



Wood Buffalo Environmental Association

MAY 2016

MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
June 24, 2016

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



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June 24, 2016

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 May 2016
Wood Buffalo Environmental Association**

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

The continuous ambient air quality monitoring network stations are:

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

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

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



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

Aboriginal Communities

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

Government and Non-Industrial Organizations

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

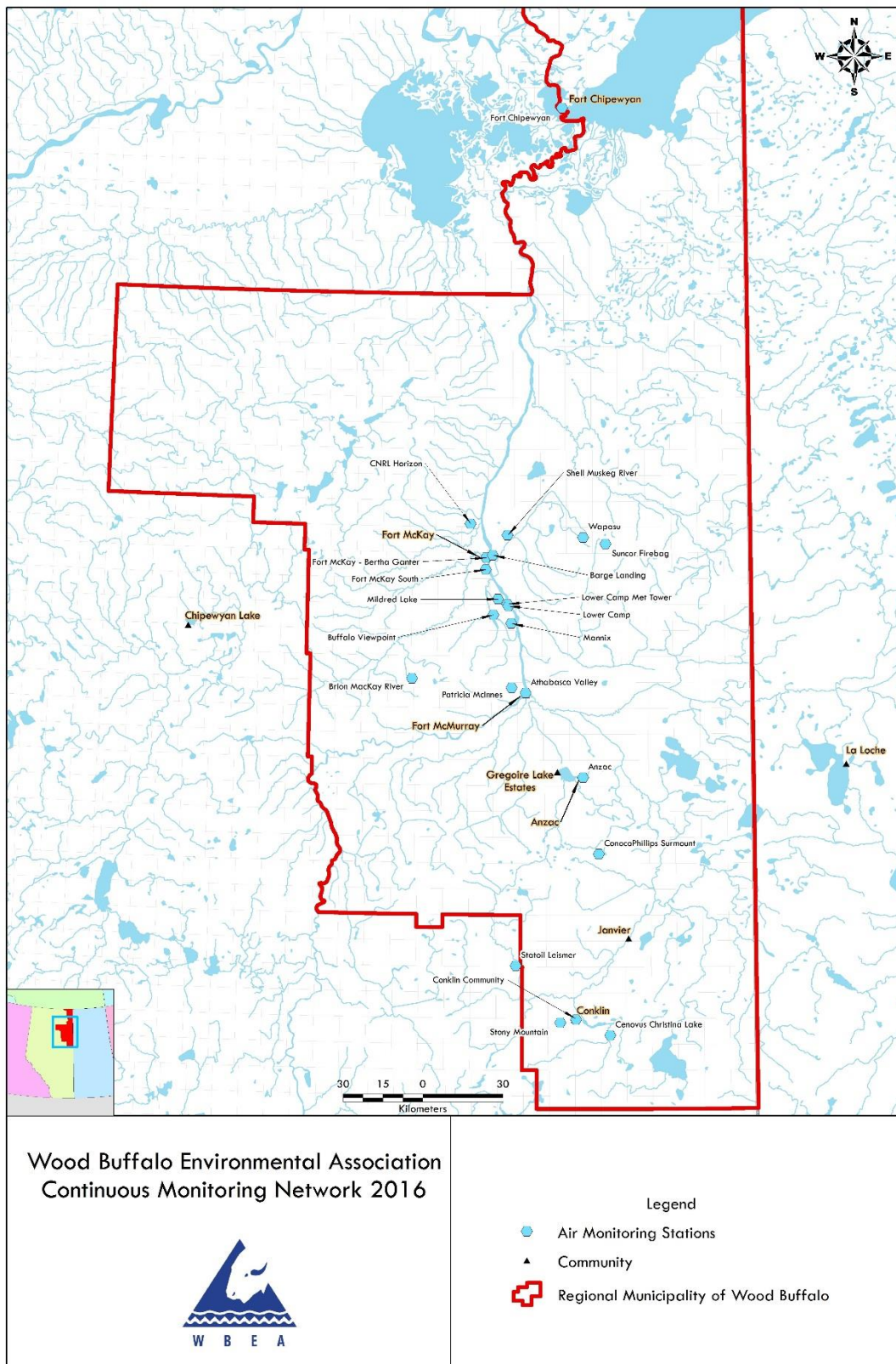


Figure 1: Map of WBEA Air Monitoring Network.

The following operational notes are provided as per the Air Monitoring Directive requirements.

1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

There were 188 ambient concentrations in excess of the air quality objectives as indicated in the Air Monitoring Directive Section III.A.3 (a & b) for H₂S, CO, NO₂, O₃, and PM_{2.5}. These are summarized following the network summary section of this report.

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 and NH₃.

1.1 Data Processing and Validation

Concentrations reported in near real-time were raw values. The final values were determined after processing of data for reporting. For all parameters except PM_{2.5}, the final 5-minute data values were determined by subtracting from the raw 5-minute data values, the daily zero responses interpolated to the time of each raw 5-minute value. The final 5-minute data values were then rounded to one decimal place greater than the reporting precision indicated in the Air Monitoring Directive (AMD). The final 1-hour data values were calculated from final 5-minute data values and then rounded to reporting precision. The final 24-hour data values were calculated from final 1-hour values.

After data processing and validation, NO₂ concentrations were re-calculated from baseline-corrected NO_x and NO concentrations. Specifically, the NO concentration was subtracted from the NO_x concentration to determine the NO₂ concentration. In cases where the NO_x and/or NO values exceeded the operating range of the analyzer, values reported for NO₂ were determined as the largest of either the difference between baseline-corrected NO_x and NO values, or the NO₂ value reported by the data acquisition system with baseline correction applied.

1.2 Revisions to AEMERA Airdata Warehouse

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

Revised H₂S calibrations from AMS 502 – ConocoPhillips Surmont are included with this report. Corrections were made to the calibration cylinder details from July 2015 to March 2016 calibration reports.

2.0 Operational Status

Continuous Monitoring

In May 2016, there were 5 incidents resulting in compliance monitoring instruments operating less than 90% of the time.

The evacuation of Fort McMurray on May 2, 2016 resulted in WBEA operating under emergency response mode; in many cases, response to issues in the field were prioritized based on staff safety and the approval of work plans through the Regional Emergency Operations Centre (REOC), affecting response time.

1. The Total Hydrocarbons (THC) analyzer at AMS 13, Fort McKay South, operated less than 90% of the time in May 2016.

There were two issues associated with the operation of the THC analyzer, resulting in 218 hours of invalid data:

- From May 16th to May 25th, particulate matter associated with forest fire smoke accumulated on the analyzer inlet filter. Specifically, THC analyzers, which utilize flame ionization detection, are sensitive to changes in sample flow and pressure. This resulted in 218 hours of invalid data.
- Sample filters were replaced and a follow up calibration occurred on May 25th.

After flagging and processing for monthly reports, data for Total Hydrocarbons was available for 71% of the month. This incident was reported to Alberta Environment and Parks on June 1st, 2016 (Trina, reference number 312136).

2. Wildfires passed through the community of Anzac on May 6, 2016. As a result of wildfires, power was interrupted at the Anzac Community air monitoring station (AMS 14) from May 6 to May 13, 2016. After flagging and processing for monthly reports, data for AMS 14 was available for 73% of the month. This incident was reported to Alberta Environment and Parks by facility operators from Nexen (reference number 312696).
3. The Total Reduced Sulphur (TRS) analyzer at AMS 15, CNRL Horizon, operated less than 90% of the time in May 2016.

There were multiple issues associated with the operation of the TRS analyzer, resulting in 193 hours of invalid data:

- From May 1st to May 2nd, 5 hours of data collection was interrupted due to communications errors. The LAN switch was replaced by the station operator on May 2nd, affecting the regular data collection of the TRS analyzer for an additional 3 hours.
- Electronic component failure (motherboard) of the TRS analyzer on May 18th resulted in 170 hours of invalid data.
- Maintenance to replace the analyzer and allow for stabilization on May 25th affected the routine operations of the TRS analyzer for 13 hours.
- Maintenance and cleaning of the sample manifold on May 26th interrupted the routine operations of the TRS analyzer for 1 hour.
- Station operator activities at the station on May 26th affected the routine operations of the TRS analyzer for 1 hour.

After flagging and processing for monthly reports, data for Total Reduced Sulphur was available for 74% of the month. This incident was reported to Alberta Environment and Parks on June 1st, 2016 (Trina, reference number 312137).

4. The Fine Particulate Matter (PM2.5) analyzer at AMS 21, Conklin Community, operated less than 90% of the time in May 2016.

There were two issues associated with the operation of the PM2.5 analyzer, resulting in 146 hours of invalid data:

- A power interruption at the station on May 5th interrupted the normal operations of all analyzers for 4 hours.
- From May 5th to May 11th, the sample pump failed to restart following automated filter tape changes, resulting in 142 hours of invalid data.

After flagging and processing for monthly reports, data for Fine Particulate Matter was available for 80% of the month. This incident was reported to Alberta Environment and Parks on June 3rd, 2016 (Raymond, reference number 312220).

5. With fires approaching the ConocoPhillips Surmont facility on May 4, 2016, power to the facility and surrounding area was de-energized. Power to the station (AMS 502 ConocoPhillips Surmont) was interrupted from May 5 to May 26, 2016. After flagging and processing for monthly reports, data for AMS 502 was available for 29% of the month. This incident was reported to Alberta Environment and Parks by facility operators from CPC (reference number 311592).

In May 2016, there were 2 incidents of a monitoring instrument not required for air quality compliance operating less than 90% of the time. Normal operations of the solar radiation and leaf wetness sensors at the Fort Chipewyan air monitoring station (AMS 8) were both invalidated for 653 hours due to intermittent electrical interference of sensor output signals.

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.

Wildfires in the Regional Municipality of Wood Buffalo (RMWB) during the month of May resulted in numerous Alberta Ambient Air Quality Exceedances (AAAQO), analyzer and station downtimes, and various effects on daily zeros, spans, and analyzer operations. The evacuation of Fort McMurray on May 2, 2016 resulted in WBEA operating under emergency response mode; in many cases, response to issues in the field were prioritized based on staff safety and the approval of work plans through the Regional Emergency Operations Centre (REOC).

While some daily zero and span responses are outside of AMD criteria, any instances of this which can be attributed to the effects of wild fire smoke have been accepted as valid data. Analyzer inlet filters have a pore size of 5.0 µm to prevent airborne particulates from entering the analyzer but with multiple, extremely high PM_{2.5} events associated with wild fire smoke, some analyzers experienced effects associated with this level of ambient particulate matter. While some span responses were suppressed, due to both the known cause of the change in analyzer performance and proven linearity during monthly calibrations, data were considered valid.

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 3 hours following the daily spans have been reported as invalid for a total of 57 hours this month.

Excessive baseline drift on May 8 affected the normal operations of the PM_{2.5} analyzer for 6 hours.

Maintenance and cleaning of the sample manifold on May 13 interrupted the normal operations of the SO₂, TRS, THC, NH₃, and NO₂ analyzers for 2 hours.

Maintenance to examine, restart the calibration system, and verify analyzers zero and span responses on May 19 interrupted the regular operations of all air quality analyzers for 1 to 3 hours.

A station power spike on May 20 affected the routine operations of the THC and O₃ analyzers for 1 hour. The O₃ analyzer operating system froze, following the power spike, resulting in 21 hours of invalid data, when the analyzer was remotely reset.

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

Sample pump fluctuations on May 17 and 27 and maintenance to restart the sample pump and verify analyzer response affected the normal operations of the THC analyzer for a total of 26 hours.

Station 3, Lower Camp B - Meteorology

No operational issues to report this month.

Station 4, Buffalo Viewpoint

Maintenance and cleaning of the sample manifold on May 3 interrupted the normal operations of the H₂S analyzer for 1 hour.

Station 5, Mannix

Due to the wildfire evacuation in Fort McMurray, a routine multipoint H₂S calibration was aborted on May 3 resulting in 3 hours of invalid data.

Maintenance to the automated calibration system and verification of daily zero/span response on May 12 interrupted the routine operations of all air quality analyzers for 1 to 2 hours.

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 33 hours this month.

Maintenance to perform as found zero and span points and change sample inlet filters on May 12 affected the routine operations of the TRS and O₃ analyzers for 2 and 4 hours respectively.

The O₃ analyzer experienced unstable operations due to wild fire smoke interferences on May 14 resulting in 1 hour of invalid data.

During the initial onset of major forest fire smoke events in the region on May 3, the filter tape of the PM_{2.5} failed to advance after reaching a filter mass threshold. The analyzer was remotely accessed to initiate a filter change and resumed normal operations.

Station 7, Athabasca Valley

Multiple instances of unstable operation due to wildfire smoke affecting the optical chamber of the PM_{2.5} analyzer resulted in 25 hours of invalid data this reporting period. An additional instance of excessive baseline drift on May 31 interrupted the routine operations of the PM_{2.5} analyzer for 3 hours.

Maintenance to replace the sample inlet filters on May 11 interrupted the routine operations of the SO₂, THC, and NO₂ analyzers for 1 hour.

Maintenance and cleaning of the sample manifold on May 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 1 hour of invalid data this reporting period.

Station 8, Fort Chipewyan

A station power interruption on May 7 affected the routine operations of the NO₂ and O₃ analyzers for 1 hour. The NO₂ analyzer required an additional 1 hour to stabilize following the power interruption.

Two instances of excessive signal noise on May 15 and May 20 affected the normal operations of the O₃ analyzer for 3 hours.

Grounding issues with the analogue signal cables of the surface leaf wetness and solar radiation sensors resulted in 653 hours of invalid data this reporting period.

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

Sample inlet filter restriction due to particulate build up from forest fire smoke affected the routine operations of the THC analyzer for 164 hours this reporting period.

Unstable operation due to baseline drift on May 13 affected the normal operations of the PM_{2.5} analyzer for 1 hour.

A power spike at the station on May 20 interrupted the routine operations of the THC analyzer for 1 hour.

Verification of the daily zero and span response on May 25 interrupted the routine operations of the SO₂, TRS, O₃, and NO₂ analyzers for 1 to 2 hours.

Station 14, Anzac

A power interruption on May 4 affected all air quality analyzers resulting in 1-2 hours of invalid data.

A station power failure on May 5 affected all parameters resulting in 183 to 186 hours of invalid data. Station power was restored May 13 with an additional 16 to 19 hours of data flagged as invalid until daily zero/span checks confirmed analyzers were performing within operational criteria.

PM_{2.5} values during wild fires on May 5 were above the data logger recording capabilities resulting in 1 hour of invalid data.

Unstable operation due to baseline drift following a daily automated tape change on May 17 affected the routine operations of the PM_{2.5} analyzer for 3 hours.

Station 15, CNRL Horizon

Multiple instances of communication errors from May 1 to 2 interrupted 5 to 16 hours of data collection from the THC, TRS, and NO₂ analyzers. The LAN switch was replaced by the station operator on May 2 interrupting the regular data collection of all parameters for 1 to 4 hours.

There were multiple issues with the operation of the TRS analyzer. Electronic component failure of the TRS analyzer on May 18 resulted in 170 hours of invalid data. Maintenance to replace and allow for stabilization on May 25 affected the routine operations of the TRS analyzer for 13 hours. Maintenance and cleaning of the sample manifold on May 26 interrupted the routine operations of the TRS analyzer for 1 hour. Station operator activities at the station on May 26 affected the routine operations of the TRS analyzer for 1 hour.

There were 2 issues with the operation of the PM_{2.5} analyzer this reporting period. Unstable operation due to foreign debris in the sample chamber on May 25 resulted in 35 hours of invalid

data. Maintenance to diagnose, repair, and clean the sample chamber on May 26 interrupted the routine operations of the PM_{2.5} analyzer for 7 hours.

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

Station 16, Shell Muskeg River

Unstable operation due to baseline drift on May 27 affected the normal operations of the SO₂ analyzer for 2 hours.

Station 17, Wapasu

Maintenance and cleaning of the sample manifold on May 3 interrupted the normal operations of the H₂S and O₃ analyzers for 2 hours.

Maintenance to confirm calibration points for the ozone calibration on May 17 interrupted the routine operations of the NO₂ analyzer for 3 hours.

Station 18, Stony Mountain

Depletion and replacement of the fuel and carrier gas cylinders at the station on May 19 affected the normal operation of the THC analyzer for 2 hours.

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

Station 19, Firebag

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

Station 20, Brion MacKay River

Maintenance to replace sample inlet filters and verify analyzers responses on May 31 interrupted the routine operations of all air quality analyzers for 2 hours.

Unstable operations due to excessive baseline drift on May 30 affected the normal operations of the H₂S analyzer for 2 hours.

Station 21, Conklin Community

A station power failure on May 5 affected all air quality analyzers resulting in 4 to 6 hours of invalid data.

A sample pump failure following the power interruption on May 5 affected the routine operation of the PM_{2.5} analyzer for 142 hours. Station operator response to this failure was delayed due to wildfires in the region and the mandatory evacuation order.

Maintenance to the calibration system and verification of analyzer response on May 20 and 28 interrupted the routine operations of the TRS analyzer for a total of 3 hours.

Depletion and replacement of the carrier gas cylinder at the station on May 26 affected the normal operation of the THC analyzer for 1 hour.

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

Station 500, Cenovus Christina Lake

No operational issues to report this month.

Station 502, ConocoPhillips Surmont

Site operations and power distribution was shut down on May 5 due to the proximity of wild fire to the CPC Surmont site. The station was off line for 516 hours, with the exception of some low power meteorological sensors and communications equipment running on battery backup (435 hours downtime). Station power was restored May 26 with an additional 14 to 19 hours of data flagged as invalid until daily zero/span checks confirmed analyzers were performing within operational criteria.

The H₂S analyzer experienced multiple instances of unstable operations due to excessive baseline drift resulting in 10 hours of invalid data this reporting period.

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

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

Yours sincerely,

Wood Buffalo Environmental Association

Mike Martineau
Data Technician

Sanjay Prasad
Air Quality Scientist

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

MAY 2016

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Prepared: Jun 23 2016 08:06

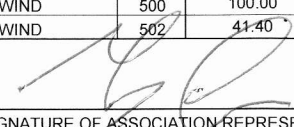
APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	5	2016					
254465-00-00	CONTINUOUS AMBIENT MONITORING						
149968-00-01							
48522-01-00							
240008-00-03				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03	SO2(ppm)	1	99.60	0.029	0	0.007	0
189942-00-02	SO2(ppm)	2	100.00	0.030	0	0.008	0
206355-00-00	SO2(ppm)	4	100.00	0.020	0	0.002	0
46586-00-00	SO2(ppm)	5	99.87	0.029	0	0.005	0
216466-00-04	SO2(ppm)	6	100.00	0.013	0	0.004	0
137467-00-00	SO2(ppm)	7	99.87	0.036	0	0.010	0
20809-01-00	SO2(ppm)	8	100.00	0.003	0	0.001	0
241311-00-00	SO2(ppm)	11	100.00	0.148	0	0.022	0
094-02-00	SO2(ppm)	13	99.87	0.029	0	0.005	0
305529-00-00	SO2(ppm)	14	72.58	0.063	0	0.005	0
026-02-00	SO2(ppm)	15	99.46	0.021	0	0.002	0
228044-00-00	SO2(ppm)	16	99.73	0.037	0	0.004	0
73203-01-00	SO2(ppm)	17	100.00	0.012	0	0.003	0
	SO2(ppm)	18	100.00	0.011	0	0.004	0
	SO2(ppm)	19	100.00	0.009	0	0.003	0
	SO2(ppm)	20	99.73	0.023	0	0.002	0
	SO2(ppm)	21	99.33	0.002	0	0.000	0
	SO2(ppm)	500	100.00	0.011	0	0.003	0
	SO2(ppm)	502	28.76	0.011	0	0.002	0
	H2S(ppm)	2	100.00	0.008	0	0.003	0
	H2S(ppm)	4	99.87	0.005	0	0.002	0
	H2S(ppm)	5	99.33	0.012	2	0.003	0
	H2S(ppm)	11	100.00	0.016	3	0.002	0
	H2S(ppm)	17	99.73	0.003	0	0.001	0
	H2S(ppm)	19	100.00	0.004	0	0.001	0
	H2S(ppm)	20	99.46	0.002	0	0.000	0
	H2S(ppm)	500	100.00	0.003	0	0.000	0
	H2S(ppm)	502	27.28	0.001	0	0.000	0
	TRS(ppm)	1	99.33	0.007	0	0.003	0
	TRS(ppm)	6	99.73	0.017	5	0.004	2
	TRS(ppm)	7	99.87	0.013	2	0.005	3
	TRS(ppm)	9	100.00	0.005	0	0.002	0
	TRS(ppm)	13	99.73	0.008	0	0.003	0
	TRS(ppm)	14	72.58	0.042	5	0.004	1
	TRS(ppm)	15	74.06	0.006	0	0.001	0
	TRS(ppm)	18	100.00	0.001	0	0.001	0
	TRS(ppm)	21	98.92	0.001	0	0.001	0
	THC(ppm)	1	99.33	4.6	-	3.1	-
	THC(ppm)	2	96.51	8.4	-	4.4	-
	THC(ppm)	4	100.00	6.6	-	3.7	-
	THC(ppm)	5	99.87	12.0	-	4.3	-
	THC(ppm)	6	100.00	8.6	-	3.6	-
	THC(ppm)	7	99.87	6.6	-	3.4	-
	THC(ppm)	9	100.00	5.8	-	3.5	-
	THC(ppm)	11	100.00	6.5	-	3.9	-
	THC(ppm)	13	70.70	7.3	-	3.6	-
	THC(ppm)	14	72.45	32.2	-	3.6	-
	THC(ppm)	15	97.45	4.8	-	2.8	-
	THC(ppm)	16	100.00	4.8	-	3.4	-
	THC(ppm)	17	100.00	4.6	-	2.8	-
	THC(ppm)	18	99.73	2.5	-	2.2	-
	THC(ppm)	19	100.00	4.7	-	3.0	-
	THC(ppm)	20	99.73	3.6	-	2.3	-
	THC(ppm)	21	99.06	2.3	-	2.0	-
	O3(ppm)	1	96.64	0.072	0	0.043	-
	O3(ppm)	6	99.33	0.291	15	0.084	-
	O3(ppm)	7	99.87	0.355	32	0.094	-

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

MAY 2016

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Prepared: Jun 23 2016 08:06

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	MONTH	YEAR					
289664-00-00	5	2016					
254465-00-00	CONTINUOUS AMBIENT MONITORING						
149968-00-01							
48522-01-00							
240008-00-03				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03							
189942-00-02							
206355-00-00	O3(ppm)	8	99.46	0.063	0	0.052	-
46586-00-00	O3(ppm)	13	99.87	0.067	0	0.041	-
216466-00-04	O3(ppm)	14	72.31	1.612	2	0.122	-
137467-00-00	O3(ppm)	17	99.73	0.077	0	0.049	-
20809-01-00	O3(ppm)	18	100.00	0.066	0	0.057	-
241311-00-02	O3(ppm)	21	99.33	0.063	0	0.050	-
094-02-00	NO2(ppm)	1	99.60	0.048	0	0.013	-
305529-00-00	NO2(ppm)	6	100.00	0.064	0	0.013	-
026-02-00	NO2(ppm)	7	99.87	0.055	0	0.016	-
228044-00-00	NO2(ppm)	8	99.73	0.014	0	0.003	-
73203-01-00	NO2(ppm)	13	99.87	0.044	0	0.010	-
	NO2(ppm)	14	72.58	0.291	1	0.019	-
	NO2(ppm)	15	98.39	0.036	0	0.007	-
	NO2(ppm)	16	100.00	0.050	0	0.016	-
	NO2(ppm)	17	99.60	0.023	0	0.007	-
	NO2(ppm)	18	100.00	0.011	0	0.004	-
	NO2(ppm)	19	100.00	0.030	0	0.010	-
	NO2(ppm)	20	99.73	0.011	0	0.002	-
	NO2(ppm)	21	99.33	0.014	0	0.003	-
	NO2(ppm)	500	100.00	0.019	0	0.005	-
	NO2(ppm)	502	28.09	0.0	0	0.0	-
	CO(ppm)	7	99.87	17.0	10	6.4	-
	NH3(ppm)	1	91.67	0.233	0	0.094	-
	NH3(ppm)	6	95.56	1.588	0	0.458	-
	PM2.5(ug/m3)	1	99.19	3151.6	-	1158.2	7
	PM2.5(ug/m3)	6	99.73	5197.9	-	1131.0	17
	PM2.5(ug/m3)	7	96.24	3261.4	-	1034.9	18
	PM2.5(ug/m3)	8	100.00	623.5	-	114.4	5
	PM2.5(ug/m3)	13	99.87	3866.6	-	1140.6	8
	PM2.5(ug/m3)	14	74.33	3182.4	-	267.3	12
	PM2.5(ug/m3)	15	94.22	2027.8	-	438.7	6
	PM2.5(ug/m3)	16	100.00	6070.2	-	1444.5	8
	PM2.5(ug/m3)	17	100.00	1238.2	-	350.3	9
	PM2.5(ug/m3)	18	100.00	389.4	-	152.6	8
	PM2.5(ug/m3)	21	80.38	353.7	-	137.0	7
	WIND	1	100.00	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	100.00	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	99.87	-	-	-	-
	WIND	8	100.00	-	-	-	-
	WIND	9	99.73	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	13	100.00	-	-	-	-
	WIND	14	75.40	-	-	-	-
	WIND	15	99.73	-	-	-	-
	WIND	16	100.00	-	-	-	-
	WIND	17	100.00	-	-	-	-
	WIND	18	99.87	-	-	-	-
	WIND	19	99.87	-	-	-	-
	WIND	20	100.00	-	-	-	-
	WIND	21	99.60	-	-	-	-
	WIND	500	100.00	-	-	-	-
	WIND	502	41.40	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE					FOR ALBERTA ENVIRONMENT USE ONLY		

Concentrations in Excess of Alberta Ambient Air Quality Objectives
(AAAQOs)
May 2016

<u>Site</u>	<u>Parameter</u>	<u>date/time</u>	<u>Reference</u>	<u>Period</u>	<u>Concentration (ppb or µg/m3)</u>		<u>Status*</u>	<u>Wind speed</u>	<u>Wind direction</u>
					<u>Reported</u>	<u>Final</u>			
AMS 1 Fort McKay	PM _{2.5}	6May 16, 24:00	311135	24hr	119	120	exc		
AMS 1 Fort McKay	PM _{2.5}	7May 16, 24:00	311142	24hr	1158	1158	exc		
AMS 1 Fort McKay	PM _{2.5}	15May 16, 24:00	311437	24hr	89	89	exc		
AMS 1 Fort McKay	PM _{2.5}	16May 16, 24:00	311487	24hr	171	171	exc		
AMS 1 Fort McKay	PM _{2.5}	17May 16, 24:00	311547	24hr	90	90	exc		
AMS 1 Fort McKay	PM _{2.5}	24May 16, 24:00	311821	24hr	38	38	exc		
AMS 1 Fort McKay	PM _{2.5}	25May 16, 24:00	311872	24hr	94	94	exc		
AMS 1 Fort McKay	TRS	7May 16, 24:00	311159	24hr	3	3	nae		
AMS 2 Mildred Lake	H ₂ S	7May 16, 24:00	311160	24hr	3	3	nae		
AMS 5 Mannix	H ₂ S	5May 16, 19:00	311071	1hr	11	11	exc	22	306
AMS 5 Mannix	H ₂ S	5May 16, 20:00	311071	1hr	12	12	exc	20	313
AMS 5 Mannix	H ₂ S	6May 16, 8:00	311087	1hr	10	10	nae	7	301
AMS 5 Mannix	H ₂ S	7May 16, 24:00	311161	24hr	3	3	nae		
AMS 6 Patricia McInnes	PM _{2.5}	2May 16, 24:00	310923	24hr	42.5	43	exc		
AMS 6 Patricia McInnes	PM _{2.5}	3May 16, 24:00	310974	24hr	282	282	exc		
AMS 6 Patricia McInnes	PM _{2.5}	4May 16, 24:00	311028	24hr	1131	1131	exc		
AMS 6 Patricia McInnes	PM _{2.5}	5May 16, 24:00	311653	24hr	64	64	exc		
AMS 6 Patricia McInnes	PM _{2.5}	6May 16, 24:00	311132	24hr	568	568	exc		
AMS 6 Patricia McInnes	PM _{2.5}	7May 16, 24:00	311141	24hr	1079	1080	exc		
AMS 6 Patricia McInnes	PM _{2.5}	8May 16, 24:00	311183	24hr	122	121	exc		
AMS 6 Patricia McInnes	PM _{2.5}	13May 16, 24:00	311391	24hr	72	73	exc		
AMS 6 Patricia McInnes	PM _{2.5}	14May 16, 24:00	311318	24hr	159	159	exc		
AMS 6 Patricia McInnes	PM _{2.5}	15May 16, 24:00	311438	24hr	425	425	exc		
AMS 6 Patricia McInnes	PM _{2.5}	16May 16, 24:00	311488	24hr	151	151	exc		
AMS 6 Patricia McInnes	PM _{2.5}	17May 16, 24:00	311548	24hr	213	213	exc		
AMS 6 Patricia McInnes	PM _{2.5}	18May 16, 24:00	311606	24hr	342	342	exc		
AMS 6 Patricia McInnes	PM _{2.5}	19May 16, 24:00	311679	24hr	49	49	exc		
AMS 6 Patricia McInnes	PM _{2.5}	20May 16, 24:00	311729	24hr	52	51	exc		
AMS 6 Patricia McInnes	PM _{2.5}	23May 16, 24:00	311780	24hr	33	33	exc		
AMS 6 Patricia McInnes	PM _{2.5}	25May 16, 24:00	311873	24hr	56	55	exc		
AMS 6 Patricia McInnes	TRS	3May 16, 24:00	310974	1hr	10	9	nae	11	220
AMS 6 Patricia McInnes	TRS	4May 16, 1:00	310974	1hr	17	17	exc	8	218
AMS 6 Patricia McInnes	TRS	4May 16, 2:00	310974	1hr	17	16	exc	5	195
AMS 6 Patricia McInnes	TRS	4May 16, 3:00	310974	1hr	12	12	exc	7	195
AMS 6 Patricia McInnes	TRS	4May 16, 4:00	310974	1hr	10	10	nae	5	238
AMS 6 Patricia McInnes	TRS	4May 16, 5:00	310974	1hr	11	11	exc	7	210
AMS 6 Patricia McInnes	TRS	4May 16, 6:00	310974	1hr	10	9	nae	13	227
AMS 6 Patricia McInnes	TRS	4May 16, 24:00	311028	24hr	5	5	exc		
AMS 6 Patricia McInnes	TRS	7May 16, 24:00	311141	24hr	4	4	exc		
AMS 6 Patricia McInnes	TRS	7May 16, 4:00	311141	1hr	10	9	nae	7	156
AMS 6 Patricia McInnes	TRS	7May 16, 6:00	311141	1hr	11	11	exc	7	161
AMS 6 Patricia McInnes	TRS	7May 16, 7:00	311141	1hr	10	10	nae	8	153
AMS 6 Patricia McInnes	TRS	7May 16, 8:00	311141	1hr	10	10	nae	6	161
AMS 6 Patricia McInnes	O ₃	3May 16, 19:00	310974	1hr	89	91	exc	15	181
AMS 6 Patricia McInnes	O ₃	3May 16, 20:00	310974	1hr	106	108	exc	13	181
AMS 6 Patricia McInnes	O ₃	3May 16, 21:00	310974	1hr	94	96	exc	14	179
AMS 6 Patricia McInnes	O ₃	3May 16, 22:00	310974	1hr	104	106	exc	16	190

Concentrations in Excess of Alberta Ambient Air Quality Objectives
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Site	Parameter	date/time	Reference	Period	Concentration (ppb or µg/m3)		Status*	Wind speed	Wind direction
					Reported	Final			
AMS 6 Patricia McInnes	O ₃	3May 16, 23:00	310974	1hr	132	140	exc	15	213
AMS 6 Patricia McInnes	O ₃	3May 16, 24:00	310974	1hr	190	192	exc	11	220
AMS 6 Patricia McInnes	O ₃	4May 16, 1:00	310974	1hr	289	291	exc	8	218
AMS 6 Patricia McInnes	O ₃	4May 16, 2:00	310974	1hr	236	239	exc	5	198
AMS 6 Patricia McInnes	O ₃	4May 16, 3:00	310974	1hr	171	173	exc	7	195
AMS 6 Patricia McInnes	O ₃	4May 16, 4:00	310974	1hr	125	128	exc	5	238
AMS 6 Patricia McInnes	O ₃	4May 16, 5:00	310974	1hr	147	149	exc	7	210
AMS 6 Patricia McInnes	O ₃	4May 16, 6:00	310974	1hr	106	109	exc	13	227
AMS 6 Patricia McInnes	O ₃	6May 16, 21:00	311132	1hr	97	99	exc	10	119
AMS 6 Patricia McInnes	O ₃	6May 16, 22:00	311132	1hr	121	123	exc	7	122
AMS 6 Patricia McInnes	O ₃	6May 16, 23:00	311132	1hr	86	88	exc	6	119
AMS 7 Athabasca Valley	PM _{2.5}	2May 16, 24:00	310923	24hr	64	64	exc		
AMS 7 Athabasca Valley	PM _{2.5}	3May 16, 24:00	310975	24hr	298	105	exc		
AMS 7 Athabasca Valley	PM _{2.5}	4May 16, 24:00	311029	24hr	550	293	exc		
AMS 7 Athabasca Valley	PM _{2.5}	5May 16, 24:00	311654	24hr	103	103	exc		
AMS 7 Athabasca Valley	PM _{2.5}	6May 16, 24:00	311083	24hr	521	385	exc		
AMS 7 Athabasca Valley	PM _{2.5}	7May 16, 24:00	311140	24hr	1141	1035	exc		
AMS 7 Athabasca Valley	PM _{2.5}	8May 16, 24:00	311184	24hr	130	101	exc		
AMS 7 Athabasca Valley	PM _{2.5}	10May 16, 24:00	311261	24hr	52	52	exc		
AMS 7 Athabasca Valley	PM _{2.5}	13May 16, 24:00	311392	24hr	342	342	exc		
AMS 7 Athabasca Valley	PM _{2.5}	14May 16, 24:00	311417	24hr	561	561	exc		
AMS 7 Athabasca Valley	PM _{2.5}	15May 16, 24:00	311439	24hr	725	725	exc		
AMS 7 Athabasca Valley	PM _{2.5}	16May 16, 24:00	311489	24hr	376	358	exc		
AMS 7 Athabasca Valley	PM _{2.5}	17May 16, 24:00	311549	24hr	258	258	exc		
AMS 7 Athabasca Valley	PM _{2.5}	18May 16, 24:00	311607	24hr	196	196	exc		
AMS 7 Athabasca Valley	PM _{2.5}	20May 16, 24:00	311730	24hr	83	83	exc		
AMS 7 Athabasca Valley	PM _{2.5}	23May 16, 24:00	311781	24hr	49	49	exc		
AMS 7 Athabasca Valley	PM _{2.5}	24May 16, 24:00	311822	24hr	66	66	exc		
AMS 7 Athabasca Valley	PM _{2.5}	25May 16, 24:00	311874	24hr	80	80	exc		
AMS 7 Athabasca Valley	TRS	4May 16, 24:00	311029	24hr	4	3	nae		
AMS 7 Athabasca Valley	TRS	6May 16, 24:00	311083	24hr	4	4	exc		
AMS 7 Athabasca Valley	TRS	7May 16, 24:00	311140	24hr	4	4	exc		
AMS 7 Athabasca Valley	TRS	7May 16, 1:00	311140	1hr	10	9	nae	6	166
AMS 7 Athabasca Valley	TRS	7May 16, 2:00	311140	1hr	10	10	nae	7	150
AMS 7 Athabasca Valley	TRS	7May 16, 3:00	311140	1hr	10	10	nae	6	161
AMS 7 Athabasca Valley	TRS	14May 16, 24:00	311397	24hr	4	3	nae		
AMS 7 Athabasca Valley	TRS	14May 16, 6:00	311397	1hr	12	12	exc	3	119
AMS 7 Athabasca Valley	TRS	14May 16, 7:00	311397	1hr	10	9	nae	6	128
AMS 7 Athabasca Valley	TRS	15May 16, 24:00	311423	24hr	4	5	exc		
AMS 7 Athabasca Valley	TRS	15May 16, 5:00	311423	1hr	13	13	exc	4	137
AMS 7 Athabasca Valley	TRS	15May 16, 6:00	311423	1hr	10	10	nae	5	135
AMS 7 Athabasca Valley	TRS	15May 16, 10:00	311423	1hr	10	10	nae	5	101
AMS 7 Athabasca Valley	TRS	16May 16, 24:00	311489	24hr	3	3	nae		
AMS 7 Athabasca Valley	O ₃	3May 16, 19:00	310975	1hr	151	152	exc	13	214
AMS 7 Athabasca Valley	O ₃	3May 16, 20:00	310975	1hr	166	167	exc	10	209
AMS 7 Athabasca Valley	O ₃	3May 16, 21:00	310975	1hr	319	320	exc	14	214
AMS 7 Athabasca Valley	O ₃	3May 16, 22:00	310975	1hr	354	355	exc	13	203
AMS 7 Athabasca Valley	O ₃	3May 16, 23:00	310975	1hr	228	229	exc	10	227
AMS 7 Athabasca Valley	O ₃	3May 16, 24:00	310975	1hr	212	213	exc	9	162
AMS 7 Athabasca Valley	O ₃	4May 16, 1:00	310975	1hr	205	206	exc	5	149
AMS 7 Athabasca Valley	O ₃	4May 16, 2:00	310975	1hr	203	205	exc	3	208

Concentrations in Excess of Alberta Ambient Air Quality Objectives
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Site	Parameter	date/time	Reference	Period	Concentration (ppb or		Status*	Wind speed	Wind direction
					Reported	Final			
AMS 7 Athabasca Valley	O ₃	4May 16, 3:00	310975	1hr	154	155	exc	4	173
AMS 7 Athabasca Valley	O ₃	4May 16, 4:00	310975	1hr	185	186	exc	4	175
AMS 7 Athabasca Valley	O ₃	4May 16, 5:00	310975	1hr	148	150	exc	6	144
AMS 7 Athabasca Valley	O ₃	4May 16, 6:00	310975	1hr	110	111	exc	6	132
AMS 7 Athabasca Valley	O ₃	4May 16, 7:00	310975	1hr	103	105	exc	10	145
AMS 7 Athabasca Valley	O ₃	4May 16, 8:00	310975	1hr	96	98	exc	9	126
AMS 7 Athabasca Valley	O ₃	4May 16, 9:00	310975	1hr	119	120	exc	7	133
AMS 7 Athabasca Valley	O ₃	4May 16, 10:00	310975	1hr	177	179	exc	7	132
AMS 7 Athabasca Valley	O ₃	4May 16, 11:00	310975	1hr	101	103	exc	10	209
AMS 7 Athabasca Valley	O ₃	5May 16, 22:00	311079	1hr	84	86	exc	21	330
AMS 7 Athabasca Valley	O ₃	6May 16, 4:00	311083	1hr	99	101	exc	7	218
AMS 7 Athabasca Valley	O ₃	6May 16, 8:00	311083	1hr	117	118	exc	6	1120
AMS 7 Athabasca Valley	O ₃	6May 16, 9:00	311083	1hr	128	129	exc	5	102
AMS 7 Athabasca Valley	O ₃	6May 16, 20:00	311083	1hr	103	105	exc	11	138
AMS 7 Athabasca Valley	O ₃	6May 16, 21:00	311083	1hr	154	155	exc	12	136
AMS 7 Athabasca Valley	O ₃	6May 16, 22:00	311083	1hr	178	179	exc	11	145
AMS 7 Athabasca Valley	O ₃	6May 16, 23:00	311083	1hr	173	174	exc	9	153
AMS 7 Athabasca Valley	O ₃	6May 16, 00:00	311083	1hr	157	159	exc	8	160
AMS 7 Athabasca Valley	O ₃	7May 16, 1:00	311140	1hr	148	148	exc	6	166
AMS 7 Athabasca Valley	O ₃	7May 16, 2:00	311140	1hr	143	145	exc	7	150
AMS 7 Athabasca Valley	O ₃	7May 16, 3:00	311140	1hr	138	138	exc	6	160
AMS 7 Athabasca Valley	O ₃	7May 16, 4:00	311140	1hr	118	119	exc	9	149
AMS 7 Athabasca Valley	O ₃	7May 16, 5:00	311140	1hr	90	91	exc	11	148
AMS 7 Athabasca Valley	O ₃	7May 16, 8:00	311140	1hr	84	85	exc	12	143
AMS 7 Athabasca Valley	CO	3May 16, 21:00	311640	1hr	14	14	exc	14	213
AMS 7 Athabasca Valley	CO	3May 16, 22:00	311640	1hr	16	16	exc	13	203
AMS 7 Athabasca Valley	CO	4May 16, 2:00	311641	1hr	15	15	exc	1	212
AMS 7 Athabasca Valley	CO	4May 16, 4:00	311641	1hr	14	13	nae	3	173
AMS 7 Athabasca Valley	CO	6May 16, 22:00	311643	1hr	14	13	nae	11	144
AMS 7 Athabasca Valley	CO	6May 16, 23:00	311643	1hr	15	15	exc	9	153
AMS 7 Athabasca Valley	CO	6May 16, 00:00	311643	1hr	16	15	exc	8	160
AMS 7 Athabasca Valley	CO	7May 16, 1:00	311644	1hr	16	16	exc	6	166
AMS 7 Athabasca Valley	CO	7May 16, 2:00	311644	1hr	17	17	exc	7	149
AMS 7 Athabasca Valley	CO	7May 16, 3:00	311644	1hr	17	17	exc	6	160
AMS 7 Athabasca Valley	CO	7May 16, 4:00	311644	1hr	15	14	exc	9	148
AMS 7 Athabasca Valley	CO	14May 16, 6:00	311397	1hr	13	13	nae	3	119
AMS 7 Athabasca Valley	CO	15May 16, 5:00	311423	1hr	14	14	exc	4	138
AMS 8 Fort Chipewyan	PM _{2.5}	7May 16, 24:00	311655	24hr	74	75	exc		
AMS 8 Fort Chipewyan	PM _{2.5}	16May 16, 24:00	311490	24hr	60	61	exc		
AMS 8 Fort Chipewyan	PM _{2.5}	17May 16, 24:00	311550	24hr	98	99	exc		
AMS 8 Fort Chipewyan	PM _{2.5}	24May 16, 24:00	311823	24hr	114	114	exc		
AMS 8 Fort Chipewyan	PM _{2.5}	25May 16, 24:00	311875	24hr	46	47	exc		
AMS 11 Lower Camp	H ₂ S	17May 16, 23:00	311546	1hr	11	11	exc	5	209
AMS 11 Lower Camp	H ₂ S	27May 16, 18:00	311968	1hr	16	16	exc	10	162
AMS 11 Lower Camp	H ₂ S	28May 16, 23:00	311990	1hr	11	16	exc	4	218
AMS 13 Fort McKay South	PM _{2.5}	4May 16, 24:00	311030	24hr	33	33	exc		
AMS 13 Fort McKay South	PM _{2.5}	6May 16, 24:00	311136	24hr	176	176	exc		
AMS 13 Fort McKay South	PM _{2.5}	7May 16, 24:00	311656	24hr	1138	1141	exc		
AMS 13 Fort McKay South	PM _{2.5}	15May 16, 24:00	311440	24hr	104	104	exc		
AMS 13 Fort McKay South	PM _{2.5}	16May 16, 24:00	311491	24hr	158	156	exc		
AMS 13 Fort McKay South	PM _{2.5}	17May 16, 24:00	311551	24hr	67	67	exc		

Concentrations in Excess of Alberta Ambient Air Quality Objectives
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May 2016

Site	Parameter	date/time	Reference	Period	Concentration (ppb or		Status*	Wind speed	Wind direction
					Reported	Final			
AMS 13 Fort McKay South	PM _{2.5}	24May 16, 24:00	311824	24hr	33	33	exc		
AMS 13 Fort McKay South	PM _{2.5}	25May 16, 24:00	311876	24hr	73	73	exc		
AMS 14 Anzac	O ₃	5May 16, 22:00	311081	1hr	1613	1612	exc	23	360
AMS 14 Anzac	O ₃	5May 16, 23:00	311081	1hr	139	138	exc	11	25
AMS 14 Anzac	O ₃	5May 16, 24:00	311081	1hr	119	-	nae	11	346
AMS 14 Anzac	PM _{2.5}	5May 16, 24:00	311080	24hr	656	223	exc		
AMS 14 Anzac	PM _{2.5}	14May 16, 24:00	311658	24hr	267	267	exc		
AMS 14 Anzac	PM _{2.5}	15May 16, 24:00	311441	24hr	267	267	exc		
AMS 14 Anzac	PM _{2.5}	16May 16, 24:00	311492	24hr	42	42	exc		
AMS 14 Anzac	PM _{2.5}	17May 16, 24:00	311552	24hr	50	52	exc		
AMS 14 Anzac	PM _{2.5}	18May 16, 24:00	311608	24hr	62	67	exc		
AMS 14 Anzac	PM _{2.5}	19May 16, 24:00	311680	24hr	50	50	exc		
AMS 14 Anzac	PM _{2.5}	20May 16, 24:00	311731	24hr	40	40	exc		
AMS 14 Anzac	PM _{2.5}	21May 16, 24:00	311748	24hr	46	46	exc		
AMS 14 Anzac	PM _{2.5}	24May 16, 24:00	311825	24hr	60	60	exc		
AMS 14 Anzac	PM _{2.5}	25May 16, 24:00	311877	24hr	73	73	exc		
AMS 14 Anzac	PM _{2.5}	26May 16, 24:00	311926	24hr	84	84	exc		
AMS 14 Anzac	TRS	5May 16, 22:00	311080	1hr	42	42	exc	23	3
AMS 14 Anzac	TRS	5May 16, 23:00	311080	1hr	12	12	exc	12	27
AMS 14 Anzac	TRS	14May 16, 2:00	311395	1hr	11	-	nae	3	238
AMS 14 Anzac	TRS	14May 16, 3:00	311395	1hr	10	-	nae	3	230
AMS 14 Anzac	TRS	15May 16, 24:00	311422	24hr	4	4.1	exc		
AMS 14 Anzac	TRS	15May 16, 3:00	311422	1hr	11	11	exc	4	274
AMS 14 Anzac	TRS	15May 16, 4:00	311422	1hr	12	12	exc	4	304
AMS 14 Anzac	TRS	15May 16, 5:00	311422	1hr	15	15	exc	3	297
AMS 14 Anzac	NO ₂	6May 16, 22:00	311080	1hr	291	291	exc	23	3
AMS 15 CNRL Horizon	PM _{2.5}	6May 16, 24:00	311137	24hr	34	34	exc		
AMS 15 CNRL Horizon	PM _{2.5}	7May 16, 24:00	311657	24hr	439	439	exc		
AMS 15 CNRL Horizon	PM _{2.5}	15May 16, 24:00	311442	24hr	48	48	exc		
AMS 15 CNRL Horizon	PM _{2.5}	16May 16, 24:00	311493	24hr	117	117	exc		
AMS 15 CNRL Horizon	PM _{2.5}	17May 16, 24:00	311553	24hr	109	109	exc		
AMS 15 CNRL Horizon	PM _{2.5}	24May 16, 24:00	311826	24hr	32	33	exc		
AMS 15 CNRL Horizon	PM _{2.5}	25May 16, 24:00	311878	24hr	79	-	nae		
AMS 15 CNRL Horizon	PM _{2.5}	26May 16, 24:00	311927	24hr	34	-	nae		
AMS 16 Shell Muskeg River	PM _{2.5}	4May 16, 24:00	311031	24hr	49	49	exc		
AMS 16 Shell Muskeg River	PM _{2.5}	6May 16, 24:00	311138	24hr	349	349	exc		
AMS 16 Shell Muskeg River	PM _{2.5}	7May 16, 24:00	311165	24hr	1444	1445	exc		
AMS 16 Shell Muskeg River	PM _{2.5}	15May 16, 24:00	311443	24hr	81	81	exc		
AMS 16 Shell Muskeg River	PM _{2.5}	16May 16, 24:00	311494	24hr	221	221	exc		
AMS 16 Shell Muskeg River	PM _{2.5}	17May 16, 24:00	311554	24hr	107	107	exc		
AMS 16 Shell Muskeg River	PM _{2.5}	18May 16, 24:00	311609	24hr	30	22	nae		
AMS 16 Shell Muskeg River	PM _{2.5}	24May 16, 24:00	311827	24hr	49	49	exc		
AMS 16 Shell Muskeg River	PM _{2.5}	25May 16, 24:00	311879	24hr	56	56	exc		
AMS 17 Wapasu Creek	PM _{2.5}	4May 16, 24:00	311032	24hr	120	120	exc		
AMS 17 Wapasu Creek	PM _{2.5}	6May 16, 24:00	311139	24hr	74	75	exc		
AMS 17 Wapasu Creek	PM _{2.5}	7May 16, 24:00	311166	24hr	191	190	exc		
AMS 17 Wapasu Creek	PM _{2.5}	15May 16, 24:00	311444	24hr	86	86	exc		

Concentrations in Excess of Alberta Ambient Air Quality Objectives
(AAAQOs)
May 2016

Site	Parameter	date/time	Reference	Period	Concentration (ppb or		Status*	Wind speed	Wind direction
					Reported	Final			
AMS 17 Wapasu Creek	PM _{2.5}	16May 16, 24:00	311495	24hr	233	233	exc		
AMS 17 Wapasu Creek	PM _{2.5}	17May 16, 24:00	311555	24hr	350	350	exc		
AMS 17 Wapasu Creek	PM _{2.5}	18May 16, 24:00	311610	24hr	167	165	exc		
AMS 17 Wapasu Creek	PM _{2.5}	24May 16, 24:00	311828	24hr	136	136	exc		
AMS 17 Wapasu Creek	PM _{2.5}	25May 16, 24:00	311880	24hr	103	103	exc		
AMS 18 Conklin Lookout	PM _{2.5}	11May 16, 24:00	311349	24hr	53	53	exc		
AMS 18 Conklin Lookout	PM _{2.5}	12May 16, 24:00	311349	24hr	84	84	exc		
AMS 18 Conklin Lookout	PM _{2.5}	13May 16, 24:00	311393	24hr	65	65	exc		
AMS 18 Conklin Lookout	PM _{2.5}	14May 16, 24:00	311419	24hr	42	42	exc		
AMS 18 Conklin Lookout	PM _{2.5}	15May 16, 24:00	311445	24hr	70	70	exc		
AMS 18 Conklin Lookout	PM _{2.5}	19May 16, 24:00	311682	24hr	153	153	exc		
AMS 18 Conklin Lookout	PM _{2.5}	21May 16, 24:00	311746	24hr	38	38	exc		
AMS 18 Conklin Lookout	PM _{2.5}	26May 16, 24:00	311928	24hr	37	37	exc		
AMS 21 Conklin Community	PM _{2.5}	12May 16, 24:00	311150	24Hr	80	80	exc		
AMS 21 Conklin Community	PM _{2.5}	13May 16, 24:00	311394	24hr	57	57	exc		
AMS 21 Conklin Community	PM _{2.5}	14May 16, 24:00	311420	24hr	45	45	exc		
AMS 21 Conklin Community	PM _{2.5}	15May 16, 24:00	311446	24hr	62	62	exc		
AMS 21 Conklin Community	PM _{2.5}	19May 16, 24:00	311681	24hr	137	137	exc		
AMS 21 Conklin Community	PM _{2.5}	21May 16, 24:00	311747	24hr	31	31	exc		
AMS 21 Conklin Community	PM _{2.5}	26May 16, 24:00	311929	24hr	32	32	exc		

*status legend:

late	exceedance, raw values were not found to be in exceedance in real time, and/or were not reported, but final
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



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
MAY 2016

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

June 24, 2016



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	34	37	99.60	29	0	7	0
TRS(ppb) Average	705	34	39	99.33	7	0	3	0
THC(ppm) Average	705	34	39	99.33	4.6	-	3.1	-
NMHC(ppm) Average	705	34	39	99.33	1.744	-	0.738	-
CH4(ppm) Average	705	34	39	99.33	3	-	2.4	-
O3 (ppb) Average	686	33	58	96.64	72	0	43	-
NO2 (ppb) Average	705	36	39	99.60	48	0	13	-
NO (ppb) Average	705	36	39	99.60	37	-	2	-
NOX (ppb) Average	705	36	39	99.60	52	-	14	-
NH3 (ppb) Average	642	40	102	91.67	233	0	94	-
PM2.5 (ug/m3) Average	736	2	8	99.19	3151.6	-	1158.2	7
Wind Speed 10 m (km/h) Average	744	0	0	100.00	21	-	16	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	33.8	-	22.2	-
Temperature 10 m (C) Average	744	0	0	100.00	33	-	23.3	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	88	-
Precipitation (mm) Total	744	0	0	100.00	6.3	-	12.1	-
Leaf Wetness (% of range) Average	744	0	0	100.00	43	-	10	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	958	-	334	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.6	2	-	0	0	0	0	0	1	29
TRS (ppb) Average	705	0.6	1	-	0	0	0	0	1	1	7
THC (ppm) Average	705	2.02	0.3	-	1.9	1.9	1.9	1.9	2	2.2	4.6
NMHC(ppm) Average	705	0.056	0.187	-	0	0	0	0	0	0.2	1.744
CH4(ppm) Average	705	1.97	0.1	-	1.9	1.9	1.9	1.9	2	2.1	3
O3 (ppb) Average	686	30	14	-	1	12	19	29	42	48	72
NO2 (ppb) Average	705	2.4	4	-	0	0	0	1	3	6	48
NO (ppb) Average	705	0.4	2	-	0	0	0	0	0	1	37
NOX (ppb) Average	705	2.8	5	-	0	0	0	1	3	7	52
NH3 (ppb) Average	642	6.1	24	-	0	0	0	0	0	15	233
PM2.5 (ug/m3) Average	736	62.58	313.8	-	0	0.7	1.4	3.8	12.6	84.9	3151.6
Wind Speed 10 m (km/h) Average	744	7.9	4	-	0	3	4	7	11	14	21
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	13.06	7.3	-	-2.7	4.4	7.8	12.2	18	23	33.8
Temperature 10 m (C) Average	744	13.41	6.7	-	-0.1	5.1	8.3	12.5	17.8	23	33
Relative Humidity (%) Average	744	57	26	-	12	21	33	58	80	91	99
Precipitation (mm) Total	744	-	-	35.71	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	1	6	-	-2	-2	-1	-1	0	5	43
Global Solar Radiation (W/m2) Average	744	223.3	266	-	0	0	0	85	419	686	958

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	13 May 2016 07:00	13 May 2016 08:00	2	Maintenance - manifold cleaning
SO2	19 May 2016 11:00	19 May 2016 11:00	1	Maintenance - verify daily QA response
TRS	19 May 2016 08:00	19 May 2016 09:00	2	Maintenance - verify daily QA response
TRS	19 May 2016 12:00	19 May 2016 12:00	1	Maintenance - verify daily QA response
NMHC, CH4, THC	19 May 2016 10:00	19 May 2016 11:00	2	Maintenance - verify daily QA response
NMHC, CH4, THC	20 May 2016 13:00	20 May 2016 13:00	1	Power spike
O3	19 May 2016 09:00	19 May 2016 09:00	1	Maintenance - verify daily QA response
O3	19 May 2016 12:00	19 May 2016 13:00	2	Maintenance - verify daily QA response
O3	20 May 2016 13:00	20 May 2016 13:00	1	Power spike
O3	20 May 2016 14:00	21 May 2016 10:00	21	Analyzer failure - frozen from power spike
NO2, NO, NOX	19 May 2016 11:00	19 May 2016 11:00	1	Maintenance - verify daily QA response
NH3	01 May 2016 05:00	31 May 2016 06:00	57	Stabilization after daily span
NH3	19 May 2016 09:00	19 May 2016 09:00	1	Maintenance - verify daily QA response
NH3	19 May 2016 13:00	19 May 2016 14:00	2	Maintenance - verify daily QA response
PM2.5	08 May 2016 23:00	09 May 2016 04:00	6	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

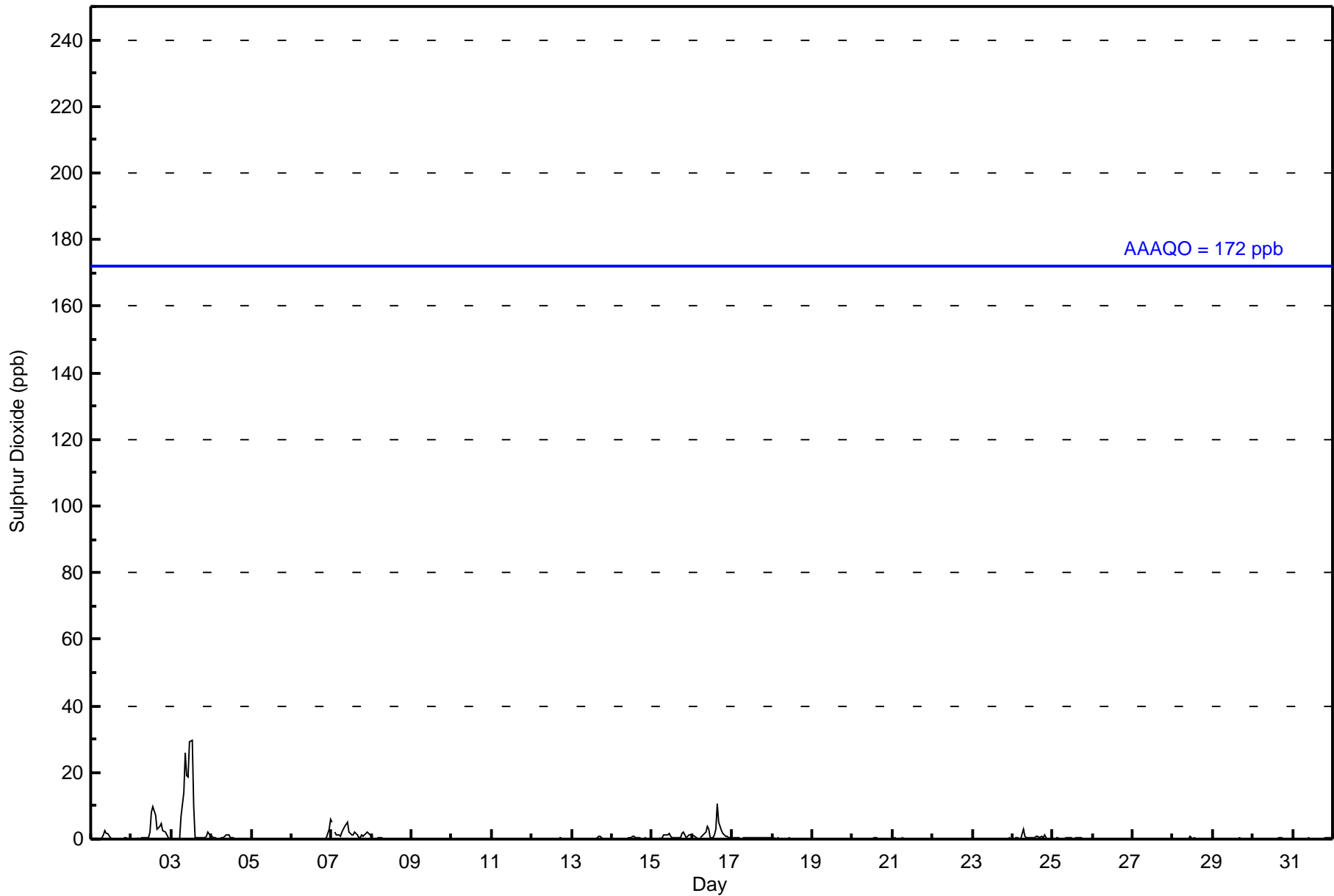
Fort McKay - Bertha Ganter - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 29 ppb on May 3 13:00										Maximum Daily Average: 7.0 ppb on May 3										Hours of Data: 707																													
Minimum Value: 0 ppb on May 9 14:00										Minimum Daily Average: 0.0 ppb on May 10										Hours of Missing Data: 37																													
Maximum Diurnal Average: 1.4 ppb at hour 13										Minimum Diurnal Average: 0.2 ppb at hour 5										Hours of Calibration: 34																													
Monthly Average: 0.6 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 9										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-May	0	Z	0	0	0	0	0	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																						
2-May	0	0	Z	0	0	0	0	0	0	0	0	2	8	10	7	3	3	4	5	3	2	1	0	0	2.2	10																							
3-May	0	0	0	Z	0	0	7	14	26	19	19	29	29	10	1	1	0	0	0	0	0	1	2	1	7.0	29																							
4-May	1	1	1	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	0.5	6																						
7-May	5	Z	2	1	1	1	2	3	4	5	2	2	1	1	2	1	0	0	1	1	2	2	2	1	1.9	5																							
8-May	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																							
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
12-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	C	C	C	1	0	0	0	0	0	0	0	0.2	1																							
13-May	0	Z	0	0	0	0	M	M	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.2	1																							
14-May	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																							
15-May	0	0	0	Z	0	0	1	1	1	1	2	1	0	0	0	0	0	1	2	2	1	1	1	1	0.8	2																							
16-May	1	1	0	0	Z	1	1	2	2	4	3	0	0	1	3	11	5	2	2	1	1	1	0	0	1.9	11																							
17-May	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
18-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
19-May	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																							
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
24-May	Z	1	0	0	0	0	3	1	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0.6	3																							
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
28-May	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
30-May	Z	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																							
31-May	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	0.2	1																						
																								0.4	0.2	0.2	0.2	0.2	0.2	0.6	0.8	1.3	1.2	1.1	1.2	1.4	0.9	0.6	0.7	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.4	Diurnal Average	
																								5	1	2	1	1	1	7	14	26	19	19	29	29	10	7	11	5	4	5	3	2	2	3	6	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	700	99.01	99.01
11 - 20	4	0.57	99.58
21 - 60	3	0.42	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



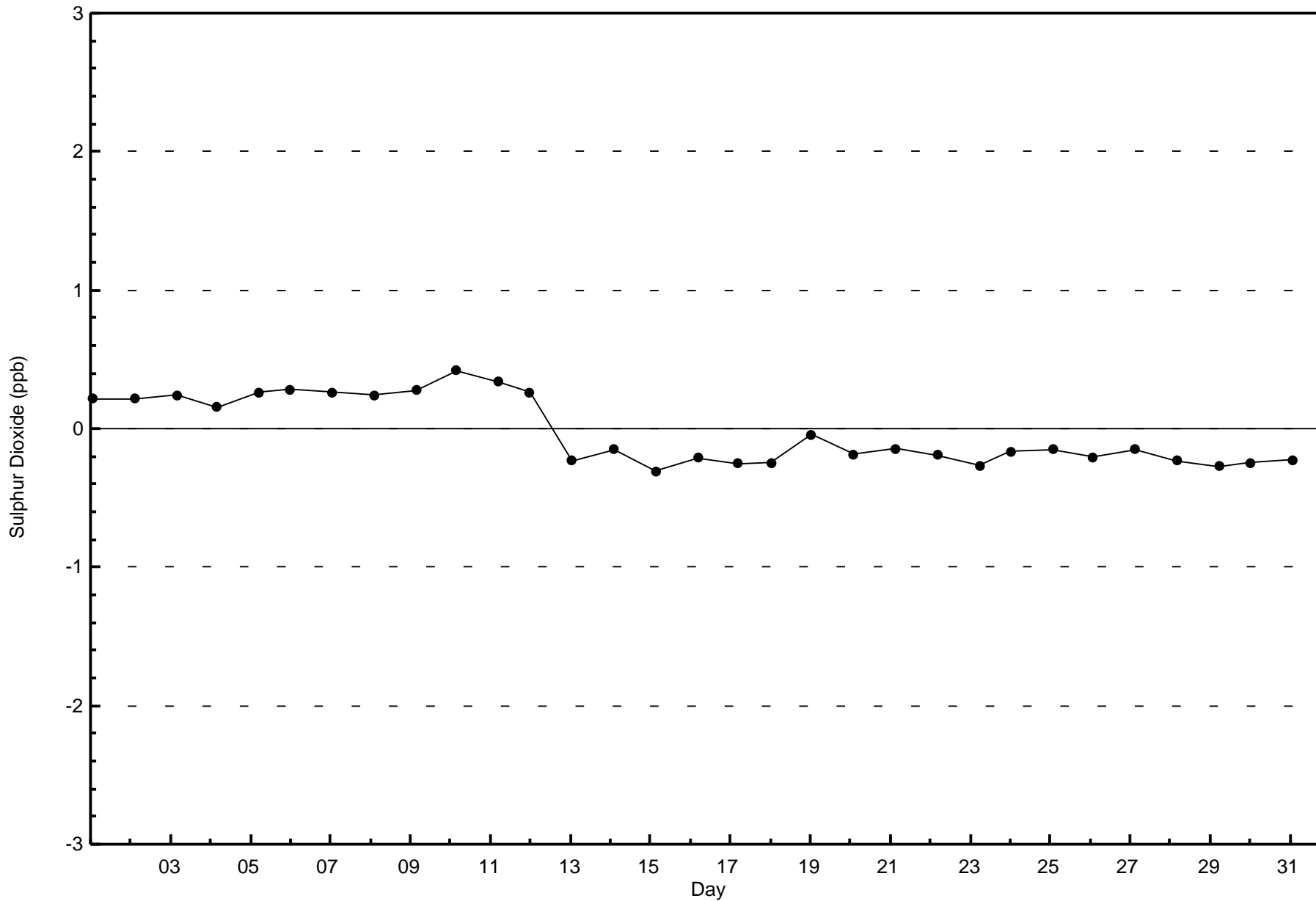
**Wood Buffalo Environmental Association
Frequency Distribution**

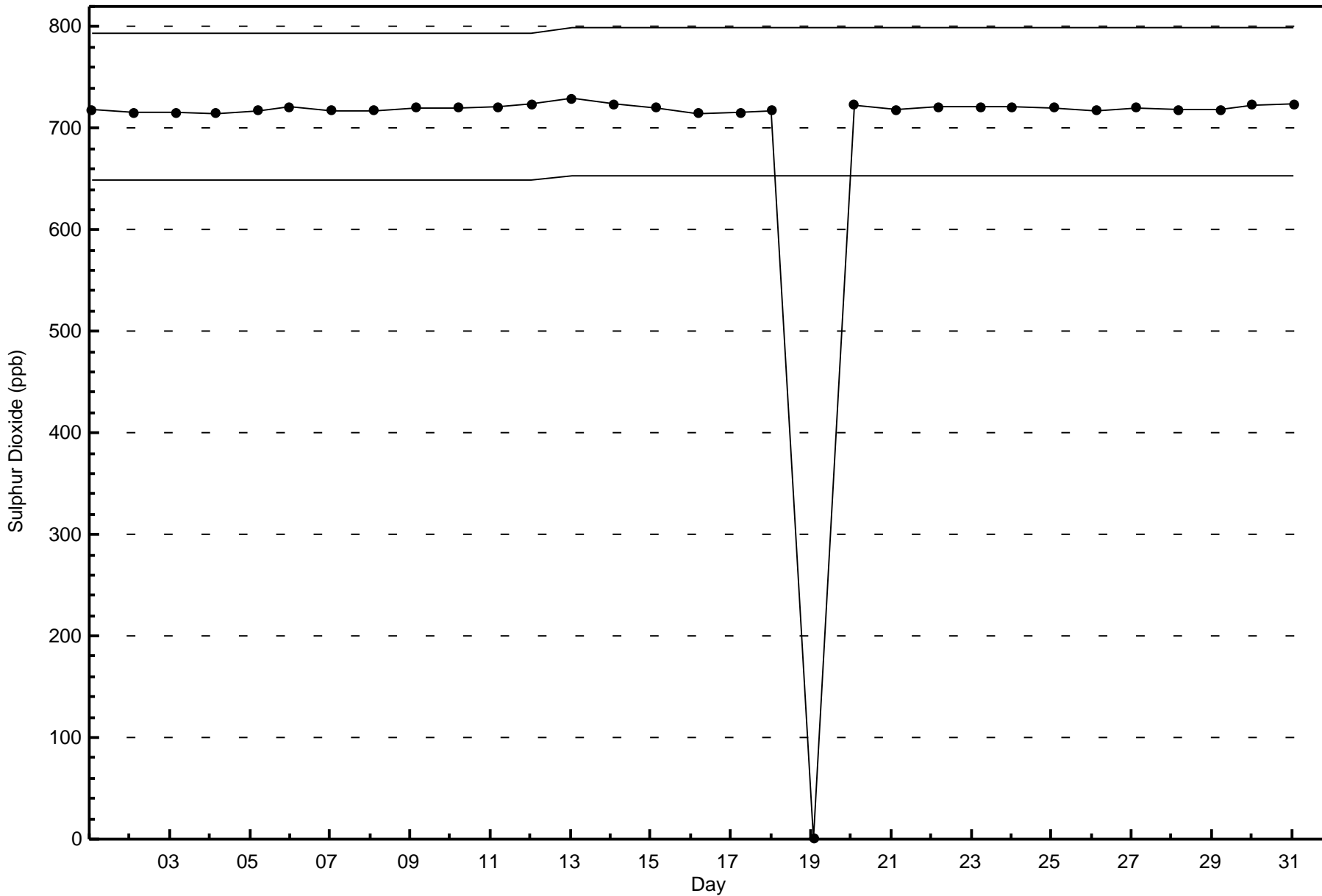
**Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	146	52	22	20	8	8	24	69	54	45	26	28	35	60	62	41	700
11 - 20	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	4
21 - 60	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	146	52	22	20	8	8	24	75	55	45	26	28	35	60	62	41	707

Total Number of Valid Hours: 707

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on May 7 01:00	Maximum Daily Average: 3.3 ppb on May 7		Hours of Data:	705
Minimum Value: 0 ppb on May 29 10:00	Minimum Daily Average: 0.3 ppb on May 29		Hours of Missing Data:	39
Maximum Diurnal Average: 0.9 ppb at hour 8	Minimum Diurnal Average: 0.4 ppb at hour 18		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 = 5		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-May	0	0	Z	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	2
2-May	1	1	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1
3-May	1	1	1	1	Z	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0.8	2
4-May	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0.7	5
7-May	7	6	5	6	6	5	6	7	6	6	3	2	Z	1	1	1	1	1	1	1	1	2	2	1	3.3	7
8-May	1	1	1	Z	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0.6	2
9-May	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-May	0	0	0	0	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
11-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
12-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
13-May	0	0	Z	0	0	0	M	M	C	C	C	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
14-May	0	1	1	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0.5	1
15-May	0	0	0	0	Z	0	1	1	2	3	3	1	1	1	1	0	1	1	1	1	1	1	2	2	1.0	3
16-May	2	2	2	2	1	Z	2	2	2	3	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1.3	3
17-May	1	1	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
18-May	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.5	1
19-May	0	0	Z	0	0	0	0	M	M	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
24-May	1	Z	1	1	1	1	2	1	1	0	1	1	0	0	1	0	0	1	1	1	1	0	0	0	0.7	2
25-May	1	2	Z	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	2
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
27-May	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0.4	1
28-May	0	0	0	0	0	Z	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1
29-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1

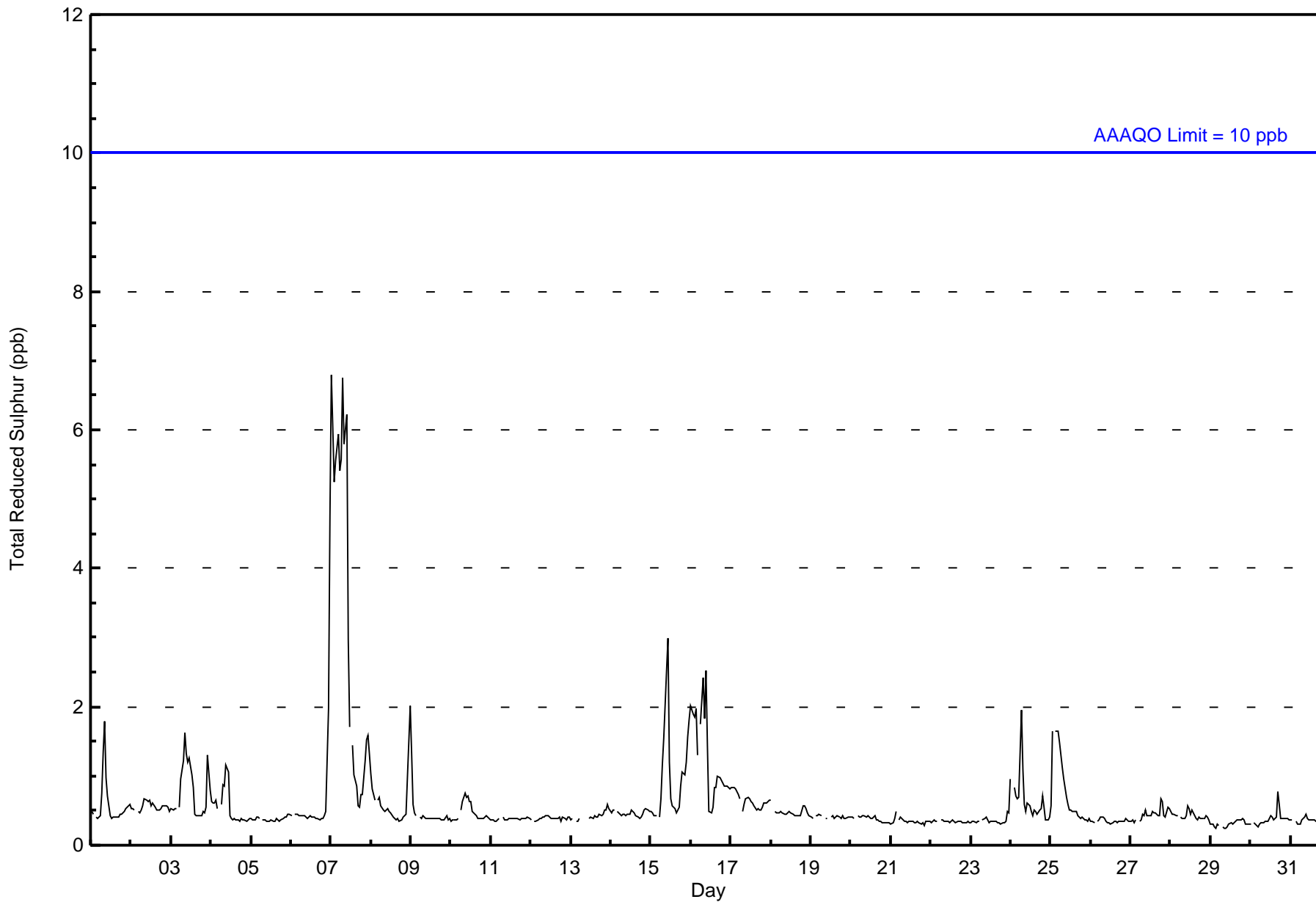
0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.9	0.8	0.8	0.7	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.7	Diurnal Average
7	6	5	6	6	5	6	7	6	6	3	2	1	1	1	1	1	1	1	1	1	1	1	2	2	5	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	690	97.87	97.87
3 - 4	4	0.57	98.44
5 - 7	11	1.56	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	145	50	25	20	8	7	22	69	52	37	24	29	36	60	59	47	690
3 - 4	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	4
5 - 7	0	0	0	0	0	0	2	3	4	1	0	1	0	0	0	0	11
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	145	50	25	20	8	7	24	75	56	39	24	30	36	60	59	47	705

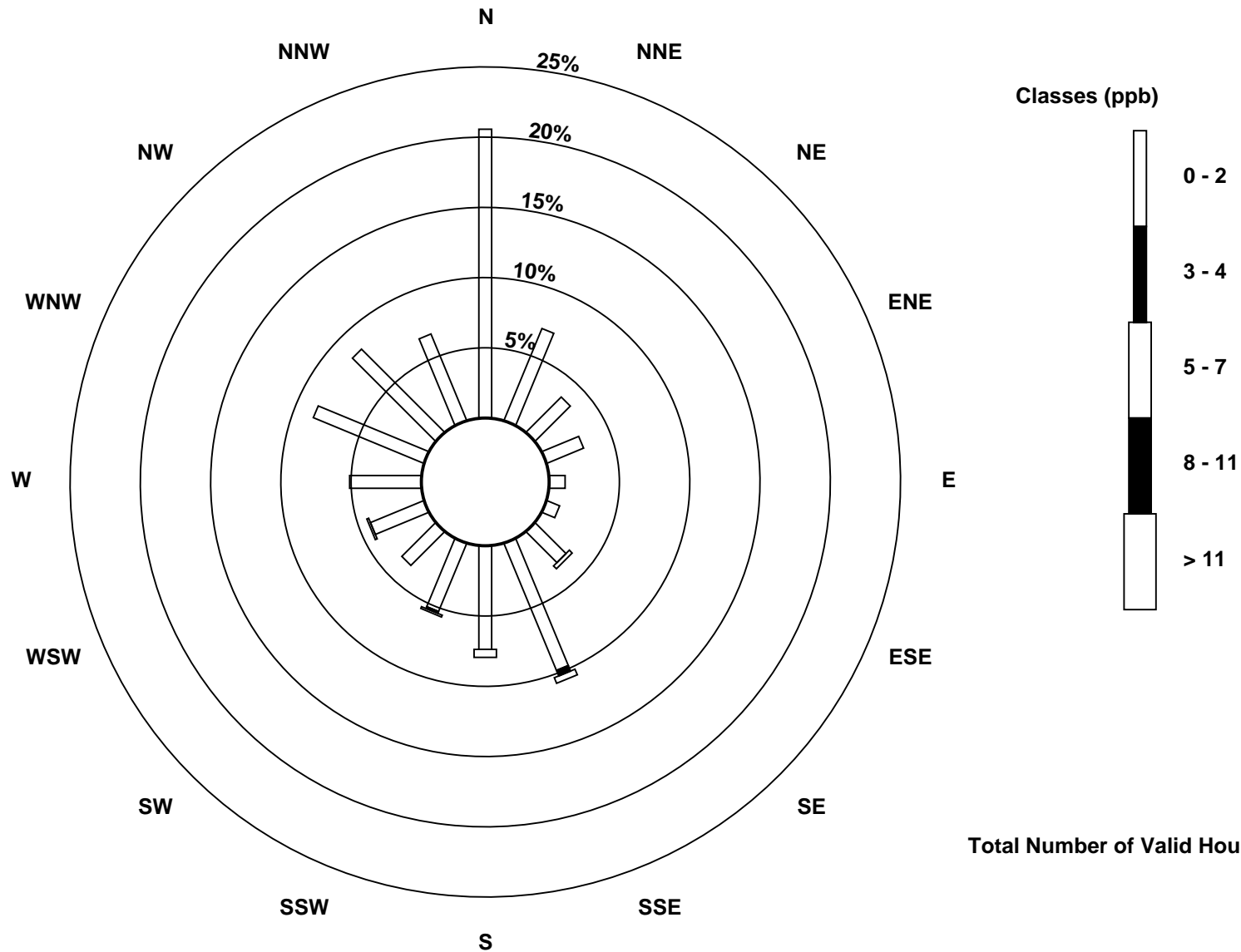
Total Number of Valid Hours: 705

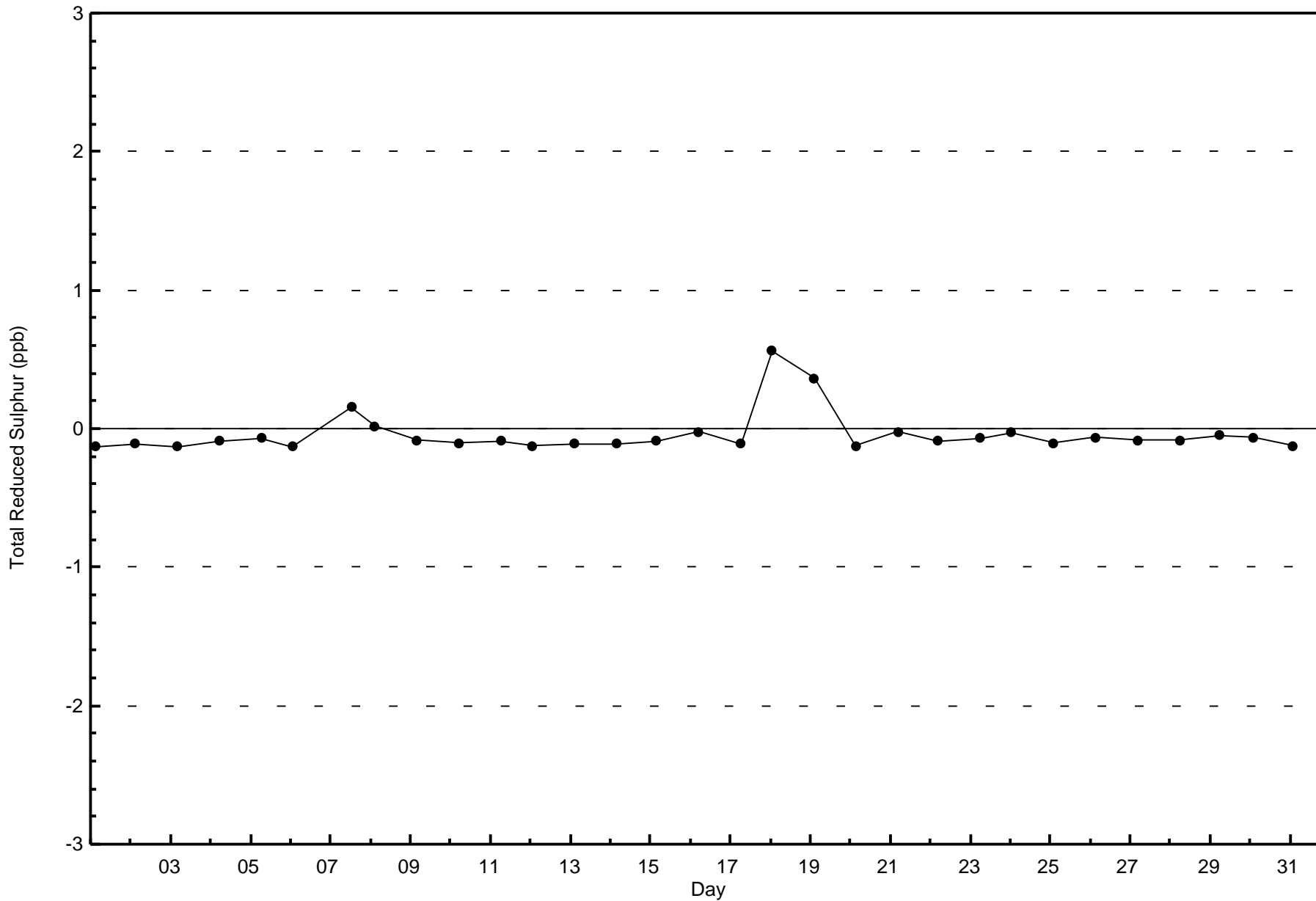
Total Number of Hours: 744

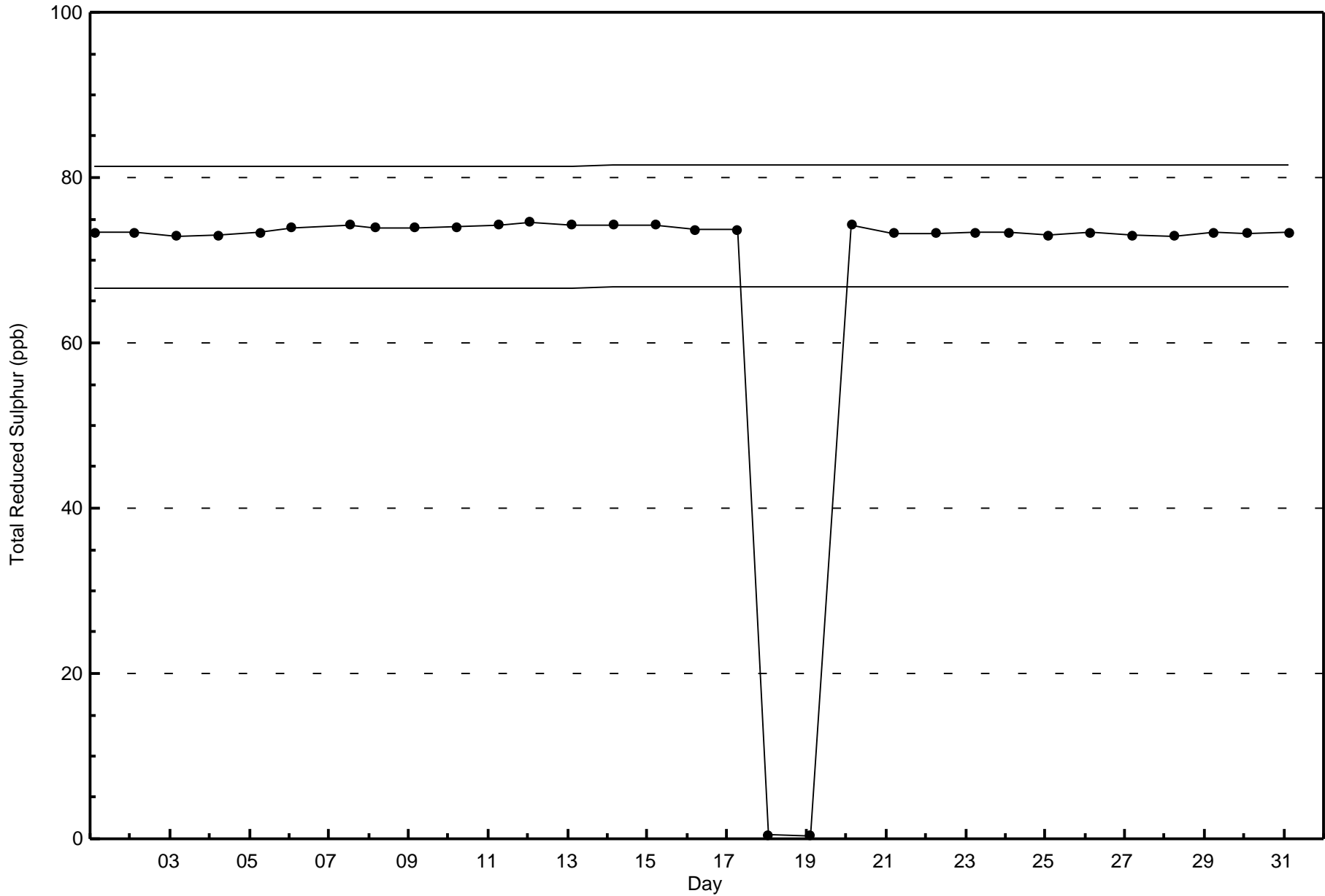


Wood Buffalo Environmental Association
Wind Rose May 2016

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









Wood Buffalo Environmental Association
Summary of Hour Averages

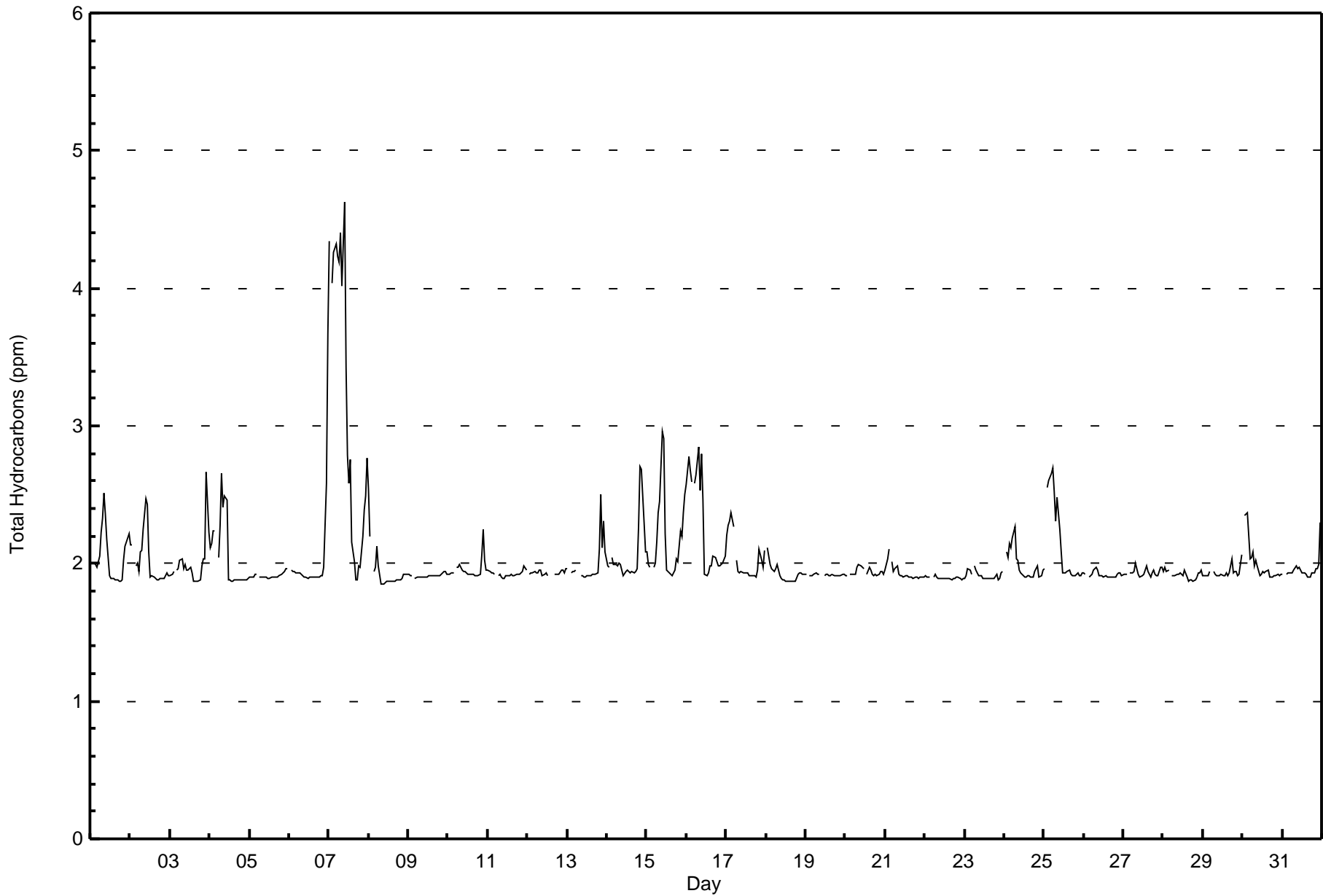
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - May 2016

Maximum Value: 4.6 ppm on May 7 10:00																		Maximum Daily Average: 3.1 ppm on May 7						Hours in Service: 744			
Minimum Value: 1.9 ppm on May 8 09:00																		Minimum Daily Average: 1.9 ppm on May 22						Hours of Data: 705			
Maximum Diurnal Average: 2.1 ppm at hour 10																		Minimum Diurnal Average: 1.9 ppm at hour 17						Hours of Missing Data: 39			
Monthly Average: 2.02 ppm																		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.2 P ₉₉ = 4.2						Hours of Calibration: 34			
																								Percent Operational Time: 99.3			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	2.2	Z	2.0	2.0	2.0	2.1	2.2	2.3	2.5	2.4	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.1	2.5	
2-May	2.1	2.1	Z	2.0	2.0	1.9	2.1	2.1	2.2	2.5	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.5	
3-May	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.7	2.2	2.0	2.7	
4-May	2.1	2.2	2.2	Z	2.0	2.3	2.7	2.4	2.5	2.5	1.9	1.9	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	2.7	
5-May	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	
6-May	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.6	3.7	2.0	3.7	
7-May	4.3	Z	4.0	4.3	4.3	4.2	4.2	4.4	4.0	4.6	3.4	2.8	2.6	2.8	2.2	2.0	1.9	1.9	2.0	2.0	2.2	2.4	2.5	2.8	3.1	4.6	
8-May	2.5	2.2	Z	1.9	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.5	
9-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
10-May	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.0	2.0	2.0	2.2	
11-May	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	
12-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	C	C	C	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	2.0	
13-May	2.0	Z	1.9	1.9	1.9	2.0	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.5	2.1	2.3	2.1	2.0	2.5	
14-May	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3	2.7	2.7	2.3	2.1	2.1	2.7
15-May	2.1	2.0	2.0	Z	2.0	2.0	2.2	2.4	2.5	3.0	2.9	2.2	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.2	2.4	2.5	2.2	3.0	
16-May	2.6	2.8	2.7	2.6	Z	2.6	2.6	2.8	2.5	2.8	2.5	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.8	
17-May	2.2	2.3	2.3	2.4	2.3	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.0	2.0	2.1	2.0	2.4	
18-May	Z	2.1	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	
19-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
20-May	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	PF	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
21-May	1.9	2.0	2.1	Z	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	
22-May	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	
23-May	1.9	1.9	2.0	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
24-May	Z	2.1	2.0	2.1	2.1	2.2	2.3	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.3	
25-May	2.0	Z	2.5	2.6	2.7	2.7	2.5	2.3	2.5	2.2	2.1	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	2.1	2.7	
26-May	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
27-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	
28-May	1.9	2.0	1.9	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
29-May	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.1	1.9	2.1	
30-May	Z	2.3	2.4	2.4	2.0	2.0	2.1	2.0	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	2.4	
31-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.3	2.0	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																											



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	589	83.55	83.55
2.1 - 3.0	105	14.89	98.44
3.1 - 10.0	11	1.56	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	140	50	17	15	5	7	17	50	41	31	19	19	31	54	56	37	589
2.1 - 3.0	5	1	5	5	3	1	6	22	10	12	7	8	4	6	6	4	105
3.1 - 10.0	0	0	0	0	0	0	1	3	4	2	0	1	0	0	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	145	51	22	20	8	8	24	75	55	45	26	28	35	60	62	41	705

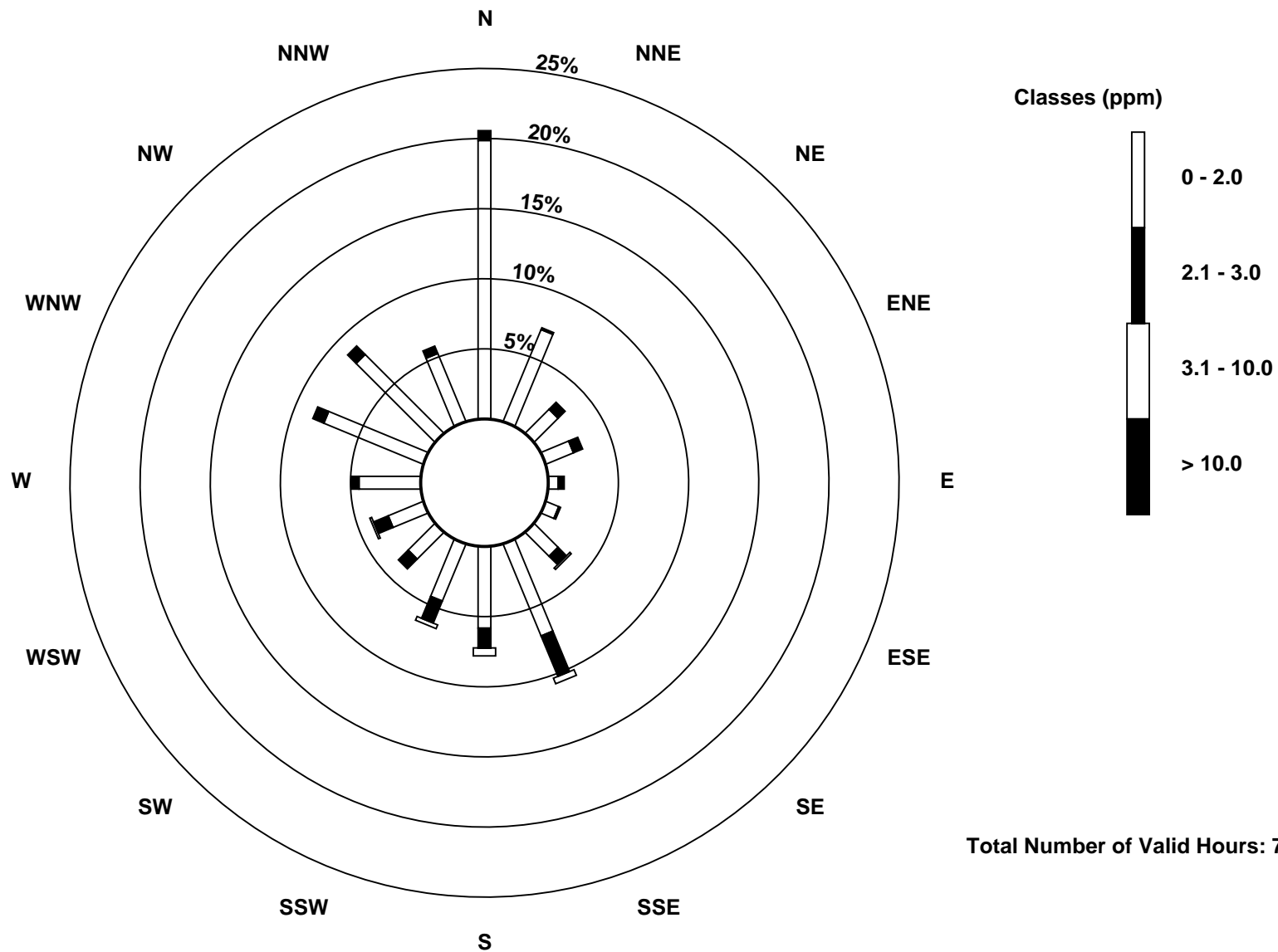
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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

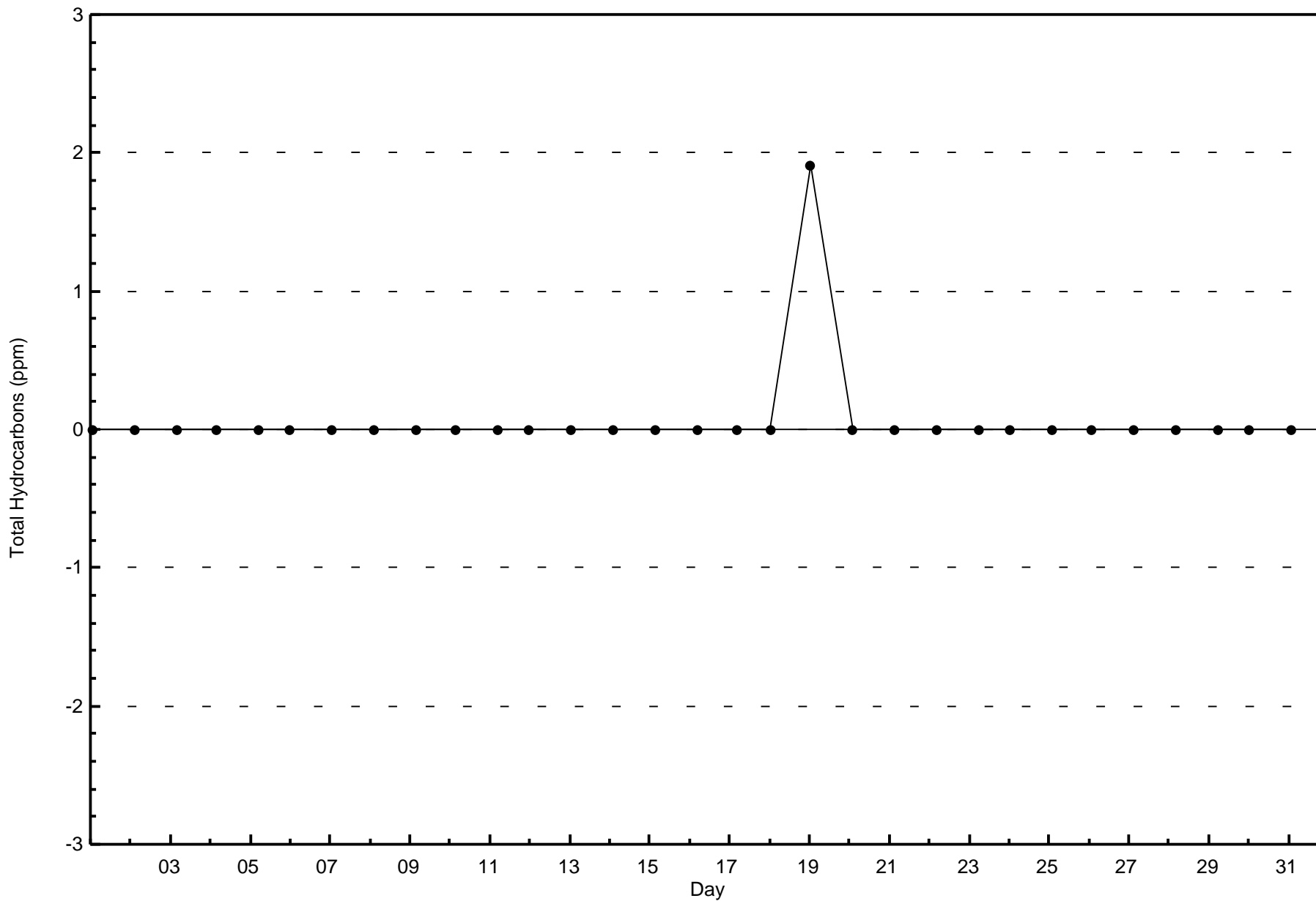


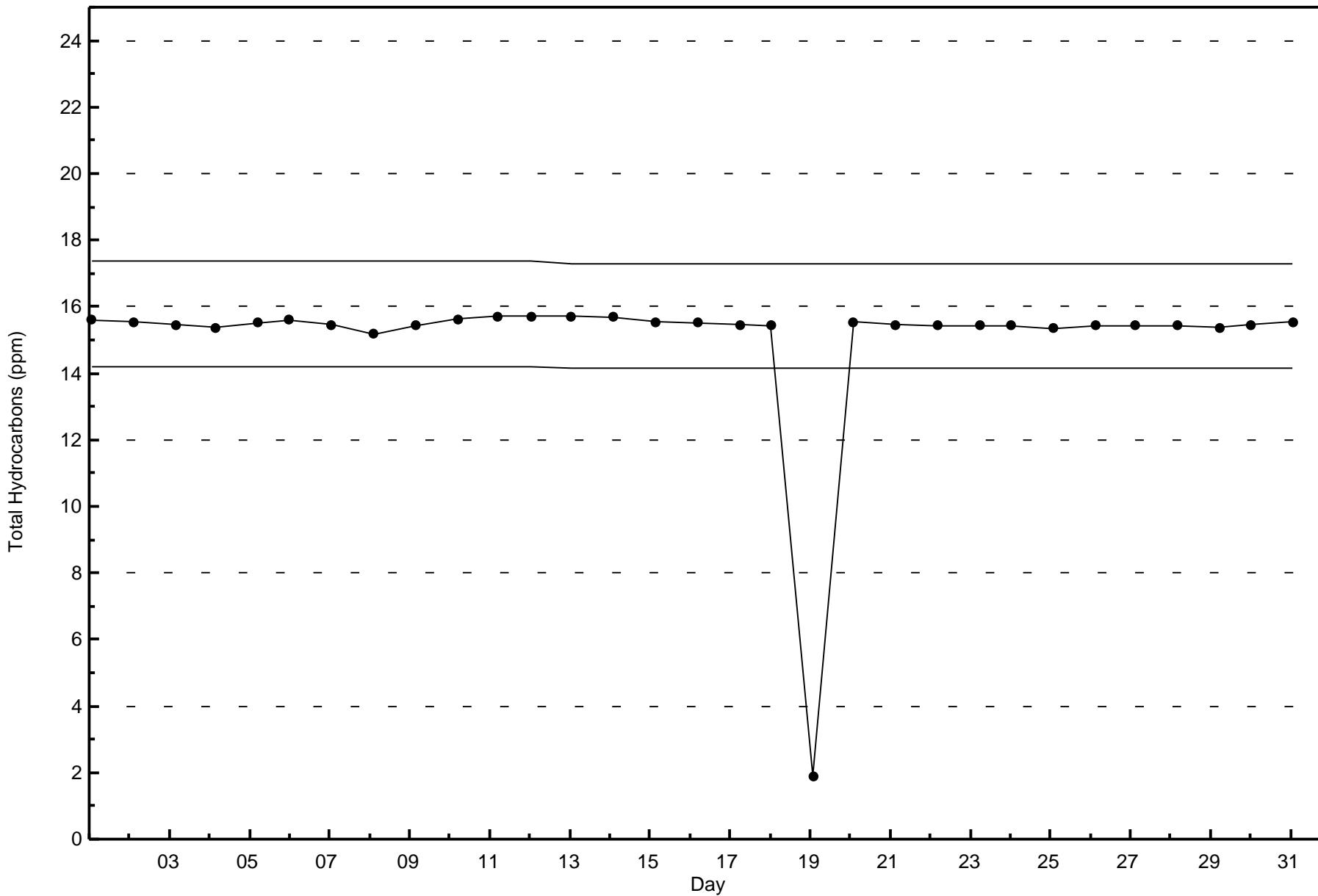
Total Number of Valid Hours: 705



Wood Buffalo Environmental Association
Zero Responses

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

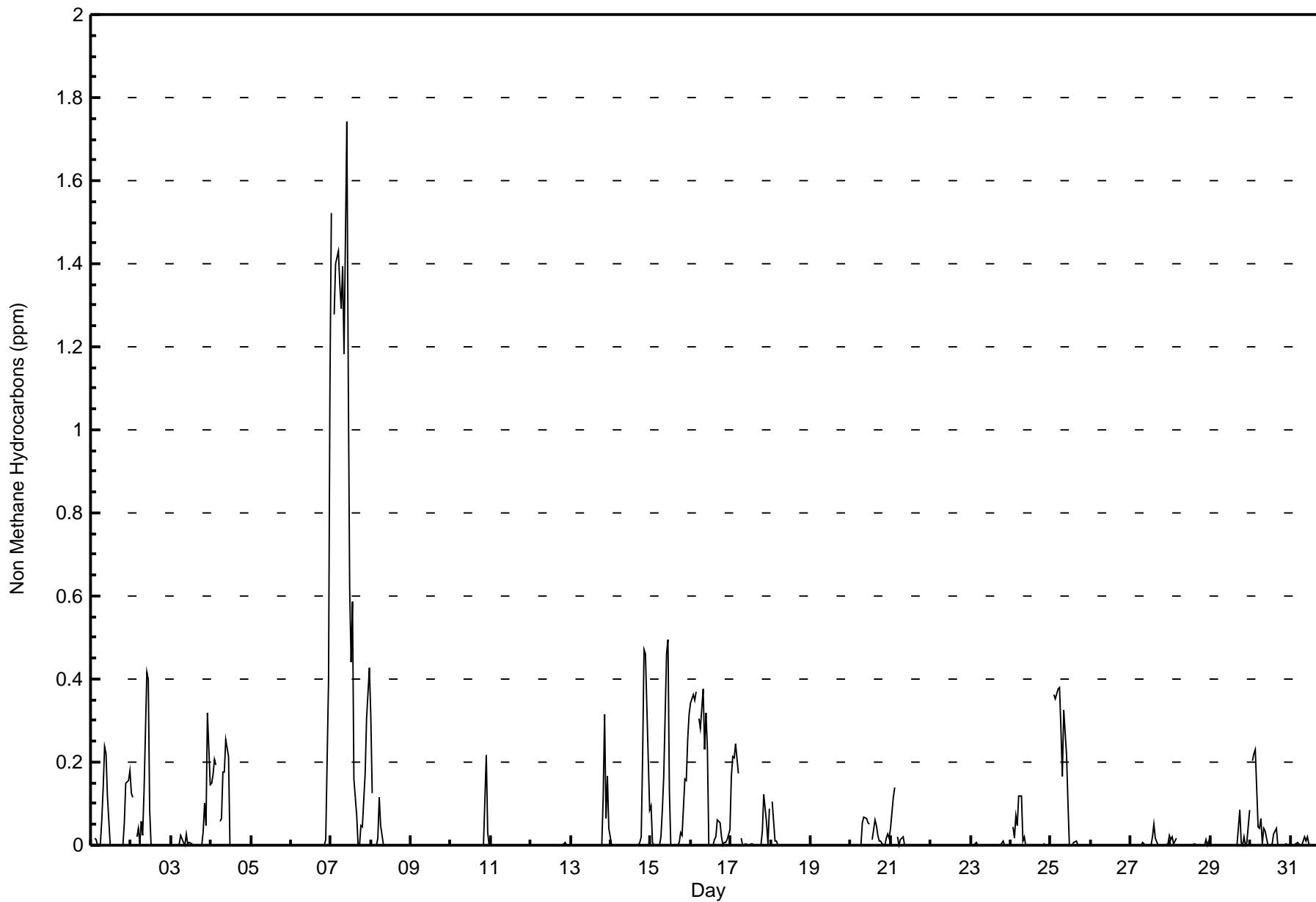






Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	501	71.06	71.06
0.006 - 0.05	86	12.20	83.26
0.06 - 0.1	42	5.96	89.22
> 0.1	76	10.78	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	125	39	13	12	4	5	14	43	35	21	16	18	30	49	51	26	501
0.006 - 0.05	13	8	4	3	1	3	3	7	8	9	3	1	1	7	4	11	86
0.06 - 0.1	5	4	1	1	0	0	3	7	3	5	0	4	1	2	4	2	42
> 0.1	2	0	4	4	3	0	4	18	9	10	7	5	3	2	3	2	76
Totals	145	51	22	20	8	8	24	75	55	45	26	28	35	60	62	41	705

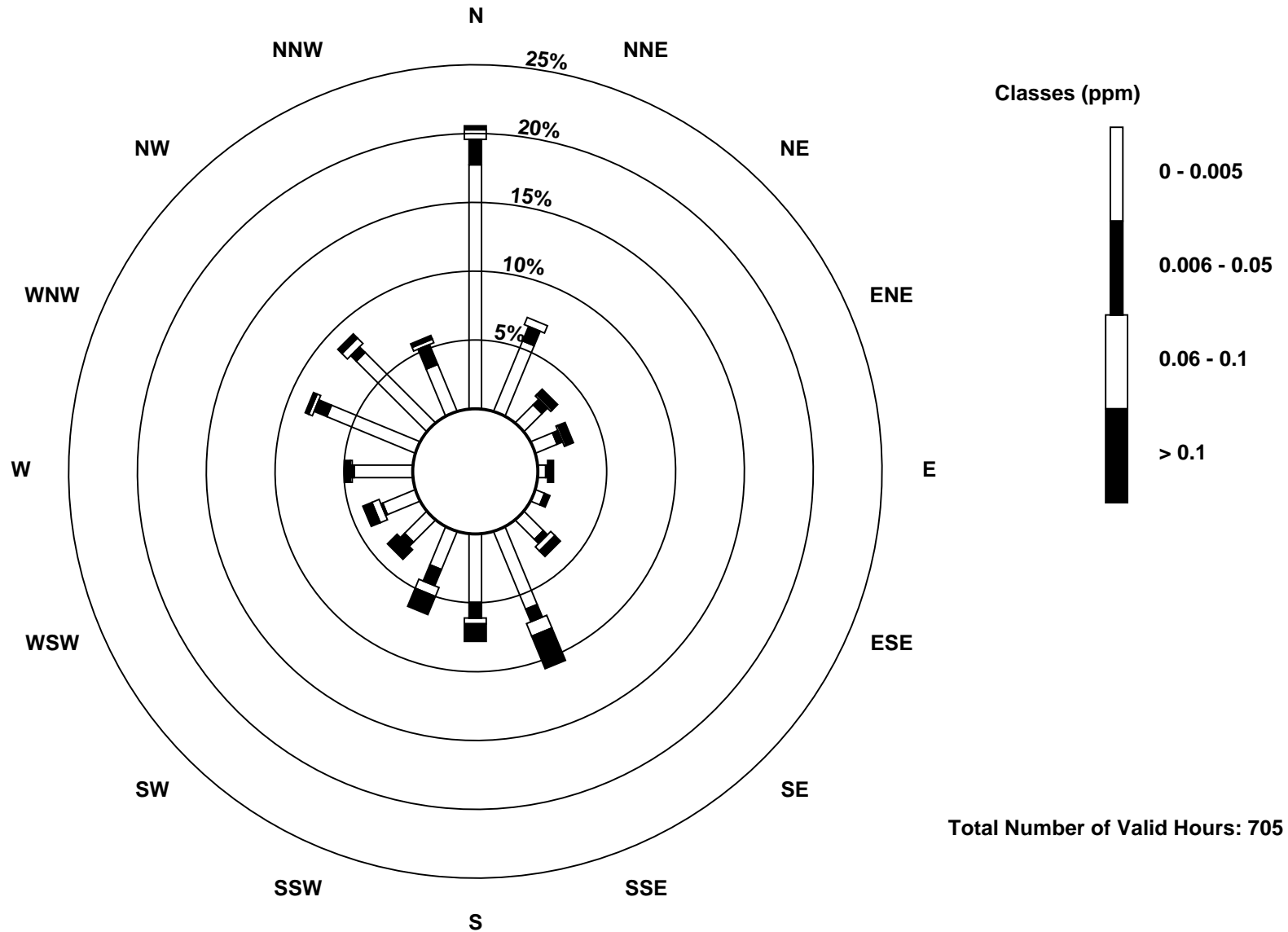
Total Number of Valid Hours: 705

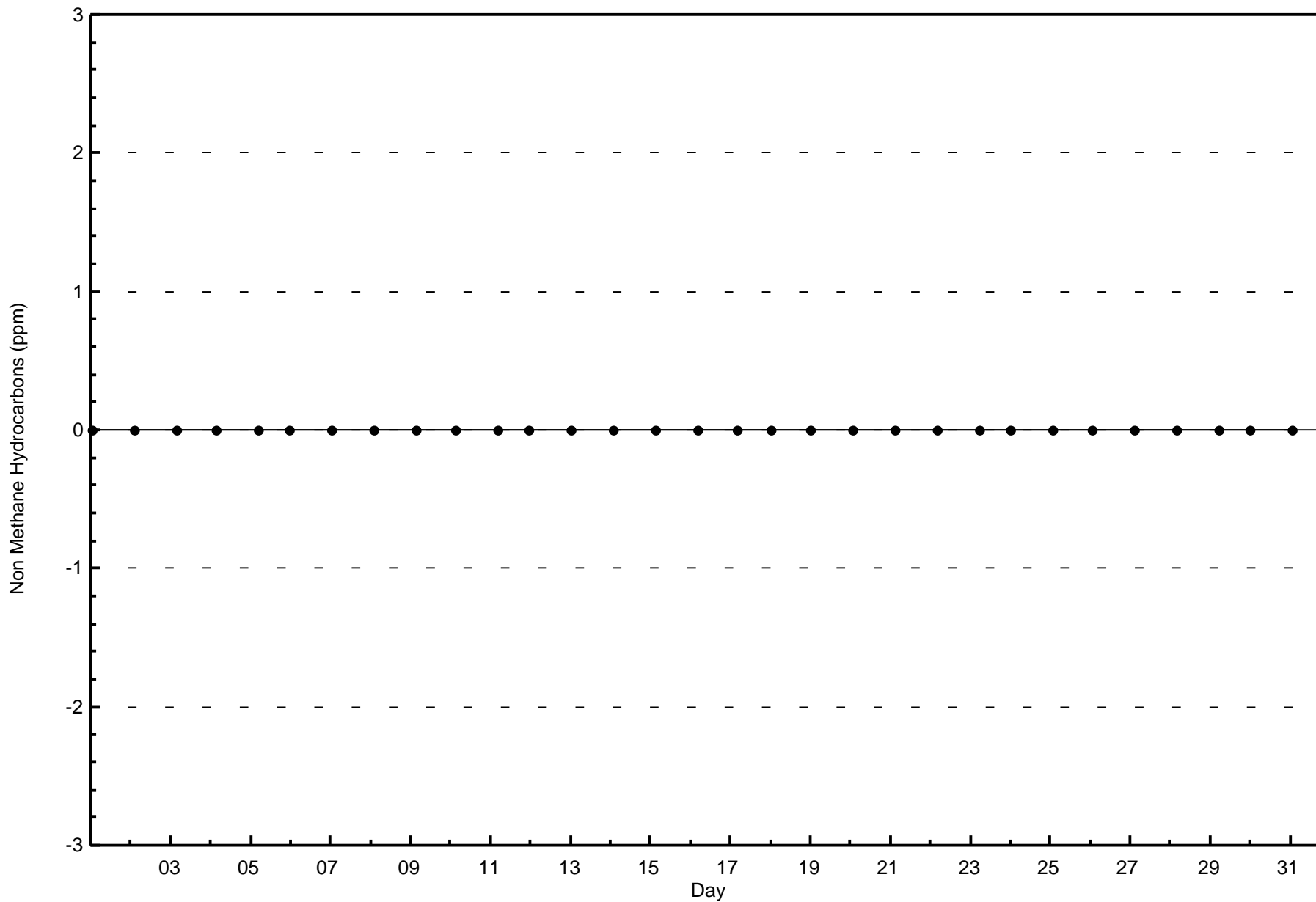
Total Number of Hours: 744

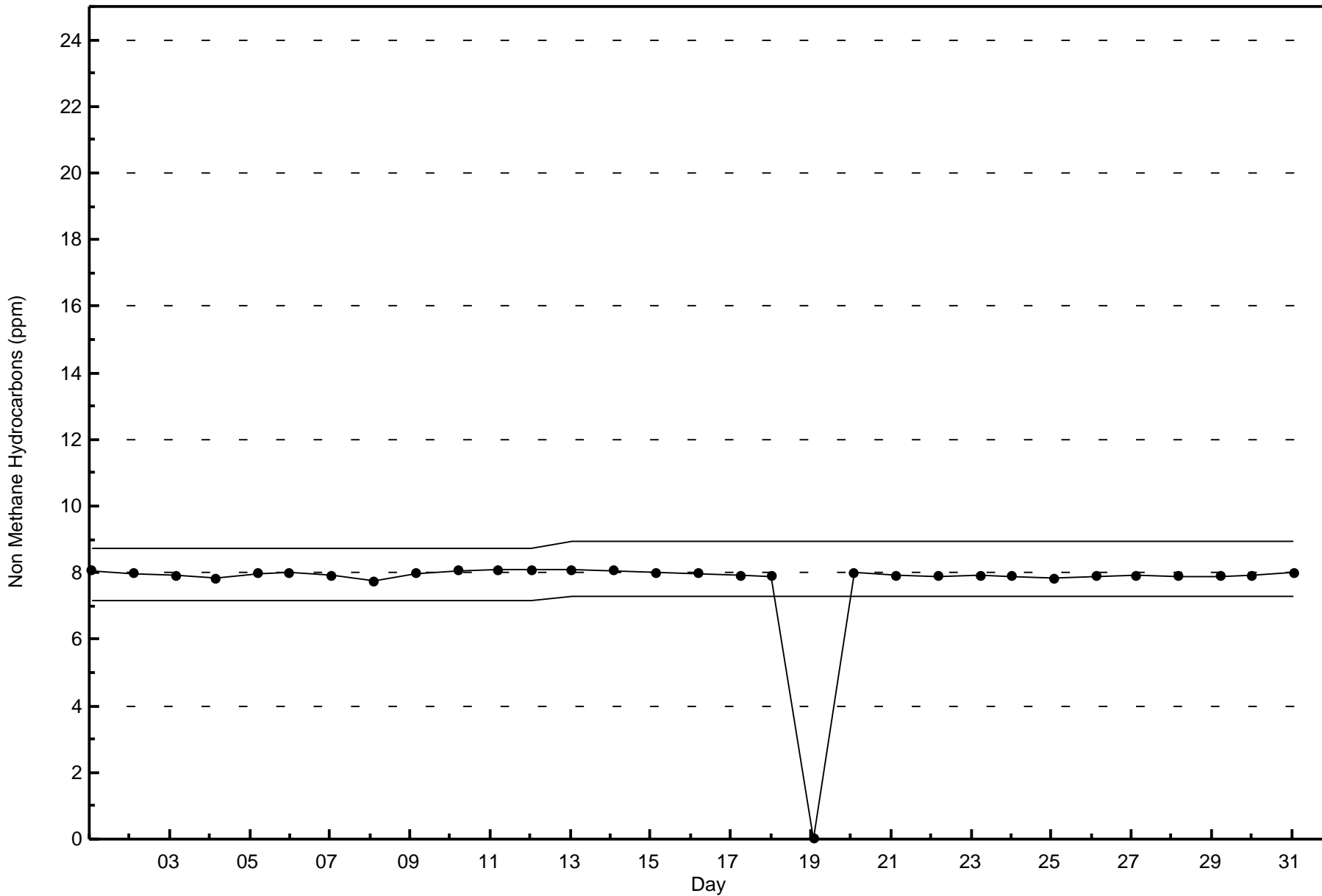


Wood Buffalo Environmental Association
Wind Rose May 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

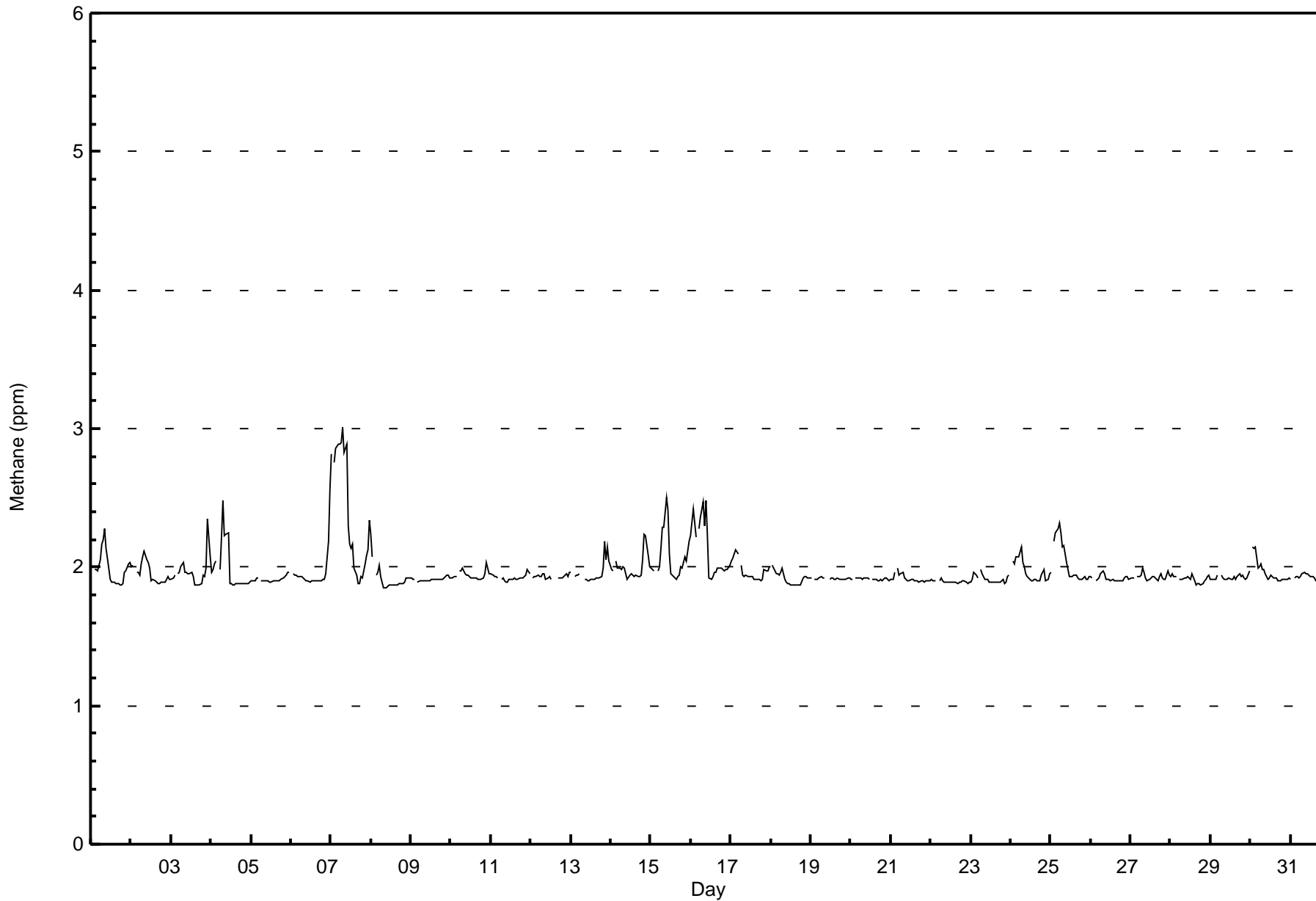
Methane (CH4) - ppm

Fort McKay - Bertha Ganter - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.0 ppm on May 7 08:00	Maximum Daily Average: 2.4 ppm on May 7		Hours of Data:	705
Minimum Value: 1.9 ppm on May 8 09:00	Minimum Daily Average: 1.9 ppm on May 22		Hours of Missing Data:	39
Maximum Diurnal Average: 2.0 ppm at hour 8	Minimum Diurnal Average: 1.9 ppm at hour 17		Hours of Calibration:	34
Monthly Average: 1.97 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.8		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-May	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.1	2.1	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	2.3
2-May	2.0	2.0	Z	2.0	2.0	1.9	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
3-May	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3	2.1	2.0	2.0	2.3	2.1	2.3
4-May	2.0	2.0	2.0	2.0	Z	2.0	2.2	2.5	2.2	2.2	2.3	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.5
5-May	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.0
6-May	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.6	2.0	2.0	2.6	2.6
7-May	2.8	Z	2.8	2.9	2.9	2.9	2.9	3.0	2.8	2.9	2.3	2.2	2.1	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.3	2.4	2.4	3.0	3.0
8-May	2.2	2.1	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
9-May	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
10-May	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0
11-May	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0
12-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	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	2.0
13-May	2.0	Z	1.9	1.9	1.9	2.0	M	M	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	2.1	2.0	2.0	2.0	2.2	2.2
14-May	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.2	2.2
15-May	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.3	2.3	2.5	2.4	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1	2.2	2.1	2.1	2.2	2.5
16-May	2.2	2.4	2.3	2.2	Z	2.3	2.4	2.5	2.3	2.5	2.2	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	2.1	2.5
17-May	2.0	2.1	2.1	2.1	2.1	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
18-May	Z	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
19-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
20-May	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	PF	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-May	1.9	1.9	2.0	Z	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
22-May	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
23-May	1.9	1.9	2.0	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
24-May	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.1	2.0	2.1
25-May	2.0	Z	2.2	2.2	2.3	2.3	2.2	2.1	2.2	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3
26-May	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
27-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
28-May	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
29-May	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	2.0	2.0
30-May	Z	2.1	2.1	2.1	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	2.1
31-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2	1.9	1.9	1.9	2.2	2.2

Z - zerospan	C - Calibration	M - Maintenance	PF - Power Failure
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**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	624	88.51	88.51
2.1 - 3.0	81	11.49	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	142	51	20	16	6	7	19	52	44	35	21	23	32	59	59	38	624
2.1 - 3.0	3	0	2	4	2	1	5	23	11	10	5	5	3	1	3	3	81
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	145	51	22	20	8	8	24	75	55	45	26	28	35	60	62	41	705

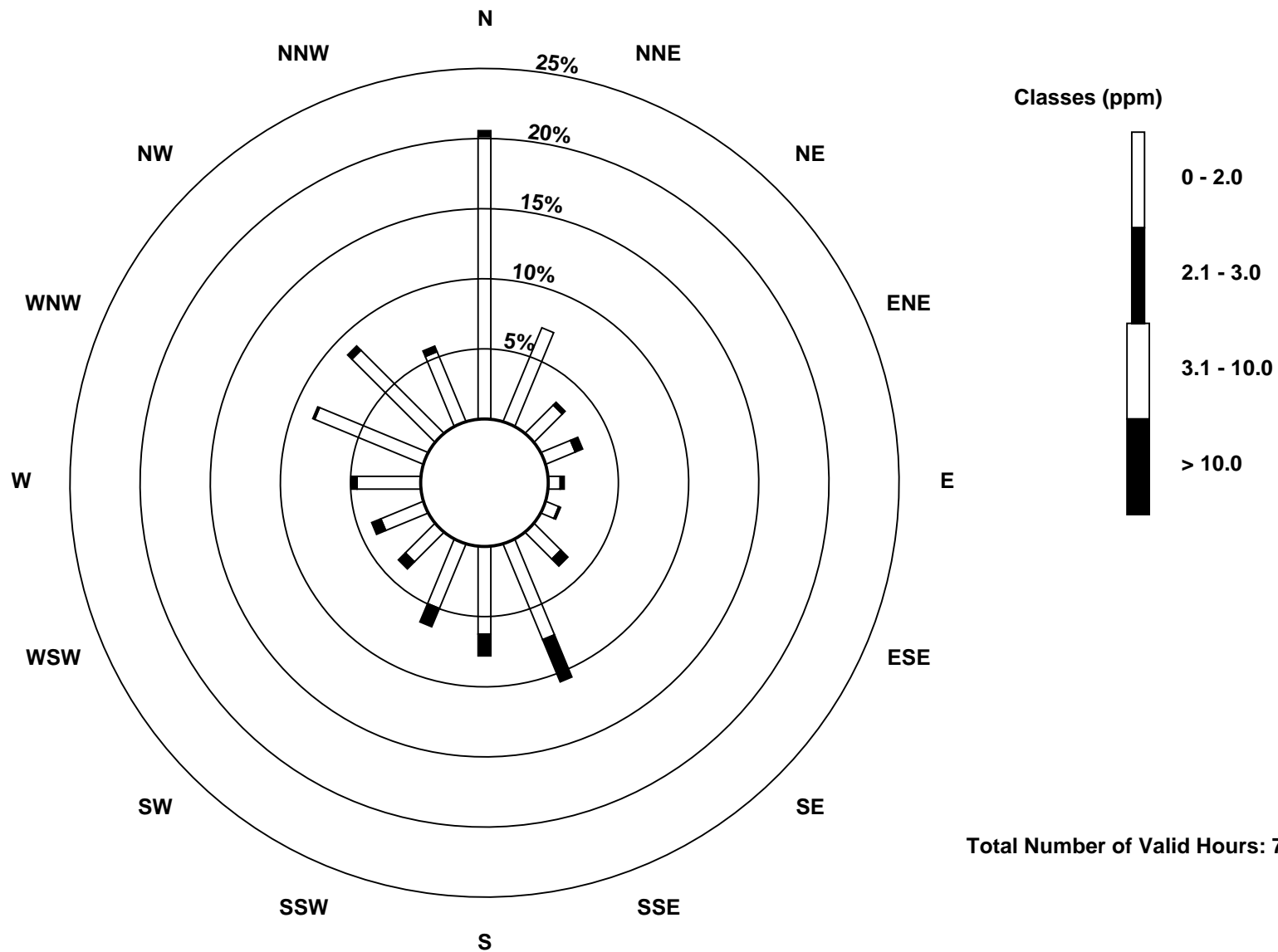
Total Number of Valid Hours: 705

Total Number of Hours: 744

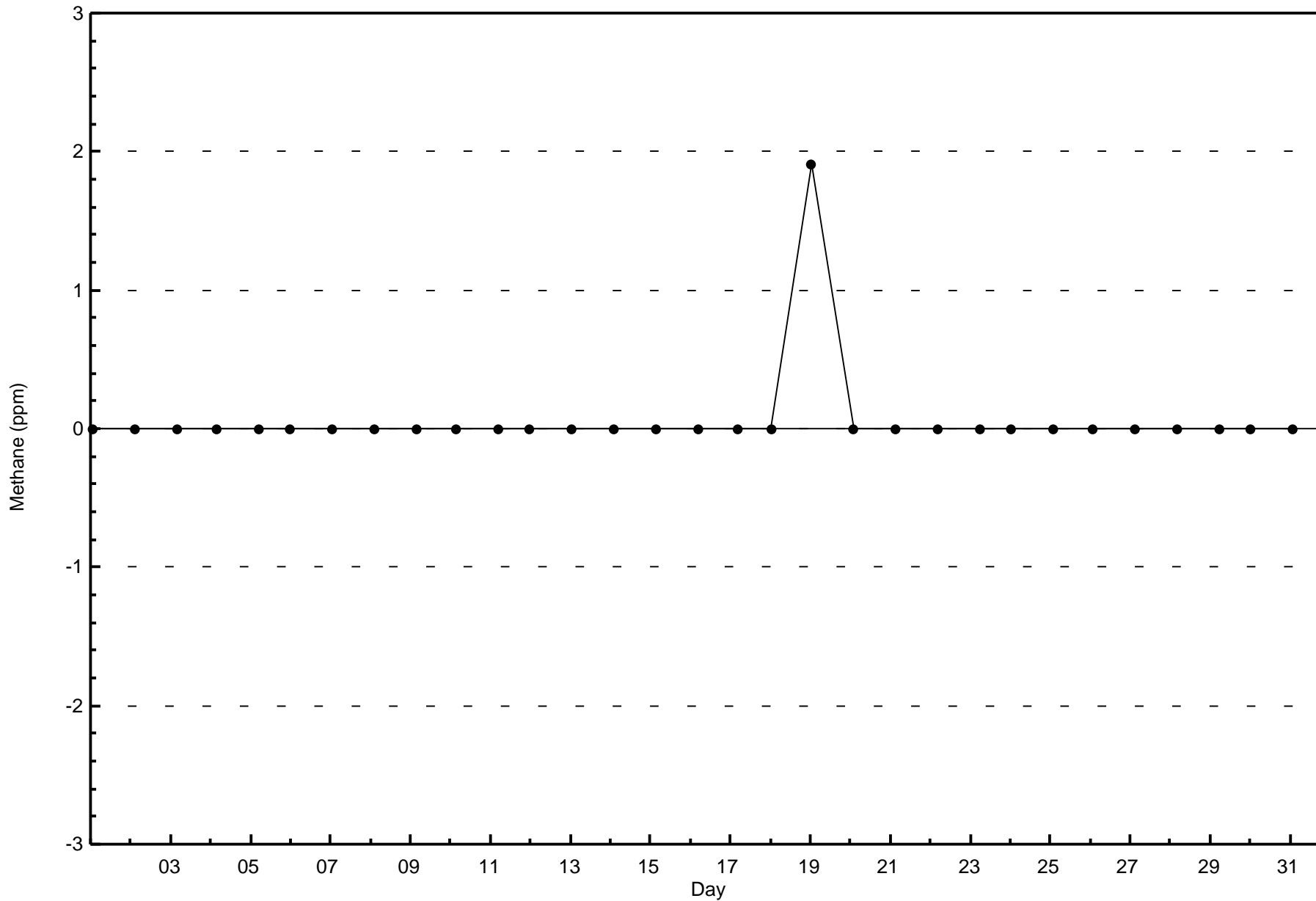


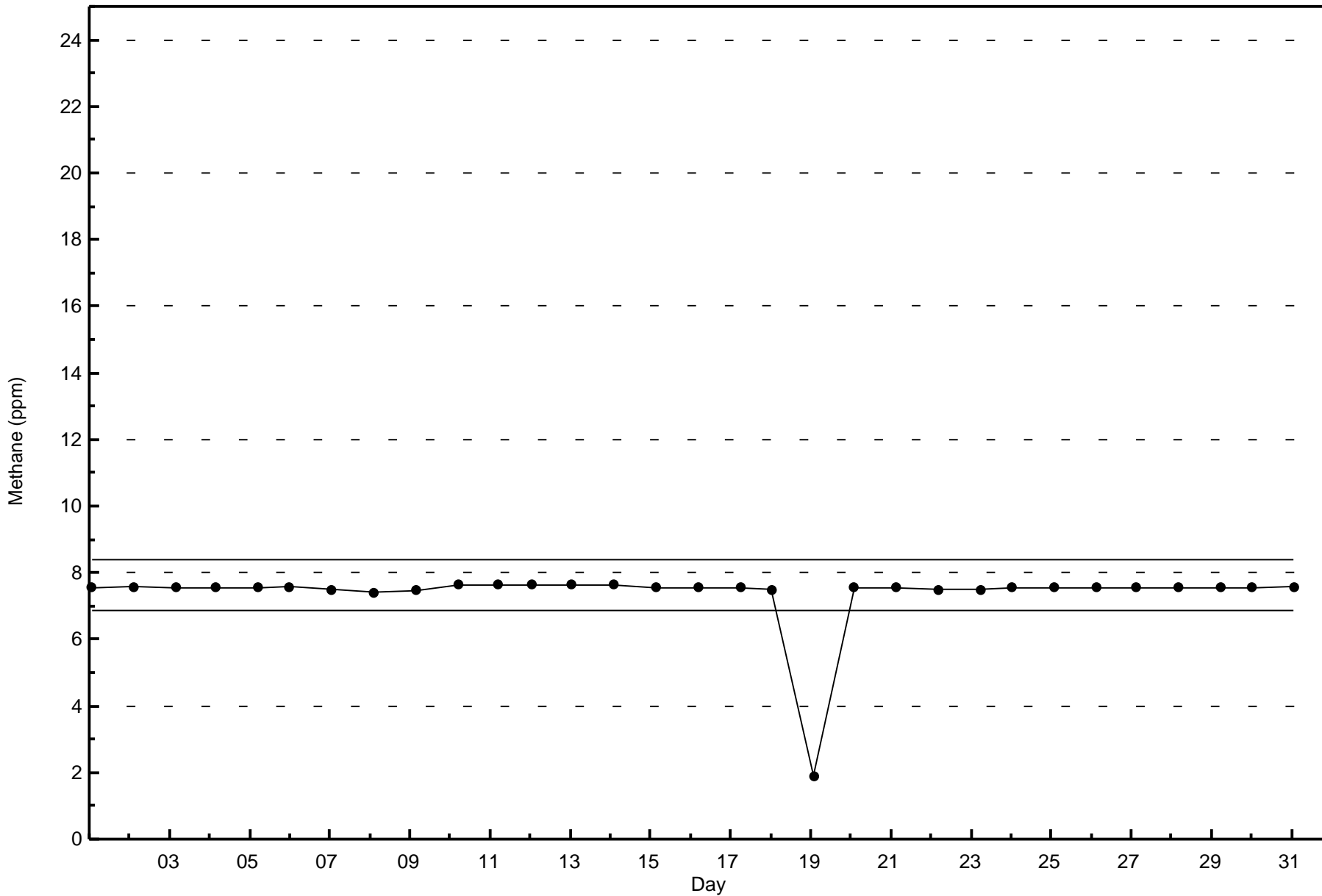
Wood Buffalo Environmental Association
Wind Rose May 2016

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



Total Number of Valid Hours: 705





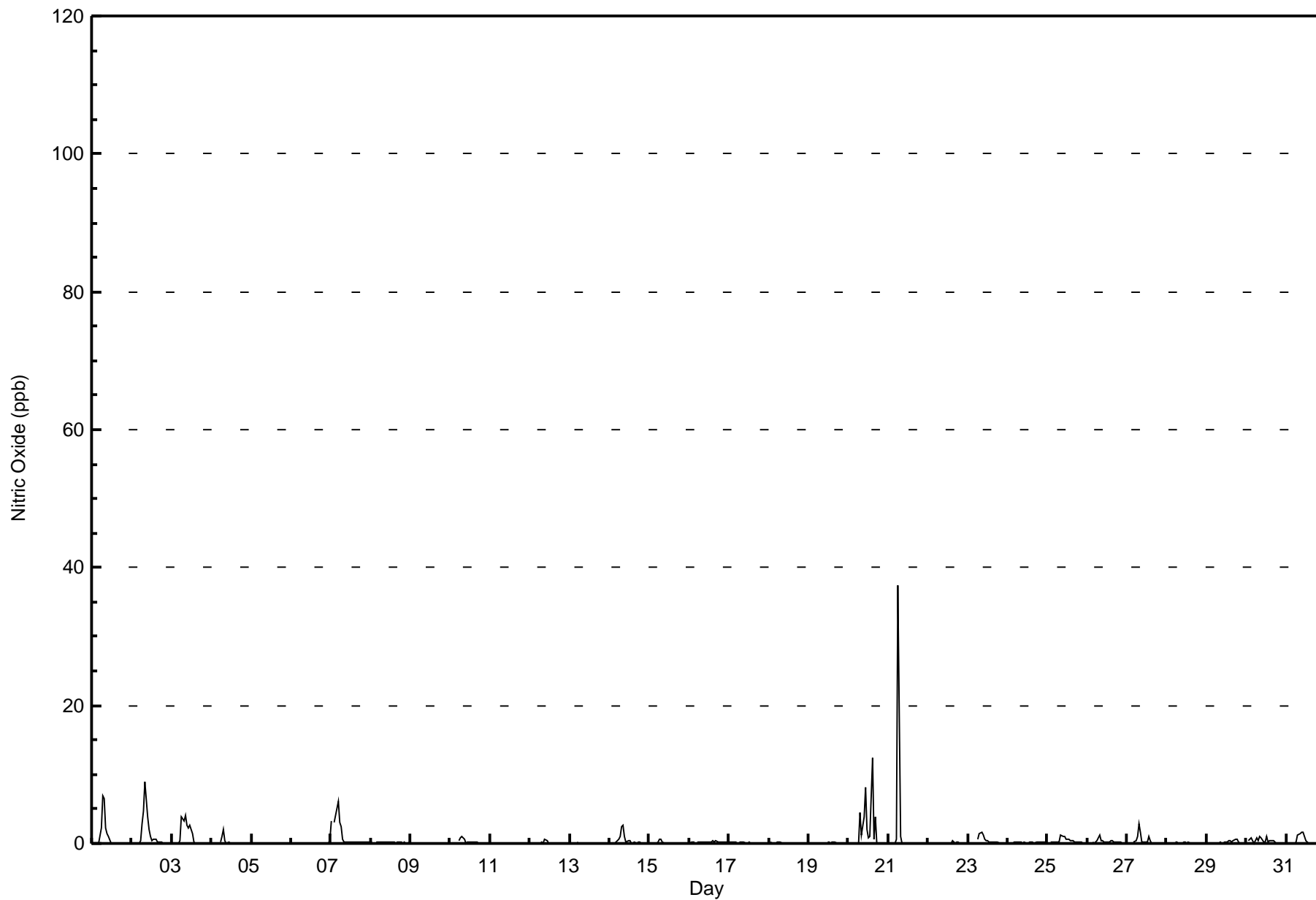


Maximum Value: 37 ppb on May 21 07:00																		Maximum Daily Average: 1.8 ppb on May 21																		Hours in Service: 744			
Minimum Value: 0 ppb on May 1 01:00																		Minimum Daily Average: 0.0 ppb on May 5																		Hours of Data: 705			
Maximum Diurnal Average: 2.0 ppb at hour 7																		Minimum Diurnal Average: 0.0 ppb at hour 22																		Hours of Missing Data: 39			
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 = 6																		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-May	0	Z	0	0	0	2	7	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	7													
2-May	0	0	Z	0	0	0	3	5	9	4	2	1	0	1	1	0	0	0	0	0	0	0	0	0	1.1	9													
3-May	0	0	0	Z	0	0	4	3	4	3	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0.9	4													
4-May	0	0	0	0	Z	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2													
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0													
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0	1													
7-May	3	Z	3	4	6	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	6													
8-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
10-May	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1													
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0													
12-May	Z	0	0	0	0	0	0	0	0	1	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0.1	1													
13-May	0	Z	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0													
14-May	0	0	Z	0	0	1	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3													
15-May	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1													
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0													
17-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
18-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
19-May	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													
20-May	0	0	Z	0	0	0	0	4	1	4	8	2	1	1	12	1	4	0	0	0	0	0	0	0	1.7	12													
21-May	0	0	0	Z	0	1	37	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	37													
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
23-May	0	0	0	0	0	Z	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2													
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
25-May	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1													
26-May	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1													
27-May	0	0	0	Z	0	0	1	3	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	3													
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	1													
30-May	Z	0	1	1	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1													
31-May	0	Z	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2													
																								Diurnal Average															
																								Diurnal Maximum															
Z - zerospan C - Calibration M - Maintenance																																							



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	145	51	21	20	8	8	24	75	55	45	26	28	35	60	62	41	704
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	146	51	21	20	8	8	24	75	55	45	26	28	35	60	62	41	705

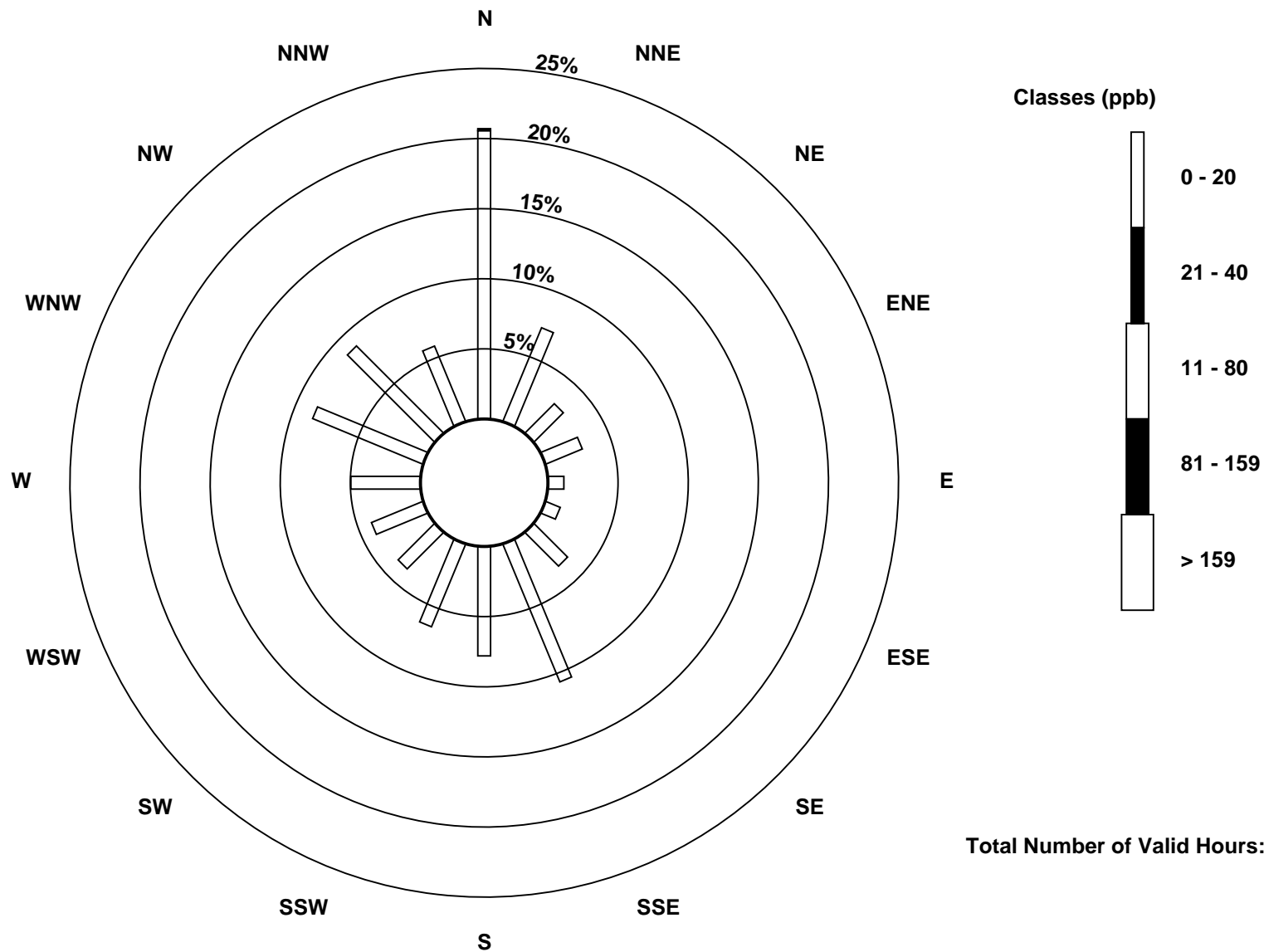
Total Number of Valid Hours: 705

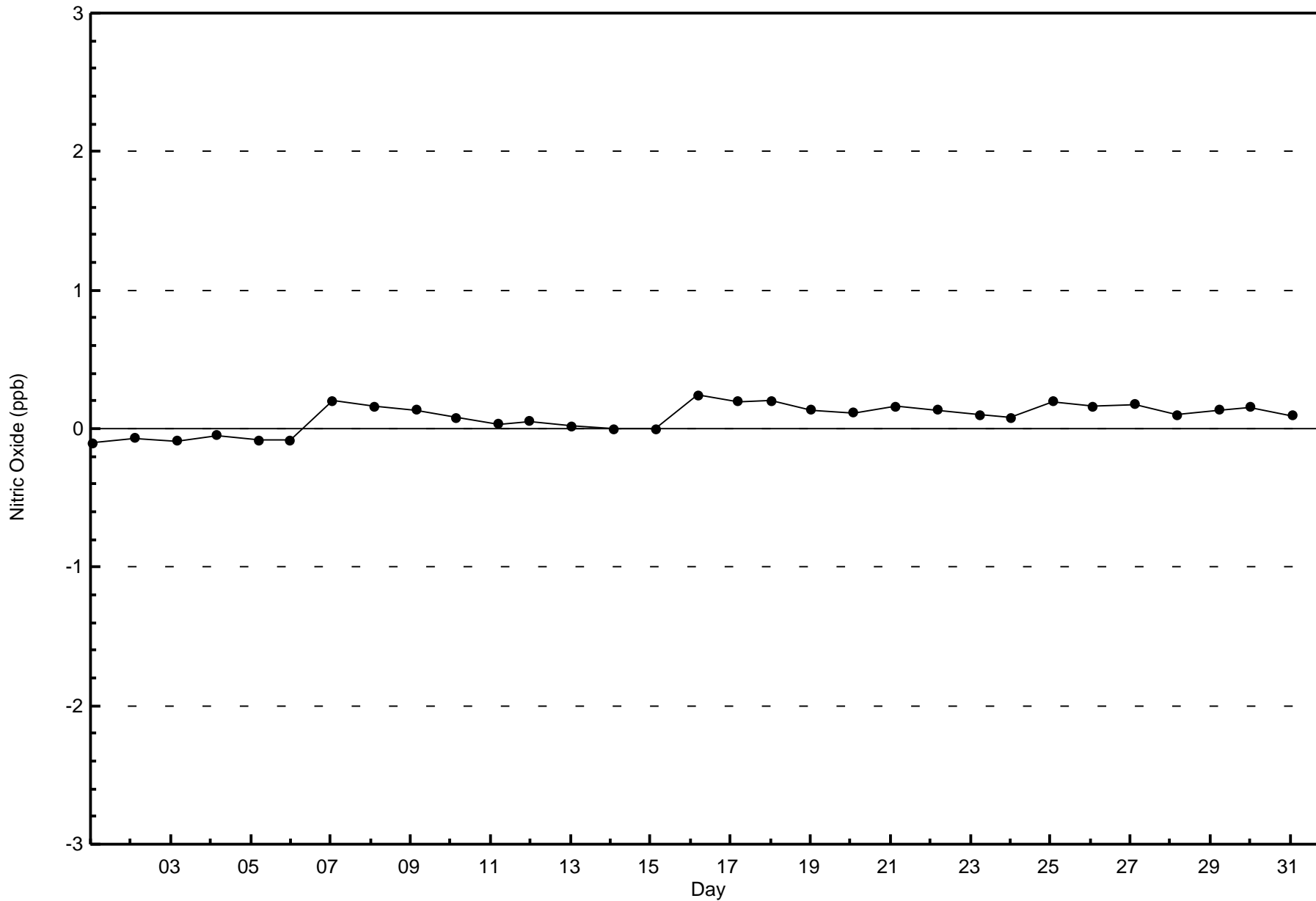
Total Number of Hours: 744

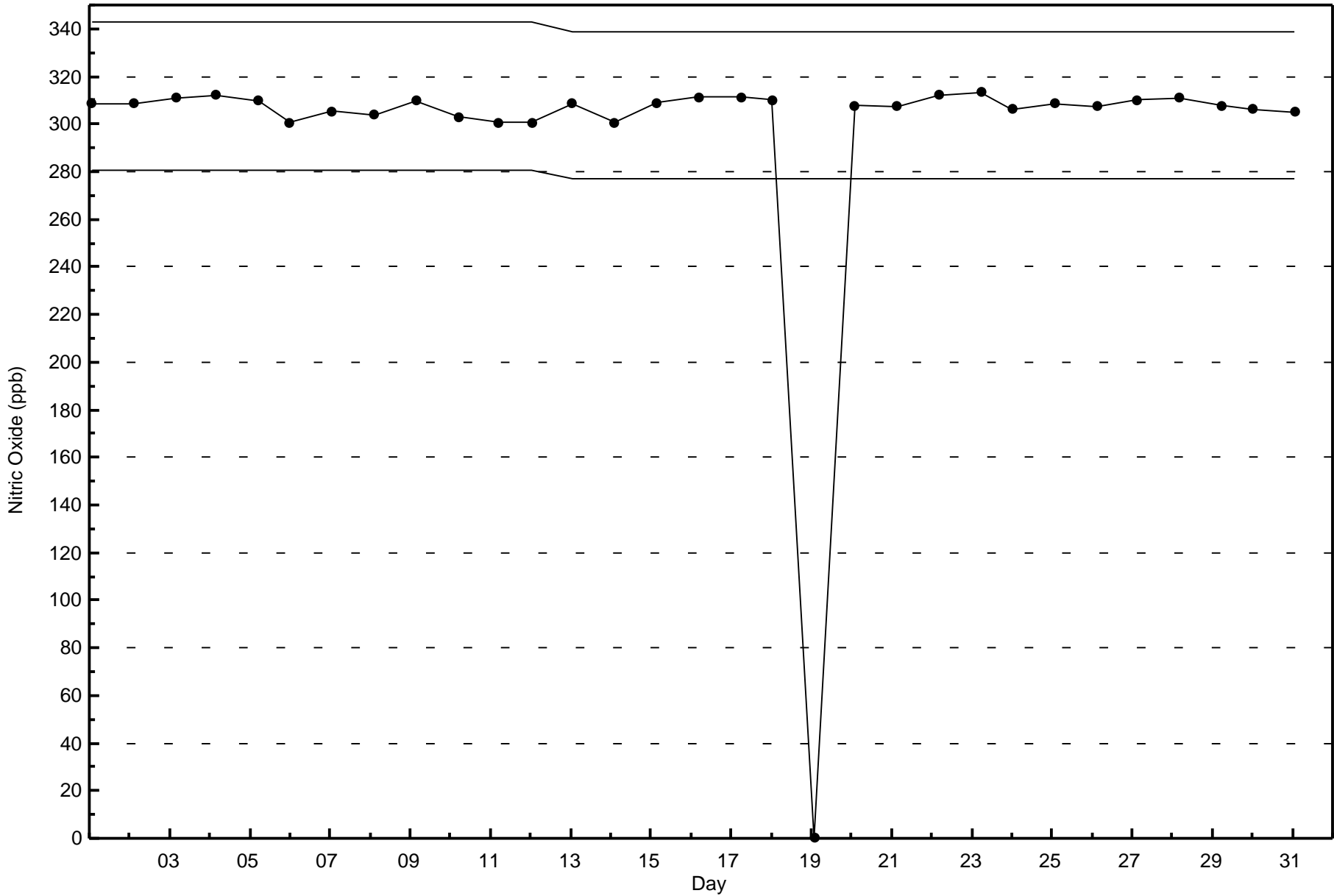


Wood Buffalo Environmental Association
Wind Rose May 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay - Bertha Ganter - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 48 ppb on May 7 01:00	Maximum Daily Average: 12.7 ppb on May 7		Hours of Data:	705
Minimum Value: 0 ppb on May 6 12:00	Minimum Daily Average: 0.2 ppb on May 22		Hours of Missing Data:	39
Maximum Diurnal Average: 4.1 ppb at hour 1	Minimum Diurnal Average: 1.1 ppb at hour 16		Hours of Calibration:	36
Monthly Average: 2.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 18		Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	5	Z	4	4	3	7	10	10	7	6	5	1	0	0	0	0	0	0	0	1	5	5	8	8	3.9	10	
2-May	5	6	Z	3	3	2	3	6	11	9	7	6	3	4	4	2	2	3	4	3	3	4	8	2	4.5	11	
3-May	2	3	3	Z	4	3	10	7	10	8	9	13	13	5	1	1	1	1	2	6	6	4	8	5	5.3	13	
4-May	5	5	6	5	Z	2	4	8	4	4	5	1	1	0	1	0	1	1	1	1	1	0	0	1	2.3	8	
5-May	1	0	1	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0.4	2	
6-May	Z	2	2	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	16	39	3.0	39
7-May	48	Z	35	30	28	21	17	19	15	15	6	3	3	3	2	2	1	1	2	3	8	11	12	9	12.7	48	
8-May	7	4	Z	3	3	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1.8	7	
9-May	1	1	1	Z	1	1	1	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0.5	1	
10-May	1	1	1	1	Z	2	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	4	5	3	1.4	5	
11-May	1	1	1	1	1	Z	1	0	0	0	0	0	1	0	1	0	0	0	0	0	2	5	3	1	0.8	5	
12-May	Z	1	1	1	1	1	1	1	1	2	1	1	0	C	C	C	C	C	1	1	3	2	1	3	1.3	3	
13-May	3	Z	1	2	2	1	M	M	0	0	0	0	0	0	0	1	1	1	1	2	6	17	15	9	2.9	17	
14-May	2	2	Z	8	4	3	3	4	5	3	1	2	2	1	1	1	1	1	2	2	7	9	6	3	3.2	9	
15-May	3	2	2	Z	2	2	2	2	3	5	7	2	1	1	1	1	1	1	2	3	3	6	8	9	2.9	9	
16-May	9	7	6	7	Z	6	5	6	4	5	4	2	2	5	10	8	11	10	8	7	6	6	6	5	6.2	11	
17-May	8	8	11	11	7	Z	3	3	3	3	4	3	3	3	2	2	2	2	2	2	6	4	3	6	4.4	11	
18-May	Z	5	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	5	
19-May	1	Z	1	1	1	1	1	1	0	0	M	1	1	1	0	1	0	0	0	0	0	0	0	0	0.4	1	
20-May	0	0	Z	0	0	0	0	5	3	3	5	3	1	2	5	0	2	0	0	0	0	0	0	1	1.4	5	
21-May	0	1	4	Z	4	1	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	10	
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0.2	1	
23-May	1	1	2	0	0	Z	2	4	5	4	2	1	1	1	1	1	1	1	1	1	0	1	1	2	1.5	5	
24-May	Z	1	1	1	1	1	2	2	1	1	1	1	1	1	3	3	3	3	3	3	3	2	1	0	1	1.6	3
25-May	1	Z	4	4	2	2	2	2	6	4	4	2	2	2	2	3	2	1	1	4	3	1	1	2	2.4	6	
26-May	2	1	Z	1	1	1	1	2	1	1	0	1	0	1	1	1	1	1	0	0	1	1	2	1	0.8	2	
27-May	1	1	1	Z	2	2	2	3	2	1	1	1	1	3	2	2	1	1	1	1	1	1	1	1	1.3	3	
28-May	1	1	1	0	Z	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0.5	1	
29-May	0	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	1	2	4	4	2	0	0	1	3	0.9	4	
30-May	Z	7	8	7	1	2	4	2	2	2	1	0	2	1	1	1	1	1	0	0	0	0	0	1	1.8	8	
31-May	1	Z	1	0	0	0	0	1	3	2	2	2	1	0	0	0	0	0	0	1	2	2	3	2	1.0	3	

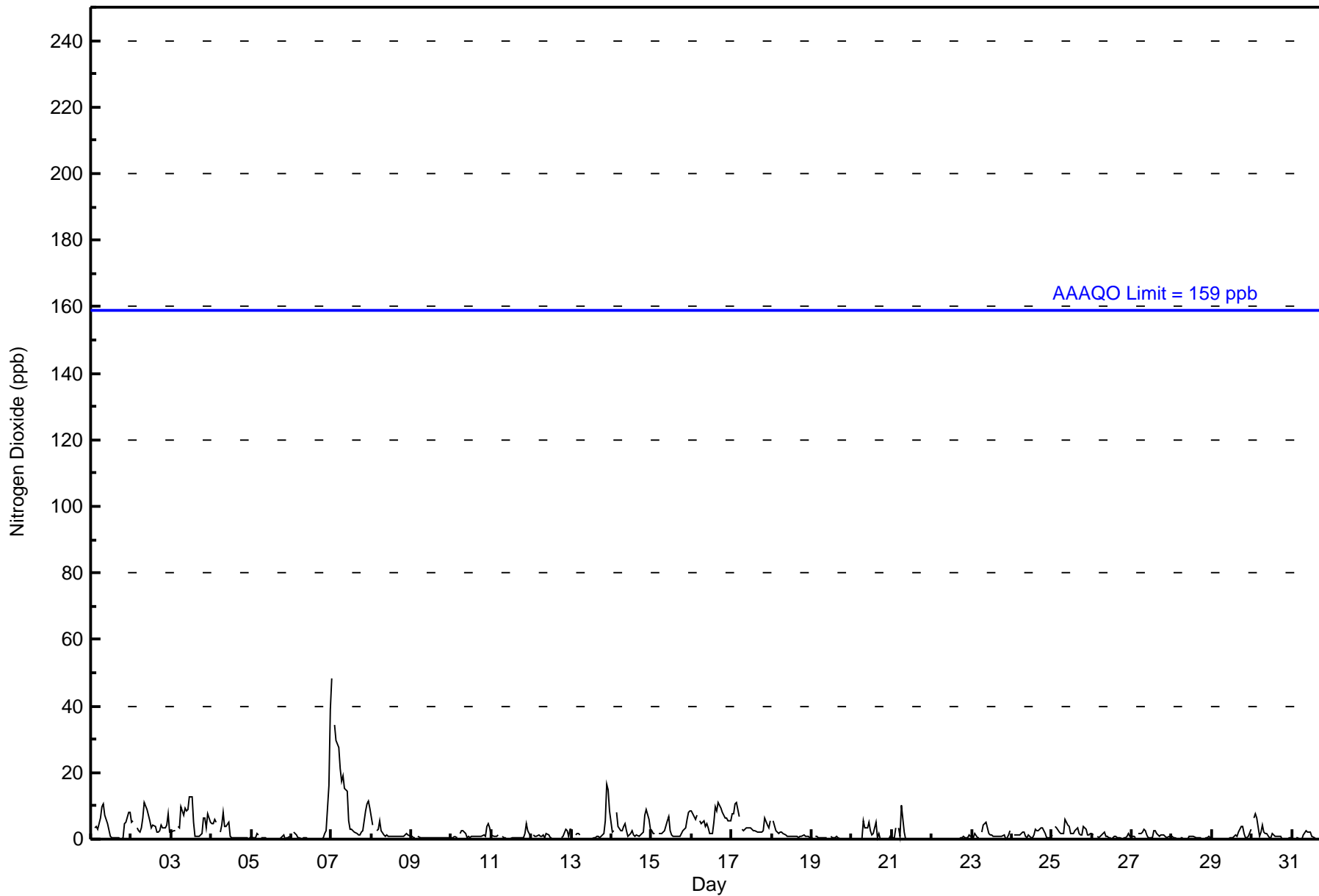
4.1	2.3	3.6	3.6	2.8	2.6	3.1	3.3	2.9	2.6	2.2	1.5	1.3	1.3	1.4	1.1	1.2	1.2	1.3	1.6	2.3	2.9	3.6	3.8	Diurnal Average	
48	8	35	30	28	21	17	19	15	15	9	13	13	5	10	8	11	10	8	7	8	17	16	39	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	99.15	99.15
21 - 40	5	0.71	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	146	51	21	20	8	8	23	73	54	44	26	27	35	60	62	41	699
21 - 40	0	0	0	0	0	0	0	2	1	1	0	1	0	0	0	0	5
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	146	51	21	20	8	8	24	75	55	45	26	28	35	60	62	41	705

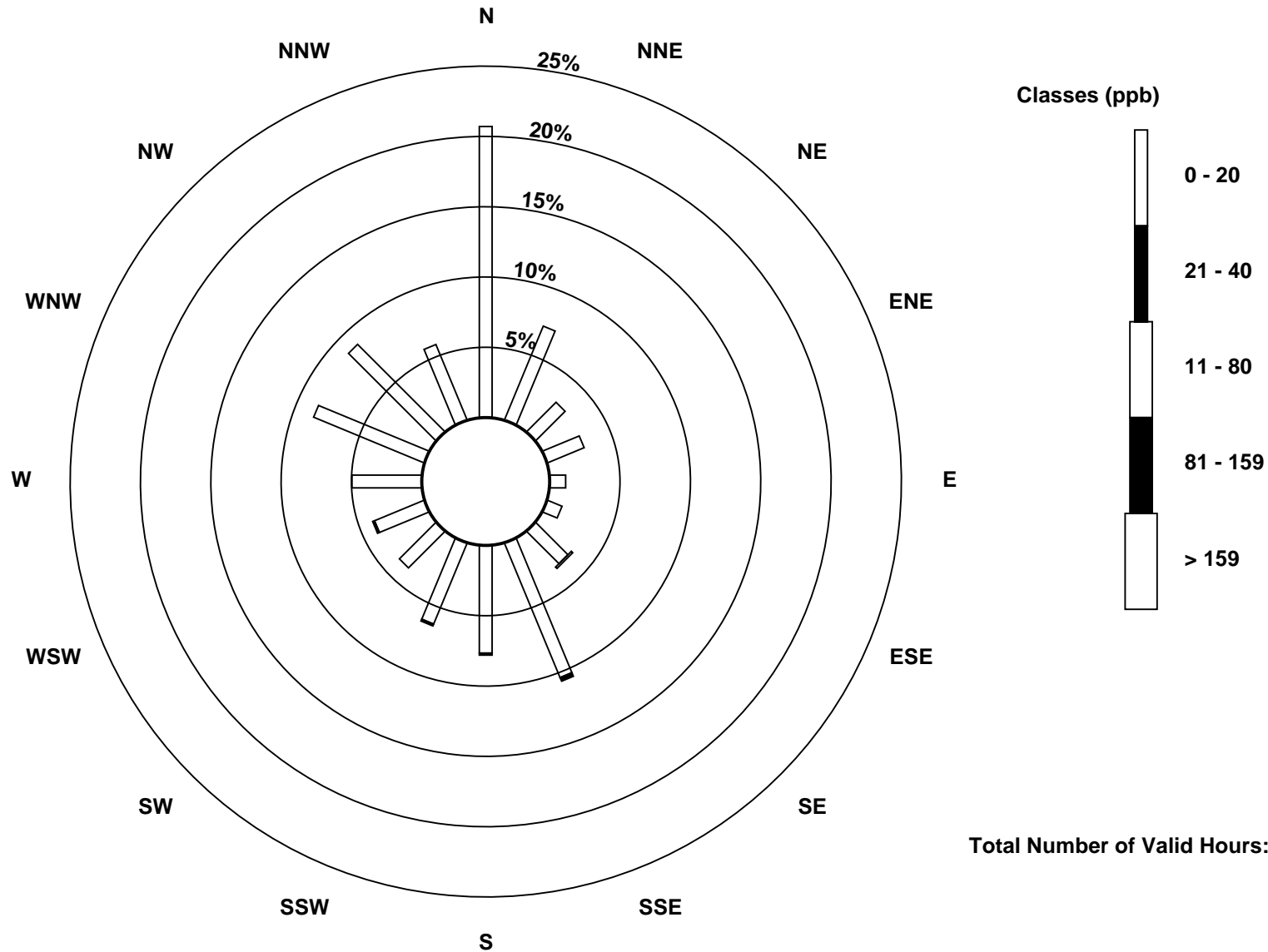
Total Number of Valid Hours: 705

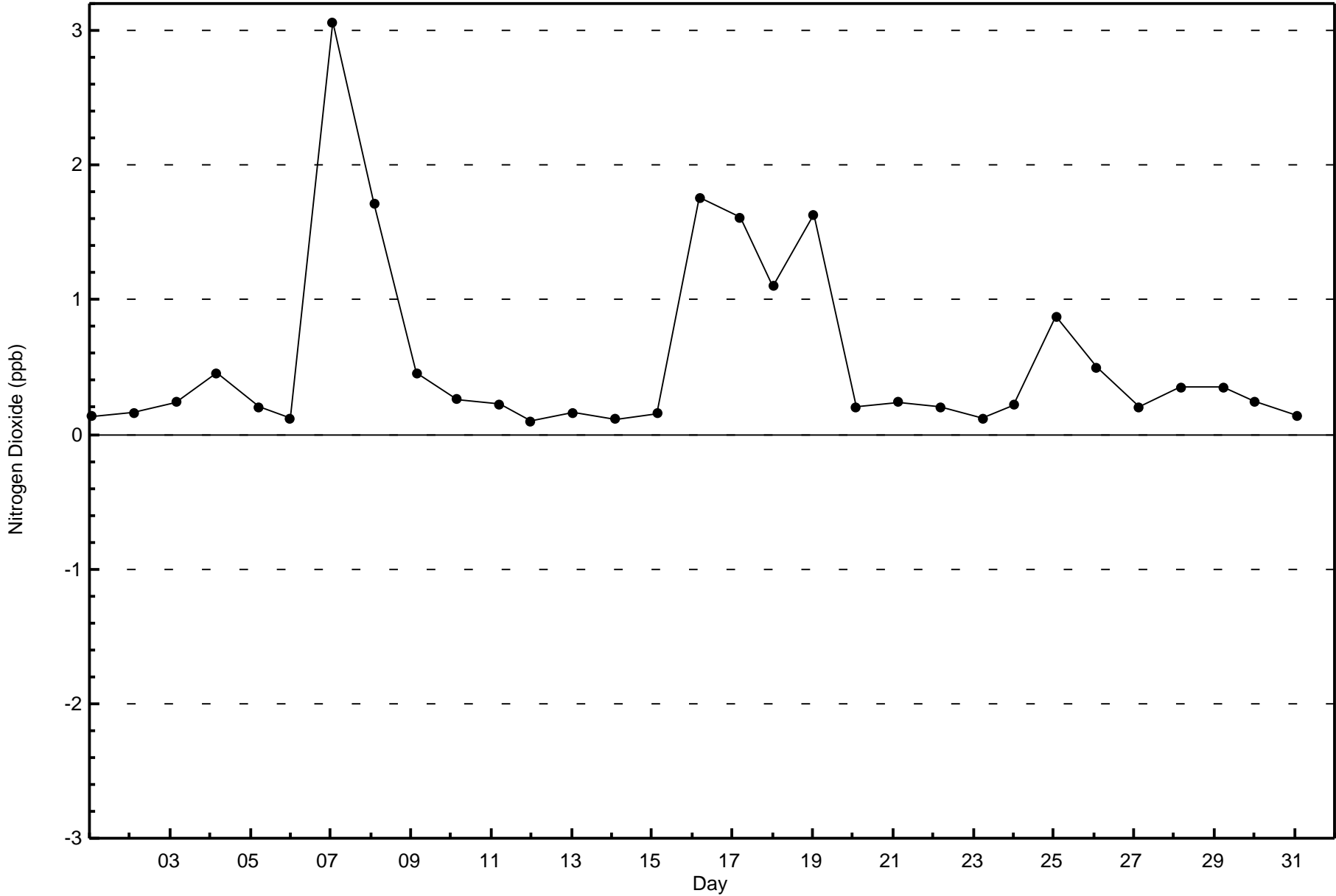
Total Number of Hours: 744

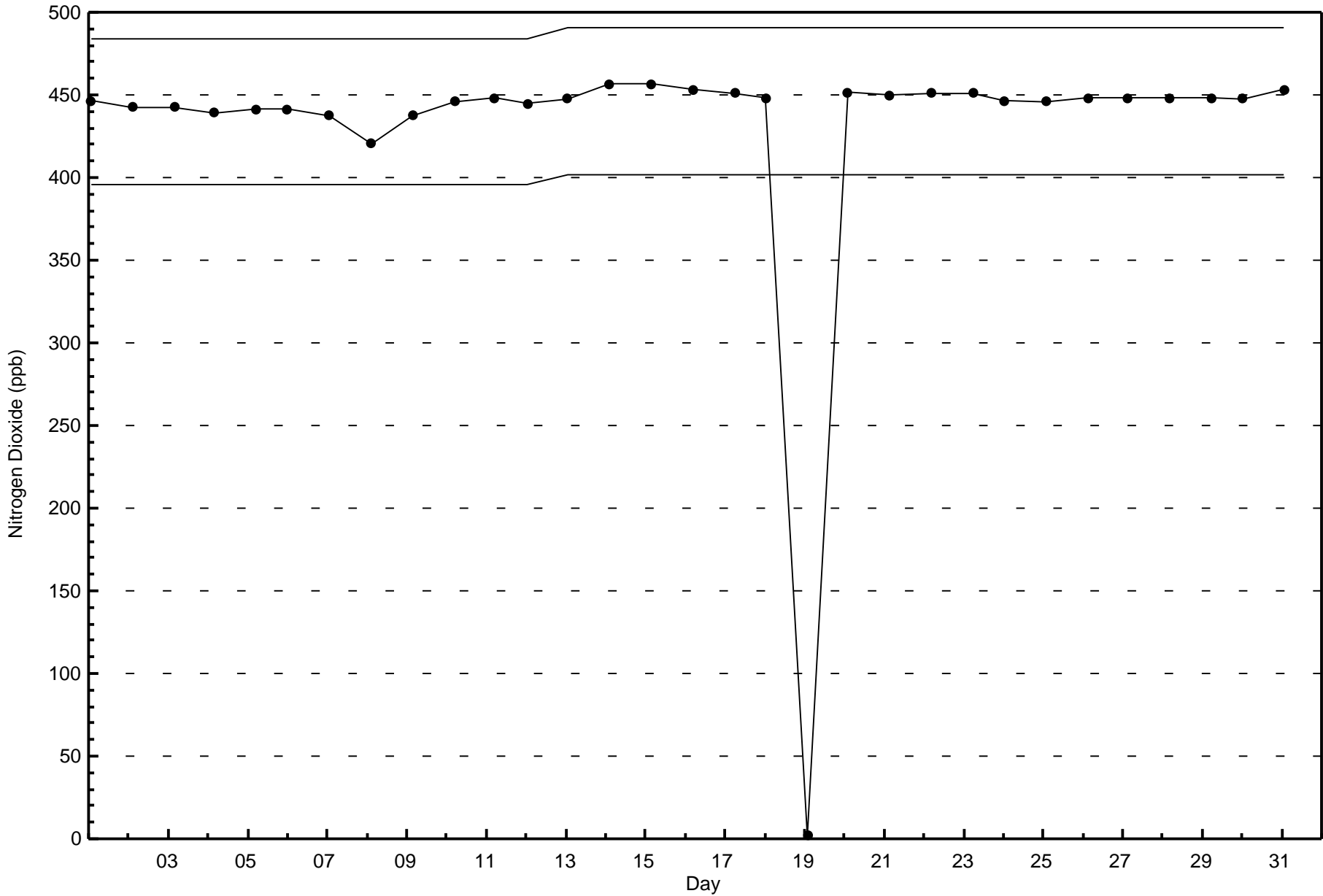


Wood Buffalo Environmental Association
Wind Rose May 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

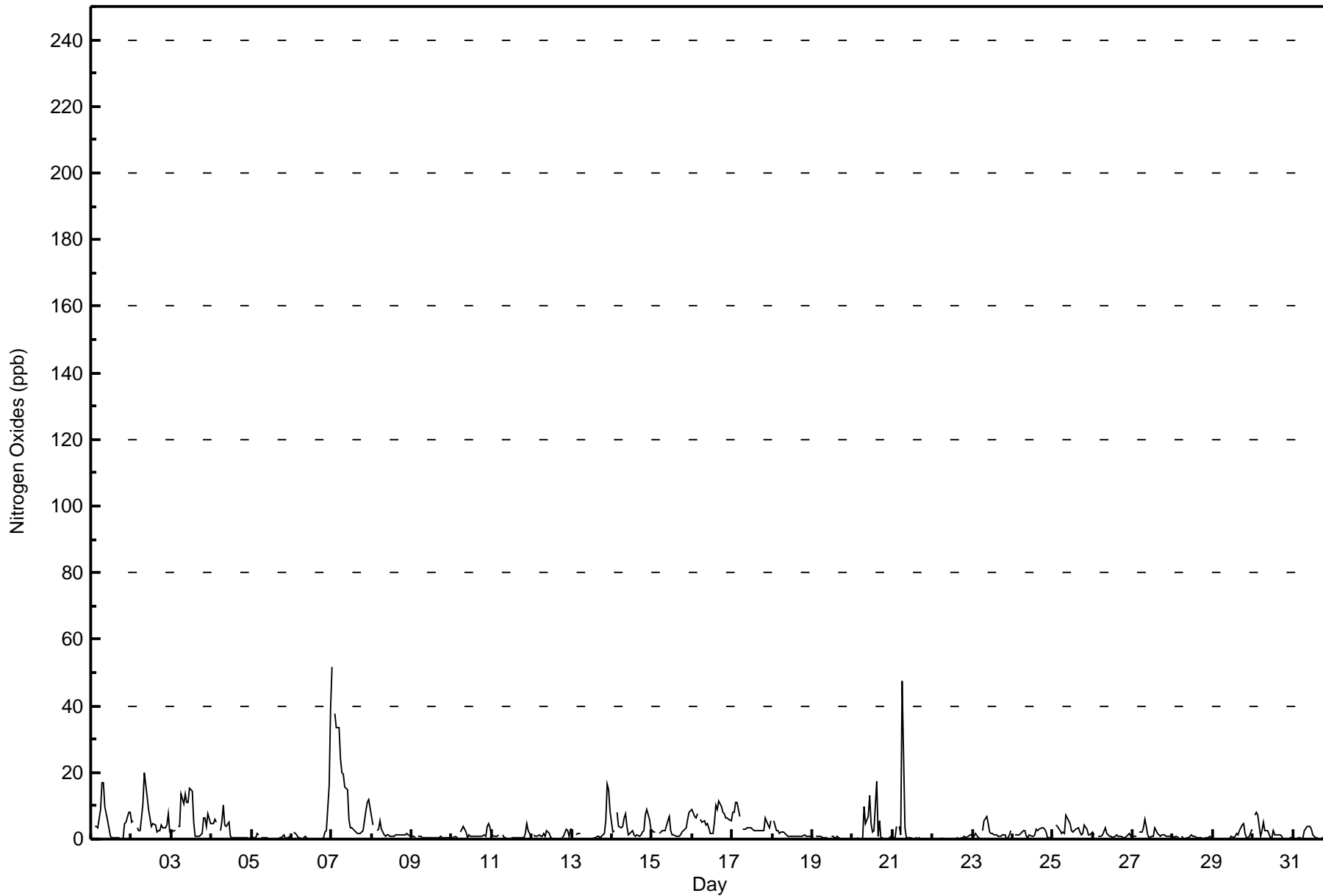
Fort McKay - Bertha Ganter - May 2016

Maximum Value: 52 ppb on May 7 01:00		Maximum Daily Average: 13.8 ppb on May 7		Hours in Service: 744																																												
Minimum Value: 0 ppb on May 13 10:00		Minimum Daily Average: 0.3 ppb on May 22		Hours of Data: 705																																												
Maximum Diurnal Average: 5.1 ppb at hour 7		Minimum Diurnal Average: 1.3 ppb at hour 16		Hours of Missing Data: 39																																												
Monthly Average: 2.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 19		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-May	5	Z	4	4	3	9	17	17	10	7	5	1	0	0	0	0	0	0	0	1	5	5	8	8	4.8	17																						
2-May	5	6	Z	3	3	3	6	11	20	13	9	6	4	5	4	2	2	3	4	3	3	4	8	2	5.6	20																						
3-May	2	2	3	Z	4	4	13	11	14	11	11	15	14	5	1	1	1	1	2	6	6	4	8	5	6.2	15																						
4-May	4	5	6	5	Z	2	5	10	4	4	5	1	1	0	0	0	0	0	1	1	1	0	0	1	2.5	10																						
5-May	1	0	1	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.4	2																						
6-May	Z	2	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	16	39	3.0	39																						
7-May	52	Z	38	34	34	24	20	19	16	15	6	3	3	3	2	2	2	2	2	3	9	11	12	9	13.8	52																						
8-May	7	4	Z	3	3	6	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2.0	7																						
9-May	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0.5	1																						
10-May	1	1	1	1	Z	2	3	4	2	1	1	1	1	1	1	1	1	1	1	1	1	4	5	3	1.6	5																						
11-May	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	4	3	1	0.8	4																						
12-May	Z	1	1	1	1	1	1	2	1	2	2	1	0	C	C	C	C	C	1	1	3	2	1	3	1.3	3																						
13-May	3	Z	1	2	2	1	M	M	0	0	0	0	0	0	0	1	1	0	1	2	6	17	15	9	2.9	17																						
14-May	2	2	Z	8	4	3	4	6	7	4	1	2	3	1	1	1	1	1	2	2	7	9	6	3	3.6	9																						
15-May	3	2	2	Z	2	2	2	3	3	5	7	2	1	1	1	1	1	1	2	3	3	6	8	9	3.0	9																						
16-May	9	7	6	7	Z	6	5	6	4	5	4	2	2	5	10	9	11	10	8	7	7	6	6	5	6.4	11																						
17-May	8	8	11	11	7	Z	3	3	3	3	4	3	3	3	3	2	2	2	2	3	6	4	4	6	4.5	11																						
18-May	Z	5	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	5																						
19-May	1	Z	1	1	1	1	1	1	1	1	1	M	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1																						
20-May	0	0	Z	0	0	0	0	10	5	7	13	5	2	3	18	1	6	0	0	0	0	0	0	1	3.1	18																						
21-May	0	1	4	Z	4	1	47	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.8	47																						
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0.3	1																						
23-May	1	1	2	0	0	Z	3	5	7	5	2	2	2	1	1	1	1	1	1	1	0	0	1	2	1.8	7																						
24-May	Z	1	1	1	1	2	3	2	1	1	1	1	1	1	3	3	3	3	3	3	2	1	1	1	1.7	3																						
25-May	1	Z	4	4	2	2	2	2	7	6	5	2	2	2	3	4	2	1	2	4	3	1	1	2	2.8	7																						
26-May	2	1	Z	1	1	1	1	4	2	1	1	1	0	1	1	1	1	1	0	1	1	1	2	1	1.1	4																						
27-May	1	1	1	Z	2	2	3	6	4	1	1	1	1	4	3	2	1	1	1	1	1	1	1	1	1.7	6																						
28-May	1	0	1	0	Z	1	1	0	0	0	1	1	1	1	0	0	0	1	0	0	1	1	1	0	0.6	1																						
29-May	0	0	0	0	0	Z	0	0	0	0	0	1	0	1	2	1	3	4	5	2	0	0	1	3	1.0	5																						
30-May	Z	7	8	7	1	2	5	3	3	3	1	1	3	1	1	1	1	1	0	0	0	0	0	1	2.2	8																						
31-May	1	Z	1	0	0	0	0	2	4	4	4	3	1	0	0	0	0	0	0	1	2	2	3	2	1.4	4																						
																								4.3	2.4	3.8	3.8	3.1	3.0	5.1	4.5	3.9	3.3	2.9	1.9	1.6	1.5	2.0	1.3	1.5	1.3	1.4	1.6	2.4	2.9	3.6	3.9	Diurnal Average
																								52	8	38	34	34	24	47	19	20	15	13	15	14	5	18	9	11	10	8	7	9	17	16	39	Diurnal Maximum
Z - zerospan																								C - Calibration				M - Maintenance																				



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	99.01	99.01
21 - 40	5	0.71	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	145	51	21	20	8	8	23	73	54	44	26	27	35	60	62	41	698
21 - 40	0	0	0	0	0	0	0	2	1	1	0	1	0	0	0	0	5
11 - 80	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	146	51	21	20	8	8	24	75	55	45	26	28	35	60	62	41	705

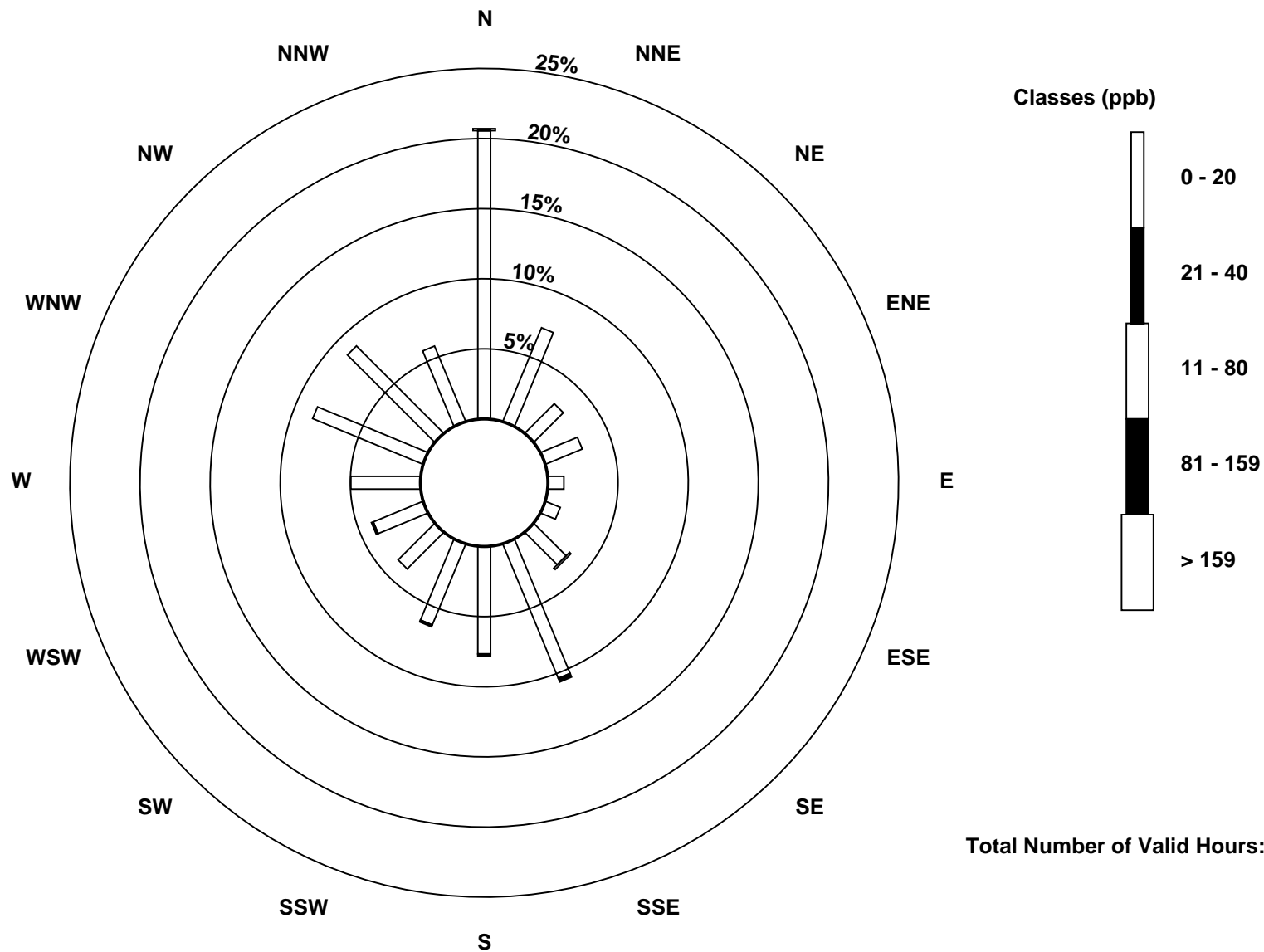
Total Number of Valid Hours: 705

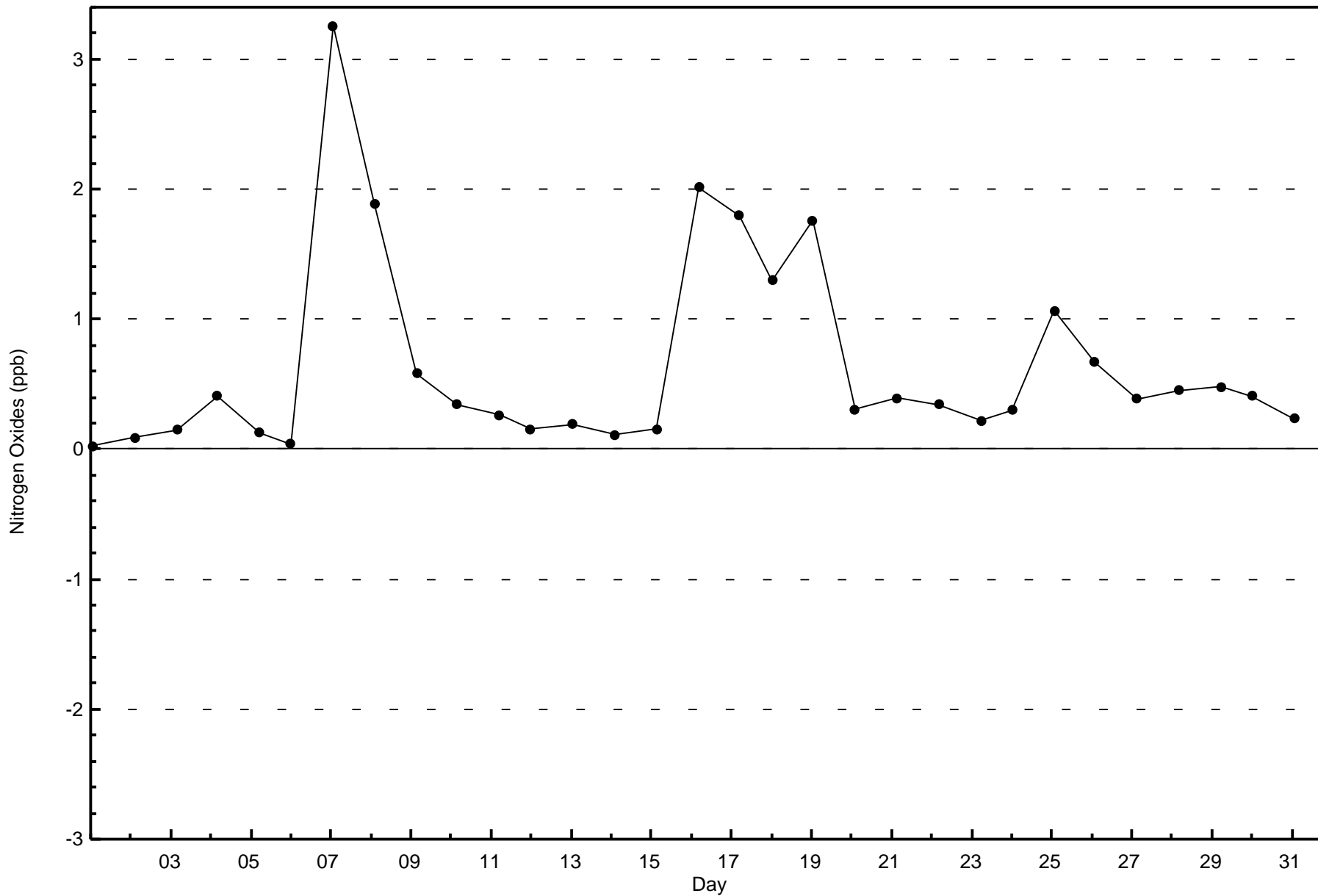
Total Number of Hours: 744

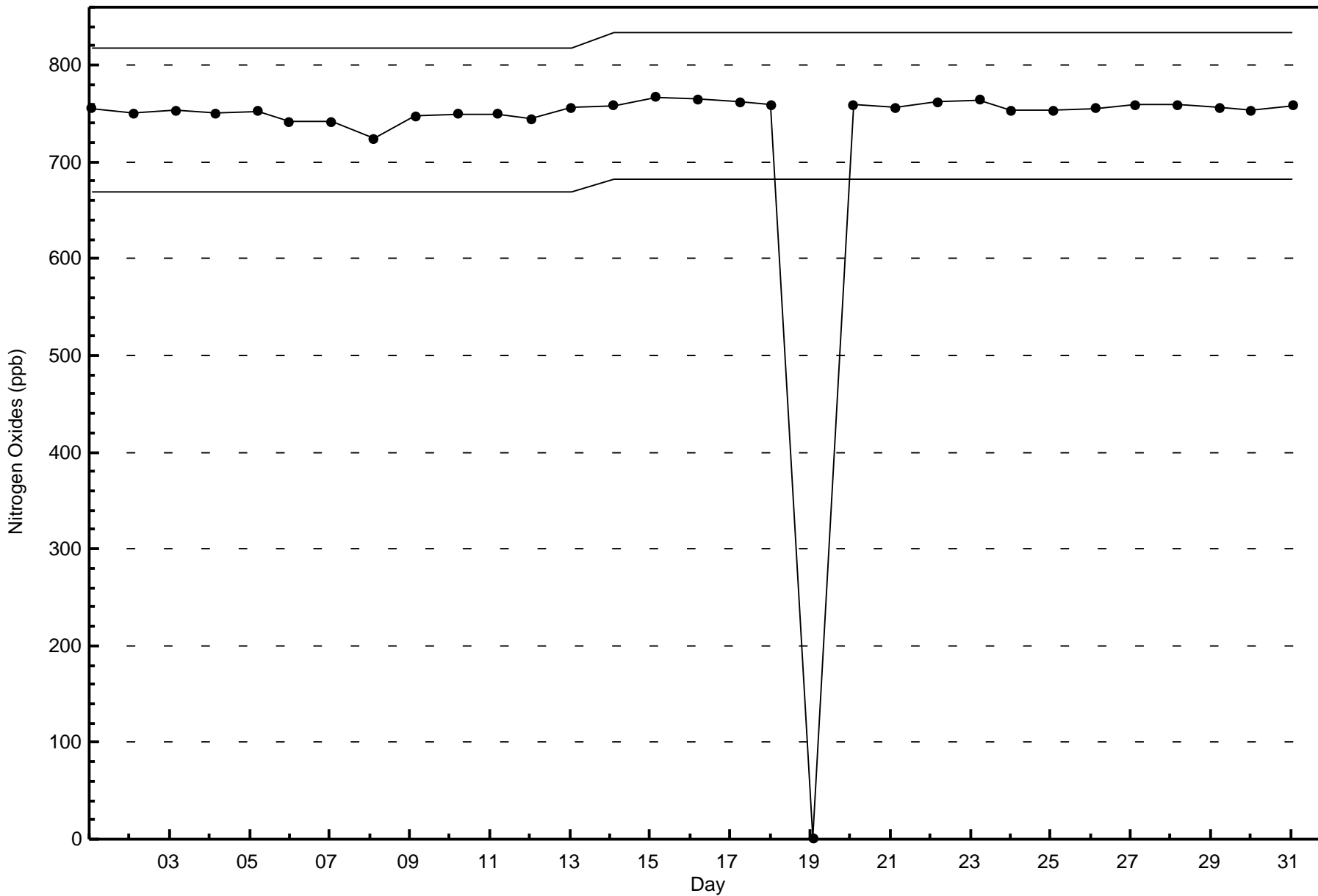


Wood Buffalo Environmental Association
Wind Rose May 2016

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









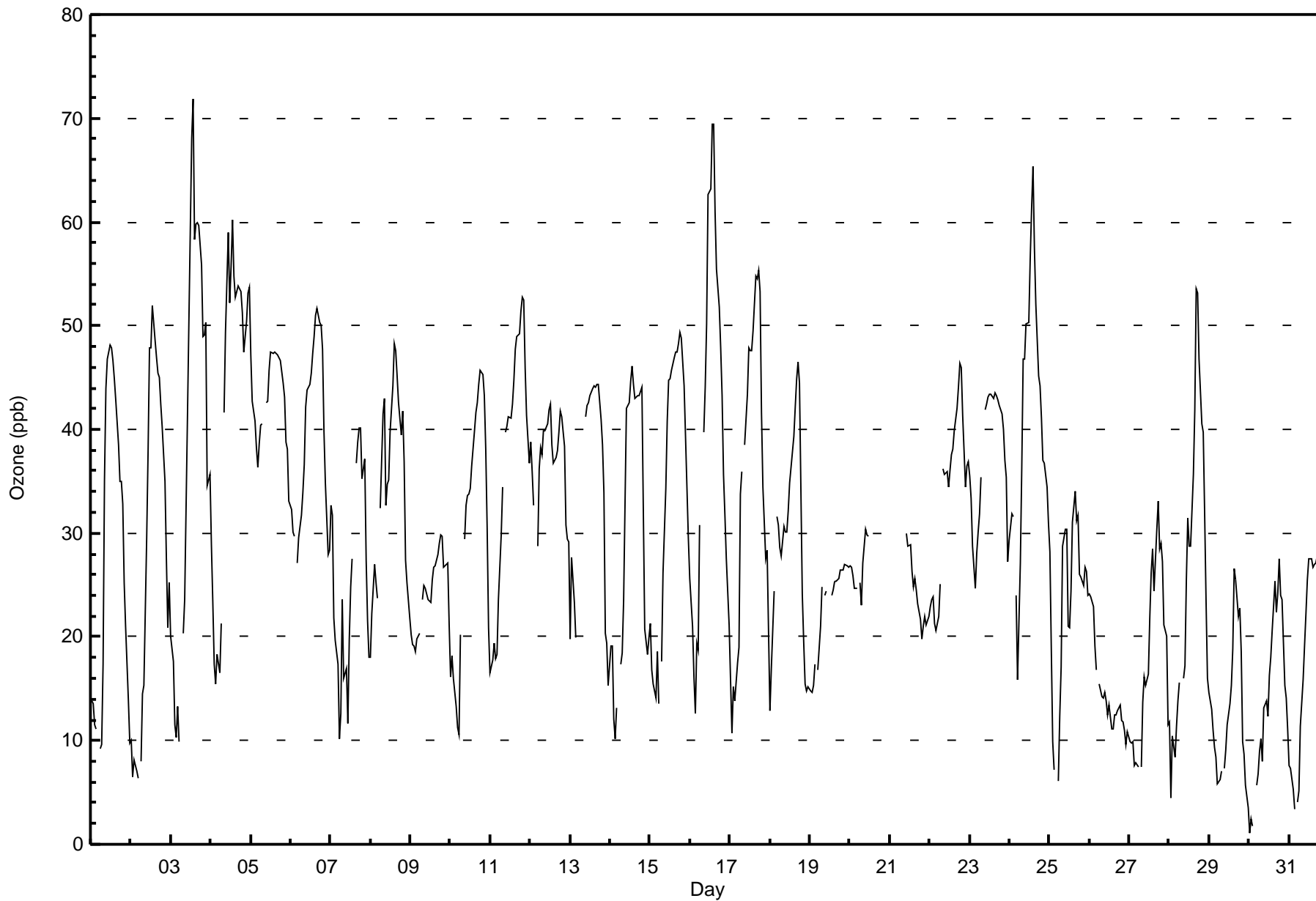
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 72 ppb on May 3 14:00										Maximum Daily Average: 42.8 ppb on May 5										Hours of Data: 686						
Minimum Value: 1 ppb on May 30 01:00										Minimum Daily Average: 12.8 ppb on May 29										Hours of Missing Data: 58						
Maximum Diurnal Average: 40.6 ppb at hour 17										Minimum Diurnal Average: 15.6 ppb at hour 4										Hours of Calibration: 33						
Monthly Average: 30.0 ppb										Percentiles: P ₁ = 5 P ₁₀ = 12 Q ₁ = 19 Median = 29 O ₃ = 42 P ₉₀ = 48 P ₉₉ = 63										Percent Operational Time: 96.6						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	14	14	12	11	Z	9	10	17	35	44	47	48	48	47	45	43	38	35	35	33	25	21	14	10	28.4	48
2-May	10	6	8	7	6	Z	8	14	15	30	38	48	48	52	49	47	45	45	42	40	35	28	21	25	29.0	52
3-May	20	18	12	10	13	10	Z	20	24	33	41	50	68	72	58	60	60	60	56	49	49	50	35	36	39.3	72
4-May	29	23	17	15	18	17	21	Z	42	49	59	52	56	60	55	53	54	54	53	51	47	50	53	54	42.8	60
5-May	47	43	41	38	36	39	40	41	Z	43	43	46	47	47	47	47	47	47	47	44	43	39	38	33	42.8	47
6-May	32	30	30	Z	27	30	32	34	37	42	44	44	45	47	49	51	52	50	50	48	40	35	28	28	39.3	52
7-May	33	32	22	20	17	10	13	24	16	17	12	20	25	28	Z	37	39	40	40	35	37	27	22	18	25.3	40
8-May	18	22	27	25	24	Z	32	41	43	33	35	35	40	44	48	48	45	43	39	42	37	27	25	22	34.6	48
9-May	20	19	19	19	20	20	Z	24	25	25	24	23	23	25	27	27	28	29	30	30	27	27	27	21	24.3	30
10-May	16	18	16	13	11	11	20	Z	29	33	34	34	34	36	40	42	43	44	46	45	43	38	31	21	30.4	46
11-May	17	18	19	18	18	24	30	34	Z	40	40	41	41	42	45	48	49	49	51	53	53	46	41	37	37.1	53
12-May	39	36	33	Z	29	36	38	38	40	40	41	42	42	38	37	37	38	40	42	41	38	31	29	29	37.1	42
13-May	20	28	23	20	Z	19	C	C	C	41	42	43	43	44	44	44	44	41	39	34	20	19	15	15	33.4	44
14-May	19	19	12	10	13	Z	17	18	23	33	42	43	45	46	44	43	43	44	44	44	32	21	18	20	30.2	46
15-May	21	17	15	14	19	14	Z	18	26	34	41	45	45	46	47	47	47	48	49	49	44	39	34	30	34.3	49
16-May	26	21	16	13	19	19	31	Z	40	44	50	63	63	69	69	61	55	52	48	43	36	32	28	21	39.9	69
17-May	16	11	15	14	18	19	34	36	Z	38	43	48	48	48	50	55	55	55	53	42	34	28	28	21	35.1	55
18-May	13	17	24	Z	32	31	29	28	31	30	30	32	35	38	39	42	45	46	44	24	20	15	15	15	29.3	46
19-May	15	15	15	17	Z	17	21	25	M	24	24	M	M	24	25	25	25	26	26	26	26	27	27	27	22.9	27
20-May	27	27	26	25	25	Z	25	23	27	30	30	30	PF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	30
21-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	30	29	29	26	25	26	25	23	22	20	21	22	21	22	--	30
22-May	23	24	24	21	21	22	25	Z	36	36	36	34	36	38	38	40	42	44	46	46	41	34	36	37	33.9	46
23-May	36	33	29	25	28	30	32	35	Z	42	42	43	43	43	44	43	43	42	41	40	37	35	27	27	37.3	44
24-May	29	32	32	Z	24	16	27	36	47	47	50	50	56	61	65	57	52	45	44	41	37	37	34	31	41.4	65
25-May	28	19	10	7	Z	6	12	17	29	30	30	21	21	24	31	34	31	32	26	26	25	27	26	24	23.4	34
26-May	24	24	23	19	17	Z	15	14	14	15	14	12	13	11	11	12	12	13	13	12	12	11	10	11	14.5	24
27-May	10	10	10	8	8	8	Z	7	14	16	15	16	22	26	29	24	30	33	29	29	27	21	20	12	18.4	33
28-May	12	5	10	8	11	14	16	Z	16	17	25	31	29	29	36	42	53	53	47	41	40	32	23	16	26.4	53
29-May	15	13	11	9	8	6	6	7	Z	7	9	12	14	15	19	27	25	22	23	19	10	9	6	4	12.8	27
30-May	1	2	2	Z	6	7	9	10	8	13	14	12	16	18	21	25	22	24	27	24	24	15	14	11	14.2	27
31-May	8	7	5	3	Z	4	5	11	16	19	22	26	27	28	27	27	27	28	28	26	25	19	14	12	18.0	28
21.2 20.0 18.6 15.6 18.7 17.4 22.0 23.9 27.5 31.5 33.8 35.8 38.0 39.1 40.0 40.5 40.6 40.4 39.5 36.8 33.4 28.8 25.8 22.9																								Diurnal Average		
47 43 41 38 36 39 40 41 47 49 59 63 68 72 69 61 60 60 56 53 53 50 53 54																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance										AF - Analyzer Failure 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 - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	196	28.57	28.57
21 - 50	447	65.16	93.73
51 - 82	43	6.27	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	3	3	1	2	4	3	16	11	17	13	11	12	22	17	18	196
21 - 50	87	40	22	18	6	4	18	47	38	20	12	15	22	33	40	25	447
51 - 82	0	3	0	0	0	0	3	8	5	6	2	3	3	6	3	1	43
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	130	46	25	19	8	8	24	71	54	43	27	29	37	61	60	44	686

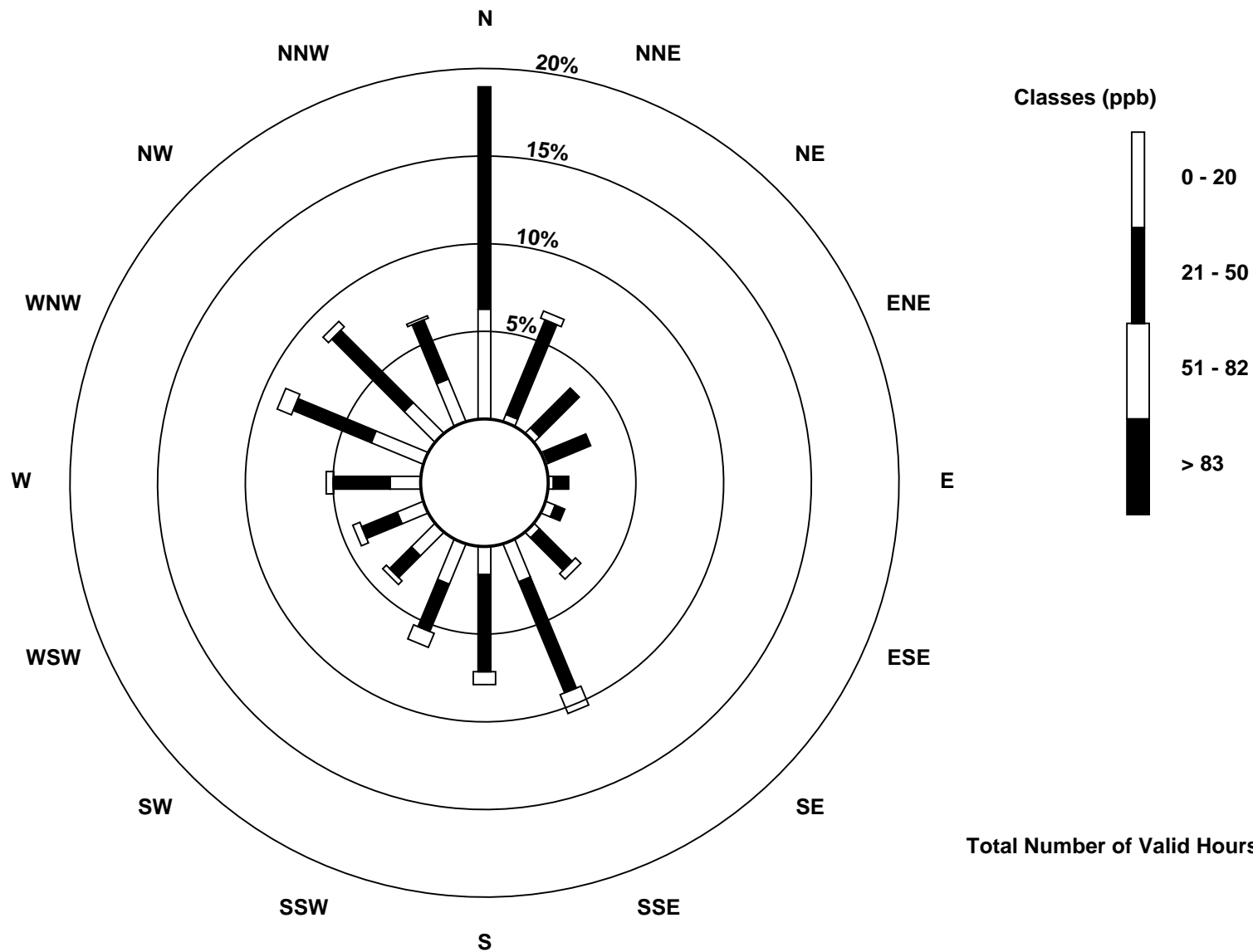
Total Number of Valid Hours: 686

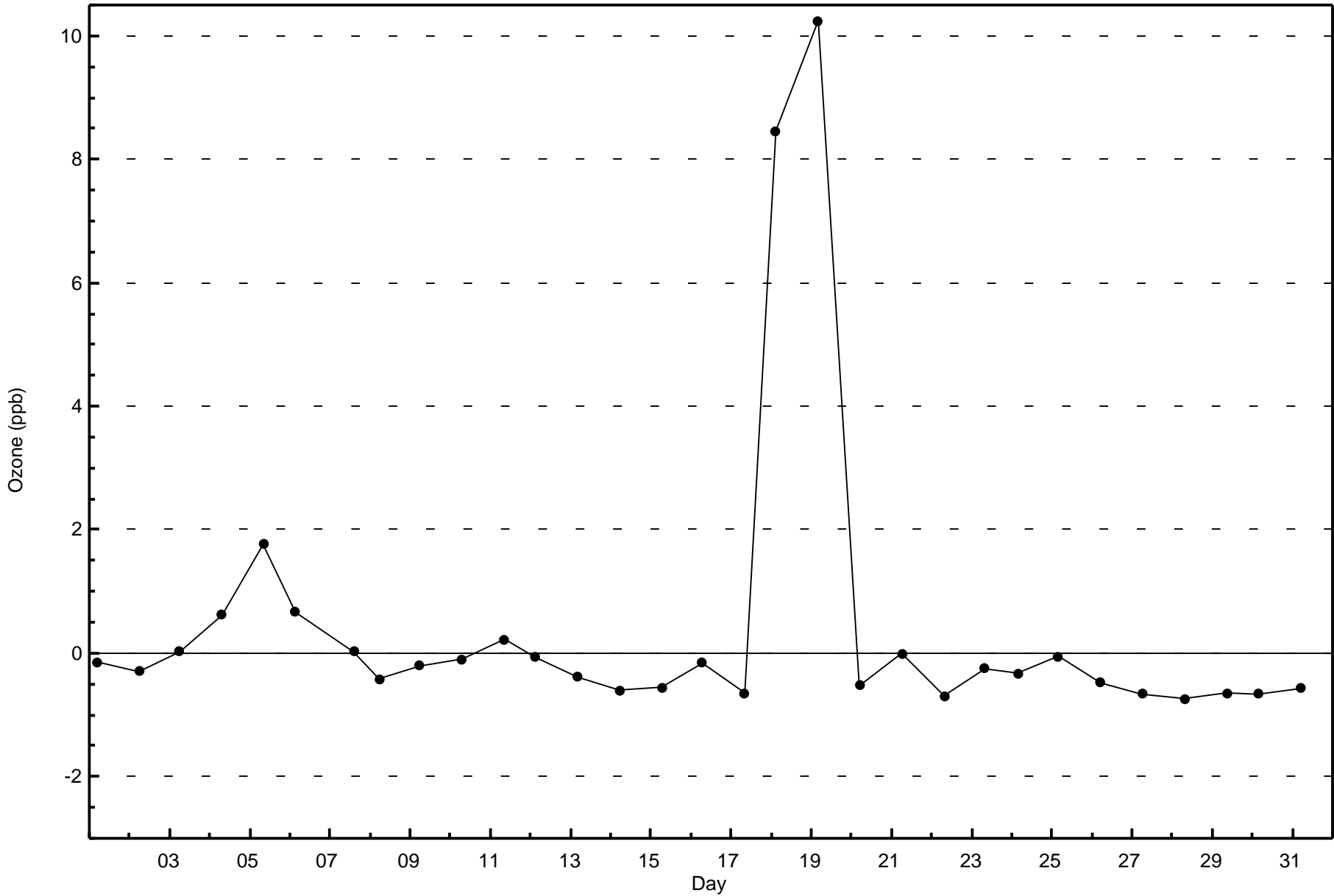
Total Number of Hours: 744

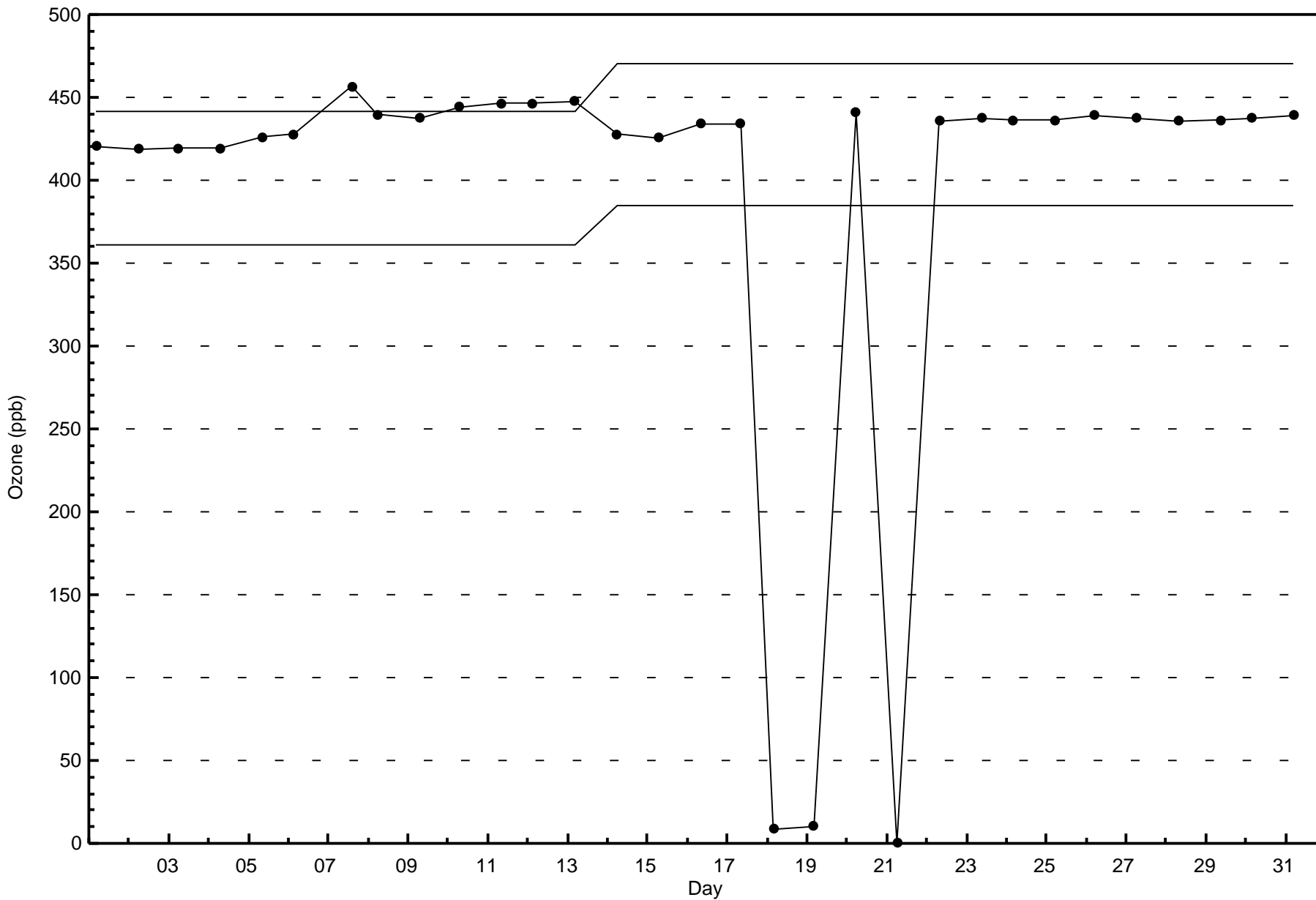


Wood Buffalo Environmental Association
Wind Rose May 2016

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



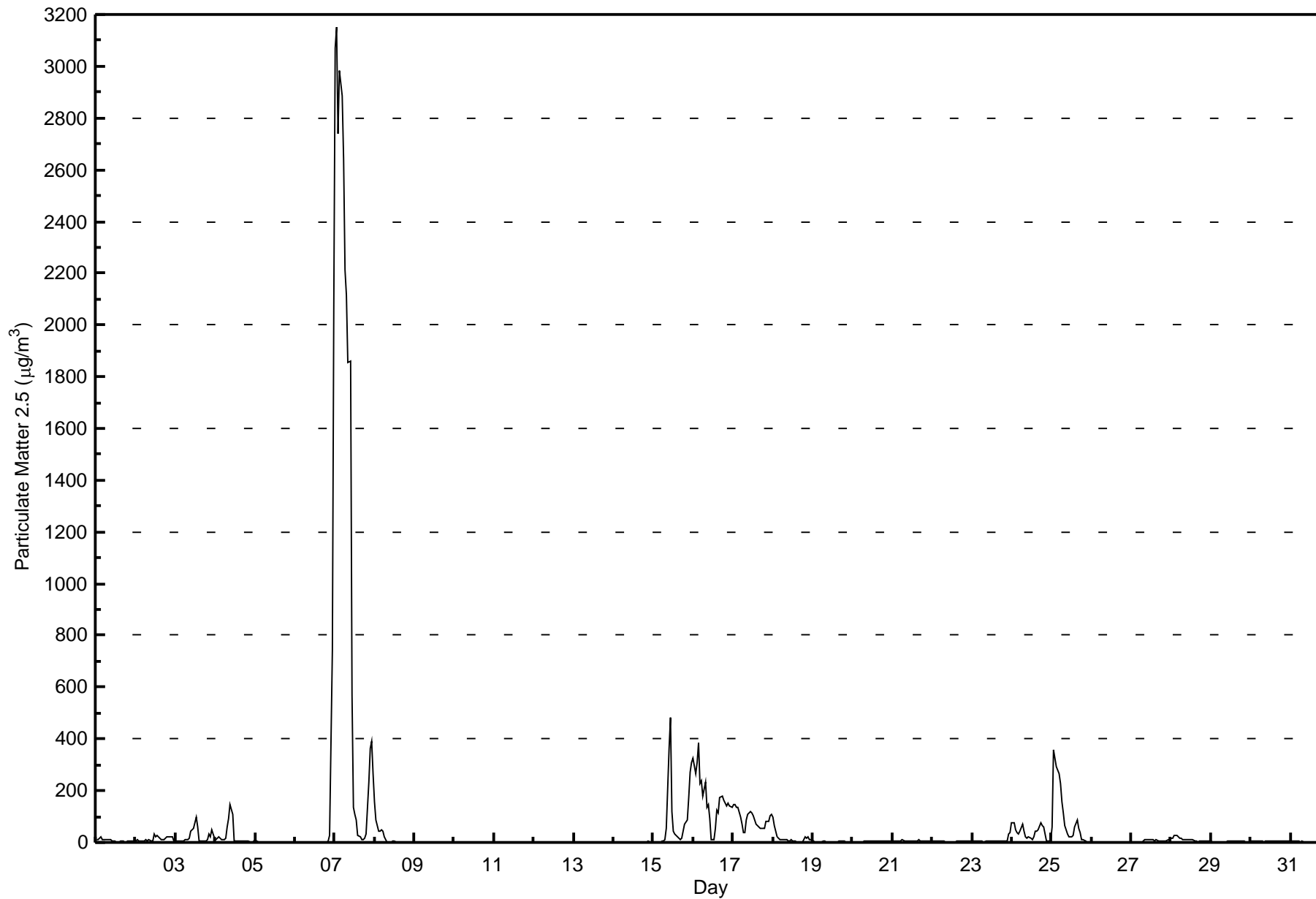






Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	324	44.02	44.02
6 - 15	122	16.58	60.60
16 - 25	32	4.35	64.95
26 - 80	58	7.88	72.83
> 81.0	66	8.97	81.79

Total Number of Valid Hours: 736

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	105	30	6	8	3	4	7	13	14	12	11	10	18	30	30	23	324
6 - 15	23	10	2	0	1	0	4	23	15	12	8	7	3	6	4	4	122
16 - 25	5	0	0	1	0	2	1	11	4	4	2	1	0	1	0	0	32
26 - 80	4	1	2	2	0	1	4	11	15	6	1	2	3	1	1	4	58
> 81.0	1	1	1	3	2	1	7	14	4	10	6	4	4	4	1	3	66
Totals	138	42	11	14	6	8	23	72	52	44	28	24	28	42	36	34	602

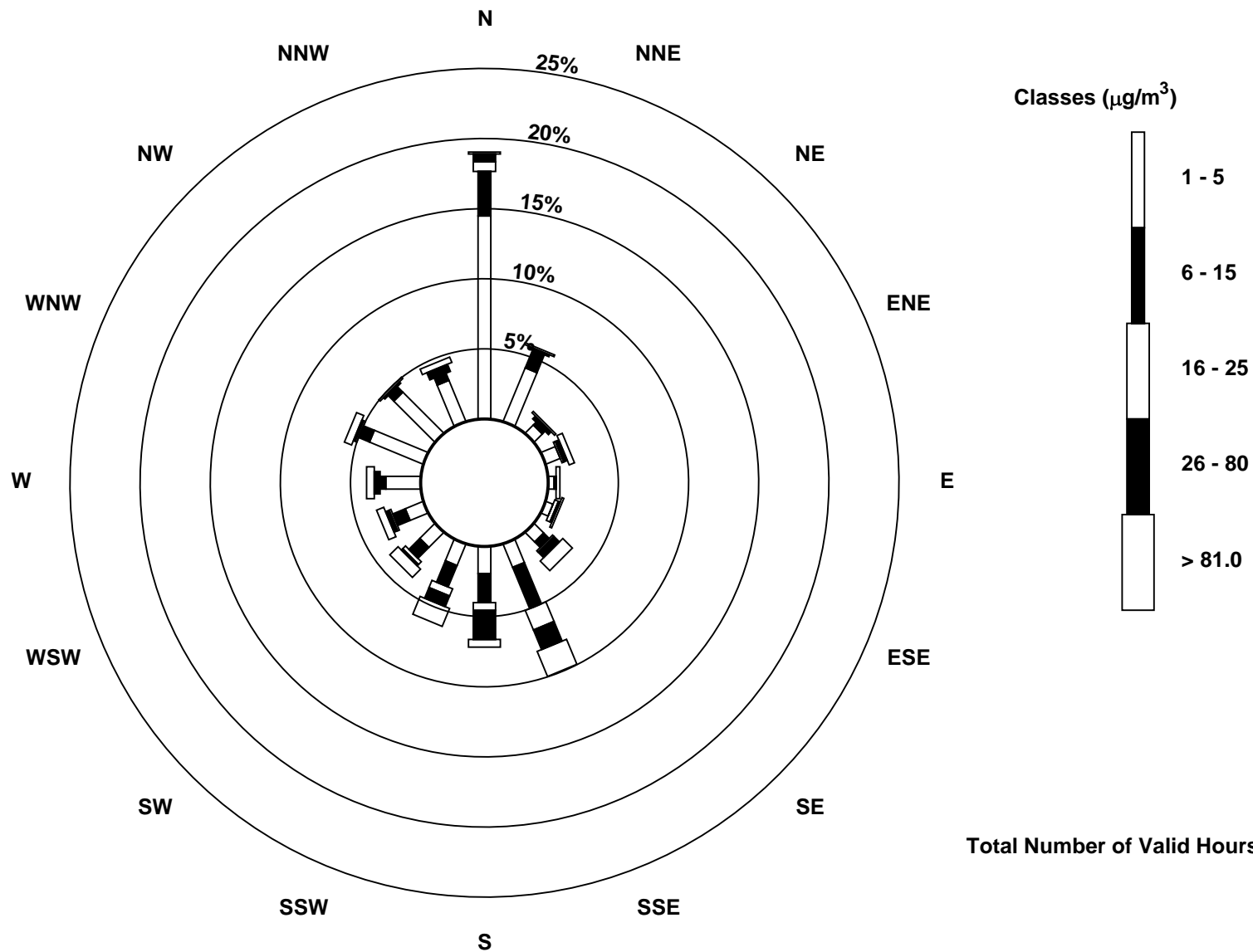
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

Fort McKay - Bertha Ganter - May 2016

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 233 ppb on May 7 10:00	Maximum Daily Average: 94.4 ppb on May 7	Hours in Service: 744
Minimum Value: 0 ppb on May 1 01:00	Maximum Diurnal Average: 18.5 ppb at hour 8	Minimum Daily Average: 0.0 ppb on May 1	Hours of Data: 642
Monthly Average: 6.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 15 P ₉₉ = 128	Minimum Diurnal Average: 1.2 ppb at hour 15	Hours of Missing Data: 102
			Hours of Calibration: 40
			Percent Operational Time: 91.7

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-May	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
2-May	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
3-May	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
4-May	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
5-May	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
6-May	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	110	6.3	110
7-May	162	173	144	106	115	104	107	229	225	233	110	41	37	Z	RE	RE	15	12	12	14	27	40	41	36	94.4	233
8-May	25	20	15	14	Z	RE	RE	13	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.6	25
9-May	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
10-May	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
11-May	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
12-May	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	0	0	--	0
13-May	0	0	0	Z	RE	RE	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-May	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-May	0	0	0	0	0	Z	RE	RE	0	35	82	37	15	10	0	0	0	0	0	14	22	43	66	74	19.0	82
16-May	78	59	36	38	27	30	Z	RE	RE	38	36	14	0	11	20	27	36	40	37	32	26	23	20	18	30.8	78
17-May	18	17	15	15	13	11	10	Z	RE	RE	14	13	13	12	0	0	0	0	0	0	0	0	0	0	7.1	18
18-May	0	0	Z	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-May	0	0	0	Z	0	0	0	0	M	0	0	0	M	M	RE	0	0	0	0	0	0	0	0	0	0.0	0
20-May	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
21-May	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-May	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
23-May	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-May	0	16	Z	RE	19	14	23	23	16	12	16	18	15	13	15	15	13	13	12	14	14	0	0	0	12.7	23
25-May	0	44	51	Z	RE	35	31	31	20	15	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10.7	51
26-May	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-May	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
28-May	0	0	0	0	0	0	Z	RE	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-May	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
30-May	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
31-May	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

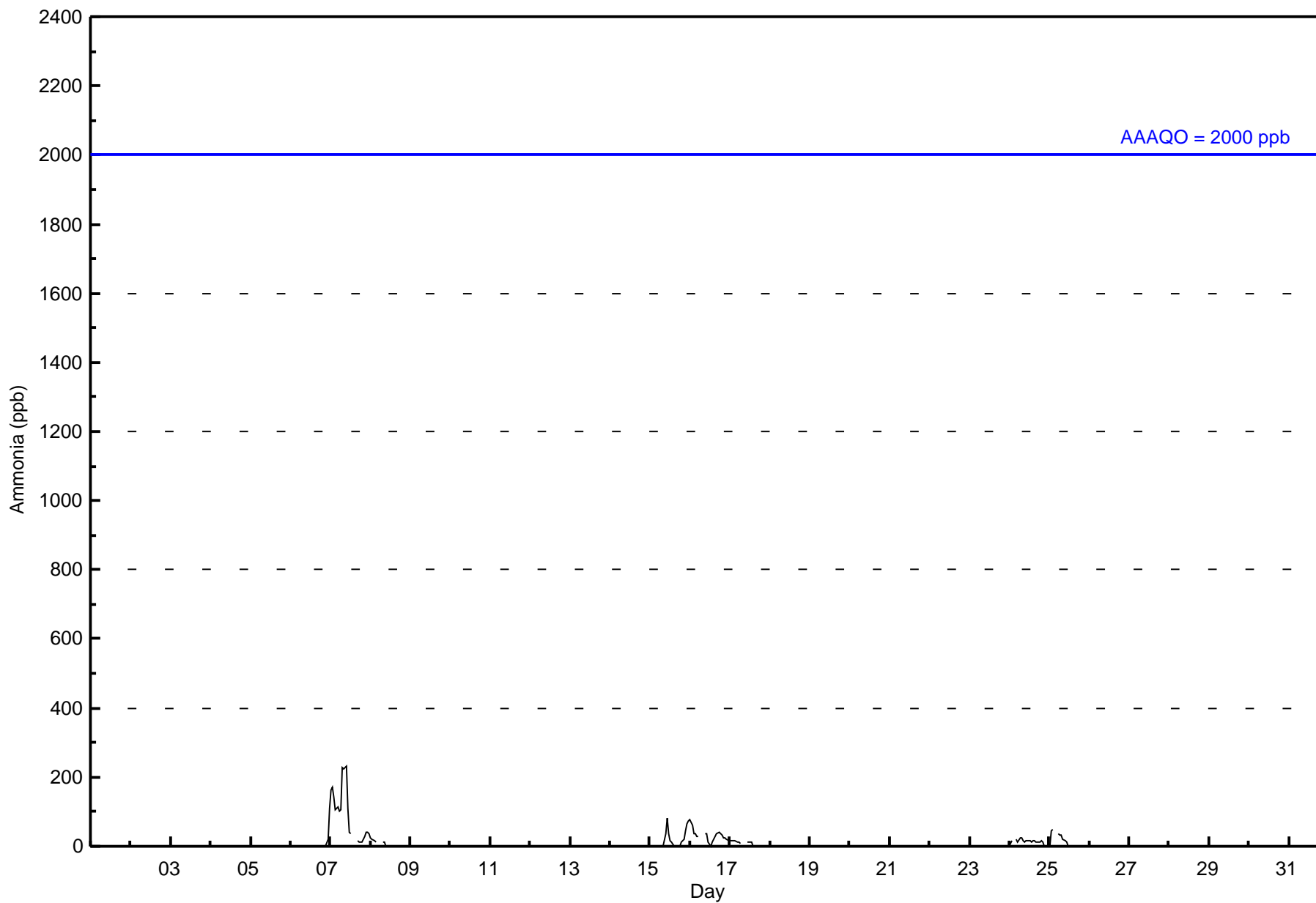
9.1	10.6	10.1	7.9	9.2	10.7	11.4	18.5	13.6	13.3	8.7	3.9	2.6	1.6	1.2	1.4	2.1	2.2	2.0	2.5	3.0	3.5	4.8	7.7	Diurnal Average	
162	173	144	106	115	104	107	229	225	233	110	41	37	13	20	27	36	40	37	32	27	43	66	110	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	546	85.05	85.05
6 - 10	3	0.47	85.51
11 - 15	32	4.98	90.50
16 - 20	12	1.87	92.37
21 - 25	6	0.93	93.30
> 26	43	6.70	100.00

Total Number of Valid Hours: 642

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	130	44	19	12	6	7	11	41	32	28	17	25	32	49	53	40	546
6 - 10	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	3
11 - 15	0	0	1	1	0	0	2	7	8	2	4	1	2	2	1	1	32
16 - 20	0	0	0	1	0	0	0	3	1	2	1	1	0	1	0	2	12
21 - 25	0	0	0	1	0	0	0	2	2	0	0	0	0	0	0	1	6
> 26	1	0	1	2	2	1	7	10	5	8	3	1	1	1	0	0	43
Totals	131	44	21	18	8	8	21	63	48	41	25	28	35	53	54	44	642

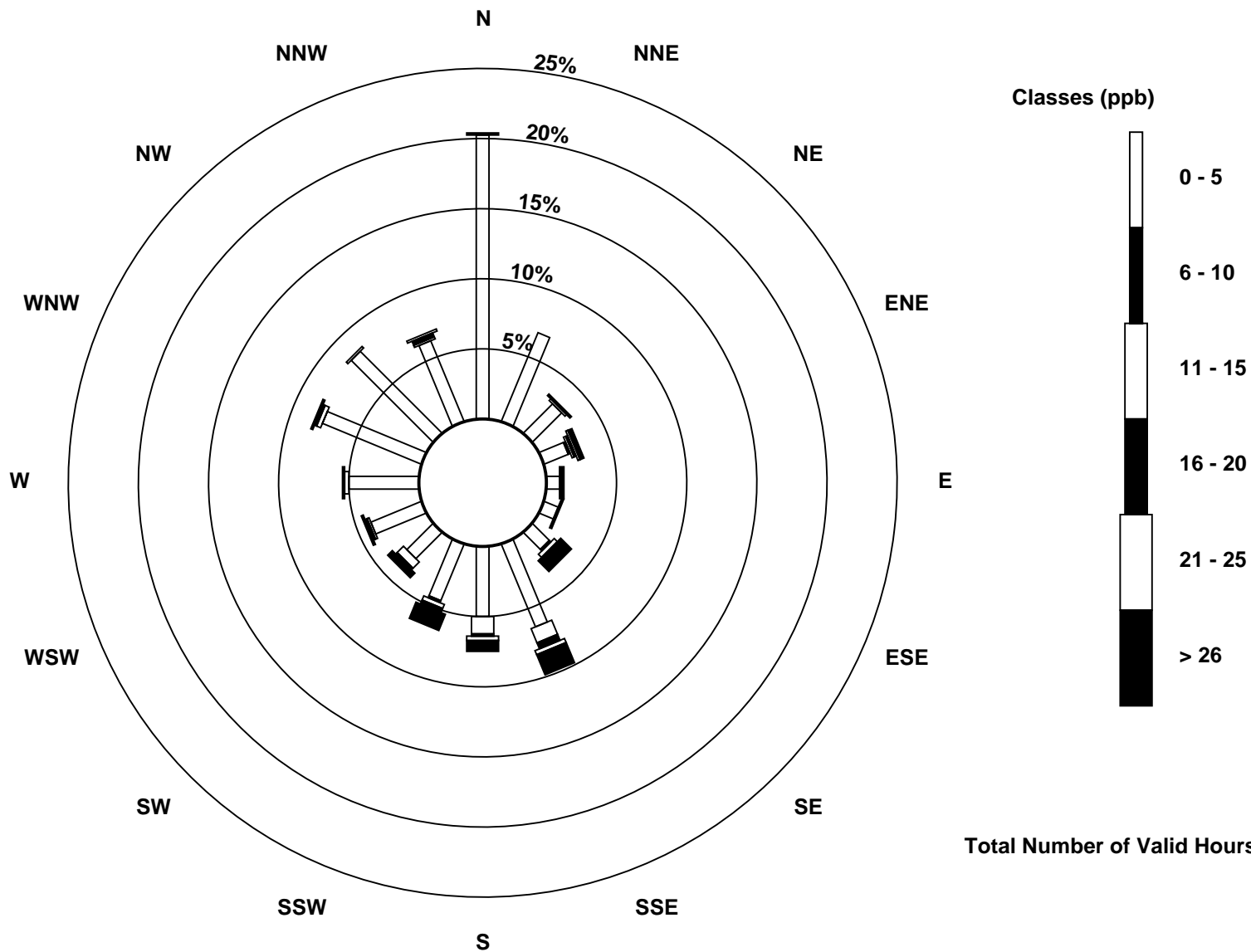
Total Number of Valid Hours: 642

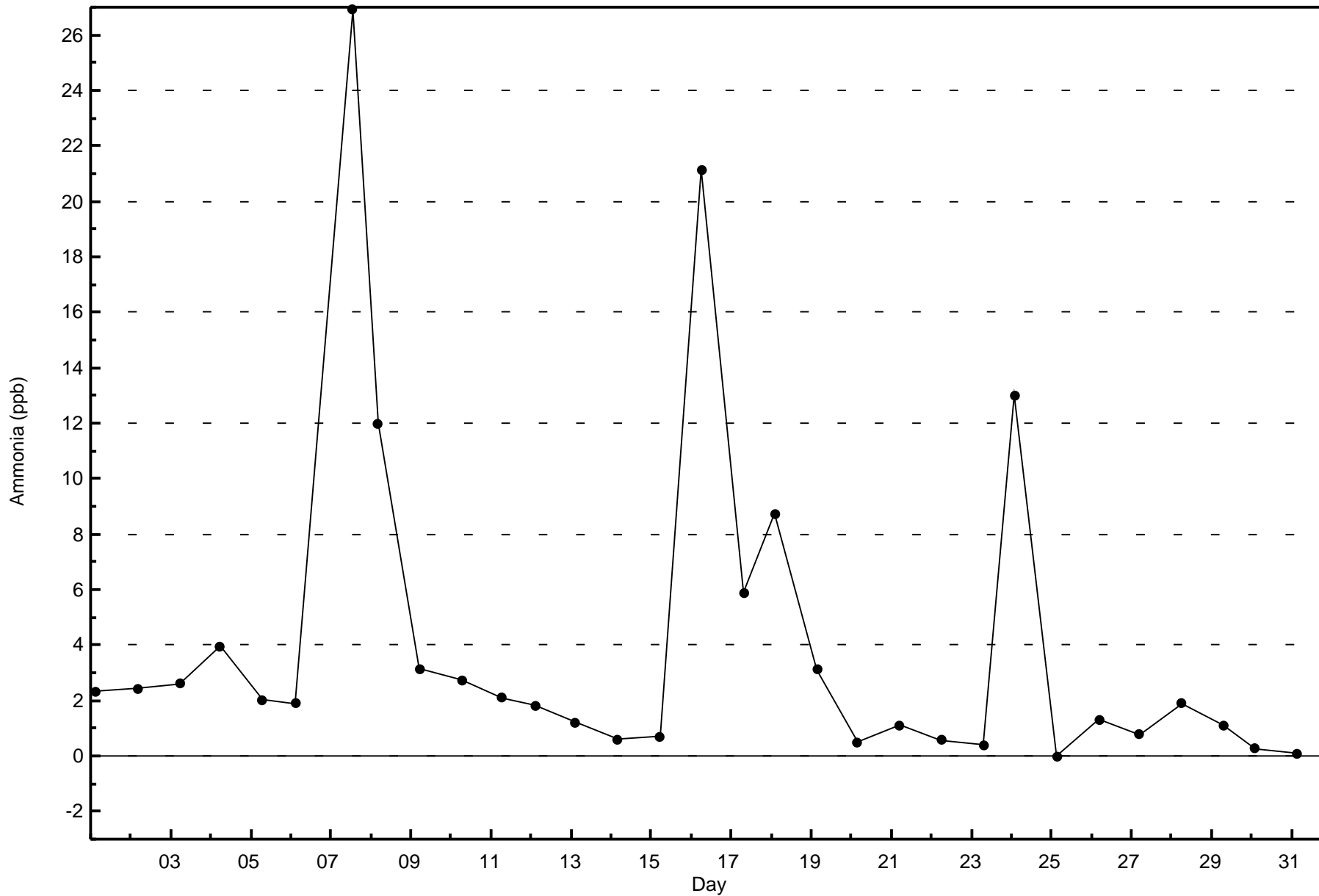
Total Number of Hours: 744

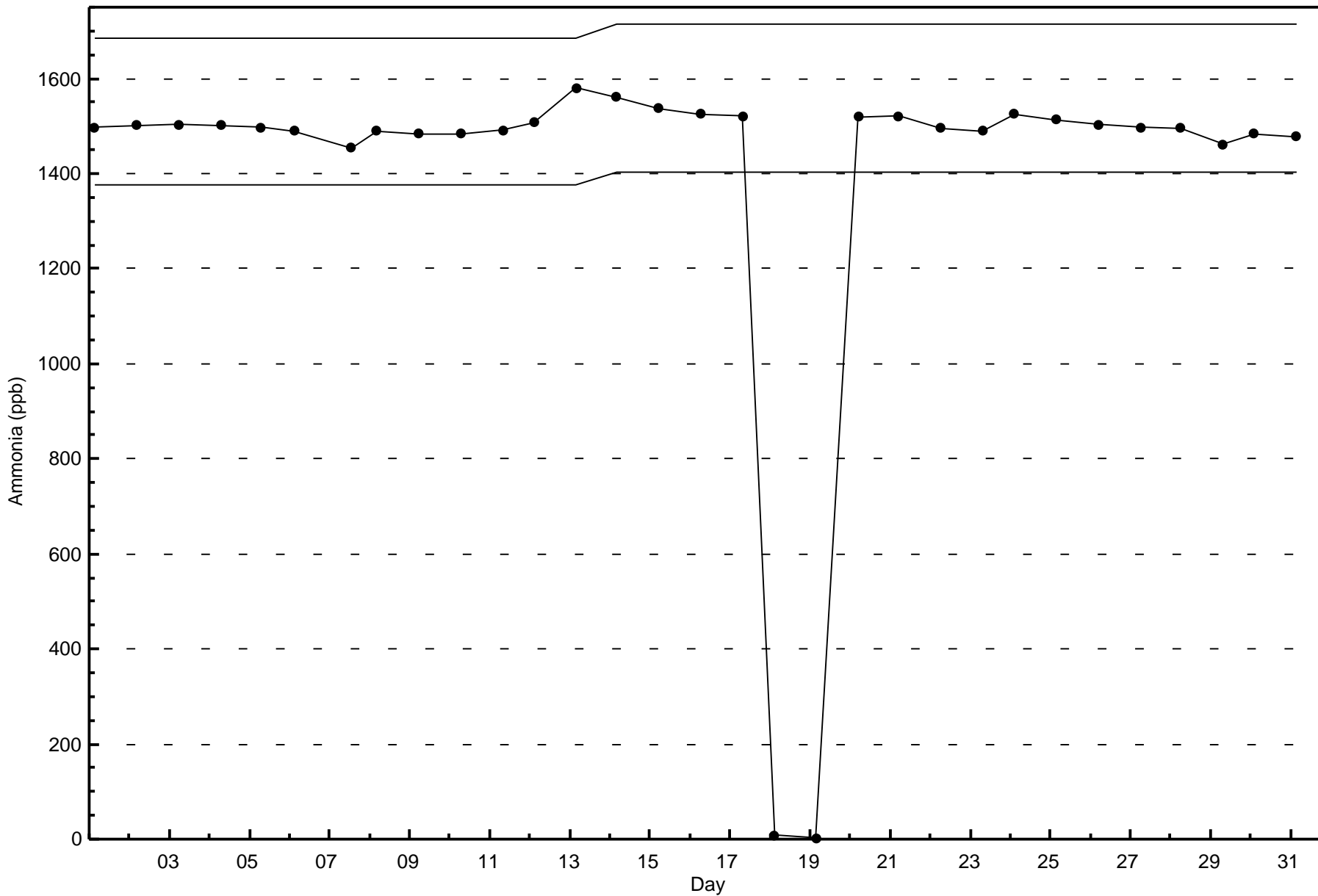


Wood Buffalo Environmental Association
Wind Rose May 2016

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







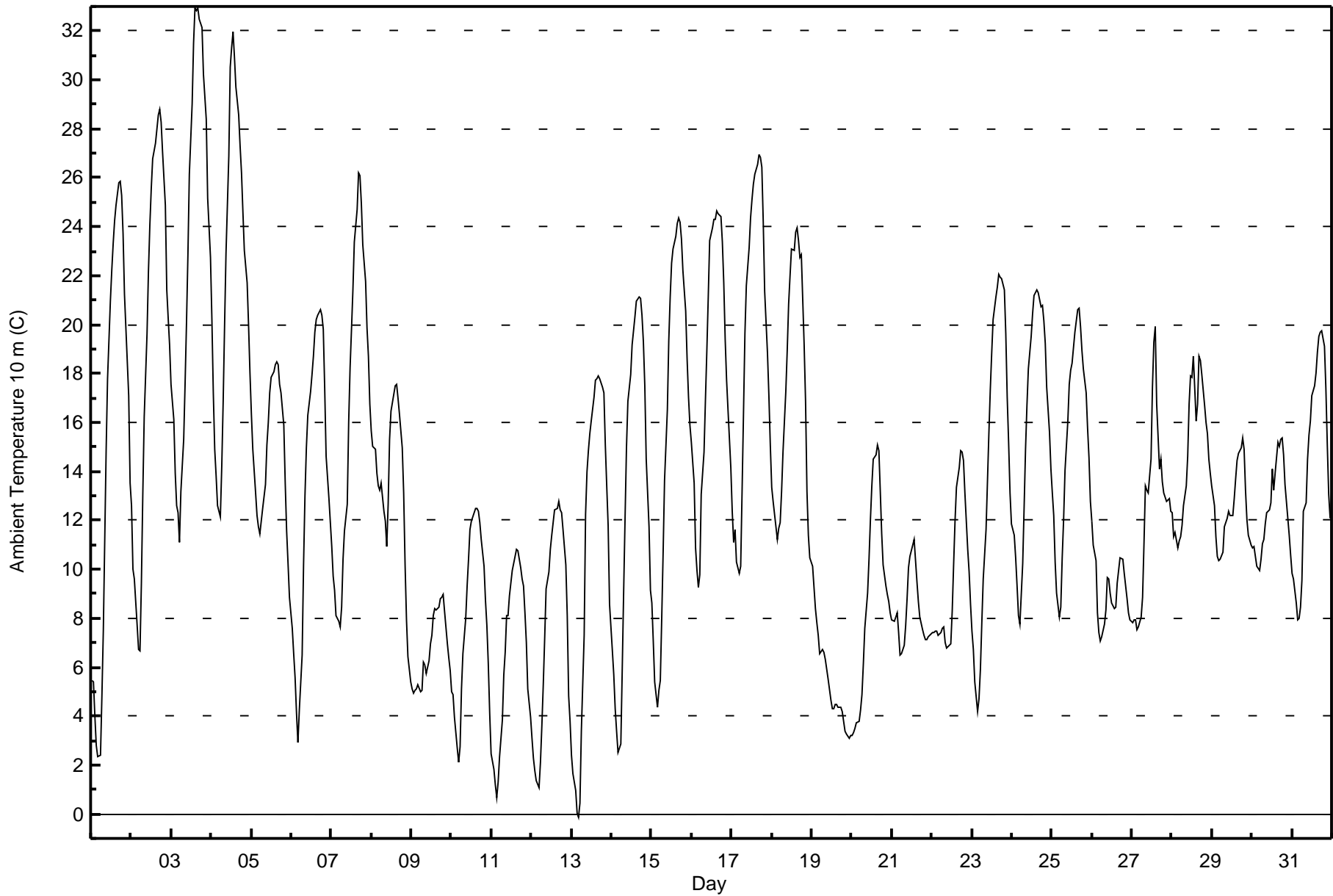


Maximum Value: 33.0 C on May 3 15:00																				Maximum Daily Average: 23.3 C on May 3					Hours in Service: 744	
Minimum Value: -0.1 C on May 13 05:00																				Minimum Daily Average: 5.5 C on May 19					Hours of Data: 744	
Maximum Diurnal Average: 18.7 C at hour 17																				Minimum Diurnal Average: 7.1 C at hour 5					Hours of Missing Data: 0	
Monthly Average: 13.41 C																				Percentiles: P ₁ = 1.3 P ₁₀ = 5.1 Q ₁ = 8.3 Median = 12.5 Q ₃ = 17.8 P ₉₀ = 23.0 P ₉₉ = 31.0					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-May	5.5	5.4	4.0	2.8	2.3	2.4	4.8	7.5	11.2	14.9	17.8	21.0	22.2	23.3	24.3	24.9	25.8	25.9	25.3	23.7	21.3	19.8	17.1	13.5	15.3	25.9
2-May	12.6	10.0	9.6	7.7	6.7	6.7	9.5	13.1	16.2	19.6	22.2	24.0	25.5	26.8	27.4	28.0	28.6	28.8	28.3	27.1	24.9	21.4	20.2	19.2	19.3	28.8
3-May	17.6	16.1	13.9	12.6	12.3	11.1	13.2	15.3	17.6	20.1	22.8	26.2	29.0	31.5	33.0	32.8	32.9	32.5	32.1	30.2	29.3	28.4	25.1	22.8	23.3	33.0
4-May	20.2	17.2	14.9	13.8	12.6	12.2	14.2	16.9	20.0	22.9	26.9	30.5	31.3	32.0	30.9	29.7	28.6	27.3	26.2	24.6	23.0	21.7	20.0	18.0	22.3	32.0
5-May	16.4	14.9	13.1	12.2	11.7	11.5	12.0	12.5	13.5	15.1	16.0	17.2	17.9	18.1	18.3	18.5	18.4	17.6	17.2	15.9	13.5	11.6	10.3	8.9	14.7	18.5
6-May	7.6	6.6	5.6	4.2	2.9	4.2	6.5	10.2	13.0	14.9	16.3	17.3	18.0	18.7	19.7	20.2	20.4	20.6	20.4	19.8	17.4	14.6	12.9	11.9	13.5	20.6
7-May	10.9	9.7	9.1	8.1	7.8	7.6	8.5	10.4	11.6	12.7	16.0	18.2	19.8	21.4	23.4	24.7	26.2	26.1	24.9	23.3	21.7	19.9	18.7	16.7	16.6	26.2
8-May	15.7	15.0	14.9	13.9	13.4	13.2	13.5	12.4	12.0	11.0	12.7	15.3	16.4	17.2	17.5	17.6	17.0	16.4	15.0	13.1	10.2	7.9	6.5	5.4	13.5	17.6
9-May	5.1	4.9	5.1	5.1	5.3	5.0	5.1	6.2	6.1	5.7	6.2	6.9	7.3	8.1	8.4	8.3	8.5	8.8	8.9	9.0	8.3	7.0	6.4	5.8	6.7	9.0
10-May	5.0	4.9	4.0	2.7	2.1	2.8	5.1	6.6	8.0	9.3	10.4	11.6	11.9	12.1	12.5	12.5	12.4	11.9	11.2	10.1	8.7	7.7	6.1	4.1	8.1	12.5
11-May	2.5	1.8	1.2	0.7	1.3	2.4	3.9	5.7	6.6	8.1	8.1	8.9	10.0	10.2	10.5	10.8	10.8	10.1	9.6	9.3	8.2	7.0	5.1	4.0	6.5	10.8
12-May	3.1	2.3	1.8	1.4	1.1	2.1	3.6	5.3	7.2	9.2	9.9	10.8	11.4	11.9	12.4	12.5	12.8	12.4	12.3	11.6	10.2	8.1	4.8	3.8	7.6	12.8
13-May	2.4	1.7	1.0	0.0	-0.1	0.4	3.4	7.3	12.3	14.0	14.8	15.5	16.0	17.1	17.7	17.8	17.9	17.8	17.4	17.2	15.1	13.4	11.8	8.5	10.8	17.9
14-May	6.6	5.7	4.3	3.4	2.5	2.9	5.9	9.1	12.1	15.0	16.9	18.0	19.1	19.7	20.3	21.0	21.1	21.1	20.4	19.3	17.5	14.5	11.7	9.1	13.2	21.1
15-May	8.6	7.1	5.4	4.3	5.0	5.4	8.0	10.7	13.6	16.5	19.3	21.1	22.5	23.1	23.6	24.1	24.4	24.2	23.5	22.2	20.6	18.6	17.1	15.9	16.0	24.4
16-May	15.2	13.5	10.9	10.0	9.2	9.8	13.1	14.8	16.9	18.9	21.1	23.5	24.0	24.3	24.3	24.6	24.5	24.4	23.4	21.7	19.4	17.7	16.5	14.1	18.2	24.6
17-May	12.4	11.1	11.6	10.3	9.8	10.1	13.2	16.4	19.6	21.6	23.2	24.3	25.1	25.8	26.1	26.6	26.9	26.8	26.4	24.2	21.4	18.9	17.1	15.1	19.3	26.9
18-May	13.3	12.8	11.7	11.2	11.7	11.9	13.2	14.8	17.3	18.9	20.9	22.0	23.1	23.0	23.8	24.0	23.4	22.7	22.9	19.2	16.8	13.2	11.4	10.5	17.2	24.0
19-May	10.1	9.2	8.4	7.8	7.3	6.6	6.7	6.6	6.3	5.9	5.5	4.7	4.3	4.3	4.5	4.5	4.4	4.4	4.2	3.8	3.4	3.3	3.1	3.2	5.5	10.1
20-May	3.2	3.3	3.5	3.7	3.8	4.2	4.9	6.2	7.6	9.0	10.4	12.0	13.4	14.5	14.7	15.1	14.8	13.2	11.4	10.2	9.3	9.0	8.7	8.2	8.9	15.1
21-May	7.9	7.9	8.1	8.2	7.4	6.5	6.6	6.9	7.7	8.8	10.1	10.5	11.0	11.2	10.4	9.5	8.7	8.0	7.5	7.3	7.1	7.1	7.3	7.4	8.3	11.2
22-May	7.4	7.4	7.5	7.5	7.3	7.4	7.6	7.6	7.0	6.8	6.9	7.0	8.3	10.2	12.0	13.3	14.1	14.8	14.8	14.5	13.1	10.8	9.9	8.6	9.7	14.8
23-May	7.5	6.7	5.4	4.2	4.7	5.9	7.8	9.6	11.6	13.6	15.5	17.3	18.8	20.2	21.1	21.5	22.0	21.9	21.9	21.4	19.6	17.0	15.2	13.1	14.3	22.0
24-May	11.9	11.4	10.5	9.3	8.1	7.8	10.2	12.5	14.9	16.7	18.2	19.5	20.5	21.2	21.3	21.4	21.3	20.7	20.8	20.2	19.2	17.4	15.6	14.1	16.0	21.4
25-May	13.1	12.2	10.3	9.0	8.0	8.5	10.5	12.0	14.0	16.1	17.6	18.1	18.4	19.0	19.7	20.6	20.7	19.9	19.0	18.2	17.2	15.8	14.6	12.7	15.2	20.7
26-May	12.0	11.0	10.4	8.2	7.4	7.1	7.2	7.8	8.4	9.7	9.6	9.0	8.6	8.4	8.4	9.4	9.9	10.5	10.4	9.8	9.3	8.8	8.2	7.9	9.1	12.0
27-May	7.8	7.9	7.9	7.6	7.7	8.0	8.8	11.1	13.4	13.2	13.1	14.5	17.5	19.3	19.9	16.8	14.1	14.5	13.6	13.1	12.9	12.8	12.9	12.3	12.5	19.9
28-May	12.3	11.3	11.5	10.9	11.1	11.3	11.8	12.6	13.4	14.6	16.7	17.9	17.9	18.7	16.1	16.7	18.7	18.5	18.0	16.7	16.0	15.5	14.5	13.9	14.9	18.7
29-May	13.4	12.6	11.3	10.6	10.3	10.4	10.7	11.7	11.9	12.1	12.4	12.2	12.2	12.9	13.7	14.4	14.7	15.0	15.3	14.9	13.2	12.0	11.4	11.0	12.5	15.3
30-May	10.9	10.9	10.5	10.1	9.9	10.4	11.0	11.2	11.8	12.3	12.5	12.7	14.1	13.2	13.9	15.2	15.0	15.3	15.4	14.7	13.5	12.1	11.4	10.6	12.4	15.4
31-May	9.8	9.6	8.6	7.9	8.0	8.5	9.5	12.4	12.7	14.5	15.5	16.0	17.1	17.5	18.0	18.9	19.5	19.7	19.7	19.1	17.4	15.1	13.1	12.1	14.2	19.7
9.9 9.1 8.3 7.4 7.1 7.2 8.7 10.4 12.1 13.6 15.0 16.3 17.2 17.9 18.3 18.6 18.7 18.4 18.0 16.9 15.4 13.8 12.4 11.1																								Diurnal Average		
20.2 17.2 14.9 13.9 13.4 13.2 14.2 16.9 20.0 22.9 26.9 30.5 31.3 32.0 33.0 32.8 32.9 32.5 32.1 30.2 29.3 28.4 25.1 22.8																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	1	0.13	0.13
0 - 10	249	33.47	33.60
10 - 20	367	49.33	82.93
> 20	127	17.07	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C

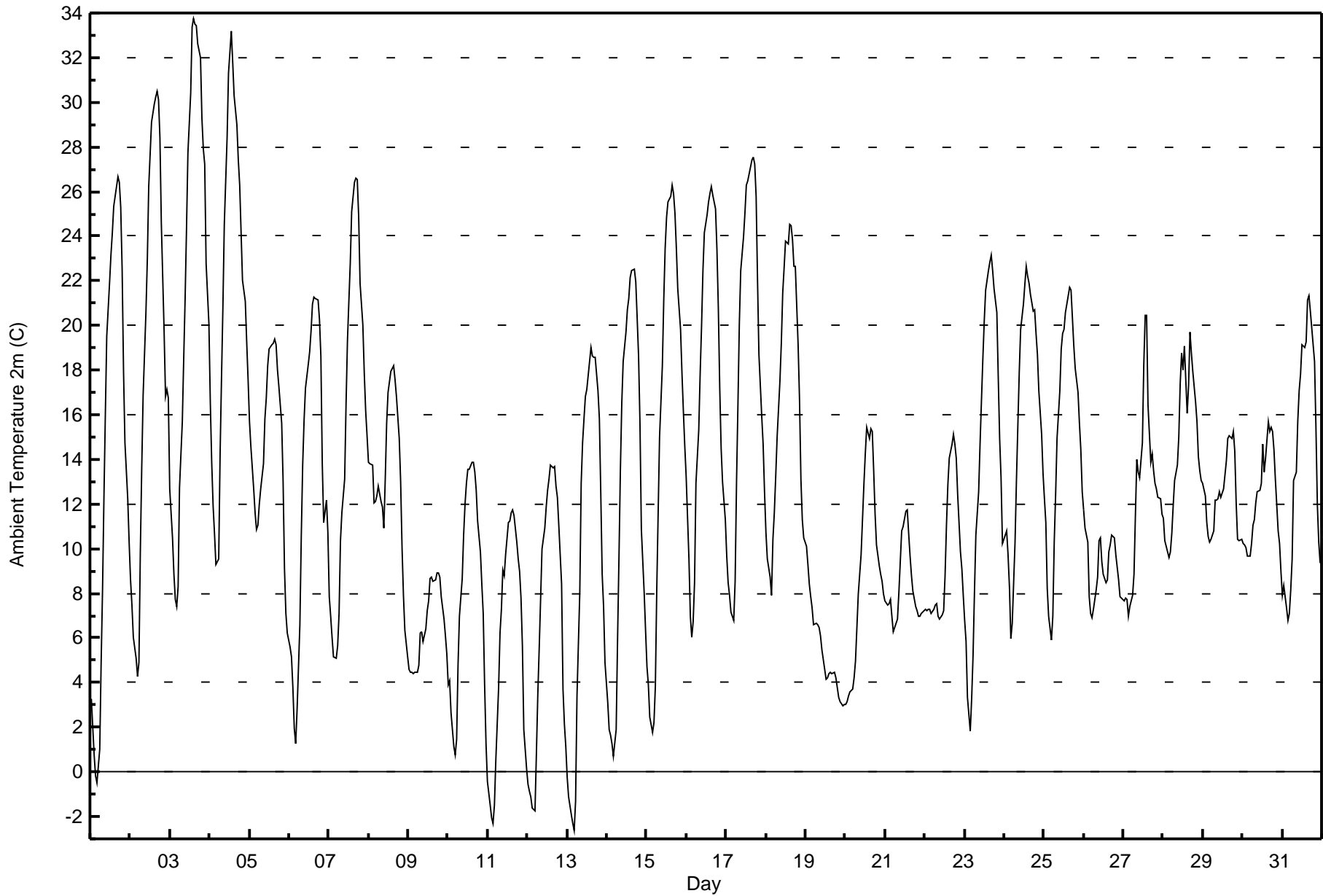
Fort McKay - Bertha Ganter - May 2016

Table containing summary statistics (Maximum Value, Minimum Value, Monthly Average, Percentiles, Hours in Service, etc.) and a detailed hourly data table for May 2016, including columns for Day, Hourly Period Ending At (MST), and Daily Average/Maximum.



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	18	2.42	2.42
0 - 10	258	34.68	37.10
10 - 20	331	44.49	81.59
> 20	137	18.41	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



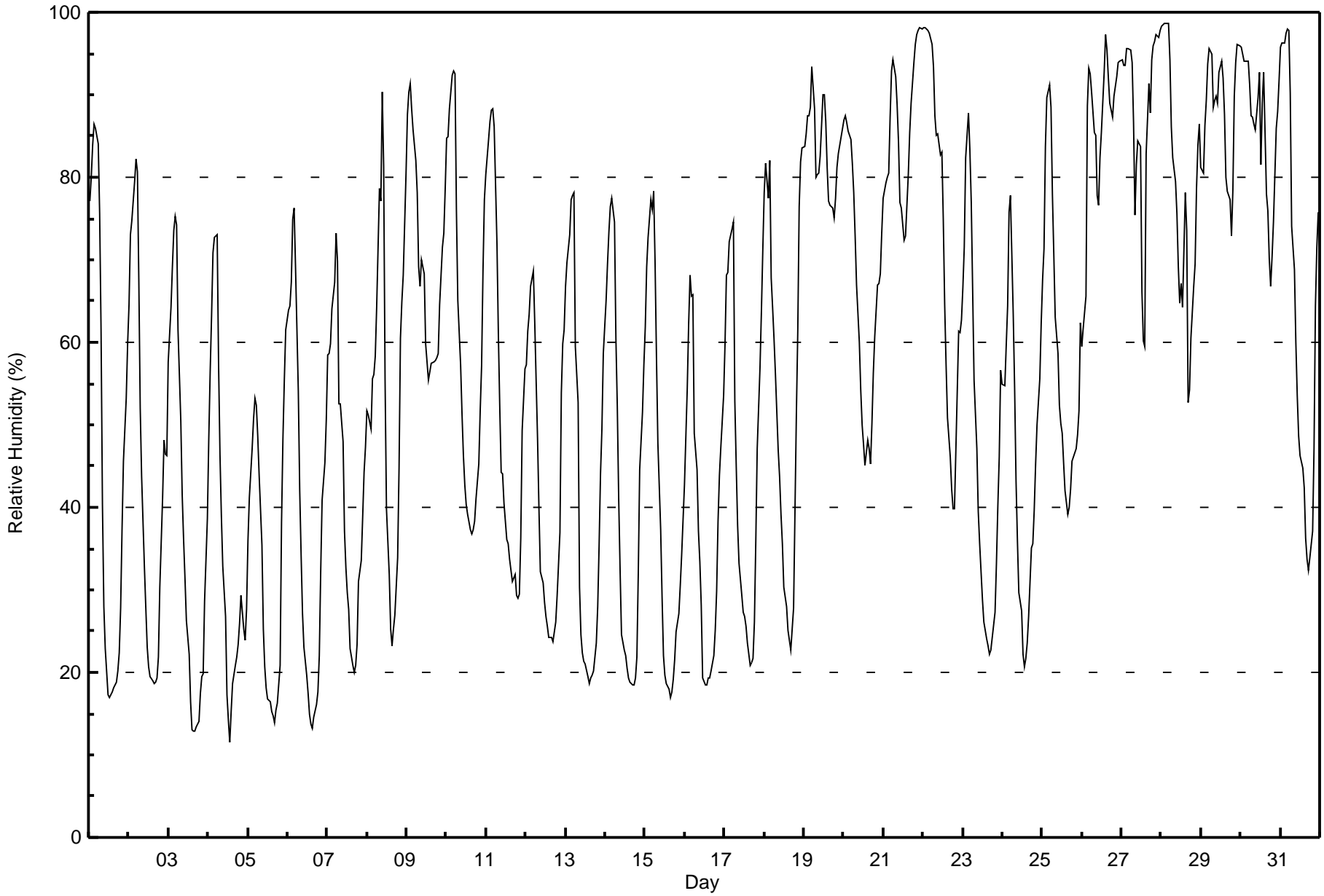
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort McKay - Bertha Ganter - May 2016

Maximum Value: 99 % on May 28 05:00																			Maximum Daily Average: 87.8 % on May 29						Hours in Service: 744																			
Minimum Value: 12 % on May 4 14:00																			Minimum Daily Average: 33.6 % on May 5						Hours of Data: 744																			
Maximum Diurnal Average: 81.4 % at hour 5																			Minimum Diurnal Average: 38.1 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 57.0 %																			Percentiles: P ₁ = 14 P ₁₀ = 21 Q ₁ = 33 Median = 58 Q ₃ = 80 P ₉₀ = 91 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-May	77	80	84	86	86	84	76	62	40	28	23	17	17	17	18	18	19	20	22	28	37	46	53	60	45.8	86																		
2-May	65	73	75	80	82	81	67	52	44	33	28	23	21	19	19	19	19	19	22	30	41	48	46	46	43.8	82																		
3-May	58	64	69	74	75	74	62	50	41	36	31	26	22	16	13	13	13	14	17	19	20	29	39	37.1	75																			
4-May	48	57	63	71	73	73	57	46	39	33	27	17	14	12	15	19	21	22	23	26	29	25	24	28	35.9	73																		
5-May	36	41	47	51	53	52	49	44	35	25	21	18	17	16	15	15	14	15	16	21	38	48	55	61	33.6	61																		
6-May	64	64	67	75	76	69	54	42	34	27	23	20	17	15	14	13	15	16	18	22	32	41	45	51	38.1	76																		
7-May	58	59	60	64	67	73	70	52	53	48	37	33	30	28	23	21	20	21	23	31	34	39	44	47	43.1	73																		
8-May	52	51	50	56	56	58	64	79	77	90	81	56	40	32	25	23	25	27	34	45	60	65	68	81	54.0	90																		
9-May	88	90	91	88	86	82	78	69	67	70	68	60	58	55	56	57	58	58	58	59	65	72	73	79	70.2	91																		
10-May	85	85	88	92	93	92	76	65	57	51	46	43	40	39	37	37	37	38	41	45	52	57	69	77	60.2	93																		
11-May	80	85	87	88	88	86	72	61	52	44	44	40	36	36	34	32	31	32	29	29	30	36	49	57	52.4	88																		
12-May	57	61	63	67	69	62	55	48	40	32	31	28	27	26	24	24	24	25	26	29	37	54	60	61	43.0	69																		
13-May	67	70	73	77	78	78	59	53	30	25	22	21	21	19	19	19	20	20	24	28	35	44	49	59	42.1	78																		
14-May	65	69	73	76	78	75	61	52	41	32	25	23	22	21	19	19	18	18	19	22	32	44	51	57	42.3	78																		
15-May	62	69	73	77	76	78	70	58	48	37	29	22	20	19	18	17	18	19	21	25	27	30	34	38	41.1	78																		
16-May	43	54	62	68	66	66	49	45	37	33	28	19	18	19	19	19	20	22	25	30	38	44	47	54	38.6	68																		
17-May	60	68	68	72	74	75	53	45	38	33	29	27	27	26	24	21	21	22	26	36	47	57	64	71	45.1	75																		
18-May	78	82	77	82	68	64	61	56	47	44	39	36	30	28	25	24	23	25	28	51	61	76	82	84	53.0	84																		
19-May	84	85	88	87	88	93	88	80	80	80	83	90	90	87	81	77	77	76	75	78	81	83	85	86	83.4	93																		
20-May	87	88	87	86	85	82	78	73	67	60	54	50	48	45	48	47	45	50	56	61	67	67	68	73	65.5	88																		
21-May	77	79	80	81	87	93	94	92	89	84	77	76	72	73	77	80	85	89	94	96	97	98	98	98	86.2	98																		
22-May	98	98	98	98	97	96	93	87	85	85	83	83	75	65	57	51	46	42	40	40	47	61	61	63	72.9	98																		
23-May	67	72	82	88	83	77	66	55	47	40	36	32	29	26	24	23	22	23	24	27	33	40	46	57	46.7	88																		
24-May	55	55	60	64	76	78	63	54	43	36	30	27	22	21	22	24	27	35	36	40	45	50	56	62	45.0	78																		
25-May	68	71	84	90	91	89	78	71	63	59	52	50	49	45	42	39	40	42	46	46	47	49	52	62	59.4	91																		
26-May	59	62	66	89	93	93	90	85	85	78	77	82	85	93	97	95	92	89	87	90	91	92	94	94	85.8	97																		
27-May	94	94	94	96	96	95	94	87	75	81	84	84	66	60	59	83	91	88	94	96	96	97	97	98	87.5	98																		
28-May	98	98	99	99	99	94	86	82	80	76	69	65	67	64	78	74	53	54	61	67	70	79	84	87	78.4	99																		
29-May	81	81	86	89	94	96	95	88	89	90	89	93	94	92	88	80	78	77	73	78	90	94	96	96	87.8	96																		
30-May	96	95	94	94	94	91	87	87	86	86	90	93	82	89	93	78	76	70	67	70	75	86	88	92	85.8	96																		
31-May	96	96	96	97	98	98	90	74	69	60	54	49	46	45	42	36	34	32	34	37	47	64	72	76	64.3	98																		
																			71.0	74.1	76.9	80.7	81.4	80.6	72.2	64.4	57.4	52.8	48.7	45.3	42.0	40.2	39.5	38.6	38.1	38.8	40.6	45.2	51.7	58.3	62.6	67.5	Diurnal Average	
																			98	98	99	99	99	98	95	92	89	90	90	93	94	93	97	95	92	89	94	96	97	98	98	98	Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

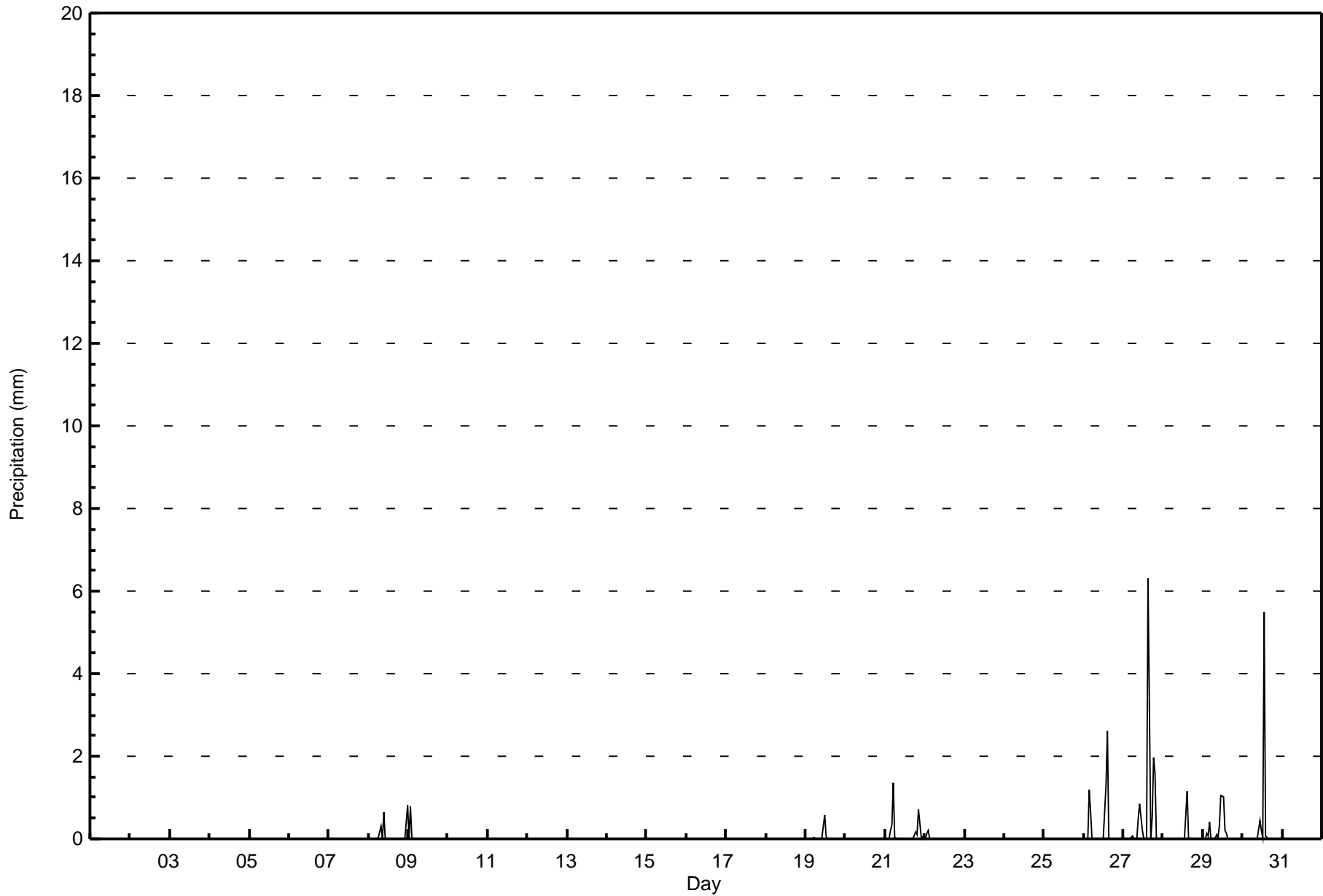
Fort McKay - Bertha Ganter - May 2016

Maximum Value: 6.3 mm on May 27 16:00 Minimum Value: 0.0 mm on May 1 01:00 Maximum Diurnal Total: 7.0 mm at hour 14 Monthly Total: 35.71 mm		Maximum Daily Total: 12.1 mm on May 27 Minimum Daily Total: 0.0 mm on May 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 $Q_3 = 0.0$ $P_{90} = 0.0$ $P_{99} = 1.2$		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.8	0.8
9-May	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	0.0	0.0	0.0	0.8	0.8
10-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.6	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	0.7	0.6
20-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.2	0.3	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.7	0.4	0.1	0.1	0.0	3.4	1.3	
22-May	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
23-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	1.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	2.6	
27-May	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.5	0.8	0.2	0.0	0.0	6.3	0.0	0.5	2.0	1.6	0.0	0.0	0.0	0.0	0.0	12.1	6.3		
28-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	0.0	
29-May	0.0	0.0	0.2	0.1	0.4	0.0	0.0	0.0	0.1	0.0	0.3	1.1	1.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	1.1	0.0	
30-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.1	5.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	5.5	0.0	
31-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.9	0.4	1.4	1.4	1.5	0.1	0.3	0.1	1.1	1.6	2.1	1.1	7.0	4.0	6.3	0.0	0.5	2.1	1.7	0.8	0.4	0.1	0.9		Diurnal Average		
	0.0	0.8	0.2	1.2	0.7	1.3	0.1	0.3	0.1	0.7	0.8	1.1	1.0	5.5	2.6	6.3	0.0	0.5	2.0	1.6	0.7	0.4	0.1	0.8		Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	721	96.91	96.91
0.4 - 0.5	5	0.67	97.58
0.6 - 0.7	4	0.54	98.12
0.8 - 1.4	9	1.21	99.33
1.5 - 10	5	0.67	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

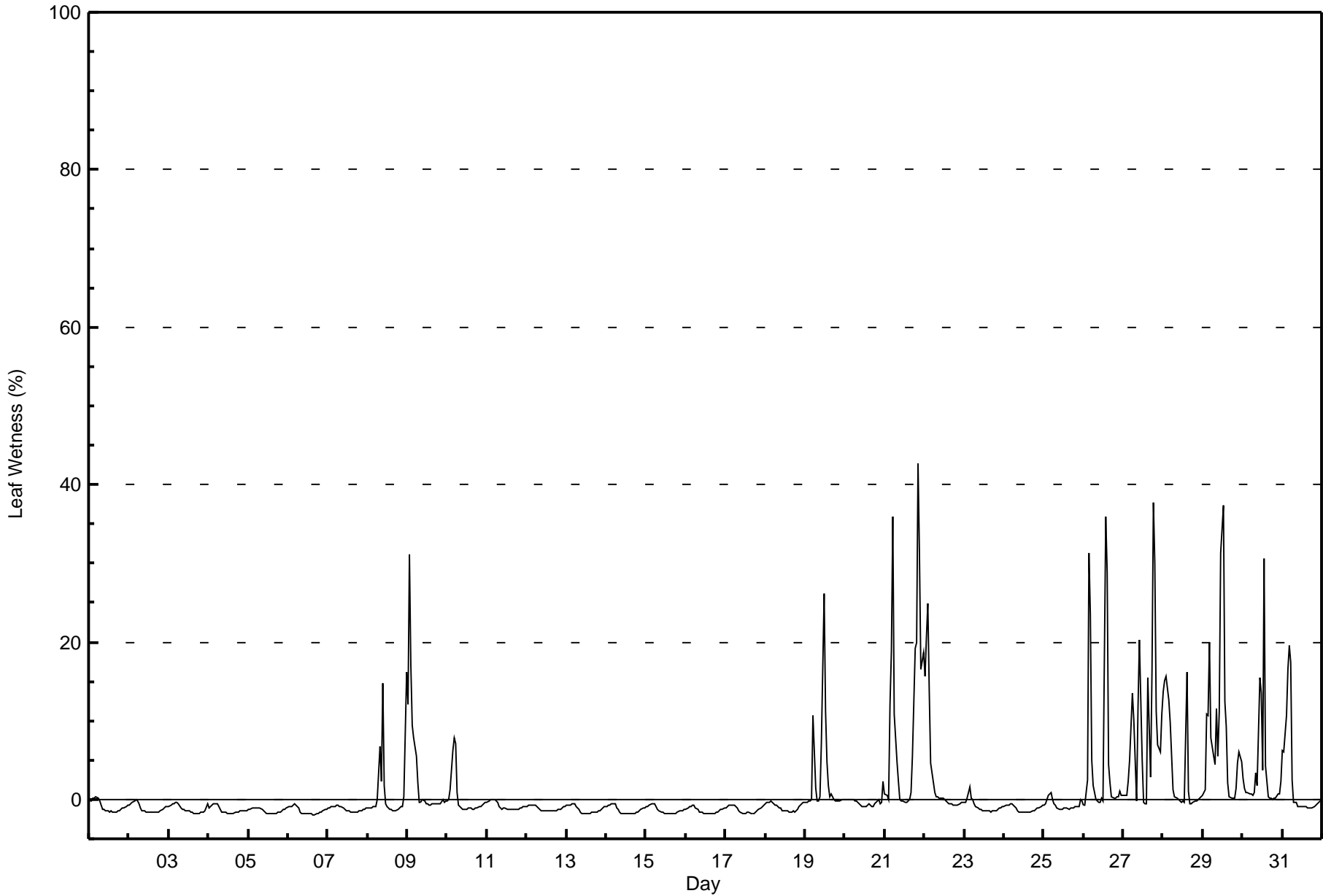


Maximum Value: 43 % on May 21 21:00																		Maximum Daily Average: 10.0 % on May 21						Hours in Service: 744			
Minimum Value: -2 % on May 6 16:00																		Minimum Daily Average: -1.4 % on May 6						Hours of Data: 744			
Maximum Diurnal Average: 3.5 % at hour 5																		Minimum Diurnal Average: -0.9 % at hour 17						Hours of Missing Data: 0			
Monthly Average: 1.0 %																		Percentiles: P ₁ = -2 P ₁₀ = -2 Q ₁ = -1 Median = -1 Q ₃ = 0 P ₉₀ = 5 P ₉₉ = 31						Hours of Calibration: 0			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	0	0	0	0	0	0	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-0.9	0	
2-May	-1	0	0	0	0	0	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1.1	0	
3-May	-1	-1	-1	0	0	0	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	0	-1.2	0	
4-May	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1.4	-1	
5-May	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1.4	-1	
6-May	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1.4	-1	
7-May	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1.2	-1	
8-May	-1	-1	-1	-1	-1	-1	0	7	2	15	2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	16	1.0	16		
9-May	12	31	17	9	8	5	2	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	3.2	31		
10-May	0	0	1	6	8	7	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0.2	8		
11-May	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.8	0	
12-May	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-1	-1	-1	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1.2	-1	
13-May	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1.3	-1	
14-May	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1.4	-1	
15-May	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1.4	-1	
16-May	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1.4	-1	
17-May	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1.3	-1	
18-May	-1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-1	-1	-1	0	-1.0	0		
19-May	0	0	0	0	0	11	1	0	0	0	7	26	11	5	2	0	1	0	0	0	0	0	0	2.6	26		
20-May	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	2	-0.3	2		
21-May	1	1	0	12	19	36	11	5	2	0	0	0	0	0	0	0	1	5	19	20	43	31	17	19	10.0	43	
22-May	16	21	25	14	5	2	1	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	0	0	3.2	25		
23-May	0	0	0	2	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-1	-1	-1	-1	-1	-1	-0.9	2	
24-May	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1.2	-1	
25-May	-1	-1	0	1	1	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	-0.7	1		
26-May	-1	-1	2	31	23	5	2	0	0	0	0	0	36	29	4	2	0	0	0	0	0	1	0	5.7	36		
27-May	0	0	1	2	5	13	10	5	0	12	20	5	0	-1	0	15	3	16	38	30	11	7	6	11	8.8	38	
28-May	14	15	16	13	10	6	1	0	0	0	0	0	0	0	16	1	-1	0	0	0	0	0	0	3.7	16		
29-May	0	1	11	11	20	8	5	4	12	5	11	31	37	12	9	2	0	0	0	0	1	5	6	5	8.3	37	
30-May	3	1	1	1	1	1	1	1	3	2	16	14	4	31	4	0	0	0	0	0	0	1	1	2	3.6	31	
31-May	6	6	11	17	19	17	2	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	2.7	19		
1.1 2.0 2.4 3.5 3.5 3.3 0.7 0.0 -0.2 0.2 0.8 1.4 0.6 1.6 0.8 -0.4 -0.9 -0.4 0.8 0.6 0.9 0.6 0.3 1.2																								Diurnal Average			
16 31 25 31 23 36 11 7 12 15 20 31 37 36 29 15 3 16 38 30 43 31 17 19																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	42	22.95	22.95
0.4 - 0.5	10	5.46	28.42
0.6 - 0.7	6	3.28	31.69
0.8 - 1.4	16	8.74	40.44
1.5 - 10	52	28.42	68.85
> 10	56	30.60	99.45

Total Number of Valid Hours: 183

Total Number of Hours: 744



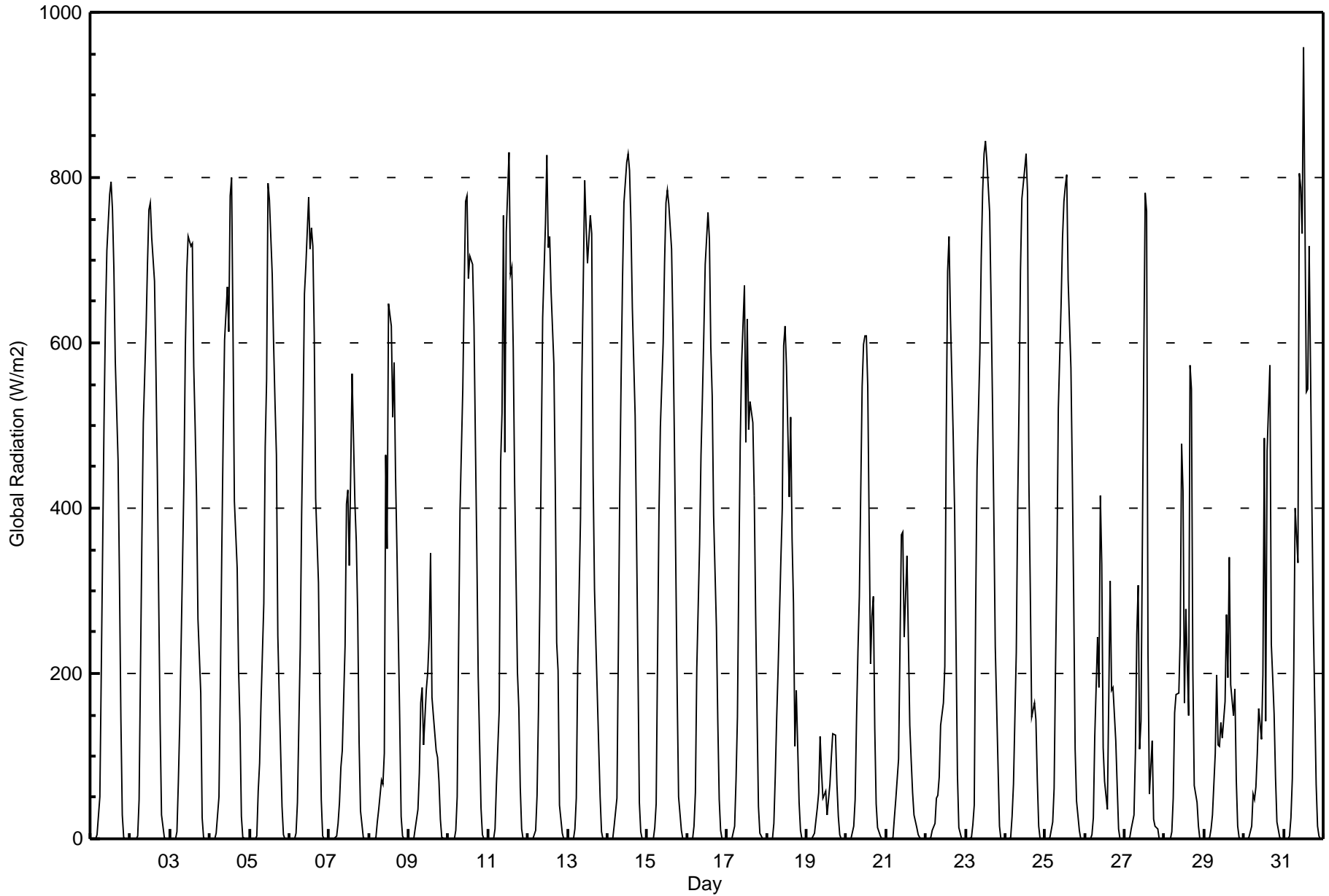
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Fort McKay - Bertha Ganter - May 2016

Maximum Value: 958 W/m2 on May 31 13:00		Maximum Daily Average: 333.7 W/m2 on May 23		Hours in Service: 744																							
Minimum Value: 0 W/m2 on May 1 01:00		Minimum Daily Average: 42.0 W/m2 on May 19		Hours of Data: 744																							
Maximum Diurnal Average: 607.0 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 2		Hours of Missing Data: 0																							
Monthly Average: 223.3 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 85 Q ₃ = 419 P ₉₀ = 686 P ₉₉ = 825		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	0	0	0	5	52	202	355	509	631	712	779	794	760	690	578	458	312	146	28	2	0	0	0	292.2	794	
2-May	0	0	0	0	4	47	207	365	504	619	697	761	770	728	674	569	447	289	139	29	2	0	0	0	285.5	770	
3-May	0	0	0	0	8	68	139	334	434	594	684	729	717	721	572	498	412	266	176	26	1	0	0	0	265.9	729	
4-May	0	0	0	0	6	51	189	348	489	603	667	613	778	800	617	409	327	205	138	27	2	0	0	0	261.2	800	
5-May	0	0	0	0	4	58	92	165	285	474	556	794	773	684	599	528	465	245	172	40	4	0	0	0	247.3	794	
6-May	0	0	0	0	7	44	230	394	510	659	693	776	714	739	717	608	411	311	167	48	4	0	0	0	292.9	776	
7-May	0	0	0	0	4	18	44	87	107	234	405	422	331	442	563	407	359	272	117	34	2	0	0	0	160.4	563	
8-May	0	0	0	0	2	20	36	71	67	103	465	350	647	620	511	576	440	349	143	27	3	0	0	0	184.6	647	
9-May	0	0	0	0	11	36	80	165	183	114	182	202	245	345	171	149	107	98	70	25	1	0	0	0	91.0	345	
10-May	0	0	0	0	10	50	232	396	544	664	770	777	678	706	695	620	482	349	197	36	5	0	0	0	300.5	777	
11-May	0	0	0	0	12	65	155	454	516	754	467	734	830	683	692	593	430	202	158	63	12	0	0	0	284.2	830	
12-May	0	0	0	0	10	53	155	293	467	631	744	826	716	728	662	575	427	238	203	40	7	0	0	0	282.3	826	
13-May	0	0	0	0	12	49	207	386	560	676	797	741	696	754	733	441	302	235	111	52	8	0	0	0	281.7	797	
14-May	0	0	0	0	15	48	226	417	559	678	770	819	830	808	744	643	512	364	209	45	8	0	0	0	320.7	830	
15-May	0	0	0	0	14	43	221	393	499	599	697	770	785	768	714	617	485	332	176	52	9	0	0	0	298.9	785	
16-May	0	0	0	1	16	55	207	356	465	534	611	695	758	725	594	535	391	256	141	47	10	0	0	0	266.5	758	
17-May	0	0	0	0	15	71	148	325	480	577	670	479	629	496	529	504	415	272	151	40	7	0	0	0	242.0	670	
18-May	0	0	0	1	19	76	146	204	337	400	597	620	572	414	510	364	285	113	180	43	11	0	0	0	203.8	620	
19-May	0	0	0	0	3	8	37	56	124	81	49	58	29	47	66	99	127	126	66	27	6	0	0	0	42.0	127	
20-May	0	0	0	0	15	48	145	228	293	547	599	608	608	547	212	269	293	133	42	13	3	0	0	0	191.8	608	
21-May	0	0	0	0	2	25	47	97	230	368	371	243	342	239	137	96	56	28	14	6	2	0	0	0	96.0	371	
22-May	0	0	0	1	11	18	50	53	74	137	165	208	488	686	728	633	487	395	238	79	13	1	0	0	185.9	728	
23-May	0	0	0	2	17	40	277	448	587	703	783	829	844	821	757	650	530	388	231	87	15	1	0	0	333.7	844	
24-May	0	0	0	1	28	66	226	406	531	688	774	810	829	783	432	300	148	165	144	71	16	0	0	0	267.5	829	
25-May	0	0	0	1	20	61	207	335	520	647	728	772	790	803	676	569	439	288	109	46	10	0	0	0	292.6	803	
26-May	0	0	0	0	4	25	123	244	184	416	332	110	69	35	171	312	179	182	118	64	12	0	0	0	107.5	416	
27-May	0	0	0	1	12	29	103	247	307	108	142	583	781	759	223	54	119	23	16	13	11	0	0	0	147.3	781	
28-May	0	0	0	1	8	50	153	175	177	245	478	420	164	279	149	572	545	204	65	44	16	1	0	0	156.0	572	
29-May	0	0	0	1	12	29	104	198	114	111	141	122	165	271	195	341	186	150	181	71	16	1	0	0	100.3	341	
30-May	0	0	0	1	16	54	48	62	103	158	120	198	486	142	469	572	236	194	152	75	21	1	0	0	129.5	572	
31-May	0	0	0	3	25	73	200	399	334	805	788	733	958	541	544	717	566	398	261	66	15	3	0	0	309.6	958	
		0.0	0.0	0.0	0.5	11.2	46.2	149.5	272.8	357.8	469.6	537.2	567.3	607.0	576.6	507.9	464.4	357.0	238.1	143.0	43.9	8.2	0.3	0.0	0.0	Diurnal Average	
		0	0	0	3	28	76	277	454	587	805	797	829	958	821	757	717	566	398	261	87	21	3	0	0	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	285	38.31	38.31
21 - 100	93	12.50	50.81
101 - 300	131	17.61	68.41
301 - 600	127	17.07	85.48
601 - 900	107	14.38	99.87
> 900	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 21 km/h on May 22 15:00	Maximum Daily Speed Average: 16.1 km/h on May 22	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 8 06:00	Minimum Daily Speed Average: 1.2 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 3.9 km/h at hour 17	Minimum Diurnal Speed Average: 1.1 km/h at hour 7	Hours of Missing Data: 0
Monthly Average Velocity: 2.5 km/h 347.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 19	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	WSW3	W3	SW3	SW4	SW3	S5	SSE6	SSE8	SSE9	SSE11	SSE12	SW10	WSW10	W10	WNW10	W7	WNW8	NW12	NW10	NNW7	NW4	W3	WNW3	SW2	WSW3.5	SSE12
2-May	WNW3	SSW3	WSW3	SSW2	SW3	SSW2	SSE3	ESE4	SSE4	E5	S3	SE7	SSE8	SE8	SSE8	SSE8	SSE8	SSE6	SSE6	SSE3	S4	SSE3	SSE6	SSE4	SSE4.0	SSE8
3-May	NE3	N3	NNW4	NW1	SSW2	WNW0	S4	S9	SSE9	SSE10	SSE11	SSE12	SSE10	SSE10	SSW10	S15	SSW12	SSW13	SSW9	SSW6	SSW10	S6	S3	WSW2	S6.0	SSW15
4-May	WSW3	SW2	SSW2	SSW3	SW3	SSW3	S5	SE6	SSE6	SE7	SSE5	WSW7	WSW7	SW7	WNW14	WNW16	NW17	WNW13	WNW15	WNW9	WNW7	WNW11	NW10	NW11	W5.1	NW17
5-May	NW10	NW12	NW9	NW7	WNW6	WNW6	WNW8	WNW8	WNW11	NW11	NW10	WNW15	NW18	WNW16	NW16	NW14	NW16	NW13	NW14	NNW9	N6	NNW4	NNW4	W4	NW9.9	NW18
6-May	W5	W4	NW2	W1	W2	WNW3	WNW4	WSW4	SSW1	NW9	NW11	NW8	W5	NW9	W6	WNW9	W7	W7	WSW5	SW3	SSW3	S5	SSE7	SSE5	W3.8	NW11
7-May	SE3	SE4	SSW1	WSW2	S2	SSE3	S4	S6	S7	SSE8	SSW7	SSE8	SE7	SE9	SSE11	SSE8	SW8	S8	SSE8	ENE3	E6	NE3	ENE2	N4	SSE4.2	SSE11
8-May	NNW3	NNW6	NNW6	NW4	WNW5	N0	WNW6	WNW11	WNW9	SSW3	S8	WSW8	WSW11	W11	W12	WSW14	WSW14	WSW13	WSW11	NW11	NW12	NNW15	NW11	NW11	W7.1	NNW15
9-May	NW9	WNW6	WNW7	W5	WNW5	W5	W5	WNW10	WNW14	WNW11	NW10	NW11	NW11	NW13	NW11	NW11	NW9	NW9	WNW7	WNW6	NNW6	N7	NNW4	WNW3	NW7.7	WNW14
10-May	W2	WNW5	WNW5	WNW4	N3	NW4	N3	ENE4	ENE5	E7	E10	ENE9	ENE9	ENE11	ENE10	NE10	NE9	NE10	NE9	NE9	NE7	NE5	NW2	W4	NE4.7	ENE11
11-May	WNW4	NW4	NW3	NNW4	NNW4	NNW5	N7	N8	NNE10	N13	N12	NNE11	NE11	NNE11	NE11	NE11	N12	NNE12	NNE11	NNE10	NNE7	N5	NNW5	NW6	N7.6	N13
12-May	NNW6	NW5	NW4	NW4	NNW4	N5	N6	N6	NNE7	NNE8	ENE12	NE10	NE10	NE10	NE9	NE10	NE9	NNE7	NNE8	NNE7	N4	WNW4	W4	NW2	NNE5.4	ENE12
13-May	WNW1	NNW1	SW2	SSW3	S2	S4	SSE5	SE5	SW3	SW5	SSW3	NNW6	WNW3	NW6	WNW6	N7	N4	ENE5	NNE3	NNE3	N3	N5	NNW4	WNW4	NW1.2	N7
14-May	W2	NW3	WNW3	WNW4	NW3	SSW2	SSE3	SSE5	SE6	SSE7	ESE7	E8	E4	ENE5	ENE7	ENE8	ENE7	ENE7	NE7	ENE6	NE3	W4	W4	WNW2	E2.1	ENE8
15-May	NW3	WSW3	SW2	WSW3	SSW4	SSE3	SE5	SE7	SSE8	SSE10	SSE10	SE10	SE9	SE8	SSE11	SSE10	SSE12	S11	S9	S8	S8	SSW7	SSW6	SSE6.5	SSE12	
16-May	SSW6	SW4	W3	SSW3	SW4	SSW5	S7	SSE8	SSE10	SSE10	SSW15	S15	S15	SSE15	SSE12	SE11	SE9	SE7	SE7	ESE4	ENE3	NNW3	WNW3	SSE6.4	S15	
17-May	WSW3	SW3	SW1	SW2	WSW3	S4	SSW6	WSW6	WNW9	NW8	W5	SSW2	S4	W7	W9	W7	W7	WSW5	NNW2	NNW2	NNW4	WNW5	W2	WSW2	W3.6	W9
18-May	SSW2	SSW4	S4	SSW5	S8	S6	S6	S6	SW7	SW9	SW9	WSW10	WSW10	W9	W9	W9	WNW11	WNW4	S3	N11	N11	N12	N13	N13	W3.3	N13
19-May	N13	N13	N12	N13	N12	N11	NNE11	NNE14	NNE15	N14	N14	N17	N15	N13	N14	N17	N18	N15	N16	N14	N14	N14	N12	N11	N13.8	N18
20-May	N12	N13	N12	N11	N12	N12	NNE12	NNE11	NNE10	NNE13	NNE14	NNE14	NNE13	NNE14	NNE15	N18	N19	N17	N15	N13	N11	N9	NNW9	NNW8	N12.5	N19
21-May	NW5	N4	N5	N7	N9	N9	N7	N10	N13	N15	N15	N14	N14	N14	N17	N15	N15	N14	N14	N11	N14	N13	N12	N15	N11.6	N17
22-May	N12	N13	N13	N14	N17	N14	N14	N16	N20	N20	NNE17	N20	NNE20	NNE18	N21	N21	NNE18	NNE16	NNE18	NNE15	N11	N11	N15	N16	N16.1	N21
23-May	N14	N9	NNW3	NNW7	N10	N10	N10	N11	NNE9	NNE10	NNE11	NNE11	NNE11	NNE12	NNE12	NNE10	NNE9	N11	NNE8	NE5	ESE6	S5	S5	S4	NNE7.3	N14
24-May	S8	S9	SSW6	SSW6	SSW4	S2	S8	SSE8	SSW8	SSE8	SSE12	SSE15	SSE18	SSE12	S6	SW3	SE5	SSE6	SSE7	S9	SSW9	S8	S7	S8.0	SSE18	
25-May	S7	SSW5	SW3	SSW3	WSW1	WNW2	E1	ENE1	ENE5	NE7	ENE7	N15	N14	N14	N18	N18	N16	NNE14	NNE10	NNE12	N14	N14	N12	NNE7.0	N18	
26-May	N13	N15	N13	N11	N10	N10	N9	NNE12	N11	N15	N16	NNW14	N16	NNW8	NNW13	N15	N14	N13	N14	N11	N10	N9	N9	N11	N12.0	N16
27-May	N8	N7	N7	N6	N7	N7	N7	N8	N1	SSE5	SE3	NNE5	NE6	N10	NNW9	WNW6	W3	S10	SSE8	SE5	SSE5	SW3	SSE3	NE2	N2.2	S10
28-May	ESE1	NNE3	E4	NE3	SW2	ESE6	SE7	SE8	SSE8	SSE7	S9	SSE10	S9	S9	SSW7	ESE3	S9	S9	SSW7	SW6	S5	SSW3	SSW3	W3	S4.8	SSE10
29-May	WSW3	SSW4	W5	WSW3	S5	WNW0	W2	WNW2	S4	SW3	WSW3	S5	SSE6	SSE3	N1	WNW1	N3	N6	N6	NNW5	NNW6	NW4	NW5	NW4	W1.3	N6
30-May	NNW4	NW5	NW5	NW3	NNW5	NW5	NW6	NW5	NNW7	N9	N8	N6	NNW4	NNW9	NNW11	N13	NNW10	NNW13	NNW11	N10	N9	NNW5	N7	WNW4	NNW6.9	N13
31-May	WNW4	W4	W2	WNW2	NNW1	NW3	WNW2	N2	NW4	E5	SE7	SE8	SSE12	SE7	SSE8	SE10	SE10	SSE7	SSE8	S8	S4	S3	SSW3	WSW2	SSE3.2	SSE12

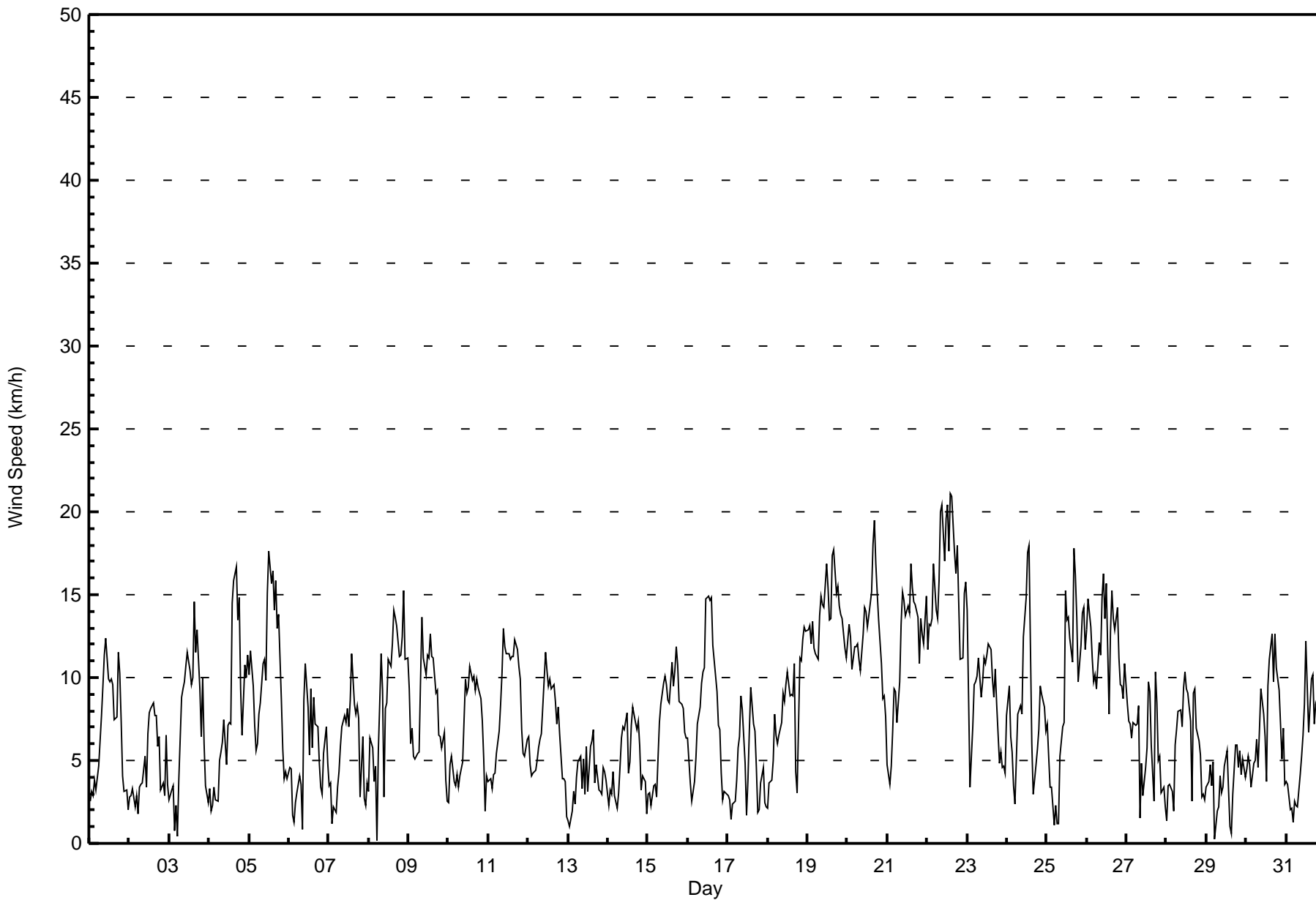
NW3.1	NNW3.1	NW2.9	NW2.4	NW2.5	NNW1.9	N1.1	NNE1.5	N1.4	NNE1.9	NE1.8	N1.9	NNE1.6	N2.4	NNW3.3	N3.6	NNW3.9	N3.3	N3.2	N3.6	N3.0	NNW3.2	NNW3.0	NNW3.4		Diurnal Average
N14	N15	N13	N14	N17	N14	N14	N16	N20	N20	NNE17	N20	NNE20	SSE18	N21	N21	N19	N17	NNE18	NNE15	N14	NNW15	N15	N16		Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	267	35.89	35.89
6 - 11	325	43.68	79.57
12 - 19	146	19.62	99.19
20 - 28	6	0.81	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	4	7	9	4	5	6	17	25	28	22	18	25	32	25	25	267
6 - 11	54	25	18	10	4	3	20	48	30	15	7	9	13	24	27	18	325
12 - 19	80	22	0	1	0	0	0	11	2	4	0	3	1	7	11	4	146
20 - 28	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	154	52	25	20	8	8	26	76	57	47	29	30	39	63	63	47	744

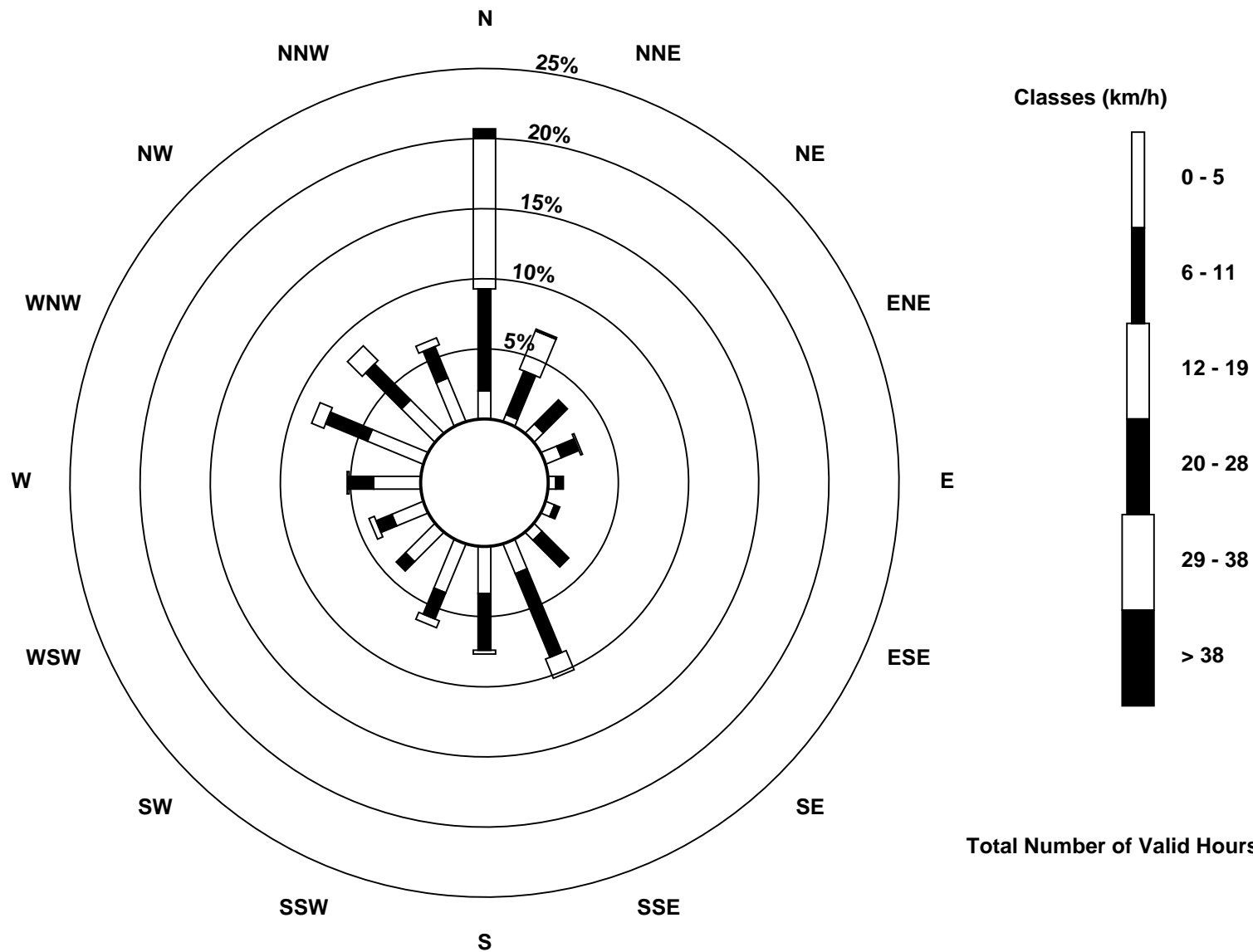
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on May 19 17:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 0 km/h on May 24 05:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 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-May	1	1	1	1	1	1	1	2	2	2	3	4	4	4	4	4	5	4	4	2	1	1	1	2	5
2-May	1	1	1	1	2	1	1	1	1	2	2	2	2	3	3	3	2	2	2	1	1	1	3	2	3
3-May	1	1	1	1	2	1	2	2	2	2	2	2	4	5	5	4	4	3	2	5	3	1	3	5	
4-May	1	1	1	1	2	1	2	2	2	1	2	3	3	4	6	5	6	5	5	3	2	3	3	3	6
5-May	3	3	3	2	1	2	2	3	4	4	4	6	6	6	6	5	6	5	4	4	2	1	1	1	6
6-May	1	2	2	1	2	1	1	1	2	4	4	4	4	5	3	4	3	4	3	1	1	2	2	1	5
7-May	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	2	2	1	2	2	2	2	3
8-May	1	2	2	1	2	2	3	4	4	3	3	4	5	5	5	5	6	5	5	5	6	5	4	4	6
9-May	3	2	3	2	2	2	2	4	5	5	4	4	4	4	4	4	3	4	3	2	2	3	2	1	5
10-May	1	1	1	2	1	1	1	2	3	3	3	4	4	4	4	4	4	4	4	4	3	3	1	1	4
11-May	1	1	1	1	1	3	2	3	4	5	5	5	5	5	5	5	5	5	5	4	3	2	1	1	5
12-May	1	1	1	1	1	1	2	2	3	4	5	5	5	5	5	4	4	3	3	3	2	1	1	1	5
13-May	1	1	1	1	1	1	1	1	2	3	3	4	3	4	3	3	2	2	2	1	1	1	1	1	4
14-May	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	2	2	2	1	1	3
15-May	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	3
16-May	1	1	1	2	2	1	2	2	2	2	2	5	5	5	3	3	3	2	2	2	1	1	1	1	5
17-May	1	1	1	1	1	1	2	3	3	3	2	2	2	3	4	3	3	2	1	2	1	2	1	1	4
18-May	1	1	1	1	2	1	1	2	3	4	4	4	4	4	4	4	4	3	2	4	5	5	5	5	5
19-May	5	5	5	5	4	4	5	6	6	6	6	7	7	5	6	7	8	6	6	5	5	5	4	4	8
20-May	4	5	4	4	4	5	5	4	4	5	4	5	5	5	5	5	5	5	4	4	3	2	2	2	5
21-May	1	1	2	2	3	4	3	2	3	4	4	5	5	4	4	4	4	3	3	2	3	2	3	4	5
22-May	3	3	3	3	4	4	4	4	5	6	5	6	6	7	6	7	6	5	6	5	3	2	3	3	7
23-May	2	3	1	2	1	2	3	4	4	4	4	4	5	6	6	5	5	4	3	2	1	2	1	1	6
24-May	2	2	1	2	0	1	2	2	3	3	3	4	5	4	3	3	2	1	2	1	2	2	2	1	5
25-May	1	2	1	1	1	1	1	2	2	3	3	3	5	5	5	5	4	6	5	5	3	4	3	3	6
26-May	3	3	4	4	2	2	3	4	3	4	4	3	5	3	4	4	3	3	3	3	2	2	2	2	5
27-May	2	2	2	2	2	1	2	2	2	2	2	2	2	3	3	4	3	5	2	3	2	1	2	1	5
28-May	1	1	1	1	2	3	2	2	2	2	2	3	2	3	4	2	3	3	2	2	2	1	1	1	4
29-May	1	1	2	2	4	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	4
30-May	1	1	1	1	2	2	1	2	2	3	2	2	2	4	3	3	3	3	3	3	2	1	1	1	4
31-May	1	1	1	1	1	1	1	2	3	2	3	2	3	3	3	3	3	3	3	2	1	1	1	2	3
																		Diurnal Maximum							



Wood Buffalo Environmental Association
Summary of Hour Averages

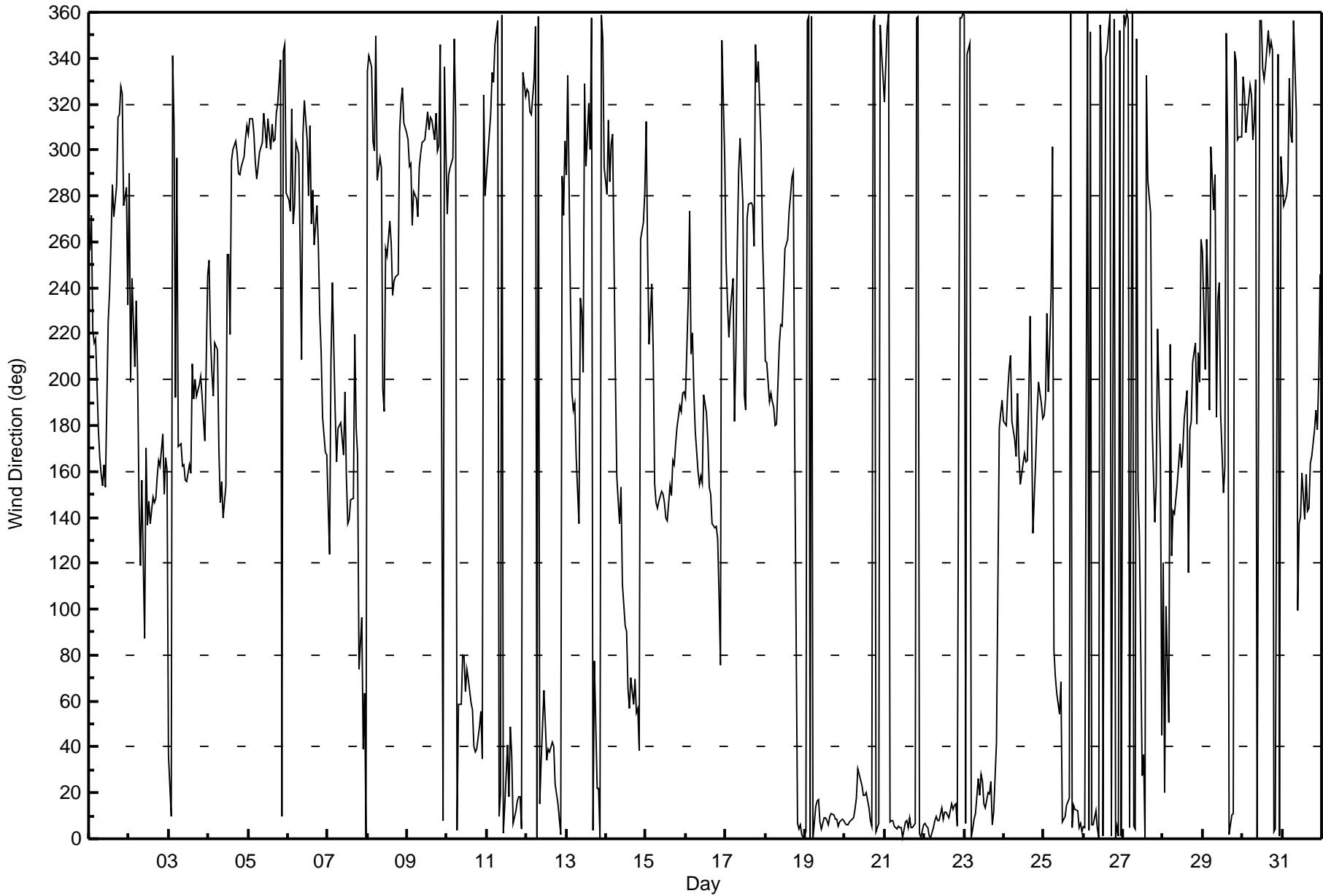
Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - May 2016

Direction of Maximum Speed: 10 deg on May 22 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 8.0 deg on May 22	Hours of Data: 744
Direction of Minimum Speed: 350 deg on May 8 06:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.2 deg on May 13	Percent Operational Time: 100.0
Monthly Average Direction: 282.7 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-May	256	271	222	216	218	178	166	159	154	163	153	225	239	260	285	271	284	314	315	328	325	276	284	233	240.5
2-May	290	199	244	205	234	201	147	119	156	87	170	136	147	138	149	147	148	158	165	163	177	150	166	160	156.5
3-May	37	10	341	310	192	297	171	172	162	163	156	163	159	207	191	200	193	197	201	193	182	173	245	180.4	
4-May	252	219	203	193	216	213	169	146	156	140	154	255	255	220	295	300	304	299	290	289	293	297	305	310	275.7
5-May	307	313	314	307	295	288	293	299	303	316	309	301	314	300	311	304	304	316	320	339	10	343	346	281	310.4
6-May	278	273	318	268	276	303	298	258	208	307	322	305	280	311	268	282	259	276	258	228	212	183	168	167	275.0
7-May	145	124	208	242	186	164	179	180	182	167	195	157	137	139	148	148	219	179	167	74	97	39	63	1	158.8
8-May	334	341	336	304	300	350	287	296	292	196	186	257	254	269	259	237	243	245	246	308	321	327	312	308	280.1
9-May	304	293	294	267	282	279	271	293	298	303	305	310	317	308	315	313	304	316	300	302	346	8	336	300	305.7
10-May	272	289	292	296	349	314	4	59	59	80	79	64	74	70	59	56	40	38	39	49	56	35	324	280	43.6
11-May	289	307	315	334	329	346	357	10	19	359	2	14	41	18	49	36	7	12	16	18	18	4	334	323	8.2
12-May	327	325	317	315	331	354	0	358	15	33	64	50	34	39	38	42	40	24	20	16	2	289	272	304	16.8
13-May	289	333	231	194	187	190	167	138	235	230	203	329	293	320	300	358	4	78	22	22	1	359	348	292	312.4
14-May	280	313	286	302	307	202	158	147	137	153	111	93	90	65	57	70	59	70	55	57	38	261	269	282	79.2
15-May	312	255	216	242	212	155	146	144	147	152	150	146	139	138	154	149	165	163	172	180	189	186	194	195	165.2
16-May	192	235	273	211	220	195	178	160	155	158	155	194	185	174	153	150	137	136	136	130	106	76	348	297	164.9
17-May	252	233	219	230	244	182	212	257	291	305	277	193	187	270	277	277	276	258	346	329	339	301	261	238	267.3
18-May	208	208	190	194	191	188	180	181	216	224	224	239	257	261	273	280	288	291	172	7	4	6	2	1	267.4
19-May	3	357	358	0	358	0	14	17	17	7	4	9	9	8	6	10	11	10	8	9	5	8	8	8	7.2
20-May	7	6	6	7	9	9	13	18	31	25	23	19	19	20	13	8	5	356	359	3	7	355	342	332	8.8
21-May	321	354	360	7	8	8	6	4	6	5	5	1	7	8	5	9	5	5	7	358	358	2	1	6	3.8
22-May	7	5	5	1	1	5	8	10	8	8	13	9	12	12	10	9	15	13	14	15	5	358	358	359	8.0
23-May	359	7	342	346	1	4	8	11	26	19	28	25	15	13	20	20	25	6	12	42	111	179	185	191	15.5
24-May	182	180	195	204	211	182	174	166	194	167	154	164	168	164	165	190	227	133	150	165	186	199	190	183	174.9
25-May	184	192	229	195	237	301	82	71	63	54	68	7	8	10	15	18	359	5	15	13	12	5	7	3	12.7
26-May	6	5	359	4	351	6	6	12	4	1	354	337	1	341	344	352	360	1	357	0	5	1	352	1	358.4
27-May	359	355	360	357	5	360	6	4	349	153	132	27	36	0	332	287	273	184	160	138	155	222	165	45	6.7
28-May	120	20	101	51	215	123	143	142	154	163	172	161	170	183	195	116	178	182	207	216	180	212	199	261	169.5
29-May	255	204	261	238	187	301	274	289	184	235	242	185	151	162	351	303	2	11	11	343	339	305	306	305	274.4
30-May	332	325	307	315	328	324	304	313	331	0	356	356	335	331	336	352	343	347	343	3	4	342	1	297	340.9
31-May	286	276	280	286	331	307	303	356	317	99	137	140	159	139	159	143	144	164	167	178	187	178	201	246	164.1

325.4 328.1 322.9 319.5 324.7 341.9 349.2 12.7 7.6 29.0 53.4 4.5 11.3 353.0 343.6 351.4 340.7 349.4 354.5 2.1 6.1 340.9 334.3 328.2
 Diurnal Average

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on May 6 09:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 8 deg on May 24 00:00																									
Percentiles: P ₁ = 11 P ₁₀ = 15 Q ₁ = 18 Median = 28 Q ₃ = 44 P ₉₀ = 57 P ₉₉ = 94																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	23	23	23	24	43	17	15	15	17	15	16	51	51	47	43	58	55	25	22	17	19	65	19	45	65
2-May	51	35	40	58	54	28	23	44	47	44	77	29	31	37	34	27	29	36	13	13	21	29	25	69	77
3-May	46	18	21	84	50	67	28	15	17	21	17	15	19	37	48	25	32	18	22	19	19	69	48	81	84
4-May	38	59	54	40	67	38	36	15	16	17	60	52	55	61	43	23	23	26	27	25	21	19	18	18	67
5-May	18	20	19	17	14	20	24	21	21	32	37	32	26	28	25	29	26	26	21	36	37	25	19	29	37
6-May	19	35	86	88	59	46	35	56	104	39	36	51	76	53	64	50	52	50	45	35	19	16	12	12	104
7-May	29	18	63	41	56	18	17	17	16	16	40	26	20	18	16	28	36	26	20	52	28	55	69	68	69
8-May	58	23	26	33	45	98	33	25	34	73	21	47	47	47	43	42	43	43	46	34	22	25	23	22	98
9-May	18	23	25	39	31	38	46	34	22	26	25	27	26	24	25	23	27	25	25	20	31	39	28	46	46
10-May	26	18	13	37	38	29	46	57	65	49	37	50	50	45	51	49	49	47	47	43	52	49	64	22	65
11-May	14	12	12	13	13	22	30	43	44	34	39	48	49	51	47	47	40	39	47	43	44	32	14	11	51
12-May	10	10	25	10	19	26	35	38	48	56	44	53	53	53	56	50	51	48	42	43	40	16	20	52	56
13-May	42	91	50	18	34	15	18	24	71	61	100	67	95	73	63	54	76	53	52	57	34	18	17	34	100
14-May	25	16	24	19	38	26	39	21	17	24	44	39	88	83	58	48	52	48	43	46	47	41	12	59	88
15-May	28	31	58	20	35	23	15	14	16	13	16	20	31	27	27	28	25	16	15	14	14	14	14	14	58
16-May	14	19	35	50	29	23	16	16	14	15	19	25	28	31	17	19	16	16	18	16	21	32	40	34	50
17-May	35	32	61	55	65	37	44	50	37	36	61	92	70	48	40	47	44	50	63	88	34	19	59	40	92
18-May	65	33	25	15	15	16	15	22	35	38	48	51	48	50	51	46	34	66	60	33	34	39	35	34	66
19-May	36	32	34	33	36	32	41	44	40	36	36	36	39	36	39	36	37	37	32	35	33	33	35	34	44
20-May	32	32	34	33	32	37	36	38	46	35	28	29	31	39	25	17	18	19	17	17	17	18	17	16	46
21-May	22	34	31	16	16	18	18	14	16	17	21	20	20	17	16	17	16	16	15	16	16	14	15	16	34
22-May	16	14	15	15	16	16	17	18	16	17	22	18	19	31	21	21	28	26	26	27	17	14	16	14	31
23-May	14	15	41	17	14	12	17	27	43	41	43	40	48	45	51	47	48	37	30	55	15	33	11	8	55
24-May	16	12	14	13	26	37	20	20	35	44	19	21	19	15	17	53	73	13	16	13	19	21	16	13	73
25-May	11	22	19	24	68	27	76	99	52	52	53	21	30	31	42	40	25	19	26	28	22	16	15	14	99
26-May	14	16	17	18	20	14	20	22	17	17	18	18	19	36	22	18	17	17	17	16	14	14	16	14	36
27-May	15	16	17	16	13	16	17	16	96	37	75	46	46	27	26	58	81	31	15	35	30	47	47	56	96
28-May	64	30	34	39	67	20	19	19	18	20	19	19	15	22	45	70	31	20	25	28	14	25	38	50	70
29-May	41	33	42	60	50	95	51	52	34	46	47	18	14	30	81	103	52	23	25	22	13	24	12	18	103
30-May	18	12	19	32	28	23	15	18	21	17	19	28	71	44	24	20	20	18	19	14	13	14	14	15	71
31-May	13	26	34	57	63	26	66	79	65	56	47	32	24	52	30	22	22	28	20	16	11	17	41	63	79
65 91 86 88 68 98 76 99 104 73 100 92 95 83 81 103 81 66 63 88 52 69 69 81																									
Diurnal Maximum																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Last Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	13:05	End Time (MST)	15:55
Gas Cert Reference	LL107945	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	08/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	819	819
Calculated slope	1.001336	0.998135	Chamber temp	45.0	45.0
Calculated intercept	-0.010335	0.739025	Pressure	684.5	699.6
Analyzer Background	12.5	12.9	Flow	0.499	0.510
Analyzer Coefficient	0.950	0.950	Intensity	90	92

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	1.0	----
as found span	5500	81.3	734.7	733.5	1.002
calibrator zero	5500	0.0	0.0	0.0	----
high point	5500	81.3	734.7	736.1	0.998
second point	5500	45.6	412.1	410.7	1.003
third point	5500	22.8	206.0	205.5	1.003
as left zero					
as left span					
Average Correction Factor					1.001

Corrected As found 732.5 Previous response 733.7 % change 0.2%

Notes:

Inlet filter changed after as founds. Zero slightly adjusted. As lefts not completed.

Calibration Performed By: Devin Russell



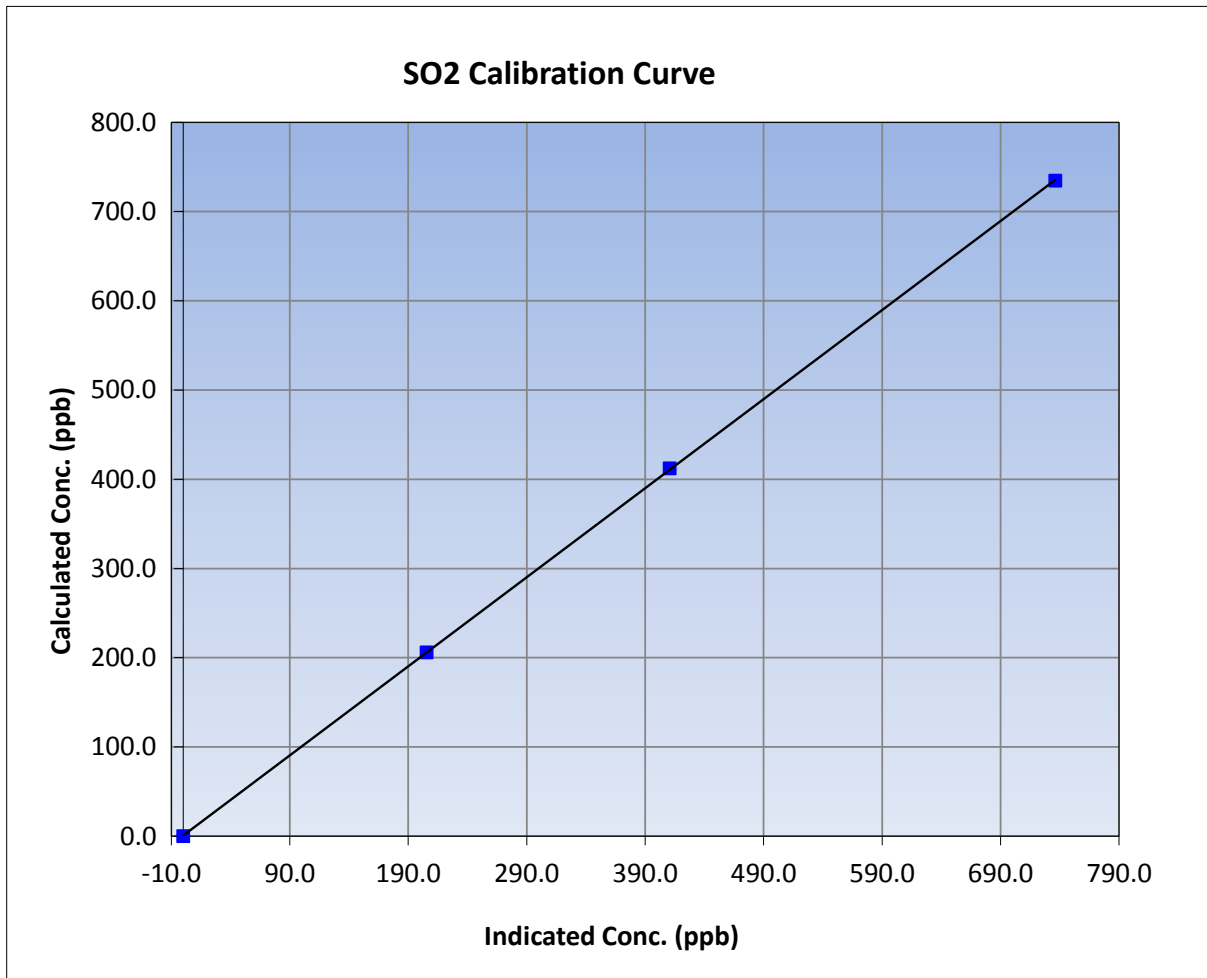
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	15:55
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

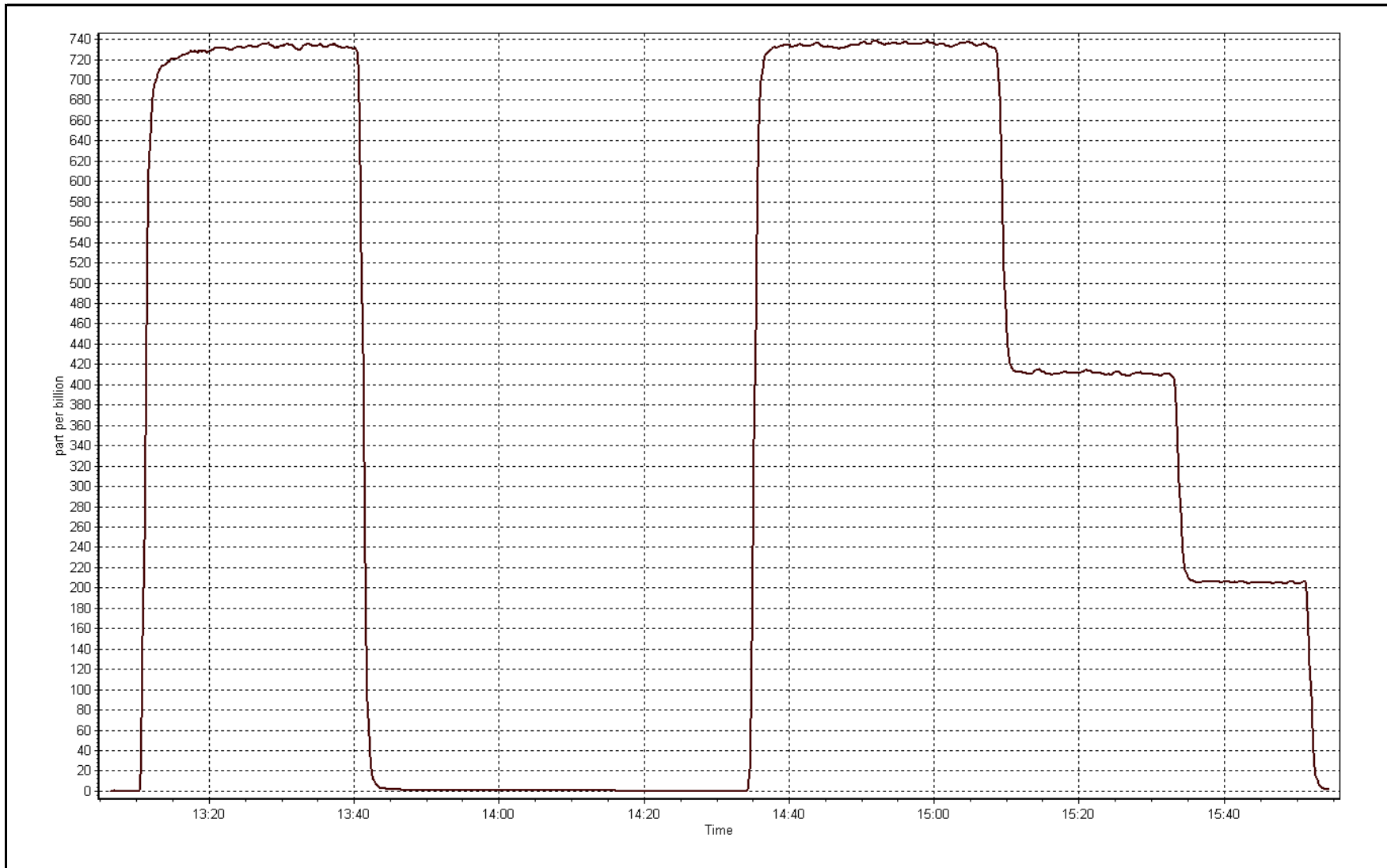
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999989
734.7	736.1	0.9980		
412.1	410.7	1.0034	Slope	0.998135
206.0	205.5	1.0025		
			Intercept	0.739025



SO2 Calibration Plot

Date: May 12, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 13, 2016	Last Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:15 MST	End Time (MST)	10:20
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	SA140071A 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-860	-860
Analyzer IP address	192.168.1.42		Lamp voltage	1160	1159
Calculated slope	1.003049	0.993314	Chamber temp	45	45
Calculated intercept	-0.037670	0.054832	Pressure	669.0	682.0
Analyzer Background	1.9	1.9	Flow	0.433	0.443
Analyzer Coefficient	1.029	1.029	Intensity	79	79
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	470	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.1	----
as found span	6500	46.0	75.0	74.9	1.001
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	75.5	0.994
second point	6500	24.6	40.1	40.3	0.996
third point	6500	12.3	20.1	20.3	0.990
as left zero					
as left span					
Average Correction Factor					0.993

Corrected As found	75.1	Previous response	74.8	% change	-0.3%
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Notes:

Inlet filter changed after as founds. Scrubber check completed after as founds. No adjustments made. As lefts not completed.

Calibration Performed By:

Devin Russell



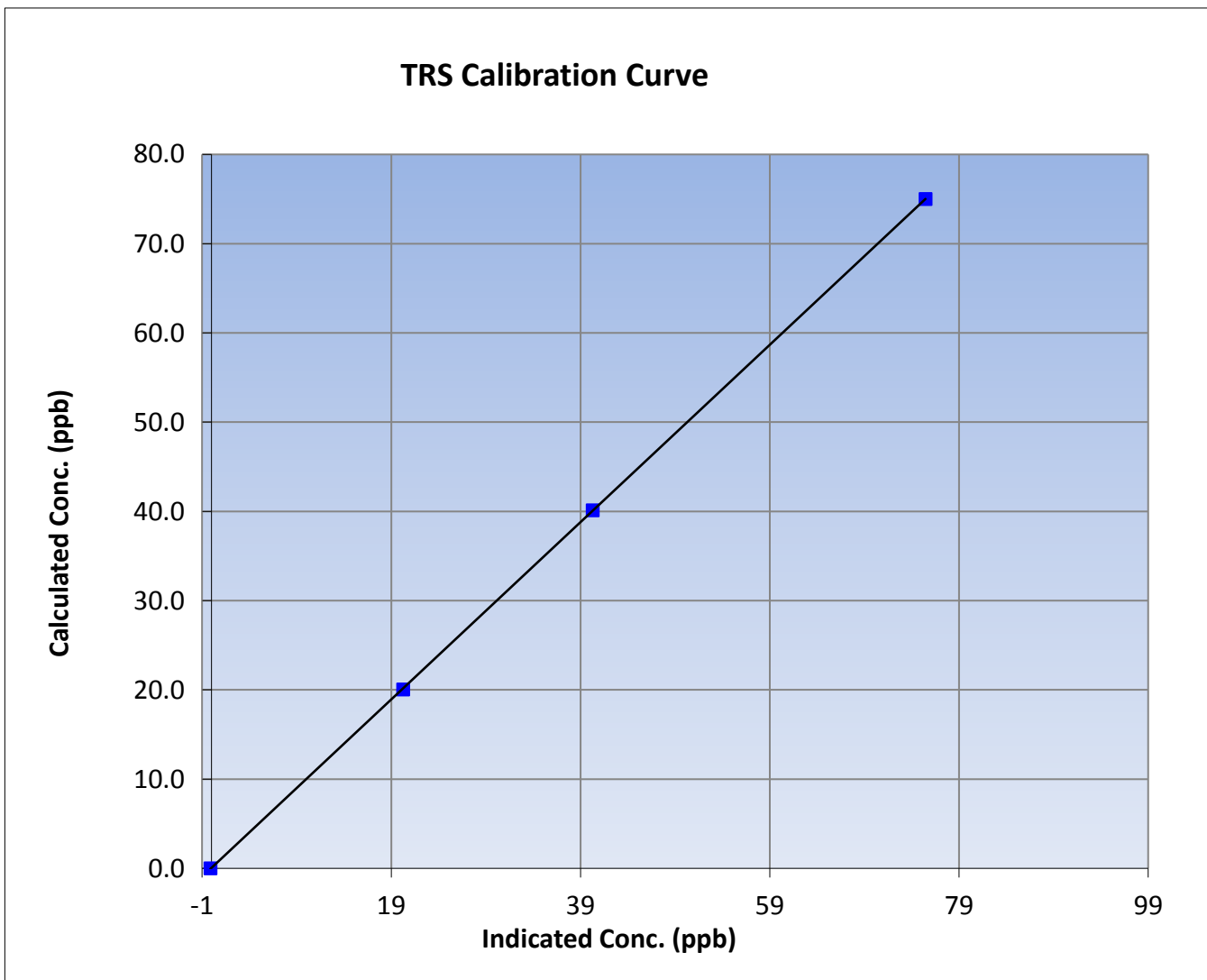
Wood Buffalo Environmental Association TRS Calibration Report

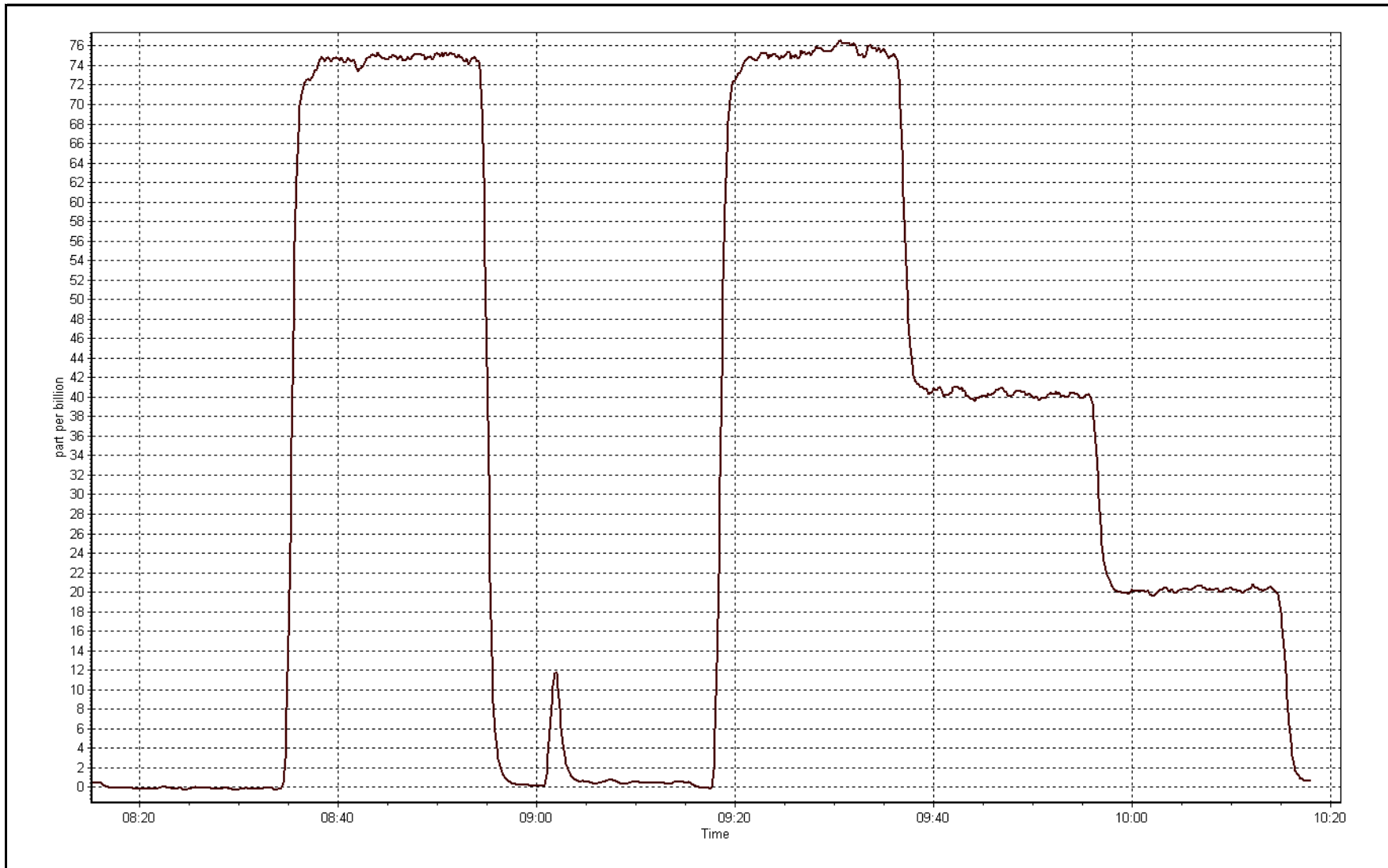
Station Information

Calibration Date	May 13, 2016	Previous Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)		End Time (MST)	10:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999993
75.0	75.5	0.9941		
40.1	40.3	0.9960	Slope	0.993314
20.1	20.3	0.9901		
			Intercept	0.054832







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May 12, 2016	Last Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	13:05	End Time (MST)	15:55
Gas Cert Reference	LL107945	Cal Gas Expiry Date	September-08-18
CH4 Cal Gas Conc.	515.0 ppm	CH4 Equiv Conc.	1065.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	74.9	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	0.998651	0.998541	Carrier Pressure	37.3	37.3
THC Calc intercept	0.039078	0.037372	Fuel Pressure	44.3	44.3
NMHC Calc slope	0.999187	1.001848	Air Pressure	38.9	38.9
NMHC Calc intercept	-0.001955	-0.004412			

Analyzer make Thermo 55i Analyzer serial # 1152430012

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	81.3	15.74	15.72	1.001
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.76	0.999
second point	5500	45.6	8.83	8.76	1.008
third point	5500	22.8	4.41	4.36	1.013
as left zero					
as left span					
Average Correction Factor					1.006

Corrected As found 15.72 Previous response 15.72 % change 0.0%

Notes:

Inlet filter changed after as founds. N2 cylinder changed after as founds. No adjustments made. As lefts not completed.

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	8.13	1.000
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	4.55	1.002
third point	5500	22.8	2.28	2.29	0.996
as left zero					
as left span					
Average Correction Factor					1.000

Corrected As found 8.13 Previous response 8.14 % change 0.1%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	7.61	7.60	1.002
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.63	0.998
second point	5500	45.6	4.27	4.21	1.014
third point	5500	22.8	2.13	2.07	1.031
as left zero					
as left span					
Average Correction Factor					1.014

Corrected As found 7.60 Previous response 7.59 % change -0.2%



Wood Buffalo Environmental Association

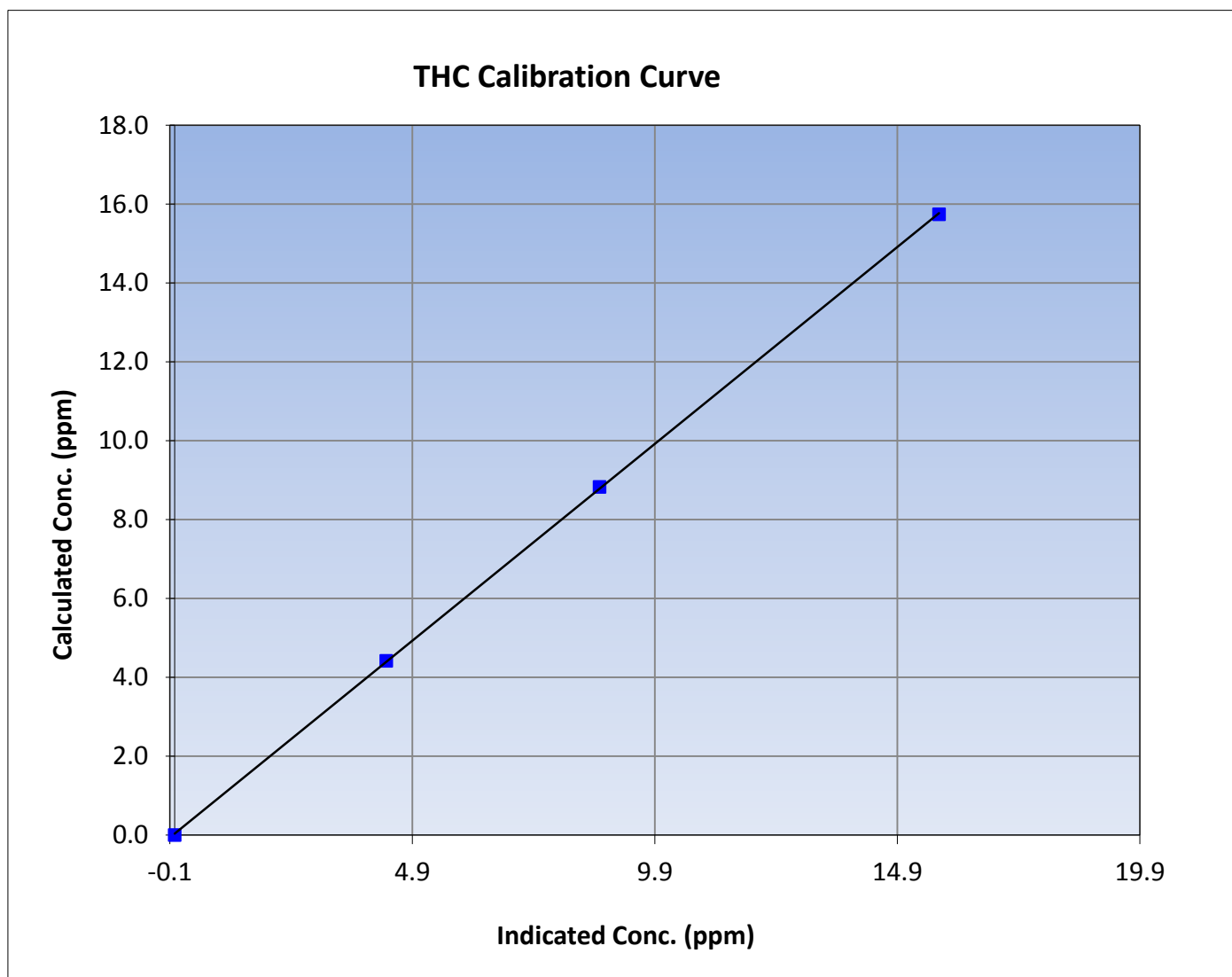
THC Calibration Summary

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	15:55
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	0.999963
15.74	15.76	0.9989		
8.83	8.76	1.0080	Slope	0.998541
4.41	4.36	1.0126		
			Intercept	0.037372





Wood Buffalo Environmental Association

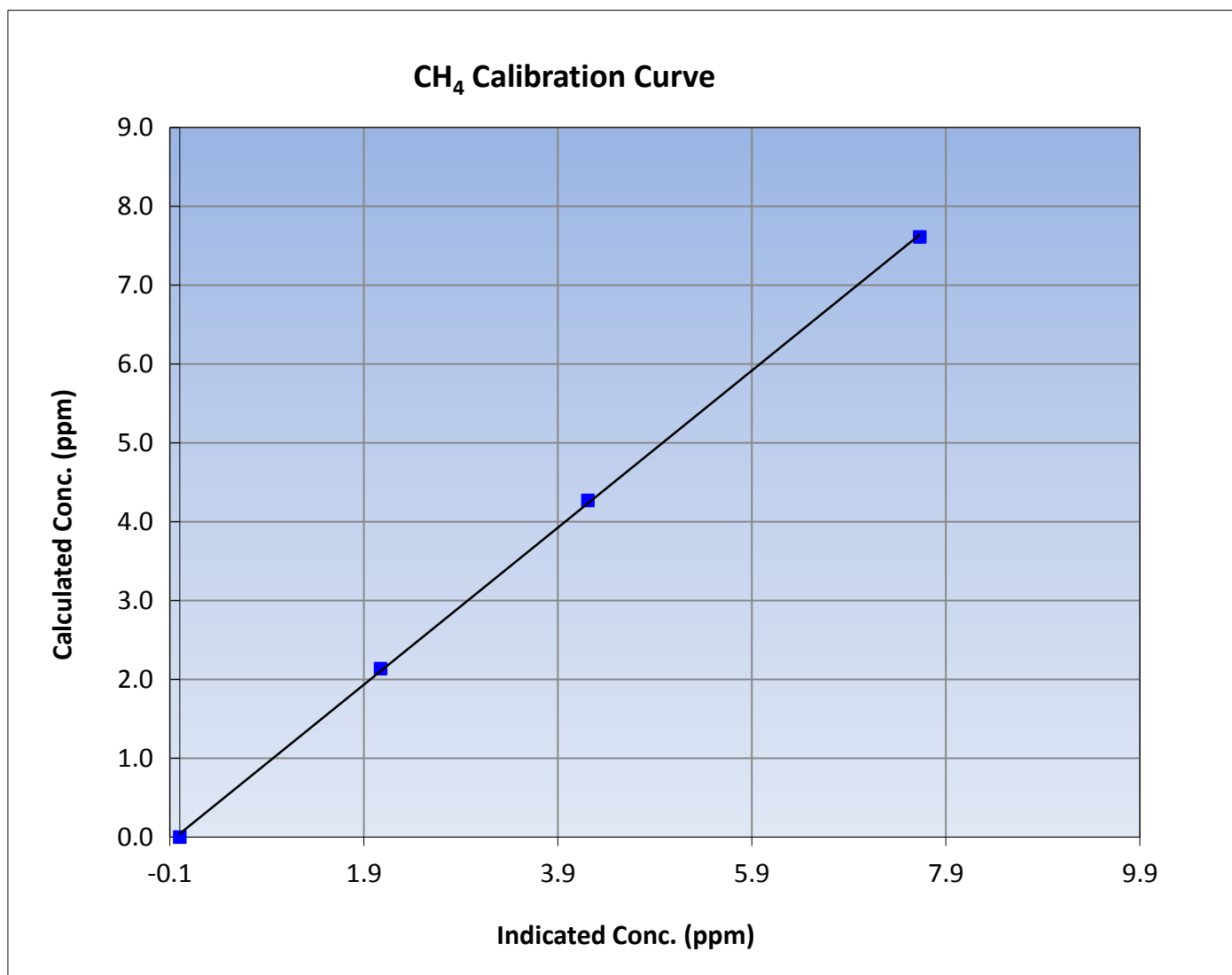
CH₄ Calibration Summary

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	15:55
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	0.999849
7.61	7.63	0.9977		
4.27	4.21	1.0142	Slope	0.996244
2.13	2.07	1.0314		
			Intercept	0.039903





Wood Buffalo Environmental Association

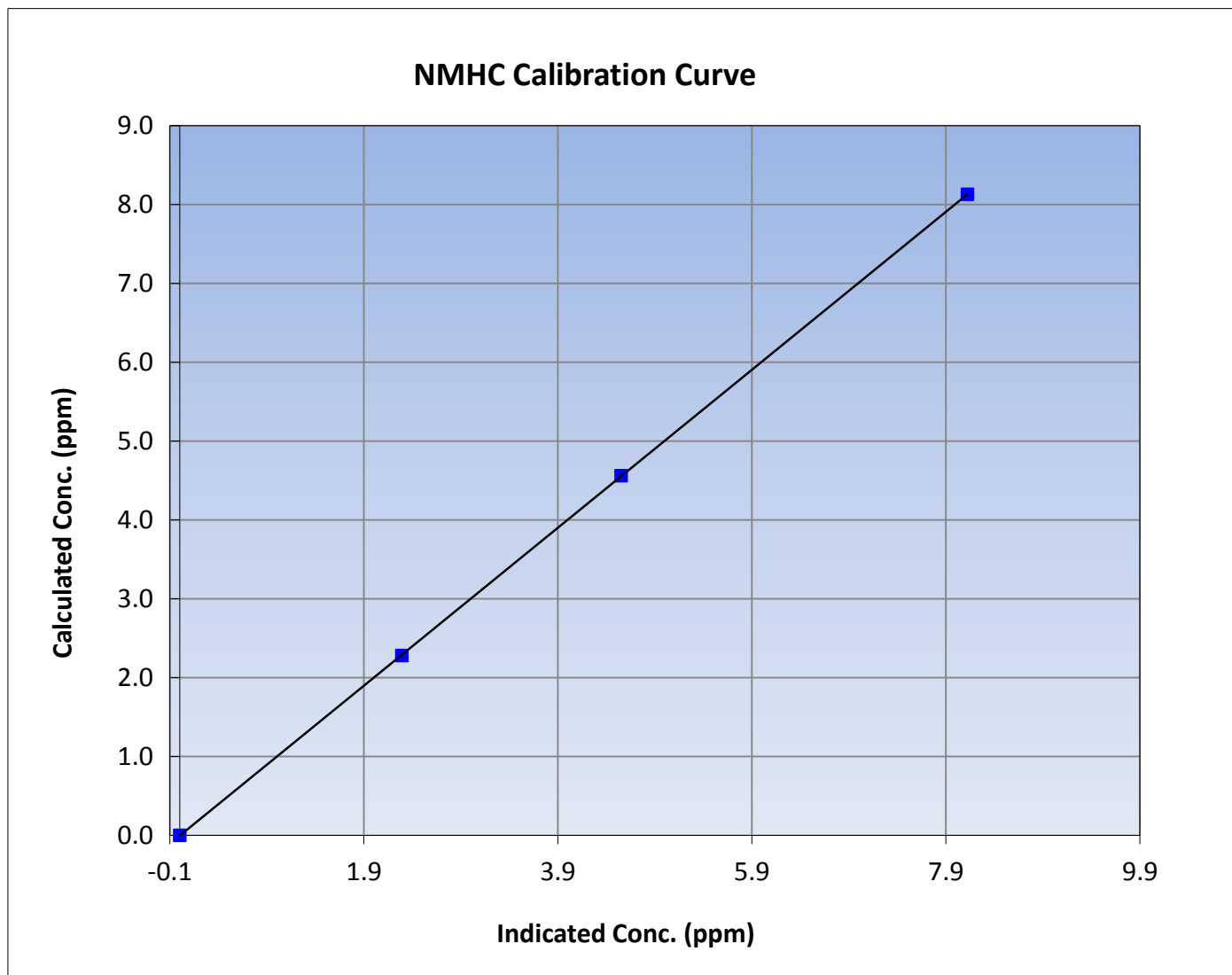
NMHC Calibration Summary

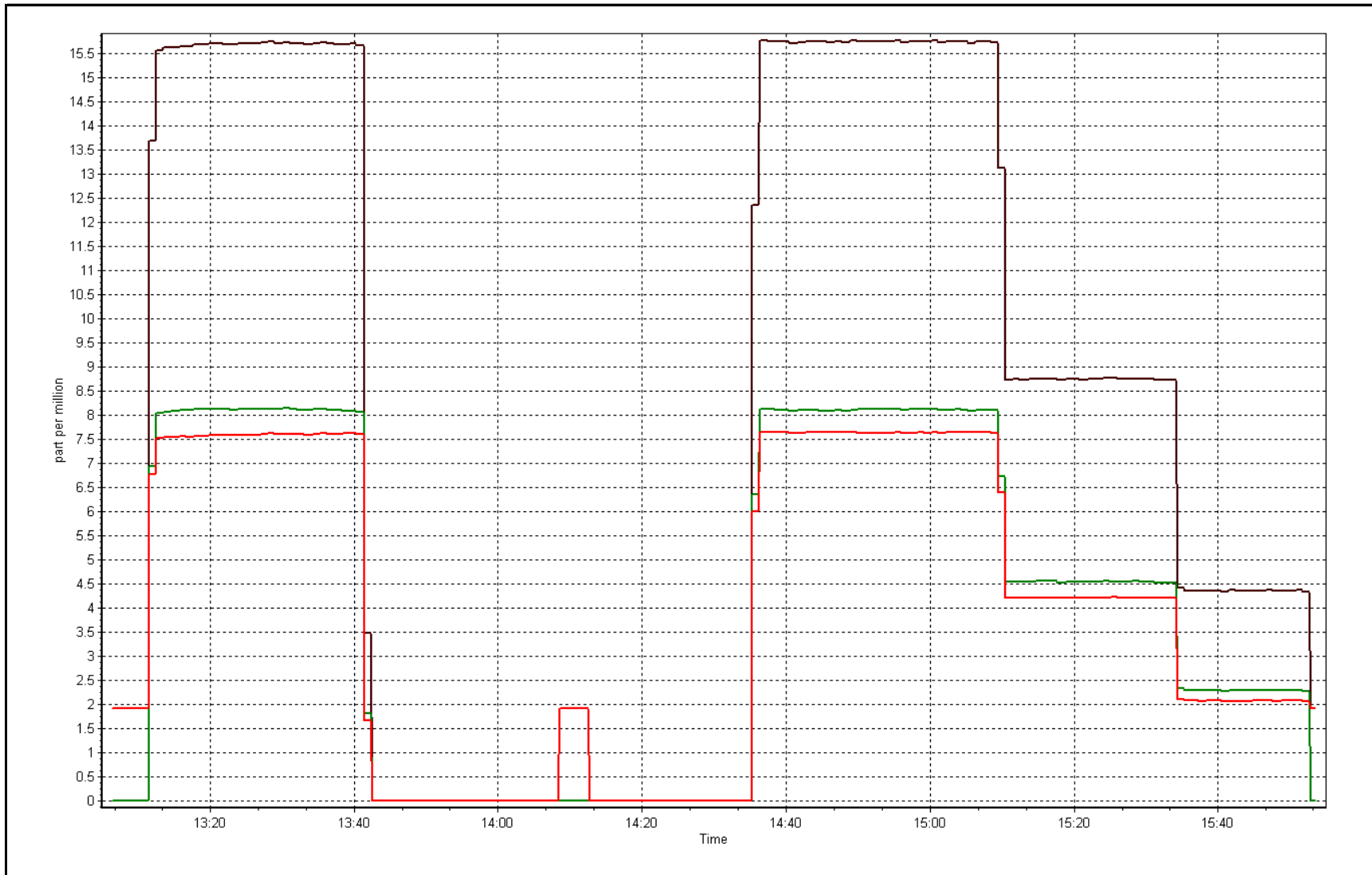
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 8, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	15:55
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	0.999996
8.13	8.12	1.0012		
4.56	4.55	1.0022	Slope	1.001848
2.28	2.29	0.9956		
			Intercept	-0.004412







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 13, 2016	Previous Calibration	April 7, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Install		
Start Time (MST)	6:25	End Time (MST)	8:20
NO2 GPT Ref date	May-12-16	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.	25.4	27.4
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.002378	0.997704	Pressure	27.3	27.4
Calculated intercept	-1.550128	-0.840018	Flow cell A	0.785	0.776
Analyzer Background	0.7	0.7	Flow cell B	0.785	0.776
Analyzer Coefficient	1.129	1.085	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	API T400	Analyzer serial #	1107
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.1	----
as found span	5000	0.98	416.5	430.8	0.967
calibrator zero	5000	0.00	0.0	-0.1	----
high point	5000	0.98	416.5	417.5	0.998
second point	5000	0.56	247.4	249.7	0.991
third point	5000	0.34	127.8	129.8	0.985
as left zero					
as left span					
Average Correction Factor					0.991

Corrected As found	430.9	Previous response	417.1	% change	-3.2%
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Notes:

Inlet filter changed after as founds. Span adjusted. As lefts not completed.

Calibration Performed By: Devin Russell



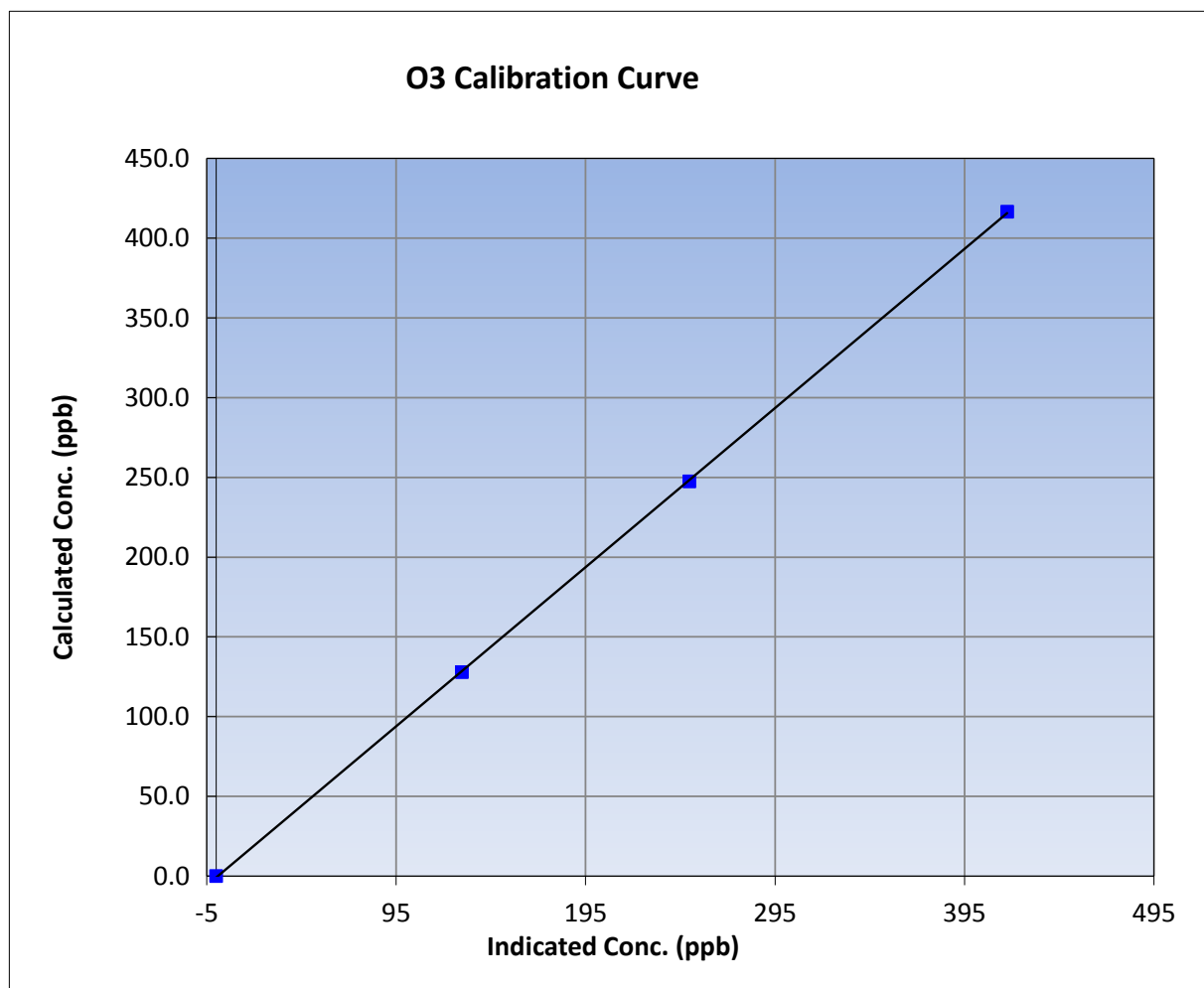
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-13-16	Previous Calibration	April 7, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	6:25	End Time (MST)	8:20
Analyzer make	API T400	Analyzer serial #	1107

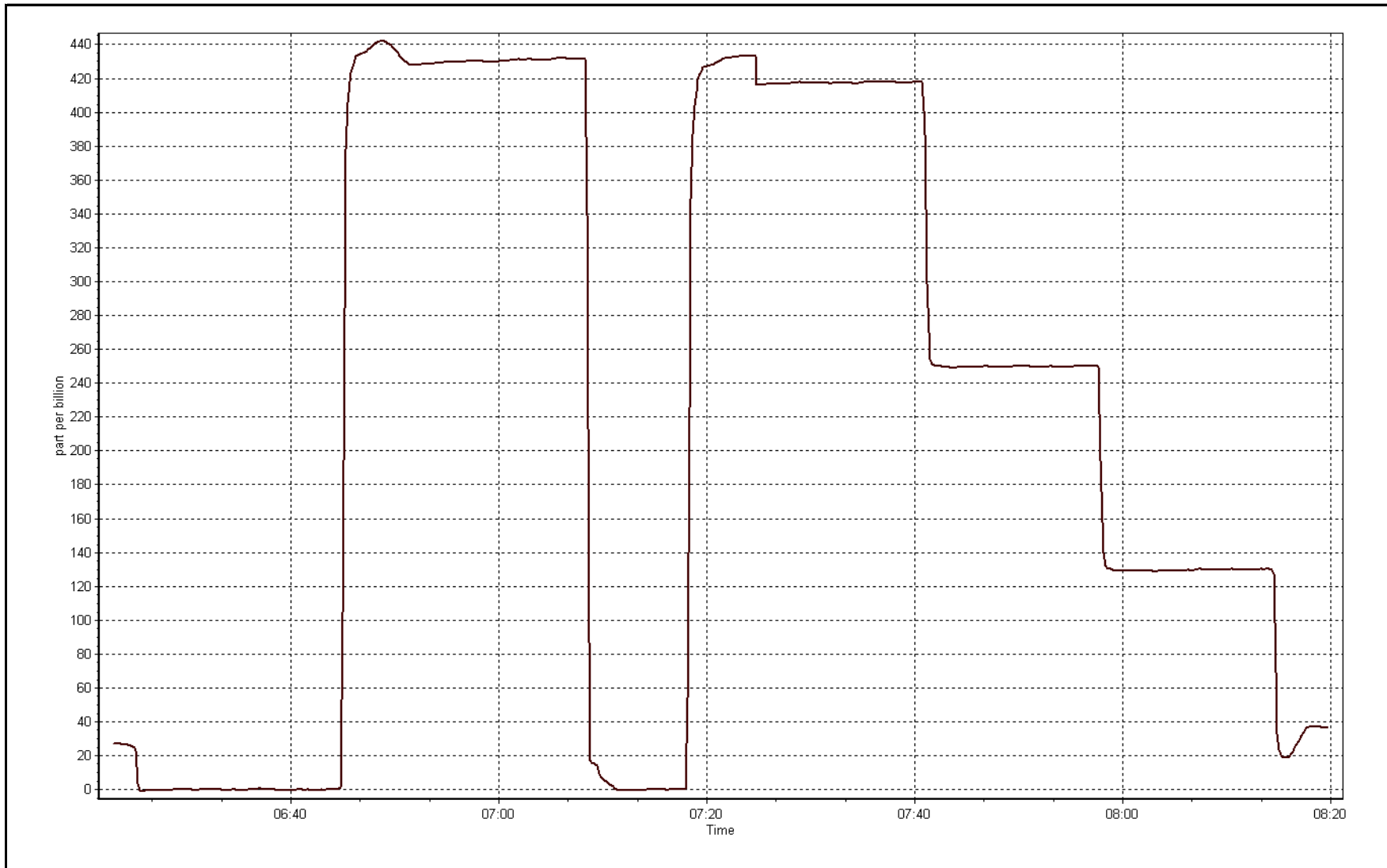
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999969
416.5	417.5	0.9976		
247.4	249.7	0.9907	Slope	0.997704
127.8	129.8	0.9850		
			Intercept	-0.840018



O3 Calibration Plot

Date: May 13, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 4, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	13:05	End Time (MST)	17:30
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL107945
NOX Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	09/08/2018
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

DACs Information

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

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000067	0.999941	1.006332
	Data Offset	1.049470	1.231210	0.045757
Current Calibration	Data Slope	0.999379	1.003746	0.996010
	Data Offset	0.287883	0.715349	-1.148605

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.838		0.849	
NOX coefficient	1.003		1.008	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.3		5.3	
NOX bkgrnd	5.3		5.4	
Chamber Temp	50.4	Deg C	50.6	Deg C
Moly Temp	322.6	Deg C	325.5	Deg C
PMT voltage	-816.2	V	-816.2	V
PMT Temp	-2.9	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	158.1	mmHg	161.3	mmHg
R Cell Press Nox	158.1	mmHg	161.3	mmHg
NO sample flow	0.67	lpm	0.677	lpm
Nox sample Flow	0.670	lpm	0.677	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 12, 2016

Station Number:

AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.5	0.2	0.2	----	----
as found span	5500	81.4	753.3	750.4	3.0	742.8	738.3	4.5	1.0142	1.0163
calibrator zero	5500	0.0	0.0	0.0	0.0	0.5	0.1	0.4	----	----
high point	5500	81.4	753.3	750.4	3.0	754.1	747.5	6.6	0.9990	1.0039
second point	5500	45.6	422.0	420.3	1.7	421.3	417.3	4.0	1.0018	1.0074
third point	5500	22.8	211.0	210.2	0.8	210.2	208.0	2.2	1.0037	1.0103
as left zero										
as left span										
Average Correction Factor									1.0015	1.0072

Corrected As found

NO_x= 742.3

NO= 738.1

Percent Change

NO_x= 1.3%

NO= 1.5%

Previous Response

NO_x= 752.2

NO= 749.2

GPT Calibration Data

Dilution Flow (total) 5500 ccm

Source Gas Flow 81.40 ccm

NOx ref calc conc = 753.3 ppb

NO ref calc conc = 750.4 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		3.0	753.1	746.8	0.4	1.0003	1.0047	----	----
1st NO2 (300)	330.3	419.5	752.0	330.3	421.7	1.0018	----	0.9948	100.5%
2nd NO2 (200)	499.5	250.3	752.6	499.5	253.1	1.0010	----	0.9889	101.1%
3rd NO2 (100)	619.0	130.8	752.2	619.0	133.2	1.0015	----	0.9818	101.9%
2nd NO ref point		3.0							
Average Correction Factor						1.0014		0.9885	101.2%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

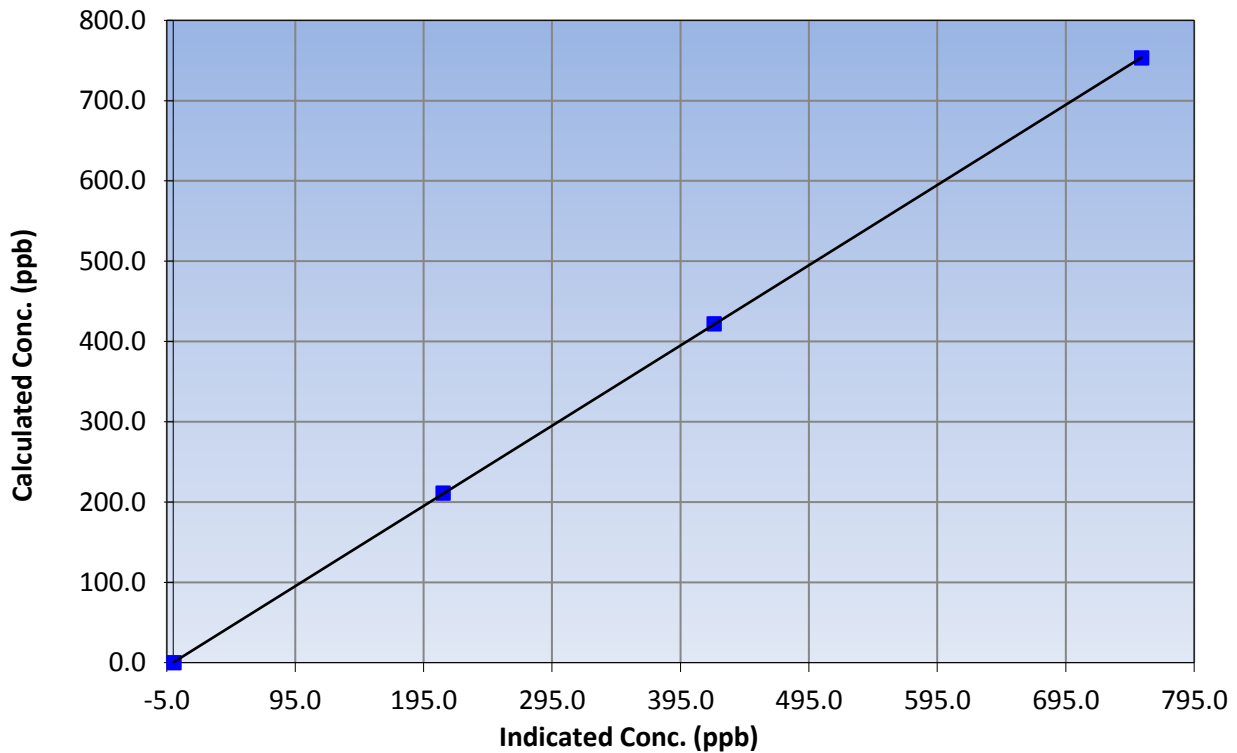
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 4, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	17:30
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	0.5	----	Correlation Coefficient	0.999994
753.3	754.1	0.9990		
422.0	421.3	1.0018	Slope	0.999379
211.0	210.2	1.0037		
			Intercept	0.287883

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

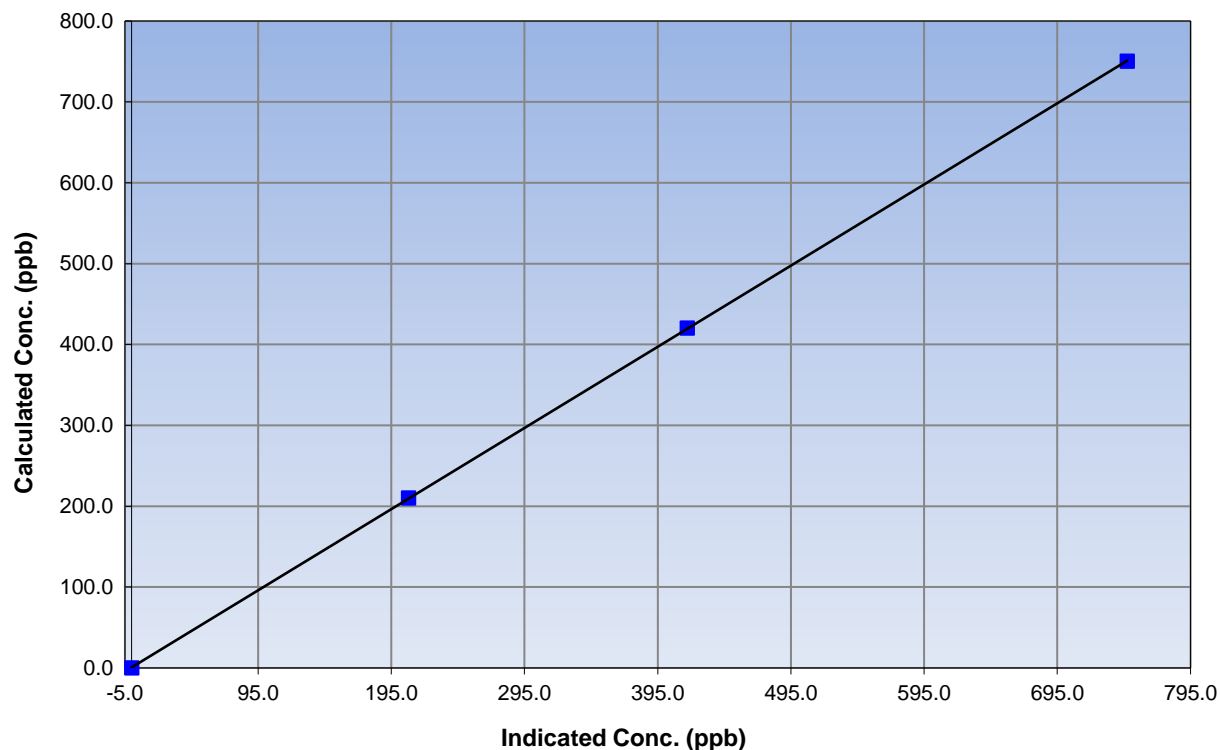
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 4, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	17:30
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	0.1	N/A	Correlation Coefficient	0.999993
750.4	747.5	1.0039		
420.3	417.3	1.0074	Slope	1.003746
210.2	208.0	1.0103		
			Intercept	0.715349

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

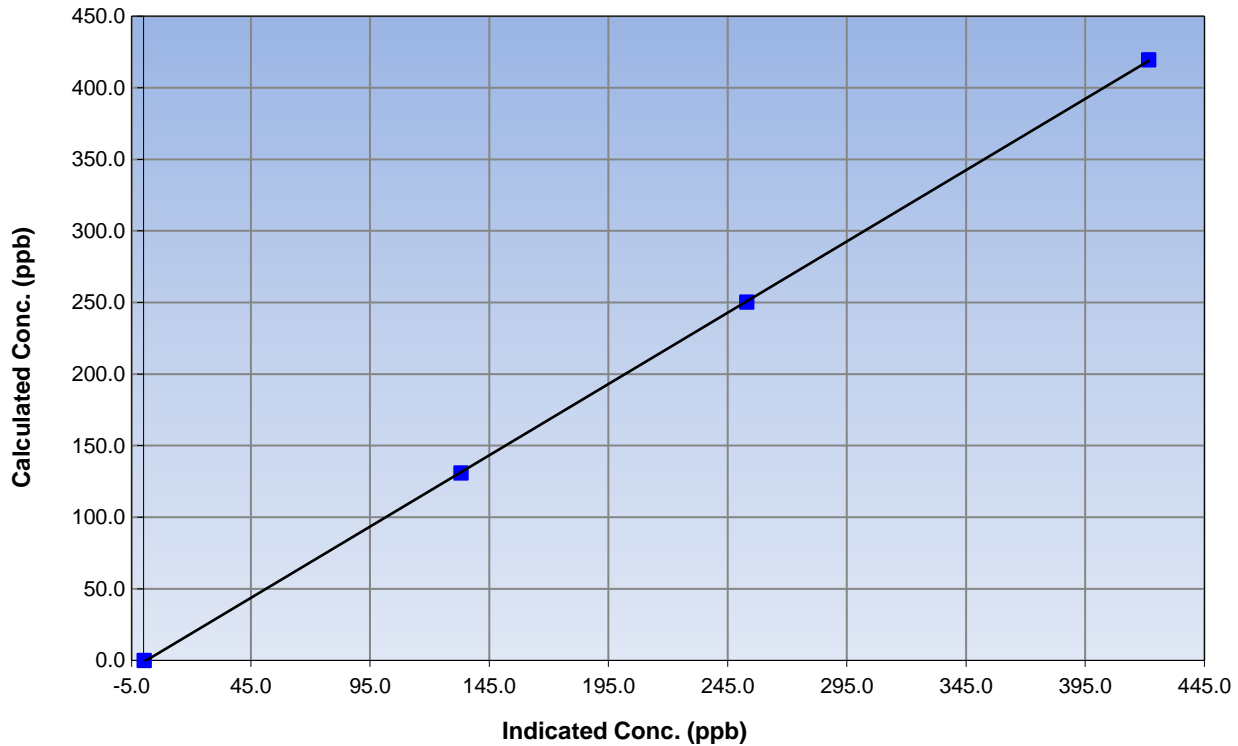
Station Information

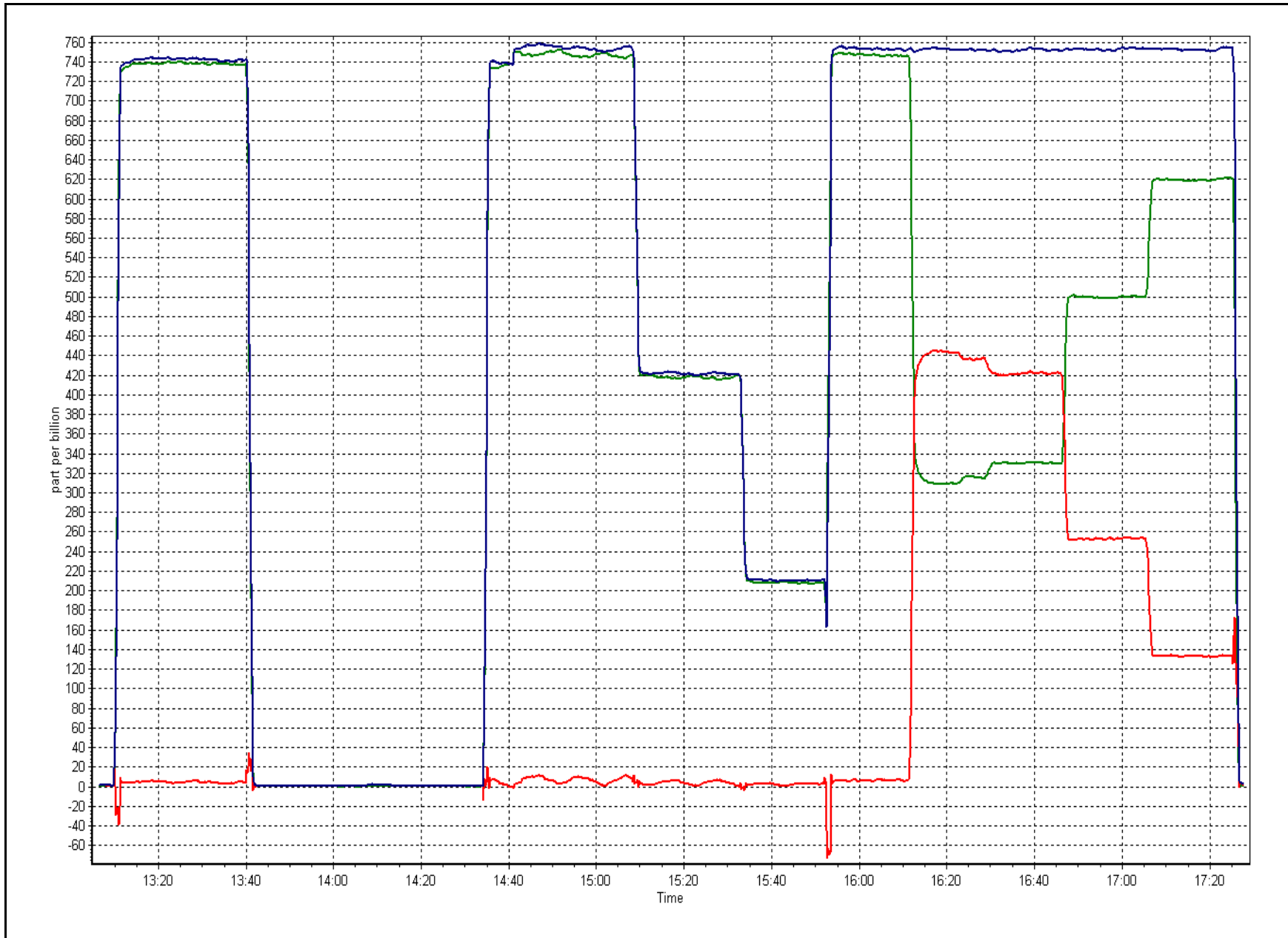
Calibration Date	May 12, 2016	Previous Calibration	April 4, 2016
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	17:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999980
419.5	421.7	0.9948		
250.3	253.1	0.9889	Slope	0.996010
130.8	133.2	0.9818		
			Intercept	-1.148605

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	May 12, 2016	NOX Previous Cal Date	April 11, 2016
NH3 Calibration Date	May 12, 2016	NH3 Previous Cal Date	April 12, 2016
Reason:	Routine		
Start Time (MST)	13:05	End Time (MST)	19:50
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	30.6 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.9 ppm	NH3 Expiry Date / SN	21/Dec/2012 LL76495
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	8/Sep/2018 LL107945

DACS Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.003336	0.994100	1.003314	1.001384	1.005824
	Data Offset	-8.233135	-9.4638598	-1.567151	-0.124040	-0.110476
Cal Stats After	Data Slope	1.009011	0.999206	0.999857	1.004453	1.013137
	Data Offset	-2.688579	-2.952105	0.644664	-0.883521	0.735530
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152	
Converter	API 501 NH3	Converter serial #	147	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	-0.2	ppb	-0.1	ppb
NOx BKG	-0.1	ppb	0.0	ppb
Nt BKG	-0.2		0.1	
NO coefficient	1.200		1.208	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.328		1.330	
NH3 coefficient	0.932		0.932	
Nt coefficient	1.330		1.361	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.2	Deg C	316.2	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	86.0	ccm
R Cell Press	4.8	mmHg	5.0	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	516.0	ccm	527.0	ccm
Sample Flow 2 Nox	518.0	ccm	527.0	ccm
Sample Flow 3 Nt	552.0	ccm	527.0	ccm

Notes:

Inlet filter changed after as founds. Zero adjusted. Nox/NO/NT span adjusted. No adjustment to NH3 span. During second and third NH3 point concentration dropped all of a sudden then slowly rose. No clear indication in diagnostics as to why.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

May 12, 2016

Station Number:

AMS 1

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	4.8	1.2	3.6	----	----
as found NO	5500	81.3	752.4	752.4	----	725.6	746.9	-20.9	1.037	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.8	-0.2	1.1	----	----
high NO point	5500	81.3	752.4	752.4	----	753.1	753.1	0.0	0.999	----
NO/O ₃ point	5500	81.3	752.4	752.4	----	755.6	752.5	3.1	0.996	----
as found NH ₃	1500	88.2	1799.3	NA	1799.3	1805.1	17.0	1787.9	0.997	1.006
first NH ₃	1500	88.2	1799.3	NA	1799.3	1805.1	17.0	1787.9	0.997	1.006
second NH ₃	1500	49.0	999.6	NA	999.6	997.4	10.7	986.3	1.002	1.014
third NH ₃	1500	24.6	501.8	NA	501.8	511.9	5.2	506.7	0.980	0.990
Average Correction Factor									0.9974	1.0034

Nt Corrected As Found Nt = 720.8 ppb
 NOx Corrected As Found NOx = 745.7 ppb
 NH₃ Previous Converter Efficiency = 93.2 %

Previous Response Nt = 766.3 ppb
 Previous Response NOx = 751.5 ppb
 NH₃ Current Converter Efficiency = 93.2 %

Nt percent change 6.3%
 NOx percent change 0.8%
 NH₃ percent change 0.0%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: May 12, 2016 Station Number: AMS 1

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	1.2	1.2	4.8	----	----
as found span	5500	81.4	753.3	750.4	753.3	746.9	744.2	725.6	1.0086	1.0083
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.2	0.4	0.8	----	----
high point	5500	81.4	753.3	750.4	753.3	753.1	747.0	753.1	1.0003	1.0045
second point	5500	45.6	422.0	420.3	422.0	421.0	421.2	417.5	1.0023	0.9980
third point	5500	22.8	211.0	210.2	211.0	210.1	209.7	209.8	1.0045	1.0022
Average Correction Factor									1.0024	1.0016

	<u>Nt</u>	<u>NO_x</u>	<u>NO</u>	<u>NO₂</u>
Corrected As found	720.8	745.7	743.0	----
Previous Response	767.3	752.4	749.4	----
Percent Change	6.4%	0.9%	0.9%	0.0%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 81.4 ccm NO_x ref calc conc = 753.3 ppb NO ref calc conc = 750.4 ppb

O ₃ Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
1st NO ref point	----	3.0	752.5	752.1	0.4	1.0010	0.9976	----	----
1st NO ₂ (300)	322.2	432.9	748.8	322.2	426.6	1.0061	----	1.0149	98.5%
2nd NO ₂ (200)	502.2	252.9	751.2	502.2	249.0	1.0028	----	1.0156	98.5%
3rd NO ₂ (100)	624.5	130.7	752.5	624.5	128.0	1.0011	----	1.0206	98.0%
2nd NO ref point		3.0							
Average Correction Factor						1.0033	0.9976	1.0170	98.3%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

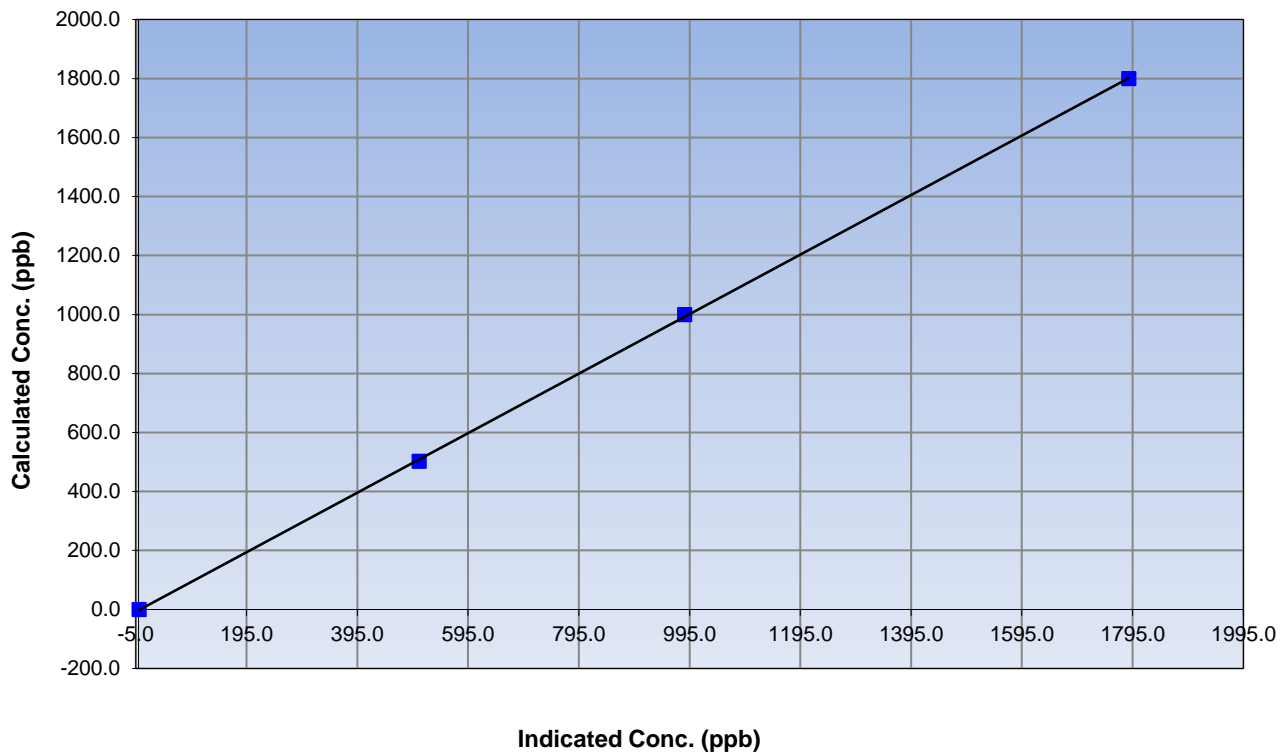
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 11, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	19:50
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	1.1	----	Correlation Coefficient	0.999942
1799.3	1787.9	1.0064		
999.6	986.3	1.0135	Slope	1.009011
501.8	506.7	0.9904		
			Intercept	-2.688579

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

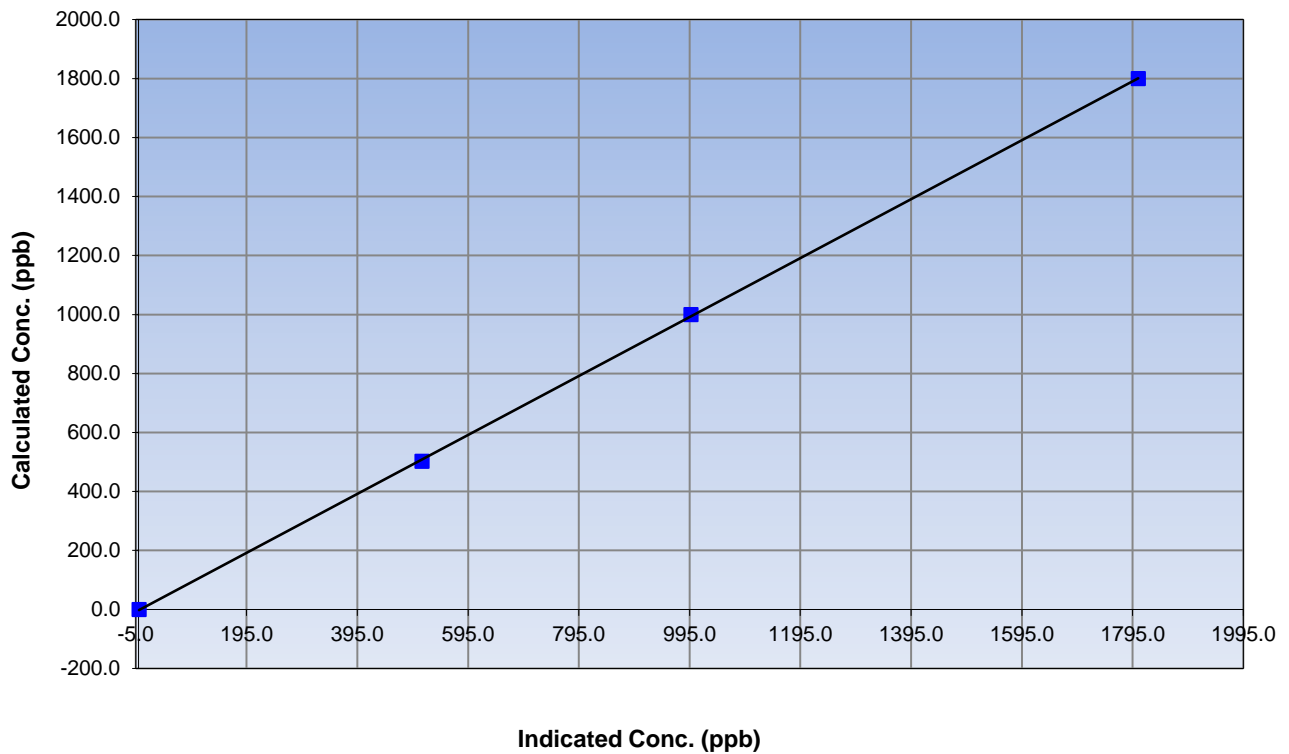
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 11, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	19:50
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	0.8	----	Correlation Coefficient	0.999951
1799.3	1805.1	0.9968		
999.6	997.4	1.0022	Slope	0.999206
501.8	511.9	0.9804		
			Intercept	-2.952105

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

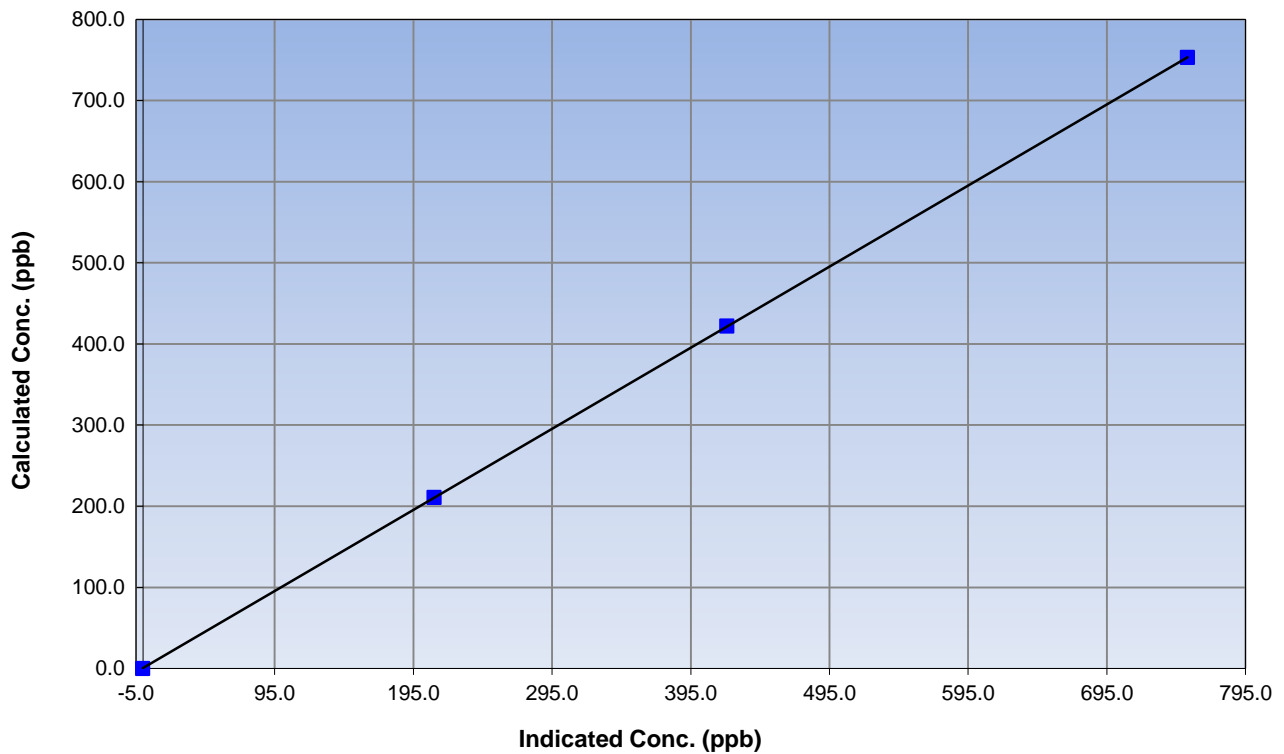
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 11, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	19:50
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	-0.2	----	Correlation Coefficient	0.999998
753.3	753.1	1.0003		
422.0	421.0	1.0023	Slope	0.999857
211.0	210.1	1.0045		
			Intercept	0.644664

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

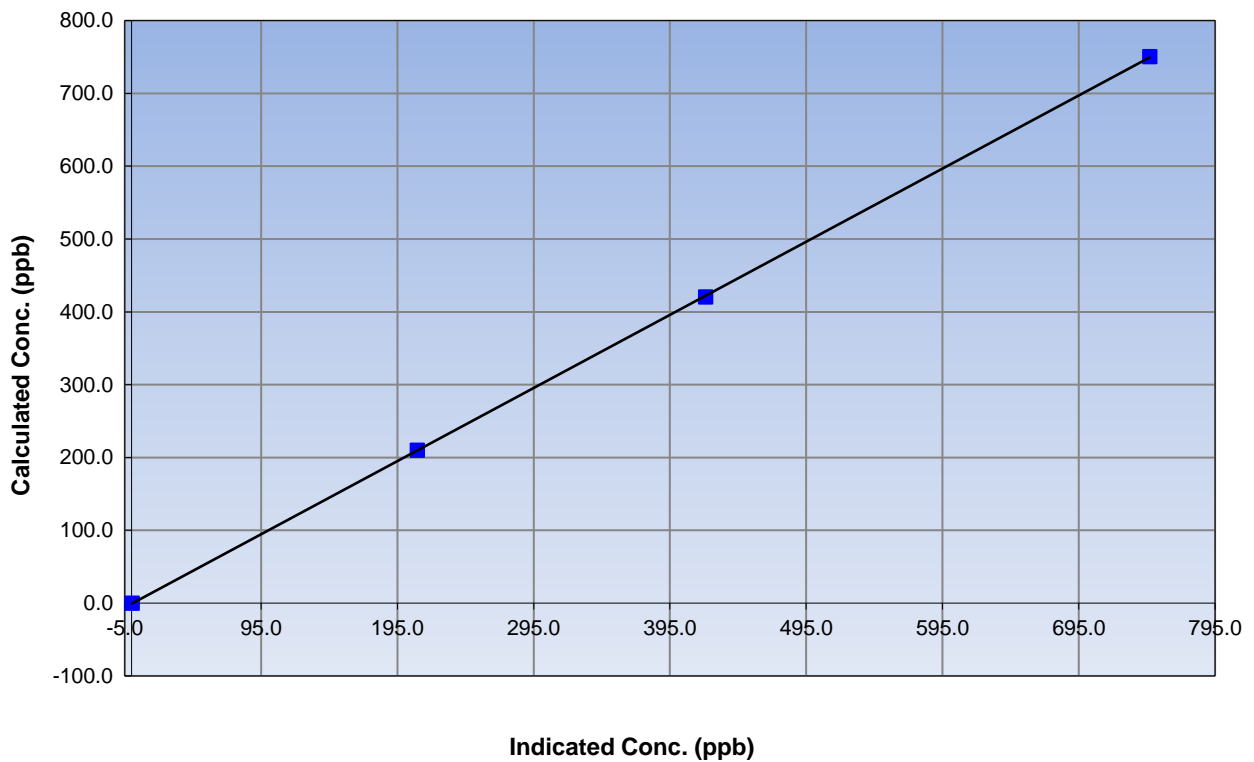
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 11, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	19:50
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999985
750.4	747.0	1.0045		
420.3	421.2	0.9980	Slope	1.004453
210.2	209.7	1.0022		
			Intercept	-0.883521

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

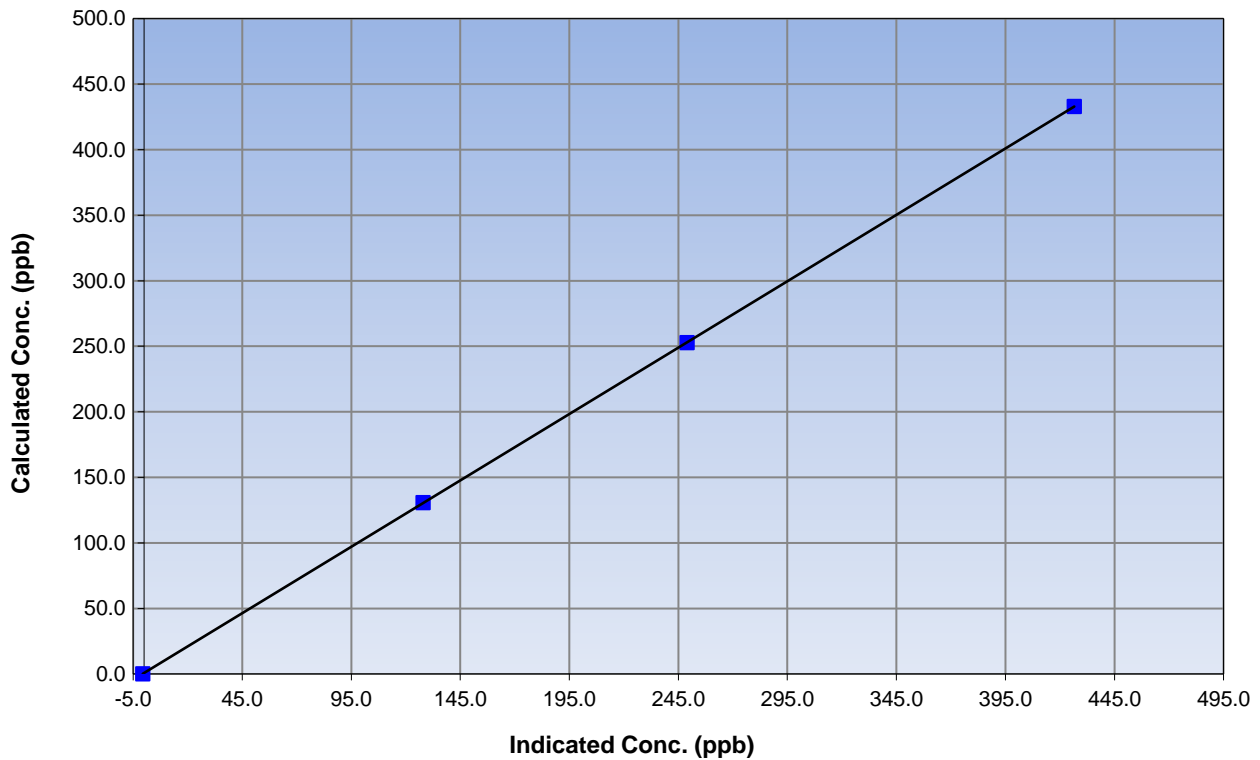
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 11, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:05	End Time (MST)	19:50
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

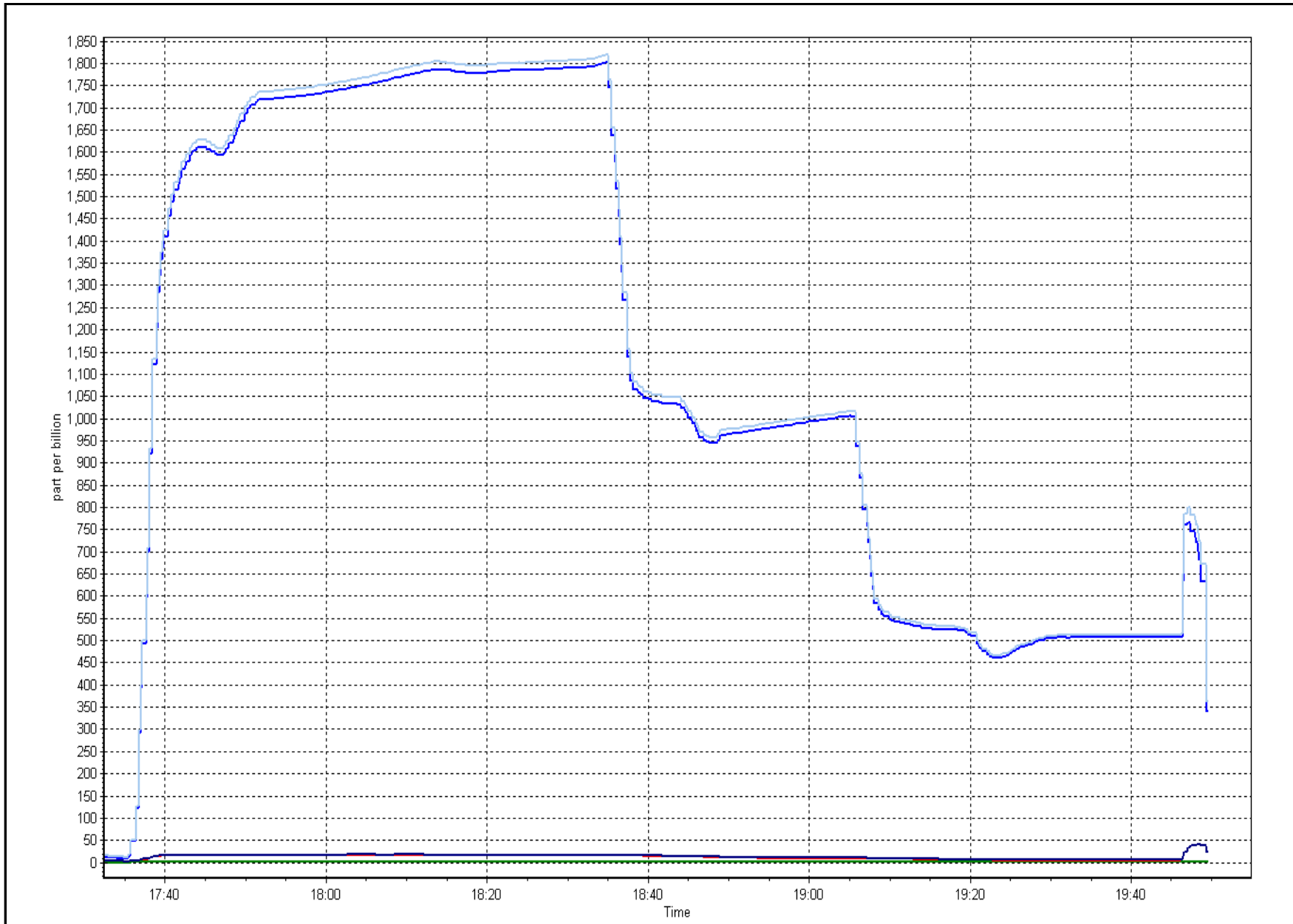
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	----	Correlation Coefficient	0.999999
432.9	426.6	1.0149		
252.9	249.0	1.0156	Slope	1.013137
130.7	128.0	1.0206		
			Intercept	0.735530

NO₂ Calibration Curve



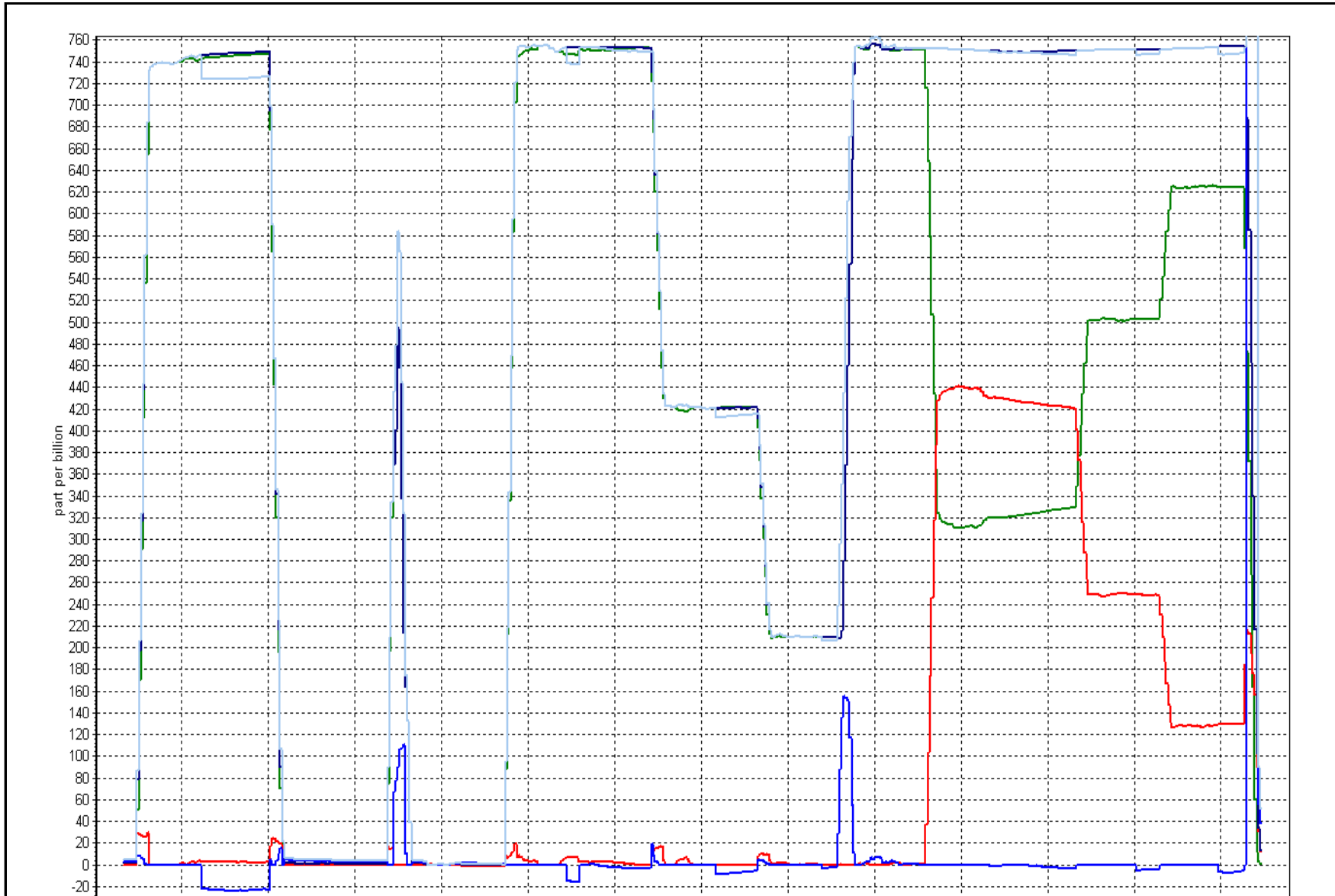
NH₃ Calibration Plot

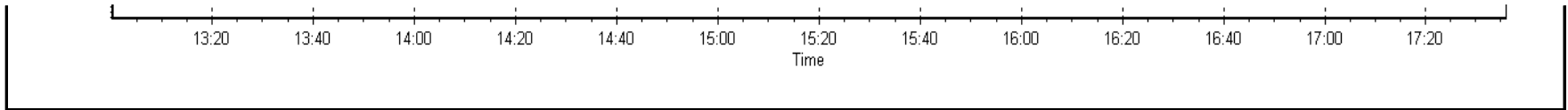
Date: May 12, 2016



NOx Calibration Plot

Date: May 12, 2016







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	May 12, 2016	Previous Calibration:	April 22, 2016
Station Name:	Bertha Ganter - Fort McKay	Station Number:	AMS 1
Start Time (MST):	14:21	End Time (MST):	15:40
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number:	E-1486
C ₁₄ Source SN:	5691
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	T1 <input checked="" type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	14.0	12.6	-1.4	14.0
T2	25.0	na	na	
T3	23.0	na	na	
T4	23.0	na	na	
RH (%)	39.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	995	994.6	-0.4	995

Main Flow (Lph)

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

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	206		206
Neph	-0.1		-0.1
C14	11.1		11.1
Indicated Concentration (ug/m3)	0	no	0
Offset 1	206.9		206.9
Offset 2	33.8		33.8

Leak Check (Quarterly)

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

	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.68		0.01
*Flow with adaptor (LPM):	16.67		

*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/clean	12/05/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

No adjustments made. All inlet cyclones cleaned.

Calibration Performed By:	Devin Russell
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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 2 MILDRED LAKE MAY 2016

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

June 24, 2016



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	711	33	33	100.00	30	0	8	0
H2S (ppb) Average	710	34	34	100.00	8	0	3	0
THC (ppm) Average	687	31	57	96.51	8.4	-	4.4	-
Temperature (C) Average	744	0	0	100.00	33.4	-	23.3	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	86	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	19	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	711	1.4	4	-	0	0	0	0	0	4	30
H2S (ppb) Average	710	0.5	1	-	0	0	0	0	0	1	8
THC (ppm) Average	687	2.42	0.7	-	2	2.1	2.1	2.2	2.4	3.1	8.4
Temperature 2 m (C) Average	744	13.45	6.6	-	-0.5	5.2	8.4	12.5	18.2	22.7	33.4
Relative Humidity (%) Average	744	55.1	24	-	14	23	33	52	78	88	98
Wind Speed 10 m (km/h) Average	744	10.2	5	-	0	4	6	10	14	17	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	17 May 2016 01:00	17 May 2016 08:00	8	Analyzer Failure - sample flow interrupted
THC	17 May 2016 09:00	17 May 2016 09:00	1	Maintenance - verify daily QA response
THC	27 May 2016 16:00	28 May 2016 08:00	17	Analyzer Failure - sample flow interrupted



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mildred Lake - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 30 ppb on May 3 03:00	Maximum Daily Average: 7.7 ppb on May 7		Hours of Data:	711
Minimum Value: 0 ppb on May 5 04:00	Minimum Daily Average: 0.0 ppb on May 29		Hours of Missing Data:	33
Maximum Diurnal Average: 2.5 ppb at hour 5	Minimum Diurnal Average: 0.4 ppb at hour 16		Hours of Calibration:	33
Monthly Average: 1.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 4 P ₉₉ = 20		Percent Operational Time:	100.0

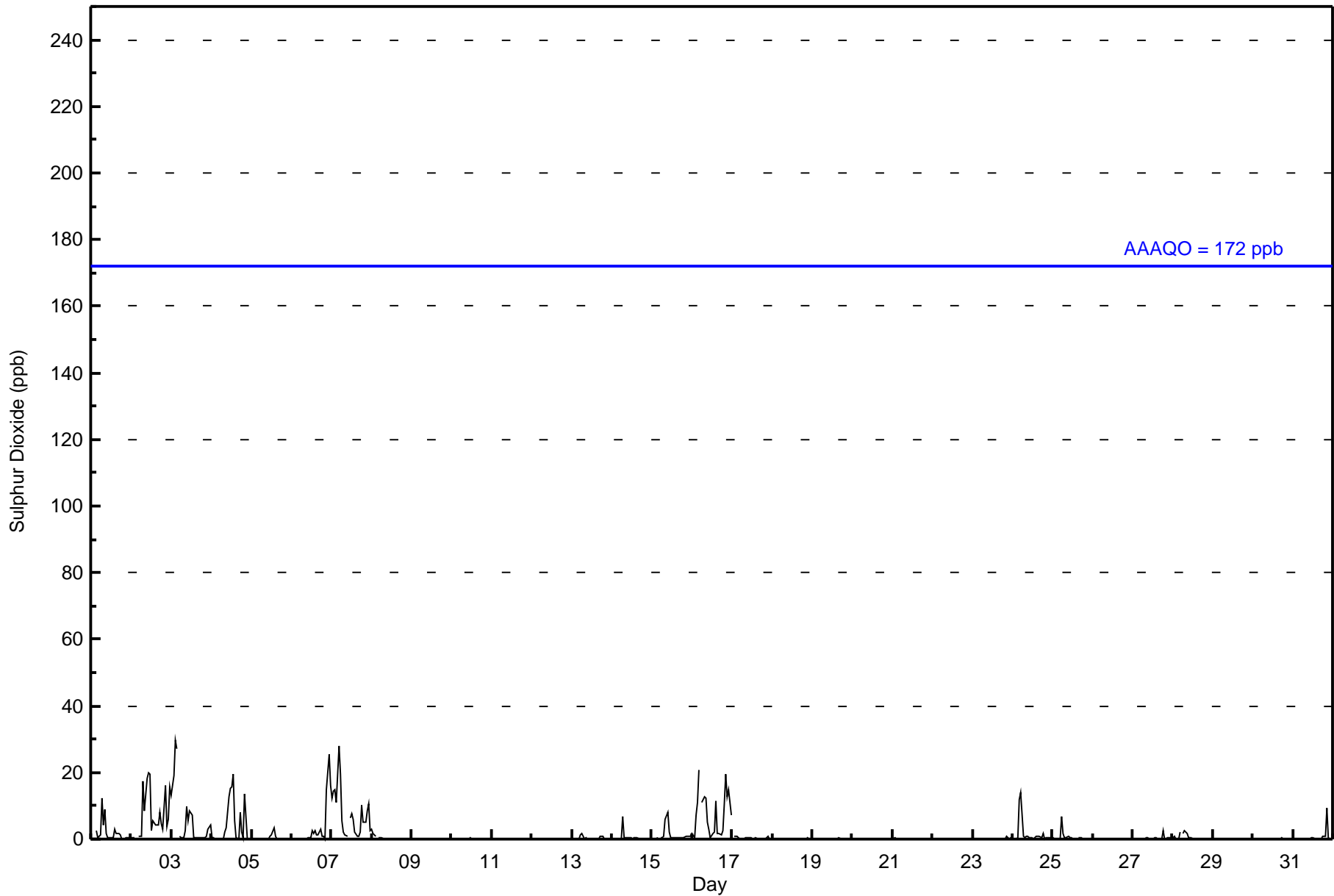
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	0	Z	2	0	1	12	4	9	2	0	0	0	0	3	2	2	1	0	0	0	1	1	0	1.8	12
2-May	0	0	0	Z	1	1	1	17	8	18	20	20	2	6	4	4	4	8	4	3	16	4	6	16	7.2	20
3-May	13	19	30	27	Z	1	0	0	2	10	6	9	7	1	1	0	0	0	0	0	1	3	4	5.9	30	
4-May	0	0	0	0	0	Z	0	0	2	3	13	15	16	19	5	0	0	8	2	1	14	0	0	4.4	19	
5-May	Z	0	0	0	0	0	0	0	0	0	0	1	1	4	1	0	0	0	0	0	0	0	0	0.3	4	
6-May	0	Z	0	0	0	0	0	0	0	0	0	1	3	2	3	1	1	3	1	1	0	15	25	16	3.1	25
7-May	12	14	15	11	28	20	5	2	1	1	Z	6	8	6	2	1	1	2	10	5	5	9	11	3	7.7	28
8-May	3	2	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-May	Z	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-May	0	0	Z	0	0	1	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	2
14-May	0	0	0	Z	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	7
15-May	0	0	0	0	Z	0	0	1	6	8	2	1	0	0	0	0	0	0	0	0	1	1	1	1	1.1	8
16-May	2	0	7	11	21	Z	11	13	12	5	3	0	2	2	12	2	2	1	3	11	20	13	15	7	7.6	21
17-May	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-May	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
24-May	0	Z	0	0	12	14	1	0	1	1	0	0	0	0	1	1	1	1	2	0	0	0	0	0	1.6	14
25-May	0	0	Z	0	0	7	2	0	1	1	1	0	0	C	C	0	0	0	0	0	0	0	0	0	0.6	7
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-May	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0.2	3
28-May	0	1	0	0	2	Z	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
29-May	Z	0	0	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	0.6	9
	1.2	1.5	2.1	2.1	2.5	1.8	1.4	1.4	1.5	1.7	1.6	1.8	1.3	1.4	1.1	0.4	0.4	0.9	0.9	0.7	2.2	1.4	2.0	1.6	Diurnal Average	
	13	19	30	27	28	20	12	17	12	18	20	20	16	19	12	4	4	8	10	11	20	15	25	16	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	673	94.66	94.66
11 - 20	33	4.64	99.30
21 - 60	5	0.70	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: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	80	146	44	5	3	15	19	54	43	42	45	28	24	52	37	36	673
11 - 20	0	0	0	0	0	3	6	10	5	2	3	0	2	2	0	0	33
21 - 60	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	5
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	80	146	44	5	3	18	25	68	49	44	48	28	26	54	37	36	711

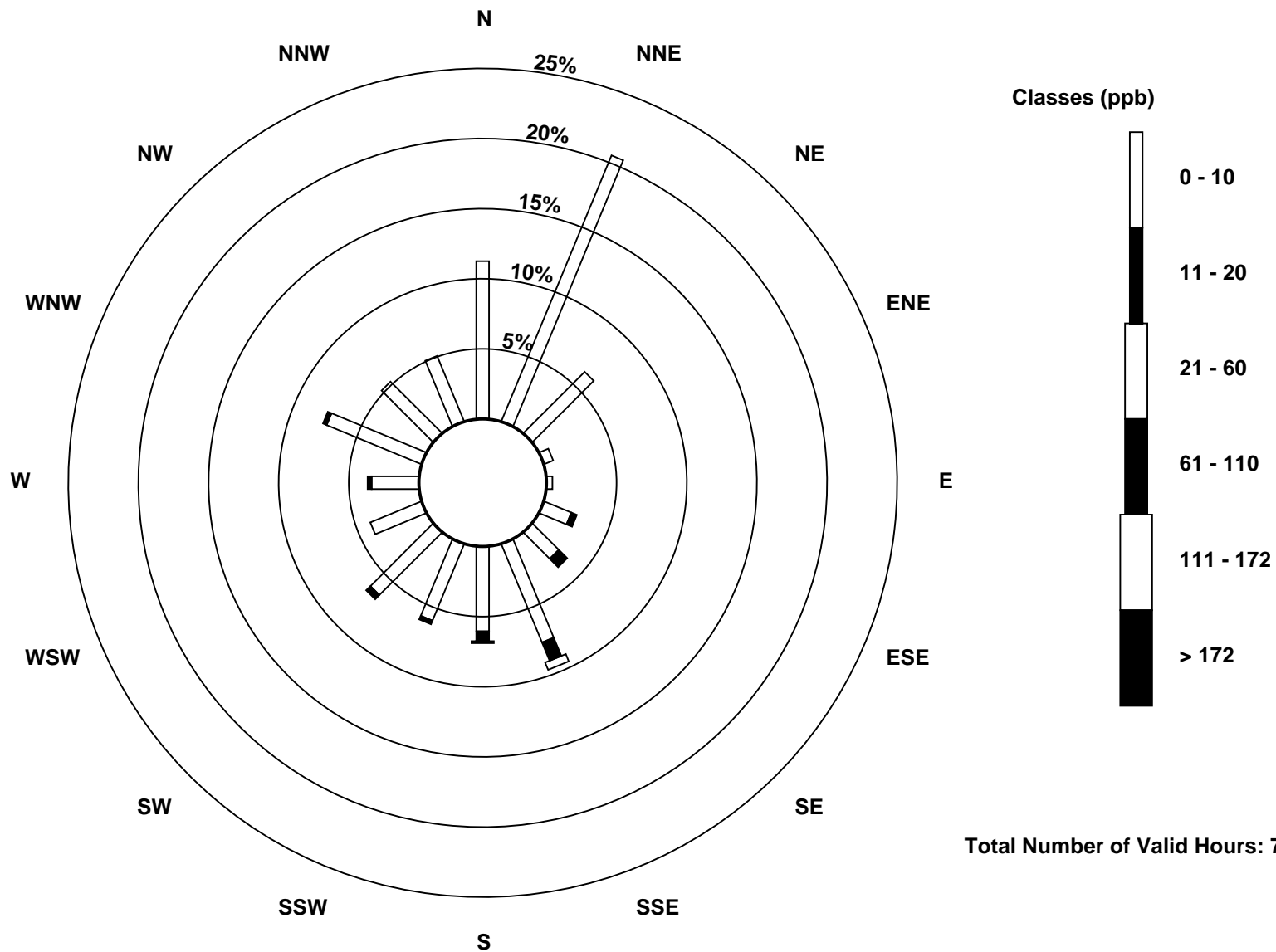
Total Number of Valid Hours: 711

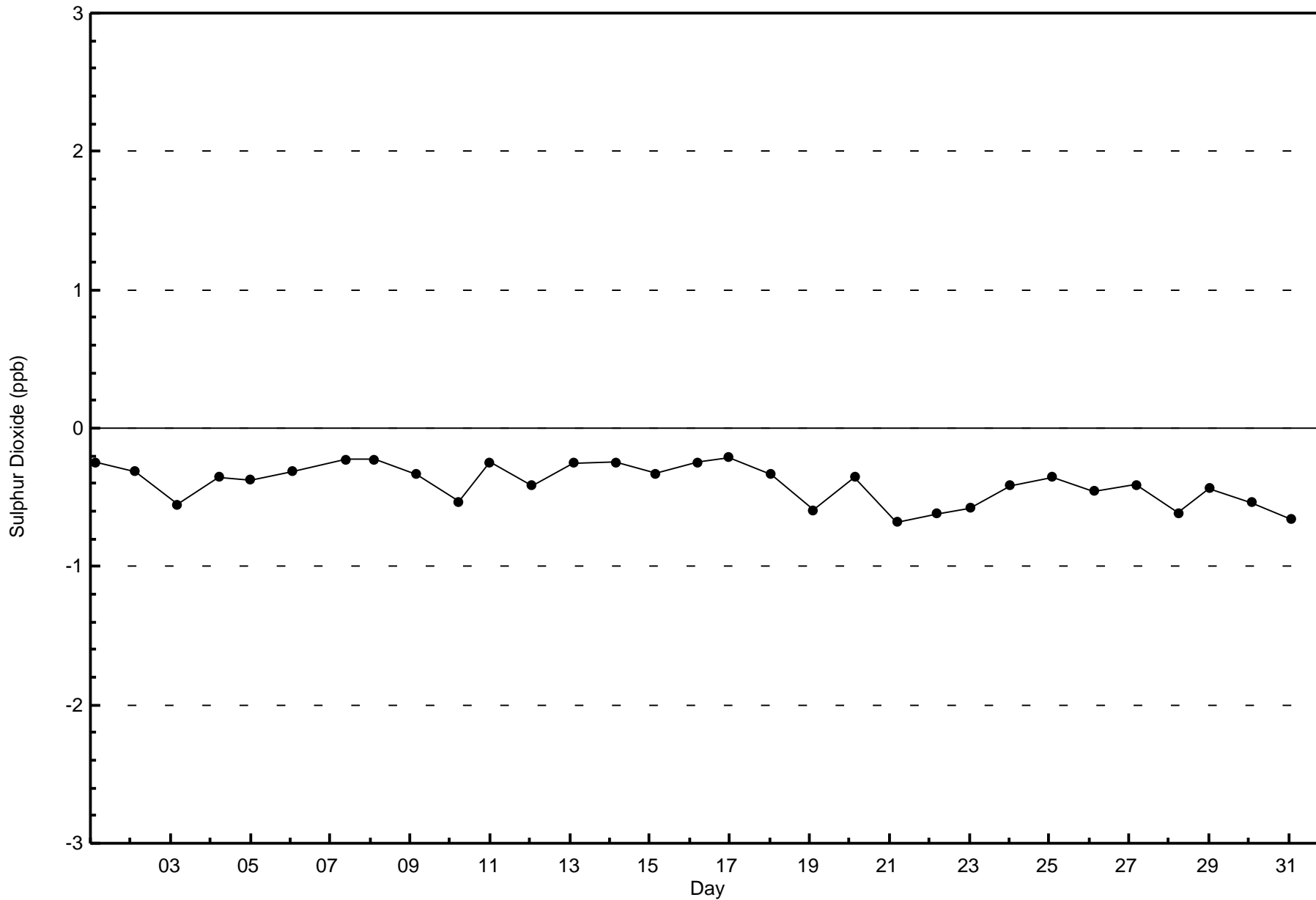
Total Number of Hours: 744

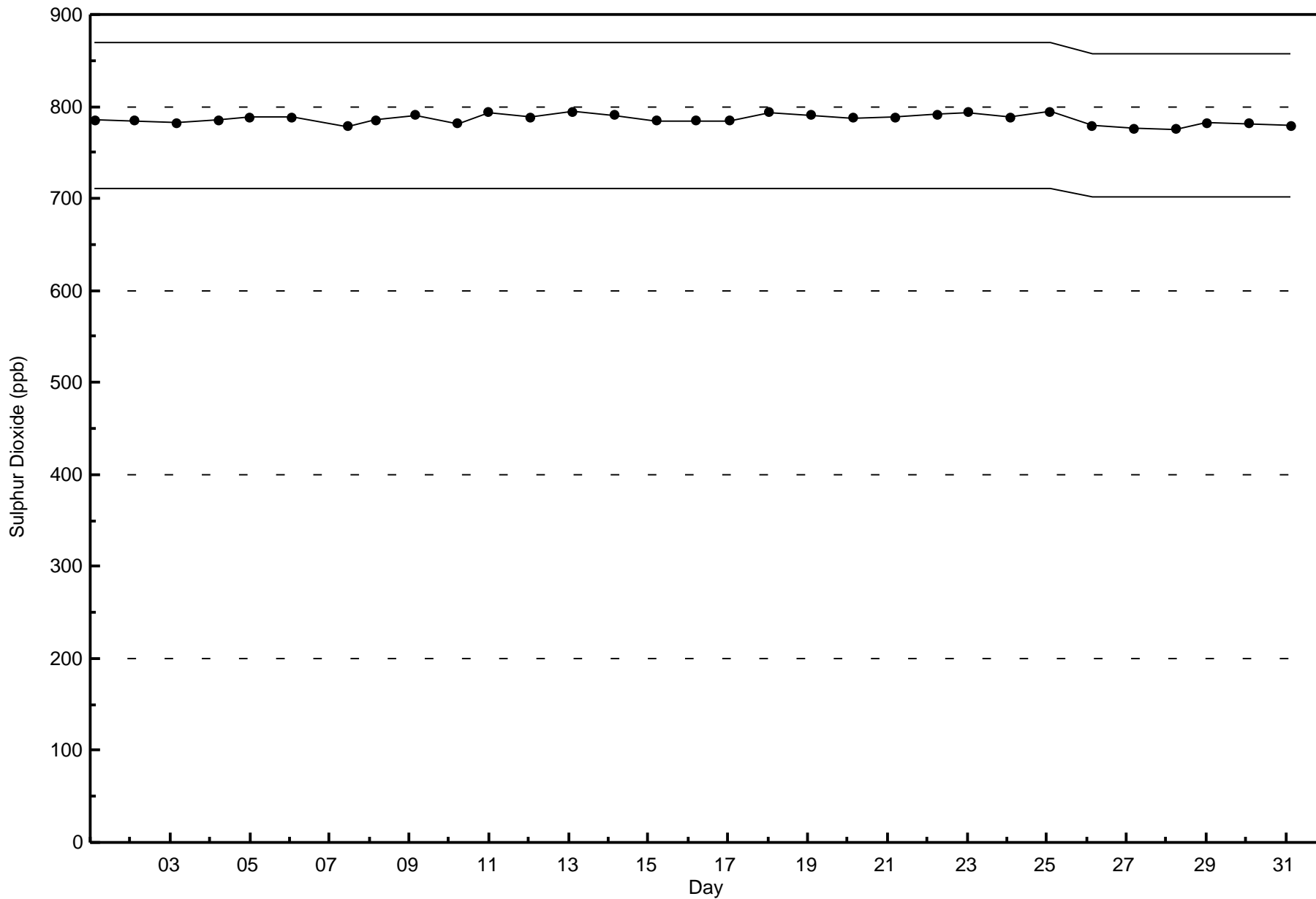


Wood Buffalo Environmental Association
Wind Rose May 2016

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

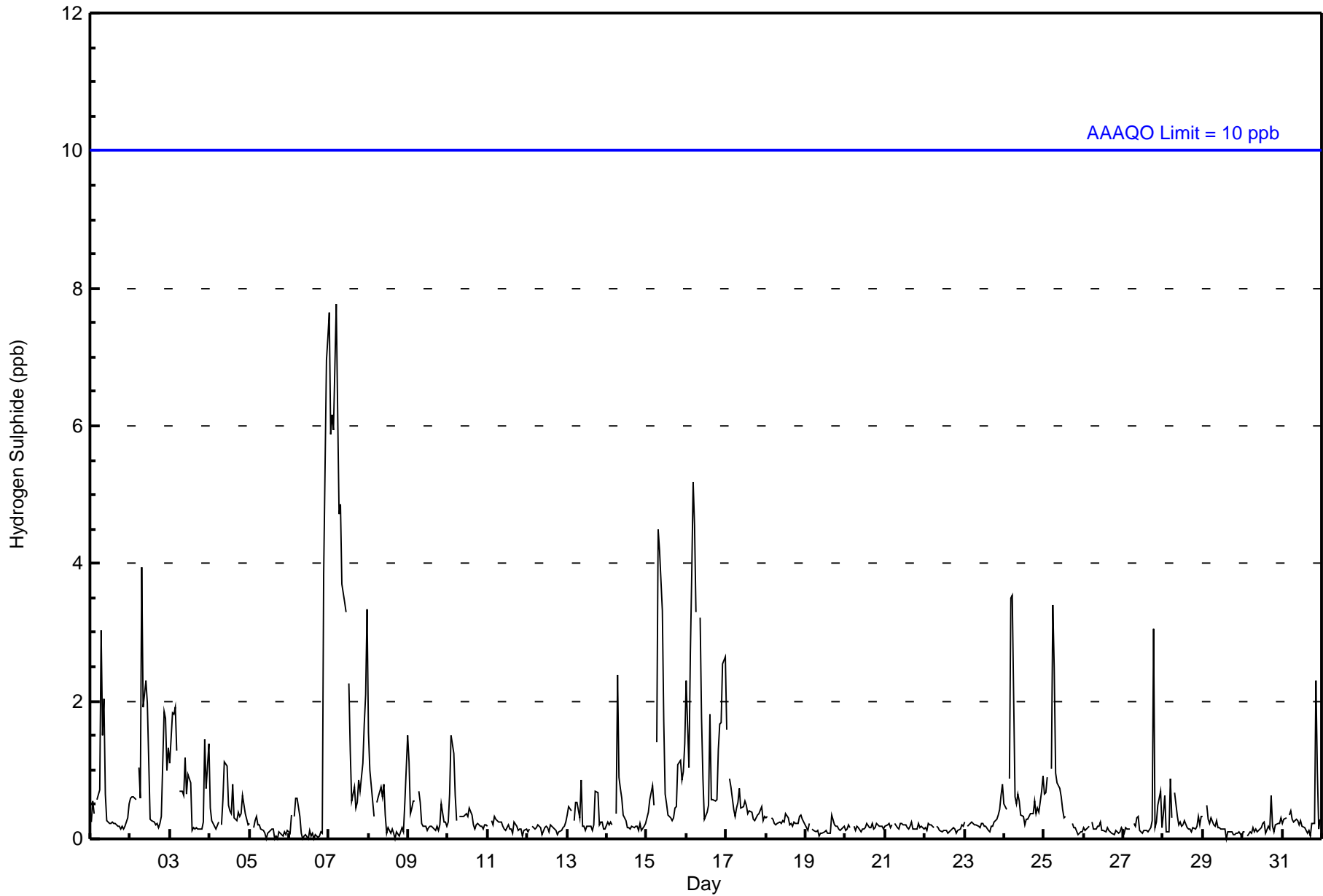








Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 ppb on May 7 05:00 Maximum Daily Average: 3.3 ppb on May 7																	Hours in Service: 744 Hours of Data: 710																																
Minimum Value: 0 ppb on May 5 11:00 Minimum Daily Average: 0.1 ppb on May 5 Maximum Diurnal Average: 1.0 ppb at hour 5 Minimum Diurnal Average: 0.2 ppb at hour 16 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																	Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	0	1	0	Z	1	1	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	3																							
2-May	1	1	1	1	Z	1	1	4	2	2	2	1	0	0	0	0	0	0	0	0	2	2	1	1	1.0	4																							
3-May	1	2	2	2	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0.8	2																							
4-May	0	0	0	0	0	0	Z	0	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0.4	1																							
5-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
6-May	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	7	0.9	7																							
7-May	8	6	6	6	8	6	5	5	4	3	3	Z	2	1	1	1	0	1	1	1	1	2	2	3	3.3	8																							
8-May	2	1	1	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.4	2																							
9-May	1	0	0	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1																							
10-May	0	1	2	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
11-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
12-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
13-May	0	0	0	Z	0	1	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1																							
14-May	0	0	0	0	Z	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
15-May	0	0	1	1	0	Z	1	5	4	3	2	1	1	0	0	0	0	0	0	1	1	1	1	1	1.1	5																							
16-May	2	1	3	4	5	5	3	Z	3	2	1	0	0	0	2	1	1	1	1	1	2	2	3	3	1.9	5																							
17-May	2	Z	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																							
18-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
19-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
20-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
21-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
22-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
23-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																							
24-May	0	0	Z	1	4	4	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0.7	4																							
25-May	1	1	1	Z	1	3	2	1	1	1	1	0	0	0	C	C	C	0	0	0	0	0	0	0	0.7	3																							
26-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
27-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0.3	3																							
28-May	0	1	0	0	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
29-May	0	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																							
30-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1																							
31-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0.3	2																						
																								0.7	0.7	0.8	0.8	1.0	1.0	0.9	0.8	0.8	0.6	0.5	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.6	0.7	0.8	Diurnal Average
																								8	6	6	6	8	6	5	5	4	3	3	1	2	1	2	1	1	1	1	3	1	2	4	7	7	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 - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	678	95.49	95.49
3 - 4	19	2.68	98.17
5 - 7	11	1.55	99.72
8 - 11	2	0.28	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	80	146	44	4	3	17	21	52	40	43	46	27	26	54	37	38	678
3 - 4	0	0	0	1	0	1	3	9	3	1	1	0	0	0	0	0	19
5 - 7	0	0	0	0	0	1	0	6	3	1	0	0	0	0	0	0	11
8 - 11	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	146	44	5	3	19	24	68	47	45	47	27	26	54	37	38	710

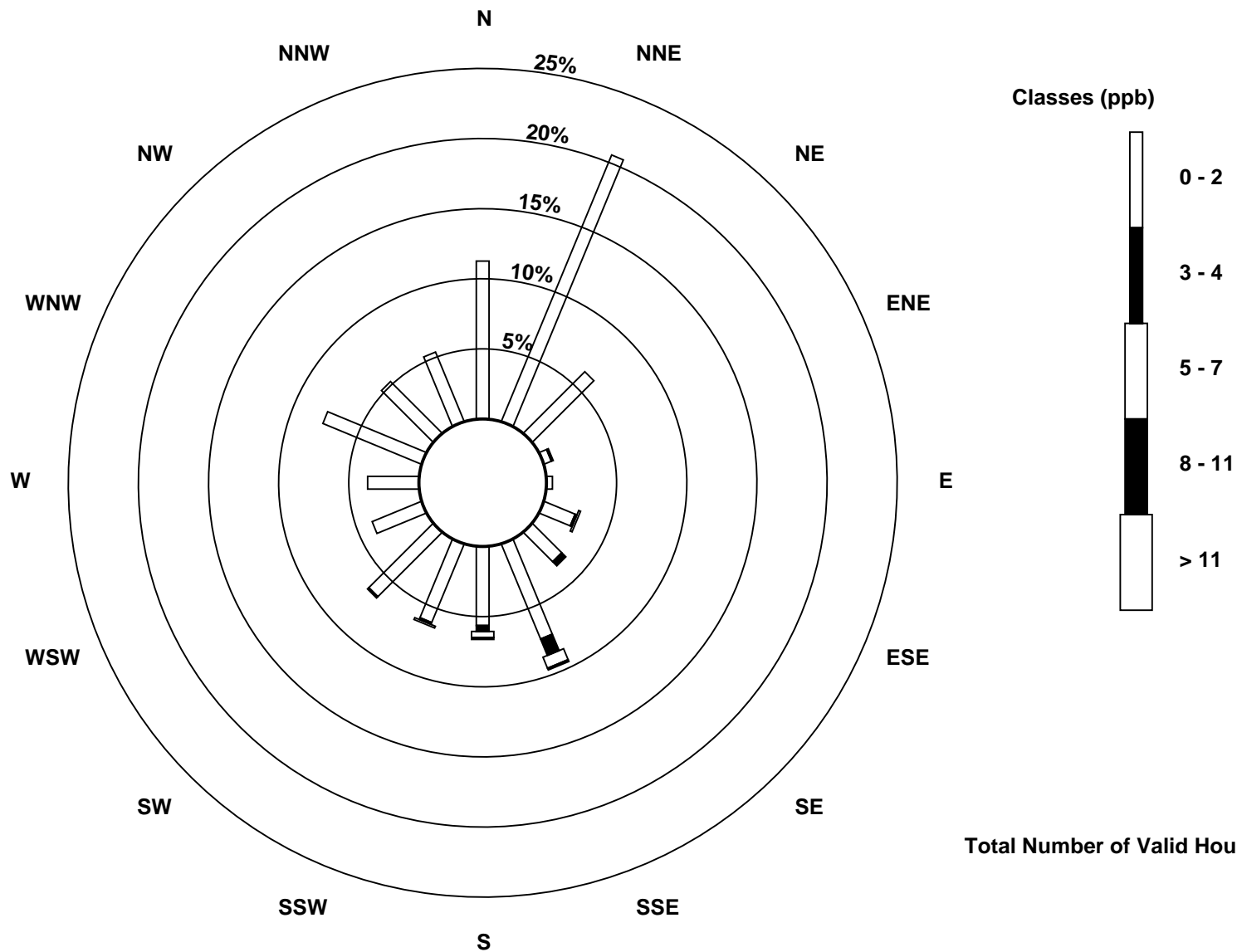
Total Number of Valid Hours: 710

Total Number of Hours: 744

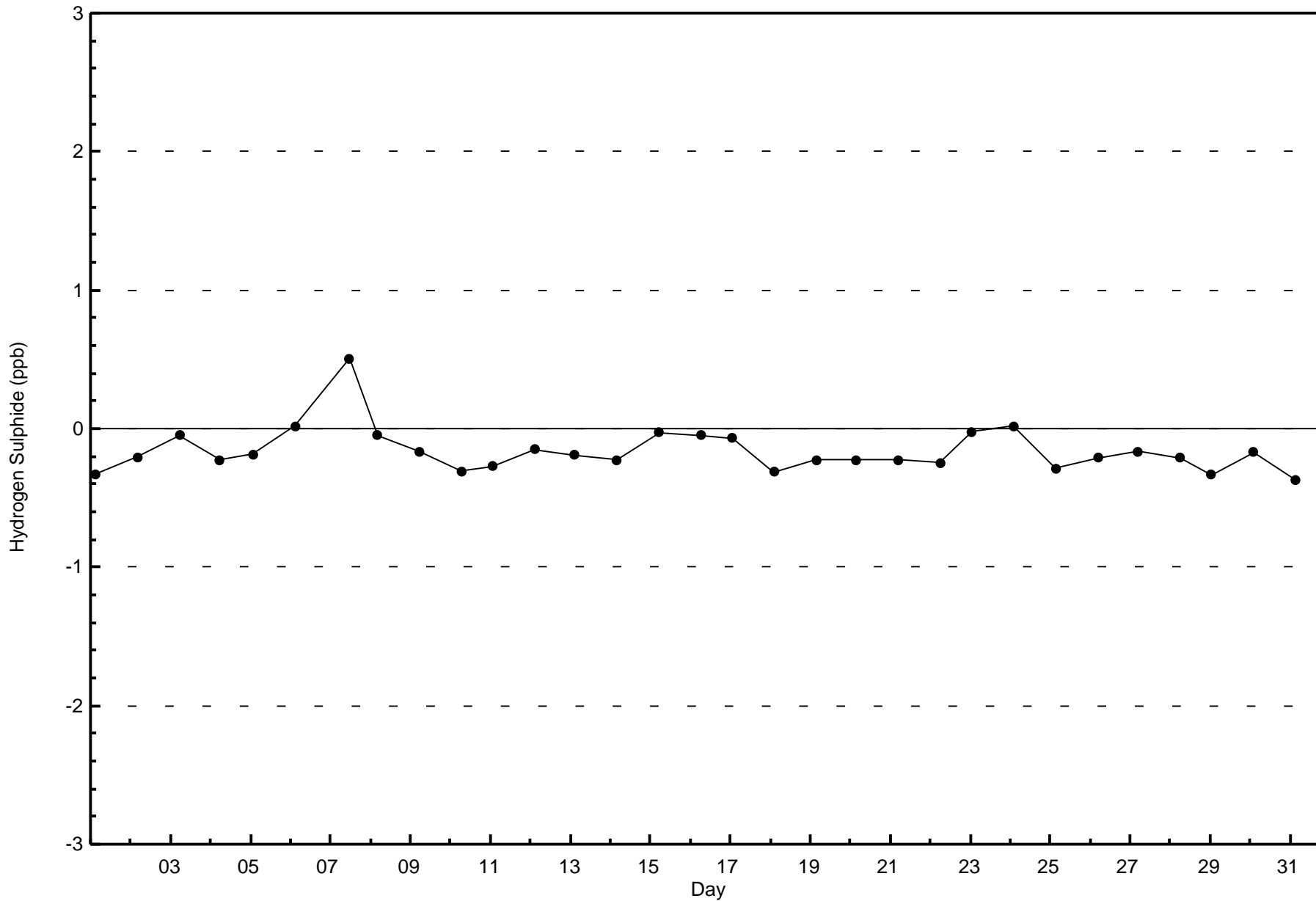


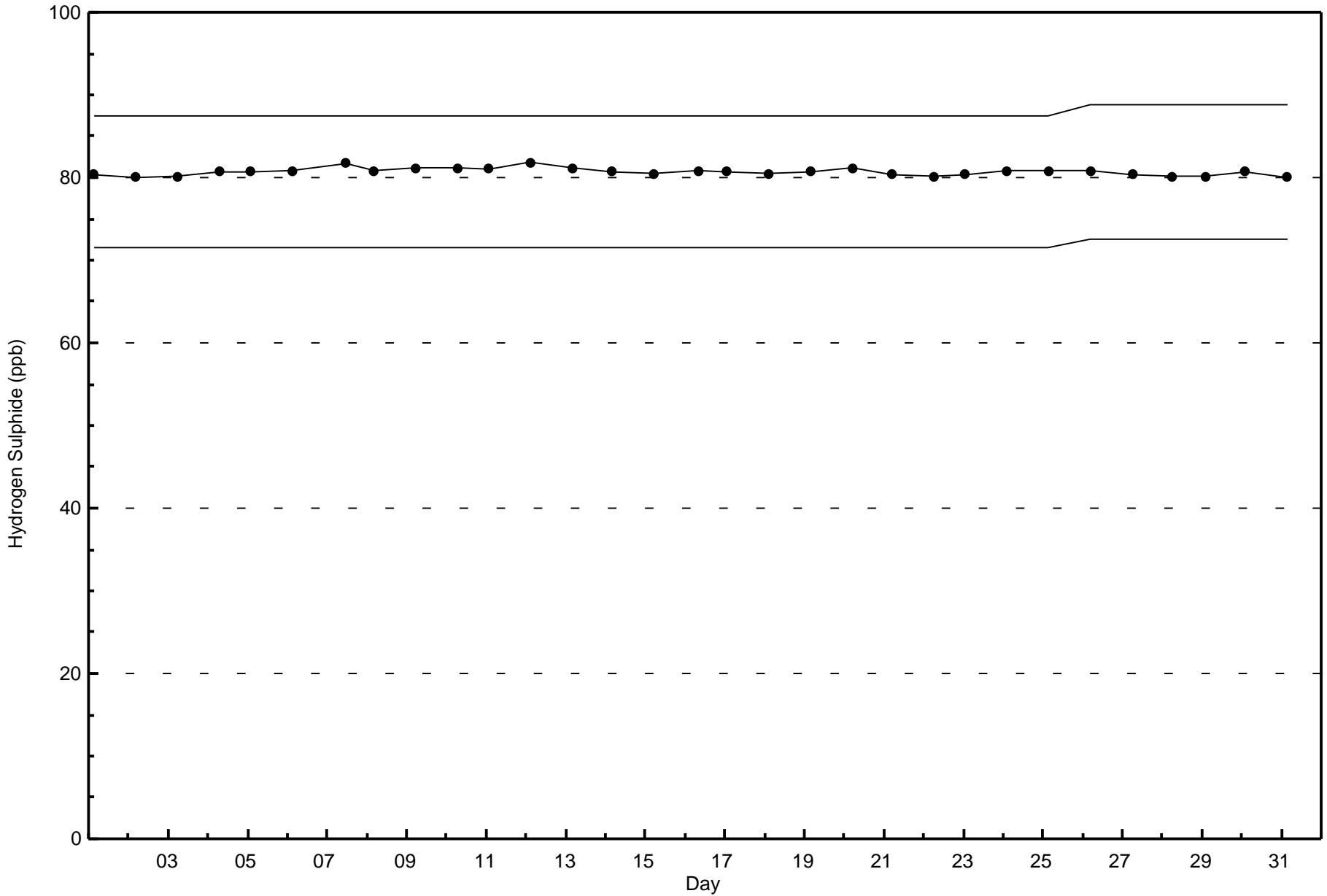
Wood Buffalo Environmental Association
Wind Rose May 2016

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



Total Number of Valid Hours: 710







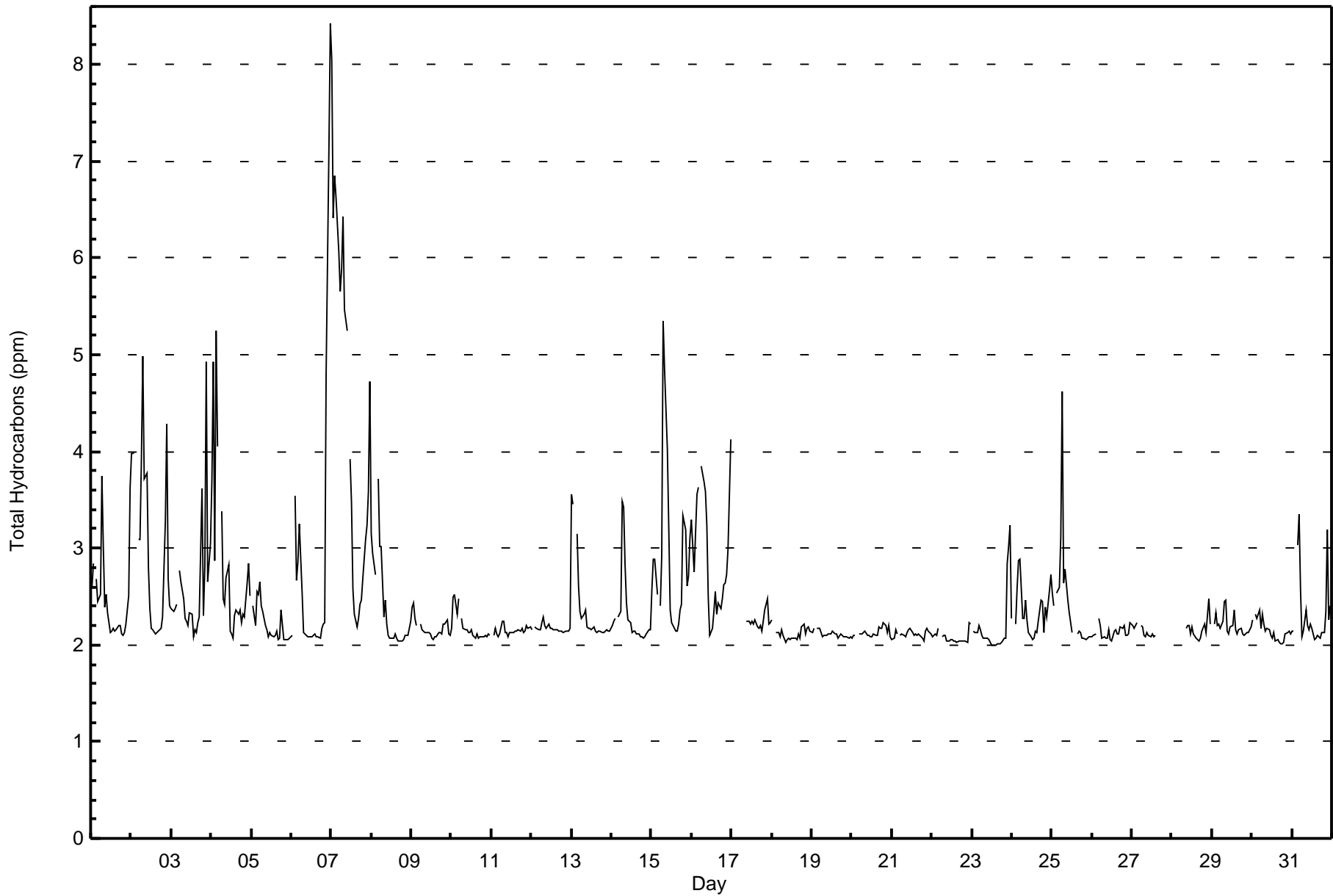
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mildred Lake - May 2016

Maximum Value: 8.4 ppm on May 7 00:00																			Maximum Daily Average: 4.4 ppm on May 7						Hours in Service: 744	
Minimum Value: 2.0 ppm on May 23 14:00																			Minimum Daily Average: 2.1 ppm on May 22						Hours of Data: 687	
Maximum Diurnal Average: 2.8 ppm at hour 5																			Minimum Diurnal Average: 2.1 ppm at hour 16						Hours of Missing Data: 57	
Monthly Average: 2.42 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 3.1 P ₉₉ = 6.4						Hours of Calibration: 31	
																									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-May	2.6	2.8	Z	2.7	2.4	2.5	3.7	3.0	2.4	2.5	2.3	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.5	3.6	2.5	3.7
2-May	4.0	4.0	4.0	Z	3.1	3.1	3.9	5.0	3.7	3.8	2.8	2.4	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.3	3.3	4.3	2.7	2.4	3.0	5.0
3-May	2.4	2.4	2.4	2.4	Z	2.8	2.7	2.5	2.3	2.2	2.2	2.3	2.3	2.1	2.2	2.1	2.2	2.3	3.6	2.3	2.8	4.9	2.7	3.0	2.6	4.9
4-May	3.7	4.9	2.9	5.2	4.0	Z	3.4	2.5	2.4	2.7	2.8	2.1	2.1	2.1	2.3	2.4	2.3	2.4	2.2	2.3	2.3	2.6	2.8	2.5	2.8	5.2
5-May	Z	2.4	2.2	2.5	2.5	2.7	2.4	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.1	2.0	2.0	2.1	2.1	2.2
6-May	2.1	Z	3.5	2.7	2.9	3.3	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	4.8	7.1	8.4	2.9	8.4
7-May	8.1	6.4	6.9	6.6	6.1	5.7	5.9	6.4	5.5	5.3	Z	3.9	3.5	2.6	2.3	2.2	2.3	2.4	2.5	2.7	3.1	3.2	3.6	4.7	4.4	8.1
8-May	3.2	2.9	2.7	Z	3.7	3.0	3.0	2.3	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.4	3.7
9-May	2.4	2.4	2.3	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.1	2.2	2.4
10-May	2.2	2.5	2.5	2.3	2.5	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
11-May	Z	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.2
12-May	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3
13-May	3.6	3.5	Z	3.1	2.6	2.4	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.4	3.6
14-May	2.2	2.2	2.3	Z	2.3	2.3	3.5	3.4	2.8	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	3.5
15-May	2.6	2.9	2.9	2.5	Z	2.4	2.9	5.4	4.8	4.0	3.2	2.4	2.2	2.2	2.1	2.1	2.2	2.4	2.4	3.3	3.2	2.6	2.7	3.1	2.9	5.4
16-May	3.3	2.8	3.2	3.5	3.6	Z	3.8	3.7	3.6	3.2	2.5	2.1	2.2	2.3	2.6	2.3	2.4	2.4	2.5	2.6	2.6	2.7	3.0	4.1	2.9	4.1
17-May	AF	AF	AF	AF	AF	AF	AF	AF	M	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.4	2.5	2.2	2.2	--	2.5
18-May	2.3	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.3
19-May	2.1	2.2	Z	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	2.1	2.1	2.1	2.2
20-May	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2
21-May	2.1	2.1	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.2
22-May	2.1	2.1	2.1	2.1	2.2	Z	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.1	2.2
23-May	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.8	3.0	3.2	2.2	3.2
24-May	2.3	Z	2.2	2.6	2.9	2.9	2.3	2.3	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.5	2.1	2.4	2.3	2.6	2.7	2.3	2.9
25-May	2.5	2.4	Z	2.5	2.6	3.1	4.6	2.6	2.8	2.5	2.3	2.2	2.1	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	4.6
26-May	2.1	2.1	2.1	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.3
27-May	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2.2
28-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.0	2.1	2.1	2.2	2.1	2.3	2.5	2.2	--	2.5
29-May	Z	2.2	2.3	2.2	2.2	2.2	2.3	2.4	2.5	2.1	2.1	2.2	2.2	2.4	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5
30-May	2.3	Z	2.3	2.3	2.4	2.2	2.3	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.4
31-May	2.1	2.1	Z	3.0	3.4	2.6	2.1	2.1	2.4	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	3.2	2.3	2.4	2.3	3.4
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan			C - Calibration			M - Maintenance			AF - Analyzer Failure																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	34	4.95	4.95
2.1 - 3.0	584	85.01	89.96
3.1 - 10.0	69	10.04	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	4	15	3	2	2	0	0	0	0	0	0	1	4	0	0	1	2	34
2.1 - 3.0	76	130	41	2	1	13	14	44	31	31	39	18	23	53	35	33	584	
3.1 - 10.0	0	1	0	1	0	2	7	19	15	10	7	3	1	1	1	1	69	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	80	146	44	5	3	15	21	63	46	41	47	25	24	54	37	36	687	

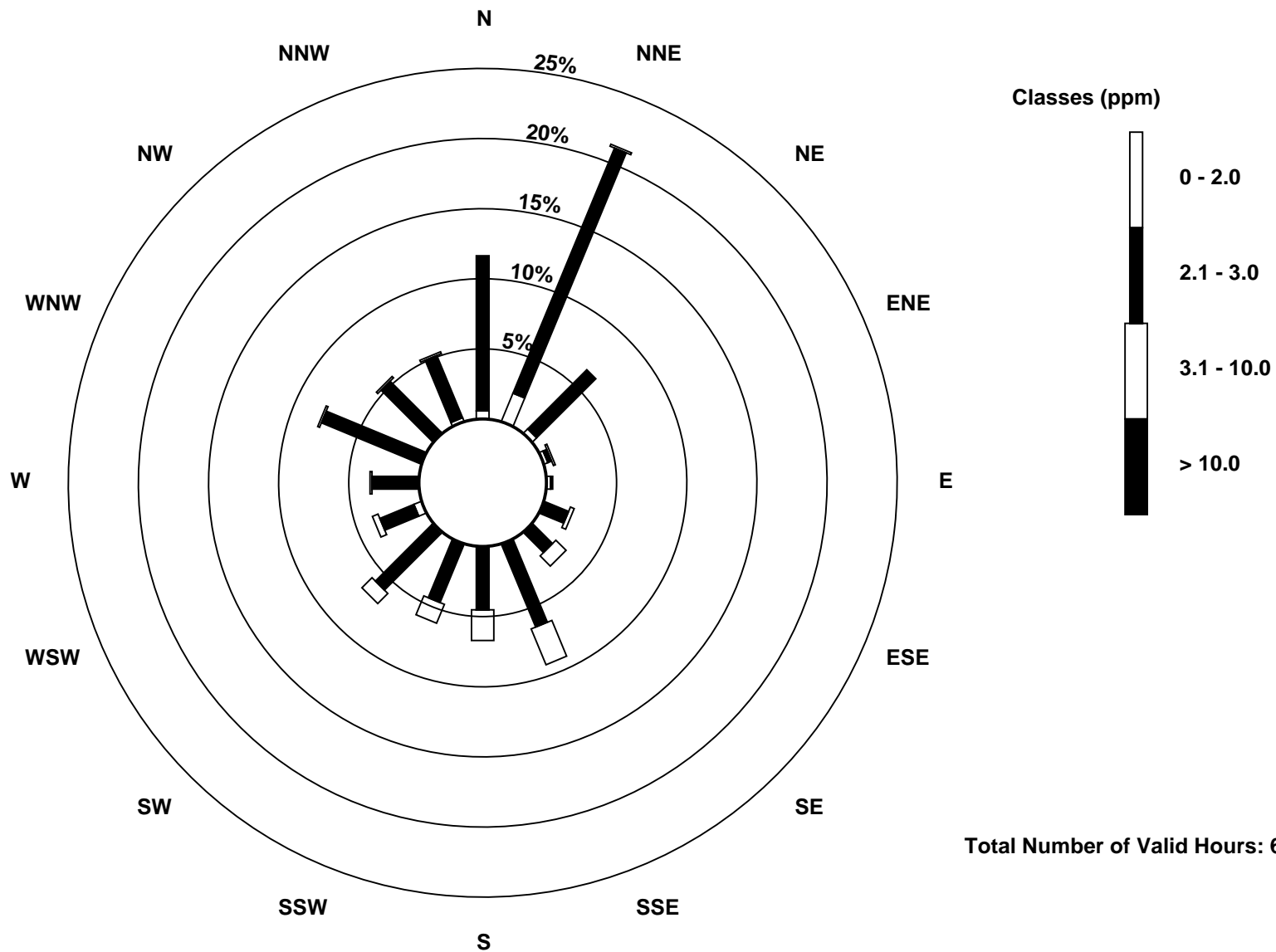
Total Number of Valid Hours: 687

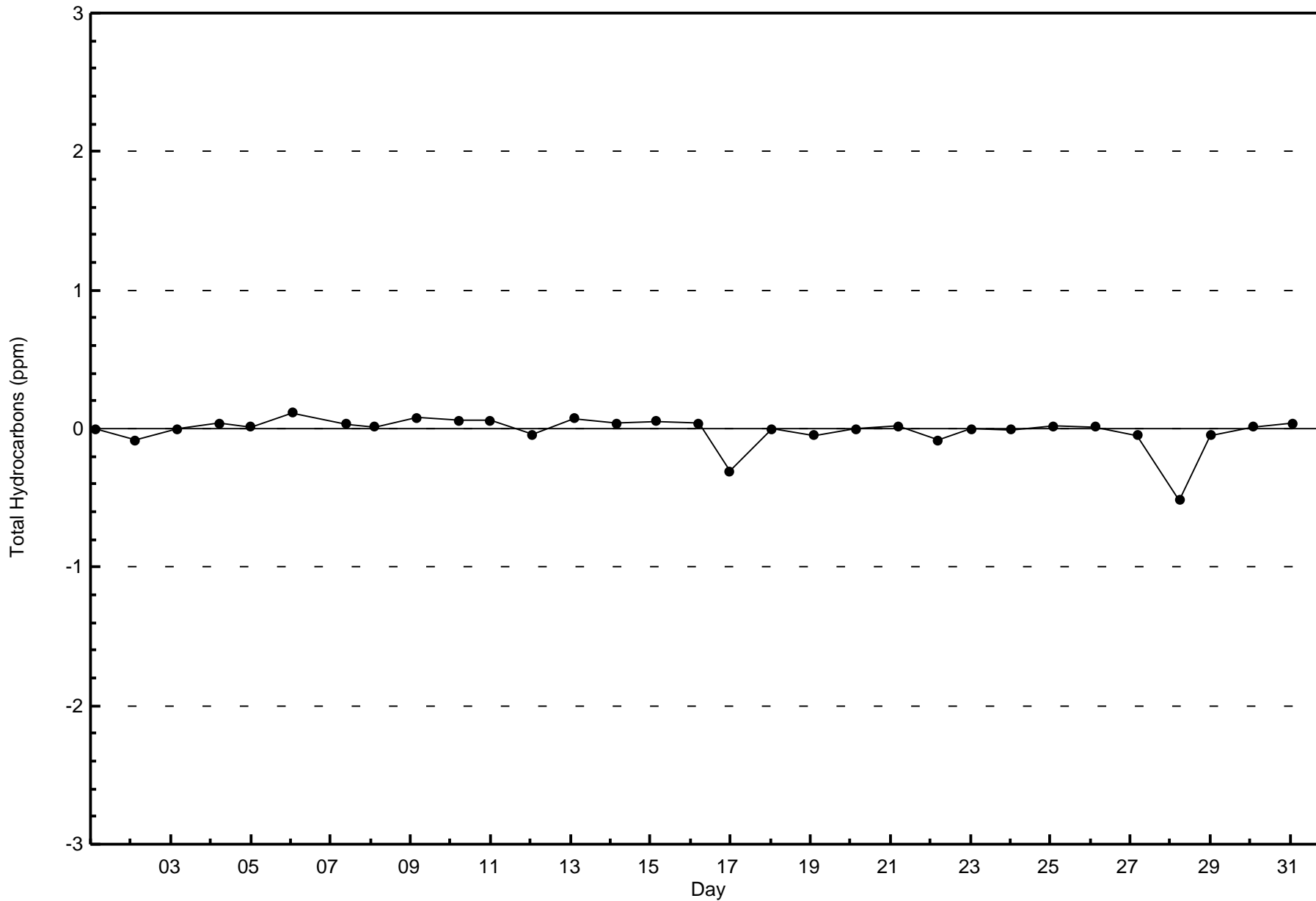
Total Number of Hours: 744

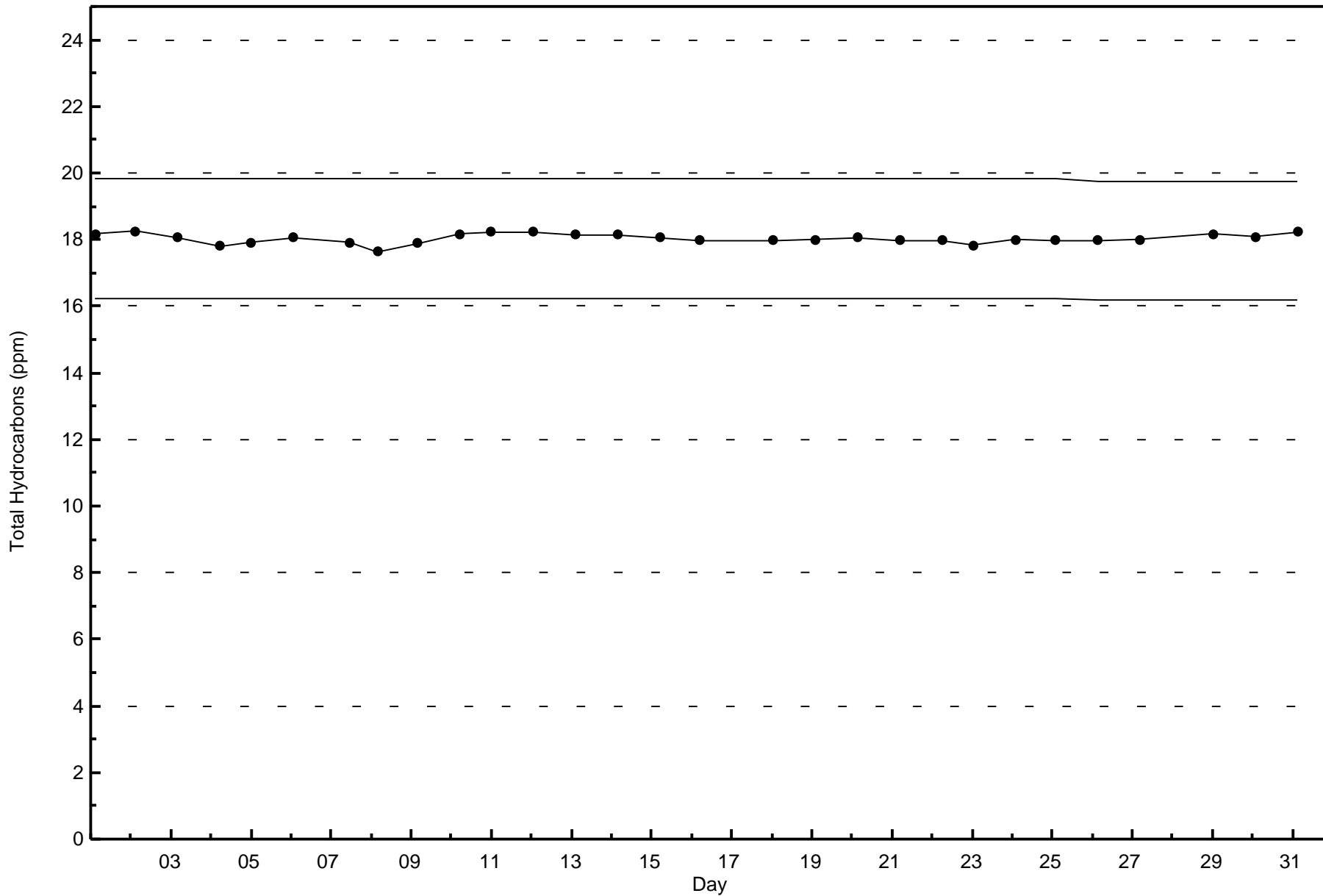


Wood Buffalo Environmental Association
Wind Rose May 2016

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









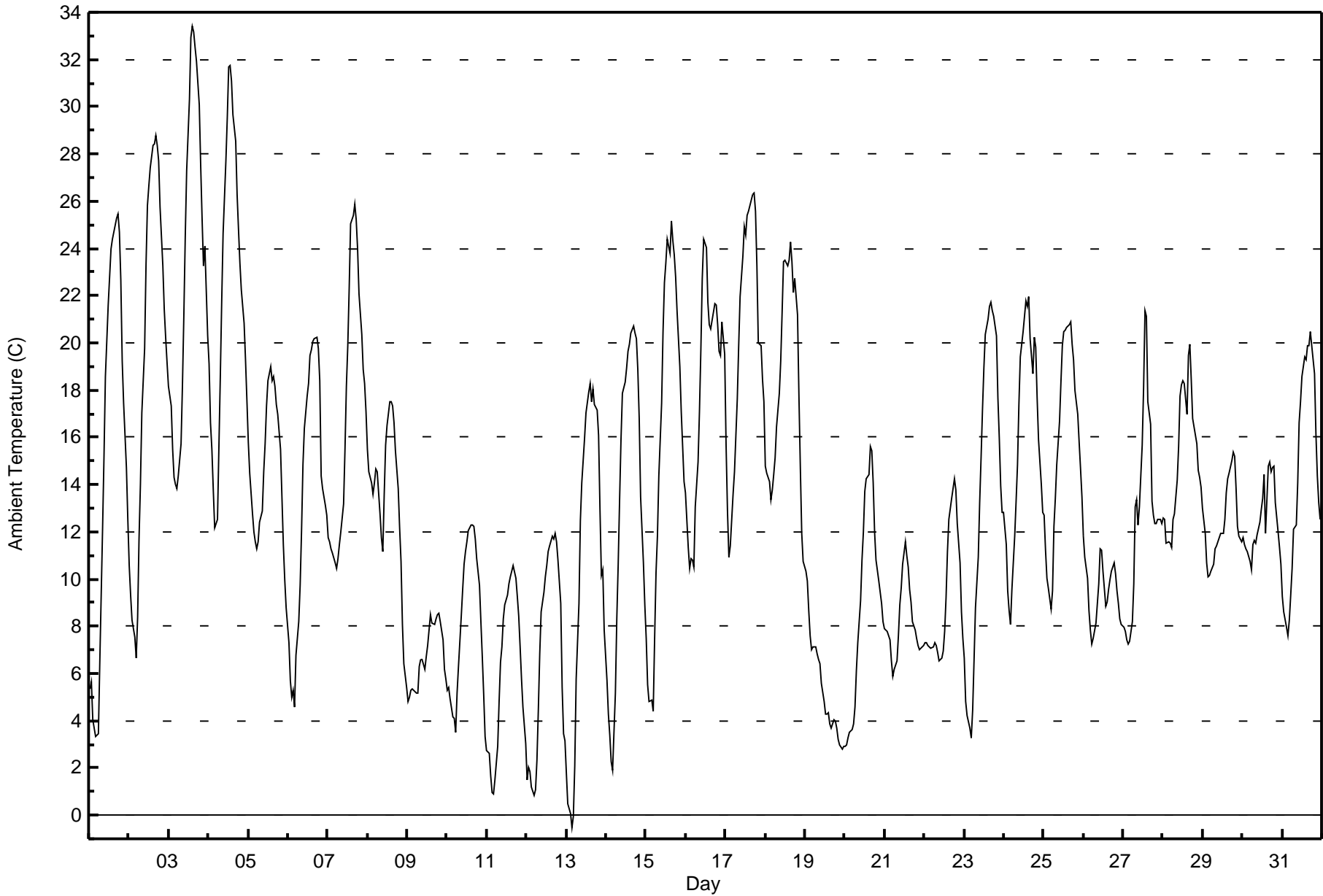
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Mildred Lake - May 2016

Maximum Value: 33.4 C on May 3 15:00																						Hours in Service: 744																								
Maximum Daily Average: 23.3 C on May 3																						Hours of Data: 744																								
Minimum Value: -0.5 C on May 13 04:00																						Hours of Missing Data: 0																								
Maximum Diurnal Average: 18.5 C at hour 16																						Hours of Calibration: 0																								
Monthly Average: 13.45 C																						Percent Operational Time: 100.0																								
Minimum Daily Average: 5.5 C on May 19																																														
Minimum Diurnal Average: 7.5 C at hour 5																																														
Percentiles: P ₁ = 1.1 P ₁₀ = 5.2 Q ₁ = 8.4 Median = 12.5 Q ₃ = 18.2 P ₉₀ = 22.7 P ₉₉ = 31.6																																														
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-May	5.3	5.6	4.0	3.7	3.3	3.4	6.5	9.3	12.2	15.2	18.6	21.6	22.8	24.0	24.4	24.7	25.3	25.4	24.7	22.7	19.2	17.4	14.7	12.5	15.3	25.4																				
2-May	10.6	9.3	8.3	7.5	6.7	8.4	11.7	14.0	17.0	19.7	23.3	25.8	26.7	27.4	28.4	28.4	28.8	28.4	27.7	25.7	23.3	21.5	20.2	19.2	19.5	28.8																				
3-May	18.1	17.3	15.5	14.3	14.0	13.8	14.4	15.7	18.2	21.2	24.5	27.3	30.3	33.0	33.4	33.2	32.5	31.9	30.1	27.5	25.3	23.3	24.1	20.3	23.3	33.4																				
4-May	19.1	16.6	15.5	13.8	12.2	12.5	15.6	18.5	21.7	24.6	27.7	29.6	31.7	31.8	31.1	29.6	28.6	26.3	24.8	23.4	22.3	20.8	19.3	17.6	22.3	31.8																				
5-May	15.8	14.5	12.8	12.0	11.6	11.3	11.6	12.4	12.9	14.6	15.7	17.3	18.4	19.0	18.4	18.6	18.1	17.4	17.0	15.5	13.5	11.5	10.0	8.8	14.5	19.0																				
6-May	7.3	5.7	5.0	5.3	4.6	6.8	8.2	9.7	12.1	14.8	16.4	17.7	18.3	19.5	19.7	20.1	20.2	20.3	19.8	18.4	14.3	13.8	13.1	12.7	13.5	20.3																				
7-May	11.8	11.6	11.3	11.1	10.7	10.5	10.9	11.4	12.0	13.2	15.5	18.2	19.9	22.3	25.0	25.4	25.9	25.2	24.0	22.1	20.3	18.8	18.3	17.1	17.2	25.9																				
8-May	15.5	14.6	14.1	13.6	14.1	14.7	14.6	12.8	11.7	11.1	13.6	15.6	16.5	17.5	17.5	17.3	16.6	15.5	13.9	12.1	10.8	8.1	6.4	5.4	13.5	17.5																				
9-May	4.8	5.0	5.3	5.3	5.3	5.2	5.2	6.3	6.6	6.6	6.2	6.7	7.2	7.8	8.5	8.2	8.1	8.3	8.5	8.6	8.2	7.4	6.2	5.8	6.7	8.6																				
10-May	5.3	5.4	4.9	4.1	4.1	3.5	5.2	6.3	8.4	9.6	10.6	11.1	11.6	12.1	12.3	12.3	12.2	11.7	10.9	9.7	8.2	6.7	5.1	3.4	8.1	12.3																				
11-May	2.7	2.6	1.7	0.9	0.9	1.5	2.9	4.8	6.5	7.1	8.3	8.9	9.3	9.8	10.1	10.3	10.6	10.1	9.2	8.4	7.1	5.8	4.6	3.0	6.1	10.6																				
12-May	1.5	2.0	1.8	1.2	0.8	1.1	2.3	4.4	6.8	8.6	9.4	10.1	10.6	11.2	11.4	11.8	11.7	11.9	11.6	10.8	8.9	5.4	3.4	3.1	6.7	11.9																				
13-May	1.8	0.5	0.1	-0.5	0.0	2.1	5.8	8.9	12.5	14.1	15.0	16.0	17.0	17.9	18.3	17.5	18.1	17.4	17.1	16.1	13.0	10.1	10.4	7.8	10.7	18.3																				
14-May	5.7	4.3	3.4	2.3	1.9	5.2	8.3	10.6	13.4	15.9	17.9	18.4	19.0	19.7	19.9	20.4	20.7	20.4	20.2	18.9	16.8	13.5	10.7	8.9	13.2	20.7																				
15-May	7.5	5.5	4.8	4.9	4.4	7.5	10.3	11.8	14.4	17.4	20.5	22.5	23.4	24.4	23.8	25.1	24.3	23.7	22.8	21.4	19.0	17.1	15.6	14.1	16.1	25.1																				
16-May	13.6	11.3	10.4	10.9	10.8	10.5	13.0	14.9	17.1	19.7	22.7	24.4	24.0	21.7	20.8	20.6	21.0	21.7	21.6	20.8	19.6	19.4	20.9	19.5	18.0	24.4																				
17-May	15.6	12.9	10.9	11.4	13.6	14.5	16.1	17.6	19.9	21.9	23.7	24.9	24.6	25.4	25.6	26.1	26.3	26.3	25.6	23.3	20.0	19.9	18.4	17.5	20.1	26.3																				
18-May	14.8	14.5	14.1	13.4	13.8	14.4	15.2	16.5	17.8	19.2	21.3	23.4	23.5	23.3	23.5	24.3	23.4	22.1	22.7	21.2	17.8	14.7	11.9	10.8	18.2	24.3																				
19-May	10.3	9.9	8.7	7.6	7.0	7.1	7.1	6.8	6.6	6.4	5.6	4.8	4.3	4.3	4.4	3.9	3.7	4.0	4.0	3.7	3.2	3.0	2.8	2.9	5.5	10.3																				
20-May	2.9	3.0	3.3	3.5	3.6	3.9	4.6	6.1	7.3	9.1	10.8	12.0	13.7	14.3	14.4	15.6	15.4	14.1	12.0	10.8	9.9	9.4	9.0	8.2	9.0	15.6																				
21-May	7.9	7.8	7.6	7.5	6.6	5.9	6.2	6.5	7.6	8.9	9.6	10.7	11.6	11.0	10.5	9.6	9.0	8.2	7.8	7.5	7.2	7.0	7.1	7.2	8.2	11.6																				
22-May	7.3	7.3	7.2	7.1	7.1	7.1	7.3	7.2	6.9	6.5	6.6	7.0	7.8	9.2	11.2	12.5	13.4	13.8	14.3	13.8	12.3	10.7	8.6	7.5	9.2	14.3																				
23-May	6.7	4.8	4.2	3.7	3.3	4.4	6.6	8.8	10.9	13.2	15.1	17.2	18.9	20.4	21.0	21.6	21.7	21.4	21.1	20.3	17.7	16.0	13.9	12.8	13.6	21.7																				
24-May	12.8	11.5	9.5	8.6	8.1	9.5	11.8	13.3	14.9	17.4	19.4	20.5	21.1	21.8	21.6	22.0	20.2	18.7	20.2	19.9	17.7	15.9	14.0	12.8	16.0	22.0																				
25-May	12.7	11.2	10.0	9.6	8.7	9.5	12.2	13.4	14.8	16.7	18.4	19.9	20.4	20.5	20.7	20.7	20.9	19.9	19.3	18.0	17.0	15.8	14.6	13.4	15.8	20.9																				
26-May	11.8	11.0	10.1	8.7	7.8	7.2	7.5	8.1	9.0	9.8	11.3	11.2	10.3	8.9	9.0	9.6	10.0	10.4	10.7	10.2	9.5	9.0	8.3	8.1	9.5	11.8																				
27-May	8.0	7.8	7.4	7.2	7.4	8.2	9.8	13.1	13.4	12.3	13.1	15.7	18.1	21.4	21.2	17.5	16.6	13.3	12.7	12.4	12.4	12.5	12.5	12.4	12.8	21.4																				
28-May	12.6	12.5	11.5	11.6	11.5	11.3	12.5	12.8	14.2	15.6	17.7	18.2	18.4	18.3	17.0	19.5	19.9	18.5	16.8	16.1	15.7	14.6	14.3	13.9	15.2	19.9																				
29-May	13.0	11.9	10.7	10.1	10.2	10.3	10.6	11.3	11.4	11.6	11.8	11.9	11.9	12.5	13.7	14.2	14.5	15.0	15.4	15.2	13.8	12.2	11.8	11.6	12.4	15.4																				
30-May	11.7	11.5	11.3	11.1	10.7	10.4	11.4	11.6	11.5	11.9	12.4	13.0	13.4	14.4	12.0	14.8	15.0	14.5	14.7	14.8	13.2	12.0	11.4	10.7	12.5	15.0																				
31-May	9.2	8.6	8.0	7.6	8.2	9.3	10.5	12.1	12.3	14.1	16.6	17.5	18.6	19.4	19.3	19.9	19.9	20.5	19.9	18.7	16.1	14.4	13.2	12.5	14.4	20.5																				
9.8																						9.0	8.2	7.7	7.5	8.1	9.5	10.9	12.3	13.8	15.5	16.7	17.5	18.2	18.3	18.5	18.5	17.9	17.5	16.4	14.6	13.2	12.1	11.0	Diurnal Average	
19.1																						17.3	15.5	14.3	14.1	14.7	16.1	18.5	21.7	24.6	27.7	29.6	31.7	33.0	33.4	33.2	32.5	31.9	30.1	27.5	25.3	23.3	24.1	20.3	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	2	0.27	0.27
0 - 10	237	31.85	32.12
10 - 20	375	50.40	82.53
> 20	130	17.47	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

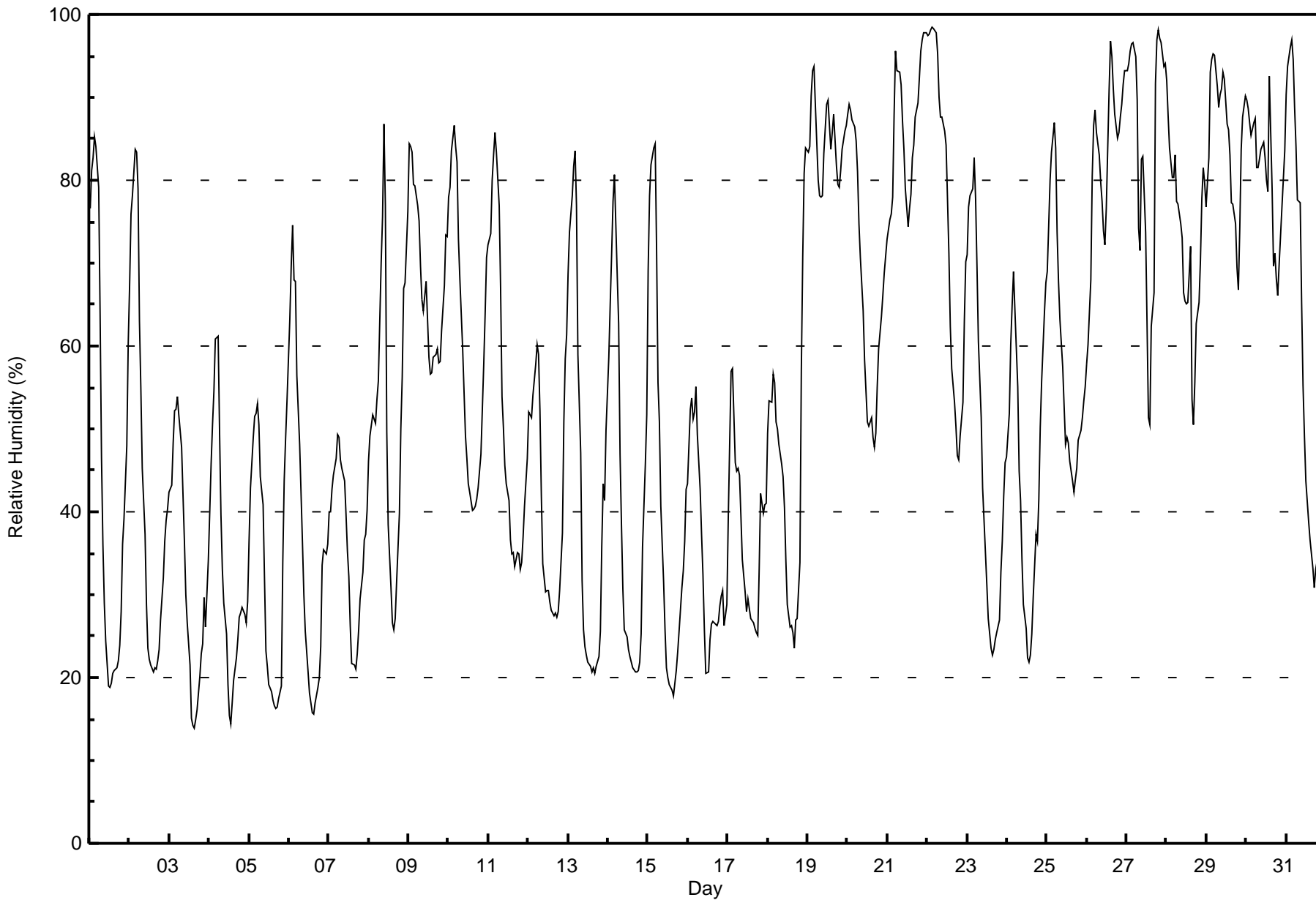
Mildred Lake - May 2016

Maximum Value: 98 % on May 22 04:00																	Maximum Daily Average: 86.1 % on May 21																	Hours in Service: 744														
Minimum Value: 14 % on May 3 16:00																	Minimum Daily Average: 32.5 % on May 3																	Hours of Data: 744														
Maximum Diurnal Average: 75.9 % at hour 5																	Minimum Diurnal Average: 39.2 % at hour 17																	Hours of Missing Data: 0														
Monthly Average: 55.1 %																	Percentiles: P ₁ = 16 P ₁₀ = 23 Q ₁ = 33 Median = 52 Q ₃ = 78 P ₉₀ = 88 P ₉₉ = 98																	Hours of Calibration: 0														
																																		Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	77	81	83	85	84	79	64	47	36	29	24	19	19	19	20	21	21	22	24	28	36	39	48	60	44.4	85																						
2-May	67	76	78	84	83	79	63	55	45	37	29	24	22	21	21	21	22	23	27	32	36	39	40	40	43.6	84																						
3-May	42	43	48	52	52	54	52	48	42	36	30	27	22	15	14	14	15	16	20	23	24	30	26	34	32.5	54																						
4-May	40	46	50	55	61	61	50	40	33	29	25	19	15	14	17	20	22	25	27	28	28	28	27	29	32.9	61																						
5-May	36	43	49	51	52	53	50	44	41	32	23	21	19	18	17	17	16	16	17	19	34	44	49	53	34.0	53																						
6-May	63	70	75	68	68	56	48	42	36	30	26	21	18	17	16	16	17	19	20	24	34	35	35	36	37.0	75																						
7-May	40	40	43	44	46	49	49	46	45	44	40	35	32	26	22	22	21	23	26	29	33	37	37	40	36.3	49																						
8-May	46	49	52	51	51	54	56	70	76	87	77	50	38	31	27	26	27	32	40	50	56	67	68	76	52.3	87																						
9-May	84	84	83	80	79	77	75	70	66	64	68	63	59	57	57	59	59	60	58	58	62	67	73	73	68.1	84																						
10-May	78	79	84	87	84	82	73	68	60	54	49	46	43	42	40	40	41	42	43	47	52	58	64	71	59.5	87																						
11-May	72	74	80	83	86	83	77	67	54	50	46	43	41	37	35	35	33	35	35	33	34	37	41	46	52.4	86																						
12-May	52	52	51	54	58	60	59	52	42	34	30	30	31	29	28	27	28	27	28	30	37	51	59	61	42.1	61																						
13-May	69	74	78	82	84	77	59	47	32	26	24	23	22	21	21	21	20	21	22	26	36	43	41	50	42.4	84																						
14-May	59	65	71	77	81	68	63	47	39	31	26	25	23	22	22	21	21	21	21	22	25	36	46	52	40.9	81																						
15-May	69	78	82	84	84	71	56	51	41	31	26	21	20	19	18	18	19	21	23	26	31	33	36	43	41.7	84																						
16-May	43	52	54	51	52	55	49	43	37	32	26	20	21	25	27	27	27	26	27	29	30	31	26	29	34.9	55																						
17-May	39	48	57	57	46	45	45	44	40	34	30	28	29	28	27	27	26	25	25	33	42	40	41	41	37.5	57																						
18-May	50	53	53	57	56	51	50	48	46	44	40	34	29	26	26	25	24	27	27	34	57	71	81	84	45.5	84																						
19-May	83	84	90	93	94	89	80	78	78	78	83	89	90	87	84	86	88	82	79	79	81	84	86	87	84.7	94																						
20-May	88	89	88	87	86	85	81	75	71	64	58	55	51	50	51	49	48	49	55	60	64	66	69	71	67.1	89																						
21-May	73	75	76	78	88	96	93	93	91	87	84	79	74	77	78	83	84	88	89	92	96	97	98	98	86.1	98																						
22-May	98	98	98	98	98	98	95	90	88	88	86	84	78	71	62	57	53	50	47	46	49	53	63	70	75.8	98																						
23-May	71	77	78	79	83	78	69	61	51	43	39	35	31	27	23	23	23	25	25	27	33	36	42	46	46.9	83																						
24-May	47	52	60	65	69	64	55	45	41	34	29	26	22	22	23	25	30	37	36	42	50	56	64	68	44.3	69																						
25-May	69	74	80	83	87	84	74	68	63	57	53	48	49	48	46	44	42	44	45	49	50	51	53	55	59.1	87																						
26-May	58	60	68	81	87	88	86	83	80	78	74	72	77	91	97	95	91	88	85	86	88	89	91	93	82.7	97																						
27-May	93	94	96	96	97	95	90	74	72	83	83	74	63	51	50	62	66	92	97	98	97	97	94	94	83.6	98																						
28-May	92	88	84	80	80	83	77	77	75	73	67	65	65	65	72	54	50	56	63	65	70	78	82	80	72.5	92																						
29-May	77	83	93	95	95	95	91	89	90	91	93	92	87	86	83	77	77	75	69	67	74	84	88	90	85.0	95																						
30-May	90	89	87	85	87	88	82	81	82	84	85	83	80	79	93	79	70	71	68	66	70	77	80	84	80.7	93																						
31-May	90	94	96	97	95	89	84	78	77	65	55	49	44	39	37	35	33	31	33	35	44	52	53	55	60.8	97																						
																								66.3	69.8	73.1	74.9	75.9	73.8	67.6	62.0	57.1	53.2	49.2	45.2	42.4	40.7	40.5	39.5	39.2	40.9	41.9	44.4	50.0	54.9	58.0	61.6	Diurnal Average
																								98	98	98	98	98	98	95	93	91	91	93	92	90	91	97	95	91	92	97	98	97	97	98	98	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mildred Lake - May 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 28 km/h on May 8 22:00	Maximum Daily Speed Average: 19.3 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 14 06:00	Minimum Daily Speed Average: 1.9 km/h on May 29	Hours of Data: 744
Maximum Diurnal Speed Average: 6.4 km/h at hour 16	Minimum Diurnal Speed Average: 1.8 km/h at hour 8	Hours of Missing Data: 0
Monthly Average Velocity: 3.2 km/h 357.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 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-May	SSW4	SSW6	SSW5	SSE6	SSW7	SSE4	S7	SSE8	SSE10	S10	S8WSW13	SW13	SW12	W10WNW11	WNW8	NW9	NNW15	NNW11	N7	N6	SW2	WSW2	WSW3.7	NNW15		
2-May	SSW3	WSW1	S3	S3	S3	S3	S5	SSW5	SSW5	SW4	SW4	SSW7	SSW3	S4	SSW4	SSE7	S6	SE8	SE8	SE7	SE7	SE8	SE11	SE9	SSE4.6	SE11
3-May	SSE13	SSE13	SSE8	SSE10	SSE12	S11	S12	SSE14	SSE13	SE11	SSE10	SSE10	SSE11	SSW14	SW13	SW12	SW11	SW10	SW6	SSW7	S6	S5	S8	SSE3	S9.1	SSE14
4-May	SW5	SSW4	SW6	SW5	SSW5	SSW6	SSW6	S6	S7	S6	SW5	W12	W10	WNW9WNW18	NW21	NW21WNW21	WNW21WNW16	WNW17WNW16	WNW13	NNW15	NW15	NW15	NW15	W8.8	NW21	
5-May	NW12	NW16	NW14	NW11	NW10WNW11	WNW12	NW11	NW12	NW13	NW16	WNW13WNW16	NW19	NW20	NW21	NNW22	NW21	NW18	NNW17	NNE9	NE8	N6	N7	NW13.0	NNW22		
6-May	W2	NW3	WSW3	WSW6	WNW6	W4	NNW7	NNW10	NNW8	NW10	WNW8	WNW9	NW10	WNW8	NW7WNW13	W8	W8	WNW6	W4	S4	SSE12	SSE13	S13	W4.5	S13	
7-May	S12	SSE15	SSE12	S12	SSE11	SSE11	SSE12	SSE13	SSE12	SSE9	SSE8	SE6	ESE6	SSE5	WSW4	WNW8	W1	SSE9	SE13	SE13	SE12	SSE4	SSE11	ENE2	SSE8.0	SSE15
8-May	NNE5	NNE7	N9	NNW9	NW9	NW9WNW10	WNW19	WNW14	W4	SW8	WSW13	WSW17	W16	WSW16	WSW17	WSW20	WSW20	WSW20	WSW15	NW16	NNW28	NNW21	NW18	WNW10.9	NNW28	
9-May	NW14	NW13	WNW12	WNW14	WNW10	WNW12	W11	WNW15	WNW17	NW19	NW16	NW14	NW17	NW17	NW15	NNW18	NW13	NW12	NNW13	WNW10	WNW9	N11	NNE9	N4	NW12.3	NW19
10-May	WNW4	WNW6	WNW5	WNW6	NW6	NNW9	NNW6	NNE8	N4	N7	NNE8	NNE10	NNE11	NE13	NNE12	NE14	NE14	NE14	NE14	NE14	NE13	NE10	NE7	ENE6	NNE7.2	NE14
11-May	NNE7	NNE9	N9	N10	N9	N9	N10	NNE12	NNE16	NNE16	NNE17	NNE19	NNE17	N20	NNE17	NNE17	NNE16	N18	N19	NNE15	NNE10	NNE8	N8	N8	NNE12.8	N20
12-May	NNE6	N9	NNE8	N6	N9	N10	N11	N12	NNE13	NE15	NNE18	NE19	NNE17	NNE14	NNE15	NNE14	NE13	NE13	NE13	NE9	NE5	N4	NNW2	WNW4	NNE10.2	NE19
13-May	WNW3	SSW2	NNW2	SW4	SSW4	SSE4	SSW5	SSW6	W6	W8	W7	SW8	WSW7	SW8	W7	WNW8	NNW6	N6	NNE6	ENE4	NE4	NE5	NE6	NNE4	W2.1	WNW8
14-May	N5	N5	N2	NNE2	NE0	ESE0	SSW4	SW4	SW5	SW6	SW6	SSE3	NNE8	N5	NE6	NE8	NNE6	NE9	NE8	NE8	NE7	NE6	NNW2	N2	NNE2.4	NE9
15-May	SW3	NE2	ESE4	SW4	SSW4	SSW5	SSW6	SSW5	S6	SSE7	S6	SSW4	SSW5	SSW7	NNE1	WSW5	S9	SSE11	SSE12	SSE10	S9	S8	SSE7	SE4	S5.2	SSE12
16-May	SSE4	SSW4	SSE5	S5	S7	SE6	ESE4	SE6	SE7	SSE7	SSW6	SW14	SSW13	SSE9	ESE9	ESE8	ESE12	ESE10	ESE9	SE7	ESE8	SE7	SE7	SW3	SSE5.8	SW14
17-May	NE2	SSW2	S4	S6	SSW7	WSW9	WSW8	W11	W11WNW10	WNW7	WNW7	WNW10	WNW11	NW12	WNW10	WNW8	WNW7	N5	SSE3	SSW4	SW6	WSW7	WSW5	W5.4	NW12	
18-May	SSW4	WSW6	WSW6	WSW8	SW8	SW7	SSW7	SW7	WSW11	SW12	SW12	WSW13	W16	W16	W11	W12	WNW14	WNW11	WNW7	N9	NNE15	NNE21	NNE22	NNE21	WNW5.8	NNE22
19-May	NNE19	NNE16	N18	N20	N20	NNE19	NNE17	NNE20	NNE22	NNE21	NNE20	NNE23	NNE20	NNE20	NNE20	NNE23	NNE20	NNE20	NNE21	NNE22	NNE19	NNE17	NNE16	NNE16	NNE19.3	NNE23
20-May	NNE16	NNE13	NNE15	NNE17	NNE17	NNE15	NNE16	NE16	NE17	NE15	NE15	NE16	NNE15	NNE18	NNE15	NNE16	N19	NNE18	NNE20	NNE14	NNE13	N8	NNW10	NNW10	NNE14.7	NNE20
21-May	NNW9	NNE7	NE6	NNE8	NNE11	NNE12	NNE11	NNE12	N14	N17	N19	N18	N14	N16	NNE18	NNE15	NNE16	NNE15	NNE14	NNE14	NNE14	N13	NNE15	NNE15	NNE13.3	N19
22-May	NNE12	NNE12	NNE12	NNE14	NNE17	NNE15	NNE13	NNE15	NNE19	NNE17	NNE17	NNE18	NE19	NNE18	NNE19	NNE18	NNE21	NNE20	NNE19	NNE17	NNE11	NNE11	N10	N12	NNE15.6	NNE21
23-May	NNE8	NNE6	N11	N11	NNE10	NNE10	N12	NNE13	NNE13	NNE14	NNE15	NNE15	NNE15	NE12	ENE13	ENE12	NE10	E10	E11	E8	ESE7	SSE9	SSE8	SSE8	NE8.0	NNE15
24-May	S14	S11	S7	SSE9	SSE7	SSE7	SSW6	SSE10	SSE7	SSE11	S13	SSE17	S19	SSE17	SSE16	SSW7	NW6	SE2	S9	SSW14	SW10	SW10	SSW7	S7	S9.2	S19
25-May	S8	S4	SSW6	S6	S4	SSE4	SSW5	NNW2	NNW4	N4	NNE5	NNE8	NNE13	NNE17	N18	N18	NNE18	NE15	NE13	NNE14	NNE15	NNE16	NNE16	NNE16	NNE7.2	NNE18
26-May	NNE16	NNE16	NNE17	NNE11	N11	NNE12	NNE12	NNE14	N13	N15	N17	NNW21	N14	N13	NNW14	NNW16	N15	N14	N16	N11	NNE10	NNE9	N11	NNE13	N13.5	NNW21
27-May	NNE9	NNE10	NNE9	NNE8	N11	NNE8	NE6	SE12	SSE18	ESE8	ESE8	ESE10	ESE11	SE8	SE6	WSW9	SW7	SSW5	SE9	ESE12	SE8	S8	SSE8	ESE7	ESE4.2	SSE18
28-May	SSE7	SE10	ESE12	SE13	SSE9	SE10	SE11	SSE13	SSE13	S11	S10	SSE12	S12	S14	SSW10	SSW10	SW5	SW6	SW7	SW3	SSE5	SW3	WSW4	WSW5	S7.5	S14
29-May	W4	W5	W5	SW7	SSW3	SW5	WNW4	WNW2	SW4	SW5	WSW5	W4	NNW4	N4	NNE4	NNE5	NE6	NE9	NE11	NE7	NNE6	N3	NNW6	NNW7	NNW1.9	NE11
30-May	N7	N8	N10	NNW8	N4	N6	NNW9	NNW10	NNW11	N11	N11	NNE11	NNE9	NW10	NNW13	N17	N16	NNW13	N11	N12	N12	N8	N7	N7	N9.7	N17
31-May	N4	NNW3	NW4	NW3	NNW4	NNW5	N3	WNW2	WNW4	W4	SW6	SW6	SW6	SSW6	S4	SSW5	SE3	SW4	S6	SSE10	SSE7	S7	SSE7	S6	SW2.5	SSE10

N2.0	N2.4	N2.5	NNW1.8	NNW2.0	N2.0	NNW1.8	N1.8	N2.0	N2.7	N2.5	NNW3.1	NNW3.6	NNW3.5	NNW5.2	NNW6.4	NNW6.1	N5.1	NNE5.0	NNE4.0	NNE3.9	NNE3.4	NNE2.7	N3.5	Diurnal Average	
NNW19	NNE16	N18	NNE20	N20	NNE19	NNE17	NNE20	NNE22	NNE21	NNE20	NNE23	NNE20	NNE20	NW20	NNE23	NNW22	WNW21	NNE21	NNE22	NNE19	NNW28	NNE22	NNE21	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

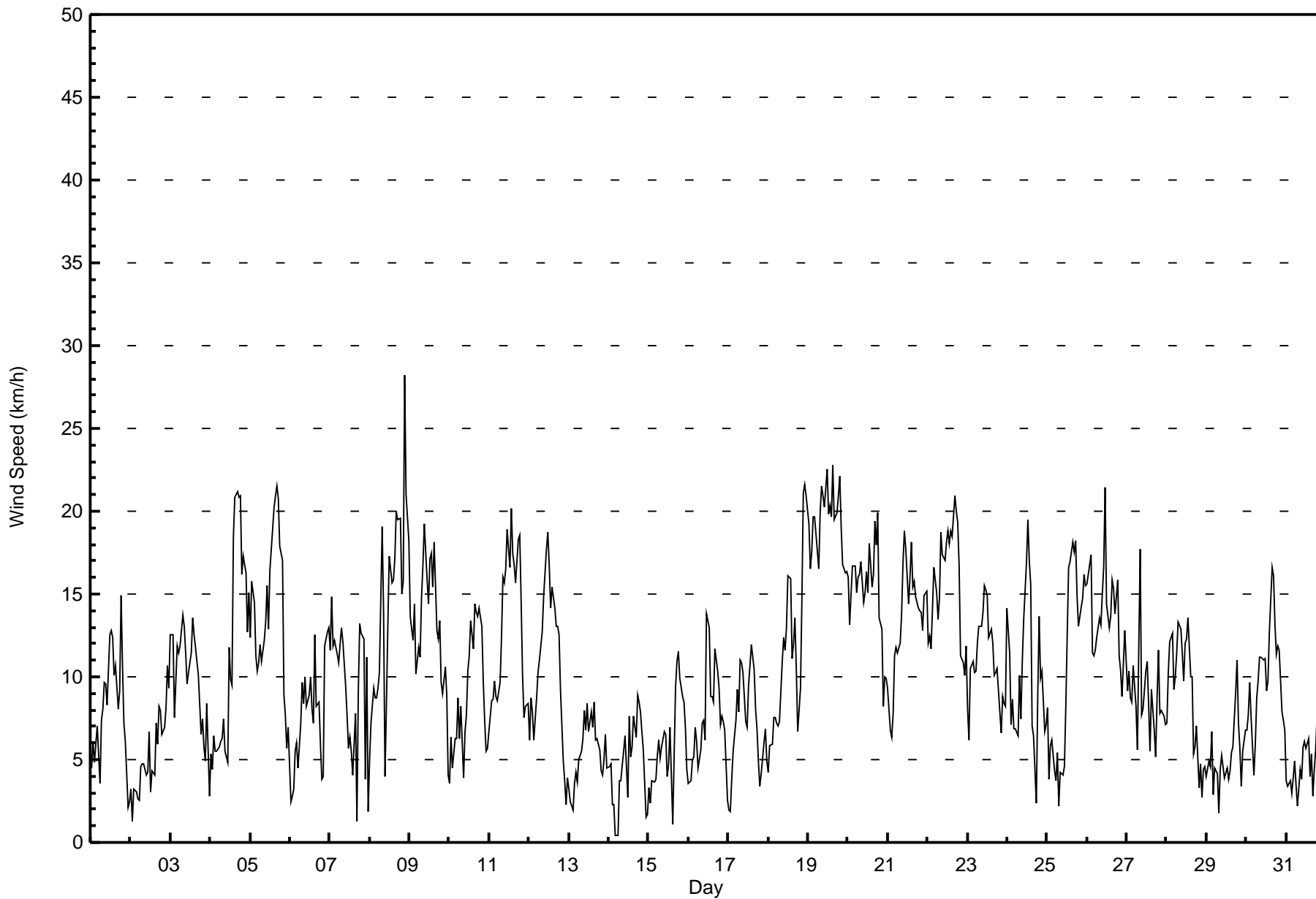
Wind Speed (WS) - km/h
Mildred Lake - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on May 19 12:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 0 km/h on May 12 23:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	2	2	1	1	2	2	1	1	2	2	2	4	4	4	4	4	4	3	3	3	1	1	1	1	4
2-May	1	1	1	2	2	1	1	2	2	1	2	2	2	3	3	3	3	2	2	1	1	2	2	2	3
3-May	3	4	3	2	3	3	3	3	3	2	2	2	3	4	4	4	3	3	1	2	1	4	3	2	4
4-May	2	2	2	2	2	2	2	1	2	2	2	4	3	4	7	6	6	6	6	4	5	5	4	4	7
5-May	3	4	3	2	2	3	3	3	3	4	4	4	6	6	6	6	5	5	5	4	4	2	1	2	6
6-May	1	1	1	2	4	3	3	2	2	5	4	5	5	4	4	5	3	3	3	3	2	3	3	3	5
7-May	3	2	3	2	2	2	2	2	2	1	1	2	1	2	3	4	2	2	4	3	3	3	3	3	4
8-May	1	2	3	2	3	3	3	6	5	2	3	5	6	6	6	6	6	6	6	5	5	6	6	5	6
9-May	4	4	3	4	4	4	3	4	5	6	4	4	4	5	5	4	4	5	4	3	2	3	2	2	6
10-May	1	2	1	2	2	2	2	2	2	3	4	4	5	4	4	4	4	4	4	3	3	2	1	1	5
11-May	1	2	2	1	1	1	2	4	4	5	6	5	5	6	5	5	5	5	5	4	3	2	1	1	6
12-May	1	1	1	1	1	1	2	3	3	4	5	6	5	5	4	5	4	4	4	3	1	1	0	1	6
13-May	1	1	1	1	1	1	1	1	2	3	3	3	3	3	4	3	4	3	2	1	1	2	1	2	4
14-May	1	1	1	1	1	1	1	1	1	1	2	3	5	4	4	4	4	3	2	2	2	1	1	1	5
15-May	1	1	1	1	1	2	1	1	1	1	2	3	2	2	3	2	3	2	2	2	2	2	2	1	3
16-May	2	1	2	2	1	1	1	1	2	2	3	5	5	3	2	2	2	3	2	3	3	2	3	2	5
17-May	2	1	2	2	2	3	4	4	4	3	2	3	3	4	4	4	3	2	2	1	1	2	2	2	4
18-May	2	2	2	2	2	3	2	3	4	4	4	5	6	5	4	4	4	4	2	7	4	5	5	6	7
19-May	5	5	4	5	4	5	5	6	6	6	6	7	6	6	6	7	6	5	6	6	5	4	4	4	7
20-May	4	3	4	4	4	4	4	5	5	4	4	4	5	5	4	4	5	4	4	4	3	2	2	2	5
21-May	2	2	2	2	4	3	3	2	3	4	4	4	3	4	4	4	4	4	4	4	3	3	4	4	4
22-May	4	3	3	3	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6	4	3	2	2	2	6
23-May	3	2	2	1	2	2	2	3	3	4	5	5	4	6	5	4	4	3	3	2	2	2	1	1	6
24-May	3	3	1	1	1	2	2	2	2	4	4	4	5	5	4	4	2	2	3	3	3	3	2	2	5
25-May	2	2	2	1	1	2	1	2	2	2	3	4	4	4	4	5	5	4	4	3	4	3	4	4	5
26-May	4	4	4	3	2	3	3	4	3	3	4	4	6	4	3	3	4	3	3	3	3	2	2	3	6
27-May	3	3	2	2	2	3	2	3	4	2	2	3	3	4	3	5	4	6	2	2	2	5	3	2	6
28-May	3	4	2	3	3	3	4	4	3	2	3	3	3	4	6	3	2	3	3	1	2	1	2	2	6
29-May	1	1	1	4	2	2	2	1	1	2	1	1	1	1	2	2	2	3	3	2	1	2	1	1	4
30-May	1	1	1	1	1	2	2	2	2	2	2	3	3	4	3	3	4	3	2	3	3	2	2	2	4
31-May	1	1	1	2	2	1	1	1	1	2	2	3	2	2	3	2	2	2	3	3	2	1	1	1	3
Diurnal Maximum																									
5 5 4 5 4 5 5 6 6 6 6 7 6 6 7 7 6 6 6 7 5 6 6 6 6																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	144	19.35	19.35
6 - 11	319	42.88	62.23
12 - 19	245	32.93	95.16
20 - 28	36	4.84	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	7	6	2	0	3	3	11	13	26	19	9	10	8	3	9	144
6 - 11	39	39	19	1	3	13	18	39	29	19	22	10	12	28	11	17	319
12 - 19	28	89	20	2	0	3	5	20	9	3	7	7	5	17	21	9	245
20 - 28	2	20	0	0	0	0	0	0	0	0	0	3	0	2	5	4	36
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	84	155	45	5	3	19	26	70	51	48	48	29	27	55	40	39	744

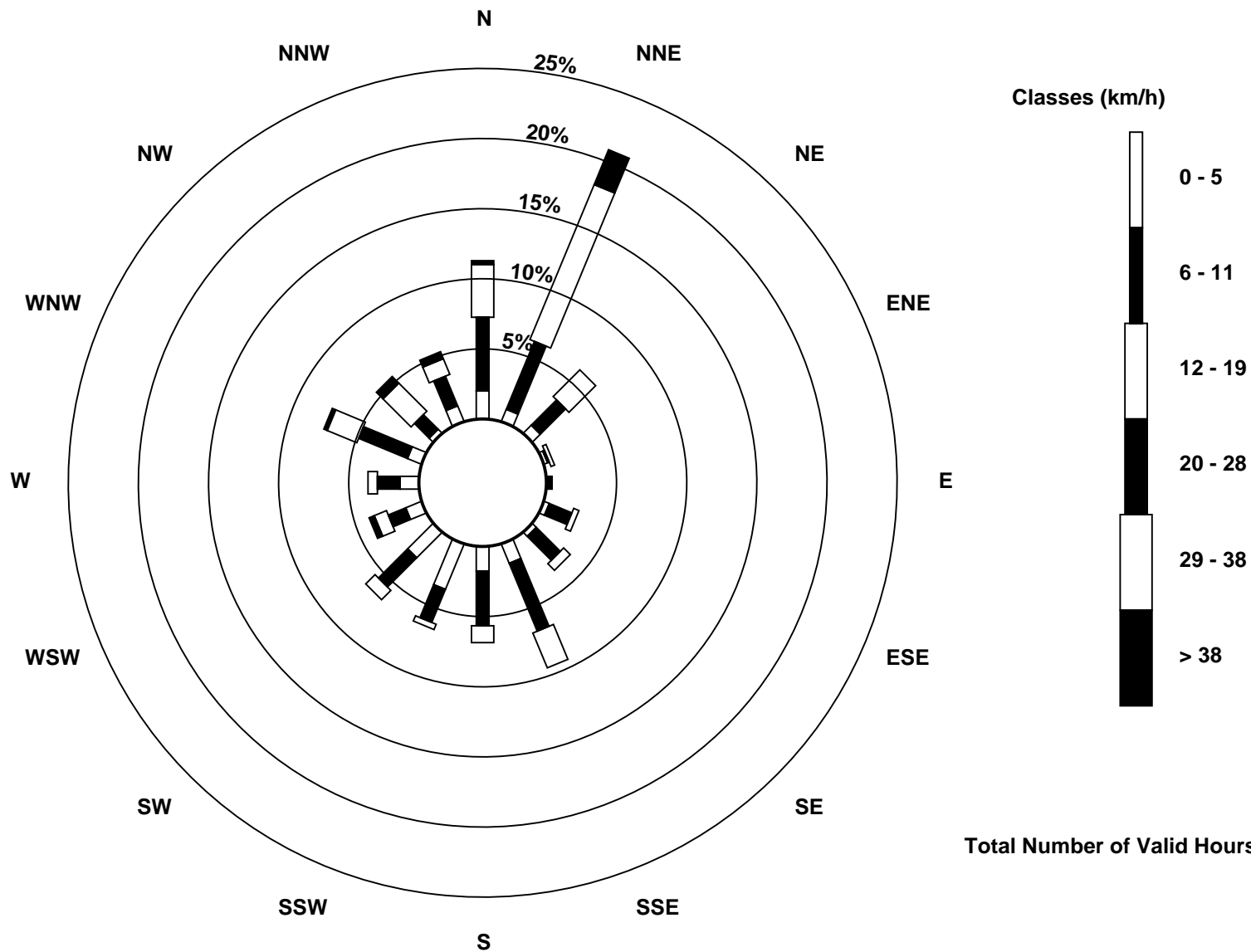
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 329 deg on May 8 22:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 23.2 deg on May 19																						Hours of Data: 744			
Direction of Minimum Speed: 113 deg on May 14 06:00											Direction of Minimum Daily Speed Average: 1.9 deg on May 29											Hours of Missing Data: 0			
Monthly Average Direction: 269.8 deg																						Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	206	212	202	165	208	165	170	159	154	171	188	239	232	225	268	299	291	318	336	338	354	357	227	241	239.6
2-May	213	248	175	186	169	189	174	193	202	217	230	197	202	173	198	152	174	141	128	132	141	138	143	146	165.8
3-May	157	157	148	160	168	175	178	168	162	146	167	161	155	203	226	224	218	215	214	197	178	178	170	165	178.3
4-May	218	199	215	222	203	200	206	190	188	176	216	273	275	282	288	310	311	294	292	292	289	299	299	319	279.1
5-May	321	318	320	317	313	296	293	311	314	313	321	303	297	304	310	325	329	325	326	333	33	45	10	1	320.4
6-May	270	321	242	256	302	280	328	327	329	311	287	290	304	283	309	293	267	264	285	265	179	153	163	173	277.2
7-May	171	159	158	169	161	162	164	166	163	165	162	146	110	150	257	291	261	152	139	128	129	162	161	73	157.5
8-May	15	14	359	335	318	314	298	293	295	271	217	244	255	259	257	256	249	243	246	256	326	329	330	317	286.3
9-May	312	309	292	292	284	285	281	288	302	316	315	319	326	325	318	329	311	312	329	299	293	358	16	9	312.4
10-May	301	291	285	292	307	348	348	13	11	353	20	33	17	40	29	39	41	47	51	47	47	56	64	24	23.7
11-May	30	15	5	1	359	358	9	25	18	21	28	13	24	8	21	25	25	7	11	25	25	22	9	358	16.0
12-May	15	5	15	6	4	8	6	6	19	34	31	35	25	31	27	32	41	47	52	48	39	350	330	297	25.0
13-May	283	209	333	220	208	155	204	212	262	281	270	231	238	226	280	298	327	5	32	58	43	36	44	19	278.3
14-May	356	356	4	16	39	113	194	223	221	216	214	162	12	4	46	45	13	43	50	40	40	39	328	354	27.1
15-May	217	36	110	228	200	208	210	202	169	162	191	195	193	208	22	240	173	166	165	165	179	182	168	139	181.3
16-May	165	202	148	169	177	124	113	131	146	162	202	224	211	166	116	104	110	109	113	130	121	141	137	216	148.8
17-May	39	207	179	179	207	238	253	260	276	289	284	286	290	298	314	290	287	300	2	162	207	229	249	251	269.4
18-May	209	248	246	239	220	230	212	232	246	234	223	258	274	276	276	271	294	291	302	358	22	21	21	26	287.8
19-May	29	15	8	11	8	16	24	28	28	25	25	28	22	26	28	29	33	27	25	26	23	24	20	23	23.2
20-May	21	24	26	22	24	25	26	37	47	34	40	41	28	27	23	21	11	15	12	16	26	6	343	332	22.8
21-May	342	13	38	16	13	25	22	14	10	9	5	6	8	4	12	22	17	20	15	15	13	11	16	21	13.1
22-May	29	29	15	13	12	20	27	25	25	27	32	27	34	31	24	22	15	20	24	23	18	15	4	3	22.2
23-May	22	17	8	8	13	15	6	13	14	20	26	29	21	50	65	69	46	79	88	91	114	163	162	166	40.7
24-May	185	189	177	168	152	168	198	166	158	162	171	160	169	165	166	198	306	141	172	198	225	216	213	190	179.3
25-May	173	181	194	189	187	157	211	334	333	10	29	12	22	13	18	10	8	15	37	35	28	24	24	23	21.7
26-May	19	21	14	13	355	21	20	25	10	7	360	341	11	5	340	346	1	356	2	9	16	12	3	13	5.9
27-May	20	14	21	20	8	17	39	126	162	119	119	105	121	140	140	247	226	196	139	102	135	177	153	115	112.1
28-May	163	134	123	125	155	135	146	152	162	173	181	166	172	187	209	202	228	214	236	220	168	218	239	251	170.7
29-May	259	270	269	219	206	229	303	298	221	233	244	269	348	1	31	23	41	36	53	49	28	10	345	345	340.4
30-May	358	354	350	347	354	352	333	329	336	353	357	18	14	317	344	350	350	348	353	354	5	9	6	4	351.7
31-May	351	330	312	307	330	334	351	288	282	268	229	226	218	208	174	204	141	235	185	159	160	174	168	177	214.1
3.3	358.9	2.1	343.8	339.7	356.0	342.3	355.2	350.9	358.3	353.9	344.2	345.9	337.5	344.2	342.2	347.6	356.9	14.1	24.9	28.7	16.0	17.7	5.2		
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

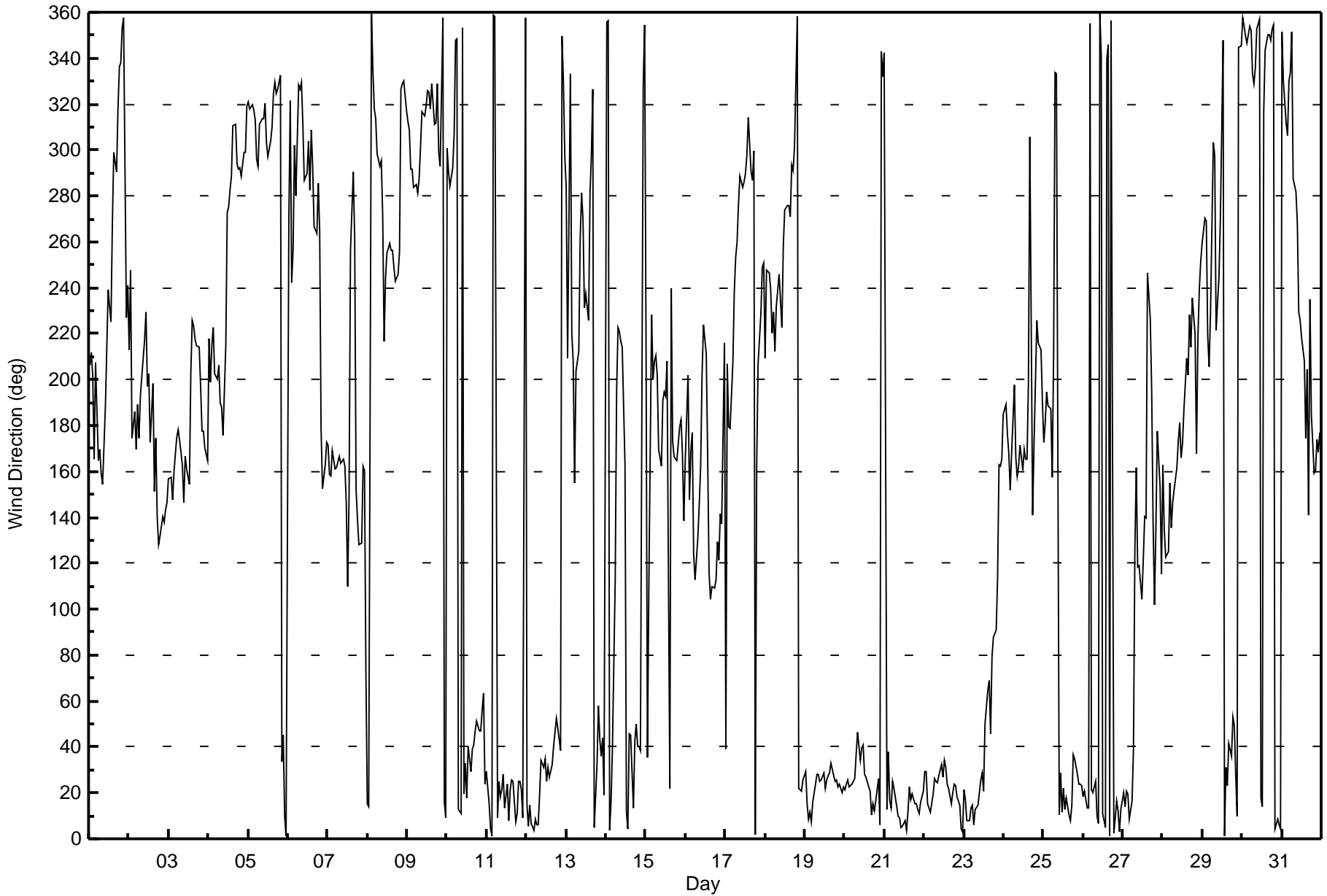
Wind Direction (WD) - deg
Mildred Lake - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on May 15 15:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 7 deg on May 1 20:00																									
Percentiles: P ₁ = 10 P ₁₀ = 13 Q ₁ = 16 Median = 20 Q ₃ = 29 P ₉₀ = 49 P ₉₉ = 86																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	12	12	20	22	16	45	13	17	17	21	22	27	28	26	35	28	45	33	11	7	9	9	70	34	70
2-May	61	88	29	38	49	49	23	32	38	49	49	36	82	86	90	50	60	24	14	13	11	14	15	13	90
3-May	13	15	28	13	13	15	16	14	16	20	25	24	29	21	24	25	20	17	16	15	26	68	29	80	80
4-May	27	45	18	26	33	28	27	22	22	37	35	22	28	32	29	19	19	17	16	16	17	17	16	19	45
5-May	15	14	13	14	16	15	16	20	16	21	20	25	28	29	24	19	17	14	14	10	26	13	15	18	29
6-May	67	51	30	23	57	62	30	17	31	39	55	53	45	45	55	31	40	32	41	39	36	15	12	15	67
7-May	13	12	17	12	11	12	12	12	12	12	16	35	25	41	75	29	86	19	18	13	14	77	15	84	86
8-May	20	26	17	19	32	26	19	18	28	44	22	25	26	26	28	24	22	24	21	23	15	12	17	16	44
9-May	17	17	17	17	24	19	19	20	19	18	17	21	17	18	20	14	19	27	19	19	17	28	14	37	37
10-May	38	13	20	14	30	17	21	22	73	54	53	43	33	26	26	27	26	25	21	19	18	16	14	15	73
11-May	17	13	10	11	12	11	14	24	25	27	28	22	24	27	27	26	29	19	17	18	18	15	14	9	29
12-May	15	12	12	13	11	11	12	19	21	26	25	26	29	31	30	29	24	24	19	18	14	16	31	25	31
13-May	43	17	61	13	30	22	21	25	37	42	47	39	58	49	57	46	64	42	22	17	16	12	10	27	64
14-May	19	10	48	25	90	91	27	33	30	34	32	86	56	83	63	57	63	37	25	16	15	10	52	72	91
15-May	17	33	32	15	24	12	15	23	25	27	31	71	61	35	107	51	26	17	12	10	15	16	17	29	107
16-May	56	21	35	42	15	19	18	22	22	23	37	28	26	23	13	13	12	15	19	41	31	33	36	75	75
17-May	71	69	32	20	23	25	28	27	24	26	36	39	24	26	24	23	27	28	28	46	21	27	24	32	71
18-May	36	31	24	23	32	32	28	38	25	27	25	31	25	21	30	26	21	19	23	27	18	17	17	18	38
19-May	18	19	16	17	16	19	19	19	19	19	18	19	19	19	20	18	20	19	19	18	18	18	17	17	20
20-May	16	16	16	17	16	17	17	19	19	25	24	24	25	20	18	19	18	18	17	17	17	18	15	14	25
21-May	13	22	19	21	15	17	18	15	17	16	15	15	18	16	18	18	19	19	16	17	15	15	16	17	22
22-May	18	18	17	16	16	18	18	18	19	20	19	19	19	22	21	20	17	19	19	18	16	14	13	11	22
23-May	24	19	12	12	12	14	15	19	22	23	25	27	29	49	39	40	43	24	18	17	26	12	10	10	49
24-May	15	14	12	10	13	19	24	16	26	24	23	21	18	21	19	61	19	77	19	16	23	19	17	18	77
25-May	15	66	13	13	47	55	20	83	51	66	68	45	33	22	20	21	21	20	19	18	17	17	17	17	83
26-May	16	18	15	19	17	19	18	21	20	19	21	15	29	25	21	13	16	17	16	17	19	17	13	14	29
27-May	18	17	17	15	13	23	50	21	16	26	25	23	30	53	49	57	42	69	16	16	19	34	38	19	69
28-May	21	18	14	16	22	17	21	17	20	20	25	19	18	18	40	24	38	32	30	31	26	43	30	28	43
29-May	30	24	22	30	67	34	50	58	25	26	26	36	30	26	47	31	34	24	21	20	16	26	10	8	67
30-May	10	11	9	10	39	34	14	16	13	15	16	21	26	29	16	14	14	12	14	17	12	13	11	14	39
31-May	20	27	12	26	21	17	29	67	31	67	41	48	52	47	87	50	76	53	59	16	13	11	15	14	87
	71	88	61	42	90	91	50	83	73	67	68	86	82	86	107	61	86	77	59	46	36	77	70	84	
	Diurnal Maximum																								



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 25, 2016	Last Calibration	April 14, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	13:05	End Time (MST)	14:45
Gas Cert Reference	SA1301009	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	800	800
Calculated slope	0.994165	1.000827	Chamber temp	45.2	45.2
Calculated intercept	1.367975	1.233213	Pressure	690.2	690.2
Analyzer Background	20.5	20.5	Flow	0.491	0.491
Analyzer Coefficient	0.935	0.935	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	797.2	0.979
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.7	780.7	779.5	1.002
second point	5000	41.5	391.8	389.4	1.006
third point	5000	20.8	196.4	193.8	1.013
as left zero					
as left span					
Average Correction Factor					1.007

Corrected As found 797.7 Previous response 783.9 % change -1.7%

Notes:

Changed inlet filter after as found. Span adjusted, no maintenance done

Calibration Performed By: Melissa Lemay



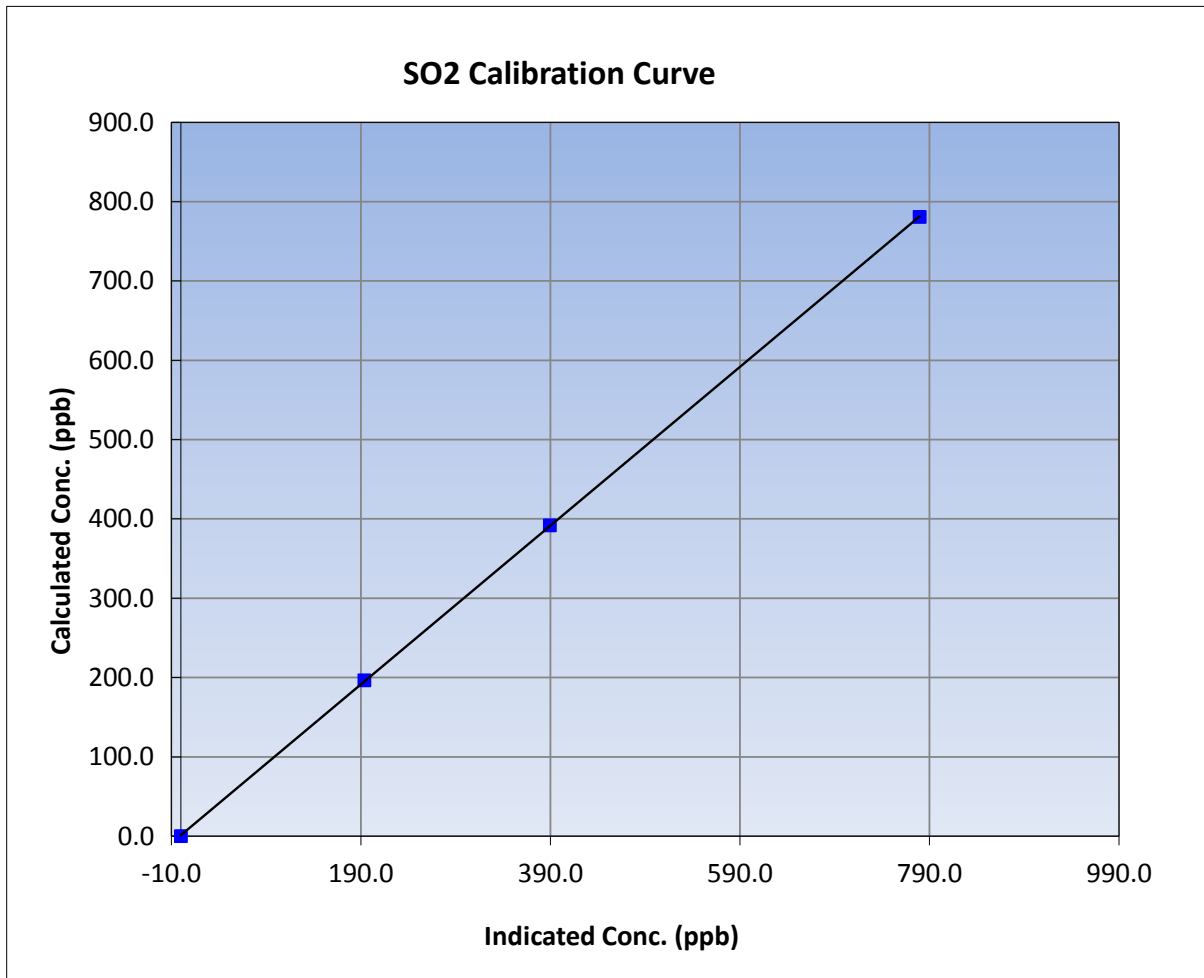
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 25, 2016	Previous Calibration	April 14, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:05	End Time (MST)	14:45
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

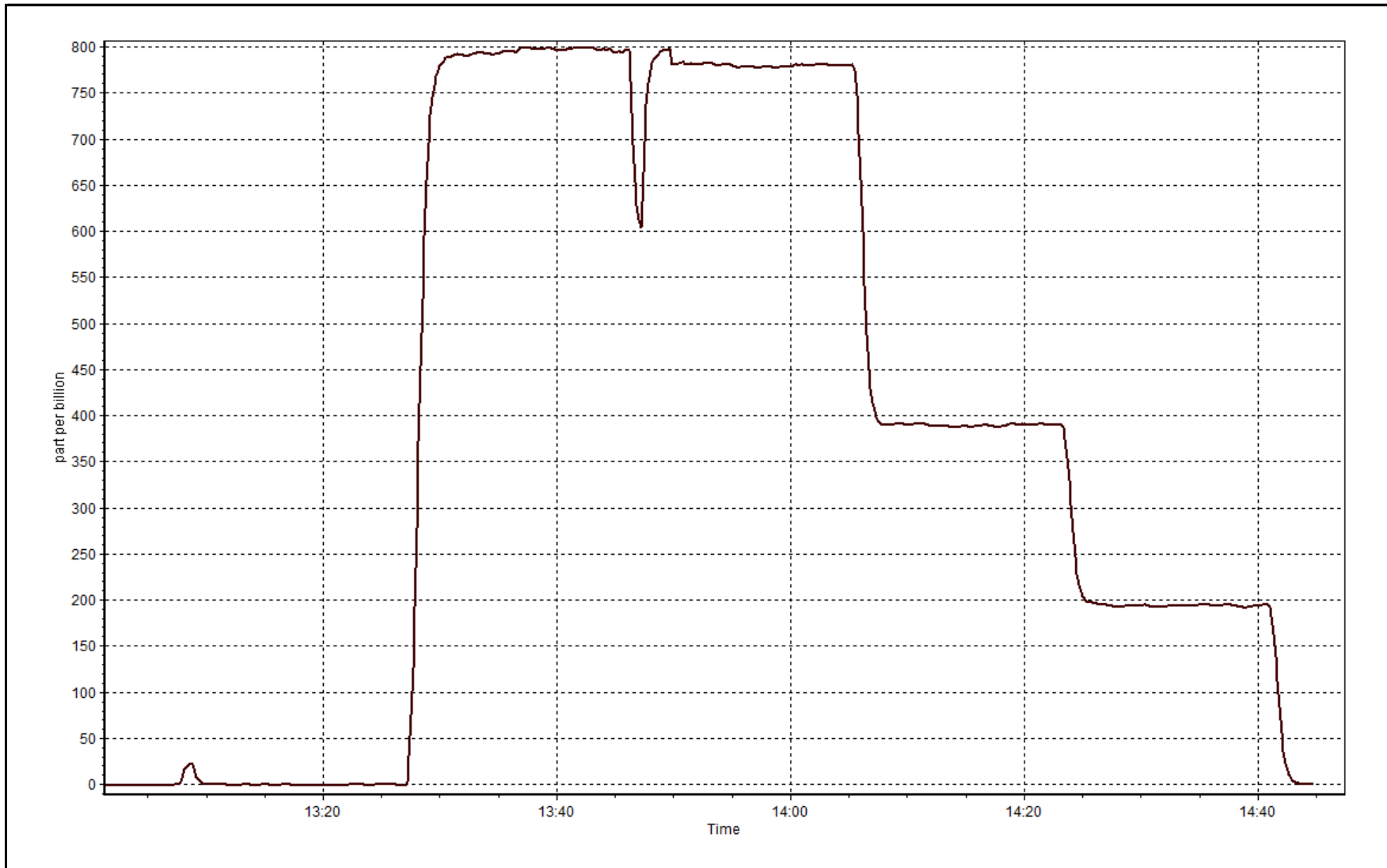
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999988
780.7	779.5	1.0015		
391.8	389.4	1.0061	Slope	1.000827
196.4	193.8	1.0132		
			Intercept	1.233213



SO2 Calibration Plot

Date: May 25, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 25, 2016	Last Calibration	April 15, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	14:40	End Time (MST)	16:22
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	785	785
Calculated slope	0.989422	0.991415	Chamber temp	45	45
Calculated intercept	0.677957	0.357394	Pressure	545.4	545.4
Analyzer Background	16	16	Flow	1.039	1.039
Analyzer Coefficient	0.969	0.969	Intensity	89	89
			Converter temp.	325	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	80.0	80.6	80.9	0.997
SO2 scrubber check	5000	21.2	200.1	0.9	----
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	80.0	80.6	80.9	0.997
second point	5000	40.0	40.3	40.5	0.996
third point	5000	20.0	20.2	19.9	1.013
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found	81.3	Previous response	80.8	% change	-0.6%
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Notes:

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

Calibration Performed By: Melissa Lemay



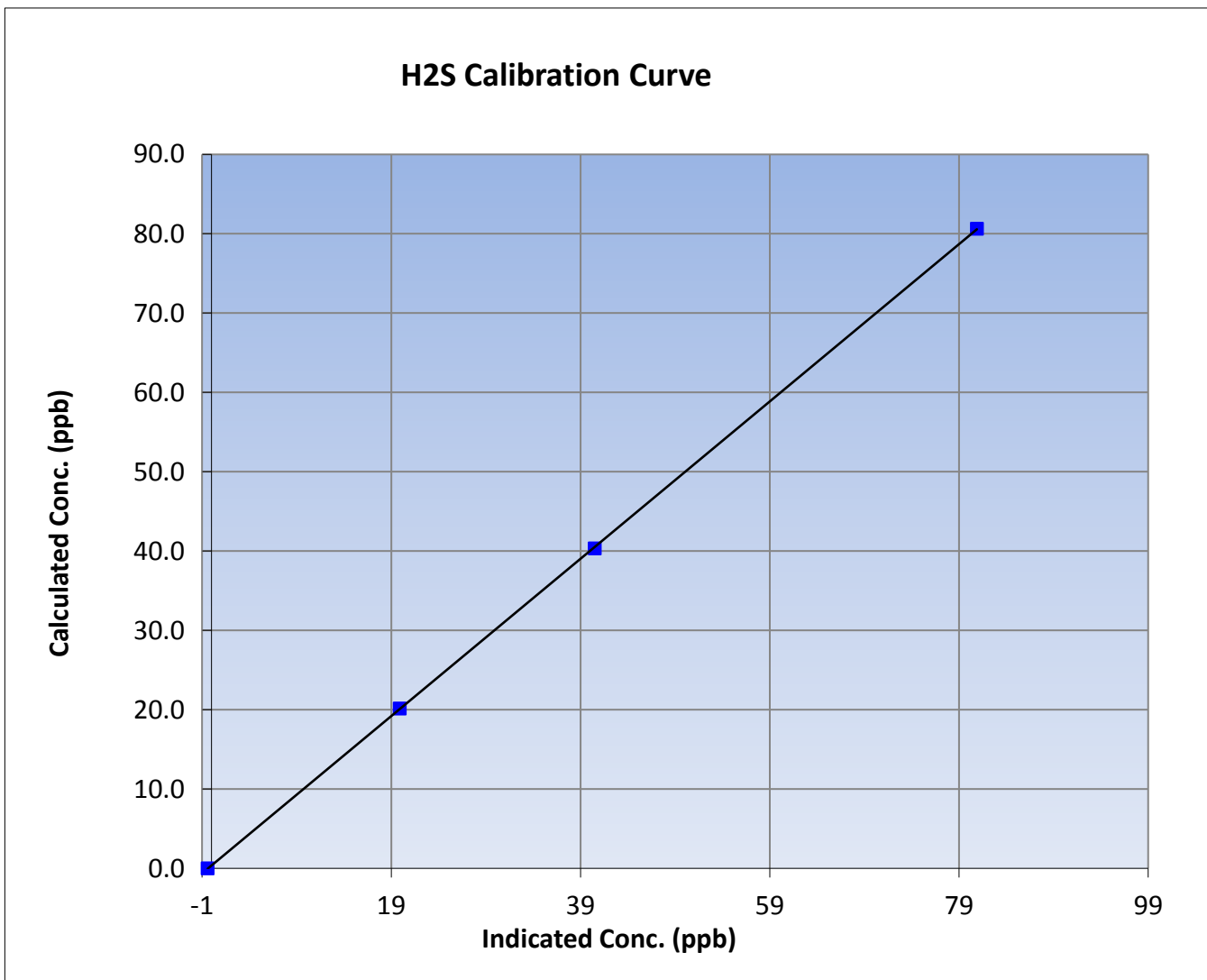
Wood Buffalo Environmental Association H2S Calibration Report

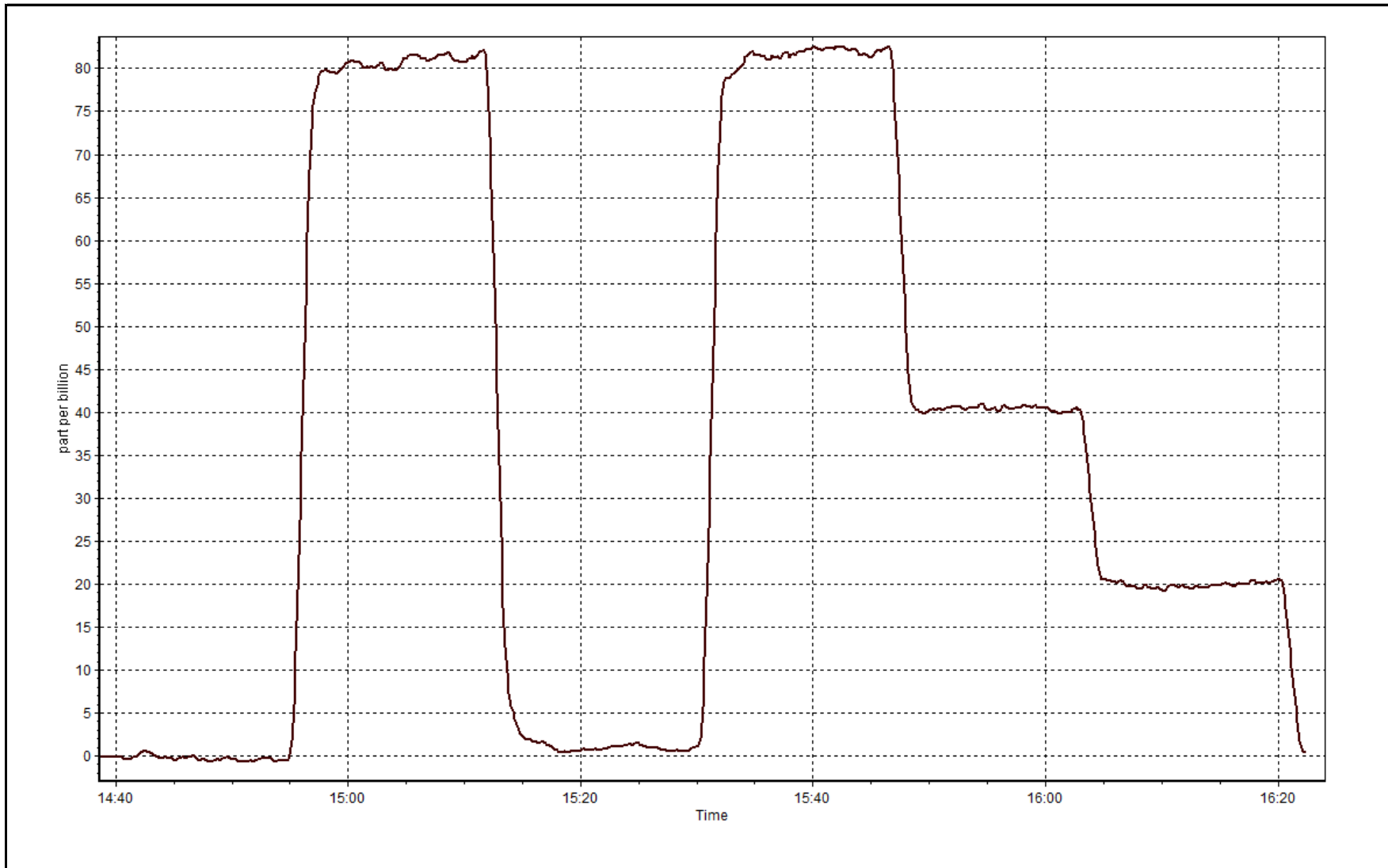
Station Information

Calibration Date	May 25, 2016	Previous Calibration	April 15, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	14:40	End Time (MST)	16:22
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	-0.4	----	Correlation Coefficient	0.999986
80.6	80.9	0.9968		
40.3	40.5	0.9956	Slope	0.991415
20.2	19.9	1.0131		
			Intercept	0.357394







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-25-16	Last Calibration	April-14-16
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	13:00	End Time (MST)	14:44
Gas Cert Reference	SA1301009	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1087.5 ppm
C3H8 Cal Gas Conc.	210 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.0
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.9	39.8
Calculated slope	0.998405	0.997648	Fuel Pressure	25.7	25.6
Calculated intercept	0.009455	0.015427	Analyzer Coeff	4.604	4.604
			Analyzer BKG	2.33	2.33

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

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	82.7	17.99	18.03	0.998
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	82.7	17.99	18.03	0.998
second point	5000	41.5	9.03	9.01	1.002
third point	5000	20.8	4.52	4.50	1.005
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found	18.02	Previous response	18.01	% change	-0.1%
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Notes:

Changed inlet filter after as found. No adjustments or maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

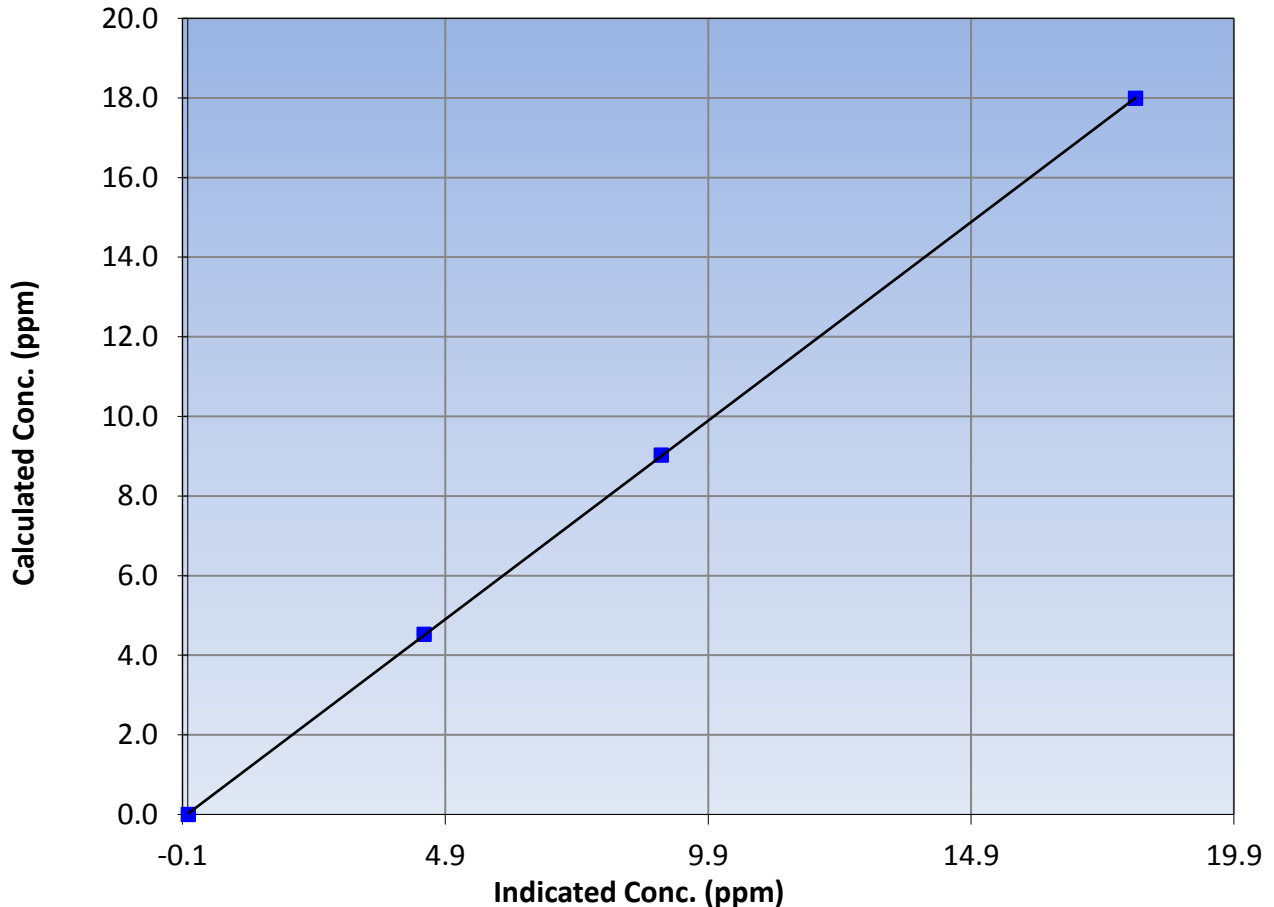
Station Information

Calibration Date	May 25, 2016	Previous Calibration	April 14, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:00	End Time (MST)	14:44
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

Calibration Data

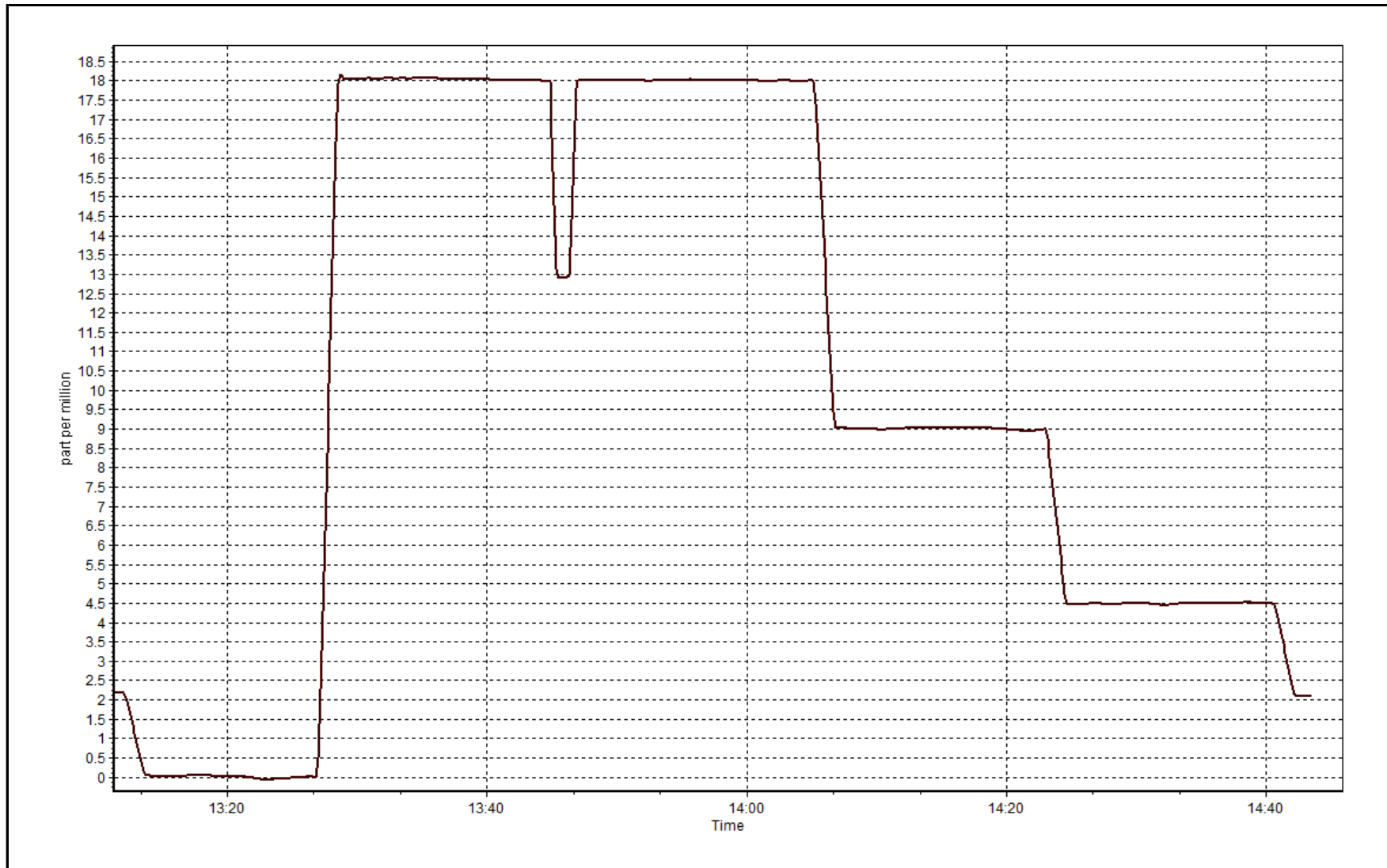
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999990
17.99	18.03	0.9976		
9.03	9.01	1.0018	Slope	0.997648
4.52	4.50	1.0053		
			Intercept	0.015427

THC Calibration Curve



THC Calibration Plot

Date: May 25, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3 LOWER CAMP METEOROLOGY MAY 2016

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

June 24, 2016



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	744	0	0	100.00	32.6	-	23.7	-
Temperature 45 m (C) Average	744	0	0	100.00	32.4	-	23.8	-
Temperature 100 m (C) Average	744	0	0	100.00	31.7	-	23.8	-
Temperature 167 m (C) Average	744	0	0	100.00	31.1	-	23.5	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	98	-	84.0	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	97	-	83.0	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	97	-	85.0	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	98	-	87.0	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	24	-	14.0	-
Wind Speed 45 m (km/h) Average	744	0	0	100.00	32	-	19.0	-
Wind Speed 100 m (km/h) Average	744	0	0	100.00	38	-	29.0	-
Wind Speed 167 m (km/h) Average	744	0	0	100.00	44	-	32.0	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 100 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 167 m (deg) Average	744	0	0	100.00	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	0.6	-	0.2	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100.00	1.7	-	0.6	-
Vertical Wind Speed 100 m (km/h) Average	744	0	0	100.00	3.6	-	1.0	-
Vertical Wind Speed 167 m (km/h) Average	744	0	0	100.00	4.5	-	1.5	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	13.77	6.5	-	0.5	5.7	8.8	13	18.3	22.6	32.6
Temperature 45 m (C) Average	744	13.73	6.4	-	0.9	5.8	8.8	13.1	17.9	22.4	32.4
Temperature 100 m (C) Average	744	13.59	6.3	-	0.8	5.9	8.7	13	17.8	22.2	31.7
Temperature 167 m (C) Average	744	13.41	6.2	-	1.3	5.8	8.8	12.9	17.6	22.2	31.1
Relative Humidity 20 m (%) Average	744	55	24	-	14	23	33	54	76	86	98
Relative Humidity 45 m (%) Average	744	53.7	23	-	13	22	32	53	74	85	97
Relative Humidity 100 m (%) Average	744	51.9	23	-	13	22	30	49	73	85	97
Relative Humidity 167 m (%) Average	744	50.9	24	-	13	22	29	47	73	86	98
Wind Speed 20 m (km/h) Average	744	8	4	-	0	2	4	8	11	14	24
Wind Speed 45 m (km/h) Average	744	11	6	-	0	3	6	11	15	19	32
Wind Speed 100 m (km/h) Average	744	15.5	8	-	0	5	9	15	21	26	38
Wind Speed 167 m (km/h) Average	744	17.9	9	-	1	6	11	18	24	30	44
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	-0.17	0.3	-	-1.2	-0.6	-0.4	-0.2	0.1	0.2	0.6
Vertical Wind Speed 45 m (km/h) Average	744	-0.1	0.5	-	-1.8	-0.8	-0.5	-0.2	0.3	0.6	1.7
Vertical Wind Speed 100 m (km/h) Average	744	0.17	0.6	-	-1.6	-0.5	-0.2	0.1	0.4	0.9	3.6
Vertical Wind Speed 167 m (km/h) Average	744	0.36	0.7	-	-1.4	-0.4	-0.1	0.3	0.7	1.3	4.5

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

OPERATIONAL NOTES

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

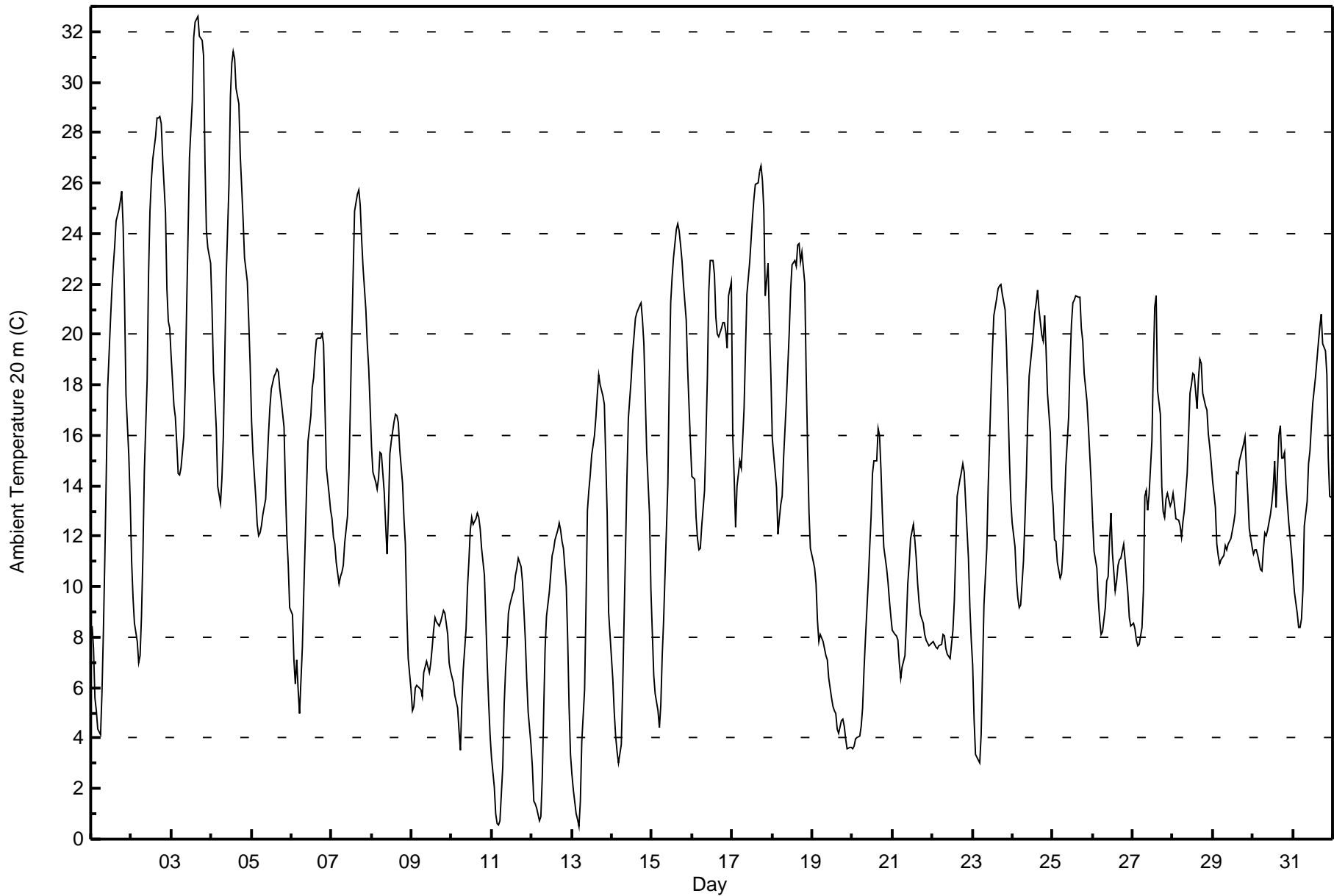


Maximum Value: 32.6 C on May 3 17:00																				Maximum Daily Average: 23.7 C on May 3					Hours in Service: 744																							
Minimum Value: 0.5 C on May 13 05:00																				Minimum Daily Average: 6.3 C on May 19					Hours of Data: 744																							
Maximum Diurnal Average: 18.7 C at hour 17																				Minimum Diurnal Average: 8.0 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 13.77 C																				Percentiles: P ₁ = 1.0 P ₁₀ = 5.7 Q ₁ = 8.8 Median = 13.0 Q ₃ = 18.3 P ₉₀ = 22.6 P ₉₉ = 30.8					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-May	8.5	7.6	5.6	5.1	4.4	4.1	5.8	8.2	11.1	14.3	17.8	20.5	21.8	22.7	23.5	24.5	25.0	25.3	25.7	24.3	21.3	17.6	15.2	13.4	15.6	25.7																						
2-May	11.0	9.6	8.6	7.8	7.0	7.3	8.9	11.2	14.5	18.2	22.3	24.9	26.1	27.0	27.9	28.6	28.6	28.7	28.3	26.9	24.8	21.8	20.5	20.3	19.2	28.7																						
3-May	19.1	17.2	16.7	15.7	14.5	14.5	14.7	16.0	18.0	21.1	24.0	27.0	29.3	31.8	32.4	32.5	32.6	31.9	31.6	31.0	26.8	24.1	23.4	22.8	23.7	32.6																						
4-May	21.0	18.5	17.4	16.3	14.0	13.3	14.3	15.9	19.0	22.3	26.0	29.4	30.8	31.2	30.9	29.8	29.1	27.1	25.8	24.6	23.1	22.1	20.5	18.8	22.5	31.2																						
5-May	16.6	15.3	13.5	12.5	12.0	12.1	12.4	12.9	13.5	14.8	16.1	17.1	17.9	18.4	18.5	18.6	18.5	17.9	17.4	16.4	13.9	12.0	10.9	9.2	14.9	18.6																						
6-May	8.9	7.1	6.1	7.1	5.9	5.0	7.6	9.8	11.8	13.9	15.8	16.8	17.9	18.3	19.2	19.8	19.9	19.9	20.0	19.6	17.2	14.7	13.6	13.0	13.7	20.0																						
7-May	12.7	12.0	11.7	11.0	10.1	10.4	10.6	10.8	11.7	12.8	14.5	17.2	20.0	22.5	24.9	25.6	25.7	25.1	23.8	22.6	21.0	19.6	18.7	17.2	17.2	25.7																						
8-May	15.5	14.5	14.2	13.9	14.3	15.3	15.3	13.7	12.5	11.3	13.0	15.3	15.8	16.6	16.8	16.8	16.5	15.4	14.1	12.7	11.7	9.0	7.1	5.9	13.6	16.8																						
9-May	5.1	5.3	6.0	6.1	6.0	5.9	5.6	6.6	6.8	7.0	6.6	7.0	7.6	8.3	8.8	8.6	8.4	8.6	8.8	9.0	8.9	8.1	7.0	6.7	7.2	9.0																						
10-May	6.4	6.2	5.7	5.2	4.3	3.5	5.4	6.7	8.4	9.9	11.0	12.3	12.8	12.5	12.7	12.9	12.8	12.3	11.5	10.4	8.7	6.9	5.4	4.1	8.7	12.9																						
11-May	3.3	2.0	1.0	0.6	0.6	0.7	2.9	5.3	6.7	7.7	9.0	9.3	9.7	9.9	10.5	10.7	11.1	10.8	10.2	9.1	7.9	6.3	5.0	3.8	6.4	11.1																						
12-May	2.9	1.5	1.4	1.2	0.7	0.9	2.4	5.0	7.5	8.8	9.8	10.5	11.2	11.5	11.9	12.2	12.5	12.2	11.8	11.5	10.0	7.9	5.2	3.3	7.3	12.5																						
13-May	2.6	1.9	1.0	0.8	0.5	1.5	3.9	5.9	9.3	13.0	13.8	14.5	15.2	16.0	16.7	17.6	18.4	18.0	17.5	17.2	15.0	12.9	9.0	8.1	10.4	18.4																						
14-May	6.3	5.0	4.1	3.5	3.0	3.8	6.1	8.8	11.5	14.3	16.7	18.2	19.3	19.9	20.6	20.9	21.2	21.2	20.6	19.6	17.5	15.4	12.8	9.9	13.3	21.2																						
15-May	8.2	6.5	5.8	5.1	4.4	5.3	7.3	8.7	10.5	14.1	18.2	21.2	22.2	23.1	24.2	24.4	24.1	23.6	23.0	22.0	20.6	18.7	17.2	15.7	15.6	24.4																						
16-May	14.4	14.2	12.7	11.9	11.5	11.5	12.4	13.8	16.0	18.3	21.7	23.0	22.9	22.4	20.7	20.0	19.9	20.3	20.5	20.5	20.1	19.4	21.5	22.1	18.0	23.0																						
17-May	15.9	14.3	12.4	14.0	15.0	14.7	15.9	17.1	19.4	21.6	22.9	23.8	24.6	25.4	26.0	26.0	26.4	26.7	26.1	25.0	21.5	22.8	20.4	18.4	20.7	26.7																						
18-May	15.9	15.2	13.9	12.1	12.7	13.3	13.6	15.1	17.4	18.7	20.1	21.7	22.8	22.9	22.7	23.5	23.6	22.9	23.3	22.0	18.5	15.6	13.0	11.5	18.0	23.6																						
19-May	11.0	10.8	10.1	8.7	7.8	8.1	7.8	7.6	7.3	7.1	6.4	5.6	5.3	5.1	5.0	4.4	4.2	4.7	4.8	4.5	4.0	3.6	3.6	3.6	6.3	11.0																						
20-May	3.6	3.7	3.9	4.0	4.1	4.5	5.2	6.7	8.0	10.2	11.5	12.7	14.5	15.0	15.0	16.3	16.0	14.7	12.9	11.6	10.8	10.2	9.5	8.8	9.7	16.3																						
21-May	8.3	8.1	8.0	7.9	7.0	6.4	6.8	7.3	8.6	10.1	10.9	11.9	12.5	11.9	11.1	10.1	9.4	8.9	8.5	8.1	7.9	7.8	7.6	7.8	8.9	12.5																						
22-May	7.9	7.7	7.6	7.5	7.6	7.7	8.1	8.1	7.5	7.3	7.2	7.7	8.3	9.5	11.4	13.6	14.3	14.5	14.9	14.6	13.4	11.1	9.2	7.9	9.8	14.9																						
23-May	6.9	4.8	3.3	3.1	3.0	4.1	6.7	9.3	11.5	14.0	15.8	17.7	19.4	20.7	21.4	21.8	21.9	22.0	21.6	21.0	19.4	17.3	15.2	13.4	14.0	22.0																						
24-May	12.5	11.6	10.3	9.6	9.1	9.3	11.0	12.6	14.3	16.6	18.4	19.5	20.1	20.9	21.3	21.8	21.0	20.0	19.7	20.7	19.4	17.7	16.1	13.9	16.1	21.8																						
25-May	13.2	11.9	11.8	11.0	10.3	10.5	11.5	13.2	14.8	16.7	18.8	20.4	21.3	21.4	21.5	21.5	21.5	20.3	19.8	18.5	17.4	16.3	15.2	14.1	16.4	21.5																						
26-May	12.6	11.4	10.8	9.5	8.6	8.1	8.2	9.1	10.3	10.4	11.9	12.9	11.4	9.8	10.3	10.8	11.1	11.1	11.7	11.1	10.4	9.7	8.8	8.4	10.3	12.9																						
27-May	8.6	8.4	7.9	7.7	7.7	8.4	9.8	13.6	13.8	13.1	13.7	15.8	18.6	21.1	21.5	17.8	16.8	14.0	13.0	12.7	13.5	13.7	13.2	13.3	13.2	21.5																						
28-May	13.7	13.3	12.7	12.7	12.4	12.0	12.6	13.0	14.5	16.1	17.7	18.0	18.5	18.4	17.0	18.3	19.0	18.8	17.7	17.2	17.0	16.0	15.5	14.9	15.7	19.0																						
29-May	14.2	13.1	11.7	11.2	10.9	11.1	11.3	11.7	11.5	11.7	11.8	11.9	12.5	12.9	14.5	14.5	15.0	15.4	15.7	15.9	14.6	13.6	12.3	11.6	12.9	15.9																						
30-May	11.3	11.5	11.5	11.2	10.7	10.6	11.5	12.2	12.0	12.2	12.9	13.3	14.0	15.0	13.2	16.0	16.4	15.1	15.1	15.3	14.1	12.5	11.9	11.3	12.9	16.4																						
31-May	10.5	9.8	9.0	8.4	8.4	8.7	9.9	12.4	13.4	14.9	15.4	16.4	17.3	18.3	19.0	19.7	20.3	20.8	19.6	19.4	18.4	15.1	13.6	13.6	14.7	20.8																						
																								10.6	9.7	8.9	8.5	8.0	8.2	9.2	10.6	12.0	13.6	15.2	16.6	17.5	18.1	18.4	18.7	18.7	18.3	17.9	17.3	15.8	14.2	12.9	11.8	Diurnal Average
																								21.0	18.5	17.4	16.3	15.0	15.3	15.9	17.1	19.4	22.3	26.0	29.4	30.8	31.8	32.4	32.5	32.6	31.9	31.6	31.0	26.8	24.1	23.4	22.8	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	223	29.97	29.97
10 - 20	383	51.48	81.45
> 20	138	18.55	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

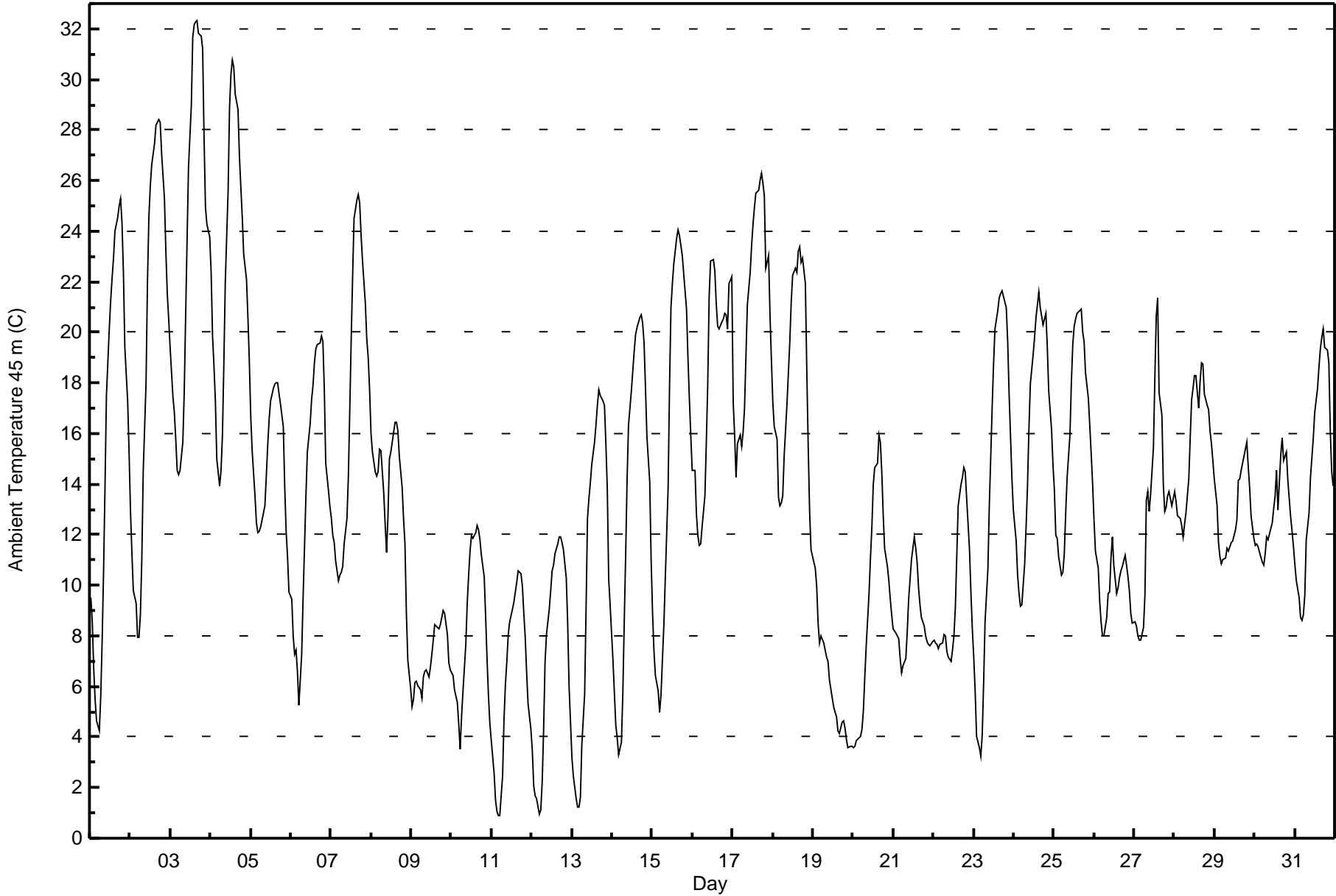


Maximum Value: 32.4 C on May 3 17:00																				Maximum Daily Average: 23.8 C on May 3					Hours in Service: 744																								
Minimum Value: 0.9 C on May 11 05:00																				Minimum Daily Average: 6.2 C on May 19					Hours of Data: 744																								
Maximum Diurnal Average: 18.4 C at hour 17																				Minimum Diurnal Average: 8.3 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 13.73 C																				Percentiles: P ₁ = 1.5 P ₁₀ = 5.8 Q ₁ = 8.8 Median = 13.1 Q ₃ = 17.9 P ₉₀ = 22.4 P ₉₉ = 30.8					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-May	9.5	8.6	6.7	5.5	4.6	4.2	5.7	7.9	10.6	13.9	17.5	20.2	21.3	22.2	23.0	24.0	24.6	25.0	25.3	24.3	22.4	19.4	17.3	15.3	15.8	25.3																							
2-May	12.9	11.3	9.8	9.3	7.9	8.0	8.9	11.0	14.5	18.0	22.0	24.5	25.8	26.6	27.5	28.2	28.3	28.4	28.3	27.1	25.3	23.2	21.5	20.5	19.5	28.4																							
3-May	19.4	17.4	16.8	15.8	14.6	14.4	14.6	15.7	17.7	20.7	23.6	26.5	29.0	31.6	32.1	32.3	32.4	31.8	31.7	31.2	27.7	24.9	24.3	23.8	23.8	32.4																							
4-May	22.4	19.8	18.7	17.3	15.0	13.9	14.5	16.0	18.8	22.0	25.6	28.8	30.2	30.8	30.5	29.4	28.8	26.9	25.7	24.5	23.1	22.1	20.6	18.9	22.7	30.8																							
5-May	16.7	15.3	13.5	12.5	12.1	12.1	12.3	12.6	13.1	14.3	15.5	16.5	17.3	17.8	18.0	18.0	18.0	17.6	17.2	16.3	13.9	12.2	11.2	9.7	14.7	18.0																							
6-May	9.5	8.0	7.2	7.4	6.6	5.3	7.3	9.5	11.5	13.6	15.2	16.4	17.3	17.9	18.8	19.4	19.5	19.6	19.8	19.6	17.7	14.8	13.7	13.1	13.7	19.8																							
7-May	12.6	12.0	11.7	11.0	10.2	10.4	10.5	10.8	11.7	12.6	14.3	17.0	19.8	22.2	24.5	25.2	25.5	25.1	23.8	22.8	21.2	19.8	19.0	17.7	17.1	25.5																							
8-May	16.0	15.3	14.5	14.3	14.5	15.4	15.3	13.7	12.4	11.3	12.7	15.0	15.3	16.1	16.5	16.4	16.1	15.1	13.9	12.6	11.6	8.9	7.1	5.9	13.6	16.5																							
9-May	5.2	5.5	6.2	6.2	6.1	5.9	5.5	6.4	6.6	6.7	6.4	6.8	7.3	7.8	8.4	8.4	8.3	8.4	8.7	9.0	8.9	8.1	6.9	6.7	7.1	9.0																							
10-May	6.5	6.4	5.9	5.4	4.5	3.5	4.8	5.8	7.7	9.3	10.4	11.4	12.0	11.9	12.1	12.3	12.2	11.8	11.2	10.3	8.8	7.1	5.7	4.5	8.4	12.3																							
11-May	3.9	2.6	1.5	1.0	0.9	0.9	2.5	4.7	6.1	7.0	8.1	8.5	9.1	9.3	9.8	10.1	10.6	10.5	9.9	8.9	7.9	6.5	5.3	4.3	6.2	10.6																							
12-May	3.4	2.1	1.7	1.6	0.9	1.1	2.2	4.3	6.9	8.0	9.1	9.8	10.6	10.8	11.2	11.6	11.9	11.9	11.7	11.4	10.3	8.5	6.0	4.6	7.2	11.9																							
13-May	3.2	2.5	1.5	1.2	1.2	1.6	3.7	5.7	9.1	12.6	13.4	14.0	14.7	15.6	16.3	17.1	17.7	17.5	17.3	17.1	15.6	13.8	10.2	9.2	10.5	17.7																							
14-May	7.0	5.8	4.5	4.0	3.3	3.8	5.8	8.6	11.3	14.2	16.3	17.7	18.4	19.2	19.9	20.2	20.6	20.7	20.3	19.6	17.8	15.9	14.1	11.0	13.3	20.7																							
15-May	8.9	7.4	6.5	5.8	5.0	5.7	7.1	8.5	10.3	13.9	17.9	21.0	21.9	22.7	23.7	24.0	23.8	23.4	23.0	22.3	20.9	19.0	17.4	15.9	15.7	24.0																							
16-May	14.5	14.5	12.8	12.0	11.6	11.6	12.3	13.5	15.6	18.0	21.4	22.8	22.9	22.4	21.2	20.3	20.1	20.4	20.5	20.8	20.7	20.1	21.9	22.2	18.1	22.9																							
17-May	17.2	15.9	14.3	15.6	15.9	15.5	16.1	17.0	19.1	21.1	22.4	23.4	24.3	24.9	25.5	25.6	26.0	26.3	25.9	25.4	22.6	23.0	20.7	18.9	20.9	26.3																							
18-May	17.2	16.3	15.8	13.5	13.1	13.2	13.6	15.1	17.1	18.4	19.6	21.2	22.2	22.5	22.4	23.2	23.4	22.8	22.9	21.9	18.5	15.5	12.9	11.4	18.1	23.4																							
19-May	10.9	10.7	10.0	8.5	7.7	8.0	7.7	7.4	7.1	7.0	6.3	5.5	5.2	5.0	4.8	4.3	4.1	4.6	4.6	4.4	3.9	3.6	3.6	3.6	6.2	10.9																							
20-May	3.6	3.6	3.9	3.9	4.0	4.3	5.0	6.4	7.6	9.7	11.1	12.3	14.0	14.6	14.8	15.9	15.7	14.5	12.8	11.5	10.7	10.2	9.5	8.8	9.5	15.9																							
21-May	8.3	8.1	8.0	7.9	7.1	6.5	6.8	7.1	8.2	9.5	10.3	11.0	11.9	11.5	10.9	9.9	9.2	8.7	8.4	8.0	7.8	7.7	7.6	7.8	8.7	11.9																							
22-May	7.8	7.7	7.7	7.5	7.7	7.7	8.1	8.0	7.4	7.2	7.0	7.4	8.0	9.1	11.1	13.2	14.0	14.3	14.7	14.5	13.4	11.4	9.7	8.3	9.7	14.7																							
23-May	7.2	5.8	4.0	3.6	3.2	4.1	6.2	8.5	10.6	13.2	15.1	17.0	18.7	20.1	20.9	21.3	21.6	21.6	21.4	21.0	19.6	17.6	15.9	14.2	13.9	21.6																							
24-May	13.0	11.8	10.4	9.7	9.2	9.3	10.8	12.3	13.9	16.2	18.0	19.1	19.8	20.6	21.1	21.6	21.0	20.3	20.5	20.7	19.4	17.7	16.2	14.8	16.1	21.6																							
25-May	13.8	11.9	11.9	11.1	10.4	10.5	11.2	12.9	14.3	15.9	18.0	19.5	20.3	20.5	20.7	20.9	20.9	20.0	19.6	18.4	17.4	16.3	15.2	14.1	16.1	20.9																							
26-May	12.6	11.3	10.7	9.4	8.5	8.0	8.0	8.7	9.7	9.8	11.1	11.9	10.8	9.7	9.9	10.3	10.6	10.7	11.2	10.8	10.3	9.8	8.9	8.5	10.0	12.6																							
27-May	8.6	8.4	8.0	7.8	7.8	8.3	9.6	13.4	13.7	12.9	13.6	15.4	18.2	20.6	21.4	17.6	16.7	14.0	12.9	13.1	13.6	13.7	13.2	13.4	13.2	21.4																							
28-May	13.7	13.3	12.7	12.7	12.4	11.9	12.4	12.9	14.2	15.8	17.3	17.8	18.3	18.3	17.0	18.1	18.8	18.7	17.6	17.1	16.9	16.1	15.6	14.9	15.6	18.8																							
29-May	14.2	13.1	11.7	11.2	10.9	11.0	11.1	11.5	11.4	11.5	11.7	11.8	12.2	12.6	14.1	14.2	14.6	15.1	15.4	15.7	14.7	13.8	12.7	11.8	12.8	15.7																							
30-May	11.6	11.6	11.5	11.3	10.9	10.8	11.3	11.9	11.8	12.0	12.5	13.0	13.5	14.5	13.0	15.2	15.8	14.9	15.1	15.3	14.2	12.7	12.2	11.5	12.8	15.8																							
31-May	10.8	10.2	9.5	8.7	8.6	8.8	9.6	11.8	12.9	14.3	15.0	15.8	16.8	17.8	18.6	19.4	19.8	20.1	19.4	19.3	18.8	16.1	14.5	13.9	14.6	20.1																							
																								11.0	10.1	9.3	8.8	8.3	8.3	9.0	10.3	11.7	13.2	14.8	16.1	17.0	17.7	18.1	18.3	18.4	18.1	17.8	17.3	16.0	14.5	13.2	12.2	Diurnal Average	
																								22.4	19.8	18.7	17.3	15.9	15.5	16.1	17.0	19.1	22.0	25.6	28.8	30.2	31.6	32.1	32.3	32.4	31.8	31.7	31.2	27.7	24.9	24.3	23.8	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	229	30.78	30.78
10 - 20	379	50.94	81.72
> 20	136	18.28	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 100 m (AT100m) - C

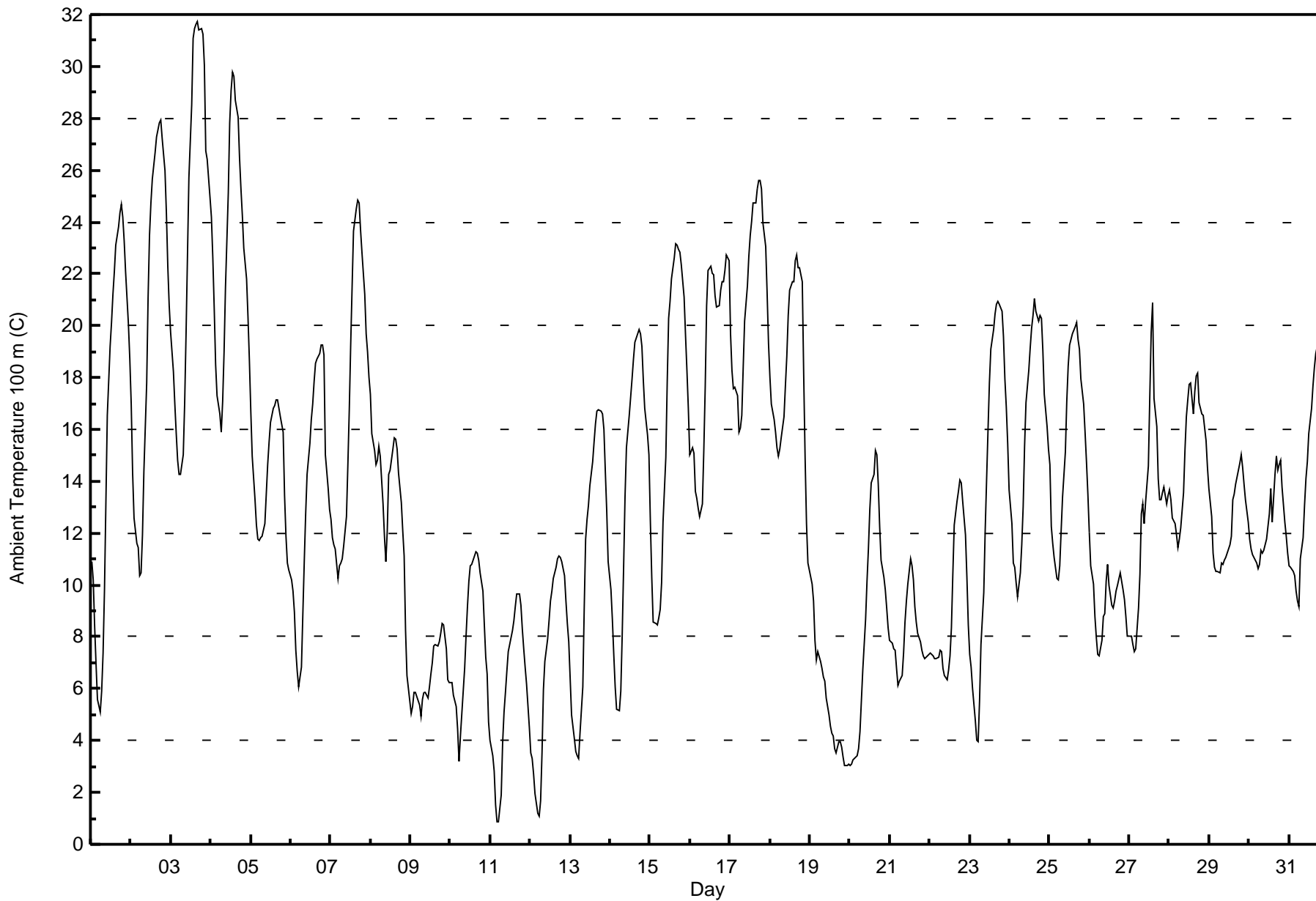
Lower Camp Met Tower - May 2016

Maximum Value: 31.7 C on May 3 17:00		Maximum Daily Average: 23.8 C on May 3		Hours in Service: 744																							
Minimum Value: 0.8 C on May 11 05:00		Minimum Daily Average: 5.6 C on May 19		Hours of Data: 744																							
Maximum Diurnal Average: 17.7 C at hour 17		Minimum Diurnal Average: 8.7 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 13.59 C		Percentiles: P ₁ = 1.9 P ₁₀ = 5.9 Q ₁ = 8.7 Median = 13.0 Q ₃ = 17.8 P ₉₀ = 22.2 P ₉₉ = 30.9		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	10.9	10.2	8.4	7.0	5.6	5.1	5.9	7.4	9.8	13.2	16.6	19.2	20.1	21.2	22.1	23.1	23.8	24.3	24.7	24.2	23.3	22.1	20.0	18.7	16.1	24.7	
2-May	17.0	14.3	12.6	11.6	11.4	10.4	10.5	11.9	14.4	17.8	21.1	23.5	24.7	25.6	26.7	27.3	27.6	27.8	27.9	27.2	26.0	24.3	22.3	20.8	20.2	27.9	
3-May	19.8	18.2	17.0	15.9	14.8	14.2	14.2	15.1	17.0	19.7	22.7	25.7	28.5	31.1	31.5	31.6	31.7	31.4	31.5	31.2	30.0	26.7	26.4	24.9	23.8	31.7	
4-May	24.2	22.6	20.7	18.5	17.3	16.6	15.9	17.1	19.0	21.5	25.1	27.8	29.1	29.8	29.6	28.7	28.0	26.5	25.3	24.2	23.0	21.8	20.4	18.7	23.0	29.8	
5-May	16.7	15.0	13.3	12.3	11.8	11.7	11.8	11.9	12.4	13.5	14.6	15.5	16.3	16.8	16.9	17.2	17.1	16.8	16.5	15.9	13.5	11.9	10.9	10.6	14.2	17.2	
6-May	10.2	9.8	8.9	7.5	6.7	6.1	6.8	8.9	10.9	12.8	14.3	15.5	16.4	17.0	17.8	18.5	18.7	18.9	19.2	19.3	18.9	15.0	13.7	12.9	13.5	19.3	
7-May	12.5	11.8	11.6	11.4	10.3	10.7	10.9	11.0	11.5	12.6	14.6	16.7	19.3	21.5	23.6	24.5	24.9	24.7	23.7	22.8	21.2	19.7	19.0	18.0	17.0	24.9	
8-May	17.3	15.8	15.2	14.6	14.8	15.3	15.0	13.1	11.9	10.9	12.1	14.3	14.4	15.3	15.7	15.6	15.3	14.3	13.2	12.1	11.1	8.3	6.5	5.5	13.2	17.3	
9-May	5.0	5.3	5.9	5.9	5.7	5.4	4.9	5.6	5.9	5.9	5.7	6.1	6.5	7.0	7.7	7.7	7.6	7.8	8.2	8.5	8.5	7.5	6.4	6.2	6.5	8.5	
10-May	6.2	6.3	5.7	5.3	4.4	3.2	4.2	5.0	6.8	8.1	9.2	10.1	10.7	10.8	11.1	11.3	11.2	11.0	10.5	9.8	8.5	7.2	6.5	4.7	7.8	11.3	
11-May	4.0	3.4	2.8	1.5	0.8	0.9	1.9	3.9	5.1	5.9	6.7	7.5	8.0	8.2	8.6	9.1	9.6	9.7	9.2	8.3	7.5	6.9	6.2	4.5	5.8	9.7	
12-May	3.5	3.3	2.7	1.9	1.2	1.1	1.7	3.5	6.0	7.1	7.9	8.6	9.4	9.7	10.2	10.7	11.0	11.1	11.1	10.9	10.4	9.4	8.5	7.8	7.0	11.1	
13-May	6.4	5.0	4.1	3.6	3.4	3.3	4.3	6.1	9.1	11.8	12.5	13.1	13.8	14.7	15.5	16.2	16.7	16.7	16.7	16.6	16.0	14.4	12.8	10.9	11.0	16.7	
14-May	9.8	8.7	7.3	6.1	5.2	5.2	5.9	8.1	10.7	13.4	15.3	16.5	17.3	17.9	18.7	19.3	19.7	19.8	19.7	19.2	17.9	16.8	15.8	15.0	13.7	19.8	
15-May	12.5	10.3	8.6	8.5	8.5	8.7	9.0	10.1	12.4	14.9	17.9	20.3	20.9	21.8	22.6	23.2	23.1	23.0	22.8	22.4	21.1	19.6	18.3	16.8	16.6	23.2	
16-May	15.0	15.3	15.1	13.6	13.4	13.0	12.6	13.1	15.2	17.6	20.8	22.1	22.3	22.0	21.9	21.2	20.7	20.8	21.4	21.7	21.7	22.1	22.7	22.5	18.7	22.7	
17-May	19.7	18.3	17.6	17.6	17.3	15.9	16.0	16.5	18.4	20.2	21.5	22.7	23.5	24.1	24.7	24.7	25.3	25.6	25.6	25.3	24.0	23.0	21.3	19.3	21.2	25.6	
18-May	18.0	17.0	16.4	15.9	15.3	15.0	15.3	15.7	16.5	17.7	18.8	20.4	21.4	21.7	21.7	22.5	22.7	22.2	22.2	21.7	18.1	14.9	12.4	10.8	18.1	22.7	
19-May	10.3	10.1	9.4	7.9	7.1	7.4	7.1	6.8	6.4	6.3	5.6	5.0	4.5	4.3	4.2	3.7	3.5	3.9	4.0	3.7	3.4	3.1	3.1	3.1	5.6	10.3	
20-May	3.0	3.1	3.3	3.3	3.4	3.7	4.4	5.5	6.7	8.7	10.1	11.4	12.9	13.9	14.3	15.2	15.0	13.9	12.2	10.9	10.3	9.8	9.1	8.4	8.9	15.2	
21-May	7.8	7.7	7.5	7.5	6.8	6.1	6.3	6.5	7.4	8.6	9.4	10.0	11.0	10.8	10.2	9.1	8.6	8.1	7.8	7.5	7.3	7.2	7.2	7.3	8.1	11.0	
22-May	7.4	7.3	7.3	7.2	7.2	7.2	7.5	7.4	6.8	6.5	6.3	6.7	7.3	8.3	10.4	12.3	13.2	13.6	14.0	14.0	13.2	11.9	10.3	8.5	9.2	14.0	
23-May	7.3	6.8	6.0	4.8	4.0	4.0	5.5	7.7	9.7	12.1	14.0	16.0	17.8	19.1	19.8	20.4	20.8	20.9	20.8	20.6	19.6	18.0	16.9	15.4	13.7	20.9	
24-May	13.7	12.4	10.9	10.7	10.1	9.6	10.5	11.5	13.0	15.4	17.1	18.3	19.1	19.9	20.4	21.0	20.6	20.2	20.4	20.3	19.0	17.4	16.1	15.3	15.9	21.0	
25-May	14.6	12.3	11.6	11.1	10.2	10.2	10.7	12.1	13.4	15.1	17.1	18.4	19.3	19.5	19.7	20.0	20.1	19.5	19.1	18.0	17.0	15.9	14.7	13.5	15.5	20.1	
26-May	12.0	10.7	10.0	8.8	8.0	7.3	7.3	7.9	8.8	8.9	10.1	10.8	10.0	9.2	9.1	9.4	9.8	10.0	10.5	10.2	9.8	9.4	8.8	8.0	9.4	12.0	
27-May	8.1	8.0	7.7	7.4	7.5	9.1	10.4	12.7	13.1	12.3	13.2	14.6	17.2	19.7	20.9	17.2	16.1	14.1	13.3	13.3	13.5	13.8	13.1	13.4	12.9	20.9	
28-May	13.6	13.3	12.6	12.4	11.9	11.5	11.7	12.2	13.6	15.2	16.5	17.2	17.8	17.8	16.6	17.4	18.1	18.2	17.0	16.6	16.5	16.0	15.6	14.6	15.2	18.2	
29-May	13.7	12.6	11.2	10.7	10.5	10.5	10.5	10.8	10.8	10.9	11.1	11.2	11.5	11.9	13.3	13.5	13.9	14.4	14.7	15.0	14.6	13.9	13.3	12.4	12.4	15.0	
30-May	11.7	11.4	11.2	11.0	10.9	10.6	10.8	11.3	11.2	11.4	11.8	12.3	12.8	13.7	12.4	14.2	15.0	14.4	14.7	14.8	13.8	12.4	11.9	11.2	12.4	15.0	
31-May	10.7	10.7	10.5	10.4	9.8	9.4	9.2	11.0	11.8	13.1	14.1	14.7	15.8	16.8	17.7	18.4	18.9	19.2	18.8	18.9	19.0	18.5	16.9	15.8	14.6	19.2	
		11.7	10.9	10.1	9.4	8.9	8.7	9.0	9.9	11.2	12.5	14.0	15.2	16.1	16.8	17.3	17.6	17.7	17.5	17.3	16.9	16.0	14.8	13.8	12.8	Diurnal Average	
		24.2	22.6	20.7	18.5	17.3	16.6	16.0	17.1	19.0	21.5	25.1	27.8	29.1	31.1	31.5	31.6	31.7	31.4	31.5	31.2	30.0	26.7	26.4	24.9	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	226	30.38	30.38
10 - 20	394	52.96	83.33
> 20	124	16.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

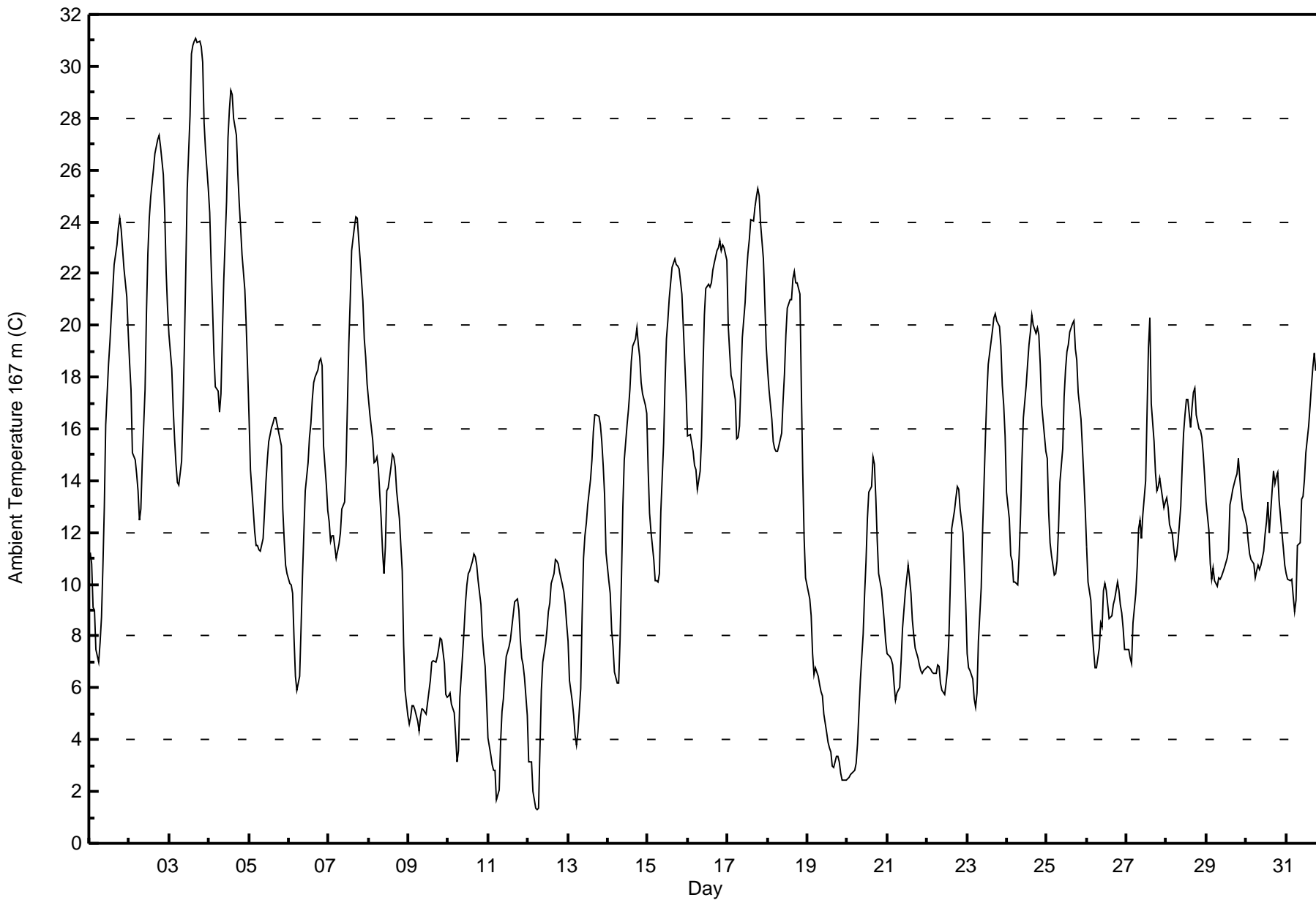


Maximum Value: 31.1 C on May 3 17:00		Maximum Daily Average: 23.5 C on May 3		Hours in Service: 744																																												
Minimum Value: 1.3 C on May 12 06:00		Minimum Daily Average: 4.9 C on May 19		Hours of Data: 744																																												
Maximum Diurnal Average: 17.3 C at hour 17		Minimum Diurnal Average: 8.9 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: 13.41 C		Percentiles: P ₁ = 2.4 P ₁₀ = 5.8 Q ₁ = 8.8 Median = 12.9 Q ₃ = 17.6 P ₉₀ = 22.2 P ₉₉ = 30.2		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-May	11.2	10.8	9.1	9.0	7.5	7.0	7.8	8.8	10.7	13.0	16.2	18.5	19.4	20.4	21.4	22.4	23.1	23.8	24.1	23.7	23.0	22.2	21.1	19.7	16.4	24.1																						
2-May	18.6	17.5	15.1	14.8	14.2	13.6	12.5	12.9	14.7	17.5	20.5	22.8	24.1	24.9	26.0	26.6	26.9	27.2	27.4	26.9	25.8	24.4	22.1	20.7	20.7	27.4																						
3-May	19.6	18.3	16.8	15.6	14.6	14.0	13.8	14.8	16.7	19.3	22.2	25.3	28.1	30.5	30.8	31.0	31.1	30.9	31.0	30.7	30.1	27.8	26.8	25.3	23.5	31.1																						
4-May	24.4	22.4	20.7	18.9	17.6	17.4	16.7	17.4	19.7	21.7	24.8	27.2	28.3	29.1	28.9	28.0	27.4	25.9	24.7	23.7	22.7	21.4	20.0	18.3	22.8	29.1																						
5-May	16.5	14.4	12.9	12.0	11.5	11.5	11.3	11.3	11.8	12.8	14.0	14.8	15.5	16.1	16.2	16.4	16.5	16.2	15.9	15.3	12.9	11.7	10.7	10.4	13.7	16.5																						
6-May	10.1	10.0	9.6	7.9	6.5	5.9	6.5	8.3	10.3	12.0	13.6	14.7	15.7	16.2	17.1	17.8	18.0	18.3	18.6	18.7	18.4	15.4	13.8	12.9	13.2	18.7																						
7-May	12.4	11.7	11.9	11.9	11.0	11.3	11.6	12.0	12.9	13.2	14.6	16.9	19.3	21.0	22.9	23.8	24.2	24.1	23.3	22.6	20.9	19.5	18.7	17.7	17.1	24.2																						
8-May	17.1	16.5	15.5	14.7	14.8	14.9	14.5	12.5	11.3	10.4	11.4	13.6	13.7	14.6	15.0	14.9	14.5	13.6	12.5	11.5	10.5	7.6	5.9	4.9	12.8	17.1																						
9-May	4.6	4.9	5.3	5.3	5.2	4.7	4.3	4.9	5.2	5.2	5.0	5.4	5.9	6.3	7.0	7.1	7.0	7.2	7.6	7.9	7.9	6.9	5.7	5.7	5.9	7.9																						
10-May	5.7	5.8	5.3	5.0	4.2	3.1	3.6	5.6	7.3	8.2	9.3	10.0	10.4	10.5	10.9	11.2	11.1	10.7	10.2	9.2	8.0	7.3	6.9	5.6	7.7	11.2																						
11-May	4.0	3.4	3.0	2.8	2.8	1.7	2.1	3.9	5.1	5.6	6.5	7.2	7.6	7.9	8.4	8.8	9.3	9.4	9.0	7.9	7.2	6.9	6.4	4.9	5.9	9.4																						
12-May	3.1	3.2	3.2	2.0	1.4	1.3	1.4	3.6	5.9	7.0	7.7	8.2	9.0	9.3	10.0	10.4	11.0	10.9	10.8	10.5	10.0	9.7	9.2	8.5	7.0	11.0																						
13-May	7.8	6.3	5.5	4.9	4.2	3.8	4.3	6.0	8.8	11.0	11.9	12.4	13.1	14.0	14.8	15.9	16.5	16.6	16.5	16.1	15.5	14.6	13.5	11.2	11.0	16.6																						
14-May	10.1	9.7	8.2	7.6	6.6	6.2	6.2	7.9	10.2	13.0	14.8	16.2	16.8	17.5	18.6	19.2	19.5	19.9	19.3	18.7	17.8	17.4	16.9	16.6	13.9	19.9																						
15-May	14.4	12.8	12.0	10.9	10.1	10.1	10.1	10.4	12.8	15.5	17.8	19.5	20.2	21.0	22.2	22.4	22.6	22.4	22.3	22.2	21.2	20.0	18.7	17.4	17.0	22.6																						
16-May	15.7	15.8	15.5	15.1	14.6	14.4	13.7	14.4	15.7	18.3	20.4	21.5	21.6	21.5	21.6	22.1	22.4	22.9	23.0	23.3	22.9	23.1	23.0	22.5	19.4	23.3																						
17-May	20.0	19.0	18.1	17.9	17.1	15.6	15.7	16.1	17.8	19.5	20.9	22.0	22.8	23.3	24.1	24.0	24.6	24.9	25.3	25.0	23.9	22.6	20.9	19.2	20.8	25.3																						
18-May	18.3	17.5	16.4	15.5	15.3	15.1	15.1	15.4	15.9	17.1	18.1	19.7	20.7	21.0	21.0	21.8	22.1	21.7	21.6	21.2	17.6	14.3	11.8	10.2	17.7	22.1																						
19-May	9.7	9.4	8.8	7.3	6.5	6.8	6.4	6.1	5.8	5.7	5.0	4.3	3.9	3.7	3.5	3.0	2.9	3.4	3.3	3.1	2.7	2.4	2.4	2.4	4.9	9.7																						
20-May	2.5	2.6	2.7	2.7	2.8	3.1	3.8	5.1	6.3	8.1	9.6	10.9	12.6	13.6	13.8	14.9	14.6	13.4	11.7	10.4	9.8	9.2	8.6	7.8	8.4	14.9																						
21-May	7.3	7.2	7.1	6.9	6.1	5.5	5.8	6.0	7.1	8.3	9.0	9.7	10.8	10.3	9.7	8.6	8.0	7.5	7.2	6.9	6.7	6.6	6.7	6.8	7.6	10.8																						
22-May	6.8	6.8	6.7	6.6	6.6	6.6	6.9	6.8	6.2	5.9	5.7	6.2	6.7	7.9	10.0	12.1	12.9	13.4	13.8	13.7	12.9	12.0	10.7	9.2	8.9	13.8																						
23-May	7.3	6.8	6.7	6.4	5.6	5.3	5.8	7.8	9.9	12.1	13.9	15.7	17.3	18.5	19.3	19.8	19.8	20.3	20.5	20.2	20.0	19.2	17.7	16.9	15.8	13.7	20.5																					
24-May	13.6	12.5	11.1	10.9	10.1	10.1	10.0	11.1	12.7	14.8	16.4	17.7	18.5	19.2	19.8	20.4	20.0	19.7	19.9	19.6	18.5	16.9	15.7	15.2	15.6	20.4																						
25-May	14.8	12.8	11.6	11.1	10.3	10.4	10.9	12.2	13.9	15.2	17.3	18.3	19.0	19.3	19.7	20.1	20.2	19.1	18.7	17.4	16.4	15.3	14.2	12.9	15.5	20.2																						
26-May	11.4	10.1	9.4	8.2	7.4	6.8	6.8	7.5	8.5	8.4	9.7	10.0	9.8	8.7	8.7	8.8	9.2	9.4	10.1	9.8	9.2	8.9	8.3	7.5	8.9	11.4																						
27-May	7.5	7.5	7.1	7.0	8.5	9.7	10.7	12.1	12.5	11.8	12.7	14.0	16.6	19.1	20.3	17.0	15.5	14.3	13.6	13.8	14.1	13.7	12.9	13.2	12.7	20.3																						
28-May	13.4	13.0	12.3	11.9	11.4	10.9	11.1	11.6	13.0	14.5	15.8	16.5	17.1	17.1	16.0	16.8	17.4	17.6	16.5	16.0	16.0	15.6	15.0	14.1	14.6	17.6																						
29-May	13.2	12.1	10.8	10.2	10.6	10.1	9.9	10.3	10.2	10.3	10.5	10.6	11.0	11.3	13.1	13.4	13.7	14.1	14.3	14.9	14.1	13.5	12.9	12.5	12.0	14.9																						
30-May	12.3	11.7	11.2	10.9	10.8	10.3	10.5	10.7	10.6	10.7	11.3	11.9	12.4	13.2	12.0	13.6	14.4	13.9	14.2	14.3	13.2	12.0	11.4	10.7	12.0	14.4																						
31-May	10.4	10.2	10.1	10.2	9.6	9.0	9.4	11.5	11.6	13.3	13.4	14.0	15.1	16.1	16.9	17.7	18.4	18.9	18.3	18.3	18.5	18.7	17.8	17.0	14.3	18.9																						
																								11.7	11.1	10.3	9.8	9.2	8.9	9.0	9.8	11.0	12.2	13.5	14.7	15.6	16.2	16.8	17.1	17.3	17.1	16.9	16.6	15.7	14.7	13.7	12.8	Diurnal Average
																								24.4	22.4	20.7	18.9	17.6	17.4	16.7	17.4	19.7	21.7	24.8	27.2	28.3	30.5	30.8	31.0	31.1	30.9	31.0	30.7	30.1	27.8	26.8	25.3	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	232	31.18	31.18
10 - 20	398	53.49	84.68
> 20	114	15.32	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



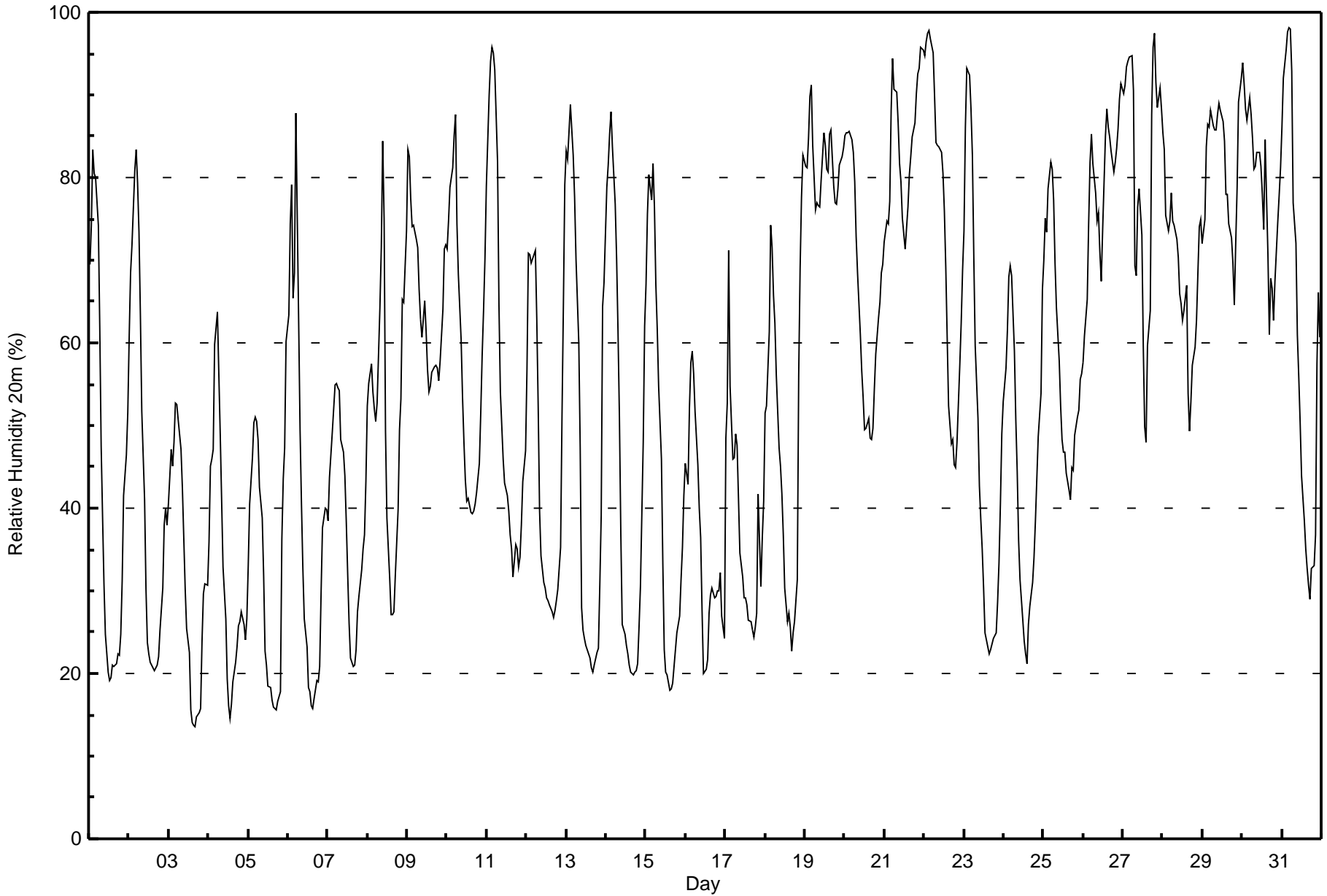
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

Lower Camp Met Tower - May 2016

Maximum Value: 98 % on May 31 05:00																		Maximum Daily Average: 83.7 % on May 21						Hours in Service: 744																									
Minimum Value: 14 % on May 3 17:00																		Minimum Daily Average: 31.6 % on May 3						Hours of Data: 744																									
Maximum Diurnal Average: 76.7 % at hour 5																		Minimum Diurnal Average: 37.8 % at hour 17						Hours of Missing Data: 0																									
Monthly Average: 55.0 %																		Percentiles: P ₁ = 16 P ₁₀ = 23 Q ₁ = 33 Median = 54 Q ₃ = 76 P ₉₀ = 86 P ₉₉ = 96						Hours of Calibration: 0																									
																								Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	70	74	83	81	80	74	62	48	39	31	25	20	19	20	21	21	21	22	22	25	31	42	47	52	42.8	83																							
2-May	61	68	72	81	83	79	73	63	52	41	30	24	22	21	21	20	21	21	22	25	30	38	40	38	43.7	83																							
3-May	41	47	45	48	53	53	51	47	42	36	30	25	23	16	14	14	15	15	16	24	30	31	31	31.6	53																								
4-May	36	45	46	47	60	64	56	49	41	33	27	19	16	15	16	19	21	23	26	26	27	26	24	27	32.9	64																							
5-May	33	40	46	50	51	51	48	43	39	32	23	21	19	18	17	16	16	16	17	18	36	44	47	60	33.3	60																							
6-May	63	74	79	65	68	88	63	50	40	33	27	23	18	18	16	16	17	19	19	21	30	38	40	40	40.2	88																							
7-May	39	44	46	49	55	55	55	54	48	47	44	38	32	26	22	21	21	23	27	29	33	35	37	43	38.5	55																							
8-May	52	55	57	54	52	50	53	64	72	84	75	49	39	32	27	27	27	32	40	50	53	65	65	73	52.0	84																							
9-May	83	83	77	74	74	73	72	66	63	61	65	61	57	54	55	56	57	57	57	55	58	64	71	72	65.3	83																							
10-May	71	75	79	81	85	88	74	68	60	53	48	43	41	41	39	39	40	41	42	45	52	59	64	70	58.3	88																							
11-May	79	90	94	96	95	93	82	65	54	50	46	43	42	40	37	35	32	36	35	33	34	38	43	47	55.7	96																							
12-May	57	71	71	70	71	71	63	52	40	34	31	30	29	29	28	27	27	28	29	30	35	51	65	79	46.6	79																							
13-May	83	82	89	86	83	78	70	60	47	28	25	24	23	22	22	21	20	21	23	23	31	39	64	67	47.2	89																							
14-May	79	82	85	88	84	77	70	61	51	37	26	25	23	22	21	20	20	20	20	21	26	31	48	62	45.8	88																							
15-May	67	76	80	77	82	76	67	62	55	46	33	23	20	20	18	18	19	21	23	25	27	31	35	42	43.4	82																							
16-May	45	43	52	58	59	56	52	45	40	36	28	20	20	22	27	29	30	29	29	30	30	32	27	24	36.1	59																							
17-May	48	53	71	55	46	46	49	48	41	35	32	29	29	28	27	26	25	24	26	27	42	31	37	41	38.1	71																							
18-May	51	52	61	74	71	66	62	56	47	45	42	37	30	26	27	26	23	25	26	31	56	69	78	83	48.6	83																							
19-May	81	81	85	90	91	84	76	77	77	76	80	85	84	81	81	85	86	79	77	77	79	82	83	83	81.6	91																							
20-May	85	85	86	86	85	83	80	73	68	61	57	53	49	50	51	48	48	50	54	59	63	65	68	70	65.7	86																							
21-May	72	75	74	77	88	94	91	90	87	82	79	75	71	74	76	80	82	85	87	90	93	93	96	95	83.7	96																							
22-May	95	96	97	98	97	95	90	84	84	84	83	81	76	69	61	52	48	48	45	45	48	57	62	69	73.5	98																							
23-May	74	86	93	92	88	83	70	60	51	43	39	35	30	25	23	22	23	23	24	25	29	33	41	49	48.4	93																							
24-May	53	57	62	68	69	68	59	51	44	36	31	26	24	22	21	26	28	31	34	38	44	49	54	66	44.3	69																							
25-May	70	75	73	79	82	81	77	70	64	58	52	48	47	47	44	42	41	45	45	49	51	52	56	56	58.5	82																							
26-May	58	61	65	74	82	85	82	78	75	76	71	67	74	85	88	86	85	83	81	82	83	86	90	91	78.7	91																							
27-May	90	91	93	94	95	95	90	69	68	76	79	73	60	50	48	60	64	88	96	97	92	89	91	88	80.6	97																							
28-May	85	83	75	74	75	78	75	74	73	70	66	65	63	64	67	54	49	53	57	60	63	68	74	75	68.3	85																							
29-May	72	75	84	86	86	88	86	86	86	88	89	88	87	84	78	78	74	73	70	65	72	79	89	92	81.4	92																							
30-May	94	91	88	87	90	88	85	81	81	83	83	81	78	74	85	71	61	68	67	63	67	75	78	81	79.1	94																							
31-May	86	92	95	98	98	98	93	77	72	61	56	50	44	38	35	33	31	29	33	33	37	57	66	61	61.4	98																							
																								66.9	71.1	74.4	75.4	76.7	76.0	70.2	63.6	58.1	53.4	49.1	44.7	41.6	39.8	39.1	38.4	37.8	39.6	40.9	42.4	47.5	53.1	58.4	62.2	Diurnal Average	
																								95	96	97	98	98	98	93	90	87	88	89	88	87	85	88	86	86	88	96	97	93	93	96	95	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	35	4.70	4.70
20 - 40	204	27.42	32.12
40 - 60	174	23.39	55.51
60 - 80	182	24.46	79.97
80 - 100	149	20.03	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

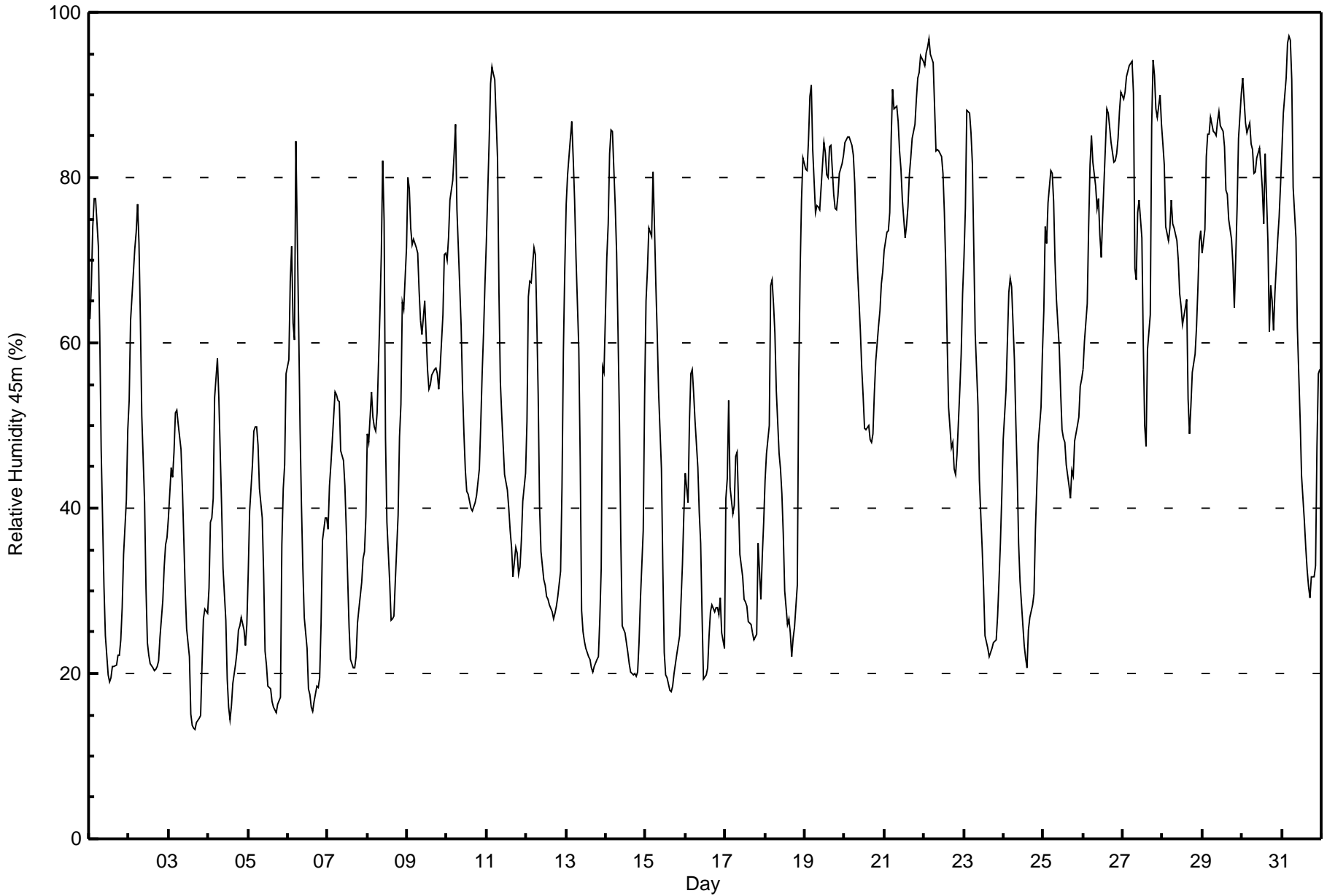
Relative Humidity 45m (RH45m) - %
Lower Camp Met Tower - May 2016

Maximum Value: 97 % on May 31 05:00																			Maximum Daily Average: 83.1 % on May 21						Hours in Service: 744																			
Minimum Value: 13 % on May 3 17:00																			Minimum Daily Average: 30.5 % on May 3						Hours of Data: 744																			
Maximum Diurnal Average: 74.5 % at hour 5																			Minimum Diurnal Average: 37.5 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 53.7 %																			Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 32 Median = 53 Q ₃ = 74 P ₉₀ = 85 P ₉₉ = 95						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-May	63	67	74	78	77	72	61	47	39	31	25	20	19	19	21	21	21	22	22	24	28	34	41	50	40.6	78																		
2-May	53	63	66	71	73	77	72	63	51	41	30	24	22	21	21	20	21	21	21	24	29	33	36	36	41.2	77																		
3-May	39	45	44	47	52	52	50	47	42	36	30	25	22	15	14	13	13	14	15	15	21	27	28	27	30.5	52																		
4-May	30	38	39	41	53	58	53	47	40	33	27	19	16	14	16	19	21	23	25	26	27	25	23	26	30.9	58																		
5-May	32	40	45	49	50	50	48	42	39	32	23	21	18	18	17	16	16	15	16	17	36	42	45	56	32.7	56																		
6-May	58	67	72	62	60	84	62	50	40	33	27	23	18	18	16	15	17	19	18	20	26	36	39	39	38.3	84																		
7-May	37	43	45	48	54	54	53	53	47	46	43	37	32	26	22	21	21	22	26	28	31	34	35	39	37.3	54																		
8-May	49	48	54	51	50	49	52	64	71	82	75	49	38	31	26	27	27	31	39	49	53	65	64	72	50.6	82																		
9-May	80	79	74	72	73	71	71	66	63	61	65	61	57	54	55	56	57	57	56	54	57	63	71	71	64.3	80																		
10-May	70	73	77	80	83	87	76	72	62	54	49	45	42	42	40	40	40	41	42	45	50	56	61	67	58.0	87																		
11-May	72	84	91	93	93	92	82	66	55	51	48	44	42	40	37	35	32	35	35	32	33	36	41	44	54.8	93																		
12-May	51	66	67	67	72	71	63	54	40	35	31	31	29	29	28	27	27	27	28	29	32	42	59	69	44.8	72																		
13-May	77	80	85	87	82	77	70	59	46	28	25	24	23	22	22	21	20	21	22	22	27	33	57	56	45.3	87																		
14-May	70	74	83	86	86	77	71	61	51	36	26	25	24	23	21	20	20	20	20	20	24	29	37	54	44.0	86																		
15-May	65	69	74	73	81	74	67	61	54	45	33	22	20	19	18	18	19	20	21	22	25	29	33	39	41.7	81																		
16-May	44	41	50	56	57	54	51	45	40	36	27	19	20	21	25	28	28	28	28	28	27	29	25	23	34.5	57																		
17-May	41	44	53	43	39	40	46	47	41	34	32	29	29	28	26	26	25	24	24	25	36	29	34	38	34.7	53																		
18-May	43	47	50	67	68	65	61	54	47	45	42	37	30	26	27	25	22	24	26	31	55	68	77	82	46.6	82																		
19-May	81	81	85	90	91	83	76	77	76	76	79	84	83	80	80	84	84	78	76	76	78	81	82	83	81.0	91																		
20-May	84	85	85	85	84	83	79	73	69	61	57	53	50	49	50	48	48	49	54	58	62	64	67	69	65.3	85																		
21-May	71	73	74	76	85	91	88	89	87	83	81	77	73	74	76	80	82	85	86	89	92	93	95	94	83.1	95																		
22-May	94	95	96	97	95	94	89	83	83	83	83	81	76	69	60	52	47	48	45	44	47	54	59	66	72.4	97																		
23-May	70	76	88	88	85	82	71	61	52	43	39	35	30	25	23	22	23	23	24	24	27	31	36	42	46.7	88																		
24-May	48	54	60	66	68	67	58	50	44	36	31	26	23	22	21	25	27	28	30	38	43	48	52	59	42.7	68																		
25-May	64	74	72	77	81	81	77	70	65	60	54	50	48	48	45	43	41	45	44	48	50	51	55	56	58.2	81																		
26-May	57	60	65	74	82	85	82	79	76	78	73	70	75	84	88	88	86	84	82	82	83	85	88	90	79.0	90																		
27-May	89	90	92	93	93	94	90	69	68	76	77	73	60	50	47	59	63	86	94	92	88	87	90	86	79.6	94																		
28-May	84	82	74	72	74	77	74	74	72	70	66	64	62	63	65	53	49	52	56	59	62	67	72	73	67.4	84																		
29-May	71	74	83	85	85	87	86	85	85	87	88	86	86	84	78	78	75	73	69	64	70	76	85	90	80.4	90																		
30-May	92	89	87	85	87	84	83	81	81	82	83	81	79	74	83	72	61	67	65	62	66	73	75	79	78.0	92																		
31-May	83	88	92	96	97	97	92	79	73	62	56	51	44	38	35	33	31	29	32	32	33	47	56	57	59.7	97																		
																			63.4	67.4	70.8	72.8	74.5	74.4	69.5	63.5	58.0	53.4	49.1	44.7	41.6	39.6	38.8	38.2	37.5	39.0	40.0	41.2	45.7	50.6	55.4	59.1	Diurnal Average	
																			94	95	96	97	97	97	92	89	87	87	88	86	86	84	88	88	86	86	94	92	92	93	95	94	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	42	5.65	5.65
20 - 40	207	27.82	33.47
40 - 60	178	23.92	57.39
60 - 80	178	23.92	81.32
80 - 100	139	18.68	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



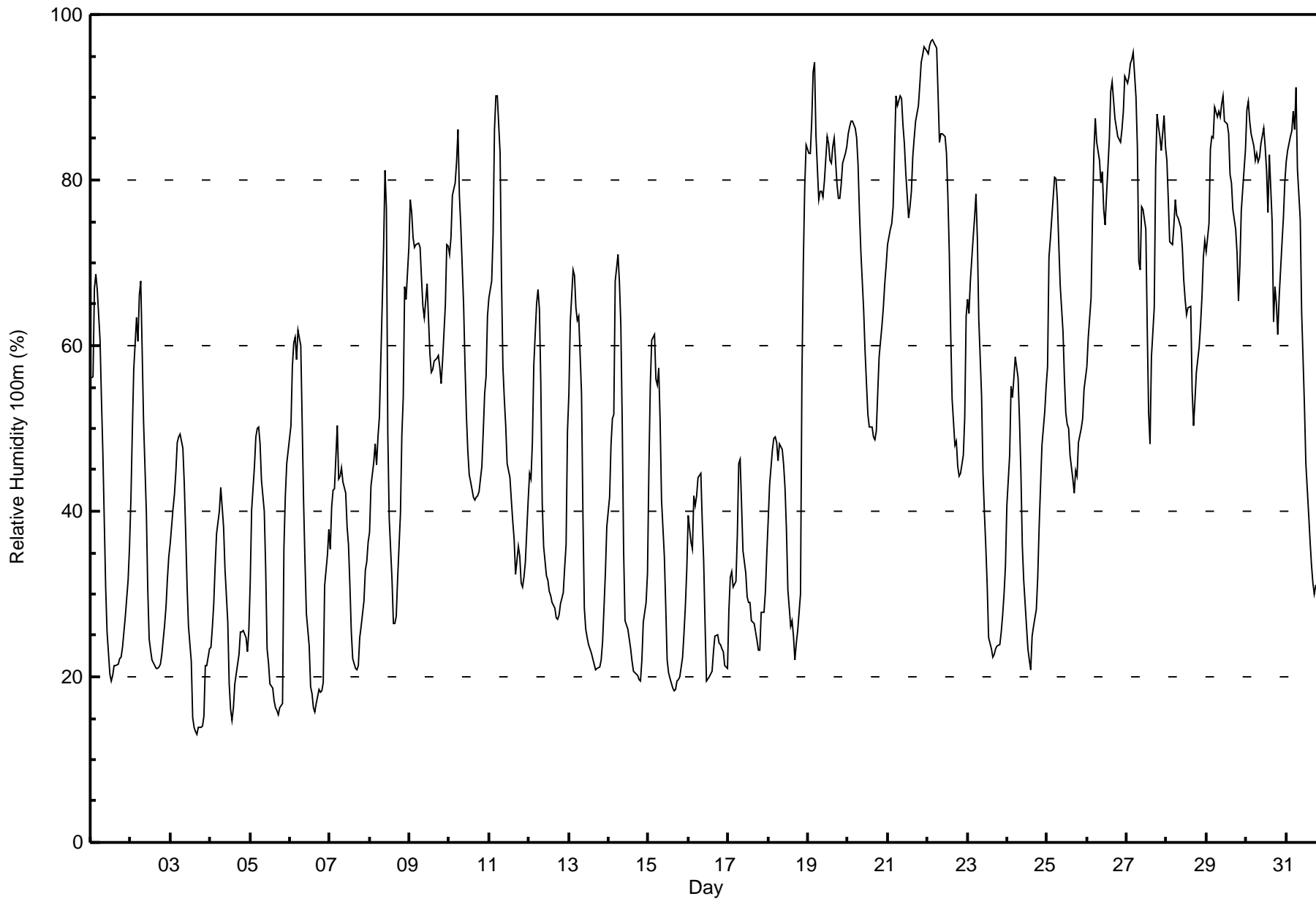
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 100m (RH100m) - %

Lower Camp Met Tower - May 2016

Maximum Value: 97 % on May 22 04:00																		Maximum Daily Average: 85.0 % on May 21						Hours in Service: 744																									
Minimum Value: 13 % on May 3 17:00																		Minimum Daily Average: 27.1 % on May 4						Hours of Data: 744																									
Maximum Diurnal Average: 69.0 % at hour 6																		Minimum Diurnal Average: 38.2 % at hour 17						Hours of Missing Data: 0																									
Monthly Average: 51.9 %																		Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 30 Median = 49 Q ₃ = 73 P ₉₀ = 85 P ₉₉ = 95						Hours of Calibration: 0																									
																		Percent Operational Time: 100.0																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	56	56	67	69	67	61	54	47	39	31	25	20	20	20	21	21	22	22	22	24	25	27	32	36	36.8	69																							
2-May	42	50	57	63	60	66	68	60	51	40	31	25	23	22	21	21	21	21	22	23	26	28	32	35	37.8	68																							
3-May	36	40	42	45	48	49	49	48	43	37	31	26	22	15	14	13	13	14	14	14	15	21	21	23	29.0	49																							
4-May	24	26	29	33	37	40	43	41	38	33	27	19	16	15	16	19	22	23	25	25	26	25	23	26	27.1	43																							
5-May	32	40	45	49	50	50	48	44	40	33	23	22	19	19	17	16	16	15	16	17	36	42	46	47	32.6	50																							
6-May	50	57	60	61	58	62	60	51	41	34	28	24	19	18	16	16	17	18	18	18	19	31	35	38	35.4	62																							
7-May	35	41	43	43	50	44	44	45	44	42	38	36	31	25	22	21	21	21	25	26	29	33	34	36	34.6	50																							
8-May	37	43	46	48	46	49	51	65	72	81	77	49	39	32	26	26	27	32	40	49	54	67	66	72	49.8	81																							
9-May	78	76	73	72	72	72	72	68	65	63	67	63	59	57	57	58	59	59	57	55	58	65	72	72	65.4	78																							
10-May	71	73	78	80	82	86	78	74	65	58	52	47	44	44	42	41	42	42	42	45	50	54	56	64	58.8	86																							
11-May	66	68	73	86	90	90	83	68	57	54	50	46	44	41	39	37	32	36	35	31	31	32	34	41	52.7	90																							
12-May	45	44	48	58	65	67	64	56	41	36	32	32	30	30	29	28	27	27	28	29	30	33	36	50	40.2	67																							
13-May	54	63	69	68	65	63	63	54	40	28	26	25	24	23	22	21	21	21	21	22	24	28	33	38	38.2	69																							
14-May	42	48	51	52	68	71	68	62	51	35	27	26	25	23	22	21	20	20	20	19	22	27	29	33	36.7	71																							
15-May	45	55	61	61	56	55	57	51	41	35	28	22	20	20	19	18	19	20	20	20	22	25	29	33	34.7	61																							
16-May	39	36	35	42	41	42	44	45	39	34	26	20	20	20	21	23	25	25	24	24	23	23	21	21	29.7	45																							
17-May	28	32	33	31	31	37	46	46	41	35	32	30	29	29	27	26	25	24	23	23	28	28	30	35	31.3	46																							
18-May	39	43	47	49	49	48	46	48	47	46	43	38	30	26	27	25	22	24	26	30	56	70	79	84	43.4	84																							
19-May	83	83	87	93	94	85	78	79	79	78	80	85	84	82	82	84	85	79	78	78	79	82	83	84	82.8	94																							
20-May	86	87	87	87	86	85	82	76	71	64	59	55	52	50	50	49	49	50	54	59	62	65	68	70	66.8	87																							
21-May	72	74	75	77	84	90	89	90	90	87	84	81	75	77	79	83	85	87	89	91	94	95	96	96	85.0	96																							
22-May	95	96	97	97	97	96	90	85	86	86	85	83	78	71	62	53	48	48	45	44	45	47	51	64	72.9	97																							
23-May	66	64	68	73	75	78	73	63	54	45	40	36	31	25	23	22	23	23	24	24	25	28	30	33	43.6	78																							
24-May	41	47	55	54	56	59	56	51	45	36	32	26	23	22	21	25	26	28	32	38	43	48	52	55	40.4	59																							
25-May	58	71	73	75	80	80	77	72	67	62	56	52	51	50	47	44	42	45	44	48	50	51	55	56	58.6	80																							
26-May	57	61	66	76	83	87	85	82	80	81	76	75	78	85	91	92	90	87	85	85	85	86	88	93	81.4	93																							
27-May	92	92	94	95	95	90	84	70	69	77	76	74	62	52	48	59	65	81	88	86	85	84	88	84	78.8	95																							
28-May	82	78	72	72	75	78	76	75	74	72	68	66	64	64	65	55	50	53	57	60	62	66	71	73	67.8	82																							
29-May	71	75	84	85	85	89	88	88	88	89	90	87	87	86	81	80	76	74	71	65	70	76	79	84	81.1	90																							
30-May	88	89	87	86	84	82	83	82	83	84	86	84	81	76	83	75	63	67	65	61	66	72	75	80	78.6	89																							
31-May	82	84	85	86	88	86	91	81	75	64	58	53	46	40	36	34	31	30	31	31	29	30	36	39	56.1	91																							
																								57.8	61.0	64.1	66.6	68.4	69.0	67.5	63.5	58.5	54.2	50.2	46.0	42.8	40.6	39.5	39.0	38.2	39.3	40.0	40.9	44.3	48.1	50.9	54.6	Diurnal Average	
																								95	96	97	97	97	96	91	90	90	89	90	87	87	86	91	92	90	87	89	91	94	95	96	96	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	41	5.51	5.51
20 - 40	233	31.32	36.83
40 - 60	185	24.87	61.69
60 - 80	157	21.10	82.80
80 - 100	128	17.20	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 167m (RH167m) - %

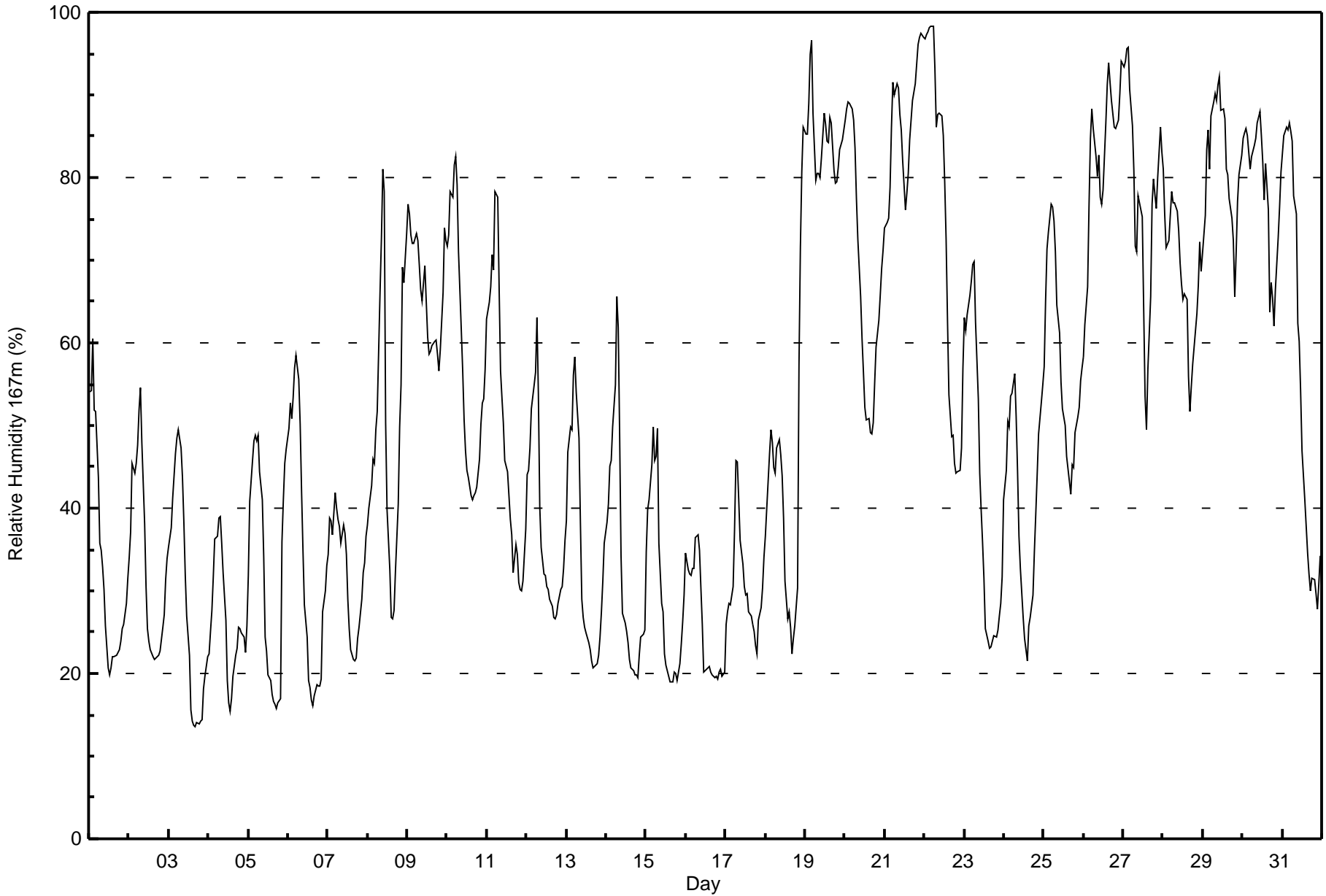
Lower Camp Met Tower - May 2016

Maximum Value: 98 % on May 22 06:00																			Maximum Daily Average: 86.5 % on May 21						Hours in Service: 744																								
Minimum Value: 13 % on May 3 17:00																			Minimum Daily Average: 25.9 % on May 16						Hours of Data: 744																								
Maximum Diurnal Average: 64.8 % at hour 6																			Minimum Diurnal Average: 38.6 % at hour 17						Hours of Missing Data: 0																								
Monthly Average: 50.9 %																			Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 29 Median = 47 Q ₃ = 73 P ₉₀ = 86 P ₉₉ = 97						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	54	54	61	52	52	44	36	35	33	30	26	21	20	21	22	22	22	22	23	24	25	26	28	32	32.7	61																							
2-May	34	37	45	44	45	48	52	55	48	38	31	25	24	23	22	22	22	22	22	23	26	27	31	34	33.3	55																							
3-May	35	38	41	44	47	48	50	47	44	38	32	27	22	16	14	14	13	14	14	14	14	18	20	22	28.6	50																							
4-May	22	25	28	32	36	37	39	39	36	32	26	19	16	15	17	20	22	23	26	25	25	24	23	26	26.4	39																							
5-May	32	41	46	48	49	48	49	44	41	34	24	23	20	19	17	17	16	16	16	17	36	41	45	47	32.8	49																							
6-May	50	53	51	53	57	59	56	50	42	35	28	24	19	18	17	16	17	19	18	18	19	27	30	33	33.8	59																							
7-May	34	39	39	37	42	40	39	38	36	38	37	34	29	25	23	22	22	22	24	26	29	32	33	37	32.3	42																							
8-May	38	40	43	46	45	50	52	66	73	81	78	50	40	32	27	27	28	32	40	50	55	69	67	73	50.1	81																							
9-May	77	76	73	72	72	73	72	69	66	65	69	65	61	59	59	60	60	60	59	57	59	66	74	72	66.5	77																							
10-May	72	73	78	78	81	82	79	71	62	57	51	47	45	44	42	41	42	42	43	46	50	53	53	57	57.8	82																							
11-May	63	65	67	71	69	78	78	67	57	53	50	46	44	41	39	37	32	36	34	31	30	30	31	37	49.4	78																							
12-May	44	45	47	52	55	56	63	54	40	35	32	32	31	30	29	28	27	27	27	29	30	30	33	36	38.0	63																							
13-May	38	47	50	49	56	58	54	49	38	29	27	26	25	24	23	22	21	21	21	22	24	27	31	36	34.1	58																							
14-May	38	40	45	46	50	55	66	62	49	34	27	26	25	24	22	21	20	20	20	19	22	24	25	25	33.6	66																							
15-May	35	40	41	45	50	46	46	50	36	29	27	22	21	20	19	19	19	20	20	19	21	24	26	29	30.2	50																							
16-May	35	33	32	32	33	33	36	37	35	30	26	20	21	21	21	20	20	19	20	19	20	20	20	20	25.9	37																							
17-May	26	27	28	28	31	37	46	46	41	36	33	30	30	30	27	27	26	25	23	22	27	28	30	34	30.8	46																							
18-May	37	40	47	50	48	45	44	47	48	47	44	39	31	27	27	26	22	24	26	30	57	72	81	86	43.5	86																							
19-May	85	85	89	95	97	88	80	80	80	80	82	88	87	84	84	87	87	81	79	79	81	83	85	86	84.7	97																							
20-May	87	88	89	89	88	87	84	77	73	66	61	56	52	51	51	49	49	50	55	60	63	66	69	71	67.9	89																							
21-May	74	75	75	79	86	92	90	91	91	88	86	82	76	78	80	85	87	89	91	94	96	97	97	97	86.5	97																							
22-May	97	97	98	98	98	98	93	86	88	88	87	85	80	73	63	54	49	49	45	44	44	45	47	57	73.4	98																							
23-May	63	62	63	66	67	70	70	62	53	44	40	36	32	25	24	23	23	24	25	24	25	27	28	32	42.0	70																							
24-May	41	45	50	50	54	54	56	51	44	37	33	27	24	23	22	26	27	29	35	39	44	49	53	55	40.3	56																							
25-May	57	65	71	73	77	77	75	71	65	61	55	52	51	50	46	43	42	45	45	49	51	52	55	57	57.8	77																							
26-May	58	62	67	77	85	88	86	83	80	83	78	77	78	87	91	94	92	89	86	86	86	87	90	94	82.7	94																							
27-May	93	94	96	96	91	86	81	72	71	78	77	75	64	53	49	57	66	77	80	78	76	80	86	83	77.5	96																							
28-May	81	76	71	72	75	78	77	77	76	74	70	67	65	66	65	56	52	55	57	61	64	67	72	69	68.5	81																							
29-May	71	75	83	86	81	87	89	90	89	91	92	88	88	87	81	80	78	75	72	66	71	77	80	83	81.8	92																							
30-May	85	85	86	85	81	83	83	84	85	87	88	85	82	77	82	76	64	67	66	62	66	73	76	81	78.7	88																							
31-May	83	85	86	86	87	86	84	78	76	62	60	54	47	41	38	34	32	30	31	31	30	28	31	34	55.6	87																							
																								56.1	58.3	60.9	62.3	64.0	64.8	64.6	62.2	57.9	54.2	50.9	46.8	43.5	41.4	40.1	39.4	38.6	39.5	40.2	40.9	44.2	47.4	50.1	52.7	Diurnal Average	
																								97	97	98	98	98	98	93	91	91	91	92	88	88	87	91	94	92	89	91	94	96	97	97	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	45	6.05	6.05
20 - 40	254	34.14	40.19
40 - 60	178	23.92	64.11
60 - 80	138	18.55	82.66
80 - 100	129	17.34	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 24 km/h on May 8 18:00	Maximum Daily Speed Average: 13.6 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 13 01:00	Minimum Daily Speed Average: 1.4 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 5.2 km/h at hour 17	Minimum Diurnal Speed Average: 0.3 km/h at hour 5	Hours of Missing Data: 0
Monthly Average Velocity: 1.7 km/h 335.6 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 20	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	S1	S1	SE2	SE5	SE4	SE6	SSE9	SSE9	SE10	SSE9	SE7	W7	W12	W13WSW13	W11	W9	W8	NW6	NNW7	NNW3	NW1	SE2	SE2	SW2.5	WSW13	
2-May	SSE1	SE1	SSW0	S1	S0	SE1	SE6	SE6	SSE2	ESE4	ESE4	SSE6	SE6	SSE7	SSE6	SE5	SSE8	SSE6	SSE6	SSE6	SSE9	SE7	SE11	SE15	SE5.0	SE15
3-May	SSE11	SSE4	SE10	SE9	SE6	SSE9	SSE10	SE9	SSE11	SE10	SE10	SE9	SSE13	SSW12	SW13	SW12WSW10	SSW10	SSW9	SSW10	SSE14	SSE4	SE8	SE3	SSE7.9	SSE14	
4-May	SSE6	SSE5	SSE6	SE3	SE7	SSE8	SE5	SSE10	SE8	SE5	SSE5	W13	W10	W6WNW18	NW19	NW19WNW20WNW22WNW15WNW16	NW17	NW14	NW12	NW17	NW14	NW12	NW12	W6.0	WNW22	
5-May	NW8	NW12	NW12	NW7	NNW5	WNW7WNW12WNW10	NW8	NW12	NW12WNW11WNW15WNW19WNW17	NW16	NW15	NNW16	NNW12	NNW12	NNE7	N3	NW4	NNW2	NW10.2	WNW19						
6-May	WNW0	NNW2	SE2	SW2	NW3	N2	ENE2	E2	ESE3	ESE4	WNW9	WSW6	W8	WSW9	WSW8	W10	W12WSW12	WSW8	WSW8	SSE4	SSE9	S2	S2	WSW3.3	W12	
7-May	SSE10	SSE7	SSE8	SE11	SE5	SSE10	SSE16	SSE14	SSE14	SSE12	SSE10	SE8	SE4	SE5	WSW5	WNW9	SSE2	SSE9	SSE17	SSE16	SE14	SE6	SSE4	NE2	SSE8.0	SSE17
8-May	N1	NNW3	NNW5	NNW5	NW7	NW10WNW12WNW21WNW12	W3	SW8WSW14WSW21WSW20	W20	W22WSW24WSW24WSW23WSW19	NW11	NW18	NW15	NW14	W11.8	WSW24										
9-May	NW11	NW10WNW12WNW14WNW15	W14	W14WNW14WNW16	NW18	NW13	NW12	NW12	NW14	NW13	NW12	NW11	NW11	NW9	WNW9	WNW9	NNW8	N6	NNW3	NW11.1	NW18					
10-May	WNW4	NNW3	NW3	NNW2	NNW4	NNW3	NNW1	NNW4	NNE4	NNE5	NNE7	N8	NNE8	NNE8	NNE10	NNE11	NNE11	NNE11	NE10	NE9	NE6	ENE4	ENE4	NNW3	NNE5.3	NNE11
11-May	N3	N2	NNW1	NNW2	N2	NNW2	N5	N9	N12	NNE10	N11	N12	NNE11	NNE12	NNE13	NE12	NNE11	NNE13	N14	NNE12	NNE9	NNE6	NNE5	NNW3	NNE7.9	N14
12-May	N3	NNW2	NE1	N1	NW2	NNW3	NNW4	N5	N10	N12	NNE11	NNE11	NNE11	NNE12	NNE11	NNE9	NNE10	NNE10	NNE9	NE7	NE3	W1	WSW1	N2	NNE6.0	N12
13-May	SSE0	SSE2	N0	SSE3	SE6	SE5	SE6	SSE8	SSE7	W7	WSW8	WSW8	WSW9	WSW8	WSW7	NW2	NNW5	N7	N4	NE3	NE2	NW2	NNW2	NNW2	SW1.4	WSW9
14-May	NW2	NW1	S1	NNW1	SE0	E0	SE2	SSE3	S2	SSW3	WSW2	W1	NNW5	N5	N6	NNE6	NNW5	N6	NE6	NE6	NNE4	NNW2	S1	NNW1	N1.6	N6
15-May	S1	N1	SSE2	SSE1	SSE2	SE6	SE7	SE8	SE8	SE7	SE6	SW4	SW5	SW4	NNE1	WSW5	SSE7	SSE11	SSE13	SSE11	SSE13	SE12	SE10	SSE3	SSE5.3	SSE13
16-May	N1	SE9	SSE10	SE7	SSE8	SSE8	SSE7	SE8	SE8	SE8	SSE4	SW14	SSW12	S5	SE6	SE4	ESE4	SE5	ESE4	ESE3	ESE3	SE3	SSE5	SSE6	SSE5.5	SW14
17-May	NNW6	WNW1	S1	SSE5	SSE8	SSE5	SW6	W13	W13WNW10	WSW9	WSW9	W7	WNW9	WNW9WNW11	WNW8	NW6	N3	S2	SSE8	SW8	WSW7	S2	W4.5	W13	W4.5	W13
18-May	SSE2	SSE2	SSE6	SSE5	SE9	SE8	SE11	SSE7WSW12WSW14	W12WSW17	W18	W17	W15WSW15WNW13WNW10	WNW5	NW4	N11	N15	N14	N12	W4.9	W18						
19-May	N13	N13	N12	N12	NNW10	N14	NNE15	NNE14	NNE15	NNE15	NNE15	N14	NNE14	NNE16	NNE16	NNE17	NNE14	NNE14	N15	N14	N12	N11	N11	N12	N13.6	NNE17
20-May	N10	NNE10	NNE11	NNE10	NNE10	NNE9	NNE9	NNE11	NNE11	NE7	NE9	NE10	NNE10	NNE12	NNE12	N12	N14	N11	N12	N8	N7	NNW6	NW8	NW7	N9.3	N14
21-May	NW5	NNW4	N3	NNW4	N7	N6	N7	N6	N8	N10	NNW9	N10	N11	N11	N14	N13	N14	N11	N11	N9	N8	N8	N8	N10	N8.5	N14
22-May	N7	N8	N8	N10	N11	N10	N10	NNE11	NNE14	NNE12	NNE12	NNE14	NNE13	NNE16	NNE14	NNE16	NNE14	NNE15	NNE16	NNE14	NNE10	N8	N5	N7	NNE11.3	NNE16
23-May	ENE1	N2	N5	N4	N3	NNW3	NNW6	N9	N9	N9	N10	NNE10	NNE10	NE10	NE8	ENE9	ENE8	ENE8	E7	E7	SE6	SSE9	SE9	SE11	NE4.4	SE11
24-May	SSE11	SSE9	SE5	SSE6	SSE7	SSE8	SSE5	SSE6	SE7	SE10	SSE10	SSE14	S16	S15	S16	SSE15	NW5	NNE2	SSE8	SSW10	SW11	SSW8	S6	SSE10	SSE8.1	S16
25-May	SSE10	E4	SE8	SSE6	SSE6	SSE7	SSE7	E3	NNE3	NW3	NNE4	N7	N10	N12	N11	N11	N12	N14	NNE11	NNE9	N8	N10	N10	N10	NNE4.7	N14
26-May	N11	N12	N12	N8	NNW7	N9	N8	NNE8	N7	NNW10	N11	NNW13	NNW11	NNW10	NW9	NNW10	NNW10	NNW9	NNW9	N7	N6	NNW5	NW6	NNW5	N8.7	NNW13
27-May	NNW4	NNW4	NW3	NNW3	NW3	N6	N4	SSE13	SSE15	ESE5	SE6	SE4	SE8	SSE10	SSE9	SW13	SW5	S8	SSE9	SE6	SE8	S8	SSE8	SE5	SSE3.9	SSE15
28-May	SSE7	SE7	SE9	SE10	SSE13	SE10	SE11	SSE11	SE9	S9	SSE12	SSE11	S12	S14	S13	SSW11	S8	SSW11	SW13	SW6	S7	SW1	SW6	WSW6	S8.1	S14
29-May	W6	W4	W3	SW7	SSW2	SW2	WNW4	WSW2	WSW5	WSW5	WSW4	W5	N3	N2	NNE3	NNE3	N4	NNE5	NNE6	NNE5	NNE3	WNW2	NNW2	NW3	WNW1.9	SW7
30-May	NNW3	NNW4	NNW4	NNW4	NW4	NNW4	NNW4	NNW6	NNW7	NNW5	N7	NNE7	N7	NW7	NNW9	NNW10	NNW11	NNW8	NNW6	N8	N7	NNW4	NNW5	NNW4	NNW5.9	NNW11
31-May	NNW2	NNW1	N2	W0	ESE1	NNE1	NNW1	N2	WNW3	NNE3	WSW5	WSW6	WSW6	W6	W5	WSW5	WSW3	N3	SSE8	SSE10	SSE9	SE3	SE7	SE7	SSW1.4	SSE10

N1.0	N1.5	NNE1.0	NE0.5	ENE0.3	ENE0.6	E0.5	ENE0.5	N0.8	N1.5	NNW1.5	WNW2.6	NW3.1	NW3.4	NW3.9	NW4.8	NW5.2	NNW3.9	NNW2.5	N1.8	NE1.2	NNW1.5	N1.2	N1.5		Diurnal Average
N13	N13	WNW12	WNW14	WNW15	N14	SSE16	WNW21	WNW16	NW18	NNE15	WSW17	WSW21	WSW20	W20	W22	WSW24	WSW24	WSW23	WSW19	WNW16	NW18	NW15	SE15		Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

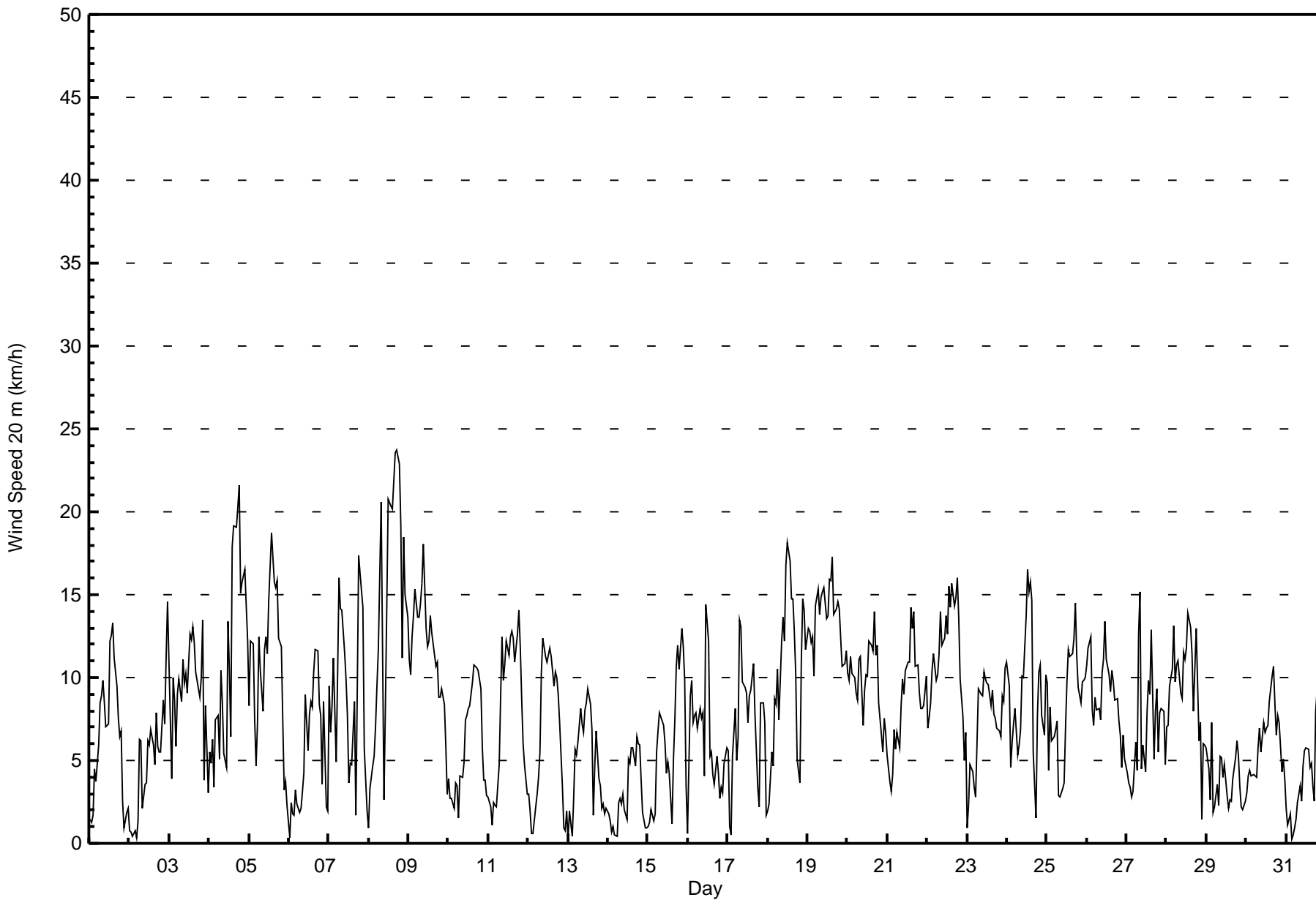
Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on May 4 15:00 Minimum Value: 0 km/h on May 31 04:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1	1	1	2	2	2	3	3	4	3	2	6	5	5	5	5	4	3	3	2	1	1	1	1	6
2-May	1	1	1	1	1	1	3	4	1	2	2	2	2	3	4	3	4	3	2	2	2	2	4	3	4
3-May	3	3	4	4	3	4	4	4	4	4	4	3	5	5	6	4	5	4	3	3	3	5	4	2	6
4-May	4	2	2	2	3	2	3	3	3	2	2	6	5	3	9	8	7	7	8	6	6	6	6	4	9
5-May	3	4	4	3	2	4	5	5	4	5	5	6	7	8	7	7	6	6	5	4	4	2	1	1	8
6-May	2	2	2	2	2	1	1	2	2	2	5	4	5	5	6	5	5	4	3	3	3	4	3	3	6
7-May	4	4	5	3	3	4	4	5	5	4	3	3	1	2	4	4	2	5	4	4	4	6	2	2	6
8-May	1	2	2	2	4	3	5	8	5	3	4	6	7	8	7	8	8	7	7	6	5	8	6	5	8
9-May	4	4	4	5	5	5	5	6	6	7	5	4	6	6	5	5	4	4	4	3	3	3	2	2	7
10-May	1	1	3	2	2	2	1	2	2	3	3	4	4	4	5	5	5	5	5	5	3	2	2	1	5
11-May	1	1	1	1	1	1	3	4	5	5	5	6	6	6	5	6	5	5	5	5	4	2	2	1	6
12-May	1	1	1	1	1	1	2	3	5	5	5	6	6	6	6	5	5	5	5	4	2	1	1	1	6
13-May	1	1	1	1	2	2	2	3	2	3	4	4	4	5	4	3	4	3	2	2	1	1	1	1	5
14-May	1	1	1	1	1	1	1	1	1	1	2	3	4	3	4	4	4	4	3	3	2	1	1	1	4
15-May	0	1	1	1	1	2	3	3	2	2	2	3	3	3	2	3	5	3	2	2	4	3	3	3	5
16-May	1	3	3	3	3	3	3	3	3	3	3	6	5	2	2	2	3	2	3	3	2	3	6	5	6
17-May	2	2	1	3	3	2	6	5	5	5	4	3	4	4	6	5	4	3	1	2	3	3	3	1	6
18-May	2	1	2	2	3	3	3	4	5	5	5	6	7	7	5	5	6	5	3	4	4	6	5	5	7
19-May	5	5	5	5	5	6	6	6	6	6	6	5	6	7	7	7	6	6	6	6	5	4	4	4	7
20-May	4	4	5	4	4	4	4	5	5	4	5	5	5	5	4	5	5	5	5	4	3	2	3	2	5
21-May	2	2	2	2	4	3	3	3	4	4	4	4	4	5	5	5	5	5	4	4	4	3	3	4	5
22-May	4	3	3	4	4	4	4	5	6	6	6	6	6	7	7	6	7	6	7	6	4	2	1	2	7
23-May	1	1	2	1	2	2	3	4	4	4	5	5	5	6	5	5	5	5	4	3	5	2	1	2	6
24-May	3	3	2	1	2	3	2	2	3	3	4	6	5	6	5	5	3	1	2	3	4	3	2	3	6
25-May	3	2	2	2	2	3	3	2	2	2	2	3	4	5	5	5	5	5	5	4	3	4	4	4	5
26-May	4	4	5	4	3	4	4	4	3	5	5	6	5	4	4	5	4	4	4	3	3	2	2	3	6
27-May	2	2	2	1	2	3	3	5	5	3	3	4	4	4	5	9	6	5	3	3	3	6	4	2	9
28-May	3	3	3	4	5	3	4	5	4	4	5	4	4	5	6	4	3	3	4	3	2	2	2	3	6
29-May	3	2	2	3	2	2	2	2	2	3	2	2	2	1	2	1	2	3	3	2	2	1	1	1	3
30-May	1	2	2	2	1	2	2	3	3	2	3	3	3	4	4	4	5	4	3	4	4	2	2	2	5
31-May	1	1	2	0	1	1	1	2	3	2	3	3	3	3	3	3	3	2	3	3	1	3	2	3	3
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	238	31.99	31.99
6 - 11	345	46.37	78.36
12 - 19	151	20.30	98.66
20 - 28	10	1.34	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

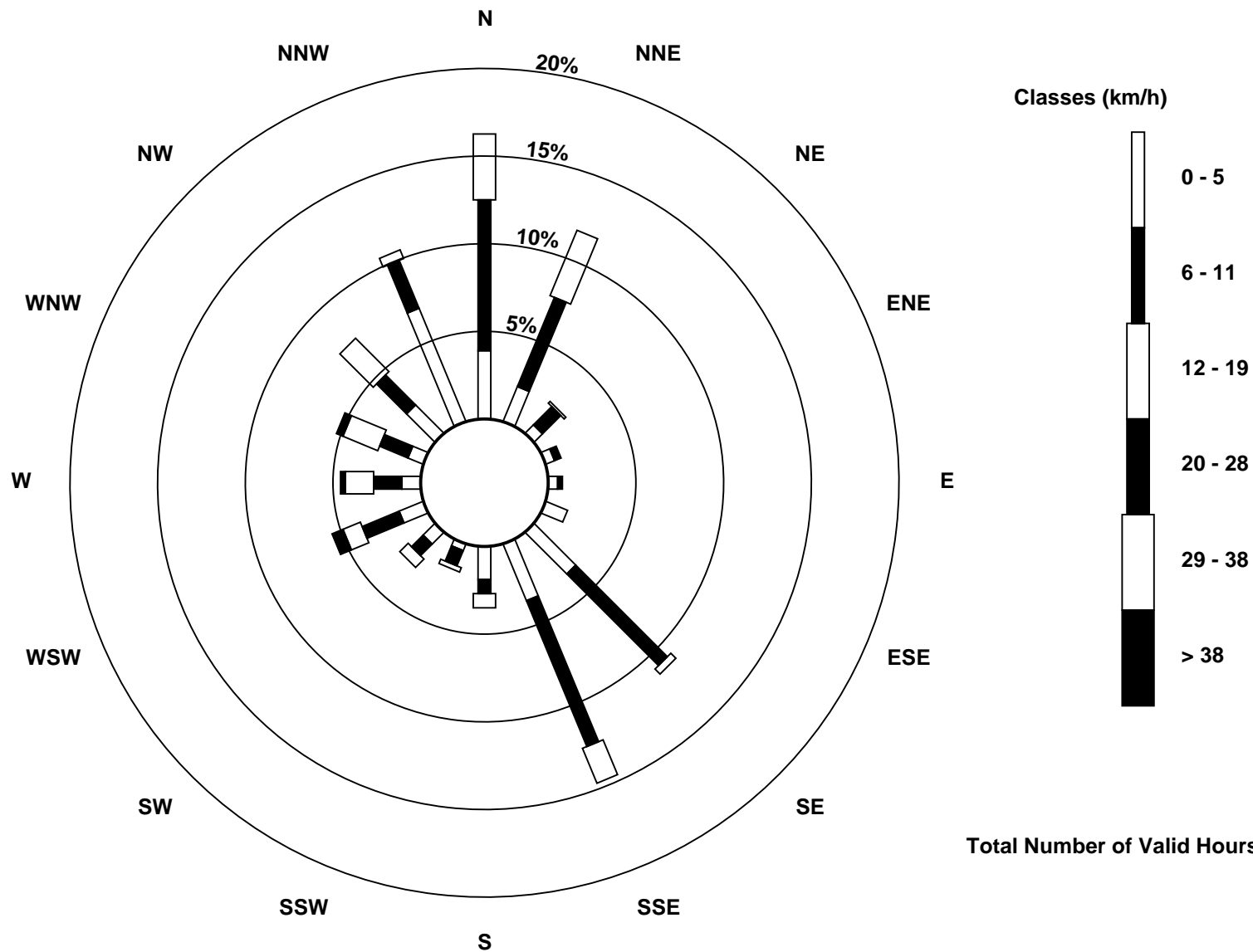
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - May 2016

Maximum Speed: 32 km/h on May 8 17:00	Maximum Daily Speed Average: 19.1 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 13 03:00	Minimum Daily Speed Average: 1.4 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 7.0 km/h at hour 17	Minimum Diurnal Speed Average: 0.6 km/h at hour 5	Hours of Missing Data: 0
Monthly Average Velocity: 2.4 km/h 339.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 11 Q ₃ = 15 P ₉₀ = 19 P ₉₉ = 28	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SSW3	S2	SSE4	SE7	SE6	SE8	SE11	SE11	SE13	SE10	SE7	WSW9	W15	W15WSW17	W14WSW11	WSW10	NW9	NNW10	N6	NW3	SSE3	SSW3	SW3.3	WSW17		
2-May	SSE2	S1	SE2	SSE2	SSE2	SE4	SE9	SE7	SE2	ESE4	E4	SE7	ESE6	SE7	SE6	ESE5	SSE9	SSE7	SE7	SE8	SE11	SE12	SE18	SE20	SE6.7	SE20
3-May	SE18	SE8	SE14	SE14	SE9	SE12	SE13	SE11	SE14	SE12	SE12	SE11	SE16	S14	SW15	SW15	SW13	S12	SSW11	S12	SE16	SSE5	SE11	SE5	SSE10.3	SE18
4-May	SE7	SE9	SE8	SSE4	SE11	SE11	SE6	SE13	SE10	SE6	SSE5	W17	W13	W8	W23WNW25	NW24WNW27	WNW28	W21	W22WNW22	WNW18	NW16	SW5	WNW28	WNW28	W7.9	WNW28
5-May	WNW12	NW16	NW16WNW11	NNW7WNW10	W17WNW13	NW10WNW15	WNW16	WNW14	WNW19	WNW24	WNW22	NW20	NW20	NW21	NW17	NW16	NNE11	N5	NNW5	NNW5	NNW5	NNW5	NNW5	NNW5	NW13.3	WNW24
6-May	WSW2	NNW2	SSW2	SW3	WNW6	N4	ENE3	E2	E3	ESE5	W11	WSW6	W10WSW10	WSW9	WSW13	WSW15	WSW16	WSW11	SW10	SSE5	SE13	SE5	SSE4	SW4.3	WSW16	
7-May	SE14	SE10	SE11	SE13	ESE9	SE14	SE20	SSE18	SE19	SE15	SE13	SE10	ESE4	SE6	WSW6	W11	SSE2	SE13	SSE22	SE22	SE21	SE9	SE5	NNE3	SE10.8	SE22
8-May	N3	N5	NNW8	NW9	NW10	NNW13	NNW16	NNW27	NNW16	W4	SW10	WSW19	WSW29	WSW28	WSW28	WSW30	WSW32	WSW32	WSW32	WSW27	NW15	NW24	NW20	NW18	W16.1	WSW32
9-May	WNW15	NW14	WNW17	WNW19	W21	W18	W19	W19	WNW21	NW23	NW17	NW15	NW16	NW18	NW16	NW16	NW14	WNW14	NW12	WNW12	W13	NNW12	N8	N4	WNW14.7	NW23
10-May	WNW5	WNW4	WNW5	WNW4	NW5	NNW5	NNW2	NNW5	NNE5	NNE6	NNE9	N10	N10	NNE12	NNE14	NNE15	NNE15	NNE15	NNE16	NE14	NE10	NE7	ENE8	N4	NNE7.5	NNE16
11-May	N5	N5	N3	NNW5	N5	NNW4	NNW7	N12	N17	NNE14	N15	N17	NNE16	NNE18	NNE18	NNE17	NNE16	NNE18	N20	NNE18	NNE13	NNE10	NNE9	N6	NNE11.7	N20
12-May	NNW5	N4	NNE2	NW1	NW2	NNW5	NNW5	NNW7	N14	N16	NNE16	NNE15	NNE16	NNE17	NNE15	NNE13	NNE15	NNE15	NNE13	NNE11	NNE7	W1	SW1	NW3	NNE8.7	NNE17
13-May	WNW1	SSE2	ENE0	SSE3	SE9	SE7	SE7	SE9	SE7	WSW8	WSW10	WSW10	WSW11	SW10	SW8	NW3	NNW6	NNW9	N6	NE5	NE5	NNW3	NNW4	NNW3	SW1.4	WSW11
14-May	NNW2	WNW2	SW1	WSW1	SSW1	E1	SE3	SE3	S2	SSW3	WSW2	WNW2	NNW6	NNW6	NNW8	NNE8	NNW6	N9	NE10	NE10	NNE8	N4	SSW1	WNW1	N2.5	NE10
15-May	S1	NW1	SSE2	SE3	SSE4	SE9	SE9	SE10	SE9	SE9	SE7	SSW4	SW5	SW5	NNE2	WSW6	SSE8	SSE13	SSE14	SE12	SSE15	SE16	SE14	SE7	SSE6.7	SE16
16-May	ESE1	SE12	SE14	SE11	SE12	SE13	SE11	SE11	SE10	SE10	SE5	SSW18	SSW15	S7	ESE8	SE6	ESE6	SE7	ESE7	ESE5	ESE5	SE6	SE8	SE9	SE8.1	SSW18
17-May	NNW6	NW2	SSE2	SE9	SSE10	SSE6	SW10	WSW19	W18	W13	WSW12	WSW10	W10	W12	WNW12	WNW15	WNW11	WNW8	N6	S2	SE11	SW12	WSW12	SW3	WSW6.4	WSW19
18-May	SSE1	S2	SSE6	SE10	SE13	SE12	SE14	SSE9	WSW17	WSW19	WSW16	WSW23	WSW26	W24	WSW20	WSW21	WNW18	WNW14	WNW7	NW5	N15	N21	N20	N17	W6.8	WSW26
19-May	N18	N18	N17	NNW18	NNW16	N19	N21	N20	N21	N22	N22	N19	NNE20	N23	NNE22	NNE25	NNE20	N20	N21	N20	N17	N15	N15	N16	N19.1	NNE25
20-May	N14	NNE15	NNE16	NNE15	NNE14	NNE13	N12	NNE16	NNE17	NE11	NE13	NE15	NNE14	N17	N17	N16	N19	NNW17	N17	N13	N10	NNW8	NW11	NW9	N13.3	N19
21-May	NW8	NNW6	N4	NNW6	NNW11	N9	N10	NNW9	NNW12	NNW14	NNW13	NNW16	N15	NNW16	N20	N17	N19	N15	N15	N13	NNW12	NNW12	NNW13	N15	N12.3	N20
22-May	N10	N11	N12	N14	N16	N14	N14	NNE16	N20	NNE17	NNE19	N20	NNE19	NNE22	NNE21	NNE22	NNE21	N21	NNE23	NNE20	N14	N12	NNW9	NNW11	N16.5	NNE23
23-May	NNE2	N4	N9	N7	N6	NNW5	NNW8	N12	N12	N12	N14	NNE14	NNE13	NE14	NE12	NE14	NE12	ENE11	ENE10	E10	ESE9	SE11	SE12	SE14	NE6.6	SE14
24-May	SSE14	SE13	SE7	SE8	SE10	SE11	SE7	SE7	SE8	SE12	SSE12	SSE16	SSE19	SSE17	SSE18	SSE17	WNW8	NNE3	SE9	S13	SSW14	SSW10	S8	SSE14	SSE10.0	SSE19
25-May	SSE14	E6	ESE10	SSE8	SE8	SE8	SE9	E3	NNE4	NW4	N5	NNW9	N13	N15	N15	N16	N17	N20	NNE17	N14	N12	N14	N14	N14	NNE6.7	N20
26-May	N15	N16	N17	N11	NNW11	N12	N11	NNE11	N10	NNW15	NNW16	NNW18	NNW16	NNW15	NW12	NW14	NNW14	NNW13	NNW13	NNW11	N10	NNW7	NW10	NNW8	NNW12.3	NNW18
27-May	NNW7	NNW6	NNW5	NNW5	NNW5	N8	N6	SE16	SSE18	ESE6	ESE8	ESE6	SE10	SSE12	SE11	SW17	SW6	S10	SE13	ESE8	SE11	SSE10	SE10	SE8	SE4.7	SSE18
28-May	SSE9	SE10	SE13	SE14	SE16	SE13	SE14	SE14	SE12	SSE10	SE14	SE14	SSE13	S15	S15	S12	S9	S12	SW15	SSW8	SSE8	SSW3	SW9	WSW9	SSE9.9	SE16
29-May	W8	W6	WSW4	SW9	SSW2	SSW3	W5	SW3	WSW7	WSW7	WSW5	W6	N4	N3	N3	NNE3	N5	NNE7	NNE9	NNE8	NNE6	NW3	NNW4	NNW4	WNW2.5	NNE9
30-May	NNW5	NNW7	NNW7	NNW7	NW7	NNW7	NNW6	NNW8	NW10	NNW8	NNW10	NNE10	N9	NW10	NW12	NNW15	NW15	NW12	NNW10	N11	N11	NNW7	NNW9	NNW7	NNW8.8	NW15
31-May	NNW3	NW2	NNW3	SW1	SE1	NNW1	NNW2	N3	WNW5	N3	WSW5	WSW7	WSW7	W7	W6	WSW6	W4	NNW3	SE10	SSE12	SSE10	SE6	SE11	SE11	SSW1.8	SSE12

N1.5	N2.1	NNE1.6	NNE0.7	NE0.6	ENE1.1	ENE0.9	NE1.0	N1.4	N2.4	N2.5	NW3.3	NW4.1	NW4.5	NW5.2	NW6.4	NW7.0	NNW5.3	N3.9	N2.8	NNE2.4	N2.2	N1.9	N2.2	Diurnal Average
N18	N18	WNW17	WNW19	W21	N19	N21	WNW27	WNW21	NW23	N22	WSW23	WSW29	WSW28	WSW28	WSW30	WSW32	WSW32	WSW32	WSW27	W22	NW24	N20	SE20	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

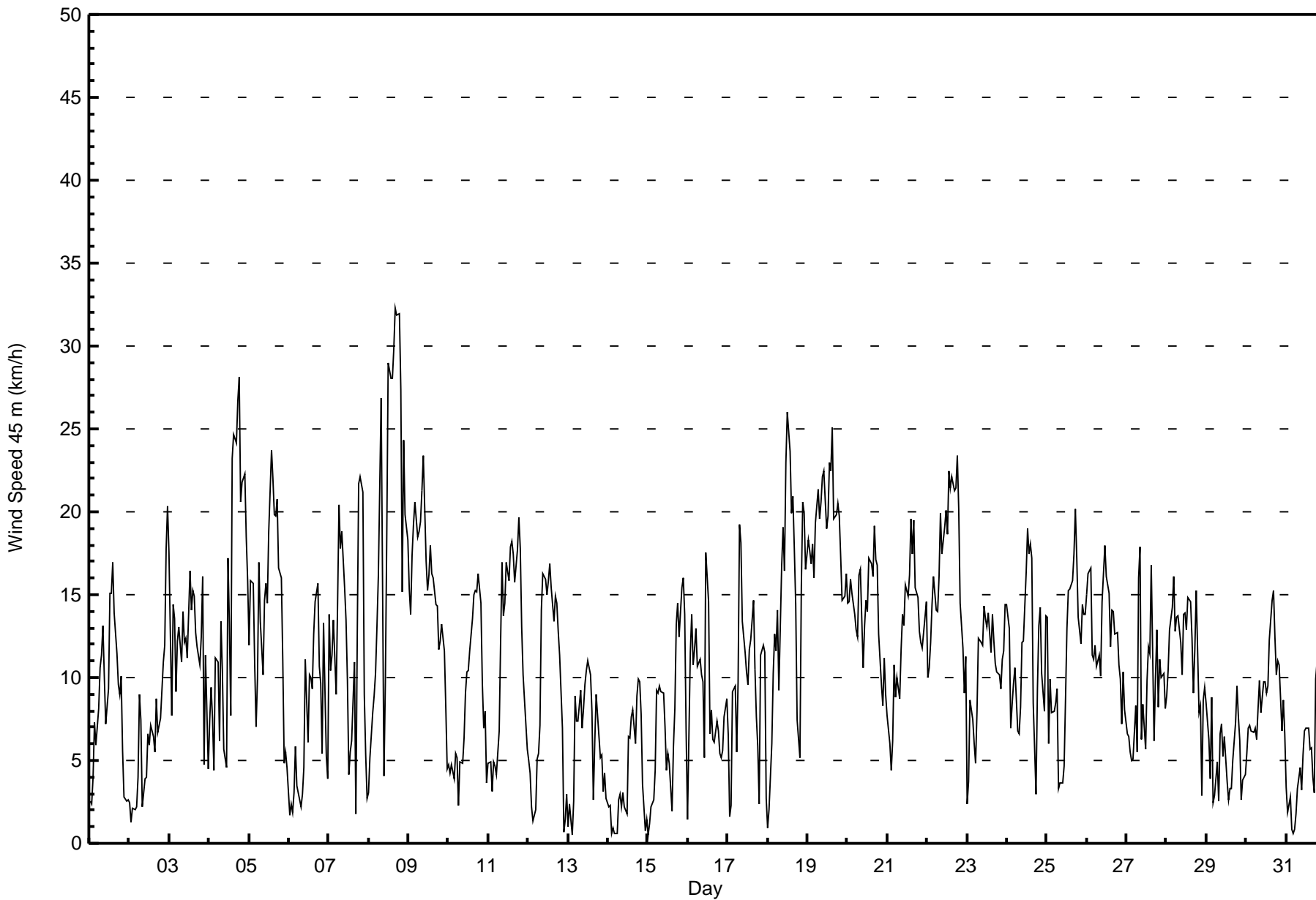
Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on May 4 15:00 Minimum Value: 0 km/h on May 12 23:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 4 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1	1	2	2	2	2	3	3	4	3	2	8	4	4	4	5	3	3	4	3	1	2	2	1	8
2-May	1	1	1	1	1	1	2	4	1	2	2	2	2	3	4	4	4	3	2	2	1	2	4	3	4
3-May	3	5	5	5	4	5	4	5	4	4	4	4	5	5	7	5	5	5	3	3	3	6	5	3	7
4-May	3	2	2	2	2	3	3	3	3	2	2	6	5	3	10	8	7	7	7	6	6	6	6	4	10
5-May	3	5	4	3	3	5	4	5	3	5	5	6	8	8	7	7	6	6	5	5	2	1	2	8	
6-May	2	2	1	2	3	2	1	2	2	3	5	4	5	5	6	6	5	4	2	2	4	4	4	4	6
7-May	4	4	5	2	3	5	4	5	4	4	3	3	1	2	5	4	2	7	3	3	4	8	3	2	8
8-May	2	2	3	3	5	4	5	7	6	4	5	5	6	6	6	7	7	6	6	6	5	8	6	6	8
9-May	4	4	4	5	5	5	5	6	6	7	5	4	6	5	5	5	4	4	4	4	3	3	2	2	7
10-May	1	2	4	4	3	2	2	2	2	4	3	5	5	5	6	6	6	6	5	5	3	2	2	2	6
11-May	2	2	1	2	2	1	3	5	5	6	6	7	7	7	6	7	6	6	6	6	4	3	2	2	7
12-May	1	1	2	1	1	1	2	3	5	5	6	7	7	6	6	6	6	5	6	4	3	1	0	1	7
13-May	1	1	1	1	2	1	2	2	2	3	4	5	5	5	5	4	4	3	2	2	2	2	1	1	5
14-May	1	1	1	1	0	1	1	2	1	2	3	3	4	4	4	4	4	5	4	3	3	2	1	1	5
15-May	0	1	1	1	1	2	3	2	2	2	2	4	3	3	3	3	5	3	2	2	3	3	2	4	5
16-May	2	3	3	4	4	4	4	4	4	3	4	5	5	3	2	3	4	2	3	4	3	3	6	5	6
17-May	3	2	2	4	3	2	8	5	5	5	4	3	3	4	6	5	4	3	2	2	3	3	4	1	8
18-May	2	1	2	2	3	4	3	4	5	5	4	6	6	6	5	4	6	5	3	6	4	7	6	5	7
19-May	6	5	4	5	5	6	7	6	7	7	7	6	7	8	8	8	7	7	6	6	5	4	4	5	8
20-May	5	4	5	5	5	4	4	6	6	5	5	7	6	6	5	5	5	5	5	4	3	2	3	2	7
21-May	2	2	2	2	5	3	3	3	4	4	4	5	4	4	5	5	5	6	5	4	4	4	3	4	6
22-May	4	3	4	4	4	5	5	6	7	6	6	6	6	8	7	7	7	7	7	7	4	2	2	3	8
23-May	3	3	2	2	2	2	3	4	4	4	5	5	5	8	6	6	6	6	5	3	4	2	1	1	8
24-May	3	3	3	2	2	3	3	2	3	4	4	7	6	6	5	5	4	2	2	3	4	3	2	3	7
25-May	3	2	2	3	2	3	3	2	2	2	2	3	4	4	5	5	5	5	6	4	4	4	4	4	6
26-May	4	5	5	5	3	4	3	4	3	5	5	6	5	4	5	5	4	4	4	3	3	3	2	3	6
27-May	3	2	2	2	2	3	3	6	6	3	4	5	4	4	6	10	6	5	3	3	4	5	3	3	10
28-May	3	3	4	5	6	4	4	5	4	4	5	5	3	5	6	4	4	3	4	3	3	2	3	3	6
29-May	4	3	3	3	2	3	2	2	2	3	3	3	2	1	2	2	2	3	4	3	2	1	1	1	4
30-May	1	2	2	2	1	2	2	3	3	3	2	4	3	4	5	5	5	4	3	5	4	2	2	2	5
31-May	1	1	1	1	1	1	1	2	3	3	3	3	3	4	3	3	3	2	4	3	2	3	3	3	4
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	155	20.83	20.83
6 - 11	256	34.41	55.24
12 - 19	269	36.16	91.40
20 - 28	59	7.93	99.33
29 - 38	5	0.67	100.00
> 38	0	0.00	100.00

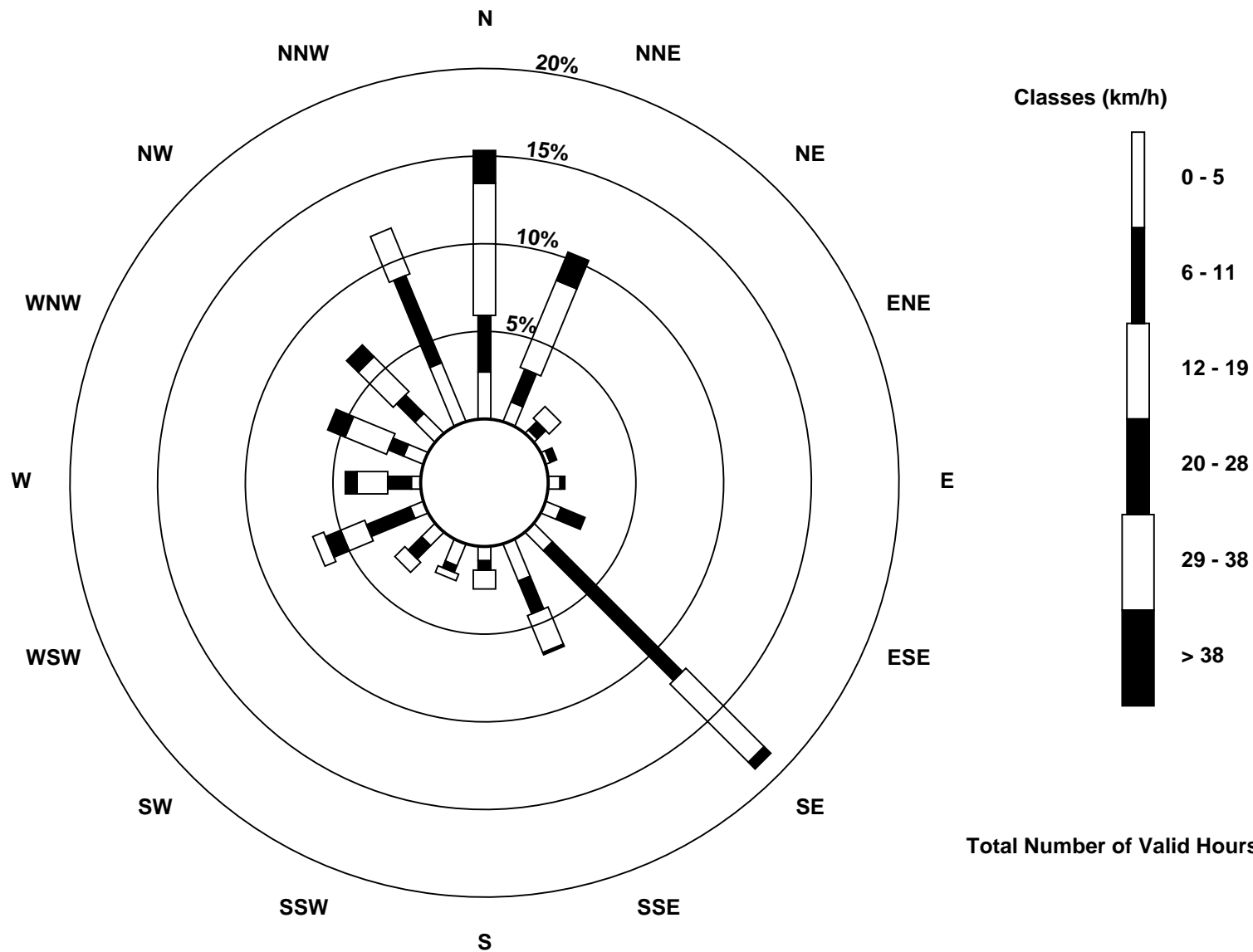
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - May 2016

Maximum Speed: 38 km/h on May 4 19:00	Maximum Daily Speed Average: 28.5 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 1 23:00	Minimum Daily Speed Average: 2.0 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 9.1 km/h at hour 17	Minimum Diurnal Speed Average: 0.9 km/h at hour 7	Hours of Missing Data: 0
Monthly Average Velocity: 3.7 km/h 346.5 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 15 Q ₃ = 21 P ₉₀ = 26 P ₉₉ = 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-May	S6	SSW5	SSE4	SSE12	SSE8	SSE10	SE13	SE14	SE18	SE12	SE7WSW12	W20	W18WSW18	W16WSW13	W11	NW14	NNW18	N13	N11	NW0	SSE5	SW4.0	W20			
2-May	SSW3	SE4	SSE5	SSE2	SSE6	S4	SSE3	SE6	E2	SE4	ESE5	SE7	SE6	SE7	ESE7	SE10	SE8	SE10	SE13	SSE16	SE19	SE28	SE29	SE8.5	SE29	
3-May	SE28	SE23	SE24	SE26	SE24	SE26	SE21	SE20	SE18	SE16	SE15	SE13	SE19	SSW15	SW18	SW17	SW14	S13	SSW14	SSW15	S16	S9	SSE14	S5	SSE15.5	SE28
4-May	SSW8	S6	SW11	SW8	S5	S7	SSW4	SE9	SE11	SE6	SSW4	W23	W17	W9	W30WNW32	NW32WNW37	W38	W29	W32WNW33WNW29	NW26	NW14.5	W38				
5-May	NW22	NW24	NW25WNW20	NW16WNW18	W23WNW17	NW13WNW18WNW19WNW17WNW24WNW29WNW28	NW25	NW26	NW29	NW25	NW26	NW29	NW25	NW25	NNE17	NE12	N8	NNW11	NW18.7	NW29						
6-May	WNW5	W4	WSW9	WSW9	W11	W5	N2	NE1	E3	ESE4	W13	W7	W12WSW11WSW10WSW14WSW16WSW16WSW12	SW12	SSW11	SE24	SE22	SE17	SW6.5	SE24						
7-May	SSE23	SE22	SE20	SSE20	SE19	SE25	SSE25	SSE24	SSE23	SSE15	SSE11	SE10	ESE6	SE7	WSW8	W14	SSE2	SE16	SE26	SE28	SE30	SE14	SSE7	SE3	SSE14.9	SE30
8-May	NNE4	ENE8	N14	NNW17	NW18	NW22WNW24WNW35WNW22	W8	SW11	WSW20WSW31	WSW30WSW31	WSW35WSW36WSW34WSW35WSW31	NW22	NW35	NW29	NW27	W19.3	WSW36									
9-May	WNW25WNW23WNW24	W27	W27	W25	W26	W26WNW27	NW31	NW23	NW19	NW21	NW23	NW20	NW21	NW20WNW19	NW17WNW18	W18	NNW16	N12	N7	WNW19.9	NW31					
10-May	WNW6	W10	W12	W12	WNW9	N8	NNW3	N6	NNE6	N9	N11	N14	N14	NNE16	NNE18	NNE21	NNE21	NNE21	NNE22	NE20	NE17	ENE17	ENE21	ENE9	NNE10.0	NNE22
11-May	NNE4	NNE8	N11	NNW12	N9	NNW10	N10	N16	N23	NNE20	N20	N23	NNE22	NNE25	NNE25	NE24	NNE22	NNE25	N28	NNE27	NNE22	NNE24	NE23	NNE11	NNE18.1	N28
12-May	NNW7	NNW12	N12	NNW9	NNW10	N11	N9	N9	N19	N21	NNE22	NNE21	NNE23	NNE23	NNE20	NNE18	NNE21	NNE21	NNE19	NE17	NE15	NNE7	NNE2	W5	NNE13.9	NNE23
13-May	W4	SW2	SSW2	SSW3	SSW5	SSE5	S4	SSW5	SW5	W9WSW11WSW11WSW11	SW11	SW8	NNW3	NNW9	NNW12	N10	NE7	NE13	NE7	ENE7	ENE4	W2.0	NE13			
14-May	N5	NNW8	NNE4	NE5	N2	SE1	SW3	SE3	S2	WSW3	WSW2	NNW3	NNW8	NNW9	N11	NNE11	NNW8	N12	NE14	NE16	NE18	NE14	N2	NNW1	NNE5.3	NE18
15-May	S1	SE4	SE9	SSW4	SSE5	S4	SSW7	SSE7	SE7	SE11	SE9	SW4	SW6	WSW6	N2	WSW6	SSE9	SSE15	SSE17	SSE16	SSE20	SSE19	SSE18	SE17	SSE8.0	SSE20
16-May	SE12	SSE6	SSE9	SE15	SE18	SE19	SE17	SE14	SE13	SE12	SSE7	SSW20	SSW16	S8	SE12	ESE13	ESE13	ESE12	SE14	SE13	SE10	SE15	SSE17	SSE15	SE12.2	SSW20
17-May	SE6	S5	SSE8	S10	SSW14	SW12WSW17WSW28	W26	W18WSW13WSW10	W13	W14WNW16WNW19WNW13	WNW9	NNW8	SE2	S11	SW18WSW20	W10	WSW10.3	WSW28								
18-May	SW4WSW10	SW8	S6	S8	S8	S7	SW10WSW18WSW21WSW19WSW24WSW29	W30WSW22WSW23	W24WNW19WNW10	NNW6	N23	N31	N29	N26	W9.8	N31										
19-May	NNE27	N26	N24	N26	N25	N28	NNE30	NNE29	NNE30	NNE33	NNE33	N28	NNE30	N33	NNE33	NNE37	NNE29	NNE29	N30	N30	N26	N23	N24	N26	N28.5	NNE37
20-May	NNE24	NNE23	NNE24	NNE23	NNE22	NNE20	NNE19	NNE22	NNE22	NE17	NE19	NE20	NNE20	NNE25	NNE24	NNE24	N27	N24	N27	N20	N16	N13	NNW17	NW14	NNE20.0	N27
21-May	NNW13	N11	NNE9	N10	N17	N15	N16	N14	N16	N18	NNW17	NNW21	N19	N22	N27	N26	N27	NNE23	N22	N19	N19	N18	N20	N22	N18.1	N27
22-May	NNE16	N17	N18	N22	N24	N22	NNE22	NNE25	NNE30	NNE26	NNE27	NNE28	NNE28	NNE31	NNE31	NNE30	NNE30	NNE32	NNE33	NNE30	NNE24	NNE23	N20	N22	NNE25.3	NNE33
23-May	NNE8	NNE9	N17	N15	N15	N12	N12	N16	N15	N17	N19	NNE19	NNE16	NE21	NE17	ENE19	NE17	ENE15	ENE16	E15	ESE16	SSE15	SSE13	SSE15	NE10.2	NE21
24-May	S17	S16	SSE12	SSE13	SSE15	SSE19	SSE7	SE8	SE11	SE15	SSE16	SSE22	SSE23	SSE20	SSE22	NW3	SSE10	SSW16	SW22	SSW18	SSW14	S13	SSE13.0	SSE23		
25-May	S17	SSE11	SE10	SSE11	SSE12	SSE11	E3	NNE3	NNW4	N5	N11	N15	N19	N21	N22	N24	N30	NNE25	NNE20	N19	N21	N21	N21	NNE8.8	N30	
26-May	N21	N23	N25	N18	NNW16	N17	N16	NNE16	N13	NNW19	NNW22	NNW23	NNW21	NNW21	NNW16	NW19	NNW20	NNW17	NNW17	N15	N15	N12	NNW16	N14	N17.5	N25
27-May	N11	N11	N10	N9	N8	NE6	ESE7	SE25	SSE24	ESE11	ESE16	ESE10	SE13	SE17	SE16	SW22	SW8	S14	SE20	ESE15	SE17	SSE18	SE19	SE16	SE8.9	SE25
28-May	SSE18	SE20	SE24	SE24	SE24	SE21	SE21	SE21	SE18	SSE13	SE20	SE21	SSE15	S16	S18	S13	S10	S13	SW19	SSW9	S11	SSW8	SW15WSW14	SSE14.3	SE24	
29-May	W13	W9	WSW8	SW11	SW5	SSW4	W6	WSW2	WSW6	SW8	WSW6	W7	NNW5	NNW3	NNE4	NNE5	N6	NNE11	NNE14	NNE12	NNE12	NNE7	N8	NNW9	NW3.3	NNE14
30-May	NNW12	NNW12	NNW14	NNW13	NNW10	NNW10	NNW10	NW11	NW13	NNW11	NNW12	NNE15	N13	NW12	NW19	NNW19	NNW22	NNW20	NNW17	N18	N18	N13	N14	N12	NNW13.6	NNW22
31-May	N9	NNW7	WNW8	NW4	WNW3	NW5	NNW3	N3	NW5	N5	WSW5	WSW7	WSW7	W8	W7	WSW6	W4	NNW4	SE13	SSE15	SSE13	S14	SSE15	SSE17	SW2.5	SSE17
N2.0 N2.7 N2.7NNW1.8 NW1.5NNE0.9NNW0.9 N1.4 N2.3 N3.6 N3.6 NW4.0 NW5.1 NW6.0 NW6.5NNW8.0NNW9.1NNW7.6 N6.1 N4.9NNE4.4NNE4.0NNE3.1 N3.1																								Diurnal Average		
SE28 N26 N25WNW27 W27 N28 NNE30WNW35 NNE30 NNE33 NNE33 N28 WSW31 NNE33 NNE33 NNE37 WSW36WNW37 W38WSW31 W32 NW35 NW29 SE29																								Diurnal Maximum		

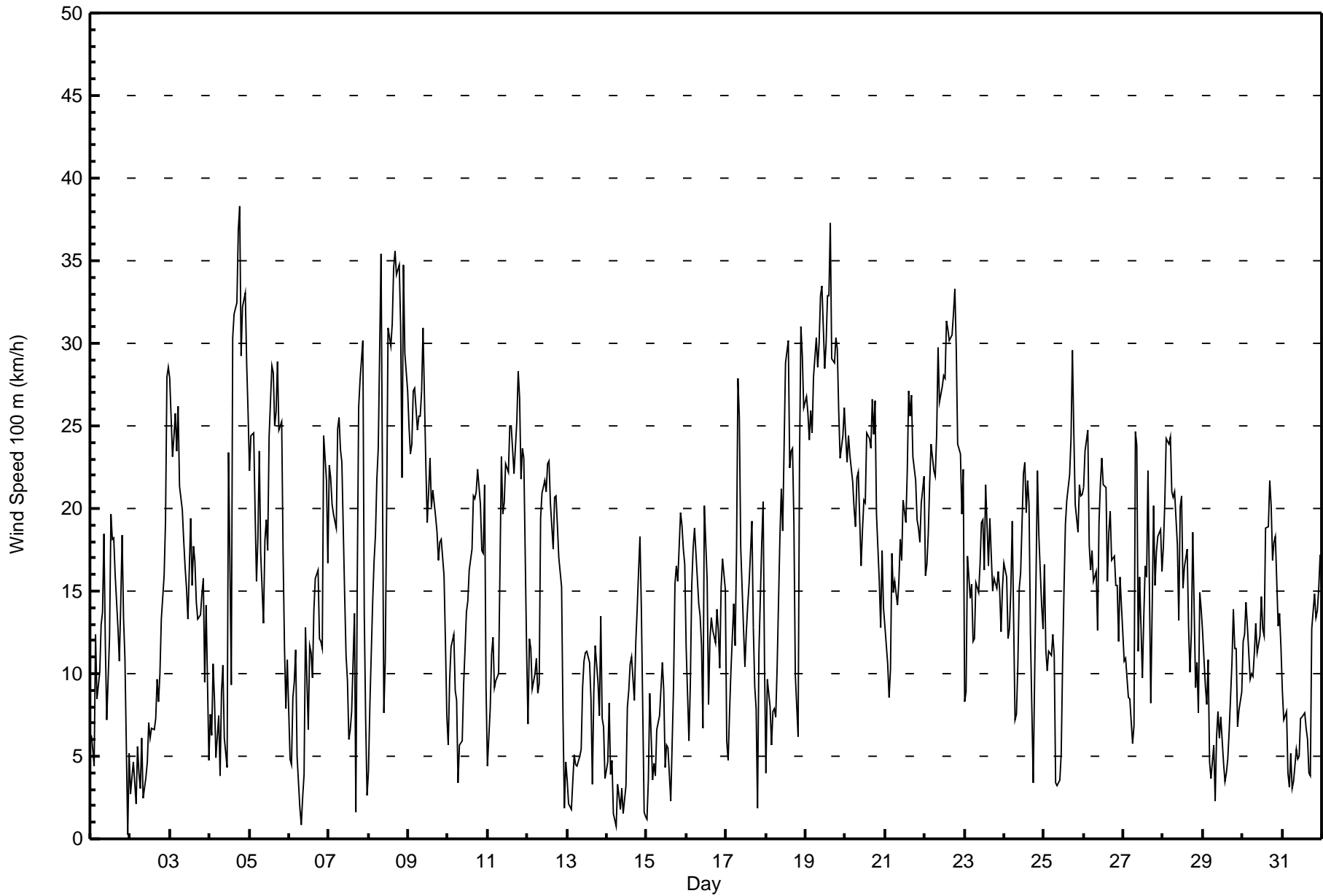
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on May 7 22:00														Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on May 15 00:00																									
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	2	2	2	3	3	4	1	2	2	4	2	10	4	4	3	4	3	4	5	2	2	3	1	4	10
2-May	2	4	4	2	3	2	3	4	1	2	1	2	2	2	4	4	4	3	2	3	2	3	5	2	5
3-May	2	3	4	3	4	4	4	3	3	3	3	2	3	6	7	5	6	5	4	3	3	4	4	3	7
4-May	4	3	3	4	2	2	2	3	2	2	3	5	4	3	10	8	7	7	6	6	6	6	7	4	10
5-May	4	4	3	3	4	5	3	5	4	4	5	6	8	8	6	7	6	6	6	4	5	3	2	2	8
6-May	1	2	3	3	3	3	1	1	2	2	5	4	5	5	6	5	4	4	3	2	4	2	2	5	6
7-May	2	3	3	2	4	2	2	3	3	3	4	2	1	2	5	5	3	9	2	2	2	12	3	2	12
8-May	1	3	4	2	6	4	4	7	6	5	5	5	5	4	4	6	5	5	5	4	4	9	6	6	9
9-May	4	4	4	5	5	4	4	5	5	6	5	4	5	5	4	4	4	4	4	3	3	4	2	3	6
10-May	2	2	5	4	3	3	2	2	2	3	2	5	5	5	5	5	5	4	4	4	3	3	1	5	5
11-May	2	2	2	2	1	1	3	5	4	4	5	6	6	5	4	5	5	5	4	4	3	2	2	5	6
12-May	2	2	2	1	1	2	2	2	6	5	5	7	7	6	6	6	5	4	6	4	2	3	1	2	7
13-May	1	1	1	1	1	1	1	2	2	3	4	4	3	5	5	4	4	3	3	2	2	2	2	3	5
14-May	2	2	1	1	1	1	1	1	1	1	2	3	4	5	5	5	4	5	3	2	3	5	1	1	5
15-May	1	1	2	2	1	2	2	1	1	1	3	4	3	3	2	3	6	3	3	3	5	4	4	3	6
16-May	4	3	3	4	4	2	2	2	1	2	5	6	5	4	3	3	3	4	3	4	2	4	6	5	6
17-May	3	2	4	4	4	5	8	4	5	5	3	3	2	3	6	4	3	2	2	2	6	4	4	3	8
18-May	2	2	2	2	2	3	2	6	4	4	3	4	5	6	5	3	5	5	4	8	4	6	6	5	8
19-May	5	4	3	4	4	5	6	5	5	5	7	5	6	6	6	6	6	5	5	5	4	3	3	4	7
20-May	4	4	4	4	4	4	3	4	5	4	5	5	5	4	3	4	4	5	4	3	3	3	2	2	5
21-May	2	3	2	2	5	3	3	3	2	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	5
22-May	4	3	3	3	3	4	4	5	6	6	6	5	5	6	5	6	6	5	6	6	4	2	2	2	6
23-May	5	3	3	2	2	3	3	3	3	4	4	5	6	8	6	6	6	6	4	3	4	4	2	3	8
24-May	4	4	2	2	3	3	3	2	2	4	5	8	7	7	5	5	4	2	3	4	4	6	5	4	8
25-May	4	3	2	2	2	2	2	2	1	2	2	4	4	3	4	4	3	4	5	4	3	3	3	3	5
26-May	2	3	3	6	3	3	3	3	2	4	3	6	5	4	4	4	4	4	4	3	2	2	2	3	6
27-May	2	2	2	2	2	3	6	5	5	3	4	5	4	4	5	10	7	8	3	4	4	5	3	3	10
28-May	4	3	3	4	5	3	3	4	3	4	4	3	4	7	8	4	4	4	4	4	3	3	1	3	8
29-May	4	3	3	3	4	2	2	1	2	2	3	2	1	1	2	1	3	2	3	2	1	2	2	2	4
30-May	1	1	2	1	1	1	2	3	2	3	2	3	4	5	6	4	5	3	3	5	4	3	3	3	6
31-May	1	1	2	1	2	2	1	2	3	3	4	3	2	3	2	3	3	2	4	3	3	3	3	3	4
Diurnal Maximum																									
5 4 5 6 6 5 8 7 6 6 7 10 8 8 10 10 7 9 6 8 6 12 7 6																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	87	11.69	11.69
6 - 11	171	22.98	34.68
12 - 19	250	33.60	68.28
20 - 28	185	24.87	93.15
29 - 38	51	6.85	100.00
> 38	0	0.00	100.00

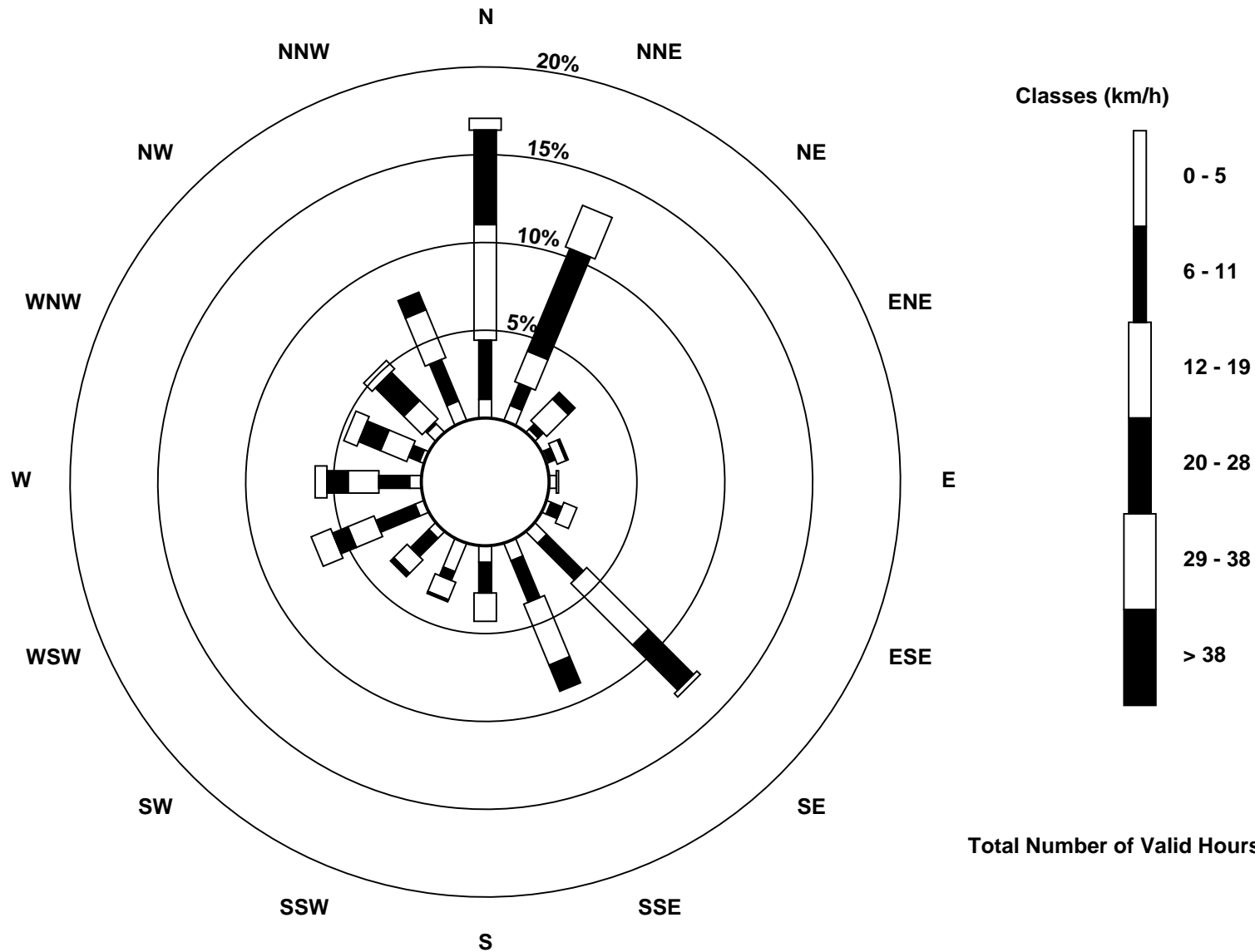
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 44 km/h on May 4 19:00	Maximum Daily Speed Average: 31.5 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 25 08:00	Minimum Daily Speed Average: 3.2 km/h on May 31	Hours of Data: 744
Maximum Diurnal Speed Average: 9.6 km/h at hour 17	Minimum Diurnal Speed Average: 2.2 km/h at hour 1	Hours of Missing Data: 0
Monthly Average Velocity: 4.4 km/h 341.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 11 Median = 18 Q ₃ = 24 P ₉₀ = 30 P ₉₉ = 40	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	S9 SSW12	S11	S13	S13	SSW8	S7	S6	SSE14	SSE10	SSE6	WSW14	W22	W20	WSW22	W18	WSW15	W13	NW18	NNW22	N18	N16	NNW7	WNW2	WSW6.6	NNW22	
2-May	WSW3	NW7	NW1	NW6	NNW3	SW2	S5	S5	SSE3	SSE4	SE5	SSE7	SE5	SE6	SE6	ESE7	SE9	SE8	SE11	SE17	SSE19	SSE21	SE31	SE33	SE7.5	SE33
3-May	SE34	SE32	SE30	SE31	SSE29	SSE28	SSE19	SSE20	SSE15	SE16	SE14	SE12	SSE18	SSW17	SW20	SW19	SW17	SSW14	SW16	SSW20	SSW21	SSW16	S17	SW10	S17.3	SE34
4-May	SW16	SW10	SW14	SW14	SW7	SSW8	WSW14	SW8	SSW5	SSW4	WSW9	W25	W18	W10	W32	WNW34	NW35	WNW42	WNW44	W34	W40	WNW40	WNW35	NW32	W19.7	WNW44
5-May	NW30	NW31	NW31	NW26	NW23	WNW22	WNW24	WNW18	NW14	WNW19	NW21	WNW19	WNW27	WNW31	WNW31	NW28	NW28	NW31	NW27	NW30	NNE22	NE23	NNE15	NNE13	NW21.2	NW31
6-May	NW6	WNW6	W9	W16	W14	W8	WNW8	WNW4	S2	SSE3	W14	W8	W13	WSW12	WSW10	W16	WSW18	WSW19	WSW15	WSW14	SSW12	SSE23	SSE24	SSE23	WSW8.4	SSE24
7-May	SSE23	SSE25	SSE23	S23	SSE24	SSE24	S27	S21	S14	SSW10	SSW8	SSW7	SSE2	SSE5	WSW11	WNW15	S1	SE15	SE29	SE30	SE33	SE19	SSE11	SSE5	SSE14.8	SE33
8-May	NE2	ENE10	N15	NNW20	NW21	NW27	WNW28	WNW41	WNW26	W11	SW12	WSW23	WSW36	WSW34	WSW36	WSW40	WSW41	WSW39	WSW39	WSW38	NW25	NW39	NW33	NW32	W21.9	WNW41
9-May	WNW31	WNW29	WNW28	WNW32	WNW31	W27	W29	WNW29	WNW29	NW32	NW24	NW20	NW23	NW24	NW21	NW23	NW21	WNW20	NW20	WNW20	WNW20	N17	NNE13	N10	WNW22.4	WNW32
10-May	NW7	W11	W16	W18	WNW14	NNW11	NW5	NNE6	N7	N9	N12	N14	N15	NNE17	NNE18	NNE21	NNE21	NNE22	NE24	NE23	NE23	ENE27	ENE29	ENE23	NNE11.2	ENE29
11-May	ENE13	ENE12	NNE10	NNE13	NNE13	N17	N15	NNE18	NNE23	NNE20	N21	NNE24	NNE24	NNE25	NNE26	NE24	NNE24	NNE27	NNE29	NNE30	NNE29	NE32	NE31	NE21	NNE21.1	NE32
12-May	NNE8	NNE12	NNE14	NNE11	N13	N18	N12	N11	NNE20	N21	NNE23	NNE22	NNE24	NNE24	NNE21	NNE19	NNE22	NNE23	NNE21	NE20	NE20	NE15	NE8	NW4	NNE16.5	NNE24
13-May	WNW10	W8	WNW9	W8	WSW10	WSW5	SW9	WSW10	W9	W11	WSW12	WSW12	WSW12	WSW11	WSW9	NNW4	NNW10	NNW13	N10	NE8	NE16	NE17	ENE19	ENE12	WNW4.0	ENE19
14-May	E5	NNW4	NNE4	NE5	NNW1	WNW4	SW4	SSW2	SW2	WSW3	WNW2	NNW4	NNW9	NNW11	N11	N13	N10	N12	NE14	NE18	NE26	NE21	NE9	NNE6	NNE6.4	NE26
15-May	NW2	WNW7	NE6	SSW6	SW7	SW7	SSW5	S4	SSE5	S7	SSE6	WSW6	WSW6	W6	NW2	WSW6	SSE8	SSE14	SSE16	SSE20	S31	S31	S26	S20	S8.4	S31
16-May	SSE16	SW15	SSW13	SSW10	S8	SSW10	S8	SSE5	SSE7	S7	S6	SSW24	SSW18	SSW10	SE11	SE16	SE18	SE18	SE18	SE17	SE15	SSE19	S21	SSE13	SSE11.8	SSW24
17-May	SSE7	SW6	SW8	SW18	SW19	WSW19	WSW26	WSW37	W29	WNW19	W13	WSW11	W14	WNW15	WNW17	WNW21	WNW14	WNW10	NNW9	E2	S13	SW20	W24	W11	WSW13.4	WSW37
18-May	SW8	WSW19	WSW17	SW8	SW11	SSW7	SSW8	SW16	WSW23	WSW25	WSW22	WSW28	WSW33	W34	WSW26	WSW28	W27	WNW22	WNW12	NNW6	NNE26	NNE34	NNE32	NNE28	W13.1	W34
19-May	NNE30	N28	N26	N29	N29	N30	NNE33	NNE30	NNE31	NNE35	NNE37	NNE32	NNE34	NNE35	NNE35	NNE41	NNE33	NNE32	NNE32	NNE31	NNE29	NNE28	NNE29	NNE31	NNE31.5	NNE41
20-May	NNE30	NNE28	NNE29	NNE28	NNE26	NNE23	NNE21	NNE23	NE23	NE17	NE20	NE21	NNE21	NNE25	NNE26	NNE24	N28	N26	N29	N22	NNE18	N15	NNW19	NNW17	NNE22.3	NNE30
21-May	NNW15	N15	NNE14	NNE13	N19	NNE19	NNE18	N17	N16	N19	N18	N22	N19	N23	N27	N26	N26	NNE25	N23	N22	N22	N21	N24	NNE25	N20.2	N27
22-May	NNE19	NNE19	NNE21	N24	N27	NNE25	NNE26	NNE28	NNE31	NNE28	NNE30	NNE29	NNE30	NNE33	NNE33	NNE32	NNE33	NNE33	NNE35	NNE33	NNE31	NNE34	NNE30	NNE33	NNE28.9	NNE35
23-May	NNE17	NE15	NNE17	NE19	NNE28	NNE22	N17	N16	N15	N17	NNE20	NNE20	NE17	NE22	NE18	ENE21	NE18	ENE16	ENE18	E17	ESE19	S21	S21	S24	NE12.5	NNE28
24-May	S25	S25	S16	S16	S16	S20	S8	SSE7	SSE9	SSE14	SSE16	SSE23	SSE23	SSE22	SSE23	SSE20	WNW14	WNW4	S12	SSW22	SW27	SSW24	SSW22	SSW21	S15.8	SW27
25-May	SSW20	S16	S13	S14	S10	S7	SSW6	NW1	N3	N3	N5	N11	N15	N19	N20	N22	N25	N31	NNE27	NNE23	NNE21	NNE24	NNE25	NNE23	NNE8.7	N31
26-May	NNE22	N26	N27	NNE21	N17	N20	NNE16	NNE17	N13	NNW21	N22	NNW25	N22	N22	NNW17	NNW21	NNW22	NNW19	NNW19	N17	N17	N14	N15	N17	N19.1	N27
27-May	NNE12	N13	NNE11	NNE11	ENE7	SE13	SE18	SE27	SSE24	SE13	SE19	ESE12	ESE13	SE16	SE16	SW27	SW11	SSW13	SSE22	ESE22	SE22	SSE24	SSE25	SE21	SE11.8	SE27
28-May	SSE24	SE26	SE31	SE30	SE28	SE25	SE24	SE23	SE19	SSE14	SE19	SE21	SSE17	S19	S20	S15	S11	S14	SW21	SSW12	S14	SW11	WSW16	W19	SSE16.5	SE31
29-May	W15	W11	W11	WSW12	WSW6	SW4	WNW7	WSW2	WSW6	WSW8	WSW7	W9	NNW5	NNW4	NNE4	NNE5	NNE7	NNE11	NE14	NNE11	NNE13	NE11	NNE10	N8	NW3.7	W15
30-May	N14	N14	N15	NNW15	NW12	NNW13	NNW11	NW13	NW14	NNW13	NNW14	NNE15	N14	NW13	NNW23	NNW21	NNW26	NNW24	NNW20	N20	N22	NNE19	N18	N14	NNW15.8	NNW26
31-May	N12	N8	NW8	NW5	WNW5	NW9	N6	N4	NW6	N6	W5	WSW7	W8	W8	W8	W7	W5	WNW5	SE12	SSE15	S17	S19	S20	S25	SW3.2	S25

N2.2NNW2.8NNW3.3 NW3.1 NW3.2 NW3.0WNW3.0 NW3.1NNW3.4NNW4.2NNW4.2 NW4.8 NW5.9 NW6.3 NW7.1NNW8.6NNW9.6NNW8.3 N6.5 NNE5.1 NE5.3 NNE5.2 NNE4.1 NNE3.6	Diurnal Average
SE34 SE32 NW31WNW32WNW31 N30 NNE33WNW41 NNE31 NNE35 NNE37 NNE32 WSW36 NNE35 WSW36 NNE41 WSW41WNW42WNW44WSW38 W40WNW40WNW35 SE33	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

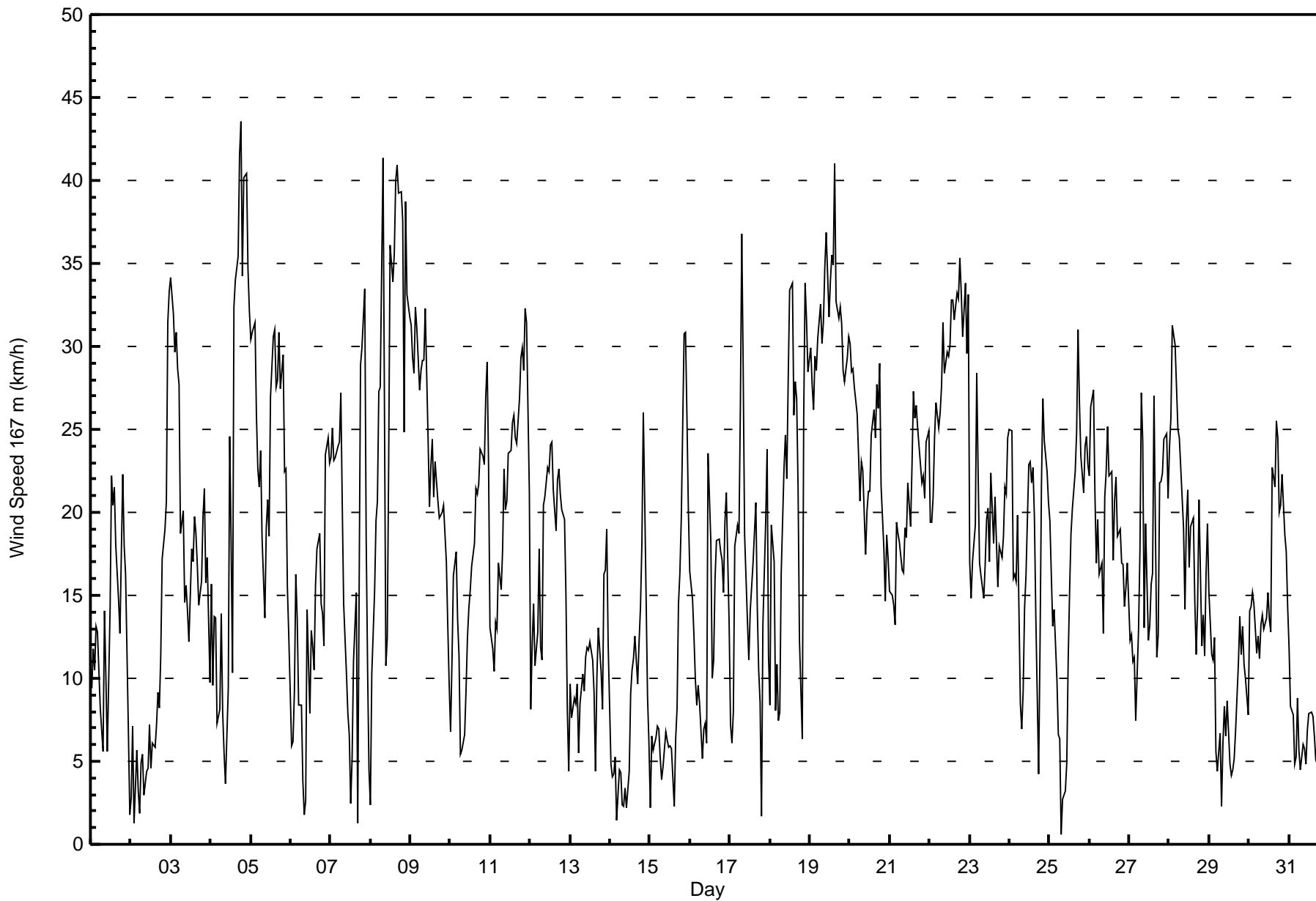
Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on May 7 22:00 Minimum Value: 0 km/h on May 15 00:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	2	2	2	4	2	1	1	4	3	3	10	4	4	3	4	3	5	6	3	1	3	3	1	10
2-May	1	1	2	1	2	2	2	3	1	1	1	2	2	2	4	4	4	2	3	2	2	3	4	2	4
3-May	2	3	3	2	2	4	5	3	4	3	4	2	4	6	8	5	6	5	4	2	2	5	3	5	8
4-May	5	3	2	3	2	5	3	3	2	2	3	3	4	4	10	7	7	7	4	5	4	6	7	5	10
5-May	3	5	3	3	4	3	2	6	4	4	5	6	8	8	6	6	6	5	6	3	5	2	5	2	8
6-May	1	2	2	3	2	3	2	3	2	2	6	4	5	4	6	6	4	4	3	2	3	2	3	3	6
7-May	3	2	3	2	2	2	3	5	3	3	2	3	1	2	7	5	3	8	2	2	2	13	4	4	13
8-May	1	4	4	2	4	4	4	8	6	6	5	6	5	4	4	5	4	4	5	3	4	8	6	5	8
9-May	4	5	4	4	6	3	3	4	4	6	5	4	5	4	4	4	4	4	4	3	2	5	2	3	6
10-May	1	3	5	2	3	2	2	2	2	3	2	5	4	4	5	4	5	4	4	4	2	3	1	6	6
11-May	3	2	1	2	2	2	2	5	4	4	5	5	5	5	5	4	5	4	5	5	3	2	1	7	7
12-May	2	2	1	1	2	2	2	2	5	4	5	6	7	6	6	5	5	5	5	4	1	2	3	2	7
13-May	1	1	1	1	1	1	1	1	2	3	4	4	3	5	5	5	4	2	3	2	3	2	2	4	5
14-May	3	1	1	1	1	1	1	2	1	2	2	3	5	5	5	5	4	5	3	2	2	3	3	0	5
15-May	2	1	1	1	2	1	1	1	1	1	2	4	2	3	3	3	5	3	3	2	5	5	5	4	5
16-May	4	5	2	3	2	2	3	2	2	2	5	5	5	5	3	3	3	3	2	5	4	4	5	6	6
17-May	4	3	4	6	3	3	8	2	4	5	3	3	3	3	6	4	3	3	2	1	9	5	4	2	9
18-May	3	4	4	3	3	2	3	6	4	4	3	4	5	5	5	2	5	5	3	8	5	6	7	6	8
19-May	5	5	3	4	4	5	6	5	6	6	7	7	6	6	8	7	8	6	6	5	5	4	4	4	8
20-May	4	4	5	4	4	5	4	5	5	4	4	5	5	5	4	4	4	4	3	3	3	3	3	2	5
21-May	2	3	3	2	5	4	3	2	2	3	3	3	3	2	2	3	3	5	4	4	3	3	3	4	5
22-May	5	3	3	3	4	4	5	6	6	7	7	5	5	6	6	6	7	5	7	6	4	3	2	1	7
23-May	6	2	2	2	2	5	2	2	3	3	4	5	5	8	6	5	6	6	4	3	3	2	1	2	8
24-May	3	4	3	2	2	3	4	2	2	3	5	8	6	5	3	4	4	2	3	4	3	4	3	2	8
25-May	2	2	3	2	2	2	2	1	1	2	2	4	3	4	3	4	3	4	4	5	4	3	3	3	5
26-May	3	3	4	7	3	3	3	3	2	3	3	5	5	5	3	3	3	3	4	3	2	2	2	2	7
27-May	2	2	2	2	3	5	5	4	4	3	4	4	4	5	5	9	8	9	5	4	3	6	4	3	9
28-May	3	2	3	5	5	3	3	3	3	4	4	3	3	8	8	4	4	4	4	4	2	3	2	3	8
29-May	4	2	2	2	3	3	2	1	2	2	3	2	1	1	2	1	2	2	4	2	2	2	1	1	4
30-May	1	1	1	1	1	1	1	2	2	3	2	3	3	4	7	4	4	3	2	5	3	5	3	2	7
31-May	1	1	1	1	2	2	1	2	3	4	4	3	3	3	3	3	3	3	4	2	3	2	3	2	4
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	61	8.20	8.20
6 - 11	143	19.22	27.42
12 - 19	223	29.97	57.39
20 - 28	214	28.76	86.16
29 - 38	92	12.37	98.52
> 38	11	1.48	100.00

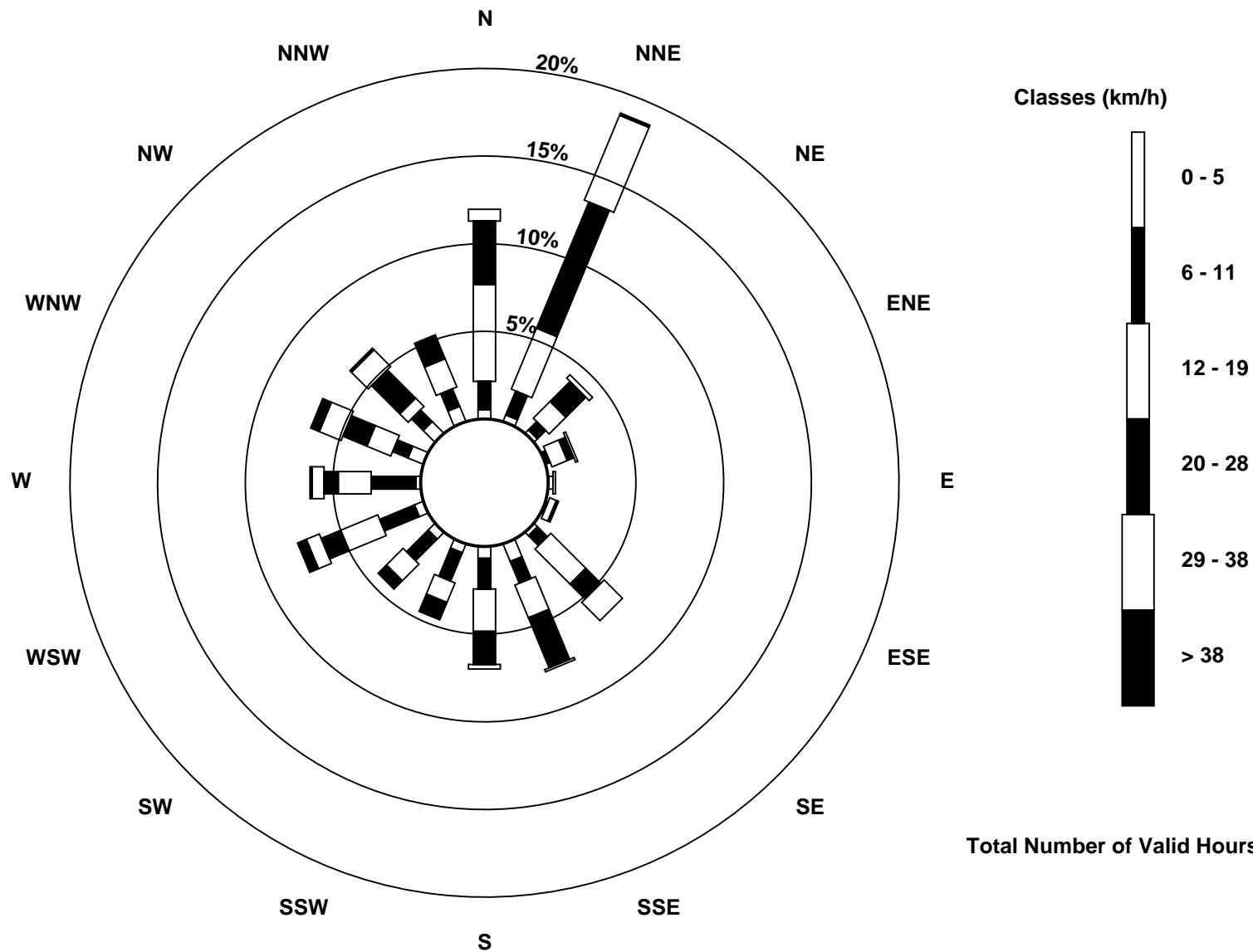
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 252 deg on May 8 18:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 8.7 deg on May 19	Hours of Data: 744
Direction of Minimum Speed: 164 deg on May 13 01:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.4 deg on May 13	Percent Operational Time: 100.0
Monthly Average Direction: 306.2 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-May	181	191	146	134	132	132	151	147	145	153	146	260	277	278	255	280	261	260	326	331	344	309	139	142	227.3
2-May	159	142	212	177	191	127	141	143	156	122	109	153	130	150	150	130	160	162	153	158	148	139	144	139	145.0
3-May	147	150	137	142	145	153	148	146	149	145	140	146	149	197	222	232	240	194	203	198	152	153	138	146	167.0
4-May	152	152	149	145	146	150	136	150	146	144	163	271	274	271	289	309	316	294	293	291	283	304	307	317	280.5
5-May	312	317	315	310	347	301	285	303	313	307	311	292	301	298	302	324	324	331	331	327	15	2	326	348	314.3
6-May	298	348	141	236	311	7	75	100	104	117	285	240	267	247	241	260	261	252	251	238	154	152	177	181	243.5
7-May	157	147	153	138	127	151	157	159	154	151	148	144	139	141	245	289	164	155	158	151	144	137	149	46	152.9
8-May	353	348	345	330	315	311	301	298	293	277	228	251	258	254	259	261	255	252	252	254	319	319	326	318	277.5
9-May	311	316	296	296	284	281	278	291	299	320	318	314	321	323	319	323	317	305	323	303	290	343	8	347	308.2
10-May	301	328	305	337	338	332	345	344	19	24	27	7	12	24	25	24	26	27	34	39	45	63	65	339	18.1
11-May	2	10	348	343	3	328	350	2	10	22	11	10	21	25	23	36	26	17	10	18	18	23	14	340	15.2
12-May	354	345	39	351	309	329	340	351	8	5	22	30	27	30	22	26	19	17	16	36	35	262	254	350	15.5
13-May	164	160	8	151	135	132	135	147	150	261	248	244	247	240	238	325	335	356	356	47	34	320	338	344	226.6
14-May	317	306	177	341	145	85	138	153	187	207	237	276	348	359	353	17	344	11	55	39	22	337	173	329	7.6
15-May	174	359	164	151	156	139	141	144	142	138	145	218	222	233	21	243	161	159	159	148	158	146	137	159	156.9
16-May	11	139	148	145	147	149	148	141	146	144	150	215	205	179	132	139	121	138	103	119	114	146	161	155	153.6
17-May	340	295	176	156	155	147	232	268	275	287	257	245	279	284	303	293	300	305	1	181	147	224	246	189	262.2
18-May	160	152	151	151	146	146	142	164	253	258	260	255	260	270	261	258	293	295	287	325	358	6	4	5	270.8
19-May	11	6	356	350	348	0	14	12	12	13	14	9	14	12	15	17	15	12	11	10	4	5	5	8	8.7
20-May	10	16	14	18	17	13	14	29	24	45	42	43	26	14	12	10	356	355	356	353	355	335	326	319	10.8
21-May	321	338	11	337	350	359	352	350	353	351	346	350	356	350	359	2	1	10	4	3	351	350	353	360	354.9
22-May	5	2	2	359	360	3	9	15	14	21	23	13	22	24	22	17	24	13	20	20	12	2	351	354	13.4
23-May	66	349	359	358	354	333	346	358	358	2	9	18	26	48	49	60	62	74	86	101	139	151	142	142	46.0
24-May	152	150	138	149	158	156	147	148	145	143	157	164	171	173	169	166	304	12	148	202	219	204	189	152	166.1
25-May	155	88	126	156	151	153	148	96	33	314	14	349	357	358	2	9	360	4	30	13	2	358	360	5	20.9
26-May	1	9	5	356	337	2	5	15	357	343	350	338	345	345	324	329	337	344	347	350	1	333	325	343	349.0
27-May	339	331	324	340	325	356	4	149	161	119	129	127	145	160	157	235	234	185	151	125	145	179	152	133	159.4
28-May	166	140	133	132	154	138	141	150	145	169	154	151	180	188	182	196	191	193	228	222	175	224	233	256	171.5
29-May	280	280	262	220	210	217	283	240	252	250	257	277	1	8	21	24	359	18	30	18	12	291	348	319	303.4
30-May	339	336	337	333	321	334	336	334	327	340	349	20	1	317	329	338	334	331	341	357	355	333	336	344	339.6
31-May	335	342	354	261	105	33	327	358	295	25	247	252	250	268	264	249	256	356	151	162	155	129	140	146	207.2

353.4	6.2	28.7	37.5	56.4	71.7	98.8	68.9	3.2	359.2	347.5	300.1	307.5	308.1	312.0	318.6	326.1	330.1	347.1	351.6	37.0	342.4	354.6	2.5
Diurnal Average																							

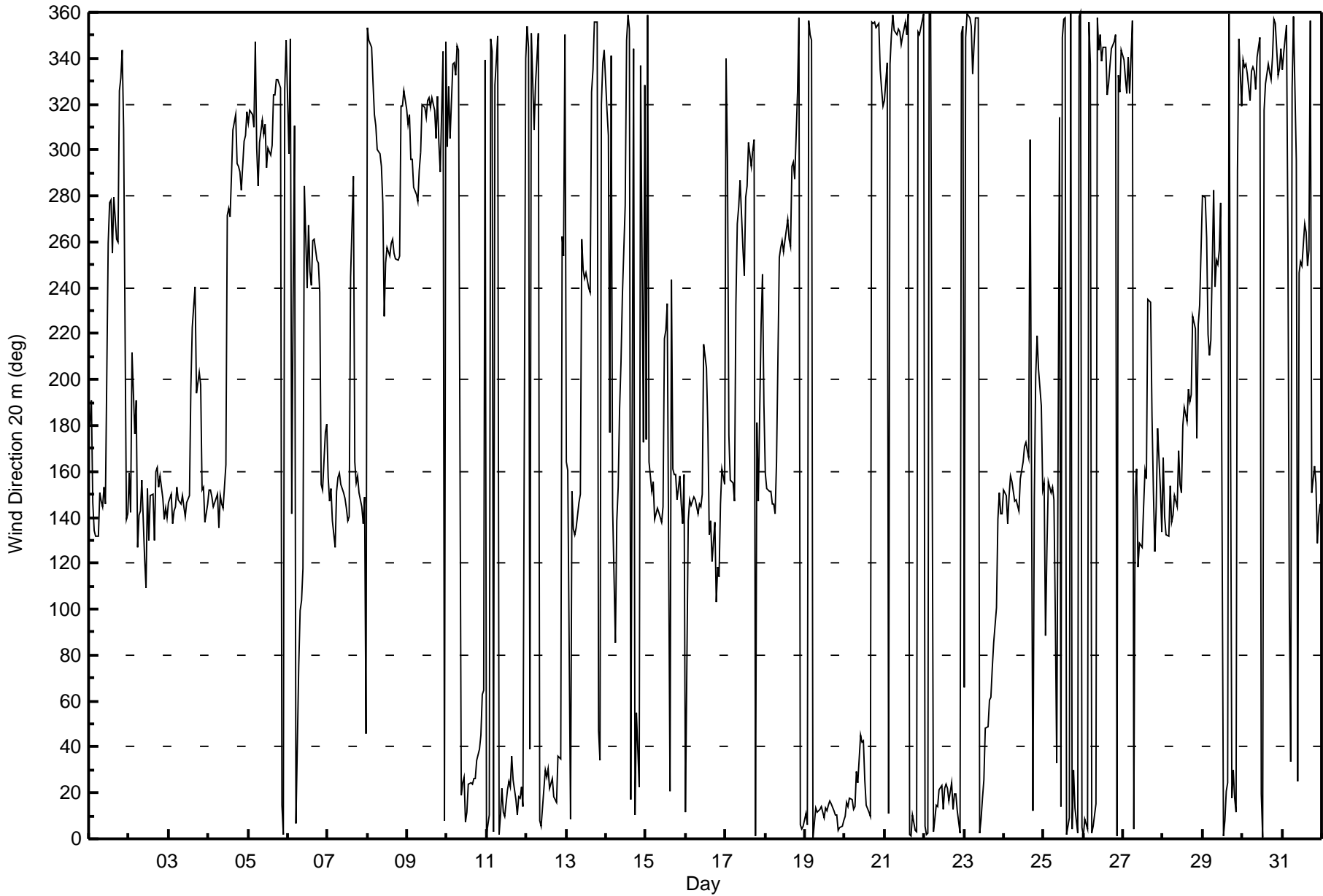
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on May 15 15:00 Minimum Value: 8 deg on May 24 00:00 Percentiles: P ₁ = 10 P ₁₀ = 17 Q ₁ = 21 Median = 26 Q ₃ = 38 P ₉₀ = 63 P ₉₉ = 94		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	49	49	75	25	48	14	15	17	20	18	18	59	23	23	19	28	25	22	33	13	31	100	45	32	100
2-May	71	74	66	72	87	77	17	34	49	38	38	24	34	23	42	61	23	26	16	24	12	10	15	12	87
3-May	14	72	21	26	36	26	20	23	17	21	19	19	16	28	29	26	28	36	31	11	11	89	48	73	89
4-May	44	31	14	45	29	20	51	13	16	20	35	25	26	38	24	20	19	21	19	17	18	18	16	17	51
5-May	15	16	15	18	29	36	19	24	25	24	25	31	30	25	29	22	24	18	20	15	31	35	21	38	38
6-May	94	51	80	78	50	36	51	69	50	49	53	55	57	38	47	35	26	18	22	12	53	23	97	94	97
7-May	21	29	30	15	34	18	11	13	15	16	17	19	29	35	71	27	67	30	9	12	15	87	48	70	87
8-May	93	33	32	27	42	18	17	19	30	75	17	18	17	16	18	18	18	16	15	14	24	18	19	18	93
9-May	17	17	16	16	18	18	19	22	21	21	21	20	23	22	22	22	24	22	20	19	18	30	26	40	40
10-May	16	31	74	63	40	34	83	36	52	61	35	43	42	38	33	32	33	33	31	31	29	23	24	37	83
11-May	26	25	77	31	47	45	28	28	29	36	34	31	36	33	33	35	33	29	24	26	22	23	32	26	77
12-May	17	32	88	80	39	24	34	26	31	25	37	41	39	41	36	43	34	31	28	30	33	69	65	28	88
13-May	92	35	91	23	14	15	17	14	20	38	38	36	29	32	54	94	63	26	27	25	47	33	26	41	94
14-May	39	49	53	43	74	89	32	40	37	25	92	94	60	71	53	66	65	38	38	29	30	58	85	73	94
15-May	33	87	30	53	45	14	19	16	15	17	24	40	39	56	103	37	63	16	9	10	12	13	14	72	103
16-May	92	21	14	27	23	21	27	22	23	17	63	17	14	37	18	34	51	24	53	78	72	72	87	67	92
17-May	36	75	97	54	19	38	56	20	22	32	29	23	31	29	34	26	28	34	22	49	17	22	22	62	97
18-May	88	34	20	19	14	21	15	43	20	19	21	19	21	21	20	19	26	21	27	54	20	24	24	24	88
19-May	26	24	22	21	24	23	24	26	26	27	26	23	27	26	27	24	29	26	25	27	24	24	23	23	29
20-May	24	26	25	27	26	25	29	32	31	47	41	40	37	27	24	25	20	23	23	26	26	27	21	17	47
21-May	18	28	40	29	24	35	25	30	23	23	25	25	21	23	21	22	23	30	26	26	25	22	23	22	40
22-May	29	21	23	20	22	24	25	26	27	31	30	27	32	30	32	28	32	25	27	27	22	14	13	18	32
23-May	64	58	14	14	26	35	25	22	26	33	28	34	39	50	46	40	48	44	41	27	31	12	8	8	64
24-May	11	12	24	13	14	18	18	22	21	21	28	22	20	22	18	24	39	73	14	15	13	15	20	10	73
25-May	12	34	24	19	18	18	21	62	58	45	65	40	28	24	26	26	25	21	31	26	21	19	19	23	65
26-May	20	22	23	26	27	26	29	32	30	26	24	26	25	24	26	24	24	26	25	28	29	30	19	31	32
27-May	33	30	26	34	33	39	55	21	18	42	39	64	39	21	20	47	49	42	17	41	21	25	23	30	64
28-May	17	19	18	19	17	20	19	20	22	24	21	21	20	15	24	21	31	22	19	18	19	74	13	22	74
29-May	25	30	71	24	61	72	42	42	18	26	34	28	37	52	65	51	37	33	38	33	30	45	24	23	72
30-May	24	20	24	24	19	17	25	23	19	26	23	34	26	37	26	28	25	22	23	25	21	36	23	24	37
31-May	34	55	67	78	90	73	54	67	70	81	44	41	38	50	59	46	68	72	21	9	8	42	12	18	90
Diurnal Maximum																									





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 246 deg on May 8 17:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 5.7 deg on May 19		Hours of Data: 744
Direction of Minimum Speed: 77 deg on May 13 03:00	Direction of Minimum Daily Speed Average: 1.4 deg on May 13	Hours of Missing Data: 0
Monthly Average Direction: 308.4 deg		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	194	171	159	135	135	134	139	136	136	142	134	255	269	269	247	272	254	254	320	327	349	322	161	211	221.3
2-May	156	177	143	151	150	144	137	130	134	111	98	142	121	139	134	112	148	147	139	142	141	131	135	133	135.5
3-May	138	135	131	133	136	142	139	135	139	133	132	137	140	190	216	223	233	184	199	186	144	149	132	139	156.2
4-May	146	145	145	154	139	139	133	138	135	132	154	264	264	263	280	300	306	284	283	281	273	293	297	308	270.1
5-May	301	309	306	297	330	288	276	294	307	299	303	283	291	288	292	315	315	323	323	320	16	7	330	343	306.2
6-May	257	338	203	236	286	6	61	84	92	105	276	239	261	240	238	253	253	244	243	231	163	139	146	148	235.2
7-May	142	135	142	133	123	139	145	147	144	141	139	135	123	127	245	280	159	143	147	142	137	126	141	31	142.0
8-May	354	357	341	326	306	303	292	289	283	271	221	243	249	245	249	253	246	244	243	244	313	312	319	308	269.5
9-May	302	304	286	285	273	270	267	280	288	311	309	306	313	312	311	315	309	296	314	292	280	336	5	353	298.6
10-May	295	300	289	297	324	339	343	343	12	13	15	0	5	22	24	21	22	25	30	34	40	52	65	354	14.5
11-May	350	4	355	346	353	337	347	358	9	16	7	6	17	21	19	31	21	15	7	16	16	21	19	349	11.5
12-May	346	357	14	323	321	343	344	342	4	2	18	25	21	24	15	20	16	13	14	32	31	263	236	324	11.6
13-May	295	154	77	155	139	133	130	136	146	256	242	237	242	234	233	324	327	348	349	42	43	336	345	336	229.5
14-May	328	285	232	248	205	95	131	137	178	212	247	289	336	347	344	12	344	3	47	35	25	6	208	292	3.7
15-May	177	326	156	144	148	138	136	136	132	132	134	213	221	236	12	239	152	148	148	145	153	144	131	139	148.6
16-May	115	128	140	138	138	140	138	135	137	136	144	205	195	175	115	127	118	129	105	122	118	133	146	140	142.9
17-May	346	311	157	146	159	167	230	257	264	278	251	239	270	276	293	283	292	296	353	186	142	217	243	222	254.0
18-May	166	177	157	138	140	140	137	165	245	249	253	247	251	261	253	249	282	286	282	318	354	4	1	2	262.3
19-May	10	2	353	344	341	356	11	10	11	11	11	5	12	8	12	14	12	10	9	7	0	1	3	6	5.7
20-May	8	14	13	14	14	14	11	26	21	40	36	40	22	11	7	6	350	348	352	350	349	335	323	315	7.4
21-May	319	339	11	336	347	355	350	347	346	345	339	342	350	343	356	358	359	10	1	357	347	347	348	355	350.6
22-May	1	359	358	355	356	359	8	13	11	20	21	11	19	19	18	14	22	10	16	18	11	358	343	344	10.2
23-May	16	349	351	352	351	341	344	352	353	356	5	14	21	47	42	55	53	66	77	92	123	145	137	134	38.9
24-May	147	144	134	139	146	144	142	137	137	136	148	151	159	164	159	156	295	12	138	189	212	196	183	150	157.2
25-May	153	100	120	149	142	141	137	85	25	315	11	345	349	352	358	4	356	360	24	10	357	354	354	359	15.4
26-May	355	6	1	352	331	358	3	13	354	337	343	330	339	338	318	321	331	336	339	346	355	333	326	340	343.5
27-May	341	335	335	346	335	350	2	138	151	111	121	119	132	150	144	230	230	177	139	113	136	161	142	125	142.8
28-May	154	133	126	125	143	130	133	139	134	156	143	140	167	177	174	185	183	182	220	213	168	197	227	248	161.0
29-May	268	268	256	214	210	207	273	236	243	241	250	265	349	358	9	14	356	15	25	13	17	314	341	341	302.5
30-May	347	334	333	333	326	331	330	328	320	333	341	20	354	308	322	329	326	324	336	354	351	337	332	340	334.7
31-May	337	325	339	234	143	344	331	349	294	10	242	250	247	268	261	246	259	347	139	153	157	137	137	141	201.2

355.0	6.0	18.8	31.3	43.9	66.6	77.7	44.1	4.5	355.9	349.2	304.9	307.9	310.3	312.8	316.9	323.8	329.9	350.9	357.7	29.8	353.6	360.0	0.8
Diurnal Average																							

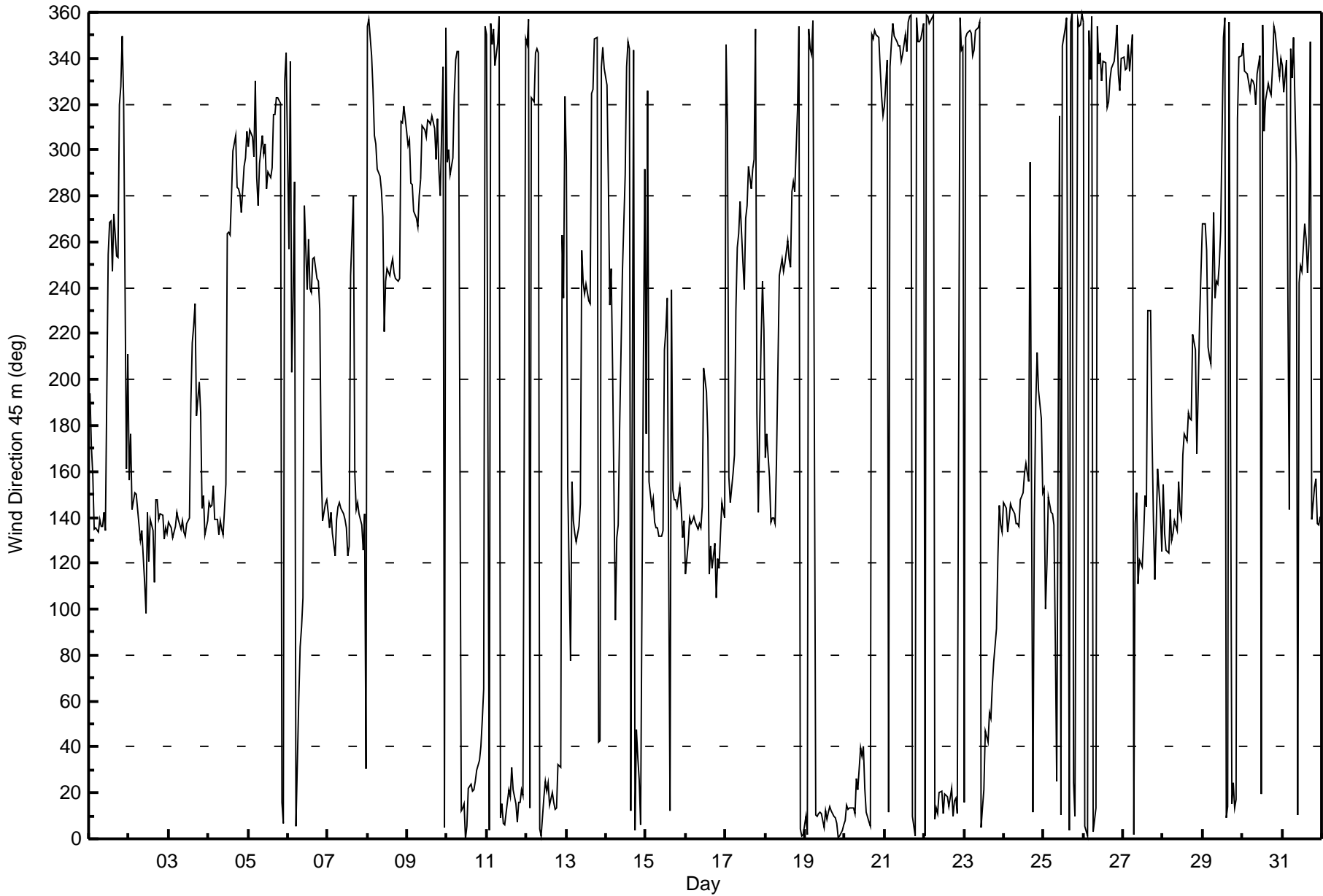
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on May 7 00:00 Minimum Value: 3 deg on May 24 00:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 15 Median = 19 Q ₃ = 29 P ₉₀ = 50 P ₉₉ = 87																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	32	26	34	13	15	9	11	12	15	12	16	61	16	18	13	23	22	18	29	10	9	62	47	27	62
2-May	31	48	25	33	52	21	7	26	49	32	35	19	30	22	34	55	22	22	14	20	8	6	8	7	55
3-May	7	35	14	17	26	19	15	17	13	15	14	14	11	28	31	26	25	36	30	10	13	88	27	71	88
4-May	24	13	14	43	8	14	37	7	11	18	38	17	17	32	20	17	16	17	14	12	13	13	12	15	43
5-May	13	13	12	12	20	29	13	19	19	21	22	26	26	22	27	20	20	15	16	12	25	27	20	19	29
6-May	74	60	61	68	32	22	36	69	55	46	48	53	45	33	46	33	22	12	18	10	28	15	57	98	98
7-May	15	21	18	10	19	12	8	10	9	9	10	12	18	36	68	20	67	19	6	6	8	73	38	72	73
8-May	41	22	19	15	36	15	12	13	26	49	15	12	10	10	12	11	12	11	9	8	21	15	14	15	49
9-May	13	13	10	11	13	13	14	16	15	17	17	16	18	19	17	18	18	19	17	14	11	29	22	32	32
10-May	18	25	60	53	32	26	59	31	40	51	27	34	34	31	26	26	26	26	21	19	17	13	12	42	60
11-May	20	11	25	15	25	19	19	21	21	28	28	25	29	24	27	25	27	23	20	17	16	14	16	15	29
12-May	10	14	56	48	32	15	26	22	27	20	26	31	31	31	26	32	24	24	20	18	11	73	24	30	73
13-May	66	29	80	30	9	10	13	9	24	31	32	30	27	29	50	88	57	21	20	18	18	23	15	33	88
14-May	31	28	71	31	44	78	29	40	42	30	90	88	52	58	41	59	59	30	24	17	14	22	74	28	90
15-May	71	63	26	26	18	7	12	10	9	13	18	43	39	52	89	31	68	13	7	9	10	11	7	50	89
16-May	93	16	9	18	15	13	17	16	16	11	58	18	15	33	10	18	33	15	25	65	53	53	66	52	93
17-May	27	75	37	25	21	37	50	12	14	22	23	18	24	21	26	20	21	25	18	54	15	20	11	37	75
18-May	90	43	21	6	7	13	9	42	12	12	12	11	13	13	13	11	19	15	20	52	14	17	17	19	90
19-May	20	18	16	15	15	16	18	18	18	19	18	18	20	19	19	17	21	19	18	19	17	17	18	17	21
20-May	19	19	18	18	20	19	20	22	21	33	31	29	28	22	17	18	14	15	16	17	18	22	14	13	33
21-May	14	18	28	23	17	24	18	18	16	14	17	15	15	14	15	17	17	20	18	20	15	14	15	15	28
22-May	20	17	17	14	16	17	19	20	18	22	19	19	22	22	21	20	21	18	19	19	15	11	9	11	22
23-May	66	54	9	8	15	24	18	16	18	24	23	26	32	35	36	30	38	35	29	19	29	10	4	3	66
24-May	10	8	14	9	10	13	13	16	15	15	25	20	18	18	15	23	30	51	14	13	12	15	15	5	51
25-May	8	27	20	12	13	15	16	58	41	41	56	31	17	19	20	19	18	16	19	20	16	14	15	16	58
26-May	14	17	17	20	18	19	20	24	24	19	17	20	18	17	20	17	16	18	16	19	22	18	12	19	24
27-May	21	16	17	20	18	26	50	16	14	32	28	42	29	17	17	48	46	42	12	29	15	22	19	17	50
28-May	16	12	12	13	14	15	14	16	15	22	17	16	17	13	22	20	31	20	18	17	18	43	9	15	43
29-May	18	25	57	24	67	55	35	49	13	16	29	23	30	39	55	42	28	26	27	23	16	40	18	14	67
30-May	14	11	15	14	12	9	15	16	12	19	15	25	19	36	19	19	18	14	15	20	16	28	15	18	36
31-May	16	29	35	50	77	66	42	51	58	87	46	34	32	42	47	38	64	64	20	8	9	18	8	11	87
Diurnal Maximum																									





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - May 2016

Direction of Maximum Speed: 281 deg on May 4 19:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 9.8 deg on May 19		Hours of Data:	744
Direction of Minimum Speed: 323 deg on May 1 23:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.0 deg on May 13		Percent Operational Time:	100.0
Monthly Average Direction: 289.7 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-May	172	205	159	150	168	153	146	138	137	143	139	252	264	266	245	272	252	260	320	329	350	355	323	153	226.9
2-May	203	146	164	164	152	172	163	146	99	126	122	142	131	132	129	109	139	138	131	128	154	144	140	139	140.0
3-May	143	144	140	143	146	146	145	143	142	135	135	138	142	195	216	222	232	189	212	193	177	180	159	179	160.4
4-May	200	187	216	225	190	173	202	145	139	136	197	264	264	264	279	300	305	282	281	279	270	292	292	306	274.2
5-May	308	307	309	302	304	287	278	295	310	298	303	282	289	287	291	315	316	320	321	320	25	34	6	347	308.1
6-May	283	268	251	255	264	273	350	46	100	119	276	261	273	245	244	256	253	241	243	235	199	146	143	145	228.5
7-May	147	140	143	151	143	144	150	153	151	151	154	141	109	129	248	280	152	141	140	143	140	136	150	134	147.0
8-May	25	57	353	333	306	304	293	286	283	268	223	241	246	243	247	250	243	241	240	242	313	313	319	306	273.5
9-May	300	299	283	281	275	269	267	277	286	309	309	308	313	312	312	317	308	297	313	291	279	343	9	7	298.2
10-May	300	273	266	262	294	351	335	1	15	8	11	4	10	24	27	23	26	28	31	37	45	58	78	66	19.7
11-May	20	13	351	344	351	345	356	7	11	21	8	10	19	21	19	34	25	18	11	17	17	29	36	17	15.6
12-May	348	346	359	346	345	356	358	349	9	7	20	25	25	26	19	24	18	15	18	34	42	31	16	273	13.8
13-May	268	214	196	207	199	168	170	202	227	260	249	240	244	236	235	337	330	347	359	49	52	34	58	59	270.9
14-May	360	343	21	55	4	134	214	125	172	237	249	339	336	346	351	13	348	3	50	38	35	41	356	340	15.0
15-May	172	145	142	193	166	191	165	156	138	140	136	228	236	246	350	250	151	148	151	161	166	166	162	146	161.5
16-May	133	168	162	144	146	146	142	137	138	132	148	208	199	190	127	117	115	118	127	127	133	140	155	148	145.6
17-May	132	177	156	189	205	229	242	252	264	277	255	242	271	279	293	282	294	296	348	135	171	226	258	262	252.9
18-May	224	245	227	171	183	169	173	221	241	245	248	244	250	259	249	248	279	283	284	327	6	9	7	7	271.8
19-May	14	7	0	351	350	3	13	13	14	13	13	11	15	11	15	15	17	13	10	10	7	8	9	11	9.8
20-May	12	17	16	16	18	17	17	28	27	48	44	43	26	17	14	13	356	354	358	359	4	356	335	324	13.1
21-May	329	355	22	360	359	10	4	359	352	352	345	347	356	349	360	3	3	12	7	4	357	357	360	5	358.9
22-May	12	10	6	3	3	7	13	16	13	23	24	17	23	22	20	18	24	14	19	22	18	14	5	356	15.1
23-May	20	17	3	356	6	3	351	358	359	2	11	18	29	50	47	60	56	71	77	93	117	161	163	163	39.2
24-May	170	171	152	156	153	152	164	136	138	145	148	149	156	163	158	156	287	321	161	194	215	209	206	185	168.6
25-May	175	148	140	160	150	147	149	83	20	337	8	349	350	358	2	8	0	3	26	20	8	4	4	8	18.3
26-May	3	8	5	5	344	5	11	17	357	341	347	329	346	346	327	325	335	338	342	353	3	355	345	355	350.8
27-May	359	359	2	5	3	48	112	137	147	121	123	116	124	144	139	228	230	184	140	118	134	158	146	133	135.5
28-May	151	139	130	130	143	136	136	138	139	151	140	138	163	176	177	186	183	182	217	207	175	201	234	252	159.1
29-May	260	264	257	225	217	210	275	243	239	236	251	262	340	333	16	18	6	20	32	21	29	28	353	332	315.4
30-May	342	341	338	338	333	327	334	325	322	334	344	19	359	307	323	328	328	328	340	359	359	2	350	349	339.5
31-May	349	335	301	317	300	304	345	357	309	7	249	245	249	273	264	252	263	328	136	149	163	176	159	166	221.2

353.7	354.8	353.9	332.5	321.6	15.4	342.6	5.4	2.9	0.9	359.1	324.4	324.1	324.1	324.3	327.6	332.4	338.3	359.3	10.5	29.3	19.6	16.2	4.3
Diurnal Average																							

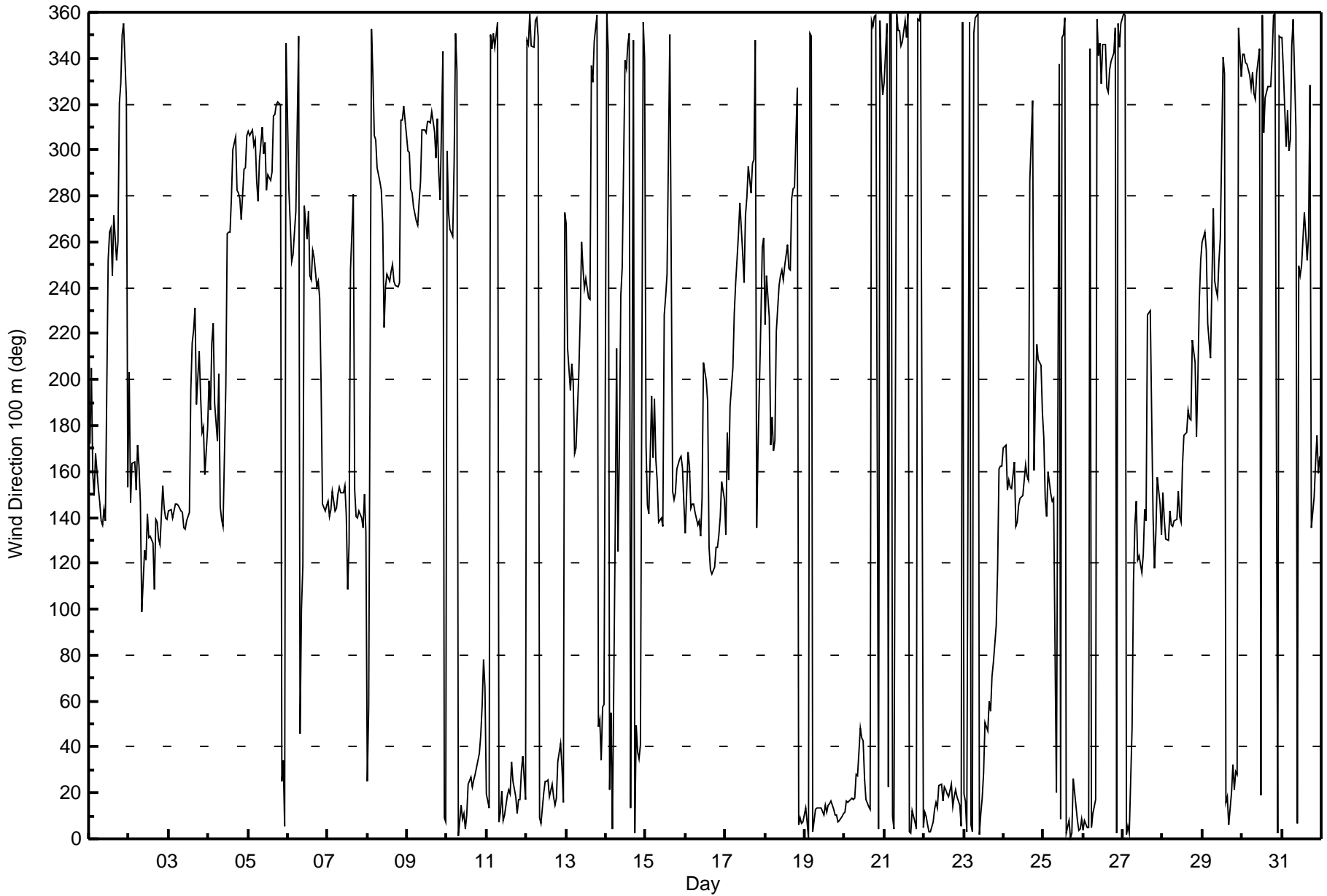
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on May 6 08:00 Minimum Value: 2 deg on May 7 21:00 Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 12 Q ₃ = 20 P ₉₀ = 36 P ₉₉ = 77																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	20	14	23	7	15	10	9	4	4	10	13	53	10	11	9	20	21	31	26	6	9	5	84	23	84
2-May	50	45	38	48	20	20	51	28	37	23	21	13	20	18	36	38	19	16	13	13	6	7	5	3	51
3-May	3	5	5	4	6	5	5	7	6	6	6	7	9	25	24	21	19	33	19	11	9	50	21	75	75
4-May	31	23	12	17	28	16	26	19	10	14	45	7	9	25	17	13	12	14	10	9	8	9	7	14	45
5-May	8	8	7	5	9	11	8	14	12	15	17	23	20	21	22	16	14	10	11	7	20	14	20	7	23
6-May	25	26	6	18	12	25	49	97	52	50	37	49	36	25	45	32	23	8	14	8	24	4	5	12	97
7-May	4	4	5	7	5	3	3	4	4	10	15	19	9	29	60	16	72	13	4	3	2	79	18	65	79
8-May	34	24	14	9	24	12	8	10	23	31	12	10	7	8	9	7	9	8	6	6	21	10	10	10	34
9-May	8	9	8	7	10	8	9	12	10	11	13	13	13	11	15	13	15	15	12	9	7	29	13	12	29
10-May	31	9	17	11	26	17	45	21	22	31	17	22	24	21	18	17	19	16	12	12	11	10	6	33	45
11-May	32	13	8	7	6	9	12	13	12	20	20	15	21	15	19	17	20	17	11	9	6	5	4	22	32
12-May	10	5	8	4	4	9	14	15	17	14	16	22	20	23	18	21	18	16	12	10	6	18	41	10	41
13-May	28	24	36	13	17	12	15	25	24	23	29	22	20	24	42	78	47	15	17	14	5	16	15	39	78
14-May	17	8	38	20	51	56	27	33	50	28	92	77	46	40	31	56	52	24	17	8	5	9	58	51	92
15-May	52	25	8	40	19	20	10	9	5	5	13	52	27	35	79	36	69	11	9	7	7	7	7	12	79
16-May	15	35	9	13	8	6	3	4	3	7	58	14	13	23	11	10	11	8	7	24	14	17	19	15	58
17-May	29	40	22	29	19	21	15	6	8	16	19	16	21	17	22	17	17	21	18	60	19	13	5	9	60
18-May	38	14	18	17	14	16	13	30	9	8	9	8	9	9	10	9	14	12	14	48	9	10	9	9	48
19-May	10	9	9	9	9	9	9	10	10	9	9	9	10	9	9	8	10	10	9	9	8	7	8	8	10
20-May	8	8	9	8	9	9	9	11	11	20	21	19	17	14	9	10	11	8	8	9	9	16	8	9	21
21-May	8	13	12	17	8	13	11	9	9	9	11	8	9	7	7	7	9	10	10	12	8	8	8	8	17
22-May	11	8	8	7	8	8	9	10	9	13	11	11	12	14	11	11	11	10	11	10	7	5	8	4	14
23-May	23	17	7	5	9	10	11	9	12	14	16	19	26	23	24	21	27	29	20	14	27	7	6	5	29
24-May	10	8	11	6	5	16	10	8	12	19	17	15	16	12	24	23	73	14	12	6	9	9	11	73	
25-May	7	15	18	9	8	6	10	50	42	45	27	20	12	13	12	11	10	10	10	12	10	8	7	8	50
26-May	7	8	7	12	11	10	13	12	19	13	9	13	13	17	19	10	11	10	11	13	13	10	6	9	19
27-May	10	10	10	10	11	48	56	8	10	17	12	18	19	12	12	38	39	40	5	18	14	17	12	7	56
28-May	8	5	6	7	7	6	6	7	7	16	8	8	15	12	22	19	27	17	15	15	14	27	5	8	27
29-May	9	14	19	23	53	48	40	63	11	9	26	17	26	22	38	22	17	14	16	13	7	15	15	6	63
30-May	4	4	6	6	14	9	9	10	7	11	13	12	12	30	13	13	12	9	8	12	8	14	10	9	30
31-May	7	11	16	14	34	17	24	40	48	92	51	26	23	30	36	37	65	53	17	7	7	8	11	7	92
Diurnal Maximum																									





Maximum Value: 0.6 km/h on May 24 14:00		Maximum Daily Average: 0.2 km/h on May 24		Hours in Service:	744																					
Minimum Value: -1.2 km/h on May 22 14:00		Minimum Daily Average: -0.7 km/h on May 19		Hours of Data:	744																					
Maximum Diurnal Average: -0.1 km/h at hour 5		Minimum Diurnal Average: -0.3 km/h at hour 17		Hours of Missing Data:	0																					
Monthly Average: -0.17 km/h		Percentiles: P ₁ = -1.0 P ₁₀ = -0.6 Q ₁ = -0.4 Median = -0.2 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.5		Hours of Calibration:	0																					
				Percent Operational Time:	100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0.1	0.1	0.1	0.1	0.2	0.0	0.1	0.1	0.4	0.1	-0.1	-0.2	-0.4	-0.6	-0.4	-0.4	-0.5	-0.1	0.2	0.0	-0.1	0.0	0.1	0.1	0.0	0.4
2-May	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	-0.3	0.3	0.3	0.0	0.1	-0.1	0.4	-0.1	0.0	0.0	0.0	0.1	0.2	-0.1	-0.4	0.1	0.4
3-May	-0.3	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	0.2	-0.1	0.4	-0.3	0.4	0.0	0.1	-0.1	-0.2	-0.3	-0.1	0.0	0.0	0.3	0.1	0.1	0.1	0.0	0.4
4-May	0.1	0.1	0.1	0.1	0.1	0.2	0.1	-0.2	0.1	0.1	0.1	-0.4	-0.1	-0.1	-0.5	-0.5	-0.5	-0.5	-0.7	-0.3	-0.5	-0.4	-0.5	-0.4	-0.2	0.2
5-May	-0.2	-0.4	-0.3	-0.1	-0.1	-0.2	-0.3	-0.2	-0.1	-0.2	-0.4	-0.2	-0.2	-0.7	-0.6	-0.5	-0.3	-0.3	-0.2	-0.2	-0.3	-0.2	-0.2	0.0	-0.3	0.0
6-May	0.0	-0.1	0.1	0.0	-0.1	0.0	0.1	0.2	0.1	0.2	0.0	-0.1	0.2	-0.3	0.2	-0.1	-0.3	-0.2	-0.1	-0.1	0.1	0.1	0.2	-0.1	0.0	0.2
7-May	0.1	-0.2	0.2	-0.3	-0.2	0.0	-0.2	-0.2	-0.2	-0.2	0.1	0.0	0.2	0.1	0.2	-0.4	0.2	0.1	-0.1	-0.2	-0.1	-0.2	0.0	-0.1	0.0	0.2
8-May	0.0	-0.2	-0.2	-0.1	-0.2	-0.4	-0.3	-0.7	-0.4	0.0	-0.1	-0.2	-0.5	-0.2	-0.4	-0.7	-0.4	-0.4	-0.1	-0.2	-0.4	-0.5	-0.5	-0.4	-0.3	0.0
9-May	-0.3	-0.3	-0.3	-0.4	-0.5	-0.3	-0.4	-0.3	-0.3	-0.6	-0.4	-0.5	-0.3	-0.3	-0.4	-0.3	-0.3	-0.4	-0.2	-0.2	-0.2	-0.2	-0.3	-0.1	-0.3	-0.1
10-May	-0.2	-0.1	-0.1	0.1	-0.2	-0.2	-0.4	-0.1	0.0	0.2	-0.4	0.1	-0.3	-0.3	-0.6	-0.5	-0.5	-0.5	-0.4	-0.4	-0.4	-0.3	-0.2	-0.2	-0.2	0.2
11-May	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.3	-0.4	-0.8	-0.5	-0.4	-0.5	-0.3	-0.6	-0.5	-0.6	-0.6	-0.7	-0.6	-0.6	-0.3	-0.2	-0.2	-0.1	-0.4	0.0
12-May	-0.1	0.0	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.4	-0.7	-0.5	-0.4	-0.3	-0.5	-0.5	-0.4	-0.6	-0.3	-0.4	-0.3	-0.2	0.1	0.0	0.0	-0.2	0.1
13-May	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.3	0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	0.0	-0.3	-0.1	-0.2	-0.1	0.0	0.1	0.0	0.0	0.3
14-May	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.6	0.3	-0.3	0.2	0.4	-0.2	-0.2	-0.1	-0.4	-0.5	-0.3	-0.4	-0.4	-0.2	0.0	0.1	0.1	0.0	0.6
15-May	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.2	0.4	0.3	0.0	0.3	0.2	0.1	-0.1	0.1	0.3	0.1	0.2	0.4	0.1	0.2	0.1	0.2	0.4
16-May	0.0	0.1	0.3	0.0	0.0	0.0	0.2	0.3	0.5	0.2	0.1	0.2	0.3	0.1	0.0	-0.1	-0.1	-0.1	-0.2	0.0	0.0	0.0	0.2	0.3	0.1	0.5
17-May	-0.4	0.0	0.1	0.2	0.3	0.2	0.0	-0.4	-0.3	-0.1	-0.1	-0.4	-0.1	-0.1	-0.3	-0.4	-0.2	-0.3	-0.1	0.1	0.3	0.2	-0.1	0.1	-0.1	0.3
18-May	0.2	0.1	0.2	0.0	0.2	0.3	0.2	0.2	-0.2	-0.3	-0.3	-0.4	-0.3	-0.6	-0.5	-0.3	-0.2	-0.3	-0.1	-0.2	-0.6	-0.8	-0.7	-0.6	-0.2	0.3
19-May	-0.7	-0.9	-0.7	-0.6	-0.2	-1.0	-0.9	-0.6	-1.0	-0.7	-0.8	-0.8	-0.7	-0.8	-0.9	-1.0	-0.8	-0.9	-0.8	-0.5	-0.6	-0.6	-0.4	-0.4	-0.7	-0.2
20-May	-0.3	-0.4	-0.6	-0.4	-0.6	-0.5	-0.3	-0.7	-0.8	-0.3	-0.6	-0.8	-0.4	-0.6	-0.6	-0.7	-1.0	-0.5	-0.7	-0.3	-0.3	-0.2	-0.2	-0.3	-0.5	-0.2
21-May	-0.2	-0.1	-0.2	-0.3	-0.2	-0.1	-0.2	-0.1	-0.5	-0.6	-0.3	-0.3	-0.8	-0.4	-0.9	-0.7	-0.9	-0.6	-0.7	-0.4	-0.3	-0.5	-0.2	-0.3	-0.4	-0.1
22-May	-0.2	-0.4	-0.4	-0.5	-0.6	-0.4	-0.5	-0.6	-0.8	-0.6	-0.7	-0.8	-0.8	-1.2	-0.8	-0.9	-0.7	-1.0	-1.1	-0.8	-0.5	-0.3	-0.2	-0.2	-0.6	-0.2
23-May	0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.4	-0.8	-0.6	-0.3	-0.4	-0.6	-0.7	-0.3	-0.5	-0.8	-0.4	-0.6	-0.4	-0.4	0.0	0.3	0.4	0.3	-0.3	0.4
24-May	0.3	0.3	0.2	0.3	0.2	0.1	0.2	0.1	0.4	0.1	0.3	0.4	0.2	0.6	0.4	0.3	-0.3	-0.1	0.3	0.3	0.0	0.3	0.3	0.5	0.2	0.6
25-May	0.5	-0.2	-0.3	0.3	0.2	0.4	0.1	0.2	0.2	0.0	-0.4	-0.2	-0.8	-0.8	-0.7	-0.8	-0.8	-1.0	-0.7	-0.5	-0.5	-0.4	-0.5	-0.6	-0.3	0.5
26-May	-0.6	-0.7	-0.8	-0.5	0.0	-0.6	-0.5	-0.4	-0.3	-0.4	-0.4	-0.6	-0.5	-0.3	-0.6	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	-0.3	-0.3	-0.3	-0.4	0.0
27-May	-0.2	-0.1	-0.3	-0.2	-0.2	-0.3	-0.3	0.0	0.3	0.0	0.0	0.1	0.1	0.4	0.1	-0.1	0.0	0.1	0.1	-0.1	0.0	0.5	0.1	-0.1	0.0	0.5
28-May	0.3	-0.1	-0.2	-0.2	0.3	-0.1	0.0	0.3	0.2	0.5	0.5	0.2	0.5	0.6	0.6	0.4	0.1	0.4	0.1	0.1	0.4	0.0	0.1	0.0	0.2	0.6
29-May	-0.3	-0.2	-0.1	0.1	0.1	0.0	-0.1	0.0	-0.1	0.1	0.0	-0.2	0.0	-0.1	0.0	-0.2	-0.2	-0.3	-0.4	-0.4	-0.2	0.0	-0.1	-0.1	-0.1	0.1
30-May	-0.1	-0.2	-0.2	-0.1	-0.2	-0.2	0.0	-0.3	-0.3	-0.1	-0.5	-0.3	-0.5	-0.2	-0.3	-0.3	-0.4	-0.3	-0.2	-0.4	-0.4	-0.3	-0.3	-0.2	-0.3	0.0
31-May	-0.1	0.0	-0.1	0.1	0.0	-0.1	-0.1	0.0	0.1	0.2	0.0	0.3	0.1	0.2	-0.1	0.2	0.2	-0.1	0.2	0.2	0.3	0.2	0.2	0.4	0.1	0.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1 Maximum Value: 4.6 km/h on May 19 16:00 Minimum Value: 0.1 km/h on May 2 03:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.8 Q ₃ = 2.5 P ₉₀ = 3.2 P ₉₉ = 4.1																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.2	0.2	0.3	0.6	0.7	0.9	1.6	2.0	2.6	2.1	2.1	2.4	2.7	2.6	2.3	2.3	1.8	1.6	1.7	1.1	0.3	0.2	0.2	0.3	2.7
2-May	0.1	0.1	0.1	0.1	0.2	0.2	1.1	1.5	1.1	1.4	1.7	2.0	1.9	2.0	1.8	1.7	1.5	1.1	0.9	0.7	0.6	0.6	1.7	2.0	2.0
3-May	1.9	1.2	1.8	1.9	1.7	2.4	2.3	2.2	2.4	2.4	2.4	2.2	2.5	1.8	2.1	2.0	1.7	1.7	1.1	1.0	1.1	1.0	1.2	0.8	2.5
4-May	1.0	0.7	0.5	0.7	0.5	0.6	0.8	1.7	1.8	1.7	1.6	2.8	2.6	1.9	3.5	3.6	3.6	3.8	4.0	2.8	3.1	3.2	2.7	2.2	4.0
5-May	1.5	2.4	2.1	1.5	1.2	1.7	2.5	2.2	1.9	2.5	2.7	2.7	3.3	3.8	3.7	3.1	3.3	3.2	2.6	2.2	2.1	0.9	0.5	0.3	3.8
6-May	0.4	0.3	0.4	0.8	0.7	0.4	0.9	1.3	1.4	1.9	2.6	2.0	2.3	2.1	2.1	2.2	2.1	1.9	1.3	0.8	0.6	2.0	1.4	1.5	2.6
7-May	2.4	1.9	1.7	1.4	1.4	2.3	2.6	2.4	2.4	2.4	2.2	1.7	1.2	1.6	2.0	2.0	1.1	1.7	2.3	2.4	2.8	1.9	0.5	0.6	2.8
8-May	0.3	0.4	0.9	0.8	1.6	1.7	2.1	3.9	2.5	1.0	1.6	2.4	3.6	3.3	3.4	3.8	3.9	3.5	3.4	3.0	2.4	3.7	3.1	2.8	3.9
9-May	2.2	2.1	2.3	2.5	2.6	2.4	2.5	3.1	3.2	3.6	2.7	2.4	2.7	3.1	2.7	2.7	2.3	2.2	1.9	1.7	1.7	2.0	1.4	0.8	3.6
10-May	0.3	0.5	1.1	0.9	0.7	0.8	1.0	1.4	1.8	2.2	2.5	2.6	2.6	2.7	2.8	3.2	3.1	3.1	3.0	2.6	1.5	0.8	0.9	0.5	3.2
11-May	0.2	0.3	0.3	0.5	0.5	0.4	1.3	2.4	3.2	2.8	3.2	3.5	3.5	3.8	3.7	3.5	3.1	3.4	3.6	3.3	2.3	1.5	1.3	0.6	3.8
12-May	0.3	0.2	0.3	0.2	0.2	0.6	1.2	1.6	2.9	3.2	3.4	3.4	3.5	3.6	3.3	3.0	3.0	2.8	2.5	2.1	0.9	0.2	0.1	0.1	3.6
13-May	0.2	0.1	0.2	0.3	0.7	0.8	1.3	1.6	1.5	2.0	2.1	2.1	2.4	2.1	1.8	2.0	2.1	1.8	1.0	0.9	0.4	0.3	0.2	0.3	2.4
14-May	0.1	0.1	0.1	0.1	0.1	0.2	0.9	1.2	1.3	1.3	1.9	1.9	2.1	2.4	2.4	2.5	1.9	2.0	1.9	1.6	1.1	0.4	0.2	0.1	2.5
15-May	0.1	0.2	0.2	0.2	0.2	0.8	1.5	1.6	1.7	1.8	1.6	1.7	1.9	1.8	1.8	1.5	1.6	1.8	1.4	1.0	1.5	1.7	1.5	1.1	1.9
16-May	0.7	1.3	1.7	1.9	1.7	2.0	2.0	2.2	2.1	1.8	1.8	2.0	1.6	0.8	0.6	0.7	0.9	0.8	0.9	1.1	0.5	0.7	1.6	1.7	2.2
17-May	0.8	0.3	0.3	0.8	1.0	1.0	1.9	2.6	2.8	2.5	2.0	1.6	1.9	2.2	2.2	2.5	2.0	1.5	0.7	0.3	1.1	1.3	1.1	0.4	2.8
18-May	0.4	0.4	0.8	0.6	1.1	1.7	2.0	1.9	2.2	2.6	2.4	3.1	3.4	3.4	2.7	2.7	2.9	2.2	1.2	1.3	2.4	3.7	3.5	3.0	3.7
19-May	3.4	3.2	2.9	3.1	2.6	3.2	4.0	3.6	4.0	4.1	4.1	3.3	3.7	4.2	4.2	4.6	3.8	3.7	3.8	3.6	3.0	2.6	2.7	3.0	4.6
20-May	2.6	2.6	3.0	2.8	2.7	2.4	2.5	3.2	3.1	2.5	3.0	3.3	3.1	3.3	3.1	2.9	3.0	2.7	2.9	2.0	1.6	1.2	1.6	1.2	3.3
21-May	0.9	0.8	0.9	1.0	1.8	1.6	1.7	1.5	2.1	2.4	2.4	2.8	2.6	2.7	3.3	3.0	3.1	3.0	2.7	2.3	2.0	1.9	2.1	2.4	3.3
22-May	1.9	1.8	2.0	2.4	2.7	2.5	2.5	3.0	3.8	3.5	3.5	3.7	3.5	4.3	4.1	4.2	4.1	3.8	4.2	3.7	2.3	1.3	0.7	1.3	4.3
23-May	0.5	0.6	0.7	0.7	0.6	0.8	1.4	2.1	2.2	2.5	2.9	2.9	2.9	3.5	2.9	3.1	2.9	2.4	2.2	1.7	1.2	0.8	0.5	0.9	3.5
24-May	1.3	1.2	0.9	0.9	1.1	1.6	1.2	1.5	1.8	2.3	2.4	3.0	2.7	2.4	2.3	2.5	1.4	0.3	0.7	1.9	1.5	1.4	1.0	1.3	3.0
25-May	1.4	1.0	1.2	0.7	0.8	1.4	1.8	1.3	1.5	1.5	1.8	2.2	2.6	2.9	2.9	2.9	3.0	3.4	3.2	2.5	2.0	2.2	2.1	2.4	3.4
26-May	2.3	2.8	2.9	2.1	1.9	2.2	2.1	2.4	2.0	2.6	2.8	3.4	2.8	2.4	2.2	2.6	2.6	2.2	2.3	1.9	1.7	1.1	1.4	1.4	3.4
27-May	1.1	0.9	0.7	0.7	0.6	1.2	1.3	2.8	2.4	1.3	1.6	1.7	2.2	2.1	1.8	2.6	1.4	1.6	1.8	1.3	1.6	1.5	1.4	1.0	2.8
28-May	1.1	1.5	1.9	2.2	2.5	2.1	2.4	2.5	2.1	1.8	2.6	2.6	1.7	1.7	1.7	1.7	1.6	1.4	1.6	1.1	1.0	0.4	0.8	1.1	2.6
29-May	1.3	1.1	0.9	1.1	0.6	0.6	1.0	0.7	0.9	1.0	1.0	1.1	1.0	1.0	1.6	1.1	1.1	1.5	1.9	1.4	0.9	0.3	0.2	0.3	1.9
30-May	0.5	0.8	1.0	0.9	0.6	0.8	1.0	1.4	1.6	1.4	1.7	2.1	1.8	2.0	2.2	2.8	2.7	2.0	1.7	1.8	1.7	1.1	1.0	0.9	2.8
31-May	0.3	0.2	0.4	0.1	0.2	0.3	0.6	1.3	1.8	1.7	1.8	2.1	1.9	2.1	1.9	1.6	1.5	1.3	1.6	1.3	0.7	0.5	0.8	1.2	2.1
3.4 3.2 3.0 3.1 2.7 3.2 4.0 3.9 4.0 4.1 4.1 3.7 3.7 4.3 4.2 4.6 4.1 3.8 4.2 3.7 3.1 3.7 3.5 3.0																									
Diurnal Maximum																									



Maximum Value: 1.7 km/h on May 25 00:00		Maximum Daily Average: 0.6 km/h on May 24		Hours in Service: 744																						
Minimum Value: -1.8 km/h on May 8 08:00		Minimum Daily Average: -0.7 km/h on May 19		Hours of Data: 744																						
Maximum Diurnal Average: 0.0 km/h at hour 6		Minimum Diurnal Average: -0.4 km/h at hour 17		Hours of Missing Data: 0																						
Monthly Average: -0.10 km/h		Percentiles: P ₁ = -1.2 P ₁₀ = -0.8 Q ₁ = -0.5 Median = -0.2 Q ₃ = 0.3 P ₉₀ = 0.6 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-May	0.1	0.1	0.2	0.5	0.7	0.5	0.6	0.7	0.8	0.5	0.2	-0.4	-0.8	-0.8	-0.5	-0.8	-0.5	-0.3	0.1	-0.4	-0.1	0.0	0.2	0.0	0.0	0.8
2-May	0.1	0.1	0.1	0.1	0.1	0.2	0.6	0.4	0.3	0.0	0.6	0.7	0.5	0.4	0.1	0.8	0.2	0.3	0.4	0.5	0.9	1.0	0.9	0.8	0.4	1.0
3-May	0.7	0.3	0.4	0.6	0.4	0.7	0.5	0.6	0.6	1.0	0.5	0.8	0.7	0.4	0.0	-0.2	-0.3	0.1	0.2	-0.2	1.5	0.6	0.9	0.4	0.5	1.5
4-May	0.6	0.7	0.6	0.4	1.0	1.0	0.5	0.7	0.5	0.2	0.2	-0.8	-0.4	-0.3	-1.3	-1.4	-1.4	-1.2	-1.7	-0.9	-1.1	-1.1	-1.1	-0.8	-0.3	1.0
5-May	-0.7	-1.0	-1.1	-0.5	-0.3	-0.3	-0.9	-0.8	-0.3	-0.4	-0.8	-0.5	-0.5	-1.2	-1.4	-0.9	-0.8	-1.0	-0.7	-0.8	-0.2	-0.1	-0.4	-0.1	-0.7	-0.1
6-May	-0.1	0.0	0.0	-0.2	-0.3	-0.1	0.1	0.4	0.4	0.6	-0.1	0.1	0.3	-0.2	0.3	-0.1	-0.5	-0.2	-0.2	0.0	0.3	0.8	0.3	0.1	0.1	0.8
7-May	0.5	0.4	0.6	0.2	0.1	0.6	0.8	0.6	0.5	0.5	0.7	0.5	0.2	0.2	0.3	-0.6	0.2	0.7	1.0	0.8	0.8	0.2	0.3	-0.1	0.4	1.0
8-May	-0.1	-0.2	-0.3	-0.4	-0.5	-0.8	-0.8	-1.8	-0.7	-0.1	-0.1	-0.1	-0.4	-0.4	-0.6	-0.6	-0.4	-0.2	0.0	-0.3	-0.7	-1.2	-1.1	-1.0	-0.5	0.0
9-May	-0.8	-0.8	-1.0	-0.9	-1.1	-0.5	-0.7	-0.7	-0.7	-1.2	-0.7	-1.1	-0.8	-0.9	-0.8	-0.8	-0.8	-0.8	-0.5	-0.6	-0.6	-0.3	-0.3	0.0	-0.7	0.0
10-May	-0.4	-0.2	-0.1	0.0	-0.4	-0.3	-0.4	-0.2	0.2	0.4	-0.3	0.1	-0.3	-0.3	-0.5	-0.2	-0.4	-0.2	-0.3	-0.4	-0.2	0.0	0.1	-0.2	-0.2	0.4
11-May	-0.2	-0.2	0.0	-0.2	-0.1	-0.2	-0.5	-0.5	-0.7	-0.1	-0.4	-0.8	-0.1	-0.4	-0.4	-0.5	-0.4	-0.5	-0.7	-0.4	-0.3	0.0	0.0	-0.2	-0.3	0.0
12-May	-0.3	-0.1	0.0	0.0	0.0	-0.2	-0.1	-0.2	-0.3	-0.8	-0.3	-0.4	-0.3	-0.5	-0.4	-0.4	-0.5	-0.2	-0.3	-0.2	0.0	0.1	0.0	0.0	-0.2	0.1
13-May	0.0	0.2	0.1	0.1	0.7	0.6	0.5	0.9	0.6	-0.2	-0.1	-0.2	-0.3	-0.3	-0.2	0.0	0.0	-0.3	-0.1	-0.2	0.0	0.0	0.0	0.0	0.1	0.9
14-May	-0.1	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.3	-0.6	0.2	0.4	-0.3	-0.2	-0.2	-0.4	-0.6	-0.4	-0.3	-0.2	0.0	0.1	0.0	0.0	0.0	1.0
15-May	0.0	0.1	0.1	0.2	0.2	0.8	0.7	0.6	0.7	0.5	0.5	0.2	0.2	0.3	0.3	-0.2	0.5	0.7	0.8	1.0	1.2	1.0	1.0	0.5	0.5	1.2
16-May	0.2	0.8	1.2	0.6	0.4	0.7	0.4	0.6	0.8	0.6	0.3	0.1	0.2	0.2	0.3	0.2	0.1	0.2	0.1	0.4	0.3	0.3	0.5	0.6	0.4	1.2
17-May	-0.5	0.0	0.1	0.8	0.7	0.3	0.1	-0.5	-0.6	-0.3	-0.2	-0.4	-0.1	-0.4	-0.5	-0.7	-0.4	-0.5	-0.2	0.1	0.9	0.4	-0.1	0.0	-0.1	0.9
18-May	0.2	0.0	0.3	0.8	1.0	0.9	0.6	0.8	-0.1	-0.4	-0.3	-0.4	-0.5	-0.8	-0.5	-0.3	-0.7	-0.8	-0.1	-0.4	-0.7	-0.7	-0.8	-0.7	-0.2	1.0
19-May	-0.6	-0.8	-0.7	-0.8	-0.6	-1.1	-1.0	-0.7	-0.7	-0.8	-1.0	-0.6	-0.4	-0.9	-0.7	-0.8	-0.7	-0.9	-0.8	-0.6	-0.7	-0.6	-0.4	-0.5	-0.7	-0.4
20-May	-0.3	-0.5	-0.6	-0.5	-0.5	-0.3	-0.2	-0.5	-0.7	0.0	-0.4	-0.3	-0.2	-0.7	-0.7	-0.4	-0.9	-0.8	-0.6	-0.5	-0.3	-0.4	-0.6	-0.5	-0.5	0.0
21-May	-0.3	-0.3	-0.2	-0.3	-0.5	-0.2	-0.4	-0.3	-0.7	-0.9	-0.5	-0.7	-1.0	-0.8	-1.0	-0.8	-1.1	-0.5	-0.6	-0.6	-0.5	-0.6	-0.5	-0.7	-0.6	-0.2
22-May	-0.4	-0.5	-0.6	-0.7	-0.7	-0.5	-0.5	-0.7	-0.9	-0.5	-0.4	-0.6	-0.7	-0.9	-0.8	-0.9	-0.6	-0.8	-1.0	-0.4	-0.5	-0.4	-0.5	-0.3	-0.6	-0.3
23-May	0.0	-0.1	-0.4	-0.3	-0.3	-0.2	-0.3	-0.8	-0.8	-0.2	-0.6	-0.5	-0.8	0.1	-0.1	-0.5	0.0	-0.4	0.2	0.1	0.4	0.9	1.4	1.3	-0.1	1.4
24-May	1.2	1.0	0.6	0.7	0.6	0.4	0.3	0.3	0.7	0.6	0.6	0.9	0.6	0.7	0.5	0.8	-0.5	-0.1	0.9	0.4	0.1	0.2	0.2	1.7	0.6	1.7
25-May	1.4	-0.1	-0.1	0.7	0.6	0.7	0.3	0.4	0.2	-0.1	-0.3	-0.2	-1.0	-1.0	-0.7	-0.8	-0.8	-1.0	-0.5	-0.4	-0.4	-0.6	-0.6	-0.6	-0.2	1.4
26-May	-0.8	-0.8	-0.8	-0.4	-0.4	-0.6	-0.4	-0.2	-0.4	-0.6	-0.9	-0.9	-0.9	-0.6	-0.6	-0.5	-0.6	-0.6	-0.7	-0.5	-0.3	-0.4	-0.5	-0.3	-0.6	-0.2
27-May	-0.2	-0.3	-0.2	-0.2	-0.3	-0.6	-0.3	0.7	1.0	0.3	0.3	0.4	0.3	0.6	0.5	0.1	0.0	0.3	0.6	0.2	0.4	0.4	0.5	0.3	0.2	1.0
28-May	0.5	0.3	0.3	0.4	0.8	0.5	0.5	0.8	0.4	0.7	0.9	0.9	0.5	0.3	0.7	0.3	0.3	0.1	0.1	0.2	0.6	0.1	0.3	0.0	0.4	0.9
29-May	-0.3	-0.4	-0.3	0.2	0.1	0.1	-0.1	0.0	-0.1	0.2	0.0	-0.2	0.0	-0.1	0.4	-0.1	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	0.4
30-May	-0.2	-0.4	-0.3	-0.3	-0.4	-0.4	-0.3	-0.6	-0.7	-0.1	-0.6	-0.3	-0.4	-0.3	-0.5	-0.7	-0.5	-0.8	-0.5	-0.3	-0.6	-0.3	-0.5	-0.3	-0.4	-0.1
31-May	-0.1	0.0	-0.1	0.0	0.1	-0.1	-0.1	0.2	0.3	0.5	0.1	0.3	0.1	0.1	-0.3	0.2	0.2	0.0	0.5	0.5	0.6	0.5	0.9	1.1	0.2	1.1
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Lower Camp Met Tower - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1 Maximum Value: 4.9 km/h on May 19 16:00 Minimum Value: 0.1 km/h on May 31 04:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.6 Q ₁ = 1.1 Median = 2.0 Q ₃ = 2.7 P ₉₀ = 3.3 P ₉₉ = 4.3																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.4	0.4	0.4	0.9	0.9	0.9	1.4	1.8	2.4	2.0	2.0	2.6	2.8	2.8	2.3	2.5	2.0	1.7	2.1	1.5	0.3	0.2	0.3	0.3	2.8
2-May	0.2	0.2	0.2	0.2	0.3	0.3	0.8	1.3	1.2	1.5	1.9	2.1	2.1	2.0	2.0	2.0	1.6	1.0	0.8	0.8	0.6	0.6	1.3	1.4	2.1
3-May	1.5	1.3	1.6	2.0	2.0	2.7	2.5	2.3	2.3	2.4	2.2	2.1	2.2	2.3	2.3	1.8	1.8	1.3	1.2	0.9	1.3	1.4	1.0	2.7	
4-May	1.4	0.9	0.8	0.9	0.6	0.6	0.7	1.3	1.5	1.6	1.6	3.0	2.8	2.1	3.9	3.9	4.1	4.2	4.3	3.1	3.4	3.6	2.8	2.5	4.3
5-May	1.8	2.6	2.3	1.7	1.4	1.9	2.6	2.3	2.1	2.8	3.2	3.1	3.8	4.0	3.9	3.7	3.7	3.6	3.0	2.7	2.2	1.1	0.7	0.3	4.0
6-May	0.5	0.3	0.5	1.1	0.9	0.5	1.0	1.3	1.6	2.2	3.0	2.3	2.7	2.5	2.4	2.5	2.3	1.6	1.4	0.8	0.8	2.4	1.8	1.7	3.0
7-May	2.7	2.1	1.8	1.3	1.7	2.2	2.2	2.2	2.2	2.0	2.0	1.5	1.1	1.5	2.3	2.2	1.1	1.5	1.8	1.9	2.4	1.8	0.7	0.7	2.7
8-May	0.3	0.5	1.0	1.1	1.7	1.7	2.3	4.1	2.9	1.2	1.8	2.3	3.2	3.0	3.0	3.7	3.5	3.3	3.1	2.5	2.7	4.0	3.4	3.1	4.1
9-May	2.4	2.2	2.3	2.6	2.4	2.8	2.8	3.4	3.5	4.0	3.1	2.6	3.0	3.3	2.9	2.8	2.6	2.4	2.2	1.9	1.8	2.2	1.5	1.0	4.0
10-May	0.3	0.7	1.3	1.2	0.8	0.9	1.1	1.6	2.0	2.5	2.6	2.8	2.7	2.9	3.0	3.2	3.2	3.2	3.1	2.6	1.6	1.0	1.0	0.7	3.2
11-May	0.3	0.5	0.4	0.6	0.6	0.5	1.3	2.5	3.3	3.2	3.5	3.5	3.5	3.7	3.9	3.6	3.4	3.5	3.7	3.5	2.4	1.6	1.5	0.8	3.9
12-May	0.4	0.4	0.5	0.3	0.4	0.7	1.3	1.8	2.9	3.2	3.4	3.6	3.7	3.7	3.3	3.1	3.0	3.0	2.7	2.2	0.9	0.3	0.1	0.1	3.7
13-May	0.2	0.2	0.3	0.2	0.6	0.7	1.2	1.4	1.3	2.2	2.4	2.3	2.7	2.5	2.1	2.3	2.3	1.9	1.3	0.8	0.4	0.4	0.3	0.5	2.7
14-May	0.3	0.1	0.1	0.1	0.1	0.2	0.9	1.3	1.4	1.3	2.1	2.1	2.4	2.5	2.6	2.7	2.1	2.1	2.1	1.7	1.1	0.6	0.2	0.1	2.7
15-May	0.1	0.2	0.2	0.3	0.3	0.7	1.5	1.3	1.5	1.5	1.4	1.8	2.1	2.2	1.9	1.8	1.7	1.6	1.3	1.1	1.6	1.9	1.4	1.3	2.2
16-May	0.9	1.3	1.6	2.2	1.6	2.0	2.2	2.1	2.2	1.6	1.8	2.5	2.1	1.0	0.6	0.7	0.9	0.8	0.9	1.3	0.6	0.9	2.0	1.8	2.5
17-May	0.8	0.4	0.4	1.3	1.2	1.2	2.1	2.9	3.0	2.7	2.1	1.7	2.2	2.4	2.5	2.6	2.1	1.6	0.7	0.4	1.1	1.5	1.0	0.6	3.0
18-May	0.5	0.6	0.9	0.7	1.0	1.7	1.8	2.0	2.1	2.4	2.5	2.8	3.1	3.5	2.7	2.5	3.1	2.3	1.5	1.4	2.6	3.9	3.5	3.3	3.9
19-May	3.7	3.4	3.0	3.1	2.8	3.5	4.1	3.7	4.0	4.3	4.1	3.6	4.1	4.6	4.4	4.9	3.9	3.9	4.0	3.9	3.3	2.8	3.0	3.2	4.9
20-May	2.9	2.8	3.1	3.0	2.8	2.6	2.6	3.4	3.3	2.7	3.1	3.3	3.3	3.5	3.2	3.2	3.1	2.8	3.0	2.3	1.7	1.4	1.7	1.2	3.5
21-May	1.1	1.0	1.0	1.1	2.0	1.8	2.0	1.8	2.0	2.5	2.5	2.8	2.5	2.7	3.2	3.3	3.3	3.1	2.8	2.4	2.2	2.1	2.2	2.5	3.3
22-May	2.1	1.9	2.2	2.4	2.8	2.7	2.7	3.1	3.9	3.6	3.7	3.9	3.8	4.2	4.3	4.2	4.2	4.2	4.3	4.0	2.5	1.4	0.9	1.6	4.3
23-May	0.7	0.8	0.7	0.7	0.7	0.9	1.6	2.0	2.1	2.6	2.9	3.1	3.0	3.7	2.8	3.2	3.1	2.3	2.3	1.7	1.2	0.8	0.4	0.5	3.7
24-May	1.2	1.3	1.0	0.9	1.2	1.5	1.2	1.6	1.8	2.3	2.5	3.0	2.9	2.9	2.5	2.5	1.3	0.3	0.7	2.0	1.9	1.6	1.2	0.9	3.0
25-May	1.2	1.1	1.2	0.8	0.9	1.5	1.8	1.3	1.7	1.7	1.9	2.3	2.6	2.9	3.0	3.2	3.0	3.6	3.3	2.6	2.2	2.4	2.3	2.7	3.6
26-May	2.5	2.9	3.1	2.5	2.0	2.4	2.3	2.4	2.2	2.7	3.0	3.6	2.9	2.6	2.3	3.0	2.7	2.2	2.3	2.0	2.0	1.2	1.5	1.6	3.6
27-May	1.4	1.1	0.9	1.0	0.8	1.4	1.6	2.8	2.5	1.4	1.7	1.7	2.3	2.0	1.6	2.9	1.7	1.7	1.7	1.3	1.5	1.7	1.4	1.0	2.9
28-May	1.2	1.5	1.9	2.2	2.5	2.1	2.4	2.4	2.2	2.0	2.6	2.5	1.9	2.1	2.0	2.0	2.0	1.6	1.7	1.2	1.1	0.7	0.9	1.3	2.6
29-May	1.4	1.1	1.1	1.3	0.7	0.7	1.1	0.8	0.8	1.1	1.1	1.0	1.0	1.0	1.8	1.2	1.1	1.7	2.2	1.6	0.9	0.3	0.3	0.3	2.2
30-May	0.6	1.0	1.2	1.0	0.6	0.8	1.1	1.5	1.5	1.6	1.7	2.2	1.8	2.2	2.4	3.0	3.1	2.3	1.8	2.1	1.8	1.2	1.3	1.0	3.1
31-May	0.4	0.2	0.4	0.1	0.2	0.3	0.6	1.5	1.8	2.0	2.1	2.3	2.1	2.2	2.2	1.9	1.8	1.5	1.6	1.2	0.8	0.7	0.9	1.3	2.3
3.7 3.4 3.1 3.1 2.8 3.5 4.1 4.1 4.0 4.3 4.1 3.9 4.1 4.6 4.4 4.9 4.2 4.2 4.3 4.0 3.4 4.0 3.5 3.3																									
Diurnal Maximum																									



Maximum Value: 3.6 km/h on May 6 23:00		Maximum Daily Average: 1.0 km/h on May 3		Hours in Service: 744																							
Minimum Value: -1.6 km/h on May 8 08:00		Minimum Daily Average: -0.5 km/h on May 9		Hours of Data: 744																							
Maximum Diurnal Average: 0.4 km/h at hour 22		Minimum Diurnal Average: -0.1 km/h at hour 14		Hours of Missing Data: 0																							
Monthly Average: 0.17 km/h		Percentiles: $P_1 = -1.1$ $P_{10} = -0.5$ $Q_1 = -0.2$ Median = 0.1 $Q_3 = 0.4$ $P_{90} = 0.9$ $P_{99} = 2.1$		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-May	0.1	0.0	0.2	0.8	0.6	0.4	0.7	0.7	1.4	0.8	0.1	0.0	-0.7	-0.8	0.0	-0.4	-0.2	0.0	0.2	-0.4	0.1	0.2	0.1	0.2	0.2	1.4	
2-May	0.1	0.3	0.2	0.1	0.2	0.1	0.2	0.4	0.1	0.0	0.1	0.3	0.2	-0.2	-0.2	0.6	-0.1	0.1	0.6	1.0	0.7	1.3	1.6	1.0	0.4	1.6	
3-May	1.3	2.0	0.4	2.1	2.1	3.1	1.6	1.1	1.2	1.0	0.7	0.7	1.2	0.8	0.4	0.5	0.3	0.6	0.3	0.7	0.9	0.7	0.1	1.0	3.1		
4-May	-0.1	0.2	0.3	0.5	0.1	0.2	0.0	0.2	0.4	0.1	0.2	-0.6	-0.6	-0.7	-1.0	-0.8	-1.3	-0.9	-1.3	-0.7	-0.6	-1.3	-1.1	-0.8	-0.4	0.5	
5-May	-0.4	-0.6	-0.8	-0.4	-0.3	0.2	-0.5	-0.7	-0.4	0.1	0.0	1.1	0.0	-0.7	-0.9	-0.7	-0.9	-1.1	-1.0	-0.6	0.2	0.3	-0.2	-0.1	-0.4	1.1	
6-May	-0.1	0.0	0.2	-1.0	-0.2	-0.2	0.1	0.7	0.5	0.7	0.5	0.6	0.9	-0.4	0.9	0.7	-0.4	0.0	0.1	0.2	0.4	2.8	3.6	2.9	0.6	3.6	
7-May	1.9	2.2	1.5	-0.6	1.4	1.6	1.9	2.0	0.7	0.4	0.5	0.3	0.0	-0.2	0.2	-0.5	-0.2	0.9	1.3	0.5	1.4	0.7	0.1	0.0	0.8	2.2	
8-May	0.0	0.1	0.0	-0.1	-0.6	-0.6	-0.9	-1.6	-0.4	-0.1	0.4	0.5	0.4	-0.2	0.1	0.5	1.0	1.4	1.5	0.5	-0.6	-0.6	-0.9	-0.9	0.0	1.5	
9-May	-1.1	-1.0	-0.8	-0.8	-0.7	-0.2	0.0	-0.4	-0.7	-1.1	-0.5	-0.9	-0.6	-1.1	-0.5	-0.4	-0.7	-0.8	-0.6	-0.6	-0.6	0.2	0.3	0.5	-0.5	0.5	
10-May	-0.1	-0.1	0.8	0.9	-0.3	-0.2	-0.3	-0.4	-0.3	1.0	-0.8	0.0	-0.3	-0.1	-0.7	0.0	-0.2	0.3	-0.2	-0.1	0.1	0.2	0.5	0.4	0.0	1.0	
11-May	0.0	-0.1	0.1	-0.2	-0.1	-0.1	-0.1	-0.3	0.0	0.9	0.5	-0.4	0.6	-0.2	-0.4	-0.5	0.5	0.3	0.6	0.2	-0.2	0.3	0.6	0.2	0.1	0.9	
12-May	-0.3	-0.3	0.0	0.0	-0.2	-0.1	0.4	-0.2	0.0	-0.2	-0.3	0.4	0.6	-0.6	0.5	0.4	-0.1	-0.1	0.1	0.3	-0.1	0.2	0.0	-0.1	0.0	0.6	
13-May	0.0	0.1	0.0	-0.1	0.0	0.1	0.2	0.1	0.1	-0.2	-0.2	-0.2	-0.4	-0.2	-0.1	0.1	0.5	-0.3	-0.2	0.1	0.1	0.0	0.0	0.2	0.0	0.5	
14-May	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.7	0.6	-0.8	-0.3	0.8	-0.1	-0.7	-0.1	-0.1	-0.5	-0.4	-0.5	-0.1	0.4	0.2	0.0	0.0	0.0	0.8	
15-May	0.1	0.2	0.6	0.1	0.0	0.0	0.2	0.5	0.5	0.1	0.0	0.1	-0.3	0.6	1.6	-0.1	0.9	1.2	1.7	1.1	1.0	0.5	0.2	1.6	0.5	1.7	
16-May	1.3	-0.3	0.4	1.5	1.2	1.5	1.2	0.5	0.7	-0.1	0.3	0.5	0.3	0.0	0.4	0.4	0.2	0.1	0.3	1.0	0.4	0.8	1.0	1.4	0.6	1.5	
17-May	0.4	0.1	0.3	0.2	0.0	0.5	0.7	0.6	0.1	-0.4	-0.3	-0.3	0.1	0.1	-0.2	-0.6	-0.1	-0.1	0.0	0.1	0.6	1.2	0.3	-0.2	0.1	1.2	
18-May	0.0	0.3	0.1	0.2	-0.1	0.3	0.0	0.8	0.4	0.2	0.0	0.1	0.4	-0.1	0.2	0.5	-0.6	-0.8	0.2	0.0	0.2	0.1	0.3	0.4	0.1	0.8	
19-May	0.3	0.2	0.1	-0.1	0.0	0.1	-0.1	0.3	0.5	0.1	-0.4	0.4	0.1	0.1	-0.5	0.0	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.5	
20-May	0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.2	-0.3	0.8	0.2	0.9	0.3	0.7	0.1	0.2	0.1	0.1	0.4	0.0	0.2	0.2	-0.5	-0.5	0.2	0.9	
21-May	-0.3	0.0	0.1	-0.1	0.1	0.2	0.2	0.2	-0.1	0.0	-0.2	-0.5	-0.3	-0.5	-0.2	-0.1	-0.4	-0.2	0.4	0.2	0.1	0.2	0.1	-0.1	-0.1	0.4	
22-May	0.3	0.2	0.0	0.0	0.0	0.2	0.1	0.2	0.2	0.5	0.2	0.2	0.0	-0.4	0.2	-0.4	-0.1	0.4	0.0	-0.3	0.0	0.0	-0.1	0.0	0.1	0.5	
23-May	0.1	-0.1	-0.3	-0.3	-0.4	0.0	-0.1	-0.2	-0.2	0.1	-0.3	0.2	-0.9	0.5	0.4	-0.1	-0.3	-0.2	0.2	0.0	0.7	0.5	0.3	0.3	0.0	0.7	
24-May	0.4	0.3	0.9	0.7	1.2	1.6	0.0	0.2	0.2	0.3	1.2	1.6	1.2	0.6	0.3	1.6	-0.4	-0.1	0.3	0.3	0.8	0.1	0.0	0.3	0.6	1.6	
25-May	0.6	0.8	-1.4	0.6	0.6	1.0	0.6	0.7	-0.5	0.2	-0.3	-0.4	-1.0	-0.5	0.1	-0.1	0.2	-0.1	-0.7	0.0	0.1	0.1	0.1	0.3	0.0	1.0	
26-May	0.0	-0.5	0.4	0.4	-0.2	0.1	0.3	0.3	0.0	-0.2	-0.6	-0.8	-0.7	-0.4	-0.3	-0.5	-0.6	-0.5	-0.4	0.2	0.0	0.2	0.0	0.2	-0.1	0.4	
27-May	0.0	0.1	0.1	0.2	-0.1	-0.2	0.3	1.3	1.5	0.4	0.7	0.4	0.6	0.6	0.7	1.0	0.3	0.9	1.0	0.4	0.7	0.8	0.9	0.8	0.6	1.5	
28-May	1.1	1.0	0.5	0.5	1.6	1.2	1.2	1.2	0.8	1.0	1.7	1.5	0.7	0.0	0.5	0.0	0.3	-0.3	0.7	0.3	0.3	0.5	1.2	0.4	0.7	1.7	
29-May	0.3	0.0	0.4	0.3	-0.1	0.2	0.1	0.2	0.2	0.6	0.3	0.1	0.0	-0.2	0.5	0.1	-0.3	0.3	0.2	0.4	0.0	0.0	-0.1	-0.2	0.1	0.6	
30-May	-0.1	-0.1	-0.2	-0.2	-0.4	-0.5	-0.3	-0.5	-0.7	0.1	-0.4	0.1	-0.3	-0.1	-0.5	-0.5	-0.3	-0.6	-0.5	0.0	0.2	0.3	-0.1	-0.2	-0.2	0.3	
31-May	-0.2	-0.1	-0.3	-0.1	-0.1	-0.3	-0.1	0.3	1.1	0.8	0.8	0.1	0.1	0.3	-0.8	0.5	0.2	0.4	0.5	0.9	0.5	0.1	1.1	1.8	0.3	1.8	
		0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.0	-0.1	0.0	0.0	-0.1	0.0	0.2	0.2	0.3	0.4	0.3	0.3	Diurnal Average	
		1.9	2.2	1.5	2.1	2.1	3.1	1.9	2.0	1.5	1.0	1.7	1.6	1.2	1.2	1.6	1.6	1.0	1.4	1.7	1.1	1.4	2.8	3.6	2.9	Diurnal Maximum	



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 100 m (VW100m) - km/h
Lower Camp Met Tower - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1 Maximum Value: 4.5 km/h on May 5 16:00 Minimum Value: 0.1 km/h on May 14 05:00 Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 1.1 Median = 1.9 Q ₃ = 2.7 P ₉₀ = 3.5 P ₉₉ = 4.3																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.8	0.7	0.5	0.8	1.1	0.7	0.8	0.7	1.3	1.3	1.5	2.3	2.5	2.7	2.7	2.8	2.4	2.0	2.4	1.1	0.3	0.3	0.3	0.5	2.8
2-May	0.3	0.6	0.6	0.3	0.5	0.5	0.4	0.7	0.9	0.9	1.2	1.4	1.9	2.0	2.4	2.7	2.4	1.4	1.1	1.0	1.1	1.0	1.2	1.1	2.7
3-May	1.2	1.3	1.7	1.6	1.9	2.0	1.8	2.0	1.7	1.6	1.5	1.2	2.1	3.2	3.5	3.0	2.3	2.5	1.6	1.4	1.1	2.1	1.7	1.1	3.5
4-May	2.1	1.2	1.1	1.4	0.7	0.8	0.8	0.8	0.7	0.6	1.3	1.7	2.3	2.3	3.4	4.1	3.9	3.7	3.7	3.0	3.2	3.3	2.5	2.4	4.1
5-May	1.6	2.5	2.1	1.4	1.7	1.7	1.7	2.2	2.1	3.2	3.9	4.0	4.4	4.5	4.1	4.5	3.9	3.4	3.1	2.2	2.5	1.6	1.4	0.3	4.5
6-May	0.6	0.6	0.7	1.8	1.3	0.6	0.8	1.2	1.6	2.2	3.9	3.1	4.0	3.3	3.1	3.3	2.8	2.0	1.8	0.7	1.0	1.5	1.4	1.9	4.0
7-May	1.6	1.2	1.5	1.6	1.4	0.9	1.0	1.6	1.2	1.2	1.2	0.9	0.5	1.5	2.8	2.3	1.2	1.1	1.4	1.2	1.0	2.0	1.1	0.8	2.8
8-May	0.5	0.9	0.7	0.7	1.0	1.5	1.9	4.0	3.0	1.3	2.4	2.8	3.2	3.1	2.9	3.1	3.6	3.6	3.2	2.4	2.6	3.7	3.3	3.0	4.0
9-May	2.3	2.2	2.2	2.4	2.2	2.5	2.4	3.3	3.3	3.9	3.4	2.7	3.3	3.3	3.3	2.9	2.6	2.5	2.2	1.5	1.7	2.0	1.6	1.2	3.9
10-May	0.5	1.0	1.5	1.5	1.3	0.9	1.3	1.7	2.0	2.8	2.3	3.4	3.1	3.3	3.5	3.4	3.5	3.6	3.0	2.7	1.8	1.0	0.4	1.1	3.6
11-May	1.1	0.9	0.5	0.5	0.4	0.6	1.5	2.4	2.9	3.3	3.3	3.2	4.3	3.7	4.1	4.1	3.9	3.8	3.3	3.3	2.0	1.0	1.0	0.9	4.3
12-May	0.7	0.4	0.5	0.4	0.6	0.9	1.7	1.9	2.8	2.9	3.5	4.2	4.3	4.1	3.9	3.9	3.2	2.7	2.4	2.4	0.6	0.4	0.3	0.2	4.3
13-May	0.4	0.3	0.3	0.4	0.5	0.4	0.8	0.8	1.3	2.8	3.2	3.1	3.1	3.3	2.7	2.8	2.8	2.2	1.3	1.1	0.5	0.8	1.0	1.0	3.3
14-May	0.4	0.2	0.2	0.3	0.1	0.2	0.3	1.3	1.3	0.7	2.6	2.9	2.9	2.8	3.0	3.1	2.7	2.3	2.1	1.5	1.2	0.8	0.3	0.1	3.1
15-May	0.3	0.3	0.4	0.5	0.4	0.4	0.7	0.6	0.5	0.4	0.9	2.2	2.2	3.1	2.3	2.2	2.2	1.6	1.4	1.6	1.6	1.8	1.9	1.6	3.1
16-May	1.7	1.3	1.1	1.4	1.2	1.1	1.1	0.8	0.7	0.7	1.7	3.4	2.5	1.1	0.6	0.8	0.8	1.1	1.0	1.9	1.1	1.8	2.4	2.3	3.4
17-May	0.9	0.7	0.9	1.9	1.4	1.7	2.3	2.5	2.3	3.0	2.7	2.4	2.2	2.6	3.0	2.6	2.5	1.7	0.7	0.3	1.2	1.9	1.1	0.9	3.0
18-May	0.7	1.0	1.5	1.0	0.9	1.0	0.9	2.3	2.5	2.4	2.5	2.8	3.1	2.9	2.5	2.5	2.8	2.2	1.7	1.7	2.5	3.5	3.2	3.4	3.5
19-May	3.6	3.2	2.8	2.8	2.8	3.0	3.8	3.7	4.1	4.2	4.0	3.4	4.3	4.3	4.1	4.4	4.2	4.2	3.7	3.7	3.0	2.5	2.8	3.0	4.4
20-May	2.7	2.8	3.2	3.0	2.9	2.8	2.8	3.5	3.1	3.6	3.5	3.9	4.0	3.3	2.7	3.1	2.5	2.2	2.3	1.8	1.3	1.8	1.3	1.2	4.0
21-May	0.9	1.1	1.3	1.3	1.5	2.1	2.0	1.6	2.0	2.4	2.7	2.7	2.3	2.1	2.0	2.5	2.2	2.7	2.5	2.4	2.0	1.9	2.1	2.2	2.7
22-May	2.3	1.8	1.8	2.1	2.4	2.4	2.7	3.3	3.7	3.6	3.9	3.7	3.8	3.8	4.2	4.0	4.0	4.0	4.3	4.0	2.4	1.4	1.0	1.0	4.3
23-May	0.8	1.2	0.5	0.5	1.0	1.1	1.8	1.9	2.2	2.9	3.0	3.8	3.6	4.3	3.7	3.8	3.5	3.3	2.6	1.8	1.2	1.3	0.9	1.0	4.3
24-May	1.6	1.7	1.2	1.1	1.1	1.3	1.1	1.0	1.3	2.1	2.8	3.2	3.7	3.3	2.8	2.8	1.1	0.4	1.1	1.9	1.9	1.6	1.2	1.1	3.7
25-May	1.2	1.8	1.4	1.3	1.0	1.0	1.0	1.3	1.3	2.2	2.3	2.6	2.6	2.7	2.7	2.8	2.3	2.5	2.9	2.6	2.2	2.0	1.8	2.2	2.9
26-May	1.9	2.4	2.5	2.4	1.9	2.5	2.5	2.4	2.4	2.9	2.7	4.0	2.4	1.8	2.4	3.0	2.7	2.5	2.4	2.0	1.8	1.3	0.9	1.7	4.0
27-May	1.3	1.1	1.0	1.2	0.9	1.9	2.2	2.5	2.5	1.3	1.7	1.9	2.3	2.4	1.8	2.7	1.9	1.4	0.9	1.3	0.9	1.6	1.4	0.8	2.7
28-May	1.6	1.5	2.0	2.3	2.4	1.8	2.1	2.0	1.8	2.2	2.2	2.1	2.4	2.2	2.4	2.5	2.4	1.7	1.6	1.3	1.1	0.9	0.9	1.3	2.5
29-May	1.4	1.4	1.5	1.3	0.9	0.8	1.4	1.2	1.3	1.3	1.4	1.1	1.1	0.9	2.2	1.3	1.1	1.5	2.4	1.8	0.7	0.6	0.5	0.3	2.4
30-May	0.4	0.4	0.8	0.6	0.7	0.7	0.9	1.6	1.3	1.9	1.8	2.1	2.0	2.3	2.4	3.3	3.2	2.1	1.7	1.6	1.8	1.4	1.4	1.2	3.3
31-May	0.5	0.3	0.5	0.2	0.3	0.4	0.6	1.7	2.2	2.2	2.5	2.8	3.3	3.1	2.8	2.4	2.3	2.2	1.3	1.2	1.1	1.1	1.5	1.6	3.3
	3.6	3.2	3.2	3.0	2.9	3.0	3.8	4.0	4.1	4.2	4.0	4.2	4.4	4.5	4.2	4.5	4.2	4.2	4.3	4.0	3.2	3.7	3.3	3.4	
	Diurnal Maximum																								



Maximum Value: 4.5 km/h on May 7 00:00		Maximum Daily Average: 1.5 km/h on May 3		Hours in Service: 744																							
Minimum Value: -1.4 km/h on May 31 15:00		Minimum Daily Average: -0.3 km/h on May 9		Hours of Data: 744																							
Maximum Diurnal Average: 0.7 km/h at hour 22		Minimum Diurnal Average: -0.1 km/h at hour 14		Hours of Missing Data: 0																							
Monthly Average: 0.36 km/h		Percentiles: $P_1 = -1.1$ $P_{10} = -0.4$ $Q_1 = -0.1$ Median = 0.3 $Q_3 = 0.7$ $P_{90} = 1.3$ $P_{99} = 2.4$		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-May	0.4	0.9	0.3	0.3	0.7	0.6	0.5	0.4	1.3	0.7	-0.1	0.2	-0.3	-0.6	0.4	-0.1	0.2	0.2	0.6	-0.3	0.2	0.2	0.1	0.1	0.3	1.3	
2-May	0.1	-0.1	0.0	-0.1	0.0	0.2	0.4	0.4	0.3	0.1	0.1	0.0	-0.4	-0.9	-0.5	0.4	-0.3	-0.2	0.8	1.7	1.0	1.2	1.6	1.0	0.3	1.7	
3-May	1.7	3.0	0.6	2.7	2.3	3.4	1.6	1.4	1.1	1.1	0.6	0.6	0.5	2.0	1.6	1.4	1.0	1.2	1.7	1.6	1.7	0.4	1.1	0.6	1.5	3.4	
4-May	0.7	0.5	1.0	1.3	0.4	0.6	0.4	0.4	0.5	0.4	0.7	-0.1	-0.3	-0.9	-0.4	-0.6	-0.9	-0.1	-0.9	-0.2	0.2	-0.9	-0.7	-0.5	0.0	1.3	
5-May	-0.2	-0.5	-0.8	-0.1	-0.1	0.7	0.0	-0.3	-0.4	0.6	0.5	2.2	0.2	0.1	-0.3	-0.5	-0.7	-1.3	-0.8	-0.7	0.9	0.9	0.1	0.1	0.0	2.2	
6-May	0.1	0.0	0.3	-1.0	-0.2	0.0	-0.3	0.2	0.3	0.1	1.0	0.9	1.3	-0.9	1.0	1.2	0.0	0.3	0.6	0.5	1.1	2.2	4.0	4.5	0.7	4.5	
7-May	1.5	2.7	1.3	-1.0	1.9	1.3	0.8	0.9	0.0	0.2	0.5	0.5	0.1	-0.3	0.0	-0.4	-0.1	0.7	1.1	-0.4	1.4	0.5	0.3	0.2	0.6	2.7	
8-May	0.1	0.4	0.2	0.0	-0.3	-0.5	-0.8	-0.8	0.0	0.0	0.7	1.2	1.0	0.5	0.8	1.4	1.8	2.5	2.5	1.6	-0.2	-0.5	-0.5	-0.9	0.4	2.5	
9-May	-1.1	-0.6	-0.4	-0.5	-0.6	0.3	0.3	0.0	-0.2	-0.9	-0.2	-0.6	-0.2	-1.2	-0.2	-0.2	-0.4	-0.6	-0.2	-0.3	-0.3	0.5	0.3	0.2	-0.3	0.5	
10-May	0.0	0.4	2.1	2.1	0.4	0.0	-0.3	-0.2	-1.1	1.1	-1.1	0.1	-0.1	-0.1	-0.8	-0.3	-0.1	0.5	-0.3	0.3	0.4	0.9	1.6	2.0	0.3	2.1	
11-May	-0.1	0.1	0.2	0.2	0.0	-0.1	0.1	-0.3	0.4	1.3	0.8	-0.4	0.9	-0.2	-0.6	-0.6	0.6	0.3	0.6	0.4	0.2	0.9	1.2	1.2	0.3	1.3	
12-May	-0.1	-0.1	0.2	0.3	0.2	-0.1	0.5	0.0	0.3	-0.3	-0.9	0.3	0.7	-0.6	0.0	0.6	-0.1	0.0	0.1	0.2	0.1	0.5	0.1	0.1	0.1	0.7	
13-May	-0.1	0.0	-0.1	0.1	0.4	0.1	0.4	0.6	0.2	-0.6	0.1	-0.3	-0.5	0.0	0.1	-0.2	1.0	-0.4	-0.4	0.1	0.4	0.5	0.3	0.8	0.1	1.0	
14-May	0.2	0.1	0.2	0.1	0.1	0.0	0.3	0.4	0.5	-0.4	-0.6	0.9	0.2	-1.1	-0.1	0.0	-0.6	-0.1	-0.5	0.1	1.0	0.7	0.2	0.1	0.1	1.0	
15-May	0.3	0.1	0.2	0.5	0.4	0.4	0.4	0.3	0.4	0.2	0.0	0.3	-0.3	-0.1	1.6	0.0	0.8	1.3	2.0	1.5	1.3	0.7	-0.3	0.1	0.5	2.0	
16-May	1.1	0.2	0.8	0.9	0.4	0.7	0.5	0.1	0.3	0.3	0.4	1.9	1.5	0.5	0.6	0.9	1.0	0.8	0.7	1.4	1.0	1.1	1.3	1.3	0.8	1.9	
17-May	0.5	0.4	0.6	1.0	1.5	1.6	1.7	1.5	0.6	0.0	-0.1	-0.2	0.3	0.4	0.7	-0.4	-0.1	-0.2	0.1	0.2	1.0	1.9	0.8	0.4	0.6	1.9	
18-May	0.4	1.4	0.7	0.5	0.6	0.4	0.3	1.3	1.2	1.0	0.5	0.4	1.0	0.5	0.6	0.8	-0.1	-0.3	0.5	0.2	0.4	0.3	0.4	0.7	0.6	1.4	
19-May	0.6	0.4	0.5	0.3	0.2	0.3	-0.1	0.2	0.8	0.6	-0.3	0.3	-0.1	0.1	-0.1	0.4	0.6	0.3	0.4	0.6	0.4	0.2	0.2	0.3	0.3	0.8	
20-May	0.0	0.2	0.3	0.3	0.3	0.1	0.5	0.3	-0.3	0.6	0.3	1.2	0.3	0.8	0.2	0.4	0.2	0.5	0.8	0.3	0.4	0.5	-0.1	-0.2	0.3	1.2	
21-May	0.0	0.2	0.3	0.0	0.3	0.4	0.5	0.3	0.2	0.2	0.1	-0.3	-0.1	-0.4	-0.1	-0.1	-0.3	-0.3	0.6	0.3	0.2	0.3	0.1	0.2	0.1	0.6	
22-May	0.5	0.3	0.1	0.0	0.4	0.2	-0.2	0.2	0.5	0.8	0.5	0.3	0.3	-0.4	0.3	-0.1	-0.1	0.7	0.1	-0.1	0.2	0.4	0.3	0.4	0.2	0.8	
23-May	0.3	0.1	0.0	0.0	-0.3	0.1	0.0	-0.1	0.3	0.3	-0.5	0.3	-0.9	0.5	0.5	-0.3	-0.4	0.1	0.2	0.3	1.3	0.7	0.3	0.2	0.1	1.3	
24-May	0.8	1.0	0.4	0.4	0.6	0.9	0.2	0.1	0.2	0.2	1.0	1.8	1.3	0.4	0.1	1.5	-0.1	0.0	0.3	1.7	2.4	2.3	2.3	2.5	0.9	2.5	
25-May	2.4	0.9	-1.0	0.6	0.4	0.2	0.4	0.4	-0.8	-0.2	-0.3	-0.5	-1.3	-0.3	0.1	0.0	0.3	0.1	-0.6	0.1	0.4	0.2	0.1	0.4	0.1	2.4	
26-May	0.2	-0.3	0.3	0.7	0.0	0.1	0.6	0.5	0.2	-0.1	-0.3	-0.9	-0.4	-0.2	0.1	-0.5	-0.2	-0.2	0.0	0.3	0.2	0.3	0.4	0.2	0.0	0.7	
27-May	0.0	0.1	0.0	0.2	0.1	0.1	1.4	1.4	1.4	0.9	1.2	0.6	0.8	0.4	0.6	2.3	0.9	1.1	0.8	1.0	0.9	1.2	1.3	1.3	0.8	2.3	
28-May	1.4	1.4	1.3	1.3	1.6	1.3	1.4	0.9	0.7	1.2	1.5	1.4	0.9	0.2	0.8	0.8	0.7	0.1	1.5	1.4	0.5	1.3	1.7	0.8	1.1	1.7	
29-May	0.9	0.4	0.8	0.5	0.4	0.3	0.3	0.3	0.2	0.7	0.4	0.5	-0.1	-0.2	0.0	0.3	-0.3	0.5	0.4	0.6	0.1	0.1	0.1	0.0	0.3	0.9	
30-May	0.1	0.0	0.4	0.1	-0.3	-0.3	-0.1	-0.4	-0.7	0.0	-0.5	0.2	-0.3	-0.3	-0.5	-0.2	-0.2	-0.7	-0.2	0.2	0.5	0.8	-0.2	-0.2	-0.1	0.8	
31-May	0.0	0.0	0.0	0.0	0.0	-0.2	0.1	-0.3	1.6	0.5	1.2	-0.1	-0.1	0.2	-1.4	0.4	0.3	-0.1	0.3	1.1	0.5	1.1	0.9	1.2	0.3	1.6	
		0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.4	0.2	-0.1	0.2	0.3	0.1	0.2	0.4	0.5	0.6	0.7	0.6	0.6	Diurnal Average		
		2.4	3.0	2.1	2.7	2.3	3.4	1.7	1.5	1.6	1.3	1.5	2.2	1.5	2.0	1.6	2.3	1.8	2.5	2.5	1.7	2.4	2.3	4.0	4.5	Diurnal Maximum	



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 167 m (VW167m) - km/h
Lower Camp Met Tower - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1 Maximum Value: 5.2 km/h on May 5 13:00 Minimum Value: 0.1 km/h on May 14 06:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.8 Q ₃ = 2.7 P ₉₀ = 3.8 P ₉₉ = 4.7																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.7	0.8	0.6	0.5	0.8	0.5	0.6	0.6	1.2	1.3	1.1	2.0	2.1	2.4	2.5	3.0	2.5	2.0	2.4	1.1	0.6	0.5	0.5	0.4	3.0
2-May	0.3	0.2	0.4	0.2	0.3	0.3	0.3	0.5	0.3	0.5	0.8	1.0	1.2	1.9	2.5	2.7	2.7	1.7	1.4	0.9	1.3	1.0	1.3	1.3	2.7
3-May	1.2	1.4	1.8	1.6	1.6	2.3	1.9	1.7	1.5	1.5	1.6	1.3	2.2	3.2	3.9	3.1	2.8	2.5	1.7	0.9	1.2	2.0	1.6	1.3	3.9
4-May	2.5	1.3	1.1	1.1	0.6	0.8	1.0	0.7	0.6	0.6	1.3	1.6	1.6	2.5	3.6	4.3	4.0	3.5	3.0	2.7	2.1	2.8	2.2	2.4	4.3
5-May	1.4	2.6	1.7	1.3	1.7	1.7	1.4	2.2	2.2	3.7	4.1	4.7	5.2	5.2	4.4	4.5	4.4	3.6	3.1	2.2	2.5	1.2	1.4	0.5	5.2
6-May	0.5	0.6	0.6	1.9	1.1	0.9	1.1	1.6	1.4	1.9	4.2	3.6	4.7	3.5	3.5	3.8	3.1	1.9	1.7	0.8	0.6	1.3	1.5	2.0	4.7
7-May	1.8	1.5	1.8	1.5	1.1	1.3	1.2	1.2	1.0	1.3	1.0	0.9	0.5	1.7	3.1	2.4	1.5	1.2	1.6	1.4	1.2	2.7	1.6	0.6	3.1
8-May	0.7	0.8	0.8	0.8	1.0	1.6	1.9	3.8	3.2	1.3	2.3	2.9	2.5	2.9	2.3	2.6	3.0	3.1	2.7	1.8	2.7	3.7	3.3	3.3	3.8
9-May	2.2	2.2	2.1	2.1	1.9	2.5	2.1	3.1	3.6	4.3	3.5	2.9	3.7	3.6	3.8	3.0	2.6	2.7	2.2	1.6	1.4	2.1	1.6	1.2	4.3
10-May	0.6	0.9	1.5	1.1	1.5	0.9	1.2	1.8	1.7	2.9	2.5	3.9	3.4	3.7	3.9	4.0	3.9	4.2	3.1	2.5	1.5	0.6	0.4	1.0	4.2
11-May	1.4	1.1	0.8	0.5	0.4	0.6	1.2	2.6	3.4	3.9	4.0	3.7	5.0	4.4	4.5	4.8	4.3	3.9	3.7	3.2	1.7	0.6	0.4	0.8	5.0
12-May	1.0	0.4	0.6	0.4	0.6	0.8	1.6	1.5	3.1	3.6	4.3	5.0	4.6	4.9	4.5	4.5	3.4	2.9	2.3	2.1	0.6	0.3	0.1	0.3	5.0
13-May	0.3	0.2	0.2	0.3	0.3	0.3	0.7	1.0	1.5	2.8	3.7	3.4	3.3	3.8	3.4	3.1	3.5	2.4	1.3	1.4	0.7	0.6	0.6	1.4	3.8
14-May	0.7	0.3	0.2	0.1	0.1	0.1	0.3	0.6	0.9	0.7	2.2	3.2	3.4	3.6	3.6	4.0	3.2	2.8	2.3	1.1	0.6	0.6	0.3	0.1	4.0
15-May	0.4	0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.5	0.9	2.4	2.5	3.0	2.7	2.6	2.4	1.9	1.6	0.8	0.6	0.9	1.3	1.3	3.0
16-May	1.8	1.8	1.0	1.1	1.0	0.8	0.8	0.8	0.7	0.6	2.0	3.5	2.2	0.8	0.8	1.0	1.0	1.5	1.3	2.2	1.4	2.0	2.1	2.1	3.5
17-May	0.9	0.7	1.2	2.4	1.6	1.6	1.9	1.5	1.8	3.0	2.7	2.4	2.3	3.3	3.5	3.2	2.8	1.8	1.0	0.3	1.3	2.5	1.0	1.4	3.5
18-May	1.3	1.0	1.7	1.5	1.4	1.1	1.0	2.7	2.3	2.0	2.1	2.6	2.5	2.6	2.2	1.9	3.0	2.0	1.5	1.8	2.9	3.5	3.4	3.8	3.8
19-May	4.1	3.7	3.0	2.6	2.6	3.3	4.0	3.8	4.7	4.1	4.0	3.9	4.7	4.7	4.3	4.3	4.7	4.4	4.3	4.1	3.3	2.7	3.0	3.1	4.7
20-May	2.7	2.6	3.3	3.1	2.8	2.9	2.8	3.8	3.1	4.0	3.7	4.5	4.3	3.6	2.8	3.3	2.4	2.0	2.2	2.0	1.8	2.0	1.1	1.0	4.5
21-May	0.7	1.2	1.2	1.4	1.5	2.4	2.1	1.6	1.6	2.0	2.5	2.5	2.4	1.9	2.1	2.6	2.4	2.9	2.8	2.7	2.1	1.9	2.3	2.6	2.9
22-May	2.7	2.1	2.1	2.4	2.6	2.5	2.8	3.5	3.9	3.8	3.9	3.7	3.9	3.7	4.3	4.4	3.9	4.2	4.4	4.0	2.5	1.3	1.1	0.6	4.4
23-May	1.2	1.3	0.6	0.5	1.1	0.8	1.6	2.0	2.5	3.2	3.2	4.4	4.1	4.8	4.5	4.2	4.1	3.9	2.7	1.7	1.2	0.9	0.5	0.7	4.8
24-May	1.0	1.1	0.9	0.9	0.8	0.7	0.9	0.9	1.1	2.2	3.1	3.7	3.7	3.3	2.6	2.7	1.2	0.5	0.9	1.4	1.8	1.4	1.0	0.7	3.7
25-May	0.7	1.2	1.2	0.9	0.7	0.6	0.7	1.1	0.8	2.1	2.3	2.8	3.0	3.3	3.0	3.5	2.6	2.8	2.6	2.6	2.6	2.4	2.0	2.6	3.5
26-May	2.2	2.5	2.8	2.6	1.9	2.4	2.5	2.7	2.2	2.4	2.5	3.7	2.2	1.7	2.3	2.4	2.2	2.3	2.3	2.0	1.7	1.4	1.0	1.5	3.7
27-May	1.3	1.3	1.2	0.9	1.4	2.3	2.4	2.4	2.7	1.3	1.5	2.3	2.7	2.9	2.1	2.2	1.7	1.3	0.8	1.2	1.3	1.5	1.3	1.0	2.9
28-May	1.5	1.4	1.7	2.4	2.3	1.9	1.9	1.8	2.2	2.5	2.5	2.5	2.2	1.8	2.0	2.2	2.2	1.3	1.3	1.2	0.8	0.9	0.9	0.9	2.5
29-May	1.2	1.2	1.4	1.2	0.7	0.6	1.1	1.1	0.9	1.2	1.3	1.0	0.9	0.7	1.4	1.3	1.1	1.8	2.5	2.0	0.8	0.8	0.5	0.3	2.5
30-May	0.3	0.3	0.4	0.4	0.8	0.7	0.7	1.3	1.2	1.7	1.7	2.5	2.3	2.2	2.0	3.4	3.2	1.5	1.3	1.8	1.8	1.7	1.7	1.3	3.4
31-May	0.6	0.4	0.6	0.3	0.4	0.5	0.6	1.5	2.5	2.5	2.7	2.8	2.9	3.3	2.9	2.6	2.7	2.5	1.5	1.4	0.7	1.1	0.9	1.0	3.3
	4.1	3.7	3.3	3.1	2.8	3.3	4.0	3.8	4.7	4.3	4.3	5.0	5.2	5.2	4.5	4.8	4.7	4.4	4.4	4.1	3.3	3.7	3.4	3.8	
	Diurnal Maximum																								



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 4
BUFFALO VIEWPOINT
MAY 2016

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

June 24, 2016



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	710	34	34	100.00	20	0	2	0
H2S (ppb) Average	710	33	34	99.87	5	0	2	0
THC (ppm) Average	710	34	34	100.00	6.6	-	3.7	-
Temperature (C) Average	744	0	0	100.00	32.8	-	23.3	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	86	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	36	-	29	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	0.4	1	-	0	0	0	0	0	1	20
H2S (ppb) Average	710	0.3	1	-	0	0	0	0	0	1	5
THC (ppm) Average	710	2.37	0.5	-	2.1	2.1	2.2	2.2	2.4	2.7	6.6
Temperature 2 m (C) Average	744	13.48	6.7	-	-0.9	4.9	8.5	12.7	18	22.7	32.8
Relative Humidity (%) Average	744	55.6	25	-	14	23	33	53	78	90	99
Wind Speed 10 m (km/h) Average	744	12.2	7	-	1	5	7	10	17	22	36
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	03 May 2016 11:00	03 May 2016 11:00	1	Maintenance - sample manifold cleaning



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Buffalo Viewpoint - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on May 10 23:00	Maximum Daily Average: 2.0 ppb on May 2		Hours of Data:	710
Minimum Value: 0 ppb on May 9 00:00	Minimum Daily Average: 0.1 ppb on May 12		Hours of Missing Data:	34
Maximum Diurnal Average: 1.2 ppb at hour 23	Minimum Diurnal Average: 0.2 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-May	0	0	Z	0	0	0	0	0	2	4	16	11	2	0	1	3	3	0	0	0	0	0	0	0	2.0	16
3-May	0	0	0	Z	0	0	0	0	0	C	C	C	1	1	1	0	0	0	0	0	0	1	1	0	0.4	1
4-May	0	0	0	0	Z	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-May	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	6	5	0.8	6
7-May	5	Z	4	3	2	2	2	1	1	1	1	1	2	1	0	0	0	1	1	1	2	2	2	2	1.5	5
8-May	3	6	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	6
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	20	3	1.5	20
11-May	2	3	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
12-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
14-May	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
15-May	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
16-May	1	1	1	0	Z	0	0	0	0	1	0	0	2	2	2	2	2	2	2	2	1	1	4	6	1.4	6
17-May	1	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1
18-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-May	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
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1	1	0.4	1
25-May	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-May	Z	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
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

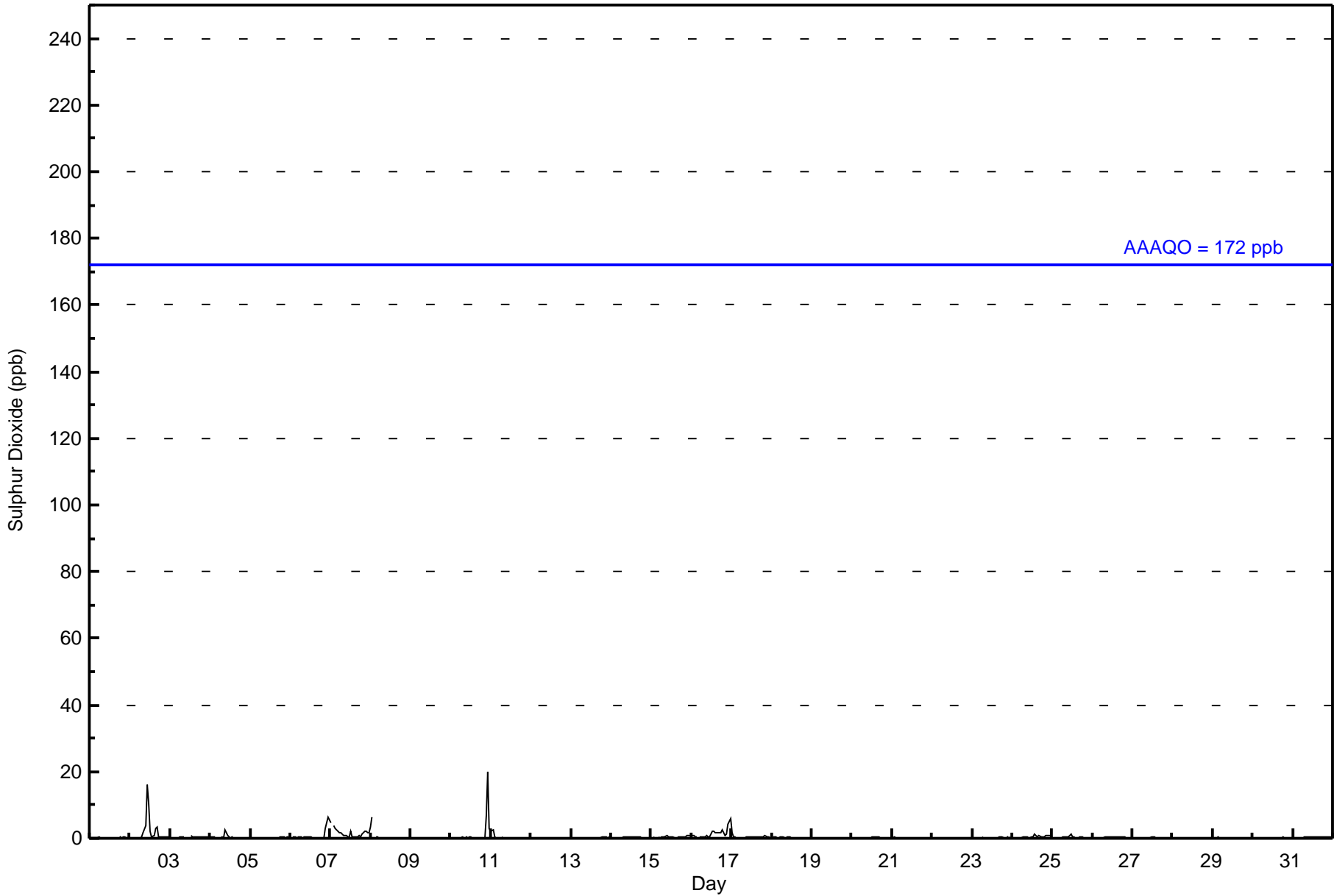
0.6	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.8	0.6	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.6	1.2	0.7	Diurnal Average
5	6	4	3	2	2	2	2	1	2	4	16	11	2	2	2	3	3	2	2	2	2	2	7	20	6	Diurnal Maximum

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
Buffalo Viewpoint - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.58	99.58
11 - 20	3	0.42	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	169	59	16	2	10	21	62	76	28	22	20	31	44	60	44	43	707
11 - 20	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	171	59	16	3	10	21	62	76	28	22	20	31	44	60	44	43	710

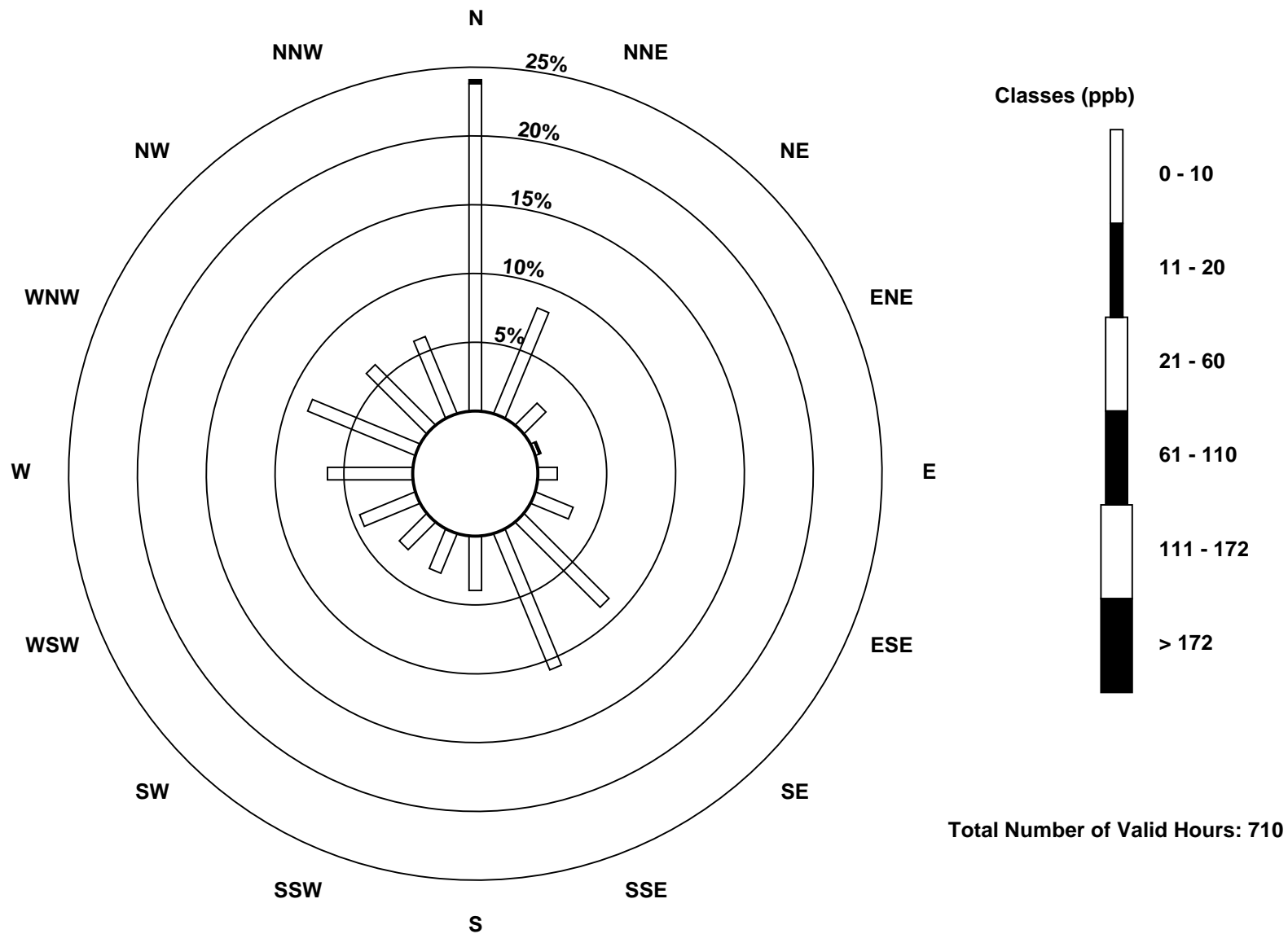
Total Number of Valid Hours: 710

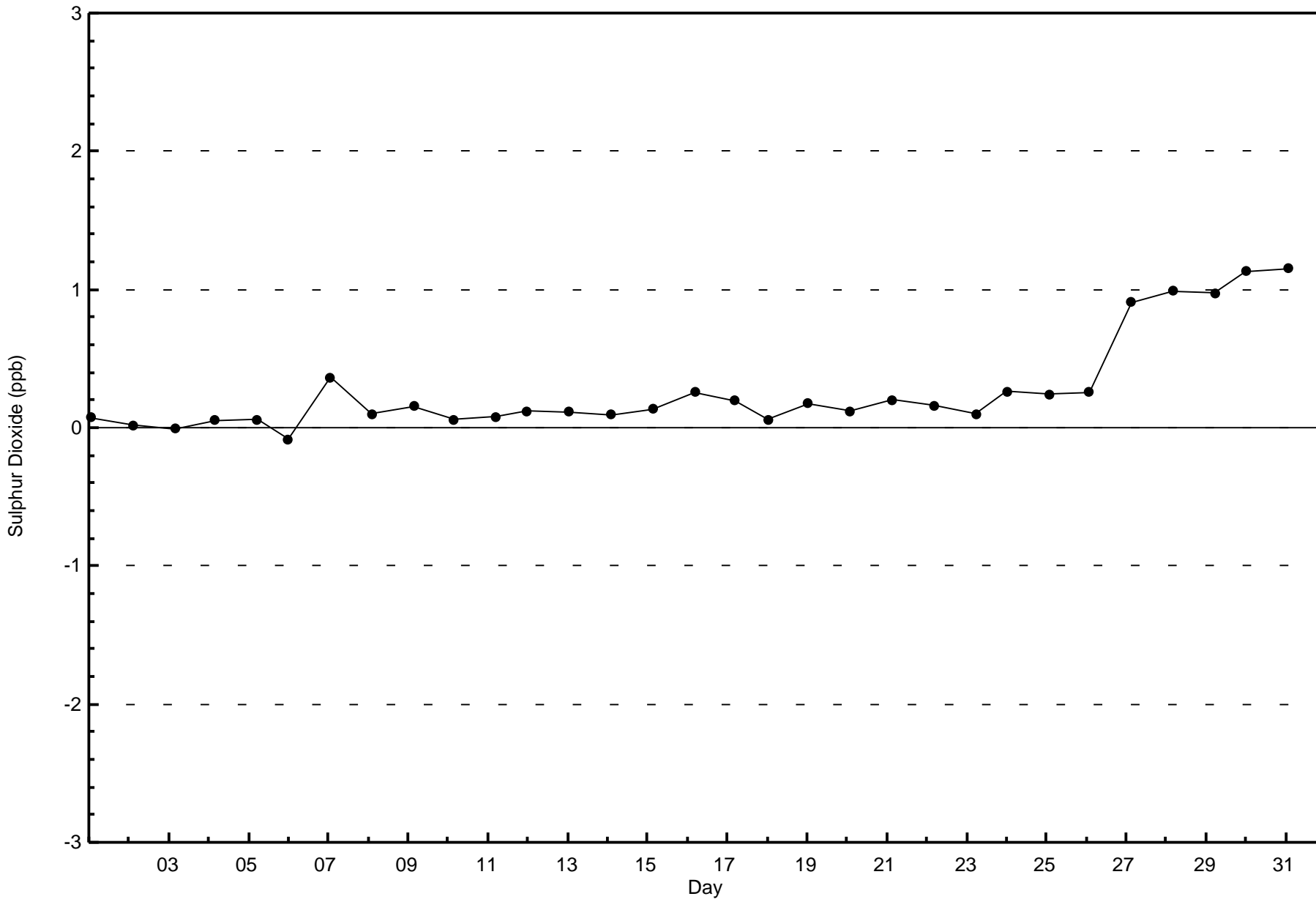
Total Number of Hours: 744

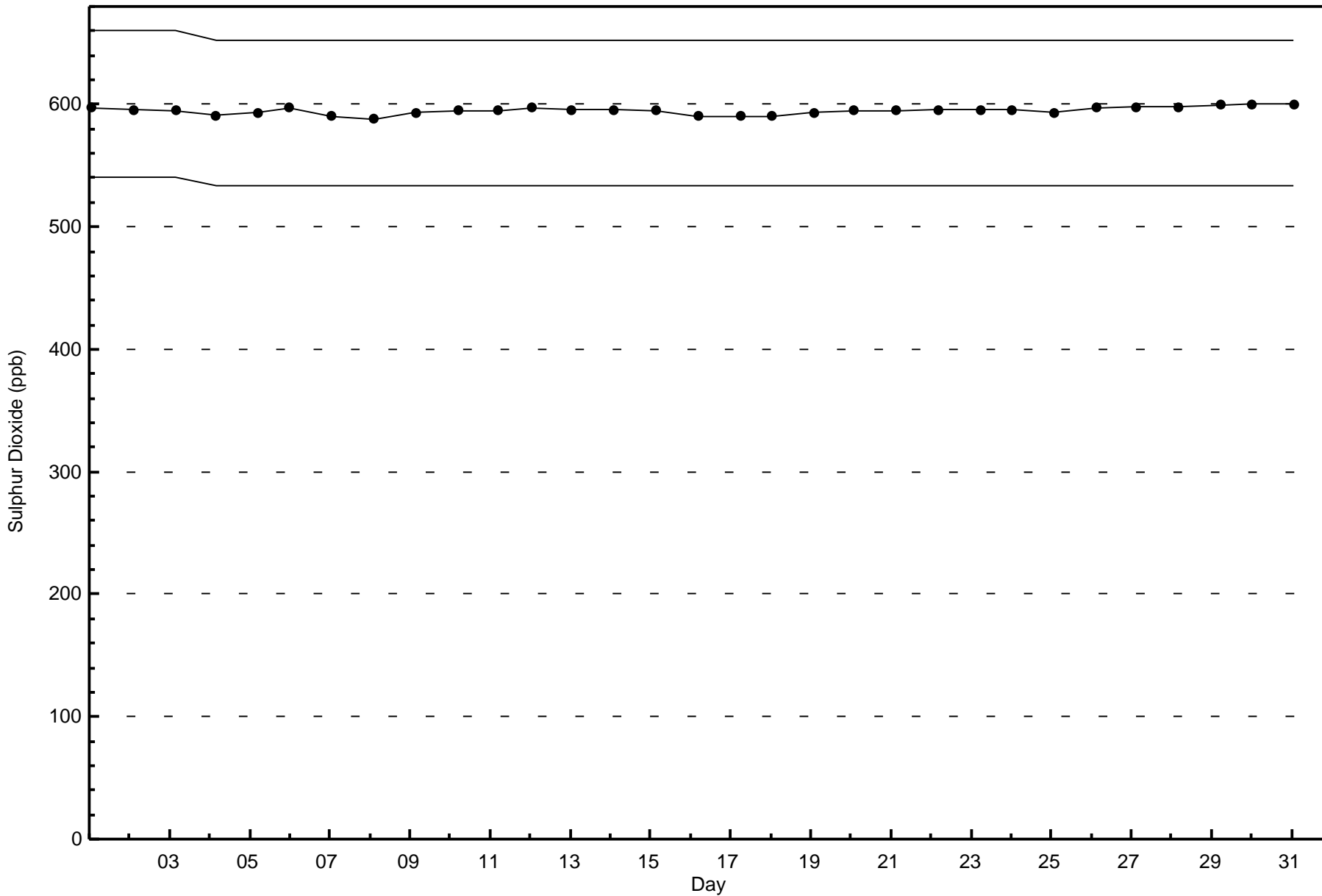


Wood Buffalo Environmental Association
Wind Rose May 2016

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







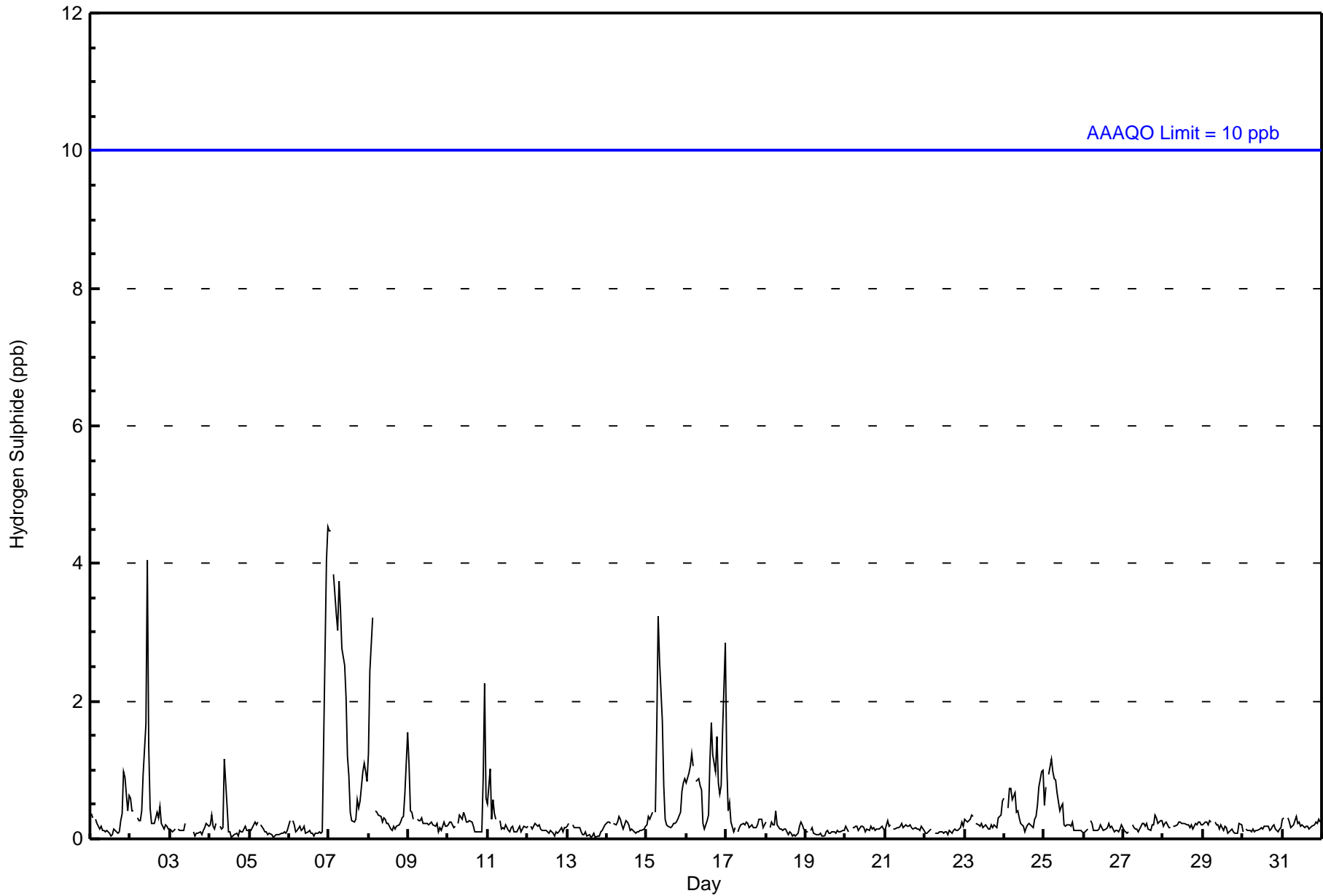


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 5 ppb on May 7 00:00										Maximum Daily Average: 1.8 ppb on May 7										Hours of Data: 710																												
Minimum Value: 0 ppb on May 13 18:00										Minimum Daily Average: 0.1 ppb on May 19										Hours of Missing Data: 34																												
Maximum Diurnal Average: 0.6 ppb at hour 2										Minimum Diurnal Average: 0.2 ppb at hour 14										Hours of Calibration: 33																												
Monthly Average: 0.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 4										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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.3	1																						
2-May	1	0	0	Z	0	0	0	0	1	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4																						
3-May	0	0	0	0	Z	0	0	0	0	0	M	0	C	C	0	0	0	0	0	0	0	0	0	0.1	0																							
4-May	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	5	0.5	5																						
7-May	4	4	Z	4	3	3	4	3	3	3	2	1	1	0	0	0	0	1	0	1	1	1	1	1	1.8	4																						
8-May	1	2	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.6	3																						
9-May	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																							
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0.4	2																						
11-May	1	1	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
12-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
15-May	0	0	0	0	Z	0	2	3	3	2	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.7	3																						
16-May	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	1	2	1	1	1	1	1	1	2	3	1.0	3																						
17-May	1	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																						
24-May	1	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1																						
25-May	0	1	Z	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
29-May	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																						
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
																								0.5	0.6	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.6	Diurnal Average
																								4	4	3	4	3	3	4	3	3	3	4	1	1	0	1	2	1	1	1	1	1	1	4	5	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	694	97.75	97.75
3 - 4	15	2.11	99.86
5 - 7	1	0.14	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	169	60	16	3	10	23	56	70	26	21	20	31	41	62	44	42	694
3 - 4	1	0	0	0	0	0	7	5	0	1	0	0	0	0	0	1	15
5 - 7	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	170	60	16	3	10	23	63	76	26	22	20	31	41	62	44	43	710

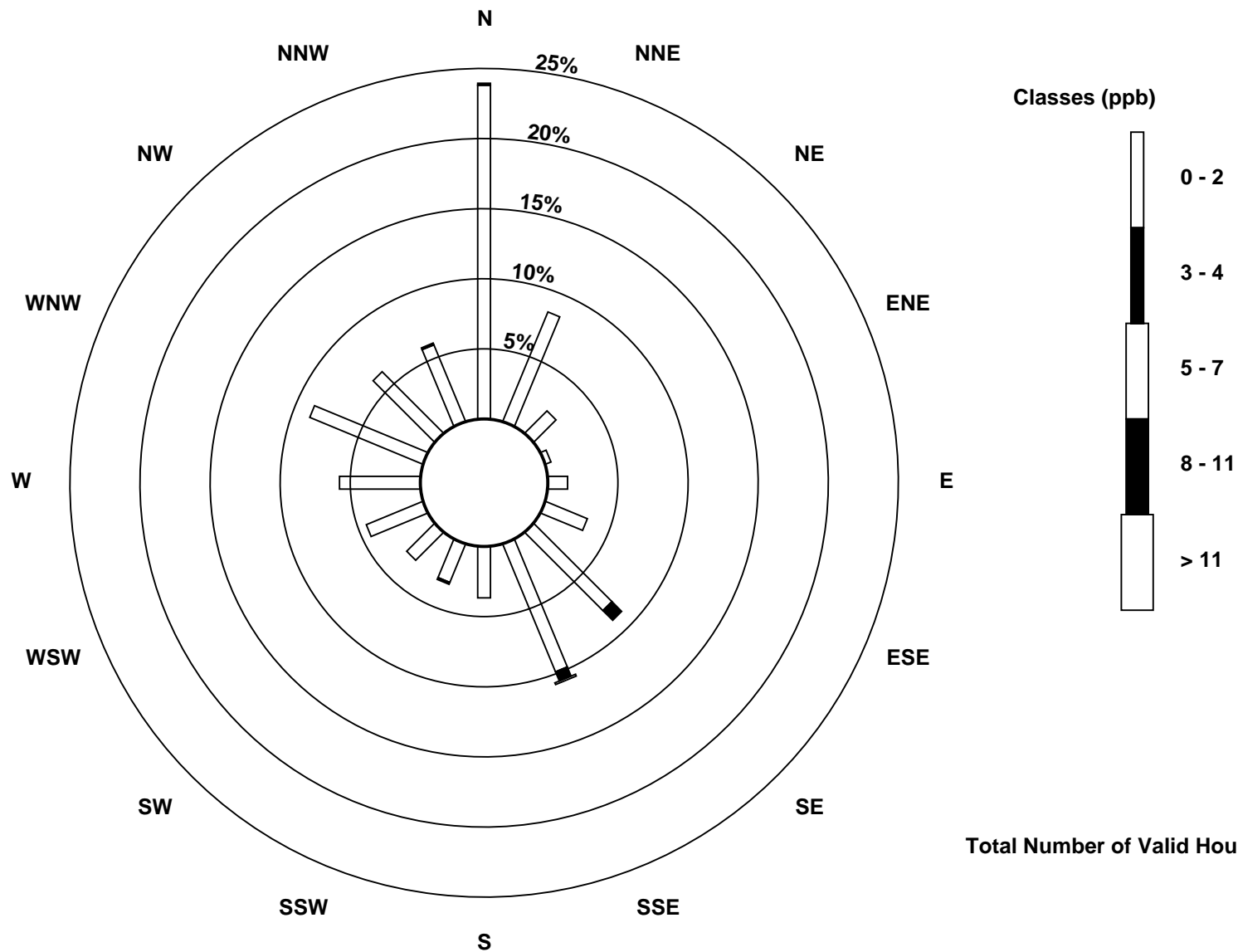
Total Number of Valid Hours: 710

Total Number of Hours: 744

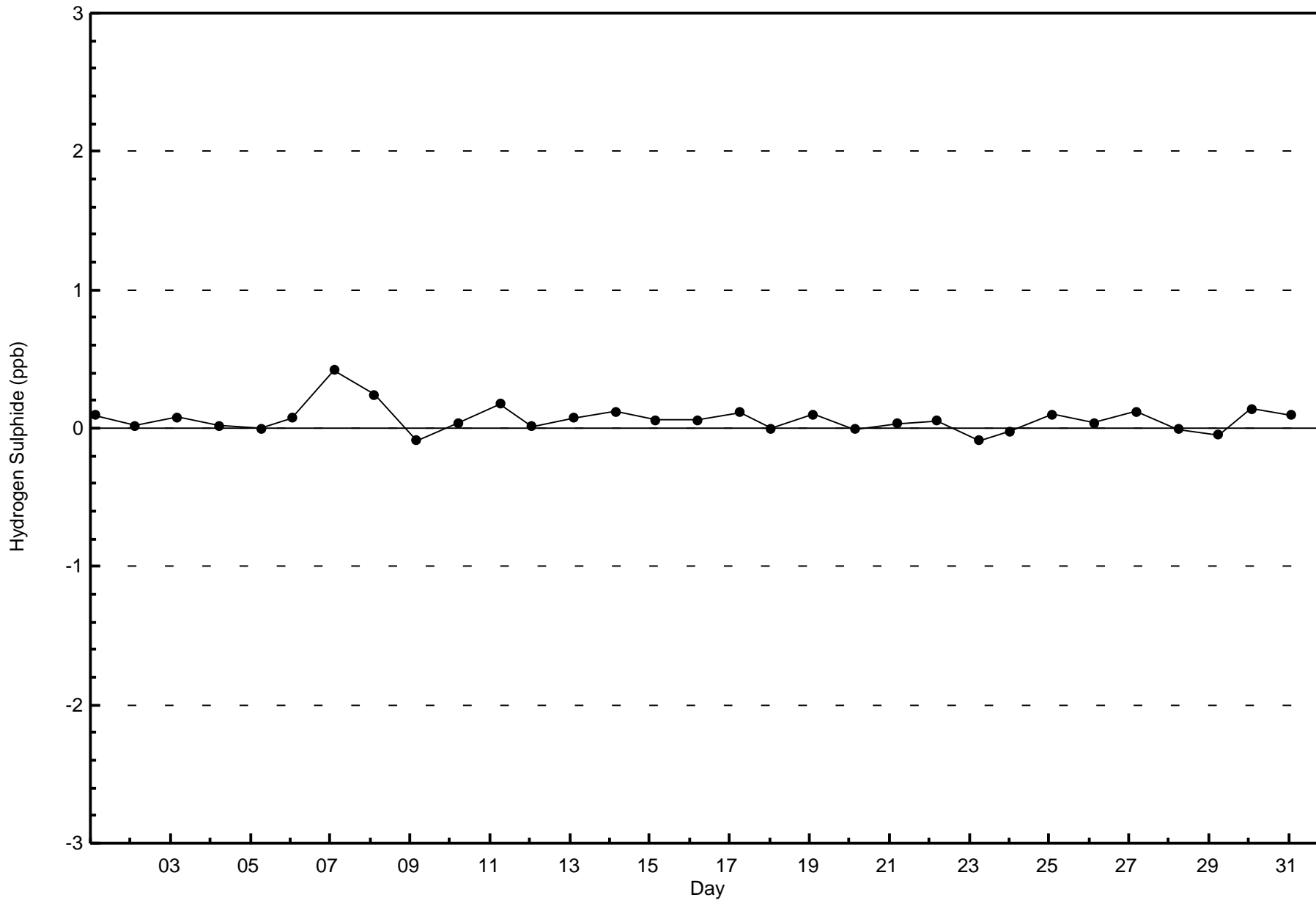


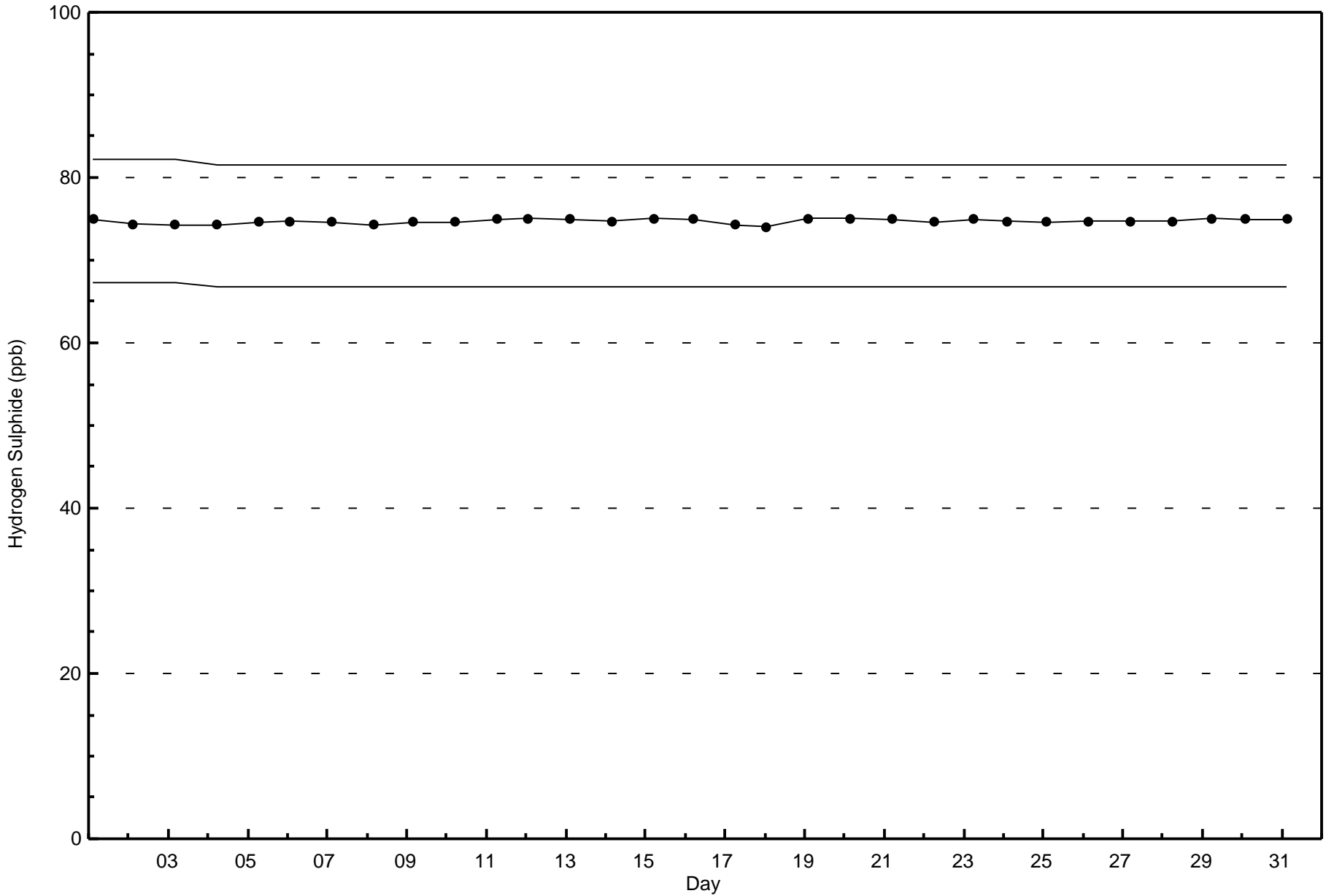
Wood Buffalo Environmental Association
Wind Rose May 2016

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



Total Number of Valid Hours: 710



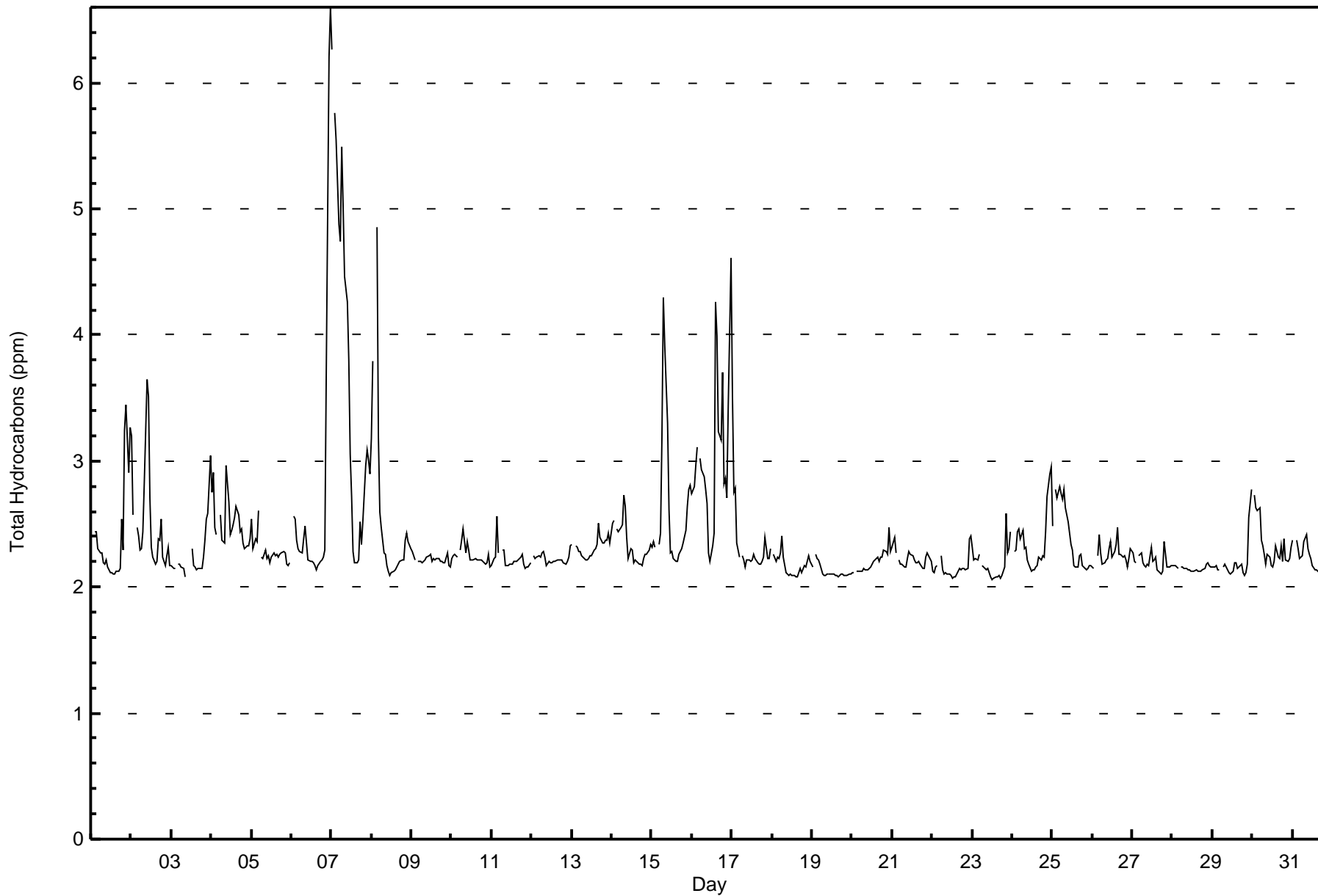




Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Value: 6.6 ppm on May 7 00:00 Minimum Value: 2.1 ppm on May 23 13:00 Maximum Diurnal Average: 2.6 ppm at hour 24 Monthly Average: 2.37 ppm		Maximum Daily Average: 3.7 ppm on May 7 Minimum Daily Average: 2.1 ppm on May 19 Minimum Diurnal Average: 2.2 ppm at hour 14 Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 4.7		Hours in Service: 744 Hours of Data: 710 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	2.6	Z	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.3	3.2	3.4	2.9	3.3	2.4	3.4	
2-May	3.2	2.6	Z	2.5	2.4	2.3	2.3	2.4	2.8	3.7	3.5	2.7	2.3	2.2	2.2	2.2	2.4	2.4	2.5	2.2	2.2	2.2	2.3	2.2	2.5	3.7	
3-May	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.1	C	C	C	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.4	2.5	2.6	3.0	2.3	3.0	
4-May	2.8	2.9	2.5	2.4	Z	2.6	2.4	2.4	2.3	3.0	2.7	2.4	2.5	2.5	2.6	2.6	2.6	2.4	2.5	2.3	2.3	2.3	2.3	2.4	2.5	3.0	
5-May	2.5	2.3	2.4	2.4	2.6	Z	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.6	
6-May	Z	2.6	2.5	2.4	2.3	2.3	2.3	2.4	2.5	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	3.7	6.2	6.6	2.7	6.6	
7-May	6.3	Z	5.8	5.5	4.9	4.7	5.5	5.0	4.5	4.3	3.8	3.1	2.7	2.3	2.2	2.2	2.2	2.2	2.5	2.3	2.5	3.0	3.1	3.0	2.9	3.7	6.3
8-May	3.2	3.8	Z	4.9	3.2	2.6	2.5	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.3	2.5	4.9	
9-May	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	
10-May	2.2	2.3	2.3	2.2	Z	2.3	2.4	2.5	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.5	
11-May	2.2	2.2	2.2	2.6	2.3	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.6	
12-May	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
13-May	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.5	
14-May	2.5	2.5	Z	2.5	2.4	2.5	2.5	2.7	2.6	2.4	2.2	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	2.7	
15-May	2.3	2.4	2.3	Z	2.3	2.4	3.2	4.3	3.9	3.3	2.6	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.6	2.8	2.8	2.6	4.3	
16-May	2.7	2.8	3.0	3.1	Z	3.0	2.9	2.9	2.8	2.7	2.3	2.2	2.3	2.4	4.3	4.0	3.2	3.2	3.7	2.8	2.9	2.7	3.4	4.6	3.0	4.6	
17-May	3.5	2.8	2.8	2.4	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.3	2.3	3.5	
18-May	Z	2.3	2.2	2.2	2.2	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	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
19-May	2.2	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
20-May	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.3	2.2	2.5	
21-May	2.3	2.4	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.2	2.4	
22-May	2.1	2.1	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.1	2.4	
23-May	2.3	2.2	2.2	2.2	2.3	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	2.3	2.3	2.4	2.2	2.6	
24-May	Z	2.3	2.3	2.4	2.5	2.4	2.5	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.4	2.7	2.9	3.0	2.3	3.0	
25-May	2.5	Z	2.8	2.7	2.8	2.7	2.7	2.8	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.8	
26-May	2.2	2.1	Z	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.3	2.3	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	
27-May	2.3	2.2	2.2	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.4	2.3	2.2	2.2	2.2	2.2	2.4	
28-May	2.2	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	
29-May	2.2	2.2	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.6	2.2	2.8	
30-May	Z	2.7	2.6	2.6	2.6	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.4	2.2	2.2	2.2	2.3	2.7	
31-May	2.4	Z	2.4	2.3	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.4	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	672	94.65	94.65
3.1 - 10.0	38	5.35	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	167	59	16	3	9	17	46	69	27	21	20	30	44	59	42	43	672
3.1 - 10.0	4	0	0	0	1	4	16	7	1	1	0	1	0	1	2	0	38
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	171	59	16	3	10	21	62	76	28	22	20	31	44	60	44	43	710

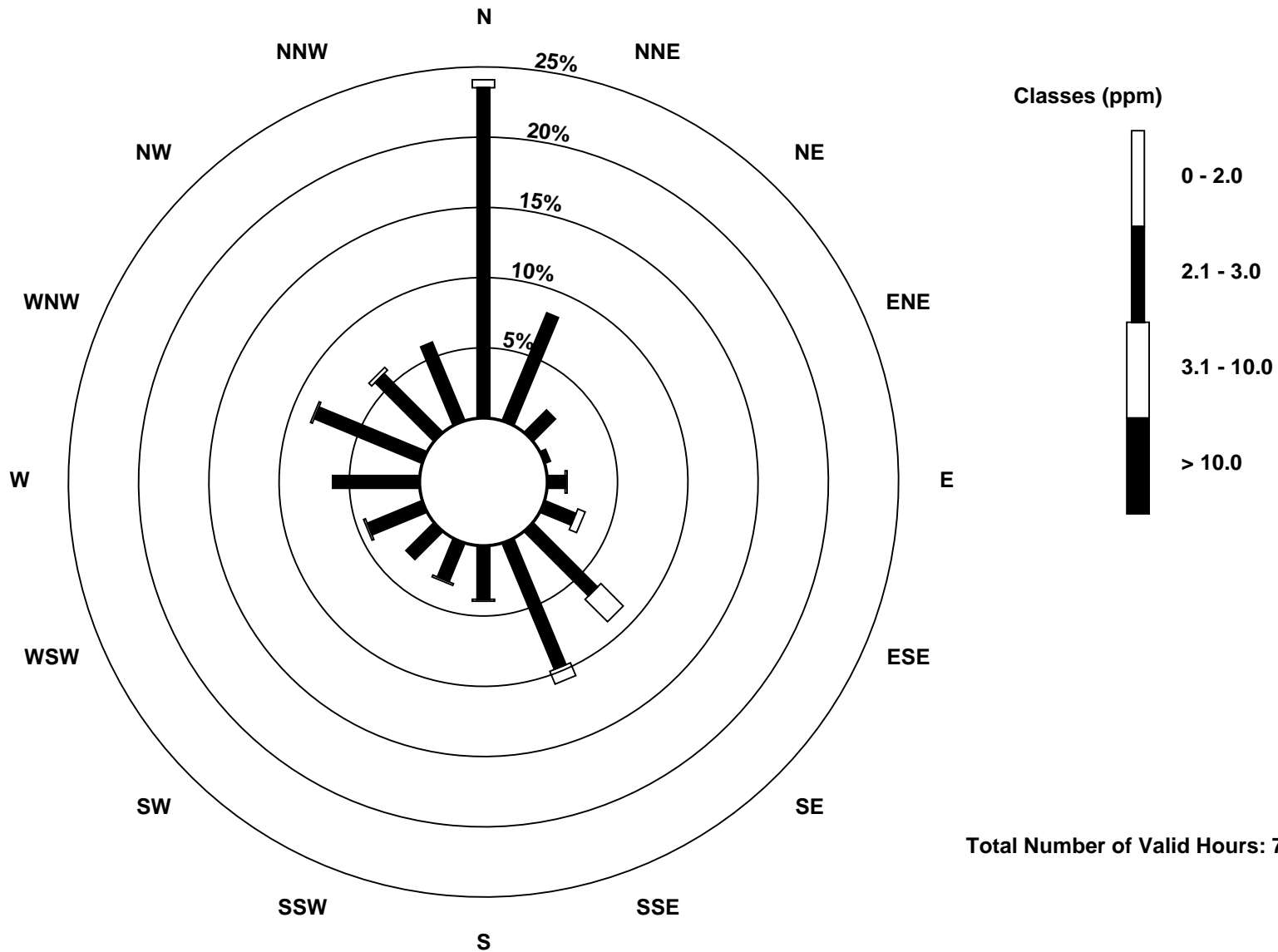
Total Number of Valid Hours: 710

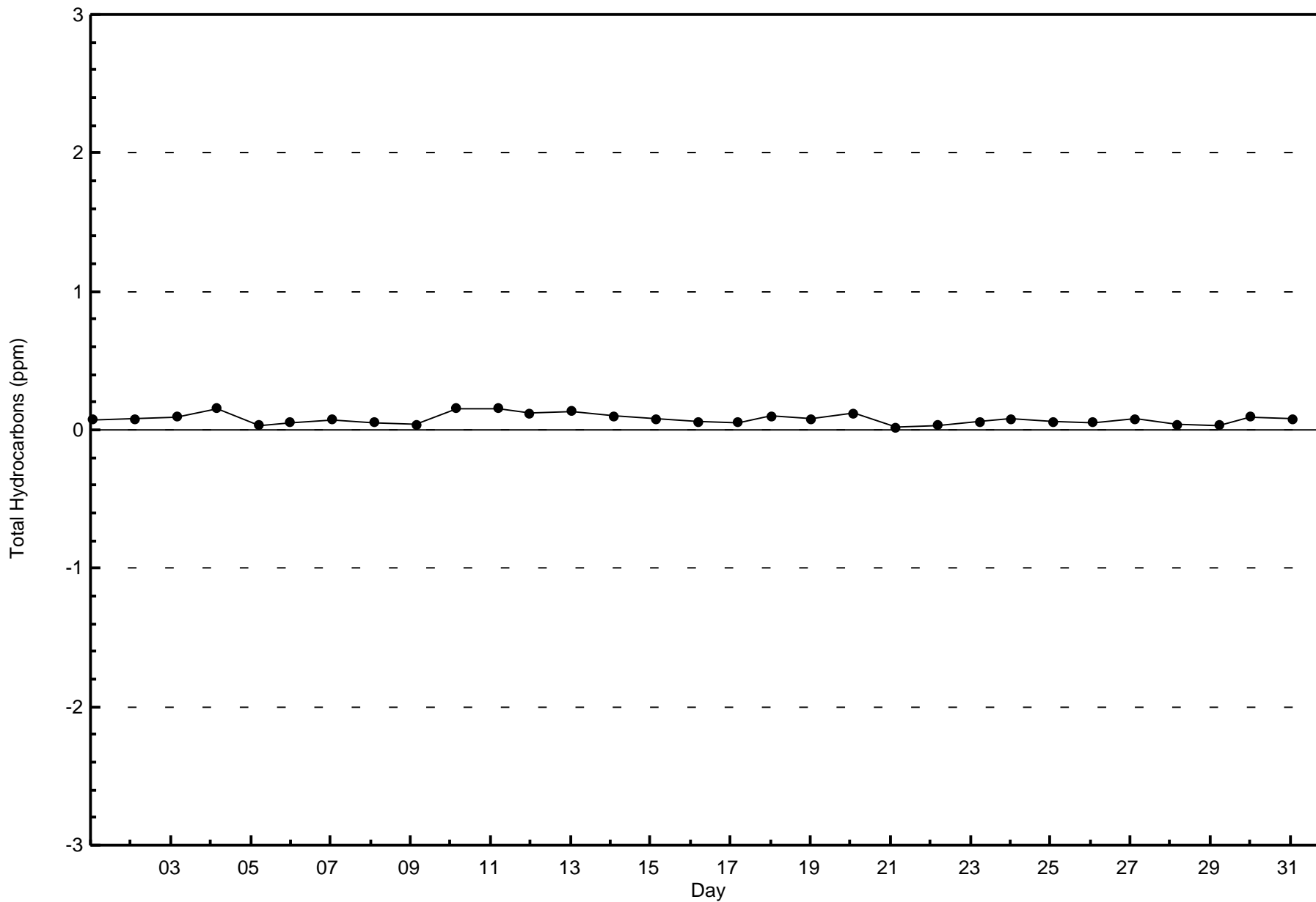
Total Number of Hours: 744

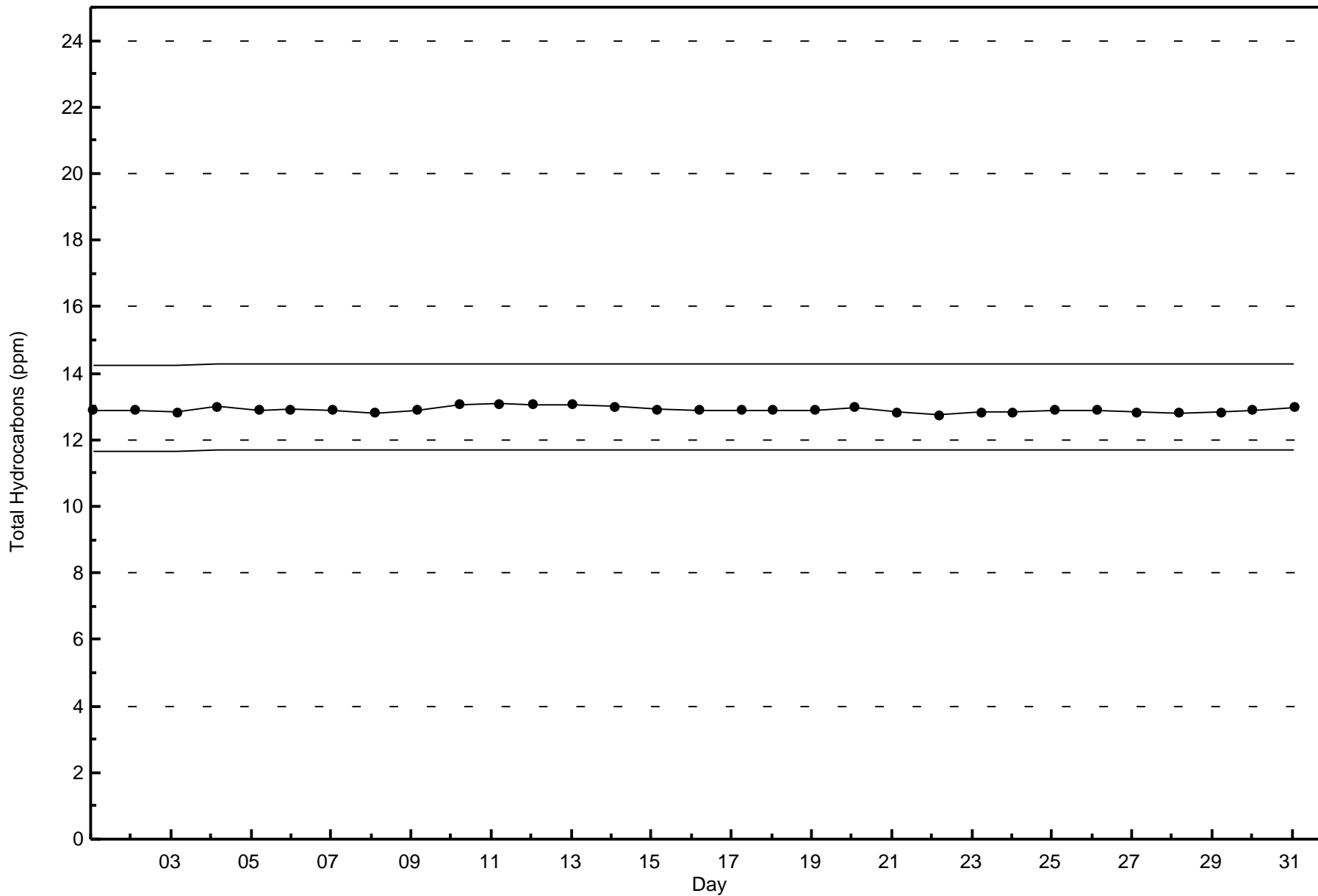


Wood Buffalo Environmental Association
Wind Rose May 2016

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





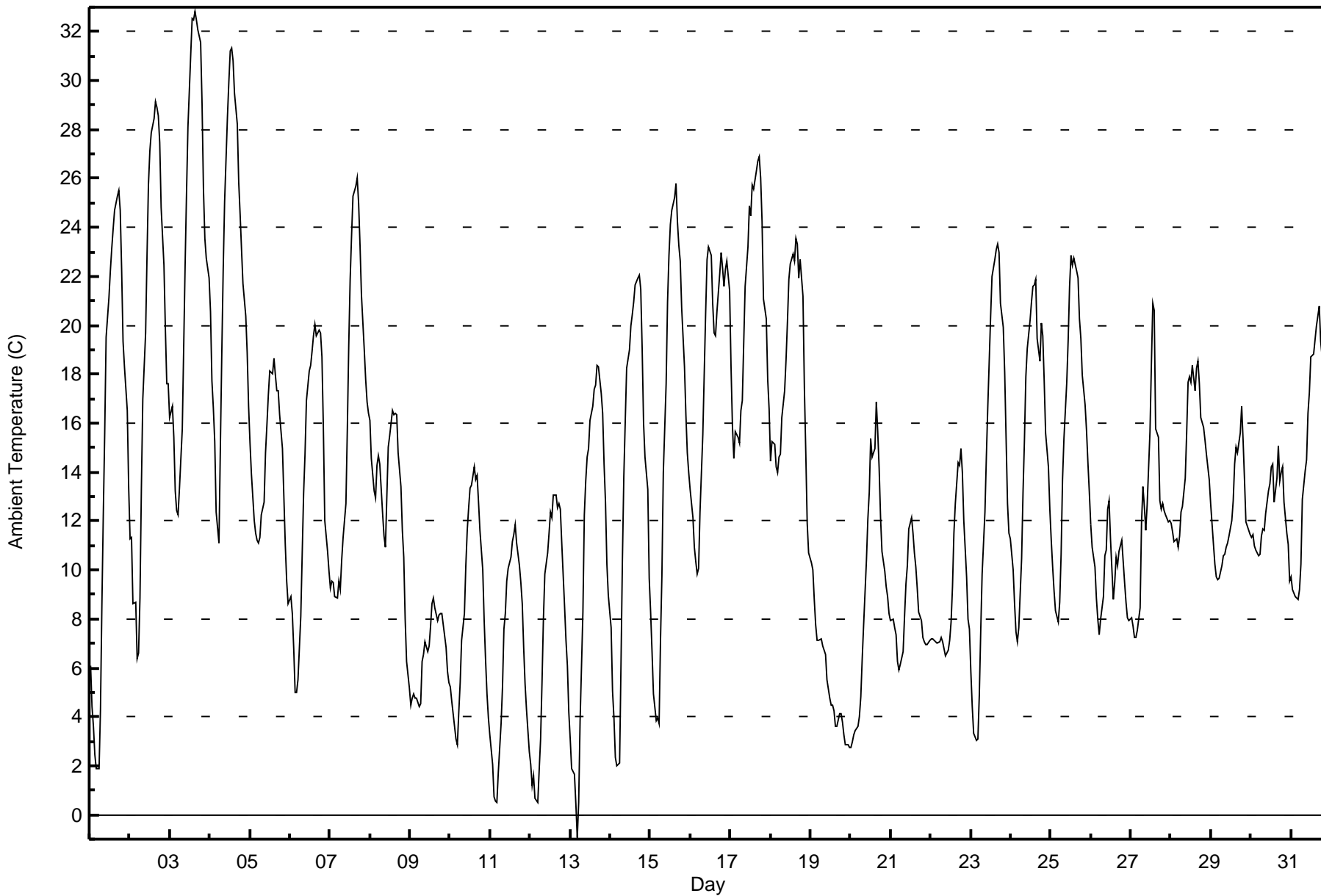




Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Value: 32.8 C on May 3 16:00		Maximum Daily Average: 23.3 C on May 3		Hours in Service: 744																																												
Minimum Value: -0.9 C on May 13 05:00		Minimum Daily Average: 5.5 C on May 19		Hours of Data: 744																																												
Maximum Diurnal Average: 18.8 C at hour 16		Minimum Diurnal Average: 7.2 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 13.48 C		Percentiles: P₁ = 0.7 P₁₀ = 4.9 Q₁ = 8.5 Median = 12.7 Q₃ = 18.0 P₉₀ = 22.7 P₉₉ = 31.1		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-May	6.1	4.4	3.6	2.4	1.9	1.9	4.3	8.6	12.2	15.6	19.5	21.1	22.2	23.2	23.9	24.7	25.3	25.5	24.7	22.3	19.3	18.3	16.5	13.3	15.0	25.5																						
2-May	11.3	11.3	8.6	8.7	6.4	6.6	8.9	13.4	17.0	19.7	22.9	25.8	27.1	27.9	28.5	29.1	28.9	28.6	27.4	24.8	22.5	19.8	17.6	17.6	19.2	29.1																						
3-May	16.2	16.7	15.4	13.2	12.4	12.3	13.3	15.8	19.1	22.5	25.4	28.1	31.1	32.6	32.5	32.8	32.5	32.1	31.5	29.1	25.6	23.6	22.7	21.9	23.3	32.8																						
4-May	20.6	17.7	16.6	15.2	12.4	11.1	15.1	18.9	22.3	25.0	28.5	30.0	31.2	31.3	30.8	29.5	28.2	25.8	24.5	23.1	21.7	20.4	18.9	16.7	22.3	31.3																						
5-May	15.2	14.0	12.0	11.5	11.2	11.1	11.3	12.2	12.8	14.8	16.0	17.1	18.1	18.0	18.6	17.9	17.3	17.3	16.3	14.9	13.0	11.1	9.6	8.6	14.2	18.6																						
6-May	8.9	8.2	6.8	5.0	5.0	5.5	8.1	10.6	13.1	14.8	17.0	18.2	18.4	18.9	19.6	20.0	19.6	19.8	19.7	18.7	15.8	12.0	10.7	9.9	13.5	20.0																						
7-May	9.3	9.5	9.5	8.9	8.9	9.5	9.2	10.4	11.3	12.7	15.8	19.2	21.9	23.7	25.3	25.7	26.0	25.0	23.3	21.2	19.0	17.8	16.9	16.4	16.5	26.0																						
8-May	16.1	14.6	13.2	12.9	14.3	14.7	14.3	12.3	11.4	10.9	13.0	15.0	15.5	16.5	16.3	16.4	16.4	14.8	13.4	11.6	10.5	8.0	6.3	5.2	13.1	16.5																						
9-May	4.5	4.8	4.9	4.8	4.7	4.4	4.6	6.3	6.6	7.1	6.7	6.9	7.7	8.6	8.9	8.4	7.9	8.1	8.2	8.2	7.8	6.9	5.9	5.4	6.6	8.9																						
10-May	5.2	4.6	4.1	3.1	2.9	4.2	5.4	7.1	8.2	10.2	11.6	12.5	13.4	13.4	14.2	13.7	13.9	12.7	11.6	10.0	8.0	6.3	5.0	3.9	8.6	14.2																						
11-May	3.3	2.0	0.7	0.6	0.5	1.7	3.7	5.2	7.6	8.2	9.6	10.1	10.5	11.2	11.5	11.8	11.1	10.2	9.5	8.6	6.8	5.3	4.3	2.6	6.5	11.8																						
12-May	2.1	1.2	1.6	0.7	0.5	1.8	3.1	5.4	8.0	9.8	10.7	11.5	12.3	12.1	13.1	13.1	12.5	12.7	12.5	11.1	8.5	7.1	6.1	4.2	7.6	13.1																						
13-May	3.1	1.9	1.6	0.4	-0.9	0.5	3.8	8.3	12.2	13.6	14.6	15.0	16.1	16.7	17.4	17.6	18.4	18.3	17.2	16.4	14.3	12.8	10.2	9.0	10.8	18.4																						
14-May	7.7	5.1	3.9	2.3	2.0	2.1	6.2	10.4	13.8	16.1	18.2	19.0	20.0	20.4	21.0	21.6	21.9	22.0	21.5	19.1	16.0	14.6	13.3	9.7	13.7	22.0																						
15-May	8.3	6.6	4.9	3.9	4.0	3.7	7.1	9.8	14.0	17.6	20.9	22.9	24.1	24.7	25.2	25.8	24.2	23.3	22.6	20.7	18.3	16.3	14.8	14.0	15.7	25.8																						
16-May	13.3	12.1	10.9	10.4	9.8	10.1	12.4	15.6	18.0	20.5	22.7	23.2	22.9	20.9	19.7	19.6	20.5	22.1	23.0	22.4	21.6	22.3	22.6	21.4	18.2	23.2																						
17-May	18.3	15.9	14.5	15.7	15.4	15.2	16.5	17.0	19.3	21.6	23.2	24.9	24.5	25.7	25.6	26.3	26.7	26.9	26.0	24.2	21.0	20.2	17.8	16.6	20.8	26.9																						
18-May	14.5	15.3	15.1	14.2	14.0	14.6	14.7	16.3	17.3	18.6	20.2	21.9	22.5	22.9	22.6	23.5	23.3	21.9	22.7	21.2	17.4	14.8	11.9	10.7	18.0	23.5																						
19-May	10.3	10.0	8.8	7.8	7.1	7.1	7.2	6.9	6.7	6.6	5.5	4.8	4.5	4.5	4.2	3.6	3.6	4.1	4.1	3.8	3.3	2.8	2.8	2.8	5.5	10.3																						
20-May	2.8	3.0	3.2	3.5	3.6	4.0	4.8	6.4	7.8	10.4	12.1	13.2	15.4	14.6	14.9	16.8	15.7	14.1	12.1	10.8	10.0	9.3	8.9	8.2	9.4	16.8																						
21-May	7.9	8.0	7.6	7.4	6.3	5.9	6.1	6.6	8.1	9.4	10.2	11.7	12.1	11.5	10.7	10.1	9.3	8.3	7.9	7.3	7.1	6.9	7.0	7.1	8.4	12.1																						
22-May	7.2	7.2	7.2	7.1	7.0	7.0	7.2	7.1	6.8	6.5	6.7	7.2	7.9	9.3	11.5	12.7	14.4	14.3	15.0	14.0	12.0	9.7	8.0	7.6	9.2	15.0																						
23-May	5.9	4.4	3.3	3.1	3.1	4.9	7.5	9.8	12.3	14.6	16.7	18.5	20.3	22.0	22.7	23.1	23.3	23.0	20.9	19.9	18.1	15.4	12.7	11.5	14.0	23.3																						
24-May	11.3	10.0	8.6	7.5	7.1	7.7	10.5	13.2	15.3	17.9	19.1	20.2	20.9	21.6	21.6	21.9	19.4	18.5	20.1	19.6	17.7	15.6	14.2	12.5	15.5	21.9																						
25-May	11.2	10.1	9.2	8.3	7.9	8.7	10.6	13.7	15.4	17.7	19.4	21.6	22.9	22.5	22.7	22.2	21.9	20.3	19.4	17.9	16.7	15.7	14.4	13.2	16.0	22.9																						
26-May	11.8	10.9	10.1	8.9	8.0	7.4	8.0	8.9	10.6	10.8	12.5	12.8	11.2	8.8	9.5	10.5	10.2	10.8	11.2	10.3	9.5	8.7	8.1	8.0	9.9	12.8																						
27-May	8.1	7.7	7.2	7.2	7.5	8.4	11.9	13.4	12.6	11.6	12.7	15.6	18.4	20.9	20.6	15.8	15.4	12.8	12.5	12.7	12.4	12.3	12.0	12.0	12.6	20.9																						
28-May	11.9	11.6	11.2	11.3	10.9	11.4	12.4	12.6	13.8	15.6	17.7	17.9	17.7	18.3	17.3	18.2	18.5	17.6	16.2	15.8	15.3	14.7	14.2	13.7	14.8	18.5																						
29-May	12.7	11.0	10.3	9.7	9.6	9.7	10.2	10.6	10.7	10.9	11.1	11.4	12.0	12.8	14.4	15.0	14.8	15.6	16.7	15.3	13.7	12.0	11.8	11.4	12.2	16.7																						
30-May	11.3	11.4	11.0	10.8	10.6	10.6	11.4	11.7	11.6	12.3	13.3	13.5	14.2	14.3	12.8	13.8	15.1	13.6	14.0	14.2	12.8	11.5	11.1	9.5	12.3	15.1																						
31-May	9.7	9.2	8.9	8.8	8.8	9.2	10.2	12.9	14.0	14.5	16.4	17.3	18.7	18.8	19.4	20.0	20.4	20.8	19.4	18.1	15.5	13.9	12.1	11.4	14.5	20.8																						
																								9.9	9.0	8.2	7.6	7.2	7.5	9.0	10.9	12.6	14.1	15.8	17.0	17.9	18.3	18.6	18.8	18.6	18.1	17.6	16.4	14.6	13.1	11.9	10.8	Diurnal Average
																								20.6	17.7	16.6	15.7	15.4	15.2	16.5	18.9	22.3	25.0	28.5	30.0	31.2	32.6	32.5	32.8	32.5	32.1	31.5	29.1	25.6	23.6	22.7	21.9	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	1	0.13	0.13
0 - 10	240	32.26	32.39
10 - 20	368	49.46	81.85
> 20	135	18.15	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

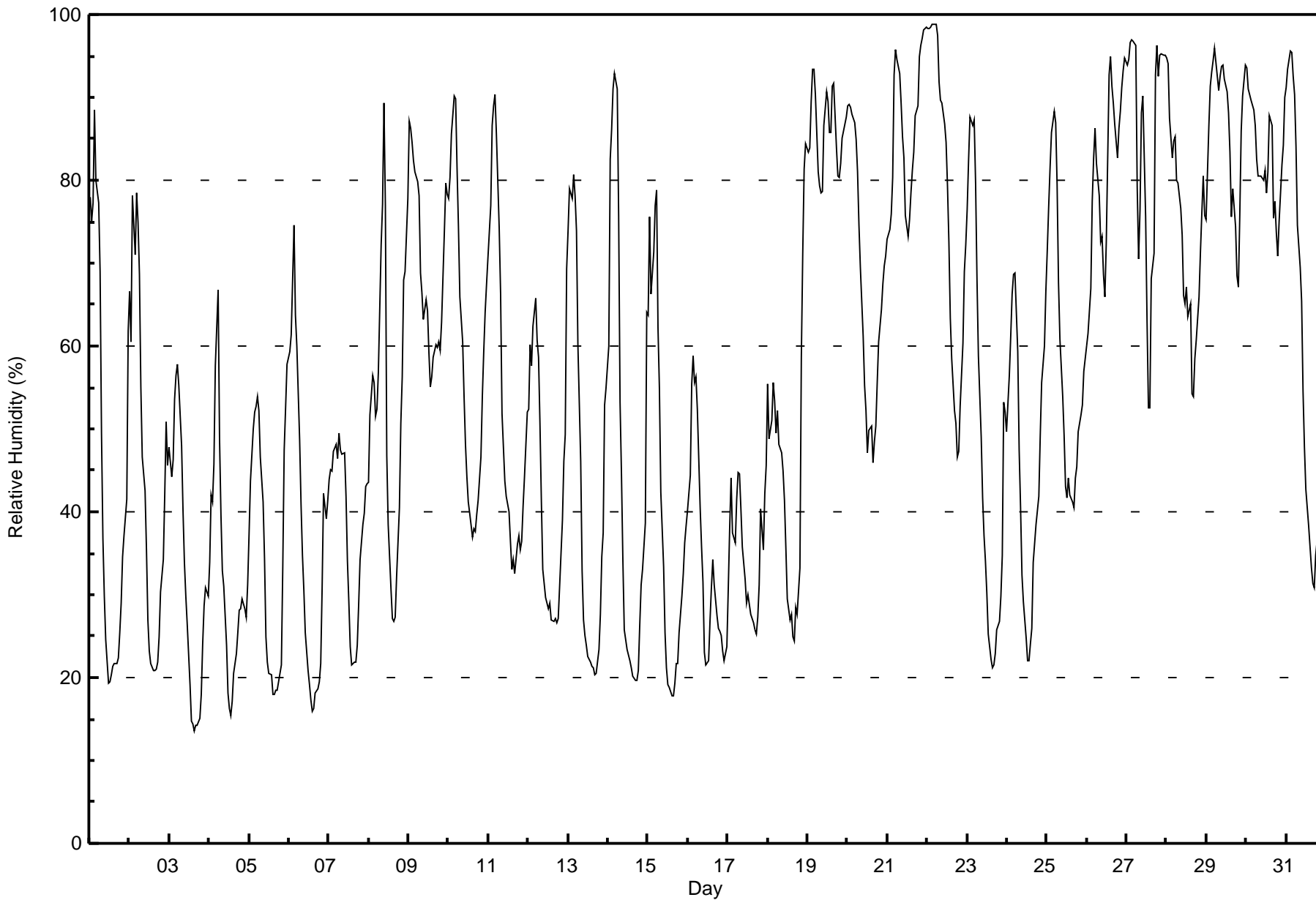


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Buffalo Viewpoint - May 2016**

Maximum Value: 99 % on May 22 05:00																		Maximum Daily Average: 86.1 % on May 21																		Hours in Service: 744	
Minimum Value: 14 % on May 3 16:00																		Minimum Daily Average: 32.2 % on May 4																		Hours of Data: 744	
Maximum Diurnal Average: 76.3 % at hour 5																		Minimum Diurnal Average: 39.9 % at hour 17																		Hours of Missing Data: 0	
Monthly Average: 55.6 %																		Percentiles: P ₁ = 16 P ₁₀ = 23 Q ₁ = 33 Median = 53 Q ₃ = 78 P ₉₀ = 90 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-May	78	75	77	88	80	77	69	49	37	30	25	19	19	20	21	22	22	22	25	29	35	37	42	62	44.2	88											
2-May	67	61	78	71	78	75	69	55	47	43	35	27	23	22	21	21	21	22	25	30	34	42	51	46	44.3	78											
3-May	48	44	46	54	56	58	55	48	40	34	30	26	19	15	14	14	14	15	18	24	29	31	30	32.4	58												
4-May	34	42	41	46	58	67	49	40	33	31	24	18	16	16	17	21	23	25	28	28	29	28	27	31	32.2	67											
5-May	37	44	50	52	53	54	52	47	41	34	25	22	21	20	18	18	18	19	19	21	33	47	52	58	35.7	58											
6-May	59	61	68	75	64	60	49	41	35	31	25	21	19	17	16	16	18	19	20	22	31	42	39	41	37.0	75											
7-May	44	45	45	47	48	46	49	48	47	47	42	34	29	24	22	22	22	24	29	34	39	40	43	43	38.0	49											
8-May	43	52	56	56	52	52	57	72	77	89	77	47	38	31	27	27	27	32	41	51	56	68	69	78	53.1	89											
9-May	87	86	85	82	81	80	78	69	67	63	66	64	59	55	56	59	60	60	60	60	63	74	80	78	69.6	87											
10-May	78	80	86	90	90	82	74	66	60	54	48	44	41	40	37	38	38	40	41	47	54	59	64	68	59.1	90											
11-May	71	77	87	89	90	86	74	66	52	48	44	42	40	36	33	34	33	36	37	35	36	41	44	52	53.5	90											
12-May	52	60	58	62	66	61	59	51	41	33	30	29	28	29	27	27	27	27	27	31	39	46	49	69	42.8	69											
13-May	74	79	78	81	78	74	60	46	33	27	25	24	23	22	21	21	20	21	23	28	35	37	53	55	43.2	81											
14-May	60	82	86	91	93	91	76	53	45	34	26	23	23	22	21	20	20	20	21	26	31	33	39	64	45.8	93											
15-May	64	76	66	71	77	79	62	55	42	33	25	21	19	19	18	18	19	22	22	25	30	33	36	38	40.4	79											
16-May	40	44	55	59	56	56	52	40	36	32	23	21	22	27	31	34	31	28	26	26	25	23	22	24	34.7	59											
17-May	31	38	44	37	36	42	45	45	40	36	32	29	30	29	28	27	26	25	27	31	40	35	42	46	35.0	46											
18-May	55	49	51	56	53	50	52	48	47	45	41	36	30	27	28	25	24	28	28	33	59	71	81	84	45.9	84											
19-May	83	84	90	93	93	90	81	79	78	79	87	91	89	86	86	91	92	84	81	80	82	85	87	88	85.8	93											
20-May	89	89	89	88	87	85	81	75	69	61	55	52	47	50	50	46	48	50	56	61	64	67	70	71	66.7	89											
21-May	73	74	76	80	93	96	95	93	89	85	83	76	73	75	79	81	83	88	89	95	96	97	98	98	86.1	98											
22-May	98	98	99	99	99	99	98	92	90	89	87	85	79	73	63	58	52	51	47	47	53	60	69	72	77.3	99											
23-May	76	82	88	87	87	80	68	59	49	42	37	34	30	25	22	21	22	23	26	27	30	35	53	52	48.1	88											
24-May	50	56	61	66	69	69	59	47	40	32	29	25	22	22	24	26	34	38	40	42	49	56	60	67	45.2	69											
25-May	71	77	82	86	88	87	80	68	61	54	49	43	42	44	42	41	41	44	45	50	52	53	57	59	58.9	88											
26-May	60	62	67	78	83	86	82	78	73	73	69	66	73	93	95	91	89	87	83	86	88	91	93	95	80.8	95											
27-May	94	95	97	97	97	96	79	70	76	88	90	76	63	53	53	68	71	93	96	93	95	95	95	95	84.4	97											
28-May	95	94	87	83	85	85	80	80	77	73	66	65	67	64	65	54	54	59	61	66	71	76	80	76	73.4	95											
29-May	75	87	91	93	94	96	93	91	93	94	94	92	91	88	83	76	79	74	68	67	76	86	90	94	86.1	96											
30-May	94	91	90	90	88	87	83	81	81	81	80	81	79	81	88	87	75	77	74	71	75	82	84	90	82.8	94											
31-May	91	93	96	95	93	90	84	75	69	65	55	48	43	38	36	33	31	31	35	38	47	53	62	56	60.7	96											
66.8																		70.3																		Diurnal Average	
98																		99																		Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

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

Maximum Speed: 36 km/h on May 19 16:00	Maximum Daily Speed Average: 28.6 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 14 08:00	Minimum Daily Speed Average: 1.6 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 8.5 km/h at hour 16	Minimum Diurnal Speed Average: 1.6 km/h at hour 4	Hours of Missing Data: 0
Monthly Average Velocity: 5.0 km/h 344.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 17 P ₉₀ = 22 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-May	SSE6	S8	SSE6	SSE9	SSE9	SSE7	SSE6	SE8	ESE8	ESE6	NNW3WSW15WSW14	W13	W14	W11	W9	W9	NW12	NNW16	NW9	WSW3	SSW6	S4	WSW3.7	NNW16			
2-May	SSE6	SW3	SE7	S3	SSE6	SSE7	SE8	SSE6	NE5	N7	N8	N9	NE7	E9	E7	ENE8	E8	E8	ESE7	SE8	SSE8	SE9	SE10	SE12	ESE4.6	SE12	
3-May	SE11	SE15	SSE12	SSE10	SSE11	SSE10	SSE10	SSE12	SSE11	SE8	ESE9	ESE9	SSE11	S13	SSW16	SSW12	SSW11	S11	SSW9	SSE8	SSE8	S6	SSE10	SW4	SSE9.2	SSW16	
4-May	S7	SSE7	S8	S6	SSE9	SSE9	SSW3	S4	SSE5	NNE5	WNW9	W18WNW14WNW13WNW23WNW24WNW24	W23	W21	W16	W17WNW20	W17WNW14	W23	W21	W16	W17WNW20	W17WNW14	W23	W21	W9.6	WNW24	
5-May	WNW15WNW20WNW15WNW15	NW15WNW12	W12WNW11WNW13WNW17WNW17WNW19WNW23	W22WNW22WNW22	NW21	NW22	NW19	N14	NNE10	NNE9	NW5	WNW14.6	WNW23														
6-May	WSW4	W5	WSW6	WSW6	W8	W10	WNW6	NW7	NW7	NW6	NW12	NW10	WNW8	W5	W10	W11WSW11	W11	WSW7	SW4	SE6	SE9	SSE8	SSE10	W4.8	NW12		
7-May	SE11	SE13	SE13	SE11	SE10	SSE9	SSE10	SSE10	SSE10	SE6	SE6	SE4	NNW4	SSW4WNW13	WNW8	NNE5	ESE9	ESE11	SE11	SE10	ESE2	SE8	ESE7	SE6.1	SE13		
8-May	E6	N8	NNW7	NW12WNW15	NW17WNW13	W22	W15	SSW5	SSW9	SW16WSW22WSW20WSW20WSW23	SW23WSW24	SW21	SW16WNW17	NW31	NW25	NW24	W13.4	NW31									
9-May	WNW20WNW18	W13	W16	W13WSW13WSW14WNW20WNW20WNW24	NW20	NW18	NW17	NW18	NW18	NW18	NW17	NW16WNW15	W13	W11	NW12	N12	N5	WNW14.5	WNW24								
10-May	W4	WSW6	WSW6	WSW3	WNW8	WNW7	NW9	N8	NE5	N7	NE7	NNE8	N12	NNE13	NNE15	NNE15	N17	NNE18	NNE18	NNE19	NNE14	NE9	ENE8	NE8	NNE7.9	NNE19	
11-May	NE8	NNE9	N9	NNW7	N9	N8	N14	N17	N19	N20	N19	N22	N22	N25	N24	N21	N20	N25	N27	N23	N20	NNE15	NNE13	N11	N16.7	N27	
12-May	NNE11	N11	N11	N11	N11	N12	N10	N12	N14	NNE16	N21	N23	N19	N17	N18	N19	NNE18	NNE17	NNE16	NNE14	NNE9	N4	NNW3	W5	N12.9	N23	
13-May	SW5	SSW6	SW2	S6	SSE9	SE7	SSE6	SW4	WNW8WNW10	NW6	W7	WNW7	W1	W7	WSW6	WNW5	NW6	NNE6	NNE7	NE6	NE7	NNE7	NNE4	WNW1.6	WNW10		
14-May	NW5	W3	WNW3	SSW4	S4	S5	SSE2	W1	N5	N6	N7	NNE8	N7	NNE3	NE5	NNE5	NE7	NNE8	NNE9	NNE10	NE9	NE6	NNE3	S5	NNE3.1	NNE10	
15-May	S4	SSE5	SSE8	SSE7	S5	SSE8	SE7	SE6	SE6	SE6	SSE1	NNW6	N9	N8	NNE8	N6	SE7	SE10	SE9	SSE7	SSE9	SSE10	SSE10	SSE10	SE4.5	SE10	
16-May	SSE10	SE11	SE11	SE10	ESE8	SE6	SE4	ESE4	ESE4	ESE3	SW12	SSW15	S11	SE6	ESE8	ESE8	SE6	SE6	ESE4	ESE4	SE6	ESE10	SE5	SSW3	SE6.1	SSW15	
17-May	N3	NW5	SSE1	S8	S8	SW8WSW18WSW21	W18WNW14WNW10	WNW9WNW10	WNW9WNW13WNW10	WNW8	WNW6	WSW3	SSE3	SSE6	S3	W5	NW2	W6.3	WSW21								
18-May	SSE5	SSW4	WSW8	SSW6	S5	SW2	SSE4	WSW9	SW12	SW14WSW14WSW18WSW20	W18WSW14	W15	W15WNW10	W6	WNW6	N24	N26	N26	N27	W7.0	N27						
19-May	N25	N23	N26	N30	N31	N28	N26	N30	N29	N31	N32	N31	N29	N30	N29	N36	N31	N29	N31	N31	N29	N24	N23	N24	N28.6	N36	
20-May	N22	NNE19	NNE19	NNE20	NNE20	NNE20	NNE20	NNE20	NNE20	NNE18	NNE17	NNE20	NNE17	N23	N22	N22	N21	N22	N24	N20	N17	NNW11	NW13	NW13	N18.6	N24	
21-May	NNW13	N12	N9	N10	N16	N17	N15	N17	N17	NNW18	NNW18	N21	N16	NNW19	N23	N20	N23	N22	N20	N21	N19	N19	N21	N21	N17.7	N23	
22-May	N18	N18	N18	N21	N24	N21	N21	N24	N28	N25	NNE24	N26	N25	N25	N25	N27	N30	N28	N28	N26	N19	N16	NNW14	NNW18	N22.8	N30	
23-May	N9	N6	N9	N10	N13	N12	N15	N15	N15	N19	N20	N15	NNE16	NNE15	NNE14	NE12	NE11	ENE10	E8	ESE8	SSE8	SE8	SSE9	NNE9.3	N20		
24-May	SSE13	SSE12	SSE8	SSE7	SSE6	SSE5	SSE6	SE7	ESE7	SE11	SSE14	SSE16	SE18	SE16	SE14	SW6	WNW6	S4	SSE9	S11	SSW11	S8	S7	SSE7	SSE8.5	SE18	
25-May	SSE8	SSE8	SSE10	SSE11	SSE6	SE6	S4	N5	N7	N7	N7	NNW9	N12	N20	N20	N23	NNW23	N26	NNE20	NNE19	NNE20	N20	N19	N18	N9.4	N26	
26-May	N17	N21	N22	N18	NNW20	N18	N16	NNE17	NNW14	NNW18	NNW21	NNW23	N15	N20	NW16	NNW17	NNW19	NNW18	NNW20	NNW16	N17	NNW13	NNW15	N15	N17.3	NNW23	
27-May	N13	N12	N12	N11	N10	NE5	ESE14	ESE15	SE12	SE8	ESE5	E11	E10	E10	E6	SW13	S8	SSE5	SE9	ESE11	SSE8	SSE11	SE8	SE7	ESE4.9	ESE15	
28-May	SSE7	SE8	SE11	SE14	SE10	SE10	SE11	SE13	SE12	SSE9	SE11	SE13	SSE11	SSE16	S13	SSE10	S6	SSE7	SSW8	S5	SSE7	SSW6	SSW7	SW7	SSE8.7	SSE16	
29-May	WSW7	WSW5	SW5	S7	SSW4	SSW5	W5	WNW3	SW4	SW6	WSW4	W5	NW4	NNE3	N5	NNW5	NNE7	NNE11	NNE14	NNE11	NNE9	NNW4	NW5	NW7	NW2.4	NNE14	
30-May	NW7	NNW9	NW9	WNW6	NNW3	NW8	NW11	NW12	NW14	NNW13	N13	N12	N12	NW11	NW14	NW14	NNW18	NNW17	NNW16	NNW16	N16	N12	N10	NNW8	NNW11.2	NNW18	
31-May	WNW6	NW6	NW5	W5	W5	WNW3	NW7	NNW4	NNW5	NW4	N5	N6	NNW5	WNW7	WNW6	W6	SSW4	W5	SE9	SE8	SE7	SSE6	SSE7	SSE8	WNW1.7	SE9	

N2.5NNW2.7NNW2.4NNW1.6NNW2.5NNW2.4NNW2.5NNW4.0NNW4.8NNW5.9NNW6.5NNW7.0NNW6.7NNW6.9NNW7.5NNW8.5NNW8.0NNW7.4	N6.9	N6.1	N5.7	N4.6	N4.2	N3.8	Diurnal Average																	
N25	N23	N26	N30	N31	N28	N26	N30	N29	N31	N32	N31	N29	N30	N29	N36	N31	N29	N31	N31	N29	NW31	N26	N27	Diurnal Maximum

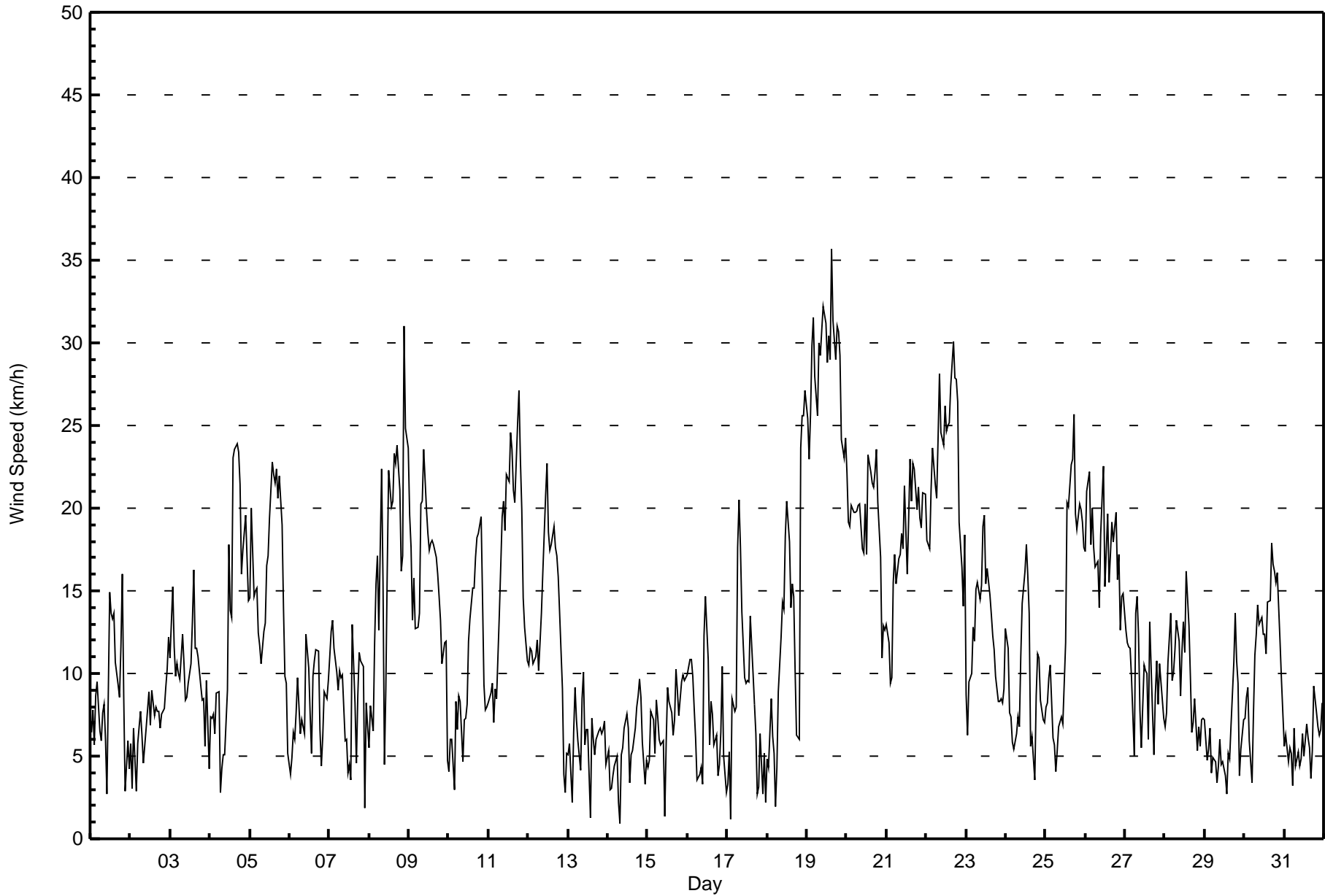
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on May 4 15:00 Minimum Value: 1 km/h on May 2 00:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	1	2	1	1	1	1	2	2	2	4	4	4	4	5	4	3	3	3	2	3	1	1	1	5
2-May	1	1	1	2	2	1	1	2	1	1	2	3	3	3	3	3	2	2	2	1	1	1	2	3	3
3-May	3	3	3	2	2	2	2	3	3	2	3	2	4	5	5	4	4	3	2	2	1	2	2	3	5
4-May	1	2	1	1	2	2	2	1	2	2	5	4	3	5	9	6	6	6	6	5	4	4	5	4	9
5-May	5	4	3	3	3	3	3	3	3	3	4	6	5	5	6	6	6	5	5	4	4	2	2	2	6
6-May	2	1	1	1	2	2	3	2	2	3	4	5	3	4	4	3	4	3	2	1	1	2	2	2	5
7-May	2	3	3	2	2	3	3	3	3	1	2	1	2	4	4	3	2	3	3	2	2	2	2	2	4
8-May	2	2	3	2	5	5	5	6	6	2	4	5	6	5	6	6	6	6	5	4	5	7	6	6	7
9-May	4	5	3	3	3	3	3	5	5	5	5	4	4	4	4	4	4	4	3	3	3	3	3	2	5
10-May	2	1	2	2	3	2	3	2	2	2	3	3	4	4	5	5	5	5	5	4	5	2	1	1	5
11-May	1	1	2	2	2	2	3	3	5	5	5	5	5	6	5	5	5	6	5	4	4	2	2	2	6
12-May	1	1	2	1	2	2	2	2	3	4	6	6	5	6	5	6	5	4	4	4	2	1	1	1	6
13-May	1	1	1	1	1	1	1	1	2	3	3	4	3	3	3	3	3	3	2	2	1	1	1	2	4
14-May	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	2	2	1	2	2	3
15-May	1	1	1	1	1	1	1	1	1	1	2	3	2	2	3	3	3	3	3	2	2	2	2	2	3
16-May	2	1	1	2	1	1	2	1	1	1	6	4	4	2	2	1	2	2	2	3	3	4	3	2	6
17-May	2	1	2	2	2	3	5	5	5	4	3	3	2	3	3	3	2	2	1	1	3	2	2	2	5
18-May	2	2	2	2	2	2	2	3	4	4	3	5	5	5	4	4	5	4	2	9	4	5	5	5	9
19-May	5	5	5	5	5	6	6	6	6	6	6	8	6	6	7	7	6	6	6	6	5	5	4	4	8
20-May	5	4	4	4	4	4	4	4	4	4	4	4	4	6	5	4	4	4	5	3	3	3	3	2	6
21-May	2	2	2	2	6	3	3	3	3	3	4	4	3	4	4	4	4	4	4	4	4	3	3	4	6
22-May	4	3	3	4	4	4	4	5	5	6	5	5	5	5	6	5	6	5	6	6	4	2	3	3	6
23-May	3	2	3	3	2	2	3	3	3	3	4	4	6	4	5	4	4	4	3	2	2	1	1	2	6
24-May	2	2	2	1	1	1	2	2	2	4	5	5	5	5	5	3	3	1	4	3	3	2	2	1	5
25-May	2	2	1	1	2	1	1	3	2	2	2	2	4	4	4	4	4	5	5	4	4	4	3	3	5
26-May	3	4	4	4	4	3	3	4	3	3	4	4	6	5	3	3	3	3	3	3	3	2	3	2	6
27-May	2	2	2	2	1	2	4	4	4	2	2	3	3	3	4	6	5	2	2	4	2	4	3	2	6
28-May	3	3	3	4	4	3	3	4	4	3	3	4	4	5	4	3	2	2	3	2	1	1	2	1	5
29-May	2	2	3	3	2	1	2	1	1	1	1	1	1	1	2	2	2	3	3	2	2	1	1	2	3
30-May	2	1	2	2	2	1	2	2	3	3	3	2	4	3	5	3	3	3	3	3	3	2	2	2	5
31-May	1	1	1	1	1	2	1	2	2	2	2	2	2	3	3	3	2	2	3	2	1	1	1	2	3
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	109	14.65	14.65
6 - 11	307	41.26	55.91
12 - 19	199	26.75	82.66
20 - 28	111	14.92	97.58
29 - 38	18	2.42	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	7	4	0	0	7	3	10	13	9	9	6	13	4	8	9	109
6 - 11	34	18	11	3	10	15	51	65	14	12	4	11	12	25	15	7	307
12 - 19	55	26	1	0	0	2	12	7	2	3	6	8	16	22	17	22	199
20 - 28	65	10	0	0	0	0	0	0	0	0	2	7	4	12	5	6	111
29 - 38	17	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	18
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	178	61	16	3	10	24	66	82	29	24	21	32	45	63	46	44	744

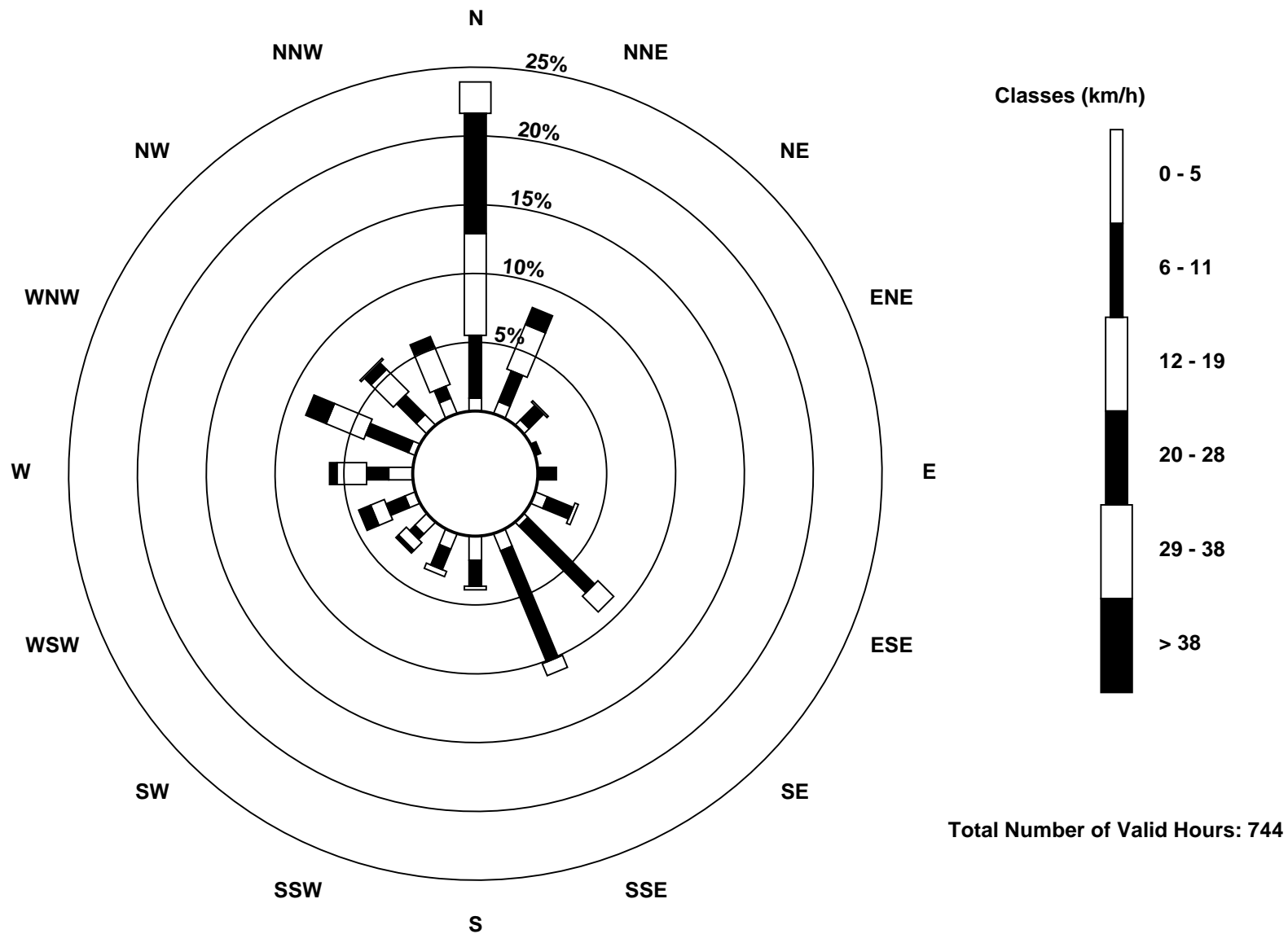
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 9 deg on May 19 16:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 3.3 deg on May 19		Hours of Data: 744
Direction of Minimum Speed: 270 deg on May 14 08:00	Direction of Minimum Daily Speed Average: 1.6 deg on May 13	Hours of Missing Data: 0
Monthly Average Direction: 303.6 deg		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	151	174	158	150	165	154	166	134	123	121	333	254	256	265	265	275	272	278	324	327	324	237	212	182	238.9
2-May	149	235	141	182	151	158	132	149	39	9	360	10	34	80	92	64	98	95	115	137	153	142	131	134	110.7
3-May	137	140	147	152	153	156	153	149	149	128	120	119	167	185	195	208	200	185	193	165	157	191	148	233	162.6
4-May	179	152	180	178	151	158	208	171	153	17	295	265	294	285	284	294	288	265	281	269	263	284	278	293	269.1
5-May	300	299	303	303	304	285	267	290	295	298	300	291	293	296	279	284	296	304	316	323	1	27	12	321	302.4
6-May	238	261	246	238	265	276	296	322	325	314	322	321	295	262	259	263	246	261	254	218	141	142	148	151	263.9
7-May	144	141	145	145	142	151	154	151	148	142	131	134	336	204	282	290	23	121	122	125	132	106	126	116	141.2
8-May	83	9	330	305	301	310	283	281	274	200	205	231	242	248	242	244	234	237	233	234	303	312	311	304	269.8
9-May	300	289	275	272	261	254	255	283	283	300	311	313	310	312	306	311	314	304	296	280	275	326	10	349	296.7
10-May	265	245	255	253	282	293	313	358	47	5	38	12	8	20	22	15	11	21	22	23	28	53	76	50	11.9
11-May	36	19	353	336	0	357	359	360	5	0	6	355	358	354	356	8	8	355	354	5	11	12	16	10	2.2
12-May	15	351	353	351	354	2	356	353	356	14	4	6	10	11	3	7	23	21	19	21	21	5	345	264	5.9
13-May	218	197	230	174	161	142	156	235	299	297	314	271	288	280	276	245	298	316	30	25	43	38	13	32	289.0
14-May	322	264	285	194	181	177	166	270	349	350	9	21	7	28	35	25	36	26	24	33	35	48	28	184	20.0
15-May	181	160	151	159	172	154	142	140	125	127	166	348	11	7	24	360	127	131	146	148	158	154	154	153	136.2
16-May	153	142	126	124	122	128	129	111	117	116	219	199	184	132	107	123	129	126	104	111	125	119	137	195	140.9
17-May	353	320	151	184	182	225	240	247	263	283	284	283	295	303	282	295	301	300	257	157	151	191	264	315	264.8
18-May	161	193	238	205	186	232	153	246	232	236	244	244	256	261	251	261	279	282	267	303	8	3	357	2	280.9
19-May	6	356	349	352	351	353	4	5	7	4	4	7	3	5	10	9	11	7	5	5	4	6	4	9	3.3
20-May	10	15	13	17	18	17	16	19	16	14	17	15	20	7	7	7	358	355	350	354	359	336	326	319	6.0
21-May	328	351	11	353	351	6	359	356	349	348	346	351	349	343	353	358	355	357	357	356	350	351	352	358	352.9
22-May	9	6	358	354	356	2	5	6	5	9	12	6	7	6	3	357	356	1	6	6	359	355	344	346	2.0
23-May	11	351	350	6	5	6	357	353	355	353	357	360	2	15	28	31	39	36	59	89	117	151	135	148	17.6
24-May	150	149	158	152	150	164	166	138	116	139	163	152	146	142	138	226	286	190	157	179	201	185	175	155	158.4
25-May	150	147	151	150	156	143	171	2	8	356	353	343	357	352	357	349	343	354	15	17	14	11	3	5	6.5
26-May	2	5	5	4	344	1	6	12	348	348	347	337	353	350	321	336	339	344	344	348	355	347	342	352	350.6
27-May	356	356	5	9	7	40	117	123	135	127	117	92	97	97	95	234	191	162	124	103	147	158	140	130	103.7
28-May	156	127	129	133	140	134	131	131	133	154	144	142	155	155	185	163	190	162	204	175	148	204	210	229	154.3
29-May	250	255	233	191	198	203	280	283	223	226	241	277	321	23	2	344	22	29	24	23	19	332	315	304	319.7
30-May	316	330	316	298	344	314	314	309	313	333	353	358	358	308	322	326	338	335	344	336	351	1	358	336	333.6
31-May	288	314	310	274	273	288	307	346	329	316	0	353	328	283	297	263	210	280	127	124	133	155	153	156	284.0

356.7 348.7 345.6 338.6 339.5 345.5 341.8 343.4 345.2 347.7 345.4 337.1 336.4 338.4 328.1 327.6 334.8 340.5 353.3 1.8 9.0 359.7 357.6 349.6
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

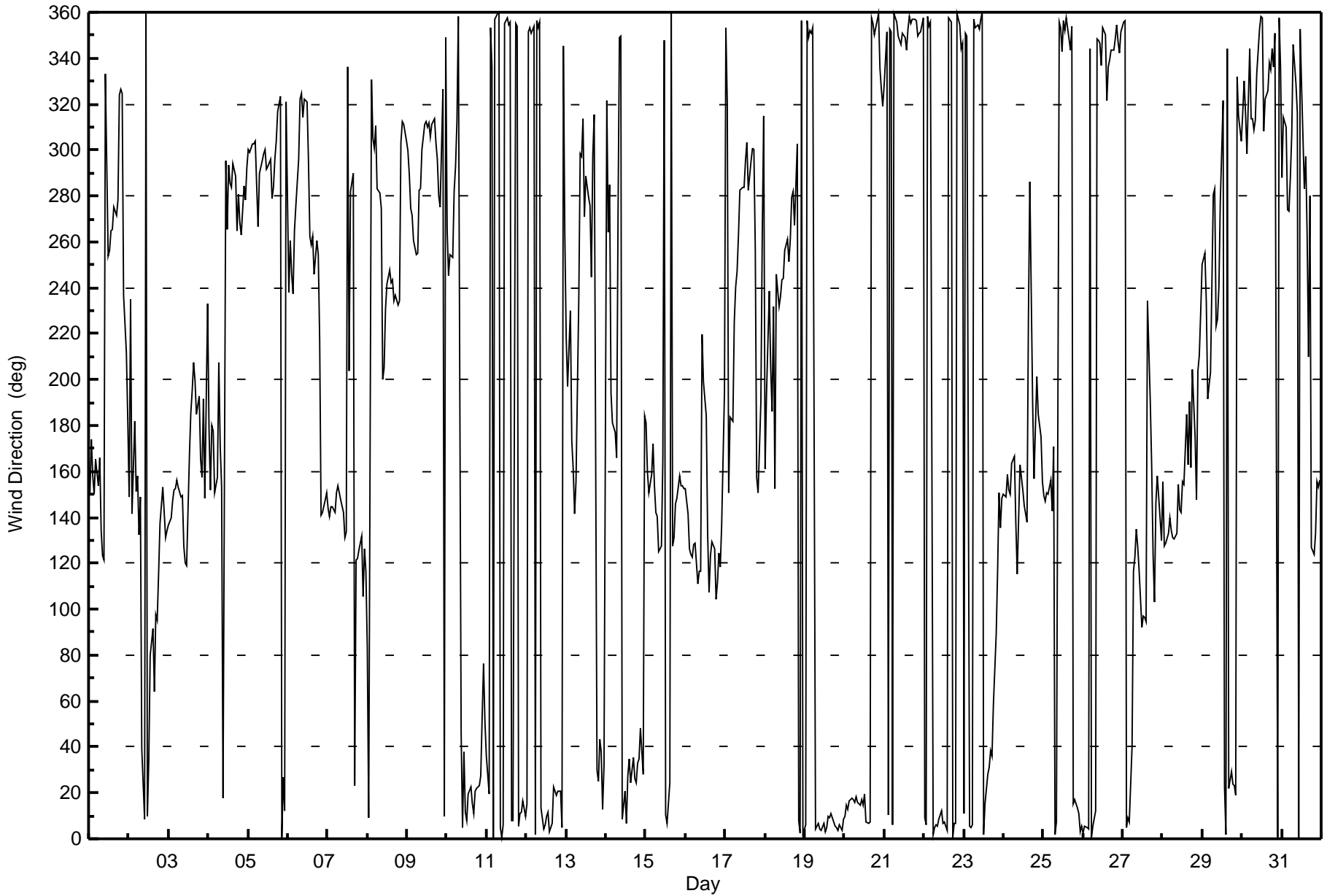
Wind Direction (WD) - deg
Buffalo Viewpoint - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on May 13 14:00 Minimum Value: 6 deg on May 16 03:00 Percentiles: P ₁ = 8 P ₁₀ = 14 Q ₁ = 16 Median = 20 Q ₃ = 27 P ₉₀ = 44 P ₉₉ = 86																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	16	20	31	16	16	14	18	20	19	34	92	26	28	27	29	35	30	27	22	10	13	52	11	24	92
2-May	24	55	11	46	26	24	9	28	41	22	24	29	58	36	48	36	30	23	17	17	13	13	14	14	58
3-May	15	17	17	15	14	16	18	17	20	29	26	23	40	30	24	37	25	20	20	17	14	51	15	71	71
4-May	23	15	17	25	16	23	74	31	55	46	46	23	19	22	28	17	18	17	17	16	15	17	20	24	74
5-May	17	14	12	13	13	15	16	19	16	18	15	20	21	17	20	18	14	16	14	11	32	15	13	45	45
6-May	43	26	22	26	23	15	45	27	28	58	26	38	48	76	51	36	28	24	32	28	12	15	15	18	76
7-May	17	17	16	15	16	23	21	21	17	18	19	56	48	75	21	33	49	25	17	13	18	88	12	16	88
8-May	34	32	26	17	26	15	19	17	27	42	28	18	20	23	20	17	21	17	19	16	31	13	15	15	42
9-May	14	16	15	15	15	14	15	18	19	15	16	15	16	17	15	17	15	15	16	19	17	28	14	30	30
10-May	24	18	19	61	49	41	22	20	61	36	42	44	29	28	24	23	20	18	17	16	17	17	13	12	61
11-May	9	12	12	23	12	17	16	16	19	20	22	18	21	19	20	23	20	20	19	18	15	12	13	11	23
12-May	11	8	12	12	13	13	14	15	17	21	21	20	26	25	23	21	19	21	19	16	12	22	36	15	36
13-May	30	15	57	16	12	16	19	40	27	26	69	73	60	108	52	56	59	48	21	15	7	8	7	36	108
14-May	18	24	31	18	13	12	46	87	34	43	37	40	44	100	68	71	51	32	21	16	26	16	12	22	100
15-May	20	23	10	14	28	8	14	19	23	26	99	71	25	32	32	44	42	21	20	17	16	16	17	16	99
16-May	16	7	6	9	7	12	30	47	42	70	32	25	28	31	14	16	28	55	70	71	44	37	72	73	73
17-May	66	37	92	21	22	20	16	15	18	21	29	32	20	21	19	21	21	25	44	42	28	69	39	68	92
18-May	36	39	15	32	48	91	51	36	20	18	19	20	20	22	21	20	22	17	28	46	15	19	19	18	91
19-May	19	18	17	17	17	18	17	19	19	18	18	19	19	18	17	18	17	17	17	18	19	18	17	16	19
20-May	16	15	15	15	14	16	16	18	17	19	20	19	23	21	22	21	22	23	22	21	24	19	15	12	24
21-May	12	22	19	22	21	19	21	18	15	17	17	18	18	18	19	19	20	20	19	18	16	17	18	20	22
22-May	17	16	18	18	18	19	17	18	19	19	18	18	19	20	20	23	23	23	23	22	23	28	17	20	28
23-May	20	24	21	21	20	19	22	22	25	24	26	25	33	29	25	26	26	32	26	17	32	14	13	17	33
24-May	17	16	20	15	14	21	24	28	27	31	28	26	25	25	28	64	14	51	23	23	17	20	16	15	64
25-May	18	13	12	11	14	14	27	66	26	28	28	23	25	19	21	18	17	20	17	16	17	16	19	17	66
26-May	18	17	19	19	15	19	18	17	20	20	18	18	27	20	15	15	14	16	15	16	17	15	13	14	27
27-May	16	15	14	12	12	40	20	22	24	26	37	25	33	33	39	25	40	57	20	27	19	22	23	24	57
28-May	26	17	22	23	21	21	22	20	23	31	27	24	26	24	23	29	28	25	21	22	17	21	13	16	31
29-May	22	39	28	35	39	23	32	41	22	19	26	24	30	67	34	30	23	18	18	16	13	28	20	12	67
30-May	12	16	12	22	65	15	13	14	14	18	17	18	18	23	22	15	16	13	15	13	15	14	15	11	65
31-May	17	14	11	15	18	35	16	46	50	62	66	49	72	58	59	51	83	51	22	17	10	10	12	18	83
66 55 92 61 65 91 74 87 61 70 99 73 72 108 68 71 83 57 70 71 44 88 72 73																									
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 3, 2016	Last Calibration	April 14, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:13	End Time (MST)	11:45
Gas Cert Reference	LL107929	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	08-Sep-18
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-593	-593
Analyzer IP address	192.168.1.43		Lamp voltage	841	838
Calculated slope	1.000280	0.998873	Chamber temp	45.0	45.0
Calculated intercept	-0.376609	0.720161	Pressure	695.2	693.1
Analyzer Background	10.8	10.8	Flow	0.495	0.492
Analyzer Coefficient	0.819	0.819	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	60.4	600.4	600.3	1.000
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	60.4	600.4	600.3	1.000
second point	5000	30.2	300.2	300.7	0.998
third point	5000	15.1	150.1	148.0	1.014
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	60.4	600.4	600.1	1.000
Average Correction Factor					1.004

Corrected As found 600.3 Previous response 600.6 % change 0.1%

Notes:

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



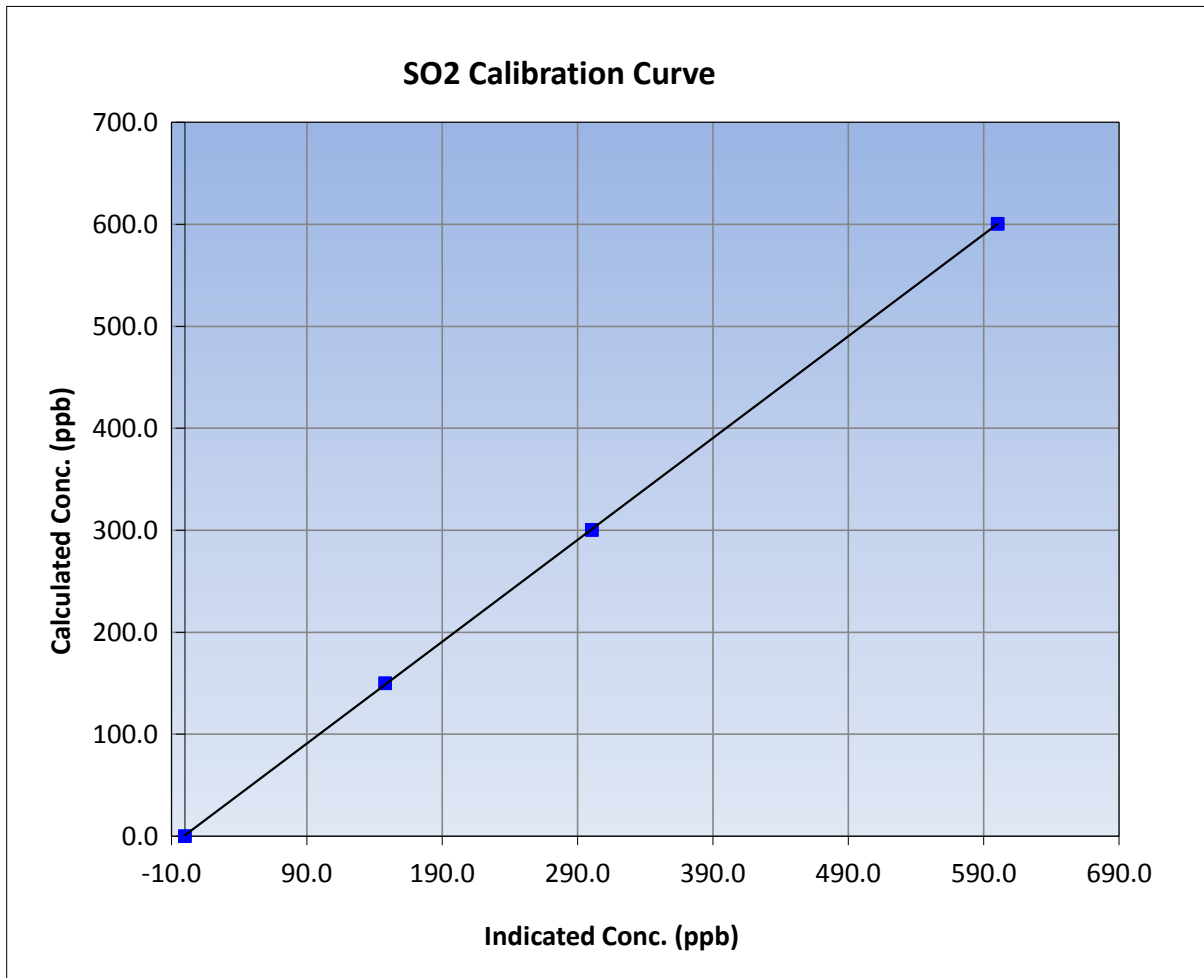
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 14, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:13	End Time (MST)	11:45
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

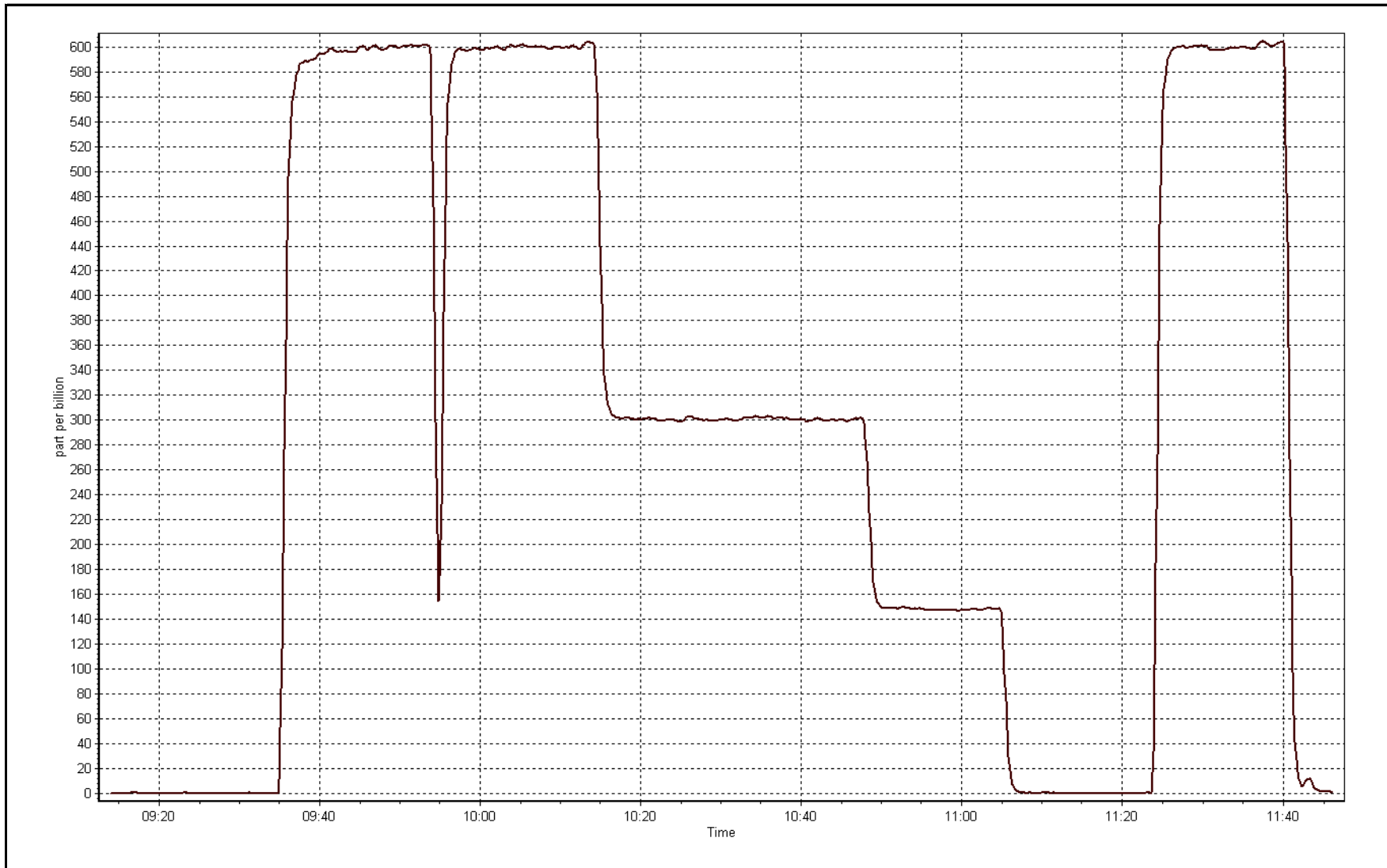
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999981
600.4	600.3	1.0001		
300.2	300.7	0.9984	Slope	0.998873
150.1	148.0	1.0143		
			Intercept	0.720161



SO2 Calibration Plot

Date: May 3, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 3, 2016	Last Calibration	April 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:46	End Time (MST)	13:35
Gas Cert Reference	LL101590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	2/22/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	LL107929 08-Spet-2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-615
Analyzer IP address	192.168.1.42		Lamp voltage	879	879
Calculated slope	0.997243	1.004631	Chamber temp	45	45
Calculated intercept	-0.005586	-0.115436	Pressure	552.6	545.7
Analyzer Background	14.1	14.3	Flow	1.051	1.038
Analyzer Coefficient	0.862	0.862	Intensity	94	94
			Converter temp.	329	329

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	----
as found span	6000	46.2	75.1	74.7	1.005
SO2 scrubber check	5000	15.1	150.1	1.4	----
calibrator zero	6000	0.0	0.0	0.0	----
high point	6000	46.2	75.1	74.7	1.005
second point	6000	25.8	41.9	42.1	0.995
third point	6000	15.4	25.0	25.0	1.003
as left zero	5000	0.0	0.0	0.1	----
as left span	6000	46.1	74.9	75.2	0.996
Average Correction Factor					1.001

Corrected As found	74.7	Previous response	75.3	% change	0.8%
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Notes:

Scrubber check done and sample inlet filter replaced after as founds. No adjustments. As left points were very short due to senior staff member advising to return home because of evacuation order in town.

Calibration Performed By: Asad Hidayat



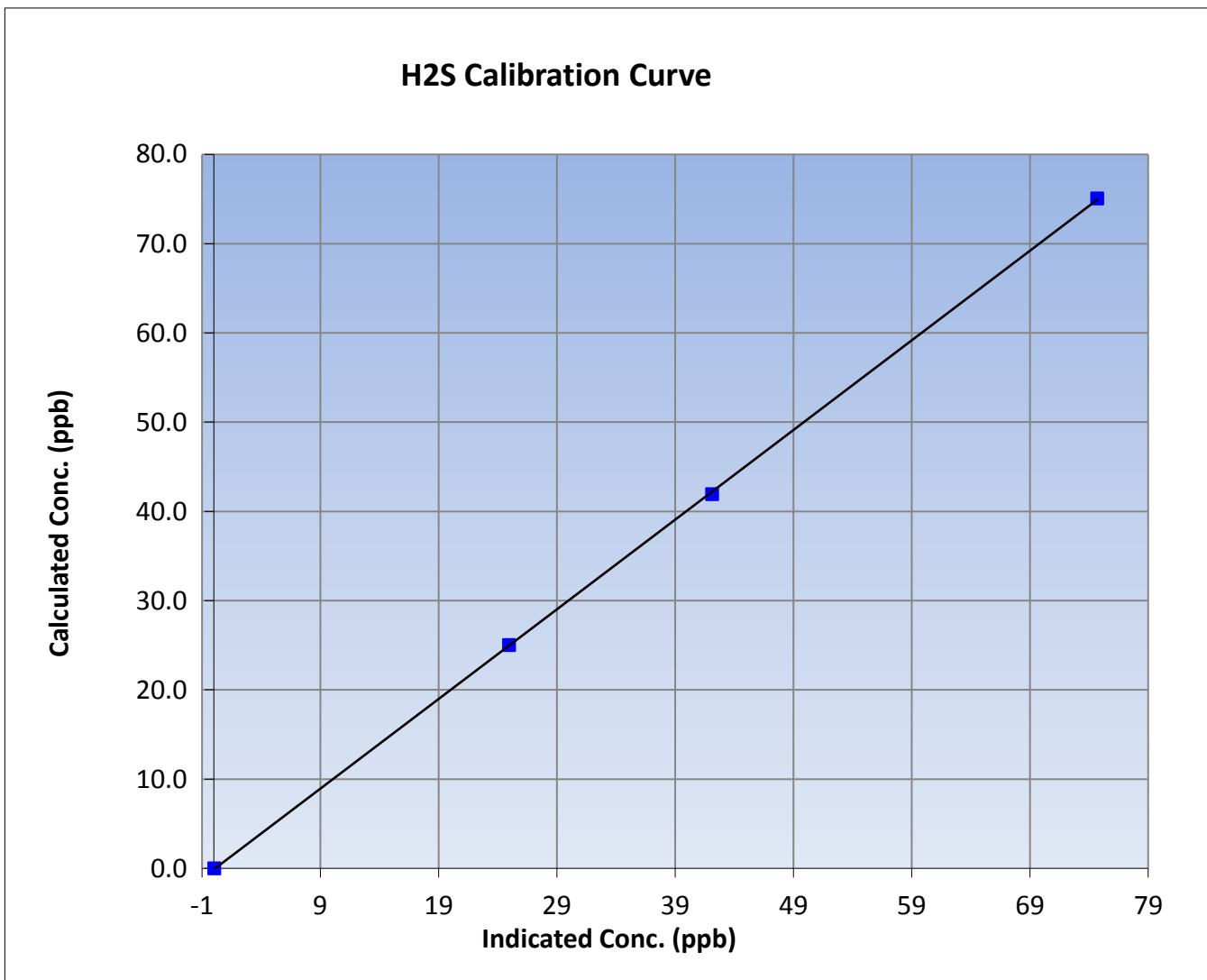
Wood Buffalo Environmental Association H2S Calibration Report

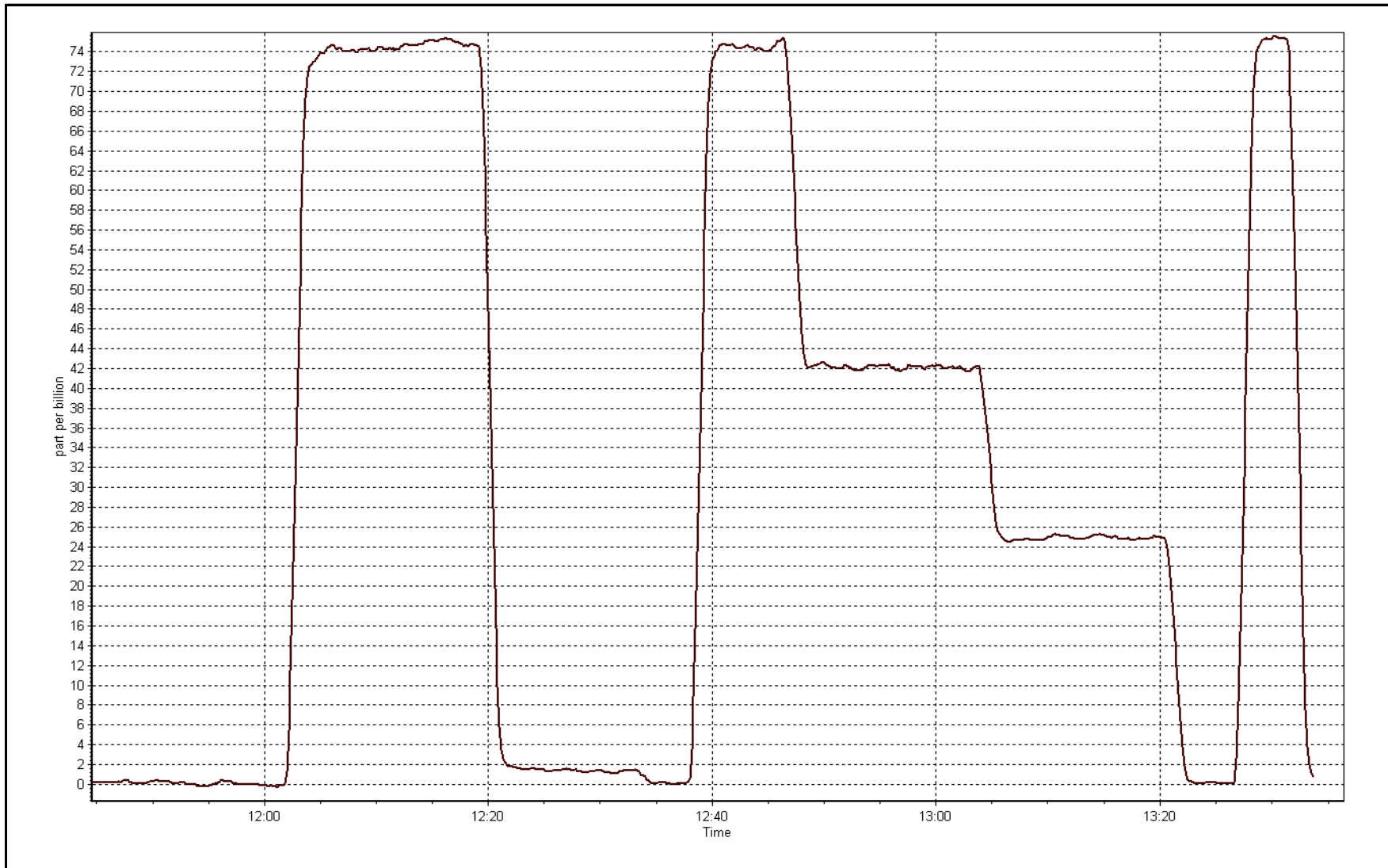
Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:46	End Time (MST)	13:35
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	0.0	----	Correlation Coefficient	0.999960
75.1	74.7	1.0050		
41.9	42.1	0.9949	Slope	1.004631
25.0	25.0	1.0026		
			Intercept	-0.115436







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-03-16	Last Calibration	April-14-16
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:13	End Time (MST)	11:42
Gas Cert Reference	LL107929	Cal Gas Expiry Date	08-Sep-18
CH4 Cal Gas Conc.	514 ppm	CH4 Equiv Conc.	1061.3 ppm
C3H8 Cal Gas Conc.	199 ppm	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG make/model	Teledyne API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	1.003784	1.006178	Fuel Pressure	19.9	19.9
Calculated intercept	-0.060162	-0.086262	Analyzer Coeff	4.1	4.1
			Analyzer BKG	0.870	0.870

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	0.06	----
as found span	5000	60.4	12.82	12.80	1.002
calibrator zero	5000	0.0	0.00	0.06	----
high point	5000	60.4	12.82	12.80	1.002
second point	5000	30.2	6.41	6.51	0.985
third point	5000	15.1	3.20	3.27	0.980
as left zero	5000	0.0	0.00	0.10	----
as left span	5000	60.4	12.82	12.83	0.999
Average Correction Factor					0.989

Corrected As found: 12.74 Previous response: 12.83 % change: 0.7%

Notes:

Sample inlet filter replaced after as founds. Hydrogen cylinder replaced after after sample filter replaced. Sudden drift on second point most likely caused by unstable internal temp (too warm). No adjustments made.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

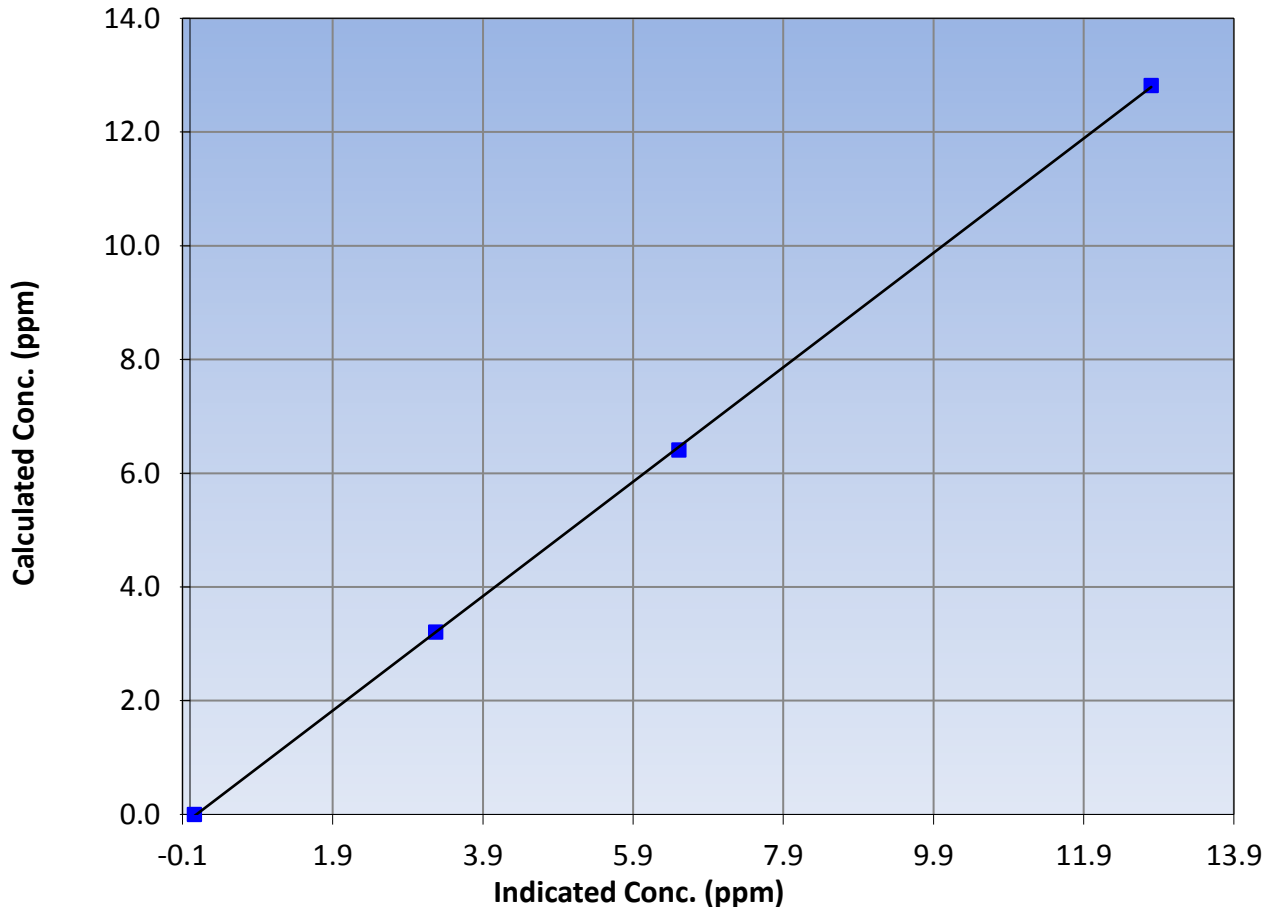
Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 14, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:13	End Time (MST)	11:42
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

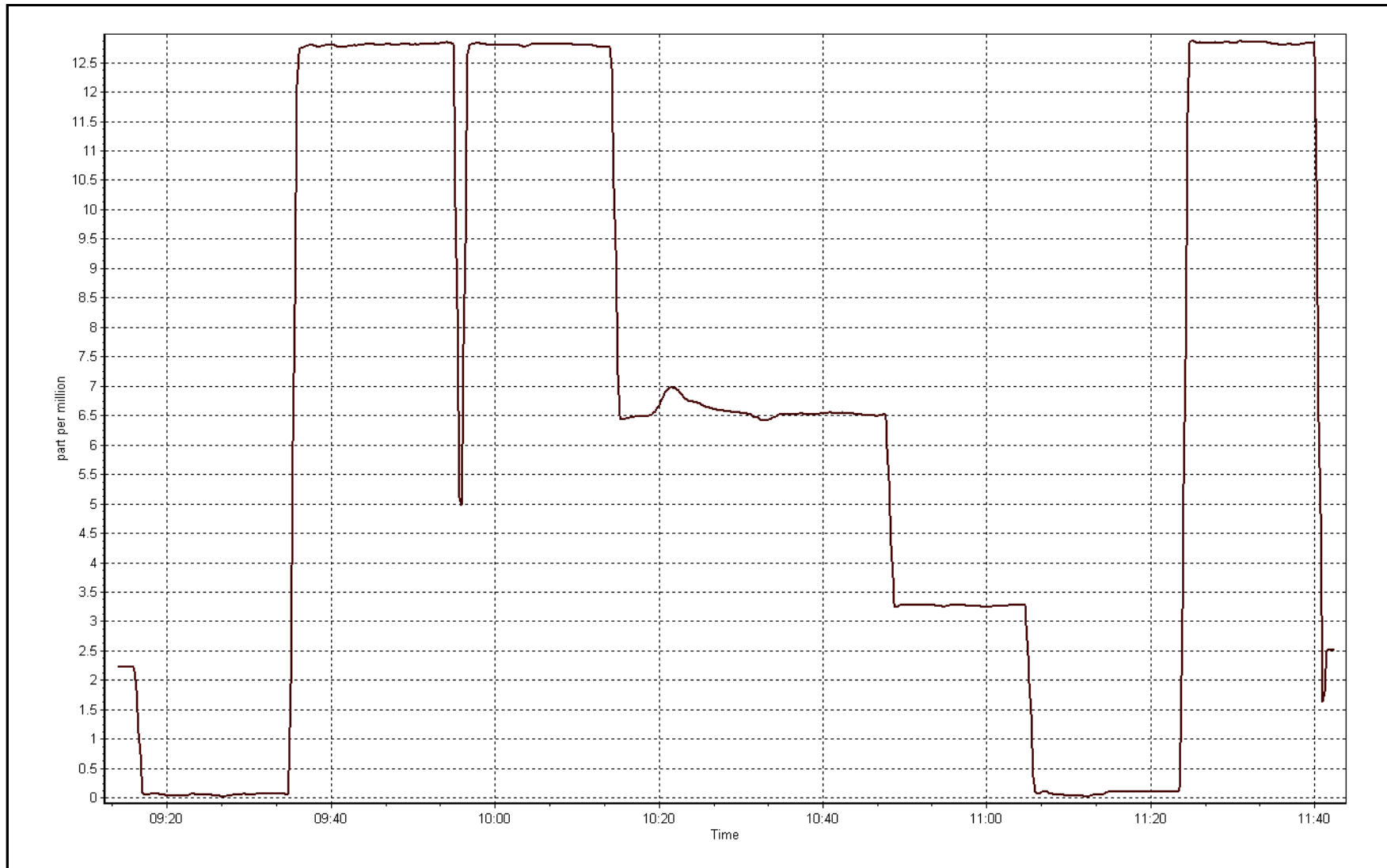
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	----	Correlation Coefficient	0.999952
12.82	12.80	1.0016		
6.41	6.51	0.9846	Slope	1.006178
3.20	3.27	0.9801		
			Intercept	-0.086262

THC Calibration Curve



THC Calibration Plot

Date: May 3, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 5
MANNIX
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)

MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	29	0	5	0
H2S (ppb) Average	706	33	38	99.33	12	2	3	0
THC (ppm) Average	708	35	36	99.87	12	-	4.3	-
Temperature 2 m (C) Average	744	0	0	100.00	34.1	-	23.4	-
Temperature 20 m (C) Average	744	0	0	100.00	31.9	-	23.5	-
Temperature 45 m (C) Average	744	0	0	100.00	31.4	-	23.4	-
Temperature 75 m (C) Average	744	0	0	100.00	31	-	23.3	-
Temperature 90 m (C) Average	744	0	0	100.00	30.9	-	23.3	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	97	-	84	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	97	-	84	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	98	-	85	-
Relative Humidity 75 m (%) Average	744	0	0	100.00	99	-	86	-
Relative Humidity 90 m (%) Average	744	0	0	100.00	99	-	87	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	33	-	21	-
Wind Speed 45 m (km/h) Average	744	0	0	100.00	40	-	29	-
Wind Speed 75 m (km/h) Average	744	0	0	100.00	42	-	33	-
Wind Speed 90 m (km/h) Average	744	0	0	100.00	44	-	35	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 75 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 90 m (deg) Average	744	0	0	100.00	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	1.7	-	0.6	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100.00	1.9	-	1	-
Vertical Wind Speed 75 m (km/h) Average	744	0	0	100.00	2.5	-	0.5	-
Vertical Wind Speed 90 m (km/h) Average	744	0	0	100.00	4.5	-	2.4	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.1	3	-	0	0	0	0	1	3	29
H2S (ppb) Average	706	0.7	1	-	0	0	0	0	1	2	12
THC (ppm) Average	708	2.5	0.9	-	2	2.1	2.2	2.2	2.4	3	12
Temperature 2 m (C) Average	744	13.51	6.5	-	-0.2	5.3	8.6	12.6	18.2	22.3	34.1
Temperature 20 m (C) Average	744	13.5	6.3	-	1.5	5.6	8.9	12.7	17.7	22	31.9
Temperature 45 m (C) Average	744	13.42	6.3	-	1.3	5.6	8.9	12.7	17.7	22	31.4
Temperature 75 m (C) Average	744	13.34	6.2	-	1.3	5.7	8.8	12.6	17.7	21.8	31
Temperature 90 m (C) Average	744	13.3	6.2	-	1.4	5.6	8.8	12.6	17.7	21.9	30.9
Relative Humidity 2 m (%) Average	744	53.1	24	-	12	22	32	51	74	87	97
Relative Humidity 20 m (%) Average	744	51.3	23	-	13	22	30	49	73	85	97
Relative Humidity 45 m (%) Average	744	51	24	-	13	21	29	49	73	85	98
Relative Humidity 75 m (%) Average	744	50.7	24	-	13	22	29	47	73	85	99
Relative Humidity 90 m (%) Average	744	50.6	24	-	13	22	29	46	74	86	99
Wind Speed 20 m (km/h) Average	744	11.6	6	-	0	5	7	11	15	20	33
Wind Speed 45 m (km/h) Average	744	15.9	8	-	1	6	10	15	21	26	40
Wind Speed 75 m (km/h) Average	744	17.7	9	-	1	6	11	17	23	30	42
Wind Speed 90 m (km/h) Average	744	18.7	9	-	0	7	12	18	25	31	44
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0.11	0.4	-	-1	-0.3	-0.1	0	0.4	0.6	1.7
Vertical Wind Speed 45 m (km/h) Average	744	-0.02	0.7	-	-1.8	-0.9	-0.6	-0.1	0.4	1	1.9
Vertical Wind Speed 75 m (km/h) Average	744	0.14	0.4	-	-1	-0.4	-0.1	0.1	0.4	0.7	2.5
Vertical Wind Speed 90 m (km/h) Average	744	0.97	0.9	-	-1.3	0	0.3	0.8	1.5	2	4.5

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC	12 May 2016 18:00	12 May 2016 18:00	1	Maintenance - calibrator reset and daily QA check initiated
H2S	03 May 2016 12:00	03 May 2016 14:00	3	Aborted calibration - wildfire evacuation
H2S	12 May 2016 18:00	12 May 2016 19:00	2	Maintenance - calibrator reset and daily QA check initiated



Summary of Hour Averages

Mannix - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 29 ppb on May 6 10:00	Maximum Daily Average: 4.8 ppb on May 6		Hours of Data:	708
Minimum Value: 0 ppb on May 10 04:00	Minimum Daily Average: 0.0 ppb on May 28		Hours of Missing Data:	36
Maximum Diurnal Average: 2.2 ppb at hour 24	Minimum Diurnal Average: 0.3 ppb at hour 16		Hours of Calibration:	35
Monthly Average: 1.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 13		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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0.3	3	
2-May	0	0	0	Z	0	0	0	1	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
3-May	0	0	0	0	Z	0	0	0	0	C	C	C	C	1	1	1	1	1	1	1	1	2	2	1	0.7	2	
4-May	1	2	4	1	1	Z	1	3	3	3	3	2	1	1	1	0	0	0	0	0	0	0	0	1	1.2	4	
5-May	Z	1	1	2	16	2	0	2	12	3	3	0	0	0	0	0	0	4	10	3	1	0	0	3	2.8	16	
6-May	2	Z	0	0	0	0	1	14	27	29	7	1	0	0	0	0	0	0	0	0	1	7	10	9	4.8	29	
7-May	7	7	7	6	5	4	3	3	2	2	2	Z	1	1	1	0	1	1	1	3	3	2	2	2	2.8	7	
8-May	1	2	7	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	7	
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
10-May	2	0	0	0	0	Z	4	2	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4	
11-May	Z	0	2	5	7	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	7	
12-May	1	Z	6	2	7	15	2	3	1	0	0	0	0	0	0	0	0	M	0	0	0	0	0	3	1.7	15	
13-May	1	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	
14-May	1	1	0	Z	0	0	0	1	1	1	4	4	1	1	1	1	1	0	0	0	0	0	0	4	1.1	4	
15-May	2	1	1	1	Z	0	1	1	1	2	2	1	0	0	0	0	0	0	0	1	1	1	1	1	1.0	2	
16-May	1	1	1	1	1	Z	1	1	1	1	1	2	2	2	1	2	2	1	1	1	1	1	1	5	1.4	5	
17-May	Z	2	3	3	2	7	6	2	0	0	0	0	0	0	0	0	0	0	0	0	2	4	9	8	2.2	9	
18-May	4	Z	15	3	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1.6	15	
19-May	0	0	Z	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	3	
20-May	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	1	4	0	0.5	4	
21-May	0	5	1	0	Z	0	0	0	1	2	3	2	2	3	1	0	0	0	0	0	0	0	0	0	0.8	5	
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.2	3	
23-May	Z	0	2	3	3	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3	
24-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.1	1	
25-May	0	0	Z	0	0	0	0	0	1	4	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0.7	6	
26-May	0	0	0	Z	2	0	0	0	1	4	2	1	2	1	1	0	0	0	3	3	3	2	3	4	1.4	4	
27-May	2	2	2	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
29-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	11	0.6	11	
30-May	10	Z	3	1	3	1	3	0	0	1	2	1	2	1	0	0	0	0	2	1	1	9	15	10	2.9	15	
31-May	6	5	Z	0	0	0	0	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	6	

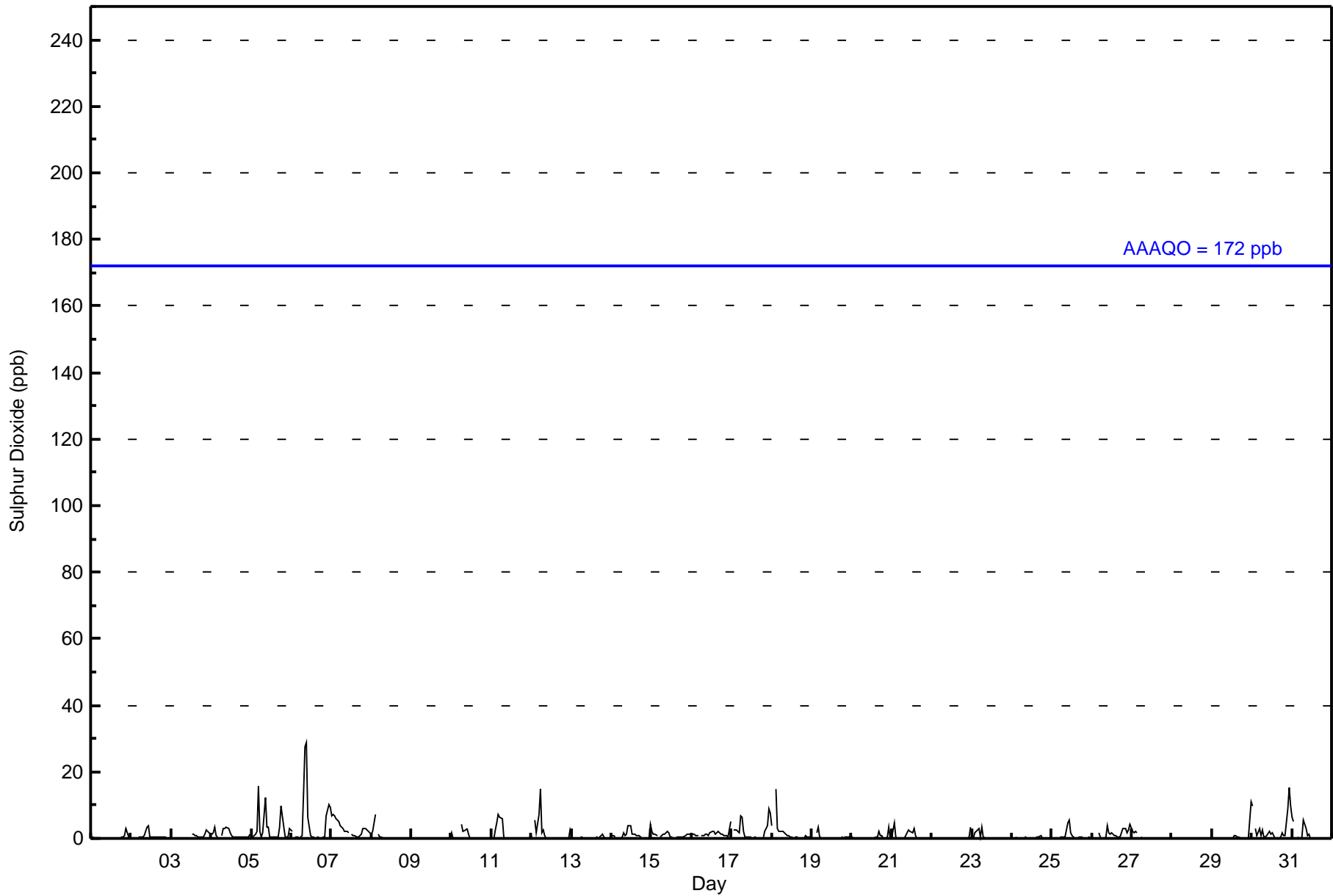
1.6	1.1	2.1	1.2	2.1	1.6	1.1	1.4	2.0	2.1	1.4	0.6	0.5	0.4	0.3	0.3	0.3	0.4	0.7	0.5	0.5	1.1	1.6	2.2	Diurnal Average	
10	7	15	6	16	15	6	14	27	29	7	4	2	3	1	2	2	4	10	3	3	9	15	11	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mannix - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	699	98.73	98.73
11 - 20	7	0.99	99.72
21 - 60	2	0.28	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	106	77	20	14	13	26	68	63	23	18	22	42	57	60	37	53	699
11 - 20	2	0	0	0	0	0	0	0	0	0	1	0	0	3	0	1	7
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	108	77	20	14	13	26	68	63	23	18	23	42	58	64	37	54	708

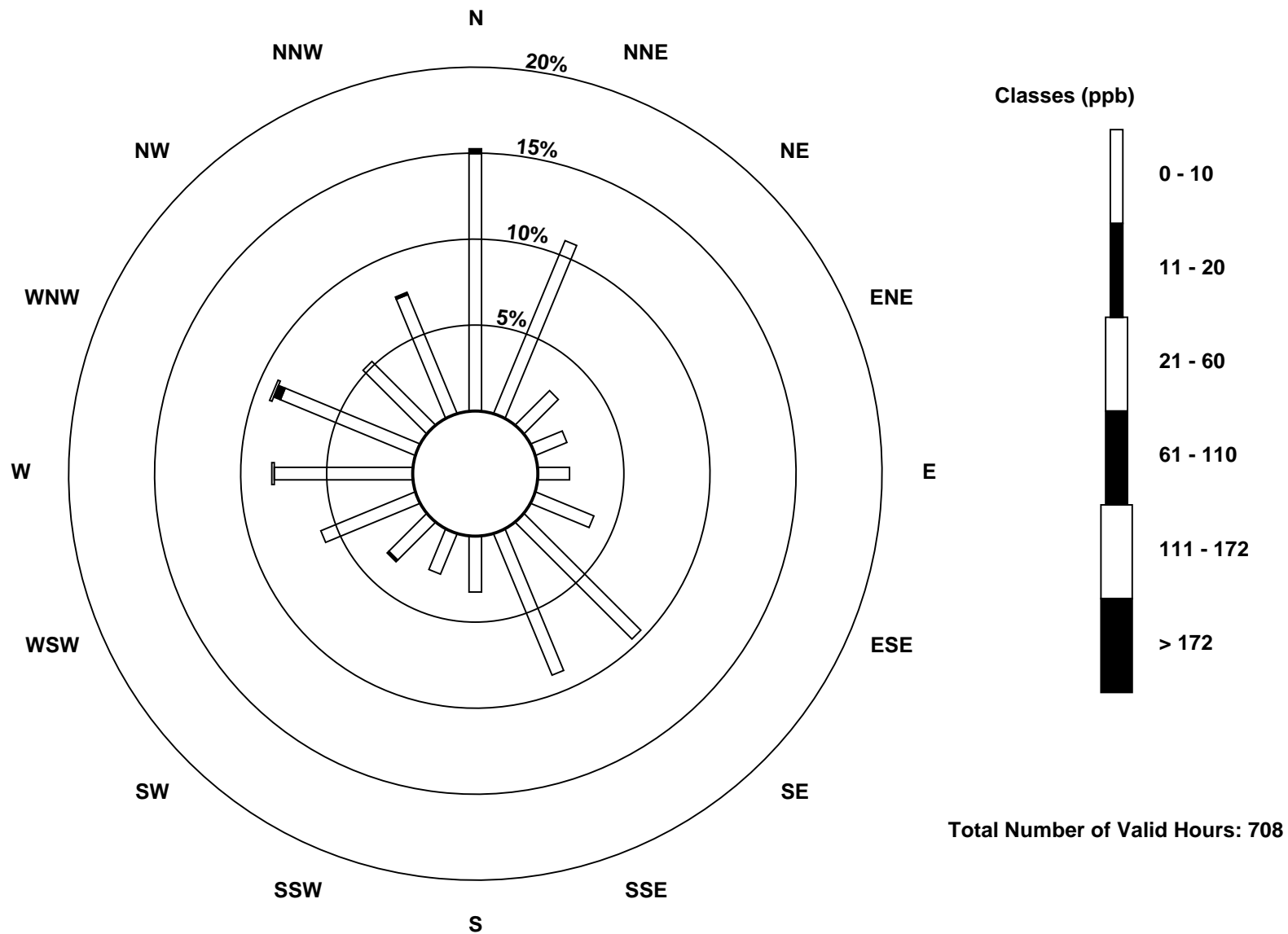
Total Number of Valid Hours: 708

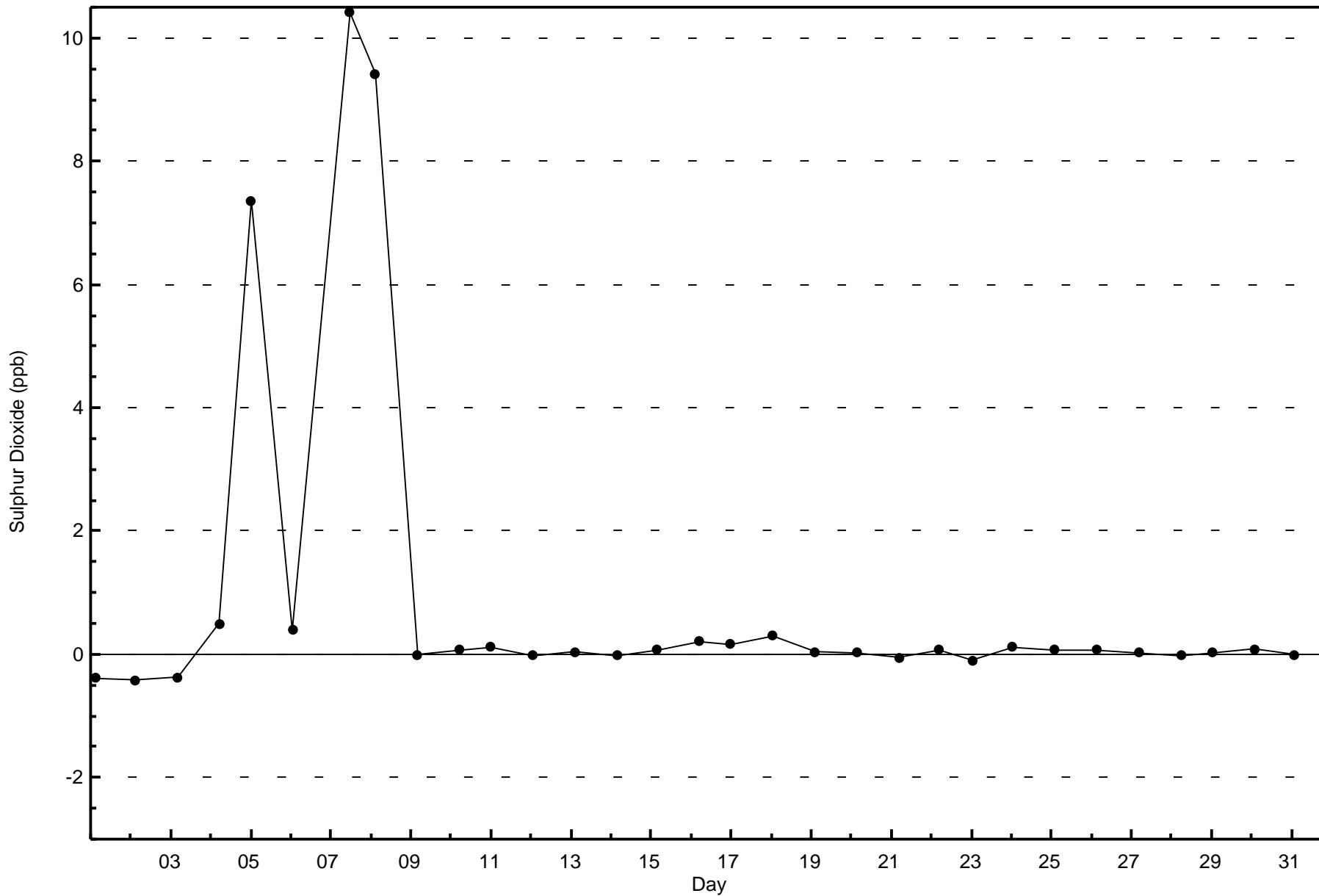
Total Number of Hours: 744

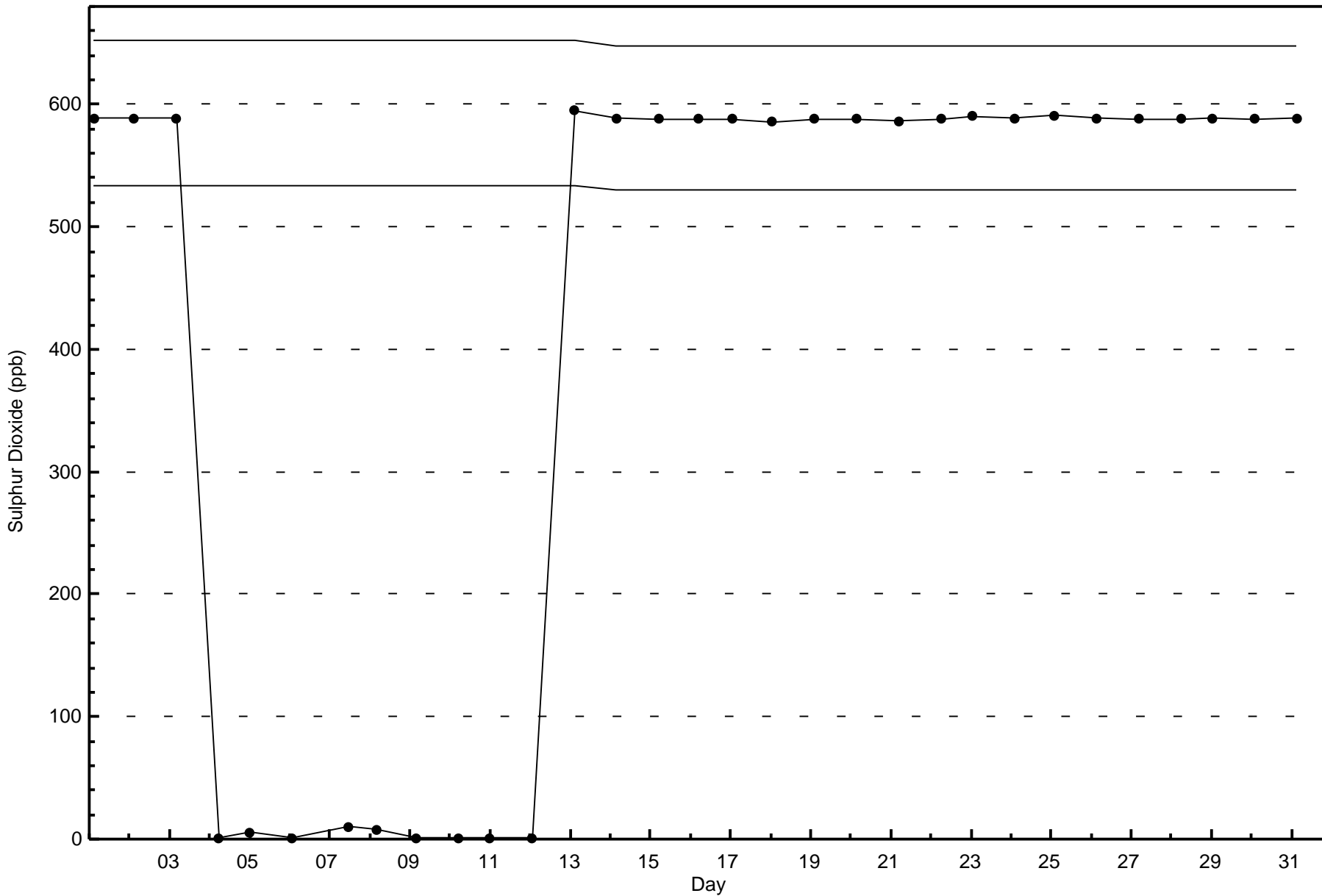


Wood Buffalo Environmental Association
Wind Rose May 2016

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







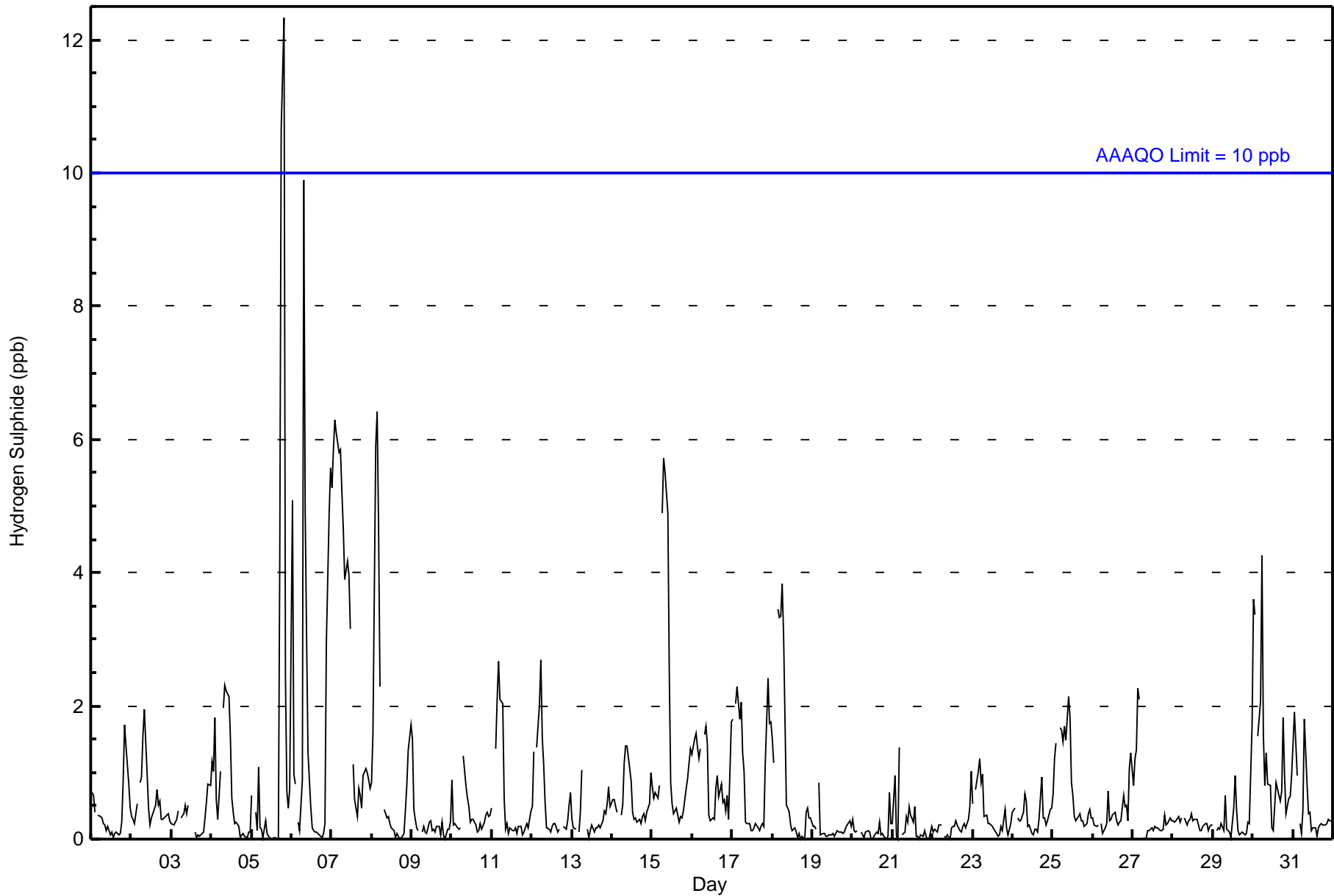


Number of Exceedences (AAAQO):	1-hr: 2	24-hr: 0	Hours in Service:	744
Maximum Value: 12 ppb on May 5 20:00	Maximum Daily Average: 3.0 ppb on May 7		Hours of Data:	706
Minimum Value: 0 ppb on May 5 13:00	Minimum Daily Average: 0.1 ppb on May 20		Hours of Missing Data:	38
Maximum Diurnal Average: 1.4 ppb at hour 8	Minimum Diurnal Average: 0.2 ppb at hour 16		Hours of Calibration:	33
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6		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-May	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0.4	2
2-May	0	0	0	1	Z	1	1	2	2	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.6	2
3-May	0	0	0	0	0	Z	0	0	1	0	1	M	M	M	0	0	0	0	0	0	0	1	1	1	0.3	1
4-May	1	1	2	1	0	1	Z	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.8	2
5-May	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	11	12	2	1	0	1	1.5	12
6-May	5	1	1	Z	0	0	1	10	5	3	1	0	0	0	0	0	0	0	0	0	0	3	5	6	1.8	10
7-May	5	6	6	6	6	6	5	5	4	4	4	3	Z	1	1	0	1	1	0	1	1	1	1	1	3.0	6
8-May	1	2	6	6	5	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1.2	6
9-May	2	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	2
10-May	1	0	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-May	0	Z	1	2	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
12-May	0	1	Z	1	2	3	2	1	1	0	0	0	0	0	0	0	0	M	M	0	0	0	1	1	0.7	3
13-May	0	0	0	Z	0	0	1	C	C	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1	
14-May	1	1	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	1
15-May	1	1	1	1	1	Z	5	6	6	5	3	1	1	0	0	0	0	0	0	0	1	1	1	1	1.5	6
16-May	1	1	2	1	1	1	Z	2	2	1	0	0	0	0	1	1	1	1	1	1	0	1	0	2	0.9	2
17-May	2	Z	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.9	2
18-May	1	1	Z	3	3	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	4
19-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
20-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1
21-May	0	1	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
23-May	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-May	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
25-May	1	1	1	Z	2	2	1	2	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.9	2
26-May	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0.4	1
27-May	1	1	1	2	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
28-May	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
29-May	0	Z	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0.3	2
30-May	4	3	Z	2	2	4	2	1	1	1	1	0	0	0	1	1	1	1	1	2	1	0	1	1	1.3	4
31-May	1	2	1	Z	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2

1.1	1.0	1.1	1.3	1.3	1.2	1.1	1.4	1.0	0.9	0.6	0.4	0.2	0.3	0.2	0.2	0.2	0.4	0.6	0.7	0.4	0.6	0.7	0.8	Diurnal Average		
5	6	6	6	6	6	5	10	6	5	4	3	1	1	1	1	1	1	4	11	12	2	3	5	6	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 - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	666	94.33	94.33
3 - 4	18	2.55	96.88
5 - 7	19	2.69	99.58
8 - 11	1	0.14	99.72
> 11	2	0.28	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	108	74	20	15	13	24	55	57	21	17	21	40	59	59	33	50	666
3 - 4	2	0	0	0	0	1	6	2	1	1	0	0	1	2	0	2	18
5 - 7	0	0	0	0	0	1	8	5	0	0	0	1	0	2	1	1	19
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Totals	110	74	20	15	13	26	69	64	22	18	21	41	60	64	36	53	706

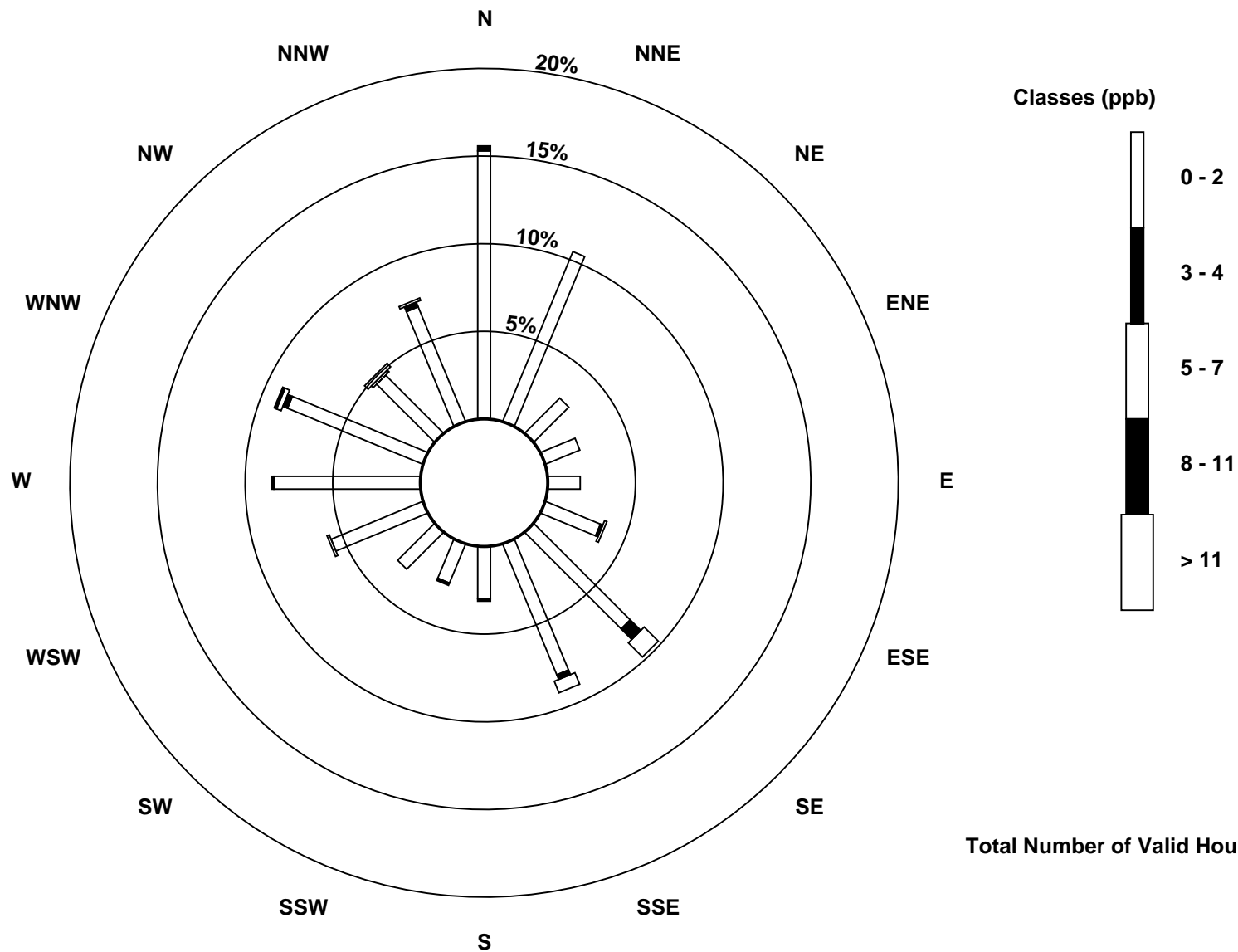
Total Number of Valid Hours: 706

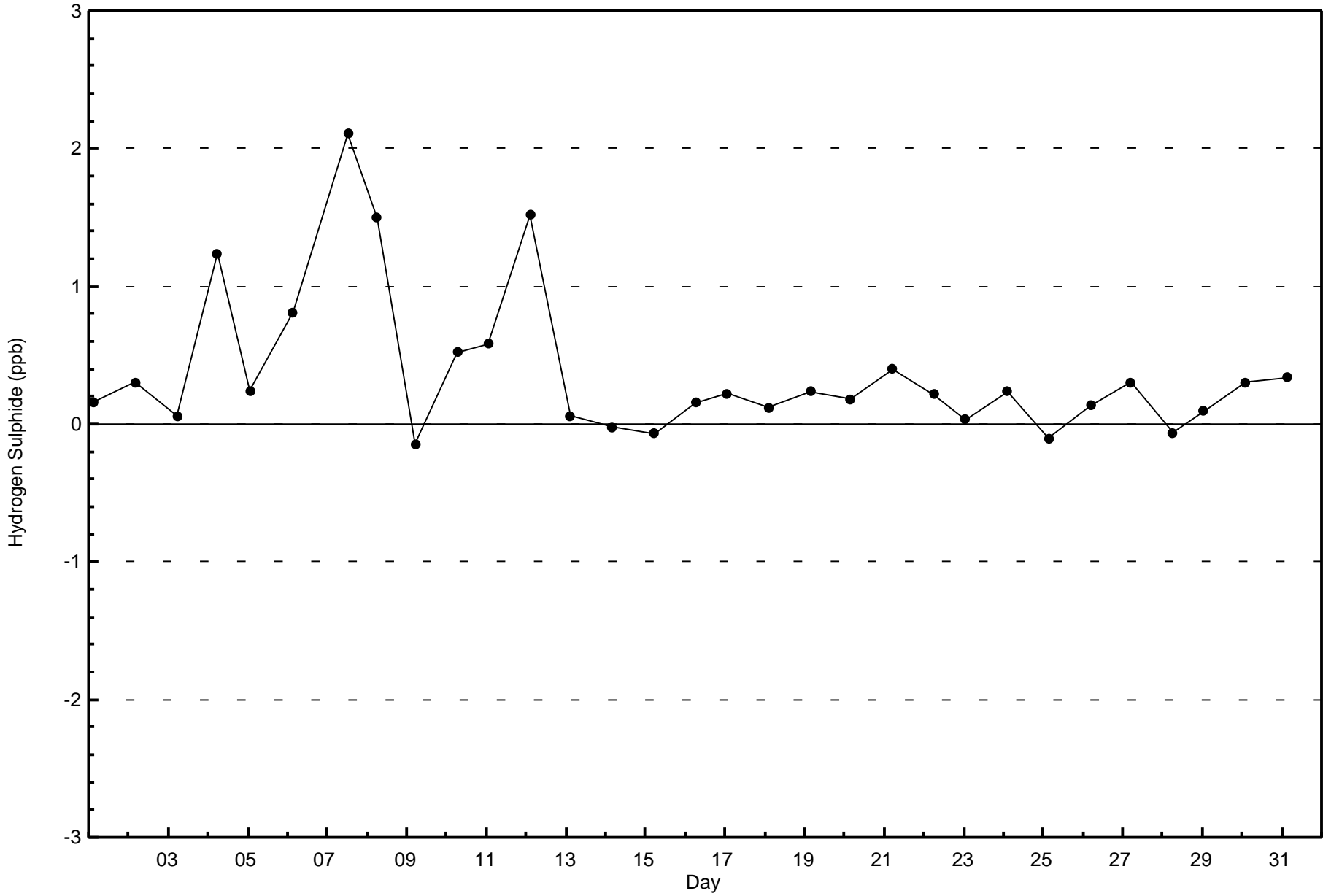
Total Number of Hours: 744

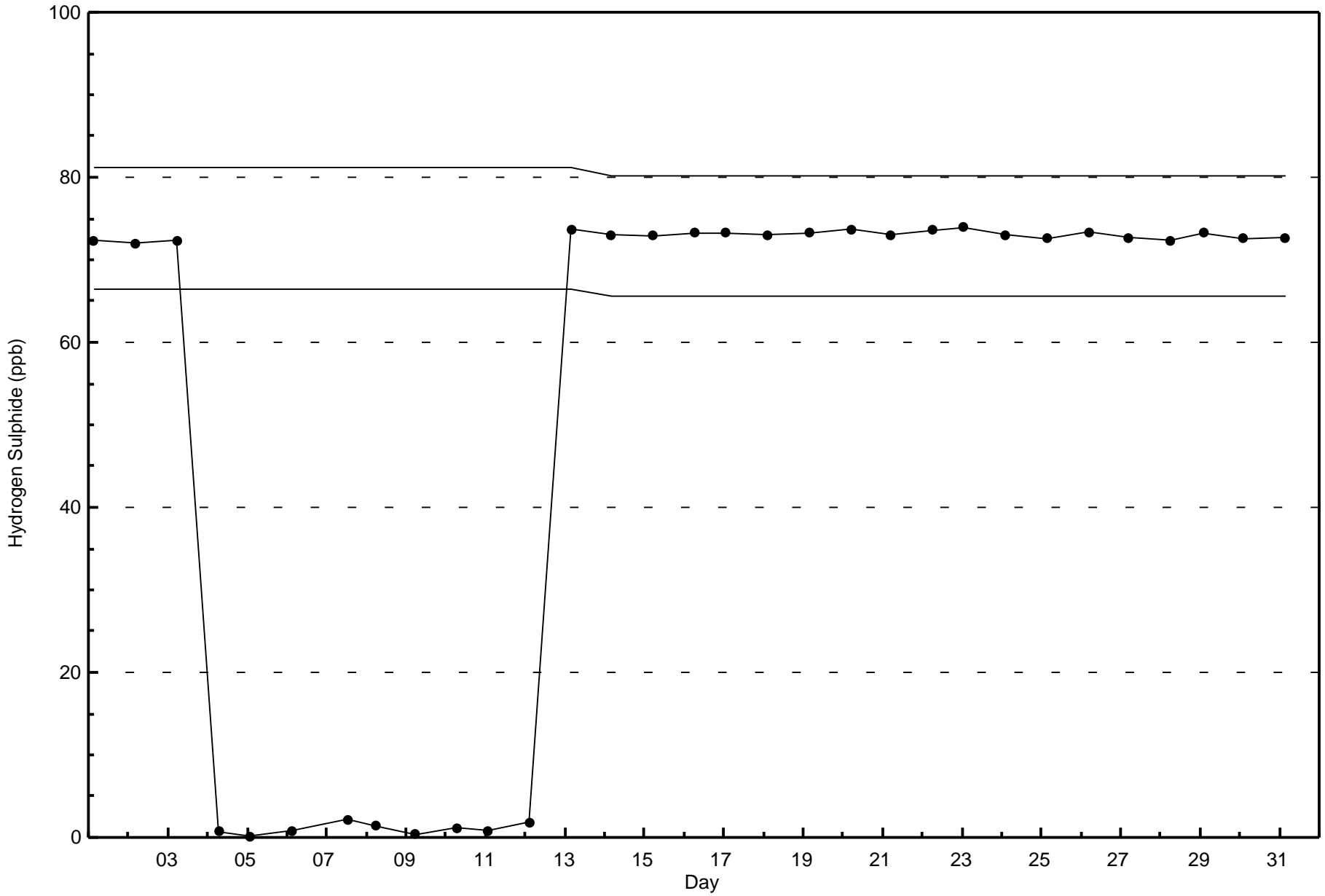


Wood Buffalo Environmental Association
Wind Rose May 2016

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









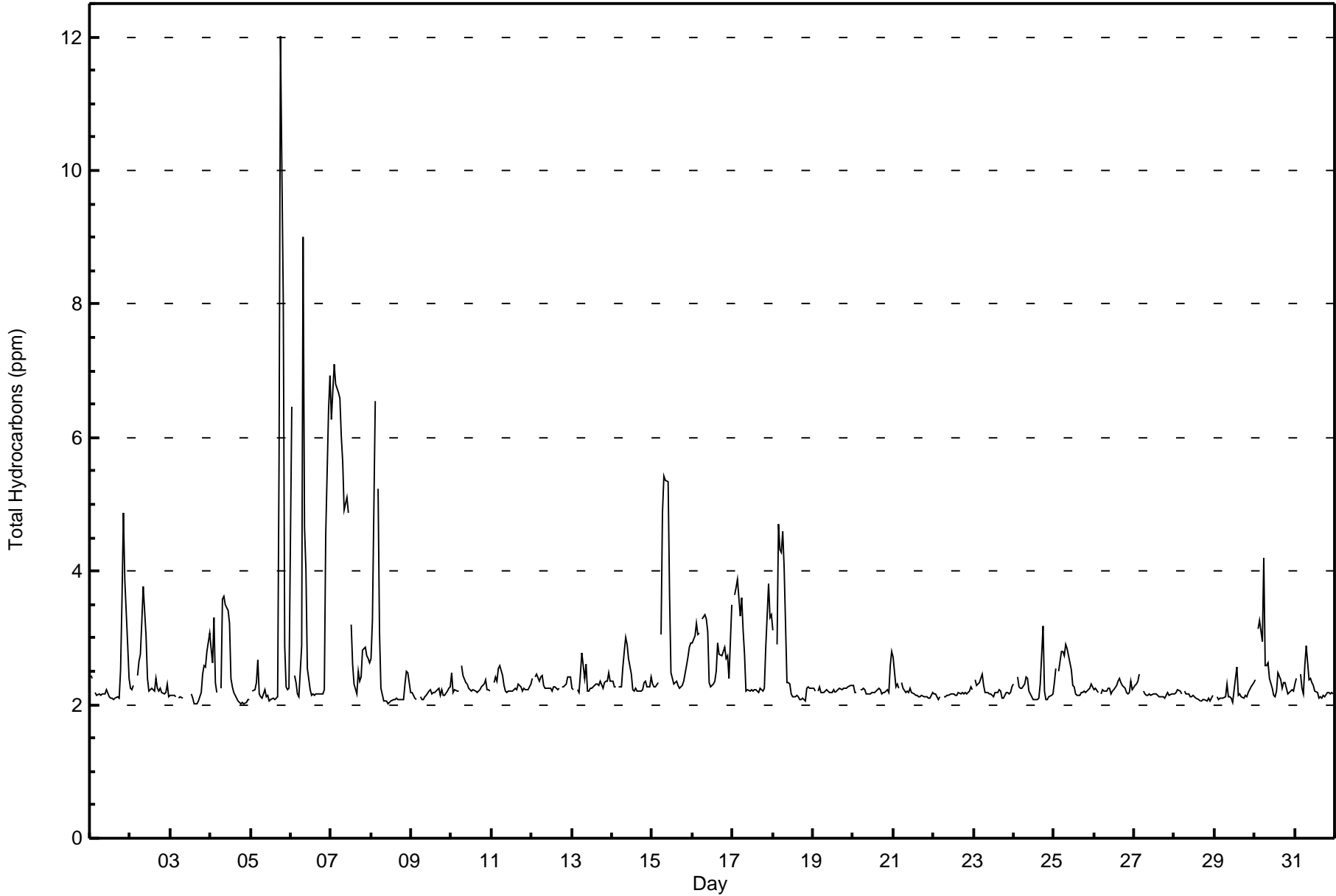
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mannix - May 2016

Maximum Value: 12.0 ppm on May 5 19:00																				Maximum Daily Average: 4.3 ppm on May 7					Hours in Service: 744	
Minimum Value: 2.0 ppm on May 3 16:00																				Minimum Daily Average: 2.1 ppm on May 28					Hours of Data: 708	
Maximum Diurnal Average: 2.9 ppm at hour 8																				Minimum Diurnal Average: 2.2 ppm at hour 15					Hours of Missing Data: 36	
Monthly Average: 2.50 ppm																				Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 3.0 P ₉₉ = 6.6					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-May	2.4	2.4	Z	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	3.6	4.9	3.9	2.9	2.4	2.5	4.9
2-May	2.2	2.2	2.3	Z	2.4	2.6	2.7	3.2	3.8	3.0	2.4	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.1	2.4	3.8	
3-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	C	C	C	C	2.2	2.1	2.0	2.0	2.0	2.1	2.2	2.5	2.6	2.6	2.8	3.1	2.3	3.1
4-May	2.8	2.6	3.3	2.3	2.2	Z	2.3	3.6	3.6	3.5	3.4	3.2	2.4	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.5	3.6	
5-May	Z	2.2	2.2	2.3	2.7	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	5.6	12.0	8.0	2.9	2.3	2.2	2.2	3.0	12.0
6-May	6.5	Z	2.4	2.3	2.2	2.1	2.9	9.0	4.7	4.0	2.6	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	4.6	6.4	6.9	3.4	9.0
7-May	6.3	6.7	7.1	6.8	6.7	6.6	6.0	5.6	4.9	5.1	4.9	Z	3.2	2.6	2.3	2.2	2.5	2.3	2.4	2.8	2.9	2.7	2.7	2.6	4.3	7.1
8-May	2.7	3.3	6.5	Z	5.2	3.1	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5	2.5	2.2	2.6	6.5
9-May	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.2	2.3
10-May	2.5	2.2	2.2	2.2	2.2	Z	2.6	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.3	2.6
11-May	Z	2.3	2.4	2.4	2.5	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.6
12-May	2.4	Z	2.4	2.5	2.4	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	M	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.5
13-May	2.2	2.2	Z	2.2	2.2	2.5	2.8	2.4	2.6	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.3	2.3	2.8	
14-May	2.3	2.3	2.3	Z	2.3	2.3	2.6	2.8	3.0	2.9	2.7	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	3.0
15-May	2.3	2.3	2.3	2.3	Z	3.1	4.9	5.4	5.4	5.3	3.7	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.7	2.9	2.9	3.0	5.4
16-May	2.9	3.0	3.2	3.1	3.1	Z	3.3	3.3	3.3	3.1	2.3	2.3	2.3	2.4	2.5	2.9	2.8	2.7	2.8	2.9	2.7	2.7	2.4	3.5	2.8	3.5
17-May	Z	3.7	3.8	3.9	3.3	3.6	3.1	2.8	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.9	3.8	3.3	3.3	2.8	3.9
18-May	3.1	Z	2.9	4.7	4.3	4.3	4.6	4.0	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.3	2.3	2.3	2.2	2.7	4.7
19-May	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	2.3	2.3	2.3	2.2	2.3
20-May	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.8	2.2	2.8
21-May	2.7	2.3	2.3	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.7
22-May	2.2	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3
23-May	Z	2.4	2.3	2.3	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.5
24-May	2.3	Z	2.4	2.3	2.2	2.2	2.3	2.4	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	3.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	3.2
25-May	2.3	2.5	Z	2.5	2.8	2.8	2.7	2.9	2.8	2.6	2.5	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.9
26-May	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.4
27-May	2.3	2.3	2.3	2.4	Z	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.4
28-May	2.2	2.2	2.2	2.2	2.2	Z	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
29-May	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.0	2.4	2.6	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.6
30-May	2.4	Z	3.1	3.3	2.9	4.2	2.6	2.6	2.6	2.4	2.2	2.1	2.1	2.2	2.5	2.4	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.5	4.2
31-May	2.3	2.4	Z	2.5	2.2	2.2	2.6	2.9	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.9
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	13	1.84	1.84
2.1 - 3.0	624	88.14	89.97
3.1 - 10.0	70	9.89	99.86
> 10.0	1	0.14	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	0	0	0	0	0	0	0	0	0	4	0	2	6	1	0	0	13
2.1 - 3.0	108	76	20	13	11	20	47	51	21	12	20	37	49	57	33	49	624	
3.1 - 10.0	0	1	0	1	2	6	21	12	2	2	3	3	3	6	3	5	70	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Totals	108	77	20	14	13	26	68	63	23	18	23	42	58	64	37	54	708	

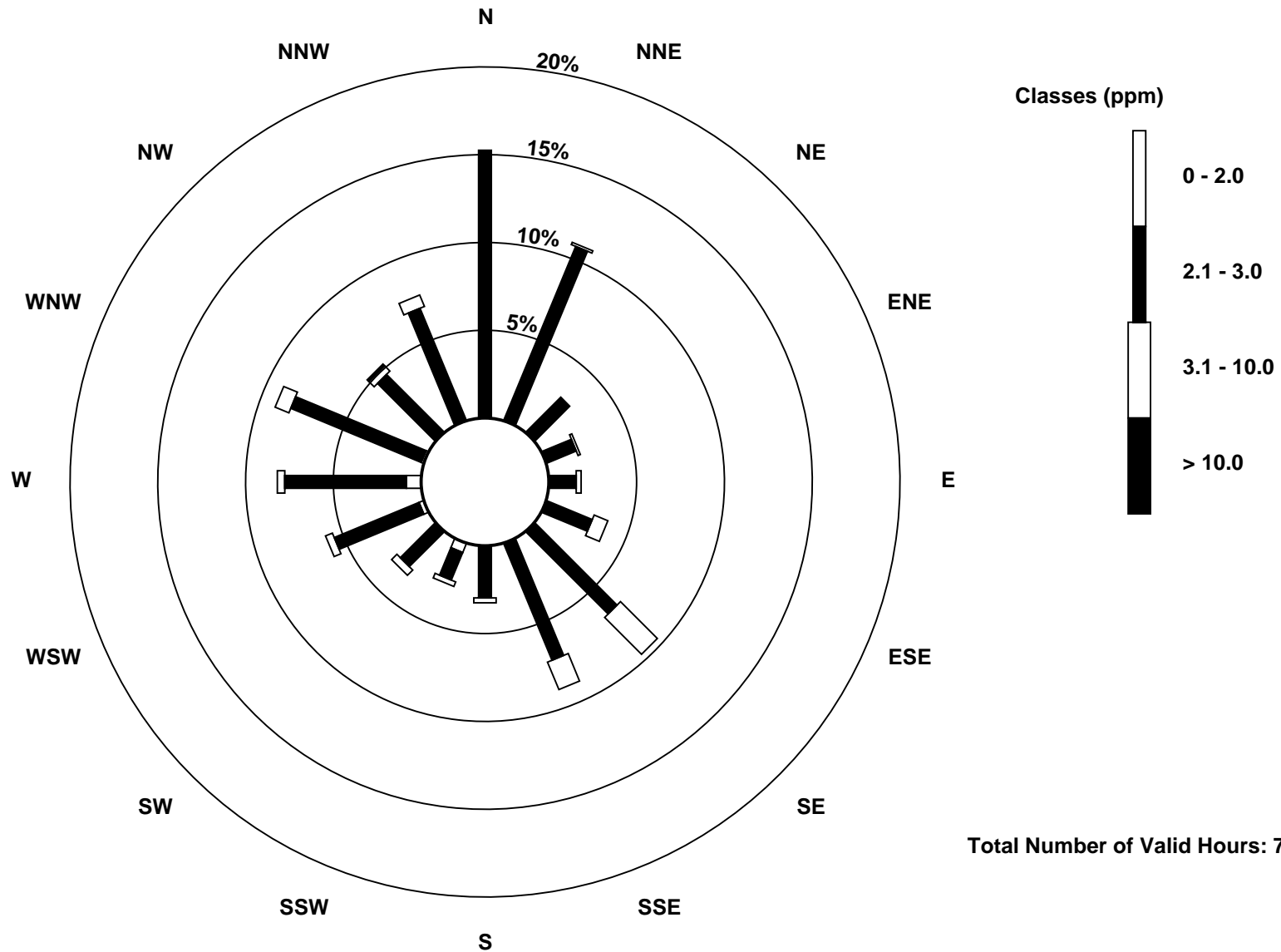
Total Number of Valid Hours: 708

Total Number of Hours: 744

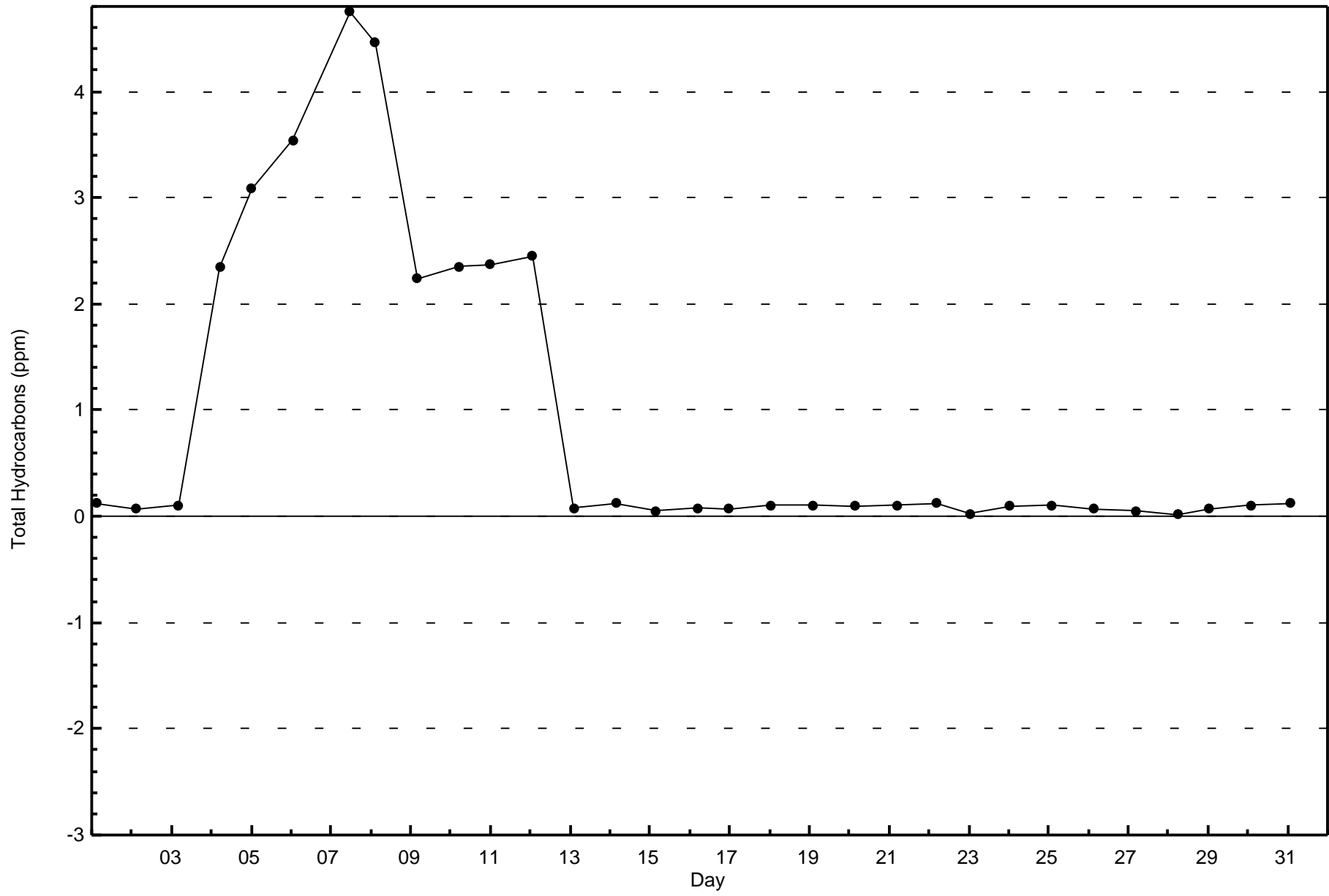


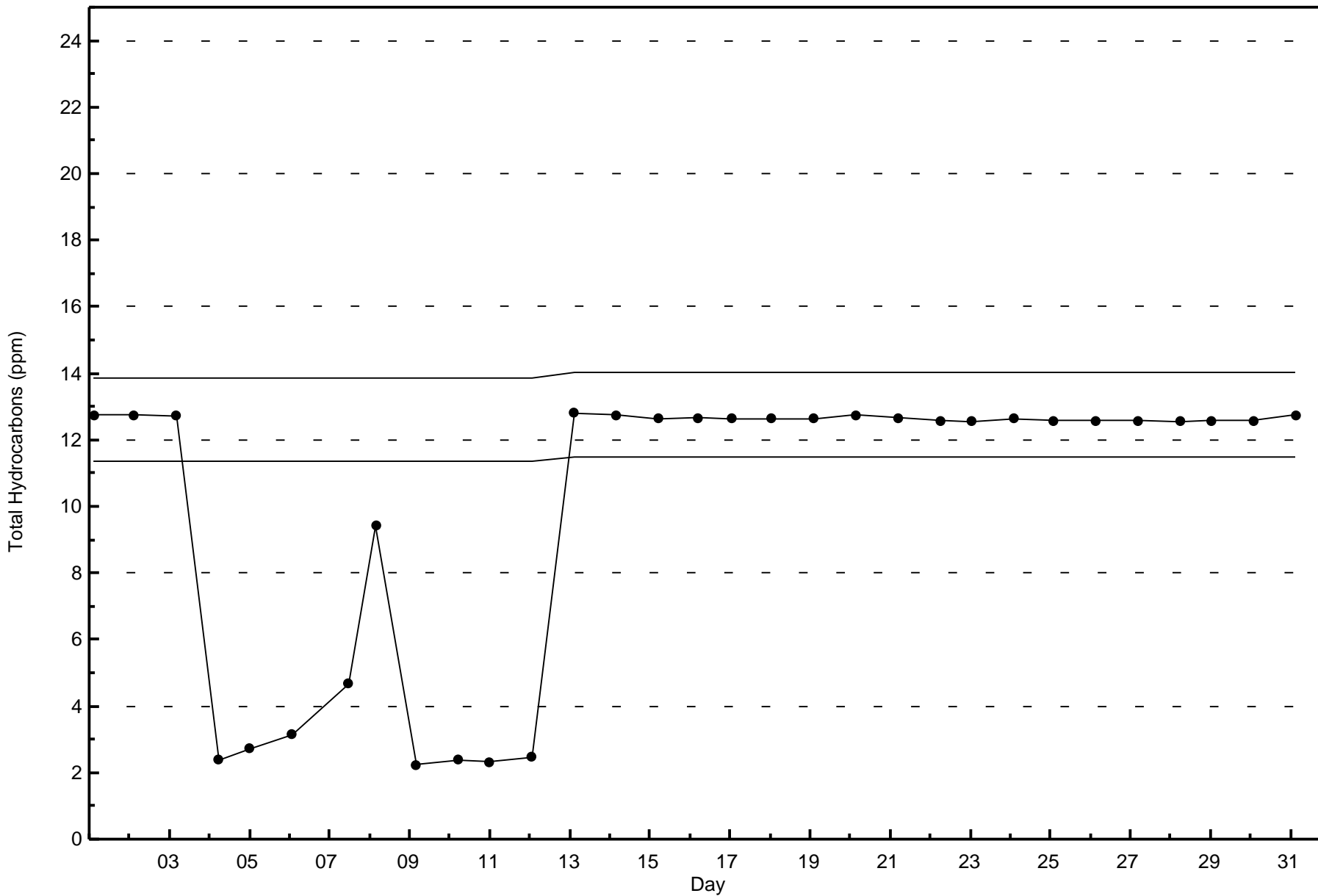
Wood Buffalo Environmental Association
Wind Rose May 2016

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



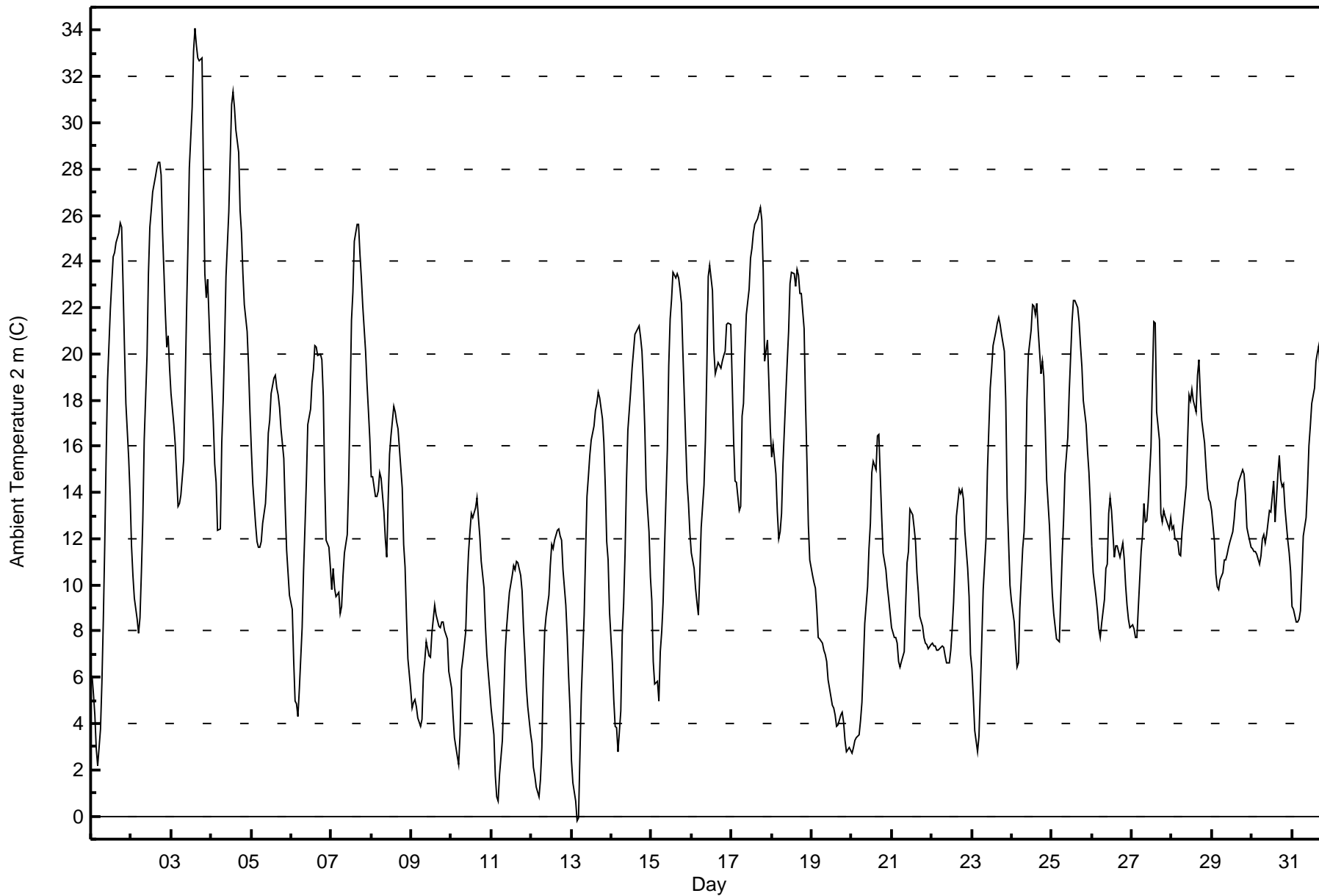
Total Number of Valid Hours: 708







Maximum Value: 34.1 C on May 3 15:00																				Maximum Daily Average: 23.4 C on May 3					Hours in Service: 744																								
Minimum Value: -0.2 C on May 13 04:00																				Minimum Daily Average: 5.9 C on May 19					Hours of Data: 744																								
Maximum Diurnal Average: 18.7 C at hour 16																				Minimum Diurnal Average: 7.3 C at hour 5					Hours of Missing Data: 0																								
Monthly Average: 13.51 C																				Percentiles: P ₁ = 1.4 P ₁₀ = 5.3 Q ₁ = 8.6 Median = 12.6 Q ₃ = 18.2 P ₉₀ = 22.3 P ₉₉ = 30.1					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-May	6.1	5.3	4.4	2.9	2.2	3.8	5.8	8.4	11.7	15.5	18.9	21.9	23.1	24.2	24.4	24.8	25.3	25.7	25.5	23.0	20.3	17.9	15.5	13.9	15.4	25.7																							
2-May	11.7	10.4	9.4	8.5	7.9	8.6	10.5	12.8	16.3	19.9	23.5	25.5	26.2	27.0	27.7	28.0	28.3	28.3	27.7	25.3	21.8	20.3	20.8	19.4	19.4	28.3																							
3-May	18.3	16.9	16.1	14.7	13.4	13.6	13.9	15.4	18.4	21.7	24.6	28.0	30.7	33.1	34.1	33.3	32.8	32.7	32.8	27.8	23.5	22.4	23.2	19.8	23.4	34.1																							
4-May	18.5	17.0	15.2	14.4	12.3	12.4	16.1	18.0	20.4	23.4	26.1	28.5	30.8	31.3	30.7	29.7	28.7	26.2	25.2	23.4	22.1	21.0	19.4	17.5	22.0	31.3																							
5-May	15.8	14.4	12.6	11.9	11.6	11.7	11.9	12.7	13.5	14.7	16.6	17.1	18.3	19.0	19.1	18.6	18.2	17.7	16.7	15.4	13.3	11.5	10.5	9.6	14.7	19.1																							
6-May	8.9	6.8	5.0	4.9	4.3	5.5	8.1	10.6	12.5	14.5	16.9	17.6	18.8	19.3	20.3	20.3	19.9	20.0	19.8	18.2	14.5	12.0	11.6	10.8	13.4	20.3																							
7-May	9.8	10.7	9.9	9.5	9.7	8.8	9.0	10.4	11.4	12.2	14.5	17.9	21.5	22.7	24.9	25.6	25.6	24.3	23.3	22.1	20.1	18.7	17.6	16.3	16.5	25.6																							
8-May	14.7	14.7	13.9	13.8	14.1	14.9	14.6	13.2	12.0	11.2	13.6	15.7	16.5	17.7	17.5	17.1	16.8	15.9	14.2	11.8	10.8	8.7	6.8	5.5	13.6	17.7																							
9-May	4.6	4.9	5.0	4.7	4.2	3.9	4.2	6.1	6.7	7.5	6.9	6.9	7.9	8.5	9.1	8.7	8.2	8.1	8.4	8.4	8.0	7.7	6.3	5.9	6.7	9.1																							
10-May	5.5	4.3	3.4	2.6	2.3	3.5	6.3	6.8	8.0	10.0	11.4	12.3	13.1	12.9	13.3	13.7	12.9	12.1	11.0	9.9	8.2	7.0	6.2	5.4	8.4	13.7																							
11-May	4.7	3.5	1.8	0.8	0.6	1.8	3.3	5.2	7.1	8.1	9.0	9.6	10.4	10.8	10.7	11.0	11.0	10.4	9.7	8.2	6.9	5.6	4.8	3.6	6.6	11.0																							
12-May	3.2	2.1	1.8	1.2	0.8	1.6	3.0	5.9	8.0	8.7	9.6	10.8	11.7	11.5	11.9	12.3	12.4	12.1	11.9	10.7	9.1	7.8	6.0	4.6	7.5	12.4																							
13-May	2.4	1.4	0.7	-0.2	-0.1	2.6	5.3	8.7	11.3	13.9	14.7	15.6	16.3	16.9	17.6	17.9	18.4	18.1	17.2	16.2	14.3	11.9	11.1	8.8	10.9	18.4																							
14-May	6.6	5.0	3.9	3.8	2.8	4.6	7.8	9.2	11.3	14.4	16.7	18.4	19.4	20.1	20.9	20.9	21.2	20.7	20.1	18.7	16.8	14.2	12.3	10.4	13.3	21.2																							
15-May	9.3	6.7	5.7	5.8	5.0	7.1	8.0	9.2	11.6	15.9	19.5	21.5	22.4	23.5	23.3	23.5	23.3	22.8	22.2	20.1	16.3	14.5	13.5	12.3	15.1	23.5																							
16-May	11.4	10.7	9.8	9.2	8.7	10.5	12.5	14.3	16.3	19.3	23.3	23.9	22.7	20.2	19.1	19.4	19.6	19.4	19.7	20.0	20.1	21.3	21.3	21.3	17.3	23.9																							
17-May	18.8	16.3	14.5	14.4	13.2	13.4	17.3	17.8	20.0	21.7	22.8	24.2	24.6	25.2	25.6	25.9	26.1	26.4	25.8	23.6	19.7	20.6	18.8	16.8	20.6	26.4																							
18-May	15.5	16.1	14.8	13.1	12.0	12.3	13.1	15.2	18.2	19.6	21.0	23.0	23.5	23.4	22.9	23.7	23.4	22.6	22.6	21.1	17.8	15.3	12.6	11.1	18.1	23.7																							
19-May	10.4	10.1	9.8	8.9	7.7	7.7	7.5	7.2	7.0	6.7	5.9	5.2	4.8	4.7	4.4	3.9	4.0	4.4	4.5	4.1	3.3	2.8	3.0	2.8	5.9	10.4																							
20-May	2.7	3.0	3.3	3.4	3.5	4.1	4.9	6.6	8.3	9.9	11.6	12.6	14.9	15.4	15.0	16.4	16.5	14.8	13.0	11.4	10.7	9.9	9.4	8.7	9.6	16.5																							
21-May	8.1	7.7	7.7	7.5	6.7	6.4	6.7	7.1	9.1	10.9	11.4	13.3	13.0	12.5	11.8	10.5	9.7	8.7	8.2	7.7	7.5	7.4	7.3	7.4	8.9	13.3																							
22-May	7.5	7.4	7.4	7.2	7.2	7.3	7.4	7.3	6.9	6.6	6.6	7.2	8.1	9.3	10.9	13.0	14.1	14.0	14.1	13.7	12.3	10.7	9.5	7.0	9.3	14.1																							
23-May	6.4	5.1	3.7	2.8	3.5	5.5	7.6	9.8	12.0	14.9	16.7	18.5	19.4	20.4	20.9	21.3	21.6	21.3	20.8	20.1	17.9	13.8	11.9	10.0	13.6	21.6																							
24-May	9.3	8.4	7.3	6.4	6.6	9.0	11.5	12.3	14.1	18.0	20.0	21.0	22.1	22.1	21.7	22.2	21.0	19.1	19.7	19.0	16.8	14.5	12.6	11.0	15.2	22.2																							
25-May	9.6	8.8	8.2	7.7	7.5	9.4	11.3	12.8	14.8	16.4	18.4	19.9	21.4	22.3	22.3	22.0	21.4	20.3	19.4	18.0	16.9	15.8	14.9	13.4	15.5	22.3																							
26-May	11.7	10.6	9.5	8.9	8.1	7.7	8.3	9.4	10.7	10.9	13.1	13.8	13.2	11.2	11.7	11.5	11.2	11.8	11.2	11.2	10.0	9.1	8.5	8.2	10.5	13.8																							
27-May	8.3	8.1	7.7	7.7	9.0	11.5	12.2	13.5	12.7	12.8	13.6	16.0	18.8	21.4	21.3	17.5	16.3	13.1	12.7	13.2	13.0	12.8	12.4	12.9	13.3	21.4																							
28-May	12.4	12.6	12.0	11.8	11.4	11.3	12.3	13.0	14.3	16.3	18.2	18.0	18.5	18.0	17.5	19.0	19.7	18.2	17.1	16.2	15.1	14.2	13.7	13.6	15.2	19.7																							
29-May	13.2	11.9	10.5	9.9	9.8	10.2	10.5	11.1	11.1	11.3	11.6	11.8	12.3	12.8	13.7	14.0	14.4	14.8	15.0	14.8	13.9	12.5	12.2	11.6	12.3	15.0																							
30-May	11.6	11.5	11.4	11.3	10.9	11.2	12.0	12.2	11.8	12.2	13.2	13.2	13.8	14.5	12.7	14.8	15.6	14.6	14.3	14.4	13.4	12.0	11.4	10.6	12.7	15.6																							
31-May	9.1	9.0	8.4	8.4	8.5	8.9	10.4	12.1	12.9	14.2	16.1	16.9	17.9	18.5	19.7	20.1	20.3	19.1	18.3	18.0	14.7	12.8	11.4	9.9	14.0	20.3																							
																								9.9	9.1	8.2	7.7	7.3	8.1	9.5	10.8	12.3	14.0	15.7	17.0	17.9	18.4	18.6	18.7	18.0	17.5	16.3	14.5	13.1	12.1	11.0	Diurnal Average		
																								18.8	17.0	16.1	14.7	14.1	14.9	17.3	18.0	20.4	23.4	26.1	28.5	30.8	33.1	34.1	33.3	32.8	32.7	32.8	27.8	23.5	22.4	23.2	21.3	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	2	0.27	0.27
0 - 10	240	32.26	32.53
10 - 20	370	49.73	82.26
> 20	132	17.74	100.00

Total Number of Valid Hours: 744

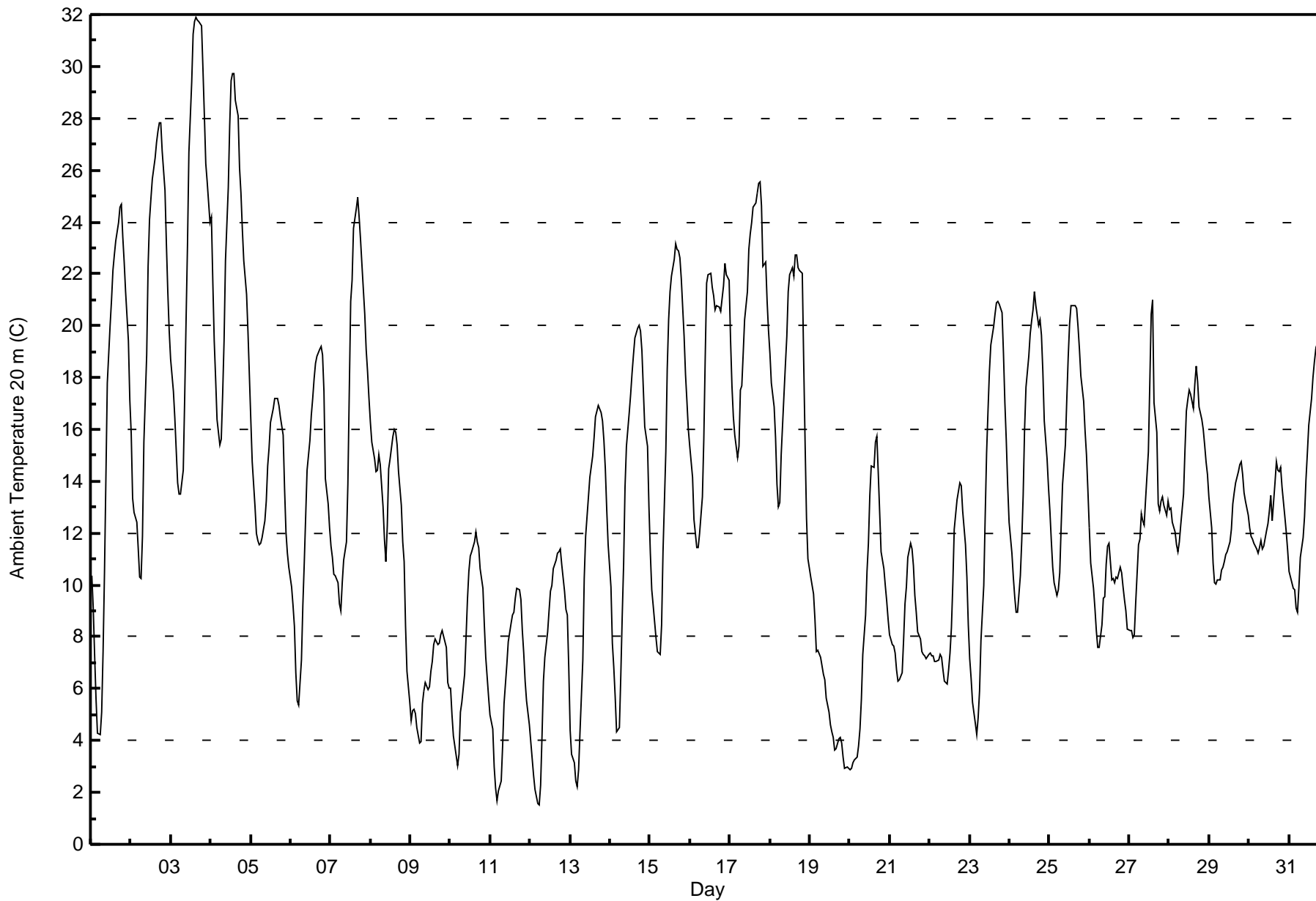
Total Number of Hours: 744



Summary of Hour Averages

Mannix - May 2016

Maximum Value: 31.9 C on May 3 16:00 Maximum Daily Average: 23.5 C on May 3																				Hours in Service: 744 Hours of Data: 744						
Minimum Value: 1.5 C on May 12 06:00 Minimum Daily Average: 5.7 C on May 19 Maximum Diurnal Average: 17.8 C at hour 17 Minimum Diurnal Average: 8.4 C at hour 6 Monthly Average: 13.50 C Percentiles: P ₁ = 2.3 P ₁₀ = 5.6 Q ₁ = 8.9 Median = 12.7 Q ₃ = 17.7 P ₉₀ = 22.0 P ₉₉ = 28.6																				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-May	10.4	9.1	7.3	5.6	4.3	4.2	5.1	7.4	10.4	14.1	17.8	20.0	21.0	22.1	22.7	23.3	24.0	24.6	24.7	23.4	22.5	21.3	19.4	17.1	15.9	24.7
2-May	15.9	13.4	12.8	12.4	11.4	10.3	10.2	11.9	15.5	18.9	22.3	24.1	24.9	25.7	26.4	27.1	27.5	27.8	27.8	26.7	25.2	23.2	21.3	19.8	20.1	27.8
3-May	18.7	17.5	16.5	15.2	13.9	13.5	13.5	14.4	17.2	20.2	23.1	26.7	29.4	31.2	31.7	31.9	31.8	31.7	31.6	29.9	28.1	26.2	25.6	24.0	23.5	31.9
4-May	24.2	21.7	19.4	18.0	16.4	15.4	15.6	17.3	19.4	22.5	25.3	27.7	29.5	29.7	29.7	28.7	28.1	26.1	25.1	23.7	22.5	21.2	19.7	18.1	22.7	29.7
5-May	16.4	14.7	13.0	12.0	11.7	11.6	11.6	11.8	12.5	13.2	14.6	15.3	16.3	16.8	17.2	17.2	17.2	16.9	16.5	15.8	13.7	12.0	11.2	10.7	14.2	17.2
6-May	9.9	9.2	8.4	6.6	5.5	5.4	7.1	9.2	10.8	12.6	14.4	15.6	16.5	17.2	18.0	18.5	18.8	19.1	19.2	18.9	17.5	14.1	13.1	12.2	13.3	19.2
7-May	11.5	11.1	10.4	10.4	10.1	9.3	9.0	10.1	11.0	11.7	13.9	17.4	20.9	21.8	23.7	24.5	24.9	24.2	23.3	22.3	20.5	19.1	18.2	17.2	16.5	24.9
8-May	16.3	15.5	14.9	14.4	14.5	15.0	14.6	13.0	11.7	10.9	12.2	14.5	14.8	15.7	16.0	15.9	15.4	14.4	13.1	11.7	10.9	8.4	6.7	5.5	13.2	16.3
9-May	4.8	5.1	5.2	5.0	4.5	3.9	3.9	5.4	5.9	6.2	6.0	6.1	6.7	7.1	7.7	7.9	7.7	7.8	8.1	8.3	8.0	7.6	6.2	6.0	6.3	8.3
10-May	6.0	5.0	4.2	3.4	3.0	3.5	5.1	5.5	6.6	8.0	9.4	10.5	11.1	11.3	11.7	12.0	11.7	11.4	10.7	9.9	8.5	7.2	6.5	5.7	7.8	12.0
11-May	5.0	4.4	3.0	2.2	1.7	2.1	2.4	3.8	5.4	6.2	7.0	7.8	8.5	8.9	8.9	9.5	9.9	9.8	9.4	8.3	7.4	6.3	5.5	4.6	6.2	9.9
12-May	4.0	3.3	2.6	2.1	1.6	1.5	2.3	4.2	6.3	7.2	8.2	9.0	9.8	10.0	10.6	10.9	11.2	11.3	11.4	10.8	9.8	9.1	8.8	6.8	7.2	11.4
13-May	4.4	3.5	3.2	2.4	2.2	2.9	4.4	7.1	10.2	11.9	12.6	13.4	14.1	15.0	15.7	16.5	16.7	16.9	16.7	16.3	15.6	14.5	12.9	11.5	10.9	16.9
14-May	9.9	7.8	6.8	5.7	4.4	4.5	6.5	8.8	10.8	13.8	15.4	16.7	17.4	18.2	18.9	19.5	19.9	20.0	19.8	19.0	17.6	16.1	15.3	13.0	13.6	20.0
15-May	11.2	9.8	9.2	8.0	7.4	7.4	7.3	8.4	11.3	15.1	18.3	20.2	21.3	21.9	22.6	23.1	23.0	22.9	22.6	21.8	19.6	18.1	17.1	16.0	16.0	23.1
16-May	15.3	14.1	12.5	12.0	11.5	11.4	12.0	13.4	15.6	18.7	21.6	22.0	22.0	21.5	21.1	20.6	20.8	20.7	20.5	21.0	21.5	22.4	22.0	21.8	18.2	22.4
17-May	19.5	17.7	16.5	15.8	14.9	15.4	17.5	17.7	18.9	20.2	21.3	22.9	23.5	24.0	24.6	24.7	25.1	25.5	25.5	24.6	22.3	22.5	20.9	19.8	20.9	25.5
18-May	18.9	17.8	16.9	15.7	13.9	13.0	13.2	15.0	17.4	18.5	19.6	21.3	22.0	22.2	21.9	22.7	22.7	22.3	22.1	22.0	18.6	15.5	12.6	11.0	18.2	22.7
19-May	10.3	10.0	9.7	8.7	7.4	7.5	7.2	6.9	6.6	6.3	5.7	5.1	4.6	4.4	4.1	3.6	3.7	4.1	4.1	3.9	3.4	2.9	3.0	2.9	5.7	10.3
20-May	2.9	3.0	3.2	3.2	3.4	3.8	4.5	5.6	7.3	8.8	10.5	11.6	13.5	14.6	14.5	15.5	15.7	14.3	12.8	11.3	10.6	10.0	9.4	8.7	9.1	15.7
21-May	8.1	7.7	7.7	7.4	6.7	6.3	6.4	6.6	7.9	9.3	9.9	11.1	11.6	11.4	10.8	9.6	8.9	8.2	7.9	7.4	7.3	7.3	7.1	7.3	8.3	11.6
22-May	7.4	7.3	7.3	7.0	7.1	7.1	7.3	7.2	6.7	6.3	6.2	6.7	7.4	8.3	10.0	12.1	13.3	13.6	13.9	13.8	12.8	11.6	10.3	8.4	9.1	13.9
23-May	7.2	6.4	5.5	4.7	4.2	4.9	5.9	7.8	10.0	12.6	15.1	16.7	18.2	19.2	20.0	20.5	20.9	21.0	20.8	20.5	18.9	17.0	15.6	13.8	13.6	21.0
24-May	12.4	11.2	10.3	9.6	9.0	8.9	10.3	11.7	13.4	16.0	17.6	18.8	19.7	20.2	20.6	21.3	20.7	20.0	20.2	19.6	18.2	16.3	14.9	13.8	15.6	21.3
25-May	12.9	11.7	10.7	10.1	9.6	9.8	10.5	12.3	13.9	15.4	17.2	18.8	20.1	20.8	20.8	20.8	20.7	20.0	19.1	18.1	17.1	15.9	15.0	13.7	15.6	20.8
26-May	12.2	10.8	9.8	9.1	8.2	7.6	7.6	8.4	9.5	9.5	10.8	11.5	11.6	10.2	10.2	10.1	10.3	10.3	10.7	10.5	9.9	9.5	9.0	8.3	9.8	12.2
27-May	8.2	8.3	8.0	8.1	9.3	11.5	11.8	12.8	12.5	12.3	13.3	15.2	17.8	20.5	21.0	17.0	15.9	13.1	12.9	13.2	13.4	13.1	12.7	13.2	13.1	21.0
28-May	12.9	13.0	12.4	12.1	11.5	11.3	11.7	12.3	13.5	15.2	16.7	17.1	17.5	17.4	16.8	17.8	18.5	17.8	16.9	16.4	16.0	15.4	14.8	14.3	15.0	18.5
29-May	13.4	12.2	10.9	10.1	10.0	10.2	10.2	10.6	10.7	10.9	11.1	11.3	11.7	12.2	13.1	13.6	13.9	14.4	14.6	14.8	14.2	13.6	13.2	12.7	12.2	14.8
30-May	12.2	11.9	11.8	11.6	11.4	11.2	11.4	11.7	11.4	11.5	12.1	12.4	12.9	13.5	12.5	13.9	14.8	14.4	14.4	14.5	13.8	12.6	12.0	11.3	12.5	14.8
31-May	10.5	10.3	9.9	9.8	9.1	8.9	9.9	11.1	11.8	12.7	14.0	15.1	16.2	17.2	18.0	18.6	19.1	18.9	18.6	18.9	18.1	17.3	15.7	14.1	14.3	19.1
11.4 10.5 9.7 9.0 8.4 8.4 8.9 10.0 11.4 12.8 14.3 15.6 16.5 17.1 17.5 17.7 17.8 17.5 17.3 16.7 15.6 14.4 13.4 12.4																								Diurnal Average		
24.2 21.7 19.4 18.0 16.4 15.4 17.5 17.7 19.4 22.5 25.3 27.7 29.5 31.2 31.7 31.9 31.8 31.7 31.6 29.9 28.1 26.2 25.6 24.0																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	232	31.18	31.18
10 - 20	385	51.75	82.93
> 20	127	17.07	100.00

Total Number of Valid Hours: 744

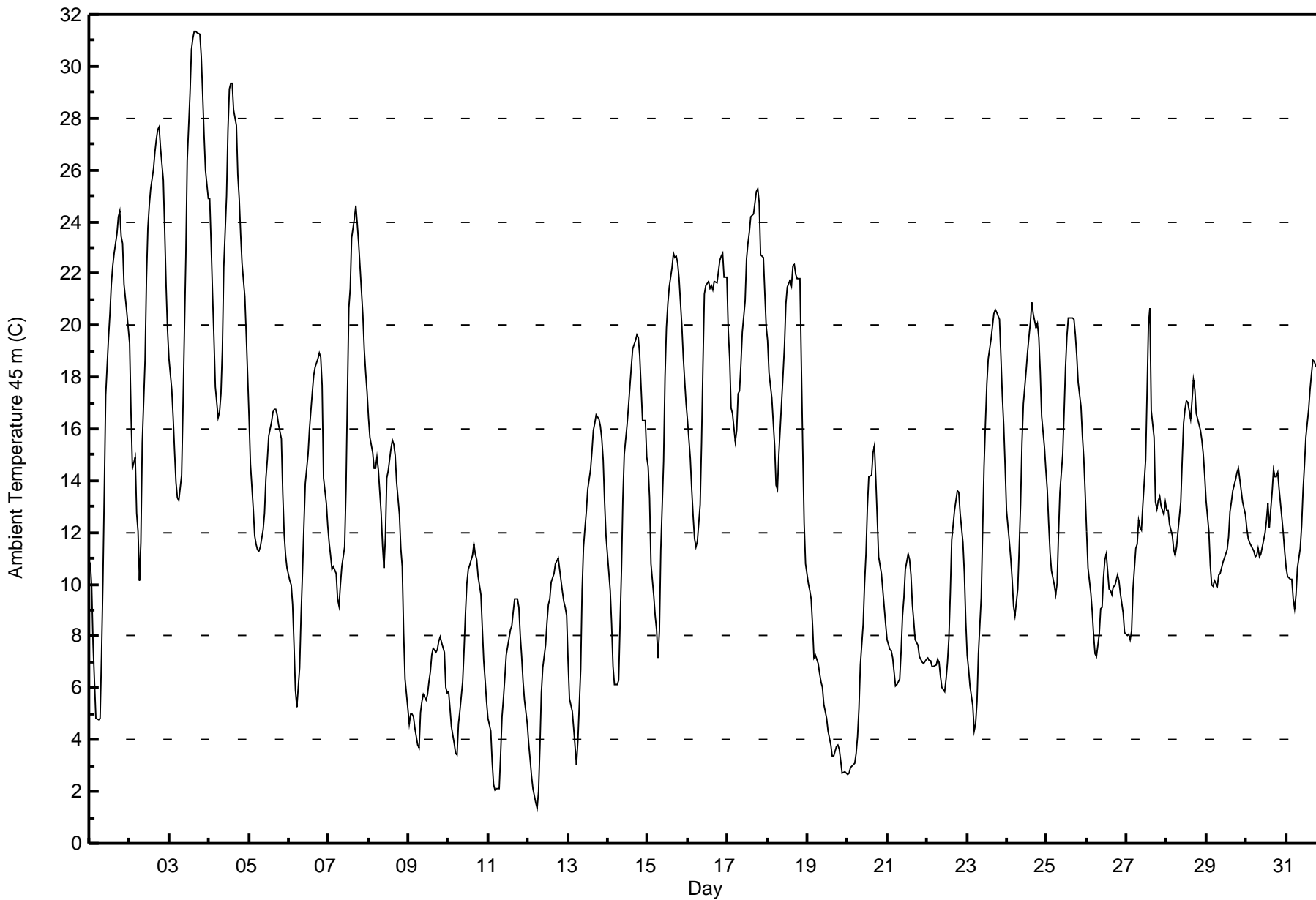
Total Number of Hours: 744



Summary of Hour Averages

Mannix - May 2016

Maximum Value: 31.4 C on May 3 17:00																				Maximum Daily Average: 23.4 C on May 3					Hours in Service: 744																							
Minimum Value: 1.3 C on May 12 06:00																				Minimum Daily Average: 5.4 C on May 19					Hours of Data: 744																							
Maximum Diurnal Average: 17.5 C at hour 17																				Minimum Diurnal Average: 8.5 C at hour 6					Hours of Missing Data: 0																							
Monthly Average: 13.42 C																				Percentiles: P ₁ = 2.3 P ₁₀ = 5.6 Q ₁ = 8.9 Median = 12.7 Q ₃ = 17.7 P ₉₀ = 22.0 P ₉₉ = 30.1					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-May	10.9	9.9	7.7	6.2	4.8	4.8	4.9	7.2	10.1	13.6	17.3	19.5	20.5	21.6	22.3	22.8	23.5	24.2	24.4	23.4	23.1	21.6	20.5	19.9	16.0	24.4																						
2-May	19.3	16.6	14.5	14.9	12.8	12.0	10.1	11.6	15.5	18.7	21.8	23.8	24.6	25.3	26.0	26.7	27.2	27.5	27.7	26.8	25.6	23.6	21.5	19.8	20.6	27.7																						
3-May	18.7	17.5	16.4	15.1	13.9	13.4	13.2	14.2	16.9	19.8	22.6	26.3	29.0	30.6	31.1	31.3	31.4	31.3	31.2	30.4	28.9	27.3	26.0	24.9	23.4	31.4																						
4-May	24.9	23.2	21.2	19.5	17.6	16.4	16.7	17.3	19.0	22.2	25.0	27.5	29.1	29.3	29.3	28.3	27.7	25.8	24.9	23.5	22.4	21.1	19.6	18.1	22.9	29.3																						
5-May	16.4	14.6	12.9	11.9	11.6	11.3	11.3	11.5	12.1	12.7	14.1	14.8	15.7	16.3	16.6	16.7	16.8	16.6	16.2	15.6	13.5	11.9	11.1	10.6	13.9	16.8																						
6-May	10.2	10.0	9.2	7.7	5.9	5.3	6.8	8.8	10.4	12.2	13.9	15.0	16.0	16.7	17.4	18.1	18.4	18.7	18.9	18.8	17.7	14.1	13.1	12.2	13.1	18.9																						
7-May	11.6	11.1	10.5	10.7	10.4	9.4	9.2	10.0	10.7	11.5	13.7	17.3	20.7	21.4	23.4	24.1	24.6	23.9	23.1	22.3	20.4	19.1	18.2	17.4	16.4	24.6																						
8-May	16.4	15.7	15.1	14.5	14.5	14.9	14.4	12.7	11.5	10.6	11.8	14.1	14.4	15.2	15.6	15.4	15.0	13.9	12.7	11.4	10.7	8.1	6.4	5.2	12.9	16.4																						
9-May	4.6	5.0	5.0	4.9	4.5	3.8	3.7	5.1	5.5	5.7	5.6	5.7	6.2	6.6	7.3	7.5	7.4	7.5	7.8	8.0	7.8	7.4	6.0	5.8	6.0	8.0																						
10-May	5.9	5.2	4.5	3.8	3.5	3.4	4.6	5.1	6.2	7.5	8.9	10.0	10.6	10.7	11.1	11.5	11.2	11.0	10.3	9.6	8.3	7.0	6.3	5.5	7.6	11.5																						
11-May	4.8	4.4	3.2	2.3	2.1	2.1	2.1	3.4	4.9	5.6	6.4	7.3	7.9	8.3	8.4	9.0	9.4	9.4	9.1	8.0	7.2	6.2	5.6	4.6	5.9	9.4																						
12-May	3.9	3.2	2.6	2.1	1.6	1.3	2.0	3.7	5.8	6.8	7.7	8.5	9.2	9.4	10.1	10.4	10.8	10.9	11.0	10.6	9.7	9.3	9.1	8.8	7.0	11.0																						
13-May	7.1	5.6	5.1	4.4	3.8	3.0	4.0	6.7	9.8	11.4	12.1	12.8	13.7	14.4	15.1	16.0	16.2	16.5	16.4	16.1	15.6	14.8	13.2	11.9	11.1	16.5																						
14-May	10.5	9.8	8.5	6.8	6.1	6.1	6.3	8.4	10.5	13.3	15.0	16.2	16.9	17.6	18.4	19.1	19.4	19.6	19.5	18.8	17.6	16.3	16.3	14.9	13.8	19.6																						
15-May	14.5	13.4	10.8	9.6	8.8	8.3	7.1	8.2	11.3	14.8	18.0	19.9	20.8	21.5	22.2	22.8	22.6	22.6	22.4	21.8	20.0	18.8	17.9	17.0	16.5	22.8																						
16-May	16.3	14.9	13.7	12.6	11.8	11.5	11.7	13.0	15.5	18.5	21.2	21.5	21.7	21.4	21.5	21.3	21.7	21.6	22.1	22.5	22.6	22.8	21.9	21.9	18.6	22.8																						
17-May	19.8	18.7	16.8	16.6	15.5	15.9	17.4	17.5	18.5	19.8	20.9	22.5	23.2	23.6	24.2	24.3	24.7	25.2	25.3	24.7	22.7	22.6	21.2	20.0	20.9	25.3																						
18-May	19.4	18.2	17.2	16.3	15.4	13.9	13.7	15.0	17.1	18.1	19.2	20.8	21.5	21.8	21.6	22.3	22.4	22.0	21.8	21.8	18.5	15.3	12.4	10.8	18.2	22.4																						
19-May	10.0	9.7	9.4	8.4	7.2	7.3	6.9	6.6	6.2	6.0	5.4	4.8	4.3	4.1	3.8	3.4	3.4	3.7	3.8	3.6	3.2	2.7	2.8	2.7	5.4	10.0																						
20-May	2.7	2.7	2.9	3.0	3.1	3.5	4.1	5.2	6.9	8.4	10.0	11.2	13.0	14.2	14.2	15.1	15.4	14.0	12.6	11.1	10.4	9.7	9.1	8.4	8.8	15.4																						
21-May	7.8	7.5	7.4	7.1	6.6	6.1	6.1	6.3	7.4	8.8	9.5	10.6	11.2	11.0	10.4	9.2	8.6	7.9	7.6	7.2	7.1	7.0	6.9	7.1	8.0	11.2																						
22-May	7.2	7.0	7.0	6.8	6.8	6.9	7.1	7.0	6.4	6.0	5.9	6.4	7.0	7.9	9.7	11.7	12.8	13.2	13.6	13.6	12.8	11.6	10.4	8.5	8.9	13.6																						
23-May	7.3	6.7	6.1	5.3	4.3	4.6	5.5	7.3	9.5	12.0	14.5	16.2	17.7	18.7	19.5	20.0	20.5	20.6	20.5	20.2	18.8	17.3	16.2	14.6	13.5	20.6																						
24-May	12.9	11.7	11.0	10.2	9.2	8.8	9.8	11.4	13.1	15.4	17.0	18.3	19.0	19.6	20.1	20.9	20.5	19.9	20.0	19.5	18.2	16.5	15.3	14.4	15.5	20.9																						
25-May	13.7	12.3	11.2	10.5	10.0	9.6	10.0	12.0	13.6	15.0	16.6	18.4	19.6	20.3	20.3	20.3	20.2	19.6	18.8	17.8	16.9	15.7	14.8	13.5	15.4	20.3																						
26-May	12.1	10.6	9.7	8.9	8.0	7.3	7.2	8.1	9.1	9.1	10.3	11.0	11.2	9.8	9.7	9.6	9.9	9.9	10.3	10.2	9.7	9.3	8.9	8.1	9.5	12.1																						
27-May	8.0	8.1	7.9	8.2	9.8	11.4	11.5	12.4	12.2	12.1	13.1	14.8	17.4	20.0	20.7	16.7	15.7	13.2	12.9	13.2	13.4	13.0	12.7	13.2	13.0	20.7																						
28-May	12.9	12.9	12.3	11.9	11.4	11.1	11.4	12.0	13.2	14.8	16.2	16.8	17.1	17.0	16.4	17.1	17.9	17.5	16.6	16.2	16.0	15.6	15.0	14.2	14.7	17.9																						
29-May	13.2	12.0	10.7	10.0	9.9	10.1	9.9	10.3	10.4	10.6	10.9	11.0	11.3	11.8	12.8	13.2	13.6	14.0	14.3	14.5	14.1	13.6	13.2	12.7	12.0	14.5																						
30-May	12.2	11.8	11.6	11.5	11.3	11.1	11.1	11.4	11.0	11.2	11.7	12.0	12.5	13.1	12.2	13.6	14.4	14.2	14.2	14.3	13.7	12.5	11.9	11.3	12.3	14.4																						
31-May	10.6	10.3	10.2	10.2	9.4	9.0	9.6	10.6	11.4	12.3	13.6	14.6	15.7	16.8	17.5	18.1	18.6	18.6	18.4	18.7	18.5	18.4	16.5	14.9	14.3	18.7																						
																								11.8	11.0	10.1	9.4	8.8	8.5	8.7	9.7	11.0	12.4	13.9	15.1	16.1	16.6	17.1	17.3	17.5	17.2	17.0	16.6	15.6	14.5	13.5	12.7	Diurnal Average
																								24.9	23.2	21.2	19.5	17.6	16.4	17.4	17.5	19.0	22.2	25.0	27.5	29.1	30.6	31.1	31.3	31.4	31.3	31.2	30.4	28.9	27.3	26.0	24.9	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	237	31.85	31.85
10 - 20	386	51.88	83.74
> 20	121	16.26	100.00

Total Number of Valid Hours: 744

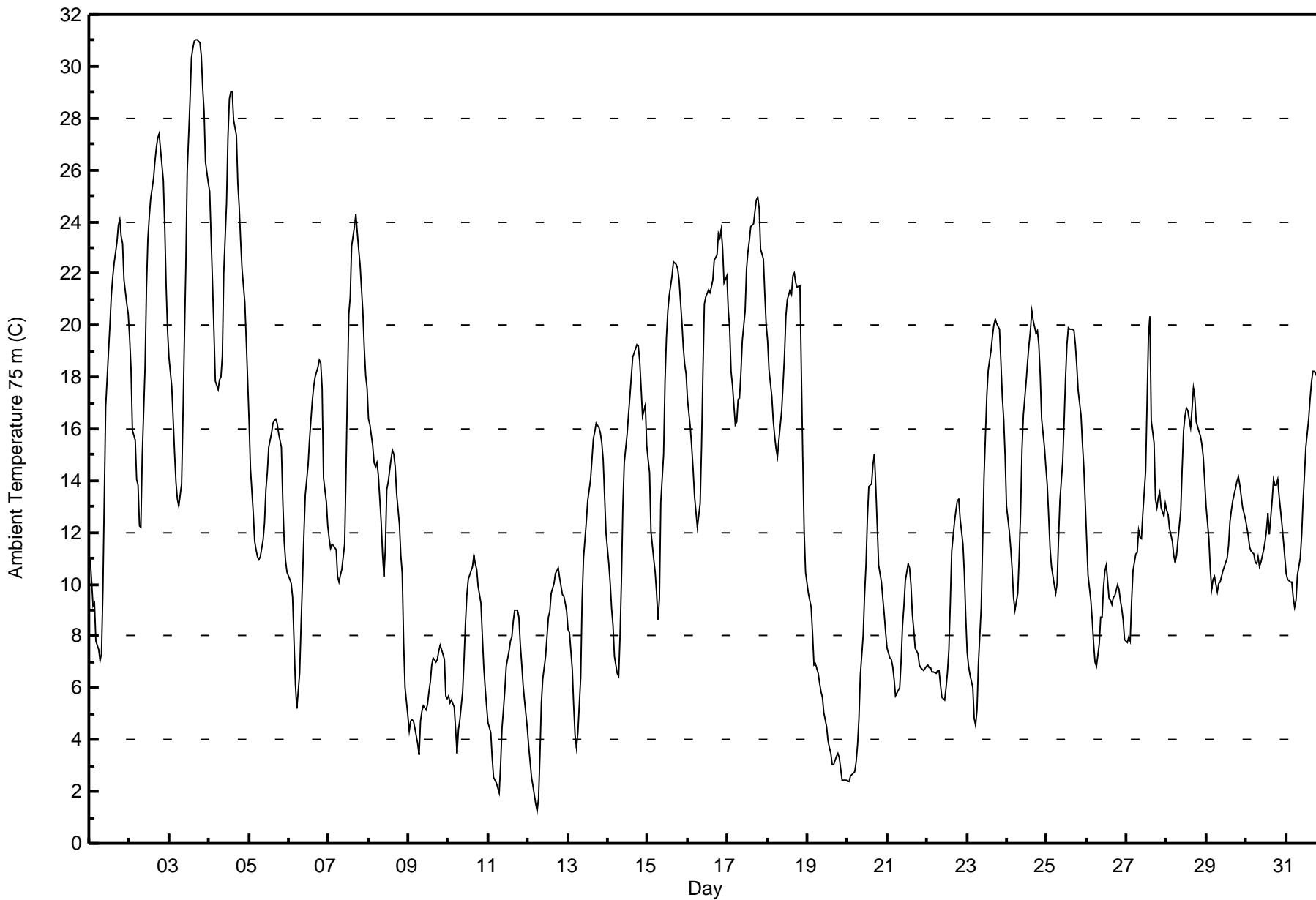
Total Number of Hours: 744



Summary of Hour Averages

Mannix - May 2016

Maximum Value: 31.0 C on May 3 17:00 Maximum Daily Average: 23.3 C on May 3																				Hours in Service: 744 Hours of Data: 744						
Minimum Value: 1.3 C on May 12 06:00 Minimum Daily Average: 5.1 C on May 19 Maximum Diurnal Average: 17.2 C at hour 17 Minimum Diurnal Average: 8.8 C at hour 6 Monthly Average: 13.34 C Percentiles: P ₁ = 2.4 P ₁₀ = 5.7 Q ₁ = 8.8 Median = 12.6 Q ₃ = 17.7 P ₉₀ = 21.8 P ₉₉ = 30.3																				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-May	11.0	10.1	9.2	9.2	7.8	7.5	7.0	7.3	9.8	13.3	16.9	19.0	20.0	21.2	21.9	22.4	23.2	23.8	24.1	23.4	23.2	21.7	20.9	20.5	16.4	24.1
2-May	19.5	18.3	15.9	15.5	14.1	13.9	12.2	12.2	15.0	18.4	21.4	23.3	24.2	24.9	25.7	26.3	26.8	27.2	27.4	26.8	25.6	23.8	21.6	19.8	20.8	27.4
3-May	18.8	17.7	16.4	15.1	14.0	13.3	13.0	13.9	16.5	19.5	22.3	25.9	28.7	30.3	30.7	31.0	31.0	31.0	30.9	30.4	29.2	28.3	26.3	25.5	23.3	31.0
4-May	25.2	23.4	21.6	19.8	17.9	17.5	17.9	18.0	18.8	22.0	24.7	27.3	28.7	29.0	29.0	27.9	27.4	25.5	24.6	23.3	22.2	20.9	19.4	17.9	22.9	29.0
5-May	16.3	14.5	12.7	11.7	11.4	11.1	10.9	11.1	11.7	12.4	13.7	14.3	15.3	15.9	16.2	16.3	16.4	16.2	15.9	15.3	13.2	11.7	10.9	10.5	13.6	16.4
6-May	10.2	10.0	9.5	7.8	6.1	5.2	6.6	8.4	10.1	11.9	13.5	14.6	15.6	16.3	17.1	17.7	18.0	18.4	18.6	18.5	17.6	14.1	13.2	12.3	13.0	18.6
7-May	11.7	11.4	11.6	11.5	11.3	10.3	10.1	10.3	10.6	11.6	14.3	17.6	20.4	21.1	23.1	23.8	24.3	23.6	22.9	22.3	20.5	19.1	18.0	17.6	16.6	24.3
8-May	16.4	16.2	15.4	14.7	14.5	14.7	14.2	12.4	11.1	10.3	11.4	13.7	13.9	14.8	15.2	15.0	14.5	13.5	12.3	11.1	10.4	7.8	6.0	4.9	12.7	16.4
9-May	4.3	4.7	4.8	4.7	4.5	3.8	3.4	4.7	5.1	5.3	5.2	5.4	5.8	6.3	6.9	7.1	7.0	7.1	7.5	7.7	7.5	7.1	5.7	5.6	5.7	7.7
10-May	5.7	5.4	5.5	5.3	4.4	3.4	4.4	4.8	5.9	7.1	8.5	9.6	10.2	10.3	10.7	11.1	10.8	10.6	9.9	9.3	8.0	6.8	6.0	5.3	7.5	11.1
11-May	4.7	4.3	3.3	2.5	2.4	2.3	1.9	3.0	4.4	5.2	5.9	6.9	7.4	7.8	8.0	8.5	9.0	9.0	8.7	7.7	6.9	6.1	5.5	4.5	5.7	9.0
12-May	3.7	3.1	2.6	2.2	1.5	1.3	1.8	3.4	5.4	6.3	7.2	8.0	8.7	9.0	9.7	10.0	10.4	10.5	10.6	10.2	9.6	9.6	9.3	9.0	6.8	10.6
13-May	8.2	8.1	6.7	5.3	4.2	3.7	4.3	6.4	9.4	11.0	11.7	12.4	13.2	14.0	14.8	15.6	15.9	16.2	16.1	15.8	15.5	14.8	13.4	12.0	11.2	16.2
14-May	10.8	10.0	9.1	8.4	7.2	6.6	6.4	8.0	10.2	13.0	14.7	15.8	16.5	17.2	18.0	18.8	19.1	19.3	19.2	18.6	17.6	16.5	16.9	15.3	13.9	19.3
15-May	14.8	14.3	12.0	11.0	10.5	9.6	8.6	9.4	13.2	15.0	17.8	19.5	20.5	21.2	21.9	22.4	22.4	22.4	22.2	21.7	20.1	19.1	18.5	18.1	16.9	22.4
16-May	17.1	16.1	15.3	14.4	13.4	12.8	12.2	13.1	15.3	18.3	20.8	21.1	21.4	21.2	21.5	21.7	22.5	22.7	23.6	23.4	23.7	22.9	21.6	21.9	19.1	23.7
17-May	20.6	19.9	18.2	17.7	16.2	16.3	17.2	17.2	18.2	19.4	20.6	22.2	22.8	23.3	23.8	23.9	24.4	24.8	25.0	24.5	22.9	22.6	21.2	20.0	21.0	25.0
18-May	19.4	18.3	17.2	16.3	15.7	15.2	14.9	15.6	16.7	17.8	18.8	20.4	21.0	21.4	21.2	21.9	22.0	21.6	21.5	21.5	18.2	15.0	12.1	10.5	18.1	22.0
19-May	9.7	9.4	9.1	8.1	6.9	6.9	6.6	6.2	5.9	5.7	5.0	4.5	4.0	3.7	3.5	3.0	3.0	3.4	3.5	3.3	2.9	2.4	2.5	2.4	5.1	9.7
20-May	2.4	2.4	2.6	2.7	2.8	3.1	3.8	4.8	6.5	8.0	9.6	10.7	12.6	13.8	13.9	14.7	15.0	13.7	12.2	10.8	10.1	9.4	8.8	8.1	8.4	15.0
21-May	7.5	7.2	7.1	6.8	6.3	5.7	5.8	6.0	7.0	8.4	9.2	10.2	10.8	10.6	10.0	8.8	8.2	7.5	7.3	6.9	6.8	6.7	6.7	6.8	7.7	10.8
22-May	6.9	6.8	6.8	6.6	6.6	6.6	6.7	6.7	6.1	5.7	5.5	6.0	6.6	7.5	9.3	11.3	12.4	12.9	13.3	13.3	12.6	11.5	10.4	8.7	8.6	13.3
23-May	7.4	6.8	6.5	6.0	4.8	4.6	5.2	6.9	9.1	11.6	14.1	15.7	17.3	18.3	19.0	19.6	20.0	20.2	20.1	19.9	18.6	17.3	16.4	15.0	13.3	20.2
24-May	13.0	12.0	11.4	10.6	9.5	9.0	9.6	11.0	12.8	15.2	16.6	17.9	18.6	19.3	19.8	20.5	20.2	19.7	19.8	19.3	18.1	16.4	15.3	14.5	15.4	20.5
25-May	13.8	12.6	11.4	10.7	10.0	9.6	10.0	11.7	13.2	14.7	16.3	18.0	19.2	19.9	19.9	19.9	19.8	19.2	18.4	17.5	16.5	15.5	14.5	13.2	15.2	19.9
26-May	11.8	10.3	9.4	8.6	7.7	7.0	6.8	7.7	8.7	8.7	9.9	10.5	10.8	9.4	9.4	9.2	9.5	9.5	10.0	9.8	9.4	9.0	8.6	7.9	9.2	11.8
27-May	7.8	8.0	7.8	9.4	10.5	11.2	11.2	12.1	11.8	11.8	12.8	14.4	17.0	19.6	20.3	16.3	15.5	13.3	13.0	13.4	13.6	13.0	12.6	13.1	12.9	20.3
28-May	12.8	12.7	12.1	11.6	11.1	10.9	11.1	11.7	12.9	14.5	16.0	16.5	16.8	16.7	16.1	16.8	17.6	17.2	16.2	15.9	15.7	15.4	14.9	14.0	14.5	17.6
29-May	13.0	11.8	10.5	9.8	10.2	10.3	9.7	10.0	10.1	10.3	10.5	10.7	11.0	11.5	12.4	12.8	13.3	13.7	14.0	14.2	13.8	13.4	13.0	12.6	11.8	14.2
30-May	12.2	11.9	11.4	11.3	11.2	10.9	10.8	11.0	10.7	10.8	11.4	11.6	12.1	12.8	11.9	13.2	14.1	13.8	13.9	14.0	13.4	12.3	11.7	11.1	12.1	14.1
31-May	10.4	10.2	10.1	10.1	9.5	9.1	9.4	10.3	11.0	11.9	13.2	14.2	15.3	16.4	17.1	17.8	18.3	18.3	18.1	18.4	18.3	18.5	17.1	15.7	14.1	18.5
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 75 m (AT75m) - C
Mannix - May 2016

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	237	31.85	31.85
10 - 20	390	52.42	84.27
> 20	117	15.73	100.00

Total Number of Valid Hours: 744

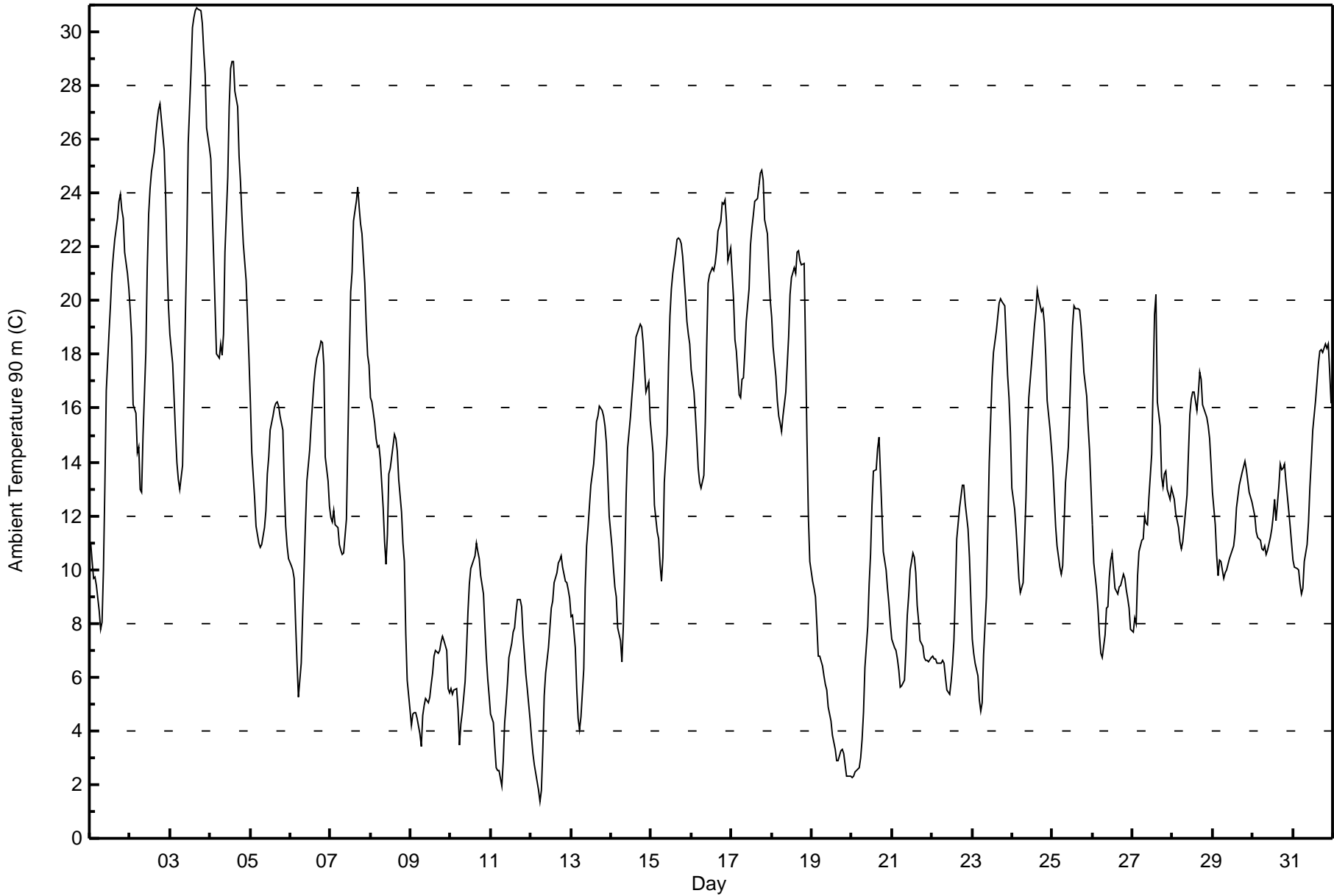
Total Number of Hours: 744



Summary of Hour Averages

Mannix - May 2016

Maximum Value: 30.9 C on May 3 17:00		Maximum Daily Average: 23.3 C on May 3		Hours in Service: 744																																												
Minimum Value: 1.4 C on May 12 06:00		Minimum Daily Average: 4.9 C on May 19		Hours of Data: 744																																												
Maximum Diurnal Average: 17.0 C at hour 17		Minimum Diurnal Average: 8.9 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 13.30 C		Percentiles: P ₁ = 2.3 P ₁₀ = 5.6 Q ₁ = 8.8 Median = 12.6 Q ₃ = 17.7 P ₉₀ = 21.9 P ₉₉ = 30.0		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-May	11.0	10.3	9.7	9.7	9.4	8.5	7.8	8.0	10.0	13.1	16.6	18.9	19.9	21.0	21.7	22.3	23.1	23.7	24.0	23.4	23.1	21.8	21.0	20.4	16.6	24.0																						
2-May	19.6	18.6	16.1	15.8	14.4	14.5	13.0	12.9	15.0	18.1	21.2	23.2	24.2	24.8	25.5	26.2	26.7	27.1	27.3	26.7	25.6	23.9	21.6	19.8	20.9	27.3																						
3-May	18.8	17.7	16.4	15.1	14.0	13.3	13.0	13.9	16.5	19.4	22.1	25.8	28.6	30.1	30.5	30.8	30.9	30.8	30.8	30.3	29.3	28.4	26.4	25.7	23.3	30.9																						
4-May	25.3	23.4	21.6	19.8	18.0	17.8	18.4	18.0	18.8	21.8	24.6	27.2	28.6	28.9	28.9	27.8	27.2	25.4	24.4	23.2	22.1	20.8	19.4	17.9	22.9	28.9																						
5-May	16.3	14.4	12.7	11.6	11.3	11.0	10.8	10.9	11.6	12.2	13.5	14.2	15.2	15.7	16.0	16.2	16.2	16.1	15.7	15.2	13.1	11.6	10.9	10.4	13.4	16.3																						
6-May	10.1	10.0	9.6	8.0	6.6	5.2	6.5	8.3	10.0	11.7	13.3	14.4	15.4	16.2	16.9	17.5	17.9	18.2	18.5	18.4	17.6	14.2	13.3	12.4	12.9	18.5																						
7-May	11.9	11.8	12.2	11.6	11.5	10.9	10.7	10.6	10.6	11.9	14.8	17.7	20.3	21.1	23.0	23.7	24.2	23.5	22.9	22.5	20.6	19.1	18.0	17.6	16.8	24.2																						
8-May	16.4	16.2	15.4	14.9	14.6	14.6	14.1	12.3	11.0	10.2	11.3	13.5	13.7	14.6	15.0	14.8	14.4	13.4	12.2	11.0	10.3	7.6	5.9	4.8	12.6	16.4																						
9-May	4.2	4.6	4.7	4.7	4.5	3.9	3.4	4.6	4.9	5.2	5.0	5.3	5.7	6.1	6.8	7.0	6.9	7.0	7.3	7.5	7.3	7.0	5.6	5.4	5.6	7.5																						
10-May	5.6	5.4	5.5	5.6	4.8	3.5	4.3	4.7	5.8	7.0	8.4	9.4	10.0	10.2	10.5	11.0	10.7	10.4	9.8	9.1	7.9	6.8	5.9	5.3	7.4	11.0																						
11-May	4.6	4.3	3.4	2.6	2.5	2.5	1.9	2.9	4.3	5.0	5.8	6.7	7.2	7.7	7.8	8.4	8.9	8.9	8.6	7.5	6.8	6.1	5.6	4.4	5.6	8.9																						
12-May	3.7	3.2	2.7	2.4	1.8	1.4	1.8	3.3	5.3	6.2	7.1	7.8	8.6	8.8	9.5	9.9	10.3	10.4	10.5	10.1	9.6	9.5	9.2	8.9	6.7	10.5																						
13-May	8.2	8.3	7.1	5.6	4.5	4.0	4.5	6.3	9.3	10.9	11.6	12.3	13.1	13.9	14.7	15.5	15.7	16.1	15.9	15.7	15.3	14.7	13.4	12.0	11.2	16.1																						
14-May	10.8	10.0	9.4	9.0	7.8	7.3	6.6	7.9	10.0	12.8	14.5	15.7	16.4	17.1	17.9	18.7	19.0	19.1	19.0	18.5	17.5	16.6	17.0	15.5	13.9	19.1																						
15-May	15.0	14.3	12.4	11.4	11.1	10.2	9.6	10.5	13.2	15.0	17.7	19.4	20.4	21.0	21.8	22.3	22.3	22.3	22.1	21.7	20.1	19.2	18.8	18.4	17.1	22.3																						
16-May	17.5	16.6	15.8	14.8	13.8	13.2	13.0	13.5	15.4	18.3	20.7	20.9	21.2	21.1	21.4	21.9	22.6	23.0	23.7	23.6	23.8	23.0	21.5	22.0	19.3	23.8																						
17-May	21.0	20.1	18.6	18.1	16.5	16.4	17.1	17.1	18.1	19.3	20.4	22.1	22.7	23.2	23.7	23.8	24.3	24.7	24.9	24.5	23.0	22.5	21.2	20.0	21.0	24.9																						
18-May	19.4	18.3	17.2	16.3	15.7	15.4	15.1	15.7	16.6	17.6	18.6	20.2	20.9	21.2	21.0	21.8	21.9	21.5	21.3	21.4	18.1	14.8	11.9	10.3	18.0	21.9																						
19-May	9.5	9.3	9.0	8.0	6.8	6.8	6.4	6.1	5.7	5.5	4.9	4.4	3.8	3.6	3.3	2.9	2.9	3.2	3.3	3.2	2.7	2.3	2.3	2.3	4.9	9.5																						
20-May	2.3	2.3	2.5	2.5	2.6	3.0	3.7	4.7	6.4	7.9	9.5	10.6	12.4	13.6	13.7	14.5	14.9	13.6	12.1	10.6	10.0	9.3	8.7	8.0	8.3	14.9																						
21-May	7.4	7.1	7.0	6.7	6.2	5.6	5.7	5.9	6.9	8.3	9.0	10.0	10.6	10.5	9.9	8.7	8.1	7.4	7.1	6.7	6.6	6.6	6.6	6.7	7.6	10.6																						
22-May	6.8	6.7	6.7	6.5	6.5	6.5	6.6	6.5	6.0	5.5	5.4	5.9	6.5	7.4	9.1	11.1	12.3	12.7	13.1	13.1	12.5	11.5	10.5	8.9	8.5	13.1																						
23-May	7.4	6.9	6.5	6.1	5.1	4.8	5.1	6.8	9.0	11.4	14.0	15.6	17.2	18.1	18.9	19.4	19.9	20.1	20.0	19.8	18.5	17.2	16.4	15.1	13.3	20.1																						
24-May	13.1	12.2	11.5	10.6	9.7	9.1	9.5	11.1	12.6	14.9	16.4	17.7	18.4	19.1	19.6	20.4	20.1	19.6	19.7	19.2	18.0	16.3	15.2	14.5	15.4	20.4																						
25-May	13.8	12.7	11.6	10.9	10.1	9.8	10.1	11.7	13.2	14.6	16.1	17.8	19.1	19.8	19.7	19.7	19.6	19.1	18.3	17.4	16.4	15.3	14.4	13.1	15.2	19.8																						
26-May	11.7	10.2	9.3	8.5	7.6	6.9	6.7	7.6	8.6	8.6	9.7	10.4	10.6	9.3	9.2	9.1	9.4	9.4	9.8	9.7	9.2	8.9	8.6	7.8	9.0	11.7																						
27-May	7.7	8.2	8.0	9.8	10.7	11.1	11.1	12.0	11.7	11.7	12.7	14.3	16.9	19.5	20.2	16.2	15.4	13.4	13.1	13.6	13.7	13.0	12.6	13.1	12.9	20.2																						
28-May	12.8	12.6	12.1	11.5	11.0	10.8	11.0	11.6	12.8	14.3	15.8	16.3	16.6	16.6	15.9	16.5	17.4	17.1	16.1	15.8	15.6	15.3	14.9	13.9	14.4	17.4																						
29-May	12.9	11.7	10.5	9.8	10.3	10.3	9.7	9.9	10.0	10.2	10.4	10.6	10.9	11.4	12.3	12.7	13.1	13.6	13.8	14.0	13.7	13.3	12.9	12.5	11.7	14.0																						
30-May	12.2	12.0	11.4	11.2	11.1	10.8	10.7	10.9	10.6	10.7	11.2	11.5	12.0	12.6	11.8	13.1	13.9	13.7	13.7	13.9	13.3	12.2	11.6	11.0	12.0	13.9																						
31-May	10.3	10.1	10.0	10.0	9.4	9.1	9.3	10.3	10.9	11.8	13.1	14.1	15.2	16.3	17.0	17.7	18.1	18.2	18.1	18.4	18.2	18.4	17.3	16.2	14.1	18.4																						
																								11.8	11.3	10.5	10.0	9.4	9.0	8.9	9.6	10.7	12.0	13.4	14.6	15.6	16.1	16.6	16.8	17.0	16.9	16.7	16.3	15.5	14.4	13.5	12.7	Diurnal Average
																								25.3	23.4	21.6	19.8	18.0	17.8	18.4	18.0	18.8	21.8	24.6	27.2	28.6	30.1	30.5	30.8	30.9	30.8	30.8	30.3	29.3	28.4	26.4	25.7	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	241	32.39	32.39
10 - 20	389	52.28	84.68
> 20	114	15.32	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



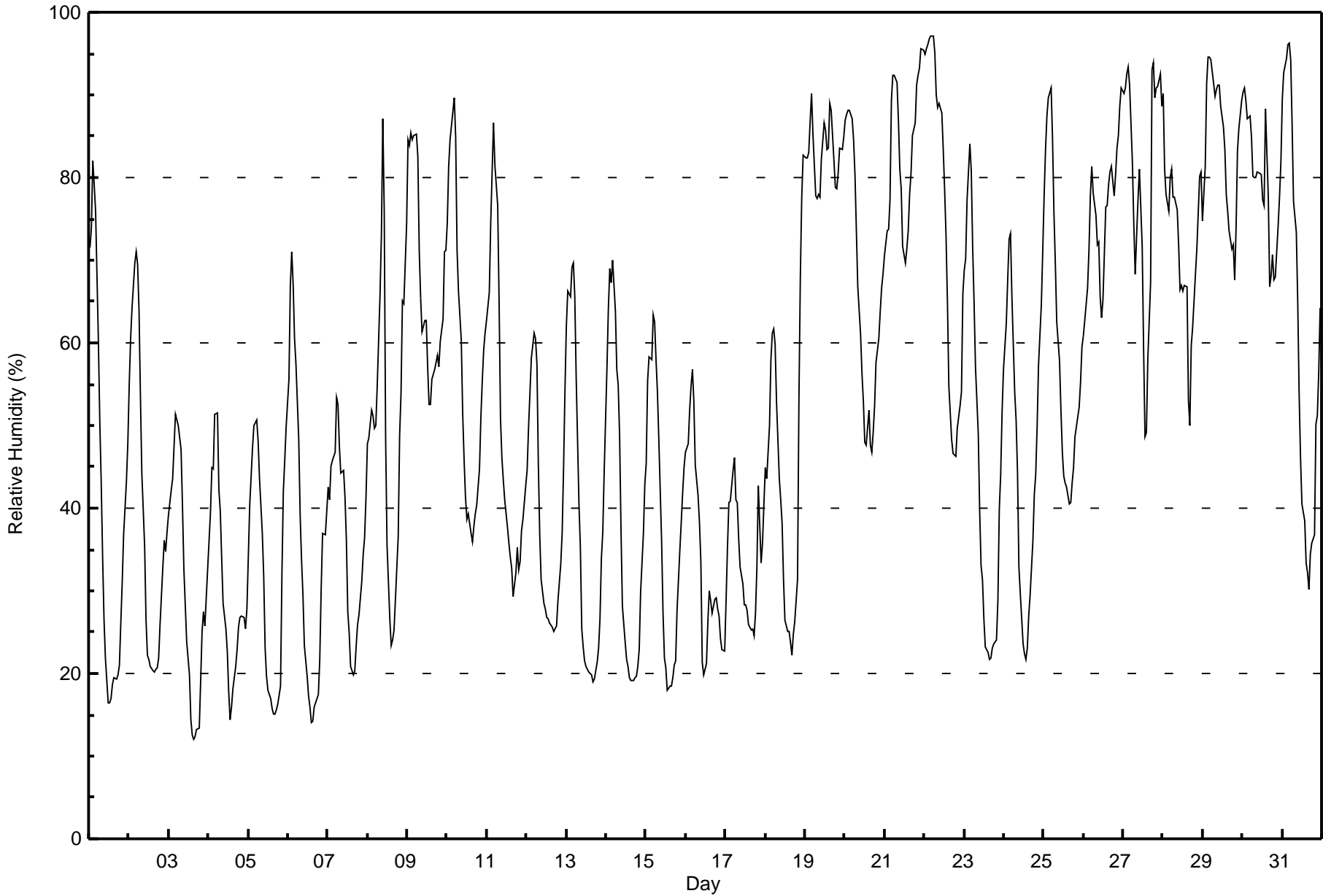
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Mannix - May 2016

Maximum Value: 97 % on May 22 05:00																			Maximum Daily Average: 83.9 % on May 29						Hours in Service: 744																			
Minimum Value: 12 % on May 3 16:00																			Minimum Daily Average: 30.2 % on May 3						Hours of Data: 744																			
Maximum Diurnal Average: 73.6 % at hour 5																			Minimum Diurnal Average: 37.3 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 53.1 %																			Percentiles: P ₁ = 14 P ₁₀ = 22 Q ₁ = 32 Median = 51 Q ₃ = 74 P ₉₀ = 87 P ₉₉ = 95						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-May	71	74	82	79	76	60	50	43	34	27	22	16	16	17	19	20	19	20	21	26	31	37	43	48	39.7	82																		
2-May	55	60	64	70	71	70	64	54	44	35	26	22	22	21	20	20	20	21	22	26	33	36	35	37	39.5	71																		
3-May	39	42	44	47	51	51	50	47	40	33	28	24	20	14	13	12	13	13	19	25	27	26	33	30.2	51																			
4-May	36	39	45	45	51	52	42	40	34	28	25	23	18	14	16	18	21	23	26	27	27	26	28	30.4	52																			
5-May	34	40	47	50	50	51	48	44	37	32	23	20	18	17	16	15	15	16	16	18	32	42	46	50	32.4	51																		
6-May	56	67	71	67	60	57	48	39	34	29	23	20	17	16	14	14	16	17	18	22	30	37	37	40	35.4	71																		
7-May	43	41	45	46	47	53	53	47	44	44	41	36	27	25	21	20	20	23	26	27	31	34	36	41	36.4	53																		
8-May	48	49	52	51	50	50	55	66	73	87	76	49	36	27	23	24	25	29	37	49	54	65	65	74	50.5	87																		
9-May	85	84	85	85	85	85	83	71	66	61	63	63	57	52	53	56	57	58	59	57	60	63	71	71	67.8	85																		
10-May	74	81	85	88	90	85	71	66	60	51	46	41	39	39	37	36	38	39	40	45	51	55	59	61	57.5	90																		
11-May	63	66	74	81	87	82	77	65	51	46	43	41	38	36	34	33	29	32	35	33	34	37	39	43	49.9	87																		
12-May	45	50	54	58	61	61	57	45	37	31	29	28	27	27	26	26	25	25	26	29	33	37	45	54	38.9	61																		
13-May	62	66	66	69	70	66	56	41	35	25	23	21	21	20	20	19	19	21	23	27	34	37	44	37.7	70																			
14-May	57	64	69	67	70	64	57	55	49	38	28	24	22	21	19	19	19	20	21	23	30	37	43	38.9	70																			
15-May	45	55	58	58	63	63	58	54	48	36	27	22	21	18	18	18	19	21	22	28	35	38	42	45	38.1	63																		
16-May	47	48	52	55	57	53	45	41	38	34	21	20	21	26	30	29	27	29	29	28	27	24	23	23	34.5	57																		
17-May	29	35	41	41	45	46	41	41	36	33	31	28	28	28	26	25	25	25	27	33	43	33	36	41	34.0	46																		
18-May	45	44	50	58	61	62	60	53	44	41	38	31	26	25	25	24	22	25	26	31	53	68	78	83	44.7	83																		
19-May	82	82	83	87	90	85	78	77	78	78	82	87	86	83	84	89	88	82	79	79	81	84	83	85	83.0	90																		
20-May	87	88	88	88	87	85	80	74	67	61	56	53	48	48	52	48	47	49	52	58	61	64	67	68	65.6	88																		
21-May	71	74	74	77	89	92	92	92	87	81	79	72	70	71	74	78	81	85	87	91	92	93	96	95	83.0	96																		
22-May	95	96	96	97	97	97	95	90	88	89	88	83	78	73	65	55	48	47	46	46	50	52	54	66	74.6	97																		
23-May	69	70	77	84	81	72	65	57	49	40	33	31	27	23	22	22	22	23	24	24	29	40	44	52	44.9	84																		
24-May	57	62	68	73	73	66	54	51	44	33	30	24	22	22	23	27	29	36	42	44	50	57	65	71	46.7	73																		
25-May	78	83	88	90	91	85	76	70	63	58	52	47	44	43	42	41	41	43	45	49	51	52	55	59	60.1	91																		
26-May	61	63	67	71	78	81	78	75	72	72	66	63	65	76	77	79	81	81	78	80	84	85	89	91	75.5	91																		
27-May	90	91	93	93	91	82	74	68	73	77	81	72	59	49	49	58	67	93	94	90	91	91	92	89	79.5	94																		
28-May	90	81	78	76	80	81	78	78	76	72	66	67	66	67	67	53	50	60	62	68	71	76	80	81	71.8	90																		
29-May	75	81	91	95	95	94	91	90	91	91	91	89	86	83	78	76	74	71	72	68	74	83	86	89	83.9	95																		
30-May	90	91	89	87	87	85	80	80	80	81	81	80	77	77	88	78	67	68	71	68	68	74	78	82	79.4	91																		
31-May	90	93	94	96	96	94	86	77	73	65	54	46	41	38	33	32	30	34	36	37	50	51	57	64	61.2	96																		
																			63.4	66.5	70.0	71.9	73.6	71.2	65.9	61.0	56.3	51.9	47.5	43.3	40.1	38.6	38.2	37.5	37.3	39.6	41.0	43.3	48.4	52.5	55.6	59.7	Diurnal Average	
																			95	96	96	97	97	97	95	92	91	91	91	89	86	83	88	89	88	93	94	91	92	93	96	95	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	51	6.85	6.85
20 - 40	207	27.82	34.68
40 - 60	184	24.73	59.41
60 - 80	162	21.77	81.18
80 - 100	140	18.82	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



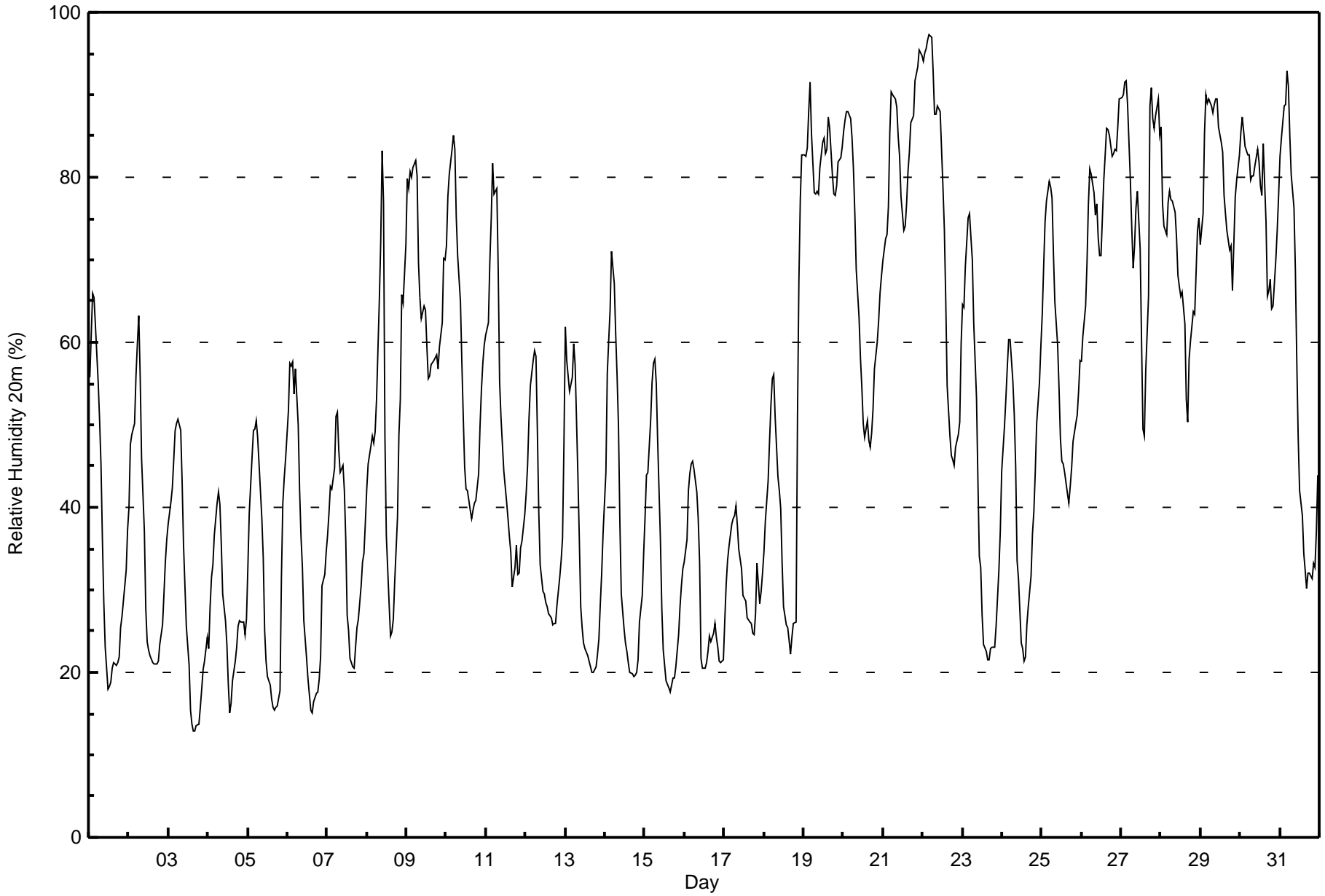
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

Mannix - May 2016

Maximum Value: 97 % on May 22 05:00 Maximum Daily Average: 83.8 % on May 21																			Hours in Service: 744 Hours of Data: 744							
Minimum Value: 13 % on May 3 16:00 Minimum Daily Average: 27.4 % on May 4 Maximum Diurnal Average: 68.1 % at hour 6 Minimum Diurnal Average: 37.6 % at hour 17 Monthly Average: 51.3 % Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 30 Median = 49 Q ₃ = 73 P ₉₀ = 85 P ₉₉ = 95																			Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	56	61	66	65	62	55	50	45	36	29	23	18	18	19	20	21	21	21	22	25	27	29	32	37	35.8	66
2-May	40	48	49	50	56	60	63	56	46	37	28	24	23	22	21	21	21	21	21	23	26	30	33	36	35.6	63
3-May	38	41	42	46	49	50	51	49	43	35	31	26	21	15	14	13	13	14	14	16	18	20	21	24	29.3	51
4-May	23	28	32	33	37	41	42	40	36	29	26	23	19	15	16	19	21	23	26	26	26	26	25	26	27.4	42
5-May	33	39	46	49	49	50	48	45	39	34	25	21	19	19	17	16	15	16	16	18	31	41	44	46	32.4	50
6-May	52	58	57	58	54	57	50	42	37	33	26	22	19	17	15	15	16	17	18	19	22	30	32	35	33.3	58
7-May	37	39	43	42	45	51	51	47	44	45	42	36	27	25	22	21	21	23	25	26	30	33	34	38	35.4	51
8-May	42	45	47	49	48	49	53	65	72	83	77	49	37	28	24	25	26	31	39	49	53	66	65	72	49.8	83
9-May	80	79	81	80	81	82	80	70	65	63	64	64	59	56	56	57	58	58	58	57	60	62	70	70	67.1	82
10-May	72	78	80	83	85	83	75	71	65	58	51	45	42	42	40	39	40	40	41	44	50	54	58	60	58.1	85
11-May	61	62	70	75	82	78	79	69	55	51	48	44	41	39	36	35	30	33	35	32	32	35	36	39	49.8	82
12-May	42	45	51	55	58	59	58	49	39	33	30	29	28	28	27	27	26	26	26	28	32	34	36	48	38.1	59
13-May	62	58	54	55	56	60	57	44	36	28	25	24	23	22	21	21	20	20	21	22	24	28	32	37	35.4	62
14-May	44	56	60	64	71	67	61	56	50	38	30	25	24	22	21	20	20	19	20	20	21	26	29	34	37.5	71
15-May	39	44	44	51	55	57	58	55	48	36	28	23	21	19	18	18	18	19	19	21	25	28	30	33	33.6	58
16-May	33	36	42	44	45	46	45	42	39	33	22	21	21	21	23	24	24	25	26	24	23	21	21	21	30.1	46
17-May	26	31	34	35	38	39	39	40	38	35	33	29	29	29	27	26	26	25	25	27	33	28	30	32	31.4	40
18-May	35	38	43	48	52	56	56	51	44	42	40	33	28	26	25	24	22	24	26	26	51	67	77	83	42.4	83
19-May	83	83	84	88	91	85	78	78	78	78	81	84	85	83	83	87	86	80	78	78	79	82	82	84	82.4	91
20-May	86	87	88	88	87	85	81	76	69	63	58	55	50	49	51	48	47	49	52	57	60	63	66	68	65.9	88
21-May	70	73	73	76	85	90	90	90	88	85	83	78	74	74	77	81	83	87	88	92	93	93	95	95	83.8	95
22-May	94	95	96	97	97	97	93	88	88	89	88	83	79	74	65	55	49	46	46	45	47	49	50	60	73.7	97
23-May	65	64	69	75	76	73	70	62	53	43	34	33	27	23	23	22	22	23	23	23	26	29	32	37	42.7	76
24-May	44	50	53	57	60	60	55	51	45	34	31	24	23	21	22	26	28	32	37	40	44	50	55	60	41.7	60
25-May	63	69	75	77	79	79	77	71	65	60	54	48	46	45	44	42	40	43	45	48	50	51	54	58	57.6	79
26-May	58	61	64	70	77	81	80	78	75	77	73	71	71	80	83	86	86	85	83	83	83	83	86	89	77.6	89
27-May	90	90	91	92	89	80	74	69	72	76	78	71	60	49	49	57	66	89	91	87	86	88	89	85	77.8	92
28-May	86	77	74	73	77	78	77	77	76	73	68	67	66	66	62	53	50	58	60	64	63	68	74	75	69.3	86
29-May	72	76	85	90	89	89	89	88	89	89	90	86	84	83	78	76	74	71	72	66	72	78	80	83	81.1	90
30-May	85	87	86	84	83	83	80	80	80	81	83	82	79	78	84	75	66	66	68	64	64	70	73	78	77.4	87
31-May	83	85	89	89	93	91	85	80	76	69	58	48	42	39	34	32	30	32	32	31	33	33	37	44	56.9	93
	57.8	60.7	63.5	65.7	68.0	68.1	66.0	62.1	57.6	53.5	49.3	44.7	41.4	39.6	38.7	38.0	37.6	39.2	40.3	41.3	44.7	48.2	51.0	54.4	Diurnal Average	
	94	95	96	97	97	97	93	90	89	89	90	86	85	83	84	87	86	89	91	92	93	93	95	95	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

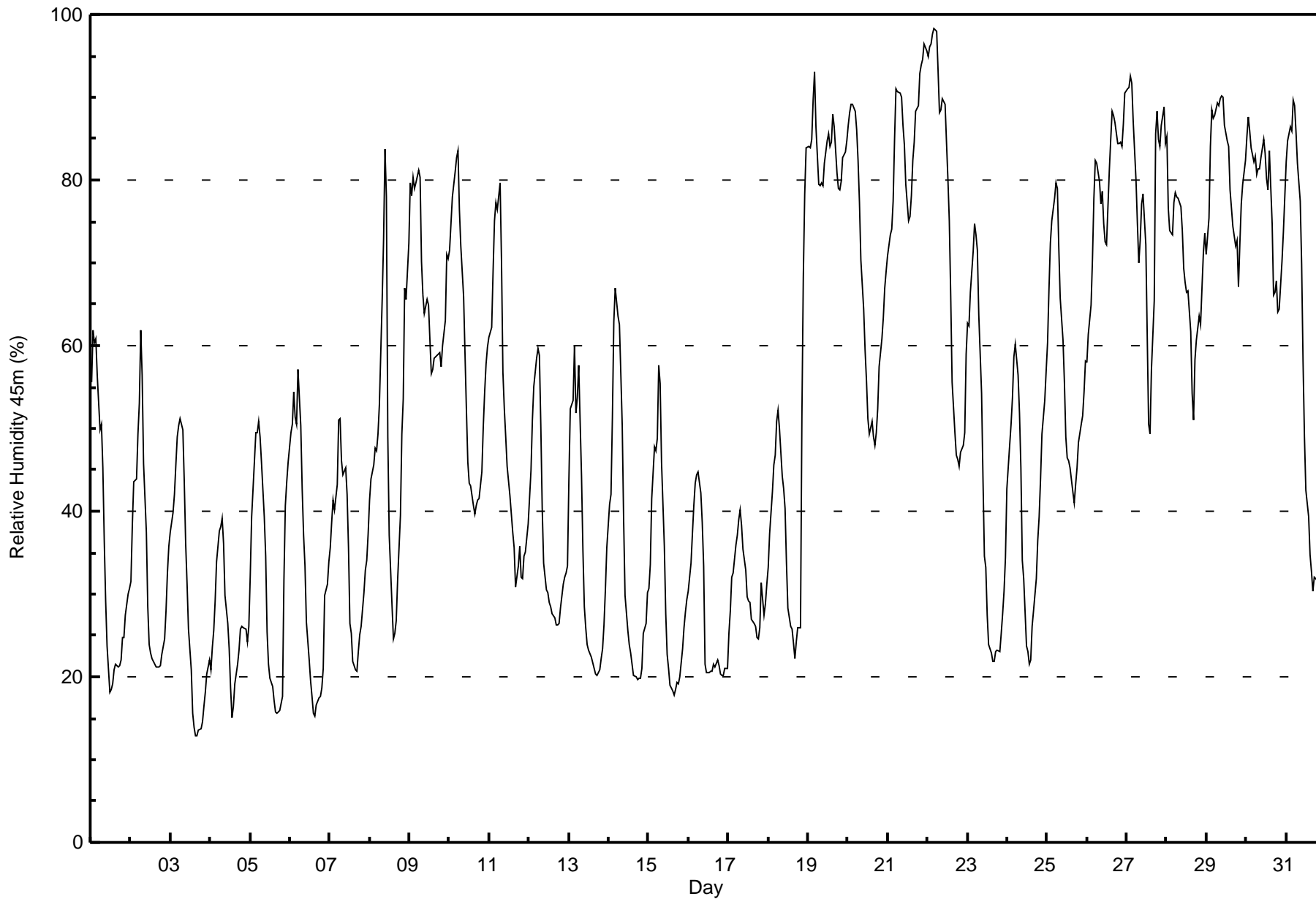
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	43	5.78	5.78
20 - 40	242	32.53	38.31
40 - 60	187	25.13	63.44
60 - 80	151	20.30	83.74
80 - 100	121	16.26	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on May 22 05:00																			Maximum Daily Average: 85.0 % on May 21						Hours in Service: 744																				
Minimum Value: 13 % on May 3 17:00																			Minimum Daily Average: 26.3 % on May 4						Hours of Data: 744																				
Maximum Diurnal Average: 66.9 % at hour 6																			Minimum Diurnal Average: 37.9 % at hour 17						Hours of Missing Data: 0																				
Monthly Average: 51.0 %																			Percentiles: P ₁ = 15 P ₁₀ = 21 Q ₁ = 29 Median = 49 Q ₃ = 73 P ₉₀ = 85 P ₉₉ = 95						Hours of Calibration: 0																				
																									Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-May	56	62	60	61	56	50	50	45	36	29	24	18	18	19	21	21	21	21	22	25	25	27	30	31	34.6	62																			
2-May	32	38	44	44	49	53	62	56	46	37	28	24	23	22	21	21	21	21	21	23	25	28	33	36	33.7	62																			
3-May	38	40	42	46	49	50	51	50	44	36	31	26	21	16	14	13	13	13	14	15	16	18	20	22	29.0	51																			
4-May	21	24	26	29	34	38	38	39	36	30	26	23	19	15	16	19	21	23	26	26	26	26	24	26	26.3	39																			
5-May	32	39	46	49	50	51	49	46	39	35	25	22	20	19	17	16	16	16	16	18	32	41	44	46	32.6	51																			
6-May	50	50	54	51	51	57	50	43	37	33	27	22	19	18	16	15	17	18	18	19	21	30	31	34	32.5	57																			
7-May	36	39	41	40	43	51	51	46	44	45	42	36	26	25	22	21	21	23	25	26	30	33	34	37	35.0	51																			
8-May	41	44	46	48	47	49	53	66	73	84	78	49	37	29	25	25	27	32	39	49	54	67	66	72	49.9	84																			
9-May	80	78	80	79	80	81	80	70	66	64	66	65	61	57	57	58	59	59	59	57	60	63	71	71	67.5	81																			
10-May	71	75	78	81	83	84	77	72	66	59	52	46	43	43	41	40	41	41	42	45	50	54	58	60	58.4	84																			
11-May	61	62	69	75	77	76	80	70	57	52	49	45	42	40	37	36	31	33	36	32	32	35	35	38	50.0	80																			
12-May	42	45	51	55	58	60	59	50	40	34	30	30	29	29	28	27	26	26	26	28	31	32	33	33	37.6	60																			
13-May	44	52	53	60	52	54	58	44	35	28	26	24	23	22	22	21	20	20	21	22	23	26	31	36	34.1	60																			
14-May	41	42	51	63	67	64	63	57	50	39	30	26	24	23	21	20	20	20	20	20	21	25	26	30	35.9	67																			
15-May	31	34	41	48	47	49	58	55	46	36	28	23	21	19	18	18	19	19	19	20	23	26	28	29	31.4	58																			
16-May	30	34	37	41	43	44	45	42	39	33	22	21	21	21	21	21	21	22	21	20	20	20	21	21	28.4	45																			
17-May	25	28	32	33	36	37	39	40	38	35	33	30	29	29	27	26	26	25	25	26	31	27	29	31	30.7	40																			
18-May	33	37	42	46	47	51	52	50	44	43	40	34	28	26	26	24	22	24	26	26	51	68	78	84	41.8	84																			
19-May	84	84	85	90	93	86	79	79	80	79	82	85	86	84	85	88	86	81	79	79	80	83	83	85	83.5	93																			
20-May	87	88	89	89	88	86	82	77	70	64	60	56	51	49	51	49	48	49	52	57	61	63	67	69	66.9	89																			
21-May	71	73	74	77	85	91	91	90	90	87	84	79	75	76	78	82	85	88	89	93	94	95	96	96	85.0	96																			
22-May	95	96	97	98	98	98	93	88	89	90	89	85	80	75	66	56	49	47	46	45	47	48	49	59	74.3	98																			
23-May	63	62	66	71	75	73	71	64	54	44	35	33	27	24	23	22	22	23	23	23	25	28	30	34	42.4	75																			
24-May	43	48	50	54	59	60	56	52	45	34	32	24	23	22	22	26	28	32	37	39	44	49	53	57	41.2	60																			
25-May	60	67	72	75	78	80	79	72	66	61	56	49	46	46	45	42	41	43	45	48	51	52	54	58	57.8	80																			
26-May	58	61	65	71	78	82	82	80	77	79	75	72	72	81	85	88	88	87	84	84	85	84	87	91	79.0	91																			
27-May	91	91	93	92	87	80	75	70	73	77	78	72	61	51	49	57	65	86	88	85	84	87	89	84	77.7	93																			
28-May	85	77	74	73	77	79	78	78	77	74	69	68	66	67	62	54	51	58	61	63	63	67	71	74	69.4	85																			
29-May	71	75	84	89	87	88	89	89	90	90	90	87	85	84	79	77	74	72	73	67	72	77	80	82	81.3	90																			
30-May	85	88	86	84	82	83	81	81	81	83	85	83	80	79	83	75	66	66	68	64	64	70	74	78	77.9	88																			
31-May	82	85	86	86	90	89	86	82	77	70	58	49	43	39	35	33	30	32	32	31	31	28	34	40	56.1	90																			
																			56.0	58.6	61.8	64.4	66.0	66.9	66.4	62.8	58.3	54.3	50.0	45.3	42.0	40.2	39.1	38.5	37.9	39.4	40.4	41.2	44.3	47.7	50.3	53.0	Diurnal Average		
																			95	96	97	98	98	98	93	90	90	90	90	87	86	84	85	88	88	88	88	89	93	94	95	96	96	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

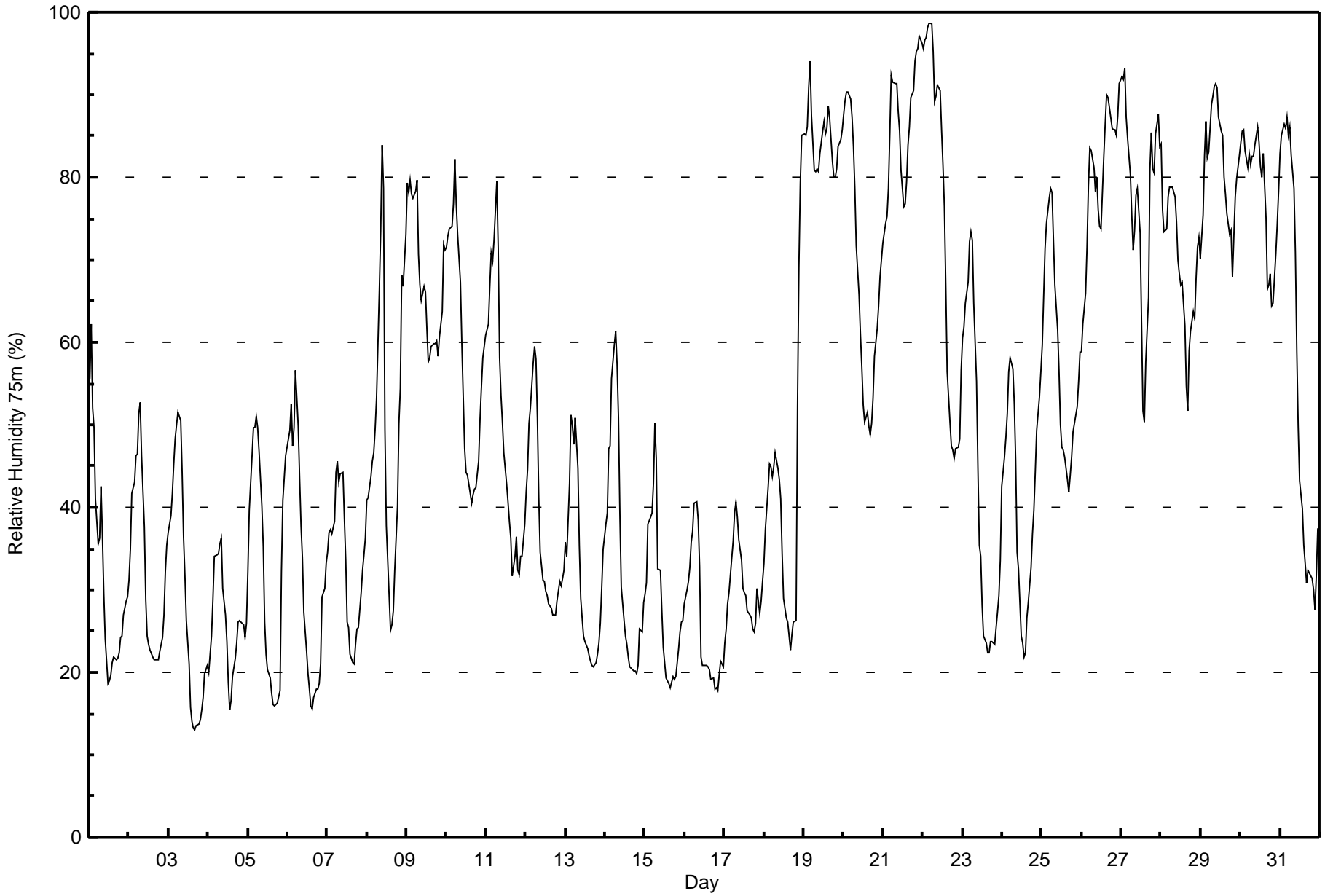
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	43	5.78	5.78
20 - 40	247	33.20	38.98
40 - 60	183	24.60	63.58
60 - 80	148	19.89	83.47
80 - 100	123	16.53	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 99 % on May 22 06:00																	Maximum Daily Average: 86.2 % on May 21																	Hours in Service: 744															
Minimum Value: 13 % on May 3 17:00																	Minimum Daily Average: 25.9 % on May 4																	Hours of Data: 744															
Maximum Diurnal Average: 64.7 % at hour 7																	Minimum Diurnal Average: 38.5 % at hour 17																	Hours of Missing Data: 0															
Monthly Average: 50.7 %																	Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 29 Median = 47 Q ₃ = 73 P ₉₀ = 85 P ₉₉ = 96																	Hours of Calibration: 0															
																																		Percent Operational Time: 100.0															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	56	62	52	50	41	36	36	43	37	30	24	19	19	20	21	22	22	22	22	24	24	27	29	29	31.9	62																							
2-May	31	35	42	43	46	46	51	53	46	38	29	24	23	23	22	22	22	22	22	22	24	27	32	35	32.5	53																							
3-May	37	39	42	45	48	50	52	51	44	36	32	26	21	16	14	13	14	14	14	16	17	20	21	28.9	52																								
4-May	20	22	24	29	34	34	34	36	36	30	27	24	19	15	17	19	22	23	26	26	26	24	26	26	25.9	36																							
5-May	32	40	46	50	50	51	50	47	40	35	26	22	20	19	17	16	16	16	16	18	32	41	44	46	32.9	51																							
6-May	48	49	53	47	50	57	50	43	38	34	27	23	20	18	16	16	17	18	18	19	21	29	30	33	32.2	57																							
7-May	34	37	37	37	38	44	46	43	44	44	39	34	26	25	22	21	21	23	25	25	30	32	34	36	33.3	46																							
8-May	41	41	44	46	47	49	53	66	74	84	79	49	38	29	25	26	27	32	40	50	54	68	67	73	50.1	84																							
9-May	79	78	80	78	77	78	80	71	67	65	67	66	62	58	58	60	60	60	60	58	61	64	72	71	67.9	80																							
10-May	71	73	74	74	77	82	77	73	67	60	53	47	44	44	42	40	41	42	42	46	51	55	58	59	58.1	82																							
11-May	61	62	67	71	70	72	80	71	58	54	50	47	43	41	38	36	32	34	36	32	32	34	34	38	49.7	80																							
12-May	42	45	50	52	58	59	58	51	41	35	31	31	30	29	28	28	27	27	27	29	31	30	31	32	37.6	59																							
13-May	36	34	43	51	50	48	51	45	35	29	27	24	24	23	22	21	21	21	21	22	24	26	30	35	31.7	51																							
14-May	38	39	47	47	56	60	61	57	51	39	30	26	24	23	22	21	20	20	20	20	21	25	25	28	34.3	61																							
15-May	30	31	38	39	39	43	50	46	32	32	28	23	21	19	19	18	19	20	19	19	23	25	26	26	28.6	50																							
16-May	28	30	31	33	36	37	40	41	38	33	22	21	21	21	21	20	19	19	18	18	18	20	21	21	26.1	41																							
17-May	24	25	28	30	34	36	39	41	39	36	34	30	30	29	27	27	27	25	25	26	30	27	29	31	30.3	41																							
18-May	33	37	42	45	45	44	45	47	45	43	41	34	29	27	26	24	23	25	26	26	52	69	79	85	41.4	85																							
19-May	85	85	86	91	94	88	81	81	81	81	83	86	87	85	86	89	87	82	80	80	81	84	85	86	84.6	94																							
20-May	88	89	90	90	89	87	84	79	72	66	61	57	52	50	51	50	49	50	53	58	62	64	68	70	68.0	90																							
21-May	72	74	75	79	85	92	92	91	91	88	86	81	77	77	80	84	86	90	91	94	95	96	97	96	86.2	97																							
22-May	96	97	97	98	99	99	95	89	90	91	91	86	81	76	67	56	50	48	47	46	47	47	48	57	74.9	99																							
23-May	60	62	65	67	72	73	72	65	55	45	35	34	28	24	24	22	22	24	24	23	25	27	29	33	42.2	73																							
24-May	43	46	49	51	56	58	57	53	46	35	32	24	23	22	22	27	28	33	37	40	44	49	53	56	41.0	58																							
25-May	60	66	71	74	77	79	78	72	67	62	56	50	47	47	46	43	42	44	46	49	51	52	55	59	58.1	79																							
26-May	59	62	66	71	79	84	83	81	78	80	76	74	74	82	86	90	90	89	86	86	86	85	87	91	80.3	91																							
27-May	92	92	93	87	85	80	75	71	74	78	79	73	62	52	50	58	65	81	85	81	80	85	88	84	77.1	93																							
28-May	84	76	73	74	78	79	79	79	78	75	70	68	67	67	62	55	52	59	61	64	63	68	71	73	69.7	84																							
29-May	70	75	83	87	82	83	89	90	91	91	91	87	86	85	80	78	76	73	74	68	73	78	80	83	81.3	91																							
30-May	84	86	86	83	81	83	81	83	83	84	86	84	81	80	83	75	66	67	68	64	65	71	74	78	78.2	86																							
31-May	83	85	86	86	87	85	86	83	79	71	59	50	43	40	35	33	31	32	32	31	30	28	32	37	56.0	87																							
																								55.4	57.3	60.0	61.5	63.2	64.4	64.7	62.6	58.6	54.9	50.6	46.0	42.7	40.9	39.7	39.0	38.5	39.8	40.7	41.3	44.3	47.6	50.1	52.6	Diurnal Average	
																								96	97	97	98	99	99	95	91	91	91	91	87	87	85	86	90	90	90	91	94	95	96	97	96	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

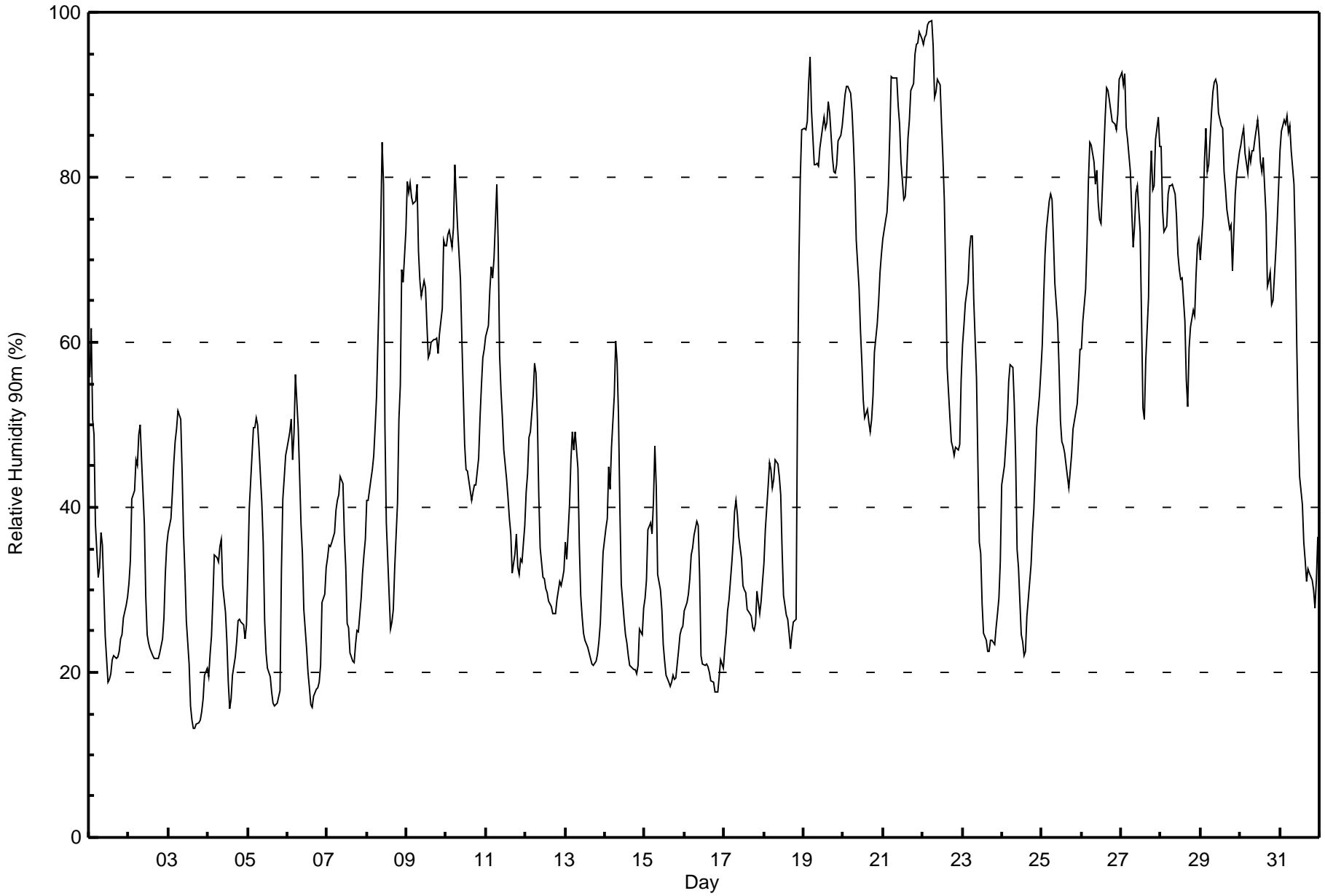
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	47	6.32	6.32
20 - 40	257	34.54	40.86
40 - 60	175	23.52	64.38
60 - 80	138	18.55	82.93
80 - 100	127	17.07	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 99 % on May 22 06:00																	Maximum Daily Average: 86.8 % on May 21																	Hours in Service: 744	
Minimum Value: 13 % on May 3 17:00																	Minimum Daily Average: 25.4 % on May 16																	Hours of Data: 744	
Maximum Diurnal Average: 64.0 % at hour 7																	Minimum Diurnal Average: 38.8 % at hour 17																	Hours of Missing Data: 0	
Monthly Average: 50.6 %																	Percentiles: P ₁ = 16 P ₁₀ = 22 Q ₁ = 29 Median = 46 Q ₃ = 74 P ₉₀ = 86 P ₉₉ = 97																	Hours of Calibration: 0	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	56	62	51	49	38	32	33	37	35	30	24	19	19	20	21	22	22	22	23	24	25	27	28	29	31.1	62									
2-May	31	34	41	42	46	45	49	50	46	38	29	25	24	23	22	22	22	22	22	22	24	27	32	35	32.1	50									
3-May	37	39	42	45	48	50	52	51	44	37	32	26	21	16	14	13	13	14	14	14	15	17	20	20	28.9	52									
4-May	20	22	24	29	34	34	33	35	36	31	27	24	19	16	17	20	22	24	26	26	26	26	24	26	25.9	36									
5-May	32	40	46	50	50	51	50	47	40	36	26	22	20	19	18	16	16	16	16	18	32	41	44	46	33.1	51									
6-May	48	49	51	46	49	56	50	44	38	34	28	23	20	18	16	16	17	18	18	19	21	29	30	33	32.0	56									
7-May	34	35	35	36	37	40	41	42	44	43	37	33	26	25	22	21	21	23	25	25	29	32	34	36	32.4	44									
8-May	41	41	43	45	46	50	53	67	74	84	79	50	38	30	25	26	28	33	41	51	55	69	67	74	50.3	84									
9-May	79	78	79	78	77	77	79	71	68	66	67	67	62	58	59	60	60	60	61	59	61	64	72	72	68.1	79									
10-May	72	73	74	72	74	82	77	74	68	60	54	48	45	44	42	41	42	43	43	46	51	55	58	59	58.1	82									
11-May	61	62	66	69	68	70	79	72	59	54	51	47	43	41	39	37	32	34	37	33	32	34	33	38	49.6	79									
12-May	42	44	48	49	54	57	56	51	42	35	32	31	30	30	29	28	27	27	27	29	31	31	31	32	37.2	57									
13-May	36	34	40	46	49	47	49	45	35	29	27	25	24	23	22	22	21	21	21	22	24	26	30	35	31.4	49									
14-May	37	39	45	42	47	54	60	58	51	40	31	26	25	24	22	21	21	20	20	20	21	25	25	28	33.4	60									
15-May	29	31	37	38	37	41	48	43	32	30	28	23	21	20	19	18	19	20	19	19	23	25	25	26	27.9	48									
16-May	27	28	29	31	34	35	37	38	38	32	22	21	21	21	21	20	19	19	18	18	18	19	22	21	25.4	38									
17-May	23	25	27	29	33	36	39	41	39	36	34	30	30	30	28	27	27	25	25	26	30	27	29	31	30.3	41									
18-May	33	37	42	45	45	42	43	46	45	44	41	35	29	27	26	25	23	25	26	26	53	70	80	86	41.5	86									
19-May	86	86	87	92	95	88	82	81	82	81	84	86	87	86	87	89	88	82	81	81	82	84	85	86	85.3	95									
20-May	88	90	91	91	90	88	84	79	72	67	62	58	53	51	52	50	49	51	54	59	62	65	68	71	68.5	91									
21-May	73	75	76	79	85	92	92	92	92	89	86	82	77	78	80	85	87	91	91	95	96	96	98	97	86.8	98									
22-May	96	97	97	98	99	99	96	90	90	92	91	86	82	77	68	57	51	48	47	46	47	47	48	55	75.2	99									
23-May	60	62	65	67	71	73	73	65	56	45	36	34	28	25	24	23	23	24	24	23	25	27	29	33	42.3	73									
24-May	43	45	48	51	55	57	57	52	46	35	33	24	24	22	23	27	29	33	37	40	44	50	54	56	41.0	57									
25-May	60	66	71	74	77	78	77	72	67	62	57	51	48	47	47	44	42	44	47	50	52	53	56	59	58.3	78									
26-May	59	63	66	72	80	84	84	82	79	81	77	75	74	83	87	91	90	89	87	87	86	86	88	92	80.9	92									
27-May	93	91	93	86	85	81	76	72	74	78	79	73	63	52	51	58	66	79	83	78	79	85	87	84	76.8	93									
28-May	84	76	73	74	78	79	79	79	78	75	71	69	68	68	62	55	52	59	62	64	63	68	72	72	70.1	84									
29-May	70	75	82	86	81	82	88	90	92	92	91	88	86	86	81	79	76	74	74	69	73	78	80	83	81.5	92									
30-May	84	85	86	83	80	83	82	83	83	85	87	85	82	81	82	75	67	67	69	65	65	71	75	79	78.5	87									
31-May	83	86	87	86	88	85	86	83	79	71	59	50	44	40	36	34	31	32	32	31	30	28	31	36	56.3	88									
																	55.3 57.1 59.5 60.6 62.2 63.4 64.0 62.3 58.8 55.2 51.0 46.3 43.0 41.3 40.0 39.4 38.8 40.0 40.9 41.4 44.3 47.7 50.1 52.6																	Diurnal Average	
																	96 97 97 98 99 99 96 92 92 92 91 88 87 86 87 91 90 91 91 95 96 96 98 97																	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	46	6.18	6.18
20 - 40	262	35.22	41.40
40 - 60	168	22.58	63.98
60 - 80	139	18.68	82.66
80 - 100	129	17.34	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 33 km/h on May 4 18:00	Maximum Daily Speed Average: 21.2 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 14 03:00	Minimum Daily Speed Average: 2.1 km/h on May 31	Hours of Data: 744
Maximum Diurnal Speed Average: 7.1 km/h at hour 16	Minimum Diurnal Speed Average: 0.4 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 3.3 km/h 332.9 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 15 P ₉₀ = 20 P ₉₉ = 27	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	S7	S7	SSE8	SSE10	SSE10	SE9	SE10	SE7	SE8	SE7	SE4WSW15	SW14WSW11	W15	W16	W11	W11	WNW8	NNW11	NNW10	NNW4	WSW6	WSW6	SW4.5	W16		
2-May	WSW7	SSW4	WSW4	SW2	SSE5	SSE6	SSE4	SSE7	ESE3	ESE4	ESE5	ESE6	E9	NE12	NE15	NE13	NE10	NE9	ESE7	SE10	SSE11	SE9	ESE11	SE14	ESE5.1	NE15
3-May	SE14	SE14	SE14	SE14	SE13	SE19	SE14	SE13	SE11	SE11	SE7	SE11	S16	SSW16	SSW10	SSW12	SSW10	SSW10	S8	SSE11	S8	SSE5	SE2	SSE10.2	SE19	
4-May	S6	S8	SSW8WSW10	S6	SSE8	SW3	ESE4	SE6	E4	ENE5	SSE3	NW11	WNW8WNW28	W27	W33	W28	W24	W23	W24	W22WNW16		W9.5	W33			
5-May	WNW16WNW19WNW19WNW15WNW14	W15	W19	W17WNW16WNW18WNW17	W19	W23WNW25	W29	W27WNW25WNW21	NW22	NW19	N14	NNE11	NNE10	NNW8	WNW16.5	W29										
6-May	WSW6	W5	WSW7WSW11WSW10	W5	WNW6	WNW7WNW10	W6	NW12	W12	W8	W11WNW13	W14WSW15	W14	W12	SW6	SSE9	SE9	SE10	SSE11	WSW6.6	WSW15					
7-May	SSE12	SE13	SE12	SE12	SE9	SE8	SE11	SSE11	SSE12	SE9	SE6	ESE4	NNW1	ENE7	NW4	WNW9	E2	ESE10	ESE9	SE12	SE12	SE11	SSE10	SE8	SE7.4	SE13
8-May	NE2	NNE8	NNW8	NW11WNW15WNW20	W17	W32	W19	WSW6	SSW8WSW17WSW23WSW26	SW25WSW27	SW27	SW27	SW26	SW20WNW16	NW32	NW28WNW25	W15.9	W32								
9-May	WNW22WNW19	W18	W20WSW20WSW16WSW17	W23	W24WNW25WNW21WNW18WNW19WNW21WNW18WNW18	NW18WNW15WNW14	W15	W14	NW12	NNE13	N7	WNW16.3	WNW25													
10-May	WNW5	WSW9	WSW9	W10	W10	W4	NNW3	NNE7	NNW2	WNW8	NNW7	N10	N11	NNE14	NNE13	N12	NNE17	NNE16	NNE18	NNE16	NNE12	NE12	ENE10	ENE9	N6.9	NNE18
11-May	NE10	NE7	N6	NNW6	N8	N8	N11	N12	N16	N17	N17	N17	N18	N18	NNE20	N18	NNE18	NNE19	N21	N22	N18	N13	N13	N9	NNE13.9	NNE22
12-May	NNE9	NNW5	N7	NNW5	NNW5	N8	N8	NNW9	N14	NNE16	NNE16	NNE16	NNE17	NNE18	NNE16	NNE17	NNE16	NNE15	NNE14	NNE14	NNE10	NNE7	N4	W6	NNE10.7	NNE18
13-May	W7	WSW6	WSW4	SW6	S6	SSE3	SSE3	WSW4	WSW5	W10	W6	NW7WNW11	WNW9	NW8	NW7	NW10	NW8	NNW7	NE7	NNE7	NNE8	NE6	NNE4	WNW3.8	WNW11	
14-May	WSW3	WNW3	E0	W3	WSW4	WSW3	SSW1	ESE4	ESE4	SE4	WNW0	NNW5	WNW7	WNW9	WNW5	NNW9	N6	NE9	NNE11	NNE11	NNE9	N4	SW8	NNW2.5	NNE11	
15-May	W7	SW4	S3	SW6	S4	S4	SSE5	SSE5	ESE4	SE6	SE7	SW3	N6	W4	NE5	ESE7	SE8	SE9	SE10	SSE13	SSE11	SSE11	SSE11	SSE11	SSE4.7	SSE13
16-May	SSE11	SSE10	SSE9	SSE8	SSE9	SSE8	SE7	SE8	ESE5	ESE6	SSW15	SSW15	SW12	S1	ENE5	ENE6	E7	E6	E7	E8	ESE9	SE10	NNE3	ESE7	SE5.7	SSW15
17-May	SE9	SE5	SE5	SE6	SSE7	SW6WSW12WSW20	W24	W18WNW11WNW11WNW12WNW12	W17WNW16WNW11	NW8	WNW5	SE2	SSE11	SW12	SW9	W3	W7.1	W24								
18-May	WSW8WSW12	SW10	S5	SSE5	SE6	SE6	SSW6WSW13WSW15WSW13WSW20	W24	W24WSW19	W18	W21	W16WNW10	WNW5	N17	N24	N23	N16	W8.2	N24							
19-May	NNE21	N19	N16	NNW15	NNW16	N17	N20	N21	NNE24	NNE25	N26	N23	NNE24	N25	N26	N27	NNE24	N24	N23	N22	N19	N16	N20	N20	N21.2	N27
20-May	N21	N21	N20	N20	NNE19	NNE17	NNE18	NNE18	NE15	NE14	NE16	NNE17	NNE15	N18	N18	N16	NNW14	NNW17	N16	N12	NNE14	NNW8	NW10	NW11	N15.1	N21
21-May	NW11	NNW8	NNE9	N8	NNW10	NNE12	N10	N10	NNW9	NNW12	NNW11	NNW13	NNW13	NNW14	NNW15	NNW17	N15	N15	N15	N14	N13	N11	N12	N14	NNW11.7	NNW17
22-May	N13	N14	N13	N14	N15	N17	N17	NNE18	NNE19	NNE20	NNE20	NNE22	NNE20	N22	N20	NNE24	N25	N26	N26	NNE24	N17	N16	N14	N13	N18.6	N26
23-May	NNE10	NNE9	N11	N11	N14	N13	NNW10	NNW9	N9	NNW10	NNE12	NNE13	NE17	ENE20	ENE17	NE15	NE14	ENE15	ENE13	ENE11	SE9	SSE8	SSE7	SSE10	NE8.5	ENE20
24-May	SSE11	SSE13	SSE10	SSE11	SSE8	SSE9	SSE5	ESE4	ESE6	SSE12	SSE11	SSE16	S16	SSE18	SSE17	SSE16	W3	W3	S7	S11	SSW12	S11	S8	S7	SSE9.4	SSE18
25-May	SSE9	SSE10	SSE9	SSE8	SSE8	SE6	SSE6	ENE3	NE3	ENE4	NNW4	NNE5	NNE8	N10	N15	N16	N16	N19	NNE19	NNE18	NNE17	N17	N13	N15	NNE6.5	NNE19
26-May	N13	N16	N17	N15	NNW11	N13	N13	N12	NNW8	NW13	NNW14	NW18	NNW13	NNW14	NW13	NW17	NW15	NW14	NNW13	NNW10	N10	NNW8	NW8	NNW8	NNW12.2	NW18
27-May	NNW6	N7	N8	N8	ENE5	ESE14	SE16	SE19	SE15	SE10	ESE10	E12	E12	E14	ESE12	SW16	SSW10	SSE6	ESE9	E12	SE9	SSE12	SE10	ESE10	ESE7.2	SE19
28-May	SE11	SE15	ESE13	ESE15	SE15	SE15	SE11	SE11	SE10	SE10	SSE11	SE11	SSE13	SSE15	S11	SSE11	S9	SSE10	SSW11	SSW7	SSE7	S6	SSW5	SW8	SSE9.5	SSE15
29-May	WSW9	W8	WSW9	SSW6	WSW2	SW3	W5	SW4	SW5	SW6	WSW6	W7	WNW5	NNW3	NE5	ENE6	NNE6	NNE10	NNE11	NNE9	NNE8	NNE6	N5	NNW5	NW2.3	NNE11
30-May	NNW6	NNW6	NW6	NW5	NW4	WNW6	NNW8	NW8WNW11	NW9	NNW10	N12	NNW9WNW10	NW14	NW14	NW16	NW13	NNW10	NNW10	NNW14	N12	N10	N9	NNW9.2	NW16		
31-May	N5	NW5	WNW4	NW3	WSW5	W7	WNW3	NNW3	WNW4	WNW6	W5	WNW5	WNW5	WNW5	WNW7	W7	W8	SE6	SE8	SE7	SSE8	S9	SSE10	SSE12	WSW2.1	SSE12

NW1.7	NW1.6	NW1.7	NNW1.7	NNW1.1	N0.4	NNW1.1	NNW2.1	NW2.6	NNW2.8	NNW3.3	NNW4.2	NW4.5	NNW5.4	NW5.9	NW7.1	NW7.0	NNW5.5	NNW5.3	N4.5	NNE3.5	N3.4	N3.5	NNW2.2	Diurnal Average
WNW22	N21	N20	W20	WSW20	WNW20	NNE20	W32	NNE24	WNW25	N26	N23	NNE24	WSW26	W29	WNW28	SW27	W33	W28	NNE24	W23	NW32	NW28	WNW25	Diurnal Maximum

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

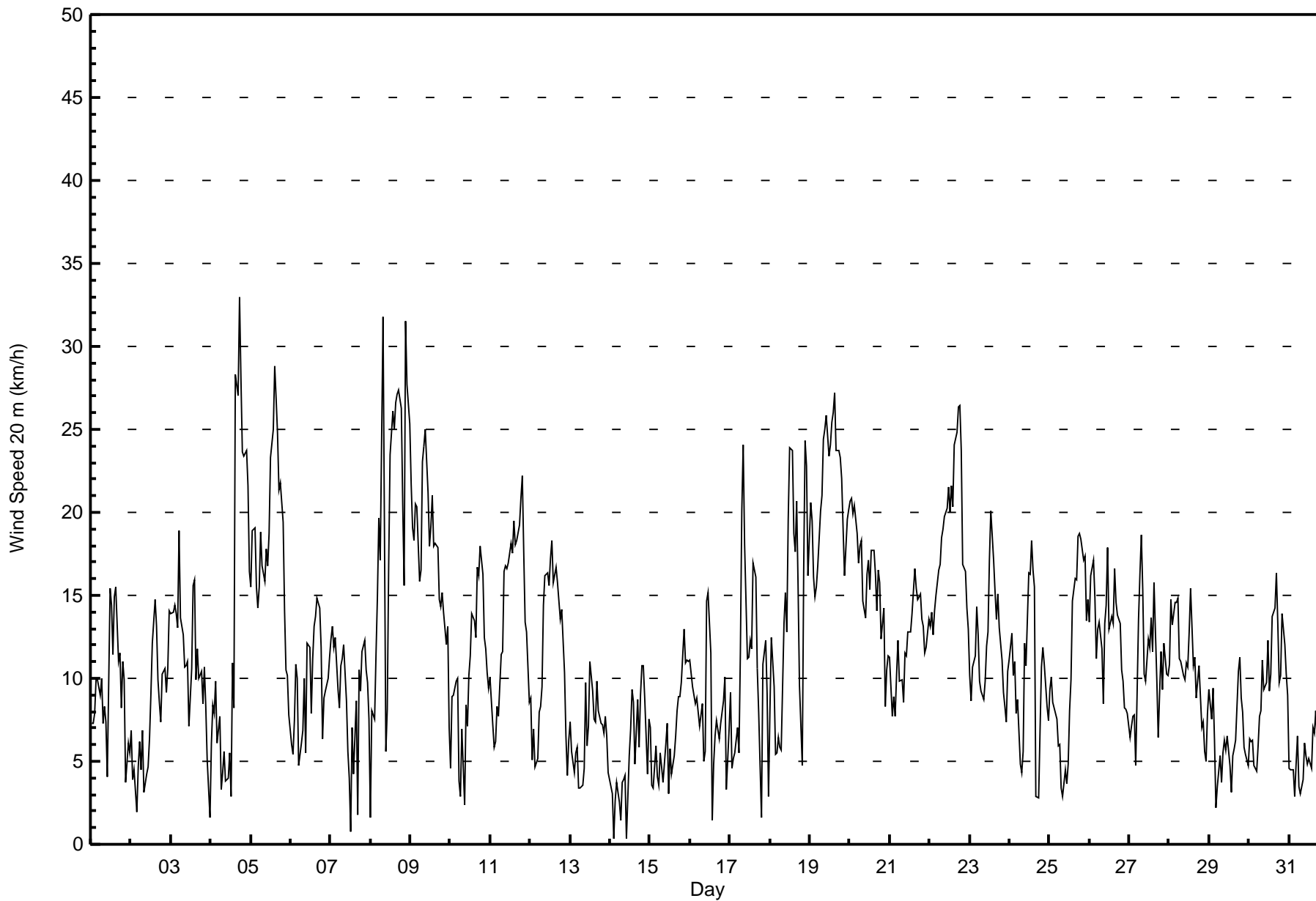


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h

Mannix - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on May 4 15:00 Minimum Value: 0 km/h on May 14 05:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 4 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1	1	2	2	2	2	2	2	3	3	2	6	6	6	6	6	3	3	3	3	2	2	1	2	6
2-May	2	1	1	2	2	2	2	2	1	2	2	3	3	3	3	3	2	2	3	2	2	3	4	4	4
3-May	5	4	4	3	3	5	4	3	3	3	4	3	5	6	6	6	5	5	4	2	2	3	3	3	6
4-May	2	2	3	4	1	3	3	2	2	2	2	3	4	4	10	8	7	7	5	6	4	5	4	4	10
5-May	4	4	4	4	3	4	3	4	4	4	4	6	8	6	6	7	6	6	6	5	4	3	3	3	8
6-May	2	1	1	2	3	2	2	3	3	3	5	6	5	7	5	6	4	4	3	2	3	3	3	3	7
7-May	3	3	3	3	4	3	2	4	4	2	2	2	2	3	4	4	3	4	3	4	5	4	5	3	5
8-May	2	2	5	3	4	5	6	7	6	3	4	7	7	7	7	7	7	7	7	6	5	8	7	6	8
9-May	5	5	3	3	4	3	3	6	6	6	6	4	4	5	5	4	5	4	4	4	3	4	3	3	6
10-May	2	2	1	1	1	3	2	2	2	4	4	5	4	6	5	5	5	5	5	5	4	3	3	2	6
11-May	3	2	2	1	2	2	3	4	6	5	6	6	6	7	6	6	6	6	6	6	5	3	3	3	7
12-May	2	2	2	1	1	3	3	3	6	5	5	5	7	6	6	6	5	6	5	4	3	2	1	2	7
13-May	1	1	1	1	1	1	2	2	5	4	4	4	5	5	5	4	4	5	3	2	2	1	1	1	5
14-May	1	2	1	1	0	1	1	2	1	2	3	3	4	4	4	4	4	3	4	3	3	2	2	1	4
15-May	1	1	2	1	1	2	2	2	1	2	3	3	3	3	3	4	3	3	3	2	3	3	2	2	4
16-May	3	2	3	2	3	3	3	3	2	2	8	6	5	2	2	2	2	3	2	3	4	5	4	6	8
17-May	5	2	3	3	2	5	5	4	4	4	4	4	3	4	5	4	4	3	2	2	5	4	3	3	5
18-May	3	3	4	2	1	2	2	5	4	4	4	6	7	6	5	6	6	4	3	3	6	7	8	8	8
19-May	7	7	6	5	6	6	6	6	7	7	8	8	7	7	8	8	8	7	7	6	6	5	7	7	8
20-May	6	6	5	6	5	5	5	5	4	4	5	5	5	5	6	5	5	6	6	5	4	3	4	4	6
21-May	3	3	3	3	5	4	3	4	4	4	4	5	5	5	5	5	5	5	5	5	5	4	4	5	5
22-May	5	4	4	5	5	6	5	6	6	7	6	7	7	7	7	7	7	8	7	7	5	4	4	3	8
23-May	2	2	3	2	4	4	4	4	3	5	5	6	7	6	5	4	4	4	3	3	5	2	1	2	7
24-May	3	3	3	3	3	3	3	2	2	5	5	7	7	7	6	5	5	2	3	5	4	4	3	2	7
25-May	2	3	2	2	2	3	3	1	2	2	3	3	4	5	5	5	6	6	5	5	5	5	4	5	6
26-May	4	6	6	5	4	4	4	4	4	5	5	6	6	5	5	5	5	5	5	4	3	3	3	3	6
27-May	3	3	2	2	4	5	5	6	6	4	4	3	5	5	5	6	7	3	3	3	4	5	3	3	7
28-May	3	5	4	5	5	6	4	4	4	4	4	4	5	7	5	5	4	4	4	3	3	2	1	2	7
29-May	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	3	3	3	3	3	2	2	1	3
30-May	2	2	2	2	3	3	3	4	4	4	4	5	4	4	5	5	6	5	4	5	5	4	4	3	6
31-May	1	2	1	1	1	1	2	2	3	3	3	4	3	3	4	4	4	3	3	2	2	2	2	3	4
Diurnal Maximum																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	110	14.78	14.78
6 - 11	310	41.67	56.45
12 - 19	244	32.80	89.25
20 - 28	76	10.22	99.46
29 - 38	4	0.54	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	4	4	5	4	10	6	10	5	3	7	9	10	12	6	12	110
6 - 11	27	22	7	6	5	13	49	45	17	10	9	18	16	21	15	30	310
12 - 19	60	38	10	3	4	4	20	13	2	5	3	13	17	23	14	15	244
20 - 28	22	15	0	1	0	0	0	0	0	0	5	6	15	10	2	0	76
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	112	79	21	15	13	27	75	68	24	18	24	46	61	66	38	57	744

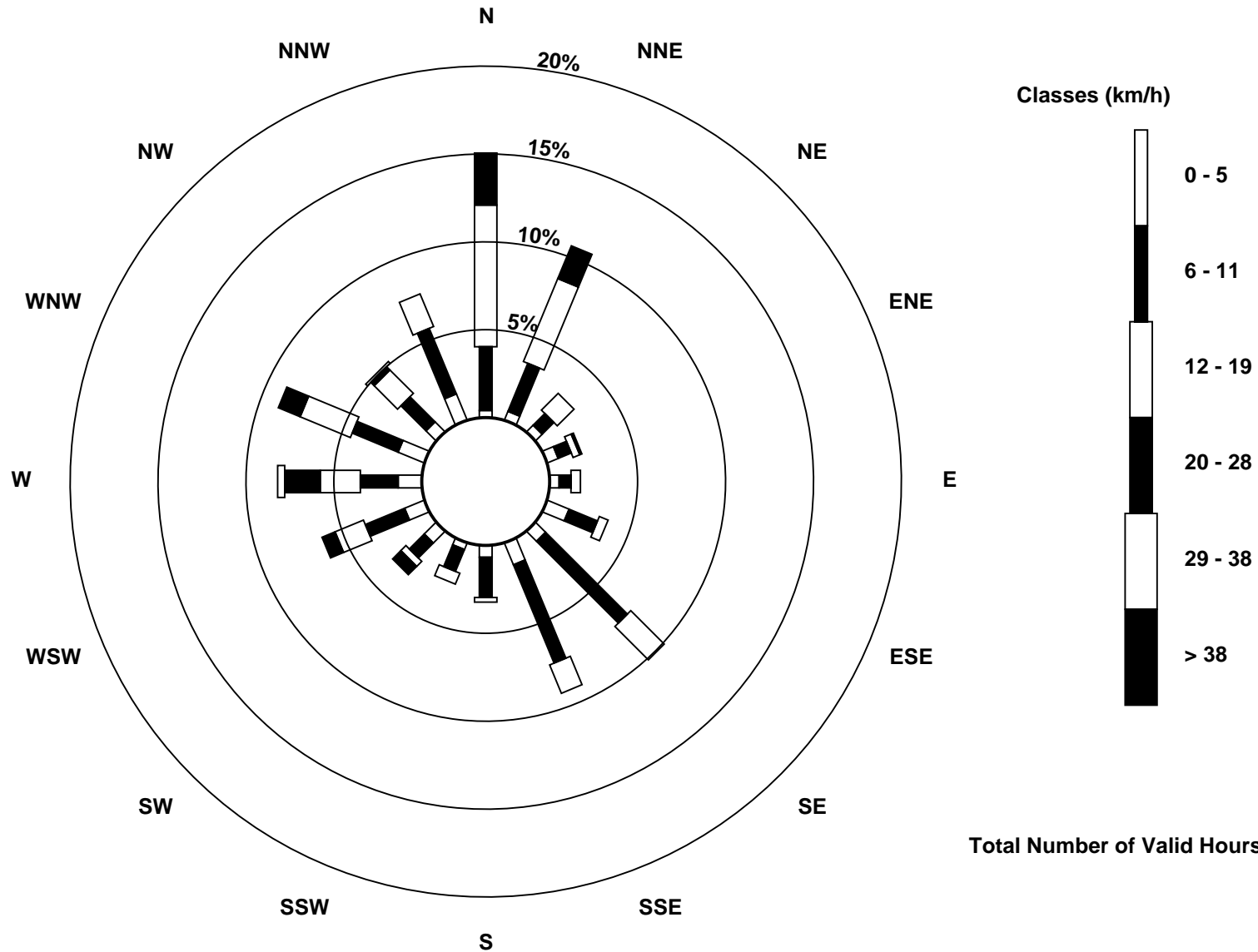
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Maximum Speed: 40 km/h on May 8 22:00	Maximum Daily Speed Average: 29.1 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 14 11:00	Minimum Daily Speed Average: 2.4 km/h on May 31	Hours of Data: 744
Maximum Diurnal Speed Average: 9.1 km/h at hour 17	Minimum Diurnal Speed Average: 0.7 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 4.2 km/h 330.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 15 Q ₃ = 21 P ₉₀ = 26 P ₉₉ = 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-May	SSE11	S13	SSE14	SE18	SSE16	SE14	SE12	SE8	SE10	SE8	ESE4	WSW18	SW17	SW13	W16	W17	W13	WSW13	NNW10	NW17	NNW18	NNW8	W3	W6	SSW5.1	WSW18
2-May	W6	WNW3	SW4	W3	SE6	SSE8	SSE8	SSE8	SE2	ESE4	ESE5	E7	ENE9	NE13	NE16	NE14	NE11	NE9	E10	SE15	SE17	SE15	ESE15	SE20	ESE6.1	SE20
3-May	SE20	SE20	SE21	SE19	SE19	SE25	SE18	SE16	SE13	SE13	SE13	SE8	SE14	SSE21	S23	SSW13	SSW15	S15	SSW16	S18	SSE18	SSE16	S11	S6	SSE14.5	SE25
4-May	SSW7	SSW13	SSW14	WSW14	SSW8	SSE15	SW8	ESE3	SE6	E3	E3	ENE5	S4	NW13	W10	WNW33	W32	W37	W31	W27	WSW27	W29	W26	W22	WSW12.6	W37
5-May	WNW23	WNW26	WNW26	WNW22	WNW20	W20	W21	W19	WNW19	WNW21	WNW20	W21	W26	WNW29	W32	W31	W30	WNW27	WNW28	NW26	N18	NNE15	N15	N12	WNW20.4	W32
6-May	W7	W9	W9	WSW15	WSW16	W7	WNW8	WNW8	WNW11	W6	NW15	W14	W10	W13	WNW16	WSW16	WSW17	WSW16	WSW13	SW9	SSE11	SE15	SE16	SE18	WSW8.2	SE18
7-May	SE19	SE20	SE19	SE21	SE17	SE13	SE16	SE17	SE17	SE11	SE7	SE5	W3	NE7	NW5	WNW10	ENE2	ESE13	ESE12	ESE17	ESE17	ESE15	SE14	SE11	SE10.9	SE21
8-May	NE3	NNE12	NNW12	NW17	WNW21	WNW27	W21	W36	W23	WSW7	SSW12	SW21	SW28	SW32	SW30	SW33	SW34	SW35	SW33	SW26	W19	WNW40	NW36	WNW33	W19.5	WNW40
9-May	WNW28	W24	W21	W24	WSW26	WSW22	WSW21	W26	W28	WNW30	WNW26	WNW22	WNW24	WNW26	WNW22	WNW23	WNW23	WNW18	WNW18	W18	W16	NW16	N17	N10	WNW20.2	WNW30
10-May	WNW7	WSW13	WSW14	WSW15	W15	WNW7	NNW4	N8	NW4	WNW10	NNW9	N13	N14	N17	N16	N16	N21	NNE21	NNE23	NNE21	NNE18	NE16	NE14	NE12	N9.0	NNE23
11-May	NE13	NE10	N9	NNW11	N13	NNW12	N15	N15	N21	N22	N21	N21	N22	N22	NNE23	N23	NNE23	NNE24	N28	N29	N25	N20	N20	N13	N18.6	N29
12-May	NNE12	NNW8	N11	N8	NNW8	NNW12	N12	NNW12	N18	NNE20	NNE19	NNE19	N21	NNE23	NNE19	N20	N20	N19	NNE18	N18	NNE16	NNE12	NNE7	NW3	N14.5	NNE23
13-May	WNW13	W10	W9	W7	SSW9	S6	S4	WSW4	W7	W11	W7	NW9	WNW13	WNW11	NW9	NW10	NW12	NW11	NNW10	NNE10	NNE10	NNE13	NNE12	NE6	NW5.8	NNE13
14-May	NNE2	NNE2	N3	N3	SSE2	SW2	SSW2	SE3	SE4	SE4	WNW1	NNW7	WNW8	WNW11	WNW11	NW6	NW12	N8	NNE11	NNE15	NNE17	NNE14	NNE11	SW2	N4.2	NNE17
15-May	WSW6	WNW5	SSE5	S9	SSE7	SSE7	SE7	SSE6	SE5	SE7	SE8	SW4	N7	W5	NNE5	ESE7	SE10	SE11	SE12	SE16	SSE23	SSE21	SSE21	SSE22	SSE7.6	SSE23
16-May	SSE22	SSE17	SSE17	SE16	SE17	SE14	SE11	SE11	ESE5	ESE6	SSW21	SSW23	SSW16	S3	ENE6	ENE11	E13	E11	E12	E11	ESE14	SE15	N4	ESE10	SE9.7	SSW23
17-May	SE15	SE8	SE11	SSE11	SSE11	SW12	WSW16	WSW24	W26	W21	W14	W14	WNW15	WNW14	W20	W19	WNW14	NW11	WNW7	SE2	SSE18	SW18	SW15	WSW7	WSW9.2	WSW26
18-May	SW13	WSW18	SW16	SSW11	S9	SSE11	SSE8	SSW9	SW16	SW18	SW15	WSW23	WSW27	WSW27	WSW21	W20	W23	W18	W12	W7	N24	N34	N32	N23	W10.5	N34
19-May	N28	N27	N23	NNW22	NNW23	N24	N27	N29	N32	N33	N35	N31	N32	N33	N35	N37	N32	N32	N31	N29	N26	N23	N28	N29	N29.1	N37
20-May	N29	N28	N27	N28	N26	N23	N23	NNE23	NNE18	NE16	NNE20	NNE21	NNE19	N23	N24	N22	NNW19	NNW24	NNW23	NNW19	N20	NNW13	NW16	NW16	N20.6	N29
21-May	NW16	NNW12	N13	N11	NNW16	N17	N14	N15	NNW12	NNW16	NW16	NNW18	NW18	NNW20	NNW21	NNW23	N22	N21	N21	N20	N19	NNW17	N18	N21	NNW16.9	NNW23
22-May	N19	N19	N18	N21	N22	N23	N23	N25	N26	N27	N28	N29	N27	N30	N27	N32	N33	N36	N37	N31	N25	N26	N23	N21	N26.0	N37
23-May	NNE16	NNE14	N18	N17	N22	N18	NNW14	NNW13	NNW12	NNW14	NNE15	NNE16	NE20	NE24	NE20	NE18	NE16	ENE18	ENE16	ENE14	SE14	SSE15	SSE15	SSE20	NE11.1	NE24
24-May	SSE23	SSE24	SSE21	SSE21	SSE15	SSE15	SSE6	ESE5	SE7	SE16	SSE16	SE22	SSE25	SSE24	SSE22	SE21	W5	WSW5	S14	S21	S22	S22	S19	S17	SSE15.8	SSE25
25-May	SSE19	SSE20	SSE18	SSE17	SSE15	SE10	SSE8	ENE3	NNE3	NE5	N5	NNE5	N10	N12	N19	N21	N22	N26	N25	NNE24	N24	N24	N19	N21	NNE7.5	N26
26-May	N20	N24	NNW26	N22	NNW17	N18	N18	N15	NNW12	NW19	NNW20	NW25	NNW18	NNW19	NW19	NW22	NW21	NW19	NW19	NNW16	N15	NNW14	NW14	NNW13	NNW17.6	NNW26
27-May	NNW11	NNW12	N12	N13	E8	ESE17	ESE20	SE23	SE21	ESE13	ESE12	E14	E14	E15	ESE15	SW20	SSW15	SSE10	ESE12	ENE16	ESE13	SSE19	SE15	ESE14	ESE9.3	SE23
28-May	SE17	ESE19	ESE16	ESE18	SE20	ESE18	ESE14	SE14	SE13	SE13	SE15	SE14	SSE18	SSE23	S19	SSE16	S14	SSE15	SSW17	S13	SSE14	S13	SSW11	SW12	SSE13.6	SSE23
29-May	WSW12	W9	WSW12	SSW11	WSW4	SW5	W7	SW4	SW6	SW8	WSW6	W7	WNW7	NW5	NE6	NE7	NNE8	NNE12	NNE14	N12	NNE12	N10	N9	NNW10	NW3.4	NNE14
30-May	NNW12	NNW12	NW11	NW9	NW8	WNW9	NNW12	NW14	WNW16	NW14	NW15	N16	NNW13	WNW14	WNW21	NW21	NW24	NW21	NNW16	NNW16	NNW22	N19	N16	N14	NW14.5	NW24
31-May	N9	NNW8	WNW9	NW6	WNW8	W9	WNW5	NNW4	WNW6	WNW7	W6	WNW6	WNW7	WNW6	WNW9	W8	W10	SE8	SE11	SE10	SE14	SSE20	SSE18	SSE23	WSW2.4	SSE23

NNW2.1	NW2.3	NW2.4	NNW2.0	NNW1.7	NNW0.7	NNW1.6	NNW2.8	NW3.5	NNW4.0	NNW4.4	NW5.3	NW5.7	NW6.9	NW7.5	NW9.0	NW9.1	NNW7.4	NNW7.0	N5.6	NNE4.8	N4.1	N4.6	N2.9	Diurnal Average	
N29	N28	N27	N28	WSW26	WNW27	N27	W36	N32	N33	N35	N31	N32	N33	N35	N37	SW34	W37	N37	N31	WSW27	WNW40	WNW36	WNW33	Diurnal Maximum	

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

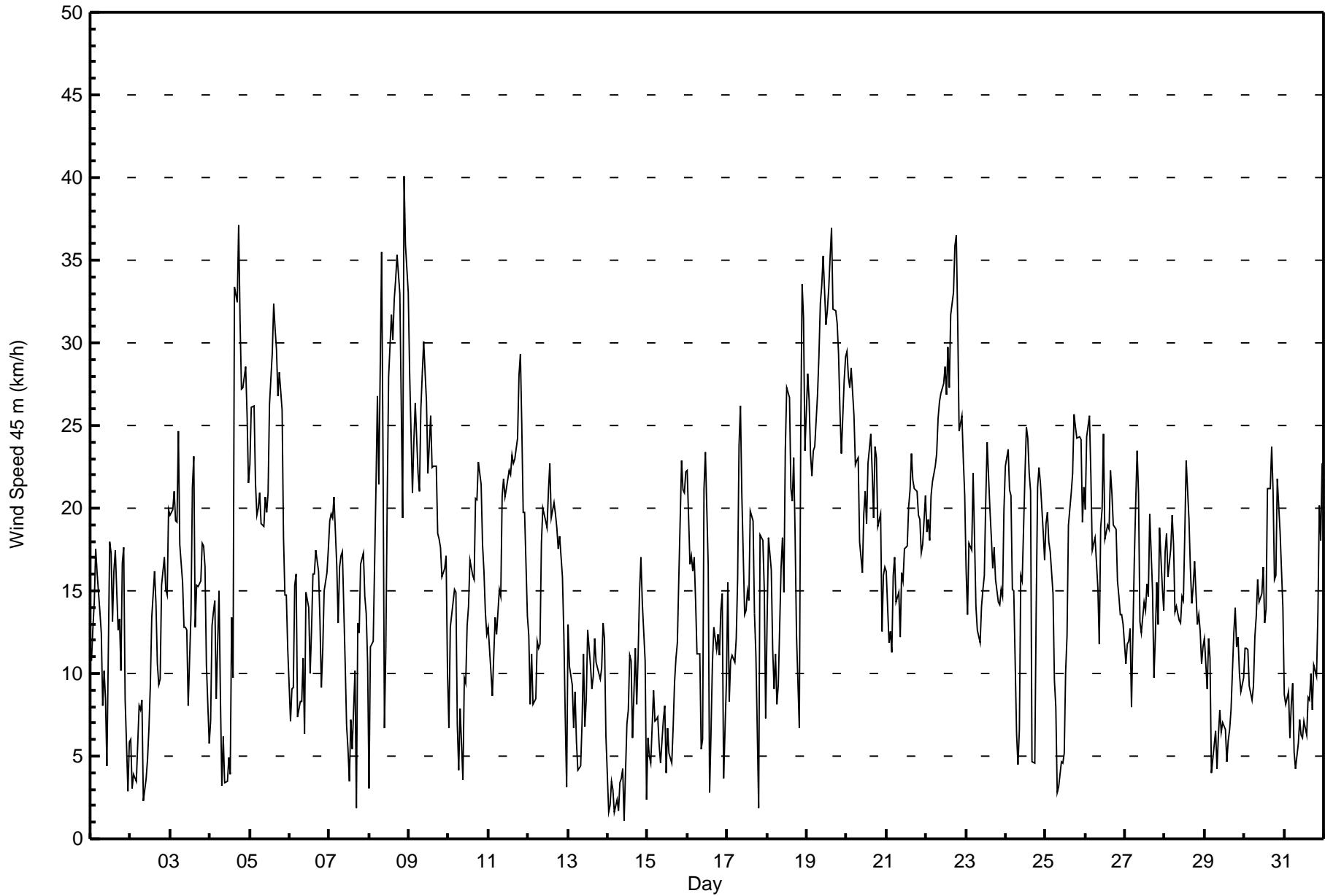


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h

Mannix - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on May 4 15:00														Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																											
Minimum Value: 1 km/h on May 14 06:00																																									
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																																									
Day	Hourly Period Ending At (MST)																								Daily Maximum																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																	
1-May	2	1	2	1	2	2	2	2	3	3	2	6	6	6	6	6	3	4	2	4	2	4	1	1	6																
2-May	2	2	2	1	2	4	2	2	2	2	2	3	3	3	3	4	2	2	3	2	3	5	5	4	5																
3-May	5	3	4	3	3	5	4	3	3	3	3	6	5	5	7	5	6	3	2	2	2	4	4	7																	
4-May	2	3	2	3	2	5	6	2	2	2	3	4	4	4	11	7	6	7	4	6	4	4	4	11																	
5-May	3	4	3	3	2	3	3	4	3	3	4	5	8	6	5	6	6	6	5	5	4	3	3	8																	
6-May	2	1	1	2	2	3	2	2	3	3	5	6	5	7	6	6	4	4	3	1	5	3	3	7																	
7-May	2	2	2	2	5	2	2	4	4	2	2	2	3	3	5	5	3	4	3	4	5	4	7	7																	
8-May	2	2	6	3	4	5	5	6	6	3	4	7	7	6	7	8	7	6	6	5	5	7	6	8																	
9-May	5	4	3	3	3	3	3	6	5	4	5	3	4	4	4	3	4	3	4	3	2	4	3	6																	
10-May	2	2	1	1	1	4	3	2	3	4	4	5	4	6	6	5	4	5	5	5	4	3	3	6																	
11-May	3	2	1	1	3	2	3	4	5	5	6	5	6	7	6	6	6	5	6	6	4	3	3	7																	
12-May	2	2	2	2	1	3	3	3	6	4	5	5	8	6	6	6	6	6	5	4	2	3	1	8																	
13-May	2	1	2	1	2	2	2	2	4	4	4	4	5	5	6	5	4	5	3	3	2	1	2	6																	
14-May	1	1	1	2	1	1	1	2	1	2	3	4	4	4	4	4	4	3	4	3	3	2	3	4																	
15-May	1	1	3	2	2	1	2	2	1	2	3	3	3	3	3	4	3	3	3	2	2	2	2	4																	
16-May	2	4	3	1	2	3	2	3	2	2	9	5	5	4	2	3	3	3	3	3	5	6	5	9																	
17-May	7	3	4	3	3	5	6	4	3	3	4	4	3	3	5	3	3	2	2	2	6	4	3	7																	
18-May	4	5	5	3	2	2	2	5	4	4	4	5	7	5	5	6	6	3	2	3	6	6	8	8																	
19-May	7	7	6	4	5	6	6	6	6	6	7	7	7	7	7	7	7	6	6	6	5	5	6	7																	
20-May	6	5	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	6	4	5	3	3	6																	
21-May	2	3	3	3	6	4	3	4	3	3	3	4	3	4	4	4	4	5	5	5	4	4	4	6																	
22-May	5	4	4	4	4	5	5	6	5	7	5	6	6	7	6	7	7	6	6	6	4	4	4	7																	
23-May	3	2	3	2	3	3	3	3	3	4	5	6	6	5	5	4	5	4	3	3	6	2	1	6																	
24-May	2	2	1	1	3	3	3	2	3	5	6	6	6	6	5	5	7	2	3	4	3	3	2	7																	
25-May	1	2	1	1	2	3	3	2	2	2	3	3	4	5	4	4	5	5	5	5	4	4	4	5																	
26-May	4	4	4	5	3	4	3	3	3	4	4	4	6	4	4	3	4	3	4	3	3	2	3	6																	
27-May	2	3	2	1	5	5	5	7	6	4	4	3	5	5	6	6	9	3	3	3	4	6	4	9																	
28-May	3	5	5	5	5	6	4	5	4	4	4	3	4	6	5	5	4	3	4	2	2	1	2	6																	
29-May	2	2	2	3	2	3	2	1	1	2	1	1	2	1	2	2	3	3	3	2	3	1	2	3																	
30-May	2	2	2	2	2	2	2	3	3	3	3	4	3	3	4	4	4	5	3	5	4	4	3	5																	
31-May	1	2	1	2	1	1	1	2	3	3	3	3	4	4	4	4	4	3	3	2	2	1	2	4																	
Diurnal Maximum																		7	7	6	5	6	6	6	7	6	7	9	7	8	7	11	8	9	7	6	6	6	7	8	8





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	59	7.93	7.93
6 - 11	160	21.51	29.44
12 - 19	294	39.52	68.95
20 - 28	186	25.00	93.95
29 - 38	44	5.91	99.87
> 38	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	5	2	3	2	6	7	2	3	1	6	3	5	4	3	3	59
6 - 11	12	6	7	3	5	3	23	15	5	7	4	4	23	23	10	10	160
12 - 19	41	24	10	4	5	19	42	23	10	9	10	17	14	12	20	34	294
20 - 28	63	12	3	0	0	1	12	18	4	2	4	10	18	20	7	12	186
29 - 38	25	0	0	0	0	0	0	0	0	0	6	0	7	6	0	0	44
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Totals	145	47	22	10	12	29	84	58	22	19	30	34	67	66	40	59	744

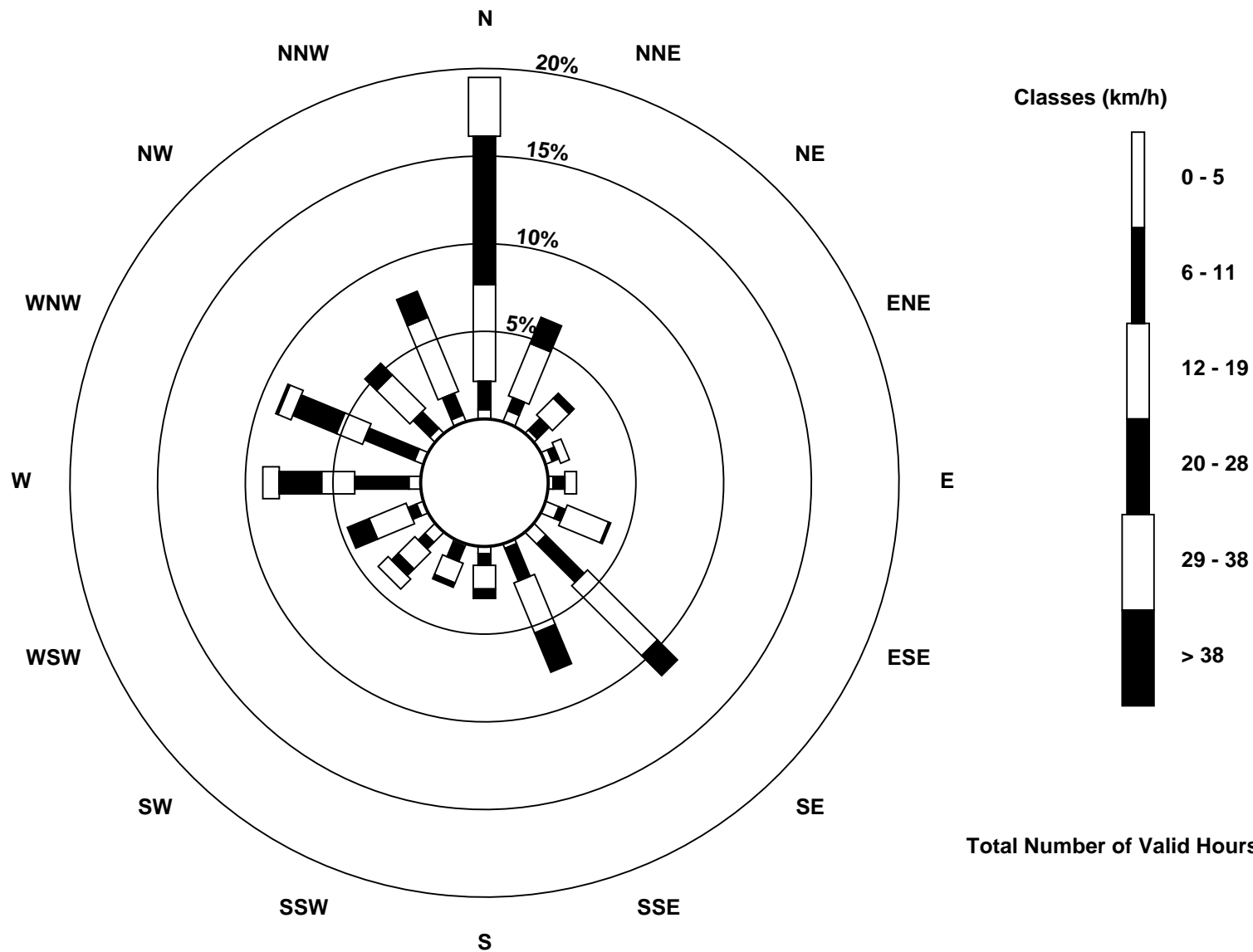
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Maximum Speed: 42 km/h on May 19 16:00	Maximum Daily Speed Average: 32.9 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 2 05:00	Minimum Daily Speed Average: 2.0 km/h on May 31	Hours of Data: 744
Maximum Diurnal Speed Average: 9.7 km/h at hour 17	Minimum Diurnal Speed Average: 2.1 km/h at hour 7	Hours of Missing Data: 0
Monthly Average Velocity: 4.7 km/h 335.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 6 Q ₁ = 11 Median = 17 Q ₃ = 23 P ₉₀ = 30 P ₉₉ = 39	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SSE12	SSE14	SSE17	SSE13	SSE17	S10	SE13	SE8	SE10	SE9	SE4	SW20	SW18	SW14	W17	W18	W13WSW14	NNW11	NW22	NNW21	N13	NNW4	NNW4	SW4.9	NW22	
2-May	WSW1	NW5	NW3	NW4	WNW1	SSE1	SSE10	SSE13	S3	SE4	ESE5	E7	ENE9	NE14	NE17	NE15	NE11	NE10	E9	SE18	SE21	SE19	ESE12	SE21	ESE6.4	SE21
3-May	SE20	SE20	SE19	SE20	SE21	SE29	SE21	SE15	SE13	SE12	SE13	SE8	SSE15	SSE23	S25	SSW13	SSW17	S17	SSW17	S22	SSE21	SSE24	S17	SSW11	SSE15.9	SE29
4-May	SW10	SSW14	SW14	WSW13	SW8	SSE13	WSW14	S1	SE6	ESE3	ENE2	NE4	S4	NW14	W11	WNW35	W34	W39	W33	W30	W30	W32	W29	WNW25	W14.4	W39
5-May	WNW27	WNW30	WNW29	WNW25	WNW22	W23	W22	W20	WNW19	WNW21	WNW20	W22	W27	WNW30	W33	W32	WNW31	WNW28	NW30	NW30	N21	NNE20	NNE19	N14	WNW21.9	W33
6-May	WNW6	WNW9	W10	WSW19	W20	W11	WNW10	WNW9	WNW11	WNW7	NW15	W15	W10	W13	WNW17	WSW17	WSW19	WSW17	W14	SW11	SSE12	SE20	SE21	SE22	WSW8.7	SE22
7-May	SSE26	SE26	SE26	SSE28	SE25	SE19	SE22	SSE23	SSE21	SSE12	SSE9	S8	WSW5	NE7	NW6	WNW10	ENE2	ESE10	ESE9	SE17	ESE17	ESE14	SE16	SE11	SE13.0	SSE28
8-May	ENE4	NE14	N13	NW20	WNW25	WNW31	W24	W37	W25	WSW7	SSW12	SW22	SW30	SW34	SW33	SW36	SW37	SW38	SW36	SW29	W21	WNW42	NW39	WNW35	W20.8	WNW42
9-May	WNW31	W27	W24	W27	W30	WSW27	WSW25	W27	W29	WNW31	WNW27	WNW23	WNW25	WNW26	WNW23	WNW23	WNW23	WNW20	WNW19	W18	W17	NW18	N19	N12	WNW21.9	WNW31
10-May	NW8	WSW14	WSW18	WSW22	W20	WNW10	NNW5	N8	NW4	WNW9	NNW10	N14	N15	N18	NNE17	N17	N22	NNE23	NNE26	NNE25	NNE23	NE22	NE18	ENE16	N10.3	NNE26
11-May	NE16	NE13	NNE7	N11	N16	N16	N18	N16	N22	N23	N23	N23	N25	N24	NNE25	N25	NNE25	NNE27	N31	N32	N29	N25	NNE26	NNE18	N21.0	N32
12-May	NNE15	N10	N14	N11	N10	N15	N14	NNW12	N19	NNE22	NNE21	NNE21	N23	NNE25	NNE22	N22	N21	N20	NNE20	NNE21	NNE21	NNE18	NE11	N4	NNE16.9	NNE25
13-May	WNW12	WNW12	WNW12	W11	WSW9	WSW6	SW6	WSW5	W8	W11	WNW7	NW9	WNW13	WNW11	NW9	NNW10	NW12	NW12	NNW11	NNE12	NNE12	NNE16	NE17	ENE9	NW6.7	NE17
14-May	ENE4	N1	NNW6	NNW6	WNW2	SSW3	SW2	SSE3	SSE4	SE4	NW1	NNW7	WNW7	WNW12	NW11	NW7	NNW12	N9	NNE12	NNE19	NNE23	NNE20	NNE14	N3	N5.5	NNE23
15-May	W1	WNW5	SE3	S10	S7	SSE6	SE10	SSE9	SSE9	SE9	SE7	SW4	N7	W5	NE5	ESE6	SE9	SE10	SE14	SE19	SSE29	SSE29	SSE30	SSE32	SSE9.5	SSE32
16-May	SSE30	S19	S16	S16	SSE16	SSE16	SSE15	SE12	SE7	SE7	SSW23	SSW25	SSW18	S4	E5	E8	E9	E9	ESE7	ESE8	SE14	SE17	N4	SE11	SSE10.7	SSE30
17-May	SSE19	SSE6	SSE11	SSE10	S12	SW19	WSW19	WSW27	W27	W21	WNW14	W14	WNW15	WNW15	W20	W20	WNW14	NW11	WNW7	E1	SSE21	SW21	SW19	SW12	WSW10.9	W27
18-May	SW16	WSW22	SW20	SSW13	SSW13	SSW12	S11	SW14	SW17	SW19	SW15	WSW25	WSW29	WSW28	WSW22	W21	W24	W19	W13	W7	N28	N38	N36	N27	W12.0	N38
19-May	N33	N31	N26	NNW25	NNW27	N27	N30	N33	N36	N38	N39	N35	N36	N38	N39	N42	N37	N36	N34	N33	N29	N27	N31	N34	N32.9	N42
20-May	N34	N32	N31	N32	N29	N25	NNE25	NNE25	NNE20	NE18	NE22	NNE24	NNE20	N25	N27	N25	NNW21	NNW27	N27	N23	N23	N14	NW18	NW18	N23.3	N34
21-May	NW17	NNW14	N15	N13	N19	N20	N17	N18	NNW13	NNW16	NNW16	NNW18	NNW19	NNW21	NNW23	NNW26	N24	N24	N24	N22	N22	N21	N21	N25	N19.0	NNW26
22-May	N22	N23	N22	N25	N25	N26	N27	N29	N30	NNE30	N31	N32	N29	N33	N30	N35	N36	N40	N40	N36	N30	N32	N30	N26	N30.0	N40
23-May	NNE22	NE15	NNE19	NNE21	N28	N23	NNW15	NNW13	N12	NNW15	NNE16	NNE17	NE22	NE27	NE22	NE20	NE18	ENE19	ENE18	ENE17	SE17	SSE20	SSE21	SSE27	NE13.1	N28
24-May	SSE29	S32	SSE27	SSE24	SSE21	SSE20	SSE7	SE4	SE7	SE17	SSE17	SE22	SSE27	SSE26	SE24	SE23	WSW4	WSW5	S17	S25	S26	S26	S23	S21	SSE18.5	S32
25-May	SSE22	SSE23	SSE23	SSE22	SSE18	SSE12	SSE9	ENE2	NNE4	NE5	N5	NNE6	N11	N13	N20	N22	N24	N29	N28	NNE28	N28	N28	N23	N25	NNE7.9	N29
26-May	N23	N28	N29	N25	NNW20	N20	N20	N16	NNW12	NW19	NNW20	NW25	NNW19	NNW21	NW18	NW22	NW22	NW20	NNW20	NNW17	N17	NNW16	NNW16	N17	NNW19.2	N29
27-May	N13	N14	N13	NE12	E9	ESE14	ESE17	SE22	SE22	ESE12	ESE11	E13	E12	E14	ESE14	SW21	SSW17	S11	SE12	ENE17	ESE10	SSE20	SE17	ESE12	ESE9.1	SE22
28-May	SE20	ESE15	ESE13	ESE14	SE18	ESE15	ESE12	SE14	SE14	SE14	SE15	SE15	SSE20	SSE25	S21	SSE17	S15	SSE17	SSW19	S15	SSE16	S15	SSW13	WSW13	SSE13.8	SSE25
29-May	WSW14	W10	W13	SSW13	WSW6	WSW5	W7	SW4	SW6	SW8	WSW6	W7	WNW6	NNW5	NE7	NE7	NNE8	NNE14	NNE16	NNE13	NNE15	NNE12	N11	N10	NW3.9	NNE16
30-May	N14	N15	NNW14	NW12	NW11	NW11	NNW14	NW14	WNW16	NW15	NNW15	N18	NNW14	WNW14	NW23	NW23	NW26	NW24	NNW18	NNW18	NNW25	N22	N19	N17	NNW16.3	NW26
31-May	N10	NNW10	NW10	NNW7	WNW9	WNW12	NW5	NNW4	WNW6	WNW7	WNW6	NW6	WNW8	WNW6	WNW8	W9	W10	SE8	SE10	SE10	SE16	S23	SSE23	SSE31	SW2.0	SSE31

N2.1	NNW2.9	NW3.1	WNW2.9	NNW2.9	NW2.3	NW2.1	NW2.9	NW3.4	NNW4.3	NNW4.7	NNW5.6	NW5.9	NNW7.2	NW7.8	NW9.5	NW9.7	NNW8.1	NNW7.9	N6.5	NNE6.1	NNE5.0	NNE5.4	NNE3.4	Diurnal Average	
N34	N32	N31	N32	W30	WNW31	N30	W37	N36	N38	N39	N35	N36	N38	N39	N42	SW37	N40	N40	N36	W30	WNW42	NW39	WNW35	Diurnal Maximum	

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

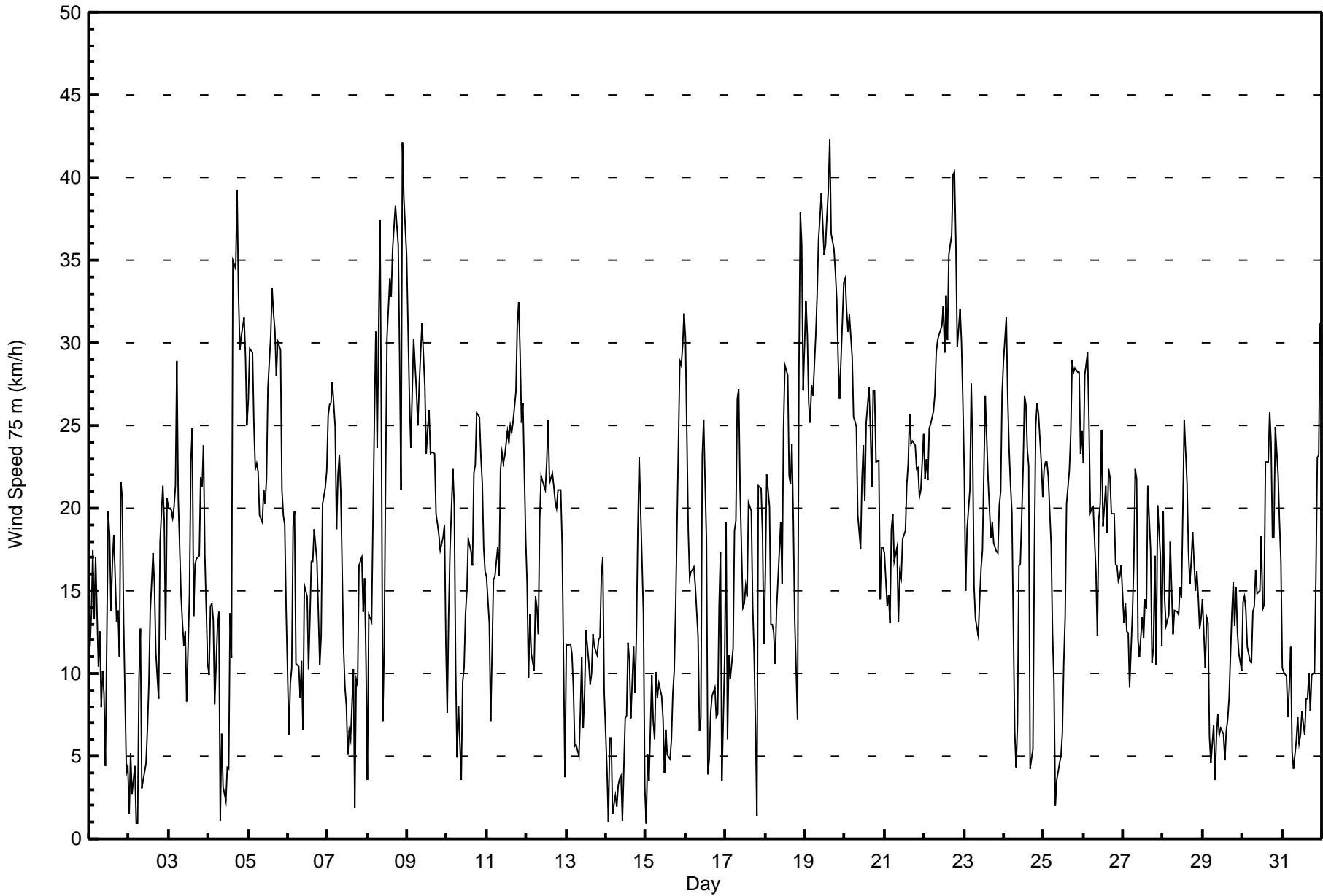


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 75 m (WS75m) - km/h

Mannix - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on May 4 15:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on May 13 02:00																									
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 4 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	2	2	3	2	3	1	1	3	3	3	2	6	7	5	6	6	3	4	3	4	1	4	1	2	7
2-May	1	2	1	1	1	2	2	2	2	2	2	3	4	3	3	4	2	2	3	3	4	7	6	6	7
3-May	7	6	6	5	4	4	4	4	3	4	3	3	6	5	5	8	5	6	3	2	4	4	5	6	8
4-May	2	3	2	3	2	6	4	2	3	2	2	3	4	4	11	7	6	7	5	6	4	4	4	4	11
5-May	3	3	3	3	2	2	3	3	2	3	4	5	8	6	5	6	6	6	5	5	4	3	3	3	8
6-May	1	1	1	2	2	5	3	2	3	3	5	6	5	7	5	6	4	4	3	1	6	2	2	2	7
7-May	3	2	2	2	4	2	2	3	4	1	1	2	3	3	5	4	3	4	3	6	7	5	7	5	7
8-May	2	3	5	3	3	5	5	6	6	4	4	8	6	6	6	7	7	5	5	5	5	7	6	5	8
9-May	5	5	3	3	3	2	2	5	5	4	4	3	3	3	3	3	4	3	4	3	2	4	3	3	5
10-May	2	2	2	1	2	5	3	2	3	4	4	5	4	6	6	5	4	5	5	5	4	3	3	4	6
11-May	3	2	1	3	3	3	3	4	5	4	5	5	5	6	6	6	6	5	5	5	4	3	3	4	6
12-May	2	2	2	1	1	3	3	3	6	4	5	5	8	5	7	6	6	6	5	4	2	3	2	2	8
13-May	2	1	2	2	1	2	1	2	4	3	4	4	5	5	6	5	4	5	3	2	2	1	2	2	6
14-May	2	1	2	1	1	1	1	2	1	2	3	4	4	4	4	4	4	3	5	3	2	2	2	3	5
15-May	1	1	3	1	3	2	1	1	1	2	3	3	4	3	3	3	3	4	3	2	3	2	2	2	4
16-May	3	5	2	2	2	2	2	3	2	3	9	5	5	4	2	3	4	3	3	3	7	8	6	8	9
17-May	6	3	6	6	3	4	6	4	3	3	4	4	3	3	5	3	3	3	2	2	9	4	3	5	9
18-May	4	6	5	3	2	2	1	5	4	3	4	5	7	5	6	5	6	3	3	3	6	6	7	9	9
19-May	7	7	6	4	5	6	6	5	6	6	6	8	7	6	7	7	7	6	6	5	5	5	6	6	8
20-May	5	4	4	4	3	4	4	4	4	4	4	4	5	5	5	5	5	4	5	5	5	3	3	2	5
21-May	2	3	3	3	7	4	3	4	3	3	3	4	3	3	4	4	4	5	5	4	4	4	4	5	7
22-May	5	3	4	4	4	5	4	5	5	6	4	7	6	6	6	6	6	6	5	6	4	3	4	2	7
23-May	3	2	3	2	3	3	3	3	3	4	6	6	7	5	5	4	5	4	3	3	6	2	1	2	7
24-May	2	2	2	1	2	3	4	2	3	6	6	7	5	6	5	5	7	3	3	4	3	3	2	1	7
25-May	1	1	1	1	2	2	4	2	2	2	3	3	4	4	4	4	4	5	5	4	4	4	4	3	5
26-May	3	4	4	4	3	4	3	3	3	3	4	4	7	4	5	3	4	3	3	3	3	2	3	2	7
27-May	2	2	1	1	4	5	7	9	7	5	5	4	4	6	7	7	9	4	5	5	4	9	6	5	9
28-May	5	6	5	5	7	7	5	6	4	4	4	4	4	7	5	4	3	3	4	2	2	1	2	2	7
29-May	2	3	2	4	3	3	3	1	1	2	1	1	1	1	2	2	2	3	3	2	2	1	1	1	4
30-May	1	1	2	2	3	3	3	3	2	3	3	4	3	3	4	4	4	4	3	5	3	4	3	3	5
31-May	1	2	1	2	1	1	2	2	3	3	4	3	3	4	4	3	4	3	4	3	2	1	4	2	4
Diurnal Maximum																									
7 7 6 6 7 7 7 9 7 6 9 8 8 7 11 8 9 7 6 6 9 9 7 9																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	56	7.53	7.53
6 - 11	135	18.15	25.67
12 - 19	243	32.66	58.33
20 - 28	220	29.57	87.90
29 - 38	82	11.02	98.92
> 38	8	1.08	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	1	3	5	2	2	5	3	4	1	3	6	2	4	5	5	56
6 - 11	11	3	6	2	6	7	17	11	6	1	6	5	13	22	11	8	135
12 - 19	35	19	11	6	3	13	27	20	10	13	10	13	12	15	13	23	243
20 - 28	58	28	6	0	0	0	20	25	8	3	4	9	20	16	10	13	220
29 - 38	41	1	0	0	0	0	1	7	1	0	8	1	11	9	2	0	82
> 38	5	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	8
Totals	155	52	26	13	11	22	70	66	29	18	31	34	59	67	42	49	744

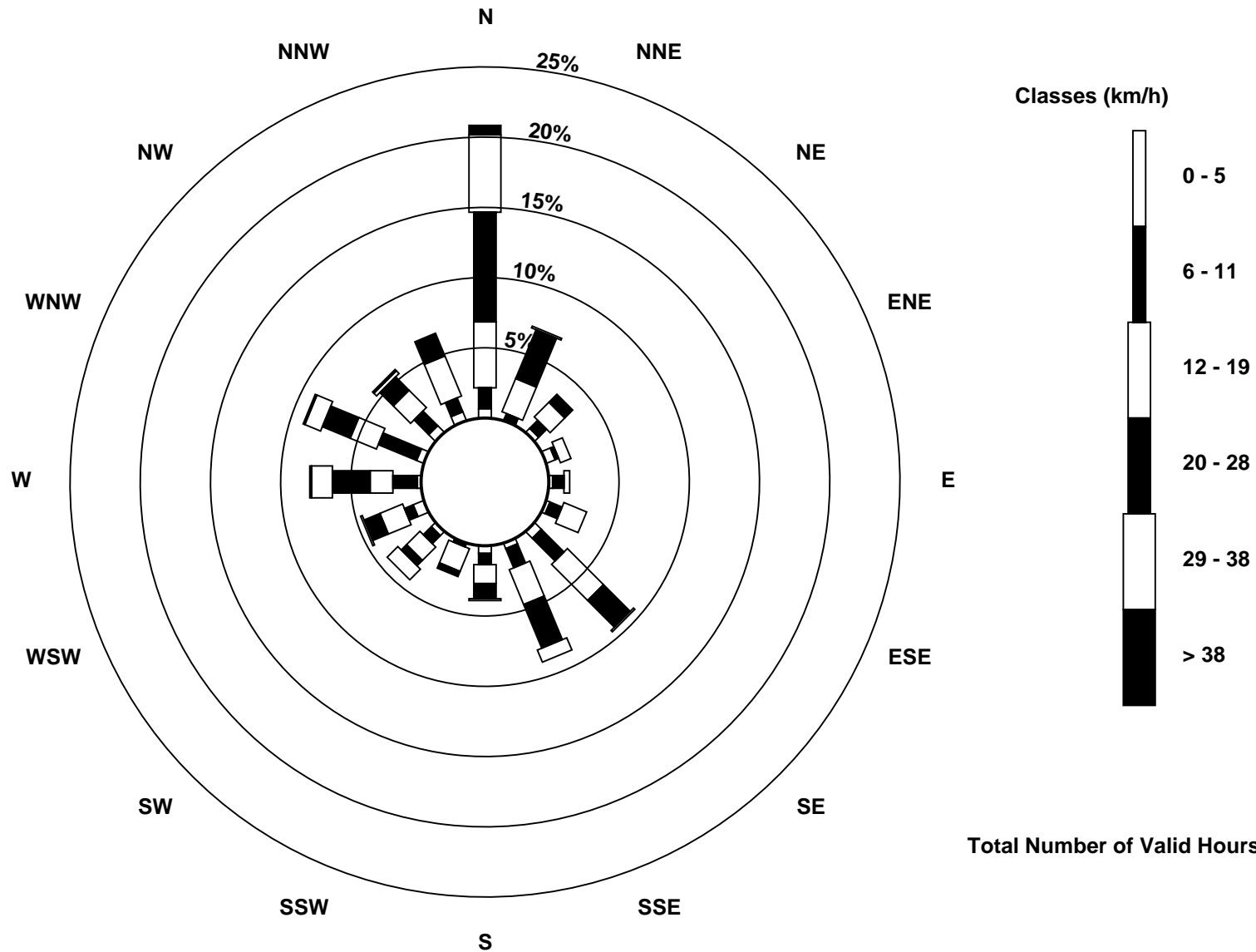
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Maximum Speed: 44 km/h on May 19 16:00	Maximum Daily Speed Average: 34.3 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 2 01:00	Minimum Daily Speed Average: 2.1 km/h on May 31	Hours of Data: 744
Maximum Diurnal Speed Average: 9.6 km/h at hour 17	Minimum Diurnal Speed Average: 2.0 km/h at hour 1	Hours of Missing Data: 0
Monthly Average Velocity: 4.6 km/h 340.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 7 Q ₁ = 12 Median = 18 Q ₃ = 25 P ₉₀ = 31 P ₉₉ = 38	Percent Operational Time: 100.0

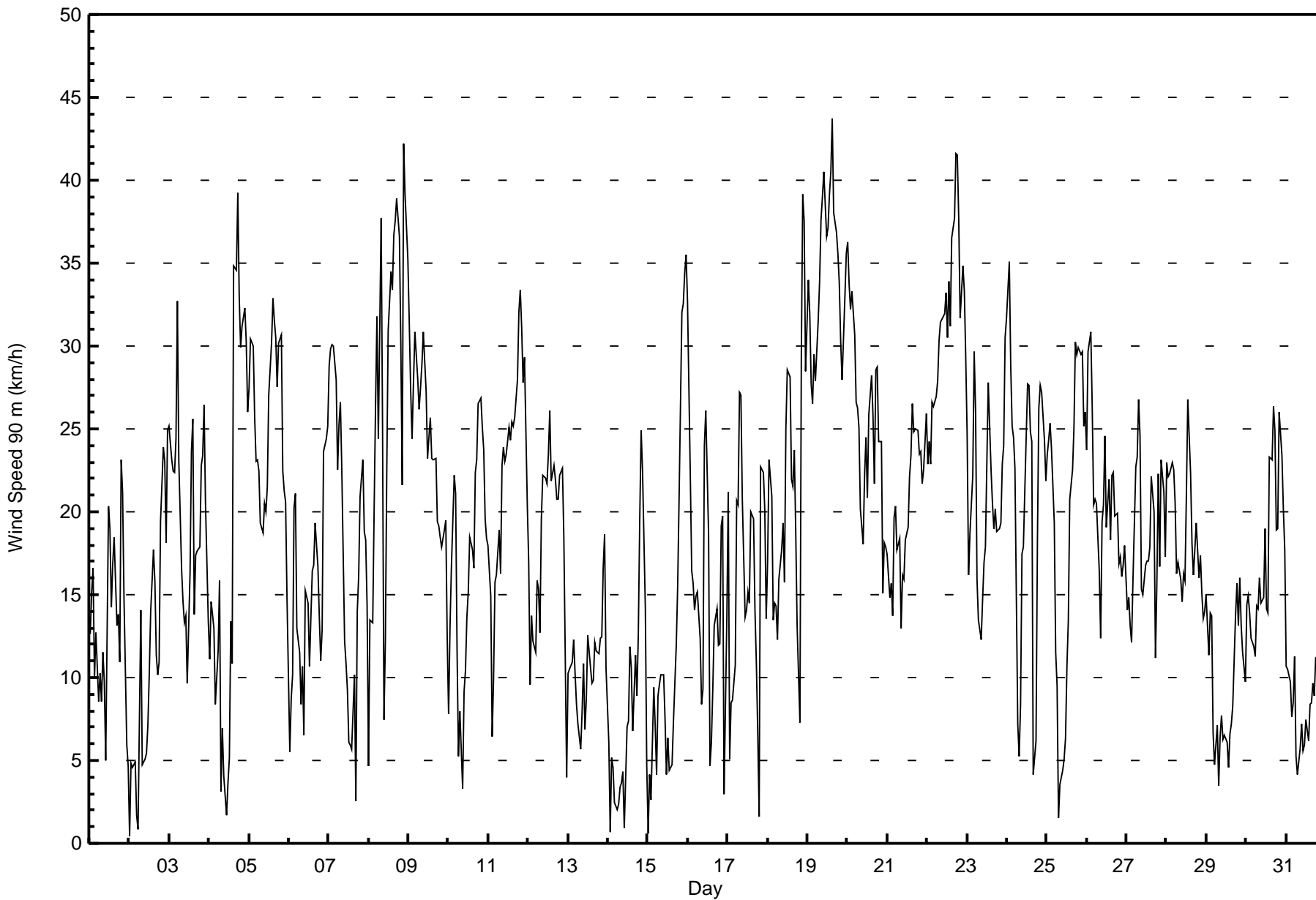
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SSE13	SSE15	SSE17	SSE10	S13	SSW9	SSE10	SE9	SE12	SE10	SE5WSW20	SW19	SW14	W17	W18	W13	W14WNW11	NNW23	NNW21	N15	N6	N5	SW5.0	NNW23		
2-May	S0	NW5	NNW5	NW5	NW2	NE1	SSE8	SSE14	S5	SSE5	SE5	ESE7	E10	ENE14	NE18	NE16	NE11	NE10	ESE11	SE19	SE24	SE23	ESE18	SE25	ESE7.4	SE25
3-May	SE25	SE23	ESE22	SE22	SE24	SE33	SE23	SE17	SE15	SE13	SE14	SE10	SSE16	SSE24	SSW26	SSW14	SSW17	SSW18	SSW18	S23	SSE23	S26	S21	SW13	SSE17.5	SE33
4-May	WSW11	SW15	SW14WSW13	SW8	S12WSW13	SW8	S12WSW16	SW3	SSE7	SE4	E2	NE4	S5	NW13	W11WNW35	W35	W39	W33	W30	W31	W32	W30WNW26	W33	W15.0	W39	
5-May	WNNW27	WNNW30	WNNW30	WNNW26	WNNW23	WNNW23	W22WNNW19	WNNW19	WNNW21	WNNW20	W22	W27WNNW30	W33	W32WNNW30	WNNW28	WNNW30	WNNW30	WNNW31	N22	NNE21	NNE21	N15	WNNW22.0	W33		
6-May	WNNW6	WNNW9	W10	W20	W21	W13WNNW11	WNNW8	WNNW11	WNNW7	NW15	W14	W11	W14WNNW16	WSW17	WSW19	W17	W14	SW11	SSE13	SSE24	SE24	SSE25	WSW8.9	SSE25		
7-May	SSE29	SE30	SSE30	SSE30	SSE28	SSE23	SSE25	SSE27	SSE23	S12	S11	S9	WSW6	NE6	WNNW6	WNNW10	E3	ESE14	ESE16	SE21	SE23	ESE19	SE18	SE14	SE15.4	SSE30
8-May	E5	NE13	N13	NNW20	WNNW26	WNNW32	WNNW24	W38	W25	WSW7	SSW12	SW22	SW31	WSW35	SW33	WSW37	SW38	SW39	SW37	SW30	WNNW22	NW42	NW39	WNNW35	W21.1	NW42
9-May	WNNW31	WNNW27	W24	W28	W31	W28WSW26	W27	W29WNNW31	WNNW27	WNNW23	WNNW24	WNNW26	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW23	WNNW22.2	WNNW31
10-May	NW8	W13	W17	W22	W21WNNW12	NNW5	N8	NW3	NW9	NNW10	N14	N15	NNE18	NNE18	N17	N22	NNE23	NNE26	NNE27	NNE25	NE24	ENE20	ENE18	N11.0	NNE27	
11-May	ENE18	ENE15	NE6	N10	N16	N16	N19	N16	N23	N24	N23	N23	NNE25	N24	NNE25	N25	NNE26	NNE28	N32	N33	N31	NNE28	NNE29	NNE20	NNE21.7	N33
12-May	NE17	N10	N14	NNE12	N12	N16	N15	N13	N20	NNE22	NNE22	NNE22	N23	NNE26	NNE22	NNE23	NNE22	N21	NNE21	NNE22	NNE23	NE18	NE11	NNE4	NNE17.6	NNE26
13-May	WNNW10	WNNW11	WNNW11	W12WSW10	W8	WSW7	WSW6	W8	W11	WNNW7	NW9	WNNW13	WNNW11	NW10	NNW10	NW12	NW12	NNW11	NNE12	NNE12	NNE17	NE19	ENE11	NW6.9	NE19	
14-May	E6	E1	NNW5	N5	NNW2	SSW2	SSW2	S3	SSE4	SE4	NW1	NNW7	WNNW7	WNNW12	NW11	NW7	NNW11	N9	NNE13	NNE20	NNE25	NNE22	NNE14	N5	N5.6	NNE25
15-May	NW1	WNNW4	ESE3	S9	SSE7	SSE4	SE9	SE10	SSE10	SSE10	SE8	SW4	N6	W4	NE5	SE7	SE10	SE12	SE16	SE21	SSE32	SSE33	SSE34	SSE36	SSE10.4	SSE36
16-May	SSE33	SSW22	SSW16	S16	S14	S15	SSE15	SSE12	SSE8	SE9	SSW24	SSW26	SSW19	S5	ESE6	ESE9	ESE13	ESE14	ESE12	ESE12	SE19	SSE20	NNE3	SE14	SSE12.0	SSE33
17-May	SSE21	S5	SSE8	S9	S11	WSW21	WSW20	WSW27	W27	W21WNNW14	W14WNNW15	WNNW14	W20WNNW20	WNNW14	NW11	WNNW7	ESE2	SSE23	SW22	SW20	SW14	WSW11.5	WSW27			
18-May	SW17	WSW23	SW21	SW13	SSW15	SSW14	SSW12	SW16	SW18	SW19	WSW16	WSW25	WSW29	WSW28	WSW22	W22	W24	W19	W13	W7	N29	N39	N38	N28	W12.7	N39
19-May	NNE34	N32	N28	N27	NNW29	N28	N31	N34	N38	N39	N41	N37	N37	N39	N40	N44	N38	N37	N36	N34	N30	N28	N33	N36	N34.3	N44
20-May	N36	N34	N32	N33	N31	NNE27	NNE26	NNE25	NE20	NE18	NE22	NNE25	NNE21	N26	N28	N26	N22	N29	N29	N24	N24	N15	NNW18	NW18	N24.3	N36
21-May	NW17	NNW15	N16	N14	N20	NNE20	N18	N18	NNW13	NNW16	NNW16	NNW18	NNW19	NNW22	NNW23	N27	N25	N25	N25	N24	N24	N22	N23	N26	N19.7	N27
22-May	N23	N24	N23	N27	N26	N27	N28	N30	N31	NNE32	NNE32	NNE33	N30	N34	N31	N37	N38	N42	N42	N38	N32	N35	N33	N29	N31.4	N42
23-May	NNE25	NE16	NNE19	NNE22	NNE30	N26	N16	N14	N12	N15	NNE17	NNE18	NE23	ENE28	NE23	NE21	NE19	ENE20	ENE19	ENE19	SE19	SSE23	SSE24	SSE31	NE13.7	SSE31
24-May	S32	S35	S29	S25	SSE24	SSE23	S7	SE5	SE8	SSE17	SSE18	SE24	SSE28	SSE28	SSE25	SE24	WSW4	SW6	S18	S26	SSW28	S27	SSW24	S22	S20.0	S35
25-May	S24	S24	S25	S24	S19	SSE12	SSE10	ENE2	NNE4	NE4	N5	NNE6	N11	N14	N21	N23	N25	N30	N29	NNE30	NNE29	N30	N25	N26	NNE7.7	N30
26-May	N24	N30	N31	N26	N20	N21	N20	N16	NNW12	NNW19	NNW20	NW25	NNW19	NNW22	NW18	NW22	NW22	NW20	NNW20	NNW17	N17	N16	NNW17	N18	NNW19.7	N31
27-May	N14	N15	N13	NE12	ESE16	ESE23	ESE23	SE27	SE25	ESE15	ESE15	E17	E17	E17	ESE18	SW22	SSW20	S11	SE16	E22	ESE17	SSE23	SE21	ESE17	ESE12.7	SE27
28-May	SE23	ESE22	ESE22	ESE23	SE23	ESE20	ESE16	SE17	SE16	SE15	SE16	SE16	SSE21	SSE27	S22	SSE18	S16	SSE18	SSW19	S16	SSE17	SSW15	SW14	WSW14	SSE15.9	SSE27
29-May	W15	W11	W14	SW14	W7	WSW5	W7	SW3	SW6	SW8	WSW6	W7	NW6	NNW5	NE7	NE7	NNE8	NNE14	NNE16	NNE13	NNE16	NNE13	NNE12	N10	NW4.1	NNE16
30-May	N14	N15	NNW14	NNW12	NW12	NW11	NNW14	NW14	NW16	NW15	NNW15	N19	NNW14	NW14	NW23	NW23	NW26	NW25	NNW19	NNW19	N26	N23	N20	N18	NNW16.7	NW26
31-May	N11	N11	NW10	NNW8	WNNW8	WNNW11	NW5	NNW4	WNNW6	WNNW7	WNNW6	NW6	WNNW7	WNNW6	WNNW8	W8	W10	SE9	SE11	SE11	SSE17	S24	SSE26	SSE34	SW2.1	SSE34

NNE2.0	NNW2.5	NW3.0	NW3.0	NW3.2	NW2.5	NW2.2	NW2.6	NW3.0	NNW3.9	NNW4.5	NNW5.5	NW5.7	NNW7.1	NNW7.7	NW9.5	NW9.6	NNW8.0	NNW7.7	N6.7	NNE6.3	NNE5.2	NNE5.5	NNE3.4	Diurnal Average
N36	S35	N32	N33	W31	SE33	N31	W38	N38	N39	N41	N37	N37	N39	N40	N44	N38	N42	N42	N38	SSE32	NW42	NW39	N36	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: 744											
Maximum Value: 14 km/h on May 27 17:00														Hours of Data: 744											
Minimum Value: 0 km/h on May 15 01:00														Hours of Missing Data: 0											
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 4 Q ₃ = 5 P ₉₀ = 6 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-May	2	2	4	2	3	1	1	1	3	3	3	6	7	5	6	6	3	4	3	4	1	4	1	2	7
2-May	1	2	1	1	1	2	3	2	2	2	2	3	4	3	3	4	2	2	3	3	4	6	6	5	6
3-May	5	5	5	4	3	4	4	3	3	3	3	5	5	5	7	5	5	3	3	4	4	5	7	7	
4-May	2	2	2	3	2	6	4	2	2	2	2	3	5	4	11	6	5	7	4	5	4	4	4	4	11
5-May	3	3	2	3	2	2	3	3	2	3	4	5	8	6	5	5	5	6	5	4	4	3	3	3	8
6-May	2	1	1	2	2	5	3	2	3	3	5	6	6	6	5	6	4	4	3	1	7	2	2	2	7
7-May	2	2	2	1	3	2	2	2	4	1	2	2	3	3	6	4	3	3	3	4	5	4	7	4	7
8-May	2	3	4	3	4	5	5	6	5	4	4	8	6	6	6	7	7	5	5	5	5	7	6	5	8
9-May	4	5	3	3	3	2	2	5	5	4	4	3	3	3	3	3	4	3	5	3	2	4	3	4	5
10-May	2	2	2	1	2	5	2	2	2	4	4	5	4	6	6	6	4	5	5	4	3	3	3	3	6
11-May	3	3	2	4	3	4	4	4	5	4	6	5	6	6	6	6	6	5	5	5	4	3	3	4	6
12-May	3	2	2	2	1	3	3	3	6	4	5	5	8	5	7	6	6	6	5	4	2	3	2	1	8
13-May	2	1	1	2	1	2	1	2	3	3	4	4	5	5	5	5	4	5	3	2	2	1	2	2	5
14-May	2	1	1	1	1	1	1	2	1	2	3	4	4	4	4	5	4	3	5	3	2	2	2	4	5
15-May	0	1	2	1	1	1	2	1	1	2	3	3	4	3	3	4	3	3	2	2	3	2	2	1	4
16-May	3	4	3	2	2	2	1	2	2	2	9	5	5	4	2	2	4	3	3	5	6	8	6	8	9
17-May	5	3	7	6	4	4	6	4	3	3	3	4	2	3	5	3	3	3	2	2	9	4	3	4	9
18-May	4	6	5	3	2	2	2	5	4	3	4	5	7	5	5	5	6	3	3	3	6	6	8	9	9
19-May	7	7	6	4	5	6	6	5	6	6	7	8	7	7	7	7	7	6	6	5	5	5	7	6	8
20-May	5	4	4	4	3	4	4	4	3	4	4	4	6	5	5	5	5	4	5	5	5	3	3	2	6
21-May	2	3	3	3	7	4	3	4	3	3	3	4	3	3	4	4	4	5	5	4	4	4	4	5	7
22-May	5	3	4	4	4	6	4	5	5	6	4	7	6	6	6	6	6	6	5	6	3	3	4	2	7
23-May	4	2	3	2	4	3	3	3	3	4	6	6	7	5	5	5	5	4	3	2	6	2	2	1	7
24-May	2	2	2	1	1	3	4	2	3	6	6	6	5	5	5	5	7	3	3	4	3	2	2	1	7
25-May	1	1	1	1	2	3	3	2	2	2	3	3	4	5	4	4	5	4	4	4	4	4	4	3	5
26-May	3	4	4	4	3	4	3	4	3	4	4	4	7	5	5	3	4	3	3	3	3	2	3	2	7
27-May	2	2	1	1	5	5	5	7	6	4	5	4	5	6	7	8	14	4	5	3	4	8	5	4	14
28-May	4	4	5	6	6	5	4	5	4	4	4	3	4	7	5	4	3	3	4	2	1	1	1	2	7
29-May	1	3	1	4	2	3	3	1	1	2	1	1	1	2	2	2	3	3	3	2	2	2	1	1	4
30-May	1	1	2	2	3	3	3	3	2	3	3	4	3	3	4	4	4	4	3	5	3	4	3	3	5
31-May	2	2	1	2	2	1	2	2	3	3	4	3	3	4	4	3	4	3	3	3	2	1	4	1	4
														Diurnal Maximum											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	54	7.26	7.26
6 - 11	123	16.53	23.79
12 - 19	227	30.51	54.30
20 - 28	232	31.18	85.48
29 - 38	96	12.90	98.39
> 38	12	1.61	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	3	4	1	4	2	5	3	6	2	3	2	1	1	7	6	54
6 - 11	10	2	7	1	2	4	13	10	6	2	5	7	13	24	11	6	123
12 - 19	37	18	10	6	3	15	19	15	10	12	13	6	19	12	13	19	227
20 - 28	52	35	5	3	1	8	18	24	11	8	5	9	17	19	9	8	232
29 - 38	42	8	0	0	0	0	1	11	3	0	5	3	11	9	2	1	96
> 38	8	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	12
Totals	153	66	26	11	10	29	56	63	36	24	32	27	62	65	44	40	744

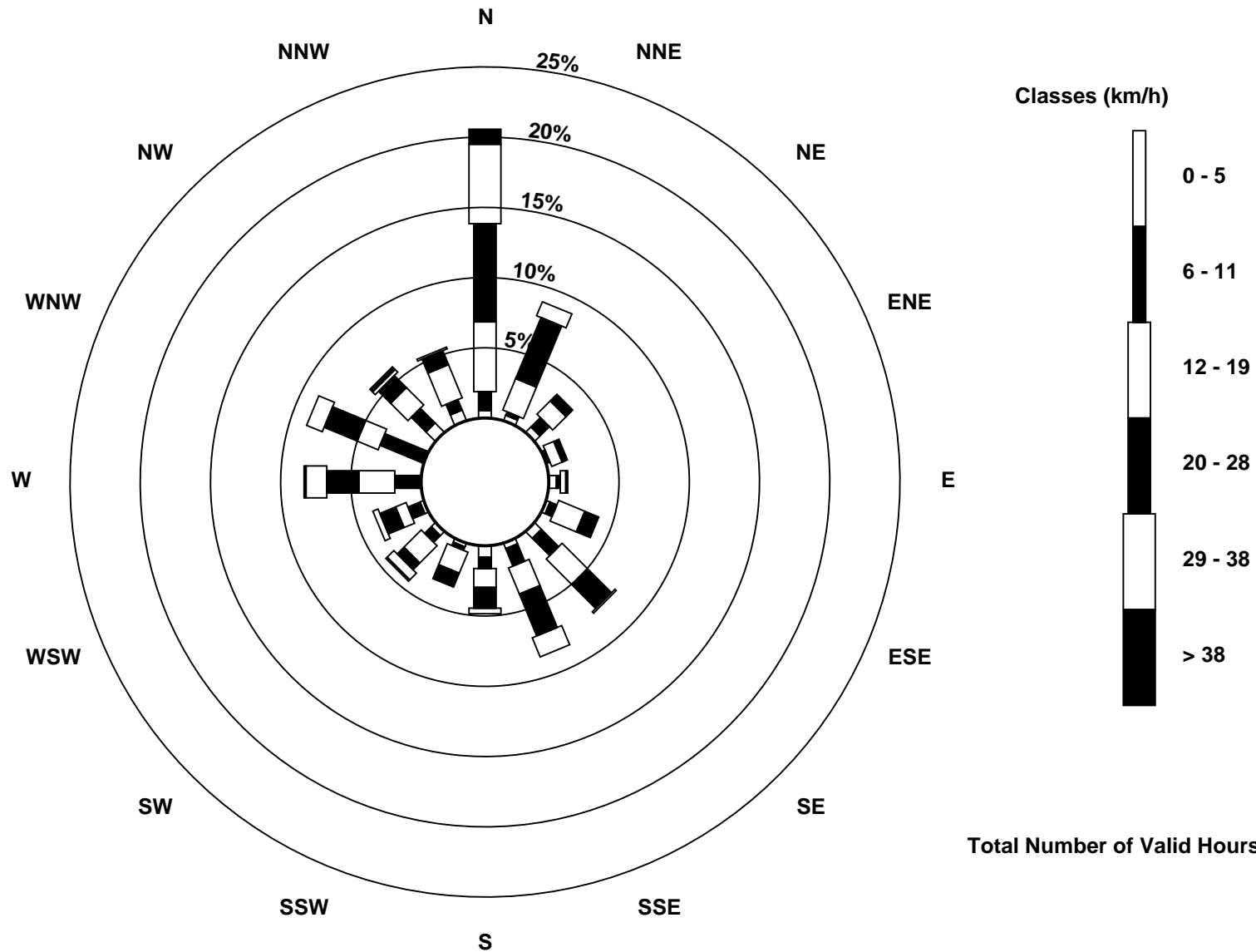
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Direction of Maximum Speed: 265 deg on May 4 18:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 6.6 deg on May 19		Hours of Data:	744
Direction of Minimum Speed: 84 deg on May 14 03:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.1 deg on May 31		Percent Operational Time:	100.0
Monthly Average Direction: 287.7 deg			

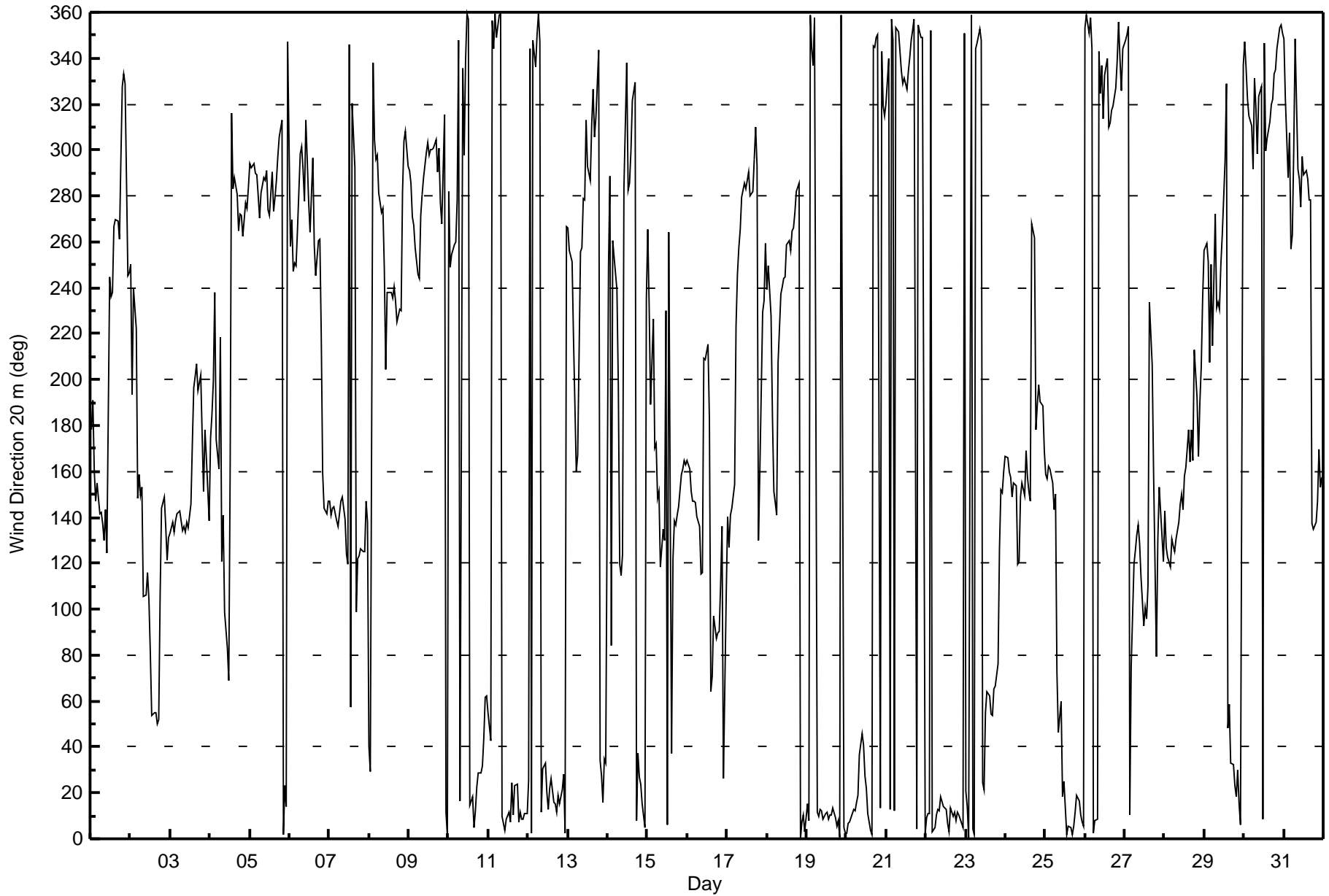
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	178	191	161	147	155	142	142	137	130	143	124	245	236	238	267	269	269	261	296	328	333	329	245	246	225.1
2-May	250	193	240	222	148	159	149	153	105	106	116	105	81	53	55	55	50	52	105	144	149	136	122	131	109.0
3-May	133	138	133	139	141	142	143	134	136	133	138	136	146	172	197	201	207	196	202	176	151	178	166	139	155.9
4-May	175	185	199	238	174	161	219	121	141	99	83	69	163	316	283	288	281	265	272	271	262	277	274	284	264.1
5-May	294	292	294	290	289	280	270	281	288	287	291	274	272	291	273	280	287	297	306	313	2	23	14	347	292.9
6-May	258	270	247	251	250	265	299	301	292	277	313	278	264	281	297	259	245	261	261	219	159	144	142	147	257.5
7-May	147	141	144	145	138	136	142	147	149	139	124	120	346	57	320	293	99	122	123	126	125	125	147	138	135.3
8-May	40	29	338	305	296	298	281	273	274	248	204	238	238	238	236	240	234	225	230	230	282	304	308	293	263.2
9-May	291	285	271	267	257	246	244	271	280	288	299	303	298	300	300	301	304	291	301	277	268	316	12	1	287.4
10-May	282	249	254	259	260	278	348	16	336	298	339	360	357	15	19	5	12	23	29	29	32	44	61	62	4.4
11-May	55	43	356	344	359	349	359	359	10	7	4	8	11	7	24	10	23	24	8	11	8	9	11	11	11.3
12-May	25	344	2	348	336	350	359	347	11	31	33	20	13	22	26	16	15	12	19	15	21	28	2	267	13.3
13-May	266	257	252	218	189	160	167	256	257	279	278	313	293	286	311	326	305	314	344	34	28	16	35	33	303.0
14-May	250	289	84	260	253	239	197	120	115	124	284	338	283	286	300	322	329	8	37	27	24	15	5	235	335.2
15-May	265	232	189	226	170	172	148	151	118	135	130	230	6	264	37	122	139	137	141	144	159	161	165	163	156.8
16-May	165	161	151	147	147	147	140	136	115	116	209	209	216	182	64	71	97	87	90	90	111	136	26	106	141.4
17-May	140	127	141	144	154	223	246	257	265	280	285	283	287	290	280	282	296	310	293	130	161	230	234	259	259.7
18-May	239	250	227	183	151	146	141	207	237	240	244	245	259	261	257	265	266	272	282	286	0	7	10	3	269.7
19-May	15	8	359	344	337	358	11	10	13	12	8	11	12	9	10	10	13	9	5	8	1	359	5	3	6.6
20-May	3	7	7	9	13	12	16	19	36	46	41	27	22	11	4	2	345	345	349	350	13	343	319	315	7.6
21-May	321	340	13	357	348	12	354	352	343	334	329	332	327	334	341	348	352	357	4	355	351	349	349	2	347.6
22-May	9	11	11	352	3	5	11	13	12	18	14	13	13	7	3	13	10	11	8	12	10	7	5	351	9.1
23-May	21	14	0	359	4	2	344	347	352	348	25	22	55	64	62	54	54	65	66	76	126	152	150	160	40.9
24-May	167	166	160	157	149	155	154	120	121	149	155	149	169	157	151	147	268	262	178	189	198	190	189	169	163.3
25-May	158	157	163	161	155	143	150	72	46	60	18	25	14	2	5	5	2	5	12	19	16	10	8	5	23.7
26-May	353	359	351	357	344	3	8	8	343	324	337	313	333	340	310	312	317	319	327	339	356	340	326	344	338.6
27-May	348	350	354	10	75	120	126	133	136	129	114	92	101	96	111	234	206	159	119	79	130	153	132	121	119.2
28-May	143	127	123	118	131	127	125	130	138	146	150	143	158	162	178	164	178	165	213	192	166	190	206	235	151.9
29-May	256	260	251	207	250	215	272	231	234	231	250	263	295	329	48	58	33	32	23	18	30	15	6	337	315.1
30-May	347	336	322	315	311	292	331	319	298	323	327	8	346	300	305	312	320	322	333	335	344	353	354	351	328.4
31-May	349	323	288	307	257	263	299	348	292	287	275	297	289	291	288	278	278	138	135	138	147	170	153	158	242.3

321.0 319.8 309.1 291.1 288.1 351.1 344.4 329.0 325.2 334.7 343.7 328.0 319.7 327.4 326.0 318.2 320.0 331.9 343.1 0.7 15.8 355.8 358.8 346.4
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: 104 deg on May 14 11:00 Minimum Value: 5 deg on May 13 02:00 Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 13 Median = 17 Q ₃ = 24 P ₉₀ = 39 P ₉₉ = 85																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	20	13	12	7	9	10	9	15	13	24	50	33	23	36	20	21	21	20	28	11	14	45	13	20	50
2-May	12	33	20	70	25	20	24	18	37	28	28	33	27	19	14	15	14	17	21	9	11	25	14	12	70
3-May	11	9	11	10	11	9	11	10	12	14	13	24	26	24	23	32	30	29	18	12	7	40	42	87	87
4-May	23	20	26	24	25	22	56	27	20	35	37	30	73	31	81	15	11	11	8	8	8	9	9	16	81
5-May	11	9	9	9	10	10	9	12	11	12	15	16	19	17	15	15	13	13	13	13	25	11	11	16	25
6-May	18	12	9	7	8	22	21	21	20	44	26	31	55	52	30	32	22	18	13	24	14	12	11	10	55
7-May	11	9	10	10	13	10	9	10	10	10	16	24	102	61	77	24	86	19	15	12	13	12	24	45	102
8-May	71	19	65	23	21	12	12	8	21	36	23	19	18	18	14	12	13	16	13	11	31	10	13	10	71
9-May	9	10	8	6	9	10	10	14	13	12	14	13	13	13	14	13	12	11	19	10	9	40	15	21	40
10-May	34	9	7	8	13	60	60	26	83	30	49	36	32	24	25	29	16	17	16	13	13	12	13	11	83
11-May	9	9	20	10	11	13	15	19	17	20	19	22	16	20	20	20	19	18	13	11	11	11	11	14	22
12-May	14	26	14	16	13	14	16	20	22	16	21	23	21	22	27	20	21	26	27	14	10	13	28	7	28
13-May	11	5	15	19	12	31	36	30	74	24	61	49	30	43	52	53	29	39	21	22	10	7	12	12	74
14-May	36	48	86	55	7	25	58	30	23	32	104	62	52	39	33	74	32	55	29	12	10	8	45	7	104
15-May	13	29	28	13	28	23	14	20	18	15	19	74	53	76	54	46	23	14	12	10	10	11	10	10	76
16-May	11	8	13	10	12	14	14	13	20	20	43	21	15	82	25	26	13	26	16	26	22	38	90	71	90
17-May	44	35	27	33	19	56	17	11	8	15	14	18	17	17	18	15	21	19	20	87	18	17	14	67	87
18-May	20	11	23	19	20	15	13	48	14	15	20	17	17	17	16	15	12	14	14	18	16	12	14	20	48
19-May	16	14	17	18	16	19	14	14	13	13	12	13	12	13	13	12	13	13	13	12	15	15	14	14	19
20-May	13	11	11	11	12	12	12	13	23	20	17	17	19	13	13	15	16	15	17	19	16	24	17	17	24
21-May	15	19	17	28	18	15	18	19	25	19	19	20	18	16	17	17	17	17	18	17	17	16	19	18	28
22-May	14	13	16	15	17	15	14	14	14	14	13	14	14	15	14	14	16	13	13	12	11	11	13	12	17
23-May	17	10	11	7	11	14	19	26	26	28	34	35	26	18	19	21	26	20	17	13	38	11	8	10	38
24-May	15	13	11	10	11	16	31	26	23	19	29	24	23	17	18	18	65	49	18	19	16	15	14	16	65
25-May	10	11	11	11	12	14	23	33	71	49	64	55	40	29	22	19	19	16	17	11	12	14	14	14	71
26-May	14	16	15	14	18	16	16	17	27	19	21	18	29	25	21	14	17	16	16	17	21	18	15	20	29
27-May	21	19	15	13	43	13	11	12	12	15	21	16	22	21	26	25	28	38	19	15	18	22	15	15	43
28-May	16	11	11	13	11	11	13	15	15	19	20	19	15	16	25	28	27	21	17	21	14	17	11	11	28
29-May	9	12	12	24	61	55	22	23	17	18	21	18	26	49	36	28	29	18	14	18	14	19	12	13	61
30-May	13	17	18	24	36	29	21	19	18	20	22	21	27	22	17	18	16	17	16	18	15	16	15	14	36
31-May	16	37	19	37	15	14	27	58	53	30	49	60	55	61	42	32	30	47	13	12	10	12	10	10	61
71 48 86 70 61 60 60 58 83 49 104 74 102 82 81 74 86 55 29 87 38 45 90 87																									
Diurnal Maximum																									





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Mannix - May 2016

Direction of Maximum Speed: 300 deg on May 8 22:00 Direction of Maximum Daily Speed Average: 0.6 deg on May 19	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 292 deg on May 14 11:00 Direction of Minimum Daily Speed Average: 2.4 deg on May 31	Percent Operational Time: 100.0
Monthly Average Direction: 296.1 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-May	158	174	155	144	151	143	140	133	126	140	119	237	228	233	262	263	266	255	292	322	333	344	262	272	213.2
2-May	277	292	222	279	142	150	157	156	131	113	115	99	74	48	48	47	43	45	99	138	143	135	115	124	106.2
3-May	125	128	126	129	132	135	137	128	131	128	132	132	144	165	188	197	203	191	195	173	152	165	179	189	152.2
4-May	210	196	213	237	204	161	226	123	138	99	79	61	170	310	276	282	276	259	266	266	258	272	270	280	257.4
5-May	293	288	292	287	288	276	266	277	284	282	286	269	266	286	268	275	281	293	301	309	356	17	8	350	290.2
6-May	270	281	261	254	257	269	295	295	288	281	307	274	260	274	291	253	240	257	257	221	160	141	139	144	253.2
7-May	144	135	138	143	135	126	134	146	143	136	130	142	268	47	307	288	76	115	115	119	118	118	135	126	131.8
8-May	48	28	343	307	294	294	277	268	269	241	198	233	232	233	231	235	230	219	225	225	278	300	304	288	259.7
9-May	286	279	267	264	256	245	242	267	275	284	294	298	293	296	295	296	300	285	296	273	263	312	4	354	283.5
10-May	291	247	252	254	260	288	329	5	320	298	335	352	351	8	9	359	5	15	20	22	25	37	54	55	354.5
11-May	50	38	359	345	358	343	352	356	3	0	358	2	6	1	16	5	16	15	2	5	2	4	8	8	5.4
12-May	19	345	359	359	342	347	355	343	5	22	24	13	6	15	17	8	8	3	12	9	15	24	21	326	8.3
13-May	285	270	279	273	210	183	186	243	263	276	275	305	288	285	305	324	305	311	339	24	24	17	27	54	304.9
14-May	31	22	3	354	153	223	204	131	127	127	292	328	286	289	298	314	326	358	25	20	15	14	14	225	351.0
15-May	249	291	151	177	167	154	146	154	136	137	129	229	353	268	22	121	132	131	136	139	153	158	159	159	152.5
16-May	159	160	151	146	142	143	139	133	121	117	204	199	209	188	71	75	89	86	87	92	115	141	9	116	141.3
17-May	145	141	142	149	159	234	239	251	259	276	281	279	282	286	277	279	294	305	289	125	155	222	227	242	247.0
18-May	229	240	228	195	186	158	151	203	232	233	236	239	254	255	251	260	261	269	279	281	355	0	3	358	263.3
19-May	8	2	355	340	334	353	4	4	6	6	2	4	5	3	4	5	7	3	360	1	357	356	359	357	0.6
20-May	357	0	1	3	7	6	10	13	29	37	32	22	14	6	358	357	342	342	346	348	5	341	318	311	0.9
21-May	315	335	6	351	343	6	351	351	338	330	324	329	325	330	338	344	349	354	358	351	349	348	349	358	344.1
22-May	3	5	3	349	357	359	4	7	6	11	7	7	7	0	358	7	4	5	2	5	5	2	1	349	3.0
23-May	14	14	357	2	359	357	341	343	346	341	16	15	47	55	53	46	45	57	58	67	124	148	151	153	34.4
24-May	164	164	158	155	148	149	159	118	125	145	151	144	162	152	147	143	262	250	175	183	191	185	185	174	162.3
25-May	157	154	160	158	155	142	149	64	20	44	2	15	8	354	359	359	357	359	5	13	9	3	1	1	20.9
26-May	352	355	348	354	341	358	2	4	339	321	332	311	329	337	307	308	315	315	323	334	350	339	325	342	335.3
27-May	348	348	353	6	83	113	119	126	130	122	110	85	94	88	106	226	201	163	118	74	120	148	127	116	112.7
28-May	136	119	113	111	124	118	119	124	132	140	144	140	151	156	171	160	171	160	205	185	163	184	201	235	149.3
29-May	253	260	251	202	250	219	271	226	229	224	243	259	296	324	34	46	22	22	18	11	21	10	4	341	314.8
30-May	343	335	321	315	312	303	328	314	296	318	324	1	341	298	302	310	315	318	328	331	341	350	351	349	325.4
31-May	350	334	301	320	282	280	303	338	294	291	278	299	296	286	288	274	274	136	128	131	143	168	150	152	236.9

329.3 322.0 312.4 295.5 286.9 330.2 332.3 327.0 319.8 330.4 335.5 321.9 314.9 323.8 320.8 315.3 317.1 327.7 339.4 356.4 17.2 359.2 0.3 355.1
Diurnal Average

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



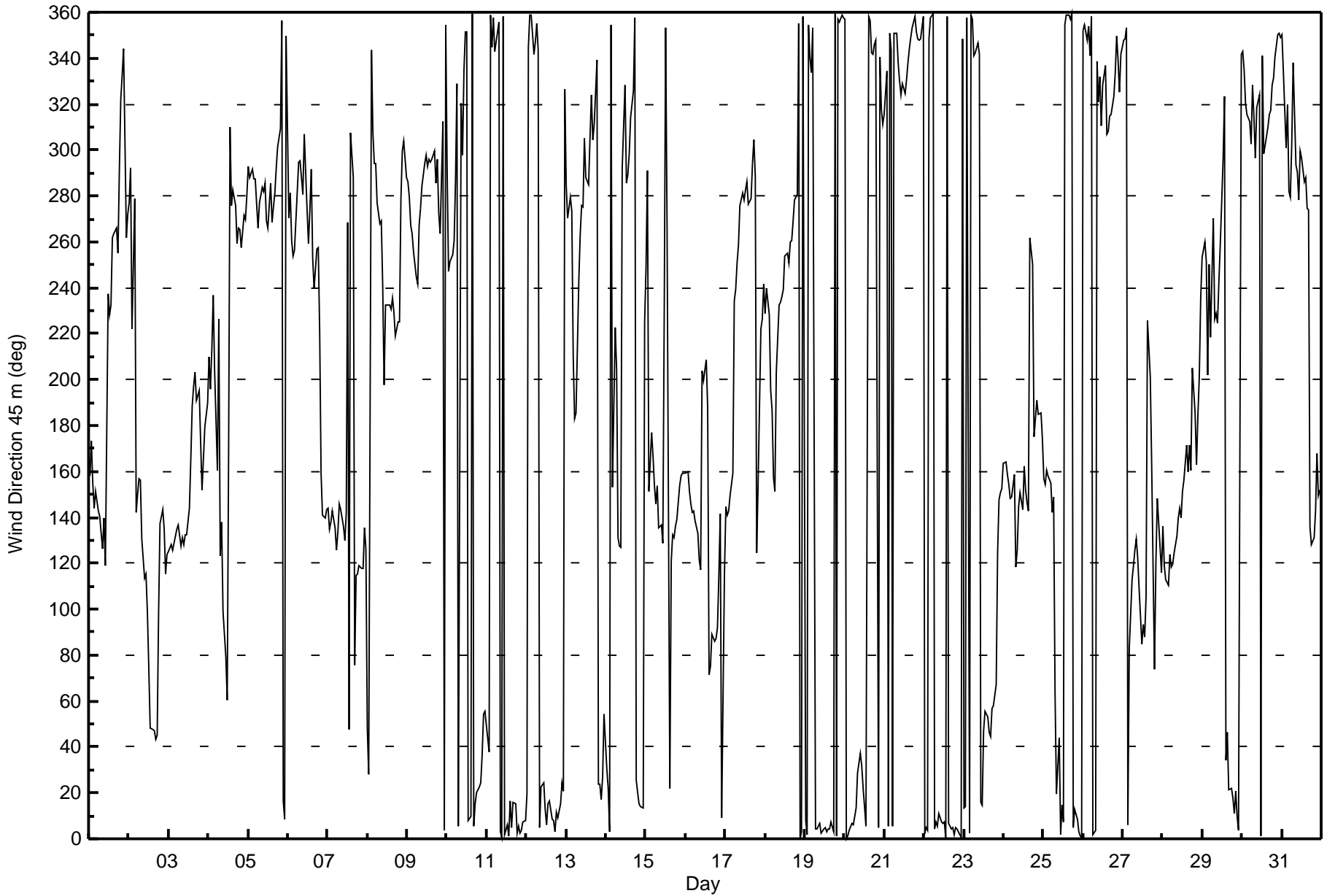
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Mannix - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on May 14 11:00 Minimum Value: 2 deg on May 25 02:00 Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 12 Q ₃ = 19 P ₉₀ = 35 P ₉₉ = 80																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	18	9	7	3	7	9	6	12	10	22	44	25	21	31	17	17	18	17	27	8	10	17	18	10	44
2-May	6	82	24	52	17	19	14	19	54	34	26	30	28	18	10	13	13	14	19	8	7	21	10	7	82
3-May	7	6	6	6	6	7	8	6	9	10	11	22	23	20	19	29	27	25	13	3	7	39	28	72	72
4-May	22	18	15	8	19	15	32	67	22	43	47	39	73	22	81	13	10	9	8	7	6	7	8	16	81
5-May	8	7	6	6	8	8	8	10	9	9	13	14	17	16	13	13	11	11	10	10	24	8	8	12	24
6-May	17	11	7	5	5	15	15	19	17	35	25	29	48	42	25	29	21	16	11	16	22	7	7	6	48
7-May	7	5	5	5	8	5	6	7	6	6	10	18	92	50	79	19	94	16	10	8	9	9	15	23	94
8-May	38	18	43	21	19	12	11	8	19	32	16	16	14	15	13	10	11	13	10	8	31	7	10	7	43
9-May	8	8	8	5	7	7	7	13	11	10	12	10	12	10	13	11	9	9	16	9	7	38	11	16	38
10-May	29	7	5	4	6	23	53	18	71	22	41	28	28	17	20	23	12	13	13	9	9	11	10	9	71
11-May	9	8	15	9	5	9	10	13	12	15	14	17	12	16	17	15	15	14	8	7	7	6	7	10	17
12-May	10	18	7	7	11	11	10	13	17	12	16	19	17	18	22	16	17	21	23	11	7	6	6	39	39
13-May	9	5	12	25	5	20	29	23	33	21	57	43	30	33	48	43	26	29	12	17	8	4	9	15	57
14-May	71	40	12	19	40	33	45	38	29	33	99	54	47	35	26	66	26	46	27	8	6	5	14	62	99
15-May	21	14	62	14	10	5	8	17	16	12	20	60	48	63	66	46	19	11	8	5	4	4	4	3	66
16-May	4	6	5	5	3	6	8	8	17	18	38	14	9	80	16	17	7	11	12	17	15	33	88	67	88
17-May	25	33	14	20	32	16	13	9	8	13	11	15	14	15	16	13	18	13	16	87	13	16	9	55	87
18-May	12	6	12	12	16	18	22	40	11	12	17	13	16	16	14	13	11	13	10	13	13	7	9	12	40
19-May	10	9	11	13	11	13	10	9	9	9	7	9	8	9	8	8	9	8	8	7	9	9	8	8	13
20-May	8	7	6	6	7	7	8	10	19	17	13	13	14	10	8	9	10	8	9	12	11	19	12	12	19
21-May	11	13	11	23	14	9	13	10	16	11	13	14	13	10	11	10	10	11	12	11	10	10	12	10	23
22-May	10	8	11	9	10	9	10	9	10	10	8	9	10	9	10	10	11	8	8	8	7	6	7	6	11
23-May	11	8	6	5	5	8	12	15	16	18	27	27	23	14	16	18	24	17	14	11	37	6	4	3	37
24-May	7	4	3	3	7	10	29	25	21	14	22	19	14	12	13	14	63	44	8	9	7	5	4	9	63
25-May	3	2	3	3	5	7	15	45	54	46	51	54	30	23	16	12	13	10	12	8	7	8	8	8	54
26-May	8	9	7	8	11	10	10	10	20	12	14	12	24	22	14	8	10	10	10	10	15	10	9	12	24
27-May	11	10	7	9	32	11	9	9	8	12	20	14	19	20	24	24	24	36	17	16	16	21	13	12	36
28-May	11	9	10	11	9	8	11	12	11	14	13	14	9	11	15	17	18	15	11	14	7	9	8	8	18
29-May	6	10	10	23	42	49	20	22	13	12	16	15	18	35	32	23	21	12	11	11	8	11	7	5	49
30-May	6	10	10	14	28	22	13	10	12	13	13	16	18	16	11	11	10	11	9	12	8	10	9	8	28
31-May	10	22	13	27	7	9	17	45	37	24	48	48	43	55	43	27	20	44	10	9	8	5	6	3	55
Diurnal Maximum																									





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - May 2016

Direction of Maximum Speed: 8 deg on May 19 16:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 3.6 deg on May 19		Hours of Data:	744
Direction of Minimum Speed: 288 deg on May 2 05:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.0 deg on May 31		Percent Operational Time:	100.0
Monthly Average Direction: 292.7 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-May	150	158	160	154	165	171	145	135	130	139	124	236	229	231	262	264	267	258	297	325	337	352	342	340	222.4
2-May	253	318	324	323	288	160	156	157	174	133	120	100	76	54	51	50	47	50	98	136	143	140	119	127	105.3
3-May	126	126	125	127	129	133	134	129	134	130	133	137	148	164	189	198	203	190	194	176	157	166	186	209	154.7
4-May	236	208	215	237	214	168	238	183	145	123	78	51	174	313	277	285	277	261	267	267	260	273	272	283	260.8
5-May	298	290	296	293	294	280	270	281	287	285	289	271	269	288	270	277	283	294	304	312	360	21	15	360	294.6
6-May	289	290	269	258	264	275	297	297	292	286	307	275	264	277	293	256	241	258	259	226	162	144	141	146	254.0
7-May	148	139	142	148	143	136	138	152	147	150	165	172	258	51	307	293	69	113	116	124	123	121	133	125	140.0
8-May	73	39	354	320	299	296	280	270	270	246	199	233	233	234	231	236	232	220	226	227	280	302	306	291	261.6
9-May	288	281	271	268	262	254	246	270	276	287	296	300	294	297	297	299	302	288	299	275	267	317	7	358	286.0
10-May	305	257	256	251	265	296	335	4	322	303	340	357	355	11	12	3	8	18	22	25	28	40	56	59	357.0
11-May	54	51	22	352	5	350	354	358	6	3	2	4	11	4	19	9	18	18	5	8	5	10	15	15	9.9
12-May	29	356	4	7	355	356	1	348	9	24	27	15	9	18	18	11	11	6	15	13	21	31	35	8	13.3
13-May	297	296	290	275	239	241	235	243	270	278	282	306	290	289	309	332	308	318	342	28	28	25	39	65	314.4
14-May	70	10	338	336	284	208	217	165	148	132	304	332	293	294	305	322	329	4	27	23	19	21	24	353	356.9
15-May	261	294	127	171	172	154	134	149	148	147	137	228	357	273	35	122	131	129	135	138	151	157	156	157	149.7
16-May	161	188	182	171	155	158	150	141	139	131	203	199	207	185	91	87	98	94	102	107	127	146	7	131	158.1
17-May	158	158	156	165	176	236	240	251	259	277	282	278	283	286	278	281	297	307	292	101	155	221	222	236	245.9
18-May	223	237	231	210	207	195	189	219	233	233	235	239	254	255	252	260	261	269	279	280	359	4	5	3	263.3
19-May	11	5	358	346	340	357	7	7	8	9	5	7	7	5	6	8	9	6	2	4	0	360	2	1	3.6
20-May	1	4	4	7	10	10	13	17	31	40	35	26	17	9	1	0	346	347	351	354	7	349	323	317	4.6
21-May	319	338	7	355	350	10	356	359	342	335	330	334	329	335	343	348	353	357	1	356	354	354	356	4	349.5
22-May	7	9	8	354	1	2	7	10	8	13	10	10	10	3	1	9	7	8	5	8	7	6	6	359	6.4
23-May	20	36	13	22	7	3	347	348	350	348	20	18	48	56	54	46	47	57	60	69	125	148	154	153	42.1
24-May	165	169	165	165	155	151	166	125	134	145	151	143	160	151	146	142	258	237	177	182	191	186	190	181	165.1
25-May	163	161	166	164	164	153	155	60	23	40	2	24	7	356	0	1	360	2	9	15	11	6	5	5	23.2
26-May	358	358	353	359	347	1	6	9	344	326	336	316	334	342	314	313	320	319	328	337	354	348	335	350	341.3
27-May	358	358	2	35	101	114	120	127	130	123	111	87	92	88	107	226	201	174	126	78	115	149	129	118	114.2
28-May	134	119	114	112	125	121	122	126	131	139	143	139	150	156	170	158	171	160	203	183	164	187	210	240	152.4
29-May	256	266	262	208	255	239	275	225	226	226	243	263	302	332	38	46	24	25	20	14	23	14	10	352	323.1
30-May	351	349	328	325	318	318	335	318	302	321	331	3	345	302	306	313	319	321	331	335	345	356	356	356	331.3
31-May	357	347	314	332	297	295	316	344	298	299	287	305	300	292	294	274	276	135	127	130	144	170	153	154	233.6

358.9 332.1 317.3 302.2 296.7 315.6 324.5 326.1 323.2 335.1 340.2 326.7 319.3 329.4 325.6 319.6 320.3 331.5 341.9 0.6 22.1 14.0 13.0 12.5
Diurnal Average

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

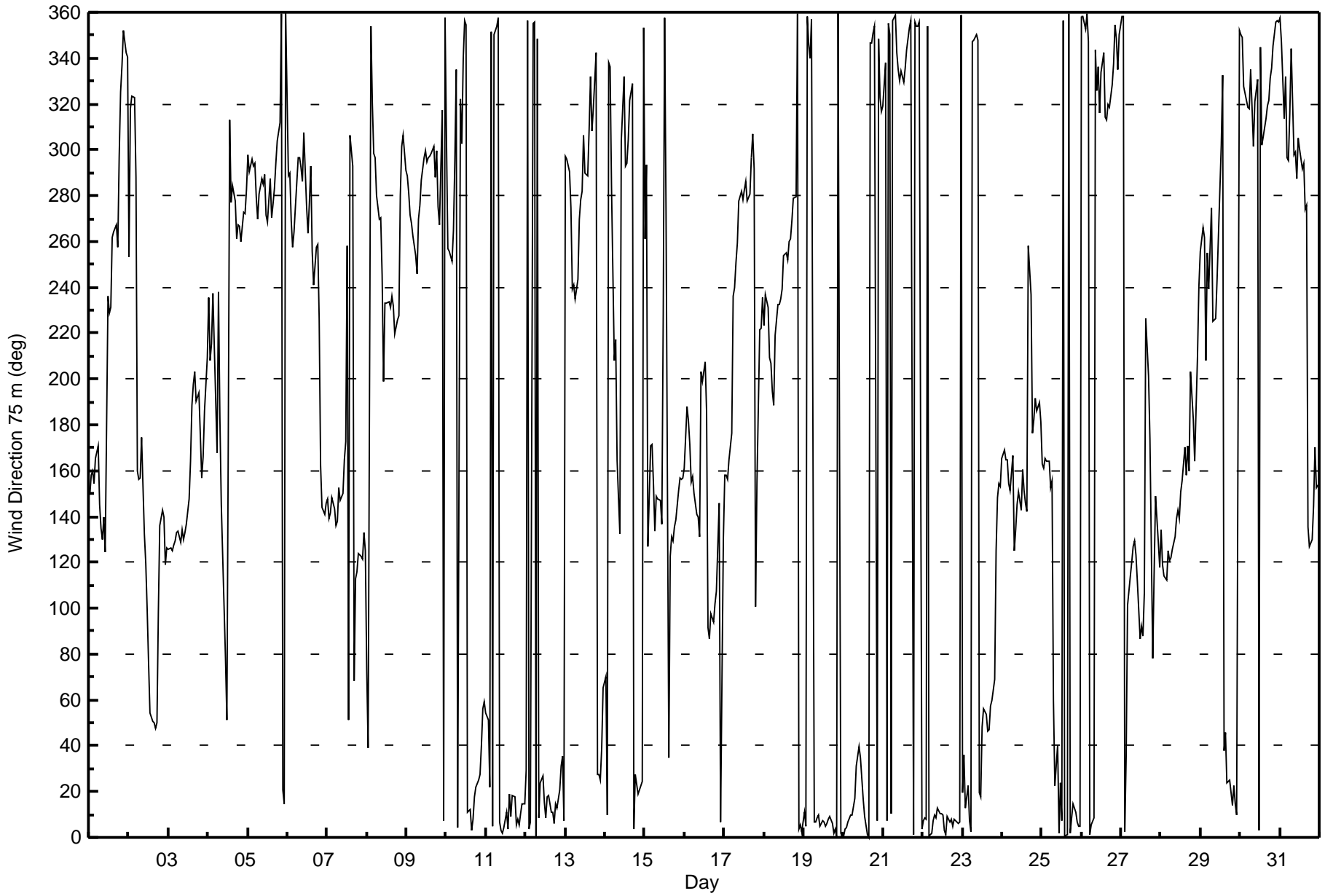


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 75 m (WD75m) - deg

Mannix - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on May 14 11:00 Minimum Value: 2 deg on May 16 00:00 Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 18 P ₉₀ = 33 P ₉₉ = 86																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	17	9	6	8	12	18	6	13	8	18	41	18	20	29	17	15	18	15	27	6	9	5	13	16	41
2-May	68	32	44	25	89	91	8	16	28	25	26	27	21	17	9	12	12	14	20	8	6	17	13	7	91
3-May	9	8	8	7	6	5	6	7	10	11	10	18	22	19	18	28	26	22	13	3	9	36	17	52	52
4-May	19	14	9	9	20	14	23	100	21	34	67	53	73	21	79	12	9	9	7	7	6	7	7	17	100
5-May	8	6	5	5	7	7	8	8	8	8	12	13	16	15	12	13	10	11	9	9	25	6	6	10	25
6-May	19	9	11	6	6	13	12	17	16	33	23	28	48	39	25	27	20	14	11	14	26	4	5	5	48
7-May	5	4	3	4	7	6	6	5	5	10	14	15	59	53	80	19	90	18	13	9	9	11	11	16	90
8-May	37	15	38	20	18	11	11	8	18	35	17	15	13	14	12	9	10	12	9	7	31	6	10	6	38
9-May	8	7	7	5	5	5	5	12	9	9	11	10	11	9	11	11	9	8	16	9	7	37	10	13	37
10-May	23	12	5	2	8	23	36	15	63	20	38	24	26	16	17	23	10	11	11	7	6	9	8	7	63
11-May	7	6	20	9	5	6	8	11	11	14	12	15	11	14	16	14	13	13	8	6	5	6	5	7	20
12-May	9	17	4	5	10	10	7	14	13	10	14	17	15	14	19	14	16	19	22	10	6	2	3	32	32
13-May	6	3	9	23	6	16	15	26	25	19	58	39	30	36	47	46	28	25	10	15	8	4	6	10	58
14-May	13	88	12	12	34	18	38	41	38	34	103	52	48	33	26	50	26	42	27	5	3	3	3	39	103
15-May	87	11	66	7	13	25	6	11	5	9	24	60	50	60	60	42	18	11	6	5	3	3	3	2	87
16-May	6	12	9	11	7	8	5	8	16	15	34	12	9	44	20	22	17	13	18	19	14	27	96	65	96
17-May	11	46	18	35	37	9	12	8	7	10	9	13	12	17	15	12	17	13	14	82	15	16	7	12	82
18-May	9	5	9	14	9	14	16	23	10	11	15	12	16	15	14	12	10	13	9	12	12	5	7	11	23
19-May	9	8	10	11	9	11	8	7	8	7	6	8	8	8	7	6	7	7	7	7	7	7	7	7	11
20-May	6	6	5	5	6	6	6	8	17	15	10	11	13	8	7	7	9	7	7	10	8	17	11	11	17
21-May	10	12	9	21	12	8	10	7	13	10	12	13	10	9	10	8	9	9	10	9	8	8	10	8	21
22-May	9	7	9	7	8	8	8	7	8	9	6	8	8	7	9	8	9	7	6	7	5	4	5	4	9
23-May	9	12	8	6	6	6	12	13	14	14	26	24	21	11	15	16	21	14	12	8	37	5	2	2	37
24-May	7	3	3	3	6	6	31	27	20	13	20	18	11	10	12	12	68	44	6	8	6	4	4	8	68
25-May	3	2	3	3	4	5	12	58	48	38	49	38	24	19	13	11	11	9	10	6	6	6	7	6	58
26-May	6	6	6	6	10	9	7	10	18	12	14	11	23	21	16	8	9	9	10	9	13	7	8	9	23
27-May	8	7	5	17	19	13	11	10	8	14	19	15	19	19	23	24	23	35	15	15	16	23	12	14	35
28-May	11	11	13	13	10	11	12	12	12	13	12	12	8	10	13	15	17	14	11	13	6	10	9	7	17
29-May	5	11	9	24	33	36	22	27	14	12	14	15	17	33	26	18	17	10	9	9	6	8	6	4	36
30-May	5	7	7	11	21	16	12	10	11	12	13	16	15	16	10	9	8	9	7	12	6	8	7	7	21
31-May	8	12	10	19	5	6	15	43	32	24	48	45	38	49	43	26	18	43	12	9	9	5	7	2	49
87 88 66 35 89 91 38 100 63 38 103 60 73 60 80 50 90 44 27 82 37 37 96 65																									
Diurnal Maximum																									



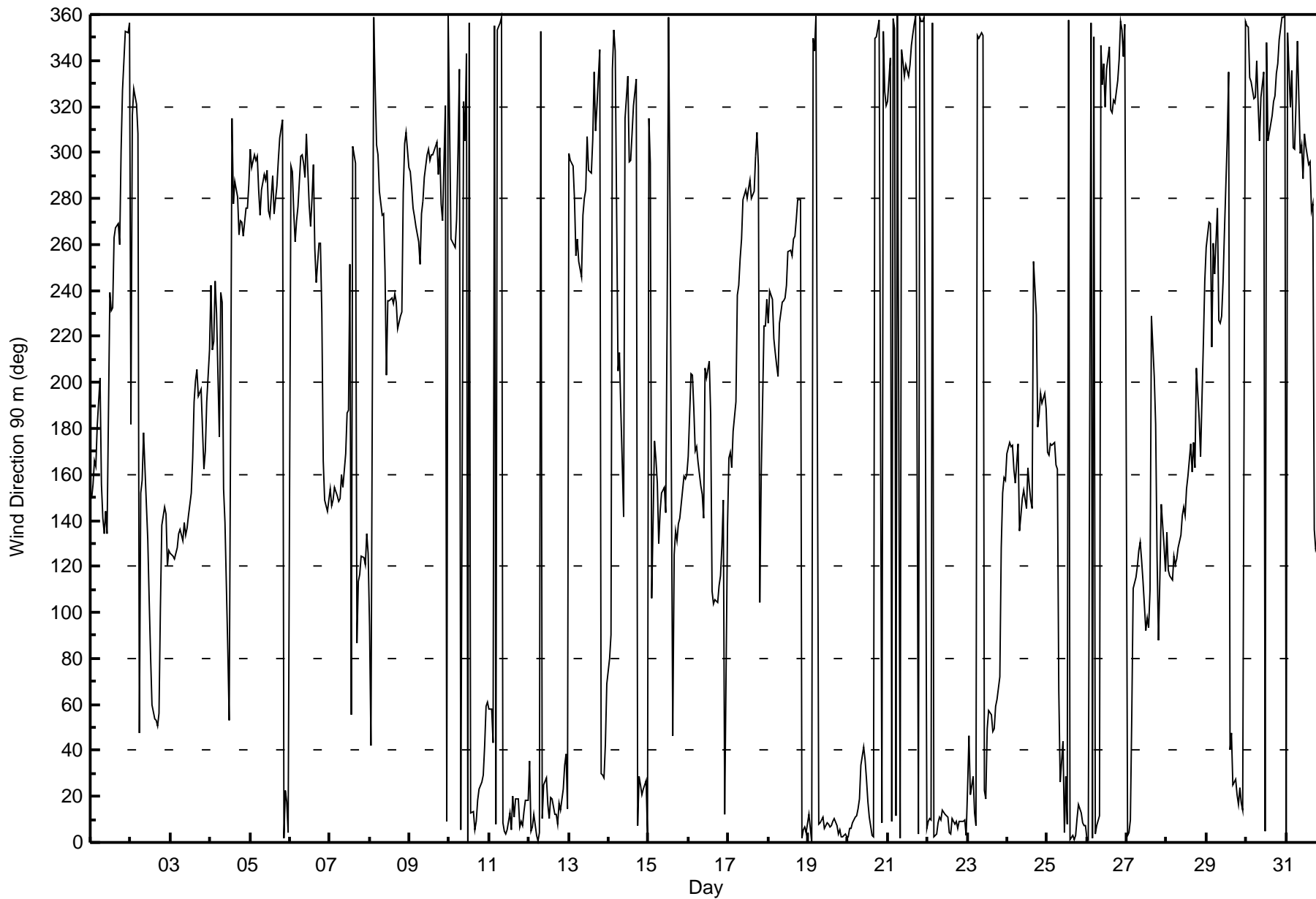


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 90 m (WD90m) - deg

Mannix - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on May 14 11:00 Minimum Value: 2 deg on Jun 1 00:00 Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 17 P ₉₀ = 32 P ₉₉ = 83		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	17	9	9	15	19	25	5	13	9	15	42	17	19	28	17	15	18	16	27	6	9	4	8	28	42	
2-May	83	24	16	15	44	79	11	15	21	20	26	30	21	19	9	12	13	15	16	9	5	14	7	5	83	
3-May	6	5	5	5	4	4	5	6	10	11	10	16	21	19	17	27	25	20	13	3	10	35	13	45	45	
4-May	17	13	9	12	17	12	20	39	20	34	81	71	72	22	78	12	9	8	7	6	6	7	7	18	81	
5-May	7	5	5	5	6	8	7	8	8	7	11	13	16	15	12	12	10	11	9	8	25	6	5	9	25	
6-May	21	10	12	7	4	10	11	17	17	35	23	28	46	39	24	27	19	14	10	13	27	3	5	5	46	
7-May	4	4	3	4	6	5	5	4	4	15	13	14	47	58	85	20	95	12	6	4	5	5	9	12	95	
8-May	28	17	37	20	18	11	10	8	18	33	17	14	13	14	11	9	9	11	9	6	31	6	10	6	37	
9-May	7	7	7	5	5	5	5	11	9	9	11	9	10	9	11	11	9	8	16	8	6	36	9	11	36	
10-May	22	13	5	3	7	21	32	15	66	20	37	24	25	16	16	23	10	11	11	7	6	9	7	6	66	
11-May	6	6	21	13	6	6	6	10	10	14	12	15	11	13	16	13	12	12	7	6	5	6	4	5	21	
12-May	10	19	5	6	11	8	6	14	13	10	13	16	14	14	18	13	16	19	21	9	7	3	4	28	28	
13-May	6	2	6	17	5	6	13	24	22	18	58	37	30	33	46	45	29	25	9	14	9	4	6	9	58	
14-May	10	97	16	10	15	49	30	33	42	36	108	54	49	32	29	56	27	41	26	4	3	3	3	32	108	
15-May	77	17	73	8	10	27	6	11	6	7	26	55	54	66	60	38	18	9	5	4	3	3	2	2	77	
16-May	8	12	10	13	10	12	6	9	16	13	30	12	9	35	18	22	14	7	13	14	11	26	100	65	100	
17-May	10	51	30	37	35	8	10	8	7	10	9	12	11	16	15	11	17	13	14	83	15	15	7	11	83	
18-May	9	5	8	15	8	12	12	17	10	10	14	11	16	14	13	12	10	12	9	12	13	5	6	9	17	
19-May	8	7	9	10	9	9	8	6	7	7	5	7	7	7	6	6	7	6	6	6	6	7	6	6	10	
20-May	5	5	5	5	5	6	6	7	17	15	10	11	12	8	6	6	8	6	6	8	8	16	11	10	17	
21-May	9	11	8	19	11	7	8	6	13	10	12	13	10	7	9	8	7	8	9	8	7	8	9	8	19	
22-May	8	6	8	6	7	7	8	7	8	8	6	7	8	7	8	8	9	6	5	6	4	4	5	3	9	
23-May	9	12	9	6	7	5	10	12	14	14	26	24	21	11	15	16	21	14	12	7	37	4	2	2	37	
24-May	6	2	3	4	5	5	25	25	20	13	20	18	11	10	12	12	70	43	5	7	6	4	4	8	70	
25-May	3	2	3	4	4	9	10	70	56	47	50	40	25	19	12	10	10	8	9	5	5	6	6	6	70	
26-May	5	5	5	5	10	8	7	9	17	12	14	11	22	21	17	8	8	9	9	8	11	7	8	7	22	
27-May	7	6	7	19	11	8	7	9	6	11	15	14	17	20	22	23	24	34	12	13	10	24	10	8	34	
28-May	10	7	8	9	8	6	9	11	10	13	12	12	8	9	13	15	17	13	10	12	6	11	8	8	17	
29-May	5	11	9	24	29	28	22	29	13	12	13	16	16	32	26	17	17	9	8	9	6	7	6	3	32	
30-May	4	6	6	10	19	16	12	10	10	12	13	15	14	16	10	9	7	8	7	11	6	7	6	6	19	
31-May	7	11	10	16	5	6	18	45	33	24	47	48	39	50	42	26	16	42	11	8	9	4	6	2	50	
		83	97	73	37	44	79	32	70	66	47	108	71	72	66	85	56	95	43	27	83	37	36	100	65	
		Diurnal Maximum																								





Maximum Value: 1.7 km/h on May 23 14:00 Maximum Daily Average: 0.6 km/h on May 27		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -1.0 km/h on May 8 19:00 Maximum Diurnal Average: 0.2 km/h at hour 8 Monthly Average: 0.11 km/h		Minimum Daily Average: -0.4 km/h on May 8 Minimum Diurnal Average: 0.0 km/h at hour 17 Percentiles: $P_1 = -0.7$ $P_{10} = -0.3$ $Q_1 = -0.1$ Median = 0.0 $Q_3 = 0.4$ $P_{90} = 0.6$ $P_{99} = 1.2$																								
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-May	-0.1	-0.2	0.2	0.6	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.0	-0.5	-0.2	-0.3	-0.1	-0.2	-0.1	-0.1	-0.3	-0.3	0.0	-0.1	-0.1	0.0	0.6
2-May	-0.1	0.0	0.0	0.1	0.2	0.2	0.3	0.2	0.2	0.4	0.6	0.6	0.4	0.6	0.6	0.7	0.6	0.3	0.4	0.5	0.5	0.5	0.2	0.4	0.3	0.7
3-May	0.5	0.6	0.5	0.4	0.6	0.4	0.4	0.3	0.3	0.2	0.2	0.4	0.4	0.2	0.0	-0.1	-0.3	0.0	-0.2	0.1	0.7	0.3	0.2	0.2	0.3	0.7
4-May	-0.1	-0.2	-0.1	-0.2	0.0	0.3	0.1	0.4	0.4	0.1	0.4	0.4	0.1	0.0	-0.6	-0.2	-0.6	-0.3	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	0.0	0.4
5-May	-0.3	-0.5	-0.5	-0.4	-0.3	0.0	0.1	0.1	0.0	-0.3	-0.1	-0.2	-0.4	-0.6	-0.6	-0.6	-0.3	-0.3	-0.4	-0.4	0.0	0.2	0.1	-0.2	-0.2	0.2
6-May	0.0	0.0	0.0	-0.3	-0.4	0.1	0.2	0.0	-0.2	-0.1	-0.1	-0.1	0.0	-0.4	-0.1	0.0	-0.3	-0.1	-0.1	-0.1	0.4	0.6	0.6	0.6	0.0	0.6
7-May	0.7	0.4	0.5	0.6	0.5	0.3	0.4	0.5	0.6	0.1	0.1	0.2	0.6	0.5	0.0	0.0	0.4	0.4	0.5	0.4	0.4	0.1	0.3	0.2	0.4	0.7
8-May	0.1	0.3	-0.1	-0.2	-0.2	-0.3	-0.2	-0.3	-0.3	0.2	-0.2	-0.3	-0.4	-0.6	-0.7	-0.7	-0.7	-1.0	-1.0	-0.4	-0.4	-0.8	-0.6	-0.6	-0.4	0.3
9-May	-0.4	-0.2	0.0	0.0	-0.5	-0.5	-0.7	-0.2	-0.2	-0.1	-0.3	-0.3	-0.3	-0.4	-0.2	-0.2	-0.2	-0.1	-0.1	0.1	0.1	-0.1	0.1	0.0	-0.2	0.1
10-May	0.0	-0.2	-0.3	-0.2	-0.2	0.0	0.5	0.3	0.2	0.1	0.1	0.4	0.3	-0.1	0.4	0.6	0.1	0.7	0.5	0.6	0.7	0.7	0.8	0.6	0.3	0.8
11-May	0.5	0.3	-0.1	0.0	-0.2	0.0	-0.2	-0.1	0.1	0.2	0.1	0.2	0.3	0.2	0.4	0.2	0.6	0.3	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	0.6
12-May	0.2	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.0	0.1	0.4	0.3	0.4	0.1	0.3	0.7	0.1	0.1	0.2	0.3	-0.1	0.1	0.1	0.0	-0.3	0.1	0.7
13-May	-0.1	-0.1	-0.1	-0.2	-0.1	0.2	0.4	0.0	0.4	-0.1	-0.2	-0.1	-0.2	-0.3	0.0	0.3	-0.2	-0.1	-0.1	0.5	0.1	0.0	0.2	0.2	0.0	0.5
14-May	-0.1	-0.1	0.1	-0.1	-0.1	0.0	0.5	0.6	0.2	0.5	0.0	0.4	-0.2	-0.2	-0.1	0.1	0.1	0.4	0.4	0.3	0.1	-0.1	0.0	-0.5	0.1	0.6
15-May	-0.2	-0.1	-0.1	-0.3	0.0	0.1	0.2	0.2	0.3	0.4	0.3	0.0	0.8	-0.1	0.4	0.7	0.3	0.6	0.4	0.4	0.6	0.4	0.2	0.3	0.2	0.8
16-May	0.3	0.3	0.2	0.4	0.7	0.5	0.5	0.4	0.4	0.5	-0.3	-0.4	-0.3	0.0	0.4	0.5	0.5	0.5	0.6	0.8	0.7	0.7	0.2	0.9	0.4	0.9
17-May	0.5	0.3	0.3	0.3	0.2	-0.1	-0.1	0.0	0.0	-0.1	-0.2	-0.1	-0.2	-0.2	-0.1	0.0	-0.2	-0.1	0.0	0.2	0.5	-0.2	-0.1	0.0	0.0	0.5
18-May	-0.1	-0.1	-0.2	-0.1	0.1	0.1	0.2	0.1	-0.2	-0.3	-0.2	-0.1	-0.2	-0.2	-0.1	0.2	0.0	0.1	0.0	0.0	0.0	-0.1	0.1	0.0	0.0	0.2
19-May	0.3	0.0	-0.1	-0.1	-0.2	-0.1	0.2	0.2	0.2	0.1	0.0	0.0	0.0	-0.3	-0.1	0.0	0.4	0.0	-0.3	-0.1	-0.3	-0.1	0.1	0.0	0.0	0.4
20-May	0.0	-0.2	-0.1	0.1	0.2	0.1	0.1	0.4	0.7	0.9	1.1	0.4	0.1	-0.1	-0.1	0.0	-0.4	-0.2	-0.3	-0.1	0.1	-0.1	-0.4	-0.4	0.1	1.1
21-May	-0.5	0.0	0.3	0.1	-0.3	0.1	-0.2	0.0	0.2	-0.2	-0.2	-0.1	-0.2	-0.1	-0.3	-0.1	-0.2	-0.1	0.1	-0.1	-0.2	-0.2	-0.3	0.1	-0.1	0.3
22-May	0.0	0.0	0.0	-0.3	-0.1	-0.2	0.0	0.2	0.2	0.5	0.0	0.0	0.3	0.0	-0.2	0.1	0.0	0.1	-0.1	-0.1	0.1	-0.1	0.0	-0.3	0.0	0.5
23-May	0.2	0.0	-0.2	-0.4	-0.3	-0.2	0.0	0.2	0.1	0.3	0.4	0.5	1.2	1.7	1.4	1.2	0.9	1.3	1.2	1.3	0.8	0.4	0.4	0.5	0.5	1.7
24-May	0.3	0.4	0.5	0.6	0.5	0.4	0.5	0.5	0.6	0.5	0.4	0.6	0.3	0.4	0.7	0.8	0.0	0.1	0.1	0.1	0.0	-0.1	0.0	0.2	0.3	0.8
25-May	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.4	0.3	0.4	0.5	0.6	0.2	-0.1	0.1	0.0	0.1	-0.1	0.1	0.2	0.2	0.1	0.0	-0.2	0.2	0.6
26-May	-0.3	-0.2	-0.3	-0.2	-0.1	-0.1	0.1	-0.1	0.0	-0.4	-0.3	-0.7	-0.3	-0.4	-0.5	-0.9	-0.4	-0.6	-0.4	-0.1	-0.1	-0.1	-0.2	-0.1	-0.3	0.1
27-May	0.1	0.0	-0.3	0.0	0.7	1.2	0.8	0.9	0.6	0.7	0.9	1.2	1.0	1.6	1.1	-0.2	0.0	0.3	0.9	1.3	0.6	0.4	0.6	0.7	0.6	1.6
28-May	0.6	0.8	1.1	1.4	0.8	0.8	0.9	0.8	0.4	0.5	0.3	0.5	0.5	0.4	0.3	0.4	0.3	0.2	-0.2	0.0	0.2	0.0	-0.1	-0.2	0.4	1.4
29-May	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.0	-0.1	0.0	0.1	0.0	0.1	0.2	0.6	0.7	0.5	0.6	0.3	0.3	0.3	0.0	0.0	0.0	0.2	0.7
30-May	-0.1	-0.1	-0.1	-0.1	0.0	0.2	-0.1	0.0	-0.5	-0.3	-0.1	0.2	-0.1	-0.3	-0.6	-0.6	-0.6	-0.4	-0.2	-0.1	-0.3	-0.1	-0.2	-0.2	-0.2	0.2
31-May	0.0	0.0	-0.1	-0.1	0.0	0.0	0.1	0.2	0.2	-0.4	-0.2	-0.1	0.1	0.1	-0.3	0.1	-0.1	0.8	0.4	0.4	0.4	0.1	0.5	0.5	0.1	0.8
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on May 19 16:00 Minimum Value: 0.1 km/h on May 14 05:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.7 Q ₁ = 1.2 Median = 1.8 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 3.7																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.6	0.5	0.6	0.8	0.8	1.1	1.2	1.3	1.6	1.7	1.8	2.6	2.4	2.3	2.2	2.0	1.8	1.6	1.1	1.5	0.9	0.6	0.2	0.2	2.6
2-May	0.2	0.2	0.2	0.3	0.3	0.5	0.8	1.2	1.1	1.4	1.6	1.8	2.0	2.0	2.0	2.0	1.7	1.3	1.1	1.0	1.0	1.1	1.8	2.2	2.2
3-May	2.3	1.9	2.1	1.8	1.7	2.4	1.9	1.8	1.7	1.9	1.8	1.9	2.2	2.6	2.8	2.0	1.9	1.9	1.7	1.1	0.7	1.1	0.9	0.6	2.8
4-May	0.5	0.8	0.5	0.6	0.3	0.7	0.8	1.1	1.3	1.5	1.4	1.4	1.9	1.9	2.6	2.9	2.8	2.9	2.3	1.9	2.0	2.1	1.8	1.6	2.9
5-May	1.7	2.1	2.0	1.8	1.5	1.6	1.7	1.8	1.8	1.9	2.3	2.3	2.6	2.8	2.9	2.7	2.6	2.5	2.5	2.4	2.0	1.4	1.4	1.0	2.9
6-May	0.4	0.2	0.2	0.5	0.8	0.7	1.2	1.4	1.6	1.9	2.2	2.4	2.4	2.3	2.2	2.3	2.1	1.8	1.4	0.8	0.9	1.2	1.3	1.4	2.4
7-May	1.5	1.6	1.6	1.6	1.5	1.0	1.3	1.5	1.8	1.1	1.0	0.9	1.4	1.6	1.6	1.6	1.1	1.7	1.9	2.1	2.5	1.9	1.5	0.8	2.5
8-May	0.3	1.0	0.9	1.2	1.7	2.2	1.6	2.6	2.3	1.0	1.8	2.6	3.1	3.3	3.1	3.3	3.4	3.4	3.1	2.4	1.9	3.2	3.1	2.8	3.4
9-May	2.4	2.0	1.5	1.4	1.8	2.0	2.1	2.3	2.4	2.9	2.5	2.0	2.3	2.3	2.2	2.1	2.0	1.7	2.0	1.5	1.1	1.9	1.8	1.0	2.9
10-May	0.5	0.7	0.6	0.6	0.7	0.6	1.2	1.7	1.6	1.9	2.2	2.4	2.4	2.6	2.6	2.6	2.5	2.5	2.6	2.4	2.0	1.6	1.6	1.3	2.6
11-May	1.0	0.8	0.5	0.6	0.9	1.1	1.9	2.0	2.7	2.8	2.9	2.9	3.1	3.0	3.0	3.1	2.8	2.8	3.1	2.9	2.5	1.9	1.7	1.3	3.1
12-May	1.1	0.5	0.9	0.5	0.6	1.2	1.5	1.9	2.3	2.7	2.7	2.9	2.9	3.2	2.7	2.7	2.7	2.5	2.5	1.9	1.4	0.9	0.2	0.3	3.2
13-May	0.3	0.2	0.1	0.3	0.4	0.6	1.0	1.3	1.6	1.8	2.1	2.2	2.2	2.1	2.1	2.2	2.0	1.8	1.3	1.2	0.7	0.4	0.8	0.4	2.2
14-May	0.3	0.2	0.1	0.2	0.1	0.3	1.0	1.2	1.3	1.6	1.8	2.2	2.1	2.2	2.1	2.1	1.9	1.7	1.6	1.6	1.4	0.8	0.4	0.3	2.2
15-May	0.2	0.2	0.3	0.3	0.3	0.5	0.8	1.0	1.1	1.4	1.5	1.8	2.0	2.0	1.9	1.7	1.6	1.4	1.3	1.2	1.7	1.4	1.4	1.4	2.0
16-May	1.5	1.0	1.1	1.1	1.3	1.3	1.4	1.5	1.2	1.3	2.7	2.6	1.9	0.5	0.5	0.7	0.8	0.7	0.7	0.9	1.3	2.0	1.8	2.3	2.7
17-May	1.5	0.8	0.9	1.0	1.1	1.2	1.8	2.2	2.1	2.1	1.7	1.7	1.6	1.8	1.9	2.0	1.6	1.4	0.8	0.5	1.7	1.8	1.1	0.8	2.2
18-May	0.8	1.3	1.4	0.7	0.7	0.9	0.9	1.4	1.8	1.9	2.0	2.8	2.9	2.6	2.1	2.2	1.9	1.7	1.4	0.8	2.6	3.5	3.6	2.9	3.6
19-May	3.3	3.1	2.8	2.7	2.7	2.9	3.1	3.3	3.7	3.6	3.8	3.6	3.5	3.6	3.7	4.0	3.5	3.6	3.5	3.3	2.9	2.7	3.1	3.4	4.0
20-May	3.2	2.9	2.9	3.0	2.7	2.6	2.4	2.5	2.4	2.5	2.6	2.6	2.5	2.5	2.8	2.8	2.3	2.8	2.8	2.4	2.4	1.5	1.8	1.8	3.2
21-May	1.7	1.5	1.5	1.4	1.8	1.9	1.8	1.9	1.9	2.2	2.1	2.5	2.3	2.4	2.7	2.8	2.7	2.6	2.6	2.5	2.3	2.2	2.3	2.5	2.8
22-May	2.2	2.1	2.1	2.5	2.6	2.6	2.6	2.8	3.0	3.0	2.8	3.3	3.1	3.4	3.2	3.6	3.8	3.7	3.8	3.2	2.5	2.5	2.1	1.9	3.8
23-May	1.3	1.0	1.3	1.1	2.0	2.0	2.0	2.1	2.1	2.4	2.6	2.7	2.7	2.9	2.8	2.5	2.3	2.2	1.9	1.6	1.8	1.0	0.6	1.4	2.9
24-May	1.9	2.1	1.6	1.6	1.2	1.6	1.2	1.3	1.4	2.3	2.6	2.9	3.3	3.0	2.7	2.7	1.8	0.8	1.5	2.2	2.3	2.0	1.3	1.1	3.3
25-May	1.3	1.5	1.3	1.2	1.1	1.1	1.2	1.2	1.3	1.6	1.8	2.0	2.1	2.3	2.7	2.7	2.8	3.1	2.9	2.5	2.6	2.5	2.2	2.4	3.1
26-May	2.2	2.8	2.9	2.5	2.1	2.3	2.3	2.0	1.8	2.4	2.9	2.8	2.5	2.6	2.5	2.4	2.4	2.3	2.3	1.9	1.7	1.6	1.4	1.6	2.9
27-May	1.4	1.3	1.3	1.1	1.2	2.4	2.6	2.9	2.4	1.8	1.7	2.0	2.2	2.4	2.2	2.2	2.1	1.2	1.5	1.5	1.3	2.2	1.6	1.4	2.9
28-May	1.7	2.2	2.1	2.3	2.3	2.3	1.9	2.0	1.9	1.9	2.1	1.9	2.2	2.7	2.5	2.5	2.1	1.8	2.0	1.5	1.3	0.8	0.5	0.8	2.7
29-May	1.0	0.8	1.0	1.2	0.5	0.6	0.8	0.7	0.8	1.1	0.9	1.0	1.2	1.2	1.5	1.4	1.3	1.7	1.7	1.5	1.2	0.7	0.6	0.7	1.7
30-May	1.1	1.1	1.3	1.0	0.9	1.1	1.7	1.8	1.9	1.9	2.1	2.2	1.9	1.9	2.3	2.5	2.7	2.4	1.9	2.1	2.4	2.2	1.9	1.6	2.7
31-May	0.6	0.7	0.5	0.4	0.4	0.6	0.9	1.4	1.3	1.8	1.9	1.9	2.2	2.1	1.9	1.9	1.7	1.6	1.2	1.1	0.8	1.3	1.1	1.7	2.2
Diurnal Maximum																									



Maximum Value: 1.9 km/h on May 24 16:00		Maximum Daily Average: 1.0 km/h on May 28		Hours in Service: 744																						
Minimum Value: -1.8 km/h on May 22 19:00		Minimum Daily Average: -1.1 km/h on May 19		Hours of Data: 744																						
Maximum Diurnal Average: 0.1 km/h at hour 7		Minimum Diurnal Average: -0.2 km/h at hour 17		Hours of Missing Data: 0																						
Monthly Average: -0.02 km/h		Percentiles: P ₁ = -1.3 P ₁₀ = -0.9 Q ₁ = -0.6 Median = -0.1 Q ₃ = 0.4 P ₉₀ = 1.0 P ₉₉ = 1.6		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-May	0.5	0.4	0.8	1.3	0.9	0.8	0.8	0.6	0.5	0.7	0.3	0.3	-0.1	0.2	0.2	-0.2	-0.3	-0.1	-0.3	-0.8	-0.9	-0.4	0.0	0.0	0.2	1.3
2-May	-0.1	0.0	0.1	0.0	0.4	0.4	0.4	0.5	0.2	0.4	0.6	0.9	0.2	0.1	0.2	0.3	0.0	0.0	0.4	0.9	1.1	1.0	0.5	0.9	0.4	1.1
3-May	1.1	1.3	1.1	1.0	1.1	1.3	0.8	0.5	0.6	0.5	0.5	0.6	0.7	1.2	0.9	0.5	0.5	0.7	0.4	0.7	1.2	1.0	0.3	0.4	0.8	1.3
4-May	-0.1	0.2	0.0	0.1	0.0	0.9	0.0	0.3	0.4	0.4	0.1	0.3	0.8	-0.3	0.0	-1.1	-0.5	-0.3	-0.3	-0.3	-0.4	-0.6	-0.4	-0.5	0.0	0.9
5-May	-0.7	-0.9	-0.9	-0.8	-0.6	-0.4	-0.1	-0.1	-0.2	-0.6	-0.2	-0.4	-0.4	-0.9	-0.5	-0.8	-0.7	-0.9	-0.8	-1.0	-0.7	-0.2	-0.4	-0.5	-0.6	-0.1
6-May	0.0	-0.2	0.0	-0.4	-0.4	0.0	0.0	0.0	-0.5	-0.1	-0.5	0.1	0.2	-0.7	-0.3	0.0	-0.1	0.1	-0.2	-0.1	0.7	1.2	1.1	1.2	0.0	1.2
7-May	1.3	1.0	1.1	1.3	1.3	0.8	1.0	1.3	1.3	0.4	0.2	0.4	1.4	0.3	0.1	0.0	0.2	0.5	0.6	0.8	0.6	0.3	0.9	0.4	0.7	1.4
8-May	0.1	0.0	-0.5	-0.6	-0.7	-0.9	-0.3	-0.5	-0.4	0.4	0.3	0.0	0.2	-0.2	-0.4	-0.6	-0.2	-0.6	-0.3	-0.2	-0.7	-1.6	-1.2	-1.0	-0.4	0.4
9-May	-1.0	-0.5	-0.1	-0.2	-0.4	-0.6	-0.5	-0.4	-0.3	-0.3	-0.5	-0.7	-0.7	-1.1	-0.5	-0.5	-0.6	-0.2	-0.4	-0.1	-0.1	-0.6	-0.5	-0.3	-0.5	-0.1
10-May	0.0	-0.2	-0.2	-0.4	-0.3	-0.1	0.6	0.1	0.4	-0.2	-0.2	0.2	0.0	-0.9	-0.1	0.4	-0.8	0.3	-0.5	0.1	0.0	0.1	0.2	0.0	-0.1	0.6
11-May	-0.2	-0.1	-0.2	-0.3	-0.6	-0.6	-0.8	-0.7	-0.6	-0.9	-0.8	-0.7	-0.3	-0.4	-0.7	-0.4	0.0	-0.6	-1.1	-1.2	-1.0	-0.8	-0.6	-0.4	-0.6	0.0
12-May	-0.4	-0.3	-0.4	-0.2	-0.4	-0.6	-0.2	-0.4	-0.7	-0.5	0.0	-0.3	-0.5	-0.8	0.5	-0.4	-0.6	-0.4	0.0	-0.7	-0.5	-0.2	-0.2	-0.1	-0.3	0.5
13-May	-0.3	-0.3	-0.3	-0.2	0.0	0.2	0.3	-0.1	0.8	0.1	-0.3	-0.5	-0.3	-0.4	-0.4	0.3	-0.5	-0.4	-0.6	0.0	-0.2	-0.3	-0.2	0.2	-0.1	0.8
14-May	0.0	0.0	0.0	-0.1	0.2	0.1	0.6	0.6	0.3	0.5	0.3	0.6	-0.4	-0.6	-0.3	0.2	-0.3	0.1	0.0	-0.1	-0.5	-0.4	-0.2	0.0	0.0	0.6
15-May	-0.2	-0.1	0.2	0.2	0.2	0.4	0.5	0.3	0.3	0.4	0.4	0.0	1.1	-0.3	0.2	1.1	0.4	0.9	1.0	1.0	1.5	1.2	1.1	1.2	0.5	1.5
16-May	1.4	0.8	1.0	1.3	1.8	1.3	1.0	0.9	0.5	0.7	0.2	0.3	0.1	0.0	0.2	0.3	0.3	0.4	0.4	0.6	1.1	1.0	0.0	1.3	0.7	1.8
17-May	1.2	0.6	0.8	0.8	0.7	-0.1	-0.1	-0.3	-0.4	-0.1	-0.4	-0.1	0.0	0.0	-0.3	0.0	-0.3	-0.1	-0.1	0.3	1.3	-0.1	-0.1	-0.1	0.1	1.3
18-May	-0.1	-0.4	-0.2	0.1	0.1	0.4	0.4	0.1	-0.2	-0.2	0.0	-0.2	-0.5	-0.1	-0.3	0.0	-0.2	-0.2	0.0	-0.1	-0.9	-1.5	-1.3	-0.4	-0.2	0.4
19-May	-1.1	-1.1	-0.6	-1.0	-1.2	-1.0	-1.0	-1.1	-0.8	-1.2	-1.6	-1.1	-1.0	-1.5	-1.4	-1.3	-0.7	-1.3	-1.3	-1.2	-1.2	-0.6	-1.0	-1.0	-1.1	-0.6
20-May	-1.1	-1.1	-1.2	-1.3	-1.1	-0.7	-0.7	-0.4	0.0	0.4	0.4	-0.1	-0.5	-1.0	-0.9	-0.9	-1.0	-1.2	-1.2	-0.7	-0.7	-0.5	-0.6	-0.6	-0.7	0.4
21-May	-0.7	-0.4	-0.1	-0.3	-0.7	-0.3	-0.6	-0.6	-0.2	-0.9	-0.4	-0.2	-0.6	-0.9	-1.0	-1.3	-0.7	-0.7	-0.4	-0.6	-0.9	-0.8	-0.7	-0.7	-0.6	-0.1
22-May	-0.4	-0.6	-0.7	-1.0	-0.8	-1.1	-1.0	-1.1	-0.8	-0.4	-0.9	-0.9	-0.5	-0.9	-1.0	-0.9	-1.3	-1.5	-1.8	-1.3	-1.0	-1.1	-1.1	-1.2	-1.0	-0.4
23-May	-0.4	-0.2	-0.8	-1.0	-1.2	-0.8	-0.6	0.0	-0.4	-0.1	-0.4	0.3	0.5	0.8	0.8	0.2	0.4	0.9	0.5	0.8	1.1	1.1	1.0	1.3	0.2	1.3
24-May	1.2	1.3	1.4	1.5	1.2	0.9	0.7	0.5	0.8	1.1	0.9	1.5	1.2	1.6	1.5	1.9	0.2	0.2	0.7	0.8	0.5	0.5	0.4	0.6	1.0	1.9
25-May	1.4	1.7	1.3	1.1	1.1	0.9	0.9	0.2	0.3	0.3	0.4	0.6	-0.1	-0.4	-0.8	-0.7	-0.6	-1.2	-0.9	-0.6	-0.8	-0.8	-0.6	-0.9	0.1	1.7
26-May	-0.9	-1.1	-1.3	-0.8	-0.7	-0.6	-0.8	-0.5	-0.1	-1.0	-1.1	-1.0	-0.6	-1.0	-0.3	-0.9	-0.6	-1.0	-0.4	-0.8	-0.7	-0.7	-0.6	-0.6	-0.8	-0.1
27-May	-0.5	-0.5	-0.8	-0.4	0.6	1.6	0.9	1.4	1.5	1.0	0.9	0.8	0.5	1.9	1.4	0.0	0.6	0.7	1.0	1.0	0.9	1.2	1.0	0.8	0.7	1.9
28-May	1.2	1.0	1.8	1.6	1.3	0.8	1.2	1.3	1.0	0.9	0.8	1.1	1.5	1.5	1.2	1.5	1.1	1.0	0.3	0.4	0.7	0.3	0.1	-0.1	1.0	1.8
29-May	0.0	0.0	-0.1	0.2	0.0	0.1	0.0	0.2	0.0	0.2	0.3	-0.2	0.1	0.0	0.5	0.4	0.6	0.4	0.0	0.2	-0.1	-0.3	-0.3	-0.3	0.1	0.6
30-May	-0.5	-0.4	-0.4	-0.3	-0.3	0.2	-0.5	0.0	-0.2	-0.3	-0.3	-0.3	-0.5	-0.2	-0.6	-0.9	-0.9	-0.8	-0.9	-0.8	-1.3	-0.8	-0.7	-0.7	-0.5	0.2
31-May	-0.2	-0.4	-0.2	-0.2	-0.2	-0.2	0.1	0.2	0.5	-0.4	-0.2	-0.3	0.0	0.0	-0.6	0.2	-0.6	1.3	0.6	0.8	0.9	0.8	1.2	1.6	0.2	1.6
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.9 km/h on May 19 16:00 Minimum Value: 0.1 km/h on May 14 03:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.2 Median = 2.0 Q ₃ = 2.6 P ₉₀ = 3.1 P ₉₉ = 3.6																							Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.5	0.4	0.5	0.6	0.8	0.8	1.0	1.2	1.6	2.1	2.2	3.3	3.3	3.0	3.1	2.4	2.3	2.1	1.3	1.8	0.7	0.7	0.2	0.2	3.3
2-May	0.2	0.2	0.2	0.2	0.3	0.4	0.7	1.2	1.0	1.5	1.8	2.1	2.4	2.2	2.3	2.4	1.8	1.4	1.2	0.9	1.2	1.2	1.7	1.9	2.4
3-May	2.3	1.8	2.0	1.8	1.5	2.5	2.1	1.7	1.8	1.8	2.0	2.1	2.5	3.1	3.2	2.5	2.4	1.9	1.7	0.6	0.5	1.4	1.3	0.9	3.2
4-May	0.7	0.9	0.5	0.3	0.3	0.6	0.8	0.9	1.4	1.5	1.6	1.7	2.4	2.5	3.0	3.0	3.1	3.2	2.5	2.1	2.2	2.3	1.9	1.8	3.2
5-May	1.7	1.9	1.8	1.7	1.5	1.6	1.9	2.1	1.9	2.2	3.0	2.8	3.2	3.2	3.5	3.0	3.0	2.7	2.8	2.7	2.2	1.6	1.4	1.0	3.5
6-May	0.5	0.2	0.2	0.4	0.5	0.9	1.4	1.9	2.0	2.5	3.0	3.1	3.1	2.8	3.1	3.1	2.6	2.3	1.5	0.8	1.0	1.3	1.2	1.3	3.1
7-May	1.4	1.4	1.3	1.4	1.5	0.9	1.0	1.5	1.6	1.0	0.7	0.9	1.6	1.9	2.1	2.1	1.5	1.6	1.8	2.0	2.2	1.9	1.7	0.8	2.2
8-May	0.3	0.8	0.8	1.2	1.6	2.3	1.7	3.1	2.6	1.3	2.3	3.0	3.7	3.5	3.5	3.6	3.6	3.4	3.2	2.5	2.2	3.4	3.4	2.7	3.7
9-May	2.4	2.2	1.7	1.6	1.4	1.7	1.9	2.6	2.6	3.1	3.0	2.3	2.6	2.5	2.6	2.5	2.3	2.1	2.1	1.7	1.3	1.9	1.8	1.1	3.1
10-May	0.6	0.5	0.3	0.3	0.4	0.6	1.5	2.1	2.1	2.5	2.9	2.9	2.9	2.8	3.2	3.4	2.8	3.0	2.7	2.6	2.2	1.9	1.7	1.4	3.4
11-May	1.0	0.8	0.4	0.5	0.6	1.1	1.9	2.2	2.9	2.9	3.3	3.3	3.6	3.5	3.1	3.4	3.2	2.9	2.8	2.8	2.4	1.8	1.7	1.5	3.6
12-May	1.1	0.5	0.8	0.6	0.4	1.1	1.6	2.1	2.7	2.9	3.0	3.5	3.3	3.4	3.4	3.3	3.0	2.9	2.7	2.0	1.4	1.0	0.2	0.2	3.5
13-May	0.2	0.2	0.2	0.2	0.2	0.4	0.9	1.6	2.1	2.6	2.6	3.1	2.7	2.7	3.5	2.5	2.3	1.4	1.2	0.7	0.4	0.9	0.6	0.6	3.5
14-May	0.4	0.2	0.1	0.2	0.2	0.2	1.0	1.3	1.4	1.8	2.4	2.9	2.6	3.0	2.8	2.6	2.4	2.2	1.8	1.6	1.3	0.9	0.3	0.4	3.0
15-May	0.2	0.2	0.2	0.3	0.3	0.3	0.7	0.8	0.9	1.4	1.6	2.4	2.6	2.6	2.5	2.1	2.1	1.7	1.4	0.9	1.1	1.0	0.9	0.8	2.6
16-May	0.8	0.8	0.7	1.0	1.1	1.1	1.3	1.4	1.2	1.5	2.7	2.8	2.0	0.4	0.5	0.8	0.8	0.8	0.9	1.0	1.4	3.1	2.5	3.2	3.2
17-May	1.5	1.0	0.9	1.1	1.3	1.5	2.2	2.4	2.2	2.3	1.9	2.0	1.7	2.2	2.0	2.2	2.0	1.8	1.0	0.7	1.3	2.0	1.2	1.1	2.4
18-May	0.8	1.3	1.5	0.9	0.9	0.9	0.8	1.5	2.1	2.1	2.4	3.2	3.1	2.9	2.6	2.4	2.3	1.8	1.3	0.9	2.3	3.0	3.4	3.3	3.4
19-May	3.6	3.4	3.3	2.9	3.0	3.0	3.1	3.2	3.8	3.4	3.4	3.4	3.5	3.6	3.6	3.9	3.8	3.5	3.4	3.0	2.8	2.8	3.1	3.3	3.9
20-May	3.4	2.8	2.6	2.6	2.5	2.5	2.5	2.7	2.4	2.8	2.8	3.0	3.1	2.5	2.8	2.6	2.3	2.5	2.8	2.4	2.5	1.6	1.8	1.8	3.4
21-May	1.6	1.5	1.6	1.5	1.6	2.0	2.0	2.1	2.3	2.6	2.4	3.0	2.6	2.7	2.7	2.9	2.7	2.6	2.6	2.6	2.6	2.3	2.5	2.9	3.0
22-May	2.3	2.3	2.2	2.5	2.8	2.8	2.5	2.8	3.2	3.2	2.9	3.2	3.1	3.4	3.2	3.5	3.6	3.5	3.3	3.2	2.4	2.1	1.9	1.5	3.6
23-May	1.4	1.0	0.8	0.7	1.6	2.0	2.2	2.4	2.5	2.9	3.0	3.4	3.2	3.1	3.0	2.7	2.5	2.6	2.1	1.8	1.7	0.9	0.5	0.7	3.4
24-May	1.2	1.1	0.8	0.8	1.1	1.3	1.1	1.4	1.8	2.6	2.8	3.2	3.5	3.1	2.6	2.9	2.0	1.0	1.3	1.8	1.7	1.4	0.9	0.5	3.5
25-May	0.4	0.5	0.5	0.6	0.5	1.0	1.3	1.2	1.5	1.9	2.4	2.6	2.6	2.8	3.2	3.0	3.0	2.9	2.8	2.6	2.5	2.6	2.2	2.3	3.2
26-May	2.0	2.6	2.6	2.3	2.0	2.3	2.1	2.1	2.2	2.5	3.2	3.3	2.8	2.7	2.9	2.7	2.7	2.5	2.6	2.0	1.6	1.5	1.4	1.7	3.3
27-May	1.3	1.2	1.0	0.8	1.7	3.0	2.9	3.0	2.6	2.0	2.0	2.3	2.5	2.9	2.6	2.4	2.0	1.1	1.4	1.4	1.3	1.8	1.6	1.4	3.0
28-May	1.6	2.4	2.5	2.7	2.4	2.3	2.1	2.3	2.1	2.2	2.4	2.4	2.1	2.3	2.4	2.8	2.4	1.5	2.0	1.2	0.8	0.3	0.4	0.8	2.8
29-May	1.0	0.9	0.7	1.0	0.5	0.6	1.0	1.1	1.0	1.3	1.3	1.1	1.5	1.6	1.9	1.6	1.6	1.8	1.9	1.8	1.2	0.6	0.6	0.3	1.9
30-May	0.8	0.9	1.2	0.9	0.9	1.2	1.7	2.0	1.7	2.1	2.3	2.2	2.1	2.1	2.0	2.5	2.8	2.6	1.8	2.0	2.2	2.2	1.8	1.3	2.8
31-May	0.6	0.8	0.5	0.5	0.4	0.4	1.0	1.7	1.8	2.2	2.5	2.6	2.9	2.7	2.6	2.5	2.1	2.0	1.4	1.2	0.6	0.4	0.6	0.9	2.9
Diurnal Maximum																									



Summary of Hour Averages

Mannix - May 2016

Maximum Value: 2.5 km/h on May 7 13:00 Maximum Daily Average: 0.5 km/h on May 24		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -1.0 km/h on May 22 19:00 Maximum Diurnal Average: 0.3 km/h at hour 13 Monthly Average: 0.14 km/h		Minimum Daily Average: -0.4 km/h on May 19 Minimum Diurnal Average: 0.0 km/h at hour 20 Percentiles: $P_1 = -0.7$ $P_{10} = -0.4$ $Q_1 = -0.1$ Median = 0.1 $Q_3 = 0.4$ $P_{90} = 0.7$ $P_{99} = 1.2$																								
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-May	0.2	0.5	0.6	0.6	0.5	0.3	0.4	0.1	0.2	0.4	0.2	0.4	0.0	0.5	0.8	0.1	0.2	0.4	0.2	-0.3	-0.2	-0.1	0.0	0.1	0.3	0.8
2-May	0.1	0.2	0.0	0.0	0.1	0.1	0.4	0.4	-0.1	0.1	0.4	0.8	-0.1	0.2	0.2	0.3	0.0	0.0	0.0	0.1	0.4	0.5	0.0	-0.3	0.2	0.8
3-May	-0.2	0.0	-0.4	-0.3	-0.1	-0.2	-0.2	-0.4	0.1	0.0	-0.2	0.3	0.3	0.8	0.7	0.3	0.6	0.6	0.3	0.6	0.8	0.9	0.3	0.3	0.2	0.9
4-May	0.0	0.1	0.1	0.2	0.1	0.5	0.3	0.2	0.3	0.4	0.2	0.2	1.0	0.4	0.5	0.3	0.8	0.6	0.8	0.4	0.4	0.5	0.4	0.4	0.4	1.0
5-May	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.7	0.0	0.6	0.3	0.5	0.1	0.6	0.3	0.4	0.4	0.4	0.4	-0.3	-0.1	-0.1	-0.2	0.3	0.7
6-May	0.2	0.2	0.2	-0.1	0.1	0.2	0.3	0.3	-0.4	0.2	0.1	0.6	0.3	-0.3	0.3	0.4	0.3	0.4	0.1	0.1	0.4	0.7	0.3	0.5	0.2	0.7
7-May	0.7	-0.1	0.2	0.9	0.8	0.0	0.1	1.0	0.7	0.2	-0.1	0.1	2.5	0.2	0.6	0.4	0.1	-0.1	-0.1	-0.1	-0.3	-0.5	-0.1	-0.3	0.3	2.5
8-May	0.1	0.2	-0.2	0.1	0.3	0.3	0.5	0.7	0.3	0.4	0.3	0.4	0.3	0.2	-0.1	-0.3	0.4	-0.4	0.0	0.0	0.1	0.2	0.2	0.4	0.2	0.7
9-May	0.2	0.5	0.8	0.6	0.3	-0.1	-0.2	0.5	0.7	0.9	0.6	0.3	0.6	-0.1	0.4	0.5	0.5	0.4	0.6	0.7	0.3	-0.1	-0.1	0.0	0.4	0.9
10-May	0.3	0.0	0.1	0.0	0.1	0.1	0.5	0.1	0.9	0.3	0.1	0.5	0.3	-0.6	0.0	0.7	-0.4	0.9	-0.4	0.3	0.1	0.2	-0.1	-0.3	0.2	0.9
11-May	-0.4	-0.1	0.1	0.2	-0.2	-0.1	-0.4	-0.5	-0.1	-0.4	-0.5	-0.1	0.1	0.0	-0.5	0.2	0.4	-0.3	-0.7	-0.7	-0.6	-0.4	-0.2	-0.2	-0.2	0.4
12-May	-0.2	0.0	0.0	-0.1	0.0	-0.3	0.1	0.0	-0.6	-0.3	0.1	-0.3	-0.1	-0.9	0.9	-0.1	-0.2	0.1	0.5	-0.3	-0.2	0.0	0.0	0.0	-0.1	0.9
13-May	0.4	0.2	0.2	0.2	0.1	0.1	0.2	0.0	1.0	0.4	-0.3	-0.1	0.1	0.0	-0.3	0.8	-0.2	-0.1	-0.4	0.1	-0.1	-0.1	0.1	0.1	0.1	1.0
14-May	0.1	0.1	0.0	0.0	0.1	0.2	0.4	0.4	0.0	0.4	0.4	0.8	-0.2	-0.3	-0.2	0.7	0.2	0.3	0.0	0.0	-0.2	-0.2	0.0	0.0	0.1	0.8
15-May	0.1	0.2	0.2	0.2	0.2	0.3	0.1	0.3	0.3	0.1	0.1	0.0	1.8	-0.3	-0.1	1.2	0.1	0.2	0.3	0.1	1.2	1.1	1.1	1.4	0.4	1.8
16-May	1.1	0.2	0.4	0.6	1.2	0.9	1.0	0.5	0.4	0.6	0.0	-0.1	0.1	-0.1	0.1	0.2	0.0	0.6	0.3	0.2	0.3	0.0	0.2	1.2	0.4	1.2
17-May	0.8	0.3	0.6	0.4	0.7	0.2	0.1	0.0	-0.1	0.6	-0.2	0.2	0.5	0.5	0.4	0.5	0.2	0.6	0.1	0.2	0.9	0.0	0.1	0.1	0.3	0.9
18-May	-0.1	-0.3	-0.2	0.1	0.0	-0.1	0.1	0.0	-0.1	-0.1	0.6	-0.2	0.0	0.6	0.3	0.5	0.3	0.3	0.3	0.0	-0.5	-0.7	-0.6	0.4	0.0	0.6
19-May	-0.3	-0.6	-0.1	-0.1	-0.5	-0.4	-0.4	-0.5	-0.1	-0.6	-0.6	-0.5	-0.5	-0.8	-0.8	-0.4	0.0	-0.5	-0.4	-0.4	-0.4	0.3	-0.4	-0.3	-0.4	0.3
20-May	-0.6	-0.5	-0.6	-0.7	-0.6	-0.4	-0.2	-0.2	0.2	0.3	0.5	0.0	-0.3	-0.4	-0.4	-0.4	-0.3	-0.4	-0.2	-0.2	-0.3	0.0	0.1	0.1	-0.2	0.5
21-May	0.0	-0.2	-0.1	-0.1	-0.2	0.1	-0.1	-0.1	0.0	-0.5	0.0	0.5	-0.1	-0.3	-0.2	-0.8	0.0	-0.2	0.1	0.0	-0.2	-0.3	-0.2	-0.1	-0.1	0.5
22-May	0.0	-0.3	-0.4	-0.4	-0.3	-0.4	-0.5	-0.6	-0.2	-0.1	-0.4	-0.1	0.4	0.0	-0.2	-0.4	-0.5	-0.7	-1.0	-0.5	-0.5	-0.6	-0.7	-0.8	-0.4	0.4
23-May	-0.3	0.1	-0.3	-0.4	-0.7	-0.5	-0.4	0.3	0.0	0.2	-0.3	0.6	0.5	0.4	0.6	-0.2	0.2	0.6	0.3	0.4	0.7	0.7	1.0	1.2	0.2	1.2
24-May	0.7	0.6	0.9	0.8	1.0	0.6	0.4	0.4	0.5	0.5	0.2	0.8	0.6	0.4	0.1	0.9	0.3	0.5	0.5	0.2	0.3	0.2	0.3	0.3	0.5	1.0
25-May	0.8	1.0	0.8	0.7	0.6	0.7	0.6	0.2	0.5	0.3	0.8	0.6	0.0	0.0	-0.5	-0.1	0.1	-0.4	-0.3	-0.2	-0.2	-0.2	-0.1	-0.4	0.2	1.0
26-May	-0.3	-0.5	-0.5	-0.1	-0.2	-0.1	-0.5	-0.1	0.1	-0.3	-0.4	0.0	0.0	-0.4	0.3	0.0	-0.1	-0.3	0.2	-0.3	-0.2	-0.3	-0.1	-0.2	-0.2	0.3
27-May	-0.1	0.0	-0.5	0.1	0.5	0.8	0.0	0.0	0.0	0.2	0.3	0.3	-0.1	1.7	0.7	0.0	0.4	0.4	0.4	0.5	0.2	0.5	0.2	0.0	0.3	1.7
28-May	0.1	-0.1	0.8	0.8	0.1	-0.3	0.3	0.4	0.3	0.5	0.0	0.7	0.8	0.7	0.8	1.0	0.9	0.8	0.1	0.3	0.5	0.1	0.0	-0.1	0.4	1.0
29-May	0.2	0.2	0.2	0.0	0.1	0.2	0.3	0.2	0.1	0.2	0.4	-0.2	0.4	0.1	0.5	0.7	1.1	0.6	0.5	0.3	0.1	-0.2	0.0	0.0	0.2	1.1
30-May	-0.2	0.0	0.0	0.0	-0.1	0.8	-0.2	0.4	0.6	0.3	0.1	-0.2	-0.1	0.3	0.2	-0.2	-0.2	-0.2	-0.4	-0.4	-0.7	-0.4	-0.3	-0.3	0.0	0.8
31-May	-0.1	-0.2	0.1	0.0	0.2	0.1	0.3	0.4	0.8	-0.3	-0.3	0.0	0.2	0.3	-0.3	0.4	-0.4	0.8	-0.2	0.2	0.4	0.4	0.9	1.3	0.2	1.3
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.3	0.1	0.2	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	Diurnal Average
	1.1	1.0	0.9	0.9	1.2	0.9	1.0	1.0	1.0	0.9	0.8	0.8	2.5	1.7	0.9	1.2	1.1	0.9	0.8	0.7	1.2	1.1	1.1	1.4	0.0	Diurnal Maximum



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on May 13 16:00 Minimum Value: 0.1 km/h on May 14 04:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.1 Median = 2.0 Q ₃ = 2.7 P ₉₀ = 3.3 P ₉₉ = 3.7																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.6	0.5	0.3	0.5	0.6	0.5	0.5	1.0	1.6	2.0	2.3	3.4	3.6	3.6	3.4	2.7	2.7	2.4	1.6	1.5	0.5	0.5	0.3	0.3	3.6
2-May	0.2	0.3	0.3	0.2	0.3	0.3	0.4	1.0	0.9	1.4	1.8	2.6	2.9	2.5	2.6	2.6	2.0	1.4	1.8	1.0	1.1	1.3	2.2	2.3	2.9
3-May	2.5	2.3	2.2	2.0	1.6	2.2	1.8	1.8	1.7	1.8	2.1	2.2	2.8	3.3	3.4	2.7	2.5	2.2	1.7	0.6	0.6	1.4	1.5	1.0	3.4
4-May	0.7	1.1	0.6	0.4	0.4	0.4	0.5	0.7	1.3	1.3	1.6	1.8	2.8	2.7	3.4	3.1	3.1	3.3	2.9	2.3	2.3	2.4	2.1	1.8	3.4
5-May	1.6	1.8	1.7	1.4	1.4	1.3	2.0	2.0	1.9	2.3	3.3	3.0	3.6	3.7	3.8	3.4	3.3	2.7	2.7	2.3	2.1	1.5	1.3	1.1	3.8
6-May	0.6	0.2	0.3	0.4	0.4	1.2	1.5	1.9	2.1	2.6	3.3	3.4	3.2	3.4	3.6	3.4	2.9	2.6	1.5	0.8	0.7	1.0	0.9	1.0	3.6
7-May	1.1	0.9	0.8	1.0	1.3	0.8	0.9	1.2	1.1	0.7	0.5	1.0	1.9	1.9	2.2	2.3	1.8	1.9	2.2	2.0	2.3	2.1	1.9	1.3	2.3
8-May	0.6	0.5	0.7	1.1	1.3	2.0	1.6	3.3	2.7	1.4	2.4	2.9	3.5	3.7	3.6	3.4	3.4	3.1	2.8	2.4	2.2	3.2	3.2	2.6	3.7
9-May	2.3	2.3	1.7	1.5	1.2	1.1	1.3	2.7	2.8	3.4	3.2	2.5	2.8	2.7	3.0	2.6	2.3	2.0	2.1	1.7	1.2	1.8	1.8	1.1	3.4
10-May	0.7	0.4	0.2	0.3	0.4	0.6	1.7	2.0	2.7	2.7	3.1	3.2	3.3	3.2	3.5	3.6	3.1	3.3	2.4	2.3	1.8	1.5	1.7	1.4	3.6
11-May	1.3	0.8	0.5	0.3	0.6	0.8	1.6	2.2	2.8	3.0	3.3	3.5	3.8	3.7	3.4	3.6	3.3	2.7	2.6	2.6	2.1	1.6	1.5	1.4	3.8
12-May	1.1	0.5	0.6	0.6	0.4	0.9	1.4	2.2	2.7	2.9	3.0	3.4	3.6	3.3	3.6	3.6	3.3	2.8	2.6	1.9	0.9	0.3	0.2	0.2	3.6
13-May	0.3	0.2	0.3	0.3	0.2	0.4	0.9	1.5	2.1	3.0	2.9	3.0	3.4	3.1	2.9	4.0	2.9	2.7	1.5	1.0	0.5	0.3	0.5	0.9	4.0
14-May	0.5	0.2	0.1	0.1	0.1	0.2	0.7	1.3	1.5	1.7	2.7	3.2	3.0	3.4	3.5	3.0	2.8	2.6	1.7	1.2	0.8	0.7	0.2	0.4	3.5
15-May	0.3	0.3	0.3	0.2	0.3	0.2	0.5	0.5	0.7	1.1	1.6	3.0	2.9	2.7	3.0	2.5	2.4	1.8	1.2	0.6	0.8	0.8	0.8	0.4	3.0
16-May	0.7	1.1	1.0	1.2	1.0	1.0	0.9	1.0	1.1	1.4	2.7	2.7	2.0	0.5	1.0	1.3	1.8	2.1	1.8	1.7	2.0	3.6	3.2	3.5	3.6
17-May	1.5	1.0	1.0	1.0	1.6	1.5	2.2	2.4	2.3	2.5	2.0	2.1	1.9	2.4	2.3	2.4	2.5	2.1	1.2	0.8	1.2	2.1	1.5	1.1	2.5
18-May	0.9	1.2	1.6	1.2	1.2	1.0	0.7	1.6	2.1	2.2	2.7	3.2	3.3	3.1	2.9	2.8	2.5	1.9	1.3	1.0	2.2	2.6	3.4	3.3	3.4
19-May	3.4	3.2	3.3	2.8	2.7	3.1	3.0	2.6	3.5	3.2	3.1	3.4	3.4	3.7	3.4	3.5	3.8	3.3	3.3	2.8	2.6	2.8	3.2	3.1	3.8
20-May	3.1	2.7	2.5	2.5	2.3	2.4	2.5	2.7	2.6	2.9	3.0	3.1	3.2	2.3	2.4	2.3	2.2	2.4	2.5	2.2	2.5	1.5	1.5	1.7	3.2
21-May	1.5	1.5	1.4	1.3	1.3	1.9	1.9	1.7	2.4	2.6	2.7	3.4	2.5	2.7	2.7	2.4	2.5	2.4	2.5	2.4	2.5	2.3	2.4	2.8	3.4
22-May	2.5	2.1	2.1	2.4	2.5	2.8	2.5	2.7	3.0	3.0	2.6	3.2	3.2	3.3	3.2	3.4	3.3	3.1	2.8	2.9	2.0	1.7	1.5	1.3	3.4
23-May	1.3	1.1	0.8	0.7	1.4	1.7	2.1	2.6	2.7	3.0	3.2	3.5	3.6	3.4	3.3	2.7	2.7	2.5	2.1	1.6	1.5	0.8	0.4	0.6	3.6
24-May	1.0	0.9	0.7	0.8	1.0	1.1	1.1	1.6	1.9	2.7	3.0	3.7	3.9	3.2	2.8	3.1	1.9	1.1	1.2	1.7	1.6	1.4	0.8	0.4	3.9
25-May	0.4	0.4	0.5	0.5	0.5	0.7	1.1	1.3	1.6	1.9	2.7	3.0	2.9	3.3	3.4	3.0	2.9	2.5	2.3	2.2	2.3	2.2	2.1	2.1	3.4
26-May	1.9	2.2	2.3	2.0	1.9	2.3	1.9	2.2	2.3	2.7	3.4	3.3	2.9	2.4	2.8	2.8	2.5	2.3	2.7	1.9	1.5	1.2	1.3	1.6	3.4
27-May	1.1	0.9	0.7	0.6	2.4	3.4	3.1	3.1	2.5	2.1	2.4	2.9	3.4	3.6	3.1	2.4	2.0	1.0	1.9	2.1	2.0	2.0	1.8	2.2	3.6
28-May	1.7	2.8	3.2	3.7	2.6	2.5	2.5	2.5	2.2	2.2	2.4	2.6	2.1	2.2	2.4	3.0	2.8	1.5	1.8	1.2	0.7	0.4	0.4	0.9	3.7
29-May	0.8	1.1	0.7	0.8	0.5	0.5	0.9	1.0	1.0	1.3	1.2	1.1	1.5	1.6	2.1	1.8	1.9	1.9	2.1	1.9	1.0	0.5	0.6	0.4	2.1
30-May	0.6	0.6	1.0	0.9	0.9	1.4	1.5	2.1	1.8	2.4	2.5	2.0	2.2	2.2	1.8	2.4	2.5	2.2	1.6	1.8	2.0	2.0	1.7	1.3	2.5
31-May	0.8	0.9	0.7	0.7	0.4	0.4	1.0	2.0	2.0	2.5	2.6	3.1	3.4	3.1	3.1	2.9	2.4	2.1	1.3	1.3	0.6	0.3	0.5	0.6	3.4
3.4 3.2 3.3 3.7 2.7 3.4 3.1 3.3 3.5 3.4 3.4 3.7 3.9 3.7 3.8 4.0 3.8 3.3 3.3 2.9 2.6 3.6 3.4 3.5																									
Diurnal Maximum																									



Summary of Hour Averages

Mannix - May 2016

Maximum Value: 4.5 km/h on May 8 22:00		Maximum Daily Average: 2.4 km/h on May 5		Hours in Service: 744																							
Minimum Value: -1.3 km/h on May 7 22:00		Minimum Daily Average: 0.1 km/h on May 3		Hours of Data: 744																							
Maximum Diurnal Average: 1.4 km/h at hour 16		Minimum Diurnal Average: 0.7 km/h at hour 11		Hours of Missing Data: 0																							
Monthly Average: 0.97 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = 0.0 Q ₁ = 0.3 Median = 0.8 Q ₃ = 1.5 P ₉₀ = 2.0 P ₉₉ = 3.4		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-May	0.2	0.5	0.4	0.4	0.2	0.2	0.4	0.0	0.2	0.3	0.0	0.8	0.2	0.9	1.7	1.2	0.9	1.1	1.3	1.9	1.7	1.2	0.4	0.5	0.7	1.9	
2-May	0.1	0.7	0.5	0.6	0.3	0.2	0.3	0.4	-0.1	-0.1	0.0	0.4	-0.1	0.4	0.5	0.5	0.1	0.1	-0.1	0.0	0.6	0.7	-0.6	-0.7	0.2	0.7	
3-May	-0.6	-0.7	-1.1	-0.9	-0.4	0.0	-0.1	-0.5	0.1	-0.2	-0.2	0.2	0.3	0.8	0.7	0.2	0.7	0.6	0.1	0.5	0.6	1.0	0.2	0.4	0.1	1.0	
4-May	0.4	0.0	0.0	0.6	0.2	0.3	0.7	0.3	0.3	0.2	0.2	0.9	1.6	1.9	3.1	3.6	3.1	3.3	2.5	2.4	3.0	2.8	2.6	1.4	3.6		
5-May	3.1	3.2	3.4	3.0	2.6	2.5	2.1	2.1	2.3	1.7	2.3	1.8	2.3	2.7	3.1	2.6	3.0	3.0	3.3	3.0	1.3	0.7	0.9	0.8	2.4	3.4	
6-May	0.7	1.1	1.1	1.1	1.8	1.1	1.3	1.1	0.4	0.6	1.4	1.7	1.0	0.6	1.5	1.3	1.0	1.3	1.0	0.3	0.4	0.8	0.6	0.6	1.0	1.8	
7-May	0.7	0.3	0.6	0.9	1.2	0.6	0.6	0.9	0.8	0.1	-0.1	0.0	3.1	0.3	1.2	1.3	0.3	-0.5	-0.5	-0.7	-0.8	-1.3	-0.2	-0.6	0.3	3.1	
8-May	0.1	0.5	0.8	2.1	3.0	3.4	2.6	3.4	2.1	0.6	0.2	0.8	1.0	0.8	0.3	0.4	1.1	-0.2	0.2	0.3	1.9	4.5	4.0	3.8	1.6	4.5	
9-May	2.9	2.8	2.6	2.6	2.4	1.5	0.9	2.6	2.8	3.6	3.2	2.5	2.9	2.3	2.4	2.7	2.8	2.2	2.6	2.1	1.6	1.8	1.1	1.0	2.3	3.6	
10-May	1.1	0.9	1.1	1.2	1.7	1.3	1.0	0.6	1.3	1.0	1.1	1.4	1.5	0.6	0.9	1.8	0.9	2.3	0.7	1.2	1.0	0.6	0.2	-0.1	1.0	2.3	
11-May	-0.2	0.1	0.4	1.1	0.8	1.3	1.0	0.6	1.2	1.1	1.0	1.5	1.5	1.7	0.7	1.9	1.6	1.1	1.2	1.5	1.4	1.3	1.4	0.9	1.1	1.9	
12-May	0.2	0.8	0.9	0.6	0.9	0.8	1.1	1.1	0.5	0.5	0.8	0.8	1.5	0.3	2.2	1.3	1.1	1.5	1.8	1.0	0.8	0.5	0.2	0.3	0.9	2.2	
13-May	1.5	1.5	1.4	1.3	0.6	0.6	0.4	0.1	1.5	0.9	0.3	0.6	1.1	0.7	0.3	1.7	0.8	0.8	0.5	0.5	0.3	0.5	0.6	0.2	0.8	1.7	
14-May	0.1	0.2	0.5	0.4	0.3	0.2	0.3	0.3	-0.2	0.3	0.6	1.4	0.2	0.6	0.4	1.3	1.2	0.9	0.5	0.7	1.0	0.8	0.6	0.3	0.5	1.4	
15-May	0.2	0.7	0.3	0.3	0.2	0.2	0.0	0.2	0.3	0.2	0.0	0.0	2.4	-0.1	0.0	0.8	-0.1	-0.1	0.4	0.3	1.0	1.0	0.9	1.1	0.4	2.4	
16-May	1.0	0.0	0.1	0.3	0.7	0.6	0.7	0.5	0.6	0.7	-0.2	-0.3	-0.2	-0.2	0.0	0.0	-0.2	0.0	-0.1	-0.2	0.1	-0.2	0.4	1.3	0.2	1.3	
17-May	0.7	0.3	0.4	0.3	0.6	0.7	0.8	1.1	1.2	2.1	0.7	1.2	1.6	1.7	1.8	1.9	1.4	1.6	0.7	0.4	0.8	0.1	0.1	0.5	1.0	2.1	
18-May	0.0	0.3	0.3	0.1	0.0	-0.2	-0.1	0.2	0.2	0.2	1.1	0.5	1.4	2.0	1.4	1.8	1.8	1.7	1.4	0.6	1.7	1.9	1.9	2.6	1.0	2.6	
19-May	1.9	1.6	1.9	2.3	1.9	1.7	1.7	1.8	2.3	1.8	1.7	1.9	1.8	1.7	1.6	2.7	2.5	2.0	1.9	1.7	1.7	2.3	1.8	2.0	1.9	2.7	
20-May	1.7	1.5	1.4	1.1	1.2	1.2	1.3	1.0	0.9	0.8	1.2	0.9	0.8	1.1	1.6	1.3	1.7	2.0	2.1	1.6	1.2	1.3	1.7	1.9	1.4	2.1	
21-May	1.7	1.2	0.8	0.9	1.5	1.5	1.3	1.3	1.1	0.9	1.4	2.1	1.4	1.5	1.8	1.3	1.9	1.6	1.8	1.9	1.6	1.3	1.5	1.8	1.5	2.1	
22-May	1.4	1.3	1.2	1.6	1.6	1.5	1.4	1.5	1.9	1.9	1.7	2.0	2.3	2.3	2.1	1.8	1.7	2.0	1.7	2.0	1.5	1.5	1.3	1.0	1.7	2.3	
23-May	0.8	0.4	0.6	0.3	1.0	1.1	0.8	1.3	1.0	1.3	0.6	1.6	0.9	0.6	0.9	0.2	0.7	0.8	0.5	0.5	0.7	0.7	0.8	1.0	0.8	1.6	
24-May	0.7	0.7	0.5	0.6	0.8	0.4	0.4	0.3	0.3	0.5	-0.1	0.7	0.4	0.4	0.0	1.0	1.1	0.7	0.4	0.3	0.0	0.2	0.0	0.2	0.4	1.1	
25-May	0.6	0.7	0.7	0.5	0.4	0.5	0.4	0.2	0.7	0.4	1.1	0.7	0.6	1.1	0.8	1.5	2.0	1.8	1.5	1.5	1.5	1.7	1.5	1.3	1.0	2.0	
26-May	1.4	1.5	1.9	1.6	1.6	1.5	0.9	1.0	1.2	1.4	1.3	2.2	1.6	1.5	2.0	2.0	1.8	1.3	1.9	1.2	1.1	1.1	1.3	1.4	1.5	2.2	
27-May	1.0	1.1	0.3	0.3	0.0	0.0	-1.0	-0.6	-0.4	-0.3	-0.1	-0.1	-0.6	1.1	0.2	0.3	1.2	0.5	0.0	0.3	-0.2	0.1	-0.2	-0.6	0.1	1.2	
28-May	-0.1	-0.8	-0.1	0.1	-0.5	-1.2	-0.2	0.0	0.0	0.4	-0.1	0.8	0.7	0.7	0.7	1.0	0.8	0.7	-0.1	0.2	0.4	0.0	0.1	0.4	0.2	1.0	
29-May	0.9	0.9	1.0	0.1	0.5	0.4	0.8	0.2	0.1	0.3	0.5	0.1	0.9	0.5	0.8	0.8	1.6	1.1	1.3	1.0	0.7	0.5	0.6	0.8	0.7	1.6	
30-May	1.0	1.2	1.4	1.1	1.1	2.0	1.2	1.7	2.1	1.7	1.4	1.0	1.0	1.6	2.4	1.8	2.1	2.1	1.3	1.2	1.4	1.4	1.2	1.0	1.5	2.4	
31-May	0.7	0.7	1.1	0.7	1.1	1.3	0.8	0.8	1.3	0.1	0.0	0.6	0.7	0.7	0.3	0.8	0.2	0.6	-0.4	0.0	0.5	0.6	0.7	1.0	0.6	1.3	
		0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.8	0.9	0.8	0.7	1.0	1.1	1.0	1.2	1.4	1.3	1.2	1.0	1.0	1.0	1.0	0.9	0.9	Diurnal Average	
		3.1	3.2	3.4	3.0	3.0	3.4	2.6	3.4	2.8	3.6	3.2	2.5	3.1	2.7	3.1	3.1	3.6	3.1	3.3	3.0	2.4	4.5	4.0	3.8	Diurnal Maximum	



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Mannix - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6.2 km/h on May 27 17:00 Minimum Value: 0.2 km/h on May 14 05:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.1 Median = 2.0 Q ₃ = 2.8 P ₉₀ = 3.4 P ₉₉ = 3.9																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.6	0.5	0.3	0.5	0.5	0.4	0.4	0.8	1.5	2.0	2.1	3.4	3.6	4.0	3.4	2.9	2.8	2.4	1.6	1.3	0.6	0.6	0.5	0.4	4.0
2-May	0.2	0.4	0.3	0.3	0.2	0.2	0.3	0.8	0.8	1.1	1.5	2.2	2.5	2.5	2.5	2.6	2.0	1.4	1.5	0.9	1.1	1.1	2.1	2.0	2.6
3-May	2.3	2.0	2.0	1.6	1.2	1.8	1.7	1.5	1.7	1.7	2.0	2.2	3.0	3.4	3.7	2.7	2.6	2.3	1.7	0.6	0.6	1.5	1.5	1.0	3.7
4-May	0.8	1.2	0.7	0.6	0.5	0.4	0.8	0.6	1.2	1.2	1.5	1.7	2.8	2.8	3.5	2.9	3.0	3.5	2.9	2.3	2.4	2.4	2.0	2.1	3.5
5-May	1.6	1.7	1.6	1.3	1.3	1.3	2.0	1.9	1.8	2.1	3.3	3.1	3.7	3.7	4.1	3.4	3.3	2.6	2.5	2.2	2.3	1.4	1.3	1.2	4.1
6-May	0.7	0.3	0.4	0.6	0.4	1.3	1.4	2.0	2.1	2.6	3.4	3.4	3.3	3.7	3.7	3.7	3.0	2.8	1.7	0.8	0.8	0.8	0.8	0.8	3.7
7-May	0.9	0.8	0.7	1.1	1.3	0.7	0.9	1.1	0.9	0.6	0.6	1.0	1.9	1.8	2.2	2.3	1.7	1.5	1.8	1.6	1.8	1.7	1.7	1.2	2.3
8-May	0.6	0.5	0.9	1.4	1.4	1.9	1.6	3.3	2.7	1.5	2.5	2.9	3.7	3.8	3.8	3.5	3.6	3.2	2.9	2.4	2.4	3.1	3.1	2.5	3.8
9-May	2.3	2.2	1.7	1.6	1.3	1.1	1.2	2.7	2.8	3.3	3.0	2.4	2.6	2.7	2.9	2.6	2.2	1.9	2.2	1.7	1.2	2.0	2.1	1.2	3.3
10-May	0.8	0.6	0.3	0.4	0.6	0.8	1.9	2.0	2.7	2.9	3.3	3.3	3.5	3.4	3.6	3.6	3.4	3.4	2.3	2.0	1.6	1.4	1.6	1.3	3.6
11-May	1.3	0.8	0.6	0.6	0.8	0.9	1.6	2.4	3.1	3.2	3.4	3.7	4.1	4.0	3.6	3.8	3.4	2.7	2.6	2.7	2.1	1.6	1.3	1.4	4.1
12-May	1.1	0.7	0.6	0.7	0.6	1.0	1.3	2.2	2.9	3.0	3.2	3.7	3.8	3.6	3.8	3.7	3.5	2.9	2.8	1.9	0.8	0.2	0.2	0.3	3.8
13-May	0.3	0.2	0.3	0.4	0.4	0.5	0.8	1.4	2.1	2.9	3.1	3.3	3.6	3.2	3.1	4.1	2.9	2.8	1.5	1.0	0.6	0.3	0.5	0.9	4.1
14-May	0.5	0.2	0.3	0.2	0.2	0.2	0.6	1.2	1.2	1.7	2.8	3.4	3.1	3.7	3.7	3.1	2.9	2.7	1.8	1.1	0.8	0.8	0.3	0.5	3.7
15-May	0.2	0.3	0.3	0.2	0.2	0.2	0.5	0.5	0.5	1.0	1.4	3.0	2.9	2.9	3.1	2.4	2.3	1.8	1.1	0.6	0.8	0.7	0.7	0.3	3.1
16-May	0.6	1.1	1.1	1.3	1.2	1.1	0.7	0.9	1.1	1.3	3.0	2.6	1.9	0.6	0.7	0.9	0.9	0.9	1.0	1.2	1.8	3.9	3.4	3.8	3.9
17-May	1.6	1.1	1.0	1.0	1.6	1.6	2.4	2.4	2.4	2.5	2.1	2.3	2.0	2.4	2.4	2.4	2.6	2.1	1.2	0.8	1.1	2.2	1.7	1.2	2.6
18-May	1.0	1.4	1.6	1.5	1.2	0.9	0.8	1.8	2.2	2.3	2.8	3.3	3.5	3.4	3.0	2.9	2.7	1.9	1.2	1.0	2.5	2.7	3.5	3.6	3.6
19-May	3.6	3.2	3.5	2.9	2.7	3.2	3.2	2.7	3.7	3.3	3.3	3.6	3.4	3.8	3.6	3.7	4.0	3.4	3.5	3.2	2.8	2.9	3.3	3.1	4.0
20-May	3.2	2.8	2.6	2.7	2.5	2.4	2.6	2.6	2.6	2.9	3.2	3.4	3.6	2.5	2.4	2.3	2.2	2.3	2.4	2.1	2.5	1.6	1.5	1.6	3.6
21-May	1.5	1.5	1.4	1.3	1.5	1.9	1.9	1.8	2.4	2.7	2.7	3.5	2.5	2.5	2.7	2.4	2.6	2.4	2.5	2.6	2.7	2.6	2.5	3.0	3.5
22-May	2.7	2.2	2.2	2.4	2.7	2.8	2.6	2.7	3.1	2.9	2.7	3.2	3.3	3.4	3.5	3.4	3.4	3.2	3.1	3.0	2.1	1.7	1.6	1.4	3.5
23-May	1.3	1.1	0.9	0.9	1.4	1.8	2.1	2.7	2.8	3.2	3.4	3.5	3.2	3.2	2.7	2.8	2.3	1.9	1.3	1.3	0.8	0.4	0.5	3.5	
24-May	0.9	0.8	0.7	0.8	0.9	1.1	1.0	1.6	1.8	3.0	3.2	3.8	4.1	3.3	2.9	3.3	2.1	1.3	1.2	1.7	1.5	1.3	0.8	0.5	4.1
25-May	0.4	0.4	0.4	0.4	0.5	0.7	0.9	1.2	1.6	1.9	2.8	2.9	3.2	3.7	3.4	3.2	3.0	2.7	2.2	2.0	2.5	2.3	2.3	2.1	3.7
26-May	2.1	2.3	2.3	2.1	2.0	2.4	2.0	2.2	2.4	2.6	3.4	3.3	2.8	2.4	2.8	2.6	2.4	2.1	2.5	2.0	1.6	1.2	1.3	1.5	3.4
27-May	1.2	0.9	0.8	0.6	2.1	2.9	2.7	2.9	2.1	1.9	1.9	2.1	2.5	2.8	2.4	2.5	6.2	1.1	1.5	1.2	1.6	2.0	1.6	1.9	6.2
28-May	1.7	2.6	2.8	2.8	2.5	2.2	2.2	2.4	2.2	2.2	2.5	2.7	2.2	2.3	2.4	3.3	2.9	1.6	1.8	1.2	0.6	0.4	0.5	0.9	3.3
29-May	0.8	1.1	0.7	0.8	0.6	0.5	0.8	0.9	1.0	1.3	1.1	1.1	1.6	1.6	2.2	1.8	2.1	2.0	2.1	2.0	1.0	0.5	0.7	0.5	2.2
30-May	0.6	0.6	1.0	1.0	1.1	1.4	1.5	2.0	1.7	2.4	2.5	2.0	2.4	2.3	1.6	2.2	2.4	2.2	1.5	1.7	2.0	2.3	1.9	1.5	2.5
31-May	0.9	1.0	0.9	0.8	0.5	0.5	1.1	2.0	2.1	2.7	2.6	3.3	3.4	3.3	3.3	3.0	2.4	2.1	1.2	1.1	0.6	0.3	0.4	0.4	3.4
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 3, 2016	Last Calibration	April 13, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:18	End Time (MST)	11:10
Gas Cert Reference	S960161A	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	824	824
Calculated slope	1.001693	1.003503	Chamber temp	45.3	44.9
Calculated intercept	0.735087	0.718737	Pressure	698.6	691.9
Analyzer Background	7.6	7.3	Flow	0.476	0.480
Analyzer Coefficient	0.974	0.974	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # 1008841399

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	60.0	600.0	597.3	1.005
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	60.0	600.0	597.3	1.005
second point	5000	30.0	300.0	298.7	1.004
third point	5000	15.0	150.0	147.3	1.018
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.0	600.0	599.3	1.001
Average Correction Factor					1.009

Corrected As found 597.8 Previous response 598.3 % change 0.1%

Notes:

Changed inlet filter after as founds. Adjusted zero.

Calibration Performed By: Evan Magill



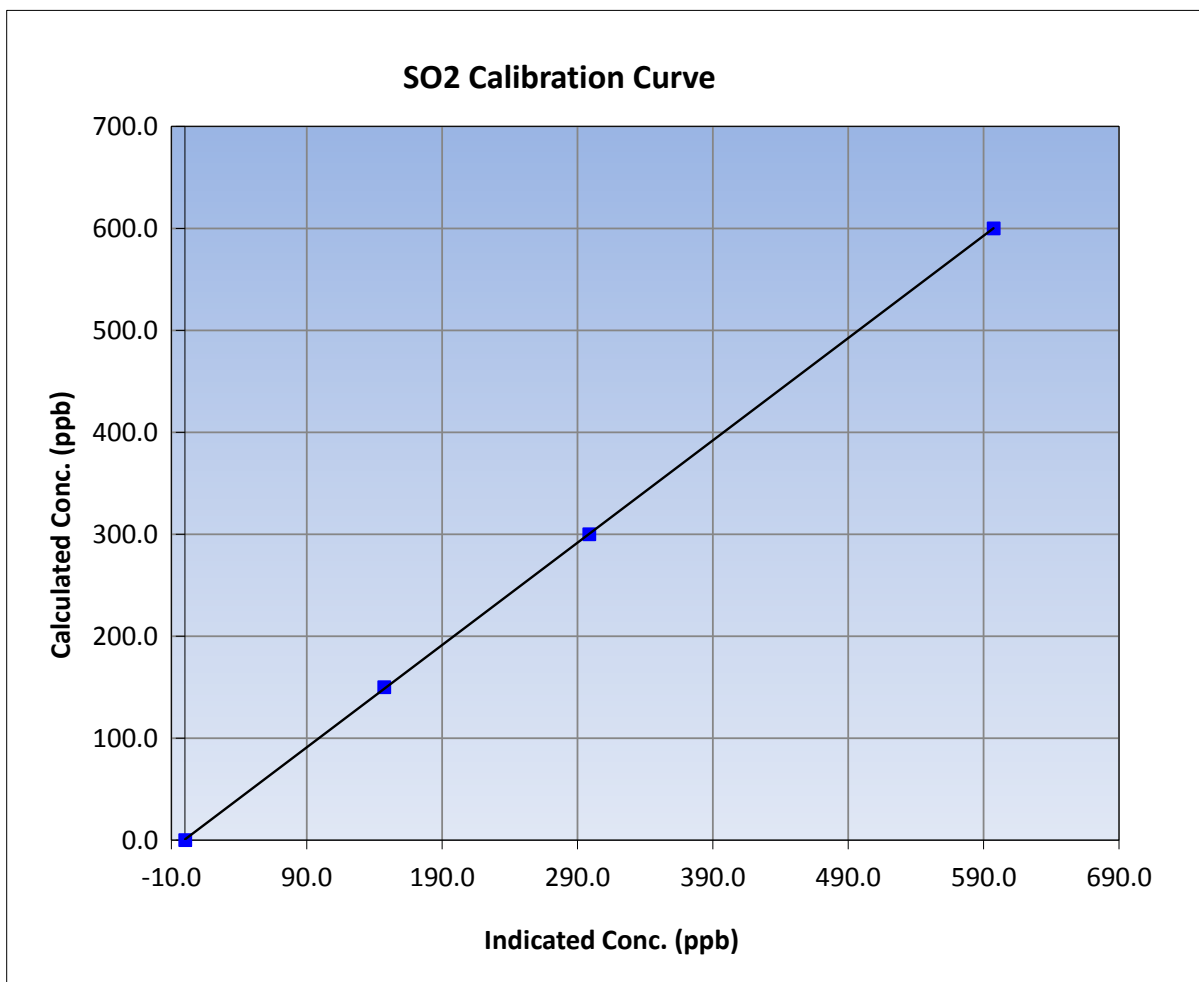
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:18	End Time (MST)	11:10
Analyzer make	TEI 43i	Analyzer serial #	1008841399

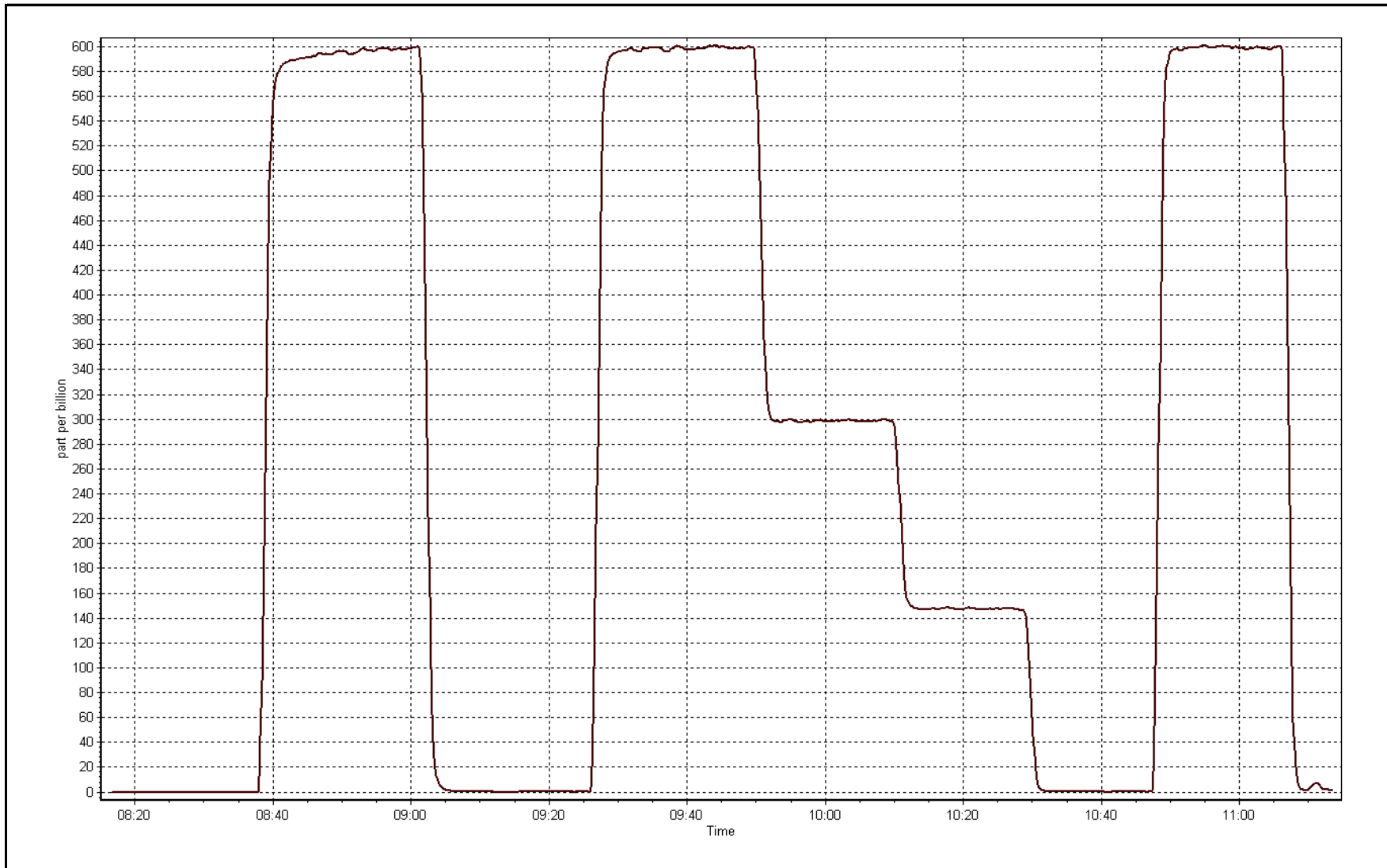
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999984
600.0	597.3	1.0045		
300.0	298.7	1.0042	Slope	1.003503
150.0	147.3	1.0184		
			Intercept	0.718737



SO2 Calibration Plot

Date: May 3, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 13, 2016	Last Calibration	April 12, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	6:50	End Time (MST)	8:50
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	814	814
Calculated slope	0.994104	1.007658	Chamber temp	45	45
Calculated intercept	-0.089469	-0.083678	Pressure	512.6	514.0
Analyzer Background	19.7	19.7	Flow	1.020	1.020
Analyzer Coefficient	0.981	0.981	Intensity	104	104
			Converter temp.	325	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	74.4	75.0	74.3	1.009
SO2 scrubber check	5000	15.0	150.0	1.5	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.4	75.0	74.4	1.008
second point	5000	41.7	42.0	41.8	1.005
third point	5000	24.8	25.0	25.1	0.994
as left zero					
as left span					
Average Correction Factor					1.002

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

No adjustments performed; scrubber check conducted after 3rd point.

Calibration Performed By: Kelly Baragar



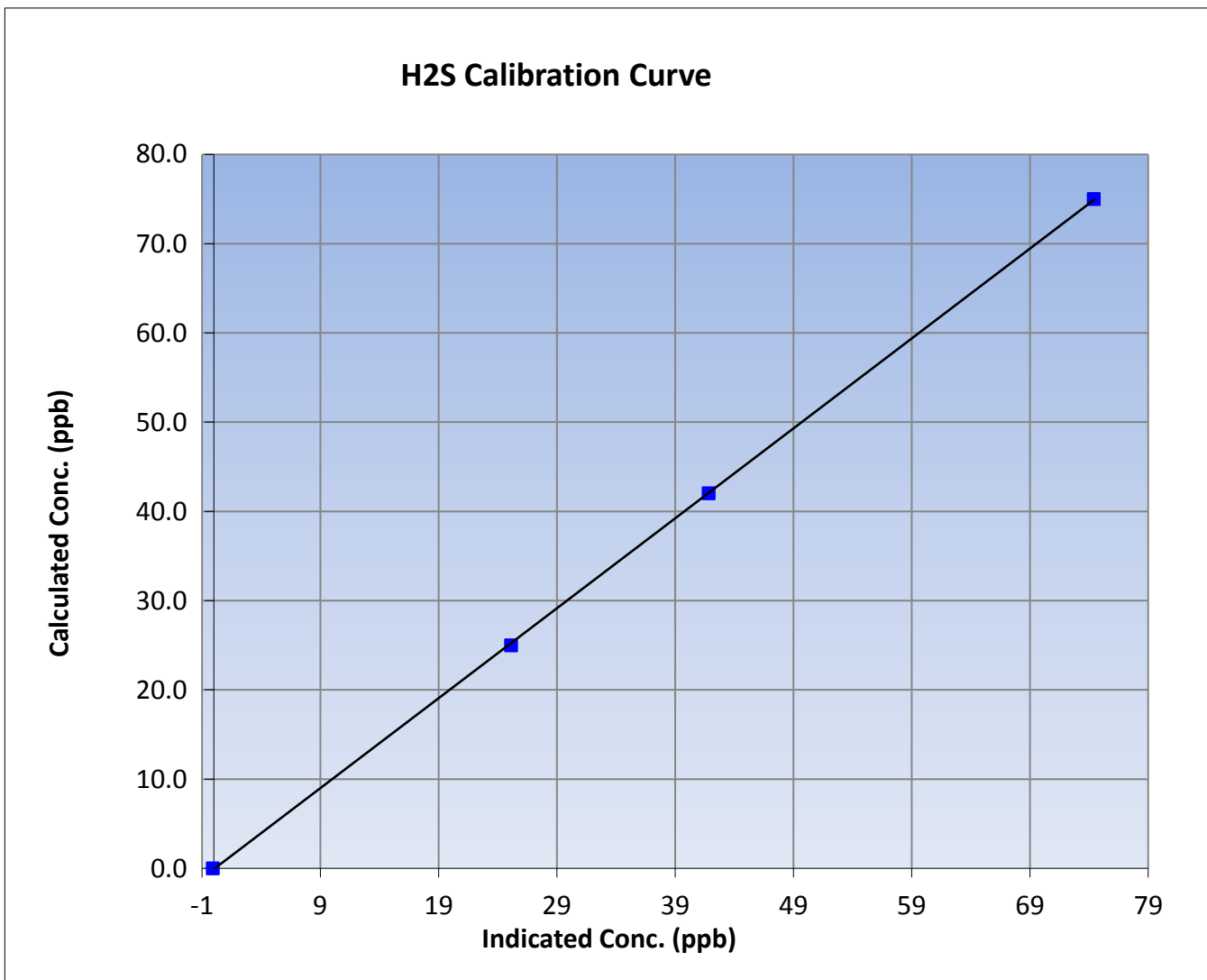
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 13, 2016	Previous Calibration	April 12, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	6:50	End Time (MST)	8:50
Analyzer make	Thermo 450i	Analyzer serial #	815129108

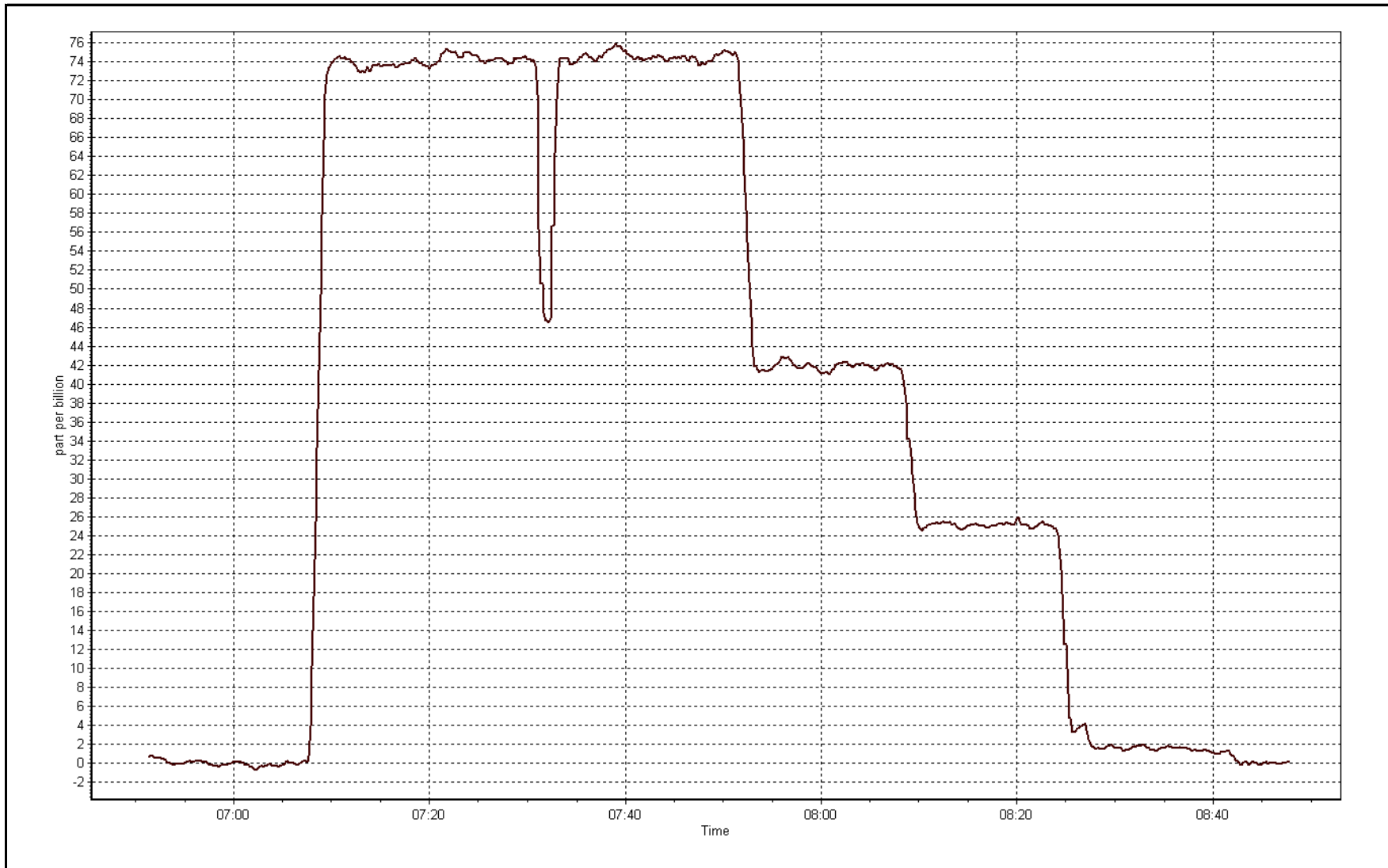
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999963
75.0	74.4	1.0080		
42.0	41.8	1.0046	Slope	1.007658
25.0	25.1	0.9944		
			Intercept	-0.083678



H2S Calibration Plot

Date: May 13, 2016





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-03-16	Last Calibration	April-13-16
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:18	End Time (MST)	11:10
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	0.995134	1.003102	Fuel Pressure	20.2	20.2
Calculated intercept	0.006115	0.000150	Analyzer Coeff	3.397	3.380
			Analyzer BKG	2.82	2.88

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	0.07	----
as found span	5000	60.0	12.46	12.56	0.992
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.0	12.46	12.41	1.004
second point	5000	30.0	6.23	6.24	0.998
third point	5000	15.0	3.11	3.07	1.014
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	60.0	12.46	12.49	0.997
Average Correction Factor					1.005

Corrected As found: 12.49 Previous response: 12.51 % change: 0.2%

Notes:

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

Calibration Performed By:

Evan Magill



Wood Buffalo Environmental Association THC Calibration Report

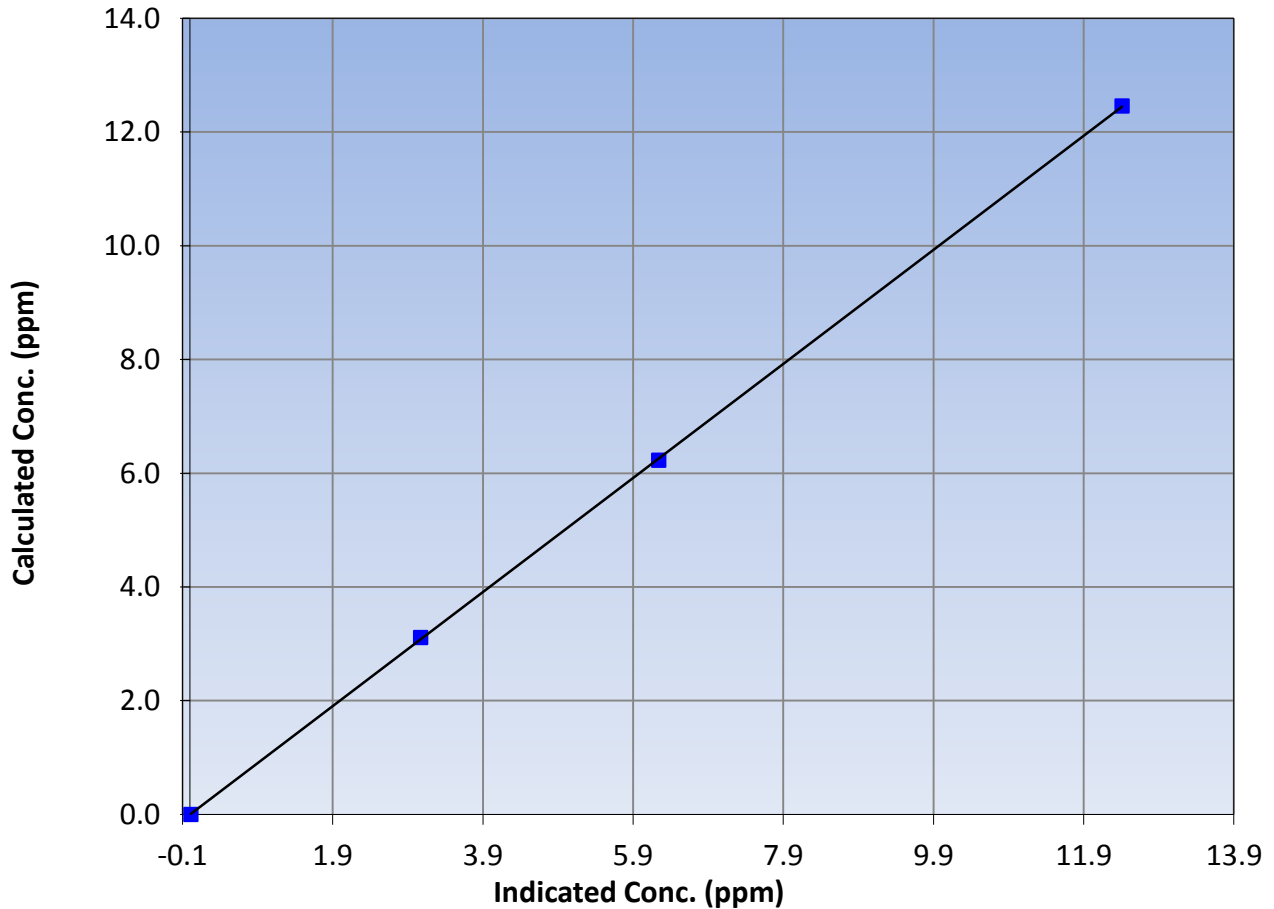
Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:18	End Time (MST)	11:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

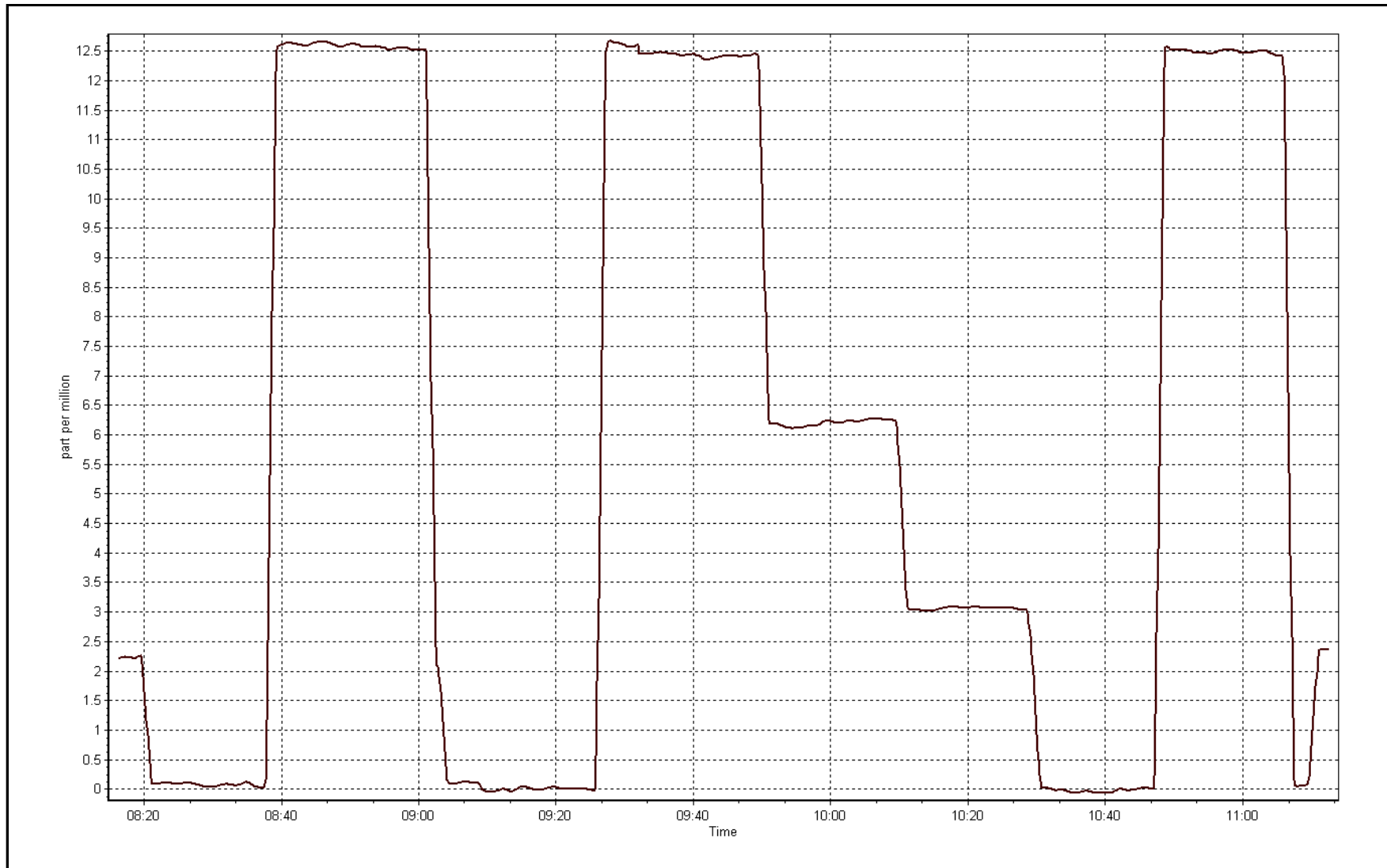
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999973
12.46	12.41	1.0037		
6.23	6.24	0.9981	Slope	1.003102
3.11	3.07	1.0143		
			Intercept	0.000150

THC Calibration Curve



THC Calibration Plot

Date: May 3, 2016





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
MAY 2016

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

June 24, 2016



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	38	38	100.00	13	0	4	0
TRS (ppb) Average	708	34	36	99.73	17	5	4	2
THC (ppm) Average	706	38	38	100.00	8.6	-	3.6	-
NMHC(ppm) Average	706	38	38	100.00	3.828	-	0.923	-
CH4(ppm) Average	706	38	38	100.00	4.8	-	2.6	-
O3 (ppb) Average	706	33	38	99.33	291	15	84	-
NO2 (ppb) Average	704	40	40	100.00	64	0	13	-
NO (ppb) Average	704	40	40	100.00	14	-	2	-
NOX (ppb) Average	704	40	40	100.00	66	-	15	-
NH3 (ppb) Average	668	43	76	95.56	1588	0	458	-
PM2.5 (ug/m3) Average	740	2	4	99.73	5197.9	-	1131	17
Temperature 2 m (C) Average	744	0	0	100.00	31.7	-	23.4	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	84	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	30	-	24	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.7	1	-	0	0	0	0	1	2	13
TRS (ppb) Average	708	0.8	2	-	0	0	0	0	0	2	17
THC (ppm) Average	706	2.23	0.7	-	1.9	1.9	2	2	2.1	2.7	8.6
NMHC(ppm) Average	706	0.139	0.426	-	0	0	0	0	0	0.4	3.828
CH4(ppm) Average	706	2.09	0.3	-	1.9	1.9	2	2	2.1	2.3	4.8
O3 (ppb) Average	706	36.8	21	-	9	20	24	35	44	52	291
NO2 (ppb) Average	704	3.6	7	-	0	0	0	1	4	8	64
NO (ppb) Average	704	0.7	1	-	0	0	0	0	1	2	14
NOX (ppb) Average	704	4.3	7	-	0	0	1	2	5	9	66
NH3 (ppb) Average	668	79	182	-	0	0	0	18	55	201	1588
PM2.5 (ug/m3) Average	740	162.12	522.2	-	0.5	1.7	4	15.9	70.2	306	5197.9
Temperature 2 m (C) Average	744	13.28	6.8	-	-1.1	4.6	8.3	12.5	17.7	22.7	31.7
Relative Humidity (%) Average	744	52.9	24	-	14	22	31	52	74	85	97
Wind Speed 10 m (km/h) Average	744	12	6	-	1	5	7	11	16	20	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	12 May 2016 08:00	12 May 2016 09:00	2	Maintenance - as found zero/span for remote calibration
O3	12 May 2016 08:00	12 May 2016 11:00	4	Maintenance - as found zero/span for remote calibration
O3	14 May 2016 06:00	14 May 2016 06:00	1	Intermittent unstable operation - excessive baseline drift
NH3	01 May 2016 04:00	31 May 2016 04:00	33	Stabilization after daily span
PM2.5	03 May 2016 19:00	03 May 2016 20:00	2	Analyzer Failure - Filter tape failed to advance



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

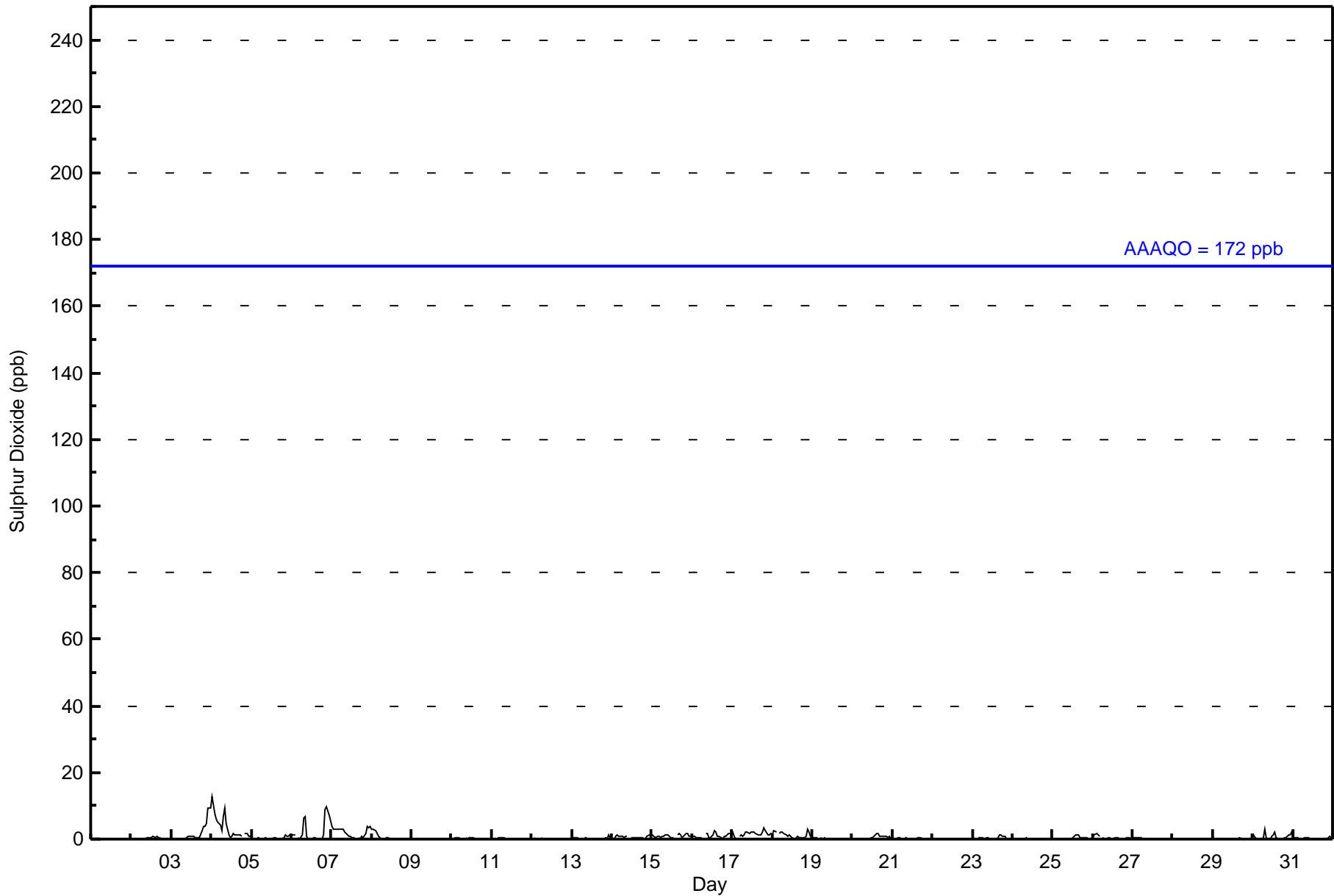
Patricia McInnes - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 13 ppb on May 4 01:00										Maximum Daily Average: 3.7 ppb on May 4										Hours of Data: 706							
Minimum Value: 0 ppb on May 1 20:00										Minimum Daily Average: 0.0 ppb on May 9										Hours of Missing Data: 38							
Maximum Diurnal Average: 1.1 ppb at hour 23										Minimum Diurnal Average: 0.3 ppb at hour 12										Hours of Calibration: 38							
Monthly Average: 0.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 9										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	0	0	0	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-May	0	0	0	0	0	Z	0	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
3-May	0	0	0	0	0	0	Z	0	0	0	1	1	1	1	0	1	0	0	3	4	4	4	9	9	1.7	9	
4-May	13	10	8	6	5	4	3	7	9	5	1	0	1	2	1	1	1	1	1	Z	1	2	1	1	3.7	13	
5-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	0.3	1	
6-May	1	1	1	Z	0	0	1	6	7	1	0	0	0	0	0	0	0	0	0	1	9	10	7	5	2.3	10	
7-May	4	3	3	3	3	3	3	3	2	1	1	1	1	0	1	Z	0	0	1	0	2	4	3	4	2.0	4	
8-May	3	3	2	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3	
9-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
10-May	0	0	0	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
11-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-May	0	0	0	Z	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0	
13-May	1	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1	
14-May	0	0	1	1	1	1	1	1	1	1	Z	0	0	0	0	1	1	0	0	0	0	1	1	1	0.6	1	
15-May	1	1	1	1	1	0	1	1	1	1	1	0	0	0	Z	1	2	1	1	1	1	2	2	1	0.9	2	
16-May	1	1	0	0	0	0	0	Z	2	2	1	0	1	3	2	1	1	0	0	1	1	1	1	1	1.0	3	
17-May	2	1	0	Z	1	1	1	1	2	2	2	2	2	2	1	1	1	1	2	3	3	1	1	2	1.6	3	
18-May	1	2	2	Z	2	2	2	2	1	1	1	1	0	0	1	1	1	0	0	1	1	3	2	1	1.2	3	
19-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
20-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	1	1	0	0.5	2	
21-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1	
22-May	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
23-May	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.3	1	
24-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
25-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.3	1	
26-May	0	1	2	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
27-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
28-May	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
29-May	0	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-May	1	0	1	Z	0	0	1	3	0	0	0	1	1	2	1	0	0	0	0	0	0	0	1	1	2	0.7	3
31-May	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1
1.0 0.9 0.8 0.7 0.7 0.5 0.6 1.0 1.0 0.6 0.3 0.3 0.4 0.5 0.4 0.4 0.4 0.3 0.4 0.5 0.9 1.1 1.1 1.0																								Diurnal Average			
13 10 8 6 5 4 3 7 9 5 2 2 2 2 3 2 2 2 1 3 4 9 10 9 9																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	112	35	30	15	15	40	37	28	35	48	52	42	45	55	41	75	705
11 - 20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	112	35	30	15	15	40	37	28	35	48	53	42	45	55	41	75	706

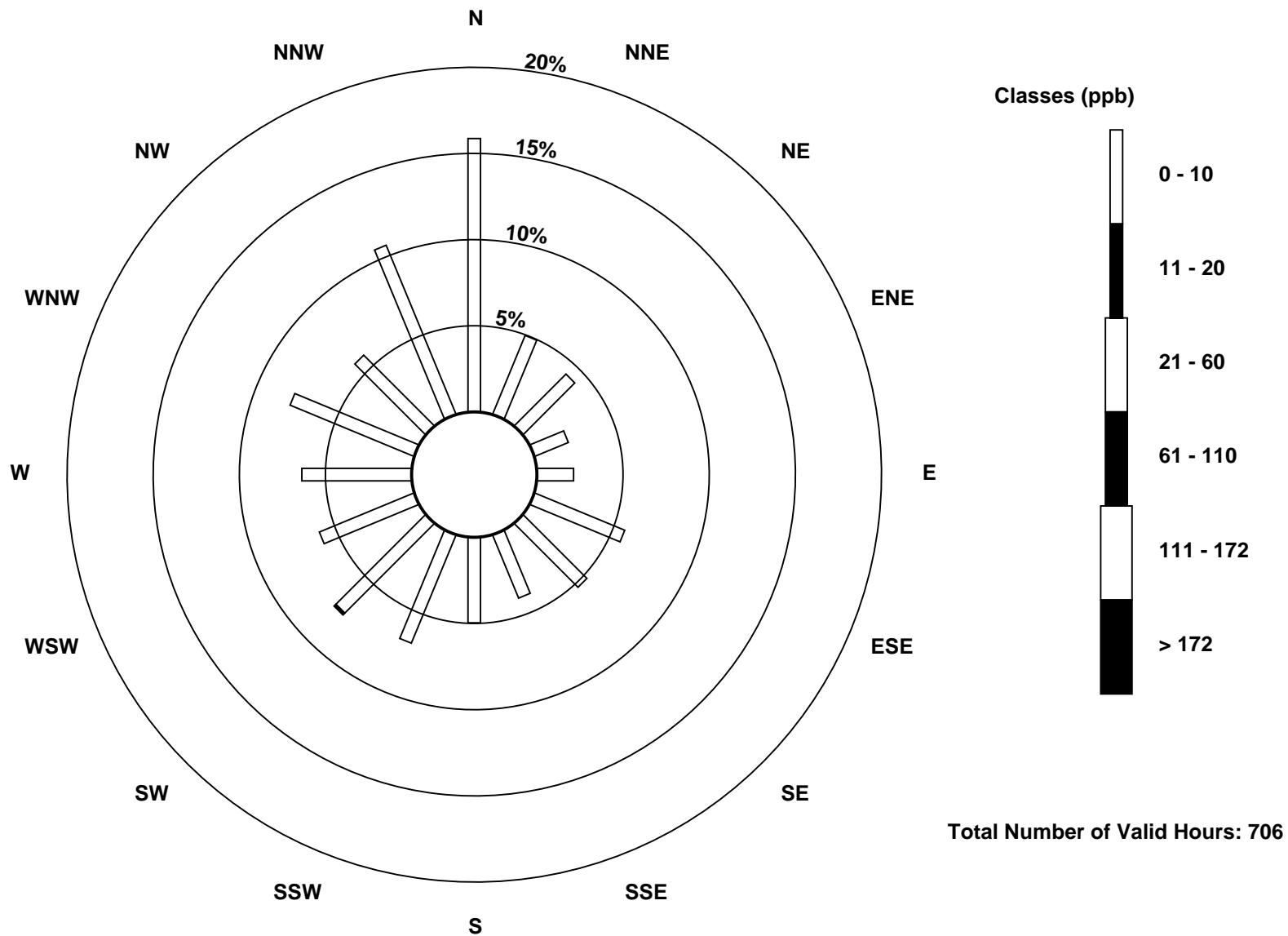
Total Number of Valid Hours: 706

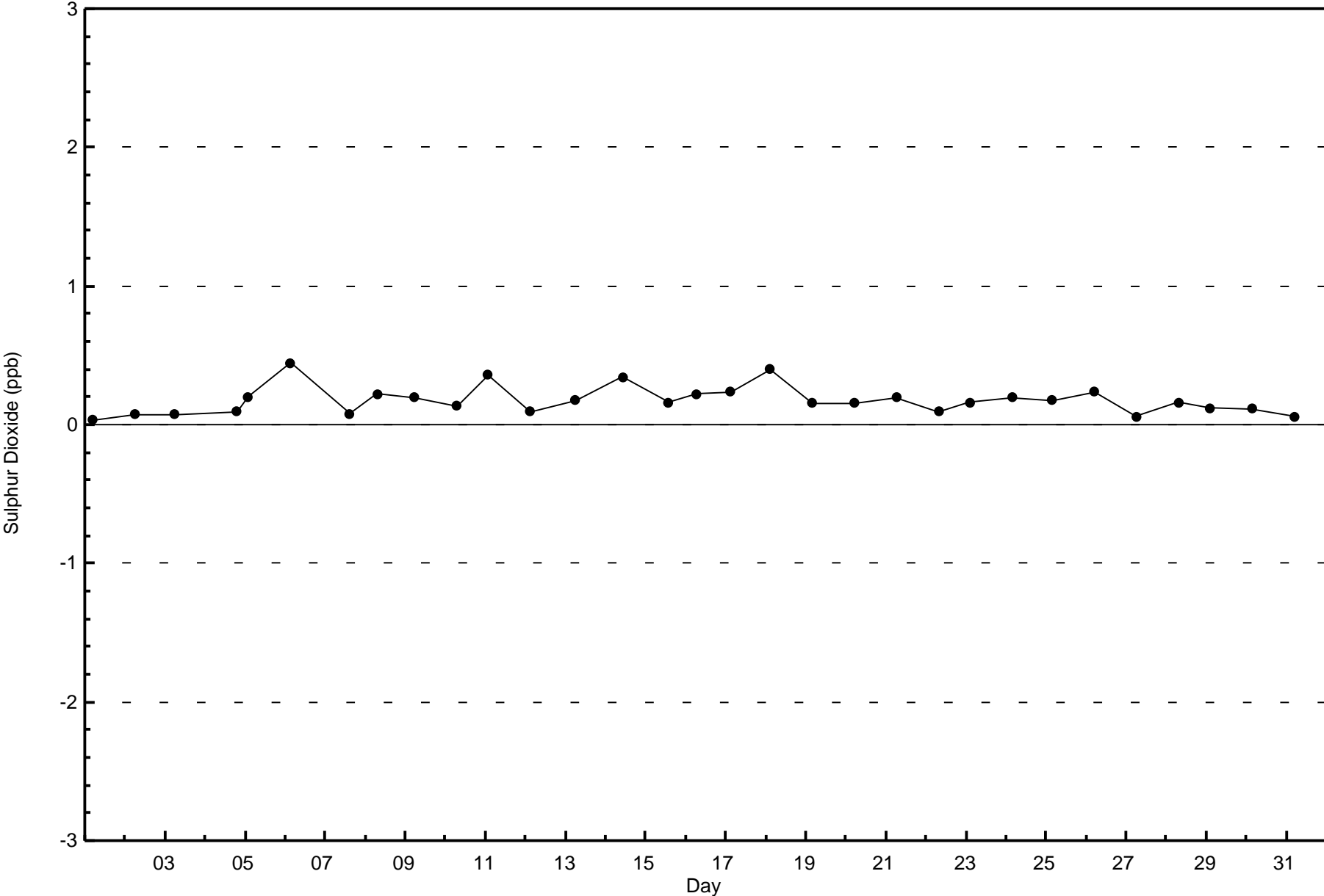
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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

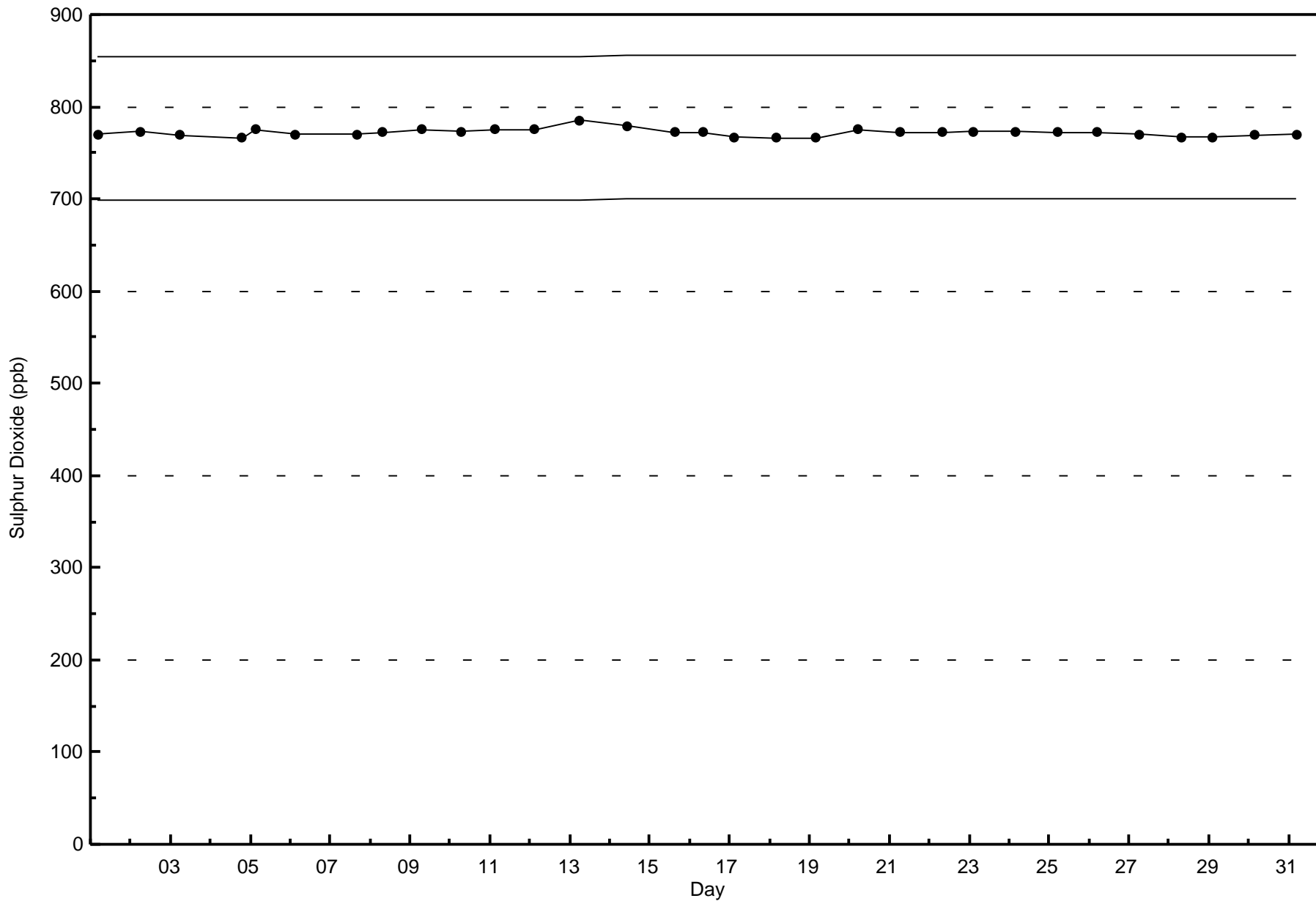






Wood Buffalo Environmental Association
Span Responses

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



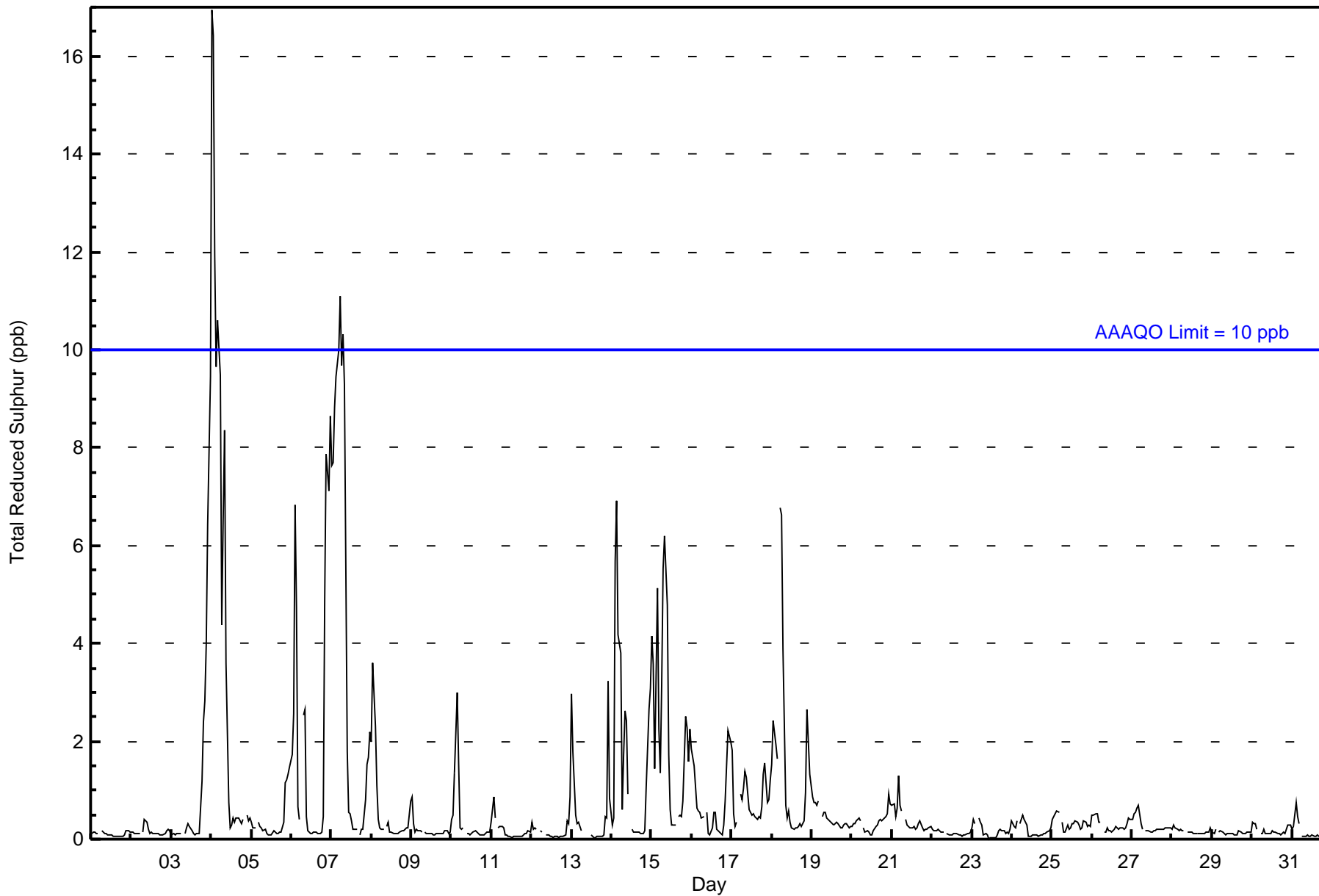


Number of Exceedences (AAAQO):	1-hr: 5	24-hr: 2	Hours in Service:	744
Maximum Value: 17 ppb on May 4 01:00	Maximum Daily Average: 4.5 ppb on May 4		Hours of Data:	708
Minimum Value: 0 ppb on May 23 11:00	Minimum Daily Average: 0.1 ppb on May 1		Hours of Missing Data:	36
Maximum Diurnal Average: 1.8 ppb at hour 4	Minimum Diurnal Average: 0.2 ppb at hour 16		Hours of Calibration:	34
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 10		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-May	0	0	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-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-May	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	3	4	6	9	1.2	9	
4-May	17	16	12	10	11	9	4	7	8	4	1	0	0	0	0	0	0	0	0	0	Z	0	0	0	0	4.5	17
5-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1	
6-May	2	3	7	5	1	0	Z	3	3	0	0	0	0	0	0	0	0	0	0	0	5	8	7	9	2.3	9	
7-May	8	8	9	9	10	11	10	10	9	2	1	1	0	0	0	0	Z	0	0	0	1	2	2	2	4.1	11	
8-May	2	4	2	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	4	
9-May	1	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
10-May	0	0	1	3	2	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3	
11-May	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
12-May	0	0	0	0	Z	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1		
13-May	3	2	1	0	0	0	0	Z	1	C	C	C	0	0	0	0	0	0	0	0	0	3	1	0.6	3		
14-May	0	0	6	7	4	4	1	2	3	2	1	Z	0	0	0	0	0	0	0	0	1	3	3	1.6	7		
15-May	4	4	1	5	2	1	3	6	6	5	2	1	0	0	0	Z	0	0	0	1	3	2	2	2.2	6		
16-May	2	2	1	1	1	1	0	0	Z	1	0	0	1	1	0	0	0	0	0	0	1	1	2	2	0.7	2	
17-May	2	1	0	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	2	1	1	1	0.8	2	
18-May	2	2	2	2	Z	7	7	4	1	0	1	0	0	0	0	0	0	0	0	0	1	3	2	1	1.6	7	
19-May	1	1	1	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
20-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1	
21-May	1	1	0	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
22-May	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
23-May	0	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-May	0	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-May	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	
26-May	0	0	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
27-May	0	1	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
28-May	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
29-May	0	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
31-May	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0.3	2	

1.6	1.6	1.6	1.8	1.4	1.5	1.1	1.4	1.4	1.4	0.6	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.6	0.9	1.2	1.3	Diurnal Average	
17	16	12	10	11	11	10	10	9	5	2	1	1	1	1	1	0	0	0	0	1	2	5	8	7	9	Diurnal Maximum

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	653	92.23	92.23
3 - 4	22	3.11	95.34
5 - 7	14	1.98	97.32
8 - 11	14	1.98	99.29
> 11	5	0.71	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	112	39	29	13	14	35	35	14	31	48	41	39	38	51	41	73	653
3 - 4	2	0	0	2	0	0	1	1	3	1	3	0	5	4	0	0	22
5 - 7	0	0	0	0	0	4	1	1	0	1	3	3	1	0	0	0	14
8 - 11	0	0	0	0	1	1	0	8	1	0	3	0	0	0	0	0	14
> 11	0	0	0	0	0	0	0	1	0	1	3	0	0	0	0	0	5
Totals	114	39	29	15	15	40	37	25	35	51	53	42	44	55	41	73	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

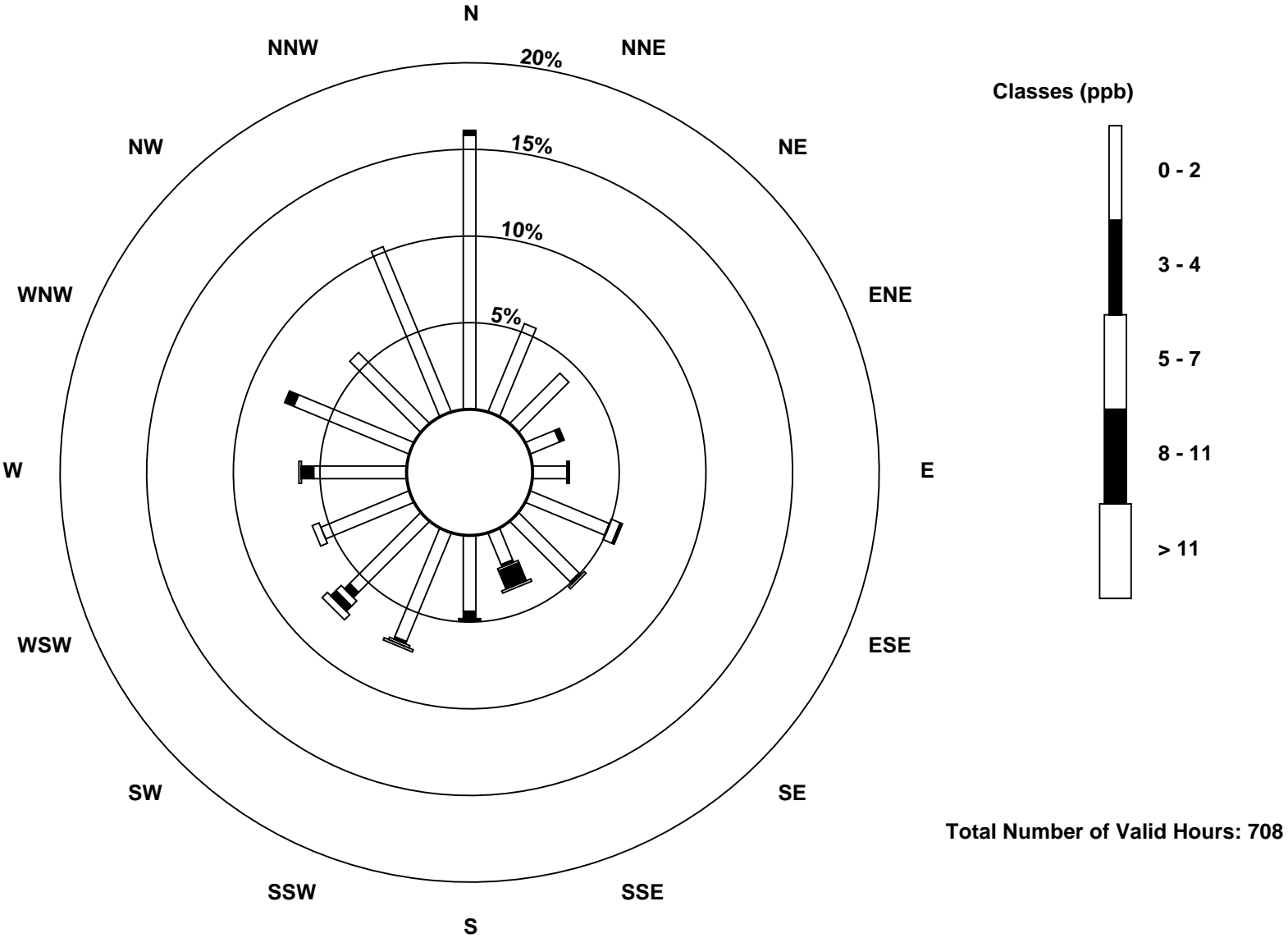


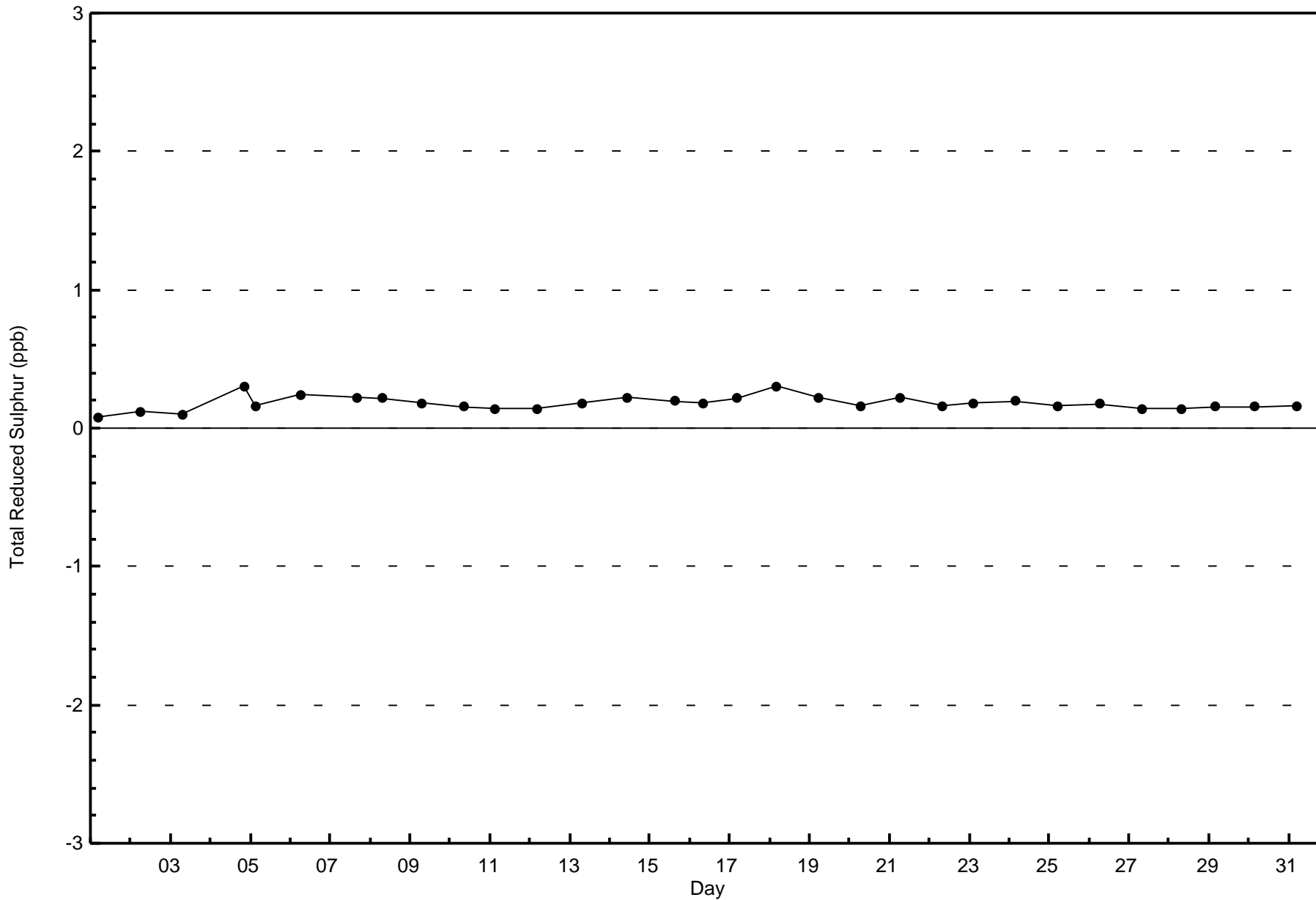
Wood Buffalo Environmental Association

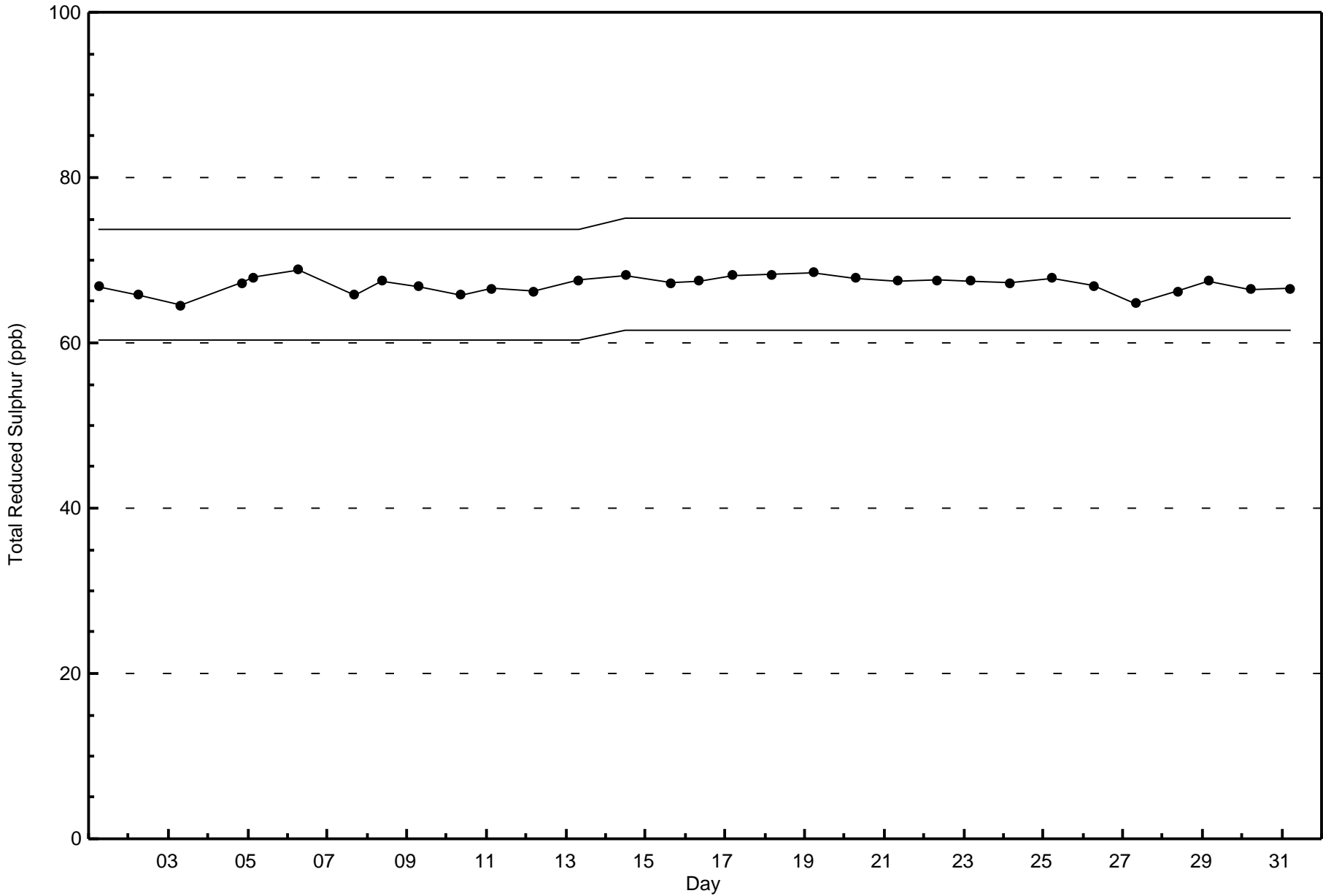
Wind Rose May 2016

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes (AMS 6)









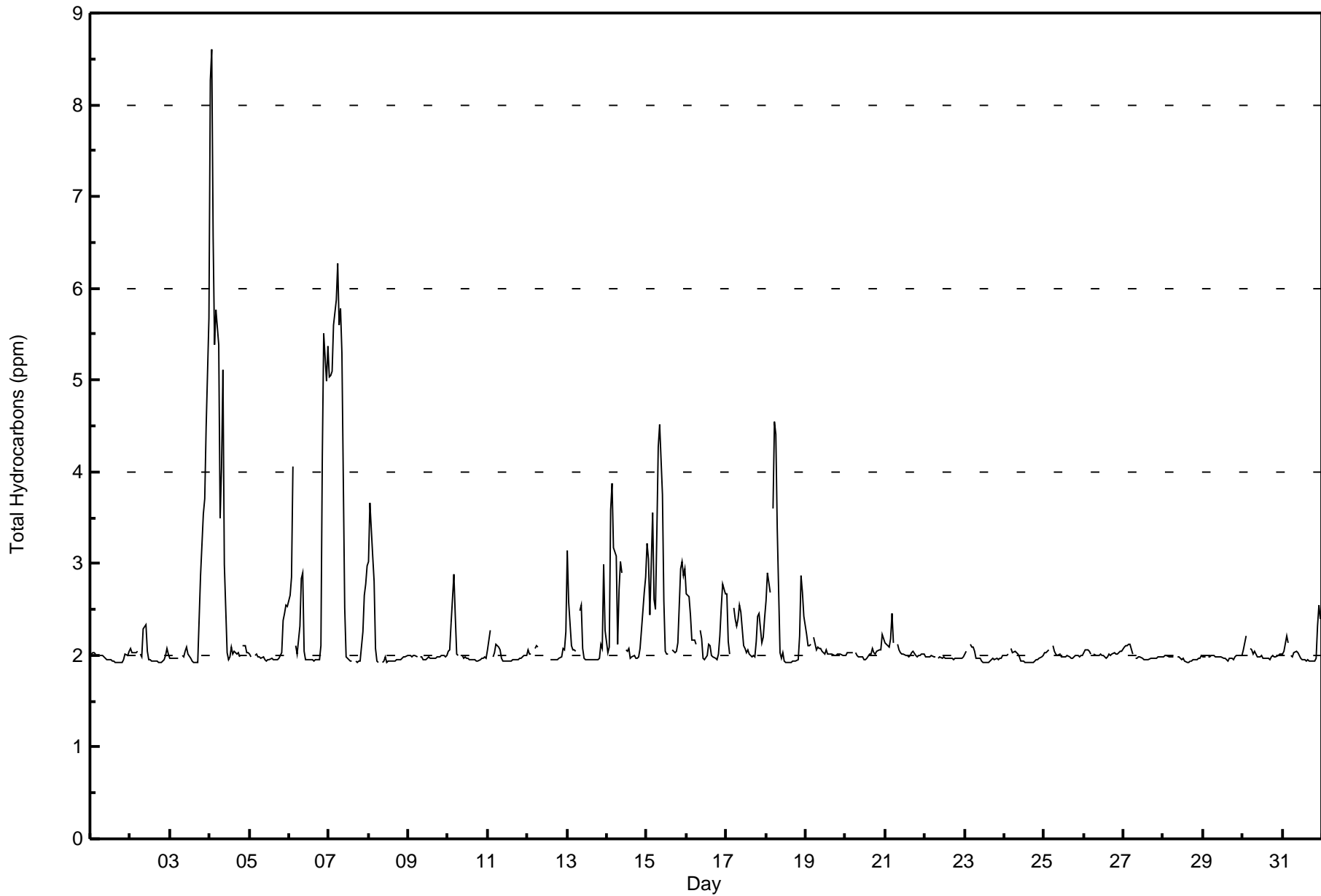
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Patricia McInnes - May 2016

Maximum Value: 8.6 ppm on May 4 02:00		Maximum Daily Average: 3.6 ppm on May 4		Hours in Service: 744																																															
Minimum Value: 1.9 ppm on May 8 07:00		Minimum Daily Average: 2.0 ppm on May 28		Hours of Data: 706																																															
Maximum Diurnal Average: 2.6 ppm at hour 3		Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Missing Data: 38																																															
Monthly Average: 2.23 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.7 P ₉₉ = 5.8		Hours of Calibration: 38																																															
				Percent Operational Time: 100.0																																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																											
1-May	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0																								
2-May	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.3	2.3	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	2.0	2.0	2.0																								
3-May	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.9	3.2	3.5	3.7	4.5	5.7	5.7	2.5	5.7																								
4-May	8.3	8.6	6.6	5.4	5.8	5.4	3.5	4.0	5.1	3.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.0	2.0	2.0	3.6	8.6																							
5-May	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.4	2.5	2.5	2.5	2.5	2.1	2.5																							
6-May	2.7	2.9	4.1	Z	2.1	2.0	2.3	2.8	2.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.1	4.2	5.5	5.0	5.4	5.4	2.8	5.5																								
7-May	5.0	5.0	5.1	5.6	5.9	6.3	5.6	5.8	5.3	2.5	2.0	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.3	2.7	2.8	3.0	3.0	3.5	6.3																								
8-May	3.0	3.7	3.1	2.8	2.1	1.9	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	3.7																								
9-May	2.0	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																							
10-May	2.0	2.1	2.4	2.9	2.4	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.9																								
11-May	2.1	2.3	Z	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3																							
12-May	2.1	2.0	2.0	Z	2.1	2.1	2.1	C	C	C	C	C	C	C	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.3	--	2.3																								
13-May	3.1	2.6	2.1	2.1	2.1	2.0	Z	2.5	2.6	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	3.0	2.3	2.3	2.2	3.1																								
14-May	2.0	2.1	3.6	3.9	3.2	3.1	2.1	2.7	3.0	2.9	Z	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.7	2.9	2.5	3.9																								
15-May	3.2	3.0	2.4	3.6	2.6	2.5	3.3	4.3	4.5	3.8	2.6	2.0	2.0	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.1	2.9	3.0	2.9	2.9	2.8	4.5																								
16-May	2.7	2.6	2.4	2.2	2.2	2.2	2.1	Z	2.3	2.2	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.5	2.8	2.7	2.7	2.2	2.8																								
17-May	2.7	2.2	2.0	Z	2.5	2.4	2.3	2.4	2.5	2.5	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.2	2.4	2.5	2.1	2.2	2.4	2.4	2.2	2.7																								
18-May	2.6	2.9	2.7	Z	3.6	4.5	4.4	3.4	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.9	2.7	2.4	2.4	2.5	4.5																								
19-May	2.2	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2																								
20-May	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.0	2.2																								
21-May	2.1	2.1	2.1	2.2	2.5	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5																								
22-May	2.0	2.0	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																							
23-May	2.0	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
24-May	2.0	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
25-May	2.0	2.0	2.0	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
26-May	2.0	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
27-May	2.1	2.1	2.1	2.1	2.1	2.0	Z	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	2.1																							
28-May	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	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																							
29-May	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	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																							
30-May	2.1	2.1	2.2	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2																							
31-May	2.0	2.0	2.2	2.1	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3	2.6	2.4	2.4	2.1	2.6																								
																								2.5	2.5	2.6	2.5	2.5	2.5	2.4	2.5	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.3	2.4	2.4	Diurnal Average			
																								8.3	8.6	6.6	5.6	5.9	6.3	5.6	5.8	5.3	3.8	2.6	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.9	3.2	4.2	5.5	5.0	5.7	Diurnal Maximum	
Z - zerospan		C - Calibration																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	495	70.11	70.11
2.1 - 3.0	166	23.51	93.63
3.1 - 10.0	45	6.37	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	89	32	27	10	11	30	29	12	20	29	25	31	28	40	32	50	495
2.1 - 3.0	22	3	3	5	3	5	7	6	10	16	17	8	15	13	8	25	166
3.1 - 10.0	1	0	0	0	1	5	1	10	5	3	11	3	2	2	1	0	45
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	112	35	30	15	15	40	37	28	35	48	53	42	45	55	41	75	706

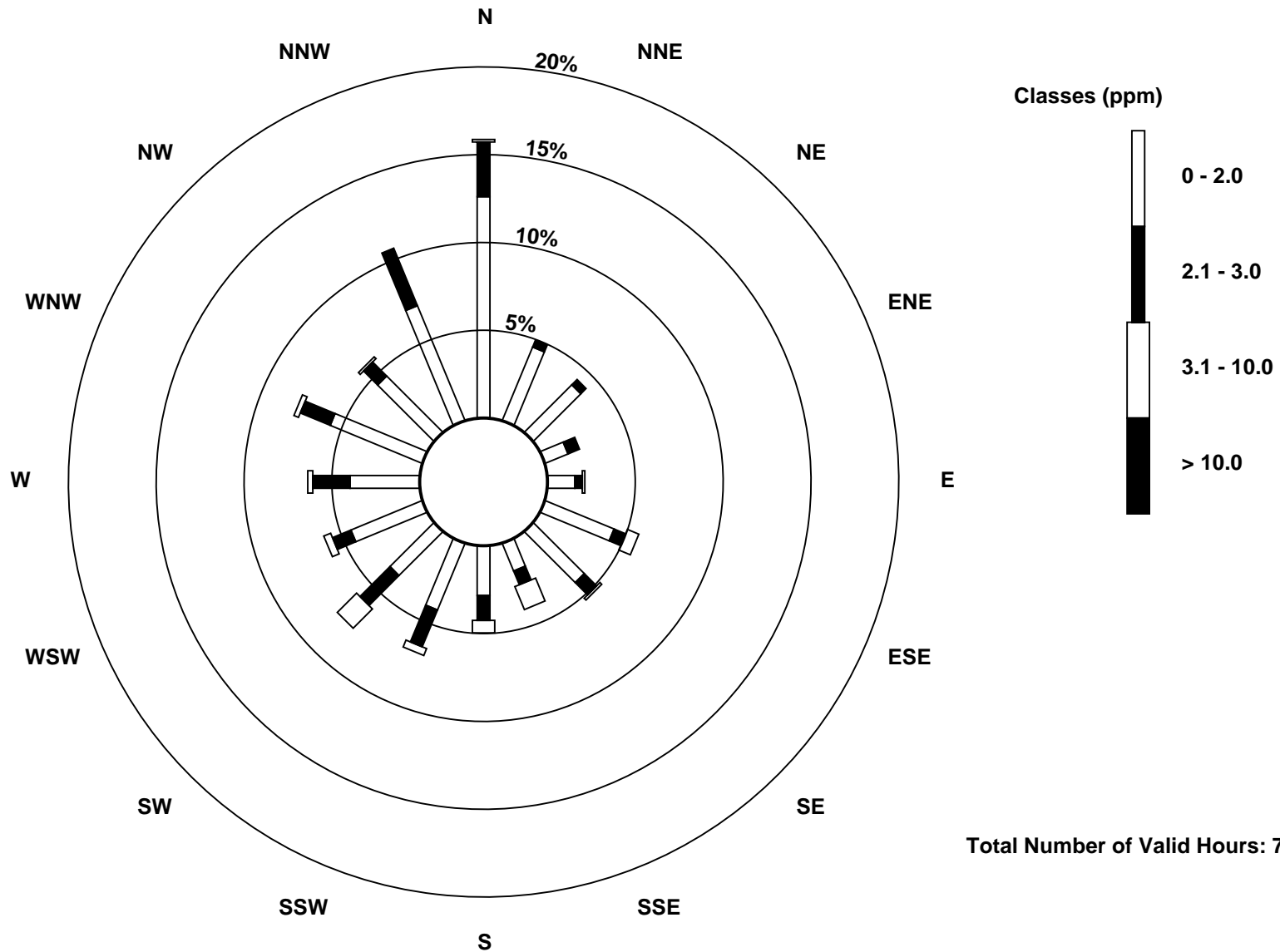
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

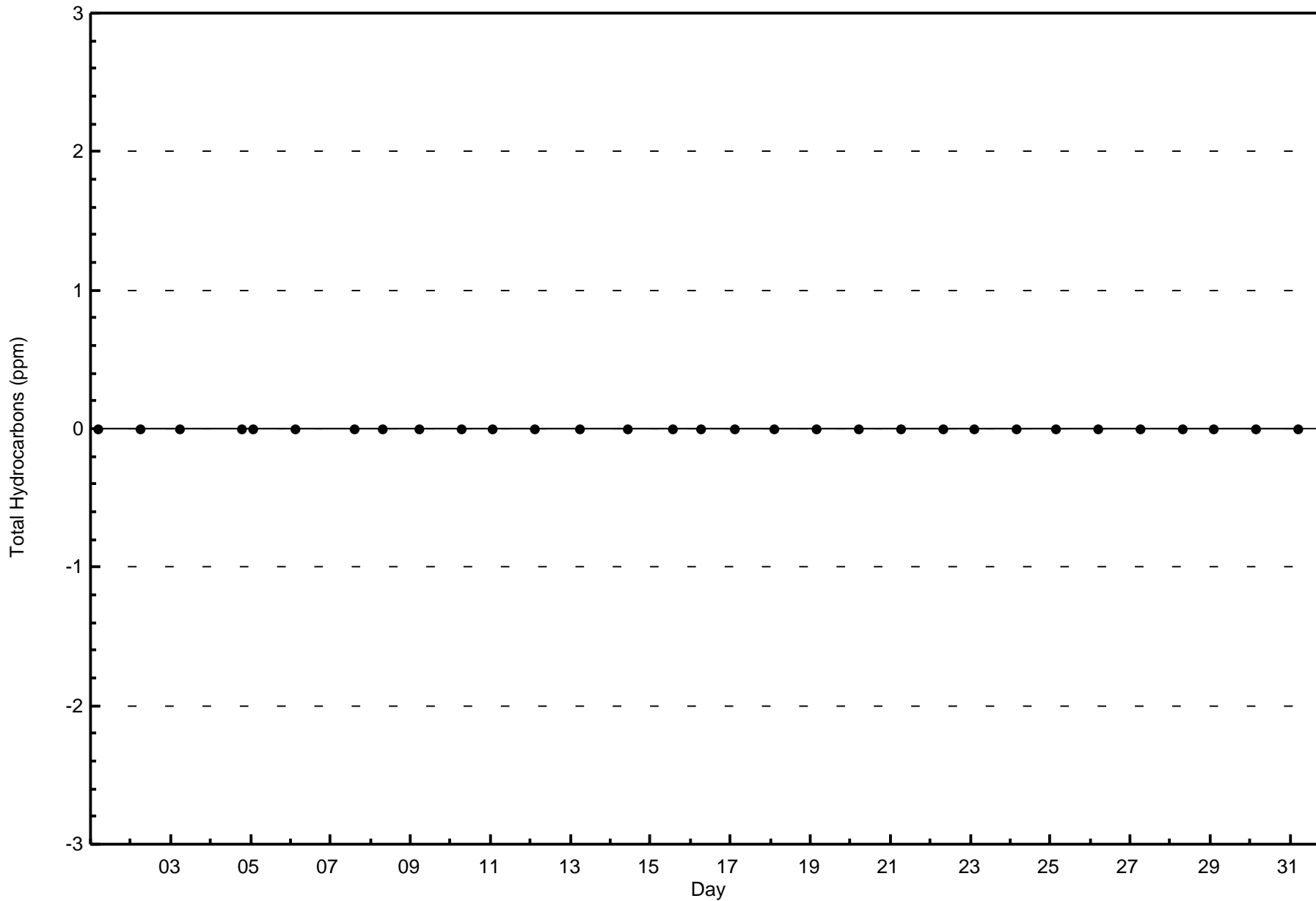
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)

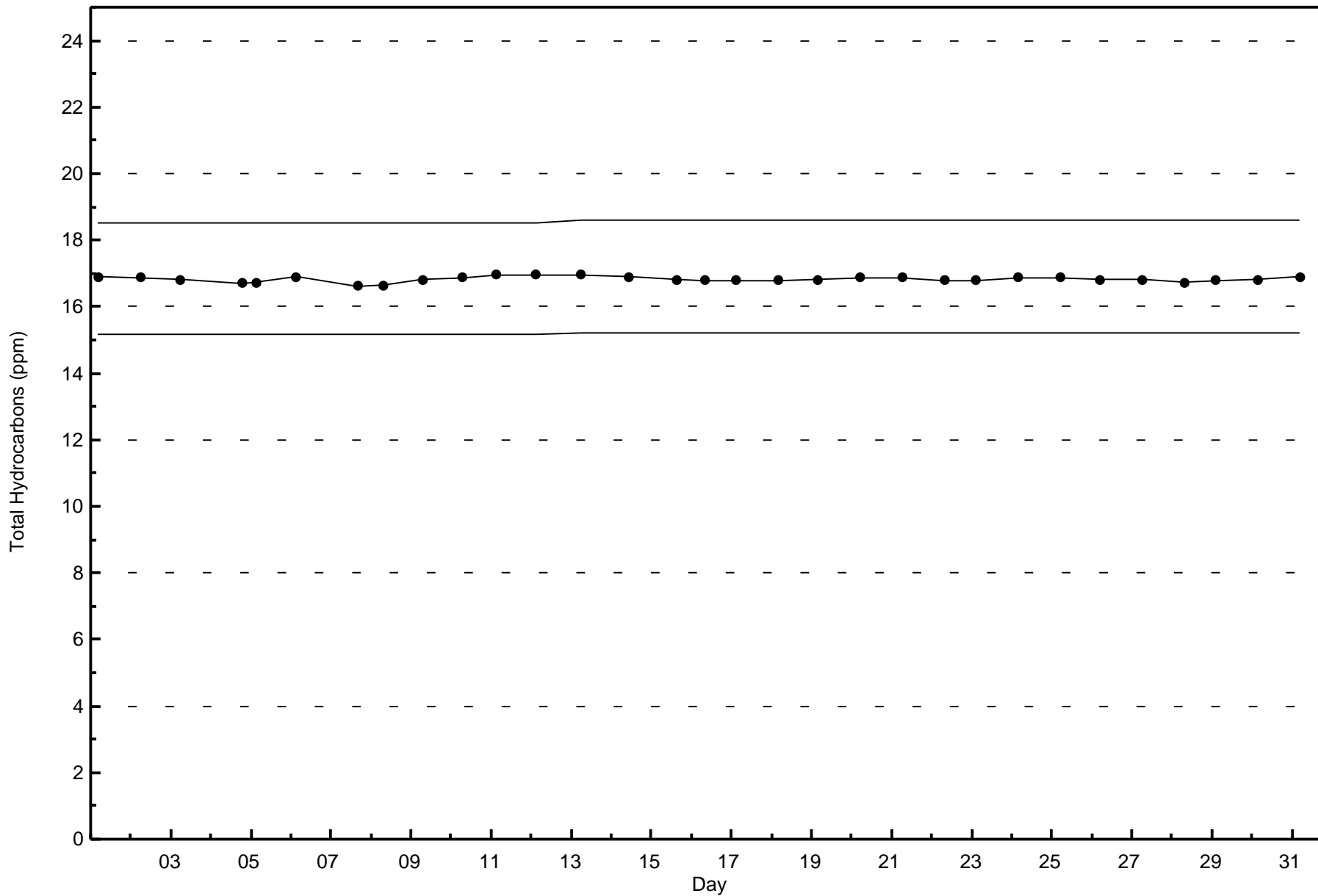


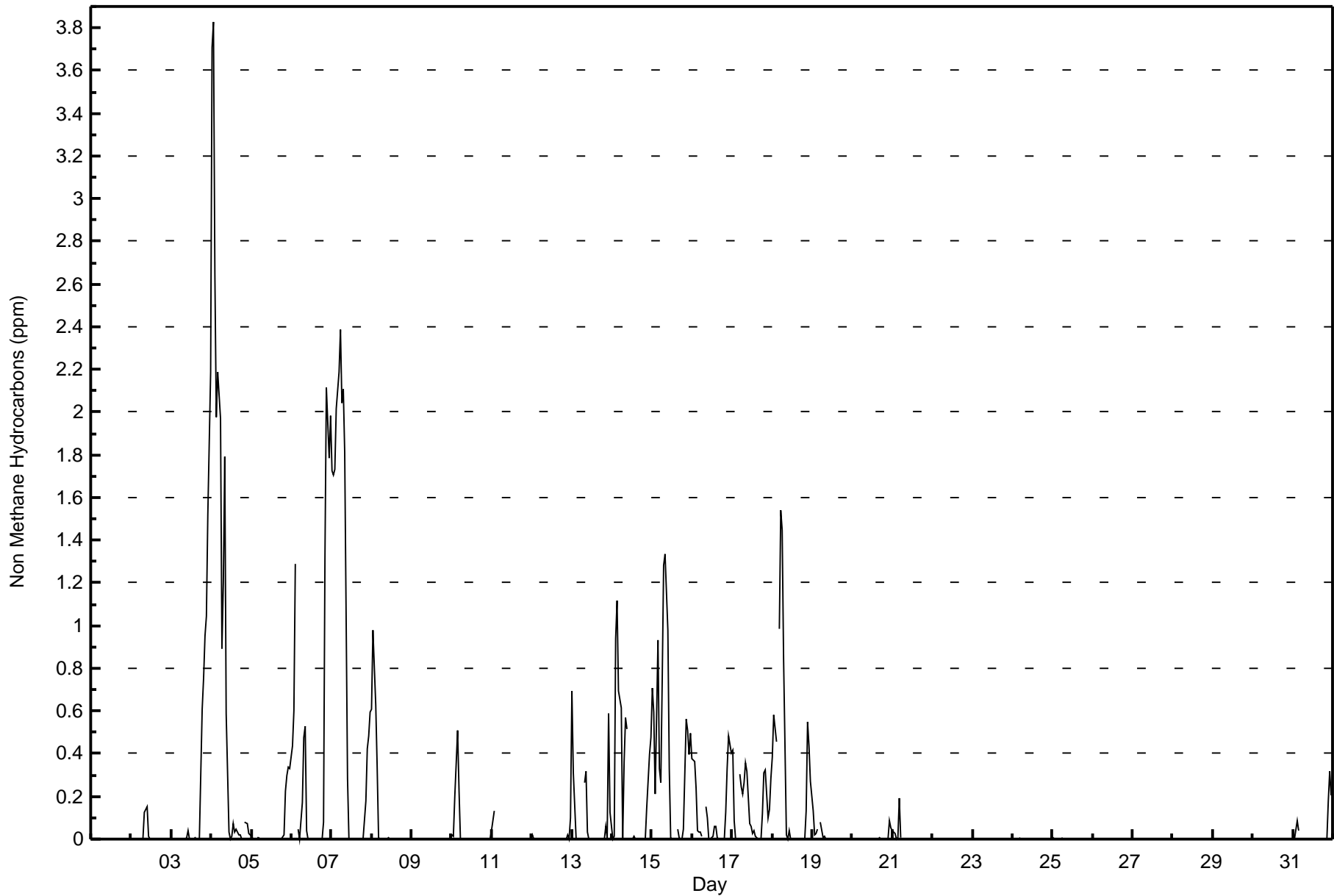


Wood Buffalo Environmental Association
Zero Responses

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









**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	514	72.80	72.80
0.006 - 0.05	55	7.79	80.59
0.06 - 0.1	25	3.54	84.14
> 0.1	112	15.86	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	101	35	27	11	11	29	29	12	19	28	24	31	24	37	32	64	514
0.006 - 0.05	5	0	2	1	1	1	2	2	3	3	7	3	6	8	4	7	55
0.06 - 0.1	1	0	1	0	1	0	0	1	3	2	2	3	4	4	2	1	25
> 0.1	5	0	0	3	2	10	6	13	10	15	20	5	11	6	3	3	112
Totals	112	35	30	15	15	40	37	28	35	48	53	42	45	55	41	75	706

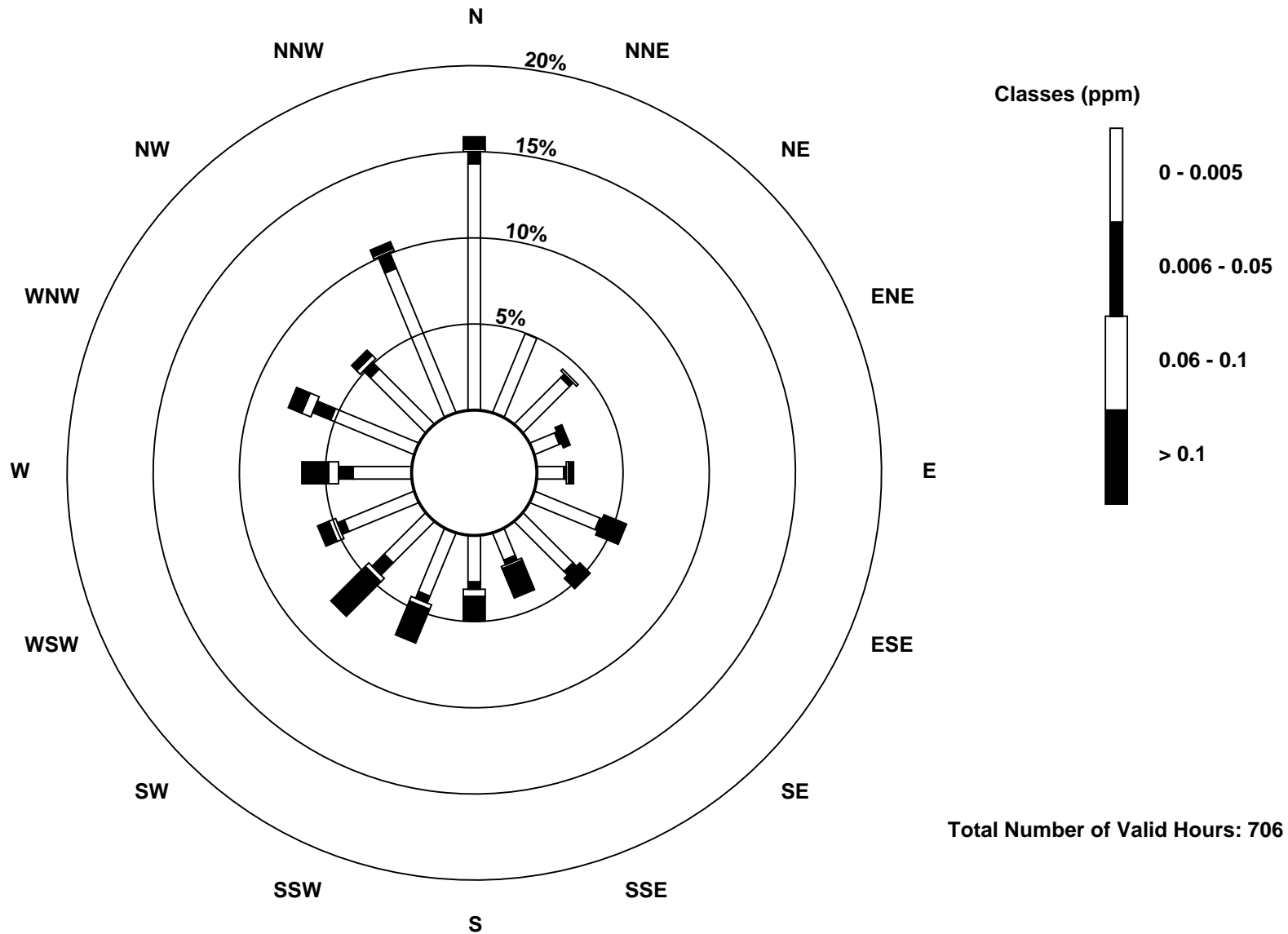
Total Number of Valid Hours: 706

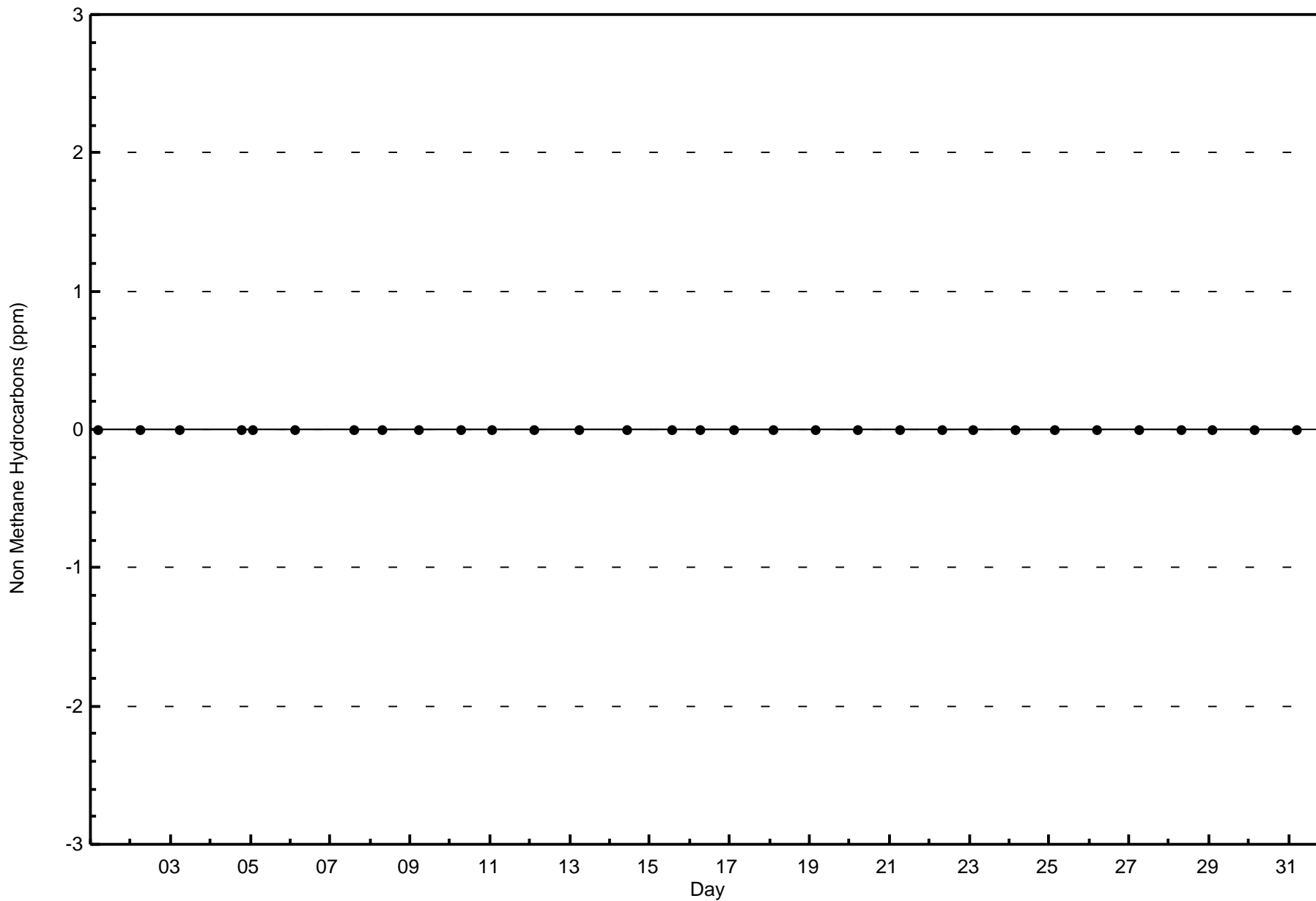
Total Number of Hours: 744

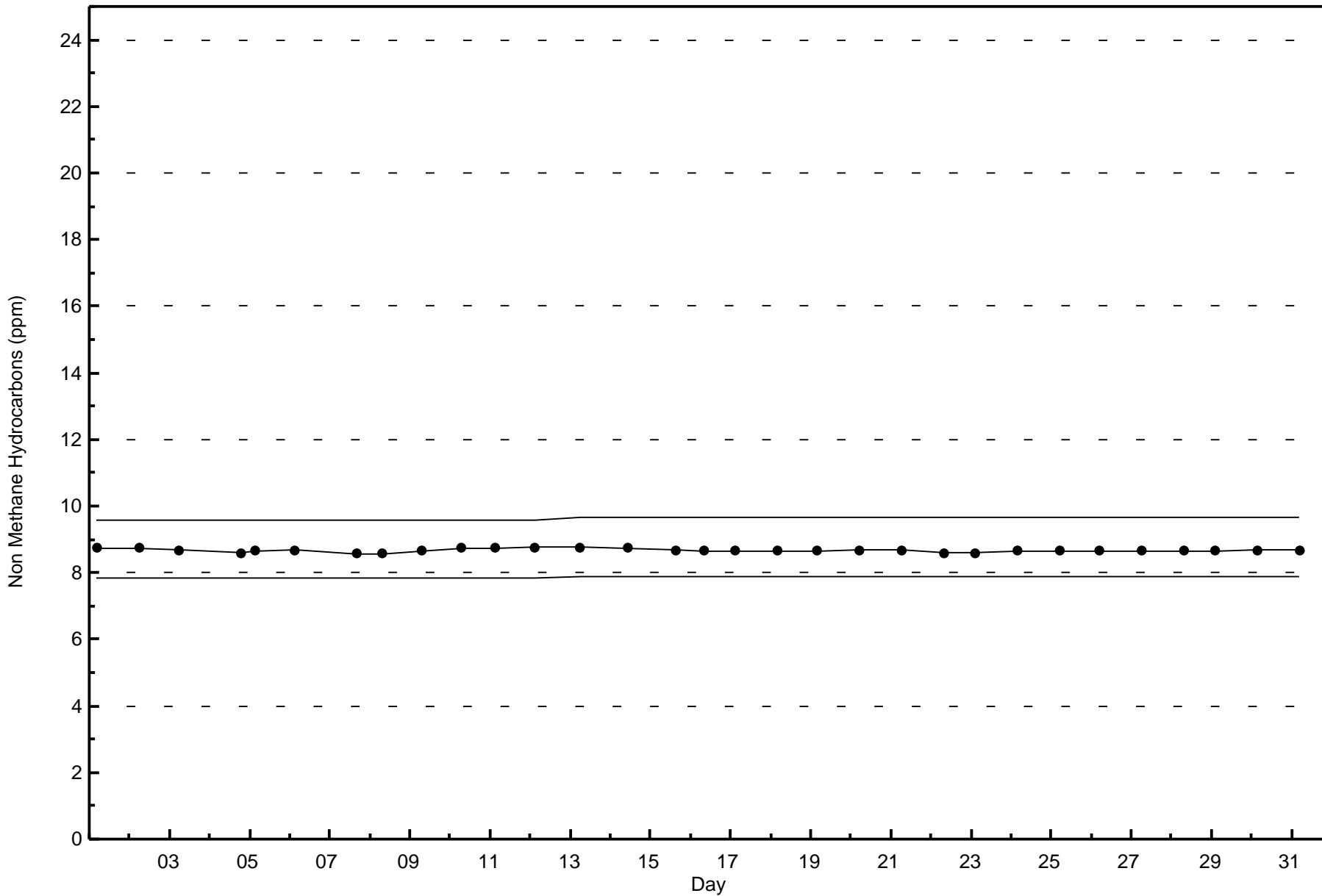


Wood Buffalo Environmental Association
Wind Rose May 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

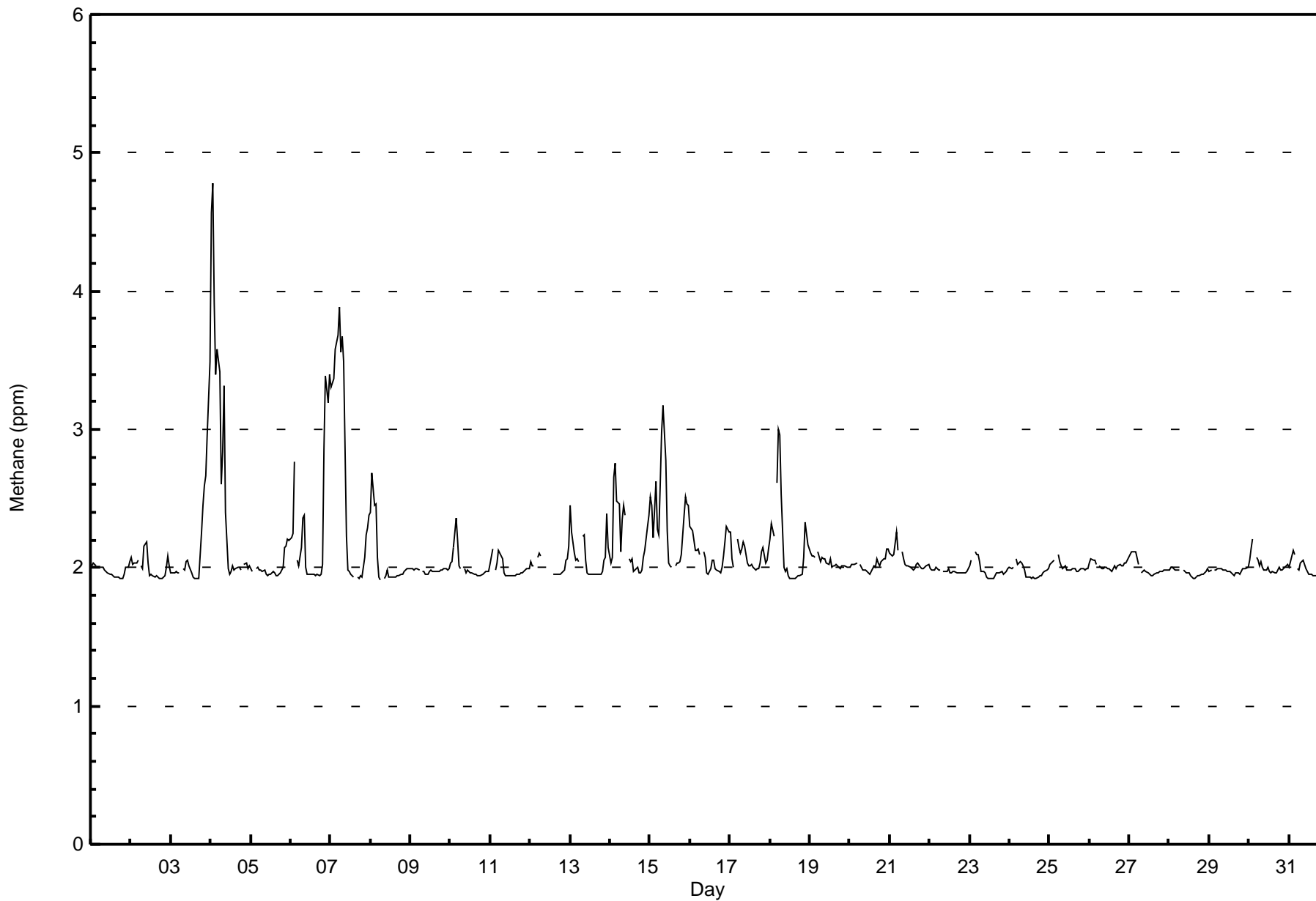
Patricia McInnes - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 ppm on May 4 02:00 Maximum Daily Average: 2.6 ppm on May 4														Hours in Service: 744 Hours of Data: 706 Hours of Missing Data: 38 Hours of Calibration: 38 Percent Operational Time: 100.0												
Minimum Value: 1.9 ppm on May 8 07:00 Minimum Daily Average: 2.0 ppm on May 28 Maximum Diurnal Average: 2.3 ppm at hour 3 Minimum Diurnal Average: 2.0 ppm at hour 15 Monthly Average: 2.09 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.3 P ₉₉ = 3.5																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
2-May	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.2	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0
3-May	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.3	2.5	2.6	2.7	3.0	3.5	2.2	3.5
4-May	4.6	4.8	3.9	3.4	3.6	3.4	2.6	2.8	3.3	2.4	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.6	4.8
5-May	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.0
6-May	2.2	2.3	2.8	Z	2.1	2.0	2.1	2.4	2.4	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.9	3.4	3.2	3.4	2.3	3.4
7-May	3.3	3.3	3.4	3.6	3.7	3.9	3.6	3.7	3.5	2.2	2.0	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.1	2.2	2.3	2.4	2.6	3.9
8-May	2.4	2.7	2.5	2.5	2.1	1.9	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.7
9-May	2.0	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
10-May	2.0	2.0	2.2	2.4	2.2	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.4
11-May	2.0	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
12-May	2.0	2.0	2.0	Z	2.1	2.1	2.1	C	C	C	C	C	C	C	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	--	2.2
13-May	2.4	2.3	2.1	2.1	2.1	2.0	Z	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4	2.1	2.1	2.4
14-May	2.0	2.1	2.6	2.8	2.5	2.5	2.1	2.4	2.5	2.4	Z	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.4	2.2	2.8
15-May	2.5	2.5	2.2	2.6	2.3	2.2	2.6	3.0	3.2	2.8	2.3	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.5	2.5	2.5	2.4
16-May	2.3	2.3	2.2	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.1	2.3
17-May	2.3	2.1	2.0	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1
18-May	2.2	2.3	2.2	Z	2.6	3.0	3.0	2.5	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.3	2.2	2.2	2.2	3.0
19-May	2.1	2.1	2.1	2.1	Z	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
20-May	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1
21-May	2.1	2.1	2.1	2.2	2.3	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3
22-May	2.0	2.0	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
23-May	2.0	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.1
24-May	2.0	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1
25-May	2.0	2.0	2.0	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
26-May	2.0	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
27-May	2.1	2.1	2.1	2.1	2.1	2.0	Z	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
28-May	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0
29-May	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	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
30-May	2.1	2.1	2.2	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
31-May	2.0	2.0	2.1	2.1	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.0	2.2
																								Diurnal Average		
																								Diurnal Maximum		
2.2 2.2 2.3 2.2 2.2 2.2 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 2.1 2.1 2.2 2.2																										
4.6 4.8 3.9 3.6 3.7 3.9 3.6 3.7 3.5 2.8 2.3 2.1 2.1 2.1 2.1 2.0 2.1 2.0 2.3 2.5 2.9 3.4 3.2 3.5																										
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Patricia McInnes - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	509	72.10	72.10
2.1 - 3.0	176	24.93	97.03
3.1 - 10.0	21	2.97	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Patricia McInnes - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	90	32	29	10	11	30	29	13	21	29	27	34	31	40	32	51	509
2.1 - 3.0	22	3	1	5	3	7	8	6	13	18	20	8	14	15	9	24	176
3.1 - 10.0	0	0	0	0	1	3	0	9	1	1	6	0	0	0	0	0	21
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	112	35	30	15	15	40	37	28	35	48	53	42	45	55	41	75	706

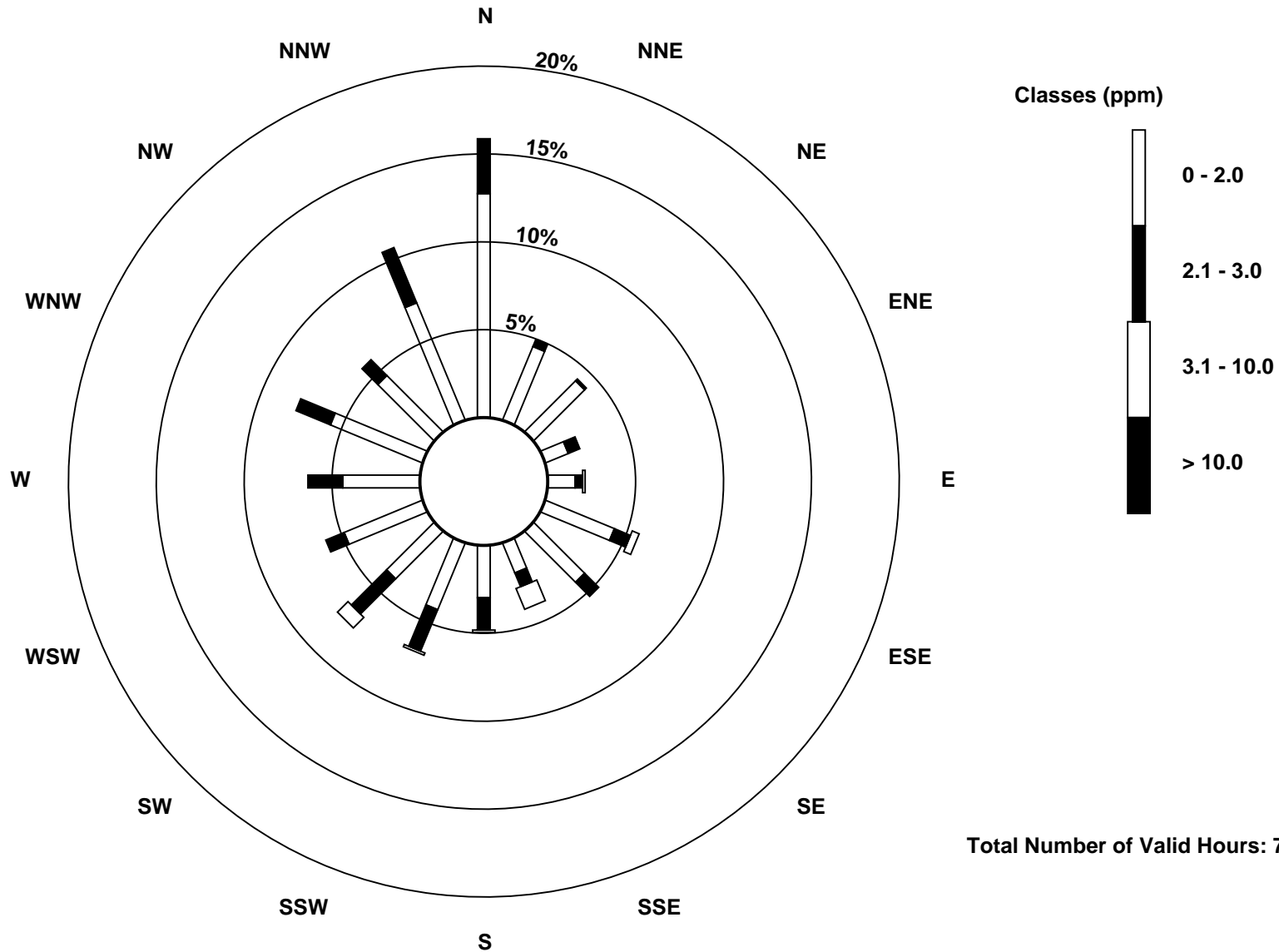
Total Number of Valid Hours: 706

Total Number of Hours: 744

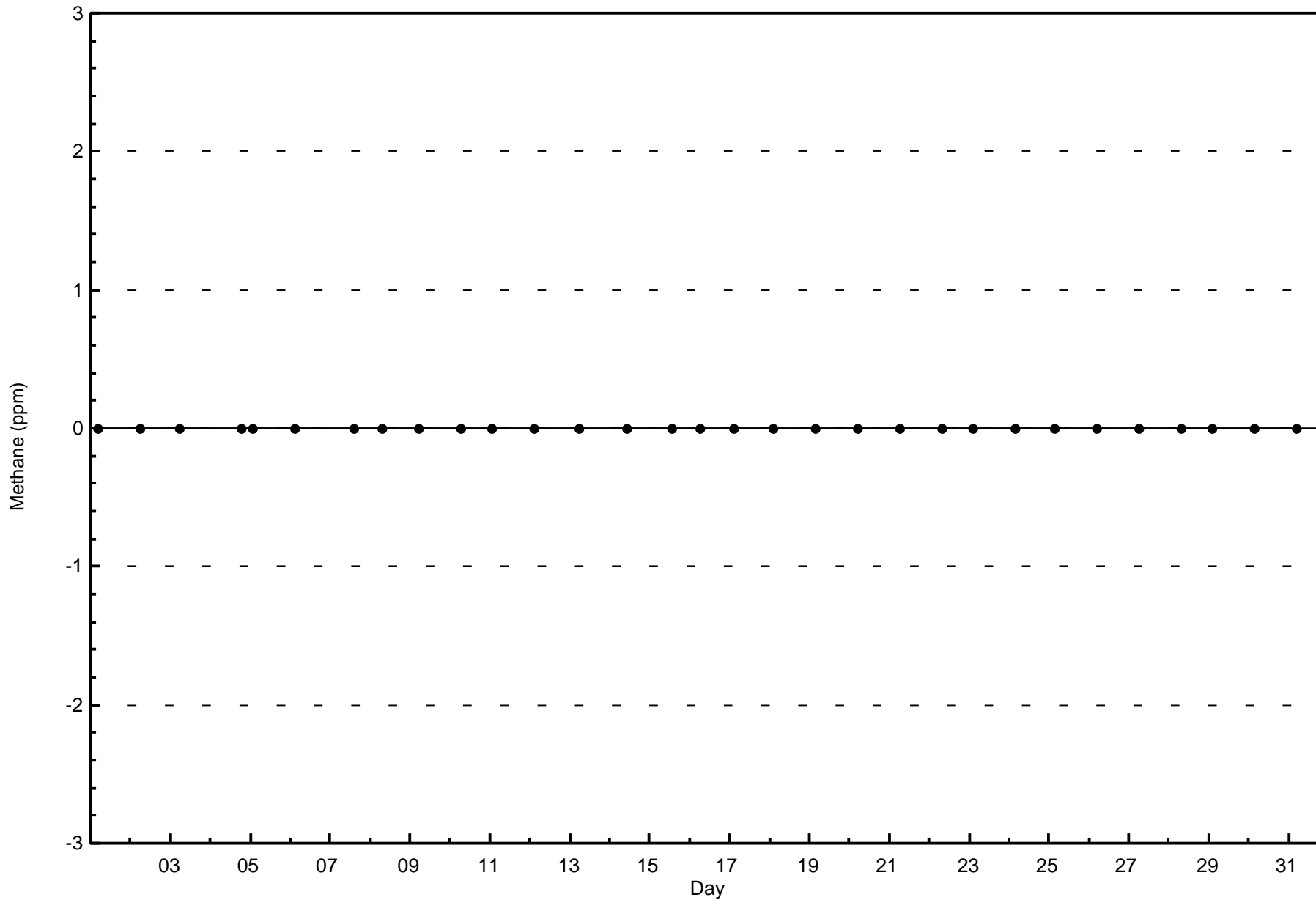


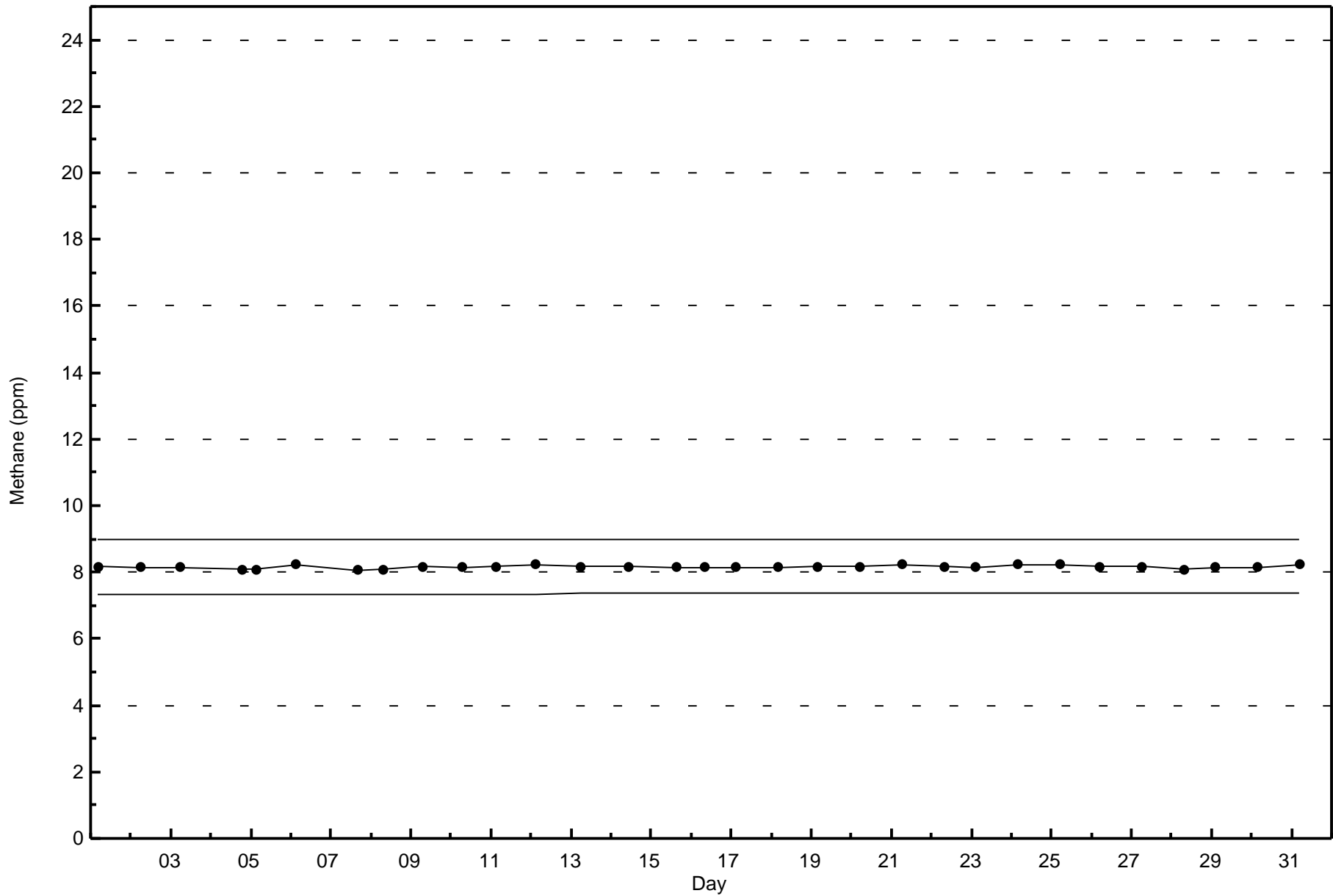
**Wood Buffalo Environmental Association
Wind Rose May 2016**

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



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Patricia McInnes - May 2016

Number of Exceedences (AAAQO):	1-hr: 15	24-hr: 0	Hours in Service:	744
Maximum Value: 291 ppb on May 4 01:00	Maximum Daily Average: 84.3 ppb on May 4		Hours of Data:	706
Minimum Value: 9 ppb on May 27 04:00	Minimum Daily Average: 19.8 ppb on May 26		Hours of Missing Data:	38
Maximum Diurnal Average: 42.4 ppb at hour 16	Minimum Diurnal Average: 30.2 ppb at hour 7		Hours of Calibration:	33
Monthly Average: 36.8 ppb	Percentiles: P ₁ = 11 P ₁₀ = 20 Q ₁ = 24 Median = 35 Q ₃ = 44 P ₉₀ = 52 P ₉₉ = 121		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-May	30	24	28	Z	35	38	39	40	43	47	49	49	48	46	43	42	42	39	38	36	32	23	20	14	36.7	49
2-May	12	16	14	11	Z	10	16	22	42	54	50	46	52	54	50	48	42	39	37	33	31	24	23	26	32.7	54
3-May	29	29	30	29	29	Z	28	29	33	41	49	57	52	59	58	62	61	61	91	108	96	106	140	192	63.9	192
4-May	291	239	173	128	149	109	66	69	76	44	41	38	44	54	46	46	46	48	Z	45	46	46	45	51	84.3	291
5-May	46	Z	38	39	38	38	39	40	42	43	41	44	44	48	47	46	46	47	45	47	56	44	48	43	43.9	56
6-May	40	39	Z	36	32	35	42	45	48	38	40	42	44	45	47	48	47	47	47	49	99	123	88	74	52.0	123
7-May	57	51	55	62	69	68	65	65	47	21	26	30	33	38	Z	38	37	38	41	33	36	36	36	38	44.4	69
8-May	31	45	28	18	25	37	Z	41	38	32	32	38	40	43	44	43	39	36	33	31	29	29	28	25	34.1	45
9-May	23	22	22	22	21	Z	21	24	26	27	28	27	25	25	25	26	27	28	28	30	31	30	28	26	25.9	31
10-May	26	23	23	27	15	20	Z	28	30	34	35	36	37	38	37	38	39	40	41	43	43	40	40	39	33.6	43
11-May	36	Z	23	27	27	26	28	31	39	40	41	41	42	42	42	43	44	48	48	44	48	48	47	44	39.1	48
12-May	38	36	Z	36	35	34	34	M	M	M	M	41	42	42	44	45	45	45	45	45	44	39	28	32	39.5	45
13-May	41	23	16	23	24	Z	28	35	C	C	40	41	42	42	43	44	44	44	44	43	40	27	39	17	35.2	44
14-May	23	22	43	37	29	UO	11	23	28	Z	35	38	39	41	44	48	48	46	44	42	37	34	32	22	34.9	48
15-May	34	25	10	41	14	12	33	52	36	38	39	38	40	Z	46	50	50	49	40	42	42	19	18	21	34.3	52
16-May	25	31	31	32	33	35	Z	45	52	59	57	57	58	60	64	60	62	61	59	57	54	54	52	51	49.9	64
17-May	48	41	Z	39	41	39	39	45	52	54	53	60	61	57	51	50	54	56	46	37	36	41	40	38	46.8	61
18-May	36	42	Z	35	55	65	55	36	26	28	41	37	35	40	43	45	44	40	39	42	36	37	26	21	39.2	65
19-May	17	16	16	Z	16	17	20	22	25	26	25	23	24	24	24	23	23	23	23	24	24	23	23	23	22.0	26
20-May	23	24	23	23	Z	23	24	25	30	30	31	31	34	48	57	51	35	28	27	27	26	27	28	26	30.5	57
21-May	26	29	28	26	22	Z	19	20	24	22	22	24	25	26	24	23	21	21	22	22	21	20	20	22	22.9	29
22-May	25	25	24	24	21	21	Z	29	31	31	31	31	32	33	34	36	37	38	39	40	40	39	39	39	32.2	40
23-May	35	Z	30	30	30	29	33	38	40	44	52	52	48	47	47	51	54	54	49	46	46	44	41	35	42.5	54
24-May	38	38	Z	24	23	31	36	40	42	45	53	52	52	51	52	51	48	45	43	40	38	35	33	31	41.0	53
25-May	25	25	23	Z	21	19	22	25	28	32	37	44	50	56	63	50	43	43	40	34	28	24	24	23	33.9	63
26-May	24	23	24	24	Z	21	20	20	21	22	24	24	24	22	20	19	18	17	17	16	14	13	14	14	19.8	24
27-May	12	11	10	9	11	Z	21	21	19	20	19	21	24	26	23	35	37	36	38	35	32	29	26	29	23.7	38
28-May	31	22	21	22	21	20	Z	18	18	21	28	28	30	41	51	52	47	43	44	42	37	34	30	27	31.6	52
29-May	22	Z	16	15	14	13	13	13	12	12	14	20	22	26	34	40	38	39	41	38	30	26	24	20	23.6	41
30-May	19	14	Z	10	12	18	22	22	23	19	16	22	27	28	29	33	34	33	29	30	30	27	26	24	23.7	34
31-May	22	18	17	Z	13	14	15	17	19	22	26	30	33	34	33	33	33	31	31	31	28	32	23	19	24.8	34

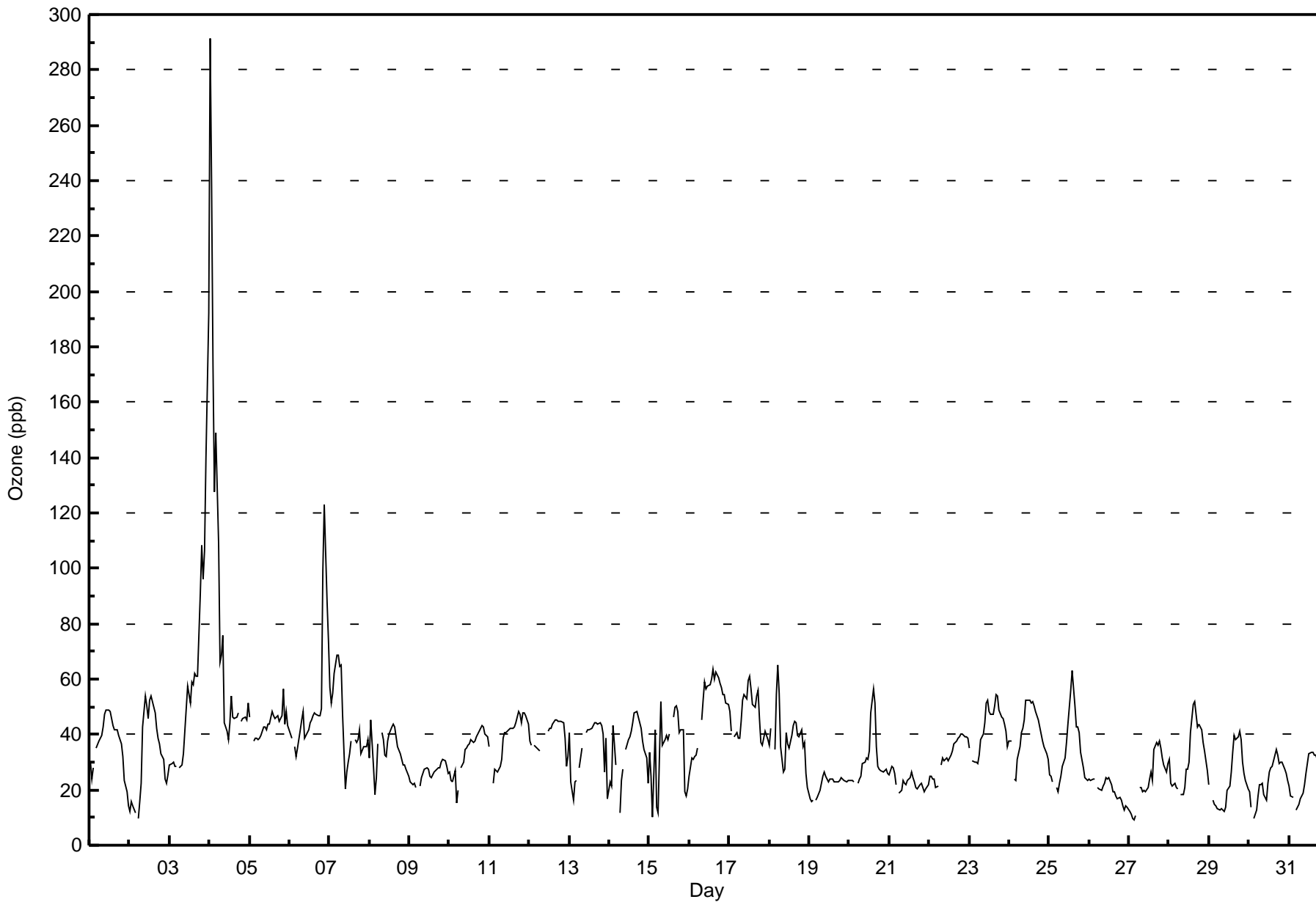
38.2	35.3	30.7	31.4	31.2	31.7	30.2	32.6	34.2	33.9	35.9	37.4	38.8	41.2	42.2	42.4	41.6	40.7	40.3	39.8	39.7	37.9	36.4	35.7	Diurnal Average	
291	239	173	128	149	109	66	69	76	59	57	60	61	60	64	62	62	61	91	108	99	123	140	192	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Patricia McInnes - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Patricia McInnes - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	79	11.19	11.19
21 - 50	541	76.63	87.82
51 - 82	71	10.06	97.88
> 83	15	2.12	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Patricia McInnes - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	14	1	0	0	1	3	2	0	5	7	6	6	1	9	6	18	79
21 - 50	97	34	24	15	11	31	26	14	21	29	36	28	38	46	32	59	541
51 - 82	0	3	4	1	2	2	9	14	5	11	6	5	6	2	1	0	71
> 83	0	0	0	0	0	3	0	0	4	2	6	0	0	0	0	0	15
Totals	111	38	28	16	14	39	37	28	35	49	54	39	45	57	39	77	706

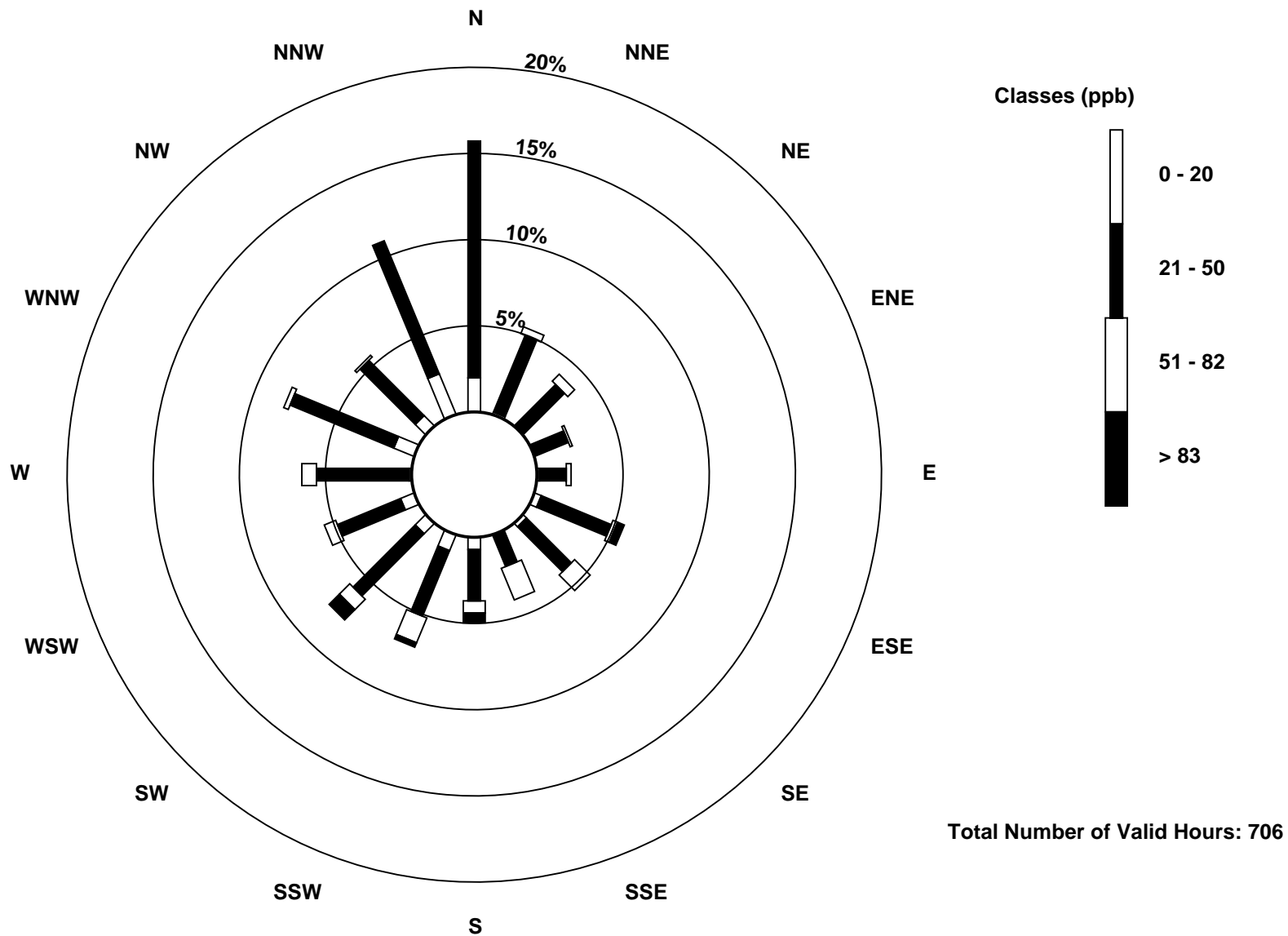
Total Number of Valid Hours: 706

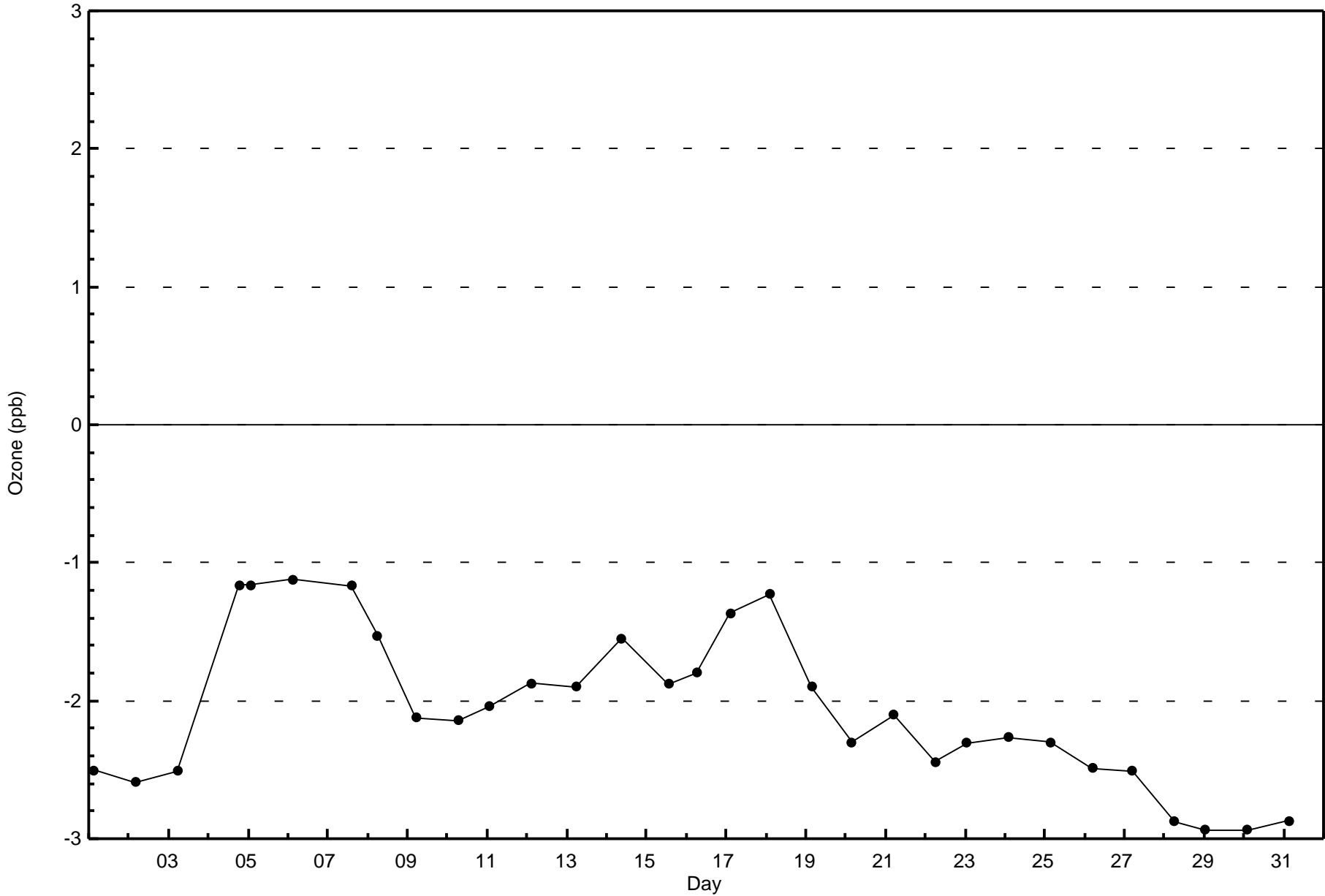
Total Number of Hours: 744

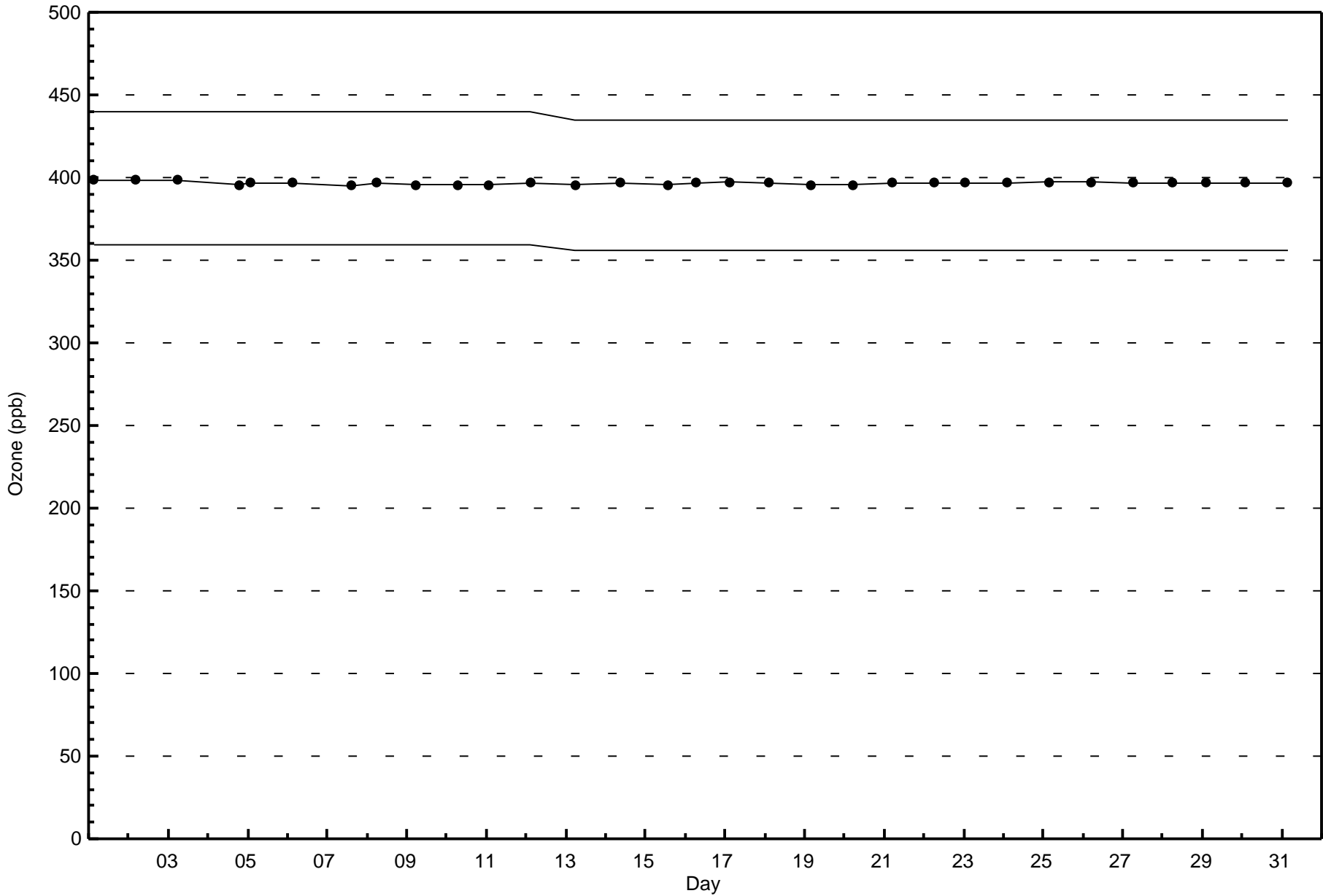


Wood Buffalo Environmental Association
Wind Rose May 2016

Ozone (O_3) - ppb
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

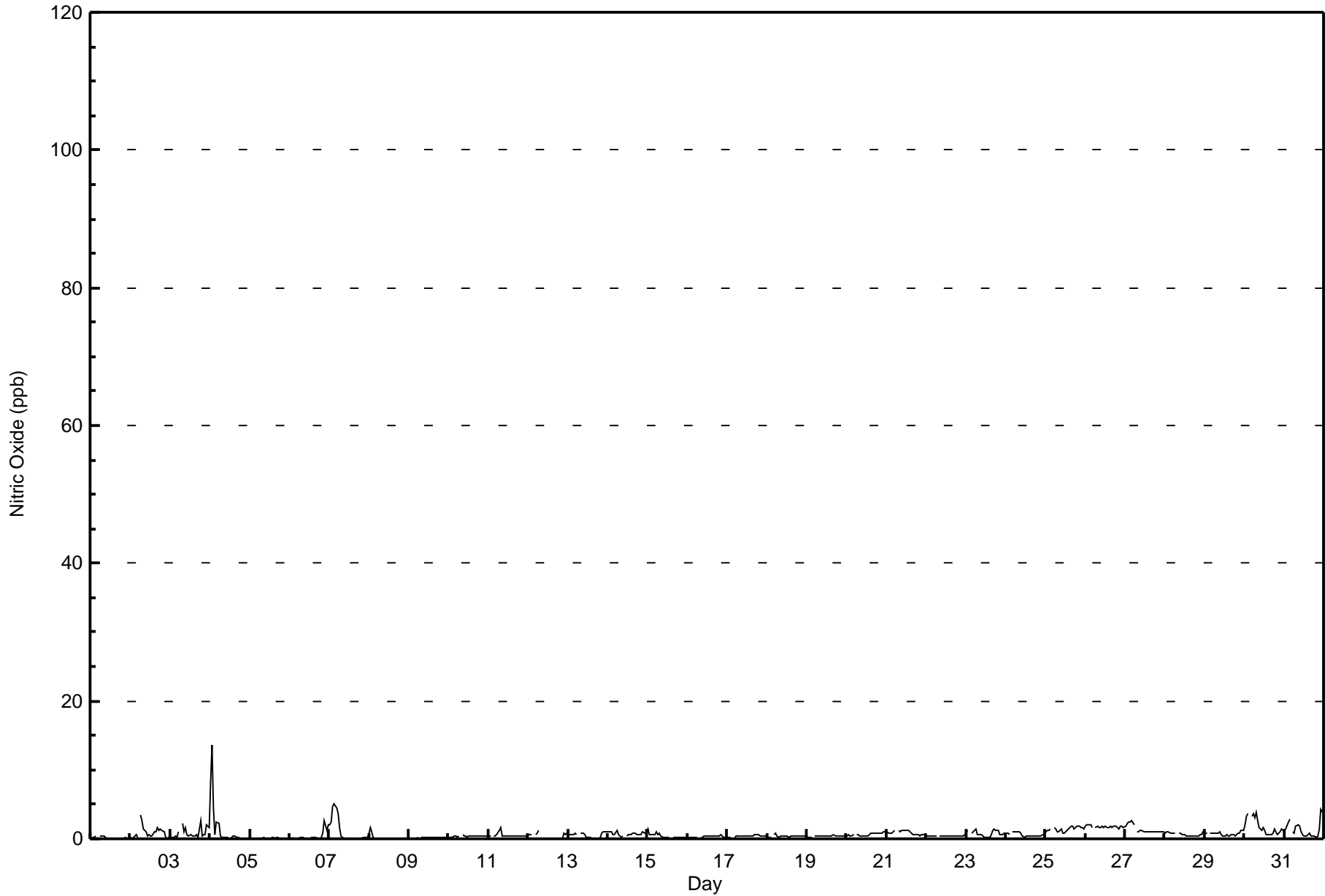
Patricia McInnes - May 2016

Maximum Value: 14 ppb on May 4 02:00																	Maximum Daily Average: 1.8 ppb on May 30																	Hours in Service: 744	
Minimum Value: 0 ppb on May 1 16:00																	Minimum Daily Average: 0.1 ppb on May 5																	Hours of Data: 704	
Maximum Diurnal Average: 1.2 ppb at hour 2																	Minimum Diurnal Average: 0.5 ppb at hour 13																	Hours of Missing Data: 40	
Monthly Average: 0.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 4																	Hours of Calibration: 40	
																	Percent Operational Time: 100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	0	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-May	0	0	0	1	0	Z	3	3	1	1	0	1	0	0	1	1	2	1	1	1	1	0	0	0	0.9	3									
3-May	0	0	0	0	0	1	Z	2	1	2	1	0	1	0	0	0	1	0	3	0	1	1	2	2	0.8	3									
4-May	8	14	4	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	Z	0	0	0	0	1.5	14									
5-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
6-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	2	0.4	3									
7-May	2	2	5	5	4	4	2	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1.1	5									
8-May	1	2	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2									
9-May	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									
10-May	0	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
11-May	0	0	Z	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.5	2									
12-May	1	1	1	Z	1	1	1	C	C	C	C	C	C	C	C	C	0	0	0	0	0	1	1	1	--	1									
13-May	1	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1									
14-May	1	1	1	1	1	1	1	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1									
15-May	1	1	1	1	1	1	1	1	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0.4	1									
16-May	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0.3	1									
17-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.4	1									
18-May	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1									
19-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1									
20-May	0	1	0	0	1	Z	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1									
21-May	1	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1									
22-May	1	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.4	1									
23-May	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.8	1									
24-May	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	1									
25-May	1	1	1	1	Z	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1.4	2									
26-May	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1.8	2									
27-May	2	2	2	2	3	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	3									
28-May	1	1	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0.7	1									
29-May	1	1	Z	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	1	1	1	1	0.7	1									
30-May	2	3	4	Z	3	4	3	4	3	2	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1.8	4									
31-May	1	1	2	3	Z	1	1	2	2	2	1	1	0	0	1	1	0	0	0	0	0	1	4	4	1.3	4									
1.0 1.2 1.1 0.9 0.9 1.0 0.9 1.0 0.7 0.7 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.7 0.8 0.8																								Diurnal Average											
8 14 5 5 4 4 3 4 3 2 2 2 2 2 2 2 2 2 2 2 3 2 2 3 4 4																								Diurnal Maximum											
Z - zerospan C - Calibration																																			



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	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: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	111	34	30	15	15	40	37	28	35	48	53	42	45	55	41	75	704
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	111	34	30	15	15	40	37	28	35	48	53	42	45	55	41	75	704

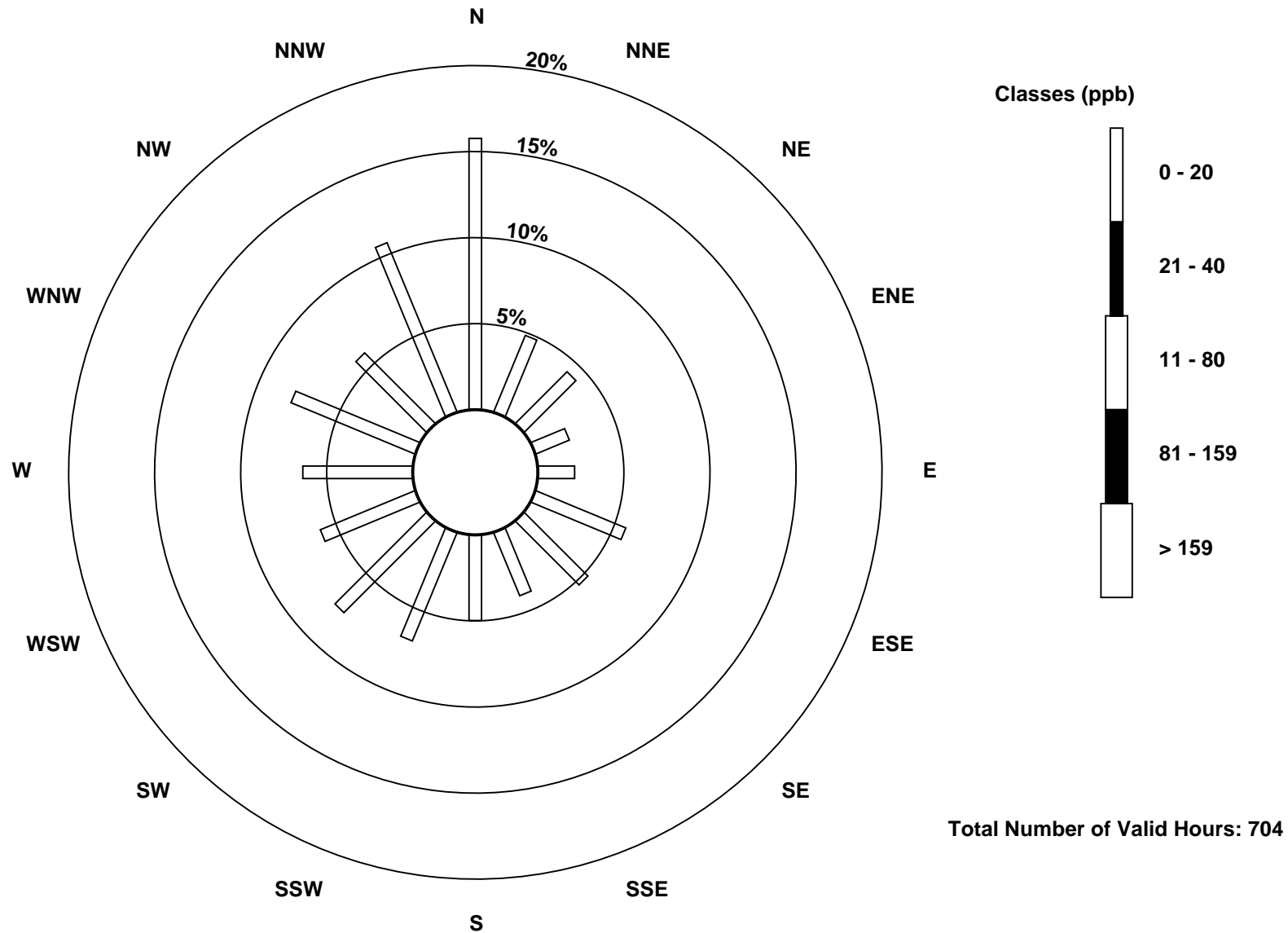
Total Number of Valid Hours: 704

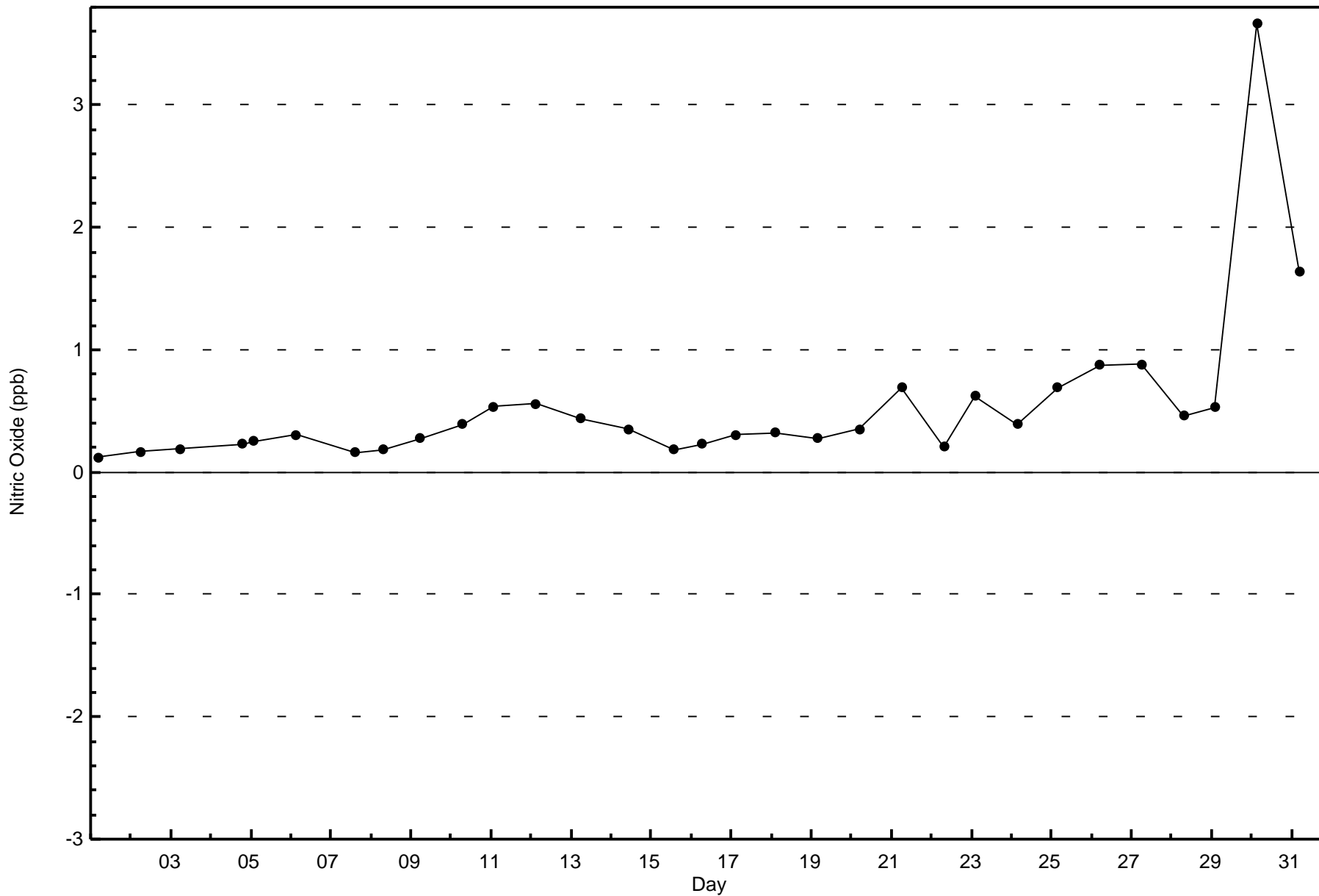
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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

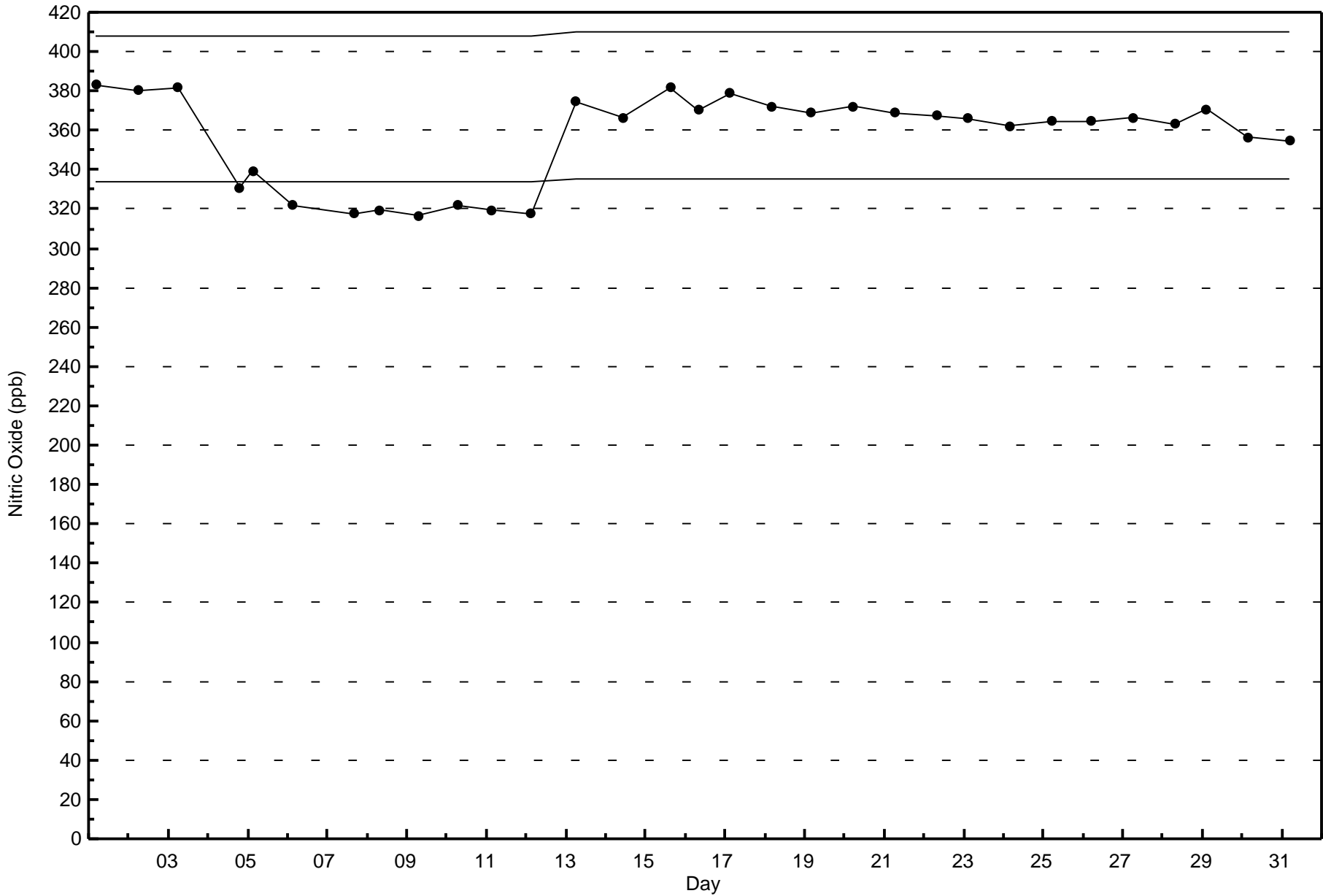






Wood Buffalo Environmental Association
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Patricia McInnes - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 64 ppb on May 6 22:00	Maximum Daily Average: 13.3 ppb on May 4		Hours of Data:	704
Minimum Value: 0 ppb on May 1 18:00	Minimum Daily Average: 0.1 ppb on May 9		Hours of Missing Data:	40
Maximum Diurnal Average: 6.1 ppb at hour 23	Minimum Diurnal Average: 1.2 ppb at hour 12		Hours of Calibration:	40
Monthly Average: 3.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 8 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-May	2	3	4	4	Z	3	2	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	4	1.2	4
2-May	3	1	2	3	2	Z	5	4	8	10	5	2	3	3	4	4	4	3	5	9	8	4	3	3	4.2	10
3-May	1	1	0	2	1	4	Z	4	3	5	5	5	6	5	3	4	3	2	16	19	19	22	44	40	9.3	44
4-May	50	38	31	24	24	19	10	15	22	9	4	1	3	8	6	6	5	5	3	Z	7	8	3	4	13.3	50
5-May	2	1	Z	2	2	0	0	0	1	1	0	0	0	2	1	0	1	1	0	2	6	5	5	6	1.7	6
6-May	4	3	8	Z	2	1	3	7	8	2	0	0	0	1	1	1	1	0	1	5	47	64	46	36	10.4	64
7-May	29	24	22	23	26	26	25	23	17	5	2	2	2	1	1	Z	1	0	4	3	9	18	18	20	13.0	29
8-May	19	20	13	7	3	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	3.0	20
9-May	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
10-May	0	1	2	3	2	0	0	Z	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.6	3
11-May	0	1	Z	0	0	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.6	3
12-May	1	0	1	Z	2	2	3	C	C	C	C	C	C	C	C	C	0	0	0	0	0	1	0	1	--	3
13-May	6	5	4	1	1	1	Z	5	5	2	0	0	0	0	0	0	0	0	0	0	1	1	5	1	1.6	6
14-May	1	1	10	10	6	7	2	5	7	8	Z	2	1	0	0	1	1	1	1	1	2	3	4	7	3.4	10
15-May	9	6	6	11	7	6	9	15	13	13	7	2	2	2	Z	6	7	6	5	8	10	7	6	6	7.3	15
16-May	8	7	4	3	3	3	3	Z	6	6	2	1	7	13	12	5	5	2	2	4	6	8	9	9	5.6	13
17-May	14	5	2	Z	8	7	6	7	10	9	7	8	9	9	8	5	6	6	7	13	11	8	7	9	7.8	14
18-May	9	15	15	Z	17	18	16	11	5	3	5	3	1	0	2	3	2	3	2	2	3	17	13	6	7.5	18
19-May	3	3	2	2	Z	4	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.6	4
20-May	1	1	1	1	2	Z	2	1	1	1	1	0	1	4	7	7	4	2	2	2	2	2	3	4	2.1	7
21-May	3	3	2	3	4	2	Z	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	1	1	1.8	4
22-May	1	0	1	1	1	1	1	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0.6	1
23-May	2	4	Z	2	1	2	2	1	1	1	1	0	0	0	1	3	6	6	5	5	1	1	2	2	2.1	6
24-May	1	1	1	Z	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.8	2
25-May	2	1	2	2	Z	2	1	1	1	2	1	2	2	3	5	5	3	3	3	3	2	1	2	2	2.2	5
26-May	3	3	3	3	1	Z	2	2	1	2	2	1	2	1	1	1	1	2	2	2	2	3	2	3	1.8	3
27-May	4	4	4	4	3	1	Z	0	1	1	1	0	0	0	0	1	1	2	2	1	1	1	1	1	1.5	4
28-May	1	1	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
29-May	1	1	Z	0	0	0	0	0	0	1	0	0	0	1	0	1	1	1	0	1	1	1	1	1	0.6	1
30-May	2	3	5	Z	4	3	2	4	2	1	1	1	1	1	0	1	0	1	2	1	1	3	3	2	1.7	5
31-May	2	2	2	2	Z	0	0	1	2	1	1	1	0	0	1	1	0	0	0	0	1	2	2	3	1.0	3

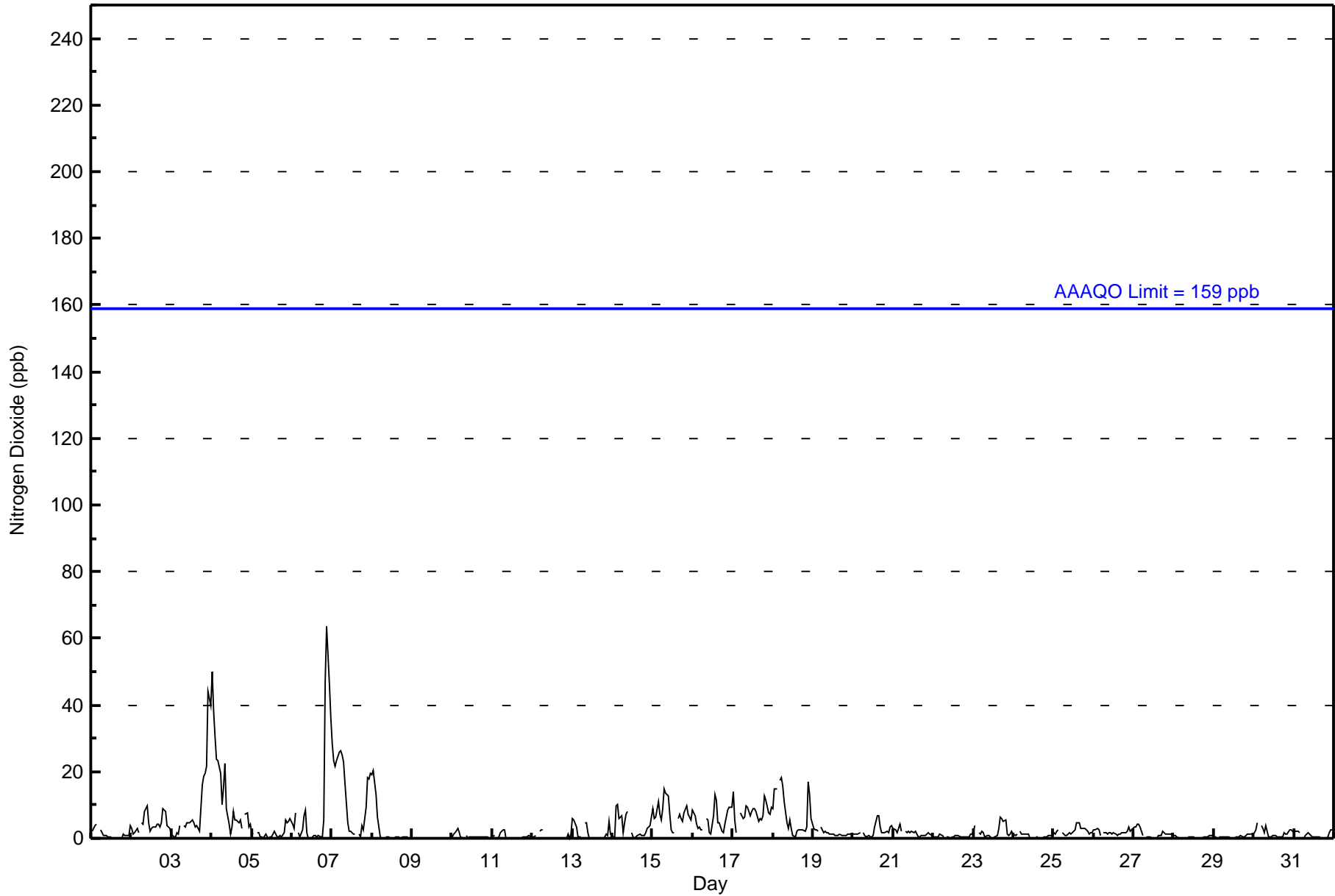
5.9	5.1	5.4	4.5	4.6	4.1	3.8	4.5	4.1	2.8	1.7	1.2	1.5	2.0	2.0	1.9	1.8	1.6	2.1	2.9	4.8	6.0	6.1	5.7	Diurnal Average
50	38	31	24	26	26	25	23	22	13	7	8	9	13	12	7	7	6	16	19	47	64	46	40	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	97.02	97.02
21 - 40	16	2.27	99.29
41 - 80	5	0.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	111	34	30	15	14	37	37	19	34	46	48	42	45	55	41	75	683
21 - 40	0	0	0	0	1	0	0	9	1	1	4	0	0	0	0	0	16
41 - 80	0	0	0	0	0	3	0	0	0	1	1	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	111	34	30	15	15	40	37	28	35	48	53	42	45	55	41	75	704

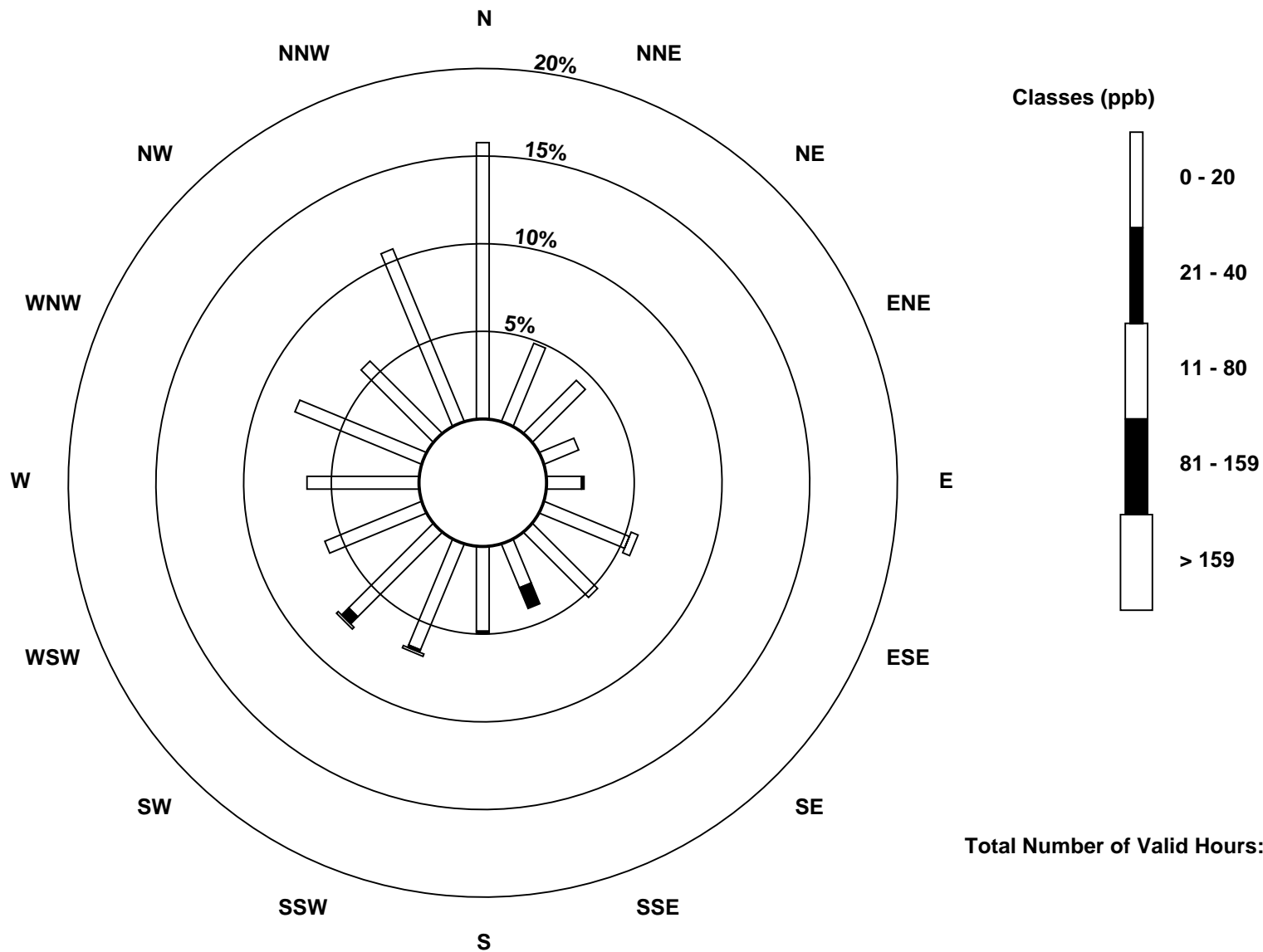
Total Number of Valid Hours: 704

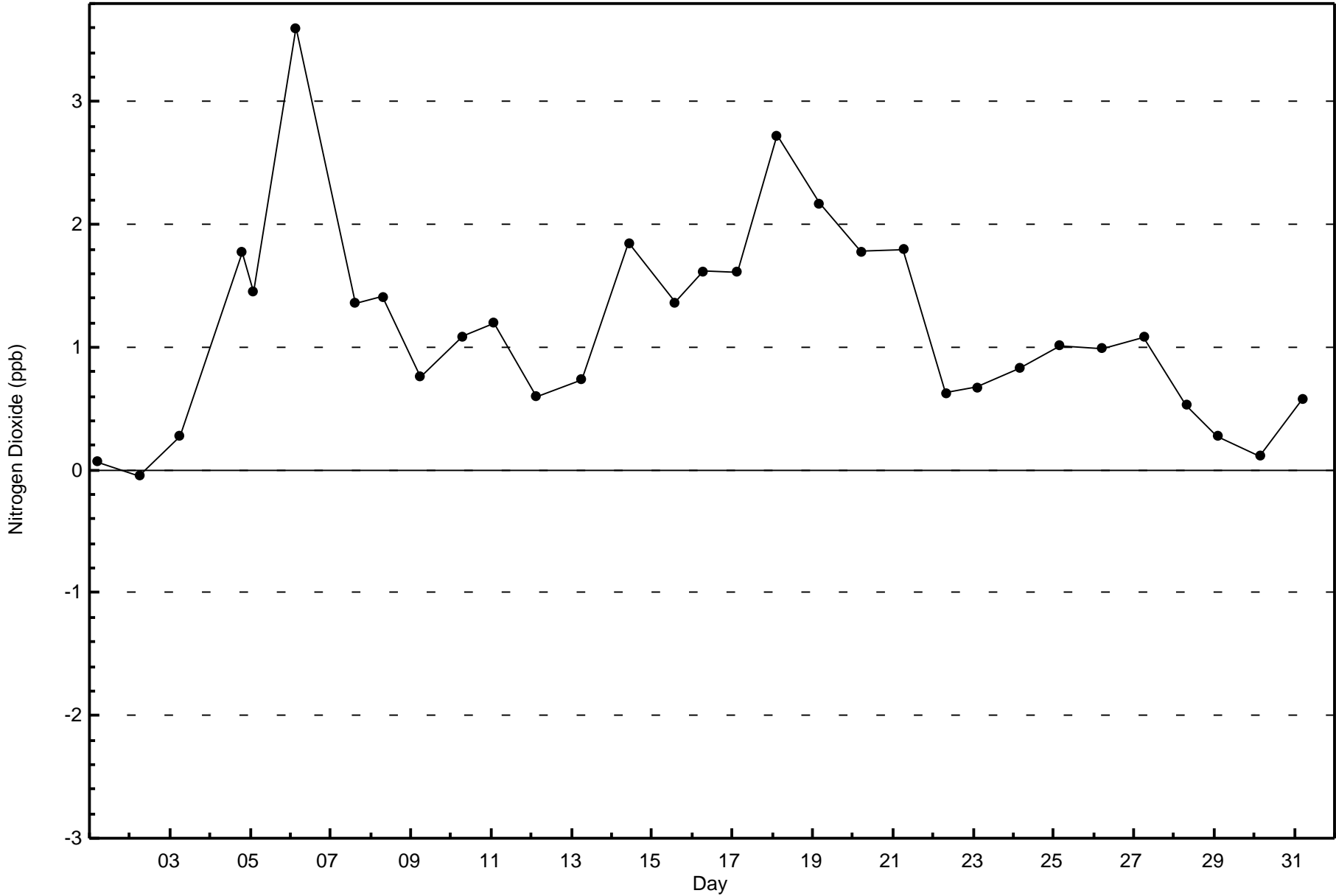
Total Number of Hours: 744

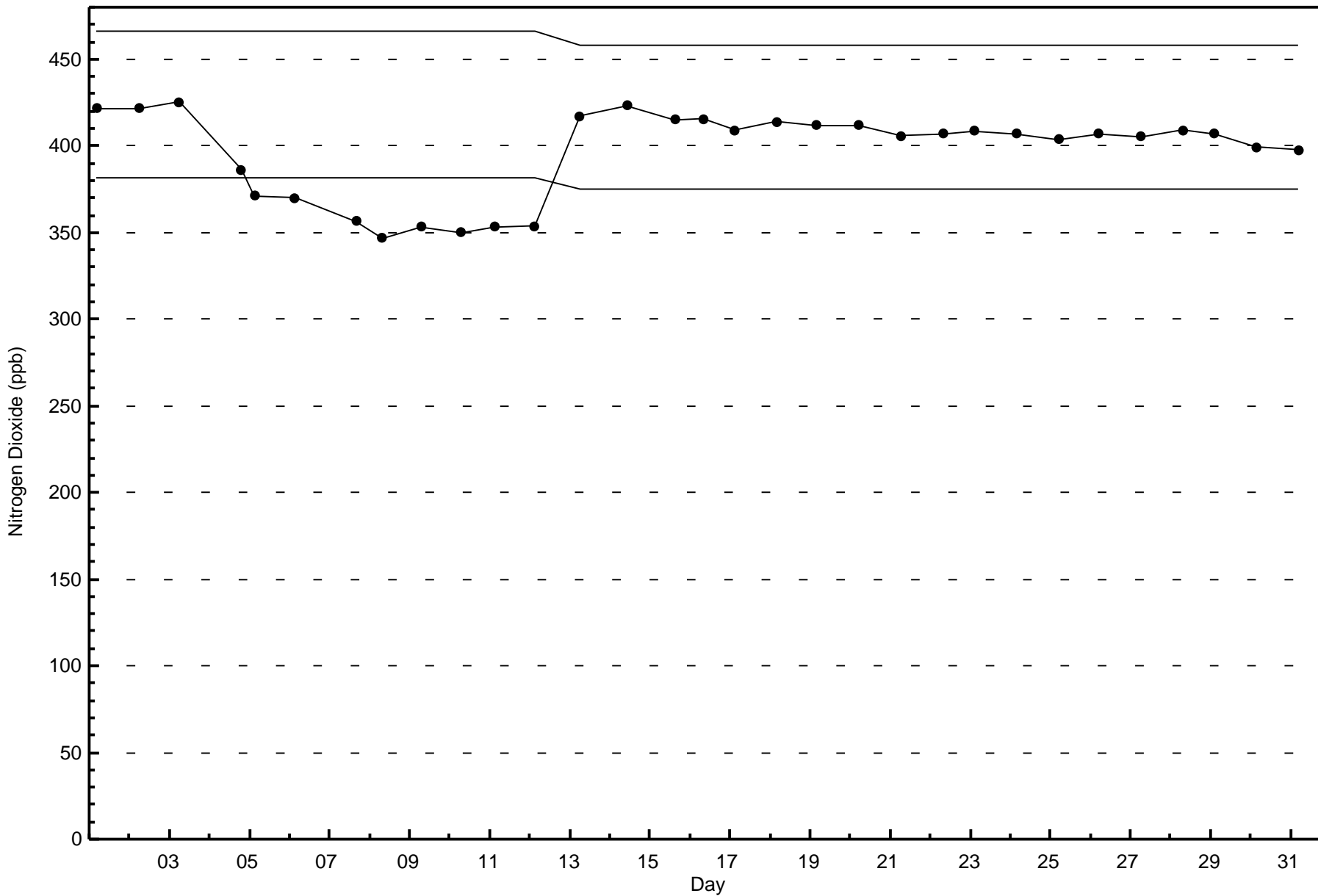


Wood Buffalo Environmental Association
Wind Rose May 2016

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









Wood Buffalo Environmental Association
Summary of Hour Averages

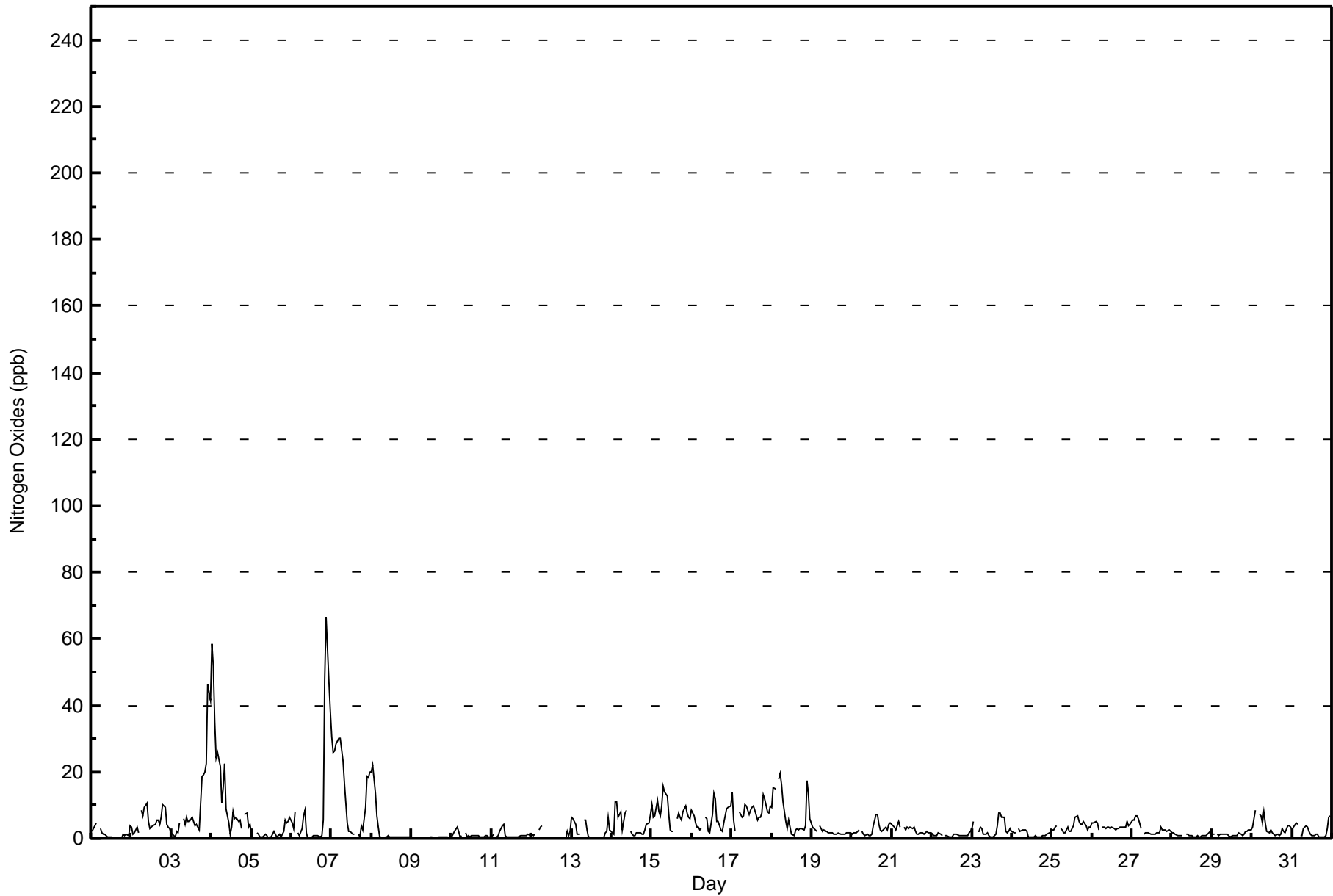
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - May 2016

Maximum Value: 66 ppb on May 6 22:00 Maximum Daily Average: 14.8 ppb on May 4																	Hours in Service: 744 Hours of Data: 704									
Minimum Value: 0 ppb on May 12 20:00 Minimum Daily Average: 0.2 ppb on May 9 Maximum Diurnal Average: 6.9 ppb at hour 23 Minimum Diurnal Average: 1.7 ppb at hour 12 Monthly Average: 4.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 39																	Hours of Missing Data: 40 Hours of Calibration: 40 Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2	3	4	5	Z	3	2	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	4	1.4	5
2-May	3	1	2	3	2	Z	8	7	10	11	5	3	3	4	4	5	6	4	6	10	9	4	3	3	5.1	11
3-May	2	1	0	2	2	5	Z	6	4	6	5	5	6	5	4	4	3	2	19	19	20	22	46	41	10.1	46
4-May	59	52	35	24	26	22	11	15	22	9	5	1	3	8	6	6	5	5	3	Z	7	8	3	4	14.8	59
5-May	2	1	Z	2	1	0	0	0	1	1	0	0	0	2	1	1	1	1	0	2	6	5	5	6	1.7	6
6-May	5	3	8	Z	2	1	3	7	8	2	0	0	0	1	1	1	1	0	1	6	48	66	47	38	10.8	66
7-May	31	26	26	28	30	30	27	23	17	5	2	2	2	1	1	Z	1	0	4	3	9	19	18	20	14.2	31
8-May	20	22	13	7	3	0	0	Z	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	3.1	22
9-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
10-May	1	1	2	3	2	0	1	Z	2	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.0	3
11-May	1	1	Z	0	1	2	4	4	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1.0	4
12-May	1	1	1	Z	3	3	4	C	C	C	C	C	C	C	C	C	0	0	0	0	0	2	1	2	--	4
13-May	6	6	4	1	1	1	Z	5	5	2	1	0	0	0	0	0	0	0	0	1	2	2	6	2	2.1	6
14-May	1	1	11	11	6	8	2	5	7	8	Z	2	1	1	1	2	2	2	1	1	2	4	4	7	4.1	11
15-May	10	6	7	11	8	7	10	16	14	13	7	3	2	2	Z	6	8	6	5	8	10	8	6	6	7.8	16
16-May	9	7	4	3	3	3	3	Z	6	6	2	2	7	14	12	5	5	3	2	5	7	9	10	10	5.9	14
17-May	14	6	2	Z	8	7	6	7	10	10	7	8	9	10	8	6	6	6	7	13	12	8	7	10	8.2	14
18-May	9	15	15	Z	18	19	16	11	5	3	6	3	1	1	3	3	3	3	3	3	4	18	14	6	7.9	19
19-May	3	3	3	2	Z	4	2	3	2	2	2	2	2	1	1	1	2	1	1	1	1	2	2	2	2.0	4
20-May	1	2	2	2	2	Z	2	1	1	1	1	1	1	4	7	7	4	3	2	3	3	3	4	5	2.7	7
21-May	4	3	3	4	5	3	Z	3	3	3	3	3	3	3	2	1	1	2	2	1	2	2	2	2	2.6	5
22-May	1	1	1	1	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.0	2
23-May	3	5	Z	2	2	4	3	1	1	2	1	0	1	1	1	4	8	8	6	7	2	2	2	3	2.9	8
24-May	2	2	2	Z	3	2	2	2	2	2	1	0	1	1	1	1	1	1	1	1	1	1	2	2	1.4	3
25-May	3	3	3	4	Z	3	2	2	2	3	2	2	3	4	6	7	5	4	4	5	4	3	4	3	3.5	7
26-May	4	5	5	5	3	Z	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	5	4	4	3.6	5
27-May	5	6	7	7	6	3	Z	1	2	2	2	1	1	1	1	2	2	3	3	2	2	2	2	2	2.8	7
28-May	2	2	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.1	2
29-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	3	3	1.3	3
30-May	3	6	8	Z	7	7	5	8	5	2	2	3	2	1	1	1	1	1	1	3	2	2	4	3	3.5	8
31-May	3	4	5	4	Z	1	1	3	4	3	2	1	1	1	1	1	1	0	0	0	1	3	7	7	2.3	7
6.8 6.3 6.5 5.4 5.5 5.1 4.7 5.5 4.8 3.5 2.2 1.7 1.9 2.4 2.5 2.5 2.3 2.1 2.7 3.4 5.3 6.7 6.9 6.5																								Diurnal Average		
59 52 35 28 30 30 27 23 22 13 7 8 9 14 12 7 8 8 8 19 19 48 66 47 41																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	96.73	96.73
21 - 40	16	2.27	99.01
41 - 80	7	0.99	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	110	34	30	15	14	37	37	19	34	46	47	42	45	55	41	75	681
21 - 40	1	0	0	0	1	0	0	9	1	1	3	0	0	0	0	0	16
11 - 80	0	0	0	0	0	3	0	0	0	1	3	0	0	0	0	0	7
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	111	34	30	15	15	40	37	28	35	48	53	42	45	55	41	75	704

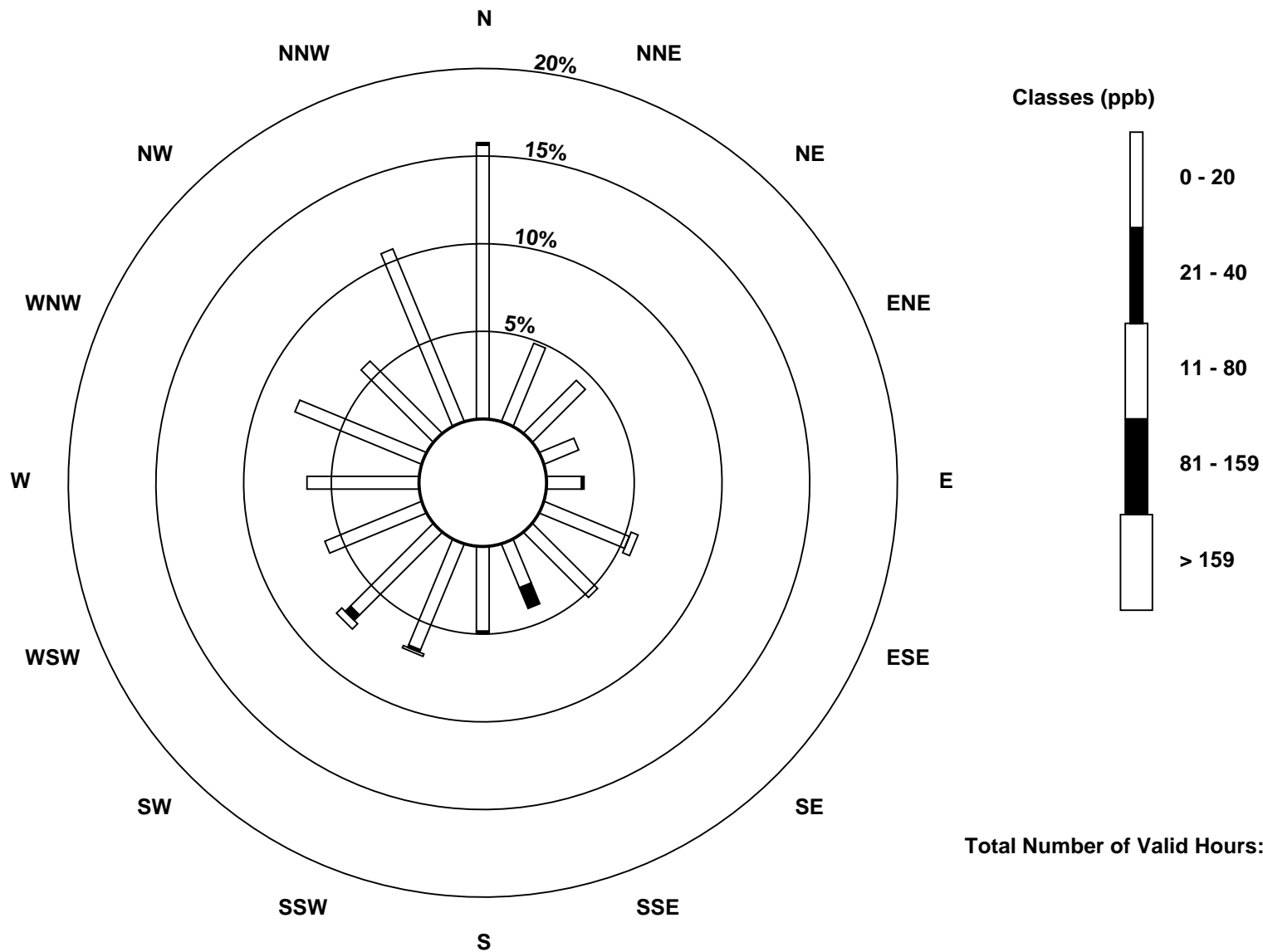
Total Number of Valid Hours: 704

Total Number of Hours: 744

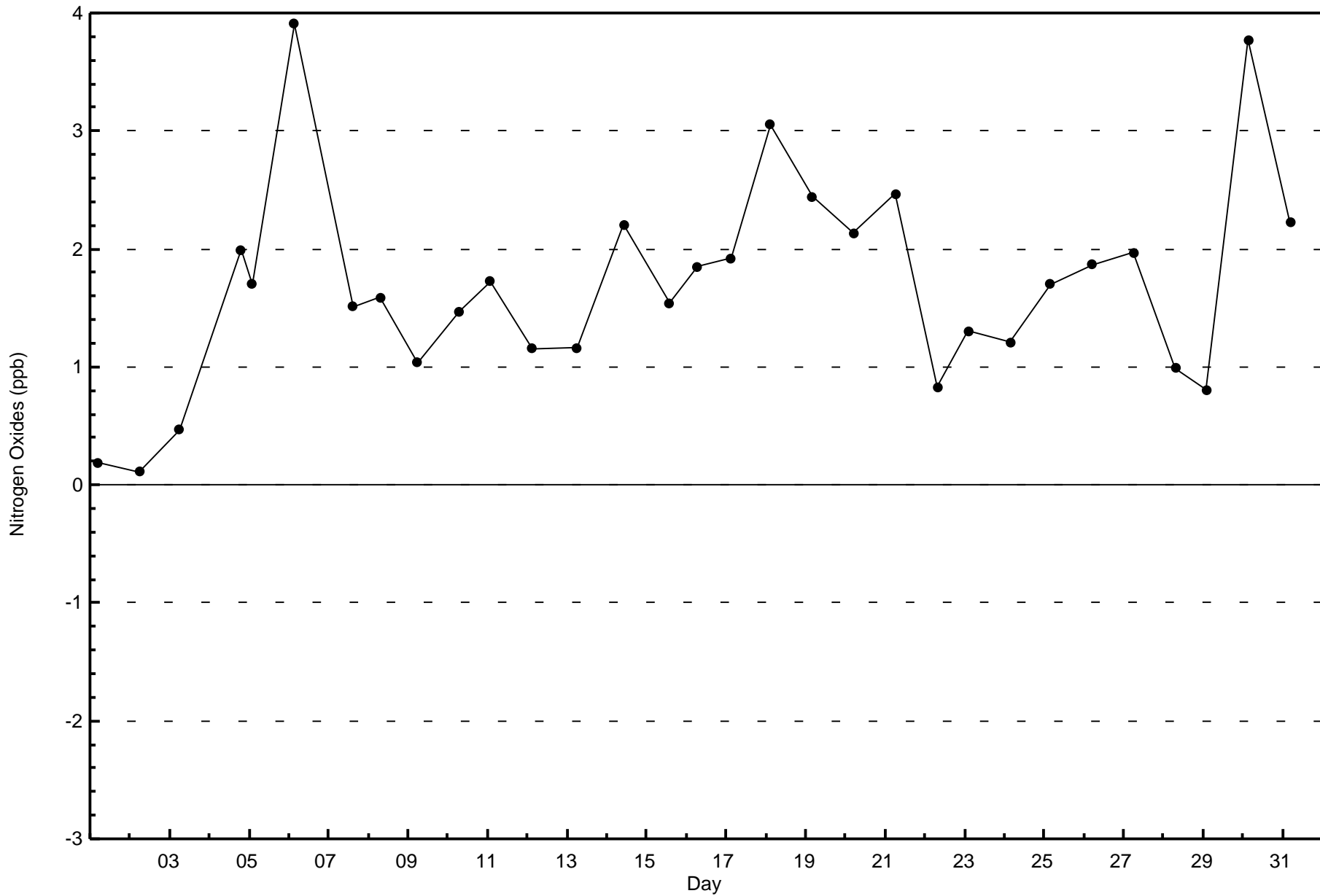


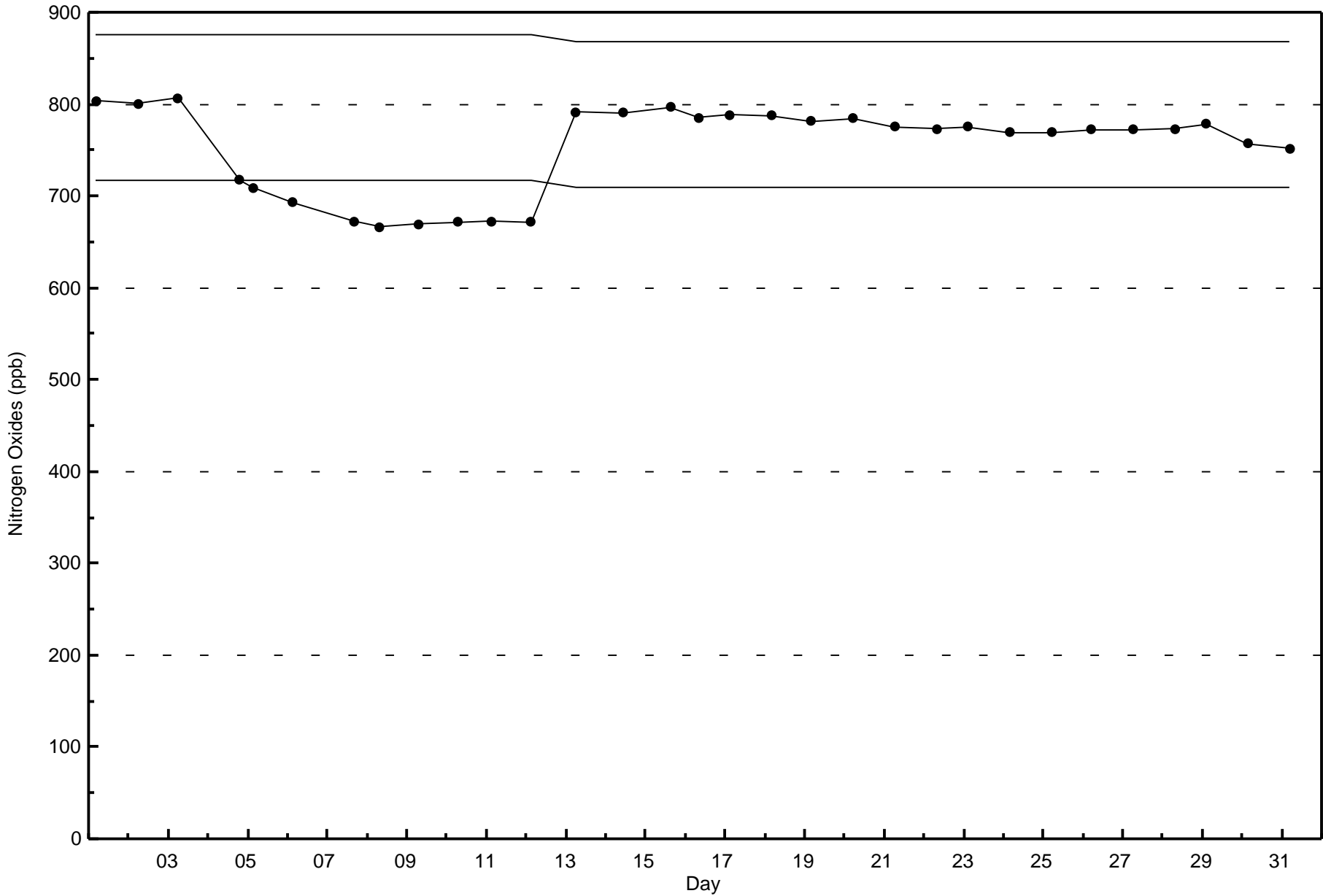
Wood Buffalo Environmental Association
Wind Rose May 2016

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



Total Number of Valid Hours: 704







Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

Patricia McInnes - May 2016

Number of Exceedences (AAAQO): 1-hr: 0	Hours in Service: 744
Maximum Value: 1588 ppb on May 4 01:00	Maximum Daily Average: 458.4 ppb on May 4
Minimum Value: 0 ppb on May 1 01:00	Hours of Data: 668
Maximum Diurnal Average: 178.6 ppb at hour 3	Hours of Missing Data: 76
Monthly Average: 79.0 ppb	Hours of Calibration: 43
Minimum Daily Average: 0.0 ppb on May 1	Percent Operational Time: 95.6
Minimum Diurnal Average: 13.8 ppb at hour 18	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 18 Q ₃ = 55 P ₉₀ = 201 P ₉₉ = 937	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	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
2-May	0	0	0	Z	RE	0	0	0	13	20	28	16	15	16	13	14	12	0	0	0	0	0	10	0	7.1	28
3-May	0	0	0	0	Z	RE	RE	0	0	19	59	56	39	18	13	11	0	0	105	258	313	422	338	948	123.8	948
4-May	1588	1538	1163	938	1070	892	503	556	736	370	86	53	43	63	50	60	55	Z	RE	52	78	71	65	56	458.4	1588
5-May	Z	RE	32	32	47	31	32	20	24	17	11	0	0	15	17	11	11	14	11	33	124	142	160	161	42.9	161
6-May	176	Z	649	298	78	51	96	201	258	71	18	12	11	12	12	11	11	11	13	44	466	737	624	665	196.7	737
7-May	551	523	574	643	751	824	859	949	819	210	58	44	37	Z	RE	29	27	19	24	33	89	191	210	266	351.4	949
8-May	232	314	216	105	51	Z	RE	26	22	27	37	23	15	13	11	11	0	0	12	12	13	15	12	0	53.1	314
9-May	0	0	0	0	Z	RE	RE	12	10	0	0	0	0	0	0	0	0	0	0	0	10	18	14	11	3.6	18
10-May	22	67	98	233	176	Z	RE	25	15	11	0	0	0	0	0	0	0	0	0	0	0	0	11	11	30.5	233
11-May	Z	RE	40	18	12	12	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	40
12-May	23	Z	RE	15	13	11	0	C	C	C	C	C	C	C	C	C	C	C	C	0	0	29	15	67	--	67
13-May	418	310	55	29	Z	RE	19	64	98	55	16	0	0	0	0	0	0	0	0	0	68	48	410	106	77.1	418
14-May	34	36	723	787	451	428	68	96	Z	RE	91	40	22	10	0	0	0	0	0	0	0	148	273	323	160.5	787
15-May	512	406	154	575	234	128	201	405	358	319	179	74	Z	RE	46	53	61	74	73	96	300	306	190	199	224.7	575
16-May	192	147	113	70	70	Z	RE	73	117	118	39	17	18	59	66	42	22	16	11	25	91	175	255	280	91.6	280
17-May	Z	RE	42	42	166	139	142	167	225	220	105	83	68	76	64	52	60	55	72	121	175	88	94	115	107.8	225
18-May	178	Z	RE	169	428	814	785	453	110	62	59	51	30	22	21	21	24	35	35	38	122	271	181	147	184.3	814
19-May	108	91	Z	RE	93	106	77	84	87	72	57	54	51	48	45	46	50	41	29	39	44	40	32	31	60.3	108
20-May	31	38	44	Z	RE	71	67	52	27	19	20	17	15	19	28	27	42	51	41	40	38	44	117	140	45.0	140
21-May	116	134	78	82	Z	RE	51	38	37	43	34	33	28	37	31	23	18	16	15	16	14	14	16	15	40.4	134
22-May	16	15	14	13	11	Z	RE	12	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.7	16
23-May	Z	RE	22	20	16	16	15	13	12	10	0	0	0	0	0	0	11	18	17	18	15	16	16	15	11.3	22
24-May	24	Z	RE	23	26	28	41	49	45	53	21	11	0	0	10	0	0	0	0	0	0	0	10	13	16.1	53
25-May	21	25	Z	RE	33	34	32	26	20	31	28	27	32	45	37	35	33	21	18	29	41	27	28	30	29.6	45
26-May	45	35	25	Z	RE	25	24	18	22	32	26	22	21	18	18	20	17	18	19	19	16	16	20	31	23.0	45
27-May	26	29	39	35	Z	RE	26	17	15	17	18	16	15	18	17	16	15	12	11	0	0	11	12	11	17.0	39
28-May	11	12	14	12	11	Z	RE	14	14	11	0	0	11	0	0	0	0	0	0	0	0	0	0	0	5.0	14
29-May	Z	RE	13	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	13
30-May	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
31-May	0	0	Z	RE	22	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	165	127	17.3	165

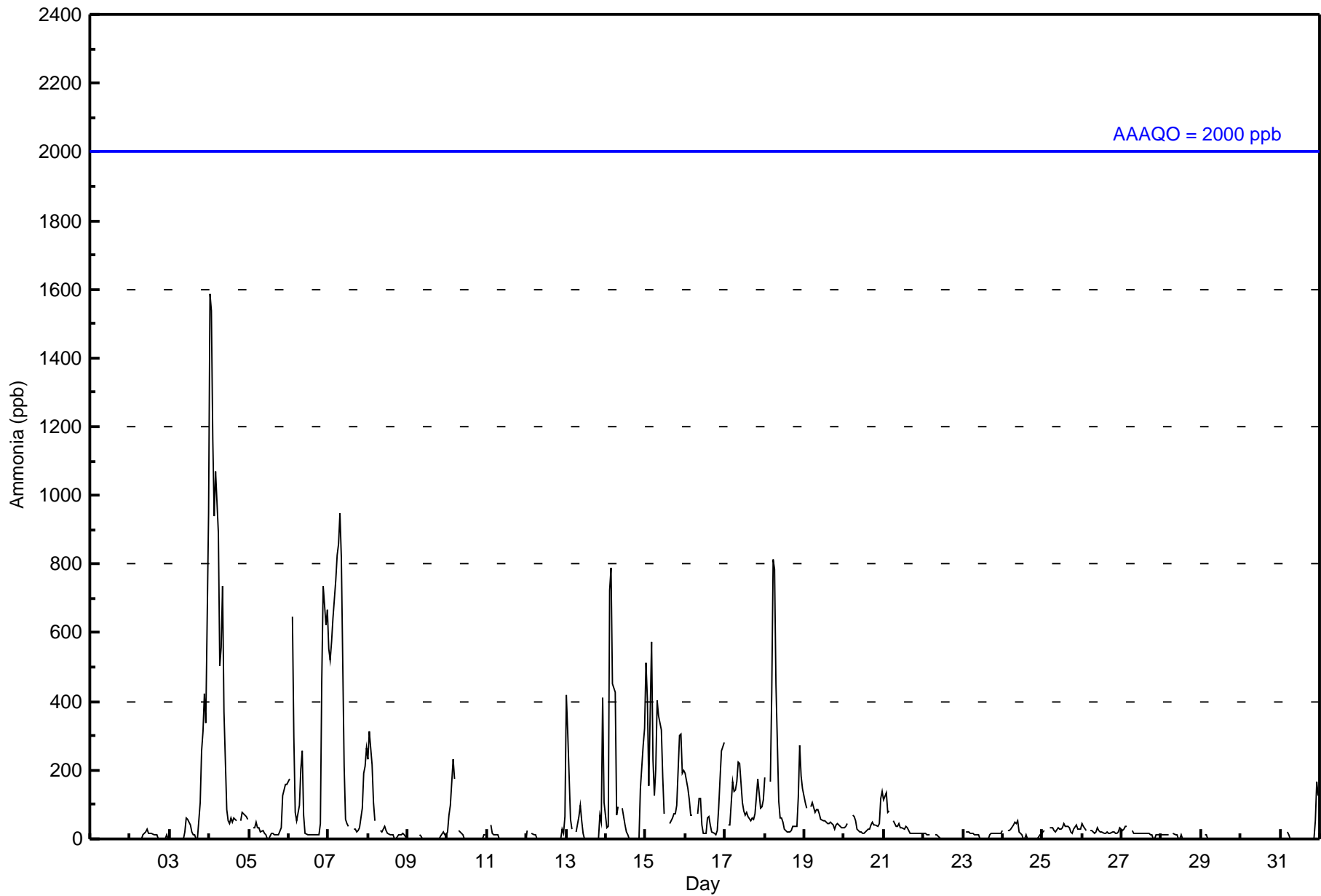
166.4	177.1	178.6	172.9	170.9	172.5	127.0	112.4	106.8	62.7	32.9	21.6	16.3	17.4	17.3	16.0	15.7	13.8	17.5	28.2	65.1	93.0	105.8	121.5	Diurnal Average	
1588	1538	1163	938	1070	892	859	949	819	370	179	83	68	76	66	60	61	74	105	258	466	737	624	948	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	212	31.74	31.74
6 - 10	9	1.35	33.08
11 - 15	83	12.43	45.51
16 - 20	54	8.08	53.59
21 - 25	29	4.34	57.93
> 26	277	41.47	99.40

Total Number of Valid Hours: 668

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	36	23	16	3	2	6	15	5	9	15	11	11	4	15	17	24	212
6 - 10	1	1	1	0	1	0	0	1	1	0	0	0	1	2	0	0	9
11 - 15	11	3	3	3	2	11	7	2	2	2	2	9	5	11	4	6	83
16 - 20	10	0	2	2	5	8	1	2	2	3	2	0	2	3	2	10	54
21 - 25	4	1	1	0	0	0	1	0	3	3	0	2	5	2	1	6	29
> 26	40	7	4	9	4	13	10	18	17	22	32	16	25	21	12	27	277
Totals	102	35	27	17	14	38	34	28	34	45	47	38	42	54	36	73	664

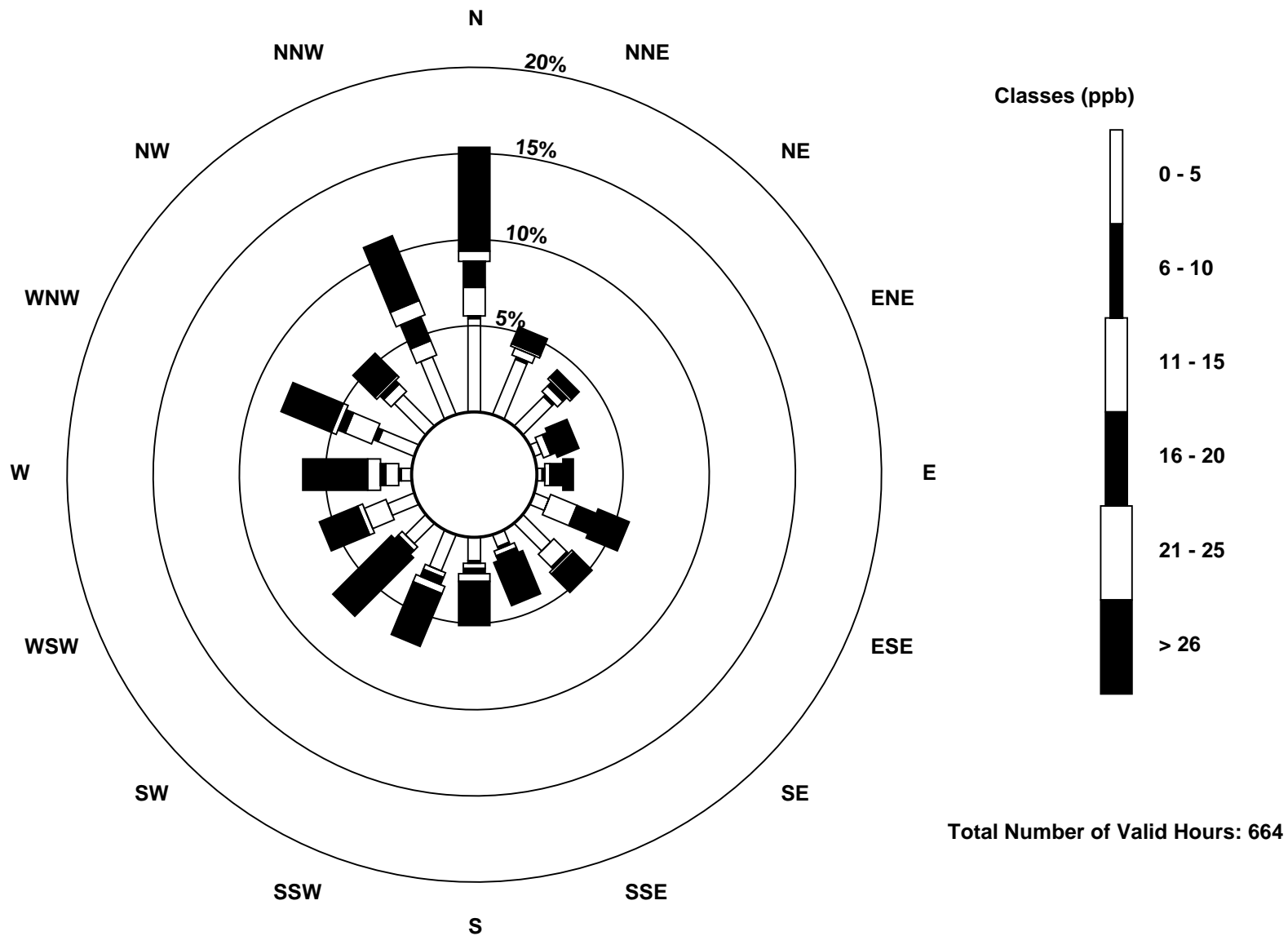
Total Number of Valid Hours: 668

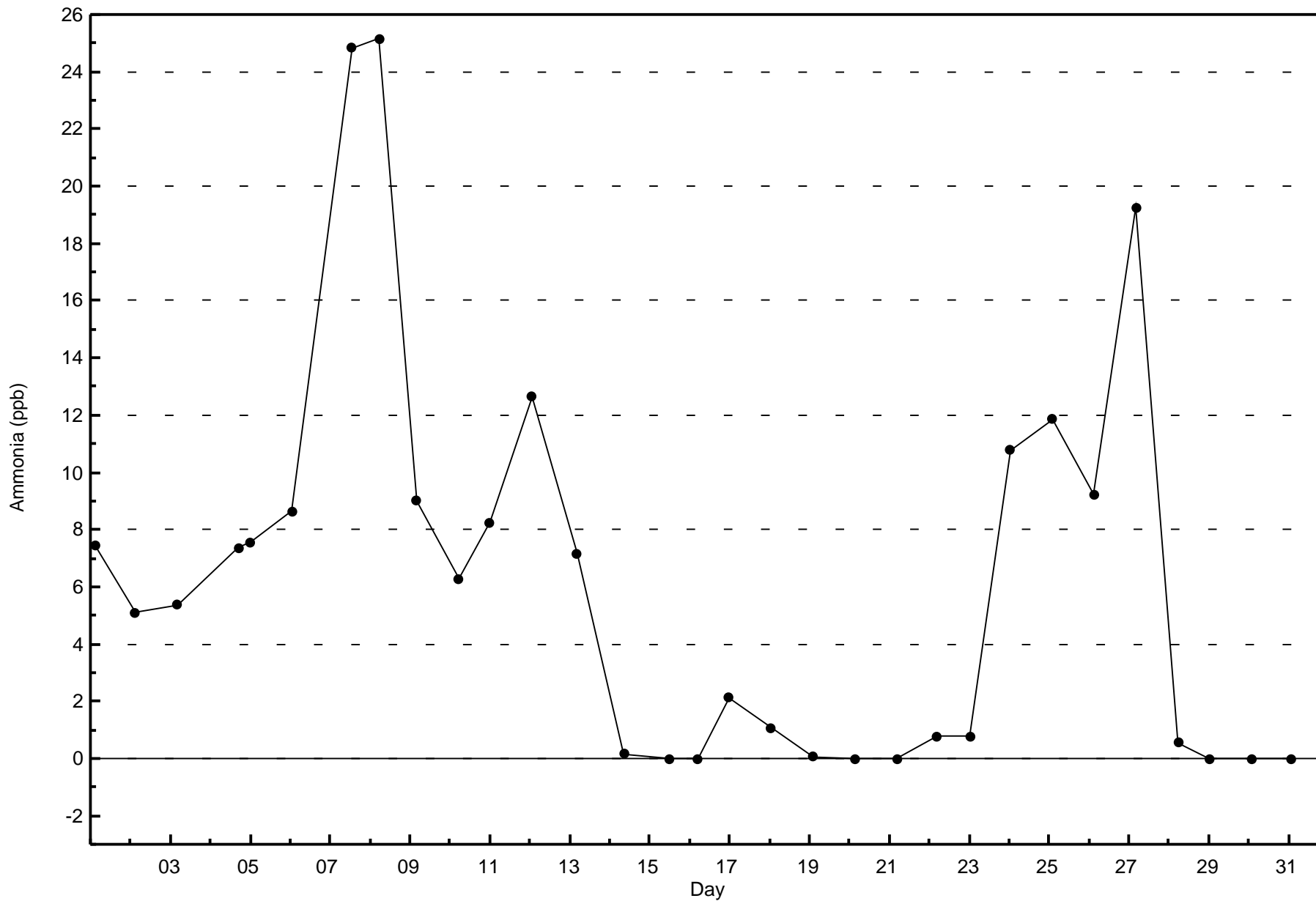
Total Number of Hours: 744

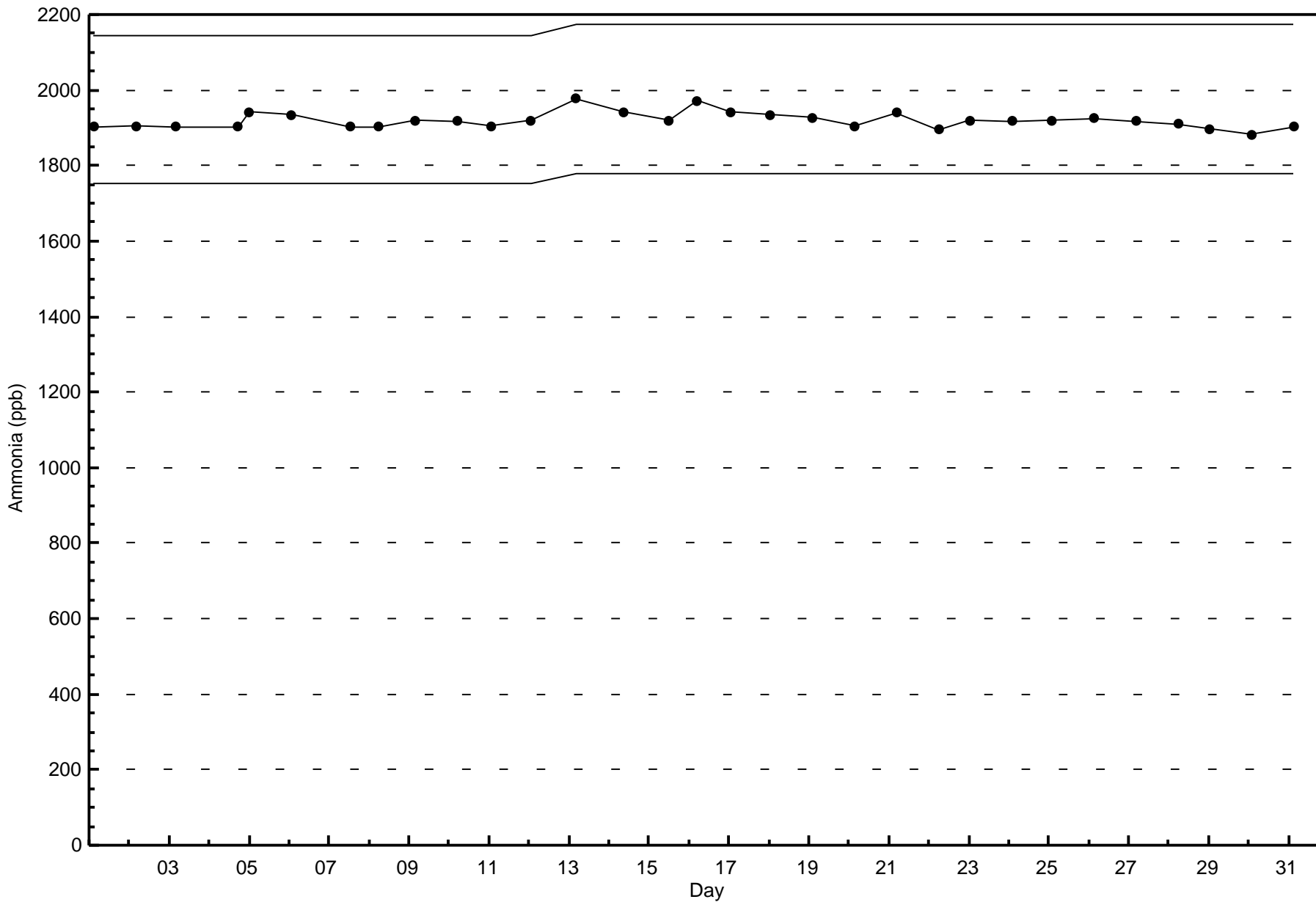


Wood Buffalo Environmental Association
Wind Rose May 2016

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





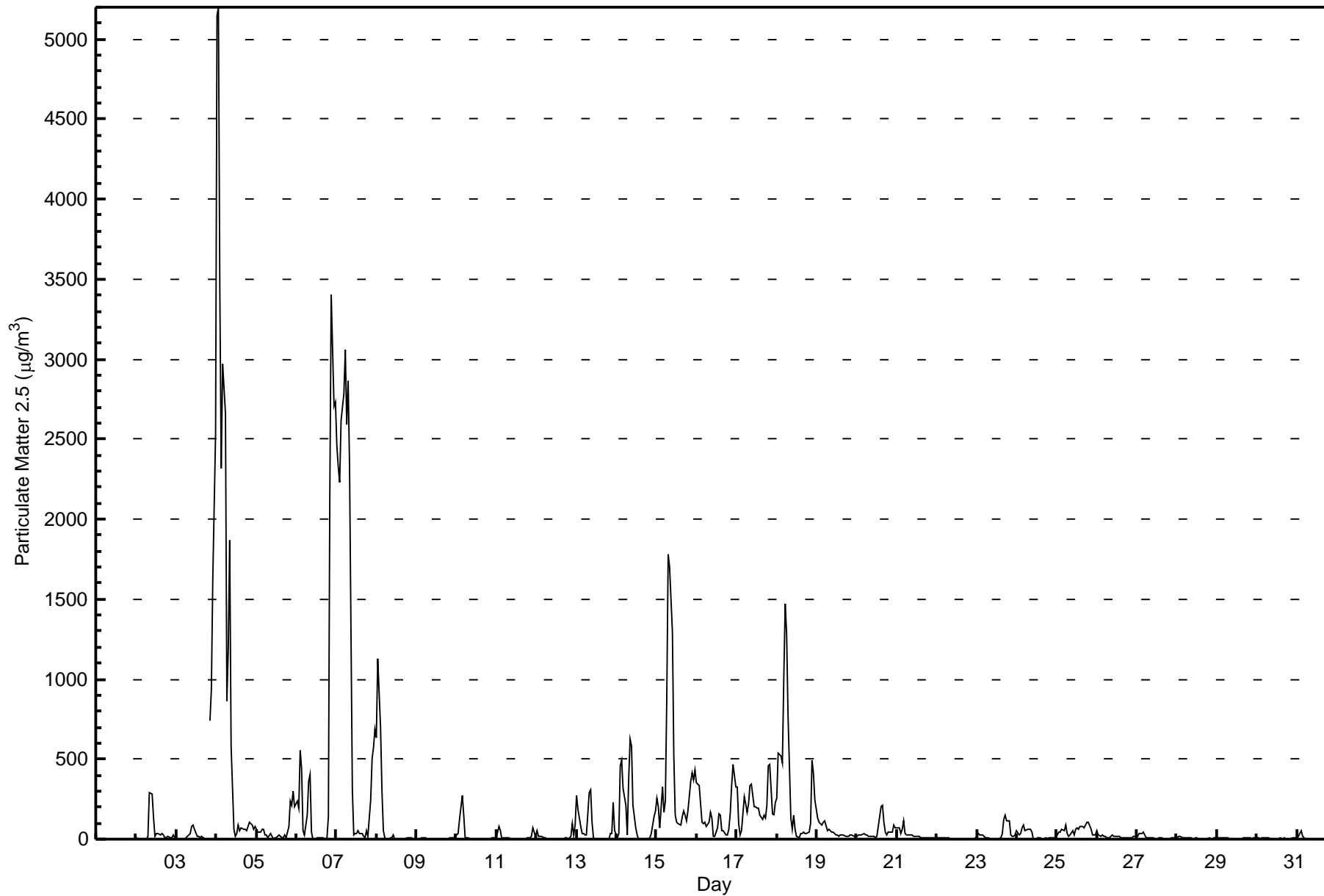




Summary of Hour Averages

Patricia McInnes - May 2016

Number of Exceedences (AAAQO):		24-hr: 17		Hours in Service:		744																				
Maximum Value: 5197.9 µg/m ³ on May 4 02:00		Maximum Daily Average: 1131.0 µg/m ³ on May 4		Hours of Data:		740																				
Minimum Value: 0.5 µg/m ³ on May 11 09:00		Minimum Daily Average: 1.6 µg/m ³ on May 1		Hours of Missing Data:		4																				
Maximum Diurnal Average: 349.9 µg/m ³ at hour 2		Minimum Diurnal Average: 23.9 µg/m ³ at hour 13		Hours of Calibration:		2																				
Monthly Average: 162.12 µg/m ³		Percentiles: P ₁ = 0.7 P ₁₀ = 1.7 O ₁ = 4.0 Median = 15.9 O ₃ = 70.2 P ₉₀ = 306.0 P ₉₉ = 2773.2		Percent Operational Time:		99.7																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1.7	1.8	1.7	1.4	0.8	1.0	1.0	1.0	1.0	1.0	1.2	0.9	0.8	0.8	0.7	1.0	1.5	1.3	1.3	2.0	2.5	2.0	2.2	7.4	1.6	7.4
2-May	7.5	2.9	2.7	2.2	2.2	2.6	3.1	15.6	290.8	284.0	130.9	21.8	35.2	33.2	26.4	38.1	23.9	11.0	9.4	15.5	13.0	13.0	22.5	12.6	42.5	290.8
3-May	4.1	2.2	2.3	3.2	3.1	3.5	5.5	27.4	31.0	77.5	87.2	59.7	19.0	16.6	9.2	14.3	8.3	10.3	AF	AF	743.1	931.9	1617.3	2535.4	282.4	2535.4
4-May	5149.7	5197.9	3432.8	2320.1	2967.5	2662.2	859.6	1186.0	1866.5	582.7	61.1	14.7	34.9	87.4	56.4	66.9	65.2	65.2	54.5	77.0	103.3	87.9	65.2	78.0	1131.0	5197.9
5-May	58.1	41.5	41.4	62.1	64.9	29.1	23.3	10.6	34.1	16.1	3.2	5.5	8.0	23.4	18.4	7.1	9.3	22.6	11.2	78.5	241.2	215.5	301.9	203.3	63.8	301.9
6-May	236.9	192.1	554.5	440.0	52.7	27.8	150.7	360.6	408.3	43.8	1.7	1.7	4.7	7.5	8.8	6.1	9.7	4.1	10.1	144.4	2134.8	3398.8	2707.8	2729.8	568.2	3398.8
7-May	2454.9	2326.6	2228.8	2613.8	2788.7	3060.2	2593.8	2865.3	2337.8	312.7	27.2	37.8	37.9	49.2	34.8	32.7	19.2	7.1	52.9	21.9	246.9	504.0	575.5	690.0	1080.0	3060.2
8-May	631.0	1127.7	699.8	295.5	53.5	5.1	2.1	2.8	4.5	9.4	26.6	2.3	2.1	1.8	1.6	2.6	2.2	2.3	6.0	6.9	8.5	10.5	2.7	1.0	121.2	1127.7
9-May	0.8	0.8	0.6	6.5	8.4	5.2	4.3	1.3	0.6	1.4	2.0	2.3	1.4	1.4	1.4	1.8	2.6	2.8	1.8	1.9	12.3	12.9	5.4	15.9	4.0	15.9
10-May	30.4	39.6	123.5	273.8	154.1	6.7	7.1	11.1	2.8	0.9	1.4	1.4	1.8	1.1	0.8	0.7	0.7	0.6	0.8	1.2	3.4	4.6	5.0	4.6	28.3	273.8
11-May	12.1	80.5	50.6	3.3	7.5	5.8	5.7	4.7	0.5	0.6	1.1	0.9	1.1	1.5	1.5	1.5	2.5	4.0	8.8	6.2	10.4	17.8	66.3	20.5	13.1	80.5
12-May	52.5	20.8	14.7	15.8	10.1	6.7	2.5	C	C	0.7	0.6	0.7	1.0	1.5	1.7	1.8	2.3	6.5	5.9	1.2	15.9	98.8	26.5	91.2	17.3	98.8
13-May	274.0	182.1	78.4	37.7	38.1	24.7	24.7	293.6	308.2	101.5	11.4	0.9	1.5	2.1	1.3	1.3	2.1	1.3	1.7	4.2	36.1	32.7	226.9	54.6	72.5	308.2
14-May	12.6	39.0	456.5	493.8	317.1	207.2	30.6	380.0	623.1	583.9	207.5	70.0	26.1	1.5	1.0	1.2	1.2	1.1	1.8	1.4	5.6	39.0	139.9	178.1	159.1	623.1
15-May	258.8	206.4	71.1	330.2	168.7	234.6	877.1	1776.7	1700.0	1293.7	516.4	150.4	109.4	95.0	86.4	138.3	172.2	153.9	116.0	174.7	363.7	414.3	366.1	431.4	425.2	1776.7
16-May	355.9	337.4	224.5	107.7	96.1	104.5	82.7	106.9	164.8	135.2	18.8	15.5	66.6	157.7	149.8	54.1	57.3	28.5	22.0	63.6	158.4	333.9	469.4	322.6	151.4	469.4
17-May	324.9	99.9	30.7	55.1	262.1	216.0	170.4	224.1	335.0	341.6	199.4	202.1	194.6	195.7	151.5	127.7	150.1	133.8	213.6	461.5	467.5	161.1	148.1	232.6	212.5	467.5
18-May	256.2	536.1	523.1	472.7	1006.3	1471.2	1287.8	773.5	129.0	63.6	147.4	61.5	16.8	10.2	31.2	34.6	41.0	33.1	34.9	41.1	93.5	491.7	413.9	246.2	342.4	1471.2
19-May	128.2	107.0	97.5	85.6	104.7	113.7	55.4	64.8	55.5	41.0	40.2	30.7	27.9	21.1	25.1	25.7	23.7	15.6	15.7	21.3	22.7	25.3	16.0	19.4	49.3	128.2
20-May	17.4	24.0	23.8	26.3	32.0	26.4	25.4	14.8	14.9	20.3	16.1	11.2	16.9	77.4	205.5	214.5	109.7	43.6	27.6	40.3	41.8	46.7	85.2	72.9	51.5	214.5
21-May	73.4	67.3	34.9	58.1	116.8	37.2	26.7	25.4	28.8	23.3	19.4	17.5	18.3	17.8	10.1	6.9	8.9	12.2	10.2	8.7	10.8	11.2	11.7	11.0	27.8	116.8
22-May	12.0	10.7	11.7	8.4	7.7	5.5	5.2	4.7	3.9	4.2	3.5	3.3	2.7	3.3	3.3	2.9	1.9	1.9	2.2	2.8	3.2	3.2	3.9	5.8	4.9	12.0
23-May	16.4	33.9	28.7	26.0	15.9	13.1	8.4	4.7	4.0	3.9	3.3	2.6	2.1	2.3	5.7	39.4	125.1	145.8	113.2	115.7	22.7	16.0	17.3	26.4	33.0	145.8
24-May	50.2	30.5	32.4	71.0	90.8	51.1	63.7	60.4	57.4	39.9	3.9	4.2	4.6	4.9	4.6	3.2	3.2	4.5	4.2	4.4	5.9	7.0	11.5	15.7	26.2	90.8
25-May	27.7	44.0	47.8	59.4	52.2	84.2	34.6	14.8	25.1	51.9	29.6	62.9	73.7	59.8	81.4	81.5	66.9	92.3	105.3	102.9	60.2	25.4	23.9	23.2	55.4	105.3
26-May	49.8	25.1	17.3	24.0	15.6	20.0	12.6	11.7	19.6	28.8	21.9	20.0	17.9	13.4	12.4	10.6	11.4	12.0	11.3	11.2	9.9	13.0	19.4	20.7	17.9	49.8
27-May	20.3	31.3	33.2	37.3	44.2	12.2	5.5	5.4	7.1	7.4	6.2	4.2	4.0	4.5	4.9	4.6	4.1	3.3	3.4	3.4	4.0	4.5	4.5	3.6	11.0	44.2
28-May	4.4	13.8	16.3	12.1	10.6	11.0	9.5	10.0	7.5	2.8	2.8	5.9	5.2	2.5	1.8	1.8	2.5	4.1	4.1	4.9	3.2	2.7	4.6	11.2	6.5	16.3
29-May	4.6	4.7	12.1	8.3	5.7	6.7	5.0	3.2	3.9	3.2	2.0	1.8	2.4	2.1	2.0	2.3	5.0	4.7	5.0	6.1	4.4	2.9	4.8	6.2	4.5	12.1
30-May	8.3	5.2	4.2	5.7	5.2	6.2	4.8	4.7	3.8	2.6	2.7	3.8	2.4	3.4	4.5	3.9	4.4	4.2	3.7	2.6	2.7	5.2	6.4	7.1	4.5	8.3
31-May	8.7	13.9	53.4	22.0	10.4	3.6	2.2	2.7	3.1	2.8	2.0	1.7	1.3	1.0	1.8	1.5	1.2	1.7	1.3	1.3	1.3	96.3	59.3	57.9	14.7	96.3
340.1 349.9 288.7 257.4 274.6 273.1 206.2 275.6 282.4 131.7 51.6 26.5 23.9 29.1 30.5 30.0 30.3 27.0 28.7 47.6 156.6 226.8 239.7 262.5																								Diurnal Average		
5149.7 5197.9 3432.8 2613.8 2967.5 3060.2 2593.8 2865.3 2337.8 1293.7 516.4 202.1 194.6 195.7 205.5 214.5 172.2 153.9 213.6 461.5 2134.8 3398.8 2707.8 2729.8																								Diurnal Maximum		
C - Calibration AF - Analyzer Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	216	29.27	29.27
6 - 15	118	15.99	45.26
16 - 25	73	9.89	55.15
26 - 80	133	18.02	73.17
> 81.0	144	19.51	92.68

Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	17	18	4	3	10	14	7	9	13	7	12	7	18	19	19	216
6 - 15	24	5	3	2	1	10	7	1	1	3	7	12	7	10	8	17	118
16 - 25	23	0	0	2	3	3	4	2	3	4	2	1	2	3	3	18	73
26 - 80	19	4	4	3	2	3	5	2	10	12	9	9	10	16	8	17	133
> 81.0	10	3	4	6	5	10	8	6	10	16	20	8	19	8	5	6	144
Totals	115	29	29	17	14	36	38	18	33	48	45	42	45	55	43	77	684

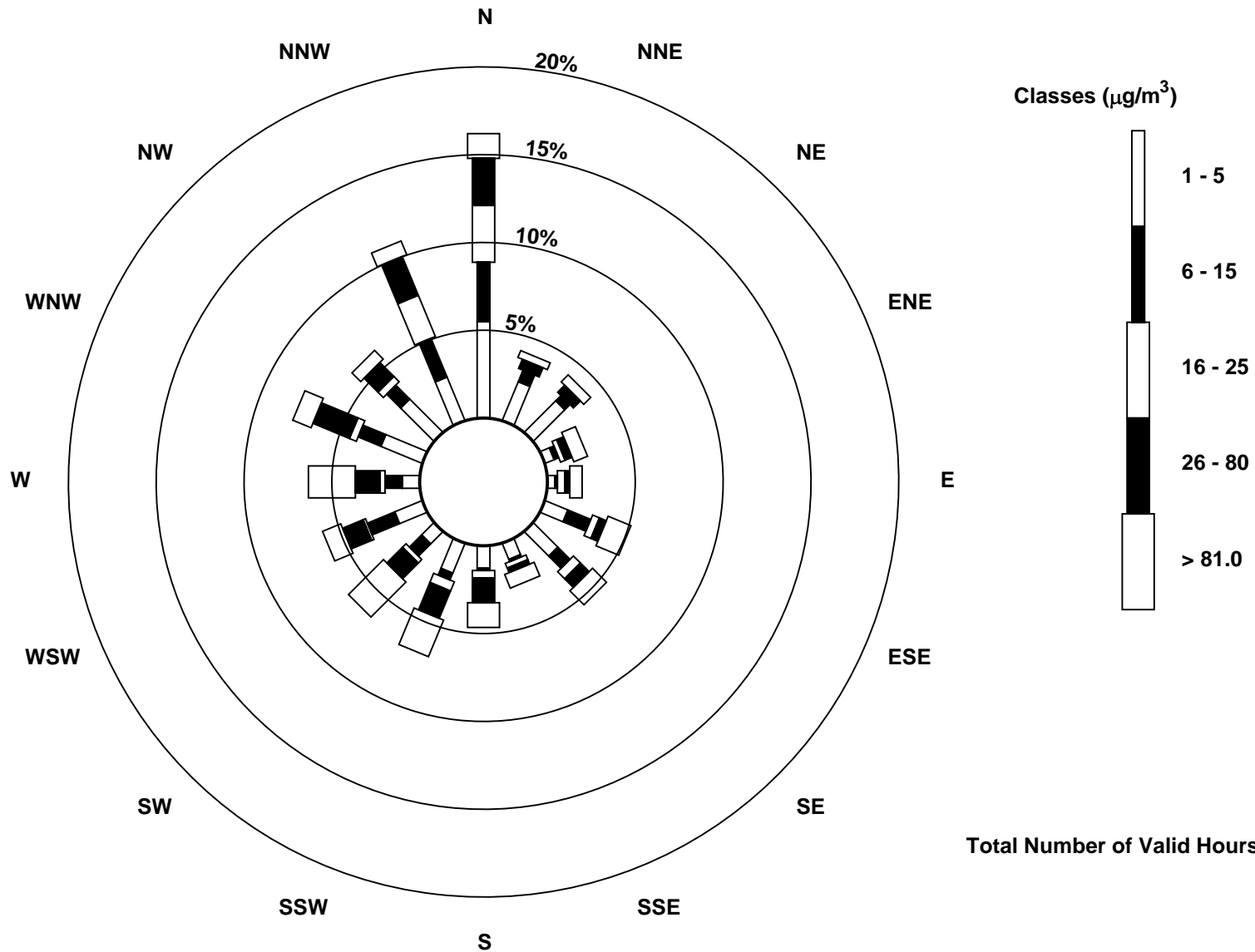
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

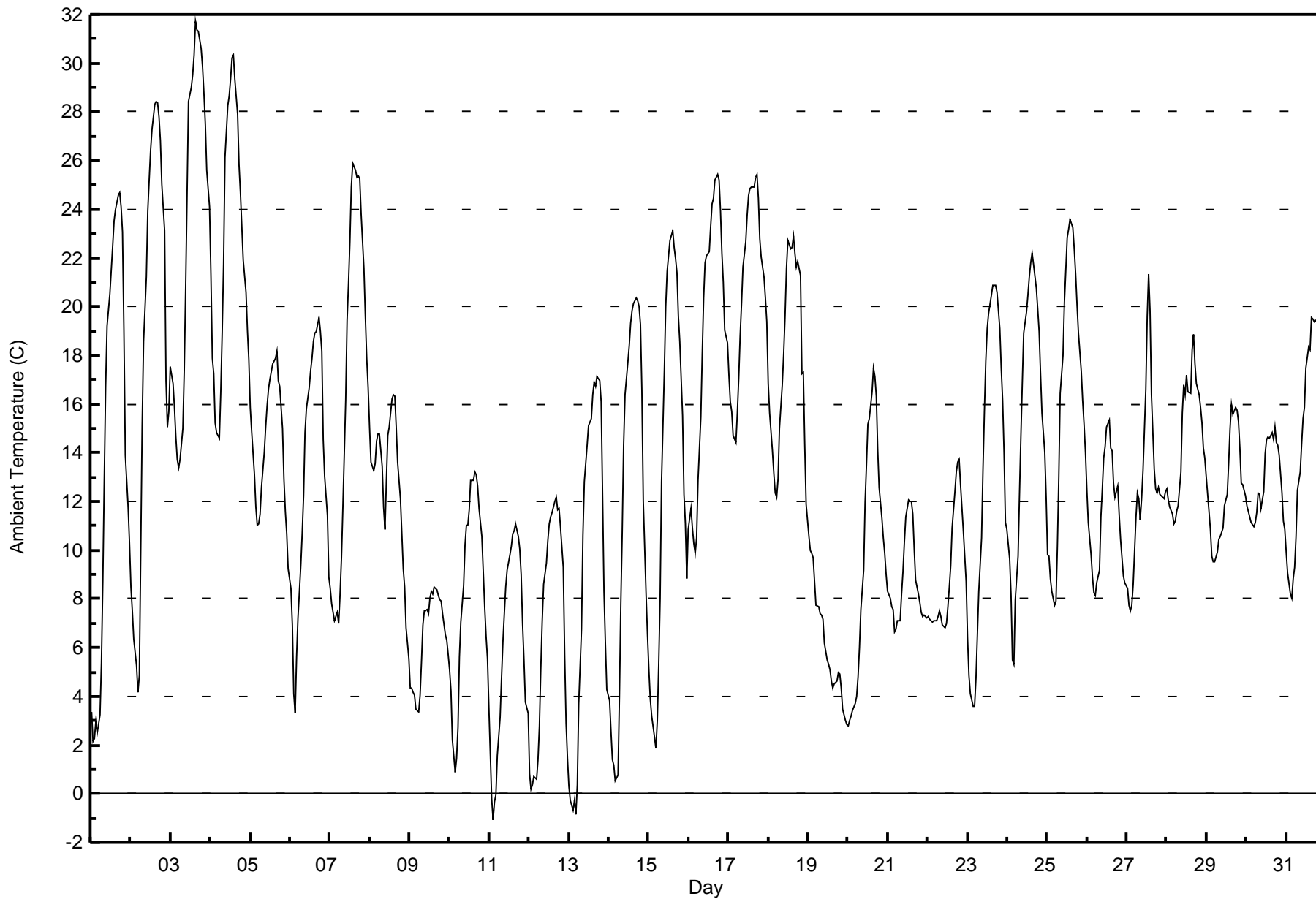
Ambient Temperature (AT) - C
Patricia McInnes - May 2016

Maximum Value: 31.7 C on May 3 16:00		Maximum Daily Average: 23.4 C on May 3		Hours in Service: 744																																												
Minimum Value: -1.1 C on May 11 03:00		Minimum Daily Average: 6.0 C on May 11		Hours of Data: 744																																												
Maximum Diurnal Average: 18.6 C at hour 16		Minimum Diurnal Average: 7.0 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 13.28 C		Percentiles: P₁ = -0.1 P₁₀ = 4.6 Q₁ = 8.3 Median = 12.5 Q₃ = 17.7 P₉₀ = 22.7 P₉₉ = 30.1		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-May	3.4	2.1	2.2	3.0	2.5	3.3	5.4	8.8	12.8	16.7	19.2	20.5	21.5	22.5	23.5	24.0	24.6	24.7	24.1	23.1	19.0	13.9	11.8	10.3	14.3	24.7																						
2-May	8.5	7.5	6.4	5.3	4.2	4.9	10.0	15.1	18.5	21.2	23.9	25.2	26.4	27.3	28.3	28.4	28.4	27.8	26.8	25.0	23.1	17.0	15.1	15.7	18.3	28.4																						
3-May	17.5	16.8	15.9	14.6	13.7	13.4	13.7	15.0	17.4	20.8	24.6	28.5	29.0	29.5	30.4	31.7	31.4	31.3	30.6	29.9	28.8	27.5	25.6	24.1	23.4	31.7																						
4-May	21.3	17.9	17.2	15.2	14.8	14.6	16.5	18.9	21.7	26.1	28.3	28.7	29.4	30.2	30.3	29.3	27.9	25.8	24.7	23.3	21.9	20.6	19.0	17.8	22.6	30.3																						
5-May	15.8	14.9	13.1	11.8	11.1	11.1	11.5	12.6	14.0	15.0	15.9	16.6	17.0	17.7	17.7	17.9	18.2	17.0	16.7	15.0	12.9	11.6	10.7	9.3	14.4	18.2																						
6-May	8.5	6.9	4.1	3.3	5.6	7.2	9.4	10.7	12.3	14.8	15.8	16.7	17.4	17.9	18.5	18.9	19.0	19.6	19.0	18.2	14.6	13.0	11.5	8.9	13.0	19.6																						
7-May	8.4	7.8	7.5	7.1	7.4	7.0	8.2	9.7	11.8	16.1	19.4	20.9	22.7	24.9	25.9	25.6	25.3	25.4	25.2	23.8	21.5	19.6	17.9	16.7	16.9	25.9																						
8-May	15.1	13.6	13.3	13.6	14.5	14.8	14.8	13.5	11.8	10.9	12.8	14.7	15.0	16.2	16.4	16.3	15.0	13.6	12.1	10.7	9.2	8.5	6.8	5.6	12.9	16.4																						
9-May	4.3	4.4	4.1	4.0	3.5	3.4	4.0	5.4	6.9	7.5	7.5	7.4	8.0	8.3	8.2	8.5	8.4	8.1	8.0	7.9	7.4	6.5	6.3	5.8	6.4	8.5																						
10-May	5.1	4.2	2.2	0.9	1.5	2.7	5.6	7.0	8.6	10.2	11.0	11.0	11.7	12.8	12.9	13.2	13.1	12.6	11.7	10.6	9.1	7.7	6.5	5.5	8.2	13.2																						
11-May	3.5	-0.2	-1.1	-0.4	-0.1	1.6	3.1	4.8	6.2	7.4	8.5	9.2	9.8	10.1	10.7	10.8	11.1	10.6	10.1	9.0	7.0	5.5	3.8	3.3	6.0	11.1																						
12-May	0.8	0.2	0.4	0.7	0.6	1.4	2.8	5.2	7.1	8.6	9.5	10.4	11.1	11.4	11.6	12.0	12.2	11.6	11.7	11.0	9.3	5.6	2.9	1.5	6.6	12.2																						
13-May	0.3	-0.3	-0.7	-0.3	-0.8	0.4	3.7	6.8	10.6	12.8	13.6	14.3	15.1	15.4	16.4	16.9	16.7	17.1	17.0	16.1	12.2	8.3	6.2	4.3	9.3	17.1																						
14-May	3.8	2.5	1.4	1.2	0.6	0.8	3.9	7.8	10.8	14.3	16.4	17.7	18.4	19.3	19.8	20.1	20.3	20.2	20.0	19.2	16.5	12.0	8.2	6.6	11.7	20.3																						
15-May	5.1	3.9	3.2	2.3	1.8	3.0	5.3	8.0	12.8	17.3	20.0	21.5	22.1	22.7	23.1	22.5	22.0	21.4	19.6	18.6	15.5	12.3	11.1	8.9	13.5	23.1																						
16-May	10.9	11.7	10.9	10.3	9.9	10.5	12.8	15.5	18.1	20.4	21.8	22.1	22.3	23.3	24.2	24.4	25.2	25.4	25.2	23.9	22.2	21.0	19.1	18.5	18.7	25.4																						
17-May	17.2	16.1	15.7	14.7	14.4	15.6	17.1	18.8	20.1	21.6	22.7	23.8	24.6	24.9	24.9	24.9	25.3	25.4	24.5	22.8	22.0	21.2	20.4	19.4	20.7	25.4																						
18-May	16.9	15.6	14.1	13.2	12.4	12.2	12.9	15.0	16.8	18.1	19.6	21.5	22.7	22.4	22.5	22.9	22.2	21.6	21.8	21.3	17.2	17.3	14.4	11.9	17.8	22.9																						
19-May	10.6	10.0	9.9	9.7	8.7	7.8	7.7	7.4	7.4	7.2	6.2	5.5	5.3	5.1	4.6	4.3	4.5	4.6	5.0	4.9	4.3	3.5	3.0	2.8	6.2	10.6																						
20-May	2.8	3.0	3.2	3.4	3.7	4.0	4.8	6.0	7.6	9.2	11.9	13.5	15.2	15.4	16.5	17.5	17.1	16.3	14.1	12.6	11.3	10.5	9.9	9.0	9.9	17.5																						
21-May	8.3	8.0	7.7	7.5	6.6	6.8	7.1	7.1	8.2	9.1	10.4	11.4	12.0	12.0	12.0	11.5	10.0	8.8	8.2	7.9	7.4	7.3	7.3	7.2	8.7	12.0																						
22-May	7.3	7.1	7.1	7.1	7.1	7.1	7.3	7.5	7.3	6.9	6.8	7.0	7.7	8.5	9.4	10.9	12.4	13.2	13.6	13.8	12.7	10.8	9.8	8.7	9.0	13.8																						
23-May	6.4	4.9	4.1	3.6	3.6	4.7	6.5	8.3	10.5	13.4	15.7	17.8	19.1	19.7	20.5	20.9	20.9	20.9	20.6	19.1	17.5	16.2	14.0	11.1	13.3	20.9																						
24-May	10.8	9.6	8.2	5.5	5.3	8.0	9.8	12.3	14.7	16.9	18.9	19.8	20.5	21.3	21.8	22.2	21.7	20.8	19.9	19.0	17.2	15.6	14.0	12.2	15.2	22.2																						
25-May	9.8	9.8	8.8	8.3	7.7	7.9	10.1	13.0	16.5	18.0	20.2	21.5	22.8	23.2	23.6	23.2	22.4	21.3	20.1	18.9	17.4	16.1	15.1	14.0	16.2	23.6																						
26-May	12.5	11.2	9.8	8.9	8.2	8.1	8.7	9.2	11.4	12.5	13.8	14.3	15.1	15.3	14.2	14.1	12.7	12.2	12.6	11.5	10.4	9.7	9.0	8.7	11.4	15.3																						
27-May	8.4	7.7	7.5	7.7	8.6	11.4	12.3	12.1	11.3	12.1	13.3	16.6	19.6	21.3	19.8	16.4	13.3	12.5	12.3	12.6	12.3	12.3	12.1	12.4	12.8	21.3																						
28-May	12.5	12.1	11.8	11.5	11.1	11.2	11.6	11.8	13.2	15.6	16.8	16.4	17.2	16.5	16.5	18.2	18.9	17.6	16.8	16.4	15.9	15.2	14.2	13.8	14.7	18.9																						
29-May	13.0	11.6	10.9	9.7	9.5	9.5	9.9	10.4	10.5	10.7	10.9	11.8	12.3	13.6	15.0	16.0	15.6	15.9	15.7	15.3	14.2	12.7	12.7	12.3	12.5	16.0																						
30-May	11.8	11.6	11.4	11.2	10.9	11.1	11.6	12.4	12.3	11.7	12.4	13.9	14.5	14.6	14.6	14.8	14.5	15.1	14.4	14.3	13.9	12.3	11.2	10.8	12.8	15.1																						
31-May	10.0	9.1	8.2	8.0	8.8	9.3	10.6	12.5	13.2	14.4	15.4	15.9	17.5	18.3	18.2	19.6	19.5	19.4	19.4	19.3	18.0	13.3	10.5	9.9	14.1	19.6																						
																								9.4	8.4	7.7	7.2	7.0	7.6	9.0	10.6	12.3	14.1	15.6	16.6	17.5	18.1	18.5	18.6	18.4	18.0	17.5	16.6	14.9	13.1	11.6	10.5	Diurnal Average
																								21.3	17.9	17.2	15.2	14.8	15.6	17.1	18.9	21.7	26.1	28.3	28.7	29.4	30.2	30.4	31.7	31.4	31.3	30.6	29.9	28.8	27.5	25.6	24.1	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	8	1.08	1.08
0 - 10	243	32.66	33.74
10 - 20	363	48.79	82.53
> 20	130	17.47	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



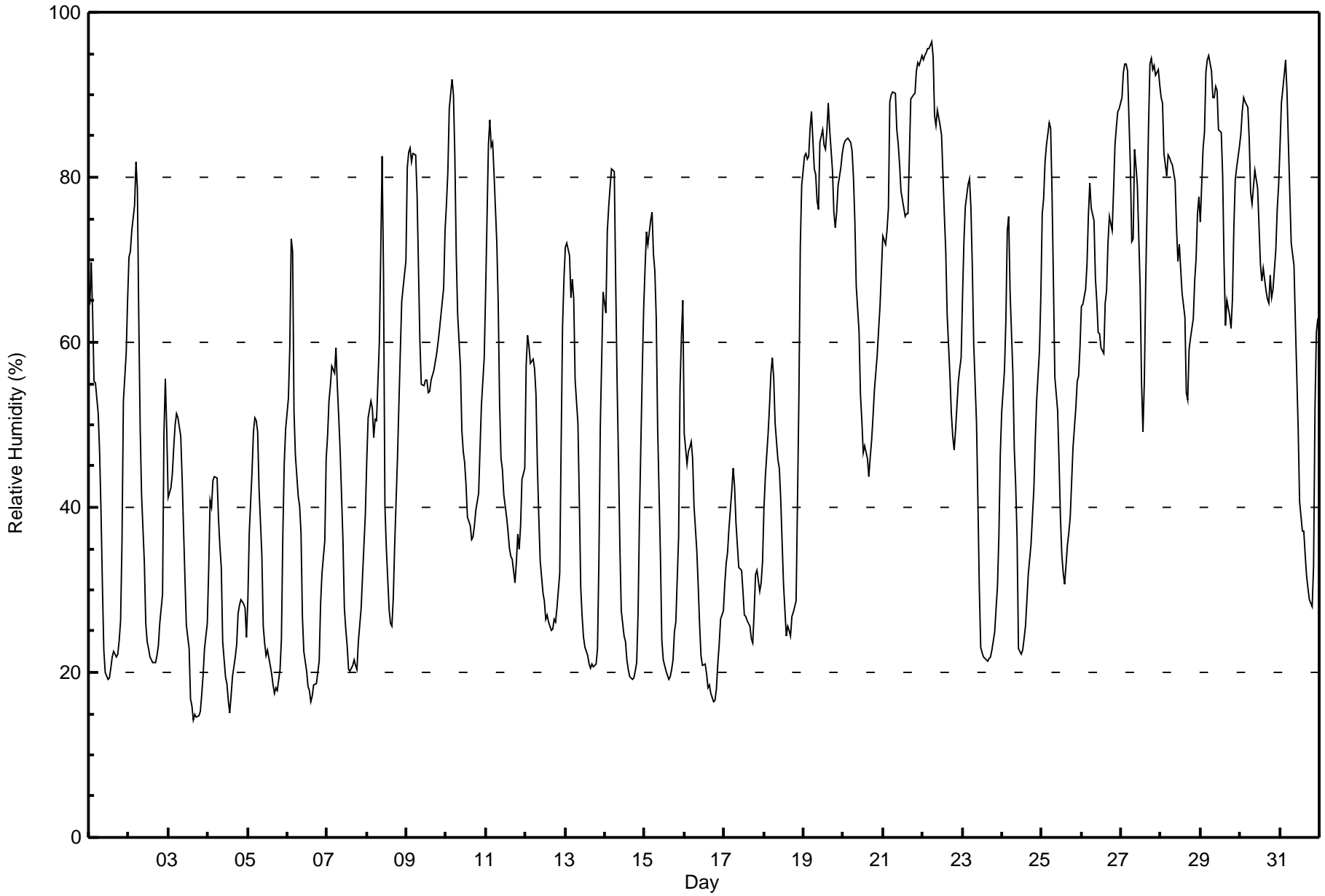
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Patricia McInnes - May 2016

Maximum Value: 97 % on May 22 06:00																		Maximum Daily Average: 83.9 % on May 21																		Hours in Service: 744	
Minimum Value: 14 % on May 3 16:00																		Minimum Daily Average: 28.8 % on May 4																		Hours of Data: 744	
Maximum Diurnal Average: 72.4 % at hour 5																		Minimum Diurnal Average: 37.0 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 52.9 %																		Percentiles: P ₁ = 16 P ₁₀ = 22 Q ₁ = 31 Median = 52 Q ₃ = 74 P ₉₀ = 85 P ₉₉ = 95																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-May	64	70	64	55	55	51	47	40	30	23	20	19	19	20	22	23	22	22	24	26	36	53	59	65	38.7	70											
2-May	70	71	74	77	82	79	63	50	42	33	26	24	23	22	21	21	21	22	23	26	30	49	56	49	43.8	82											
3-May	41	42	44	47	50	51	51	49	44	37	32	26	23	17	16	14	15	15	15	15	17	20	23	26	30.4	51											
4-May	33	41	40	43	44	44	39	35	33	24	19	19	17	15	17	20	22	23	27	28	29	28	28	24	28.8	44											
5-May	29	37	44	49	51	51	49	42	34	26	24	22	23	21	20	19	17	18	18	20	24	37	45	50	32.0	51											
6-May	53	60	72	71	51	46	41	40	37	27	22	20	18	18	16	17	19	19	20	21	28	32	36	46	34.7	72											
7-May	49	53	55	57	56	59	55	51	47	36	28	25	23	20	20	21	22	21	20	24	28	32	35	39	36.5	59											
8-May	46	51	53	52	49	51	51	60	71	83	68	40	35	28	26	26	29	36	46	53	59	65	67	70	50.4	83											
9-May	81	83	84	82	83	83	78	69	60	55	55	55	55	54	54	55	57	58	59	60	62	65	67	73	66.1	84											
10-May	77	81	88	92	90	82	71	63	57	49	47	45	43	39	38	36	36	38	40	42	47	52	55	58	56.9	92											
11-May	66	84	87	84	84	81	72	65	53	46	45	41	39	37	35	34	34	31	33	37	35	38	43	45	52.0	87											
12-May	57	61	59	58	58	57	54	45	39	34	30	29	27	27	26	25	25	26	26	28	32	48	62	68	41.6	68											
13-May	72	72	71	65	68	65	55	50	41	30	27	24	23	22	21	21	21	21	21	23	33	50	58	66	42.5	72											
14-May	64	73	76	79	81	81	67	55	46	35	27	24	24	22	20	20	19	19	20	21	27	39	56	64	44.2	81											
15-May	69	73	72	75	76	71	69	63	50	34	24	22	21	20	19	20	20	22	25	26	36	54	61	65	45.2	76											
16-May	49	45	47	47	48	46	40	35	31	26	22	21	21	20	18	18	17	16	17	18	21	23	26	28	29.2	49											
17-May	31	33	35	37	42	45	43	38	35	33	32	30	27	27	26	26	24	24	27	32	32	30	31	33	32.2	45											
18-May	40	44	49	52	56	58	56	50	46	45	41	36	31	24	26	25	24	27	27	29	41	53	72	79	42.9	79											
19-May	83	83	82	83	86	88	81	80	77	76	84	86	84	83	86	89	86	81	76	74	76	79	81	83	81.9	89											
20-May	84	84	85	85	84	83	80	75	67	61	54	51	47	47	46	44	46	48	51	54	58	62	64	69	63.7	85											
21-May	73	72	74	76	89	90	90	90	86	84	81	78	76	75	76	76	83	90	90	90	93	94	94	95	83.9	95											
22-May	94	95	95	96	96	97	95	87	86	88	86	85	80	75	71	63	56	51	49	47	49	55	57	58	75.5	97											
23-May	66	72	77	79	80	76	69	60	50	41	30	23	22	22	21	21	22	22	23	25	28	30	37	46	43.4	80											
24-May	51	57	63	74	75	66	56	47	43	36	23	22	23	24	26	29	32	36	39	42	48	53	59	66	45.4	75											
25-May	76	77	82	84	87	86	78	67	56	52	46	39	34	32	31	35	37	39	43	47	52	55	56	59	56.2	87											
26-May	64	65	66	70	75	79	76	75	68	65	61	61	59	59	65	66	72	75	74	78	84	86	88	88	71.7	88											
27-May	90	93	94	94	93	81	72	73	83	81	79	67	55	49	55	68	86	94	94	93	94	92	93	91	81.8	94											
28-May	90	89	83	80	83	82	82	82	79	74	70	72	69	66	63	54	53	59	61	63	67	70	76	78	72.6	90											
29-May	75	84	85	93	94	95	93	90	90	91	91	86	86	80	69	62	65	63	62	65	74	80	81	84	80.6	95											
30-May	85	88	90	89	88	85	78	77	79	81	79	74	69	67	69	66	65	65	68	65	66	71	76	79	75.8	90											
31-May	84	89	92	94	90	84	78	72	69	62	56	50	41	37	37	34	32	30	29	28	33	52	61	63	58.2	94											
																		64.6 68.4 70.3 71.5 72.4 70.7 65.4 60.4 55.7 50.5 46.0 42.4 39.9 37.8 37.3 37.0 38.1 39.0 40.2 42.0 46.4 53.1 58.1 61.5																		Diurnal Average	
																		94 95 95 96 96 97 95 90 90 91 91 86 86 83 86 89 86 94 94 93 94 94 94 95																		Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Patricia McInnes - May 2016

Maximum Speed: 30 km/h on May 4 16:00	Maximum Daily Speed Average: 23.8 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 14 03:00	Minimum Daily Speed Average: 0.6 km/h on May 31	Hours of Data: 744
Maximum Diurnal Speed Average: 6.4 km/h at hour 17	Minimum Diurnal Speed Average: 2.3 km/h at hour 8	Hours of Missing Data: 0
Monthly Average Velocity: 3.9 km/h 325.4 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 16 P ₉₀ = 20 P ₉₉ = 28	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	SW4	SW5	SSW6	SSW7	SSW8	SSW9	SSW8	S7	S9	S13	SW17	SW18	SW14	SW15	W16WNNW17	W15WNNW16	W11	WSW9	WNNW8	WNNW7	WNNW4	WSW4	WSW8.1	SW18			
2-May	WSW2	WSW5	WSW4	SW3	W2	SSW3	S4	SE4	E5	ESE6	ESE6	E5	NE6	ENE8	ESE10	ESE15	ESE14	SE14	ESE12	SE9	SE8	SSE2	E3	ESE4	ESE4.8	ESE15	
3-May	ESE10	SE13	SE14	SE10	SE10	SE11	SE9	SE8	SE9	SE9	SE6	SE4	SSW12	SW11	WSW12	WSW15	WSW11	S15	S13	S14	S15	SSW15	SW11	S8.2	S15		
4-May	SW7	SW1	SSW6	SW5	SW7	SW12	SSW6	SE6	E6	SW9	SW15	WSW15	WSW11	SW16	W27	W30	W29	W29	W29	W21	WNNW20	W17	W17	WNNW17	WNNW18	W12.3	W30
5-May	WNNW15	NW19	NW18	NW13	WNNW11	WNNW13	WNNW16	WNNW17	NW15	NW17	WNNW17	WNNW20	NW21	W25	WNNW24	WNNW22	WNNW20	WNNW19	NW21	NW13	NW9	N11	NW17	W7	WNNW15.6	W25	
6-May	WNNW7	WNNW8	WSW5	SW5	WNNW10	WNNW13	WNNW5	ENE6	ENE8	WNNW10	WNNW17	WNNW15	W13	W15	WSW15	W14	WNNW15	WNNW9	W7	S2	ESE10	ESE7	ESE6	SSE4	WNNW5.5	WNNW17	
7-May	SSE6	SSE5	SSE7	SSE7	SSE7	SSE7	SSE8	SSE7	S6	SW10	WSW14	SW10	WSW11	WSW18	SW15	SW16	SW18	SW15	WSW9	S6	SE9	SE13	SE7	ESE5	SSW6.9	WSW18	
8-May	ENE4	N7	NW11	NW12	WNNW18	NW15	WNNW22	W26	W15	SW6	SW14	WSW22	SW25	WSW23	WSW22	WSW28	SW28	WSW25	WSW24	WSW21	WSW16	WNNW19	NW24	WNNW20	W15.7	WSW28	
9-May	WNNW18	WNNW17	WNNW15	W15	WSW14	WSW14	W15	WNNW19	WNNW26	NW24	NW17	NW20	NW20	NW20	WNNW18	WNNW17	NW16	NW15	NW12	WNNW12	W9	W11	NW10	NW18	WNNW15.0	WNNW26	
10-May	WNNW5	WSW6	W6	W6	W8	WNNW7	NE2	NNE10	NE8	WNNW9	NE14	NNE11	N11	N11	NNE16	NNE16	NNE18	NNE19	NNE19	NNE18	NNE15	NE13	NE10	ENE8	NNE8.9	NNE19	
11-May	NE4	NW5	NW6	NW8	NW8	WNNW10	N12	N16	NNE18	NNE18	N17	NNE20	N20	N19	N18	N19	N21	N21	N21	N20	N17	N13	WNNW9	N8	N13.9	N21	
12-May	WNNW6	NW8	NW6	WNNW6	WNNW8	WNNW11	WNNW12	N11	NNE13	NNE16	NNE15	NNE16	N18	N18	N17	NNE17	N18	N16	N14	N14	N9	NW7	WNNW7	WNNW7	N11.3	N18	
13-May	WNNW5	SW1	SW5	SW6	SW4	S3	S5	SSE5	E7	ENE6	SW4	WNNW5	NNE7	N6	NW5	WNNW8	NNE3	NNE10	WNNW7	WNNW6	WNNW4	WNNW5	W4	WNNW7	NW1.8	NNE10	
14-May	NW6	WNNW4	WSW1	W3	WNNW3	SW3	S2	ESE3	SE3	ESE4	ENE7	ENE10	NE13	NE15	NE17	NE18	NE16	NE15	NE11	NE10	NNE6	WNNW4	WNNW5	W4	NE5.4	NE18	
15-May	W4	W3	SSW3	SW3	SSW2	SSW3	S4	SSE4	ESE4	ESE5	SE7	E5	E7	NE5	ENE4	SE3	SSW3	ESE7	ESE5	SE8	S3	SSW2	SW3	SE2.6	SE8		
16-May	SSW8	SSW9	SW9	SW9	SW8	SW9	SSW10	SSW11	SSW10	SSW13	SW18	SSW17	S10	S10	S16	SSW20	SSW22	SSW19	SSW15	SSW10	SSE10	SSE9	S8	SSW11	SSW11.7	SSW22	
17-May	SW11	SSW10	SSW12	SSW7	SW7	WSW15	WSW15	W16	W18	W15	WSW16	WSW16	W17	W17	WNNW18	W16	W14	W12	NE2	ESE9	SSW8	SW11	WSW11	SSW8	WSW10.4	WNNW18	
18-May	SSW8	SW11	SW11	SW13	SW14	SW13	SW11	SW10	SW16	SW16	SW15	WSW20	W22	W22	W18	W18	W15	W10	WSW8	WSW8	W4	N18	N22	N25	WSW10.2	N25	
19-May	N23	N21	N22	N20	WNNW18	WNNW19	N25	N23	N24	N23	N24	N26	NNE29	N26	N29	N29	N26	N26	N26	N25	N22	N21	N23	N22	N23.8	N29	
20-May	N20	N20	N18	N18	N16	N15	N15	NNE15	ENE16	E15	ENE15	NE17	ENE14	NE14	NE14	NNE13	WNNW11	WNNW13	N17	WNNW16	N14	WNNW13	WNNW11	NW10	NNE12.8	N20	
21-May	WNNW9	WNNW9	N8	W4	WNNW9	WNNW9	WNNW11	WNNW12	WNNW13	WNNW13	WNNW13	WNNW15	WNNW14	WNNW16	WNNW16	WNNW19	WNNW17	WNNW16	N18	N18	N18	N18	N16	N17	WNNW13.3	WNNW19	
22-May	N16	N16	N17	N18	N16	N18	N17	NNE20	NNE21	N23	N23	N22	N23	N24	N23	N22	N23	N24	N23	N21	N18	N16	N14	NNE9	N19.3	N24	
23-May	WNNW10	N9	WNNW11	WNNW12	N13	N12	N13	NNE11	N12	N16	NNE18	NE19	NE19	ENE14	E10	SE11	ESE9	E8	ESE12	SE10	SSE7	SSE6	S5	NE7.1	NE19		
24-May	SSW7	SSW6	S7	S5	SSE6	SSE4	SSE5	SE7	ESE6	E6	SE22	SE22	SE20	SE18	SSE18	SSE16	S15	SSW13	S14	SSW15	SSW14	SSW11	S7	SSW5	SSE9.5	SE22	
25-May	S4	S6	S6	SSW6	SSW6	S5	S6	SSW8	ESE2	NE7	ENE5	NNE6	N7	NNE10	NE12	NNE17	N21	N21	N20	NNE16	N14	N14	N13	N13	NNE5.8	N21	
26-May	WNNW13	WNNW14	WNNW16	WNNW15	WNNW16	N15	N15	N12	WNNW9	WNNW11	WNNW15	N14	WNNW16	N18	WNNW17	WNNW16	WNNW14	WNNW15	N14	WNNW15	N13	WNNW11	WNNW11	WNNW11	WNNW14.0	N18	
27-May	WNNW10	WNNW9	N8	N6	NNE5	ESE14	ESE16	ESE17	ESE11	ESE13	E13	E14	ESE16	ESE17	ESE16	W9	S8	E8	ENE10	ESE2	SE7	SSE9	ESE5	ESE11	ESE7.0	ESE17	
28-May	SE11	ESE12	ESE15	ESE18	SE14	ESE16	SE14	SE12	SE13	SE13	SE15	SE12	SSE14	S17	S10	SE11	SSE12	SSW15	SSW12	SSW10	SSW6	SSW5	SW4	WSW3	SE10.1	ESE18	
29-May	NW6	N2	SW7	WNNW6	SW4	SW3	SSW5	SSW7	SW6	WSW6	WSW6	NW6	WNNW4	NNE6	ENE5	NE6	NNE10	NE11	NNE11	NNE12	NNE9	WNNW7	WNNW6	WNNW7	WNNW2.9	NNE12	
30-May	WNNW8	WNNW8	NW8	NW7	WNNW6	NW7	WNNW11	N12	NW12	NW12	WNNW12	WNNW13	N18	N15	WNNW15	WNNW20	WNNW18	WNNW18	WNNW13	WNNW14	WNNW11	WNNW10	WNNW9	WNNW9	WNNW11.6	WNNW20	
31-May	NW7	NW6	W5	WSW4	WNNW6	WNNW6	NW8	N2	N2	NE7	NNE7	ESE5	ENE7	NE7	E5	ESE7	NE6	S6	SSE5	SSW8	S6	S2	SSW3	S4	N0.6	SSW8	

NW3.9	NW3.9	NW3.1	WNNW3.1	WNNW3.5	WNNW3.3	NW2.6	WNNW2.3	N2.8	WNNW3.4	NW2.8	WNNW3.9	NW1.1	NW4.8	NW5.1	NW6.2	NW6.4	NW6.2	NW5.6	WNNW4.2	WNNW2.8	NW4.0	NW4.7	NW4.0	Diurnal Average
N23	N21	N22	N20	WNNW18	WNNW19	N25	WNNW26	WNNW26	NW24	N24	N26	NNE29	N26	N29	W30	W29	W29	N26	N25	N22	N21	NW24	N25	Diurnal Maximum

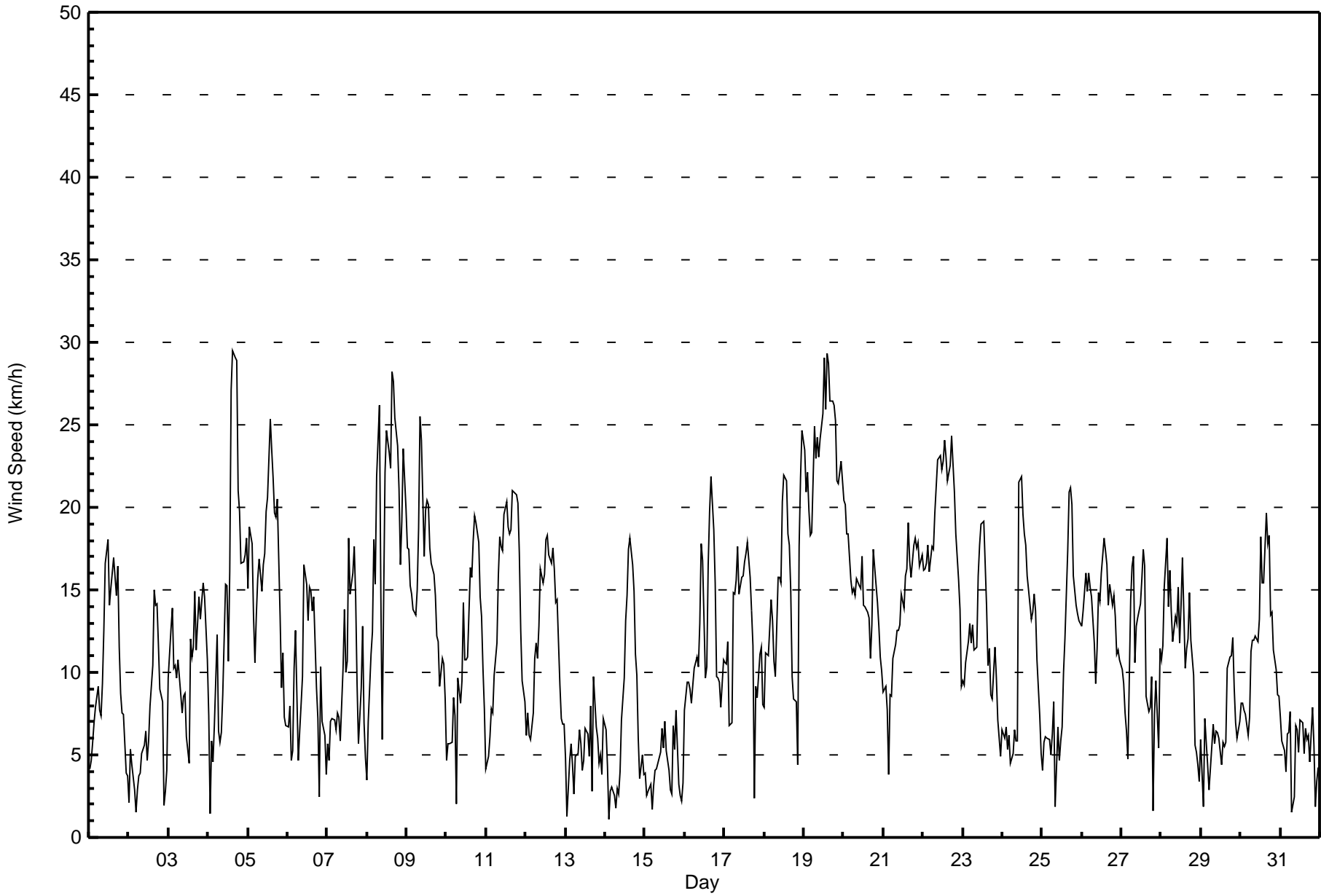
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on May 4 15:00 Minimum Value: 1 km/h on May 1 22:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	2	2	1	1	2	2	1	2	3	5	4	6	5	6	6	5	4	3	2	2	1	2	1	6
2-May	1	1	1	2	1	1	1	1	1	1	2	3	3	3	4	3	3	3	3	2	1	3	2	4	4
3-May	4	3	3	2	2	2	3	2	1	2	2	2	5	3	4	6	5	5	5	3	4	3	4	2	6
4-May	2	2	3	2	3	4	2	1	1	3	4	4	4	5	10	6	6	7	5	5	4	4	4	4	10
5-May	3	4	3	3	3	2	3	3	3	4	5	5	6	6	6	6	5	5	5	3	1	3	1	1	6
6-May	1	2	1	2	2	2	3	1	2	6	5	6	6	6	6	5	5	5	3	4	2	2	1	1	6
7-May	1	1	1	1	1	1	1	1	1	4	3	4	4	5	6	3	4	3	4	1	4	3	4	3	6
8-May	1	2	3	3	3	5	6	7	5	2	6	5	5	6	5	7	6	5	5	5	3	7	6	6	7
9-May	5	4	3	3	3	2	3	5	5	5	4	4	4	4	4	4	3	4	3	3	2	2	2	1	5
10-May	1	2	2	2	2	2	2	2	3	4	4	5	4	4	5	4	4	4	4	4	3	3	2	2	5
11-May	2	1	1	1	2	2	3	3	4	4	5	5	5	5	5	5	4	4	4	5	4	2	1	2	5
12-May	1	1	1	1	2	1	2	2	4	5	5	6	6	6	5	5	5	4	4	4	3	1	1	1	6
13-May	1	1	1	1	1	1	1	1	1	3	4	4	3	4	3	5	3	3	4	2	1	2	1	1	5
14-May	1	2	1	1	1	1	1	1	1	1	3	3	5	5	5	4	4	4	3	2	2	1	1	1	5
15-May	1	1	2	1	1	1	2	1	1	1	2	2	3	3	3	3	1	1	1	1	1	1	1	1	3
16-May	2	2	1	1	1	1	2	2	2	4	4	5	3	4	5	5	6	5	4	3	1	2	2	3	6
17-May	3	3	2	2	3	4	4	4	3	3	3	4	5	4	4	4	3	3	2	2	3	2	2	2	5
18-May	2	2	1	2	2	2	2	2	3	4	3	5	5	6	5	4	4	2	3	2	2	4	4	5	6
19-May	5	4	4	5	4	4	5	5	5	5	5	6	7	5	6	7	5	5	5	5	4	4	4	4	7
20-May	4	4	3	3	3	3	3	4	3	3	4	4	4	3	3	3	2	3	4	3	3	3	3	2	4
21-May	3	2	2	1	3	2	2	2	2	3	3	3	3	3	4	3	3	3	4	4	4	4	3	4	4
22-May	3	3	3	3	3	4	4	5	4	5	5	5	5	5	5	5	5	6	5	4	4	3	3	2	6
23-May	2	1	1	2	2	2	2	2	3	3	5	5	5	5	5	4	3	3	2	3	2	2	1	1	5
24-May	1	1	1	1	1	2	2	2	2	4	6	6	5	6	5	5	5	4	3	3	3	3	2	1	6
25-May	1	2	1	1	1	1	2	2	2	2	2	2	3	4	4	4	4	4	4	4	3	2	2	2	4
26-May	2	2	3	3	3	3	3	3	2	3	4	3	4	3	3	3	4	3	3	2	3	2	2	2	4
27-May	2	2	1	1	2	4	5	5	4	4	3	4	4	4	4	3	6	4	4	3	2	4	2	3	6
28-May	2	3	4	4	4	4	3	3	3	3	3	3	4	6	3	3	4	3	3	3	2	1	1	2	6
29-May	2	2	3	3	1	2	1	1	1	1	1	1	1	2	2	3	3	3	2	3	2	1	1	1	3
30-May	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	4	4	4	3	3	2	2	2	1	4
31-May	1	1	1	2	1	1	1	2	2	3	3	2	3	4	2	4	3	2	2	2	2	1	1	2	4
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	112	15.05	15.05
6 - 11	264	35.48	50.54
12 - 19	280	37.63	88.17
20 - 28	82	11.02	99.19
29 - 38	6	0.81	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	2	4	4	5	11	3	10	13	10	15	9	9	8	2	4	112
6 - 11	13	14	11	9	7	14	22	14	15	29	22	11	9	17	19	38	264
12 - 19	58	20	15	4	3	16	11	4	9	12	19	13	21	24	15	36	280
20 - 28	41	4	0	0	0	0	3	0	0	2	1	9	4	10	7	1	82
29 - 38	2	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	117	41	30	17	15	41	39	28	37	53	57	42	46	59	43	79	744

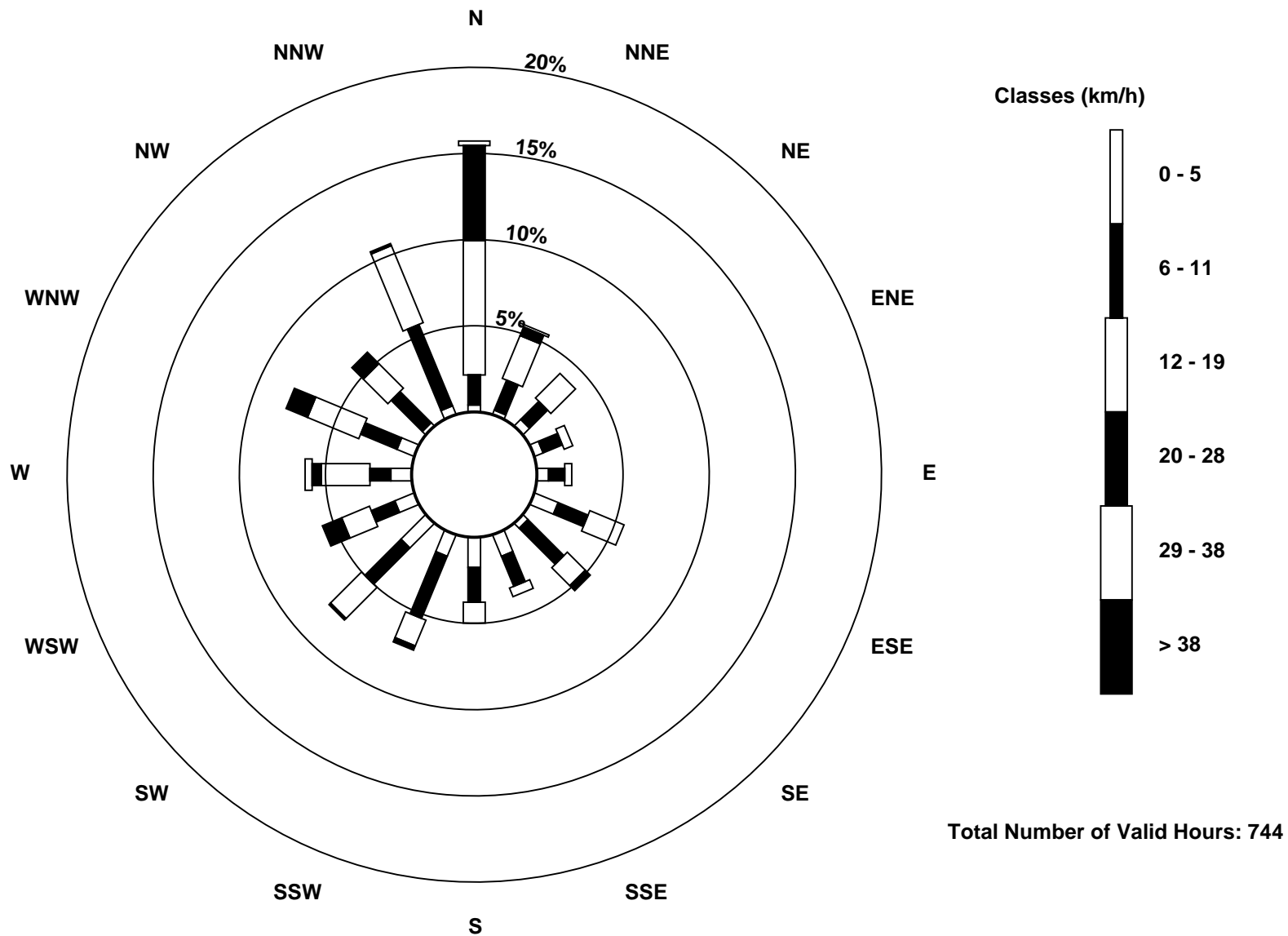
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 271 deg on May 4 16:00 Direction of Maximum Daily Speed Average: 4.1 deg on May 19	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 258 deg on May 14 03:00 Direction of Minimum Daily Speed Average: 0.6 deg on May 31	Percent Operational Time: 100.0
Monthly Average Direction: 293.1 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-May	228	230	207	195	192	203	193	176	169	187	224	236	233	232	259	290	277	285	272	249	298	302	284	249	240.1
2-May	240	237	245	225	280	213	186	140	88	116	121	81	49	70	118	116	107	124	119	124	127	147	90	117	120.4
3-May	123	127	126	130	134	136	137	140	140	140	136	140	130	203	222	246	244	248	181	180	180	189	213	220	173.0
4-May	219	218	203	235	217	231	194	141	100	214	233	257	248	224	263	271	279	278	285	284	274	271	285	282	260.4
5-May	298	305	306	311	299	291	292	301	317	319	300	295	305	266	295	285	288	303	305	307	314	351	327	266	299.9
6-May	301	293	250	231	291	286	346	73	71	327	295	295	277	263	255	279	289	288	278	175	119	123	120	159	282.3
7-May	154	168	155	155	155	161	153	165	176	221	244	235	242	258	233	230	227	227	251	172	131	127	130	117	202.4
8-May	67	354	324	316	298	305	285	281	273	234	224	237	236	254	243	240	233	242	246	247	238	293	313	297	264.3
9-May	294	293	292	270	257	249	267	283	289	305	314	307	307	308	301	299	312	323	306	299	267	273	315	342	295.4
10-May	285	255	266	268	281	292	55	14	38	346	37	19	358	3	21	19	21	16	16	17	27	34	46	59	11.8
11-May	42	320	311	309	320	328	349	360	12	14	2	15	7	7	3	1	354	1	353	359	357	355	346	2	357.9
12-May	332	323	322	331	330	331	346	356	21	12	17	12	4	7	3	13	353	3	8	10	5	321	298	297	356.8
13-May	285	219	221	220	226	186	188	167	97	64	217	339	27	11	310	348	23	23	344	338	301	298	262	301	322.4
14-May	306	333	258	281	295	225	186	119	129	102	58	60	39	45	35	46	39	46	41	38	15	303	291	272	34.5
15-May	264	261	201	236	210	195	176	158	109	120	128	98	101	46	72	162	192	118	120	125	150	190	205	214	140.6
16-May	208	203	220	223	219	223	212	201	205	212	215	209	172	173	184	196	210	208	207	192	162	163	186	199	201.1
17-May	214	206	209	195	215	240	251	269	272	265	244	254	279	278	283	271	271	273	53	123	199	226	239	205	249.4
18-May	204	231	227	225	223	223	215	215	224	233	229	240	266	266	267	274	281	271	241	257	268	355	356	358	258.1
19-May	4	2	5	5	346	348	3	10	10	5	5	3	12	8	8	8	7	2	2	7	2	360	1	1	4.1
20-May	2	6	8	8	10	7	9	27	78	83	69	49	59	50	41	21	345	340	349	348	350	340	325	325	15.7
21-May	336	340	351	280	342	345	345	344	342	347	339	336	326	332	340	343	345	346	356	356	358	358	353	354	345.1
22-May	355	358	356	359	1	4	4	14	13	11	9	7	2	358	355	359	360	360	5	9	6	354	2	16	3.1
23-May	348	350	345	343	351	352	356	19	7	357	13	48	49	41	62	94	132	115	94	114	137	166	167	171	37.0
24-May	199	204	174	173	165	150	154	138	123	85	124	127	129	134	149	167	180	193	188	197	204	205	184	194	161.3
25-May	180	188	188	196	198	184	181	205	109	55	76	17	9	32	37	13	9	7	4	14	356	355	354	355	11.9
26-May	346	348	344	345	346	350	358	356	339	341	337	359	347	3	339	343	343	341	350	347	349	341	341	344	346.8
27-May	345	343	354	350	29	106	114	123	108	105	89	96	107	111	118	270	191	93	68	112	130	164	103	123	102.3
28-May	126	120	113	116	124	120	126	125	125	129	132	132	156	183	172	143	160	193	193	199	199	205	219	249	146.2
29-May	319	354	232	283	220	232	210	212	229	243	240	311	347	29	60	49	20	42	18	12	13	340	343	338	339.8
30-May	335	338	325	304	297	314	333	349	326	312	335	342	7	359	341	337	334	335	346	341	336	345	337	327	336.9
31-May	320	313	281	253	299	302	323	351	7	35	17	121	59	46	83	102	38	172	155	201	175	179	195	190	7.0

319.5 317.2 304.7 298.6 296.7 293.3 314.0 341.1 3.7 348.2 333.3 336.0 345.7 331.0 323.7 318.6 314.1 324.2 335.5 340.9 339.8 325.3 326.1 322.5
 Diurnal Average

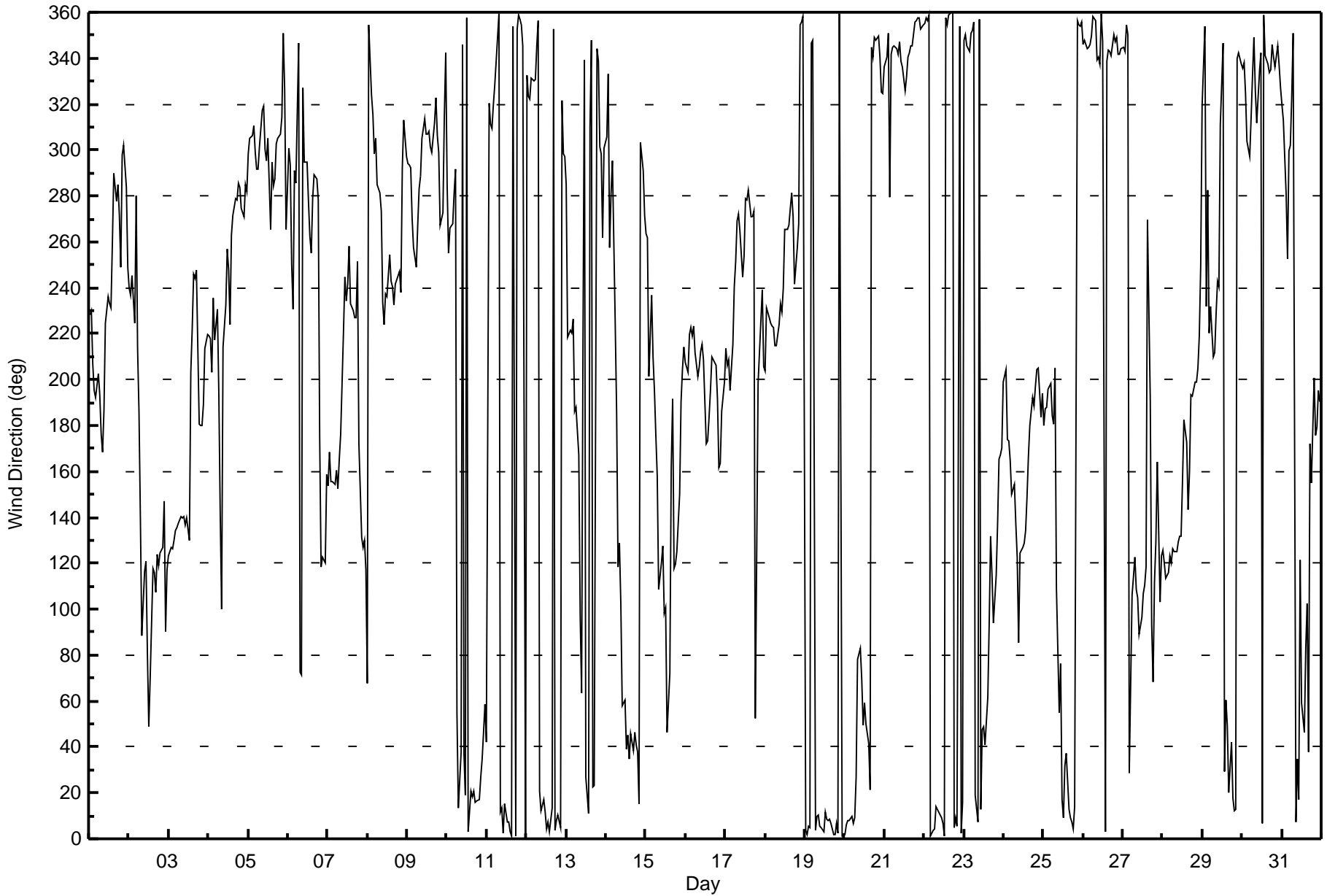
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on May 31 08:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 4 deg on May 12 23:00 Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 14 Median = 17 Q ₃ = 24 P ₉₀ = 41 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-May	18	33	16	12	14	14	14	14	18	23	21	23	30	26	31	18	24	20	17	8	18	6	16	22	33
2-May	41	12	31	46	42	30	27	23	22	28	34	75	49	40	28	18	17	15	13	12	11	79	67	80	80
3-May	12	13	12	14	13	13	12	14	19	18	21	29	84	13	28	43	26	29	26	13	11	14	20	15	84
4-May	17	89	44	35	32	17	36	23	15	53	20	16	38	26	23	16	14	13	13	12	12	12	13	11	89
5-May	10	10	10	12	13	9	10	15	16	18	16	23	21	20	26	20	25	17	12	10	13	14	16	24	26
6-May	16	15	28	43	13	12	56	17	16	59	35	35	41	33	33	31	31	66	29	62	13	16	15	29	66
7-May	17	14	9	17	7	8	11	11	20	19	18	25	23	20	33	24	15	13	26	23	18	13	32	45	45
8-May	46	22	12	14	12	14	13	14	22	35	20	17	18	19	20	17	17	15	14	12	10	31	13	13	46
9-May	12	11	11	13	13	10	15	15	14	15	17	12	14	16	16	20	16	14	16	17	11	9	21	11	21
10-May	26	12	15	17	12	13	82	22	29	35	26	30	27	36	22	20	20	17	16	14	11	11	14	18	82
11-May	48	16	16	5	11	10	18	16	19	18	20	20	22	23	24	22	19	18	16	17	14	14	11	18	48
12-May	11	5	7	7	10	8	13	21	21	22	27	25	22	29	26	29	21	25	23	17	16	15	4	4	29
13-May	19	71	16	7	25	31	17	25	23	52	74	65	55	53	81	66	87	32	44	16	23	17	21	4	87
14-May	6	27	76	21	41	19	36	29	46	49	44	36	29	28	23	21	18	15	19	12	19	36	22	35	76
15-May	15	51	56	27	46	27	18	25	21	26	30	70	44	74	73	83	58	12	14	12	34	38	53	43	83
16-May	8	11	8	8	8	8	12	15	20	21	18	21	32	32	17	19	20	19	17	15	9	13	16	14	32
17-May	12	14	12	23	25	14	17	17	13	22	17	18	21	22	17	16	19	20	75	15	42	12	17	16	75
18-May	14	8	8	9	9	9	11	14	13	17	24	18	18	19	18	18	19	25	21	10	33	20	16	16	33
19-May	15	15	15	15	17	15	16	15	14	15	16	16	16	16	14	14	15	16	15	15	15	15	15	16	17
20-May	14	14	14	13	13	13	13	15	17	15	22	24	23	16	17	19	14	14	14	15	15	12	16	14	24
21-May	12	13	17	52	21	22	14	14	16	15	17	15	14	14	15	14	14	14	15	16	15	15	15	15	52
22-May	14	14	15	14	15	14	14	14	16	14	14	14	15	17	16	15	16	15	17	13	15	14	14	12	17
23-May	12	10	11	10	13	14	15	21	24	19	18	19	21	25	30	35	21	23	20	17	13	17	12	18	35
24-May	14	12	8	9	14	18	19	28	38	54	20	22	23	19	30	26	22	21	16	16	14	15	16	14	54
25-May	12	15	7	11	13	12	16	19	78	35	45	46	53	36	27	20	17	16	19	13	14	14	14	14	78
26-May	12	12	11	13	13	16	16	16	20	18	23	21	23	19	17	18	19	16	18	15	15	12	12	14	23
27-May	11	12	13	13	37	16	16	19	19	18	16	20	23	19	18	57	53	27	33	87	15	23	31	14	87
28-May	14	14	13	13	15	13	15	15	15	18	19	16	17	24	20	22	29	17	16	19	16	13	18	54	54
29-May	30	72	29	40	34	52	27	19	17	16	21	22	32	33	42	62	21	24	21	13	15	19	11	9	72
30-May	10	11	13	14	9	12	15	17	15	16	20	21	17	19	18	14	13	16	14	12	11	13	10	10	21
31-May	13	14	9	23	14	11	11	95	84	43	53	56	57	64	50	54	53	35	37	22	14	29	29	36	95
48 89 76 52 46 52 82 95 84 59 74 75 84 74 81 83 87 66 75 87 42 79 67 80																									
Diurnal Maximum																									





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Last Calibration	April 26, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:50
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	Teledyne API T700	Serial Number	2449
ZAG Make/Model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-678
Analyzer IP address	192.168.1.43		Lamp voltage	764	761
Calculated slope	1.001888	0.999878	Chamber temp	44.9	45.2
Calculated intercept	0.897634	0.729317	Pressure	695.8	706.4
Analyzer Background	5.9	5.9	Flow	0.441	0.449
Analyzer Coefficient	1.122	1.122	Intensity	90	92

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	0.6	----
as found span	6000	94.7	786.0	785.6	1.000
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	94.7	786.0	785.6	1.000
second point	6000	47.5	394.3	393.7	1.001
third point	6000	23.8	197.5	195.6	1.010
as left zero					
as left span					
Average Correction Factor					1.004

Corrected As found 785.0 Previous response 783.6 % change -0.2%

Notes:

Inlet filter changed after as founds. No adjustments.

Calibration Performed By: Devin Russell



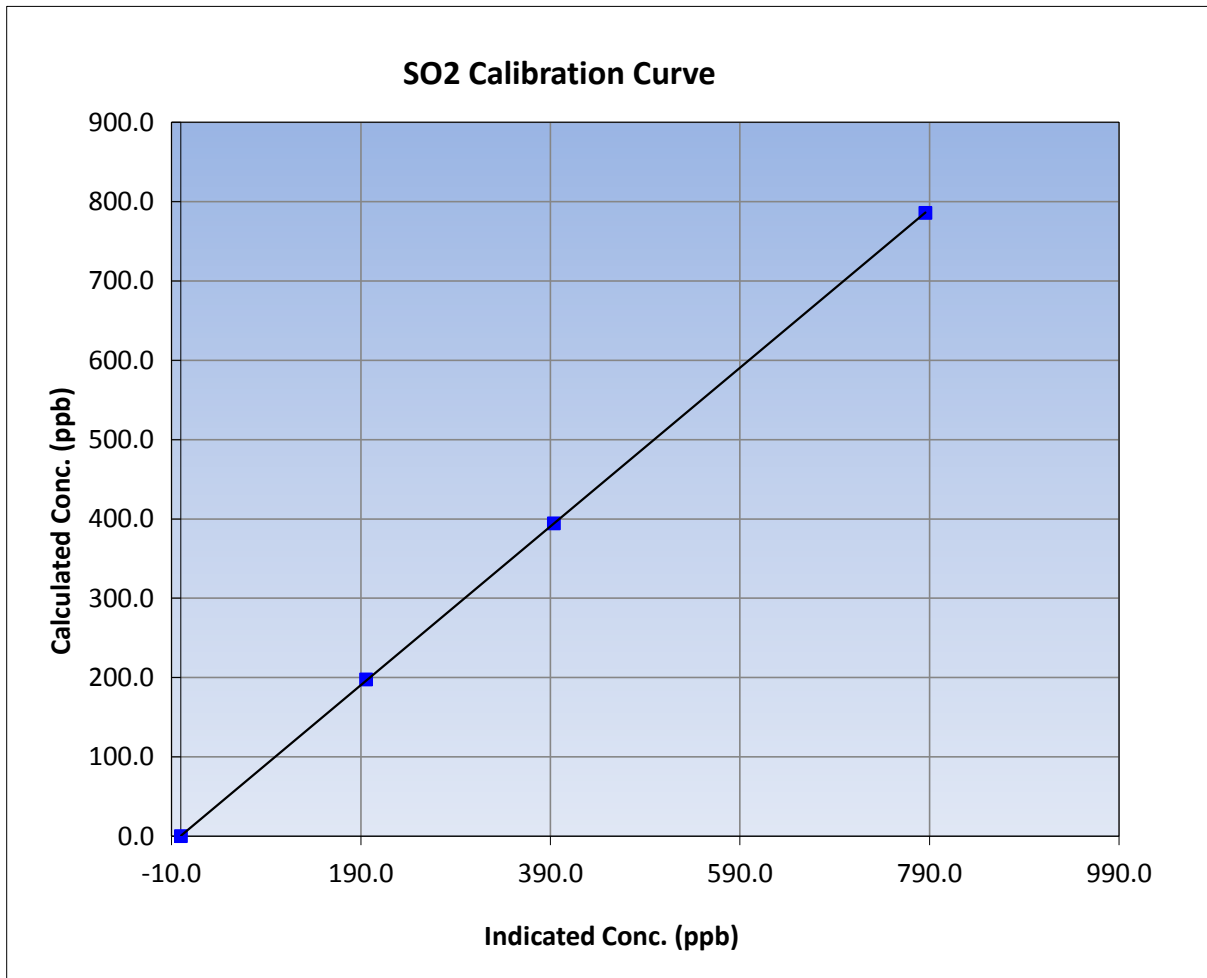
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 26, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:50
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

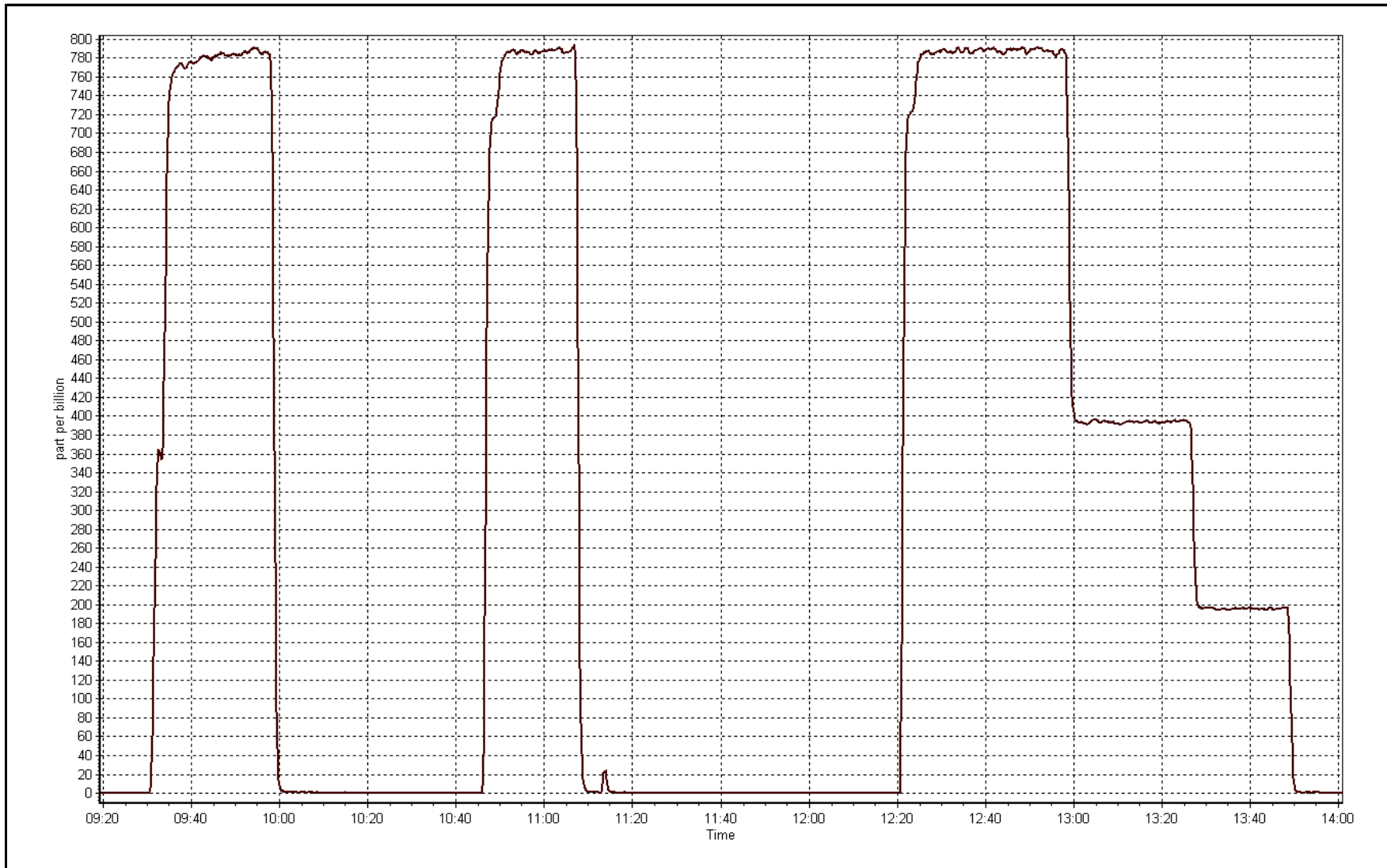
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999993
786.0	785.6	1.0005		
394.3	393.7	1.0015	Slope	0.999878
197.5	195.6	1.0101		
			Intercept	0.729317



SO2 Calibration Plot

Date: May 12, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 13, 2016	Last Calibration	April 21, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	11:10
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	Teledyne API T700	Serial Number	2449
Dil air Make/Model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	SA130110A 12/Dec/16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.42		Lamp voltage	1004	999
Calculated slope	0.989956	1.007050	Chamber temp	45	45
Calculated intercept	-0.282193	-0.352624	Pressure	695.2	698.8
Analyzer Background	2.09	2.09	Flow	0.439	0.442
Analyzer Coefficient	1.158	1.158	Intensity	91	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153358	
Converter make/model	CDN-101		Converter serial #	520	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	0.1	----
as found span	5500	72.9	70.0	68.7	1.018
SO2 scrubber check	5500	21.7	196.5	0.2	----
calibrator zero	5500	0.0	0.0	0.1	----
high point	5500	72.9	70.0	69.7	1.004
second point	5500	41.8	40.1	40.3	0.995
third point	5500	20.8	20.0	20.4	0.978
as left zero					
as left span					
Average Correction Factor					0.992

Corrected As found	68.6	Previous response	71.0	% change	3.4%
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Notes:

Inlet filter changed after as founds. As founds were completed on May 12. Calibrator zero began at 9:25 MST on May 13. Made no adjustments; however, new values were used for both calibrator zero and high point. Scrubber check done after calibrator zero.

Calibration Performed By:

Devin Russell



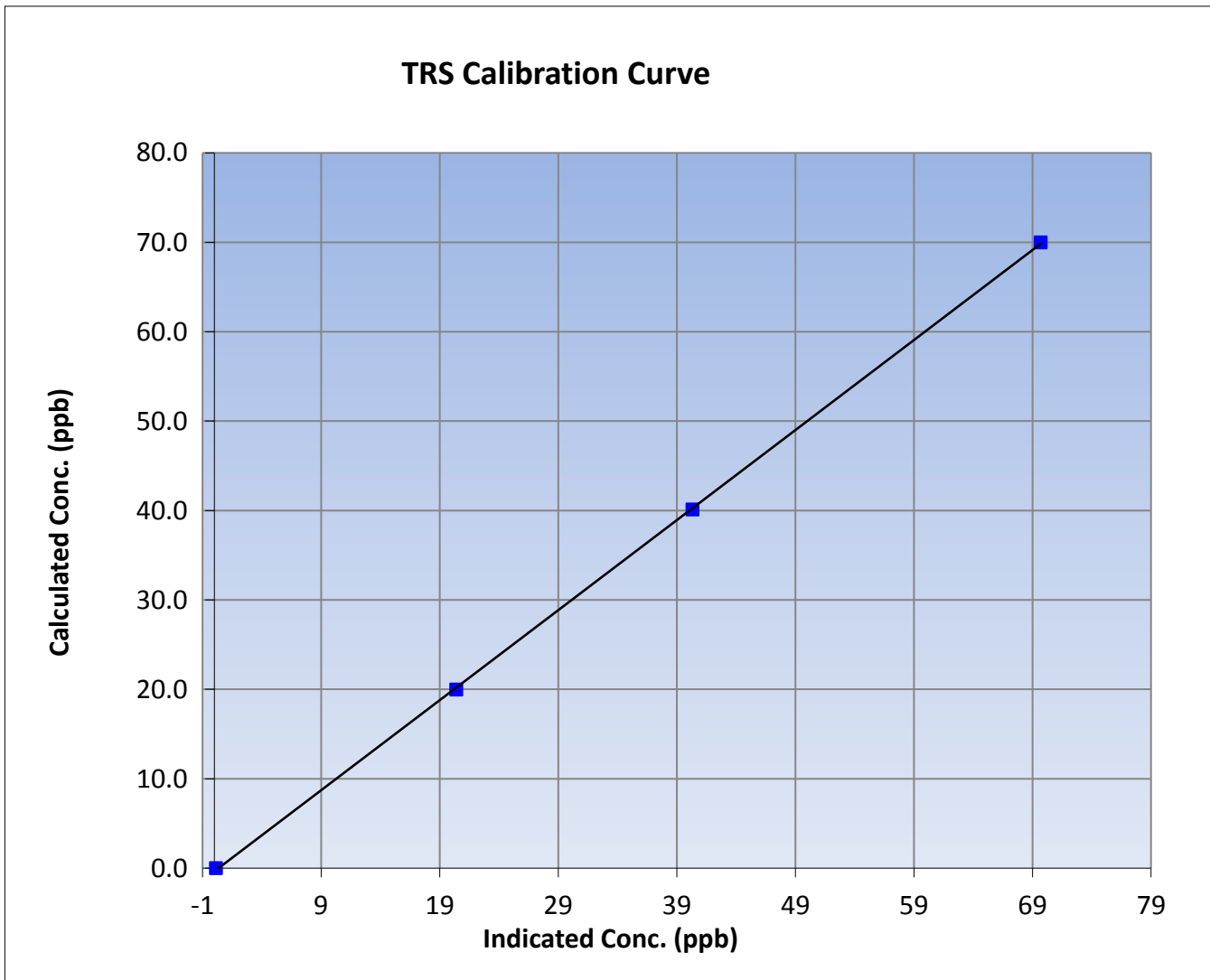
Wood Buffalo Environmental Association TRS Calibration Report

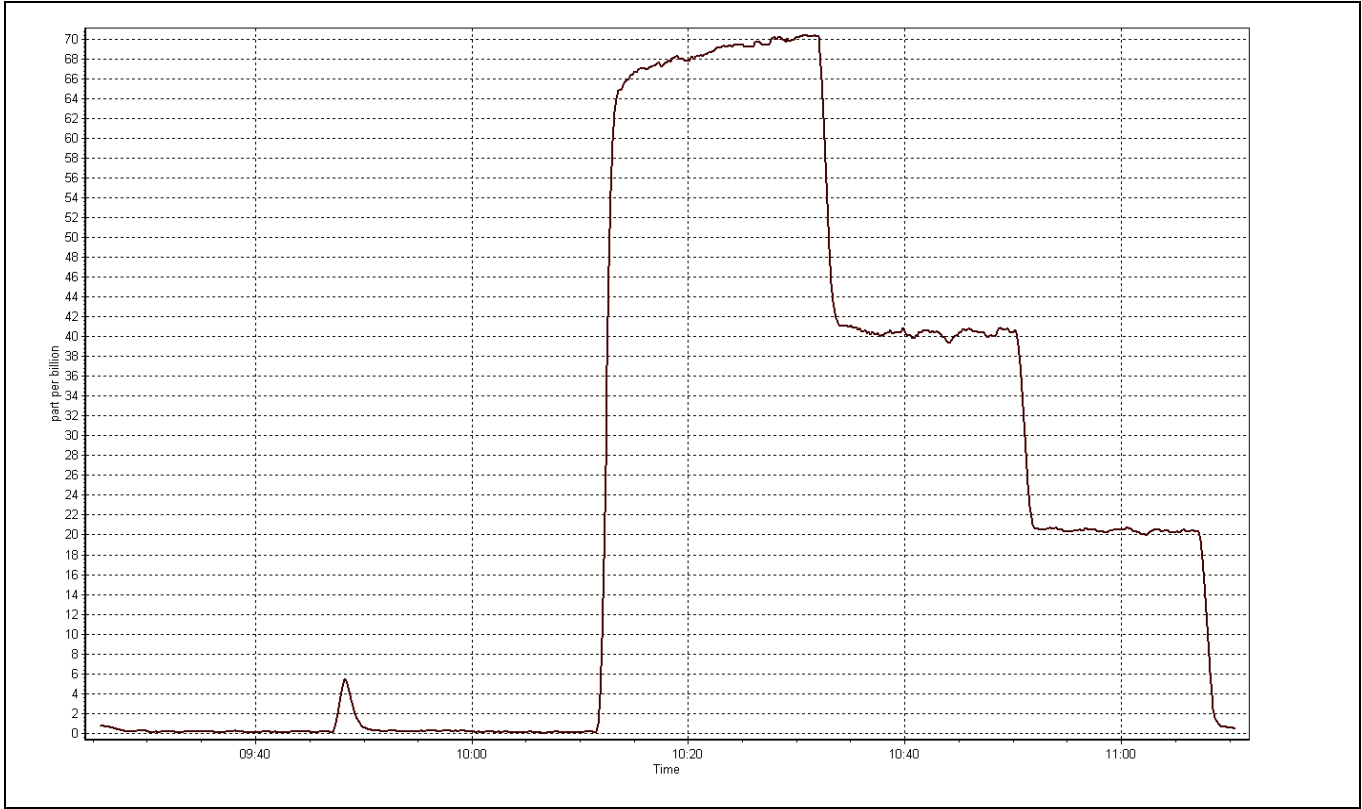
Station Information

Calibration Date	May 13, 2016	Previous Calibration	April 21, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	11:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

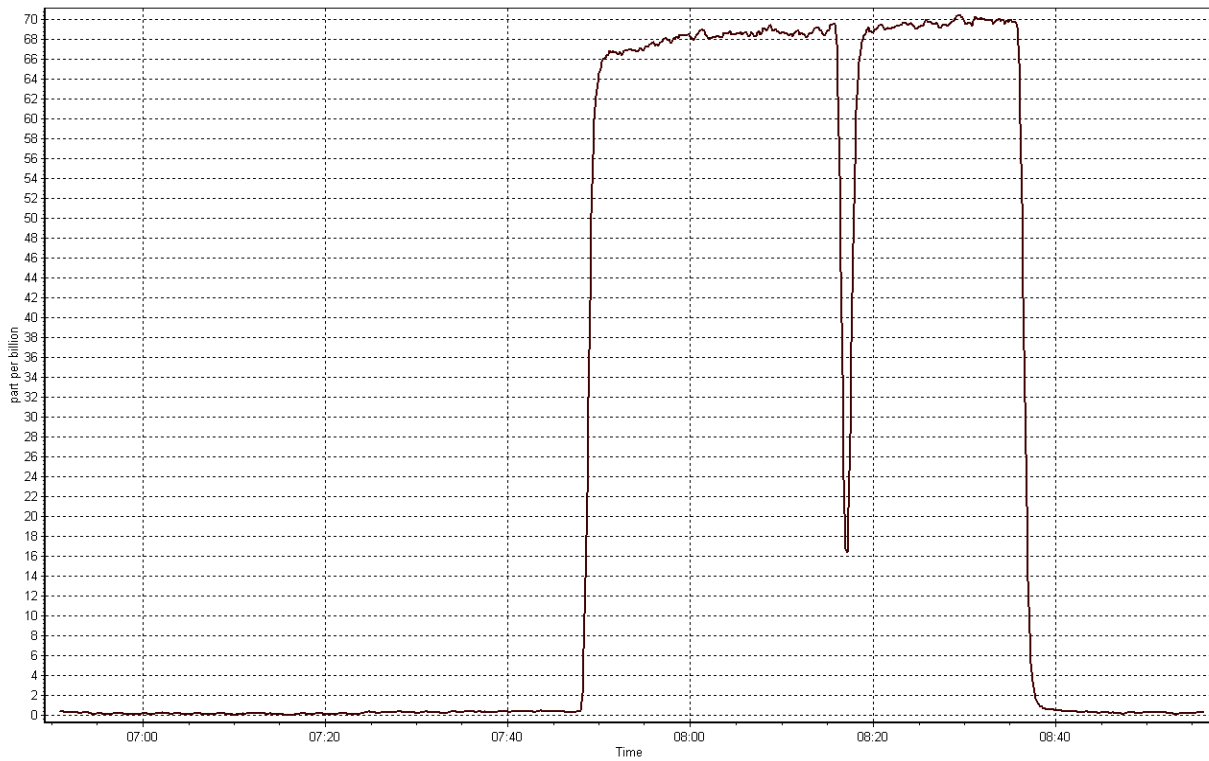
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999947
70.0	69.7	1.0041		
40.1	40.3	0.9950	Slope	1.007050
20.0	20.4	0.9783		
			Intercept	-0.352624





As found test and filter change Date: May 12, 2016





Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-12-16	Last Calibration	April-26-16
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:30
Gas Cert Reference	EY0000355	Cal Gas Expiry Date	September-18-18
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1068.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2449
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.3	75.3
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	0.999112	0.997112	Carrier Pressure	34.6	34.5
THC Calc intercept	0.028080	0.038283	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.998549	0.994064	Air Pressure	32.4	32.4
NMHC Calc intercept	0.008006	0.009328			

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	16.95	0.994
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	16.86	16.89	0.998
second point	6000	47.5	8.46	8.41	1.005
third point	6000	23.8	4.24	4.18	1.013
as left zero					
as left span					
Average Correction Factor					1.006

Corrected As found 16.95 Previous response 16.84 % change -0.6%

Notes:

Sample inlet filter replaced after as founds. N2 cylinder changed after as founds. No Adjustments.

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	8.73	0.994
second point	6000	47.5	4.35	4.36	0.999
third point	6000	23.8	2.18	2.18	1.001
as left zero					
as left span					
Average Correction Factor					0.998

Corrected As found 8.77 Previous response 8.69 % 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	6000	0	0.00	0.00	----
as found span	6000	94.7	8.18	8.18	0.999
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	8.18	8.16	1.002
second point	6000	47.5	4.10	4.05	1.013
third point	6000	23.8	2.05	2.01	1.022
as left zero					
as left span					
Average Correction Factor					1.012

Corrected As found 8.18 Previous response 8.16 % change -0.3%



Wood Buffalo Environmental Association

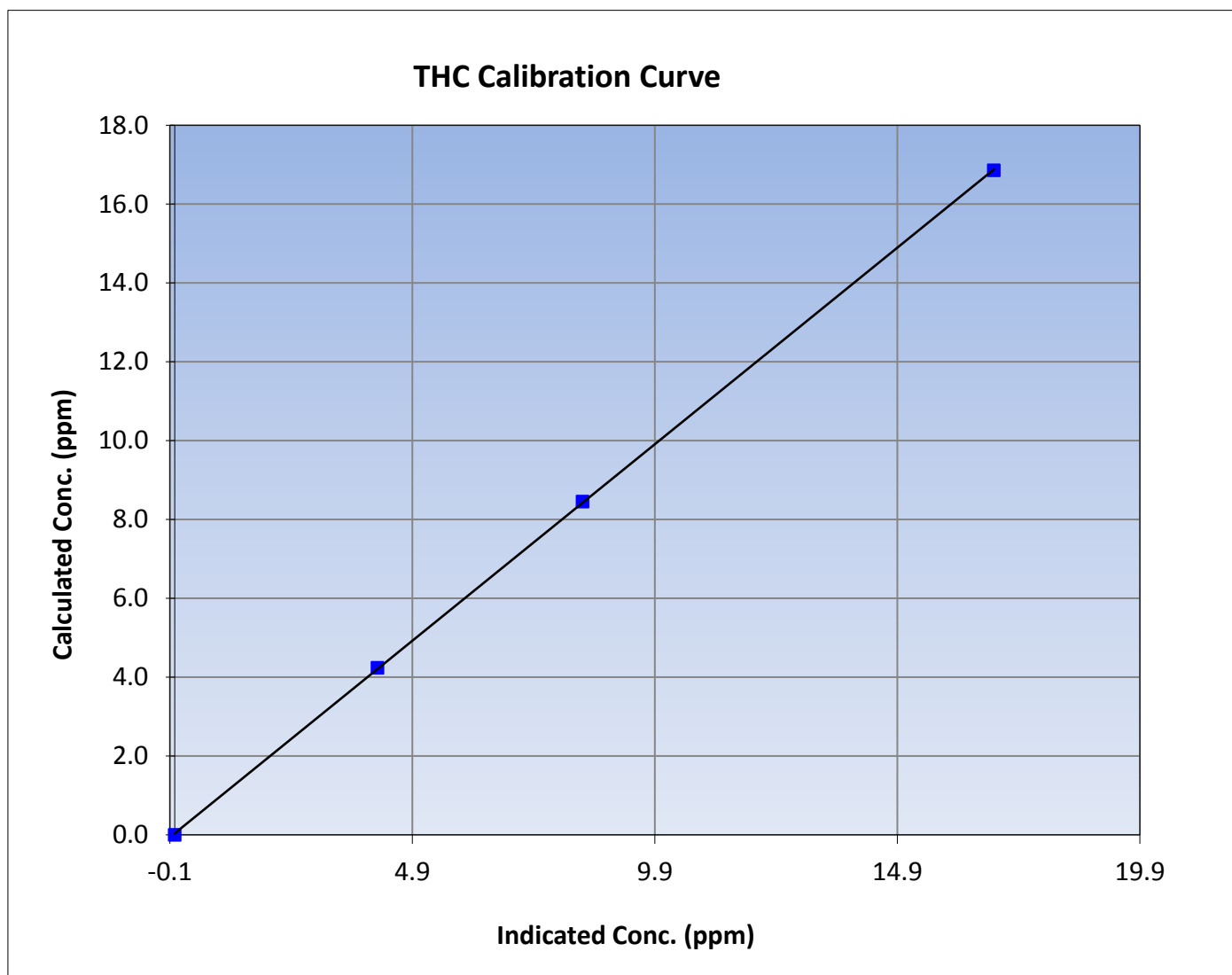
THC Calibration Summary

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 26, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999975
16.86	16.89	0.9980		
8.46	8.41	1.0054	Slope	0.997112
4.24	4.18	1.0135		
			Intercept	0.038283





Wood Buffalo Environmental Association

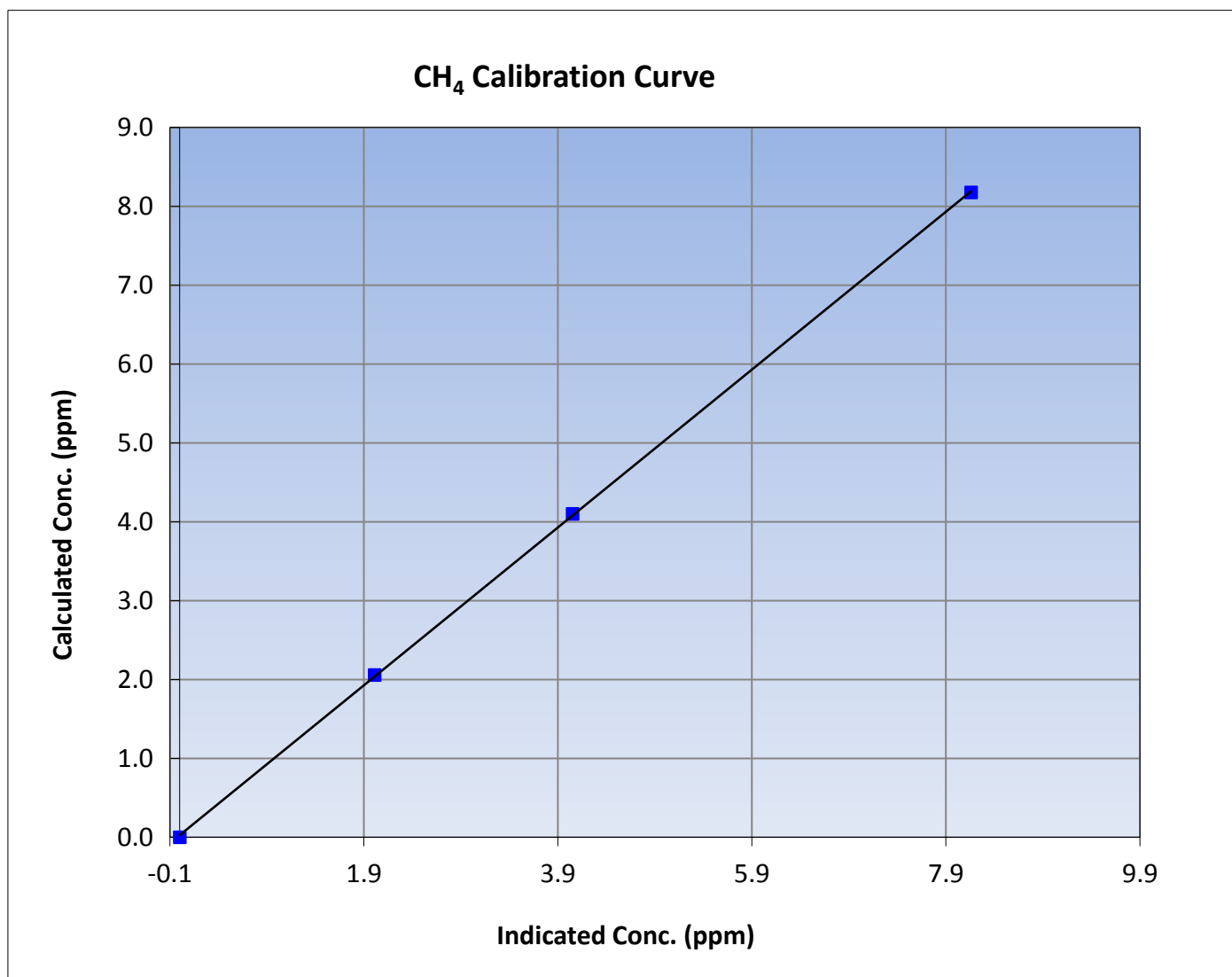
CH₄ Calibration Summary

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 26, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999953
8.18	8.16	1.0019		
4.10	4.05	1.0126	Slope	1.000786
2.05	2.01	1.0223		
			Intercept	0.025041





Wood Buffalo Environmental Association

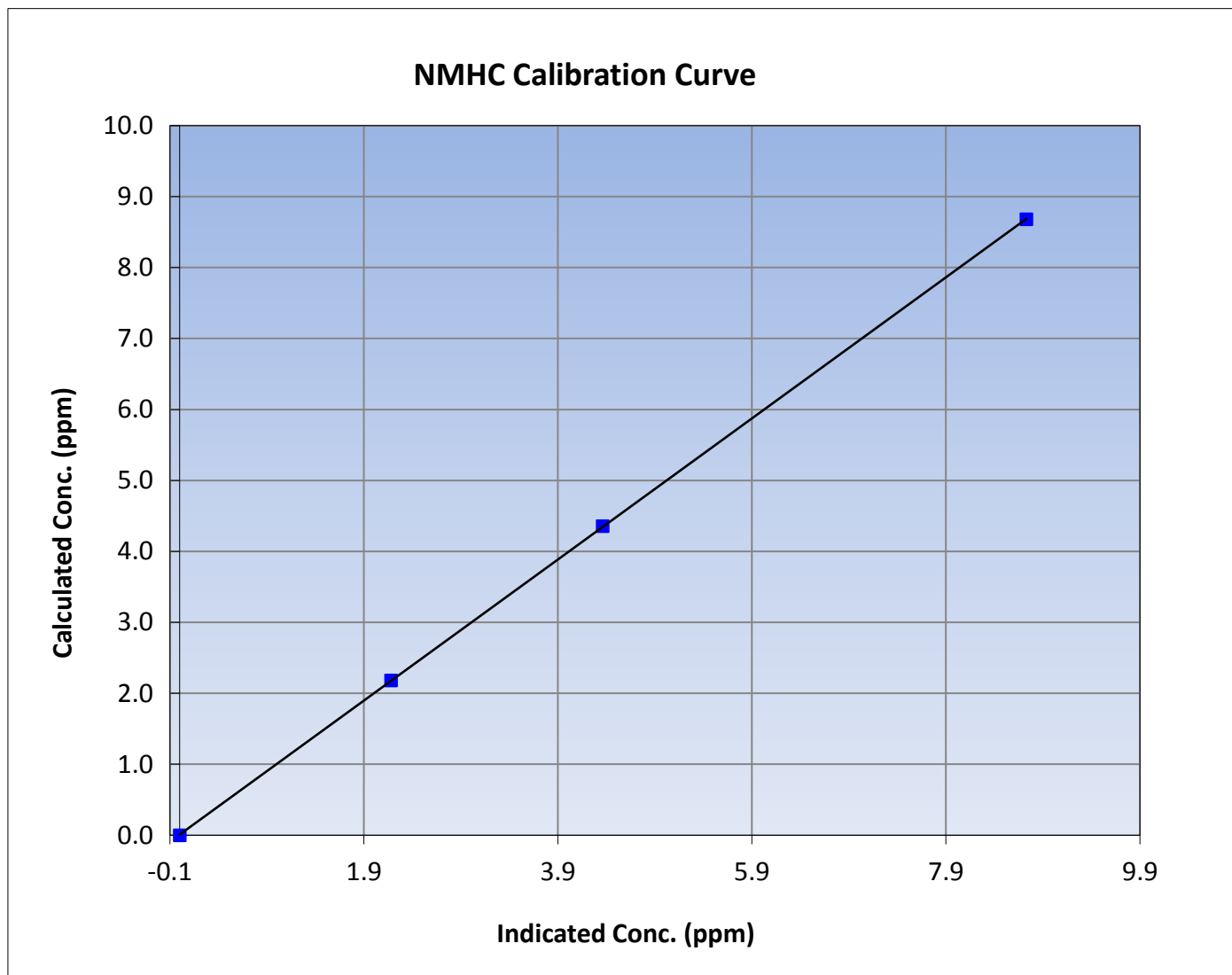
NMHC Calibration Summary

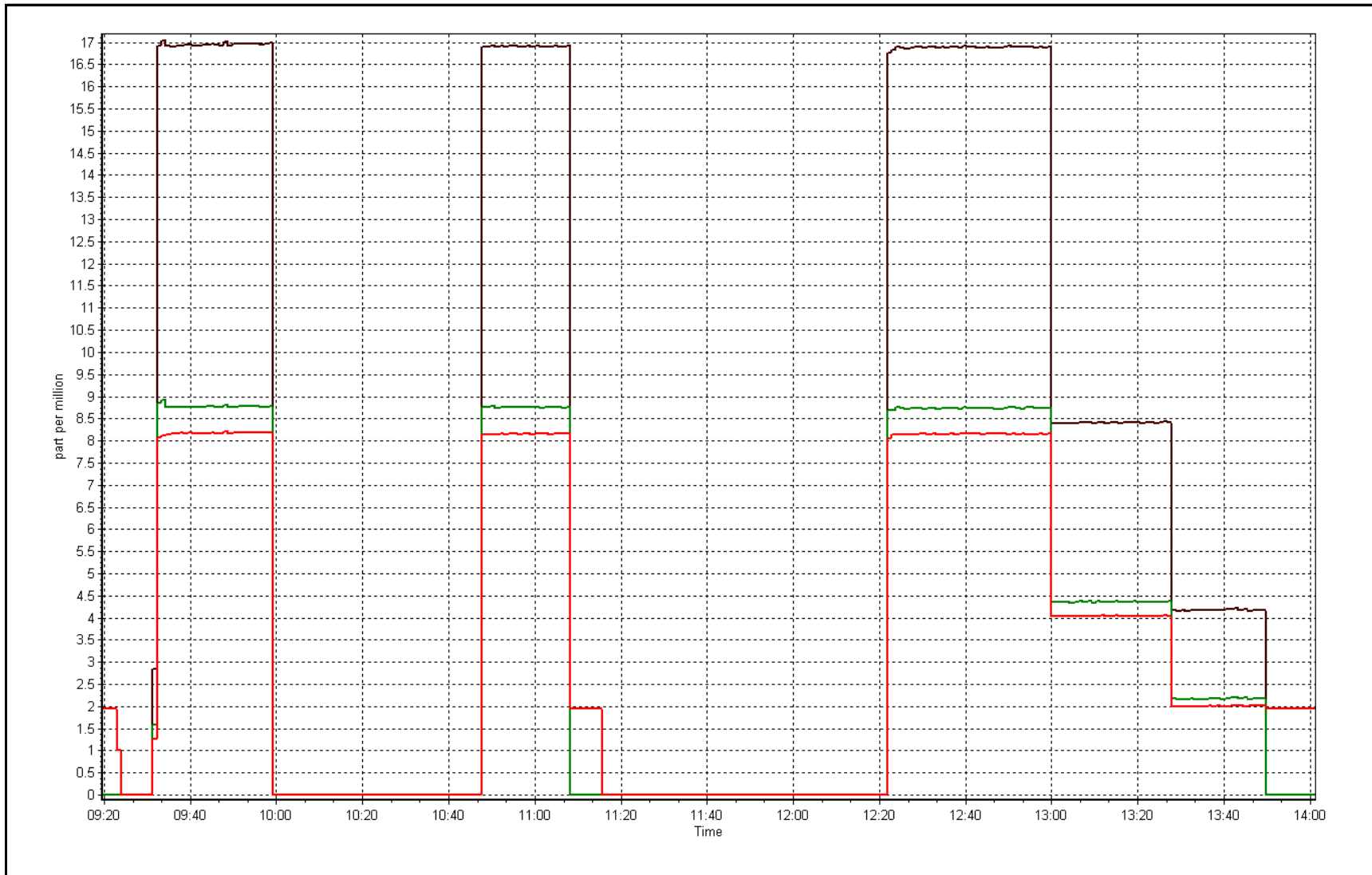
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 26, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999993
8.68	8.73	0.9944		
4.35	4.36	0.9987	Slope	0.994064
2.18	2.18	1.0008		
			Intercept	0.009328







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 13, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	9:25
NO2 GPT Ref date	NA	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	2449
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.	27.5	26.1
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.5
Calculated slope	1.003333	1.009508	Pressure	675.1	678.3
Calculated intercept	-1.744629	-1.131311	Flow cell A	0.705	0.696
Analyzer Background	-1.7	-1.7	Flow cell B	0.728	0.716
Analyzer Coefficient	0.991	0.991	Cell A Intensity	91640	89490
			Cell B Intensity	93042	90696

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 Generator Drive Voltage (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	800.0	0.0	0.3	----
as found span	5500	1080.4	400.0	381.2	1.049
calibrator zero	5500	800.0	0.0	0.1	----
high point	5500	1097.1	400.0	396.8	1.008
second point	5500	919.5	200.0	200.0	1.000
third point	5500	816.0	100.0	101.1	0.990
as left zero					
as left span					
Average Correction Factor					0.999

Corrected As found	380.9	Previous response	400.4	% change	5.1%
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Notes:

As found points captured May 12 followed by inlet filter change and as left points.

Calibration Performed By:

Devin Russell



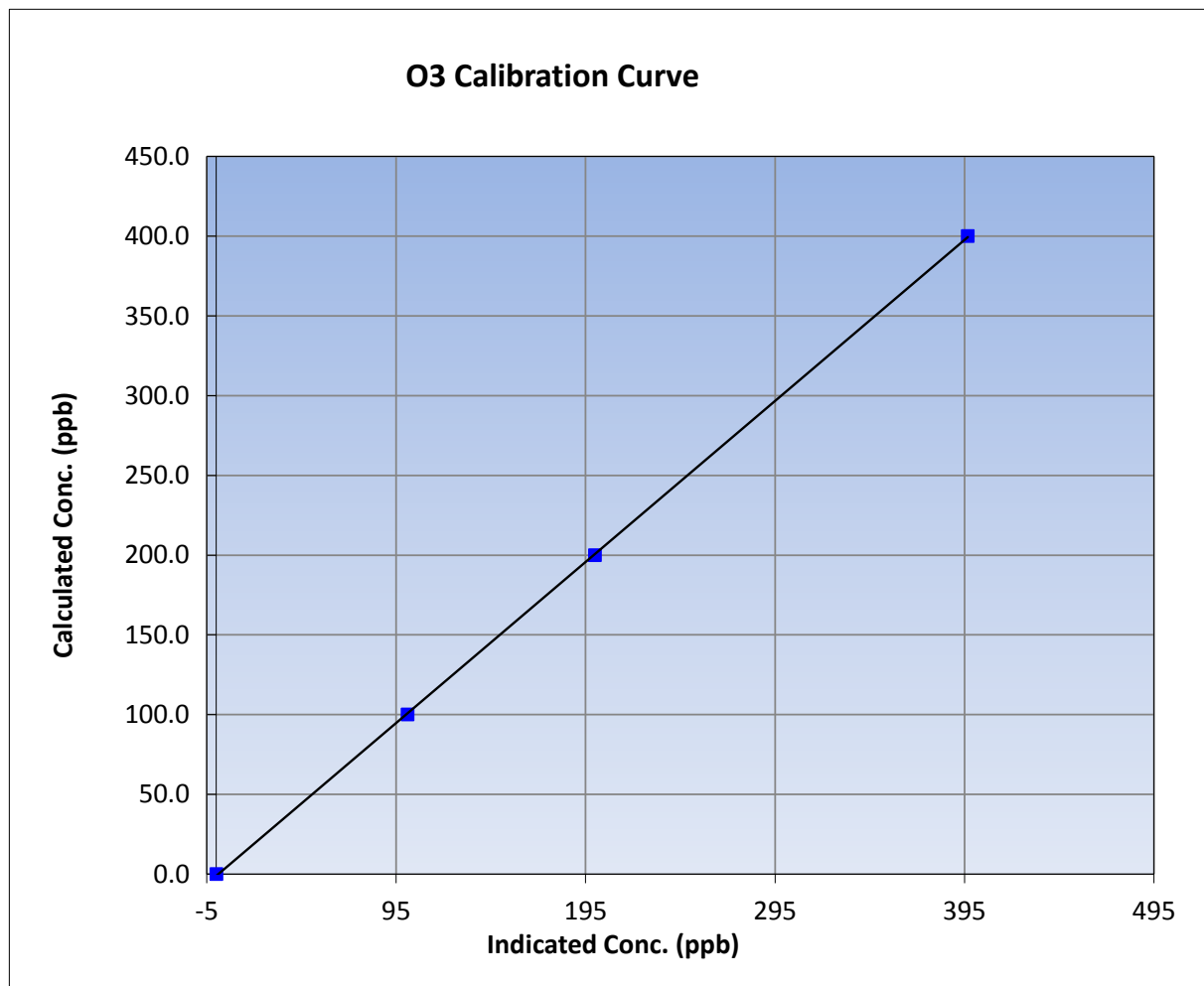
Wood Buffalo Environmental Association O3 Calibration Report

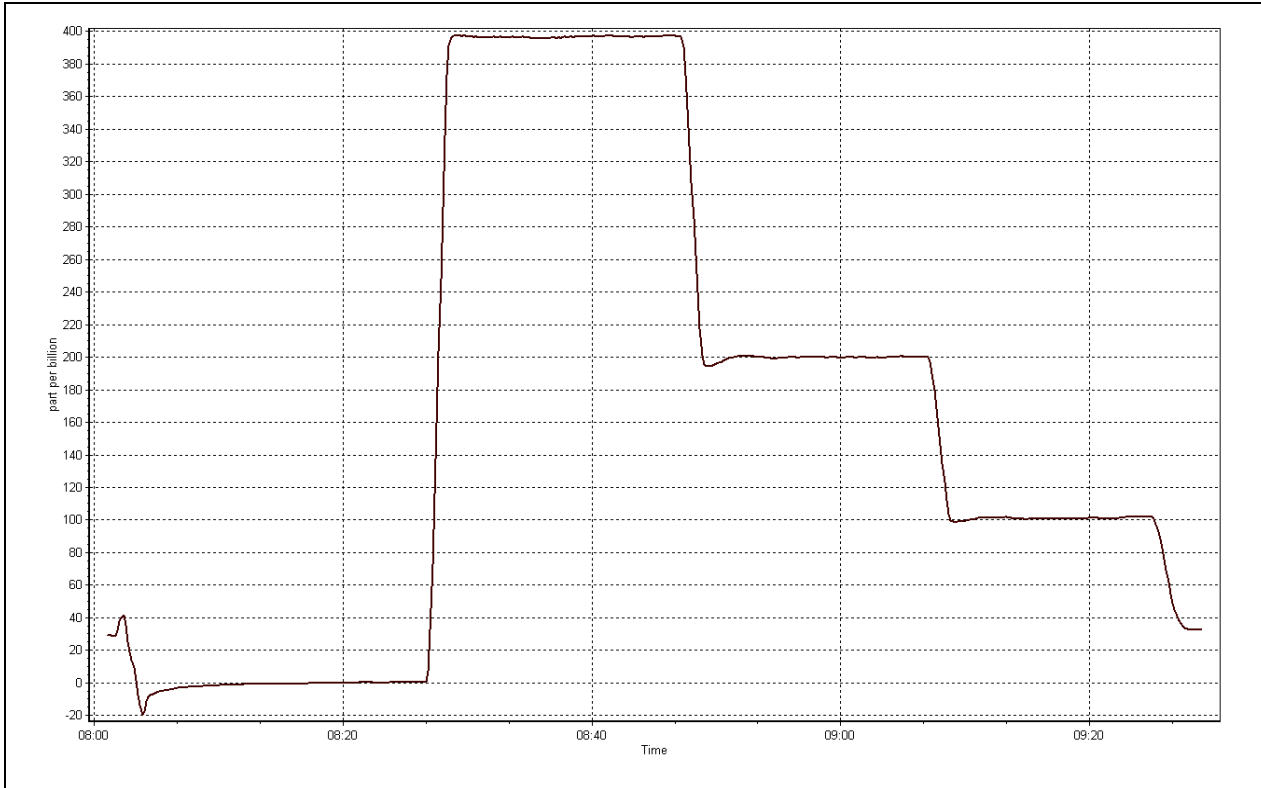
Station Information

Calibration Date	May-13-16	Previous Calibration	April 20, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:05	End Time (MST)	9:25
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

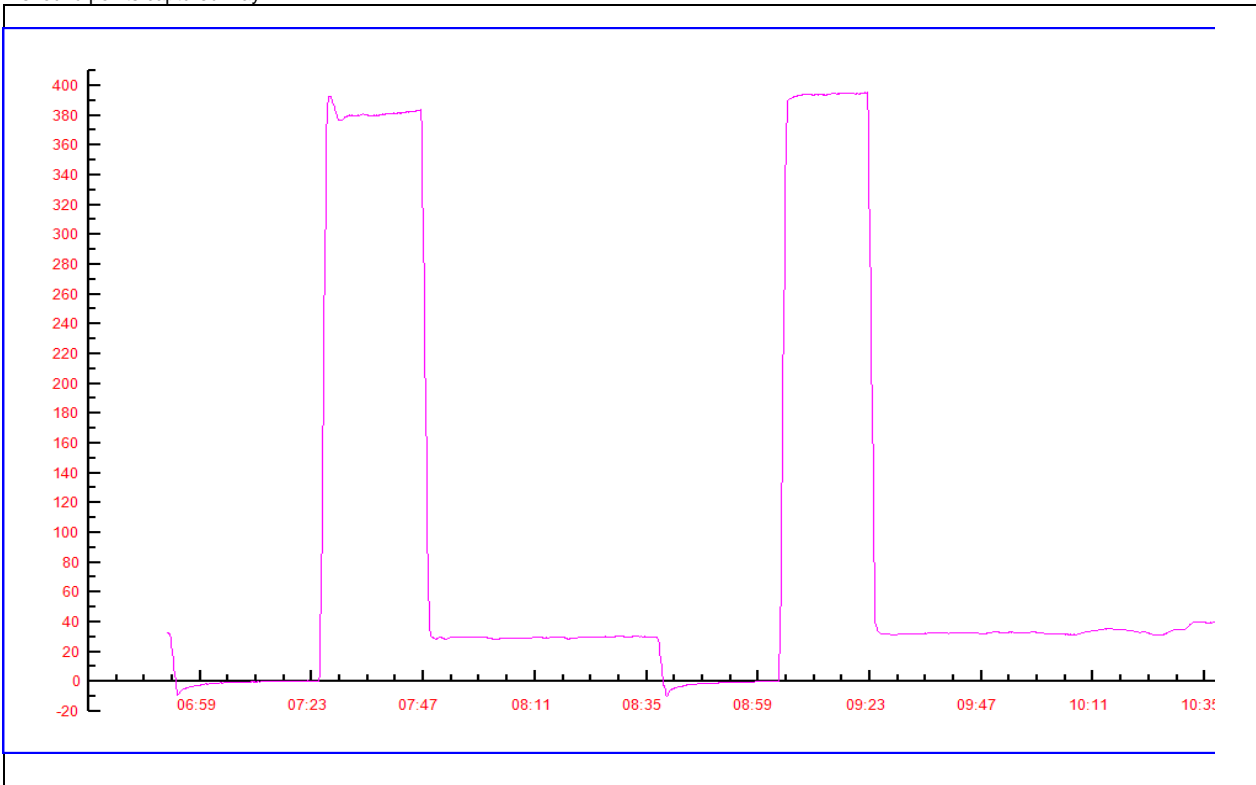
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999969
400.0	396.8	1.0081		
200.0	200.0	1.0003	Slope	1.009508
100.0	101.1	0.9895		
			Intercept	-1.131311





As found points captured May 12





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	15:25
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOX Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Teledyne API T700	Serial Number	2449
Zero air Generator	Teledyne API 701	Serial Number	60

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998241	0.997044	0.997795
	Data Offset	0.968793	0.930536	1.021930
Current Calibration	Data Slope	1.001845	0.998574	1.002739
	Data Offset	1.525366	1.443744	1.535140

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.42	
NO coefficient	1.185		1.404	
NOX coefficient	1.002		1.002	
NO2 coefficient	1.000		1.002	
NO bkgrnd	3.000		4.1	
NOX bkgrnd	3.300		4.8	
Chamber Temp	50.700	Deg C	50.7	Deg C
Moly Temp	322.100	Deg C	321.8	Deg C
PMT voltage	-761.100	V	-761.1	V
PMT Temp	-3.000	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	188.600	mmHg	188.6	mmHg
R Cell Press Nox	188.600	mmHg	188.9	mmHg
NO sample flow	0.777	lpm	0.777	lpm
Nox sample Flow	0.777	lpm	0.776	lpm

Notes:

Inlet filter changed after as founds. Adjusted both zero and span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 12, 2016

Station Number:

AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	1.4	0.6	0.8	----	----
as found span	6000	94.7	803.4	800.2	3.2	683.4	680.6	2.8	1.1755	1.1757
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	6000	94.7	803.4	800.2	3.2	801.0	800.5	0.5	1.0030	0.9997
second point	6000	47.5	403.0	401.4	1.6	400.4	400.2	0.2	1.0065	1.0030
third point	6000	23.8	201.9	201.1	0.8	198.3	198.3	0.0	1.0181	1.0140
as left zero										
as left span										
Average Correction Factor									1.0092	1.0056

Corrced As found NO_x= 682.0 NO= 680.1 Percent Change NO_x= 17.9% NO= 17.9%
 Previous Response NO_x= 803.8 NO= 801.7

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.90 ccm NOx ref calc conc = 804.2 ppb NO ref calc conc = 801.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		3.2	800.3	798.5	0.0	1.0049	1.0032	----	----
1st NO2 (300)	392.1	409.6	799.8	392.1	407.7	1.0055	----	1.0047	99.5%
2nd NO2 (200)	594.7	206.9	798.9	594.7	204.1	1.0067	----	1.0136	98.7%
3rd NO2 (100)	694.7	107.0	798.3	694.7	103.6	1.0075	----	1.0327	96.8%
2nd NO ref point	----	3.2	797.7	795.3	2.4	1.0082	1.0072	----	----
Average Correction Factor						1.0070		1.0170	98.3%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

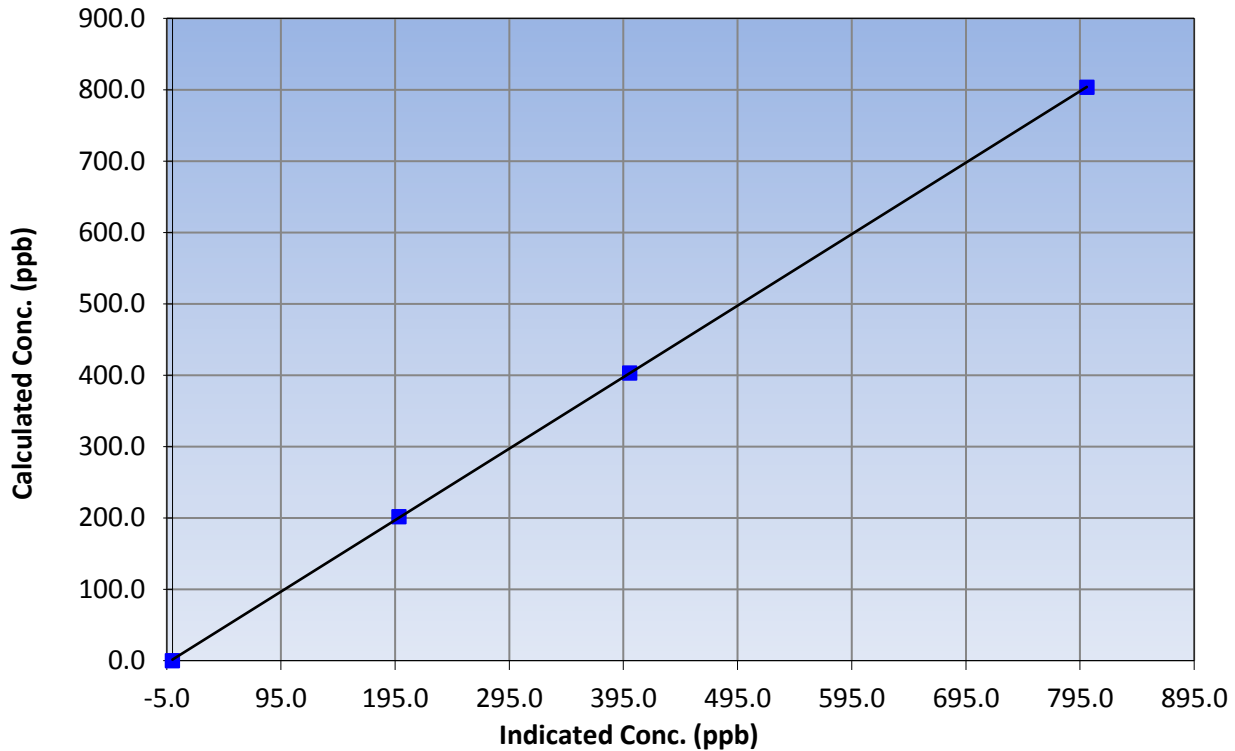
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	15:25
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999985
803.4	801.0	1.0030		
403.0	400.4	1.0065	Slope	1.001845
201.9	198.3	1.0181		
			Intercept	1.525366

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

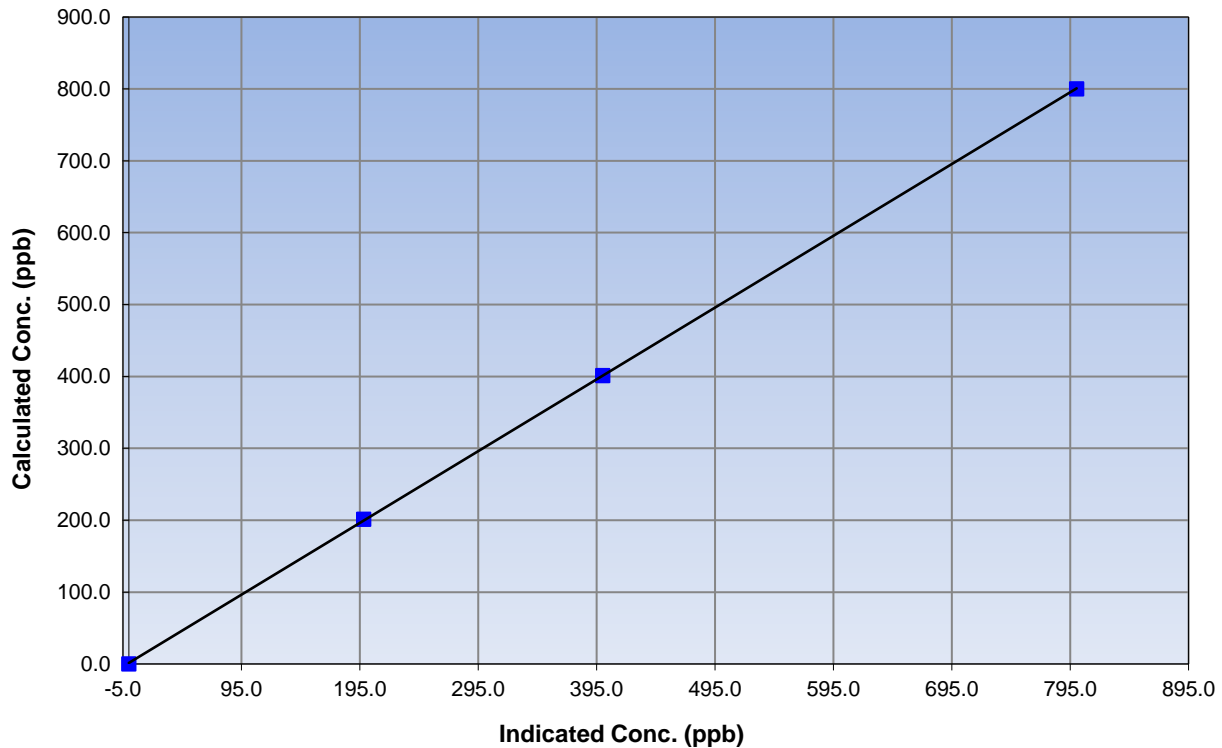
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	15:25
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999986
800.2	800.5	0.9997		
401.4	400.2	1.0030	Slope	0.998574
201.1	198.3	1.0140		
			Intercept	1.443744

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

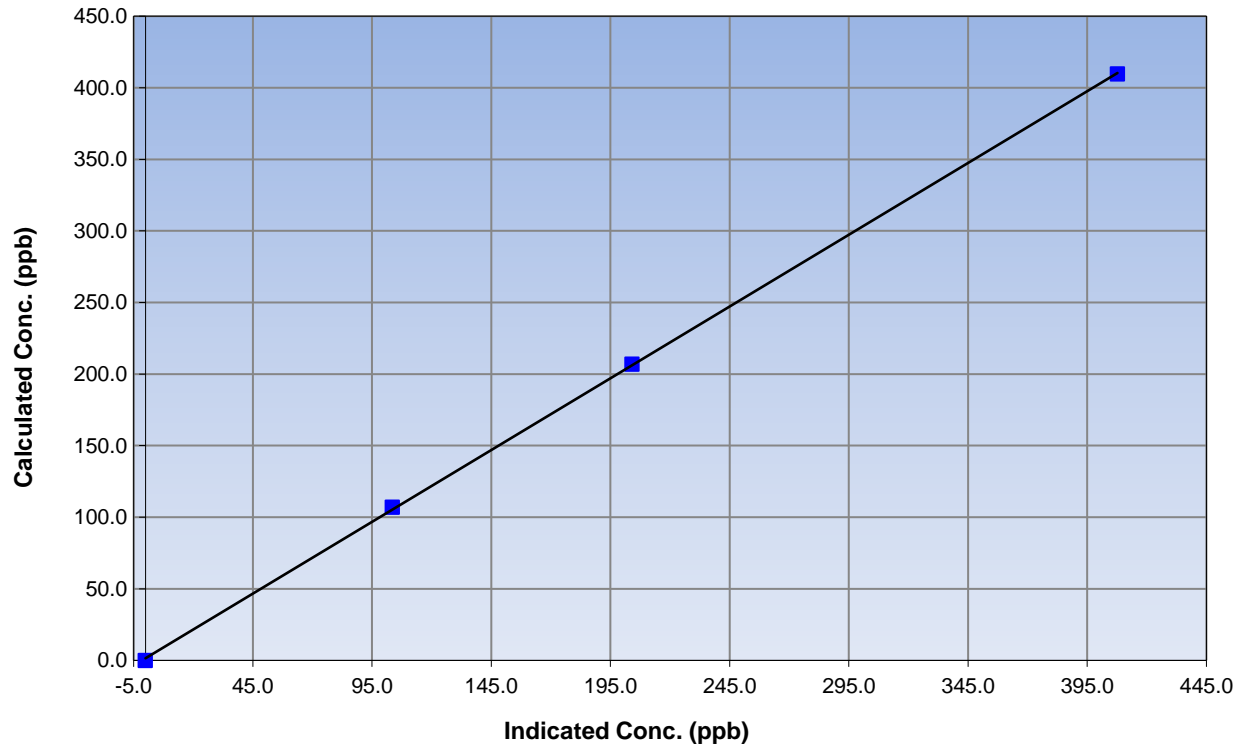
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	15:25
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

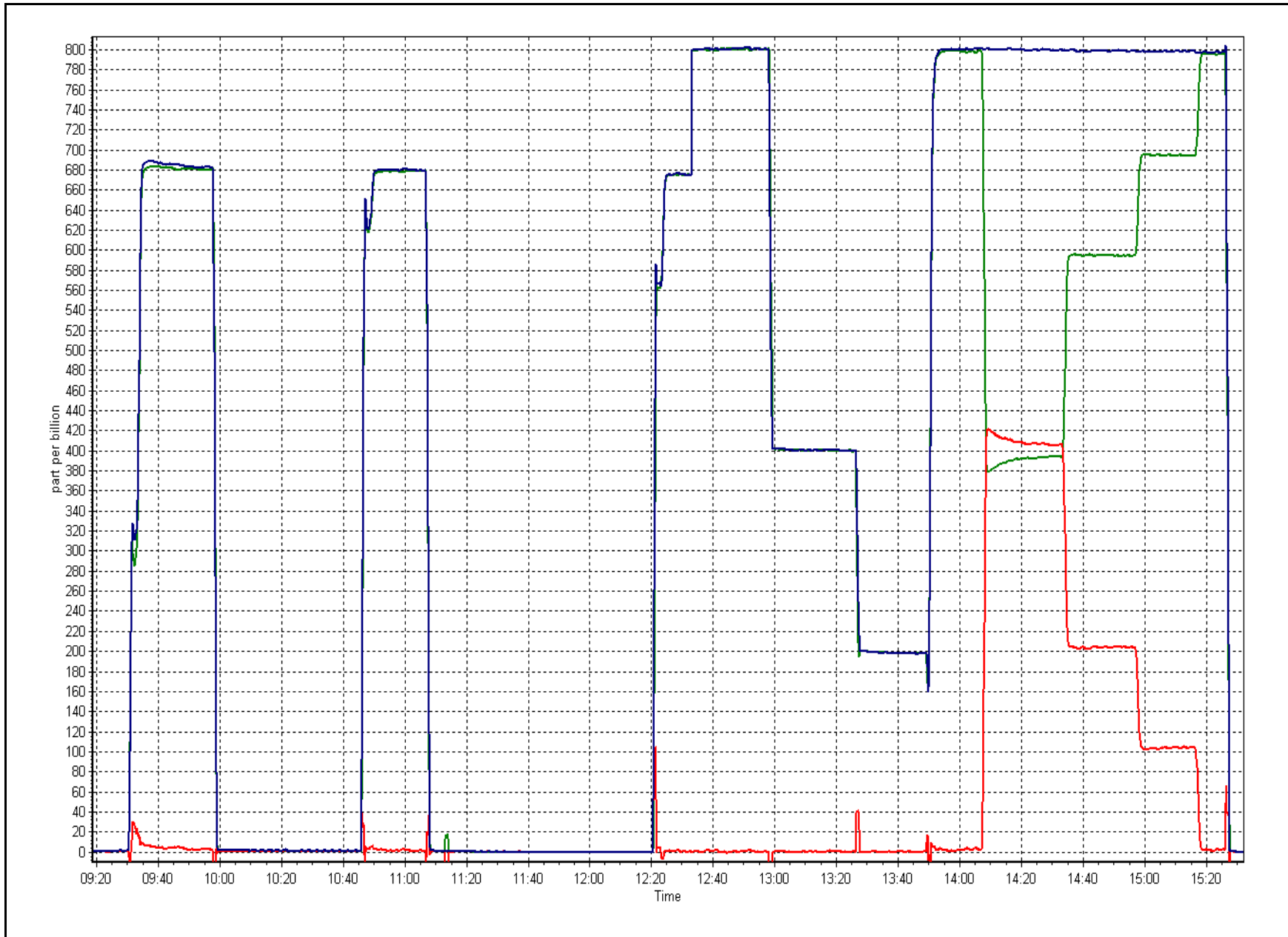
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999937
409.6	407.7	1.0047		
206.9	204.1	1.0136	Slope	1.002739
107.0	103.6	1.0327		
			Intercept	1.535140

NO₂ Calibration Curve



NOX Calibration Plot

Date: May 12, 2016





Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	May 12, 2016	NOX Previous Cal Date	April 20, 2016
NH3 Calibration Date	May 12, 2016	NH3 Previous Cal Date	April 21, 2016
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	18:10
Calibrator	Teledyne API T700	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	75.1 ppm	Serial Number	2449
NOx Cal Gas Conc	50.9 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355

DACs Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.999478	0.980308	1.005176	1.000433	1.004424
	Data Offset	-3.491074	-4.641996	1.454033	1.912168	1.056367
Cal Stats After	Data Slope	0.988466	0.969769	1.016015	1.016874	1.001443
	Data Offset	3.866279	2.985610	2.551776	2.883819	-0.882067
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model Teledyne T201 Analyzer serial # 215
 Converter Converter serial #

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOX Conc range	1000	ppb	1000	ppb
NO BKG	-0.2	ppb	0.1	ppb
NOx BKG	-0.2	ppb	0.7	ppb
Nt BKG	-0.4		18.4	
NO coefficient	1.013		1.013	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.035		1.035	
NH3 coefficient	0.955		0.955	
Nt coefficient	1.038		1.051	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.0	Deg C	314.5	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	87.0	ccm
R Cell Press	6.1	mmHg	6.2	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	560.0	ccm	561.0	ccm
Sample Flow 2 Nox	560.0	ccm	561.0	ccm
Sample Flow 3 Nt	560.0	ccm	561.0	ccm

Notes:

Inlet filter changed after as founds. Adjusted zero on all channels (NO, TN, NOx). Forget to write down "High NO (2nd ref)" for GPT, used 1st ref number values to fill out that info.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

May 12, 2016

Station Number:

AMS 6

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-1.8	-3.7	2.0	----	----
as found NO	6000	94.7	803.4	803.4	----	789.2	786.7	2.5	1.018	----
calibrator zero	6000	0.0	0.0	0.0	0.0	-1.6	0.3	-1.9	----	----
high NO point	6000	94.7	803.4	803.4	----	791.0	789.8	1.2	1.016	----
NO/O ₃ point	6000	94.7	803.4	803.4	----	794.3	792.3	1.6	1.011	----
as found NH ₃	3500	93.2	1999.8	NA	1999.8	2058.1	39.9	2018.9	0.972	0.991
first NH ₃	3500	93.2	1999.8	NA	1999.8	2058.1	39.9	2018.9	0.972	0.991
second NH ₃	3500	46.6	999.9	NA	999.9	1032.5	21.8	1010.6	0.968	0.989
third NH ₃	3500	23.3	500.0	NA	500.0	507.5	10.2	497.3	0.985	1.005
Average Correction Factor									1.0135	0.9951

Nt Corrected As Found Nt = 791.0 ppb
 NOx Corrected As Found NOx = 790.5 ppb
 NH₃ Previous Converter Efficiency = 95.5 %

Previous Response Nt = 824.2 ppb
 Previous Response NOx = 797.8 ppb
 NH₃ Current Converter Efficiency = 95.5 %

Nt percent change 4.2%
 NOx percent change 0.9%
 NH₃ percent change 0.0%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: May 12, 2016 Station Number: AMS 6

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-3.7	-4.1	-1.8	----	----
as found span	6000	94.7	803.4	800.2	803.4	786.7	781.3	789.2	1.0212	1.0243
calibrator zero	6000	0.0	0.0	0.0	0.0	0.3	0.0	-1.6	----	----
high point	6000	94.7	803.4	800.2	803.4	789.8	785.5	791.0	1.0172	1.0187
second point	6000	47.5	403.0	401.4	403.0	392.1	390.4	391.8	1.0276	1.0281
third point	6000	23.8	201.9	201.1	201.9	193.8	192.2	189.3	1.0421	1.0465
Average Correction Factor									1.0290	1.0311

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	791.0	790.5	785.3	----
Previous Response	824.2	797.8	798.0	----
Percent Change	4.2%	0.9%	1.6%	-0.7%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.9 ccm NO_x ref calc conc = 804.2 ppb NO ref calc conc = 801.1 ppb

O ₃ Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
1st NO ref point	----	3.2	792.3	786.1	6.5	1.0151	1.0190	----	----
1st NO ₂ (300)	390.2	399.1	789.1	390.2	398.9	1.0192	----	1.0004	100.0%
2nd NO ₂ (200)	588.5	200.8	790.7	588.5	202.2	1.0172	----	0.9932	100.7%
3rd NO ₂ (100)	685.9	103.4	790.2	685.9	104.3	1.0177	----	0.9911	100.9%
2nd NO ref point	----	3.2	792.3	786.1	6.5	1.0151	1.0190	----	----
Average Correction Factor						1.0173	1.0190	0.9949	100.5%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

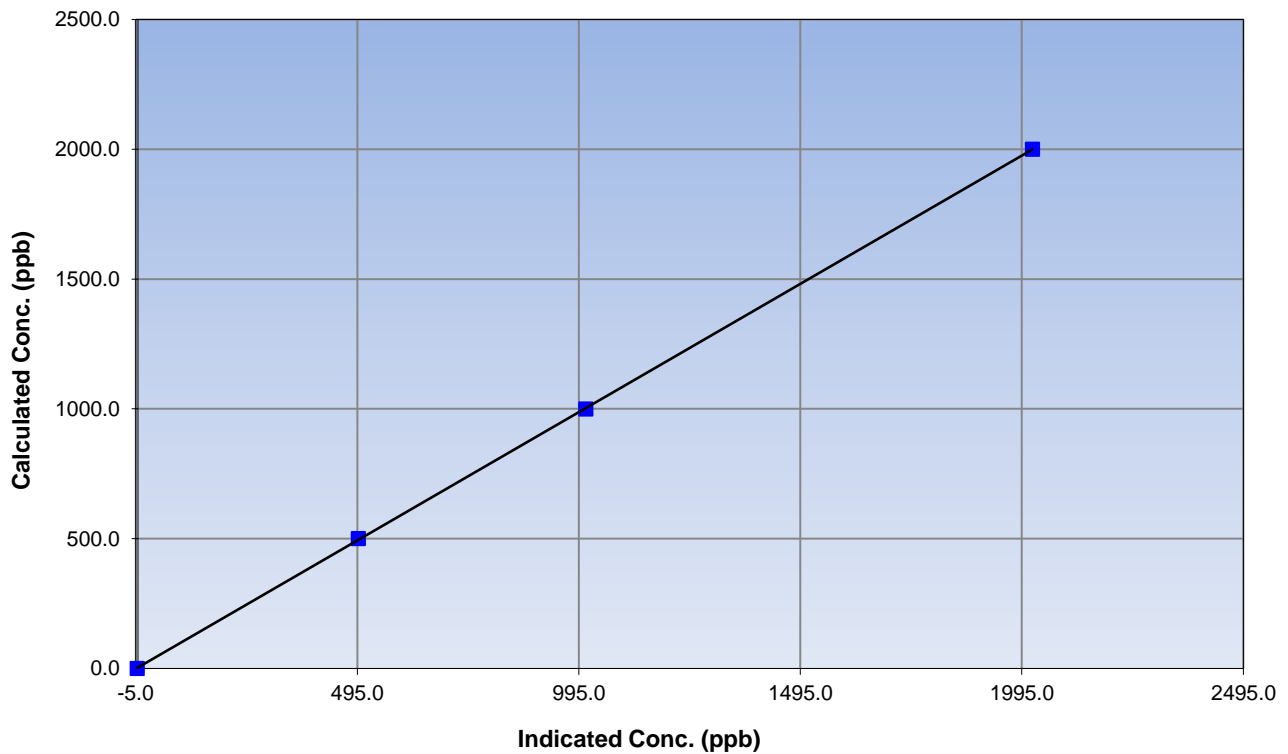
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	18:10
Analyzer make	Teledyne T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.9	----	Correlation Coefficient	0.999985
1999.8	2018.9	0.9905		
999.9	1010.6	0.9895	Slope	0.988466
500.0	497.3	1.0054		
			Intercept	3.866279

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

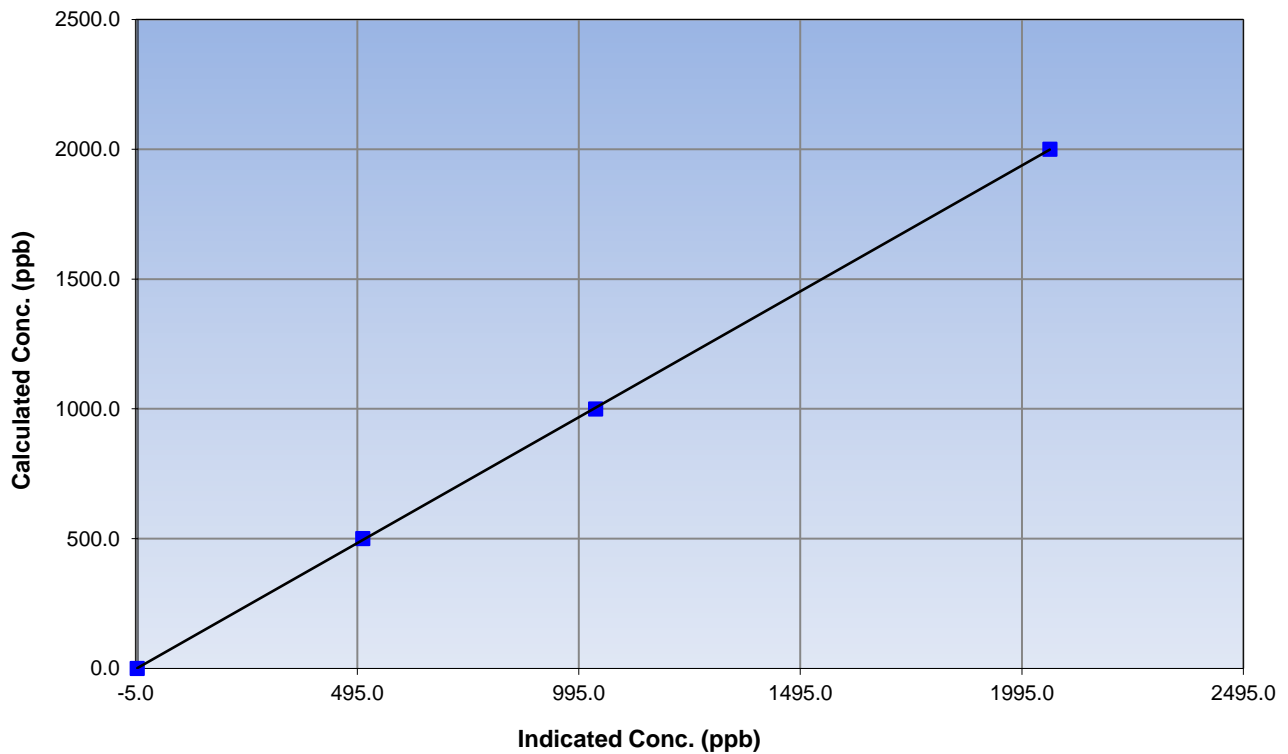
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	18:10
Analyzer make	Teledyne T201	Analyzer serial #	215

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.6	----	Correlation Coefficient	0.999979
1999.8	2058.1	0.9717		
999.9	1032.5	0.9685	Slope	0.969769
500.0	507.5	0.9852		
			Intercept	2.985610

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

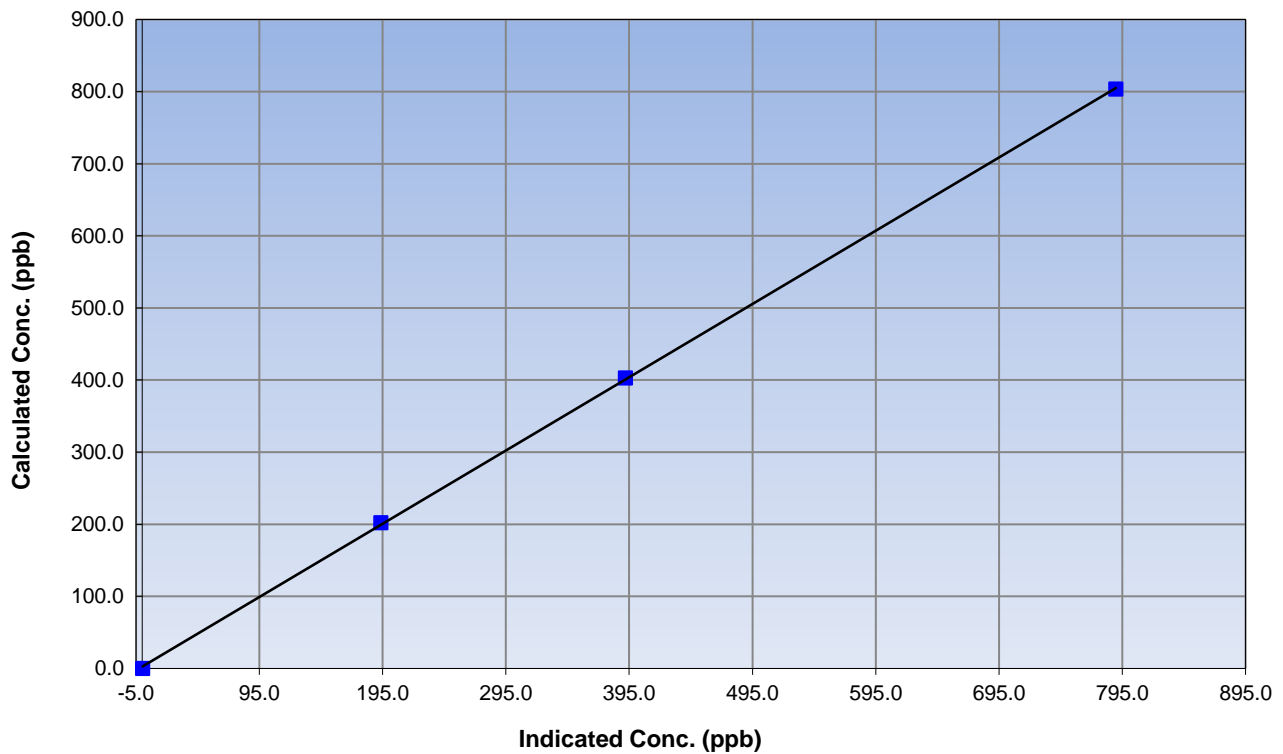
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	18:10
Analyzer make	Teledyne T201	Analyzer serial #	215

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999940
803.4	789.8	1.0172		
403.0	392.1	1.0276	Slope	1.016015
201.9	193.8	1.0421		
			Intercept	2.551776

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

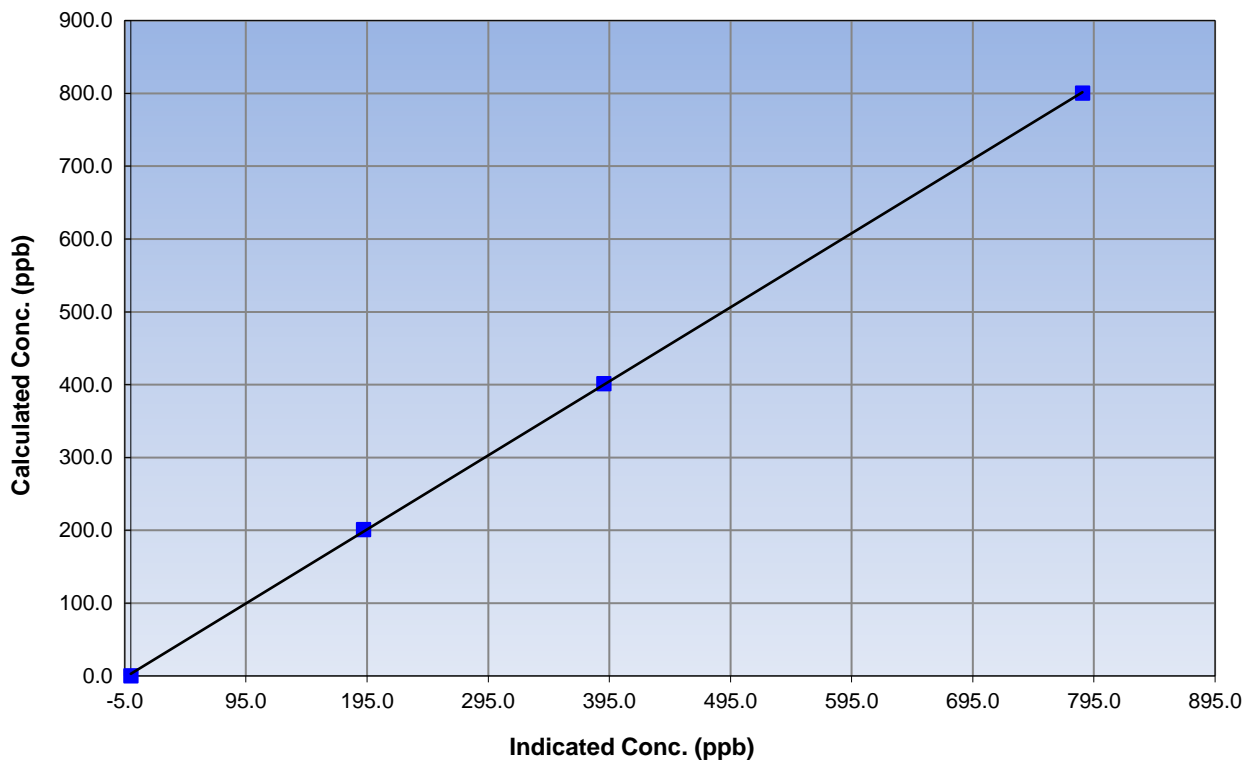
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	18:10
Analyzer make	Teledyne T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999942
800.2	785.5	1.0187		
401.4	390.4	1.0281	Slope	1.016874
201.1	192.2	1.0465		
			Intercept	2.883819

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

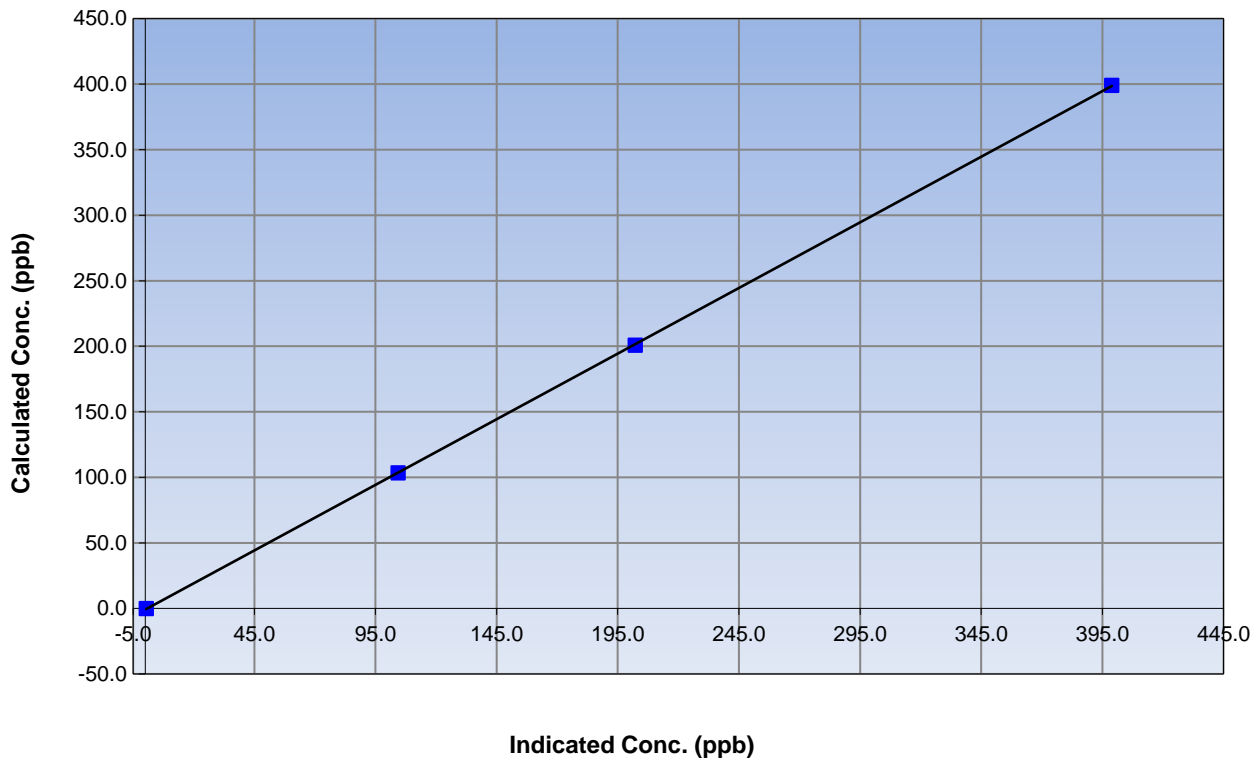
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	18:10
Analyzer make	Teledyne T201	Analyzer serial #	215

Calibration Information

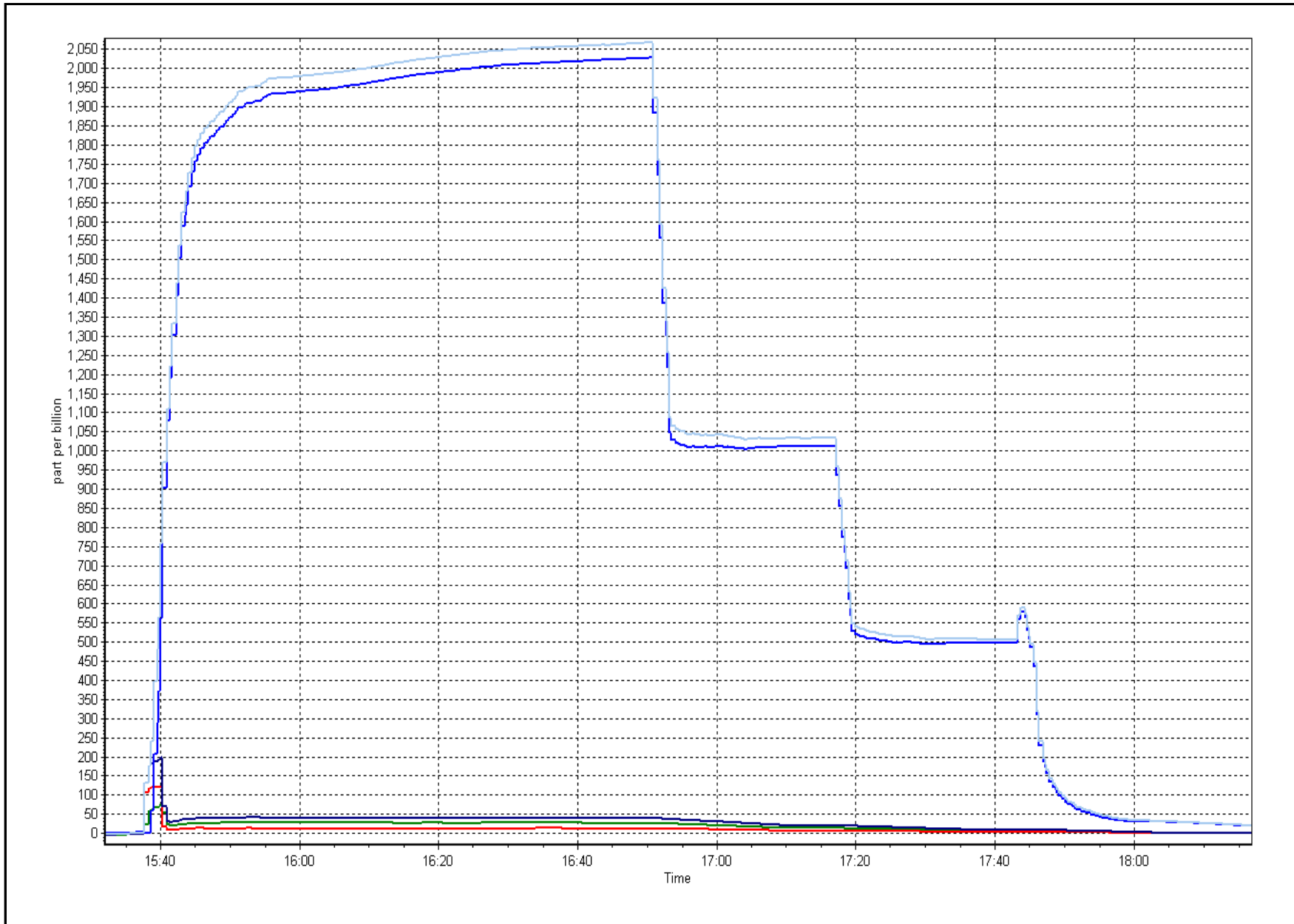
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999987
399.1	398.9	1.0004		
200.8	202.2	0.9932	Slope	1.001443
103.4	104.3	0.9911		
			Intercept	-0.882067

NO₂ Calibration Curve



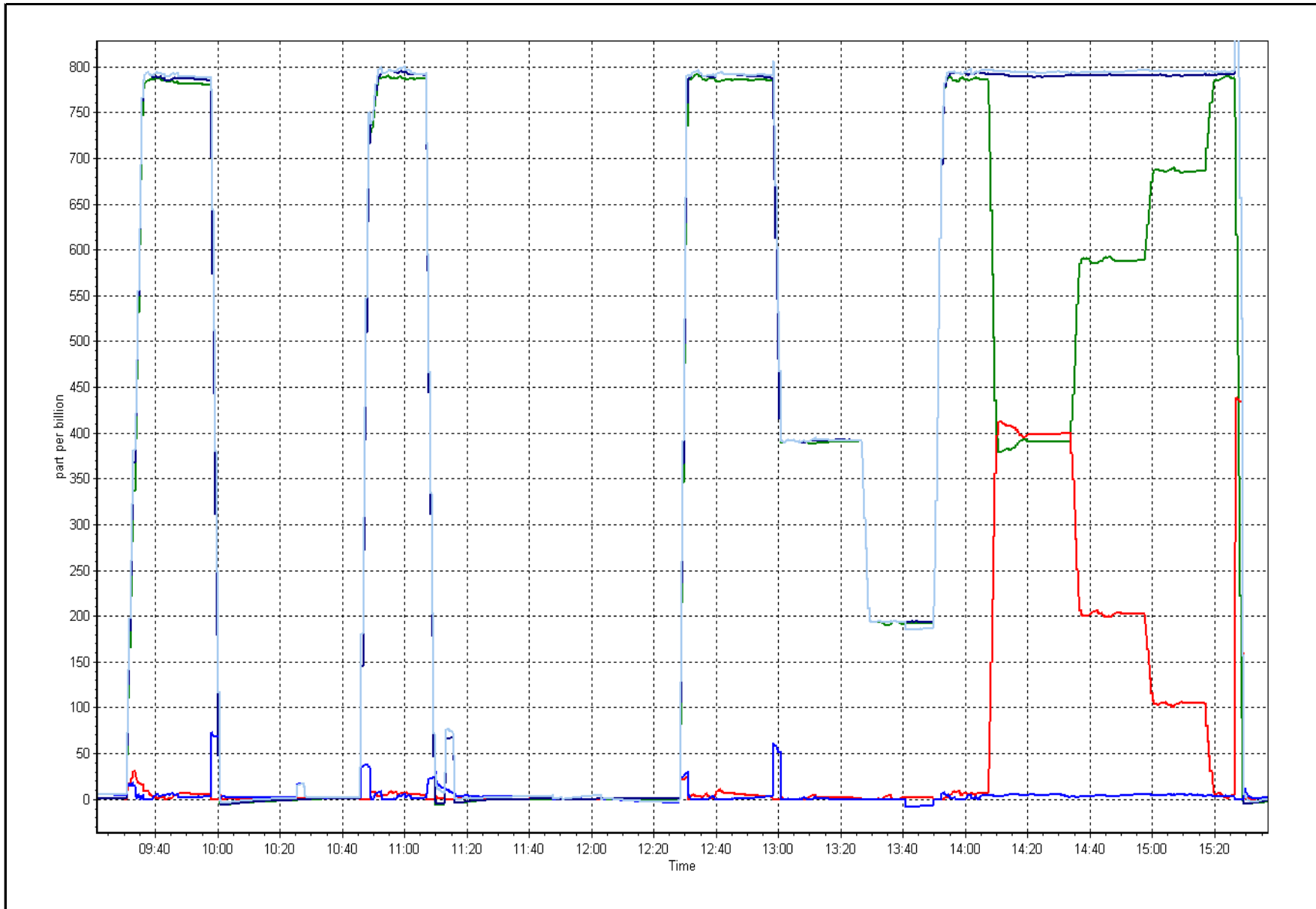
NH₃ Calibration Plot

Date: May 12, 2016



NOX Calibration Plot

Date: May 12, 2016





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	May 12, 2016	Previous Calibration:	April 26, 2016
Station Name:	Patricia McInnis	Station Number:	AMS 6
Start Time (MST):	7:02	End Time (MST):	8:50
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

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

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	4.0	3.7	-0.3	4.0
T2	19.0	na	na	19.0
T3	20.0	na	na	20.0
T4	12.0	na	na	12.0
RH (%)	21.0	na	na	21.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	986	982.6	-3.4	986

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

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	206		206
Neph	-0.1		-0.1
C14	8		8
Indicated Concentration (ug/m3)	0	no	0
Offset 1	206.4		206.4
Offset 2	32.8		32.8

Leak Check (Quarterly)			
Leak Check Date:		Previous Leak Check Date:	February 12, 2016
	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:	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	26/04/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head cleaned. Head was not overly dirty. No adjustments made.

Calibration Performed By: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
MAY 2016

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	711	32	33	99.87	36	0	10	0
TRS (ppb) Average	711	32	33	99.87	13	2	5	3
THC (ppm) Average	711	32	33	99.87	6.6	-	3.4	-
NMHC (ppm) Average	711	32	33	99.87	3.016	-	0.992	-
CH4(ppm) Average	711	32	33	99.87	3.7	-	2.5	-
O3 (ppb) Average	710	33	34	99.87	355	32	94	-
NO2 (ppb) Average	710	33	34	99.87	55	0	16	-
NO (ppb) Average	710	33	34	99.87	99	-	4	-
NOX (ppb) Average	710	33	34	99.87	104	-	19	-
PM2.5 (ug/m3) Average	715	1	29	96.24	3261.4	-	1034.9	18
CO(ppm) Average	713	30	31	99.87	17	10	6.4	-
Temperature 2 m (C) Average	744	0	0	100.00	31.2	-	23.1	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.5	-	29.4	-
Relative Humidity (%) Average	744	0	0	100.00	95	-	82	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	34	-	18	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	711	1	3	-	0	0	0	0	1	2	36
TRS (ppb) Average	711	1.3	2	-	0	0	0	0	1	4	13
THC (ppm) Average	711	2.24	0.9	-	1.8	1.8	1.8	1.9	2.1	3.5	6.6
NMHC (ppm) Average	711	0.238	0.532	-	0	0	0	0	0.1	1	3.016
CH4(ppm) Average	711	2.01	0.3	-	1.8	1.8	1.8	1.9	2	2.5	3.7
O3 (ppb) Average	710	35.1	32	-	7	15	20	28	40	50	355
NO2 (ppb) Average	710	4.9	7	-	0	1	1	2	6	12	55
NO (ppb) Average	710	1.8	5	-	0	0	0	1	1	4	99
NOX (ppb) Average	710	6.7	10	-	0	1	2	3	8	15	104
PM2.5 (ug/m3) Average	715	152.2	391.3	-	0.1	2.7	5.9	15	96.9	411.9	3261.4
CO(ppm) Average	713	1.56	3.1	-	0	0.1	0.1	0.2	1	5	17
Temperature 2 m (C) Average	744	14.02	6.3	-	0.8	6.2	9.3	13.1	18.2	23	31.2
Barometric Pressure (inHg) Average	744	28.95	0.2	-	28.3	28.7	28.8	28.9	29.1	29.3	29.5
Relative Humidity (%) Average	744	53.1	22	-	15	23	33	54	72	82	95
Wind Speed 10 m (km/h) Average	743	10.8	6	-	1	3	6	11	15	19	34
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC, NO2	11 May 2016 21:00	11 May 2016 21:00	1	Maintenance - sample inlet filters replaced
TRS, O3, CO	12 May 2016 10:00	12 May 2016 10:00	1	Maintenance - cleaned glass manifold
PM2.5	03 May 2016 21:00	04 May 2016 05:00	9	Unstable Operation - wildfire smoke affected optic chamber
PM2.5	04 May 2016 10:00	04 May 2016 10:00	1	Unstable Operation - wildfire smoke affected optic chamber
PM2.5	06 May 2016 04:00	06 May 2016 04:00	1	Unstable Operation - wildfire smoke affected optic chamber
PM2.5	06 May 2016 20:00	07 May 2016 06:00	11	Unstable Operation - wildfire smoke affected optic chamber
PM2.5	08 May 2016 03:00	08 May 2016 03:00	1	Unstable Operation - wildfire smoke affected optic chamber
PM2.5	16 May 2016 03:00	16 May 2016 04:00	2	Unstable Operation - wildfire smoke affected optic chamber
PM2.5	31 May 2016 19:00	31 May 2016 21:00	3	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	26 May 2016 10:00	26 May 2016 10:00	1	Maintenance - tower lowered to access surveillance camera



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Athabasca Valley - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 36 ppb on May 4 07:00	Maximum Daily Average: 10.0 ppb on May 4		Hours of Data:	711
Minimum Value: 0 ppb on May 19 10:00	Minimum Daily Average: 0.0 ppb on May 22		Hours of Missing Data:	33
Maximum Diurnal Average: 2.1 ppb at hour 1	Minimum Diurnal Average: 0.4 ppb at hour 18		Hours of Calibration:	32
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 14		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	Z	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1
3-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	2	1	1	2	2	3	9	8	14	8	11	2.7	14
4-May	29	14	8	17	34	34	36	15	9	22	9	3	2	1	1	1	1	1	1	1	1	1	0	1	10.0	36
5-May	5	8	7	11	2	2	1	4	1	1	1	1	0	0	1	0	0	1	4	6	11	5	2	2	3.2	11
6-May	7	5	2	2	1	1	3	4	5	2	1	0	Z	0	0	0	0	0	1	6	8	8	7	7	3.1	8
7-May	7	5	4	3	2	2	2	2	1	1	2	2	2	1	1	1	Z	1	1	1	3	3	2	2	2.1	7
8-May	2	2	2	2	1	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
10-May	0	0	0	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-May	0	0	0	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0.3	1
12-May	0	Z	0	1	1	1	2	C	C	C	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.5	2
13-May	1	Z	1	1	2	3	2	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0.8	3
14-May	2	2	Z	2	2	2	2	1	1	1	1	0	1	0	1	1	1	1	1	0	0	0	1	1	1.0	2
15-May	1	1	1	1	2	1	1	1	1	1	1	0	0	Z	0	1	1	1	1	1	1	1	1	1	0.8	2
16-May	1	1	1	1	1	1	1	1	1	1	1	1	2	2	Z	1	1	0	0	0	1	0	0	0	0.8	2
17-May	1	1	1	1	1	Z	1	1	1	2	1	2	2	2	2	1	1	1	1	3	4	4	1	1	1.4	4
18-May	Z	1	0	0	0	1	1	1	1	2	2	1	0	0	0	1	0	0	0	1	1	1	1	0	0.6	2
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0.5	2
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.2	1
24-May	Z	0	0	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-May	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	1	0.3	1
27-May	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-May	Z	1	1	1	1	1	0	2	6	0	0	2	1	1	3	0	0	0	0	3	1	1	0	0	1.1	6
31-May	1	Z	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

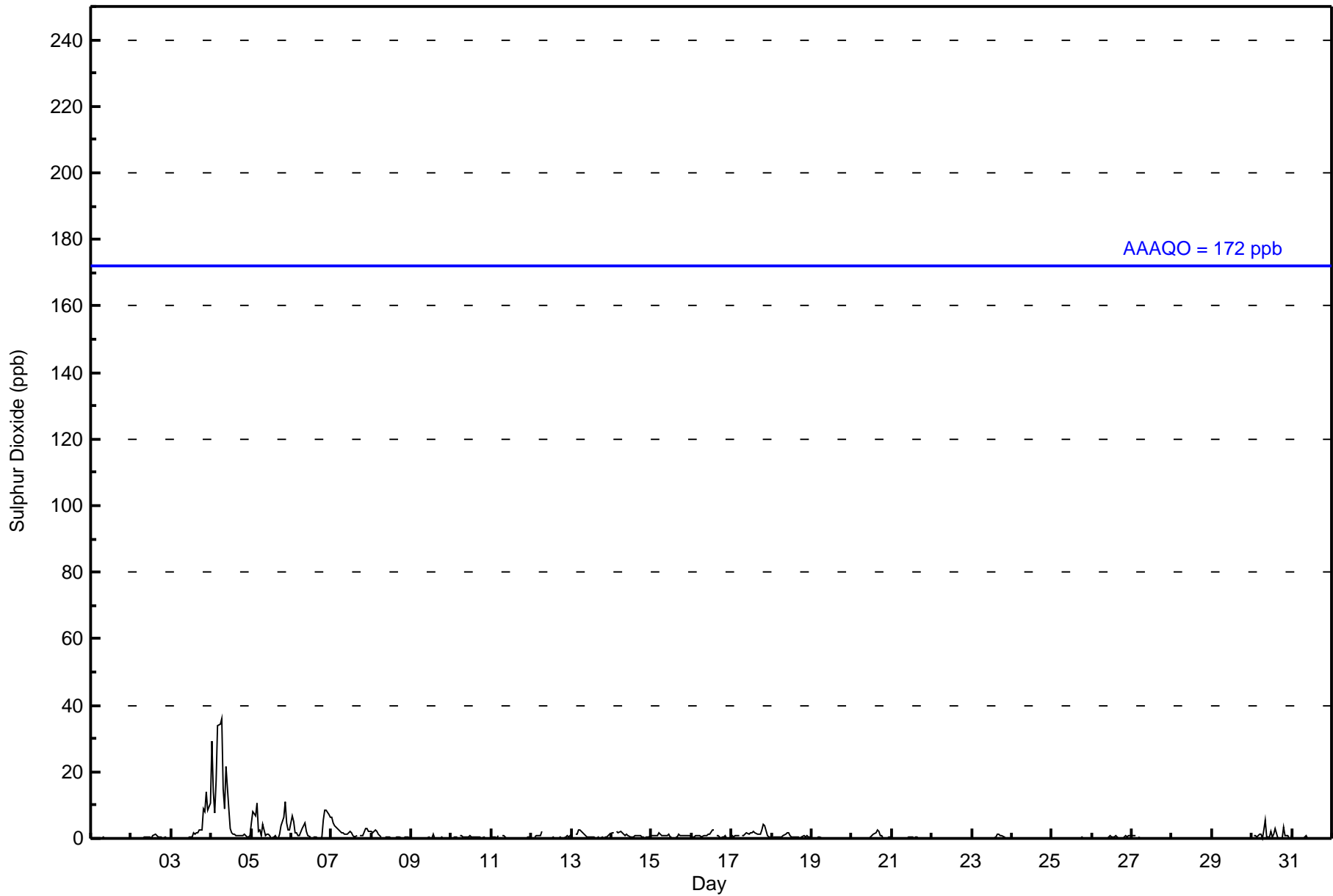
2.1	1.6	1.1	1.7	1.9	1.9	1.7	1.2	1.0	1.2	0.7	0.6	0.4	0.5	0.5	0.5	0.4	0.4	0.5	1.1	1.4	1.2	0.9	0.9	Diurnal Average	
29	14	8	17	34	34	36	15	9	22	9	3	2	2	3	2	2	2	2	4	9	11	14	8	11	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	699	98.31	98.31
11 - 20	7	0.98	99.30
21 - 60	5	0.70	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: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	100	27	11	16	27	32	113	41	13	18	28	26	34	44	39	129	698
11 - 20	0	0	0	0	0	0	1	0	2	2	0	0	0	0	2	0	7
21 - 60	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	5
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	100	27	11	16	27	32	118	42	15	20	28	26	34	44	41	129	710

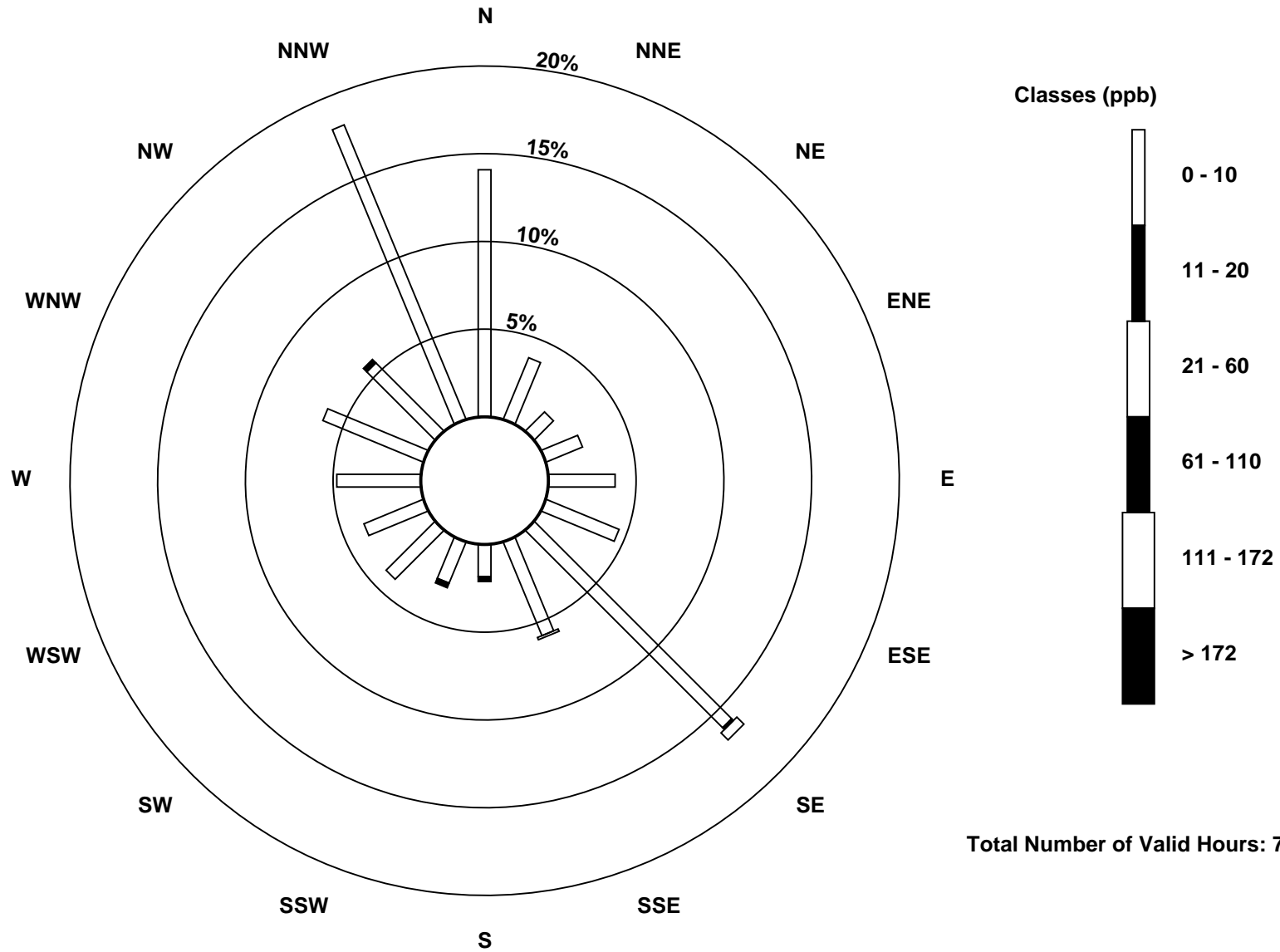
Total Number of Valid Hours: 710

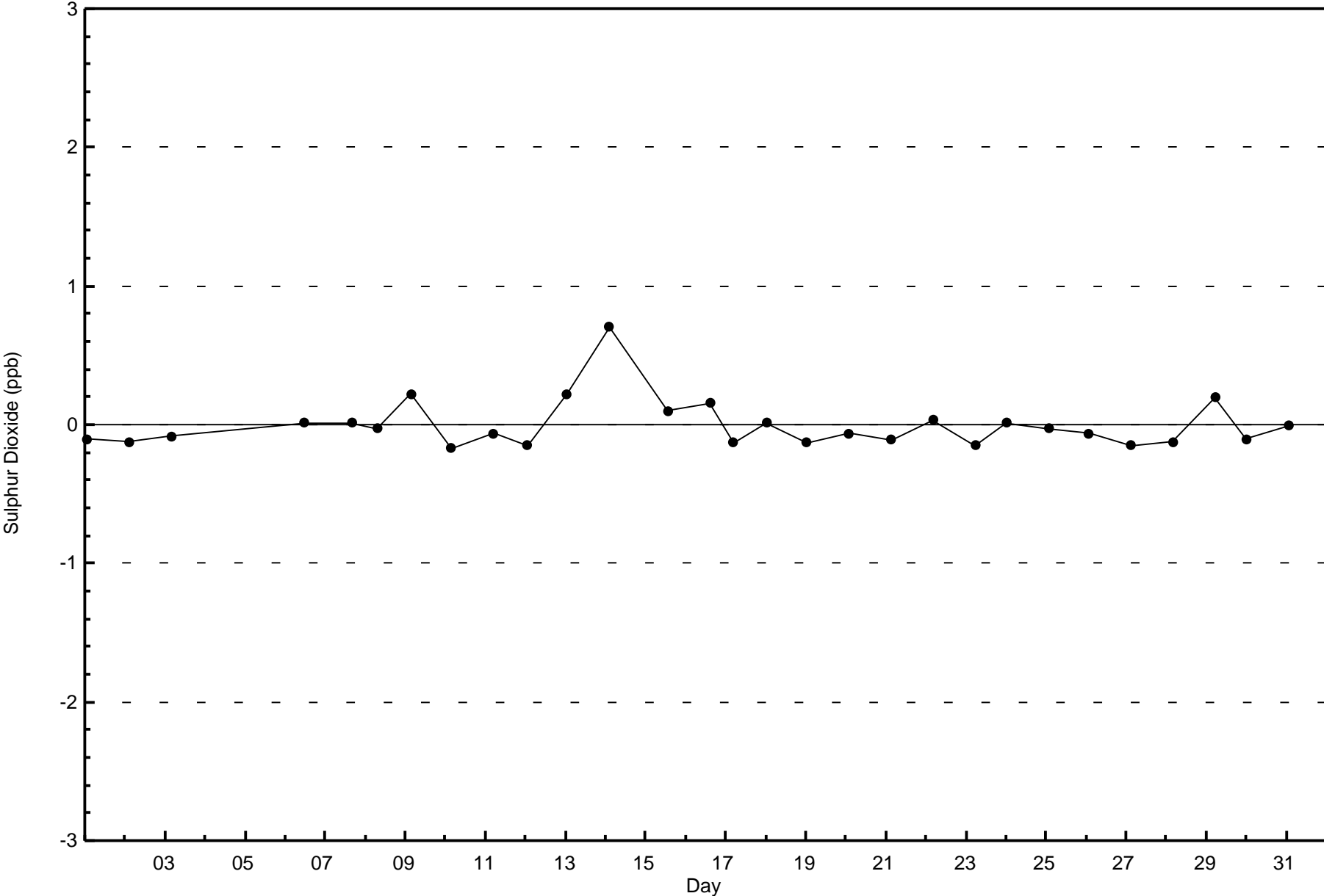
Total Number of Hours: 744

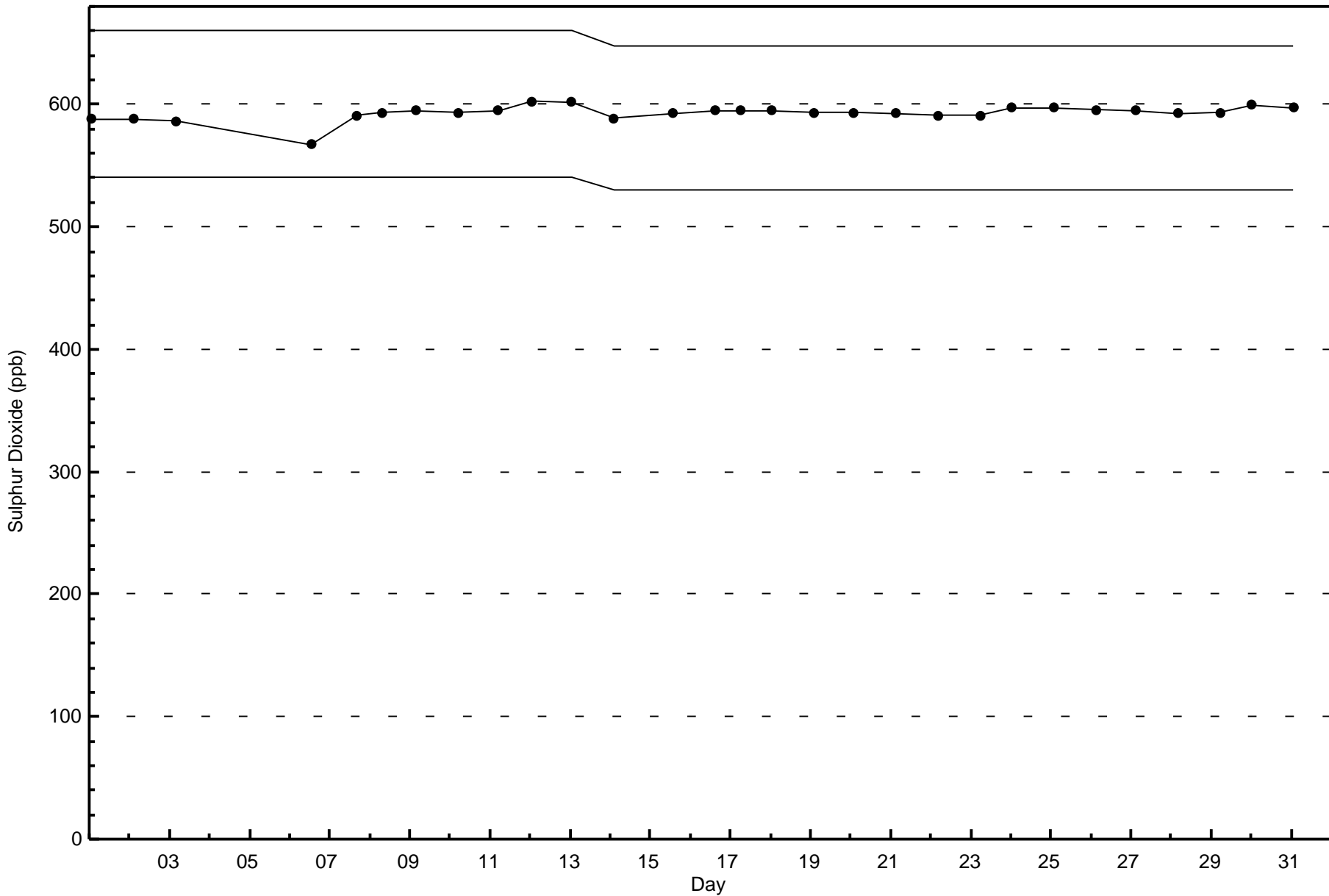


Wood Buffalo Environmental Association
Wind Rose May 2016

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









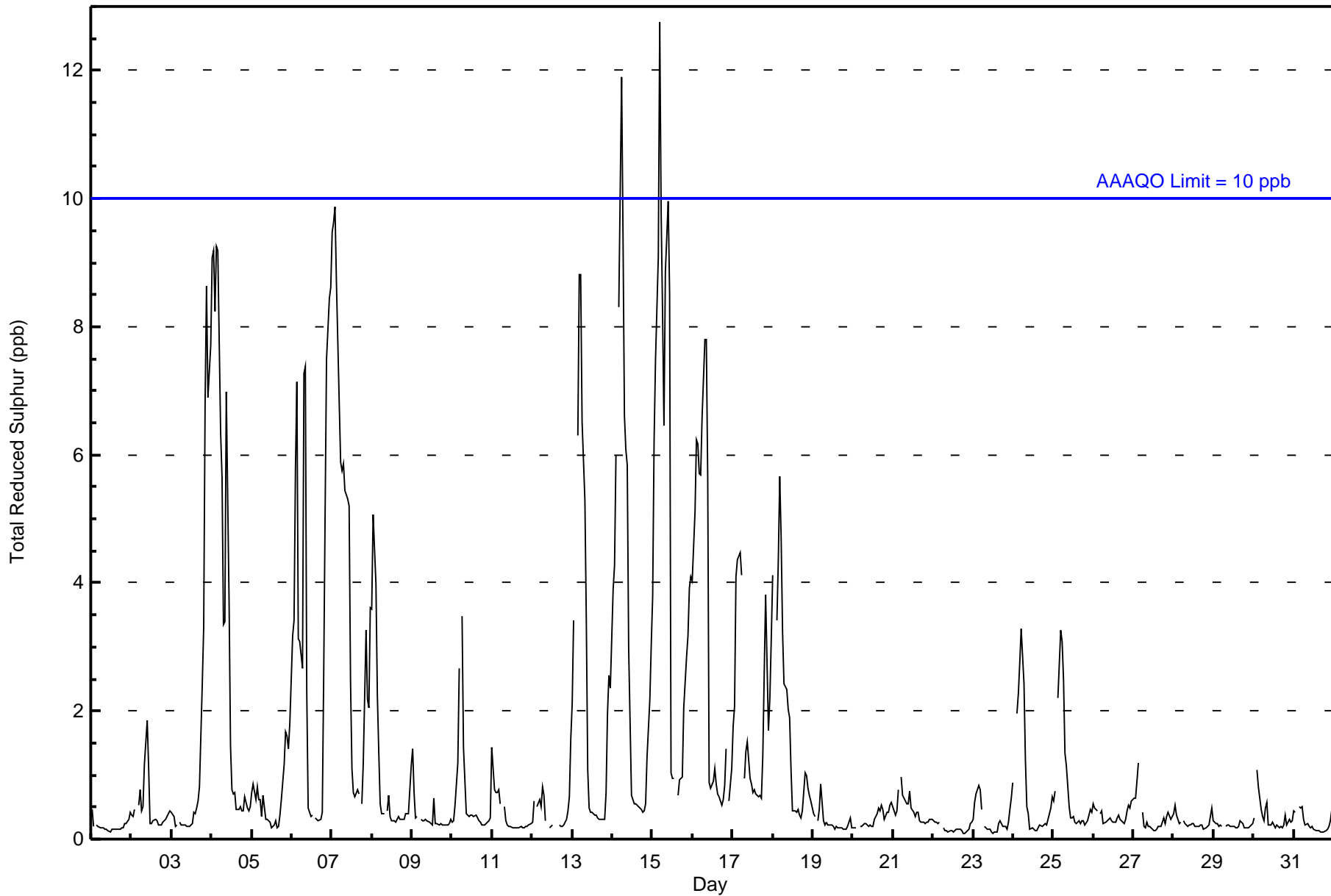
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - May 2016

Number of Exceedences (AAAQO): 1-hr: 2 24-hr: 3										Hours in Service: 744																	
Maximum Value: 13 ppb on May 15 05:00										Maximum Daily Average: 4.9 ppb on May 15										Hours of Data: 711							
Minimum Value: 0 ppb on May 23 13:00										Minimum Daily Average: 0.2 ppb on May 22										Hours of Missing Data: 33							
Maximum Diurnal Average: 3.0 ppb at hour 5										Minimum Diurnal Average: 0.3 ppb at hour 18										Hours of Calibration: 32							
Monthly Average: 1.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-May	0	0	0	Z	1	1	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
3-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3	7	9	7	8	1.8	9	
4-May	9	9	8	9	9	6	6	3	3	7	4	1	1	1	1	0	0	1	0	0	1	0	0	1	3.4	9	
5-May	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	2	0.7	2	
6-May	3	3	6	7	3	3	3	7	7	2	0	0	0	Z	0	0	0	0	0	3	5	7	8	9	3.5	9	
7-May	9	10	10	9	7	6	6	6	5	5	5	2	1	1	1	1	1	Z	1	1	3	2	2	4	4.2	10	
8-May	4	5	4	2	1	1	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1.0	5	
9-May	1	1	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
10-May	0	0	1	1	3	Z	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3	
11-May	1	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-May	0	1	Z	1	1	1	1	1	0	M	0	0	0	C	C	C	0	0	0	0	0	0	1	2	0.5	2	
13-May	2	3	Z	6	9	9	7	5	3	1	0	0	0	0	0	0	0	0	0	0	1	2	3	2	2.5	9	
14-May	4	4	6	Z	8	12	9	7	6	6	3	1	1	1	1	1	0	0	0	0	1	1	2	3	3.3	12	
15-May	4	6	7	9	13	10	8	6	9	10	9	1	1	1	Z	1	1	1	1	1	2	3	3	4	4	4.9	13
16-May	4	5	6	6	6	6	7	8	8	6	1	1	1	1	1	1	1	1	1	1	1	1	Z	1	3.1	8	
17-May	2	2	4	4	4	4	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	3	4	2	3	2.0	4	
18-May	4	Z	3	4	6	5	3	2	2	2	2	1	0	0	0	0	0	0	0	0	1	1	1	1	1.8	6	
19-May	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	
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.3	1	
21-May	1	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
23-May	0	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
24-May	1	Z	2	2	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.8	3	
25-May	1	1	Z	2	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	3	
26-May	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1	
27-May	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
28-May	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
29-May	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	
30-May	0	Z	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
31-May	0	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
1.8 2.0 2.6 2.6 3.0 2.7 2.3 1.8 1.8 1.6 1.0 0.5 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.4 0.7 1.1 1.2 1.2 1.5																								Diurnal Average			
9 10 10 9 13 12 9 8 9 10 9 2 1 1 1 1 1 1 1 1 2 3 7 9 8 9																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	602	84.67	84.67
3 - 4	44	6.19	90.86
5 - 7	38	5.34	96.20
8 - 11	25	3.52	99.72
> 11	2	0.28	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	96	28	11	13	18	17	71	25	14	15	24	22	34	44	40	129	601
3 - 4	0	0	0	1	3	6	18	4	0	3	3	1	1	1	1	2	44
5 - 7	1	0	0	0	6	5	19	3	0	1	2	1	0	0	0	0	38
8 - 11	0	0	0	1	1	1	10	8	2	2	0	0	0	0	0	0	25
> 11	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
Totals	97	28	11	15	28	30	119	40	16	21	29	24	35	45	41	131	710

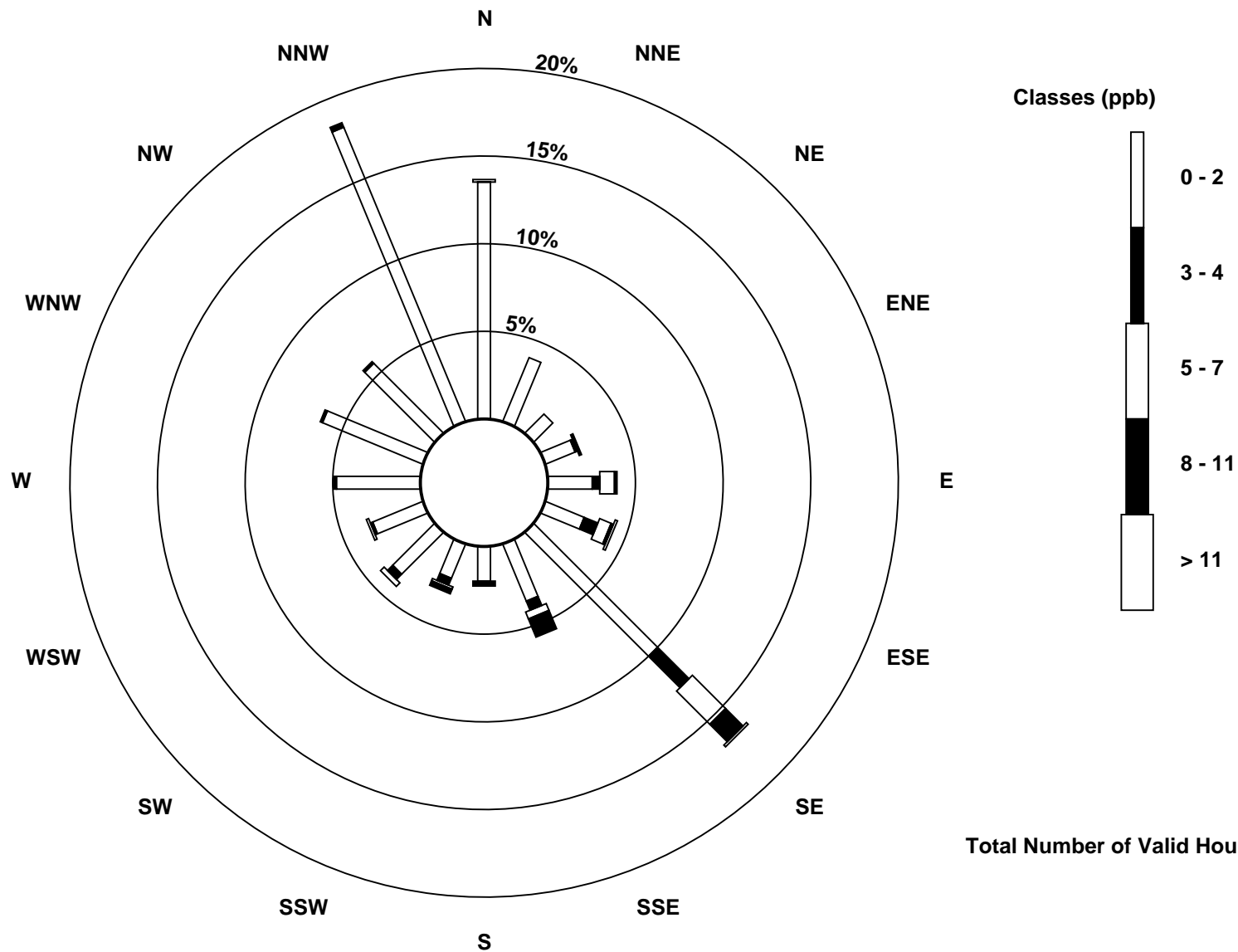
Total Number of Valid Hours: 710

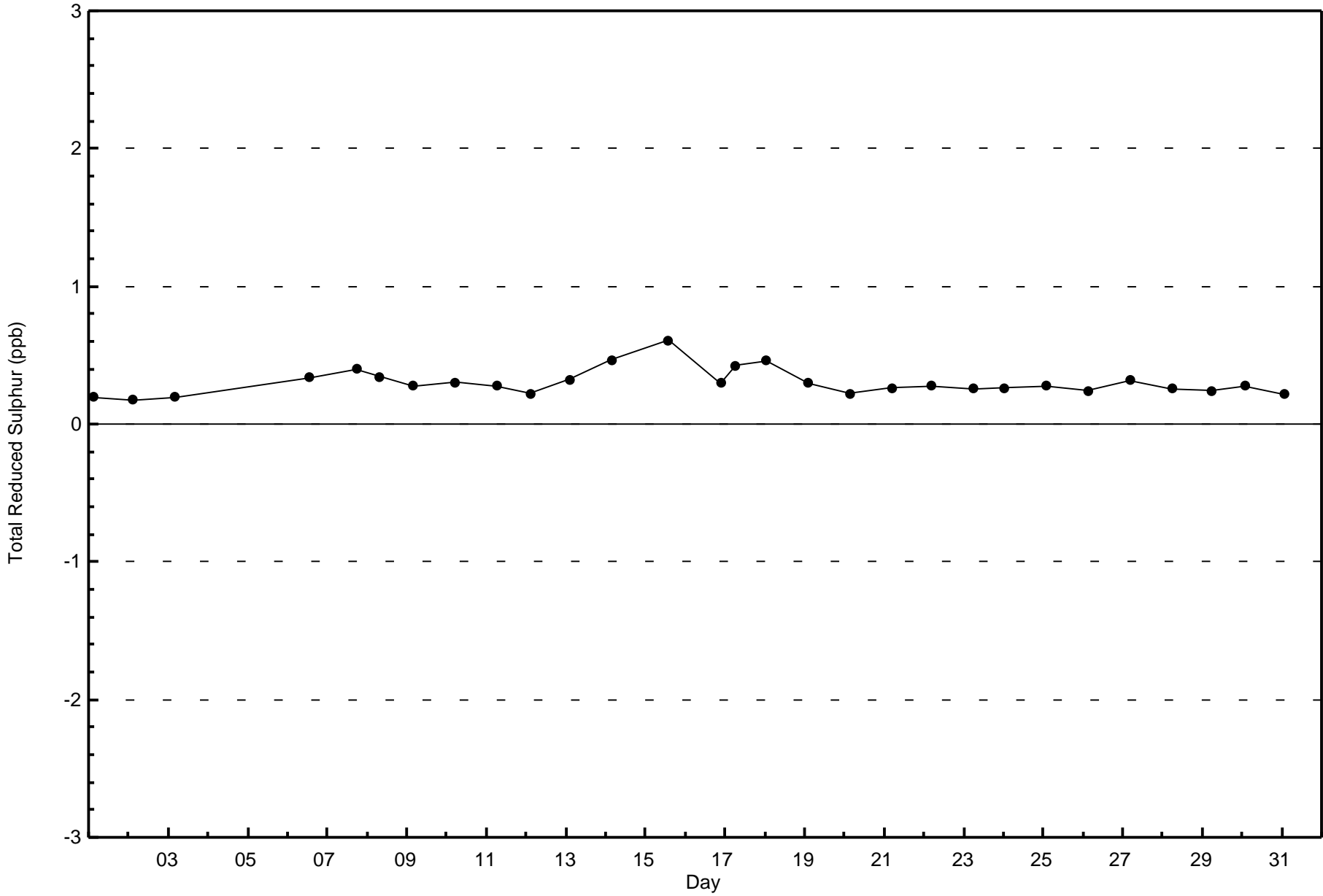
Total Number of Hours: 744

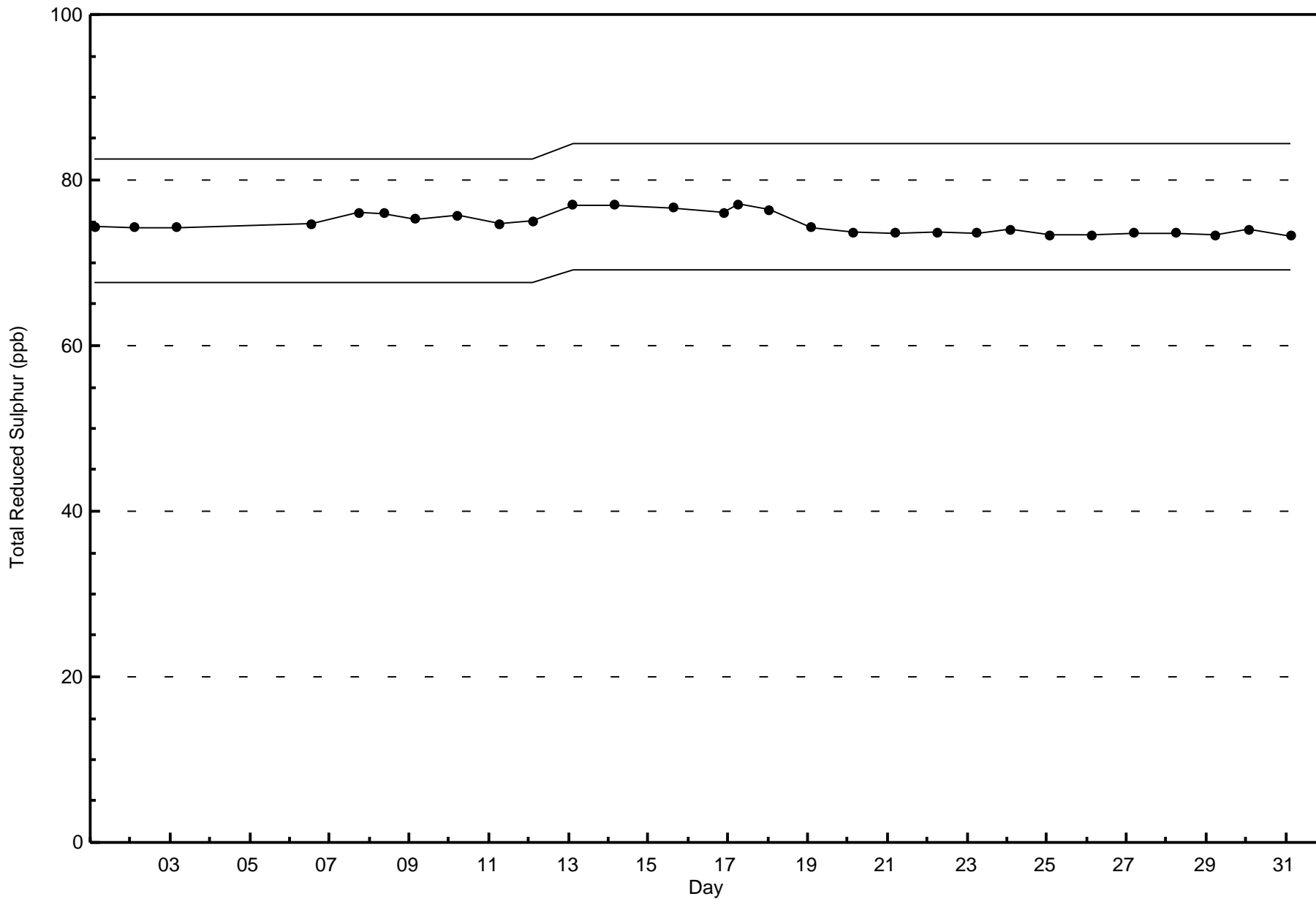


Wood Buffalo Environmental Association
Wind Rose May 2016

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









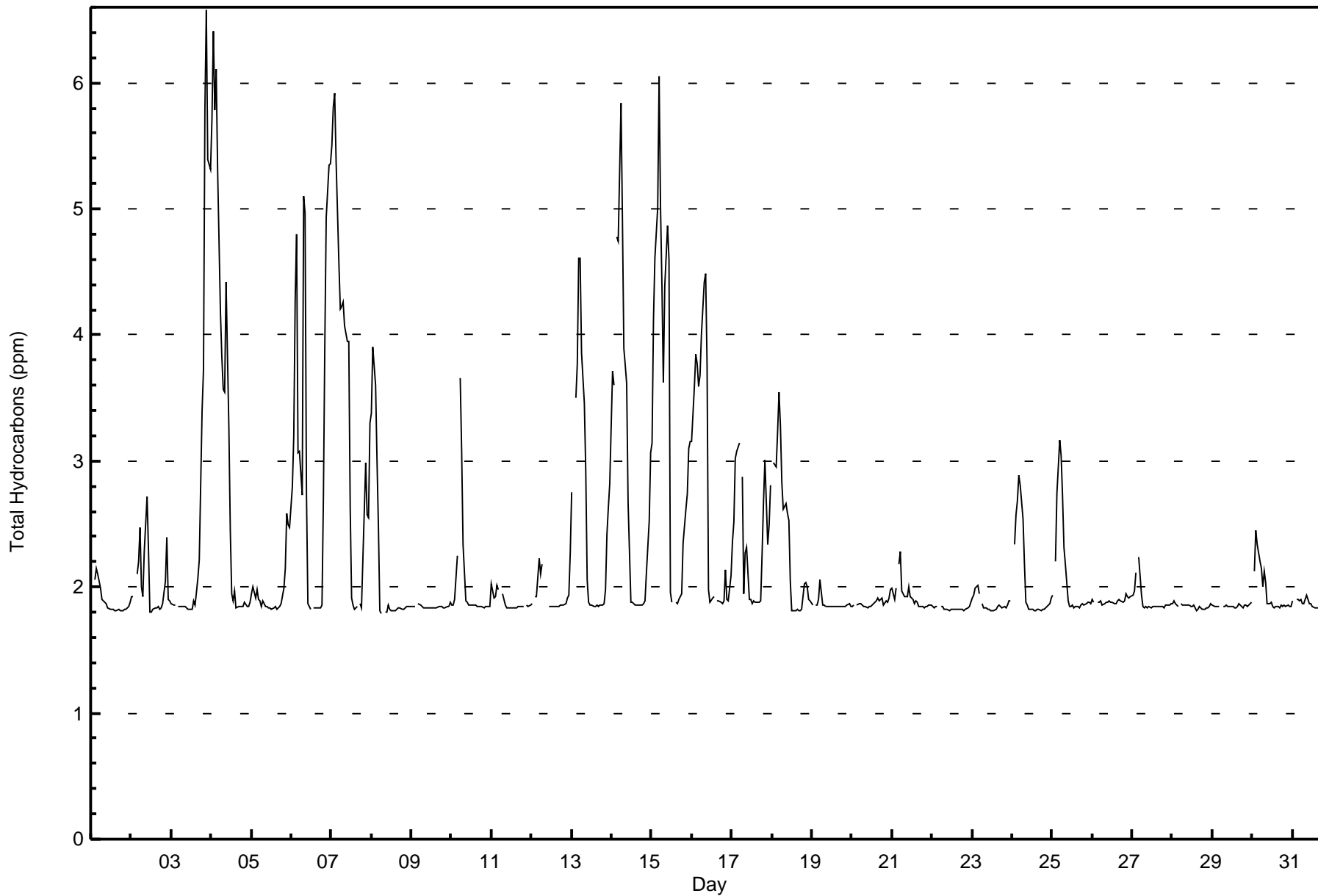
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Athabasca Valley - May 2016

Maximum Value: 6.6 ppm on May 3 22:00 Maximum Daily Average: 3.4 ppm on May 7		Hours in Service: 744 Hours of Data: 711 Hours of Missing Data: 33 Hours of Calibration: 32 Percent Operational Time: 99.9																									
Minimum Value: 1.8 ppm on May 8 07:00 Maximum Diurnal Average: 2.9 ppm at hour 4 Monthly Average: 2.24 ppm		Minimum Daily Average: 1.8 ppm on May 22 Minimum Diurnal Average: 1.8 ppm at hour 15 Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 2.1 P ₉₀ = 3.5 P ₉₉ = 5.8																									
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-May	1.9	Z	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.1
2-May	1.9	1.9	Z	2.1	2.2	2.5	2.0	1.9	2.3	2.7	2.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.4	1.9	1.9	2.0	2.7	
3-May	1.9	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.1	2.2	3.4	3.7	5.8	6.6	5.4	5.3	2.7	6.6	
4-May	5.7	6.4	5.8	6.1	5.3	4.2	3.8	3.6	3.5	4.4	3.3	2.4	1.9	1.9	2.0	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	3.2	6.4	
5-May	1.9	2.0	1.9	2.0	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.2	2.6	2.5	2.5	2.0	2.6	
6-May	2.8	3.2	4.3	4.8	3.1	3.1	2.7	5.1	5.0	2.7	1.9	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.9	2.7	3.9	4.9	5.3	5.4	3.2	5.4	
7-May	5.5	5.8	5.9	5.4	4.6	4.2	4.2	4.3	4.1	4.0	3.9	2.6	1.9	1.9	1.8	1.8	Z	1.9	1.8	2.2	3.0	2.6	2.5	3.3	3.4	5.9	
8-May	3.4	3.9	3.6	3.0	2.5	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	2.1	3.9	
9-May	1.8	1.8	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	
10-May	1.9	1.9	1.9	2.2	Z	3.7	3.1	2.3	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	2.0	3.7	3.7	
11-May	2.0	1.9	1.9	2.0	2.0	Z	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	M	1.9	1.9	1.9	1.9	2.0	
12-May	1.9	Z	1.9	1.9	2.2	2.1	2.2	C	C	C	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3	1.9	2.3		
13-May	2.7	Z	3.5	3.8	4.6	4.6	3.9	3.5	2.9	2.1	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.4	2.6	2.8	2.6	4.6	
14-May	3.7	3.6	Z	4.8	4.7	5.8	4.9	3.9	3.8	3.6	2.7	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.5	3.1	3.0	5.8	
15-May	3.1	4.1	4.6	5.0	6.1	5.0	4.4	3.6	4.4	4.9	4.6	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.3	2.6	2.7	3.1	3.2	6.1	
16-May	3.2	3.6	3.8	3.8	3.6	3.7	4.0	4.4	4.5	3.8	2.0	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.9	2.1	4.5	
17-May	2.4	2.5	3.0	3.1	3.1	Z	2.9	2.0	2.3	2.3	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3	2.7	3.0	2.3	2.5	2.8	3.1	
18-May	Z	3.0	3.0	3.2	3.5	3.3	2.8	2.6	2.7	2.6	2.5	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.0	2.0	1.9	1.9	2.3	3.5	
19-May	1.9	Z	1.9	1.9	1.9	2.1	1.9	1.9	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	2.1	
20-May	1.8	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	
21-May	2.0	1.9	2.0	Z	2.2	2.3	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.3	
22-May	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	
23-May	1.9	1.9	2.0	2.0	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	
24-May	Z	2.3	2.6	2.7	2.9	2.8	2.5	2.2	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.1	2.9	
25-May	1.9	Z	2.2	2.7	3.2	3.0	2.7	2.3	2.2	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1	3.2	
26-May	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	
27-May	1.9	2.0	2.1	Z	2.2	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.2	
28-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	
29-May	1.9	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.9	
30-May	Z	2.1	2.4	2.3	2.2	2.2	2.0	2.1	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8	2.0	2.4	
31-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	530	74.54	74.54
2.1 - 3.0	91	12.80	87.34
3.1 - 10.0	90	12.66	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	96	27	11	11	18	13	54	22	8	11	19	21	29	42	34	113	529
2.1 - 3.0	3	0	0	3	1	6	29	6	5	3	4	3	5	1	6	16	91
3.1 - 10.0	1	0	0	2	8	13	35	14	2	6	5	2	0	1	1	0	90
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	27	11	16	27	32	118	42	15	20	28	26	34	44	41	129	710

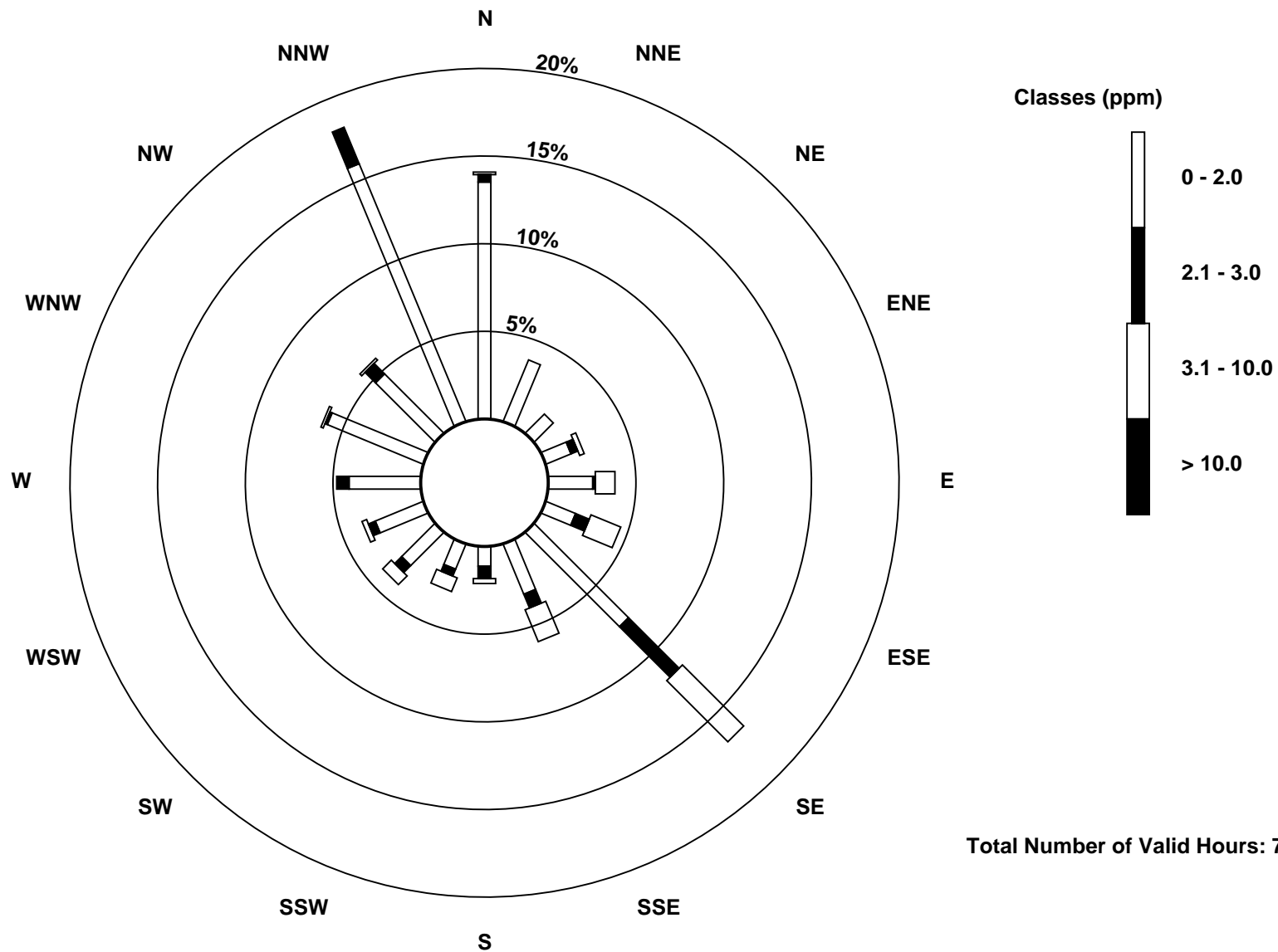
Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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

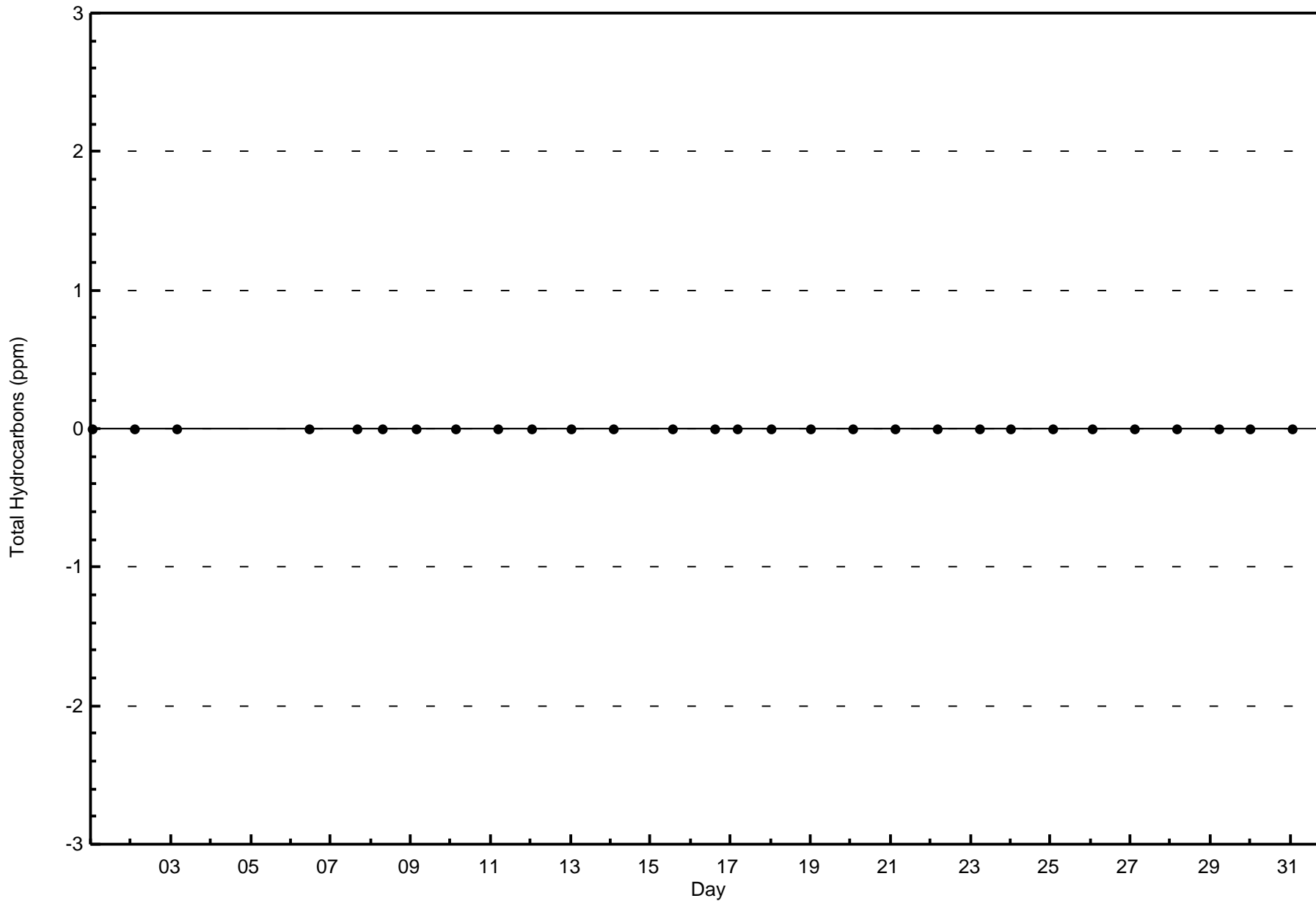


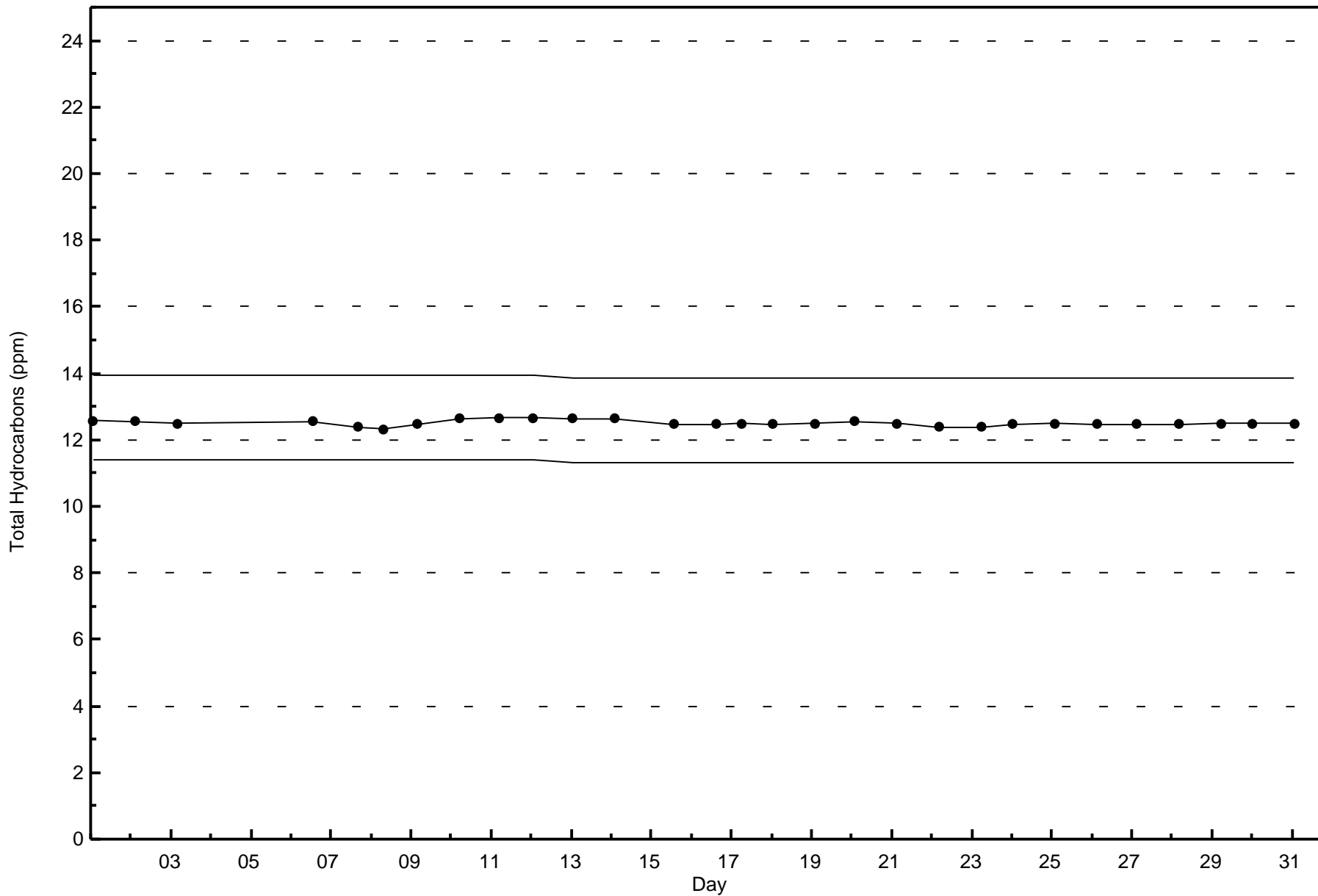
Total Number of Valid Hours: 710



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2016



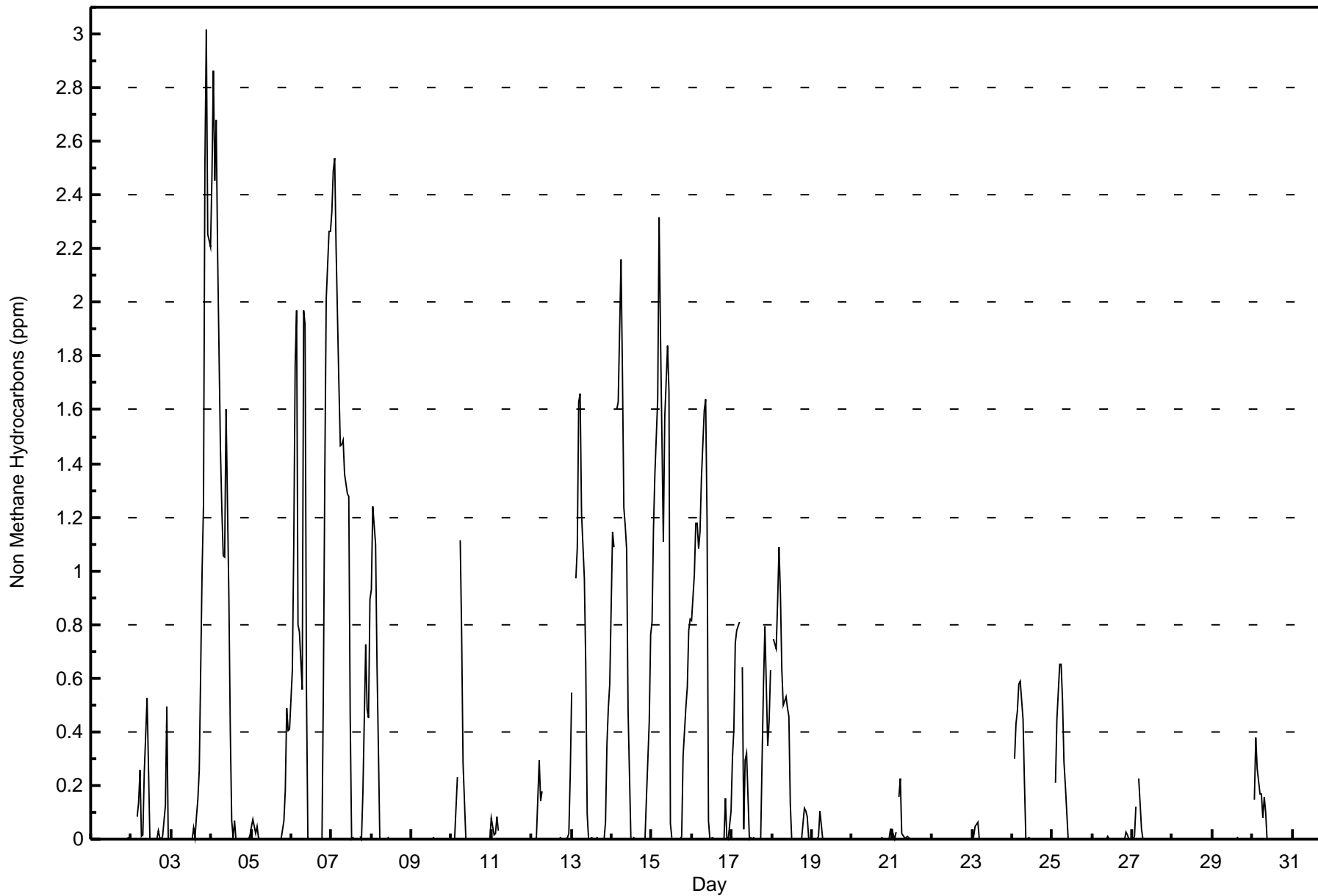




Wood Buffalo Environmental Association
Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - May 2016

Maximum Value: 3.016 ppm on May 3 22:00		Maximum Daily Average: 0.992 ppm on May 7		Hours in Service: 744																																													
Minimum Value: 0.000 ppm on May 1 01:00		Minimum Daily Average: 0.000 ppm on May 31		Hours of Data: 711																																													
Maximum Diurnal Average: 0.607 ppm at hour 4		Minimum Diurnal Average: 0.002 ppm at hour 14		Hours of Missing Data: 33																																													
Monthly Average: 0.238 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 1.0 P ₉₉ = 2.5		Hours of Calibration: 32																																													
				Percent Operational Time: 99.9																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.004																							
2-May	0.002	0.000	Z	0.083	0.135	0.257	0.013	0.018	0.249	0.524	0.266	0.000	0.000	0.000	0.000	0.000	0.030	0.003	0.000	0.011	0.127	0.493	0.000	0.000	0.096	0.524																							
3-May	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	0.041	0.008	0.082	0.150	0.258	0.998	1.247	2.510	3.016	2.254	2.206	0.555	3.016																							
4-May	2.474	2.866	2.452	2.677	2.188	1.458	1.228	1.057	1.053	1.603	0.901	0.405	0.067	0.003	0.068	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.014	0.855	2.866																							
5-May	0.046	0.071	0.020	0.047	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.071	0.182	0.487	0.406	0.408	0.073	0.487																						
6-May	0.629	1.098	1.771	1.971	0.797	0.774	0.559	1.971	1.920	0.552	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.572	1.362	2.012	2.267	2.264	0.892	2.267																							
7-May	2.341	2.490	2.540	2.199	1.694	1.465	1.470	1.486	1.363	1.285	1.275	0.456	0.000	0.006	0.000	0.000	Z	0.010	0.000	0.173	0.724	0.482	0.452	0.894	0.992	2.540																							
8-May	0.930	1.238	1.098	0.649	0.338	0.000	0.000	Z	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	0.185	1.238																							
9-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003																							
10-May	0.000	0.000	0.000	0.233	Z	1.114	0.768	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.104	1.114																							
11-May	0.081	0.018	0.020	0.086	0.033	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	M	0.000	0.000	0.000	0.011	0.086																							
12-May	0.000	Z	0.000	0.006	0.293	0.141	0.178	C	C	C	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.006	0.020	0.244	0.045	0.293																							
13-May	0.545	Z	0.974	1.086	1.628	1.660	1.214	0.970	0.647	0.092	0.000	0.000	0.003	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.063	0.354	0.486	0.580	0.448	1.660																						
14-May	1.145	1.088	Z	1.604	1.630	2.161	1.740	1.233	1.164	1.075	0.479	0.001	0.002	0.004	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.153	0.434	0.762	0.638	2.161																						
15-May	0.810	1.158	1.363	1.638	2.319	1.871	1.499	1.109	1.573	1.838	1.666	0.057	0.005	Z	0.002	0.000	0.000	0.002	0.009	0.308	0.494	0.566	0.780	0.821	0.865	2.319																							
16-May	0.814	0.986	1.178	1.179	1.082	1.146	1.344	1.597	1.637	1.181	0.070	0.000	0.007	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.154	0.003	0.000	0.105	0.543	1.637																						
17-May	0.303	0.407	0.731	0.777	0.809	Z	0.641	0.038	0.295	0.320	0.000	0.005	0.000	0.003	0.000	0.000	0.000	0.000	0.297	0.577	0.793	0.348	0.443	0.629	0.322	0.809																							
18-May	Z	0.748	0.712	0.885	1.090	0.913	0.629	0.497	0.532	0.490	0.459	0.129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.117	0.105	0.085	0.006	0.001	0.322	1.090																							
19-May	0.000	Z	0.000	0.000	0.012	0.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.105																							
20-May	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	0.003	0.007	0.000	0.000	0.000	0.000	0.039	0.002	0.039																							
21-May	0.036	0.000	0.024	Z	0.156	0.225	0.021	0.004	0.006	0.012	0.008	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	0.021	0.225																							
22-May	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	0.002	0.000	0.000	0.000	0.002																							
23-May	0.000	0.009	0.048	0.065	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.005	0.065																							
24-May	Z	0.302	0.431	0.476	0.578	0.586	0.445	0.209	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.132	0.586																							
25-May	0.002	Z	0.213	0.449	0.651	0.653	0.516	0.291	0.198	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.129	0.653																							
26-May	0.013	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.015	0.000	0.003	0.003	0.026																						
27-May	0.000	0.012	0.123	Z	0.225	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.225																							
28-May	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																						
29-May	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	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003																						
30-May	Z	0.146	0.377	0.265	0.171	0.167	0.077	0.155	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063	0.377																							
31-May	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																						
																								0.363	0.505	0.521	0.607	0.565	0.546	0.398	0.377	0.358	0.299	0.166	0.034	0.003	0.002	0.003	0.003	0.006	0.009	0.042	0.099	0.218	0.259	0.244	0.289	Diurnal Average	
																								2.474	2.866	2.540	2.677	2.319	2.161	1.740	1.971	1.920	1.838	1.666	0.456	0.067	0.041	0.068	0.082	0.150	0.258	0.998	1.247	2.510	3.016	2.267	2.264	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	474	66.67	66.67
0.006 - 0.05	41	5.77	72.43
0.06 - 0.1	27	3.80	76.23
> 0.1	169	23.77	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	88	27	7	10	17	11	51	19	10	11	17	18	25	39	29	95	474
0.006 - 0.05	8	0	4	0	0	1	4	2	0	0	1	1	2	2	1	14	40
0.06 - 0.1	0	0	0	2	1	2	2	1	0	0	2	2	2	1	4	8	27
> 0.1	4	0	0	4	9	18	61	20	5	9	8	5	5	2	7	12	169
Totals	100	27	11	16	27	32	118	42	15	20	28	26	34	44	41	129	710

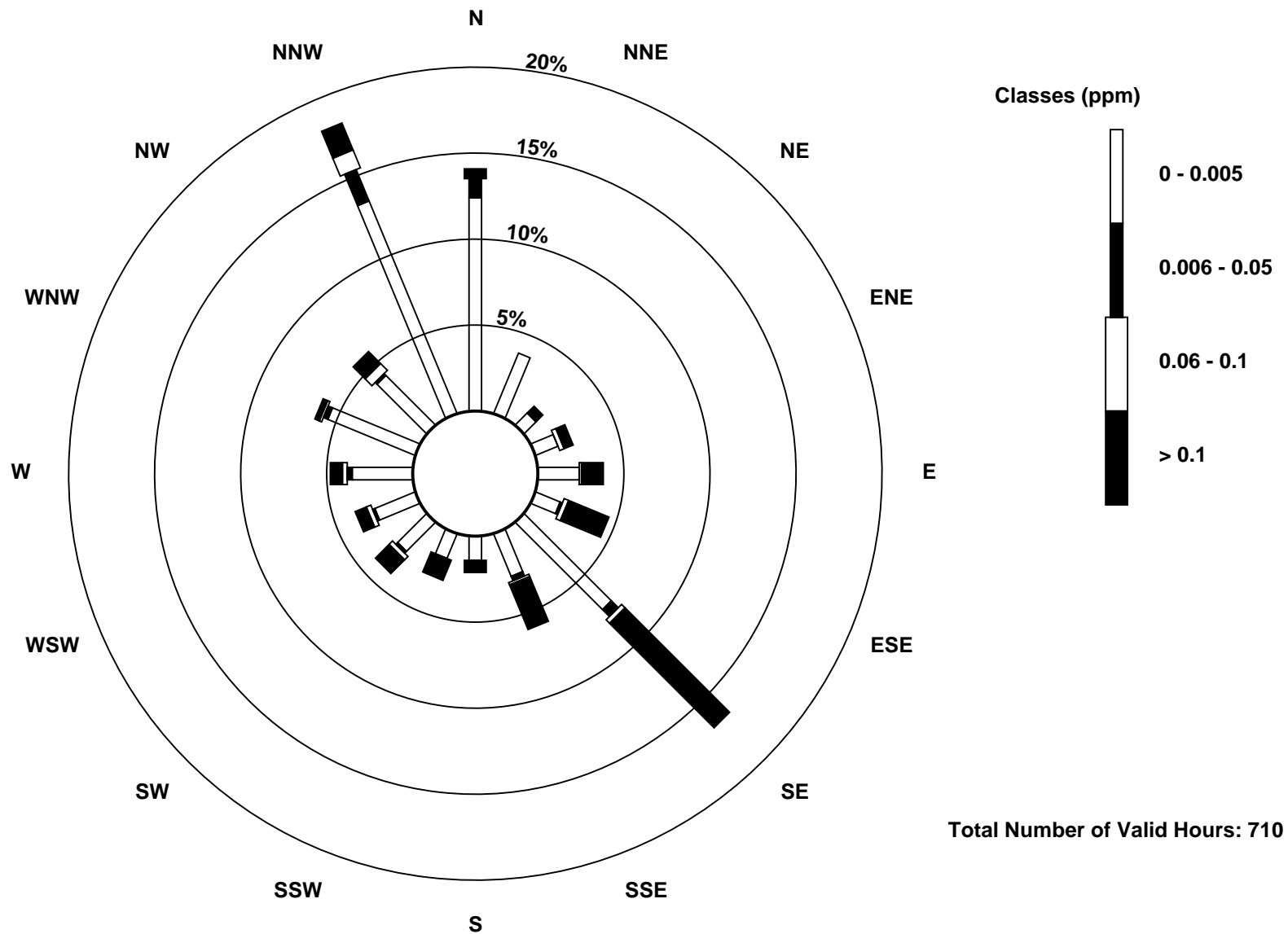
Total Number of Valid Hours: 710

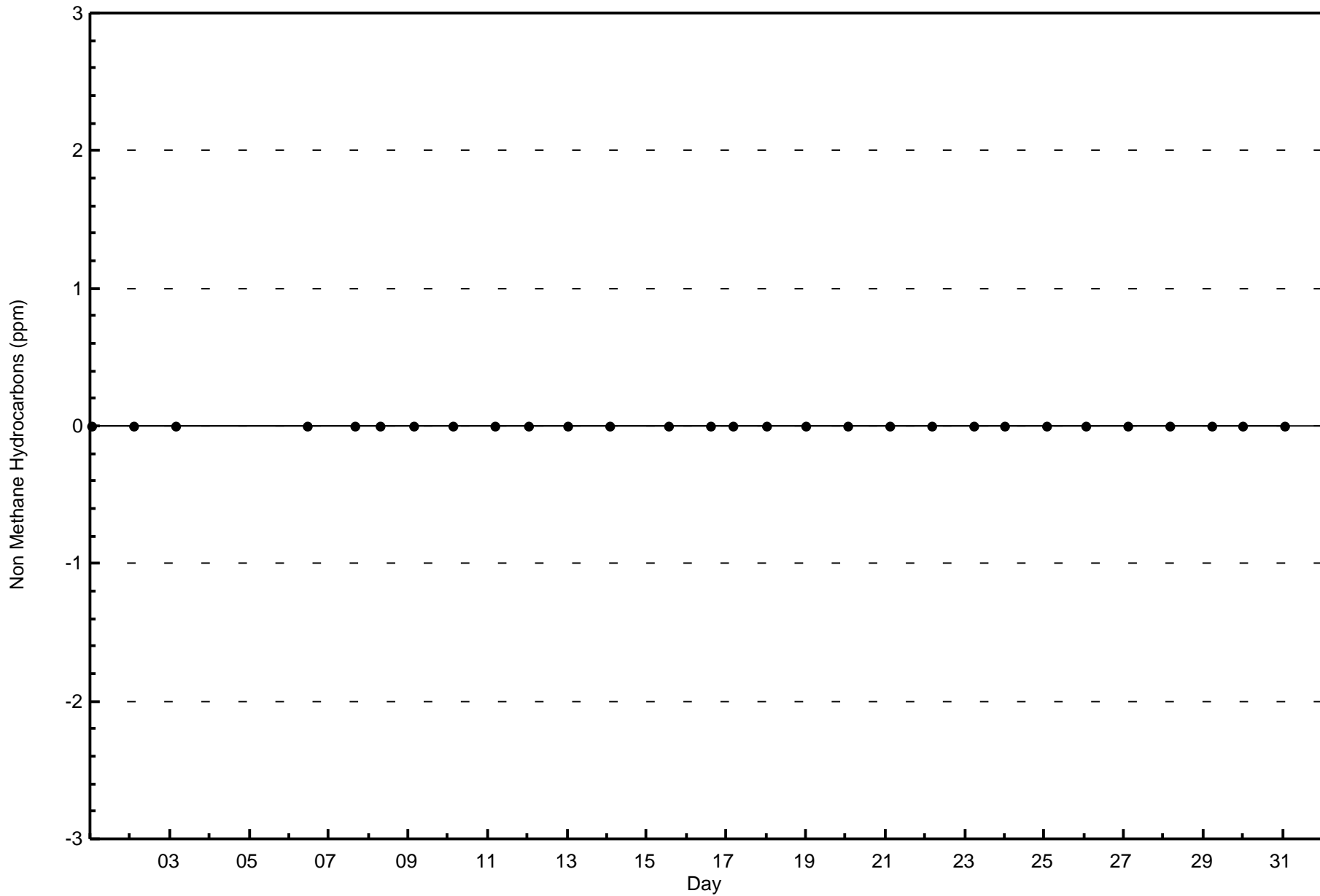
Total Number of Hours: 744

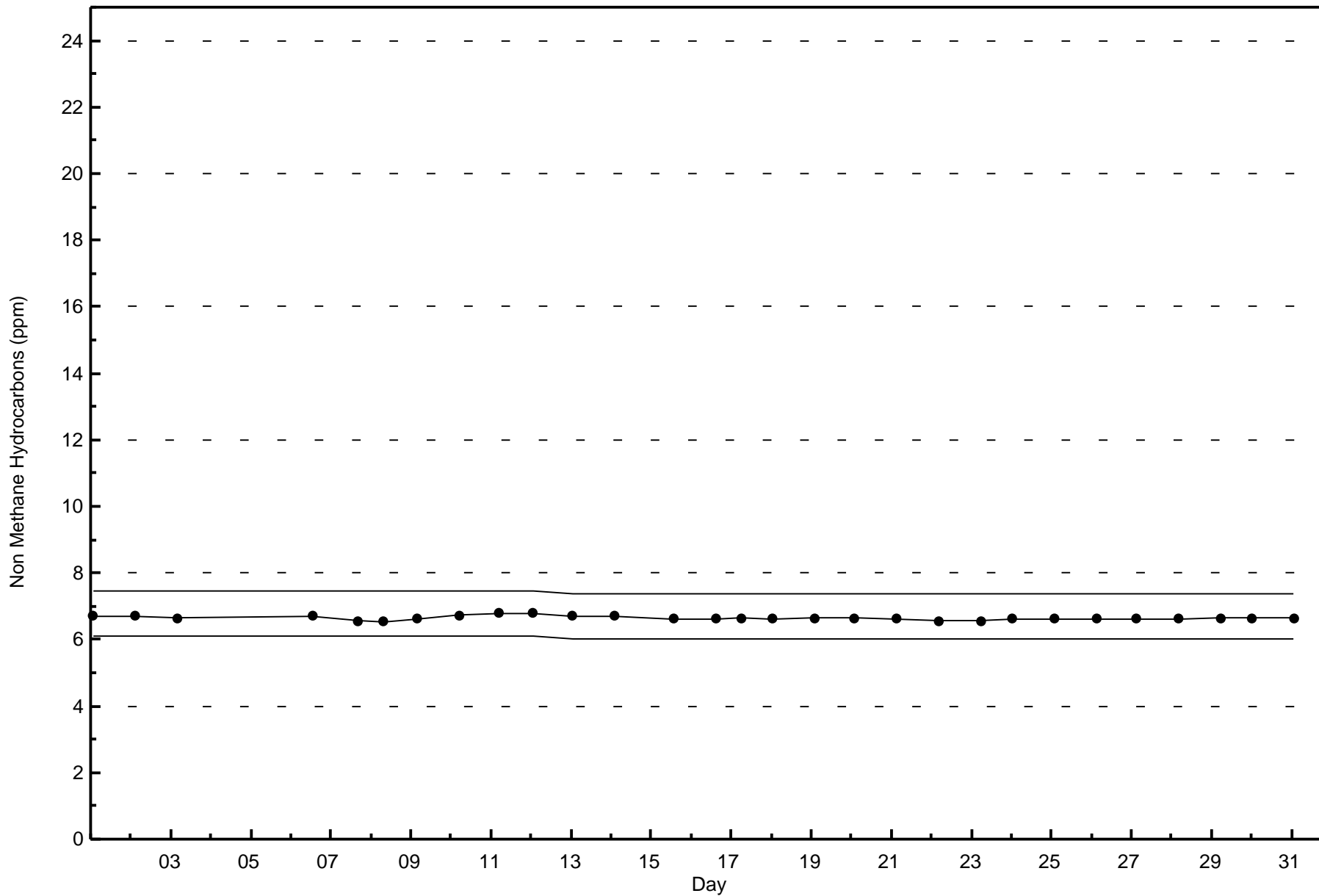


Wood Buffalo Environmental Association
Wind Rose May 2016

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)









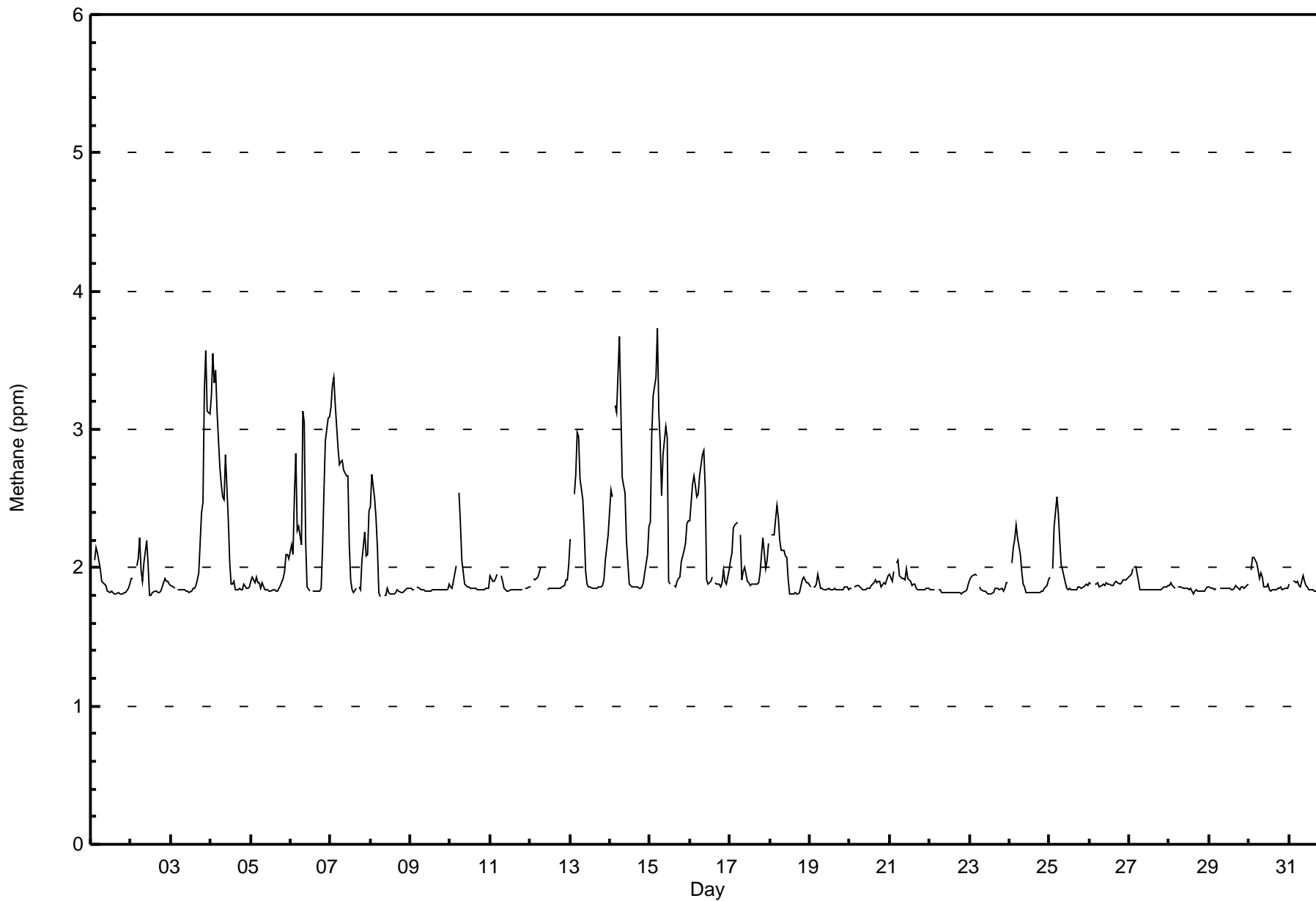
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Athabasca Valley - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 ppm on May 15 05:00 Maximum Daily Average: 2.5 ppm on May 15																	Hours in Service: 744 Hours of Data: 711 Hours of Missing Data: 33 Hours of Calibration: 32 Percent Operational Time: 99.9										
Minimum Value: 1.8 ppm on May 8 07:00 Minimum Daily Average: 1.8 ppm on May 22 Maximum Diurnal Average: 2.3 ppm at hour 4 Minimum Diurnal Average: 1.8 ppm at hour 15 Monthly Average: 2.01 ppm Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.5 P ₉₉ = 3.4																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	1.9	Z	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.1	
2-May	1.9	1.9	Z	2.0	2.1	2.2	2.0	1.9	2.0	2.2	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
3-May	1.9	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.4	2.5	3.3	3.6	3.1	3.1	2.2	2.2	3.6	
4-May	3.2	3.5	3.3	3.4	3.1	2.7	2.6	2.5	2.5	2.8	2.4	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	2.4	2.4	3.5	
5-May	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.1	2.1	2.1	1.9	2.1	
6-May	2.2	2.1	2.5	2.8	2.3	2.3	2.2	3.1	3.0	2.2	1.9	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.9	2.1	2.6	2.9	3.1	3.1	2.3	3.1	
7-May	3.2	3.3	3.4	3.2	2.9	2.7	2.8	2.8	2.7	2.7	2.7	2.2	1.9	1.8	1.8	1.8	Z	1.9	1.8	2.1	2.3	2.1	2.1	2.4	2.5	3.4	
8-May	2.4	2.7	2.5	2.4	2.1	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	2.0	2.7	
9-May	1.8	1.8	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	
10-May	1.9	1.9	1.9	2.0	Z	2.5	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.5	
11-May	1.9	1.9	1.9	1.9	1.9	Z	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	M	1.9	1.9	1.9	1.9	1.9	
12-May	1.9	Z	1.9	1.9	1.9	2.0	2.0	C	C	C	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0		
13-May	2.2	Z	2.5	2.7	3.0	2.9	2.6	2.5	2.3	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.2	2.2	3.0	
14-May	2.6	2.5	Z	3.2	3.1	3.7	3.2	2.7	2.6	2.5	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.3	2.3	3.7	
15-May	2.3	3.0	3.2	3.4	3.7	3.1	2.9	2.5	2.8	3.0	2.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.3	2.3	3.7	
16-May	2.3	2.6	2.7	2.6	2.5	2.5	2.7	2.8	2.8	2.6	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.2	2.8	
17-May	2.1	2.1	2.3	2.3	2.3	Z	2.2	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.0	2.1	2.2	2.3	
18-May	Z	2.2	2.2	2.3	2.5	2.4	2.2	2.1	2.1	2.1	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.5	
19-May	1.9	Z	1.9	1.9	1.9	2.0	1.9	1.9	1.8	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	1.9	1.9	1.8	2.0	
20-May	1.8	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
21-May	2.0	1.9	2.0	Z	2.0	2.1	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.1	
22-May	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	
23-May	1.9	1.9	1.9	2.0	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	
24-May	Z	2.0	2.1	2.2	2.3	2.2	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.3	
25-May	1.9	Z	2.0	2.3	2.5	2.4	2.2	2.0	2.0	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.5	
26-May	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	
27-May	1.9	2.0	2.0	Z	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	
28-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	
29-May	1.9	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.9	
30-May	Z	2.0	2.1	2.1	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8	1.8	2.1	
31-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	565	79.47	79.47
2.1 - 3.0	122	17.16	96.62
3.1 - 10.0	24	3.38	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	98	27	11	12	19	16	60	24	10	11	20	23	32	42	37	122	564
2.1 - 3.0	2	0	0	4	8	12	52	10	3	6	7	3	2	2	4	7	122
3.1 - 10.0	0	0	0	0	0	4	6	8	2	3	1	0	0	0	0	0	24
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	27	11	16	27	32	118	42	15	20	28	26	34	44	41	129	710

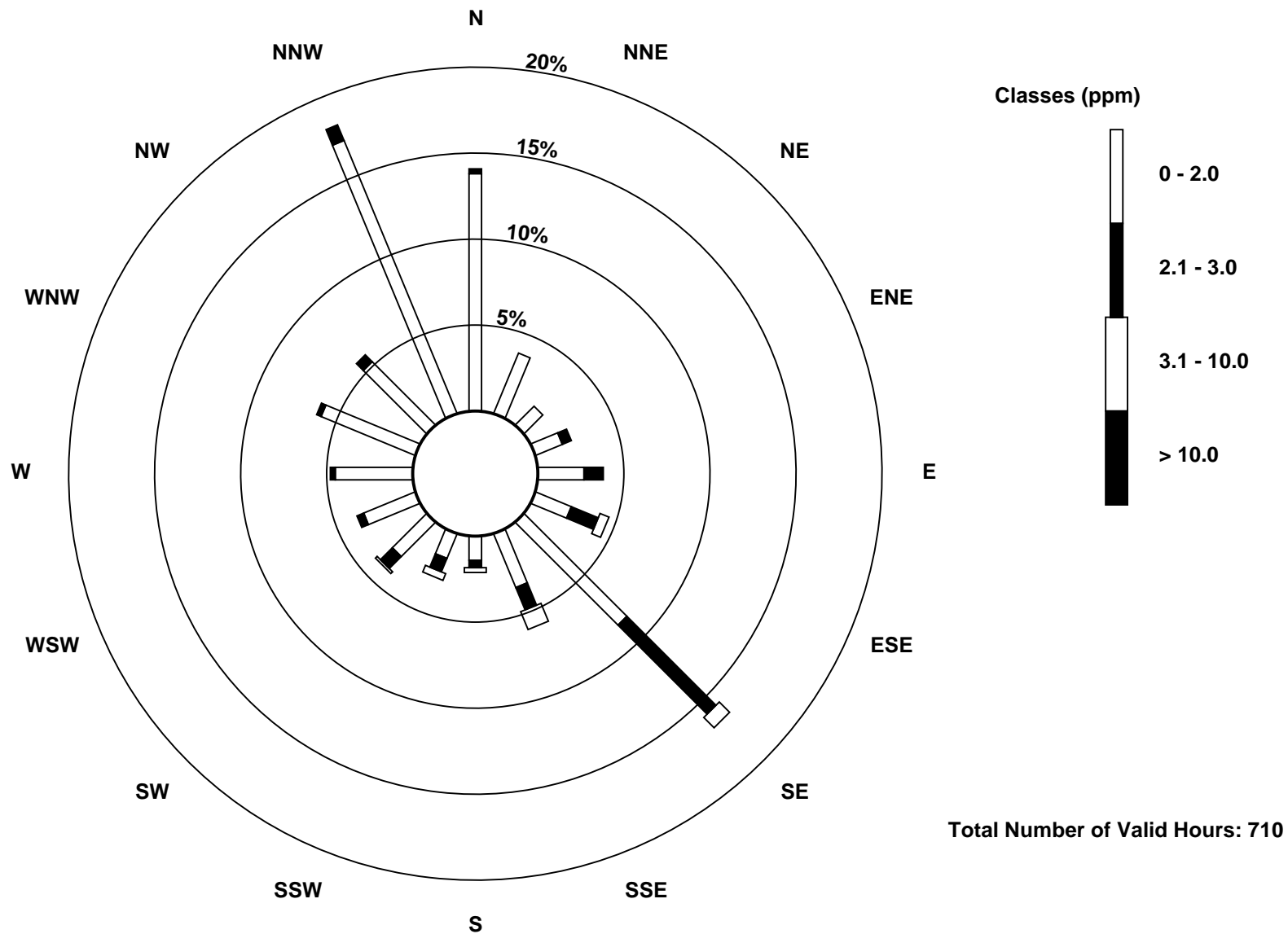
Total Number of Valid Hours: 710

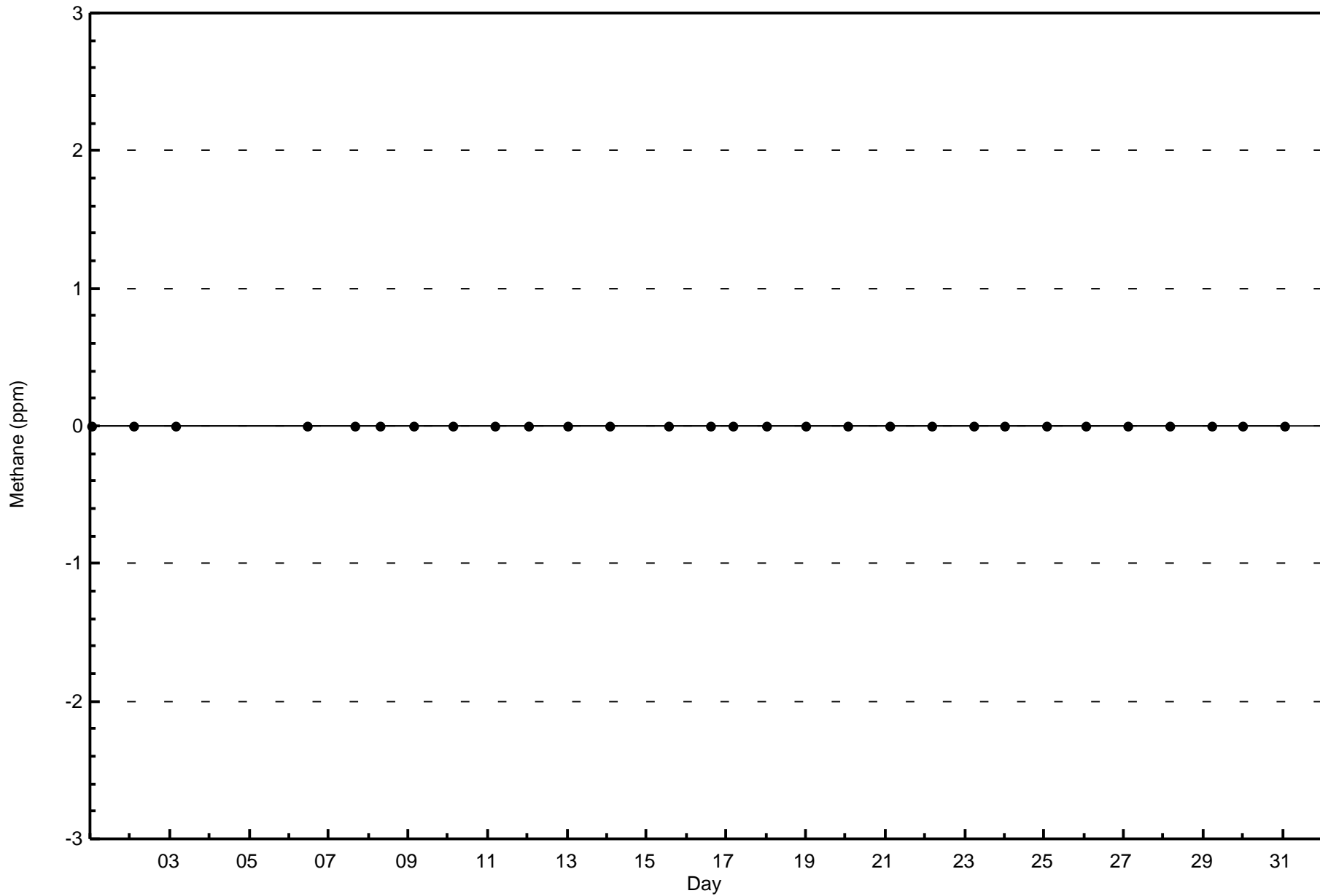
Total Number of Hours: 744

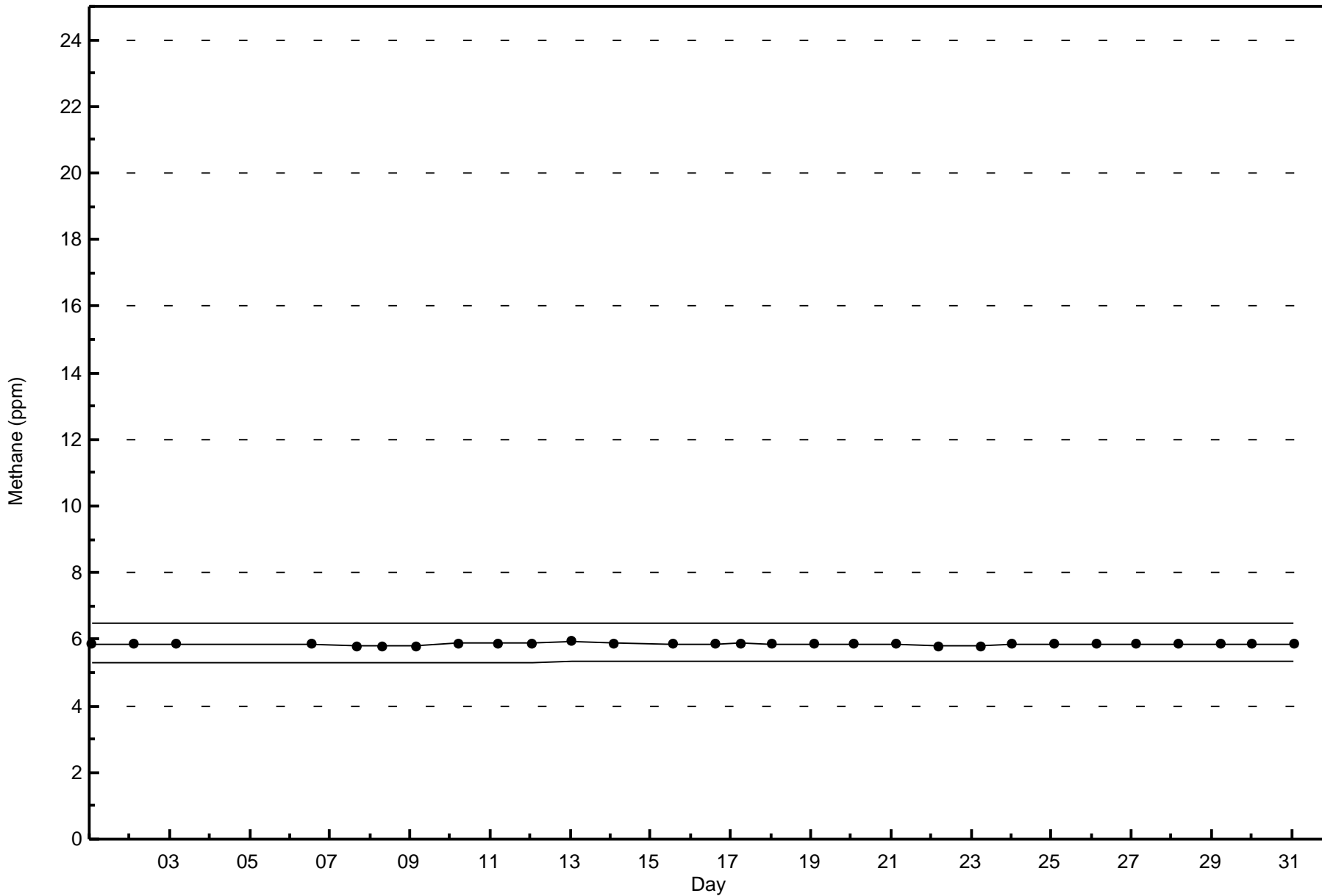


Wood Buffalo Environmental Association
Wind Rose May 2016

Methane (CH₄) - ppm
Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Athabasca Valley - May 2016

Number of Exceedences (AAAQO):	1-hr: 32	24-hr: 0	Hours in Service:	744
Maximum Value: 355 ppb on May 3 22:00	Maximum Daily Average: 94.1 ppb on May 4		Hours of Data:	710
Minimum Value: 7 ppb on May 31 05:00	Minimum Daily Average: 17.0 ppb on May 26		Hours of Missing Data:	34
Maximum Diurnal Average: 43.5 ppb at hour 22	Minimum Diurnal Average: 26.7 ppb at hour 7		Hours of Calibration:	33
Monthly Average: 35.1 ppb	Percentiles: P ₁ = 9 P ₁₀ = 15 Q ₁ = 20 Median = 28 Q ₃ = 40 P ₉₀ = 50 P ₉₉ = 175		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-May	18	16	13	Z	10	15	18	25	30	33	42	43	44	41	38	36	36	34	32	29	20	18	13	11	26.8	44
2-May	9	8	11	8	Z	13	10	21	49	80	65	35	33	46	50	44	34	30	27	19	12	12	15	16	28.2	80
3-May	19	18	24	24	23	Z	23	23	23	27	31	38	41	58	55	49	69	73	152	167	320	355	229	213	89.3	355
4-May	206	205	155	186	150	111	105	98	120	179	103	72	42	49	59	45	48	48	48	46	49	43	44	53	94.1	206
5-May	58	57	48	55	43	41	38	48	39	42	43	43	47	49	43	45	48	48	50	55	57	86	73	57	50.3	86
6-May	72	49	81	101	50	53	46	118	129	73	41	34	40	42	Z	45	43	43	46	105	155	179	174	159	81.6	179
7-May	148	145	138	119	91	81	82	85	75	71	67	47	42	35	36	40	37	42	Z	25	69	53	46	59	71.1	148
8-May	57	63	65	34	23	33	40	41	39	Z	37	36	39	42	42	42	44	37	32	29	29	28	26	23	38.4	65
9-May	22	21	20	20	19	Z	19	22	24	25	26	26	23	20	24	24	26	26	26	29	28	28	27	26	24.0	29
10-May	25	23	22	19	30	47	Z	28	28	30	33	34	35	36	36	36	37	38	39	40	39	37	34	34	33.0	47
11-May	27	24	24	29	28	24	25	Z	32	37	38	39	40	39	39	40	41	44	45	42	44	44	43	41	36.0	45
12-May	40	18	33	Z	30	31	31	33	31	M	C	C	C	C	39	39	40	39	39	39	33	30	26	24	33.0	40
13-May	22	20	20	Z	40	37	28	21	17	22	29	32	33	34	35	36	36	37	36	35	27	20	15	20	28.3	40
14-May	21	19	21	24	23	32	24	18	18	18	21	26	Z	31	34	37	38	36	35	31	27	22	16	14	25.4	38
15-May	12	18	19	24	37	22	17	15	26	24	23	23	29	33	36	Z	38	28	19	16	12	9	10	11	21.8	38
16-May	8	13	17	16	16	15	18	22	21	20	37	44	41	44	50	48	47	44	40	33	35	Z	25	25	30.5	50
17-May	23	15	21	22	18	14	14	Z	34	40	41	49	51	49	43	41	45	43	28	27	23	26	22	17	30.6	51
18-May	15	14	Z	15	21	16	16	21	26	35	38	33	31	35	36	39	39	34	32	26	18	19	12	11	25.2	39
19-May	11	11	11	Z	14	15	15	17	22	25	24	20	20	20	19	19	20	19	20	19	20	19	19	18	18.1	25
20-May	18	18	16	15	Z	16	16	23	24	28	30	32	40	52	54	56	48	28	24	24	23	24	23	22	28.4	56
21-May	22	24	23	22	18	Z	17	17	19	20	21	22	23	23	22	21	19	19	20	20	19	18	19	20	20.3	24
22-May	22	22	21	20	19	19	Z	27	29	27	27	28	29	30	31	33	34	34	36	36	36	34	31	30	28.4	36
23-May	26	25	22	23	23	23	26	Z	32	38	47	49	46	45	42	45	46	45	42	41	38	31	24	28	35.1	49
24-May	22	17	Z	15	17	19	25	30	36	39	45	45	46	45	44	42	42	39	37	35	33	30	26	24	32.8	46
25-May	22	21	15	Z	16	17	18	19	20	26	36	39	41	42	46	38	33	37	38	30	25	21	20	19	27.8	46
26-May	20	22	21	20	Z	18	17	16	18	18	20	19	21	19	17	17	15	14	14	14	12	12	12	12	17.0	22
27-May	10	9	9	8	8	Z	19	19	17	18	17	19	22	24	21	22	35	32	31	31	27	22	18	20	19.9	35
28-May	22	16	18	20	19	18	Z	17	17	21	25	26	28	35	45	41	36	39	41	40	34	28	20	22	27.3	45
29-May	20	15	15	14	13	12	12	Z	11	11	11	13	17	22	25	30	31	32	34	31	28	24	19	17	19.9	34
30-May	16	13	Z	7	10	14	18	19	20	18	15	20	22	24	25	28	30	30	28	25	26	25	25	22	21.0	30
31-May	19	17	12	Z	7	9	12	15	18	21	25	28	31	31	31	30	29	29	28	27	23	18	17	17	21.5	31

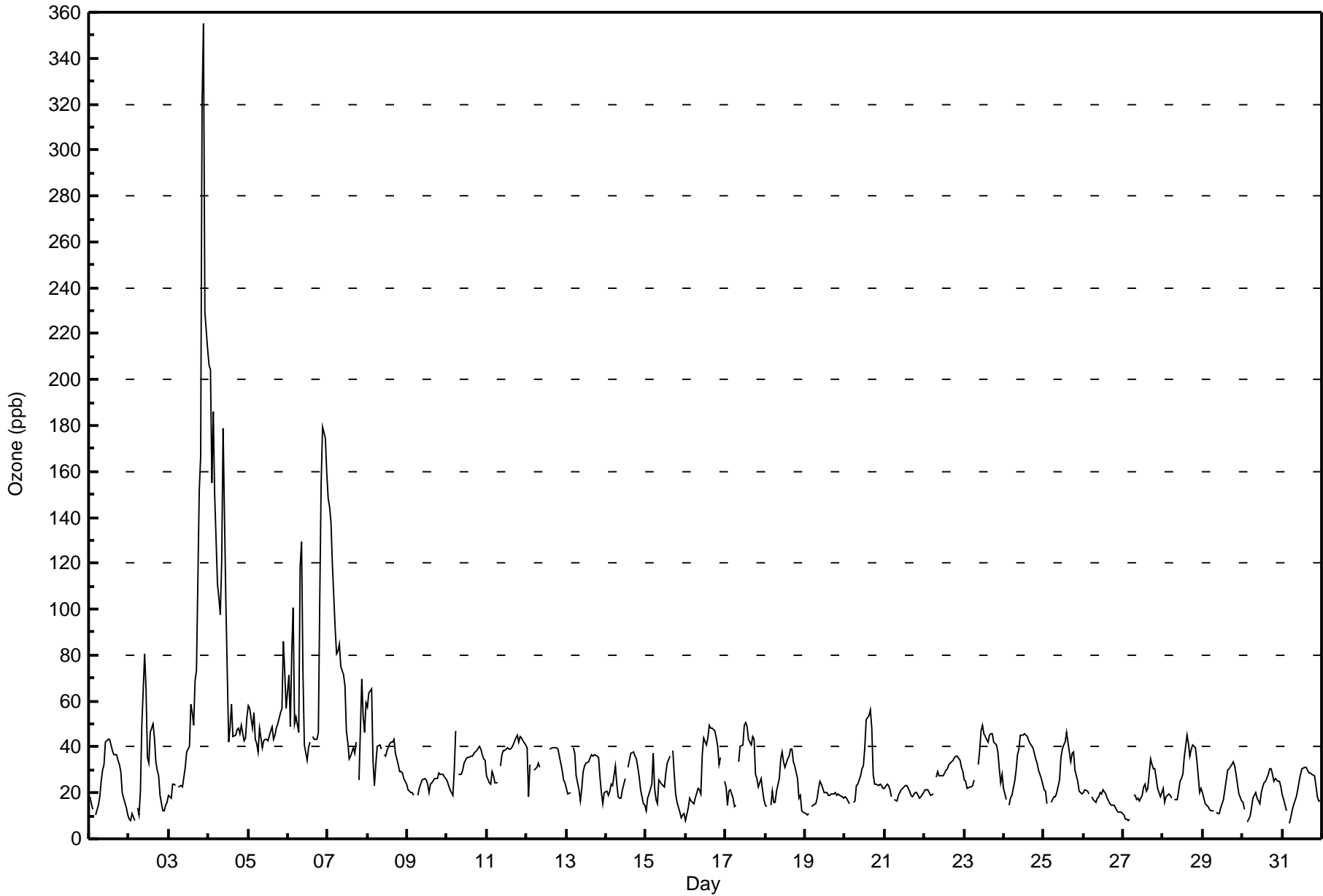
33.9	31.4	32.7	34.4	29.1	28.4	26.7	31.7	33.8	36.7	35.3	33.9	34.2	36.3	37.4	36.9	37.4	36.3	37.5	37.8	43.2	43.5	36.6	35.0	Diurnal Average	
206	205	155	186	150	111	105	118	129	179	103	72	51	58	59	56	69	73	152	167	320	355	229	213	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	206	29.01	29.01
21 - 50	437	61.55	90.56
51 - 82	35	4.93	95.49
> 83	32	4.51	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	38	4	0	3	12	15	46	10	2	2	8	3	6	3	7	46	205
21 - 50	56	23	8	10	16	13	54	22	11	14	17	18	24	41	27	83	437
51 - 82	3	0	3	2	0	3	5	1	0	0	2	2	3	2	7	2	35
> 83	0	0	0	0	0	2	10	9	2	5	3	0	0	0	0	1	32
Totals	97	27	11	15	28	33	115	42	15	21	30	23	33	46	41	132	709

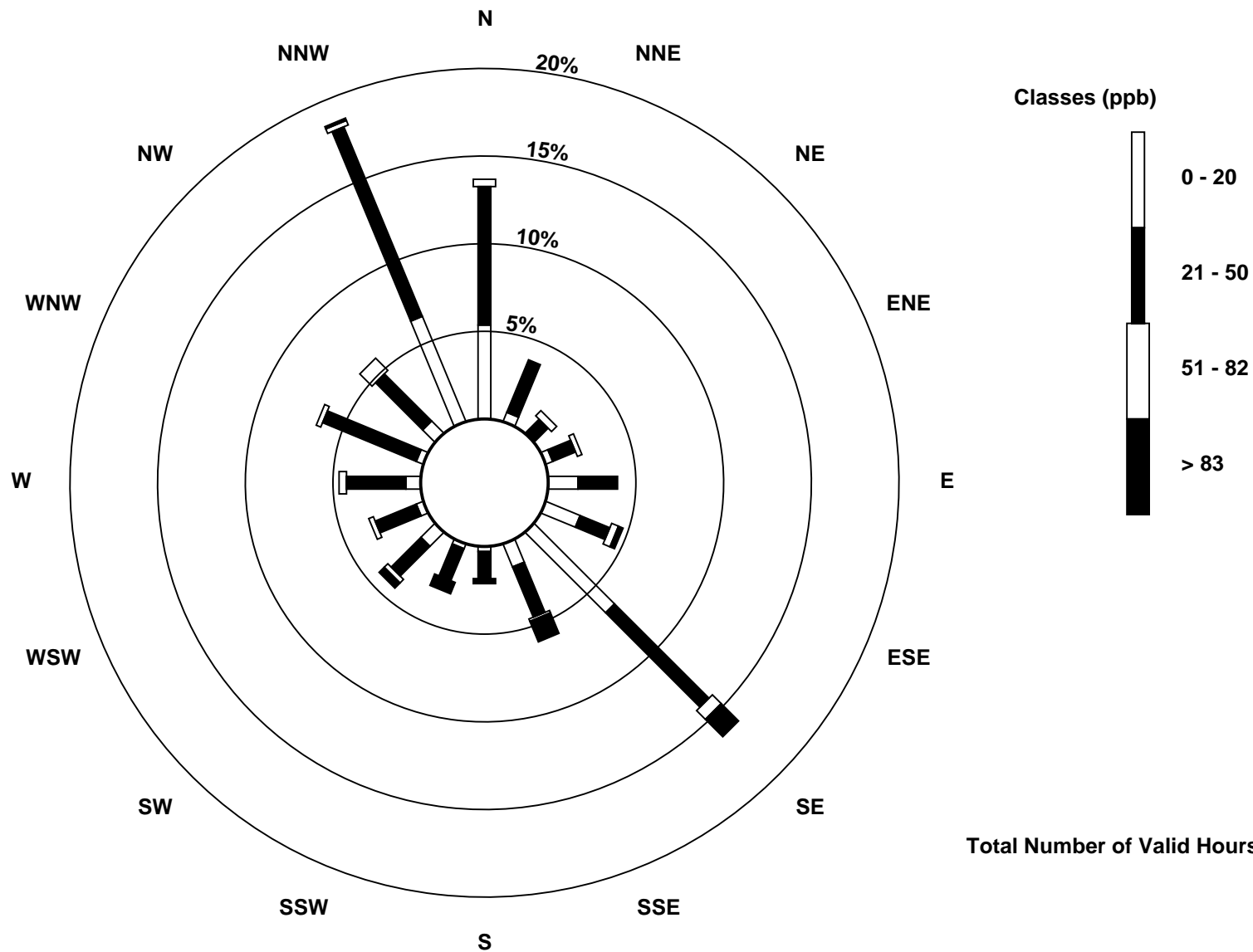
Total Number of Valid Hours: 709

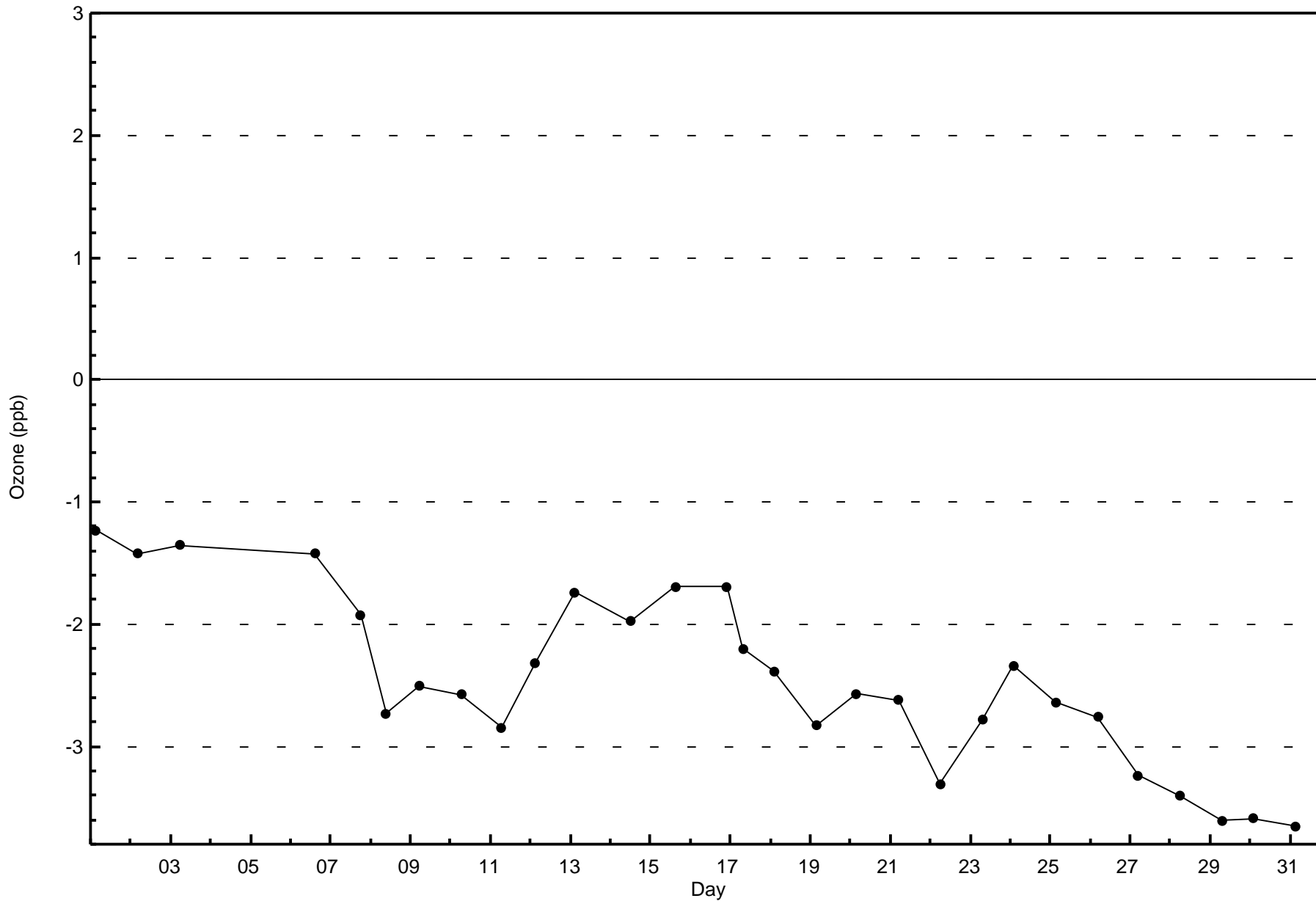
Total Number of Hours: 744

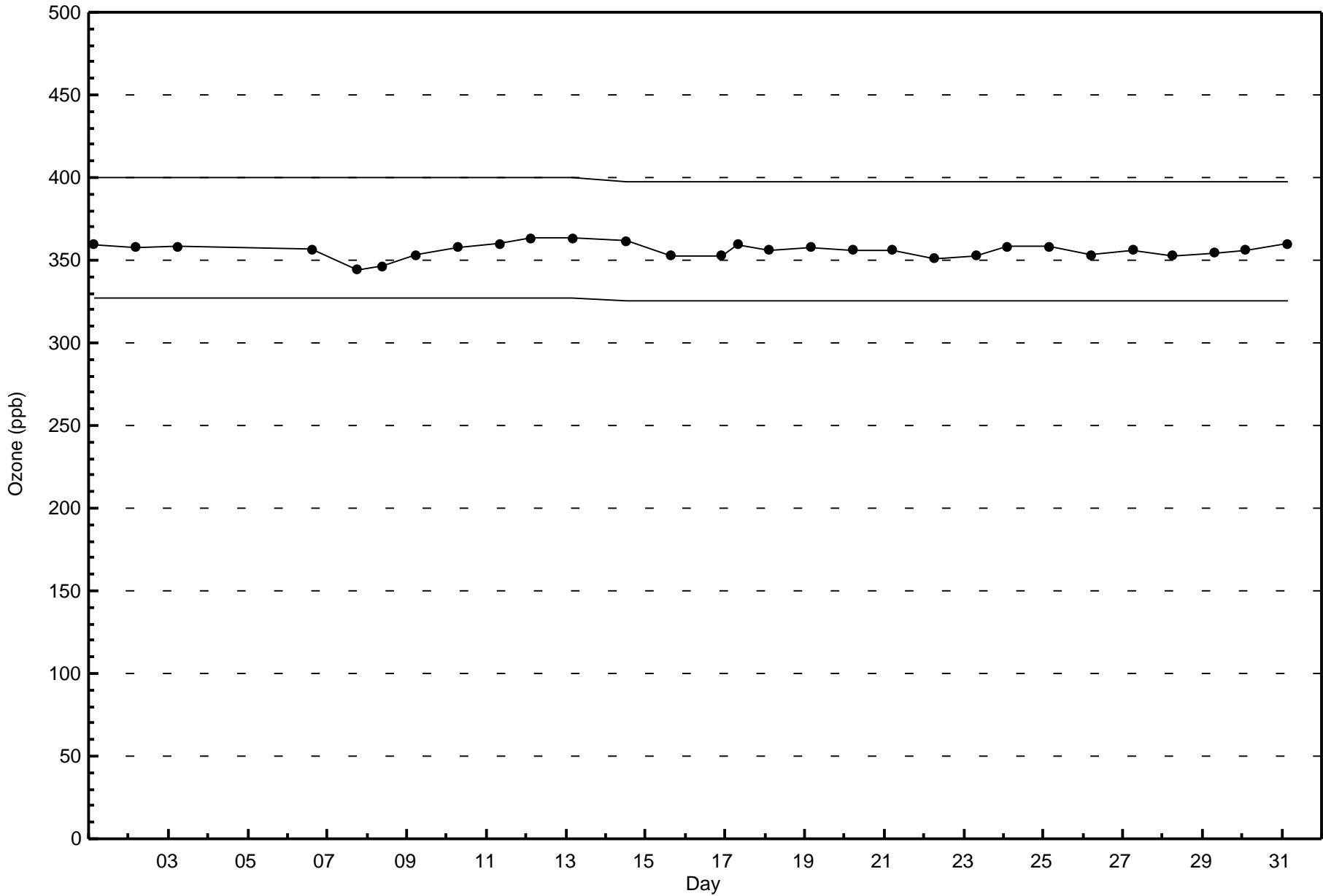


Wood Buffalo Environmental Association
Wind Rose May 2016

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







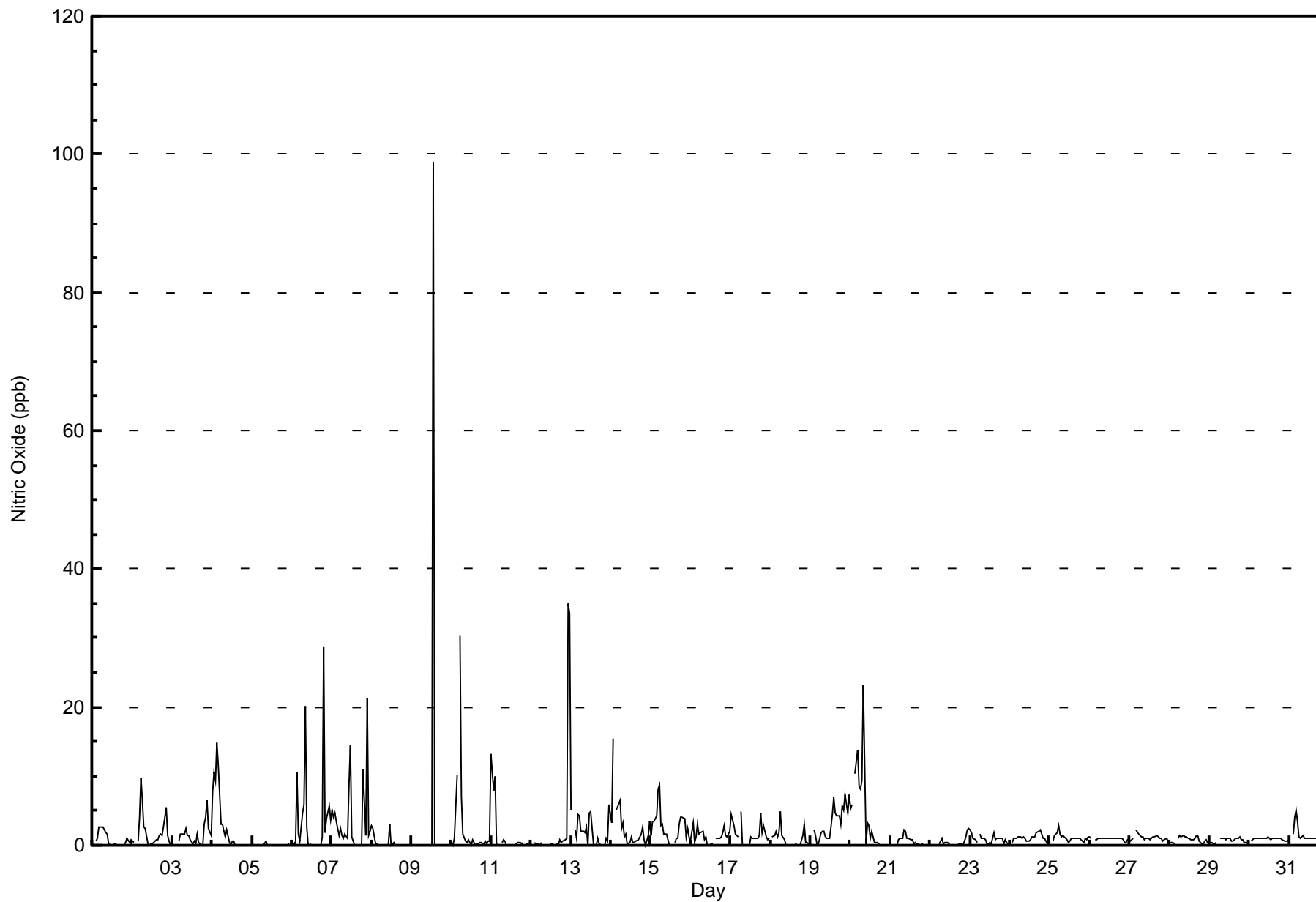


Maximum Value: 99 ppb on May 9 14:00																	Maximum Daily Average: 4.3 ppb on May 9																	Hours in Service: 744	
Minimum Value: 0 ppb on May 1 01:00																	Minimum Daily Average: 0.0 ppb on May 5																	Hours of Data: 710	
Maximum Diurnal Average: 4.0 ppb at hour 14																	Minimum Diurnal Average: 0.7 ppb at hour 16																	Hours of Missing Data: 34	
Monthly Average: 1.8 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 20																	Hours of Calibration: 33	
																																		Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	0	Z	1	1	3	3	3	2	2	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.8	3									
2-May	1	0	Z	1	4	10	6	3	3	0	0	0	0	1	1	1	2	1	3	6	1	1	0	1.9	10										
3-May	0	0	0	Z	1	2	2	2	2	1	1	1	0	1	0	2	0	0	0	3	4	7	2	2	1.4	7									
4-May	8	11	9	15	12	3	3	2	1	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2.8	15									
5-May	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	1									
6-May	0	1	0	10	2	1	5	6	20	3	0	0	Z	0	0	0	0	0	1	29	2	4	6	4	4.0	29									
7-May	5	4	5	3	1	2	1	1	2	1	9	14	1	1	0	0	Z	0	0	11	1	21	1	2	3.8	21									
8-May	3	2	0	0	0	0	0	Z	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3									
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	0	0	0	4.3	99									
10-May	1	0	1	10	Z	30	7	2	1	0	1	0	0	1	0	0	0	0	0	0	1	0	1	1	2.5	30									
11-May	13	8	10	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	M	0	0	0	1.6	13									
12-May	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	1	0	1	1	35	34	3.9	35										
13-May	5	Z	2	1	4	4	2	2	2	3	0	5	5	0	0	0	1	0	0	0	1	1	6	6	1.9	6									
14-May	3	16	Z	5	5	7	2	3	1	2	0	1	1	0	0	1	1	1	2	3	1	0	1	4	2.6	16									
15-May	2	4	4	4	8	9	3	3	2	2	1	0	0	Z	0	1	1	3	4	4	4	1	2	1	2.7	9									
16-May	1	3	0	1	3	2	2	2	1	1	0	0	0	0	Z	1	1	1	1	2	3	1	1	2	1.3	3									
17-May	4	4	3	2	1	Z	5	0	0	0	0	0	1	1	1	1	1	1	5	2	3	1	1	1	1.6	5									
18-May	Z	1	1	2	1	2	5	1	1	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0.9	5									
19-May	0	Z	2	1	0	0	2	2	2	1	1	1	3	4	7	5	4	4	3	6	5	7	5	7	3.2	7									
20-May	5	6	Z	10	14	8	8	9	23	0	3	3	1	2	0	0	0	0	0	0	0	0	0	0	4.2	23									
21-May	0	0	0	Z	0	1	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2									
22-May	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.4	2									
23-May	2	2	1	1	0	Z	2	1	1	1	0	0	0	0	2	1	1	1	1	1	1	0	0	0	0.9	2									
24-May	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	0	1	1.1	2									
25-May	0	Z	1	1	2	3	2	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1.1	3									
26-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0.9	1									
27-May	1	1	1	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1.1	2									
28-May	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0.8	1									
29-May	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.7	1									
30-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1									
31-May	1	Z	2	4	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1.5	5									
2.0 2.6 1.7 2.9 2.6 3.5 2.2 1.8 2.5 1.0 0.9 1.2 0.7 4.0 0.7 0.7 0.8 0.9 0.9 2.4 1.3 1.8 2.1 2.3																								Diurnal Average											
13 16 10 15 14 30 8 9 23 3 9 14 5 99 7 5 4 4 5 29 6 21 35 34																								Diurnal Maximum											
Z - zerospan C - Calibration M - Maintenance																																			



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.01	99.01
21 - 40	6	0.85	99.86
41 - 80	0	0.00	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	27	11	16	26	31	116	42	15	20	28	25	33	44	40	129	702
21 - 40	0	0	0	0	1	1	2	0	0	0	0	1	1	0	0	0	6
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	27	11	16	27	32	118	42	15	20	28	26	34	44	41	129	709

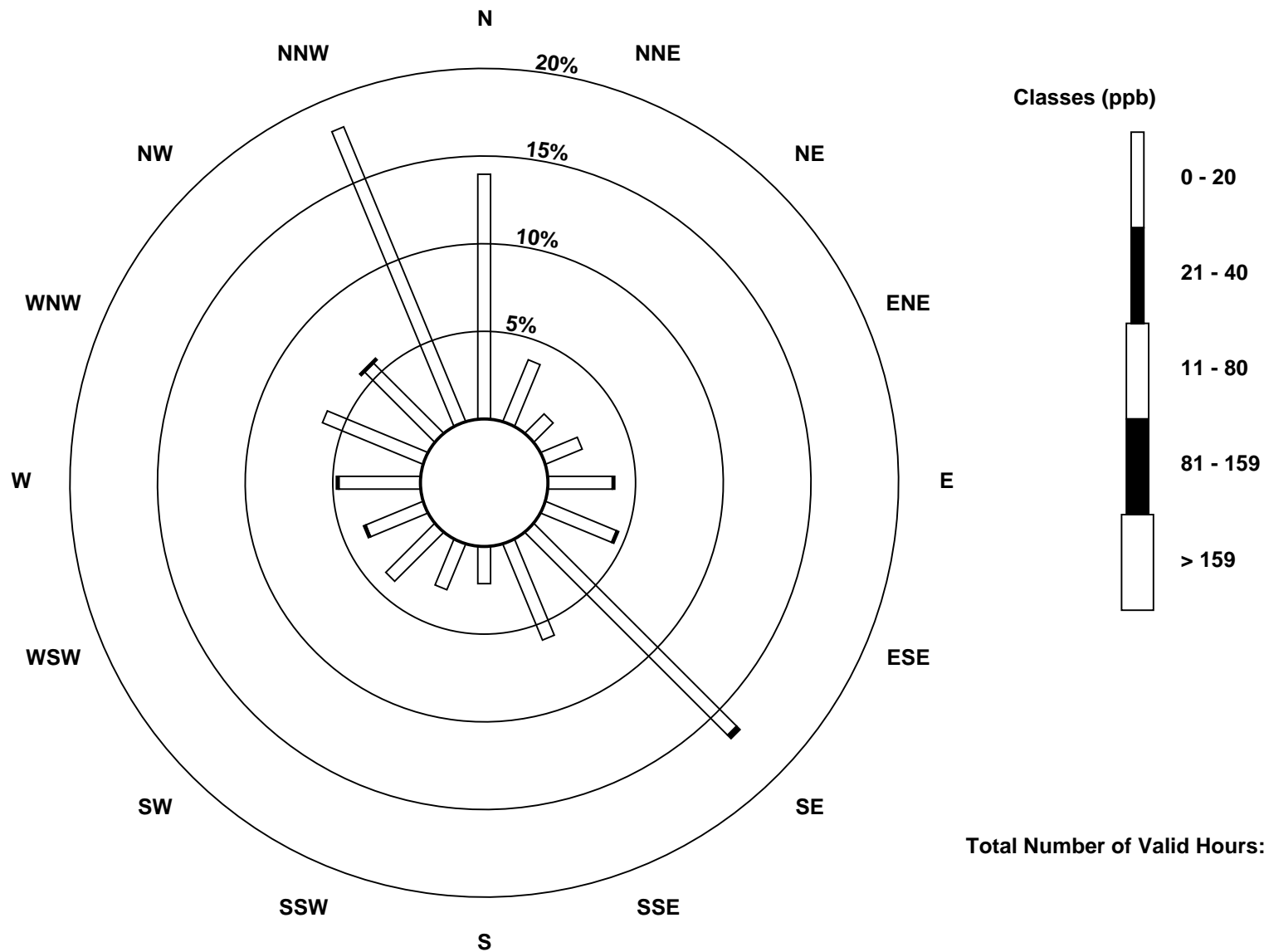
Total Number of Valid Hours: 709

Total Number of Hours: 744

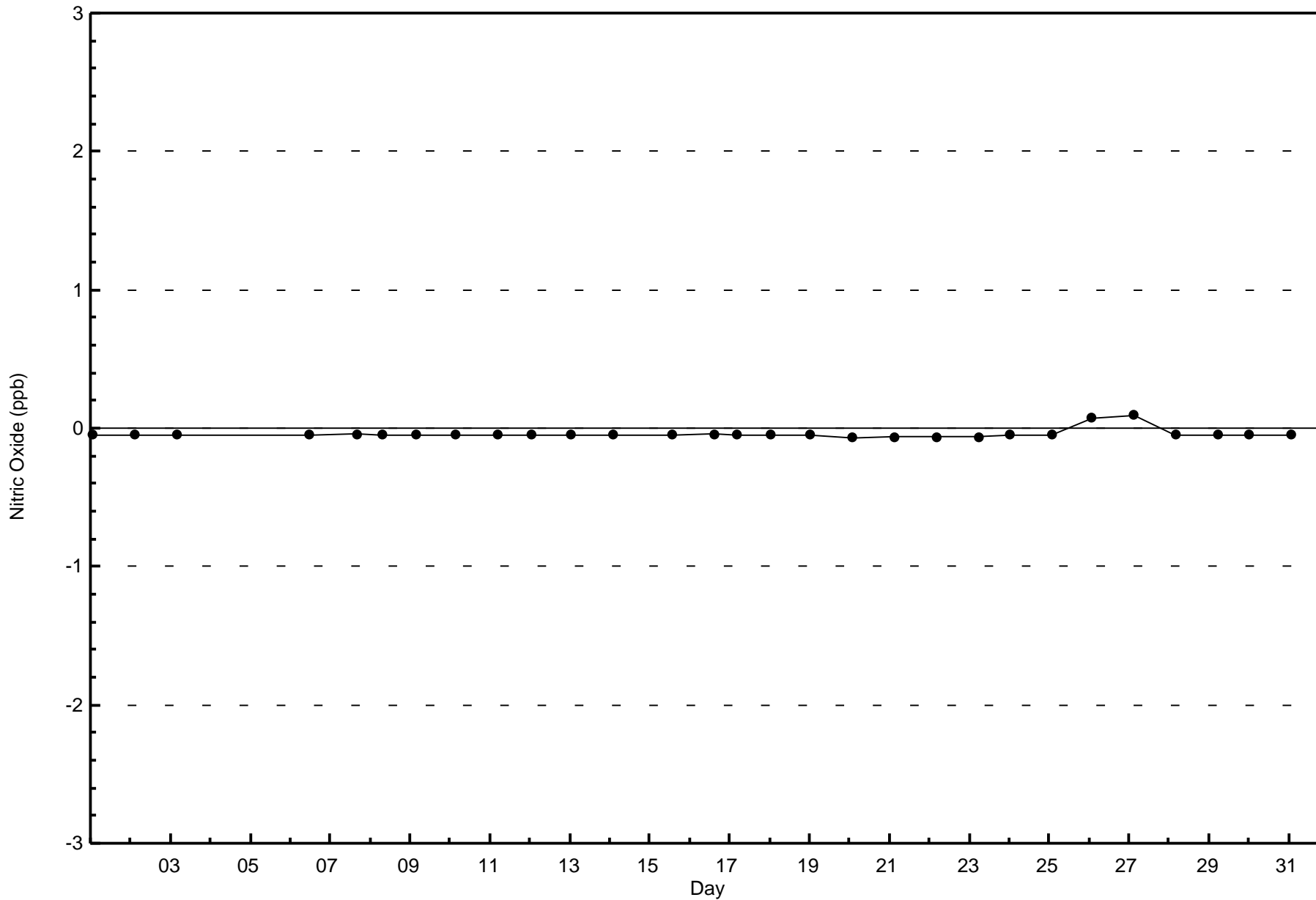


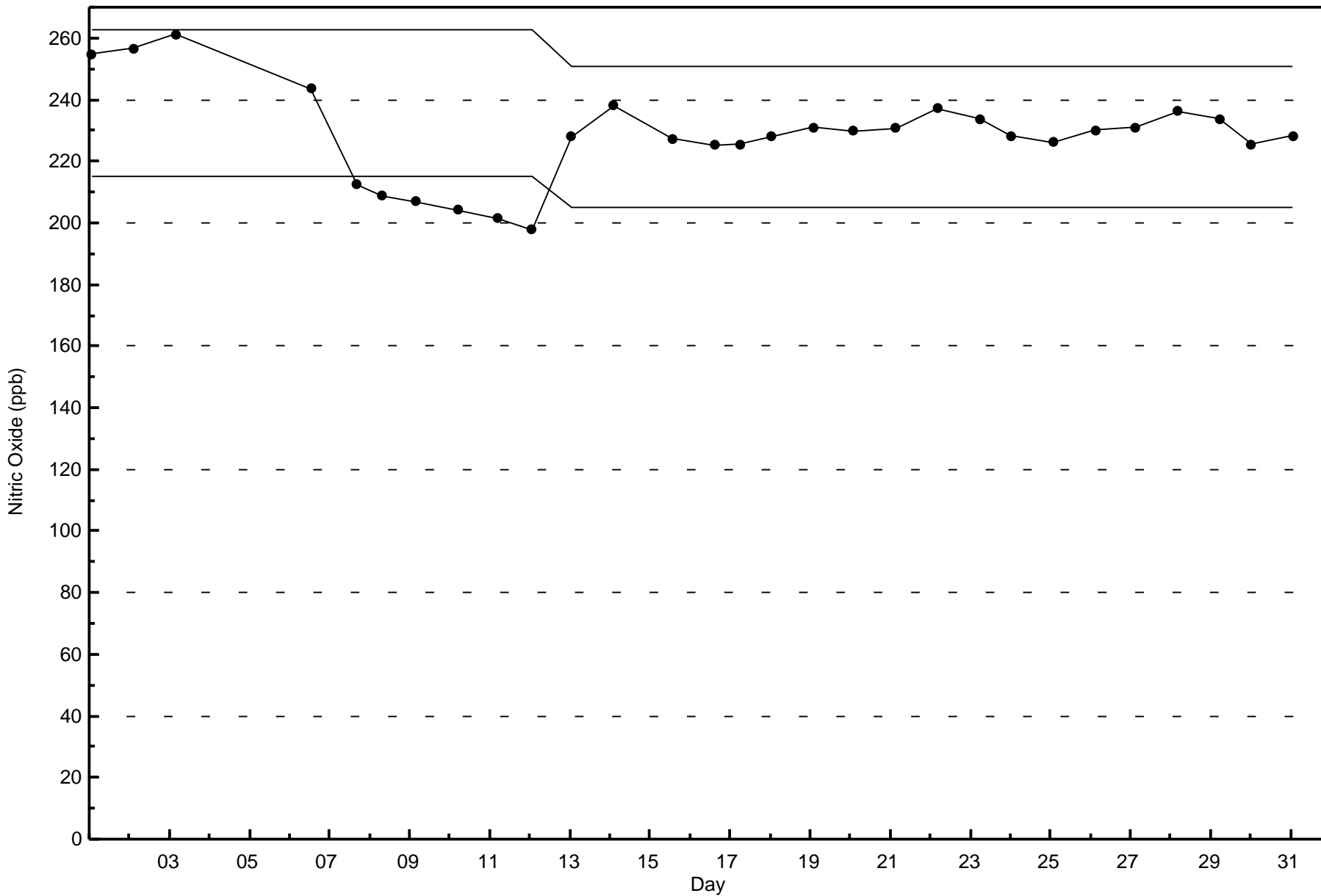
Wood Buffalo Environmental Association
Wind Rose May 2016

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



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association
Summary of Hour Averages

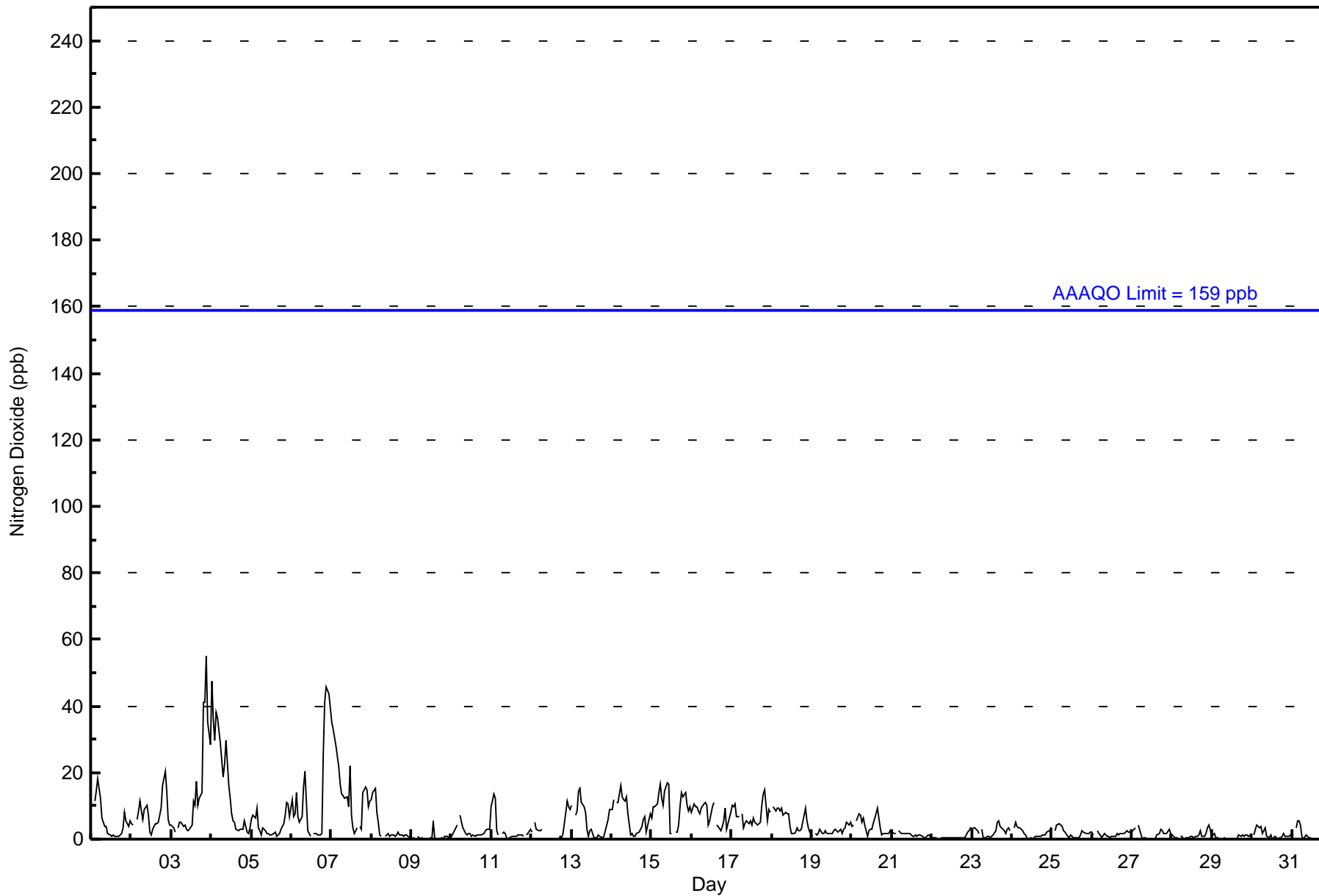
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 55 ppb on May 3 22:00										Maximum Daily Average: 16.1 ppb on May 4										Hours of Data: 710						
Minimum Value: 0 ppb on May 9 03:00										Minimum Daily Average: 0.5 ppb on May 9										Hours of Missing Data: 34						
Maximum Diurnal Average: 8.0 ppb at hour 4										Minimum Diurnal Average: 1.9 ppb at hour 13										Hours of Calibration: 33						
Monthly Average: 4.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 6 P ₉₀ = 12 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-May	4	Z	11	15	18	12	7	5	4	4	2	1	1	1	1	1	1	1	2	3	8	5	4	5	5.0	18
2-May	5	4	Z	6	8	12	8	6	9	10	7	2	1	3	5	5	5	7	9	16	20	14	6	4	7.5	20
3-May	4	3	2	Z	3	5	5	4	4	3	3	3	4	11	10	17	10	12	14	41	41	55	35	28	13.9	55
4-May	48	36	30	38	37	29	24	19	23	30	16	12	8	6	5	3	3	3	3	6	2	2	3	3	16.1	48
5-May	6	7	7	9	3	2	1	4	2	2	2	1	1	2	2	1	1	2	3	5	7	11	11	7	4.1	11
6-May	12	7	8	14	7	5	7	16	20	12	3	1	Z	2	2	2	1	1	2	26	41	46	44	40	13.7	46
7-May	35	33	31	28	22	16	14	13	12	13	10	22	7	4	2	3	Z	4	3	14	16	15	10	12	14.6	35
8-May	12	14	15	8	5	1	1	Z	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	0	3.3	15
9-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	1	1	1	1	0.5	6
10-May	1	2	3	4	Z	7	5	3	2	1	2	2	1	1	1	1	1	1	1	2	3	3	3	3	2.3	7
11-May	10	14	12	3	1	Z	2	2	2	0	0	0	1	1	1	1	1	1	1	1	M	1	2	3	2.7	14
12-May	2	Z	5	3	2	3	3	C	C	C	C	0	0	0	0	0	0	1	1	2	8	12	10	9	3.1	12
13-May	10	Z	7	8	14	15	11	10	8	3	1	3	3	1	1	1	1	1	1	1	3	4	6	9	5.2	15
14-May	9	12	Z	11	11	16	13	12	11	13	8	1	2	1	1	2	2	3	4	6	7	2	6	8	6.9	16
15-May	7	10	10	11	14	17	12	10	15	17	17	2	2	Z	2	2	4	10	14	13	14	10	8	10	9.9	17
16-May	8	10	10	10	9	8	10	11	11	10	4	6	10	11	Z	4	4	3	4	6	9	3	5	8	7.4	11
17-May	10	10	11	7	7	Z	8	3	5	6	5	6	4	6	5	4	5	5	10	14	15	5	9	8	7.2	15
18-May	Z	10	9	9	10	9	9	7	8	8	8	4	2	2	2	3	2	2	3	7	9	5	3	2	5.8	10
19-May	1	Z	2	1	2	3	2	2	2	2	2	2	2	3	3	2	2	3	2	3	4	5	4	5	2.4	5
20-May	4	4	Z	6	8	7	5	6	4	1	3	3	3	5	8	9	7	4	1	2	2	2	2	3	4.2	9
21-May	2	2	2	Z	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.4	3
22-May	1	1	1	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	2	3	3	0.8	3
23-May	3	3	4	3	2	Z	3	1	1	1	1	1	1	1	2	5	6	4	4	2	2	3	4	3	2.4	6
24-May	Z	4	5	4	3	3	2	2	1	1	0	0	0	0	1	1	1	1	1	1	1	2	3	3	1.8	5
25-May	3	Z	3	4	5	4	4	3	2	1	1	1	1	1	1	1	1	1	1	3	2	2	2	2	2.0	5
26-May	2	1	Z	2	2	1	1	2	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1.5	2
27-May	3	3	3	Z	4	1	0	0	0	0	0	0	0	0	0	1	2	3	3	2	2	2	3	2	1.5	4
28-May	1	1	0	0	Z	1	1	0	1	0	1	1	1	1	1	1	1	2	1	1	2	4	4	3	1.2	4
29-May	1	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.6	2
30-May	Z	1	3	4	4	4	2	3	3	1	1	1	0	0	1	0	0	1	1	2	1	1	1	1	1.5	4
31-May	2	Z	4	5	5	4	1	0	1	1	1	1	0	0	0	0	0	0	1	1	4	5	4	3	1.8	5
7.2 7.7 7.2 8.0 7.4 7.0 5.2 5.0 5.2 4.7 3.3 2.5 1.9 2.3 2.0 2.4 2.3 2.6 3.1 5.8 7.7 7.3 6.4 6.2																								Diurnal Average		
48 36 31 38 37 29 24 19 23 30 17 22 10 11 10 17 10 12 14 41 41 55 44 40																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	96.48	96.48
21 - 40	18	2.54	99.01
41 - 80	7	0.99	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	27	11	16	27	32	110	33	13	15	27	26	34	44	41	129	684
21 - 40	0	0	0	0	0	0	6	7	2	2	1	0	0	0	0	0	18
11 - 80	0	0	0	0	0	0	2	2	0	3	0	0	0	0	0	0	7
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	99	27	11	16	27	32	118	42	15	20	28	26	34	44	41	129	709

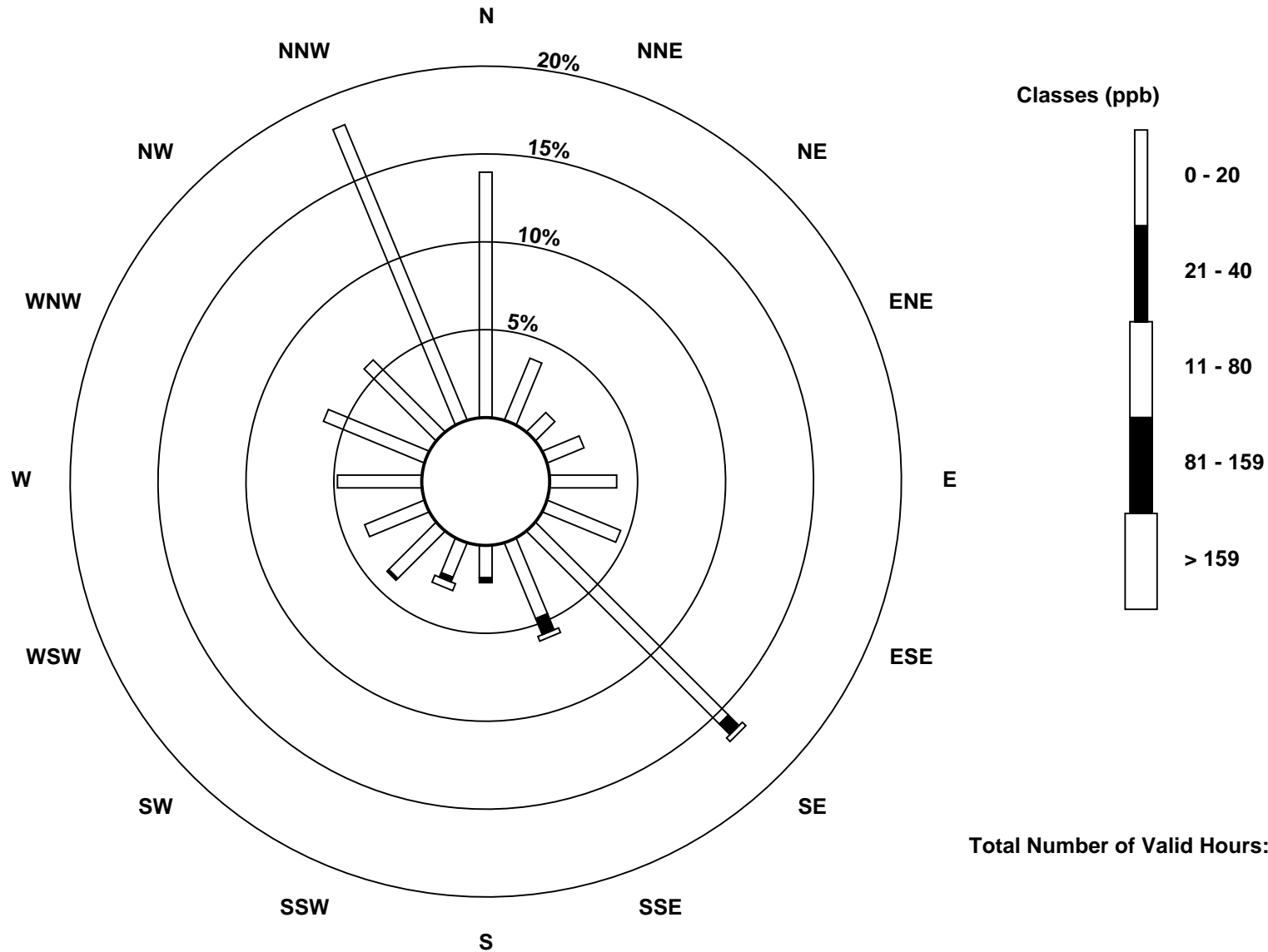
Total Number of Valid Hours: 709

Total Number of Hours: 744

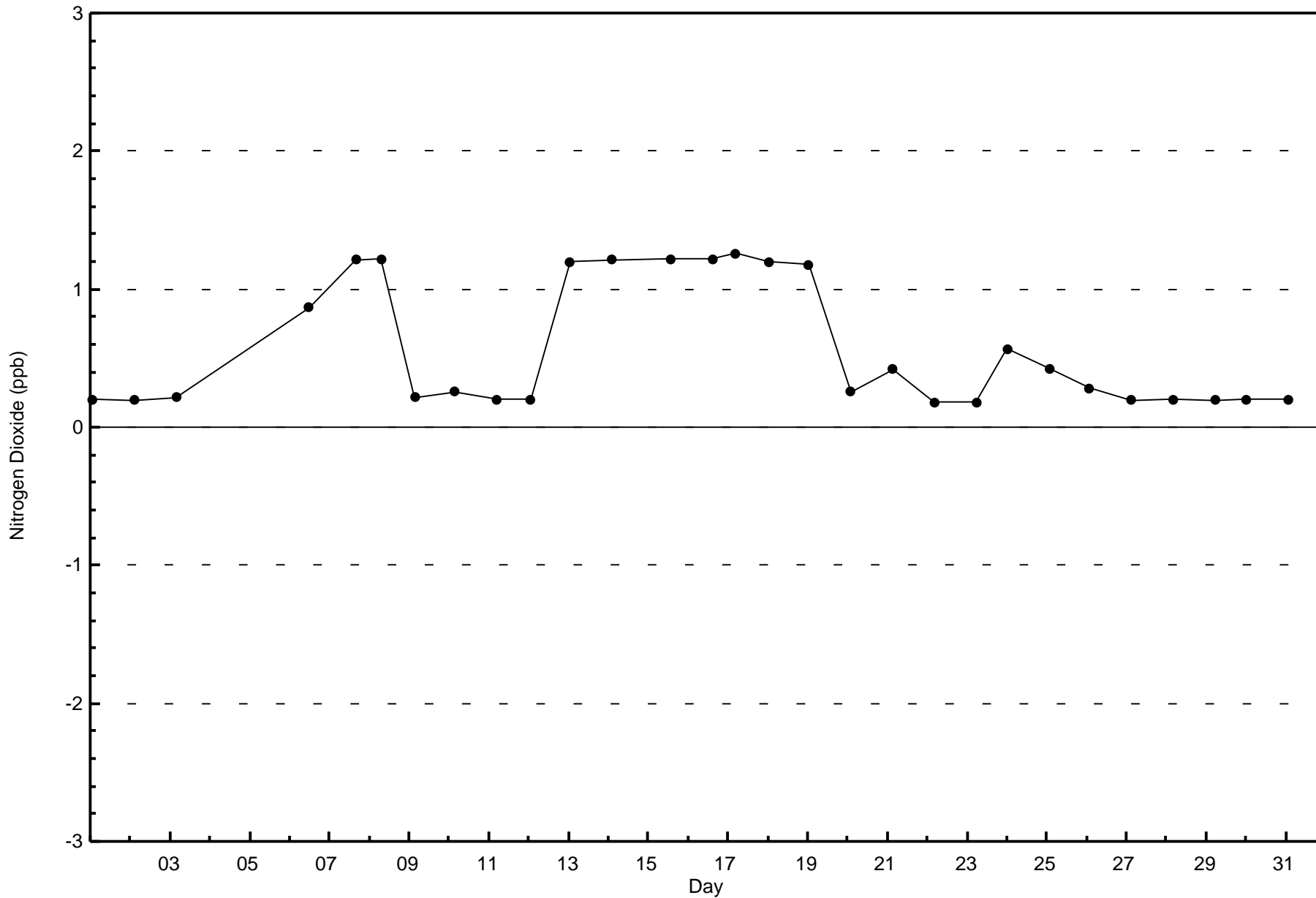


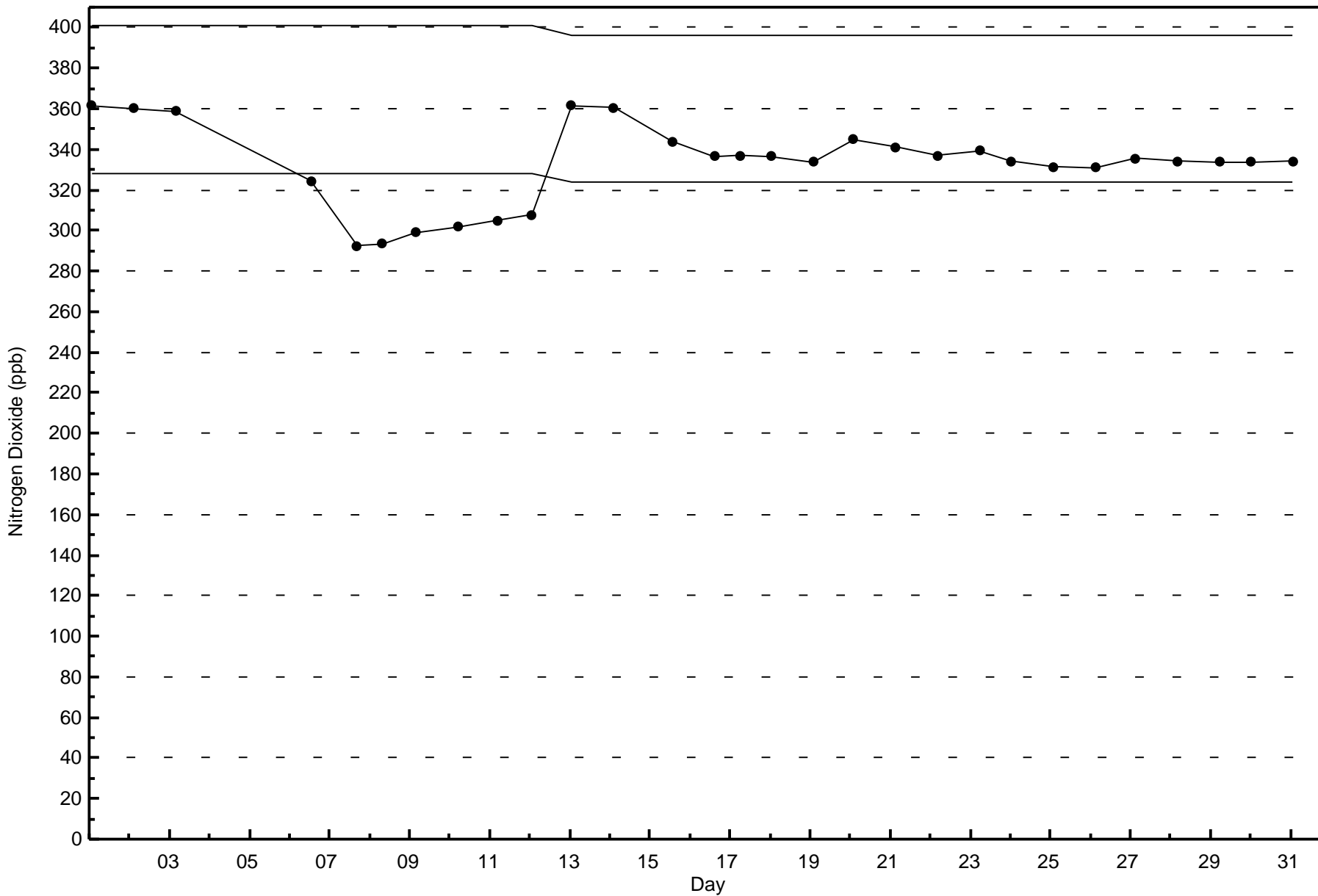
Wood Buffalo Environmental Association
Wind Rose May 2016

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



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association
Summary of Hour Averages

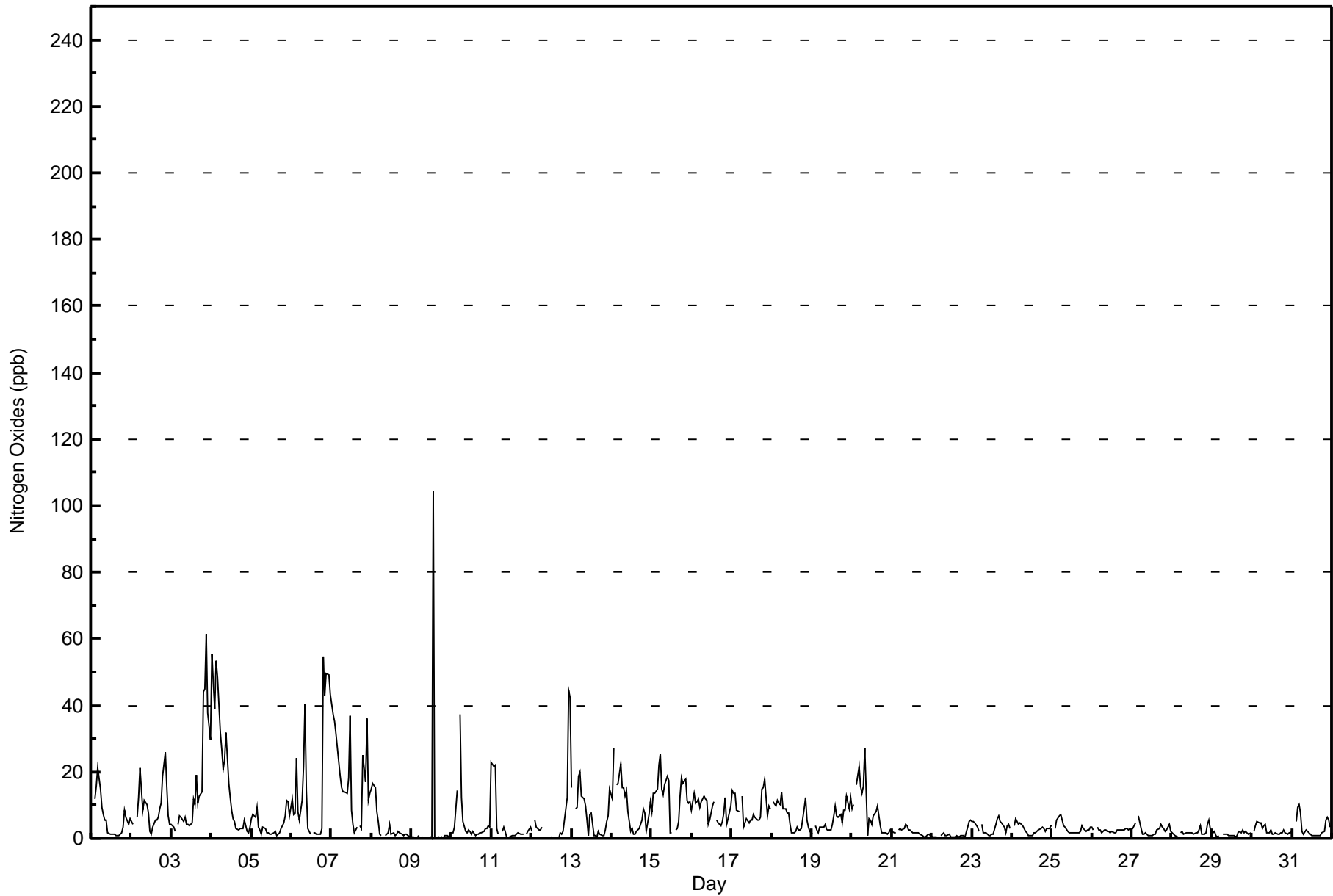
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2016

Maximum Value: 104 ppb on May 9 14:00		Maximum Daily Average: 18.9 ppb on May 4		Hours in Service: 744																																													
Minimum Value: 0 ppb on May 9 03:00		Minimum Daily Average: 1.2 ppb on May 22		Hours of Data: 710																																													
Maximum Diurnal Average: 10.8 ppb at hour 4		Minimum Diurnal Average: 2.6 ppb at hour 13		Hours of Missing Data: 34																																													
Monthly Average: 6.7 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 O ₃ = 8 P ₉₀ = 15 P ₉₉ = 49		Hours of Calibration: 33																																													
				Percent Operational Time: 99.9																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	4	Z	12	16	21	15	9	7	6	5	2	1	1	1	1	1	1	1	2	3	9	7	4	6	5.9	21																							
2-May	5	4	Z	7	12	21	15	9	12	10	7	2	1	4	6	5	6	9	11	19	26	16	7	4	9.5	26																							
3-May	4	3	2	Z	4	7	7	5	6	4	4	4	5	12	10	19	11	13	14	44	45	61	38	30	15.3	61																							
4-May	55	47	39	53	48	32	27	21	24	32	17	12	8	6	5	3	3	3	3	3	6	2	2	3	18.9	55																							
5-May	6	7	7	9	3	2	1	4	3	2	2	1	1	2	2	1	1	2	3	5	7	11	11	7	4.2	11																							
6-May	12	7	8	24	8	6	11	22	40	14	3	1	Z	2	2	1	1	1	3	55	43	50	49	43	17.7	55																							
7-May	40	37	35	31	23	19	15	14	14	14	18	37	8	4	2	3	Z	4	3	25	17	36	11	14	18.5	40																							
8-May	15	16	15	8	5	1	1	Z	1	1	2	4	1	2	1	1	2	2	1	1	1	1	1	0	3.7	16																							
9-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	104	0	0	0	0	0	0	1	1	1	2	4.9	104																						
10-May	1	2	4	15	Z	37	12	5	2	2	2	2	1	2	1	1	1	2	2	2	3	3	4	3	4.8	37																							
11-May	23	21	22	3	1	Z	2	3	2	0	0	1	1	1	1	1	2	1	1	1	M	1	2	4	4.4	23																							
12-May	2	Z	6	3	3	3	3	C	C	C	C	0	0	0	0	0	0	2	1	2	9	12	45	42	7.0	45																							
13-May	15	Z	9	9	19	20	13	12	10	6	1	7	8	1	1	1	2	1	1	1	3	5	7	15	7.1	20																							
14-May	12	27	Z	16	17	22	15	15	13	14	8	2	3	1	1	2	3	4	5	9	7	2	7	11	9.5	27																							
15-May	8	13	13	15	22	25	15	13	16	19	17	2	1	Z	3	3	5	13	18	17	18	12	11	11	12.6	25																							
16-May	9	14	10	11	12	9	11	13	12	11	4	6	10	11	Z	5	5	4	5	8	12	4	6	10	8.7	14																							
17-May	15	13	14	8	8	Z	13	3	5	6	4	6	5	7	6	5	6	6	15	15	18	7	10	9	8.9	18																							
18-May	Z	11	10	11	11	10	14	9	9	8	8	4	1	2	2	3	2	2	3	9	12	6	4	2	6.7	14																							
19-May	1	Z	4	3	2	3	3	4	4	3	3	2	4	7	10	7	6	7	5	8	9	13	9	12	5.6	13																							
20-May	9	10	Z	16	21	15	13	16	27	1	6	6	4	7	8	10	7	4	2	2	2	1	2	3	8.3	27																							
21-May	2	2	2	Z	3	3	3	3	4	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1.9	4																							
22-May	0	0	0	1	Z	1	1	2	1	1	1	1	0	0	0	1	1	1	1	1	1	3	5	6	1.2	6																							
23-May	5	5	4	3	2	Z	4	2	2	1	1	1	1	1	4	6	7	5	5	3	2	4	4	3	3.3	7																							
24-May	Z	4	6	5	4	5	4	3	2	2	1	1	1	2	2	2	3	3	4	3	2	3	3	4	2.9	6																							
25-May	4	Z	3	6	7	7	5	4	3	2	1	1	2	2	2	2	2	2	4	3	2	2	3	3	3.1	7																							
26-May	3	2	Z	3	3	2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	3	2.4	3																							
27-May	3	4	5	Z	7	3	1	1	2	1	1	1	1	1	3	3	4	4	3	2	3	4	2	2	2.6	7																							
28-May	2	1	1	1	Z	2	2	1	2	2	2	2	2	1	2	2	3	4	1	1	2	4	5	3	2.0	5																							
29-May	1	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	2	1.3	2																							
30-May	Z	2	4	5	5	5	3	4	4	2	2	3	1	1	2	1	1	1	2	2	2	1	2	2	2.4	5																							
31-May	2	Z	5	9	10	8	2	1	3	2	2	1	1	1	1	1	1	1	2	2	5	6	5	3	3.3	10																							
																								9.3	10.3	8.9	10.8	10.0	10.5	7.4	6.8	7.7	5.7	4.1	3.7	2.6	6.3	2.7	3.1	3.0	3.5	4.0	8.1	9.0	9.2	8.5	8.5	Diurnal Average	
																								55	47	39	53	48	37	27	22	40	32	18	37	10	104	10	19	11	13	18	55	45	61	49	43	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	663	93.38	93.38
21 - 40	32	4.51	97.89
41 - 80	14	1.97	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	26	9	14	26	28	104	32	12	15	26	25	33	44	40	129	662
21 - 40	0	1	2	2	1	4	10	7	2	1	2	0	0	0	0	0	32
11 - 80	0	0	0	0	0	0	4	3	1	4	0	1	1	0	0	0	14
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	27	11	16	27	32	118	42	15	20	28	26	34	44	41	129	709

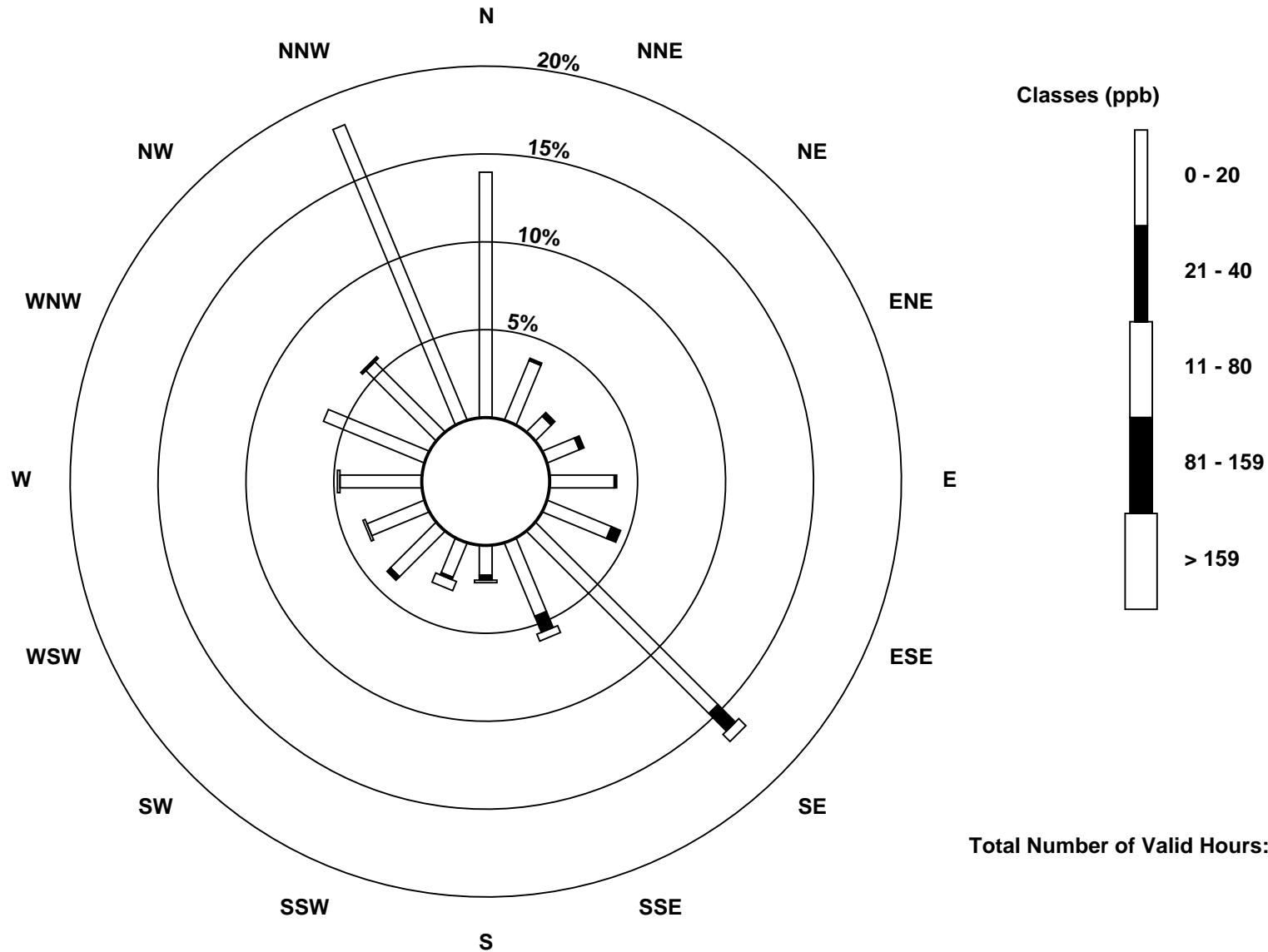
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

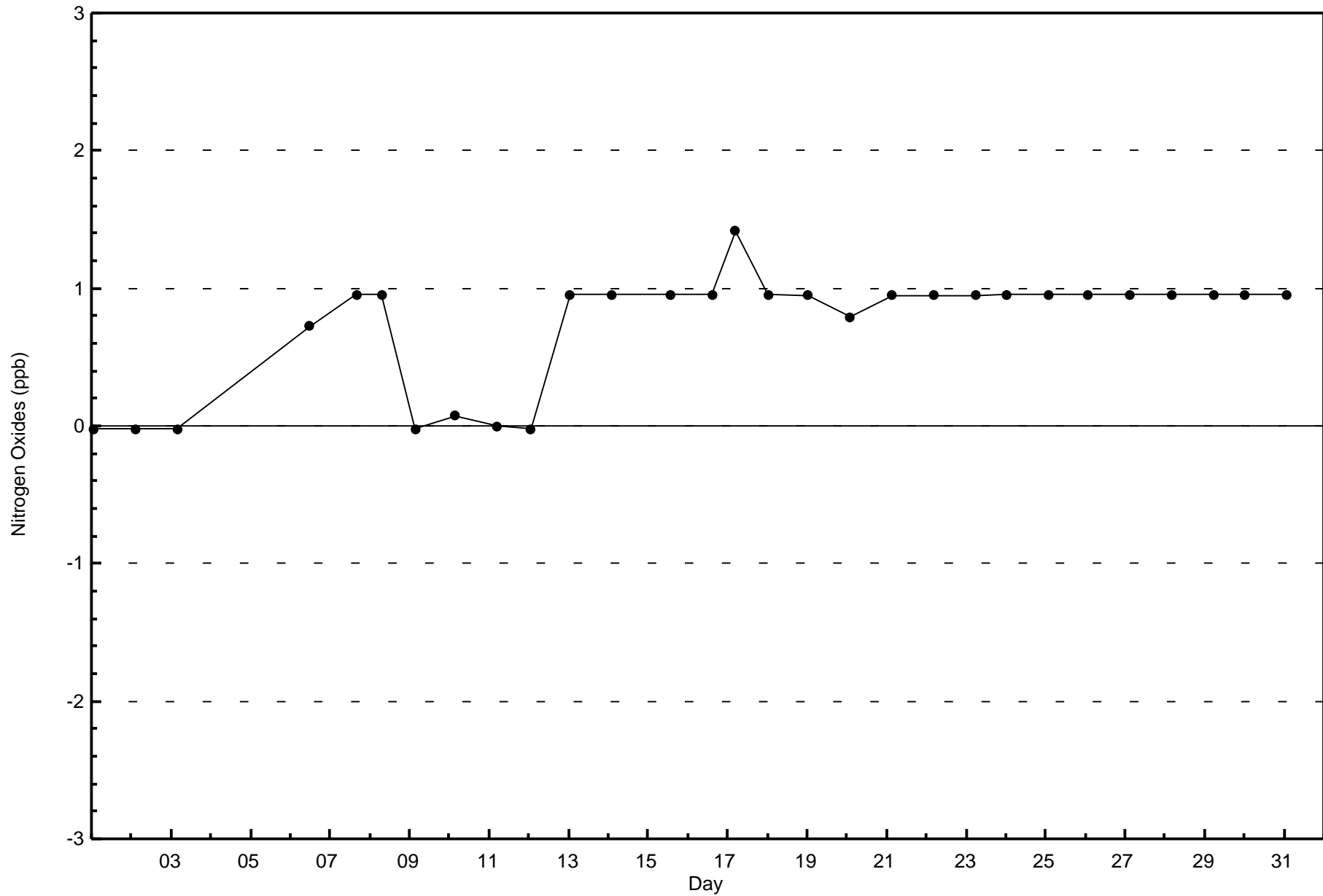
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)

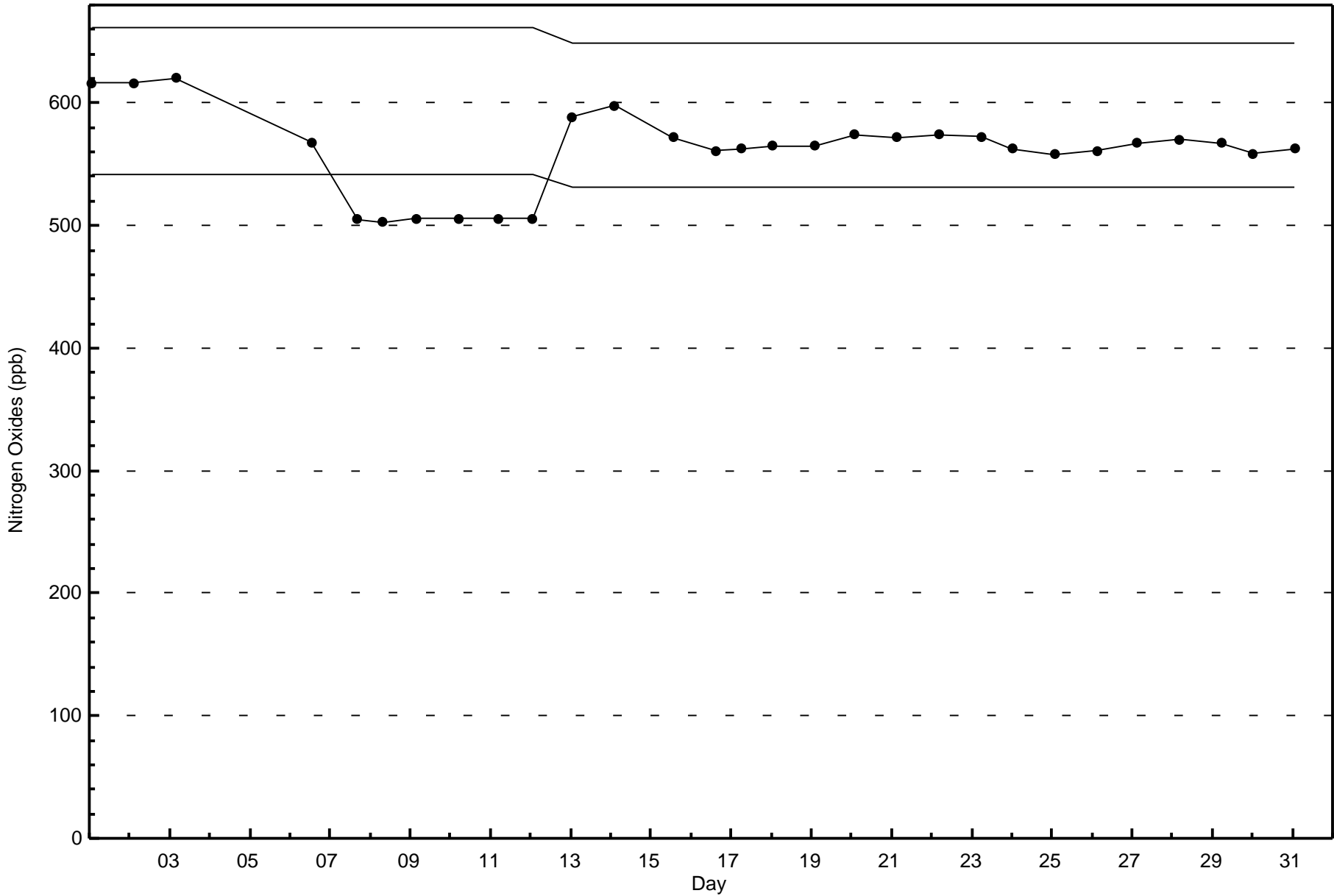




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2016





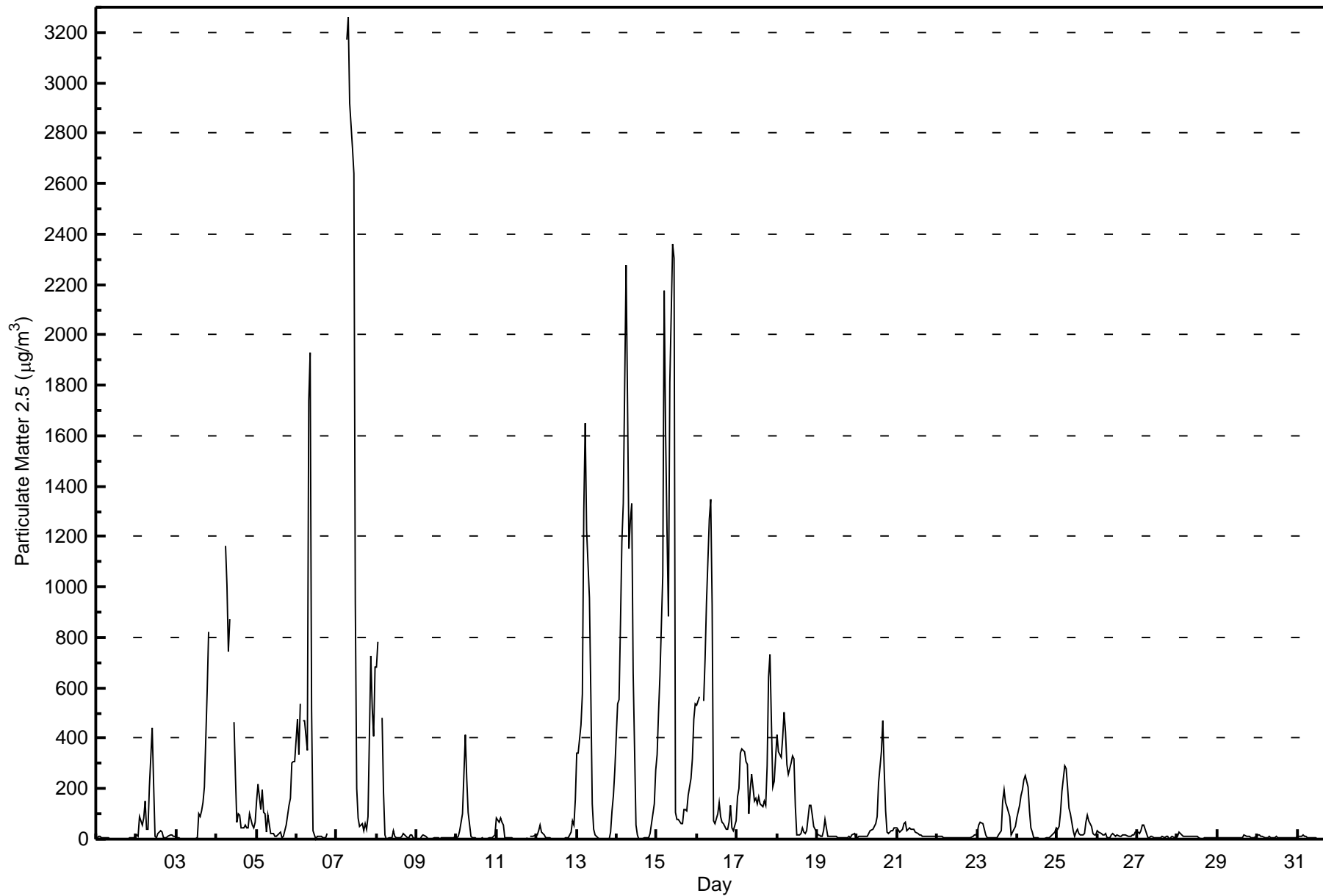


Number of Exceedences (AAAQO):	24-hr: 18	Hours in Service:	744
Maximum Value: 3261.4 µg/m ³ on May 7 08:00	Maximum Daily Average: 1034.9 µg/m ³ on May 7	Hours of Data:	715
Minimum Value: 0.1 µg/m ³ on May 31 18:00	Minimum Daily Average: 4.1 µg/m ³ on May 1	Hours of Missing Data:	29
Maximum Diurnal Average: 379.6 µg/m ³ at hour 9	Minimum Diurnal Average: 28.7 µg/m ³ at hour 13	Hours of Calibration:	1
Monthly Average: 152.20 µg/m ³	Percentiles: P ₁ = 1.0 P ₁₀ = 2.7 O ₁ = 5.9 Median = 15.0 O ₃ = 96.9 P ₉₀ = 411.9 P ₉₉ = 2268.8	Percent Operational Time:	96.2

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-May	7.9	8.5	10.5	6.5	5.3	3.9	3.3	3.5	2.6	2.3	1.9	1.5	1.6	1.1	0.6	0.6	1.3	1.7	1.2	1.8	6.4	5.9	6.9	10.7	4.1	10.7
2-May	15.5	14.0	89.9	53.2	84.3	150.9	37.2	41.9	209.6	439.8	220.4	8.8	2.9	20.1	31.6	27.3	7.8	5.1	7.0	11.9	16.7	15.6	13.1	10.4	64.0	439.8
3-May	6.4	4.5	1.8	1.4	1.5	1.9	2.1	2.8	2.4	2.5	2.8	2.3	4.6	98.4	91.0	111.3	144.5	205.4	593.3	823.7	UO	UO	UO	UO	105.2	823.7
4-May	UO	UO	UO	UO	UO	1161.1	1007.5	744.5	872.4	UO	462.4	252.9	68.8	101.6	94.3	45.3	43.0	55.4	46.0	43.4	99.4	54.5	47.0	66.2	292.5	1161.1
5-May	149.8	219.7	116.3	196.1	108.5	98.7	29.2	96.9	20.5	20.9	21.9	11.3	9.2	23.1	29.1	5.2	11.9	33.2	53.4	135.6	162.9	301.9	305.9	308.9	102.9	308.9
6-May	473.5	336.3	537.9	UO	467.4	470.2	354.2	1737.1	1928.3	512.8	34.7	2.7	9.0	10.4	13.6	9.9	6.2	6.1	23.8	UO	UO	UO	UO	UO	385.2	1928.3
7-May	UO	UO	UO	UO	UO	UO	3171.4	3261.4	2920.1	2739.1	2642.5	937.9	200.2	81.2	52.1	63.0	34.4	62.8	38.2	88.7	725.4	517.9	407.6	684.2	1034.9	3261.4
8-May	681.5	783.5	UO	481.9	184.8	16.2	2.2	2.9	3.5	6.6	35.4	8.6	4.0	5.0	3.3	8.9	25.0	16.4	7.8	5.0	16.5	19.0	8.2	2.6	101.3	783.5
9-May	1.5	1.8	2.0	8.7	14.3	8.6	6.3	2.3	1.6	2.4	4.0	4.2	3.1	3.0	2.7	3.2	4.2	3.4	4.1	3.5	3.9	5.7	5.7	14.3	4.8	14.3
10-May	8.0	9.6	30.9	103.1	255.6	411.9	239.2	105.3	10.4	3.7	3.1	3.5	2.2	2.3	2.7	3.0	2.3	2.1	2.1	3.1	5.4	6.1	10.6	14.8	51.7	411.9
11-May	82.1	68.3	82.7	68.6	54.8	7.1	5.9	5.2	5.6	3.0	2.2	2.0	2.0	1.7	1.7	1.9	2.3	2.3	2.9	C	13.5	10.3	11.4	14.4	19.6	82.7
12-May	19.3	35.4	58.7	25.9	16.5	6.9	4.0	5.6	4.2	2.8	1.8	2.0	2.0	1.9	2.2	2.2	2.8	3.9	4.5	6.7	25.4	70.2	55.7	156.3	21.5	156.3
13-May	339.8	339.1	454.2	574.8	1304.3	1649.2	1225.8	954.0	568.0	138.9	38.3	17.1	10.1	1.8	1.6	2.8	1.8	1.0	0.9	1.0	29.5	114.1	171.4	275.4	342.3	1649.2
14-May	538.2	552.1	850.1	1180.6	1333.1	2278.7	1739.6	1151.5	1264.8	1328.4	661.4	58.5	15.8	1.7	1.1	1.3	4.4	7.2	5.2	7.9	19.9	60.5	138.0	273.6	561.4	2278.7
15-May	336.5	501.2	650.4	1044.6	2178.0	1612.2	1224.7	884.5	1813.8	2361.5	2305.3	106.2	77.1	79.3	64.2	61.5	119.6	116.6	110.5	172.7	241.5	316.8	474.7	535.2	724.5	2361.5
16-May	530.1	566.8	UO	UO	546.4	716.1	940.8	1267.4	1348.8	925.8	73.0	64.3	99.1	147.6	89.8	65.2	59.0	38.0	41.0	69.8	136.7	42.8	32.8	70.6	357.8	1348.8
17-May	167.1	202.5	343.4	359.8	348.7	309.2	295.0	98.1	197.4	255.3	151.8	164.8	138.2	167.5	139.2	126.0	148.6	135.9	293.5	643.9	734.5	208.0	229.2	326.3	257.7	734.5
18-May	414.6	348.4	326.2	401.9	502.1	427.4	298.4	257.1	300.2	327.8	319.7	126.3	17.2	17.6	23.6	44.5	29.9	20.1	34.5	136.7	135.5	96.9	53.1	38.5	195.8	502.1
19-May	14.5	15.9	13.6	13.4	32.9	76.1	12.4	11.8	13.0	13.6	13.4	11.5	6.1	5.2	6.0	5.7	6.8	7.8	7.6	8.5	8.2	14.5	22.7	6.6	14.5	76.1
20-May	7.3	9.1	8.7	9.4	9.7	10.4	13.3	23.4	34.4	40.5	50.9	58.8	91.1	225.1	348.8	470.3	274.2	109.6	28.0	21.9	31.2	32.6	43.6	43.5	83.2	470.3
21-May	42.6	27.5	36.1	41.3	61.4	65.0	35.1	44.0	39.5	36.6	39.2	26.2	21.8	14.6	14.0	11.2	9.8	10.8	12.0	8.5	10.2	9.0	10.4	10.9	26.6	65.0
22-May	11.7	11.6	11.0	9.1	7.8	7.3	5.2	3.9	4.0	4.4	4.4	4.1	4.2	4.6	5.0	5.1	7.8	7.8	6.6	6.2	6.5	8.7	18.0	18.9	7.7	18.9
23-May	27.3	53.2	68.4	59.9	39.1	15.1	5.7	3.3	3.6	4.7	5.9	5.3	6.8	17.0	32.3	148.3	193.3	147.1	125.9	88.8	18.9	25.4	38.2	47.7	49.2	193.3
24-May	81.6	132.0	171.5	194.0	232.3	249.2	204.7	110.5	42.3	27.3	3.7	3.4	3.0	2.2	2.1	1.9	1.8	2.8	4.7	7.1	9.2	16.3	30.5	43.9	65.8	249.2
25-May	36.6	52.5	105.3	187.4	288.4	278.3	207.7	122.4	102.2	36.1	13.9	27.7	40.7	20.8	17.1	19.1	21.2	64.9	93.1	71.6	48.3	22.7	19.3	16.4	79.7	288.4
26-May	35.0	26.6	21.2	16.3	18.2	21.6	6.7	7.7	14.7	24.9	19.4	13.8	14.8	8.7	14.7	17.7	15.0	13.6	8.9	11.9	18.4	14.1	27.4	16.8	35.0	
27-May	29.3	24.2	36.2	53.6	56.1	22.0	7.6	7.5	9.9	9.1	8.4	6.9	7.1	7.4	7.4	8.6	7.1	10.6	9.4	2.5	7.3	11.7	7.2	8.6	15.2	56.1
28-May	12.3	28.2	23.9	13.3	12.6	11.9	11.5	10.2	11.7	10.1	10.6	11.2	10.2	5.2	0.8	2.7	4.7	4.4	4.5	4.8	5.1	5.3	6.2	6.9	9.5	28.2
29-May	7.8	4.8	4.9	3.8	4.7	5.7	3.8	4.0	5.7	6.7	4.8	3.9	5.3	6.2	7.6	8.1	14.5	12.1	9.9	9.2	7.2	6.2	8.0	10.9	6.9	14.5
30-May	16.7	16.7	13.1	9.6	8.3	8.1	8.1	8.8	6.5	3.4	6.0	9.9	8.1	6.9	7.7	6.5	5.8	6.8	5.2	4.7	4.1	5.6	6.7	6.6	7.9	16.7
31-May	9.5	10.4	11.3	15.0	13.2	8.5	4.7	4.4	6.5	5.9	4.4	3.9	2.6	1.9	1.4	0.9	0.3	0.1	UO	UO	UO	1.7	3.7	4.4	5.5	15.0

141.5	151.9	151.1	190.1	282.4	337.0	358.5	354.3	379.6	309.9	231.2	63.3	28.7	35.3	35.6	41.5	39.2	36.0	53.0	85.6	90.8	69.8	75.9	105.4	Diurnal Average	
681.5	783.5	850.1	1180.6	2178.0	2278.7	3171.4	3261.4	2920.1	2739.1	2642.5	937.9	200.2	225.1	348.8	470.3	274.2	205.4	593.3	823.7	734.5	517.9	474.7	684.2	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}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - May 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	157	21.96	21.96
6 - 15	196	27.41	49.37
16 - 25	55	7.69	57.06
26 - 80	108	15.10	72.17
> 81.0	164	22.94	95.10

Total Number of Valid Hours: 715

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	32	8	2	1	1	1	15	11	4	4	11	4	6	14	12	31	157
6 - 15	43	15	2	3	9	7	24	4	1	4	3	6	6	8	12	49	196
16 - 25	12	2	1	2	1	1	5	1	1	0	0	3	4	3	2	16	54
26 - 80	10	2	2	2	5	2	10	6	1	3	3	5	8	10	7	32	108
> 81.0	5	1	4	7	8	16	46	11	5	7	10	7	10	11	7	9	164
Totals	102	28	11	15	24	27	100	33	12	18	27	25	34	46	40	137	679

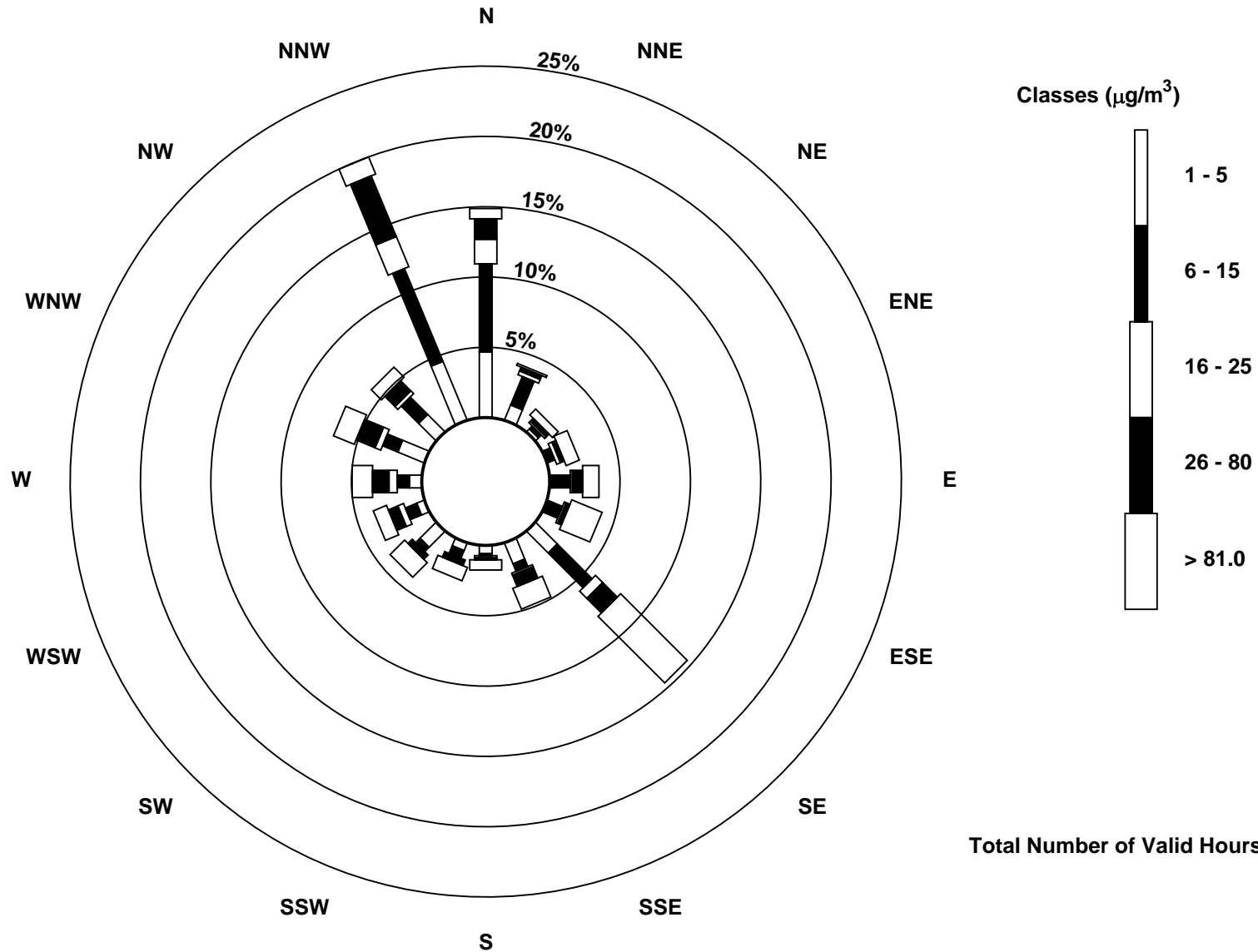
Total Number of Valid Hours: 714

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

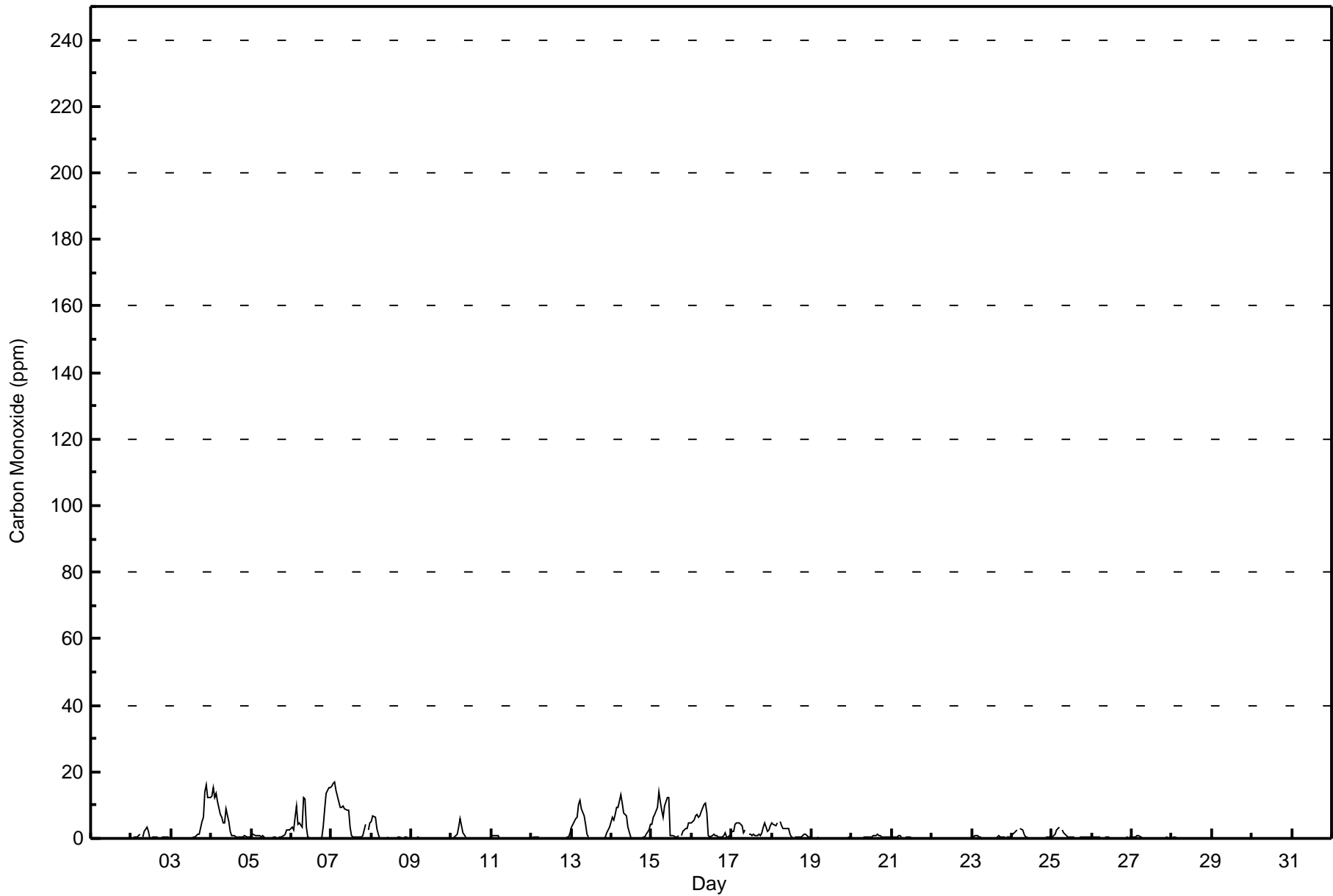
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	419	58.77	58.77
0.4 - 0.5	53	7.43	66.20
0.6 - 0.7	39	5.47	71.67
0.8 - 1.4	52	7.29	78.96
1.5 - 10	119	16.69	95.65
> 10	29	4.07	99.72

Total Number of Valid Hours: 713

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	90	20	5	6	14	10	44	14	8	8	15	13	18	27	29	97	418
0.4 - 0.5	5	3	1	1	0	2	5	2	1	1	0	3	4	6	1	18	53
0.6 - 0.7	2	1	3	2	1	1	6	3	0	2	2	1	2	4	1	8	39
0.8 - 1.4	2	0	2	2	3	1	6	3	3	1	4	3	6	7	7	2	52
1.5 - 10	2	0	0	3	9	16	47	9	2	6	7	5	3	2	3	5	119
> 10	0	0	0	1	1	3	9	9	2	3	1	0	0	0	0	0	29
Totals	101	24	11	15	28	33	117	40	16	21	29	25	33	46	41	130	710

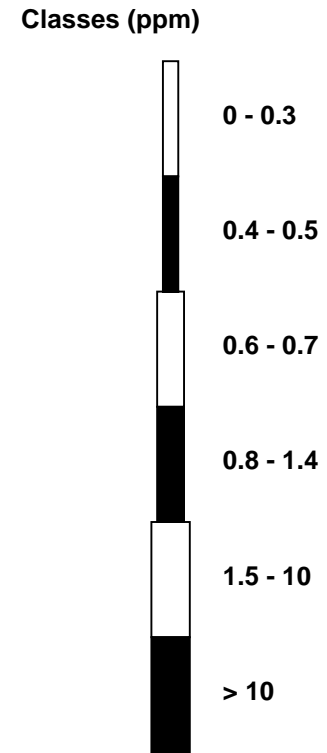
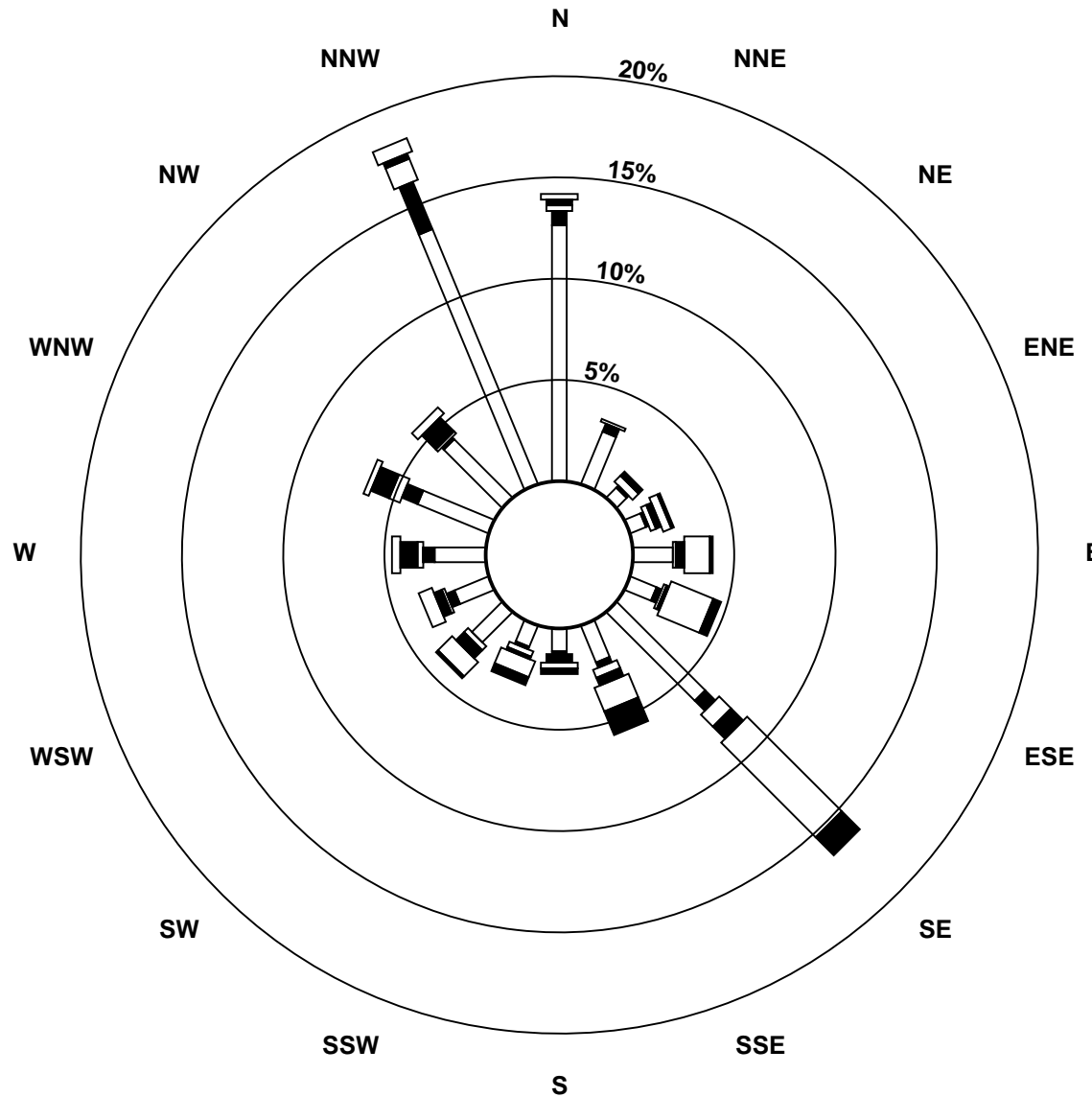
Total Number of Valid Hours: 712

Total Number of Hours: 744

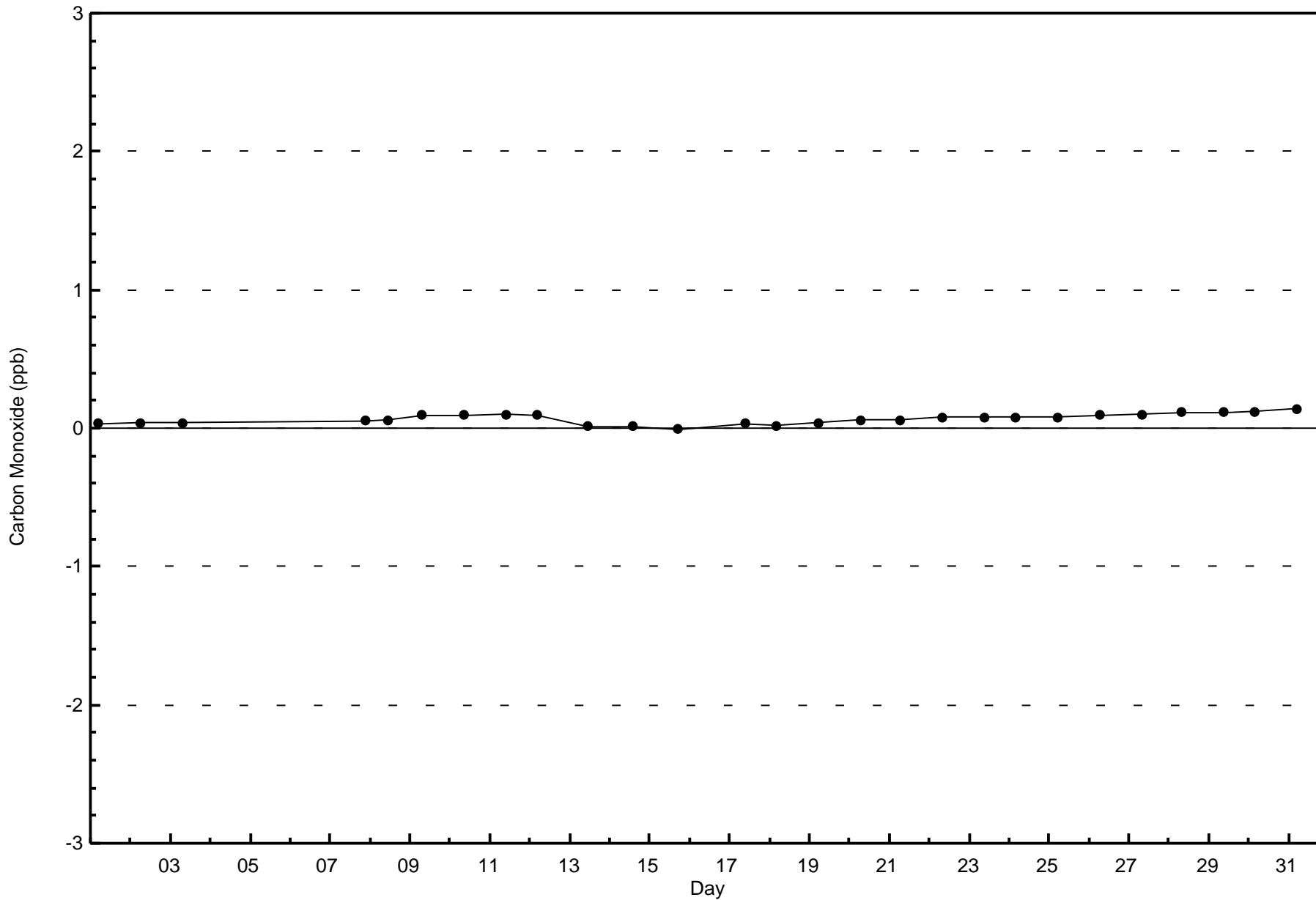


Wood Buffalo Environmental Association
Wind Rose May 2016

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



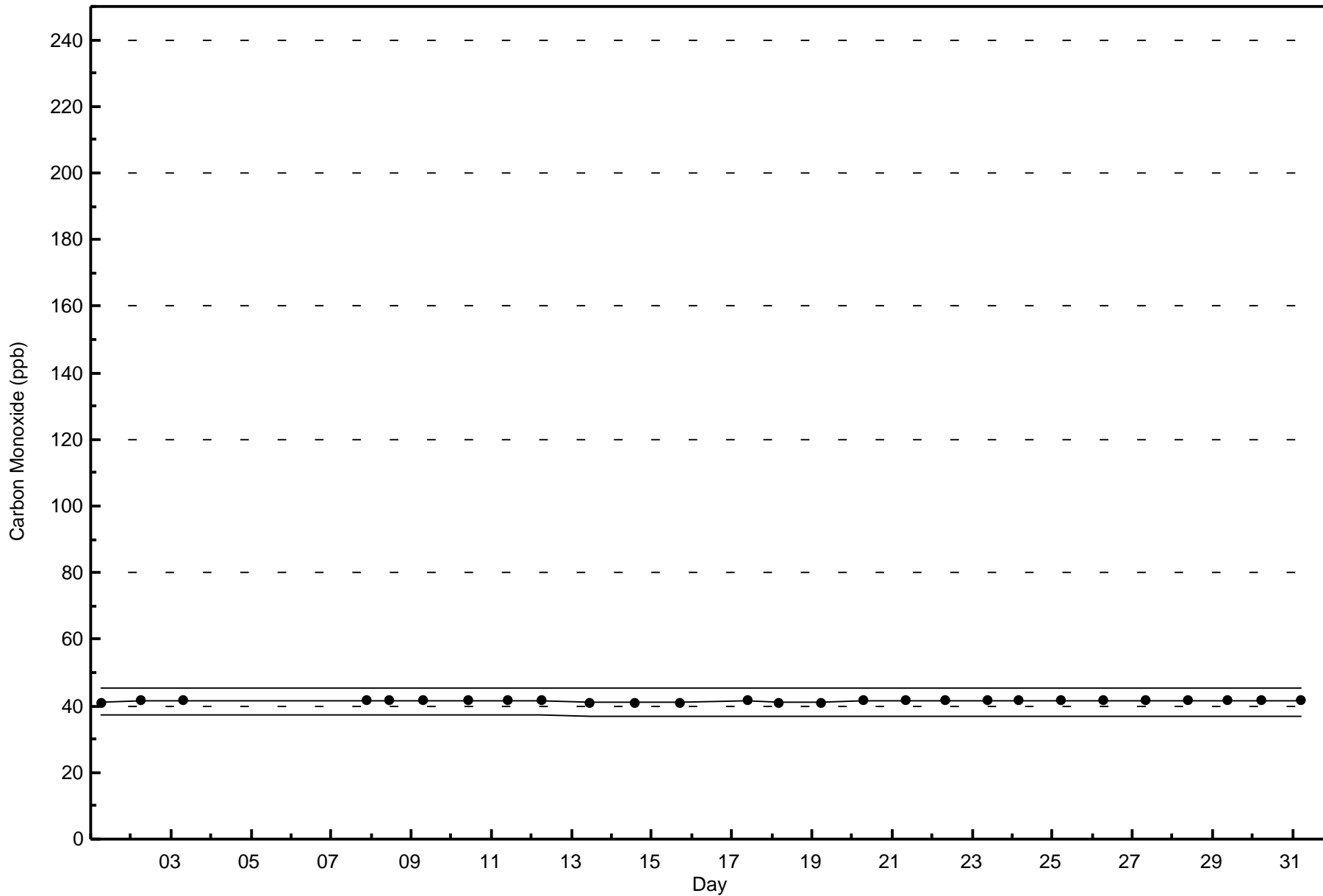
Total Number of Valid Hours: 712





Wood Buffalo Environmental Association
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - May 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

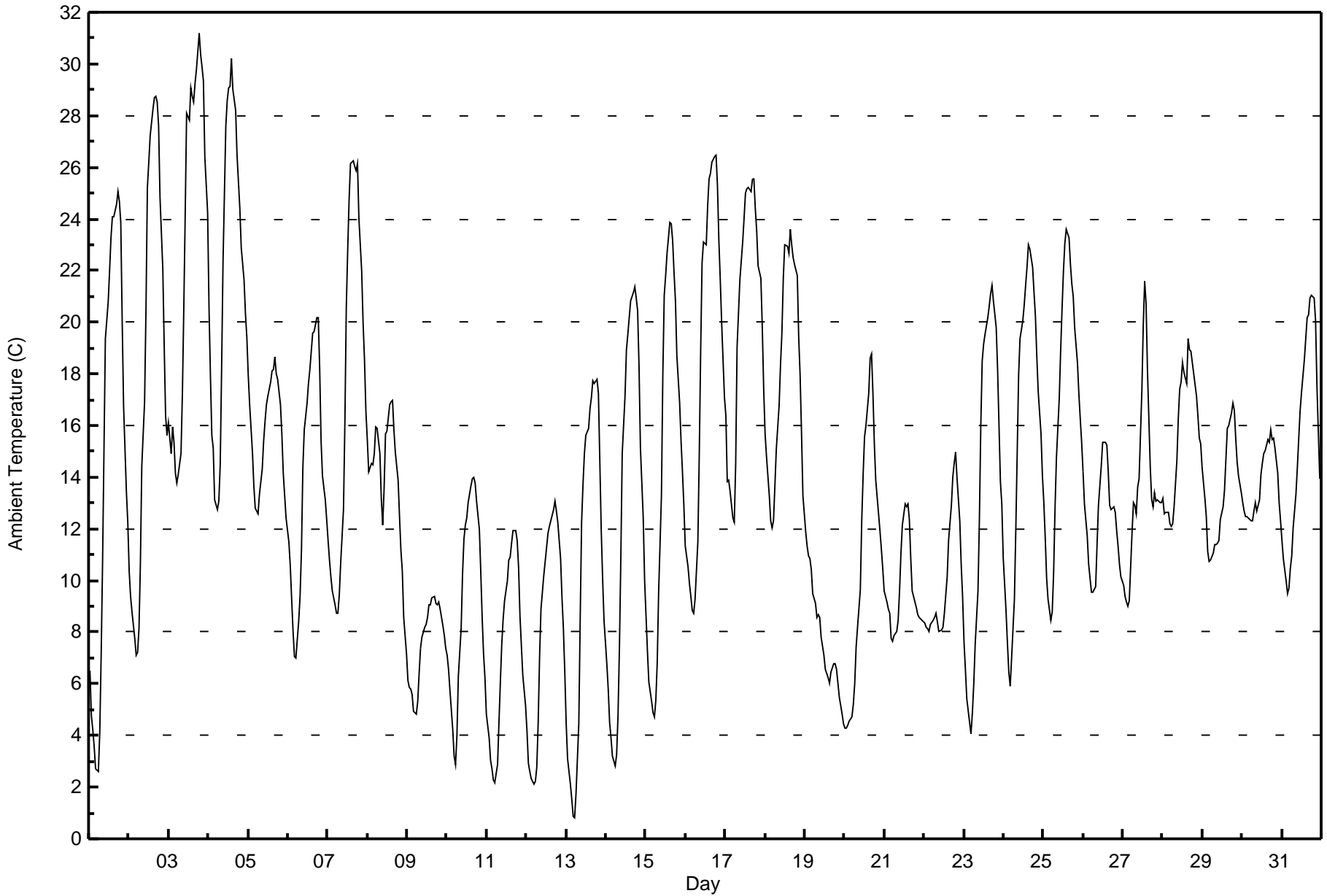
Ambient Temperature (AT) - C
Athabasca Valley - May 2016

Maximum Value: 31.2 C on May 3 19:00 Maximum Daily Average: 23.1 C on May 3																				Hours in Service: 744 Hours of Data: 744																												
Minimum Value: 0.8 C on May 13 06:00 Minimum Daily Average: 7.3 C on May 11 Maximum Diurnal Average: 19.1 C at hour 16 Minimum Diurnal Average: 8.1 C at hour 5 Monthly Average: 14.02 C Percentiles: P₁ = 2.2 P₁₀ = 6.2 Q₁ = 9.3 Median = 13.1 Q₃ = 18.2 P₉₀ = 23.0 P₉₉ = 29.2																				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-May	6.5	4.8	4.2	3.6	2.7	2.6	4.1	7.1	10.7	15.0	19.4	20.8	22.0	23.3	24.1	24.1	24.6	25.0	24.7	23.8	20.1	16.7	13.4	12.2	14.8	25.0																						
2-May	10.4	9.4	8.8	7.7	7.1	7.2	8.1	10.6	14.4	16.9	20.5	25.2	26.2	27.2	28.3	28.7	28.7	28.5	27.6	24.9	22.1	19.1	16.4	15.6	18.3	28.7																						
3-May	16.1	14.9	16.0	15.3	14.2	13.8	14.1	14.9	17.3	20.6	24.2	28.1	27.8	29.0	28.7	28.5	29.3	29.8	31.2	30.4	29.9	29.3	26.4	24.2	23.1	31.2																						
4-May	20.6	18.0	15.6	15.1	13.1	12.7	13.1	14.5	18.2	22.3	27.6	28.6	29.1	29.1	30.2	29.0	28.2	26.5	25.4	24.4	22.9	21.6	20.4	19.4	21.9	30.2																						
5-May	17.9	16.8	14.9	13.7	12.8	12.7	12.6	13.4	14.3	15.4	16.2	16.8	17.1	17.7	18.1	18.2	18.6	18.0	17.8	16.8	15.7	14.2	13.3	12.4	15.6	18.6																						
6-May	11.5	10.6	9.3	8.0	7.1	7.0	8.4	9.4	11.2	14.4	15.9	16.9	17.6	18.2	18.9	19.6	19.7	20.2	20.2	18.2	15.4	14.0	13.1	12.4	14.0	20.2																						
7-May	11.5	10.8	10.1	9.6	9.1	8.7	8.7	9.4	10.7	12.8	16.1	20.6	22.8	24.7	26.2	26.2	26.1	25.9	26.1	24.0	22.0	19.9	18.6	16.5	17.4	26.2																						
8-May	15.4	14.2	14.5	14.5	14.9	16.0	15.9	14.9	13.2	12.2	13.6	15.7	15.8	16.8	16.9	17.0	15.8	15.0	13.9	12.5	11.2	10.4	8.6	7.2	14.0	17.0																						
9-May	6.1	5.9	5.8	5.6	5.0	4.8	5.3	6.4	7.4	7.8	8.2	8.3	8.6	9.1	9.0	9.4	9.4	9.1	9.0	9.2	8.9	8.2	7.9	7.4	7.6	9.4																						
10-May	7.1	6.6	5.8	4.3	3.2	2.9	4.0	6.3	8.1	10.2	11.6	12.2	12.4	13.0	13.7	14.0	14.0	13.8	13.1	12.0	10.3	8.6	7.2	6.2	9.2	14.0																						
11-May	4.8	3.9	3.0	2.7	2.3	2.2	2.9	4.5	6.1	7.5	8.5	9.2	10.0	10.8	10.9	11.4	11.9	11.9	11.6	10.5	8.6	7.5	6.4	5.1	7.3	11.9																						
12-May	4.2	2.9	2.6	2.3	2.1	2.2	2.8	4.5	7.0	8.9	10.2	10.7	11.3	11.8	12.1	12.6	12.7	13.1	12.7	12.3	10.8	9.3	8.1	6.5	8.1	13.1																						
13-May	4.4	3.1	2.1	1.5	0.9	0.8	1.7	4.4	8.5	12.3	13.7	14.9	15.6	15.9	16.7	17.1	17.8	17.6	17.8	17.2	14.6	12.0	10.1	8.5	10.4	17.8																						
14-May	6.8	5.8	4.5	3.9	3.2	2.8	3.2	4.8	7.4	10.8	14.9	17.2	18.9	19.5	20.2	20.9	21.1	21.4	21.0	20.4	18.3	15.1	12.4	10.0	12.7	21.4																						
15-May	8.6	7.3	6.1	5.3	4.9	4.7	5.4	6.8	9.5	13.3	18.0	21.1	21.8	22.7	23.8	23.8	23.2	21.9	20.8	18.7	16.9	15.4	14.2	12.9	14.5	23.8																						
16-May	11.3	10.5	9.9	9.4	8.9	8.7	9.3	11.5	14.8	18.9	22.3	23.1	23.0	24.5	25.6	25.8	26.2	26.4	26.5	25.3	23.1	21.7	19.9	17.1	18.5	26.5																						
17-May	16.4	13.9	13.9	13.5	12.4	12.3	14.5	19.0	20.3	21.6	23.1	24.0	25.0	25.2	25.2	25.0	25.5	25.5	24.4	23.5	22.2	21.7	19.8	17.4	20.2	25.5																						
18-May	15.7	14.8	13.3	12.3	12.0	12.3	13.7	15.1	16.8	18.4	19.6	21.7	23.0	22.9	22.7	23.6	23.0	22.5	22.2	21.8	19.4	17.9	15.7	13.3	18.1	23.6																						
19-May	11.9	11.3	11.0	10.9	10.4	9.5	9.1	8.6	8.7	8.6	7.8	7.1	6.6	6.4	6.2	6.0	6.4	6.8	6.8	6.5	6.0	5.5	4.8	4.5	7.8	11.9																						
20-May	4.3	4.3	4.4	4.5	4.7	5.2	6.0	7.4	8.2	9.7	12.3	14.1	15.6	16.0	17.2	18.6	18.7	17.2	15.3	13.9	12.6	11.9	11.2	10.5	11.0	18.7																						
21-May	9.6	9.2	8.9	8.7	7.8	7.6	7.9	8.0	8.4	9.6	11.1	12.1	12.9	12.9	13.0	12.4	10.8	9.6	9.2	8.9	8.7	8.6	8.5	8.4	9.7	13.0																						
22-May	8.3	8.2	8.2	8.0	8.3	8.4	8.6	8.7	8.4	8.0	8.1	8.2	8.7	9.4	10.2	11.5	12.9	14.0	14.5	15.0	14.0	12.3	10.6	9.4	10.1	15.0																						
23-May	7.6	6.6	5.4	4.5	4.1	4.9	6.0	7.6	9.6	12.4	16.0	18.5	19.2	19.5	20.2	20.6	21.1	21.4	20.8	19.8	18.2	16.0	13.8	12.9	13.6	21.4																						
24-May	10.9	8.8	7.6	6.4	5.9	7.0	9.3	12.0	14.9	18.0	19.3	20.1	20.7	21.4	22.1	23.0	22.8	22.1	21.2	20.3	18.7	17.3	15.7	14.1	15.8	23.0																						
25-May	13.0	11.7	10.1	9.3	8.5	8.8	10.3	12.8	14.8	17.1	18.9	20.5	22.0	23.0	23.6	23.3	22.3	21.5	21.0	19.8	18.4	17.3	16.3	15.3	16.6	23.6																						
26-May	14.2	13.0	11.7	10.6	10.1	9.6	9.5	9.8	11.4	12.9	13.7	14.4	15.3	15.3	15.2	14.2	12.9	12.8	12.8	12.6	11.9	11.4	10.6	10.1	12.3	15.3																						
27-May	9.8	9.4	9.1	9.0	9.2	11.9	13.0	12.9	12.6	13.6	13.9	17.4	19.9	21.6	20.7	18.1	14.4	13.2	12.8	13.4	13.1	13.1	13.0	13.0	13.7	21.6																						
28-May	13.2	12.6	12.6	12.6	12.2	12.1	12.2	12.9	14.6	16.3	17.4	17.7	18.4	18.0	17.6	19.3	18.9	18.9	18.5	17.6	17.2	16.4	15.5	15.3	15.7	19.3																						
29-May	14.4	13.2	12.5	11.1	10.8	10.8	11.0	11.4	11.4	11.4	11.6	12.4	12.8	13.5	14.7	15.9	16.0	16.5	16.9	16.6	15.5	14.6	14.1	13.4	13.4	16.9																						
30-May	13.0	12.7	12.5	12.5	12.4	12.3	12.3	12.7	13.0	12.7	13.1	14.1	14.5	14.9	15.0	15.5	15.3	15.8	15.5	15.5	15.1	14.2	13.0	12.3	13.7	15.8																						
31-May	11.5	10.9	10.0	9.5	9.7	10.5	11.0	12.0	13.3	14.4	15.5	16.6	17.3	18.6	19.4	20.2	20.3	20.9	21.0	21.0	20.1	17.5	15.7	14.0	15.4	21.0																						
																								10.9	9.9	9.2	8.6	8.1	8.2	8.8	10.1	11.8	13.7	15.6	17.0	17.8	18.5	18.9	19.1	19.0	18.8	18.5	17.6	16.2	14.8	13.4	12.2	Diurnal Average
																								20.6	18.0	16.0	15.3	14.9	16.0	15.9	19.0	20.3	22.3	27.6	28.6	29.1	29.1	30.2	29.0	29.3	29.8	31.2	30.4	29.9	29.3	26.4	24.2	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Athabasca Valley - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	216	29.03	29.03
10 - 20	386	51.88	80.91
> 20	142	19.09	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

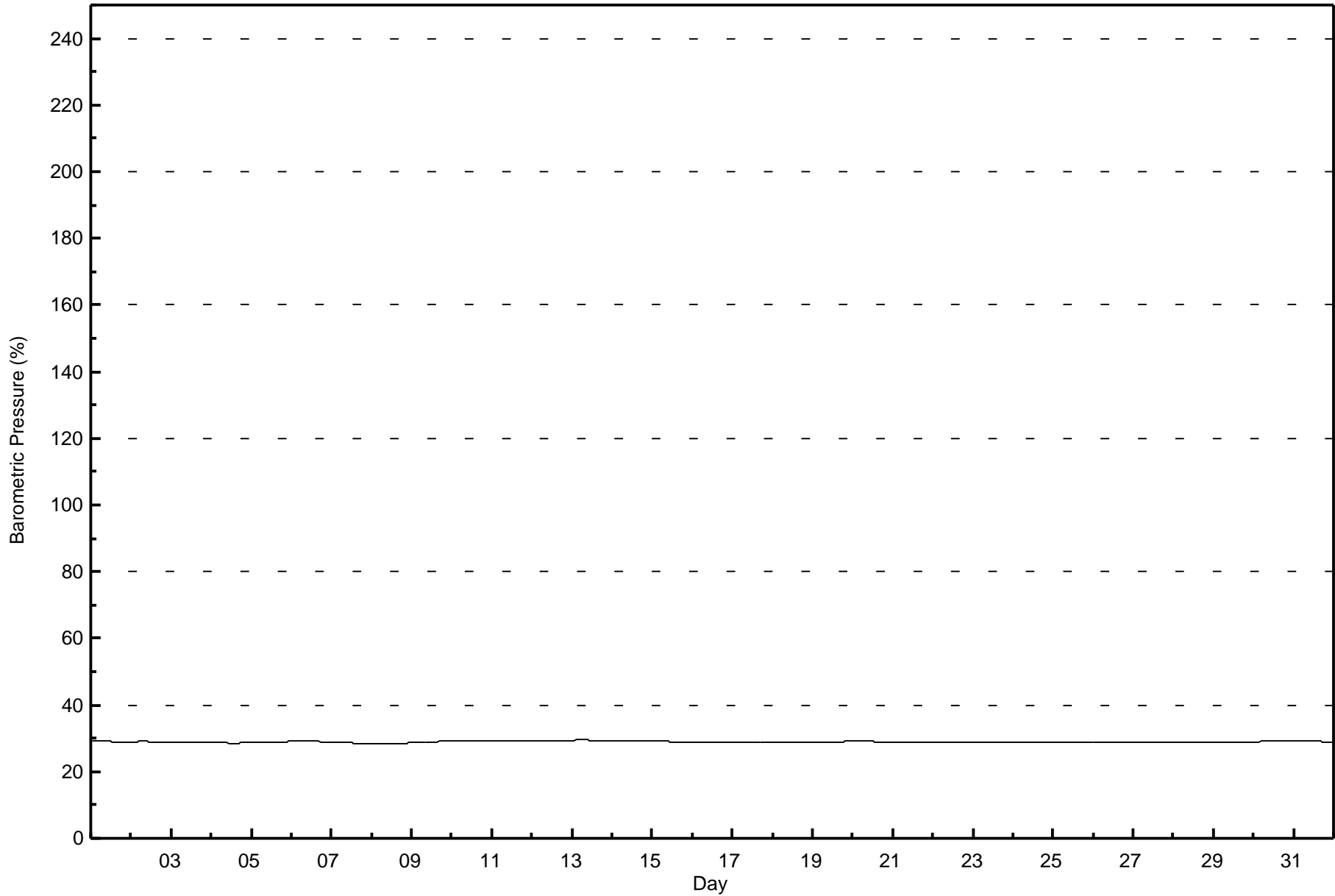
Barometric Pressure (BP) - %
Athabasca Valley - May 2016

Maximum Value: 29.5 % on May 13 07:00		Maximum Daily Average: 29.4 % on May 12		Hours in Service: 744																										
Minimum Value: 28.3 % on May 8 04:00		Minimum Daily Average: 28.4 % on May 8		Hours of Data: 744																										
Maximum Diurnal Average: 29.0 % at hour 7		Minimum Diurnal Average: 28.9 % at hour 19		Hours of Missing Data: 0																										
Monthly Average: 28.95 %		Percentiles: P ₁ = 28.4 P ₁₀ = 28.7 Q ₁ = 28.8 Median = 28.9 Q ₃ = 29.1 P ₉₀ = 29.3 P ₉₉ = 29.4		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-May	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	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1
2-May	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1
3-May	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.9	
4-May	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	28.6	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
5-May	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.1	
6-May	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.1	29.2	
7-May	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	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.6	28.9	
8-May	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	
9-May	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	28.9	29.2	29.2	
10-May	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	29.2	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	
11-May	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	29.3	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	
12-May	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	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	
13-May	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.5	29.5	
14-May	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.3	
15-May	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1	
16-May	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	
17-May	28.8	28.8	28.8	28.8	28.8	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	
18-May	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	
19-May	28.8	28.8	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	29.1	29.1	29.1	29.1	29.0	29.1	29.1	29.1	
20-May	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	
21-May	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	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	29.0	
22-May	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	28.6	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	28.8	
23-May	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	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	28.8	28.9	
24-May	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	28.8	28.8	28.8	28.9
25-May	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	28.8	28.9	
26-May	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	28.9	28.9	
27-May	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	28.9	28.9	28.9	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	
28-May	28.9	28.9	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.9	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	
29-May	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	29.0	29.0	29.0	29.0	28.9	29.0	29.0	
30-May	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2	
31-May	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.2	
	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	28.9	28.9	28.9	28.9	28.9	28.9	Diurnal Average	
	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - May 2016

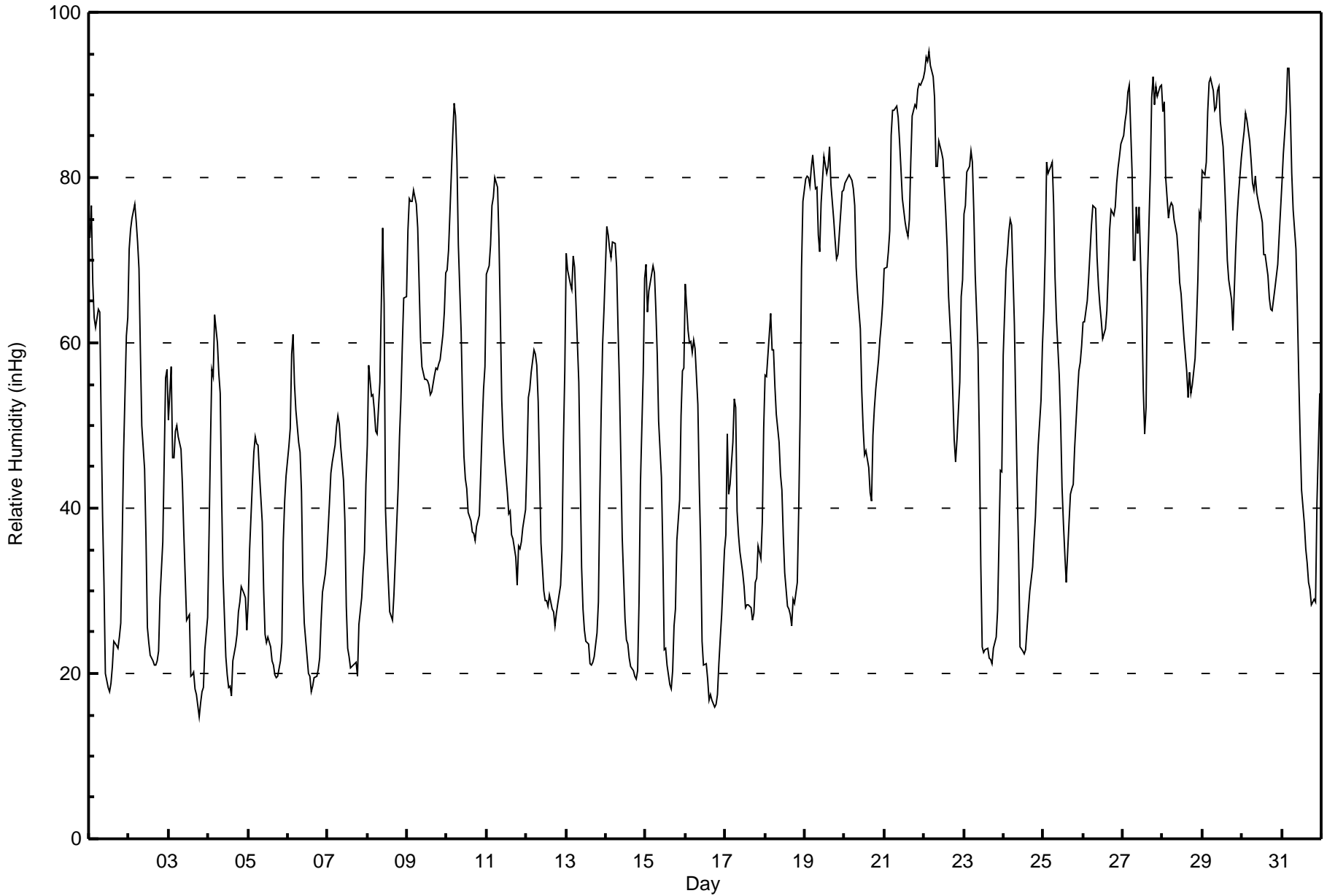




Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - inHg
Athabasca Valley - May 2016

Maximum Value: 95 inHg on May 22 04:00		Maximum Daily Average: 82.1 inHg on May 21		Hours in Service: 744																							
Minimum Value: 15 inHg on May 3 19:00		Minimum Daily Average: 32.2 inHg on May 3		Hours of Data: 744																							
Maximum Diurnal Average: 71.6 inHg at hour 5		Minimum Diurnal Average: 37.6 inHg at hour 15		Hours of Missing Data: 0																							
Monthly Average: 53.1 inHg		Percentiles: P₁ = 17 P₁₀ = 23 Q₁ = 33 Median = 54 Q₃ = 72 P₉₀ = 82 P₉₉ = 93		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	73	77	67	63	62	64	64	51	39	31	20	18	18	19	21	24	23	23	24	26	36	47	61	63	42.2	77	
2-May	71	74	75	77	75	72	69	59	50	45	36	26	24	22	21	21	21	22	23	29	36	46	56	57	46.1	77	
3-May	51	57	46	46	49	50	49	47	43	37	32	26	27	20	20	20	18	17	15	16	18	18	23	27	32.2	57	
4-May	37	48	57	56	63	60	56	54	41	32	22	20	18	18	17	22	23	25	27	29	30	30	29	25	35.0	63	
5-May	29	35	43	47	49	48	48	44	38	30	25	24	24	23	22	21	20	20	22	22	24	36	41	44	32.3	49	
6-May	48	50	59	61	55	52	48	47	42	31	26	22	20	20	18	18	19	20	20	22	26	30	32	34	34.1	61	
7-May	37	41	44	46	48	50	51	50	47	43	38	28	23	22	21	21	21	21	20	26	29	32	35	43	34.9	51	
8-May	48	57	54	54	52	49	49	55	65	74	65	40	35	27	27	26	30	34	42	49	53	60	65	66	49.0	74	
9-May	74	77	77	77	79	77	74	67	60	57	56	56	55	55	54	54	56	57	57	58	58	61	64	68	63.6	79	
10-May	69	71	76	85	89	87	82	72	61	53	46	44	42	39	38	37	37	36	38	39	44	50	54	57	56.2	89	
11-May	68	69	72	77	78	80	79	73	63	53	49	46	42	39	40	37	36	34	31	35	35	36	38	40	52.0	80	
12-May	46	53	54	56	59	59	57	53	44	36	30	29	29	28	29	28	27	26	27	28	31	35	48	57	40.4	59	
13-May	71	69	67	67	70	69	65	55	44	33	28	25	24	24	21	21	21	22	25	29	41	52	60	64	44.5	71	
14-May	74	73	71	70	72	72	69	62	55	46	36	27	24	23	22	21	20	20	19	20	29	43	56	68	45.6	74	
15-May	70	64	66	68	69	68	64	59	51	44	35	23	23	21	19	18	20	26	28	36	41	51	57	57	44.9	70	
16-May	67	62	60	60	59	60	59	52	43	36	24	21	21	19	17	17	17	16	16	18	21	24	27	35	35.5	67	
17-May	37	49	42	43	48	53	52	40	37	35	32	31	28	28	28	28	27	27	31	31	35	34	38	50	36.8	53	
18-May	56	56	61	64	59	59	55	51	48	44	42	37	32	28	28	27	26	29	28	31	40	51	69	77	45.8	77	
19-May	80	80	80	79	81	83	79	79	73	71	77	83	82	81	81	84	79	75	72	70	71	73	78	79	77.9	84	
20-May	79	80	80	80	80	79	77	69	66	62	54	50	46	47	45	42	41	49	52	54	58	61	62	65	61.6	80	
21-May	69	69	71	74	85	88	88	89	87	84	81	78	75	74	73	75	82	87	89	88	91	91	91	92	82.1	92	
22-May	93	94	94	95	94	92	90	81	81	84	83	82	79	76	72	66	59	54	48	46	48	55	66	68	75.0	95	
23-May	76	77	81	81	83	82	76	68	59	48	33	23	23	23	23	22	22	21	23	24	28	36	45	44	46.7	83	
24-May	59	69	71	73	75	74	62	52	43	34	23	23	22	23	26	28	30	33	36	39	44	48	53	60	45.8	75	
25-May	64	71	82	80	81	82	77	68	63	56	51	43	38	34	31	38	42	42	43	47	54	57	58	60	56.7	82	
26-May	62	62	65	68	71	74	77	76	70	67	65	63	61	62	64	68	74	76	75	76	79	81	82	84	71.0	84	
27-May	85	87	88	90	91	81	70	70	76	73	77	64	54	49	52	68	80	90	92	89	91	90	91	91	78.8	92	
28-May	88	89	80	75	76	77	77	75	73	71	67	66	63	61	57	53	56	54	55	58	63	68	76	75	68.9	89	
29-May	81	80	82	88	91	92	91	88	89	91	91	87	84	80	75	70	68	65	62	66	71	75	78	82	80.3	92	
30-May	84	86	88	87	84	82	79	79	80	78	76	76	75	71	71	68	65	64	64	65	67	69	73	76	75.3	88	
31-May	79	83	88	93	93	88	81	76	71	64	56	49	42	38	35	33	31	30	28	29	29	41	47	54	56.6	93	
		65.2	68.0	69.1	70.4	71.6	71.1	68.1	63.2	58.2	53.0	47.6	42.7	40.5	38.5	37.6	38.0	38.5	39.2	39.7	41.9	45.8	51.0	56.5	60.0	Diurnal Average	
		93	94	94	95	94	92	91	89	89	91	91	87	84	81	81	84	82	90	92	89	91	91	91	92	Diurnal Maximum	





Maximum Speed: 34 km/h on May 4 18:00	Maximum Daily Speed Average: 17.4 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 17 07:00	Minimum Daily Speed Average: 0.9 km/h on May 13	Hours of Data: 743
Maximum Diurnal Speed Average: 7.5 km/h at hour 15	Minimum Diurnal Speed Average: 0.9 km/h at hour 6	Hours of Missing Data: 1
Monthly Average Velocity: 3.7 km/h 331.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 11 Q ₃ = 15 P ₉₀ = 19 P ₉₉ = 26	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	E2	ESE3	SE4	S4	S5	SSE9	SE9	SE9	SE9	E5	SW14	SW18	SW15	SW14WSW14	WNW16	WNW14	WNW15	WNW14	WSW9	W6	WSW4	SE2	E1	SW4.6	SW18	
2-May	SE2	SE2	SE3	ESE3	SE4	SE4	SE6	SE8	ESE5	NW2	NW3	NNE3	N3	NNE4	ESE8	SE11	SE12	SE12	SE9	SE5	SSE3	SE3	ESE5	ESE4	ESE4.1	SE12
3-May	SE3	SE8	SE14	SE14	SE12	SE12	SSE12	SSE13	SSE11	SE11	SE11	ESE9	NNE5	NE8	N4	E5	SW2	N3	SSW13	SSW8	SSW14	SSW13	SW9	S5	SSE6.2	SE14
4-May	SSE4	SSW1	SSE3	S3	SE6	SE6	SE10	SE8	SE7	SE7	SW8WSW10	NW5	WNW4	W24WNW33	WNW34	WNW34	WNW22	WNW23	W17	W22	WNW19	WNW22	W9	W9.4	WNW34	
5-May	WNW19	NW17	NNW19	NW18	WNW13	WNW11	NW8	NNW12	N11	NNW12	NW17	WNW23	NW25	WNW27	WNW25	WNW26	WNW23	NW24	NW24	NW19	NW15	NNW19	NNW8	W9	NW16.9	WNW27
6-May	NNW10	WNW5	WSW7	SW6	WSW7	SW6	SSE2	ESE6	ESE4	ENE3	NNW12	NW14	WNW14	WNW16	WNW15	WNW12	NW16	WNW12	W7	SE11	SE12	SE11	SSE9	SSE8	W3.8	NW16
7-May	SSE6	SSE7	SSE6	SSE8	SSE11	SSE9	SE11	SE12	SE12	SE10	ESE6	SSW3	E3	NNW6	W16	WSW14	SW16	WSW10	WSW6	SE5	SE14	SE12	SE10	ESE5	SSE5.9	W16
8-May	ESE4	N3	NW8	NNW9	NW12	NW15	WNW20	WNW28	WNW15	W8	SW11	WSW19	W25	WSW22	W22	WSW25	WSW26	WSW25	WSW24	W22	WSW19	WNW24	NW28	NW25	W15.9	NW28
9-May	WNW20	WNW14	NW11	W14	WSW15	WSW14	W14	WNW19	WNW27	NW24	NW20	NNW22	NW20	NW21	NW19	NW16	NW16	NNW17	NW14	NW16	W9	W14	NW13	N11	WNW14.9	WNW27
10-May	NW7	W6	W3	S1	SE3	ESE4	SE5	N5	N7	NNE8	N12	N11	NNW12	N9	NNW16	N16	N16	NNE14	NNE15	NNE14	NE12	ENE12	ENE10	E3	NNE6.9	N16
11-May	ENE3	NE5	NE4	NW4	NNW9	NNW11	NNW14	NNW15	NNW16	NNW17	NNW19	NNW20	NNW19	N18	NNW21	N20	N20	N22	N16	N18	N15	NNE13	NNE10	NNE7	N13.4	N22
12-May	N6	NNE4	N5	NNW5	NNW7	NNW10	NNW13	NNW11	NNW14	N13	N15	N16	N19	NNW20	NNW22	NNW17	N16	NNE14	N12	N11	NE7	NE5	W3	WSW6	N10.5	NNW22
13-May	S2	E4	ESE4	SE6	SE7	SE7	SE8	SE6	SE6	ENE2	W5	ENE6	N7	NNW7	N6	N3	WNW6	NNW7	NNW6	NNW7	W3	WSW3	W2	WNW2	NE0.9	SE8
14-May	E2	ENE2	E3	ESE3	ESE3	ESE3	SE6	SE6	E5	E4	NNW3	NNW9	N13	NNW13	NNW15	N13	N11	NNE9	NE10	NE8	NNE3	W6	SW2	E2	NNE3.9	NNW15
15-May	ESE3	E4	SE3	SE3	SE4	SE5	SE6	SE7	SE6	E5	ENE2	WNW4	NNW6	NNW6	E6	ENE3	SW4	ESE4	SSE3	SE3	SSW1	ESE1	SW1	SSW1	ESE2.0	SE7
16-May	SSE1	SE3	E6	E5	ESE6	SE11	SE12	SE9	SE9	ESE5	WSW11	SW11	SW3	S9	SSW16	SSW15	SSW14	SSW13	S11	SSE8	SSE8	SSE9	SSE6	SE6	S6.5	SSW16
17-May	SE5	SE4	SE7	SE11	SE9	ESE7	ENE1	W12	W13	W16	WSW15	W16	W18	WNW19	WNW19	WNW15	W14	WNW7	ESE6	SE10	SE11	S4	SSE9	SE6	WSW4.7	WNW19
18-May	SE5	SSE5	SE5	SSE4	SSE6	SE5	SE4	ESE2	SSW4	SW14	SW14	WSW17	W23	W23	W19	W11	WNW17	WNW13	WSW8	SW6	ESE1	NNW9	NNW22	NNW21	W5.9	W23
19-May	N19	N16	N14	N11	NNW18	NNW19	N17	N15	NNE18	NNE18	N18	N20	N20	N20	N21	N20	N19	N18	N19	N17	N17	N16	N15	N16	N17.4	N21
20-May	N15	N14	N13	N12	NNE12	NNE11	NNE9	ENE12	E15	E13	E14	ENE13	ENE11	ENE11	NE9	NE7	SE10	N8	N16	NNW18	NNW16	NNW13	NW13	NNW12	NNE9.2	NNW18
21-May	NNW14	NNW11	NNW8	WNW7	NNW8	NW8	NNW11	NNW12	NNW11	N10	N11	NNW12	NNW13	NW17	NNW16	NNW18	NNW18	NNW20	NNW19	NNW17	NNW18	NNW14	NNW18	NNW18	NNW13.5	NNW20
22-May	NNW14	NNW11	NNW16	NNW14	NNW12	N12	N12	NNE15	NNE18	N16	N15	N16	N19	NNW23	NNW23	NNW19	NNW19	N16	N17	NNE16	N13	N11	N7	N4	N14.6	NNW23
23-May	N7	N9	N8	NNW10	NNW11	NNW13	N12	NNW12	N11	NNW15	NNE12	ENE18	E21	E18	E11	SE11	SE12	SE12	ESE11	SE12	SE7	SE4	SE7	SE7	NE5.6	E21
24-May	S4	SE2	SE3	SE2	SE5	ESE4	SSE8	SE8	SE8	SE9	SSE19	S19	SSE18	SE16	SE17	SSE14	SSW13	SSW13	SSW11	SSW11	SSW11	S7	SSE6	SE7	SSE8.8	SSE19
25-May	SSE8	SSE4	SSE2	SE2	SSE5	SE5	SE6	SE3	E6	NNE2	NW3	NW5	NNW8	N13	NNW13	N17	NNW20	NNW20	NNE11	N12	N11	NNW11	NNW13	N11	N5.6	NNW20
26-May	N12	N16	NNW20	NNW19	NNW18	NNW17	NNW14	NNW12	NNW10	M	N16	N15	N15	NNW17	NNW19	N16	N13	N14	N11	N13	N13	NNW13	NNW14	NNW12	NNW14.6	NNW20
27-May	NNW12	NNW12	NNW10	NNW9	N6	ESE9	SE14	SE16	ESE8	ESE11	E9	ESE13	E16	ESE17	SE14	SSW6	SSW7	SE10	E4	SSE4	SE7	SSE9	SE3	SE6	ESE5.3	ESE17
28-May	SE10	SE8	SE11	SE12	SE11	SE10	SE11	SE12	SE13	SE15	SE13	SE13	SSE15	S16	S10	SSE12	SSE13	S13	SW11	SW9	SW5	SSW4	SSE2	SSE4	SSE9.4	S16
29-May	WNW4	NNW4	W10	W5	SW6	SW5	SW7	WSW7	SW6	SW6	SW7	WNW5	NNW5	NNW6	NNW7	N10	NNE8	NNE7	NE8	N10	N7	NNW7	N5	NNW6	NW3.5	N10
30-May	NNW9	NNW10	NNW8	NNW7	NW8	NNW9	NNW10	NNW11	NNW11	NW15	NNW14	NNW14	NNW20	NNW17	NNW15	NNW18	NNW18	NNW19	NNW16	NNW14	NNW11	NNW10	NNW6	NW7	NNW12.2	NNW20
31-May	NW5	NW4	NW1	E1	ENE2	E2	N5	N6	N8	NNW8	N7	N7	NNW8	WSW4	SW3	W4	N9	NW4	ESE5	SW2	S6	SE3	SSE5	SE4	N2.0	N9

NNW3.3	N3.3	NNW2.6	NNW1.5	NNW1.1	NNE0.9	NE1.2	NNE1.6	NNE2.6	N3.0	NNW3.4	NW4.9	NNW6.9	NW6.6	NW7.5	NW7.4	NW7.2	NW6.8	NNW5.3	NNW4.2	NNW2.2	NW3.2	NNW3.7	NNW3.1	Diurnal Average	
WNW20	NW17	NNW20	NNW19	NNW18	NNW19	WNW20	WNW28	WNW27	NW24	NW20	WNW23	W25	WNW27	WNW25	WNW33	WNW34	WNW34	WSW24	WNW23	WSW19	WNW24	NW28	NW25	Diurnal Maximum	

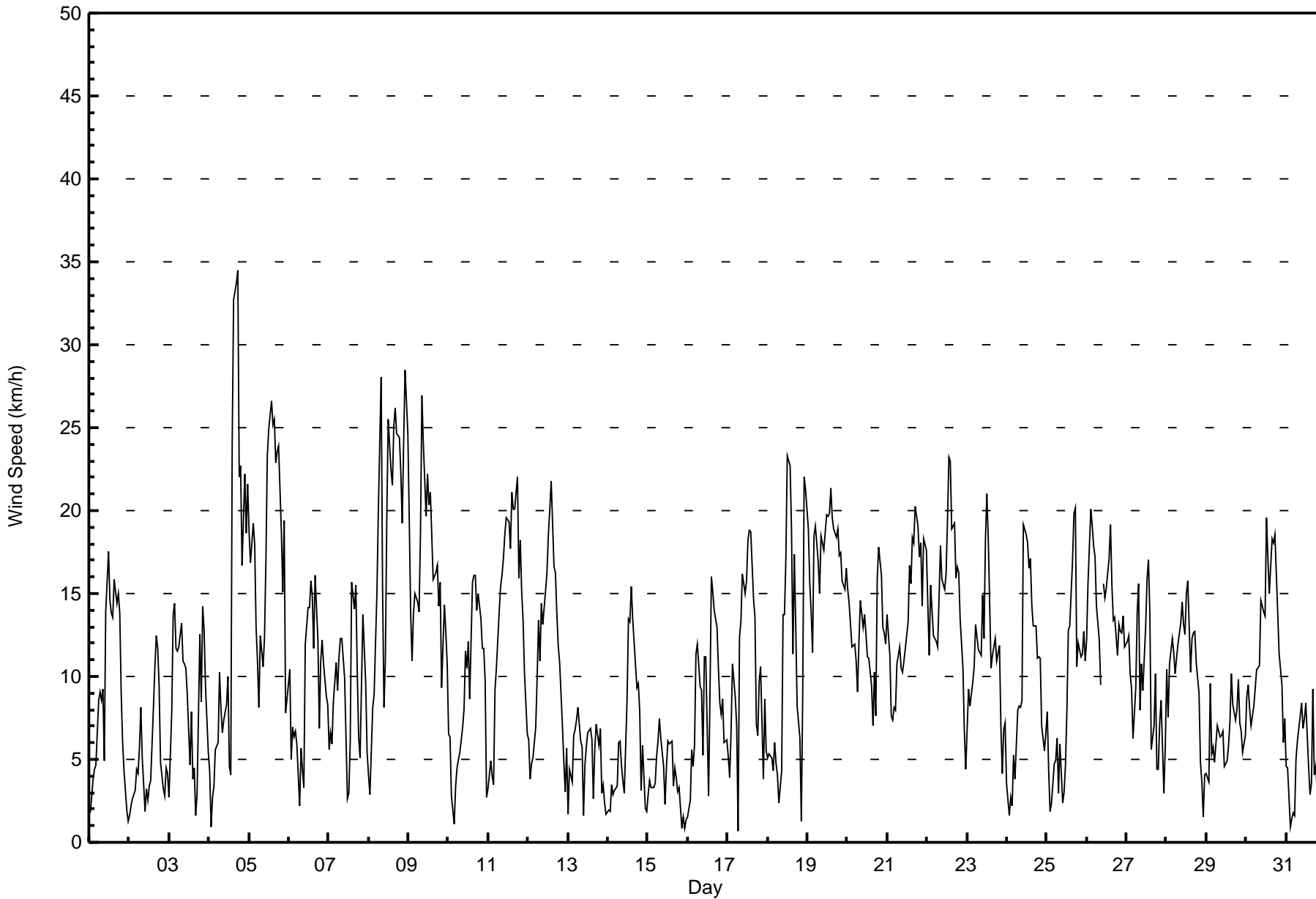
M - Maintenance
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Athabasca Valley - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on May 4 15:00														Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9											
Minimum Value: 1 km/h on May 13 03:00																									
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-May	2	1	1	1	1	1	1	1	1	1	6	4	4	5	5	6	6	5	3	1	2	2	2	2	6
2-May	1	2	1	1	1	1	1	2	1	1	1	2	1	2	3	2	3	3	3	2	1	1	2	2	3
3-May	2	2	3	3	3	2	3	3	2	2	2	3	3	4	4	4	5	4	5	5	4	4	3	5	5
4-May	2	2	2	2	1	2	2	2	1	1	4	3	3	4	12	7	6	9	5	5	5	3	3	3	12
5-May	4	6	4	5	3	3	2	4	4	4	5	5	7	6	9	6	6	5	5	3	3	5	4	2	9
6-May	2	2	2	2	2	2	2	1	1	3	7	6	6	5	5	5	4	4	3	5	3	3	2	2	7
7-May	2	2	2	2	2	2	3	3	3	2	2	2	2	6	6	4	4	3	3	2	3	3	3	2	6
8-May	2	2	5	2	5	5	5	9	5	3	6	5	7	6	7	7	7	5	6	6	4	8	6	5	9
9-May	5	4	3	2	2	3	4	5	6	6	5	4	4	4	3	3	3	3	2	4	2	3	2	3	6
10-May	2	2	2	1	2	2	2	3	2	3	3	3	4	4	5	4	5	4	4	4	2	3	2	3	5
11-May	1	2	1	2	2	2	3	3	3	4	5	5	6	5	5	5	6	6	4	5	4	3	3	2	6
12-May	2	1	1	2	2	2	3	2	4	5	5	5	5	6	6	5	5	4	4	3	3	2	1	2	6
13-May	2	1	1	1	1	1	1	1	1	1	2	3	3	4	3	2	3	3	3	3	1	2	2	1	4
14-May	1	1	1	1	1	1	1	1	1	1	2	3	4	3	4	3	4	4	3	2	2	1	2	2	4
15-May	1	1	1	1	1	1	2	1	1	1	1	2	2	2	3	2	1	1	2	2	1	2	1	1	3
16-May	2	2	2	2	3	2	2	2	2	2	4	4	4	4	5	5	6	4	4	2	2	2	4	2	6
17-May	2	3	3	2	2	2	5	4	5	3	4	4	4	5	4	3	3	4	2	2	5	2	2	2	5
18-May	2	1	1	1	1	1	1	2	4	3	2	4	7	6	5	5	3	4	2	3	1	4	6	5	7
19-May	5	4	4	4	4	5	4	4	5	5	5	5	5	5	6	5	5	5	5	5	5	4	4	4	6
20-May	4	4	3	3	3	2	2	4	4	3	5	4	4	4	3	4	3	3	4	5	4	2	2	2	5
21-May	2	2	3	1	3	3	2	2	2	3	2	3	3	3	3	4	4	4	4	4	4	4	3	3	4
22-May	3	3	4	4	3	3	3	4	5	4	4	4	5	5	4	4	4	5	4	4	3	3	2	1	5
23-May	2	2	2	2	2	3	3	2	2	4	5	6	6	6	4	3	3	3	3	4	3	1	1	2	6
24-May	2	1	1	1	2	1	2	2	2	5	6	5	5	5	6	5	4	4	4	4	4	2	1	2	6
25-May	2	2	2	1	1	1	1	2	1	1	1	1	3	3	2	4	5	4	3	3	3	3	3	3	5
26-May	3	3	4	4	3	3	3	2	3	M	3	3	4	4	4	4	4	3	3	3	3	2	2	2	4
27-May	2	2	2	2	3	6	4	5	3	4	3	5	4	5	5	4	7	2	2	2	2	3	2	2	7
28-May	3	2	4	4	4	3	3	3	3	4	4	5	4	6	3	4	3	4	3	3	2	1	1	1	6
29-May	4	3	4	4	2	2	2	1	1	1	1	2	1	1	2	2	2	2	3	3	2	2	1	1	4
30-May	2	2	2	1	1	2	3	2	3	2	3	3	4	4	3	4	3	4	4	2	2	3	3	2	4
31-May	1	1	1	1	1	1	2	2	2	2	2	3	3	2	2	2	3	3	3	2	2	1	1	2	3
Diurnal Maximum																									
5 6 5 5 5 6 5 9 6 6 7 6 7 6 12 7 7 9 6 6 5 8 6 5																									
M - Maintenance																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	170	22.88	22.88
6 - 11	251	33.78	56.66
12 - 19	262	35.26	91.92
20 - 28	57	7.67	99.60
29 - 38	3	0.40	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	6	3	8	18	21	36	15	8	6	9	3	7	6	10	4	170
6 - 11	31	9	7	4	5	11	61	20	5	6	14	10	9	4	7	48	251
12 - 19	55	13	1	4	5	2	26	8	3	9	7	8	12	21	16	72	262
20 - 28	8	0	0	0	1	0	0	0	0	0	0	5	7	13	9	14	57
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	104	28	11	16	29	34	123	43	16	21	30	26	35	47	42	138	743

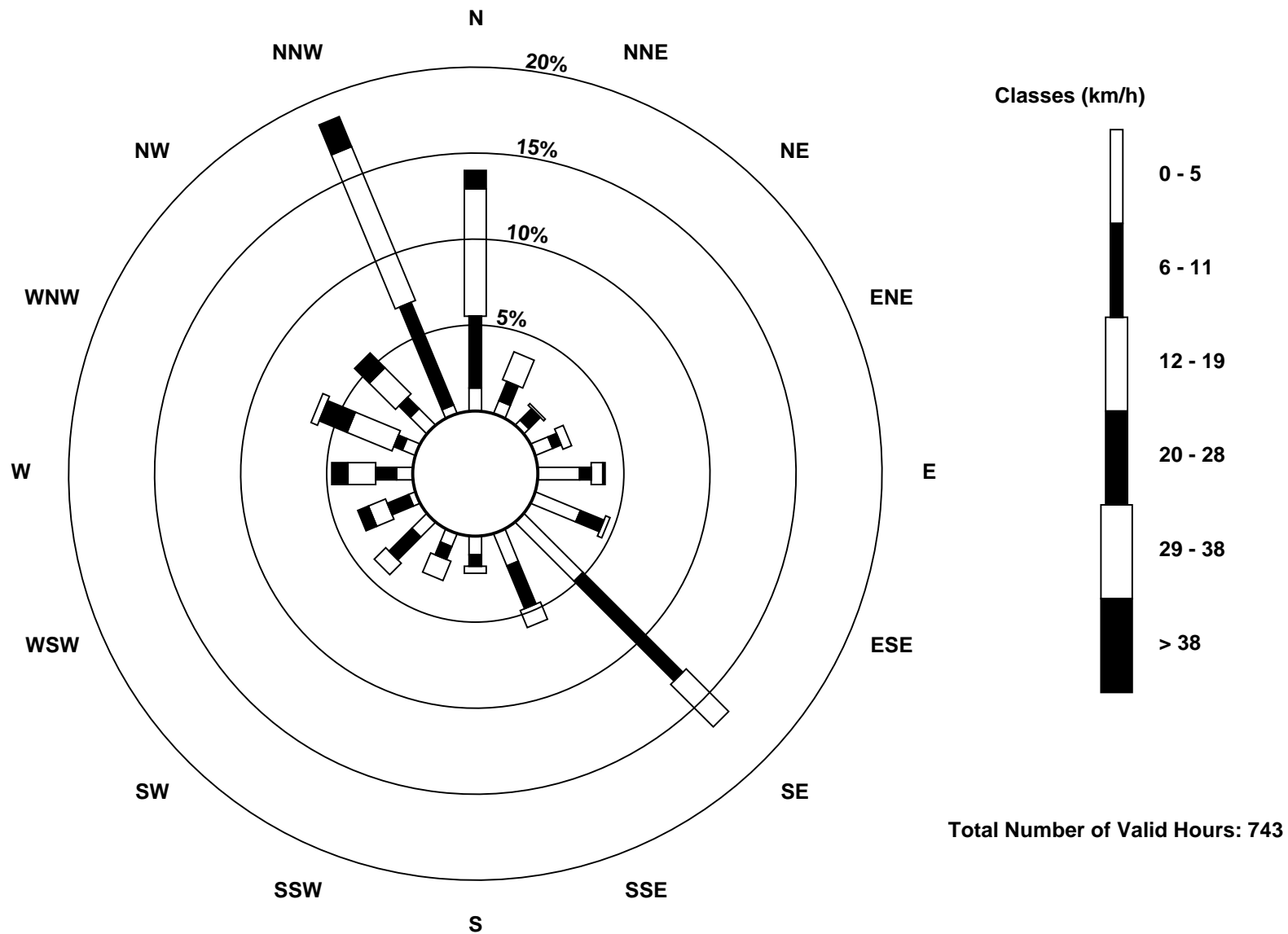
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - May 2016

Direction of Maximum Speed: 286 deg on May 4 18:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 3.1 deg on May 19	Hours of Data: 743
Direction of Minimum Speed: 59 deg on May 17 07:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.9 deg on May 13	Percent Operational Time: 99.9
Monthly Average Direction: 319.2 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-May	97	114	144	169	169	147	134	137	132	91	218	222	222	223	256	298	294	293	290	253	265	242	142	99	230.4
2-May	146	128	124	112	125	140	126	135	114	311	312	27	7	31	103	124	137	139	139	135	151	126	119	109	123.1
3-May	139	134	139	142	141	146	156	155	153	140	137	120	15	44	7	80	235	353	213	201	213	203	225	189	157.9
4-May	148	212	166	173	143	134	145	129	133	132	219	247	318	290	264	289	289	286	295	291	280	274	291	285	274.1
5-May	299	320	330	321	303	297	323	331	353	346	312	302	308	289	299	299	295	316	316	309	305	328	340	270	310.7
6-May	328	283	249	221	242	221	162	120	102	75	333	304	286	283	285	294	307	298	261	138	136	144	153	160	268.6
7-May	166	149	160	148	148	149	145	143	141	136	120	209	91	327	262	238	230	238	242	142	133	139	144	113	166.9
8-May	115	5	317	340	308	308	292	291	283	265	222	255	267	249	262	254	241	239	255	259	252	290	316	305	273.1
9-May	297	300	305	259	244	238	267	282	301	311	322	329	316	322	310	319	323	337	311	306	276	268	310	350	302.8
10-May	305	262	267	179	126	106	135	354	2	15	1	5	348	3	346	352	351	20	12	28	55	59	64	91	11.9
11-May	61	43	40	323	330	341	342	346	343	341	345	345	345	356	345	350	353	351	8	8	10	17	19	15	353.7
12-May	359	21	353	343	328	336	343	337	340	357	360	355	350	345	341	346	354	14	7	10	44	35	280	243	351.1
13-May	182	79	120	137	134	135	133	126	127	77	274	67	8	336	4	3	300	343	334	331	275	238	266	287	48.1
14-May	95	76	94	106	116	118	129	137	99	80	340	345	358	347	348	358	8	24	45	35	27	268	223	99	22.1
15-May	114	96	125	130	138	135	141	132	132	100	68	287	339	335	81	60	229	118	148	138	201	114	236	203	119.5
16-May	160	130	80	95	123	133	134	124	128	105	239	225	232	178	195	211	206	208	184	160	151	147	149	141	169.4
17-May	143	132	144	137	137	117	59	269	268	277	249	264	272	283	285	287	281	286	105	139	139	189	149	129	244.9
18-May	129	151	142	148	147	146	135	116	207	227	225	239	281	279	277	262	294	287	245	230	114	343	345	347	271.0
19-May	351	354	358	1	346	344	3	5	21	14	9	352	3	6	10	8	11	9	1	8	5	5	360	6	3.1
20-May	6	10	7	10	14	12	14	64	80	86	79	61	74	69	40	53	137	5	352	345	341	338	326	332	23.7
21-May	340	329	332	295	343	325	345	343	348	352	349	348	339	325	342	345	348	342	342	348	342	347	339	342	340.9
22-May	342	347	341	343	348	353	4	13	12	10	5	0	353	343	342	344	343	359	6	14	8	5	358	5	355.6
23-May	358	355	349	344	341	346	354	348	351	347	26	58	82	88	91	143	130	129	110	125	136	142	143	144	55.9
24-May	184	138	144	140	145	120	147	136	139	141	156	170	160	144	142	167	206	212	205	208	202	176	157	143	165.7
25-May	164	150	161	133	155	138	137	127	84	24	310	322	337	350	346	349	347	347	14	7	354	346	346	351	357.9
26-May	351	349	338	341	343	340	344	336	336	M	350	349	356	346	344	356	353	349	356	355	354	337	336	341	345.9
27-May	336	340	339	339	2	123	128	130	116	115	97	115	100	123	135	203	198	133	89	167	139	167	129	145	116.5
28-May	142	132	130	131	144	141	140	142	138	140	140	146	161	183	170	163	151	179	226	231	214	193	160	157	156.4
29-May	289	335	266	275	233	227	224	238	228	223	230	282	341	334	330	352	32	21	35	353	1	332	356	347	313.5
30-May	345	342	341	327	322	331	340	345	343	321	336	348	345	348	343	347	330	332	340	339	336	341	333	321	338.2
31-May	313	321	313	83	77	83	352	359	7	346	352	3	347	256	230	270	11	322	105	216	179	141	154	145	351.4

339.1 352.7 348.6 346.7 340.5 15.7 45.8 14.8 20.5 4.1 329.6 323.3 332.7 324.9 317.2 316.9 312.5 322.8 328.7 332.9 330.5 319.5 334.8 334.5
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

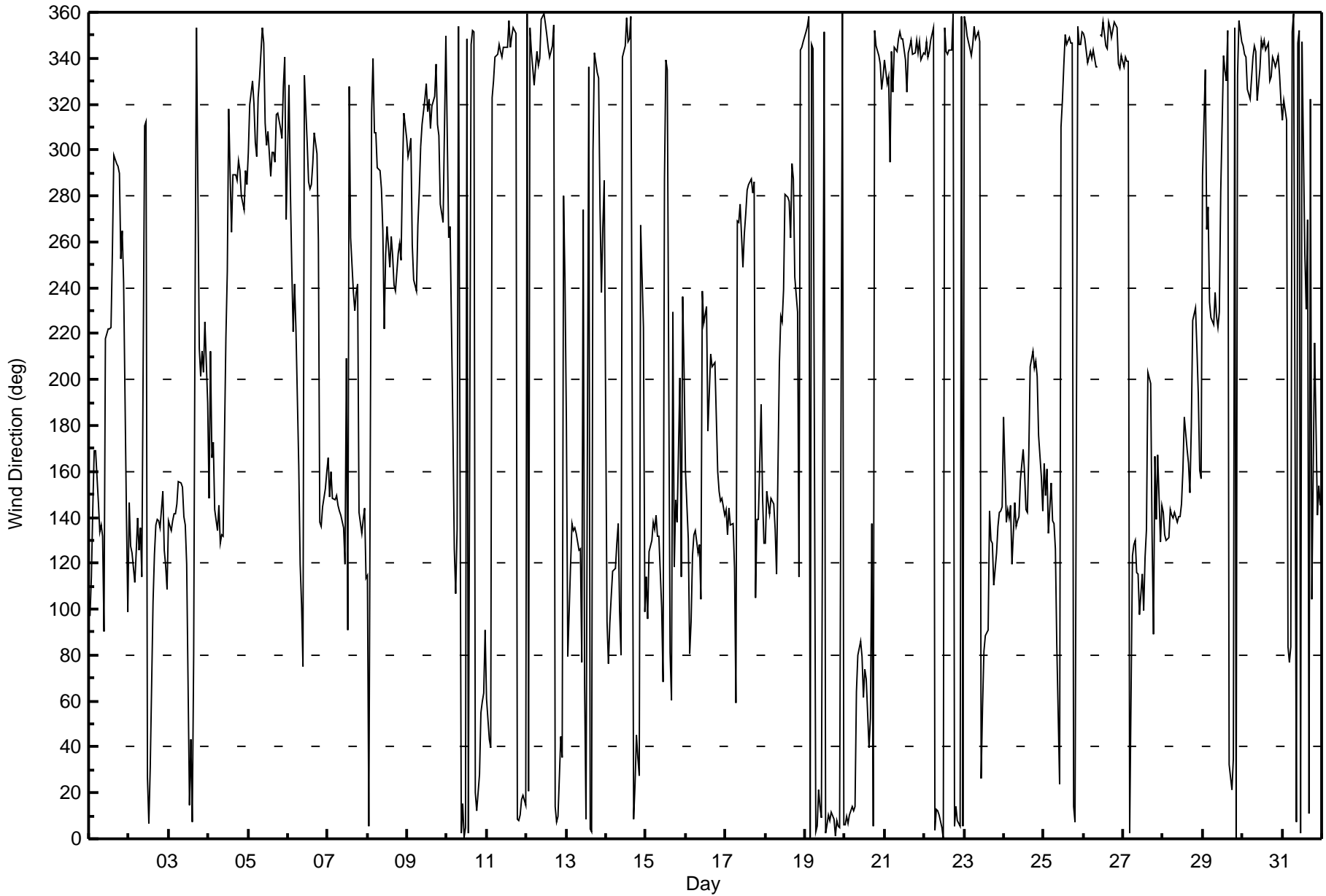
Wind Direction (WD) - deg
Athabasca Valley - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on May 3 17:00 Minimum Value: 8 deg on May 1 20:00 Percentiles: P ₁ = 10 P ₁₀ = 13 Q ₁ = 16 Median = 20 Q ₃ = 29 P ₉₀ = 53 P ₉₉ = 85		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	80	44	23	21	26	12	9	11	9	27	51	13	19	21	31	25	27	26	21	8	35	60	78	99	99	
2-May	79	51	57	29	21	23	22	12	26	49	33	73	54	64	23	21	17	15	13	18	28	21	27	31	79	
3-May	55	19	13	13	15	14	16	14	15	16	16	22	65	56	71	79	107	100	28	57	21	21	32	67	107	
4-May	47	92	51	41	18	32	12	22	14	11	50	14	60	66	31	15	13	12	12	12	8	14	11	92		
5-May	22	13	15	15	13	19	23	15	23	20	25	16	20	23	27	20	20	17	12	9	12	27	30	25	30	
6-May	16	48	26	31	42	17	64	24	27	85	36	37	29	21	29	28	19	28	27	52	14	15	17	19	85	
7-May	21	17	25	18	13	16	13	12	12	12	23	64	74	76	19	19	17	14	27	17	13	15	18	28	76	
8-May	37	57	31	20	27	13	14	14	28	29	20	22	21	17	17	18	14	13	15	13	11	25	11	16	57	
9-May	15	15	19	17	13	14	19	16	18	18	16	15	20	15	16	20	14	12	15	16	15	11	27	19	27	
10-May	30	25	63	78	42	34	54	37	29	32	27	26	30	39	19	24	20	26	24	24	16	14	18	82	82	
11-May	30	26	32	43	15	15	13	15	13	16	16	18	21	21	17	21	21	20	20	20	18	14	15	25	43	
12-May	15	20	18	29	24	15	14	15	11	30	29	27	23	20	18	23	25	30	36	21	17	24	48	33	48	
13-May	71	12	19	10	13	11	9	18	27	82	37	65	71	67	48	84	62	27	25	14	22	59	57	88	88	
14-May	35	49	26	29	24	19	14	14	32	39	48	21	20	19	17	21	34	36	24	19	57	15	76	78	78	
15-May	41	23	30	31	23	17	16	11	21	25	73	30	38	32	51	62	61	29	27	25	82	52	93	52	93	
16-May	71	53	21	49	39	12	12	13	11	39	39	21	86	49	29	29	28	29	26	16	12	15	58	20	86	
17-May	37	38	38	12	15	24	84	17	14	12	20	19	15	15	16	16	16	68	25	16	25	46	13	30	84	
18-May	25	16	14	18	14	17	29	71	73	13	12	23	16	16	23	32	13	19	20	39	94	32	16	17	94	
19-May	18	19	20	21	17	16	21	21	20	19	20	20	20	20	18	19	19	20	20	19	20	20	21	20	21	
20-May	19	19	20	20	17	19	19	22	17	17	26	28	28	18	30	62	31	37	18	16	13	11	15	16	62	
21-May	13	11	22	30	25	21	15	14	17	18	16	18	15	13	14	15	17	11	13	17	13	17	8	12	30	
22-May	12	18	11	16	18	19	21	20	19	20	20	19	19	12	11	13	13	21	19	17	17	17	17	21	21	
23-May	14	15	16	16	13	16	18	16	16	16	45	25	17	19	36	18	16	18	20	20	16	17	11	12	45	
24-May	36	80	26	59	17	28	21	18	22	36	21	23	28	23	24	33	35	28	27	22	24	25	16	18	80	
25-May	12	36	54	60	22	21	13	75	16	64	23	16	24	15	15	17	16	16	22	18	19	16	14	19	75	
26-May	17	15	12	14	13	12	14	14	19	M	17	18	19	15	15	19	20	16	20	18	18	13	12	13	20	
27-May	11	12	16	14	29	37	19	18	24	27	19	26	22	25	33	59	62	13	57	54	24	23	54	29	62	
28-May	17	16	16	18	19	18	18	17	17	18	21	17	20	26	30	29	18	28	19	17	23	19	75	33	75	
29-May	38	54	31	48	27	16	15	13	14	13	14	37	22	11	14	21	30	37	28	24	17	20	15	15	54	
30-May	14	12	11	16	12	15	12	15	15	17	14	16	13	17	16	19	12	14	11	12	13	15	26	13	26	
31-May	24	33	84	62	30	34	31	23	27	18	30	44	46	57	80	68	28	59	70	78	36	26	33	30	84	
		80	92	84	78	42	37	84	75	73	85	73	73	86	76	80	84	107	100	70	78	94	60	93	99	
		Diurnal Maximum																								
M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - May 2016





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Last Calibration	April 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	6:50	End Time (MST)	9:30
Gas Cert Reference	S970259A	Station temp.	18 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	-619
Analyzer IP address	192.168.1.103		Lamp voltage	802	802
Calculated slope	0.994250	0.993163	Chamber temp	44.0	43.9
Calculated intercept	2.000456	1.451854	Pressure	685.2	706.5
Analyzer Background	18.8	18.8	Flow	0.475	0.484
Analyzer Coefficient	1.084	1.084	Intensity	43456	43506

Analyzer make Thermo 45C Analyzer serial # 630718530

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	60.7	607.0	599.7	1.012
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	60.7	607.0	610.7	0.994
second point	5000	30.4	304.0	303.2	1.003
third point	5000	15.2	152.0	150.7	1.009
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found 599.6 Previous response 608.5 % change 1.5%

Notes:

As found captured on May 11th; inlet filter replaced and secondary point captured to show the impact of wildfire smoke. No effects noted; full calibration conducted May 12.

Calibration Performed By: Melissa Lemay



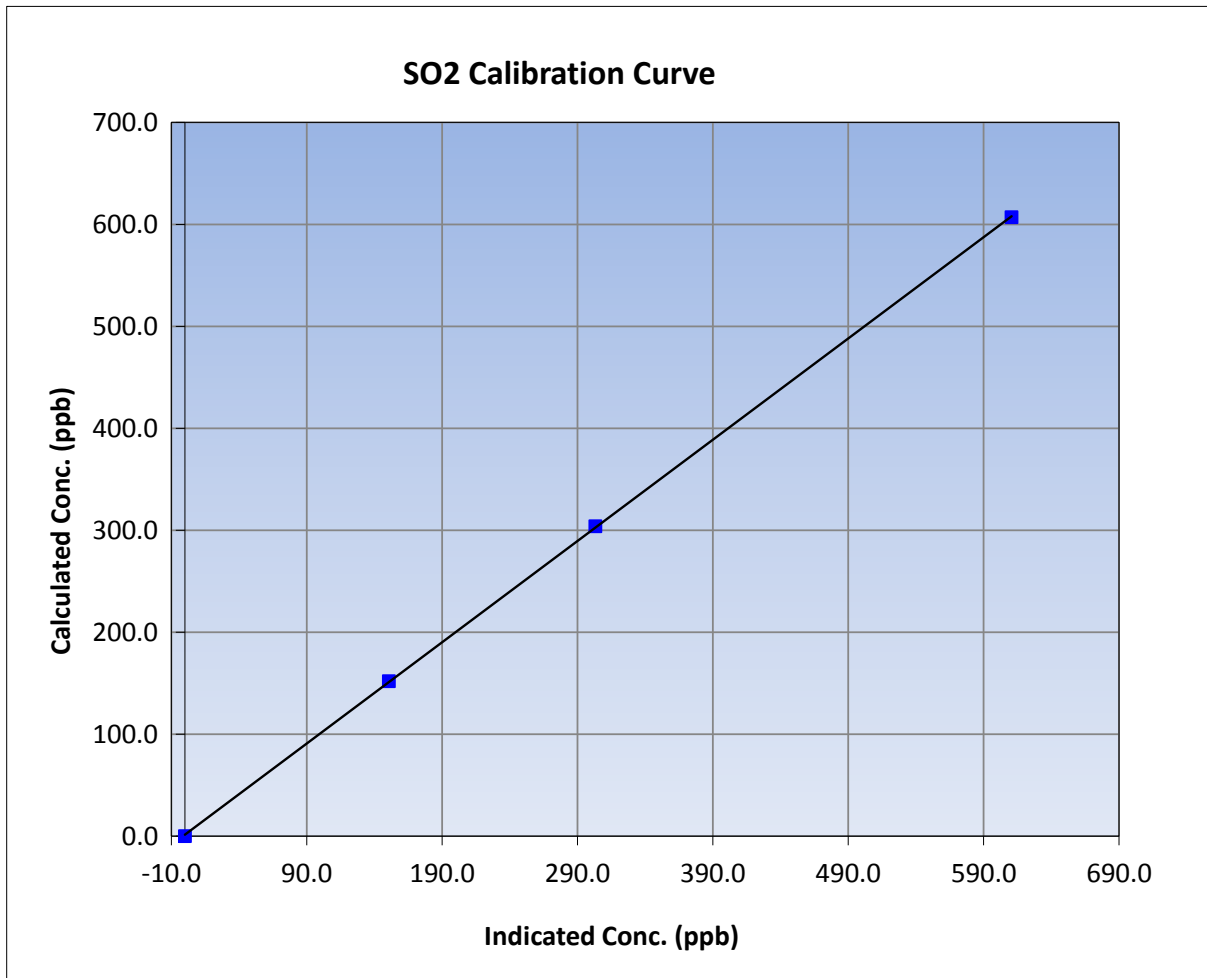
Wood Buffalo Environmental Association SO2 Calibration Report

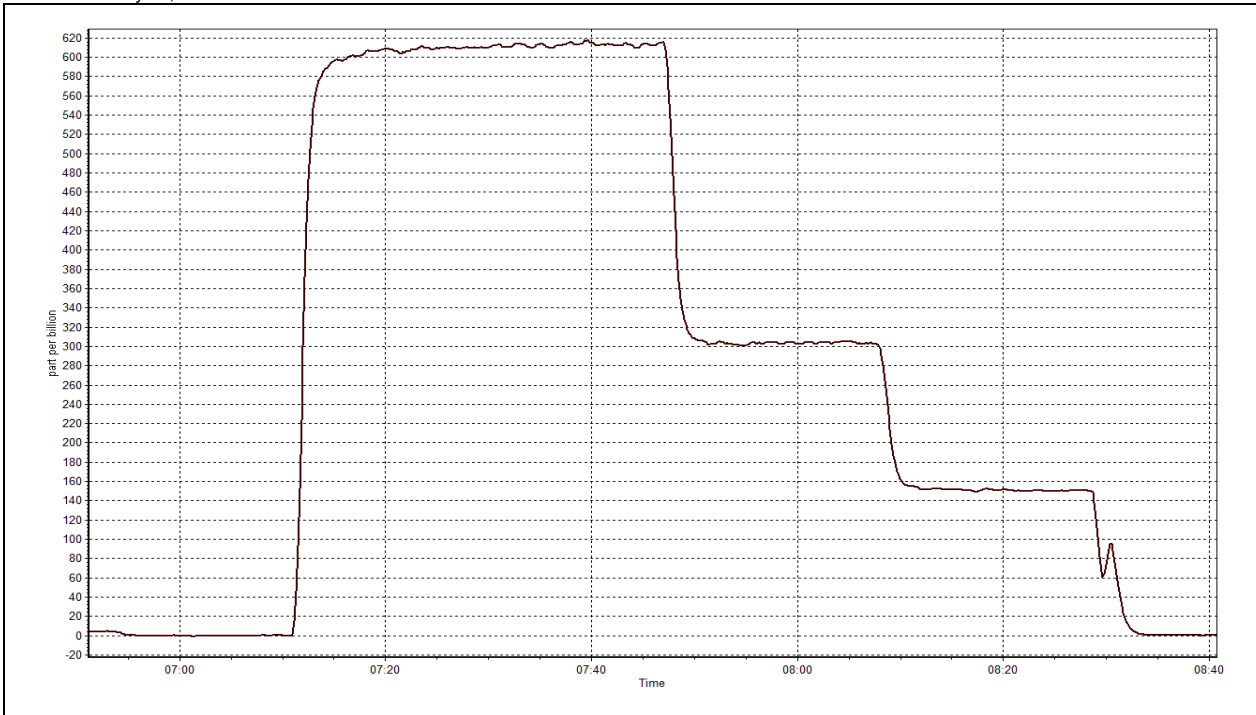
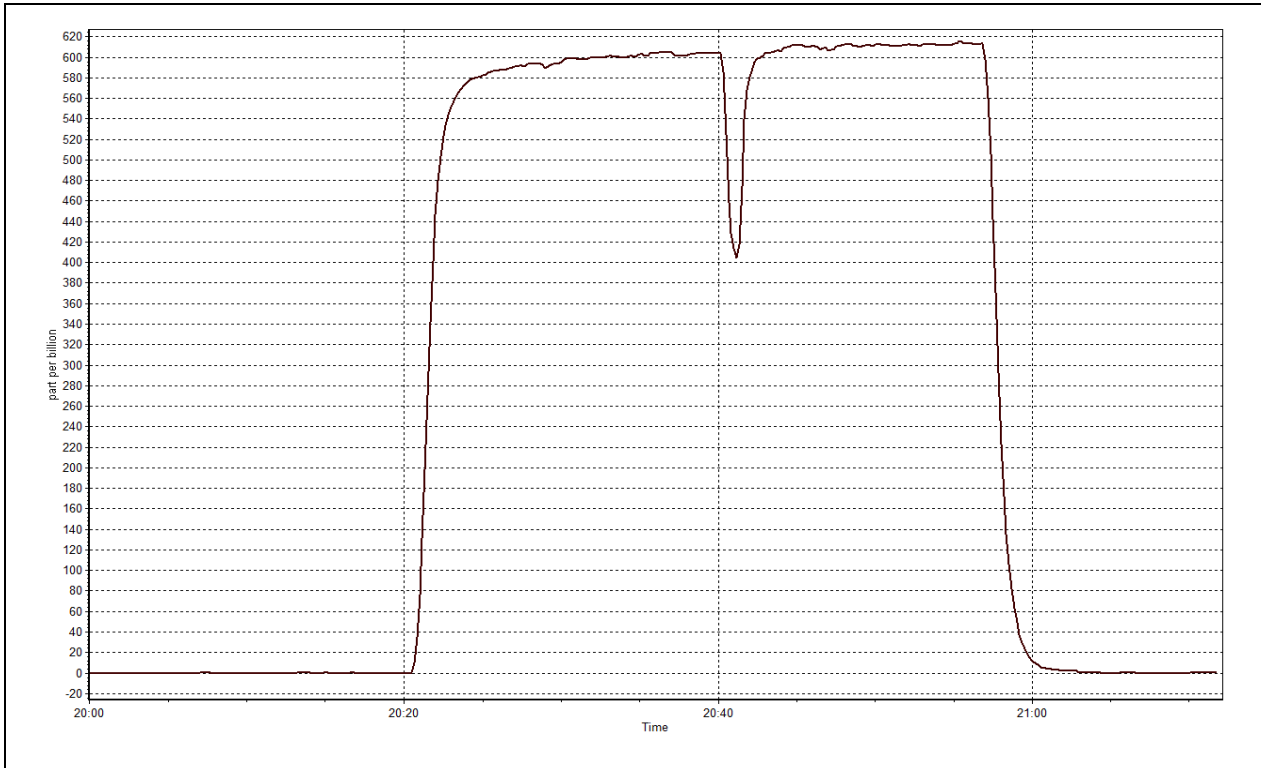
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	9:30
Analyzer make	Thermo 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999971
607.0	610.7	0.9940		
304.0	303.2	1.0028	Slope	0.993163
152.0	150.7	1.0088		
			Intercept	1.451854







Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 12, 2016	Last Calibration	April 20, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	15:40
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	09/09/2017
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 ppm	SO2 gas cert/exp	S970259A 26/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	1118	1118
Calculated slope	1.005674	0.985350	Chamber temp	45	45
Calculated intercept	-0.331567	-0.220885	Pressure	715.0	715.0
Analyzer Background	2.35	2.39	Flow	0.441	0.441
Analyzer Coefficient	1.067	1.067	Intensity	71	71
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-LTE		Analyzer serial #	1507864683	
Converter make/model	CDN-101		Converter serial #	503	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.2	----
as found span	6000	89.6	75.0	76.2	0.984
SO2 scrubber check	5000	15.2	152.0	0.6	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	89.6	75.0	76.2	0.984
second point	6000	50.2	42.0	43.1	0.974
third point	6000	29.9	25.0	25.5	0.981
as left zero					
as left span					
Average Correction Factor					0.980

Corrected As found	76.0	Previous response	74.9	% change	-1.5%
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Notes:

Inlet filter changed after as found; no sensitivity loss due to recent local wildfires.

Calibration Performed By:

Kelly Baragar



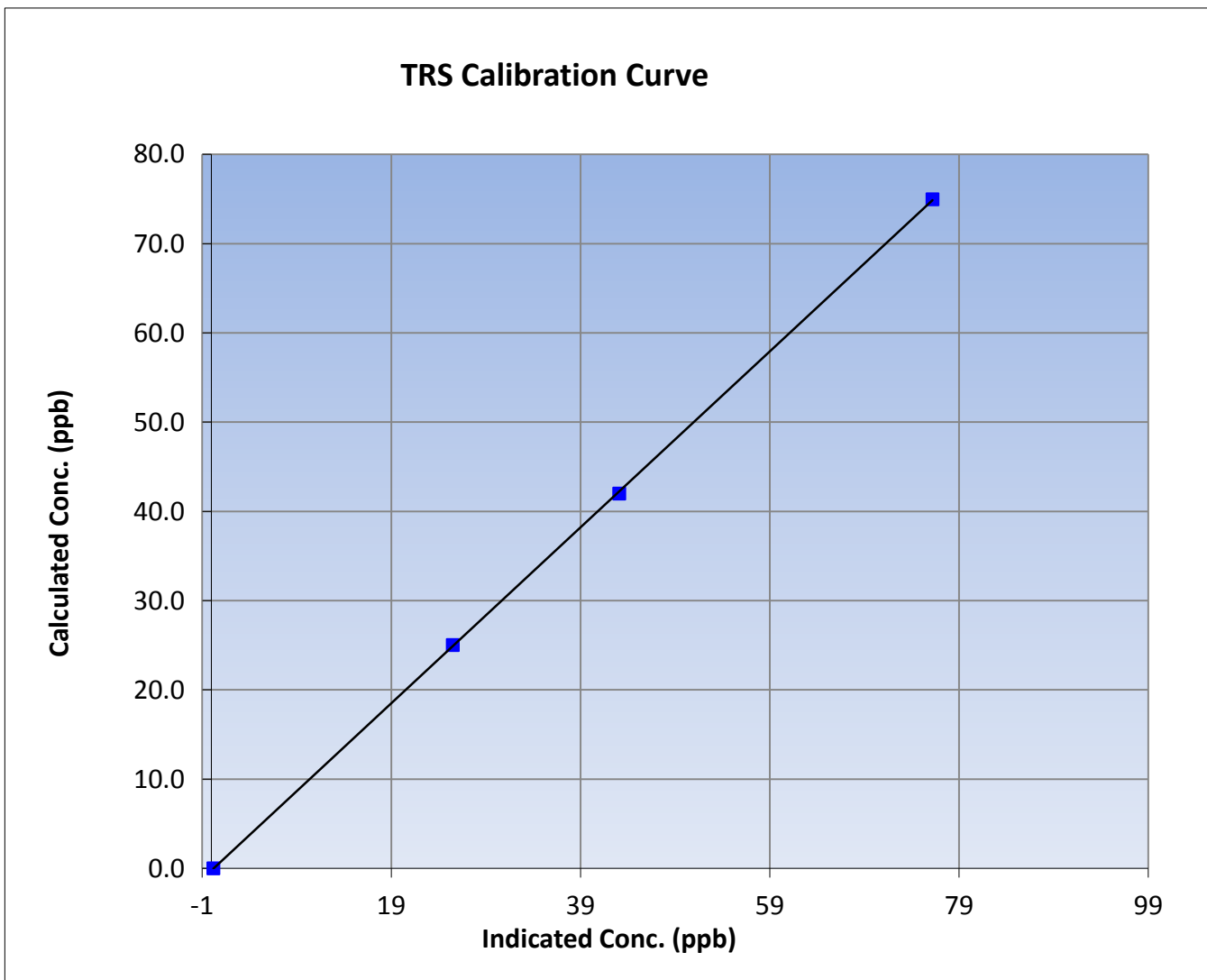
Wood Buffalo Environmental Association TRS Calibration Report

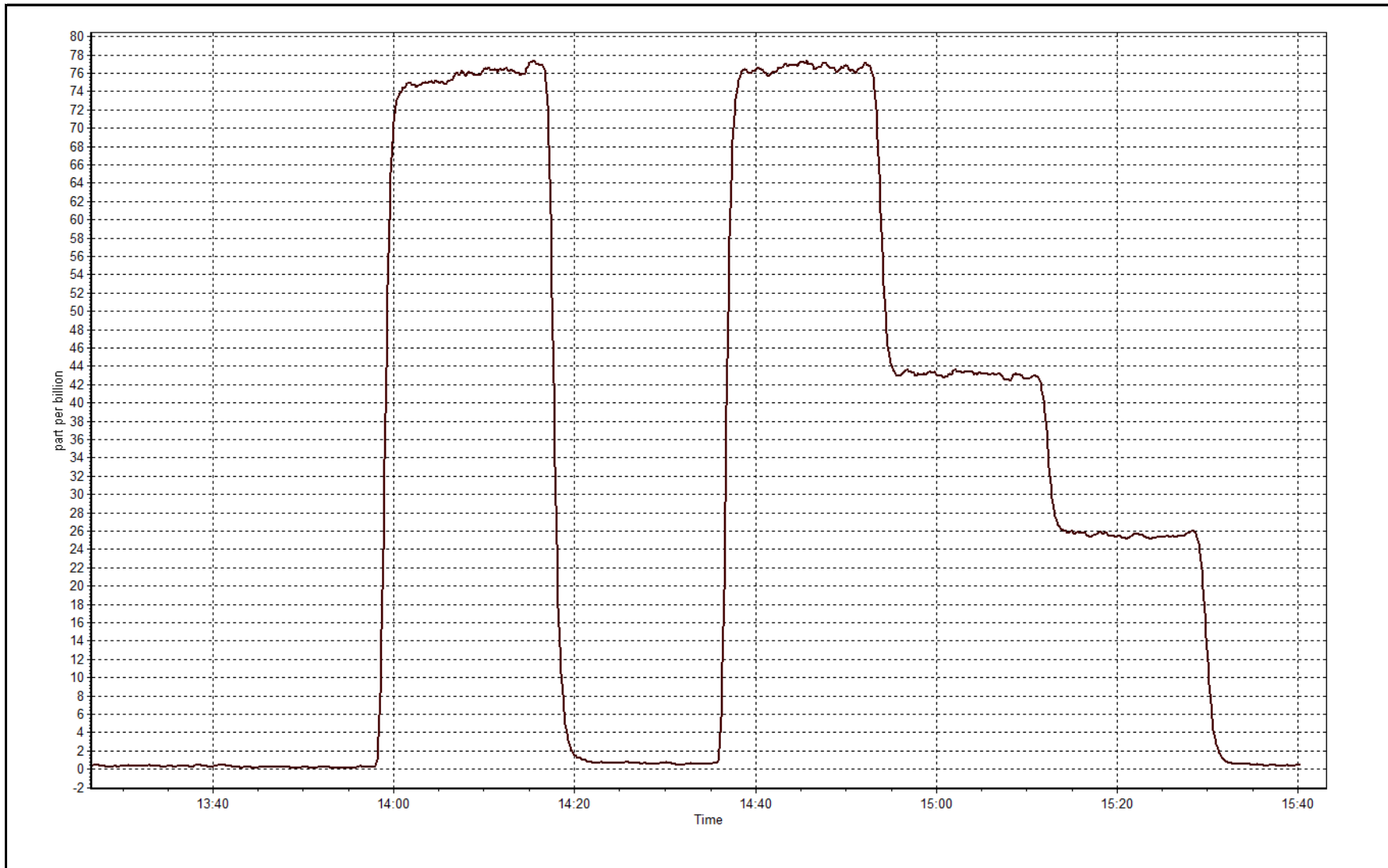
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	13:20	End Time (MST)	15:40
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999971
75.0	76.2	0.9838		
42.0	43.1	0.9745	Slope	0.985350
25.0	25.5	0.9810		
			Intercept	-0.220885







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-12-16	Last Calibration	April-19-15
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	6:50	End Time (MST)	8:40
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	387.4	388.9
THC Calc slope	1.003242	0.996836	Carrier Pressure	36.8	36.8
THC Calc intercept	0.022311	0.042510	Fuel Pressure	42.1	42.1
NMHC Calc slope	0.993719	0.993674	Air Pressure	32.2	32.2
NMHC Calc intercept	0.004200	0.014268			

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	12.71	0.993
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.66	0.997
second point	5000	30.4	6.32	6.23	1.015
third point	5000	15.2	3.16	3.12	1.013
as left zero					
as left span					
Average Correction Factor					1.009

Corrected As found 12.71 Previous response 12.56 % change -1.2%

Notes:

As found captured on May 11th; inlet filter replaced and secondary point captured to show the impact of wildfire smoke. No effects noted; full calibration conducted May 12. N2 cylinder (carrier gas) replaced during high point capture.

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	6.80	0.982
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.72	0.994
second point	5000	30.4	3.34	3.32	1.007
third point	5000	15.2	1.67	1.67	1.001
as left zero					
as left span					
Average Correction Factor					1.001

Corrected As found 6.80 Previous response 6.72 % change -1.2%

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	60.7	5.95	5.92	1.005
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	2.91	1.024
third point	5000	15.2	1.49	1.45	1.027
as left zero					
as left span					
Average Correction Factor					1.018

Corrected As found 5.92 Previous response 5.85 % change -1.2%



Wood Buffalo Environmental Association

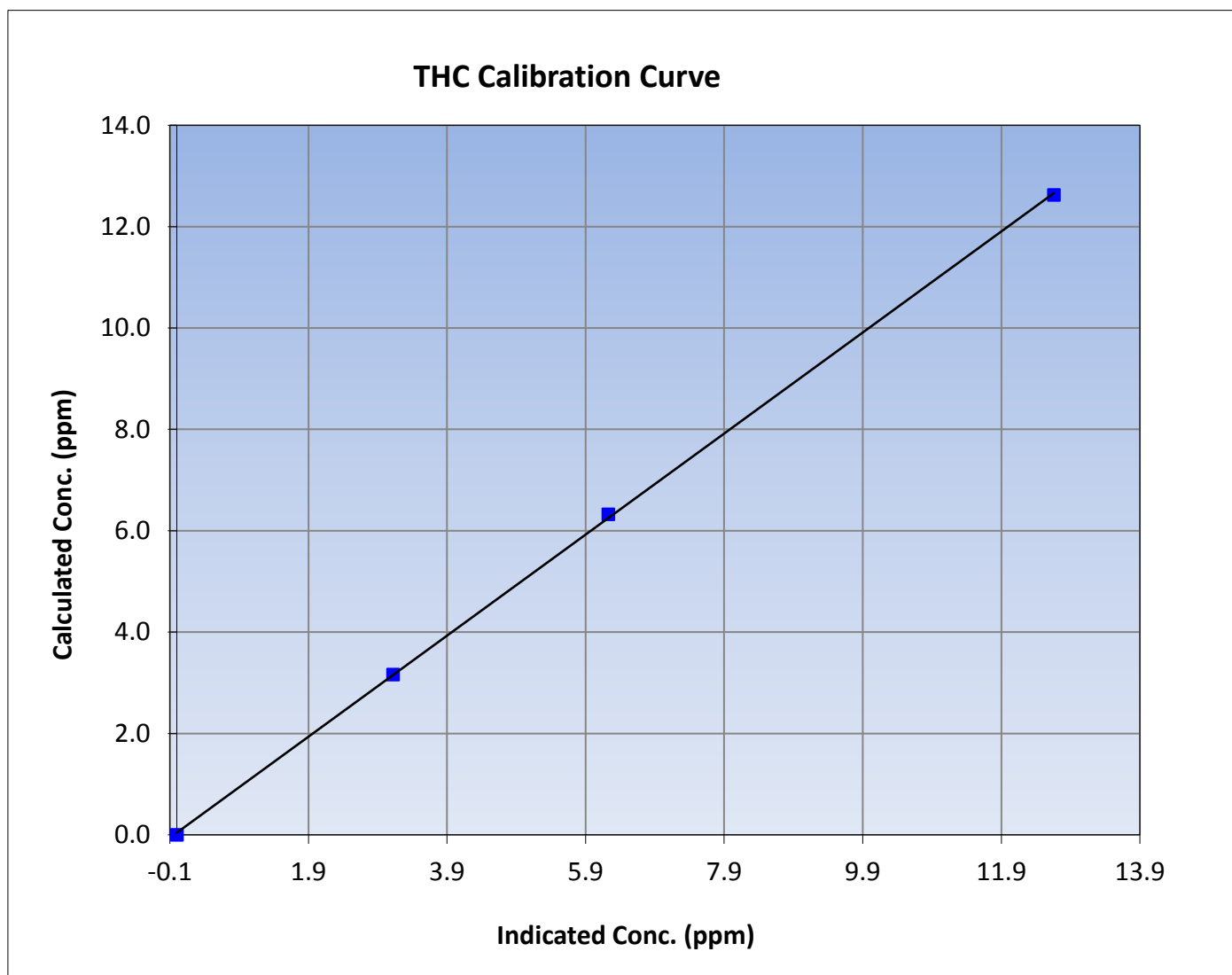
THC Calibration Summary

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	8:40
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	0.999906
12.63	12.66	0.9973		
6.32	6.23	1.0150	Slope	0.996836
3.16	3.12	1.0133		
			Intercept	0.042510





Wood Buffalo Environmental Association

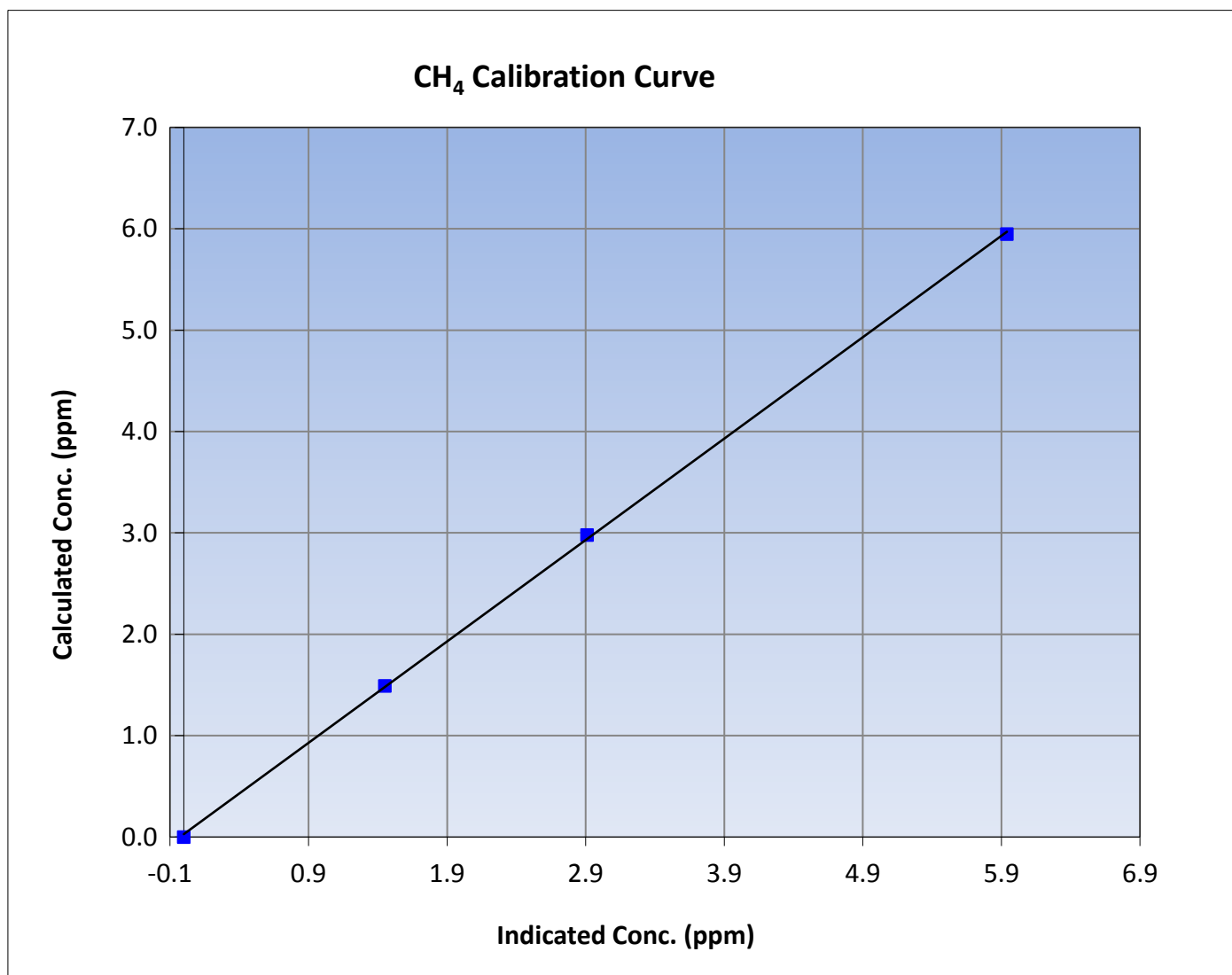
CH₄ Calibration Summary

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	8:40
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	0.999846
5.95	5.94	1.0014		
2.98	2.91	1.0238	Slope	1.000392
1.49	1.45	1.0273		
			Intercept	0.028342





Wood Buffalo Environmental Association

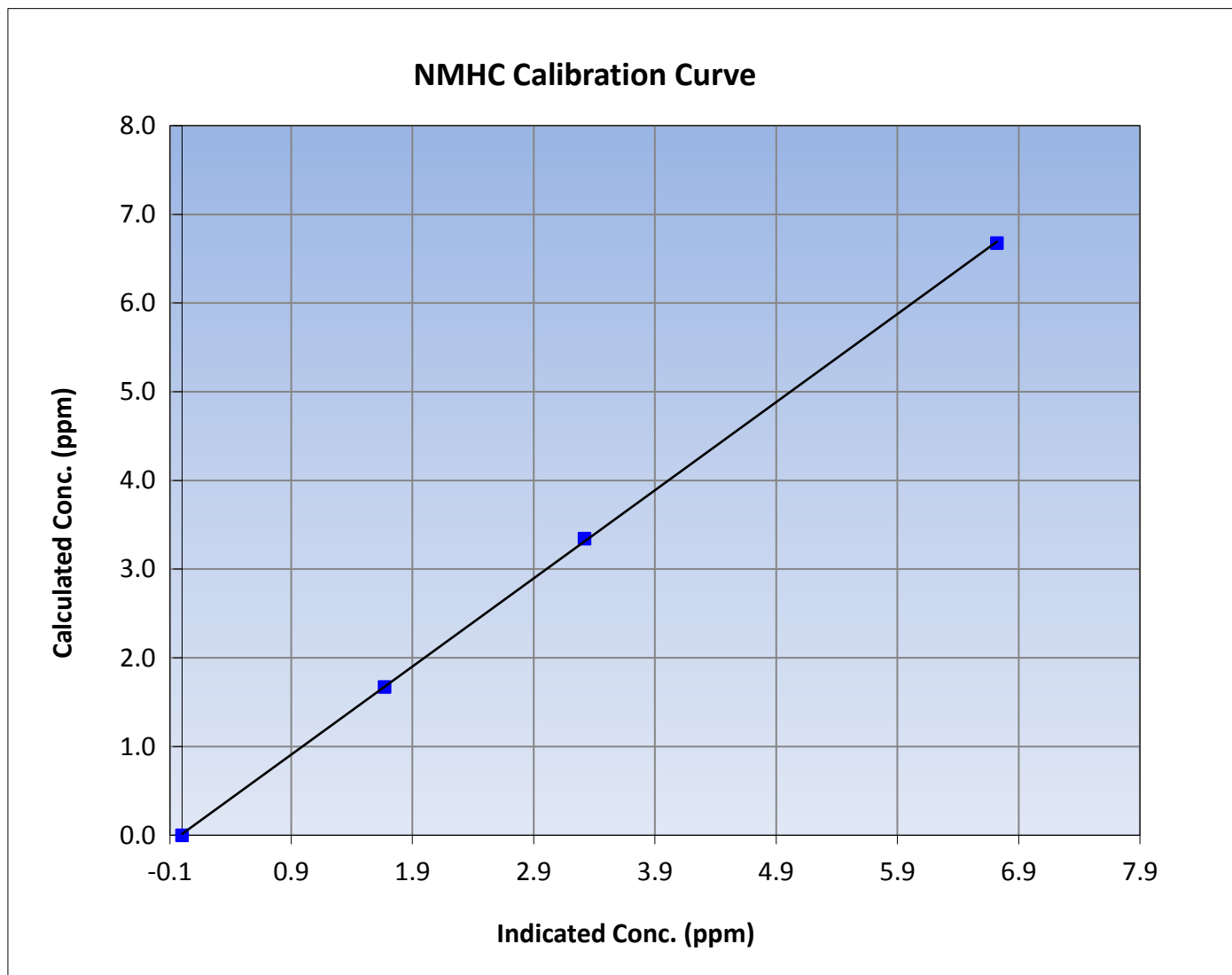
NMHC Calibration Summary

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	8:40
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

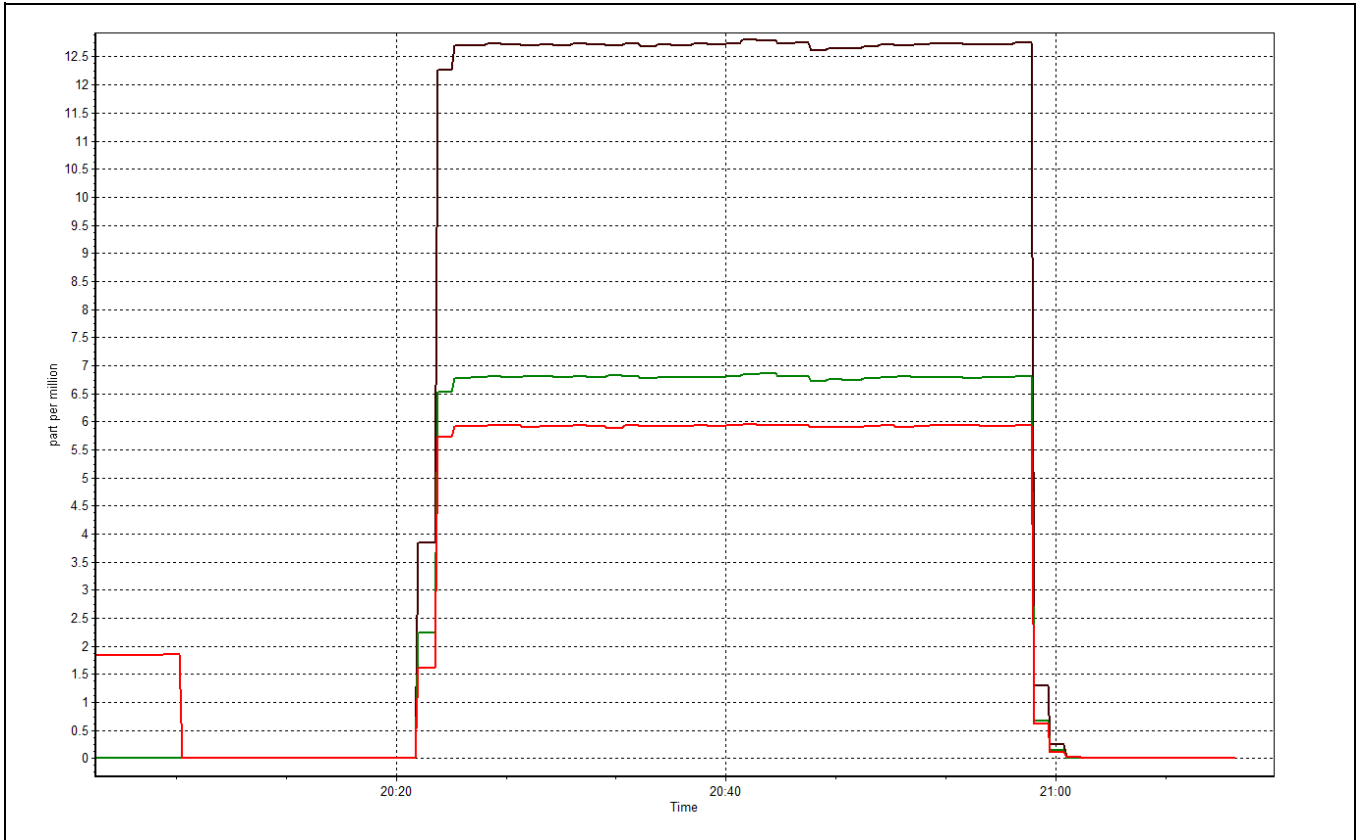
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999944
6.68	6.72	0.9936		
3.34	3.32	1.0072	Slope	0.993674
1.67	1.67	1.0012		
			Intercept	0.014268

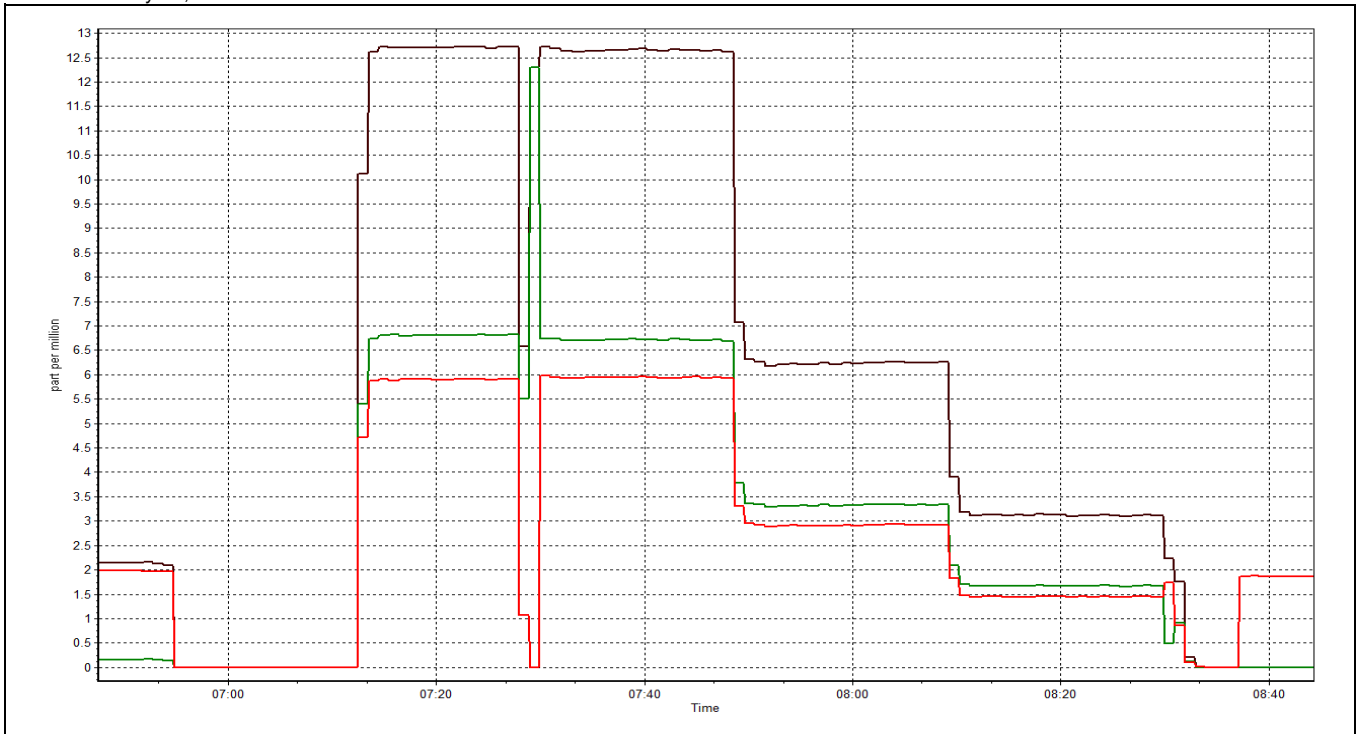


THC Calibration Plot

Date: May 11, 2016



Date: May 12, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 20, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	13:40
NO2 GPT Ref date	May-12-16	Transfer Standard	GPT
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11021107
DACS make/model	Campbell Scientific CR3000	Serial Number	1864
		Serial Number	5564

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.7	27.2
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.8
Calculated slope	1.011399	1.007193	Pressure	730.6	730.6
Calculated intercept	1.399579	-1.196459	Flow cell A	0.778	0.778
Analyzer Background	0.2	-0.3	Flow cell B	0.781	0.781
Analyzer Coefficient	0.943	0.943	Cell A Intensity	69790	69790
			Cell B Intensity	61686	61686

Analyzer make	TEI 49i	Analyzer serial #	1507964700
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.8	----
as found span	5000	1.22	376.9	371.5	1.014
calibrator zero	5000	0.00	0.0	0.2	----
high point	5000	1.22	376.9	374.3	1.007
second point	5000	0.70	187.3	189.4	0.989
third point	5000	0.43	94.1	94.5	0.996
as left zero					
as left span					
Average Correction Factor					0.997

Corrected As found	372.3	Previous response	371.3	% change	-0.3%
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Notes:

Inlet filter changed after as found; no sensitivity loss due to recent local wildfires.

Calibration Performed By: Kelly Baragar



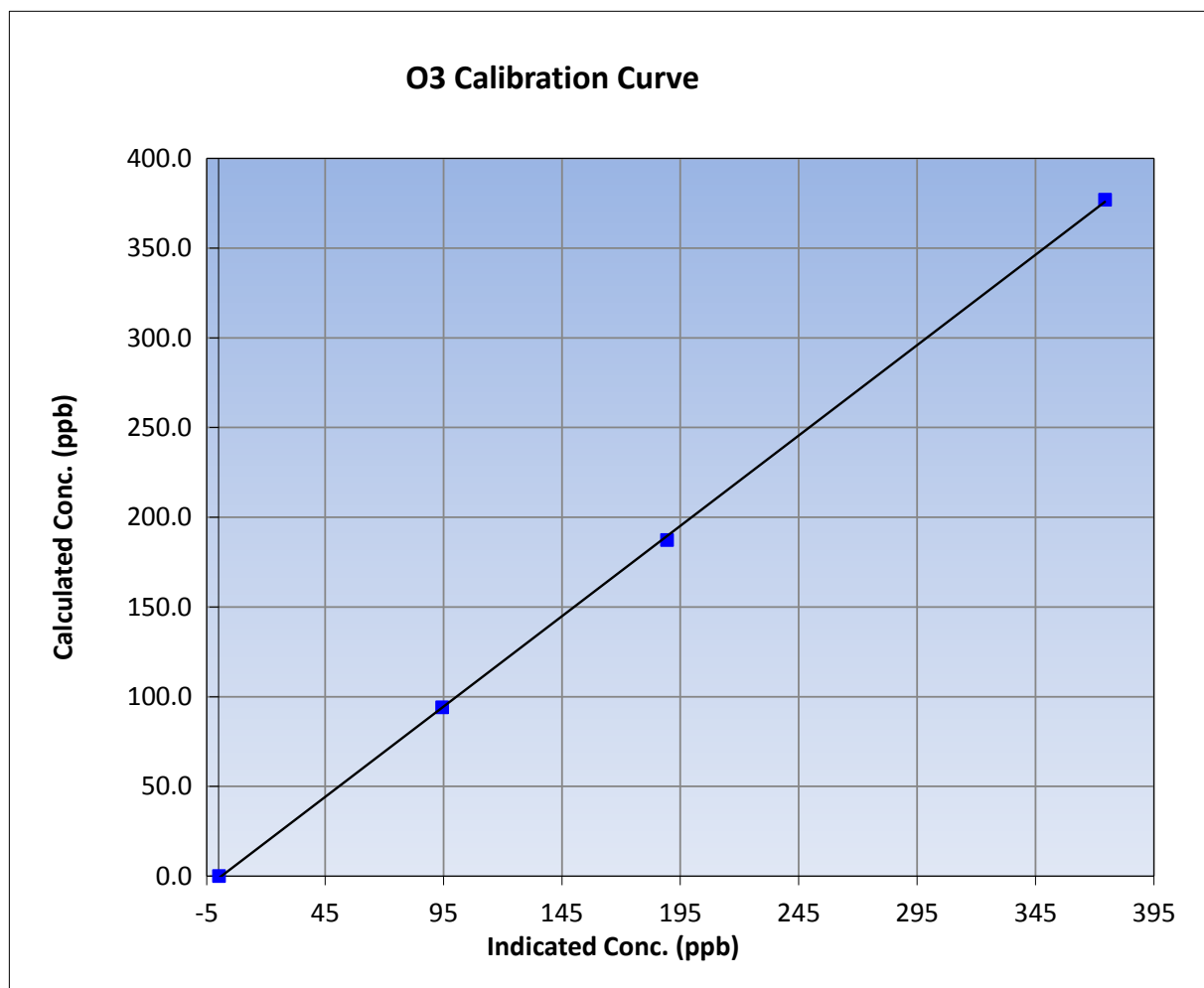
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-12-16	Previous Calibration	April 20, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:10	End Time (MST)	13:40
Analyzer make	TEI 49i	Analyzer serial #	1507964700

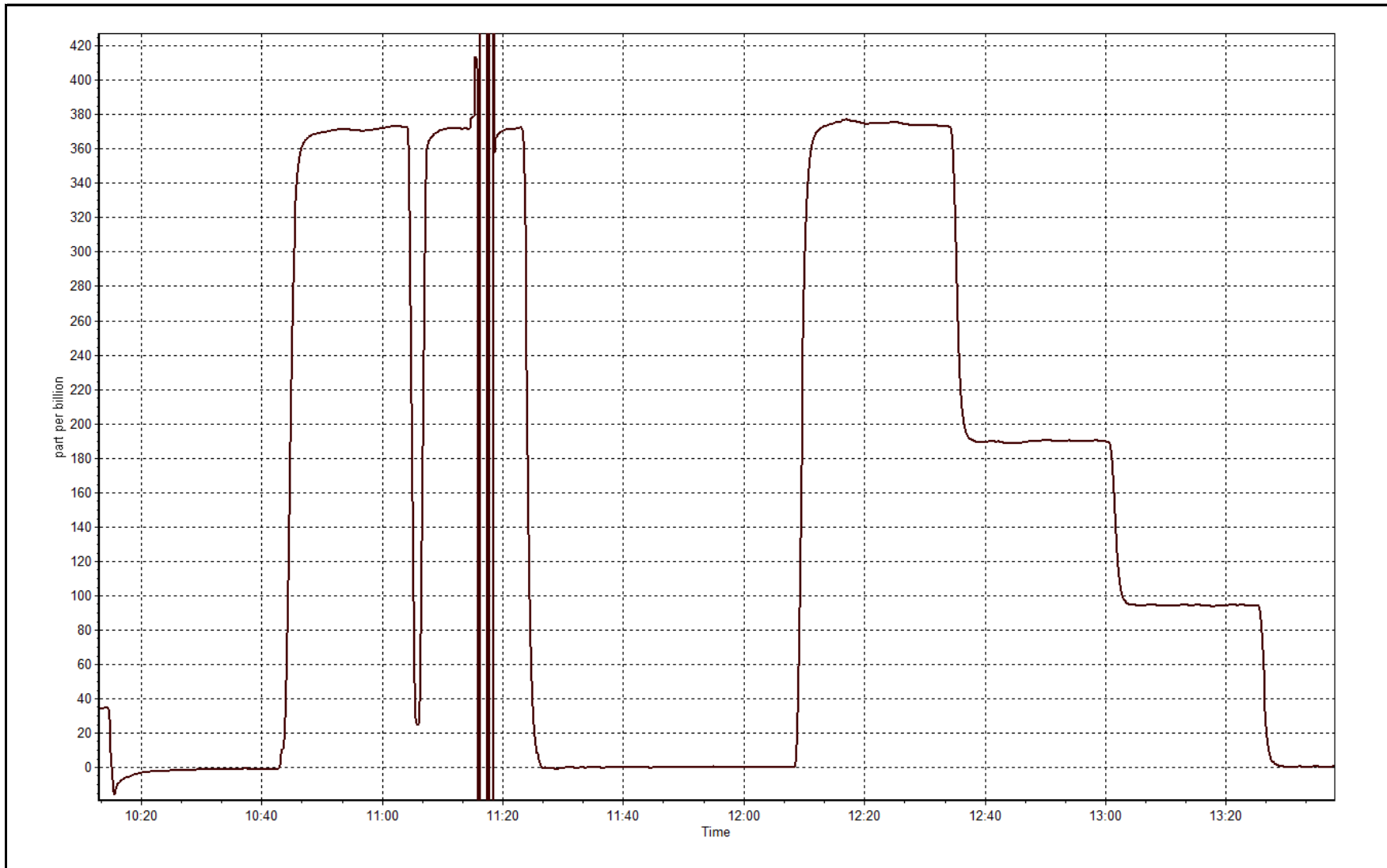
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999905
376.9	374.3	1.0069		
187.3	189.4	0.9889	Slope	1.007193
94.1	94.5	0.9963		
			Intercept	-1.196459



O3 Calibration Plot

Date: May 12, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 19, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	6:40	End Time (MST)	10:15
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOx Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne PAI T701	Serial Number	1864

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	5564
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.994877	0.994244	1.001674
	Data Offset	2.102095	2.342395	-0.273653
Current Calibration	Data Slope	0.998507	0.998366	1.002109
	Data Offset	1.945736	2.174703	-0.424733

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	0.988		1.158	
NOx coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgnd	2.8		3.2	
NOx bkgnd	2.9		3.4	
Chamber Temp	49.8	Deg C	49.5	Deg C
Moly Temp	323	Deg C	323	Deg C
PMT voltage	-784	V	-784	V
PMT Temp	-3.5	Deg C	-3.5	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	141.2	mmHg	144.6	mmHg
R Cell Press Nox	141.2	mmHg	144.6	mmHg
NO sample flow	0.880	lpm	0.900	lpm
Nox sample Flow	0.880	lpm	0.900	lpm

Notes:

As found captured on May 11th; inlet filter replaced and secondary point captured to show the impact of wildfire smoke.
As found change noted; full calibration conducted May 12 to set sensitivity of the instrument.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: May 12, 2016 Station Number: AMS 7

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.6	-0.1	0.4	----	----
as found span	5000	60.7	599.7	599.7	0.0	510.9	510.1	1.0	1.1738	1.1757
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.2	----	----
high point	5000	60.7	599.7	599.7	0.0	600.0	599.8	0.3	0.9995	0.9998
second point	5000	30.4	300.4	300.4	0.0	296.9	296.9	0.4	1.0116	1.0118
third point	5000	15.2	150.2	150.2	0.0	146.9	146.6	0.5	1.0220	1.0241
as left zero										
as left span										
Average Correction Factor									1.0111	1.0119

Corrected As found NO_x= 510.3 NO= 510.2 Percent Change NO_x= 17.7% NO= 17.8%
 Previous Response NO_x= 600.7 NO= 600.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 60.70 ccm NOx ref calc conc = 599.7 ppb NO ref calc conc = 599.7 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	597.9	596.9	0.2	1.0030	1.0047	----	----
1st NO2 (300)	220.0	376.9	596.5	220.0	376.4	1.0054	----	1.0015	99.8%
2nd NO2 (200)	409.6	187.3	597.1	409.6	187.8	1.0043	----	0.9978	100.2%
3rd NO2 (100)	502.8	94.1	597.1	502.8	94.4	1.0043	----	0.9971	100.3%
2nd NO ref point		0.0	596.9	597.1	0.2	1.0047	1.0044	----	----
Average Correction Factor						1.0047		0.9988	100.1%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

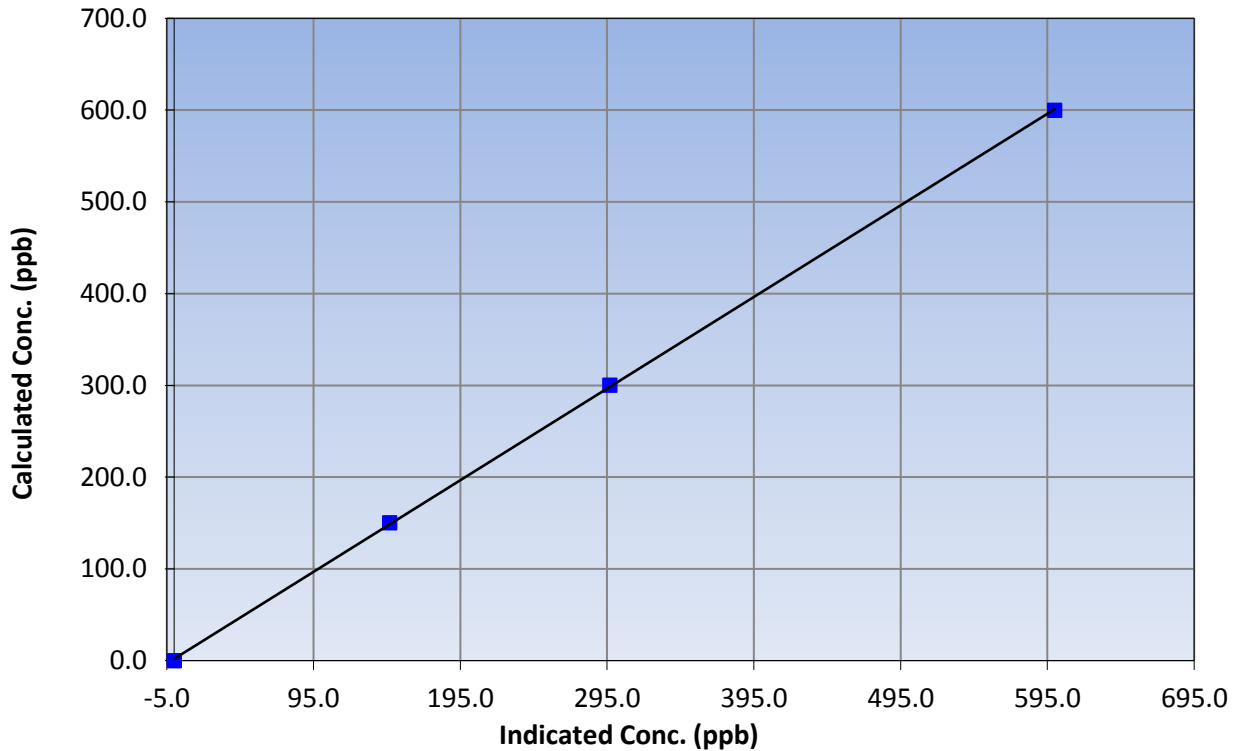
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 19, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:40	End Time (MST)	10:15
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999937
599.7	600.0	0.9995		
300.4	296.9	1.0116	Slope	0.998507
150.2	146.9	1.0220		
			Intercept	1.945736

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

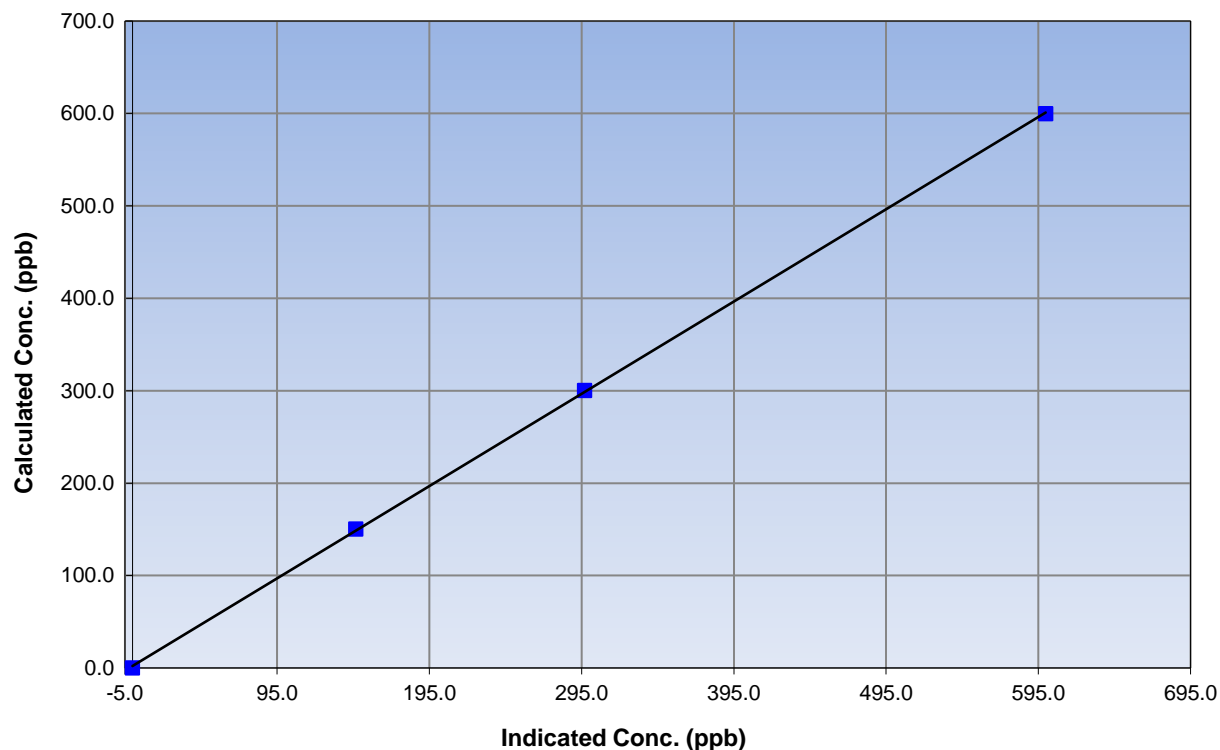
Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 19, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:40	End Time (MST)	10:15
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	0.999939
599.7	599.8	0.9998		
300.4	296.9	1.0118	Slope	0.998366
150.2	146.6	1.0241		
			Intercept	2.174703

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

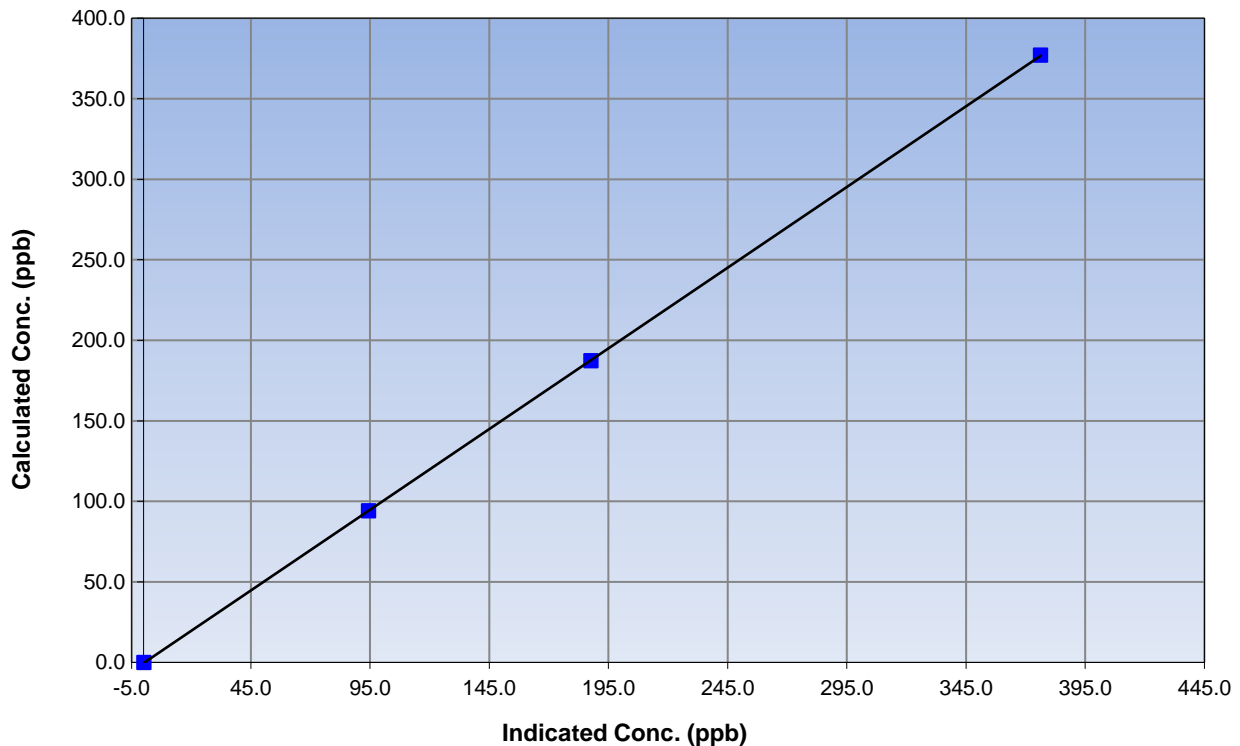
Station Information

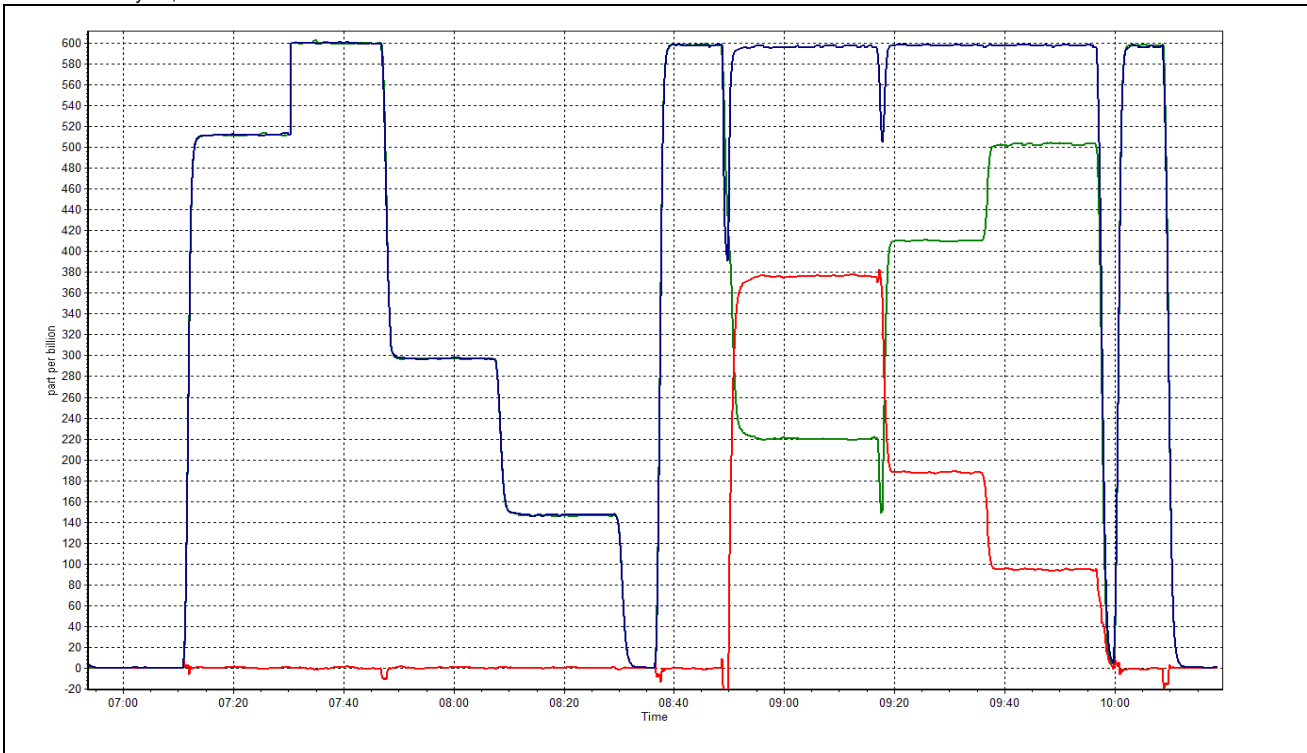
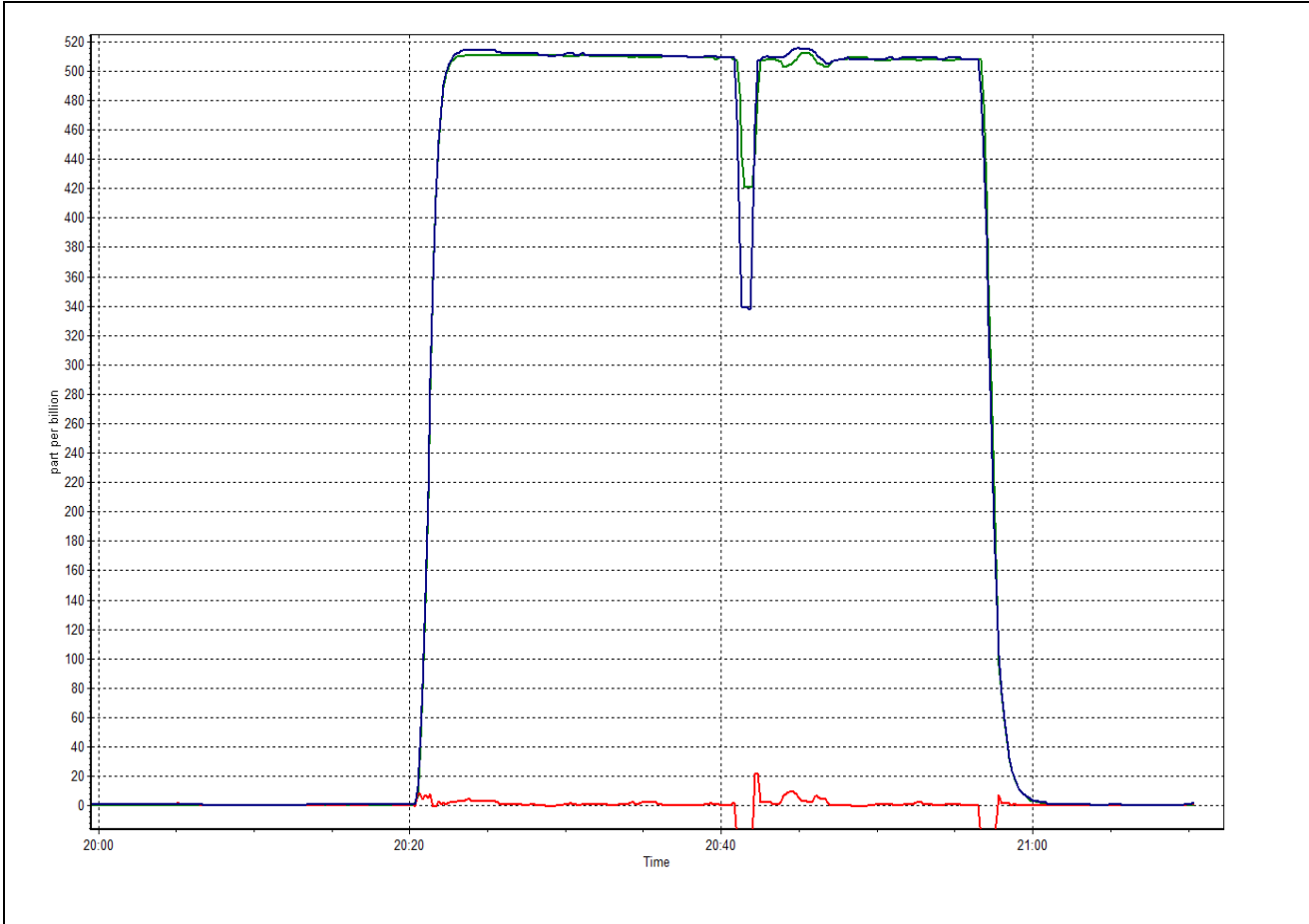
Calibration Date	May 12, 2016	Previous Calibration	April 19, 2016
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:40	End Time (MST)	10:15
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999997
376.9	376.4	1.0015		
187.3	187.8	0.9978	Slope	1.002109
94.1	94.4	0.9971		
			Intercept	-0.424733

NO₂ Calibration Curve







Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	May 12, 2016	Last Calibration	April 22, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	15:40	End Time (MST)	17:45
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	02/02/2023
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		Chamber temp.	48.5	48.5
Analyzer IP address	192.168.1.48		Pressure	554.7	743.5
Calculated slope	0.999937	1.003299	Flow	0.383	0.501
Calculated intercept	0.063463	0.031307	Intensity	199423	199423
Analyzer Background	5.079	5.079	S/R ratio	1.172741	1.172741
Analyzer Coefficient	1.065	1.065			

Analyzer make Thermo 48i-TLE Analyzer serial # 1408761381

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	69.7	41.4	41.0	1.009
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.3	1.004
second point	5000	35.2	20.9	20.8	1.006
third point	5000	15.2	9.0	8.9	1.010
as left zero					
as left span					
Average Correction Factor					1.006

Corrected As found 40.9 Previous response 41.3 % change 1.1%

Notes:

Inlet filter changed after as found; no sensitivity loss due to recent local wildfires.

Calibration Performed By:

Kelly Baragar



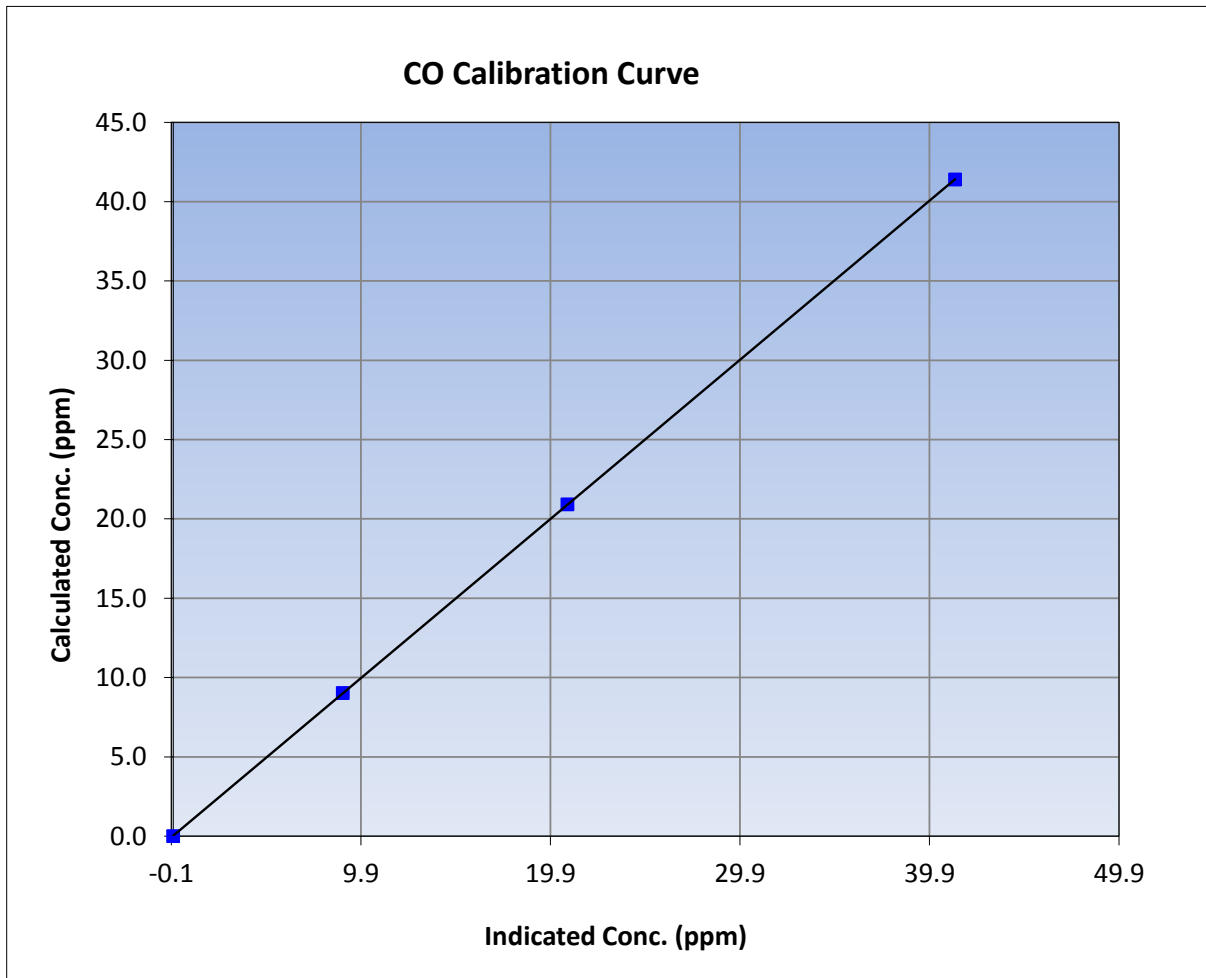
Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	May 12, 2016	Previous Calibration	April 22, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	15:40	End Time (MST)	17:45
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

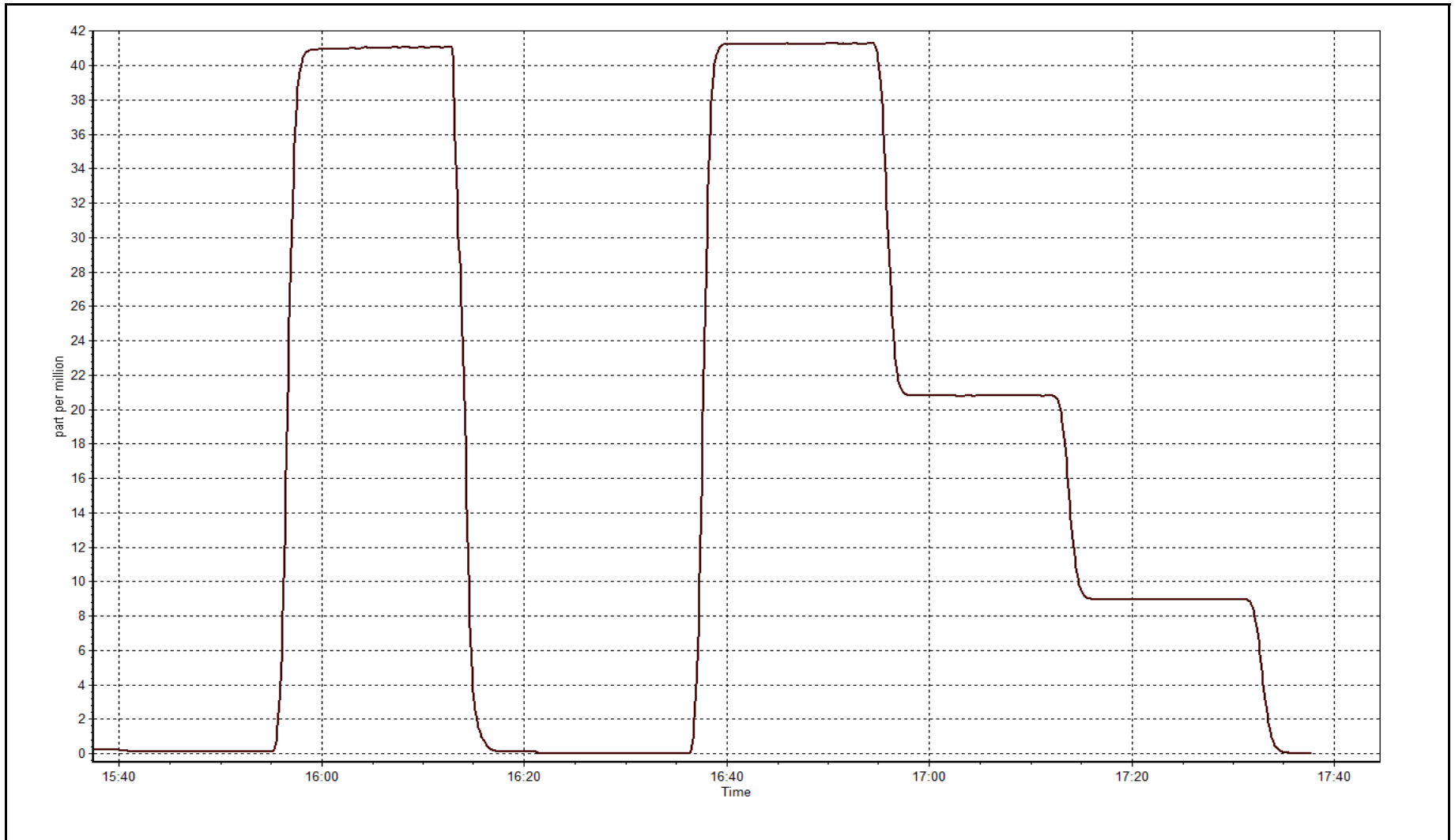
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999998
41.4	41.3	1.0037		
20.9	20.8	1.0057	Slope	1.003299
9.0	8.9	1.0099		
			Intercept	0.031307



CO Calibration Plot

Date: May 12, 2016





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>May 11, 2016</u>	Previous Calibration:	<u>04/22/2016</u>
Station Name:	<u>Athabasca Valley</u>	Station Number:	<u>AMS 7</u>
Start Time (MST):	<u>19:15</u>	End Time (MST):	<u>19:58</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>E515</u>		
C ₁₄ Source SN:	<u>3256</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	9.0	10.0	1.0	1.0
T2	22.0	na	#VALUE!	22.0
T3	24.0	na	#VALUE!	24.0
T4	23.0	na	#VALUE!	23.0
RH (%)	15.0	na	#VALUE!	15.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	999	995.0	-4.0	999

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1010	10	1010	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	242		242
Neph	2.6		2.6
C14	188.5		188.5
Indicated Concentration (ug/m3)	0.6	No	0.6
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	<u>April 22, 2016</u>	Previous Leak Check Date:	<u>March 8, 2016</u>
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.80		0.05
*Flow with adaptor (LPM):	16.75		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annualy)			
Foil Calibration Date:	<u>April 22, 2016</u>	Previous Foil Calibration:	<u>NA</u>
Zeroed?:	<u>No</u>		
Foil Mass:	<u>1337</u>		<u>Mass foil set S/N:</u> 5872
Previous Correction Factor:	<u>6849</u>		
New Correction Factor:	<u>6853</u>		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	22/04/2016
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	na	NA
HEPA filter	Good	NA

NOTES:

Cyclone head was cleaned

Calibration Performed By: Melissa Lemay



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	37	37	100.00	3	0	1	0
O3(ppb) Average	706	34	38	99.46	63	0	52	-
NO2(ppb) Average	705	37	39	99.73	14	0	3	-
NO(ppb) Average	705	37	39	99.73	2	-	0	-
NOX(ppb) Average	705	37	39	99.73	15	-	3	-
PM2.5(ug/m3) Average	744	0	0	100.00	623.5	-	114.4	5
Wind Speed 10 m (km/h) Average	744	0	0	100.00	39	-	23	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	26.8	-	18.7	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	94	-
Precipitation (mm) Total	744	0	0	100.00	3.3	-	11.9	-
Leaf Wetness (% of range) Average	91	0	653	12.23	49	-	8	-
Global Solar Radiation (W/m2) Average	91	0	653	12.23	825	-	331	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	707	0.1	0	-	0	0	0	0	0	0	0	3
O3(ppb) Average	706	33	10	-	10	22	25	33	40	44	63	63
NO2(ppb) Average	705	0.7	1	-	0	0	0	0	1	1	14	14
NO(ppb) Average	705	0.1	0	-	0	0	0	0	0	0	2	2
NOX(ppb) Average	705	0.8	1	-	0	0	0	0	1	1	15	15
PM2.5(ug/m3) Average	744	16.39	56.1	-	1.2	2.2	2.6	3.4	5.6	25.5	623.5	623.5
Wind Speed 10 m (km/h) Average	744	14.5	7	-	1	6	9	13	20	24	39	39
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	10.33	5	-	0.8	4.3	6.9	9.6	12.9	17.3	26.8	26.8
Relative Humidity (%) Average	744	65.8	20	-	18	38	50	69	82	91	99	99
Precipitation (mm) Total	744	-	-	35.56	-	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	91	1.5	9	-	-1	-1	-1	-1	-1	-1	49	49
Global Solar Radiation (W/m2) Average	91	309.3	301	-	0	0	0	230	623	744	825	825

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	07 May 2016 18:00	07 May 2016 18:00	1	Station power failure
O3	15 May 2016 17:00	15 May 2016 18:00	2	Unstable Operation - excessive signal noise
O3	20 May 2016 13:00	20 May 2016 13:00	1	Unstable Operation - excessive signal noise
NO2, NO, NOX	07 May 2016 18:00	07 May 2016 19:00	2	Station power failure
Surface Leaf Wetness	04 May 2016 20:00	01 Jun 2016 00:00	653	Analyzer Failure - signal wire fault
Solar Global Radiation	04 May 2016 20:00	01 Jun 2016 00:00	653	Analyzer Failure - signal wire fault



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

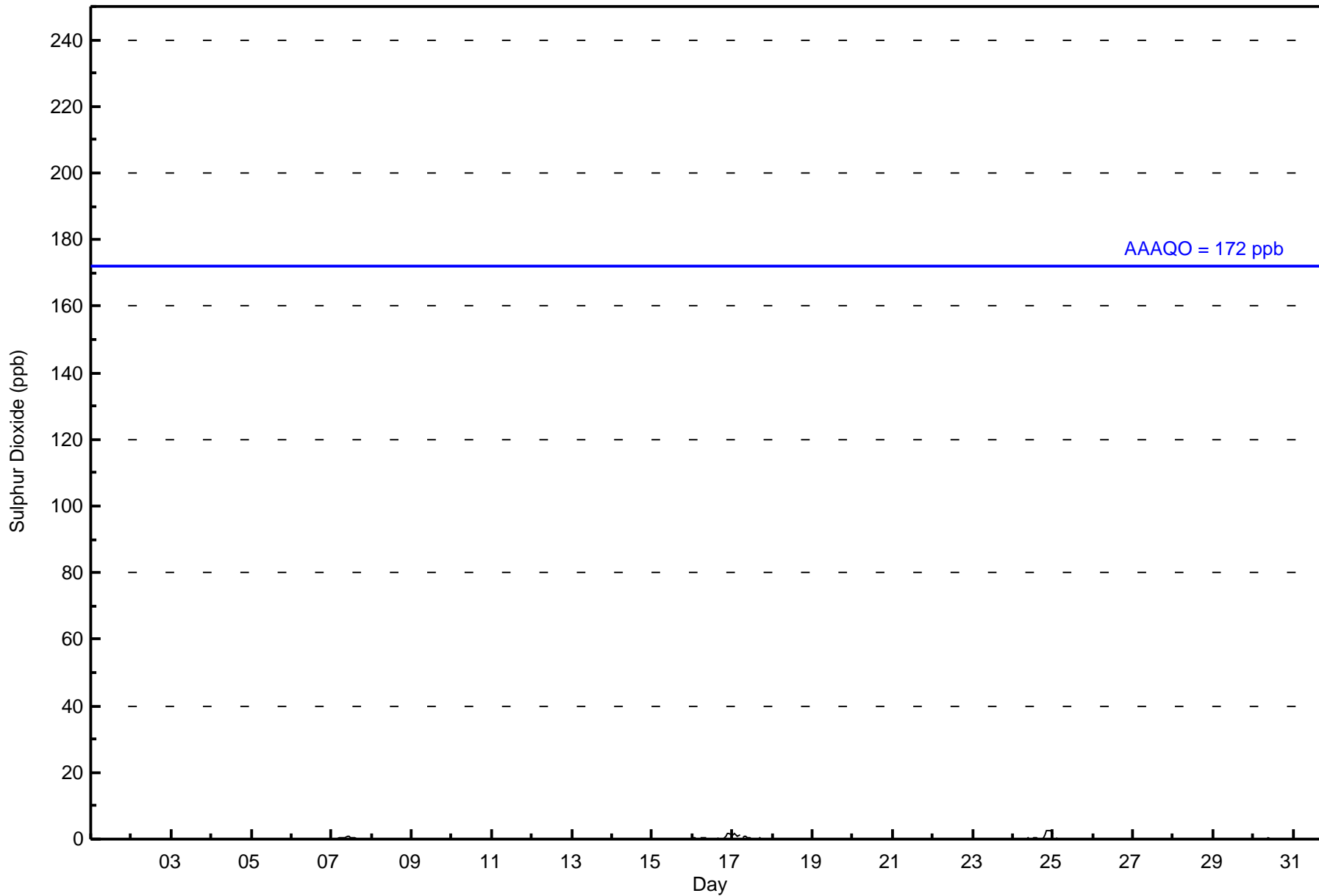
Fort Chipewyan - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 3 ppb on May 24 22:00										Maximum Daily Average: 0.6 ppb on May 24										Hours of Data: 707																													
Minimum Value: 0 ppb on May 2 23:00										Minimum Daily Average: 0.0 ppb on May 19										Hours of Missing Data: 37																													
Maximum Diurnal Average: 0.2 ppb at hour 22										Minimum Diurnal Average: 0.0 ppb at hour 18										Hours of Calibration: 37																													
Monthly Average: 0.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 2										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
2-May	0	0	Z	0	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-May	0	0	0	Z	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-May	0	0	0	0	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-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
6-May	Z	0	0	0	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-May	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
8-May	0	0	Z	0	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-May	0	0	0	Z	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
12-May	Z	0	0	0	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-May	0	Z	0	0	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-May	0	0	Z	0	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-May	0	0	0	Z	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-May	0	0	0	0	Z	1	1	0	0	C	C	C	C	C	C	0	0	0	0	0	1	2	2	1	--	2																							
17-May	1	1	1	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
18-May	Z	0	0	0	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-May	0	Z	0	0	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-May	0	0	Z	0	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-May	0	0	0	Z	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	2	0.6	3																							
25-May	2	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	2																							
26-May	0	0	Z	0	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-May	0	0	0	Z	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
30-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
																								0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.1	Diurnal Average
																								2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	2	3	2	2	Diurnal Maximum
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	21	18	58	91	210	61	5	5	15	11	20	20	42	50	43	37	707
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	18	58	91	210	61	5	5	15	11	20	20	42	50	43	37	707

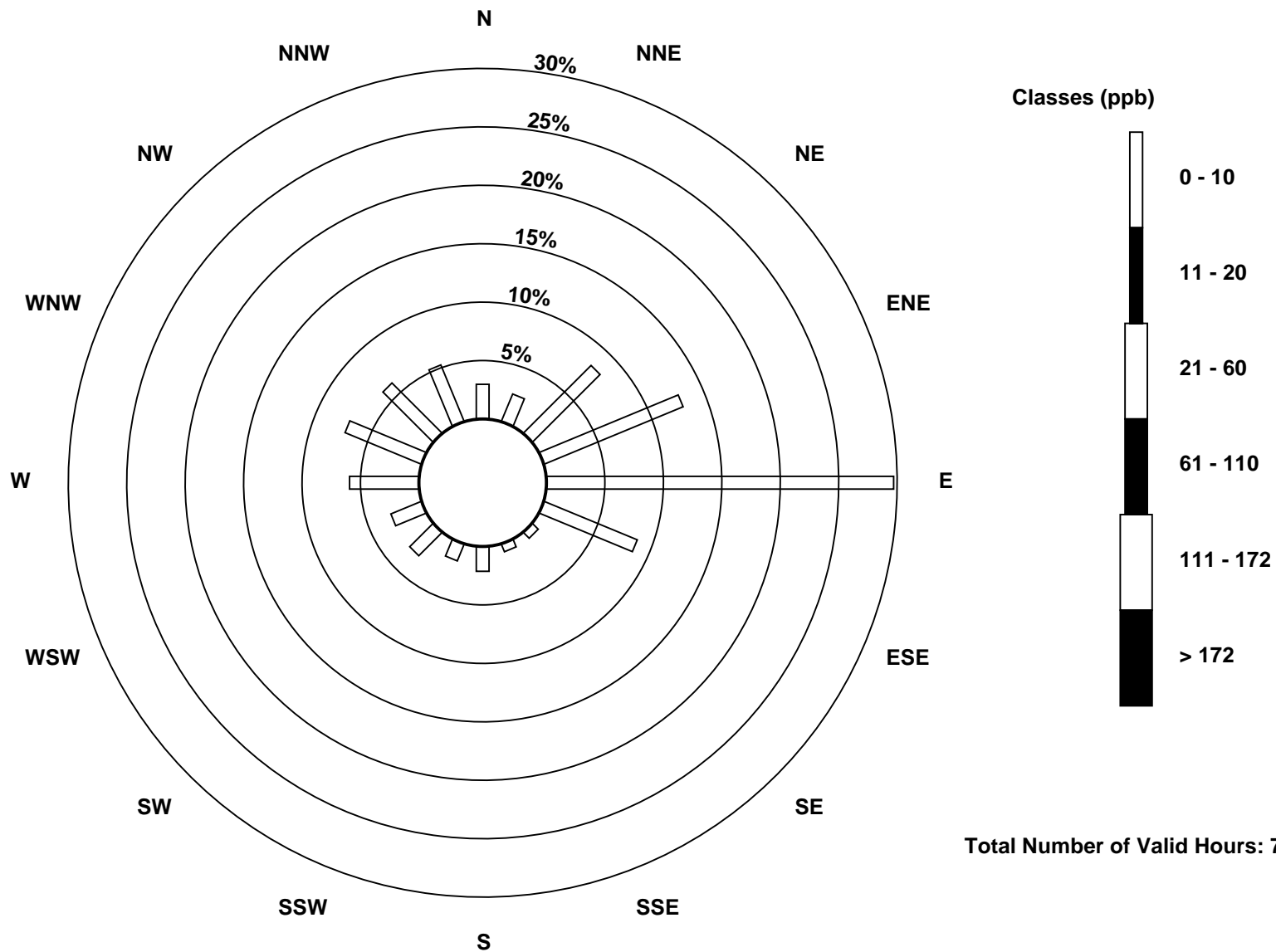
Total Number of Valid Hours: 707

Total Number of Hours: 744

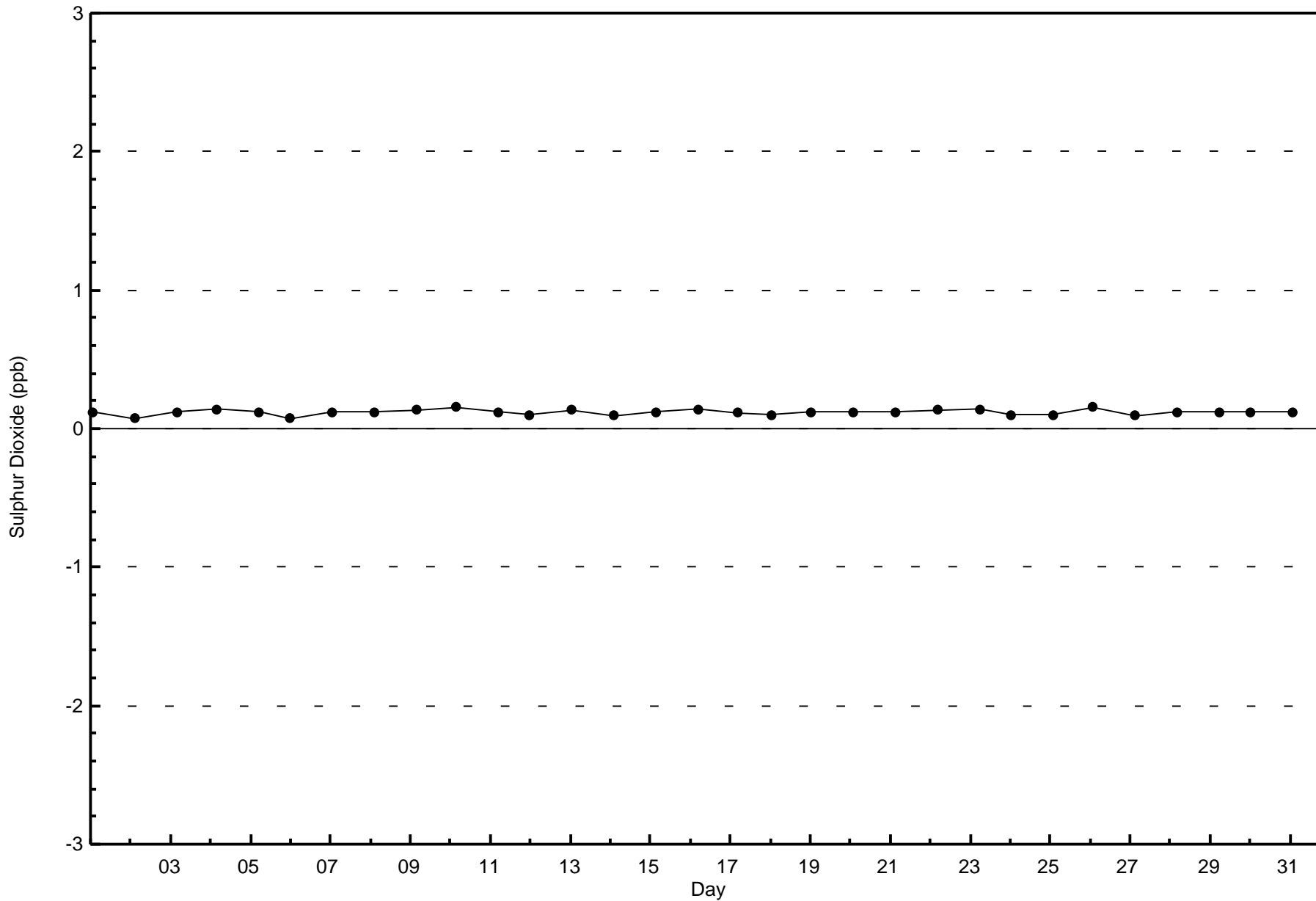


Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)



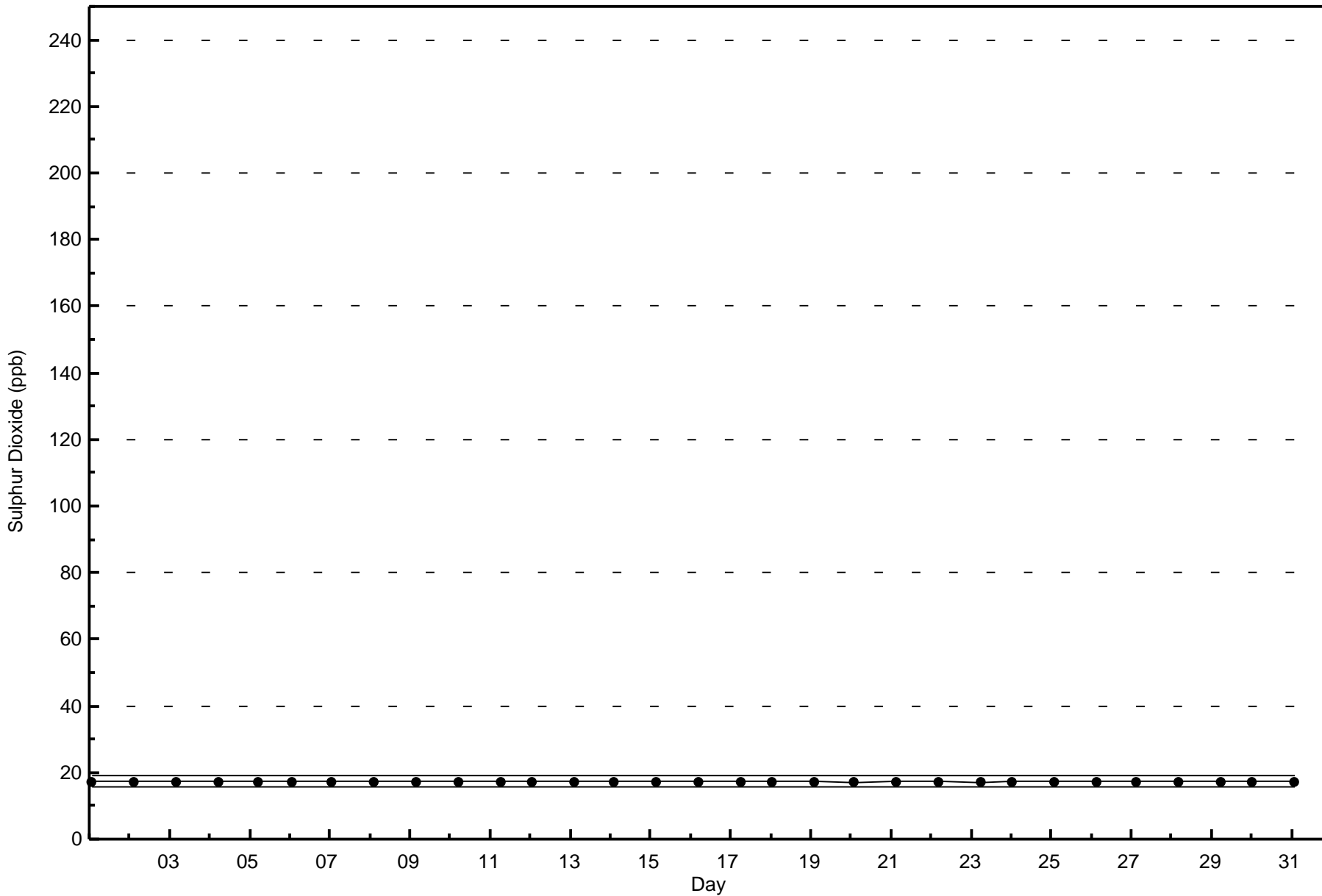
Total Number of Valid Hours: 707





Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

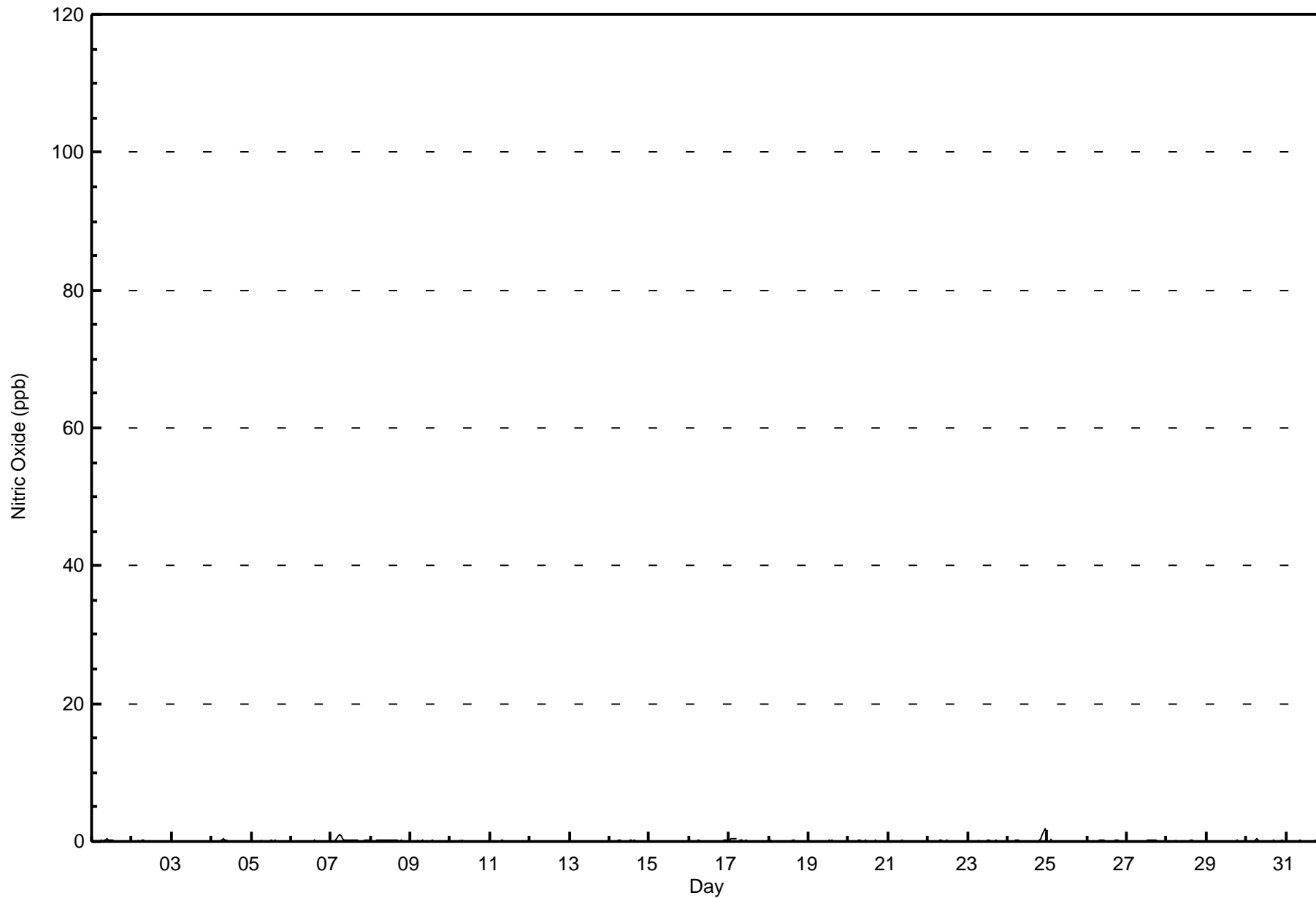
Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2016

Maximum Value: 2 ppb on May 24 23:00																	Maximum Daily Average: 0.3 ppb on May 7																	Hours in Service: 744	
Minimum Value: 0 ppb on May 11 23:00																	Minimum Daily Average: 0.0 ppb on May 13																	Hours of Data: 705	
Maximum Diurnal Average: 0.1 ppb at hour 7																	Minimum Diurnal Average: 0.0 ppb at hour 20																	Hours of Missing Data: 39	
Monthly Average: 0.1 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																	Hours of Calibration: 37	
																	Percent Operational Time: 99.7																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
3-May	0	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									
4-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
7-May	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	PF	PF	0	0	0	0	0.3	1									
8-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
12-May	Z	0	0	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-May	0	Z	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
16-May	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0									
17-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
18-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
19-May	0	Z	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.3	2									
25-May	2	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	2									
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
30-May	Z	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									
31-May	0	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									
																	Diurnal Average		Diurnal Maximum																
																	0.1		0.1																
																	2		2																
Z - zerospan																	C - Calibration		PF - Power Failure																



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	18	58	91	210	59	5	5	15	11	20	20	42	50	43	37	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	18	58	91	210	59	5	5	15	11	20	20	42	50	43	37	705

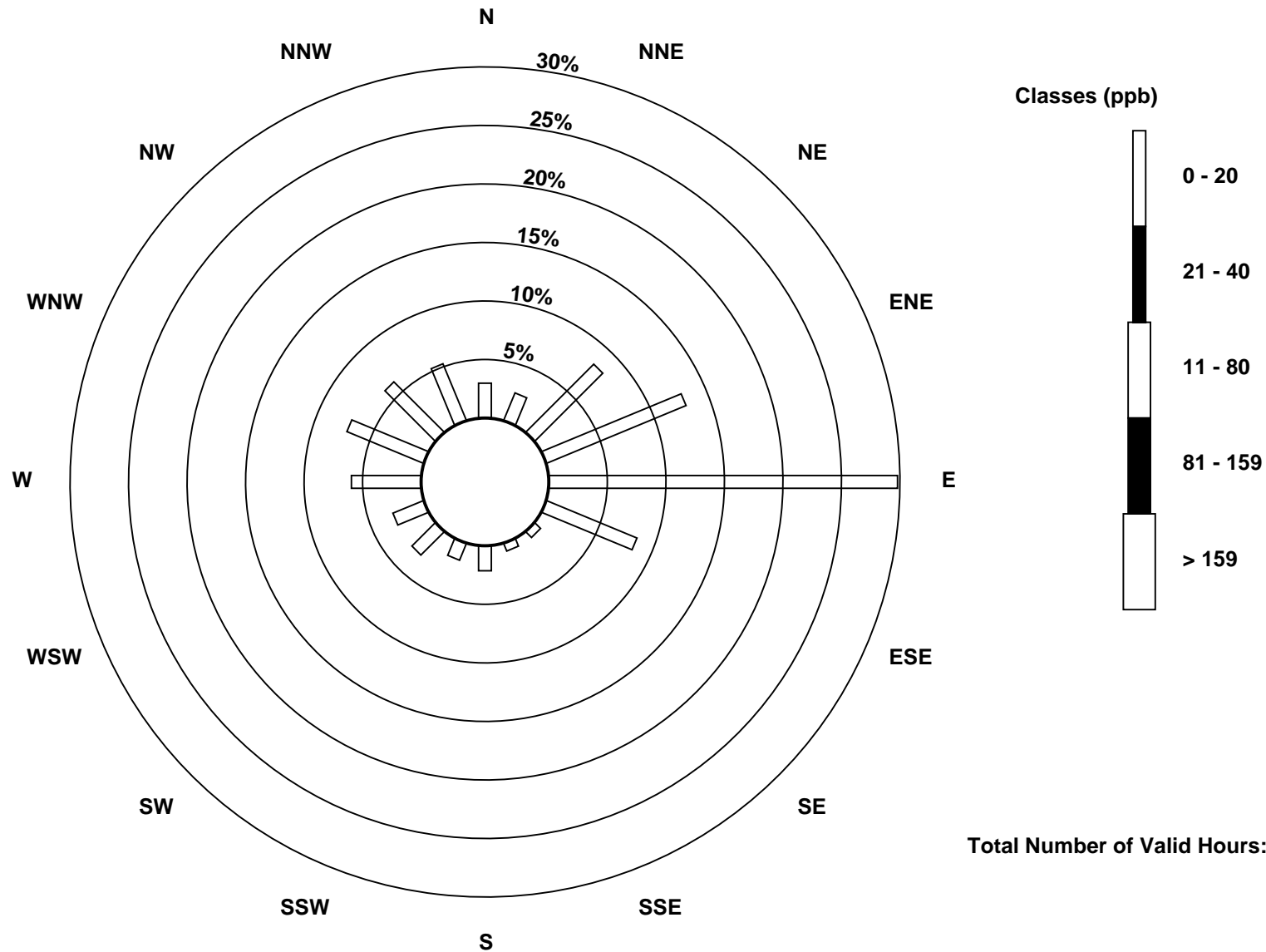
Total Number of Valid Hours: 705

Total Number of Hours: 744

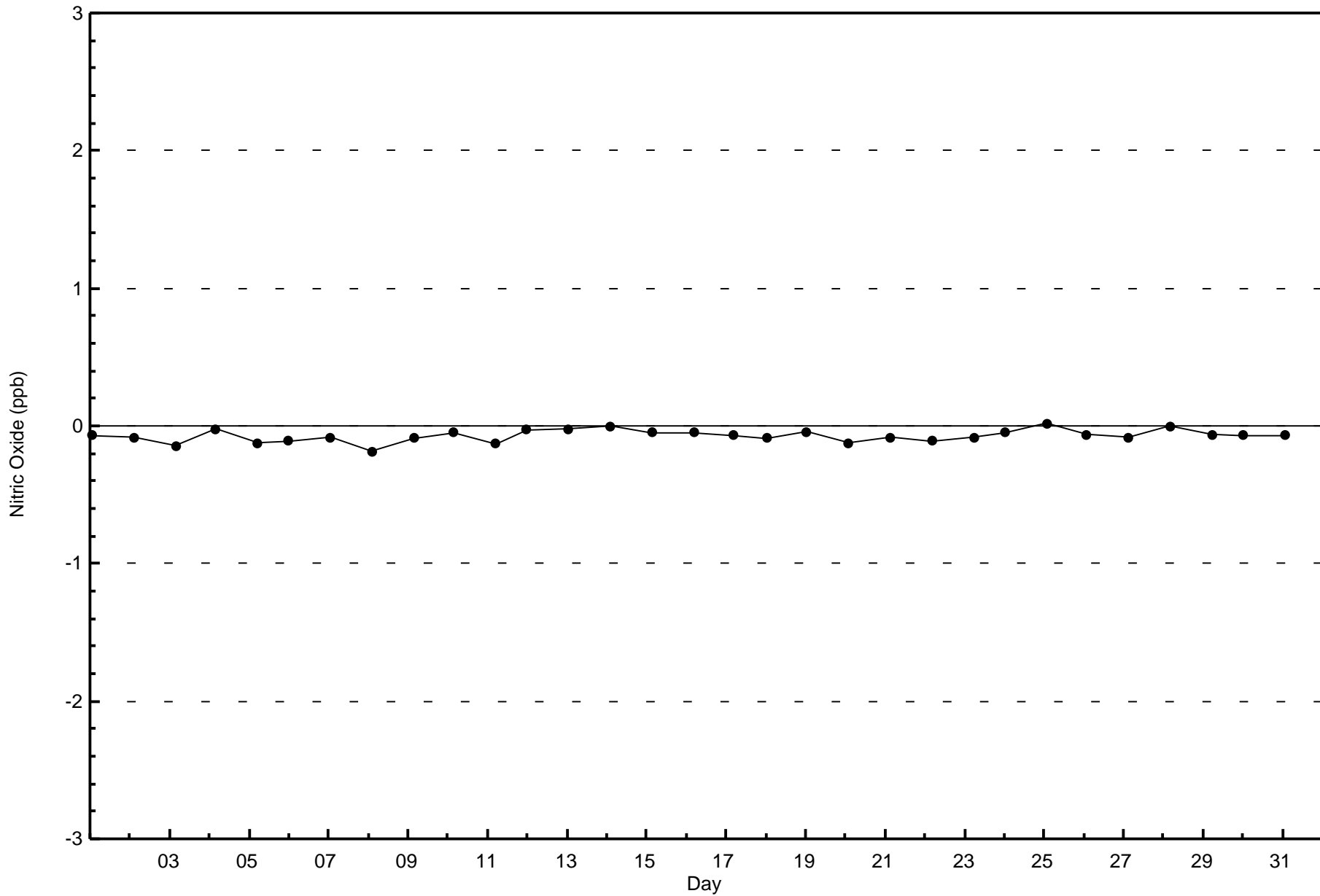


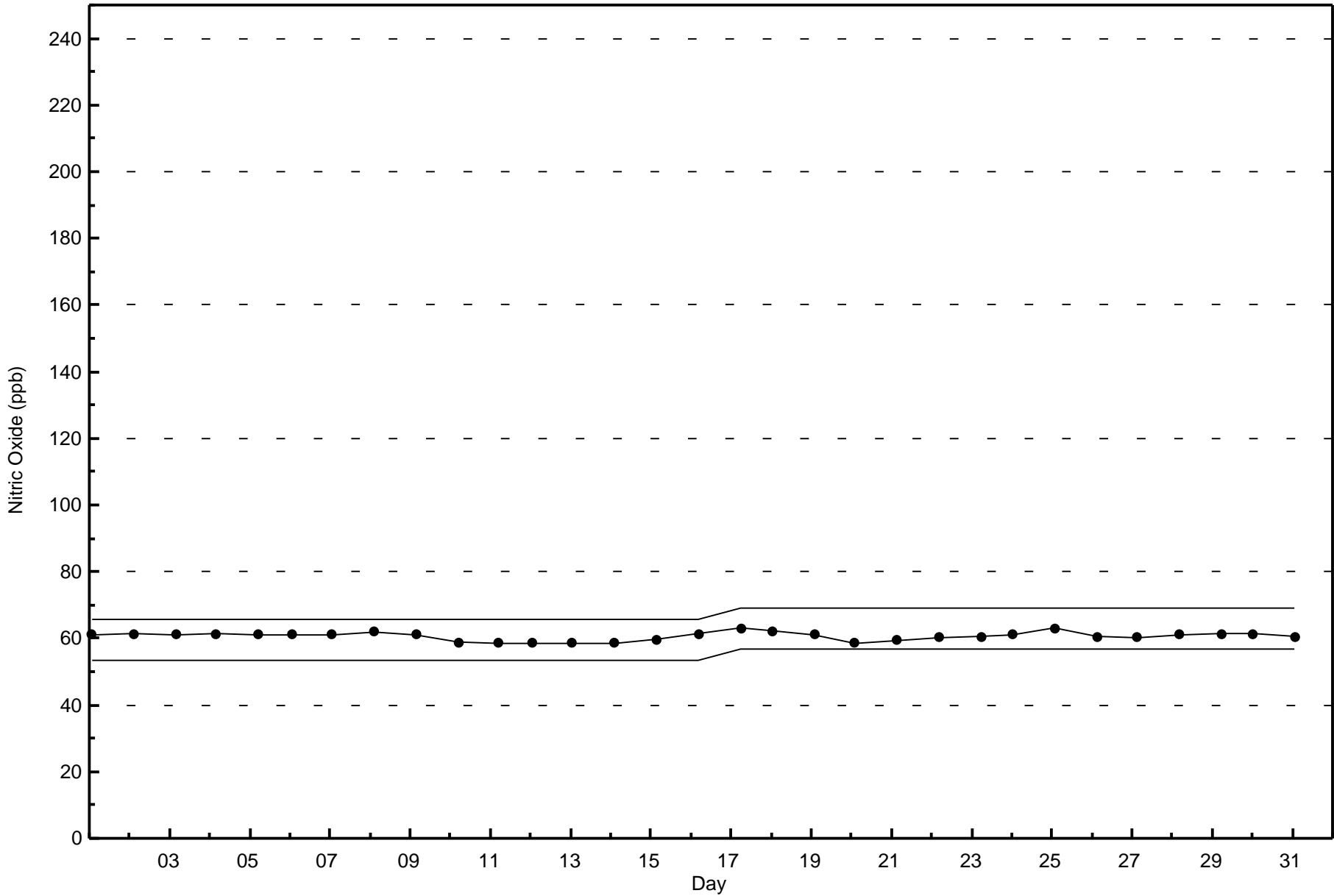
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 705







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

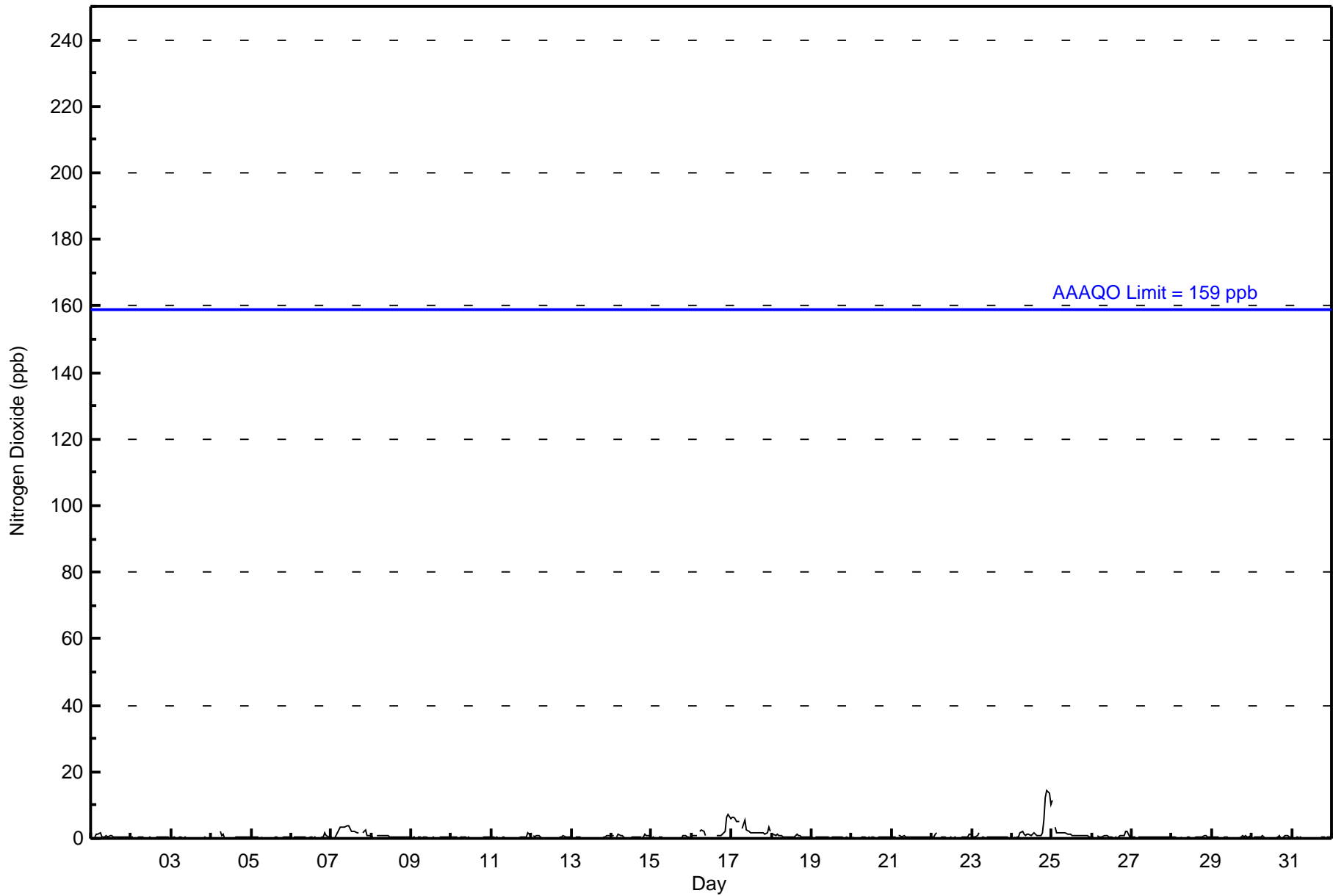
Fort Chipewyan - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 14 ppb on May 24 22:00										Maximum Daily Average: 3.3 ppb on May 24										Hours of Data: 705						
Minimum Value: 0 ppb on May 2 14:00										Minimum Daily Average: 0.2 ppb on May 3										Hours of Missing Data: 39						
Maximum Diurnal Average: 1.3 ppb at hour 23										Minimum Diurnal Average: 0.5 ppb at hour 12										Hours of Calibration: 37						
Monthly Average: 0.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 6										Percent Operational Time: 99.7						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1	Z	1	1	1	2	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2
2-May	0	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
3-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-May	0	0	0	0	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	2
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
6-May	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0.4	2
7-May	0	Z	0	1	2	3	3	3	3	4	4	3	2	2	2	2	2	PF	PF	2	3	1	1	1	2.1	4
8-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
10-May	0	0	0	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1
11-May	1	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0.4	2
12-May	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.4	1
13-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
14-May	1	1	Z	1	1	1	1	0	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	0	0.5	1
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
16-May	1	1	1	1	Z	2	3	2	1	C	C	C	C	C	C	1	1	1	1	2	2	6	7	6	--	7
17-May	6	7	6	5	5	Z	3	4	6	3	2	2	2	2	2	2	2	2	2	2	1	2	3	2	3.1	7
18-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
19-May	1	Z	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0.4	1
20-May	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0.3	1
21-May	0	1	0	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0.5	1
22-May	0	0	1	2	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	2
23-May	1	0	0	1	2	Z	1	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0.4	2
24-May	Z	0	0	0	1	2	2	1	1	1	1	1	1	2	1	1	1	1	2	6	12	14	13	10	3.3	14
25-May	12	Z	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.6	12
26-May	1	1	Z	1	1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	2	2	1	0	0.7	2
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0.4	1
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	1	1	0.4	1
29-May	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0.4	1
30-May	Z	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0.4	1
31-May	0	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
1.1 0.7 0.8 0.8 0.9 0.9 0.8 0.7 0.7 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.7 1.1 1.2 1.3 1.0																								Diurnal Average		
12 7 6 5 5 3 3 4 6 4 4 3 2 2 2 2 2 2 2 2 2 6 12 14 13 10																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	18	58	91	210	59	5	5	15	11	20	20	42	50	43	37	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	18	58	91	210	59	5	5	15	11	20	20	42	50	43	37	705

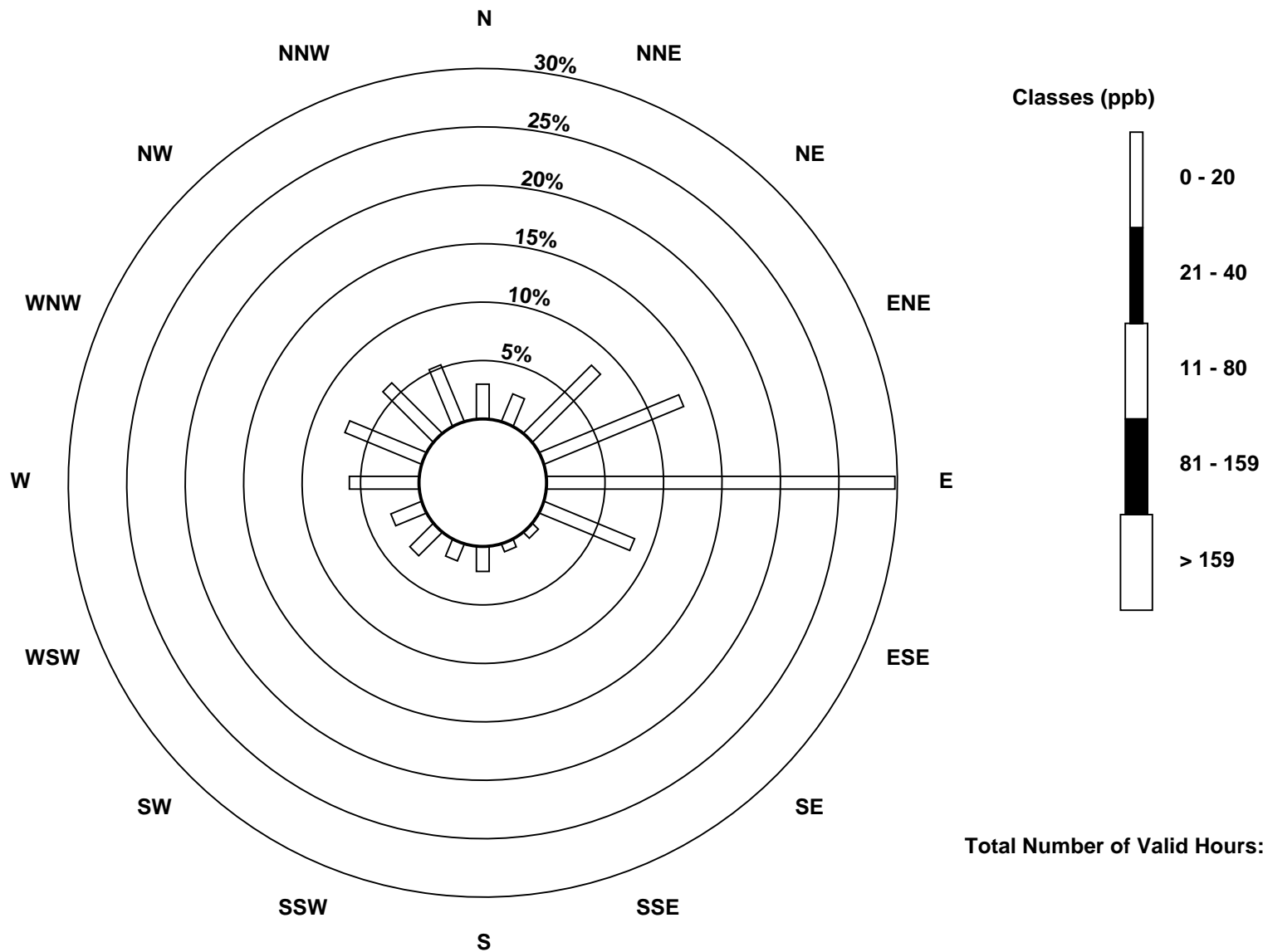
Total Number of Valid Hours: 705

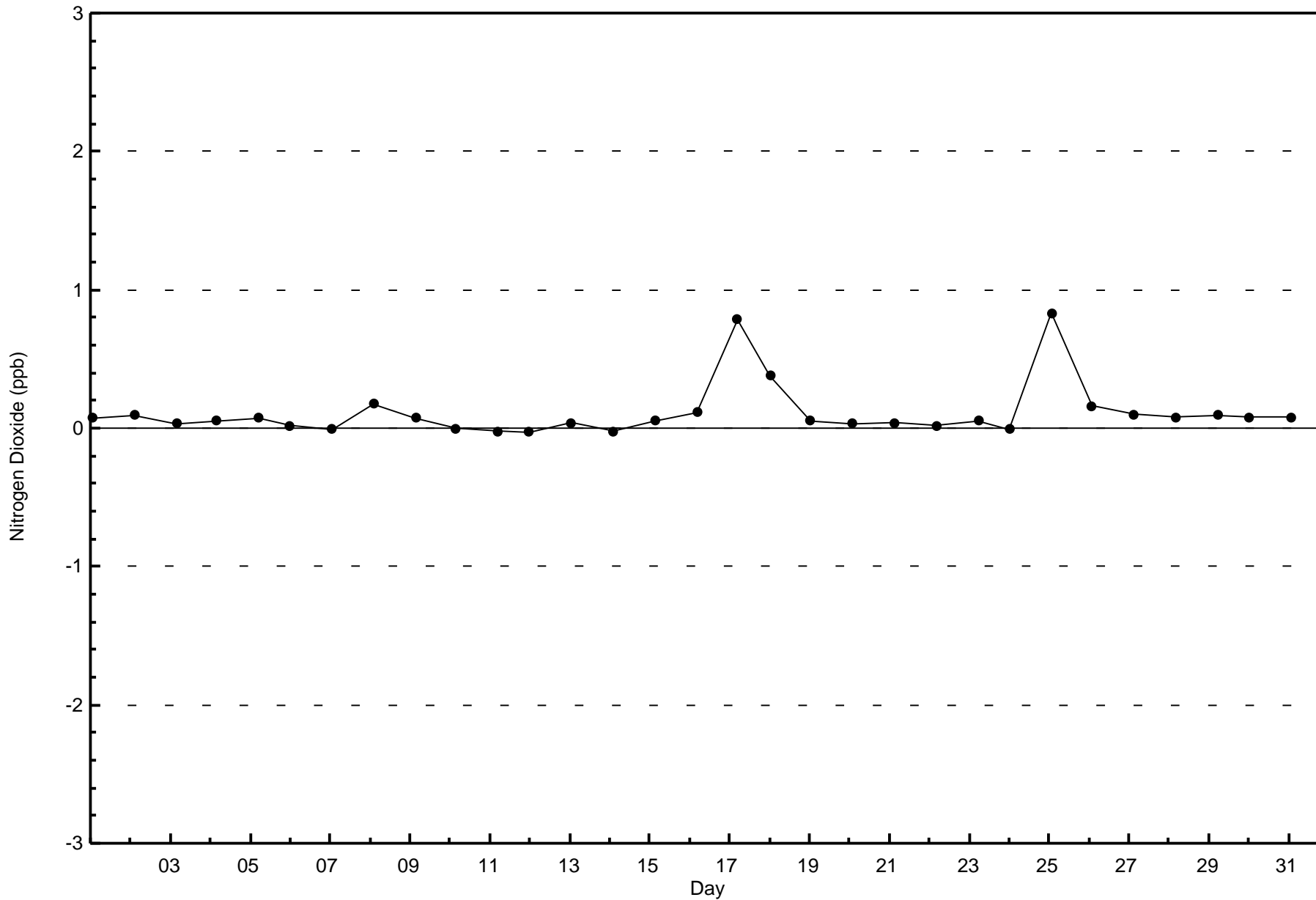
Total Number of Hours: 744

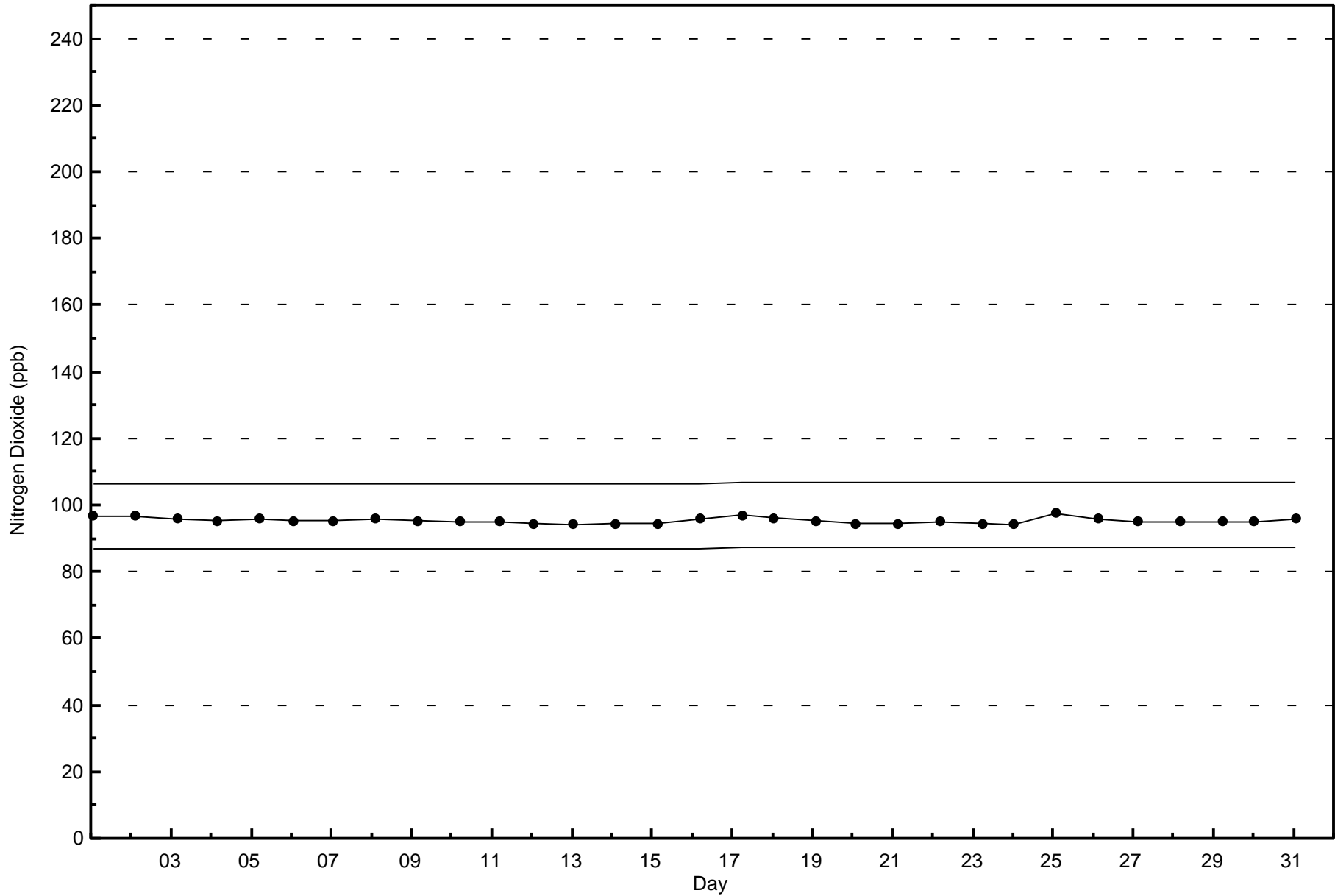


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association
Summary of Hour Averages

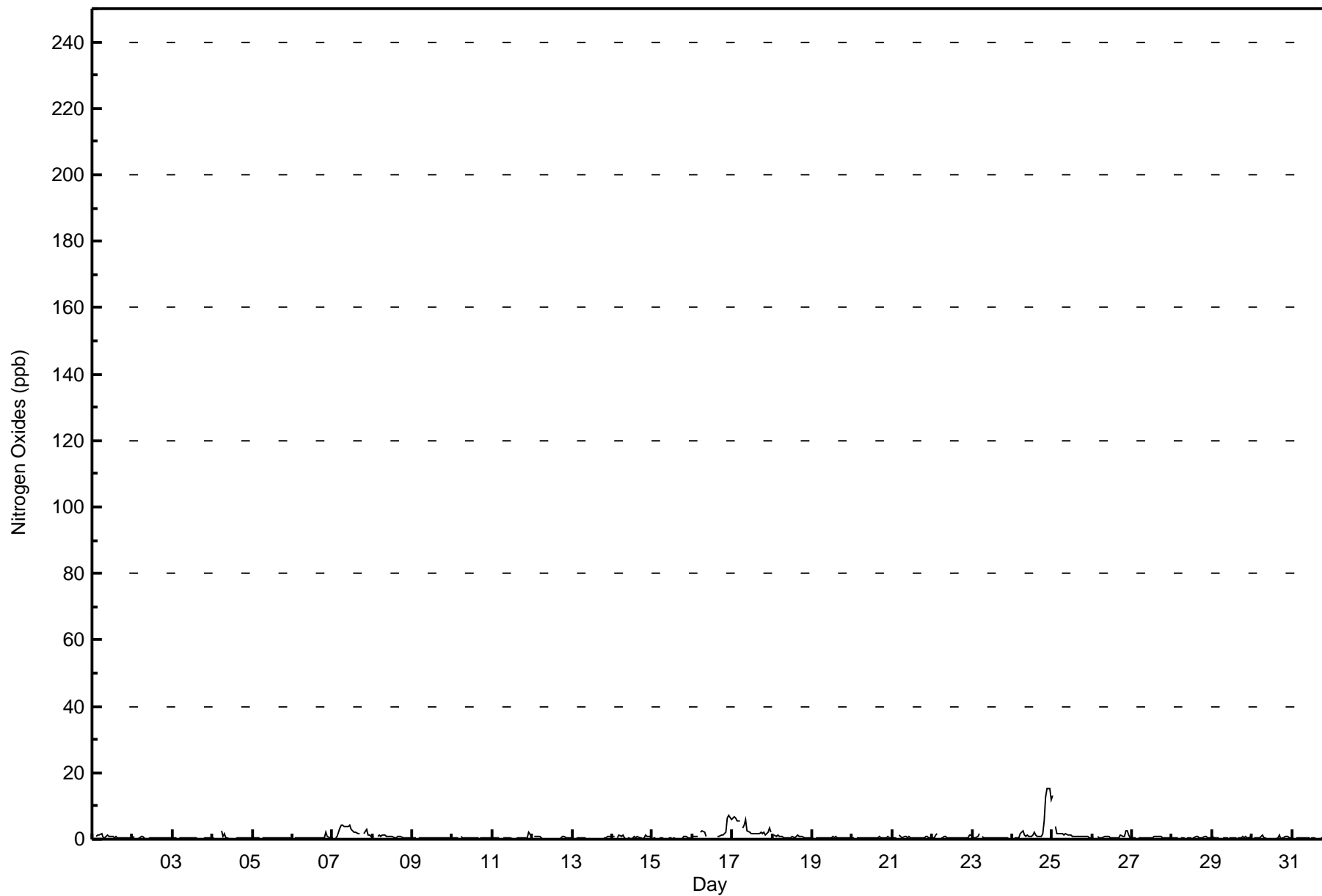
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2016

Maximum Value: 15 ppb on May 24 22:00		Maximum Daily Average: 3.5 ppb on May 24		Hours in Service: 744																																													
Minimum Value: 0 ppb on May 13 13:00		Minimum Daily Average: 0.3 ppb on May 3		Hours of Data: 705																																													
Maximum Diurnal Average: 1.4 ppb at hour 23		Minimum Diurnal Average: 0.5 ppb at hour 12		Hours of Missing Data: 39																																													
Monthly Average: 0.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 7		Hours of Calibration: 37																																													
				Percent Operational Time: 99.7																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	1	Z	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	2																							
2-May	0	1	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.4	1																							
3-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
4-May	0	0	0	0	Z	2	1	2	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0.5	2																							
5-May	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1																							
6-May	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	1	0	0	0.5	2																							
7-May	0	Z	0	1	3	4	4	4	4	4	4	3	3	2	2	2	2	PF	PF	2	3	1	1	1	2.4	4																							
8-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	1																							
9-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
10-May	0	0	0	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.4	1																							
11-May	1	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0.4	2																							
12-May	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1																							
13-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1																							
14-May	1	1	Z	1	1	1	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0.6	1																							
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1																							
16-May	1	1	1	1	Z	2	3	2	1	C	C	C	C	C	C	1	1	1	1	1	2	6	7	6	--	7																							
17-May	6	7	6	5	6	Z	3	4	6	3	2	2	2	2	2	2	2	2	2	2	2	1	2	3	2	3.2	7																						
18-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.8	1																							
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																							
20-May	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0.4	1																							
21-May	1	1	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0.6	1																							
22-May	0	0	1	2	Z	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.6	2																							
23-May	1	0	0	1	2	Z	1	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0	0	0	0.5	2																							
24-May	Z	0	0	0	1	2	2	1	1	1	1	1	1	2	1	1	1	1	2	6	13	15	15	12	3.5	15																							
25-May	13	Z	4	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	13																							
26-May	1	1	Z	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	2	2	1	0	0.8	2																							
27-May	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	1	0	0	0	0.5	1																							
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	1	0.4	1																							
29-May	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0.4	1																							
30-May	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0.5	1																							
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1																							
																								1.2	0.8	0.8	0.8	1.0	1.0	0.9	0.8	0.8	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.8	1.2	1.3	1.4	1.1	Diurnal Average	
																								13	7	6	5	6	4	4	4	4	6	4	4	3	3	2	2	2	2	2	2	6	13	15	15	12	Diurnal Maximum
Z - zerospan																								C - Calibration				PF - Power Failure																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	18	58	91	210	59	5	5	15	11	20	20	42	50	43	37	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	18	58	91	210	59	5	5	15	11	20	20	42	50	43	37	705

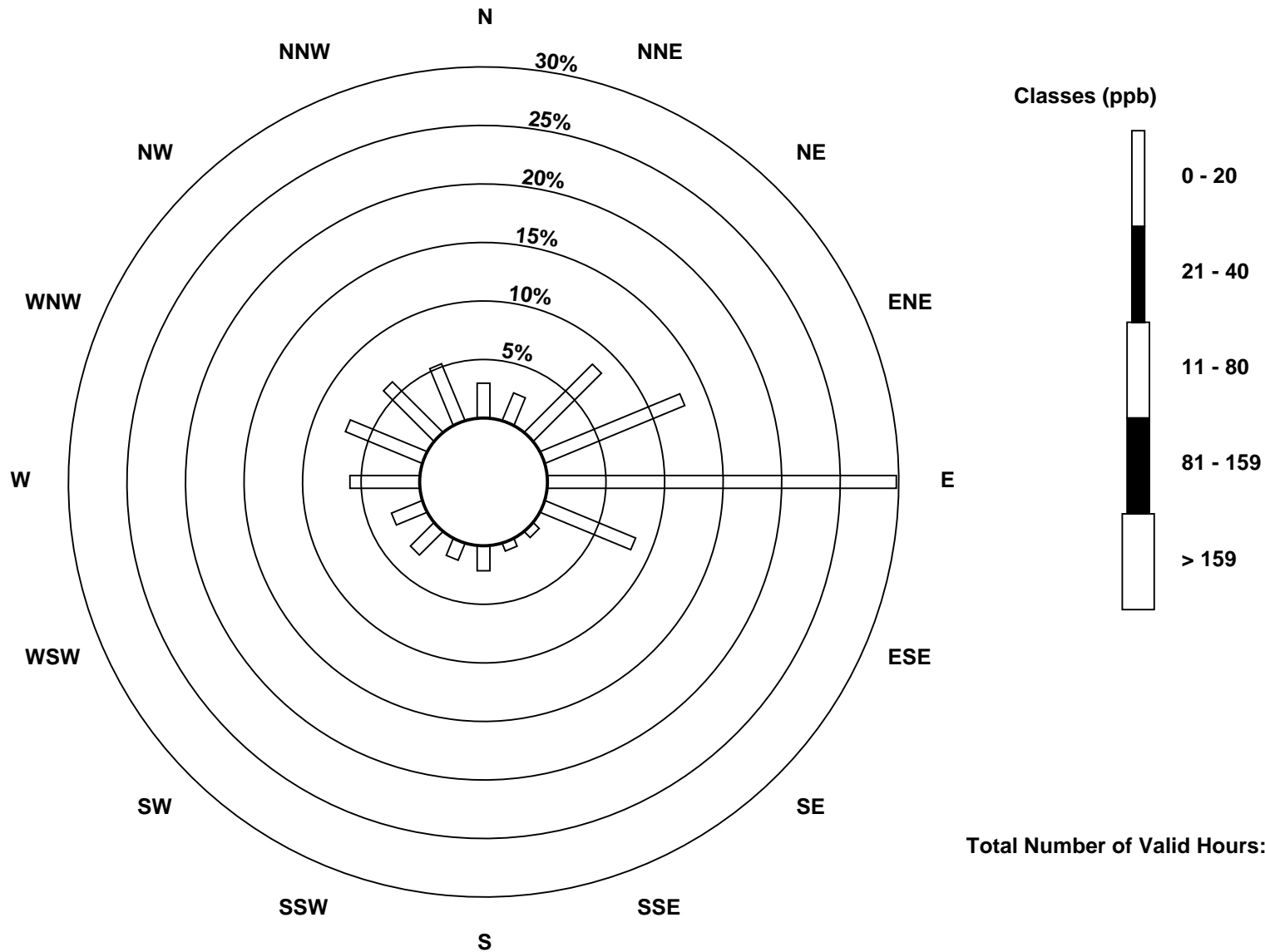
Total Number of Valid Hours: 705

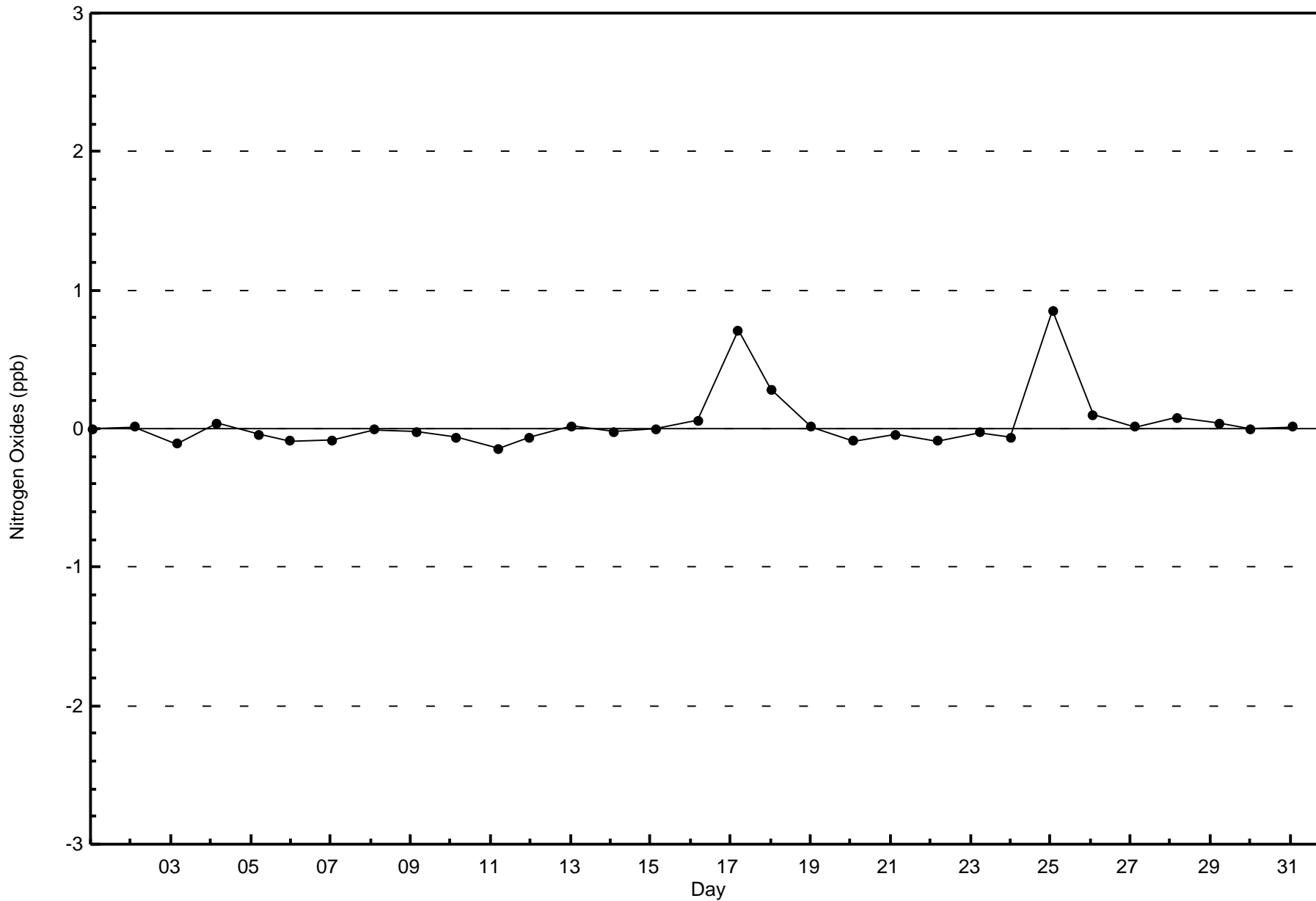
Total Number of Hours: 744

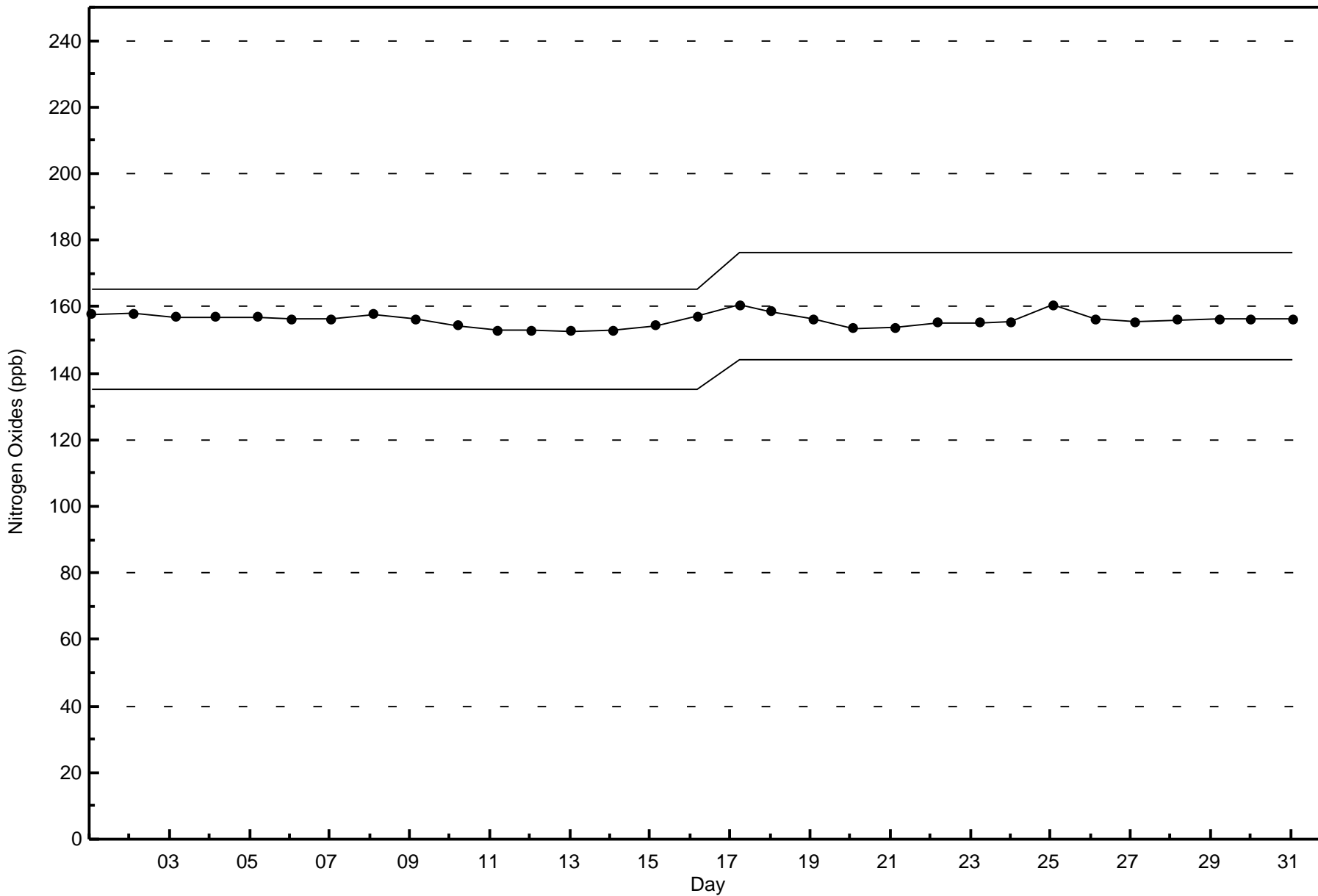


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

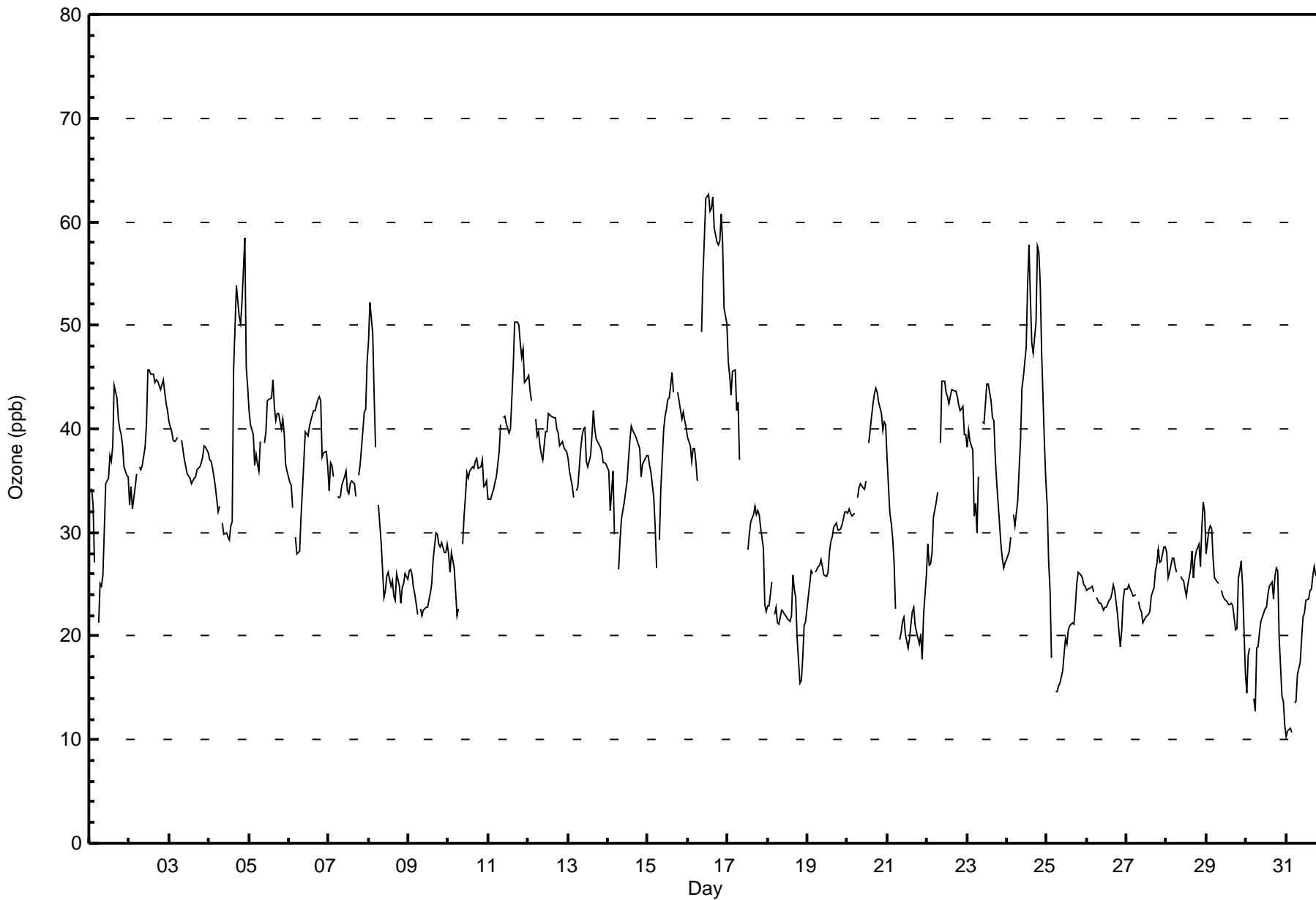
Fort Chipewyan - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 63 ppb on May 16 13:00										Maximum Daily Average: 51.7 ppb on May 16										Hours of Data: 706						
Minimum Value: 10 ppb on May 31 01:00										Minimum Daily Average: 19.8 ppb on May 31										Hours of Missing Data: 38						
Maximum Diurnal Average: 35.7 ppb at hour 16										Minimum Diurnal Average: 28.2 ppb at hour 6										Hours of Calibration: 34						
Monthly Average: 33.0 ppb										Percentiles: P ₁ = 14 P ₁₀ = 22 Q ₁ = 25 Median = 33 Q ₃ = 40 P ₉₀ = 44 P ₉₉ = 59										Percent Operational Time: 99.5						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	34	34	33	27	Z	21	25	25	26	30	35	35	37	37	38	44	43	41	40	39	38	36	36	35	34.4	44
2-May	33	34	32	35	36	Z	36	36	36	38	40	46	46	45	45	44	45	45	44	44	45	44	42	42	40.6	46
3-May	41	40	39	39	39	39	Z	39	38	37	36	36	35	35	35	35	35	36	36	37	37	38	38	38	37.3	41
4-May	37	37	36	35	34	32	33	Z	31	30	30	30	29	31	31	46	54	52	51	50	52	58	46	44	39.5	58
5-May	42	40	39	37	38	37	36	39	Z	39	40	43	43	43	45	42	41	41	41	40	41	40	37	36	39.9	45
6-May	35	35	32	Z	30	28	28	32	34	37	40	39	40	41	41	42	42	43	43	43	37	38	38	36	37.1	43
7-May	34	37	37	35	Z	33	33	33	35	35	36	34	34	35	35	35	33	PF	36	36	40	42	42	47	36.2	47
8-May	48	52	49	43	38	Z	33	29	26	24	24	26	26	25	25	24	23	26	25	23	25	25	26	25	30.1	52
9-May	26	27	26	25	24	22	Z	23	22	22	23	23	23	24	25	27	30	30	29	29	29	28	28	29	25.8	30
10-May	28	26	28	27	24	22	23	Z	29	32	33	36	35	36	36	36	37	37	36	36	37	34	35	35	32.1	37
11-May	33	33	34	34	35	35	38	40	Z	41	41	41	40	40	43	46	50	50	50	48	47	48	45	45	41.6	50
12-May	45	44	43	Z	41	39	40	38	38	37	40	40	41	41	41	41	41	40	40	38	39	38	38	38	40.0	45
13-May	37	36	34	33	Z	34	34	38	39	40	40	37	36	37	39	42	40	39	39	38	38	37	37	37	37.5	42
14-May	36	32	34	36	30	Z	26	29	31	32	33	35	37	39	40	40	39	39	39	38	35	37	37	37	35.3	40
15-May	37	36	36	33	30	27	Z	29	34	40	41	42	43	43	45	44	UO	UO	43	43	41	42	41	40	38.6	45
16-May	39	38	37	38	38	37	35	Z	49	55	58	62	63	61	61	62	59	58	58	58	61	58	52	50	51.7	63
17-May	47	45	43	46	46	42	43	37	Z	C	C	C	28	30	31	32	33	32	32	32	31	29	23	22	35.1	47
18-May	23	23	25	Z	22	23	21	21	22	22	22	22	22	21	22	26	24	24	20	15	16	18	21	21	21.6	26
19-May	24	25	26	26	Z	26	27	27	27	27	26	26	26	28	29	30	30	31	30	30	30	31	32	32	28.1	32
20-May	32	32	32	32	32	Z	33	34	35	34	34	35	UO	39	41	42	43	44	44	43	42	40	41	40	37.4	44
21-May	37	32	31	29	27	23	Z	20	20	21	22	20	19	20	21	22	23	21	20	19	20	18	22	26	23.2	37
22-May	29	27	27	28	31	33	34	Z	39	45	45	44	43	42	43	44	44	44	43	42	42	42	39	39	38.6	45
23-May	38	40	39	38	32	33	30	35	Z	41	41	42	44	44	43	41	41	37	35	31	29	27	27	27	36.3	44
24-May	27	28	30	Z	32	31	33	36	39	44	45	48	54	58	53	48	47	50	58	57	54	47	39	35	43.1	58
25-May	33	27	24	18	Z	15	15	15	16	17	18	20	19	21	21	21	21	23	25	26	26	25	25	25	21.5	33
26-May	24	24	25	25	24	Z	24	23	23	23	23	23	23	24	24	24	25	24	22	21	19	21	24	24	23.2	25
27-May	25	25	24	24	24	24	Z	23	23	22	21	22	22	22	22	24	25	26	27	28	27	27	29	29	24.6	29
28-May	28	26	26	28	27	27	26	Z	26	25	25	24	24	25	26	28	26	27	28	29	27	30	33	32	27.2	33
29-May	28	30	31	30	27	26	25	25	Z	24	24	24	23	23	23	23	23	21	21	26	26	27	25	16	24.8	31
30-May	15	18	19	Z	14	13	19	19	20	21	22	23	23	24	25	25	24	26	27	26	20	14	14	11	20.0	27
31-May	10	11	11	11	Z	14	14	16	18	20	22	22	23	24	24	25	26	27	26	26	24	23	21	20	19.8	27
32.4 32.1 31.7 31.2 31.0 28.2 29.4 29.3 29.9 31.9 32.7 33.2 33.4 34.1 34.7 35.7 35.6 35.7 35.7 35.2 34.6 34.3 33.2 32.7																								Diurnal Average		
48 52 49 46 46 42 43 40 49 55 58 62 63 61 61 62 59 58 58 58 61 58 52 50																								Diurnal Maximum		
Z - zerospan										C - Calibration					UO - Unstable Operation					PF - Power Failure						
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Fort Chipewyan - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	46	6.52	6.52
21 - 50	634	89.80	96.32
51 - 82	26	3.68	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort Chipewyan - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	2	1	2	1	2	0	0	0	0	0	0	1	3	10	15	46
21 - 50	13	16	59	84	199	59	5	5	12	10	19	18	35	45	34	21	634
51 - 82	0	0	0	0	7	1	0	0	3	4	2	1	8	0	0	0	26
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	18	60	86	207	62	5	5	15	14	21	19	44	48	44	36	706

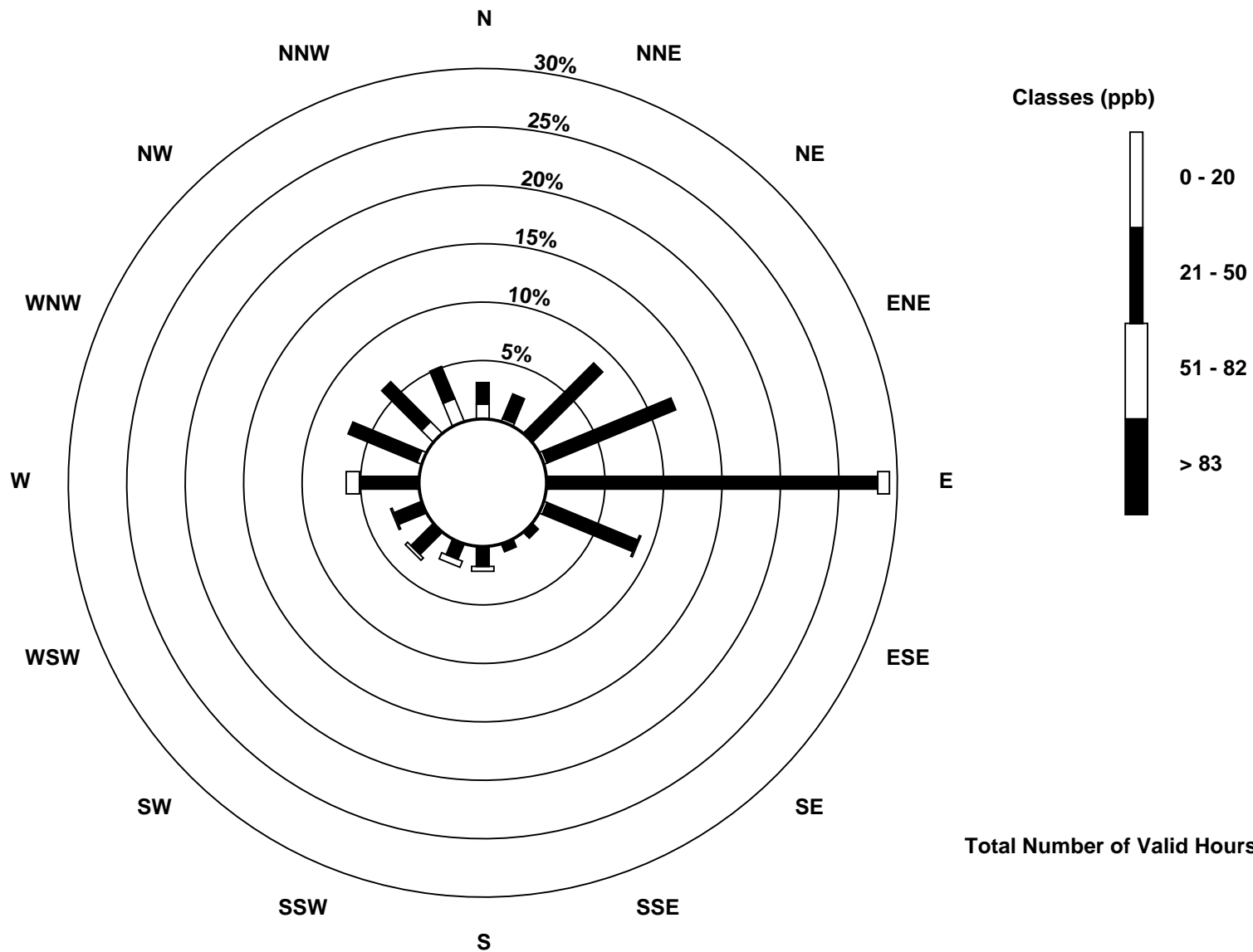
Total Number of Valid Hours: 706

Total Number of Hours: 744

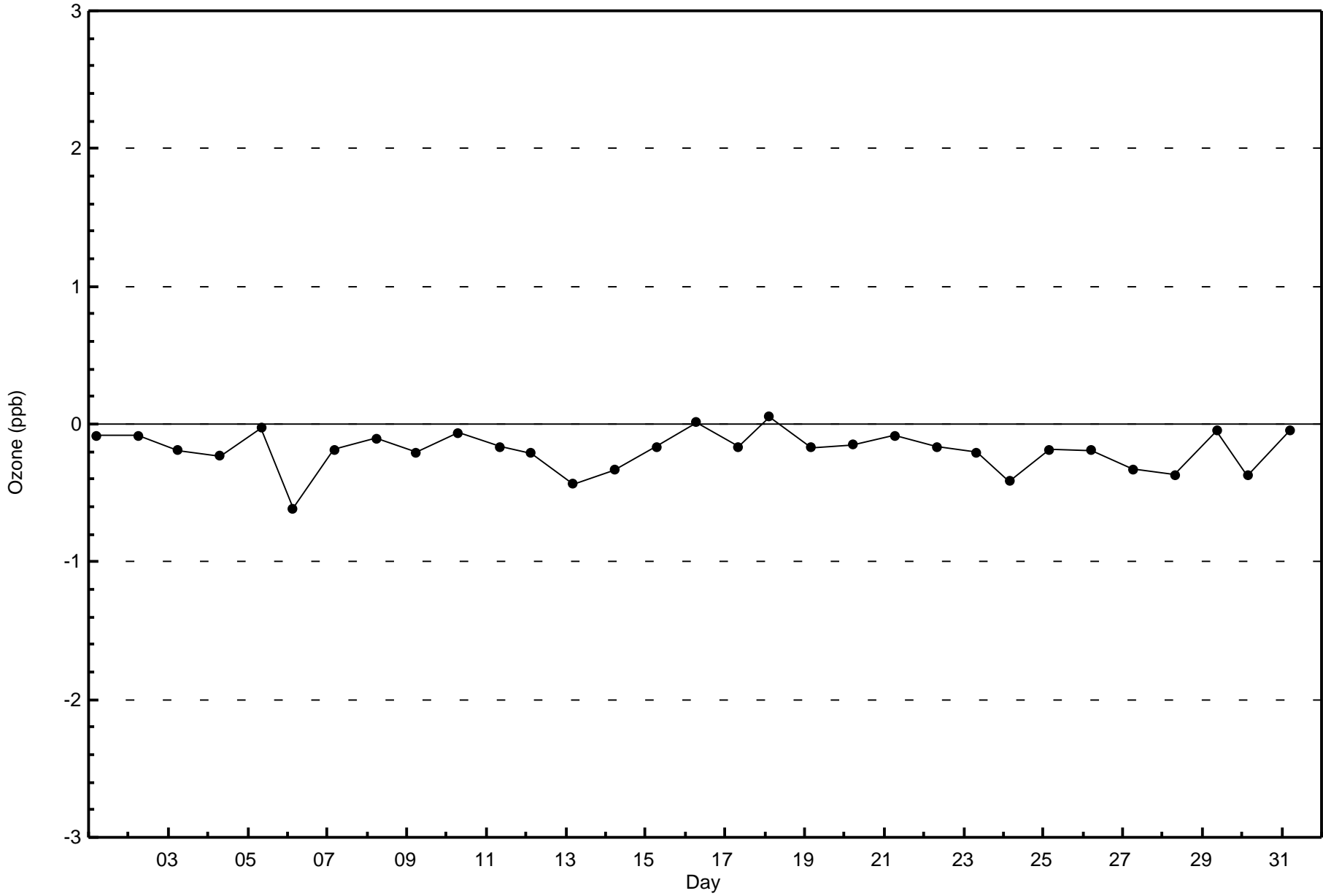


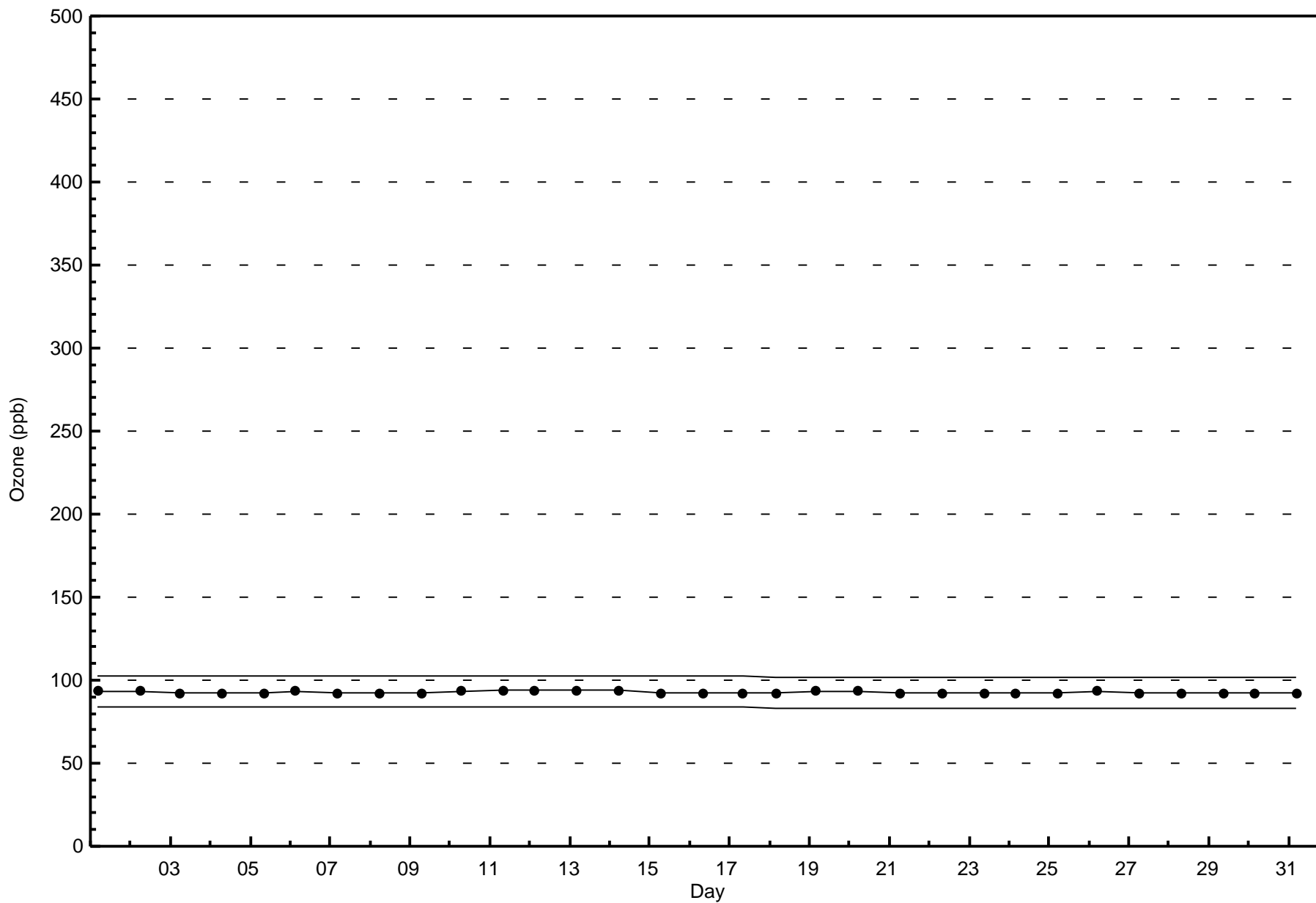
Wood Buffalo Environmental Association
Wind Rose May 2016

Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 706



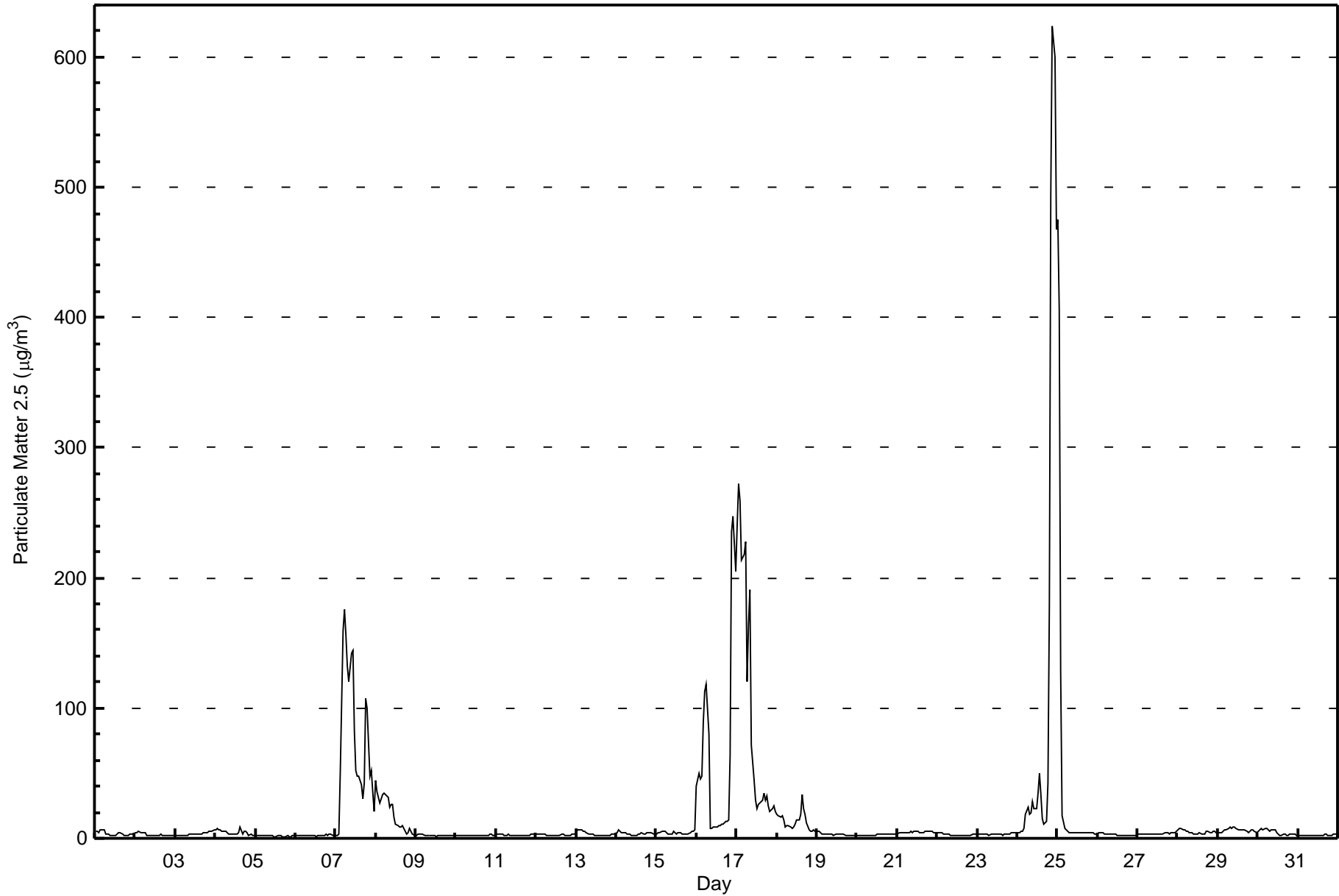




Summary of Hour Averages

Fort Chipewyan - May 2016

Number of Exceedences (AAAQO): 24-hr: 5 Maximum Value: 623.5 µg/m ³ on May 24 22:00		Maximum Daily Average: 114.4 µg/m ³ on May 24		Hours in Service: 744 Hours of Data: 744																						
Minimum Value: 1.2 µg/m ³ on May 5 18:00 Maximum Diurnal Average: 33.3 µg/m ³ at hour 22 Monthly Average: 16.39 µg/m ³		Minimum Daily Average: 1.8 µg/m ³ on May 5 Minimum Diurnal Average: 6.4 µg/m ³ at hour 17 Percentiles: P ₁ = 1.6 P ₁₀ = 2.2 Q ₁ = 2.6 Median = 3.4 Q ₃ = 5.6 P ₉₀ = 25.5 P ₉₉ = 146.4		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-May	5.4	5.0	4.9	6.3	6.1	7.0	3.2	2.9	2.7	2.6	2.1	2.2	2.5	2.9	4.7	4.3	3.2	2.6	2.5	2.4	2.4	2.9	3.1	2.9	3.6	7.0
2-May	3.9	4.3	5.0	4.8	4.4	4.2	4.2	2.6	2.7	2.6	2.2	2.2	1.9	2.4	2.4	2.7	2.5	2.4	2.3	2.1	2.6	2.6	2.3	2.3	3.0	5.0
3-May	2.2	2.3	2.4	2.4	2.5	2.6	2.7	2.7	2.7	2.9	2.8	3.3	3.4	3.8	3.3	3.7	3.5	3.9	4.3	4.9	5.1	5.7	5.4	6.3	3.5	6.3
4-May	6.4	7.8	6.9	6.0	5.0	5.2	5.1	4.3	3.7	3.7	3.4	3.1	3.1	3.4	4.3	8.6	3.4	5.1	5.8	4.3	2.3	3.2	2.7	1.9	4.5	8.6
5-May	1.8	1.7	1.9	2.2	2.3	2.5	2.4	2.0	2.1	1.9	1.7	1.6	1.4	1.8	1.8	1.7	1.4	1.2	1.4	1.7	1.6	1.6	1.6	1.7	1.8	2.5
6-May	1.9	2.3	2.4	2.5	2.7	2.6	2.4	2.2	2.2	2.1	2.0	1.8	1.5	2.0	2.3	2.6	2.7	2.5	2.7	2.4	3.8	3.5	2.3	2.1	2.4	3.8
7-May	2.3	2.2	3.4	50.1	160.0	175.5	156.5	132.3	120.2	141.6	144.4	82.4	52.1	48.0	47.5	41.3	30.8	42.3	107.6	99.4	48.1	51.7	35.8	20.3	74.8	175.5
8-May	44.8	35.5	27.0	29.8	33.4	34.6	33.6	31.8	24.0	26.2	25.6	16.2	10.7	9.2	9.0	8.3	9.5	7.5	3.2	4.1	7.6	5.4	2.7	2.3	18.4	44.8
9-May	2.2	2.9	3.5	3.3	3.2	2.3	2.0	2.0	1.9	1.9	1.7	1.7	1.6	1.7	1.8	1.8	1.9	2.0	1.9	2.0	1.9	2.0	1.9	1.8	2.1	3.5
10-May	1.9	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.2	2.1	2.3	2.4	2.4	2.3	2.6	2.3	2.4	2.5	2.6	3.0	2.8	2.7	2.7	2.4	3.0
11-May	3.0	3.1	3.3	3.4	3.1	2.6	2.5	2.7	2.6	2.6	2.5	2.4	2.5	2.4	2.4	2.5	2.6	2.5	2.5	2.6	2.7	3.2	2.8	3.1	2.7	3.4
12-May	3.7	3.3	3.1	3.0	3.0	2.9	2.6	2.7	2.6	2.4	2.0	2.0	2.1	2.3	2.6	3.3	3.1	2.2	2.7	2.4	2.4	2.8	3.1	2.9	2.7	3.7
13-May	4.4	6.0	6.2	6.0	5.6	5.0	4.2	3.4	3.0	3.0	2.8	2.3	2.5	2.7	2.7	2.4	2.2	2.2	2.1	2.2	2.5	3.1	3.1	3.0	3.4	6.2
14-May	4.8	6.0	5.1	4.3	4.5	3.9	3.3	2.8	2.8	2.6	2.2	2.6	2.7	3.1	3.6	3.8	3.8	3.8	3.9	4.3	4.2	4.3	3.8	3.4	3.7	6.0
15-May	3.5	4.1	4.4	4.9	5.4	5.1	4.0	3.4	2.9	3.4	5.5	4.8	3.5	4.2	3.8	3.7	3.3	3.4	3.7	3.7	4.4	5.2	5.7	6.8	4.3	6.8
16-May	40.6	50.0	45.2	47.4	88.6	112.3	118.7	79.8	8.0	7.8	8.6	8.6	8.3	9.2	10.3	11.3	10.7	12.6	13.4	14.6	64.3	235.7	246.8	204.7	60.7	246.8
17-May	240.9	272.2	259.0	213.2	218.0	228.0	120.5	164.1	191.3	71.9	44.1	28.9	22.3	25.5	27.6	29.1	34.3	29.0	32.5	24.7	20.8	22.5	24.8	20.2	98.6	272.2
18-May	18.8	17.8	16.8	17.7	14.1	8.9	9.9	9.6	8.7	7.8	8.6	10.8	14.3	14.6	18.3	33.8	22.4	18.8	12.0	6.3	5.3	5.8	6.9	5.0	13.0	33.8
19-May	5.3	5.4	4.7	3.4	3.0	2.9	2.8	2.9	3.2	2.9	2.7	2.8	3.0	3.2	3.2	3.2	2.7	2.4	2.3	2.3	2.3	2.2	2.2	2.1	3.0	5.4
20-May	2.3	2.5	2.4	2.4	2.4	2.5	2.6	2.6	2.6	2.6	2.7	2.7	2.8	2.9	2.8	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.3	3.5	2.8	3.5
21-May	3.4	4.0	4.6	4.8	4.7	4.8	4.7	4.9	5.0	4.6	4.9	5.0	4.9	4.7	4.5	4.6	4.7	4.9	5.2	5.4	5.3	5.6	4.8	4.1	4.7	5.6
22-May	4.0	4.1	4.1	4.0	3.8	3.6	3.3	2.9	2.6	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.5	2.5	2.6	3.0	3.3	3.7	3.0	4.1
23-May	3.0	2.9	3.0	3.1	3.5	3.1	2.8	2.6	2.8	2.9	2.9	2.8	3.1	3.2	3.0	2.7	3.3	3.7	3.7	3.7	4.2	4.1	4.0	4.2	3.3	4.2
24-May	4.6	4.8	5.1	5.1	7.7	18.8	23.7	18.5	19.7	27.7	22.9	22.4	34.3	50.2	33.4	14.8	11.1	13.1	42.4	179.4	494.1	623.5	599.6	467.9	114.4	623.5
25-May	474.6	406.1	127.6	17.1	7.7	6.1	5.2	4.8	4.5	4.4	4.4	4.1	4.4	4.4	4.3	4.4	4.4	4.3	4.3	4.1	4.0	3.9	3.7	3.6	46.5	474.6
26-May	3.8	3.8	3.8	3.8	3.6	3.4	3.3	3.2	3.2	3.0	3.0	2.8	2.7	2.6	2.2	2.1	2.2	2.4	2.3	2.2	2.3	2.4	2.3	2.3	2.9	3.8
27-May	3.0	3.4	3.4	3.2	3.1	3.1	3.0	3.1	2.8	2.8	2.7	2.7	2.8	2.9	3.0	3.5	4.0	4.0	4.0	3.7	4.4	4.5	4.8	5.0	3.5	5.0
28-May	6.1	7.3	7.6	6.7	6.2	5.4	4.9	4.1	3.8	3.6	3.7	3.4	3.4	3.8	3.6	3.7	3.8	5.0	5.7	4.7	4.6	5.0	5.1	4.7	4.8	7.6
29-May	4.0	4.1	4.3	5.0	6.0	6.8	7.8	8.3	8.1	8.8	8.8	7.8	6.9	6.8	6.5	6.2	6.2	5.1	4.7	5.6	6.4	6.4	5.5	4.0	6.3	8.8
30-May	5.6	6.5	7.1	7.0	7.8	7.5	6.3	5.5	6.3	6.9	6.0	4.4	3.3	2.7	2.5	2.8	3.2	2.4	2.6	2.7	3.2	2.9	2.7	2.7	4.6	7.8
31-May	2.6	2.5	2.4	2.4	2.4	2.4	2.5	2.6	2.6	2.5	2.4	2.3	2.4	2.4	2.5	2.6	2.7	2.8	2.4	2.4	2.6	2.9	2.8	3.0	2.5	3.0
																								Diurnal Average		
																								Diurnal Maximum		
29.5 28.6 18.8 15.4 20.2 21.9 17.8 16.8 14.6 11.8 10.8 7.9 6.9 7.5 7.2 7.2 6.4 6.5 9.4 13.2 23.4 33.3 32.3 25.9																								Diurnal Average		
474.6 406.1 259.0 213.2 218.0 228.0 156.5 164.1 191.3 141.6 144.4 82.4 52.1 50.2 47.5 41.3 34.3 42.3 107.6 179.4 494.1 623.5 599.6 467.9																								Diurnal Maximum		
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - May 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	557	74.87	74.87
6 - 15	90	12.10	86.96
16 - 25	23	3.09	90.05
26 - 80	41	5.51	95.56
> 81.0	33	4.44	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	10	19	57	82	136	51	3	5	6	3	11	18	39	47	40	30	557
6 - 15	8	1	1	1	39	7	1	0	3	5	1	2	8	6	3	4	90
16 - 25	3	0	0	2	8	3	1	0	0	4	1	0	0	0	0	1	23
26 - 80	0	0	2	6	17	2	0	0	2	1	6	1	0	0	1	3	41
> 81.0	2	0	2	2	18	2	0	0	4	1	2	0	0	0	0	0	33
Totals	23	20	62	93	218	65	5	5	15	14	21	21	47	53	44	38	744

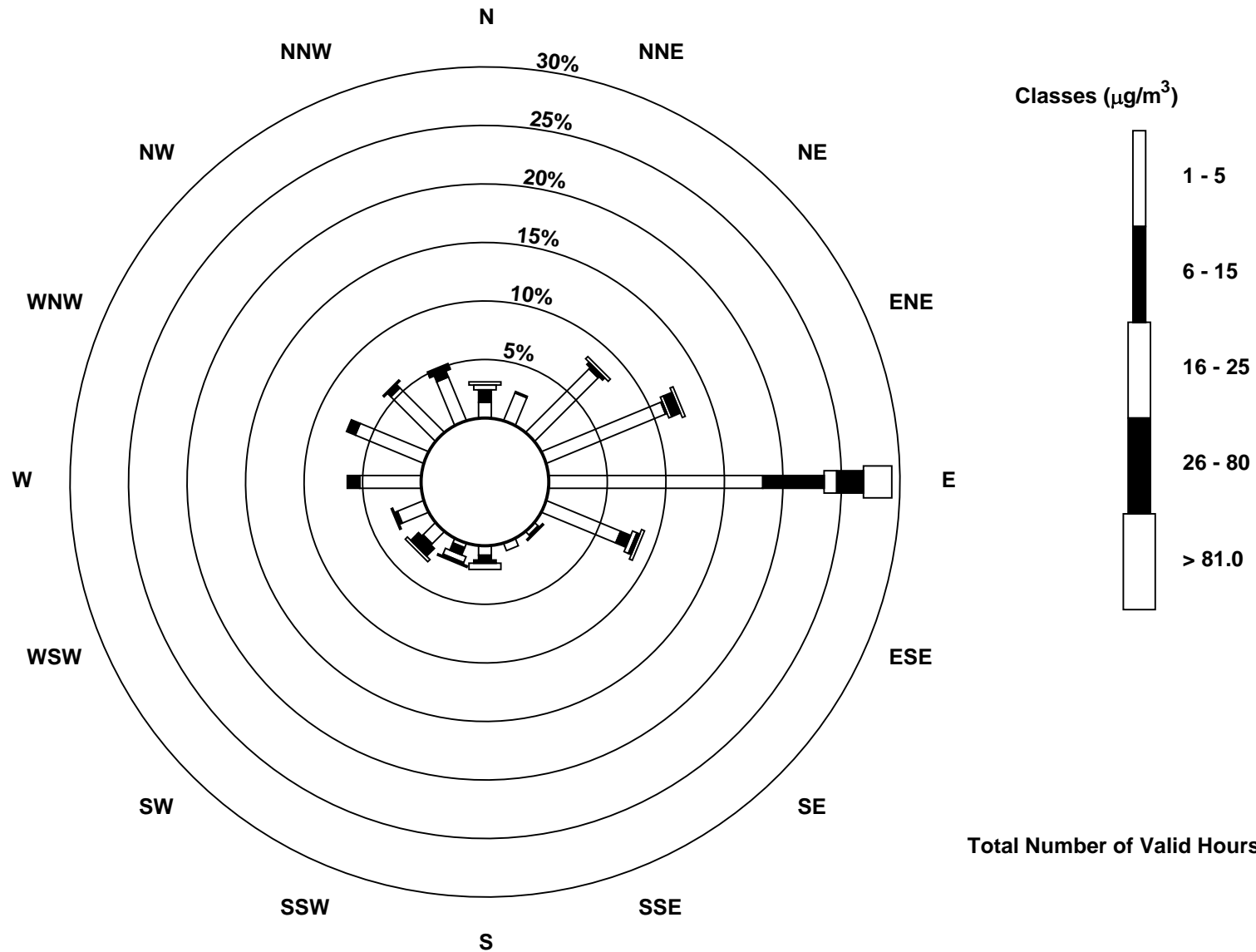
Total Number of Valid Hours: 744

Total Number of Hours: 744



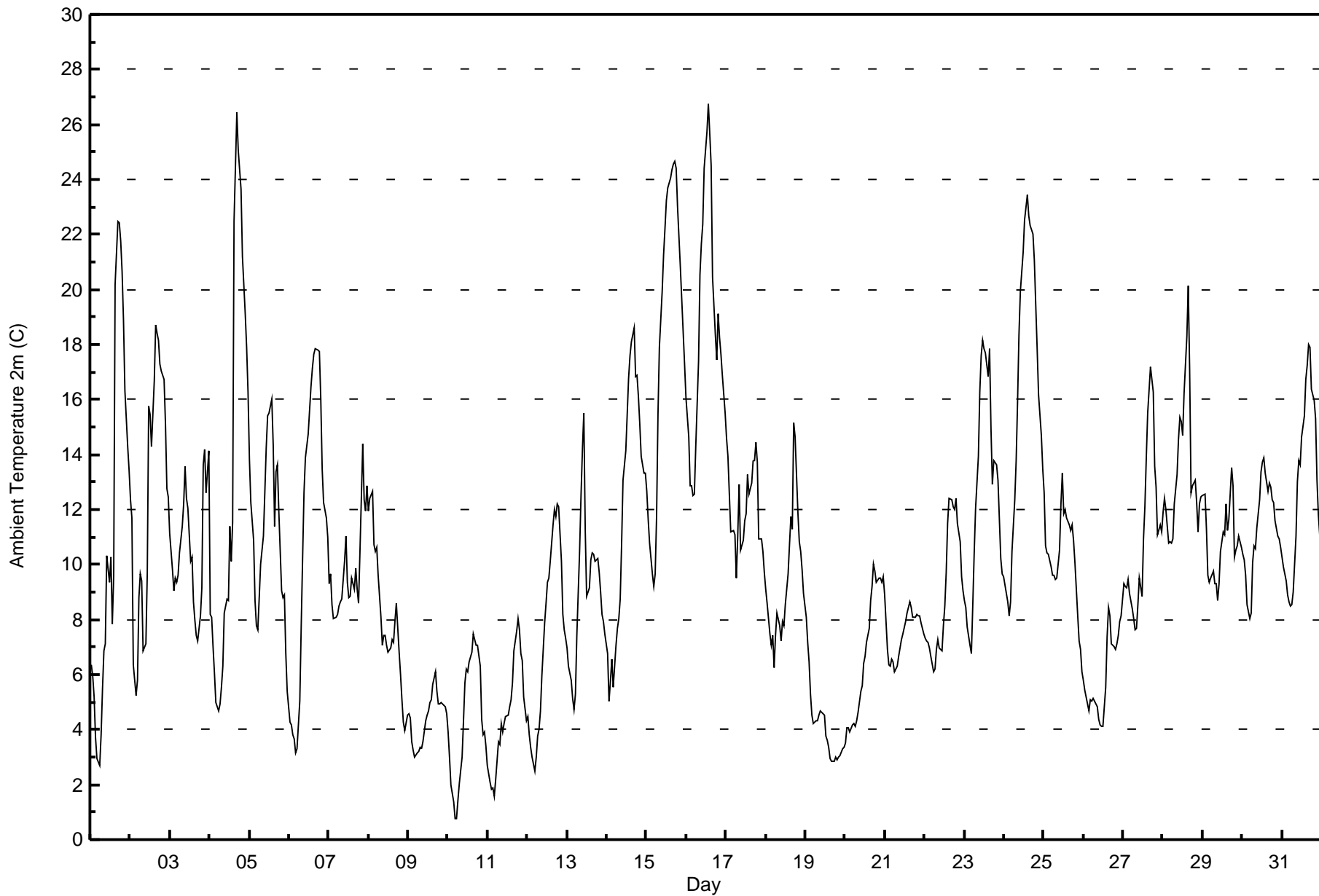
Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan (AMS 8)





Maximum Value: 26.8 C on May 16 14:00		Maximum Daily Average: 18.7 C on May 16		Hours in Service: 744																																												
Minimum Value: 0.8 C on May 10 05:00		Minimum Daily Average: 4.2 C on May 19		Hours of Data: 744																																												
Maximum Diurnal Average: 13.6 C at hour 17		Minimum Diurnal Average: 6.7 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 10.33 C		Percentiles: P ₁ = 2.0 P ₁₀ = 4.3 Q ₁ = 6.9 Median = 9.6 Q ₃ = 12.9 P ₉₀ = 17.3 P ₉₉ = 24.5		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-May	6.4	5.9	5.2	3.7	2.9	2.7	3.8	5.5	6.9	7.1	10.3	9.3	10.3	7.9	9.6	20.2	22.5	22.4	21.8	20.6	18.9	16.3	14.3	13.4	11.2	22.5																						
2-May	12.4	11.7	6.4	5.2	5.8	8.8	9.6	9.4	6.9	7.1	9.7	15.8	15.5	14.3	16.7	18.7	18.4	18.2	17.3	17.0	16.7	15.1	12.7	12.5	12.6	18.7																						
3-May	11.2	9.8	9.1	9.5	9.4	9.6	10.4	11.4	12.2	13.6	12.4	12.1	10.1	10.3	8.6	8.0	7.4	7.2	8.1	9.2	13.6	14.2	12.6	14.2	10.6	14.2																						
4-May	8.2	8.1	7.0	6.1	5.0	4.7	5.0	5.6	6.3	8.2	8.8	8.7	11.4	10.1	11.6	22.5	26.4	25.1	24.4	23.6	21.2	19.1	17.9	16.3	13.0	26.4																						
5-May	13.8	12.3	10.9	8.7	7.8	7.6	8.8	10.0	11.1	12.6	14.3	15.4	15.5	16.0	14.3	11.4	13.4	13.7	11.9	9.0	8.8	8.9	6.8	5.4	11.2	16.0																						
6-May	4.3	4.2	3.8	3.7	3.1	3.3	5.0	7.7	10.2	12.6	13.9	14.8	15.6	16.5	17.1	17.6	17.8	17.8	17.7	16.0	13.5	12.3	11.7	11.0	11.3	17.8																						
7-May	9.3	9.6	8.5	8.1	8.1	8.2	8.5	8.6	8.7	10.1	11.0	9.4	8.8	8.8	9.5	9.1	9.9	9.1	8.6	10.5	14.4	12.3	12.0	12.9	9.8	14.4																						
8-May	11.9	12.4	12.7	10.7	10.5	10.6	9.6	8.1	7.1	7.4	7.4	7.1	6.8	7.0	7.3	7.2	7.9	8.6	6.8	6.0	5.1	4.3	4.0	4.5	8.0	12.7																						
9-May	4.6	4.4	3.5	3.3	3.0	3.1	3.2	3.4	3.3	3.6	4.3	4.5	4.7	5.0	5.1	5.6	6.1	5.4	4.9	4.9	5.0	4.9	4.8	4.6	4.4	6.1																						
10-May	3.9	3.0	2.0	1.4	0.8	0.8	1.4	2.1	3.0	4.3	5.7	6.2	6.1	6.5	6.8	7.5	7.3	7.1	7.1	6.3	4.4	3.8	3.9	3.4	4.4	7.5																						
11-May	2.7	2.1	1.8	1.9	1.6	2.2	3.5	3.4	4.2	3.9	4.2	4.5	4.5	4.8	5.1	5.7	6.9	7.6	8.0	7.6	6.8	6.5	5.2	4.3	4.5	8.0																						
12-May	4.5	3.8	3.3	3.0	2.5	3.0	3.7	4.0	4.7	5.9	7.9	8.6	9.3	9.5	10.1	11.4	12.0	11.7	12.2	12.1	10.1	8.2	7.6	7.3	7.4	12.2																						
13-May	7.0	6.3	5.8	5.2	4.7	5.3	7.4	10.5	12.5	14.2	15.5	11.3	8.8	9.1	10.2	10.4	10.4	10.1	10.2	9.7	9.0	8.2	7.9	7.5	9.1	15.5																						
14-May	6.8	5.0	5.8	6.6	5.5	7.1	7.7	8.0	8.7	10.7	13.1	14.2	15.5	16.8	17.6	18.1	18.6	16.8	16.9	16.1	15.1	13.9	13.3	13.3	12.1	18.6																						
15-May	12.6	11.6	10.8	9.7	9.2	9.7	11.7	15.5	17.9	19.9	21.3	22.2	23.2	23.7	24.0	24.3	24.6	24.7	24.4	23.0	20.8	19.6	18.4	17.3	18.3	24.7																						
16-May	16.0	14.6	12.9	12.9	12.5	12.6	14.3	17.4	20.6	21.7	22.4	24.4	25.7	26.8	25.7	24.5	20.4	18.4	17.4	19.1	18.3	17.7	16.9	15.5	18.7	26.8																						
17-May	14.6	13.9	12.5	11.2	11.2	11.1	9.5	11.0	12.9	10.5	10.9	11.6	11.9	13.3	12.5	13.0	13.8	13.8	14.4	13.8	10.9	10.9	10.5	9.7	12.1	14.6																						
18-May	9.1	8.6	7.5	7.1	7.4	6.2	7.4	8.2	7.8	7.2	7.9	7.8	8.6	9.6	10.7	11.8	11.3	15.1	14.6	11.9	10.8	10.4	9.8	8.9	9.4	15.1																						
19-May	8.1	7.2	6.4	5.3	4.5	4.2	4.3	4.3	4.5	4.7	4.6	4.5	3.8	3.6	3.4	3.0	2.9	2.8	3.0	2.9	3.0	3.0	3.3	3.4	4.2	8.1																						
20-May	3.5	4.0	4.1	3.9	4.2	4.2	4.1	4.3	4.6	5.4	5.6	6.4	6.6	7.2	7.7	8.7	9.2	10.0	9.8	9.4	9.5	9.5	9.4	9.5	6.7	10.0																						
21-May	8.9	6.9	6.3	6.3	6.6	6.4	6.1	6.3	6.6	7.0	7.3	7.5	8.0	8.2	8.5	8.6	8.5	8.1	8.1	8.2	8.1	8.1	7.9	7.5	7.5	8.9																						
22-May	7.3	7.2	7.2	6.9	6.6	6.1	6.2	6.9	7.3	7.0	6.9	7.8	8.5	9.7	11.5	12.4	12.4	12.1	12.0	12.4	11.5	10.8	9.5	9.1	9.0	12.4																						
23-May	8.7	8.5	7.7	7.1	6.7	8.5	10.4	12.1	13.9	16.3	17.6	18.1	17.8	17.7	16.9	17.8	14.9	12.9	13.8	13.6	13.1	11.6	10.2	9.7	12.7	18.1																						
24-May	9.6	8.9	8.6	8.1	8.7	10.5	12.4	13.8	15.9	18.4	20.0	21.4	22.5	23.0	23.4	22.7	22.3	22.0	21.1	19.4	17.8	16.2	14.7	13.5	16.4	23.4																						
25-May	12.6	10.7	10.4	10.4	9.9	9.6	9.6	9.4	9.5	10.5	12.2	13.3	11.9	12.0	11.7	11.4	11.2	11.4	10.9	10.1	8.1	7.2	6.9	6.1	10.3	13.3																						
26-May	5.8	5.5	4.9	4.7	5.1	5.0	5.1	4.9	4.8	4.4	4.2	4.1	4.1	5.5	7.4	8.4	8.1	7.1	7.0	6.9	7.1	7.4	7.9	8.1	6.0	8.4																						
27-May	9.3	9.2	9.1	9.5	9.0	8.4	8.0	7.6	7.7	8.5	9.5	8.8	10.9	12.1	13.9	15.5	17.2	16.7	16.3	13.6	12.8	11.1	11.5	11.2	11.1	17.2																						
28-May	11.9	12.4	12.0	10.8	10.8	10.8	11.0	12.2	13.3	14.5	15.3	15.2	14.7	16.2	18.3	20.2	17.0	12.6	12.9	13.1	12.2	11.2	12.2	12.5	13.5	20.2																						
29-May	12.5	12.6	11.3	9.6	9.4	9.5	9.7	9.3	9.3	8.7	9.3	10.5	11.2	11.1	12.2	11.2	11.6	13.5	12.9	10.3	10.5	10.7	11.0	10.6	10.8	13.5																						
30-May	10.4	10.2	9.6	8.5	8.0	8.3	10.1	10.7	10.6	11.3	12.4	13.4	13.7	13.9	13.3	12.7	13.0	12.8	12.3	12.3	11.6	11.0	10.9	10.7	11.3	13.9																						
31-May	10.3	9.9	9.4	8.9	8.6	8.5	8.6	9.0	11.0	13.0	13.8	13.6	14.6	15.4	16.7	17.2	18.0	17.9	16.4	16.0	15.3	13.0	11.8	11.0	12.8	18.0																						
																								9.0	8.4	7.6	7.0	6.7	7.0	7.6	8.4	9.2	10.0	11.0	11.4	11.6	12.0	12.5	13.4	13.6	13.3	13.0	12.4	11.8	10.9	10.2	9.8	Diurnal Average
																								16.0	14.6	12.9	12.9	12.5	12.6	14.3	17.4	20.6	21.7	22.4	24.4	25.7	26.8	25.7	24.5	26.4	25.1	24.4	23.6	21.2	19.6	18.4	17.3	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	393	52.82	52.82
10 - 20	311	41.80	94.62
> 20	40	5.38	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

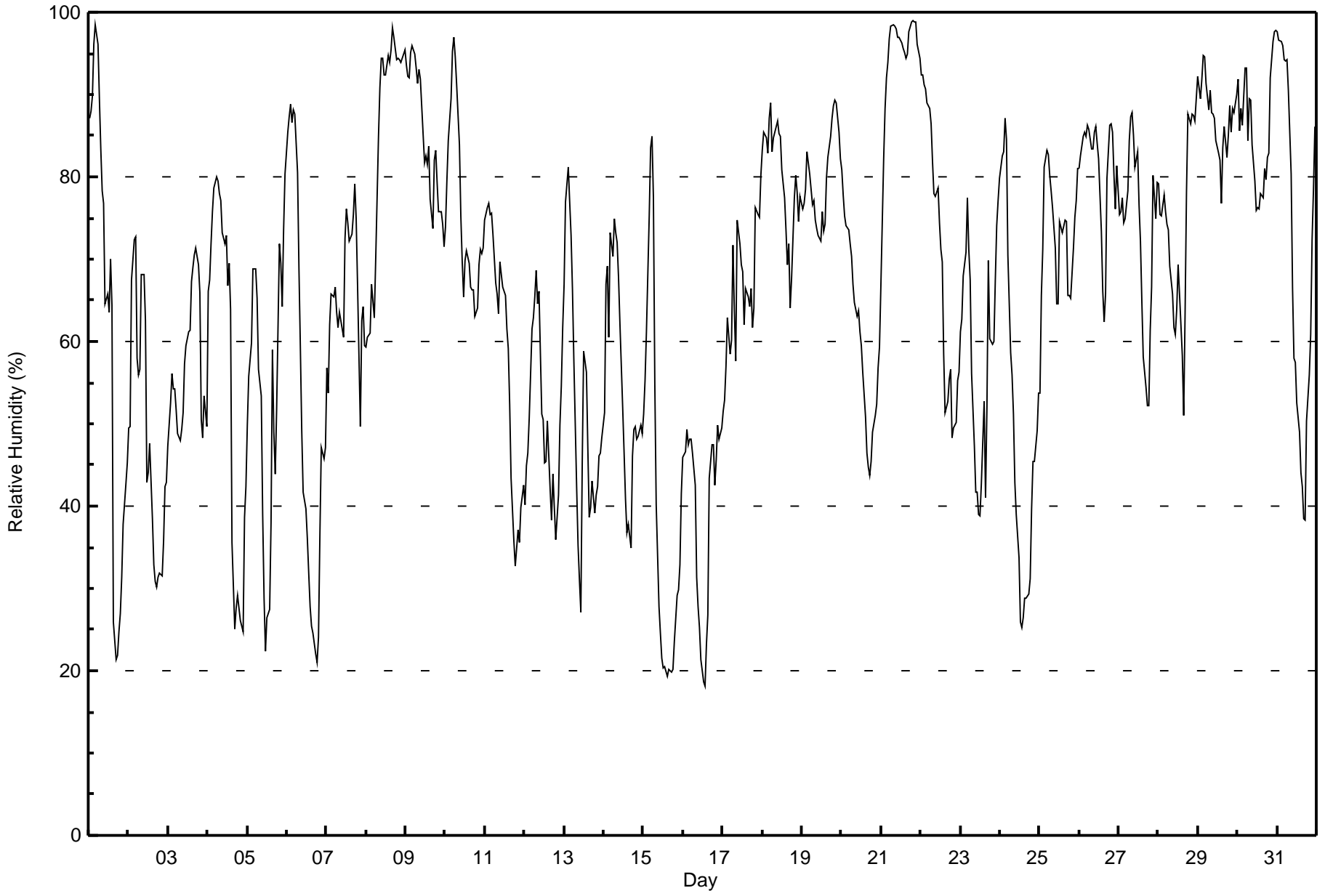
Fort Chipewyan - May 2016

Maximum Value: 99 % on May 21 20:00																			Maximum Daily Average: 94.4 % on May 21						Hours in Service: 744																								
Minimum Value: 18 % on May 16 14:00																			Minimum Daily Average: 39.2 % on May 16						Hours of Data: 744																								
Maximum Diurnal Average: 78.8 % at hour 5																			Minimum Diurnal Average: 55.0 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 65.8 %																			Percentiles: P ₁ = 20 P ₁₀ = 38 Q ₁ = 50 Median = 69 Q ₃ = 82 P ₉₀ = 91 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-May	87	88	90	96	98	96	89	83	78	77	65	66	64	70	64	26	21	22	25	27	31	38	43	45	62.1	98																							
2-May	50	50	67	72	73	58	56	57	68	68	63	43	44	48	39	33	31	30	31	32	31	36	42	43	48.5	73																							
3-May	47	53	56	54	54	52	49	48	49	51	57	60	61	61	67	69	71	71	69	66	51	48	53	50	57.0	71																							
4-May	66	67	72	76	79	80	80	78	77	73	72	73	67	70	64	36	25	28	29	28	26	25	39	42	57.1	80																							
5-May	50	56	60	69	69	69	65	57	53	39	29	22	26	27	38	59	49	44	52	72	70	64	74	80	53.8	80																							
6-May	85	87	89	87	88	88	81	69	59	49	42	40	36	32	28	25	25	22	21	24	36	47	46	47	52.2	89																							
7-May	57	54	62	66	65	67	63	62	64	62	61	73	76	74	72	73	75	79	75	67	50	62	64	59	65.9	79																							
8-May	59	61	61	67	65	63	70	85	91	94	94	92	92	95	94	95	98	97	94	94	94	94	94	96	85.0	98																							
9-May	94	92	92	95	96	95	93	91	93	92	85	82	83	81	84	77	74	82	83	79	76	76	74	72	85.0	96																							
10-May	74	79	84	89	95	97	95	91	84	75	70	65	70	71	70	67	66	66	63	64	69	71	71	71	75.8	97																							
11-May	75	76	77	75	76	73	67	66	63	70	68	67	66	62	59	52	43	36	33	35	37	36	40	42	58.1	77																							
12-May	40	45	47	51	61	63	65	69	65	66	51	50	45	46	50	42	38	44	40	36	41	50	55	62	50.9	69																							
13-May	67	77	81	77	73	66	58	42	35	31	27	45	59	56	47	39	40	43	39	41	42	46	46	48	51.1	81																							
14-May	51	67	69	61	73	70	75	73	72	68	62	52	46	41	37	38	35	46	49	50	48	49	50	49	55.5	75																							
15-May	51	55	61	75	83	85	77	55	40	28	25	22	20	21	19	20	20	20	20	24	29	30	33	42	39.8	85																							
16-May	46	47	49	47	48	48	46	43	31	28	25	21	19	18	23	27	43	47	47	43	46	50	48	49	39.2	50																							
17-May	51	53	57	63	58	60	72	64	58	75	72	69	68	62	66	65	64	66	62	64	76	75	75	80	65.7	80																							
18-May	83	85	85	83	87	89	83	85	86	87	85	85	81	78	74	69	72	64	68	78	80	78	75	78	79.8	89																							
19-May	76	77	79	83	82	80	77	77	75	74	73	72	76	73	74	80	82	85	87	89	89	89	85	82	79.8	89																							
20-May	81	78	75	74	74	72	70	67	65	63	64	61	60	56	51	46	45	44	45	49	51	52	57	59	60.8	81																							
21-May	67	82	88	92	94	97	98	99	98	98	97	97	96	96	95	94	95	98	99	99	99	99	96	94	94.4	99																							
22-May	92	92	91	91	89	88	86	82	78	78	79	74	71	70	58	51	53	55	57	48	49	50	55	56	70.6	92																							
23-May	61	63	68	71	77	71	67	56	47	42	42	39	39	43	53	41	52	70	60	60	60	68	74	77	58.4	77																							
24-May	80	83	83	87	85	70	59	56	51	43	39	34	26	25	26	29	29	29	31	40	45	45	49	54	49.9	87																							
25-May	54	66	71	81	83	83	80	78	76	71	65	64	75	74	73	75	75	66	66	65	71	75	77	81	72.7	83																							
26-May	81	82	85	85	85	86	86	83	83	85	86	84	82	73	66	62	66	80	86	86	85	80	76	81	80.8	86																							
27-May	76	76	77	74	75	78	84	87	88	85	81	83	77	72	65	58	54	52	52	61	67	80	75	79	73.3	88																							
28-May	79	76	75	78	76	74	74	69	66	62	61	64	69	66	58	51	63	78	88	86	88	87	87	89	73.5	89																							
29-May	92	89	92	95	95	91	88	90	88	88	87	84	83	82	77	84	86	82	85	89	85	88	88	90	87.4	95																							
30-May	92	86	88	86	93	93	84	90	89	84	80	76	76	76	78	78	81	80	82	83	92	96	98	98	85.8	98																							
31-May	98	97	96	96	94	94	94	90	80	66	58	57	53	49	44	42	38	38	50	56	61	72	78	86	70.4	98																							
																								69.7	72.2	75.1	77.3	78.8	77.3	75.2	72.3	69.4	66.8	63.3	61.9	61.5	60.2	58.5	55.0	55.2	56.9	57.7	59.1	60.6	63.2	65.1	67.2	Diurnal Average	
																								98	97	96	96	98	97	98	99	98	98	97	97	96	96	95	95	98	98	99	99	99	99	98	98	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Fort Chipewyan - May 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	4	0.54	0.54
20 - 40	89	11.96	12.50
40 - 60	170	22.85	35.35
60 - 80	273	36.69	72.04
80 - 100	208	27.96	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

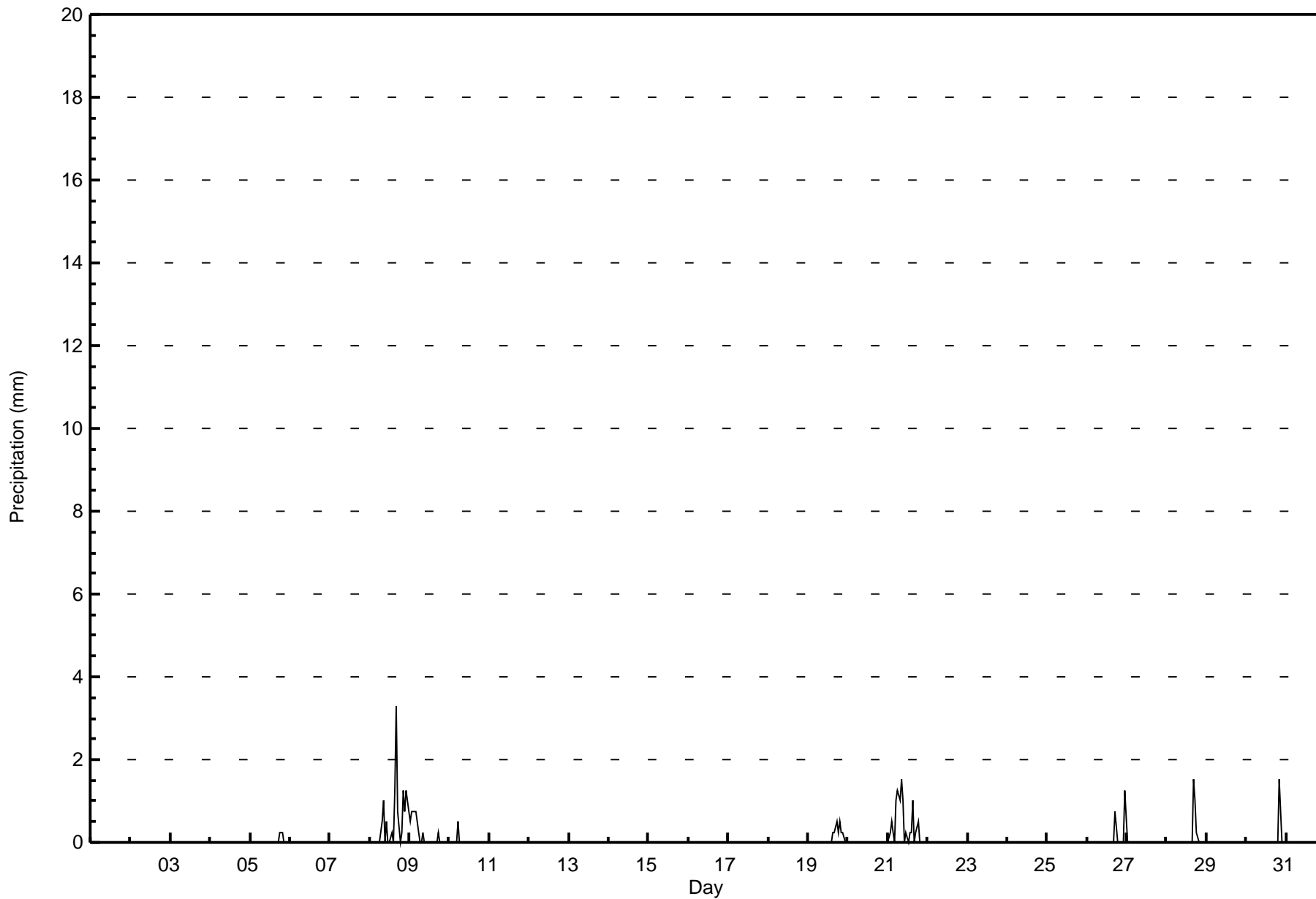
Precipitation (PC) - mm
Fort Chipewyan - May 2016

Maximum Value: 3.3 mm on May 8 17:00 Maximum Daily Total: 11.9 mm on May 8		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																																														
Minimum Value: 0.0 mm on May 1 01:00 Maximum Diurnal Total: 5.1 mm at hour 17 Monthly Total: 35.56 mm		Minimum Daily Total: 0.0 mm on May 1 Minimum Diurnal Total: 0.0 mm at hour 13 Percentiles: $P_1 = 0.0$ $P_{10} = 0.0$ $Q_1 = 0.0$ Median = 0.0 $Q_3 = 0.0$ $P_{90} = 0.0$ $P_{99} = 1.3$																																														
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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.5																					
6-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.5	0.0	0.0	0.3	0.0	1.3	3.3	0.8	0.0	0.3	1.3	0.8	1.3	0.8	11.9	3.3																						
9-May	0.5	0.8	0.8	0.8	0.8	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.8																						
10-May	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5																						
11-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.5	0.3	0.5	0.3	0.3	0.0	0.0	2.3	0.5																						
20-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.3	0.5	0.3	0.0	1.0	1.3	1.0	1.5	1.0	0.0	0.3	0.0	0.3	0.3	1.0	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.0	9.4	1.5																						
22-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	1.3	2.0	1.3																						
27-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	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	1.0	0.3	0.0	0.0	0.0	0.0	0.0	2.8	1.5																						
29-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.5	1.5	0.0																					
31-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	0.0																					
																								0.5	1.0	1.3	1.0	0.8	1.8	1.3	1.5	2.8	1.0	0.5	0.3	0.0	0.5	0.3	2.5	5.1	3.6	1.3	1.0	3.0	1.3	1.3	2.0	Diurnal Average
																								0.5	0.8	0.8	0.8	0.8	1.0	1.3	1.0	1.5	1.0	0.5	0.3	0.0	0.3	0.3	1.3	3.3	1.0	0.5	0.5	1.5	0.8	1.3	1.3	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - May 2016

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	713	95.83	95.83
0.4 - 0.5	8	1.08	96.91
0.6 - 0.7	0	0.00	96.91
0.8 - 1.4	19	2.55	99.46
1.5 - 10	4	0.54	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

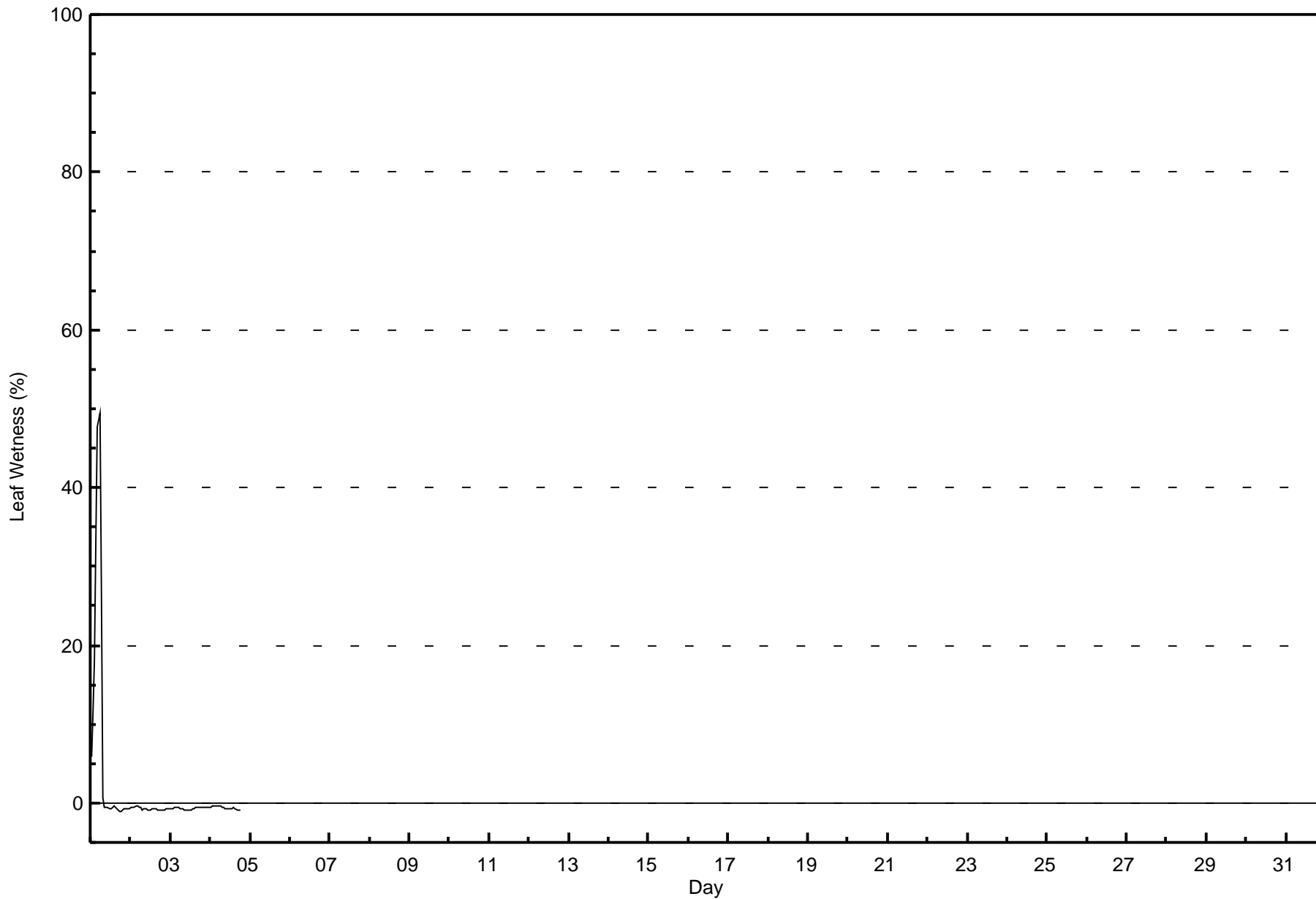
Fort Chipewyan - May 2016

Maximum Value: 49 % on May 1 06:00		Maximum Daily Average: 7.5 % on May 1		Hours in Service: 744																							
Minimum Value: -1 % on May 1 18:00		Minimum Daily Average: -0.7 % on May 2		Hours of Data: 91																							
Maximum Diurnal Average: 12.0 % at hour 6		Minimum Diurnal Average: -0.9 % at hour 18		Hours of Missing Data: 653																							
Monthly Average: 1.5 %		Percentiles: P ₁ = -1 P ₁₀ = -1 Q ₁ = -1 Median = -1 Q ₃ = -1 P ₉₀ = -1 P ₉₉ = 49		Hours of Calibration: 0																							
				Percent Operational Time: 12.2																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	6	11	18	33	48	49	26	1	0	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	7.5	49	
2-May	-1	-1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.7	0
3-May	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-0.7	0	
4-May	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	AF	AF	AF	AF	AF	-0.6	0	
5-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
6-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
7-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
8-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
9-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
10-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
11-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
22-May	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-May	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-May	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-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
26-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
27-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
28-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
29-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
30-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
31-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
		1.0	2.5	4.2	7.9	11.6	12.0	6.1	-0.4	-0.7	-0.7	-0.8	-0.8	-0.8	-0.7	-0.6	-0.7	-0.9	-0.9	-0.8	-0.7	-0.7	-0.7	-0.7	-0.6	Diurnal Average	
		6	11	18	33	48	49	26	1	0	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	0	-1	-1	-1	Diurnal Maximum	
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Fort Chipewyan - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Fort Chipewyan - May 2016

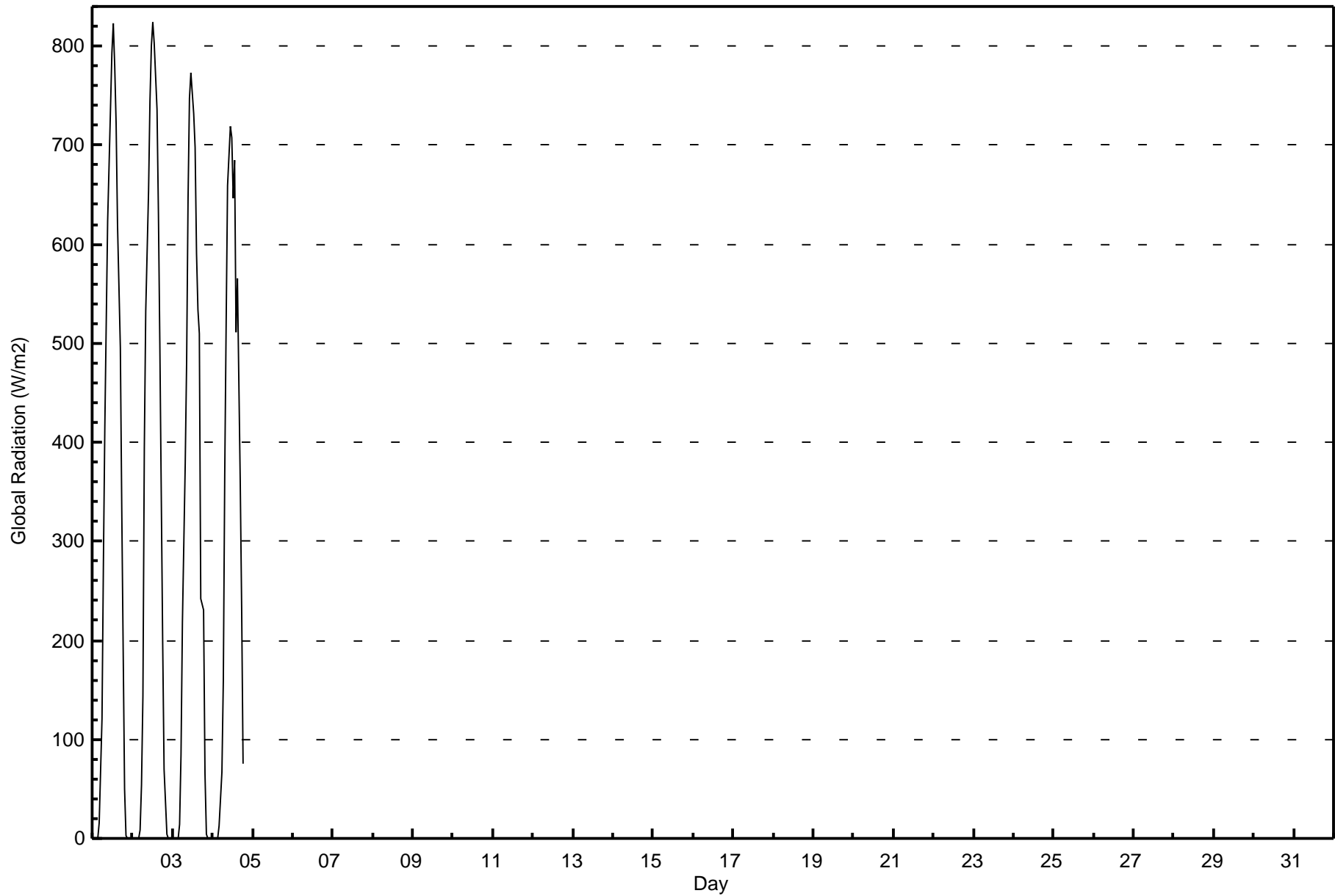
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	0	0.00	0.00
0.6 - 0.7	1	12.50	12.50
0.8 - 1.4	0	0.00	12.50
1.5 - 10	1	12.50	25.00
> 10	6	75.00	100.00

Total Number of Valid Hours: 8

Total Number of Hours: 744



Maximum Value: 825 W/m2 on May 2 13:00																			Maximum Daily Average: 330.8 W/m2 on May 4						Hours in Service: 744	
Minimum Value: 0 W/m2 on May 1 01:00																			Minimum Daily Average: 289.7 W/m2 on May 3						Hours of Data: 91	
Maximum Diurnal Average: 768.5 W/m2 at hour 12																			Minimum Diurnal Average: 0.0 W/m2 at hour 3						Hours of Missing Data: 653	
Monthly Average: 309.3 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 230 Q ₃ = 623 P ₉₀ = 744 P ₉₉ = 825						Hours of Calibration: 0	
																									Percent Operational Time: 12.2	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	0	0	0	16	120	279	415	522	624	679	793	822	780	722	619	496	333	190	50	3	0	0	0	311.0	822
2-May	0	0	0	0	9	54	143	394	533	654	745	800	825	802	736	630	498	349	199	70	5	0	0	0	310.3	825
3-May	0	0	0	0	15	83	218	379	483	647	748	773	732	698	591	534	510	242	230	66	5	0	0	0	289.7	773
4-May	0	0	0	0	14	67	160	367	519	659	718	708	646	685	510	566	358	232	76	AF	AF	AF	AF	AF	330.8	718
5-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
6-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
7-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
8-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
9-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
10-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
11-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	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-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
22-May	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-May	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-May	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-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
26-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
27-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
28-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
29-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
30-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
31-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
																			0.0 0.0 0.0 0.1 13.1 81.2 200.2 388.9 514.3 645.8 722.8 768.5 756.2 741.5 640.0 587.0 465.6 289.0 173.8 62.0 4.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 16 120 279 415 533 659 748 800 825 802 736 630 510 349 230 70 5 0 0 0						Diurnal Maximum	
AF - Analyzer Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - May 2016

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	32	35.16	35.16
21 - 100	7	7.69	42.86
101 - 300	10	10.99	53.85
301 - 600	18	19.78	73.63
601 - 900	24	26.37	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 91

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort Chipewyan - May 2016

Maximum Speed: 39 km/h on May 8 03:00	Maximum Daily Speed Average: 22.5 km/h on May 27	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 29 18:00	Minimum Daily Speed Average: 0.9 km/h on May 4	Hours of Data: 744
Maximum Diurnal Speed Average: 9.4 km/h at hour 15	Minimum Diurnal Speed Average: 4.9 km/h at hour 22	Hours of Missing Data: 0
Monthly Average Velocity: 6.7 km/h 67.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 13 Q ₃ = 20 P ₉₀ = 24 P ₉₉ = 33	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SSE4	SSW4	SW3	E5	E7	E8	E8	E9	E11	E13	E14	E12	E12	E11	ESE7	W17	W17WSW15WSW11WSW10	W9	NW9	NW5	NW9					
2-May	NNW8	ENE8	E10	E9	E9	ENE6	E3	E7	ESE12	ESE12	ESE13	E19	E23	E24	E26	ENE25	ENE31	ENE33	ENE32	ENE30	E34	E36	E33	E30		
3-May	E30	E31	E30	E33	E33	E34	E32	E31	E27	E19	E16	ESE15	ESE11	E12	ESE12	ESE15	ESE14	ESE15	ESE13	E14	ENE13	E24	E25	E19		
4-May	E16	E18	E16	E9	E13	ESE10	ESE12	ESE18	E20	ESE18	ESE15	E9	E10	E11	E7	W17	W25	W24	W18	W20	W26	W24	NW21	NW20		
5-May	NW23	NW18W	NW12	W11	W10	W10W	NW12	W14	W12WSW18	W23W	NW24	NW21W	NW20	NW16W	WSW12	W12	W12	W16W	NW23W	NW14	NW8W	NW12W	NW14			
6-May	W12W	NW12W	NW11W	NW11	NW9W	NW11W	NW10	W	W11	W13W	NW13	W14W	WSW17	WSW20	W17W	WSW15	W15W	WSW13	W8	SW4	ESE5	ESE7	SSE17	SSE16		
7-May	ESE15	ESE20	E21	E21	E24	E24	E24	E25	E19	E15	E11	E13	E12	E10	E11	E12	E10	ESE10	ESE9	E8	NE8	ENE7	ENE13	ENE19		
8-May	ENE28	E39	E39	ENE18	NE16	ENE21	NW5	NNW11	N10	NNW7	N12	NNW11	NNW10	W6	WNW3	WNW3	NW11	NNW19	NNW24	NW19	NW21	NW19	NW18W	NW18		
9-May	NW20	NW21	NW24W	NW17W	NW17W	NW21W	NW25W	NW24W	NW24W	NW26W	NW27W	NW28W	NW28W	NW26	NW25	NW24	NW20	NW16	NW12	NW11	NW14W	NW12	NW14			
10-May	NNW10	NNW9	NNW11	NNW10	NW6	NW7	NNW7	NNW7	NNW7	NNW9	NNW11	N9	E7	SE11	E15	E13	E16	E14	E10	E12	ENE15	ENE12	E19	ENE16		
11-May	ENE10	ENE9	NE10	NE13	NE14	NE13	ENE17	ENE18	E20	E24	E22	E21	E20	E18	E23	E28	E26	E24	ENE21	ENE16	ENE12	NE12	NNE10	NNE7		
12-May	NE7	ENE6	ENE7	ENE9	ENE9	E9	E13	E13	E10	ESE11	ESE15	E16	E18	E16	E16	ESE14	ESE11	E10	SSE3	WSW3	W9W	NW10W	NW12W	NW12		
13-May	WNW12W	WNW12W	WNW13W	WNW11W	WNW11	W13W	WNW12W	WNW15	W14W	WNW15	NW13	E25	E31	E32	E32	E32	E31	E25	E22	E20	ENE15	ENE5	E5	E4		
14-May	ESE2	WSW2	ESE2	E4	ESE2	ENE3	E4	ESE7	E8	ESE8	ESE12	ESE14	ESE13	ESE9	ESE10	SE8	S6	ESE11	E9	ESE5	ENE3	E3	S3	SW6		
15-May	W7	W6	WNW6	WNW7	W5	W3	W4	W11	W10	W10	SW13W	SW14W	WSW15W	WSW14	SW17W	WSW18	W14W	WSW14W	WSW10	SW9	SW8	SSW5	SSW8	S17		
16-May	S7	SW9	SW10	SW8	SW9	SW11	SSW5	WSW4	W13W	WSW16	W12	W10	W8	SSW9	SSW7	SSW6	E12	E12	E14	E11	E12	ESE10	E8	E11		
17-May	E11	ENE8	ENE9	E9	E9	E9	E15	E15	E9	ESE11	E19	E22	E24	E22	E21	E18	E15	E11	ENE6	E5	ESE4	ENE1	ESE3	E4		
18-May	ESE4	E10	E11	E7	ESE15	E18	E8	E13	E17	E16	E15	E24	E23	E21	E22	E22	E20	N8	N15	NNW14	NNW15	N15	N13	N11		
19-May	N10	NNE12	N12	N14	NNE14	NNE13	NNE15	NNE13	NNE15	NNE15	NNE15	NE17	ENE21	ENE22	ENE22	NE18	NE17	NE16	NE15	NE17	NE17	NE17	NE19	NE20		
20-May	NE20	ENE22	NE22	NE21	NE21	ENE25	ENE26	ENE26	NE26	NE23	NE20	NE20	NE21	NE20	NE23	NE24	NE28	NE28	NE22	NE20	ENE18	NE13	ENE20	ENE16		
21-May	NNE7	NNW8	N10	NNE7	NE3	W6	WNW7	NW6	NW9	NW7	NW5	NW5	NW5	NNW7	NNW6	NNW2	WSW4	WNW6	W6	WNW7	WNW6	NW6	NNW6	NNW9		
22-May	N11	NNE10	NNE10	NE9	NE10	NE10	NE11	NE15	NE15	E30	E28	E25	E19	ESE20	E26	E30	E25	E23	E16	NE13	NE12	NE15	ENE8	ENE5		
23-May	ESE5	ENE6	E6	ENE6	ESE3	E2	SW2	SW5	WNW7	SSW7	S9	S7	ESE8	E12	E16	E17	E16	E17	E19	E18	ENE14	E16	E16	E15		
24-May	E14	E17	E18	E19	E15	SE9	SSW11	SSW17	SSW20	SW20	SSW23	SW22	SW19	SW17	SSW14	SSW21	S19	S15	S16	S18	S14	S15	S9	NE4		
25-May	NE4	N6	N12	N11	N8	N8	NNW10	NNW12	NNW9	NNW9	N9	ENE8	ESE19	E22	E22	E24	E26	E28	ENE28	ENE29	ENE33	ENE31	ENE31	ENE27		
26-May	ENE29	ENE28	ENE22	NE18	ENE24	ENE28	ENE27	NE24	NE25	NE24	NE20	NE20	NE17	NE16	NE14	NE13	NE12	NE14	NNE8	NNE6	NNE8	NNE7	ENE14	ENE18		
27-May	ENE23	E28	ENE25	ENE23	ENE26	ENE29	ENE30	ENE28	ENE27	ENE29	ENE26	ENE23	ENE22	ENE24	ENE24	ENE22	ENE22	ENE22	NE23	NE24	E21	ENE10	E10	E17	E12	
28-May	E15	ESE20	E22	E21	E21	E19	E15	E21	ENE21	E23	E24	E23	E18	E21	ENE17	ENE21	E14	ESE14	W1	E10	E11	ESE12	E15	E14		
29-May	ENE15	E10	SE6	ESE6	SE4	ESE5	ESE5	E8	E11	E12	E14	E10	E18	E15	E15	E19	E9	E1	E8	E12	ESE3	SW2	WNW8	NW7		
30-May	N9	N10	ENE6	NNE3	N4	NNW4	NE7	E8	ESE11	E17	E15	E19	E19	E23	E22	ENE13	E7	ESE8	ESE6	ENE3	NNE4	WNW7	NNW9	NW10		
31-May	NNW10	NNW11	NW12	NNW13	NNW12	NW10	NW11	NNW11	NNW8	NNW7	NW7	WNW8	W8	WNW9W	WSW13	SW12	SW8	S5	ESE11	ESE16	SSE17	S7	N10	N10		

NE6.9	ENE7.3	ENE7.4	NE7.0	ENE7.1	ENE6.8	ENE5.8	ENE6.4	ENE6.0	E5.7	ENE5.9	E7.3	E8.4	E8.6	E9.4	E8.0	E7.3	ENE7.1	ENE6.7	ENE6.1	NE5.2	NE4.9	NE6.4	NE6.2	Diurnal Average
E30	E39	E39	E33	E33	E34	E32	E31	E27	E30	E28W	NNW28	E31	E32	E32	E32	ENE31	ENE33	ENE32	ENE30	E34	E36	E33	E30	Diurnal Maximum

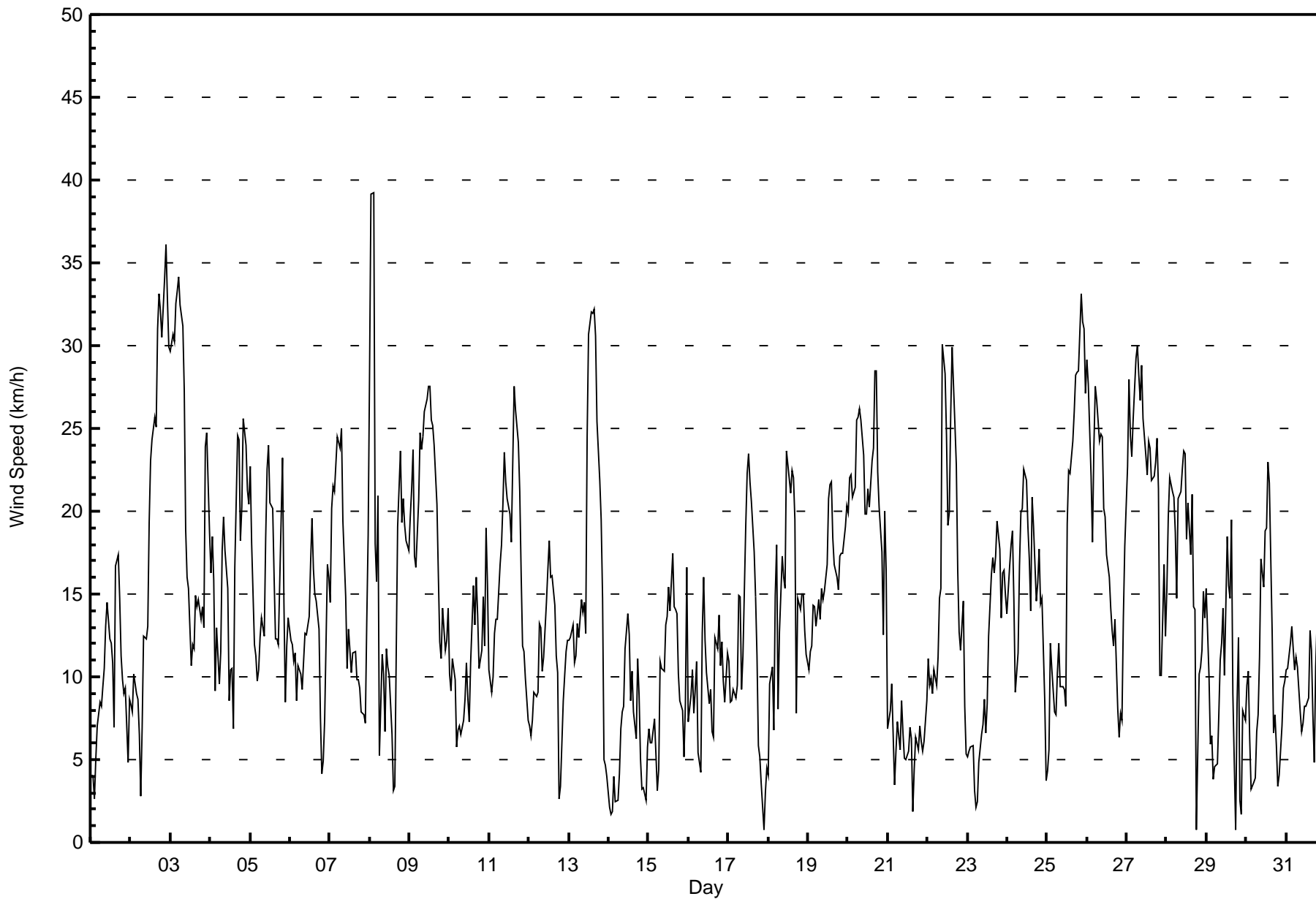
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Chipewyan - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on May 3 22:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 0 km/h on May 14 01:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	1	1	2	1	1	1	2	1	2	2	2	2	3	3	3	6	4	4	2	1	1	1	2	1	6
2-May	3	3	2	1	1	1	0	2	3	2	3	2	2	1	3	4	5	5	5	5	4	3	3	3	5
3-May	3	3	3	3	3	4	3	3	3	4	2	4	3	3	2	3	3	2	3	4	6	11	4	2	11
4-May	3	1	3	2	5	2	3	5	2	2	3	2	2	2	3	8	6	7	4	5	6	6	7	7	8
5-May	6	5	4	2	2	2	3	3	3	5	6	8	7	7	9	7	4	3	5	7	6	2	3	2	9
6-May	3	3	2	2	2	2	2	2	3	4	5	5	5	6	6	6	5	3	2	1	1	2	4	3	6
7-May	2	3	2	2	2	2	2	3	3	2	2	2	2	1	2	1	2	3	5	4	4	3	5	3	5
8-May	4	7	5	9	4	5	3	4	6	3	4	4	4	3	2	1	4	8	9	6	6	5	5	6	9
9-May	6	6	7	4	5	5	6	6	6	6	6	7	8	7	7	7	6	6	4	3	3	3	4	4	8
10-May	4	3	3	3	2	2	2	2	3	3	4	3	2	1	5	2	4	2	2	3	2	1	4	3	5
11-May	1	1	2	2	2	2	3	3	4	2	2	2	2	1	4	2	2	3	3	3	1	1	1	3	4
12-May	2	2	2	1	1	2	1	1	1	2	2	1	2	1	1	2	2	3	2	1	2	1	1	2	3
13-May	2	1	2	1	2	2	3	3	4	5	5	8	3	2	3	4	5	3	4	2	2	3	1	1	8
14-May	0	2	1	1	1	0	1	1	1	2	2	3	2	3	3	3	3	3	1	1	1	1	1	1	3
15-May	1	1	1	1	2	1	2	3	2	3	4	4	4	4	4	4	4	4	2	2	1	2	4	4	4
16-May	3	3	2	2	1	2	2	4	3	4	3	3	3	3	3	4	4	2	2	2	1	2	2	1	4
17-May	1	1	2	2	2	2	4	5	4	4	2	2	2	2	2	2	1	4	2	2	3	1	1	2	5
18-May	1	2	4	1	6	6	2	1	2	4	2	3	3	3	2	2	3	5	5	5	5	5	5	4	6
19-May	4	4	5	5	4	5	5	4	5	5	4	5	5	4	4	4	4	3	3	3	4	3	4	4	5
20-May	4	5	4	4	4	5	4	5	5	5	4	4	4	5	6	5	5	6	5	4	3	3	4	6	6
21-May	3	4	2	2	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	2	1	1	2	2	4
22-May	3	2	2	2	2	2	3	4	5	3	2	3	2	2	4	3	4	2	3	2	2	2	2	1	5
23-May	1	1	1	1	1	1	1	1	2	2	2	2	1	3	1	2	2	2	3	2	3	3	3	2	3
24-May	2	2	2	2	3	2	2	3	4	3	4	4	4	5	5	5	4	3	4	2	2	3	3	2	5
25-May	1	3	3	3	3	3	4	4	3	3	4	6	2	2	2	3	2	3	4	5	6	6	6	5	6
26-May	5	5	4	3	4	5	5	5	4	5	4	5	4	4	3	3	3	3	3	2	2	2	4	3	5
27-May	5	3	3	3	4	4	4	4	3	4	4	4	4	4	5	4	4	4	4	8	3	4	2	2	8
28-May	3	2	2	2	2	3	2	3	3	3	3	2	2	2	2	3	7	10	4	4	5	3	4	3	10
29-May	4	2	3	2	1	2	2	2	2	1	2	2	3	4	7	4	4	1	6	3	1	2	2	2	7
30-May	3	3	1	2	1	1	2	4	3	1	2	2	2	2	2	4	2	1	2	1	2	1	2	2	4
31-May	3	3	3	3	4	3	3	4	3	3	3	3	4	3	4	4	3	2	2	4	5	4	4	4	5
Diurnal Maximum																									
6 7 7 9 6 6 6 6 6 6 6 8 8 7 9 8 7 10 9 8 6 11 7 7																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	66	8.87	8.87
6 - 11	235	31.59	40.46
12 - 19	255	34.27	74.73
20 - 28	155	20.83	95.56
29 - 38	31	4.17	99.73
> 38	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	2	3	6	11	13	1	2	2	3	5	4	4	2	5	2	66
6 - 11	16	10	8	18	52	21	4	0	6	6	9	3	18	20	16	28	235
12 - 19	6	8	27	21	79	27	0	3	7	2	5	13	19	19	12	7	255
20 - 28	0	0	24	36	55	4	0	0	0	3	2	1	6	12	11	1	155
29 - 38	0	0	0	12	19	0	0	0	0	0	0	0	0	0	0	0	31
> 38	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Totals	23	20	62	93	218	65	5	5	15	14	21	21	47	53	44	38	744

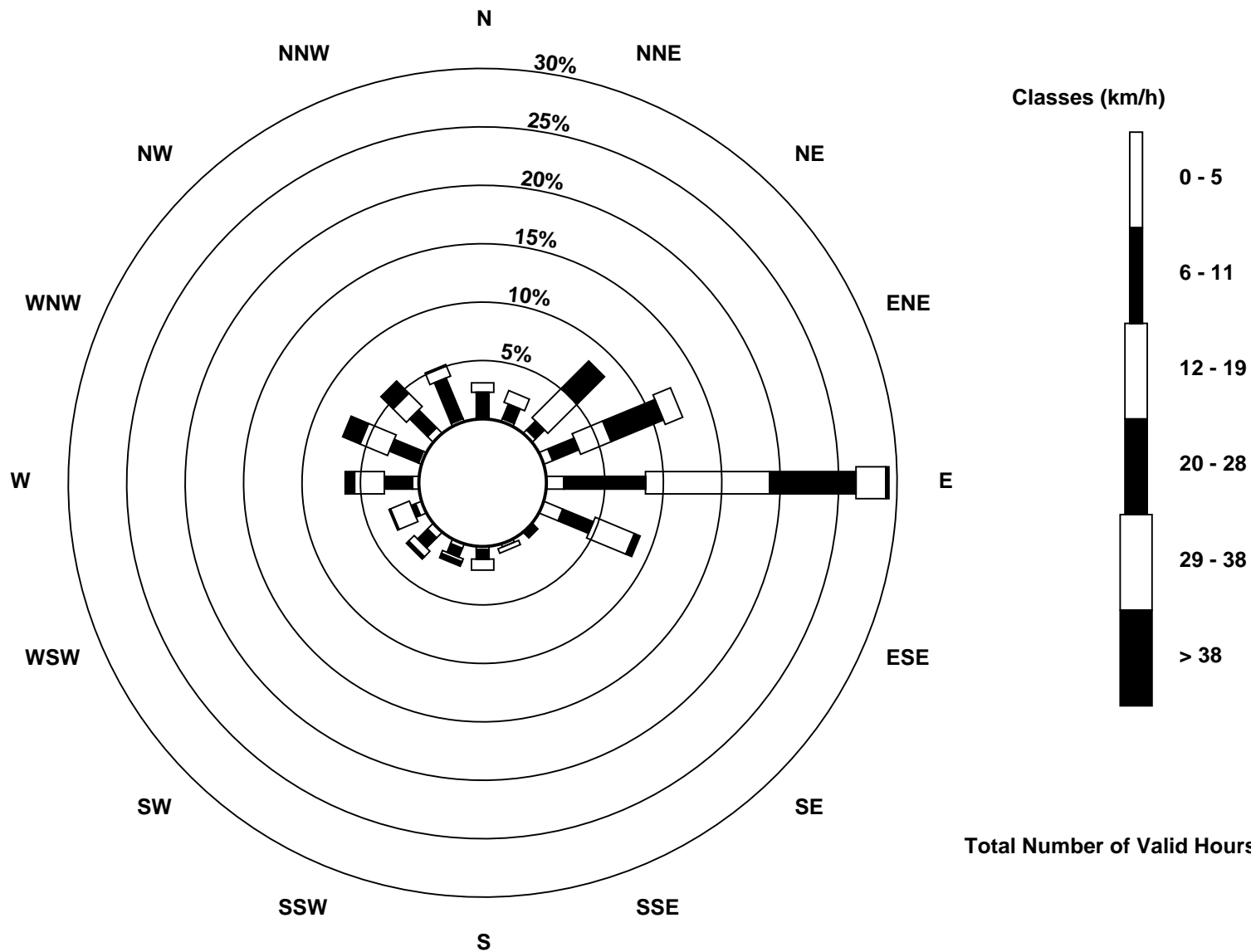
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - May 2016

Direction of Maximum Speed: 85 deg on May 8 03:00 Direction of Maximum Daily Speed Average: 70.3 deg on May 27	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 82 deg on May 29 18:00 Direction of Minimum Daily Speed Average: 0.9 deg on May 4	Percent Operational Time: 100.0
Monthly Average Direction: 323.5 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-May	155	194	216	83	83	81	86	88	90	101	96	98	95	93	113	259	260	257	246	244	264	316	306	309	131.5
2-May	346	65	82	97	92	71	84	91	102	107	102	89	90	90	85	74	68	67	65	75	80	85	86	87	80.8
3-May	89	89	92	90	87	87	88	87	88	94	98	102	105	101	104	109	109	105	104	90	76	83	87	83	91.6
4-May	96	92	93	94	101	105	103	103	101	106	112	101	91	92	90	267	273	279	281	278	272	273	313	323	53.8
5-May	321	315	290	280	273	280	287	277	262	256	272	289	306	297	314	246	270	276	275	284	291	305	282	282	286.1
6-May	281	282	287	289	291	291	291	282	280	277	290	259	251	251	260	257	259	256	272	218	111	114	151	149	261.3
7-May	107	110	98	95	92	94	91	89	96	94	89	99	97	94	92	91	88	103	108	81	45	77	68	66	91.7
8-May	75	81	85	57	52	58	306	348	354	342	349	338	343	268	291	303	317	332	333	325	319	310	307	303	6.0
9-May	311	310	315	300	303	290	295	288	283	286	295	294	299	301	304	307	312	324	326	315	304	296	308	321	301.9
10-May	328	332	338	336	322	320	341	346	337	333	348	4	98	129	101	100	96	90	82	85	68	59	79	78	49.4
11-May	58	58	50	40	46	54	64	70	88	98	94	96	95	100	96	93	89	85	77	65	57	48	13	20	76.6
12-May	52	62	70	77	75	85	92	99	97	110	106	100	98	99	100	102	114	99	163	250	275	288	294	295	92.4
13-May	293	294	291	284	283	281	284	288	281	286	312	87	96	93	89	83	89	83	80	84	78	71	93	90	67.3
14-May	117	238	113	85	103	67	100	104	97	104	113	107	107	114	134	176	107	94	105	71	84	184	232	111.1	
15-May	260	270	282	294	268	262	262	273	267	262	236	250	244	247	232	237	265	255	253	231	222	207	192	170	245.1
16-May	176	221	223	222	220	227	213	237	261	247	271	281	263	205	207	193	100	95	99	84	98	113	84	96	190.0
17-May	89	69	65	81	79	80	92	88	82	102	96	97	95	91	93	87	97	95	71	88	103	63	107	96	89.9
18-May	105	99	83	79	115	90	89	100	98	101	100	97	93	99	95	99	97	5	349	341	340	350	358	357	77.1
19-May	8	12	4	4	13	18	24	20	28	27	27	44	60	68	63	51	50	43	44	48	45	47	50	47	38.5
20-May	55	63	54	51	53	57	59	60	56	55	54	53	43	42	43	44	53	53	51	51	58	40	63	66	53.4
21-May	22	335	355	28	40	262	286	310	322	310	312	310	319	337	341	339	255	285	279	292	300	306	335	340	321.0
22-May	1	15	24	35	42	50	44	40	56	91	95	90	99	105	94	87	86	93	79	56	47	50	61	58	73.3
23-May	102	77	89	75	103	90	220	231	285	213	186	172	120	101	96	90	84	100	90	85	76	87	86	91	97.6
24-May	90	91	98	97	100	131	198	204	209	214	211	216	230	222	211	201	191	182	170	180	185	186	173	46	181.8
25-May	55	8	6	5	356	349	335	341	346	346	4	70	102	96	93	93	93	79	73	65	64	65	67	68	62.0
26-May	70	65	62	56	66	62	57	55	55	52	51	47	42	41	41	36	45	46	17	22	26	22	62	62	53.4
27-May	75	79	76	69	68	70	74	72	71	74	70	69	70	63	60	57	60	52	52	87	69	96	89	94	70.3
28-May	96	109	95	91	89	87	81	82	78	79	83	92	92	88	75	65	85	116	270	79	90	103	86	82	87.4
29-May	76	86	127	112	131	109	106	97	94	97	95	100	95	100	101	92	94	82	89	90	113	234	286	314	94.7
30-May	350	358	60	30	7	338	46	92	108	94	97	96	97	95	91	67	88	120	111	77	14	297	331	326	73.5
31-May	332	334	317	332	336	325	314	333	329	329	319	282	276	288	255	233	233	171	111	118	148	175	351	0	310.3
52.8 58.9 58.6 54.3 62.7 60.5 56.5 60.4 64.8 79.0 75.1 81.1 84.6 88.7 85.1 85.1 81.9 72.9 62.5 64.3 52.3 52.3 53.9 49.6																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

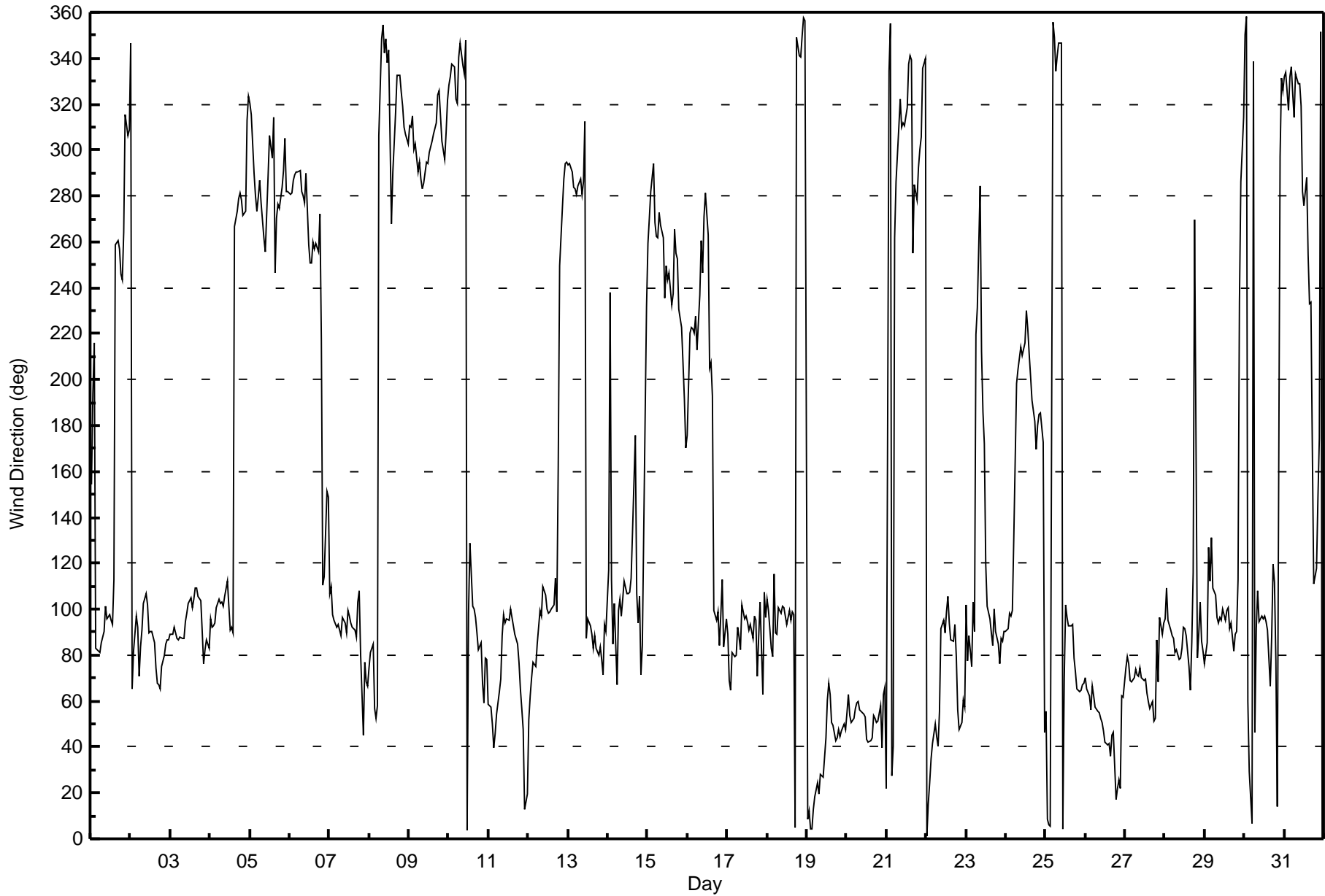
Wind Direction (WD) - deg
Fort Chipewyan - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on May 28 19:00 Minimum Value: 4 deg on May 2 14:00 Percentiles: P ₁ = 4 P ₁₀ = 6 Q ₁ = 9 Median = 13 Q ₃ = 21 P ₉₀ = 32 P ₉₉ = 71		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	41	29	44	19	7	6	8	6	9	10	5	9	12	15	54	34	17	16	12	9	13	17	26	19	54
2-May	20	30	13	8	10	10	19	10	9	8	16	5	4	4	11	10	8	8	8	8	6	6	5	6	30
3-May	5	4	4	5	6	5	6	5	5	9	8	12	14	12	13	8	8	7	10	17	25	16	7	5	25
4-May	8	5	9	13	31	10	13	11	6	9	6	18	15	11	63	27	15	14	14	15	14	14	22	18	63
5-May	18	17	17	12	14	14	13	14	21	19	19	23	26	23	38	31	21	17	18	14	25	27	11	11	38
6-May	12	11	14	12	14	12	13	17	20	27	30	31	23	23	27	26	24	20	24	34	26	23	14	21	34
7-May	9	12	7	5	5	5	5	5	8	7	8	7	7	8	7	6	8	20	34	46	41	39	18	9	46
8-May	9	7	7	32	16	11	68	23	36	28	23	20	23	36	45	23	17	23	23	21	17	17	17	16	68
9-May	16	17	16	15	15	14	15	15	15	14	15	15	16	16	17	17	19	20	22	18	15	15	17	18	22
10-May	20	21	21	21	23	16	24	29	31	30	30	34	51	10	12	9	8	8	12	9	8	7	10	9	51
11-May	8	8	13	10	9	9	10	10	13	5	6	7	7	7	8	6	7	8	8	9	6	7	10	26	26
12-May	10	23	10	6	8	7	5	5	7	8	10	5	6	6	6	9	10	11	59	26	16	9	8	9	59
13-May	10	9	9	9	9	11	14	16	17	24	33	55	7	5	6	9	11	10	10	6	9	74	11	5	74
14-May	20	52	48	11	33	15	18	10	9	10	13	13	18	26	21	41	59	32	10	16	42	8	59	9	59
15-May	9	10	14	8	26	21	21	12	19	26	21	24	20	27	16	20	22	20	18	14	9	27	15	10	27
16-May	31	26	11	11	9	7	21	62	21	18	20	29	45	31	63	61	18	8	11	14	9	17	10	4	63
17-May	6	7	11	15	12	11	7	12	41	14	4	5	4	5	5	5	5	17	18	32	51	76	20	26	76
18-May	23	13	15	8	13	16	19	8	9	9	10	5	5	4	5	5	7	63	24	24	21	24	23	23	63
19-May	25	22	21	22	21	21	20	21	20	20	22	22	11	11	10	12	11	12	11	10	11	11	10	10	25
20-May	10	11	10	11	10	10	10	11	12	13	13	15	13	14	13	14	11	10	10	11	10	19	8	12	19
21-May	56	35	23	42	65	23	13	27	18	23	30	29	27	23	27	79	27	13	16	15	19	18	17	19	79
22-May	18	17	16	13	10	12	12	16	22	7	6	10	7	6	8	8	11	9	15	13	9	8	9	14	22
23-May	18	14	6	14	23	47	57	43	34	39	19	31	14	8	5	5	9	6	6	5	9	6	6	7	57
24-May	8	8	6	6	7	28	13	8	9	9	10	13	16	21	21	22	14	16	10	6	6	5	35	70	70
25-May	52	50	18	20	22	24	24	24	33	29	39	67	7	7	7	6	8	7	9	10	9	10	10	9	67
26-May	9	10	11	11	10	9	11	11	11	11	11	12	12	14	16	16	16	17	30	19	17	21	10	9	30
27-May	10	6	8	9	9	9	8	8	8	8	9	9	11	10	10	14	10	10	10	33	18	20	7	7	33
28-May	10	9	7	6	5	7	9	7	8	8	8	6	5	6	14	9	31	53	91	15	26	19	9	8	91
29-May	10	8	63	28	26	16	28	11	8	7	6	9	8	8	11	7	10	85	73	6	52	67	16	22	85
30-May	20	33	24	72	45	22	27	36	10	6	8	5	5	5	6	20	28	8	29	30	38	11	15	16	72
31-May	19	19	15	19	22	21	19	27	34	55	47	29	30	29	27	34	44	49	6	10	25	59	34	29	59
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Fort Chipewyan - May 2016





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 16, 2016	Last Calibration	April 18, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	14:20
Gas Cert Reference	LL79696	Station temp.	22 Deg C
Cal Gas Concentration	2.35 ppm	Cal Gas Exp Date	2/13/16
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-826	827
Analyzer IP address	192.168.1.43		Lamp voltage	1014	1006
Calculated slope	1.035627	1.009634	Chamber temp	45.0	45.0
Calculated intercept	-0.194315	-0.067626	Pressure	714.0	711.6
Analyzer Background	1.18	1.18	Flow	0.437	0.436
Analyzer Coefficient	1.069	1.064	Intensity	90	90

Analyzer make Thermo 43i-TLE Analyzer serial # 1136451241

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6832	0.0	0.0	0.1	----
as found span	6845	53.5	18.4	18.2	1.011
calibrator zero	6832	0.0	0.0	0.1	----
high point	6845	53.5	18.4	18.3	1.004
second point	6841	32.5	11.2	11.1	1.003
third point	6836	20.8	7.2	7.1	1.013
as left zero	6832	0.0	0.0	0.1	----
as left span	6845	53.5	18.4	17.8	1.034
Average Correction Factor					1.007

Corrected As found 18.1 Previous response 17.9 % change -0.7%

Notes:

Remote calibration. Span adjusted slightly.

Calibration Performed By: Devin Russell



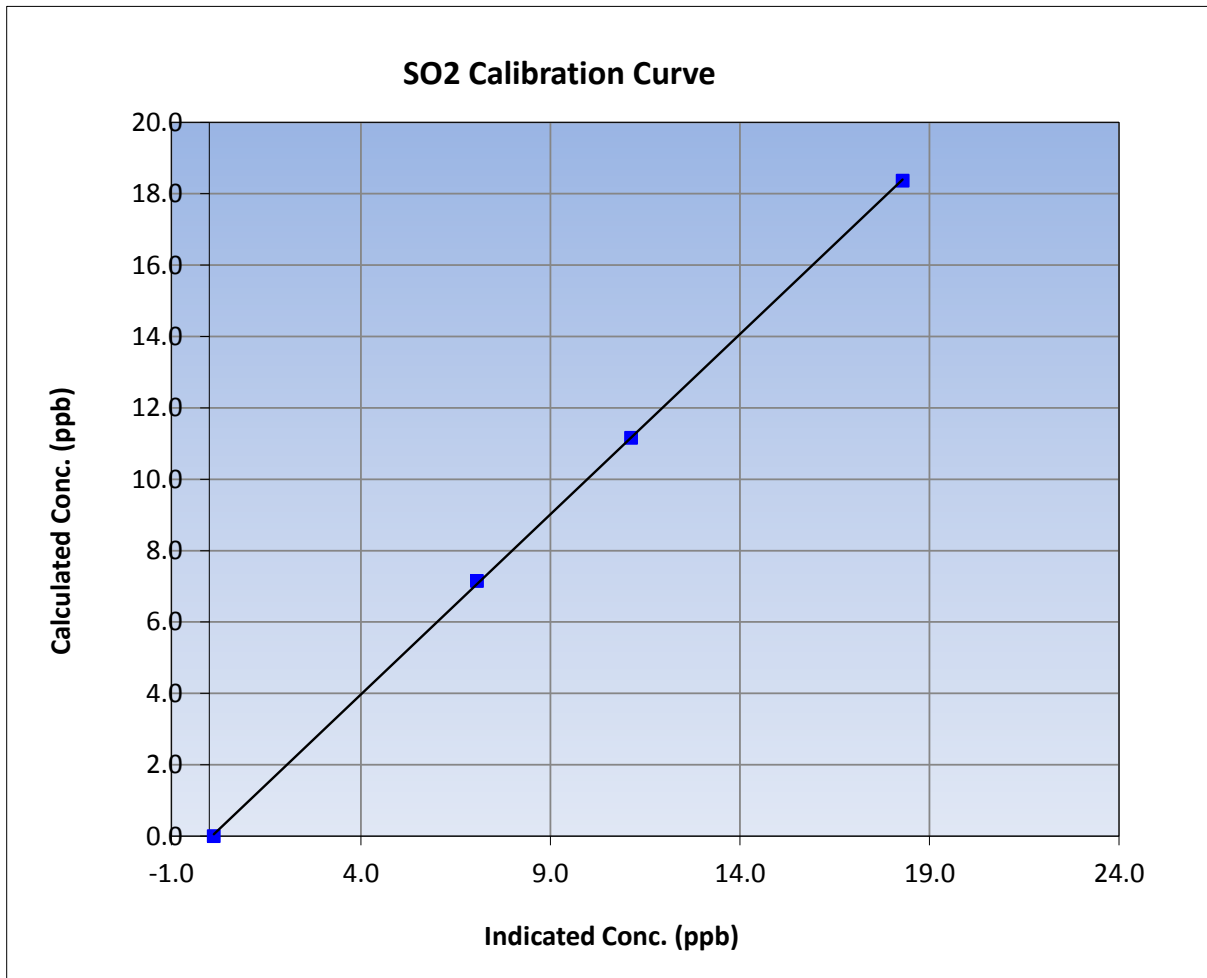
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 16, 2016	Previous Calibration	April 18, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:10	End Time (MST)	14:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

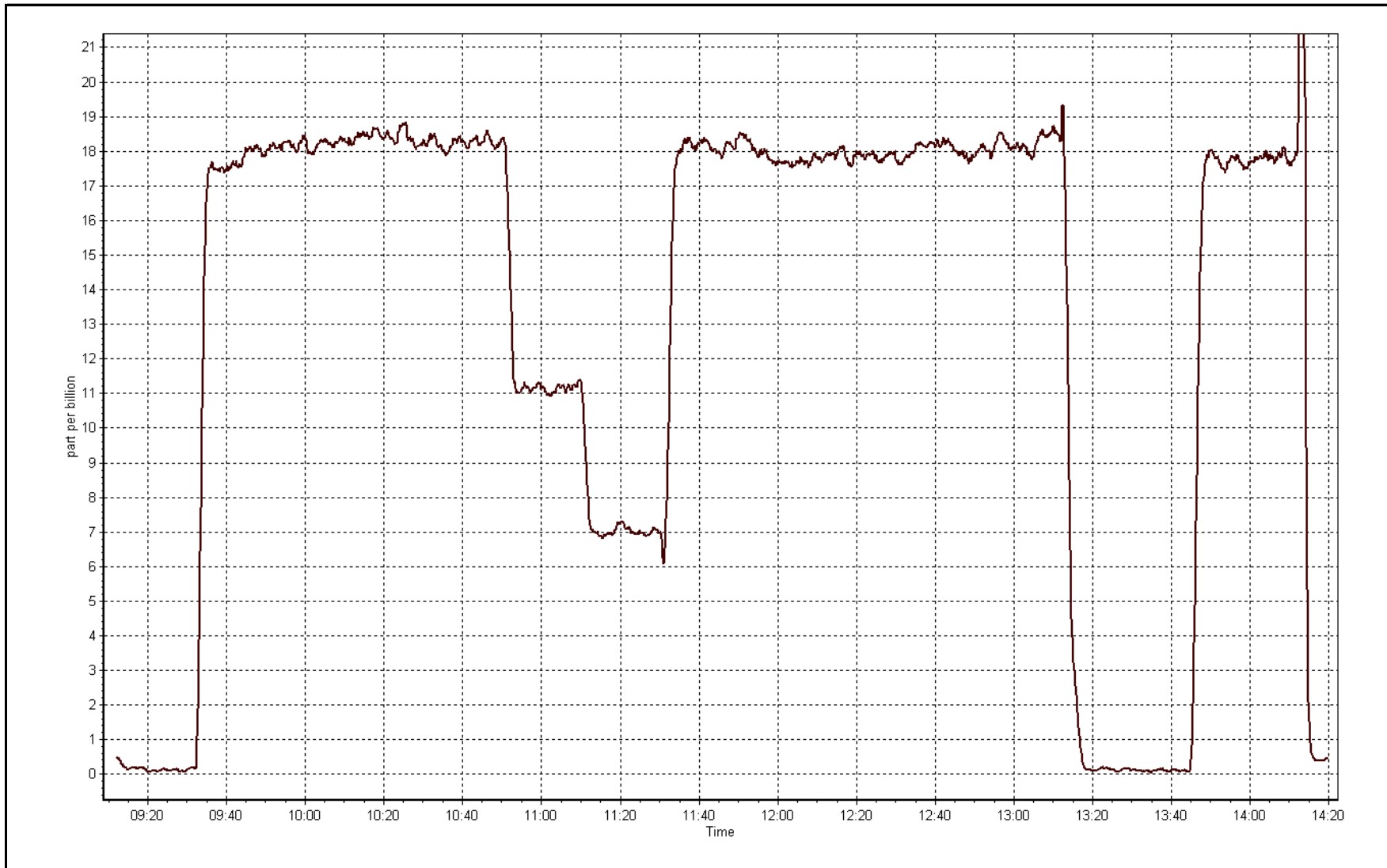
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999932
18.4	18.3	1.0042		
11.2	11.1	1.0031	Slope	1.009634
7.2	7.1	1.0128		
			Intercept	-0.067626



SO2 Calibration Plot

Date: May 16, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 17, 2016	Previous Calibration	April 18, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	11:10
NO2 GPT Ref date	May-17-16	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	38.8	38.8
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.012241	1.018825	Pressure	27.2	27.2
Calculated intercept	-0.080979	-0.079584	Flow cell A	768	768
Analyzer Background	-0.4	-0.4	Flow cell B	768	768
Analyzer Coefficient	1.014	1.014	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA
Analyzer make	Teledyne API T400		Analyzer serial #	1107	

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 generator reference voltage - generator drive voltage (ppb of O3 called from from calibrator)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As found zero	6830	0.00	0.0	0.2	----
As found span	6720	238.2 - 829.7 (100ppb)	94.7	92.9	1.019
calibrator zero	6830	0.00	0.0	0.2	----
high point	6723	237.0 - 830.8 (100ppb)	94.7	93.1	1.017
second point	6721	190.8-799.1 (80 ppb)	76.8	75.6	1.016
third point	6723	115.2-733.3 (50 ppb)	48.9	47.8	1.024
as left zero					
as left span					
Average Correction Factor					1.019

Corrected As found	92.7	Previous response	93.6	% change	1.0%
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Notes:

Remote calibration. Response drop during span point is due to communication issue with APICOM. No adjustments made. As lefts not completed.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association O3 Calibration Report

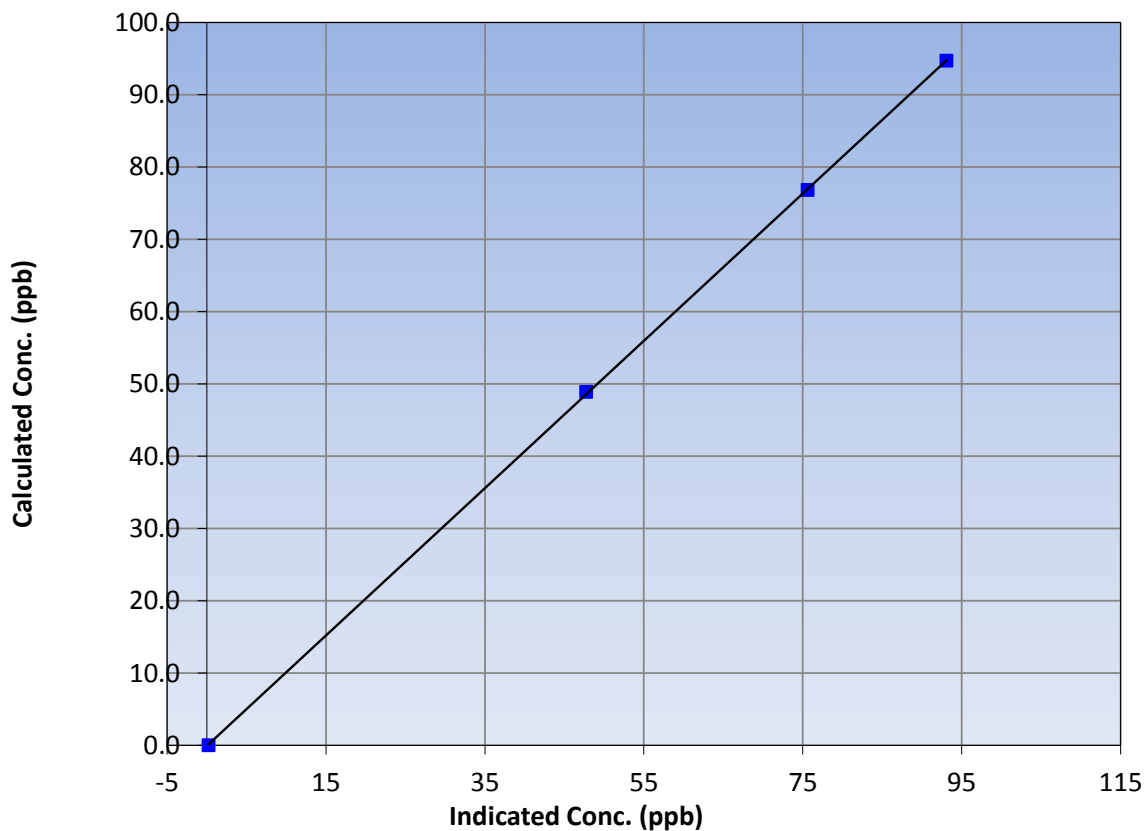
Station Information

Calibration Date	May-17-16	Previous Calibration	April 18, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:05	End Time (MST)	11:10
Analyzer make	Teledyne API T400	Analyzer serial #	1107

Calibration Data

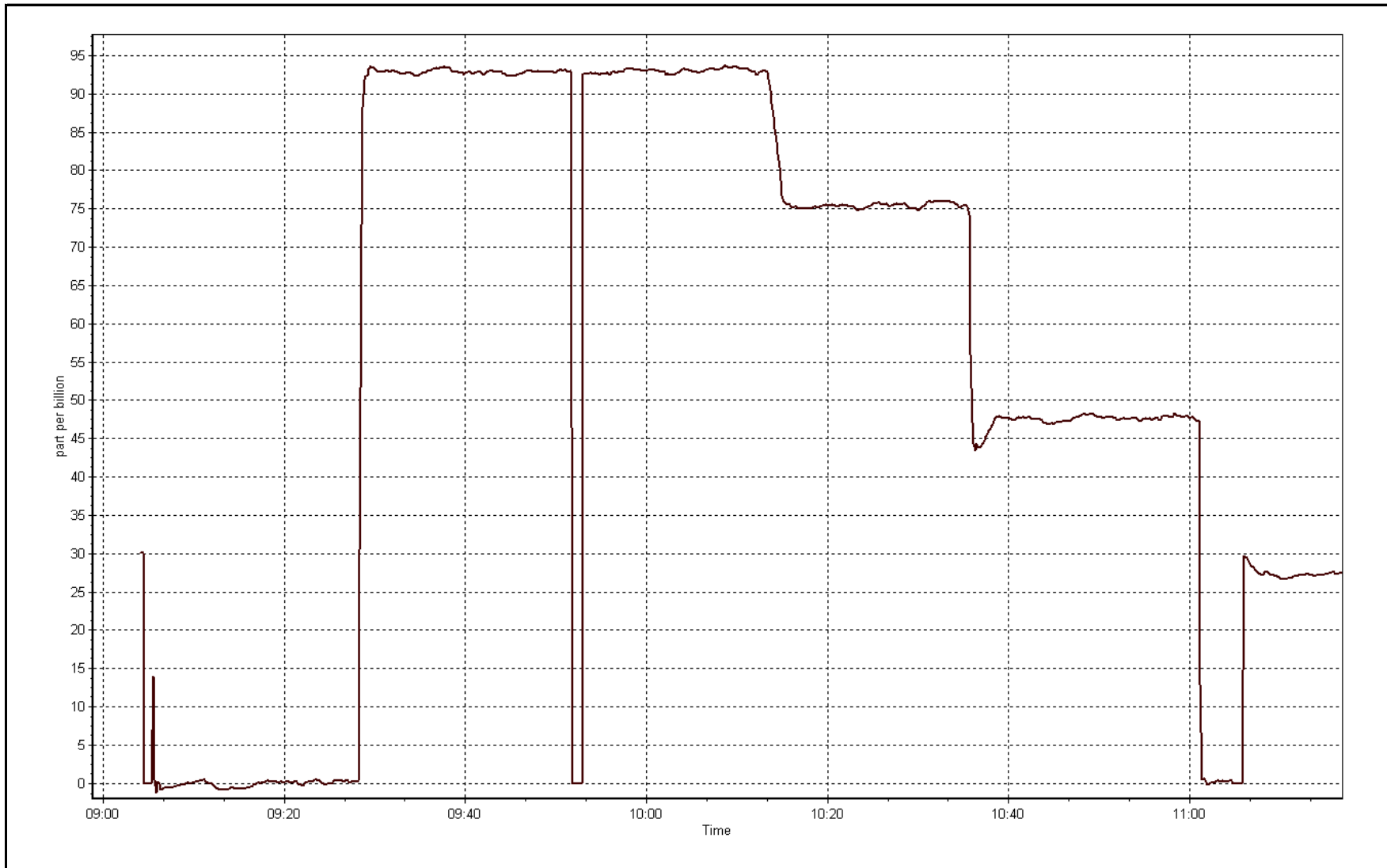
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999971
94.7	93.1	1.0174		
76.8	75.6	1.0159	Slope	1.018825
48.9	47.8	1.0241		
			Intercept	-0.079584

O3 Calibration Curve



O3 Calibration Plot

Date: May 17, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 16, 2016	Previous Calibration	April 18, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	14:20
NO Cal Gas Conc	20.1 ppm	Gas Cert Reference	LL79696
NOx Cal Gas Conc	20.1 ppm	Cal Gas Expiry Date	2/13/18
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API 701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996769	0.994741	0.999159
	Data Offset	-0.109433	0.097563	-0.129891
Current Calibration	Data Slope	0.983851	0.980342	1.007871
	Data Offset	0.747482	0.921634	0.244201

Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172
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Test Point	before		after	
		ppb		ppb
Concentration range	0-200		0-200	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.234		1.234	
NOx coefficient	1.244		1.244	
NO2 coefficient	1.000		1.000	
NO bkgnd	0.1		0.1	
NOx bkgnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314.5	Deg C	314.8	Deg C
PMT voltage	502	V	502	V
PMT Temp	5.1	Deg C	5	Deg C
O3 flow	88	ccm	88	ccm
R Cell press NO	3.8	mmHg	3.8	mmHg
R Cell Press Nox	3.8	mmHg	3.8	mmHg
NO sample flow	1111	lpm	1092	lpm
Nox sample Flow	1111.000	lpm	1112.000	lpm

Notes:

Remote calibration. No adjustments made. Instability during span is due to communication errors while using APICOM.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 16, 2016

Station Number:

AMS 8

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6832	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
as found span	6845	53.5	157.1	157.1	0.0	159.2	159.5	-0.3	0.9869	0.9847
calibrator zero	6832	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
high point	6845	53.5	157.1	157.1	0.0	159.5	160.1	-0.6	0.9851	0.9814
second point	6841	32.5	95.5	95.5	0.0	96.1	96.1	0.0	0.9937	0.9940
third point	6836	20.8	61.2	61.2	0.0	60.3	60.1	0.2	1.0149	1.0185
as left zero	6832	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as left span	6845	53.5	157.1	64.2	92.9	157.3	63.8	93.5	0.9988	1.0072
Average Correction Factor									0.9979	0.9980

Corrced As found NO_x= 159.2 NO= 159.5 Percent Change NO_x= -0.9% NO= -1.0%
 Previous Response NO_x= 157.7 NO= 157.8

GPT Calibration Data

Dilution Flow (total) 6845 ccm Source Gas Flow 53.50 ccm NOx ref calc conc = 157.1 ppb NO ref calc conc = 157.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	158.3	158.9	-0.1	0.9924	0.9886	----	----
1st NO2 (300)	64.2	94.7	158.1	64.2	93.9	0.9938	----	1.0088	99.1%
2nd NO2 (200)	82.1	76.8	158.1	82.1	76.0	0.9935	----	1.0103	99.0%
3rd NO2 (100)	110.1	48.9	157.9	110.1	47.8	0.9950	----	1.0213	97.9%
2nd NO ref point	----	0.0	158.5	158.3	0.2	0.9911	0.9925	----	----
Average Correction Factor						0.9933		1.0135	98.7%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

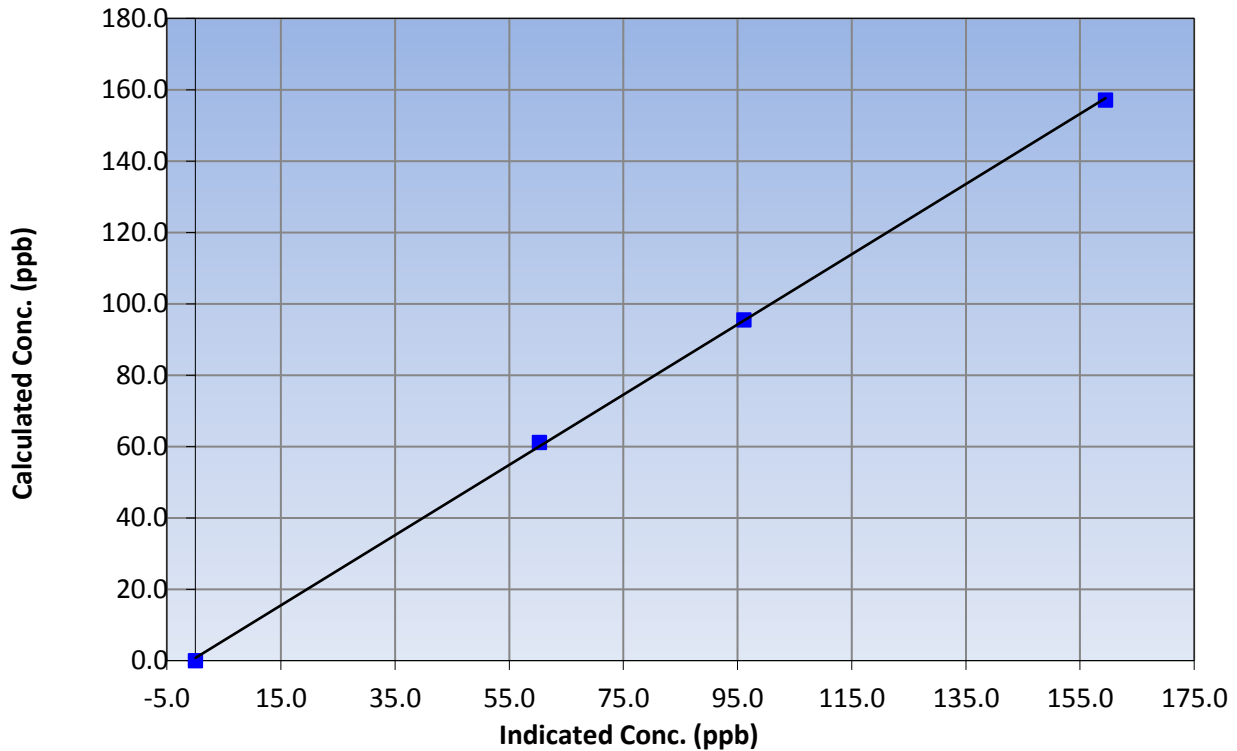
Station Information

Calibration Date	May 16, 2016	Previous Calibration	April 18, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:10	End Time (MST)	14:20
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999830
157.1	159.5	0.9851		
95.5	96.1	0.9937	Slope	0.983851
61.2	60.3	1.0149		
			Intercept	0.747482

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

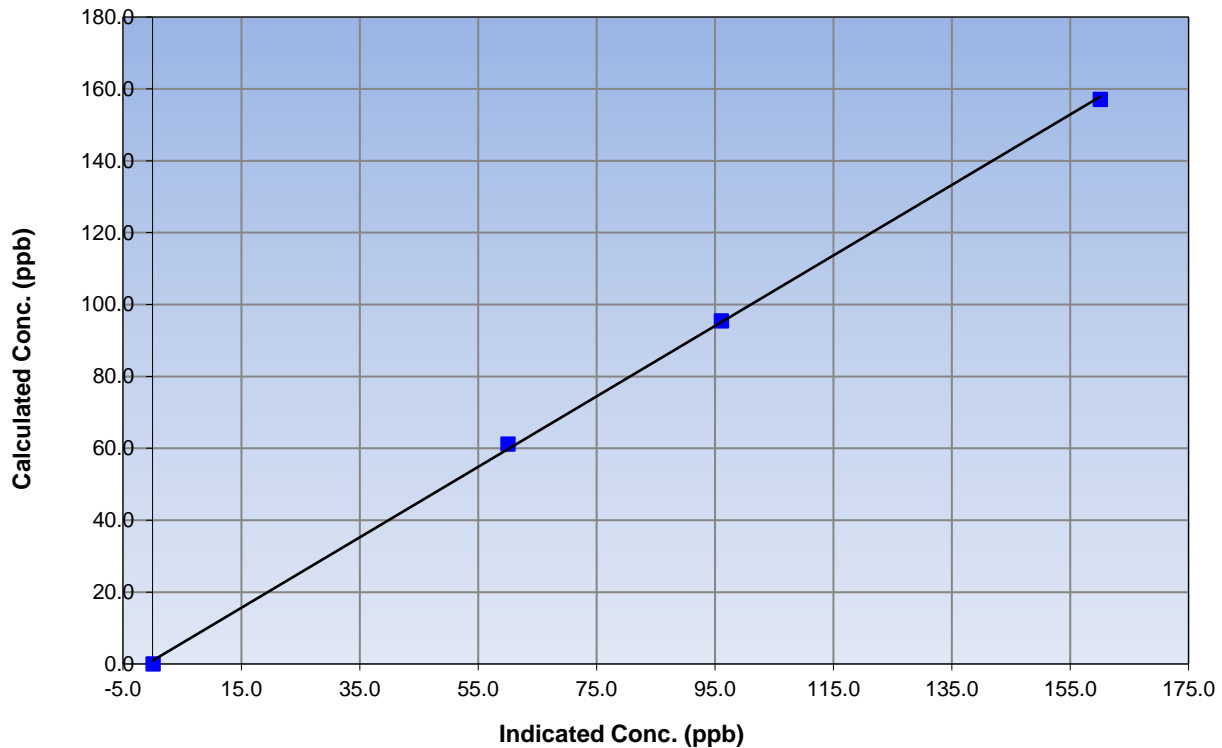
Station Information

Calibration Date	May 16, 2016	Previous Calibration	April 18, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:10	End Time (MST)	14:20
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999722
157.1	160.1	0.9814		
95.5	96.1	0.9940	Slope	0.980342
61.2	60.1	1.0185		
			Intercept	0.921634

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

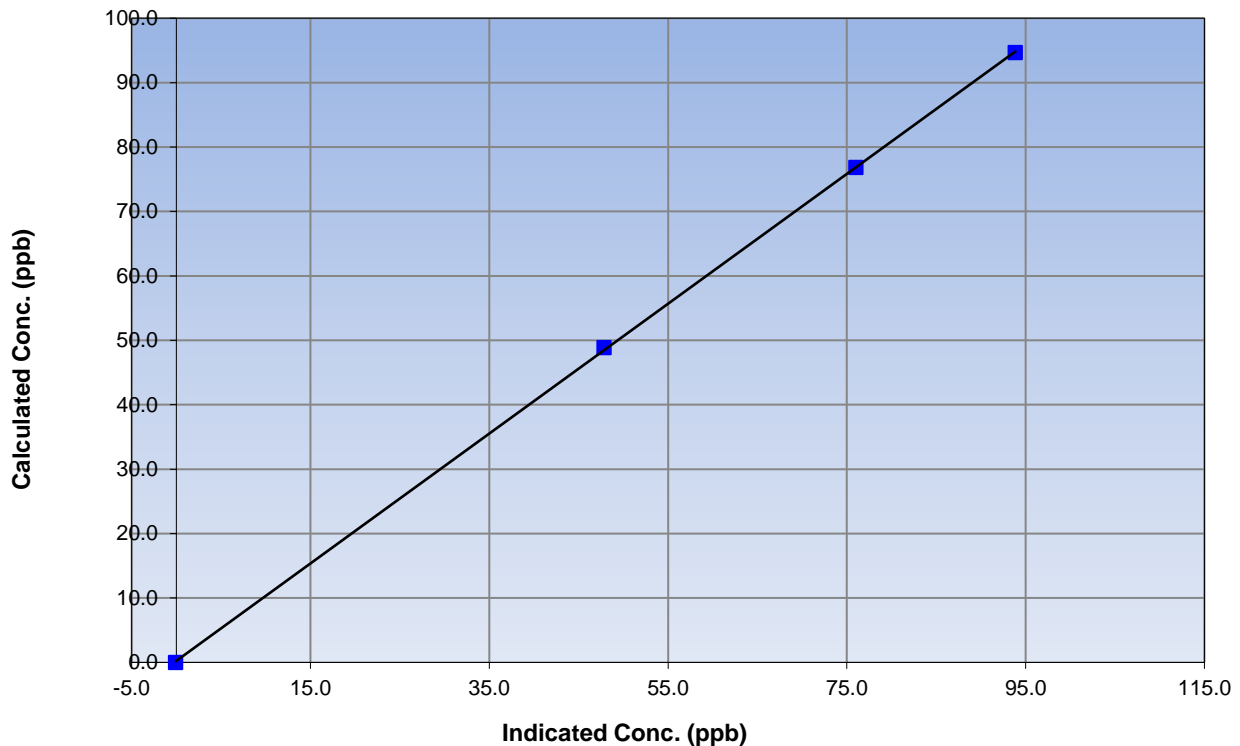
Station Information

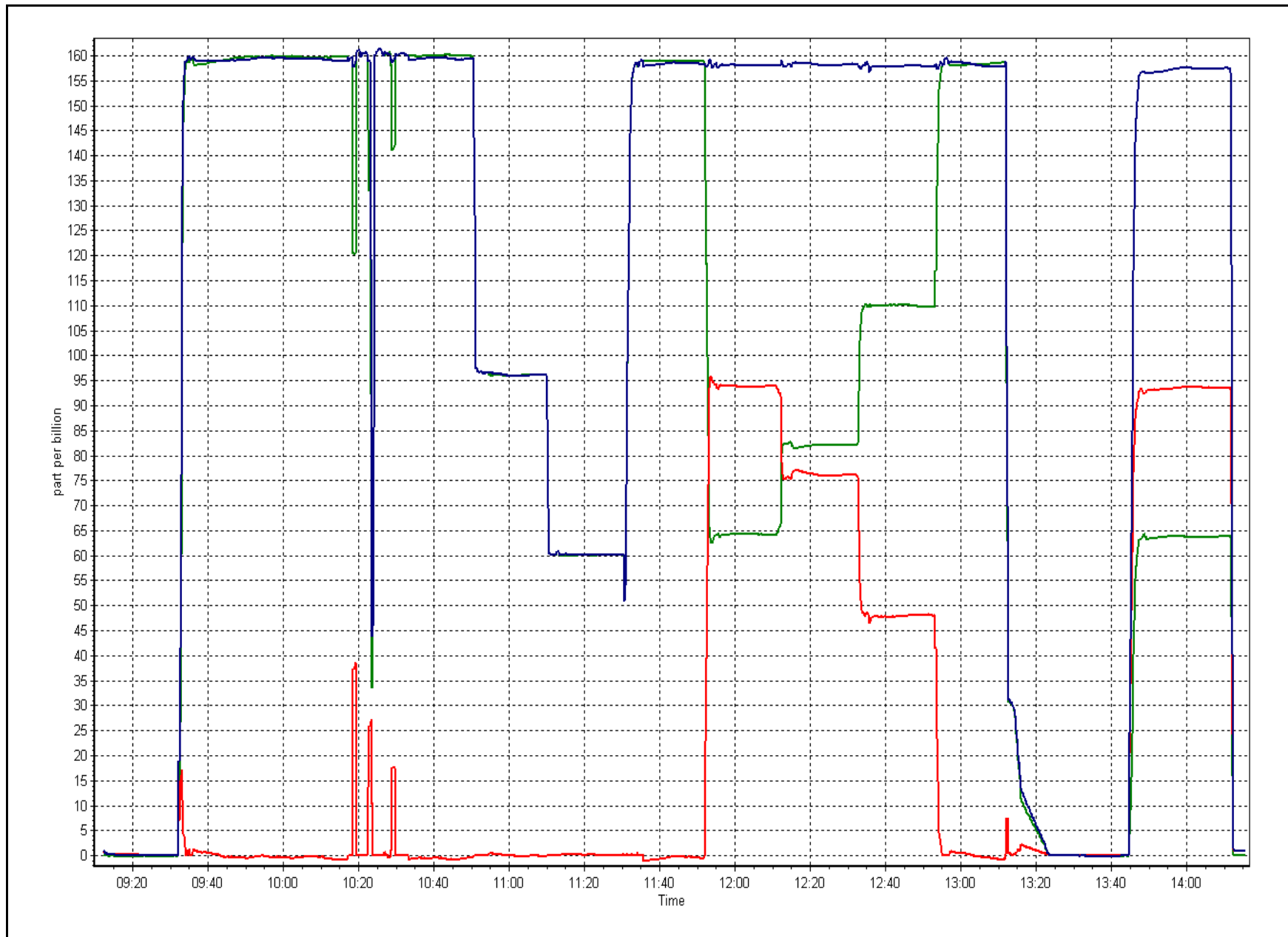
Calibration Date	May 16, 2016	Previous Calibration	April 18, 2016
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:10	End Time (MST)	14:20
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999957
94.7	93.9	1.0088		
76.8	76.0	1.0103	Slope	1.007871
48.9	47.8	1.0213		
			Intercept	0.244201

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	709	35	35	100.00	5	0	2	0
THC(ppm) Average	710	34	34	100.00	5.8	-	3.5	-
Temperature (C) Average	744	0	0	100.00	33.6	-	23.7	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	86	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	19	-	14	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	709	0.4	1	-	0	0	0	0	0	1	5
THC(ppm) Average	710	2.28	0.4	-	2	2.1	2.1	2.2	2.3	2.6	5.8
Temperature (C) Average	744	13.48	7	-	-1.1	4.9	8.1	12.5	18.4	23.4	33.6
Relative Humidity (%) Average	744	55.8	25	-	13	22	33	55	79	89	98
Wind Speed 10 m (km/h) Average	742	6.7	4	-	0	3	4	6	9	12	19
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	14 May 2016 02:00	14 May 2016 02:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	14 May 2016 23:00	14 May 2016 23:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

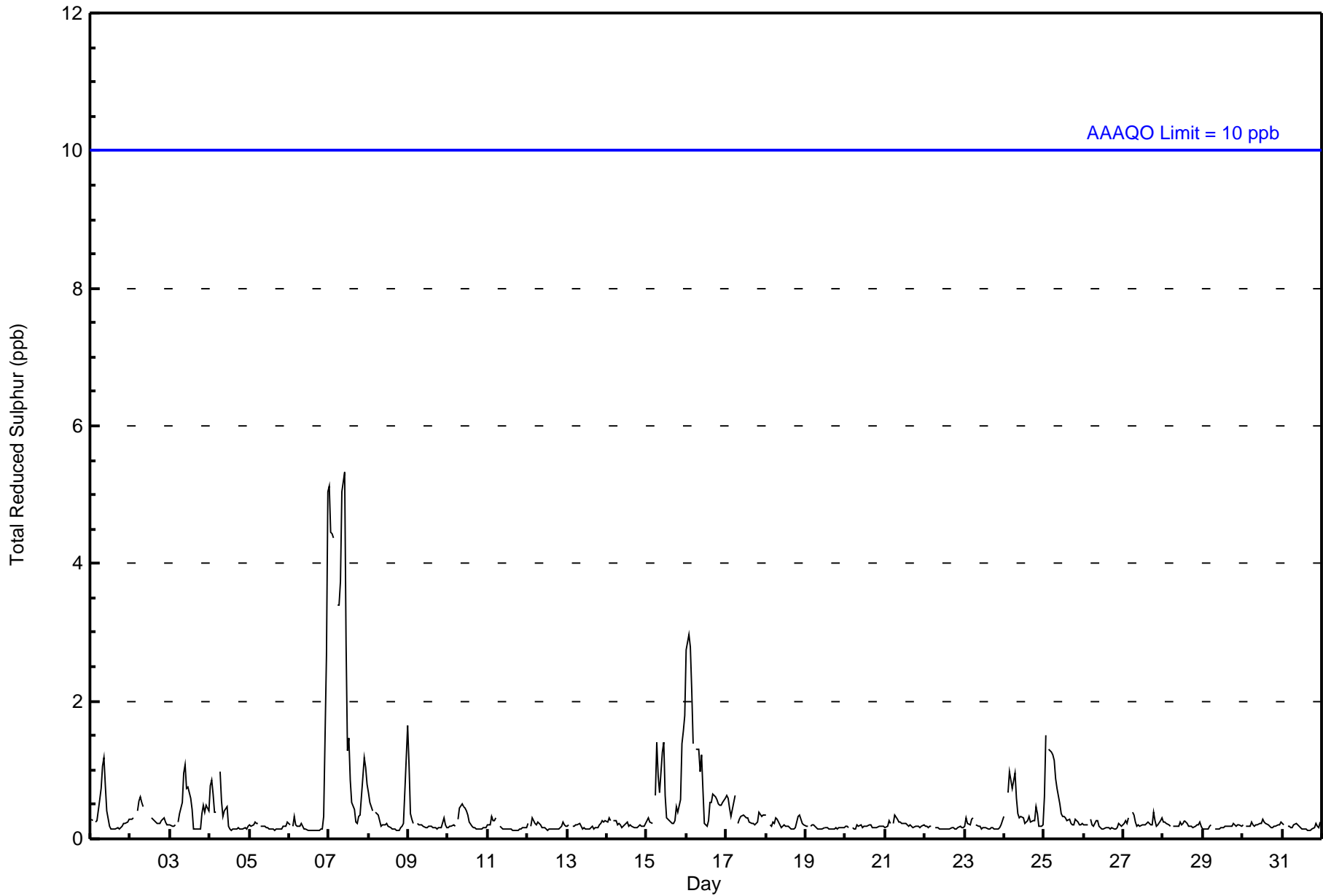
Barge Landing - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 ppb on May 7 10:00 Maximum Daily Average: 2.2 ppb on May 7																	Hours in Service: 744 Hours of Data: 709										
Minimum Value: 0 ppb on May 6 13:00 Minimum Daily Average: 0.2 ppb on May 22 Maximum Diurnal Average: 0.6 ppb at hour 2 Minimum Diurnal Average: 0.2 ppb at hour 18 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 Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
2-May	0	0	0	Z	0	1	1	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-May	0	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-May	1	1	1	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-May	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
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0.5	5
7-May	5	4	4	4	Z	3	3	4	5	5	3	1	1	1	1	0	0	0	0	0	0	1	1	1	1	2.2	5
8-May	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.3	2
9-May	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
10-May	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	0.2	1
11-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-May	0	Z	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-May	0	0	0	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	2	2	0.7	2
16-May	3	3	3	2	1	Z	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1.0	3
17-May	1	1	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-May	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-May	1	2	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-May	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
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
0.5 0.6 0.5 0.5 0.4 0.5 0.6 0.5 0.5 0.5 0.4 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.4 0.5																								Diurnal Average			
5 4 4 4 1 3 3 4 5 5 3 1 1 1 1 1 1 1 1 1 1 1 3 5																								Diurnal Maximum			
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	694	97.88	97.88
3 - 4	11	1.55	99.44
5 - 7	4	0.56	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	81	106	57	14	10	11	27	35	55	51	33	50	35	37	39	51	692
3 - 4	0	0	0	0	0	0	3	3	4	1	0	0	0	0	0	0	11
5 - 7	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	4
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	81	106	57	14	10	11	31	39	61	52	33	50	35	37	39	51	707

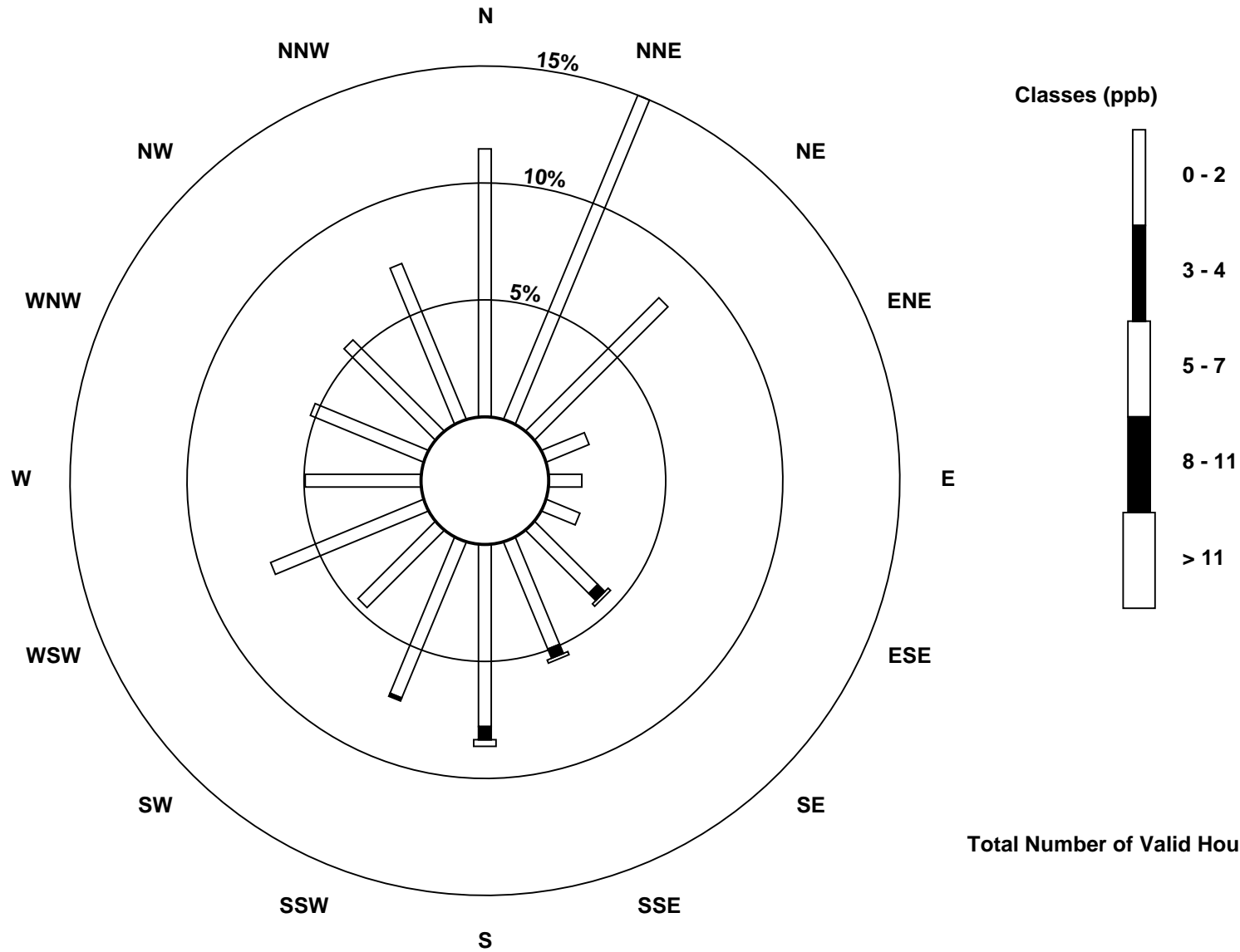
Total Number of Valid Hours: 707

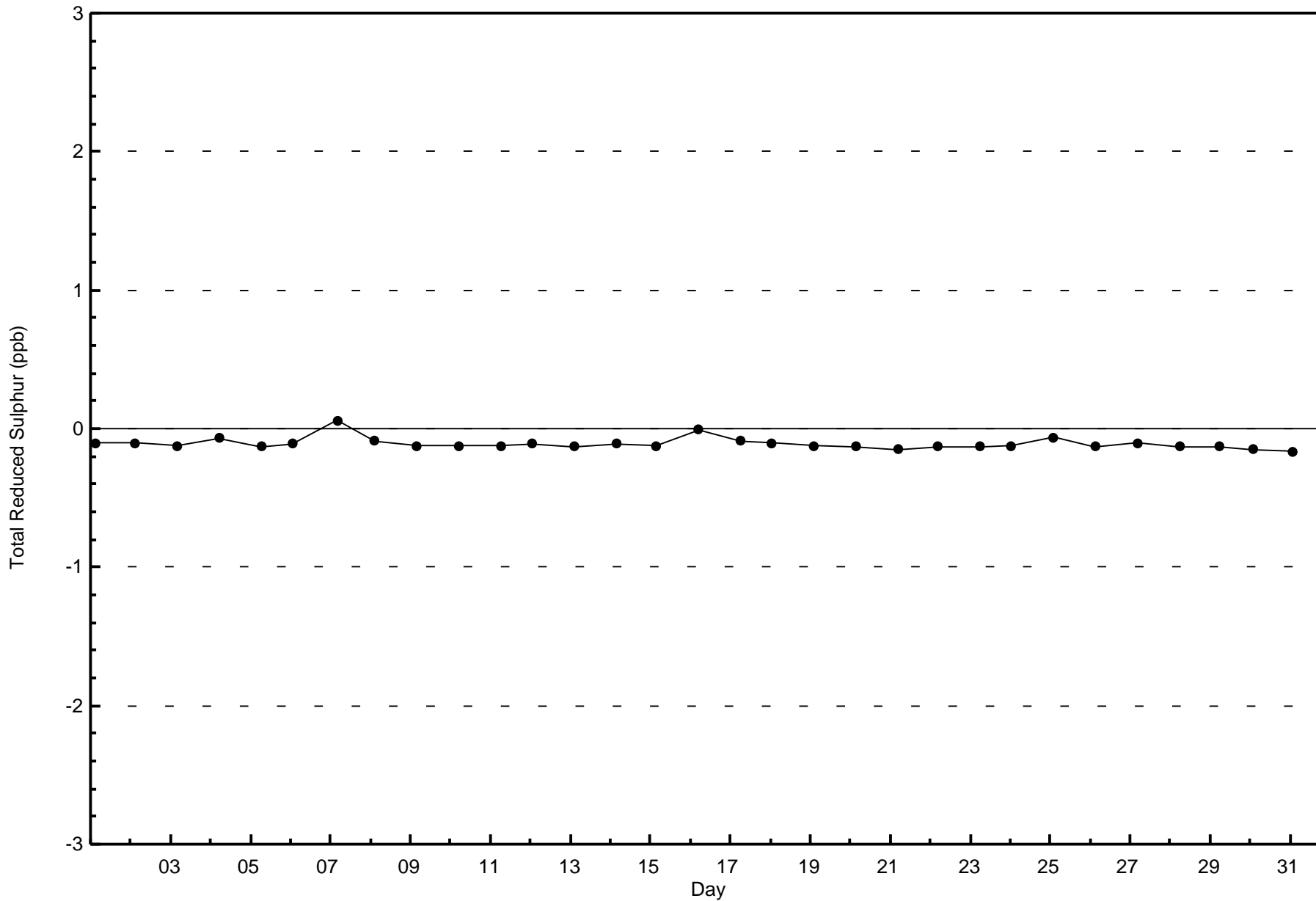
Total Number of Hours: 744

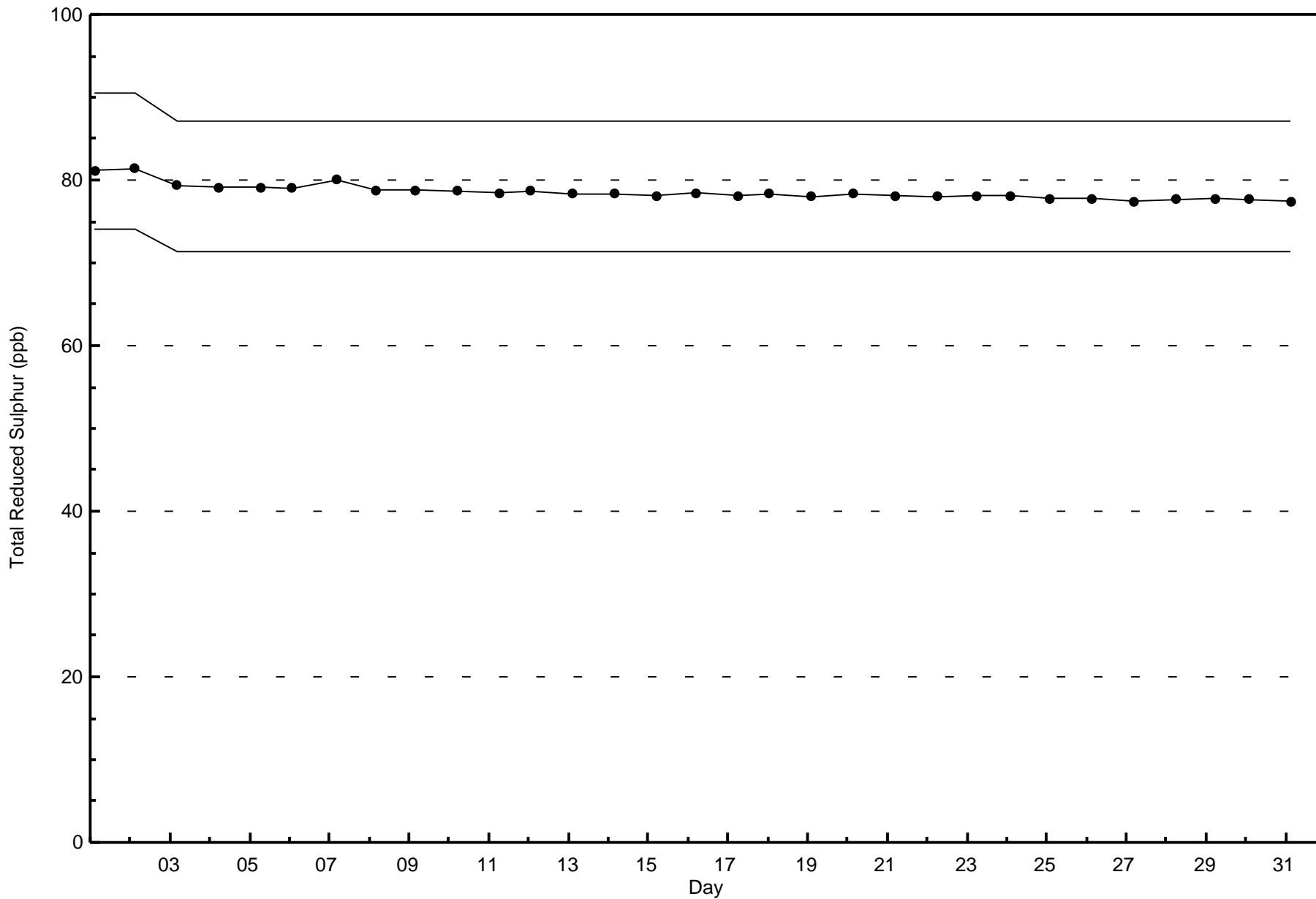


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)









Wood Buffalo Environmental Association
Summary of Hour Averages

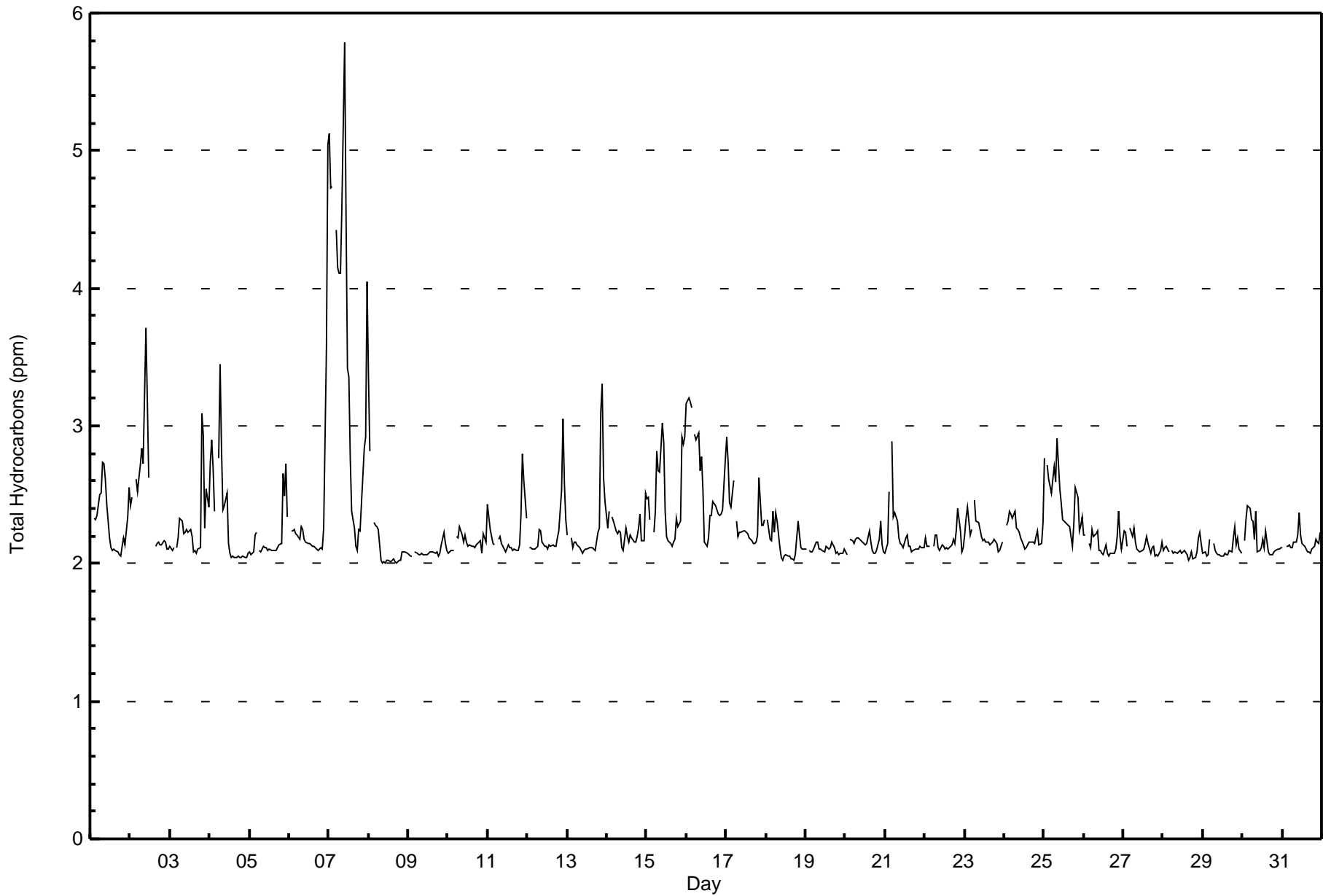
Total Hydrocarbons (THC) - ppm
Barge Landing - May 2016

Maximum Value: 5.8 ppm on May 7 10:00		Maximum Daily Average: 3.5 ppm on May 7		Hours in Service:	744																																											
Minimum Value: 2.0 ppm on May 8 18:00		Minimum Daily Average: 2.1 ppm on May 9		Hours of Data:	710																																											
Maximum Diurnal Average: 2.5 ppm at hour 1		Minimum Diurnal Average: 2.1 ppm at hour 18		Hours of Missing Data:	34																																											
Monthly Average: 2.28 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.6 P ₉₉ = 4.5		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-May	2.3	Z	2.3	2.3	2.3	2.5	2.5	2.7	2.7	2.6	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.3	2.6	2.3	2.7																						
2-May	2.4	2.5	Z	2.6	2.5	2.6	2.7	2.8	2.7	3.7	3.2	2.6	C	C	C	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.5	3.7																						
3-May	2.1	2.1	2.1	Z	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	3.1	2.9	2.3	2.5	2.4	2.3	3.1																						
4-May	2.7	2.9	2.7	2.4	Z	2.8	3.4	2.8	2.4	2.4	2.5	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.3	3.4																						
5-May	2.1	2.1	2.1	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7	2.5	2.7	2.3	2.2	2.7																						
6-May	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	3.6	5.0	2.4	5.0																						
7-May	5.1	4.7	4.7	Z	4.4	4.1	4.1	4.1	4.6	5.8	4.5	3.4	3.4	2.8	2.4	2.3	2.1	2.1	2.3	2.2	2.6	2.8	2.9	4.0	3.5	5.8																						
8-May	3.4	2.8	Z	2.3	2.3	2.3	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	2.1	2.1	2.1	2.1	2.2	3.4																						
9-May	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2																						
10-May	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.3																						
11-May	2.4	2.2	2.2	2.2	2.1	Z	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	2.4	2.8	2.6	2.3	2.2	2.8																						
12-May	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	3.0	2.6	2.3	2.2	3.0																						
13-May	2.2	Z	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	3.1	3.3	2.6	2.4	2.3	3.3																						
14-May	2.3	2.4	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.5	2.5																						
15-May	2.5	2.5	2.3	Z	2.2	2.4	2.8	2.7	2.7	3.0	2.9	2.4	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.9	2.9	2.5	3.0																						
16-May	3.2	3.2	3.2	3.1	Z	2.9	2.9	3.0	2.7	2.8	2.5	2.2	2.1	2.2	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.8	2.6	3.2																						
17-May	2.9	2.7	2.4	2.4	2.6	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.6	2.3	2.3	2.3	2.3	2.9																						
18-May	Z	2.3	2.2	2.2	2.4	2.2	2.4	2.3	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.4																						
19-May	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2																						
20-May	2.1	2.1	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.1	2.1	2.3																						
21-May	2.1	2.1	2.5	Z	2.9	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.9																						
22-May	2.2	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.4	2.2	2.1	2.1	2.2	2.4																						
23-May	2.2	2.3	2.4	2.2	2.2	Z	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.5																						
24-May	Z	2.3	2.3	2.4	2.4	2.3	2.4	2.3	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	2.1	2.1	2.3	2.2	2.4																						
25-May	2.8	Z	2.7	2.6	2.5	2.6	2.7	2.6	2.9	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.3	2.6	2.5	2.2	2.3	2.3	2.5	2.9																						
26-May	2.2	2.2	Z	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	2.2	2.4	2.2	2.1	2.1	2.4																						
27-May	2.2	2.2	2.1	Z	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.3																						
28-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.2																						
29-May	2.1	2.1	2.1	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.2	2.1	2.1	2.1	2.3																						
30-May	Z	2.2	2.3	2.4	2.4	2.3	2.3	2.2	2.4	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4																						
31-May	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.4																						
																								2.5	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.4	Diurnal Average
																								5.1	4.7	4.7	3.1	4.4	4.1	4.1	4.1	4.6	5.8	4.5	3.4	3.4	2.8	2.4	2.4	2.5	2.4	2.4	3.1	3.1	3.3	3.6	5.0	Diurnal Maximum
Z - zerospan C - Calibration																																																



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	29	4.08	4.08
2.1 - 3.0	655	92.25	96.34
3.1 - 10.0	26	3.66	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	3	4	9	5	5	3	0	29
2.1 - 3.0	80	108	53	14	9	11	28	36	49	47	27	41	32	32	37	49	653
3.1 - 10.0	1	1	3	1	0	0	6	3	9	2	0	0	0	0	0	0	26
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	81	109	56	15	9	11	34	39	58	52	31	50	37	37	40	49	708

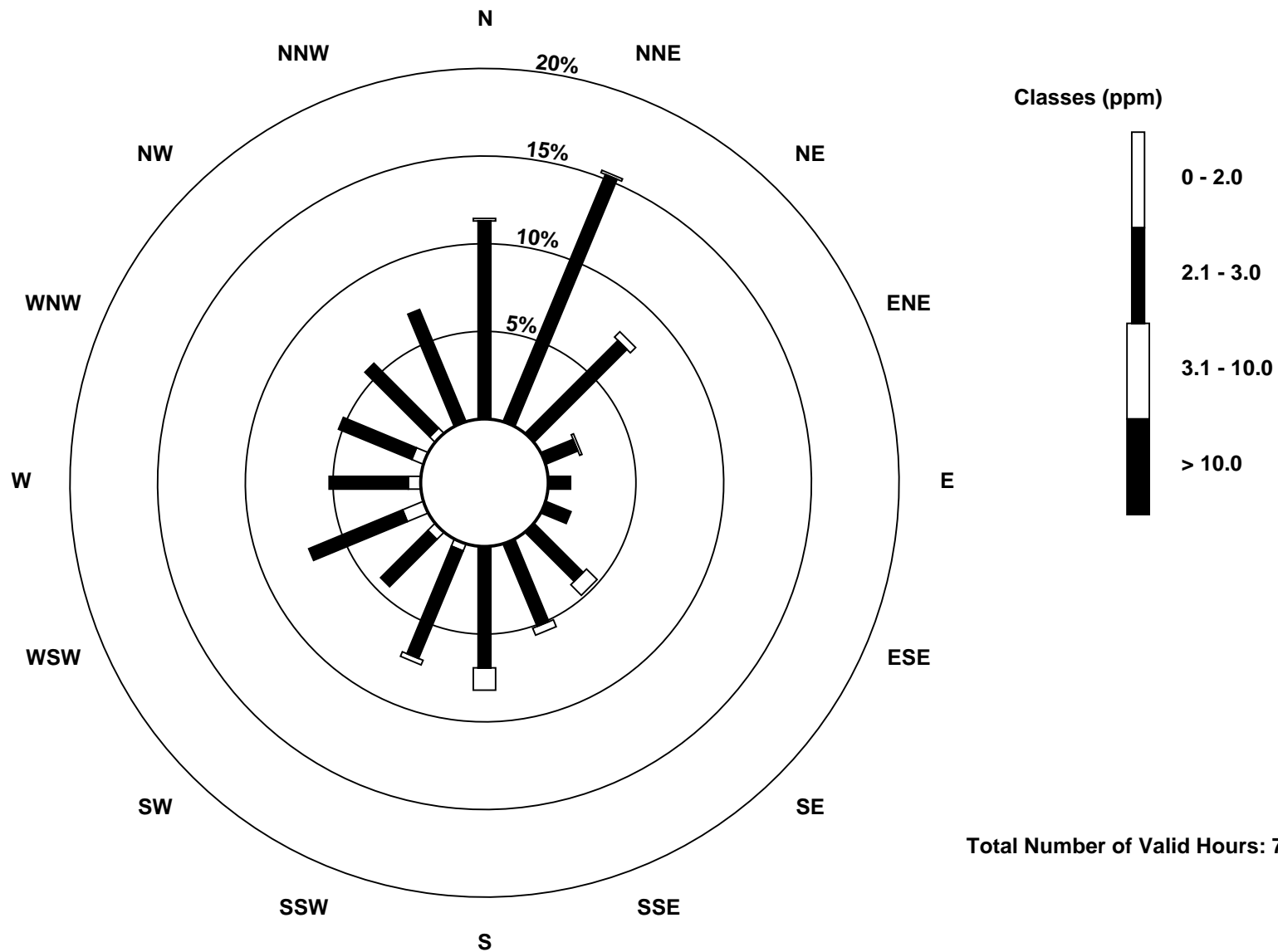
Total Number of Valid Hours: 708

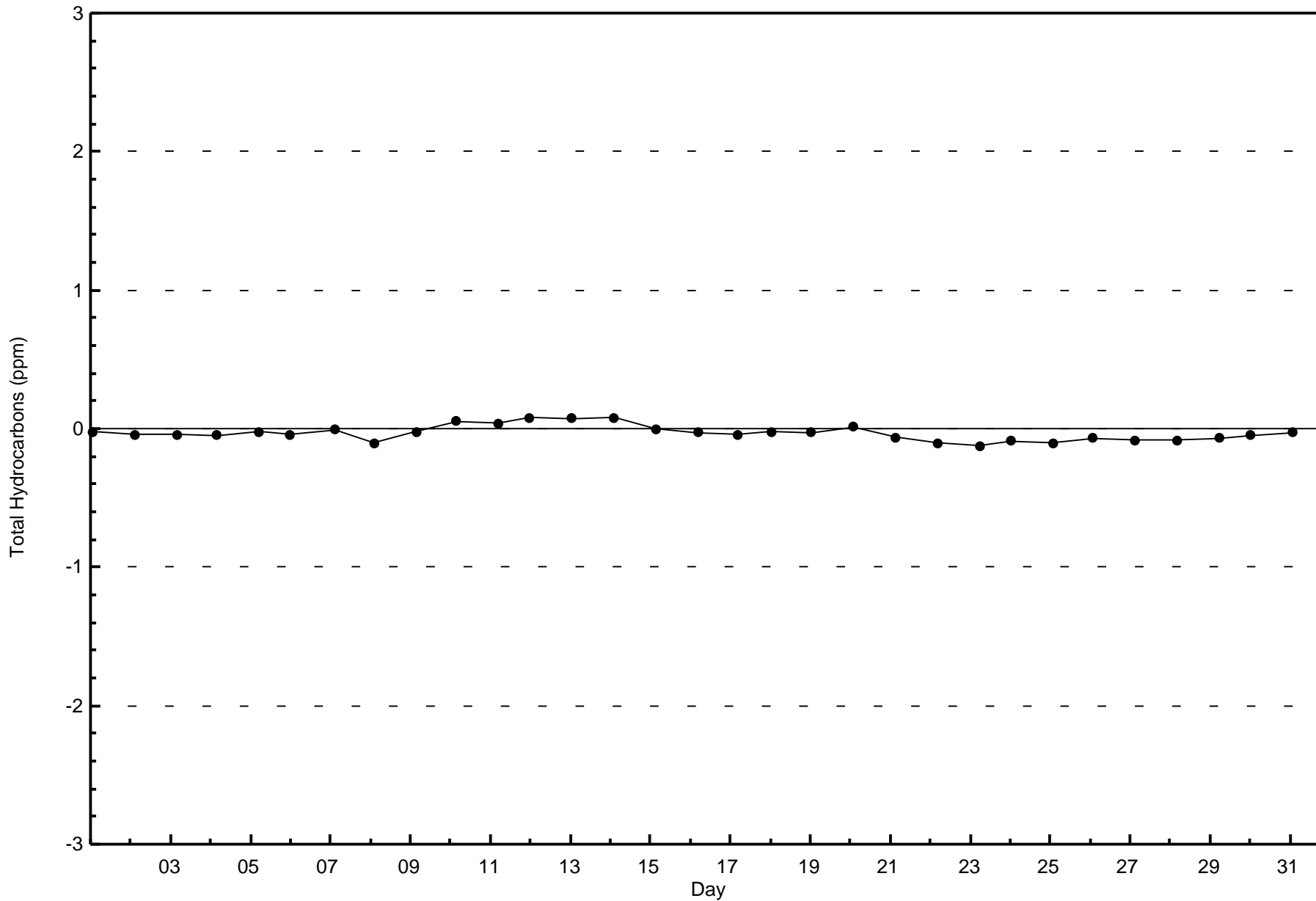
Total Number of Hours: 744

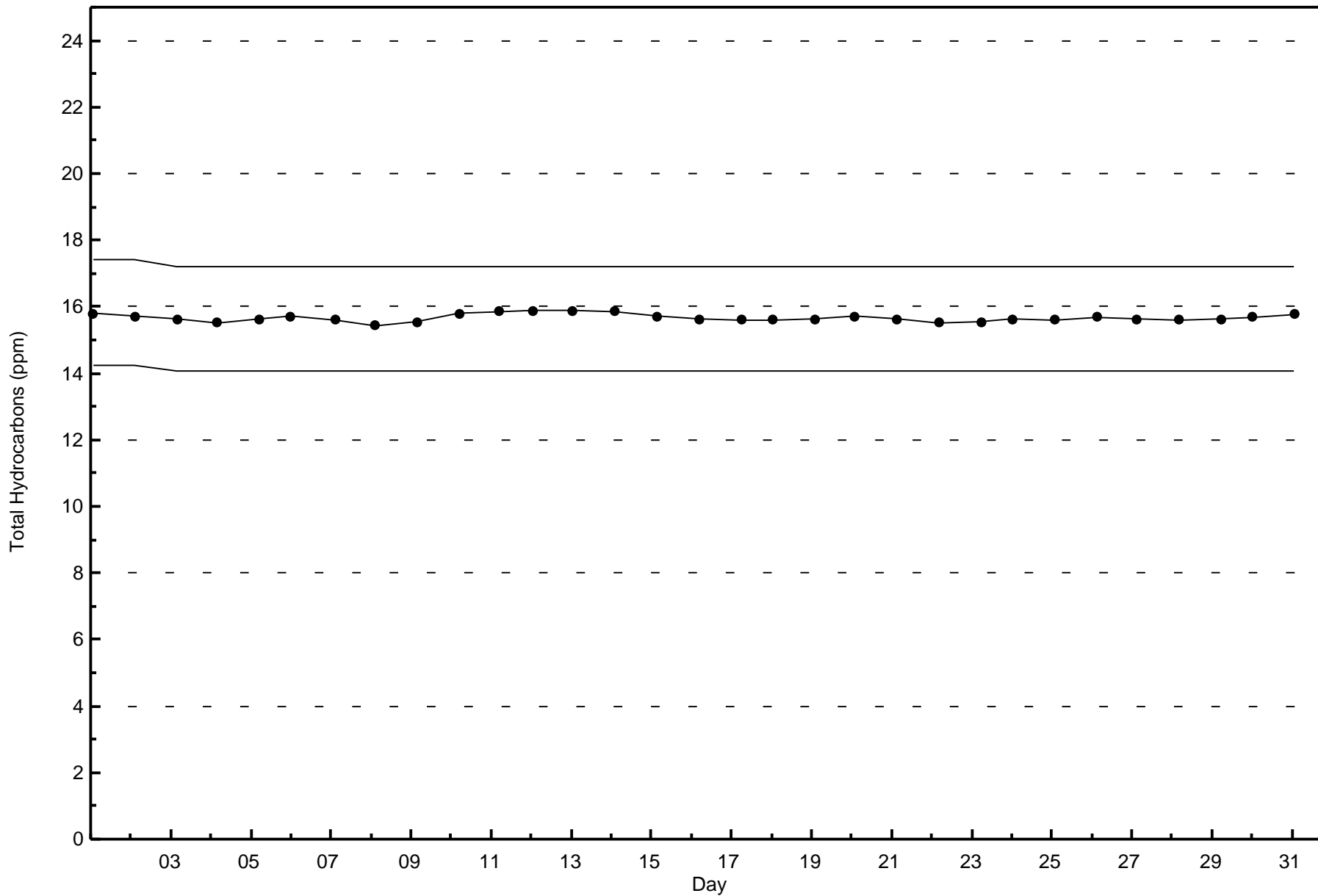


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

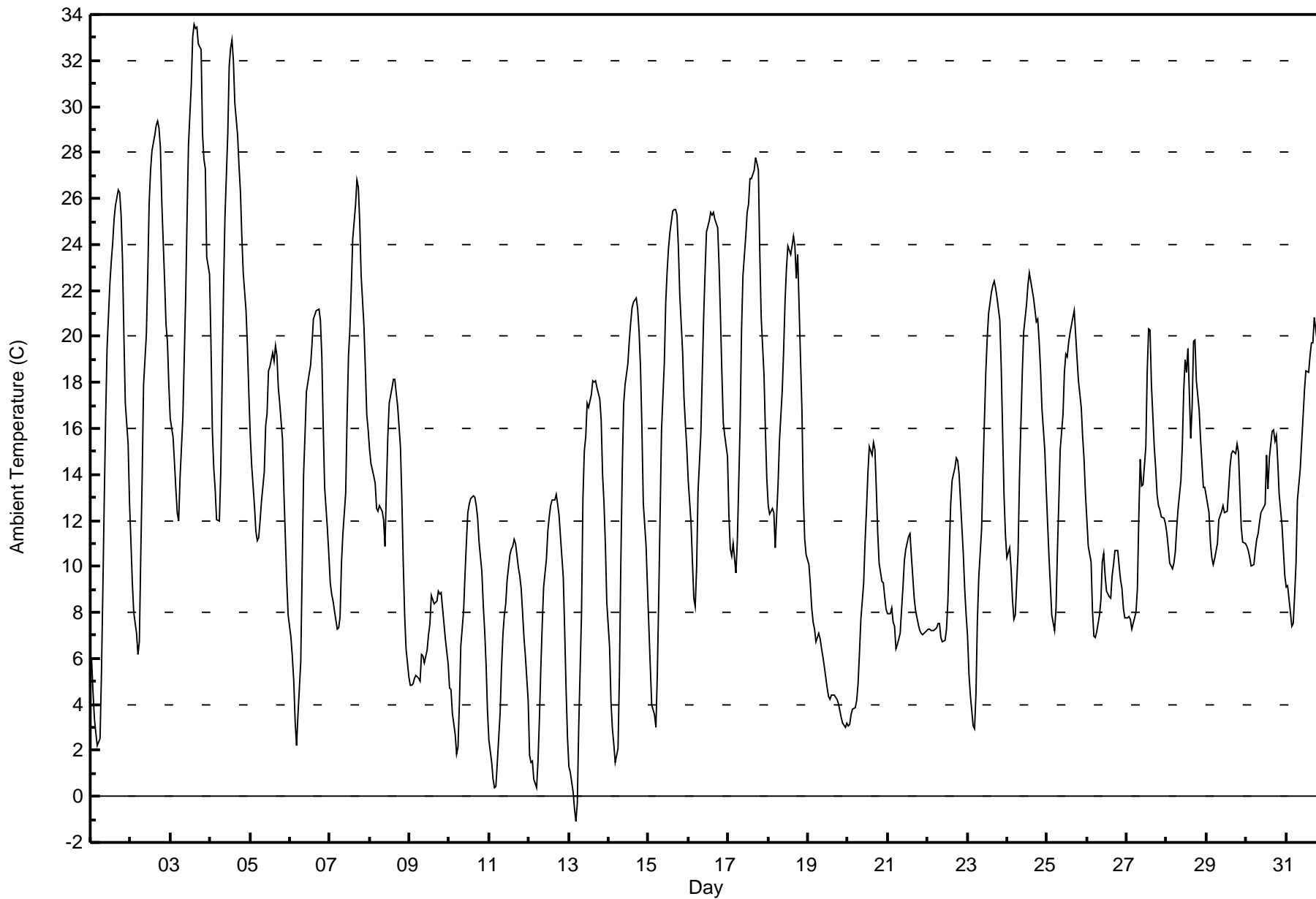
Barge Landing - May 2016

Maximum Value: 33.6 C on May 3 15:00 Maximum Daily Average: 23.7 C on May 3																				Hours in Service: 744																												
Minimum Value: -1.1 C on May 13 05:00 Minimum Daily Average: 5.5 C on May 19																				Hours of Data: 744																												
Maximum Diurnal Average: 19.1 C at hour 16 Minimum Diurnal Average: 6.5 C at hour 5																				Hours of Missing Data: 0																												
Monthly Average: 13.48 C Percentiles: P₁ = 0.7 P₁₀ = 4.9 Q₁ = 8.1 Median = 12.5 Q₃ = 18.4 P₉₀ = 23.4 P₉₉ = 32.3																				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-May	5.9	4.5	3.3	2.8	2.2	2.5	5.3	9.0	12.9	16.5	19.5	22.3	23.3	24.0	25.1	25.7	26.3	26.2	25.3	23.3	20.1	17.1	15.3	12.8	15.5	26.3																						
2-May	11.1	9.3	8.0	7.1	6.1	6.7	10.5	13.9	17.9	20.1	22.7	25.8	27.3	28.1	28.7	29.2	29.4	29.0	28.2	25.8	22.4	20.5	19.8	17.9	19.4	29.4																						
3-May	16.4	15.6	14.5	13.4	12.4	12.0	13.9	16.5	19.1	21.7	25.2	28.3	30.9	33.0	33.6	33.4	33.5	32.7	32.5	28.8	27.7	27.3	23.4	22.7	23.7	33.6																						
4-May	19.8	16.0	14.3	13.4	12.1	12.0	14.1	18.2	22.2	25.2	28.8	31.7	32.5	32.9	32.0	30.2	28.7	27.4	26.3	24.3	22.8	21.2	19.5	17.5	22.6	32.9																						
5-May	15.7	14.4	12.6	11.5	11.1	11.2	12.0	12.8	14.1	16.1	16.7	18.5	18.7	19.3	18.9	19.6	19.2	17.8	17.1	15.5	13.2	11.3	9.4	7.9	14.8	19.6																						
6-May	6.9	6.1	5.0	3.2	2.2	3.5	5.9	10.0	14.0	15.7	17.6	18.3	18.7	19.7	20.8	20.9	21.1	21.2	20.7	19.1	16.1	13.4	11.6	10.5	13.4	21.2																						
7-May	9.3	8.8	8.5	8.1	7.3	7.3	7.8	10.1	11.5	13.2	16.5	19.2	20.3	22.1	24.3	25.7	26.8	26.5	25.0	22.6	20.5	18.6	16.6	15.9	16.4	26.8																						
8-May	15.1	14.5	13.9	13.6	12.5	12.4	12.6	12.4	12.0	10.9	13.4	15.6	17.1	17.8	18.1	18.2	17.5	17.0	15.2	12.9	10.2	7.9	6.4	5.2	13.4	18.2																						
9-May	4.9	4.8	4.9	5.2	5.3	5.1	5.0	6.2	6.1	5.8	6.4	7.0	7.5	8.7	8.5	8.4	8.5	8.9	8.8	8.9	8.2	6.9	6.3	5.8	6.7	8.9																						
10-May	4.7	4.6	3.6	2.7	1.8	2.2	4.0	6.6	8.1	9.6	11.0	12.4	12.7	12.9	13.1	13.0	12.7	12.1	11.1	9.8	8.3	7.2	5.8	3.7	8.1	13.1																						
11-May	2.4	1.5	0.7	0.4	0.4	1.5	3.6	5.6	7.0	7.9	8.4	9.4	10.5	10.8	10.9	11.2	11.0	9.9	9.6	9.0	8.0	6.9	6.1	4.1	6.5	11.2																						
12-May	1.8	1.5	1.5	0.8	0.4	1.5	3.4	5.6	7.5	9.1	10.4	11.6	12.1	12.7	12.9	12.9	13.2	12.7	12.2	11.3	9.6	7.2	4.6	2.6	7.4	13.2																						
13-May	1.3	1.0	0.2	-0.5	-1.1	-0.3	3.0	8.0	12.9	15.0	15.6	17.1	16.9	17.5	18.1	18.0	18.1	17.8	17.3	16.4	14.0	12.8	10.9	8.5	10.8	18.1																						
14-May	6.5	4.1	3.0	2.3	1.5	2.1	5.3	10.1	14.1	17.0	17.9	18.8	19.8	20.6	21.2	21.5	21.7	21.2	20.2	18.7	16.1	12.7	10.9	9.0	13.2	21.7																						
15-May	7.3	5.6	4.0	3.5	3.0	5.3	8.6	12.3	15.9	18.9	21.5	22.8	23.9	24.6	25.5	25.5	25.5	25.3	23.9	21.8	19.4	17.3	16.2	15.1	16.4	25.5																						
16-May	13.7	11.9	10.2	8.6	8.3	10.0	13.2	15.7	18.3	20.8	22.8	24.5	25.0	25.4	25.3	25.4	25.1	24.7	23.1	20.8	18.4	16.2	15.7	14.8	18.2	25.4																						
17-May	12.2	10.8	10.4	11.0	9.7	11.1	13.7	16.2	20.3	22.6	24.4	25.4	25.8	26.8	26.9	27.3	27.8	27.6	27.2	23.7	20.8	18.3	15.9	13.8	19.6	27.8																						
18-May	12.6	12.3	12.5	12.3	10.8	12.2	13.6	15.5	17.7	19.4	21.6	22.9	23.9	23.5	23.9	24.4	24.0	22.5	23.6	19.0	16.8	13.1	11.2	10.5	17.5	24.4																						
19-May	10.1	9.2	8.2	7.6	7.3	6.7	7.1	6.8	6.4	6.0	5.6	4.7	4.3	4.2	4.4	4.4	4.4	4.2	4.0	3.7	3.4	3.2	3.0	3.2	5.5	10.1																						
20-May	3.1	3.1	3.6	3.8	3.8	4.1	4.9	6.2	7.7	9.3	11.0	12.5	14.0	15.2	14.8	15.4	15.1	13.4	11.5	10.2	9.4	9.3	8.7	8.1	9.1	15.4																						
21-May	8.0	7.9	8.2	7.6	7.4	6.4	6.6	7.1	8.1	9.1	10.3	10.7	11.3	11.4	10.4	9.5	8.6	8.1	7.5	7.2	7.1	7.0	7.1	7.2	8.3	11.4																						
22-May	7.3	7.3	7.2	7.2	7.2	7.3	7.5	7.5	6.9	6.7	6.8	7.3	8.5	10.7	12.7	13.7	14.3	14.7	14.6	14.0	12.8	10.5	9.0	7.9	9.6	14.7																						
23-May	7.0	5.3	4.4	3.1	2.9	4.5	7.7	9.5	11.6	14.1	16.3	18.4	19.9	21.0	21.9	22.2	22.4	22.1	21.7	20.7	18.6	15.8	13.1	11.4	14.0	22.4																						
24-May	10.4	10.8	9.9	8.6	7.7	7.9	10.7	13.9	16.2	18.5	20.2	21.4	22.2	22.8	22.4	22.0	21.7	20.6	20.8	19.8	18.6	16.9	15.1	13.4	16.3	22.8																						
25-May	11.9	10.4	9.2	7.9	7.2	8.1	10.6	12.8	15.1	16.6	18.4	19.2	19.1	19.7	20.2	20.8	21.1	20.1	19.1	18.1	16.9	15.7	14.7	13.2	15.3	21.1																						
26-May	12.0	10.9	10.2	8.0	7.0	6.9	7.1	7.9	8.6	10.2	10.5	9.6	8.9	8.7	8.6	9.6	10.1	10.7	10.7	10.0	9.4	9.0	8.2	7.8	9.2	12.0																						
27-May	7.8	7.8	7.7	7.3	7.5	8.0	9.0	12.2	14.7	13.5	13.5	15.2	18.5	20.3	20.2	17.9	15.2	14.3	13.2	12.7	12.4	12.1	12.1	11.8	12.7	20.3																						
28-May	11.4	10.8	10.1	9.9	10.1	10.7	11.7	12.5	13.7	15.3	17.6	19.0	18.5	19.5	15.6	17.0	19.8	19.8	18.1	16.8	15.5	14.5	13.4	13.4	14.8	19.8																						
29-May	13.1	12.3	11.1	10.4	10.1	10.3	11.0	12.0	12.2	12.4	12.7	12.3	12.4	13.4	14.4	14.9	15.0	14.9	15.3	15.0	13.3	11.7	11.1	11.0	12.6	15.3																						
30-May	10.9	10.7	10.4	10.0	10.1	10.7	11.2	11.4	11.9	12.3	12.6	12.7	14.8	13.4	14.7	15.9	16.0	15.5	15.7	14.6	13.1	11.8	10.7	9.6	12.5	16.0																						
31-May	9.1	9.2	8.0	7.4	7.5	8.8	10.1	12.9	14.2	15.4	16.5	17.6	18.5	18.4	19.2	19.7	19.7	20.8	20.4	19.3	16.2	14.1	12.5	10.8	14.4	20.8																						
																								9.3	8.5	7.7	7.0	6.5	7.1	8.7	10.9	12.9	14.4	15.9	17.2	18.0	18.7	18.9	19.1	19.1	18.7	18.1	16.6	14.8	13.1	11.7	10.6	Diurnal Average
																								19.8	16.0	14.5	13.6	12.5	12.4	14.1	18.2	22.2	25.2	28.8	31.7	32.5	33.0	33.6	33.4	33.5	32.7	32.5	28.8	27.7	27.3	23.4	22.7	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	3	0.40	0.40
0 - 10	247	33.20	33.60
10 - 20	355	47.72	81.32
> 20	139	18.68	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

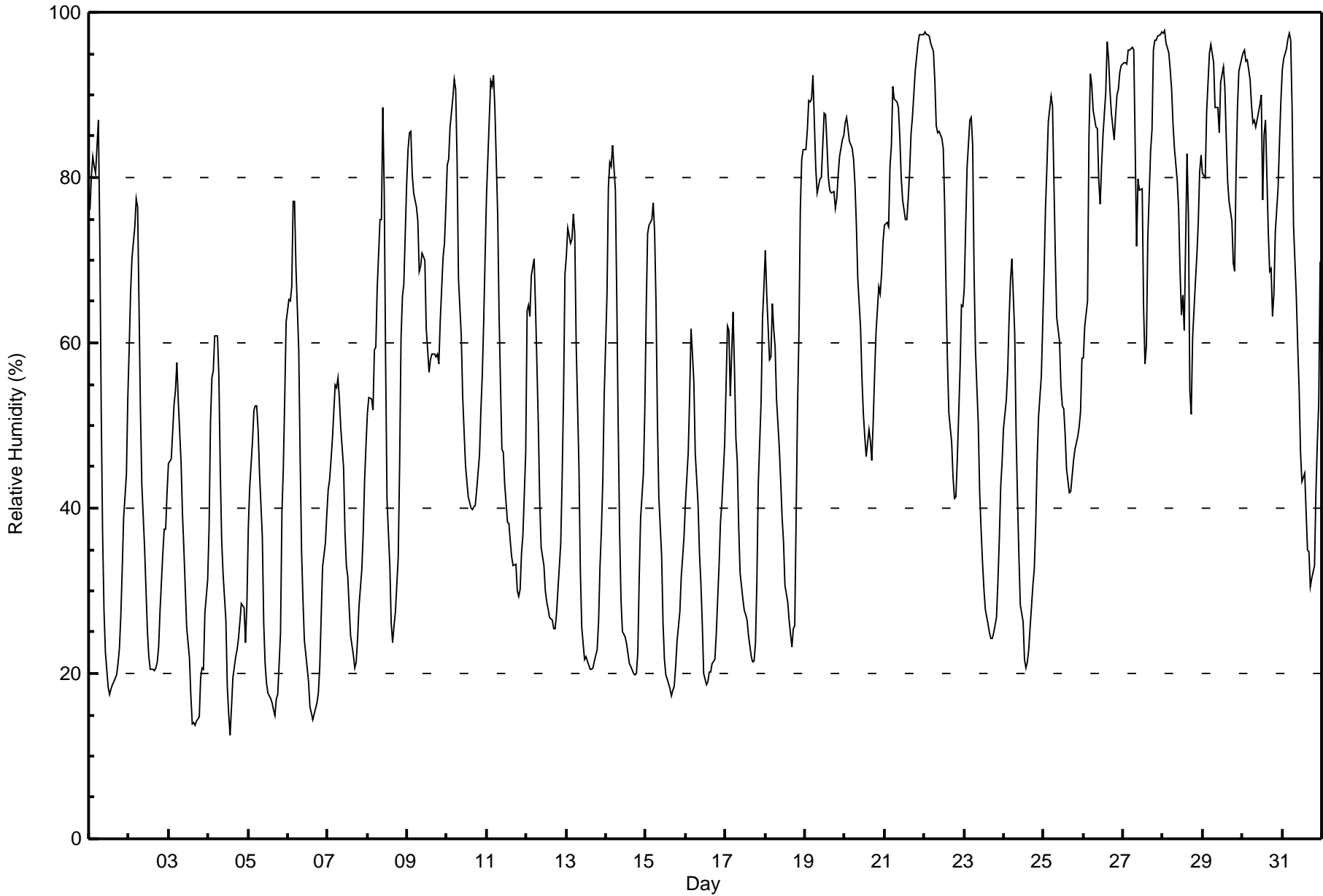
Barge Landing - May 2016

Maximum Value: 98 % on May 28 02:00																			Maximum Daily Average: 85.9 % on May 29						Hours in Service: 744																			
Minimum Value: 13 % on May 4 14:00																			Minimum Daily Average: 31.8 % on May 3						Hours of Data: 744																			
Maximum Diurnal Average: 78.6 % at hour 5																			Minimum Diurnal Average: 38.4 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 55.8 %																			Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 33 Median = 55 Q ₃ = 79 P ₉₀ = 89 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-May	76	80	83	81	80	87	73	52	37	28	23	18	18	18	19	19	20	21	23	27	32	39	44	53	43.8	87																		
2-May	59	66	70	74	77	76	64	52	43	35	30	25	22	21	21	20	21	21	23	28	35	37	37	42	41.7	77																		
3-May	45	46	49	53	54	58	53	46	39	35	30	26	22	17	14	14	14	15	20	21	21	27	31	31.8	58																			
4-May	38	50	56	57	61	61	56	44	36	32	26	19	15	13	16	19	22	23	24	26	28	28	24	29	33.4	61																		
5-May	38	43	48	52	52	52	49	44	37	26	21	19	18	17	16	16	15	17	18	25	40	45	53	63	34.3	63																		
6-May	65	65	67	77	77	69	59	46	35	29	24	21	19	16	15	14	15	16	18	21	27	33	36	39	37.7	77																		
7-May	42	43	46	48	55	55	56	53	50	45	37	33	32	28	25	22	21	21	24	28	33	37	43	48	38.5	56																		
8-May	51	53	53	52	59	60	67	75	75	89	78	58	41	33	26	24	26	27	34	45	60	66	67	79	54.1	89																		
9-May	83	85	86	80	78	76	75	69	69	71	70	62	59	56	58	59	59	58	59	57	63	70	72	76	68.8	86																		
10-May	82	82	86	90	92	91	82	68	61	54	49	45	43	41	40	40	40	40	42	47	52	56	63	70	60.7	92																		
11-May	78	87	92	91	92	88	75	63	55	47	47	43	38	38	36	34	33	33	30	29	30	35	37	47	53.3	92																		
12-May	64	65	63	68	70	64	57	50	41	35	33	30	29	28	27	26	25	25	27	30	36	44	54	68	44.2	70																		
13-May	71	74	72	73	76	73	60	45	32	26	24	22	22	21	20	20	21	21	23	26	33	37	43	54	41.2	76																		
14-May	66	79	82	81	84	78	65	50	37	29	25	24	24	22	21	21	20	20	20	23	32	39	44	52	43.3	84																		
15-May	64	73	74	75	77	73	65	51	41	34	26	22	20	19	18	17	18	19	21	24	27	32	34	37	40.1	77																		
16-May	41	47	54	62	59	55	47	40	35	31	26	20	19	19	20	20	21	22	25	29	33	38	41	48	35.4	62																		
17-May	55	62	62	54	64	57	48	46	38	32	29	28	27	26	25	22	21	22	24	31	43	53	63	67	41.5	67																		
18-May	71	66	58	58	65	62	59	53	47	43	39	36	31	29	26	25	23	25	26	52	61	76	82	83	49.9	83																		
19-May	83	86	89	89	90	92	81	78	79	80	80	88	88	84	80	79	78	78	76	77	80	83	84	85	82.8	92																		
20-May	87	87	86	84	84	82	79	74	68	62	56	51	49	46	49	48	46	50	56	61	67	66	68	72	65.8	87																		
21-May	74	75	74	81	84	91	89	89	88	85	80	77	75	75	77	81	85	87	93	95	96	97	97	97	85.2	97																		
22-May	98	97	97	97	96	95	92	86	85	86	85	84	77	66	58	52	48	44	41	41	46	57	65	64	73.2	98																		
23-May	67	74	81	87	87	84	69	59	50	42	37	34	30	28	26	25	24	24	25	27	31	36	42	46	47.3	87																		
24-May	50	53	57	63	68	70	61	49	41	34	28	26	22	21	21	23	26	31	33	38	46	51	56	62	42.9	70																		
25-May	69	76	81	87	90	89	79	70	63	60	55	52	52	49	45	42	42	44	46	47	49	50	52	58	60.3	90																		
26-May	58	62	65	85	92	91	88	86	86	80	77	81	85	90	96	94	91	88	85	87	90	91	93	94	84.8	96																		
27-May	94	94	94	95	95	96	95	84	72	80	78	79	64	57	60	73	83	86	95	97	97	97	97	98	85.8	98																		
28-May	97	98	96	95	93	91	86	84	80	76	69	63	66	62	83	75	54	51	61	67	71	74	81	83	77.3	98																		
29-May	80	80	88	92	95	96	94	88	88	88	85	92	93	91	85	79	77	75	70	69	81	88	93	94	85.9	96																		
30-May	95	95	94	94	92	89	87	87	86	87	89	90	77	85	87	73	69	69	63	66	73	79	84	89	83.4	95																		
31-May	93	94	96	97	97	97	88	74	66	60	54	47	43	44	39	35	35	31	32	33	42	48	53	70	61.1	97																		
																			68.8	72.2	74.1	76.5	78.6	77.4	71.0	63.1	56.8	52.9	48.8	45.6	42.5	40.7	40.3	39.1	38.4	38.9	40.3	44.3	50.1	54.9	59.0	64.4	Diurnal Average	
																			98	98	97	97	97	97	95	89	88	89	89	92	93	91	96	94	91	88	95	97	97	97	97	98	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - May 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Barge Landing - May 2016

Maximum Speed: 19 km/h on May 8 17:00	Maximum Daily Speed Average: 13.8 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 29 06:00	Minimum Daily Speed Average: 1.0 km/h on May 27	Hours of Data: 742
Maximum Diurnal Speed Average: 3.5 km/h at hour 17	Minimum Diurnal Speed Average: 0.5 km/h at hour 6	Hours of Missing Data: 2
Monthly Average Velocity: 1.7 km/h 348.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 16	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SE2	SW2	SSW4	SSW4	SSW4	SSE6	SSE5	S7	SSE8	SSW8	SSW9	SW10	WSW12	WSW11	W10	W9	W8	NW10	NW8	NNW6	N2	NNW1	W2	S2	SW3.7	WSW12
2-May	W3	SSE1	SSW2	SE3	SSE3	SE3	S2	NE2	WSW4	ENE4	NNE4	W2	WNW5	SW2	SW4	SSW2	ESE5	E4	SE5	SE4	SE4	SE6	SSE9	S4	SSE1.8	SSE9
3-May	SSE3	SSE3	SE3	SSE5	SSE6	SE4	SSE5	S8	S9	S8	S7	S9	SSW8	S7	SW13	SSW11	SSW11	SSW11	SSW9	S6	SSW10	SSE4	SE4	SW4	S6.4	SW13
4-May	SSW3	S2	S4	SSW4	S4	SSE3	S5	SSW3	SSW4	S4	SSW6	WSW7	WSW8	SW10	WNW10	NW14	NW14	WNW11	WNW15	W10	WNW6	WNW7	NW10	NW9	W4.9	WNW15
5-May	NW7	NW10	NW7	NW4	WNW4	WSW6	W7	W6	NW6	NW9	NW9	WNW13	NW14	WNW13	WNW13	NW12	NW13	NW10	NW12	N8	NNE7	NNE5	N3	W2	NW7.5	NW14
6-May	W4	WSW6	N1	W3	W4	WNW4	WSW4	WSW4	W3	N4	NNW8	WNW7	WNW4	NW8	WNW6	WSW7	W7	WSW9	WSW7	WSW5	S4	SSE7	SSE7	SSE6	W3.5	WSW9
7-May	SE5	SE6	SE4	SSE4	SE4	SE5	SSE6	S7	S7	S7	SSW7	S6	SE5	SE7	SE8	SSE5	SW8	SSW7	SSE7	E4	E4	NE2	ENE2	NE3	SSE4.2	SW8
8-May	N3	NNW5	NNW4	NW3	WNW3	S1	WSW4	WNW12	WNW9	WSW4	SW7	WSW9	WSW13	WSW15	W15	WSW18	WSW19	WSW17	WSW16	WNW12	NW12	NNW12	NW9	NW9	W7.9	WSW19
9-May	WNW8	W6	W9	WSW10	W8	W9	WSW10	WNW9	WNW10	WNW9	WNW8	NW11	NW11	NW10	NW9	NW10	WNW8	NW7	WNW6	WNW5	N6	NNE7	NNW4	WNW3	WNW7.1	NW11
10-May	W4	W3	W3	WNW3	NW4	NW4	NNW4	NNE4	NNE6	NE6	ENE7	NE9	ENE10	NE10	NE10	NE10	NE10	NE10	NE10	ENE9	NE7	ENE5	ENE1	NE5.3	NE10	
11-May	N2	NNW4	NNW3	NNW4	NNW4	NNW5	N6	NNE8	NE9	NNE10	NNE10	NNE11	NE12	NE12	NE13	NNE11	NNE11	NNE12	NNE12	NNE11	NE9	NE7	NE7	N4	NNE7.7	NE13
12-May	NW3	NNW4	N4	NNW3	NNW4	N5	N5	N5	NNE7	NE9	NE10	NE10	NE11	NE10	NE10	NE9	NNE9	NNE9	NE10	NNE8	NE5	N2	W2	W2	NNE5.7	NE11
13-May	WSW3	W4	WSW4	SSW3	SSE3	S4	SSW4	SSW4	SW4	SW3	WSW5	WSW5	WNW4	NW4	N5	N3	N4	N3	NE4	NE5	NE4	NE5	NE3	NNW3	WNW1.0	N5
14-May	NW2	AF	WSW1	WSW2	WSW2	SW3	WSW3	WSW4	WSW5	WSW4	ENE4	ENE6	NNE6	ENE7	ENE7	NE7	NE6	NE7	NE8	NE6	E3	S2	AF	NNW1	NE1.9	NE8
15-May	NNW3	WSW3	SSE3	SSW3	SSW3	S4	SSW3	SSW5	S6	S7	SW6	SW2	SSE4	SSW2	WSW4	S7	S7	S8	SSE8	S7	S7	S6	S7	S6	S4.5	S8
16-May	S6	S3	S2	SSW3	S4	S6	SSE6	S7	S7	S6	SSW8	SW13	SW14	S11	SE13	SE11	SE9	SE9	SE6	ESE5	ESE5	ESE4	NE2	NNW4	SSE5.2	SW14
17-May	ESE0	WSW2	SSW2	S4	SSW4	SSW5	SW8	SW7	W7	NW6	NW5	NW2	NNE1	WSW7	W9	WSW9	WSW6	WNW4	NNW1	N2	N3	NW4	W3	SW2	WSW3.2	WSW9
18-May	S3	SSW4	SW5	SSW4	SSE4	SSW6	S5	SSW6	SW8	SW10	WSW11	WSW12	WSW13	WSW14	WSW12	W10	W11	W8	WNW1	NNE9	N11	N12	N13	N10	W4.2	WSW14
19-May	N11	N13	N12	N13	N11	N11	NNE14	NNE14	NNE16	NNE15	N14	NNE17	NNE14	NNE16	NNE15	NNE16	NNE17	NNE15	NNE16	NNE15	NNE13	NNE12	NNE11	NNE10	NNE13.8	NNE17
20-May	N11	NNE11	NNE12	NNE12	NNE12	NNE12	NNE11	NNE11	NE11	NE11	NE11	NNE12	NE11	NNE12	NNE12	NNE11	N12	N10	N9	N8	NNE7	NNE7	NNW6	NNW5	NNE10.0	NNE12
21-May	NNW4	N3	ENE5	NE4	NNE7	NNE7	NNE8	NNE6	N7	N8	NNE9	NNE9	NNE9	NNE8	NNE11	NNE10	N10	N10	N7	N8	N8	N8	N8	N9	NNE7.5	NNE11
22-May	NNE9	N8	N7	N8	N10	N9	NNE9	NNE12	NNE13	NNE14	NNE13	NNE12	NNE14	NNE14	NNE13	NNE15	NNE14	NE14	NNE15	NNE12	NNE9	N7	N7	N8	NNE11.0	NNE15
23-May	N7	NNW4	NNW2	NNW5	NNW4	N4	NNE7	NNE9	NNE9	NNE9	NE9	NE8	NNE8	NNE9	NNE8	NNE8	NNE8	NE7	NE7	E5	ESE4	SE5	SE5	SSE5	NNE5.1	NE9
24-May	S6	S9	S5	S4	SSE4	SSE5	S7	SSW7	SSW8	SSW6	S8	SSE13	S13	SSE14	SSE9	SSW5	WSW4	ESE3	ESE4	SE6	S8	SSW7	SSW7	S6	S6.4	SSE14
25-May	SSW4	S4	SSW4	S4	SE3	WNW1	NNW1	NNW2	ENE4	NNE6	NNE6	NNE9	NE9	NNE9	NE9	NE9	NNE9	N9	NNE11	NE8	NNW9	NNE9	NNE9	NNE9	NNE4.9	NNE11
26-May	NNE8	NNE9	N8	N8	N7	NNE8	NNE8	NNE9	NNE7	N9	N9	NNW9	N11	NNW4	N8	N9	N9	N8	N9	N7	NNE6	NNE6	N6	N6	N7.5	N11
27-May	N4	N4	N4	N4	N4	N5	NNW4	NE4	NNW2	SE3	SE3	NE4	NE5	NNE5	NNW6	W5	W3	S8	SSE7	ESE6	ESE7	SW3	S3	E4	NE1.0	S8
28-May	SSE2	E3	SE5	ESE4	SSW3	SE3	SE3	SE7	SSE6	SW4	SW5	SSE8	S6	SSW8	SSW8	SSW2	SSW5	SW6	SW6	SW5	SSE4	S1	SSE3	SW4	S3.7	SSE8
29-May	WSW4	SW4	WSW5	SW5	S5	E0	WSW3	WNW1	SW4	SW4	WSW5	SSW4	S3	W2	NW3	NW3	NNW2	ENE5	NE5	NNE5	N4	NNW3	NW2	NNW3	W1.3	NNE5
30-May	NNW4	NW4	NW3	NW2	NNW4	NNW3	WNW4	NNW3	NNW4	N5	N6	NNE5	NNE4	NNW7	NNW7	NNW9	NNW9	NNW8	NNW7	N8	N5	N5	N4	NNW2	NNW4.8	NNW9
31-May	W1	WSW3	W1	SW1	WSW1	WNW2	W2	NNW3	N5	ENE5	E4	E2	WSW4	WNW2	SSW6	SW3	N3	SSW3	SSE7	S7	SE5	SSE5	SSE6	W1	SSW1.1	SSE7

NNW1.5	NW1.5	NW1.1	NW0.9	NNW0.8	N0.5	NW0.7	NNW0.8	NNW1.2	N1.6	NNW1.4	NNW1.6	NNW1.9	NNW1.9	NNW2.7	NNW2.8	NNW3.5	NNW2.8	N2.5	NNE3.2	NE2.8	NNE2.4	NNE1.7	NNW1.9	Diurnal Average	
N11	N13	N12	N13	NNE12	NNE12	NNE14	NNE14	NNE16	NNE15	N14	NNE17	NW14	NNE16	NNE15	WSW18	WSW19	WSW17	NNE16	NNE15	NNE13	NNW12	N13	N10	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

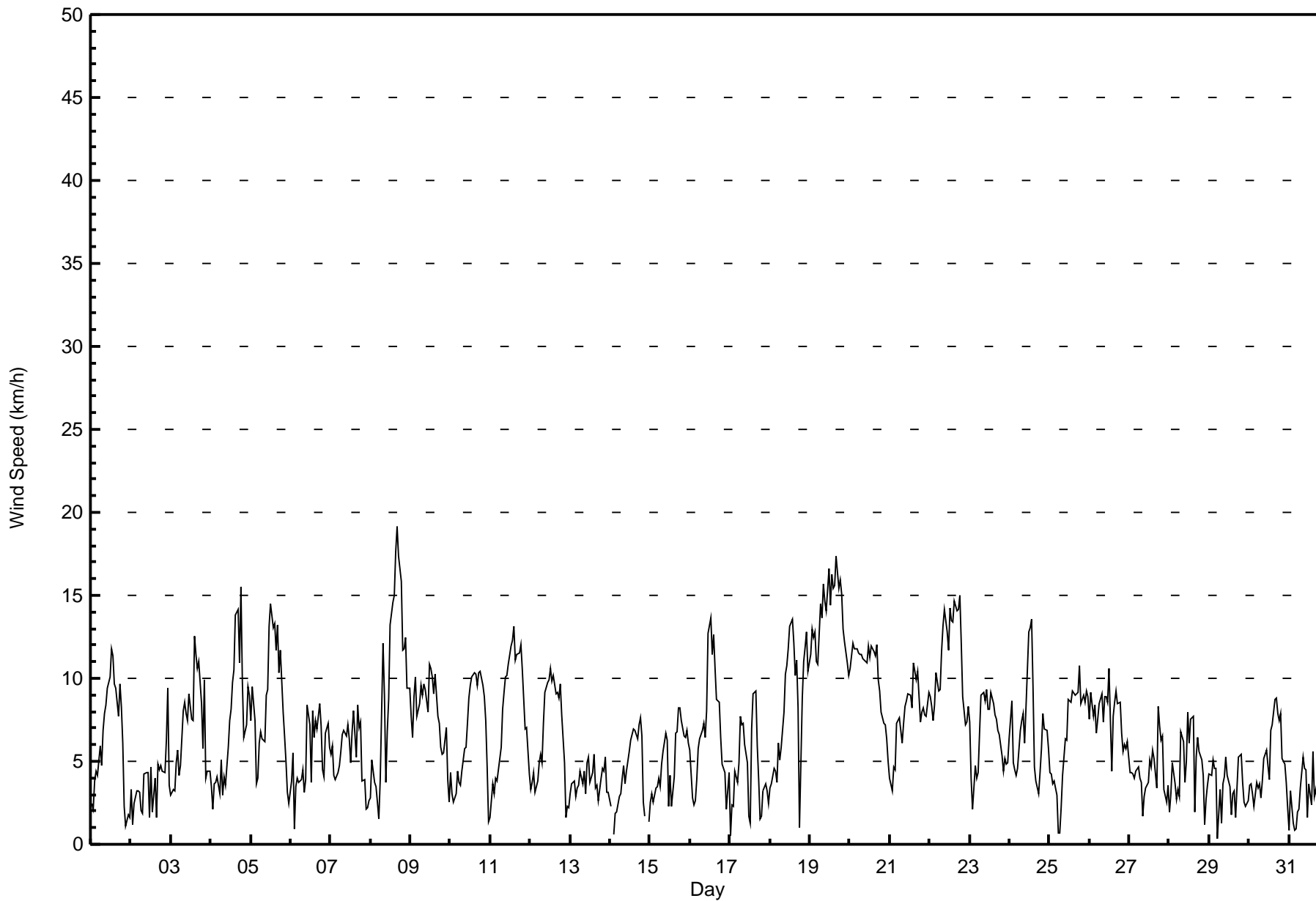
Wind Speed (WS) - km/h
Barge Landing - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on May 4 19:00 Minimum Value: 0 km/h on May 30 00:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1	1	1	1	1	1	1	2	2	3	3	4	4	4	4	3	3	3	3	2	1	1	1	1	4
2-May	2	1	1	1	2	1	1	1	1	1	1	2	2	2	2	3	3	2	2	1	1	1	3	1	3
3-May	1	1	1	1	2	1	1	3	3	2	3	3	4	5	5	4	4	3	1	6	2	1	3	6	
4-May	1	1	2	1	2	1	2	1	2	2	2	3	3	4	5	5	6	5	6	4	3	3	4	3	6
5-May	3	3	3	1	1	1	2	2	2	3	4	5	6	6	5	5	5	4	4	3	2	2	1	1	6
6-May	1	2	1	1	2	1	1	2	2	3	3	4	3	4	4	4	3	3	4	2	1	2	2	1	4
7-May	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	2	3	2	2	1	1	1	3
8-May	1	2	2	1	2	2	4	5	4	3	3	4	4	5	5	5	6	6	5	5	4	4	3	4	6
9-May	3	2	3	3	2	3	3	4	4	3	4	4	4	4	3	4	3	3	2	2	2	2	1	1	4
10-May	1	2	1	1	1	1	1	2	2	2	3	3	3	3	4	3	3	3	4	3	3	2	2	1	4
11-May	1	1	1	1	1	1	2	3	3	3	3	4	4	4	5	4	4	4	4	3	3	2	2	2	5
12-May	1	1	1	1	1	1	1	1	3	3	4	4	4	4	3	3	3	3	3	2	2	1	1	1	4
13-May	1	1	1	1	1	1	1	1	2	3	4	3	3	3	2	2	2	2	2	1	1	2	2	1	4
14-May	1	AF	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	2	2	1	2	AF	1	3
15-May	1	1	1	1	1	1	1	2	2	2	3	2	2	2	3	3	3	3	3	2	2	2	2	2	3
16-May	1	1	1	2	1	2	2	2	2	2	3	5	5	5	4	3	3	2	2	1	1	1	2	1	5
17-May	1	1	1	1	2	1	3	2	2	2	2	2	1	3	4	3	3	2	1	2	1	1	1	1	4
18-May	1	1	2	1	1	2	2	2	2	3	3	4	4	4	4	4	4	5	3	3	4	4	4	3	5
19-May	4	4	4	4	3	3	4	4	5	5	4	5	5	5	5	5	5	5	5	5	4	4	3	3	5
20-May	3	3	4	3	4	3	3	3	4	3	4	4	4	4	3	4	4	3	3	3	2	2	2	2	4
21-May	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	3
22-May	3	3	2	3	3	3	3	4	4	4	4	4	4	4	4	5	4	4	4	4	2	2	2	2	5
23-May	2	1	1	2	1	1	2	2	3	3	3	3	3	3	3	3	2	2	2	1	2	1	1	3	
24-May	2	3	2	1	1	1	2	2	3	2	3	5	5	5	4	3	2	1	1	1	3	2	2	2	5
25-May	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	2	3	3	3	3
26-May	2	3	2	3	2	3	3	3	2	3	3	3	4	3	3	3	3	3	3	2	2	2	1	2	4
27-May	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	4	2	4	2	2	2	2	1	2	4
28-May	1	1	1	1	1	1	2	2	2	1	3	3	2	3	4	2	3	2	2	2	1	1	1	1	4
29-May	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	0	3
30-May	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	3	3	3	2	2	2	1	1	1	3
31-May	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	3	1	2	3	2	1	1	1	1	3
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	329	44.34	44.34
6 - 11	333	44.88	89.22
12 - 19	80	10.78	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	31	9	15	9	10	9	23	22	25	33	21	28	22	18	15	39	329
6 - 11	48	65	38	6	0	2	10	17	37	23	10	15	16	14	21	11	333
12 - 19	7	36	4	0	0	0	1	2	1	0	3	11	1	6	6	2	80
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	86	110	57	15	10	11	34	41	63	56	34	54	39	38	42	52	742

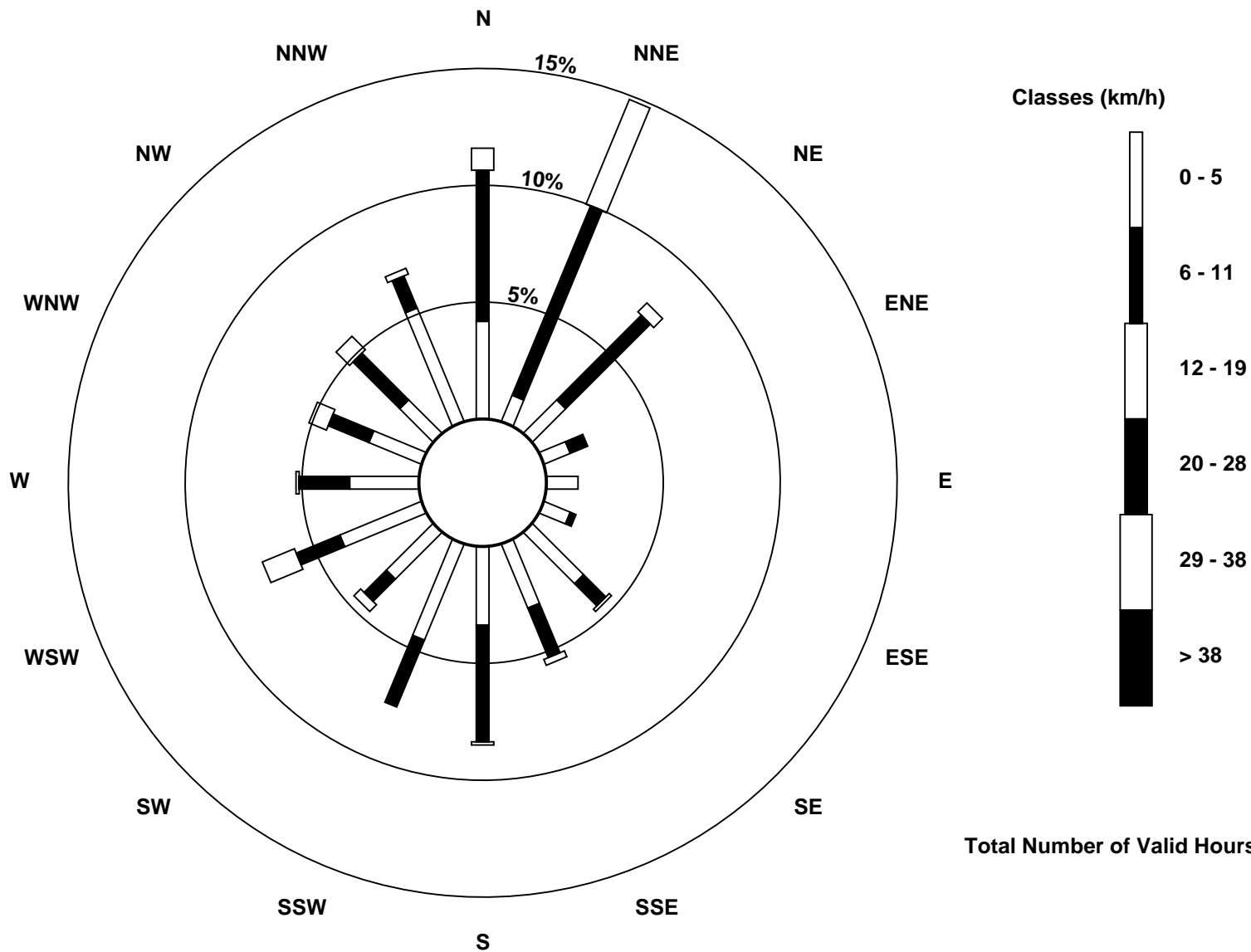
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Barge Landing (AMS 9)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - May 2016

Direction of Maximum Speed: 247 deg on May 8 17:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 14.5 deg on May 19	Hours of Data: 742
Direction of Minimum Speed: 90 deg on May 29 06:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.0 deg on May 27	Percent Operational Time: 99.7
Monthly Average Direction: 278.6 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-May	144	228	212	192	194	148	155	178	165	193	202	224	245	258	265	262	269	324	325	335	355	332	271	170	235.1
2-May	268	159	211	139	159	143	169	42	256	58	24	277	286	218	224	199	116	96	130	124	132	129	148	175	148.7
3-May	155	147	131	162	155	142	168	178	179	183	188	181	193	189	223	199	210	204	205	173	194	167	133	225	186.6
4-May	213	188	191	198	174	156	185	194	200	180	207	245	238	214	294	308	312	302	282	274	299	301	305	319	268.1
5-May	317	319	316	304	301	254	269	281	305	313	306	291	307	296	303	308	309	320	326	352	33	32	5	281	310.6
6-May	265	241	352	274	266	294	254	242	259	359	332	285	296	313	282	254	270	258	247	237	184	161	156	148	260.4
7-May	124	133	141	152	125	146	162	175	183	185	208	189	145	129	126	160	232	202	153	95	99	51	67	46	156.2
8-May	355	342	337	324	300	171	244	282	287	240	214	248	250	257	260	240	247	246	243	301	318	329	314	309	271.1
9-May	298	272	269	256	264	268	255	282	293	296	293	311	314	309	305	314	298	313	291	299	352	25	348	297	295.8
10-May	264	267	278	295	325	321	339	28	32	43	62	55	57	51	52	43	44	37	39	49	57	55	72	59	39.5
11-May	349	345	346	343	341	342	353	28	37	30	17	26	40	44	49	32	33	25	24	25	35	39	38	352	26.0
12-May	325	345	354	340	340	352	354	10	32	38	52	38	43	43	42	44	28	28	36	32	49	353	270	264	26.6
13-May	251	263	249	201	153	173	212	211	233	216	248	250	286	309	356	7	354	356	35	44	46	49	38	346	293.4
14-May	325	AF	257	251	247	221	242	250	248	239	76	65	26	72	60	52	34	48	51	56	82	179	AF	299	46.5
15-May	340	247	148	206	207	177	194	195	183	178	219	234	150	198	237	169	177	177	166	174	176	182	181	180	185.5
16-May	172	188	182	210	188	175	159	177	184	186	198	219	220	172	140	143	124	126	127	114	114	121	36	345	166.5
17-May	110	240	211	191	213	207	222	235	269	318	306	307	20	245	262	247	253	296	337	355	4	323	262	221	257.7
18-May	170	211	222	208	165	193	181	197	226	232	239	242	251	250	257	261	267	272	288	13	10	10	11	6	261.0
19-May	8	7	5	6	7	11	21	25	18	12	11	14	16	12	15	18	24	17	18	19	14	12	13	14	14.5
20-May	10	12	16	19	19	23	19	28	45	36	36	31	40	31	33	17	9	360	0	6	17	14	343	339	20.0
21-May	330	11	61	39	29	27	27	14	9	11	22	12	29	24	16	13	11	11	5	359	2	3	3	9	14.6
22-May	15	8	4	0	2	10	16	23	17	15	25	21	21	29	25	27	29	34	27	29	22	355	356	355	18.3
23-May	356	348	334	343	339	355	18	29	29	28	45	42	24	23	21	20	33	35	41	79	107	141	137	154	32.0
24-May	169	172	170	189	167	159	185	195	212	197	189	164	178	163	163	207	257	117	121	140	190	204	197	185	178.7
25-May	193	171	192	171	133	300	328	347	60	32	21	22	35	30	35	39	15	5	31	36	26	17	20	24	30.3
26-May	14	14	3	9	358	25	28	32	16	356	351	331	1	344	351	354	4	0	1	6	14	15	356	359	4.4
27-May	2	354	358	8	357	351	348	38	346	133	128	51	56	13	329	263	264	187	154	122	119	218	180	96	44.1
28-May	150	92	126	120	199	129	139	143	148	223	214	153	177	192	196	209	204	214	218	219	163	191	153	235	178.1
29-May	245	217	238	231	187	90	244	292	220	232	239	204	183	270	324	312	338	62	49	26	357	335	318	330	261.3
30-May	335	325	324	319	327	327	294	327	338	349	5	14	15	334	341	343	332	340	347	6	360	358	356	345	343.9
31-May	280	258	262	232	251	282	277	338	352	65	86	87	241	288	204	224	355	208	166	186	145	149	148	275	191.4

330.2 323.0 323.2 305.8 326.5 356.9 305.2 336.7 333.1 358.5 346.7 331.6 339.9 336.8 337.4 334.0 334.8 346.8 8.6 22.8 34.8 22.1 14.1 343.4
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Barge Landing - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 102 deg on May 2 14:00	Hours of Data: 742
Minimum Value: 7 deg on May 23 23:00	Hours of Missing Data: 2
Percentiles: P ₁ = 11 P ₁₀ = 19 Q ₁ = 22 Median = 27 O ₃ = 36 P ₉₀ = 54 P ₉₉ = 95	Hours of Calibration: 0
	Percent Operational Time: 99.7

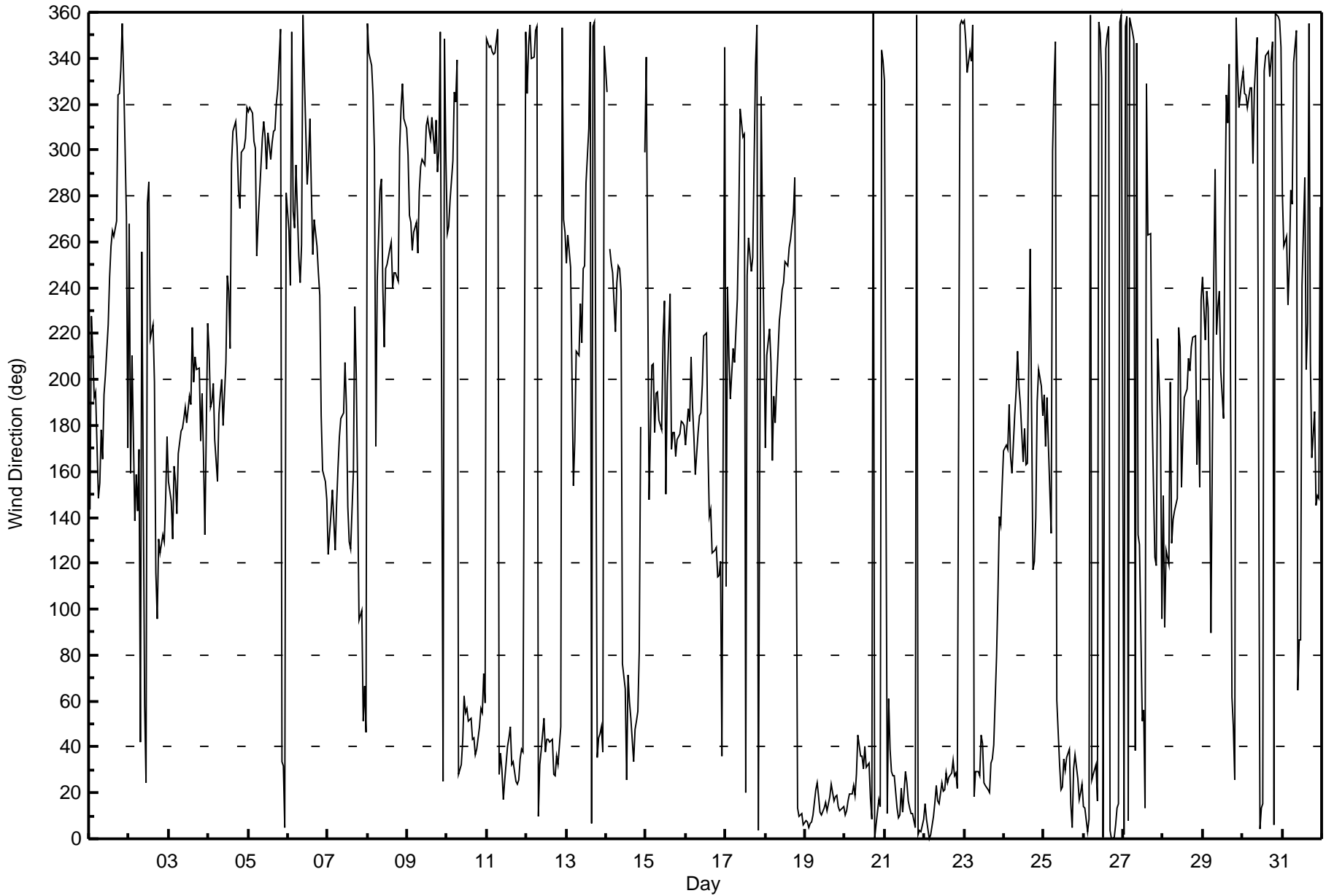
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	26	27	23	27	39	14	27	25	30	33	35	40	29	32	39	38	47	27	24	20	18	66	50	52	66	
2-May	24	73	36	38	40	40	66	63	36	42	44	99	60	102	73	98	59	51	25	11	25	14	16	29	102	
3-May	37	23	13	13	16	16	28	28	30	32	46	31	41	53	31	34	37	30	27	13	29	77	35	60	77	
4-May	39	70	41	22	32	30	32	56	51	83	41	46	40	40	55	30	28	32	31	30	28	29	29	25	83	
5-May	26	24	23	26	22	20	30	34	29	34	32	34	32	36	32	34	32	32	25	29	20	25	22	44	44	
6-May	31	25	83	38	42	34	27	41	67	86	38	56	85	50	60	66	47	36	28	24	19	13	15	13	86	
7-May	12	11	14	17	10	11	17	25	25	27	32	35	38	28	26	64	32	37	23	41	50	47	56	45	64	
8-May	28	26	65	42	72	85	46	31	37	73	36	35	24	27	27	24	20	22	21	35	23	23	28	29	85	
9-May	29	30	26	22	24	24	20	34	33	29	34	29	27	31	31	27	32	36	35	33	31	22	23	24	36	
10-May	17	35	30	37	19	33	27	37	33	40	36	29	29	30	29	28	27	23	21	23	20	19	20	52	52	
11-May	28	11	19	11	13	15	21	28	26	25	29	28	25	28	23	26	28	26	22	21	19	18	19	25	29	
12-May	12	12	13	16	13	17	19	30	27	29	31	32	28	30	29	30	32	30	21	21	17	45	38	18	45	
13-May	12	14	10	31	29	21	31	50	51	86	77	63	68	79	66	66	58	61	33	28	19	19	45	16	86	
14-May	28	AF	44	11	17	20	18	35	36	62	58	52	43	42	36	37	41	26	23	21	41	55	AF	35	62	
15-May	12	30	43	29	21	21	37	35	38	30	42	100	72	97	84	45	45	32	28	21	19	20	22	21	100	
16-May	16	31	32	48	32	32	23	26	29	39	32	33	32	40	24	21	19	15	17	20	19	20	49	15	49	
17-May	82	39	51	27	39	28	28	25	33	32	50	82	96	48	33	29	52	49	50	54	36	20	26	50	96	
18-May	25	26	27	28	24	27	29	29	27	23	25	29	27	23	26	32	34	37	85	28	24	23	21	24	85	
19-May	23	24	24	23	23	23	21	21	22	22	22	22	22	23	23	21	20	22	21	21	22	23	22	22	24	24
20-May	22	23	21	21	21	20	21	23	23	23	24	23	24	24	22	24	23	26	22	22	21	24	21	21	26	
21-May	19	28	23	23	19	23	21	23	27	25	27	28	23	25	22	23	22	23	23	22	23	21	21	22	28	
22-May	22	21	22	21	22	23	21	22	22	22	22	22	23	24	25	22	23	21	21	21	19	18	18	20	25	
23-May	20	24	44	17	19	21	23	23	24	28	31	36	36	35	35	39	32	32	26	29	16	24	7	10	44	
24-May	17	21	17	18	17	20	26	32	33	52	42	33	33	32	38	60	35	35	19	18	28	23	22	21	60	
25-May	21	17	19	20	19	47	80	54	46	36	36	28	27	26	28	24	33	26	22	20	23	22	22	23	80	
26-May	22	21	23	22	24	24	23	23	28	24	25	23	26	50	29	25	24	25	25	23	24	24	21	21	50	
27-May	21	20	21	19	23	18	18	37	78	76	57	40	49	54	24	58	55	30	22	33	20	30	58	30	78	
28-May	48	16	20	27	48	26	32	20	30	38	46	34	30	37	40	91	54	37	26	33	22	72	34	28	91	
29-May	21	31	22	27	39	86	28	83	31	27	23	25	32	70	35	44	67	26	26	22	24	32	33	19	86	
30-May	14	16	22	19	18	21	26	28	24	26	29	34	59	38	24	25	22	23	26	23	20	19	14	16	59	
31-May	49	15	34	76	80	31	36	54	38	48	58	99	82	94	42	91	47	94	34	29	9	8	17	70	99	
	82	73	83	76	80	86	80	83	78	86	77	100	96	102	84	98	67	94	85	54	50	77	58	70		
	Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - May 2016





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	May 2, 2016	Last Calibration	April 7, 2016
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	12:21
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	1021	1017
Calculated slope	0.997508	0.999362	Chamber temp	45	45
Calculated intercept	-0.052008	-0.042191	Pressure	699.4	687.6
Analyzer Background	2.1	2.07	Flow	0.441	0.434
Analyzer Coefficient	1.058	1.038	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	83.8	79.9	81.5	0.981
SO2 scrubber check	5000	15.4	147.2	0.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.8	79.9	79.9	1.000
second point	5000	41.9	40.0	40.2	0.993
third point	5000	21.0	20.0	20.1	0.996
as left zero	6000	0.0	0.0	-0.1	----
as left span	5000	83.8	79.9	79.4	1.007
Average Correction Factor					0.996

Corrected As found	81.6	Previous response	80.2	% change	-1.7%
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Notes:

Changed inlet filter after as founds. Scrubber check done after as founds. Adjusted span.

Calibration Performed By:

Evan Magill



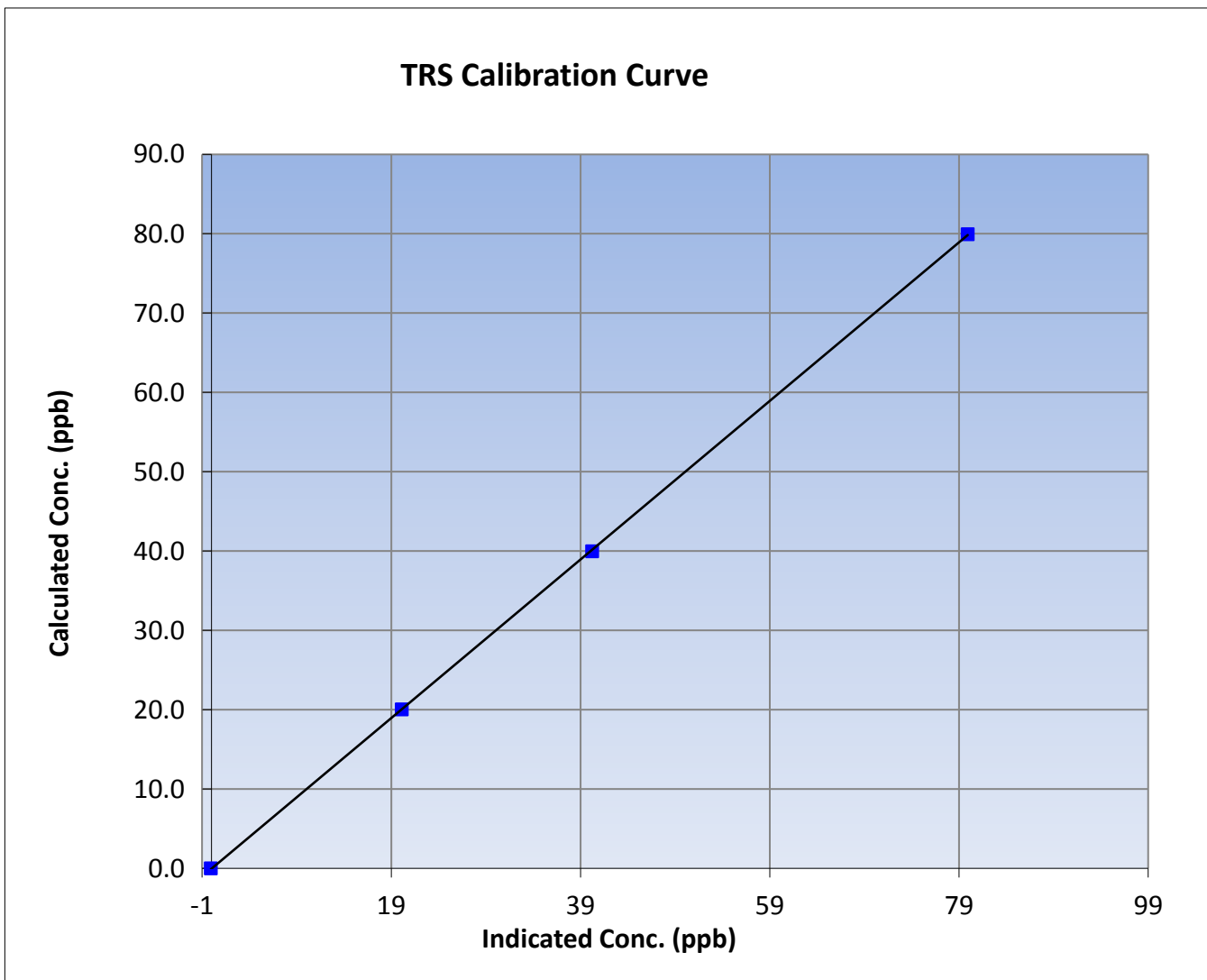
Wood Buffalo Environmental Association TRS Calibration Report

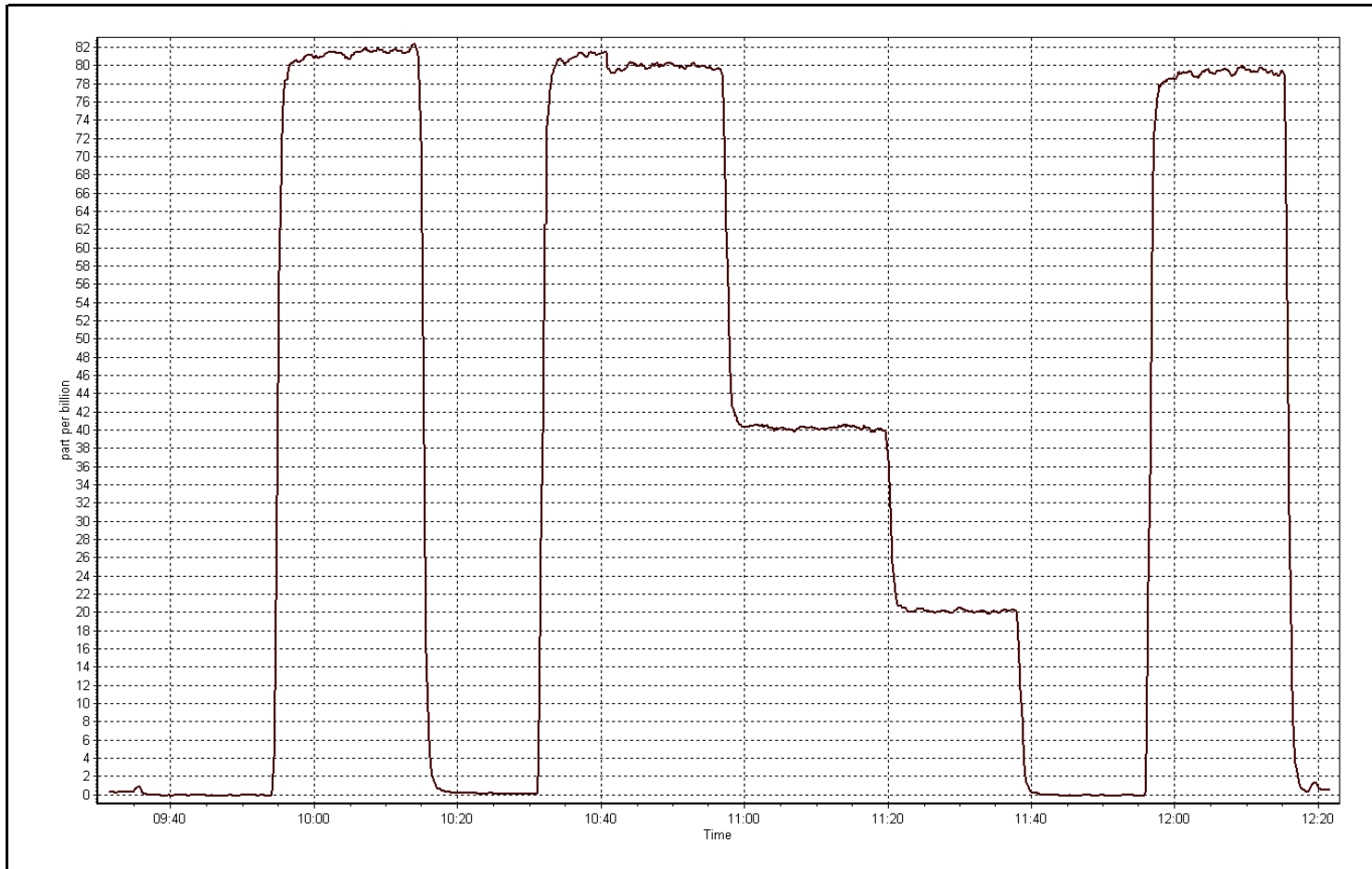
Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 7, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:35	End Time (MST)	12:21
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	0.999981
79.9	79.9	1.0002		
40.0	40.2	0.9934	Slope	0.999362
20.0	20.1	0.9957		
			Intercept	-0.042191







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-02-16	Last Calibration	April-08-16
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	12:20	End Time (MST)	14:35
Gas Cert Reference	LL104180	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	0.999702	1.002775	Fuel Pressure	24.1	24.1
Calculated intercept	0.033413	-0.015001	Analyzer Coeff	4.264	4.264
			Analyzer BKG	5.62	5.62

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	76.7	15.70	15.66	1.003
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	76.7	15.70	15.66	1.003
second point	5000	41.0	8.39	8.41	0.998
third point	5000	15.4	3.15	3.15	1.001
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	76.7	15.70	15.63	1.005
Average Correction Factor					1.000

Corrected As found	15.65	Previous response	15.67	% change	0.1%
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Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By:

Evan Magill



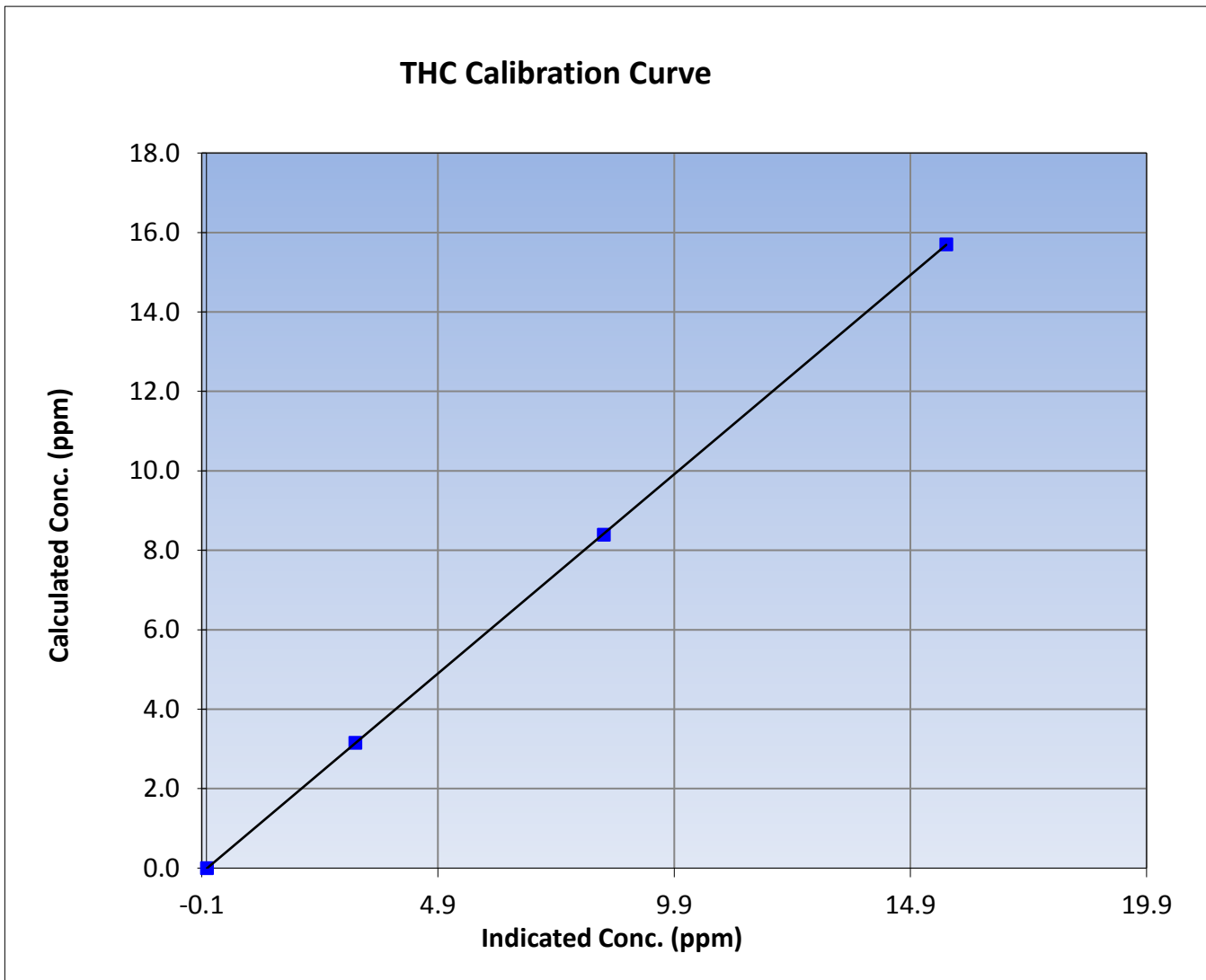
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 8, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:20	End Time (MST)	14:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

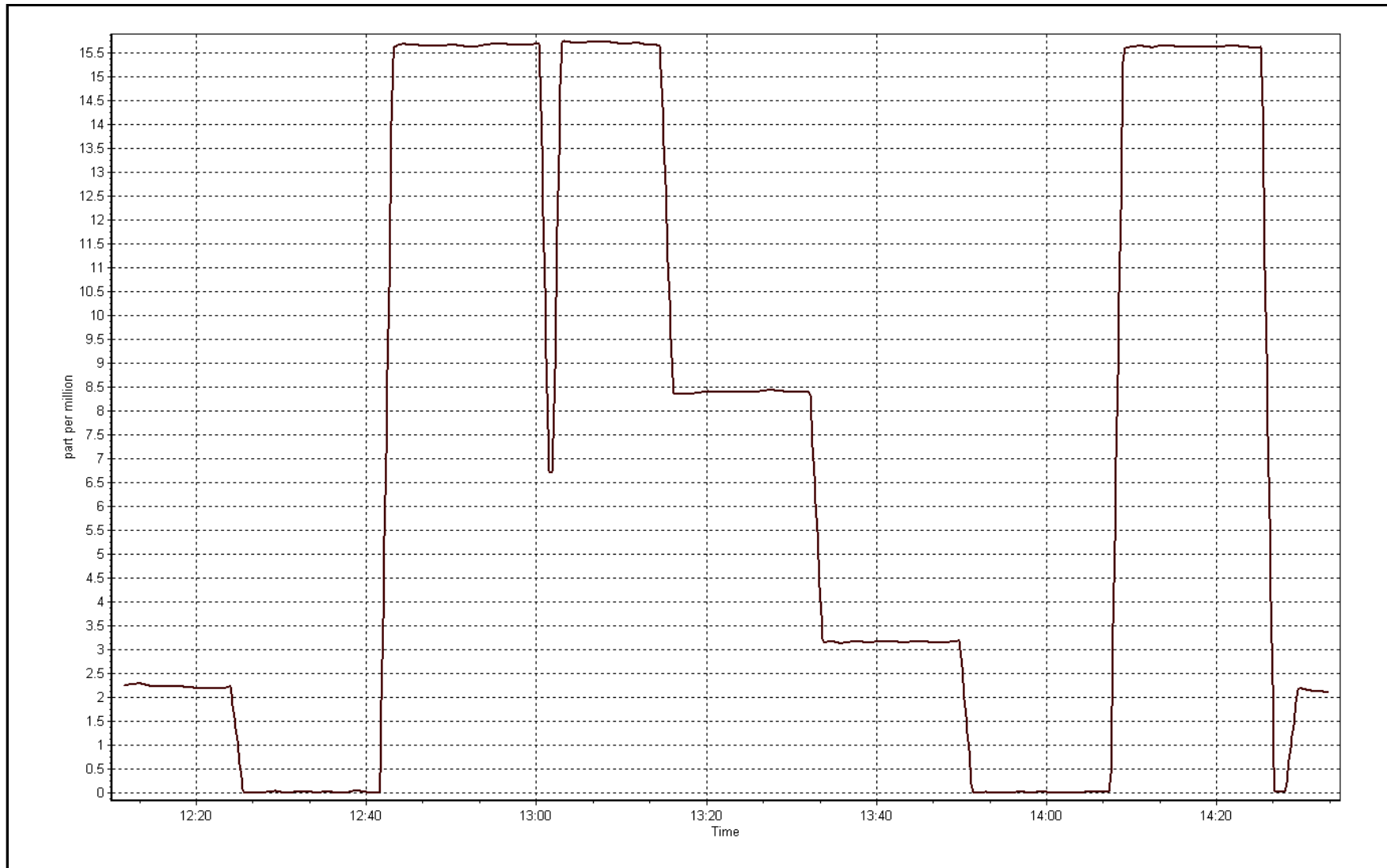
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999994
15.70	15.66	1.0026		
8.39	8.41	0.9979	Slope	1.002775
3.15	3.15	1.0008		
			Intercept	-0.015001



THC Calibration Plot

Date: May 2, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 11 LOWER CAMP MAY 2016

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	711	33	33	100.00	148	0	22	0
H2S (ppb) Average	709	35	35	100.00	16	3	2	0
THC (ppm) Average	711	33	33	100.00	6.5	-	3.9	-
Temperature (C) Average	744	0	0	100.00	33.9	-	23	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	83	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	20	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	711	2.8	11	-	0	0	0	0	1	5	148
H2S (ppb) Average	709	0.7	1	-	0	0	0	0	1	2	16
THC (ppm) Average	711	2.4	0.6	-	2	2.1	2.1	2.2	2.3	3	6.5
Temperature 2 m (C) Average	744	13.67	6.5	-	-0.2	5.6	9	12.8	18	22.7	33.9
Relative Humidity (%) Average	744	57.9	23	-	13	25	39	59	79	87	99
Wind Speed 10 m (km/h) Average	744	10.1	6	-	0	3	5	9	14	18	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report



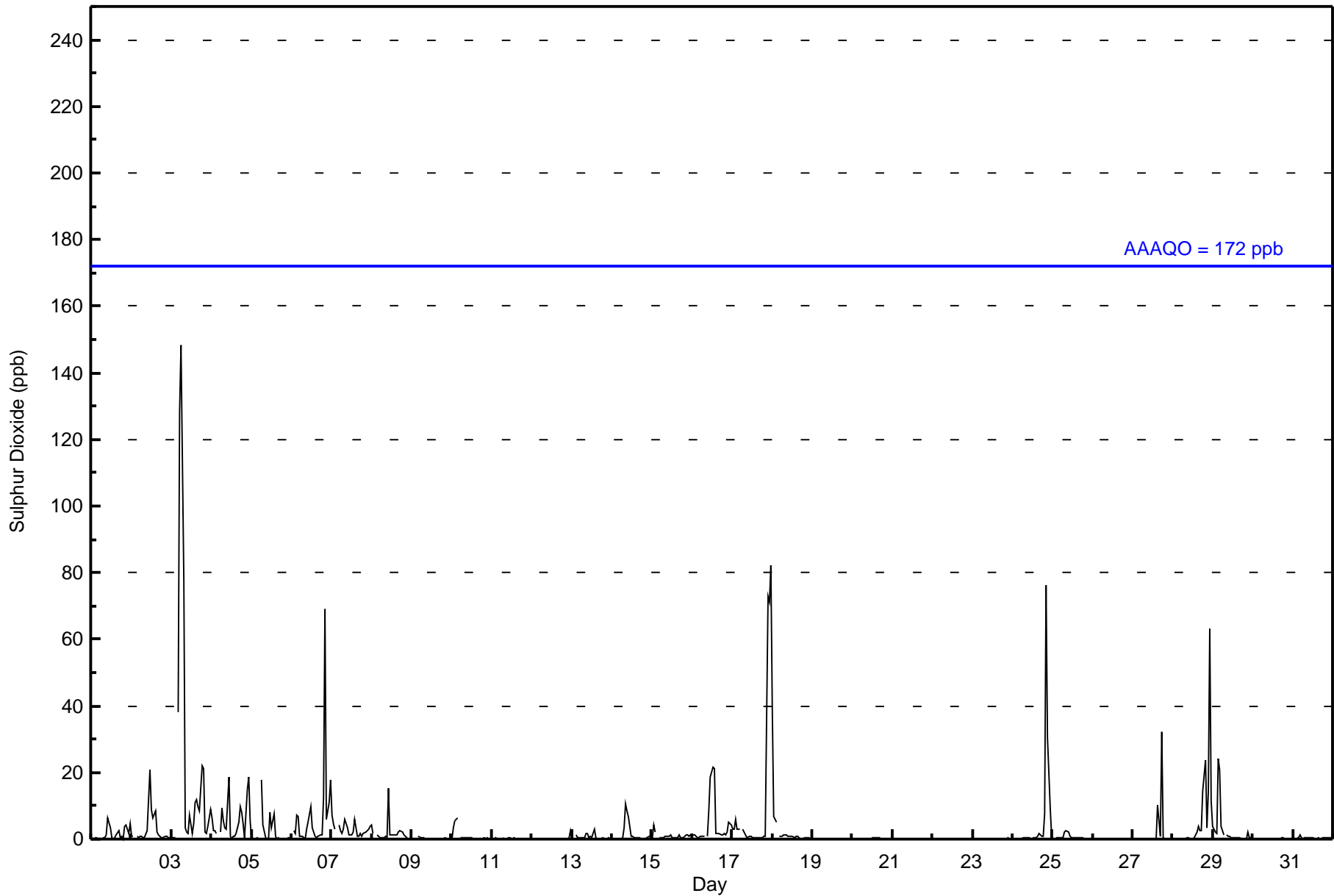
Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Lower Camp - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 148 ppb on May 3 07:00										Maximum Daily Average: 22.4 ppb on May 3										Hours of Data: 711							
Minimum Value: 0 ppb on May 14 20:00										Minimum Daily Average: 0.1 ppb on May 19										Hours of Missing Data: 33							
Maximum Diurnal Average: 6.3 ppb at hour 7										Minimum Diurnal Average: 1.1 ppb at hour 17										Hours of Calibration: 33							
Monthly Average: 2.8 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 70										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	8	Z	1	0	0	0	0	0	0	1	6	4	0	0	0	1	2	1	1	0	4	4	2	5	1.8	8	
2-May	1	1	Z	1	1	1	1	0	1	3	12	21	9	6	9	2	1	1	0	0	1	1	0	0	3.1	21	
3-May	0	0	0	Z	38	128	148	78	3	2	2	7	2	5	11	12	10	9	22	21	2	2	4	9	22.4	148	
4-May	6	3	3	2	Z	2	9	5	3	3	19	1	0	1	1	1	2	5	10	8	5	0	15	19	5	5.5	19
5-May	0	0	0	0	0	Z	18	4	0	0	0	8	4	8	1	0	0	0	0	0	0	0	0	0	0	2.0	18
6-May	Z	3	2	7	7	1	1	0	0	3	5	10	3	2	1	1	1	1	1	12	69	6	11	18	7.1	69	
7-May	7	5	3	Z	4	2	2	3	6	3	1	1	1	2	6	1	1	2	1	2	2	3	3	4	2.8	7	
8-May	4	2	Z	1	1	1	0	0	1	1	15	1	1	1	1	1	2	3	2	1	1	0	0	0	1.9	15	
9-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
10-May	0	4	6	6	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6
11-May	0	0	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-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.3	3	
13-May	0	Z	1	1	0	0	0	0	2	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0.6	3
14-May	0	0	Z	0	0	0	1	3	11	8	7	1	1	0	1	0	0	0	0	0	0	0	1	1	1.6	11	
15-May	1	4	2	Z	1	0	0	1	1	1	1	1	0	0	0	0	0	1	0	1	1	1	1	1	0.9	4	
16-May	1	1	1	1	1	1	1	1	Z	1	9	19	22	21	2	2	2	1	1	2	1	2	5	4	4.4	22	
17-May	3	3	6	3	3	Z	3	2	1	0	1	1	1	0	0	0	0	0	0	0	1	1	73	71	11.1	82	
18-May	39	7	5	Z	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	2.8	39	
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	0	0	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
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	8	76	30	9	0	0	5.7	76	
25-May	0	Z	0	0	0	0	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
26-May	0	0	Z	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	10	1	32	0	0	0	0	0	0	0	0	2.0	32
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	4	2	3	14	24	4	15	63	11	6.3	63	
29-May	4	2	2	24	21	4	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	2	0	0	2.9	24	
30-May	Z	0	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
31-May	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	0.3	1
2.8																								Diurnal Average			
39																								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 - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	674	94.80	94.80
11 - 20	16	2.25	97.05
21 - 60	12	1.69	98.73
61 - 110	7	0.98	99.72
111 - 172	2	0.28	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	88	62	25	17	13	53	115	14	8	1	3	37	53	64	57	64	674
11 - 20	0	0	0	0	0	2	3	0	1	3	3	1	1	2	0	0	16
21 - 60	0	0	0	0	0	1	2	1	6	1	1	0	0	0	0	0	12
61 - 110	0	0	0	0	0	1	2	0	0	2	2	0	0	0	0	0	7
111 - 172	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	62	25	17	13	57	124	15	15	7	9	38	54	66	57	64	711

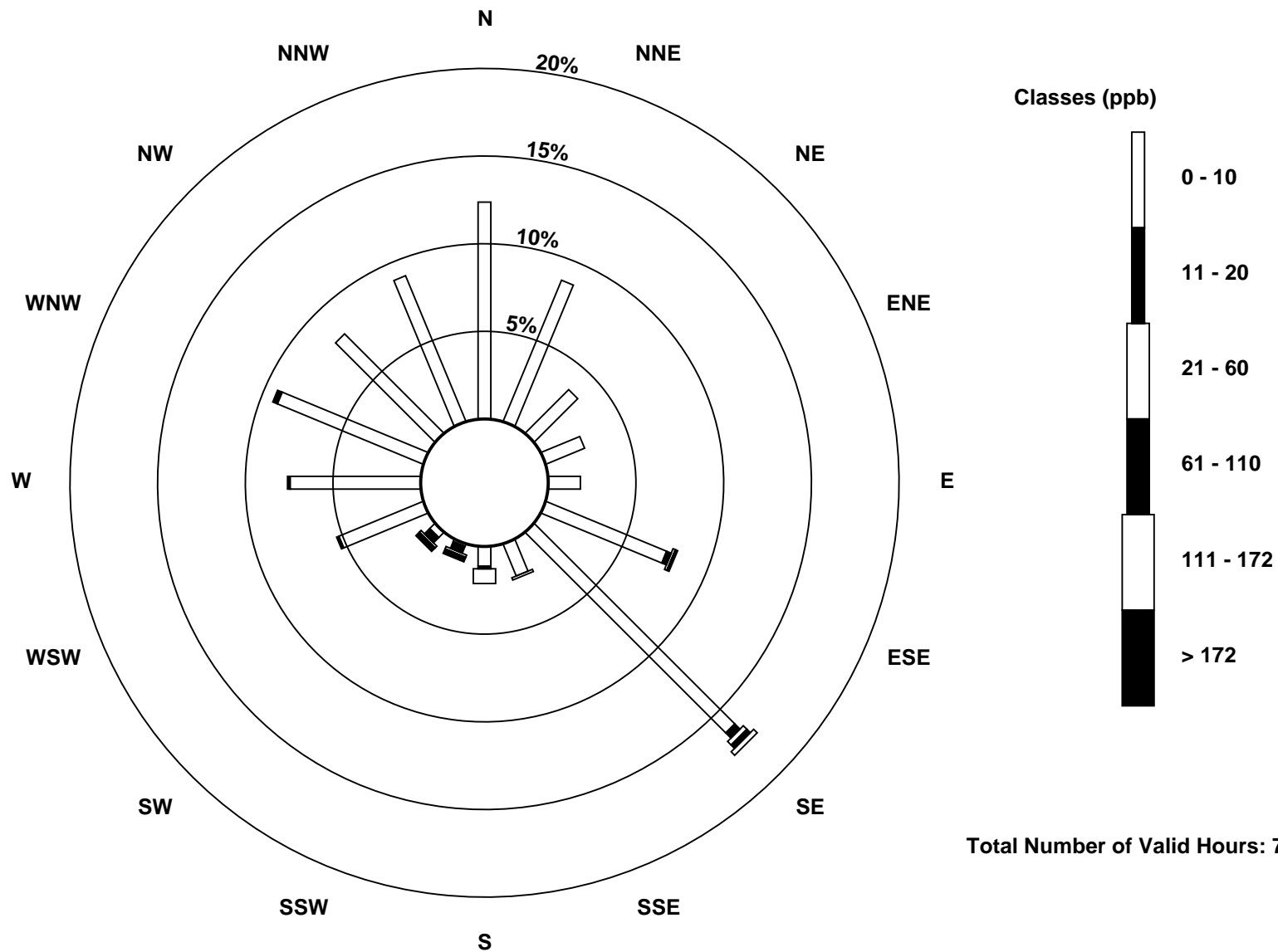
Total Number of Valid Hours: 711

Total Number of Hours: 744

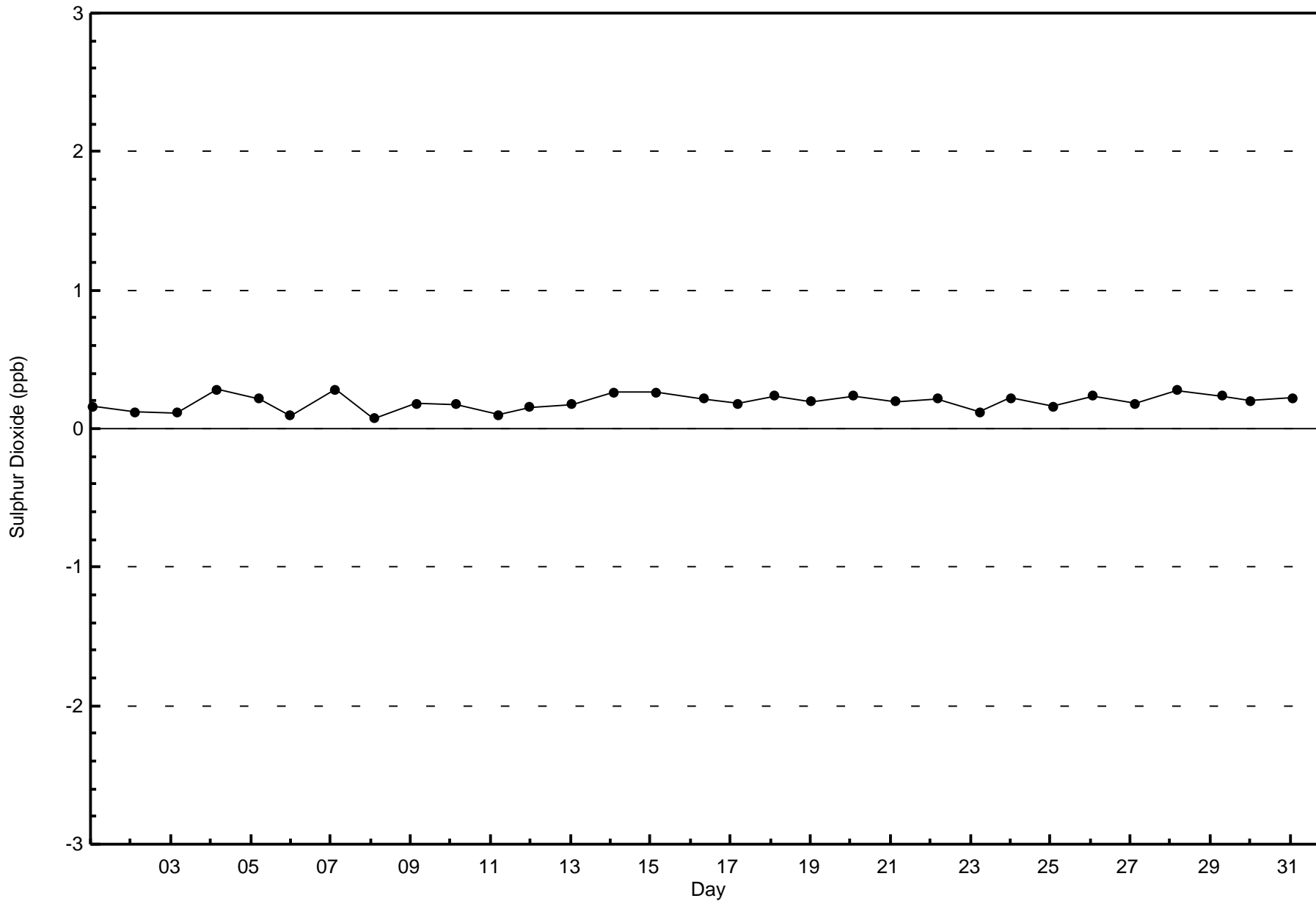


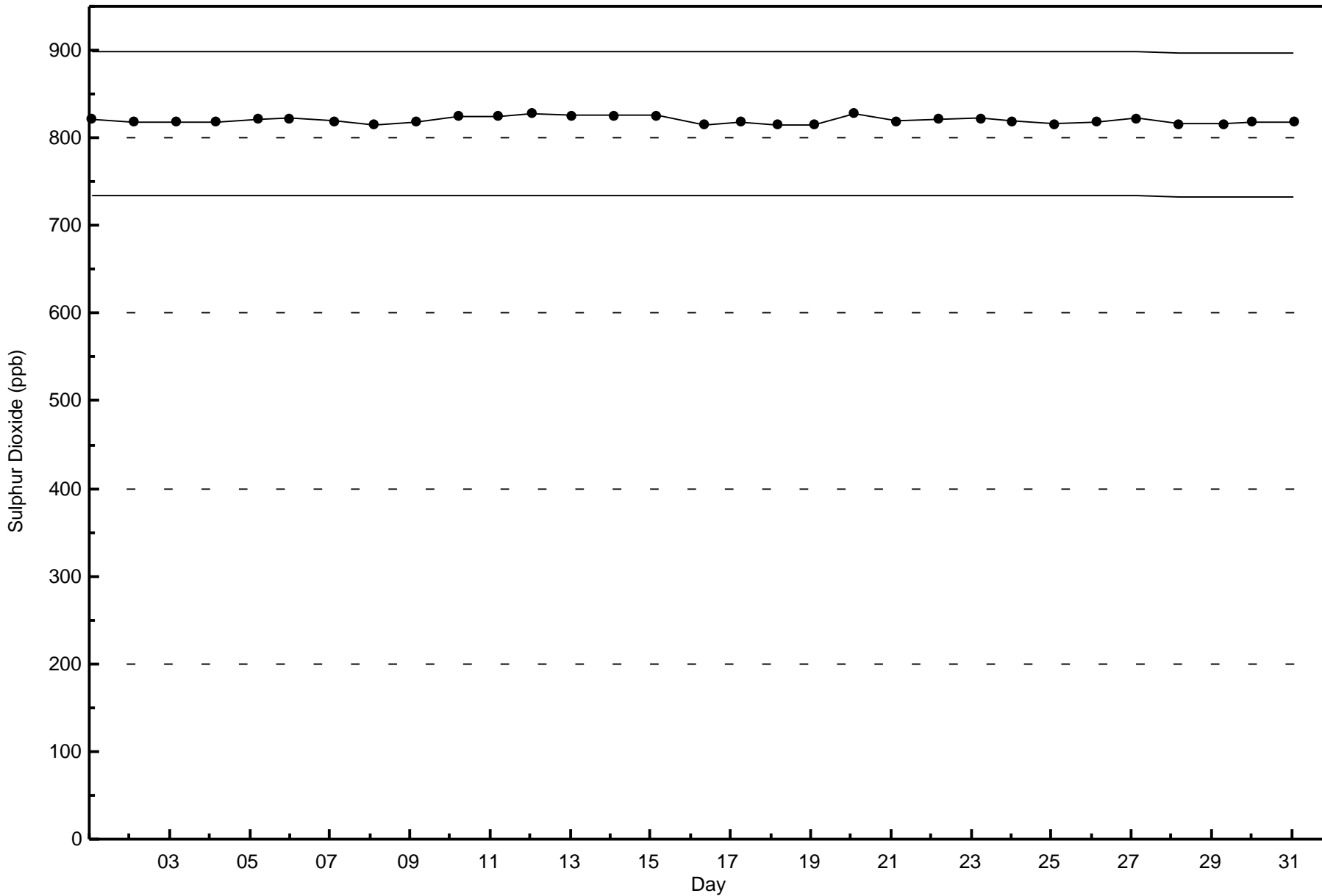
Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)



Total Number of Valid Hours: 711



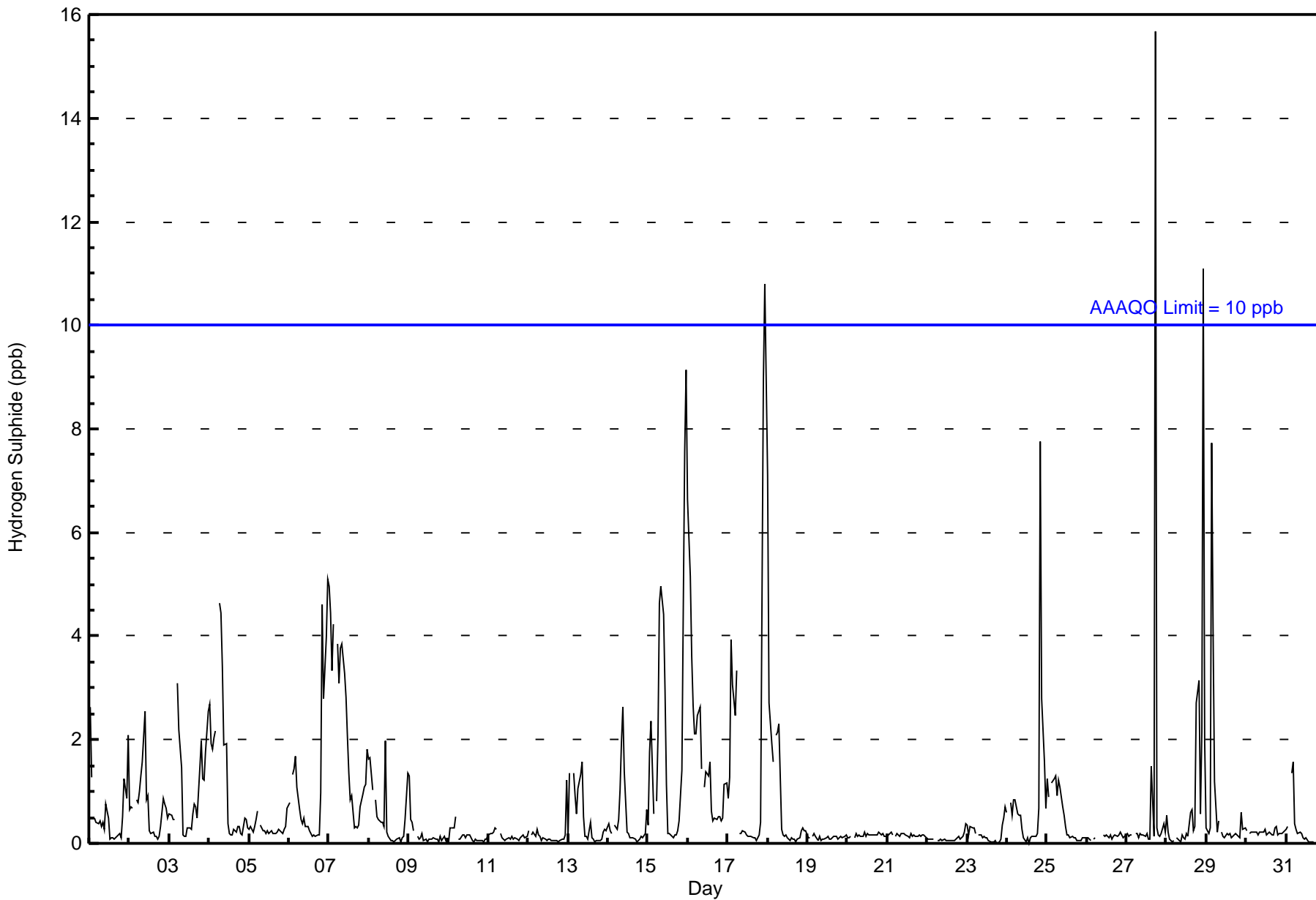




Number of Exceedences (AAAQO):	1-hr: 3	24-hr: 0	Hours in Service:	744
Maximum Value: 16 ppb on May 27 18:00	Maximum Daily Average: 2.2 ppb on May 15		Hours of Data:	709
Minimum Value: 0 ppb on May 31 18:00	Minimum Daily Average: 0.1 ppb on May 22		Hours of Missing Data:	35
Maximum Diurnal Average: 1.5 ppb at hour 23	Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:	35
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	3	1	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	2	0.6	3																						
2-May	1	1	1	Z	1	1	1	1	2	3	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0.7	3																						
3-May	1	1	0	0	Z	3	2	1	0	0	0	0	0	1	1	1	0	1	2	1	1	2	3	1.0	3																							
4-May	3	2	2	2	2	Z	5	4	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1.3	5																							
5-May	0	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																							
6-May	1	Z	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	5	3	4	1.2	5																							
7-May	5	4	3	4	Z	4	3	4	4	3	3	2	1	1	1	0	0	0	0	1	1	1	1	2.2	5																							
8-May	2	2	1	Z	1	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0.5	2																							
9-May	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																							
10-May	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
11-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
12-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1																							
13-May	0	1	Z	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																							
14-May	0	0	0	Z	0	0	0	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	1	0.5	3																							
15-May	0	2	2	1	Z	1	2	5	5	4	3	1	0	0	0	0	0	0	0	0	1	5	8	2.2	9																							
16-May	7	5	4	3	2	2	2	3	1	Z	1	1	1	2	1	0	0	0	1	1	0	0	1	1.8	7																							
17-May	1	1	4	3	2	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	11	2.0	11																							
18-May	7	3	2	2	Z	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7																							
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1																							
24-May	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	8	3	2	1	0.9	8																							
25-May	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																							
26-May	0	0	0	Z	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	16	0	0	0	0	0	0	0.9	16																							
28-May	1	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	3	3	1	2	11	2	1.1	11																							
29-May	0	0	0	8	4	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.8	8																							
30-May	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																							
31-May	0	0	Z	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																							
																								1.2	1.0	0.9	1.2	0.9	0.9	0.9	1.0	0.8	0.7	0.6	0.3	0.2	0.2	0.2	0.2	0.2	0.7	0.3	0.4	0.7	1.0	1.5	1.3	Diurnal Average
																								7	5	4	8	4	4	5	5	5	4	3	2	1	2	1	1	1	16	3	3	8	9	11	9	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 - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	658	92.81	92.81
3 - 4	32	4.51	97.32
5 - 7	10	1.41	98.73
8 - 11	6	0.85	99.58
> 11	3	0.42	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	90	60	25	18	13	50	95	14	11	3	5	38	55	65	54	62	658
3 - 4	0	1	0	0	1	4	21	0	3	1	1	0	0	0	0	0	32
5 - 7	0	0	0	0	0	2	7	1	0	0	0	0	0	0	0	0	10
8 - 11	0	0	0	0	0	1	2	0	0	2	1	0	0	0	0	0	6
> 11	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
Totals	90	61	25	18	14	57	125	15	15	6	9	38	55	65	54	62	709

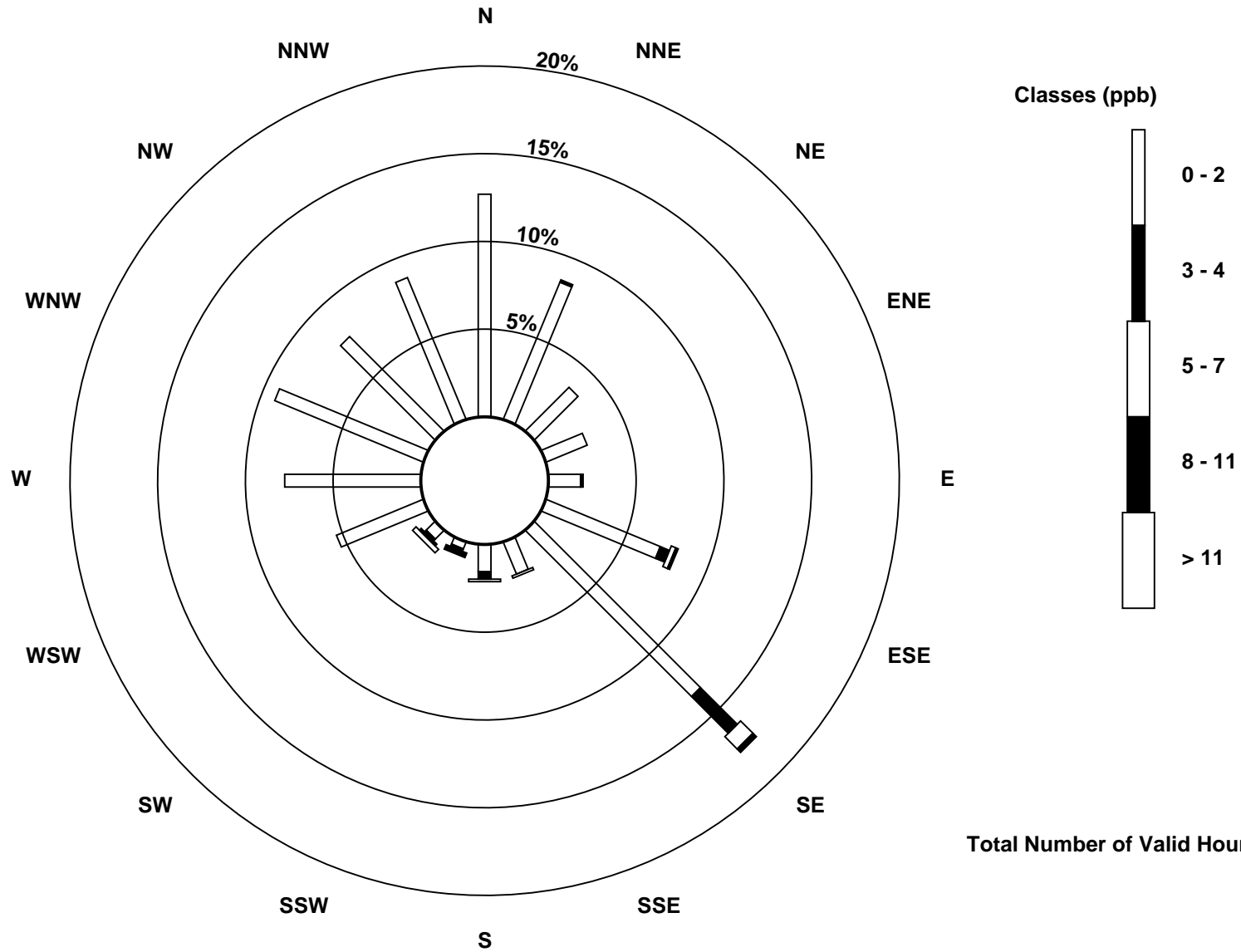
Total Number of Valid Hours: 709

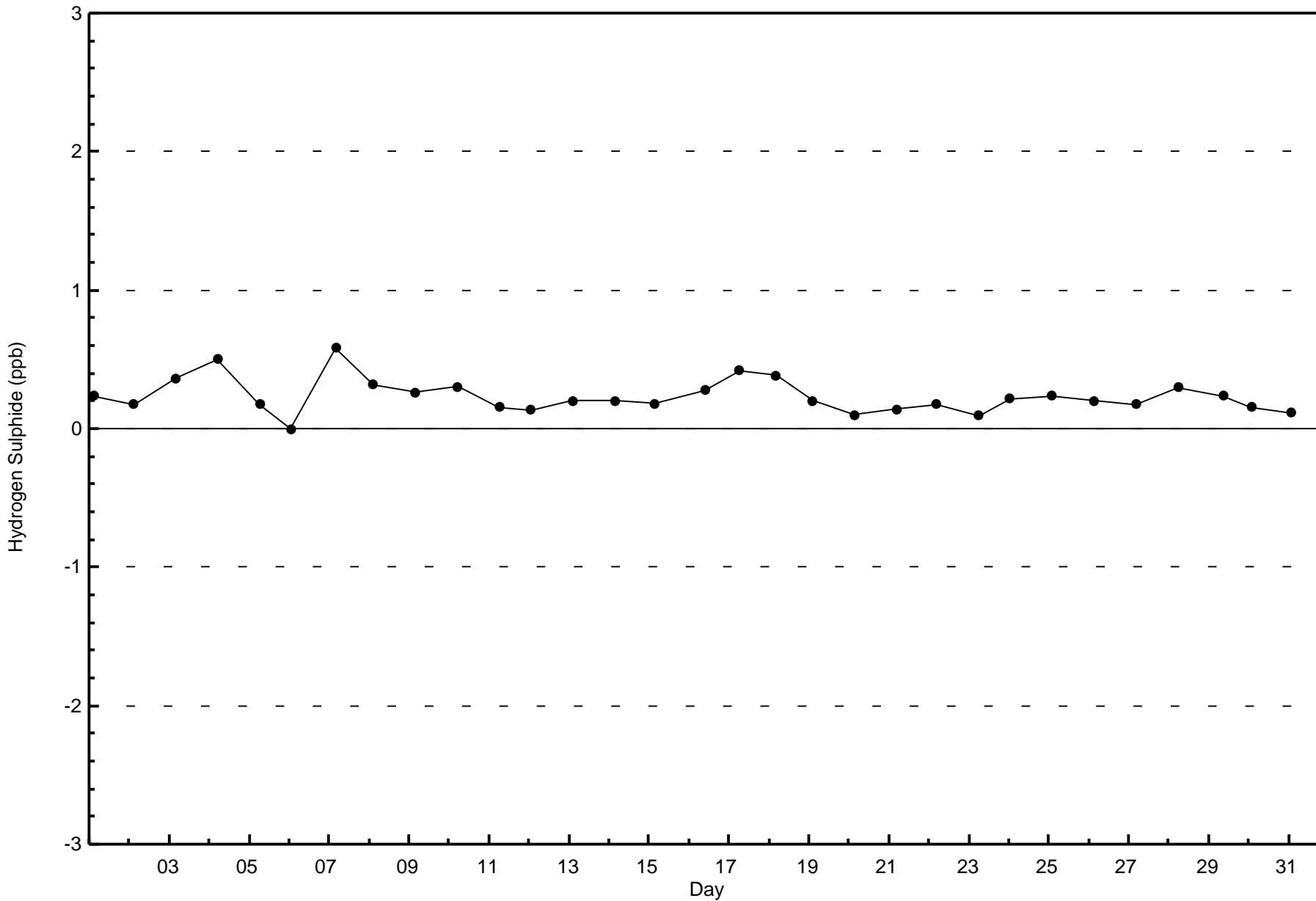
Total Number of Hours: 744

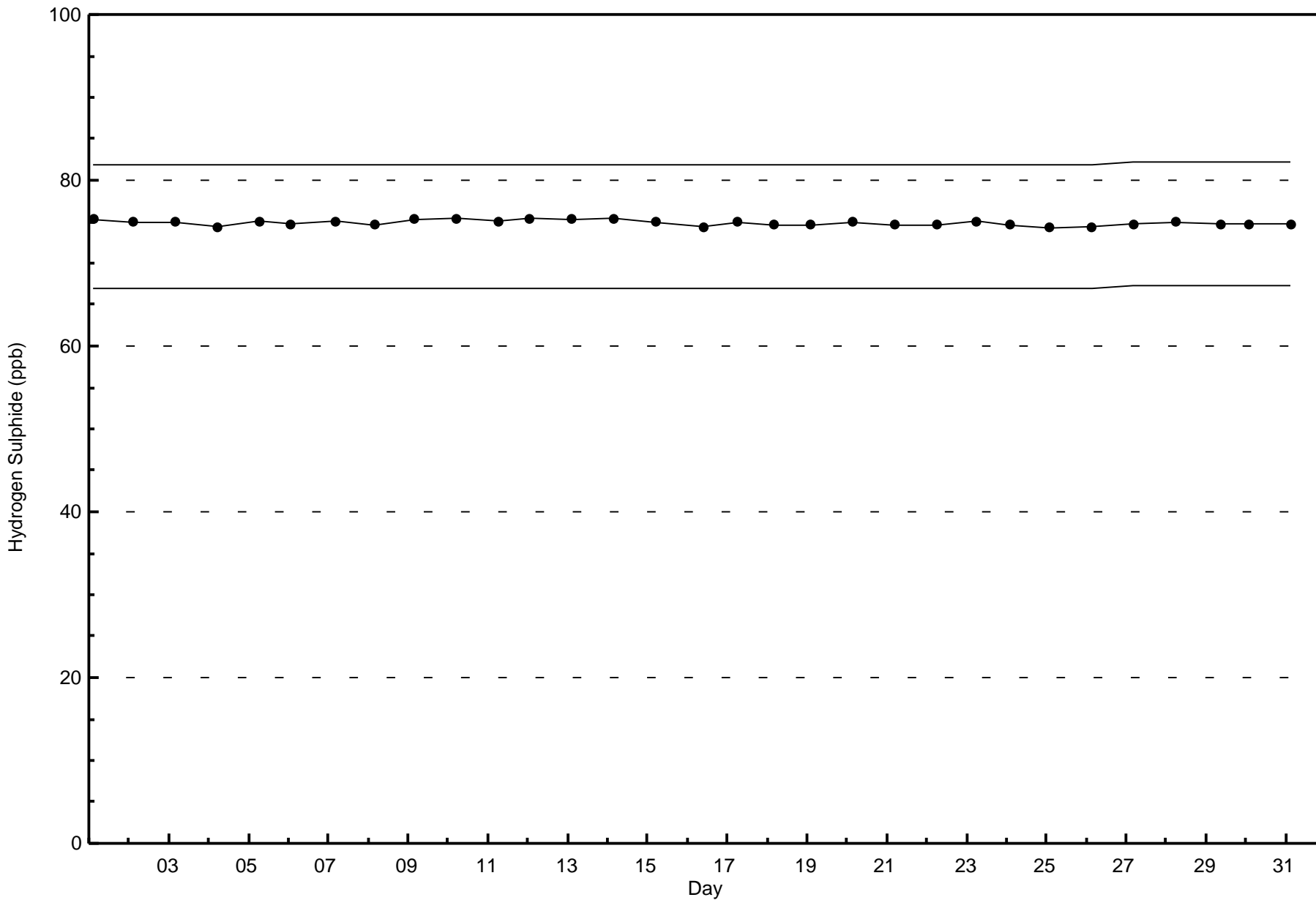


Wood Buffalo Environmental Association
Wind Rose May 2016

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)









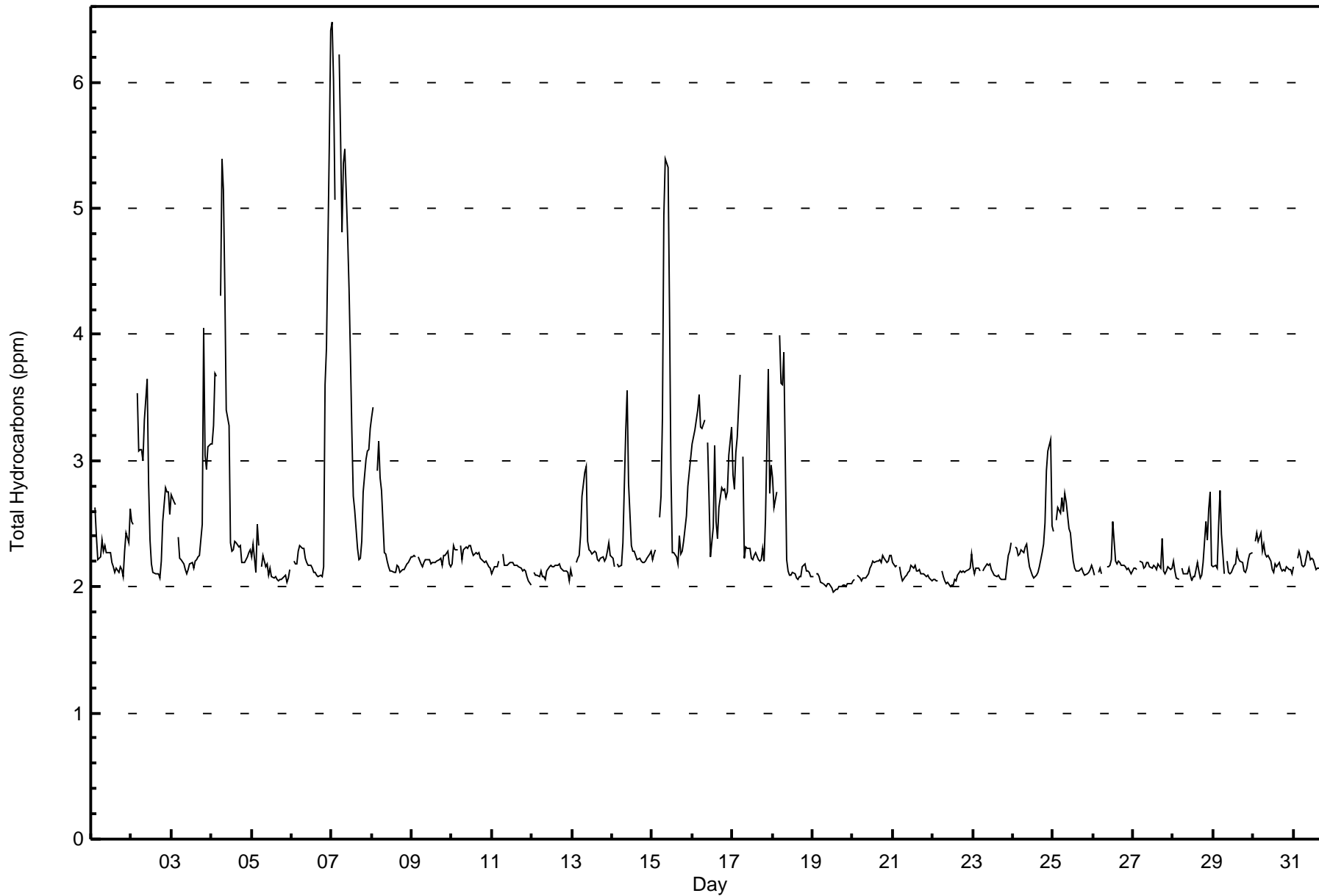
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Lower Camp - May 2016

Maximum Value: 6.5 ppm on May 7 01:00																			Maximum Daily Average: 3.9 ppm on May 7						Hours in Service: 744	
Minimum Value: 2.0 ppm on May 19 13:00																			Minimum Daily Average: 2.0 ppm on May 19						Hours of Data: 711	
Maximum Diurnal Average: 2.7 ppm at hour 8																			Minimum Diurnal Average: 2.2 ppm at hour 16						Hours of Missing Data: 33	
Monthly Average: 2.40 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 3.0 P ₉₉ = 5.5						Hours of Calibration: 33	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.4	Z	2.6	2.4	2.2	2.2	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.3	2.4	2.3	2.6	2.3	2.6	
2-May	2.5	2.5	Z	3.5	3.1	3.1	3.1	3.0	3.3	3.6	2.8	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.8	2.8	2.8	2.6	2.7	3.6
3-May	2.7	2.7	2.7	Z	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.5	4.1	3.0	2.9	3.1	3.1	2.5	4.1
4-May	3.1	3.3	3.7	3.7	Z	4.3	5.4	5.2	4.4	3.4	3.3	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	3.0	5.4
5-May	2.2	2.3	2.1	2.5	2.3	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.5
6-May	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	3.6	3.9	5.5	6.4	2.6	6.4
7-May	6.5	6.0	5.1	Z	6.2	5.6	4.8	5.4	5.5	4.8	4.4	3.8	3.2	2.7	2.6	2.3	2.2	2.2	2.4	2.8	3.0	3.1	3.1	3.3	3.9	6.5
8-May	3.3	3.4	Z	2.9	3.2	2.9	2.8	2.3	2.3	2.2	2.2	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	2.4	3.4
9-May	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	2.3	2.3	2.3	2.2	2.2	2.2	2.3
10-May	2.2	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	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.3
11-May	2.1	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.3
12-May	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2
13-May	2.1	Z	2.2	2.2	2.2	2.4	2.7	2.9	3.0	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.3	3.0
14-May	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.8	3.2	3.6	2.8	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	3.6
15-May	2.2	2.3	2.3	Z	2.5	2.7	3.3	4.9	5.4	5.3	4.2	2.9	2.3	2.3	2.2	2.2	2.4	2.3	2.3	2.4	2.6	2.8	2.9	3.0	2.9	5.4
16-May	3.1	3.2	3.3	3.4	3.5	3.3	3.3	3.3	Z	3.1	2.7	2.2	2.5	3.1	2.5	2.4	2.6	2.8	2.8	2.8	2.7	2.7	3.0	3.3	2.9	3.5
17-May	2.9	2.8	3.1	3.2	3.7	Z	3.0	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.5	3.7	2.7	3.0	2.6	3.7
18-May	2.9	2.6	2.8	Z	4.0	3.6	3.6	3.9	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.5	4.0
19-May	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	2.1
20-May	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3
21-May	2.2	2.2	2.2	Z	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
22-May	2.1	2.1	2.1	2.0	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.3
23-May	2.2	2.1	2.2	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.1	2.3
24-May	Z	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.5	2.9	3.1	3.2	2.5	2.4	3.2
25-May	2.4	Z	2.5	2.6	2.6	2.7	2.6	2.7	2.7	2.5	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.7
26-May	2.1	2.1	Z	2.1	2.2	2.1	C	C	2.2	2.2	2.2	2.2	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.5
27-May	2.2	2.1	2.1	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.4	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.4
28-May	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	2.5	2.4	2.6	2.8	2.2	2.2	2.8
29-May	2.2	2.2	2.1	2.5	2.8	2.4	2.1	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.8
30-May	Z	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.4
31-May	2.2	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.4
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	33	4.64	4.64
2.1 - 3.0	609	85.65	90.30
3.1 - 10.0	69	9.70	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	22	7	0	1	0	0	0	0	0	0	0	0	0	1	1	1	33
2.1 - 3.0	66	54	24	15	11	47	82	11	11	6	9	38	53	63	56	63	609
3.1 - 10.0	0	1	1	1	2	10	42	4	4	1	0	0	1	2	0	0	69
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	62	25	17	13	57	124	15	15	7	9	38	54	66	57	64	711

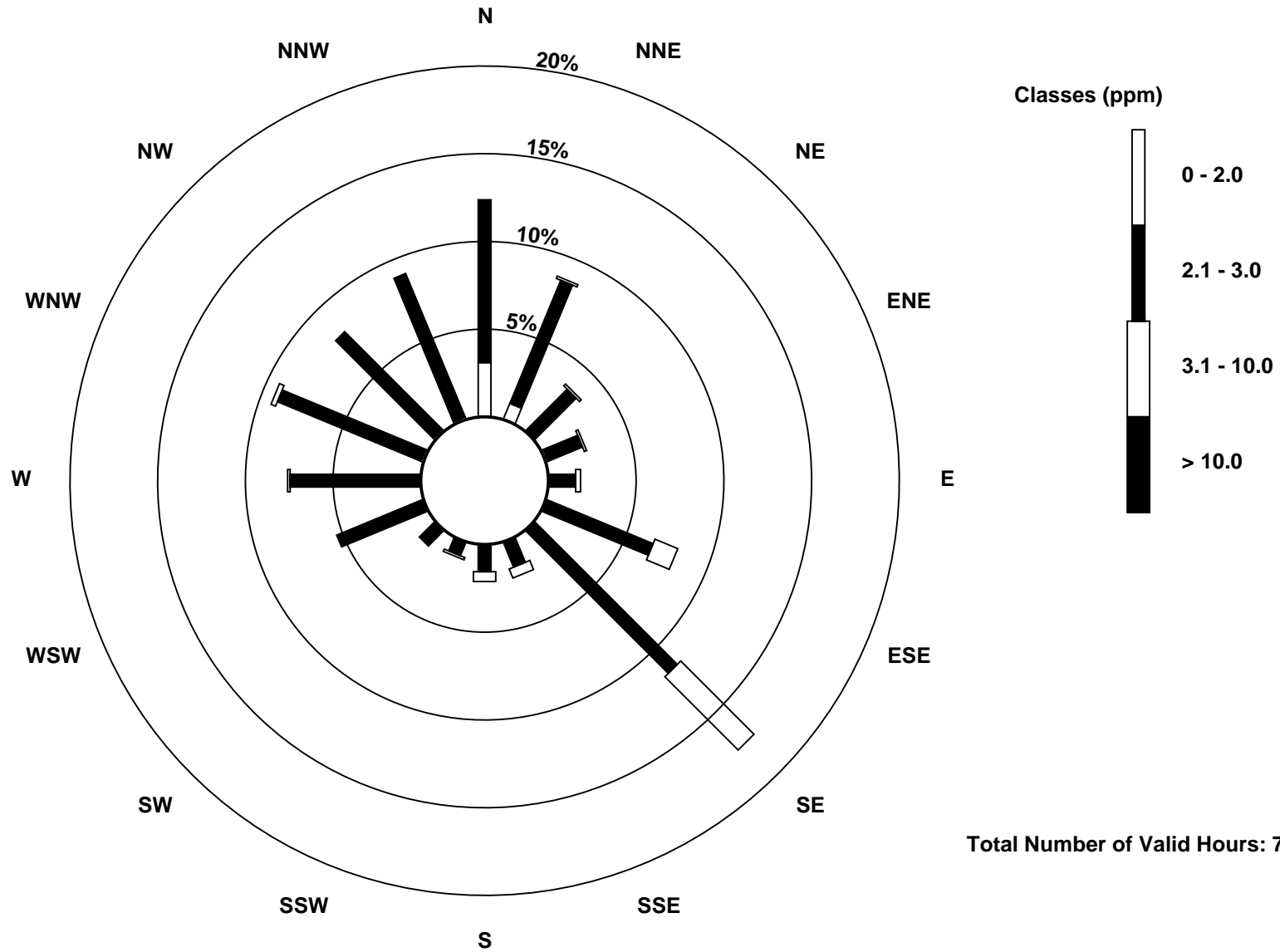
Total Number of Valid Hours: 711

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)



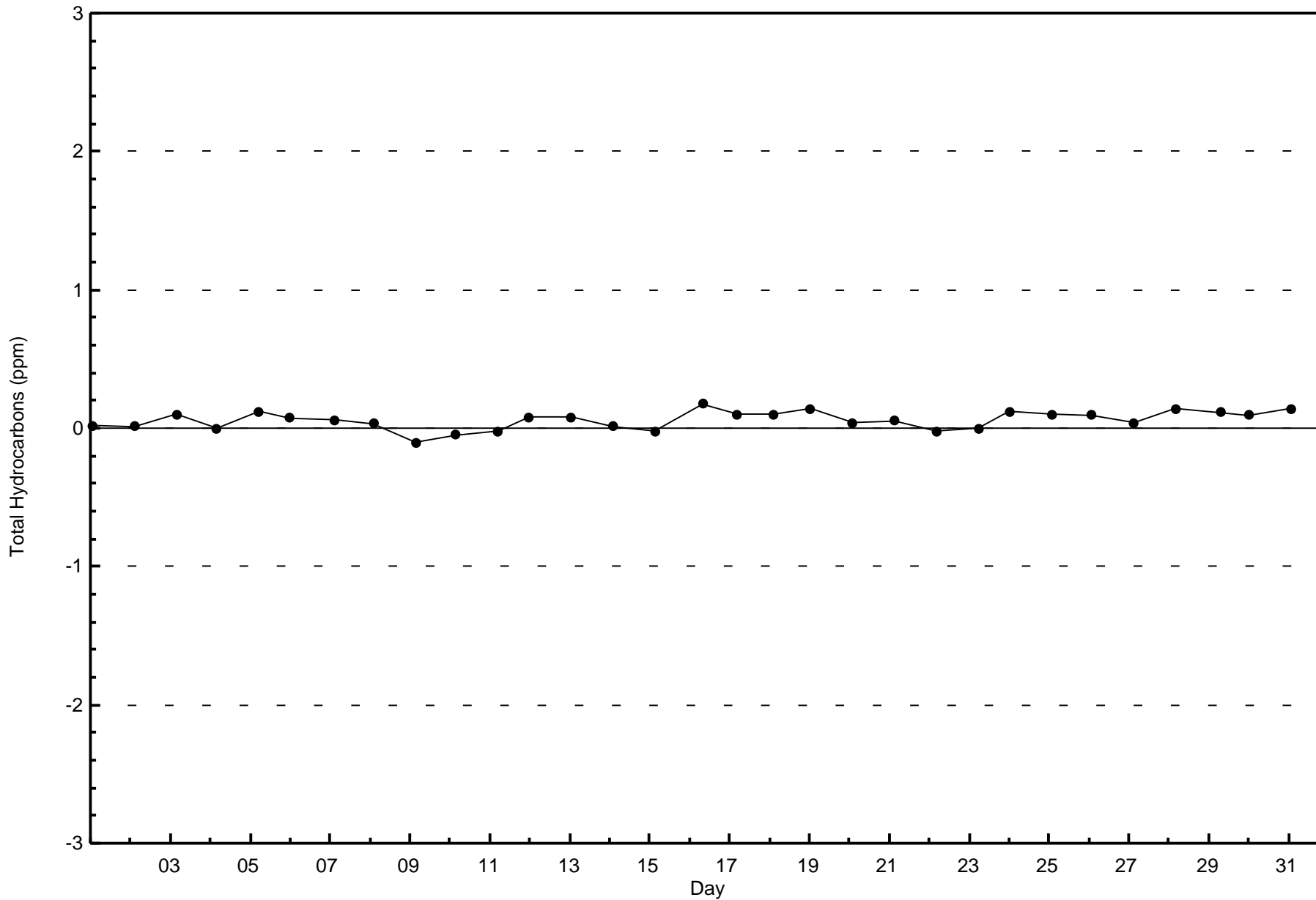


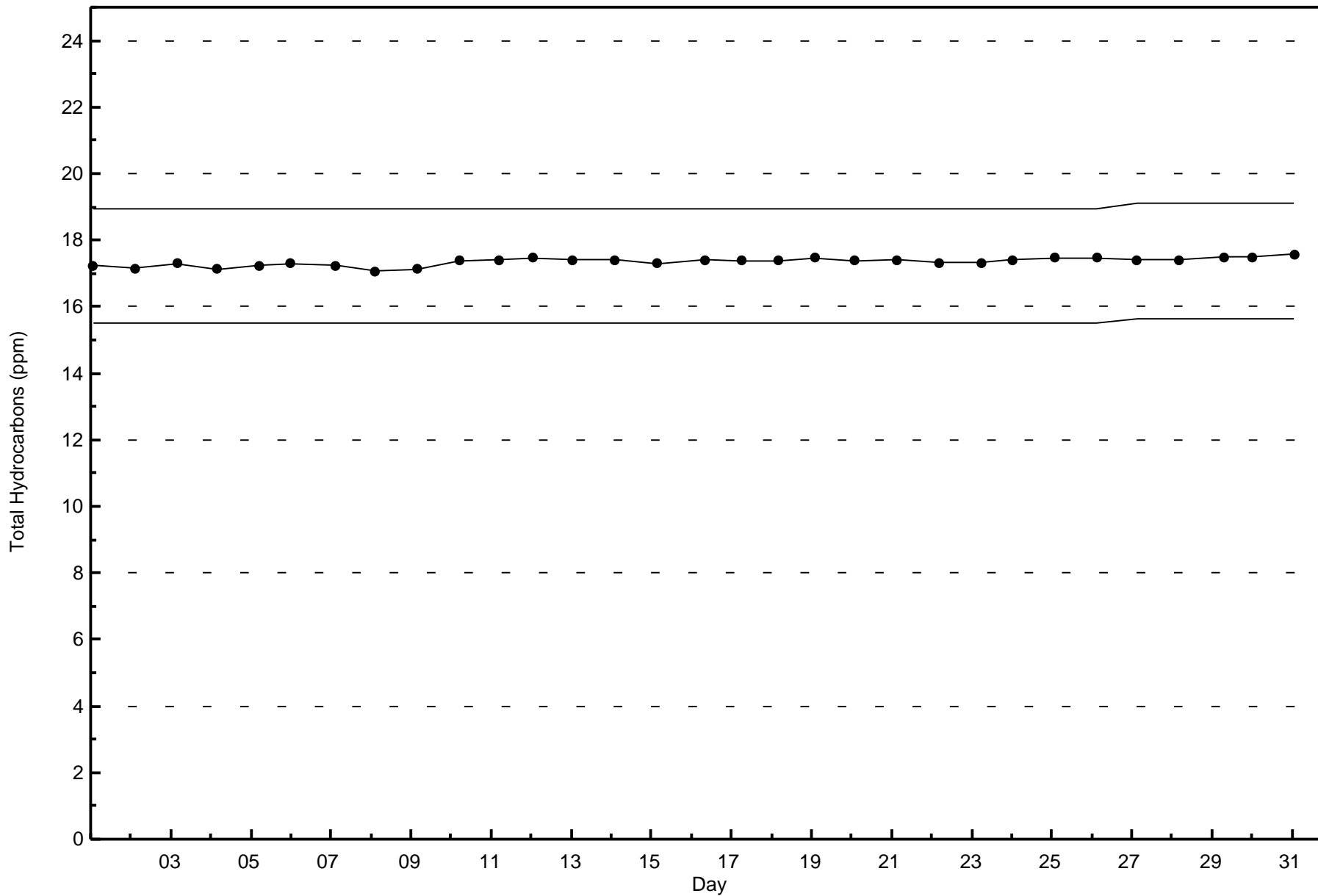
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Lower Camp - May 2016







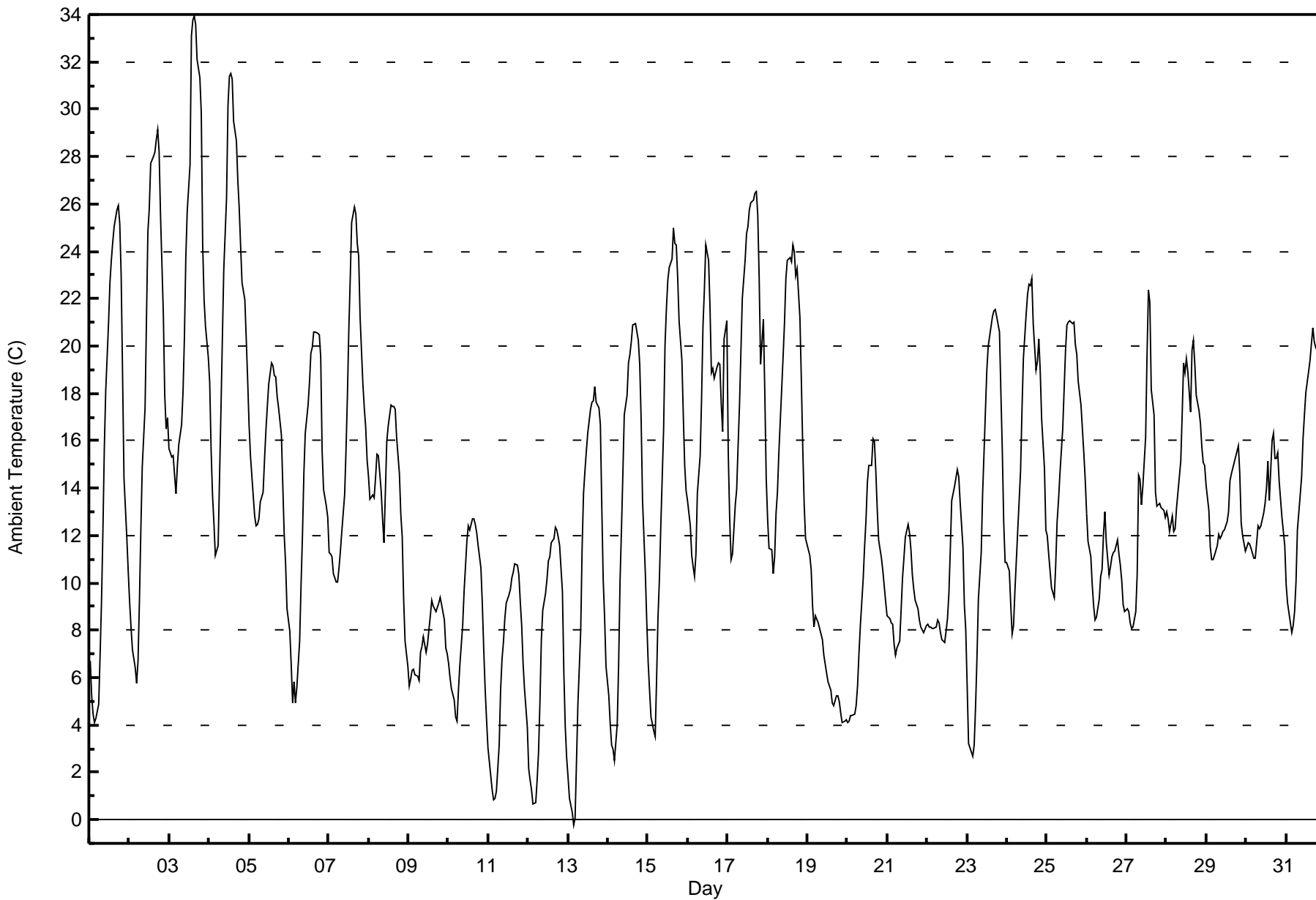
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Lower Camp - May 2016

Maximum Value: 33.9 C on May 3 16:00 Maximum Daily Average: 23.0 C on May 3																				Hours in Service: 744 Hours of Data: 744																												
Minimum Value: -0.2 C on May 13 04:00 Minimum Daily Average: 6.5 C on May 11 Maximum Diurnal Average: 18.9 C at hour 16 Minimum Diurnal Average: 7.7 C at hour 5 Monthly Average: 13.67 C Percentiles: P₁ = 0.9 P₁₀ = 5.6 Q₁ = 9.0 Median = 12.8 Q₃ = 18.0 P₉₀ = 22.7 P₉₉ = 31.3																				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-May	6.7	5.2	4.5	4.1	4.3	4.9	6.9	9.2	12.2	15.7	18.1	21.0	22.7	23.6	24.4	25.0	25.7	26.0	25.2	23.0	18.7	14.4	11.9	10.5	15.2	26.0																						
2-May	9.2	8.1	7.2	6.4	5.8	6.7	9.3	12.3	14.9	17.4	21.1	24.8	25.8	27.7	28.0	28.2	28.7	29.2	28.2	25.5	21.4	17.9	16.5	17.0	18.2	29.2																						
3-May	15.7	15.3	15.3	14.6	13.8	15.0	15.9	16.7	18.0	20.4	23.7	27.7	33.1	33.8	33.9	33.6	32.1	31.3	29.8	24.2	22.0	20.9	19.5	23.0	33.9																							
4-May	18.5	15.6	13.7	12.5	11.1	11.6	14.5	17.3	20.3	23.2	26.3	30.2	31.4	31.5	31.3	29.5	28.7	27.0	25.8	24.2	22.7	21.9	20.3	18.6	22.0	31.5																						
5-May	16.7	15.4	13.6	12.8	12.4	12.5	12.7	13.4	13.8	15.2	16.4	17.5	18.4	19.3	19.2	18.7	18.7	17.9	17.4	16.3	14.1	12.1	10.8	8.9	15.2	19.3																						
6-May	8.0	6.5	4.9	5.8	4.9	5.6	7.6	9.9	12.0	14.6	16.3	17.5	18.5	19.7	19.9	20.6	20.6	20.6	20.5	19.5	15.5	14.0	13.2	12.7	13.7	20.6																						
7-May	11.3	11.2	11.1	10.4	10.0	10.0	10.6	11.3	12.2	13.7	15.6	17.9	20.7	22.9	25.2	25.9	25.6	24.3	23.8	21.2	18.4	17.4	16.6	15.2	16.8	25.9																						
8-May	14.5	13.5	13.7	13.6	14.4	15.4	15.4	13.9	12.7	11.7	13.8	15.9	16.6	17.5	17.5	17.5	17.3	16.1	14.6	12.9	11.9	9.3	7.6	6.4	13.9	17.5																						
9-May	5.6	5.9	6.3	6.4	6.1	6.1	5.9	7.0	7.3	7.7	7.0	7.4	8.0	8.6	9.2	9.0	8.8	9.0	9.1	9.4	9.1	8.4	7.2	7.0	7.6	9.4																						
10-May	6.6	6.0	5.5	5.0	4.3	4.1	5.4	6.6	8.2	9.6	10.7	11.7	12.4	12.2	12.7	12.7	12.4	12.1	11.6	10.6	9.1	7.2	5.6	4.2	8.6	12.7																						
11-May	3.1	1.8	1.3	0.9	0.9	1.2	3.1	5.5	6.8	7.5	8.5	9.2	9.5	9.8	10.2	10.4	10.8	10.8	10.3	9.2	8.2	6.6	5.5	3.9	6.5	10.8																						
12-May	2.2	1.7	1.3	0.7	0.7	1.7	2.8	5.0	7.6	8.8	9.6	10.1	10.9	11.1	11.7	11.9	12.3	12.2	11.9	11.6	9.6	6.2	3.9	2.6	7.0	12.3																						
13-May	1.8	0.9	0.3	-0.2	0.0	2.5	4.9	8.0	11.4	13.8	14.7	15.5	16.3	17.3	17.6	17.7	18.3	17.6	17.4	16.7	13.2	10.1	8.6	6.5	10.5	18.3																						
14-May	5.2	4.1	3.2	3.0	2.5	4.1	6.6	10.1	12.2	14.6	17.1	17.9	19.3	19.7	20.2	20.9	21.0	20.6	20.2	19.2	16.9	13.5	10.4	8.4	12.9	21.0																						
15-May	6.6	5.5	4.3	3.7	3.5	6.0	8.5	10.1	12.4	16.5	20.0	21.6	22.8	23.3	23.7	25.0	24.3	24.3	22.9	21.1	19.4	17.1	14.9	13.9	15.5	25.0																						
16-May	13.5	12.4	11.2	10.7	10.2	11.2	13.8	15.4	17.8	20.8	22.4	24.3	23.6	21.7	18.9	19.0	18.6	19.1	19.3	19.2	17.6	16.4	20.3	21.1	17.4	24.3																						
17-May	15.5	12.8	11.0	11.2	13.3	14.0	15.8	17.5	19.8	22.0	23.6	24.7	25.0	25.8	26.1	26.2	26.4	26.5	25.5	22.9	19.2	21.1	18.1	14.4	19.9	26.5																						
18-May	12.7	11.4	11.4	10.4	11.1	12.9	13.8	15.5	18.1	19.5	20.9	22.8	23.6	23.7	23.5	24.3	24.0	23.0	23.2	21.2	18.6	15.7	13.4	11.9	17.8	24.3																						
19-May	11.4	11.1	10.6	9.0	8.1	8.6	8.3	8.1	7.8	7.6	6.9	6.2	5.8	5.6	5.5	5.0	4.8	5.3	5.3	5.0	4.5	4.1	4.2	4.2	6.8	11.4																						
20-May	4.1	4.1	4.4	4.4	4.5	4.8	5.6	7.0	8.2	10.2	11.5	12.6	14.3	15.0	15.0	16.1	16.0	14.7	13.1	11.8	11.0	10.5	9.8	9.2	9.9	16.1																						
21-May	8.6	8.5	8.3	8.2	7.4	7.0	7.3	7.6	8.8	10.2	11.0	12.0	12.5	12.1	11.4	10.4	9.7	9.2	8.9	8.4	8.1	8.0	7.9	8.2	9.2	12.5																						
22-May	8.3	8.2	8.1	8.1	8.1	8.1	8.4	8.3	7.9	7.6	7.5	7.9	8.5	9.5	11.4	13.5	14.1	14.4	14.8	14.5	13.4	11.5	9.1	8.0	10.0	14.8																						
23-May	5.7	3.2	3.0	2.7	3.1	4.8	6.9	9.3	11.3	13.8	15.5	17.3	19.0	20.0	20.8	21.2	21.5	21.6	21.3	20.6	18.0	15.6	12.6	10.9	13.3	21.6																						
24-May	10.8	10.5	9.1	7.9	8.2	9.7	12.2	13.5	14.7	17.3	19.5	21.4	22.2	22.6	22.6	22.8	20.9	19.0	19.3	20.3	18.9	16.9	14.8	12.3	16.1	22.8																						
25-May	12.0	11.2	10.5	9.8	9.4	10.7	12.6	13.5	14.6	16.5	18.2	19.8	20.9	21.0	21.0	20.9	21.0	20.1	19.6	18.5	17.5	16.5	15.5	14.4	16.1	21.0																						
26-May	12.9	11.7	11.1	9.9	9.0	8.5	8.6	9.3	10.3	10.6	12.0	13.0	11.7	10.3	10.7	11.1	11.3	11.4	11.8	11.2	10.7	10.1	9.1	8.8	10.6	13.0																						
27-May	8.9	8.8	8.3	8.1	8.1	8.8	10.4	14.5	14.3	13.3	14.0	16.2	19.6	22.4	21.9	18.1	17.1	13.8	13.2	13.3	13.4	13.2	13.0	12.8	13.6	22.4																						
28-May	13.0	12.7	12.2	12.8	12.2	12.3	13.2	13.8	15.1	17.1	19.3	18.9	19.5	19.0	17.2	19.8	20.3	19.2	17.9	17.3	16.7	15.7	15.1	15.0	16.0	20.3																						
29-May	14.1	13.0	11.5	11.0	11.0	11.2	11.6	12.0	11.9	12.0	12.2	12.2	12.6	13.0	14.3	14.6	14.9	15.3	15.5	15.8	14.6	12.5	12.0	11.3	12.9	15.8																						
30-May	11.5	11.7	11.6	11.5	11.0	11.1	11.7	12.4	12.3	12.4	13.0	13.4	14.0	15.2	13.4	16.0	16.3	15.3	15.3	15.5	14.3	12.8	12.2	11.6	13.1	16.3																						
31-May	9.9	9.1	8.3	7.9	8.2	8.8	10.0	12.2	13.7	14.5	16.1	17.1	18.0	18.9	19.4	20.1	20.7	20.2	19.9	19.7	16.7	13.3	11.9	12.3	14.5	20.7																						
																								9.8	8.9	8.3	7.8	7.7	8.4	9.7	11.2	12.5	14.1	15.6	16.9	17.8	18.5	18.6	18.9	18.9	18.3	17.9	16.9	15.0	13.3	12.0	11.0	Diurnal Average
																								18.5	15.6	15.3	14.6	14.4	15.4	15.9	17.5	20.3	23.2	26.3	30.2	31.4	33.1	33.8	33.9	33.6	32.1	31.3	29.8	24.2	22.0	20.9	21.1	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - May 2016**

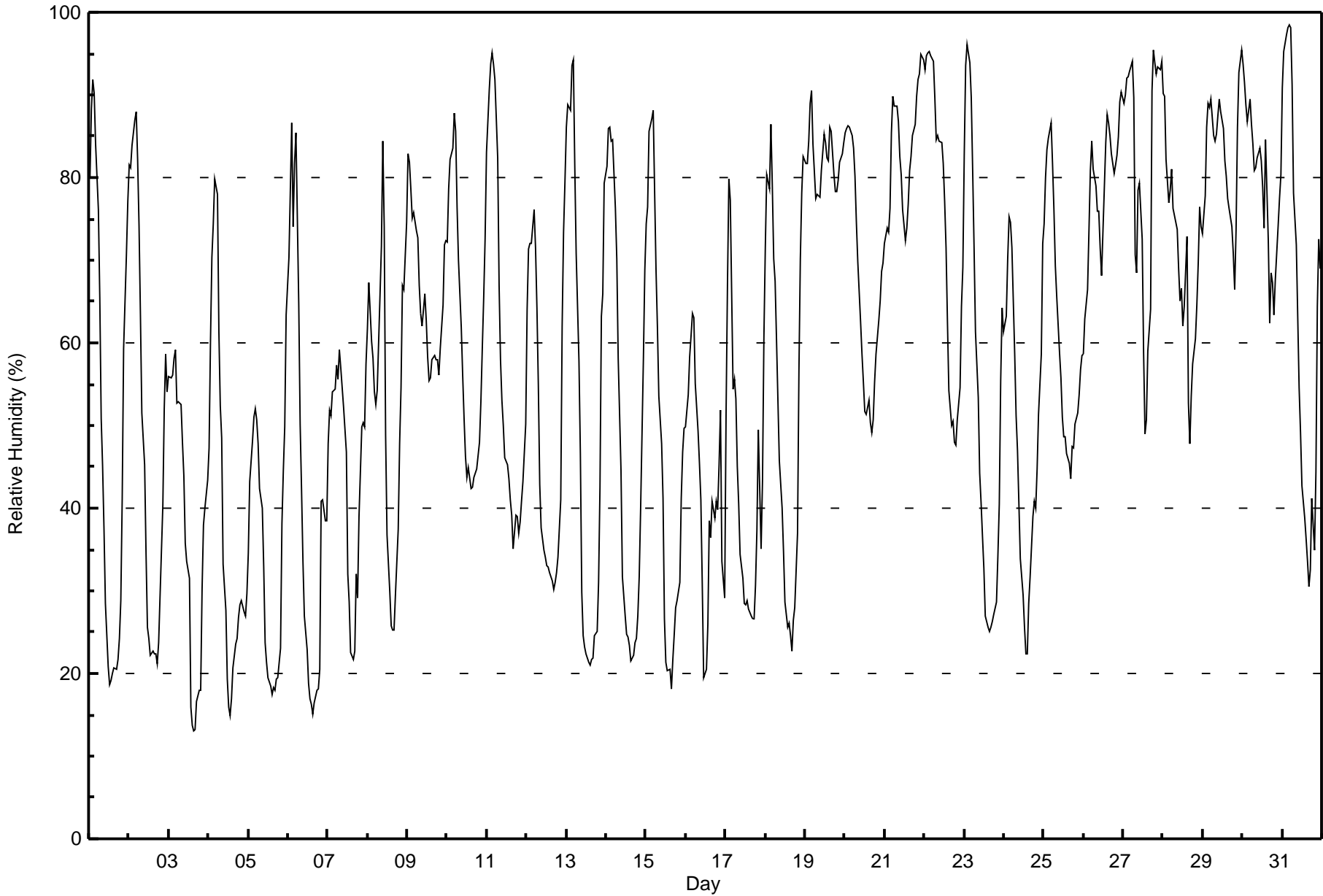
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	1	0.13	0.13
0 - 10	221	29.70	29.84
10 - 20	391	52.55	82.39
> 20	131	17.61	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 99 % on May 31 05:00																			Maximum Daily Average: 83.1 % on May 21						Hours in Service: 744																								
Minimum Value: 13 % on May 3 16:00																			Minimum Daily Average: 34.9 % on May 5						Hours of Data: 744																								
Maximum Diurnal Average: 80.2 % at hour 5																			Minimum Diurnal Average: 39.3 % at hour 17						Hours of Missing Data: 0																								
Monthly Average: 57.9 %																			Percentiles: P ₁ = 16 P ₁₀ = 25 Q ₁ = 39 Median = 59 Q ₃ = 79 P ₉₀ = 87 P ₉₉ = 95						Hours of Calibration: 0																								
																			Percent Operational Time: 100.0																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	80	88	92	90	84	76	65	51	45	37	28	21	19	19	20	21	21	22	24	29	41	59	71	77	49.2	92																							
2-May	82	81	84	87	88	82	74	63	52	45	35	26	24	22	23	22	22	21	24	29	40	52	59	54	49.7	88																							
3-May	56	56	56	58	59	53	53	53	48	44	36	34	31	16	14	13	13	17	18	18	30	38	40	43	37.3	59																							
4-May	47	60	70	74	80	78	61	52	48	33	28	19	16	15	17	21	24	24	27	28	29	27	27	30	39.0	80																							
5-May	35	43	48	51	52	51	48	42	40	33	24	21	20	19	18	18	19	20	20	23	38	45	50	63	34.9	63																							
6-May	70	78	87	74	82	85	65	50	42	34	27	23	19	17	16	15	16	18	18	21	41	41	39	39	42.3	87																							
7-May	48	52	51	54	54	57	56	59	57	52	50	47	32	29	22	22	23	32	29	39	50	50	50	58	44.7	59																							
8-May	62	67	60	58	54	52	54	66	72	84	74	49	37	30	26	25	25	29	37	48	55	67	67	75	53.0	84																							
9-May	83	82	79	75	76	74	73	67	64	62	66	63	58	55	56	58	58	58	58	56	59	65	72	72	66.2	83																							
10-May	72	79	82	84	88	86	77	70	62	56	51	46	44	45	42	43	44	44	45	48	53	59	65	73	60.7	88																							
11-May	83	91	94	95	94	92	82	67	58	53	50	46	45	43	41	39	35	39	39	37	38	41	43	50	58.2	95																							
12-May	64	71	72	72	76	72	64	55	43	38	35	34	33	33	32	31	30	31	32	34	41	62	73	79	50.4	79																							
13-May	86	89	88	94	94	81	71	58	47	30	25	23	22	21	21	22	22	25	25	31	43	63	66	79	51.1	94																							
14-May	81	86	86	84	85	76	70	58	51	45	32	27	25	24	23	22	22	24	24	27	32	40	58	69	48.8	86																							
15-May	74	76	86	87	88	78	69	62	54	48	41	27	21	20	20	18	22	25	28	29	31	41	47	50	47.6	88																							
16-May	50	54	58	61	64	63	55	49	45	41	31	19	21	26	39	36	41	39	41	40	45	52	34	29	43.0	64																							
17-May	52	67	80	77	54	56	53	45	41	34	32	29	28	29	28	27	27	27	31	37	50	35	43	61	43.4	80																							
18-May	72	80	79	86	79	70	68	60	46	43	40	35	29	26	26	25	23	27	28	37	57	70	78	83	52.6	86																							
19-May	82	82	84	89	90	84	77	78	78	78	81	85	84	82	82	86	86	80	78	78	80	82	83	84	82.3	90																							
20-May	85	86	86	86	85	84	80	75	70	63	59	55	52	51	53	50	49	51	55	59	63	65	69	70	66.7	86																							
21-May	72	74	73	76	85	90	89	89	87	83	80	76	72	74	77	81	83	85	86	90	92	93	95	94	83.1	95																							
22-May	93	95	95	95	95	94	90	85	85	84	84	82	77	71	63	54	50	50	48	48	51	55	64	69	74.1	95																							
23-May	83	94	96	94	90	81	72	61	53	44	41	37	33	27	26	25	26	26	27	29	34	40	55	64	52.4	96																							
24-May	61	63	70	75	74	72	59	51	47	40	34	29	26	22	22	28	32	39	41	40	45	51	59	72	48.1	75																							
25-May	74	80	83	85	87	82	76	69	66	59	56	51	49	49	47	45	43	48	47	50	52	54	57	59	61.1	87																							
26-May	59	63	66	74	81	84	81	79	76	76	72	68	74	84	88	87	85	83	81	82	83	85	89	90	78.7	90																							
27-May	89	90	92	92	93	94	90	71	68	78	79	72	59	49	51	59	64	91	95	94	93	93	93	94	81.0	95																							
28-May	90	90	82	77	78	81	76	75	74	69	65	67	62	64	73	53	48	54	58	60	65	70	76	74	70.0	90																							
29-May	73	78	86	89	88	89	85	84	85	87	89	88	86	82	80	78	76	74	71	66	74	86	93	95	82.7	95																							
30-May	94	92	89	87	89	86	84	81	81	82	84	82	79	74	85	72	62	69	67	63	68	74	77	80	79.2	94																							
31-May	91	95	97	98	99	98	91	78	72	63	55	49	43	39	36	34	30	33	41	35	44	64	72	69	63.6	99																							
																								72.3	76.8	79.1	80.0	80.2	77.5	71.2	64.6	59.8	55.5	51.0	46.1	42.5	40.6	40.8	39.7	39.3	42.0	43.3	45.3	52.0	58.7	63.3	67.7	Diurnal Average	
																								94	95	97	98	99	98	91	89	87	87	89	88	86	84	88	87	86	91	95	94	93	93	95	95	Diurnal Maximum	





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Lower Camp - May 2016

Maximum Speed: 28 km/h on May 8 17:00	Maximum Daily Speed Average: 19.2 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 29 05:00	Minimum Daily Speed Average: 0.7 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 7.2 km/h at hour 17	Minimum Diurnal Speed Average: 0.9 km/h at hour 5	Hours of Missing Data: 0
Monthly Average Velocity: 2.9 km/h 341.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 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-May	ESE2	E1	ESE2	SE6	ESE6	ESE10	SE14	SE16	SE18	SE13	ESE9	W7	W15	W15WSW15	W13	W10	W10	WNW9	WNW9	W2	NE1	ESE2	ESE2	SSW2.2	SE18	
2-May	ENE1	E1	NE1	E2	NE1	ENE1	ESE7	SE10	ESE3	ESE4	ESE4	SE7	ESE6	SE8	SE9	ESE7	SE9	SE7	SE8	SE6	SE5	SE5	SE10	ESE13	ESE5.4	ESE13
3-May	SE11	SE11	ESE11	ESE15	SE11	SE15	SE14	SE18	ESE17	ESE17	ESE14	SE15	SE17	SSE10	SSW11	SSW11	SW10	SSE9	S5	S7	SE10	SE4	SE8	S2	SE9.9	SE18
4-May	SE8	ESE4	SE4	ESE2	ESE4	ESE4	ESE6	SE11	SE12	SE9	SE9	W16	W13	W8	W21WNW24WNW24	W25	W24	W18	W20WNW21WNW16WNW15	W25	W24	W18	W20WNW21WNW16WNW15	W7.5	W25	
5-May	WNW13	WNW16	WNW15	WNW13	WNW9	W12	W17WNW14WNW12WNW16WNW17	W17	WNW20	W24	WNW23	NW21	NW20	NW21	NW18	NW15	N11	N4	NW4	WNW2	WNW13.8	W24	WNW13.8	W24		
6-May	E1	NW2	E3	W5	WNW2	NNE3	ENE4	NE4	NE5	E5WNW10	WSW6	W10	WSW7	WSW7	WSW12	WSW14	WSW13	WSW10	SW7	SE4	SE13	SE13	SE11	SW2.9	WSW14	
7-May	SE13	SE12	SE9	SE8	SE11	SE12	SE13	SE12	SE15	SE12	SE11	SE9	SE6	ESE6	WSW4	W10	ENE1	SE10	SE13	SE11	ESE14	ESE5	SE2	WNW1	SE8.0	SE15
8-May	S1	W3	WNW4	WNW7	WNW9	WNW13	WNW14	W26	W17	W4	SW9	WSW15	WSW24	WSW22	WSW22	WSW26	WSW28	WSW27	WSW26	WSW22	WNW16	WNW26	NW21	WNW21	W15.3	WSW28
9-May	WNW17	WNW16	W16	W18	W19	W19	W18	W21	W21	WNW23	WNW19	WNW15	WNW18	NW19	WNW16	NW17	NW16	WNW14	WNW14	WNW12	W12	NNW11	N8	N6	WNW15.0	WNW23
10-May	WNW4	W4	W6	W8	NW5	NNW5	NNE4	NNW5	N5	N8	N10	N12	N11	NNE15	NNE14	NNE15	NNE17	NNE18	NNE17	NNE16	NE9	ENE6	ENE5	NNW3	N7.5	NNE18
11-May	NNW2	NW2	N2	NW3	NW3	NNW4	NNW6	N12	NNE18	NNE16	NNE16	N17	NNE19	NNE19	NNE20	NNE20	NNE19	N20	N20	NNE19	N13	NNE8	N7	WNW4	N11.5	NNE20
12-May	NNW2	NW2	NE1	ENE2	NNW2	NW4	N8	NNW8	N15	N15	N17	NNE18	NNE18	NNE18	NNE16	NNE14	NNE14	N14	N15	NNE12	NE5	NE1	ENE2	NNW1	N8.9	NNE18
13-May	ENE2	ENE2	NE1	E2	ESE5	ESE8	SE10	SE10	SE9	W5	W8	WSW10	W9	WSW9	WSW7	NNW3	NW8	NNW9	NNW5	NE4	WNW1	N1	WNW2	NNE1	W0.7	WSW10
14-May	NNW2	ENE2	ENE2	NE2	ENE3	NE3	E4	SE6	ESE5	E4	ENE4	NW4	NW7	NNW7	NNW8	N5	NNW7	N8	NE10	NNE11	NNE6	W2	E2	ENE2	NNE3.0	NNE11
15-May	ENE2	NE2	E2	E2	ENE2	ESE6	SE11	SE10	SE10	SE9	SE8	S2	NNW3	NW5	N4	WSW5	SE8	SE9	SE8	SE6	SE8	SE9	SE7	SE7	SE4.4	SE11
16-May	SE7	SE5	SE8	SE11	SE9	SE9	SE8	SE12	SE11	SE9	SE6	SSW12	S9	SSE4	SE5	SE6	ESE5	ESE5	ESE4	SE7	ESE3	ESE1	SSE6	SE7	SE6.6	SSW12
17-May	WNW5	NW2	NNE1	ESE4	SE6	SE5	SSW4	WSW17	WSW19	W16	W11	WSW10	W11	W12	WNW12	W15	WNW11	WNW8	NNW4	SSE3	SE7	SSW6	SW4	ESE2	W5.6	WSW19
18-May	ESE3	ESE2	SE5	ESE3	SE5	SE7	SE9	SSE6	WSW10	WSW16	W15	WSW18	WSW23	W22	WSW17	WSW18	W17	WNW13	W8	NW5	NNW12	N21	N18	N17	W6.1	WSW23
19-May	N18	N17	N16	NNW15	NNW15	N18	N22	N22	NNE22	NNE22	N24	N19	NNE21	N22	N24	NNE24	N21	N21	N22	N20	N16	N14	N16	N17	N19.2	NNE24
20-May	N16	NNE14	N17	NNE15	NNE14	N15	NNE14	NNE18	NNE18	NE14	NE17	NE17	NNE16	NNE20	N17	N19	N16	NNW13	NNW15	NNW10	NNW7	NW7	NW11	WNW10	N13.2	NNE20
21-May	WNW8	NNW6	N4	NNW6	NNW9	N8	NNW8	NNW8	NNW10	NNW12	NNW12	NNW14	NNW13	NNW13	N16	N17	N16	N16	N15	N14	NNW10	NNW10	NNW11	N12	NNW10.9	N17
22-May	N11	N10	N11	N13	N14	N14	N14	N17	N19	NNE20	NNE21	N23	NNE21	NNE23	NNE23	NNE24	NNE24	N21	NNE25	NNE21	N14	NNW8	NW6	NW7	N16.4	NNE25
23-May	NE1	N1	WNW4	WNW3	NW5	WNW6	NW8	NNW11	N11	NNW13	N15	NNE15	NNE14	NE18	NE14	NE15	NE12	ENE11	ENE13	E11	SE7	SE5	SE5	SE7	NNE6.2	NE18
24-May	SE7	SE8	SE5	SE7	SE8	SE7	SE6	ESE9	ESE11	ESE12	SE11	SE12	SE12	SSE12	SSE11	SE11	WNW8	WNW0	SE5	S7	SSW7	S6	SSE4	SE7	SE7.1	ESE12
25-May	SE7	SE7	E4	SE3	SE5	SE7	ESE9	E4	NNE5	NW4	N5	NNW9	NNW12	NNW14	N14	N16	N16	N18	NNE17	N12	NNW10	N11	N11	N13	N6.5	N18
26-May	N12	N14	N16	NNW11	NW10	N11	N11	N14	NNW10	NNW15	NNW14	NW18	NW15	NNW13	WNW13	NW17	NW15	NW12	NNW12	NNW10	NNW9	NW7	WNW9	NW7	NNW11.6	NW18
27-May	NNW7	NW6	NW6	NNW5	NW5	NNW5	NNE3	ESE16	SE12	E7	ESE11	ESE8	SE9	SE10	SE9	SW14	WSW6	S7	SE9	ESE8	SE9	SSE7	ESE8	ESE5	SE3.8	ESE16
28-May	SSE5	ESE8	ESE12	ESE14	SE12	ESE12	ESE15	SE14	ESE12	SE8	SE12	SE12	SSE8	S9	SSE8	S8	S7	S7	SW11	SSW6	SSE5	S3	SW4	WSW9	SE7.5	ESE15
29-May	WSW7	W5	WSW8	SW7	S0	SW3	W6	WSW3	WSW6	WSW7	W6	W7	NNW5	N3	NE3	NNE2	N5	NNE9	NE11	NNE8	N5	WSW3	NNW1	WNW3	WNW2.4	NE11
30-May	W4	WNW5	WNW5	NW6	NW6	NW6	NW6	NW8	NW10	NW8	NNW10	N12	N8	WNW11	NW13	NW15	NW17	NW13	NW9	NNW10	NNW9	NW6	NW7	NW6	NW8.4	NW17
31-May	NW2	NE1	WNW1	E1	ESE2	NE1	NNW3	NNW4	WNW6	NNW5	WNW3	W6	W6	WNW8	NW6	WNW6	WNW4	NNE3	SE7	SE6	SE4	SE4	SE6	SE8	WNW0.7	SE8

N1.4	N1.8	N1.7	N0.9	N0.9	NNE1.3	ENE1.7	NE1.8	NNE2.2	N2.9	N3.3	NW4.0	NW4.8	NW5.5	NW5.8	NW6.8	NW7.2	NNW5.6	NNW4.9	N3.7	N2.5	NNW2.4	NNW1.9	NNW2.0	Diurnal Average
N18	N17	N17	W18	W19	W19	N22	W26	NNE22	WNW23	N24	N23	WSW24	W24	N24	WSW26	WSW28	WSW27	WSW26	WSW22	W20	WNW26	NW21	WNW21	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

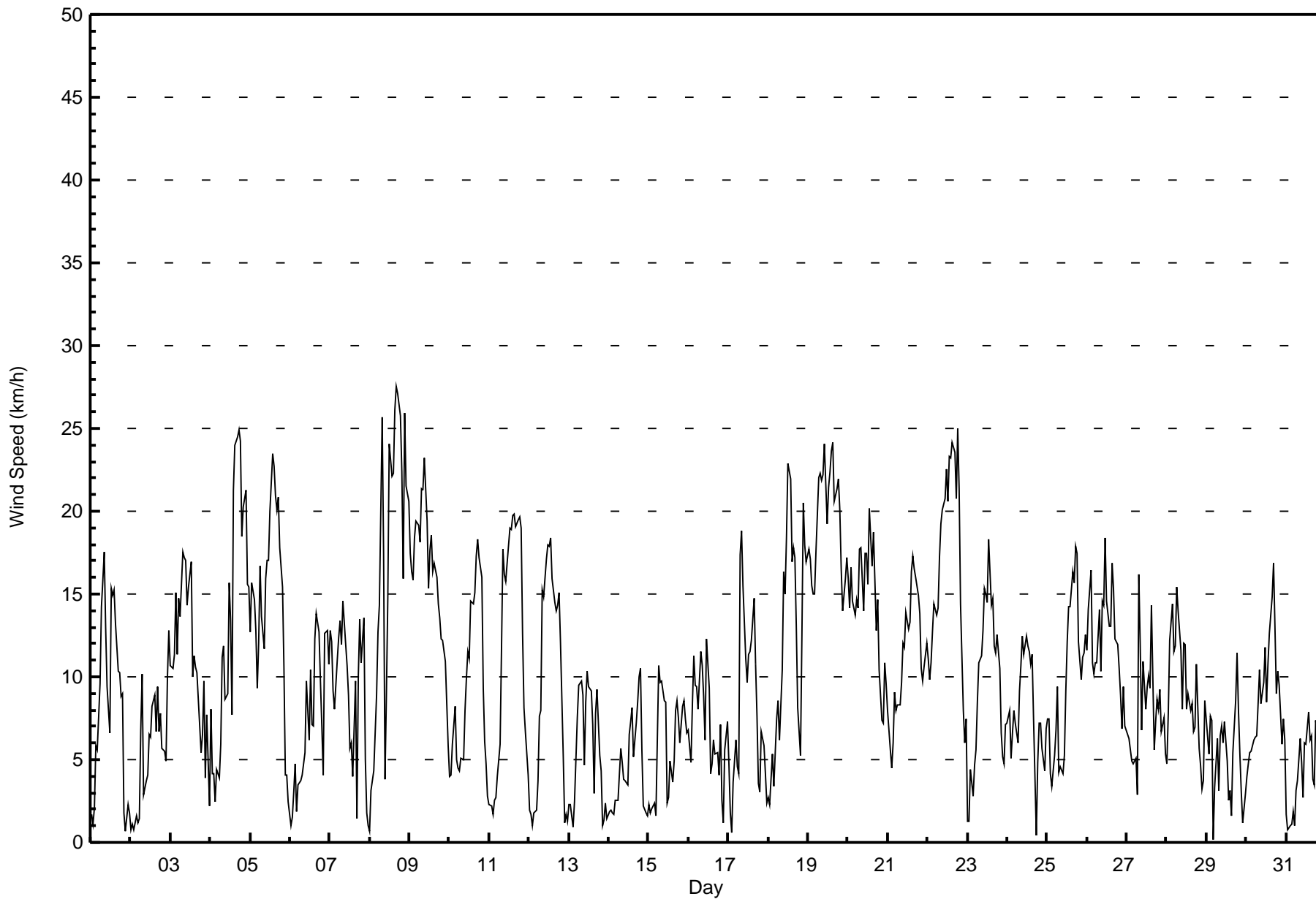
Wind Speed (WS) - km/h
Lower Camp - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on May 4 15:00 Minimum Value: 1 km/h on May 2 09:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1	1	1	3	2	4	2	3	2	2	2	6	4	3	3	4	3	3	3	2	2	1	2	2	6
2-May	1	1	1	2	1	1	4	4	1	1	1	2	2	2	3	3	3	2	1	2	1	1	3	3	4
3-May	2	2	2	3	4	4	3	3	2	2	3	2	3	4	5	4	4	4	3	1	2	3	3	3	5
4-May	2	2	1	1	1	2	3	2	2	1	1	5	3	3	8	6	6	5	5	4	4	4	4	3	8
5-May	2	4	3	2	3	4	3	3	3	4	4	5	6	6	6	6	5	5	4	4	5	2	2	1	6
6-May	2	1	2	3	2	1	1	1	1	2	5	3	4	4	4	5	4	4	3	3	2	3	3	4	5
7-May	3	3	3	2	2	3	3	3	3	2	2	1	1	1	5	3	1	4	3	3	3	4	2	2	5
8-May	1	2	2	2	4	4	4	6	4	3	4	5	5	5	5	6	6	6	5	5	4	7	5	5	7
9-May	3	3	4	4	4	3	3	4	5	5	4	3	4	4	4	4	3	4	3	3	2	3	2	2	5
10-May	2	2	2	2	3	1	1	2	2	3	3	5	4	5	5	5	5	4	4	3	3	1	1	2	5
11-May	1	1	1	1	1	1	3	4	4	5	5	5	5	6	5	5	5	5	4	3	3	2	2	2	6
12-May	1	1	1	2	1	1	2	2	5	5	5	6	5	6	5	6	6	4	4	4	2	1	1	1	6
13-May	1	1	1	1	1	3	2	2	2	3	4	4	4	4	4	4	4	3	1	3	1	1	1	1	4
14-May	1	1	1	1	1	1	1	1	1	1	1	3	3	4	3	4	4	4	4	2	2	1	1	1	4
15-May	1	1	1	1	2	3	2	2	2	1	2	3	2	2	2	2	3	2	2	1	2	2	1	2	3
16-May	2	2	2	2	2	2	2	2	2	1	4	5	4	2	1	2	2	2	3	3	2	2	4	4	5
17-May	3	1	1	2	2	1	4	4	3	4	3	2	2	3	4	3	2	2	2	2	2	2	1	4	4
18-May	1	2	1	1	2	2	2	3	3	4	3	4	5	5	5	4	4	4	2	6	4	5	5	5	6
19-May	4	5	4	4	4	5	5	5	5	5	5	5	5	5	6	5	6	5	4	4	4	3	3	3	6
20-May	3	3	3	3	3	3	3	4	4	4	5	4	5	5	4	4	4	4	4	3	2	2	2	2	5
21-May	1	2	1	2	3	3	2	2	2	3	3	3	3	3	3	4	4	4	4	5	2	2	3	3	5
22-May	3	2	3	3	3	3	3	4	4	5	4	4	5	4	6	5	5	5	5	5	3	2	2	1	6
23-May	2	1	2	2	1	1	2	2	3	3	4	5	5	6	6	6	5	5	4	3	2	1	1	1	6
24-May	2	2	2	2	2	2	1	2	2	3	5	5	4	4	4	4	5	1	1	3	3	2	1	1	5
25-May	2	2	2	1	2	2	2	2	1	1	2	3	3	4	3	3	3	4	4	4	3	3	3	3	4
26-May	3	3	4	4	2	2	2	3	2	3	3	5	4	3	4	3	4	3	3	3	2	2	2	2	5
27-May	1	1	1	1	2	2	4	4	4	2	4	4	3	3	4	6	4	5	3	2	4	4	3	2	6
28-May	2	3	3	4	4	3	3	3	3	3	4	3	3	4	4	3	3	3	4	3	2	1	2	2	4
29-May	2	2	2	3	2	2	2	1	1	2	2	2	1	2	1	1	2	3	3	2	2	2	1	1	3
30-May	1	1	2	2	1	1	1	2	2	2	2	3	2	4	4	3	4	3	2	4	3	2	2	2	4
31-May	1	1	2	1	2	2	1	1	2	2	3	3	2	3	2	2	2	2	2	2	1	1	2	2	3
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	195	26.21	26.21
6 - 11	266	35.75	61.96
12 - 19	223	29.97	91.94
20 - 28	60	8.06	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	8	17	16	14	27	19	5	6	1	3	4	9	18	16	20	195
6 - 11	18	5	3	2	2	20	83	9	9	5	5	15	18	16	25	31	266
12 - 19	51	32	7	1	0	13	28	1	0	1	1	11	21	26	13	17	223
20 - 28	13	17	0	0	0	0	0	0	0	0	0	9	9	8	4	0	60
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	94	62	27	19	16	60	130	15	15	7	9	39	57	68	58	68	744

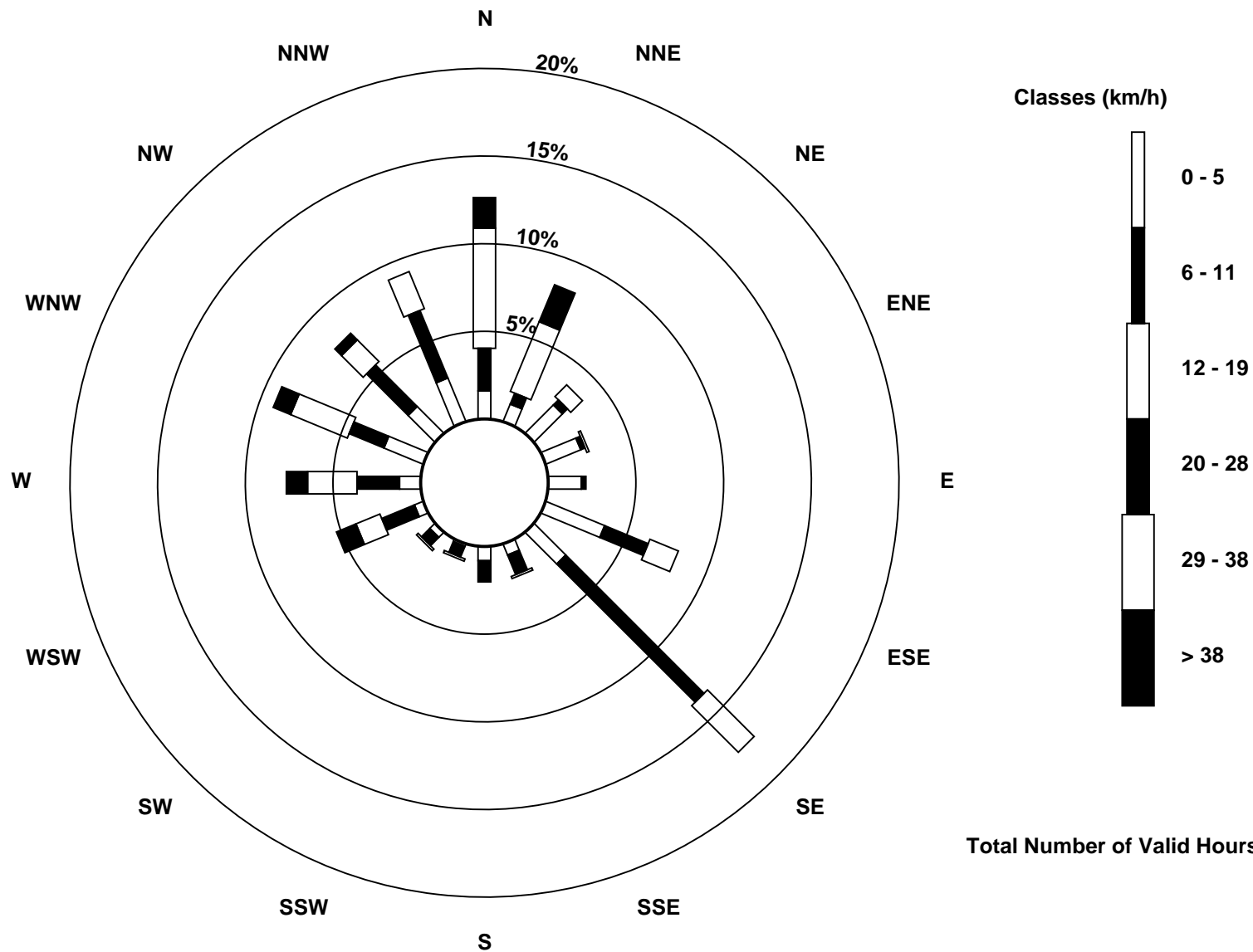
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Lower Camp (AMS 11)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - May 2016

Direction of Maximum Speed: 246 deg on May 8 17:00 Direction of Maximum Daily Speed Average: 4.2 deg on May 19	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 185 deg on May 29 05:00 Direction of Minimum Daily Speed Average: 0.7 deg on May 13	Percent Operational Time: 100.0
Monthly Average Direction: 307.4 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-May	103	98	105	125	116	123	126	125	126	126	121	268	274	275	254	269	259	260	303	302	270	54	122	118	199.3
2-May	78	91	49	85	54	72	119	129	112	107	103	125	114	128	124	117	130	135	137	142	136	133	127	116	122.8
3-May	124	132	110	119	131	137	131	124	120	120	121	125	128	167	204	210	227	164	172	175	140	134	137	171	139.0
4-May	132	123	126	102	114	114	115	130	131	128	132	264	267	277	278	292	295	278	275	269	263	283	286	291	268.5
5-May	285	296	293	283	311	279	265	286	292	286	285	277	286	280	282	307	308	312	314	305	10	352	314	289	294.4
6-May	87	320	89	260	292	20	63	52	48	93	283	245	275	248	252	254	250	245	246	231	132	141	142	143	227.9
7-May	124	125	137	128	138	130	140	137	128	132	132	130	132	118	258	281	76	134	138	135	122	109	128	290	132.9
8-May	186	278	285	290	295	290	283	281	278	271	224	246	246	249	249	254	246	243	241	244	299	299	307	300	265.9
9-May	292	297	276	274	264	261	261	272	278	297	294	300	303	307	300	305	304	289	303	286	266	331	5	11	290.2
10-May	283	263	265	265	308	336	20	341	351	2	5	359	355	18	21	17	25	26	31	33	41	64	67	330	10.4
11-May	336	313	351	324	318	332	348	359	17	24	19	7	16	14	12	27	23	11	10	14	10	15	4	299	11.2
12-May	343	312	38	59	336	323	355	335	353	0	11	12	23	21	19	29	13	5	7	28	34	41	60	343	11.0
13-May	62	78	45	101	120	113	124	128	129	265	261	258	266	250	258	348	312	345	338	48	292	354	292	28	266.0
14-May	335	60	67	45	65	45	101	129	119	87	59	324	326	339	338	356	333	4	26	15	274	97	77	21.3	
15-May	71	45	85	82	65	104	125	129	129	127	132	184	344	326	358	258	131	140	141	139	144	135	136	142	128.2
16-May	146	125	134	136	134	127	133	126	125	134	135	201	187	159	136	130	122	118	112	129	119	117	155	139	139.1
17-May	282	323	32	117	140	137	197	258	258	267	265	256	264	278	284	280	289	288	329	156	138	199	216	123	259.1
18-May	118	109	127	102	136	131	133	150	249	253	259	252	251	261	252	251	274	282	277	325	345	4	1	0	274.8
19-May	10	2	351	331	331	354	9	10	14	12	6	6	13	5	9	12	9	8	4	7	1	358	2	5	4.2
20-May	6	16	10	14	16	10	16	25	25	44	39	40	30	12	4	8	349	343	346	342	335	321	306	299	8.4
21-May	302	329	4	327	331	349	348	342	335	340	332	334	343	336	350	358	352	5	360	3	338	336	338	352	344.7
22-May	3	355	354	353	353	358	5	11	8	23	19	9	18	13	16	17	16	11	13	15	9	345	310	326	8.4
23-May	39	8	293	299	310	300	325	342	357	348	355	14	27	41	42	43	53	72	65	94	131	138	138	137	29.9
24-May	139	142	132	135	139	130	127	121	119	119	126	137	144	150	148	140	285	296	142	173	196	178	156	139	141.5
25-May	141	137	93	144	144	135	123	93	15	316	357	342	343	346	355	3	353	354	20	6	348	349	350	358	7.8
26-May	352	359	1	348	323	351	6	8	345	327	332	321	326	327	302	308	318	324	329	339	345	313	297	326	333.6
27-May	330	314	313	329	312	335	16	123	138	101	107	119	129	132	128	233	257	171	129	109	124	150	123	106	129.5
28-May	148	112	112	110	135	117	120	125	120	137	131	128	154	171	159	173	174	175	221	199	156	172	221	241	144.0
29-May	256	259	252	217	185	216	264	254	253	238	262	266	342	11	40	32	356	12	35	27	8	253	331	288	295.4
30-May	277	299	300	305	304	319	316	320	314	320	333	8	350	294	309	314	315	310	321	342	346	322	313	326	320.0
31-May	309	38	290	99	111	44	335	344	291	346	297	272	279	303	320	299	286	12	129	145	137	130	136	137	297.7

351.8	358.6	0.3	350.7	352.0	31.2	60.5	49.5	21.8	8.6	0.4	324.7	323.2	325.4	321.6	321.5	323.3	331.4	348.5	357.0	2.8	336.0	341.9	343.7
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

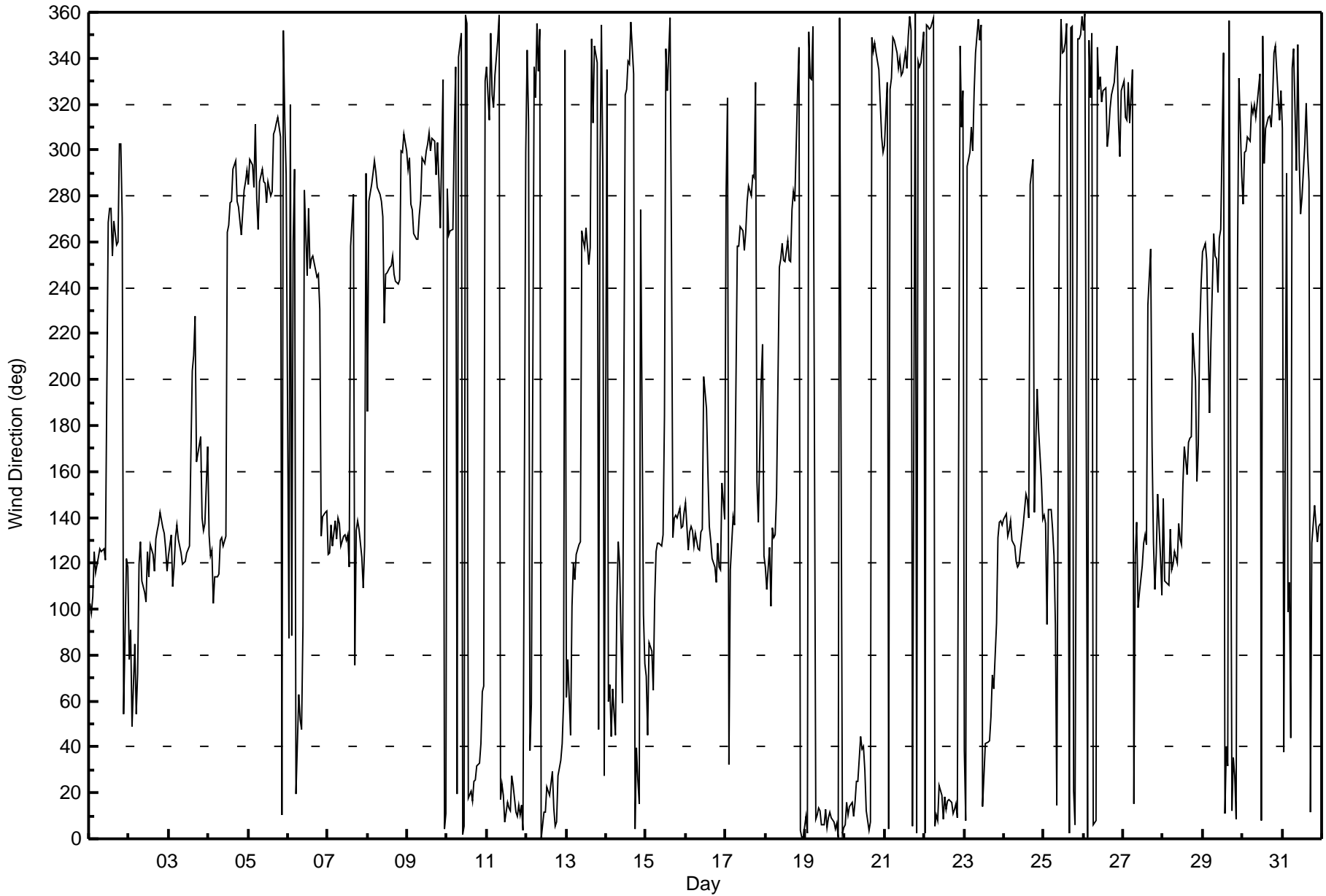
Wind Direction (WD) - deg
Lower Camp - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on May 29 05:00 Minimum Value: 5 deg on May 4 09:00 Percentiles: P ₁ = 8 P ₁₀ = 13 Q ₁ = 17 Median = 21 Q ₃ = 35 P ₉₀ = 55 P ₉₉ = 89		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	40	77	63	28	32	22	11	9	7	7	10	91	17	16	18	25	23	20	31	11	56	64	54	51	91
2-May	34	61	34	34	71	88	31	10	22	19	29	12	15	15	26	39	16	14	8	16	14	15	11	11	88
3-May	13	10	13	9	23	18	13	11	7	6	8	7	6	41	44	38	32	42	44	18	9	78	46	80	80
4-May	23	36	30	64	31	56	51	9	5	8	13	19	17	36	19	12	14	16	13	11	11	13	12	13	64
5-May	11	13	12	10	20	21	12	15	19	14	18	21	21	16	20	19	20	15	16	11	28	36	42	51	51
6-May	83	73	47	61	70	32	23	24	23	37	55	60	38	59	75	38	20	18	16	20	51	17	17	22	83
7-May	17	16	21	21	15	16	15	14	12	12	11	10	13	31	91	18	79	12	14	15	12	81	81	100	100
8-May	83	68	40	22	38	13	12	12	22	72	24	16	14	15	14	13	14	14	13	11	22	14	15	12	83
9-May	12	13	12	11	13	11	11	14	12	15	15	17	16	19	17	16	17	18	16	15	12	35	23	29	35
10-May	34	58	22	17	34	40	38	39	43	28	17	23	30	20	26	25	25	21	20	15	15	17	27	68	68
11-May	45	35	57	48	51	40	34	23	18	28	31	27	23	22	24	22	24	23	21	13	13	12	24	33	57
12-May	46	40	87	71	44	25	29	26	24	23	23	23	27	26	30	27	26	22	15	16	28	42	25	47	87
13-May	46	34	81	43	20	26	15	14	16	74	50	34	35	38	76	79	48	26	21	30	58	49	50	54	81
14-May	50	30	55	29	25	38	26	17	22	20	49	77	64	63	40	84	48	35	24	11	28	61	49	42	84
15-May	23	66	34	38	48	30	16	16	14	14	14	70	74	56	61	68	33	20	19	21	19	16	16	21	74
16-May	27	34	19	15	16	17	20	14	13	14	58	33	33	33	25	22	33	31	66	38	75	83	88	51	88
17-May	74	65	90	46	24	34	65	14	12	14	25	20	19	22	17	17	19	25	38	39	22	32	42	40	90
18-May	31	55	11	17	36	23	25	51	26	14	15	16	13	13	19	14	16	13	18	46	20	18	20	22	55
19-May	18	19	21	17	18	20	16	16	17	19	17	18	17	17	15	16	18	16	17	17	17	18	16	15	21
20-May	16	13	14	14	16	15	16	18	16	21	24	19	22	18	16	16	22	20	20	20	25	31	14	14	31
21-May	14	29	30	31	21	25	22	21	20	20	20	20	19	19	19	17	20	17	20	23	20	18	19	19	31
22-May	18	17	18	18	19	16	16	17	17	18	17	16	18	19	16	21	19	18	17	17	13	17	23	14	23
23-May	73	44	34	50	25	18	24	20	18	23	19	31	35	31	36	27	41	34	23	20	22	18	13	12	73
24-May	19	19	20	18	18	25	21	15	13	17	25	36	35	36	35	30	45	91	15	30	25	29	22	14	91
25-May	17	22	45	31	33	26	21	36	40	36	33	28	23	23	23	19	20	19	19	25	21	20	20	18	45
26-May	19	18	18	27	18	20	21	15	24	20	21	18	20	20	17	13	17	17	18	22	24	21	14	23	27
27-May	22	19	19	22	31	40	66	19	28	33	21	24	24	24	25	42	55	47	23	27	22	37	29	31	66
28-May	35	21	12	15	28	21	12	17	18	34	20	19	36	36	38	46	48	36	25	36	27	29	58	14	58
29-May	16	20	23	32	100	49	32	49	18	17	23	21	30	53	51	75	21	16	19	21	23	43	71	43	100
30-May	27	25	22	25	18	16	19	17	13	22	21	19	22	29	17	19	18	14	17	24	20	37	19	17	37
31-May	78	74	91	40	83	88	39	44	47	65	76	60	46	37	49	44	70	61	24	25	16	11	14	17	91
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - May 2016





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Last Calibration	April 4, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	5:45	End Time (MST)	7:16
Gas Cert Reference	LL110099	Station temp.	20 Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	25/03/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	800	800
Calculated slope	1.001192	1.014060	Chamber temp	44.8	44.8
Calculated intercept	0.725715	-0.315677	Pressure	709.6	709.6
Analyzer Background	11.0	11.0	Flow	0.489	0.489
Analyzer Coefficient	1.014	1.014	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	0.1	----
as found span	5000	80.9	830.0	818.4	1.014
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	80.9	830.0	818.4	1.014
second point	5000	40.9	419.6	415.2	1.011
third point	5000	20.5	210.3	207.3	1.015
as left zero					
as left span					
Average Correction Factor					1.013

Corrected As found 818.3 Previous response 828.3 % change 1.2%

Notes:

Changed inlet filter after as founds. No adjustments or maintenance done

Calibration Performed By: Melissa Lemay



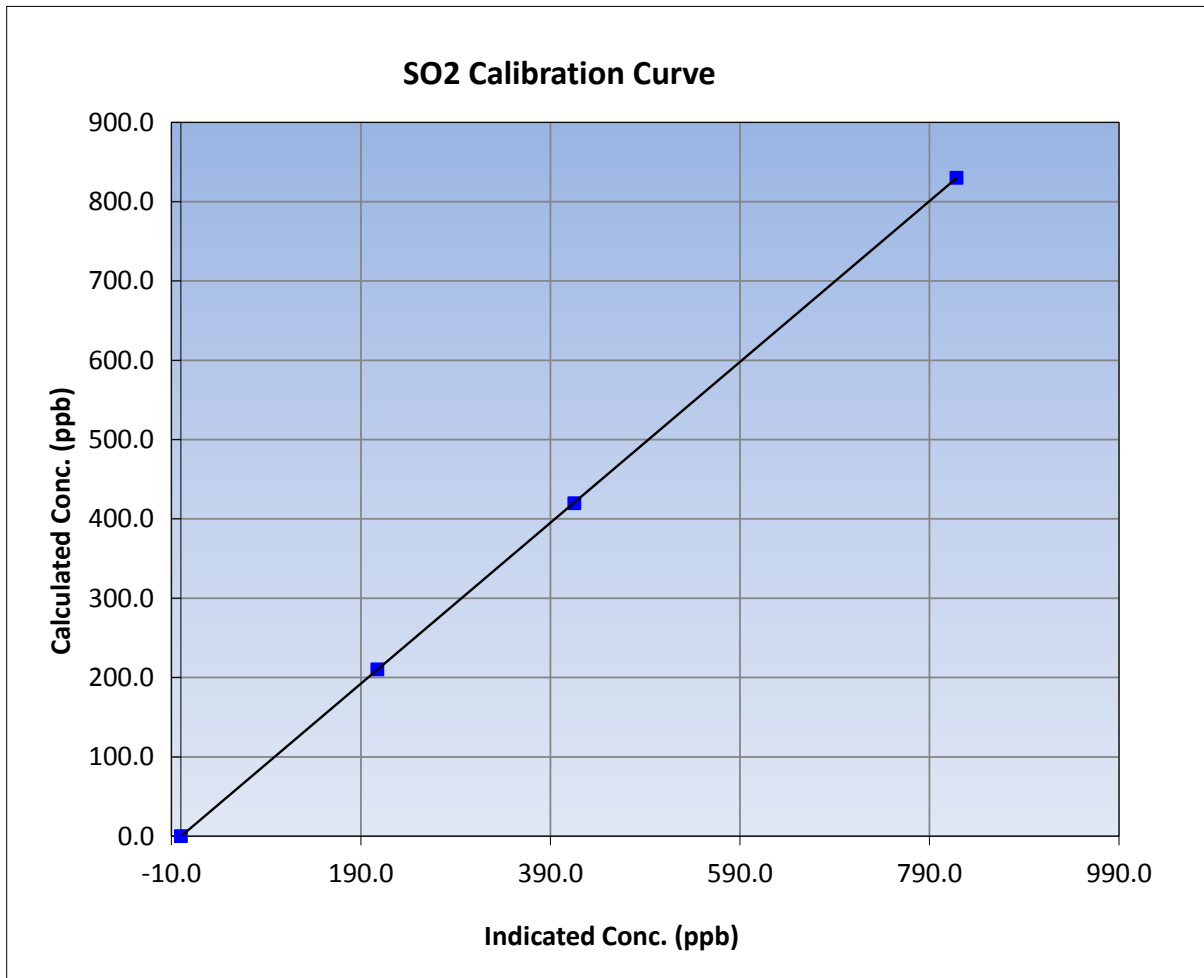
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 4, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	5:45	End Time (MST)	7:16
Analyzer make	TEI 43i	Analyzer serial #	100841398

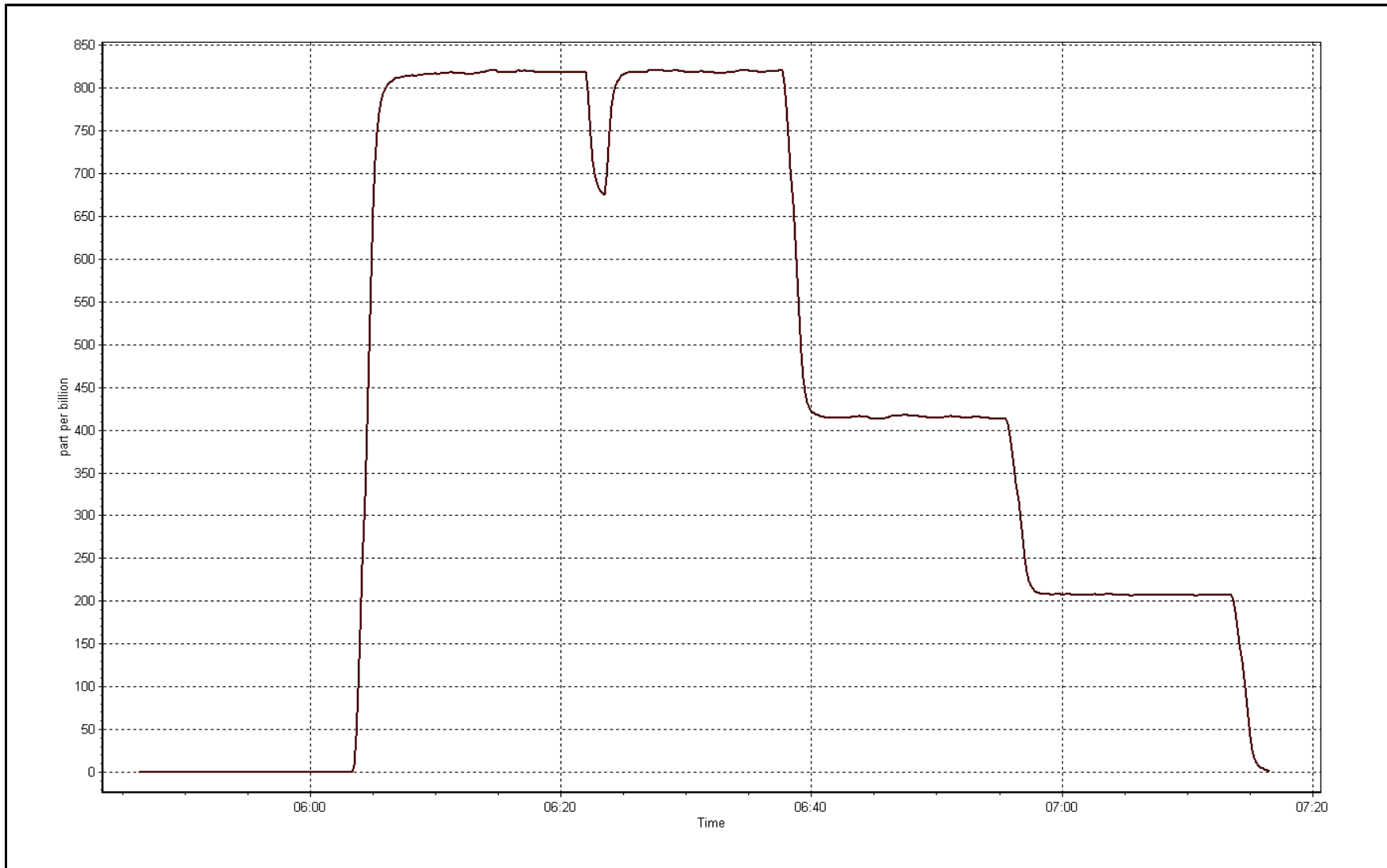
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999996
830.0	818.4	1.0142		
419.6	415.2	1.0107	Slope	1.014060
210.3	207.3	1.0146		
			Intercept	-0.315677



SO2 Calibration Plot

Date: May 26, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 26, 2016	Last Calibration	April 5, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	9:03
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	-671
Analyzer IP address	192.168.1.42		Lamp voltage	797	797
Calculated slope	0.999559	1.011289	Chamber temp	45	45
Calculated intercept	-0.203534	-0.373218	Pressure	567.8	567.8
Analyzer Background	10.7	10.7	Flow	1.022	1.022
Analyzer Coefficient	1.178	1.178	Intensity	90	90
			Converter temp.	325	325

Analyzer make/model	Thermo 450i	Analyzer serial #	1410661328
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	72.8	75.0	74.3	1.009
SO2 scrubber check	5000	20.5	210.7	1.4	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	72.8	75.0	74.3	1.009
second point	5000	38.8	40.0	40.3	0.992
third point	5000	19.4	20.0	20.1	0.994
as left zero					
as left span					
Average Correction Factor					0.998

Corrected As found	74.1	Previous response	75.2	% change	1.5%
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Notes:

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

Calibration Performed By: Melissa Lemay



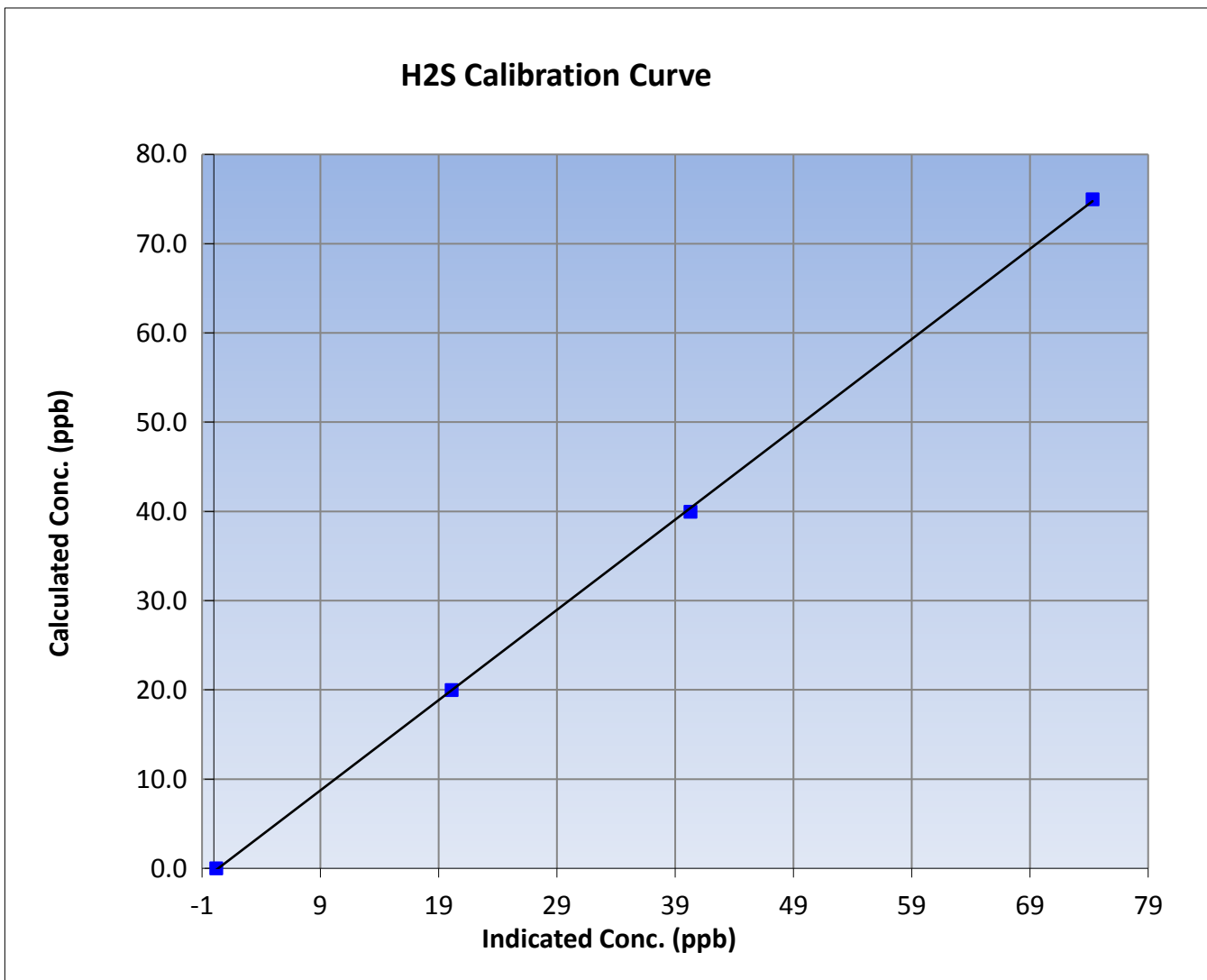
Wood Buffalo Environmental Association H2S Calibration Report

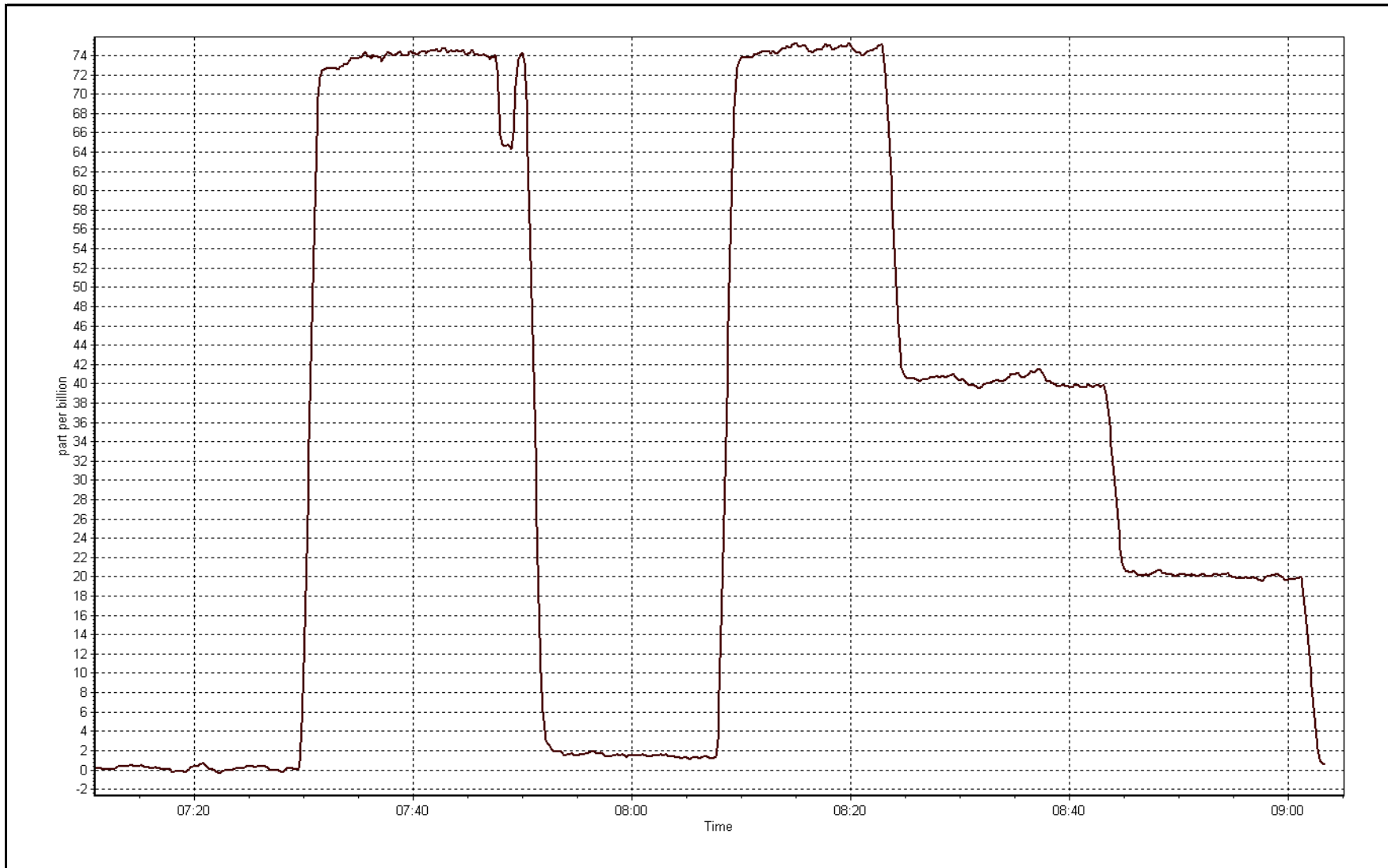
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 5, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	7:10	End Time (MST)	9:03
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999918
75.0	74.3	1.0092		
40.0	40.3	0.9917	Slope	1.011289
20.0	20.1	0.9941		
			Intercept	-0.373218







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-26-16	Last Calibration	April-04-16
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	5:45	End Time (MST)	7:16
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	7.8	7.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.2	40.2
Calculated slope	1.002312	1.001884	Fuel Pressure	25.1	25.1
Calculated intercept	-0.031035	-0.082870	Analyzer Coeff	4.608	4.608
			Analyzer BKG	2.36	2.36

Analyzer make	51i-LT	Analyzer serial #	1218153353
---------------	--------	-------------------	------------

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.06	----
as found span	5000	80.9	17.32	17.34	0.999
calibrator zero	5000	0.0	0.00	0.06	----
high point	5000	80.9	17.32	17.34	0.999
second point	5000	40.9	8.76	8.89	0.985
third point	5000	20.5	4.39	4.45	0.986
as left zero					
as left span					
Average Correction Factor					0.990

Corrected As found	17.28	Previous response	17.31	% change	0.2%
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Notes:

Changed inlet filter after as founds. No adjustments or maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

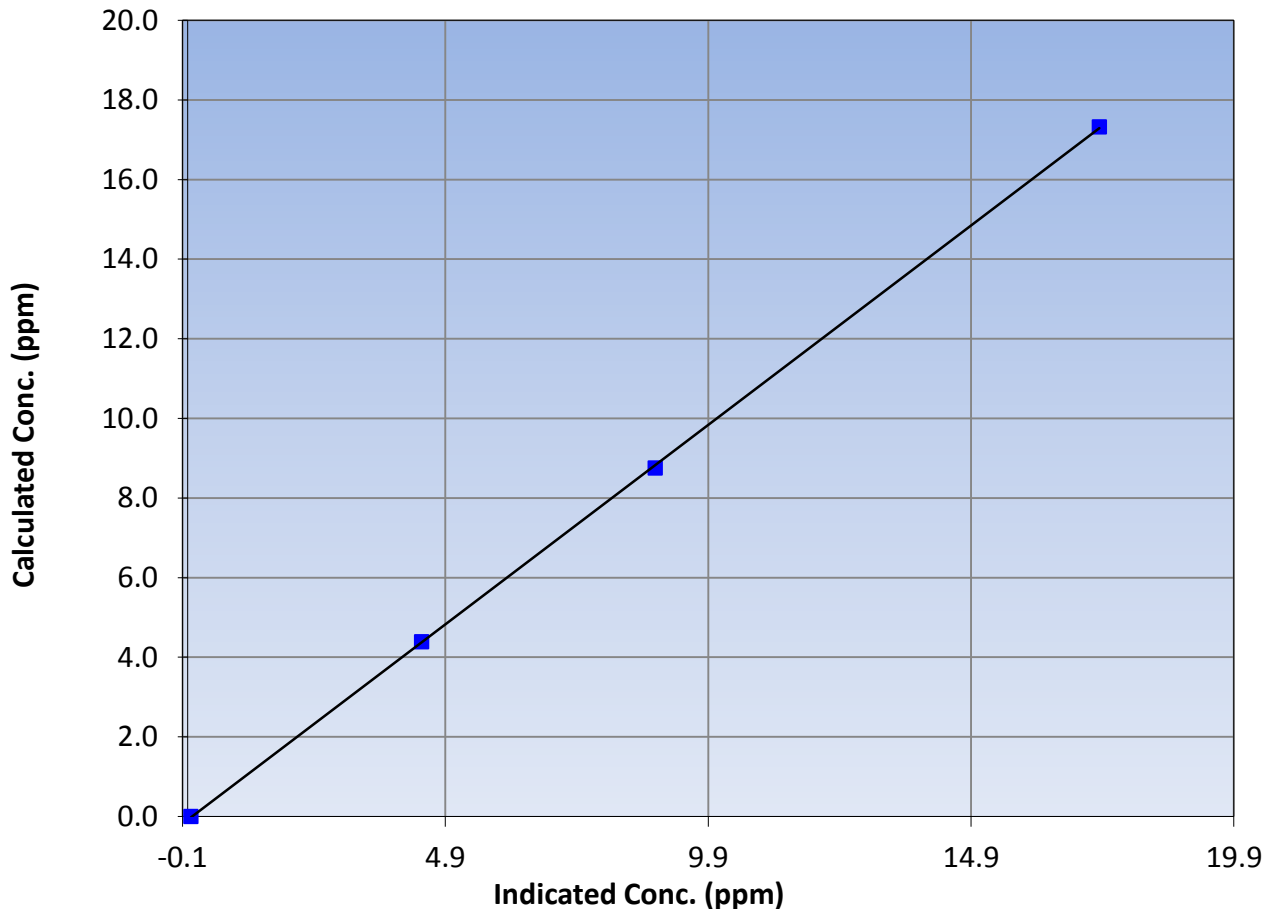
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 4, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	5:45	End Time (MST)	7:16
Analyzer make	51i-LT	Analyzer serial #	1218153353

Calibration Data

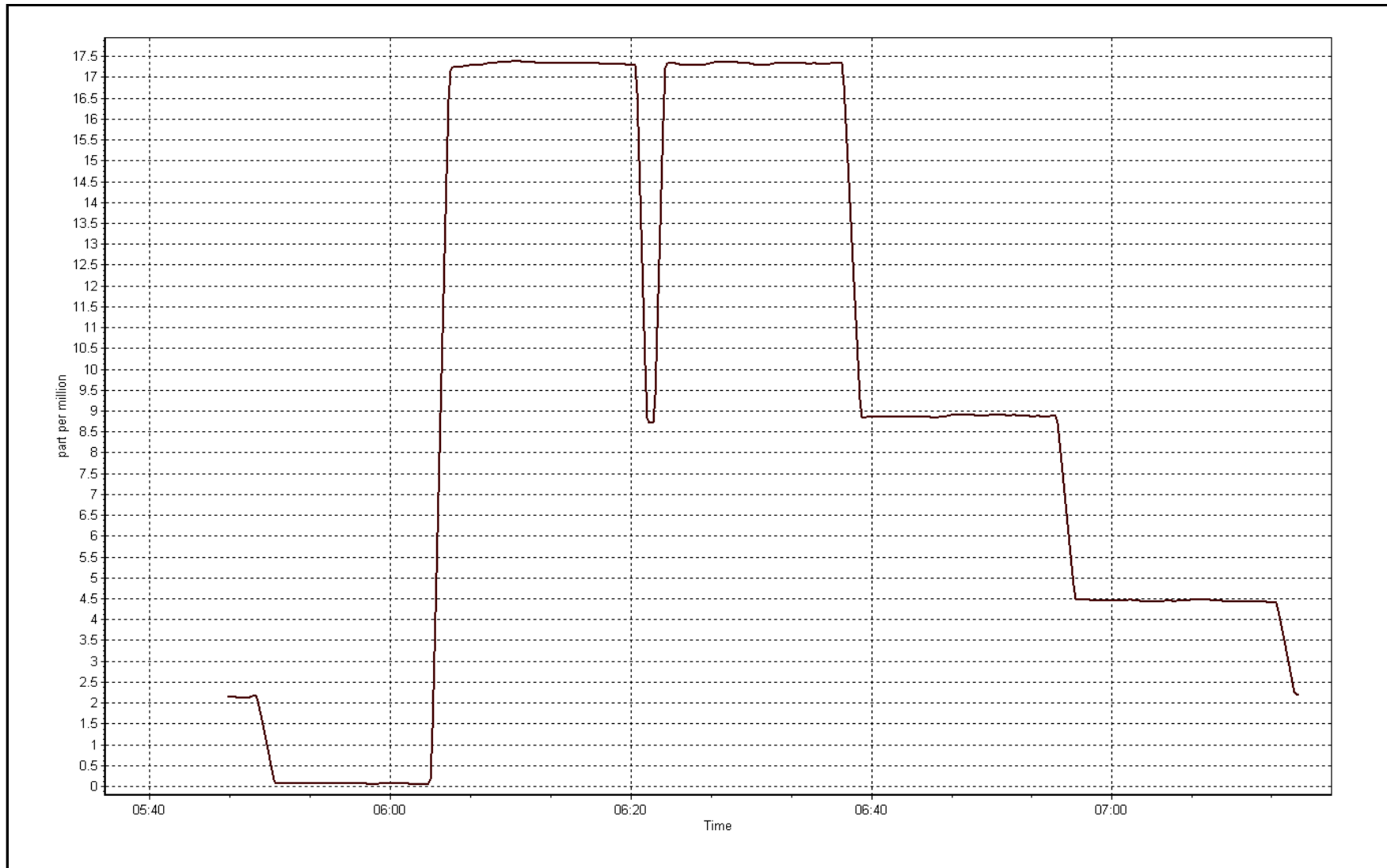
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	----	Correlation Coefficient	0.999962
17.32	17.34	0.9989		
8.76	8.89	0.9850	Slope	1.001884
4.39	4.45	0.9863		
			Intercept	-0.082870

THC Calibration Curve



THC Calibration Plot

Date: May 26, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	708	35	36	99.87	29	0	5	0
TRS(ppb) Average	708	34	36	99.73	8	0	3	0
THC(ppm) Average	498	28	246	70.70	7.3	-	3.6	-
O3(ppb) Average	706	37	38	99.87	67	0	41	-
NO2(ppb) Average	708	35	36	99.87	44	0	10	-
NO(ppb) Average	708	35	36	99.87	13	-	2	-
NOX(ppb) Average	708	35	36	99.87	48	-	12	-
PM2.5(ug/m3) Average	741	2	3	99.87	3866.6	-	1140.6	8
ET(C) Average	744	0	0	100.00	34.7	-	21	-
RH(%) Average	744	0	0	100.00	98	-	87	-
WS(km/h) Average	744	0	0	100.00	19	-	16	-
WD(deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	708	0.5	2	-	0	0	0	0	0	1	29
TRS(ppb) Average	708	0.3	1	-	0	0	0	0	0	1	8
THC(ppm) Average	498	2.25	0.5	-	1.8	2	2	2.1	2.3	2.5	7.3
O3(ppb) Average	706	27.9	14	-	3	9	16	27	41	47	67
NO2(ppb) Average	708	2.1	4	-	0	0	1	1	2	4	44
NO(ppb) Average	708	0.3	1	-	0	0	0	0	0	1	13
NOX(ppb) Average	708	2.3	4	-	0	0	1	1	3	5	48
PM2.5(ug/m3) Average	741	61.96	343	-	0	0.9	1.9	3.8	9.6	66.9	3866.6
Temperature 2 m (C) Average	744	12.37	7.6	-	-4.3	3.5	7.2	11.5	17.7	22.8	34.7
Relative Humidity (%) Average	744	59.1	26	-	13	22	35	61	83	91	98
Wind Speed 10 m (km/h) Average	744	6.5	4	-	0	2	3	6	10	12	19
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2	25 May 2016 11:00	25 May 2016 11:00	1	Maintenance - verify daily QA response
TRS	25 May 2016 12:00	25 May 2016 13:00	2	Maintenance - verify daily QA response
THC	16 May 2016 09:00	25 May 2016 10:00	218	Unstable Operation - inlet filter restricted from forest fire smoke
O3	25 May 2016 12:00	25 May 2016 12:00	1	Maintenance - verify daily QA response
PM2.5	13 May 2016 15:00	13 May 2016 15:00	1	Unstable Operation - negative baseline



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Fort McKay South - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 29 ppb on May 3 12:00	Maximum Daily Average: 4.7 ppb on May 3		Hours of Data:	708
Minimum Value: 0 ppb on May 2 04:00	Minimum Daily Average: 0.0 ppb on May 26		Hours of Missing Data:	36
Maximum Diurnal Average: 1.3 ppb at hour 12	Minimum Diurnal Average: 0.2 ppb at hour 6		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 = 7		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-May	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-May	0	0	Z	0	0	0	0	3	2	C	C	C	C	14	6	4	5	5	3	2	1	0	0	0	2.4	14
3-May	0	0	0	Z	0	0	0	1	8	15	22	29	24	4	1	0	0	0	0	0	0	0	1	0	4.7	29
4-May	0	0	0	0	Z	0	0	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0.2	3
7-May	3	2	1	1	1	1	1	1	Z	2	0	0	3	3	3	1	0	0	1	1	1	1	1	1	1.2	3
8-May	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-May	Z	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
14-May	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
15-May	0	0	0	Z	0	0	1	1	1	2	2	1	0	0	0	0	0	1	0	0	0	1	0	0	0.6	2
16-May	0	0	0	0	Z	0	1	2	1	8	4	1	1	2	3	12	4	3	2	1	1	0	0	0	2.0	12
17-May	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0.5	1
18-May	Z	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
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0.3	1
25-May	0	Z	0	0	0	0	0	0	0	1	M	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
26-May	0	0	Z	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-May	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1

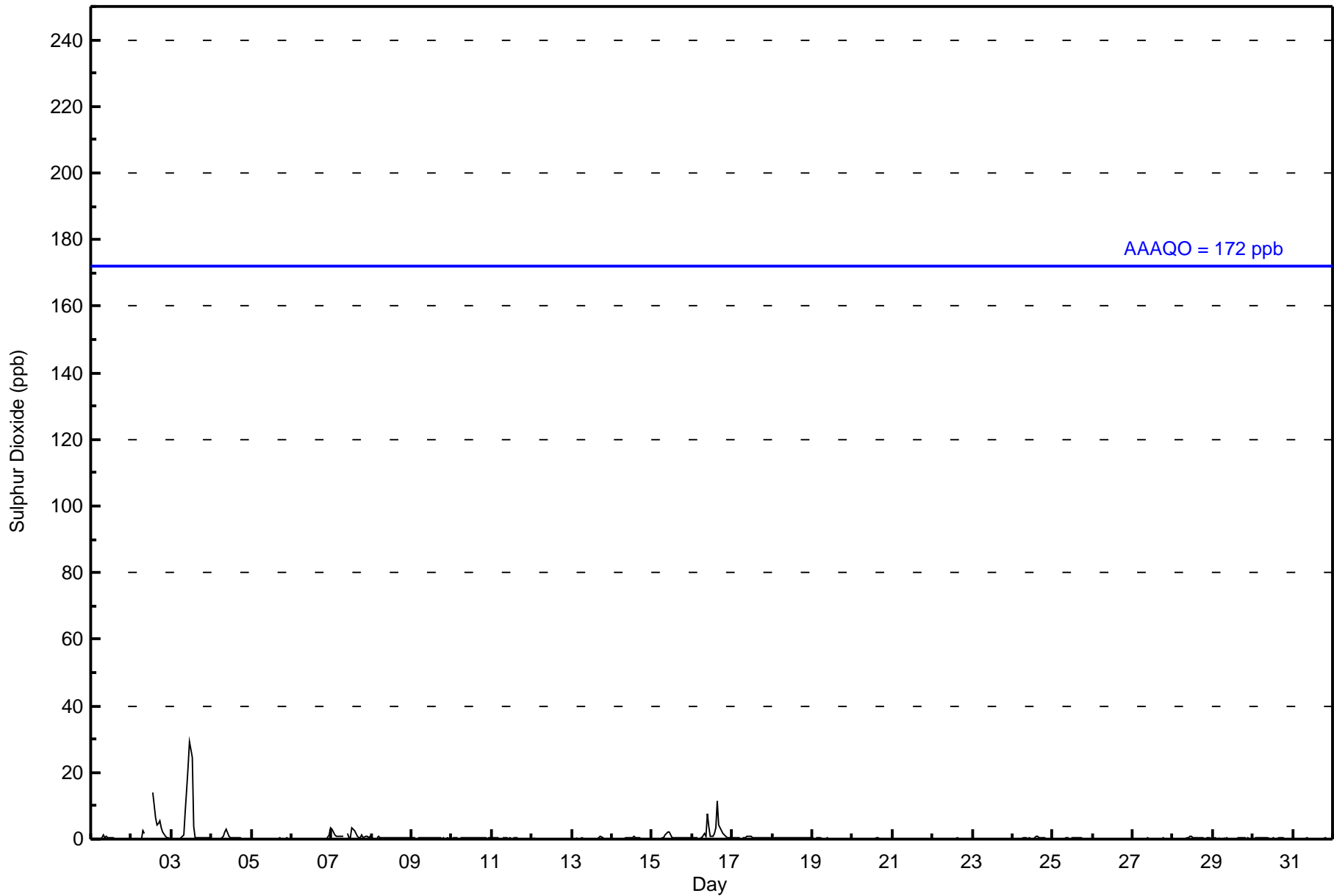
0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.5	0.7	1.2	1.2	1.3	1.2	1.0	0.6	0.8	0.5	0.5	0.4	0.3	0.2	0.2	0.2	0.3	Diurnal Average	
3	2	1	1	1	1	1	3	8	15	22	29	24	14	6	12	5	5	3	2	1	1	1	3	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	99.15	99.15
11 - 20	3	0.42	99.58
21 - 60	3	0.42	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	116	90	26	6	8	17	24	28	53	50	61	60	46	39	51	27	702
11 - 20	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
21 - 60	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	116	90	26	6	8	19	27	29	53	50	61	60	46	39	51	27	708

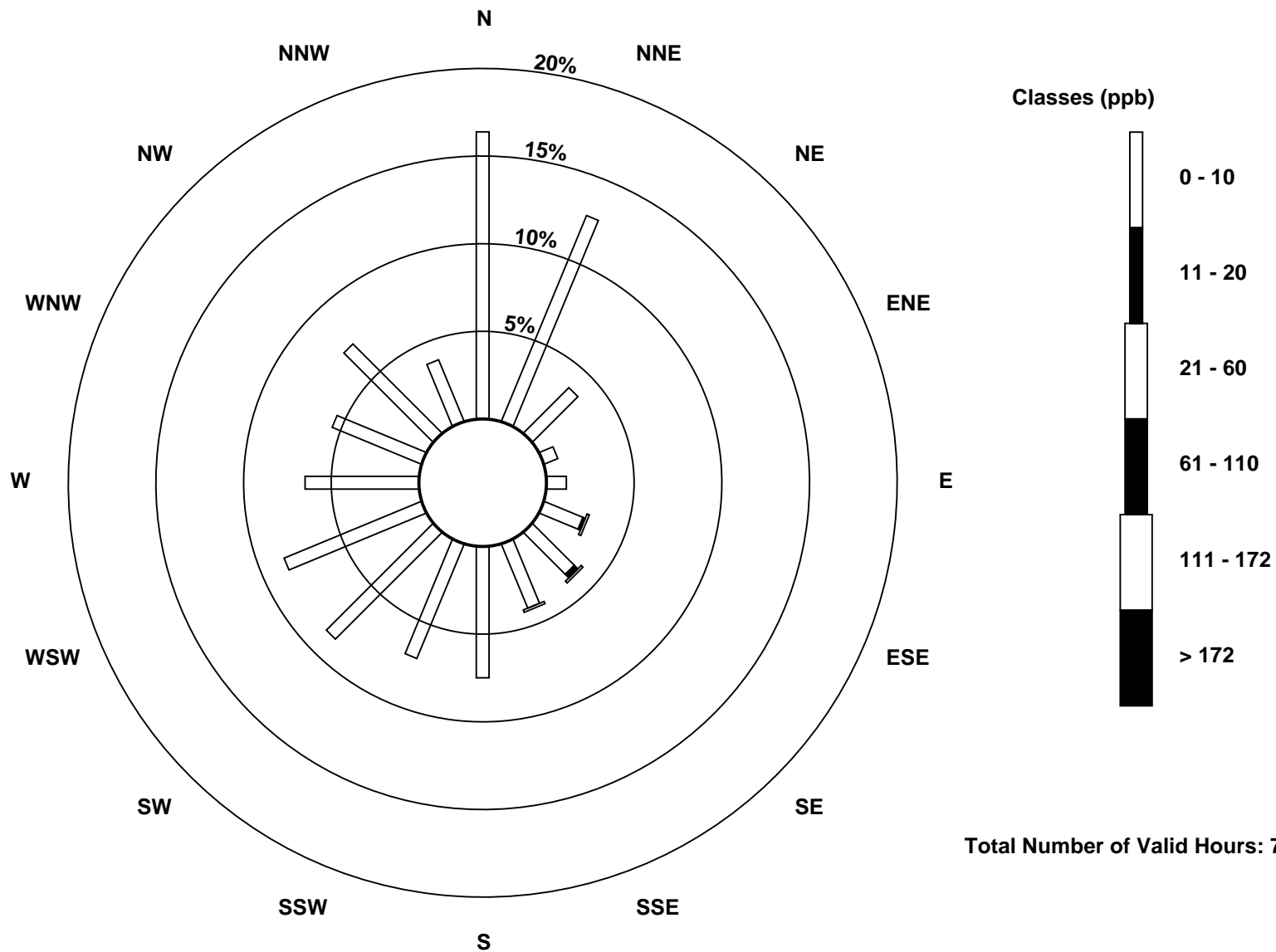
Total Number of Valid Hours: 708

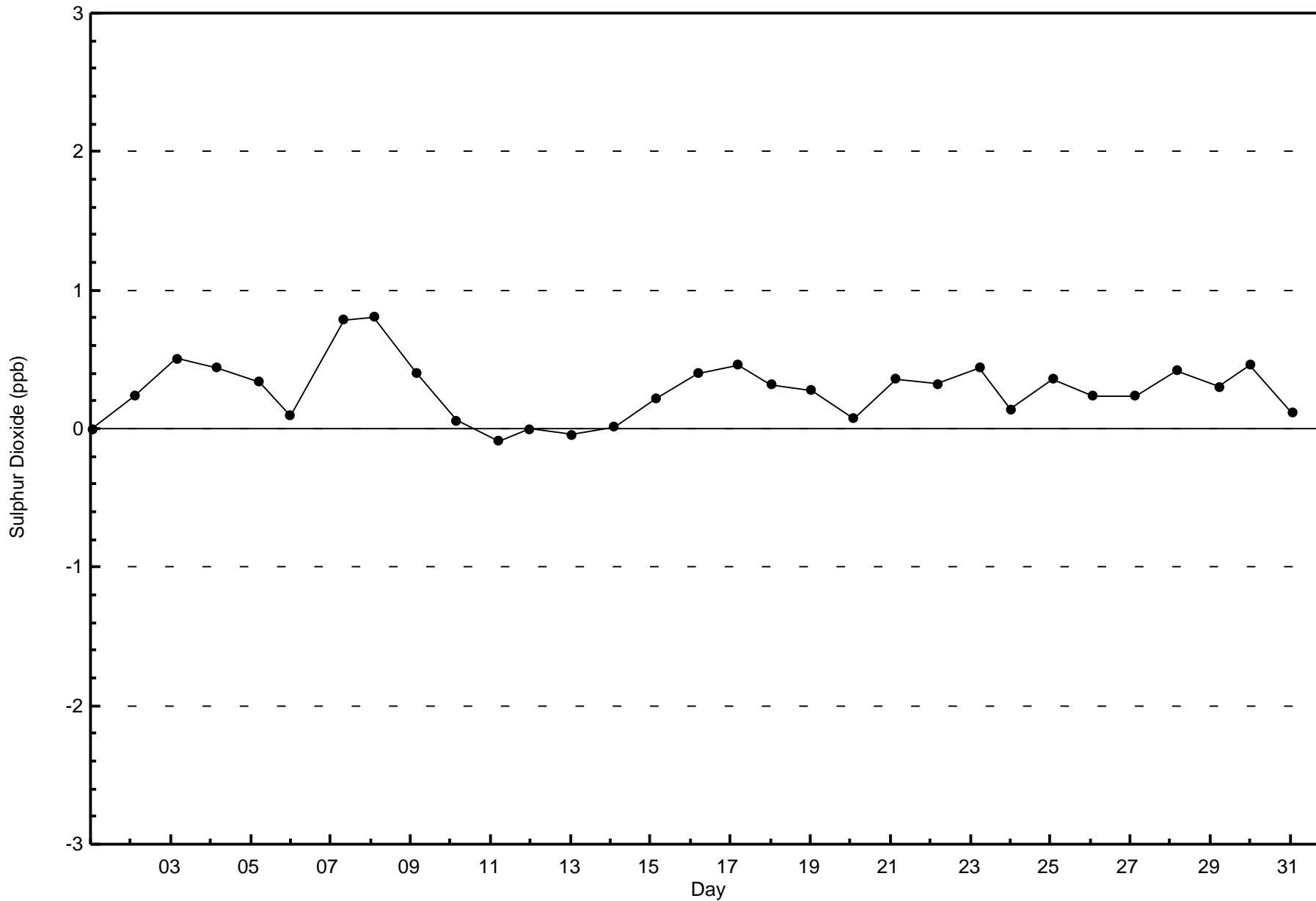
Total Number of Hours: 744

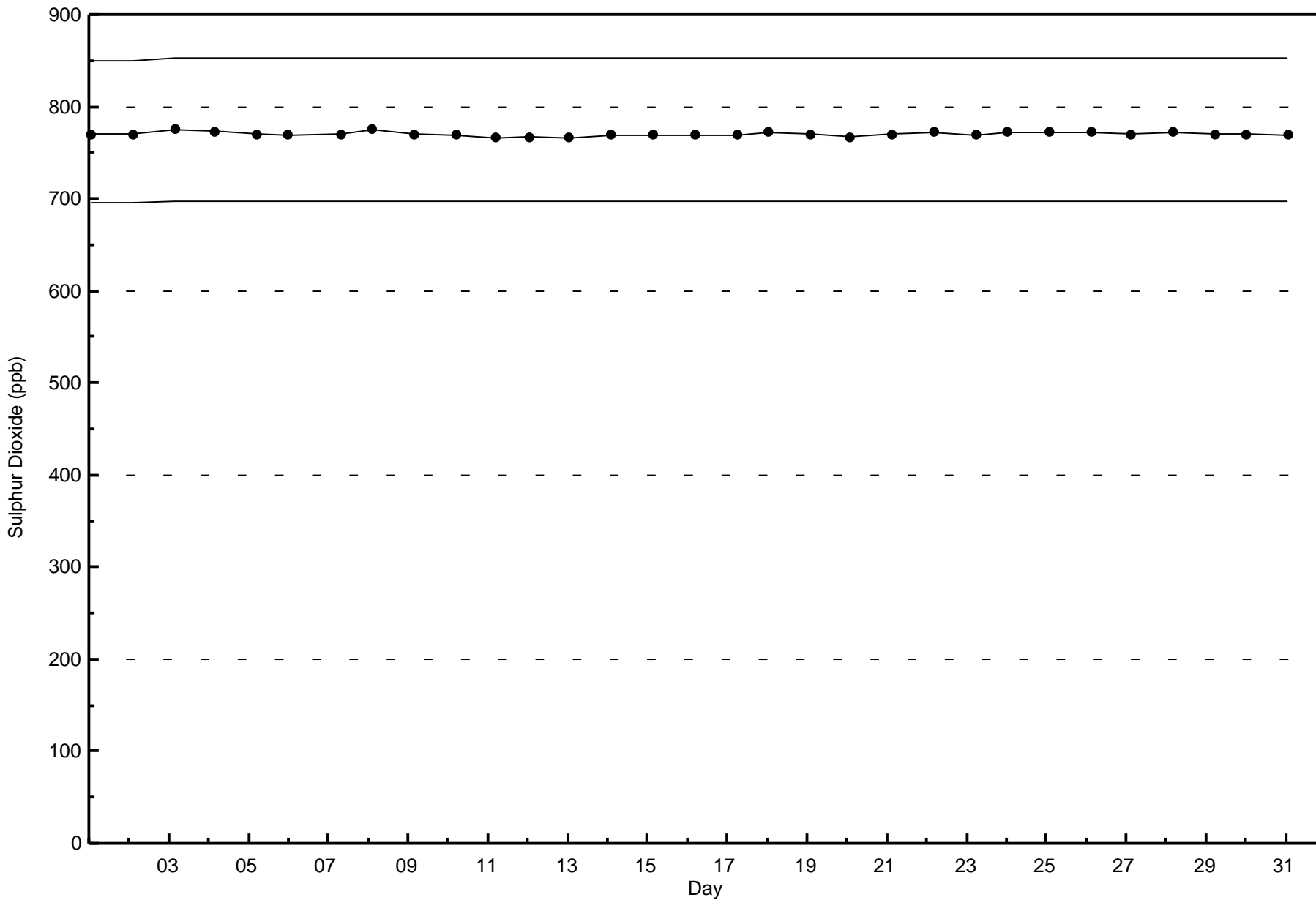


Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

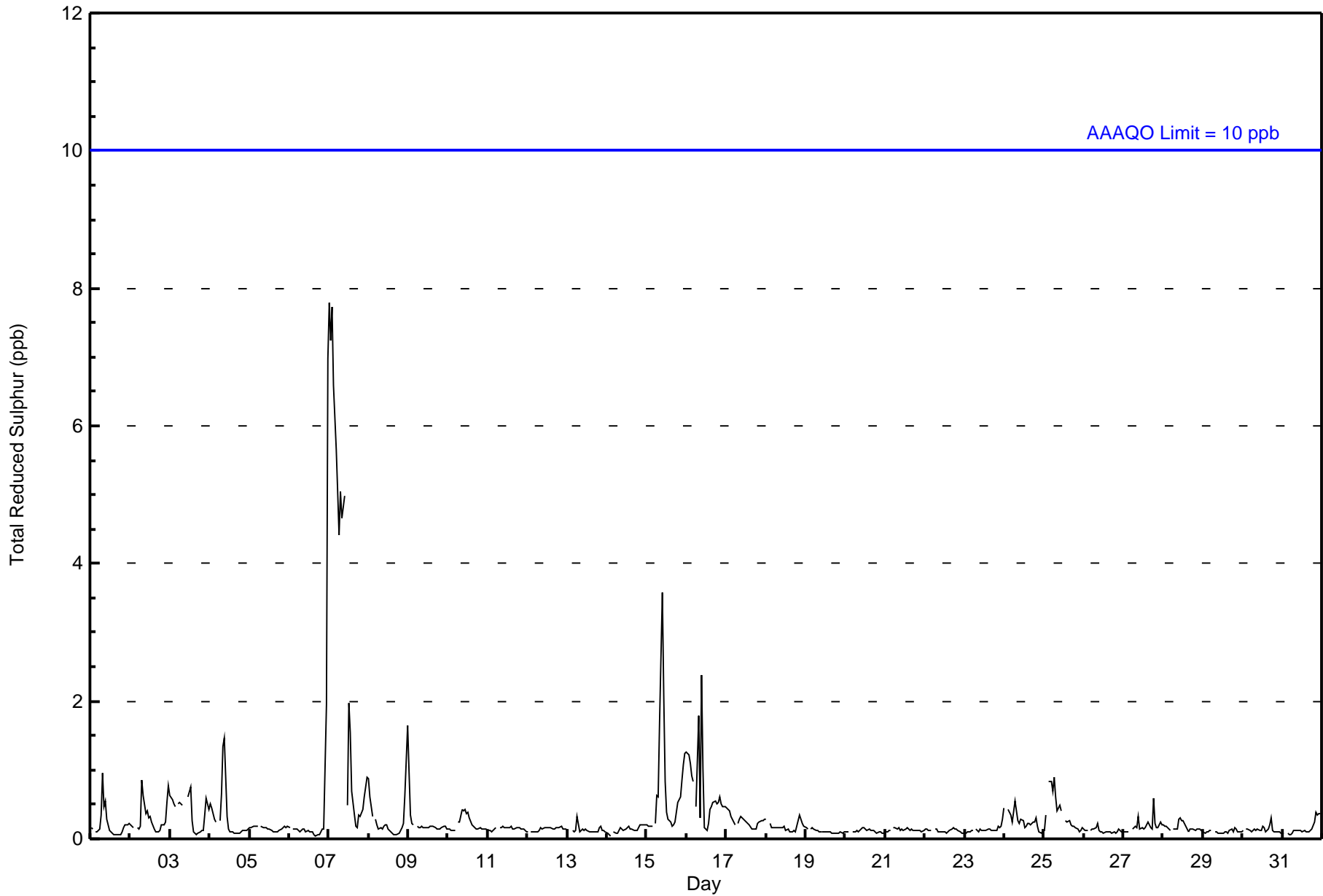
Fort McKay South - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 ppb on May 7 01:00 Maximum Daily Average: 3.0 ppb on May 7																	Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 34 Percent Operational Time: 99.7										
Minimum Value: 0 ppb on May 6 17:00 Minimum Daily Average: 0.1 ppb on May 29 Maximum Diurnal Average: 0.6 ppb at hour 10 Minimum Diurnal Average: 0.1 ppb at hour 17 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-May	0	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
2-May	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
3-May	1	1	1	0	Z	1	1	0	C	C	C	1	1	0	0	0	0	0	0	0	0	0	1	0	0.4	1	
4-May	1	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	0.5	7	
7-May	8	7	8	7	6	5	4	5	5	5	Z	0	2	2	1	0	0	0	0	0	0	1	1	1	3.0	8	
8-May	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.3	2	
9-May	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
11-May	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	
12-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
15-May	0	0	0	0	Z	0	1	1	2	4	2	1	0	0	0	0	0	0	0	0	1	1	1	1	0.7	4	
16-May	1	1	1	1	1	Z	0	2	0	2	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0.7	2	
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
23-May	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	
24-May	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-May	0	0	Z	1	1	1	1	1	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1	
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
29-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.5 0.4 0.6 0.3 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.3 0.5 8 7 8 7 6 5 4 5 5 5 2 1 2 2 1 0 1 1 1 1 1 1 1 2 7																								Diurnal Average Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	696	98.31	98.31
3 - 4	2	0.28	98.59
5 - 7	8	1.13	99.72
8 - 11	2	0.28	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	115	90	27	6	8	20	25	28	46	48	58	63	45	38	49	30	696
3 - 4	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	1	4	2	1	0	0	0	0	0	8
8 - 11	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	115	90	27	6	8	21	25	29	51	51	60	63	45	38	49	30	708

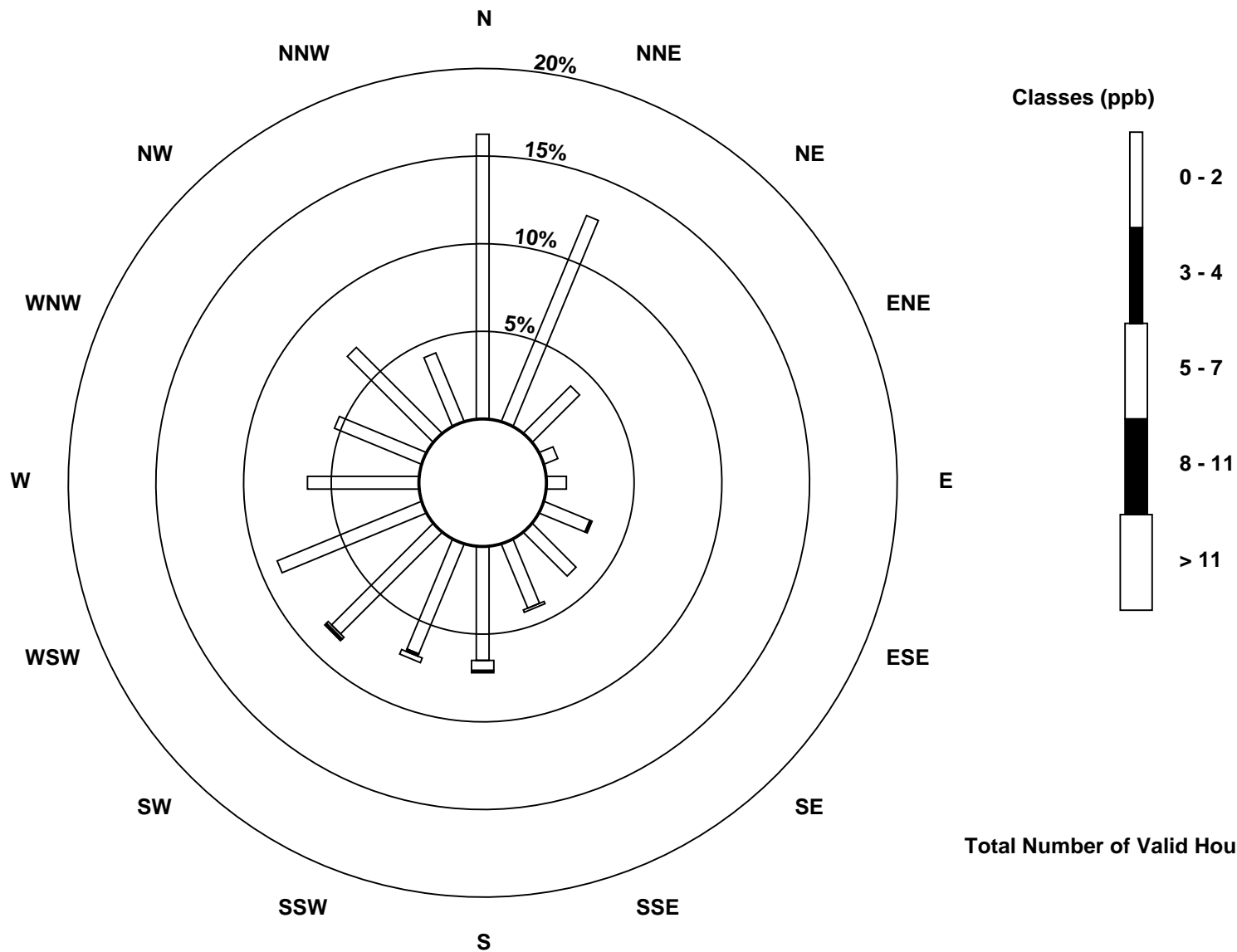
Total Number of Valid Hours: 708

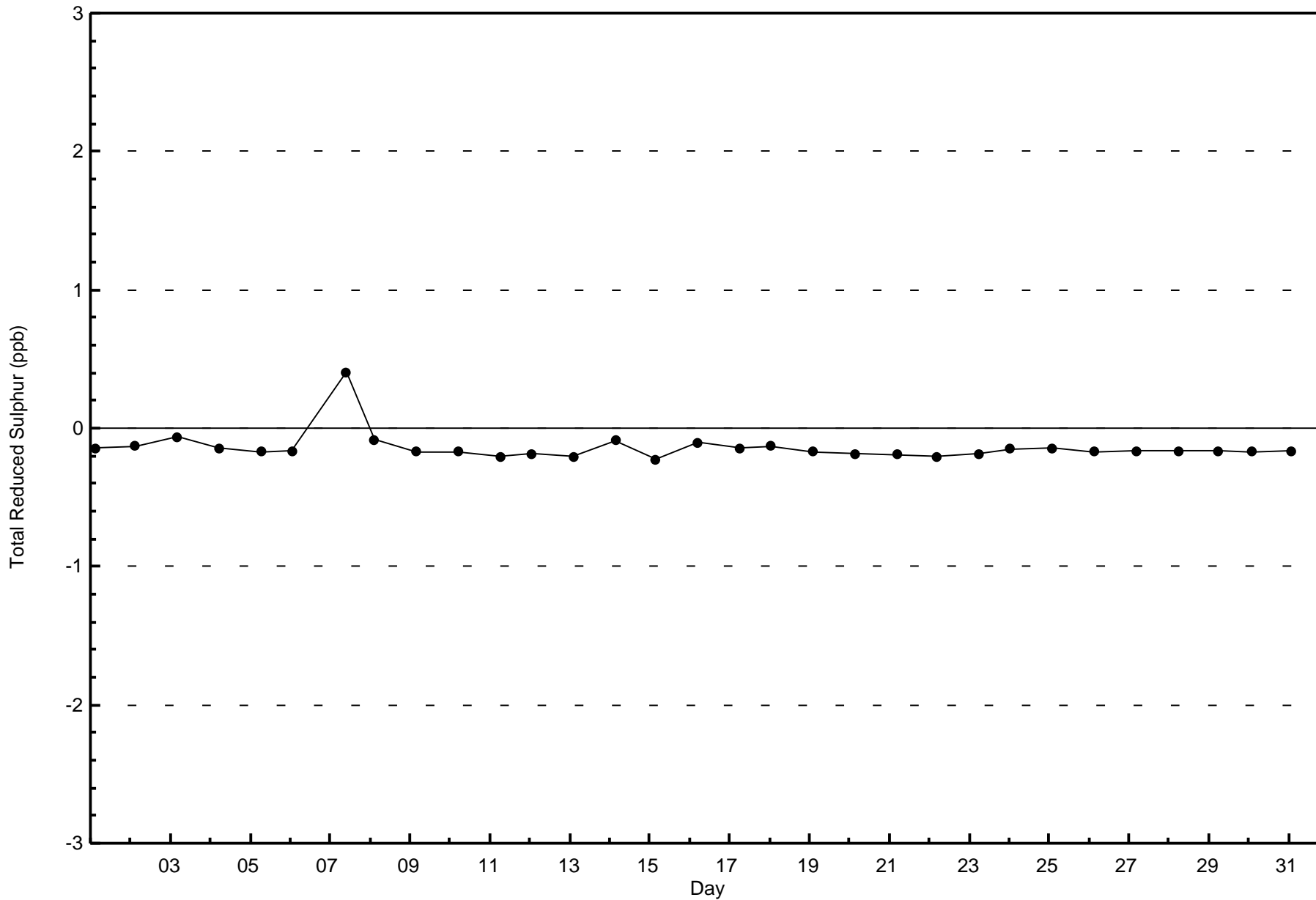
Total Number of Hours: 744

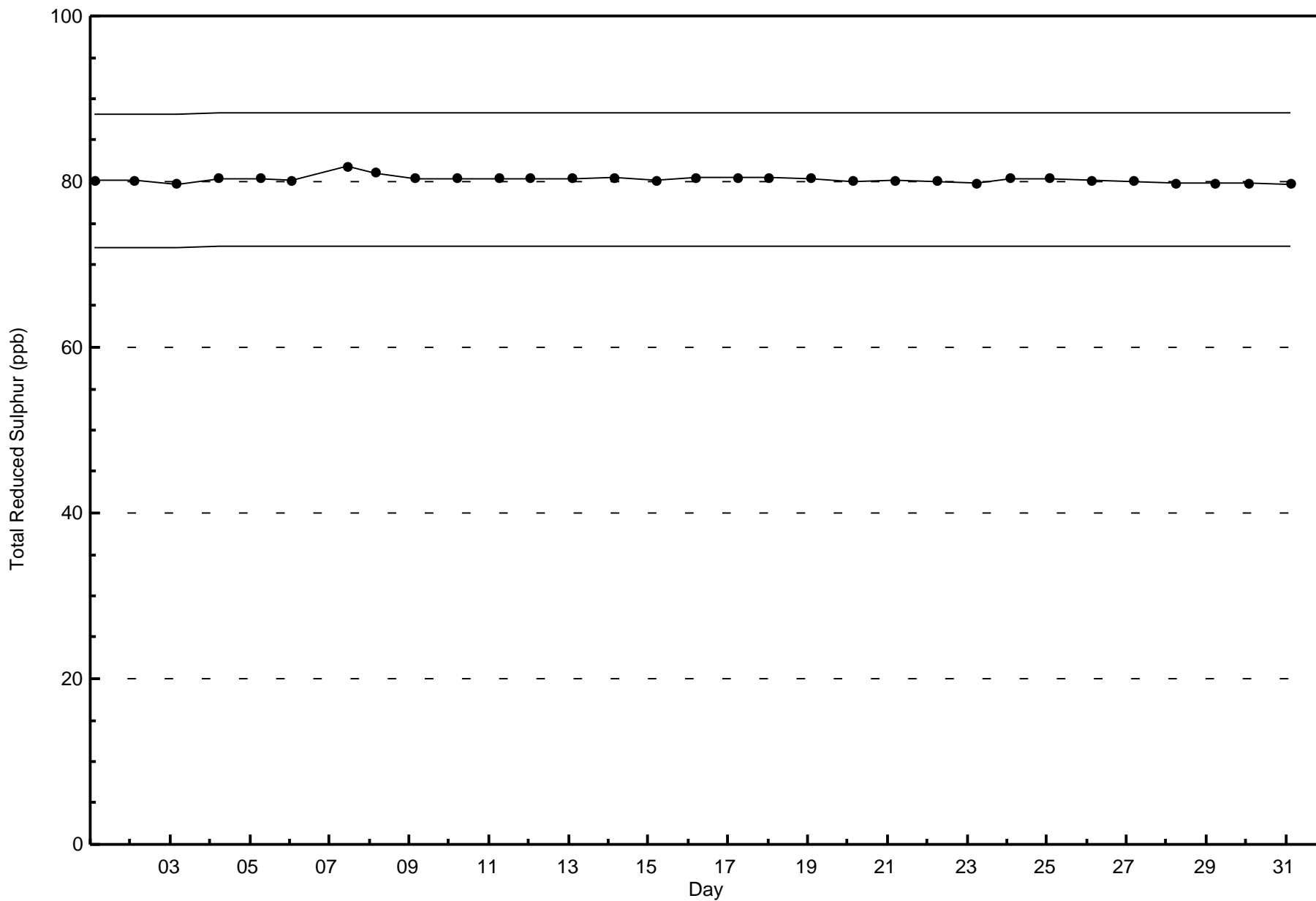


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

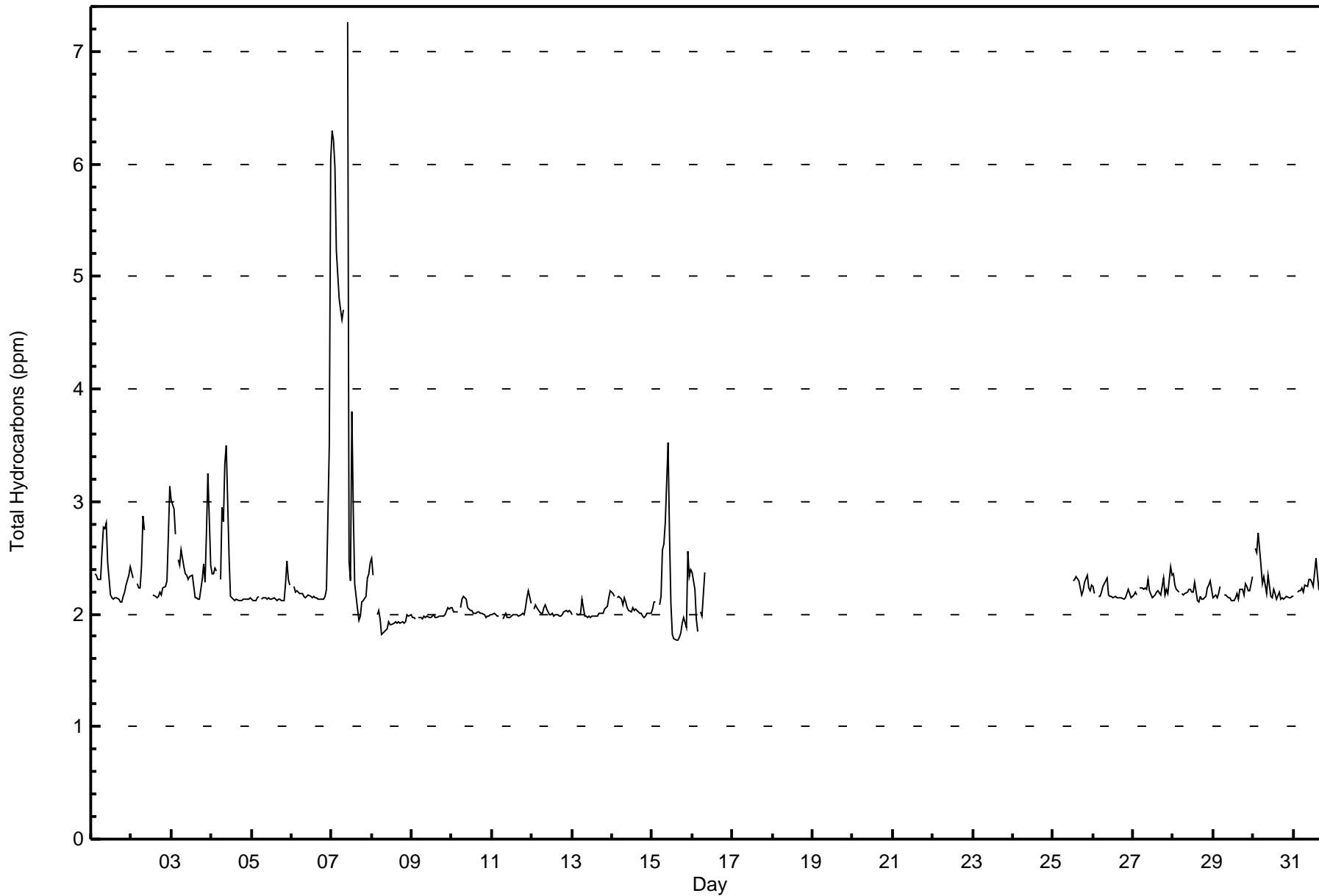
Fort McKay South - May 2016

Maximum Value: 7.3 ppm on May 7 10:00		Maximum Daily Average: 3.6 ppm on May 7		Hours in Service: 744																							
Minimum Value: 1.8 ppm on May 15 16:00		Minimum Daily Average: 2.0 ppm on May 8		Hours of Data: 498																							
Maximum Diurnal Average: 2.6 ppm at hour 10		Minimum Diurnal Average: 2.1 ppm at hour 17		Hours of Missing Data: 246																							
Monthly Average: 2.25 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 6.0		Hours of Calibration: 28																							
				Percent Operational Time: 70.7																							
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-May	2.4	Z	2.4	2.3	2.3	2.3	2.6	2.8	2.8	2.8	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.3	2.8	
2-May	2.4	2.3	Z	2.3	2.2	2.2	2.4	2.9	2.7	C	C	C	C	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.7	3.1	2.4	3.1	
3-May	3.0	2.9	2.7	Z	2.5	2.4	2.6	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.3	2.4	2.3	2.7	3.2	2.4	2.5	3.2	
4-May	2.4	2.4	2.4	2.4	Z	2.3	2.9	2.8	3.3	3.5	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	3.5	
5-May	2.1	2.1	2.1	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5	2.3	2.3	2.2	2.5	
6-May	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	3.5	6.0	2.4	6.0	
7-May	6.3	6.2	6.0	5.2	4.8	4.7	4.6	4.7	Z	7.3	2.5	2.3	3.8	2.9	2.3	2.0	1.9	2.0	2.1	2.1	2.2	2.3	2.4	2.5	3.6	7.3	
8-May	2.5	2.4	Z	2.0	2.0	2.0	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	2.0	2.0	2.0	2.0	2.5	
9-May	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	
10-May	2.1	2.0	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.2	
11-May	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	2.1	2.1	2.2	2.1	2.0	2.2	
12-May	Z	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
13-May	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.2	
14-May	2.2	2.2	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	
15-May	2.0	2.1	2.1	Z	2.1	2.2	2.6	2.6	2.8	3.5	2.7	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	2.6	2.3	2.4	2.2	3.5
16-May	2.4	2.2	2.0	1.8	Z	2.0	2.0	2.4	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	2.4	
17-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
18-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
19-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
20-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
21-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
22-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
23-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
24-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--	
25-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	--	2.3
26-May	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.4	2.3	2.2	2.4	
27-May	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.4	2.3	2.2	2.4	
28-May	2.4	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.1	2.1	2.2	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.4	
29-May	2.1	2.2	2.1	2.2	2.3	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.3	
30-May	Z	2.6	2.5	2.7	2.4	2.3	2.3	2.3	2.2	2.3	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.3	2.7	
31-May	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.5	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	3.0	3.0	2.3	3.0	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan																											
C - Calibration																											
UO - Unstable Operation																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	145	29.12	29.12
2.1 - 3.0	336	67.47	96.59
3.1 - 10.0	17	3.41	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 498

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	7	28	15	3	0	1	1	2	9	7	10	14	12	16	16	4	145
2.1 - 3.0	48	15	6	3	7	13	17	18	31	26	34	29	20	21	30	18	336
3.1 - 10.0	0	0	0	0	0	4	0	1	4	4	4	0	0	0	0	0	17
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	43	21	6	7	18	18	21	44	37	48	43	32	37	46	22	498

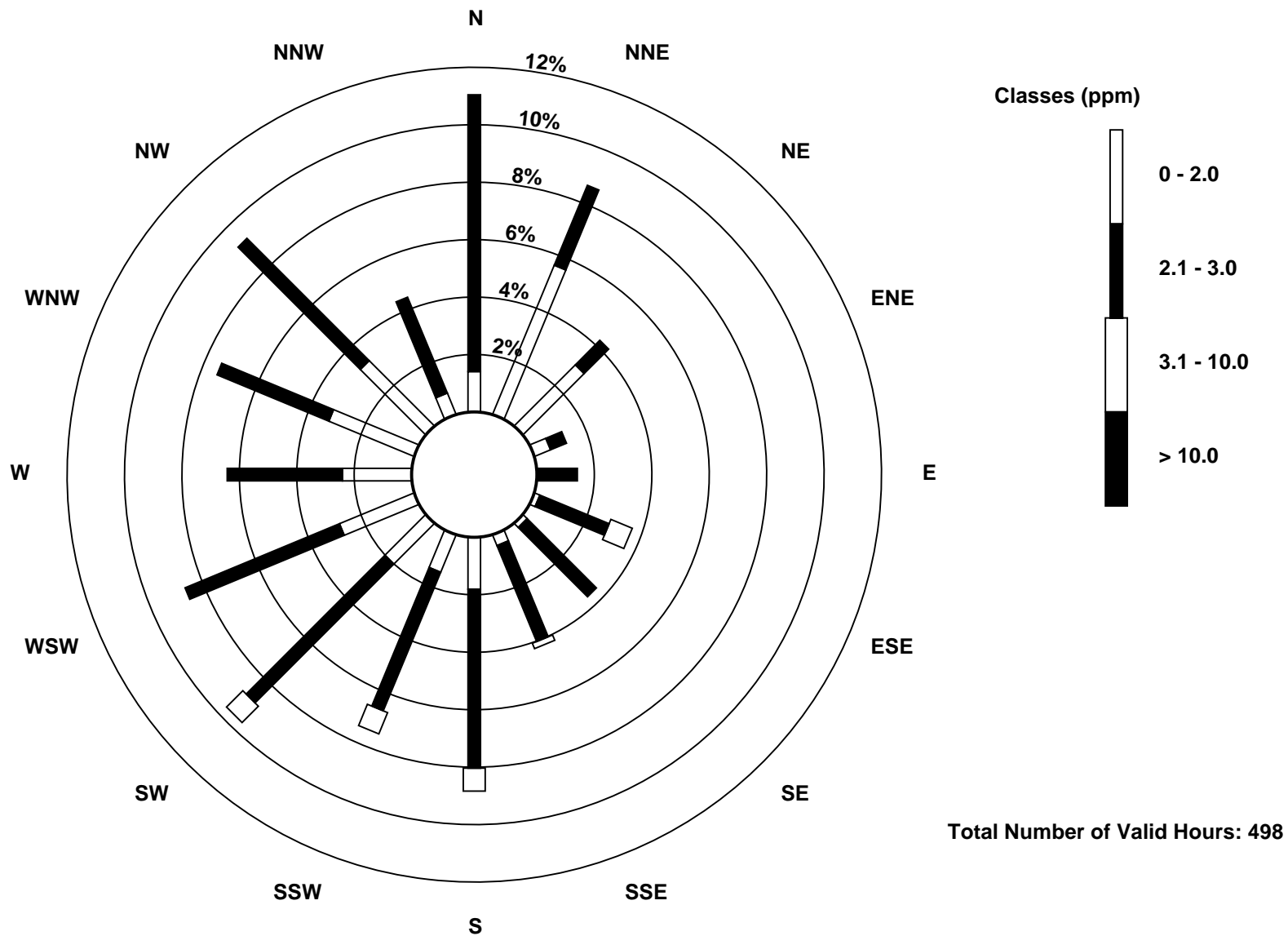
Total Number of Valid Hours: 498

Total Number of Hours: 744

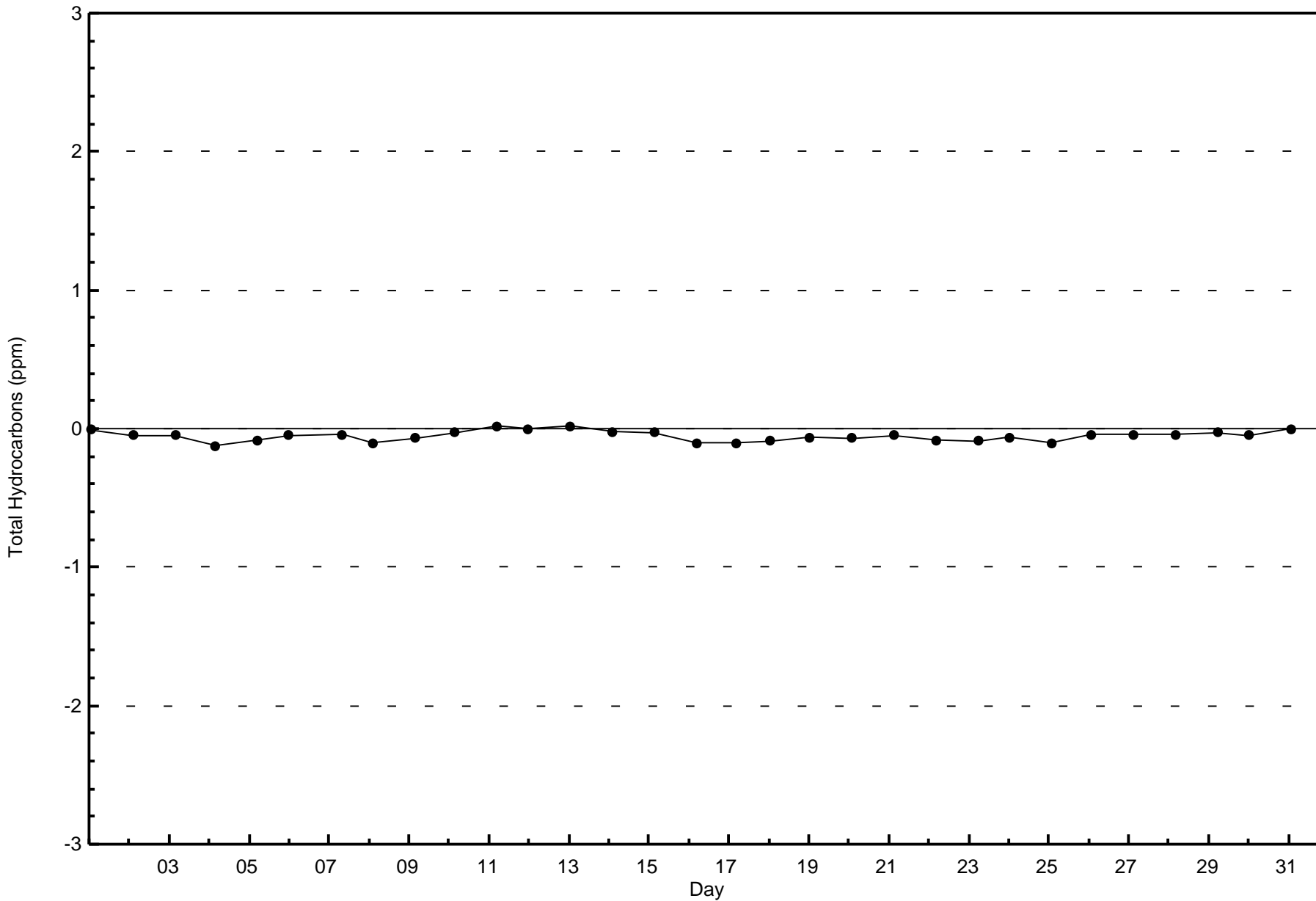


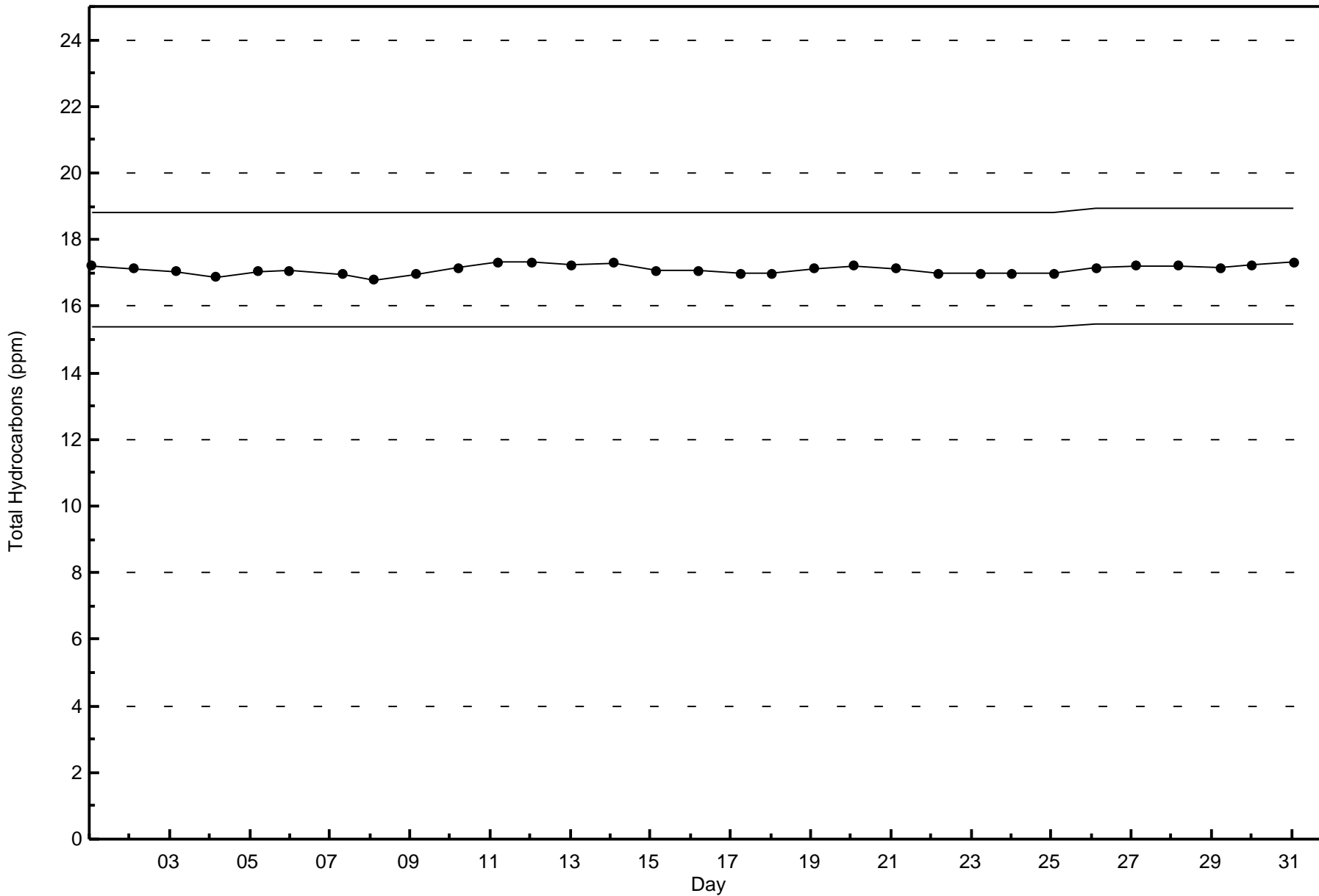
Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)



Total Number of Valid Hours: 498







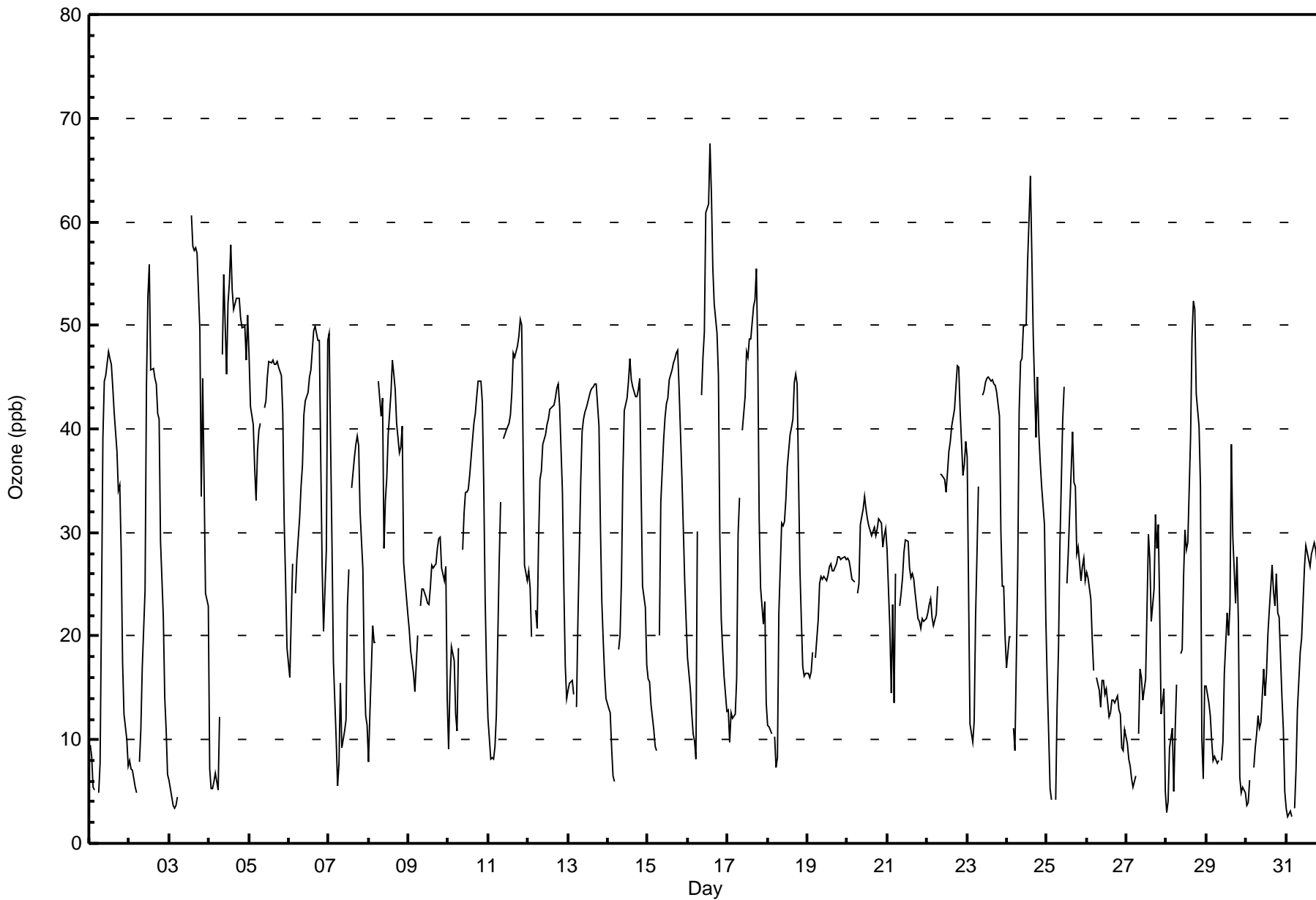
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay South - May 2016

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																			Daily Average		Daily Maximum	
Maximum Value: 67 ppb on May 16 14:00		Maximum Daily Average: 40.6 ppb on May 5		Hours of Data: 706																			26.1		47	
Minimum Value: 3 ppb on May 31 02:00		Minimum Daily Average: 14.8 ppb on May 30		Hours of Missing Data: 38																			25.7		56	
Maximum Diurnal Average: 40.5 ppb at hour 16		Minimum Diurnal Average: 12.8 ppb at hour 5		Hours of Calibration: 37																			--		61	
Monthly Average: 27.9 ppb		Percentiles: P ₁ = 4 P ₁₀ = 9 Q ₁ = 16 Median = 27 Q ₃ = 41 P ₉₀ = 47 P ₉₉ = 60		Percent Operational Time: 99.9																			37.8		58	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	10	8	5	5	Z	5	8	23	39	45	45	47	47	46	44	42	38	34	35	28	17	12	10	7	26.1	47
2-May	8	7	7	5	5	Z	8	11	17	24	44	53	56	46	46	45	44	41	41	29	22	14	11	7	25.7	56
3-May	6	5	4	3	4	4	Z	C	C	C	C	C	C	61	58	57	58	57	50	33	45	35	24	23	--	61
4-May	7	5	5	6	7	5	12	Z	47	55	45	52	54	58	53	52	53	53	53	51	50	50	47	51	37.8	58
5-May	47	42	40	36	33	38	40	41	Z	42	43	45	46	46	47	46	46	46	46	45	41	31	25	19	40.6	47
6-May	16	22	27	Z	24	27	31	34	36	41	43	44	45	46	48	49	50	49	49	37	27	21	28	49	36.6	50
7-May	49	39	29	18	10	5	8	15	9	11	12	23	26	Z	34	37	38	39	38	32	26	17	12	11	23.5	49
8-May	8	13	21	19	19	Z	45	41	43	28	33	35	40	44	47	45	44	41	38	38	40	27	25	22	32.9	47
9-May	21	19	18	16	15	20	Z	23	25	24	24	23	23	25	27	27	27	28	29	30	27	25	27	14	23.2	30
10-May	9	15	19	18	12	11	19	Z	28	32	34	34	34	36	39	41	41	43	45	45	43	35	24	17	29.2	45
11-May	12	8	8	8	9	12	27	33	Z	39	39	40	41	41	43	47	47	48	49	51	50	38	27	25	32.4	51
12-May	26	25	20	Z	22	21	29	35	36	39	39	40	41	42	42	42	43	44	44	42	34	25	17	14	33.2	44
13-May	15	15	16	14	Z	13	21	35	40	41	42	42	43	44	44	44	44	44	40	31	23	20	16	14	30.5	44
14-May	13	13	9	7	6	Z	19	20	25	36	42	43	45	47	45	44	43	43	44	45	34	25	23	17	29.8	47
15-May	16	16	13	11	9	9	Z	20	33	39	41	42	43	45	46	46	47	47	48	44	35	30	25	22	31.6	48
16-May	18	15	13	11	10	8	30	Z	43	47	49	61	62	67	63	56	52	49	45	30	22	19	16	13	34.7	67
17-May	13	10	13	12	12	16	30	33	Z	40	43	47	47	49	49	52	52	55	47	31	25	21	23	13	31.9	55
18-May	11	11	11	Z	10	7	8	22	31	31	31	33	36	39	40	41	45	45	44	27	22	17	16	16	25.9	45
19-May	16	16	17	19	Z	18	22	25	26	25	26	25	26	27	27	26	26	27	28	28	27	28	28	27	24.3	28
20-May	28	27	27	26	25	Z	24	25	31	32	33	32	31	31	30	30	31	30	30	31	31	29	30	30	29.3	33
21-May	28	21	15	23	14	26	Z	23	24	26	28	29	29	27	26	26	26	24	22	21	21	22	21	22	23.6	29
22-May	22	23	24	22	21	22	25	Z	36	36	35	34	36	38	39	40	42	44	46	46	42	35	37	39	34.0	46
23-May	37	24	12	10	12	22	28	34	Z	43	44	44	45	45	45	44	44	44	44	41	30	25	25	20	33.2	45
24-May	17	20	20	Z	11	9	27	42	47	47	50	50	56	60	64	57	49	39	45	40	37	35	31	22	37.9	64
25-May	15	11	5	4	Z	4	13	19	29	41	44	M	25	28	32	40	35	34	28	29	25	27	28	25	24.6	44
26-May	26	26	24	20	17	Z	16	15	13	16	16	14	15	12	13	14	14	14	14	13	12	9	9	11	15.3	26
27-May	10	8	8	6	5	6	Z	11	17	16	14	16	23	30	27	21	25	32	28	31	23	12	15	5	16.9	32
28-May	3	4	9	11	5	11	15	Z	18	19	26	30	28	29	39	49	52	52	43	40	35	10	6	15	23.9	52
29-May	15	14	12	10	8	8	8	8	Z	8	10	16	22	20	23	38	30	23	28	21	6	5	5	5	15.0	38
30-May	4	4	6	Z	7	9	11	12	11	12	17	14	16	20	22	27	24	23	26	22	22	14	11	5	14.8	27
31-May	3	3	3	3	Z	3	7	13	18	20	23	27	29	27	27	28	28	29	28	26	14	12	9	7	16.9	29
17.1 15.7 14.8 13.2 12.8 13.2 20.4 24.5 28.9 31.8 33.8 35.8 37.0 39.1 39.6 40.5 39.9 39.4 38.5 34.1 29.3 23.4 21.0 19.0																								Diurnal Average		
49 42 40 36 33 38 45 42 47 55 50 61 62 67 64 57 58 57 53 51 50 50 47 51																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	236	33.43	33.43
21 - 50	436	61.76	95.18
51 - 82	34	4.82	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort McKay South - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	4	2	2	5	5	4	4	18	28	36	32	11	12	18	19	236
21 - 50	79	83	25	4	3	13	14	18	30	19	23	31	26	24	31	13	436
51 - 82	0	1	0	0	1	2	3	4	3	6	2	2	7	2	1	0	34
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	115	88	27	6	9	20	21	26	51	53	61	65	44	38	50	32	706

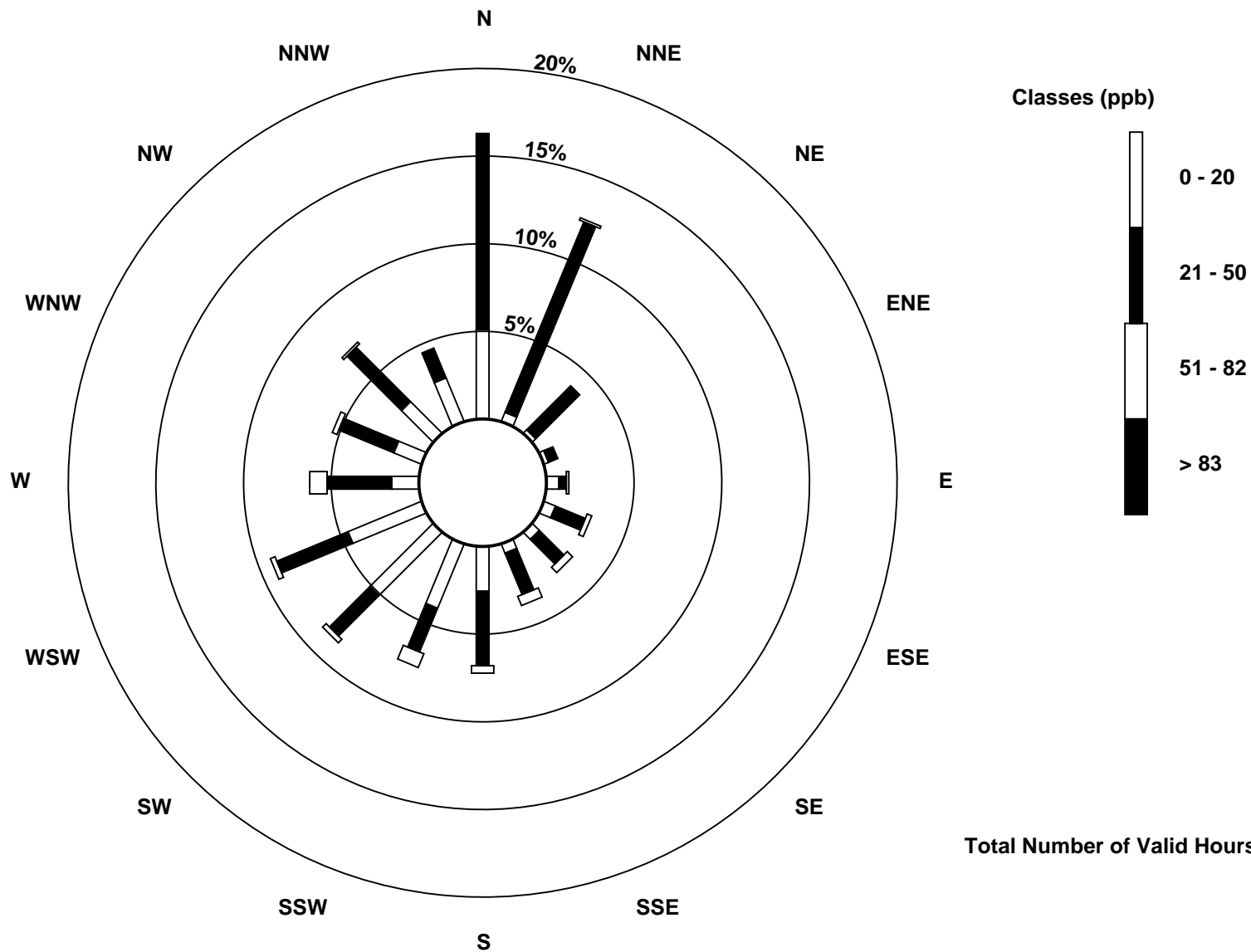
Total Number of Valid Hours: 706

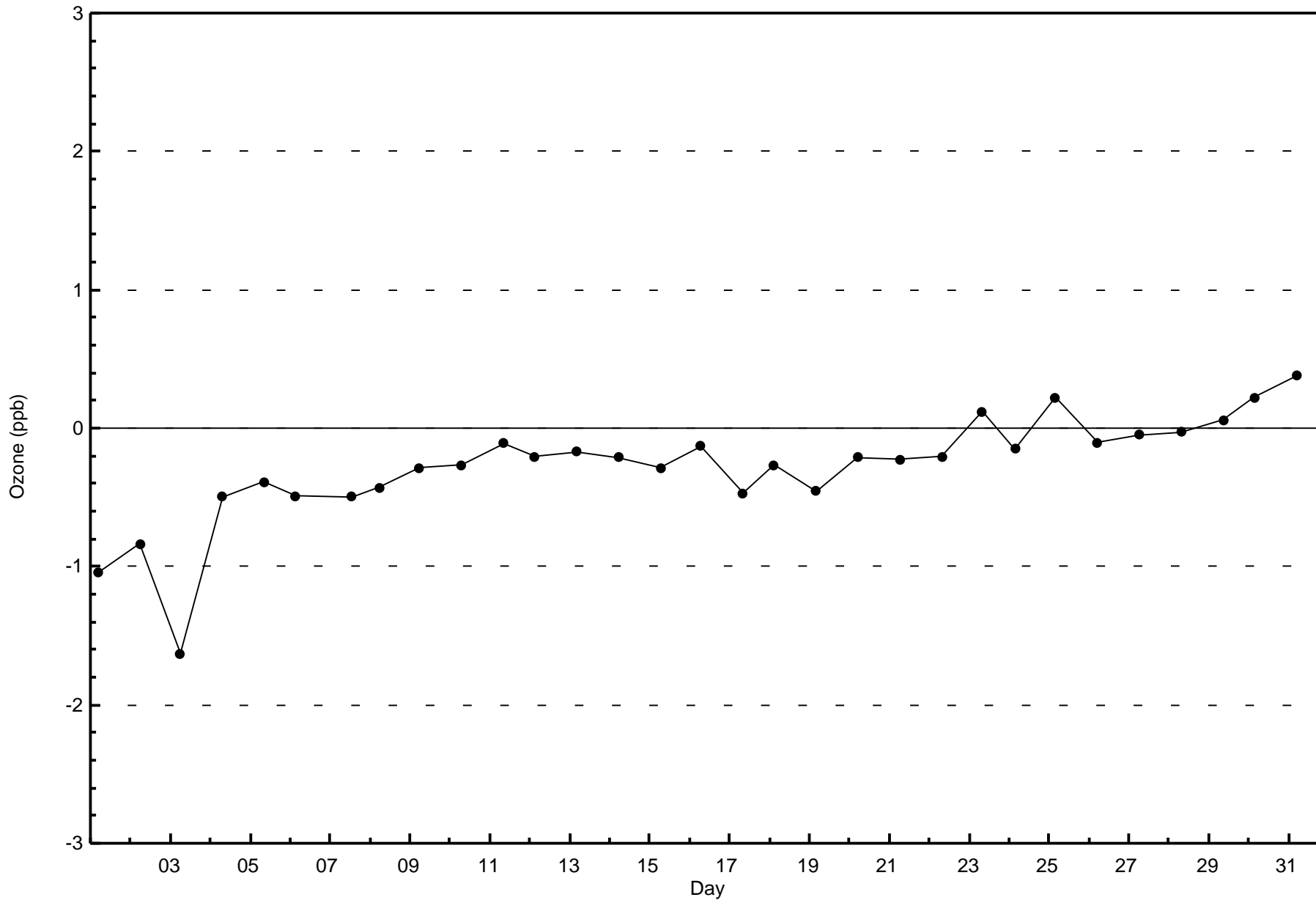
Total Number of Hours: 744

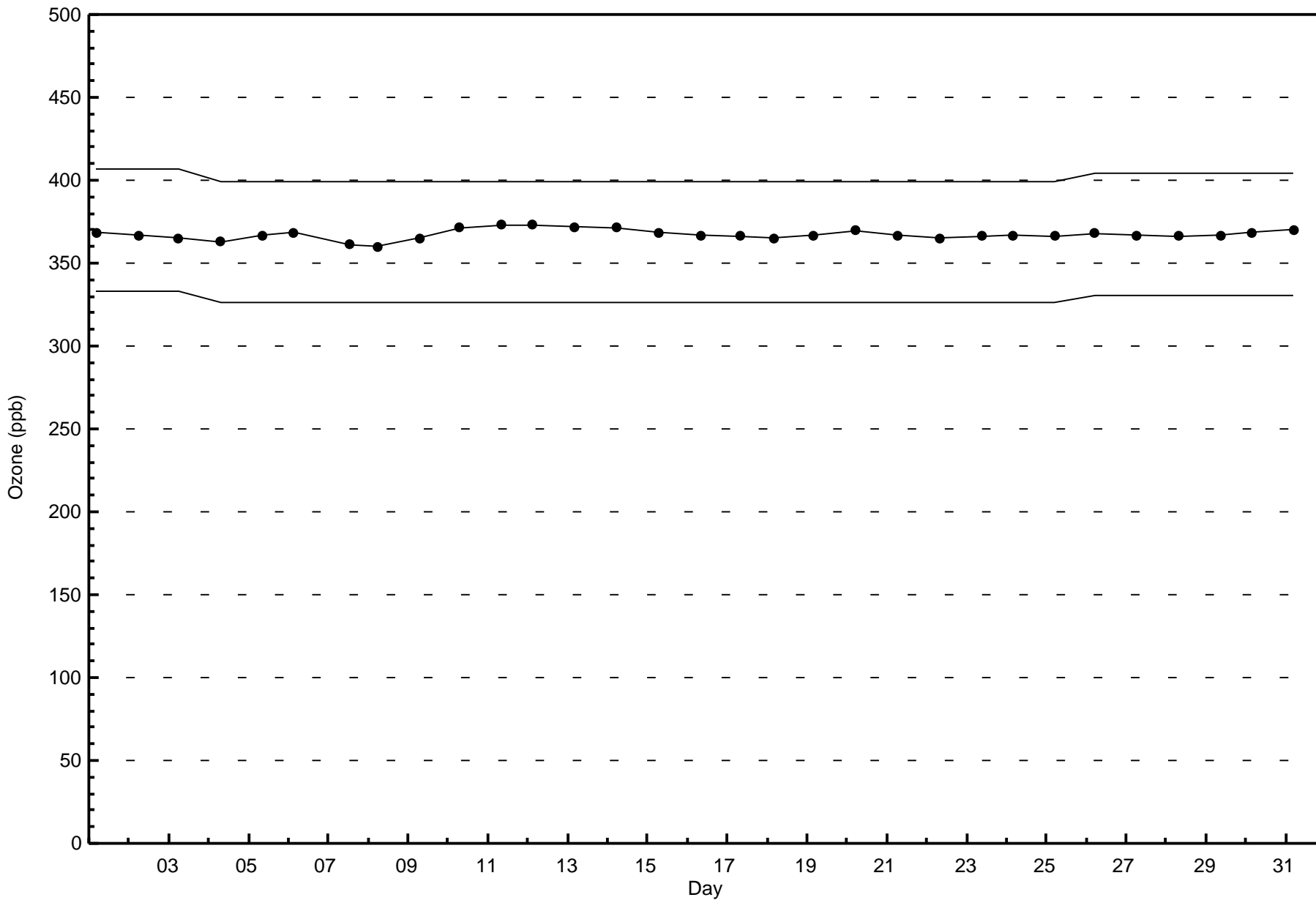


Wood Buffalo Environmental Association
Wind Rose May 2016

Ozone (O₃) - ppb
Fort McKay South (AMS 13)







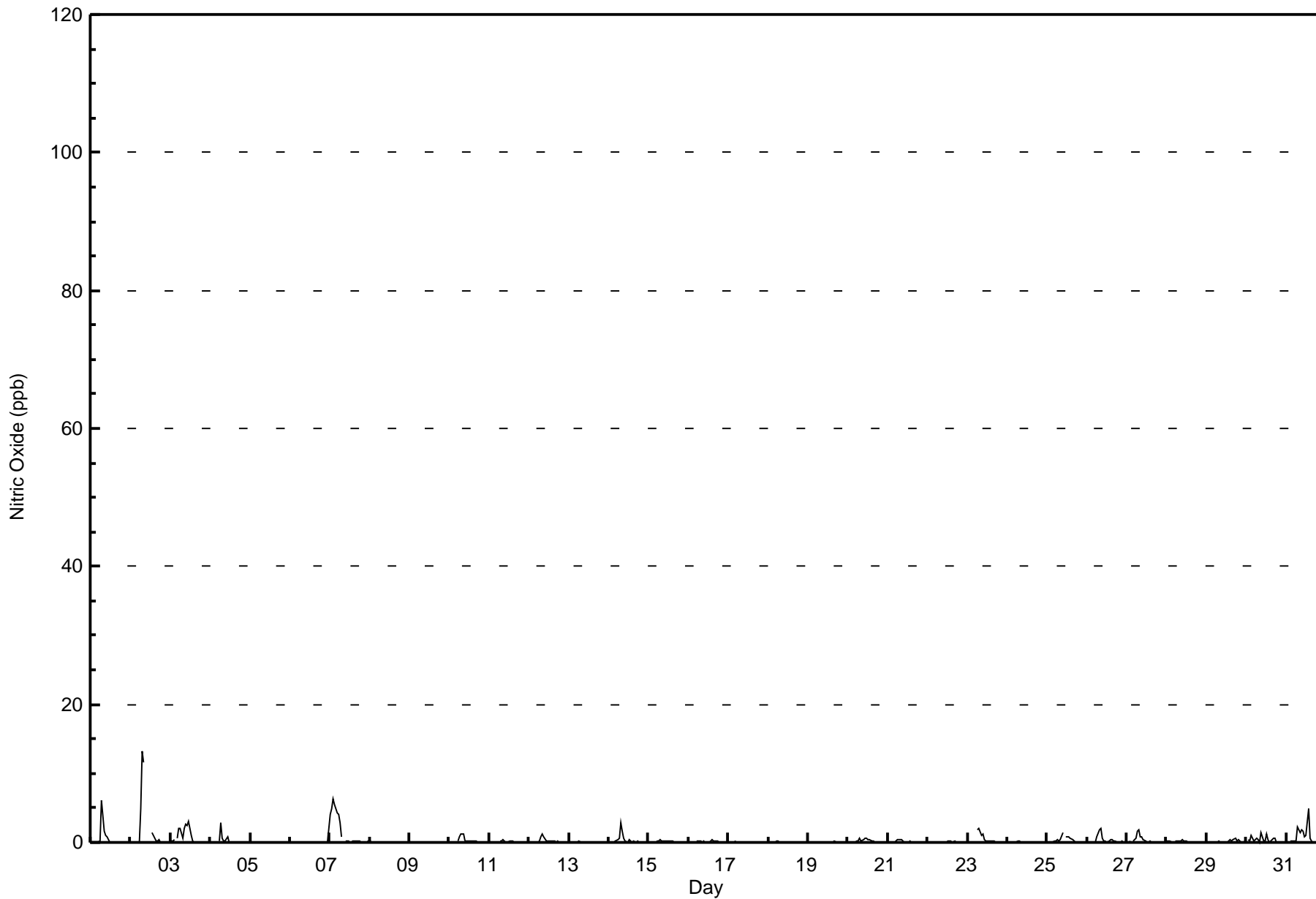


Maximum Value: 13 ppb on May 2 08:00																	Maximum Daily Average: 1.7 ppb on May 2										Hours in Service: 744	
Minimum Value: 0 ppb on May 1 13:00																	Minimum Daily Average: 0.0 ppb on May 5										Hours of Data: 708	
Maximum Diurnal Average: 1.1 ppb at hour 8																	Minimum Diurnal Average: 0.0 ppb at hour 22										Hours of Missing Data: 36	
Monthly Average: 0.3 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-May	0	Z	0	0	0	0	6	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6		
2-May	0	0	Z	0	0	0	5	13	12	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0	1.7	13		
3-May	0	0	0	Z	1	2	2	1	2	3	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0.7	3		
4-May	0	0	0	0	Z	0	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3		
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0		
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	2		
7-May	4	5	6	5	4	4	3	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	6		
8-May	0	0	Z	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0		
10-May	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
12-May	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		
13-May	0	Z	0	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-May	0	0	Z	0	0	0	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3		
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
17-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0		
18-May	Z	0	0	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-May	0	Z	0	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-May	0	0	Z	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
23-May	0	0	0	0	0	Z	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2		
24-May	Z	0	0	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-May	0	Z	0	0	0	0	0	0	0	2	M	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	2		
26-May	0	0	Z	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2		
27-May	0	0	0	Z	0	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2		
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
30-May	Z	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0.4	1		
31-May	0	Z	0	0	0	0	0	2	1	2	2	1	1	5	1	0	0	0	0	0	0	0	0	0	0.7	5		
																	0.2		Diurnal Average									
																	4		Diurnal Maximum									
Z - zerospan																	C - Calibration		M - Maintenance									



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay South - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	116	90	26	6	8	19	27	29	53	50	61	60	46	39	51	27	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	116	90	26	6	8	19	27	29	53	50	61	60	46	39	51	27	708

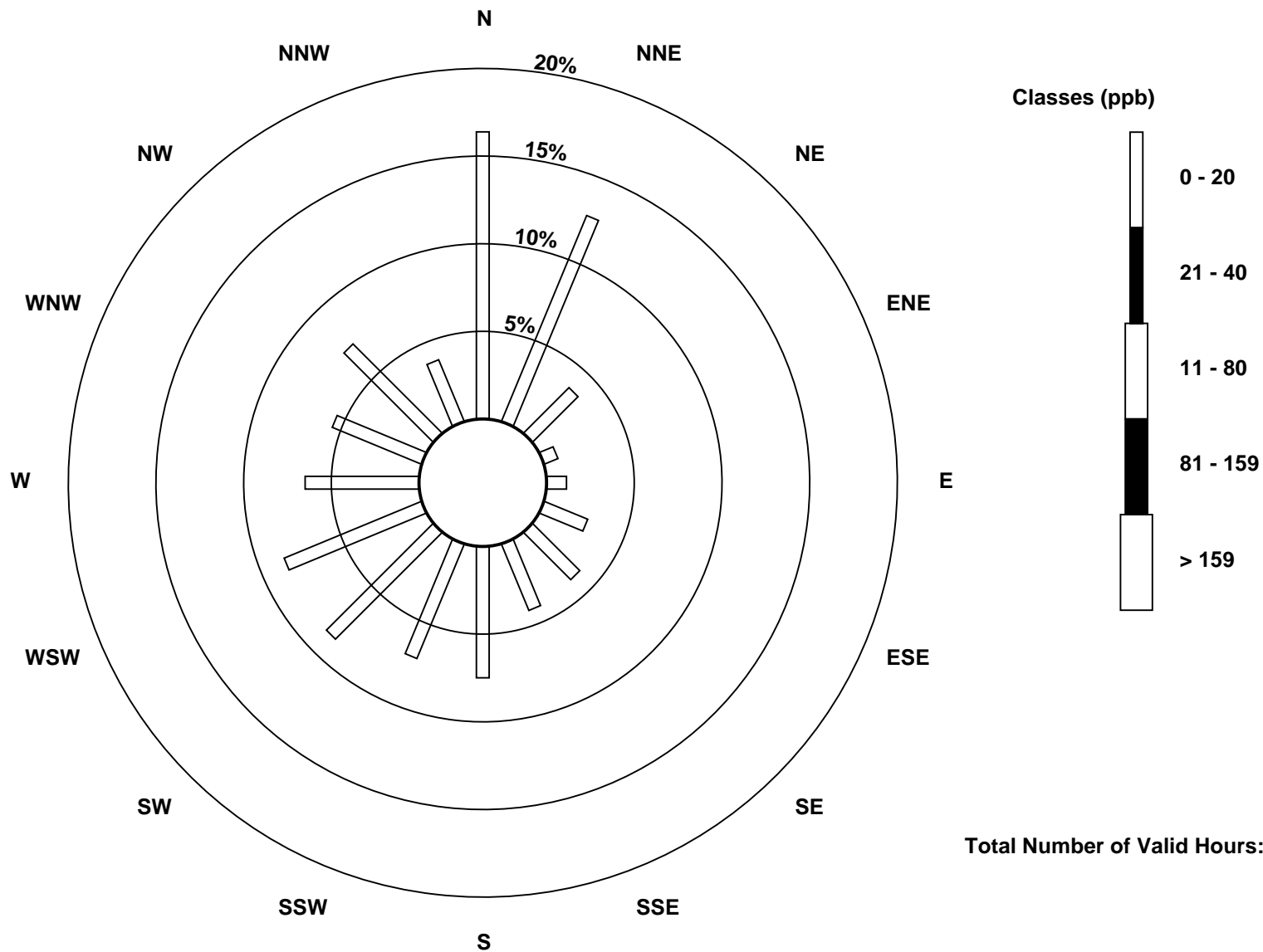
Total Number of Valid Hours: 708

Total Number of Hours: 744

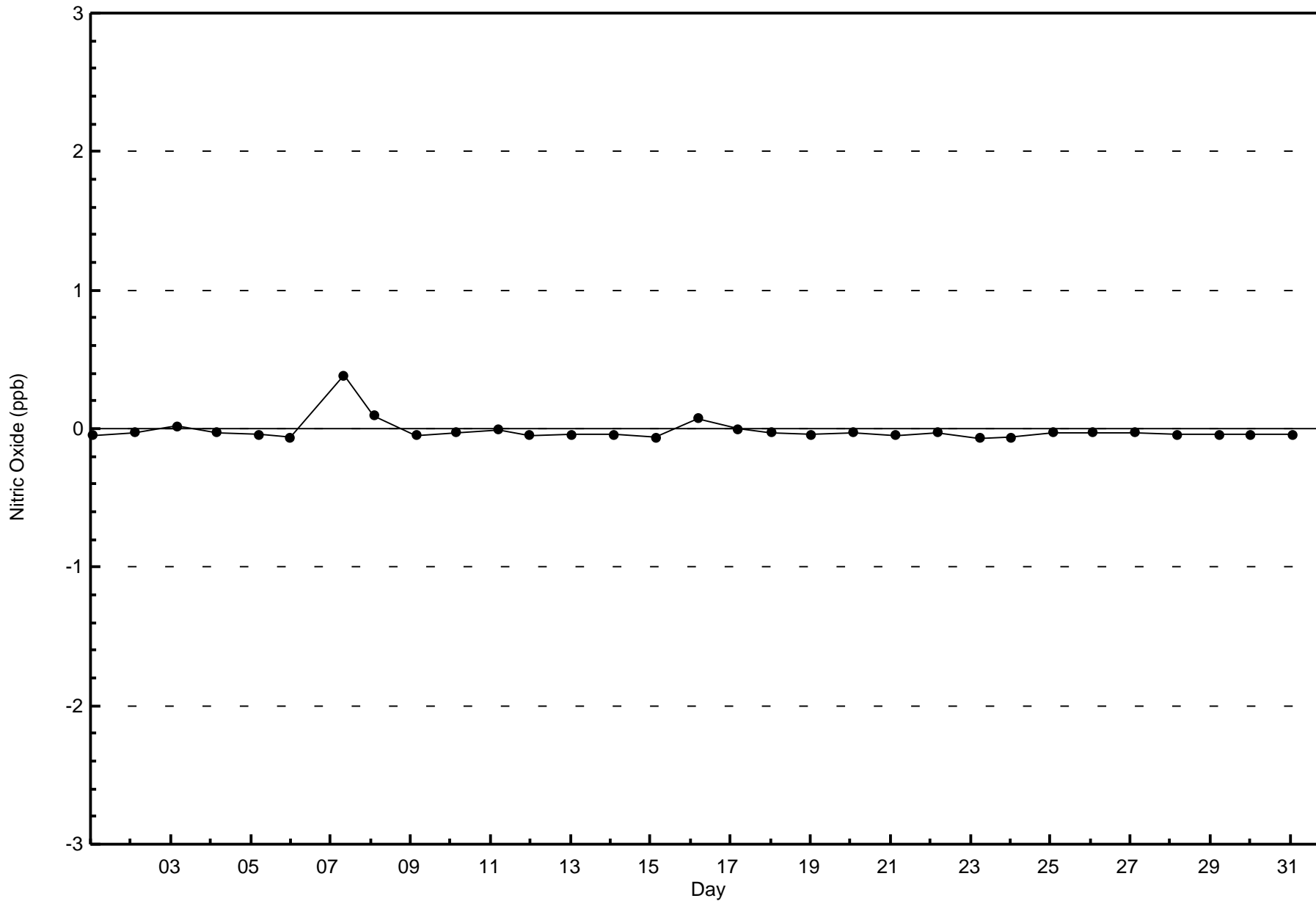


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 708



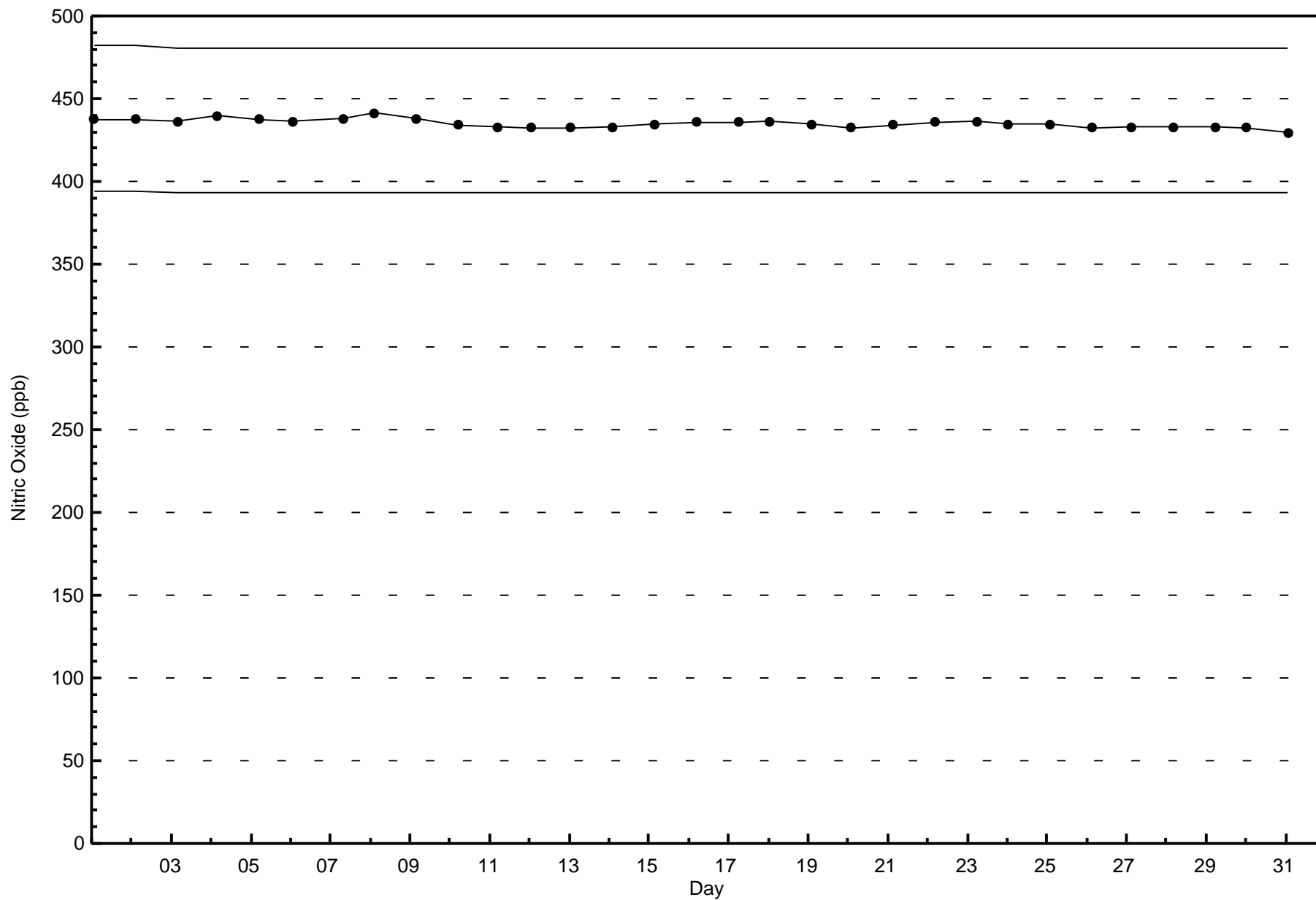


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort McKay South - May 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

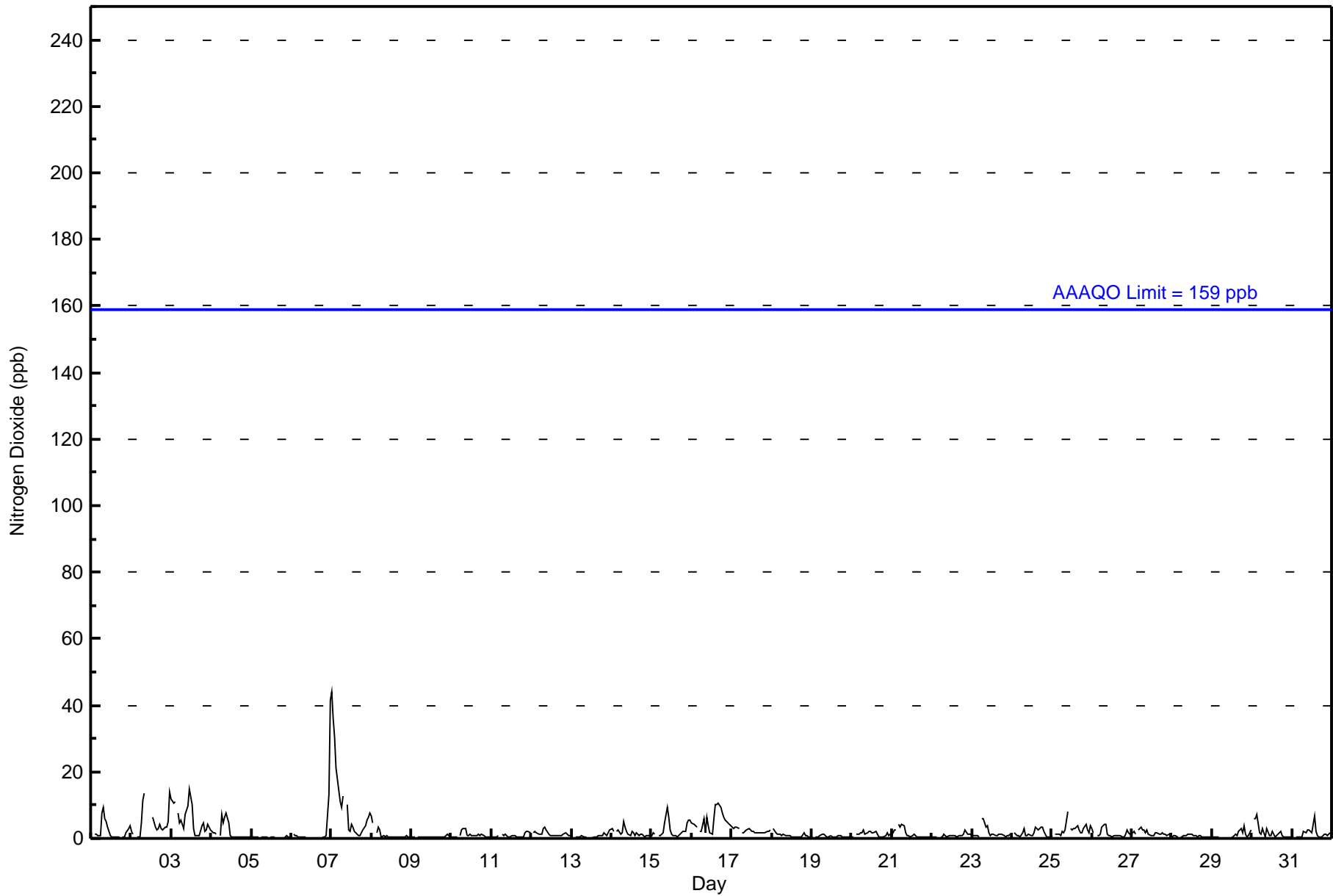
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 44 ppb on May 7 01:00 Maximum Daily Average: 10.2 ppb on May 7																	Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 35 Percent Operational Time: 99.9									
Minimum Value: 0 ppb on May 5 17:00 Minimum Daily Average: 0.4 ppb on May 5 Maximum Diurnal Average: 3.6 ppb at hour 1 Minimum Diurnal Average: 1.3 ppb at hour 17 Monthly Average: 2.1 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 14																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	3	Z	1	1	1	1	8	9	6	5	4	1	0	0	0	0	0	0	0	0	1	2	3	4	2.2	9
2-May	2	1	Z	1	1	0	5	11	14	C	C	C	C	6	4	3	3	4	3	3	3	3	5	14	4.5	14
3-May	12	11	11	Z	8	5	6	3	7	9	10	15	10	3	1	1	1	1	4	5	2	3	4	3	5.7	15
4-May	2	2	2	1	Z	1	7	5	7	8	5	1	1	1	1	1	1	1	1	1	1	1	0	1	2.0	8
5-May	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
6-May	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	42	2.7	42
7-May	44	36	30	21	14	11	10	13	Z	10	2	2	4	3	2	1	1	1	1	2	2	4	6	8	10.2	44
8-May	7	5	Z	2	3	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	1.2	7
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.4	1
10-May	0	1	1	1	Z	1	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	3
11-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	2	2	2	2	0.9	2
12-May	Z	2	2	2	1	1	1	3	4	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1.4	4
13-May	1	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	2	3	0.7	3
14-May	3	2	Z	2	2	1	2	5	3	2	1	2	2	1	2	1	2	1	1	1	1	1	1	1	1.7	5
15-May	1	2	1	Z	1	1	1	2	5	10	6	3	1	1	1	1	1	1	2	2	2	5	6	5	2.5	10
16-May	5	4	4	4	Z	2	2	6	2	6	4	2	1	6	10	10	11	9	8	6	6	5	5	4	5.2	11
17-May	4	3	3	3	3	Z	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2	2	3	2.3	4
18-May	Z	3	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	2	1	1	1	1	0.9	3
19-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
20-May	1	1	Z	1	1	2	2	3	1	2	2	2	2	2	2	1	1	1	1	1	1	2	1	1	1.3	3
21-May	1	2	3	Z	4	3	4	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	4
22-May	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	0.9	3
23-May	1	1	1	1	0	Z	6	6	4	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	6
24-May	Z	2	1	1	1	1	2	3	1	1	1	1	1	2	4	3	3	3	3	2	1	1	1	1	1.6	4
25-May	1	Z	1	1	1	1	2	2	3	8	M	3	3	3	3	4	3	2	2	3	4	3	2	4	2.6	8
26-May	3	2	Z	1	1	1	3	4	4	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1.5	4
27-May	2	2	1	Z	3	3	3	3	2	3	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1.6	3
28-May	1	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0.8	1
29-May	0	0	0	0	1	Z	0	0	0	0	0	0	0	1	1	1	2	3	2	4	1	1	1	3	0.9	4
30-May	Z	6	6	7	2	1	3	2	0	3	1	1	2	1	0	1	2	2	1	1	1	1	1	0	1.9	7
31-May	0	Z	0	0	0	0	0	2	2	3	3	2	2	7	2	1	0	0	0	1	1	1	1	2	1.4	7
3.6 3.5 2.9 2.1 2.0 1.7 2.5 3.1 2.6 2.9 1.8 1.5 1.4 1.6 1.4 1.3 1.3 1.4 1.3 1.5 1.5 1.6 2.1 3.4																								Diurnal Average		
44 36 30 21 14 11 10 13 14 10 10 15 10 7 10 10 11 9 8 6 6 6 13 42																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.29	99.29
21 - 40	3	0.42	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	116	90	26	6	8	19	27	29	50	50	59	60	46	39	51	27	703
21 - 40	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	116	90	26	6	8	19	27	29	53	50	61	60	46	39	51	27	708

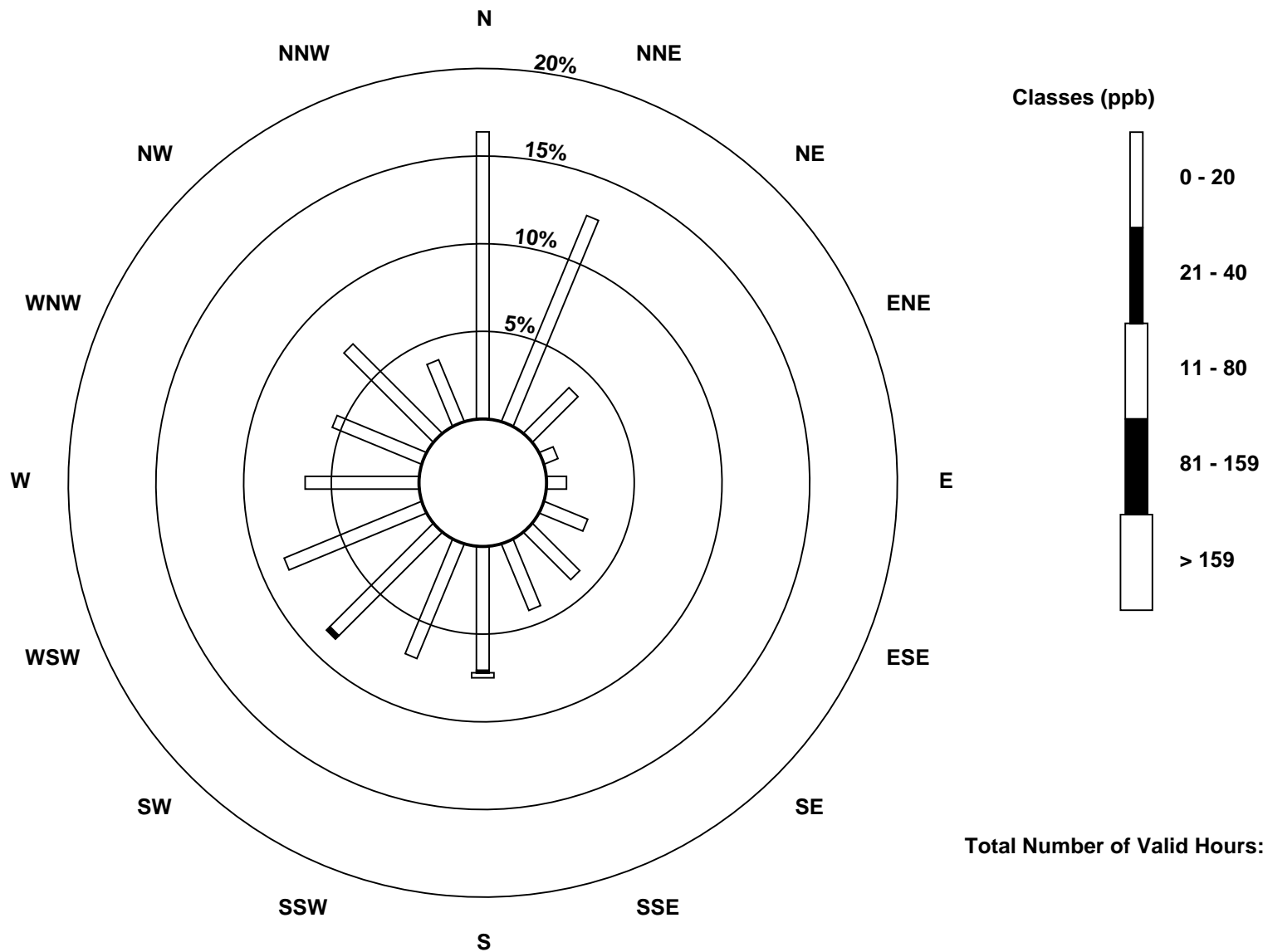
Total Number of Valid Hours: 708

Total Number of Hours: 744

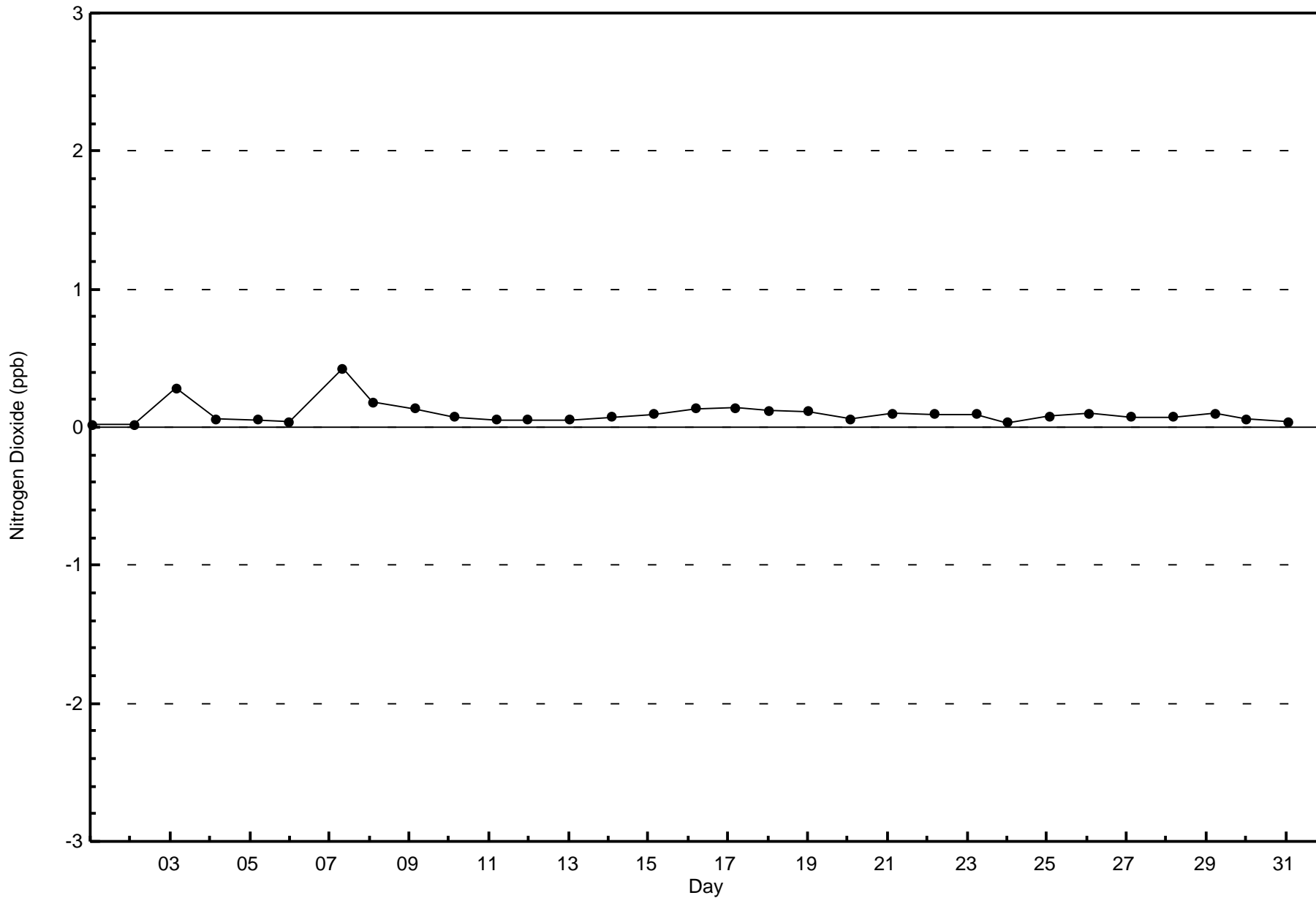


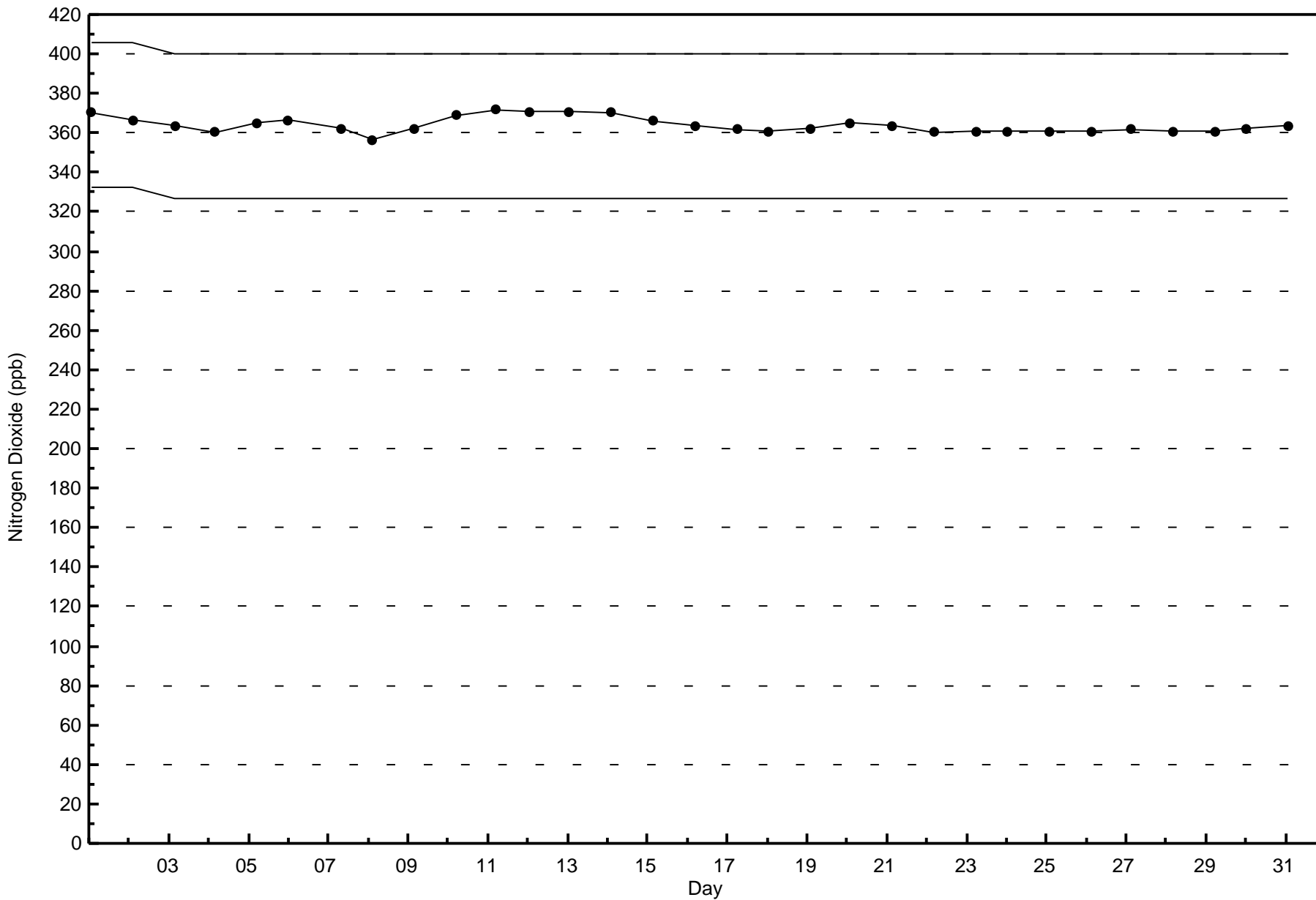
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association
Summary of Hour Averages

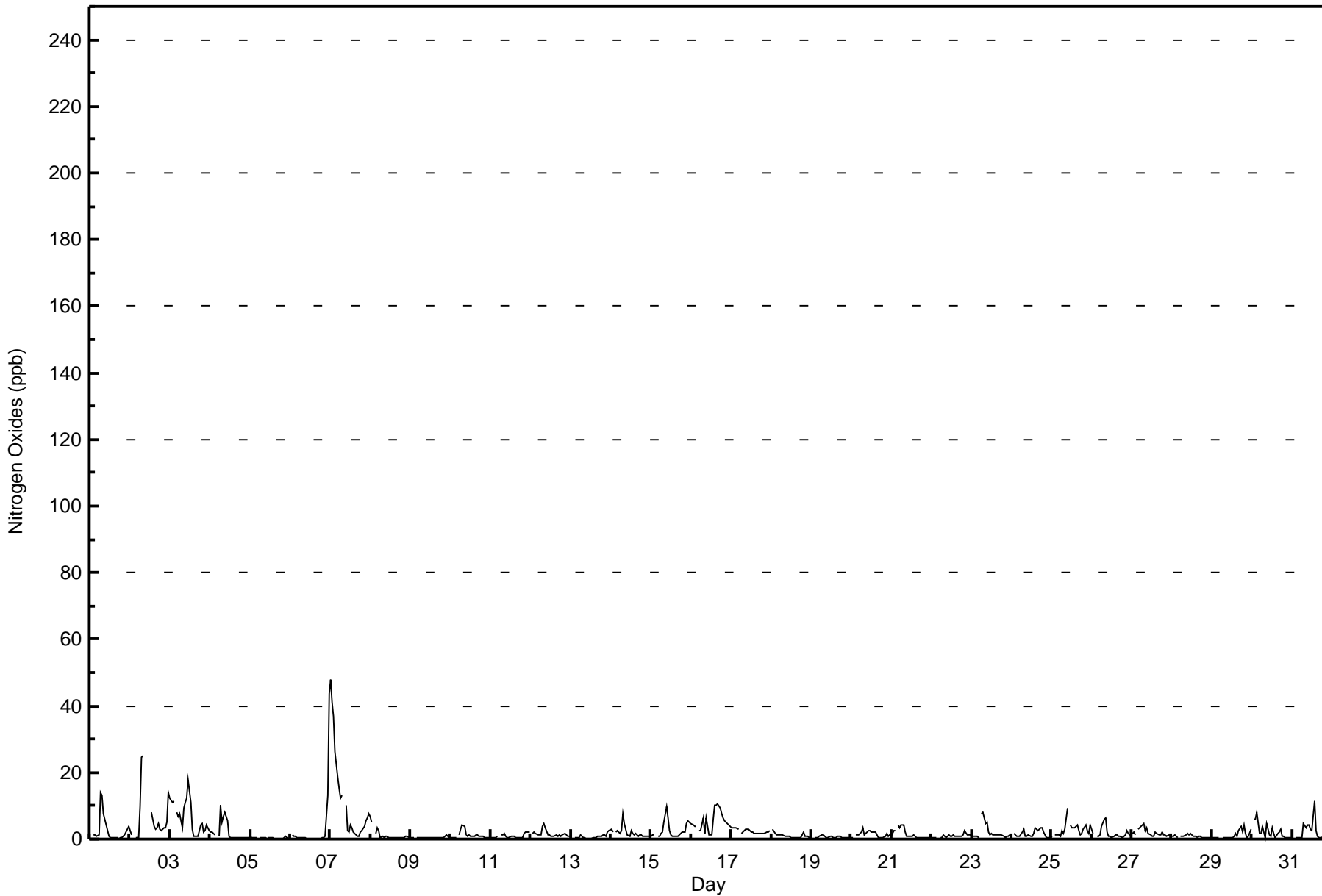
Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2016

Maximum Value: 48 ppb on May 7 01:00		Maximum Daily Average: 11.6 ppb on May 7		Hours in Service: 744																																													
Minimum Value: 0 ppb on May 6 16:00		Minimum Daily Average: 0.4 ppb on May 5		Hours of Data: 708																																													
Maximum Diurnal Average: 4.2 ppb at hour 8		Minimum Diurnal Average: 1.3 ppb at hour 19		Hours of Missing Data: 36																																													
Monthly Average: 2.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 24		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-May	3	Z	1	1	1	1	14	13	8	6	4	1	0	0	0	0	0	0	0	0	1	1	3	4	2.8	14																							
2-May	2	1	Z	1	0	0	10	25	25	C	C	C	C	8	4	3	3	5	3	3	3	3	5	14	6.2	25																							
3-May	12	11	11	Z	8	7	8	3	9	11	12	18	11	3	1	1	1	1	4	5	2	3	4	3	6.5	18																							
4-May	2	2	2	1	Z	1	10	5	7	8	6	1	1	0	0	0	0	0	1	1	1	0	0	1	2.2	10																							
5-May	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1																							
6-May	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	44	2.8	44																						
7-May	48	41	37	26	19	15	12	13	Z	10	3	2	4	3	2	1	1	1	1	2	3	4	6	6	8	11.6	48																						
8-May	7	5	Z	2	3	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	1.2	7																							
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.4	1																							
10-May	0	1	1	1	Z	1	3	4	4	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1.2	4																							
11-May	1	1	1	1	1	Z	1	1	2	1	0	1	1	1	1	1	1	0	0	1	2	2	2	2	1.0	2																							
12-May	Z	2	2	2	1	1	1	4	5	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1.5	5																							
13-May	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	3	0.7	3																							
14-May	3	2	Z	2	3	2	3	8	5	3	1	3	2	1	2	1	1	1	1	1	1	1	1	1	2.0	8																							
15-May	1	1	1	Z	1	1	2	2	5	10	6	3	1	1	1	1	1	1	2	2	2	5	6	5	2.6	10																							
16-May	5	4	4	4	Z	2	3	6	2	6	4	1	1	6	10	10	11	9	8	6	6	5	4	4	5.3	11																							
17-May	4	3	3	4	3	Z	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2	2	3	2.3	4																							
18-May	Z	3	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	2	1	1	1	1.0	3																							
19-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
20-May	1	1	Z	1	1	2	2	3	1	2	3	3	2	2	2	1	1	1	1	1	1	2	1	1	1.5	3																							
21-May	1	2	2	Z	4	3	4	4	2	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1.5	4																							
22-May	1	0	0	0	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	3	1	1	1	0.9	3																							
23-May	1	1	1	1	1	Z	8	8	5	5	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2.0	8																							
24-May	Z	2	1	1	1	1	2	3	1	1	1	1	2	4	3	3	3	3	3	2	1	1	1	1	1.7	4																							
25-May	1	Z	1	1	1	1	3	2	3	10	M	4	3	4	4	4	3	1	2	3	4	3	2	4	2.8	10																							
26-May	3	2	Z	1	1	1	4	6	6	2	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1.8	6																							
27-May	2	2	1	Z	3	4	4	4	3	3	2	1	1	1	2	2	1	1	2	1	1	1	1	1	1.9	4																							
28-May	1	1	1	0	Z	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	0	1	0	0.9	2																							
29-May	0	0	0	0	1	Z	0	0	0	0	0	0	0	1	2	1	2	4	2	4	2	1	1	3	1.1	4																							
30-May	Z	6	6	8	2	2	4	2	0	5	1	1	3	2	1	2	2	3	1	1	1	1	1	1	2.3	8																							
31-May	0	Z	1	1	0	1	1	4	3	4	4	3	3	11	3	1	0	0	0	1	1	1	1	2	2.1	11																							
																								3.8	3.7	3.2	2.4	2.2	2.0	3.4	4.2	3.5	3.4	2.1	1.8	1.6	1.9	1.6	1.4	1.4	1.4	1.3	1.5	1.5	1.6	2.1	3.5	Diurnal Average	
																								48	41	37	26	19	15	14	25	25	11	12	18	11	11	10	10	11	9	8	6	6	6	13	44	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	99.01	99.01
21 - 40	4	0.56	99.58
41 - 80	3	0.42	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	116	90	26	6	7	18	27	29	50	50	59	60	46	39	51	27	701
21 - 40	0	0	0	0	1	1	0	0	0	0	2	0	0	0	0	0	4
11 - 80	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	116	90	26	6	8	19	27	29	53	50	61	60	46	39	51	27	708

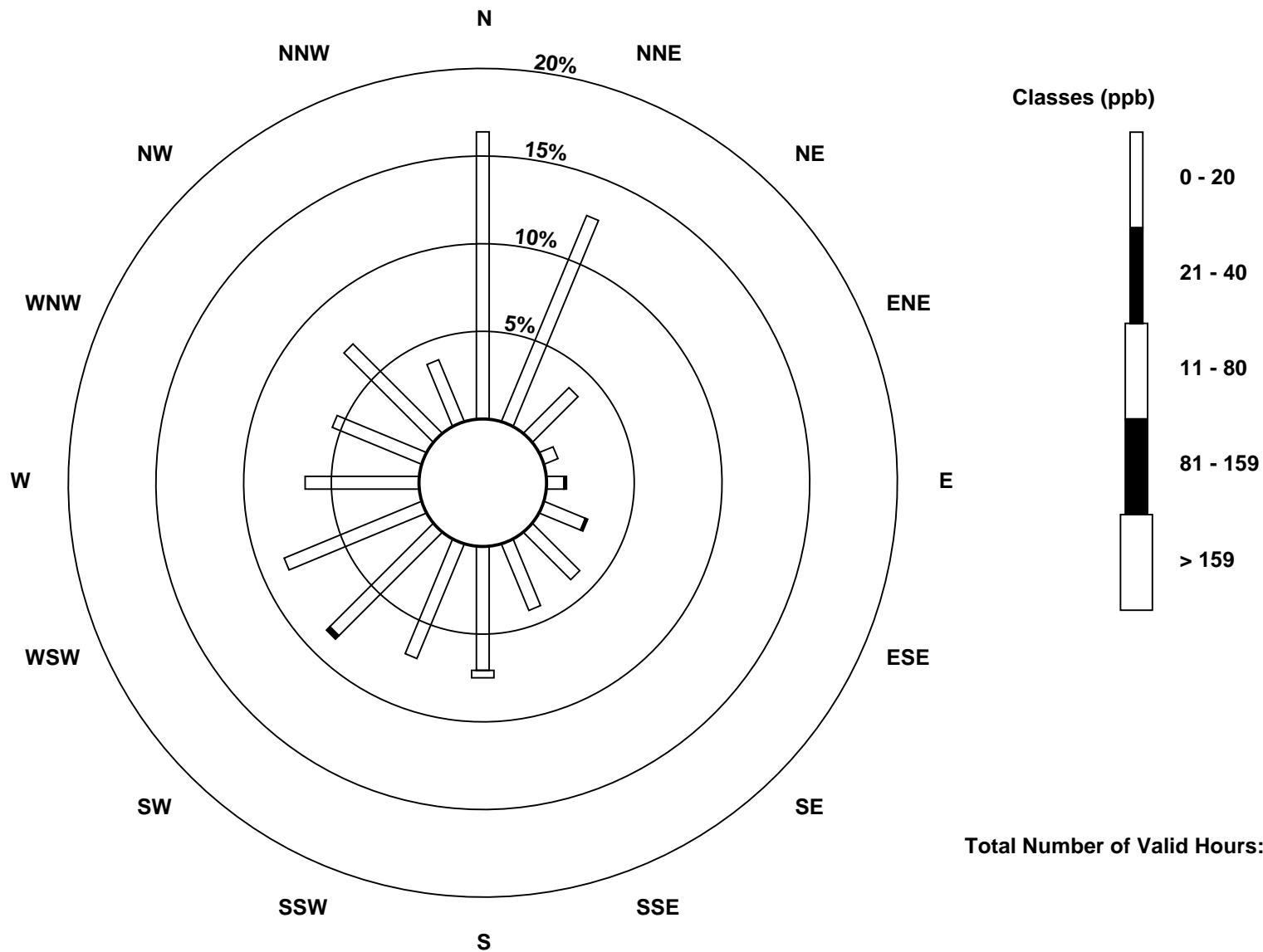
Total Number of Valid Hours: 708

Total Number of Hours: 744

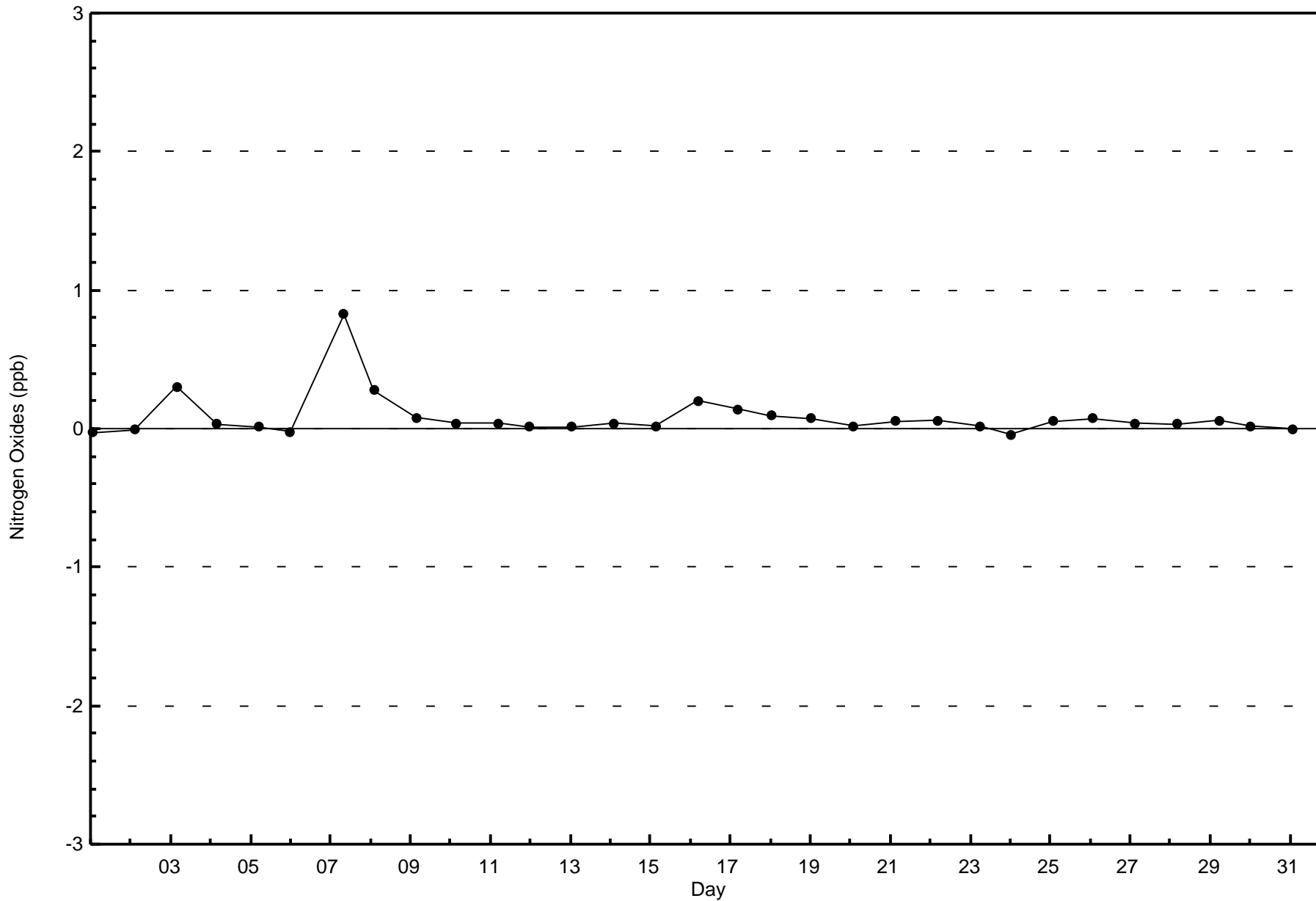


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)



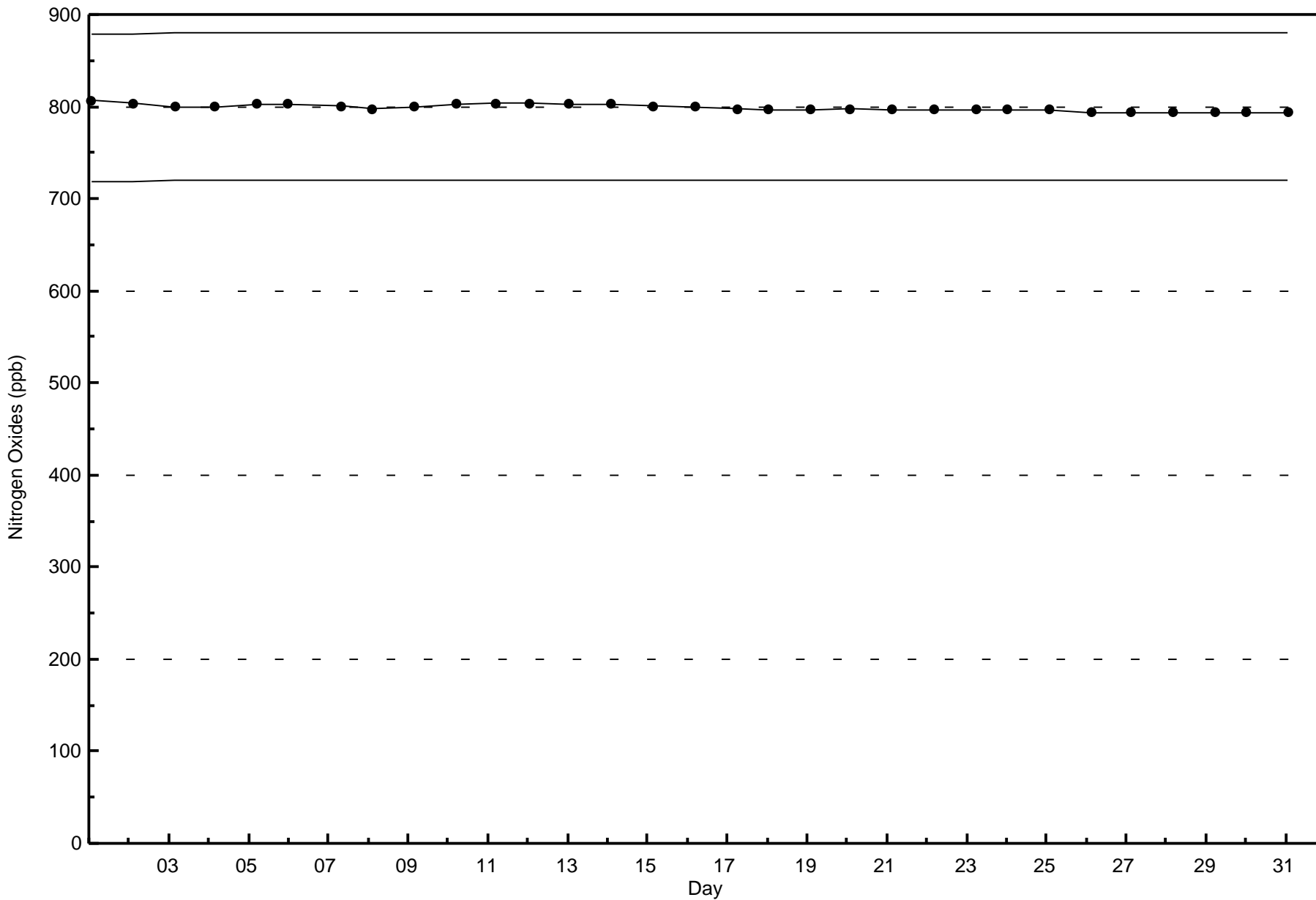
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2016





Summary of Hour Averages

Fort McKay South - May 2016

Number of Exceedences (AAAQO): 24-hr: 8	Hours in Service: 744
Maximum Value: 3866.6 µg/m ³ on May 7 01:00	Maximum Daily Average: 1140.6 µg/m ³ on May 7
Minimum Value: 0.0 µg/m ³ on May 5 11:00	Hours of Data: 741
Maximum Diurnal Average: 155.9 µg/m ³ at hour 1	Hours of Missing Data: 3
Monthly Average: 61.96 µg/m ³	Hours of Calibration: 2
Minimum Daily Average: 1.3 µg/m ³ on May 9	Percent Operational Time: 99.9
Minimum Diurnal Average: 12.1 µg/m ³ at hour 12	
Percentiles: P ₁ = 0.0 P ₁₀ = 0.9 O ₁ = 1.9 Median = 3.8 O ₃ = 9.6 P ₉₀ = 66.9 P ₉₉ = 2135.9	

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-May	7.8	7.7	6.9	6.6	6.1	5.5	7.2	6.1	3.6	4.0	3.2	2.0	1.7	1.5	1.7	2.7	2.6	2.2	2.6	3.3	5.0	6.3	7.2	7.2	4.6	7.8
2-May	6.8	6.7	6.3	5.8	5.5	5.3	5.5	5.8	6.1	5.9	26.4	28.8	36.9	13.8	9.5	9.4	10.3	10.2	11.7	14.6	14.8	15.8	20.0	21.9	12.7	36.9
3-May	18.2	16.4	13.5	12.2	11.3	10.8	11.1	7.6	18.4	27.0	C	C	78.5	28.1	0.3	0.2	0.0	0.2	1.9	4.1	2.9	3.6	5.7	9.1	12.8	78.5
4-May	8.3	4.9	3.9	4.8	6.4	7.6	15.2	162.2	254.6	262.1	12.9	4.0	3.8	2.7	2.9	3.1	4.1	5.0	4.5	5.2	5.7	3.1	1.7	4.0	33.0	262.1
5-May	6.4	3.0	2.7	2.3	2.4	2.1	1.6	1.4	1.1	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.4	2.6	2.8	3.2	1.4	6.4
6-May	2.8	3.3	3.0	2.8	2.8	2.5	1.7	0.8	0.5	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.9	2.1	10.2	811.3	3369.1	175.6	3369.1
7-May	3866.6	3835.5	3741.5	3066.3	2223.9	1970.5	1785.0	2177.8	1874.3	1354.0	76.5	48.0	194.5	111.4	32.2	15.7	11.3	11.6	15.3	35.8	88.9	217.2	274.5	345.7	1140.6	3866.6
8-May	319.8	189.0	59.1	45.0	44.1	18.3	2.3	2.0	1.4	1.4	0.8	1.4	0.4	0.0	0.0	0.0	0.2	0.4	0.8	1.5	2.1	1.8	1.3	1.4	28.9	319.8
9-May	1.4	1.4	1.4	1.3	1.3	1.2	1.1	1.0	1.1	1.6	1.4	1.2	1.1	1.2	1.5	1.1	1.3	1.4	1.4	1.3	1.4	1.6	1.5	1.5	1.3	1.6
10-May	1.9	2.8	2.6	2.8	2.9	2.7	1.9	1.4	1.4	1.2	1.5	1.1	1.0	0.8	0.8	1.0	1.0	1.1	1.2	2.0	2.7	3.2	3.9	4.3	2.0	4.3
11-May	4.4	4.5	4.5	4.3	4.1	3.4	1.9	1.5	1.0	0.8	0.8	0.8	1.2	1.5	1.6	1.2	0.9	0.9	0.8	0.8	1.0	1.9	3.5	4.0	2.1	4.5
12-May	3.9	3.5	3.5	3.4	3.2	3.1	2.0	1.7	1.4	1.0	0.8	0.9	0.9	0.8	0.5	0.6	0.7	0.7	0.7	1.1	1.6	2.5	3.4	4.1	1.9	4.1
13-May	3.4	2.9	3.0	3.3	3.0	3.0	2.8	1.0	0.4	0.1	0.1	0.1	0.2	0.3	UO	0.4	0.6	0.6	0.8	1.8	2.1	3.1	4.3	4.4	1.8	4.4
14-May	5.0	5.7	4.9	5.0	4.9	5.2	2.7	1.9	1.5	1.0	0.7	0.4	0.9	0.8	0.6	0.7	0.5	0.6	0.5	1.0	2.6	3.4	3.5	3.5	2.3	5.7
15-May	3.0	3.3	3.3	3.7	3.5	3.1	4.9	11.9	204.7	822.0	391.3	99.9	33.6	24.5	17.3	11.1	10.0	17.6	48.7	64.2	71.5	151.6	244.1	252.1	104.2	822.0
16-May	249.0	241.7	245.3	261.0	266.5	203.2	77.0	257.4	21.1	225.4	113.8	9.6	9.2	66.8	135.9	132.7	175.1	182.3	161.3	154.7	149.0	139.8	132.2	129.2	155.8	266.5
17-May	129.0	124.5	101.1	78.8	54.6	30.2	35.7	48.0	77.2	92.8	97.9	91.9	76.0	67.0	57.3	43.3	44.0	42.5	43.0	42.4	40.5	49.0	66.9	66.3	66.7	129.0
18-May	66.9	50.5	33.6	19.2	12.2	12.3	11.8	8.9	6.8	3.9	5.0	10.1	6.0	3.1	1.8	1.7	1.9	1.9	2.2	32.8	19.4	16.5	9.7	8.4	14.4	66.9
19-May	8.1	4.9	3.8	4.5	4.2	4.0	6.1	5.6	4.7	4.7	4.1	3.7	3.4	3.1	2.3	2.3	2.5	2.4	2.4	2.3	2.0	2.0	2.1	2.0	3.6	8.1
20-May	1.9	2.1	1.9	2.0	1.7	1.9	1.7	1.8	2.2	2.2	2.4	2.5	2.4	2.5	3.4	3.1	4.6	4.9	4.1	4.8	5.5	5.3	4.7	4.5	3.1	5.5
21-May	4.3	4.8	5.1	5.0	5.6	5.2	5.1	5.0	4.8	3.1	2.1	2.1	2.7	3.4	3.9	4.4	5.6	5.0	3.9	3.4	3.1	3.7	3.2	2.3	4.0	5.6
22-May	3.1	2.6	3.2	5.0	5.2	5.5	5.1	4.2	3.2	3.0	2.9	2.6	1.9	1.6	1.7	1.8	2.2	2.3	2.8	3.2	2.9	3.4	3.8	3.6	3.2	5.5
23-May	4.0	4.9	5.5	5.5	5.4	5.4	3.0	1.8	1.9	1.9	1.7	1.9	1.9	1.8	1.7	1.8	2.2	2.3	2.8	3.0	4.1	9.1	24.7	34.0	5.5	34.0
24-May	68.4	76.7	42.6	32.2	26.4	23.7	51.1	35.5	18.3	13.4	19.1	13.9	8.4	17.9	48.9	43.0	43.2	64.3	62.6	42.6	28.3	6.6	7.0	6.5	33.4	76.7
25-May	12.6	112.8	186.7	261.5	236.1	197.3	163.0	101.9	50.8	55.0	38.7	17.5	21.3	22.9	39.2	87.2	60.5	44.3	16.5	12.3	5.9	3.6	3.4	3.6	73.1	261.5
26-May	3.8	4.4	4.3	4.7	4.6	4.4	4.2	4.2	4.3	3.3	2.6	3.0	3.6	4.2	2.6	1.0	0.8	1.2	1.6	2.4	3.2	3.5	3.6	3.6	3.3	4.7
27-May	4.0	4.2	4.0	4.1	4.2	3.8	2.1	2.9	4.2	5.8	5.4	4.6	3.3	3.2	5.3	8.5	5.4	4.1	4.4	4.2	3.4	3.2	4.8	5.2	4.3	8.5
28-May	7.1	12.0	21.4	19.3	14.4	13.2	10.6	8.5	9.8	9.3	6.7	5.1	4.5	4.3	2.7	2.6	3.3	4.8	6.4	5.2	3.5	3.0	2.7	2.8	7.6	21.4
29-May	2.5	3.9	5.5	5.4	3.4	1.6	2.2	3.1	2.2	1.6	1.5	1.4	1.5	2.1	2.4	1.9	4.4	4.7	2.4	3.6	4.4	3.6	4.4	3.3	3.0	5.5
30-May	2.4	3.9	6.7	7.9	6.6	6.4	4.0	2.0	2.5	2.3	2.2	2.0	2.0	2.2	2.2	2.0	1.7	1.9	3.6	4.8	5.2	5.7	4.5	5.3	3.7	7.9
31-May	6.9	7.6	7.2	7.4	6.7	5.9	3.1	2.0	1.6	1.6	1.9	2.2	2.4	3.1	2.7	2.1	1.5	1.4	1.7	2.3	4.2	6.0	6.0	6.1	3.9	7.6

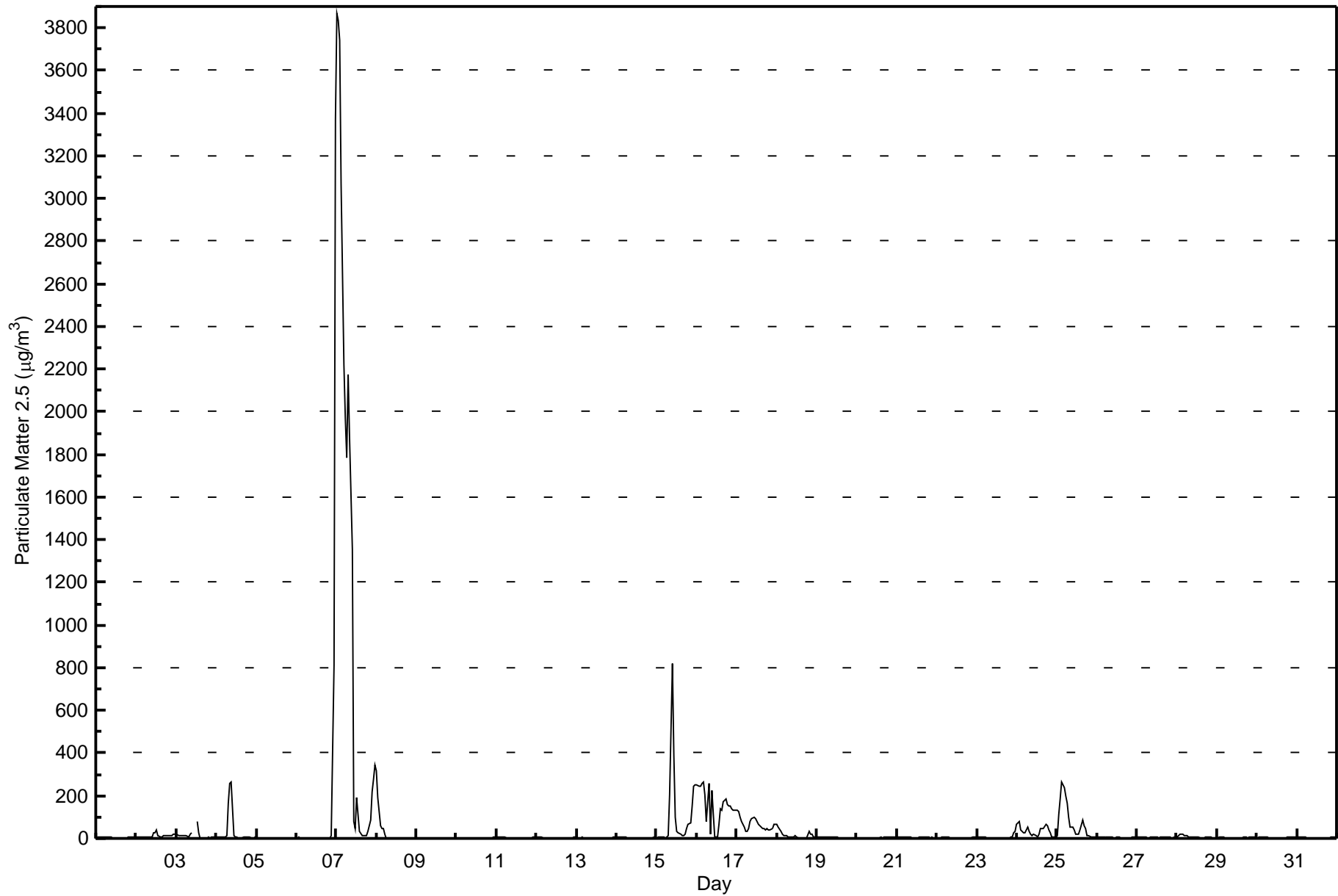
155.9	153.3	146.4	125.6	96.2	82.8	72.0	92.8	83.4	93.9	27.5	12.1	16.3	12.8	12.8	12.5	13.0	13.6	13.3	14.9	15.8	22.3	53.9	139.4	Diurnal Average
3866.6	3835.5	3741.5	3066.3	2223.9	1970.5	1785.0	2177.8	1874.3	1354.0	391.3	99.9	194.5	111.4	135.9	132.7	175.1	182.3	161.3	154.7	149.0	217.2	811.3	3369.1	Diurnal 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}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - May 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	408	55.06	55.06
6 - 15	103	13.90	68.96
16 - 25	26	3.51	72.47
26 - 80	62	8.37	80.84
> 81.0	52	7.02	87.85

Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	103	61	13	2	4	6	2	10	24	19	24	32	28	23	32	25	408
6 - 15	8	4	1	0	3	5	7	8	12	13	16	15	3	4	2	2	103
16 - 25	4	2	0	1	1	1	1	3	2	3	4	0	3	0	1	0	26
26 - 80	4	3	0	1	1	3	5	5	9	6	7	6	7	2	1	2	62
> 81.0	0	2	3	0	0	6	11	1	2	7	6	5	2	2	3	2	52
Totals	119	72	17	4	9	21	26	27	49	48	57	58	43	31	39	31	651

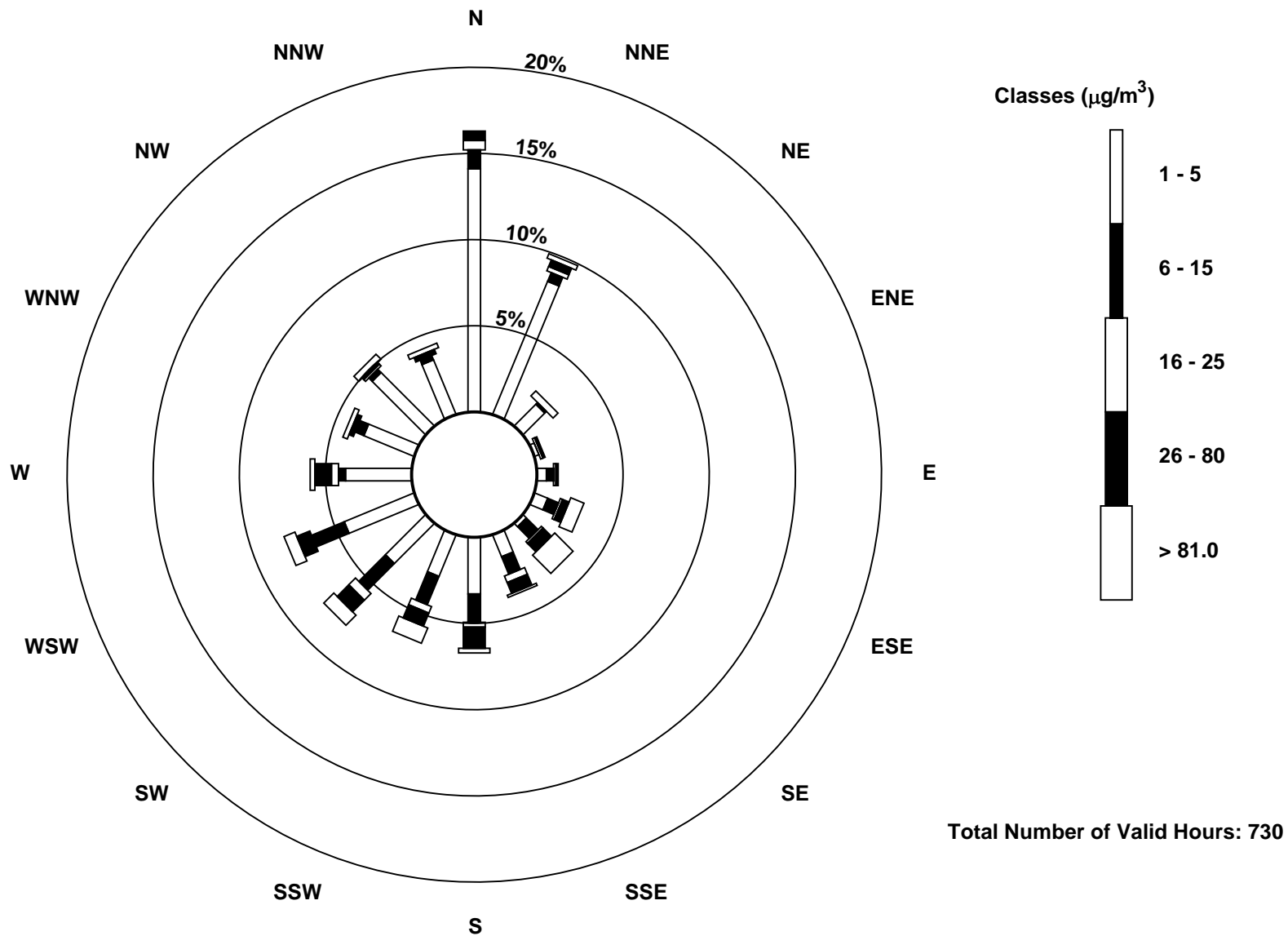
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association
Summary of Hour Averages

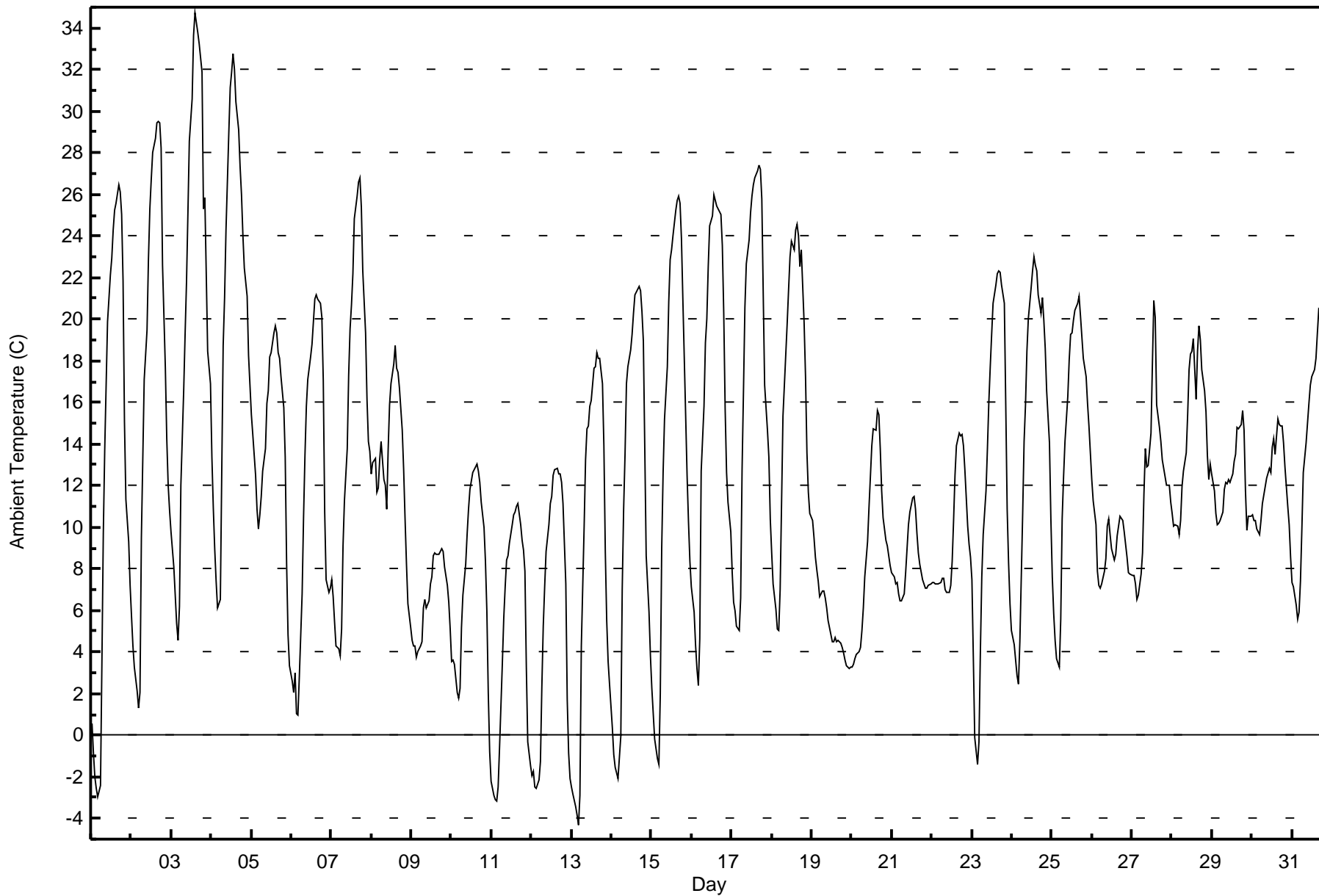
Ambient Temperature (AT) - C
Fort McKay South - May 2016

Maximum Value: 34.7 C on May 3 15:00 Maximum Daily Average: 21.0 C on May 3																				Hours in Service: 744 Hours of Data: 744																												
Minimum Value: -4.3 C on May 13 05:00 Minimum Daily Average: 5.0 C on May 11 Maximum Diurnal Average: 19.2 C at hour 16 Minimum Diurnal Average: 3.9 C at hour 5 Monthly Average: 12.37 C Percentiles: P₁ = -2.9 P₁₀ = 3.5 Q₁ = 7.2 Median = 11.5 Q₃ = 17.7 P₉₀ = 22.8 P₉₉ = 31.3																				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-May	0.6	-0.9	-2.0	-2.6	-3.0	-2.4	3.5	9.7	13.7	16.8	19.9	22.1	22.9	24.3	25.2	25.6	26.4	26.1	25.1	21.9	15.1	11.4	9.3	7.2	13.2	26.4																						
2-May	5.7	4.3	3.3	2.1	1.3	2.1	9.5	13.3	17.1	19.5	22.8	25.3	26.7	28.0	28.7	29.4	29.5	29.4	28.2	22.6	17.6	14.3	12.0	10.8	16.8	29.5																						
3-May	9.8	8.1	6.7	5.4	4.5	6.2	12.0	16.6	19.3	21.8	25.1	28.5	30.6	33.6	34.7	34.2	33.8	33.2	31.9	25.3	25.9	22.2	18.5	16.9	21.0	34.7																						
4-May	13.3	10.9	8.9	7.4	6.1	6.5	12.7	18.7	21.0	24.3	29.0	31.1	31.9	32.8	32.0	30.4	29.1	27.3	26.0	24.0	22.5	21.1	18.3	16.8	20.9	32.8																						
5-May	15.4	14.4	12.5	10.8	9.9	10.6	11.5	12.7	13.8	16.0	16.5	18.2	18.4	19.3	19.7	19.3	18.4	18.1	17.2	15.8	13.4	8.2	4.9	3.3	14.1	19.7																						
6-May	2.6	2.1	3.0	1.0	1.0	2.8	6.8	10.5	13.4	15.8	17.1	18.2	18.8	19.9	20.9	21.2	21.0	20.8	20.1	17.0	10.7	7.5	6.8	7.1	11.9	21.2																						
7-May	7.4	6.7	5.4	4.3	4.1	3.8	5.1	9.1	11.3	13.8	17.3	19.5	20.7	22.2	24.8	25.9	26.6	26.8	25.4	22.3	19.3	16.2	14.1	13.6	15.2	26.8																						
8-May	12.6	13.1	13.3	11.7	11.9	13.2	14.1	12.3	12.0	10.9	13.7	15.9	16.9	17.8	18.7	17.7	17.4	16.7	14.7	12.8	10.4	8.2	6.4	5.2	13.2	18.7																						
9-May	4.6	4.3	4.3	3.7	4.0	4.3	4.5	6.1	6.5	6.1	6.5	7.3	7.6	8.6	8.7	8.7	8.7	8.9	8.9	8.8	8.1	7.2	6.4	5.1	6.6	8.9																						
10-May	3.5	3.6	3.4	2.1	1.8	2.2	5.2	6.7	8.2	9.6	10.8	11.8	12.2	12.6	12.9	13.0	12.7	12.2	11.2	10.0	8.3	6.0	2.0	-0.8	7.6	13.0																						
11-May	-2.2	-2.9	-3.1	-3.2	-2.5	-0.6	3.5	5.6	7.1	8.4	8.6	9.2	10.1	10.6	10.8	11.0	11.1	10.1	9.4	8.9	7.9	3.2	-0.3	-1.5	5.0	11.1																						
12-May	-2.0	-1.8	-2.5	-2.5	-2.2	-1.3	2.3	5.3	7.1	8.9	10.1	11.1	11.5	12.5	12.7	12.8	12.5	12.6	12.2	11.1	7.3	1.7	-0.9	-2.1	5.7	12.8																						
13-May	-2.5	-2.8	-3.4	-3.8	-4.3	-2.9	4.3	10.1	13.2	14.7	14.9	15.8	16.1	17.7	17.7	18.4	18.1	18.1	16.9	13.9	8.9	5.5	3.6	2.5	8.8	18.4																						
14-May	0.4	-0.9	-1.5	-1.8	-2.1	-0.1	7.0	10.8	13.5	16.9	17.7	18.5	19.3	20.3	21.2	21.3	21.6	21.4	20.4	18.9	13.8	8.6	5.9	3.8	11.5	21.6																						
15-May	2.2	1.0	-0.2	-1.1	-1.4	2.0	9.0	12.6	15.2	17.7	20.8	22.8	23.3	24.0	25.2	25.7	25.9	25.5	23.9	21.0	15.3	12.5	10.2	8.4	14.2	25.9																						
16-May	7.2	5.9	4.3	3.2	2.4	4.7	12.7	15.8	18.9	20.0	22.5	24.5	25.0	26.0	25.7	25.5	25.3	25.0	23.5	20.3	15.7	12.6	11.2	9.8	16.2	26.0																						
17-May	7.8	6.4	6.0	5.2	5.0	6.6	12.8	16.6	20.6	22.7	23.8	25.1	25.9	26.4	26.8	27.2	27.4	27.2	25.8	21.2	16.8	14.7	13.3	10.4	17.6	27.4																						
18-May	8.8	7.3	6.1	5.1	5.1	7.0	11.1	15.4	18.3	19.8	21.5	23.0	23.8	23.3	24.3	24.5	24.0	22.5	23.4	19.8	17.3	13.6	11.7	10.7	16.1	24.5																						
19-May	10.3	9.5	8.6	7.9	7.4	6.7	6.9	6.9	6.6	6.1	5.5	4.8	4.5	4.5	4.7	4.5	4.6	4.4	4.2	4.0	3.6	3.4	3.2	3.3	5.7	10.3																						
20-May	3.3	3.4	3.7	3.9	4.0	4.2	5.1	6.2	7.6	9.3	10.9	12.4	13.9	14.7	14.6	15.6	15.4	13.8	11.8	10.4	9.4	9.1	8.6	8.2	9.1	15.6																						
21-May	7.8	7.6	7.3	7.4	6.8	6.4	6.5	6.8	7.8	9.0	10.1	10.7	11.4	11.5	10.9	9.7	8.8	8.2	7.5	7.3	7.1	7.1	7.2	7.3	8.3	11.5																						
22-May	7.4	7.4	7.3	7.3	7.2	7.4	7.5	7.5	7.0	6.9	6.9	7.2	8.4	10.3	12.5	13.9	14.5	14.4	14.5	13.9	12.7	10.0	9.1	8.6	9.6	14.5																						
23-May	7.5	3.7	-0.1	-1.4	-0.3	4.0	7.6	9.7	11.8	13.8	16.0	17.7	19.2	20.8	21.6	22.2	22.3	22.2	21.6	20.7	15.9	10.9	8.3	6.4	12.6	22.3																						
24-May	5.1	4.3	3.6	2.9	2.4	4.5	10.6	14.1	15.9	18.5	20.1	21.5	22.3	23.0	22.6	22.3	21.2	20.3	21.0	19.9	18.6	16.6	14.0	10.4	14.8	23.0																						
25-May	7.6	5.9	4.6	3.7	3.2	5.6	10.4	12.4	14.1	16.3	18.1	19.3	19.3	19.9	20.4	20.8	21.1	20.2	19.1	18.1	17.3	16.0	14.9	13.6	14.2	21.1																						
26-May	12.3	11.3	10.1	7.9	7.2	7.0	7.3	7.9	8.5	10.1	10.4	9.7	9.0	8.4	8.7	9.6	10.0	10.5	10.3	9.8	9.2	8.6	7.8	7.8	9.1	12.3																						
27-May	7.7	7.7	7.2	6.5	6.7	7.8	8.7	11.6	13.8	12.9	13.0	14.6	17.8	20.9	20.1	15.9	14.8	14.1	13.3	12.9	12.4	12.0	12.0	11.2	12.3	20.9																						
28-May	10.7	10.1	10.1	10.0	9.6	10.4	11.9	12.7	13.6	15.4	17.6	18.4	18.5	19.1	16.1	18.5	19.7	19.0	17.6	16.5	15.6	13.4	12.3	13.0	14.6	19.7																						
29-May	12.6	11.7	10.6	10.1	10.2	10.3	10.7	11.8	12.1	12.1	12.3	12.2	12.6	13.2	13.5	14.8	14.7	14.9	15.6	14.7	11.7	9.8	10.5	10.5	12.2	15.6																						
30-May	10.6	10.3	10.3	9.9	9.7	10.3	11.1	11.5	12.0	12.4	12.8	12.7	13.8	14.3	13.5	15.2	15.0	14.9	14.8	14.1	12.9	11.0	10.1	8.6	12.2	15.2																						
31-May	7.3	7.2	6.3	5.6	5.9	7.4	9.9	12.7	14.0	15.0	15.9	16.8	17.2	17.6	18.1	19.3	20.5	20.4	20.6	19.1	13.0	9.7	7.9	7.2	13.1	20.6																						
																								6.6	5.8	5.0	4.1	3.9	5.1	8.4	11.0	12.7	14.2	15.7	17.0	17.7	18.7	19.0	19.2	19.1	18.7	17.9	16.0	13.3	10.7	9.0	7.8	Diurnal Average
																								15.4	14.4	13.3	11.7	11.9	13.2	14.1	18.7	21.0	24.3	29.0	31.1	31.9	33.6	34.7	34.2	33.8	33.2	31.9	25.3	25.9	22.2	18.5	16.9	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort McKay South - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	39	5.24	5.24
0 - 10	263	35.35	40.59
10 - 20	310	41.67	82.26
> 20	132	17.74	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

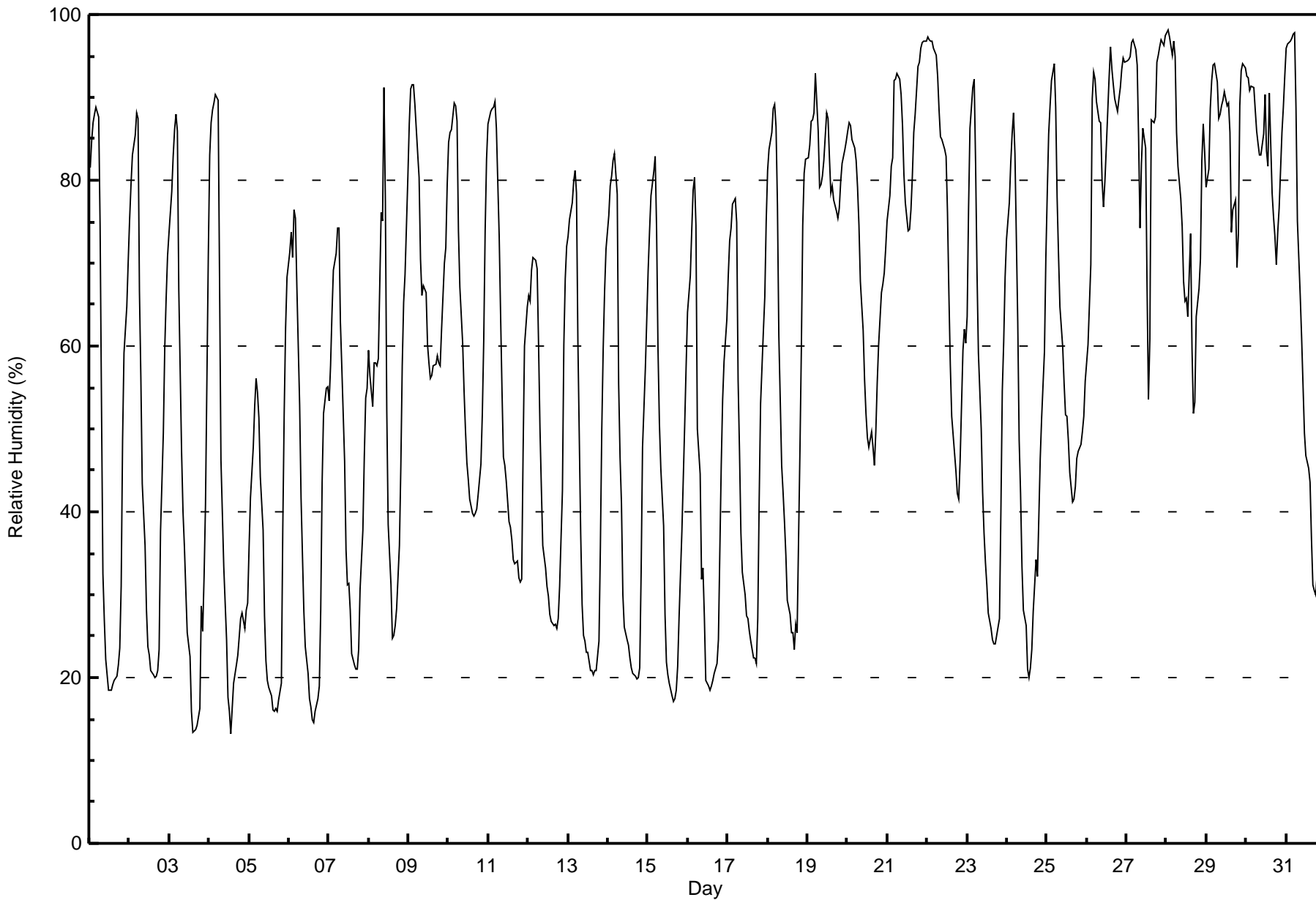


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Fort McKay South - May 2016**

Maximum Value: 98 % on May 28 02:00																			Maximum Daily Average: 87.4 % on May 27						Hours in Service: 744																			
Minimum Value: 13 % on May 4 14:00																			Minimum Daily Average: 35.4 % on May 5						Hours of Data: 744																			
Maximum Diurnal Average: 85.6 % at hour 5																			Minimum Diurnal Average: 38.7 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 59.1 %																			Percentiles: P ₁ = 16 P ₁₀ = 22 Q ₁ = 35 Median = 61 Q ₃ = 83 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-May	82	85	87	88	89	88	75	53	33	27	22	19	18	18	19	20	20	22	24	31	49	59	65	70	48.3	89																		
2-May	75	79	83	85	88	87	67	56	43	36	28	24	23	21	20	20	20	21	23	38	49	60	66	71	49.3	88																		
3-May	74	79	83	86	88	86	67	47	40	36	31	25	23	16	13	14	14	16	29	26	32	41	71	43.7	88																			
4-May	83	87	88	89	90	90	68	46	40	33	25	18	16	13	16	19	22	23	25	27	28	26	28	29	42.9	90																		
5-May	36	42	48	53	56	54	51	44	38	27	22	20	19	18	16	16	16	16	17	19	38	52	62	68	35.4	68																		
6-May	71	74	71	76	75	67	53	42	35	28	24	21	18	16	15	15	16	18	19	28	44	52	55	55	41.1	76																		
7-May	53	58	64	69	71	74	74	63	58	46	35	31	31	28	23	22	21	21	23	31	38	47	54	55	45.4	74																		
8-May	60	56	53	58	58	58	59	76	75	91	77	52	39	31	25	25	26	28	36	45	58	65	69	80	54.2	91																		
9-May	87	91	92	92	89	83	80	71	66	67	66	60	58	56	56	58	58	59	58	58	62	70	72	79	70.3	92																		
10-May	85	86	86	89	89	87	74	67	60	55	50	46	44	42	40	39	40	40	42	46	52	61	74	83	61.5	89																		
11-May	87	88	89	89	89	86	73	64	55	47	46	44	39	38	37	34	34	34	32	31	32	47	60	65	55.8	89																		
12-May	66	65	69	71	70	69	60	50	43	36	33	31	30	28	27	26	26	26	27	31	43	60	68	72	47.0	72																		
13-May	73	75	77	80	81	78	61	37	29	25	24	23	23	21	21	20	21	21	24	36	50	60	67	72	45.8	81																		
14-May	76	79	81	82	83	78	55	47	41	30	26	25	24	22	21	21	20	20	20	21	33	48	57	63	44.7	83																		
15-May	69	74	78	81	83	74	60	51	45	38	28	22	20	19	18	17	18	18	21	27	38	44	50	57	43.8	83																		
16-May	64	69	74	79	80	75	50	45	32	33	27	20	19	18	19	20	21	22	25	35	46	54	58	63	43.6	80																		
17-May	68	73	74	77	78	75	56	47	38	33	30	28	27	26	24	22	22	22	27	41	53	62	66	75	47.7	78																		
18-May	81	84	86	89	89	87	77	61	46	42	39	35	29	28	25	25	23	26	25	47	59	75	81	83	55.9	89																		
19-May	83	84	87	87	88	93	86	79	80	80	82	88	87	83	78	79	78	76	75	77	80	82	84	85	82.6	93																		
20-May	86	87	87	85	84	82	79	75	68	62	56	52	49	48	50	48	46	50	56	60	66	68	69	72	65.9	87																		
21-May	75	78	82	83	92	92	93	92	90	87	81	77	74	74	76	80	86	88	94	94	96	97	97	97	86.4	97																		
22-May	97	97	97	97	96	95	93	88	85	85	84	83	76	66	58	51	47	45	42	42	46	59	62	60	73.0	97																		
23-May	63	77	86	91	92	82	69	59	50	42	37	34	31	28	26	25	24	24	25	27	40	55	60	68	50.7	92																		
24-May	73	77	82	86	88	83	63	49	42	33	28	26	21	20	21	23	28	34	32	39	46	51	59	71	49.1	88																		
25-May	79	86	89	92	94	89	78	71	65	60	55	52	52	49	45	41	41	43	46	47	48	50	52	56	61.6	94																		
26-May	58	60	70	90	93	92	90	87	87	80	77	80	84	92	96	93	92	90	88	90	91	93	95	94	85.9	96																		
27-May	94	95	95	97	97	96	94	85	74	82	86	84	67	54	61	87	87	88	94	95	96	97	96	98	87.4	98																		
28-May	98	98	97	95	97	95	86	82	78	74	68	65	66	64	74	60	52	53	64	67	71	82	87	83	77.2	98																		
29-May	79	81	89	92	94	94	92	88	88	89	90	91	89	89	86	74	77	78	69	74	89	93	94	94	86.3	94																		
30-May	93	92	91	91	91	88	86	84	83	83	86	90	84	82	91	78	76	73	70	74	77	86	89	93	84.6	93																		
31-May	96	96	97	97	98	98	89	75	66	61	55	49	47	45	44	37	31	31	30	35	59	72	79	83	65.4	98																		
																			76.2	79.1	81.6	84.4	85.6	83.1	72.8	63.9	57.1	53.2	49.0	45.6	42.8	40.4	40.0	39.0	38.7	39.4	41.0	46.5	54.9	63.1	68.2	73.0	Diurnal Average	
																			98	98	97	97	98	98	94	92	90	91	90	91	89	92	96	93	92	90	94	95	96	97	97	98	Diurnal Maximum	





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Fort McKay South - May 2016

Maximum Speed: 19 km/h on May 19 15:00	Maximum Daily Speed Average: 15.9 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 31 05:00	Minimum Daily Speed Average: 0.8 km/h on May 27	Hours of Data: 744
Maximum Diurnal Speed Average: 3.8 km/h at hour 17	Minimum Diurnal Speed Average: 1.5 km/h at hour 12	Hours of Missing Data: 0
Monthly Average Velocity: 2.2 km/h 344.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 10 P ₉₀ = 12 P ₉₉ = 18	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SW3	SW3	SSW3	SW3	SW3	S2	S3	SE4	SSE7	S8	S8	SW10	SW12	SW9WSW10	W8	W8	NW10	NW8	NW4	WNW3	SW4	WSW3	SW2	SW4.0	SW12	
2-May	SW1	WSW1	SSW2	SW1	SW2	SSW1	SE2	E2	ESE2	NE5	ESE4	ESE5	E7	ESE7	ESE7	ESE6	ESE7	SE6	SE4	SSE3	SSW2	SW2	SSW2	SW2	SE2.4	E7
3-May	NW2	W2	WSW2	WSW2	WSW2	S1	SSE3	S8	S8	SE7	SE6	SSE7	ESE7	S9	S13	SSW12	SSW12	SSW10	S8	SSW5	SSW6	S5	SW3	SW4	S5.2	S13
4-May	SW3	S2	S2	S2	SW2	SSW2	SSE3	SE3	ESE5	ESE4	SW4	SW9	WSW8	SW7	W12WNW12	WNW14	W12	W12	W7	WSW9	W8	W4	NW7	WSW4.6	WNW14	
5-May	WNW7	WNW8	NW6	W3	W5	WSW7	W7	WNW6	WNW6	NW8	WNW8	W11WNW12	NW12WNW12	NW11	NW11	NW12	NW10	NW7	NNE6	N2	WSW2	WSW3	WNW7.0	NW12		
6-May	WSW3	SW4	W5	WSW1	WNW3	WNW1	N2	NW4	NW3	WNW8	NW8	W6	W8	W8	WSW6	WSW8	WSW9	WSW8	WSW6	SW3	SW3	S3	SSW4	S4	W4.1	WSW9
7-May	S5	S3	SW2	SW3	SSW1	SSW2	SSW4	S4	S4	SSE4	S6	S5	ESE6	SE6	SE7	SW5	WSW6	S6	SSE6	SE2	NE2	NNE2	WNW2	NNW2	S2.7	SE7
8-May	NW2	NNW4	NNW4	WNW3	WNW4	W4	W6	W9	W7	SSW2	SSW7	SW9WSW13	WSW14	SW15	SW14	WSW16	SW14	SW13	W8	NW8	NW12	NW8	WNW7	WSW6.8	WSW16	
9-May	WNW7	W5	W5	W6	WSW4	W6	WSW6	W9WNW10	WNW8	NW9	WNW9	NW9	WNW8	NW9	WNW8	WNW6	NW7	WNW5	W5	NW4	N7	N4	WSW1	WNW5.9	WNW10	
10-May	SW3	WSW6	WSW6	W7	NNW2	NW3	N3	N5	NE6	NE7	NE7	NE8	NE10	NE10	NE11	NNE11	NE11	NNE11	NNE11	NE11	NE7	NNE4	NW2	W2	NNE4.9	NE11
11-May	SW2	WNW2	NW3	NW3	NW3	NNW3	N6	N10	NNE11	NNE12	NNE12	NNE13	NNE13	NNE14	NE15	NNE13	NNE13	NNE12	N13	NNE12	NNE8	N3	WNW3	NW4	NNE7.8	NE15
12-May	NNW3	NNW4	NW2	NW3	NW3	NNW4	NNW5	N7	N8	NNE11	NNE12	NNE11	NNE12	NNE12	NNE11	NNE11	NNE10	NNE10	NNE9	NNE7	N3	WSW4	SSW2	S1	NNE5.8	NNE12
13-May	SW1	WSW1	SSW1	S2	SSW1	S3	SSE3	SW3	WNW5	WSW4	NW2	W2	WNW4	N3	NW5	WNW6	NNW5	NE5	NNE3	W2	WSW2	WSW2	NW3	WSW2	WNW1.5	WNW6
14-May	SW3	SW2	WSW2	SW2	WSW3	S2	SE2	E3	E4	SSE5	ENE5	ENE7	NE7	NE8	NE7	NE8	NNE8	NNE7	NE6	N2	WSW3	SW3	SSW1	NE2.3	NE8	
15-May	WSW2	SW2	SW1	WSW2	SW2	SSW2	SSE3	SE3	ESE5	ESE6	SE4	ESE6	ENE7	ESE6	SE8	S5	S7	SSE8	SSE7	S5	SSW4	S4	SSW2	SSW2	SSE3.3	SSE8
16-May	SW3	SW2	NW1	WSW2	SSW2	S3	S5	SE5	S8	SE6	SSE6	SSW13	SSW13	SSE11	SE10	SE8	SE7	SE5	SE4	SE3	WSW2	WSW2	W2	WNW2	S4.0	SSW13
17-May	SW3	SW4	SSW3	SSW4	SSW3	S3	SSW2	SW5	W9	W6	NW4	WSW2	WSW5	WSW7	W9	W8	W7	W4	NNW1	WSW2	W2	WSW3	SW3	S3	WSW3.6	W9
18-May	SSW2	S1	NW1	W1	NW1	W1	WSW1	S2	WSW7	SW8	SW10WSW10	WSW13	WSW11	WSW10	WSW10	W10	W5	W3	N10	N12	N15	N14	N14	WNW3.6	N15	
19-May	N16	N14	N14	N17	N13	N12	NNE14	NNE16	NNE18	N17	N18	N18	N16	NNE18	NNE19	NNE18	NNE18	NNE18	NNE19	NNE17	N14	N13	N13	N12	N15.9	NNE19
20-May	N12	NNE11	NNE10	NNE12	NNE13	NNE13	N11	NNE13	NE13	NNE12	NNE13	NNE13	NNE13	NNE14	NNE12	N12	N14	N10	N12	N9	N8	N5	NNW5	NNW5	NNE10.7	N14
21-May	NW3	NNE2	NNE2	NNE4	N4	N9	N7	N7	N9	N10	NNE10	N11	NNE11	NNE11	N12	N12	N12	N10	N9	N10	N9	N9	N9	N11	N8.3	N12
22-May	N10	N10	N9	N10	N12	N11	N11	NNE11	N15	NNE15	NNE14	N14	N16	NNE15	NNE17	NNE16	NNE15	NNE16	NNE17	NNE13	N10	N6	N8	N11	NNE12.4	NNE17
23-May	N8	N3	WNW1	NW3	NNW3	N5	NNE7	NNE11	NNE11	N12	NE10	NE10	N11	NNE11	NNE11	NNE11	NNE9	N8	NNE8	E4	ESE1	SSW3	SW2	SW3	NNE5.9	N12
24-May	SW3	SW3	SW3	SW2	WSW2	SSW2	SSE5	S6	SSW7	S7	SSE8	S9	SSE12	SSE11	SSE8	WSW3	W2	SE1	SE5	SSE6	SSW9	SSW7	S6	S3	S4.8	SSE12
25-May	SSW2	SSW2	WSW2	SW3	SW2	SSW1	NE2	NE3	NNE5	NNE6	N8	N12	N12	NNE12	NNE11	NNE12	N13	N14	NNE11	NNE9	NNE10	N10	N11	N11	NNE6.7	N14
26-May	N9	N11	N10	N8	NNW6	N8	NNE10	NNE11	N9	N10	N11	NNW8	N12	NNW6	NNW9	N11	N10	N8	N10	N9	N8	N6	NNW6	N8	N8.8	N12
27-May	N6	N5	N5	N5	NNW5	N6	N6	N6	ESE3	SSE5	ESE1	N4	NE4	E5	NW6	WSW6	WSW2	S9	SSE7	ESE3	S4	SSW3	S3	N2	N0.8	S9
28-May	NW2	N4	ENE3	E3	SW1	E4	E3	SE8	SE9	SSE9	SSE10	SSE10	SSE9	S11	SSW9	SSW9	S9	S7	SSW8	SW5	S5	SW3	SSW3	WSW4	S4.5	S11
29-May	WSW4	SW4	WSW6	SSW3	S3	SSW2	W2	SSW1	S4	SW4	WSW3	SSW4	S3	ESE2	NNE3	WNW3	NNE3	NNE5	NNE8	NNW4	NNW2	WNW3	NW3	NW3	W1.1	NNE8
30-May	NNW3	NW3	WNW3	N2	NW2	NNW3	WNW4	NW3	NW5	N7	N8	NNW6	NNW4	NNW6	NW6	N10	N9	NNW9	NNW8	N7	N6	NNW4	NNW4	WNW2	NNW4.9	N10
31-May	W2	WSW2	WSW1	SSW1	SW0	SSW1	N0	ENE3	N5	ESE3	SE1	SSE6	SSE6	ENE5	NE4	S1	SSW1	SSE5	S10	S9	WSW3	SW2	SW3	W2	SSE1.5	S10

NW2.1	NW2.1	NW1.9	NW1.7	NW1.9	NNW1.6	N1.5	NNE2.0	N2.0	NNE2.2	NNE2.4	N1.5	N2.5	N2.1	NNW3.0	NNW3.6	NNW3.8	NNW2.9	N2.8	N2.8	NNW2.5	NNW2.3	NW2.2	NW2.4	Diurnal Average
N16	N14	N14	N17	N13	NNE13	NNE14	NNE16	NNE18	N17	N18	N18	N16	NNE18	NNE19	NNE18	NNE18	NNE18	NNE19	NNE17	N14	N15	N14	N14	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

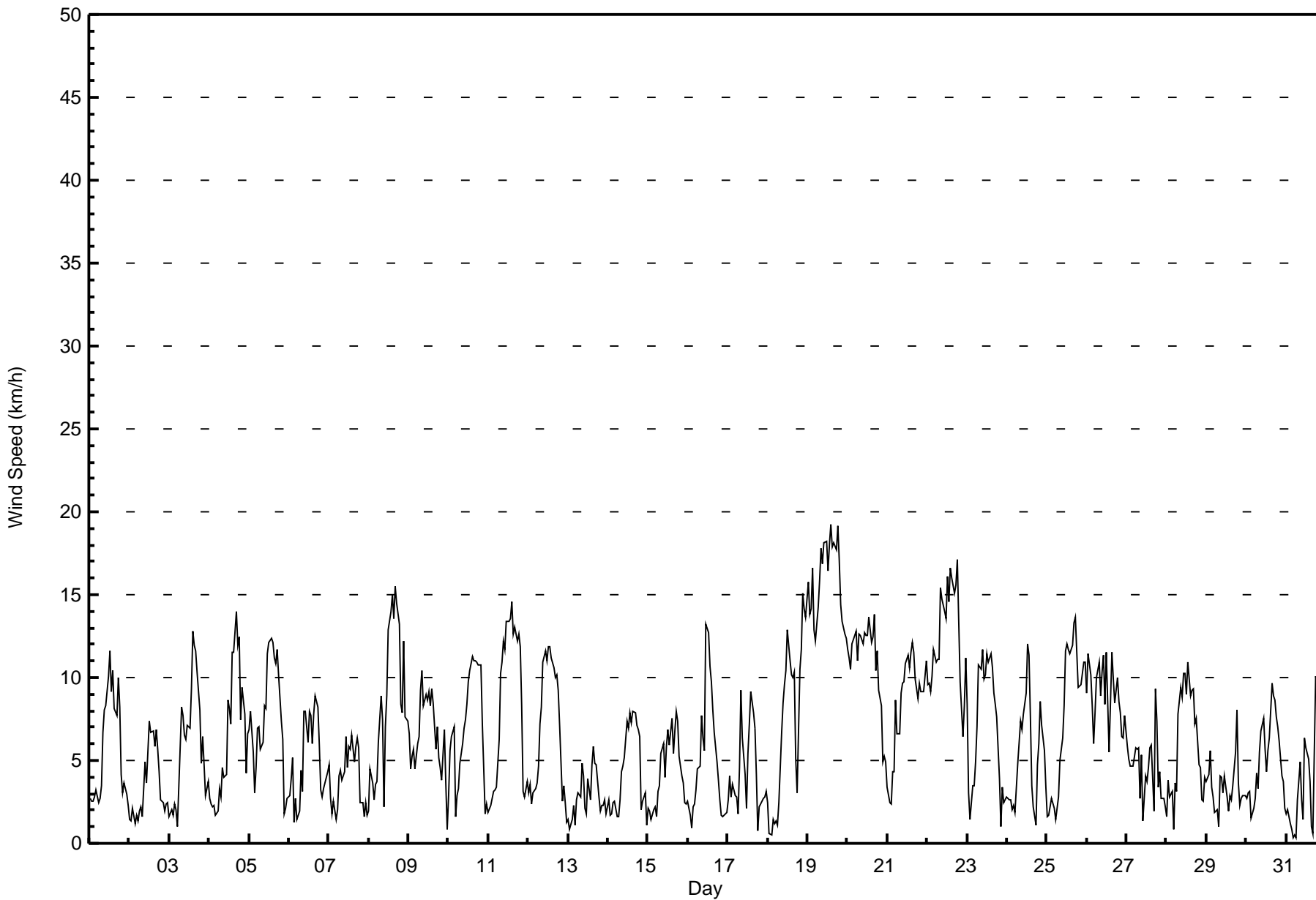
Wind Speed (WS) - km/h
Fort McKay South - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on May 19 17:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 0 km/h on May 12 22:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 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-May	1	1	1	1	1	1	1	2	2	3	3	4	5	5	5	4	4	4	4	2	1	1	1	1	5
2-May	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3	3	2	2	1	1	1	1	1	1	3
3-May	1	1	1	1	1	1	1	3	3	2	2	3	3	4	5	5	4	4	3	1	5	2	3	3	5
4-May	1	1	1	1	1	1	1	1	2	1	2	4	3	4	5	5	6	5	3	4	3	2	3	3	6
5-May	3	4	2	1	1	2	3	3	3	4	4	5	5	5	5	5	5	6	4	3	3	1	1	1	5
6-May	1	3	3	1	2	2	1	2	2	4	4	4	5	4	5	4	4	3	3	1	1	1	1	1	5
7-May	2	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	2	2	2	1	2	2	3
8-May	1	1	2	1	2	2	3	4	3	2	3	4	5	5	6	5	6	5	5	4	4	5	3	4	6
9-May	3	2	2	2	2	2	2	4	4	3	4	4	4	4	4	3	3	3	2	2	2	3	2	1	4
10-May	1	1	2	2	2	1	2	2	2	3	3	3	4	4	4	4	4	4	4	4	3	2	1	1	4
11-May	1	1	1	1	1	1	2	4	4	4	4	5	5	4	5	4	4	4	4	4	3	1	1	1	5
12-May	1	1	1	1	1	1	2	2	3	4	4	5	5	5	5	4	4	4	3	2	2	0	1	1	5
13-May	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	2	2	1	1	1	1	1	3
14-May	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	2	1	1	1	1	1	3
15-May	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	2	1	1	1	1	3
16-May	1	1	1	1	1	2	2	2	3	2	4	5	5	4	3	3	3	2	2	1	1	1	1	1	5
17-May	1	1	1	1	1	1	2	3	4	3	3	2	2	3	4	4	3	2	1	1	1	1	1	1	4
18-May	1	1	1	1	1	1	1	1	3	3	3	4	5	5	4	4	4	3	2	4	5	5	5	4	5
19-May	5	4	5	5	5	4	5	5	6	6	6	6	6	6	6	6	7	6	6	6	5	4	4	4	7
20-May	4	4	3	4	4	4	4	4	4	4	4	5	4	5	4	4	4	4	4	3	3	2	2	2	5
21-May	1	1	2	2	3	3	2	2	3	3	4	3	3	3	4	4	4	3	3	3	3	3	3	3	4
22-May	3	3	3	3	4	3	4	4	5	5	5	4	6	5	6	5	5	5	6	4	3	2	3	3	6
23-May	3	2	1	2	1	1	2	3	3	3	3	4	4	4	4	4	3	3	2	1	1	1	1	1	4
24-May	1	0	0	1	1	1	1	2	2	3	4	4	5	4	3	2	2	2	2	3	3	2	2	1	5
25-May	1	1	1	0	1	1	1	2	2	3	3	4	4	4	4	4	4	4	4	3	3	3	3	4	4
26-May	3	3	3	3	2	2	3	4	3	4	4	3	4	3	3	4	3	3	3	3	2	2	2	2	4
27-May	2	2	1	1	2	2	2	2	3	3	1	2	2	3	2	4	2	5	2	2	2	2	2	1	5
28-May	1	1	1	1	1	2	1	3	2	3	3	3	2	3	6	4	3	3	3	1	1	1	1	2	6
29-May	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	2	3	2	1	1	1	1	3
30-May	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	1	1	1	3
31-May	1	1	1	1	1	1	1	1	3	2	3	3	2	2	2	2	2	2	2	3	1	1	1	1	3
Diurnal Maximum																									
5 4 5 5 5 4 5 5 6 6 6 6 6 6 6 6 7 6 6 6 5 5 5 4																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	352	47.31	47.31
6 - 11	286	38.44	85.75
12 - 19	106	14.25	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: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	21	10	7	4	8	12	15	10	35	41	53	42	21	20	30	23	352
6 - 11	66	38	18	2	1	9	12	18	19	10	7	21	23	15	18	9	286
12 - 19	35	44	2	0	0	0	0	1	1	4	5	4	3	4	3	0	106
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	122	92	27	6	9	21	27	29	55	55	65	67	47	39	51	32	744

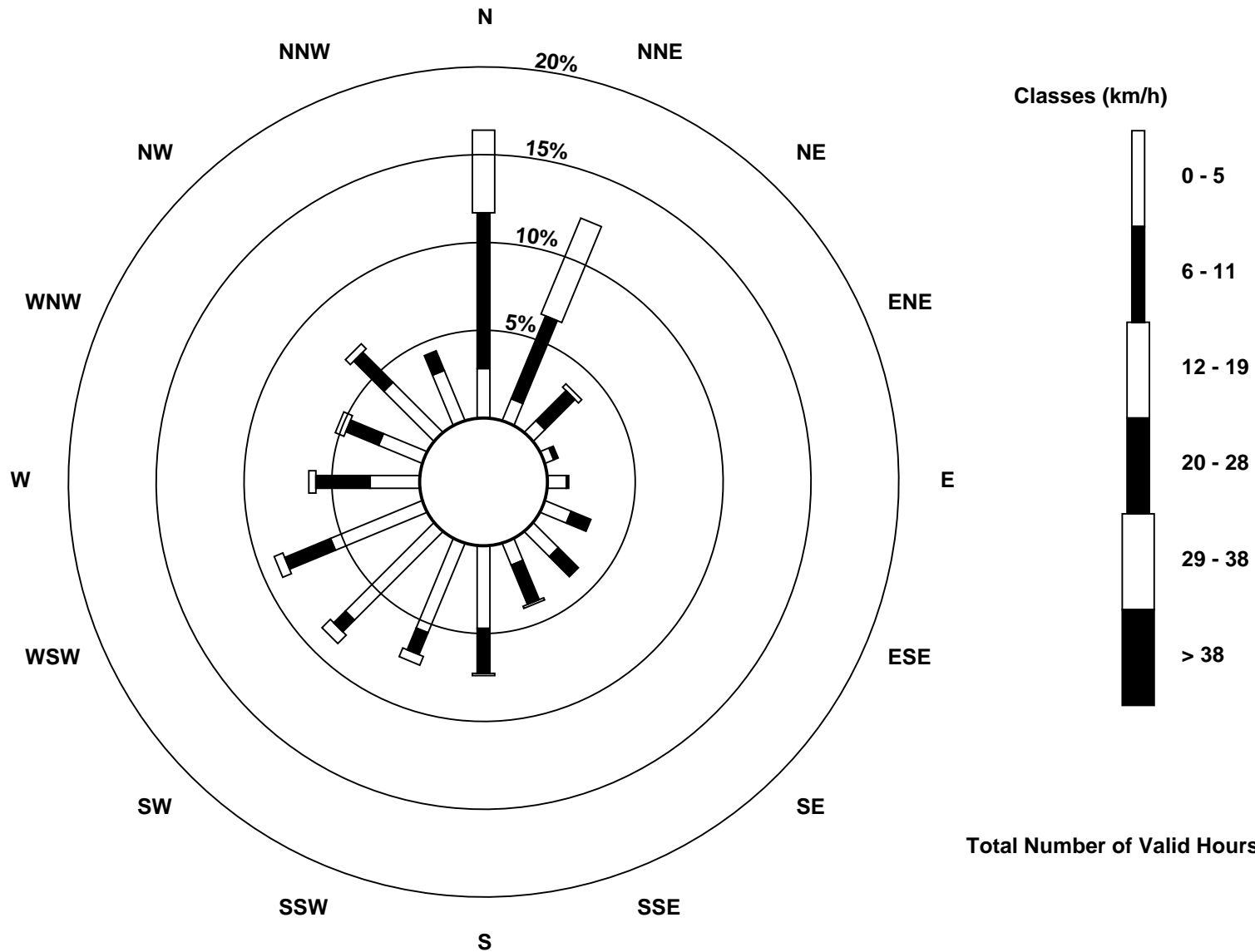
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

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 - May 2016

Direction of Maximum Speed: 16 deg on May 19 15:00 Direction of Maximum Daily Speed Average: 10.7 deg on May 19	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 219 deg on May 31 05:00 Direction of Minimum Daily Speed Average: 0.8 deg on May 27	Percent Operational Time: 100.0
Monthly Average Direction: 267.2 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-May	218	236	204	229	223	183	181	140	165	173	174	234	229	225	255	266	265	319	307	319	282	236	240	229	235.9
2-May	230	245	205	228	234	203	139	86	106	41	110	123	97	108	105	123	105	125	146	161	213	217	204	224	128.3
3-May	315	267	257	247	257	175	149	170	179	145	145	160	121	179	189	202	207	202	189	196	202	186	217	214	186.7
4-May	235	191	181	176	220	210	167	127	103	103	235	227	242	222	278	292	299	268	266	259	255	269	273	304	257.2
5-May	290	300	309	279	265	254	264	289	290	308	299	268	302	309	289	316	304	310	321	326	17	350	258	255	298.7
6-May	244	234	260	239	285	283	4	307	310	297	305	273	267	260	237	258	256	243	252	220	227	183	196	183	258.8
7-May	186	187	215	220	202	192	192	175	176	165	184	185	103	126	127	220	237	174	154	144	37	21	299	338	173.8
8-May	321	345	334	299	282	271	264	271	268	193	198	234	253	239	234	227	240	226	233	273	319	323	311	294	258.0
9-May	288	259	263	259	253	259	241	276	284	293	306	303	314	303	305	303	288	305	292	280	314	6	356	245	292.0
10-May	233	253	256	260	327	325	357	3	35	52	39	46	40	40	34	32	35	26	28	34	36	24	326	262	23.0
11-May	231	302	317	326	319	327	3	9	20	30	22	19	30	25	35	27	15	19	6	20	24	5	300	325	14.8
12-May	327	336	321	310	322	333	344	5	9	29	32	31	21	31	32	31	18	17	21	19	354	242	206	189	14.8
13-May	234	247	210	179	202	188	162	230	283	250	323	281	300	2	313	294	348	44	33	269	258	258	307	241	285.0
14-May	233	218	239	236	240	188	134	101	98	163	62	66	45	39	39	39	30	33	52	37	359	248	234	207	51.3
15-May	242	230	216	241	224	199	157	137	118	123	135	109	71	116	128	172	173	162	166	175	196	191	203	212	154.9
16-May	221	236	307	241	202	190	174	142	184	130	157	202	206	164	138	134	138	144	136	146	239	253	266	297	172.4
17-May	217	215	197	206	210	184	203	229	268	272	311	239	239	254	270	276	269	259	337	249	269	246	225	182	249.4
18-May	199	190	314	262	310	259	244	171	237	226	228	241	242	248	256	257	262	281	268	9	10	6	9	6	285.2
19-May	8	4	7	7	2	1	13	15	14	9	7	9	10	12	16	14	16	16	14	17	10	10	8	8	10.7
20-May	8	12	13	18	16	15	11	19	35	26	22	27	26	23	18	10	7	355	0	2	5	350	333	327	13.1
21-May	312	12	19	23	2	9	7	3	9	10	16	8	15	13	9	8	5	6	4	1	359	360	359	3	6.5
22-May	8	5	4	1	359	6	6	16	11	14	21	10	7	19	15	17	21	24	18	17	10	354	355	359	11.4
23-May	5	349	297	326	336	3	13	13	16	7	34	47	6	17	13	16	15	11	20	79	122	211	221	220	13.5
24-May	228	215	219	221	249	198	167	171	204	174	162	170	157	147	156	239	259	126	134	166	194	199	189	188	178.4
25-May	211	199	240	227	226	213	34	47	33	19	5	7	9	13	15	22	6	9	20	27	16	8	11	10	12.1
26-May	3	2	0	357	346	8	15	20	6	358	356	338	1	348	335	352	358	354	357	355	4	356	344	356	357.9
27-May	353	350	354	351	346	353	351	3	121	159	107	2	49	92	318	249	240	183	151	117	169	207	176	3	9.4
28-May	304	2	77	82	215	101	92	132	143	161	159	155	161	184	207	213	191	185	209	217	190	225	203	247	174.6
29-May	256	219	245	210	184	205	260	209	179	234	252	208	185	122	13	295	16	16	30	343	337	300	310	315	270.8
30-May	337	318	299	350	317	333	299	318	323	352	2	348	344	327	326	350	349	345	346	354	356	339	331	290	339.3
31-May	264	251	238	194	219	193	360	67	11	102	124	155	155	66	43	183	203	149	180	174	238	217	225	260	165.4

316.2 318.2 314.9 317.3 315.8 334.4 354.7 11.9 5.0 20.0 15.8 353.3 358.4 11.2 346.8 335.0 337.0 348.5 357.8 3.2 347.0 328.1 320.8 325.3
 Diurnal Average

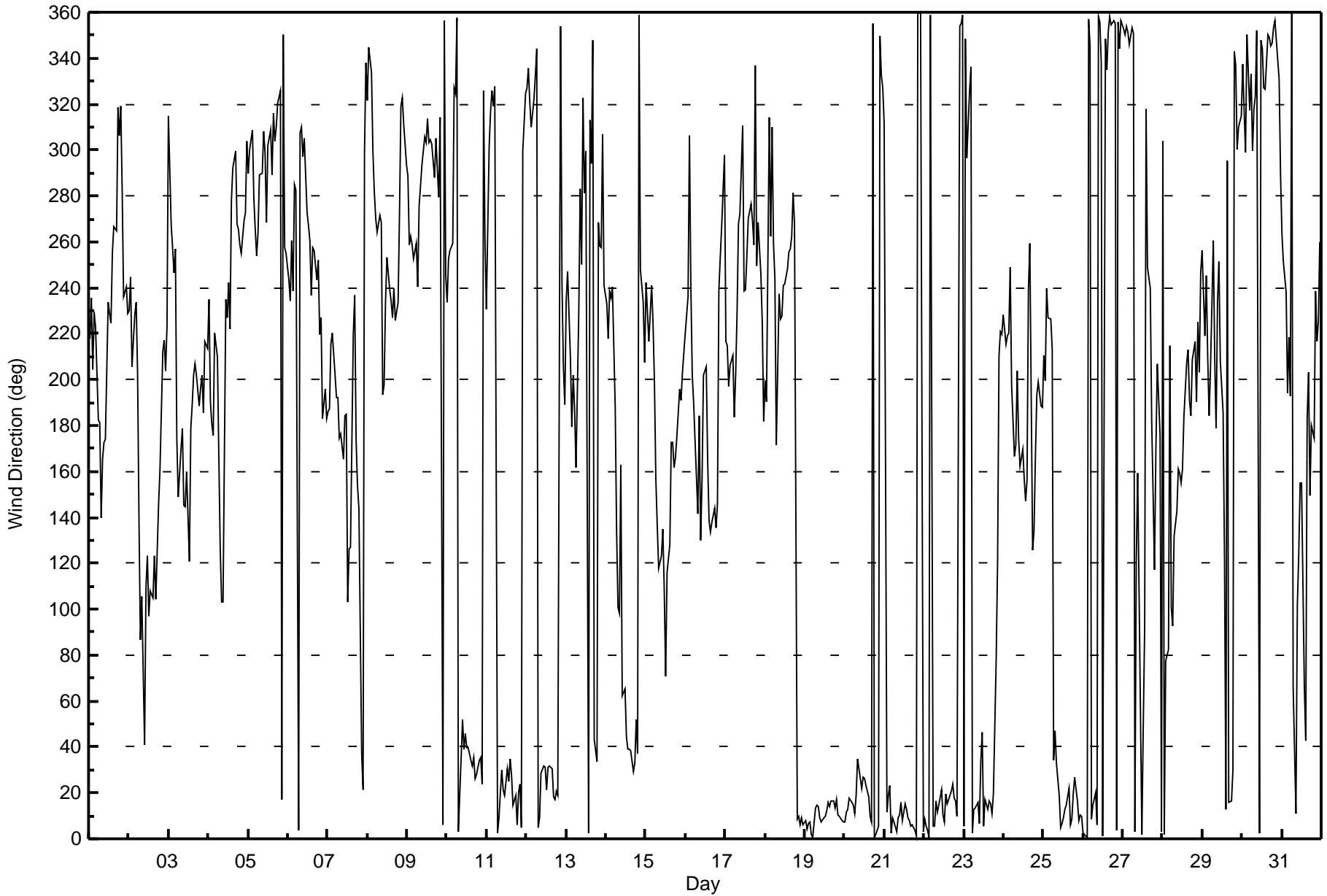
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay South - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 109 deg on May 31 17:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 7 deg on May 12 22:00																									
Percentiles: P ₁ = 12 P ₁₀ = 21 Q ₁ = 26 Median = 32 Q ₃ = 44 P ₉₀ = 60 P ₉₉ = 95																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	29	20	27	31	24	19	23	37	30	33	39	41	38	48	43	49	50	40	36	25	30	28	11	33	50
2-May	67	42	37	68	60	64	47	60	81	39	67	51	40	51	54	56	37	35	26	23	15	50	33	35	81
3-May	32	26	17	28	43	59	32	25	30	36	43	41	45	41	31	34	26	27	19	12	42	27	82	69	82
4-May	51	48	60	46	67	41	35	40	39	41	65	39	49	57	45	40	37	36	32	27	24	30	33	36	67
5-May	32	41	34	29	17	19	30	50	43	46	52	43	45	45	46	43	47	38	40	36	24	54	56	24	56
6-May	29	48	57	92	60	106	87	47	79	51	55	65	54	57	77	56	40	32	37	19	19	17	15	15	106
7-May	23	21	32	23	32	24	16	18	17	31	31	42	35	37	44	76	40	31	32	65	51	64	42	72	76
8-May	53	25	49	45	55	56	32	36	43	66	30	35	33	31	32	29	29	28	25	46	29	34	39	36	66
9-May	33	29	25	19	28	26	19	34	38	36	39	40	36	44	40	39	48	39	42	34	46	27	40	66	66
10-May	25	15	16	20	82	38	47	52	48	43	50	47	45	37	38	32	38	33	32	28	31	23	61	21	82
11-May	25	33	15	13	16	20	28	33	34	33	37	33	37	33	33	34	33	33	26	27	26	32	18	18	37
12-May	20	16	20	14	18	14	23	27	39	34	39	41	36	41	39	37	32	31	30	28	53	7	23	48	53
13-May	54	62	50	27	56	25	24	81	65	76	89	97	87	99	74	59	67	42	50	32	24	31	18	38	99
14-May	18	19	26	8	9	25	32	49	46	51	64	47	59	51	49	46	38	43	42	28	55	12	10	48	64
15-May	44	28	34	44	52	31	21	37	26	30	61	54	46	63	43	60	52	31	27	18	12	17	24	28	63
16-May	37	29	57	36	30	19	29	30	31	31	54	33	31	38	33	36	37	34	32	24	30	43	60	52	60
17-May	43	23	26	28	40	26	92	65	35	45	73	100	63	44	37	45	41	47	71	33	27	54	50	40	100
18-May	29	84	85	37	43	23	45	39	35	32	34	35	32	32	40	34	35	45	63	37	27	26	26	27	85
19-May	27	27	26	26	27	27	27	27	26	26	27	26	26	27	27	26	28	27	26	29	27	25	25	24	29
20-May	26	26	29	25	25	24	29	25	33	33	33	31	34	29	29	28	26	30	26	27	25	31	27	32	34
21-May	28	29	39	26	27	25	24	25	26	29	40	28	27	26	27	25	26	26	25	26	28	26	26	24	40
22-May	24	25	24	23	27	26	25	25	27	27	28	27	28	32	30	30	30	27	26	26	22	24	24	25	32
23-May	24	21	53	28	15	22	26	29	30	29	40	38	32	39	31	37	40	39	32	48	75	24	21	25	75
24-May	16	16	18	38	25	27	21	30	32	43	52	44	34	32	36	67	89	92	29	31	21	20	15	28	92
25-May	45	50	15	16	28	37	50	59	50	47	33	29	33	32	33	31	29	27	28	26	27	25	25	27	59
26-May	23	25	22	29	29	24	25	26	26	29	29	32	25	42	32	24	25	27	23	23	21	20	23	22	42
27-May	21	26	25	18	37	25	27	26	89	50	82	43	65	77	34	54	82	36	20	60	25	46	52	35	89
28-May	45	18	51	43	86	43	37	28	16	20	22	21	22	20	42	35	36	25	24	23	17	25	26	32	86
29-May	27	25	19	44	66	57	59	91	23	31	41	23	45	59	38	63	46	23	29	27	30	22	20	26	91
30-May	22	22	39	62	66	32	31	35	30	25	26	25	47	70	34	31	25	24	23	24	23	18	21	13	70
31-May	39	27	47	68	86	85	92	59	61	80	101	55	44	64	65	101	109	52	21	16	20	24	26	55	109
Diurnal Maximum																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 2, 2016	Last Calibration	April 5, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:45
Gas Cert Reference	LL110515	Station temp.	22 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	08/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		HVPS voltage	548	547
Analyzer IP address	192.168.1.44		Lamp voltage	1558	1534
Calculated slope	0.998661	1.002824	Box temp	31.7	30.8
Calculated intercept	-0.219128	-0.599428	Pressure	26.3	26.3
Analyzer Background	40.9	40.9	Flow	687	689
Analyzer Coefficient	0.985	0.985	Lamp Ratio	53	52

Analyzer make API T100 Analyzer serial # 599

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	78.9	785.8	783.8	1.003
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	78.9	785.8	783.8	1.003
second point	5000	39.4	392.4	392.9	0.999
third point	5000	19.7	196.2	196.0	1.001
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	78.9	785.8	783.3	1.003
Average Correction Factor					1.001

Corrected As found 783.5 Previous response 787.1 % change 0.5%

Notes:

No maintenance or adjustments done, filter changed out,

Calibration Performed By: Melissa Lemay



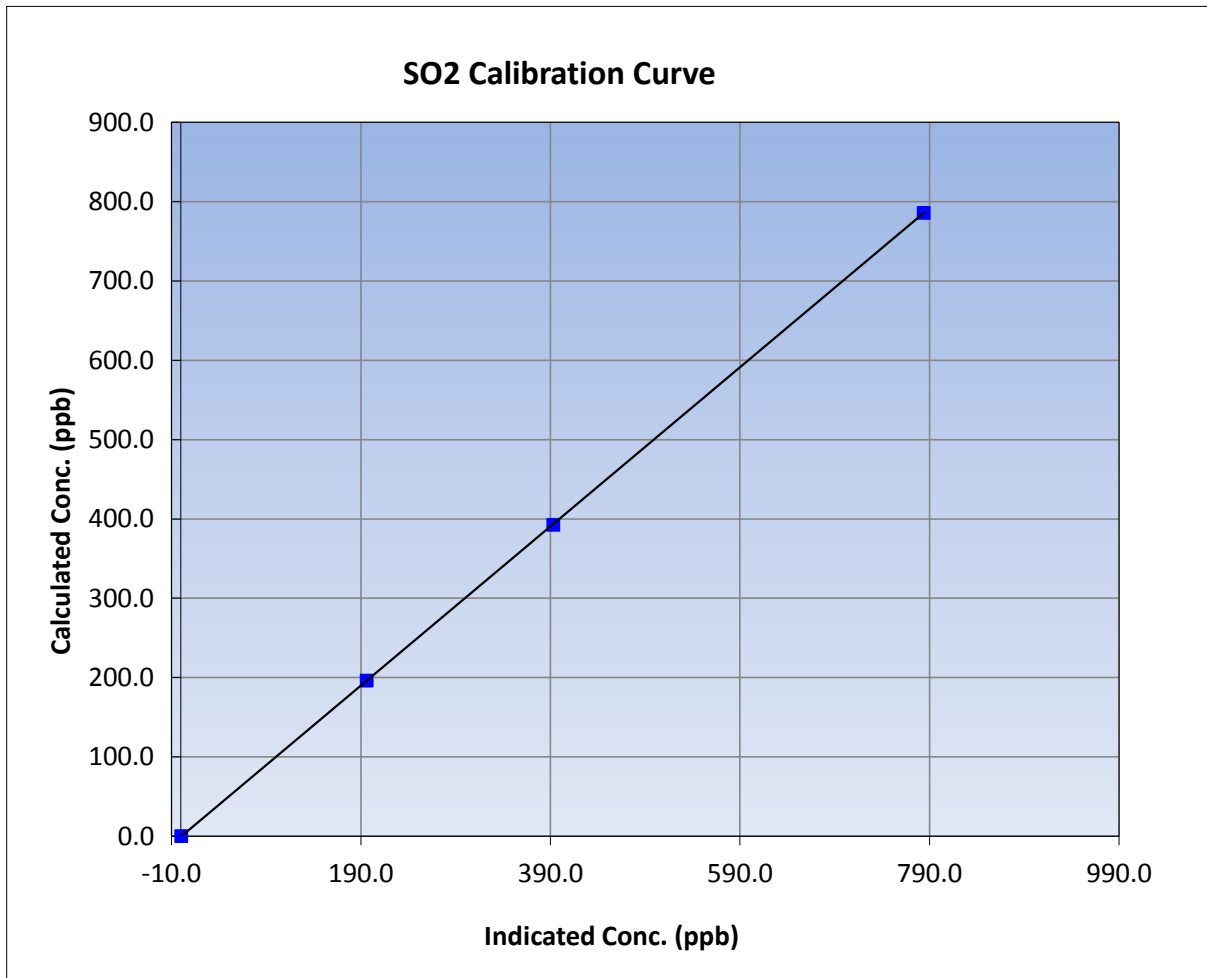
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 5, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	API T100	Analyzer serial #	599

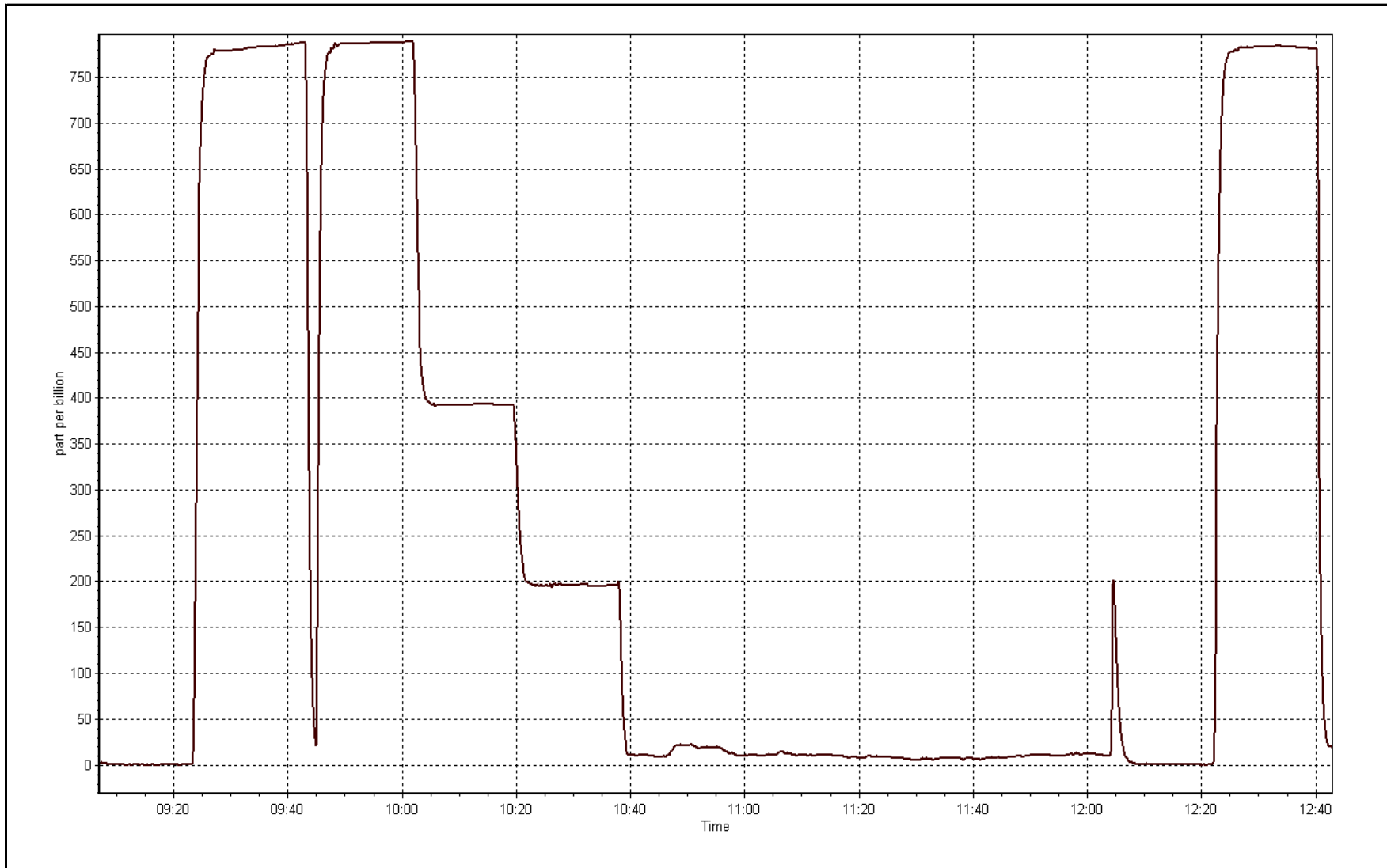
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999996
785.8	783.8	1.0026		
392.4	392.9	0.9988	Slope	1.002824
196.2	196.0	1.0011		
			Intercept	-0.599428



SO2 Calibration Plot

Date: May 2, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 3, 2016	Last Calibration	April 18, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	10:44
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL110515 8/Sep/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-727
Analyzer IP address	192.168.1.44		Lamp voltage	1010	1009
Calculated slope	0.994116	0.993682	Chamber temp	45	45
Calculated intercept	0.139234	0.179289	Pressure	696.5	688.1
Analyzer Background	2.13	2.13	Flow	0.452	0.447
Analyzer Coefficient	1.038	1.038	Intensity	90	88
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	78.9	80.0	80.2	0.998
SO2 scrubber check	5000	17.6	175.3	0.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.9	80.0	80.3	0.996
second point	5000	39.4	40.0	40.2	0.994
third point	5000	19.7	20.0	19.7	1.014
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	78.9	80.0	80.5	0.994
Average Correction Factor					1.001

Corrected As found	80.3	Previous response	80.3	% change	0.0%
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Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



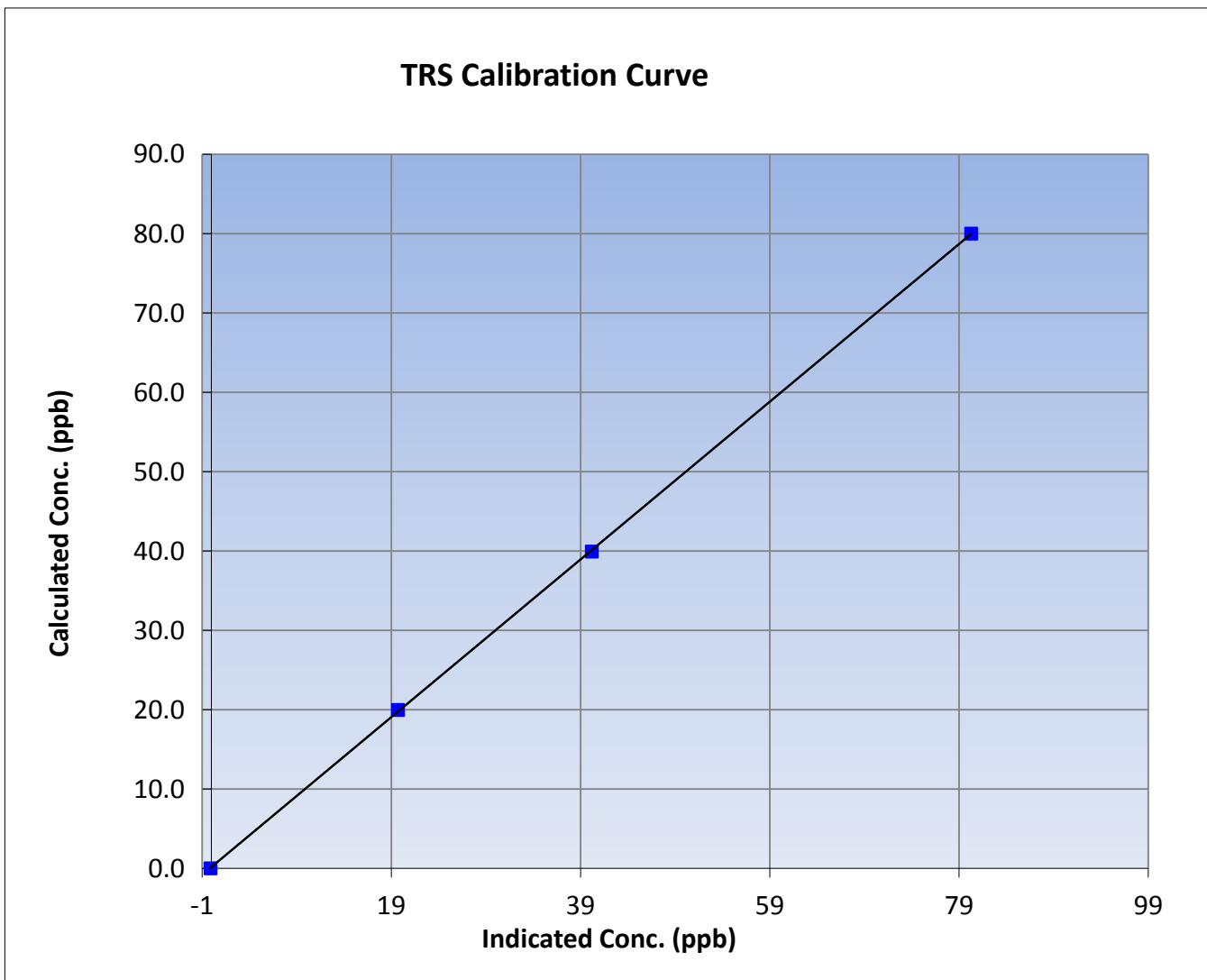
Wood Buffalo Environmental Association TRS Calibration Report

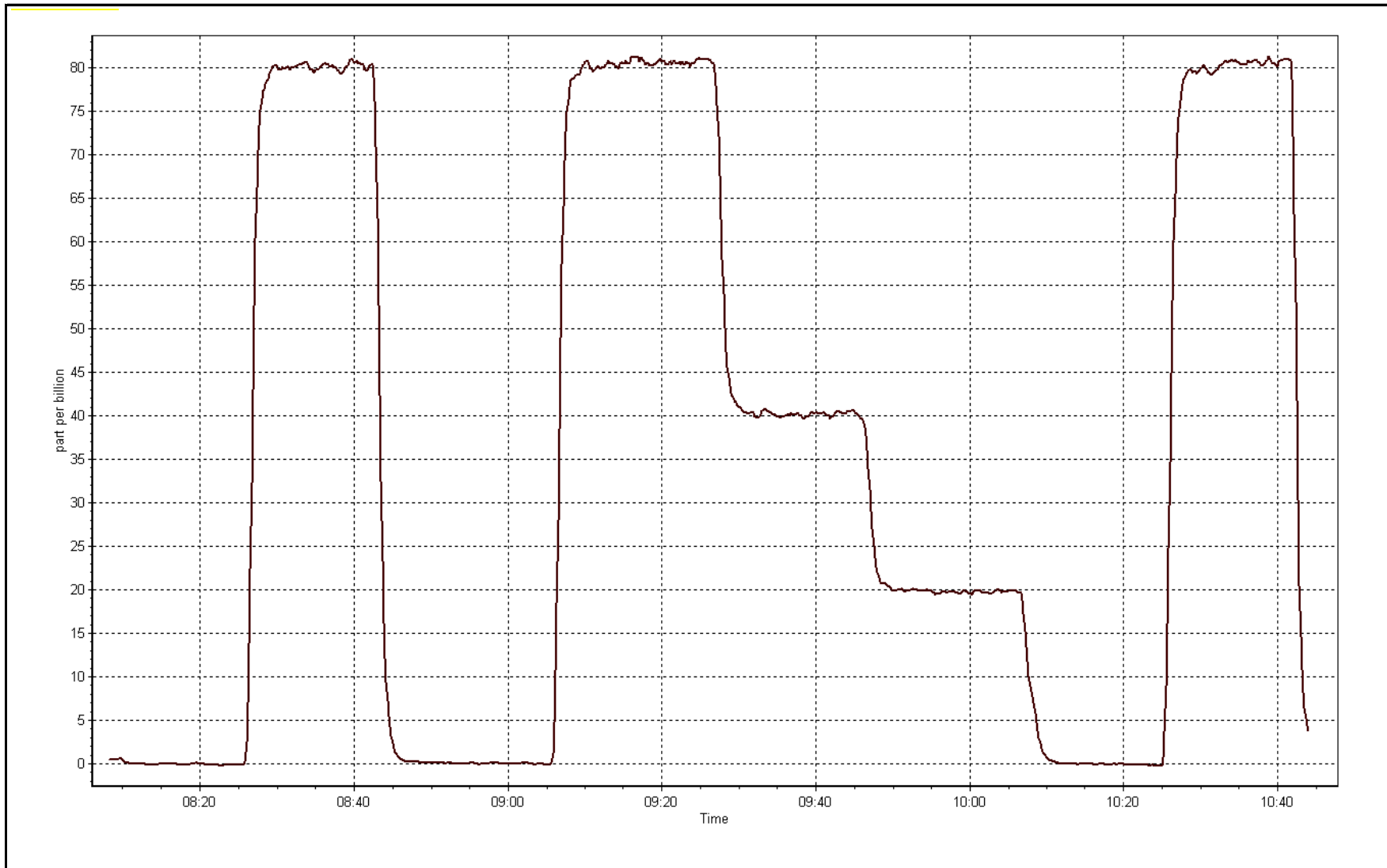
Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 18, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:10	End Time (MST)	10:44
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999975
80.0	80.3	0.9963		
40.0	40.2	0.9938	Slope	0.993682
20.0	19.7	1.0140		
			Intercept	0.179289







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-02-16	Last Calibration	April-06-16
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:45
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	1.004906	0.990173	Fuel Pressure	23.1	23.1
Calculated intercept	0.034021	0.077103	Analyzer Coeff	3.162	3.162
			Analyzer BKG	1.480	1.480

Analyzer make	51i-LT	Analyzer serial #	1505164380
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.05	----
as found span	5000	78.9	16.84	16.95	0.993
calibrator zero	5000	0.0	0.00	-0.05	----
high point	5000	78.9	16.84	16.95	0.993
second point	5000	39.4	8.41	8.37	1.005
third point	5000	19.7	4.20	4.16	1.011
as left zero	5000	0.0	0.00	-0.05	----
as left span	5000	78.9	16.84	17.00	0.990
Average Correction Factor					1.003

Corrected As found	17.00	Previous response	16.72	% change	-1.6%
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Notes:

Filter changed out, no adjustments or maintenance done

Calibration Performed By:

Melissa Lemay



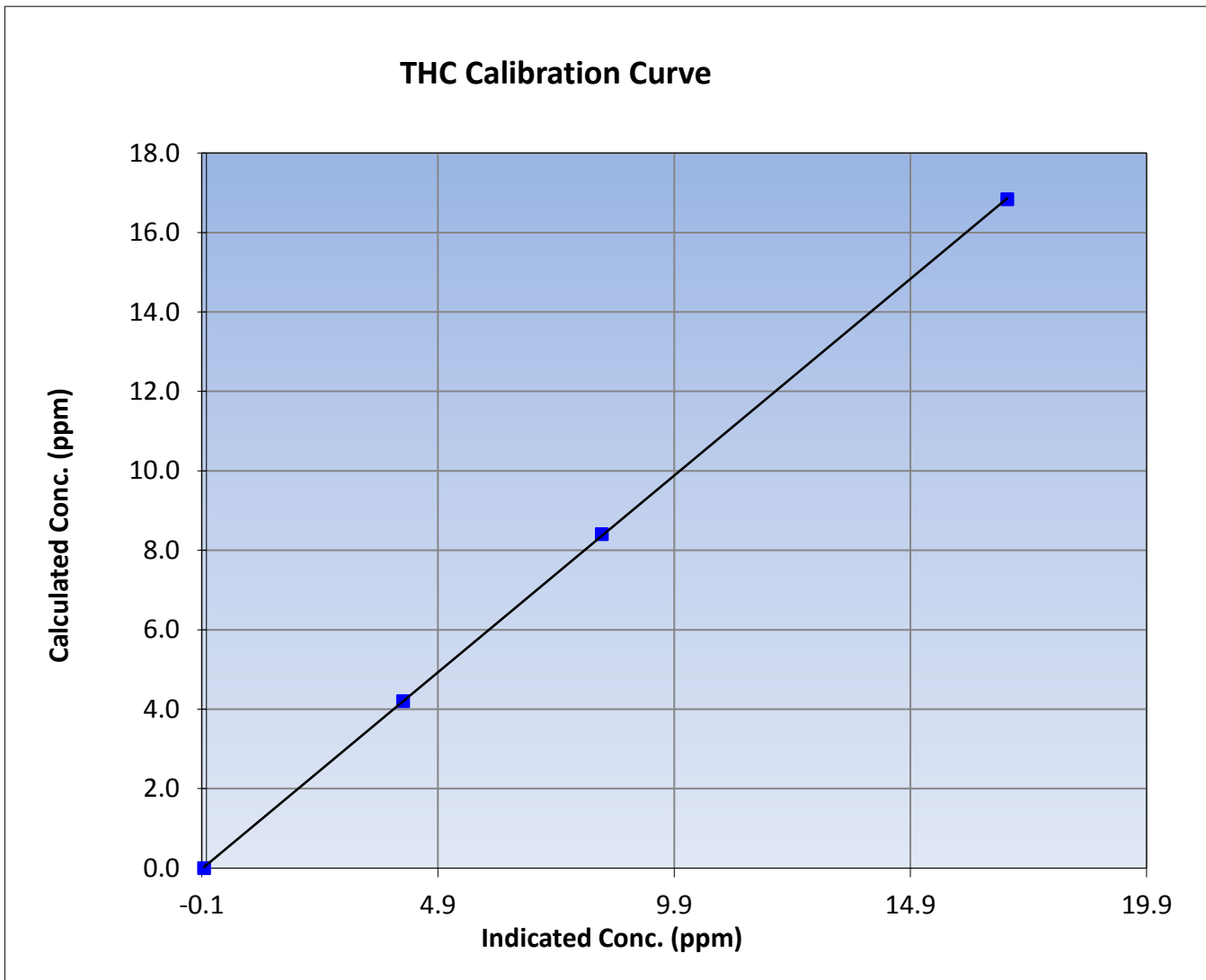
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 6, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	51i-LT	Analyzer serial #	1505164380

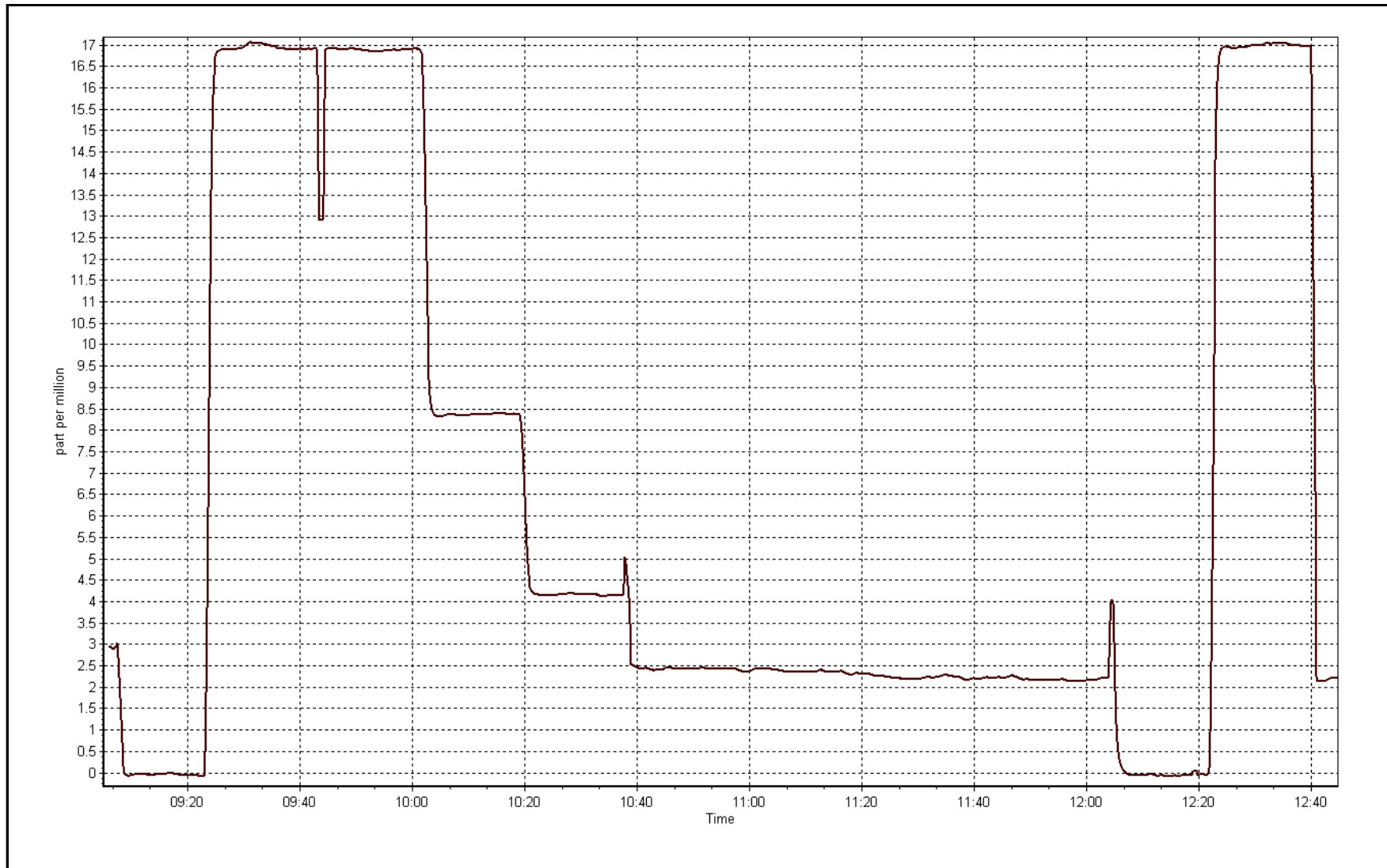
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.05	----	Correlation Coefficient	0.999979
16.84	16.95	0.9933		
8.41	8.37	1.0045	Slope	0.990173
4.20	4.16	1.0106		
			Intercept	0.077103



THC Calibration Plot

Date: May 2, 2016





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-25-16	Last Calibration	May-02-16
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	<input type="checkbox"/> Other: <input type="checkbox"/> Repair		
Start Time (MST)	9:30	End Time (MST)	11:35
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.2	34.2
Calculated slope	0.990173	0.996441	Fuel Pressure	23.1	23.1
Calculated intercept	0.077103	0.082943	Analyzer Coeff	3.162	3.162
			Analyzer BKG	1.480	1.480

Analyzer make	51i-LT	Analyzer serial #	1505164380
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.24	----
as found span	5000	78.9	16.84	8.81	1.911
calibrator zero	5000	0.0	0.00	-0.07	----
high point	5000	78.9	16.84	16.83	1.000
second point	5000	39.4	8.41	8.32	1.011
third point	5000	19.6	4.18	4.12	1.015
as left zero					
as left span					
Average Correction Factor					1.009

Corrected As found	9.05	Previous response	16.93	% change	87.0%
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Notes:

Sample pressure around 8.2psi after as founds changed out filter, sample pressure back up to 9.2psi

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

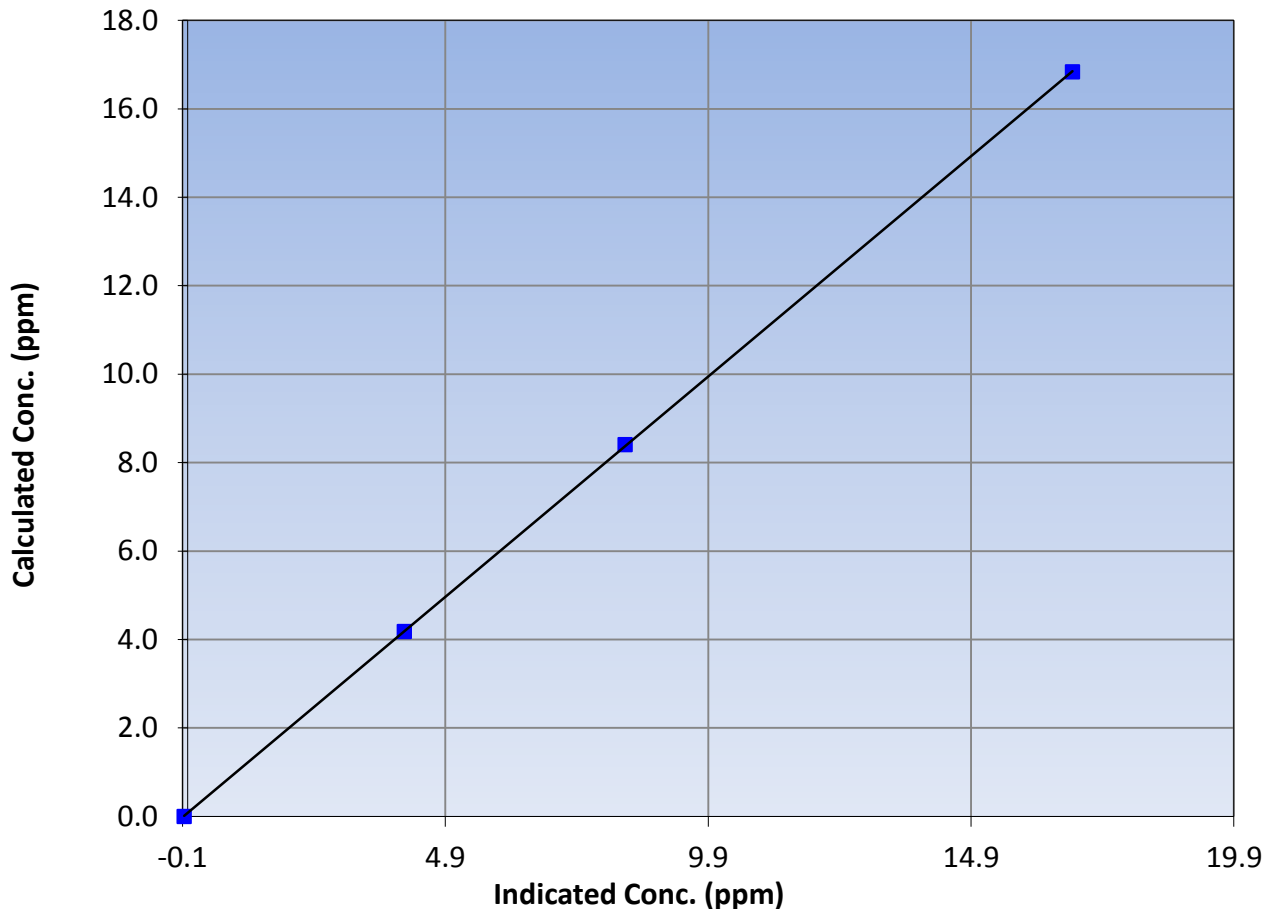
Station Information

Calibration Date	May 25, 2016	Previous Calibration	May 2, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	11:35
Analyzer make	51i-LT	Analyzer serial #	1505164380

Calibration Data

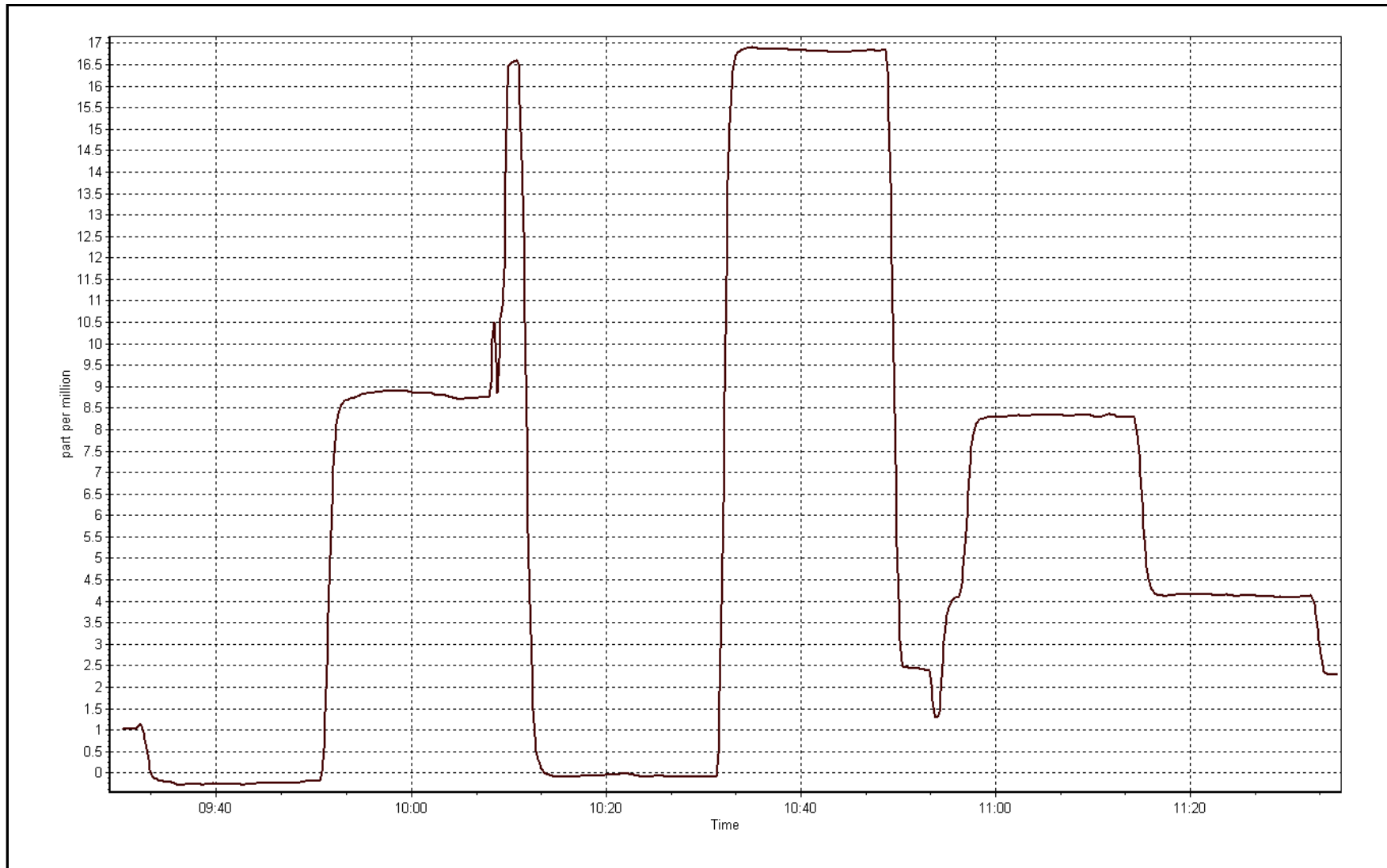
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.07	----	Correlation Coefficient	0.999989
16.84	16.83	1.0004		
8.41	8.32	1.0106		
4.18	4.12	1.0152		
			Slope	0.996441
			Intercept	0.082943

THC Calibration Curve



THC Calibration Plot

Date: May 25, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 15, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:25	End Time (MST)	12:46
NO2 GPT Ref date	May-02-16	Transfer Standard	Nox
		Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	25.2	25.5
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.001472	0.998799	Pressure	26.7	26.4
Calculated intercept	-0.527530	-0.270279	Flow	764.0	756.0
Analyzer Background	0.8	0.8	Intensity	2535.7	4105.8
Analyzer Coefficient	1.029	1.029			

Analyzer make	API T400	Analyzer serial #	825
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.1	----
as found span	5000	0.89	356.6	357.8	0.997
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	0.89	356.6	357.2	0.998
second point	5000	0.47	211.7	212.5	0.996
third point	5000	0.36	111.6	111.8	0.998
as left zero	5000	0.00	0.0	0.7	----
as left span	5000	0.89	356.6	369.9	0.964
Average Correction Factor					0.998

Corrected As found	357.9	Previous response	356.6	% change	-0.4%
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Notes:

O₃ zero was spiking, changed the O₃ scrubber, adsorption tube is clean, Peaked the UV lamp, purged the O₃ scrubber for 40min, zero was adjusted, filter changed out

Calibration Performed By: Melissa Lemay



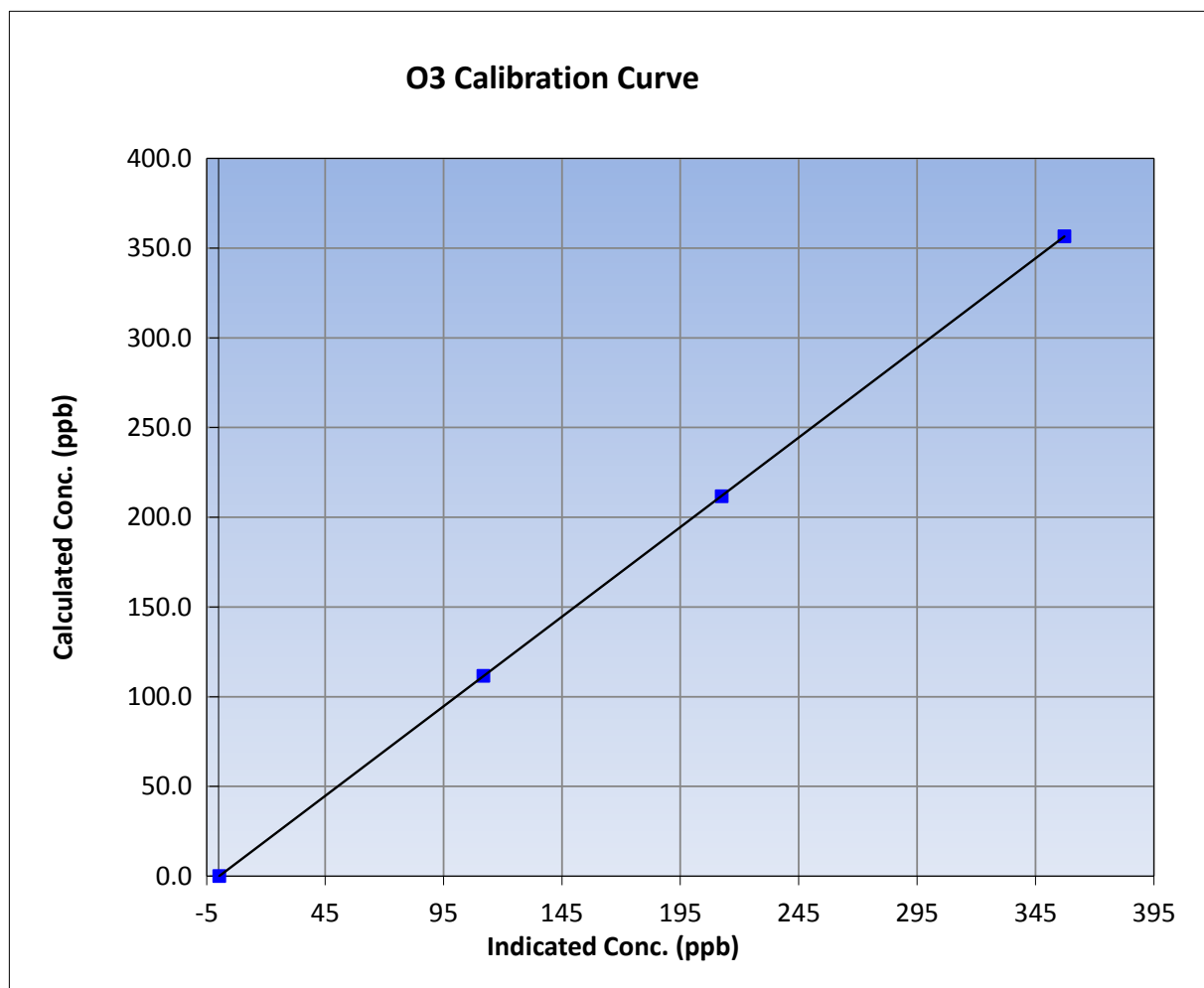
Wood Buffalo Environmental Association O3 Calibration Report

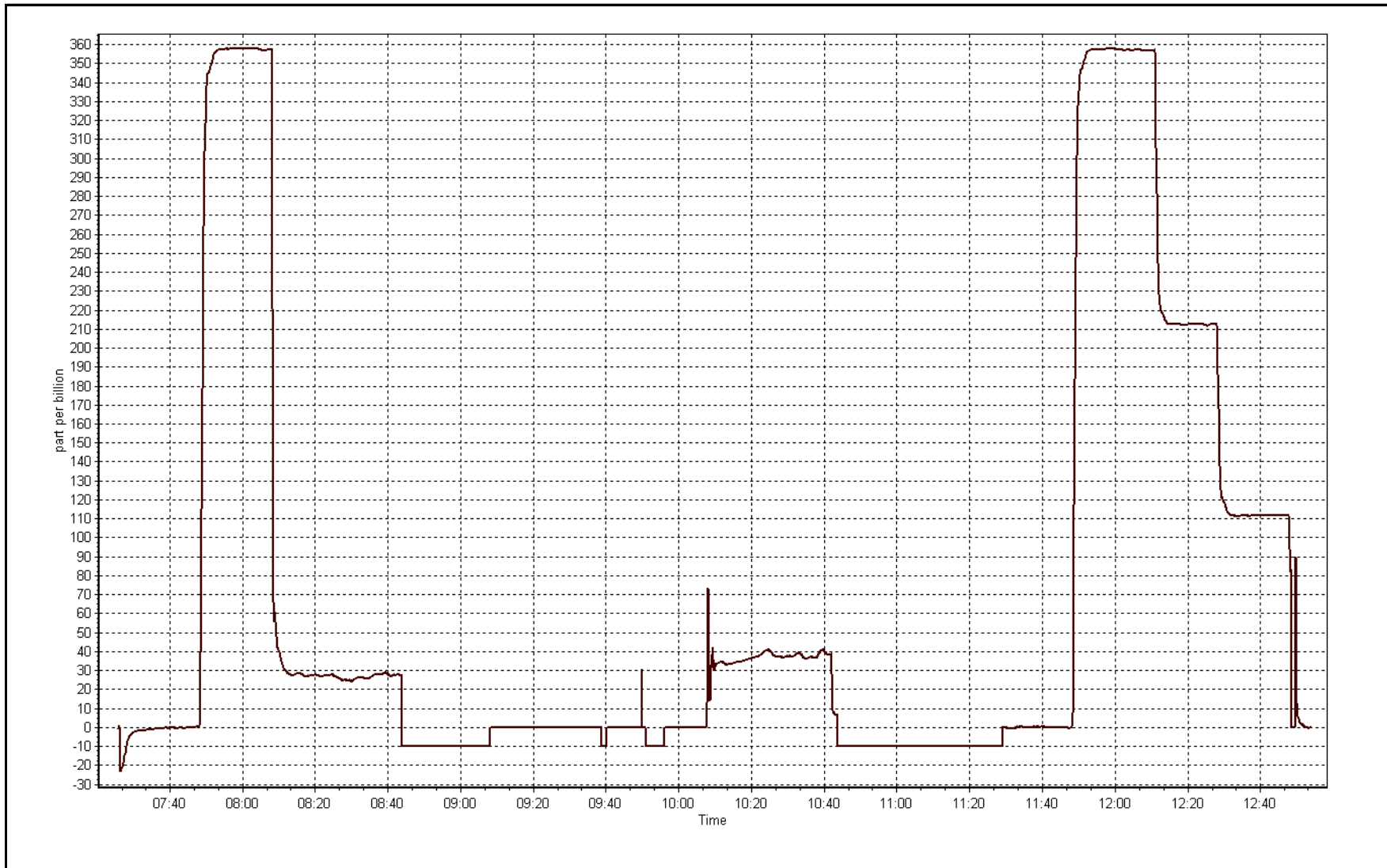
Station Information

Calibration Date	May-03-16	Previous Calibration	April 15, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:25	End Time (MST)	12:46
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999998
356.6	357.2	0.9983		
211.7	212.5	0.9962	Slope	0.998799
111.6	111.8	0.9982		
			Intercept	-0.270279







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 5, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:45
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL110515
NOX Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	08/09/2018
Calibrator	Sabio 4010	Serial Number	11041107
Zero air Generator	Teledyne API T701	Serial Number	5613

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	1850
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.011116	1.011436	1.000963
	Data Offset	-0.102347	-0.101411	0.026417
Current Calibration	Data Slope	1.008729	1.009798	1.001636
	Data Offset	0.323601	0.263157	0.085651

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.998		0.998	
NOX coefficient	1.002		1.002	
NO2 coefficient	1.000		1.000	
NO bkgrnd	7.4		7.4	
NOX bkgrnd	7.4		7.4	
Chamber Temp	50.4	Deg C	50.5	Deg C
Moly Temp	326.8	Deg C	323.7	Deg C
PMT voltage	-827.3	V	-827.3	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	178.8	mmHg	178.5	mmHg
R Cell Press Nox	178.8	mmHg	178.5	mmHg
NO sample flow	0.906	lpm	0.902	lpm
Nox sample Flow	0.906	lpm	0.902	lpm

Notes:

No maintenance or adjustments done, filter changed out'



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 2, 2016

Station Number:

AMS 13

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
as found span	5000	78.9	803.2	800.0	3.2	796.5	792.4	4.1	1.0084	1.0096
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
high point	5000	78.9	803.2	800.0	3.2	796.5	792.4	4.1	1.0084	1.0096
second point	5000	39.4	401.1	399.5	1.6	396.1	394.5	1.6	1.0126	1.0127
third point	5000	19.7	200.5	199.8	0.8	198.6	197.8	0.8	1.0098	1.0099
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	78.9	803.2	435.7	367.5	801.3	437.9	363.4	1.0024	0.9950
Average Correction Factor									1.0103	1.0108

Corrected As found

NO_x= 796.3

NO= 792.4

Percent Change

NO_x= -0.2%

NO= -0.2%

Previous Response

NO_x= 794.5

NO= 791.1

GPT Calibration Data

Dilution Flow (total) 5000 ccm

Source Gas Flow 78.90 ccm

NOx ref calc conc = 803.2 ppb

NO ref calc conc = 800.0 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		3.2	794.9	792.3	0.2	1.0104	1.0098	----	----
1st NO2 (300)	435.7	359.8	794.9	435.7	359.1	1.0104	----	1.0018	99.8%
2nd NO2 (200)	580.6	214.9	795.3	580.6	214.7	1.0099	----	1.0007	99.9%
3rd NO2 (100)	680.7	114.8	794.6	680.7	113.9	1.0108	----	1.0075	99.3%
2nd NO ref point		3.2	794.4	791.5	2.9	1.0111	1.0108	----	----
Average Correction Factor						1.0106		1.0034	99.7%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

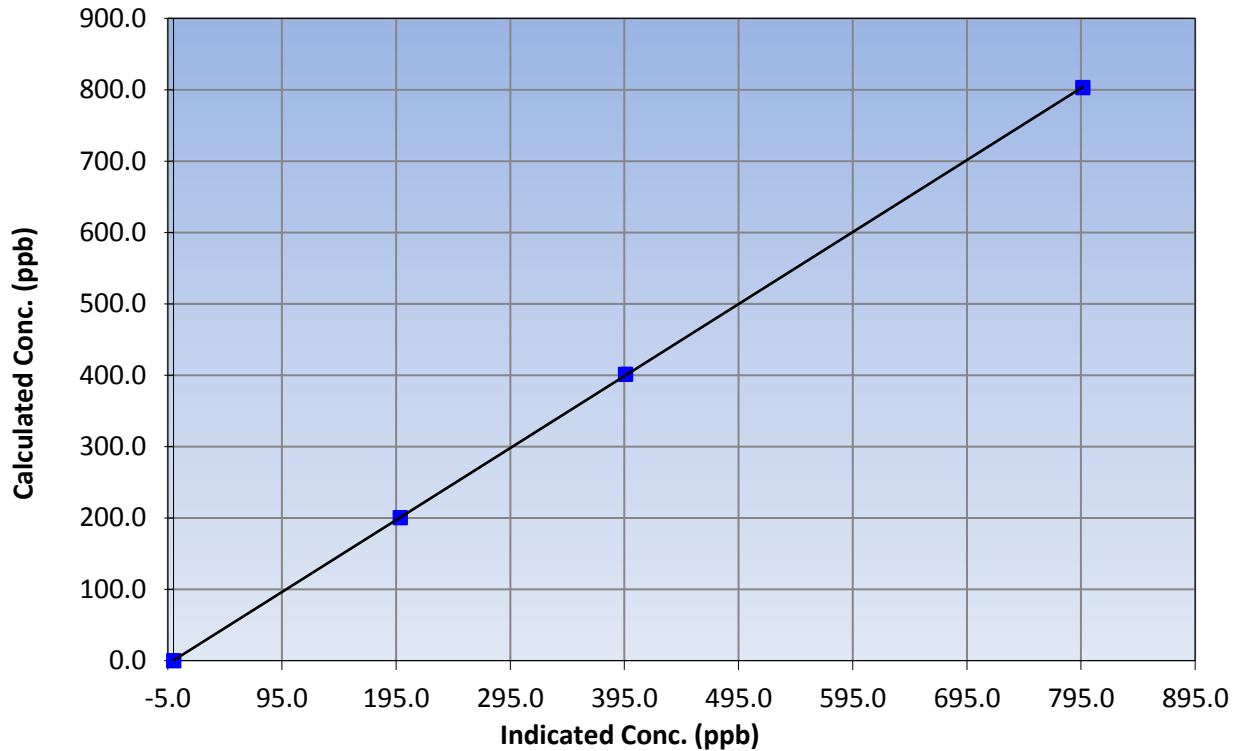
Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 5, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999994
803.2	796.5	1.0084		
401.1	396.1	1.0126	Slope	1.008729
200.5	198.6	1.0098		
			Intercept	0.323601

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

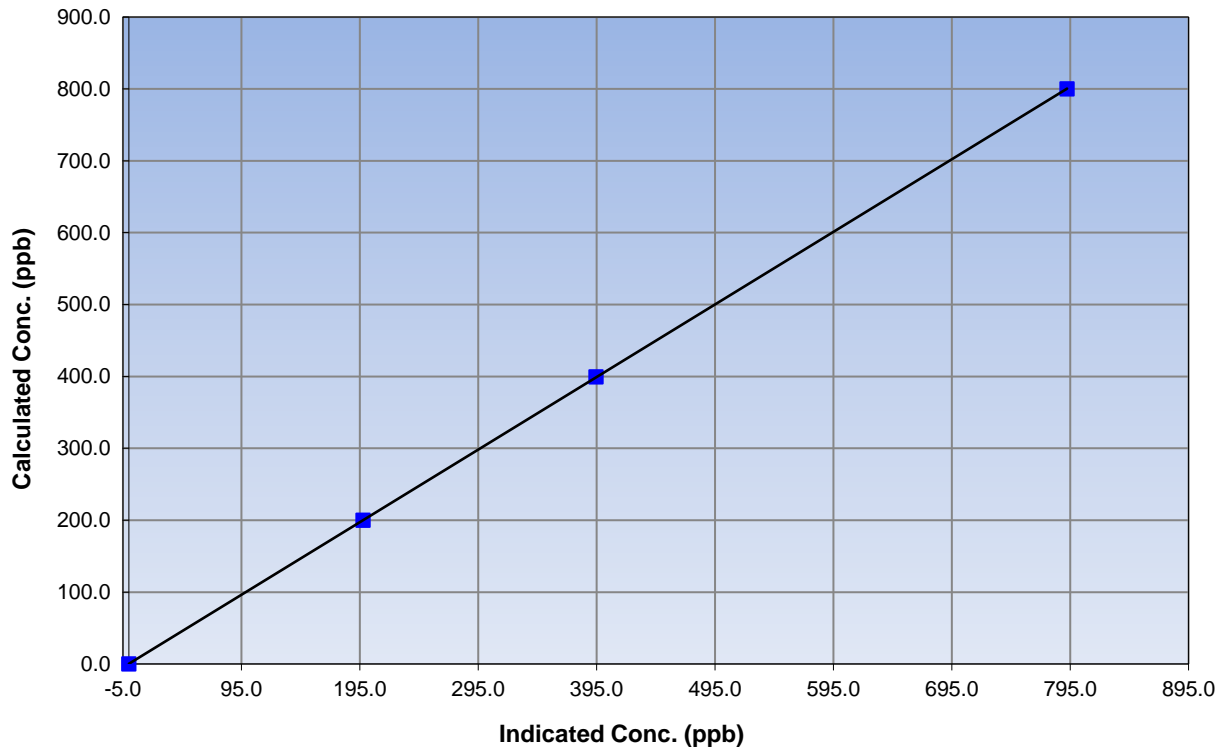
Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 5, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:00	End Time (MST)	12:45
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	0.999997
800.0	792.4	1.0096		
399.5	394.5	1.0127	Slope	1.009798
199.8	197.8	1.0099		
			Intercept	0.263157

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

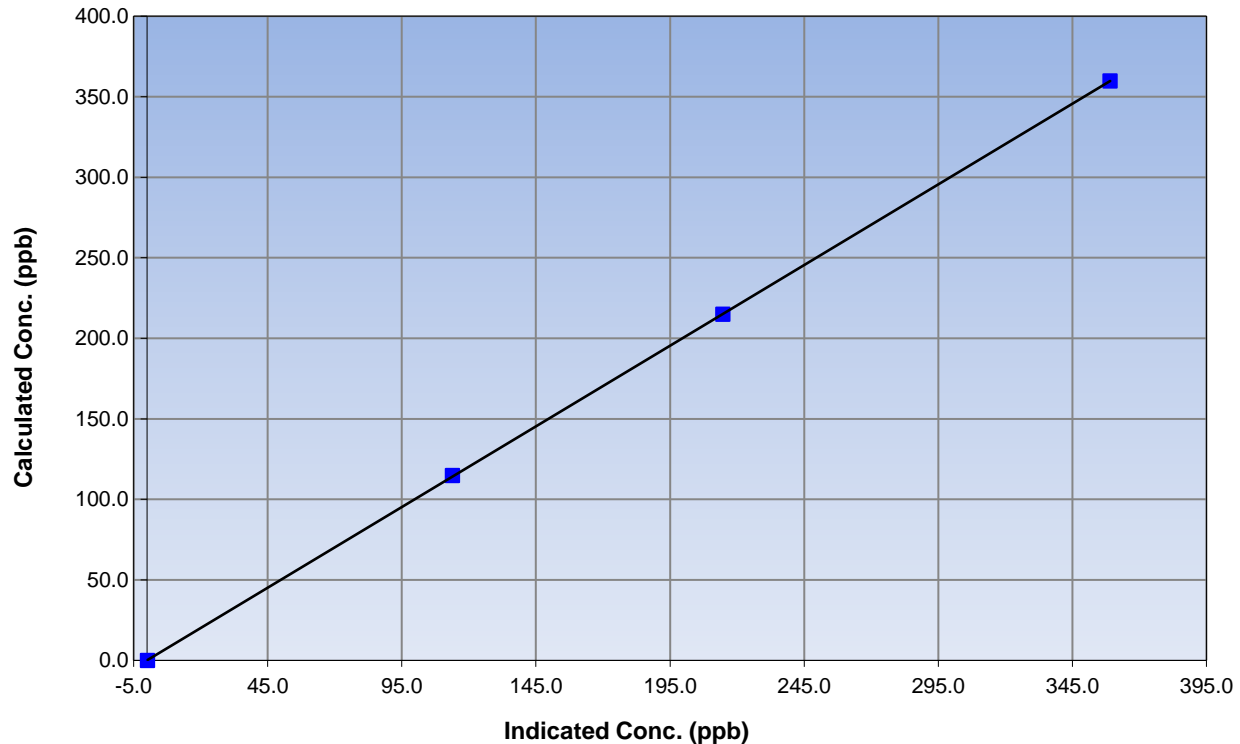
Station Information

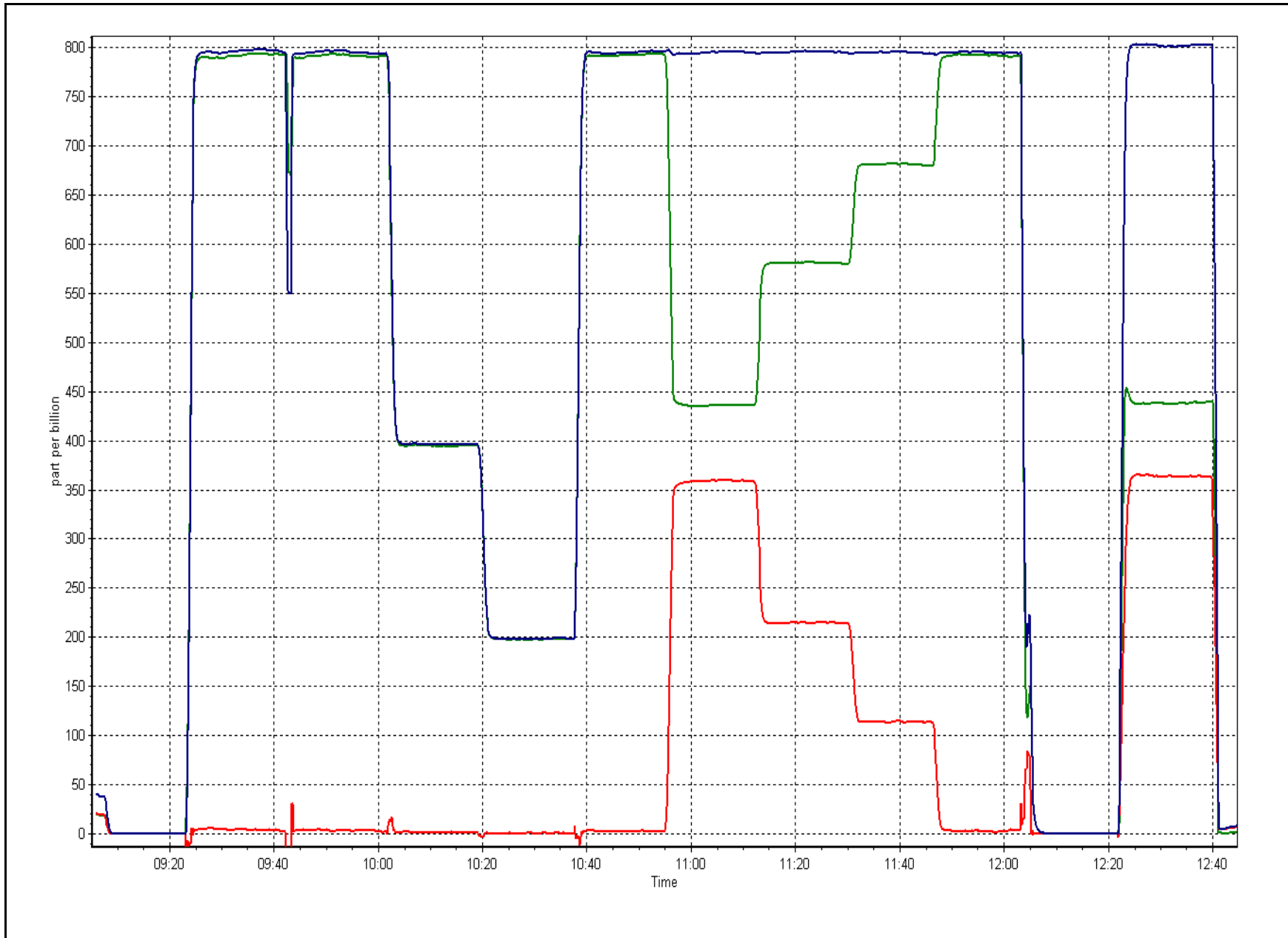
Calibration Date	May 2, 2016	Previous Calibration	April 5, 2016
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999993
359.8	359.1	1.0018		
214.9	214.7	1.0007	Slope	1.001636
114.8	113.9	1.0075		
			Intercept	0.085651

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	May 3, 2016	Previous Calibration:	April 18, 2016
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:28	End Time (MST):	11:19
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	-		
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	23.0	23.0	0.0	23.0
T2	24.0	na	na	24.0
T3	23.0	na	na	23.0
T4	24.0	na	na	24.0
RH (%)	37.0	na	na	37.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	975	977.0	2.0	975

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	990	-10	1000	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	432		430
Neph	9.8		-0.4
C14	24.8		8.9
Indicated Concentration (ug/m3)	3.6	Yes	-0.2
Offset 1	432.2		432.1
Offset 2	55		55.1

Leak Check (Quarterly)			
Leak Check Date:	April 18, 2015	Previous Leak Check Date:	March 4, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.45		-0.05
*Flow with adaptor (LPM):	16.50		
<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	03/05/2016
Pump	Good	
Filter Tape	Good	28/09/2015
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Flow and nephelometer adjusted

Calibration Performed By: Melissa Lemay



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 14
ANZAC
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	514	26	230	72.58	63	0	5	0
TRS(ppb) Average	515	25	229	72.58	42	5	4	1
THC(ppm) Average	513	26	231	72.45	32.2	-	3.6	-
NMHC(ppm) Average	513	26	231	72.45	17.085	-	0.944	-
CH4(ppm) Average	513	26	231	72.45	15.1	-	2.7	-
NO2(ppb) Average	512	28	232	72.58	291	1	19	-
NO(ppb) Average	512	28	232	72.58	248	-	12	-
NOX(ppb) Average	512	28	232	72.58	539	-	31	-
O3(ppb) Average	513	25	231	72.31	1612	2	122	-
PM2.5(ug/m3) Average	551	2	193	74.33	3182.4	-	267.3	12
AT 2m(C) Average	561	0	183	75.40	30.8	-	22.1	-
RH(%) Average	561	0	183	75.40	96	-	85	-
Leaf Wetness (% of range) Average	561	0	183	75.40	32	-	9	-
WS(km/h) Average	561	0	183	75.40	23	-	13	-
WD(deg) Average	561	0	183	75.40	-	-	-	-
PC(mm) Total	561	0	183	75.40	5.8	-	13	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	514	1	3	-	0	0	0	1	1	1	63
TRS(ppb) Average	515	0.8	2	-	0	0	0	0	1	1	42
THC(ppm) Average	513	2.16	1.4	-	1.9	1.9	2	2	2	2.2	32.2
NMHC (ppm) Average	513	0.105	0.799	-	0	0	0	0	0	0.1	17.085
CH4(ppm) Average	513	2.06	0.6	-	1.9	1.9	2	2	2	2.1	15.1
NO2(ppb) Average	512	2.4	13	-	0	0	1	1	2	4	291
NO(ppb) Average	512	1.4	11	-	0	0	0	0	1	1	248
NOX(ppb) Average	512	3.8	24	-	0	1	1	1	3	5	539
O3(ppb) Average	513	34.6	71	-	6	15	21	30	41	49	1612
PM2.5(ug/m3) Average	551	60.26	179.1	-	0.5	2.2	4.8	12.2	46.4	122.4	3182.4
Temperature 2 m (C) Average	561	14.15	6.3	-	-0.5	6.8	9.7	13.5	18.4	22.8	30.8
Relative Humidity (%) Average	561	55.5	25	-	13	22	33	56	77	89	96
Leaf Wetness (% of range) Average	561	1	4	-	-2	-1	-1	0	0	5	32
Wind Speed 20 m (km/h) Average	561	8.5	4	-	1	4	6	8	11	14	23
Wind Direction 20 m (deg) Average	561	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	561	-	-	14.22	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2	04 May 2016 17:00	04 May 2016 17:00	1	Power spike
SO2, NO2	06 May 2016 00:00	13 May 2016 17:00	186	Station power failure
SO2, NO2	13 May 2016 18:00	14 May 2016 09:00	16	Unstable Operation - required zero/span response
SO2, NO2	14 May 2016 12:00	14 May 2016 12:00	1	Power spike
TRS	04 May 2016 17:00	04 May 2016 17:00	1	Power spike
TRS	06 May 2016 00:00	13 May 2016 17:00	186	Station power failure
TRS	13 May 2016 18:00	14 May 2016 10:00	17	Unstable Operation - required zero/span response
CH4, NMHC, THC	04 May 2016 16:00	04 May 2016 17:00	2	Power spike
CH4, NMHC, THC	06 May 2016 00:00	13 May 2016 17:00	186	Station power failure
CH4, NMHC, THC	13 May 2016 18:00	14 May 2016 09:00	16	Unstable Operation - required zero/span response
CH4, NMHC, THC	14 May 2016 12:00	14 May 2016 12:00	1	Power spike
O3	04 May 2016 17:00	04 May 2016 17:00	1	Power spike
O3	06 May 2016 00:00	13 May 2016 17:00	186	Station power failure
O3	13 May 2016 18:00	14 May 2016 12:00	19	Unstable Operation - required zero/span response
PM2.5	04 May 2016 17:00	04 May 2016 17:00	1	Power spike
PM2.5	05 May 2016 22:00	05 May 2016 22:00	1	Out of Range
PM2.5	06 May 2016 00:00	13 May 2016 17:00	186	Station power failure
PM2.5	17 May 2016 01:00	17 May 2016 03:00	3	Unstable Operation following automated tape change
Temperature/ Relative Humidity	06 May 2016 03:00	13 May 2016 17:00	183	Station power failure
Surface Leaf Wetness	06 May 2016 03:00	13 May 2016 17:00	183	Station power failure
Wind Speed, Wind Direction	06 May 2016 03:00	13 May 2016 17:00	183	Station power failure
Precipitation Collector	06 May 2016 03:00	13 May 2016 17:00	183	Station power failure



Summary of Hour Averages

Anzac - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 63 ppb on May 5 22:00	Maximum Daily Average: 4.5 ppb on May 5		Hours of Data:	514
Minimum Value: 0 ppb on May 5 07:00	Minimum Daily Average: 0.4 ppb on May 1		Hours of Missing Data:	230
Maximum Diurnal Average: 3.5 ppb at hour 22	Minimum Diurnal Average: 0.6 ppb at hour 10		Hours of Calibration:	26
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 7		Percent Operational Time:	72.6

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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.4	1
2-May	0	0	Z	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
3-May	0	1	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
4-May	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
5-May	0	0	3	2	0	Z	0	0	1	1	2	1	1	1	0	0	0	0	0	1	4	63	21	PF	4.5	63
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	Z	1	PF	1	0	1	1	1	1	1	1	1	1	1	--	1
15-May	0	1	1	2	2	1	1	1	1	1	1	Z	1	0	1	1	1	1	4	3	2	2	2	1	1.2	4
16-May	1	1	0	0	1	1	Z	2	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0.8	2
17-May	0	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	0	0	0	0.4	1
18-May	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	1	0	1	2	2	2	5	1.0	5
19-May	3	Z	2	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1.0	3
20-May	1	1	Z	1	1	1	1	1	0	0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1.0	2
21-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.8	1
22-May	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
23-May	1	1	1	0	0	Z	0	0	0	0	0	0	0	1	1	2	2	1	1	1	1	2	1	0	0.7	2
24-May	Z	1	2	14	13	5	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1.9	14
25-May	1	Z	3	8	9	7	1	1	1	0	0	0	0	0	1	1	1	2	1	1	1	1	1	2	1.9	9
26-May	3	4	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4
27-May	1	1	1	Z	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.5	1
28-May	1	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1
29-May	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.4	1
30-May	Z	1	1	0	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0.7	1
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1

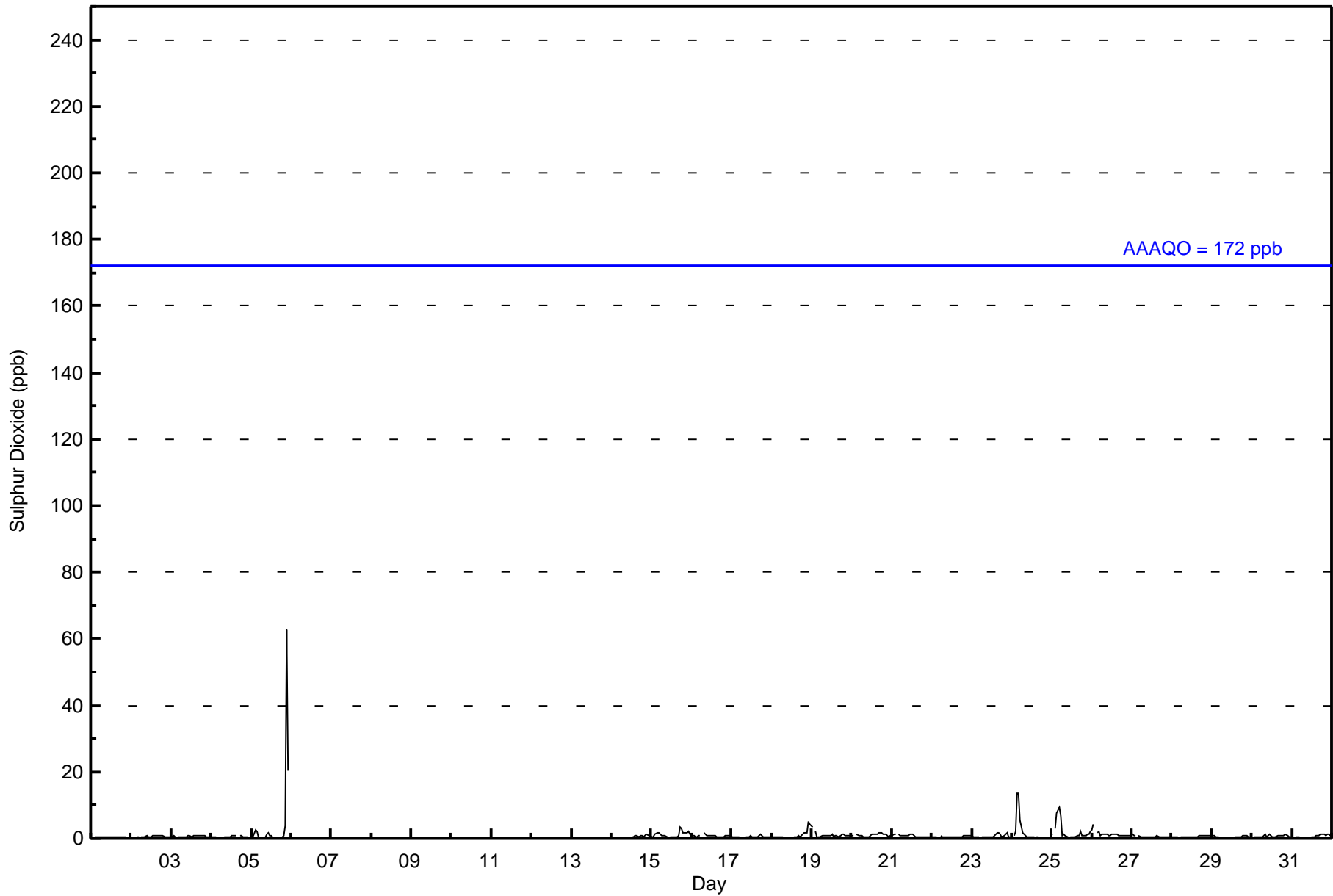
0.8	0.8	0.9	1.7	1.8	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.9	0.8	0.8	0.9	3.5	1.7	0.8	Diurnal Average
3	4	3	14	13	7	2	2	1	1	2	1	1	1	1	1	2	2	4	3	2	4	63	21	4	Diurnal Maximum

Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	510	99.22	99.22
11 - 20	2	0.39	99.61
21 - 60	1	0.19	99.81
61 - 110	1	0.19	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 514

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Anzac - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	30	38	32	19	20	20	29	29	40	15	40	21	25	67	49	36	510
11 - 20	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
21 - 60	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
61 - 110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	39	32	19	20	20	29	31	40	15	40	21	25	67	49	36	514

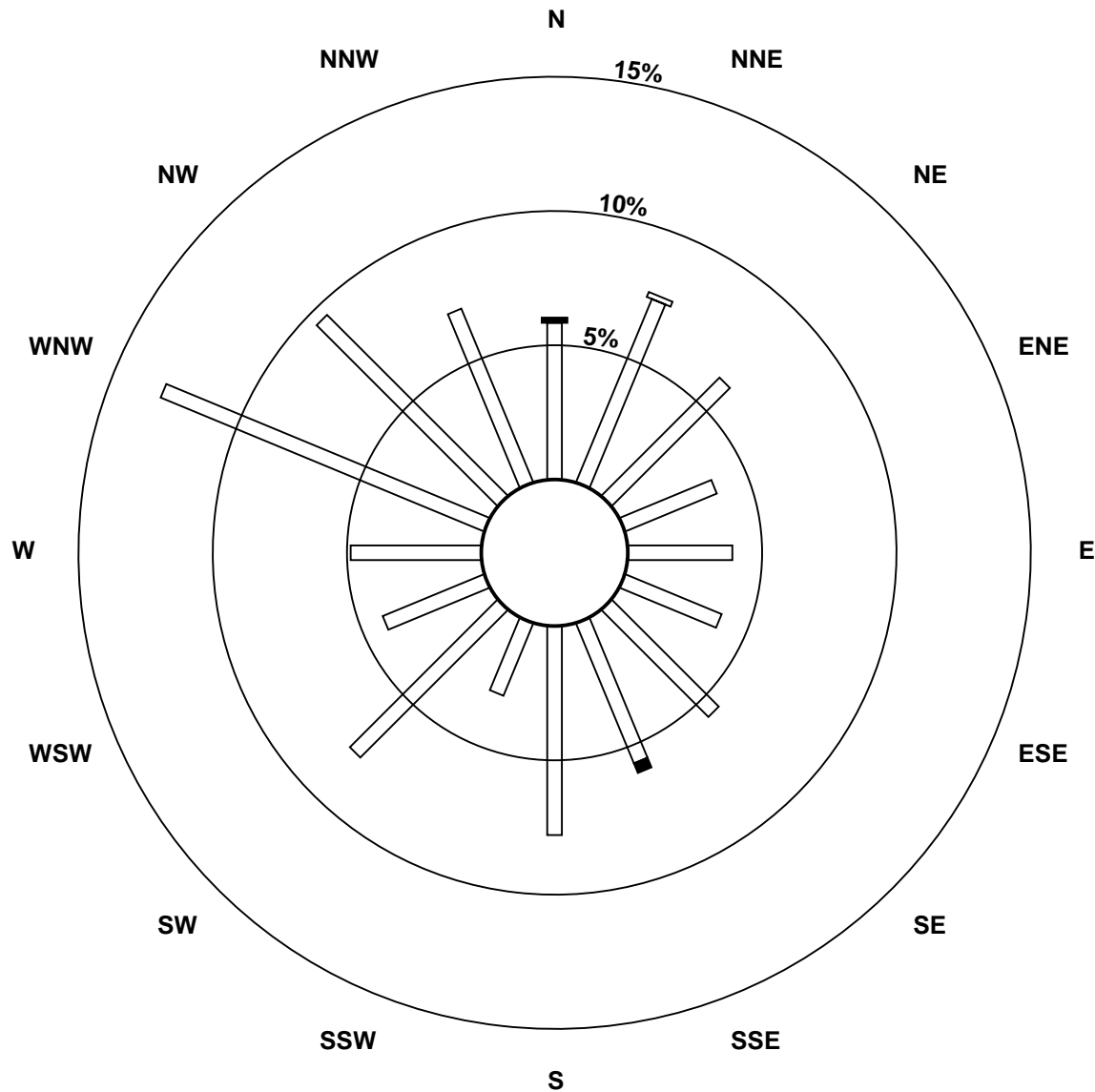
Total Number of Valid Hours: 514

Total Number of Hours: 744

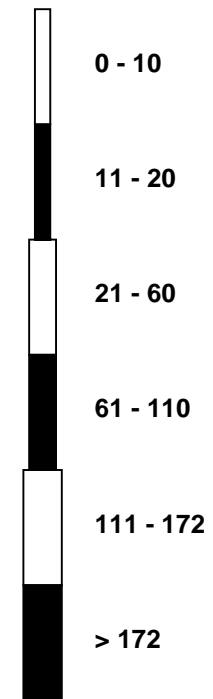


Wood Buffalo Environmental Association
Wind Rose May 2016

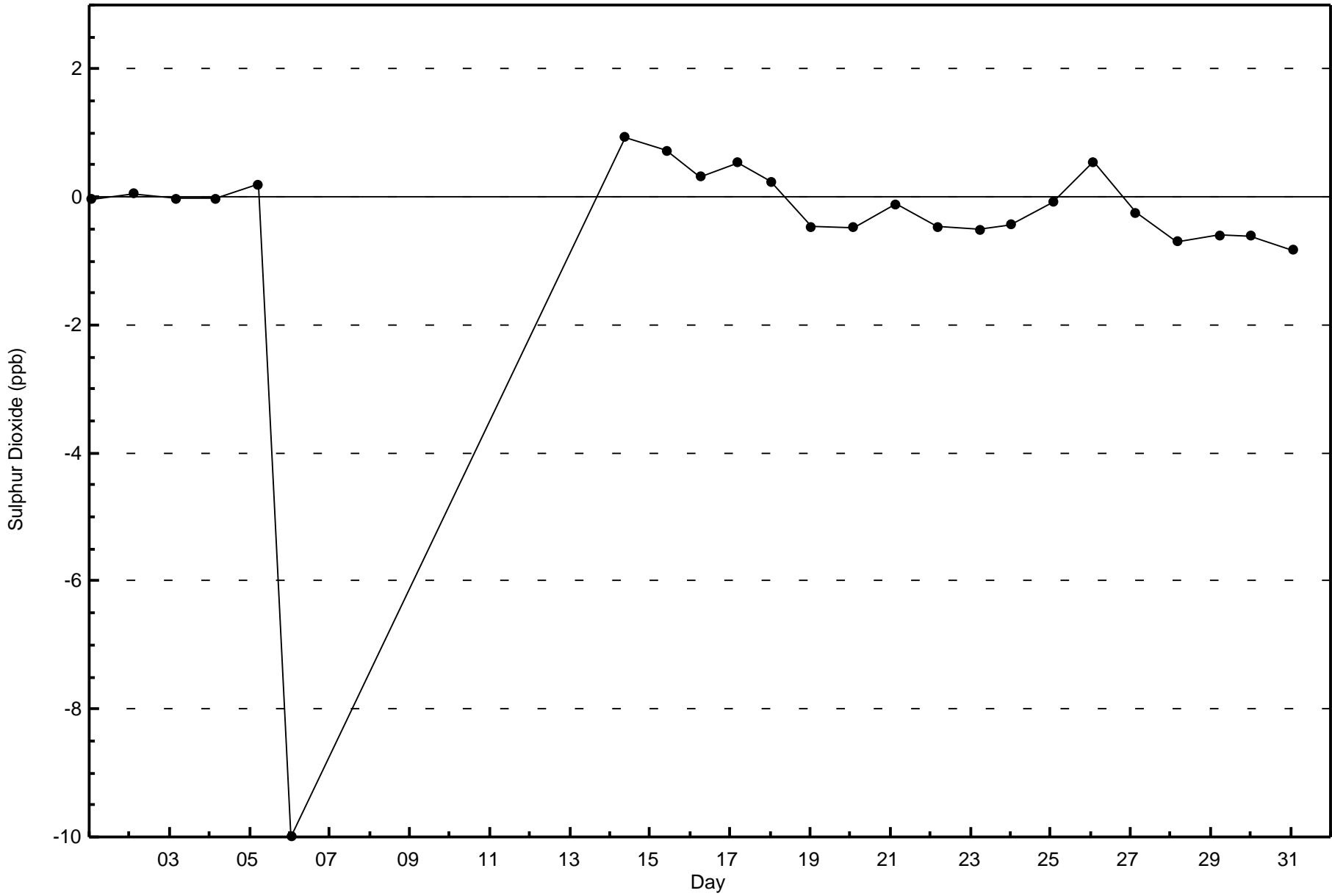
Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)

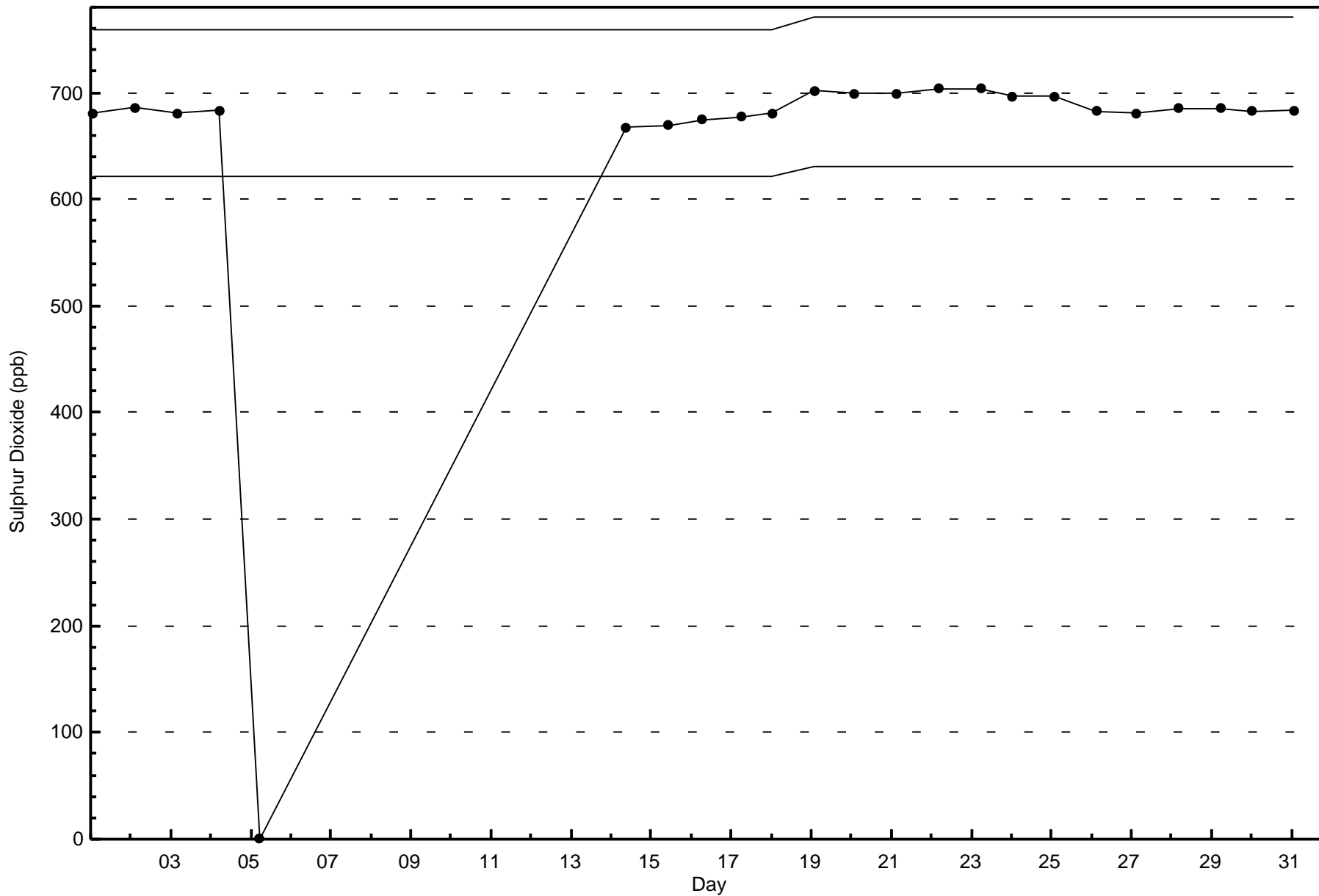


Classes (ppb)



Total Number of Valid Hours: 514







Summary of Hour Averages

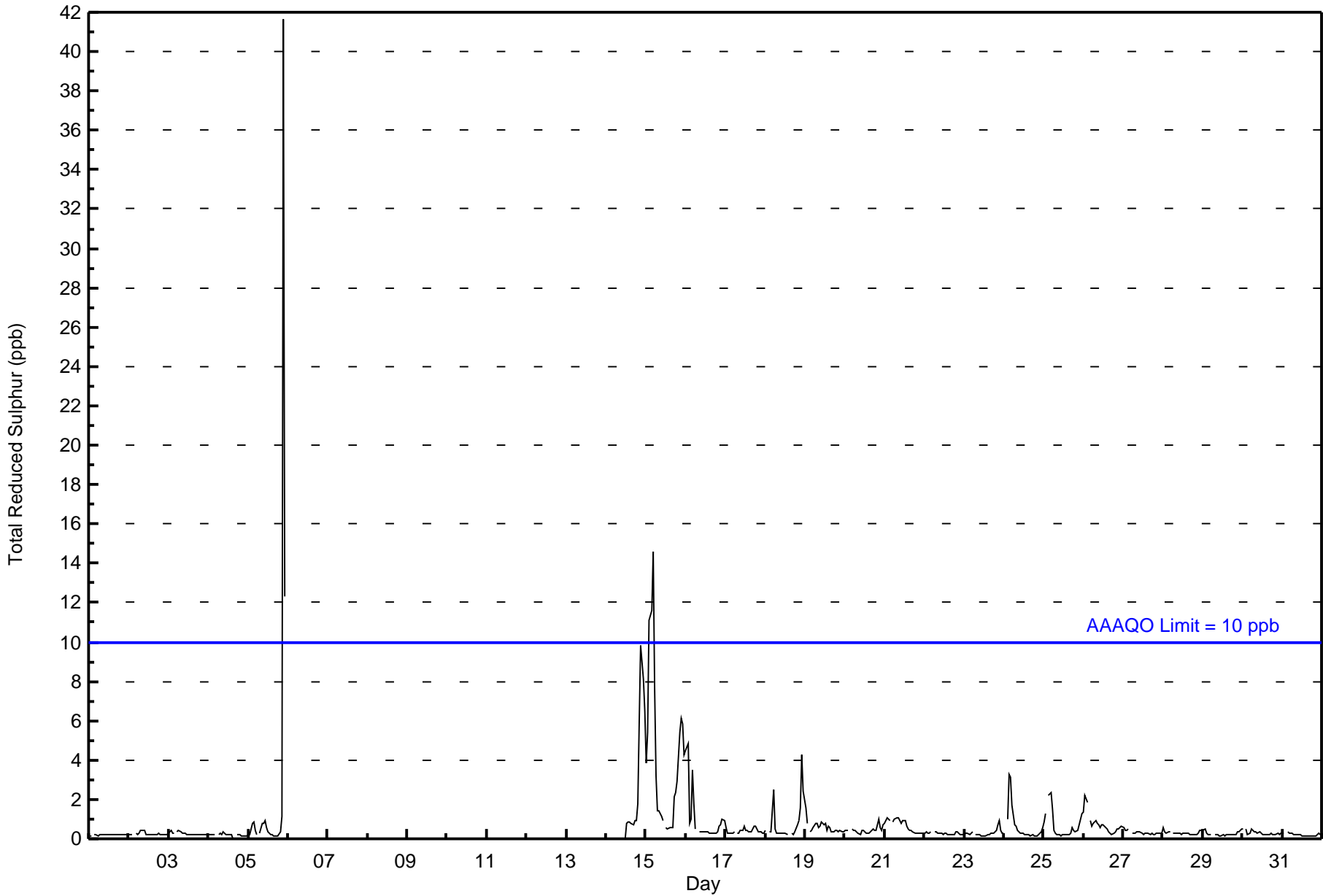
Anzac - May 2016

Number of Exceedences (AAAQO):	1-hr: 5	24-hr: 1	Hours in Service:	744
Maximum Value: 42 ppb on May 5 22:00	Maximum Daily Average: 4.1 ppb on May 15		Hours of Data:	515
Minimum Value: 0 ppb on May 4 16:00	Minimum Daily Average: 0.2 ppb on May 4		Hours of Missing Data:	229
Maximum Diurnal Average: 2.9 ppb at hour 22	Minimum Diurnal Average: 0.3 ppb at hour 16		Hours of Calibration:	25
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 11		Percent Operational Time:	72.6

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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-May	0	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
5-May	0	0	1	1	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	42	12	2.9	42
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	Z	0	1	1	1	1	1	1	1	1	2	6	10	8	--	--
15-May	4	5	11	12	15	8	3	1	1	1	1	Z	1	1	1	1	1	1	2	2	3	5	6	6	4.1	15
16-May	5	5	1	1	3	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	5
17-May	1	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0.4	1
18-May	0	Z	0	0	1	2	1	0	0	0	0	0	0	0	C	C	0	0	0	1	1	2	4	2	0.9	4
19-May	2	1	Z	0	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0.6	2
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.4	1
21-May	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	1
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
24-May	0	Z	1	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	3
25-May	1	1	Z	2	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0.7	2
26-May	1	2	2	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0.7	2
27-May	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-May	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-May	0	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

0.8	1.0	1.1	1.3	1.6	1.1	0.6	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.9	2.9	1.6	1.0	Diurnal Average
5	5	11	12	15	8	3	1	1	1	1	1	1	1	1	1	1	2	2	3	6	42	12	6	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	491	95.34	95.34
3 - 4	8	1.55	96.89
5 - 7	8	1.55	98.45
8 - 11	3	0.58	99.03
> 11	5	0.97	100.00

Total Number of Valid Hours: 515

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	31	39	31	18	20	20	28	27	39	13	39	17	21	65	48	35	491
3 - 4	1	0	0	0	0	0	1	2	1	0	1	2	0	0	0	0	8
5 - 7	0	0	0	1	0	0	1	1	1	0	1	1	2	0	0	0	8
8 - 11	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	3
> 11	1	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	5
Totals	33	40	31	19	20	20	30	30	41	13	42	21	25	67	48	35	515

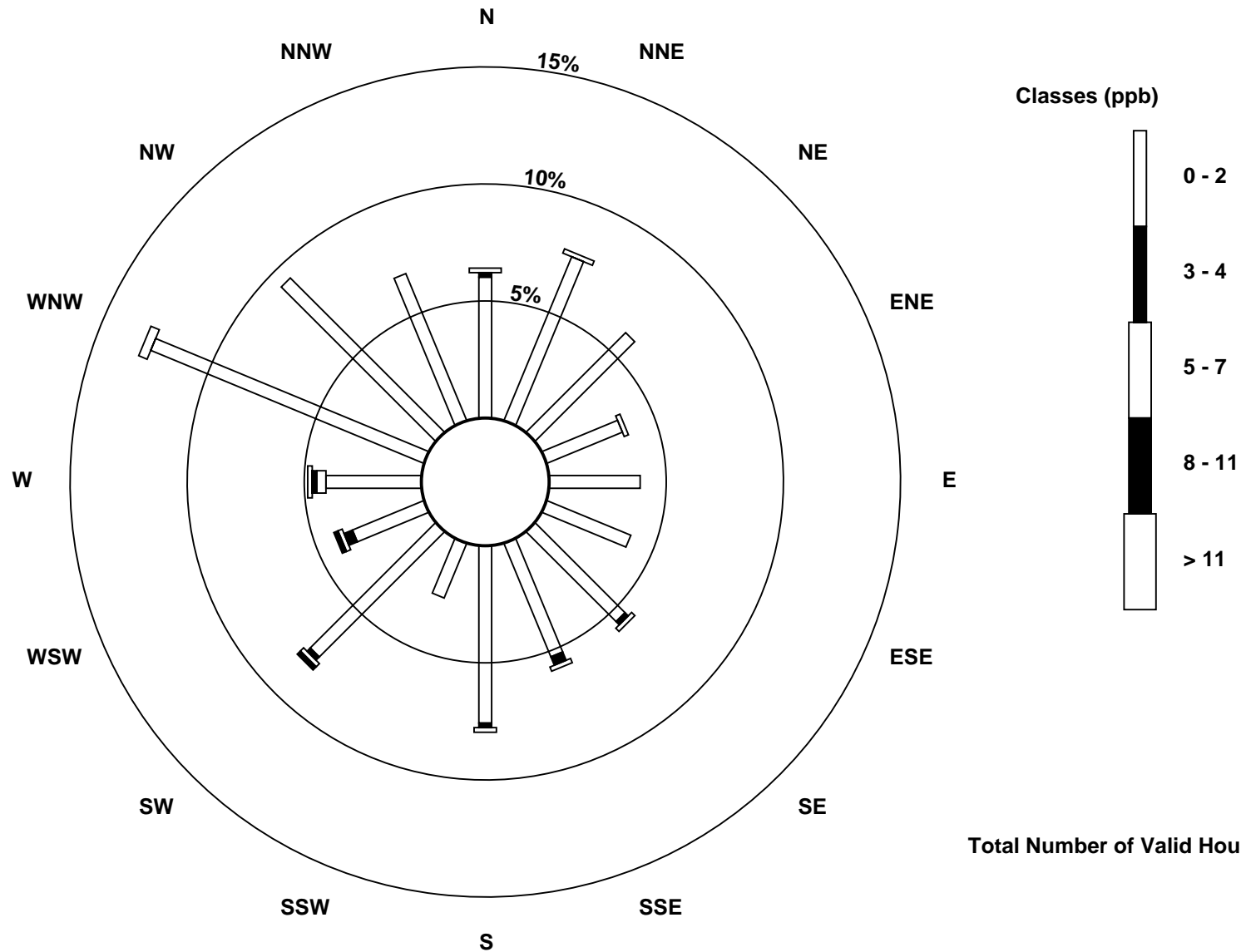
Total Number of Valid Hours: 515

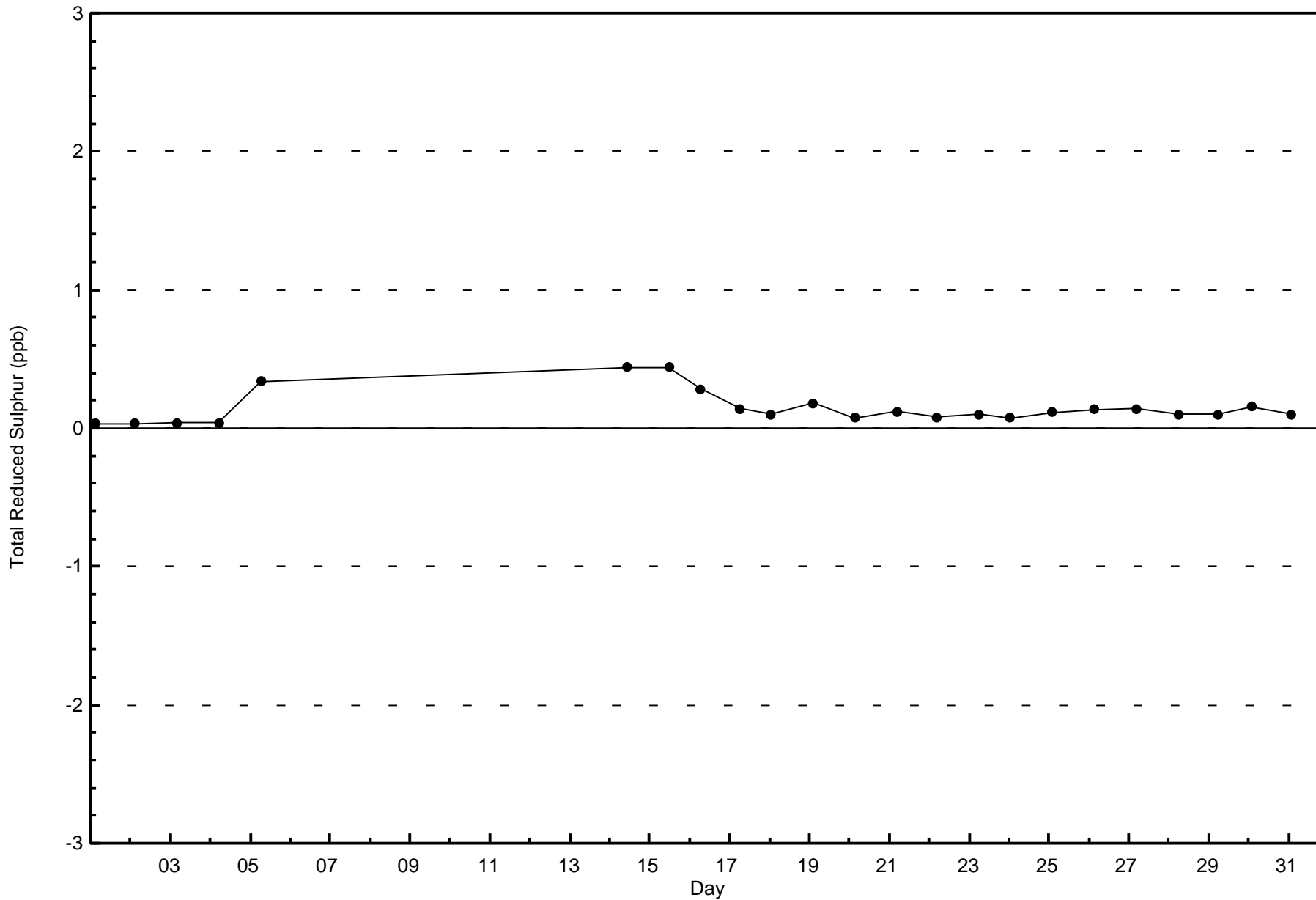
Total Number of Hours: 744

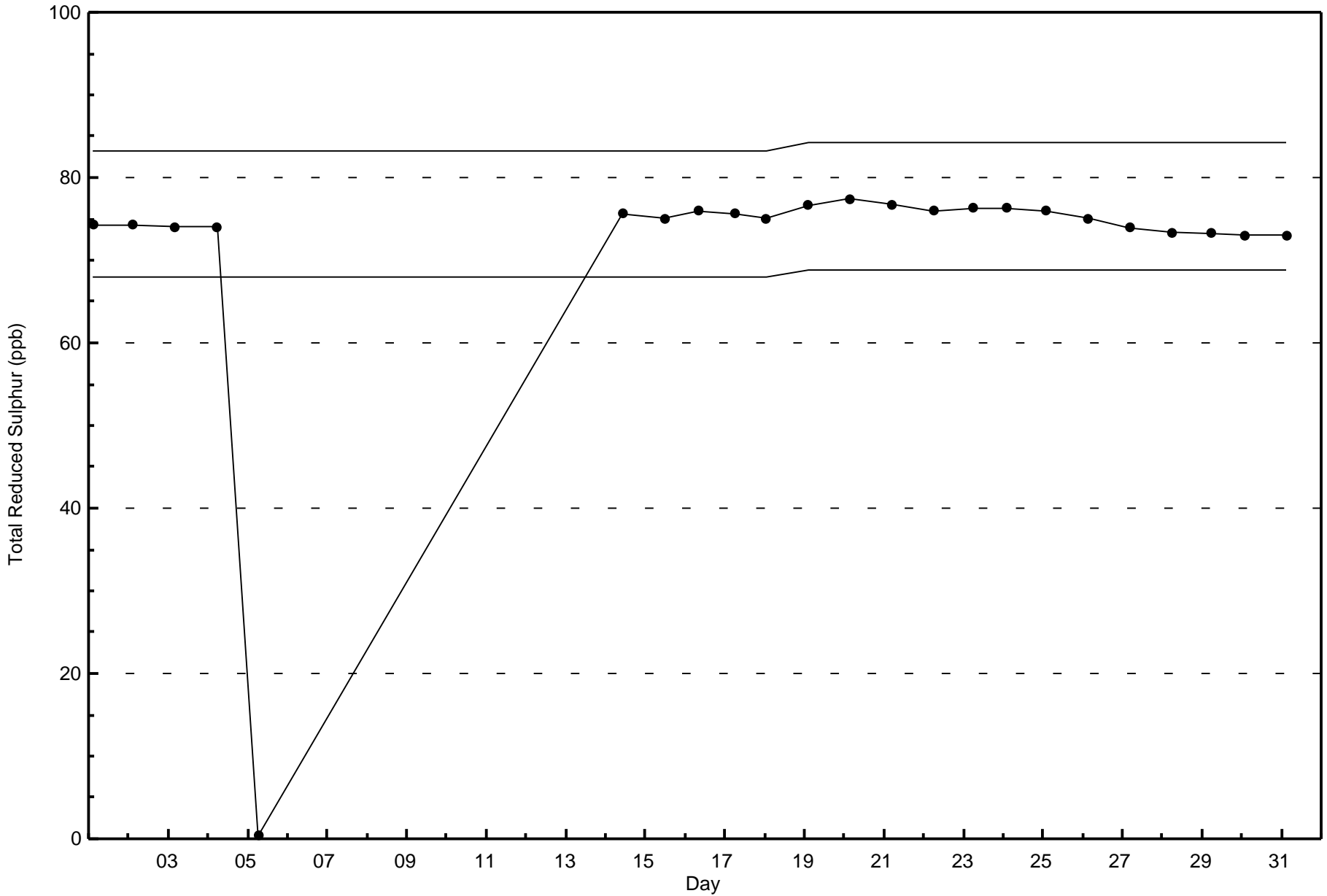


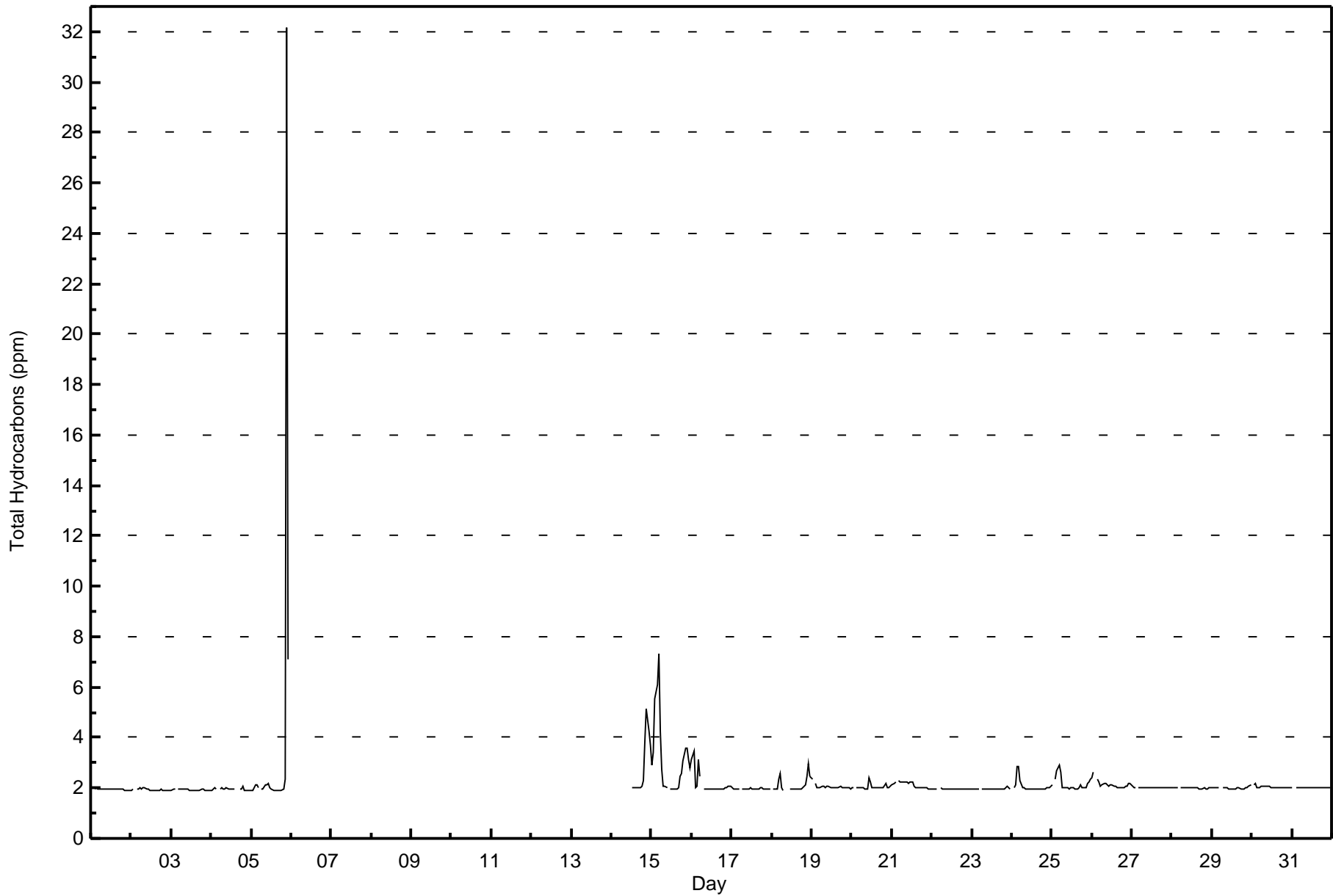
Wood Buffalo Environmental Association
Wind Rose May 2016

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	409	79.73	79.73
2.1 - 3.0	86	16.76	96.49
3.1 - 10.0	17	3.31	99.81
> 10.0	1	0.19	100.00

Total Number of Valid Hours: 513

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	21	29	30	15	17	17	26	27	30	13	33	16	19	57	34	25	409
2.1 - 3.0	9	9	2	3	3	3	1	3	9	2	4	3	2	7	15	11	86
3.1 - 10.0	0	1	0	1	0	0	2	1	1	0	3	2	4	2	0	0	17
> 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	31	39	32	19	20	20	29	31	40	15	40	21	25	66	49	36	513

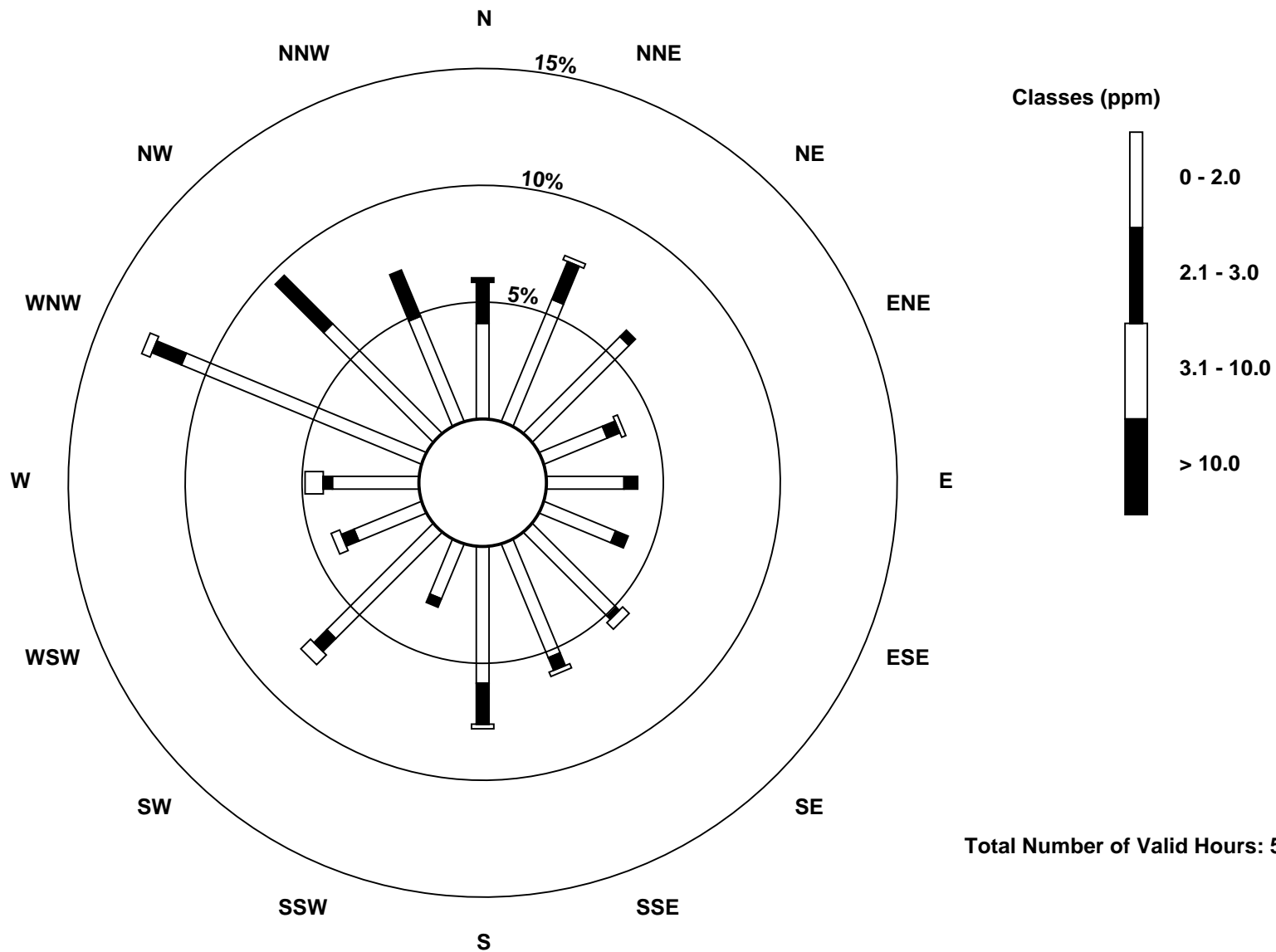
Total Number of Valid Hours: 513

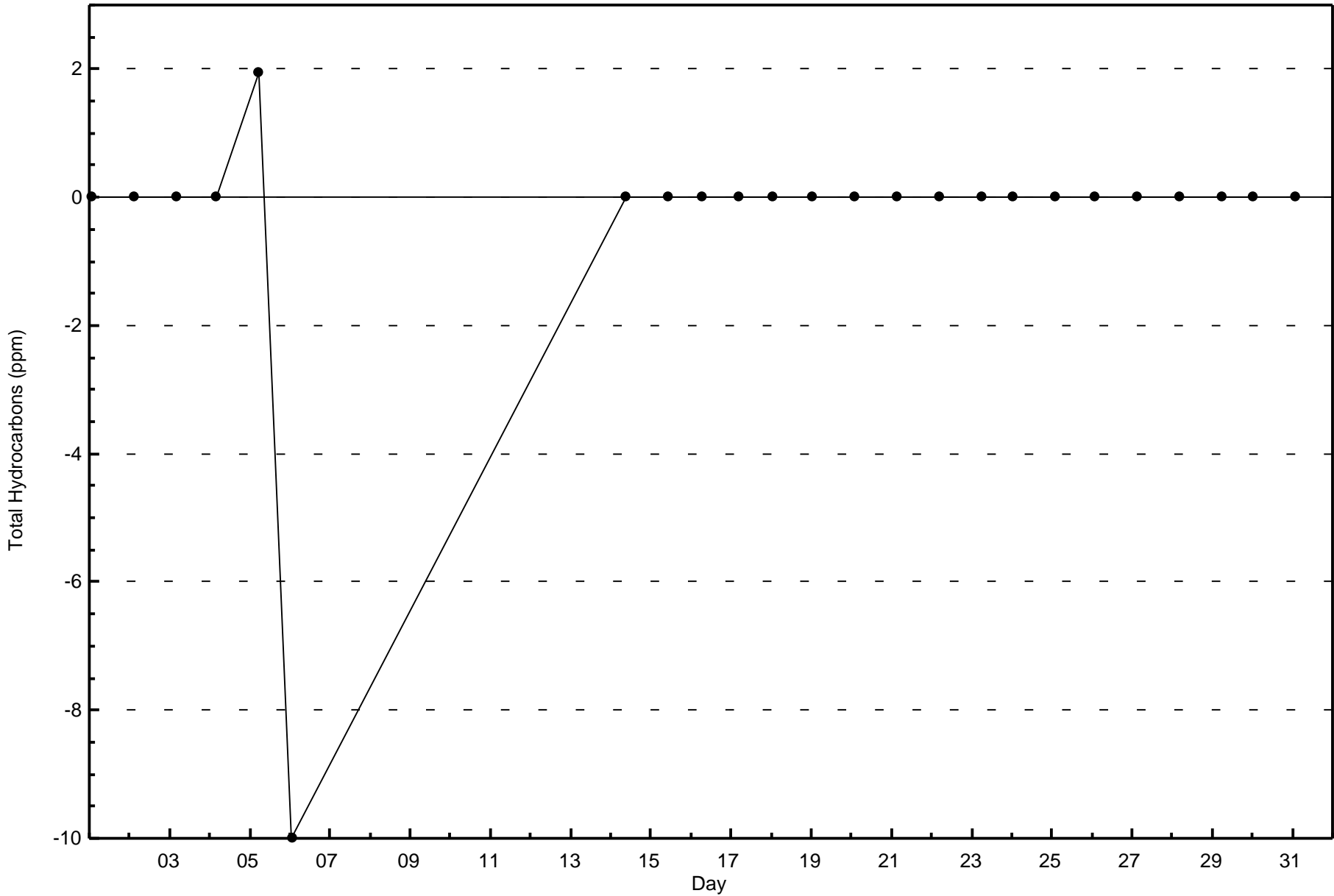
Total Number of Hours: 744

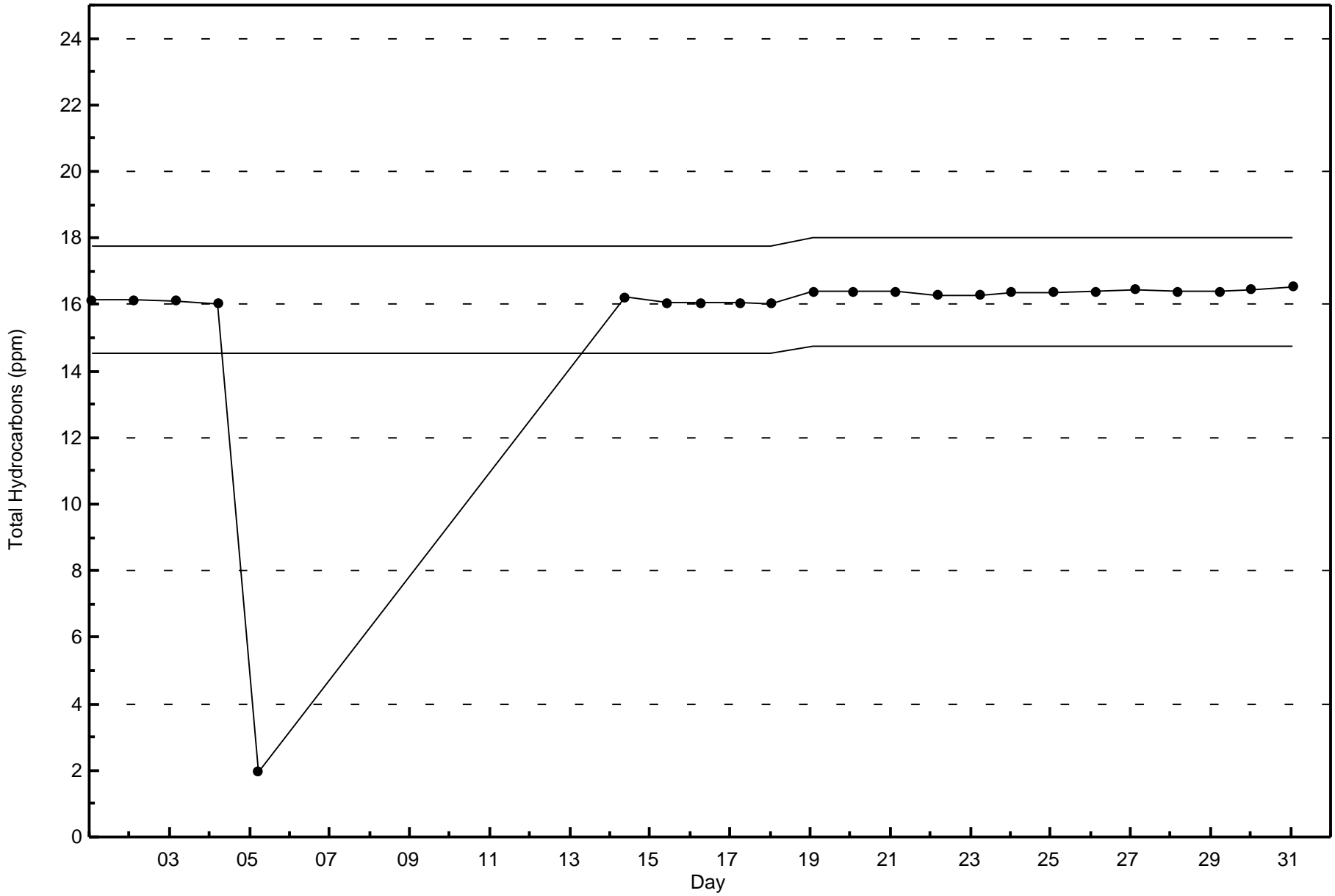


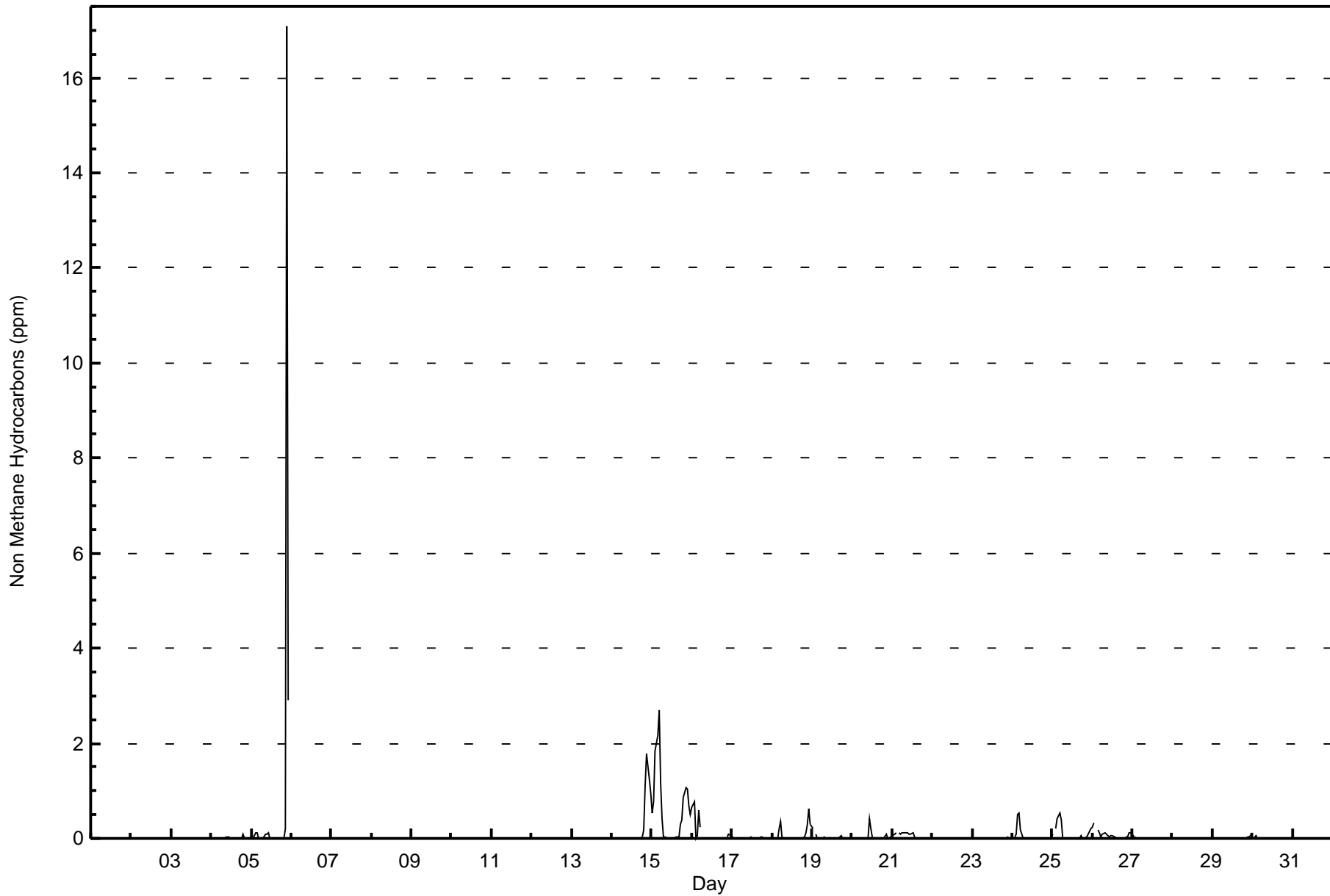
Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	367	71.54	71.54
0.006 - 0.05	65	12.67	84.21
0.06 - 0.1	35	6.82	91.03
> 0.1	46	8.97	100.00

Total Number of Valid Hours: 513

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	18	23	28	15	12	15	24	25	24	12	30	15	16	54	30	26	367
0.006 - 0.05	5	10	2	0	5	2	3	2	9	1	4	2	3	4	9	4	65
0.06 - 0.1	4	2	2	1	1	1	0	0	3	0	0	0	1	6	9	5	35
> 0.1	4	4	0	3	2	2	2	4	4	2	6	4	5	2	1	1	46
Totals	31	39	32	19	20	20	29	31	40	15	40	21	25	66	49	36	513

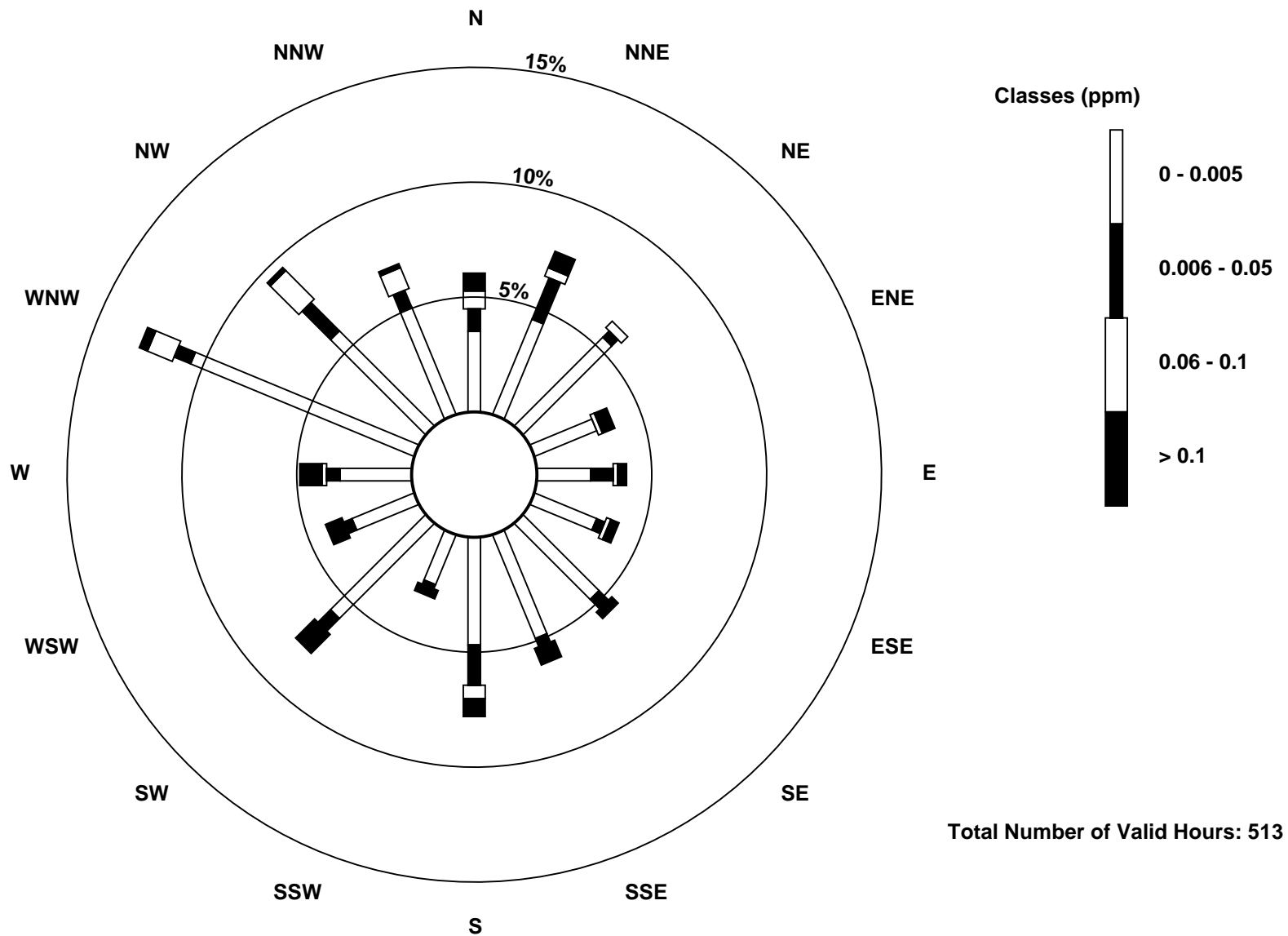
Total Number of Valid Hours: 513

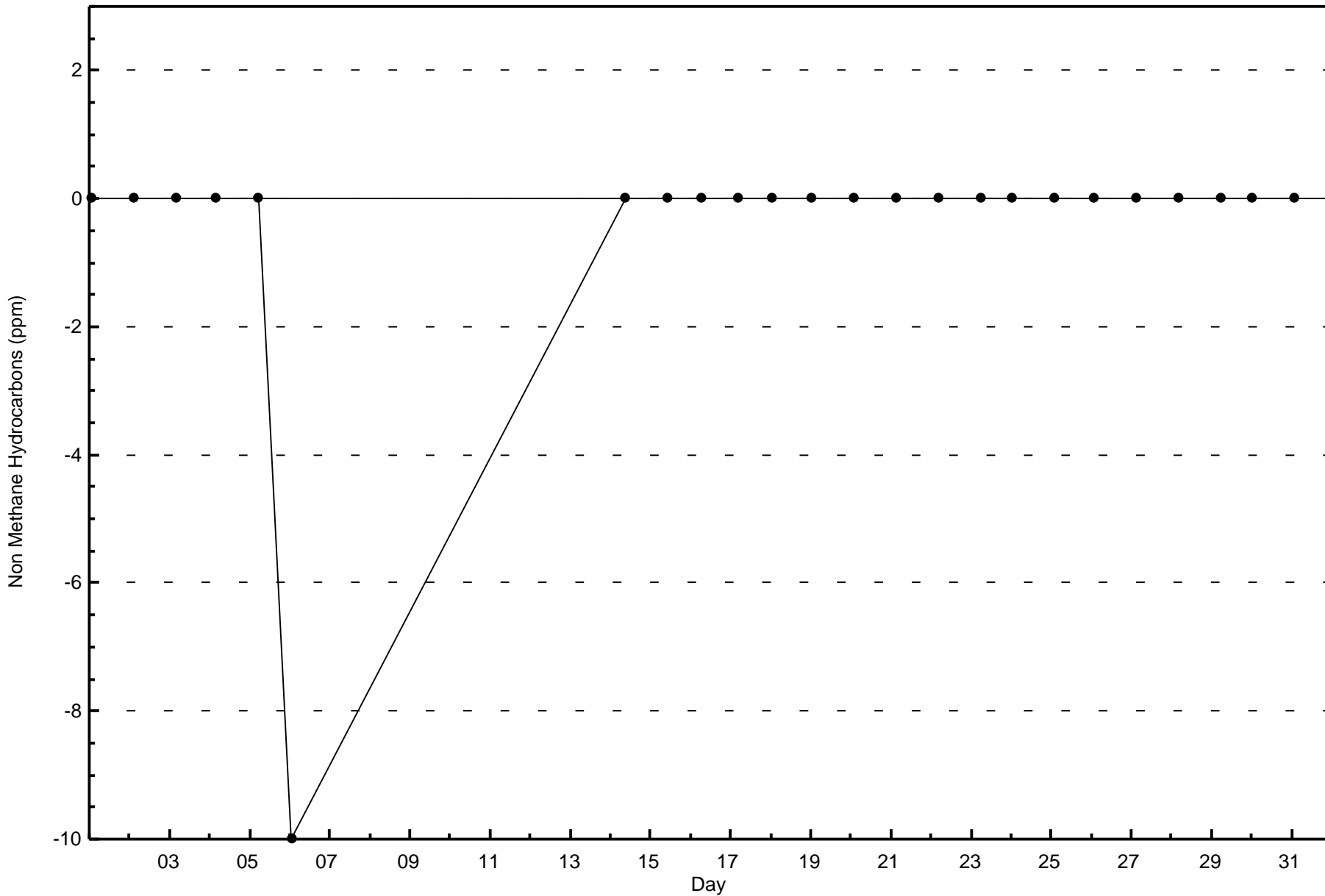
Total Number of Hours: 744

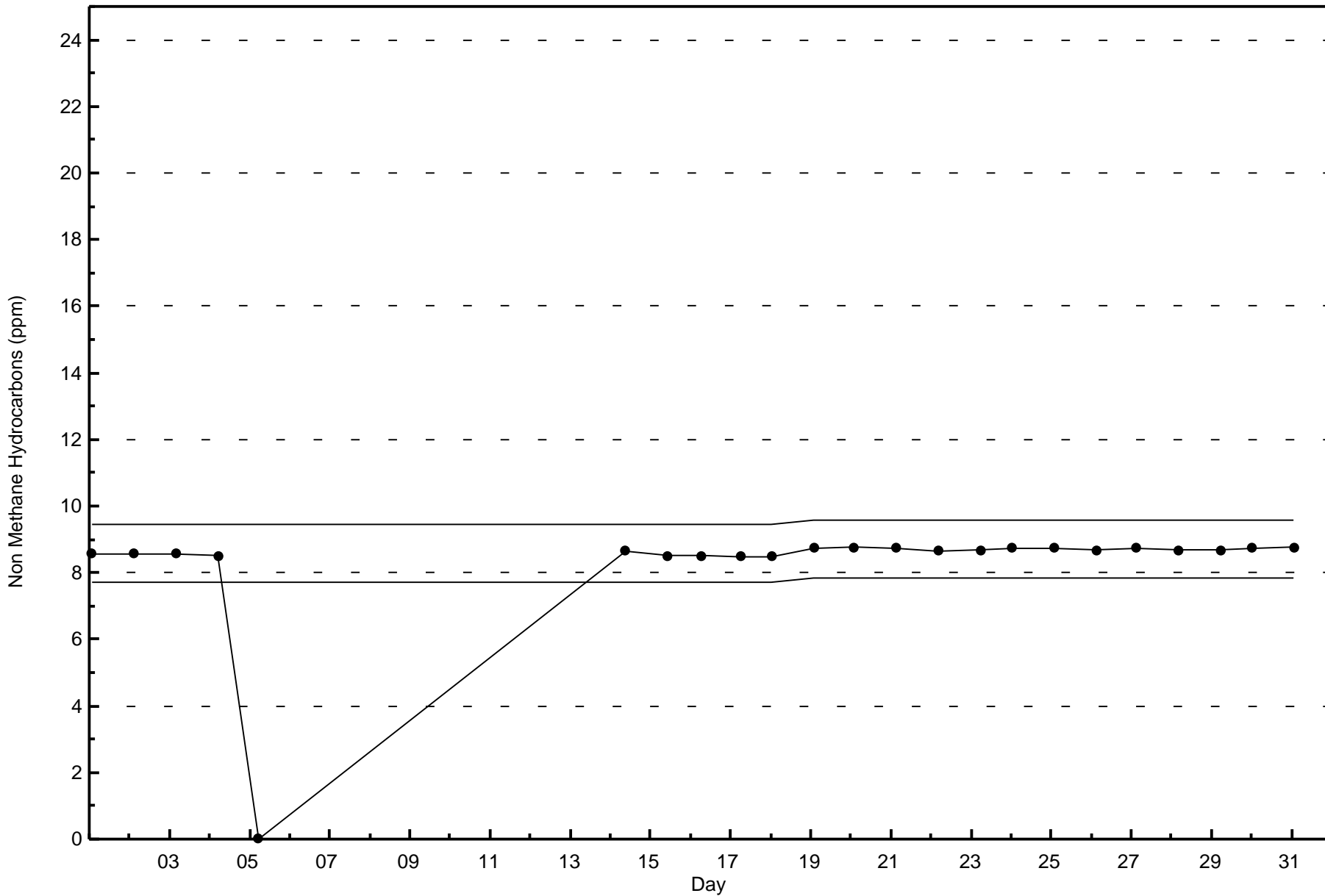


Wood Buffalo Environmental Association
Wind Rose May 2016

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)



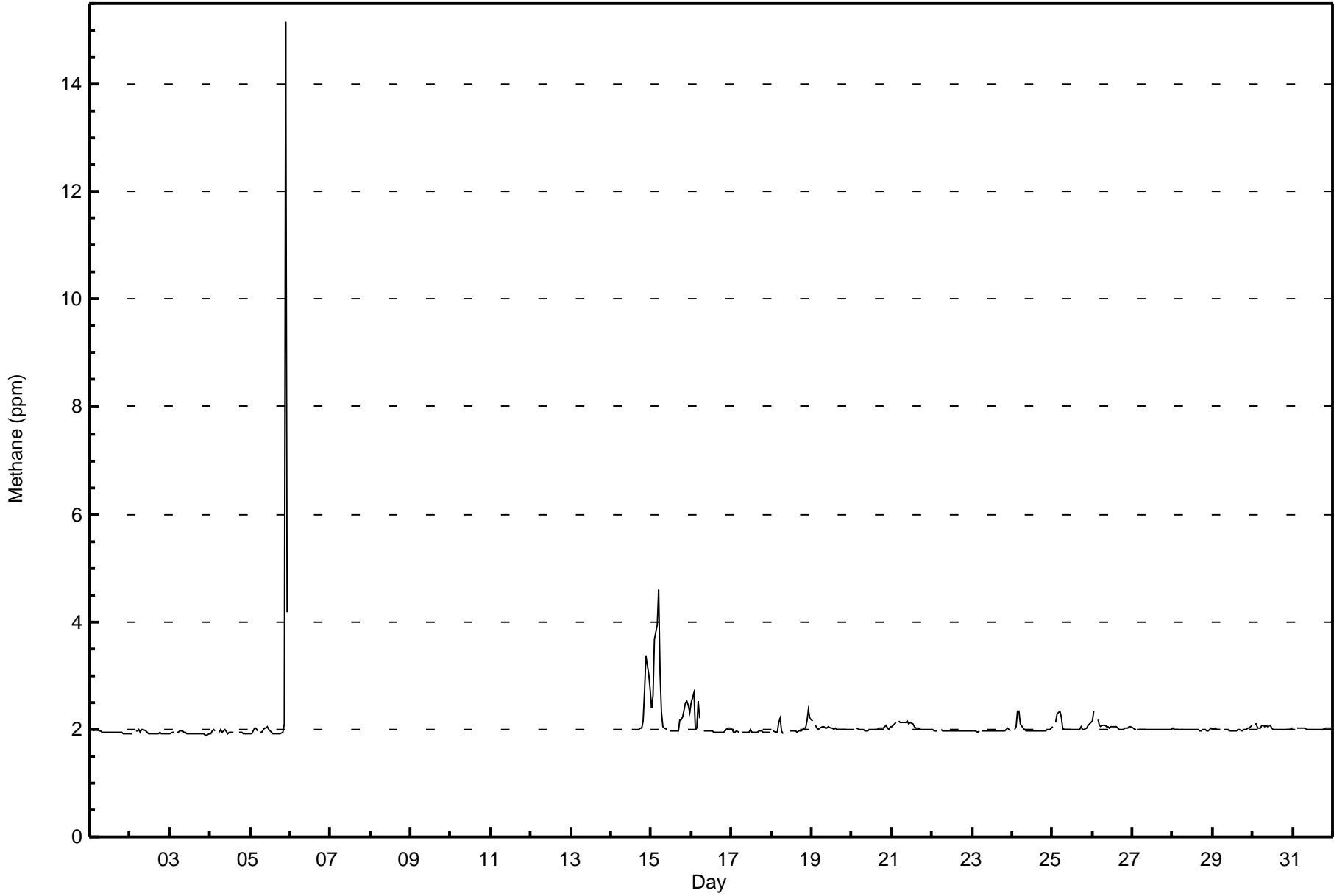






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Anzac - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	435	84.80	84.80
2.1 - 3.0	71	13.84	98.64
3.1 - 10.0	6	1.17	99.81
> 10.0	1	0.19	100.00

Total Number of Valid Hours: 513

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Anzac - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	22	33	31	16	18	17	27	27	35	13	34	17	19	63	37	26	435
2.1 - 3.0	8	5	1	3	2	3	2	4	5	2	5	3	5	1	12	10	71
3.1 - 10.0	0	1	0	0	0	0	0	0	0	0	1	1	1	2	0	0	6
> 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	31	39	32	19	20	20	29	31	40	15	40	21	25	66	49	36	513

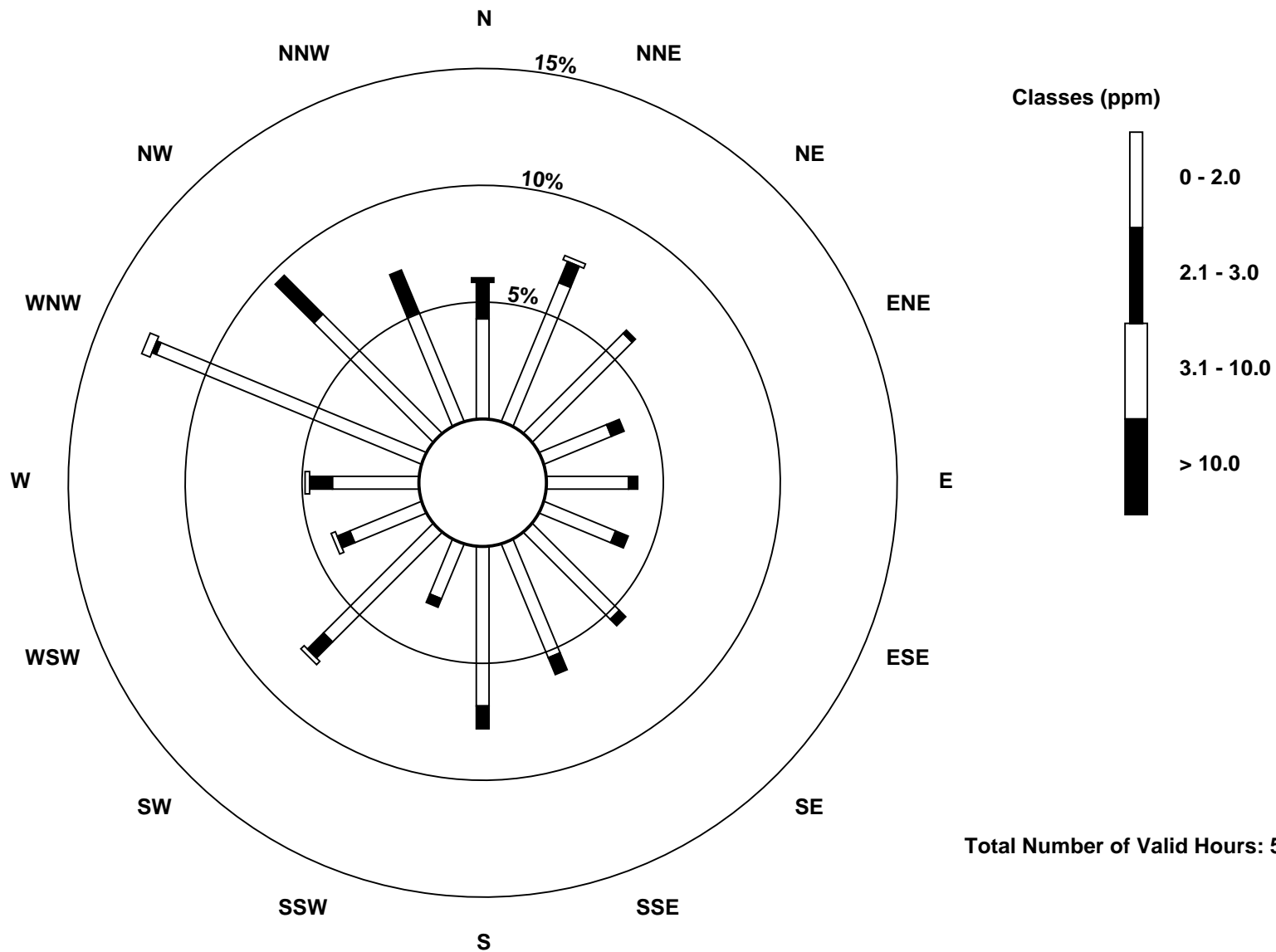
Total Number of Valid Hours: 513

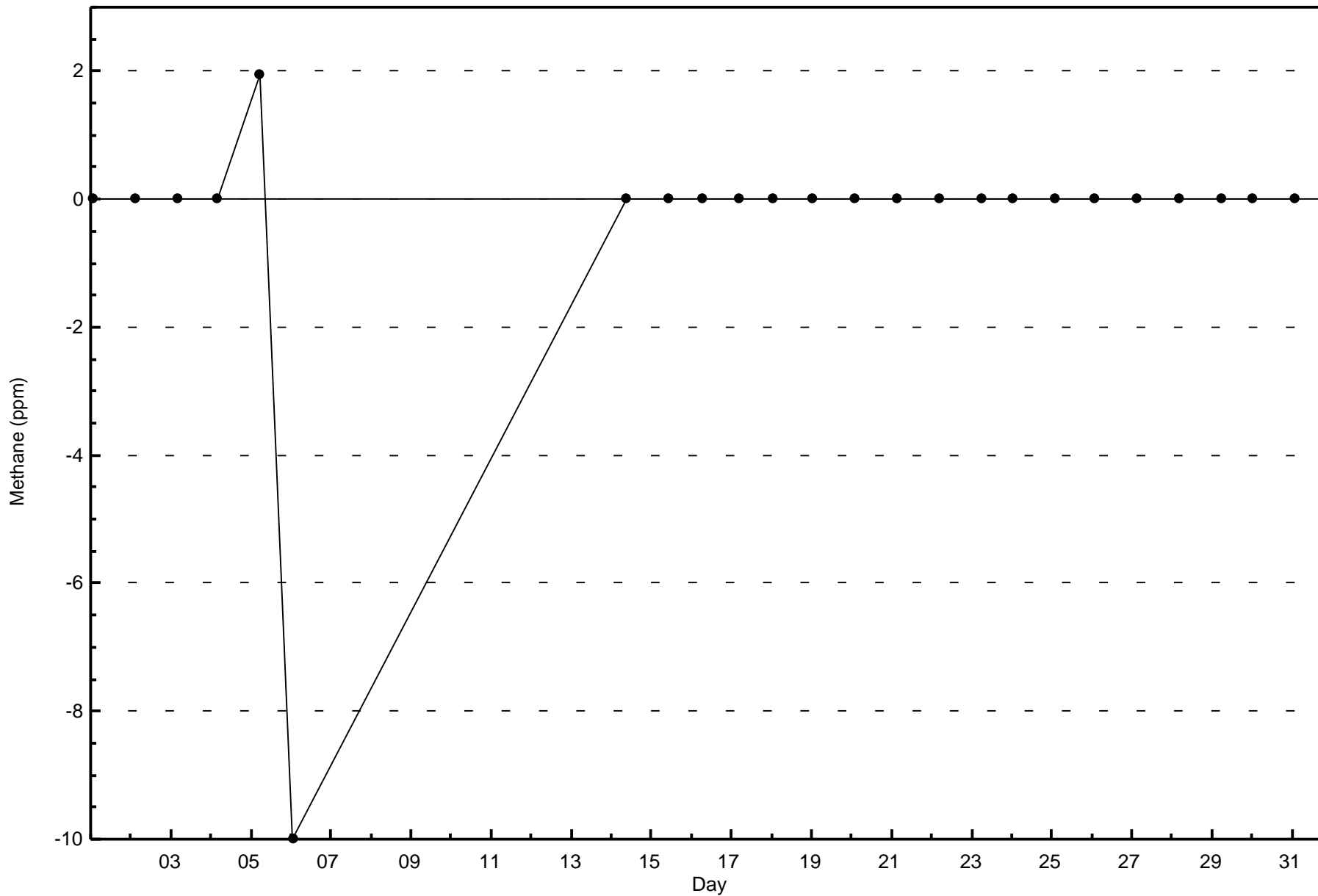
Total Number of Hours: 744

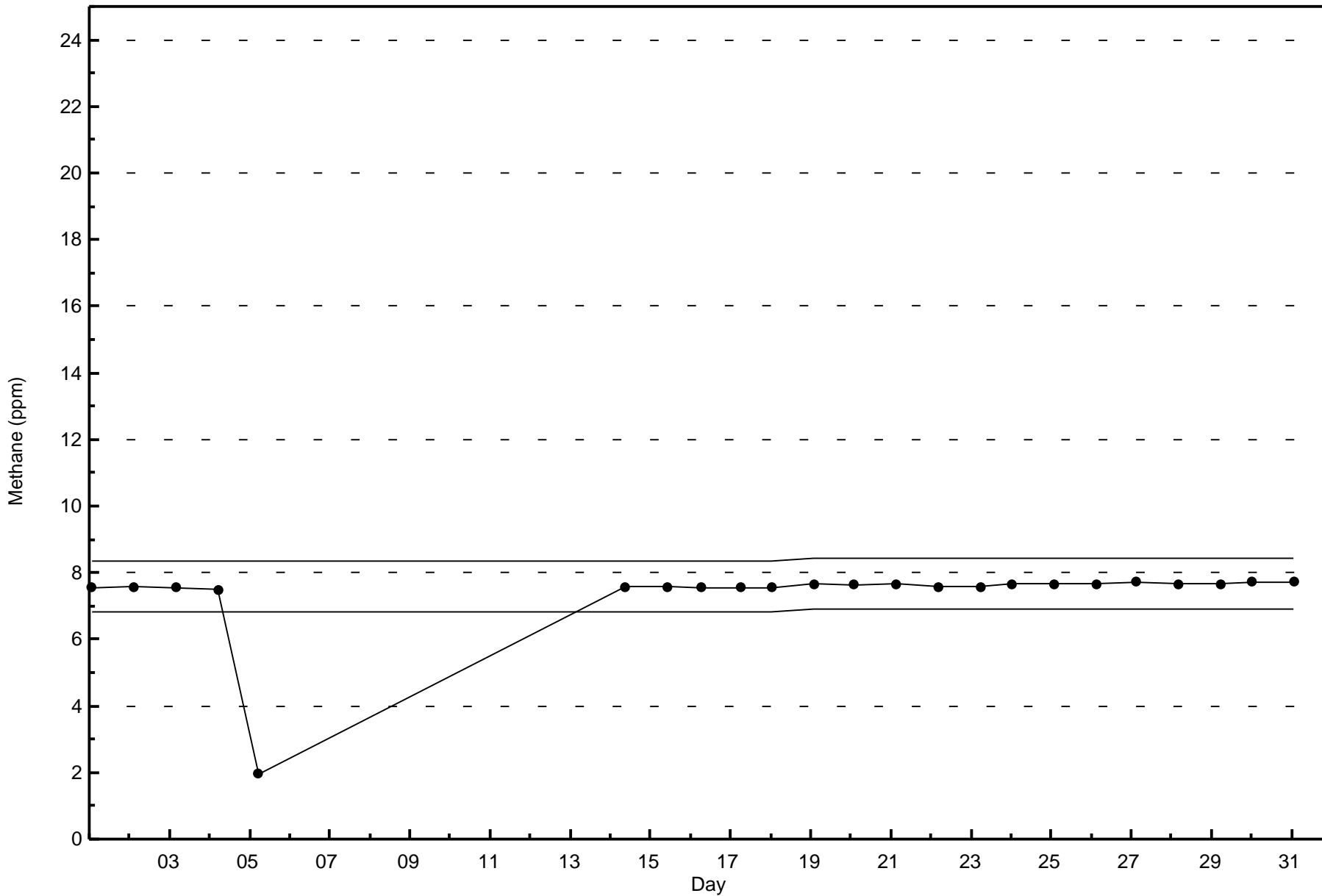


Wood Buffalo Environmental Association
Wind Rose May 2016

Methane (CH₄) - ppm
Anzac (AMS 14)







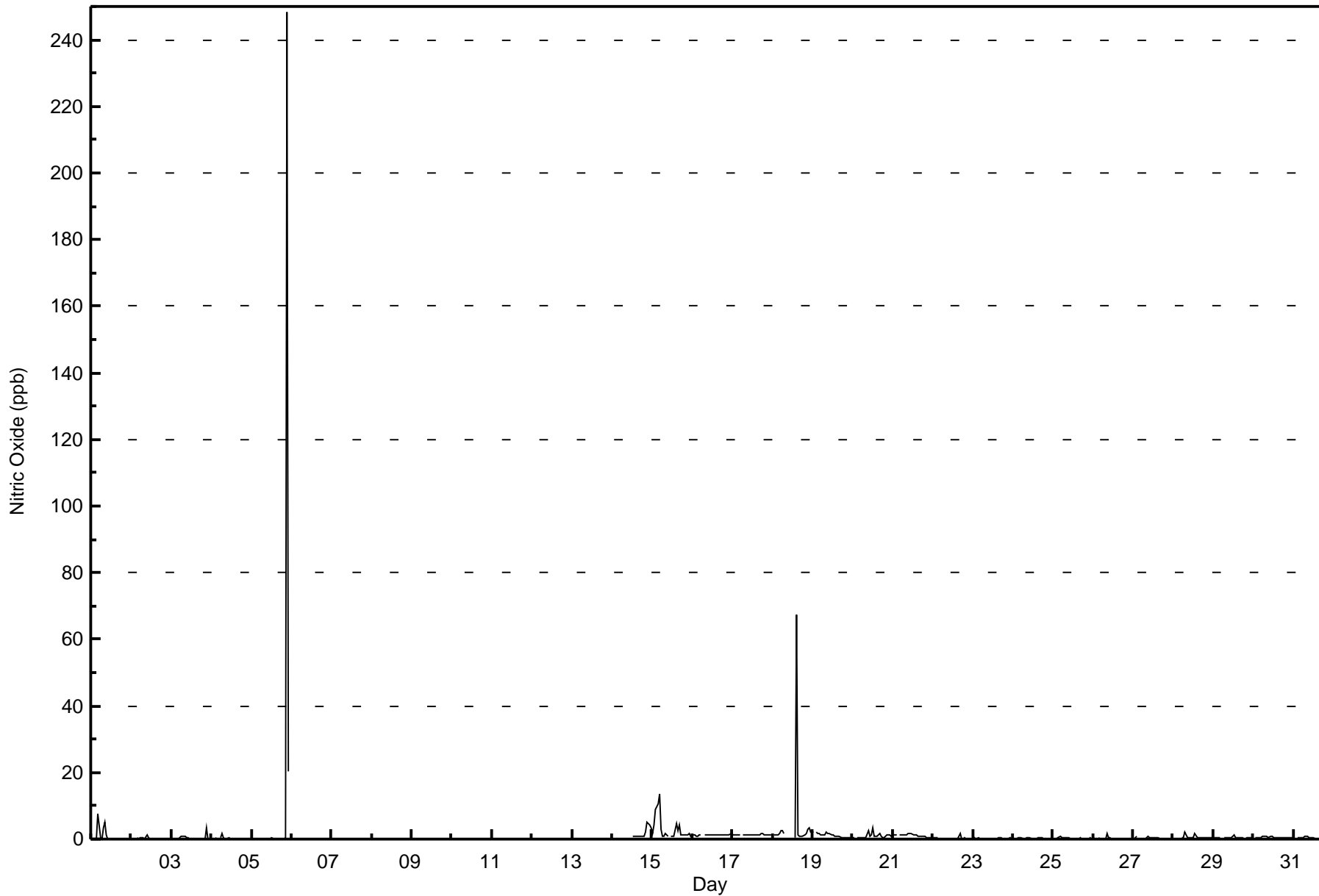


Maximum Value: 248 ppb on May 5 22:00		Maximum Daily Average: 12.4 ppb on May 5		Hours in Service: 744																																												
Minimum Value: 0 ppb on May 26 08:00		Minimum Daily Average: 0.2 ppb on May 23		Hours of Data: 512																																												
Maximum Diurnal Average: 11.7 ppb at hour 22		Minimum Diurnal Average: 0.4 ppb at hour 19		Hours of Missing Data: 232																																												
Monthly Average: 1.4 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 9		Hours of Calibration: 28																																												
				Percent Operational Time: 72.6																																												
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-May	0	Z	0	0	7	0	0	3	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	7																						
2-May	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
3-May	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0.4	3																						
4-May	0	0	0	0	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	248	20	12.4	248																						
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
14-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	Z	1	PF	1	1	1	1	1	1	1	1	2	5	4	3	--	5																					
15-May	2	4	9	11	14	3	1	1	2	1	Z	1	1	1	5	3	4	1	1	1	1	1	2	1	3.0	14																						
16-May	1	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2																						
17-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1.3	2																						
18-May	Z	1	1	1	2	3	2	2	C	C	C	C	C	0	67	1	1	1	1	1	2	3	3	2	5.3	67																						
19-May	2	Z	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	0	1	0	0	1.1	2																						
20-May	0	1	Z	0	1	1	1	0	0	3	1	1	3	1	1	1	2	1	1	1	1	1	1	1	1.0	3																						
21-May	1	1	1	Z	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	1.1	2																						
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	2																						
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
25-May	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
26-May	0	0	Z	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																						
27-May	0	1	1	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
28-May	0	0	0	0	Z	0	1	2	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0.5	2																						
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1																						
30-May	Z	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
31-May	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
																								0.5	0.7	1.0	1.1	1.7	0.8	0.7	0.8	0.9	0.8	0.6	0.5	0.6	0.5	3.5	0.6	0.7	0.5	0.4	0.4	0.5	11.7	1.6	0.6	Diurnal Average
																								2	4	9	11	14	3	2	3	5	3	2	2	3	2	67	3	4	2	2	1	2	248	20	3	Diurnal Maximum
Z - zerospan																								C - Calibration				UO - Unstable Operation				PF - Power Failure																



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	510	99.61	99.61
21 - 40	0	0.00	99.61
41 - 80	1	0.20	99.80
81 - 159	0	0.00	99.80
> 159	1	0.20	100.00

Total Number of Valid Hours: 512

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	39	32	19	20	20	29	31	40	15	40	21	25	64	49	36	510
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	1	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	31	39	32	19	20	20	29	31	40	15	40	21	25	65	49	36	512

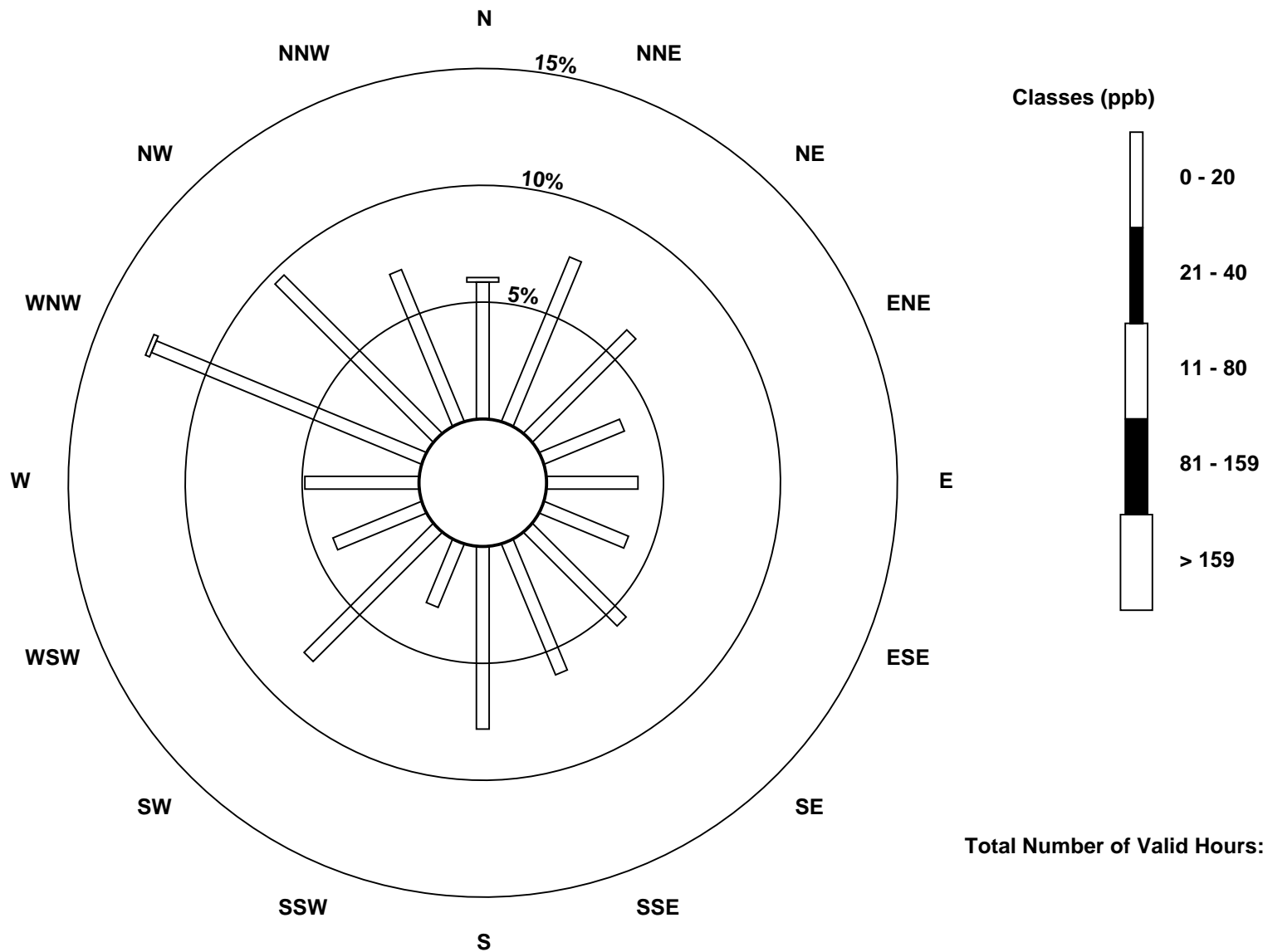
Total Number of Valid Hours: 512

Total Number of Hours: 744

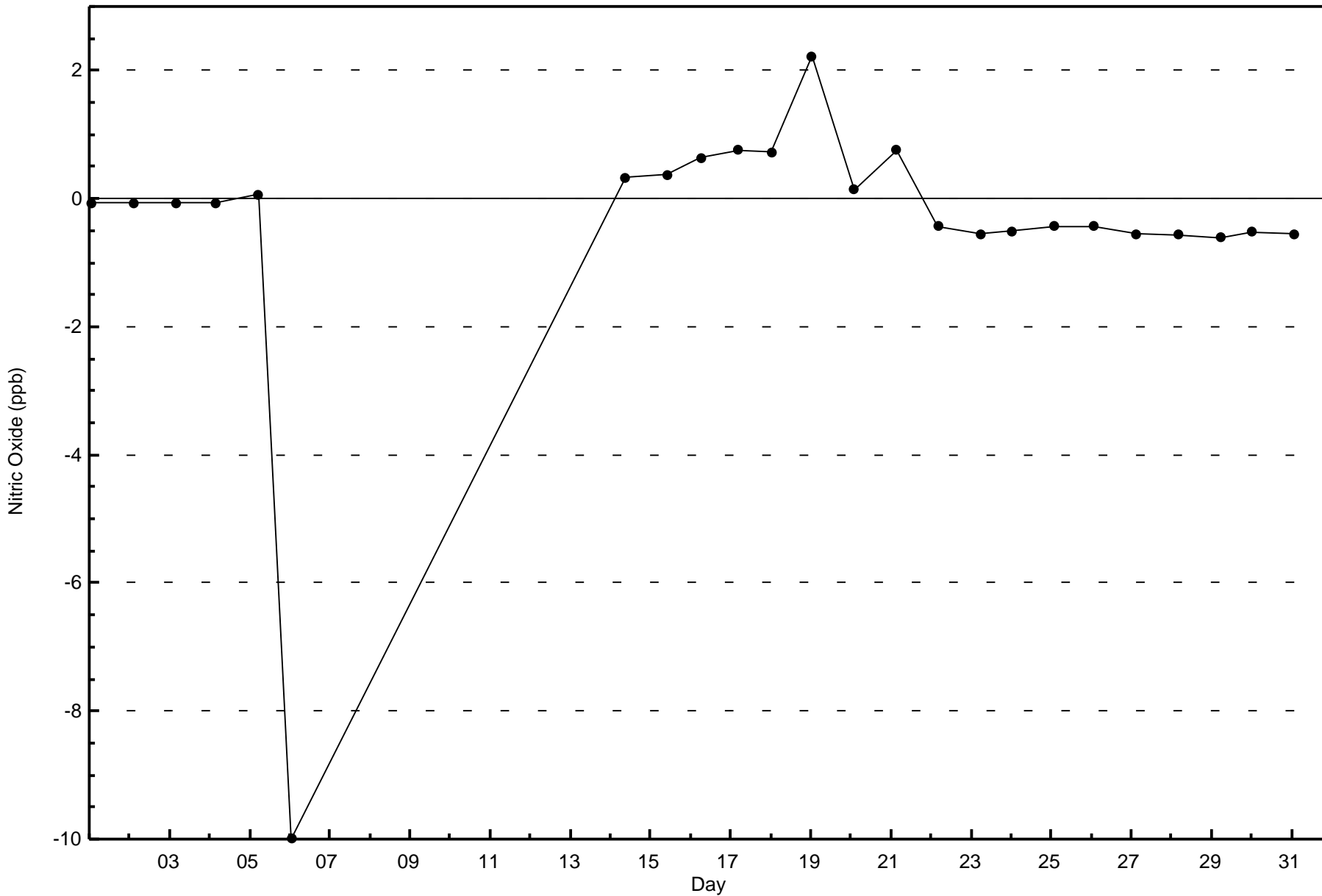


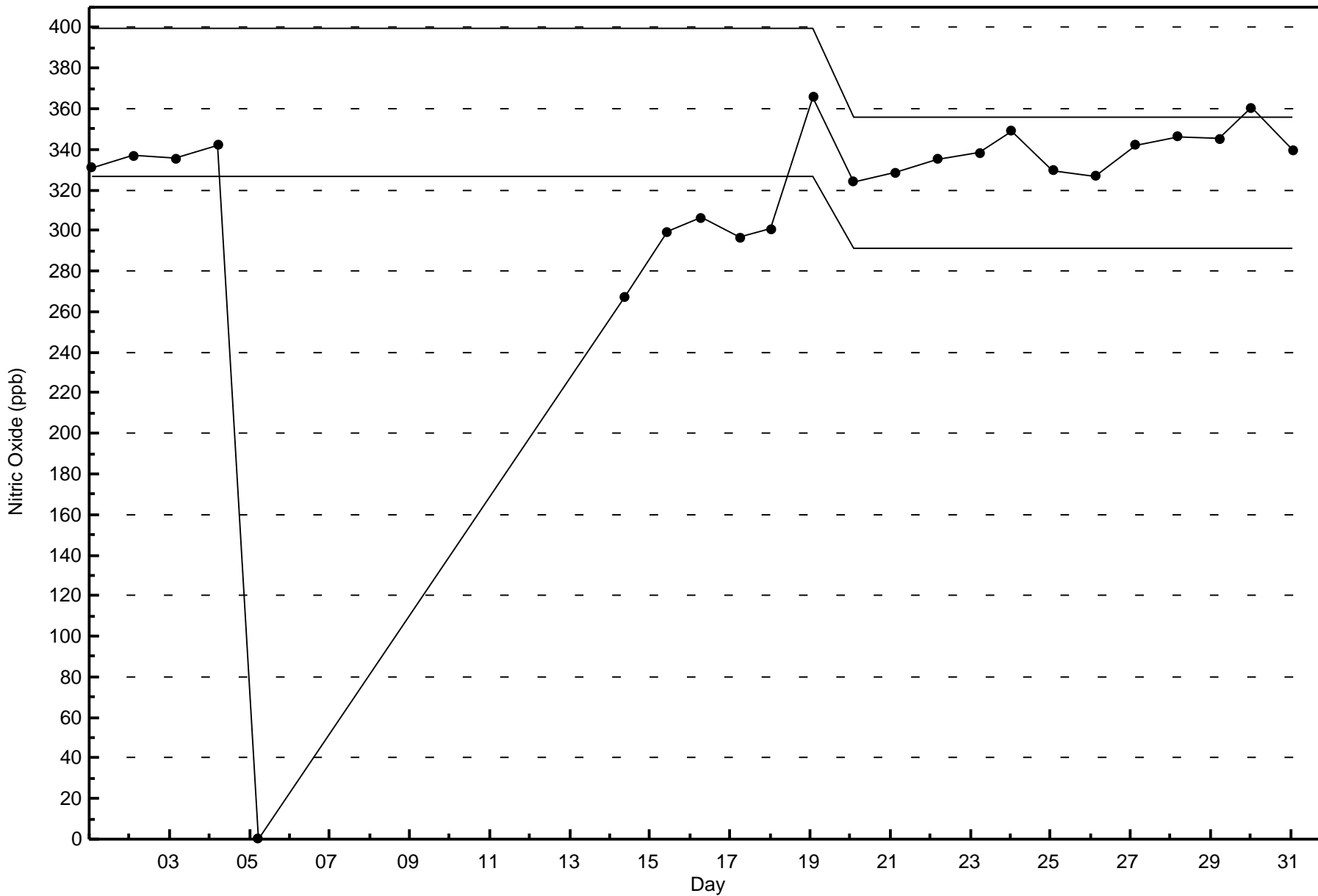
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 512







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Anzac - May 2016

Number of Exceedences (AAAQO): 1-hr: 1 24-hr: 0	Hours in Service: 744
Maximum Value: 291 ppb on May 5 22:00	Maximum Daily Average: 19.0 ppb on May 5
Minimum Value: 0 ppb on May 14 13:00	Hours of Data: 512
Maximum Diurnal Average: 15.1 ppb at hour 22	Hours of Missing Data: 232
Monthly Average: 2.4 ppb	Hours of Calibration: 28
Minimum Daily Average: 0.4 ppb on May 22	Percent Operational Time: 72.6
Minimum Diurnal Average: 0.9 ppb at hour 14	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 2 P ₉₀ = 4 P ₉₉ = 14

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	1	Z	2	2	10	2	1	3	8	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.8	10	
2-May	1	1	Z	2	2	2	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1.0	4	
3-May	1	7	2	Z	4	4	5	3	3	2	2	1	1	1	1	1	1	1	1	1	1	9	2	3	2.5	9	
4-May	3	3	2	3	Z	3	6	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	6	
5-May	1	3	13	9	3	Z	1	1	4	5	5	5	4	1	1	1	1	1	1	4	22	291	44	PF	19.0	291	
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	Z	0	PF	0	0	1	1	1	3	2	4	9	13	11	11	--	13
15-May	6	8	12	12	15	9	4	3	3	1	Z	0	0	0	0	1	2	14	13	8	10	10	11	5	6.3	15	
16-May	4	5	1	1	5	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1.0	5	
17-May	0	0	0	0	0	Z	0	0	0	0	1	3	1	1	1	1	2	3	2	1	0	0	0	0	0.6	3	
18-May	Z	1	0	0	1	2	0	0	C	C	C	C	C	0	0	1	1	1	2	5	6	5	7	5	2.0	7	
19-May	4	Z	3	1	1	1	2	2	2	3	3	2	2	1	1	1	1	1	1	2	1	2	2	2	1.7	4	
20-May	2	2	Z	2	1	1	1	1	1	2	1	1	3	2	2	2	3	4	2	2	2	2	3	2	1.8	4	
21-May	2	2	3	Z	3	2	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1	2.0	3	
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0.4	1	
23-May	0	1	0	0	0	Z	0	0	0	0	1	1	1	3	4	4	3	1	1	1	2	1	0	1.1	4		
24-May	Z	1	1	4	4	3	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	1	1	1	1.0	4	
25-May	1	Z	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2	5	3	2	2	2	2	2	1.6	5	
26-May	3	3	Z	3	3	2	2	2	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1.8	3	
27-May	1	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1.0	2	
28-May	1	1	1	1	Z	0	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
29-May	1	1	1	1	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0.8	2	
30-May	Z	1	1	1	1	2	2	2	3	2	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1.4	4	
31-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	

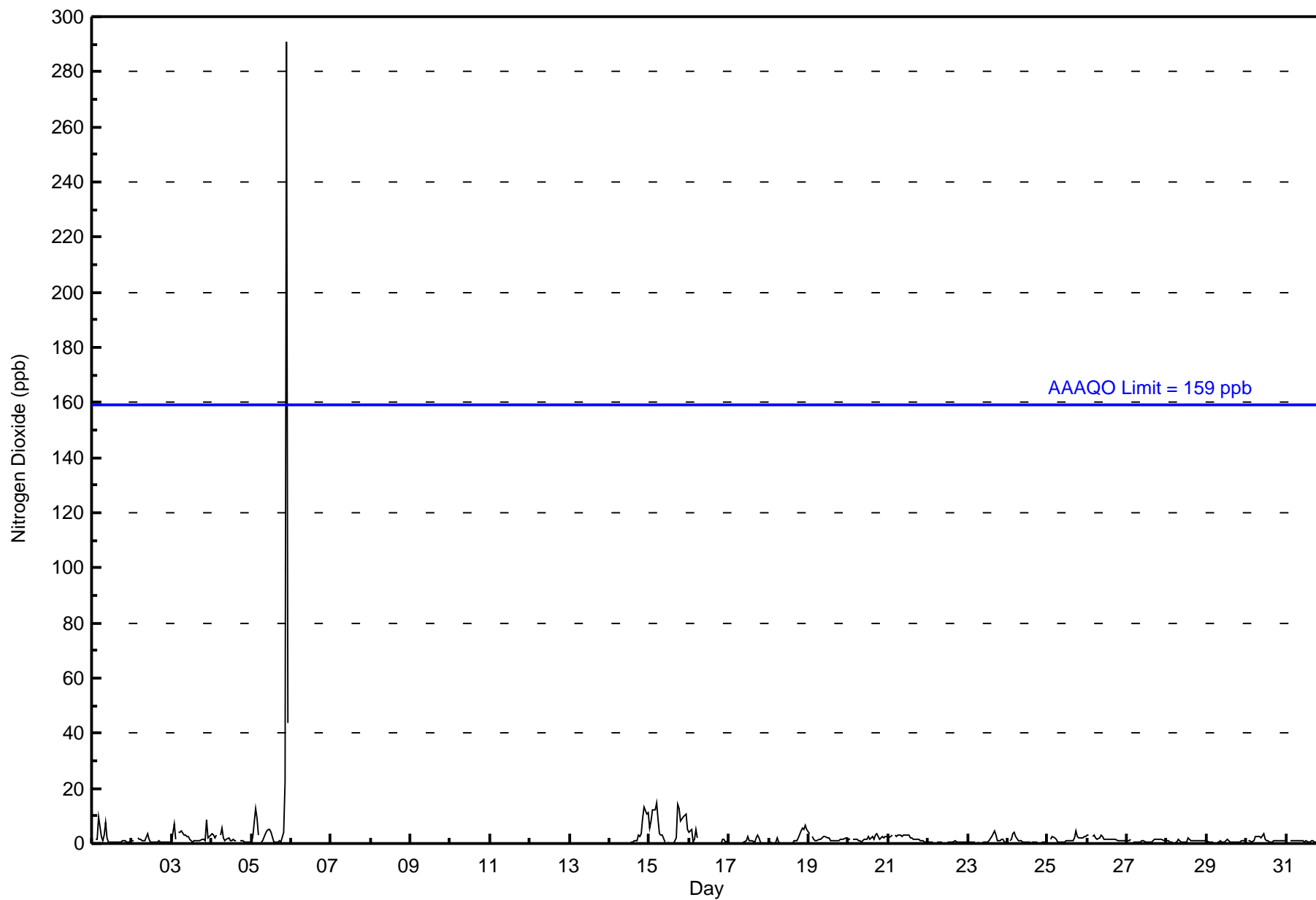
1.7	2.2	2.3	2.3	3.0	2.2	1.5	1.3	1.7	1.5	1.4	1.2	1.1	0.9	0.9	1.0	1.3	2.0	1.7	1.7	2.9	15.1	3.9	1.9	Diurnal Average
6	8	13	12	15	9	6	3	8	5	5	5	4	2	3	4	4	14	13	8	22	291	44	11	Diurnal Maximum

Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	509	99.41	99.41
21 - 40	1	0.20	99.61
41 - 80	1	0.20	99.80
81 - 159	0	0.00	99.80
> 159	1	0.20	100.00

Total Number of Valid Hours: 512

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	38	32	19	20	20	29	31	40	15	40	21	25	65	48	36	509
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
41 - 80	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	31	39	32	19	20	20	29	31	40	15	40	21	25	65	49	36	512

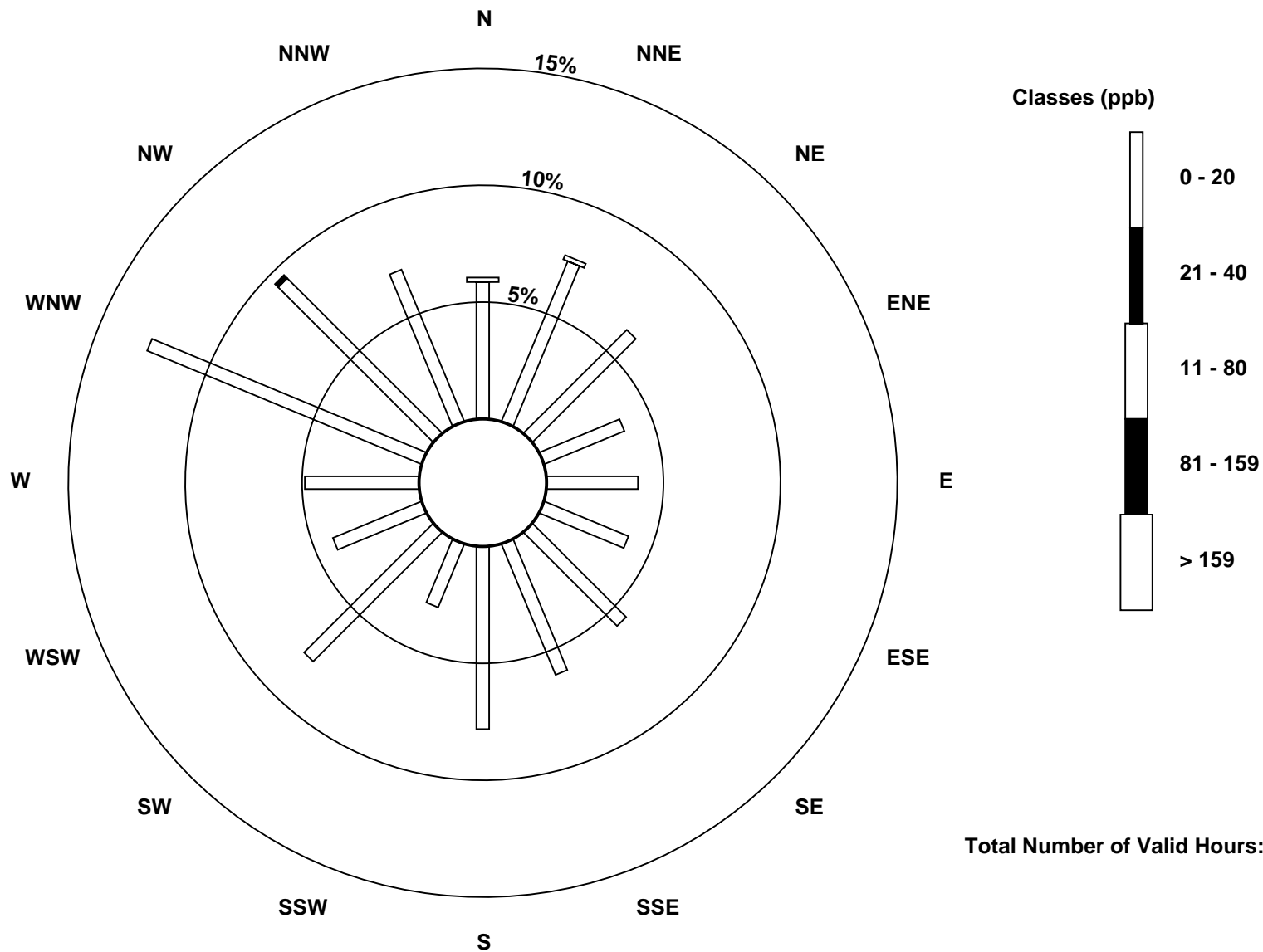
Total Number of Valid Hours: 512

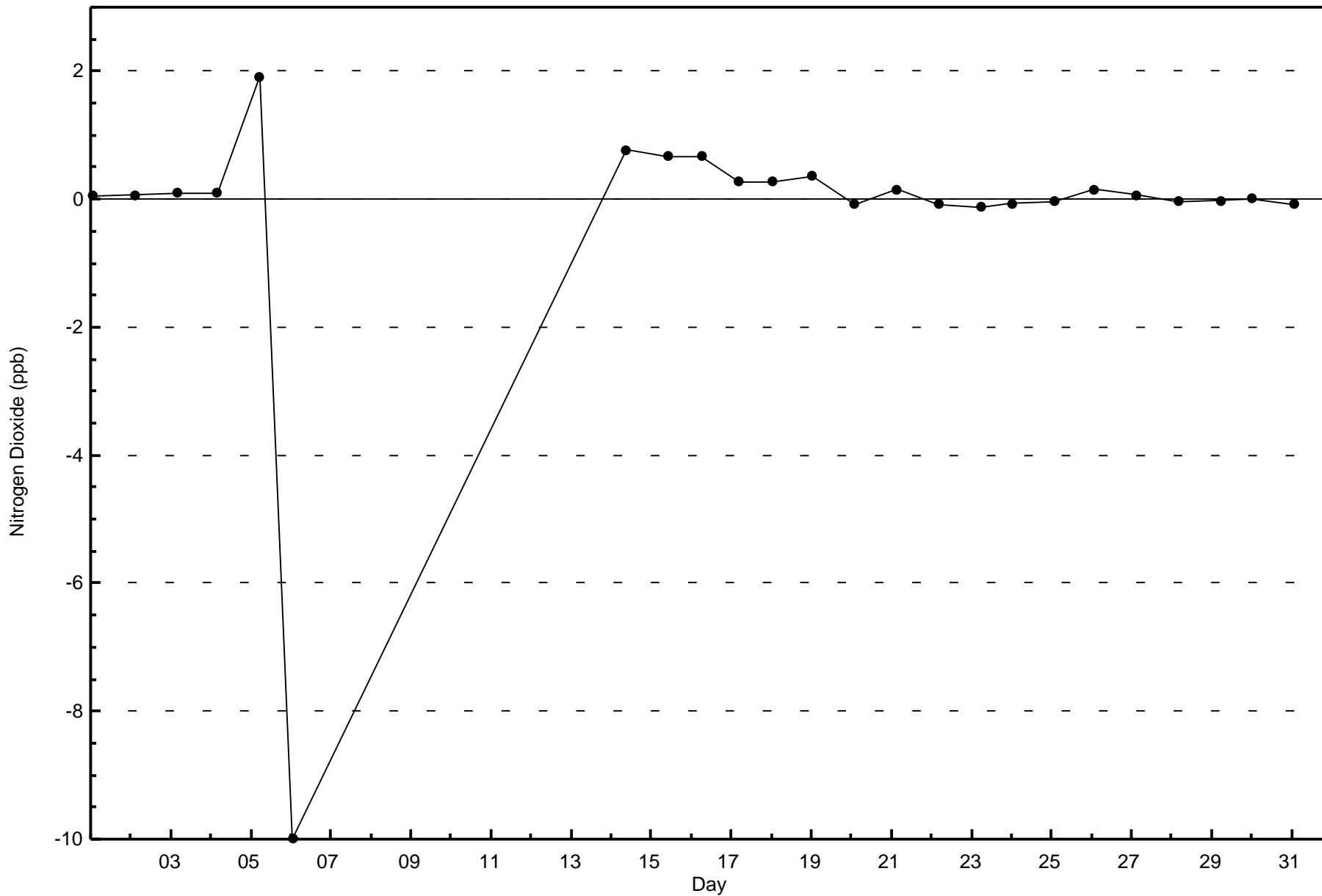
Total Number of Hours: 744

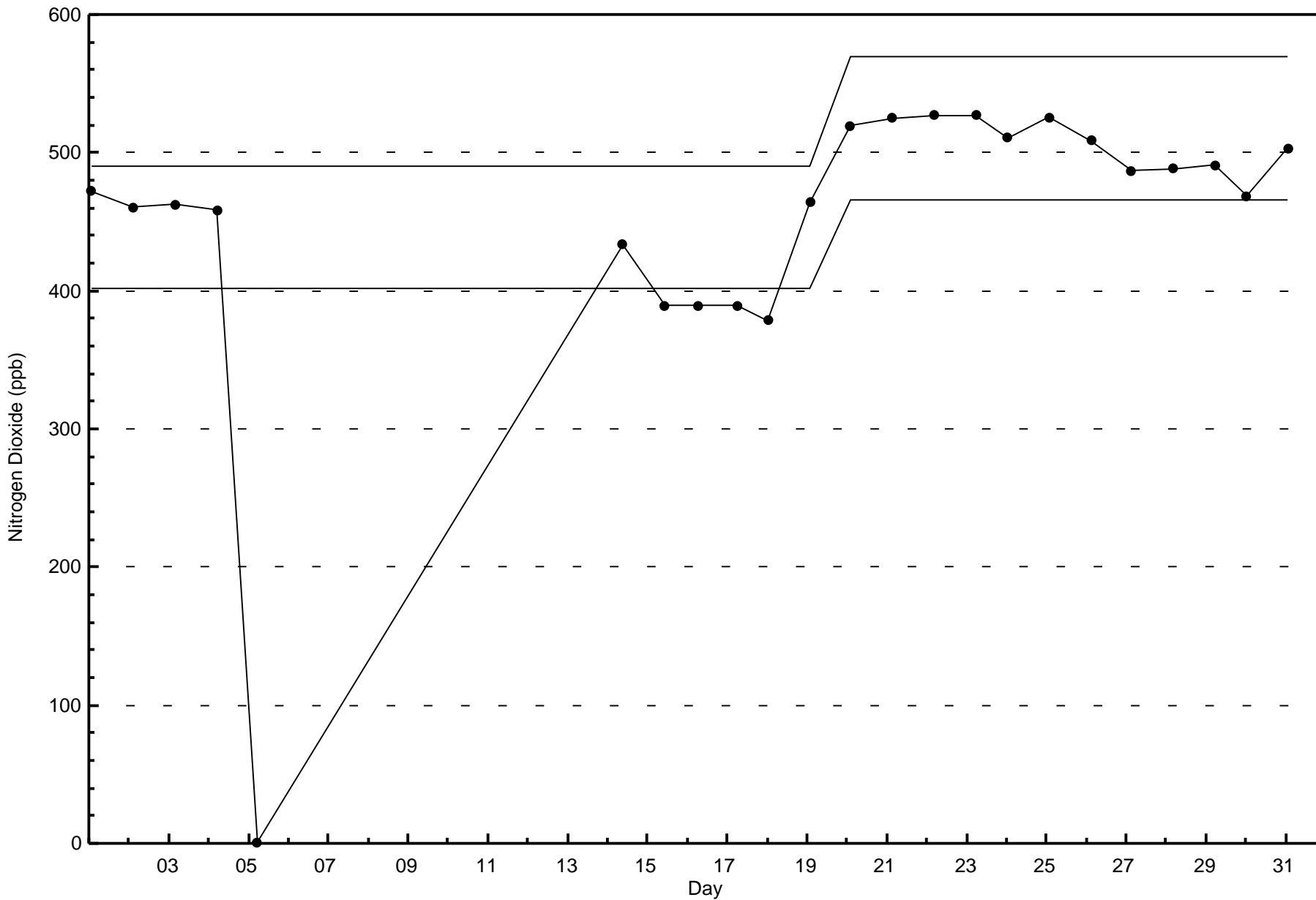


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)

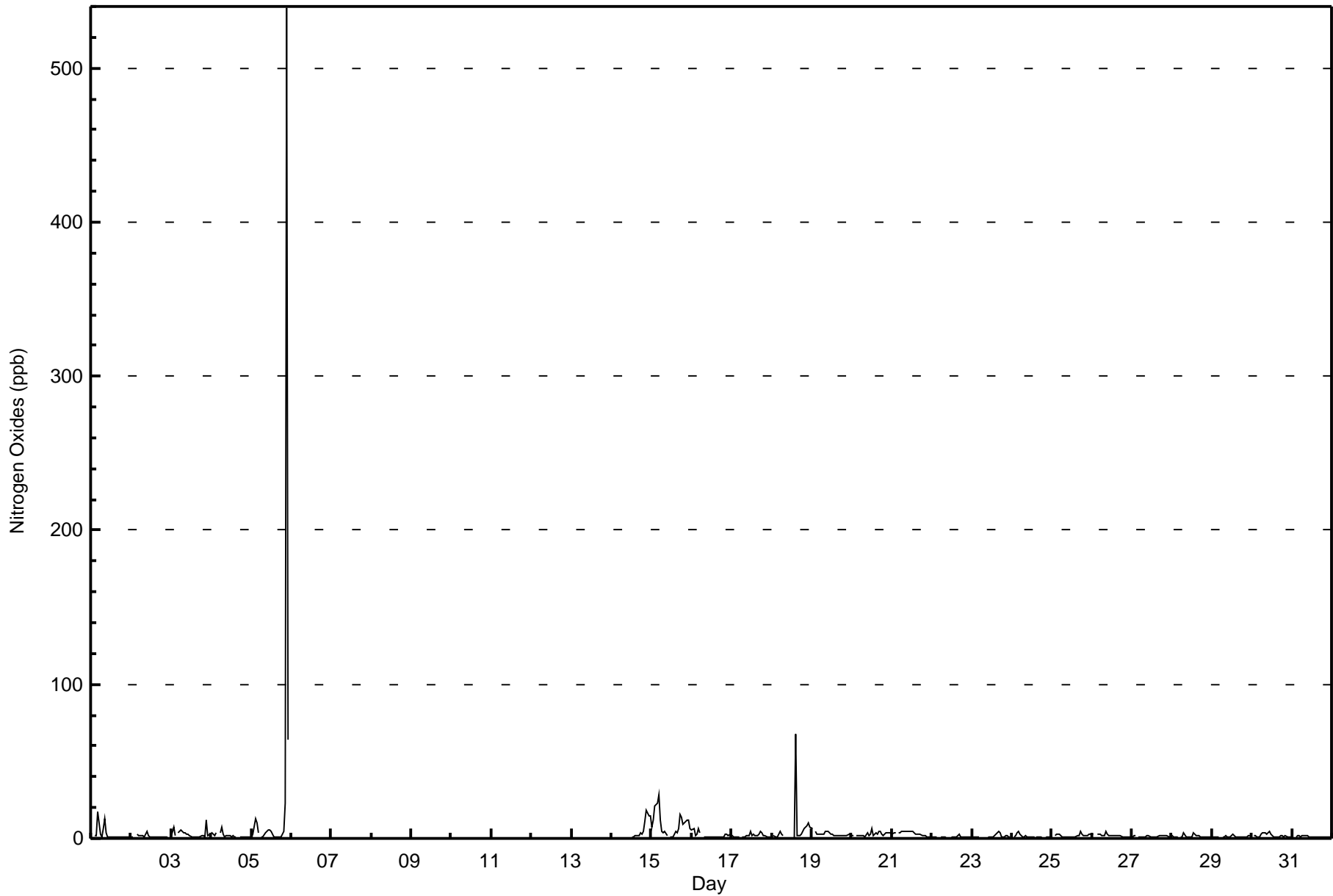








Maximum Value: 539 ppb on May 5 22:00		Maximum Daily Average: 31.3 ppb on May 5		Hours in Service: 744																																													
Minimum Value: 0 ppb on May 18 14:00		Minimum Daily Average: 0.7 ppb on May 22		Hours of Data: 512																																													
Maximum Diurnal Average: 26.7 ppb at hour 22		Minimum Diurnal Average: 1.4 ppb at hour 14		Hours of Missing Data: 232																																													
Monthly Average: 3.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 O ₃ = 3 P ₉₀ = 5 P ₉₉ = 19		Hours of Calibration: 28																																													
				Percent Operational Time: 72.6																																													
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-May	1	Z	2	2	17	3	1	6	13	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.6	17																							
2-May	1	1	Z	2	2	2	1	2	1	5	2	1	1	1	1	1	1	1	1	1	1	1	0	0	1.2	5																							
3-May	1	7	2	Z	4	5	5	4	4	3	3	2	1	1	1	1	1	1	1	2	1	12	2	3	2.9	12																							
4-May	4	3	2	3	Z	4	8	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.9	8																							
5-May	1	3	13	10	3	Z	1	1	4	5	5	5	5	1	1	1	1	1	1	4	23	539	64	PF	31.3	539																							
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
14-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	Z	1	PF	1	1	2	2	2	2	4	3	5	11	18	15	15	--	--																					
15-May	7	12	21	23	28	11	4	4	4	1	Z	1	1	1	5	4	7	15	14	9	11	12	12	6	9.3	28																							
16-May	5	6	1	2	7	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	2	3	2.3	7																							
17-May	1	1	1	1	1	Z	1	1	1	2	2	4	2	2	2	2	3	4	4	2	2	1	1	1	2.0	4																							
18-May	Z	2	1	1	3	5	3	2	C	C	C	C	C	0	67	2	2	1	3	6	7	8	10	7	7.2	67																							
19-May	6	Z	5	3	3	3	3	3	4	4	4	3	3	2	2	2	2	2	2	2	2	2	3	2	2.8	6																							
20-May	2	2	Z	2	2	2	2	1	1	4	2	3	6	2	3	3	5	4	3	2	3	3	4	3	2.8	6																							
21-May	3	3	4	Z	4	4	4	4	4	4	5	5	4	3	3	3	2	2	2	2	2	1	1	1	3.1	5																							
22-May	1	1	1	0	Z	1	1	1	1	0	0	0	0	1	0	0	3	1	1	1	1	1	1	1	0.7	3																							
23-May	1	1	1	1	0	Z	0	0	0	0	1	1	1	3	4	5	3	1	1	1	2	1	1	1	1.3	5																							
24-May	Z	1	2	4	5	3	1	1	2	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1.2	5																							
25-May	1	Z	1	3	3	2	1	1	1	1	1	1	1	1	1	2	5	3	2	2	2	3	3	3	1.8	5																							
26-May	3	3	Z	3	3	2	2	2	5	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2.0	5																							
27-May	1	2	2	Z	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1.3	2																							
28-May	1	1	1	1	Z	1	1	3	1	1	1	1	4	1	2	2	1	1	1	1	1	1	1	1	1.3	4																							
29-May	1	1	1	1	1	Z	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2	1.1	3																							
30-May	Z	2	1	1	1	3	3	3	3	3	5	2	1	1	1	1	1	1	2	1	2	1	1	1	1.9	5																							
31-May	1	Z	1	2	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2																							
																								2.3	2.9	3.3	3.4	4.7	3.0	2.2	2.1	2.7	2.3	2.0	1.8	1.8	1.4	4.4	1.6	2.0	2.4	2.1	2.2	3.4	26.7	5.5	2.5	Diurnal Average	
																								7	12	21	23	28	11	8	6	13	5	5	5	6	4	67	4	7	15	14	9	23	539	64	15	Diurnal Maximum	
Z - zerospan																								C - Calibration				UO - Unstable Operation				PF - Power Failure																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	505	98.63	98.63
21 - 40	4	0.78	99.41
41 - 80	2	0.39	99.80
81 - 159	0	0.00	99.80
> 159	1	0.20	100.00

Total Number of Valid Hours: 512

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	38	32	19	20	20	29	31	40	15	40	21	24	62	48	36	505
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	4
41 - 80	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	31	39	32	19	20	20	29	31	40	15	40	21	25	65	49	36	512

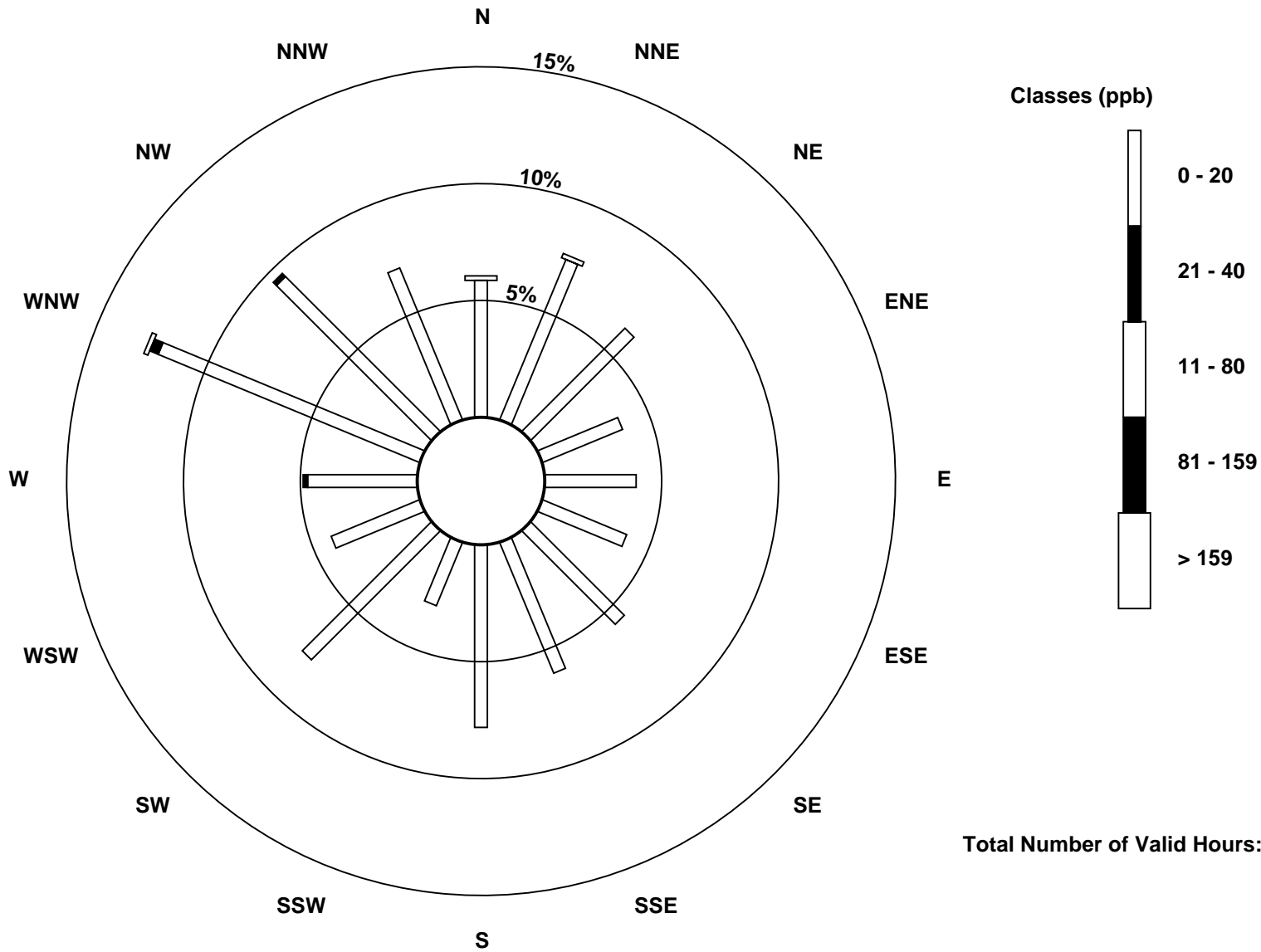
Total Number of Valid Hours: 512

Total Number of Hours: 744

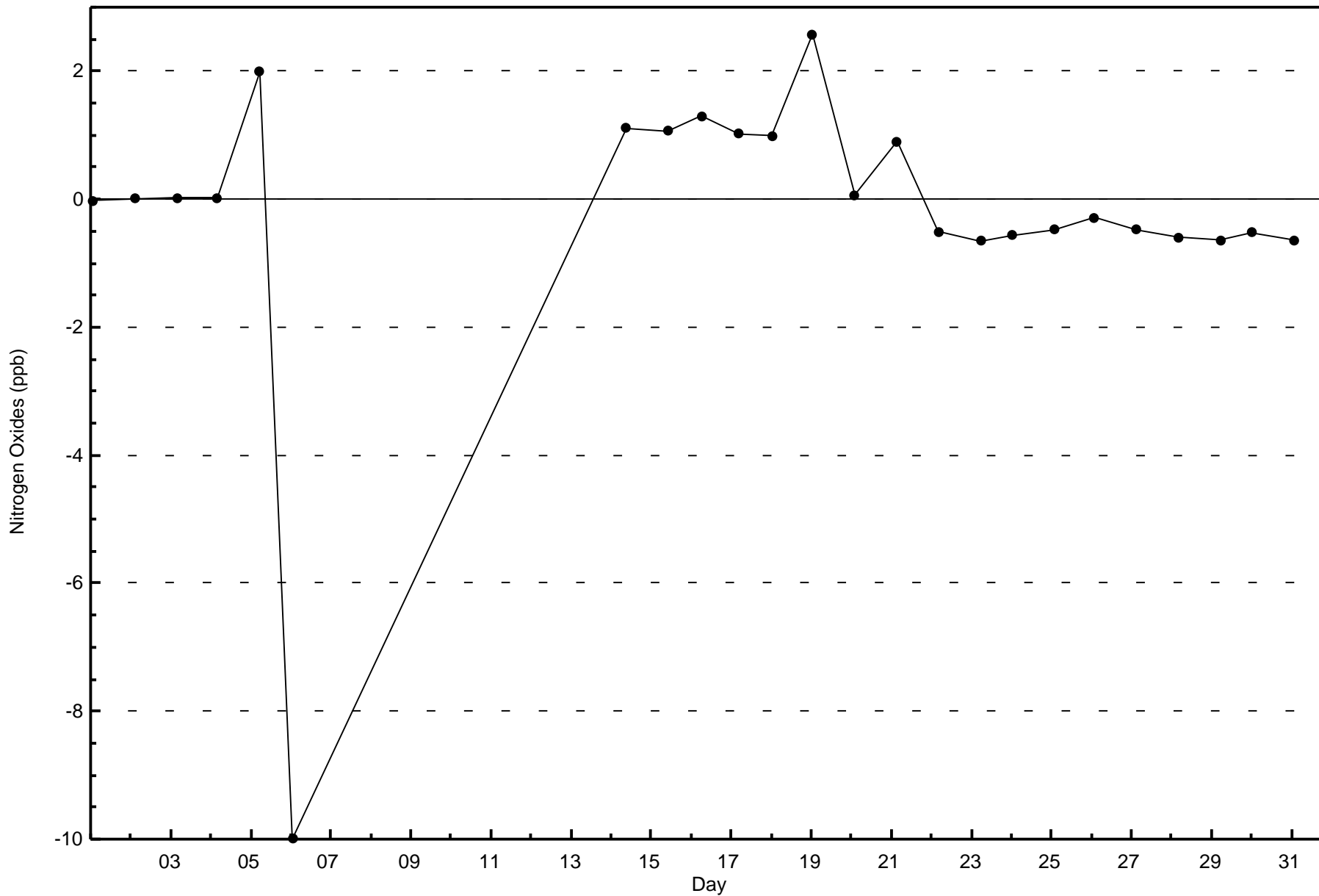


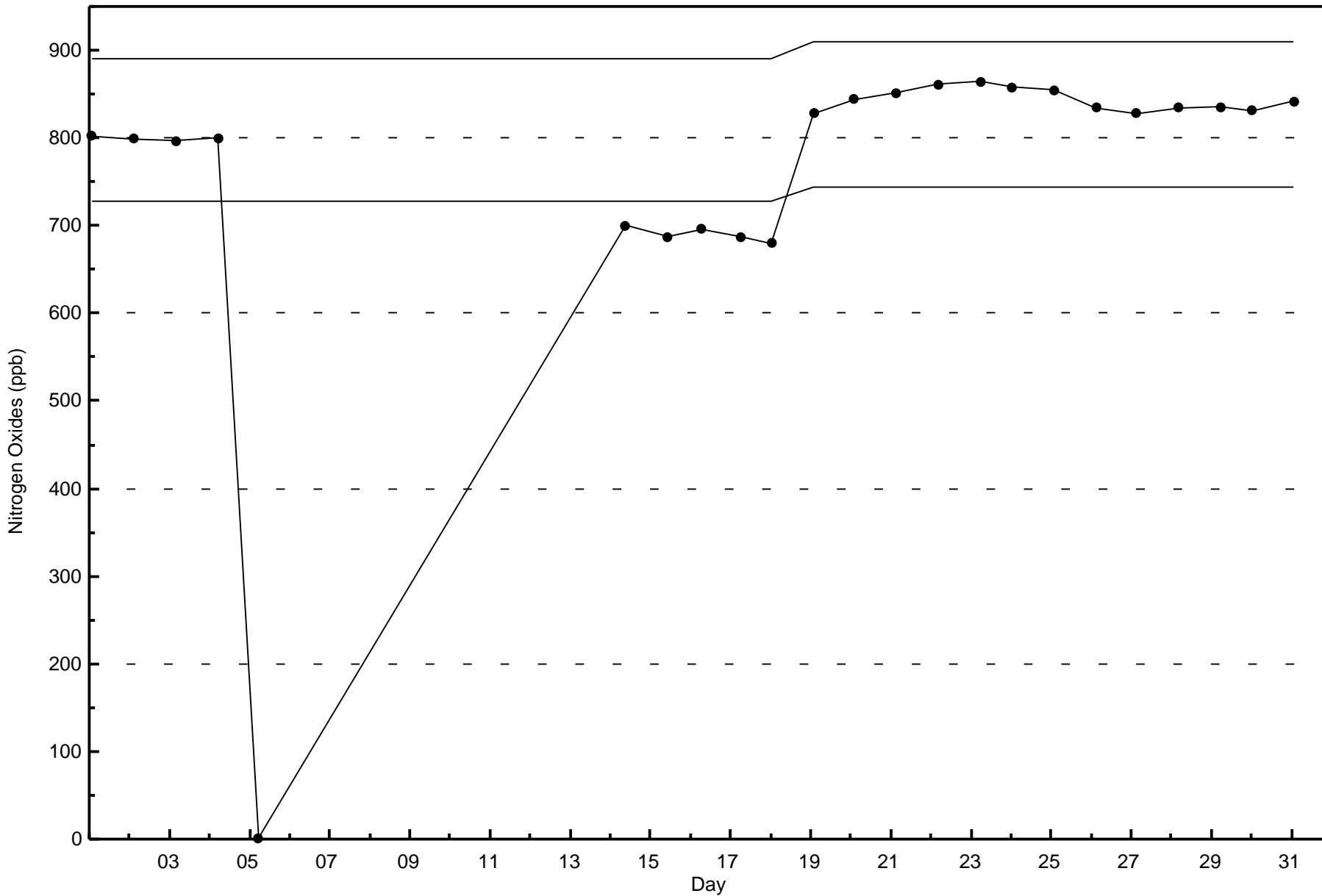
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 512







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Anzac - May 2016

Number of Exceedences (AAAQO):	1-hr: 2	24-hr: 0	Hours in Service:	744
Maximum Value: 1612 ppb on May 5 22:00	Maximum Daily Average: 122.1 ppb on May 5		Hours of Data:	513
Minimum Value: 6 ppb on May 30 03:00	Minimum Daily Average: 17.6 ppb on May 21		Hours of Missing Data:	231
Maximum Diurnal Average: 98.0 ppb at hour 22	Minimum Diurnal Average: 21.9 ppb at hour 4		Hours of Calibration:	25
Monthly Average: 34.6 ppb	Percentiles: P ₁ = 10 P ₁₀ = 15 Q ₁ = 21 Median = 30 Q ₃ = 41 P ₉₀ = 49 P ₉₉ = 68		Percent Operational Time:	72.3

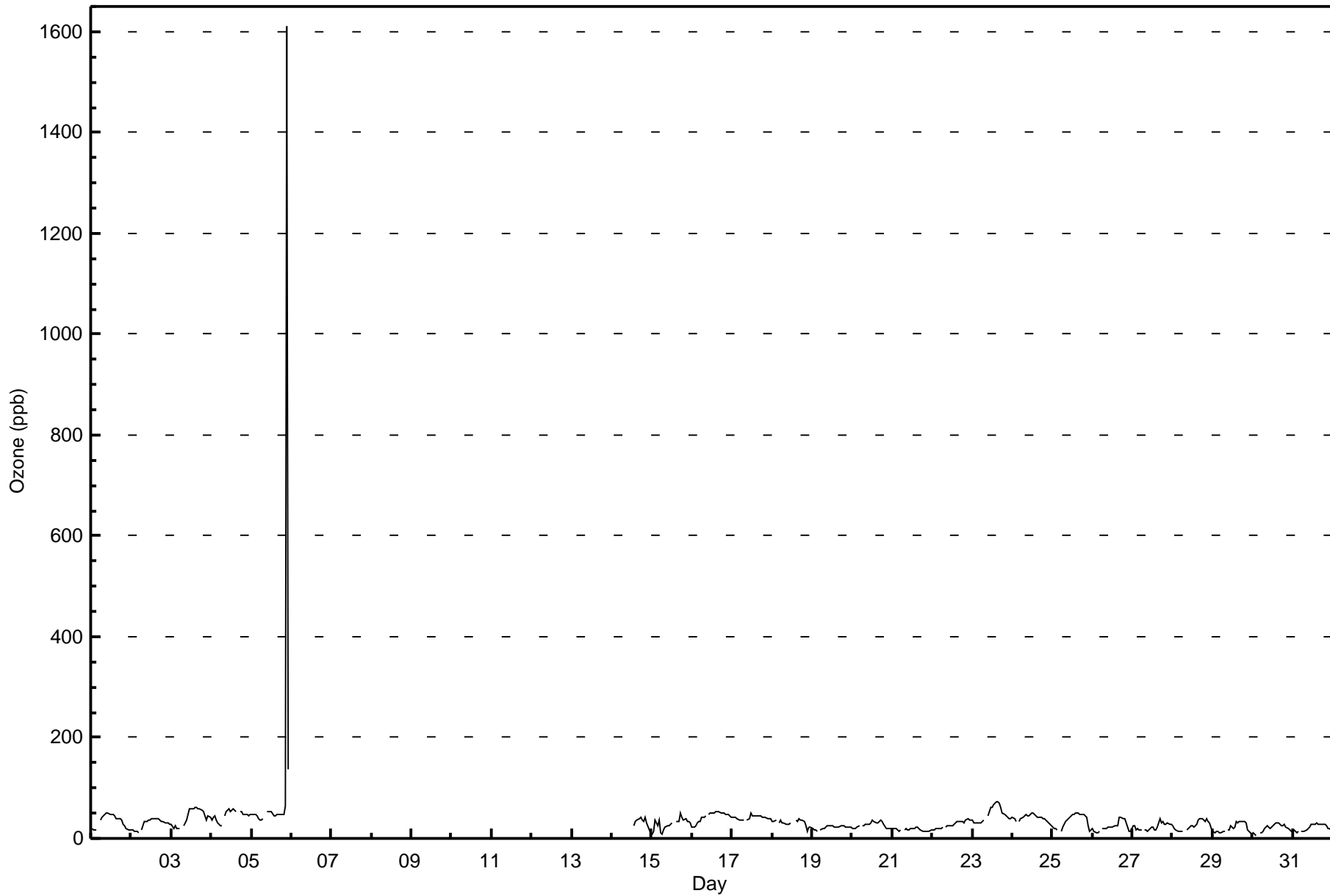
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	20	17	16	18	Z	36	42	46	47	50	51	49	48	46	44	39	38	38	37	29	26	20	17	17	34.3	51																							
2-May	16	16	15	13	12	Z	16	25	33	35	37	37	38	39	38	39	39	37	34	33	31	30	30	28	29.2	39																							
3-May	28	20	26	21	18	19	Z	25	30	37	48	58	59	59	62	61	60	59	57	52	46	37	44	42	42.2	62																							
4-May	36	43	44	35	30	26	Z	45	55	60	53	55	59	56	53	PF	53	52	48	48	47	46	47	46.2	60																								
5-May	46	48	48	43	38	37	38	39	Z	52	53	52	52	45	46	48	48	47	46	49	63	1612	138	PF	122.1	1612																							
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
14-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	Z	26	34	37	38	43	36	34	42	30	17	12	--	43																						
15-May	9	14	37	24	36	11	8	16	23	26	27	28	32	Z	26	34	37	38	43	36	34	42	30	17	12	28.8	51																						
16-May	21	21	26	32	33	34	41	43	45	Z	49	50	50	51	52	53	53	51	50	49	49	47	47	42	43.1	53																							
17-May	43	43	42	40	37	36	35	37	Z	37	39	49	45	46	45	44	44	43	41	42	43	41	40	40	41.4	49																							
18-May	35	35	35	Z	30	35	31	30	27	27	27	30	C	C	36	35	39	35	36	33	26	15	21	22	30.5	39																							
19-May	19	17	18	15	Z	18	19	19	22	24	24	25	24	22	23	23	23	24	24	24	24	22	21	21	21.5	25																							
20-May	21	21	21	21	24	Z	25	26	27	27	29	32	35	33	32	30	34	36	32	28	21	20	20	20	26.7	36																							
21-May	18	19	18	16	15	16	Z	18	18	17	17	21	21	20	22	23	21	18	15	13	13	14	14	16	17.6	23																							
22-May	16	17	19	19	20	20	22	Z	23	24	25	26	26	27	30	32	33	35	34	30	35	39	38	37	27.2	39																							
23-May	37	30	32	31	31	30	33	35	Z	44	52	61	62	67	74	72	70	61	51	47	44	42	39	39	47.0	74																							
24-May	43	38	33	Z	35	38	41	43	47	46	46	49	50	47	44	43	43	41	40	39	37	33	28	26	40.4	50																							
25-May	23	20	19	16	Z	13	22	27	32	38	41	44	47	48	49	50	48	49	47	47	43	26	14	16	33.9	50																							
26-May	19	15	11	12	14	Z	19	19	20	22	23	22	23	25	26	25	43	41	39	38	30	21	14	15	23.3	43																							
27-May	25	24	18	18	16	17	Z	17	17	15	17	22	22	18	17	21	38	30	34	29	27	32	29	27	23.1	38																							
28-May	25	21	16	15	15	15	15	Z	16	21	23	25	24	23	29	35	40	40	41	35	38	34	31	23	26.1	41																							
29-May	14	12	15	13	13	12	13	15	Z	16	16	24	20	23	33	30	33	34	34	34	30	18	15	9	20.7	34																							
30-May	10	8	6	Z	12	10	15	21	22	25	19	22	24	29	32	31	28	26	25	29	23	20	18	14	20.3	32																							
31-May	14	16	12	14	Z	14	13	15	18	19	23	27	29	28	30	29	29	29	29	28	25	19	19	17	21.7	30																							
																								24.5	23.4	24.0	21.9	23.8	23.0	24.9	27.2	28.4	31.2	33.8	36.5	37.4	37.2	38.6	38.6	39.8	40.0	38.2	35.8	34.9	98.0	32.0	25.5	Diurnal Average	
																								46	48	48	43	38	38	42	46	47	55	60	61	62	67	74	72	70	61	57	52	63	1612	138	47	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Anzac - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	126	24.56	24.56
21 - 50	346	67.45	92.01
51 - 82	39	7.60	99.61
> 83	1	0.19	99.81

Total Number of Valid Hours: 513

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	4	1	2	3	4	14	4	4	3	1	11	6	8	22	23	126
21 - 50	17	34	29	13	14	14	15	23	37	8	29	10	18	53	20	12	346
51 - 82	0	0	1	5	1	2	1	2	0	4	10	0	1	5	7	0	39
> 83	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	33	39	31	20	18	20	30	29	41	15	40	21	25	66	49	35	512

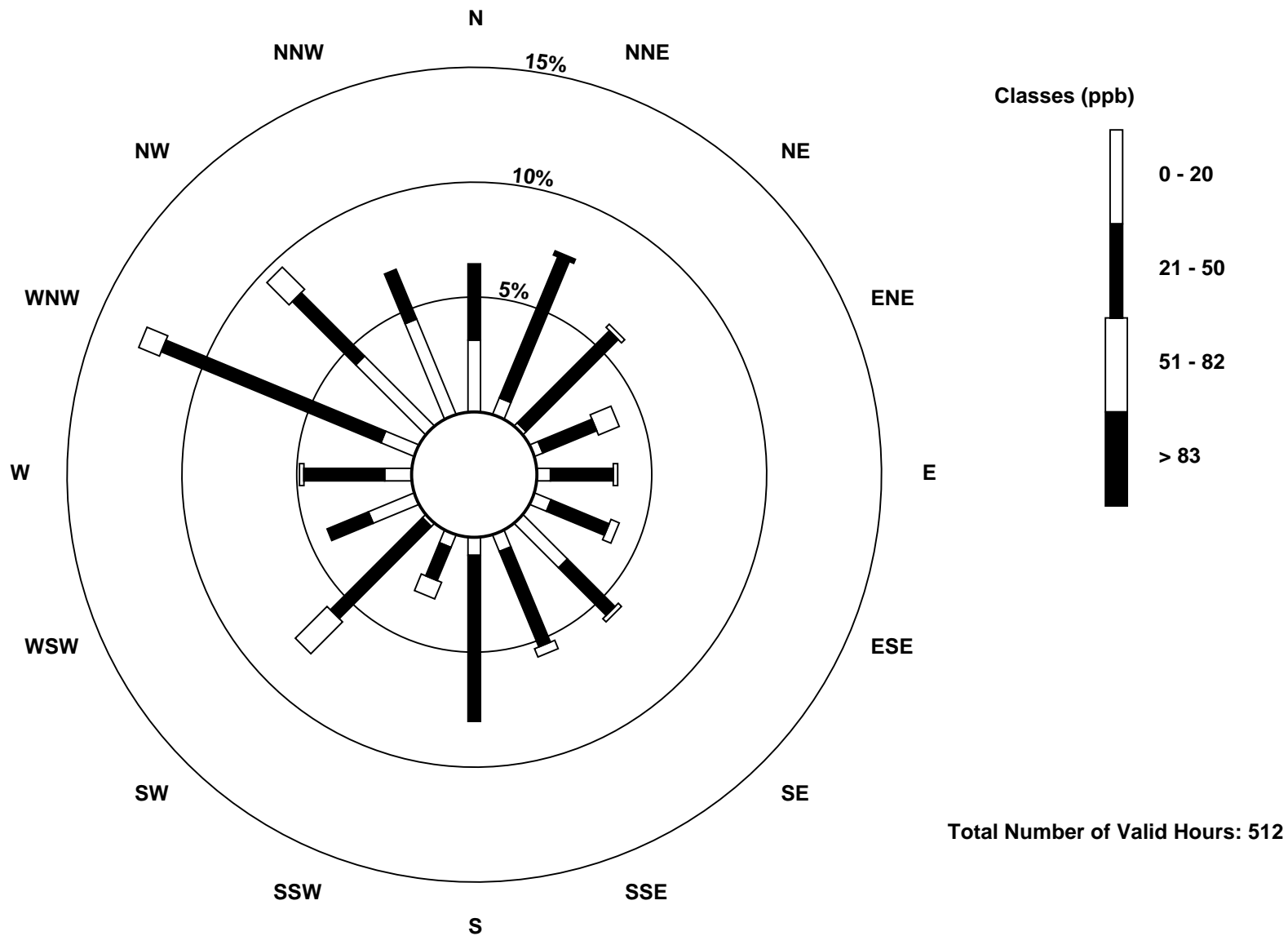
Total Number of Valid Hours: 513

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

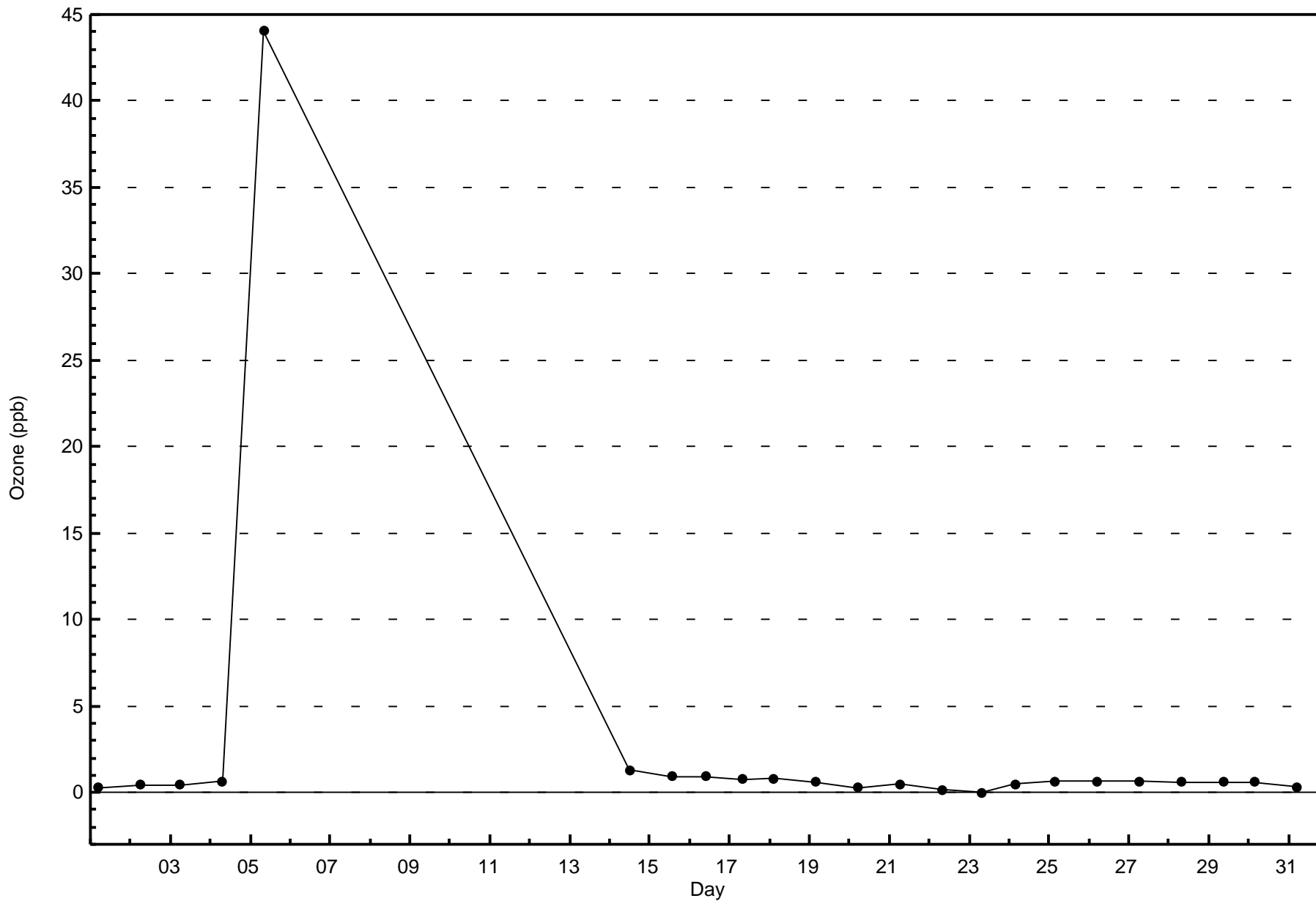
Ozone (O₃) - ppb
Anzac (AMS 14)





Wood Buffalo Environmental Association
Zero Responses

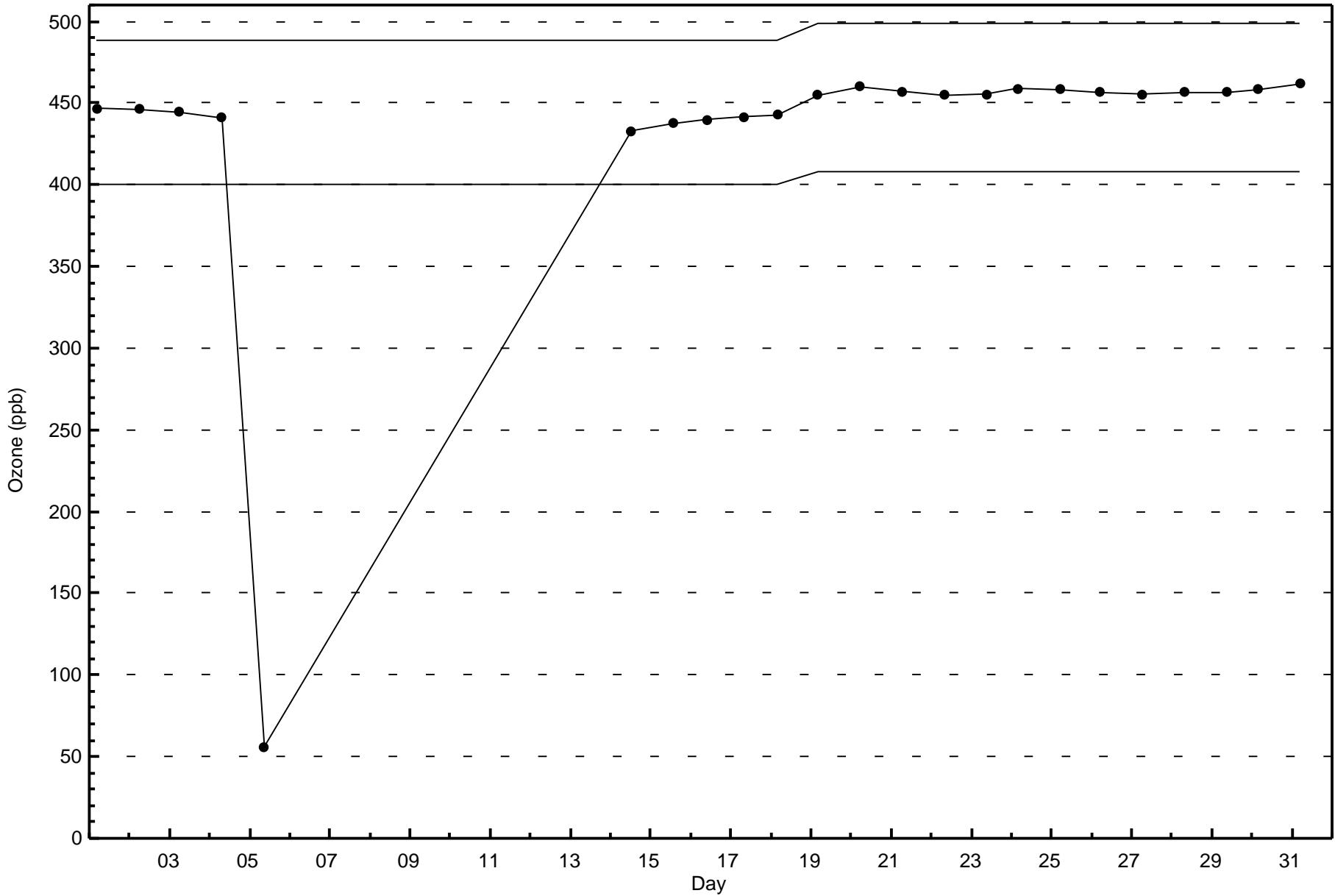
Ozone (O₃) - ppb
Anzac - May 2016





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Anzac - May 2016





Summary of Hour Averages

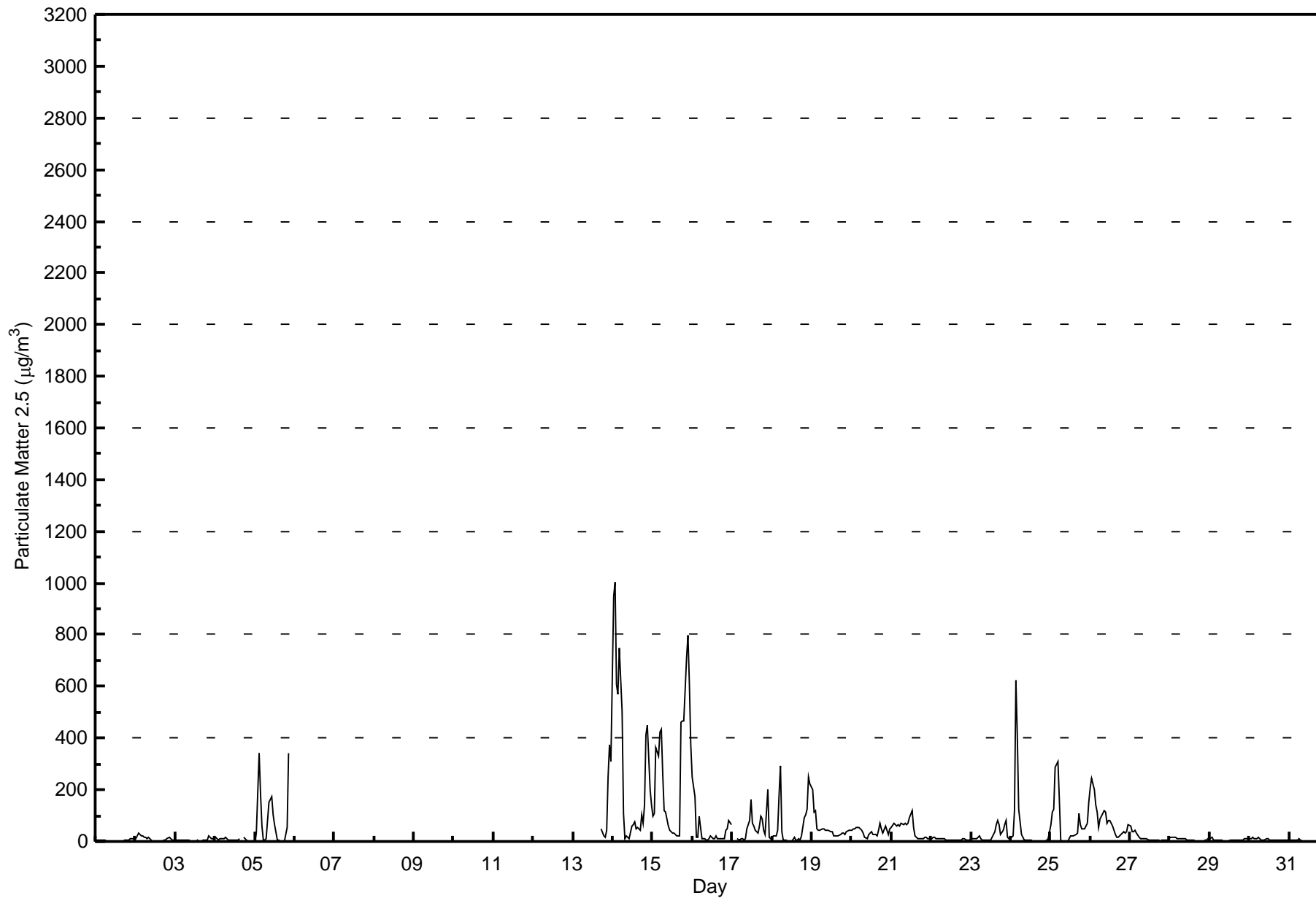
Anzac - May 2016

Number of Exceedences (AAAQO): 24-hr: 12																								Hours in Service: 744			
Maximum Value: 3182.4 µg/m ³ on May 5 23:00												Maximum Daily Average: 267.3 µg/m ³ on May 14												Hours of Data: 551			
Minimum Value: 0.5 µg/m ³ on May 31 19:00												Minimum Daily Average: 3.5 µg/m ³ on May 31												Hours of Missing Data: 193			
Maximum Diurnal Average: 208.1 µg/m ³ at hour 23												Minimum Diurnal Average: 14.9 µg/m ³ at hour 16												Hours of Calibration: 2			
Monthly Average: 60.26 µg/m ³												Percentiles: P ₁ = 0.7 P ₁₀ = 2.2 O ₁ = 4.8 Median = 12.2 O ₃ = 46.4 P ₉₀ = 122.4 P ₉₉ = 707.5												Percent Operational Time: 74.3			
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-May	5.5	6.3	5.8	5.7	6.7	4.0	2.1	1.6	1.7	1.7	1.8	1.9	1.6	1.7	1.8	1.4	1.7	3.5	4.8	5.1	6.8	8.6	9.8	9.3	4.2	9.8	
2-May	11.6	20.0	30.4	22.2	20.7	16.8	14.4	12.3	15.6	4.1	2.3	2.3	1.5	1.3	1.4	1.7	2.0	3.1	4.9	10.0	15.1	10.8	5.9	3.5	9.8	30.4	
3-May	2.9	3.7	3.6	3.9	4.2	4.1	5.0	5.3	2.8	1.9	1.9	2.0	2.5	3.1	2.1	2.5	2.4	2.8	3.7	6.2	22.8	18.2	8.3	11.7	5.3	22.8	
4-May	14.8	13.1	7.4	8.3	9.0	10.7	14.9	11.9	6.0	4.2	3.6	6.4	4.9	5.1	9.3	PF	13.9	12.4	4.4	2.7	1.9	1.7	1.8	7.5	14.9		
5-May	2.0	33.8	343.6	183.4	62.2	6.2	3.8	11.6	153.2	161.2	173.6	104.1	65.4	5.5	3.0	2.0	1.4	2.5	0.9	53.3	339.4	OR 3182.4	PF	222.5	3182.4		
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
14-May	950.6	1005.9	608.1	567.2	748.6	504.0	107.9	12.2	19.9	14.7	11.8	58.4	65.7	78.5	47.3	52.6	43.5	101.0	71.8	140.4	414.0	451.0	201.2	138.7	267.3	1005.9	
15-May	95.8	108.1	362.8	332.3	421.0	432.4	262.6	118.4	115.4	57.1	44.4	37.1	30.6	33.3	24.3	23.1	21.9	462.9	468.2	465.5	707.9	798.0	611.6	372.5	267.0	798.0	
16-May	250.5	173.1	16.6	18.9	95.9	52.3	9.4	8.2	7.3	7.0	9.4	22.0	13.5	11.8	19.4	13.5	12.6	9.7	8.4	10.3	40.7	49.8	79.5	65.6	41.9	250.5	
17-May	UO	UO	UO	9.2	7.1	9.1	12.2	7.7	11.3	49.0	79.4	164.5	72.7	60.9	41.5	31.3	62.1	99.1	86.0	43.6	25.1	199.1	17.2	12.6	52.4	199.1	
18-May	13.7	22.6	22.1	45.2	179.8	293.9	36.3	5.4	3.6	2.1	C	C	2.5	14.7	7.4	2.8	11.3	3.5	22.9	89.8	103.3	124.1	246.8	222.4	67.1	293.9	
19-May	200.3	114.8	119.2	46.4	42.6	44.7	46.4	46.2	43.1	41.2	41.1	36.6	39.7	20.4	23.9	23.4	19.5	24.5	32.4	34.2	26.4	38.7	42.3	42.4	49.6	200.3	
20-May	43.1	48.9	49.5	56.6	53.6	48.6	44.5	32.6	13.9	10.1	26.9	30.2	37.7	25.6	26.7	23.1	46.0	73.0	49.9	32.7	62.3	41.4	25.1	49.3	39.6	73.0	
21-May	55.2	71.7	62.4	58.2	65.5	57.7	68.9	65.4	71.3	63.5	71.5	94.2	122.0	56.3	19.3	13.8	11.3	9.1	8.9	11.5	15.0	15.8	13.3	11.4	46.4	122.0	
22-May	13.5	15.4	15.3	9.5	10.0	12.5	11.4	10.3	8.2	7.1	7.8	7.5	6.8	6.2	4.4	3.2	3.7	4.3	4.3	8.6	9.2	4.5	5.7	5.7	8.1	15.4	
23-May	8.5	9.6	13.1	9.8	17.8	21.6	8.6	6.5	4.4	2.8	3.0	4.9	7.2	14.2	39.7	66.3	81.8	67.5	25.7	44.7	63.5	79.7	17.3	10.6	26.2	81.8	
24-May	11.4	24.0	121.0	621.7	413.0	123.1	26.1	17.1	6.0	4.8	5.4	5.1	3.4	2.7	1.5	2.4	2.1	1.7	1.3	1.0	1.1	2.3	10.4	40.2	60.4	621.7	
25-May	63.0	113.6	125.4	285.6	309.4	165.3	5.9	0.8	0.7	0.9	2.2	10.6	19.3	21.8	23.8	24.4	30.4	107.9	65.3	47.1	46.3	59.9	72.6	154.5	73.2	309.4	
26-May	203.5	242.0	202.3	143.0	114.8	54.5	89.4	106.9	119.7	113.0	70.9	81.1	81.6	57.0	43.9	29.4	16.0	15.9	24.5	33.2	36.9	32.9	38.8	64.6	84.0	242.0	
27-May	60.5	35.4	36.6	42.4	30.0	13.8	11.6	12.3	11.1	11.0	13.3	7.8	5.5	6.2	5.0	6.2	3.8	4.5	2.4	2.8	3.5	2.9	4.3	5.5	14.1	60.5	
28-May	14.5	14.4	16.2	19.0	11.6	10.3	10.8	8.2	8.6	8.2	7.3	6.7	6.5	6.9	4.1	2.2	1.3	1.0	1.3	1.7	2.4	3.7	7.0	8.2	7.6	19.0	
29-May	8.9	13.8	5.2	2.9	3.1	4.6	3.9	3.5	2.3	1.9	2.4	2.5	2.8	3.6	2.8	3.7	3.4	2.8	3.6	4.7	6.2	8.5	9.0	11.6	4.9	13.8	
30-May	13.4	13.5	13.9	10.0	10.1	18.4	10.5	4.9	6.7	6.7	11.3	8.7	7.0	6.1	4.6	3.0	3.9	4.4	4.9	3.6	3.8	3.9	5.2	6.7	7.7	18.4	
31-May	7.2	7.6	7.5	7.7	6.3	6.3	8.4	4.2	2.2	2.0	1.1	0.9	0.9	0.7	0.7	0.6	0.6	0.5	0.5	0.5	1.3	3.4	6.3	7.1	3.5	8.4	
93.2 96.0 99.5 109.1 114.9 83.2 35.4 22.3 27.6 25.1 26.9 31.6 26.1 19.3 15.4 14.9 17.4 44.4 38.7 44.7 83.2 96.1 208.1 68.0																								Diurnal Average			
950.6 1005.9 608.1 621.7 748.6 504.0 262.6 118.4 153.2 161.2 173.6 164.5 122.0 78.5 47.3 66.3 81.8 462.9 468.2 465.5 707.9 798.0 3182.4 372.5																								Diurnal Maximum			
C - Calibration UO - Unstable Operation PF - Power Failure OR - Out of Range																											
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																											



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	141	25.59	25.59
6 - 15	155	28.13	53.72
16 - 25	46	8.35	62.07
26 - 80	113	20.51	82.58
> 81.0	80	14.52	97.10

Total Number of Valid Hours: 551

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	6	4	10	7	1	8	9	13	12	6	9	1	4	28	16	7	141
6 - 15	9	11	9	2	5	3	13	11	11	5	16	11	6	12	14	17	155
16 - 25	2	5	3	0	1	2	2	1	5	0	7	4	6	4	1	3	46
26 - 80	9	16	8	8	11	5	6	2	7	1	1	3	3	10	14	9	113
> 81.0	8	3	2	3	2	2	2	4	7	3	10	6	8	12	6	2	80
Totals	34	39	32	20	20	20	32	31	42	15	43	25	27	66	51	38	535

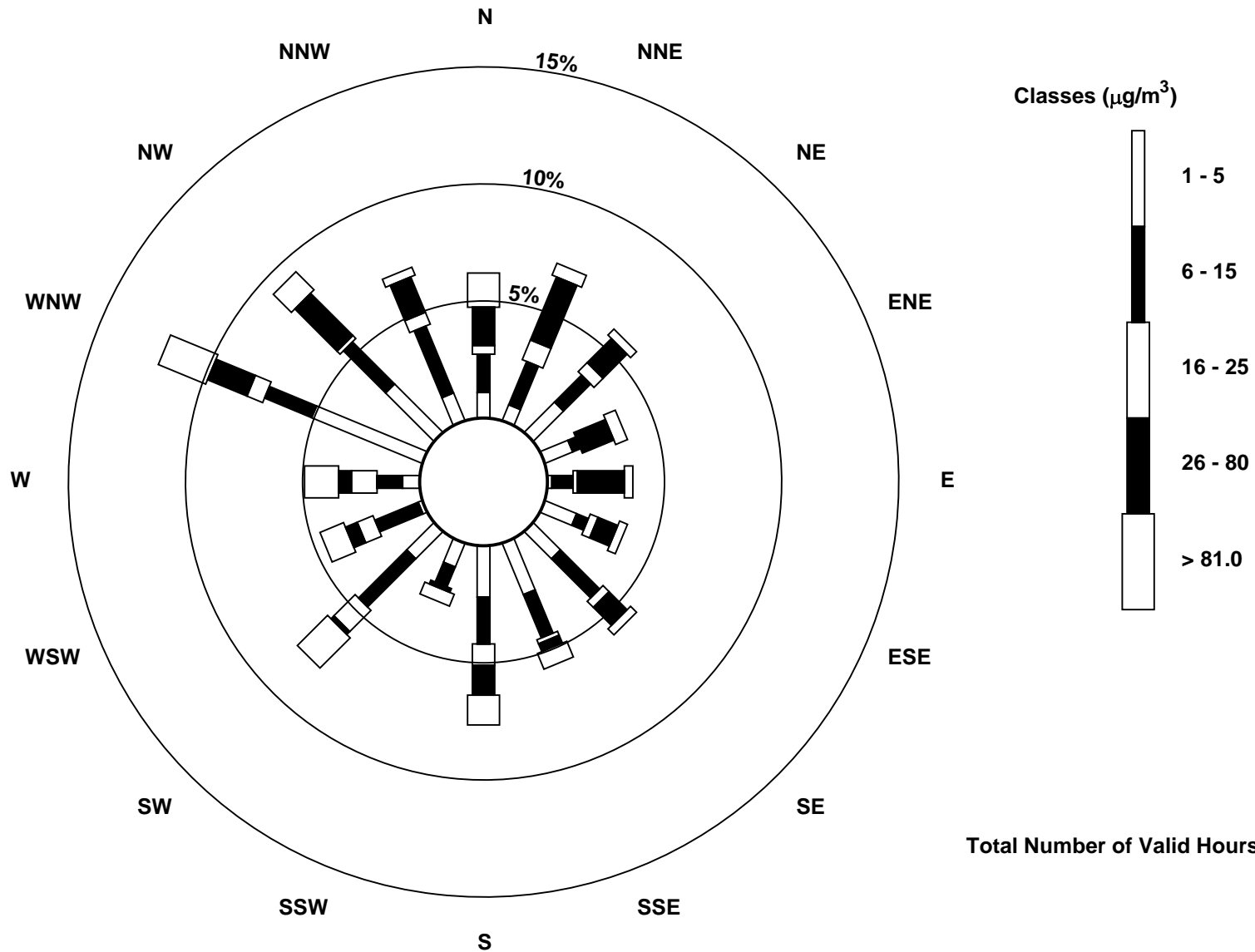
Total Number of Valid Hours: 551

Total Number of Hours: 744



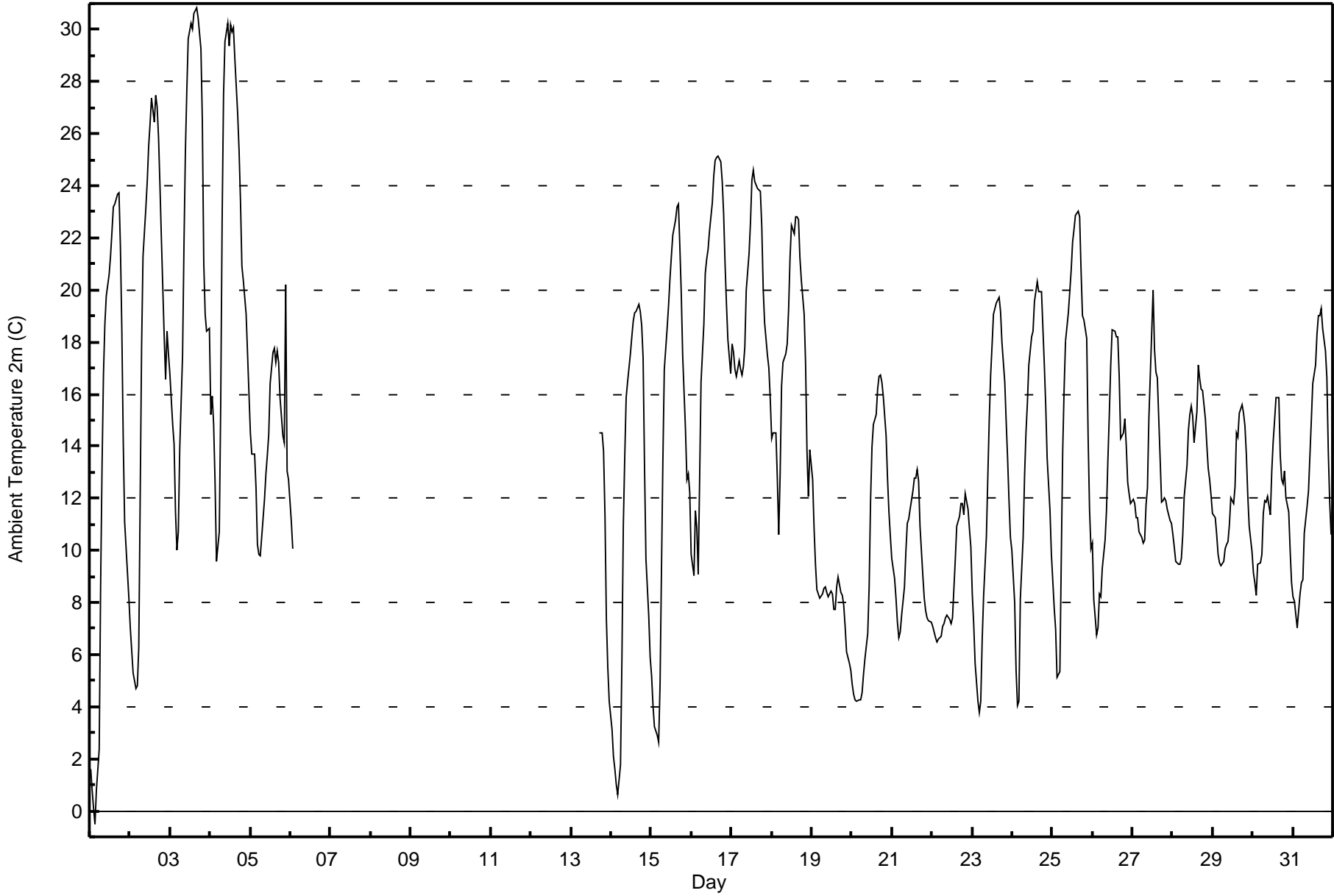
Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac (AMS 14)





Maximum Value: 30.8 C on May 3 17:00 Maximum Daily Average: 22.1 C on May 3																				Hours in Service: 744 Hours of Data: 561 Hours of Missing Data: 183 Hours of Calibration: 0 Percent Operational Time: 75.4							
Minimum Value: -0.5 C on May 1 04:00 Minimum Daily Average: 8.3 C on May 19 Maximum Diurnal Average: 19.8 C at hour 16 Minimum Diurnal Average: 7.4 C at hour 5 Monthly Average: 14.15 C Percentiles: P ₁ = 1.6 P ₁₀ = 6.8 Q ₁ = 9.7 Median = 13.5 Q ₃ = 18.4 P ₉₀ = 22.8 P ₉₉ = 30.2																											
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-May	1.6	0.8	0.1	-0.5	0.8	2.4	8.7	13.2	16.8	18.7	19.8	20.6	21.3	22.2	23.2	23.3	23.7	23.7	21.7	18.5	14.2	11.1	9.1	8.2	13.5	23.7	
2-May	7.0	6.2	5.3	4.7	4.8	6.3	12.0	17.8	21.3	23.1	24.1	25.5	26.4	27.4	26.5	27.5	27.1	25.8	24.0	22.0	18.2	16.6	18.4	17.5	18.2	27.5	
3-May	16.8	14.8	14.1	11.5	10.0	10.7	13.9	17.5	21.7	25.3	27.6	29.6	30.2	30.0	30.6	30.7	30.8	30.5	29.3	26.5	21.1	19.0	18.4	18.5	22.1	30.8	
4-May	15.2	15.9	14.9	12.6	9.6	10.7	15.6	22.7	27.5	29.5	30.3	29.4	30.2	29.9	30.1	28.9	26.7	25.4	23.4	20.9	20.4	19.1	17.6	16.0	21.8	30.3	
5-May	14.5	13.7	13.7	12.4	10.2	9.8	9.8	10.5	12.0	12.9	13.6	14.5	16.4	17.6	17.7	17.2	17.6	17.2	15.9	14.4	14.1	20.2	13.0	12.7	14.2	20.2	
6-May	11.1	10.1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	11.1	
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	14.5	14.5	13.8	11.4	7.4	5.5	4.2	--	14.5
14-May	3.1	2.1	1.6	1.0	0.6	1.7	5.9	11.0	13.6	15.9	16.5	17.6	18.2	18.8	19.1	19.2	19.4	19.2	18.7	17.4	13.2	9.7	7.5	5.9	11.5	19.4	
15-May	5.2	4.0	3.2	2.9	2.7	4.9	9.2	13.5	16.9	18.6	19.4	20.4	21.3	22.1	22.7	23.2	23.3	21.7	19.9	17.5	14.6	12.7	13.0	12.2	14.4	23.3	
16-May	9.8	9.0	11.5	10.9	9.1	12.7	16.5	18.7	20.7	21.2	21.6	22.3	23.4	24.4	25.0	25.1	25.1	24.9	24.2	22.9	21.0	19.4	18.1	16.8	18.9	25.1	
17-May	17.9	17.6	16.9	16.7	17.3	16.9	16.7	17.0	17.8	20.0	21.4	22.6	24.2	24.6	24.1	23.9	23.8	23.8	22.4	20.0	18.7	17.5	17.0	15.8	19.8	24.6	
18-May	14.3	14.5	14.5	12.8	10.6	12.9	16.3	17.2	17.6	17.9	19.3	21.2	22.5	22.2	22.8	22.8	22.7	21.3	20.4	19.1	17.2	13.8	12.1	13.9	17.5	22.8	
19-May	12.7	10.9	9.5	8.5	8.3	8.2	8.4	8.6	8.6	8.4	8.2	8.4	8.3	7.7	7.8	8.6	9.0	8.4	8.3	7.9	7.1	6.1	5.7	5.4	8.3	12.7	
20-May	4.9	4.5	4.3	4.2	4.3	4.2	4.5	5.3	5.9	6.8	8.6	11.9	14.0	14.9	15.2	16.2	16.7	16.8	16.5	15.9	14.4	12.8	11.5	10.6	10.2	16.8	
21-May	9.7	8.9	8.1	7.2	6.7	6.9	7.5	8.6	10.0	11.0	11.2	11.6	12.3	12.8	12.8	13.1	12.6	10.9	9.0	8.2	7.7	7.4	7.3	7.2	9.5	13.1	
22-May	7.1	6.8	6.6	6.5	6.6	6.7	7.1	7.2	7.4	7.5	7.3	7.2	7.4	8.5	9.7	10.9	11.3	11.8	11.8	11.4	12.2	11.6	10.8	10.1	8.8	12.2	
23-May	8.4	7.2	5.7	4.2	3.8	4.2	6.5	8.2	10.6	12.8	15.0	16.7	17.9	19.1	19.5	19.6	19.7	19.2	18.0	16.5	14.9	13.5	11.9	10.5	12.6	19.7	
24-May	10.0	8.0	5.4	4.1	4.2	8.1	10.5	12.8	14.5	15.7	17.1	18.2	18.4	19.6	19.9	20.3	19.9	19.9	18.5	17.1	15.6	13.5	11.5	9.9	13.9	20.3	
25-May	8.8	7.8	7.0	5.2	5.3	9.7	13.8	16.2	18.1	19.1	19.9	20.8	21.8	22.3	22.9	23.0	22.8	20.7	19.0	18.9	18.1	14.3	11.6	10.1	15.7	23.0	
26-May	10.3	8.1	6.8	7.1	8.3	8.2	9.3	10.4	11.5	13.5	15.2	17.1	18.5	18.4	18.2	18.2	16.7	14.3	14.5	15.1	14.0	12.6	12.2	11.8	12.9	18.5	
27-May	12.0	11.8	11.2	11.2	10.7	10.5	10.3	10.4	11.7	12.4	15.1	18.4	20.0	17.7	16.8	16.7	13.5	11.8	11.9	12.0	11.9	11.6	11.2	11.0	13.0	20.0	
28-May	10.6	10.1	9.6	9.5	9.4	9.7	10.6	12.1	13.3	14.6	15.2	15.5	15.2	14.1	15.3	17.1	16.6	16.2	16.1	15.1	14.1	13.2	12.7	12.1	13.2	17.1	
29-May	11.4	11.2	10.6	9.8	9.5	9.4	9.6	10.1	10.2	10.3	11.0	12.0	11.8	12.5	14.5	14.4	15.3	15.6	15.3	14.8	13.7	12.1	10.9	10.0	11.9	15.6	
30-May	9.2	8.8	8.2	9.5	9.5	9.9	11.4	11.9	11.9	12.1	11.4	13.0	14.2	15.0	15.9	15.9	13.6	12.7	12.6	13.0	12.0	11.5	10.0	8.8	11.8	15.9	
31-May	8.2	8.1	7.0	7.7	8.3	8.7	8.9	10.7	11.7	12.3	13.7	15.0	16.4	17.1	18.3	19.0	19.0	19.3	18.5	17.6	16.6	13.8	11.9	10.6	13.3	19.3	
																								Diurnal Average			
																								Diurnal Maximum			
PF - Power Failure																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Anzac - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	1	0.18	0.18
0 - 10	153	27.27	27.45
10 - 20	312	55.61	83.07
> 20	95	16.93	100.00

Total Number of Valid Hours: 561

Total Number of Hours: 744



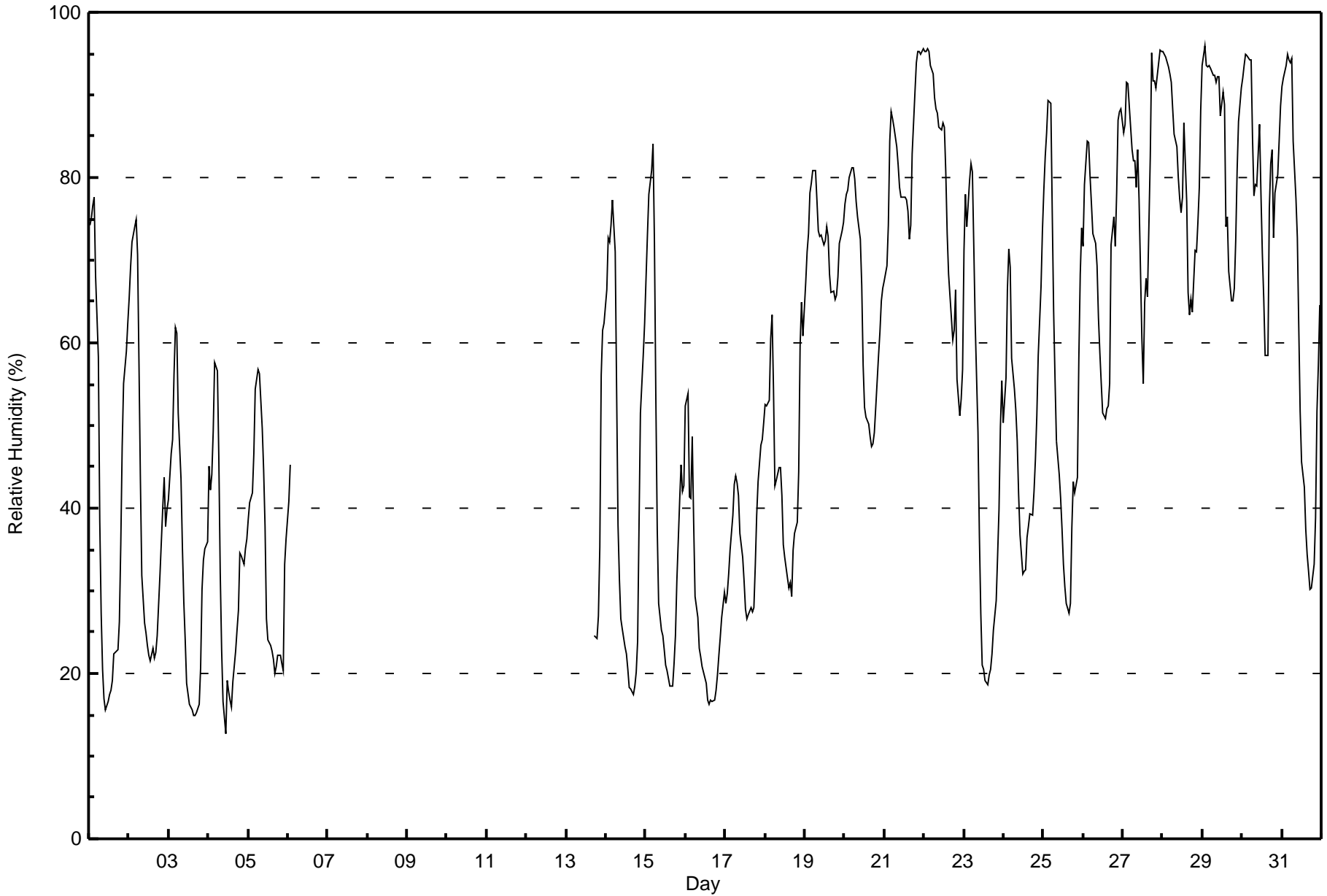
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Anzac - May 2016

Maximum Value: 96 % on May 29 02:00																		Maximum Daily Average: 84.8 % on May 29																		Hours in Service: 744	
Minimum Value: 13 % on May 4 11:00																		Minimum Daily Average: 27.6 % on May 16																		Hours of Data: 561	
Maximum Diurnal Average: 76.3 % at hour 5																		Minimum Diurnal Average: 39.4 % at hour 16																		Hours of Missing Data: 183	
Monthly Average: 55.5 %																		Percentiles: P ₁ = 16 P ₁₀ = 22 Q ₁ = 33 Median = 56 Q ₃ = 77 P ₉₀ = 89 P ₉₉ = 95																		Hours of Calibration: 0	
																																				Percent Operational Time: 75.4	
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-May	74	75	77	78	68	58	38	27	20	17	16	17	17	18	19	22	23	23	26	36	47	55	59	62	40.6	78											
2-May	66	69	72	74	75	71	58	43	32	26	25	23	22	21	23	22	23	25	28	32	40	44	38	40	41.3	75											
3-May	41	47	48	56	62	61	52	44	35	29	24	19	16	16	15	15	15	16	21	30	34	35	36	32.6	62												
4-May	45	42	44	49	58	57	46	32	23	17	13	19	18	17	16	19	23	25	28	35	34	33	35	36	31.8	58											
5-May	39	41	42	47	54	56	57	56	50	45	38	27	24	23	23	22	20	21	22	22	21	20	33	36	34.9	57											
6-May	41	45	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	45											
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--											
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--											
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--											
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--											
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--											
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--											
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	25	24	27	35	56	62	62	--	62											
14-May	66	73	72	74	77	71	54	38	31	27	25	23	22	20	18	18	18	18	18	20	24	38	52	58	62	41.8	77										
15-May	68	73	78	81	84	72	53	38	28	25	25	23	21	20	19	18	18	21	25	31	41	45	42	43	41.4	84											
16-May	52	54	41	41	49	38	29	27	23	22	21	20	19	17	16	17	17	17	18	20	22	24	27	30	27.6	54											
17-May	28	30	32	35	39	43	44	43	41	37	34	31	28	27	27	28	28	28	33	39	43	48	48	50	36.0	50											
18-May	53	52	53	61	63	54	43	43	45	45	42	36	34	32	30	31	29	35	37	38	44	60	65	61	45.2	65											
19-May	67	71	73	78	79	81	81	77	74	73	73	72	72	74	73	68	66	66	65	66	68	72	74	75	72.4	81											
20-May	77	78	79	80	81	81	80	77	75	73	67	57	52	51	50	49	48	48	49	52	58	61	65	67	64.8	81											
21-May	67	69	74	84	88	87	86	84	82	79	78	78	78	77	76	73	74	83	90	94	95	95	95	96	82.6	96											
22-May	95	95	96	95	94	92	90	88	88	86	86	87	86	81	73	68	63	60	62	66	56	51	53	57	77.8	96											
23-May	71	78	74	80	82	81	72	62	49	37	27	21	21	19	19	20	20	22	25	29	34	40	50	55	45.3	82											
24-May	50	56	66	71	69	58	54	52	48	42	37	32	32	33	36	38	39	39	42	46	51	58	67	74	49.7	74											
25-May	78	83	85	89	89	76	64	56	48	44	41	37	33	31	28	27	28	38	43	42	44	58	68	74	54.4	89											
26-May	72	79	84	84	80	77	73	72	69	63	59	55	51	51	52	52	55	72	75	72	78	87	88	88	70.4	88											
27-May	86	86	92	91	89	83	82	82	79	83	77	60	55	65	68	66	83	95	92	92	91	92	95	95	82.5	95											
28-May	95	95	95	93	93	92	88	85	84	80	78	76	78	87	77	66	63	65	64	71	71	75	79	88	80.7	95											
29-May	94	96	93	93	94	93	92	92	92	92	92	88	90	89	74	75	69	65	65	67	72	81	87	91	84.8	96											
30-May	92	94	95	95	94	94	85	78	79	79	86	78	71	65	59	58	76	82	83	73	78	80	84	89	81.2	95											
31-May	91	92	94	95	94	94	94	84	77	73	62	52	46	43	37	34	32	30	30	33	39	52	57	65	62.5	95											
																		67.0 69.7 72.1 75.0 76.3 72.6 65.9 60.1 55.4 51.8 48.9 44.8 42.9 42.4 40.4 39.4 40.4 42.4 44.3 46.9 51.4 57.2 61.0 63.8																		Diurnal Average	
																		95 96 96 95 94 94 94 92 92 92 92 88 90 89 77 75 83 95 92 94 95 95 95 96																		Diurnal Maximum	
PF - Power Failure																																					





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	39	6.95	6.95
20 - 40	147	26.20	33.16
40 - 60	116	20.68	53.83
60 - 80	147	26.20	80.04
80 - 100	112	19.96	100.00

Total Number of Valid Hours: 561

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

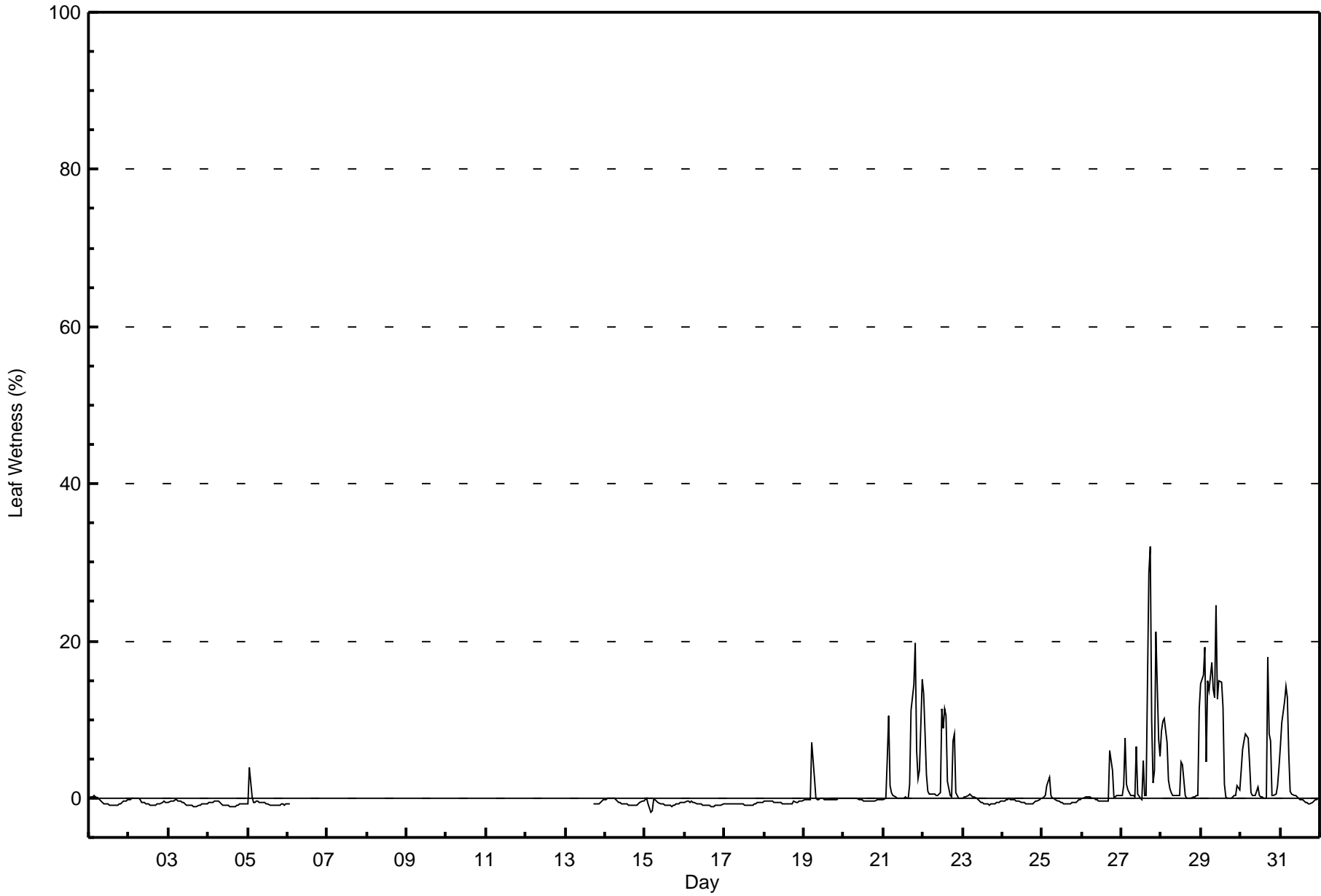
Anzac - May 2016

Maximum Value: 32 % on May 27 18:00																	Maximum Daily Average: 8.8 % on May 29																	Hours in Service: 744			
Minimum Value: -2 % on May 15 04:00																	Minimum Daily Average: -0.8 % on May 16																	Hours of Data: 561			
Maximum Diurnal Average: 2.7 % at hour 3																	Minimum Diurnal Average: -0.4 % at hour 16																	Hours of Missing Data: 183			
Monthly Average: 1.0 %																	Percentiles: P ₁ = -1 P ₁₀ = -1 Q ₁ = -1 Median = 0 Q ₃ = 0 P ₉₀ = 5 P ₉₉ = 19																	Hours of Calibration: 0			
																																		Percent Operational Time: 75.4			
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-May	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	-0.4	0												
2-May	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	-0.5	0												
3-May	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.7	0												
4-May	-1	-1	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.7	0												
5-May	-1	4	0	-1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.5	4												
6-May	-1	-1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	-1												
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--												
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--												
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--												
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--												
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--												
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--												
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0												
14-May	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	-0.5	0												
15-May	0	0	-1	-2	-2	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.7	0												
16-May	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.8	0												
17-May	-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												
18-May	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	0	0	-0.5	0												
19-May	0	0	0	0	0	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	7												
20-May	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-May	0	0	5	11	2	1	0	0	0	0	0	0	0	0	0	0	2	11	14	20	6	2	4	15	3.8	20											
22-May	13	8	3	1	1	1	0	0	0	0	1	11	9	11	11	2	0	0	7	8	1	0	0	0	3.7	13											
23-May	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	-0.3	0												
24-May	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	-0.4	0												
25-May	0	0	0	2	3	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	-0.1	3												
26-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	0	0	0	0	0	0.4	6												
27-May	0	2	8	2	1	0	0	0	0	7	0	0	0	5	0	0	29	32	10	2	4	21	8	5	5.7	32											
28-May	9	10	10	7	2	1	1	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	11	2.6	11												
29-May	15	16	19	5	15	14	17	14	13	24	13	15	15	12	2	0	0	0	0	0	0	2	1	8.8	24												
30-May	3	6	7	8	8	4	1	0	0	0	1	0	0	0	0	0	18	8	7	0	0	0	4	3.4	18												
31-May	7	10	12	14	13	6	1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	0	0	0	0	2.4	14												
1.7 2.2 2.7 1.9 1.7 1.4 0.9 0.5 0.3 1.1 0.3 0.7 0.8 0.9 0.0 -0.4 1.5 1.8 1.3 0.8 0.1 0.7 0.3 1.3																	Diurnal Average																				
15 16 19 14 15 14 17 14 13 24 13 15 15 12 11 2 29 32 14 20 6 21 8 15																	Diurnal Maximum																				
PF - Power Failure																																					



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Anzac - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	65	35.14	35.14
0.4 - 0.5	26	14.05	49.19
0.6 - 0.7	6	3.24	52.43
0.8 - 1.4	6	3.24	55.68
1.5 - 10	51	27.57	83.24
> 10	31	16.76	100.00

Total Number of Valid Hours: 185

Total Number of Hours: 744



Maximum Speed: 23 km/h on May 5 22:00	Maximum Daily Speed Average: 12.3 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 29 23:00	Minimum Daily Speed Average: 1.4 km/h on May 25	Hours of Data: 561
Maximum Diurnal Speed Average: 3.7 km/h at hour 14	Minimum Diurnal Speed Average: 0.5 km/h at hour 20	Hours of Missing Data: 183
Monthly Average Velocity: 1.2 km/h 303.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 18	Percent Operational Time: 75.4

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-May	W5	WSW5	WSW5	SW5	SW6	SW5	SW6	SW7	W6	WNW8	NW10	NW11	WNW11	WNW10	NW10	WNW10	WNW9	WNW9	WNW6	WNW1	SSW3	SW4	WSW4	WSW4	W5.7	NW11
2-May	WSW3	WSW3	WSW3	WNW3	WNW4	SW3	E2	ENE3	ESE4	SSE6	ESE4	ESE5	ESE6	NNW3	NNE4	ENE7	ENE7	E7	ESE6	SE7	SSE7	S8	SSE10	SSE11	SE2.8	SSE11
3-May	SSE12	SE12	SSE10	SE8	SE8	SE7	SE7	ESE6	ESE5	SE5	SSE5	SSW3	SSW14	SSW12	SW13	SW13	SW12	SW11	SW9	SSW6	S7	S7	S8	S6	S6.7	SSW14
4-May	WSW7	SW7	SW6	SW6	SW4	SSW5	SW4	E2	E3	SSE5	SSE9	WNW10	NW12	WNW13	W15	WNW15	WNW17	NW17	NW12	NW9	NW10	NW12	NW9	WNW12	WNW6.8	NW17
5-May	WNW10	NW7	WNW7	NW8	NW9	NW10	NW9	WNW8	WNW8	WNW10	WNW7	NW8	NW11	WNW17	WNW16	WNW15	WNW14	WNW14	WNW10	NW9	NW11	N23	NNE11	NNW11	WNW10.0	N23
6-May	W12	WNW8	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	W12
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----
14-May	SSW2	WSW3	SW3	SW3	WSW3	SW4	WNW3	NW6	W4	WNW3	WNW7	NNW10	N12	N12	N14	N11	N10	N9	NNE8	NNE6	ENE2	SW1	W3	W3	NNW3.9	N14
15-May	WSW5	W5	W4	WNW4	WNW2	WSW4	WNW3	NW6	SW3	WSW5	WNW7	NW6	W8	WNW9	W4	W4	NNW5	ESE6	ESE6	SE5	SE5	SE6	S8	S8	WSW2.1	WNW9
16-May	SW6	WSW9	WSW8	WSW6	SW6	SW10	SW12	WSW11	WSW14	SW15	SW17	SW19	SW18	SW18	SW19	SW21	SW18	SW18	SW15	SSW9	S10	S11	S11	S10	SW12.3	SW21
17-May	SW16	SW16	SW16	W12	W14	WNW16	WNW16	WNW11	W9	WNW10	WNW11	WNW12	WNW9	WNW12	WNW10	WNW8	WNW7	WNW6	S6	SSW9	SW10	SW11	SW12	WSW8	W9.1	SW16
18-May	W7	W7	W7	WSW6	SW6	SW5	W6	WNW9	WNW9	WNW11	WNW9	WNW14	WNW14	WNW14	WNW13	WNW14	WNW12	WNW11	WNW8	NW5	WNW3	W4	N5	NNE9	WNW7.8	WNW14
19-May	N7	N8	N7	NNW9	NNW9	N10	NNE10	NNE11	NNE14	NNE12	NNE10	NNE12	N13	N13	NNE15	NNE15	NNE16	NNE16	NNE14	NNE14	NE12	NNE9	NE9	NE9	NNE11.0	NNE16
20-May	ENE9	ENE11	ENE11	ENE11	E13	E12	E12	E12	E13	E15	ENE15	E14	E13	E15	E11	ESE9	SE7	E4	ENE5	NE5	N4	NW5	WNW6	NW5	ENE8.4	E15
21-May	NNW4	NW6	NNW5	NW6	NNW3	NW6	NW4	NNW4	NW5	NW8	NNW9	W9	WNW9	NW9	NNW10	NNW9	NW9	NW11	NNW10	NNW9	NNW10	NNW9	NNW8	NNW7	NW7.2	NW11
22-May	NNW8	N8	N8	N9	N10	N9	NNE9	NNE11	NNE11	NNE13	NNE12	NNE13	NNE12	NNE10	NNE13	NE14	NE12	NNE10	NE7	NNE5	NNE9	NE12	NE9	NE9	NNE9.6	NE14
23-May	ESE7	NE3	NE7	NE7	NNE8	NE10	NE9	NE11	NE13	ENE14	ENE18	ENE16	NE15	ENE15	ENE14	E11	ESE12	SE12	SE7	SSE6	S7	S11	S10	ENE7.6	ENE18	
24-May	S10	S5	S5	SSE5	SSE6	SSE10	SSE12	SSE13	SSE14	SE16	S15	S14	S14	S16	S15	SSW11	SSW13	SW12	SW10	SSW7	S5	S6	S9.7	SE16		
25-May	S7	S6	SSW6	S4	SSW3	SW7	WSW6	NW7	WNW5	NW7	W7	W5	NE7	NE7	N5	NNE6	NNE15	NNE10	NE7	NE5	NNE3	NNE4	ENE5	N1.4	NNE15	
26-May	E5	N3	N3	NNW5	NW6	NNW7	N6	NE6	ENE6	NE6	NE7	NW8	NNW10	N10	N10	NE8	S10	SW7	E3	ESE3	E7	NNE3	E2	ESE4	NNE2.9	N10
27-May	SE8	SE7	ESE7	SE13	SE15	SE15	SE13	SE12	SSE10	SE14	SE16	ESE17	ESE15	ESE14	SE8	W7	ENE7	ENE10	ESE6	SSE9	SSE9	SE8	SE8	SE9.8	ESE17	
28-May	SE9	SE8	SE10	SE11	SE10	SSE8	SE10	SSE12	SSE10	SSE11	SSE12	SSE12	S13	S11	S14	S15	S13	SSW10	S10	S7	S6	SSE6	SSE7	S6	SSE9.5	S15
29-May	SE3	SSW4	WNW9	WNW9	NW6	NNW3	NNW3	NW3	WNW6	WNW6	NW6	NW5	W8	WNW6	NE3	ENE9	NE8	NNE6	NE8	NE8	NE6	NNE4	N1	N3	NNW2.7	WNW9
30-May	N4	NW3	NW5	NW6	NW6	NW7	NNW8	N10	NNW9	NNW10	NNW13	NNW10	NNW12	N13	N14	N14	N10	NNW9	NNW8	N8	NNW6	NNW6	N6	NNW6	NNW8.2	N14
31-May	NNW6	NW8	NW6	NW7	NW8	NNW7	NNW5	NW7	NW8	WNW5	WNW6	WNW6	WNW8	W9	WNW5	WNW7	WNW7	WNW5	W4	W1	S4	SSE6	S7	S7	WNW4.2	W9

SW1.8	WSW1.9	W1.6	WNW1.5	WNW1.0	W1.2	NW0.8	N1.1	NNW0.9	NW1.1	NNW1.4	NW2.4	WNW3.0	NW3.7	NNW3.1	NW2.4	NW2.4	NW2.6	NNW0.8	N0.5	SW0.5	WSW0.5	S1.1	S0.8	Diurnal Average
SW16	SW16	SW16	SE13	SE15	WNW16	WNW16	SE13	NNE14	E15	SW17	SW19	SW18	SW18	SW19	SW21	SW18	SW18	SW15	NNE14	NE12	N23	SW12	WNW12	Diurnal Maximum

PF - Power Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

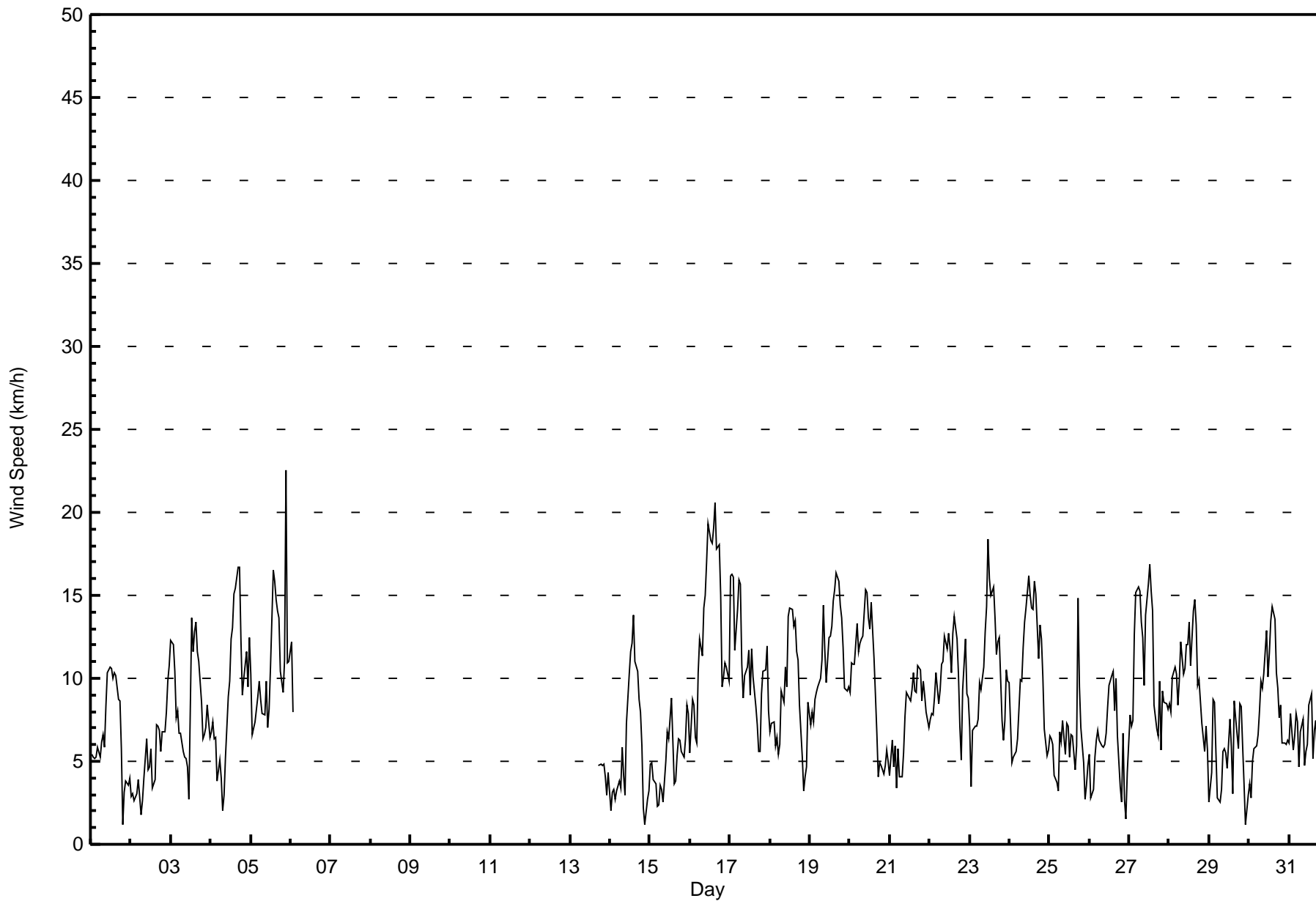
Wind Speed (WS) - km/h
Anzac - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on May 5 22:00																	Hours in Service: 744 Hours of Data: 561 Hours of Missing Data: 183 Hours of Calibration: 0 Percent Operational Time: 75.4								
Minimum Value: 0 km/h on May 14 04:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	1	1	1	1	1	1	2	2	2	3	3	4	3	4	4	4	3	3	2	1	1	1	1	1	4
2-May	1	1	1	1	1	2	1	1	2	2	3	3	3	4	2	2	3	2	2	1	1	2	2	3	4
3-May	3	3	3	2	2	2	2	1	1	1	2	5	5	4	6	5	4	3	3	2	1	2	2	3	6
4-May	2	1	1	1	1	2	1	1	2	3	3	6	4	5	6	6	6	7	6	3	4	4	3	5	7
5-May	4	4	4	3	3	3	3	3	3	3	3	5	6	6	6	6	5	5	4	4	5	10	4	4	10
6-May	4	3	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	4
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	3	2	1	1	1	1	1	3
14-May	1	1	1	0	1	1	1	2	1	2	3	3	4	4	4	4	4	3	2	2	1	2	1	1	4
15-May	1	1	2	2	2	2	1	1	1	2	2	3	2	3	3	3	2	2	2	1	1	1	2	2	3
16-May	2	2	2	2	2	3	3	4	4	5	6	7	6	6	7	6	6	5	3	2	2	3	3	7	
17-May	6	4	5	4	5	6	6	5	3	3	4	3	4	3	3	2	2	4	3	3	2	3	2	6	
18-May	1	2	2	1	1	1	2	3	3	4	3	5	5	5	4	5	4	4	3	2	1	1	2	2	5
19-May	2	2	2	2	2	3	3	4	5	4	3	4	4	4	5	5	5	5	5	5	4	3	3	3	5
20-May	3	3	3	3	4	4	4	4	4	4	4	4	4	5	5	3	3	1	1	1	1	2	2	2	5
21-May	2	2	1	3	2	2	2	1	2	3	3	2	2	2	3	3	3	3	3	3	3	2	2	2	3
22-May	2	2	2	3	3	2	3	4	4	4	3	4	4	3	4	4	4	3	3	2	4	4	3	4	4
23-May	3	2	2	2	2	2	3	3	4	4	5	5	5	5	4	4	4	4	4	2	1	2	3	2	5
24-May	3	2	1	1	1	2	3	3	4	4	5	5	6	5	5	5	4	4	4	4	3	2	1	1	6
25-May	1	2	2	1	1	1	3	2	2	3	2	2	2	3	3	3	3	4	4	2	1	1	1	1	4
26-May	2	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	5	3	2	1	2	2	1	2	5
27-May	2	2	2	4	4	5	5	4	4	4	4	5	5	5	5	5	4	3	3	2	4	4	2	2	5
28-May	2	2	2	3	3	2	3	3	3	3	4	4	4	3	4	5	5	4	3	2	2	1	2	1	5
29-May	1	2	3	3	2	1	1	1	2	2	2	2	2	2	3	2	2	2	2	2	3	1	1	1	3
30-May	2	2	1	2	2	2	3	3	3	3	4	4	4	4	4	4	4	3	2	3	1	2	1	1	4
31-May	1	2	1	2	2	3	1	3	3	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	3
																	Diurnal Maximum								
PF - Power Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Anzac - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - May 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	129	22.99	22.99
6 - 11	304	54.19	77.18
12 - 19	126	22.46	99.64
20 - 28	2	0.36	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 561

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	6	4	4	7	6	3	3	6	6	12	16	15	14	9	10	129
6 - 11	19	18	22	10	4	10	18	21	27	7	16	9	12	44	40	27	304
12 - 19	7	16	6	6	9	4	11	7	9	3	17	2	4	19	4	2	126
20 - 28	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	40	32	20	20	20	32	31	42	16	46	27	31	77	53	39	561

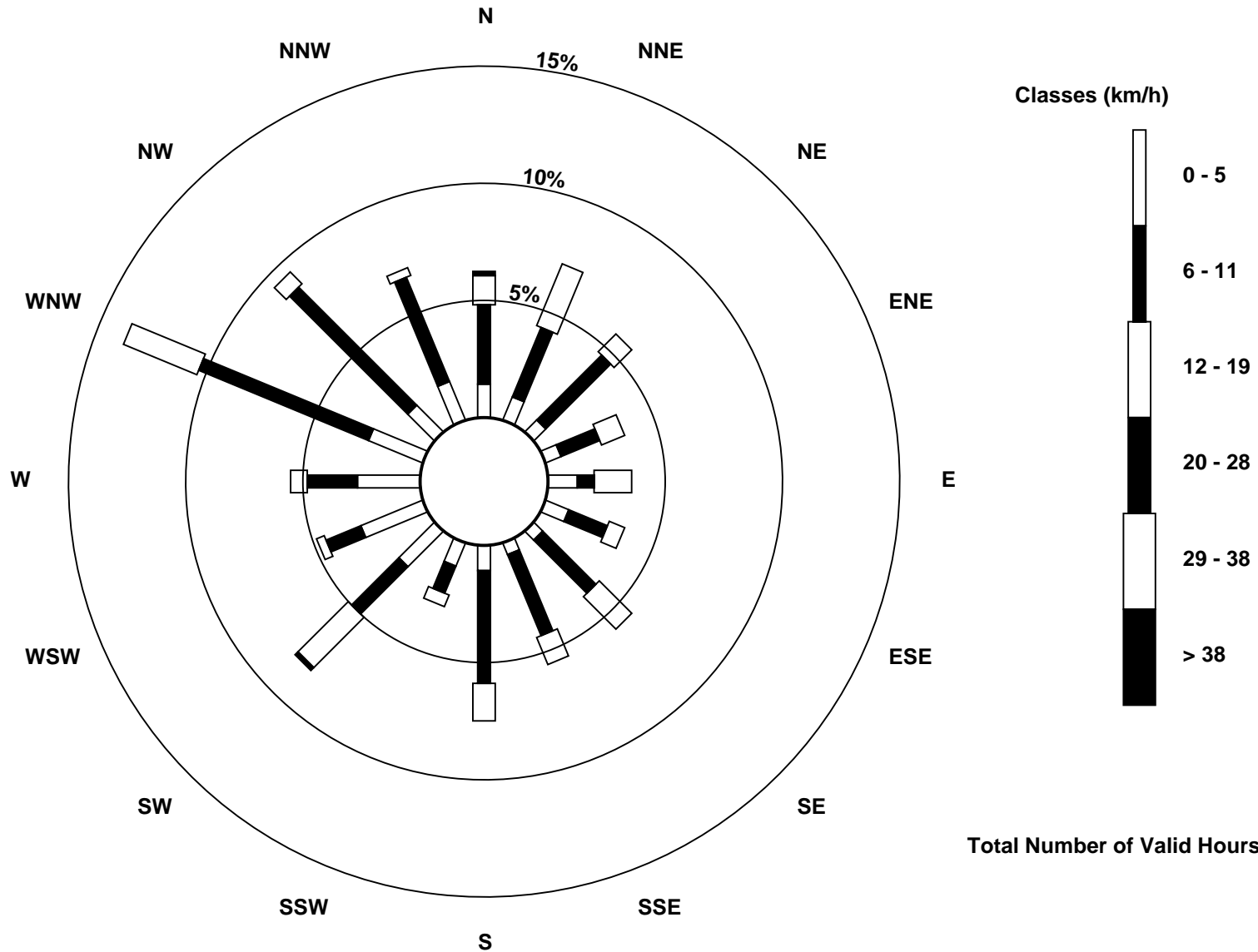
Total Number of Valid Hours: 561

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Anzac (AMS 14)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - May 2016

Direction of Maximum Speed: 360 deg on May 5 22:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 221.5 deg on May 16		Hours of Data:	561
Direction of Minimum Speed: 4 deg on May 29 23:00		Hours of Missing Data:	183
Direction of Minimum Daily Speed Average: 1.4 deg on May 25		Percent Operational Time:	75.4
Monthly Average Direction: 287.7 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-May	264	258	254	236	222	215	227	236	262	299	310	305	301	298	305	294	292	300	296	288	210	231	255	252	277.0	
2-May	239	238	248	294	283	233	82	68	112	155	113	120	109	337	23	74	78	85	116	139	161	171	157	147	130.9	
3-May	148	134	148	131	139	130	140	116	120	132	150	208	210	211	230	223	226	220	216	196	176	181	176	191	179.4	
4-May	240	230	223	232	221	208	234	88	101	166	151	302	306	285	281	294	295	305	306	308	307	312	304	303	284.2	
5-May	303	309	297	313	311	310	307	294	292	297	301	307	307	300	299	301	299	292	306	317	316	360	25	347	312.1	
6-May	263	285	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	285	236	267	278	274	280	249	--
14-May	213	238	230	223	240	230	286	307	259	298	295	340	351	352	355	8	360	7	25	29	63	220	268	276	335.7	
15-May	257	269	269	300	292	250	246	286	227	246	283	310	271	303	276	280	342	104	113	131	145	163	170	180	245.8	
16-May	220	242	250	250	221	226	233	244	243	236	222	230	224	219	223	227	222	226	217	201	179	176	172	180	221.5	
17-May	220	222	228	266	278	285	301	283	281	292	291	300	295	302	299	296	303	301	180	203	224	227	231	244	265.0	
18-May	266	279	280	258	221	227	269	286	284	283	288	284	291	291	300	287	298	289	302	311	299	278	355	22	287.8	
19-May	358	352	359	348	348	354	19	26	30	26	20	18	11	357	15	20	31	31	29	32	36	33	40	49	19.6	
20-May	57	66	69	78	88	85	82	87	88	80	73	89	88	87	96	109	124	92	69	46	6	315	295	320	78.7	
21-May	335	325	333	316	346	322	318	336	313	307	329	266	292	323	338	332	324	325	330	328	329	335	343	342	324.1	
22-May	345	355	354	351	359	4	19	21	26	29	25	24	23	27	29	36	35	33	45	23	31	45	44	55	23.8	
23-May	114	44	39	38	36	27	41	39	45	50	57	68	65	54	75	65	97	102	133	137	164	172	180	179	76.9	
24-May	181	186	173	157	155	160	160	147	168	163	148	145	172	176	180	178	175	197	208	228	225	204	187	182	176.5	
25-May	174	183	195	191	190	209	234	246	306	301	311	269	260	38	35	9	28	31	24	36	49	27	21	72	349.6	
26-May	89	355	352	345	318	330	355	47	64	51	45	307	327	351	359	37	176	234	100	123	93	21	96	115	16.3	
27-May	133	140	120	125	125	132	134	139	136	147	125	135	113	115	115	141	278	75	60	107	159	168	127	140	128.3	
28-May	138	127	125	137	146	156	140	147	165	155	147	167	184	173	169	175	183	197	183	179	182	164	161	184	162.1	
29-May	144	206	288	299	317	338	327	321	286	302	307	317	278	284	48	72	49	30	55	51	46	29	4	2	345.0	
30-May	11	312	316	316	312	314	339	355	340	336	336	333	333	350	359	352	3	342	330	351	343	348	352	335	341.4	
31-May	331	316	324	315	324	343	343	313	317	299	288	300	296	269	303	293	295	289	281	277	189	157	173	169	297.3	

220.8 252.4 262.5 293.4 288.6 280.2 313.5 351.3 331.3 318.7 347.8 311.9 299.1 315.5 330.8 323.2 308.8 321.1 343.1 357.9 216.2 258.7 177.0 186.6
 Diurnal Average

PF - Power Failure

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



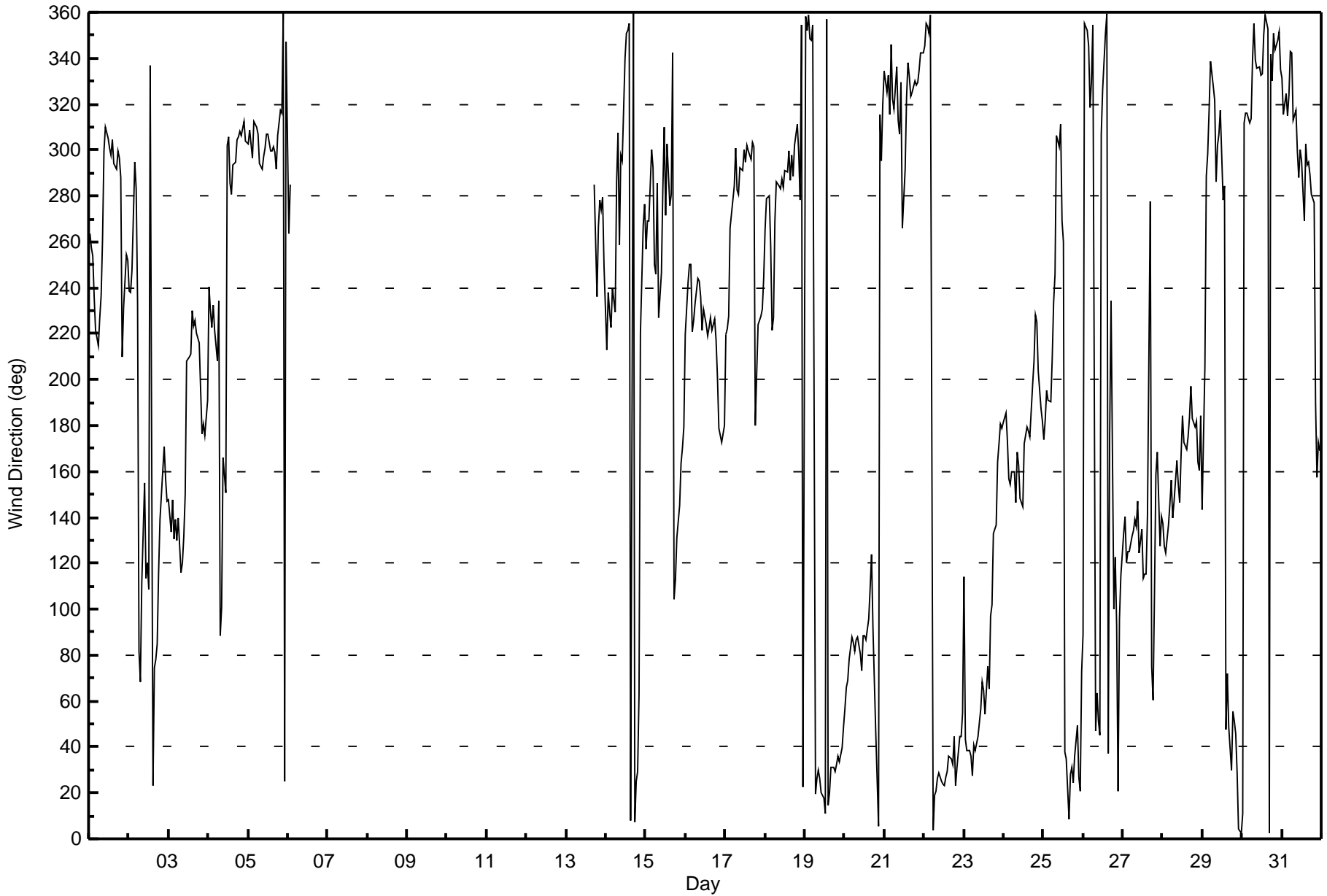
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Anzac - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 103 deg on May 3 12:00	Hours of Data: 561
Minimum Value: 6 deg on May 1 02:00	Hours of Missing Data: 183
	Hours of Calibration: 0
	Percent Operational Time: 75.4
Percentiles: P ₁ = 9 P ₁₀ = 15 Q ₁ = 18 Median = 23 Q ₃ = 29 P ₉₀ = 43 P ₉₉ = 79	

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	9	6	7	14	9	11	15	19	40	29	25	26	28	32	24	31	31	26	28	86	12	11	20	19	86	
2-May	15	13	18	36	26	79	25	43	57	52	72	76	59	74	49	33	28	21	24	18	13	13	16	16	79	
3-May	16	15	17	19	14	16	19	19	26	36	52	103	37	29	37	29	35	28	24	25	13	15	14	25	103	
4-May	19	9	9	12	24	22	53	64	64	54	33	48	24	34	31	30	30	27	27	25	23	23	24	23	64	
5-May	26	69	56	27	21	22	23	26	26	24	31	26	33	28	28	28	30	31	28	21	35	25	30	29	69	
6-May	27	34	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	34	
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	37	44	23	17	12	23	12	44
14-May	30	9	9	13	10	11	31	25	50	94	48	28	29	37	24	36	30	23	24	16	22	57	21	15	94	
15-May	17	7	19	17	36	33	11	39	72	57	40	53	39	28	82	72	49	38	22	14	17	14	13	16	82	
16-May	29	20	19	20	22	17	20	20	23	27	27	27	29	27	31	27	30	21	25	24	16	17	16	19	31	
17-May	22	18	22	27	27	27	28	30	28	26	26	22	37	25	20	25	26	27	48	28	24	15	15	14	48	
18-May	18	16	17	22	13	11	31	26	28	29	29	26	26	28	24	28	24	26	23	17	22	11	50	17	50	
19-May	17	14	17	16	16	20	18	20	19	19	20	20	21	18	20	20	19	18	19	18	18	17	19	17	21	
20-May	17	15	16	18	18	20	18	23	23	21	23	26	29	23	28	31	48	34	22	19	21	25	28	31	48	
21-May	20	16	19	20	40	21	31	26	32	33	29	25	24	20	16	19	19	16	16	16	14	15	16	17	40	
22-May	16	16	15	16	17	18	18	19	19	19	19	19	17	18	19	20	18	19	18	22	19	17	18	28	28	
23-May	26	36	21	19	19	18	21	25	27	22	25	20	25	29	25	28	28	29	20	23	17	18	19	16	36	
24-May	18	18	14	12	14	18	18	26	30	29	31	27	34	35	35	31	27	38	27	21	18	21	17	16	38	
25-May	14	18	20	23	19	30	24	40	25	61	26	43	59	45	51	61	48	18	19	27	29	22	24	28	61	
26-May	27	41	14	29	16	18	21	29	27	40	32	38	33	27	23	37	46	24	57	67	23	48	55	20	67	
27-May	21	17	16	16	15	18	19	22	23	22	21	24	26	23	25	62	59	28	16	33	30	21	19	16	62	
28-May	18	17	16	18	18	20	22	20	24	27	22	25	21	24	21	26	27	35	22	21	20	16	18	23	35	
29-May	69	33	28	23	23	36	36	26	25	26	24	32	23	32	80	26	26	30	22	20	21	14	61	23	80	
30-May	20	26	16	17	19	20	25	19	17	17	17	24	22	20	20	22	27	17	15	18	14	15	15	12	27	
31-May	12	14	13	14	15	17	22	29	33	70	48	53	39	42	79	50	36	45	43	71	17	14	13	13	79	
69 69 56 36 40 79 53 64 72 94 72 103 59 74 82 72 59 45 57 86 35 57 61 31																										
Diurnal Maximum																										

PF - Power Failure





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

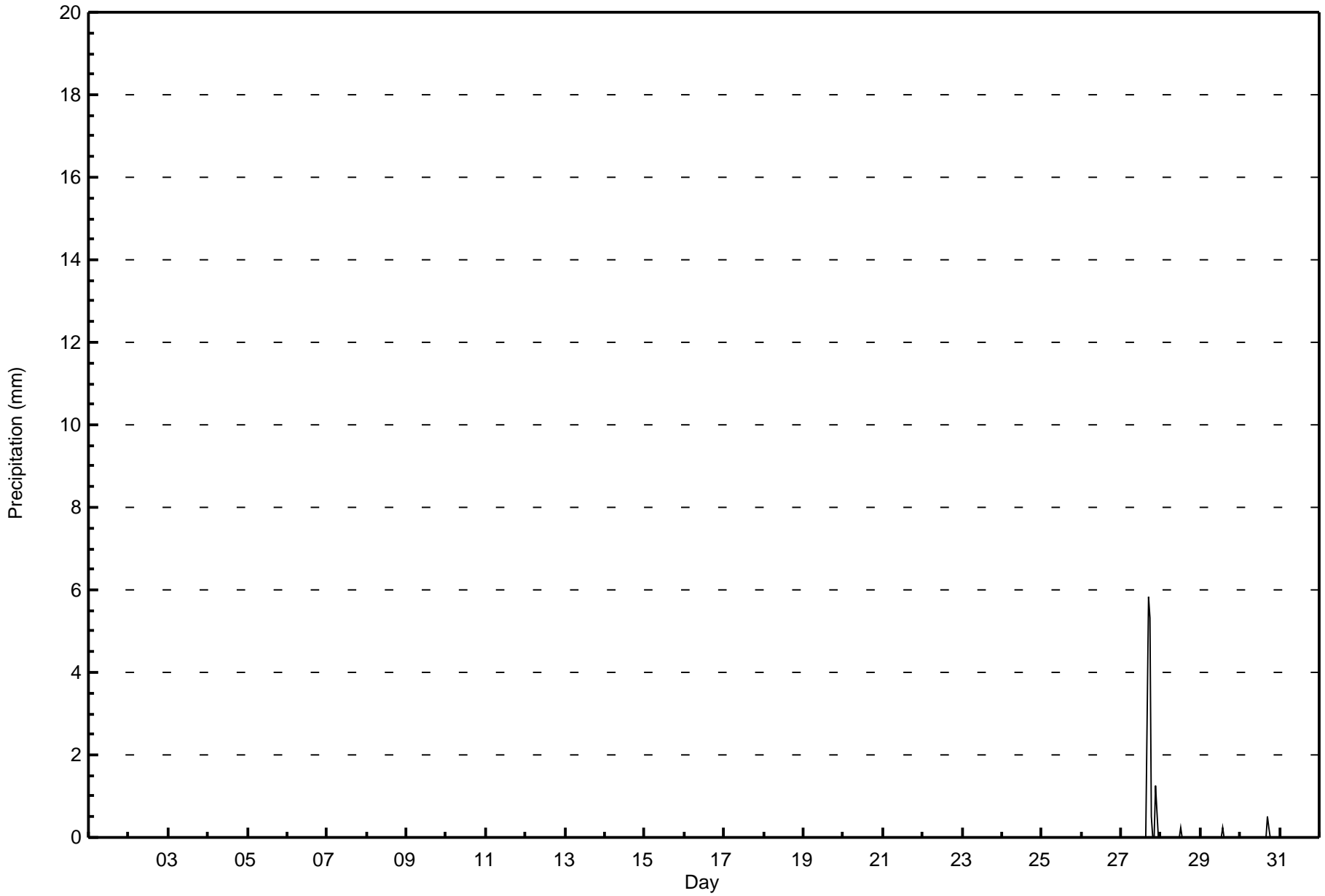
Anzac - May 2016

Maximum Value: 5.8 mm on May 27 17:00		Maximum Daily Total: 13.0 mm on May 27		Hours in Service: 744																															
Minimum Value: 0.0 mm on May 1 01:00		Minimum Daily Total: 0.0 mm on May 1		Hours of Data: 561																															
Maximum Diurnal Total: 6.4 mm at hour 17		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 183																															
Monthly Total: 14.22 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.2		Hours of Calibration: 0																															
				Percent Operational Time: 75.4																															
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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0.0
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	5.3	0.5	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	5.8
28-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
29-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
30-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5
31-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	6.4	5.6	0.5	0.0	0.0	1.3	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	0.3	0.3	0.0	0.0	5.8	5.3	0.5	0.0	0.0	1.3	0.0	0.0							Diurnal Maximum				
PF - Power Failure																																			



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - May 2016





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Last Calibration	April 13, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	11:08
Gas Cert Reference	SA130026A	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG Make/Model	API 701	Serial Number	764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	2500	2465
Calculated slope	1.010586	0.997772	Chamber temp	50.0	50.0
Calculated intercept	-0.222312	0.860086	Pressure	25.4	25.4
Analyzer Background	18.8	20.7	Flow	618	601
Analyzer Coefficient	1.063	1.086	Intensity	62	61

Analyzer make API T100 Analyzer serial # 723

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.5	----
as found span	5000	74.9	707.1	680.3	1.039
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	74.9	707.1	708.4	0.998
second point	5000	37.5	354.0	352.7	1.004
third point	5000	18.7	176.5	176.0	1.003
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found 679.8 Previous response 699.9 % change 3.0%

Notes:

filter changed out, zero and span adjusted, no maintenance done

Calibration Performed By: Melissa Lemay



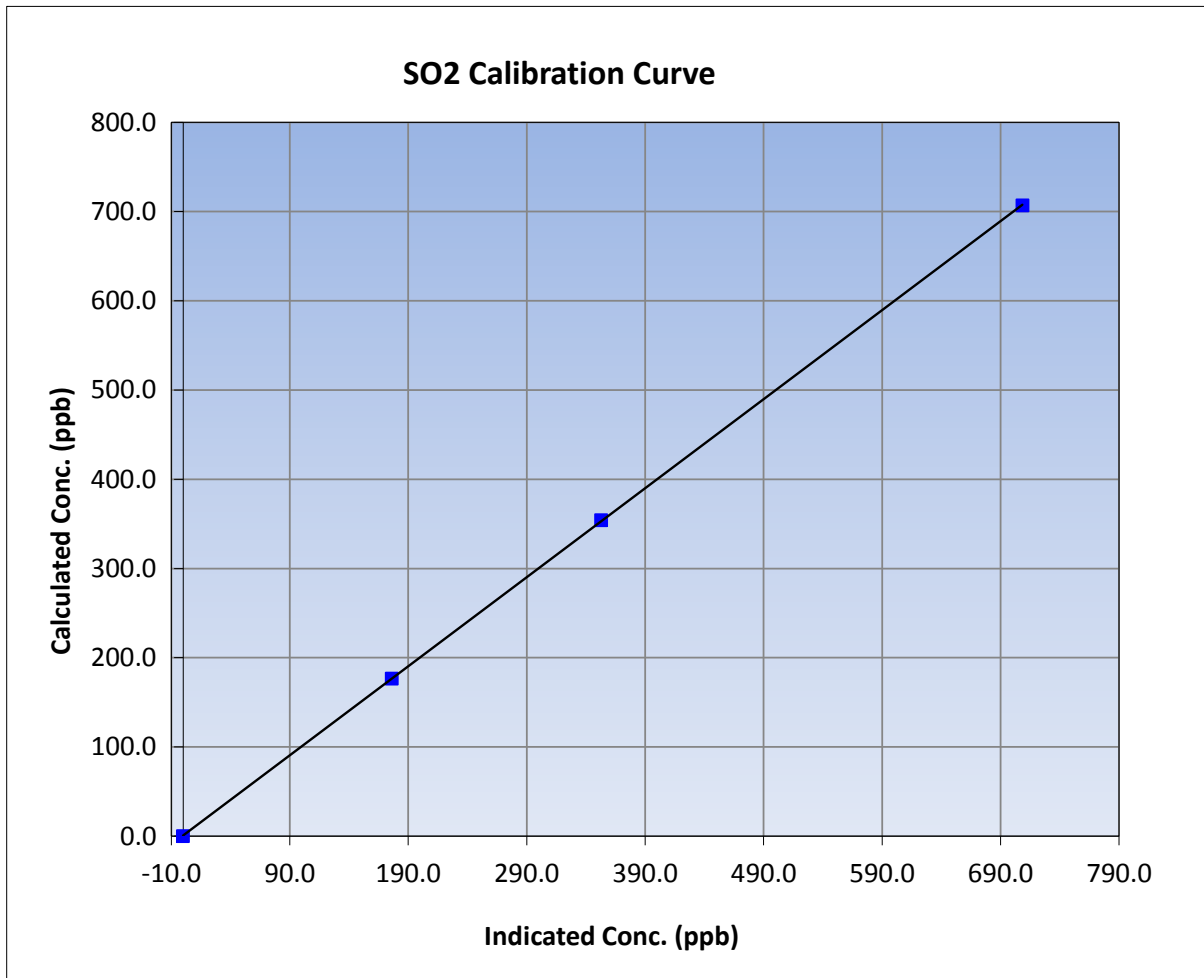
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 13, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:25	End Time (MST)	11:08
Analyzer make	API T100	Analyzer serial #	723

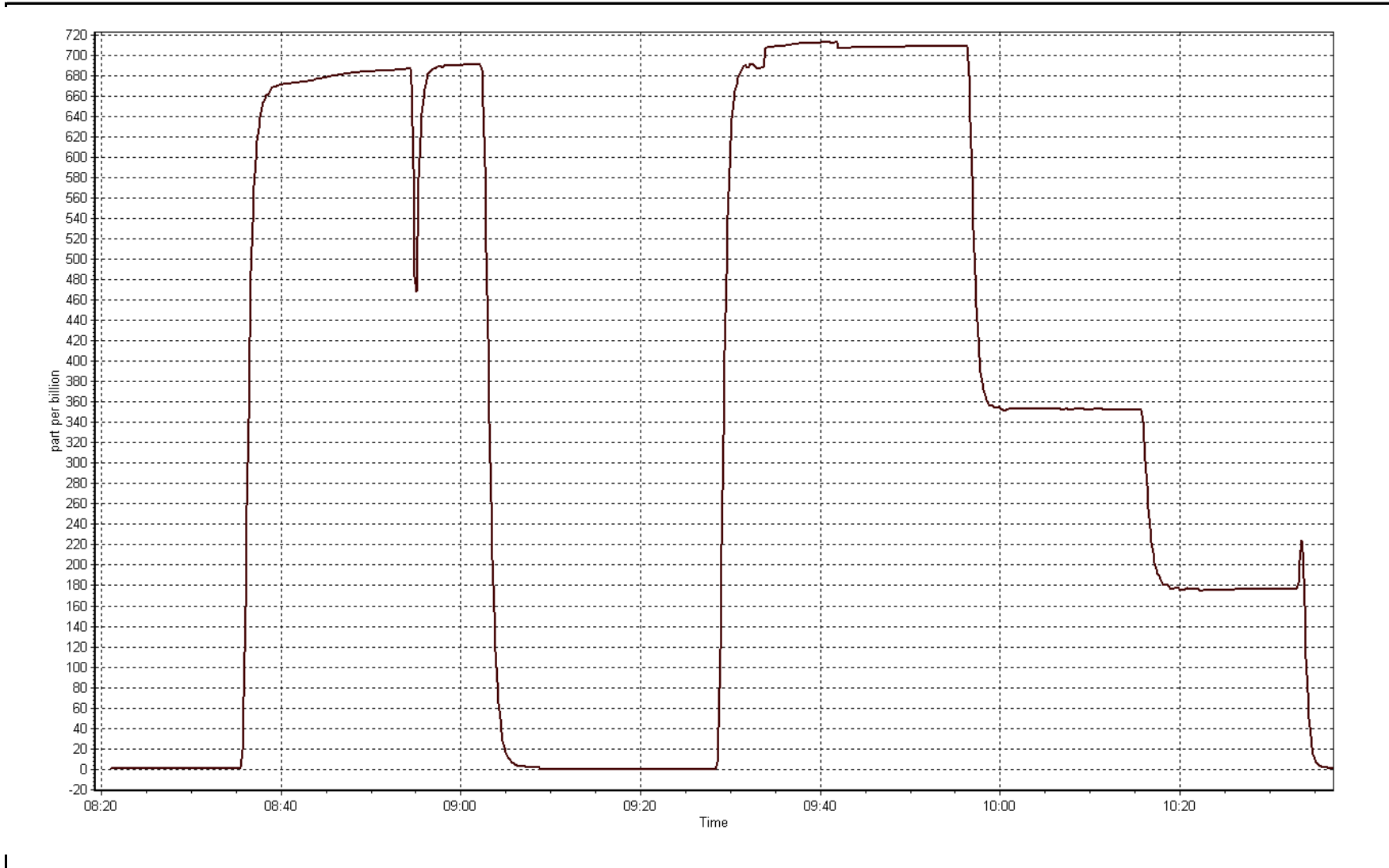
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999991
707.1	708.4	0.9981		
354.0	352.7	1.0037	Slope	0.997772
176.5	176.0	1.0030		
			Intercept	0.860086



SO2 Calibration Plot

Date: May 18, 2016





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	May 18, 2016	Last Calibration	April 4, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	13:50	End Time (MST)	15:52
Gas Cert Reference	ALM033528	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/Dec/16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.42		Lamp voltage	998	991
Calculated slope	0.999251	1.004182	Chamber temp	45	45
Calculated intercept	-0.165326	-0.207205	Pressure	659.2	654.7
Analyzer Background	1.75	1.75	Flow	0.407	0.402
Analyzer Coefficient	1.207	1.207	Intensity	99	99
			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	74.9	1.002
SO2 scrubber check	5000	18.7	176.5	0.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	74.8	1.003
second point	5000	39.6	40.0	40.2	0.995
third point	5000	19.8	20.0	20.3	0.985
as left zero					
as left span					
Average Correction Factor					0.994

Corrected As found	74.9	Previous response	75.3	% change	0.5%
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Notes:

No maintenance or adjustments done, filter changed out,

Calibration Performed By:

Melissa Lemay



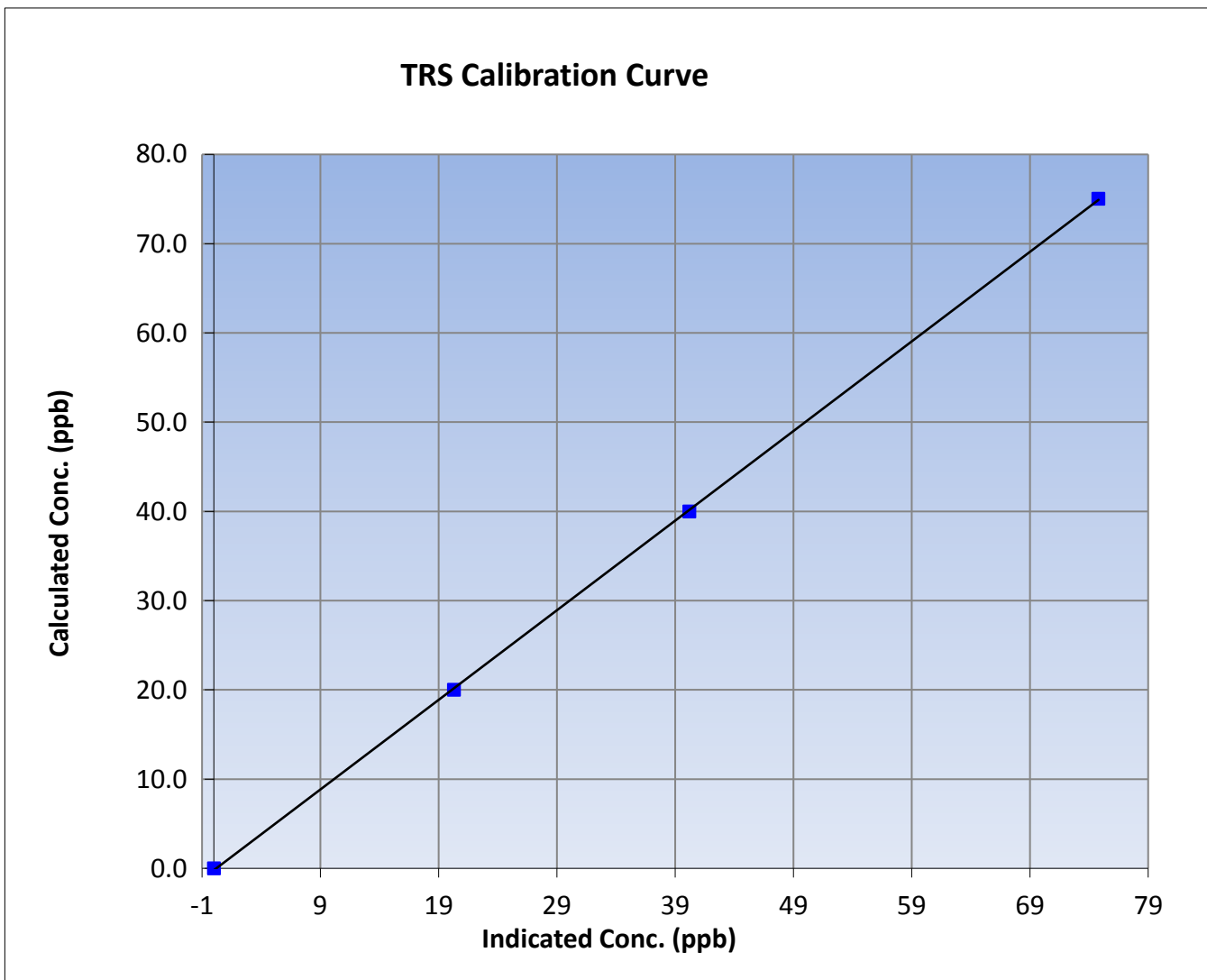
Wood Buffalo Environmental Association TRS Calibration Report

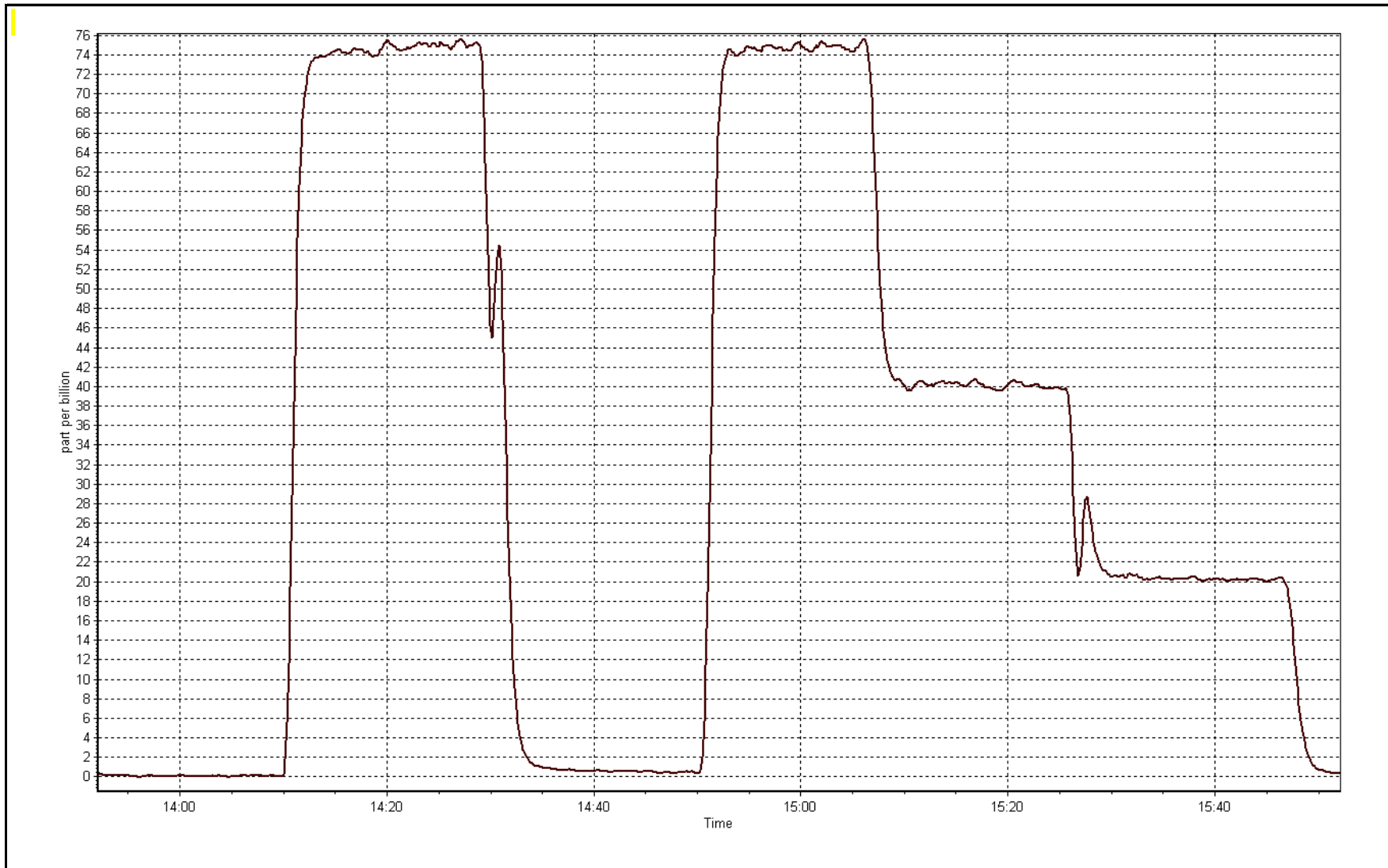
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 4, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	13:50	End Time (MST)	15:52
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999961
75.0	74.8	1.0032		
40.0	40.2	0.9949	Slope	1.004182
20.0	20.3	0.9851		
			Intercept	-0.207205







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-18-16	Last Calibration	April-21-16
Station Name	Anzac	Station Number	AMS 14
Reason:	Install		
Start Time (MST)	8:25	End Time (MST)	11:08
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	75.2	75.2
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	356.6	359.3
THC Calc slope	1.000837	0.997364	Carrier Pressure	32.0	32.0
THC Calc intercept	0.026232	0.016078	Fuel Pressure	44.6	44.6
NMHC Calc slope	1.004728	0.998551	Air Pressure	32.7	32.7
NMHC Calc intercept	0.018228	0.004052			

Analyzer make Thermo 55i Analyzer serial # 1317958219

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	16.01	1.022
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.41	0.997
second point	5000	37.5	8.19	8.15	1.005
third point	5000	18.7	4.09	4.09	0.999
as left zero					
as left span					
Average Correction Factor					1.000

Corrected As found 16.01 Previous response 16.32 % change 1.9%

Notes:

Span adjusted, filter changed out, no maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	8.69	8.48	1.025
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.71	0.998
second point	5000	37.5	4.35	4.33	1.005
third point	5000	18.7	2.17	2.18	0.995
as left zero					
as left span					
Average Correction Factor					0.999

Corrected As found 8.48 Previous response 8.63 % change 1.8%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	7.53	1.019
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.71	0.995
second point	5000	37.5	3.84	3.82	1.005
third point	5000	18.7	1.91	1.92	0.997
as left zero					
as left span					
Average Correction Factor					0.999

Corrected As found 7.53 Previous response 7.69 % change 2.1%



Wood Buffalo Environmental Association

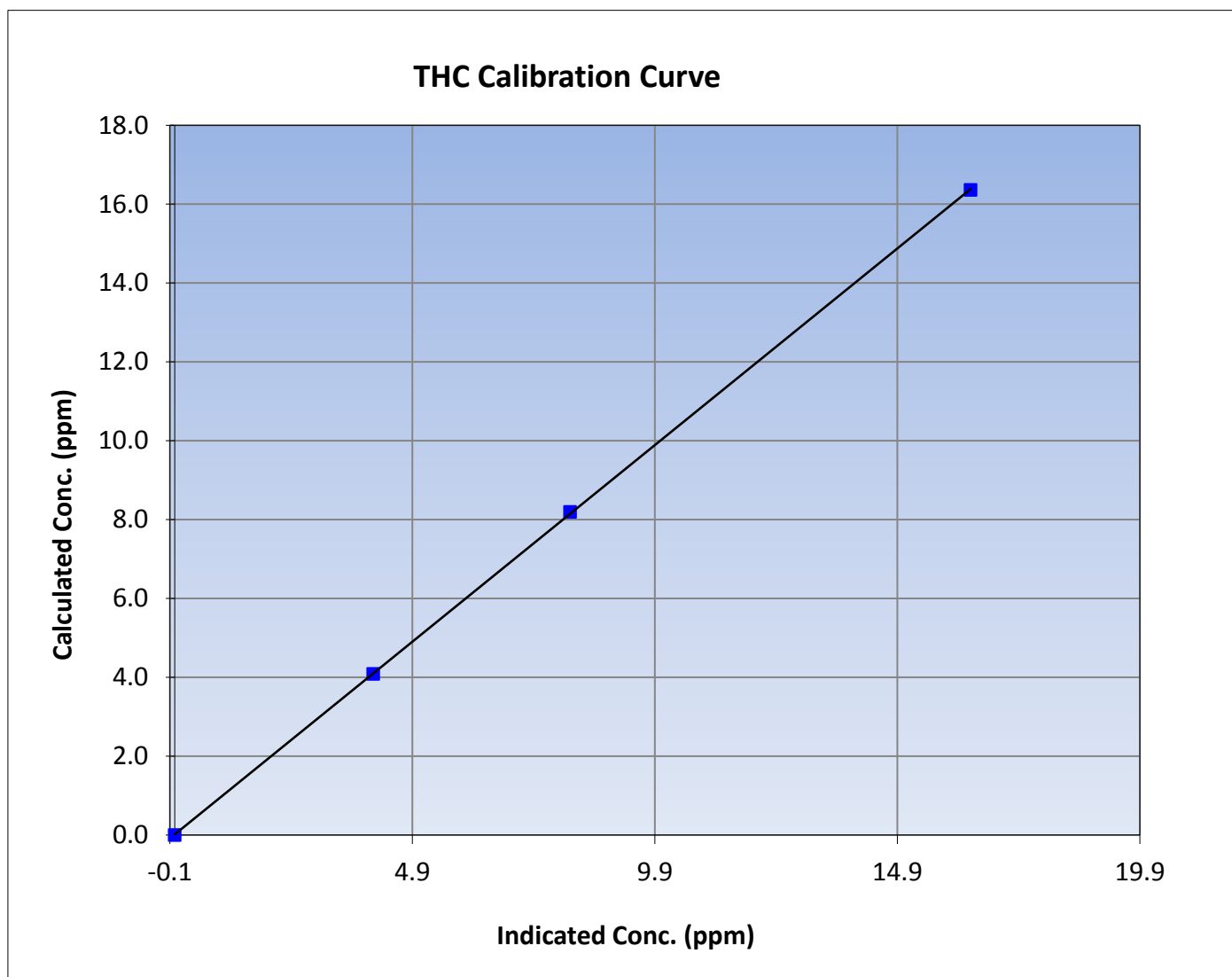
THC Calibration Summary

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 21, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:25	End Time (MST)	11:08
Analyzer make	Thermo 55i	Analyzer serial #	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999979
16.36	16.41	0.9971		
8.19	8.15	1.0051	Slope	0.997364
4.09	4.09	0.9988		
			Intercept	0.016078





Wood Buffalo Environmental Association

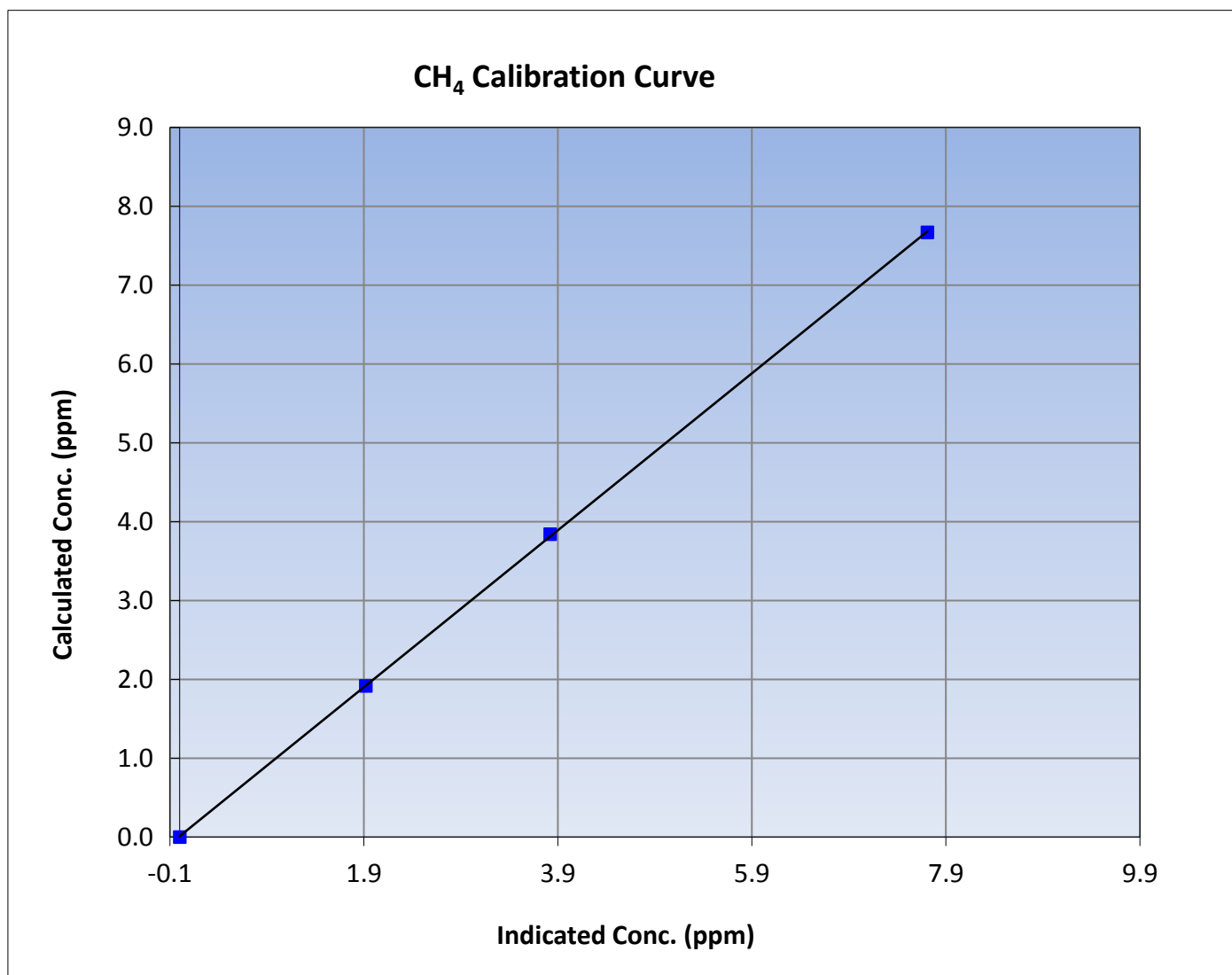
CH₄ Calibration Summary

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 21, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:25	End Time (MST)	11:08
Analyzer make	Thermo 55i	Analyzer serial #	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999965
7.67	7.71	0.9948		
3.84	3.82	1.0052	Slope	0.995126
1.91	1.92	0.9973		
			Intercept	0.010050





Wood Buffalo Environmental Association

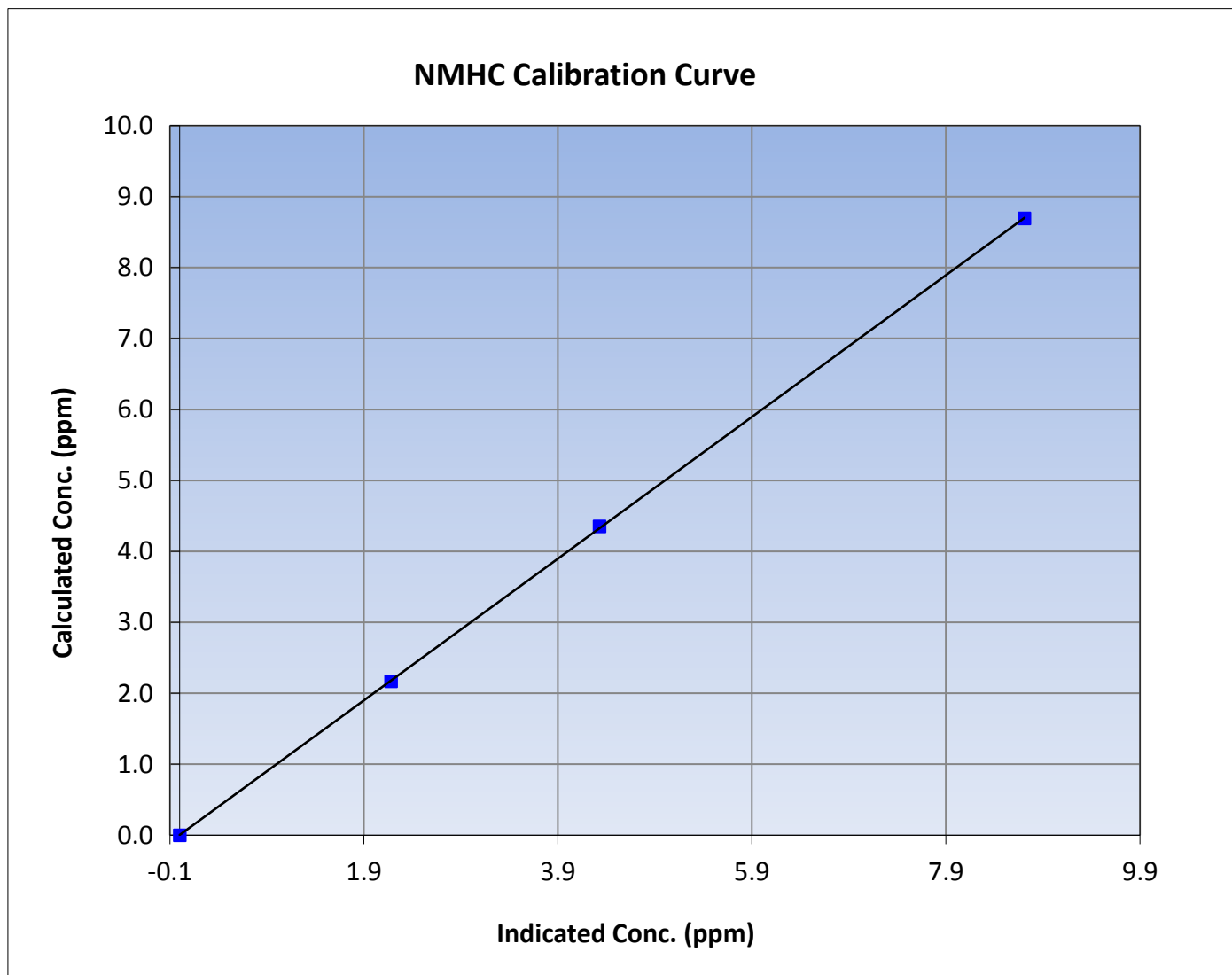
NMHC Calibration Summary

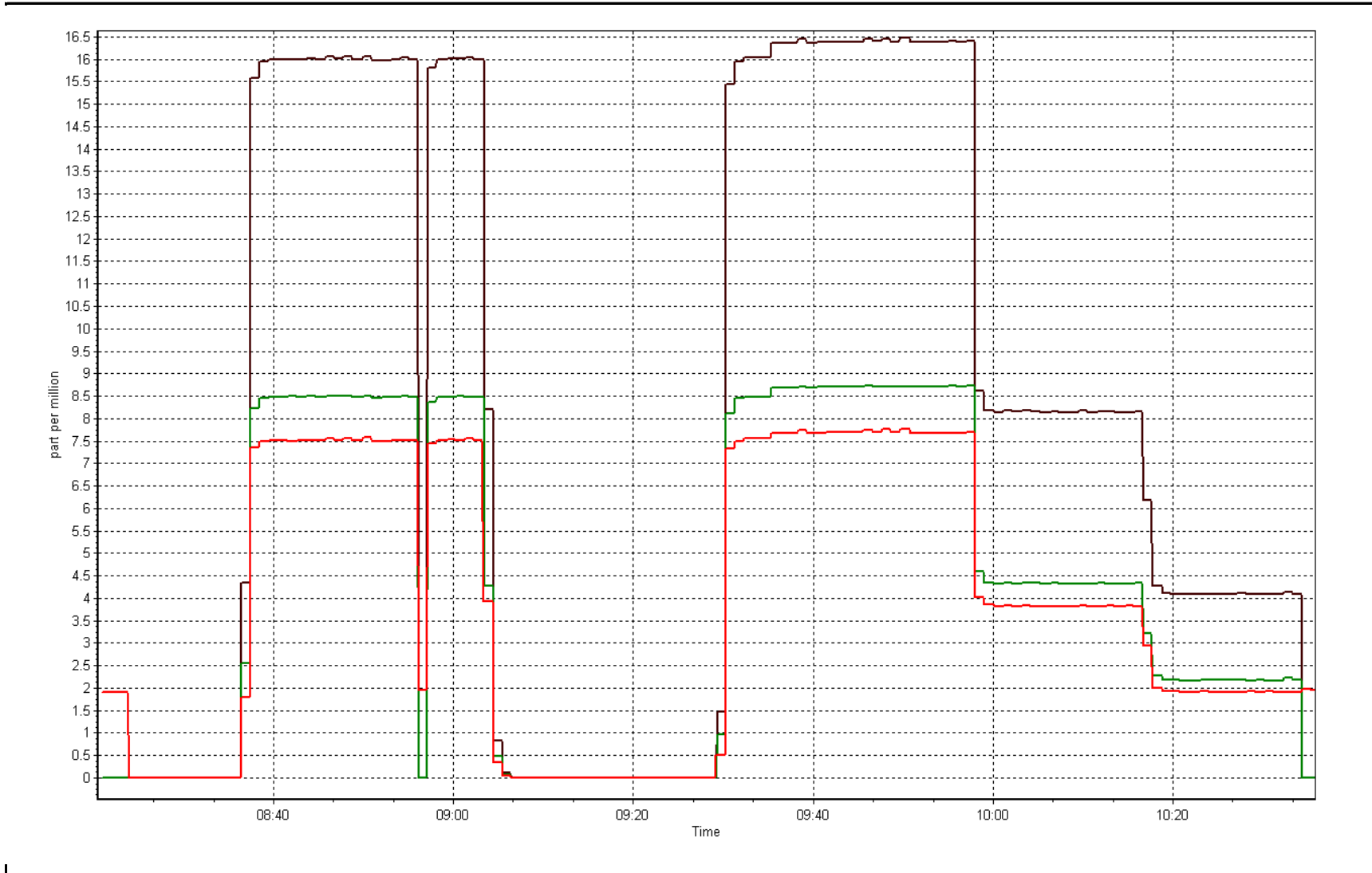
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 21, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:25	End Time (MST)	11:08
Analyzer make	Thermo 55i	Analyzer serial #	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999981
8.69	8.71	0.9980		
4.35	4.33	1.0051	Slope	0.998551
2.17	2.18	0.9955		
			Intercept	0.004052







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 14, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	12:05	End Time (MST)	13:58
NO2 GPT Ref date	May-18-16	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.7	28.5
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	1.002922	0.999935	Pressure	655.2	652.8
Calculated intercept	-0.616427	-1.360172	Flow cell A	0.703	0.701
Analyzer Background	-2.0	-2.1	Flow cell B	0.705	0.703
Analyzer Coefficient	1.006	1.030	Cell A Intensity	108491	105877
			Cell B Intensity	115324	113657

Analyzer make	Thermo 49i	Analyzer serial #	1426262596
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.5	----
as found span	5000	1.19	444.7	415.7	1.070
calibrator zero	5000	0.00	0.0	0.5	----
high point	5000	1.19	444.7	445.2	0.999
second point	5000	0.85	302.5	304.7	0.993
third point	5000	0.51	155.3	157.6	0.985
as left zero					
as left span					
Average Correction Factor					0.992

Corrected As found	415.2	Previous response	444.0	% change	6.9%
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Notes:

span adjusted, filter changed out, diagnostics similar to last months clibration, Drop in span could be due to smoke.

Calibration Performed By:

Melissa Lemay



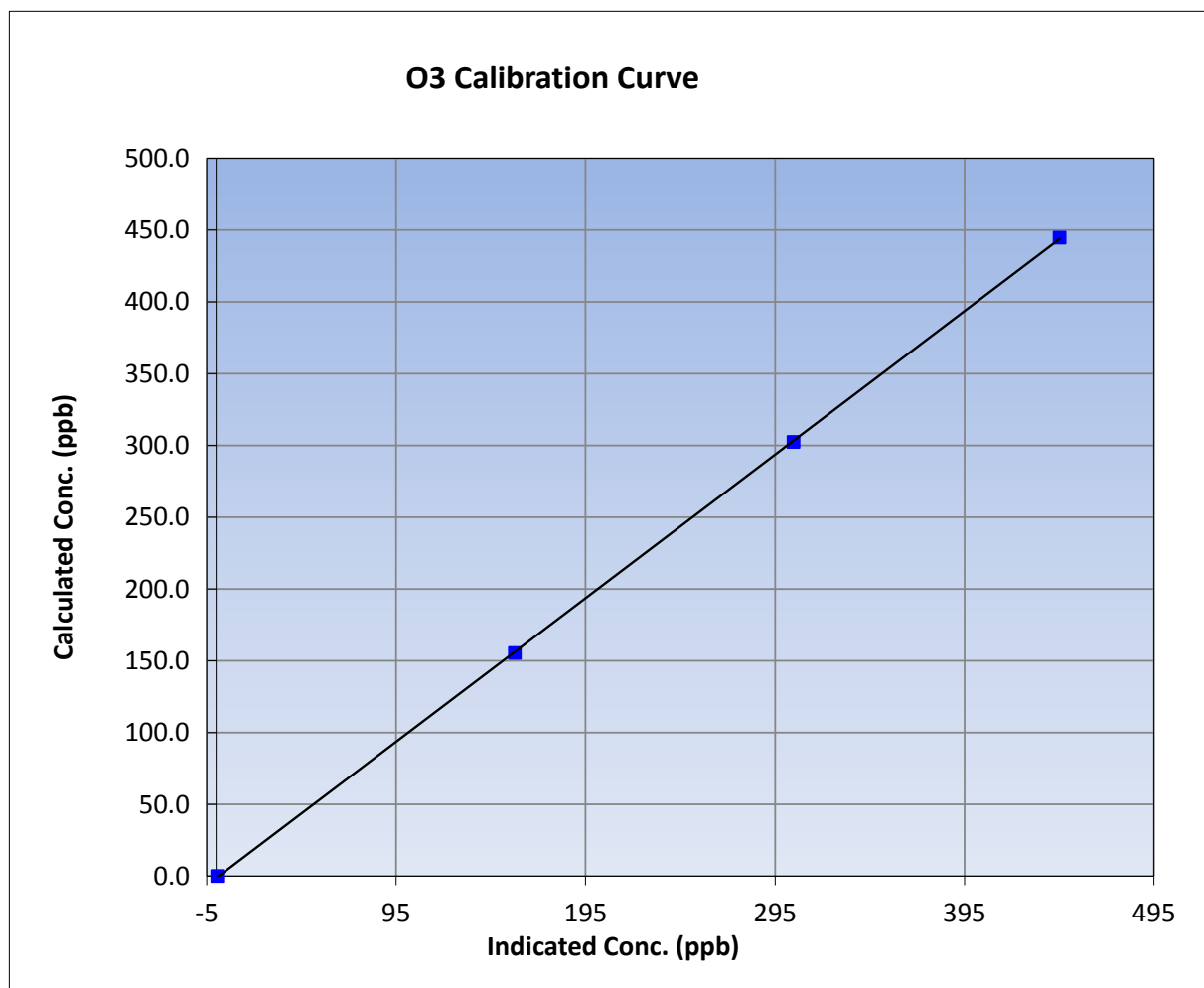
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-18-16	Previous Calibration	April 14, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	12:05	End Time (MST)	13:58
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

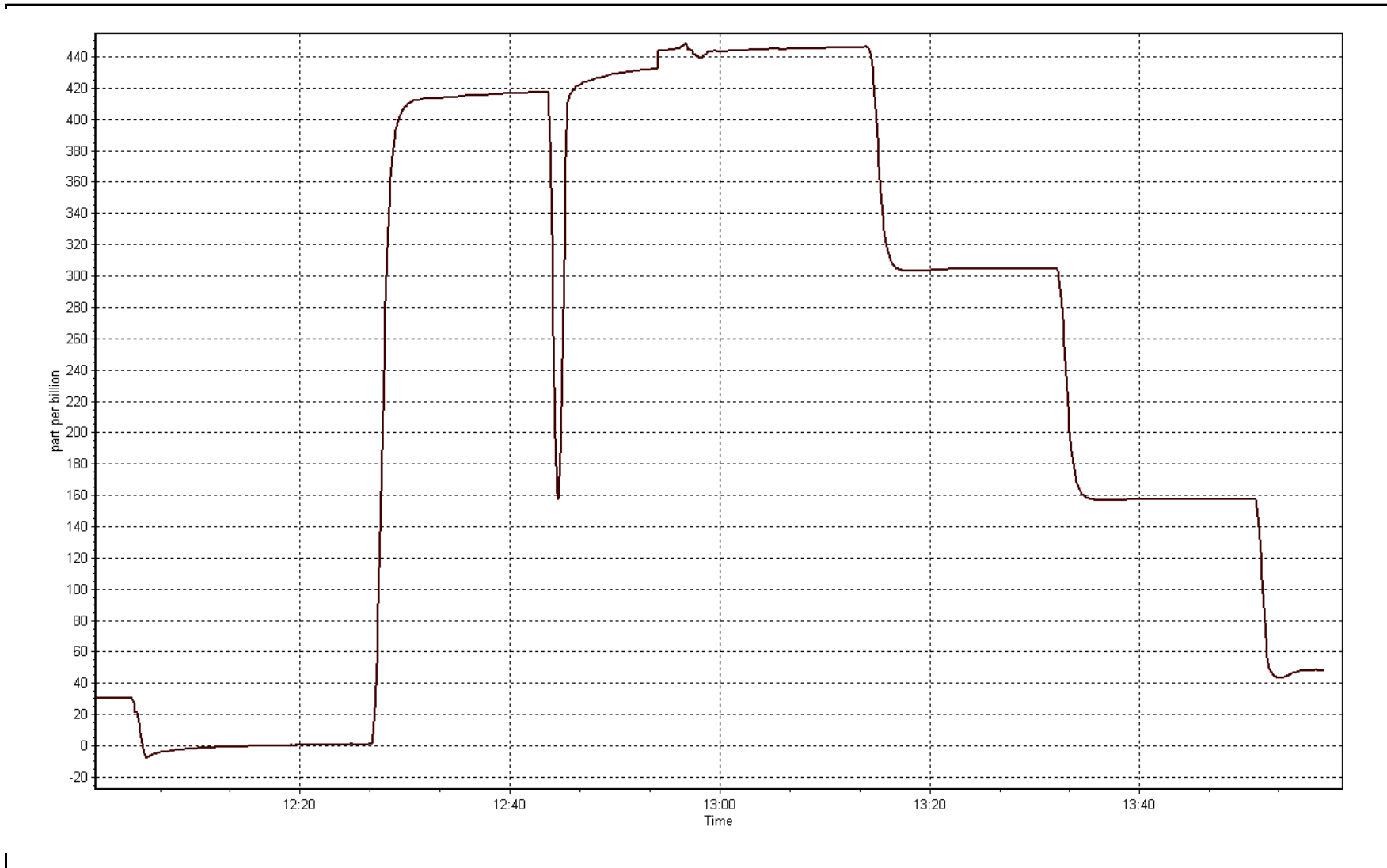
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999972
444.7	445.2	0.9989		
302.5	304.7	0.9928	Slope	0.999935
155.3	157.6	0.9854		
			Intercept	-1.360172



O3 Calibration Plot

Date: May 18, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 13, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:16
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOx Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne PAI T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.993757	0.993814	1.002908
	Data Offset	0.656876	0.537304	0.013749
Current Calibration	Data Slope	0.998914	0.998020	1.003604
	Data Offset	0.941648	0.679956	0.014809

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.985		1.115	
NOx coefficient	1.000		1.000	
NO2 coefficient	0.997		0.999	
NO bkgnd	3.6		5.0	
NOx bkgnd	3.6		5.4	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	321.6	Deg C	321.6	Deg C
PMT voltage	-807.7	V	-807.7	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	142.4	mmHg	134.5	mmHg
R Cell Press Nox	142.4	mmHg	134.5	mmHg
NO sample flow	0.768	lpm	0.797	lpm
Nox sample Flow	0.768	lpm	0.797	lpm

Notes:

filter changed out, Pump was changed out, O rings were checked and good; Span did increase but still out by 10% this could be due to loss of sensitivity due to smoke, similar to other stations, zero and span adjusted



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 18, 2016

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	3.1	0.8	2.3	----	----
as found span	5000	74.9	799.9	799.9	0.0	670.6	670.2	0.4	1.1929	1.1936
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
high point	5000	74.9	799.9	799.9	0.0	800.6	801.4	-0.9	0.9992	0.9982
second point	5000	37.5	400.5	400.5	0.0	398.7	399.5	-0.7	1.0045	1.0025
third point	5000	18.7	199.7	199.7	0.0	198.6	199.4	-0.8	1.0056	1.0016
as left zero										
as left span										
									1.0031	1.0008

Corrected As found

NO_x= 667.5

NO= 669.4

Percent Change

NO_x= 20.5%

NO= 20.2%

Previous Response

NO_x= 804.3

NO= 804.4

GPT Calibration Data

Dilution Flow (total) 5000 ccm

Source Gas Flow 74.90 ccm

NOx ref calc conc = 799.9 ppb

NO ref calc conc = 799.9 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	801.7	802.4	0.1	0.9978	0.9969	----	----
1st NO2 (300)	357.7	444.7	800.8	357.7	443.2	0.9989	----	1.0034	99.7%
2nd NO2 (200)	499.9	302.5	801.2	499.9	301.3	0.9984	----	1.0040	99.6%
3rd NO2 (100)	647.1	155.3	801.7	647.1	154.6	0.9978	----	1.0045	99.5%
2nd NO ref point		0.0	802.0	802.7	-0.8	0.9974	0.9966	----	----
Average Correction Factor						0.9981		1.0040	99.6%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

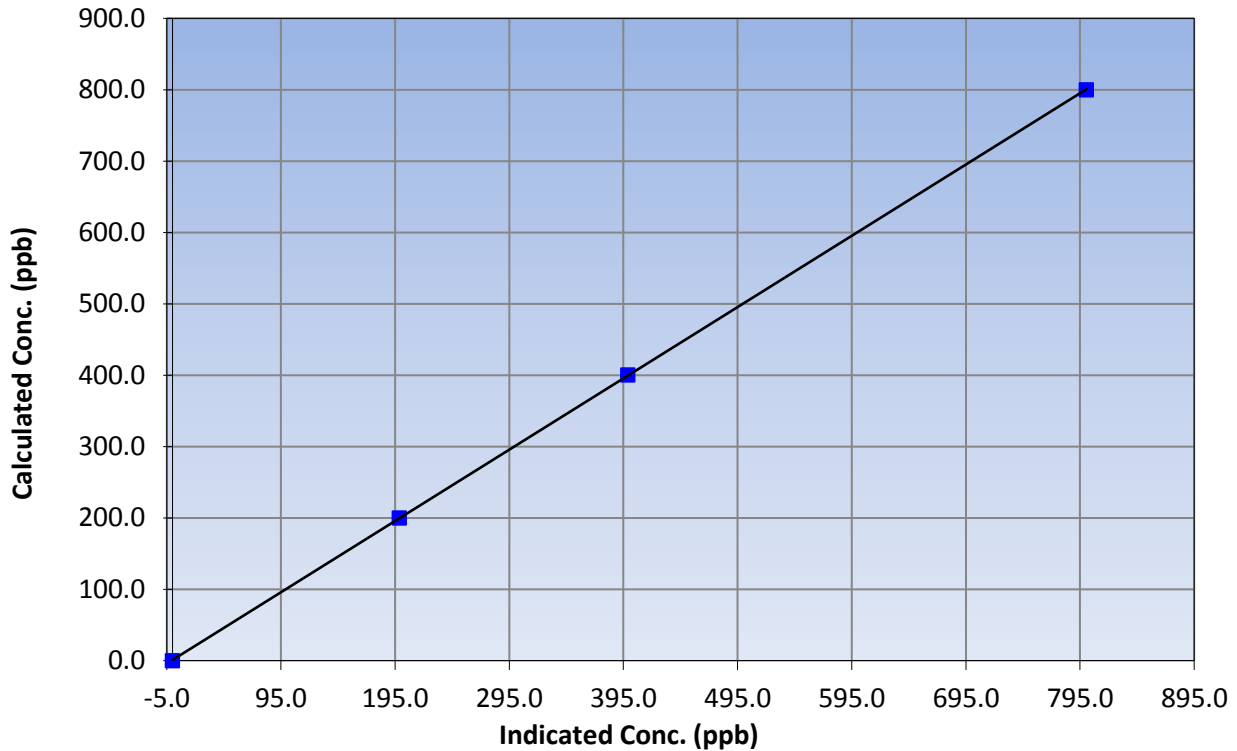
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 13, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:25	End Time (MST)	12:16
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
799.9	800.6	0.9992		
400.5	398.7	1.0045	Slope	0.998914
199.7	198.6	1.0056		
			Intercept	0.941648

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

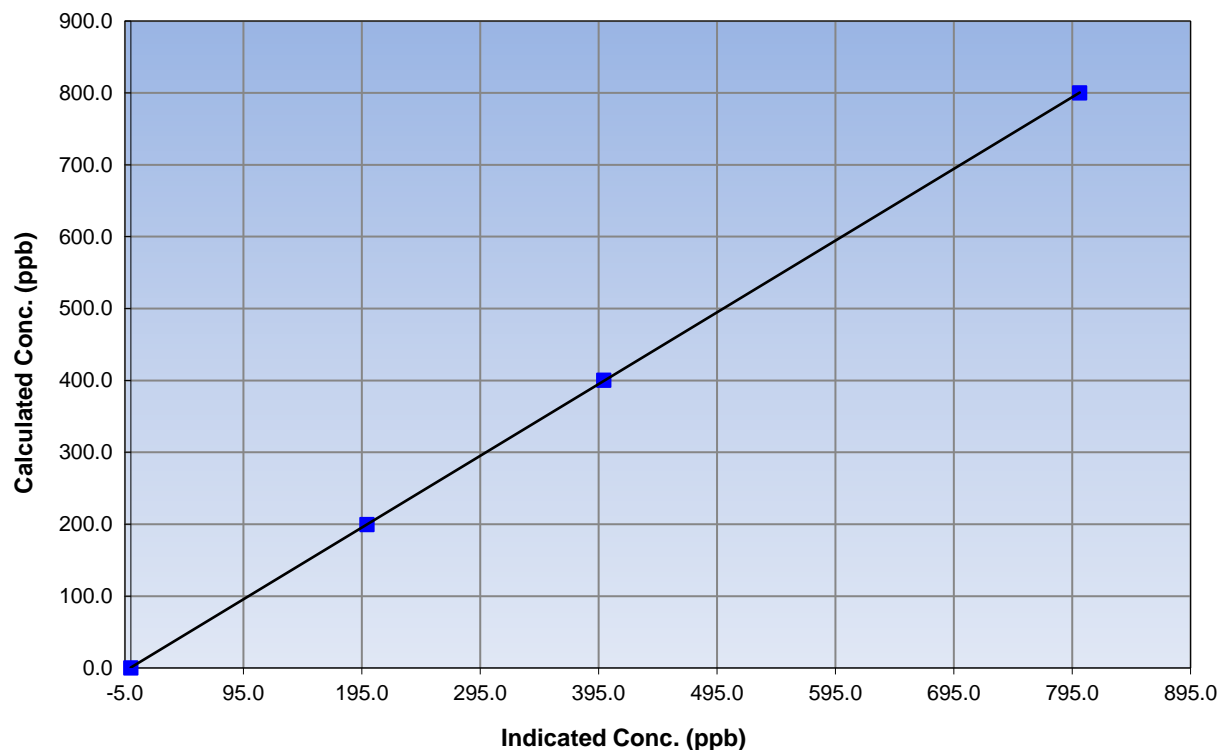
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 13, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:25	End Time (MST)	12:16
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	0.999995
799.9	801.4	0.9982		
400.5	399.5	1.0025	Slope	0.998020
199.7	199.4	1.0016		
			Intercept	0.679956

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

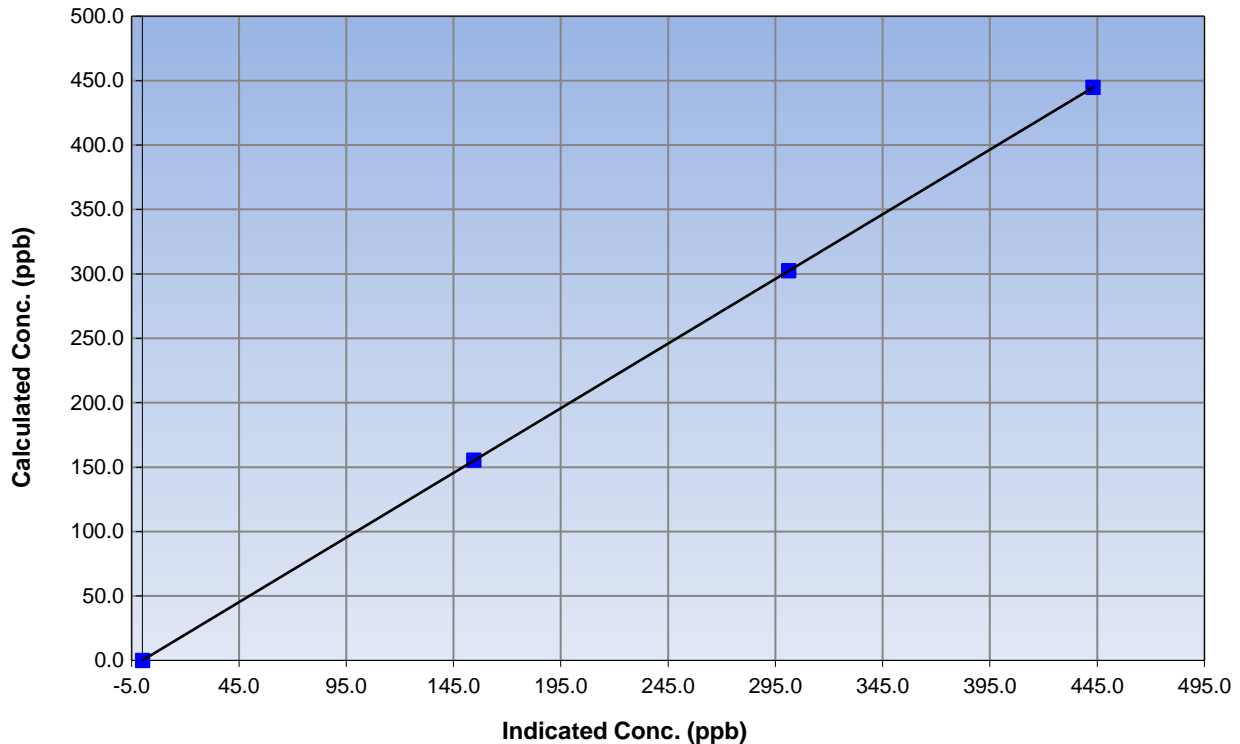
Station Information

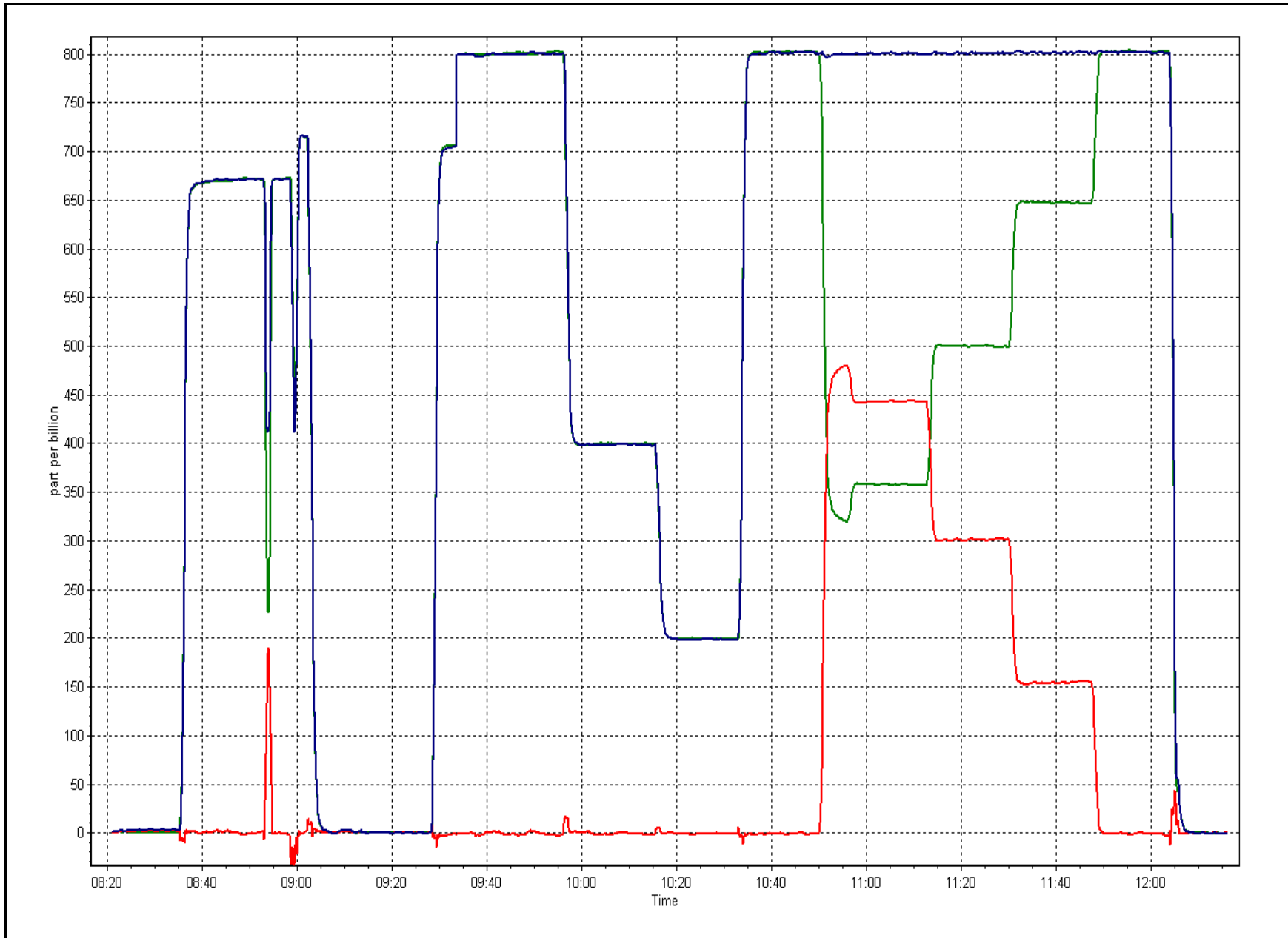
Calibration Date	May 18, 2016	Previous Calibration	April 13, 2016
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	8:25	End Time (MST)	12:16
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	1.000000
444.7	443.2	1.0034		
302.5	301.3	1.0040	Slope	1.003604
155.3	154.6	1.0045		
			Intercept	0.014809

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>May 18, 2016</u>	Previous Calibration:	<u>April 14, 2016</u>
Station Name:	<u>Anzac</u>	Station Number:	<u>AMS 14</u>
Start Time (MST):	<u>10:37</u>	End Time (MST):	<u>11:15</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1450</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	20.0	19.6	-0.4	20.0
T2	32.0	na	na	32.0
T3	29.0	na	na	29.0
T4	24.0	na	na	24.0
RH (%)	25.0	na	na	25.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	950	949.0	-1.0	950

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	192		192
Neph	0.6		0.6
C14	6.2		6.2
Indicated Concentration (ug/m3)	0.2	No	0.2
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	<u>March 1, 2016</u>	Previous Leak Check Date:	<u>February 12, 2015</u>
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.78		0.00
*Flow with adaptor (LPM):	16.78		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	<u>March 16, 2016</u>	Previous Foil Calibration:	<u>June 17, 2015</u>
Zeroed?:			
Foil Mass:	<u>1337</u>		Mass foil set S/N: 2520
Previous Correction Factor:	<u>6935</u>		
New Correction Factor:	<u>7125</u>		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	May 18, 2016
Pump	Good	NA
Filter Tape	Good	Mar 1, 2016
Mass Foil Cal Set	na	NA
HEPA filter	Good	NA

NOTES:

No parameters adjusted, cyclone heads cleaned

Melissa Lemay



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	34	38	99.46	21	0	2	0
TRS (ppb) Average	524	27	220	74.06	6	0	1	0
THC (ppm) Average	691	34	53	97.45	4.8	-	2.8	-
NO2 (ppb) Average	697	35	47	98.39	36	0	7	-
NO (ppb) Average	697	35	47	98.39	48	-	4	-
NOX (ppb) Average	697	35	47	98.39	74	-	9	-
PM2.5 (ug/m3) Average	701	0	43	94.22	2027.8	-	438.7	6
Temperature 2 m (C) Average	743	0	1	99.87	33.3	-	22.7	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	28	-	22	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
Precipitation (mm) Total	743	0	1	99.87	11.4	-	16.3	-
Relative Humidity (%) Average	743	0	1	99.87	98	-	88	-
Global Solar Radiation (W/m2) Average	743	0	1	99.87	895	-	355	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.3	1	-	0	0	0	0	0	1	21
TRS (ppb) Average	524	0.3	0	-	0	0	0	0	0	1	6
THC (ppm) Average	691	2.23	0.3	-	1.9	2	2.1	2.2	2.3	2.4	4.8
NO2 (ppb) Average	697	2.9	5	-	0	0	1	1	3	7	36
NO (ppb) Average	697	0.8	4	-	0	0	0	0	0	1	48
NOX (ppb) Average	697	3.7	7	-	0	0	1	1	3	8	74
PM2.5 (ug/m3) Average	701	31.51	145.2	-	0.7	1.6	2.2	3.9	10.4	46.7	2027.8
Temperature 2 m (C) Average	743	12.71	7.1	-	-2.5	4	7.4	11.9	17.7	23	33.3
Wind Speed 10 m (km/h) Average	742	9.7	5	-	0	4	6	9	13	18	28
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	743	-	-	45.47	-	-	-	-	-	-	-
Relative Humidity (%) Average	743	56.7	25	-	13	22	32	58	81	90	98
Global Solar Radiation (W/m2) Average	743	230.8	274	-	0	0	0	95	430	697	895

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2	02 May 2016 10:00	02 May 2016 13:00	4	Maintenance - replaced LAN swit ch
TRS, THC	02 May 2016 11:00	02 May 2016 13:00	3	Maintenance - replaced LAN swit ch
ALL OTHER PARAMETERS	02 May 2016 13:00	02 May 2016 13:00	1	Maintenance - replaced LAN swit ch
TRS	01 May 2016 13:00	01 May 2016 13:00	1	Data collection to analyzer interrupted
TRS	01 May 2016 15:00	01 May 2016 17:00	3	Data collection to analyzer interrupted
TRS	02 May 2016 10:00	02 May 2016 10:00	1	Data collection to analyzer interrupted
TRS	18 May 2016 14:00	25 May 2016 15:00	170	Analyzer Failure - motherboard failure
TRS	25 May 2016 16:00	26 May 2016 04:00	13	Maintenance - analyzer stabilization
TRS	26 May 2016 11:00	26 May 2016 11:00	1	Maintenance - cleaned glass manifold
TRS	26 May 2016 15:00	26 May 2016 15:00	1	Maintenance - tech activity
THC	01 May 2016 13:00	01 May 2016 13:00	1	Data collection to analyzer interrupted
THC	01 May 2016 15:00	01 May 2016 16:00	2	Data collection to analyzer interrupted
THC	01 May 2016 19:00	02 May 2016 03:00	9	Data collection to analyzer interrupted
THC	02 May 2016 05:00	02 May 2016 06:00	2	Data collection to analyzer interrupted
THC	02 May 2016 09:00	02 May 2016 10:00	2	Data collection to analyzer interrupted
NO2, NO, NOX	01 May 2016 13:00	01 May 2016 13:00	1	Data collection to analyzer interrupted
NO2, NO, NOX	01 May 2016 15:00	01 May 2016 16:00	2	Data collection to analyzer interrupted
NO2, NO, NOX	01 May 2016 20:00	01 May 2016 20:00	1	Data collection to analyzer interrupted
NO2, NO, NOX	01 May 2016 22:00	01 May 2016 23:00	2	Data collection to analyzer interrupted
NO2, NO, NOX	02 May 2016 05:00	02 May 2016 05:00	1	Data collection to analyzer interrupted
NO2, NO, NOX	02 May 2016 07:00	02 May 2016 07:00	1	Data collection to analyzer interrupted
PM2.5	25 May 2016 00:00	26 May 2016 10:00	35	Unstable Operation - debris in chamber
PM2.5	26 May 2016 11:00	26 May 2016 17:00	7	Maintenance - diagnose and repair debris in chamber
Wind Speed, Wind Direction	07 May 2016 02:00	07 May 2016 02:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

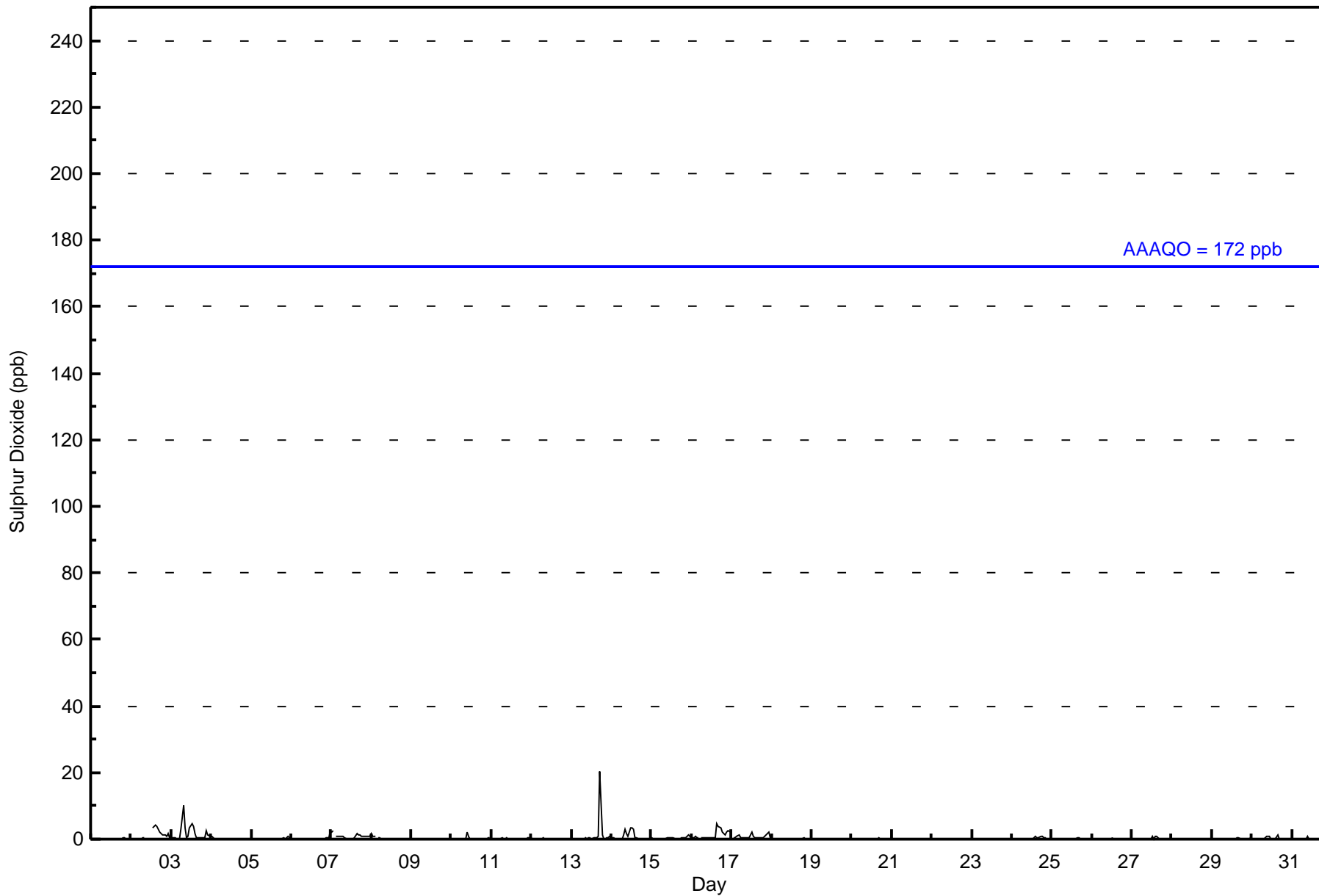
CNRL Horizon - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																		Hours in Service: 744								
Maximum Value: 21 ppb on May 13 18:00																		Maximum Daily Average: 1.7 ppb on May 3								
Minimum Value: 0 ppb on May 2 02:00																		Hours of Data: 706								
Maximum Diurnal Average: 0.9 ppb at hour 18																		Hours of Missing Data: 38								
Monthly Average: 0.3 ppb																		Hours of Calibration: 34								
Minimum Daily Average: 0.0 ppb on May 22																		Percent Operational Time: 99.5								
Minimum Diurnal Average: 0.1 ppb at hour 6																		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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1
2-May	0	0	0	Z	0	0	0	0	0	M	M	M	M	3	4	4	3	2	2	1	1	1	2	1	1.3	4
3-May	0	0	0	0	Z	0	3	10	3	1	1	3	5	4	2	0	0	0	0	0	0	2	1	1	1.7	10
4-May	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
5-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0.2	3
7-May	2	3	Z	1	1	1	1	1	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	0.8	3
8-May	2	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-May	0	0	0	0	0	Z	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	2
11-May	Z	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	21	1	0	0	0	1	1.2	21	
14-May	1	0	0	Z	0	0	0	1	3	2	1	4	3	3	0	0	0	0	0	0	0	0	0	0	0.9	4
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1
16-May	1	1	1	0	0	Z	0	0	0	1	0	0	0	0	5	4	3	2	2	1	2	3	2	1.3	5	
17-May	Z	0	1	1	1	1	1	0	0	0	1	1	2	1	0	0	0	0	1	1	1	2	2	0	0.8	2
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-May	0	0	Z	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-May	Z	0	0	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0.2	1
25-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-May	0	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0.1	1
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-May	Z	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-May	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
31-May	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
0.3 0.2 0.1 0.1 0.2 0.1 0.2 0.5 0.3 0.3 0.2 0.4 0.5 0.4 0.4 0.5 0.4 0.9 0.3 0.2 0.2 0.3 0.4 0.4																								Diurnal Average		
2 3 1 1 1 1 3 10 3 2 1 4 5 4 4 5 4 21 2 2 1 2 3 3																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.86	99.86
11 - 20	0	0.00	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	100	160	28	12	6	16	21	21	57	69	50	31	35	50	26	22	704
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	160	28	12	6	16	21	21	57	69	50	31	35	50	26	23	705

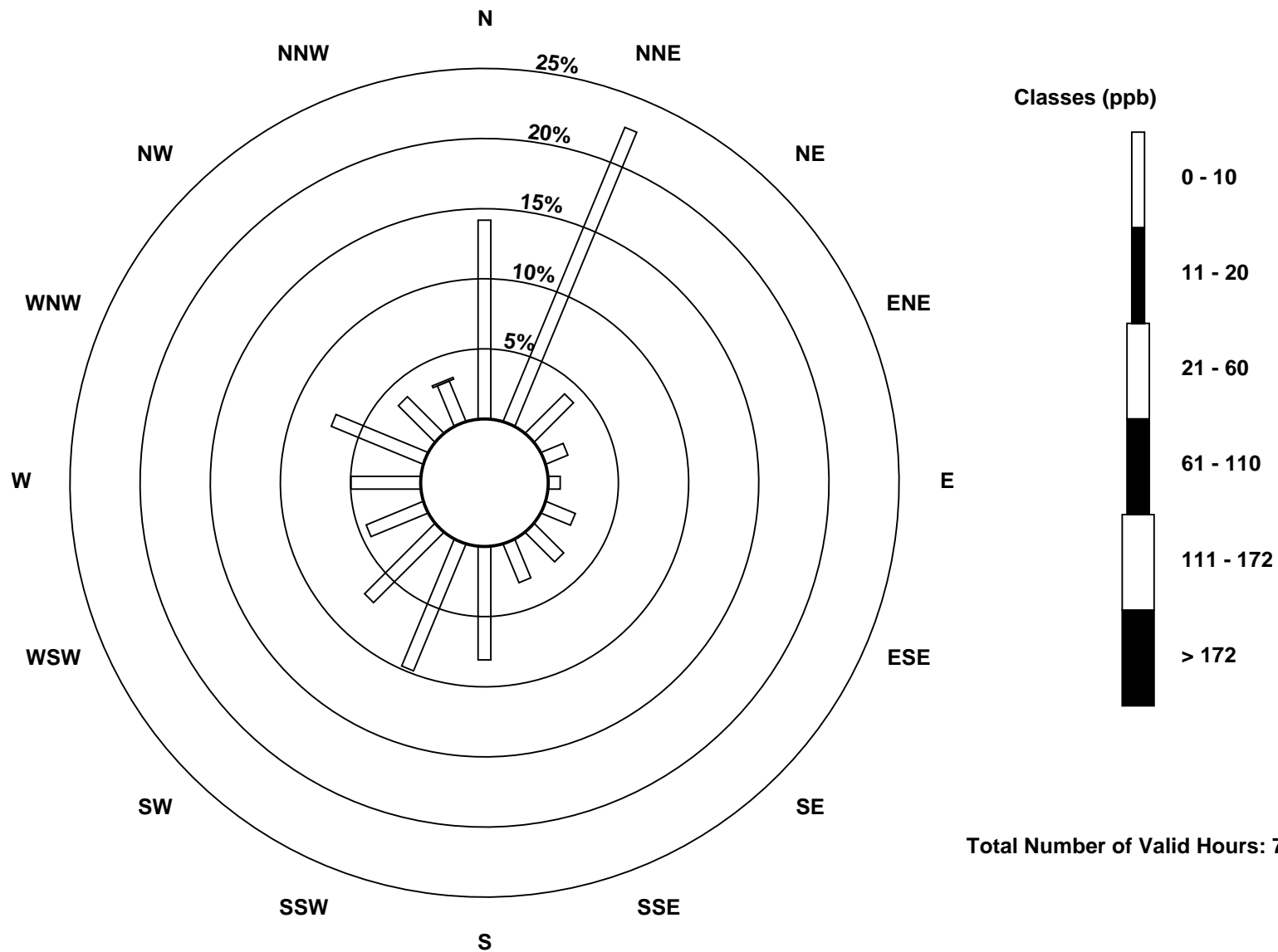
Total Number of Valid Hours: 705

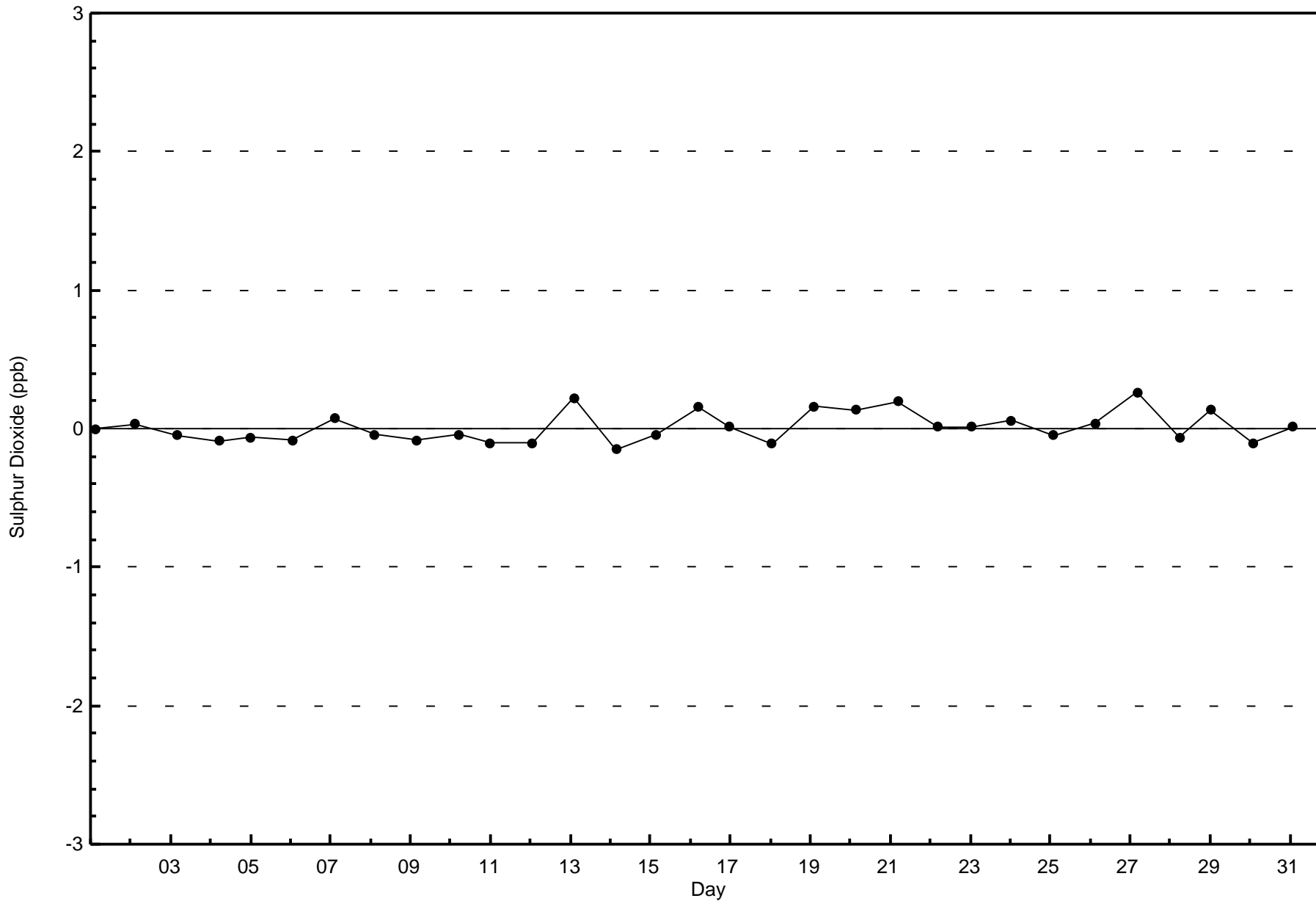
Total Number of Hours: 744

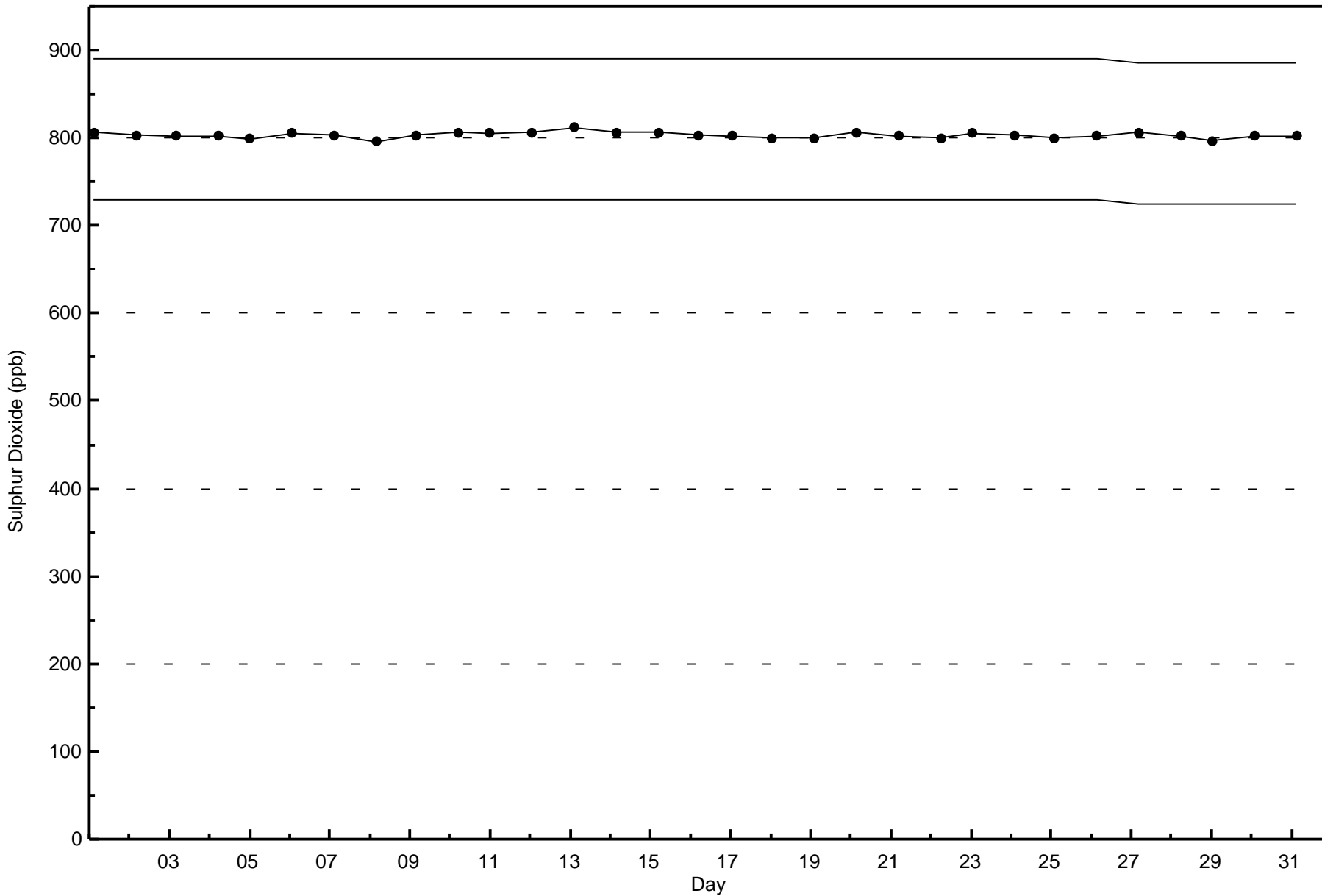


Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)









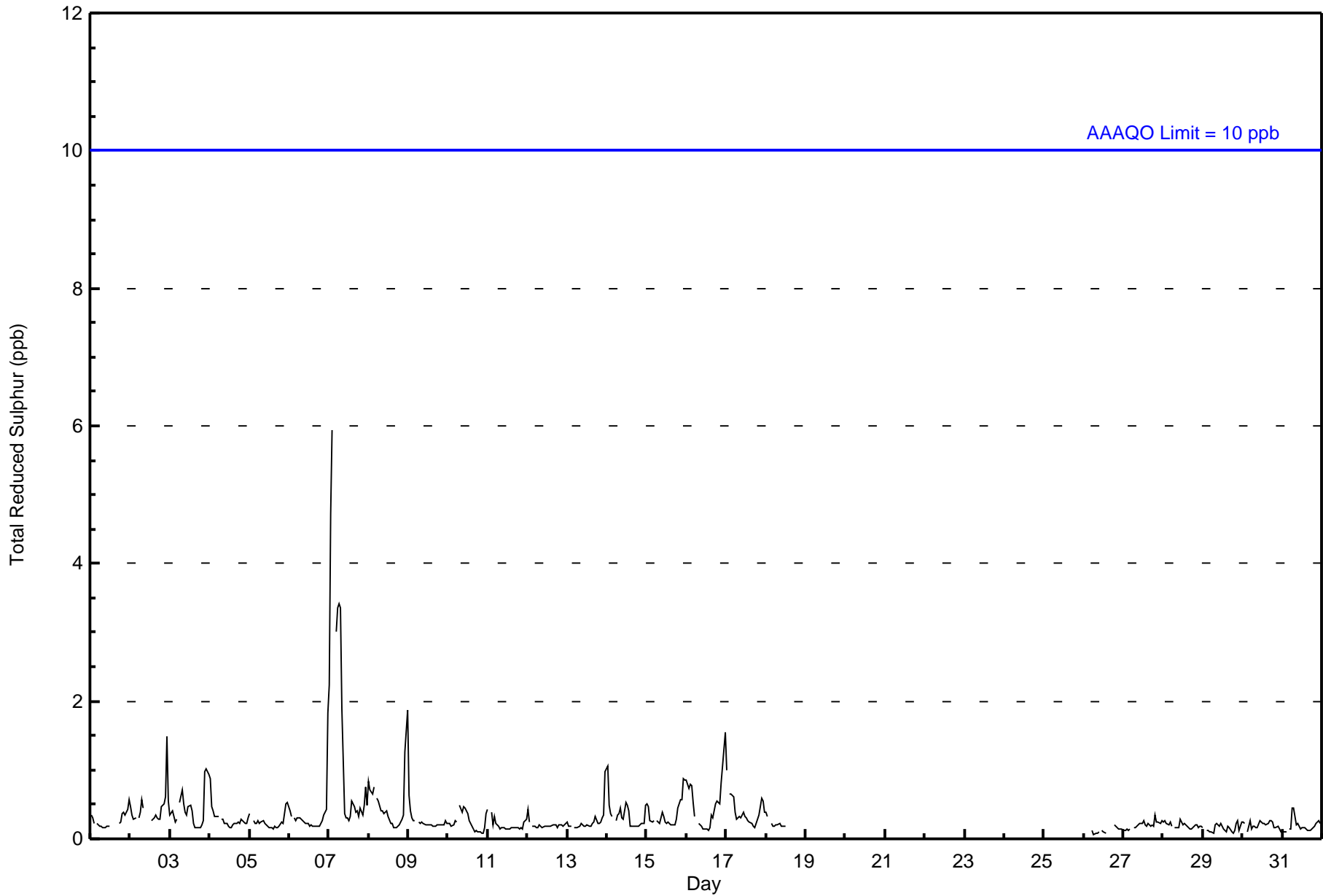
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - May 2016

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																																											
Maximum Value: 6 ppb on May 7 03:00		Maximum Daily Average: 1.5 ppb on May 7		Hours of Data:		524																																											
Minimum Value: 0 ppb on May 26 07:00		Minimum Daily Average: 0.2 ppb on May 29		Hours of Missing Data:		220																																											
Maximum Diurnal Average: 0.6 ppb at hour 3		Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:		27																																											
Monthly Average: 0.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3		Percent Operational Time:		74.1																																											
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-May	0	0	0	Z	0	0	0	0	0	0	0	0	UO	0	UO	UO	UO	0	0	0	0	0	0	1	0.3	1																							
2-May	0	0	0	0	Z	0	0	1	0	UO	M	M	M	0	0	0	0	0	0	0	1	1	1	1	0.4	1																							
3-May	0	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1																							
4-May	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
5-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																							
6-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.3	2																							
7-May	2	5	6	Z	3	3	3	3	2	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1.5	6																							
8-May	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.5	2																							
9-May	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
10-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
11-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
12-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
13-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																							
14-May	1	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
15-May	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1																							
16-May	1	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	0.5	2																							
17-May	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.4	1																							
18-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0																							
19-May	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-May	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-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																							
22-May	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-May	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-May	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-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	--	--																							
26-May	M	M	M	M	Z	0	0	0	0	0	M	0	0	M	C	C	C	0	0	0	0	0	0	0	--	0																							
27-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
28-May	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																							
29-May	0	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																							
30-May	0	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																							
31-May	0	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																							
																								0.5	0.6	0.6	0.3	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6	Diurnal Average	
																								2	5	6	1	3	3	3	3	2	0	0	1	0	0	1	0	0	1	1	1	1	1	1	2	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure UO - Unstable Operation																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	518	98.85	98.86
3 - 4	4	0.76	99.62
5 - 7	2	0.38	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 524

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	59	69	21	10	6	15	16	16	45	55	44	26	34	52	26	24	518
3 - 4	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	4
5 - 7	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	69	21	10	6	15	16	17	46	58	44	26	34	52	26	24	523

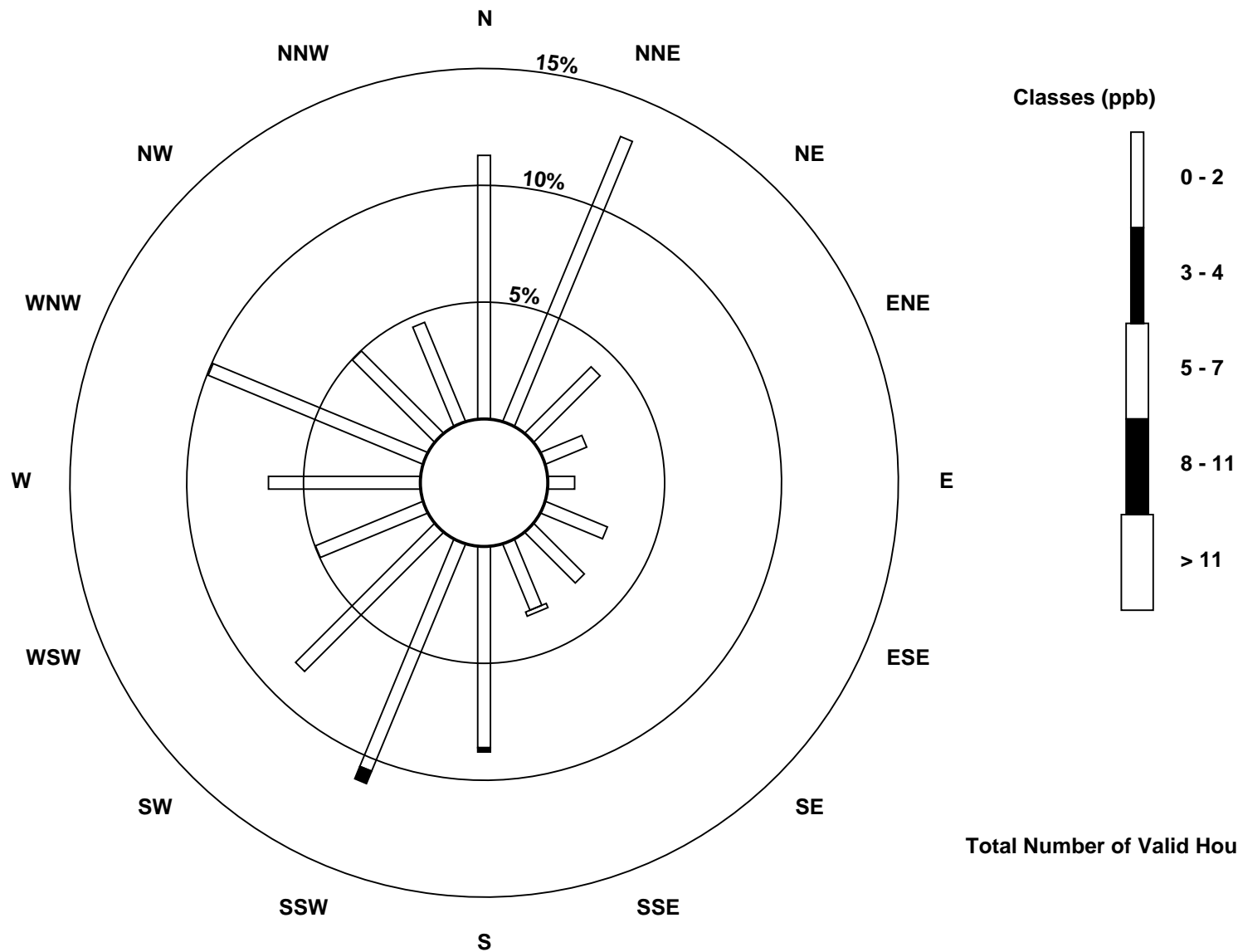
Total Number of Valid Hours: 523

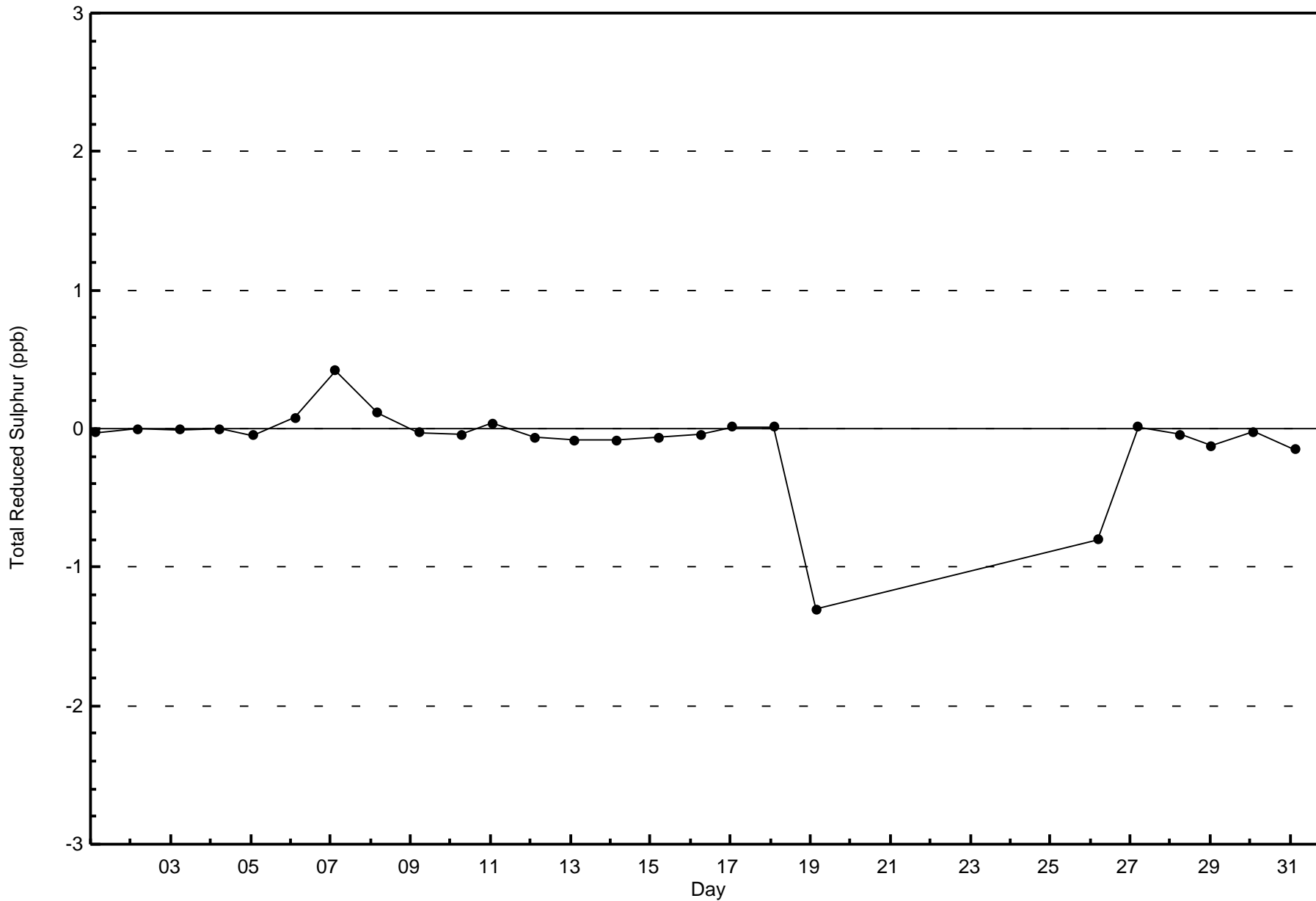
Total Number of Hours: 744

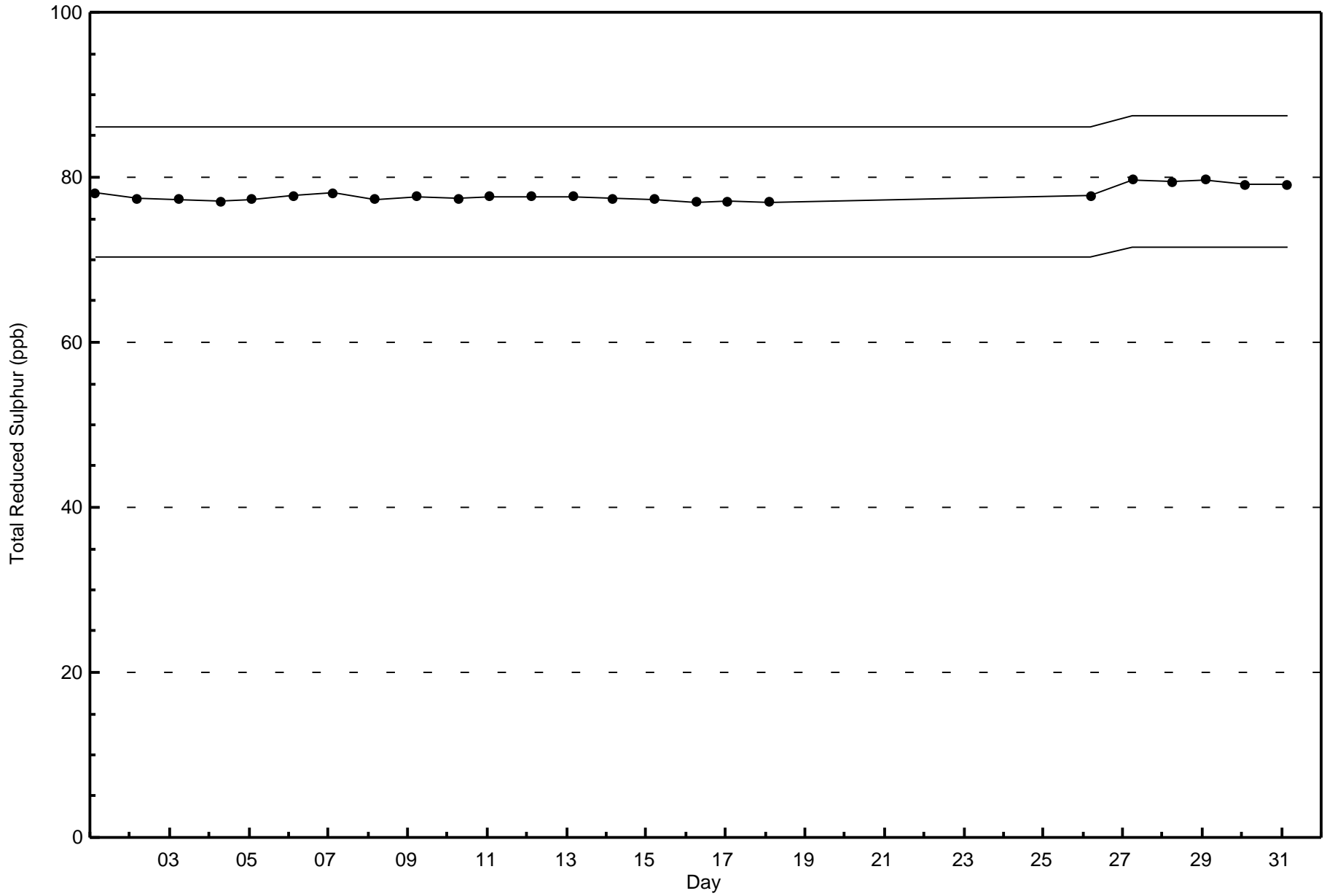


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)

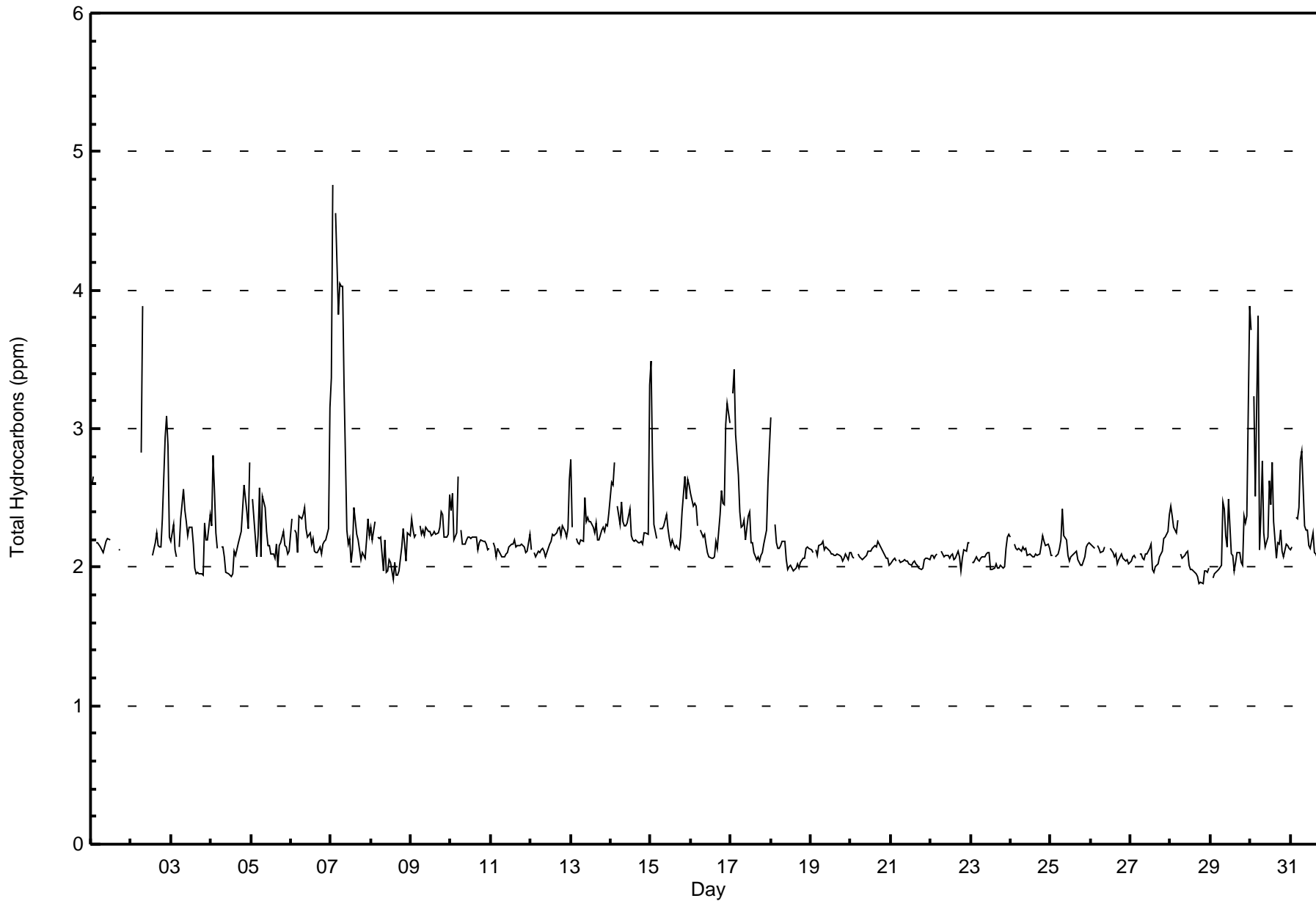








Maximum Value: 4.8 ppm on May 7 02:00 Maximum Daily Average: 2.8 ppm on May 7																				Hours in Service: 744 Hours of Data: 691						
Minimum Value: 1.9 ppm on May 28 20:00 Minimum Daily Average: 2.0 ppm on May 21 Maximum Diurnal Average: 2.5 ppm at hour 1 Minimum Diurnal Average: 2.1 ppm at hour 17																				Hours of Missing Data: 53 Hours of Calibration: 34						
Monthly Average: 2.23 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 3.9																				Percent Operational Time: 97.5						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.6	2.7	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	UO	2.1	UO	UO	2.1	2.1	UO	UO	UO	UO	UO	UO	--	2.7
2-May	UO	UO	UO	Z	UO	UO	2.8	3.9	UO	UO	M	M	M	2.1	2.2	2.3	2.2	2.1	2.1	2.4	2.9	3.1	2.9	2.2	--	3.9
3-May	2.2	2.3	2.1	2.1	Z	2.1	2.3	2.6	2.4	2.3	2.2	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.0	1.9	2.3	2.2	2.2	2.4	2.2	2.6
4-May	2.3	2.8	2.6	2.2	2.1	Z	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	2.1	2.1	2.2	2.2	2.3	2.4	2.6	2.4	2.3	2.8	2.2	2.8
5-May	Z	2.5	2.2	2.1	2.2	2.6	2.1	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.0	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.2	2.6
6-May	2.4	Z	2.3	2.2	2.1	2.4	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	3.2	2.3	3.2
7-May	3.4	4.8	Z	4.6	3.8	4.0	4.0	4.0	3.3	2.3	2.2	2.2	2.0	2.1	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.4	2.2	2.8	4.8
8-May	2.3	2.2	2.3	Z	2.2	2.2	2.2	2.0	2.2	2.0	2.0	2.1	2.0	1.9	2.0	1.9	1.9	2.0	2.1	2.3	2.2	2.0	2.3	2.2	2.1	2.3
9-May	2.3	2.3	2.2	2.2	Z	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.4	2.4	2.2	2.2	2.2	2.5	2.3	2.5
10-May	2.4	2.5	2.2	2.3	2.6	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.6
11-May	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.2
12-May	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.6	2.2	2.6
13-May	2.8	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.5	2.3	2.4	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.8
14-May	2.6	2.6	2.8	Z	2.4	2.3	2.5	2.3	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	3.3	2.4	3.3
15-May	3.5	2.8	2.3	2.2	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.4	2.7	2.5	2.6	2.6	2.4	3.5
16-May	2.5	2.4	2.5	2.4	2.3	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.4	2.6	2.5	2.4	3.0	3.2	3.0	2.4	3.2
17-May	Z	3.2	3.4	3.0	2.7	2.4	2.3	2.3	2.3	2.2	2.4	2.4	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.3	2.6	2.9	2.4	3.4
18-May	3.1	Z	2.3	2.2	2.1	2.1	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	2.1	2.1	2.1	2.2	2.1	2.1	3.1
19-May	2.1	2.1	Z	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	2.0	2.1	2.1	2.1	2.1	2.1	2.2
20-May	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2
21-May	2.0	2.1	2.1	2.0	Z	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1
22-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.1
23-May	Z	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.1	2.2
24-May	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2
25-May	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.4	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.4
26-May	2.2	2.2	2.1	Z	2.2	2.1	2.1	2.1	2.1	C	C	C	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.2
27-May	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.4	2.1	2.4
28-May	2.4	2.4	2.3	2.3	2.3	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.4
29-May	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.5	2.4	2.2	2.1	2.5	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.4	2.3	2.4	3.9	2.2	3.9
30-May	3.7	Z	3.2	2.5	3.8	2.1	2.4	2.8	2.2	2.1	2.2	2.6	2.5	2.8	2.3	2.1	2.2	2.2	2.3	2.1	2.1	2.2	2.2	2.1	2.5	3.8
31-May	2.1	2.1	Z	2.4	2.3	2.4	2.8	2.8	2.3	2.3	2.3	2.2	2.1	2.3	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.4	2.2	2.2	2.8
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	101	14.62	14.62
2.1 - 3.0	569	82.34	96.96
3.1 - 10.0	21	3.04	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 691

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	8	31	2	1	1	0	2	4	5	16	18	6	3	0	4	0	101
2.1 - 3.0	91	128	25	11	4	16	18	17	50	47	25	20	30	46	18	23	569
3.1 - 10.0	1	1	0	0	1	0	0	0	2	6	3	1	2	1	2	0	20
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	160	27	12	6	16	20	21	57	69	46	27	35	47	24	23	690

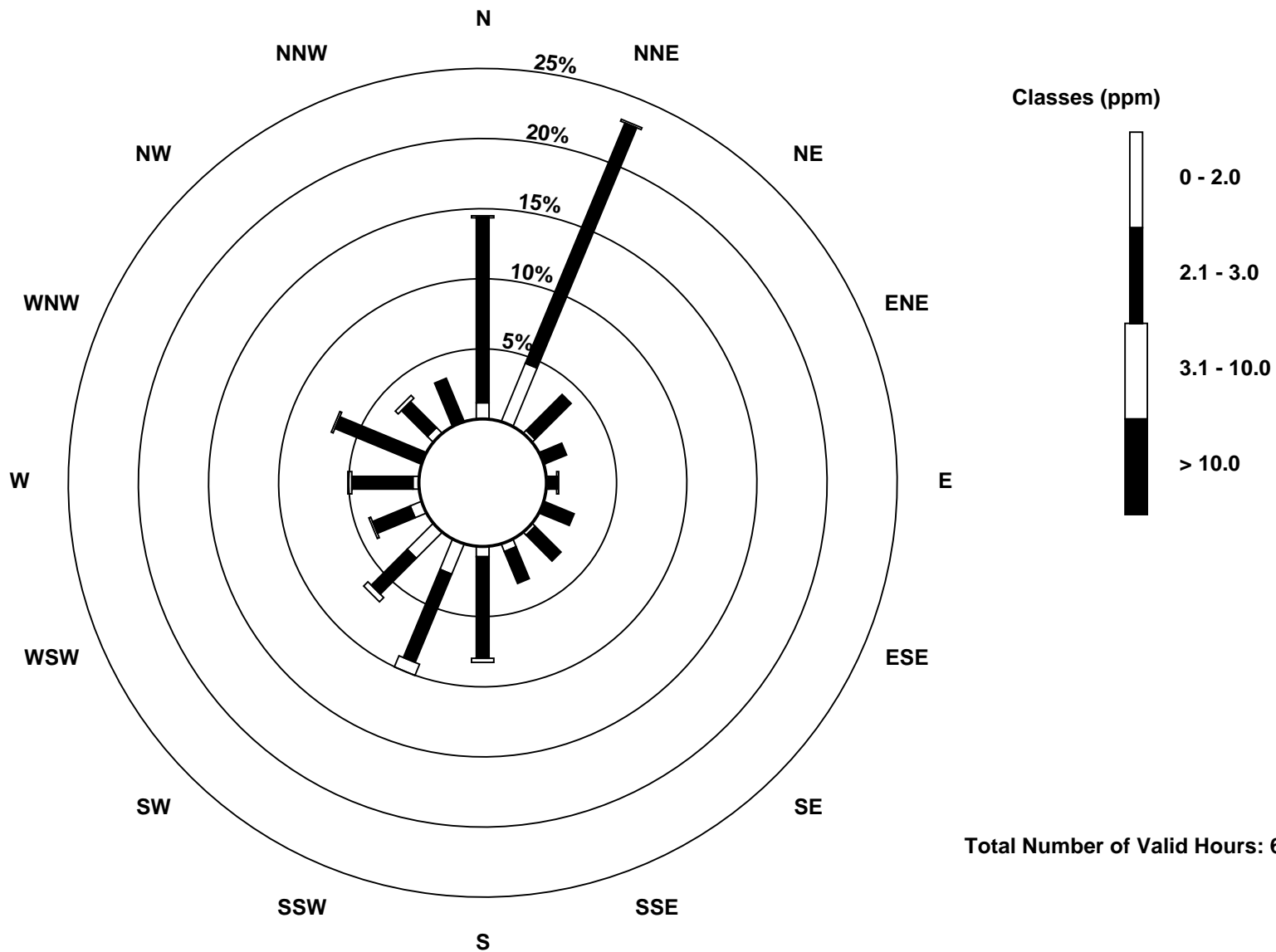
Total Number of Valid Hours: 690

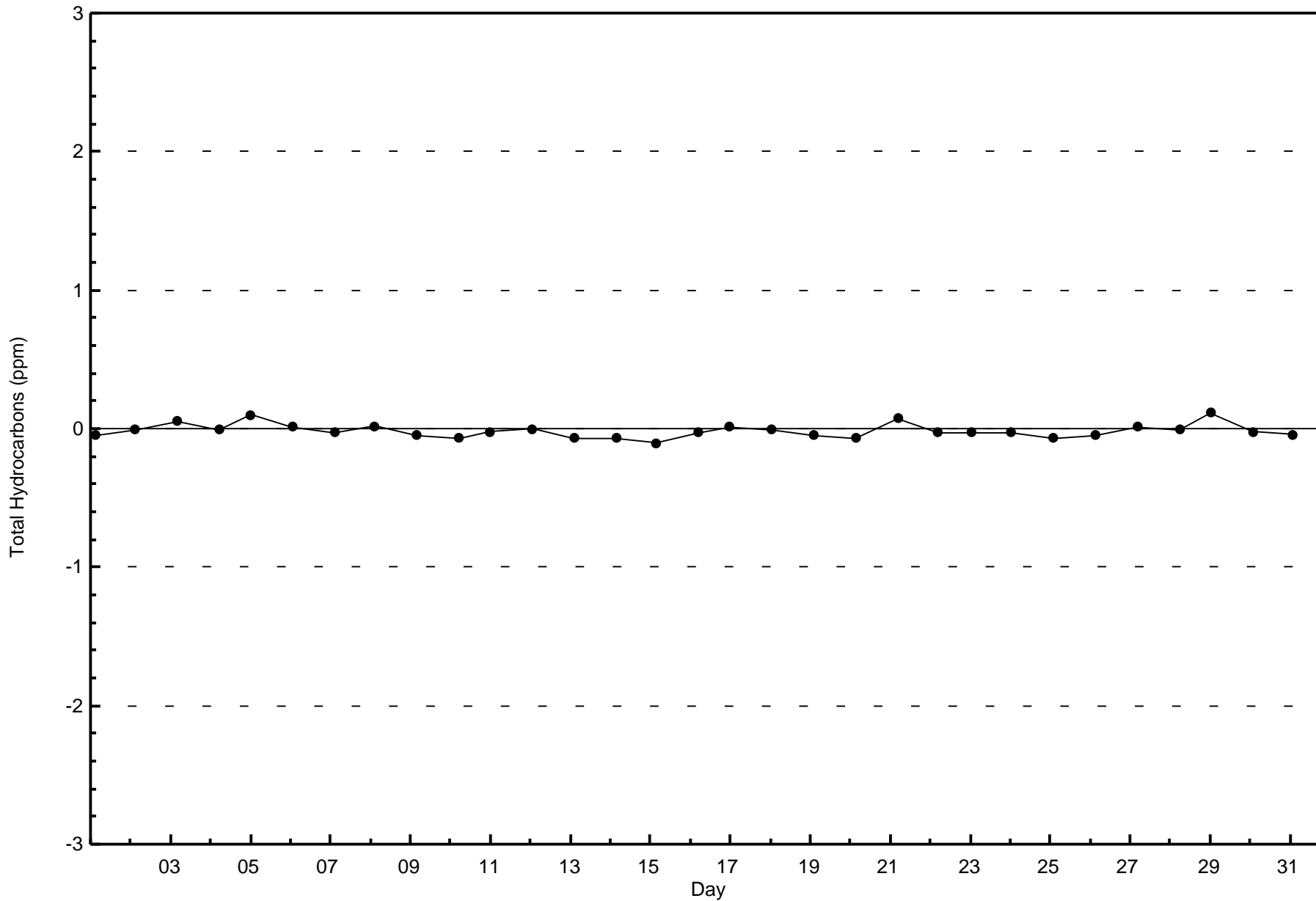
Total Number of Hours: 744

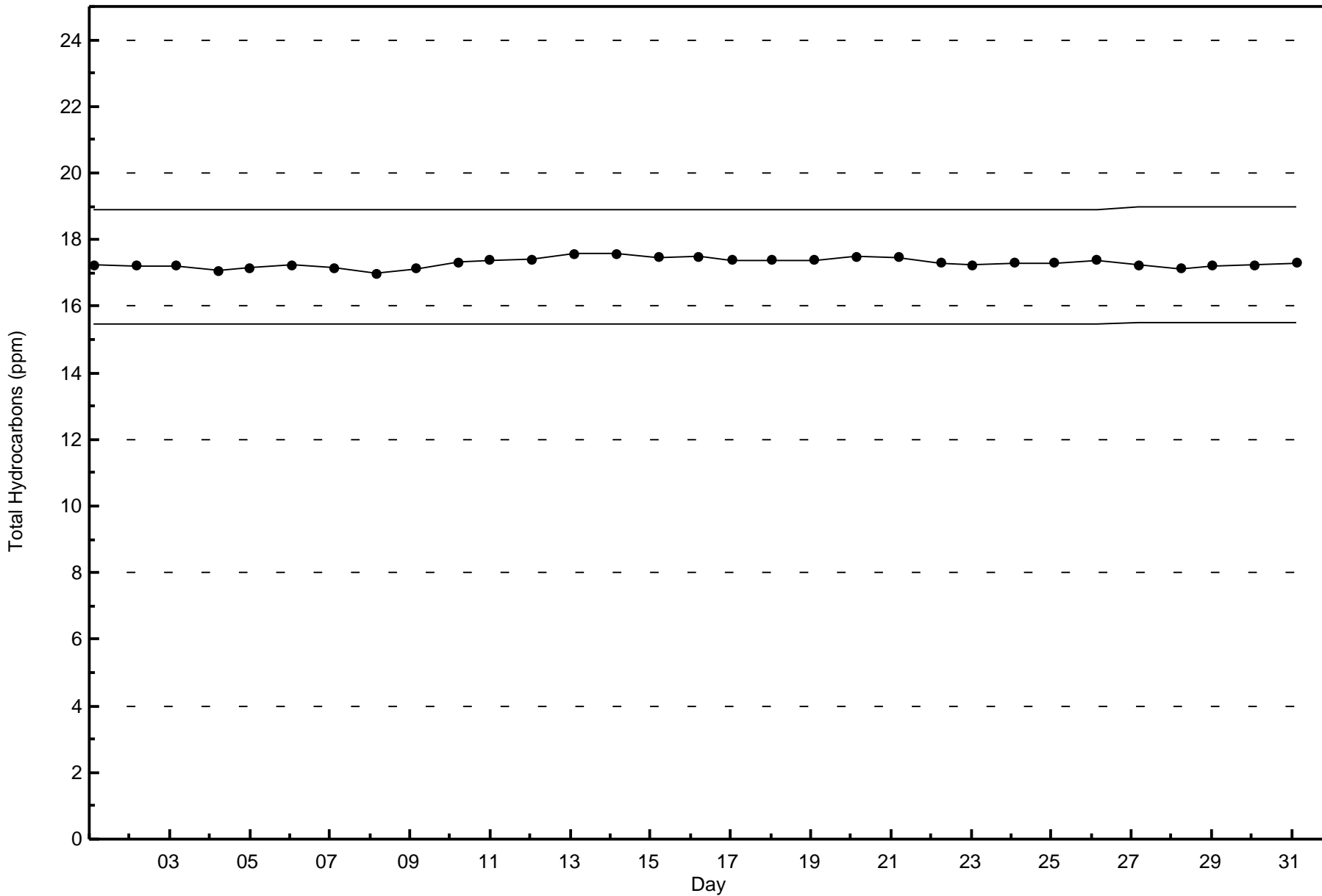


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association
Summary of Hour Averages

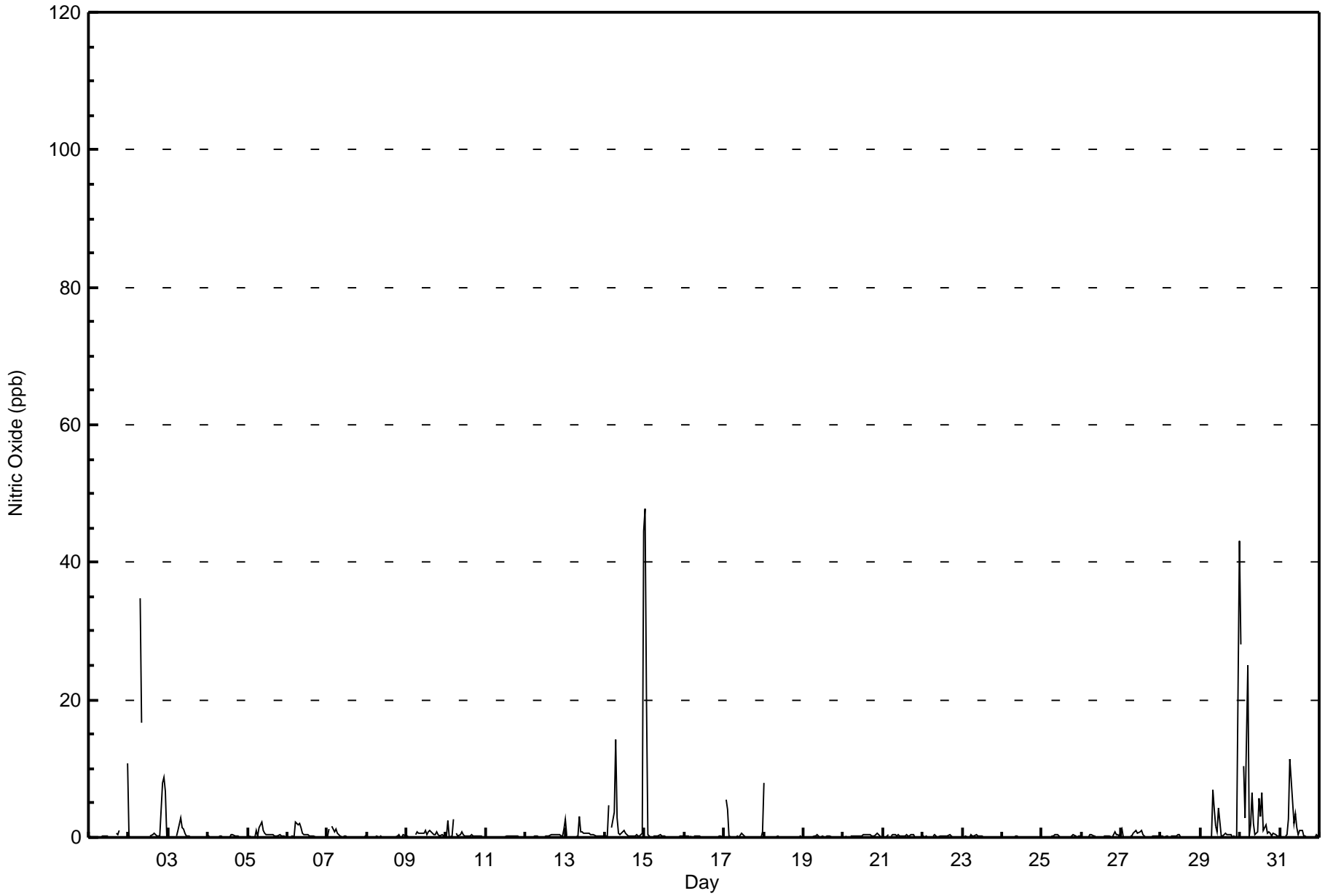
Nitric Oxide (NO) - ppb
CNRL Horizon - May 2016

Maximum Value: 48 ppb on May 15 01:00		Maximum Daily Average: 4.3 ppb on May 30		Hours in Service: 744																						
Minimum Value: 0 ppb on May 1 04:00		Minimum Daily Average: 0.0 ppb on May 24		Hours of Data: 697																						
Maximum Diurnal Average: 3.5 ppb at hour 1		Minimum Diurnal Average: 0.1 ppb at hour 20		Hours of Missing Data: 47																						
Monthly Average: 0.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 18		Hours of Calibration: 35																						
				Percent Operational Time: 98.4																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	0	Z	0	0	0	0	0	0	0	0	UO	0	UO	UO	1	0	1	UO	0	UO	UO	11	--	11	
2-May	0	0	0	Z	UO	0	UO	35	17	M	M	M	M	0	0	1	0	0	0	0	8	9	7	0	--	35
3-May	0	0	0	0	Z	0	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
4-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-May	Z	0	0	0	0	1	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
6-May	0	Z	0	0	0	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
7-May	0	1	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
8-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-May	0	0	0	0	Z	0	1	1	1	1	1	1	0	1	1	1	0	0	1	0	0	0	0	0	0.5	1
10-May	0	2	0	0	3	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
11-May	Z	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
13-May	3	0	Z	0	0	0	0	0	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	3
14-May	0	0	5	Z	1	4	14	3	1	0	1	1	1	0	0	0	0	0	0	0	0	0	1	45	3.4	45
15-May	48	20	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.1	48
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-May	Z	5	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	5
18-May	8	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	8
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	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
21-May	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	0	Z	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-May	0	0	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	1	0	0	0	0.3	1
27-May	1	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-May	Z	0	0	0	0	0	0	7	4	2	1	4	0	0	0	1	0	0	0	0	0	0	0	43	2.8	43
30-May	28	Z	10	3	25	0	2	7	2	0	1	6	3	6	1	2	1	1	1	0	1	0	0	0	4.3	28
31-May	0	0	Z	0	0	3	11	8	2	4	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.5	11
		3.5	1.2	0.8	0.2	1.2	0.5	1.2	2.3	1.3	0.5	0.4	0.6	0.3	0.4	0.2	0.3	0.2	0.2	0.2	0.1	0.4	0.4	0.4	3.3	Diurnal Average
		48	20	10	3	25	4	14	35	17	4	1	6	3	6	1	2	1	1	1	0	8	9	7	45	Diurnal Maximum
Z - zerspan		C - Calibration					M - Maintenance					UO - Unstable Operation														



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
CNRL Horizon - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	691	99.14	99.14
21 - 40	3	0.43	99.57
41 - 80	3	0.43	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	100	158	27	12	6	16	20	21	57	69	48	30	33	47	23	23	690
21 - 40	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	159	27	12	6	16	20	21	57	69	48	30	35	48	25	23	696

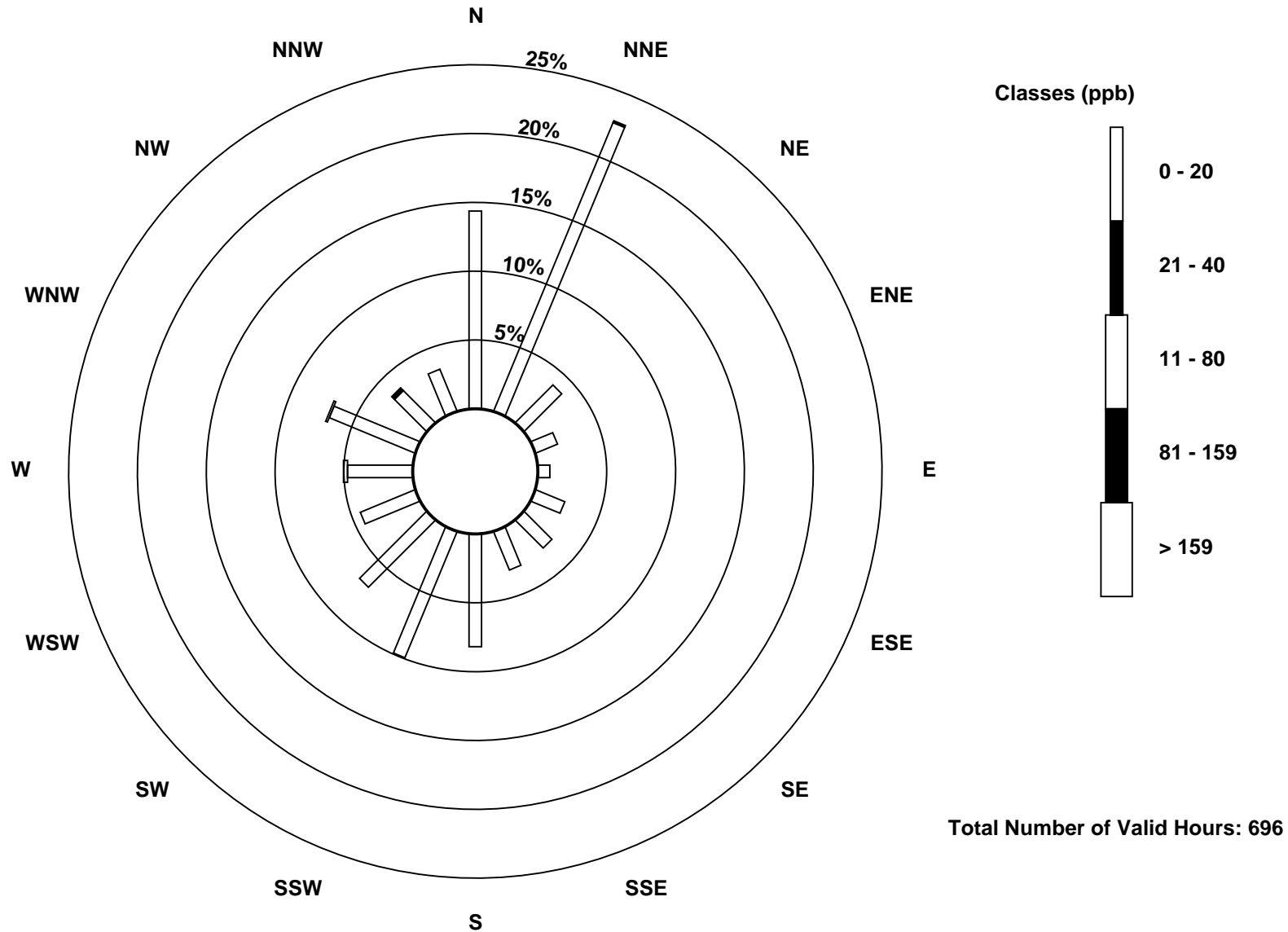
Total Number of Valid Hours: 696

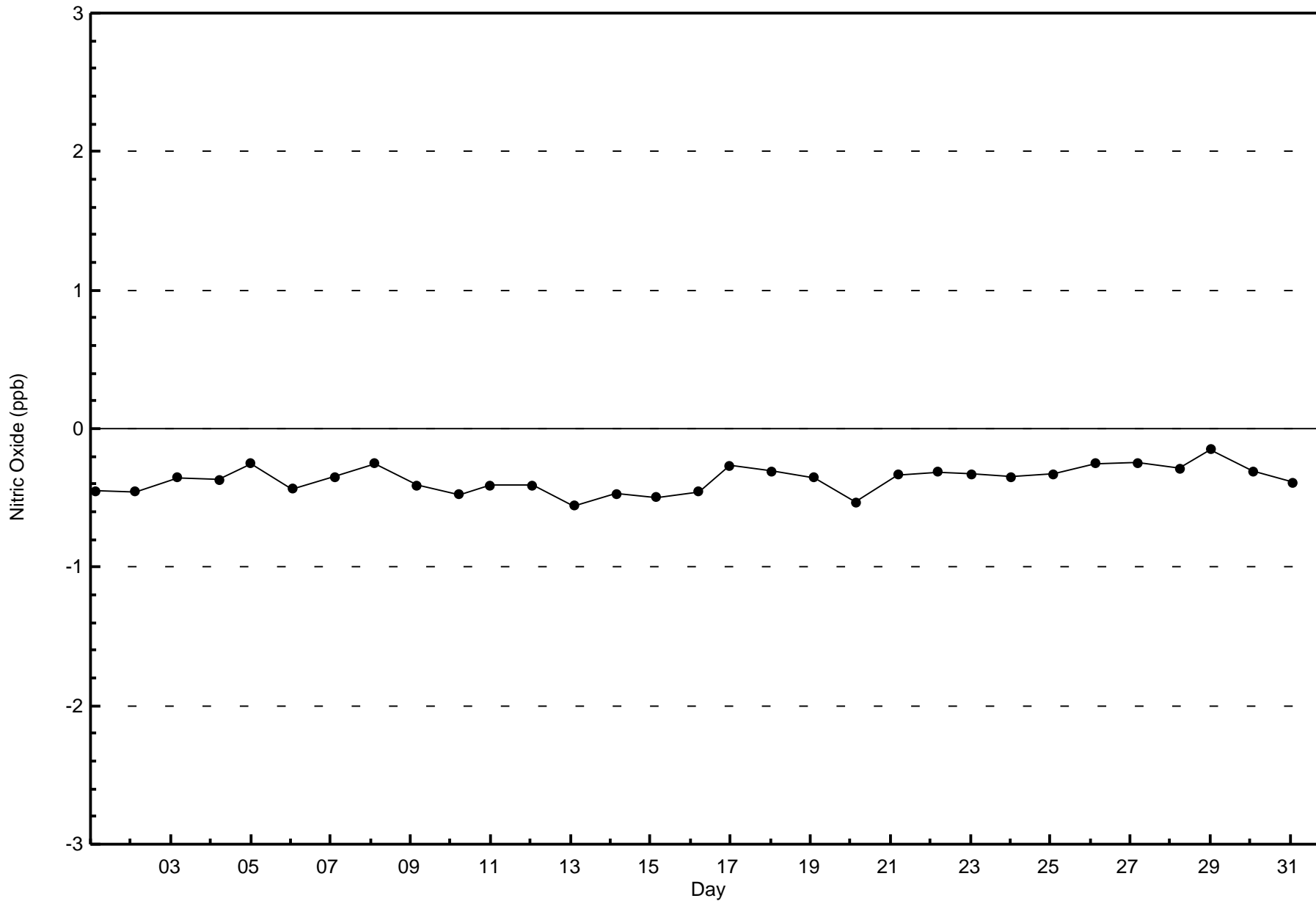
Total Number of Hours: 744

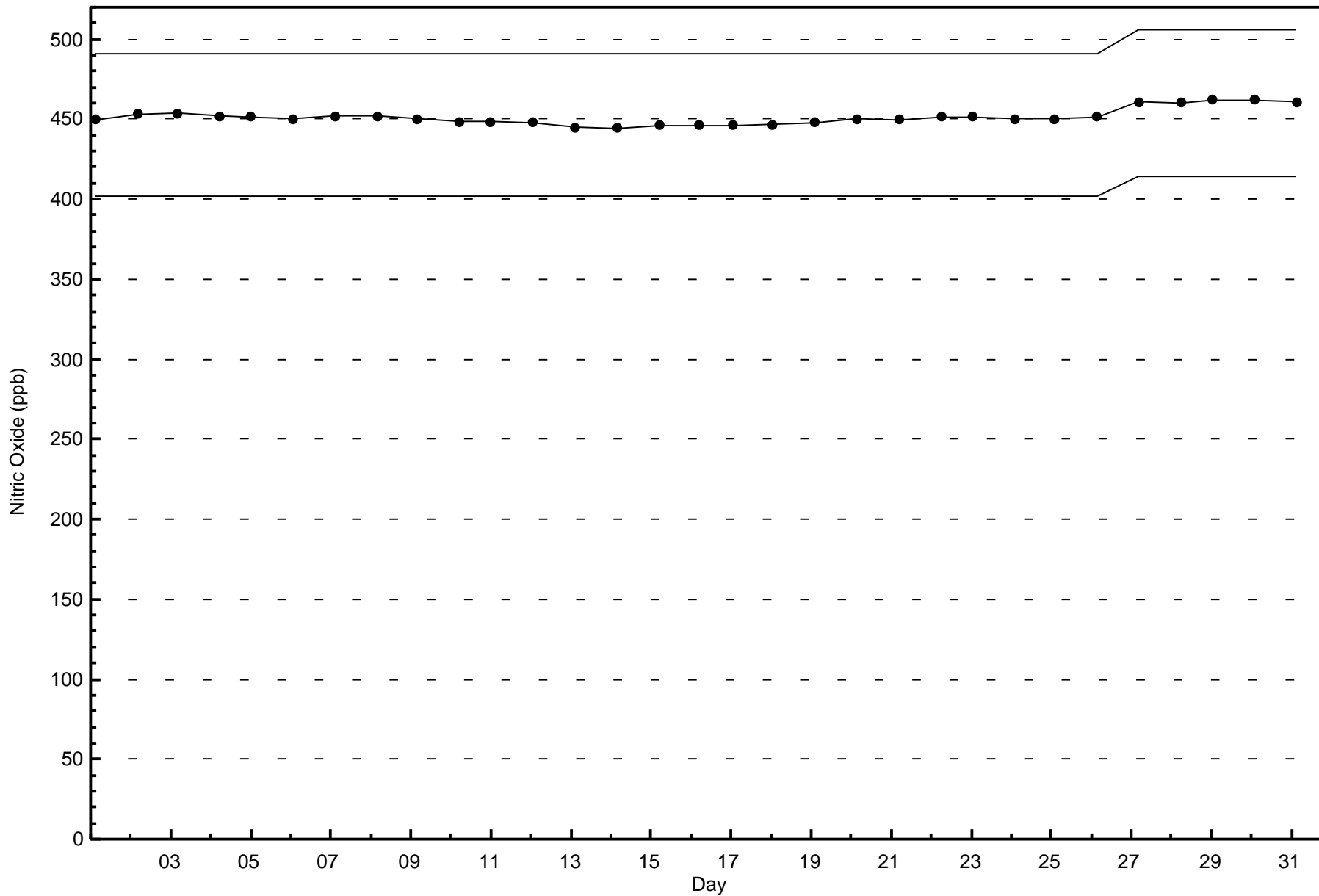


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

CNRL Horizon - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 36 ppb on May 2 22:00	Maximum Daily Average: 7.0 ppb on May 7		Hours of Data:	697
Minimum Value: 0 ppb on May 13 07:00	Minimum Daily Average: 0.4 ppb on May 19		Hours of Missing Data:	47
Maximum Diurnal Average: 6.6 ppb at hour 2	Minimum Diurnal Average: 1.3 ppb at hour 15		Hours of Calibration:	35
Monthly Average: 2.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 26		Percent Operational Time:	98.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	10	6	Z	1	1	0	0	1	1	1	0	0	UO	0	UO	UO	2	2	6	UO	6	UO	UO	17	--	17	
2-May	7	2	1	Z	UO	1	UO	19	16	M	M	M	M	3	5	6	5	5	6	10	32	36	27	8	--	36	
3-May	5	9	4	2	Z	3	5	8	7	6	6	6	6	4	2	1	1	1	1	1	7	5	6	6	4.2	9	
4-May	7	14	6	1	1	Z	1	1	1	1	1	0	0	0	1	3	4	4	4	6	9	17	10	7	14	4.8	17
5-May	Z	16	4	1	4	13	2	10	9	4	2	1	1	1	2	2	1	1	1	5	0	1	2	4	3.7	16	
6-May	10	Z	9	10	1	8	7	6	4	2	1	1	1	1	1	1	1	1	0	0	0	0	1	13	3.4	13	
7-May	15	34	Z	21	18	18	14	10	5	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	7.0	34	
8-May	3	3	3	Z	2	2	4	1	4	0	1	1	1	0	0	0	0	0	2	6	1	1	7	5	2.1	7	
9-May	6	6	3	4	Z	4	3	3	3	3	2	3	2	2	3	3	2	3	6	4	1	1	1	7	3.2	7	
10-May	6	13	3	5	11	Z	2	1	1	2	1	0	0	0	0	0	0	1	1	1	2	3	1	1	2.3	13	
11-May	Z	2	2	1	2	2	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	3	2	2	1.1	3	
12-May	2	Z	5	3	4	5	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	2	13	1.8	13	
13-May	18	9	Z	5	1	0	0	1	7	2	2	1	1	1	1	1	1	2	1	0	1	3	5	5	2.9	18	
14-May	7	8	17	Z	10	8	13	6	2	1	2	3	2	1	1	0	1	1	1	2	1	1	2	28	5.1	28	
15-May	26	21	11	2	Z	1	1	1	1	2	1	1	1	1	1	1	0	1	1	1	2	3	6	6	3.9	26	
16-May	5	5	5	4	3	Z	1	2	2	2	1	1	1	2	6	4	8	7	13	15	26	25	16	6.7	26		
17-May	Z	16	21	15	8	4	2	2	3	3	7	8	5	4	2	2	2	1	3	2	6	6	7	11	6.1	21	
18-May	16	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1.3	16	
19-May	0	0	Z	0	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0.4	1	
20-May	0	0	0	Z	0	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	2	2	2	1	0.7	2	
21-May	1	1	2	3	Z	1	2	2	1	1	1	1	1	1	1	1	1	1	2	1	0	0	0	0	1.0	3	
22-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	2	1	0.8	2	
23-May	Z	1	2	1	2	2	1	1	1	1	0	1	1	1	0	0	0	0	1	1	1	2	1	1	0.9	2	
24-May	1	Z	1	1	1	1	1	1	0	0	0	1	1	1	2	2	2	3	3	3	2	1	1	1	1.2	3	
25-May	1	1	Z	1	1	1	1	2	2	1	1	1	1	1	2	2	2	1	2	2	1	0	1	1	1.1	2	
26-May	0	0	1	Z	1	1	1	1	0	C	C	C	C	1	1	1	1	0	0	1	1	1	1	1	0.6	1	
27-May	2	0	1	0	Z	0	0	1	1	3	2	2	2	2	2	2	1	1	1	2	2	1	2	3	1.4	3	
28-May	5	5	4	5	6	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	1.5	6	
29-May	Z	0	0	0	0	0	0	5	6	4	2	6	1	1	1	2	2	1	1	1	3	2	2	11	2.2	11	
30-May	13	Z	10	6	16	1	6	7	3	1	2	7	4	9	2	4	2	3	2	1	2	3	1	1	4.5	16	
31-May	1	1	Z	1	0	1	6	7	2	4	2	1	2	2	1	1	0	0	0	0	1	1	5	2	1.7	7	

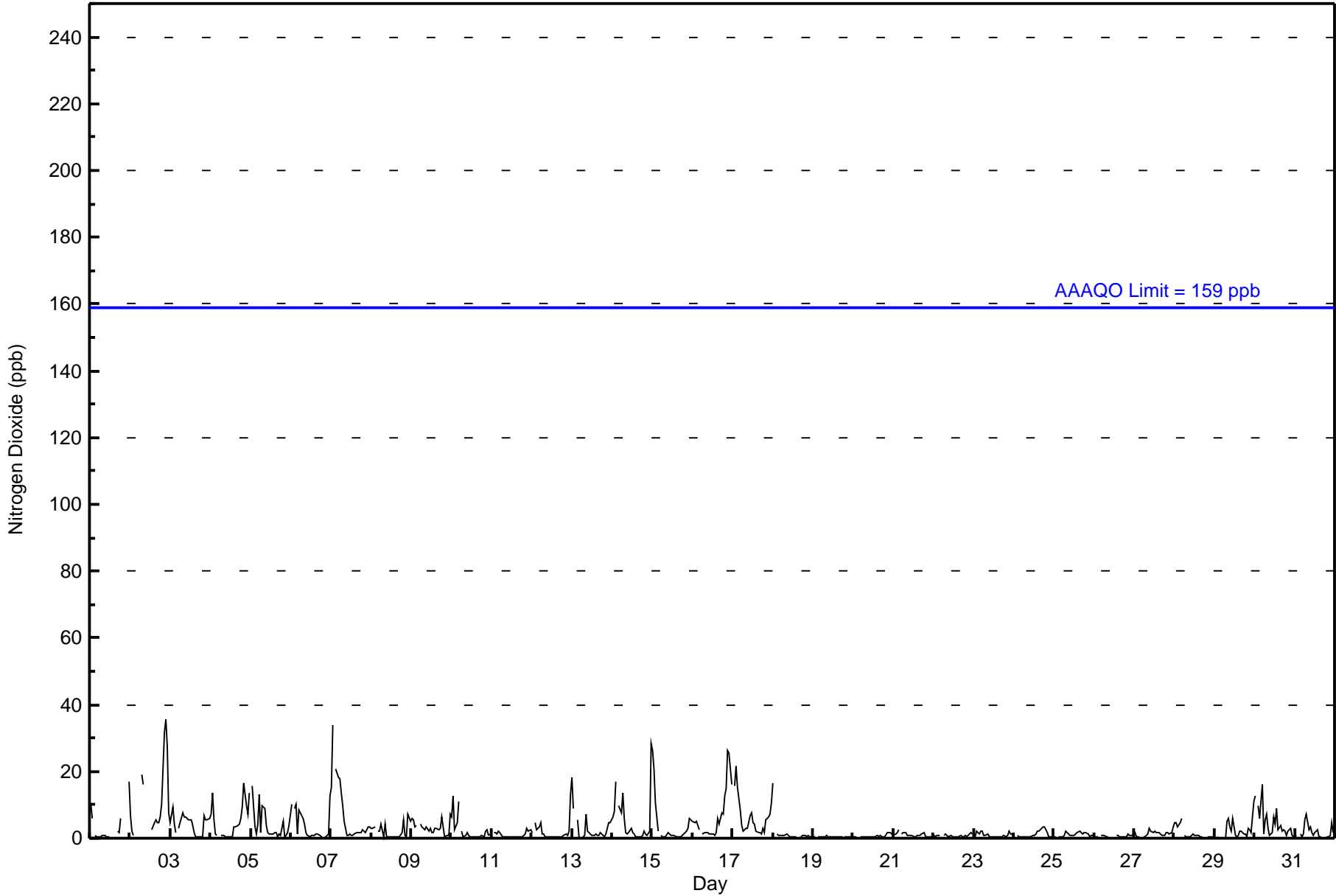
6.4	6.6	4.6	3.6	3.8	3.0	2.6	3.2	2.8	1.6	1.4	1.7	1.3	1.4	1.3	1.5	1.3	1.4	1.9	2.3	3.6	3.9	4.1	5.9	Diurnal Average
26	34	21	21	18	18	14	19	16	6	7	8	6	9	5	6	5	8	7	13	32	36	27	28	Diurnal Maximum

Z - zerospan 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 - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	686	98.42	98.42
21 - 40	11	1.58	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: 697

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	97	159	27	12	5	15	20	21	57	66	48	30	33	48	25	23	686
21 - 40	3	0	0	0	1	1	0	0	0	3	0	0	2	0	0	0	10
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	159	27	12	6	16	20	21	57	69	48	30	35	48	25	23	696

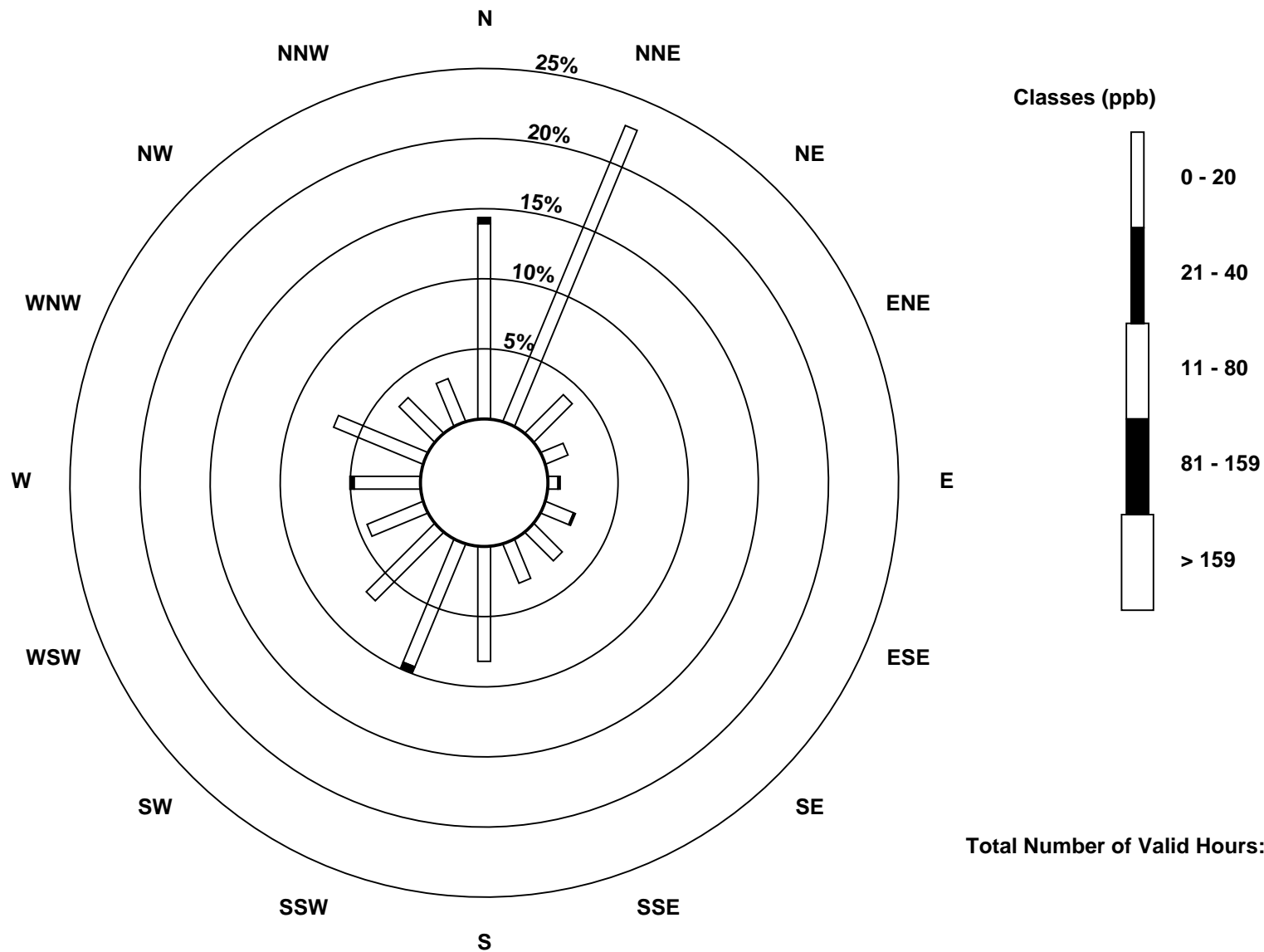
Total Number of Valid Hours: 696

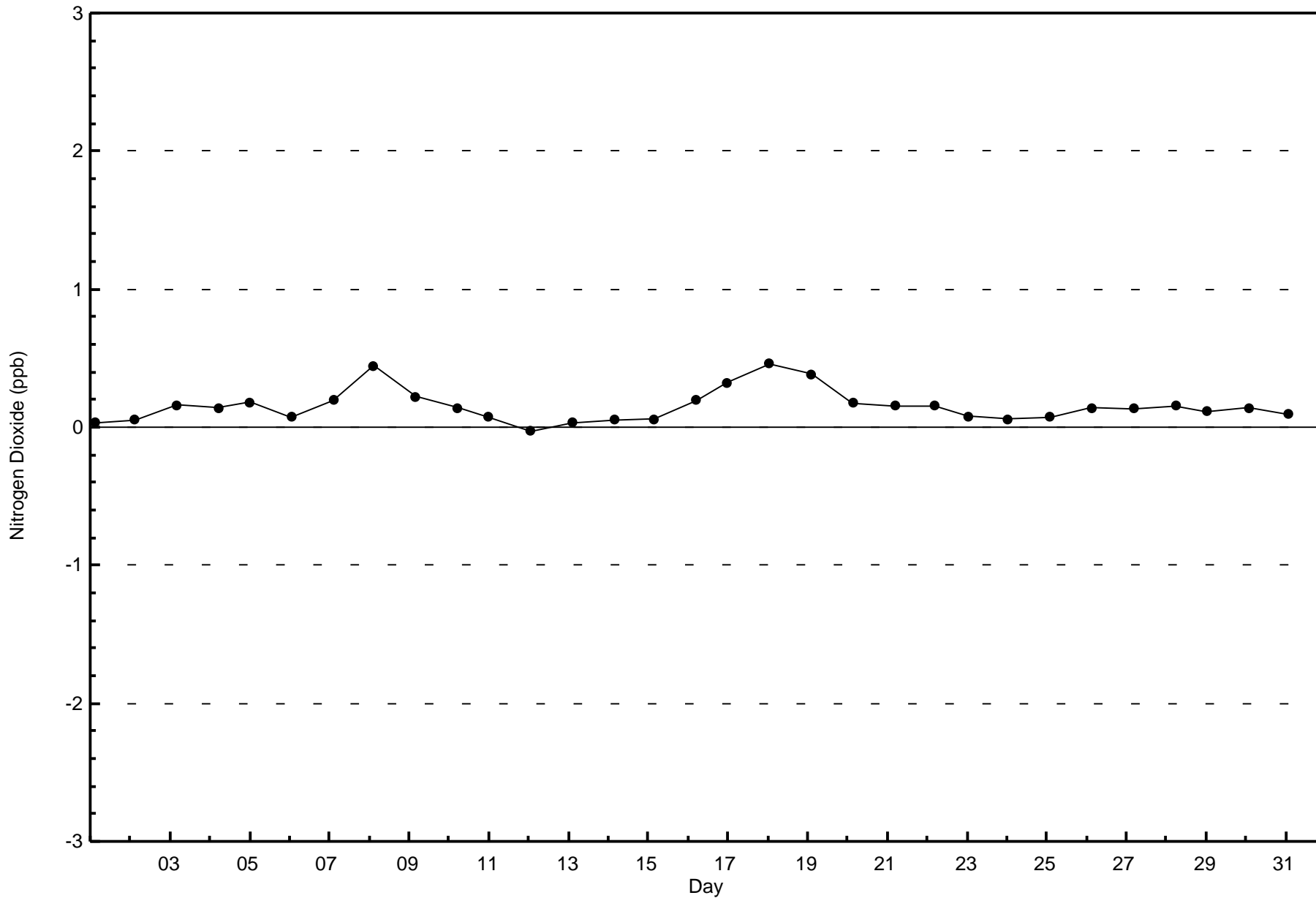
Total Number of Hours: 744

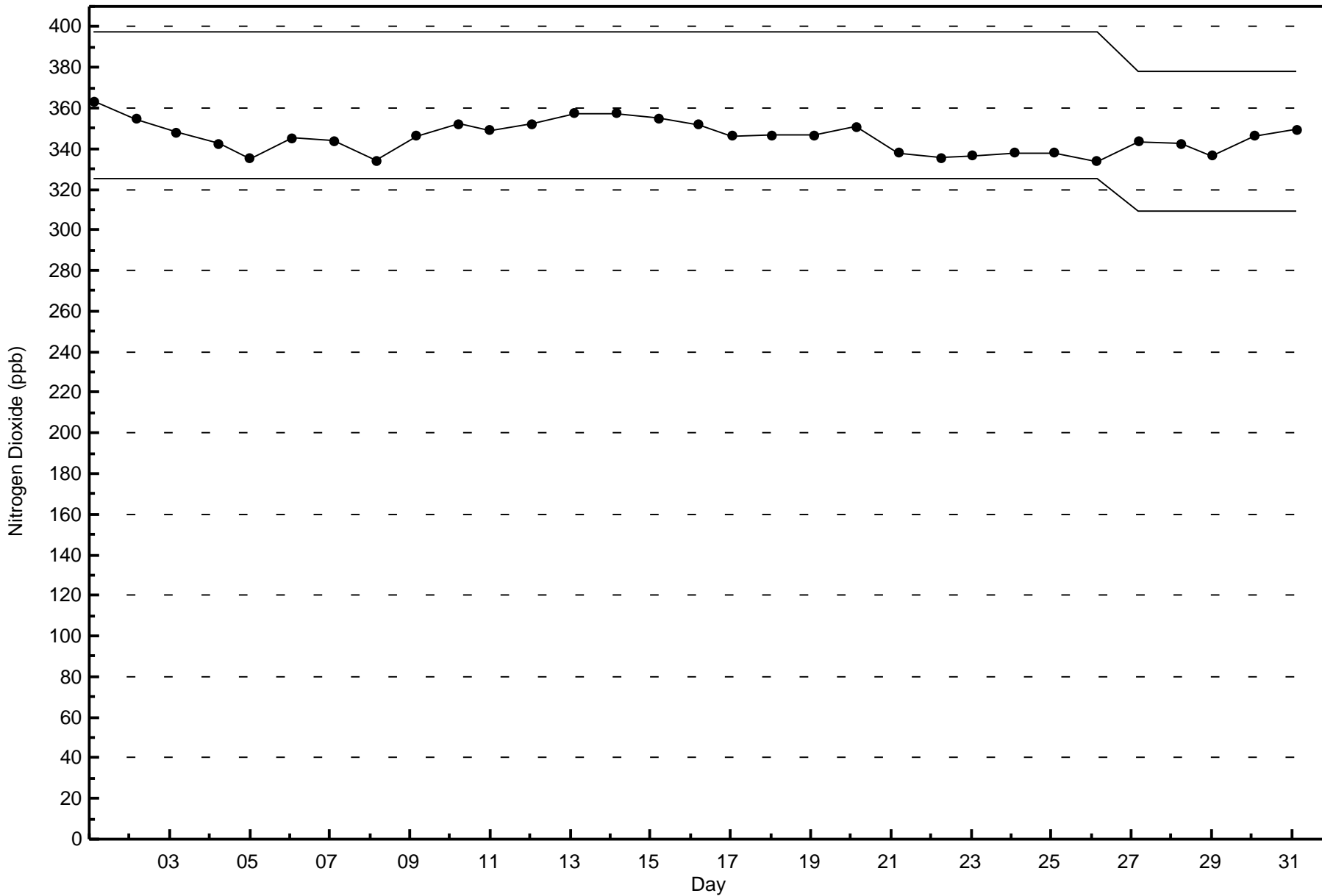


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association
Summary of Hour Averages

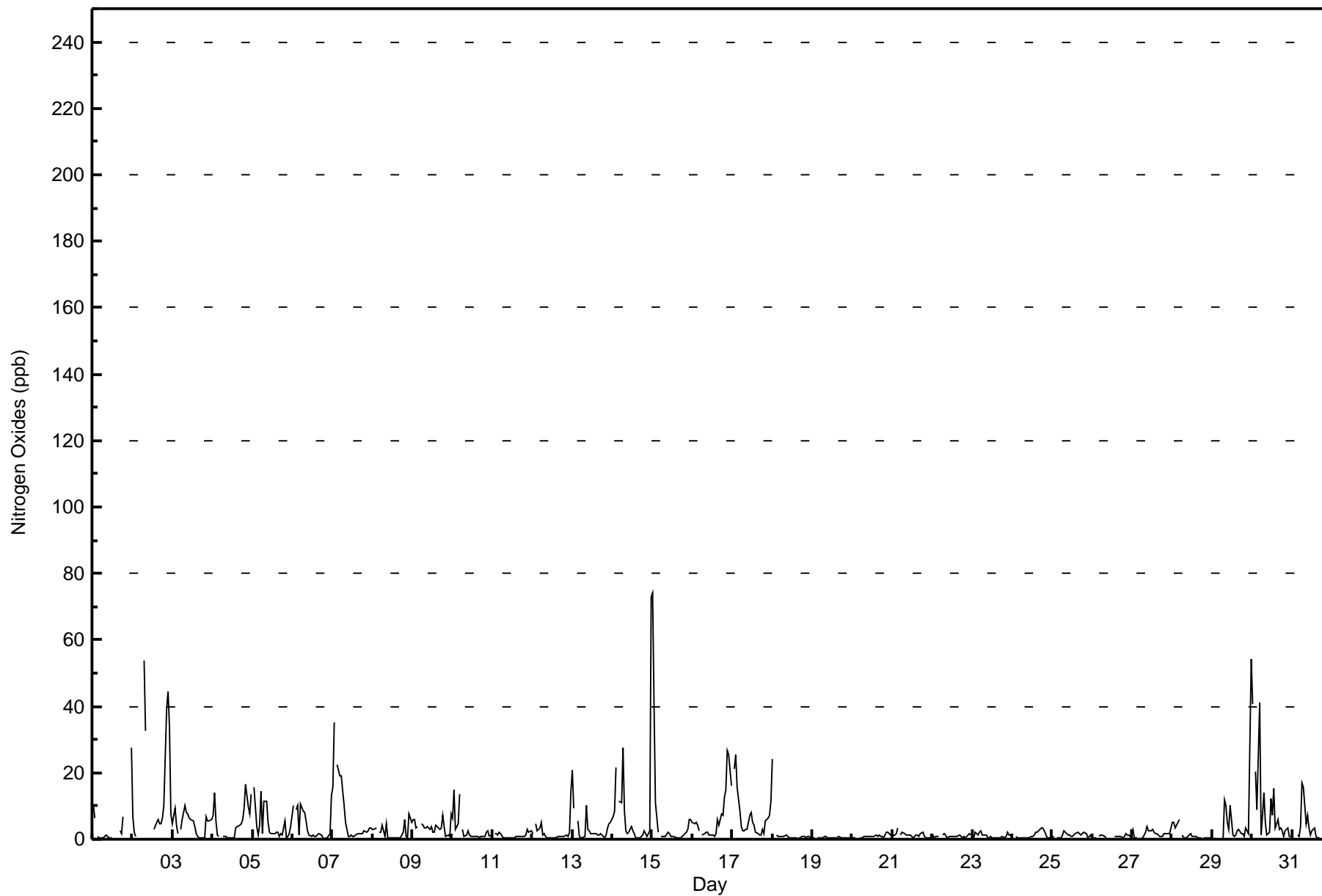
Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2016

Maximum Value: 74 ppb on May 15 01:00		Maximum Daily Average: 8.8 ppb on May 30		Hours in Service: 744																																													
Minimum Value: 0 ppb on May 31 19:00		Minimum Daily Average: 0.5 ppb on May 19		Hours of Data: 697																																													
Maximum Diurnal Average: 9.9 ppb at hour 1		Minimum Diurnal Average: 1.5 ppb at hour 17		Hours of Missing Data: 47																																													
Monthly Average: 3.7 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 8 P ₉₉ = 41		Hours of Calibration: 35																																													
				Percent Operational Time: 98.4																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	10	6	Z	1	1	0	0	1	1	1	1	1	UO	0	UO	UO	2	2	7	UO	6	UO	UO	28	--	28																							
2-May	7	2	1	Z	UO	1	UO	54	33	M	M	M	M	3	5	6	5	5	7	10	39	44	34	8	--	54																							
3-May	5	9	4	2	Z	3	6	10	8	8	7	6	6	4	2	1	1	1	0	1	7	5	6	6	4.6	10																							
4-May	7	14	6	1	1	Z	1	1	1	1	0	0	0	1	4	4	4	5	6	9	17	10	7	14	4.9	17																							
5-May	Z	16	4	1	4	14	2	11	11	5	2	2	2	2	2	2	1	2	1	6	1	1	2	4	4.2	16																							
6-May	10	Z	9	10	1	11	8	8	6	3	1	1	1	1	1	1	2	1	0	0	0	0	2	13	3.9	13																							
7-May	15	35	Z	22	19	19	14	10	5	1	1	1	1	1	1	2	2	2	2	2	2	3	3	4	7.3	35																							
8-May	3	3	3	Z	2	2	4	1	5	0	0	1	1	0	0	0	0	0	2	6	1	1	8	5	2.1	8																							
9-May	6	6	3	4	Z	5	4	4	3	4	3	4	2	2	4	4	3	3	7	4	1	1	1	7	3.7	7																							
10-May	6	15	3	5	14	Z	3	1	1	3	1	1	1	1	1	1	1	1	1	1	2	3	1	1	2.8	15																							
11-May	Z	2	2	1	2	2	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	3	2	2	1.2	3																							
12-May	1	Z	5	3	3	5	1	2	1	0	0	0	0	1	1	1	1	1	1	1	1	1	2	15	2.0	15																							
13-May	21	9	Z	5	1	0	0	1	10	3	3	2	2	2	2	1	1	2	1	1	1	3	5	5	3.5	21																							
14-May	7	8	22	Z	11	11	28	9	2	2	2	4	2	2	1	0	1	1	1	3	2	1	3	73	8.4	73																							
15-May	74	41	11	2	Z	1	1	1	1	2	2	1	1	1	1	1	0	0	1	1	2	3	6	6	7.0	74																							
16-May	5	5	5	4	3	Z	1	2	2	2	1	1	1	1	2	6	4	8	7	13	15	26	26	16	6.8	26																							
17-May	Z	21	25	15	8	4	2	2	3	3	7	8	5	4	2	2	1	1	3	2	6	6	7	11	6.6	25																							
18-May	24	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1.7	24																							
19-May	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1																							
20-May	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1.0	2																							
21-May	1	1	2	3	Z	1	2	2	1	1	1	1	1	1	1	1	1	2	2	1	0	0	0	0	1.2	3																							
22-May	1	1	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	0	1	0	1	2	1	0.9	2																							
23-May	Z	0	2	1	2	2	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	2	1	1	1.0	2																							
24-May	1	Z	1	1	1	1	0	1	1	0	1	1	1	1	2	2	2	3	3	3	2	1	1	1	1.2	3																							
25-May	1	1	Z	1	1	1	1	3	2	1	1	1	1	1	2	2	2	2	1	2	2	0	1	1	1.3	3																							
26-May	1	0	0	Z	1	1	1	1	1	C	C	C	C	1	1	1	1	1	0	1	2	1	1	1	0.9	2																							
27-May	3	1	1	0	Z	1	1	1	2	4	3	2	3	2	2	2	1	1	1	2	2	2	2	4	1.7	4																							
28-May	5	5	4	5	6	Z	1	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	1.6	6																							
29-May	Z	0	0	0	0	0	0	12	10	5	3	10	1	1	1	3	3	2	2	1	3	2	2	54	5.0	54																							
30-May	41	Z	20	9	41	1	7	14	5	1	2	12	7	15	3	6	3	3	3	1	3	3	1	1	8.8	41																							
31-May	1	1	Z	1	1	4	17	15	5	7	3	1	3	4	1	1	0	0	0	0	1	1	5	2	3.2	17																							
																								9.9	7.8	5.4	3.9	5.0	3.5	3.8	5.5	4.1	2.1	1.7	2.3	1.6	1.8	1.5	1.7	1.5	1.6	2.1	2.5	4.0	4.3	4.4	9.2	Diurnal Average	
																								74	41	25	22	41	19	28	54	33	8	7	12	7	15	5	6	5	8	7	13	39	44	34	73	Diurnal Maximum	
Z - zerspan																								C - Calibration				M - Maintenance				UO - Unstable Operation																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	675	96.84	96.84
21 - 40	14	2.01	98.85
41 - 80	8	1.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	97	158	26	12	5	15	20	20	57	65	45	29	33	47	23	23	675
21 - 40	3	0	1	0	0	1	0	1	0	3	3	1	0	0	0	0	13
11 - 80	0	1	0	0	1	0	0	0	0	1	0	0	2	1	2	0	8
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	159	27	12	6	16	20	21	57	69	48	30	35	48	25	23	696

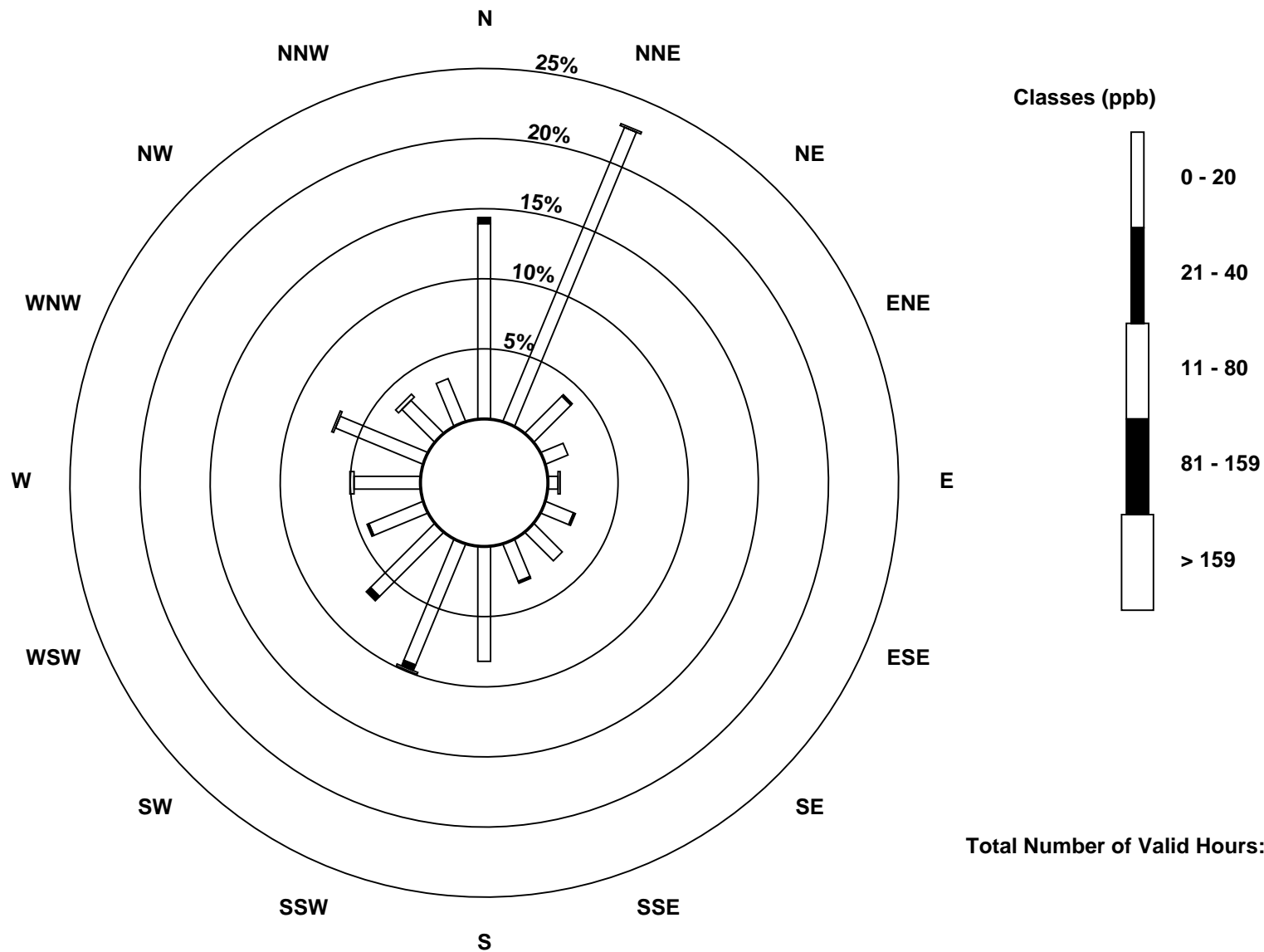
Total Number of Valid Hours: 696

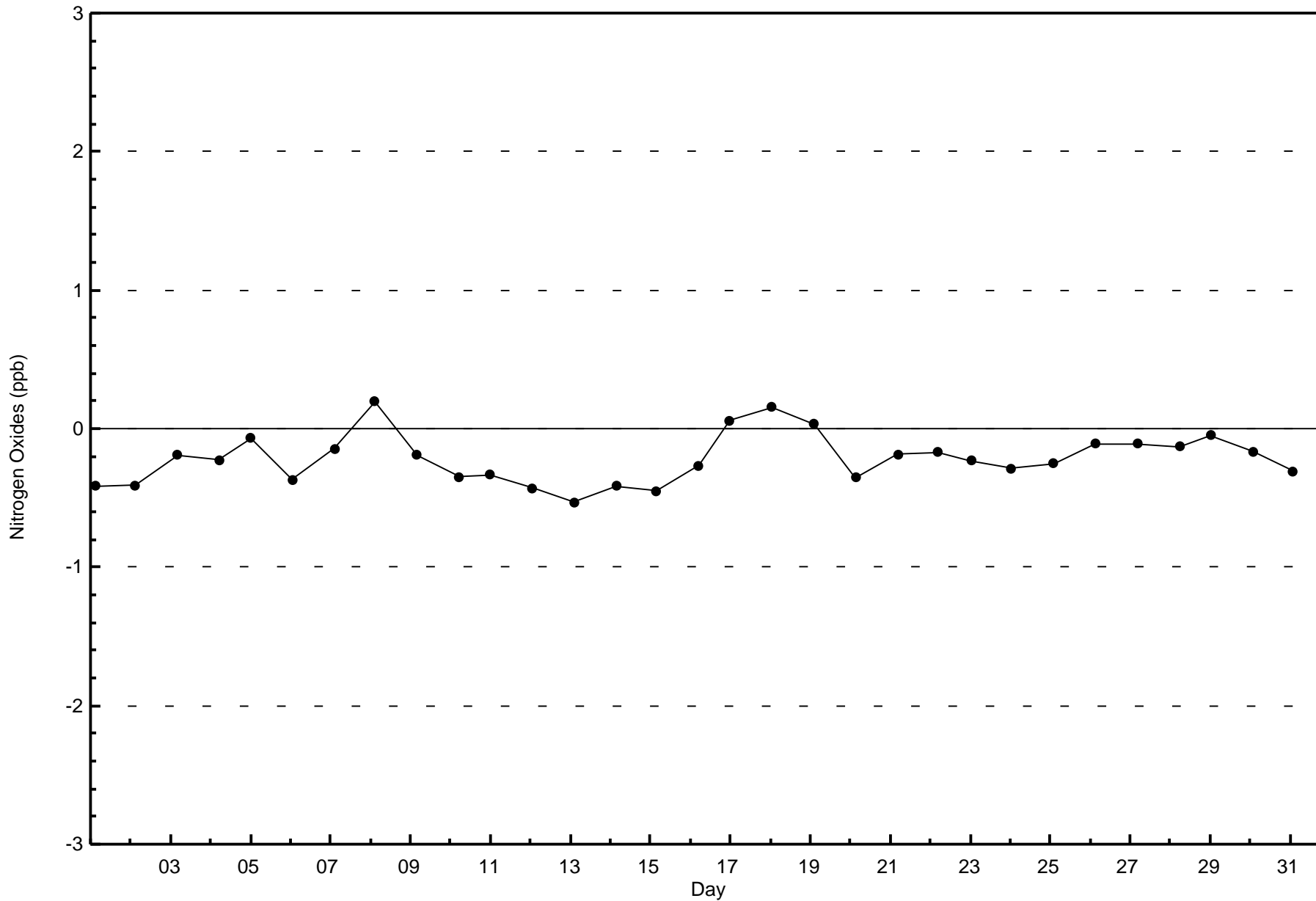
Total Number of Hours: 744

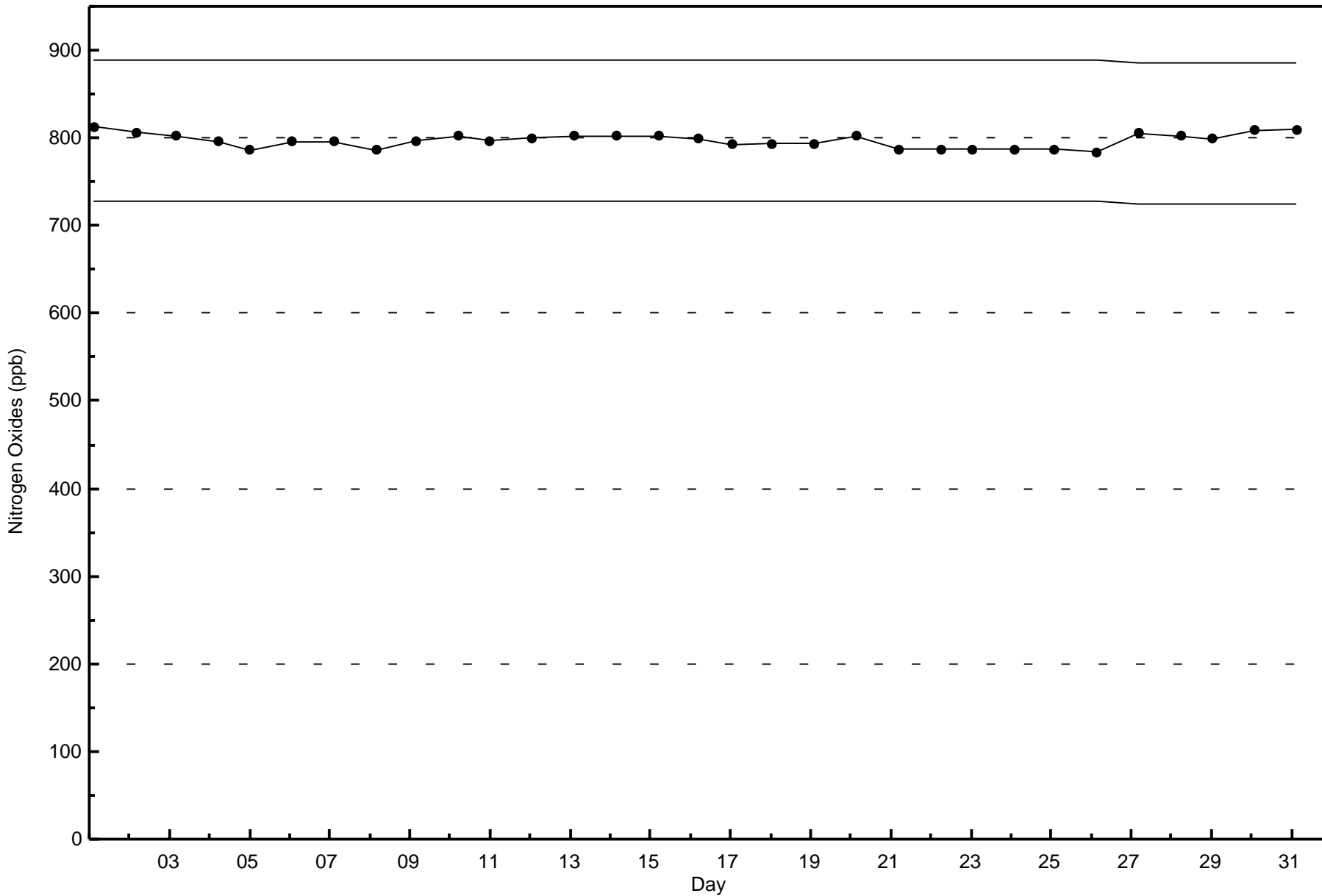


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)









Summary of Hour Averages

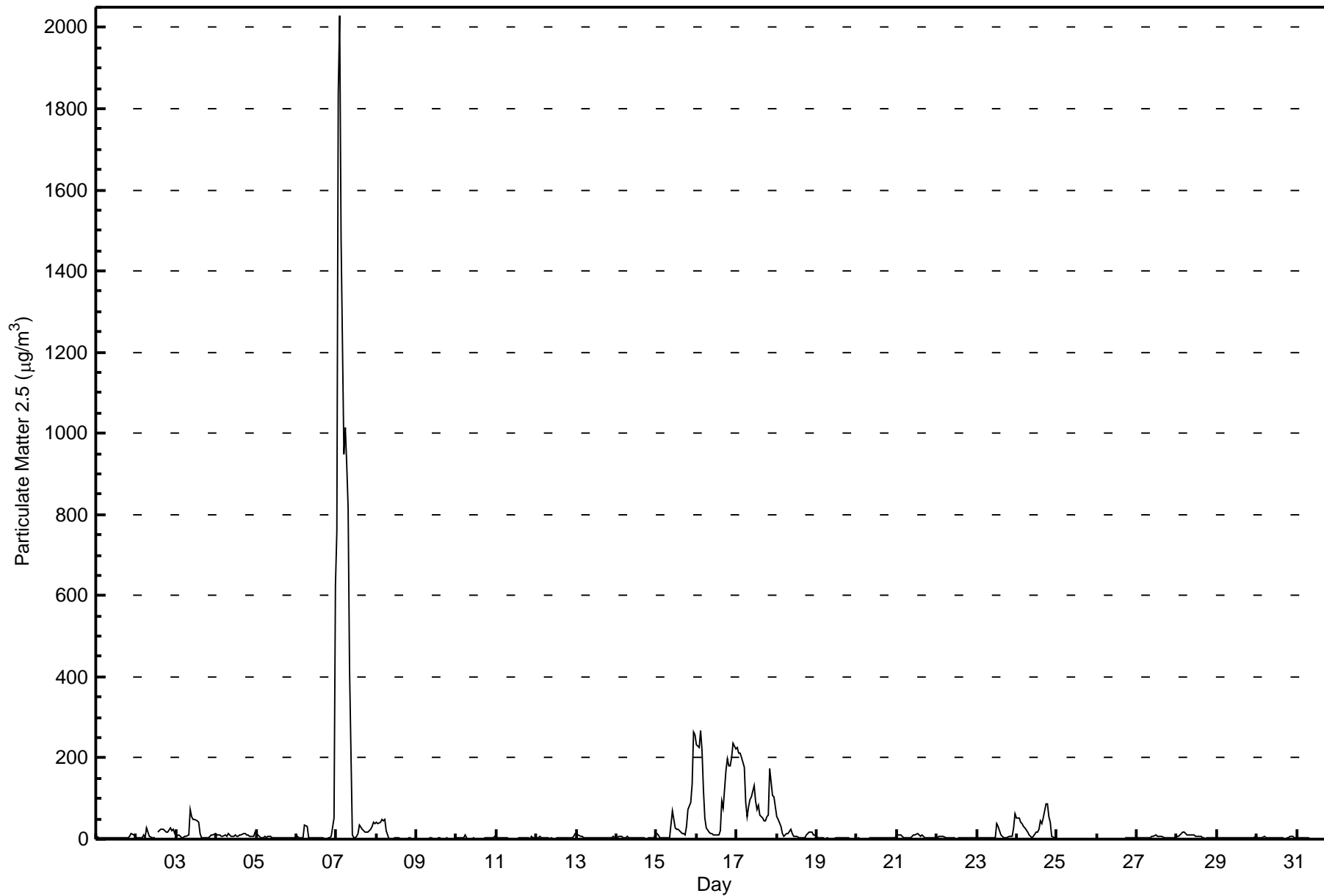
CNRL Horizon - May 2016

Number of Exceedences (AAAQO):	24-hr: 6	Hours in Service:	744
Maximum Value: 2027.8 µg/m ³ on May 7 03:00	Maximum Daily Average: 438.7 µg/m ³ on May 7	Hours of Data:	701
Minimum Value: 0.7 µg/m ³ on May 9 00:00	Minimum Daily Average: 1.4 µg/m ³ on May 9	Hours of Missing Data:	43
Maximum Diurnal Average: 94.3 µg/m ³ at hour 3	Minimum Diurnal Average: 9.8 µg/m ³ at hour 12	Hours of Calibration:	0
Monthly Average: 31.51 µg/m ³	Percentiles: P ₁ = 0.9 P ₁₀ = 1.6 Q ₁ = 2.2 Median = 3.9 Q ₃ = 10.4 P ₉₀ = 46.7 P ₉₉ = 759.7	Percent Operational Time:	94.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	6.7	4.2	3.1	3.0	2.9	3.7	4.6	4.1	2.5	1.8	2.3	2.1	2.0	2.0	2.7	3.0	2.2	1.9	3.7	4.7	5.6	12.6	9.3	7.3	4.1	12.6	
2-May	4.1	3.1	3.0	3.5	9.5	3.2	28.2	16.1	5.4	3.8	3.7	4.4	M	18.0	24.8	24.8	23.2	21.4	17.2	17.4	29.0	21.9	25.2	12.6	14.1	29.0	
3-May	8.4	9.6	8.2	4.7	4.1	6.8	6.7	11.0	71.7	55.7	48.4	47.0	45.7	40.1	14.0	3.1	3.1	3.0	2.9	3.1	5.5	10.6	11.7	13.2	18.2	71.7	
4-May	10.5	11.7	9.6	8.2	8.3	9.0	8.6	15.4	11.6	8.0	7.7	9.0	7.4	7.2	10.0	9.3	12.9	13.2	8.8	9.2	8.1	7.0	8.6	16.9	9.8	16.9	
5-May	14.6	9.3	4.9	2.7	3.3	5.7	4.8	6.3	5.3	3.5	3.2	4.6	4.5	4.6	4.0	3.2	2.5	2.4	2.6	3.2	2.8	3.2	3.7	3.0	4.5	14.6	
6-May	6.7	2.6	4.6	4.6	3.2	33.4	32.1	2.9	2.8	2.1	1.9	1.8	1.9	2.2	1.9	1.8	1.7	1.7	1.7	2.1	3.2	5.8	53.3	626.9	33.5	626.9	
7-May	756.5	1838.3	2027.8	1479.2	948.0	1014.3	924.1	815.2	420.7	12.0	2.8	4.1	5.4	14.1	33.5	23.2	20.3	18.9	18.3	18.2	23.9	29.6	41.8	39.2	438.7	2027.8	
8-May	40.9	37.7	43.0	47.5	44.3	49.7	22.5	1.3	1.6	1.4	1.7	3.1	3.5	3.2	1.1	1.0	0.9	1.0	1.3	2.4	2.3	0.9	0.8	0.7	13.1	49.7	
9-May	0.8	0.8	0.8	1.0	0.9	0.8	0.9	0.9	2.1	1.9	1.4	1.3	1.6	2.2	1.8	1.5	1.4	1.7	1.8	1.5	1.4	1.4	1.7	2.0	1.4	2.2	
10-May	2.8	4.2	2.5	3.2	5.2	11.3	1.8	1.1	1.1	1.2	1.7	1.6	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.9	2.7	2.4	5.0	5.6	2.8	11.3	
11-May	3.1	3.4	2.7	2.4	2.7	1.8	2.1	1.1	1.1	1.2	1.2	1.1	1.4	1.8	1.9	2.0	1.9	2.0	2.0	2.0	1.6	6.3	2.8	4.1	2.2	6.3	
12-May	4.1	3.4	5.9	3.6	4.0	3.4	2.3	2.7	1.3	2.0	1.6	1.3	1.9	2.0	2.1	2.1	2.2	2.3	2.2	2.3	2.9	3.8	6.1	13.4	3.3	13.4	
13-May	15.2	10.2	7.9	8.3	3.0	2.2	2.0	2.0	1.8	1.8	1.9	1.8	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.8	4.4	4.0	6.3	4.4	3.9	15.2	
14-May	4.4	5.6	8.1	6.3	4.8	4.8	5.7	2.2	1.9	1.8	2.1	2.5	2.4	2.2	1.8	1.9	2.0	1.7	1.6	2.0	2.1	3.0	2.8	13.4	3.6	13.4	
15-May	13.2	9.1	5.1	3.8	3.7	3.3	2.5	2.0	3.9	70.9	50.3	27.7	23.4	25.4	16.3	15.2	13.2	12.0	29.9	72.5	91.7	136.4	263.3	258.0	48.0	263.3	
16-May	233.9	225.0	265.9	220.2	121.5	51.4	28.4	17.0	14.6	13.3	11.2	11.0	11.0	8.8	21.6	95.4	77.0	171.4	196.9	180.0	180.1	200.7	235.0	222.4	117.2	265.9	
17-May	225.7	211.6	212.5	200.2	176.2	91.1	56.2	78.3	98.4	105.0	132.6	92.3	72.9	81.9	59.1	51.3	45.3	44.4	54.0	59.7	172.5	108.7	105.9	78.5	108.9	225.7	
18-May	56.4	48.6	30.1	14.4	8.2	10.9	12.5	13.3	24.6	13.5	7.7	7.0	8.4	4.9	2.6	2.0	1.9	1.9	12.1	16.9	17.6	18.3	11.9	9.1	14.8	56.4	
19-May	4.3	2.0	2.2	2.2	1.9	1.6	2.0	1.5	0.8	0.9	1.3	1.9	2.4	2.1	1.9	2.1	2.5	2.5	2.3	2.1	1.5	1.3	1.4	1.5	1.9	4.3	
20-May	1.6	1.9	1.6	1.4	1.2	1.2	1.1	1.4	1.8	2.2	2.2	2.4	2.6	2.6	2.8	2.9	2.8	2.6	3.3	3.9	3.9	3.3	3.9	3.6	2.4	3.9	
21-May	11.6	9.9	9.1	7.3	4.6	4.3	4.2	4.4	5.1	7.3	12.1	10.0	14.3	9.2	8.5	9.8	6.8	5.2	4.5	4.0	4.2	4.2	3.7	3.3	7.0	14.3	
22-May	4.8	5.6	6.4	5.8	5.4	5.1	4.3	3.5	2.6	2.4	2.0	1.6	1.7	1.9	1.8	2.1	2.2	2.3	3.2	3.0	3.2	3.4	3.6	3.1	3.4	6.4	
23-May	3.5	4.0	4.3	4.2	4.4	4.1	3.2	3.5	4.2	3.7	3.3	3.0	38.5	31.8	9.3	5.3	5.0	4.6	4.7	5.5	7.6	8.5	28.5	61.5	10.7	61.5	
24-May	51.8	51.5	41.5	36.8	31.7	27.2	16.9	8.8	6.6	4.9	5.7	16.5	17.9	24.8	44.7	39.8	50.5	86.9	87.6	55.8	42.9	5.4	3.8	UO	33.0	87.6	
25-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--
26-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	M	M	4.5	4.2	3.2	3.0	2.8	2.6	2.6	--	4.5
27-May	2.9	2.5	3.1	3.8	3.8	3.6	3.7	4.2	5.0	6.8	7.7	9.0	6.5	6.6	6.1	5.8	3.9	3.0	1.8	2.1	2.0	2.1	2.2	3.0	4.2	9.0	
28-May	5.6	6.8	11.2	18.0	16.5	14.8	12.0	10.8	9.8	9.2	9.0	8.1	7.6	7.2	5.4	2.1	1.7	1.7	2.2	3.2	3.3	4.0	4.3	4.4	7.5	18.0	
29-May	3.8	3.3	3.0	3.0	2.9	2.7	2.7	3.1	4.0	4.6	4.8	4.9	3.8	3.0	3.2	4.0	3.3	2.6	3.0	2.6	2.6	3.0	3.3	6.4	3.5	6.4	
30-May	4.9	4.0	4.5	4.1	5.4	3.7	3.9	2.7	2.2	2.7	2.2	3.0	2.5	2.9	3.1	2.3	1.7	1.5	2.1	3.7	5.4	5.3	3.9	3.7	3.4	5.4	
31-May	3.2	3.2	3.5	3.5	2.8	2.8	4.2	3.1	1.4	1.3	1.2	1.2	1.1	1.1	0.9	0.9	0.9	0.9	0.9	1.0	2.1	2.5	3.2	2.3	2.0	4.2	

51.9	87.3	94.3	72.7	49.5	47.5	41.5	35.9	24.7	12.0	11.5	9.8	10.6	10.9	10.0	11.1	10.2	14.1	16.0	16.4	21.3	20.7	28.7	49.2	Diurnal Average	
756.5	1838.3	2027.8	1479.2	948.0	1014.3	924.1	815.2	420.7	105.0	132.6	92.3	72.9	81.9	59.1	95.4	77.0	171.4	196.9	180.0	180.1	200.7	263.3	626.9	Diurnal Maximum	

M - Maintenance 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}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	420	59.91	59.91
6 - 15	129	18.40	78.32
16 - 25	33	4.71	83.02
26 - 80	57	8.13	91.16
> 81.0	39	5.56	96.72

Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - May 2016

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	71	119	20	3	2	2	6	6	24	29	28	22	17	37	19	15	420
6 - 15	11	17	3	4	1	5	8	4	12	19	15	1	12	10	3	4	129
16 - 25	6	3	2	5	3	3	1	4	2	2	1	0	0	1	0	0	33
26 - 80	5	3	2	0	0	3	3	6	12	9	4	5	0	1	2	2	57
> 81.0	3	0	0	0	2	3	3	0	6	10	5	2	0	1	1	3	39
Totals	96	142	27	12	8	16	21	20	56	69	53	30	29	50	25	24	678

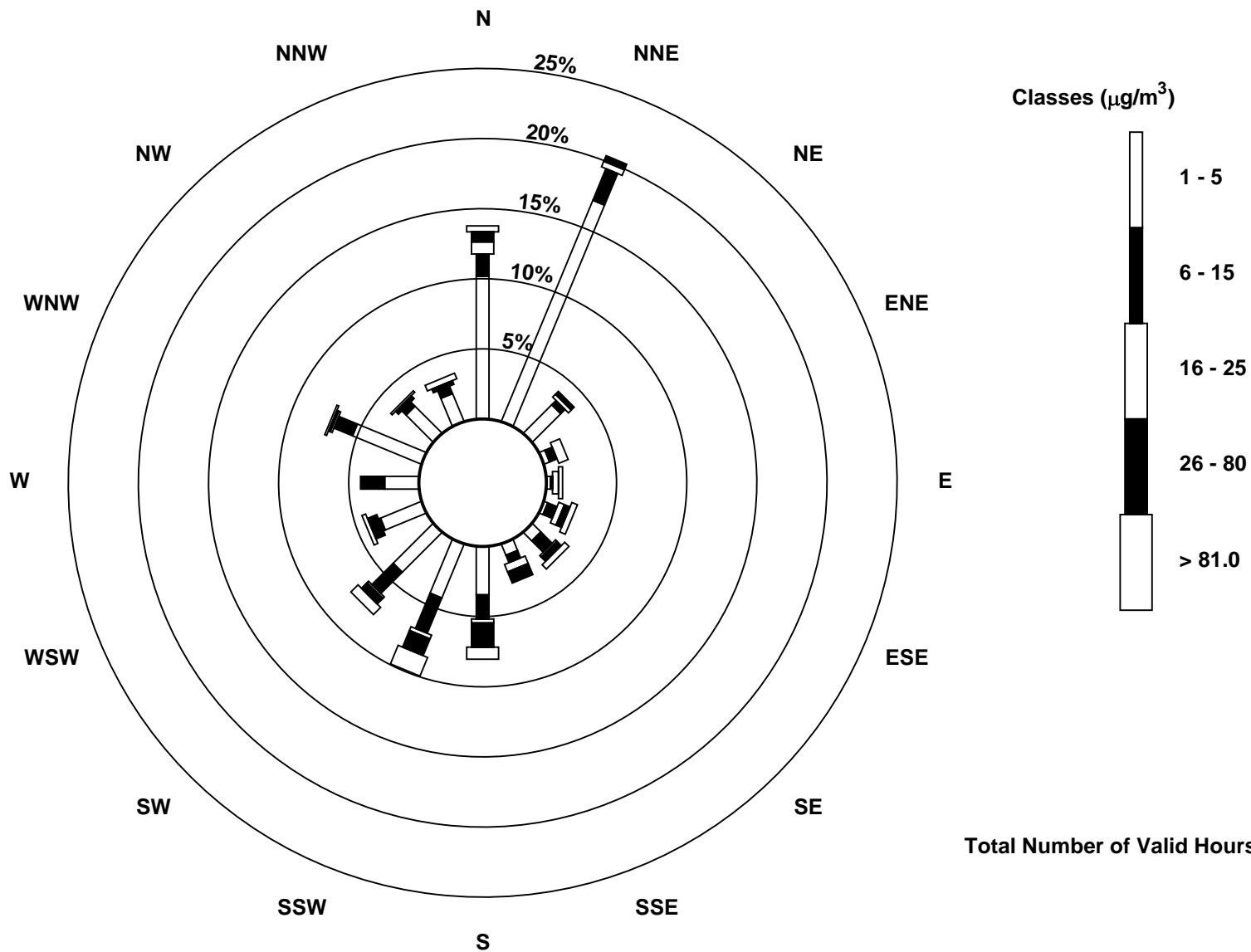
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)

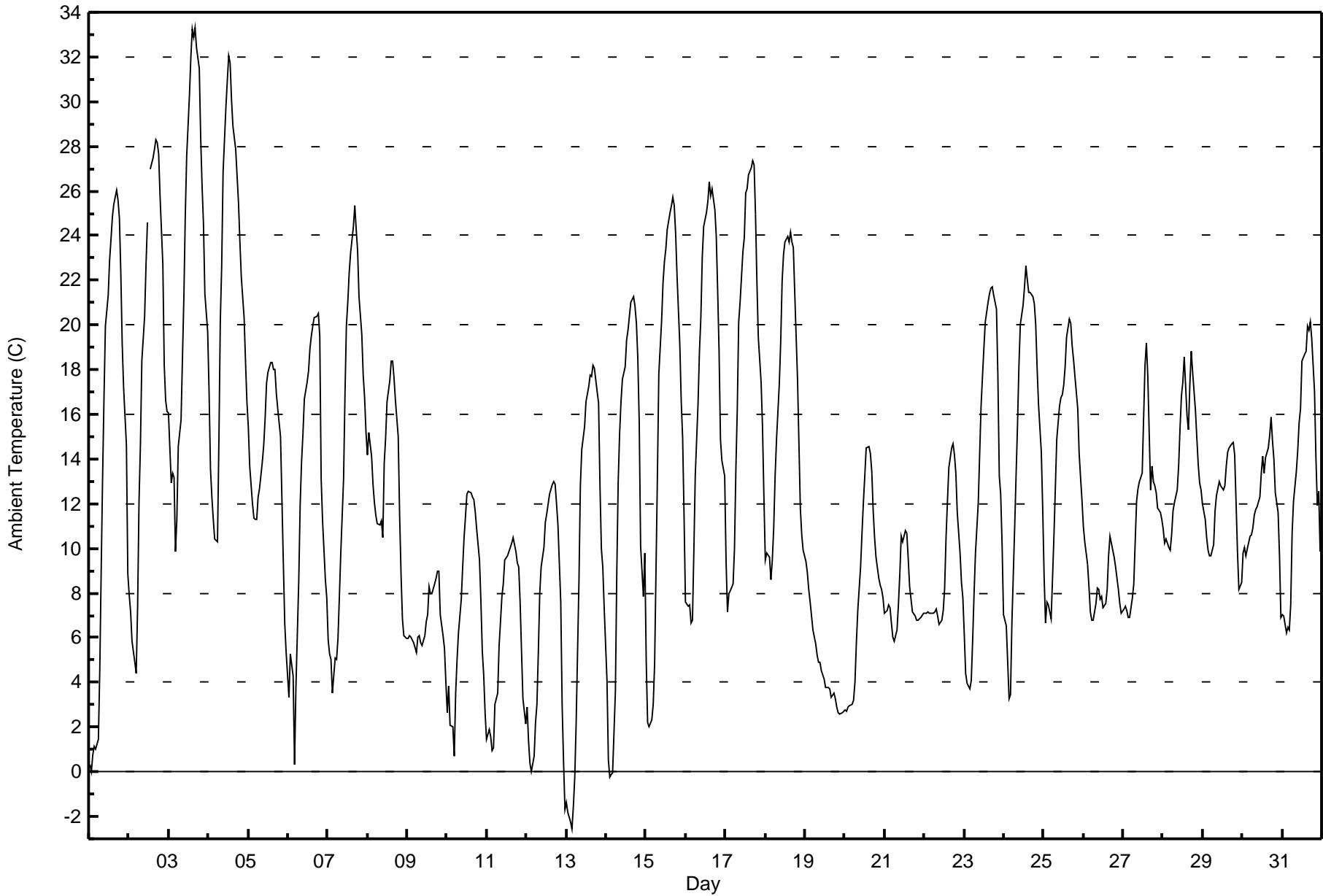




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
CNRL Horizon - May 2016

Maximum Value: 33.3 C on May 3 17:00 Maximum Daily Average: 22.7 C on May 3																				Hours in Service: 744 Hours of Data: 743																												
Minimum Value: -2.5 C on May 13 04:00 Minimum Daily Average: 4.8 C on May 19 Maximum Diurnal Average: 18.6 C at hour 17 Minimum Diurnal Average: 5.7 C at hour 5 Monthly Average: 12.71 C Percentiles: P ₁ = -0.2 P ₁₀ = 4.0 Q ₁ = 7.4 Median = 11.9 Q ₃ = 17.7 P ₉₀ = 23.0 P ₉₉ = 31.6																				Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	0.3	0.0	0.8	1.1	1.0	1.4	4.6	9.0	13.2	16.7	20.0	21.3	22.9	23.9	24.9	25.4	26.1	25.6	24.8	22.3	19.1	17.2	14.6	8.9	14.4	26.1																						
2-May	7.9	7.1	5.9	4.9	4.4	7.4	12.1	14.6	18.4	20.4	22.7	24.6	M	26.9	27.5	27.9	28.3	28.1	27.7	25.8	22.7	18.2	16.6	16.1	18.1	28.3																						
3-May	16.1	12.9	13.3	13.2	9.8	11.3	14.6	15.8	18.5	21.2	24.8	27.6	30.3	32.0	33.2	32.8	33.3	32.4	31.5	28.4	26.2	24.5	21.4	19.7	22.7	33.3																						
4-May	17.0	13.6	12.3	11.3	10.4	10.3	14.7	20.2	22.7	26.8	29.7	30.9	32.1	31.8	30.1	28.9	27.8	26.7	25.5	23.7	22.2	20.3	18.4	16.6	21.8	32.1																						
5-May	15.4	13.7	12.0	11.4	11.3	11.3	12.3	12.7	13.8	14.6	15.8	17.4	17.9	18.3	18.3	18.0	18.0	16.9	16.3	15.0	12.2	9.4	6.7	5.4	13.9	18.3																						
6-May	3.3	5.3	4.8	4.3	0.3	3.8	8.5	11.9	13.8	15.1	16.7	17.5	18.0	18.9	19.5	20.0	20.3	20.4	20.5	19.5	13.1	11.3	8.6	7.8	12.6	20.5																						
7-May	5.9	5.3	5.0	3.5	5.1	5.0	6.0	7.8	9.8	13.1	16.9	20.0	21.0	22.3	23.2	24.4	25.3	24.3	23.3	21.2	19.6	17.8	16.7	15.2	14.9	25.3																						
8-May	14.2	15.2	14.1	12.9	12.1	11.5	11.1	11.1	11.2	10.5	13.8	14.9	16.6	17.5	18.4	18.4	17.6	16.6	15.0	11.5	8.9	6.8	6.1	5.9	13.0	18.4																						
9-May	6.0	6.1	6.0	5.9	5.8	5.3	6.0	6.1	5.8	5.6	6.1	6.7	7.0	8.3	8.0	8.0	8.4	8.7	9.0	9.0	7.0	6.1	5.5	4.0	6.7	9.0																						
10-May	2.7	3.8	2.1	2.0	0.7	3.5	5.0	6.2	7.7	9.2	10.5	11.4	12.4	12.5	12.5	12.3	12.1	11.6	10.8	9.5	7.6	5.4	4.3	2.6	7.5	12.5																						
11-May	1.4	1.9	1.6	1.0	1.1	3.0	3.5	5.7	6.7	7.9	8.4	9.5	9.7	9.9	10.0	10.2	10.5	9.9	9.3	9.1	7.6	5.4	3.3	2.1	6.2	10.5																						
12-May	2.9	1.4	0.4	0.0	0.7	2.2	3.0	5.3	8.0	9.2	10.0	11.2	11.5	12.0	12.4	12.9	13.0	12.9	12.0	11.1	7.6	2.9	0.4	-1.7	6.7	13.0																						
13-May	-1.3	-1.8	-2.3	-2.5	-1.6	-0.2	2.2	8.6	12.8	14.5	14.9	15.4	16.6	17.3	17.8	17.7	18.2	18.1	17.0	16.5	12.8	10.0	9.2	7.3	9.9	18.2																						
14-May	4.1	0.5	-0.2	-0.1	-0.1	3.6	8.9	13.0	15.2	16.6	17.6	18.1	19.3	19.8	20.4	21.0	21.2	20.8	20.1	18.5	15.7	10.1	7.9	9.8	12.6	21.2																						
15-May	5.0	2.2	2.0	2.3	3.0	4.9	9.0	13.3	17.8	20.2	21.9	22.8	23.4	24.3	25.0	25.3	25.7	25.3	24.1	22.2	19.1	16.5	14.9	11.5	15.9	25.7																						
16-May	7.6	7.4	7.4	6.6	6.8	9.9	13.2	16.5	18.8	20.4	23.0	24.4	25.0	25.5	26.4	25.8	26.1	25.1	23.9	21.5	18.8	14.8	13.9	13.3	17.6	26.4																						
17-May	9.4	7.2	8.0	8.1	8.4	10.0	13.5	16.3	20.1	21.0	23.3	23.9	25.9	26.1	26.7	27.1	27.4	27.2	25.0	22.0	19.5	17.5	15.4	12.3	18.4	27.4																						
18-May	9.5	9.8	9.6	8.6	9.5	10.9	13.3	14.9	17.4	19.3	22.0	23.2	23.7	24.0	23.7	24.2	23.7	23.4	21.5	17.6	14.7	11.8	10.6	9.9	16.5	24.2																						
19-May	9.4	8.9	8.2	7.6	7.0	6.4	5.7	5.2	4.9	4.9	4.5	4.1	3.8	3.8	3.8	3.7	3.4	3.5	3.3	2.9	2.6	2.6	2.7	2.7	4.8	9.4																						
20-May	2.7	2.7	2.9	3.0	3.0	3.2	4.0	5.8	7.2	9.2	10.7	12.1	13.3	14.5	14.6	14.3	13.4	11.7	10.5	9.6	8.7	8.3	8.1	7.8	8.4	14.6																						
21-May	7.1	7.2	7.5	7.4	6.6	6.0	5.9	6.4	7.4	8.9	10.6	10.3	10.8	10.7	9.6	8.3	7.7	7.2	7.0	6.8	6.8	6.8	6.9	7.1	7.8	10.8																						
22-May	7.1	7.1	7.2	7.1	7.1	7.1	7.1	7.3	6.9	6.6	6.8	7.2	8.3	10.5	12.1	13.6	14.5	14.7	14.2	13.4	11.6	9.8	8.5	7.8	9.3	14.7																						
23-May	6.1	4.4	4.0	3.7	4.1	5.9	8.0	9.8	12.1	14.3	16.4	17.7	19.0	20.2	21.0	21.4	21.6	21.7	21.3	20.7	17.7	13.2	12.5	10.1	13.6	21.7																						
24-May	7.0	6.5	4.9	3.2	3.5	6.6	11.0	13.3	15.5	18.1	20.0	20.9	21.7	22.6	22.0	21.4	21.5	21.2	21.0	20.0	18.1	16.5	14.3	11.8	15.1	22.6																						
25-May	8.7	6.7	7.6	7.5	6.9	8.6	10.5	12.7	14.8	16.4	16.8	16.9	17.3	18.1	19.5	20.2	20.1	19.0	18.5	17.7	16.2	14.3	13.2	12.1	14.2	20.2																						
26-May	11.0	10.3	9.3	8.3	7.2	6.8	6.8	7.5	8.2	8.2	7.7	7.9	7.3	7.6	8.2	9.7	10.6	10.2	9.6	9.2	8.7	8.2	7.6	7.1	8.5	11.0																						
27-May	7.3	7.4	7.2	6.9	6.9	7.8	8.4	10.3	12.1	12.7	13.0	13.4	15.8	18.2	19.2	17.7	12.6	13.7	13.0	12.8	12.5	11.8	11.6	11.3	11.8	19.2																						
28-May	10.9	10.2	10.4	10.1	9.9	10.6	11.7	12.1	12.6	13.7	15.4	16.8	17.5	18.6	16.0	15.3	17.3	18.8	17.9	16.2	14.9	13.8	12.9	12.6	14.0	18.8																						
29-May	12.0	11.3	10.5	9.9	9.7	9.6	10.2	11.7	12.3	12.7	13.0	12.8	12.6	12.8	13.7	14.3	14.5	14.7	14.8	14.2	12.1	9.8	8.2	8.5	11.9	14.8																						
30-May	9.8	10.0	9.6	10.0	10.6	10.6	10.9	11.5	11.7	11.9	12.3	13.4	14.1	13.4	14.0	14.5	15.0	15.9	14.8	14.0	12.5	11.6	9.7	6.9	12.0	15.9																						
31-May	7.1	7.0	6.2	6.4	6.3	7.5	10.7	12.1	13.5	14.4	15.6	16.2	18.4	18.7	18.8	19.9	19.7	20.2	19.4	17.0	14.0	11.9	12.5	9.8	13.5	20.2																						
																								7.5	6.8	6.4	6.0	5.7	6.8	8.8	10.8	12.6	14.0	15.5	16.5	17.1	18.1	18.4	18.5	18.6	18.3	17.5	16.1	13.9	11.8	10.4	9.1	Diurnal Average
																								17.0	15.2	14.1	13.2	12.1	11.5	14.7	20.2	22.7	26.8	29.7	30.9	32.1	32.0	33.2	32.8	33.3	32.4	31.5	28.4	26.2	24.5	21.4	19.7	Diurnal Maximum
M - Maintenance																																																





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
CNRL Horizon - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	11	1.48	1.48
0 - 10	289	38.90	40.38
10 - 20	316	42.53	82.91
> 20	127	17.09	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

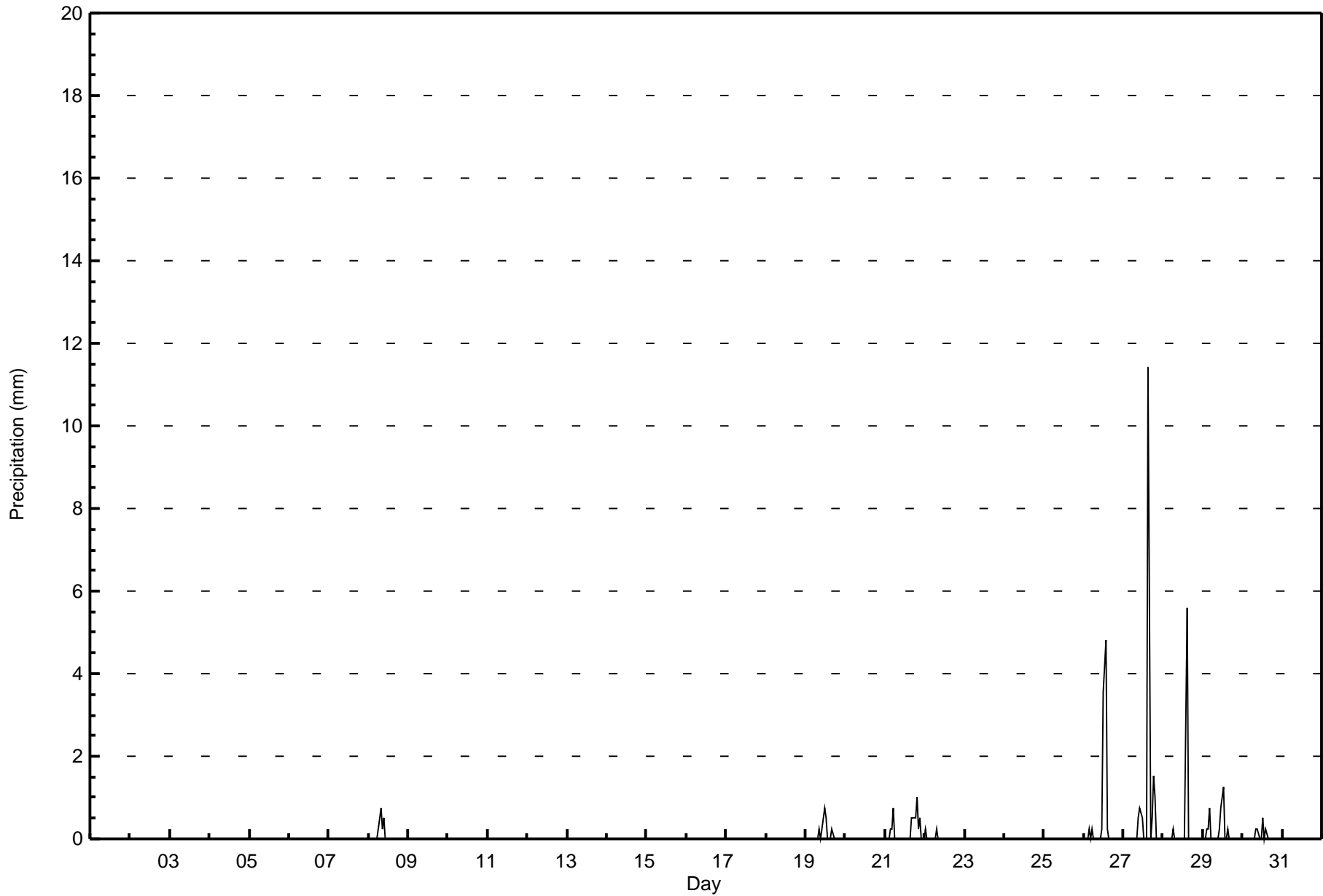
CNRL Horizon - May 2016

Maximum Value: 11.4 mm on May 27 16:00		Maximum Daily Total: 16.3 mm on May 27		Hours in Service: 744																																													
Minimum Value: 0.0 mm on May 1 01:00		Minimum Daily Total: 0.0 mm on May 1		Hours of Data: 743																																													
Maximum Diurnal Total: 11.7 mm at hour 16		Minimum Diurnal Total: 0.0 mm at hour 2		Hours of Missing Data: 1																																													
Monthly Total: 45.47 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.8		Hours of Calibration: 0																																													
				Percent Operational Time: 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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
3-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	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																					
9-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.8	0.5	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																					
20-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.3	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	1.0	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
22-May	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
23-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	3.6	4.8	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																					
27-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	0.5	0.0	0.0	0.0	11.4	0.0	0.5	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
28-May	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	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
29-May	0.0	0.0	0.3	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
30-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
31-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.8	1.0	1.0	0.5	1.0	0.8	1.3	1.3	2.3	5.8	4.8	6.1	11.7	0.8	1.0	2.0	2.0	0.3	0.5	0.0	0.0	Diurnal Average	
																								0.3	0.0	0.3	0.3	0.8	0.8	0.3	0.8	0.3	0.5	0.8	0.8	3.6	4.8	5.6	11.4	0.5	0.5	1.5	1.0	0.3	0.5	0.0	0.0	Diurnal Maximum	
M - Maintenance																																																	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
CNRL Horizon - May 2016





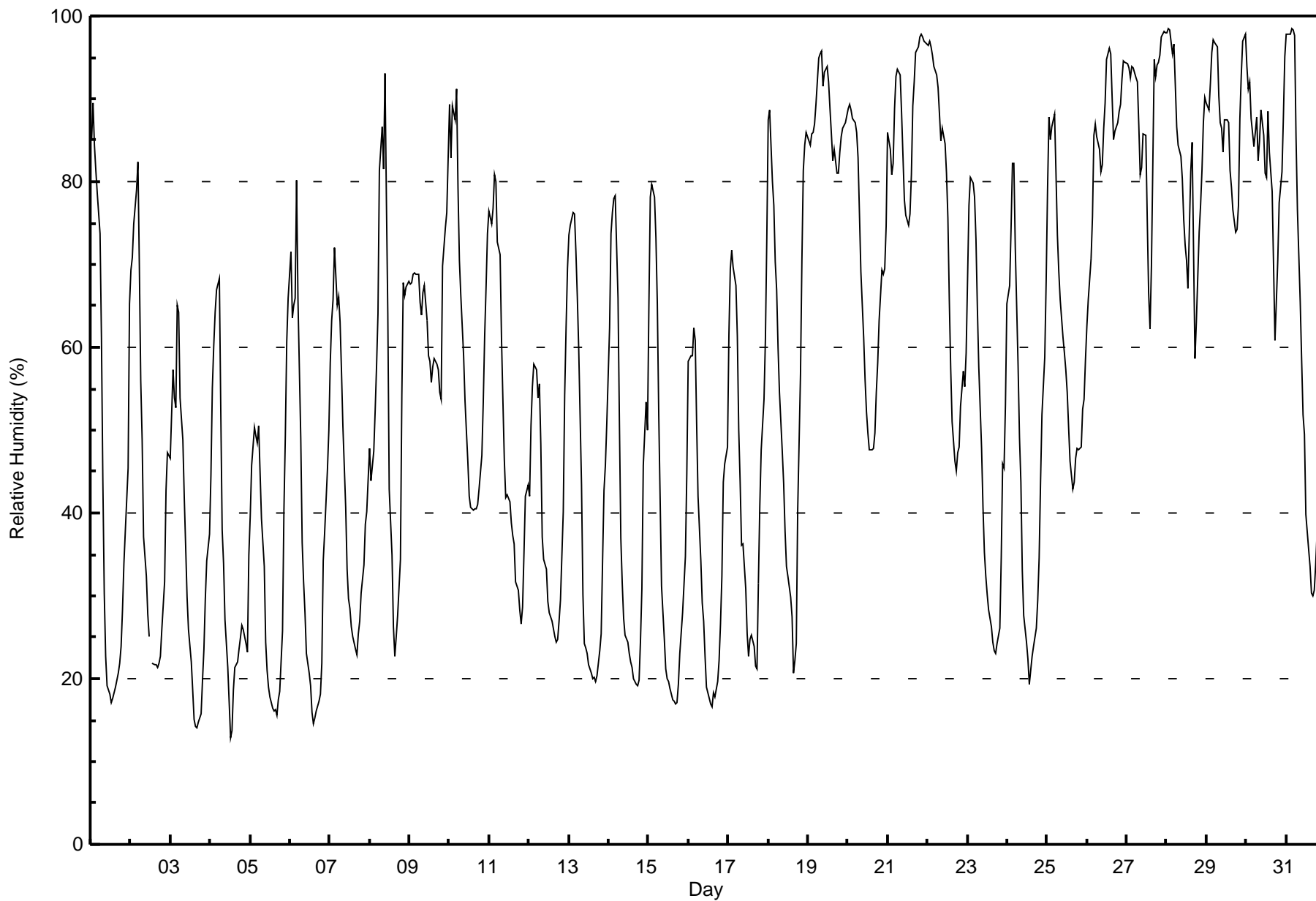
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

CNRL Horizon - May 2016

Maximum Value: 98 % on May 31 04:00																			Maximum Daily Average: 88.2 % on May 21						Hours in Service: 744	
Minimum Value: 13 % on May 4 13:00																			Minimum Daily Average: 34.2 % on May 4						Hours of Data: 743	
Maximum Diurnal Average: 78.2 % at hour 5																			Minimum Diurnal Average: 39.4 % at hour 18						Hours of Missing Data: 1	
Monthly Average: 56.7 %																			Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 32 Median = 58 Q ₃ = 81 P ₉₀ = 90 P ₉₉ = 98						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-May	85	90	84	81	79	74	61	44	30	23	19	18	17	18	18	19	21	22	24	28	34	38	45	65	43.2	90
2-May	69	71	75	79	82	70	56	49	37	32	28	25	M	22	22	22	21	22	23	26	32	43	47	47	43.5	82
3-May	47	57	54	53	65	64	54	49	42	36	30	26	22	19	15	14	14	15	16	20	24	30	34	37	34.8	65
4-May	45	55	60	64	67	68	53	38	34	27	21	17	13	14	19	21	22	24	25	26	26	24	23	35	34.2	68
5-May	40	46	50	49	48	50	45	39	34	24	21	19	18	16	16	16	16	17	18	26	40	49	61	66	34.4	66
6-May	72	64	65	66	80	66	49	36	32	28	23	21	19	16	15	15	16	17	18	22	34	38	45	50	37.8	80
7-May	58	63	66	72	65	66	63	57	51	41	33	30	28	26	25	24	23	25	27	30	34	39	40	44	42.9	72
8-May	48	44	47	52	58	64	81	87	82	93	78	64	43	35	26	23	25	28	34	54	68	66	67	68	55.6	93
9-May	68	68	69	69	69	69	65	64	67	67	63	59	58	56	58	59	58	57	55	54	70	74	76	83	64.7	83
10-May	89	83	89	87	91	79	71	66	59	54	50	46	42	41	40	41	40	41	43	47	53	61	67	74	60.6	91
11-May	76	75	77	81	80	73	71	61	54	46	42	42	41	39	37	36	32	31	28	27	29	35	42	43	49.9	81
12-May	42	50	55	58	57	54	56	48	37	34	33	29	28	27	27	25	24	25	27	30	40	54	62	70	41.4	70
13-May	74	75	76	76	72	66	60	43	30	24	24	23	22	21	20	20	20	20	23	25	34	43	46	51	41.2	76
14-May	62	74	76	78	78	66	51	37	31	27	25	24	23	22	21	20	19	19	20	25	31	46	53	50	40.8	78
15-May	65	78	80	78	73	65	52	42	31	25	21	20	20	19	17	17	17	17	19	23	28	31	35	45	38.3	80
16-May	58	59	59	62	61	51	42	34	29	27	23	19	18	17	17	18	18	20	22	27	32	44	46	48	35.4	62
17-May	61	70	72	70	67	61	50	44	36	36	31	25	23	25	25	24	22	21	31	41	48	54	61	73	44.6	73
18-May	87	89	80	77	70	67	60	55	47	44	38	34	32	30	27	21	22	24	40	57	71	81	84	86	55.2	89
19-May	85	84	86	86	87	89	95	95	96	92	93	94	92	89	86	83	84	81	81	84	85	86	87	88	87.8	96
20-May	89	89	89	88	87	86	83	76	69	61	56	52	50	48	48	48	50	55	58	63	69	69	70	75	67.8	89
21-May	86	84	81	82	89	93	94	93	88	83	78	76	75	76	81	89	92	96	96	97	98	98	97	97	88.2	98
22-May	96	97	96	95	94	93	91	88	85	86	85	81	76	66	58	51	46	45	47	48	53	57	55	59	72.9	97
23-May	68	77	81	80	78	73	65	58	48	41	35	32	30	28	26	24	23	23	24	26	35	46	45	53	46.7	81
24-May	65	68	74	82	82	72	58	49	44	33	28	24	22	19	21	23	24	26	29	35	44	52	59	68	45.9	82
25-May	79	88	85	87	88	81	74	69	66	61	59	57	55	50	46	43	44	47	48	48	48	53	54	58	62.0	88
26-May	63	66	71	76	86	87	86	84	81	82	87	90	95	96	95	90	85	86	87	88	89	92	95	94	85.4	96
27-May	94	94	93	94	94	93	92	87	81	82	86	86	76	67	62	70	95	93	94	94	95	97	98	98	88.0	98
28-May	98	98	98	95	97	92	87	84	83	80	75	72	71	67	81	85	72	59	63	74	77	81	87	90	82.0	98
29-May	90	89	92	96	97	97	96	90	87	87	84	87	87	87	81	79	77	74	74	77	88	93	97	98	87.6	98
30-May	94	91	92	88	84	86	88	83	85	89	86	81	80	88	84	79	70	61	66	70	77	81	88	95	82.7	95
31-May	98	98	98	98	98	98	85	77	65	58	52	50	40	36	34	30	30	31	34	42	50	61	59	73	62.3	98
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
CNRL Horizon - May 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	52	7.00	7.00
20 - 40	178	23.96	30.96
40 - 60	162	21.80	52.76
60 - 80	158	21.27	74.02
80 - 100	193	25.98	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



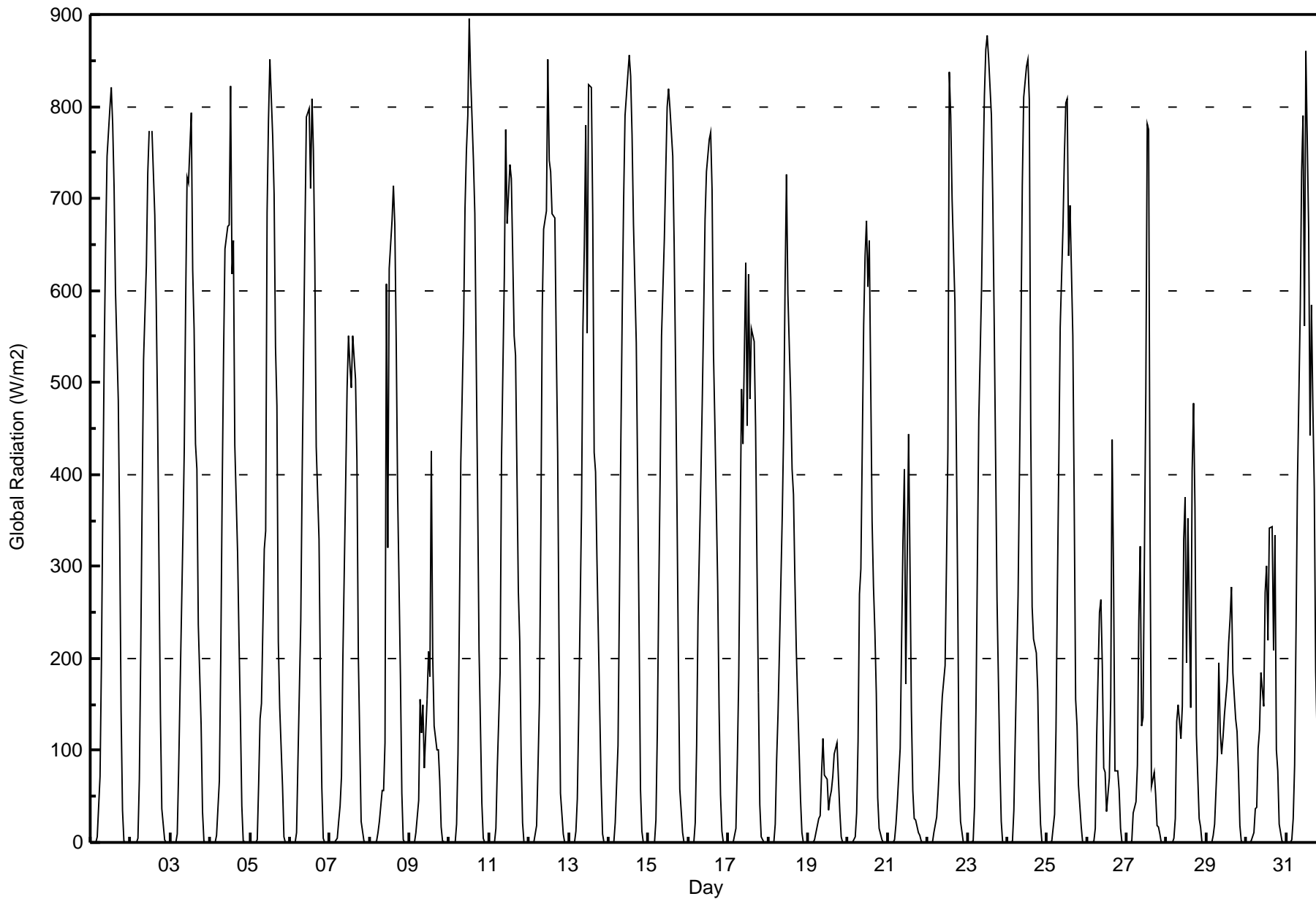
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

CNRL Horizon - May 2016

Maximum Value: 895 W/m2 on May 10 13:00		Maximum Daily Average: 354.7 W/m2 on May 23		Hours in Service: 744																							
Minimum Value: 0 W/m2 on May 1 01:00		Minimum Daily Average: 38.5 W/m2 on May 19		Hours of Data: 743																							
Maximum Diurnal Average: 618.8 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 2		Hours of Missing Data: 1																							
Monthly Average: 230.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 95 Q ₃ = 430 P ₉₀ = 697 P ₉₉ = 850		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-May	0	0	0	0	6	71	197	374	535	651	745	799	820	781	712	600	480	334	142	34	2	0	0	0	303.5	820	
2-May	0	0	0	0	4	68	207	376	525	627	728	773	M	773	682	589	465	302	141	37	2	0	0	0	273.9	773	
3-May	0	0	0	0	9	79	165	331	427	589	724	717	793	622	558	434	406	236	128	34	1	0	0	0	260.6	793	
4-May	0	0	0	0	7	67	202	380	529	645	670	671	823	617	654	431	314	219	136	40	2	0	0	0	267.0	823	
5-May	0	0	0	0	3	64	135	151	319	339	685	785	851	767	704	538	475	219	147	61	6	0	0	0	260.4	851	
6-May	0	0	0	0	11	90	241	401	534	667	788	798	710	808	752	630	431	329	173	59	5	0	0	0	309.5	808	
7-May	0	0	0	0	5	23	40	71	201	392	494	550	519	494	551	504	415	202	113	23	2	0	0	0	191.6	551	
8-May	0	0	0	0	2	10	22	57	56	109	607	320	625	676	715	671	541	380	179	53	2	0	0	0	209.4	715	
9-May	0	0	0	0	11	46	156	118	149	81	156	207	181	426	202	126	101	101	67	17	1	0	0	0	89.5	426	
10-May	0	0	0	0	20	96	247	413	563	690	753	790	895	833	742	683	523	375	209	43	5	0	0	0	328.3	895	
11-May	0	0	0	0	15	80	185	416	516	615	774	673	737	722	637	551	529	274	218	93	22	0	0	0	294.0	774	
12-May	0	0	0	0	19	83	153	331	577	666	686	851	741	729	683	679	543	423	211	53	10	0	0	0	309.9	851	
13-May	0	0	0	0	12	48	138	361	560	648	780	554	823	821	681	424	403	306	142	63	9	0	0	0	282.3	823	
14-May	0	0	0	0	21	105	264	433	578	698	790	834	856	833	769	673	543	393	232	58	12	0	0	0	337.2	856	
15-May	0	0	0	0	25	120	269	397	551	656	730	799	819	798	746	649	519	366	199	58	11	0	0	0	321.4	819	
16-May	0	0	0	1	21	106	245	395	480	574	678	729	765	773	709	532	454	281	144	51	12	0	0	0	289.5	773	
17-May	0	0	0	0	16	90	180	344	492	434	631	453	619	482	559	544	452	301	164	42	7	0	0	0	242.1	631	
18-May	0	0	0	1	20	91	140	210	356	448	605	726	596	484	406	378	287	209	153	47	10	0	0	0	215.4	726	
19-May	0	0	0	0	3	11	26	29	75	113	73	68	35	49	57	71	96	108	70	34	6	0	0	0	38.5	113	
20-May	0	0	0	0	7	33	110	270	297	563	637	677	605	654	349	277	228	162	48	15	3	0	0	0	205.6	677	
21-May	0	0	0	0	3	20	44	102	216	328	406	173	443	302	143	56	26	24	11	8	2	0	0	0	96.2	443	
22-May	0	0	0	1	10	27	54	85	128	159	192	303	427	837	790	699	587	436	265	68	22	1	0	0	212.1	837	
23-May	0	0	0	2	39	145	300	460	604	722	811	861	877	853	791	695	563	416	264	87	23	1	0	0	354.7	877	
24-May	0	0	0	1	35	116	268	405	544	714	811	844	851	807	456	256	220	207	165	69	20	1	0	0	282.9	851	
25-May	0	0	0	2	30	122	277	411	559	670	748	803	808	638	693	550	366	156	127	63	16	0	0	0	293.3	808	
26-May	0	0	0	0	2	15	116	251	263	192	80	76	34	70	157	438	291	78	77	57	15	0	0	0	92.2	438	
27-May	0	0	0	2	32	45	83	241	321	126	136	490	780	776	341	62	76	51	18	18	9	0	0	0	150.3	780	
28-May	0	0	0	1	4	26	131	150	112	148	330	375	195	353	147	404	477	364	118	26	17	0	0	0	140.8	477	
29-May	0	0	0	0	7	21	95	195	120	95	115	139	175	216	243	278	184	134	121	76	19	1	0	0	93.1	278	
30-May	0	0	0	1	11	36	39	102	122	184	147	271	301	220	342	344	208	335	101	77	20	1	0	0	119.3	344	
31-May	0	0	0	3	26	84	230	389	579	729	790	561	860	666	443	584	473	384	186	44	17	2	0	0	293.7	860	
		0.0	0.0	0.0	0.5	14.1	65.8	159.9	279.0	383.5	460.4	558.0	569.9	618.8	609.0	529.5	463.0	376.7	261.5	144.2	48.6	10.1	0.2	0.0	0.0	Diurnal Average	
		0	0	0	3	39	145	300	460	604	729	811	861	895	853	791	699	587	436	265	93	23	2	0	0	Diurnal Maximum	
M - Maintenance																											





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
CNRL Horizon - May 2016

Maximum Speed: 28 km/h on May 19 17:00	Maximum Daily Speed Average: 22.1 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 28 05:00	Minimum Daily Speed Average: 1.3 km/h on May 29	Hours of Data: 742
Maximum Diurnal Speed Average: 6.1 km/h at hour 20	Minimum Diurnal Speed Average: 0.8 km/h at hour 7	Hours of Missing Data: 2
Monthly Average Velocity: 3.1 km/h 346.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 24	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SW5	SW5	SSW8	S8	SSW11	S11	S11	S12	S12	S12	SSW14	SW15	SW13	SW12	WSW11	SW8	W13	WNW12	WNW11	NW9	NW7	WNW8	WNW6	SW5	SW7.1	SW15
2-May	WSW5	WSW6	WSW2	SW4	SE2	SW7	NE1	NNE3	NE5	NNE5	E5	E7	M	ESE7	ENE11	ENE11	ENE9	ENE10	E9	ESE6	ESE6	E1	N4	SE5	E3.1	ENE11
3-May	ENE6	ENE4	SE6	SE6	SSE3	ESE1	S5	S10	S8	S10	S10	SSE9	S7	S7	SW10	W6	SSW10	SSW9	SSW9	SSW7	W6	NNW6	NNW6	NNW6	S3.9	SW10
4-May	NW2	SW6	SW7	SSW7	SSW6	S6	SSW7	ESE1	SE5	SSE7	SSW10	SW11	SW10	W9	WNW22	WNW23	WNW21	W17	W17	WNW14	WNW14	W13	W11	WNW14	W8.5	WNW23
5-May	WNW14	WNW15	NW12	WNW8	W6	W7	W10	W9	WNW8	WNW14	WNW16	WNW19	WNW22	W20	WNW21	WNW20	NW19	WNW18	WNW11	N9	N6	N5	W4	WNW12.2	WNW22	
6-May	SW8	WSW10	WSW8	WSW8	SW6	WNW3	NW3	NW8	NW7	WNW10	WNW14	WNW10	NW11	WNW11	WNW5	NW10	WNW9	WNW9	WSW6	SW5	S6	SSW3	S5	SW2	W5.7	WNW14
7-May	SSW1	AF	SSE2	SSW5	SSW8	SSW8	SSW8	S9	S11	S13	S12	SSE10	SE9	ESE10	ESE12	ESE11	ENE8	N10	NNE9	N10	NNE8	N6	N7	N6	SE2.7	S13
8-May	NNW6	N8	NW8	NE2	NNW2	S2	SW7	WSW12	W11	SSW6	SW9	SW10	SW14	SW15	SW15	SW19	SW19	SW20	WSW15	WNW20	NW20	NW19	WNW16	WNW16	W8.6	WNW20
9-May	WNW15	W11	W8	W11	W12	W10	W11	W13	W16	WNW15	WNW15	WNW16	NW15	WNW16	WNW16	WNW15	WNW13	WNW11	WNW11	NW12	NNE13	NNE8	NNW2	SW5	WNW10.9	W16
10-May	WSW8	WSW7	WSW8	W7	NNE4	N3	N8	NE8	N6	NE6	NE9	NNE11	NNE13	NNE14	NNE15	NE16	NE15	NNE15	NNE16	NE14	NE10	NNE7	N7	N6	NNE7.3	NE16
11-May	NNW5	N6	N6	N6	N6	N8	N9	NNE13	NNE14	N15	NNE16	NNE16	NNE18	NNE18	NNE19	NNE18	NNE18	NNE18	NNE19	NNE16	NE9	NNE7	N6	NNW7	NNE11.9	NNE19
12-May	N8	N6	NNE5	N5	N6	NNE5	N6	N9	NNE12	NNE11	N16	NNE15	NNE16	NNE15	NNE13	NNE15	NNE15	NNE14	NNE15	N10	NNE5	NW1	W6	W6	NNE9.1	N16
13-May	WSW5	SW4	SW6	SW8	SSW8	SSW7	SSW6	SE5	NNE2	WSW6	W5	W7	WSW10	WNW6	NW9	NW9	NNW6	NNW9	NNE7	ENE6	NE6	NNE6	N6	NNW5	WNW2.8	WSW10
14-May	WNW5	S2	SSW3	SW5	SSW4	SSW4	SSE3	S4	SSE6	ESE3	ENE5	NNE5	NNW6	N6	N7	NNE5	NNE8	NNE10	NNE11	NNE10	NNE7	SSW2	SW6	W7	NNE1.6	NNE11
15-May	W3	SW5	S5	SSW7	S8	S8	S7	S7	S9	S10	SSW7	SE2	NE5	SE8	SSE8	SSE11	S10	S13	SSE14	SSE11	S10	S10	SSW9	SW7	S7.1	SSE14
16-May	SW3	SSW5	SSW8	SSW6	S8	S8	S10	SSW10	SSW11	SSW12	SSW11	SSW15	S16	S16	S11	SE11	SE11	ESE10	ESE9	E8	ESE6	N4	N5	NNW6	S6.7	S16
17-May	WNW3	SW5	SSW7	SSW9	SSW9	S9	SSW9	SW10	SW8	WSW8	NW6	E2	ESE2	WSW1	WSW11	WSW8	SW8	WSW7	NNE9	N9	N7	NNW5	NW6	WSW5	WSW3.6	WSW11
18-May	SW7	SSW8	SW8	SSW9	SSW13	SSW11	SSW11	SSW11	SSW13	SSW13	SW10	SW14	SW15	SW14	SW14	WSW14	WSW10	SW8	NNE10	N19	N22	N18	N19	N21	WSW4.8	N22
19-May	N21	N20	N20	N20	N20	N18	N19	NNE18	NNE21	NNE24	NNE22	NNE24	NNE25	NNE24	NNE23	NNE25	NNE28	NNE24	N25	N25	N24	N21	NNE22	NNE19	NNE22.1	NNE28
20-May	NNE18	NNE19	NNE20	NNE19	NNE18	NNE18	NNE19	NNE18	NNE16	NNE16	NNE17	NE18	NNE19	NNE19	NNE20	NNE22	N20	N18	N16	N14	NNE13	NNE9	NNE7	SW1	NNE16.1	NNE22
21-May	SW2	ENE5	NNE7	NNE9	NNE9	NNE10	NNE9	NNE8	NNE13	NNE14	NNE12	NNE14	NNE16	NNE14	NNE15	NNE14	NNE12	NNE12	NNE11	NNE10	N12	N12	N9	N13	NNE10.6	NNE16
22-May	NNE11	N11	NNE12	N10	N15	N15	NNE15	NNE15	NNE19	NNE21	NNE19	NNE20	NNE20	NNE22	NNE22	NNE23	NNE22	NNE22	N22	N18	N12	N10	N11	N12	NNE16.5	NNE23
23-May	N7	N7	NNE8	N8	NE7	NNE8	NNE10	NNE11	N9	NNE10	NE15	NE14	NNE13	NNE13	NNE13	NNE12	NNE11	NE9	NNE9	NE7	ENE5	ESE5	S8	SSW7	NNE7.8	NE15
24-May	SSW6	S7	SSW7	WSW5	SSW5	SSW6	S8	S10	SSW9	S9	S12	SSE17	SSE15	SSE13	SSE13	SSW8	SSE7	SE6	SE7	SE7	SSE8	SSW11	S9	S6	S8.4	SSE17
25-May	S7	S7	S8	S8	S8	SSW4	NNE4	NE7	NE9	NNE10	NNE13	NNE12	NNE12	NNE15	N15	NNE15	NNE15	NNE14	NNE13	NNE13	NNE13	N12	NNE13	NNE14	NNE7.3	NNE15
26-May	N14	N15	N12	NNE14	N12	NNE12	NNE13	NNE14	N13	N13	N14	NNW10	NNE15	N8	N14	N15	N16	NNE12	N13	NNE13	NNE10	NNE9	NNE9	NNE9	N12.3	N16
27-May	NNE8	N8	N8	N9	N10	N10	N10	N9	NNE8	NNE5	NE1	N6	N8	N8	NW6	SSE1	WSW5	S9	SSE8	SE9	SE3	W2	W2	NE4	NNE3.7	N10
28-May	NNE3	NE5	NE5	NE4	E0	ESE3	SE6	SE7	SE6	SE4	NNW2	N4	E4	S6	S9	SSW1	SE4	SSW8	SSW7	S6	S7	S6	SSW7	SSW5	SSE2.8	S9
29-May	SW6	SSW6	SSW7	SSW7	SSW7	WSW3	SW3	WNW1	NNE3	N1	NW1	NNW3	NE3	NNE4	NW2	W3	NNE4	NNE8	NNE7	N7	NW5	N4	WNW4	WNW4	WNW1.3	NNE8
30-May	NW6	WNW4	WSW6	WSW6	NW6	N5	WNW3	WNW7	NNW5	N7	NNW7	SW4	W5	W4	NNW8	N9	NNW12	NNW14	NNW10	N11	NNE7	N6	NE5	S1	NNW5.1	NNW14
31-May	SW2	SW5	SW5	SSW5	SW3	W1	N1	N3	WNW6	NE5	ESE5	ENE2	WSW3	WNW6	WSW7	WSW4	ESE5	SSE8	SSE8	SSE7	SSE7	SSW5	SSW4	S6	SSW2.3	SSE8

NNW3.1	NW2.5	WNW1.9	WNW1.8	WNW1.4	NW0.9	NW0.8	N1.4	N2.2	N2.3	N2.8	N2.8	NNW4.0	NNW3.4	NNW4.2	N5.3	N5.2	N4.9	N5.5	N6.1	NNE5.2	N4.2	NNW3.8	NNW3.6	Diurnal Average	
N21	N20	NNE20	N20	N20	NNE18	N19	NNE18	NNE21	NNE24	NNE22	NNE24	NNE25	NNE24	NNE23	NNE25	NNE28	NNE24	N25	N25	N24	NNE21	NNE22	N21	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
CNRL Horizon - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on May 27 16:00	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 1 km/h on May 12 23:00	
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-May	1	2	1	1	2	2	2	2	3	3	5	5	5	5	4	4	4	4	3	2	1	1	3	2	5
2-May	3	2	1	2	2	1	2	1	2	2	3	3	M	3	4	3	3	3	2	1	1	2	2	1	4
3-May	1	1	1	1	2	1	2	3	2	3	3	3	3	4	5	3	5	3	4	1	3	2	1	2	5
4-May	2	2	2	1	2	2	4	1	2	2	3	4	4	6	6	6	6	7	5	4	4	4	3	4	7
5-May	4	4	3	2	2	2	3	3	3	4	5	6	6	7	6	6	5	5	5	4	3	1	1	1	7
6-May	1	2	3	2	1	2	3	2	3	5	5	5	4	5	5	5	4	4	3	1	1	2	1	2	5
7-May	1	AF	2	1	1	1	1	2	3	3	4	3	3	3	3	3	3	3	2	3	3	1	1	1	4
8-May	4	3	2	1	2	2	3	4	4	3	4	3	5	5	6	6	6	6	6	7	5	5	5	4	7
9-May	4	4	3	3	4	3	4	4	5	4	4	4	4	4	5	4	5	4	3	3	3	3	2	1	5
10-May	1	1	1	3	1	1	2	2	2	2	4	4	4	5	5	5	4	4	4	3	3	1	1	1	5
11-May	1	1	2	1	2	2	3	4	5	4	5	5	5	5	5	5	5	5	5	4	4	2	1	2	5
12-May	2	1	1	1	1	1	2	3	4	4	5	4	5	5	4	5	5	5	4	3	2	2	1	1	5
13-May	1	1	1	2	1	1	1	2	2	3	4	4	5	4	4	4	3	3	2	2	1	1	1	1	5
14-May	1	1	1	1	1	1	1	2	2	3	3	3	4	4	3	3	3	3	3	2	2	1	1	1	4
15-May	2	1	1	1	2	2	2	2	3	3	3	3	4	4	4	5	4	4	4	3	2	2	2	1	5
16-May	2	1	2	1	2	2	3	3	3	4	4	5	5	5	4	4	4	3	3	2	2	2	2	1	5
17-May	1	2	1	2	3	4	3	3	3	3	2	2	3	3	4	3	3	3	3	2	1	1	1	2	4
18-May	1	2	3	3	3	3	3	3	4	4	4	5	5	5	5	5	4	3	8	5	6	5	6	5	8
19-May	5	5	5	5	5	5	5	5	6	6	6	7	8	7	6	7	7	6	6	6	6	5	5	5	8
20-May	5	5	5	5	4	4	4	4	4	4	5	4	5	5	5	6	5	5	4	4	3	2	2	2	6
21-May	2	2	2	2	2	3	2	2	3	4	4	4	4	4	4	4	3	3	3	2	3	3	2	3	4
22-May	3	3	3	2	4	4	4	4	5	5	5	6	5	6	6	6	6	6	6	5	3	2	2	3	6
23-May	2	1	2	1	1	2	2	3	3	3	5	4	4	5	5	4	4	3	3	2	1	2	1	1	5
24-May	1	1	1	1	1	1	2	3	3	3	4	5	5	5	4	3	2	2	2	2	3	2	1	1	5
25-May	1	1	2	2	1	2	2	2	3	3	4	4	3	4	4	4	4	4	3	3	3	3	3	3	4
26-May	3	4	3	3	3	4	4	4	4	3	3	3	4	4	4	4	4	3	3	3	3	2	2	2	4
27-May	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	9	2	6	3	3	3	2	2	1	9
28-May	1	1	1	2	2	2	3	2	2	2	2	2	2	3	4	2	3	3	2	1	1	2	1	1	4
29-May	1	1	2	2	3	2	1	2	2	2	2	1	1	2	1	1	2	2	2	2	1	1	1	1	3
30-May	1	1	1	1	1	2	1	2	2	2	3	2	3	2	2	3	4	4	3	3	1	2	1	1	4
31-May	1	1	2	1	1	1	2	1	3	2	2	2	3	3	3	3	3	3	3	2	1	1	2	1	3
	5	5	5	5	5	5	5	5	6	6	6	7	8	7	6	9	7	7	8	7	6	5	6	5	

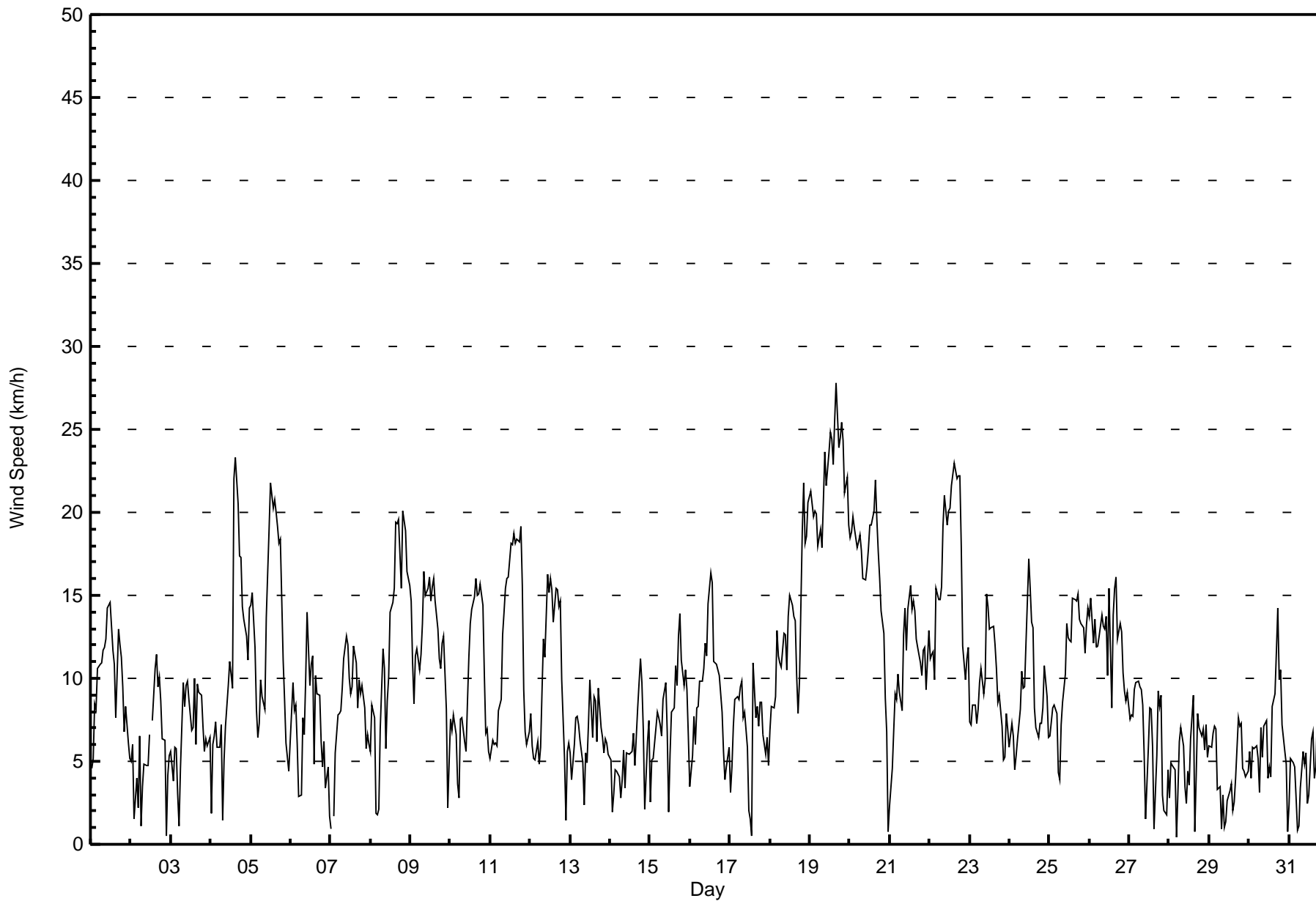
Diurnal Maximum

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	153	20.62	20.62
6 - 11	355	47.84	68.46
12 - 19	189	25.47	93.94
20 - 28	45	6.06	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	15	12	5	5	8	8	4	7	17	18	10	9	9	6	8	153
6 - 11	55	44	11	7	3	8	13	14	46	48	24	19	19	16	13	15	355
12 - 19	29	82	6	0	0	1	0	5	9	7	11	3	7	21	6	2	189
20 - 28	12	23	0	0	0	0	0	0	0	0	1	0	1	7	1	0	45
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	108	164	29	12	8	17	21	23	62	72	54	32	36	53	26	25	742

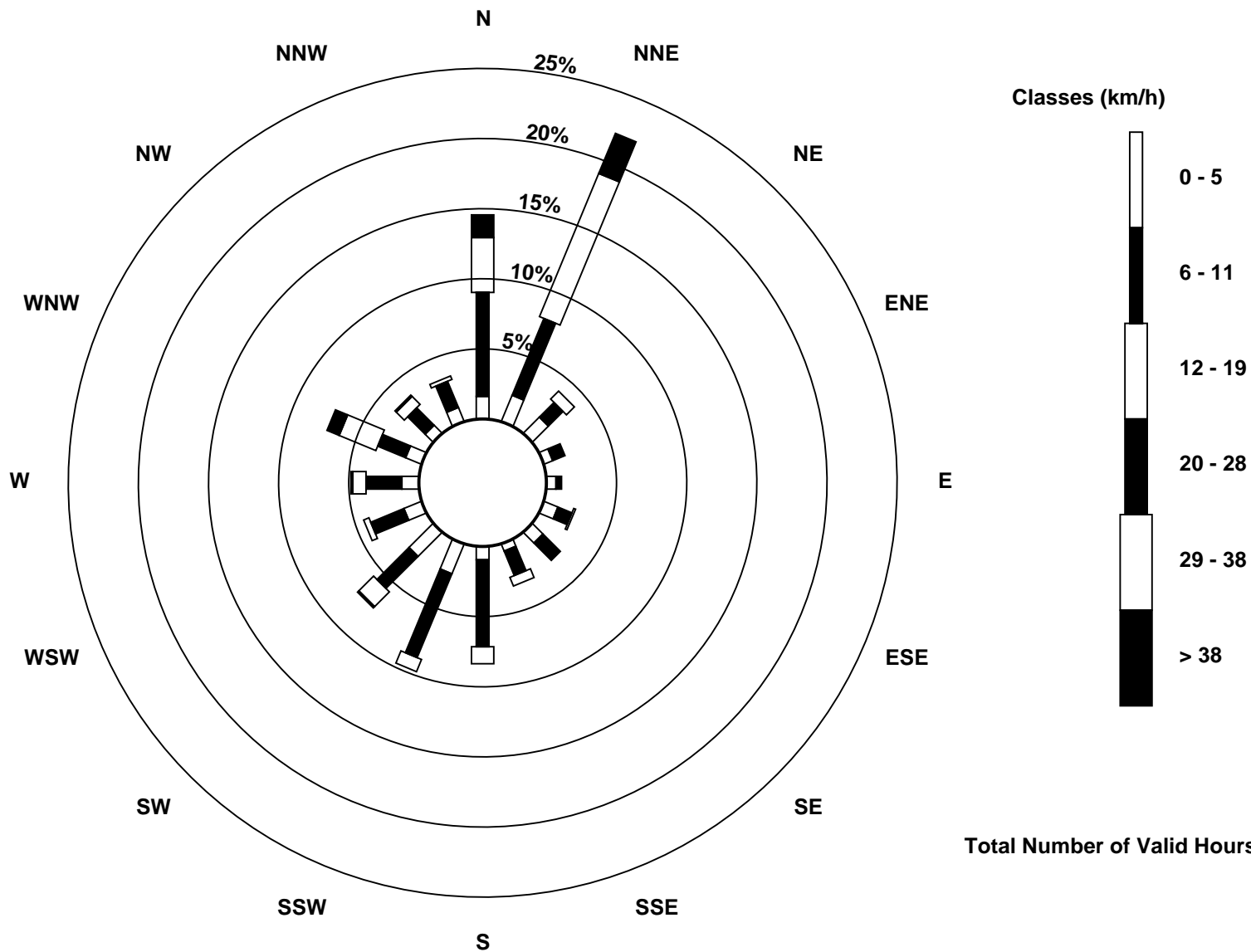
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - May 2016

Direction of Maximum Speed: 18 deg on May 19 17:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 11.9 deg on May 19	Hours of Data: 742
Direction of Minimum Speed: 96 deg on May 28 05:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.3 deg on May 29	Percent Operational Time: 99.7
Monthly Average Direction: 260.6 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-May	231	214	208	189	199	190	184	178	179	182	195	224	219	217	242	231	281	303	297	317	305	293	282	225	226.6
2-May	237	247	258	219	145	216	49	17	42	26	83	95	M	106	75	63	71	71	85	104	123	100	353	135	86.5
3-May	78	67	125	134	150	116	176	173	186	174	178	161	171	169	225	260	204	207	202	202	268	337	348	340	186.6
4-May	308	236	235	210	203	182	198	120	140	166	199	227	229	267	288	297	283	281	278	283	282	276	274	295	263.4
5-May	290	292	307	295	281	259	264	279	293	294	291	285	290	279	289	295	305	303	310	337	3	358	350	279	296.2
6-May	219	238	257	247	217	298	313	309	313	289	289	299	315	292	282	319	296	291	242	221	184	212	177	231	274.4
7-May	210	AF	163	208	200	199	201	191	187	190	185	163	136	120	111	104	64	9	33	10	17	4	359	10	137.6
8-May	342	4	313	49	348	183	231	253	262	200	217	223	236	233	224	214	223	214	251	295	318	315	295	299	259.5
9-May	300	274	261	274	275	269	267	273	280	297	297	291	304	294	293	296	302	301	284	311	12	19	330	232	292.4
10-May	240	250	237	261	16	351	5	41	8	48	43	31	17	14	26	38	37	26	33	39	38	27	2	349	21.0
11-May	330	351	358	5	356	3	10	16	15	11	25	20	21	27	25	27	26	24	17	29	38	28	356	334	17.5
12-May	354	354	21	1	10	15	10	10	23	21	3	33	27	26	20	21	13	14	15	9	22	310	272	260	12.9
13-May	254	229	232	232	213	202	192	138	13	241	277	273	258	303	314	321	338	341	28	61	44	12	355	332	291.7
14-May	295	186	201	214	213	203	162	189	162	106	60	29	335	10	3	13	25	29	20	27	32	195	233	268	11.3
15-May	275	214	175	192	191	188	186	177	187	191	193	136	37	129	148	155	182	171	165	167	180	187	193	216	177.8
16-May	234	206	192	194	184	181	185	199	196	192	196	199	189	190	184	136	131	121	118	101	113	352	3	348	175.8
17-May	301	214	201	194	208	181	208	220	233	251	326	80	123	258	243	250	234	243	13	9	1	335	304	256	244.2
18-May	218	207	218	213	208	207	206	199	213	211	223	231	214	219	224	238	238	227	21	11	9	10	10	7	243.2
19-May	10	8	6	7	6	9	10	12	18	13	13	13	15	13	16	15	18	12	10	11	10	11	13	14	11.9
20-May	14	12	15	15	15	16	15	21	32	33	27	34	21	14	20	13	6	359	359	8	21	28	19	224	16.8
21-May	233	58	18	23	19	20	27	25	16	18	19	21	12	19	24	18	15	24	23	12	4	7	6	10	17.4
22-May	18	11	14	1	358	7	17	26	22	14	18	18	14	15	16	13	26	16	9	6	2	355	354	358	12.6
23-May	10	360	15	9	35	31	33	32	7	30	48	41	24	24	27	23	29	37	32	37	66	122	178	195	31.5
24-May	192	190	196	254	201	193	175	179	192	182	181	165	167	163	167	192	166	127	131	138	159	193	191	190	175.9
25-May	180	182	187	188	183	200	32	55	42	28	16	21	20	23	23	10	12	32	28	26	21	11	14	17	26.2
26-May	9	11	2	12	359	14	22	18	7	2	0	338	15	354	358	4	9	14	7	16	29	22	13	12	8.8
27-May	27	8	9	9	6	8	10	9	17	24	35	0	350	10	322	163	239	174	164	128	130	269	266	36	14.4
28-May	14	47	54	40	96	114	140	128	136	136	331	7	88	171	179	192	130	205	204	191	174	176	199	210	156.7
29-May	225	200	204	212	200	246	215	282	20	357	315	327	39	30	307	262	27	27	15	356	319	356	296	296	302.6
30-May	326	302	252	256	316	5	294	291	330	1	339	231	265	273	343	358	333	333	347	5	19	10	48	175	332.3
31-May	217	221	220	197	231	275	1	2	302	35	113	78	243	287	254	245	118	161	166	159	168	199	212	172	196.8

320.5 311.7 298.7 289.4 287.8 313.8 332.6 358.8 354.0 357.1 350.7 352.3 347.3 348.6 340.9 350.7 353.1 355.1 3.9 9.6 12.2 353.0 337.2 328.7
 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

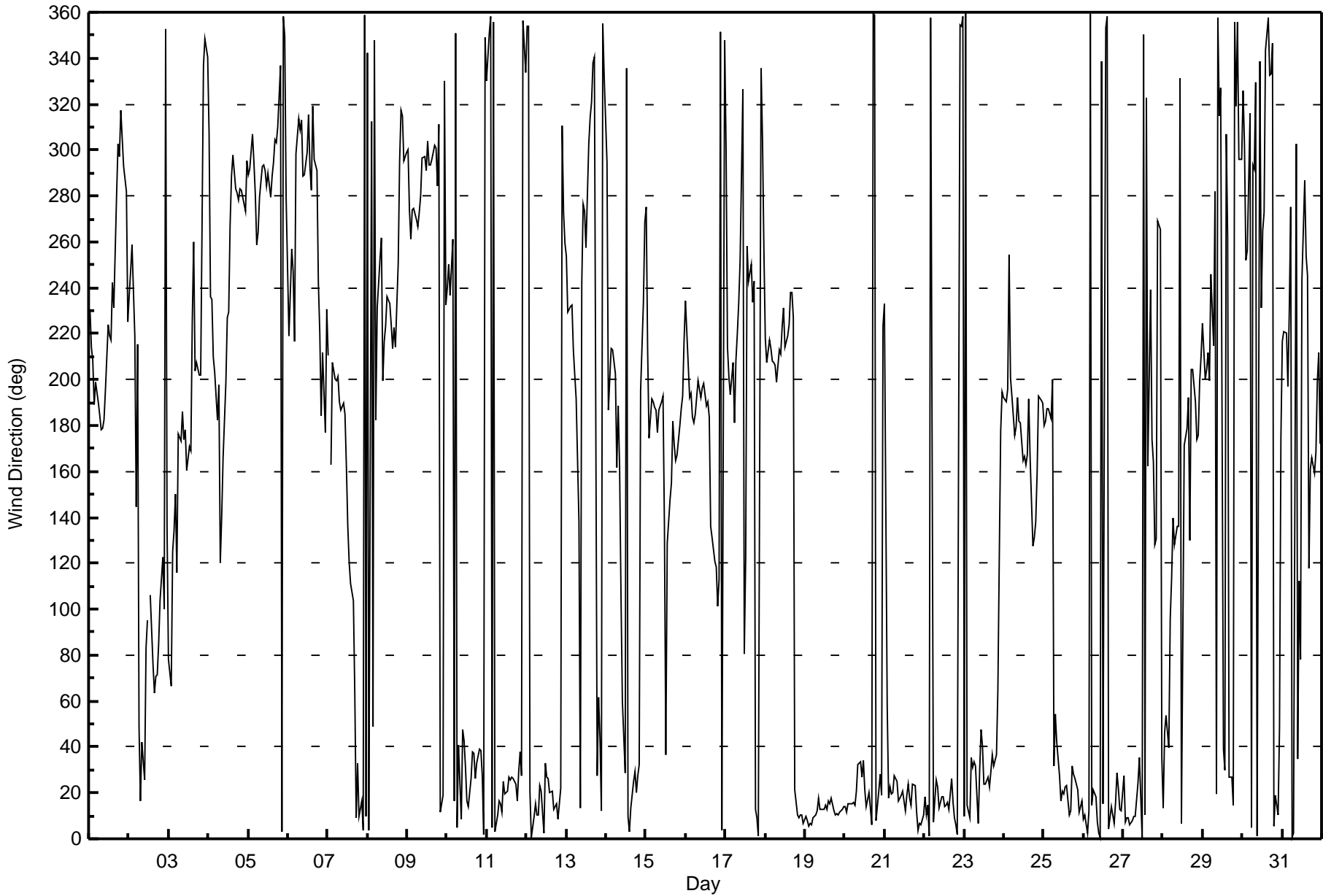
Wind Direction (WD) - deg
CNRL Horizon - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on May 17 14:00		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																							
Minimum Value: 7 deg on May 6 21:00																									
Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 19 Median = 22 Q ₃ = 31 P ₉₀ = 51 P ₉₉ = 90																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	12	23	10	11	14	13	15	15	18	23	24	30	31	35	35	50	27	22	19	17	12	8	24	23	50
2-May	51	29	80	41	74	12	78	32	40	48	53	46	M	60	36	25	35	20	18	15	16	91	42	22	91
3-May	19	29	11	10	35	49	15	21	27	22	27	34	49	49	49	51	39	30	18	15	53	29	15	15	53
4-May	84	27	21	16	15	24	23	68	37	27	34	34	38	53	20	17	20	20	18	19	19	19	16	16	84
5-May	17	18	16	14	15	19	21	21	29	24	23	27	24	25	25	20	24	17	17	35	18	14	16	38	38
6-May	9	15	39	24	22	56	53	27	34	38	31	44	38	40	90	43	39	35	32	19	7	67	35	63	90
7-May	67	AF	30	15	11	12	14	17	18	20	21	27	32	26	27	26	37	19	20	22	24	22	19	21	67
8-May	49	39	19	76	85	83	21	23	28	23	31	27	27	29	27	26	24	23	37	17	18	17	19	18	85
9-May	19	22	26	19	22	22	22	23	21	20	20	20	20	22	19	20	21	22	20	20	19	20	57	10	57
10-May	12	19	13	52	32	34	28	25	40	60	44	29	30	28	27	21	24	24	20	16	16	13	13	9	60
11-May	18	12	15	11	14	19	21	22	26	25	27	29	23	23	22	22	21	22	20	19	15	21	15	27	29
12-May	14	13	15	11	12	13	17	21	23	34	25	27	30	27	34	27	26	27	22	19	14	74	21	14	74
13-May	14	32	20	12	9	10	15	32	80	63	88	56	48	67	63	38	46	36	23	25	21	17	12	16	88
14-May	27	52	16	10	10	23	28	42	42	82	60	64	69	68	51	69	45	33	21	18	12	77	20	13	82
15-May	51	12	16	9	12	15	18	26	24	26	55	96	75	56	54	39	46	22	17	15	14	13	14	9	96
16-May	40	14	13	18	14	14	17	24	25	24	29	28	30	27	38	31	31	25	21	19	16	50	26	9	50
17-May	31	13	12	14	17	23	22	21	34	28	45	83	95	104	32	47	41	34	45	17	15	20	20	30	104
18-May	12	12	20	13	15	18	18	22	20	25	32	30	27	26	29	30	29	30	84	21	20	21	21	21	84
19-May	20	20	21	21	22	21	22	21	20	20	21	20	21	21	21	19	20	20	20	20	21	20	19	18	22
20-May	19	19	18	18	19	20	18	20	22	21	23	23	21	23	21	21	23	24	21	21	18	19	18	90	90
21-May	46	25	18	17	17	19	19	20	19	21	23	20	21	23	21	19	19	19	19	19	19	20	19	19	46
22-May	20	19	20	21	20	21	20	19	20	20	22	21	22	22	21	23	21	22	22	20	19	17	18	20	23
23-May	17	14	17	14	18	17	21	21	28	30	24	27	27	28	33	31	35	32	22	21	21	19	15	11	35
24-May	20	10	10	24	24	16	19	21	29	34	34	26	25	32	26	31	30	22	22	19	26	17	18	15	34
25-May	8	8	13	13	12	26	62	24	28	29	25	26	25	24	24	23	23	18	20	18	19	20	19	20	62
26-May	19	20	20	19	20	21	21	21	24	22	21	24	24	32	21	22	21	21	21	18	18	19	19	21	32
27-May	16	19	18	17	19	18	18	22	23	23	91	25	29	35	40	91	31	36	23	33	67	42	63	17	91
28-May	28	16	18	24	80	45	21	22	27	29	97	47	55	33	37	87	56	30	23	19	14	18	12	16	97
29-May	16	15	13	16	24	62	26	81	46	79	74	53	32	44	55	39	46	21	20	19	18	10	19	13	81
30-May	19	30	16	16	26	21	25	27	34	22	36	47	62	36	34	25	21	21	29	20	17	21	9	80	80
31-May	49	11	10	21	32	70	90	55	45	48	50	85	80	54	38	68	47	37	23	11	10	30	52	13	90
84 52 80 76 85 83 90 81 80 82 97 96 95 104 90 91 56 37 84 35 67 91 63 90																									
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
CNRL Horizon - May 2016





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Last Calibration	April 25, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:02	End Time (MST)	11:20
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	622	622
Analyzer IP address	192.168.1.43		Lamp voltage	855	855
Calculated slope	0.997989	1.000870	Chamber temp	45.3	45.3
Calculated intercept	-0.247579	0.118386	Pressure	706.9	705.7
Analyzer Background	18.7	18.7	Flow	0.428	0.426
Analyzer Coefficient	1.012	1.012	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	808.2	1.008
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	81.5	815.0	813.9	1.001
second point	5000	40.6	406.0	406.4	0.999
third point	5000	20.2	202.0	201.0	1.005
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found 808.2 Previous response 816.9 % change 1.1%

Notes:

Sample inlet filter replaced after as founds. Filter was pretty filthy, took new "high point" average after changing the filter.
No adjustments.

Calibration Performed By: Asad Hidayat



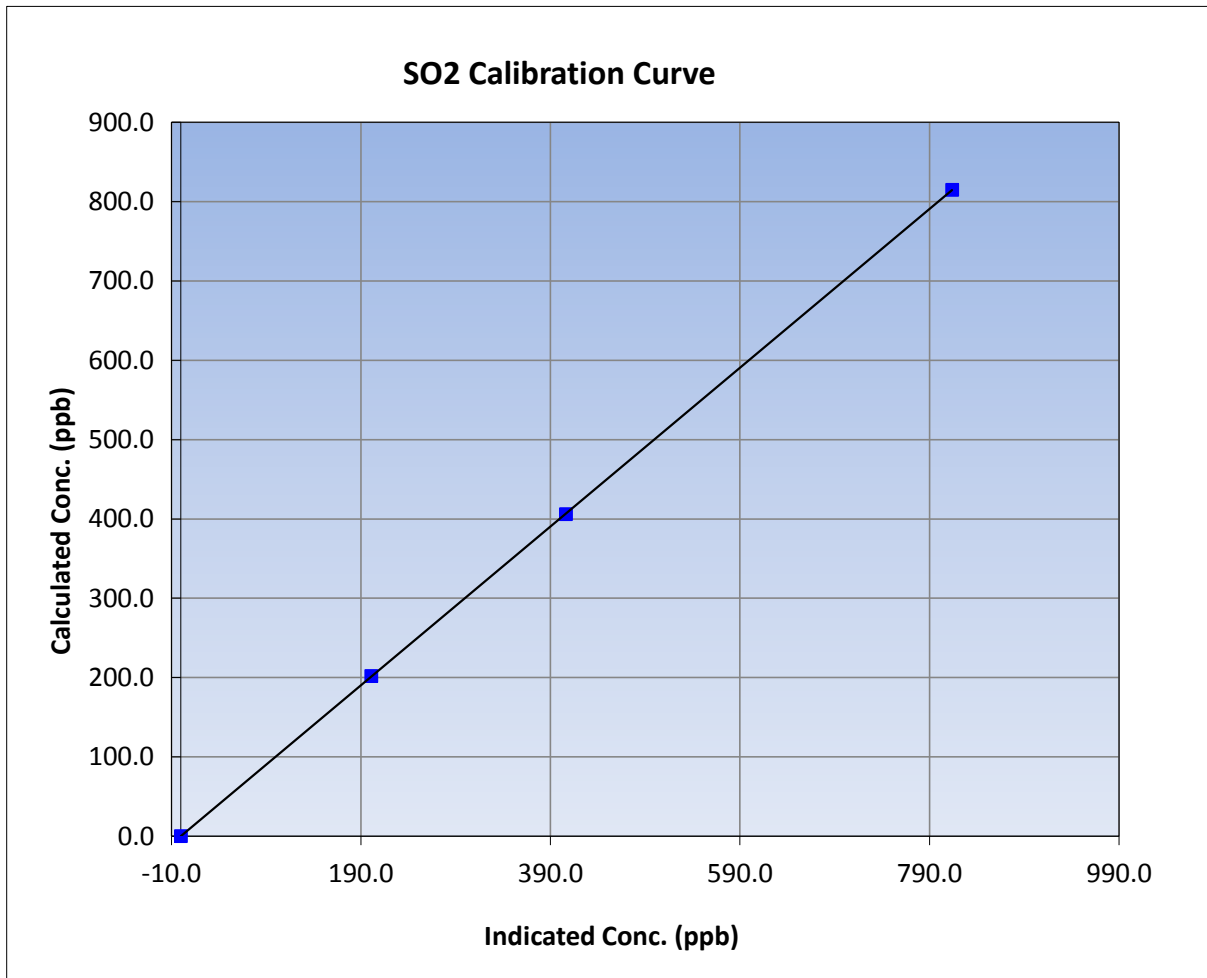
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 25, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:02	End Time (MST)	11:20
Analyzer make	Thermo 43i	Analyzer serial #	710321322

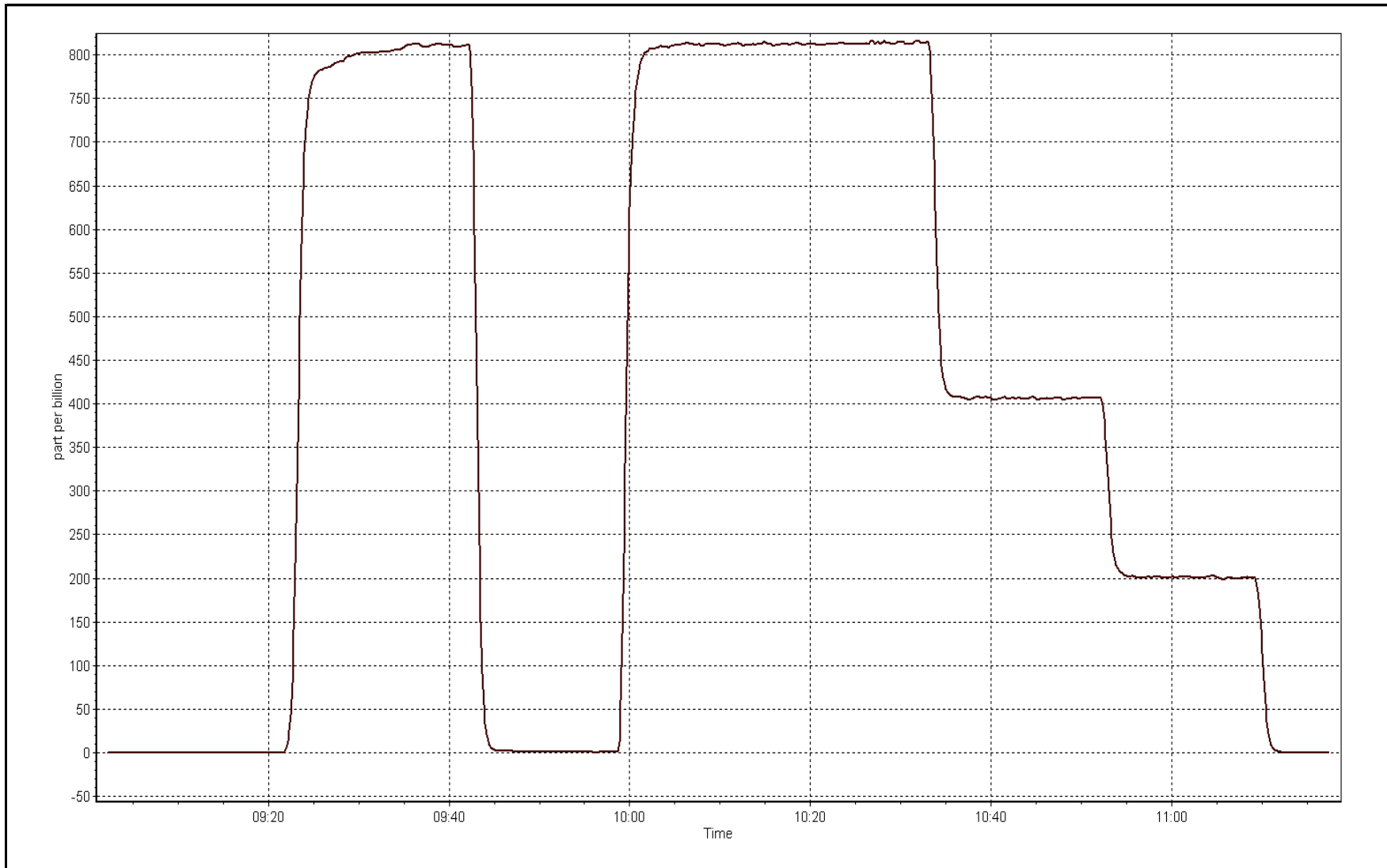
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
815.0	813.9	1.0013		
406.0	406.4	0.9989	Slope	1.000870
202.0	201.0	1.0052		
			Intercept	0.118386



SO2 Calibration Plot

Date: May 26, 2016





Wood Buffalo Environmental Association Repair TRS Calibration Report

Station Information

Calibration Date	May 25, 2016	Last Calibration	NA
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Install		
Start Time (MST)	17:00	End Time (MST)	19:30
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	NA	-684
Analyzer IP address	192.168.1.44		Lamp voltage	NA	984
Calculated slope	NA	0.992430	Chamber temp	NA	45
Calculated intercept	NA	0.134430	Pressure	NA	638.4
Analyzer Background	NA	3.21	Flow	NA	0.399
Analyzer Coefficient	NA	1.176	Intensity	NA	89
			Converter temp.	NA	800
Analyzer make/model	Thermo 43i TLE		Analyzer serial #	1151680032	
Converter make/model	CDN-101		Converter serial #	531	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	20.4	204.0	0.5	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	41.7	80.1	80.6	0.994
second point	5000	20.6	39.6	39.7	0.996
third point	5000	10.2	19.6	19.5	1.003
as left zero					
as left span					
Average Correction Factor					0.997

Corrected As found NA Previous response NA % change NA

Notes:

Replaced analyzer due to motherboard failing on the old analyzer. Could not perform as founds on the old analyzer. Adjusted zero and span on new analyzer. Sample inlet filter replaced prior to the calibration. Very short scrubber test done after 3rd point.

Calibration Performed By: _____ Asad Hidayat



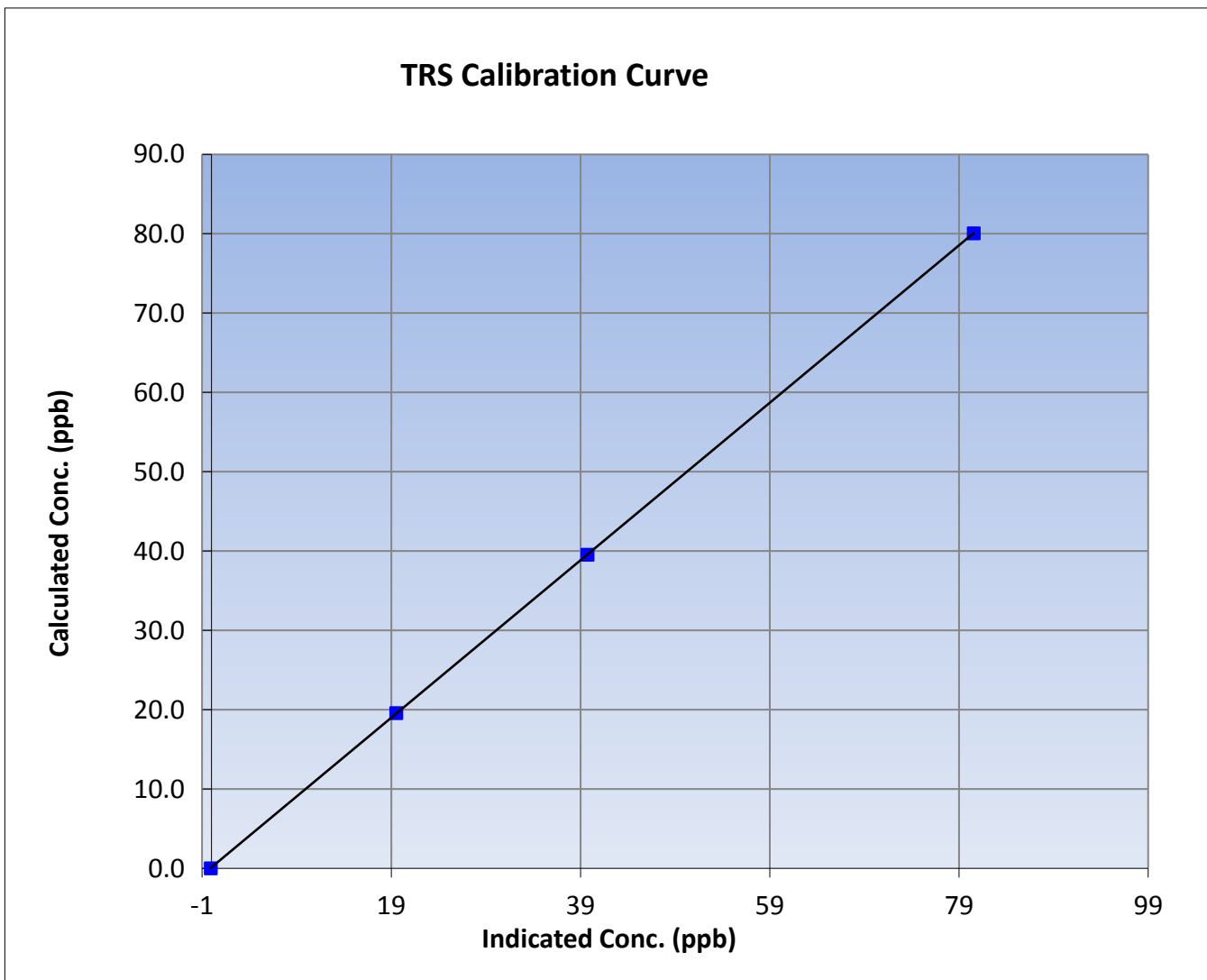
Wood Buffalo Environmental Association TRS Calibration Report

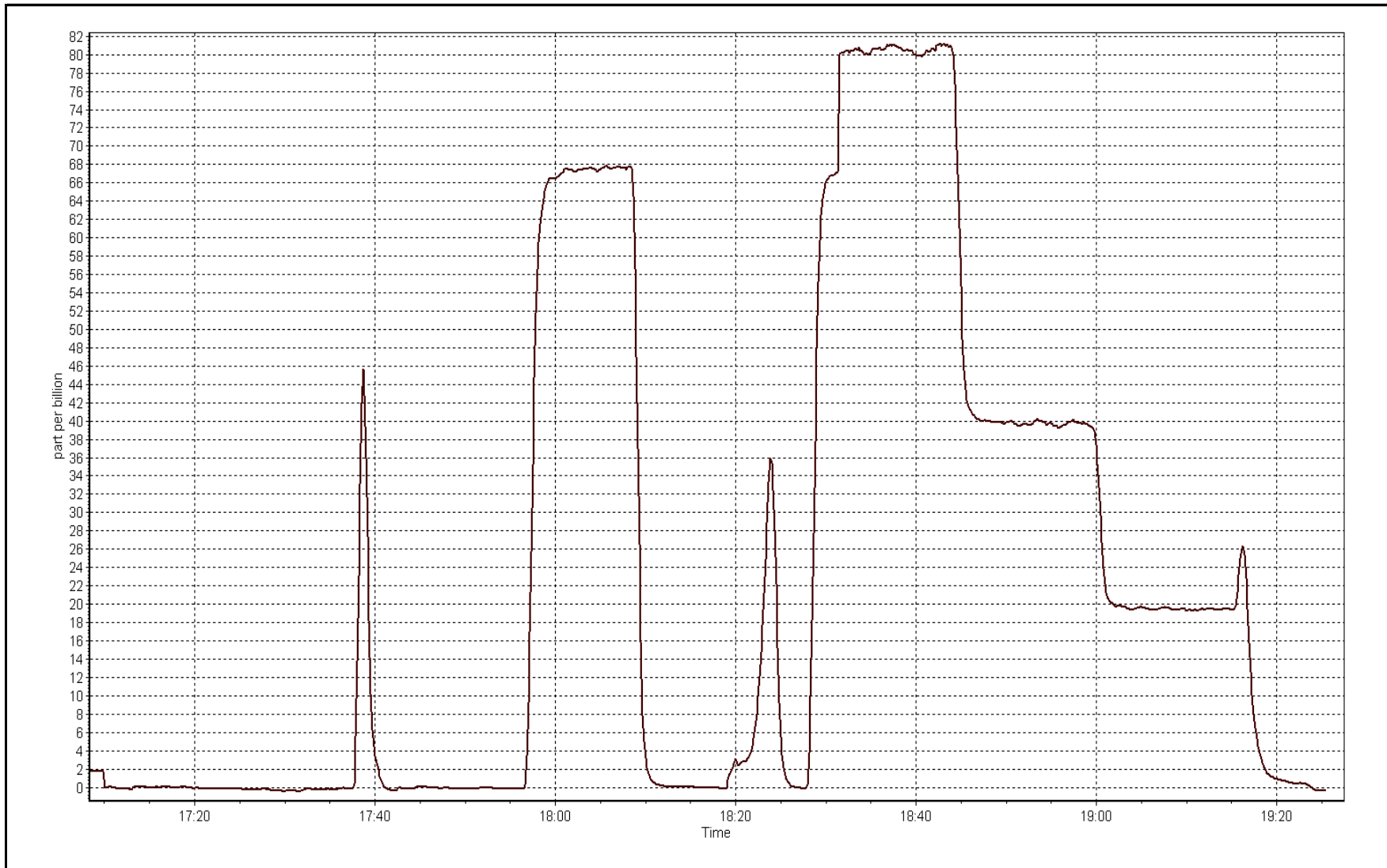
Station Information

Calibration Date	May 25, 2016	Previous Calibration	NA
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	17:00	End Time (MST)	19:30
Analyzer make	Thermo 43i TLE	Analyzer serial #	1151680032

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
80.1	80.6	0.9940		
39.6	39.7	0.9955	Slope	0.992430
19.6	19.5	1.0028		
			Intercept	0.134430







Wood Buffalo Environmental Association Repair TRS Calibration Report

Station Information

Calibration Date	May 26, 2016	Last Calibration	May 25, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	14:42	End Time (MST)	15:30
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-684	-685
Analyzer IP address	192.168.1.44		Lamp voltage	984	989
Calculated slope	0.992430	1.000312	Chamber temp	45	45
Calculated intercept	0.134430	-0.602019	Pressure	638.4	638.0
Analyzer Background	3.21	2.3	Flow	0.399	0.402
Analyzer Coefficient	1.176	1.196	Intensity	89	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i TLE		Analyzer serial #	1151680032	
Converter make/model	CDN-101		Converter serial #	531	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.9	----
as found span	5000	41.5	79.7	77.6	1.026
SO2 scrubber check	5000	20.4	204.0	0.5	----
calibrator zero	5000	0.0	0.0	0.8	----
high point	5000	41.5	79.7	80.3	0.992
second point	5000	20.6	39.6	40.1	0.986
third point	5000	10.2	19.6	19.9	0.983
as left zero					
as left span					
Average Correction Factor					0.987

Corrected As found	78.5	Previous response	80.2	% change	2.1%
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Notes:

Re-calibrating instrument to bring baseline up since it had shifted slightly negative over night. Adjusted both zero and span. Scrubber check done after 3rd point. Instrument pulling ambient air at 17:27 MST.

Calibration Performed By:

Asad Hidayat



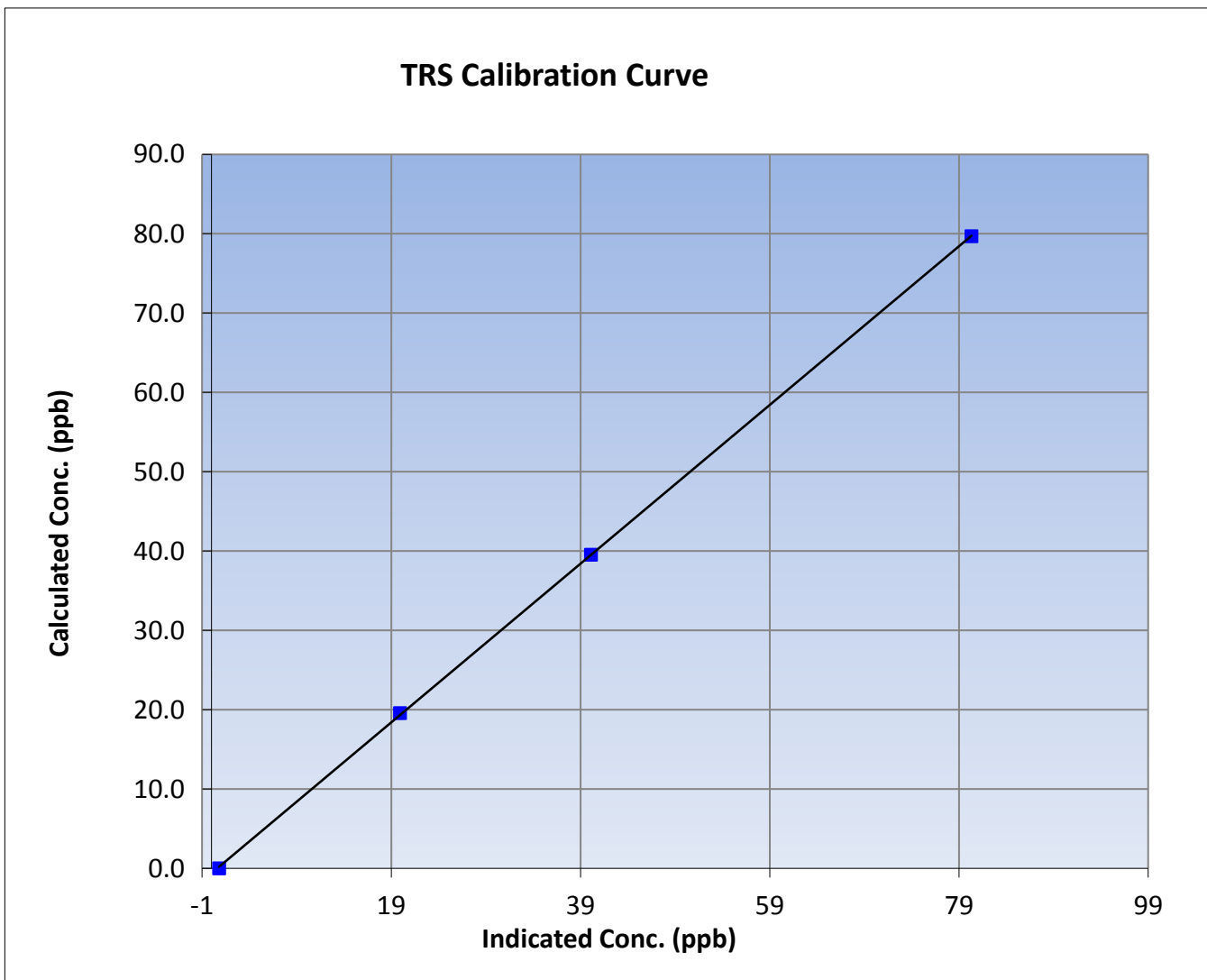
Wood Buffalo Environmental Association TRS Calibration Report

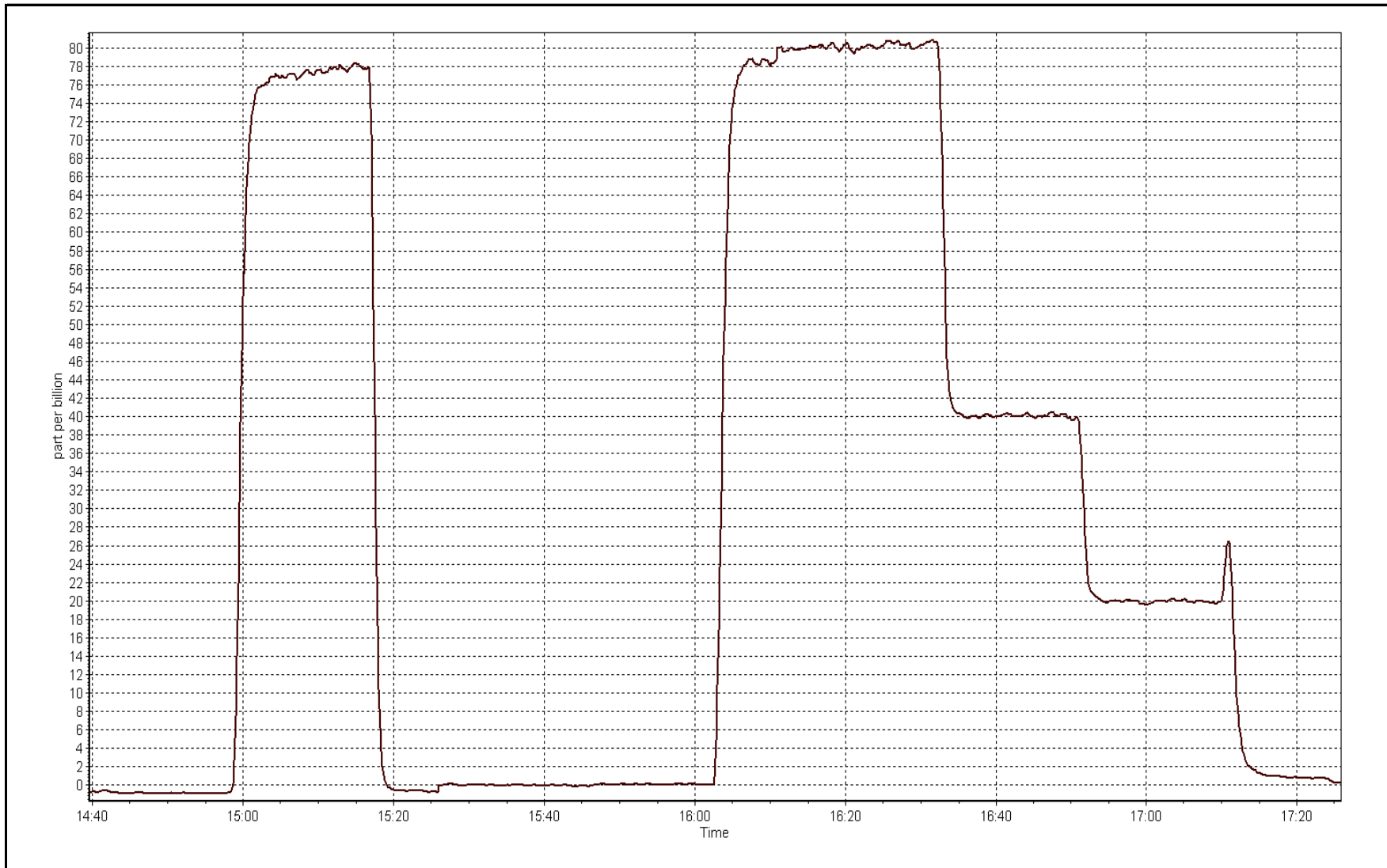
Station Information

Calibration Date	May 26, 2016	Previous Calibration	May 25, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	14:42	End Time (MST)	15:30
Analyzer make	Thermo 43i TLE	Analyzer serial #	1151680032

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	----	Correlation Coefficient	0.999966
79.7	80.3	0.9919		
39.6	40.1	0.9858	Slope	1.000312
19.6	19.9	0.9831		
			Intercept	-0.602019







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-26-16	Last Calibration	April-25-16
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:02	End Time (MST)	11:20
Gas Cert Reference	S0002486	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1046.8 ppm
C3H8 Cal Gas Conc.	197 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.7	8.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	38.0
Calculated slope	0.999873	0.998939	Fuel Pressure	26.3	26.3
Calculated intercept	-0.018927	0.003033	Analyzer Coeff	3.2	3.1
			Analyzer BKG	2.080	2.060

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.01	----
as found span	5000	81.5	17.06	17.23	0.990
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	81.5	17.06	17.07	1.000
second point	5000	40.6	8.50	8.52	0.998
third point	5000	20.2	4.23	4.23	1.000
as left zero					
as left span					
Average Correction Factor					0.999

Corrected As found	17.24	Previous response	17.08	% change	-0.9%
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Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



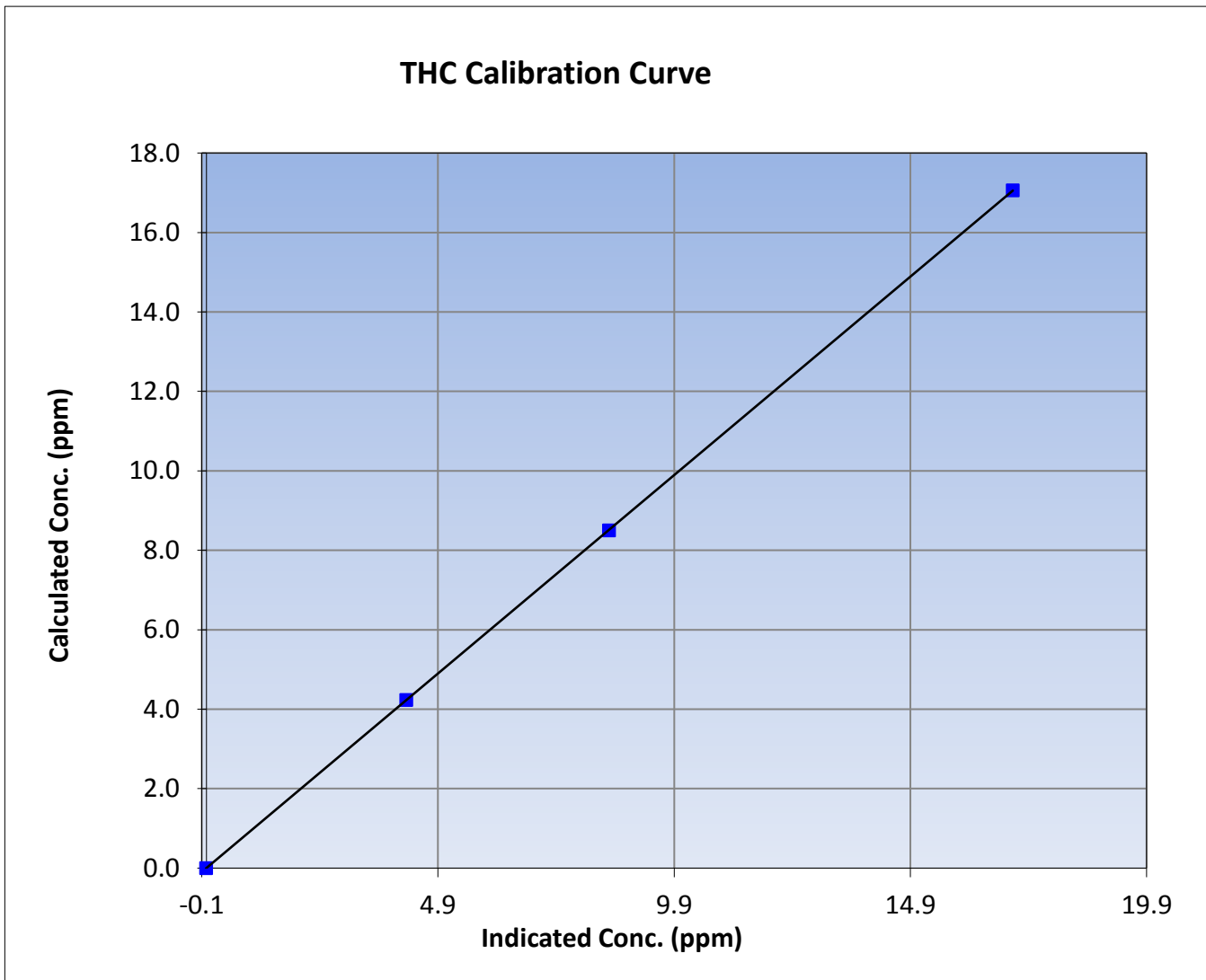
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 25, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:02	End Time (MST)	11:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

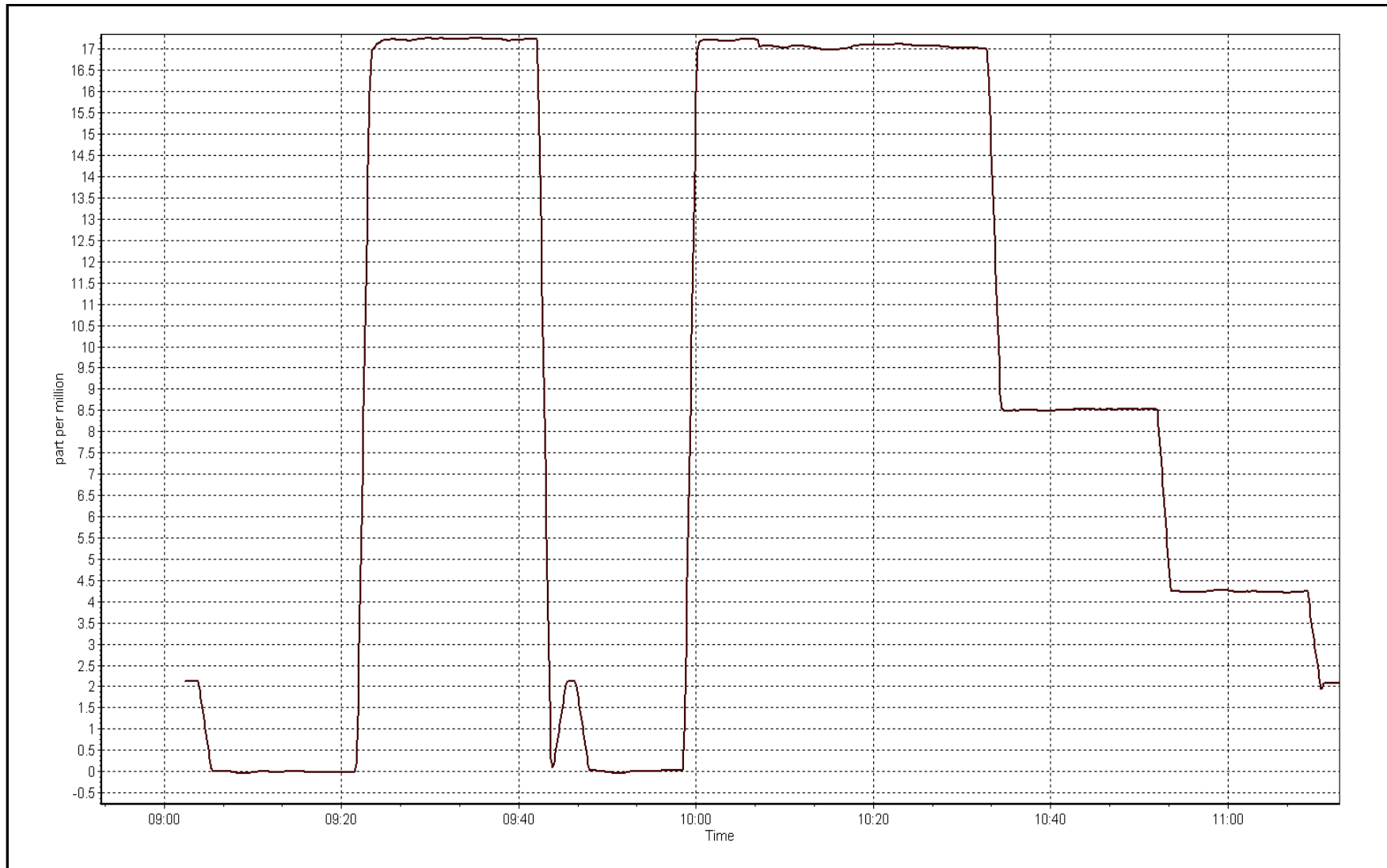
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999998
17.06	17.07	0.9995		
8.50	8.52	0.9976	Slope	0.998939
4.23	4.23	0.9997		
			Intercept	0.003033



THC Calibration Plot

Date: May 26, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:02	End Time (MST)	12:55
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002486
NOX Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	26/09/2017
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997024	0.997210	0.997029
	Data Offset	-0.638681	-0.379520	-0.339091
Current Calibration	Data Slope	0.996449	0.997457	0.996646
	Data Offset	-0.342854	0.020547	-0.272533

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	0.954		0.977	
NOX coefficient	0.999		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	11.2		11.5	
NOX bkgrnd	11.2		11.5	
Chamber Temp	49.8	Deg C	50	Deg C
Moly Temp	326.3	Deg C	326	Deg C
PMT voltage	-779.2	V	-779.2	V
PMT Temp	-2.7	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	181.2	mmHg	182.1	mmHg
R Cell Press Nox	181.5	mmHg	182.1	mmHg
NO sample flow	0.681	lpm	0.681	lpm
Nox sample Flow	0.682	lpm	0.680	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span slightly.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 26, 2016

Station Number:

AMS 15

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.3	0.2	----	----
as found span	5000	81.5	797.1	797.1	0.0	784.9	783.9	1.0	1.0155	1.0169
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.3	0.2	----	----
high point	5000	81.5	797.1	797.1	0.0	799.4	798.4	1.0	0.9970	0.9983
second point	5000	40.6	397.1	397.1	0.0	400.8	399.8	1.0	0.9907	0.9931
third point	5000	20.2	197.6	197.6	0.0	197.9	197.2	0.7	0.9981	1.0017
as left zero										
as left span										
Average Correction Factor									0.9953	0.9977

Corrected As found

NO_x= 785.1

NO= 784.2

Percent Change

NO_x= 1.9%

NO= 2.0%

Previous Response

NO_x= 800.1

NO= 799.7

GPT Calibration Data

Dilution Flow (total) 5000 ccm

Source Gas Flow 81.50 ccm

NOx ref calc conc = 797.1 ppb

NO ref calc conc = 797.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	798.1	795.8	0.2	0.9987	1.0016	----	----
1st NO2 (300)	465.0	330.8	797.4	465.0	332.4	0.9996	----	0.9953	100.5%
2nd NO2 (200)	567.9	228.0	796.4	567.9	228.5	1.0009	----	0.9976	100.2%
3rd NO2 (100)	675.2	120.6	796.9	675.2	121.7	1.0002	----	0.9910	100.9%
2nd NO ref point		0.0	795.0	792.1	2.9	1.0026	1.0063	----	----
Average Correction Factor						1.0008		0.9946	100.5%

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

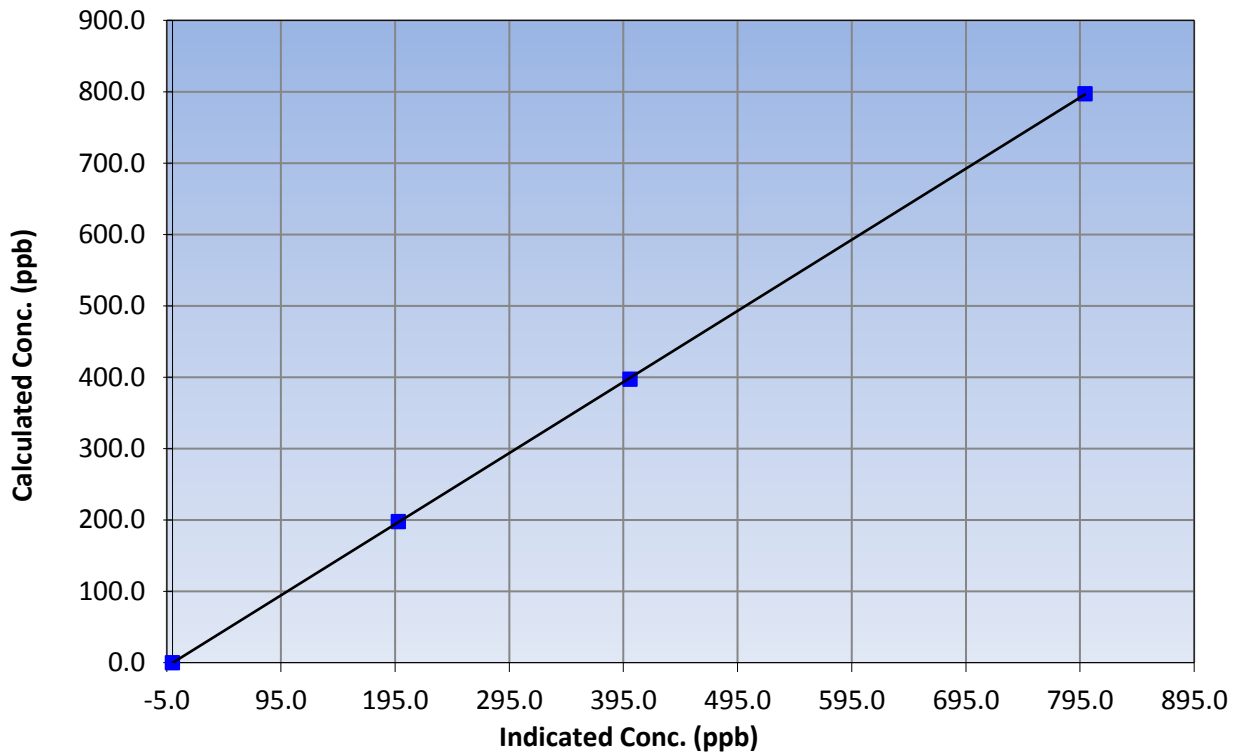
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:02	End Time (MST)	12:55
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999985
797.1	799.4	0.9970		
397.1	400.8	0.9907	Slope	0.996449
197.6	197.9	0.9981		
			Intercept	-0.342854

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

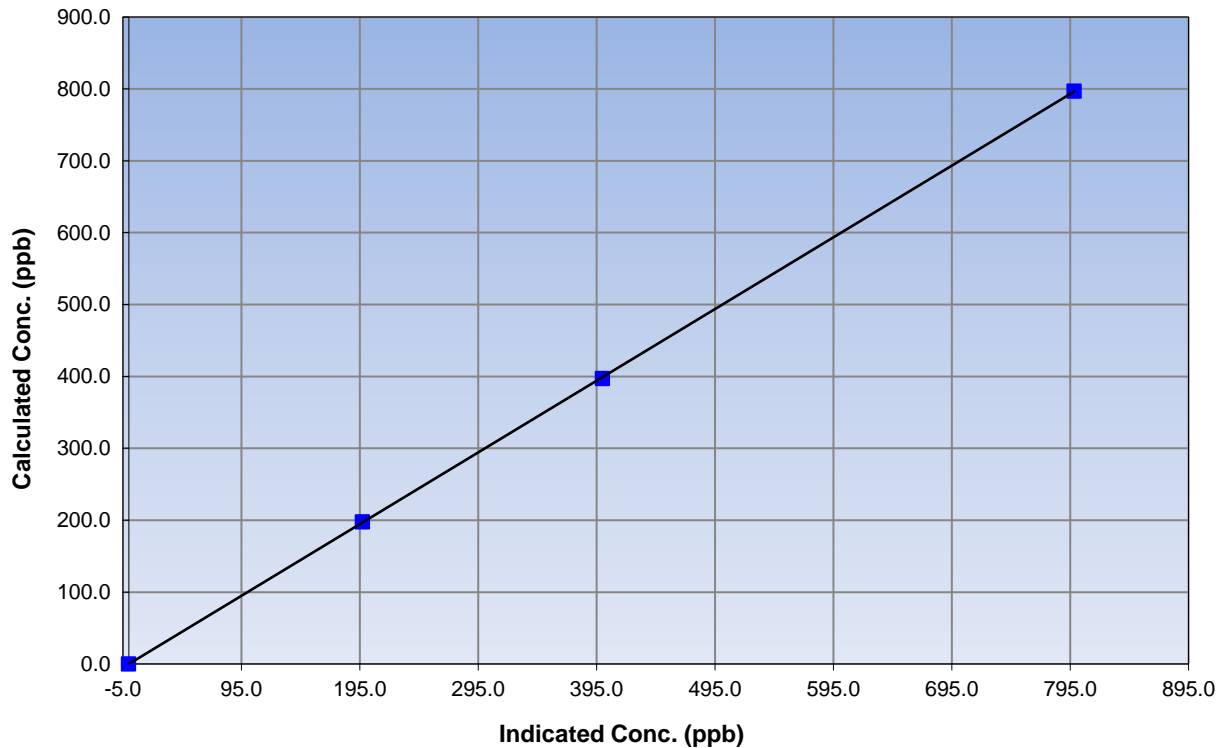
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:02	End Time (MST)	12:55
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	0.999988
797.1	798.4	0.9983		
397.1	399.8	0.9931	Slope	0.997457
197.6	197.2	1.0017		
			Intercept	0.020547

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

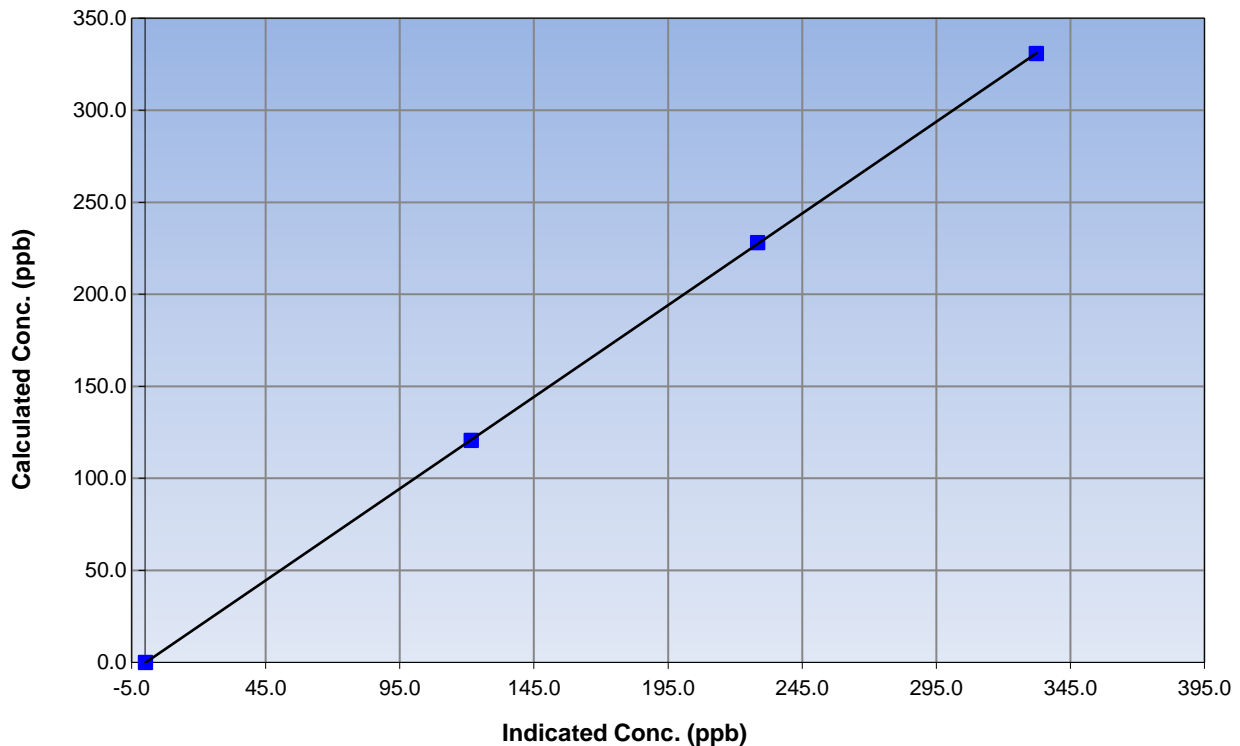
Station Information

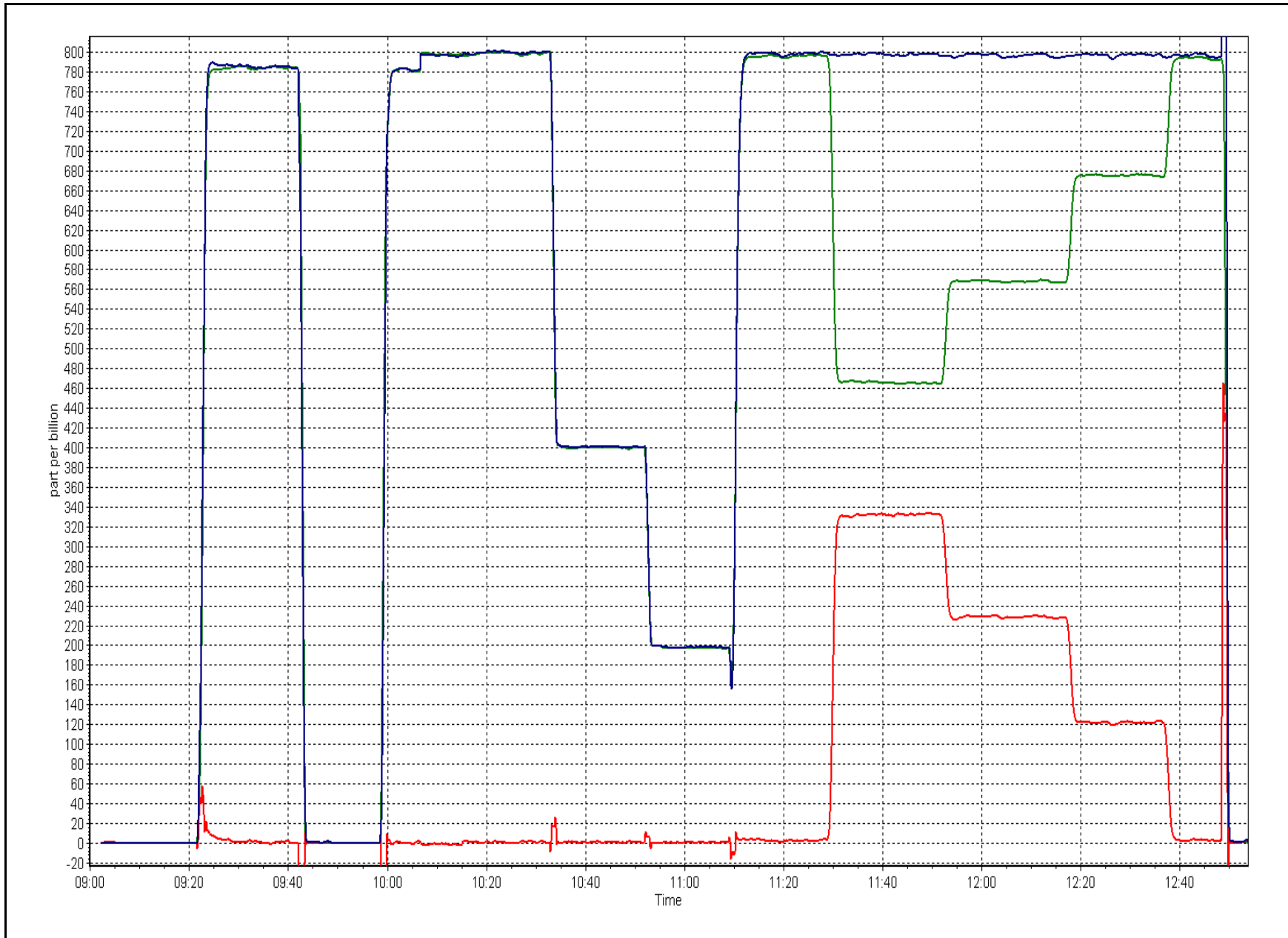
Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:02	End Time (MST)	12:55
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999992
330.8	332.4	0.9953		
228.0	228.5	0.9976	Slope	0.996646
120.6	121.7	0.9910		
			Intercept	-0.272533

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>May 26, 2016</u>	Previous Calibration:	<u>April 28, 2016</u>
Station Name:	<u>CNRL Horizon</u>	Station Number:	<u>AMS 15</u>
Start Time (MST):	<u>9:10</u>	End Time (MST):	<u>16:45</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>E-2020</u>		
C ₁₄ Source SN:	<u>7409</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	8.0	8.4	0.4	8.0
T2	23.0	na	na	23.0
T3	23.0	na	na	23.0
T4	20.0	na	na	20.0
RH (%)	34.0	na	na	34.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	975	977.0	2.0	975

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
999	997	-2	997	999

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	165		NA
Neph	1963		NA
C14	168.8		NA
Indicated Concentration (ug/m3)	54.5	NO	1.1
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	<u>April 28, 2016</u>	Previous Leak Check Date:	<u>January 13, 2016</u>
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.81		0.11
*Flow with adaptor (LPM):	16.70		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	<u>June 22, 2015</u>	Previous Foil Calibration:	NA
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1507</u>		<u>Mass foil set S/N:</u> 2022
Previous Correction Factor:	<u>7091</u>		
New Correction Factor:	<u>7029</u>		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	26/05/2016
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	Good	06/22/2015
HEPA filter	Good	15/03/2016

NOTES:

No adjustments. Cleaned cyclone head. Cleaned out nephelometer chamber due to spider getting stuck inside it. Did not adjust zero since the instrument still has not been stabilized.

Calibration Performed By: Asad Hidayat



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 16
SHELL MUSKEG RIVER
MAY 2016

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	35	37	99.73	37	0	4	0
THC (ppm) Average	709	35	35	100.00	4.8	-	3.4	-
NO2 (ppb) Average	709	35	35	100.00	50	0	16	-
NO (ppb) Average	709	35	35	100.00	73	-	34	-
NOX (ppb) Average	709	35	35	100.00	104	-	51	-
PM2.5 (ug/m3) Average	741	3	3	100.00	6070.2	-	1444.5	8
Temperature 2 m (C) Average	744	0	0	100.00	33.5	-	22.5	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	85	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.4	-	29.3	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	37	-	28	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.7	2	-	0	0	0	0	1	1	37
THC (ppm) Average	709	2.5	0.4	-	1.9	2.1	2.2	2.4	2.6	3	4.8
NO2 (ppb) Average	709	6.3	7	-	0	0	1	5	9	15	50
NO (ppb) Average	709	5.7	10	-	0	0	0	0	8	17	73
NOX (ppb) Average	709	12	15	-	0	0	1	6	17	32	104
PM2.5 (ug/m3) Average	741	82.92	471.9	-	0.6	1.8	2.8	6.2	18.2	85.2	6070.2
Temperature 2 m (C) Average	744	12.97	6.8	-	-2.1	4.9	8	11.9	17.6	22.5	33.5
Relative Humidity (%) Average	744	56.6	24	-	13	23	34	58	80	88	99
Barometric Pressure (inHg) Average	744	28.86	0.2	-	28.2	28.6	28.7	28.8	29	29.2	29.4
Wind Speed 10 m (km/h) Average	744	12.6	7	-	1	5	7	11	18	23	37
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	27 May 2016 02:00	27 May 2016 03:00	2	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 37 ppb on May 16 16:00	Maximum Daily Average: 3.7 ppb on May 16		Hours of Data:	707
Minimum Value: 0 ppb on May 6 21:00	Minimum Daily Average: 0.2 ppb on May 29		Hours of Missing Data:	37
Maximum Diurnal Average: 1.8 ppb at hour 16	Minimum Diurnal Average: 0.4 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 5		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-May	0	0	Z	0	0	0	2	2	3	4	3	1	0	0	0	0	0	1	1	1	1	1	1	0	0.9	4
2-May	1	0	0	Z	0	0	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	0	0	0.9	2
3-May	0	0	0	0	Z	0	0	0	1	5	12	19	11	7	1	1	0	1	0	1	1	1	1	1	2.8	19
4-May	2	1	1	1	1	Z	3	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1	0.8	3
5-May	Z	1	1	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
6-May	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.6	5
7-May	5	4	Z	2	2	1	1	1	2	2	2	2	2	1	2	2	1	0	1	1	1	1	1	1	1.6	5
8-May	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
9-May	1	1	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	1	0	0	0.4	1
10-May	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
11-May	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	1	0	1	1	0.4	1
12-May	0	Z	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
13-May	0	0	Z	0	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
14-May	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-May	0	0	0	0	Z	1	4	2	1	1	1	0	0	0	0	0	0	0	1	1	0	1	2	2	0.8	4
16-May	1	1	1	1	1	Z	1	1	1	2	2	1	1	2	19	37	3	2	2	1	1	1	1	1	3.7	37
17-May	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.4	1
19-May	1	0	Z	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
20-May	1	1	0	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-May	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1
23-May	Z	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0.5	1
24-May	0	Z	1	0	0	0	1	2	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0.7	2
25-May	1	1	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
26-May	1	1	0	Z	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1
27-May	0	UO	UO	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
29-May	Z	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-May	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	1	1	0	1	0.4	1
31-May	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1

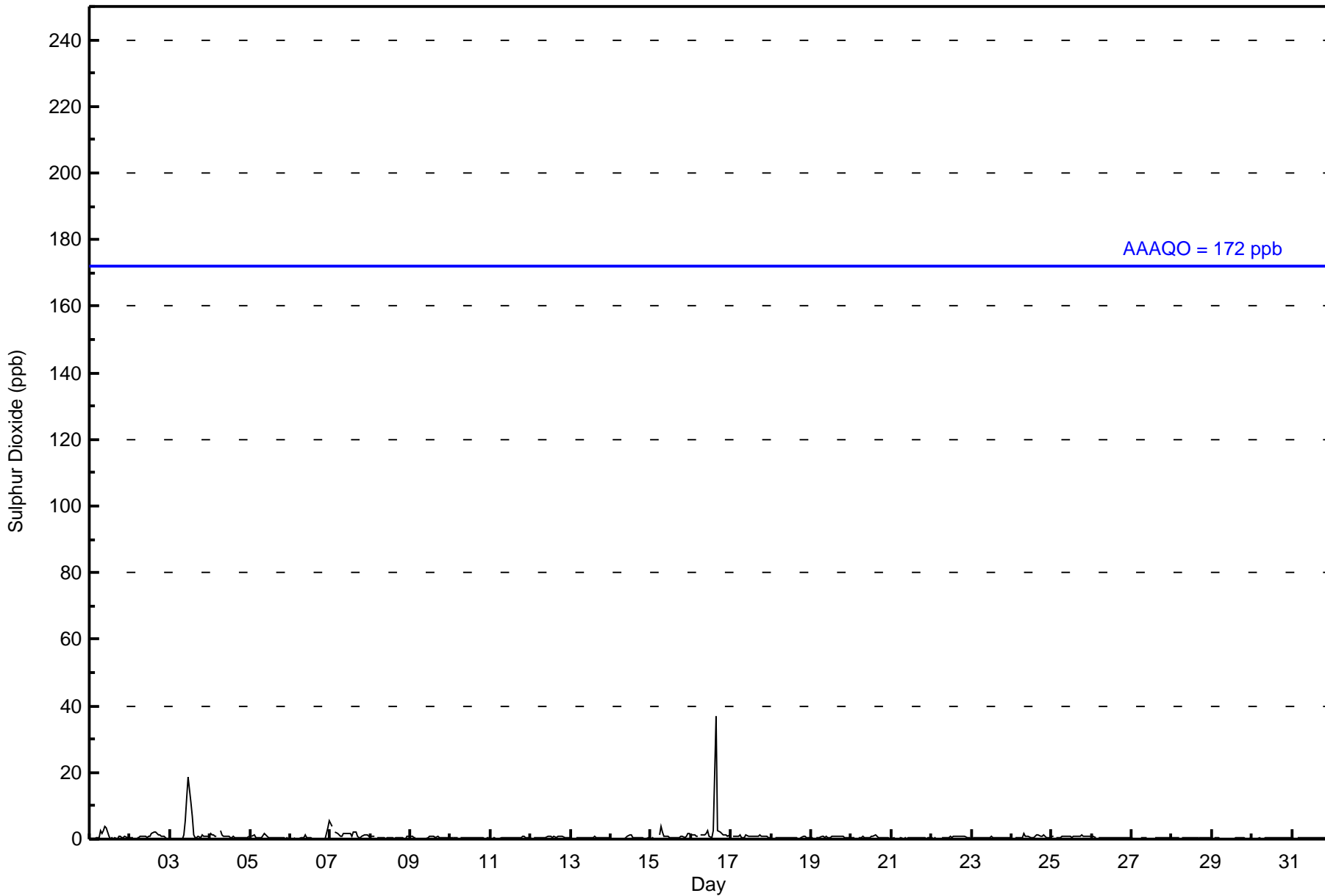
0.7	0.6	0.4	0.4	0.4	0.4	0.7	0.6	0.7	0.9	1.1	1.2	0.9	0.8	1.2	1.8	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.7	Diurnal Average	
5	4	1	2	2	1	4	2	3	5	12	19	11	7	19	37	3	2	2	1	1	1	3	5	Diurnal Maximum	

Z - zeronpan 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
Shell Muskeg River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	99.29	99.29
11 - 20	4	0.57	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	47	139	88	13	14	13	11	25	94	64	40	35	24	42	31	22	702
11 - 20	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	4
21 - 60	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	139	88	13	14	13	13	25	95	66	40	35	24	42	31	22	707

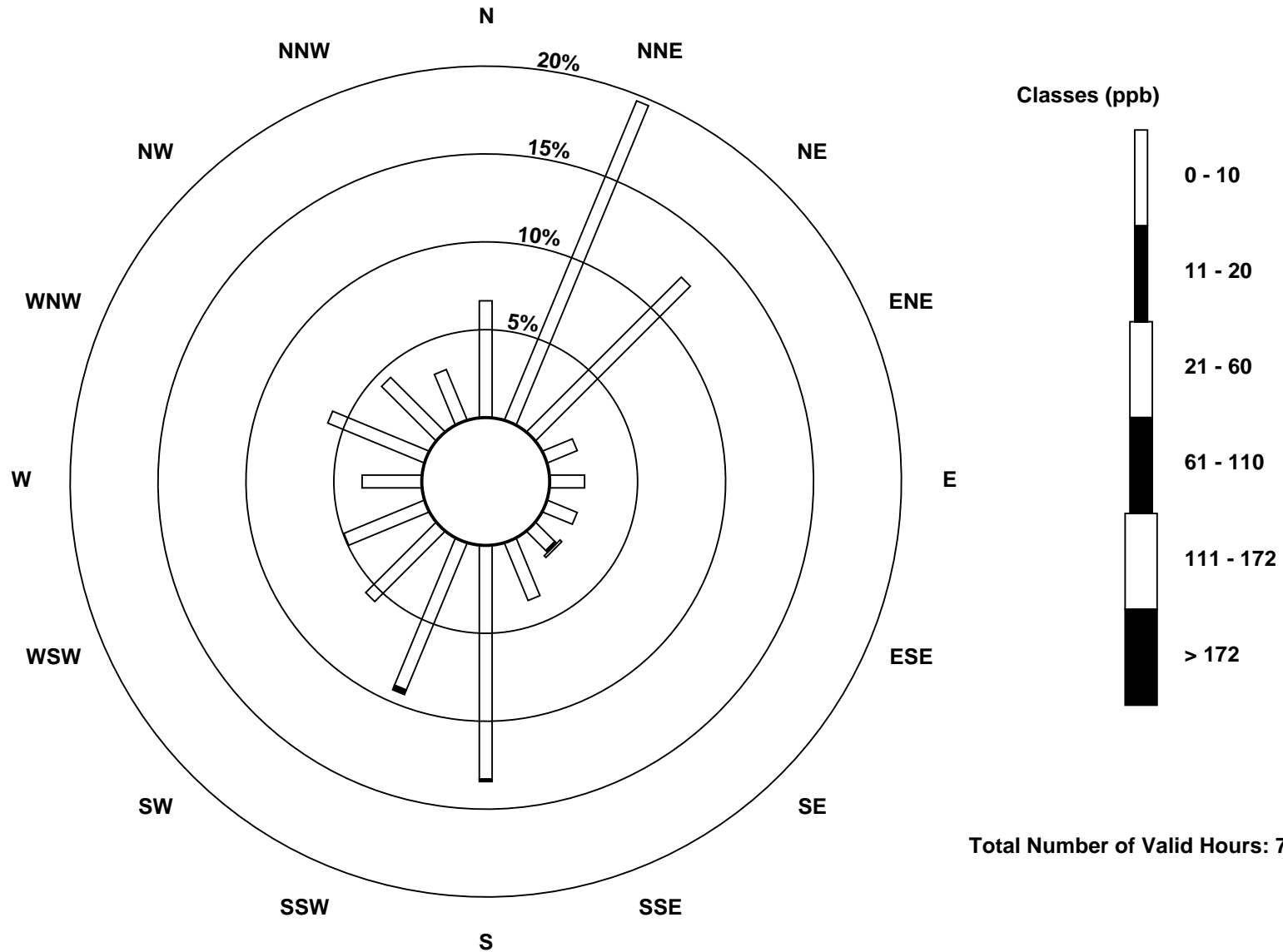
Total Number of Valid Hours: 707

Total Number of Hours: 744

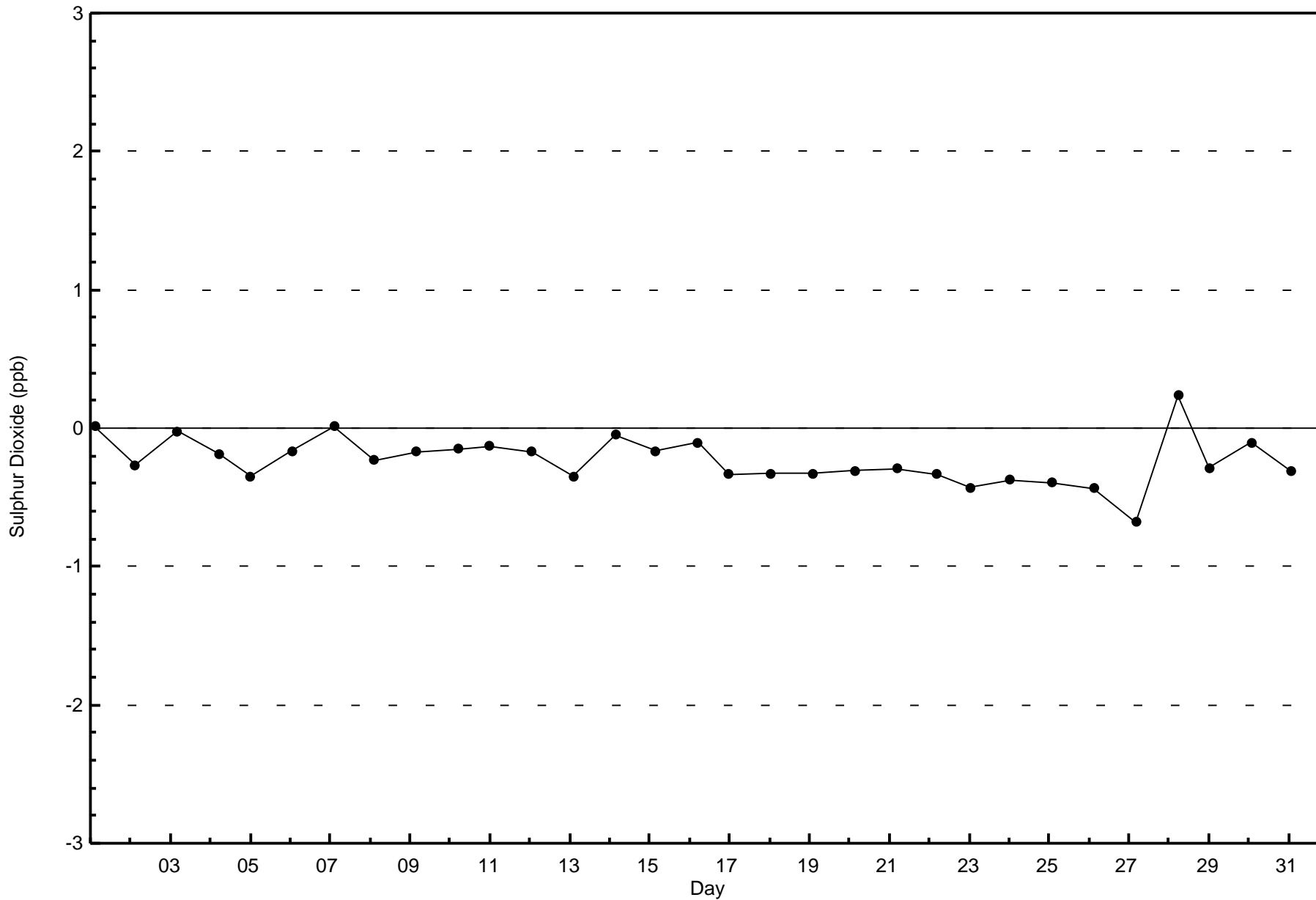


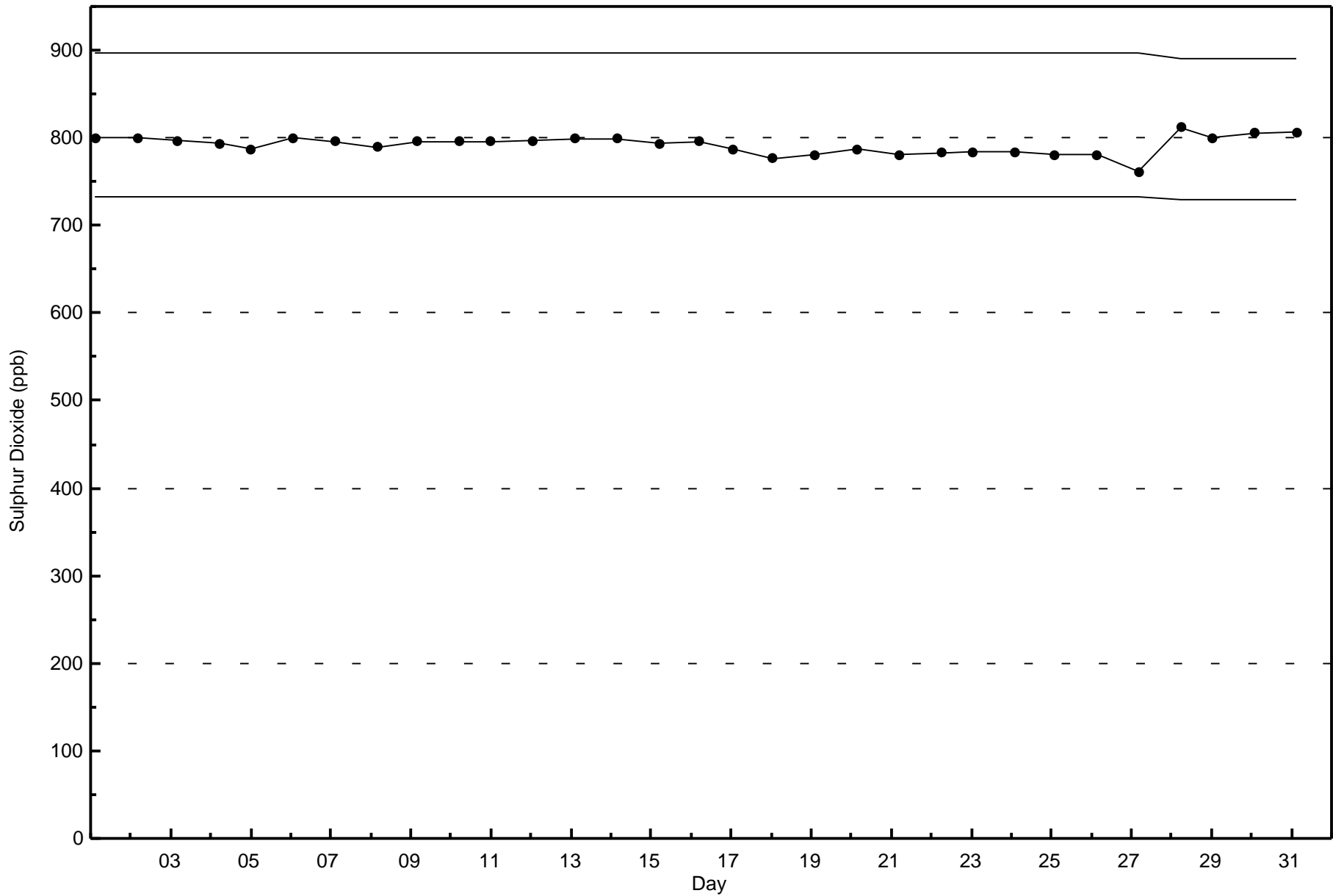
Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association
Summary of Hour Averages

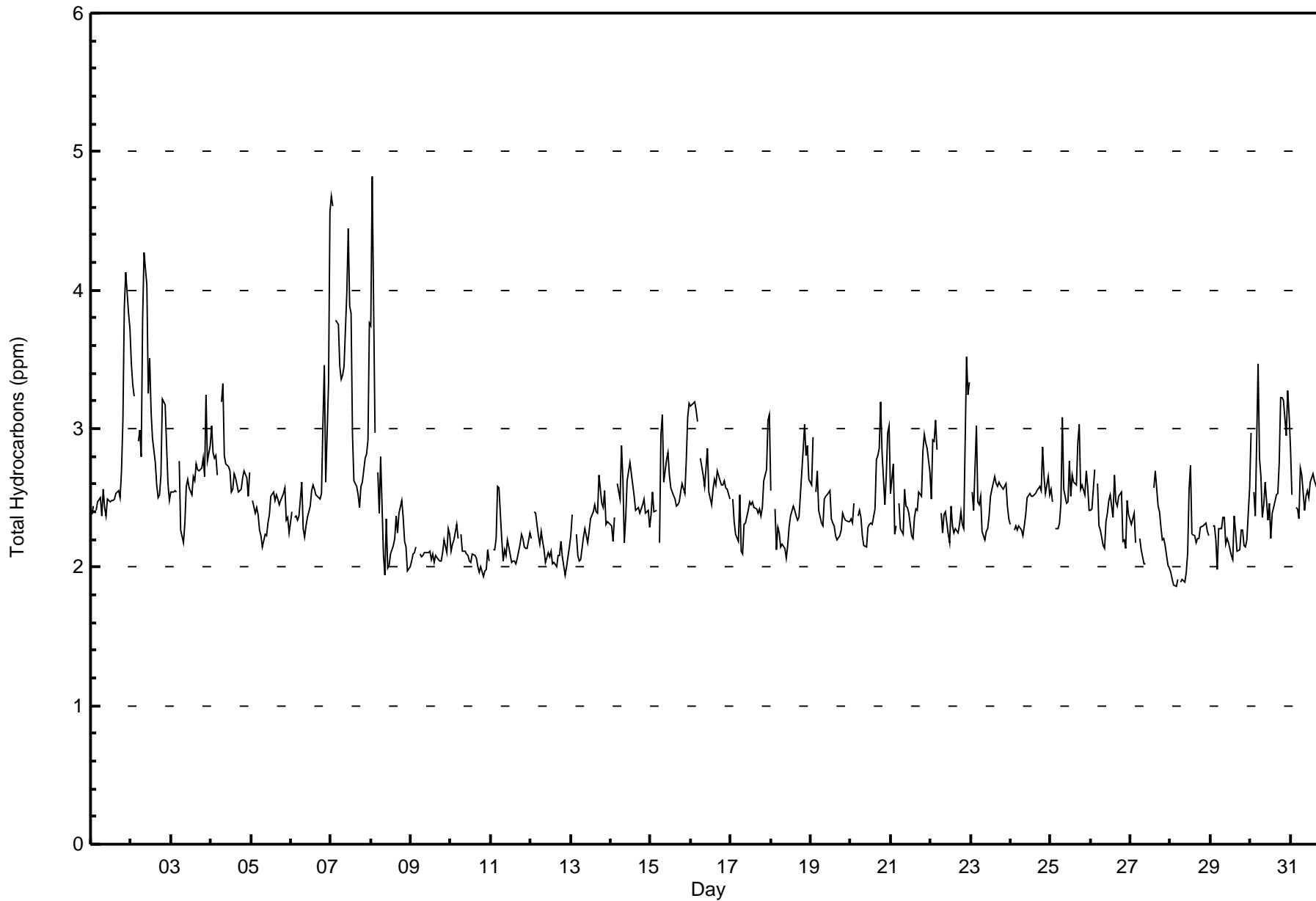
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2016

Maximum Value: 4.8 ppm on May 8 02:00		Maximum Daily Average: 3.4 ppm on May 7		Hours in Service: 744																						
Minimum Value: 1.9 ppm on May 28 04:00		Minimum Daily Average: 2.1 ppm on May 10		Hours of Data: 709																						
Maximum Diurnal Average: 2.7 ppm at hour 2		Minimum Diurnal Average: 2.4 ppm at hour 9		Hours of Missing Data: 35																						
Monthly Average: 2.50 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 4.0		Hours of Calibration: 35																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.4	2.4	Z	2.4	2.5	2.5	2.4	2.6	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.7	3.1	3.9	4.1	3.8	3.7	2.8	4.1
2-May	3.5	3.3	3.2	Z	2.9	3.0	2.8	3.8	4.3	4.0	3.3	3.5	3.1	2.9	2.8	2.6	2.5	2.5	2.7	3.2	3.2	2.9	2.6	2.5	3.1	4.3
3-May	2.5	2.5	2.5	2.5	Z	2.8	2.3	2.2	2.3	2.6	2.6	2.6	2.5	2.6	2.6	2.7	2.7	2.7	2.7	2.8	2.7	3.2	2.8	2.9	2.6	3.2
4-May	3.0	2.8	2.8	2.8	2.7	Z	3.2	3.3	2.8	2.7	2.7	2.7	2.5	2.6	2.7	2.6	2.5	2.6	2.6	2.6	2.7	2.6	2.5	2.7	2.7	3.3
5-May	Z	2.5	2.4	2.4	2.4	2.3	2.2	2.1	2.2	2.2	2.3	2.4	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.5	2.6	2.3	2.4	2.2	2.4	2.6
6-May	2.4	Z	2.4	2.4	2.3	2.4	2.6	2.3	2.2	2.3	2.4	2.4	2.5	2.6	2.6	2.5	2.5	2.5	2.5	3.0	3.5	2.6	3.3	4.6	2.6	4.6
7-May	4.7	4.6	Z	3.8	3.8	3.4	3.4	3.4	3.4	4.0	4.4	3.9	3.8	3.0	2.6	2.6	2.5	2.4	2.6	2.6	2.8	2.8	2.9	3.8	3.4	4.7
8-May	3.7	4.8	3.0	Z	2.7	2.4	2.8	2.1	1.9	2.3	2.0	2.0	2.1	2.2	2.2	2.4	2.3	2.4	2.5	2.4	2.2	2.1	2.0	2.0	2.5	4.8
9-May	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.2	2.1	2.3	2.2	2.1	2.3
10-May	2.1	2.2	2.2	2.3	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.0	2.1	2.3
11-May	Z	2.1	2.1	2.2	2.6	2.6	2.2	2.0	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.2	2.6
12-May	2.2	Z	2.4	2.4	2.2	2.2	2.3	2.2	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.1	1.9	2.0	2.1	2.1	2.1	2.4
13-May	2.2	2.4	Z	2.2	2.1	2.0	2.1	2.2	2.3	2.2	2.2	2.3	2.4	2.4	2.5	2.4	2.4	2.7	2.5	2.4	2.5	2.3	2.3	2.3	2.3	2.7
14-May	2.3	2.2	2.4	Z	2.6	2.5	2.9	2.6	2.2	2.4	2.6	2.8	2.7	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.3	2.5	2.9
15-May	2.4	2.5	2.4	2.4	Z	2.2	3.0	3.1	2.6	2.8	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.5	2.5	2.6	2.5	2.8	3.1	3.2	2.6	3.2
16-May	3.2	3.2	3.2	3.1	3.1	Z	2.8	2.7	2.6	2.7	2.9	2.5	2.4	2.6	2.6	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.7	3.2
17-May	Z	2.5	2.3	2.2	2.2	2.5	2.1	2.1	2.3	2.3	2.4	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.7	3.1	2.5	3.1
18-May	2.6	Z	2.4	2.1	2.3	2.2	2.1	2.2	2.1	2.1	2.2	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.5	2.8	3.0	2.8	2.9	2.6	2.4	3.0
19-May	2.6	2.9	Z	2.5	2.7	2.4	2.3	2.3	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.9
20-May	2.3	2.3	2.5	Z	2.4	2.4	2.4	2.2	2.2	2.1	2.3	2.3	2.3	2.3	2.4	2.8	2.8	2.9	3.2	2.8	2.5	2.7	3.0	3.0	2.5	3.2
21-May	2.5	2.7	2.2	2.3	Z	2.5	2.3	2.2	2.6	2.4	2.4	2.4	2.2	2.2	2.4	2.4	2.4	2.5	2.5	2.8	3.0	2.9	2.9	2.7	2.5	3.0
22-May	2.5	2.9	2.9	3.1	2.9	Z	2.4	2.2	2.4	2.4	2.2	2.2	2.4	2.3	2.3	2.3	2.2	2.3	2.4	2.3	2.3	3.5	3.2	3.3	2.6	3.5
23-May	Z	2.5	2.4	3.0	2.5	2.4	2.5	2.3	2.2	2.3	2.3	2.4	2.5	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.4	2.3	2.5	3.0
24-May	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.9	2.7	2.5	2.7	2.5	2.9
25-May	2.6	2.5	Z	2.3	2.3	2.3	2.5	3.1	2.6	2.5	2.5	2.8	2.5	2.7	2.6	2.6	2.9	3.0	2.6	2.6	2.5	2.7	2.6	2.4	2.6	3.1
26-May	2.4	2.4	2.7	Z	2.6	2.3	2.3	2.2	2.1	2.3	2.4	2.5	2.5	2.4	2.7	2.5	2.4	2.5	2.5	2.2	2.2	2.1	2.5	2.4	2.4	2.7
27-May	2.3	2.3	2.4	2.2	Z	2.2	2.1	2.1	2.0	2.0	C	C	C	C	2.6	2.7	2.4	2.4	2.3	2.2	2.2	2.2	2.0	2.0	2.2	2.7
28-May	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.1	2.6	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.1	2.7
29-May	Z	2.3	2.3	2.2	2.0	2.3	2.3	2.4	2.4	2.2	2.2	2.2	2.1	2.1	2.4	2.3	2.1	2.1	2.3	2.3	2.2	2.1	2.2	2.6	2.2	2.6
30-May	3.0	Z	2.5	2.4	3.5	2.8	2.7	2.4	2.4	2.6	2.3	2.5	2.2	2.4	2.4	2.5	2.5	2.8	3.2	3.2	3.2	3.0	3.3	3.1	2.7	3.5
31-May	2.9	2.5	Z	2.4	2.4	2.4	2.7	2.7	2.4	2.5	2.6	2.5	2.6	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.6	2.5	2.3	2.5	2.9
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	44	6.21	6.21
2.1 - 3.0	606	85.47	91.68
3.1 - 10.0	59	8.32	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	3	14	3	1	2	2	4	2	2	4	0	1	3	3	0	44
2.1 - 3.0	37	136	73	8	9	10	11	13	76	61	35	34	23	39	26	15	606
3.1 - 10.0	10	2	1	2	4	1	0	8	17	3	1	1	0	0	2	7	59
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	141	88	13	14	13	13	25	95	66	40	35	24	42	31	22	709

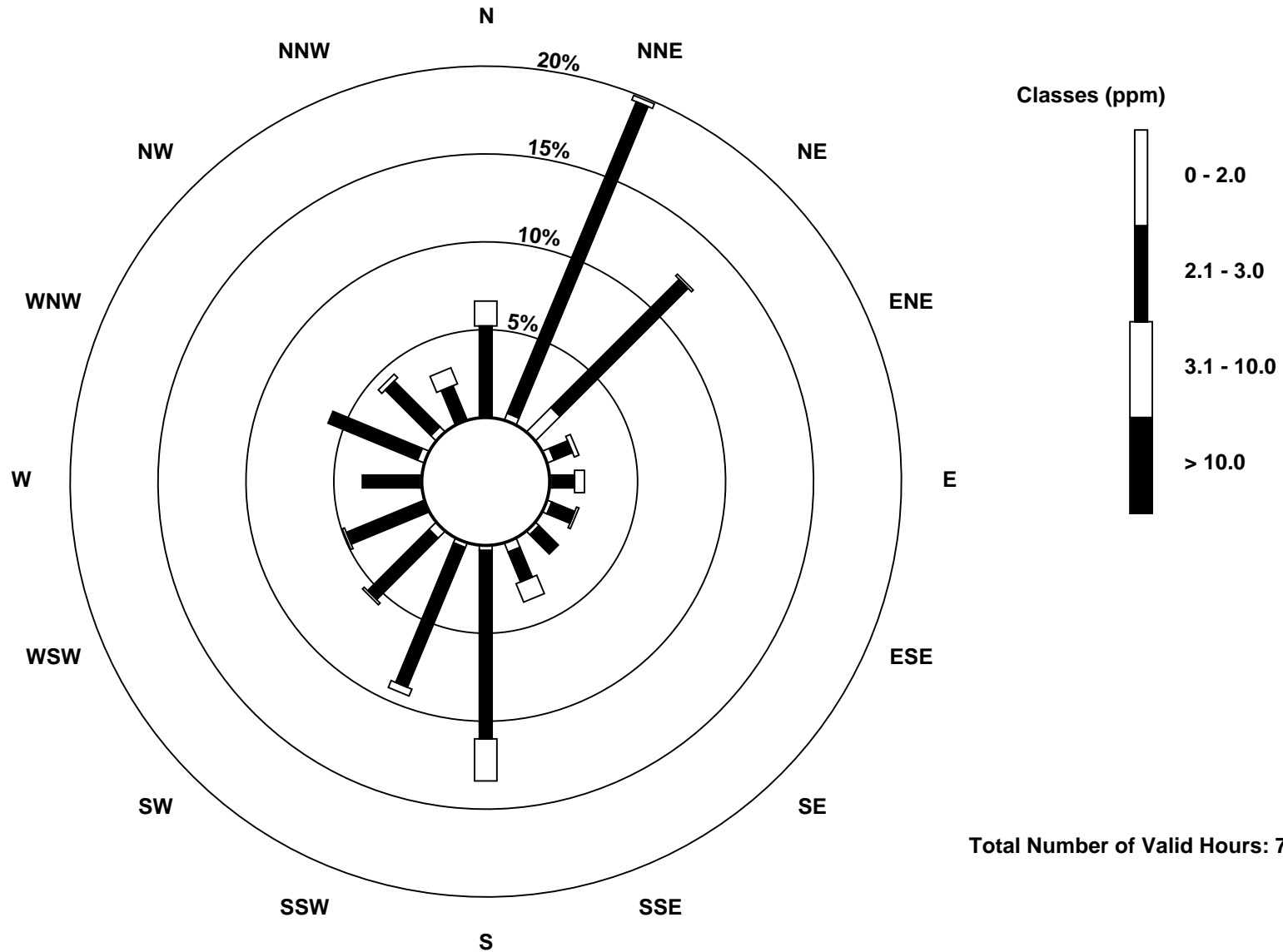
Total Number of Valid Hours: 709

Total Number of Hours: 744

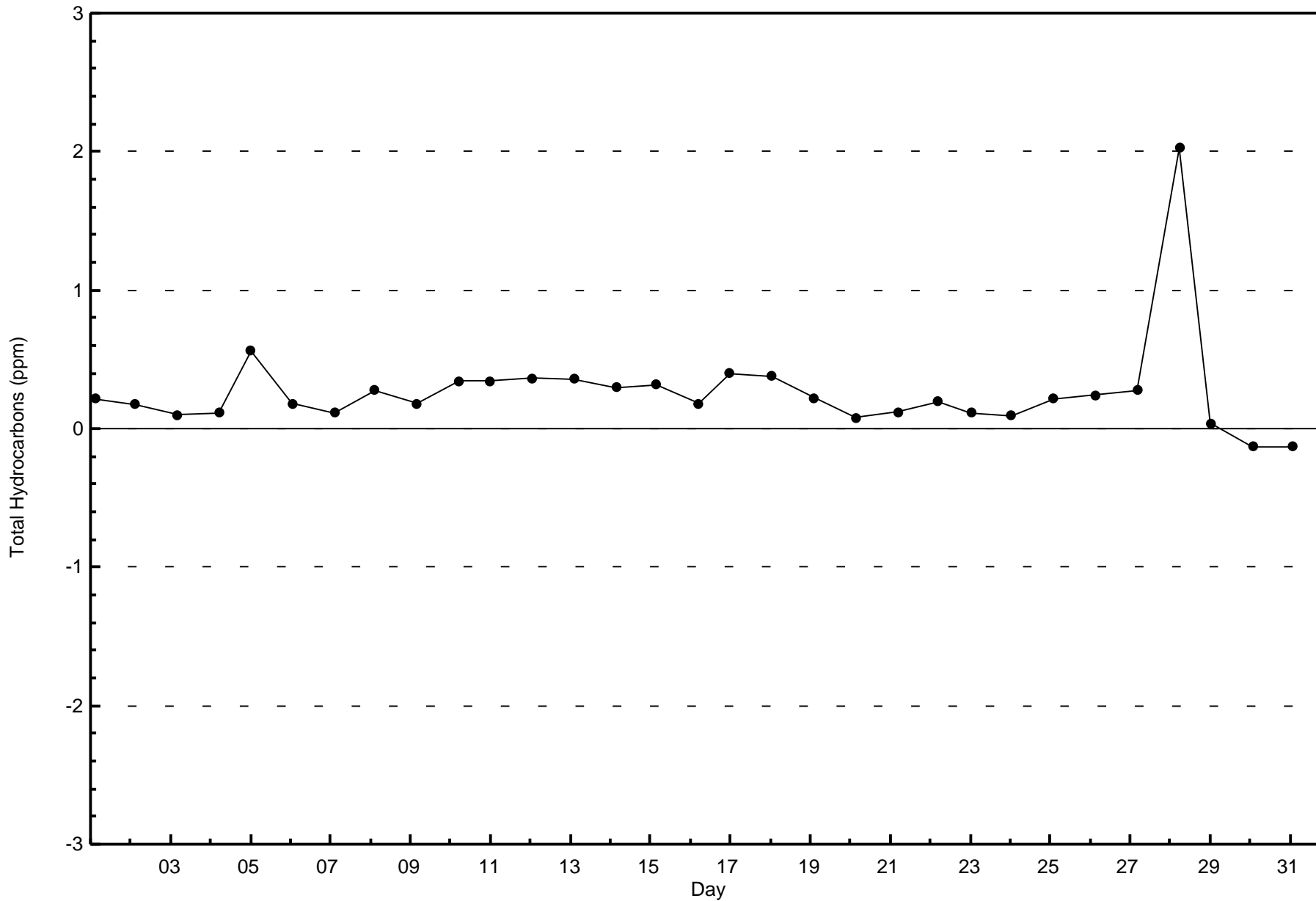


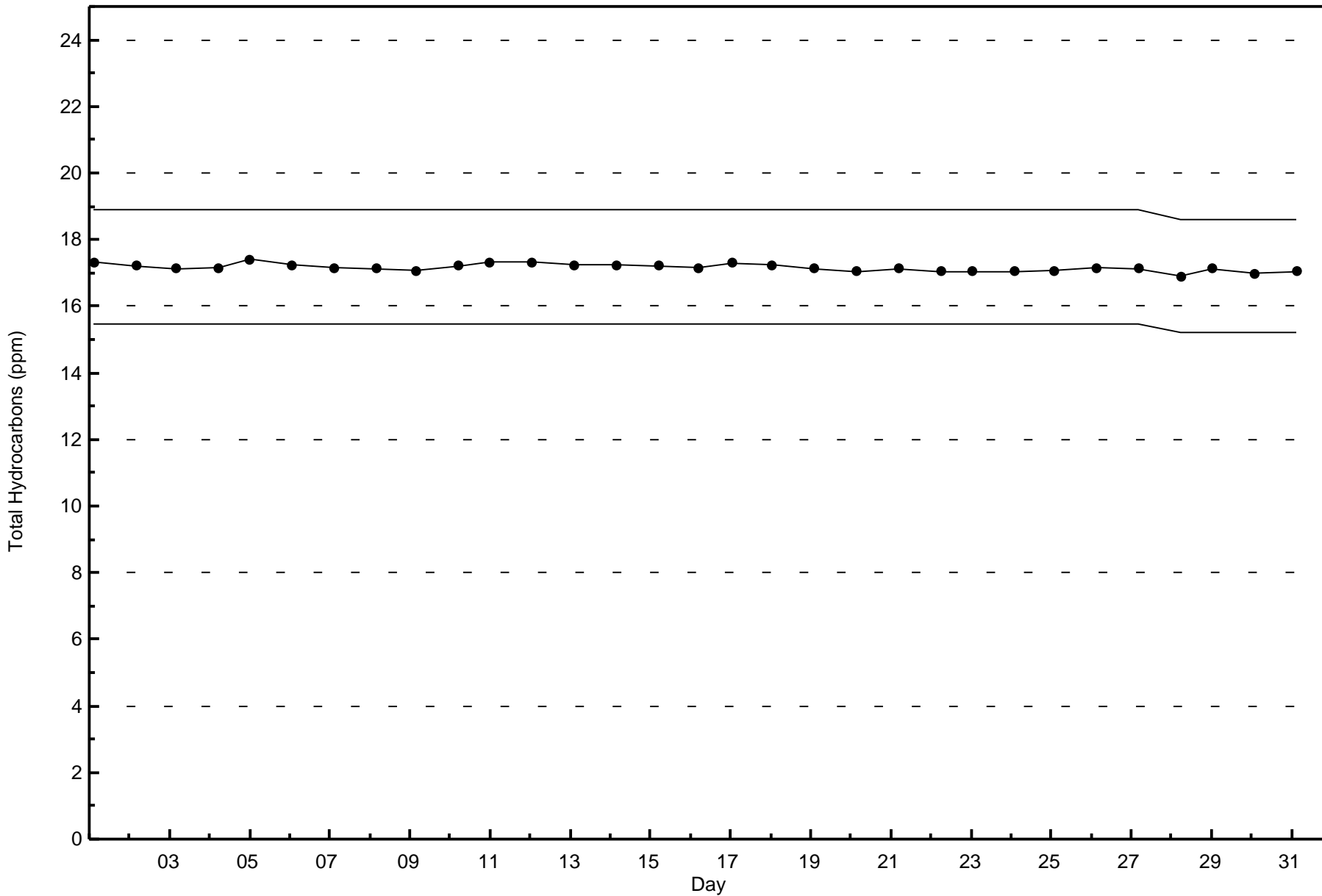
Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association
Summary of Hour Averages

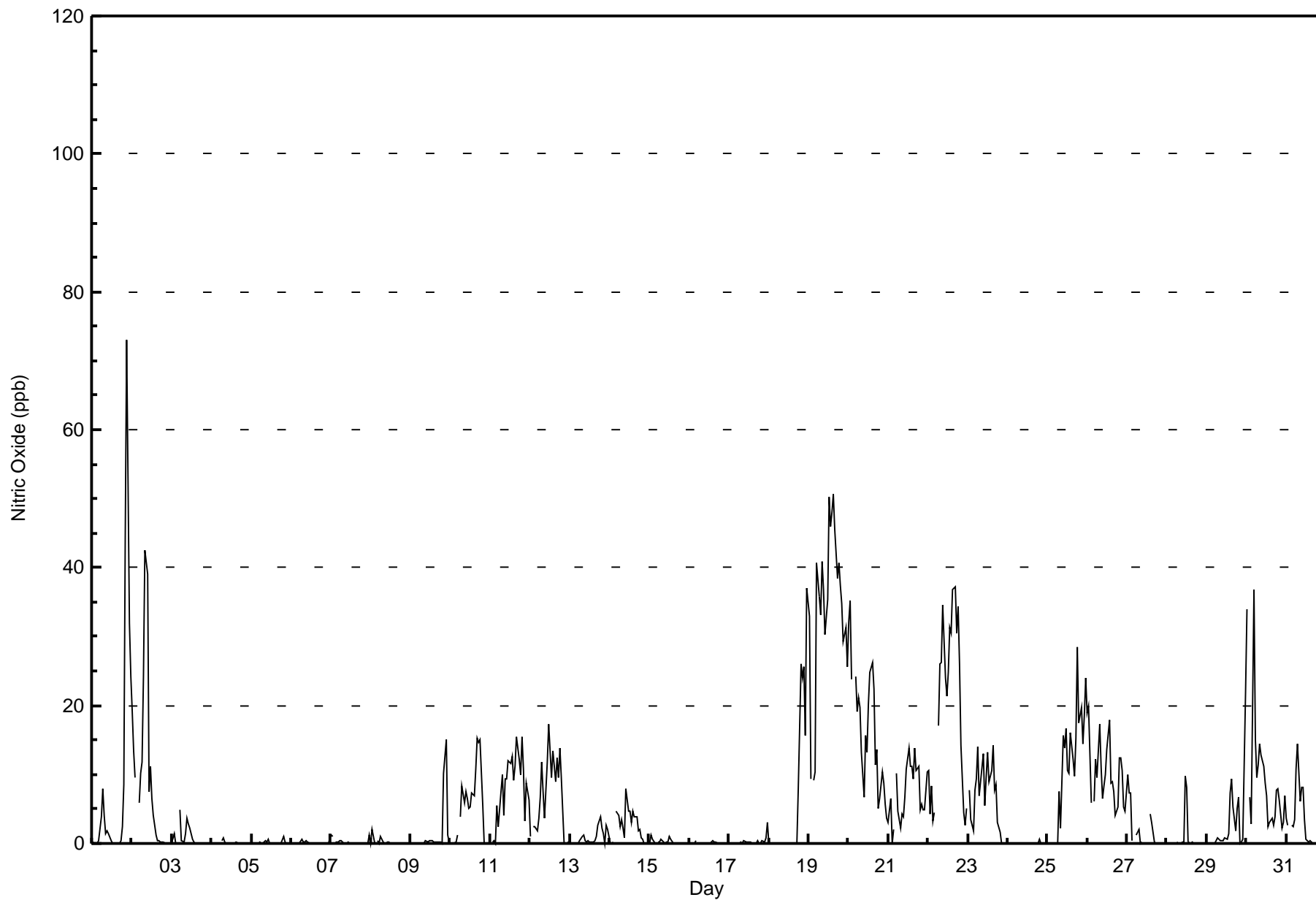
Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2016

Maximum Value: 73 ppb on May 1 22:00		Maximum Daily Average: 34.5 ppb on May 19		Hours in Service: 744																							
Minimum Value: 0 ppb on May 3 23:00		Minimum Daily Average: 0.0 ppb on May 24		Hours of Data: 709																							
Maximum Diurnal Average: 6.9 ppb at hour 13		Minimum Diurnal Average: 1.0 ppb at hour 4		Hours of Missing Data: 35																							
Monthly Average: 5.7 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 8 P ₉₀ = 17 P ₉₉ = 43		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-May	0	0	Z	0	0	4	8	4	1	2	1	0	0	0	0	0	0	0	2	8	44	73	32	24	9.0	73	
2-May	19	13	10	Z	6	10	12	24	42	39	7	11	7	4	1	0	0	0	0	0	0	0	0	0	9.0	42	
3-May	0	2	0	0	Z	5	0	0	1	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0.8	5	
4-May	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
5-May	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1	
6-May	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1	
7-May	1	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
8-May	0	2	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
9-May	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	10	15	1	0	1.3	15	
10-May	0	0	0	0	1	Z	4	8	6	8	7	5	5	7	7	11	15	15	15	6	0	0	0	0	5.2	15	
11-May	Z	0	0	0	5	2	8	10	4	9	9	12	12	13	9	11	15	12	10	15	11	3	9	6	8.1	15	
12-May	1	Z	2	2	2	4	7	12	8	4	12	17	13	10	13	9	12	10	14	9	0	0	0	0	7.0	17	
13-May	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	1	3	4	2	1	0	3	2	0.9	4		
14-May	0	0	0	Z	5	4	2	3	2	1	8	5	5	3	5	4	4	2	2	1	1	0	0	0	2.4	8	
15-May	0	1	1	0	Z	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
17-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0.3	3	
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	26	24	26	16	37	5.9	37	
19-May	33	9	Z	9	10	41	36	33	41	37	30	35	50	46	48	51	46	38	41	37	35	29	31	26	34.5	51	
20-May	32	35	24	Z	24	19	21	20	13	7	16	13	20	25	26	22	11	14	5	6	10	9	6	4	16.6	35	
21-May	3	7	0	2	Z	10	5	2	4	4	7	11	14	11	11	9	14	11	11	5	6	5	5	10	7.2	14	
22-May	10	4	8	3	4	Z	17	26	26	35	24	21	25	31	31	37	37	30	34	26	14	4	3	5	19.9	37	
23-May	Z	8	3	2	8	9	14	7	11	13	5	9	13	9	11	14	8	8	3	2	0	0	0	0	6.9	14	
24-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.0	1	
25-May	0	0	Z	0	0	0	0	8	2	16	14	17	11	10	16	12	10	15	29	18	20	14	18	24	11.0	29	
26-May	19	20	6	Z	6	12	10	17	11	7	8	10	14	18	9	9	7	4	5	12	12	11	5	5	10.3	20	
27-May	10	7	7	0	Z	1	2	2	0	0	C	C	C	C	4	3	0	0	0	0	0	0	0	0	2.0	10	
28-May	0	0	0	0	0	Z	0	0	0	0	0	10	8	0	0	0	0	0	0	0	0	0	0	0	0.8	10	
29-May	Z	0	0	0	0	0	1	1	1	1	0	1	1	1	7	9	5	2	5	7	0	0	1	22	2.8	22	
30-May	34	Z	7	3	37	15	9	11	14	13	11	9	7	2	3	4	3	4	8	8	6	2	3	7	9.6	37	
31-May	4	3	Z	3	2	3	11	15	6	8	8	3	1	0	0	0	0	0	0	0	0	0	0	0	3.0	15	
		6.4	4.3	2.8	1.0	4.3	5.4	5.4	6.7	6.4	6.7	5.8	6.5	6.9	6.4	6.6	6.7	6.2	5.5	6.4	6.2	6.3	6.2	4.3	5.7	Diurnal Average	
		34	35	24	9	37	41	36	33	42	39	30	35	50	46	48	51	46	38	41	37	44	73	32	37	Diurnal Maximum	
Z - zerospan		C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	652	91.96	91.96
21 - 40	46	6.49	98.45
41 - 80	11	1.55	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	94	88	13	13	13	13	25	95	66	39	35	24	42	31	14	652
21 - 40	0	39	0	0	1	0	0	0	0	0	1	0	0	0	0	5	46
11 - 80	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	3	11
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	141	88	13	14	13	13	25	95	66	40	35	24	42	31	22	709

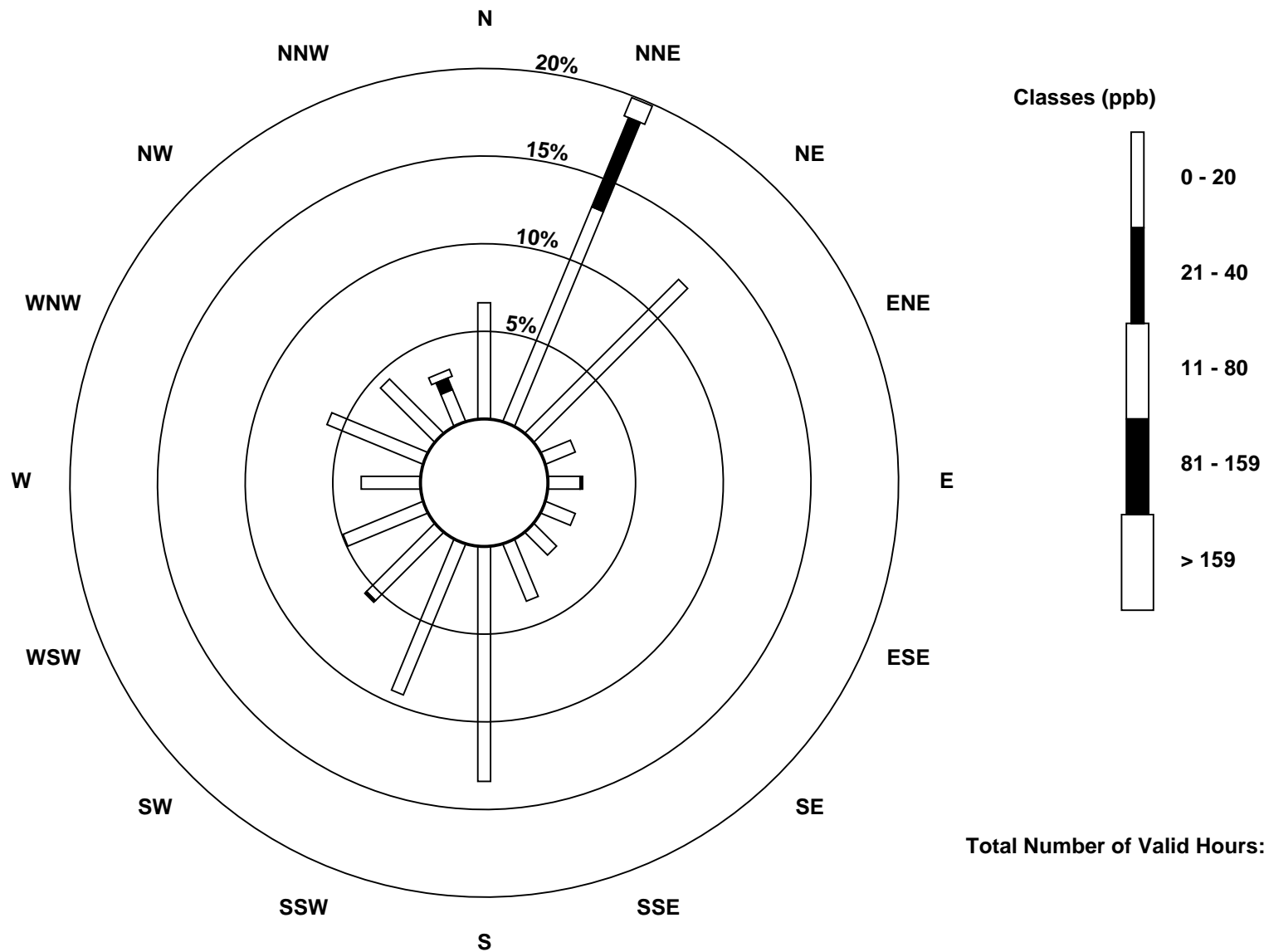
Total Number of Valid Hours: 709

Total Number of Hours: 744

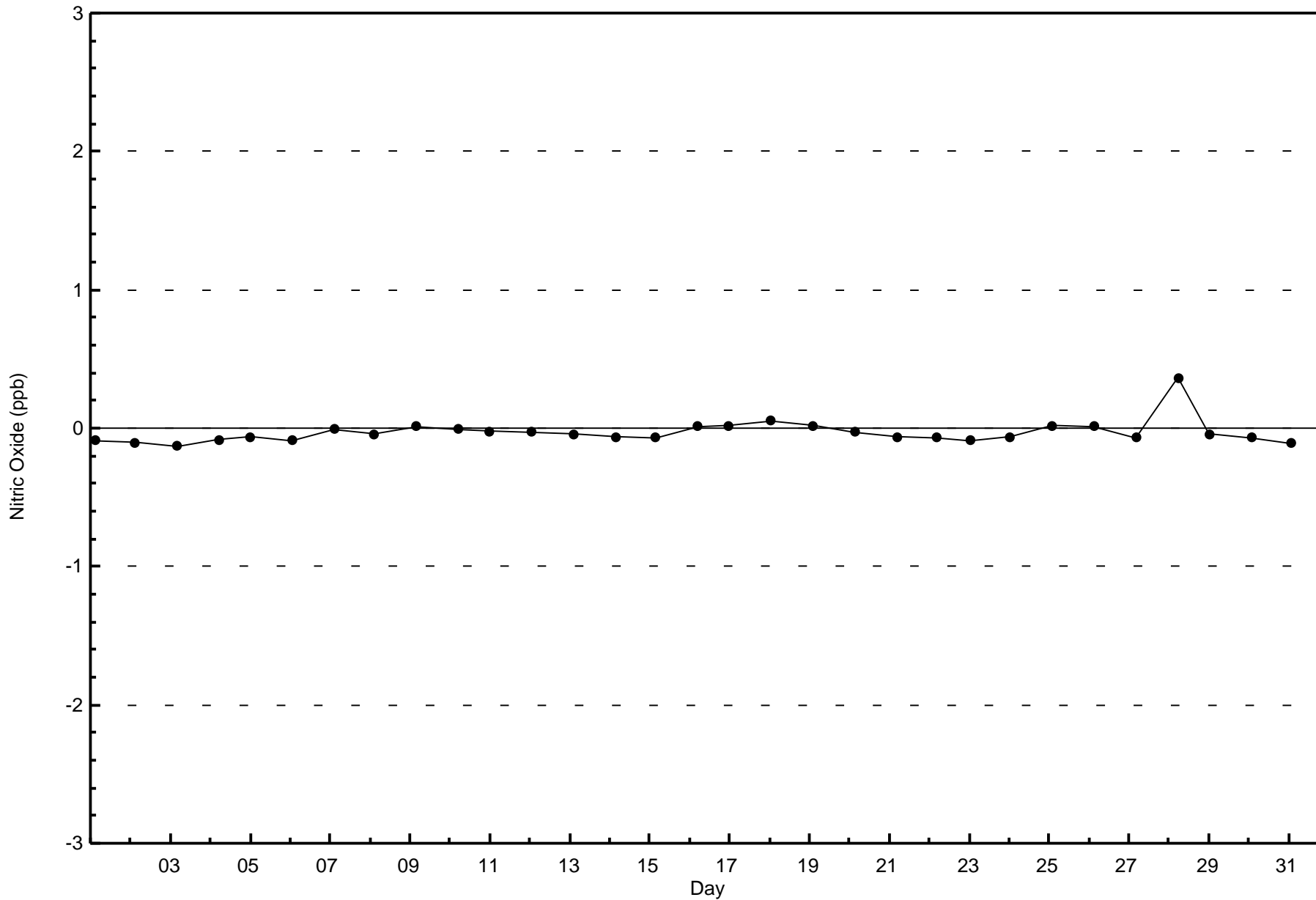


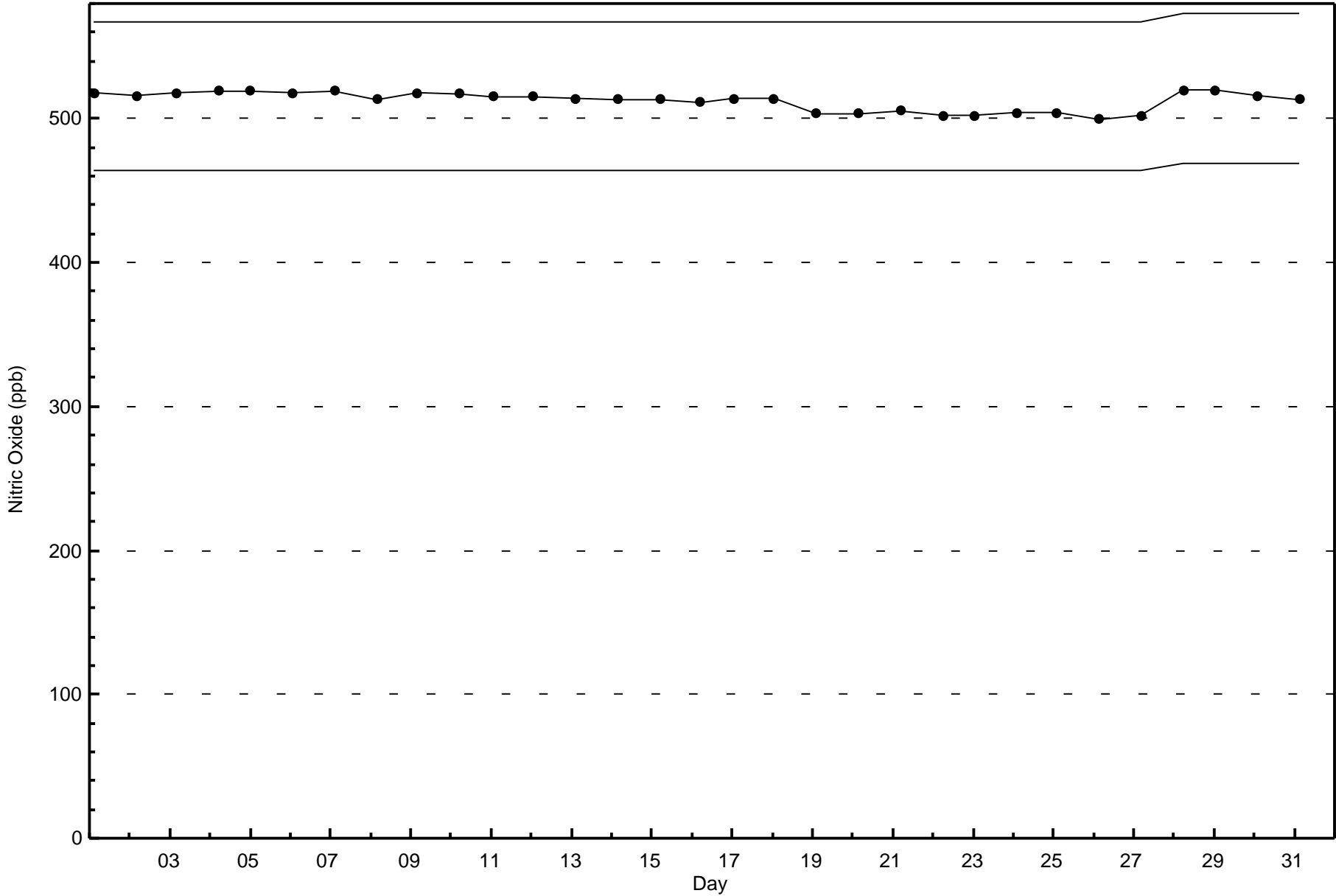
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association
Summary of Hour Averages

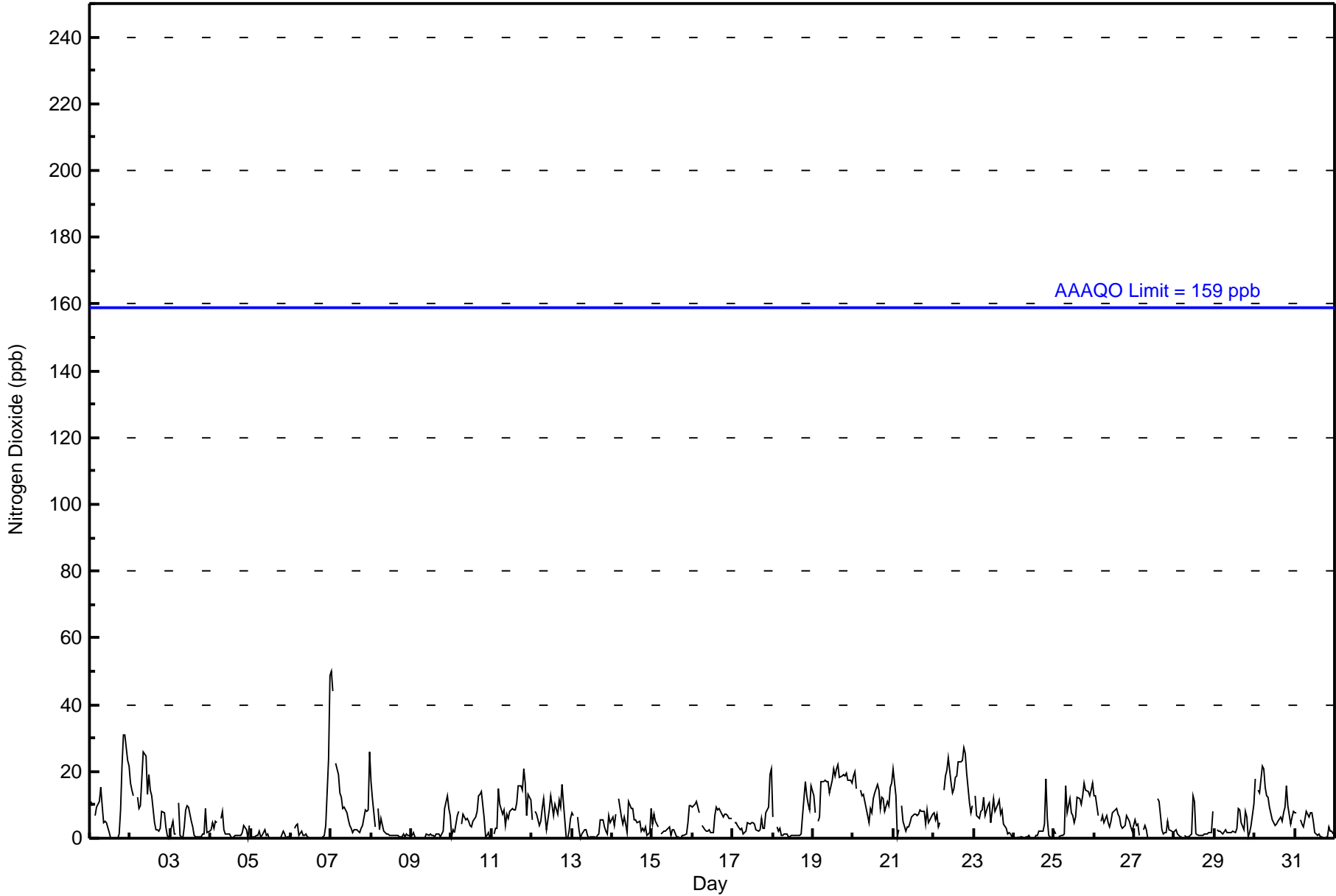
Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 50 ppb on May 7 01:00										Maximum Daily Average: 16.3 ppb on May 19										Hours of Data: 709						
Minimum Value: 0 ppb on May 1 13:00										Minimum Daily Average: 0.7 ppb on May 5										Hours of Missing Data: 35						
Maximum Diurnal Average: 9.5 ppb at hour 1										Minimum Diurnal Average: 4.7 ppb at hour 4										Hours of Calibration: 35						
Monthly Average: 6.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 5 Q ₃ = 9 P ₉₀ = 15 P ₉₉ = 25										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	11	10	Z	7	9	11	15	10	5	5	5	2	0	0	0	0	0	1	9	22	31	31	23	22	9.9	31
2-May	17	15	13	Z	12	9	10	18	26	25	13	19	15	13	5	3	3	2	3	8	8	4	1	0	10.3	26
3-May	2	5	1	1	Z	11	1	0	3	9	10	9	5	4	1	1	0	0	0	1	1	9	2	2	3.4	11
4-May	3	5	3	5	5	Z	6	8	3	1	1	1	0	0	0	1	1	1	1	2	4	2	0	4	2.4	8
5-May	Z	0	0	1	1	2	1	1	3	1	1	0	0	0	0	0	0	0	0	2	1	0	0	1	0.7	3
6-May	1	Z	3	4	4	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	1	4	24	49	4.2	49
7-May	50	44	Z	23	19	14	12	9	9	8	6	4	3	2	2	2	2	2	3	4	9	8	8	26	11.7	50
8-May	17	12	4	Z	9	3	6	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.9	17
9-May	1	2	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	9	13	9	7	2.3	13
10-May	0	3	2	7	8	Z	4	7	6	6	5	4	3	5	6	8	13	13	14	6	0	1	2	0	5.3	14
11-May	Z	1	3	3	15	10	7	8	4	7	6	8	9	9	9	11	16	16	15	21	16	7	13	12	9.7	21
12-May	6	Z	8	7	4	5	9	12	7	2	9	13	10	7	10	7	11	9	16	11	0	0	2	6	7.4	16
13-May	8	7	Z	7	3	0	1	3	2	1	0	0	0	0	1	1	5	6	3	2	1	7	5	5	2.7	8
14-May	6	4	7	Z	12	6	4	6	4	2	11	9	9	5	6	5	5	2	3	2	3	1	2	9	5.4	12
15-May	4	7	5	4	Z	1	2	2	2	3	3	1	3	3	1	0	0	0	1	1	1	5	10	10	2.9	10
16-May	10	10	11	9	8	Z	4	3	2	2	3	2	2	7	9	9	9	7	6	7	7	7	6	6	6.3	11
17-May	Z	5	5	4	3	3	1	2	2	5	4	5	5	4	2	2	2	6	3	3	8	10	19	21	5.3	21
18-May	6	Z	4	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	7	17	13	10	9	16	4.2	17
19-May	13	8	Z	5	6	17	17	17	17	17	13	17	21	19	21	22	18	19	19	19	19	17	17	17	16.3	22
20-May	19	20	15	Z	15	13	13	11	9	5	9	8	12	14	16	14	9	12	12	8	11	10	15	17	12.4	20
21-May	21	13	0	3	Z	10	5	2	4	3	5	7	7	7	7	7	9	8	8	4	8	5	6	7	6.7	21
22-May	8	5	7	3	5	Z	15	19	20	24	17	14	15	18	19	23	23	23	27	25	19	11	8	10	15.5	27
23-May	Z	13	7	6	8	9	12	7	10	11	5	8	12	8	10	11	7	8	4	3	1	2	1	0	7.1	13
24-May	1	Z	0	0	1	0	0	0	0	1	0	0	0	1	1	2	2	2	4	18	6	1	0	0	1.8	18
25-May	2	1	Z	1	1	1	1	16	8	12	8	7	5	6	12	12	10	13	17	15	14	13	14	17	8.8	17
26-May	13	13	7	Z	5	7	5	7	5	3	5	8	8	9	7	6	4	3	4	7	6	5	4	2	6.1	13
27-May	5	4	4	1	Z	3	4	2	0	0	C	C	C	C	12	11	3	1	2	2	5	3	2	2	3.4	12
28-May	2	3	1	1	1	Z	1	1	1	1	1	13	11	1	1	1	1	1	1	1	2	2	2	8	2.4	13
29-May	Z	3	2	2	2	1	3	2	2	2	2	2	2	3	9	8	5	3	8	6	1	2	4	10	3.5	10
30-May	18	Z	14	14	22	21	15	13	12	10	6	5	4	4	5	6	5	8	10	16	10	4	6	8	10.1	22
31-May	8	8	Z	6	4	3	5	8	7	8	8	5	2	1	1	1	0	0	0	0	3	2	2	1	3.6	8
										9.5 8.3 5.1 4.7 7.0 6.2 5.9 6.4 5.6 5.7 5.2 5.7 5.5 5.1 5.6 5.7 5.2 5.4 6.6 7.7 7.1 6.0 7.0 9.4										Diurnal Average						
										50 44 15 23 22 21 17 19 26 25 17 19 21 19 21 23 23 23 27 25 31 31 24 49										Diurnal Maximum						
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	96.19	96.19
21 - 40	24	3.39	99.58
41 - 80	3	0.42	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	131	88	13	13	13	13	23	92	66	39	34	24	42	30	14	682
21 - 40	0	10	0	0	1	0	0	0	2	0	1	1	0	0	1	8	24
11 - 80	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	141	88	13	14	13	13	25	95	66	40	35	24	42	31	22	709

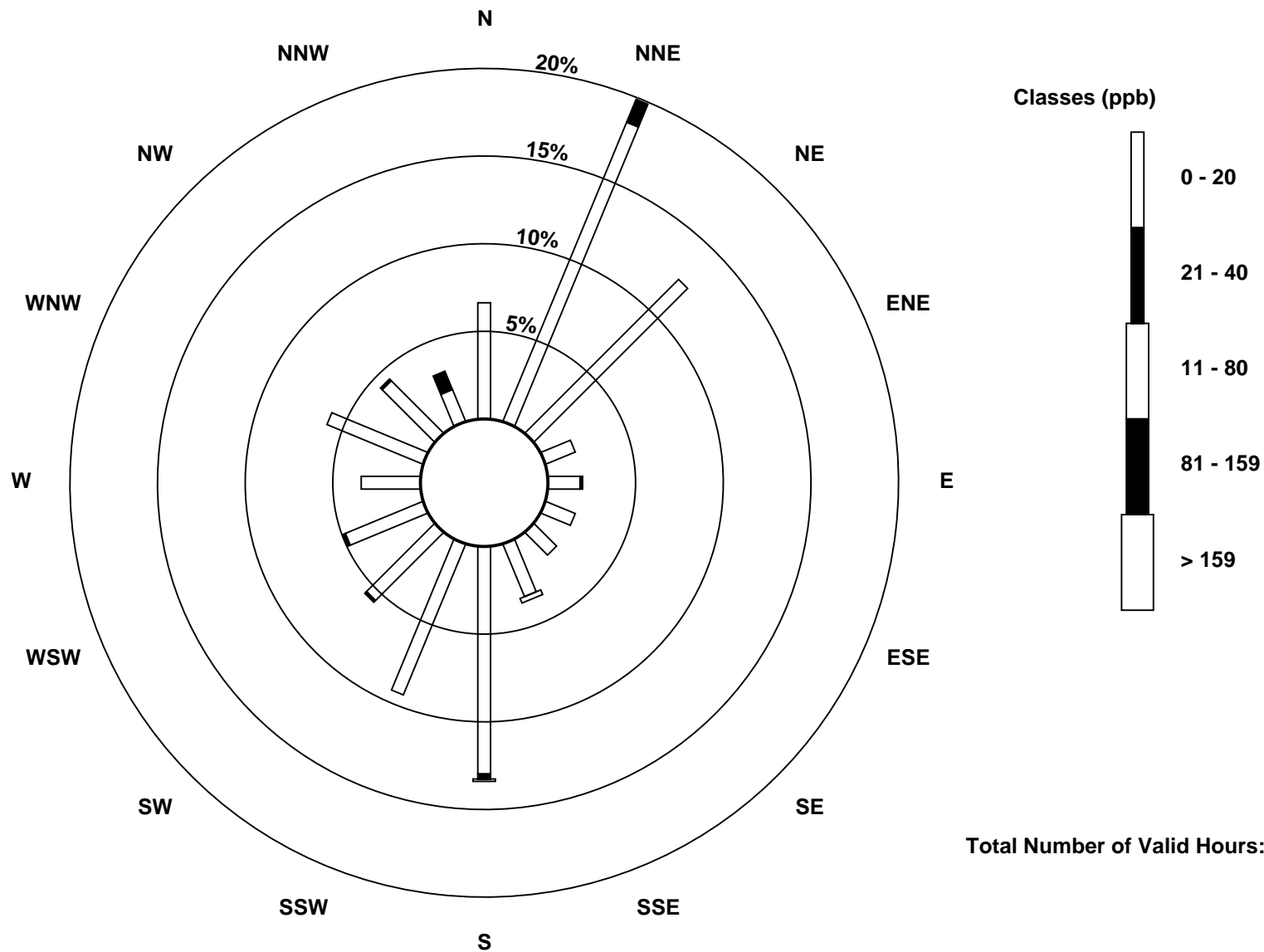
Total Number of Valid Hours: 709

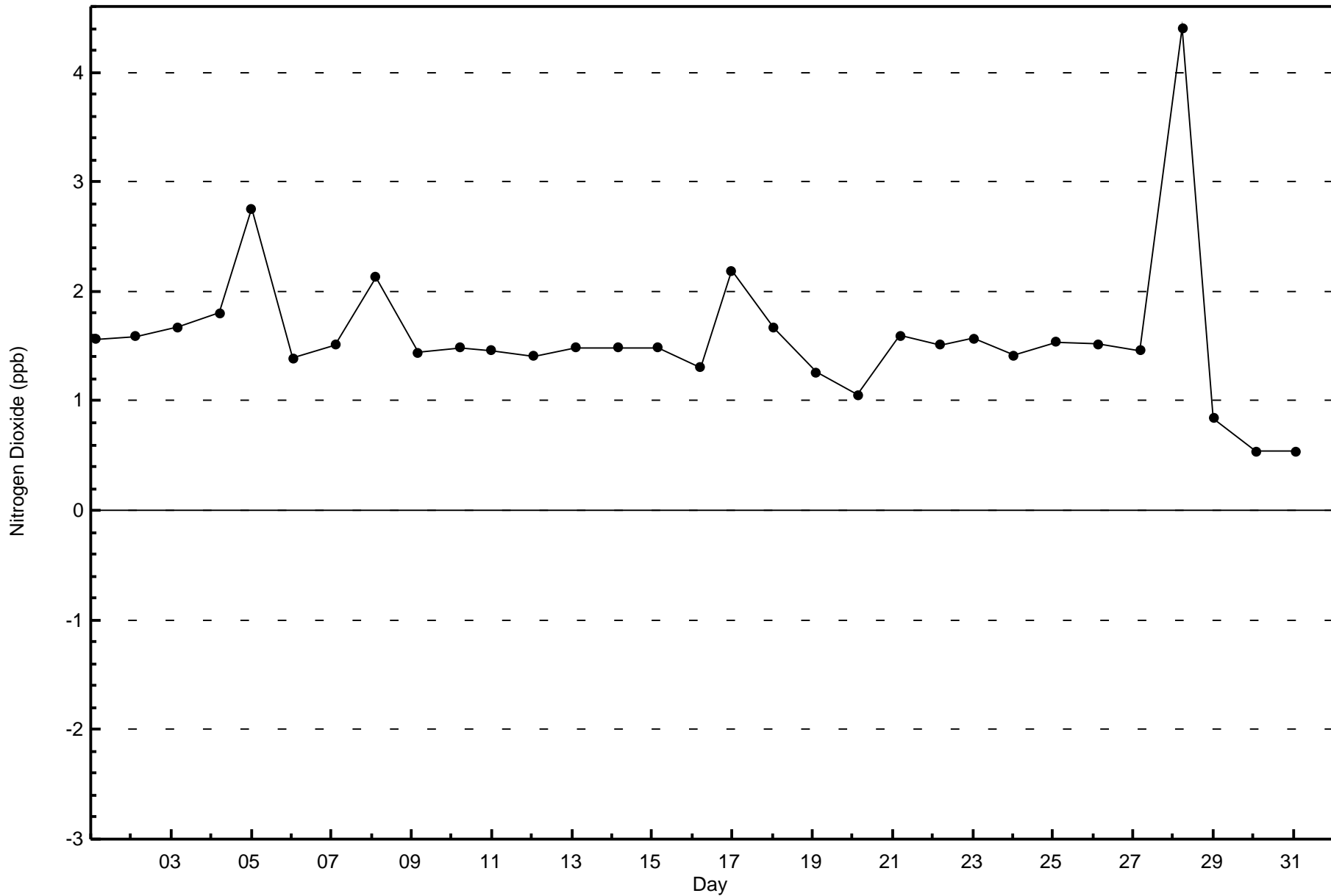
Total Number of Hours: 744

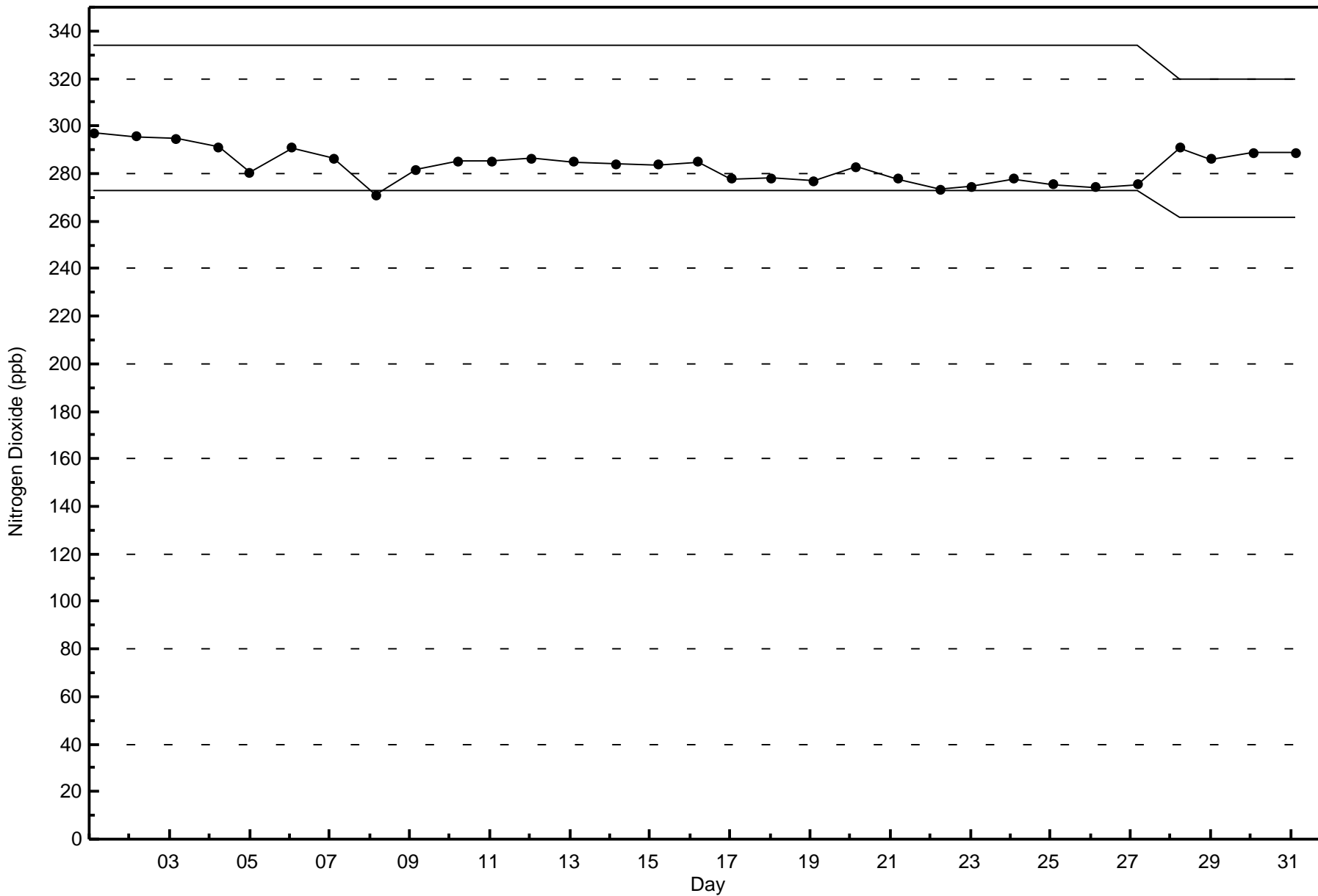


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)









Wood Buffalo Environmental Association
Summary of Hour Averages

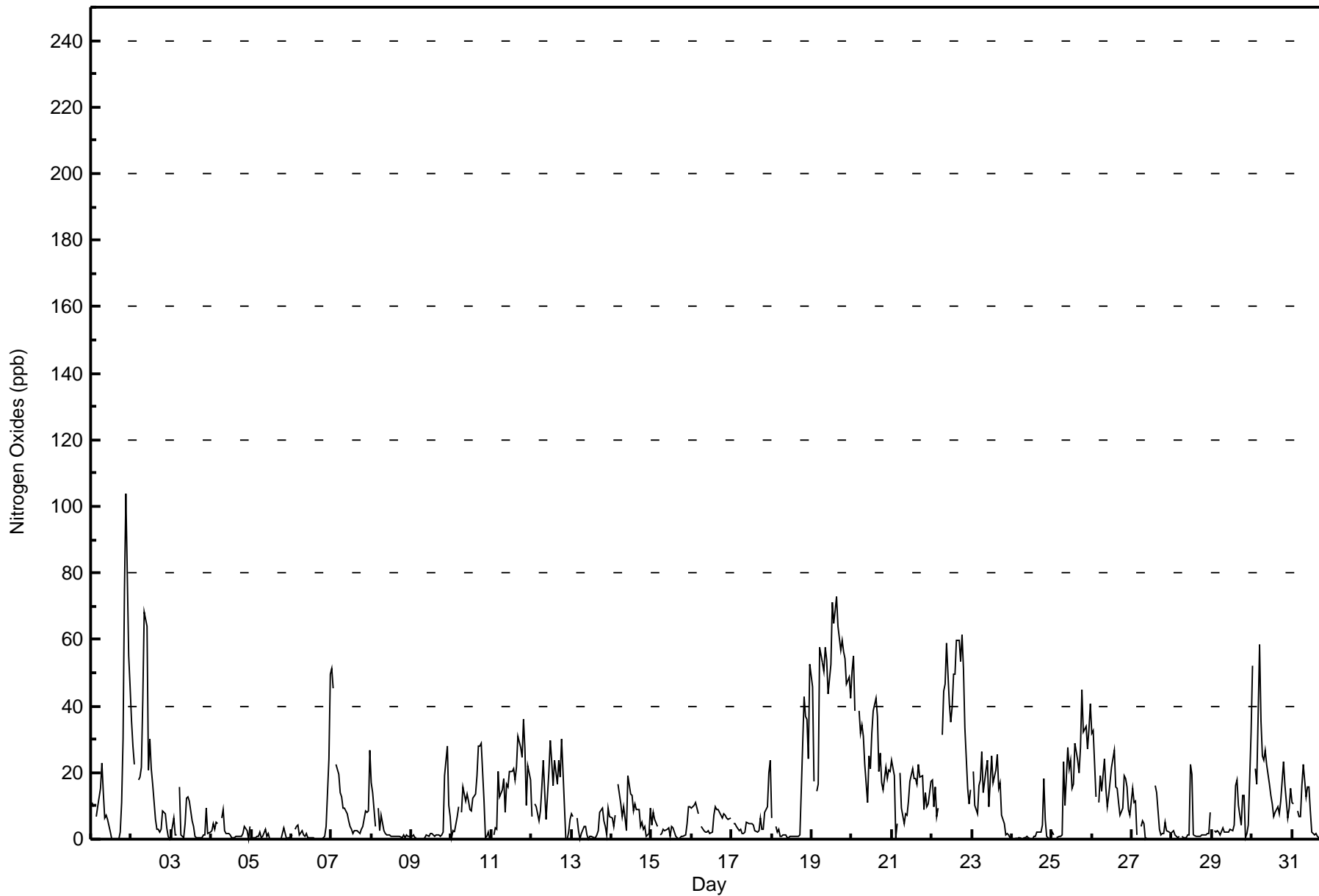
Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2016

Maximum Value: 104 ppb on May 1 22:00																		Maximum Daily Average: 50.8 ppb on May 19																		Hours in Service: 744			
Minimum Value: 0 ppb on May 4 23:00																		Minimum Daily Average: 0.8 ppb on May 5																		Hours of Data: 709			
Maximum Diurnal Average: 16.0 ppb at hour 1																		Minimum Diurnal Average: 5.7 ppb at hour 4																		Hours of Missing Data: 35			
Monthly Average: 12.0 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 6 O ₃ = 17 P ₉₀ = 32 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-May	11	10	Z	7	10	15	23	14	6	7	6	2	0	0	0	0	0	2	11	30	75	104	55	46	18.9	104													
2-May	36	28	Z	Z	18	19	22	42	68	64	21	30	21	17	6	3	3	2	3	8	8	4	1	0	19.3	68													
3-May	1	6	1	1	Z	16	1	0	5	12	13	12	6	4	1	0	0	0	0	1	1	9	2	2	4.2	16													
4-May	3	4	3	5	4	Z	6	9	3	2	2	1	0	0	1	1	1	1	1	2	4	2	0	4	2.5	9													
5-May	Z	0	0	1	1	2	1	1	3	1	2	0	0	0	0	0	0	0	0	3	2	0	0	1	0.8	3													
6-May	1	Z	3	4	4	1	2	1	1	2	1	0	0	0	0	0	0	0	0	0	1	4	24	49	4.3	49													
7-May	51	45	Z	Z	19	14	13	9	9	7	6	4	3	2	2	3	2	2	3	4	9	8	8	27	11.9	51													
8-May	17	14	4	Z	9	3	7	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3.1	17													
9-May	1	1	0	0	Z	0	0	0	0	1	1	2	1	1	1	1	1	1	1	2	19	28	10	7	3.6	28													
10-May	0	3	2	7	10	Z	8	16	11	14	11	9	9	12	13	19	28	28	29	12	0	1	2	0	10.6	29													
11-May	Z	1	3	3	20	13	15	18	8	16	15	20	20	21	18	22	31	28	25	36	27	10	22	18	17.9	36													
12-May	7	Z	11	10	6	9	16	24	14	6	20	30	23	16	24	16	24	19	30	20	0	0	2	6	14.4	30													
13-May	8	7	Z	6	2	0	2	4	4	1	0	1	1	0	0	1	2	8	9	6	4	1	9	7	3.6	9													
14-May	6	4	7	Z	16	10	7	10	6	3	19	14	13	8	10	9	9	4	5	3	4	1	2	9	7.8	19													
15-May	4	8	6	4	Z	1	2	3	3	3	3	1	4	3	1	0	0	0	1	1	1	5	10	10	3.2	10													
16-May	9	10	11	9	8	Z	4	2	2	2	3	2	2	7	10	9	9	7	6	7	7	7	6	6	6.4	11													
17-May	Z	4	5	4	3	3	1	2	2	5	5	5	5	4	3	2	2	6	3	3	8	10	20	24	5.6	24													
18-May	6	Z	4	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	15	43	37	36	24	52	10.2	52													
19-May	46	17	Z	14	17	58	53	50	58	54	44	53	71	65	69	73	64	57	60	56	54	47	49	42	50.8	73													
20-May	51	55	39	Z	39	32	34	31	22	11	25	21	32	38	42	37	20	26	17	15	21	18	21	20	29.0	55													
21-May	24	19	0	4	Z	20	10	4	8	7	11	17	21	18	18	17	22	19	19	9	14	10	11	17	13.9	24													
22-May	18	10	16	7	9	Z	31	44	47	59	41	35	40	49	49	60	60	54	62	51	34	15	10	15	35.4	62													
23-May	Z	20	10	8	16	18	26	14	21	24	10	17	25	17	21	25	15	17	7	5	1	2	1	0	13.9	26													
24-May	1	Z	0	0	1	0	0	0	1	1	0	0	0	1	1	2	2	2	4	18	6	1	0	0	1.8	18													
25-May	2	1	Z	1	1	1	1	23	10	28	21	24	15	17	29	24	20	28	45	32	34	27	33	41	19.8	45													
26-May	32	33	13	Z	11	19	14	24	15	10	13	18	22	27	16	15	11	7	9	19	18	16	9	7	16.4	33													
27-May	15	11	12	1	Z	4	6	5	0	0	C	C	C	C	16	14	3	1	2	2	5	3	2	2	5.4	16													
28-May	2	3	1	0	1	Z	1	0	0	1	1	22	19	1	1	1	1	1	1	1	1	2	2	8	3.2	22													
29-May	Z	3	2	2	2	1	4	2	2	2	2	3	2	4	16	18	10	4	13	13	1	2	4	32	6.3	32													
30-May	52	Z	21	16	58	36	25	24	27	22	17	13	11	7	8	10	8	11	17	23	16	6	9	15	19.7	58													
31-May	11	10	Z	8	7	7	16	22	13	16	16	9	2	1	2	1	0	0	0	1	4	2	2	1	6.6	22													
																		16.0 12.7 7.9 5.7 11.3 11.6 11.3 13.0 12.0 12.4 11.0 12.2 12.4 11.5 12.2 12.4 11.4 10.9 12.9 13.8 13.4 12.2 11.3 15.2																		Diurnal Average			
																		52 55 39 23 58 58 53 50 68 64 44 53 71 65 69 73 64 57 62 56 75 104 55 52																		Diurnal Maximum			
Z - zerspan		C - Calibration																																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	572	80.68	80.68
21 - 40	87	12.27	92.95
41 - 80	49	6.91	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	39	59	74	12	12	13	13	22	89	65	39	34	24	42	28	7	572
21 - 40	8	44	14	1	1	0	0	1	5	1	0	1	0	0	3	8	87
11 - 80	0	38	0	0	1	0	0	2	1	0	1	0	0	0	0	6	49
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	141	88	13	14	13	13	25	95	66	40	35	24	42	31	22	709

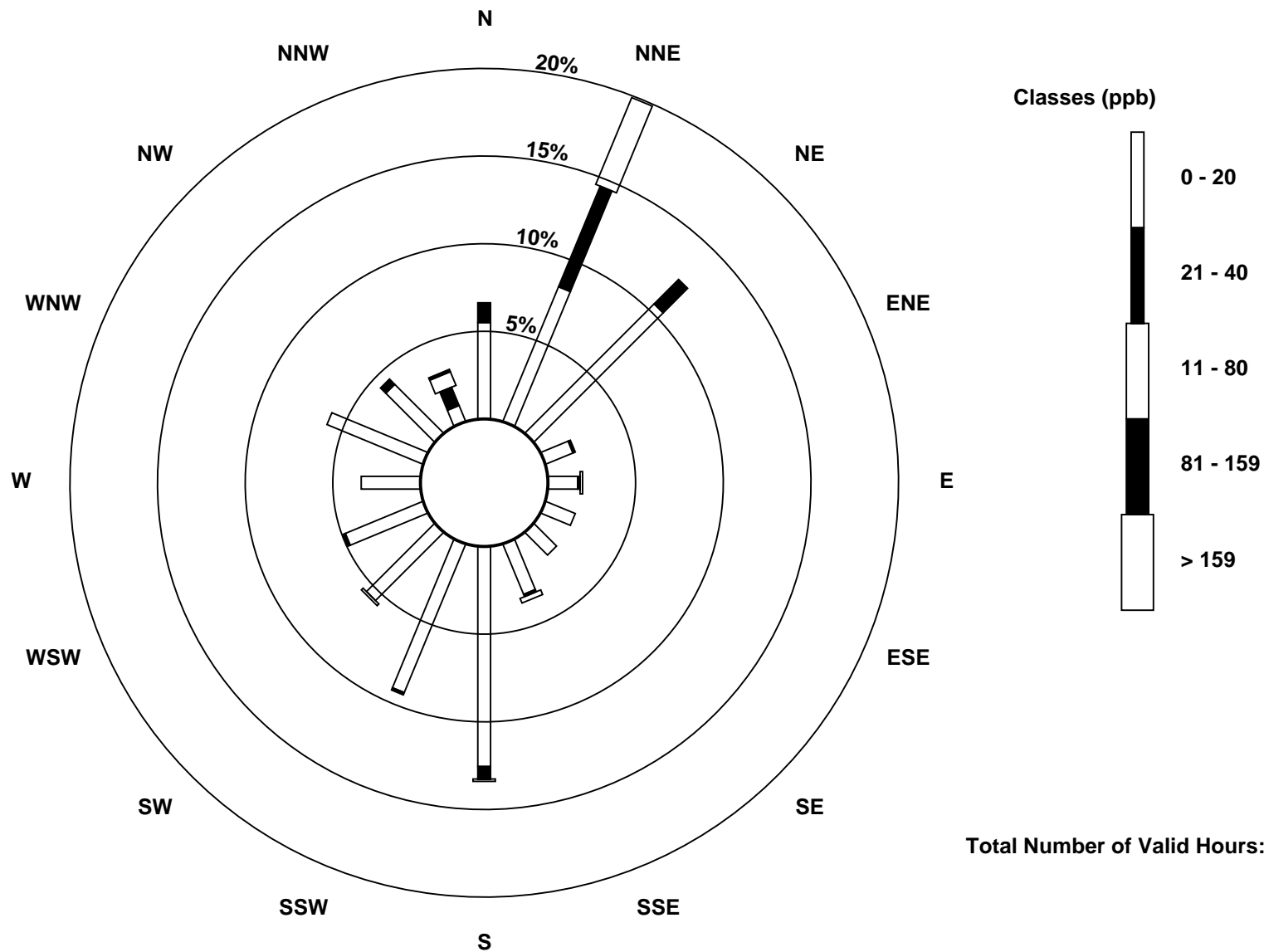
Total Number of Valid Hours: 709

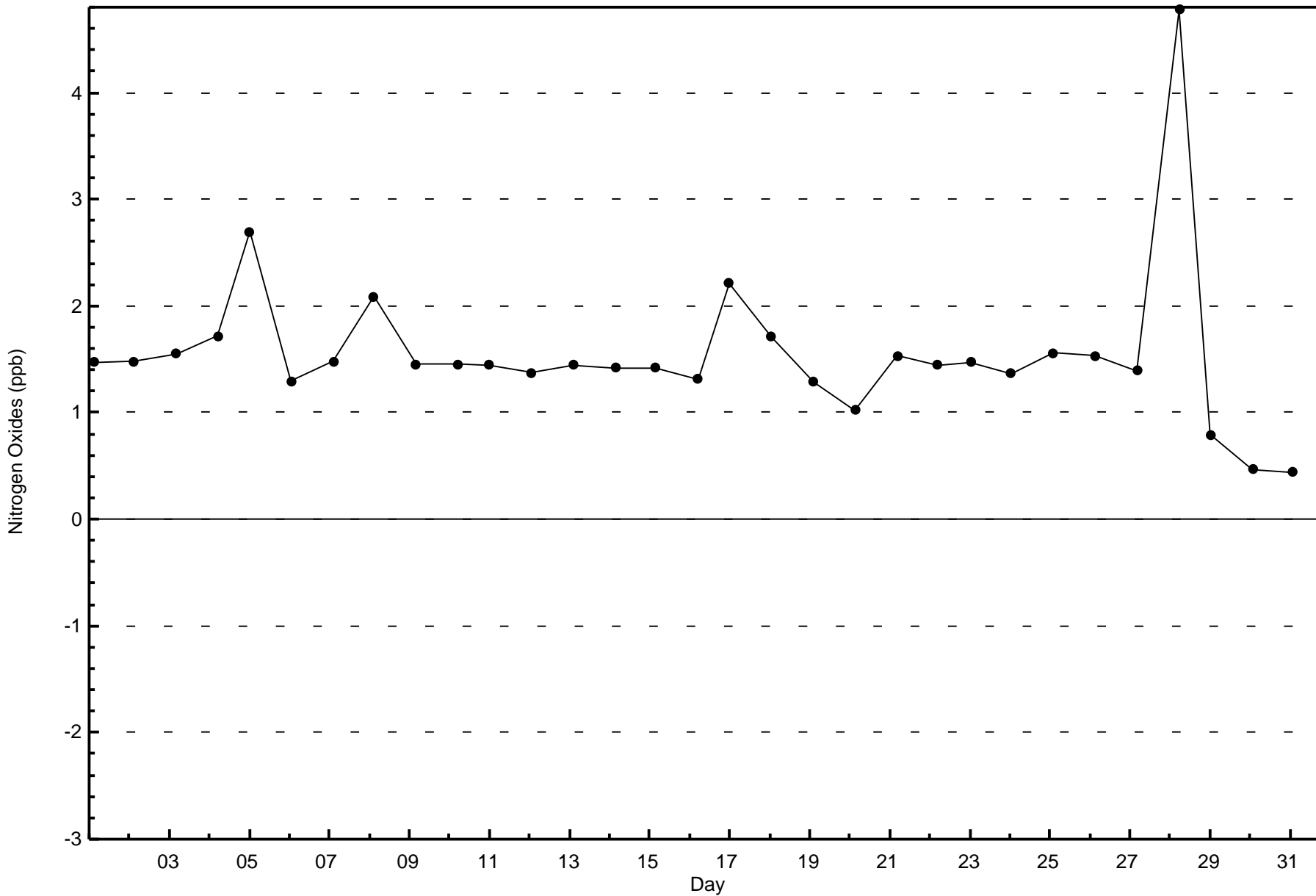
Total Number of Hours: 744

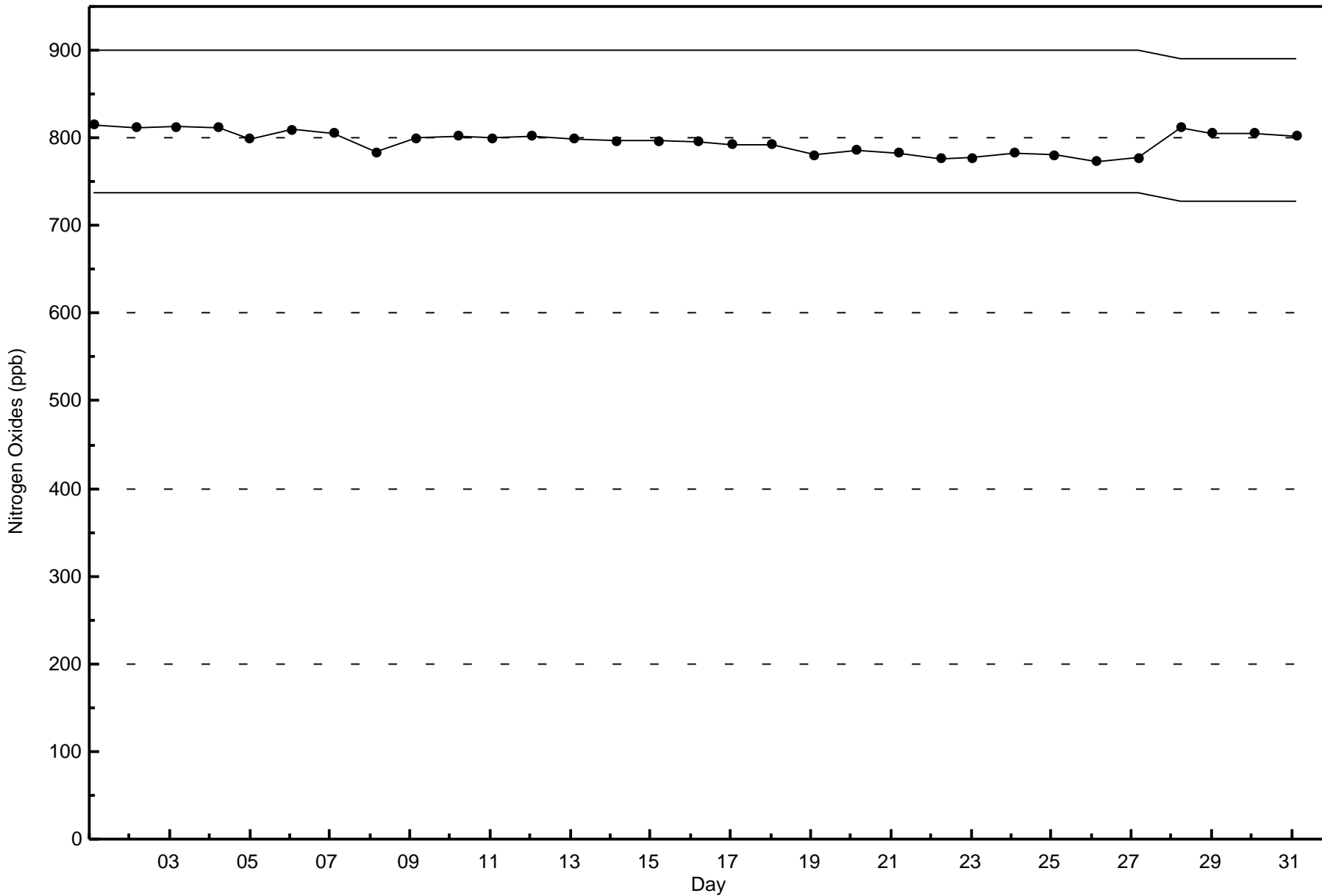


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)







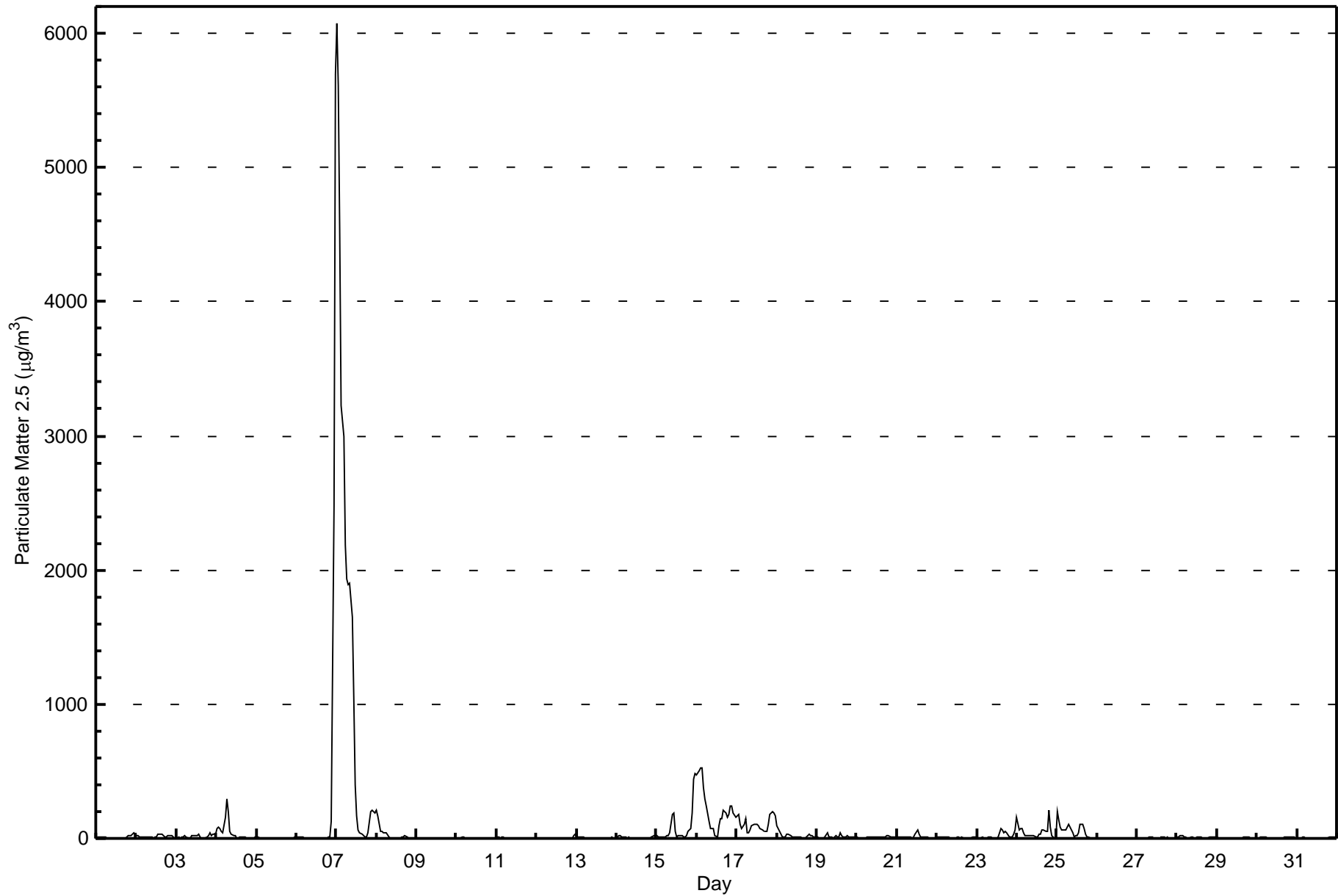


Number of Exceedences (AAAQO): 24-hr: 8 Maximum Value: 6070.2 µg/m ³ on May 7 01:00 Minimum Value: 0.6 µg/m ³ on May 26 17:00 Maximum Diurnal Average: 245.6 µg/m ³ at hour 1 Monthly Average: 82.92 µg/m ³																						Maximum Daily Average: 1444.5 µg/m ³ on May 7 Minimum Daily Average: 1.5 µg/m ³ on May 9 Minimum Diurnal Average: 16.1 µg/m ³ at hour 19 Percentiles: P ₁ = 0.9 P ₁₀ = 1.8 Q ₁ = 2.8 Median = 6.2 Q ₃ = 18.2 P ₉₀ = 85.2 P ₉₉ = 2014.4		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 3 Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	10.0	8.4	6.5	7.4	9.0	8.4	4.7	3.6	2.7	3.0	2.9	1.9	2.0	1.2	1.9	3.6	4.9	4.3	7.7	20.0	22.9	21.0	39.1	33.8	9.6	39.1
2-May	20.0	23.7	14.2	9.8	9.1	10.3	10.5	13.8	11.4	7.9	4.7	8.0	11.7	31.7	27.1	29.8	21.9	15.3	14.5	17.4	18.2	16.7	7.4	2.5	14.9	31.7
3-May	4.7	6.0	5.2	8.7	15.6	21.8	5.4	3.2	4.3	16.4	25.2	21.3	25.1	34.9	7.0	3.7	4.0	2.8	5.7	25.7	36.8	26.2	33.8	31.4	15.6	36.8
4-May	74.5	82.8	75.9	52.4	45.1	153.5	295.9	196.6	53.4	26.5	25.1	20.7	5.0	4.0	9.3	7.2	7.0	8.7	4.6	3.9	3.7	2.7	3.0	7.8	48.7	295.9
5-May	9.1	6.5	4.1	4.9	4.0	4.8	4.5	3.2	3.4	1.8	1.9	2.0	3.2	2.8	1.9	2.6	3.3	2.3	2.2	4.8	3.3	3.6	3.7	6.2	3.8	9.1
6-May	10.9	7.6	6.5	6.2	5.9	4.0	3.5	2.2	1.6	2.2	1.4	1.0	0.9	0.8	1.0	1.9	1.8	2.1	2.7	6.2	11.4	124.4	2480.9	5699.0	349.4	5699.0
7-May	6070.2	5607.3	4542.9	3224.9	2993.4	2186.9	1929.6	1893.4	1902.2	1654.7	1055.9	402.2	166.0	67.3	45.6	27.4	18.6	12.9	14.6	45.2	198.5	212.4	204.2	190.7	1444.5	6070.2
8-May	206.7	165.9	57.6	49.5	46.8	38.4	43.2	7.2	1.5	1.6	1.6	2.1	2.9	3.2	1.7	8.0	14.9	15.9	10.7	3.0	2.7	1.7	0.9	0.8	28.7	206.7
9-May	0.9	1.1	1.0	0.9	1.0	0.9	0.9	0.9	1.5	2.3	1.9	1.4	1.4	1.7	2.0	1.5	1.5	1.5	1.4	1.5	1.7	1.5	2.3	2.4	1.5	2.4
10-May	2.7	4.4	4.4	5.7	6.8	4.5	2.7	3.1	2.1	1.2	1.2	1.4	1.1	1.0	1.4	1.4	1.9	2.5	2.8	2.9	4.1	4.0	3.6	3.3	2.9	6.8
11-May	5.5	8.0	5.2	5.6	7.9	5.1	2.8	1.9	1.5	1.4	1.7	1.3	1.7	2.8	1.9	2.1	1.8	2.8	2.5	2.2	2.6	2.8	2.9	2.8	3.2	8.0
12-May	3.8	3.9	4.2	4.4	3.9	3.3	3.1	2.0	2.0	1.7	1.4	1.4	1.6	1.5	1.9	1.8	1.5	1.7	2.0	2.7	3.6	3.9	17.9	35.7	4.6	35.7
13-May	12.7	10.8	11.9	15.5	6.7	2.9	5.2	5.1	4.2	1.1	0.7	0.9	1.1	1.4	1.6	2.6	2.5	2.1	2.8	2.7	3.6	5.9	4.4	4.5	4.7	15.5
14-May	10.0	22.9	20.0	14.5	12.6	8.5	4.5	5.3	1.9	1.4	1.4	2.3	2.8	2.1	1.9	2.0	2.3	2.5	2.1	2.6	3.0	5.8	18.4	13.9	6.9	22.9
15-May	16.3	15.4	7.7	7.1	6.1	9.2	19.4	16.8	37.0	183.2	193.1	57.5	14.5	23.4	21.3	16.9	14.7	12.5	17.7	49.1	76.0	194.2	445.9	486.5	80.9	486.5
16-May	474.9	503.4	529.7	524.5	377.8	298.8	246.3	124.4	76.6	73.1	75.4	19.2	13.7	98.1	146.2	148.4	209.2	190.7	160.2	181.3	240.9	237.0	190.4	162.5	220.9	529.7
17-May	172.2	176.4	110.2	74.9	100.4	150.7	42.9	43.8	65.8	89.6	106.7	101.5	101.1	92.7	77.1	59.0	55.6	57.7	57.0	106.0	173.5	198.1	192.7	166.5	107.2	198.1
18-May	96.3	76.4	33.5	14.7	13.0	14.2	31.9	29.5	25.7	11.7	5.6	7.9	12.0	13.1	6.1	2.8	2.5	4.2	15.7	35.8	24.8	24.5	13.7	13.4	22.0	96.3
19-May	9.2	4.6	2.5	2.3	3.1	5.6	43.6	10.0	6.6	5.6	5.1	20.5	15.5	12.9	41.4	21.0	14.5	14.7	16.0	13.5	9.3	7.4	7.8	5.4	12.4	43.6
20-May	5.7	5.1	4.9	4.4	3.1	3.2	6.4	7.6	10.0	11.0	8.4	7.0	6.8	6.2	7.2	8.5	10.7	15.0	18.0	16.4	8.6	7.7	8.1	7.2	8.2	18.0
21-May	9.2	8.5	6.7	10.5	6.6	6.7	6.7	6.8	5.6	2.9	6.5	35.0	62.6	30.9	13.0	12.6	10.5	8.1	6.0	4.7	3.6	4.3	4.2	4.7	11.5	62.6
22-May	7.3	8.3	7.6	7.9	8.0	8.0	6.4	5.4	4.1	4.1	3.5	3.5	5.7	7.5	3.6	12.8	5.2	4.5	4.5	3.6	3.5	5.6	5.9	5.3	5.9	12.8
23-May	5.1	4.9	4.7	5.4	4.4	3.7	3.4	9.2	10.0	4.2	4.3	3.9	3.6	10.0	72.4	58.6	42.9	49.8	38.5	9.4	10.1	14.2	35.5	62.9	19.6	72.4
24-May	158.5	61.2	70.8	69.5	41.1	21.1	17.7	25.1	17.2	17.5	19.8	15.0	11.2	31.7	36.5	65.5	64.6	50.0	48.2	205.1	86.2	23.1	4.1	10.2	48.8	205.1
25-May	196.1	136.2	80.8	58.7	64.2	61.0	87.8	102.6	78.9	40.5	14.9	24.1	23.2	40.5	102.6	100.5	71.1	34.5	12.6	7.5	2.3	3.1	3.1	1.8	56.2	196.1
26-May	1.8	2.1	2.4	3.1	2.1	1.8	1.8	2.7	2.7	2.4	2.2	2.4	3.0	2.9	2.6	0.8	0.6	1.4	1.9	2.1	2.6	1.8	2.0	3.6	2.2	3.6
27-May	2.9	3.4	4.0	1.6	2.2	4.7	4.1	5.6	6.2	7.5	8.2	C	C	C	5.7	13.3	6.9	5.1	6.2	2.8	1.4	2.3	3.6	3.9	4.8	13.3
28-May	5.5	14.9	21.2	16.1	12.1	10.0	2.9	4.3	7.4	6.5	2.7	4.6	10.0	10.2	9.6	2.4	2.3	2.0	3.5	5.7	7.6	8.1	8.1	8.6	7.8	21.2
29-May	5.5	2.8	3.4	4.0	4.2	1.7	1.7	1.6	2.1	3.7	2.2	2.0	2.6	2.7	2.6	4.4	5.6	6.3	6.8	5.7	2.4	1.3	2.8	3.7	3.4	6.8
30-May	3.2	5.0	6.7	7.0	8.3	5.8	2.2	1.8	3.7	3.7	1.8	3.7	5.1	4.9	4.3	3.3	5.3	6.7	7.1	12.1	10.0	8.8	9.9	5.0	5.6	12.1
31-May	1.9	2.8	4.7	5.7	6.7	3.3	2.1	2.0	2.1	3.4	3.3	2.9	2.8	2.1	2.9	2.6	2.3	1.9	2.0	8.9	9.7	8.5	9.6	8.3	4.3	9.7
245.6 225.5 182.6 136.4 123.6 98.8 91.7 82.0 76.0 70.8 51.3 26.0 17.3 18.2 21.3 20.3 19.8 17.5 16.1 26.1 31.9 38.2 121.6 225.6 6070.2 5607.3 4542.9 3224.9 2993.4 2186.9 1929.6 1893.4 1902.2 1654.7 1055.9 402.2 166.0 98.1 146.2 148.4 209.2 190.7 160.2 205.1 240.9 237.0 2480.9 5699.0																								Diurnal Average Diurnal Maximum		
C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - May 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	328	44.44	44.44
6 - 15	194	26.29	70.73
16 - 25	50	6.78	77.51
26 - 80	79	10.70	88.21
> 81.0	63	8.54	96.75

Total Number of Valid Hours: 738

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - May 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	24	85	56	6	3	0	1	3	12	26	19	16	16	30	20	11	328
6 - 15	18	42	21	2	5	1	3	16	33	11	9	11	2	6	6	8	194
16 - 25	2	6	2	0	2	4	2	0	9	13	5	1	1	0	1	2	50
26 - 80	3	10	8	2	2	4	1	1	19	15	4	5	1	1	2	1	79
> 81.0	1	3	3	4	2	4	6	6	19	7	2	1	1	3	1	0	63
Totals	48	146	90	14	14	13	13	26	92	72	39	34	21	40	30	22	714

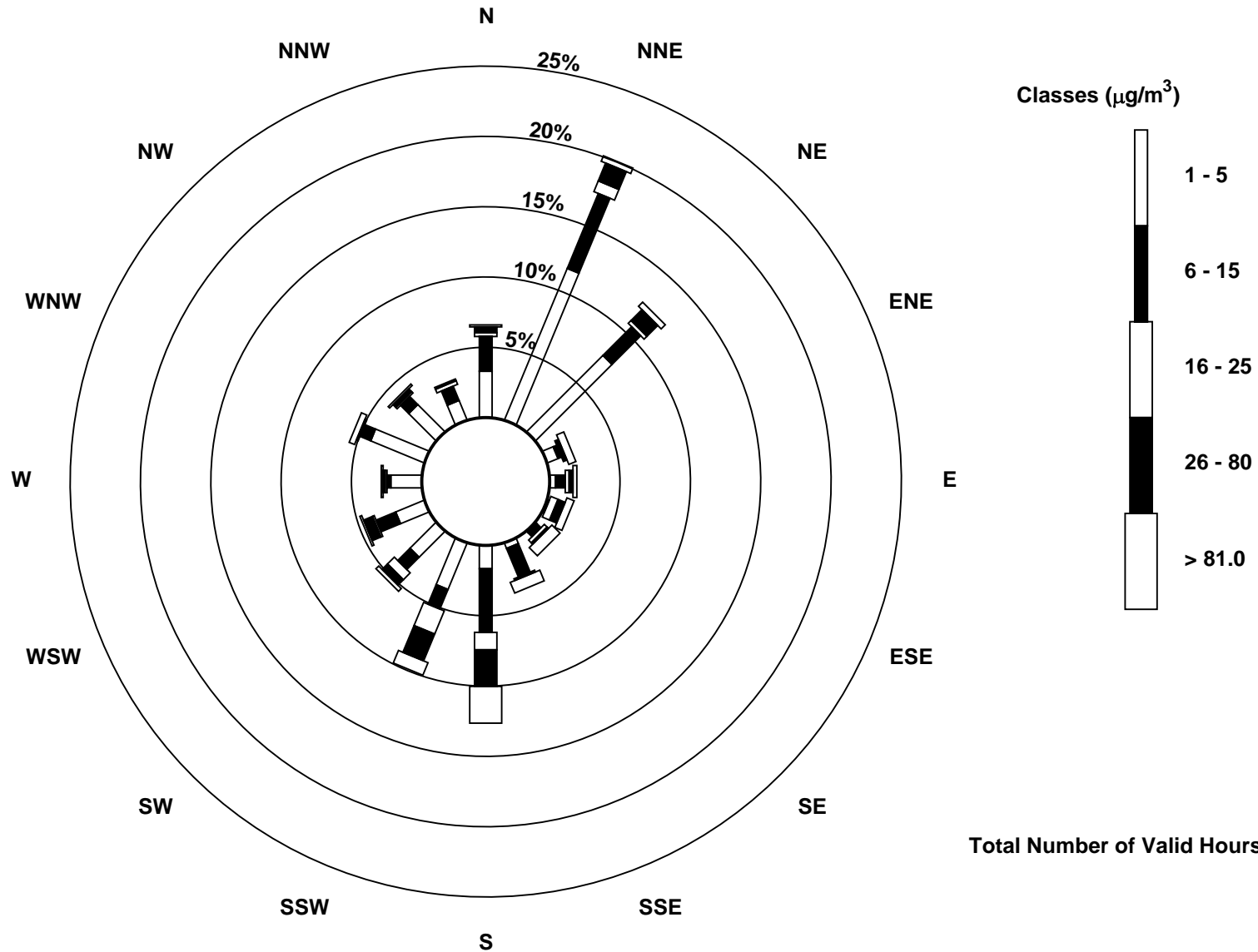
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River (AMS 16)



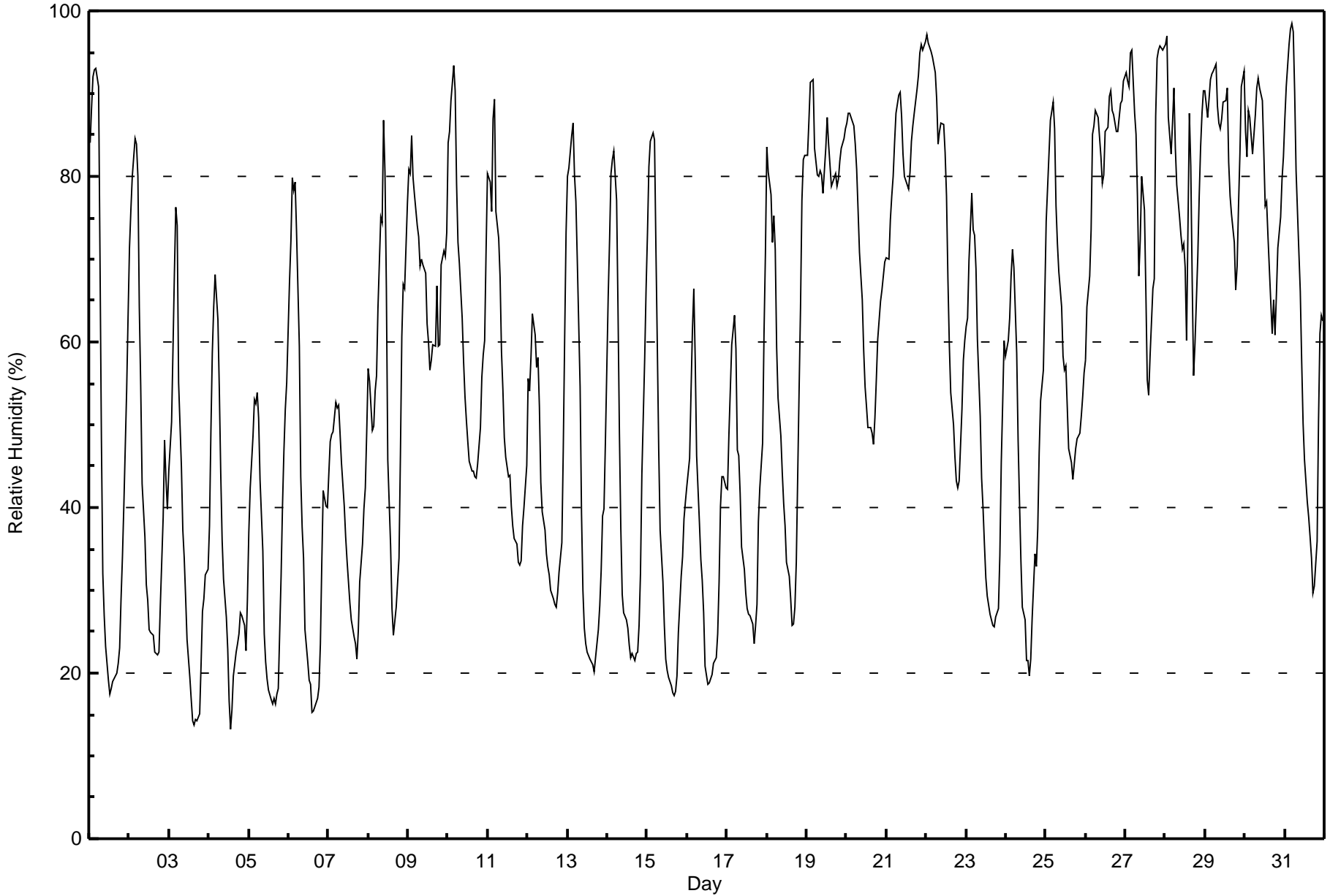


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Shell Muskeg River - May 2016**

Maximum Value: 99 % on May 31 05:00																			Maximum Daily Average: 85.0 % on May 29						Hours in Service: 744																			
Minimum Value: 13 % on May 4 14:00																			Minimum Daily Average: 34.3 % on May 4						Hours of Data: 744																			
Maximum Diurnal Average: 79.3 % at hour 5																			Minimum Diurnal Average: 39.0 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 56.6 %																			Percentiles: P ₁ = 16 P ₁₀ = 23 Q ₁ = 34 Median = 58 Q ₃ = 80 P ₉₀ = 88 P ₉₉ = 96						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-May	84	88	92	93	93	91	70	48	32	27	23	19	17	18	19	19	20	21	23	29	34	40	54	63	46.7	93																		
2-May	71	76	80	85	84	80	64	55	43	36	31	29	25	25	25	23	22	22	23	28	39	48	43	40	45.7	85																		
3-May	44	50	59	68	76	74	55	45	37	34	29	24	19	17	14	14	14	15	21	27	29	32	33	35.3	76																			
4-May	38	49	59	64	68	63	54	44	36	31	27	23	17	13	16	20	22	24	25	27	27	26	23	29	34.3	68																		
5-May	37	42	49	53	52	54	51	43	35	25	21	19	18	17	16	17	16	17	18	32	40	47	52	55	34.5	55																		
6-May	67	72	80	78	79	73	60	44	38	34	25	21	19	19	15	16	16	17	18	24	33	42	40	40	40.4	80																		
7-May	44	48	49	49	53	52	52	49	45	40	36	33	31	29	26	24	24	22	25	31	36	40	42	49	38.8	53																		
8-May	57	55	49	50	54	56	64	75	74	87	81	66	46	35	28	25	26	28	34	46	61	67	66	77	54.5	87																		
9-May	81	80	85	80	78	74	73	69	70	69	68	62	60	57	58	60	60	67	59	60	69	71	70	73	68.9	85																		
10-May	84	85	89	93	90	79	72	70	63	58	53	51	48	46	44	44	44	43	45	50	56	58	60	71	62.4	93																		
11-May	80	79	76	87	89	76	73	68	59	54	48	46	44	44	40	38	36	36	33	33	34	38	40	45	54.0	89																		
12-May	56	54	58	63	61	57	58	52	43	39	37	34	33	32	30	29	28	28	30	32	36	47	60	73	44.7	73																		
13-May	80	81	85	86	80	77	70	55	39	30	25	24	23	22	21	21	20	22	25	28	32	39	40	48	44.7	86																		
14-May	65	72	80	82	83	77	64	49	38	30	27	26	25	23	22	22	22	22	23	26	32	44	58	66	45.0	83																		
15-May	73	81	84	85	84	71	60	47	37	31	26	22	20	19	19	18	17	18	20	25	32	34	39	41	41.8	85																		
16-May	42	46	54	61	66	58	46	38	34	31	27	21	19	19	19	20	21	22	25	31	40	44	44	42	36.3	66																		
17-May	42	49	54	60	63	59	47	46	42	35	33	30	28	27	27	26	24	26	28	38	42	48	61	71	41.9	71																		
18-May	84	80	78	72	75	71	59	53	49	44	41	38	33	32	29	26	26	28	33	54	64	77	82	83	54.6	84																		
19-May	83	87	91	92	92	83	80	80	81	80	78	83	87	84	81	79	79	80	79	80	82	83	85	86	83.1	92																		
20-May	86	88	88	87	86	84	81	76	71	65	59	55	52	50	50	49	48	51	55	60	65	66	68	70	67.0	88																		
21-May	70	70	75	78	80	84	88	90	90	87	83	80	79	78	80	84	86	88	91	92	95	96	95	96	84.8	96																		
22-May	97	96	96	95	94	93	89	84	85	86	86	83	78	68	60	54	50	46	43	42	43	52	58	60	72.4	97																		
23-May	62	63	70	78	74	73	69	60	51	44	40	36	32	29	27	26	26	26	27	28	34	45	53	60	47.1	78																		
24-May	58	60	63	68	71	69	59	48	41	34	28	26	22	22	20	22	27	34	33	38	47	53	57	65	44.3	71																		
25-May	75	79	83	87	89	86	76	72	69	64	58	57	57	52	47	45	43	45	47	48	49	51	53	56	62.0	89																		
26-May	58	64	68	74	85	86	88	87	85	82	79	80	86	86	90	90	88	87	85	85	87	89	89	92	83.0	92																		
27-May	92	92	91	95	95	88	85	78	68	72	80	76	66	55	54	58	66	68	87	94	95	96	95	96	80.9	96																		
28-May	96	97	87	83	86	91	83	79	75	73	71	72	69	60	88	81	67	56	60	70	78	84	88	90	78.5	97																		
29-May	90	87	89	92	92	93	94	89	86	86	87	89	89	91	82	78	75	72	66	69	77	83	91	93	85.0	94																		
30-May	85	82	88	87	83	85	88	91	92	91	89	83	76	77	73	65	61	65	61	66	71	75	80	82	79.0	92																		
31-May	87	91	96	98	99	97	90	81	71	66	58	50	46	41	39	36	34	30	31	36	51	61	63	62	63.0	99																		
																			70.0	72.4	75.6	78.2	79.3	75.9	69.7	63.4	57.3	53.8	50.2	47.0	44.0	41.5	40.6	39.6	39.0	39.5	40.9	45.9	51.9	57.2	60.7	64.7	Diurnal Average	
																			97	97	96	98	99	97	94	91	92	91	89	89	89	91	90	90	88	88	91	94	95	96	95	96	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	42	5.65	5.65
20 - 40	183	24.60	30.24
40 - 60	176	23.66	53.90
60 - 80	164	22.04	75.94
80 - 100	179	24.06	100.00

Total Number of Valid Hours: 744

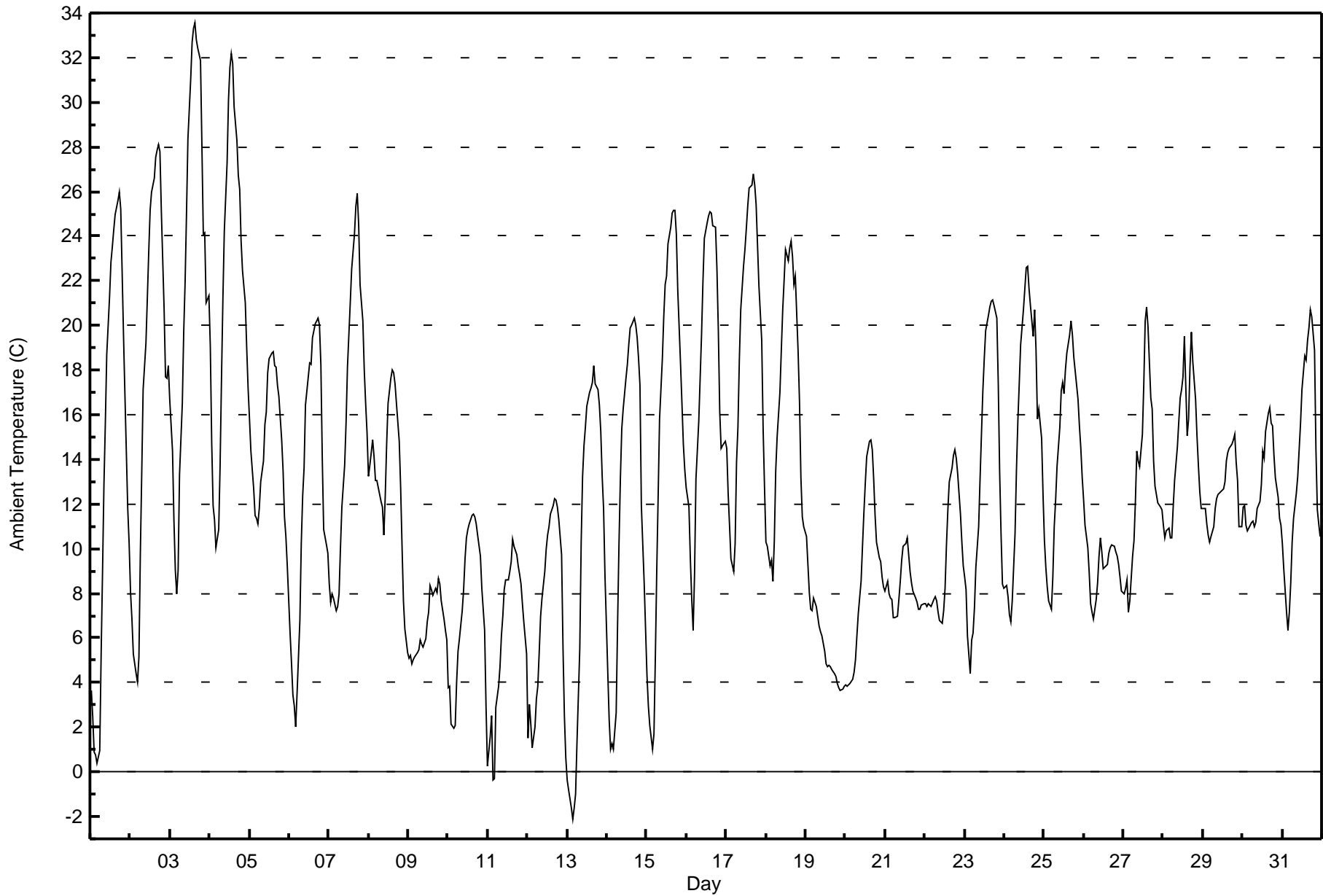
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Shell Muskeg River - May 2016

Maximum Value: 33.5 C on May 3 16:00 Minimum Value: -2.1 C on May 13 04:00 Maximum Diurnal Average: 18.5 C at hour 17 Monthly Average: 12.97 C		Maximum Daily Average: 22.5 C on May 3 Minimum Daily Average: 5.8 C on May 19 Minimum Diurnal Average: 6.2 C at hour 5 Percentiles: P ₁ = -0.3 P ₁₀ = 4.9 Q ₁ = 8.0 Median = 11.9 Q ₃ = 17.6 P ₉₀ = 22.5 P ₉₉ = 31.6		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	3.7	2.4	0.9	0.8	0.4	1.0	5.2	9.0	12.9	15.6	18.7	21.3	22.8	23.6	24.3	25.0	25.6	26.0	25.2	22.4	19.5	16.9	11.8	10.2	14.4	26.0
2-May	8.0	6.8	5.2	4.4	4.0	5.1	9.7	13.4	17.1	19.2	21.2	23.3	25.2	26.0	26.6	27.6	27.9	28.1	27.8	25.2	20.7	17.7	17.6	18.2	17.7	28.1
3-May	16.7	14.4	11.3	9.0	8.0	9.0	13.3	16.5	19.7	22.0	25.0	28.4	31.0	32.7	33.3	33.5	32.8	32.4	31.9	28.0	24.1	24.2	21.0	21.3	22.5	33.5
4-May	19.1	14.7	11.9	11.3	10.1	10.8	13.7	17.6	21.2	24.2	27.3	30.1	31.5	32.2	31.8	29.8	28.3	26.7	26.1	23.8	22.5	21.0	19.0	17.2	21.7	32.2
5-May	15.8	14.4	12.7	11.5	11.4	11.1	11.8	13.0	13.9	15.6	16.1	17.9	18.5	18.7	18.8	18.2	18.1	17.3	16.8	14.9	13.5	11.4	10.5	9.2	14.6	18.8
6-May	6.2	4.9	3.5	3.0	2.0	3.5	6.8	10.2	12.4	13.6	16.5	17.7	18.3	18.3	19.5	19.8	20.0	20.4	20.0	18.3	14.1	10.9	10.2	9.8	12.5	20.4
7-May	8.4	7.6	8.0	7.8	7.2	7.4	8.0	10.1	11.8	13.7	15.6	18.1	19.6	21.0	22.5	24.1	25.3	25.9	24.6	21.8	20.2	18.0	16.5	15.2	15.8	25.9
8-May	13.2	13.8	14.9	14.1	13.1	13.0	12.8	12.1	11.9	10.6	12.4	14.7	16.5	17.6	18.0	17.9	17.4	16.5	14.8	12.8	10.1	7.7	6.4	5.3	13.2	18.0
9-May	5.1	5.2	4.8	5.0	5.2	5.3	5.4	5.9	5.7	5.6	6.0	6.7	7.2	8.3	8.2	7.9	8.2	8.1	8.7	8.4	7.6	6.8	6.4	5.9	6.6	8.7
10-May	3.8	3.8	2.1	1.9	2.1	4.0	5.4	6.0	7.2	8.2	9.5	10.5	10.9	11.1	11.5	11.5	11.4	11.1	10.6	9.7	8.2	7.3	6.4	3.0	7.4	11.5
11-May	0.2	1.6	2.5	-0.4	-0.3	2.9	3.9	4.7	6.1	7.0	8.2	8.6	8.6	9.0	9.4	10.4	10.1	9.8	9.2	8.8	8.4	7.5	6.7	5.3	6.2	10.4
12-May	1.5	3.0	2.1	1.1	2.0	3.3	3.9	5.3	7.0	7.8	9.0	10.0	10.6	11.0	11.5	11.9	12.3	12.2	11.9	11.3	9.7	5.6	2.5	0.6	7.0	12.3
13-May	-0.4	-0.8	-1.6	-2.1	-1.6	-1.0	1.3	5.5	10.3	13.2	14.6	15.4	16.3	17.0	17.2	17.4	18.2	17.4	17.1	16.4	15.2	13.3	11.8	8.8	10.0	18.2
14-May	4.5	2.3	1.0	1.3	1.0	2.6	6.6	10.2	13.1	15.4	16.3	17.6	18.3	19.1	19.9	20.0	20.3	20.0	19.5	18.5	17.3	11.9	8.5	6.4	12.2	20.3
15-May	4.4	2.9	2.1	1.0	1.7	5.1	9.0	12.4	15.8	18.5	20.4	21.9	22.2	23.6	24.4	25.0	25.1	25.1	24.1	21.6	18.2	16.5	14.7	13.6	15.4	25.1
16-May	12.8	11.9	9.5	7.7	6.3	8.9	13.1	15.7	17.7	19.5	21.9	23.9	24.6	24.9	25.1	25.1	24.5	24.4	22.6	19.8	16.1	14.5	14.6	14.8	17.5	25.1
17-May	14.5	12.5	11.1	9.6	9.0	10.2	13.9	15.4	18.5	20.7	22.6	23.4	24.4	25.4	26.2	26.3	26.8	26.3	25.4	23.6	21.7	19.3	15.4	12.8	19.0	26.8
18-May	10.3	10.1	9.2	9.5	8.6	10.4	13.5	15.0	17.0	18.9	20.7	22.0	23.4	22.9	23.5	23.8	23.1	21.8	22.2	18.8	16.6	13.2	11.4	11.0	16.5	23.8
19-May	10.5	9.3	8.1	7.3	7.2	7.8	7.4	7.0	6.5	6.3	6.1	5.4	4.8	4.7	4.8	4.7	4.6	4.4	4.3	4.0	3.8	3.7	3.7	3.9	5.8	10.5
20-May	3.9	3.9	3.9	4.0	4.2	4.5	5.1	6.1	7.1	8.5	10.1	11.6	12.9	14.1	14.8	14.9	14.4	13.1	11.5	10.3	9.6	9.4	8.7	8.3	9.0	14.9
21-May	8.1	8.5	8.0	7.8	7.7	6.9	6.9	6.9	7.7	8.5	9.5	10.1	10.3	10.5	9.7	9.0	8.5	8.1	7.8	7.6	7.3	7.3	7.5	7.5	8.2	10.5
22-May	7.5	7.4	7.5	7.4	7.4	7.7	7.8	7.7	7.2	6.8	6.7	7.2	8.2	10.2	11.7	13.0	13.6	14.2	14.4	14.1	13.4	11.6	10.3	9.2	9.7	14.4
23-May	8.7	8.1	6.1	4.4	5.9	6.2	7.3	9.2	11.0	13.1	15.1	17.1	18.5	19.8	20.4	20.8	21.1	21.2	20.9	20.3	17.5	13.4	10.7	8.4	13.6	21.2
24-May	8.2	8.3	7.8	7.0	6.7	7.6	10.7	13.5	15.7	17.4	19.1	20.7	21.7	22.6	22.7	21.7	20.9	19.5	20.7	18.9	15.8	16.3	15.0	12.4	15.5	22.7
25-May	10.3	9.2	8.3	7.7	7.3	8.7	11.0	12.2	13.7	15.4	17.1	17.5	17.0	18.0	18.8	19.6	20.2	19.6	18.6	17.9	16.7	15.5	14.5	13.2	14.5	20.2
26-May	12.2	11.0	10.0	8.9	7.5	7.2	6.9	7.7	8.5	9.7	10.5	9.9	9.1	9.2	9.3	9.8	10.1	10.2	10.1	9.9	9.7	9.3	8.7	8.1	9.3	12.2
27-May	8.0	8.2	8.6	7.2	7.7	9.7	10.3	12.1	14.4	14.0	13.7	15.1	17.4	20.2	20.8	20.0	16.8	16.2	13.9	12.8	12.4	12.1	11.9	11.7	13.1	20.8
28-May	11.0	10.5	10.8	10.9	10.5	10.5	11.8	13.0	14.6	15.7	16.8	17.1	17.7	19.5	15.0	15.8	18.2	19.7	18.4	16.7	15.1	13.8	12.5	11.8	14.5	19.7
29-May	11.8	11.8	11.1	10.6	10.3	10.5	11.0	11.8	12.3	12.5	12.5	12.6	12.7	13.0	13.9	14.3	14.5	14.7	14.9	15.1	13.9	13.1	11.0	11.0	12.5	15.1
30-May	11.9	12.0	11.0	10.8	11.1	11.2	11.3	11.0	11.1	11.8	12.1	12.9	14.4	14.0	15.2	16.1	16.3	15.6	15.5	14.2	13.2	12.3	11.4	11.1	12.8	16.3
31-May	10.2	9.1	7.2	6.3	7.1	8.5	10.3	11.4	12.5	13.2	14.4	15.6	17.1	18.6	18.5	19.3	19.9	20.7	20.4	18.9	14.4	11.7	11.1	10.6	13.6	20.7
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Shell Muskeg River - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	8	1.08	1.08
0 - 10	261	35.08	36.16
10 - 20	354	47.58	83.74
> 20	121	16.26	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Barometric Pressure (BP) - inHg

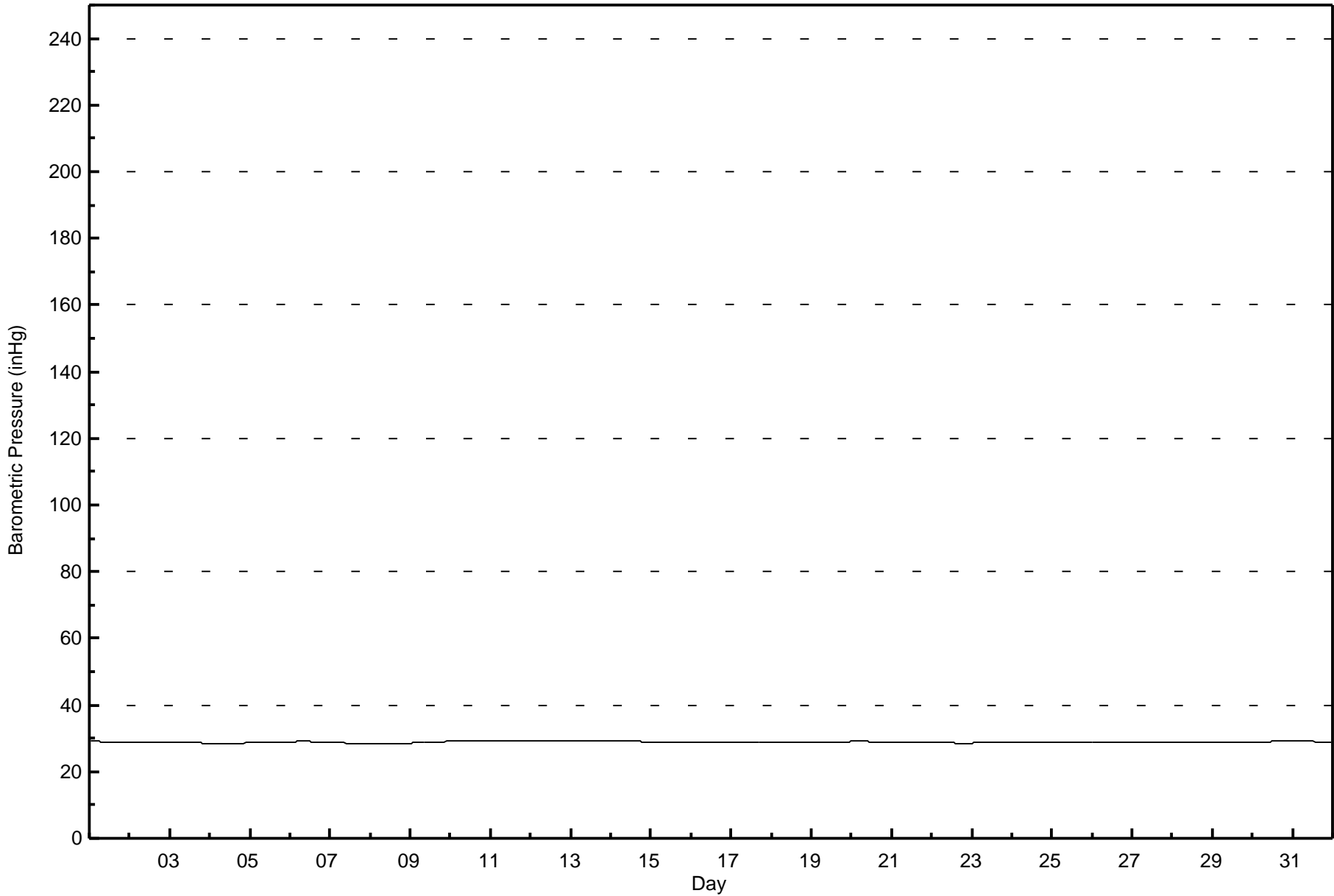
Shell Muskeg River - May 2016

Maximum Value: 29.4 inHg on May 12 08:00		Maximum Daily Average: 29.3 inHg on May 12		Hours in Service: 744																																
Minimum Value: 28.2 inHg on May 8 04:00		Minimum Daily Average: 28.3 inHg on May 8		Hours of Data: 744																																
Maximum Diurnal Average: 28.9 inHg at hour 8		Minimum Diurnal Average: 28.8 inHg at hour 18		Hours of Missing Data: 0																																
Monthly Average: 28.86 inHg		Percentiles: P ₁ = 28.3 P ₁₀ = 28.6 Q ₁ = 28.7 Median = 28.8 Q ₃ = 29.0 P ₉₀ = 29.2 P ₉₉ = 29.4		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-May	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	28.8	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	29.0	29.0			
2-May	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	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	28.8	28.9	29.0		
3-May	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	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8		
4-May	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	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	28.7		
5-May	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	28.9	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	29.0		
6-May	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	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	29.0	29.1		
7-May	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.6	28.8		
8-May	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.5	28.5	
9-May	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	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	29.1	29.1		
10-May	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	
11-May	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	
12-May	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	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	
13-May	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	
14-May	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.3	
15-May	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	28.8	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	29.0
16-May	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	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	28.8
17-May	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8
18-May	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	28.6	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	28.8
19-May	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	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
20-May	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	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
21-May	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	28.7	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	28.9
22-May	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.7	28.7	28.6	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7
23-May	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	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
24-May	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	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
25-May	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	28.8	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
26-May	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
27-May	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.8	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-May	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.8	28.8	28.8	28.8	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
29-May	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
30-May	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
31-May	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	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	29.0	29.1
		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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	Diurnal Average
		29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - May 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Shell Muskeg River - May 2016

Maximum Speed: 37 km/h on May 19 17:00	Maximum Daily Speed Average: 27.8 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 24 18:00	Minimum Daily Speed Average: 0.8 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 8.8 km/h at hour 20	Minimum Diurnal Speed Average: 1.2 km/h at hour 4	Hours of Missing Data: 0
Monthly Average Velocity: 4.2 km/h 5.4 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 18 P ₉₀ = 23 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-May	S6	S7	SSW7	S9	S7	S11	S9	S9	S10	SSW11	S14	SW15	WSW17	WSW15	WSW15	WSW11	WSW11	WNW15	NW11	NW9	NNW9	NNW7	NNW1	SW5	SW6.6	WSW17
2-May	SSW2	S4	SSE4	S7	SSE5	SSE6	S2	E2	NNW4	NNW5	N6	NE6	NNW6	NE6	NE11	ENE9	E8	E9	E8	E7	ESE6	SE6	SSE7	S6	E3.0	NE11
3-May	W4	WSW3	SSW3	SSW5	SSW6	SSW5	SSW5	S10	SSW11	S9	SSW11	S11	SSW11	SSW12	SSW14	SSW14	SSW16	SSW14	S11	S9	S9	ENE4	SE9	SSW9	SSW8.1	SSW16
4-May	S7	S7	SSW7	SSW8	S8	S7	S8	SSE5	S4	SSW6	SW8	SW10	WSW12	SW12	W20	WNW27	WNW25	WNW23	WNW24	WNW18	WNW19	WNW21	WNW17	NW14	W9.7	WNW27
5-May	NW13	NW21	NW13	NW8	NW8	W8	W10	W11	WNW12	NW14	WNW17	WNW19	WNW24	WNW23	WNW22	NW21	NW21	NW20	NW17	NNE17	NNE16	NE13	NE12	N5	NW12.5	WNW24
6-May	WSW8	WSW6	WSW4	WSW6	SW5	WSW6	SW5	WNW8	NW7	ENE3	WNW13	WNW15	NW12	NNW9	W8	W6	W11	WNW10	WSW8	WSW7	S5	S7	S9	S8	W5.5	WNW15
7-May	SSE8	SSE8	SSW5	S6	S6	S8	S8	S9	S7	S9	SSW11	S9	SSE7	ESE5	ESE11	ESE9	ESE5	SSW10	SSE6	E7	ENE9	ENE5	ENE3	E1	SSE5.4	ESE11
8-May	E1	NNE6	NNE11	N9	NW9	NW6	SW6	W22	W19	WSW11	SW9	SW13	WSW21	SW24	WSW23	SW32	SW31	SW31	WSW26	WNW20	NW19	NNW20	NW18	NW18	W12.4	SW32
9-May	WNW17	WNW14	W13	WSW15	W18	W19	WSW18	W17	WNW19	WNW20	WNW16	WNW16	WNW17	WNW17	NW16	WNW17	WNW14	NW12	WNW9	NW10	NNE17	NNE19	N10	WNW6	WNW12.8	WNW20
10-May	W8	W10	W8	WNW6	WNW8	NNW11	NNE12	NNE10	NNE8	NE11	NE13	NE17	NE21	NE20	NE21	NE21	NE21	NNE22	NNE23	NE21	NE15	NE18	NE16	ENE7	NNE11.7	NNE23
11-May	ENE6	NE13	NE9	NNE3	NNW4	N10	NNE17	NE17	NNE17	NE21	NNE20	NNE21	NE25	NE24	NE23	NNE21	NNE23	NNE23	NNE23	NNE22	NE20	NE16	NE15	NE14	NNE16.6	NE25
12-May	NNE9	NNE12	NNE8	NE7	NNE15	NNE17	NNE10	NNE12	NNE14	NE21	NNE17	NE19	NNE19	NE20	NE20	NE19	NNE18	NNE20	NNE19	NE19	ENE12	ENE9	WSW3	SW4	NE13.5	NE21
13-May	S5	S5	S7	SSW7	S8	S8	SSW7	S6	SSW5	SW5	SW4	W4	W9	WNW9	W11	NW7	NW11	N10	NE12	NE16	NE13	NE13	NE14	NE8	NNW0.8	NE16
14-May	SE3	S3	S4	SSE4	S4	S4	SSE4	SSW5	WSW5	WSW6	NE5	NNE7	ENE7	NE6	NNE5	NE12	NE10	NE16	NE18	NE16	E2	SW4	WSW3	ENE3.5	NE18	
15-May	SE4	SSE5	S7	S8	S7	S7	SSW6	SSW7	SSW7	SSW10	SW10	WSW6	NNE6	W5	S5	SSW8	S9	S11	S11	S10	S9	SSW12	S12	S12	S7.1	S12
16-May	S11	S7	SSE6	SSE6	SSE9	S9	S9	S10	S9	S11	S11	SSW17	SSW18	S18	SE16	SE13	SE12	SE11	ESE9	ESE6	ESE4	SE4	SE4	S6	SSE8.6	S18
17-May	S7	S7	SW9	SSW8	SSW7	SSW11	SSW12	SW11	WSW12	WNW11	W8	WNW3	N2	WNW4	WSW8	WSW16	WSW9	NE3	E6	NE12	NE12	NE9	NW6	WSW4	WSW3.7	WSW16
18-May	SSW7	SSW7	SSE5	S7	S8	S10	SSW9	SSW11	SSW10	SW16	SW15	SW18	WSW22	SW24	WSW22	WSW15	W17	WSW9	NE10	NNE22	NNE25	NNE26	N23	NNE24	WSW4.8	NNE26
19-May	NNE25	N23	N27	N28	N25	NNE27	NNE30	NNE30	NNE28	NNE28	NNE27	NNE29	NNE32	NNE31	NNE29	NNE32	NNE37	NNE31	NNE28	NNE27	NNE25	NNE25	NNE26	NNE26	NNE27.8	NNE37
20-May	NNE24	NNE23	NNE23	NNE24	NNE25	NNE23	NNE24	NE24	NE24	NE21	NE22	NE23	NE24	NNE23	NNE24	NNE22	N23	N22	N20	N20	NNE22	NNE15	N13	N10	NNE21.0	NNE25
21-May	NNW7	NNE12	NE16	NE18	NE17	NNE22	NE16	NE16	N14	N17	N16	NNE18	NNE18	NNE17	NNE20	NNE20	NNE20	NNE20	NNE18	N17	N19	N19	N16	NNE18	NNE16.6	NNE22
22-May	NNE18	N17	N16	N20	N22	NNE20	NNE21	NNE28	NNE23	NNE27	NNE27	NNE26	NNE25	NNE25	NNE27	NNE29	NNE29	NNE28	NNE27	NNE26	NNE21	N18	N23	N21	NNE23.3	NNE29
23-May	NNE19	NNE19	NNE12	NNE11	NNE20	NNE19	NNE15	NE17	NE17	NE17	NE20	NE16	NNE19	NE18	NNE16	NNE16	NE15	NE16	NE15	ENE9	ESE7	SSE8	S7	S7	NE12.8	NNE20
24-May	S10	S13	S11	S9	S7	S6	S9	S10	SSW10	SW12	SSW14	S17	SSW18	S18	S16	SSW10	W8	WNW1	ESE5	ESE7	S10	SSW11	SSW11	S8	S9.6	SSW18
25-May	S8	S8	SSW8	SSW7	S6	SSW4	SSW2	ENE3	NE8	NE11	NNE14	NNE18	NE18	NNE15	NNE19	NNE19	N20	N19	NNE22	NNE18	NNE22	NNE22	NNE24	NNE24	NNE10.5	NNE24
26-May	NNE24	NNE24	N20	NNE22	N18	NNE19	NNE20	NE19	NE18	N16	N19	NNW16	N18	NNE18	NNE17	N16	N18	N18	NNE21	NNE18	NNE18	NNE18	NNE15	NNE17	NNE18.1	NNE24
27-May	NNE15	NNE14	NNE12	NE4	NE6	NE11	ENE8	E8	SE9	SSE11	SSW3	E5	NE9	E7	NNE5	W6	WSW13	SSW11	S11	SE8	E7	S3	SW7	E5	E3.0	NNE15
28-May	S3	SE3	ESE6	ESE7	SSW6	SSE4	SSE6	SSE7	SSE9	SW7	WSW5	NW6	NE3	S12	S13	SSW7	SSW5	SW8	SW9	SW9	S6	SSE5	S6	SSW6	S5.0	S13
29-May	SSW5	SSW6	SW9	SSW7	SSW8	SSW4	SSW4	SW4	SSW5	SW6	SW7	SW7	SSW6	S4	NE4	NNE9	NE13	NE14	NE13	NE15	NE12	NE13	E1	NNW5	E0.8	NE15
30-May	NNW8	N7	NW7	NW3	NNW9	NNW12	NNW9	NNW10	NNW9	N10	NNE14	NNE16	NE17	NW13	NW15	NNW14	NNW14	NNW13	N17	N18	N16	NNE12	N11	NNE10	N10.6	N18
31-May	N7	SW1	SSW4	S4	S3	SSW3	SSW4	NNW6	NW6	WNW6	N5	NE3	W4	SW6	NW6	SW5	S8	SW6	SSW8	S6	SSE9	SSE8	SSE9	SSW9	SSW2.6	SSE9

N2.6	N2.6	N1.9	N1.2	N1.9	N2.4	NNE1.7	NNE2.4	N2.8	N3.0	N3.9	N4.3	N5.2	N3.9	N4.8	NNW5.9	NNW6.4	N6.5	NNE6.9	NNE8.8	NNE8.8	NNE7.2	NNE4.7	N3.6	Diurnal Average	
NNE25	NNE24	N27	N28	N25	NNE27	NNE30	NNE30	NNE28	NNE28	NNE29	NNE32	NNE31	NNE29	SW32	NNE37	SW31	NNE28	NNE27	NNE25	NNE26	NNE26	NNE26	Diurnal Maximum		

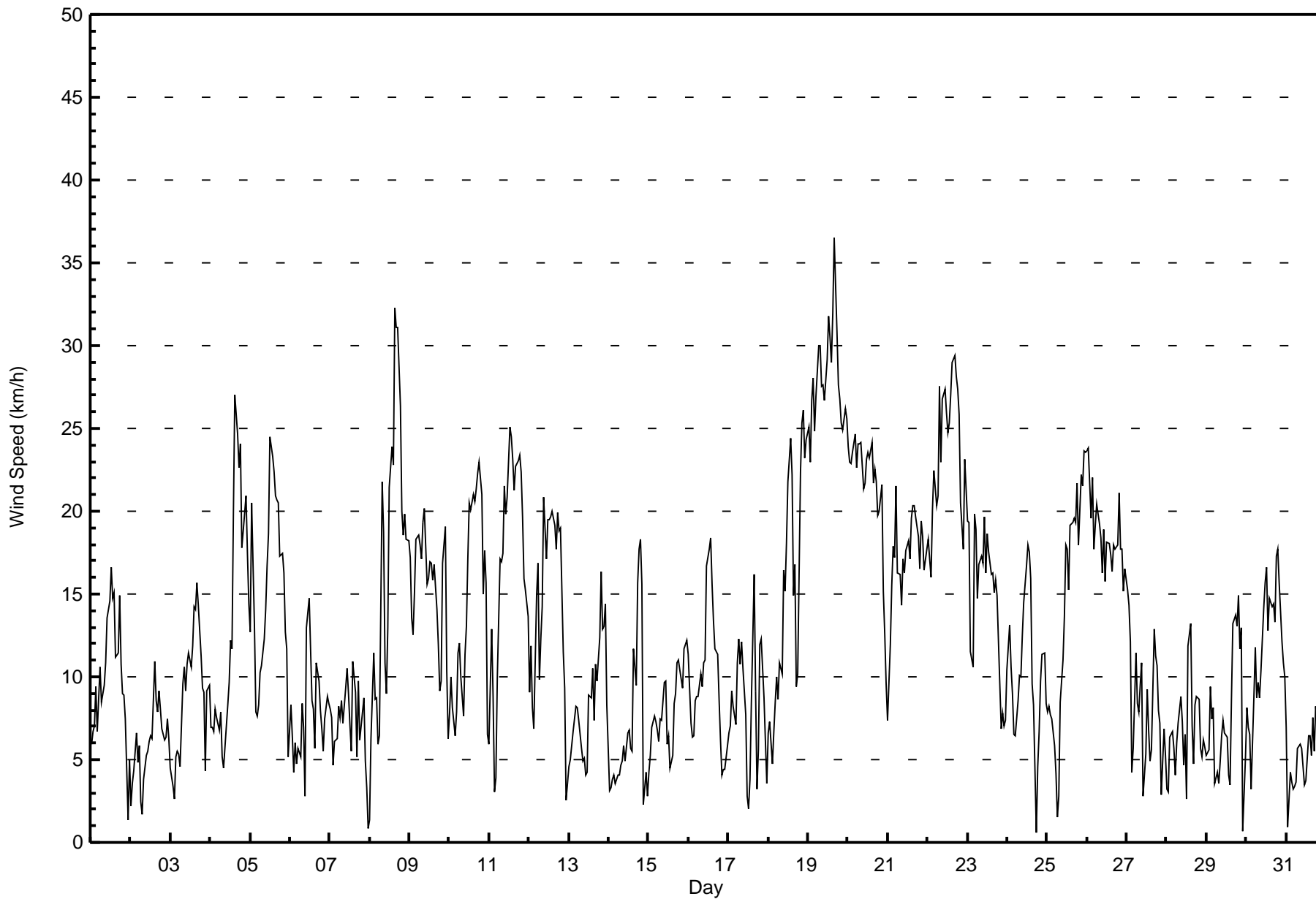
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Shell Muskeg River - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on May 18 19:00 Minimum Value: 0 km/h on May 14 04:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1	2	1	1	2	1	2	2	2	3	4	5	5	4	5	4	5	5	3	2	2	1	2	1	5
2-May	1	2	2	1	1	1	1	1	2	2	2	2	2	3	4	3	2	3	2	1	1	1	2	2	4
3-May	1	1	1	1	1	1	2	3	3	2	3	3	3	4	6	6	5	5	3	2	3	3	2	5	6
4-May	2	1	2	2	1	1	3	2	1	2	3	3	4	6	9	6	6	6	6	4	4	5	3	4	9
5-May	3	5	4	2	2	2	3	2	4	5	4	6	7	7	6	7	7	6	6	5	3	2	3	2	7
6-May	2	2	2	2	2	2	2	2	2	2	6	5	5	4	4	5	5	4	3	3	1	2	2	2	6
7-May	1	1	2	1	1	2	2	2	2	3	3	3	3	2	3	3	2	3	3	2	2	2	2	2	3
8-May	1	3	3	3	4	4	3	5	5	6	3	6	5	6	6	6	7	5	4	6	7	7	6	6	7
9-May	5	5	2	3	4	4	3	4	4	4	4	4	4	5	4	4	4	5	2	3	4	4	3	1	5
10-May	1	1	2	2	2	3	3	2	3	3	4	4	4	4	4	4	4	4	4	4	4	2	4	2	4
11-May	1	3	5	2	2	3	3	3	3	3	5	5	4	4	5	5	5	5	5	4	4	3	3	3	5
12-May	3	3	2	4	4	2	3	3	3	4	5	5	5	4	4	4	4	5	4	3	3	2	1	1	5
13-May	1	1	1	1	1	1	2	1	2	3	3	4	3	5	5	5	5	4	4	2	2	2	3	4	5
14-May	1	1	1	0	0	1	1	1	1	2	3	4	4	4	4	4	4	4	3	3	3	3	1	1	4
15-May	2	1	1	1	1	1	2	2	2	3	2	3	3	3	3	4	3	3	3	3	2	2	2	3	4
16-May	3	3	2	2	2	1	2	3	3	3	3	7	6	5	4	3	3	4	3	2	1	1	1	1	7
17-May	2	2	1	2	2	2	4	3	3	3	3	2	2	2	4	4	3	2	2	3	2	4	2	1	4
18-May	1	2	1	2	2	2	2	4	3	5	4	5	5	5	4	5	4	4	10	6	6	6	5	5	10
19-May	5	5	6	5	5	6	7	6	6	6	6	7	7	7	7	7	8	8	6	6	6	6	6	6	8
20-May	5	5	5	5	4	5	4	4	4	4	4	5	4	4	4	4	4	5	4	4	4	4	4	3	5
21-May	2	4	3	3	3	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	3	4	4
22-May	4	4	3	4	4	4	5	5	5	6	5	5	5	5	6	6	6	6	6	5	4	4	5	5	6
23-May	4	4	5	5	3	3	3	3	3	3	4	4	4	4	5	4	5	3	3	4	1	3	1	1	5
24-May	2	2	2	2	2	1	3	3	2	4	4	5	6	6	6	4	2	2	1	2	2	3	3	2	6
25-May	1	2	2	2	2	1	1	2	2	3	4	4	3	3	4	4	4	5	4	3	3	4	4	4	5
26-May	4	5	4	5	5	4	4	3	4	4	5	5	6	8	5	4	4	4	4	4	3	3	3	3	8
27-May	3	2	3	2	3	2	2	3	4	4	2	2	4	3	3	6	5	4	3	4	3	2	3	2	6
28-May	1	1	2	2	2	1	2	2	3	2	2	2	2	4	6	2	2	3	3	3	1	1	1	1	6
29-May	2	1	2	2	2	2	1	1	1	2	2	1	2	1	3	3	2	3	2	2	2	3	3	2	3
30-May	2	4	1	2	3	2	2	3	3	5	3	3	3	4	5	5	5	4	4	5	4	3	3	3	5
31-May	2	2	1	1	1	1	1	3	2	2	2	2	3	4	3	3	3	2	3	2	1	2	2	3	4
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Shell Muskeg River - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	107	14.38	14.38
6 - 11	289	38.84	53.23
12 - 19	208	27.96	81.18
20 - 28	126	16.94	98.12
29 - 38	14	1.88	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - May 2016

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	3	6	5	7	4	5	9	15	20	10	7	4	3	1	5	107
6 - 11	10	12	16	8	9	9	5	19	76	43	18	14	14	9	15	12	289
12 - 19	23	52	49	1	0	0	3	0	10	11	7	10	6	19	12	5	208
20 - 28	14	68	20	0	0	0	0	0	0	0	2	5	1	11	4	1	126
29 - 38	0	11	0	0	0	0	0	0	0	0	3	0	0	0	0	0	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	146	91	14	16	13	13	28	101	74	40	36	25	42	32	23	744

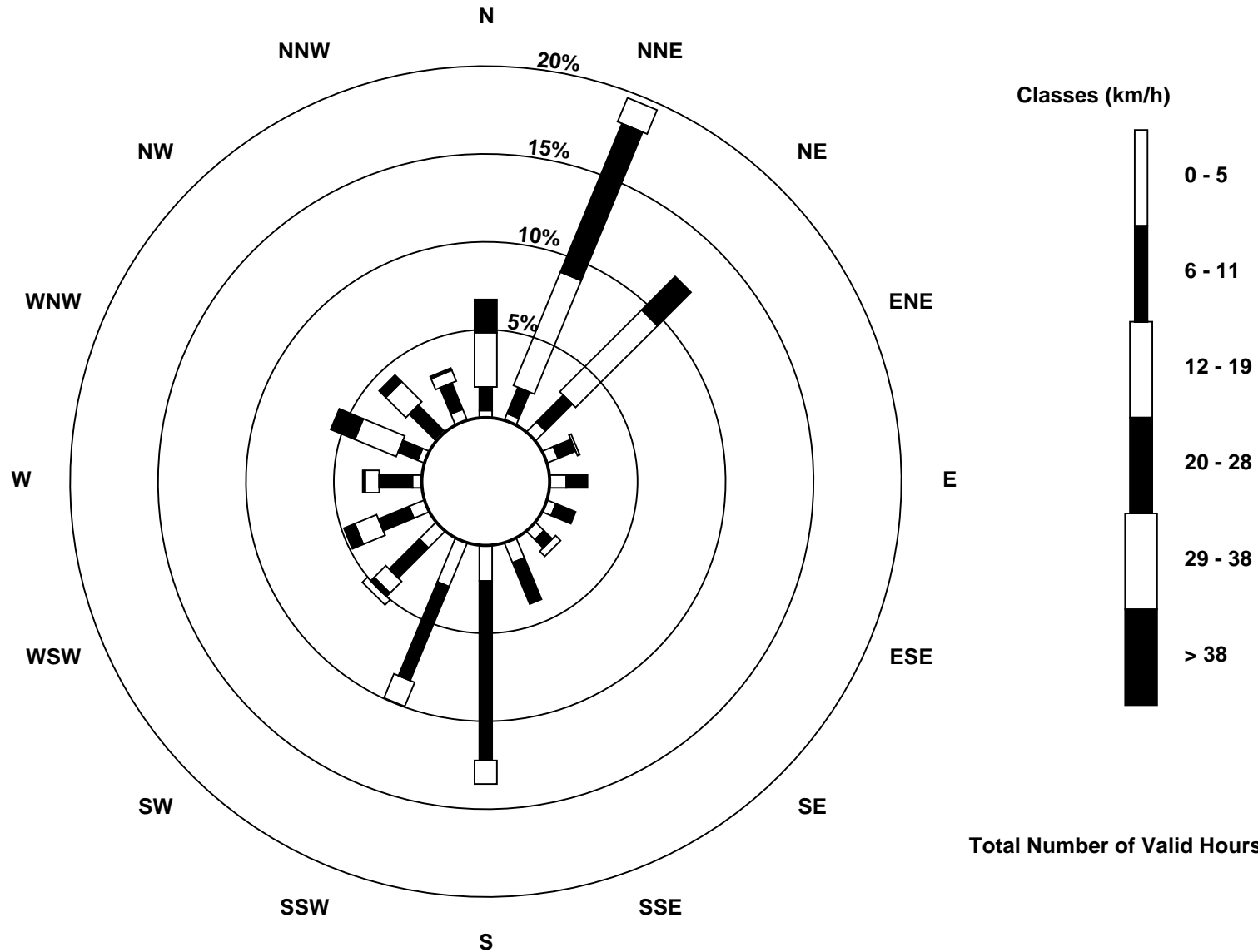
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Shell Muskeg River (AMS 16)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Shell Muskeg River - May 2016

Direction of Maximum Speed: 24 deg on May 19 17:00 Direction of Maximum Daily Speed Average: 16.9 deg on May 19	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 294 deg on May 24 18:00 Direction of Minimum Daily Speed Average: 0.8 deg on May 13	Percent Operational Time: 100.0
Monthly Average Direction: 243.9 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-May	186	183	196	180	189	178	176	184	184	195	189	218	239	240	249	246	252	296	314	316	338	330	328	216	228.2
2-May	210	178	154	178	151	168	176	87	343	334	10	40	345	37	52	77	83	82	90	91	115	146	166	176	97.4
3-May	279	256	209	197	207	210	202	182	194	187	203	184	193	199	199	207	212	201	191	178	186	62	127	194	195.2
4-May	172	171	201	199	177	178	191	168	189	211	226	230	254	229	281	297	294	292	293	288	293	289	283	305	267.2
5-May	311	305	310	311	311	263	262	277	298	316	300	287	291	290	289	311	306	309	313	14	33	53	36	1	310.7
6-May	245	238	250	239	236	252	219	299	311	65	296	285	304	331	268	275	277	284	251	242	181	171	180	185	262.1
7-May	168	164	195	181	171	182	182	180	183	190	197	185	166	109	123	102	117	201	151	88	61	75	77	89	157.3
8-May	100	17	17	11	320	325	225	271	278	243	226	227	242	234	238	234	228	234	238	289	316	331	310	304	263.6
9-May	303	287	264	254	264	267	256	272	282	287	296	303	298	302	305	292	295	304	290	307	19	28	351	300	294.3
10-May	265	267	261	300	301	345	21	32	18	54	43	44	44	38	41	35	34	31	32	44	50	45	47	64	30.9
11-May	66	51	40	24	345	351	30	34	26	38	15	23	35	40	36	17	22	16	16	25	35	45	37	35	28.7
12-May	30	27	23	35	30	30	31	33	23	46	32	34	32	40	35	36	26	30	22	36	61	73	244	224	33.8
13-May	186	173	179	197	186	188	196	174	197	229	234	259	264	293	279	314	311	5	42	45	47	47	40	42	346.7
14-May	132	183	183	168	187	185	164	198	238	249	35	25	60	41	22	49	42	48	45	45	47	93	218	242	56.9
15-May	139	161	178	174	189	182	193	198	192	203	217	254	26	274	191	193	177	169	178	181	190	192	190	188	188.7
16-May	188	186	167	166	168	169	176	186	191	188	187	206	205	175	145	132	126	125	114	113	116	129	140	179	166.9
17-May	188	181	214	203	194	210	213	220	247	282	266	283	350	291	242	244	249	42	84	47	39	43	314	240	237.4
18-May	200	207	165	190	184	189	196	205	205	218	218	229	238	234	238	251	260	243	40	20	13	17	9	15	254.7
19-May	15	4	3	4	4	20	23	28	14	14	12	15	21	18	19	21	24	21	17	16	17	18	22	23	16.9
20-May	18	19	19	23	24	23	25	34	38	41	36	34	34	30	32	12	7	9	1	10	24	21	353	350	22.4
21-May	333	25	46	40	35	25	41	43	11	7	11	17	25	27	16	17	15	12	18	5	3	3	7	14	18.8
22-May	18	6	10	1	3	16	23	27	22	18	25	32	15	22	23	21	22	25	21	25	25	6	360	2	18.0
23-May	24	23	32	14	23	23	25	35	38	34	40	41	33	37	27	31	40	37	45	66	102	149	181	180	36.6
24-May	181	173	181	189	173	190	183	187	202	220	203	183	197	177	181	194	264	294	120	120	169	198	201	185	188.1
25-May	182	177	192	193	183	208	213	71	40	40	27	17	38	21	28	30	10	11	32	33	25	24	27	26	29.2
26-May	25	24	11	14	10	24	24	34	39	9	351	347	353	16	12	352	6	5	5	25	32	32	20	21	15.3
27-May	23	25	28	53	47	48	65	84	133	152	210	93	38	91	14	268	240	193	190	142	98	170	217	87	85.3
28-May	177	144	102	111	199	151	164	166	162	218	243	325	35	185	180	206	213	215	216	214	170	168	173	199	185.3
29-May	211	192	228	212	201	205	204	223	206	217	227	226	199	169	50	33	44	47	35	39	51	40	86	344	79.2
30-May	341	355	312	308	330	346	327	344	333	359	31	24	43	319	322	331	329	335	3	356	7	23	6	13	352.8
31-May	8	233	204	177	187	204	211	327	320	301	8	43	276	236	313	222	182	229	199	190	157	161	165	203	213.5

2.7	7.0	359.7	358.6	352.2	7.7	27.2	19.5	352.9	353.5	349.1	354.8	353.7	353.4	351.6	346.4	344.7	356.7	12.1	23.3	30.5	29.4	13.3	4.4
Diurnal Average																							

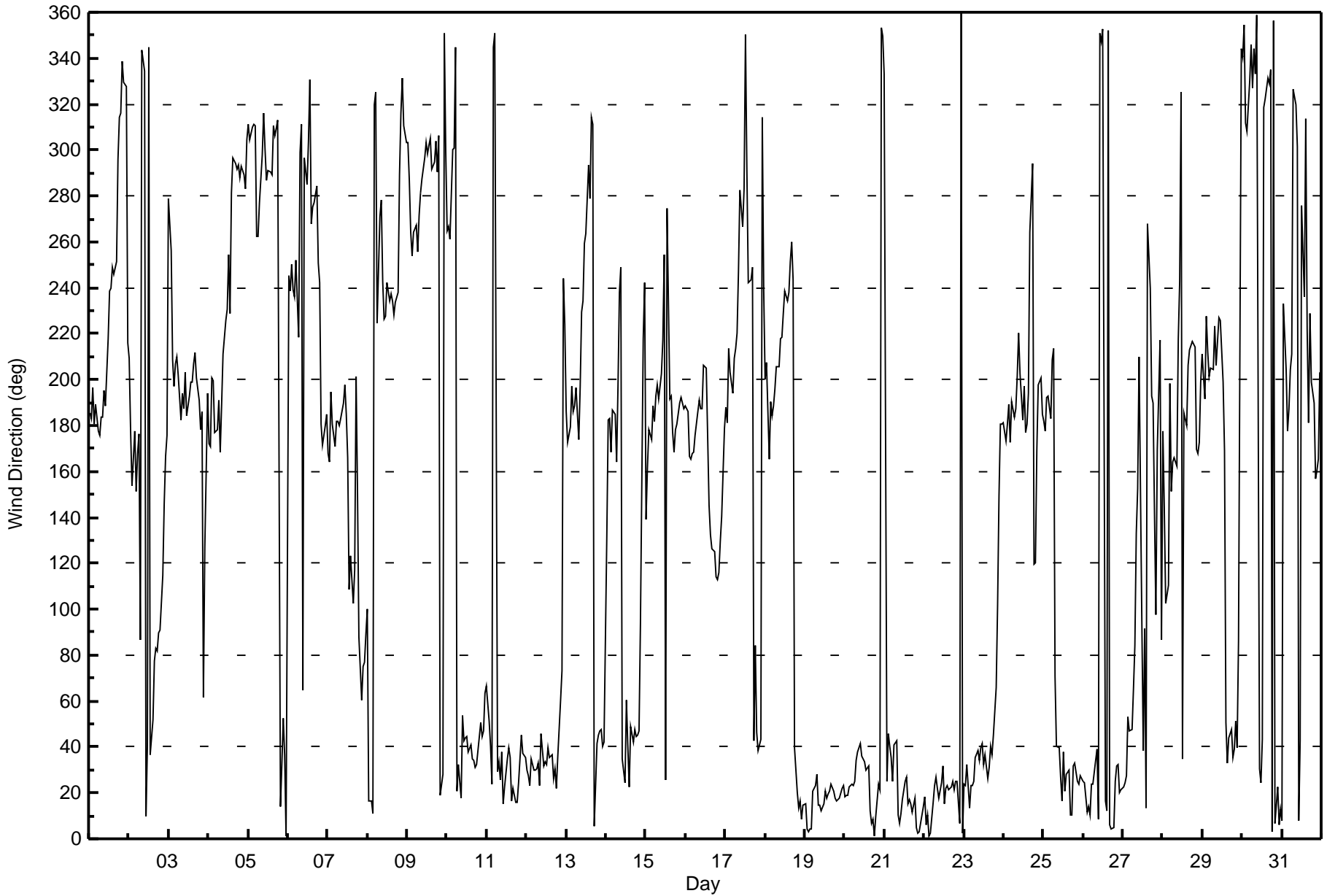
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Shell Muskeg River - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 89 deg on May 17 13:00 Minimum Value: 6 deg on May 14 21:00 Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 15 Median = 19 Q ₃ = 27 P ₉₀ = 46 P ₉₉ = 81		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	16	13	11	10	18	10	15	21	24	26	25	26	22	24	26	29	31	20	19	16	11	10	86	32	86	
2-May	53	52	23	15	20	20	63	66	70	37	34	26	42	66	26	38	34	27	19	15	14	21	19	28	70	
3-May	20	26	33	18	18	16	25	21	25	25	27	26	31	35	31	32	23	23	22	14	20	67	13	36	67	
4-May	20	19	15	15	19	13	23	29	44	55	33	27	27	36	36	15	14	14	15	17	12	11	10	18	55	
5-May	17	13	15	14	15	22	15	15	19	22	20	22	21	21	21	21	23	18	22	32	12	11	20	53	53	
6-May	24	31	45	50	46	29	20	21	37	75	38	28	39	46	60	79	46	36	39	21	14	11	17	17	79	
7-May	11	12	21	16	11	16	17	18	22	21	24	27	28	66	18	29	62	29	47	23	22	38	61	86	86	
8-May	79	35	22	30	30	53	51	13	17	28	23	22	15	17	12	13	11	11	29	19	22	21	17	79	79	
9-May	16	22	14	13	11	13	12	16	13	13	17	20	19	21	21	15	17	27	29	35	21	12	19	26	35	
10-May	7	7	10	31	26	18	29	21	43	18	22	16	12	15	16	16	14	14	13	14	13	7	12	18	43	
11-May	14	12	33	75	53	22	17	14	24	13	24	23	15	12	16	21	15	16	17	13	13	10	13	15	75	
12-May	20	12	19	58	15	7	21	16	23	13	21	16	19	16	17	19	21	23	18	14	15	12	52	27	58	
13-May	11	7	10	12	12	13	17	26	55	65	81	85	47	59	38	68	36	30	20	7	9	10	9	16	85	
14-May	40	16	13	13	19	17	21	34	38	41	76	70	53	73	72	23	36	16	9	7	6	74	11	25	76	
15-May	35	16	14	8	14	16	24	25	29	29	28	65	45	77	69	48	39	25	18	16	19	18	18	17	77	
16-May	19	22	10	13	11	12	18	22	28	27	28	28	26	24	18	17	18	20	20	20	57	24	26	22	57	
17-May	17	22	14	16	15	17	22	22	22	20	38	75	89	61	51	14	35	80	43	11	11	27	28	51	89	
18-May	15	23	40	25	21	19	21	21	25	18	20	19	16	12	13	23	16	58	59	16	16	17	16	15	59	
19-May	16	15	16	16	15	13	12	13	15	15	17	15	14	15	13	12	12	14	15	14	14	14	11	12	17	
20-May	13	13	13	11	10	10	9	13	11	11	15	14	14	12	12	18	16	18	15	17	11	12	20	19	20	
21-May	25	24	11	11	12	12	9	10	20	17	19	19	18	17	19	16	17	17	15	16	15	15	16	16	25	
22-May	15	16	17	14	15	15	13	12	14	14	12	12	17	18	16	14	15	14	13	11	10	17	15	16	18	
23-May	12	9	32	39	9	7	11	13	13	14	15	21	15	20	20	18	23	22	11	27	15	25	15	15	39	
24-May	16	13	16	18	14	19	23	25	28	24	26	28	26	24	28	30	17	82	21	21	24	20	20	18	82	
25-May	14	17	18	19	20	23	78	62	28	18	21	22	13	24	18	15	18	21	11	12	9	9	10	10	78	
26-May	9	10	18	17	19	19	11	12	12	19	18	23	29	34	20	18	17	17	16	11	13	12	15	15	34	
27-May	7	8	12	32	18	13	10	34	32	18	73	47	29	50	64	67	27	24	26	25	24	50	17	42	73	
28-May	46	37	22	21	41	34	21	22	18	26	49	28	80	24	29	27	64	40	21	20	31	20	20	18	80	
29-May	21	22	14	17	23	25	28	40	31	24	23	17	27	32	75	28	11	15	13	11	16	11	83	48	83	
30-May	23	36	20	76	19	15	24	22	21	31	15	20	13	45	27	29	27	30	18	17	20	23	19	20	76	
31-May	22	83	16	21	24	24	19	55	39	55	59	75	73	64	43	80	41	45	26	25	10	10	12	24	83	
		79	83	45	76	53	53	78	66	70	75	81	85	89	77	75	80	64	82	59	35	57	74	86	86	
		Diurnal Maximum																								





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 27, 2016	Last Calibration	April 19, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	12:55
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	820	813
Calculated slope	0.999092	0.995105	Chamber temp	45.0	45.0
Calculated intercept	2.517841	1.697493	Pressure	701.2	703.8
Analyzer Background	9.0	9.0	Flow	0.444	0.444
Analyzer Coefficient	1.036	1.050	Intensity	107	108

Analyzer make Thermo 43i Analyzer serial # 1118148498

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	83.6	807.6	789.7	1.023
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	83.6	807.6	810.7	0.996
second point	5000	42.0	405.7	404.9	1.002
third point	5000	21.1	203.8	202.0	1.009
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found 789.9 Previous response 805.8 % change 2.0%

Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



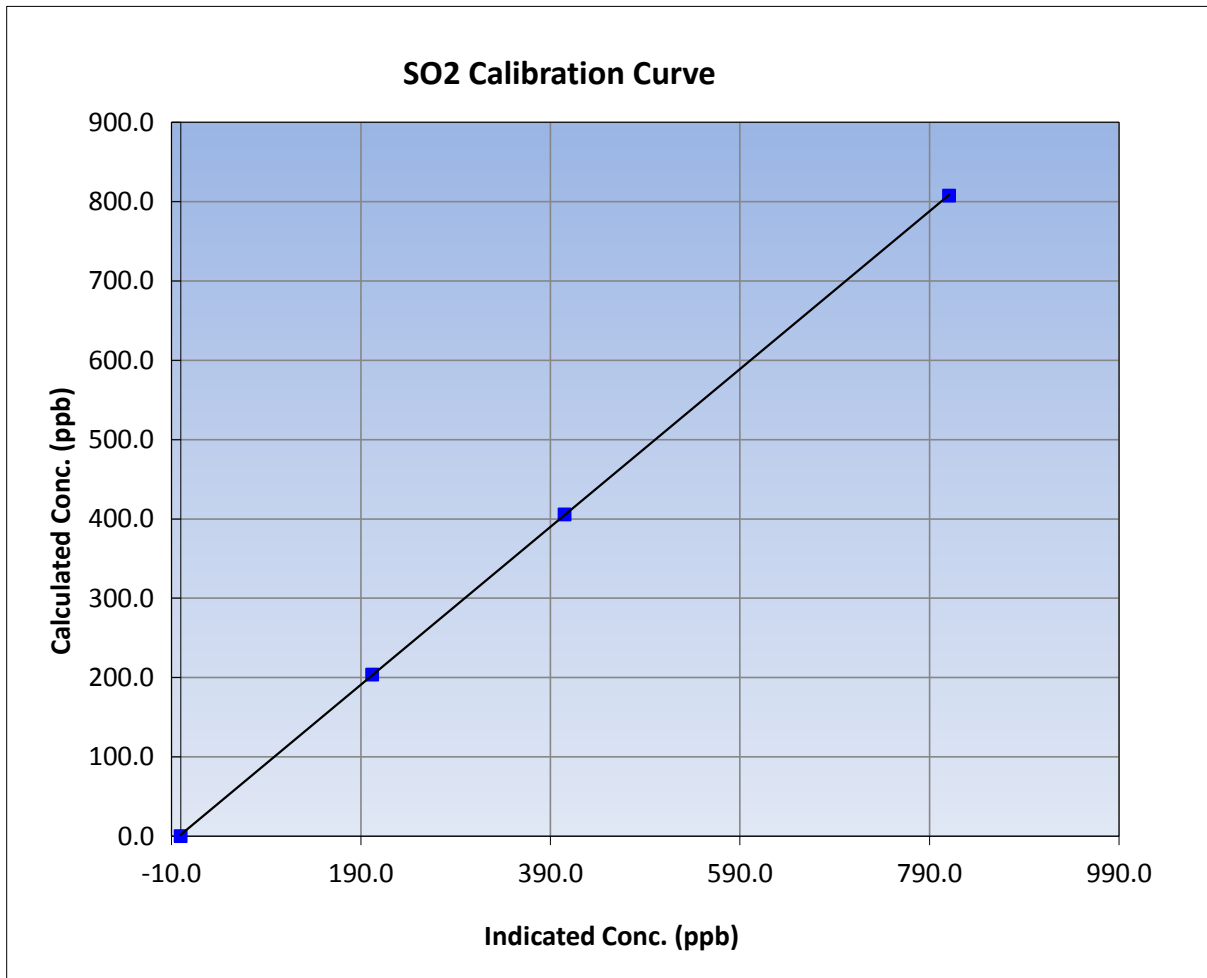
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	12:55
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

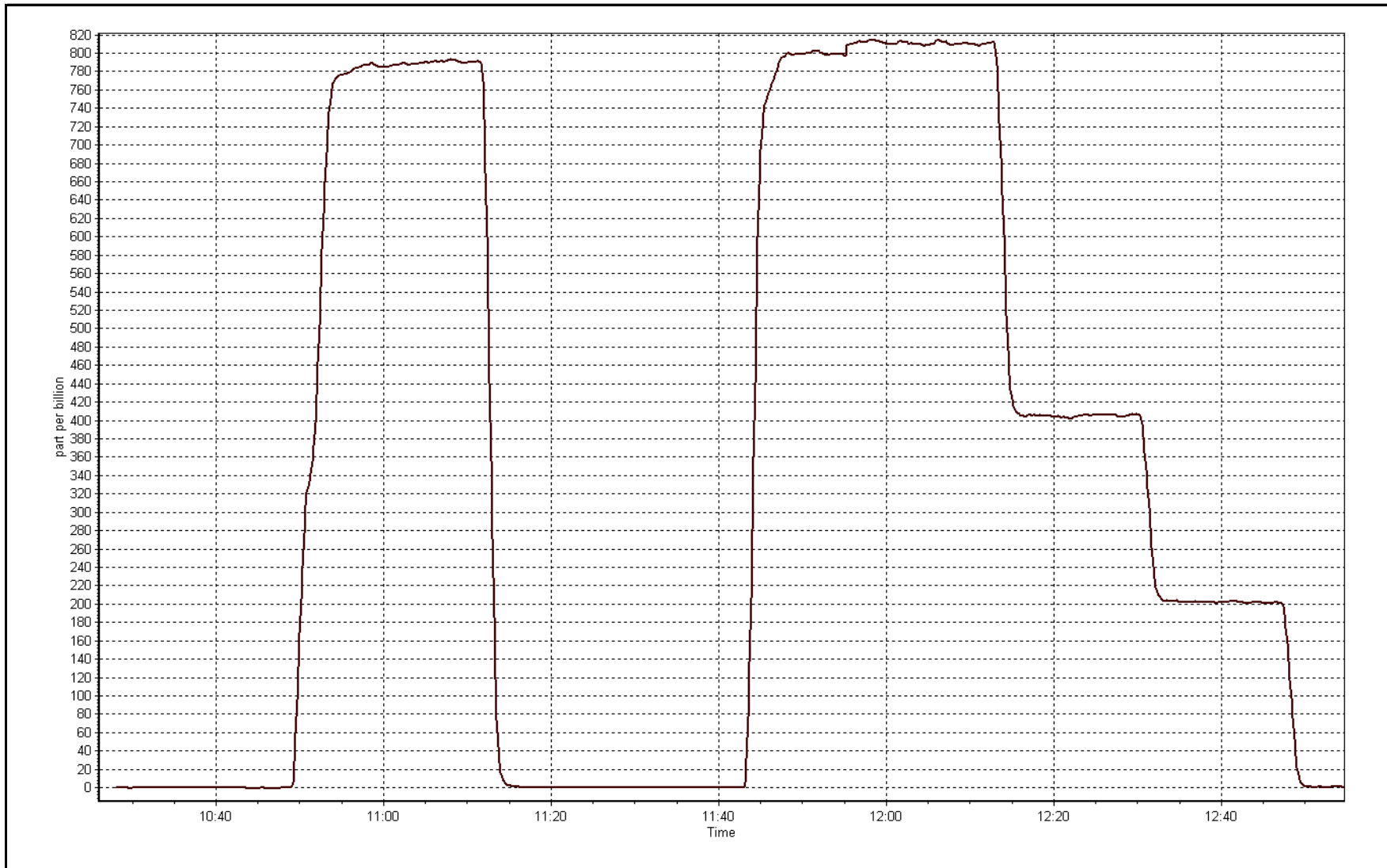
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999985
807.6	810.7	0.9962		
405.7	404.9	1.0020	Slope	0.995105
203.8	202.0	1.0093		
			Intercept	1.697493



SO2 Calibration Plot

Date: May 27, 2016





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-27-16	Last Calibration	April-20-16
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	12:55
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	0.996273	1.003133	Fuel Pressure	24.2	24.2
Calculated intercept	0.040469	-0.090906	Analyzer Coeff	4.431	4.476
			Analyzer BKG	2.24	2.60

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.21	----
as found span	5000	83.6	17.02	17.10	0.995
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	83.6	17.02	17.01	1.000
second point	5000	42.0	8.55	8.66	0.987
third point	5000	21.1	4.29	4.45	0.965
as left zero					
as left span					
Average Correction Factor					0.984

Corrected As found	16.89	Previous response	17.04	% change	0.9%
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Notes:

Sample inlet filter replaced after as founds. Adjusted both zero and span.

Calibration Performed By:

Asad Hidayat



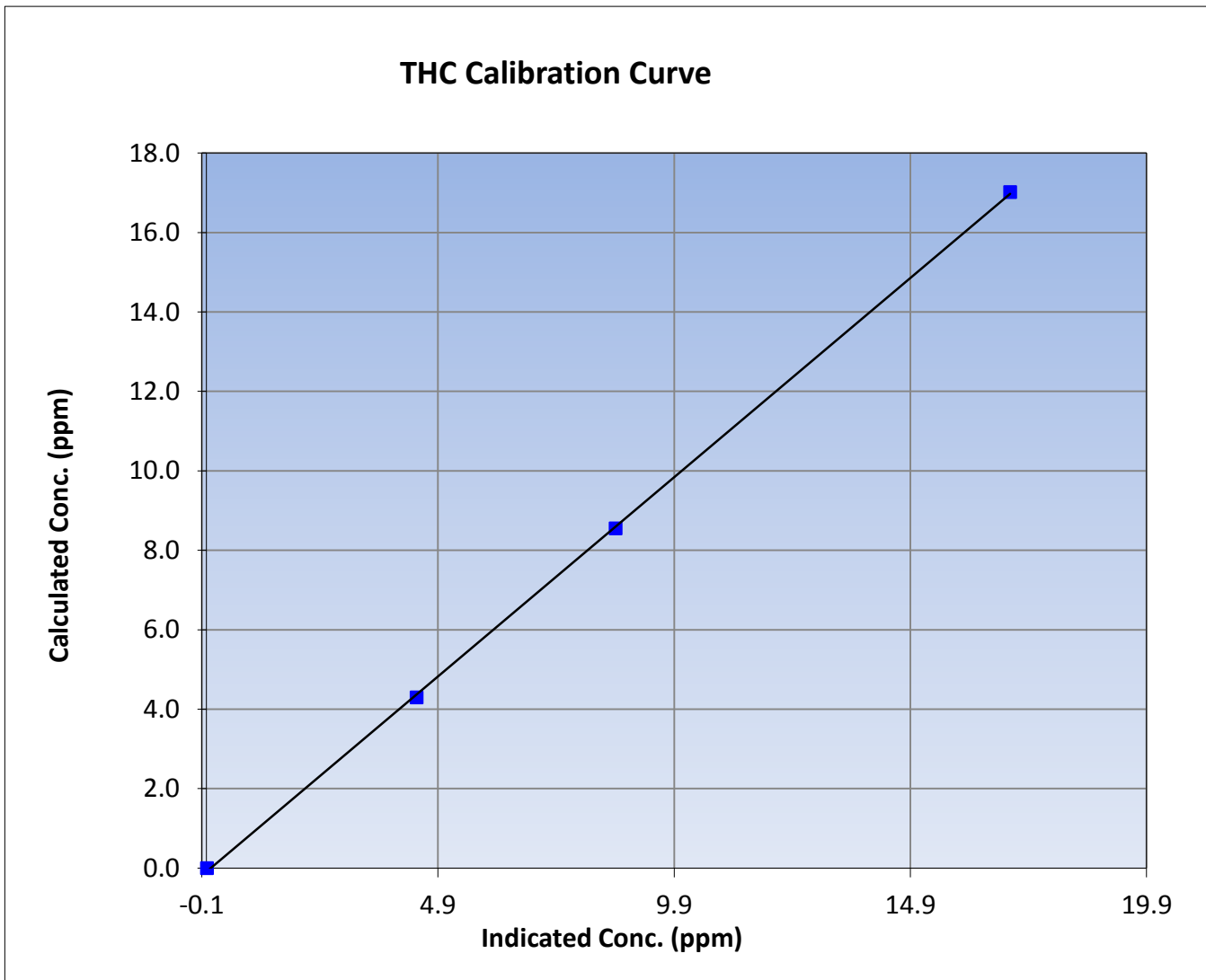
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 20, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	12:55
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

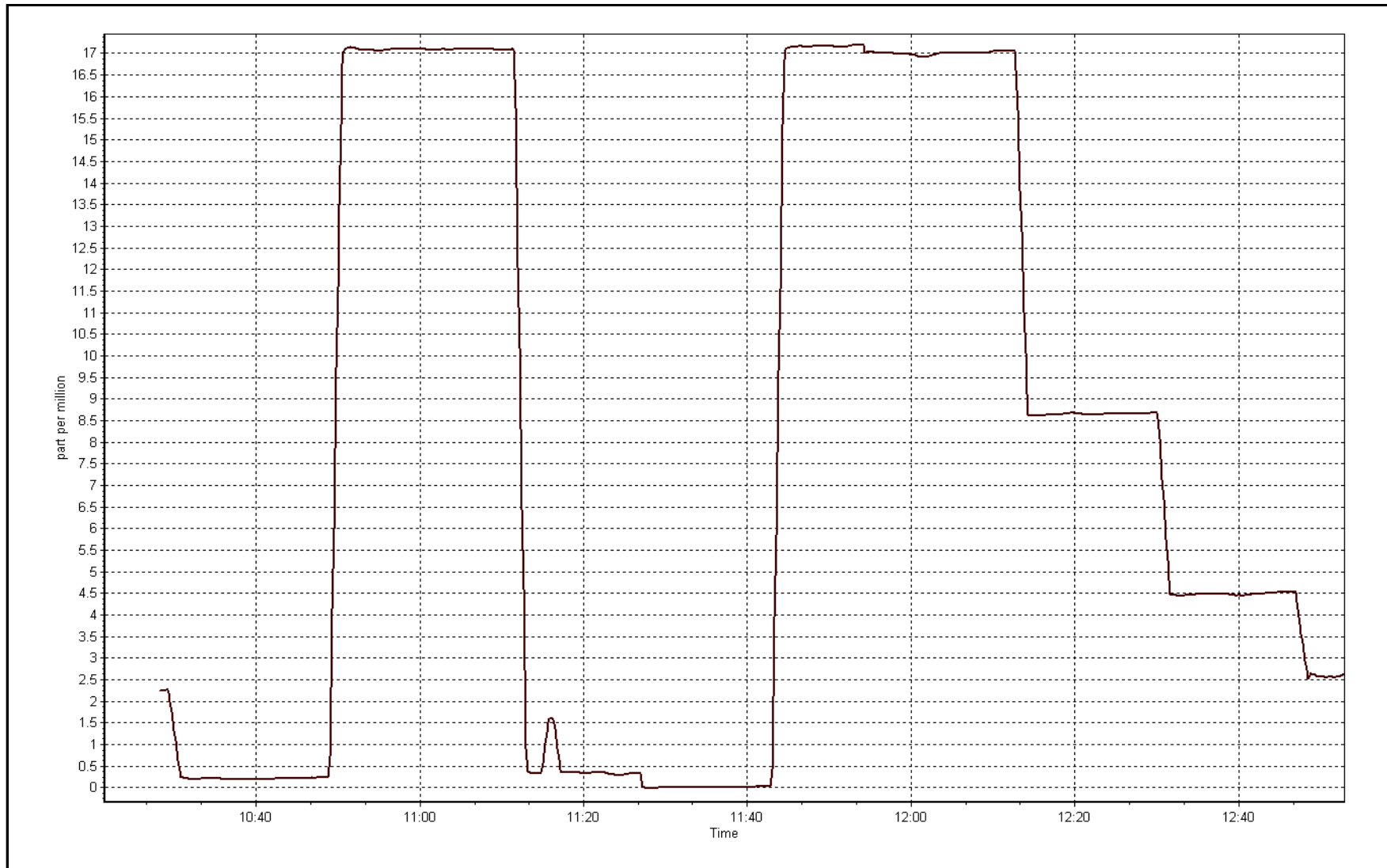
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999894
17.02	17.01	1.0004		
8.55	8.66	0.9872	Slope	1.003133
4.29	4.45	0.9651		
			Intercept	-0.090906



THC Calibration Plot

Date: May 27, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:10
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOX Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	API T700	Serial Number	493
Zero air Generator	Teledyne API T701	Serial Number	2155

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001923	0.999845	0.998316
	Data Offset	1.286889	1.999260	0.381508
Current Calibration	Data Slope	0.999800	0.999480	0.991269
	Data Offset	0.697664	1.505058	-0.218043

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.038		1.073	
NOX coefficient	0.996		1.000	
NO2 coefficient	1.000		0.998	
NO bkgrnd	8.6		8.9	
NOX bkgrnd	8.7		9.1	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	325.5	Deg C	327.4	Deg C
PMT voltage	-744.4	V	-744.4	V
PMT Temp	-2.8	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	164.9	mmHg	168.6	mmHg
R Cell Press Nox	164.6	mmHg	168.6	mmHg
NO sample flow	0.904	lpm	0.898	lpm
Nox sample Flow	0.905	lpm	0.899	lpm

Notes:

Changed inlet filter after as founds. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: May 27, 2016 Station Number: AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	0.2	----	----
as found span	5000	83.6	802.6	802.6	0.0	776.6	776.7	-0.2	1.0335	1.0333
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	0.2	----	----
high point	5000	83.6	802.6	802.6	0.0	802.7	802.4	0.2	0.9999	1.0002
second point	5000	42.0	403.2	403.2	0.0	401.5	400.6	0.9	1.0042	1.0065
third point	5000	21.1	202.6	202.6	0.0	201.5	200.1	1.5	1.0051	1.0123
as left zero										
as left span										
Average Correction Factor									1.0031	1.0063

Corrcctd As found NO_x= 776.5 NO= 776.8 Percent Change NO_x= 3.0% NO= 3.1%
 Previous Response NO_x= 799.7 NO= 800.7

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)	----	529.6	266.2	798.5	529.6	268.8	0.9886	1.0000	0.9902	101.0%
2nd NO2 (200)	----	612.8	183.0	797.5	612.8	184.6	0.9898	1.0000	0.9912	100.9%
3rd NO2 (100)	----	701.2	94.7	797.1	701.2	95.9	0.9903	1.0000	0.9870	101.3%
4th NO2 (0)	795.8	----	2.5	798.3	795.8	2.5	0.9888	1.0000	N/A	----
Average Correction Factor							0.9894	1.0000	0.9895	101.1%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

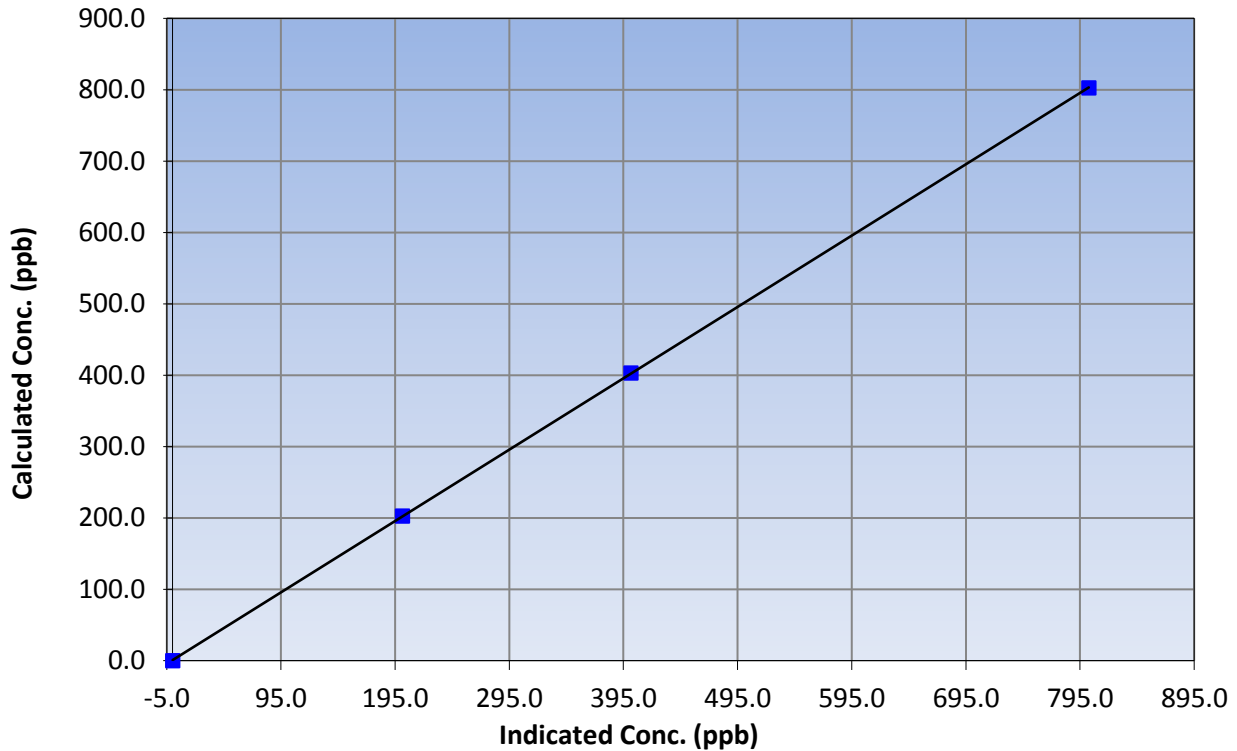
Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999993
802.6	802.7	0.9999		
403.2	401.5	1.0042	Slope	0.999800
202.6	201.5	1.0051		
			Intercept	0.697664

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

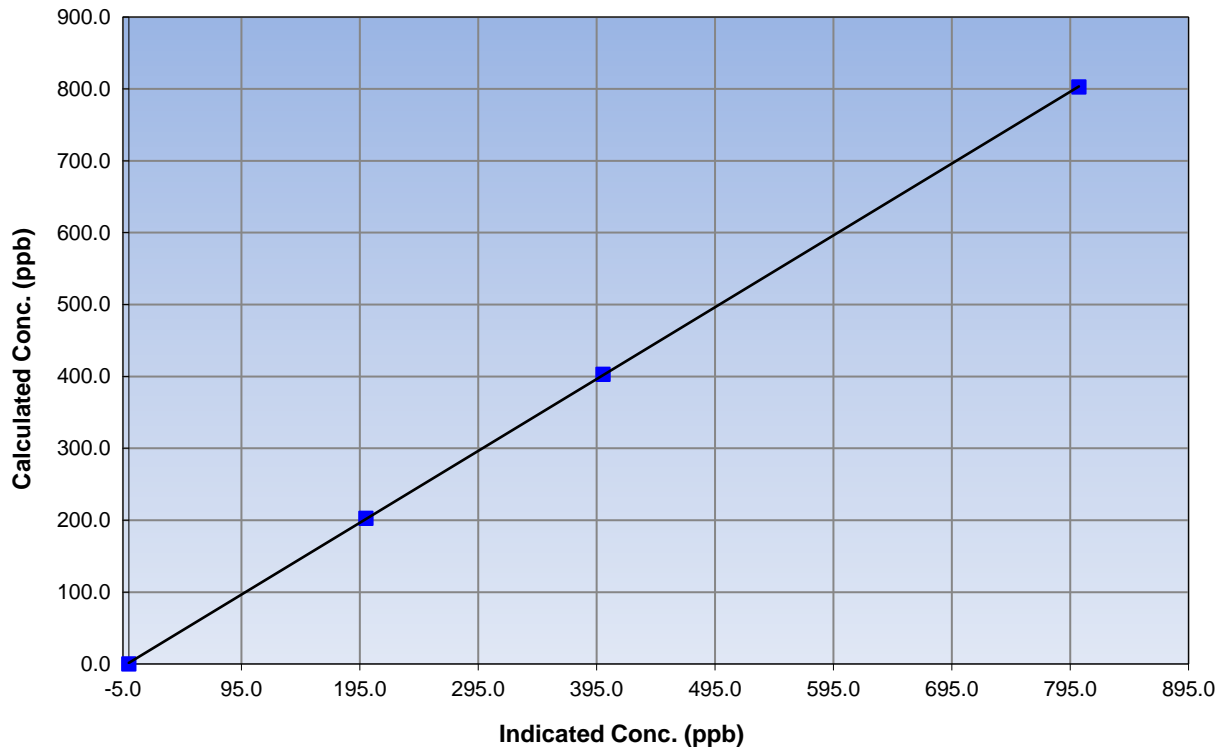
Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999984
802.6	802.4	1.0002		
403.2	400.6	1.0065	Slope	0.999480
202.6	200.1	1.0123		
			Intercept	1.505058

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

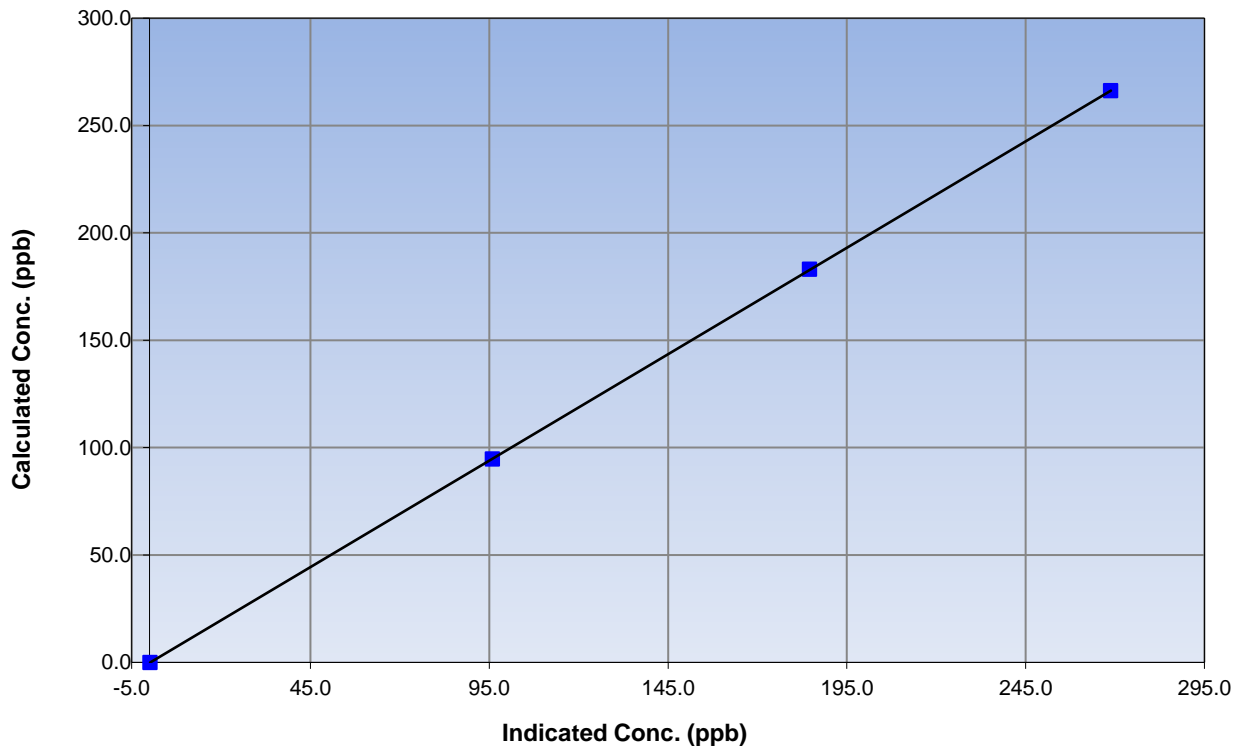
Station Information

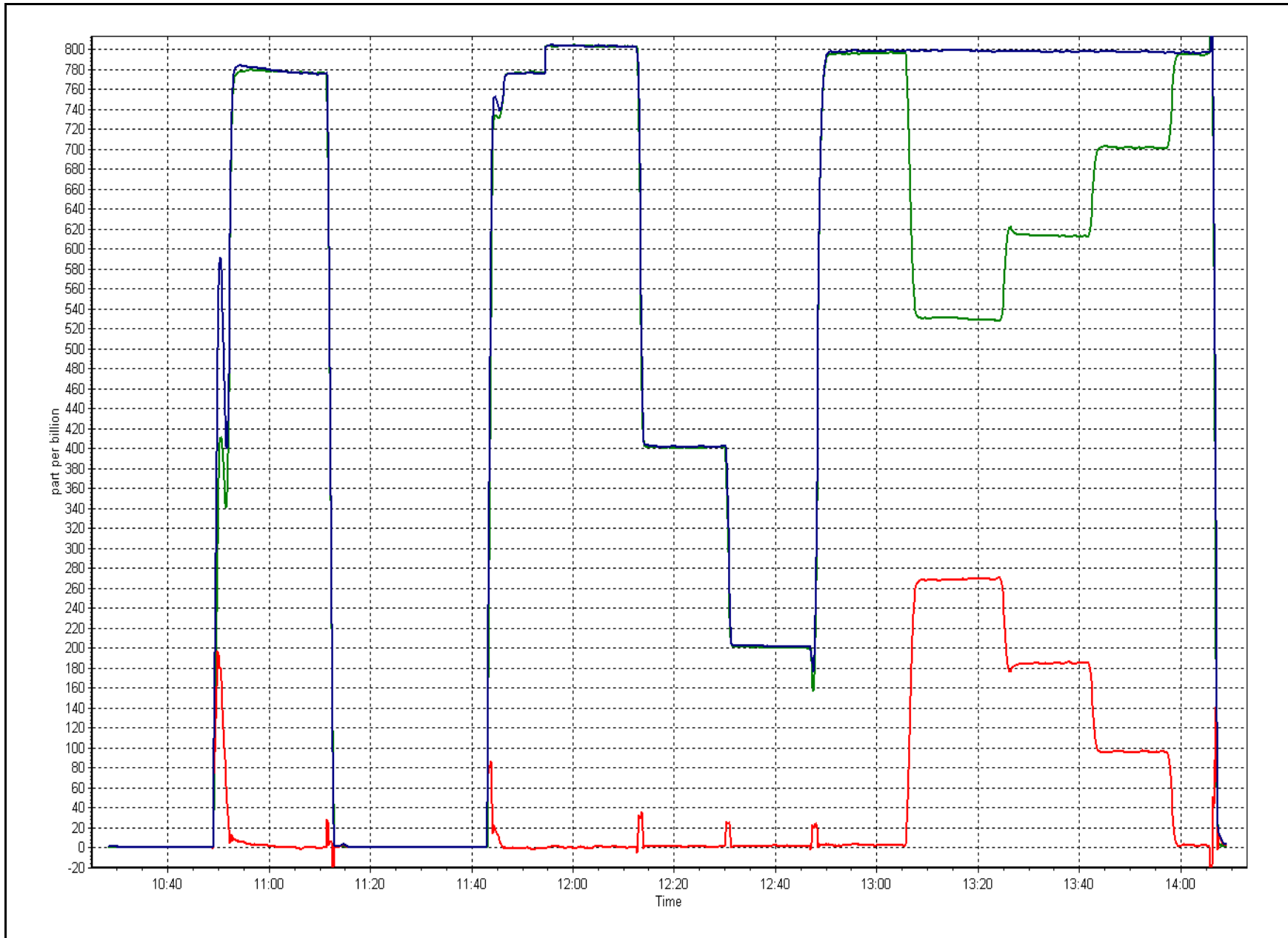
Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999998
266.2	268.8	0.9902		
183.0	184.6	0.9912	Slope	0.991269
94.7	95.9	0.9870		
			Intercept	-0.218043

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>May 27, 2016</u>	Previous Calibration:	<u>April 19, 2016</u>
Station Name:	<u>Shell Muskeg River</u>	Station Number:	<u>AMS 16</u>
Start Time (MST):	<u>11:30</u>	End Time (MST):	<u>13:13</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>E-798</u>		
C ₁₄ Source SN:	<u>4142</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	18.0	17.5	-0.5	18.0
T2	28.0	na	na	28.0
T3	28.0	na	na	28.0
T4	38.0	na	na	38.0
RH (%)	36.0	na	na	36.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	975	975.9	0.9	975

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	541		541
Neph	-0.08		-0.08
C14	27.5		27.5
Indicated Concentration (ug/m3)	0.0	no	0.0
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	<u>January 25, 2016</u>	Previous Leak Check Date:	<u>October 29, 2015</u>
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.70		0.09
*Flow with adaptor (LPM):	16.61		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	<u>May 25, 2015</u>	Previous Foil Calibration:	na
Zeroed?:	<u>yes</u>		
Foil Mass:	<u>1337</u>		Mass foil set S/N: 2518
Previous Correction Factor:	<u>7029</u>		
New Correction Factor:	<u>7067</u>		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	27/05/2016
Pump	Good	
Filter Tape	Good	<u>April 19, 2016</u>
Mass Foil Cal Set	na	May 25, 2015
HEPA filter	Good	

NOTES:

No adjustments. Cyclone head cleaned at station.

Calibration Performed By:	Asad Hidayat
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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 17
WAPASU
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	12	0	3	0
H2S (ppb) Average	708	34	36	99.73	3	0	1	0
THC (ppm) Average	708	36	36	100.00	4.6	-	2.8	-
O3 (ppb) Average	710	32	34	99.73	77	0	49	-
NO2 (ppb) Average	705	36	39	99.60	23	0	7	-
NO (ppb) Average	705	36	39	99.60	12	-	2	-
NOX (ppb) Average	705	36	39	99.60	23	-	8	-
PM2.5 (ug/m3) Average	742	2	2	100.00	1238.2	-	350.3	9
Temperature 2 m (C) Average	744	0	0	100.00	31	-	22.6	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	91	-
Precipitation (mm) Total	744	0	0	100.00	4.5	-	4.5	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	19	-	13	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.5	1	-	0	0	0	0	0	1	12
H2S (ppb) Average	708	0.2	0	-	0	0	0	0	0	0	3
THC (ppm) Average	708	2.22	0.3	-	2	2.1	2.1	2.1	2.2	2.4	4.6
O3 (ppb) Average	710	31	13	-	1	14	22	31	41	46	77
NO2 (ppb) Average	705	1.5	3	-	0	0	0	0	1	5	23
NO (ppb) Average	705	0.4	1	-	0	0	0	0	1	1	12
NOX (ppb) Average	705	1.9	3	-	0	0	0	1	2	5	23
PM2.5 (ug/m3) Average	742	50.56	136.3	-	0.2	1	1.5	3.4	13	167.3	1238.2
Temperature 2 m (C) Average	744	11.9	6.9	-	-4.4	2.9	7	11.7	16.5	20.8	31
Relative Humidity (%) Average	744	56.8	25	-	16	25	34	55	80	92	99
Precipitation (mm) Total	744	-	-	13.95	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	744	8.8	4	-	0	4	6	9	11	13	19
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

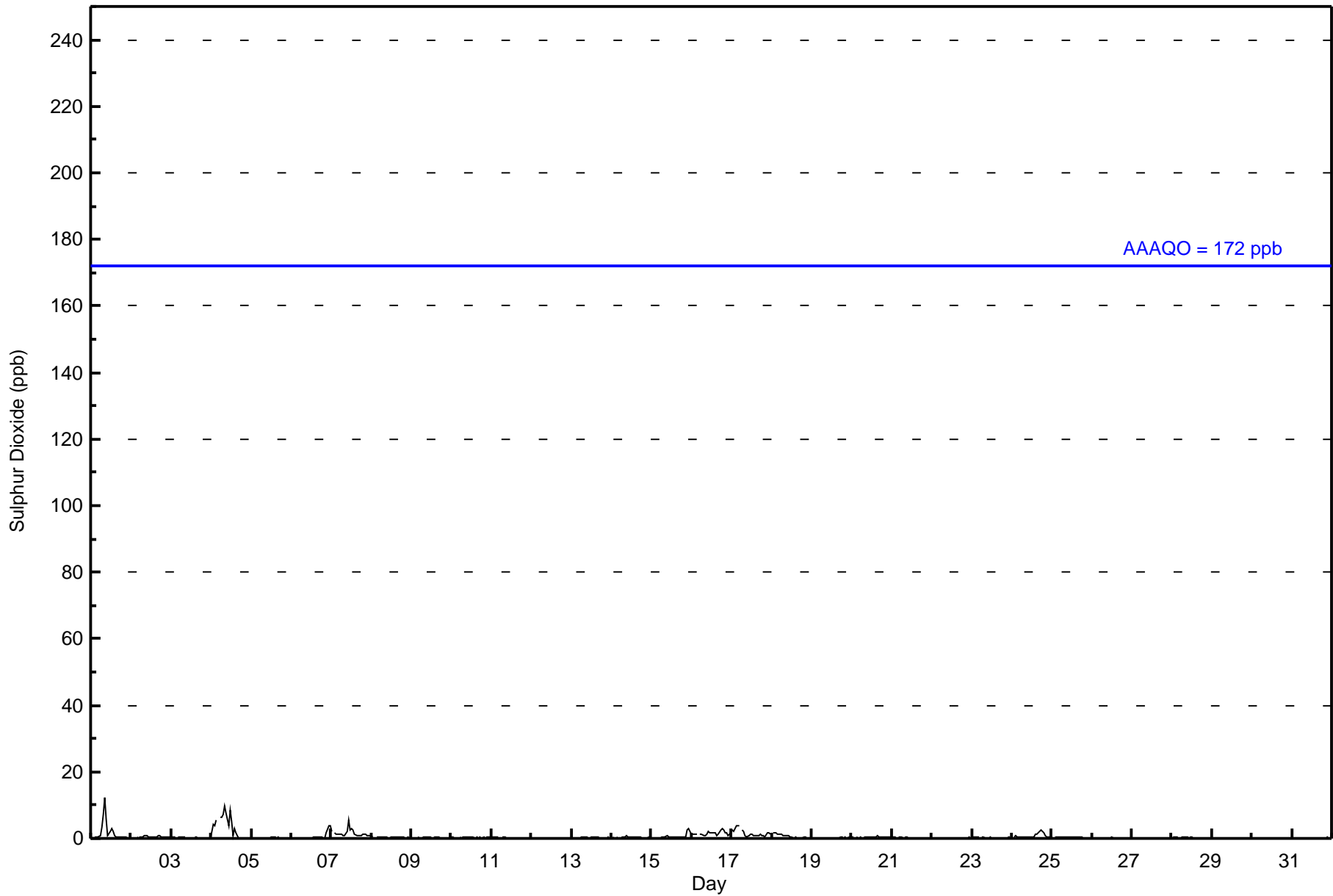
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, O3	03 May 2016 12:00	03 May 2016 13:00	2	Maintenance - cleaned glass manifold
NO2, NO, NOX	17 May 2016 13:00	17 May 2016 15:00	3	Maintenance - confirmed calibration points for Ozone



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 12 ppb on May 1 09:00										Maximum Daily Average: 3.3 ppb on May 4										Hours of Data: 708							
Minimum Value: 0 ppb on May 3 19:00										Minimum Daily Average: 0.0 ppb on May 30										Hours of Missing Data: 36							
Maximum Diurnal Average: 1.0 ppb at hour 9										Minimum Diurnal Average: 0.3 ppb at hour 21										Hours of Calibration: 36							
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: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	Z	0	0	0	1	3	7	12	6	1	2	3	2	1	0	0	0	0	0	0	0	0	0	1.8	12	
2-May	0	0	Z	0	0	0	0	1	1	1	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0.4	1	
3-May	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	1	0	0	0	0	0	0	0	0	0.2	1	
4-May	2	4	4	6	Z	6	6	7	10	8	4	8	5	1	3	2	0	0	0	0	0	0	0	0	3.3	10	
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	4	0.5	4
7-May	2	Z	2	1	1	1	1	1	1	2	6	3	3	3	1	1	1	1	1	1	1	1	1	1	1.5	6	
8-May	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
14-May	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
15-May	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0.6	3	
16-May	1	1	1	1	Z	1	1	1	1	1	2	2	2	2	2	1	1	2	3	2	2	2	1	2	1.6	3	
17-May	2	2	3	4	4	Z	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1.6	4	
18-May	Z	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1	
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-May	Z	1	1	0	0	1	0	0	0	0	1	0	1	1	1	1	2	2	2	2	1	0	0	0	0.8	2	
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1	
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
31-May	0	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	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Wapasu - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	73	90	29	18	11	58	73	71	31	18	26	25	47	43	29	65	707
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	73	90	29	18	11	58	73	71	32	18	26	25	47	43	29	65	708

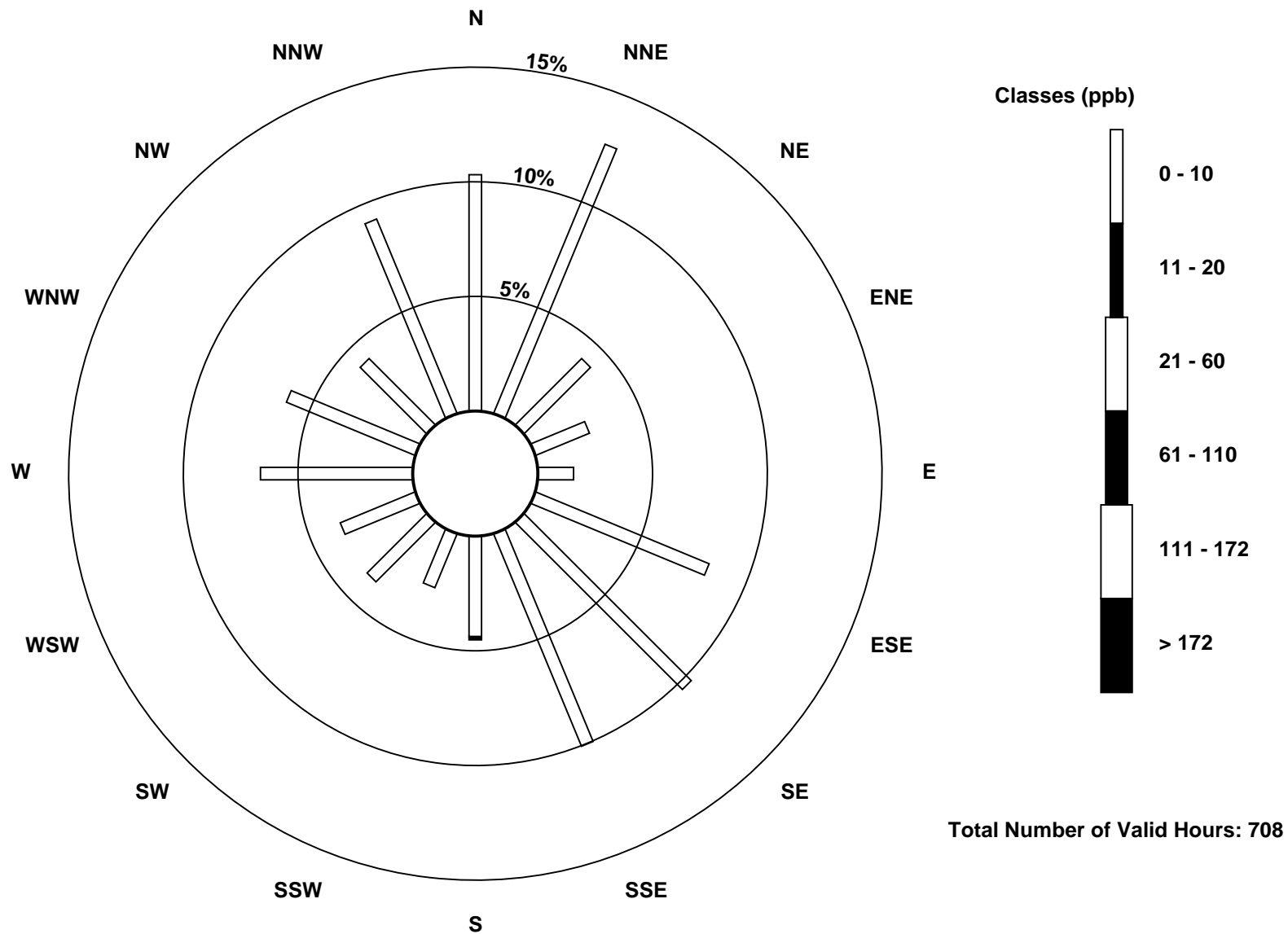
Total Number of Valid Hours: 708

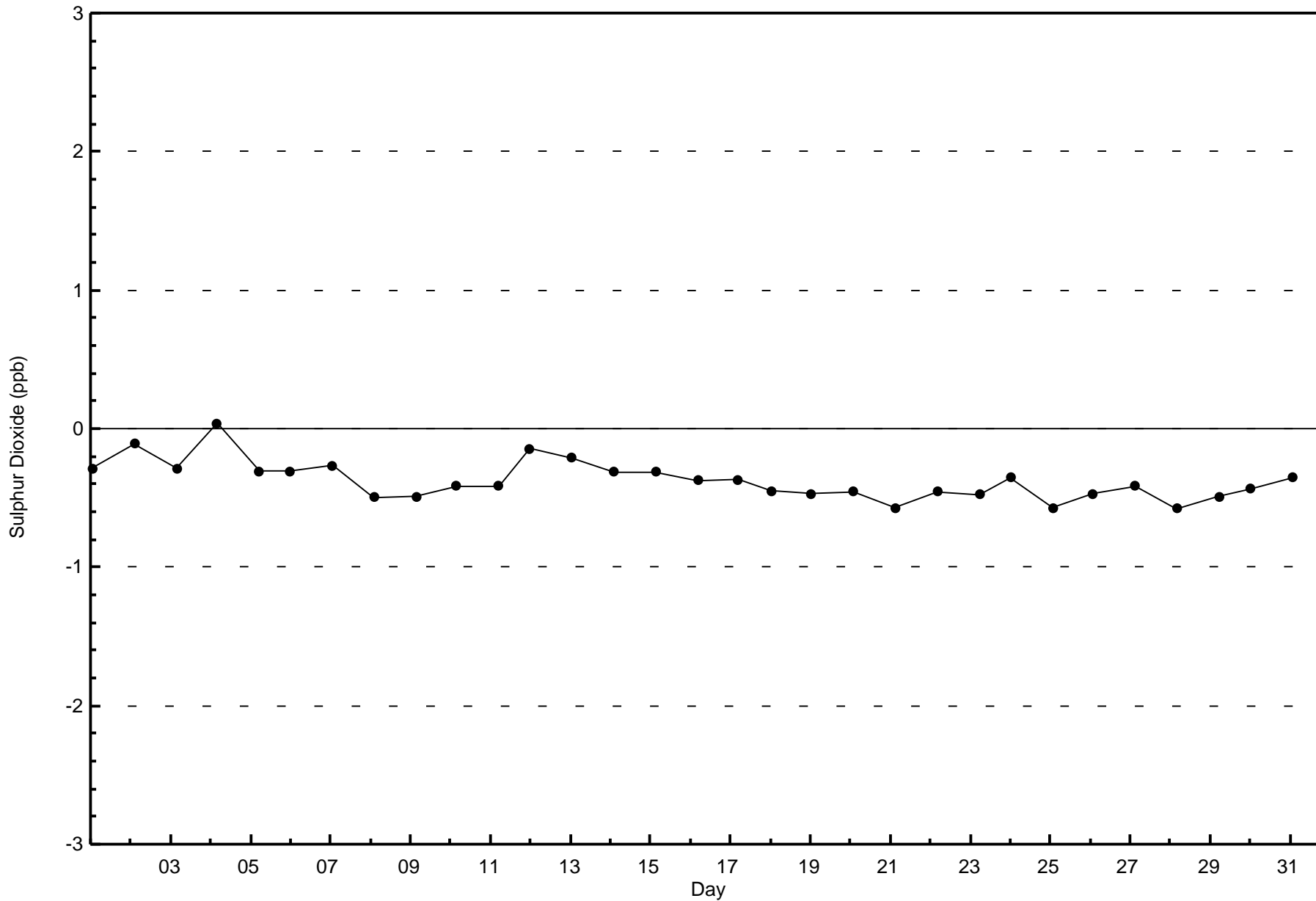
Total Number of Hours: 744

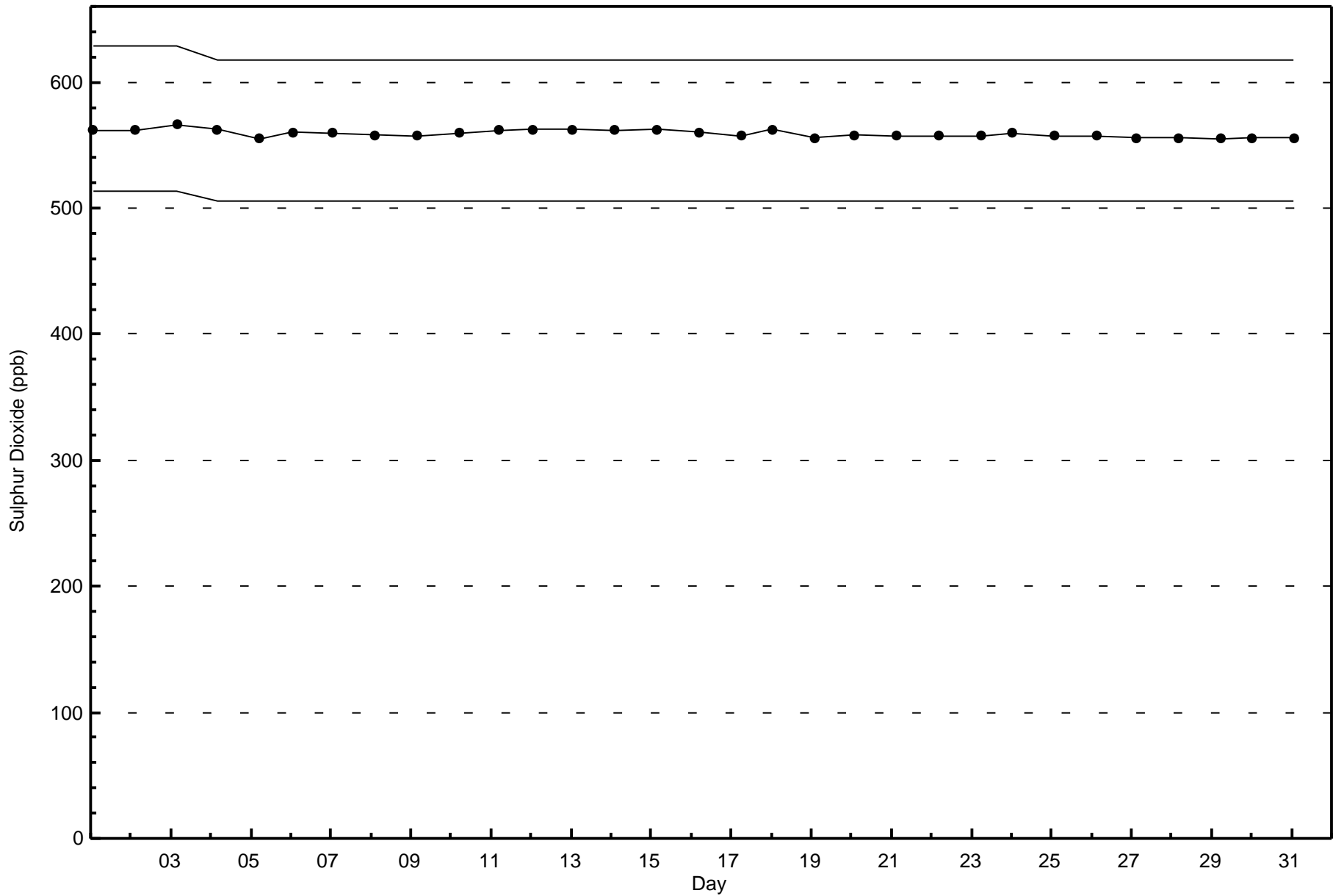


Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3 ppb on May 17 05:00	Maximum Daily Average: 0.8 ppb on May 17		Hours of Data:	708
Minimum Value: 0 ppb on May 8 10:00	Minimum Daily Average: 0.1 ppb on May 28		Hours of Missing Data:	36
Maximum Diurnal Average: 0.5 ppb at hour 5	Minimum Diurnal Average: 0.1 ppb at hour 16		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 2		Percent Operational Time:	99.7

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

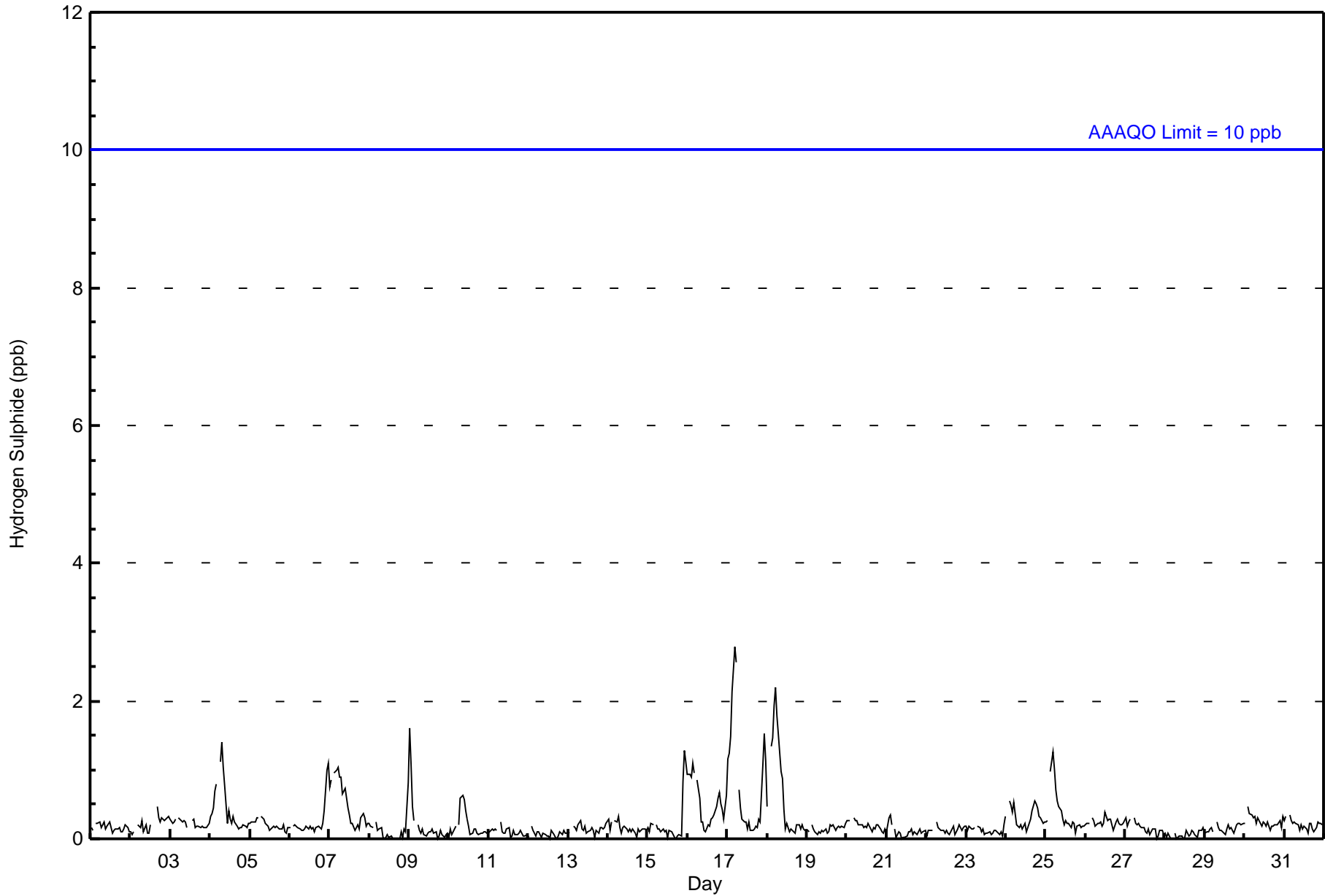
0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	Diurnal Average
2	1	1	2	3	3	2	2	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	2	1	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	99.72	99.72
3 - 4	2	0.28	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	72	91	29	18	11	59	70	69	34	20	26	26	45	42	29	65	706
3 - 4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	91	29	18	11	59	70	71	34	20	26	26	45	42	29	65	708

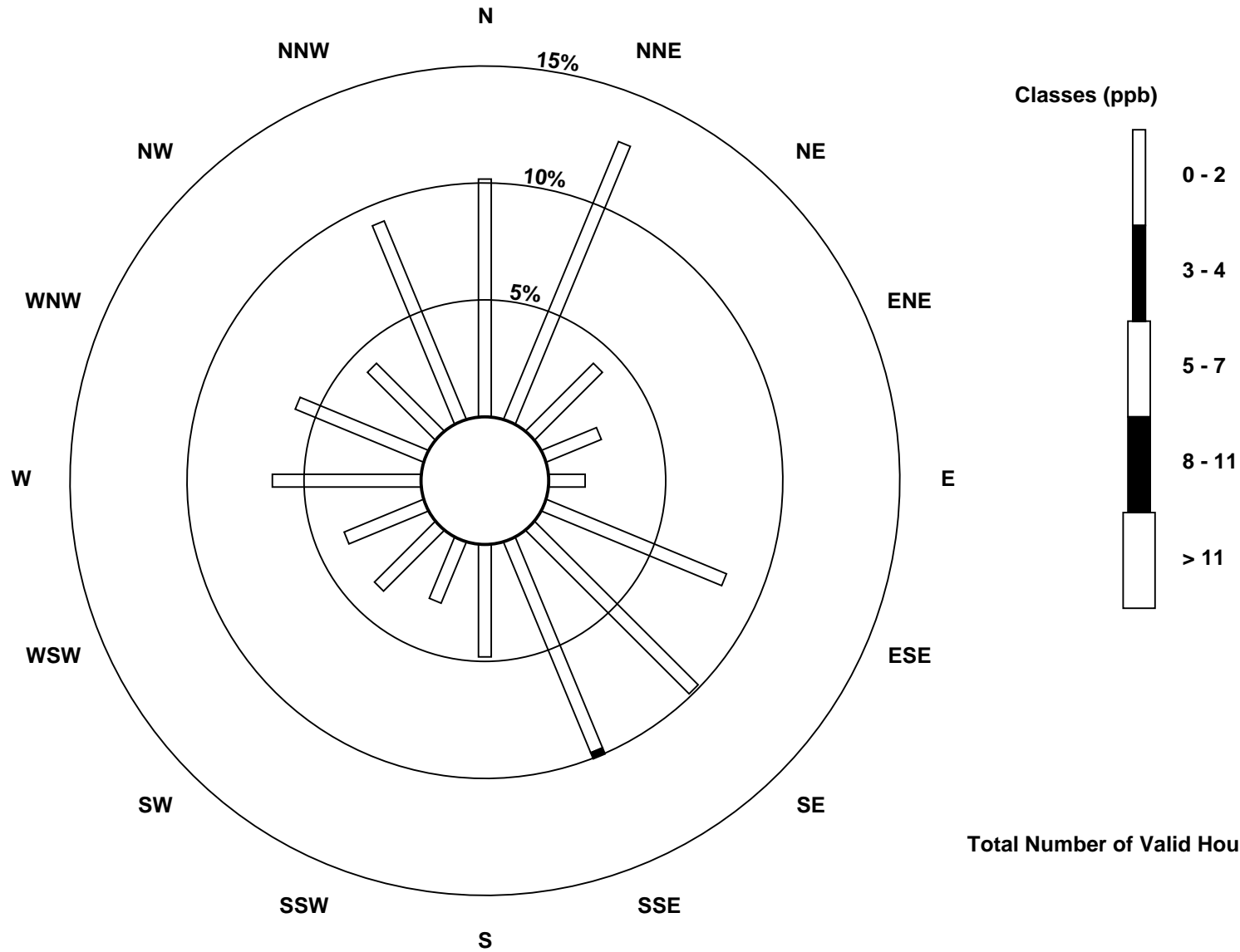
Total Number of Valid Hours: 708

Total Number of Hours: 744

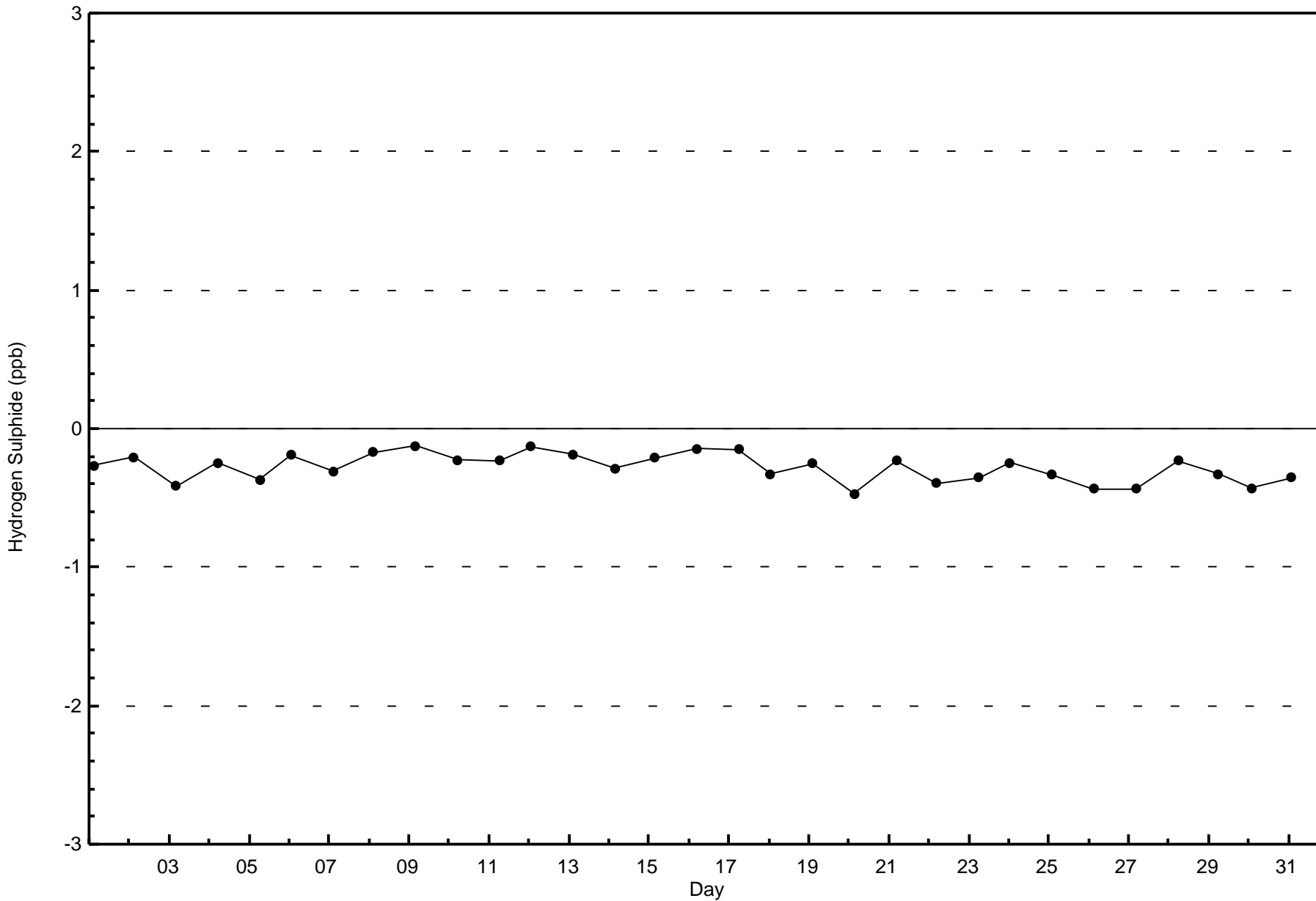


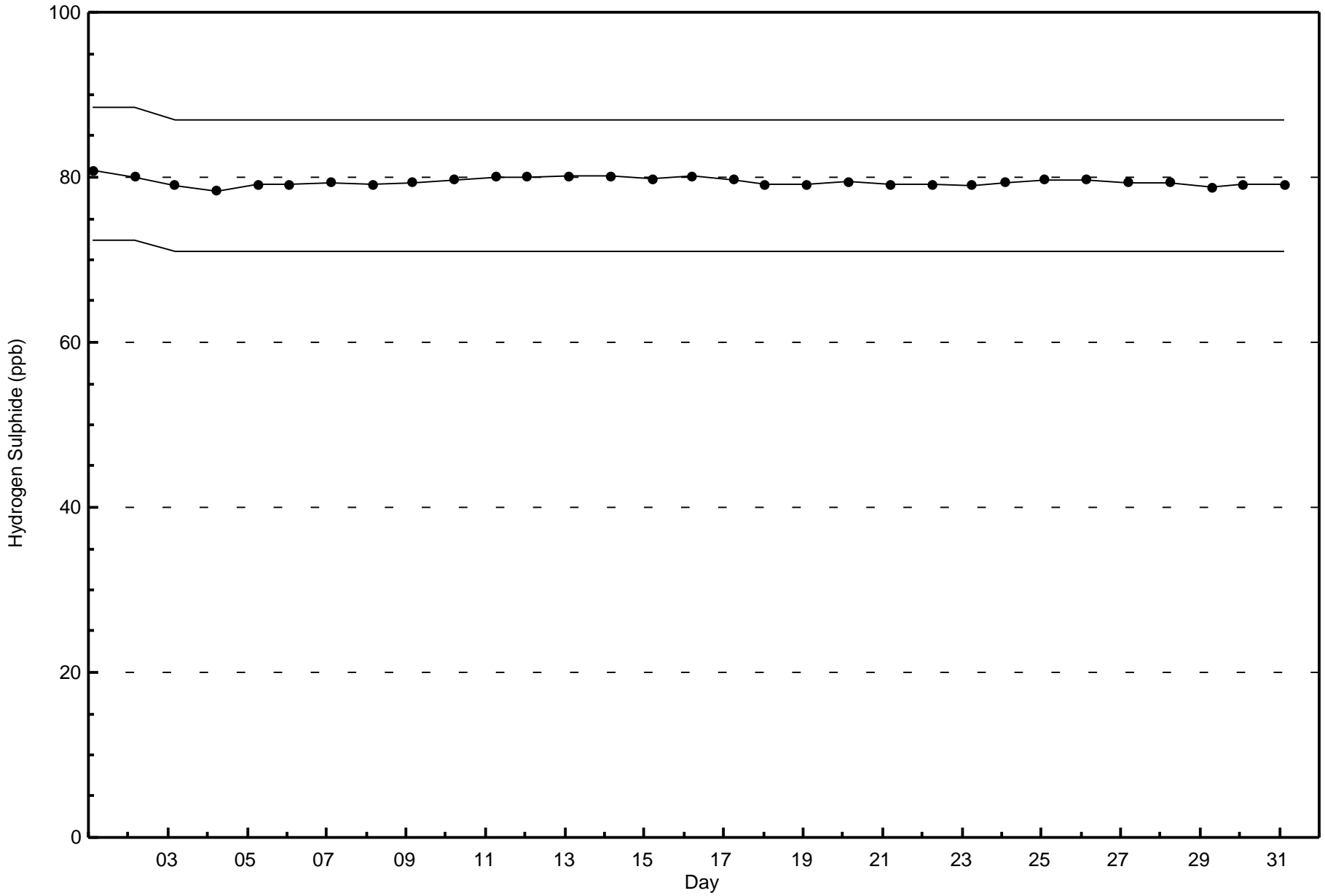
Wood Buffalo Environmental Association
Wind Rose May 2016

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 708



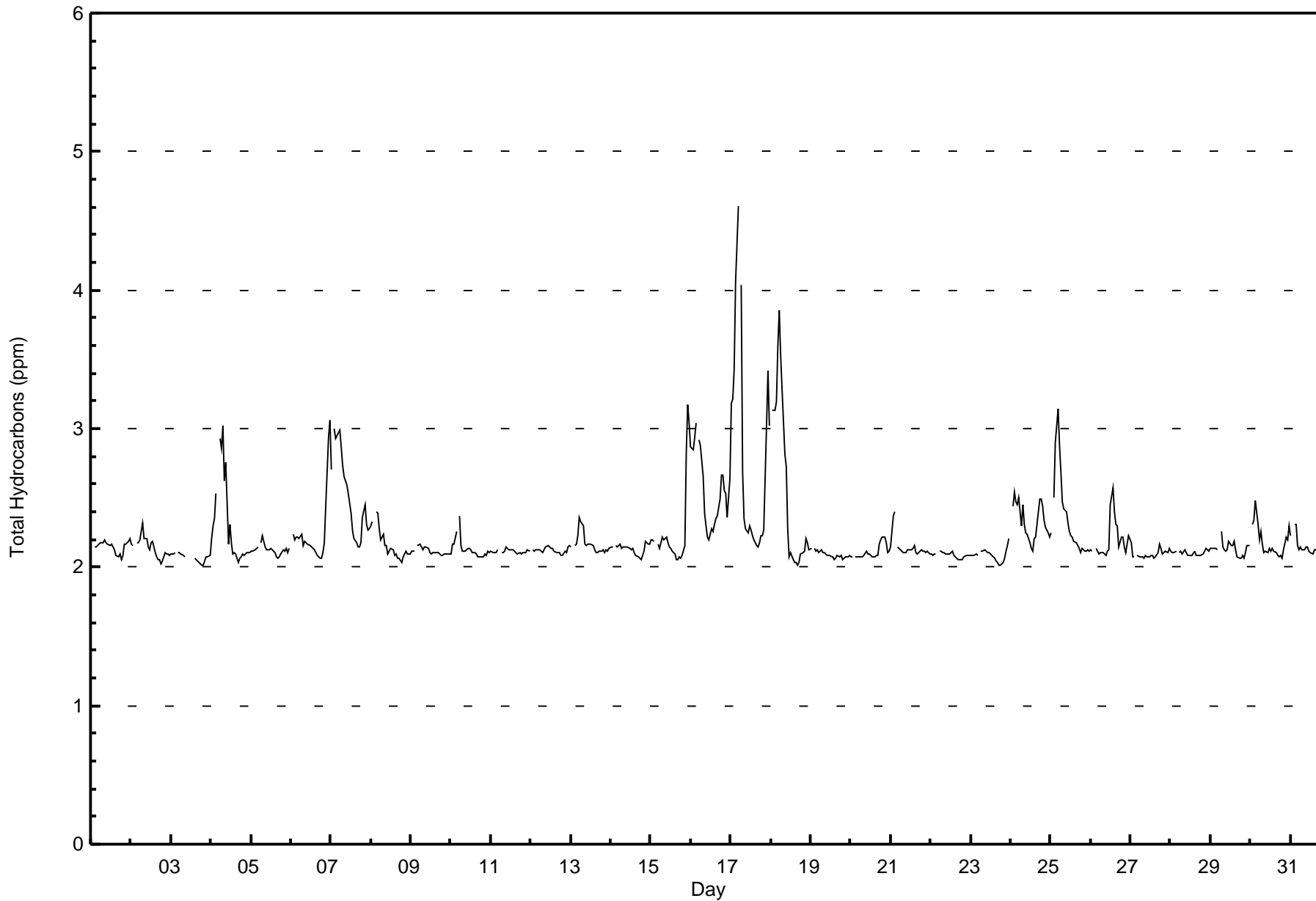




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Wapasu - May 2016

Maximum Value: 4.6 ppm on May 17 05:00																			Maximum Daily Average: 2.8 ppm on May 17						Hours in Service: 744		
Minimum Value: 2.0 ppm on May 18 17:00																			Minimum Daily Average: 2.1 ppm on May 3						Hours of Data: 708		
Maximum Diurnal Average: 2.4 ppm at hour 4																			Minimum Diurnal Average: 2.1 ppm at hour 17						Hours of Missing Data: 36		
Monthly Average: 2.22 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 3.4						Hours of Calibration: 36		
																			Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	2.1	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	
2-May	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
3-May	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	C	C	C	C	C	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1
4-May	2.2	2.3	2.3	2.5	Z	2.9	2.9	3.0	2.6	2.8	2.2	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
5-May	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
6-May	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.9	3.1	2.2	3.1
7-May	2.7	Z	3.0	2.9	3.0	3.0	2.9	2.7	2.7	2.6	2.5	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.4	2.5	2.3	2.3	2.3	2.5	3.0	
8-May	2.3	2.3	Z	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.4
9-May	2.1	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
10-May	2.1	2.2	2.2	2.3	Z	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4
11-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
12-May	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2
13-May	2.1	Z	2.2	2.2	2.2	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4
14-May	2.1	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2
15-May	2.2	2.2	2.2	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.8	3.2	3.0	2.3	3.2
16-May	2.9	2.8	2.9	3.0	Z	2.9	2.9	2.7	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.7	2.7	2.6	2.5	2.4	2.6	2.6	3.0	
17-May	3.2	3.2	3.4	4.1	4.6	Z	4.0	2.7	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	3.0	3.4	3.0	2.8	4.6	
18-May	Z	3.1	3.1	3.2	3.6	3.9	3.5	3.3	2.8	2.7	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.6	3.9	
19-May	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
20-May	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2
21-May	2.1	2.4	2.4	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4
22-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
23-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.2	2.2
24-May	Z	2.4	2.5	2.5	2.4	2.5	2.3	2.5	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.3	2.5	
25-May	2.2	Z	2.5	2.9	3.1	2.9	2.7	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	3.1
26-May	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.6	2.4	2.3	2.3	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.6
27-May	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
28-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
29-May	2.1	2.1	2.1	2.1	2.1	Z	2.3	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	2.2	2.2	2.1	2.3
30-May	Z	2.3	2.3	2.5	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.5	
31-May	2.2	Z	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	19	2.68	2.68
2.1 - 3.0	672	94.92	97.60
3.1 - 10.0	17	2.40	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	3	2	2	2	3	0	1	1	3	1	1	0	0	19
2.1 - 3.0	73	90	29	15	9	56	69	57	28	17	25	22	46	42	29	65	672
3.1 - 10.0	0	0	0	0	0	0	2	11	4	0	0	0	0	0	0	0	17
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	90	29	18	11	58	73	71	32	18	26	25	47	43	29	65	708

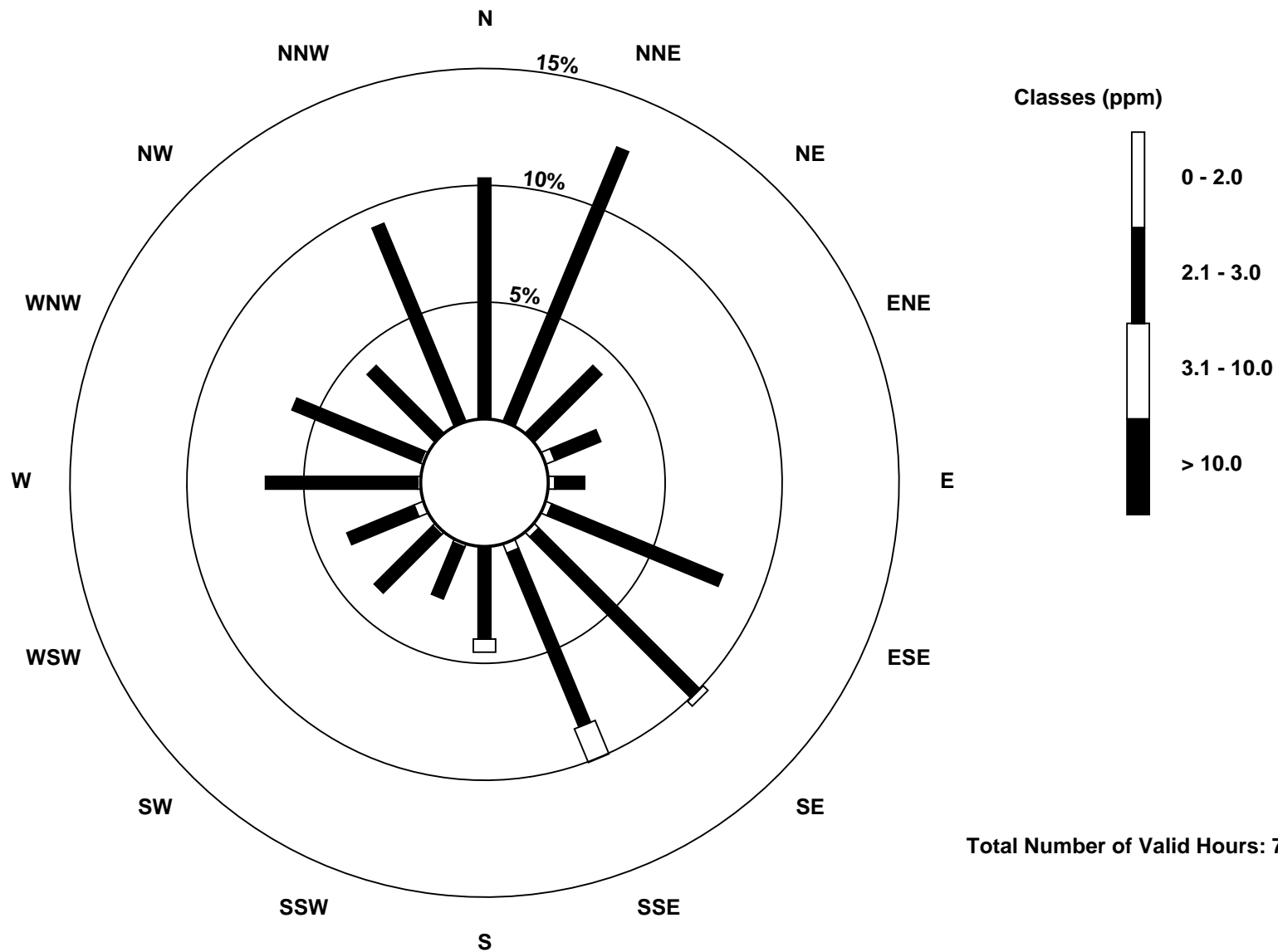
Total Number of Valid Hours: 708

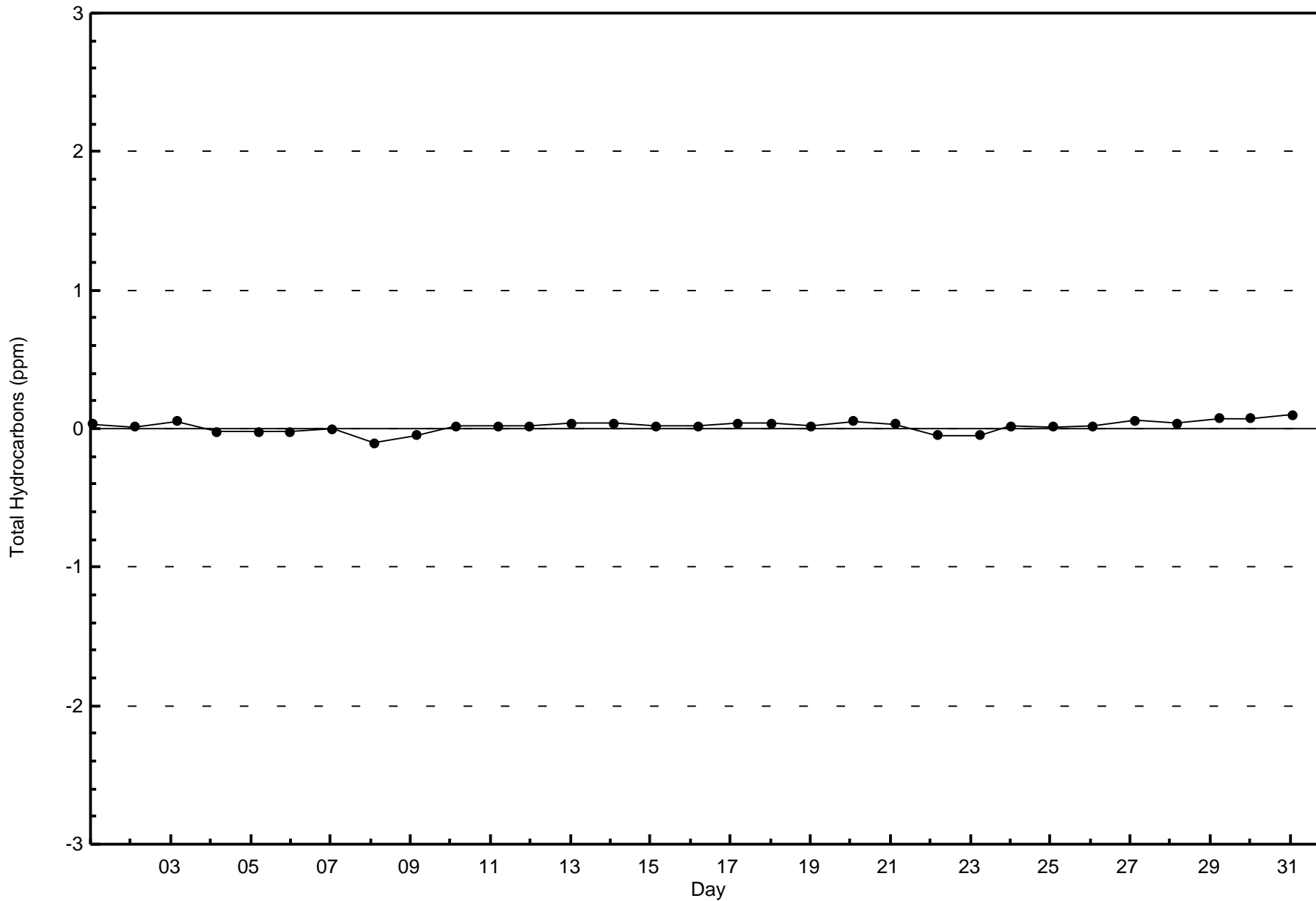
Total Number of Hours: 744

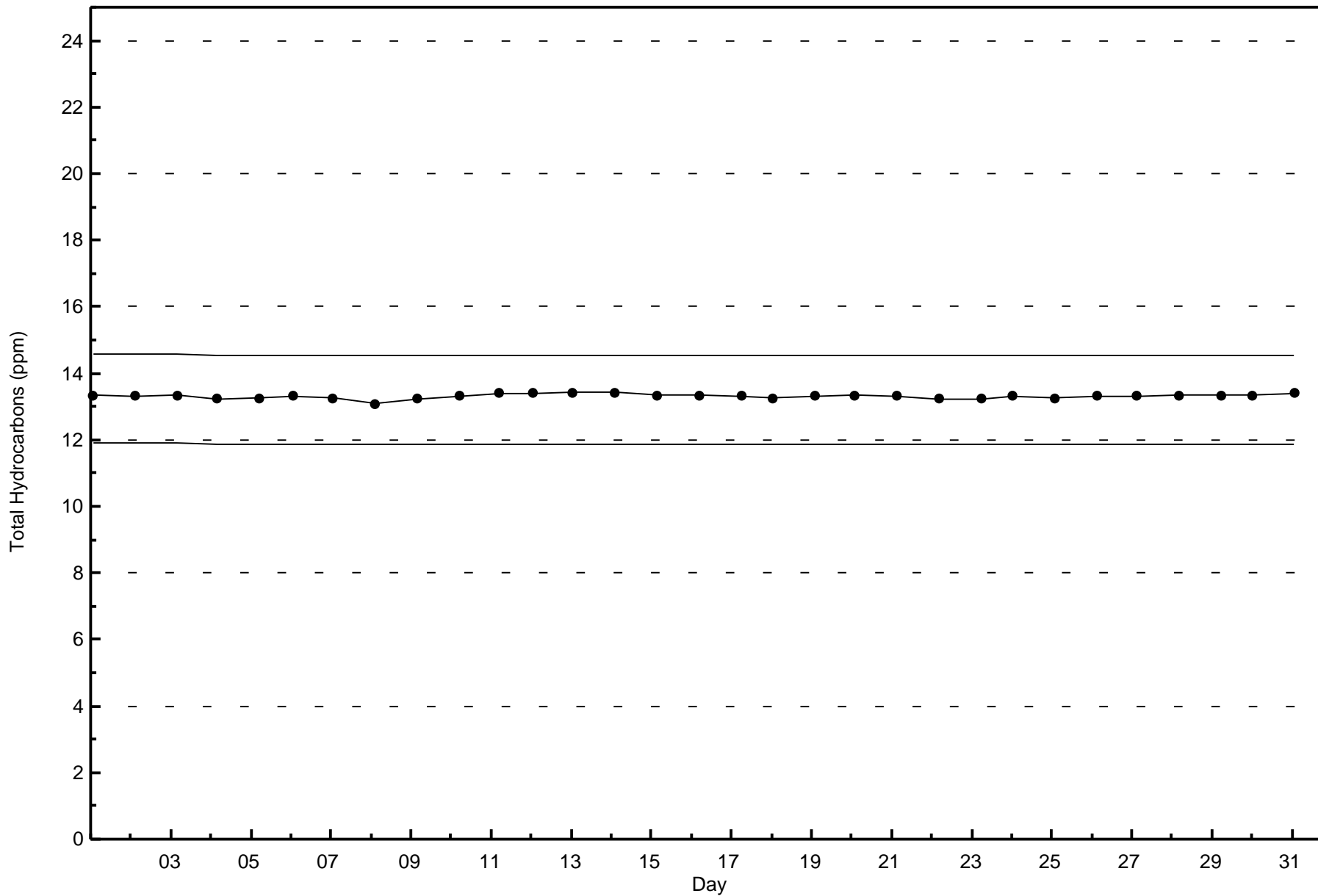


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

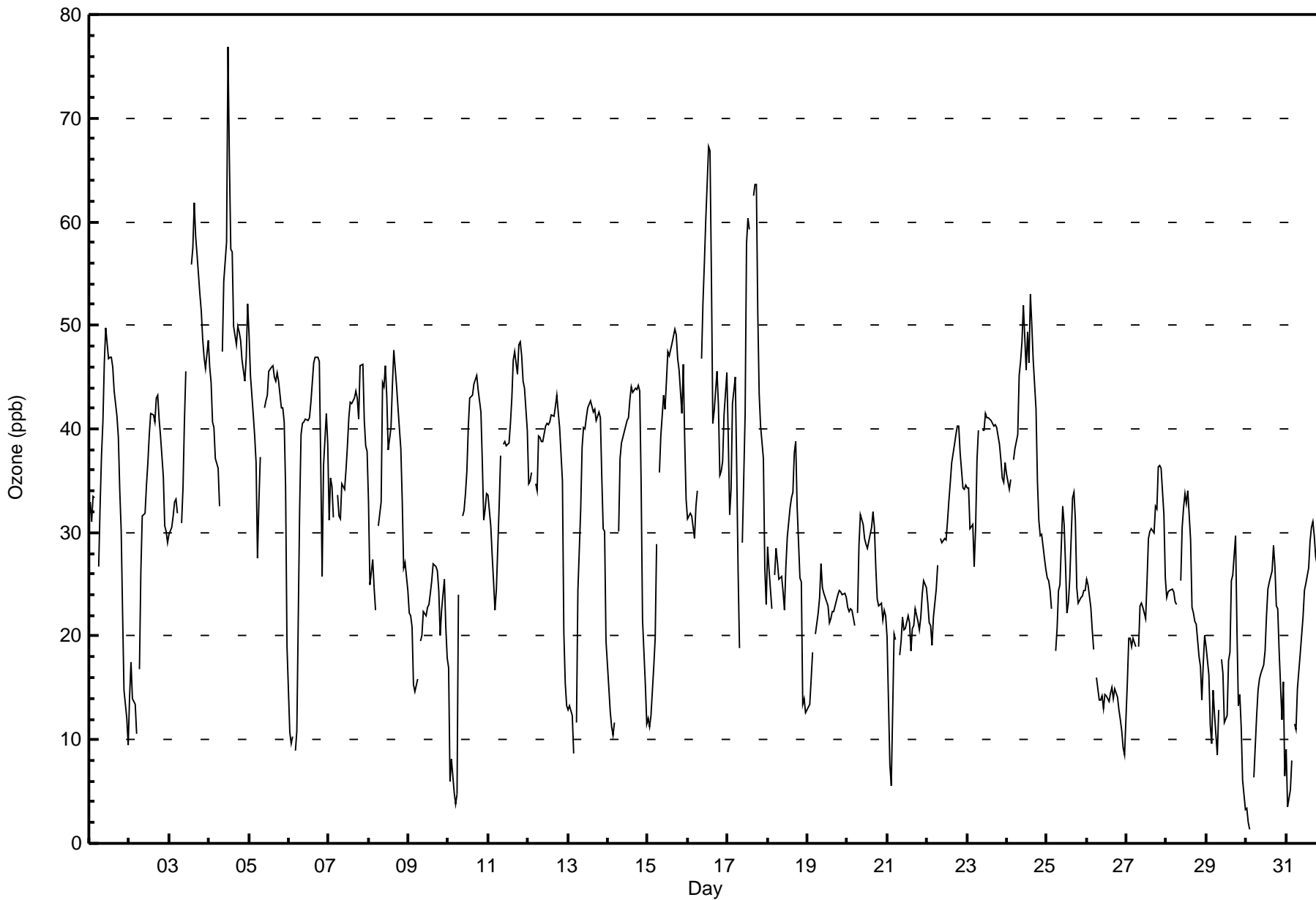
Wapasu - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 77 ppb on May 4 12:00 Maximum Daily Average: 49.1 ppb on May 4										Hours in Service: 744 Hours of Data: 710																
Minimum Value: 1 ppb on May 30 03:00 Minimum Daily Average: 15.2 ppb on May 29 Maximum Diurnal Average: 38.6 ppb at hour 17 Minimum Diurnal Average: 22.2 ppb at hour 4 Monthly Average: 31.0 ppb Percentiles: P ₁ = 5 P ₁₀ = 14 Q ₁ = 22 Median = 31 O ₃ = 41 P ₉₀ = 46 P ₉₉ = 62										Hours of Missing Data: 34 Hours of Calibration: 32 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-May	33	31	34	33	Z	27	33	37	41	46	50	47	47	47	46	44	41	39	34	30	22	15	12	9	34.7	50
2-May	14	18	14	13	11	Z	17	26	32	32	35	37	39	42	41	41	43	43	41	39	35	31	30	29	30.5	43
3-May	30	30	32	33	33	32	Z	31	34	41	46	M	M	56	57	62	59	57	53	51	49	47	46	49	44.1	62
4-May	46	44	41	40	37	36	32	Z	47	54	58	77	66	57	57	50	48	50	49	49	47	45	47	52	49.1	77
5-May	49	45	41	39	37	28	33	37	Z	42	43	43	46	46	45	45	45	45	45	42	42	41	34	19	40.6	49
6-May	11	10	10	Z	9	11	32	39	41	41	41	41	41	43	44	46	47	47	47	37	26	37	41	39	33.9	47
7-May	31	35	34	31	Z	34	32	31	35	34	36	38	41	43	42	43	44	43	41	46	46	41	38	38	38.2	46
8-May	33	25	27	25	22	Z	31	33	44	44	46	43	38	40	44	48	46	44	40	38	33	27	27	24	35.8	48
9-May	22	22	21	15	15	16	Z	19	20	22	22	23	23	24	25	27	27	26	24	20	23	26	21	18	21.8	27
10-May	17	6	8	5	4	5	24	Z	32	32	34	36	40	43	43	44	45	45	44	42	37	31	32	34	29.6	45
11-May	34	31	28	25	22	25	33	37	Z	39	39	38	39	41	43	47	47	45	48	48	47	45	44	40	38.4	48
12-May	35	35	36	Z	35	34	39	39	39	39	40	41	40	41	41	41	42	43	42	40	35	20	15	13	35.9	43
13-May	13	13	12	9	Z	12	24	32	38	40	40	41	42	43	42	42	42	41	42	41	35	30	30	19	31.5	43
14-May	15	13	11	10	12	Z	30	37	39	39	40	41	41	43	44	44	44	44	44	44	35	21	15	12	31.2	44
15-May	12	11	12	17	20	29	Z	36	39	43	42	45	47	47	48	49	50	49	47	46	41	46	39	33	36.9	50
16-May	31	32	32	31	29	32	34	Z	47	52	56	60	67	67	55	41	42	45	42	35	36	37	41	45	43.1	67
17-May	39	32	34	42	45	36	26	19	Z	29	41	58	60	59	C	63	64	64	51	43	40	37	27	23	42.4	64
18-May	29	26	23	Z	26	28	27	26	26	24	23	27	30	32	33	34	38	39	32	26	25	13	14	13	26.6	39
19-May	13	13	16	18	Z	20	22	24	27	25	24	23	23	21	22	22	22	23	24	24	24	24	24	24	21.9	27
20-May	23	22	23	22	21	Z	22	29	32	31	29	29	28	29	30	32	30	27	24	23	23	22	23	22	25.9	32
21-May	20	8	6	13	20	20	Z	18	20	22	21	21	22	21	19	21	21	23	21	21	22	24	25	25	19.6	25
22-May	23	21	21	19	22	24	27	Z	29	29	29	29	31	33	35	37	38	39	40	40	38	34	34	35	30.9	40
23-May	34	34	30	31	27	30	37	40	Z	40	40	42	41	41	41	40	40	40	40	38	37	35	35	37	37.0	42
24-May	36	34	35	Z	37	38	40	45	47	48	52	46	49	46	53	50	47	42	35	31	30	30	28	26	40.2	53
25-May	26	25	24	23	Z	19	21	24	25	32	31	27	22	23	25	33	34	31	25	23	24	24	24	24	25.7	34
26-May	26	25	23	21	19	Z	16	14	14	14	13	14	14	14	14	15	14	15	14	13	12	11	9	9	15.3	26
27-May	16	20	20	19	20	19	Z	19	23	23	23	22	25	29	30	30	30	33	32	36	36	36	32	26	26.0	36
28-May	24	24	24	24	24	23	23	Z	25	31	32	34	33	34	29	23	22	21	21	18	17	14	17	20	24.3	34
29-May	19	16	11	10	15	12	9	13	Z	18	16	12	12	18	18	25	26	30	21	13	14	11	6	3	15.2	30
30-May	3	2	1	Z	6	9	12	15	16	16	17	19	22	25	25	26	29	27	23	23	19	12	16	7	16.1	29
31-May	9	4	5	8	Z	12	11	15	18	20	22	24	25	27	29	30	31	30	28	26	20	18	22	25	19.9	31
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Wapasu - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	145	20.42	20.42
21 - 50	536	75.49	95.92
51 - 82	29	4.08	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	15	20	2	1	2	23	26	6	3	2	3	3	7	1	5	26	145
21 - 50	58	71	28	18	8	35	49	59	29	12	15	22	35	38	22	37	536
51 - 82	0	0	0	0	0	0	1	4	2	6	6	1	5	2	1	1	29
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	91	30	19	10	58	76	69	34	20	24	26	47	41	28	64	710

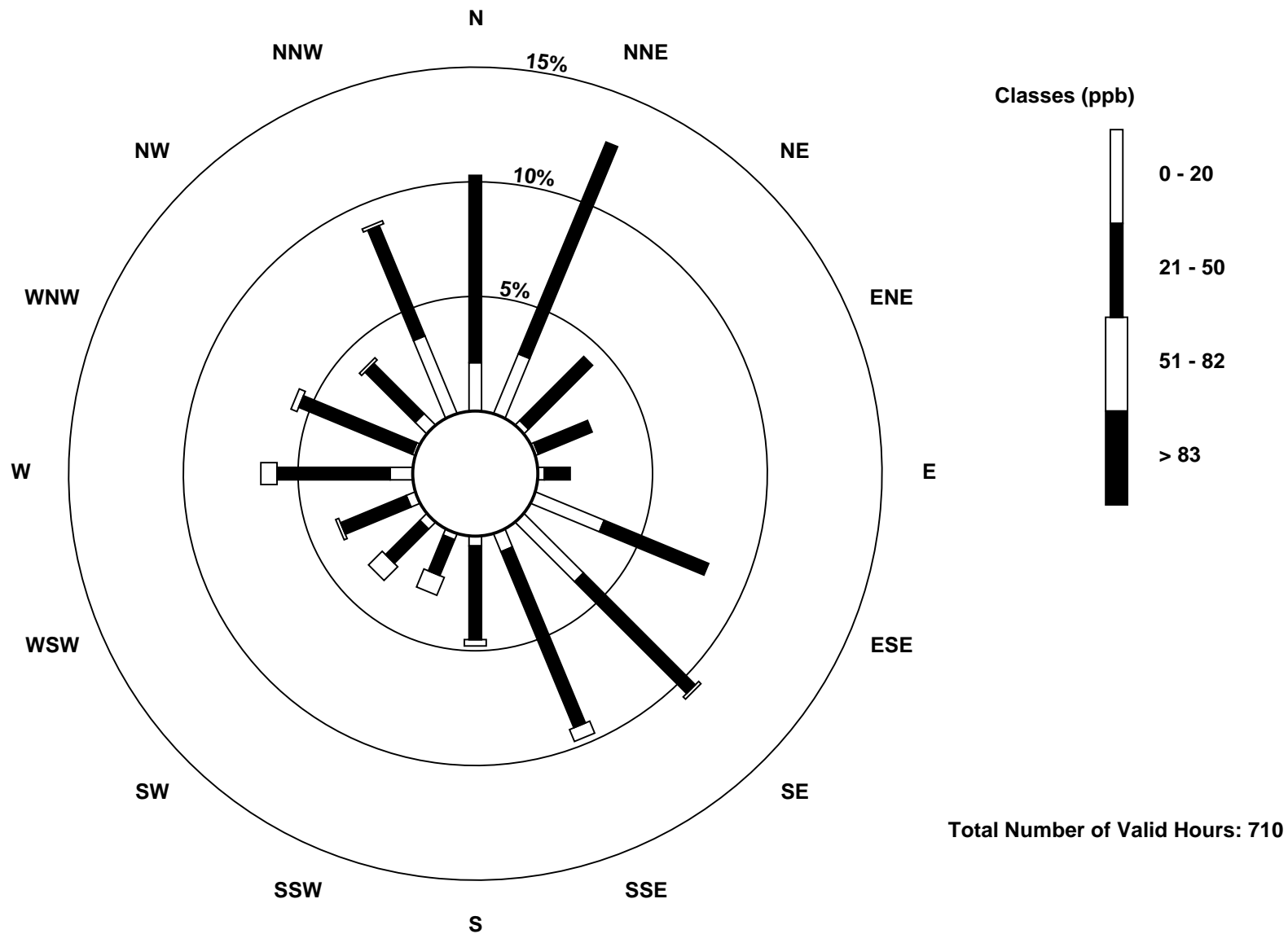
Total Number of Valid Hours: 710

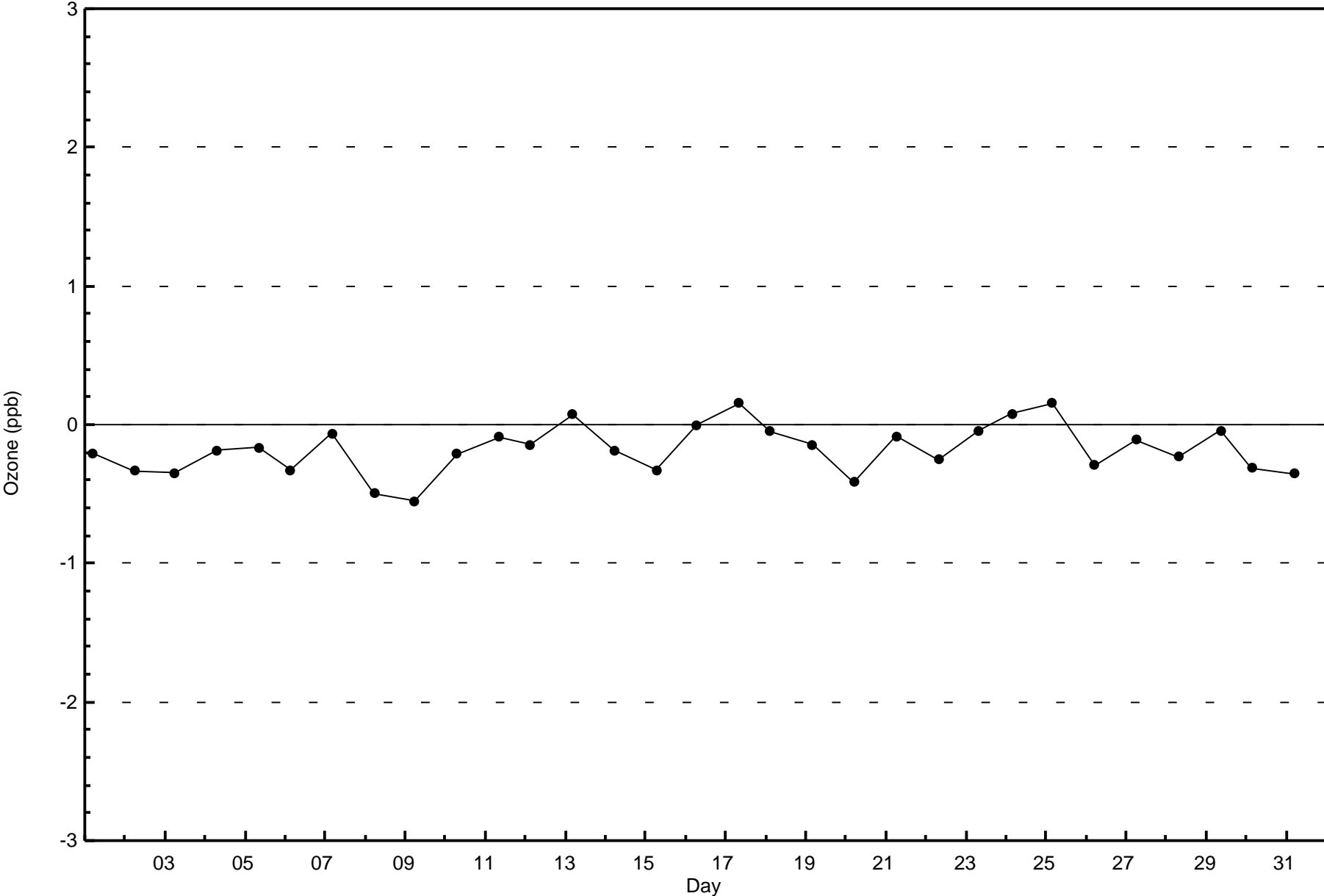
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Ozone (O₃) - ppb
Wapasu (AMS 17)

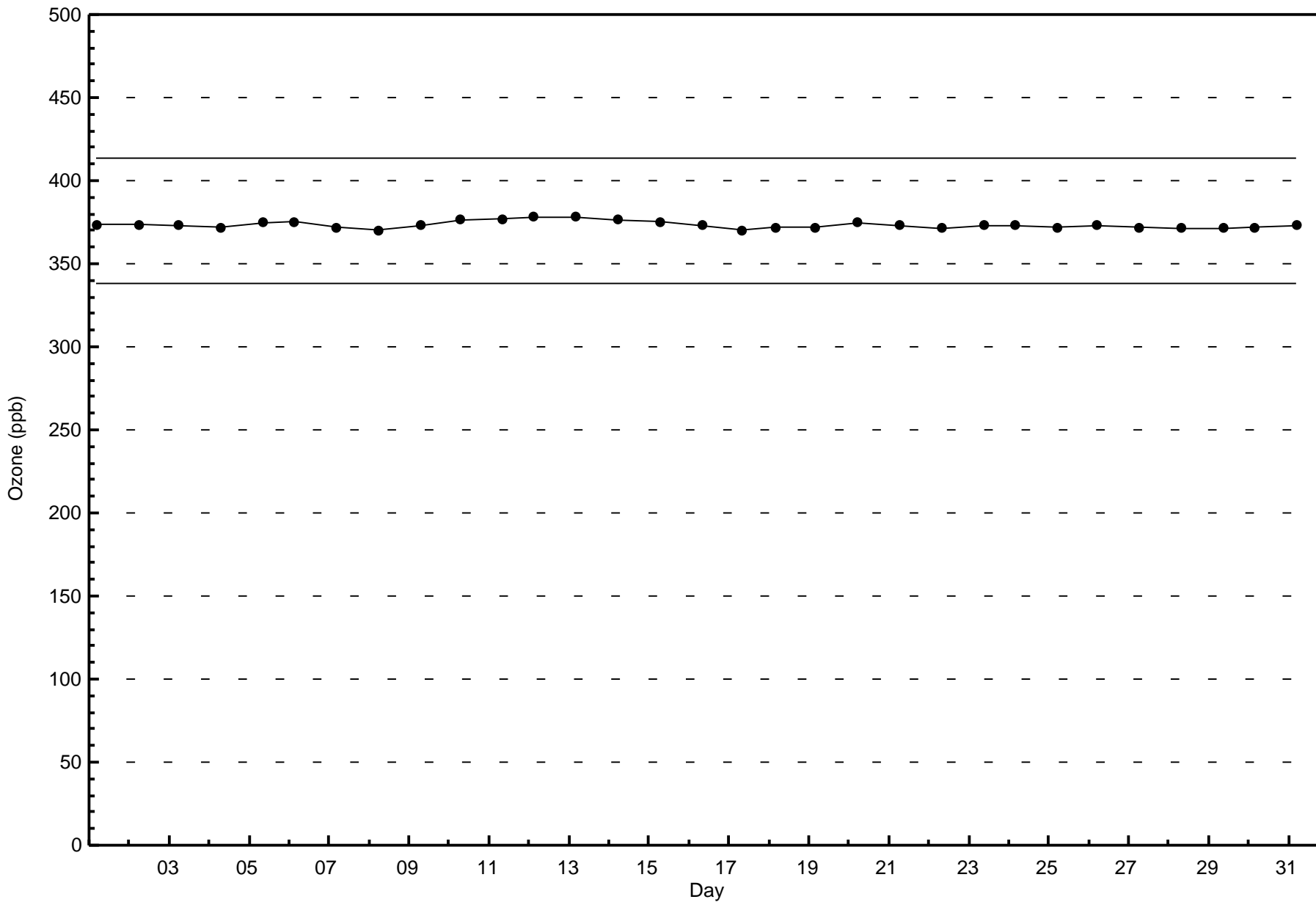






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Wapasu - May 2016



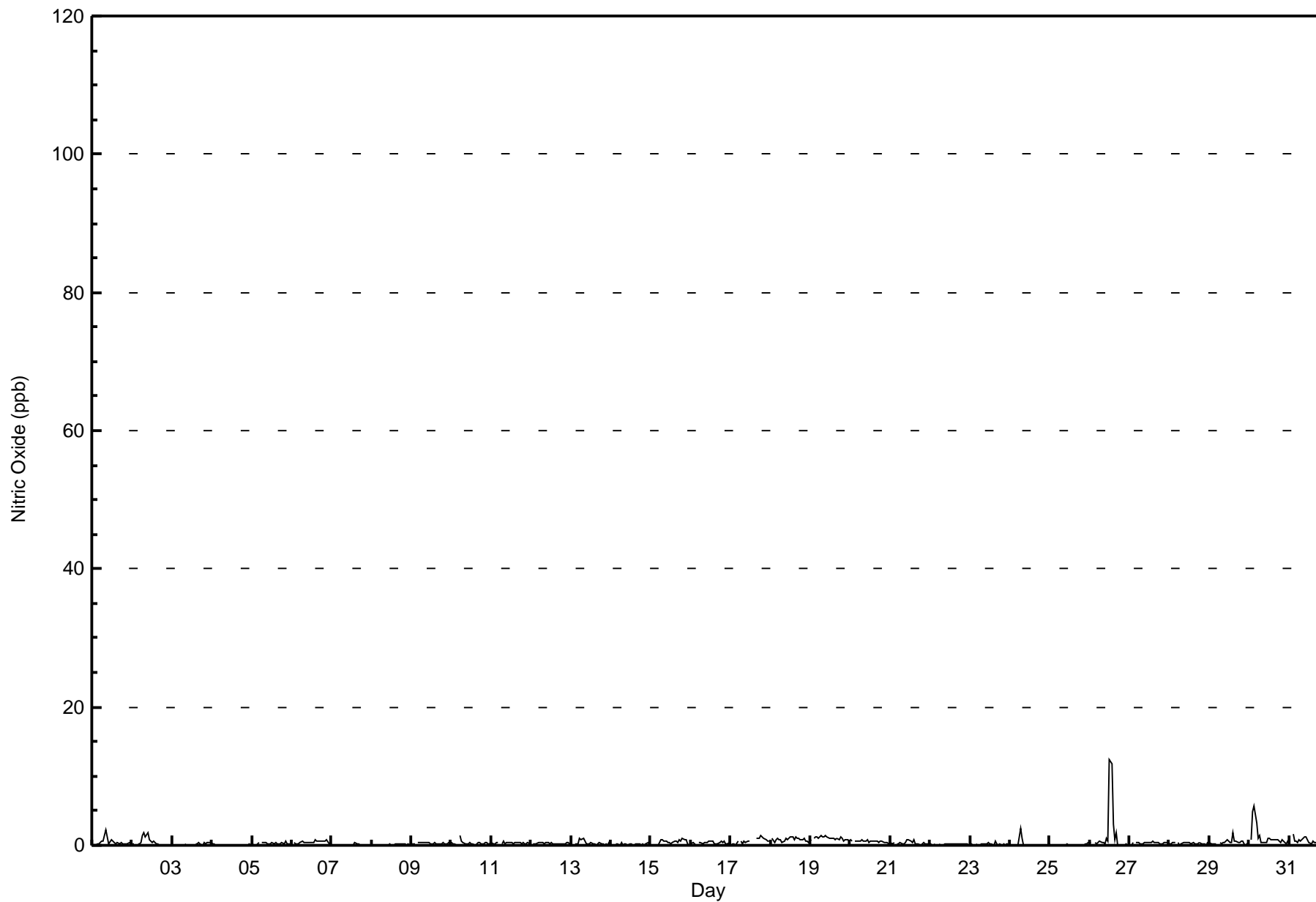


Maximum Value: 12 ppb on May 26 13:00		Maximum Daily Average: 1.5 ppb on May 26		Hours in Service: 744																													
Minimum Value: 0 ppb on May 2 19:00		Minimum Daily Average: 0.0 ppb on May 4		Hours of Data: 705																													
Maximum Diurnal Average: 0.8 ppb at hour 13		Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Missing Data: 39																													
Monthly Average: 0.4 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2		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-May	0	Z	0	0	0	1	1	2	2	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2							
2-May	0	0	Z	0	0	0	1	2	1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.5	2							
3-May	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.2	0								
4-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0								
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1								
6-May	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0.4	1								
7-May	0	Z	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0								
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0								
10-May	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								
11-May	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1								
12-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0								
13-May	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1								
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0								
15-May	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	1	1	0	1	1	1	1	1	0	0.5	1								
16-May	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	0	0	0.4	1								
17-May	0	0	0	0	1	Z	1	0	1	1	1	1	M	M	M	1	1	1	1	1	1	1	1	0.6	1								
18-May	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.9	1								
19-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1								
20-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0.6	1								
21-May	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0.3	1								
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0								
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1								
24-May	Z	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2								
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0								
26-May	0	0	Z	0	0	0	1	1	0	0	1	1	12	12	3	1	2	0	0	0	0	0	0	1.5	12								
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1								
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0								
29-May	0	0	0	0	0	Z	0	0	0	0	1	1	0	1	2	1	1	0	0	1	1	0	0	0.5	2								
30-May	Z	1	5	6	3	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	1	1.2	6								
31-May	0	Z	2	1	1	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0.5	2								
		0.2	0.2	0.4	0.5	0.4	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.8	0.7	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	Diurnal Average							
		1	1	5	6	3	1	2	2	2	2	1	1	12	12	3	1	2	1	1	1	1	1	1	1	Diurnal Maximum							
Z - zerspan		C - Calibration			M - Maintenance																												



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	73	90	29	18	11	58	73	71	32	18	26	25	45	42	29	65	705
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	73	90	29	18	11	58	73	71	32	18	26	25	45	42	29	65	705

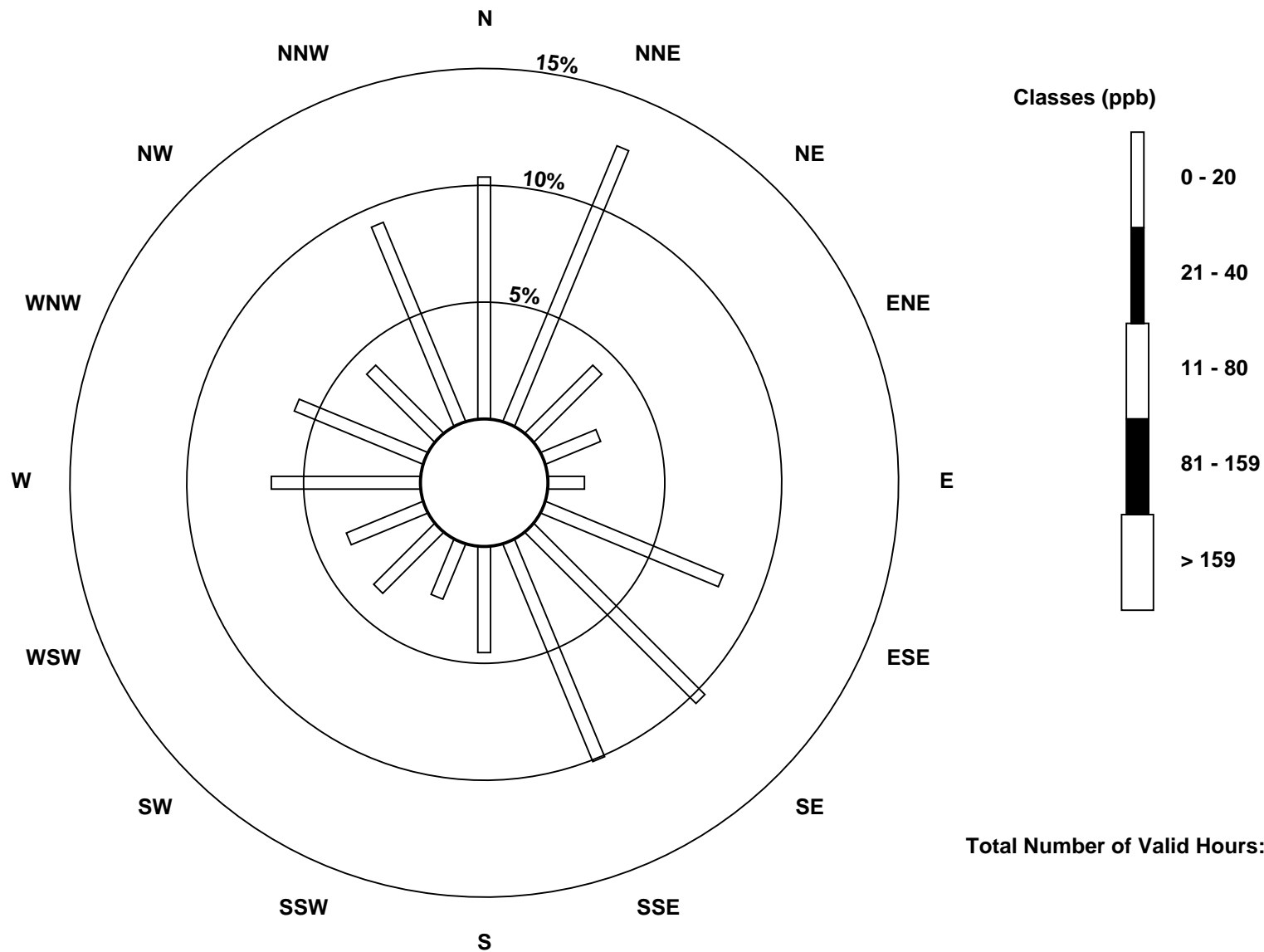
Total Number of Valid Hours: 705

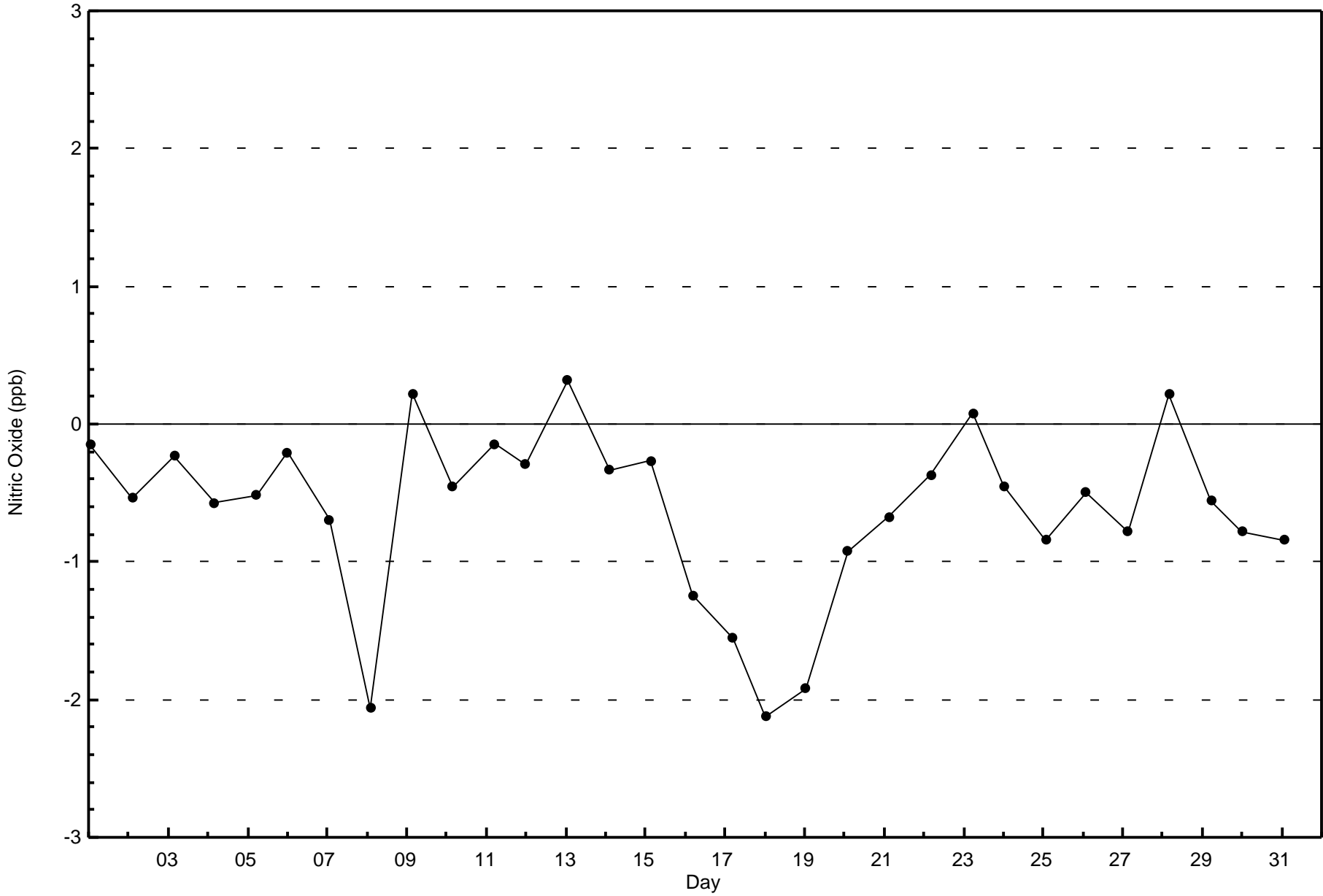
Total Number of Hours: 744

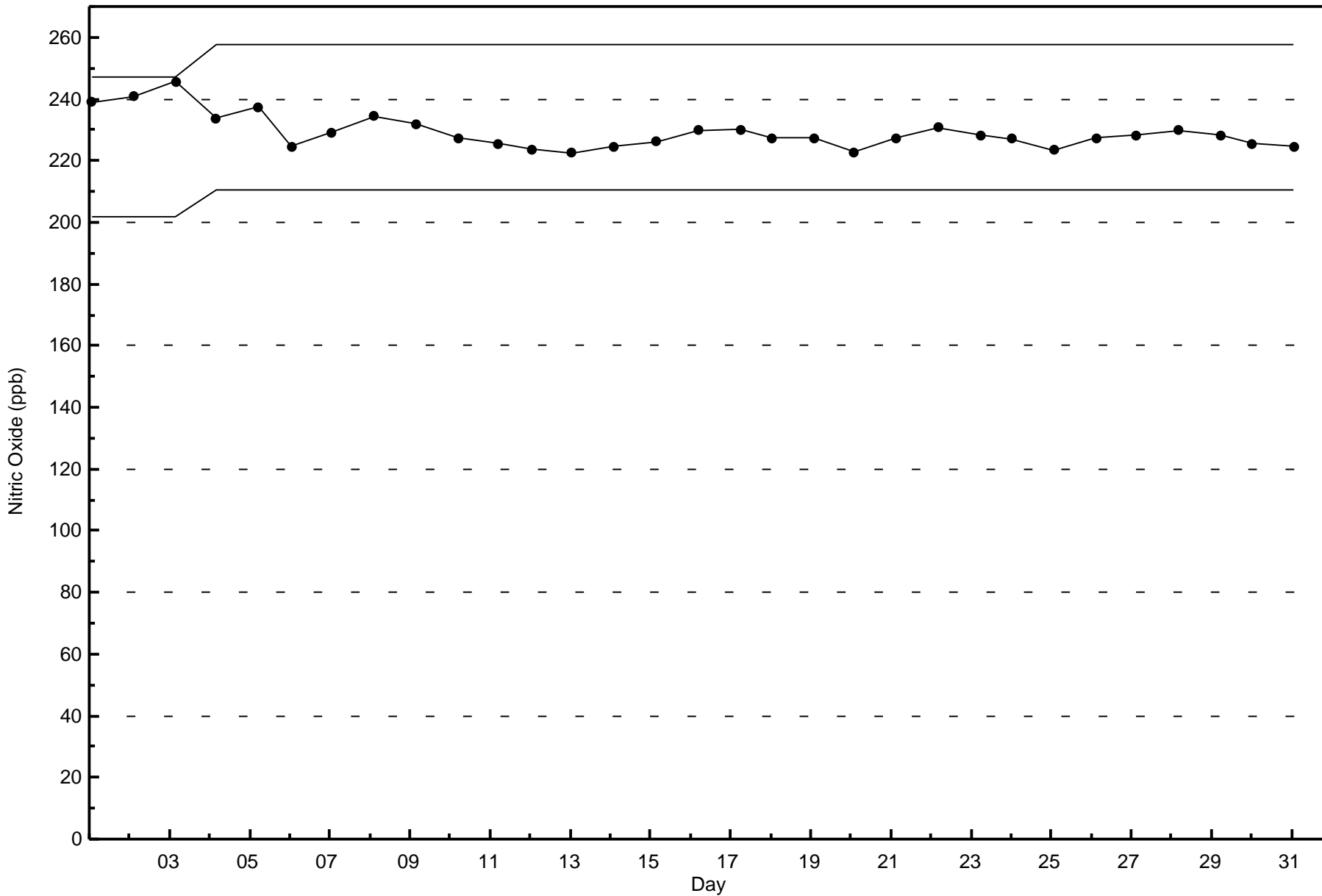


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on May 7 00:00	Maximum Daily Average: 7.2 ppb on May 17		Hours of Data:	705
Minimum Value: 0 ppb on May 1 19:00	Minimum Daily Average: 0.0 ppb on May 11		Hours of Missing Data:	39
Maximum Diurnal Average: 3.1 ppb at hour 3	Minimum Diurnal Average: 0.7 ppb at hour 16		Hours of Calibration:	36
Monthly Average: 1.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 15		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-May	0	Z	1	1	2	5	3	6	7	4	1	2	2	1	1	0	0	0	0	0	0	0	0	1	1.6	7	
2-May	1	1	Z	0	0	1	3	5	3	4	2	1	2	2	1	1	1	1	1	1	1	0	0	0	1.3	5	
3-May	0	0	0	Z	0	0	0	1	1	C	C	C	C	C	1	2	1	1	1	0	0	0	0	1	0.6	2	
4-May	2	4	4	5	Z	7	6	7	6	5	2	4	3	1	3	2	0	1	1	0	0	1	0	0	2.9	7	
5-May	1	1	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
6-May	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	21	23	2.4	23
7-May	12	Z	10	9	9	9	7	5	4	4	4	4	3	3	2	1	1	1	1	3	5	3	2	2	4.4	12	
8-May	3	2	Z	3	2	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0.9	3	
9-May	0	0	0	Z	2	2	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
10-May	0	0	1	2	Z	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3	
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
12-May	Z	0	0	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-May	0	Z	0	0	1	3	4	2	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0.6	4	
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	0.3	2	
15-May	2	1	0	Z	0	0	2	2	2	2	1	0	1	0	0	0	0	0	0	0	0	11	15	11	2.2	15	
16-May	8	7	8	7	Z	6	5	4	3	2	2	1	3	5	6	5	5	7	11	12	9	7	5	7	5.7	12	
17-May	12	12	15	20	22	Z	13	5	2	1	2	3	M	M	M	1	1	2	2	2	1	9	13	7	7.2	22	
18-May	Z	6	5	5	7	7	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2.1	7	
19-May	0	Z	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	4	3	3	0	0	0.7	4	
21-May	1	14	18	Z	1	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	1.8	18	
22-May	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	
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0.3	2	
24-May	Z	4	4	2	1	2	4	1	0	0	1	0	1	1	3	4	6	11	9	8	4	1	0	0	2.9	11	
25-May	1	Z	2	1	2	1	1	0	0	4	4	2	1	0	0	1	1	0	0	0	0	0	0	0	0.8	4	
26-May	0	0	Z	0	0	0	0	1	0	0	1	0	3	4	2	1	3	0	0	1	1	0	0	0	0.8	4	
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0	0	0.2	2	
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
29-May	0	0	0	0	0	Z	2	1	0	0	1	2	1	1	3	1	0	0	0	0	0	0	0	0	0.5	3	
30-May	Z	0	2	5	12	8	7	1	0	0	0	0	1	1	1	1	0	1	0	0	2	7	1	10	2.6	12	
31-May	6	Z	10	6	4	1	2	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	1.6	10	

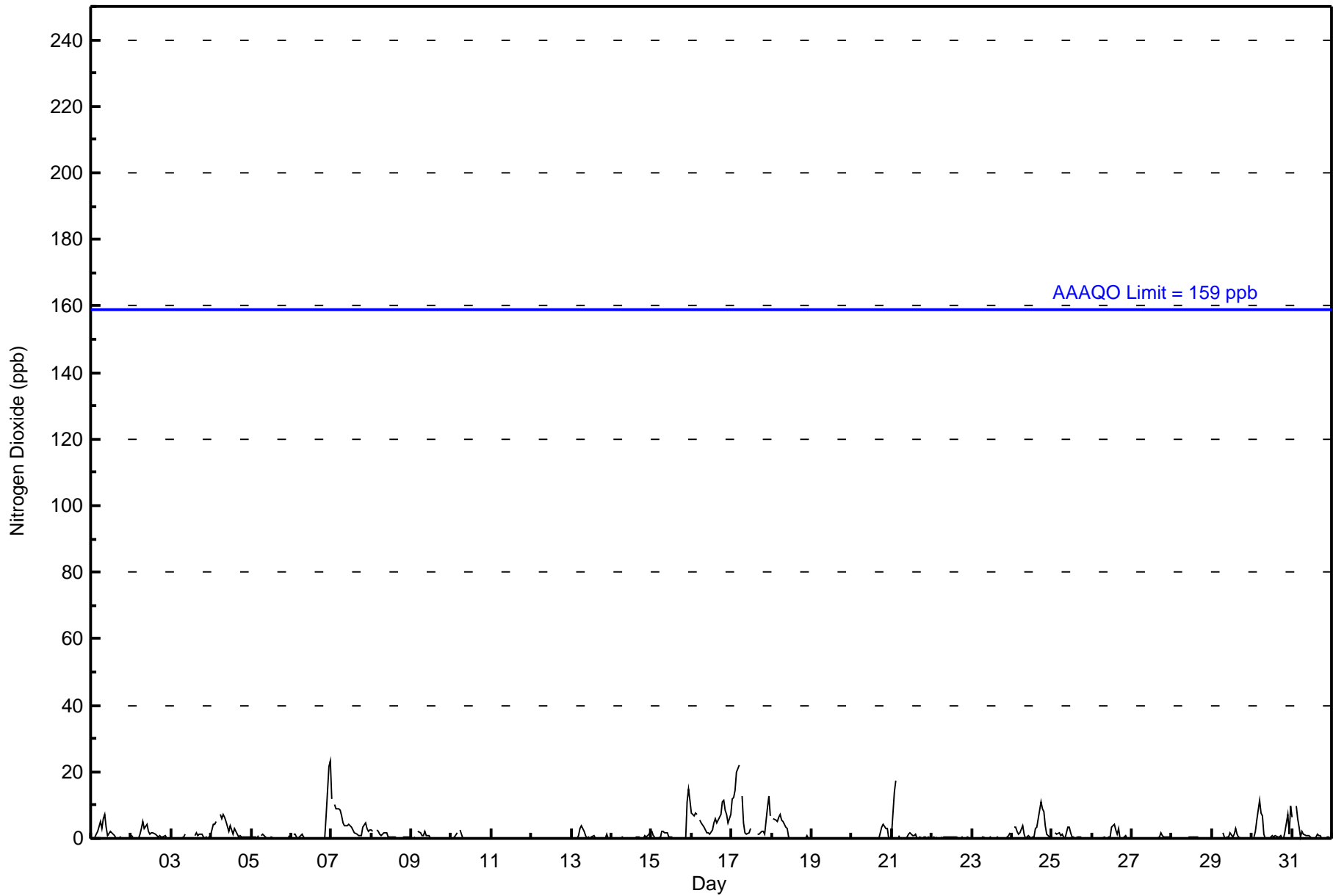
1.9	2.1	3.1	2.6	2.5	2.1	2.2	1.6	1.2	1.1	0.8	0.8	0.7	0.8	0.9	0.7	0.7	1.0	1.0	1.0	0.9	1.8	2.0	2.2	Diurnal Average
12	14	18	20	22	9	13	7	7	5	4	4	3	5	6	5	6	11	11	12	9	11	21	23	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	99.57	99.57
21 - 40	3	0.43	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	73	90	29	18	11	58	71	70	32	18	26	25	45	42	29	65	702
21 - 40	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	90	29	18	11	58	73	71	32	18	26	25	45	42	29	65	705

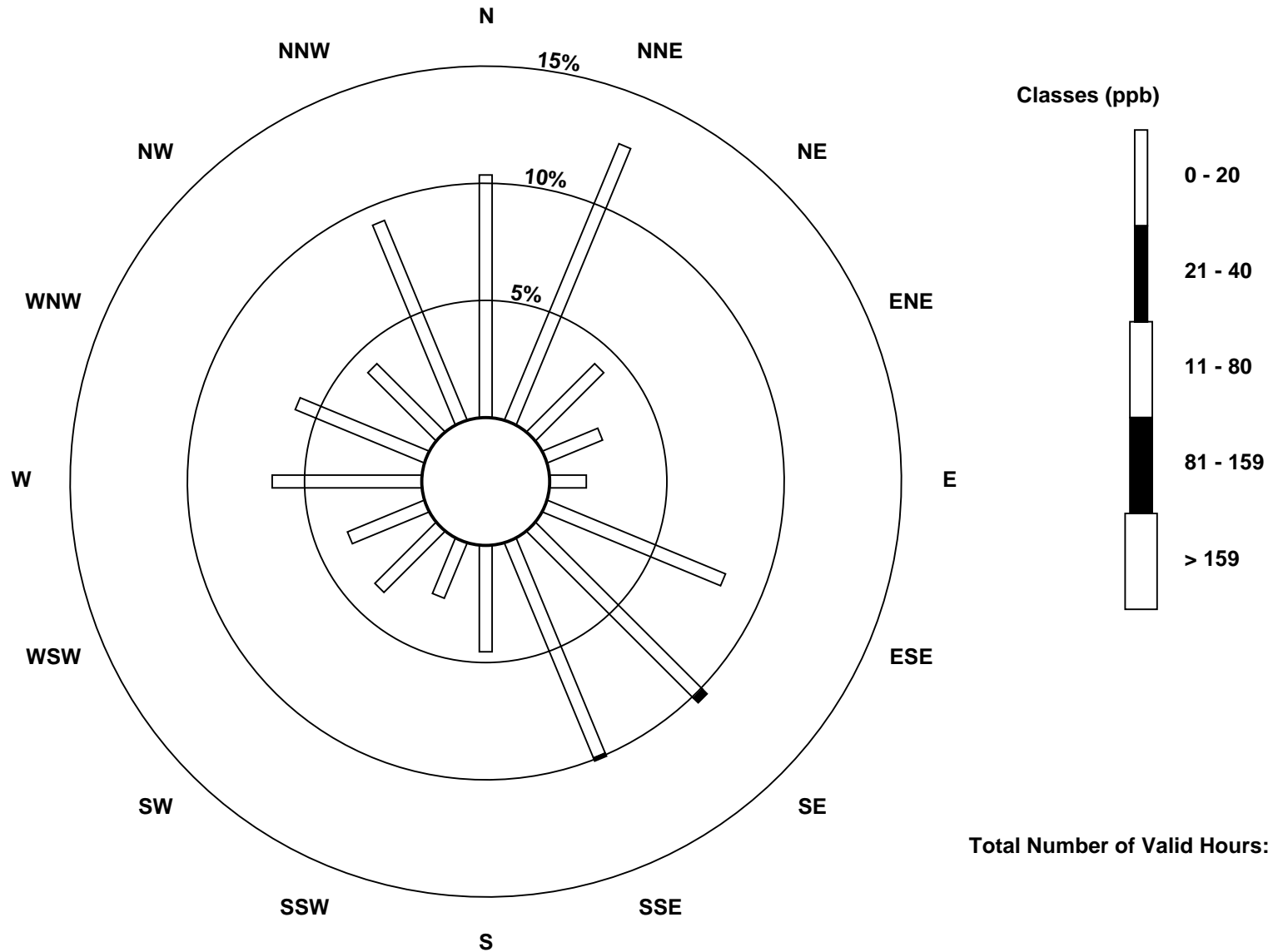
Total Number of Valid Hours: 705

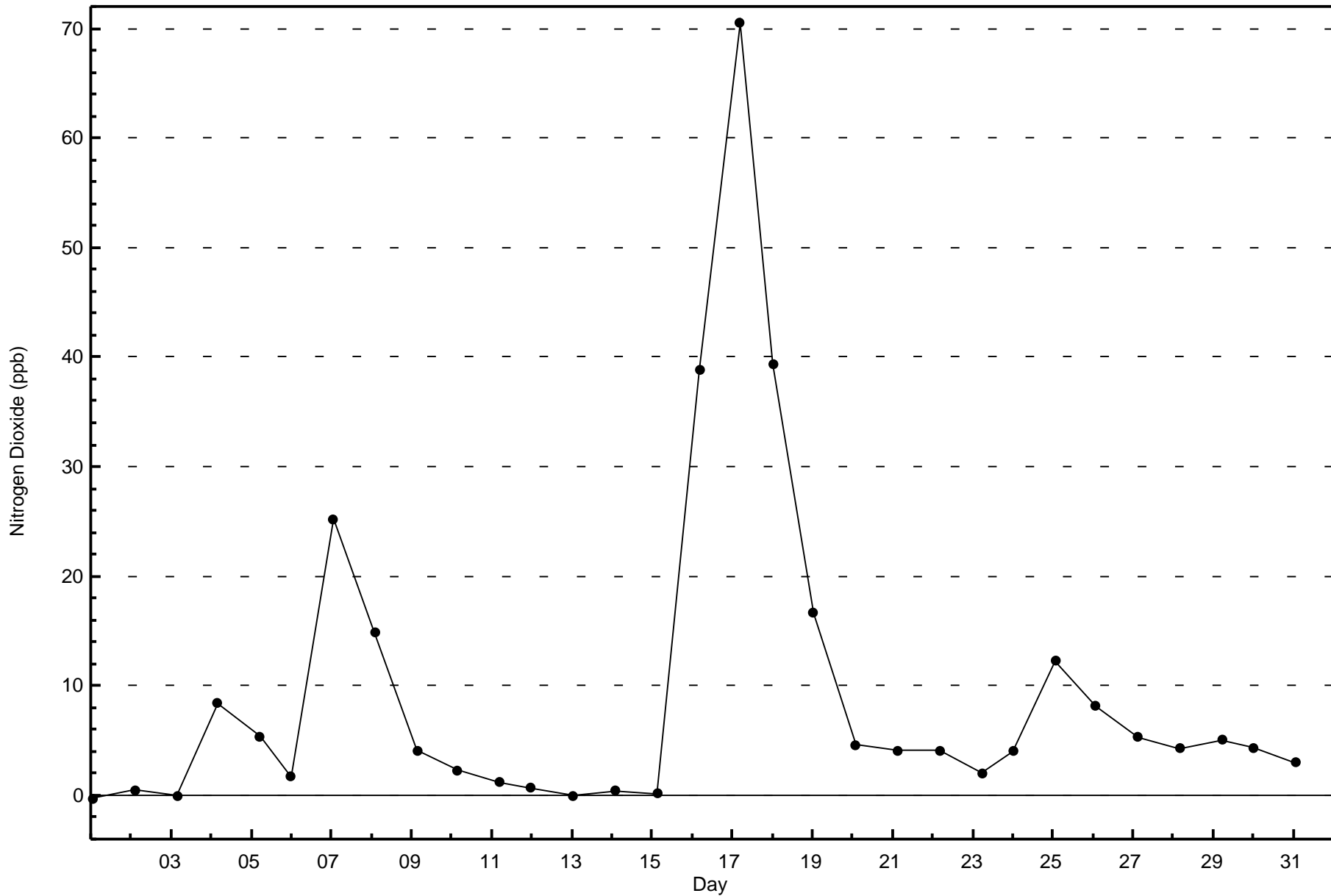
Total Number of Hours: 744

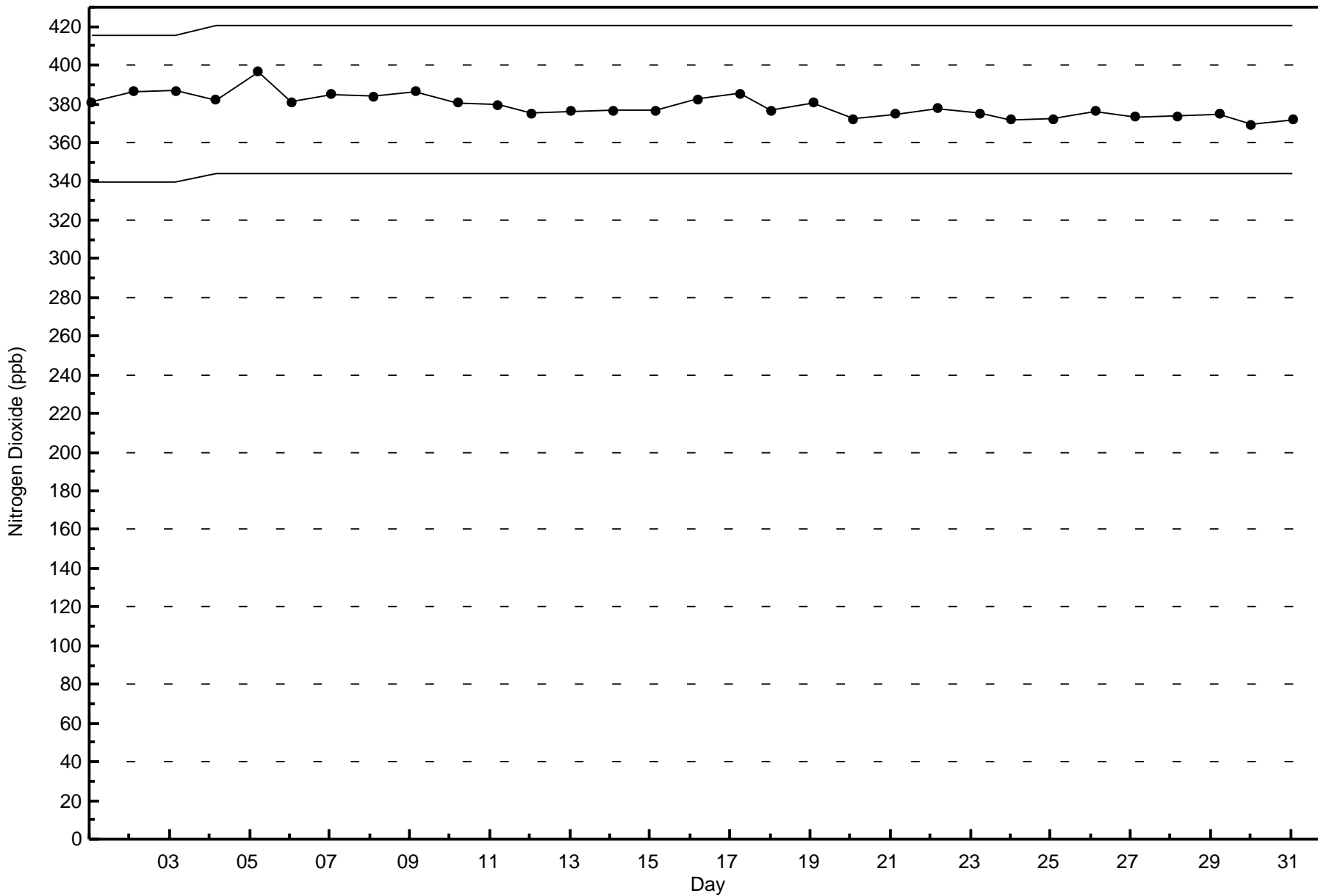


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)







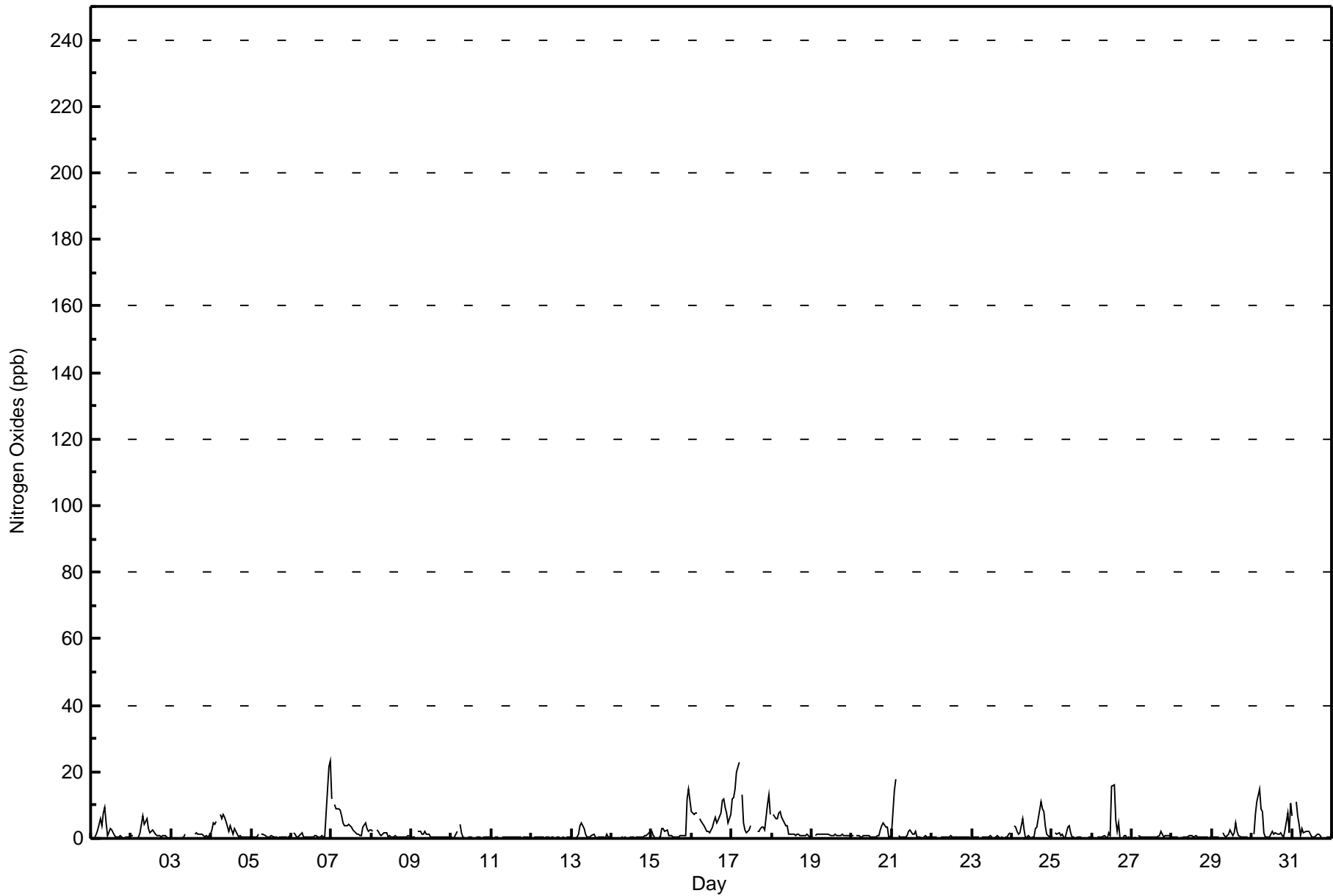


Maximum Value: 23 ppb on May 7 00:00		Maximum Daily Average: 7.8 ppb on May 17		Hours in Service: 744																																													
Minimum Value: 0 ppb on May 2 23:00		Minimum Daily Average: 0.3 ppb on May 12		Hours of Data: 705																																													
Maximum Diurnal Average: 3.5 ppb at hour 3		Minimum Diurnal Average: 1.1 ppb at hour 16		Hours of Missing Data: 39																																													
Monthly Average: 1.9 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 16		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-May	1	Z	1	1	2	6	4	7	9	5	1	3	2	2	1	0	0	1	0	0	0	0	0	1	2.1	9																							
2-May	1	1	Z	0	0	2	4	7	4	6	3	2	2	2	1	1	1	1	0	1	1	0	0	0	1.8	7																							
3-May	0	0	0	Z	0	0	0	1	1	C	C	C	C	C	1	2	1	1	1	1	1	1	1	0.7	2																								
4-May	3	5	4	5	Z	7	6	7	6	5	2	4	3	1	3	2	0	1	1	0	0	0	1	0	2.9	7																							
5-May	1	1	0	0	1	Z	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0.5	1																							
6-May	Z	1	1	1	1	1	2	1	0	0	0	0	0	0	1	1	1	1	1	1	1	8	22	23	2.9	23																							
7-May	12	Z	10	9	9	9	7	5	4	4	4	4	3	2	2	1	1	1	1	3	5	3	2	2	4.5	12																							
8-May	3	2	Z	3	2	1	1	2	2	2	1	1	1	0	1	0	0	0	0	1	1	0	1	0	1.0	3																							
9-May	0	0	1	Z	2	2	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2																							
10-May	0	0	1	2	Z	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4																							
11-May	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
12-May	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																							
13-May	0	Z	0	0	1	4	5	3	1	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	1.0	5																							
14-May	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	0.4	2																							
15-May	2	1	0	Z	0	0	3	3	2	3	1	1	1	1	1	1	0	1	1	1	1	12	15	11	2.7	15																							
16-May	8	7	8	7	Z	6	5	4	3	2	2	2	3	5	6	5	6	8	11	12	9	8	5	7	6.1	12																							
17-May	12	12	15	20	23	Z	13	5	3	2	2	4	M	M	M	2	2	3	4	3	2	10	13	7	7.8	23																							
18-May	Z	7	6	6	8	8	6	5	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	0	2.9	8																							
19-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1																							
20-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	5	3	3	1	0	1.3	5																							
21-May	2	14	18	Z	1	0	1	0	0	1	2	2	1	1	2	1	0	0	0	1	1	0	0	0	2.2	18																							
22-May	0	0	0	0	Z	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0.4	1																							
23-May	0	0	0	0	0	Z	0	1	0	1	0	1	1	0	0	1	0	0	0	0	0	1	2	0	0.5	2																							
24-May	Z	4	4	2	1	2	6	2	0	0	1	0	1	1	3	4	6	11	9	8	4	1	0	0	3.0	11																							
25-May	1	Z	2	1	2	1	1	0	0	3	4	2	1	0	0	1	1	0	0	0	0	0	0	0	0.9	4																							
26-May	0	0	Z	0	0	0	1	1	1	0	2	1	16	16	5	2	5	0	0	1	1	0	0	0	2.3	16																							
27-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	1	1	1	0.6	2																							
28-May	0	0	0	0	Z	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0.4	1																							
29-May	0	0	0	0	0	Z	2	1	0	1	1	3	1	2	5	2	1	0	0	1	1	0	0	0	0.9	5																							
30-May	Z	1	7	11	15	9	8	2	0	0	0	1	2	1	2	1	1	2	1	1	3	8	2	10	3.8	15																							
31-May	7	Z	11	7	4	1	3	2	2	2	2	1	0	0	1	1	1	1	0	0	0	0	0	0	2.1	11																							
																								2.1	2.4	3.5	3.1	3.0	2.5	2.7	2.1	1.7	1.6	1.3	1.2	1.5	1.5	1.4	1.1	1.1	1.3	1.3	1.4	1.2	2.1	2.3	2.4	Diurnal Average	
																								12	14	18	20	23	9	13	7	9	6	4	4	16	16	6	5	6	11	11	12	9	12	22	23	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	99.57	99.57
21 - 40	3	0.43	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	73	90	29	18	11	58	71	70	32	18	26	25	45	42	29	65	702
21 - 40	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	90	29	18	11	58	73	71	32	18	26	25	45	42	29	65	705

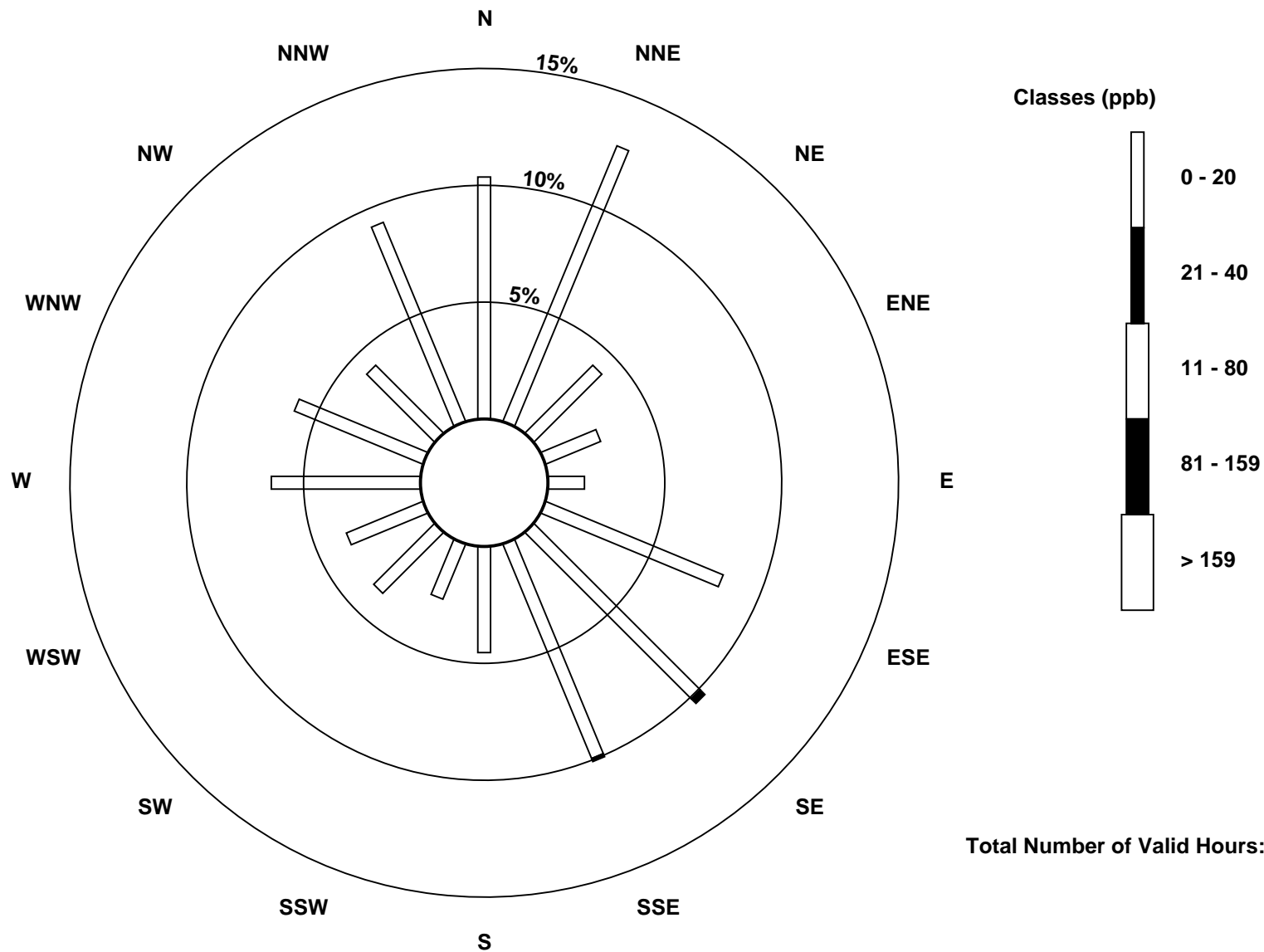
Total Number of Valid Hours: 705

Total Number of Hours: 744

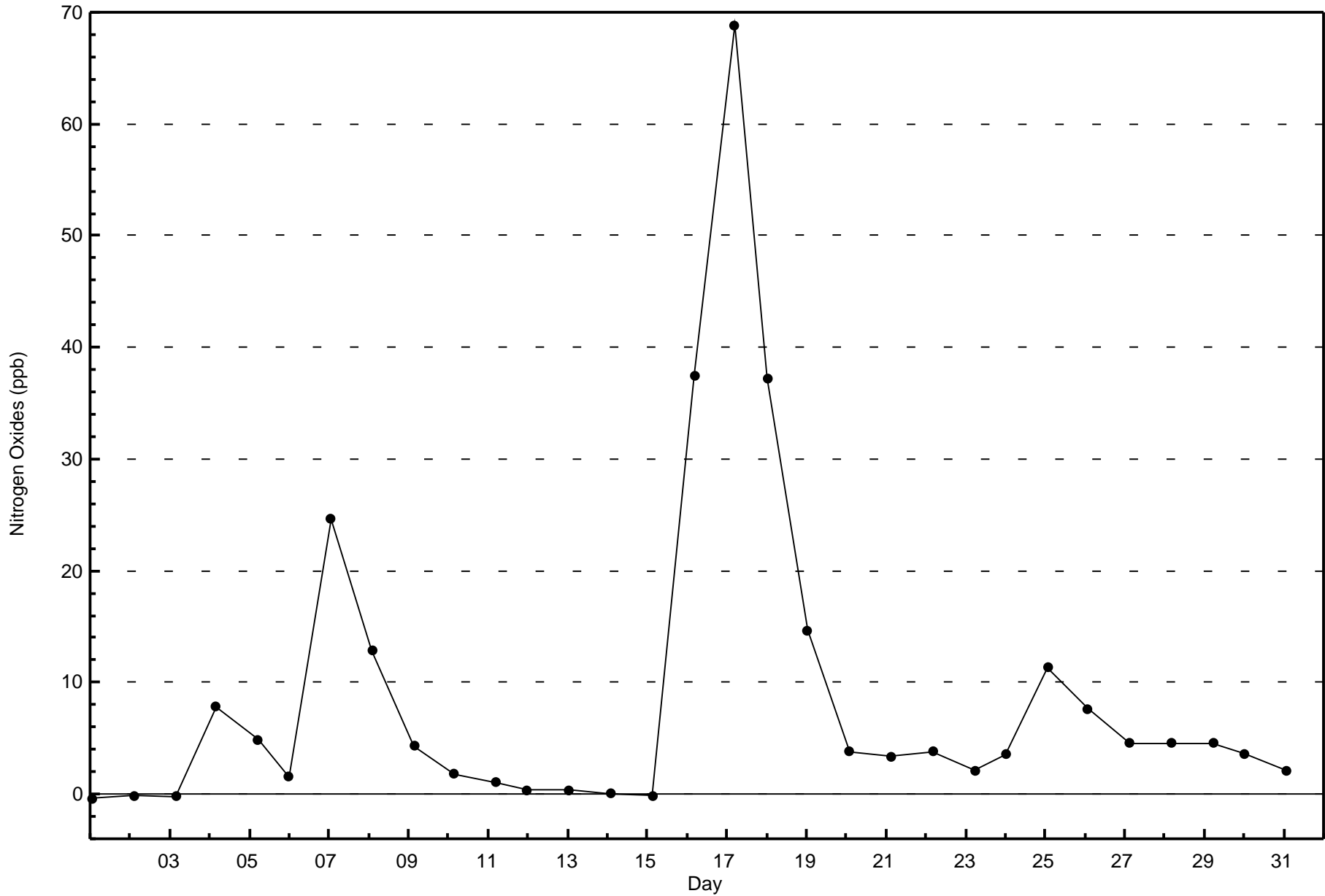


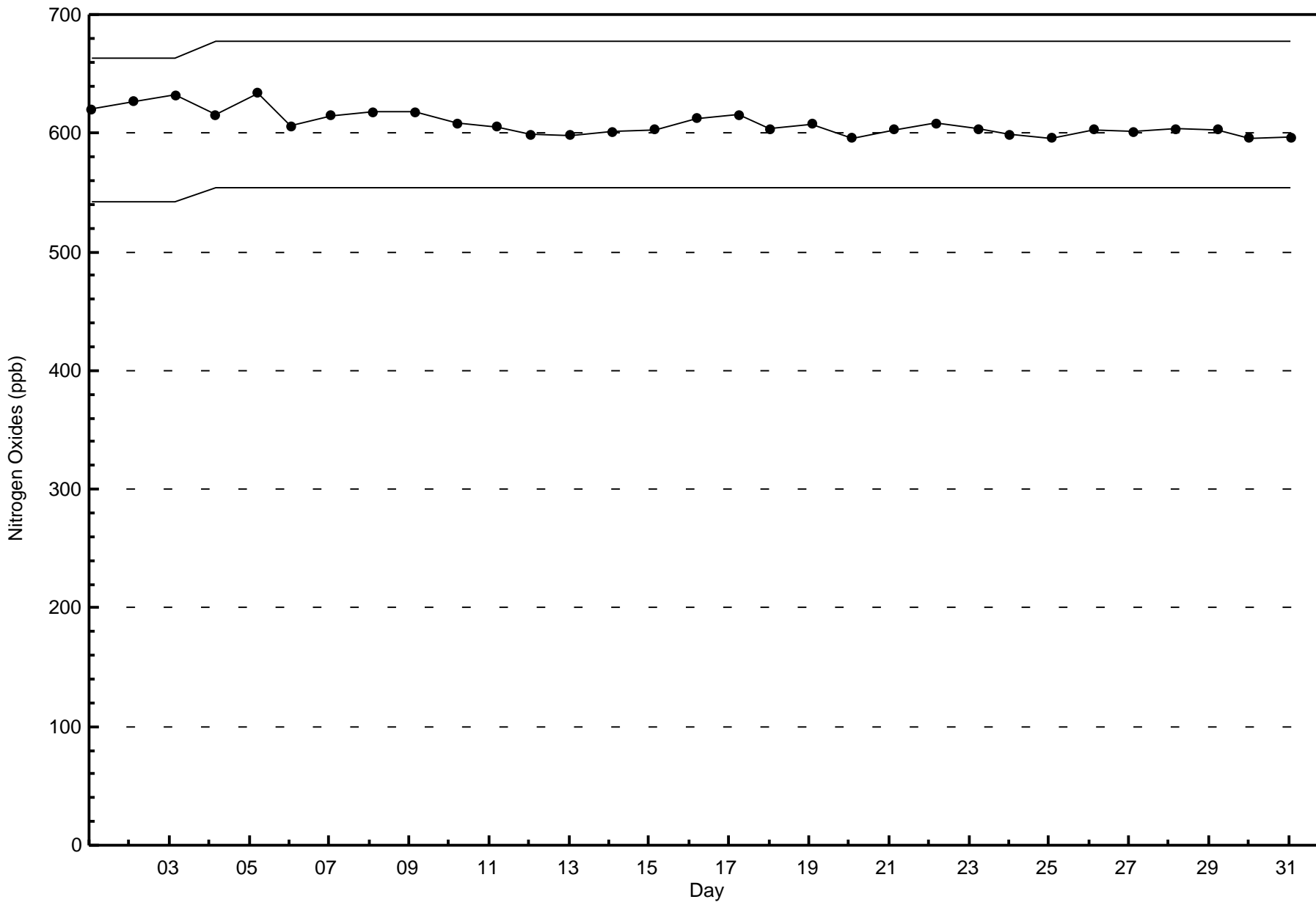
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 705







Summary of Hour Averages

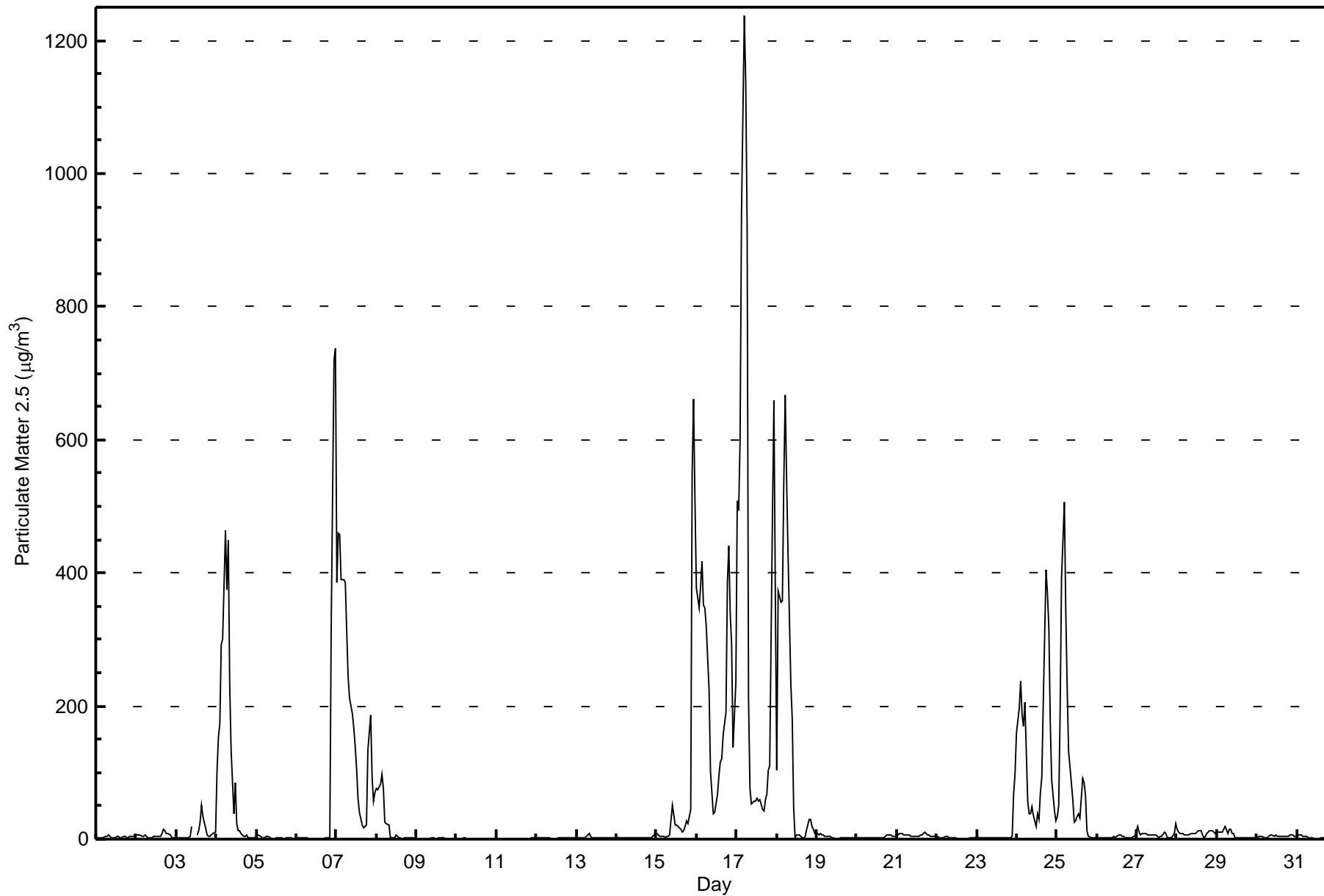
Wapasu - May 2016

Number of Exceedences (AAAQO):	24-hr: 9	Hours in Service:	744
Maximum Value: 1238.2 µg/m ³ on May 17 05:00	Maximum Daily Average: 350.3 µg/m ³ on May 17	Hours of Data:	742
Minimum Value: 0.2 µg/m ³ on May 9 01:00	Minimum Daily Average: 0.8 µg/m ³ on May 9	Hours of Missing Data:	2
Maximum Diurnal Average: 118.1 µg/m ³ at hour 6	Minimum Diurnal Average: 12.6 µg/m ³ at hour 14	Hours of Calibration:	2
Monthly Average: 50.56 µg/m ³	Percentiles: P ₁ = 0.3 P ₁₀ = 1.0 Q ₁ = 1.5 Median = 3.4 Q ₃ = 13.0 P ₉₀ = 167.3 P ₉₉ = 617.0	Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.8	2.5	2.5	2.6	3.1	3.9	4.3	5.6	3.3	1.7	1.9	2.2	5.0	3.2	2.7	2.6	3.7	3.7	2.4	2.5	3.2	3.6	3.7	4.3	3.2	5.6
2-May	5.9	6.6	5.4	4.9	4.7	5.4	4.8	2.8	1.7	2.3	4.3	4.0	4.5	4.8	5.2	9.5	14.3	13.0	9.0	8.7	5.4	1.8	1.8	1.9	5.5	14.3
3-May	1.9	2.0	2.1	2.3	2.4	2.5	2.5	2.6	3.9	18.1	C	C	6.6	12.1	24.4	50.3	34.6	26.4	5.6	4.2	4.6	6.3	8.9	11.5	10.7	50.3
4-May	101.0	153.5	174.1	292.1	300.9	463.2	374.9	449.0	233.1	132.7	37.5	85.4	23.3	13.4	13.3	9.5	5.2	4.7	5.8	2.7	1.7	1.2	1.1	2.0	120.1	463.2
5-May	6.3	6.9	4.8	2.8	1.7	1.6	3.3	3.8	1.4	1.0	1.0	1.0	2.2	1.7	1.7	1.2	1.0	1.0	1.6	1.9	1.3	1.1	0.8	0.9	2.2	6.9
6-May	1.1	1.1	1.2	1.1	1.1	1.3	1.5	0.8	0.8	0.7	0.7	0.6	0.6	0.8	1.1	1.0	1.1	1.3	1.8	2.7	319.8	720.7	736.8	75.0	736.8	
7-May	384.9	460.2	458.1	389.9	389.5	385.1	312.5	244.3	211.7	187.8	168.3	138.8	106.6	61.5	40.9	21.4	17.5	18.4	20.5	134.3	186.8	92.3	58.1	69.3	190.0	460.2
8-May	77.3	75.0	82.6	96.8	76.4	25.9	22.5	21.9	2.5	1.4	1.5	2.5	6.7	2.3	1.3	0.6	0.8	1.1	1.5	1.7	1.1	1.5	1.2	0.3	21.1	96.8
9-May	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	1.2	1.8	1.0	1.0	1.3	1.5	1.6	1.4	0.9	0.9	1.0	0.9	0.7	0.7	0.6	0.8	1.8
10-May	0.6	0.6	0.8	1.0	1.2	1.4	1.0	0.8	0.7	0.7	0.6	0.6	0.8	0.8	0.6	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.0	0.9	0.8	1.4
11-May	0.9	0.9	0.9	0.8	0.9	0.9	0.8	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.7	0.8	1.0	0.8	1.3	1.3	1.4	0.8	1.4
12-May	1.5	1.6	1.8	1.8	1.7	1.6	1.4	1.3	1.1	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.3	1.4	1.4	1.4	1.3	1.4	1.5	1.5	1.3	1.8
13-May	1.4	1.4	1.4	1.5	2.2	2.9	4.8	8.8	4.8	1.2	1.4	1.3	1.7	2.0	1.7	1.4	1.5	2.0	1.8	1.5	1.6	2.0	2.0	1.9	2.3	8.8
14-May	1.8	1.9	1.8	1.8	1.7	1.8	1.6	1.5	1.9	1.9	1.9	1.9	1.8	1.9	1.8	2.1	2.2	1.7	1.5	1.4	2.2	2.8	5.8	8.1	2.3	8.1
15-May	8.4	6.3	4.3	3.9	3.3	3.1	4.5	3.8	7.3	50.7	35.1	21.0	21.2	18.5	15.4	11.2	13.2	19.0	27.6	23.6	44.1	548.1	660.6	509.4	86.0	660.6
16-May	377.4	346.7	380.8	418.2	352.3	347.9	320.3	225.6	102.6	70.3	38.0	39.6	68.7	95.6	117.5	120.6	156.8	190.9	386.6	440.2	339.9	291.5	137.1	235.3	233.4	440.2
17-May	508.9	494.2	598.7	938.3	1238.2	1136.8	921.3	209.6	75.5	52.2	57.4	56.2	60.7	56.8	58.3	44.0	41.3	59.6	66.8	103.1	110.7	493.8	658.2	366.2	350.3	1238.2
18-May	103.8	372.7	357.0	357.7	535.7	666.7	540.2	430.0	233.2	180.2	46.5	3.0	6.0	6.3	4.5	2.9	1.1	1.1	12.9	29.3	29.2	18.8	14.5	8.9	165.1	666.7
19-May	7.6	7.3	8.4	6.8	6.3	5.2	4.8	3.6	5.1	2.8	1.5	1.0	0.5	0.7	1.1	1.5	1.5	1.5	1.6	1.4	1.2	1.2	1.3	1.3	3.1	8.4
20-May	1.6	2.0	2.3	2.2	2.0	1.9	2.0	2.2	1.9	1.6	1.8	1.7	1.4	1.5	1.7	2.3	2.6	4.2	5.8	5.9	6.7	4.6	3.6	3.6	2.8	6.7
21-May	4.9	8.4	9.3	7.4	5.7	5.7	5.4	5.6	5.2	4.7	4.4	4.4	4.0	4.4	5.6	6.1	8.6	9.6	7.0	6.4	4.3	3.7	3.6	3.5	5.7	9.6
22-May	3.4	1.9	2.1	1.4	2.6	3.7	3.6	3.1	2.9	2.3	1.7	1.4	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.2	1.9	2.7	3.1	1.9	3.7
23-May	3.5	2.9	2.8	2.9	2.9	2.4	1.8	2.1	2.5	2.4	2.5	2.4	2.2	2.2	1.9	2.0	1.8	2.0	2.2	2.8	3.1	4.5	68.5	98.2	9.3	98.2
24-May	158.0	196.3	236.5	185.9	169.7	206.4	57.9	37.1	38.7	49.4	36.8	19.3	37.1	30.2	70.8	93.8	201.2	405.2	369.6	317.9	174.8	88.4	41.4	28.5	135.5	405.2
25-May	34.2	51.0	192.1	391.3	507.2	343.8	226.9	131.9	108.4	59.5	25.1	28.1	34.5	37.9	32.7	91.7	85.8	65.6	11.9	4.0	2.2	2.1	1.5	1.2	102.9	507.2
26-May	1.1	1.2	1.4	1.4	1.3	1.2	1.1	1.2	1.9	3.0	3.3	3.0	4.6	6.2	6.9	3.8	3.8	2.1	1.9	1.8	1.5	1.5	3.4	3.9	2.6	6.9
27-May	18.0	9.7	6.3	7.7	8.6	7.5	6.3	5.8	6.3	5.7	5.9	6.3	4.0	3.0	3.6	5.1	9.7	8.4	3.1	1.2	1.2	2.7	7.6	23.0	6.9	23.0
28-May	15.1	10.7	9.3	7.8	6.3	6.3	6.1	5.5	8.0	7.7	7.8	8.5	11.1	12.6	12.5	6.4	2.1	3.5	8.9	12.4	12.6	13.7	11.3	9.4	9.0	15.1
29-May	11.4	11.2	10.2	10.1	14.2	18.7	7.9	13.9	15.6	7.7	8.8	3.0	2.8	2.0	2.9	2.4	2.4	2.5	2.5	1.4	1.4	2.1	2.7	3.1	6.7	18.7
30-May	3.1	3.2	4.5	4.2	2.1	1.3	2.9	4.4	7.1	5.6	4.7	5.3	5.2	4.7	4.0	4.1	4.4	3.8	4.9	5.1	5.5	6.0	4.9	5.2	4.4	7.1
31-May	5.3	6.4	5.5	4.4	4.2	3.8	3.5	2.6	2.3	1.6	1.1	0.8	0.8	1.0	1.1	1.2	1.6	1.1	0.8	1.2	1.1	1.8	2.1	3.4	2.4	6.4

59.8	72.5	82.9	101.7	117.8	118.1	92.0	59.1	35.2	27.7	16.8	14.9	13.8	12.6	14.2	16.2	20.2	27.7	31.3	36.2	30.8	62.0	78.5	69.3	Diurnal Average
508.9	494.2	598.7	938.3	1238.2	1136.8	921.3	449.0	233.2	187.8	168.3	138.8	106.6	95.6	117.5	120.6	201.2	405.2	386.6	440.2	339.9	548.1	720.7	736.8	Diurnal Maximum

C - Calibration
 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 - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	378	50.94	50.94
6 - 15	107	14.42	65.36
16 - 25	21	2.83	68.19
26 - 80	53	7.14	75.34
> 81.0	99	13.34	88.68

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - May 2016

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	34	73	25	17	5	28	37	10	8	2	10	14	23	26	18	48	378
6 - 15	14	7	1	0	0	19	25	10	3	3	5	5	3	2	2	8	107
16 - 25	0	0	0	0	1	0	2	3	4	2	1	1	3	2	0	2	21
26 - 80	6	2	0	0	0	0	3	8	7	7	4	2	7	3	2	2	53
> 81.0	2	1	1	1	1	13	13	43	13	6	2	0	2	0	1	0	99
Totals	56	83	27	18	7	60	80	74	35	20	22	22	38	33	23	60	658

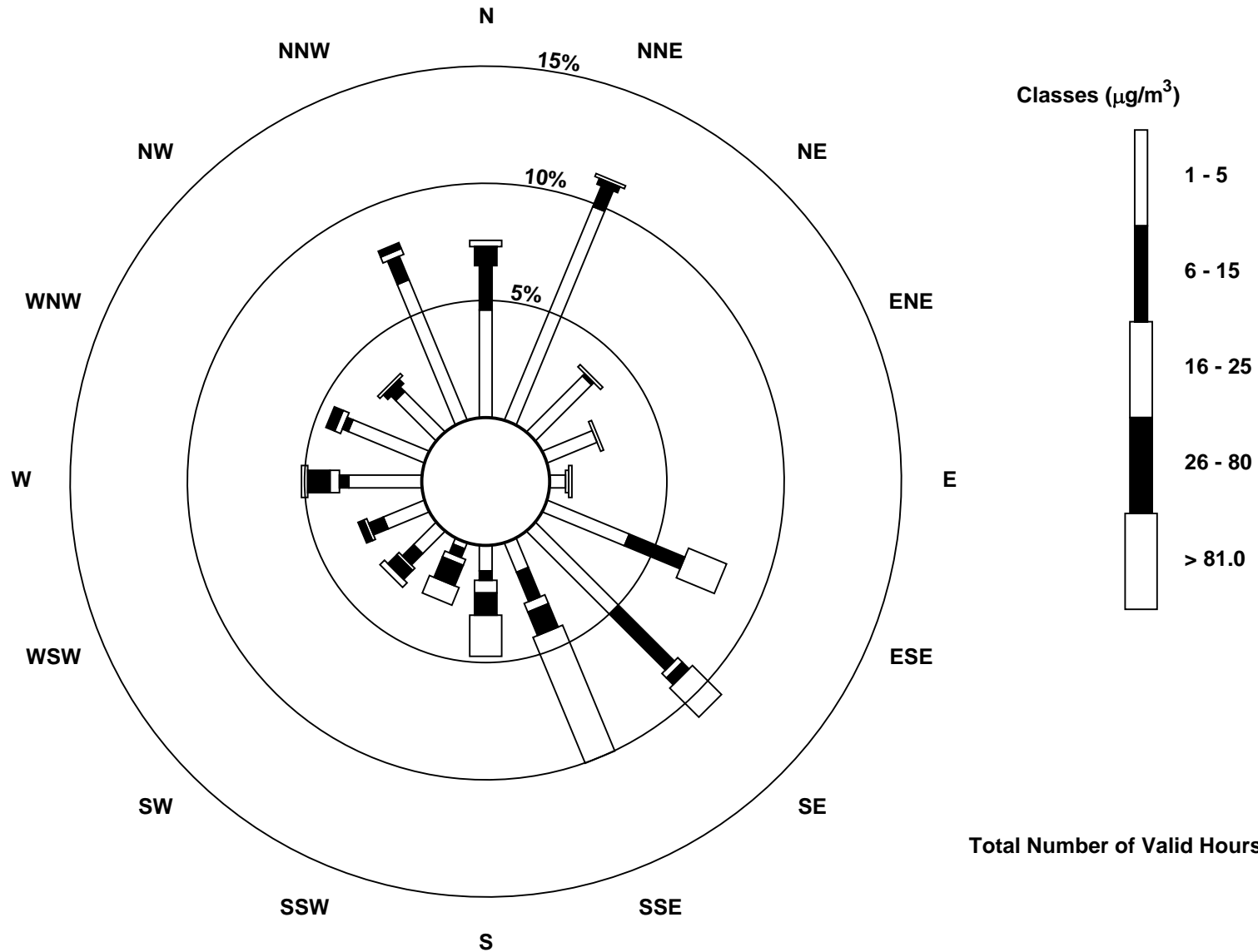
Total Number of Valid Hours: 742

Total Number of Hours: 744



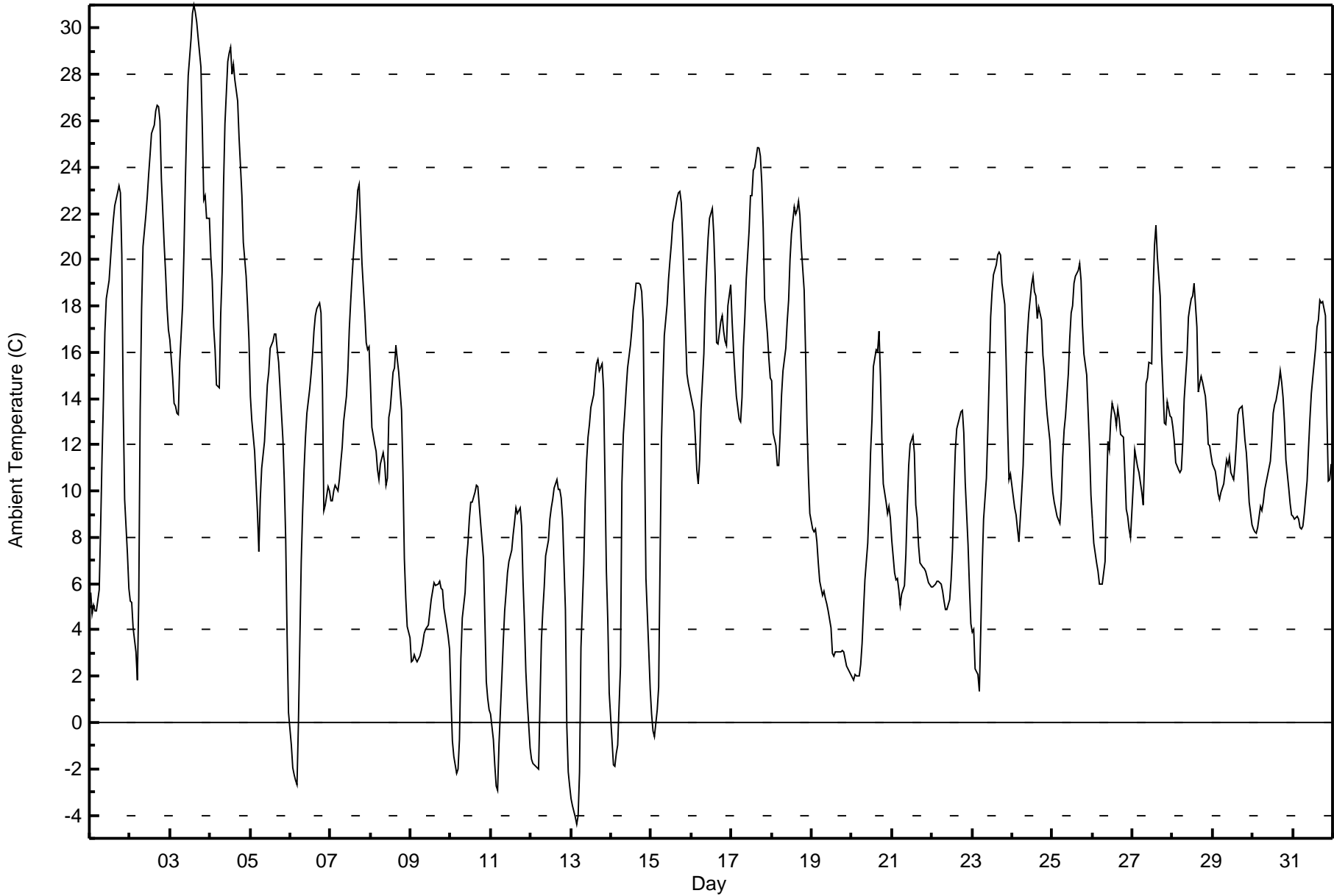
Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu (AMS 17)





Maximum Value: 31.0 C on May 3 15:00																				Maximum Daily Average: 22.6 C on May 3					Hours in Service: 744																							
Minimum Value: -4.4 C on May 13 04:00																				Minimum Daily Average: 3.9 C on May 11					Hours of Data: 744																							
Maximum Diurnal Average: 17.0 C at hour 17																				Minimum Diurnal Average: 5.9 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 11.90 C																				Percentiles: P ₁ = -2.7 P ₁₀ = 2.9 Q ₁ = 7.0 Median = 11.7 Q ₃ = 16.5 P ₉₀ = 20.8 P ₉₉ = 28.9					Hours of Calibration: 0																							
																									Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	5.6	4.7	5.0	4.8	4.8	5.8	8.4	11.4	13.9	16.8	18.3	19.1	20.0	20.9	21.7	22.3	22.9	23.2	22.9	20.2	13.7	9.6	7.3	5.8	13.7	23.2																						
2-May	5.2	5.2	4.1	3.1	1.8	5.4	13.5	17.9	20.6	21.9	22.7	23.7	24.5	25.5	25.8	26.4	26.7	26.6	26.0	23.5	20.6	19.4	17.9	16.9	17.7	26.7																						
3-May	16.6	14.9	13.8	13.7	13.4	13.3	15.6	18.0	20.4	23.5	26.0	28.0	29.5	30.6	31.0	30.7	30.3	29.6	28.3	25.7	22.6	22.8	21.8	21.8	22.6	31.0																						
4-May	20.1	19.1	17.1	16.1	14.6	14.5	17.7	19.5	23.2	25.9	28.5	28.9	29.2	28.0	28.5	27.8	26.9	25.3	24.0	22.8	20.7	19.3	18.0	16.5	22.2	29.2																						
5-May	14.1	13.0	11.7	10.4	9.1	7.4	9.6	11.0	12.2	13.3	14.6	15.1	16.2	16.5	16.8	16.8	16.1	15.6	14.4	12.2	10.4	7.9	3.7	0.4	12.0	16.8																						
6-May	-1.0	-1.9	-2.2	-2.5	-2.7	0.0	7.0	9.2	10.9	12.3	13.4	14.4	15.1	15.9	16.9	17.6	17.9	18.1	17.7	14.6	9.2	9.4	10.2	10.0	9.6	18.1																						
7-May	9.6	9.6	10.0	10.3	10.0	10.5	11.2	11.9	13.0	14.1	15.2	16.9	18.2	19.3	20.2	21.9	23.0	23.2	21.5	19.8	17.7	16.4	16.1	16.2	15.7	23.2																						
8-May	14.6	12.7	12.0	11.7	10.9	10.5	11.2	11.6	11.2	10.2	10.6	13.2	13.6	15.1	15.3	16.3	15.7	15.1	13.5	10.8	7.1	5.4	4.2	3.7	11.5	16.3																						
9-May	2.6	2.7	3.0	2.8	2.6	2.9	3.1	3.4	3.8	4.1	4.2	4.8	5.3	5.7	6.0	5.9	6.0	6.1	5.8	5.7	5.0	4.2	3.7	3.2	4.3	6.1																						
10-May	1.0	-0.8	-1.5	-2.2	-2.0	-0.8	2.8	4.5	5.6	7.0	7.8	8.8	9.5	9.5	9.9	10.3	10.2	9.4	8.6	7.1	4.4	1.8	1.0	0.5	4.7	10.3																						
11-May	0.3	-0.7	-1.8	-2.7	-2.9	-0.9	2.0	3.5	4.8	5.6	6.5	7.0	7.5	8.1	8.7	9.3	9.0	9.3	8.5	6.1	4.3	2.2	0.9	-1.1	3.9	9.3																						
12-May	-1.6	-1.7	-1.8	-1.9	-2.0	0.8	3.6	4.8	5.9	7.2	7.9	8.8	9.3	9.7	10.1	10.5	10.1	10.0	9.7	8.8	4.9	-0.2	-2.1	-2.7	4.5	10.5																						
13-May	-3.3	-3.6	-4.1	-4.4	-4.0	-2.1	3.3	6.8	9.6	11.3	12.3	12.9	13.6	14.1	14.9	15.5	15.7	15.2	15.5	14.4	10.6	6.5	4.4	1.3	7.3	15.7																						
14-May	-0.8	-1.8	-1.9	-1.3	-0.9	2.4	10.4	12.5	13.4	14.4	15.3	16.3	17.0	17.8	18.3	19.0	19.0	18.9	18.6	17.3	12.0	6.2	3.1	1.5	10.3	19.0																						
15-May	0.4	-0.4	-0.6	0.5	1.5	7.0	12.2	14.7	16.8	18.1	19.2	20.0	20.7	21.6	22.3	22.7	22.9	22.9	22.4	20.9	17.0	15.1	14.6	14.4	14.4	22.9																						
16-May	14.0	13.4	12.2	10.9	10.3	11.4	13.5	15.9	18.3	19.7	20.9	21.8	22.2	21.1	19.3	16.4	16.4	17.4	17.6	16.9	16.5	16.3	18.0	18.9	16.6	22.2																						
17-May	17.3	16.1	15.0	14.1	13.1	13.0	14.0	16.2	17.5	19.1	21.3	22.7	22.8	23.8	24.0	24.9	24.9	24.5	23.3	21.4	18.3	16.8	15.7	14.9	19.0	24.9																						
18-May	14.8	12.5	11.9	11.1	11.1	12.5	14.2	15.2	16.2	17.3	18.3	20.0	21.1	22.3	22.0	22.2	22.5	21.9	20.5	18.7	16.0	12.9	10.7	9.1	16.5	22.5																						
19-May	8.4	8.2	8.4	7.8	6.9	6.1	5.5	5.7	5.4	5.1	4.8	4.1	3.0	2.9	3.1	3.0	3.1	3.1	3.1	3.0	2.7	2.5	2.2	2.1	4.6	8.4																						
20-May	1.9	1.8	2.1	2.0	2.0	2.5	3.4	4.8	6.2	7.8	9.4	11.7	13.1	15.4	16.1	16.1	16.9	14.9	12.2	10.3	9.5	9.1	9.3	8.9	8.6	16.9																						
21-May	7.9	6.5	6.2	6.2	5.7	5.1	5.6	5.9	7.3	9.4	11.1	12.0	12.4	11.7	9.4	8.8	7.7	6.9	6.7	6.7	6.5	6.3	6.1	5.9	7.7	12.4																						
22-May	5.8	5.9	6.0	6.1	6.1	6.0	5.7	5.3	4.9	4.9	5.3	6.2	7.5	9.9	11.8	12.7	13.2	13.4	13.5	12.5	10.4	7.7	5.8	4.3	7.9	13.5																						
23-May	3.9	4.0	2.3	2.1	1.3	4.0	6.7	8.8	10.5	12.7	15.0	17.5	18.6	19.4	19.7	20.2	20.3	20.2	19.0	18.1	15.5	12.8	10.5	10.7	12.2	20.3																						
24-May	10.3	9.3	8.9	8.4	7.8	8.8	11.1	13.4	15.4	16.7	17.7	18.9	19.3	18.6	18.5	17.5	18.0	17.4	15.8	15.2	14.1	13.3	12.1	10.7	14.1	19.3																						
25-May	10.0	9.5	9.2	8.9	8.6	9.6	11.4	12.6	13.3	15.1	16.6	17.7	18.0	19.0	19.3	19.5	19.8	19.1	17.1	16.0	15.0	13.4	11.8	9.9	14.2	19.8																						
26-May	8.8	7.8	6.9	6.5	6.0	6.0	6.0	7.0	9.9	12.2	11.8	13.0	13.8	13.3	12.8	13.6	13.1	12.5	12.3	10.8	9.2	8.9	8.3	8.0	9.9	13.8																						
27-May	10.3	11.8	11.4	11.1	10.8	9.9	9.4	11.5	14.7	14.9	15.5	15.5	18.7	20.6	21.5	20.1	18.4	15.9	14.4	13.0	12.9	13.9	13.2	13.2	14.3	21.5																						
28-May	12.8	12.1	11.2	10.9	10.8	10.9	12.2	14.0	15.9	17.5	18.0	18.3	18.4	19.0	17.1	14.3	14.6	14.9	14.7	14.1	13.3	12.1	12.0	11.5	14.2	19.0																						
29-May	11.1	10.9	10.4	9.9	9.7	10.0	10.3	10.9	11.3	11.1	11.5	10.8	10.5	11.2	12.1	13.3	13.5	13.7	13.0	12.2	11.6	10.7	9.5	8.6	11.2	13.7																						
30-May	8.4	8.2	8.2	8.4	9.4	9.2	9.5	10.1	10.4	10.7	11.3	12.2	13.4	13.7	13.9	14.7	15.2	14.7	14.1	13.0	11.4	10.1	9.5	9.0	11.2	15.2																						
31-May	8.9	8.8	8.9	8.8	8.4	8.3	8.5	9.0	10.4	11.9	13.1	14.2	14.9	16.2	17.1	17.4	18.3	18.1	18.2	17.6	13.4	10.4	10.5	11.2	12.6	18.3																						
																								7.7	7.0	6.5	6.2	5.9	6.8	9.0	10.5	12.0	13.3	14.3	15.3	16.0	16.7	16.9	17.0	17.0	16.7	15.9	14.5	12.1	10.4	9.4	8.6	Diurnal Average
																								20.1	19.1	17.1	16.1	14.6	14.5	17.7	19.5	23.2	25.9	28.5	28.9	29.5	30.6	31.0	30.7	30.3	29.6	28.3	25.7	22.6	22.8	21.8	21.8	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Wapasu - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	38	5.11	5.11
0 - 10	252	33.87	38.98
10 - 20	362	48.66	87.63
> 20	92	12.37	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

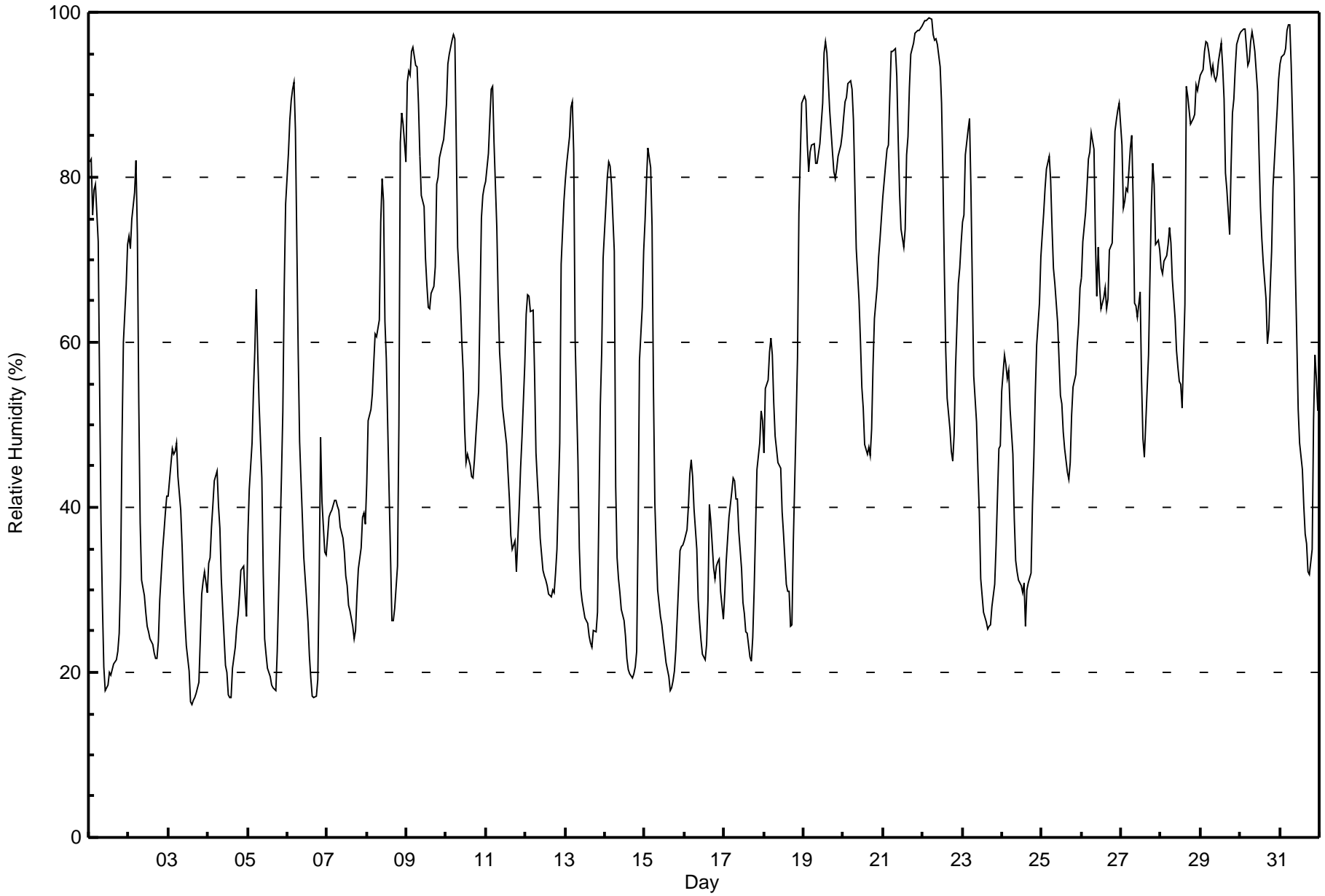
Wapasu - May 2016

Maximum Value: 99 % on May 22 05:00																	Maximum Daily Average: 90.9 % on May 29																	Hours in Service: 744									
Minimum Value: 16 % on May 3 15:00																	Minimum Daily Average: 29.5 % on May 4																	Hours of Data: 744									
Maximum Diurnal Average: 75.8 % at hour 5																	Minimum Diurnal Average: 40.4 % at hour 17																	Hours of Missing Data: 0									
Monthly Average: 56.8 %																	Percentiles: P ₁ = 17 P ₁₀ = 25 Q ₁ = 34 Median = 55 Q ₃ = 80 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-May	82	82	75	79	79	72	55	38	28	21	18	18	20	20	20	21	21	23	25	32	48	60	67	72	44.8	82																	
2-May	73	71	75	78	82	73	53	38	31	29	27	26	25	24	23	22	22	22	24	29	35	37	39	41	41.6	82																	
3-May	41	45	47	47	47	48	44	40	35	30	26	23	20	16	16	17	17	17	19	24	29	31	32	30	30.9	48																	
4-May	33	34	38	40	43	44	40	37	31	28	21	20	17	17	17	20	23	25	27	29	32	33	29	27	29.5	44																	
5-May	37	42	48	54	59	66	59	53	44	32	24	22	21	20	18	18	18	18	23	37	44	52	67	77	39.6	77																	
6-May	83	87	89	91	91	86	59	48	43	39	34	29	26	22	19	17	17	17	19	31	48	41	35	34	46.1	91																	
7-May	36	39	39	40	41	41	40	40	38	36	35	32	30	28	28	26	24	25	29	33	35	39	39	38	34.6	41																	
8-May	43	51	52	54	57	61	61	63	75	80	77	63	58	42	34	26	26	28	33	50	84	88	86	82	57.2	88																	
9-May	91	93	92	95	96	94	93	89	83	78	76	70	67	64	64	66	67	69	79	80	82	84	85	87	81.0	96																	
10-May	89	94	95	97	97	97	84	72	65	60	56	50	45	46	45	44	44	46	49	54	65	75	78	79	67.7	97																	
11-May	79	83	87	91	91	84	74	65	59	56	52	51	48	44	41	37	35	36	32	36	40	45	49	57	57.1	91																	
12-May	63	66	66	64	64	56	47	43	40	36	32	32	31	31	30	29	30	30	32	35	48	70	73	77	46.8	77																	
13-May	80	82	85	88	89	83	60	46	35	30	29	28	27	26	24	24	23	25	25	27	40	52	59	70	48.2	89																	
14-May	77	80	82	81	79	71	42	34	31	30	28	26	24	22	20	20	19	20	21	23	37	58	64	71	44.2	82																	
15-May	75	80	84	81	74	54	40	35	30	27	26	24	23	21	19	18	18	19	20	23	31	35	35	35	38.6	84																	
16-May	36	37	40	44	46	44	40	35	29	26	24	22	22	23	29	40	38	33	31	33	33	34	30	26	33.1	46																	
17-May	30	33	36	39	42	44	43	41	41	37	32	28	27	25	25	22	21	24	30	37	45	48	52	51	35.5	52																	
18-May	47	54	55	59	60	59	53	49	45	45	45	40	37	31	30	30	26	26	36	50	58	76	83	89	49.2	89																	
19-May	90	89	84	81	83	84	84	82	82	83	84	89	95	96	95	92	88	83	81	80	81	83	84	85	85.7	96																	
20-May	87	89	90	91	92	91	87	79	71	65	60	55	52	48	46	47	46	50	57	63	67	70	73	75	68.8	92																	
21-May	78	81	83	84	90	95	95	96	92	85	78	74	72	74	83	85	91	95	96	97	98	98	98	98	88.1	98																	
22-May	99	99	99	99	99	99	97	97	97	96	93	89	80	69	59	53	49	47	46	49	57	67	69	72	78.3	99																	
23-May	75	75	83	86	87	79	67	56	50	45	39	31	29	27	26	25	26	28	28	31	35	41	47	47	48.4	87																	
24-May	54	59	57	56	57	52	46	39	34	32	31	31	30	31	26	30	31	32	40	46	54	60	65	70	44.2	70																	
25-May	73	76	79	81	83	80	74	69	67	62	58	54	52	49	47	44	43	45	51	55	56	60	62	67	61.9	83																	
26-May	68	72	76	79	82	83	85	83	72	66	72	67	64	65	67	64	65	71	72	78	86	87	88	89	75.1	89																	
27-May	84	76	77	79	78	83	85	77	65	64	63	66	55	48	46	50	58	68	76	82	79	72	72	71	69.9	85																	
28-May	69	68	70	70	72	74	72	68	63	59	57	55	55	52	65	91	90	88	86	87	88	91	90	91	73.8	91																	
29-May	92	93	95	96	96	95	93	94	92	92	92	94	96	93	89	80	78	73	81	88	89	93	96	97	90.9	97																	
30-May	98	98	98	98	94	94	96	98	97	95	90	83	76	72	70	65	60	62	67	71	79	85	88	92	84.4	98																	
31-May	94	95	95	96	98	98	98	94	80	69	60	52	48	45	40	37	36	32	32	35	51	59	56	52	64.5	98																	
																	69.5	71.7	73.3	74.7	75.8	73.7	66.7	61.1	56.3	52.6	49.7	46.5	44.3	41.7	40.7	40.7	40.4	41.1	44.1	49.1	56.5	61.9	64.2	66.1	Diurnal Average		
																	99	99	99	99	99	99	98	98	97	96	93	94	96	96	95	92	91	95	96	97	98	98	98	98	98	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Wapasu - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	30	4.03	4.03
20 - 40	216	29.03	33.06
40 - 60	162	21.77	54.84
60 - 80	153	20.56	75.40
80 - 100	183	24.60	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

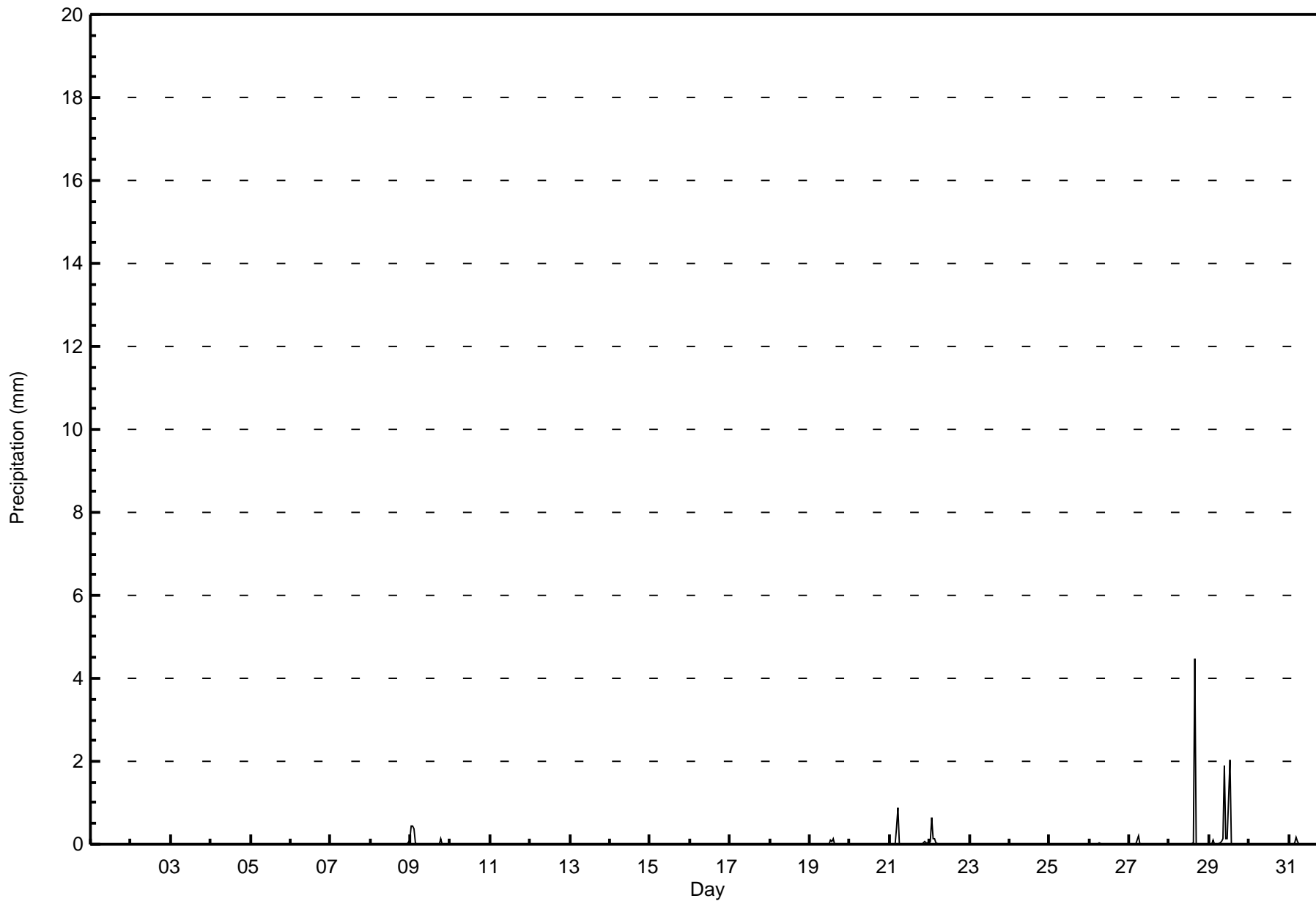
Wapasu - May 2016

Maximum Value: 4.5 mm on May 28 16:00		Maximum Daily Total: 4.5 mm on May 28		Hours in Service: 744																								
Minimum Value: 0.0 mm on May 1 01:00		Minimum Daily Total: 0.0 mm on May 1		Hours of Data: 744																								
Maximum Diurnal Total: 4.5 mm at hour 16		Minimum Diurnal Total: 0.0 mm at hour 17		Hours of Missing Data: 0																								
Monthly Total: 13.95 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 = 0.4		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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
9-May	0.5	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.5	0.5
10-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1
20-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.4	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	1.5	0.9	0.9	
22-May	0.1	0.7	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.7	0.7	0.7	
23-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
27-May	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2
28-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	4.5	4.5	4.5	4.5
29-May	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	1.9	0.1	0.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	2.0	2.0	2.0	2.0
30-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-May	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.2	0.2	0.2
																								Diurnal Average				
																								Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Wapasu - May 2016





Maximum Speed: 19 km/h on May 8 17:00	Maximum Daily Speed Average: 12.6 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 14 07:00	Minimum Daily Speed Average: 0.4 km/h on May 29	Hours of Data: 744
Maximum Diurnal Speed Average: 4.1 km/h at hour 15	Minimum Diurnal Speed Average: 0.3 km/h at hour 8	Hours of Missing Data: 0
Monthly Average Velocity: 1.0 km/h 26.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 11 P ₉₀ = 13 P ₉₉ = 17	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	SE6	SE7	SE7	SE7	SSE7	SSE7	SSE7	S7	S8	S9	SW11	SW13	SW12WSW13	WSW12	WSW11	WSW11	WSW11	WNW10	WNW5	NW1	E4	ESE4	SE4	SSW5.1	WSW13		
2-May	SE5	SE5	SE5	SE5	SE7	ESE5	SSE2	WNW3	NNW1	WNW5	WNW6	SW5	S4	SSE4	WNW5	W3	SE3	SE3	ESE6	ESE7	ESE11	ESE16	ESE15	ESE15	SE3.7	ESE16	
3-May	ESE15	ESE16	ESE16	SE15	SE14	SE13	SE12	SSE11	SSE10	S9	S8	S10	SSW10	SSW12	SW10	S12	SSE13	SSE10	SSE10	SE9	SE11	SSE12	SE10	SSE10	SSE10.4	ESE16	
4-May	SSE9	SSE7	SSE6	SSE8	SSE7	SE7	SSE6	S7	S6	SSW7	SW7	W11WSW10	SW8	SW6	N4WNW14	W14	W10	W11	W8	W8	WNW9	WNW10	WNW10	SW4.8	W14		
5-May	NW6	WNW7	NW8	NW9	NW6	W1	W4	W7	WNW8	WNW12	WNW13	W15	W17	W18	W17	WNW16	WNW16	WNW15	NNW12	N10	N6	NNE5	NE4	ESE3	WNW8.6	W18	
6-May	SE4	SE4	SE5	SE5	SE5	SSE3	WNW5	NW10	NW11	WNW9	W10	W11	WNW8	W11WSW11	W10	W10	WSW7	WSW5	SE2	SE5	SE9	SE13	SE13	WSW3.1	SE13		
7-May	SE13	SE12	SE12	SSE11	SSE10	SSE10	SSE10	SSE10	S10	S9	S9	SSW9	S7	SSW5	SSE6	SSW5	SSE3	SSE3	SE10	ESE13	ESE13	ESE13	SE12	SE7	SSE8.3	ESE13	
8-May	NNE2	NW2	NNE4	NE2	WNW4	W7	WNW6	W11	W14	WSW11	WSW9	WSW13	WSW13	SW16	SW15	SW17	SW19	SW17	SW17	W11	NNW10	NNW13	NW12	WNW10	WSW8.3	SW19	
9-May	W10	W10	W8	WSW6	W5	WSW7	SW6	WSW10	W10	W11	W11	WNW12	WNW12	WNW13	WNW11	WNW10	WNW9	WNW9	NW6	NW3	NNW6	N5	NW3	WNW3	WNW7.4	WNW13	
10-May	W3	SW2	W3	SSW2	SSW2	S1	N5	NNW8	NW9	NNW11	NNW12	NNW13	NNW11	N10	N10	N10	NNE11	NNE12	NNE11	NNE9	NE6	NE5	ENE5	ENE5	N5.7	NNW13	
11-May	E6	E6	E4	E3	NE4	NNE4	NNE6	N8	NNE11	N10	N11	NNE11	N12	N12	N13	NNE12	NNE12	N12	N12	N9	NNE6	NNE5	NNE5	NE5	NNE7.8	N13	
12-May	ENE4	E5	E5	E5	ENE4	NE5	NNE7	NNE7	NNE10	N10	NNE12	NE13	NNE11	NNE12	NNE12	NNE10	NNE10	N11	NNE9	N6	NE3	ESE3	ESE4	ESE4	NNE6.6	NE13	
13-May	ESE4	SE4	SE5	SE6	SE6	SE5	SSE4	SSW2	WNW5	WNW9	W8	W7	WNW8	WNW9	W10	NW8	NW8	N7	N9	N6	NE5	NE5	ENE4	ESE4	NW1.6	W10	
14-May	ESE4	ESE4	ESE4	ESE4	ESE4	ESE3	S0	NW5	WNW6	NW7	NNW8	NNW7	NNW9	NNW9	NNW8	N10	NNW9	NNW9	NNW9	NNW7	NW2	ESE3	ESE4	ESE4	NNW3.2	N10	
15-May	ESE4	ESE5	SE5	SE7	SE6	SE5	S5	SW6	WSW7	W8	W8	W6	W4	WNW6	WNW6	SW6	WSW5	SSW3	S6	S5	SSE7	SSE9	SSE9	SSE10	SSW3.5	SSE10	
16-May	SSE10	SSE9	SSE7	SSE7	SSE8	SSE9	SSE7	SSE7	SSW9	SW11	SW12	SSW13	SSW13	SSW10	S2	ESE4	ESE7	ESE8	ESE9	ESE8	ESE8	SE10	SSE10	SE9	SSE6.7	SSW13	
17-May	SE11	SSE10	SSE9	SSE8	SSE9	SSE9	S9	SW11	SW11	WSW8	WSW7	W8	W8	W6	WNW8	NW7	W5	WNW5	NNW2	ENE5	ESE6	SE9	SSE8	S7	SSW4.0	SW11	
18-May	S6	SSE6	SSE6	SSE6	SSE7	S7	S8	S8	SSW10	SSW10	SSW12	SW14	WSW13	WSW14	WSW14	WSW13	WSW12	W11	NW9	N11	NNE9	NNW11	N11	N12	WSW4.3	WSW14	
19-May	N12	NNE10	NNE10	NNE11	N12	NNE13	NNE14	N13	N14	N15	N14	N13	N17	N13	N14	N13	N13	NNE17	NNE14	NNE13	NNE11	NNE9	NNE9	NNE9	NNE12.6	NNE17	
20-May	NNE8	NNE8	NNE9	NNE7	NNE9	NNE9	NNE8	NE12	NE13	NE12	ENE12	NE12	NE12	NE12	NE12	NE12	NE12	NNE6	NNW9	NNW9	NNW7	N6	NE6	NE6	NNW4	NNE8.3	NE13
21-May	N3	N4	NNE5	NE8	NNE6	NNE7	NE7	NNE7	NNE7	N8	NNW10	NNW12	NNW11	N9	NNW12	N11	N10	N11	N10	N10	N9	NNE11	NNE12	NNE11	N8.4	NNE12	
22-May	NNE10	NNE9	NNE8	N8	N10	NNE11	NNE11	NNE11	NNE13	NNE12	NNE12	NNE12	N15	N14	N16	N16	NNE15	NNE14	NNE14	NNE12	NNE6	NNE6	NNE6	NE7	NNE11.0	N16	
23-May	NE7	ENE9	ENE7	NE6	NE6	NE7	NE11	NE11	NNE9	NNE10	NNE10	ENE13	ENE13	ENE13	ENE10	ENE10	ENE10	ENE11	E10	E7	ESE6	ESE8	SE7	SE10	ENE7.9	ENE13	
24-May	SSE11	SSE10	SSE10	SSE9	SSE7	SSE8	S9	SSW11	SSW12	S11	SSW13	S14	SSE15	S12	S11	SE6	E8	ESE10	ESE9	ESE10	SE9	SSE8	S7	S7	SSE9.0	SSE15	
25-May	SSE7	SSE7	SSE7	SSE7	SSE7	SSE6	SW5	W5	NW6	N6	NNW8	NNW10	N12	N12	N12	N13	N11	N12	N10	N7	NNE10	NE10	NNE8	NNE7	N4.3	N13	
26-May	NNE9	NNE10	NNE9	N8	NNE7	NNE7	NNE7	NNE7	NNE9	N10	NNW13	NNW15	NNW17	NNW18	NNW15	N12	N8	NNE8	N7	N7	NNE7	NE6	NNE5	N5	N8.7	NNW18	
27-May	E7	ESE13	ESE15	ESE16	ESE18	ESE18	ESE18	SE14	SE14	SE11	SE14	ESE11	ESE12	ESE15	ESE15	SE17	SSE9	SW12	S8	SE7	ESE9	ESE13	SE13	SE12	SE12.0	ESE18	
28-May	ESE14	SE13	ESE13	ESE16	ESE17	SE14	SE13	SE13	SE14	SSE13	SE11	SE13	SSE14	SE16	S13	SSE10	SSE9	SE10	SE10	SE9	SE8	ESE6	SE8	SSE8	SE11.5	ESE17	
29-May	SSE7	S5	SE5	SE5	SSE7	S5	SE3	ESE4	SSE5	SW3	W7	W7	W6	NNW6	NNW6	NNW7	NNE8	N7	N5	NNE5	NNE5	N4	NNW2	ENE2	NNW0.4	NNE8	
30-May	NNE2	NNW2	NNW1	NNW4	NW7	NNW7	NNW9	NNW11	N11	NNW12	NNW13	NNW15	NNW17	NNW16	NNW15	NNW15	NNW16	NNW16	NNW14	NNW11	NNW8	NNW7	N5	NNW7	NNW9.9	NNW17	
31-May	NNW5	NNW4	N5	NW6	NW8	NW9	NNW9	NW9	NNW9	N8	NNW5	NW7	WNW6	WNW8	WNW6	WNW8	NNW7	WSW6	SSW5	S5	SE5	SE6	SE9	SE11	NW3.2	SE11	

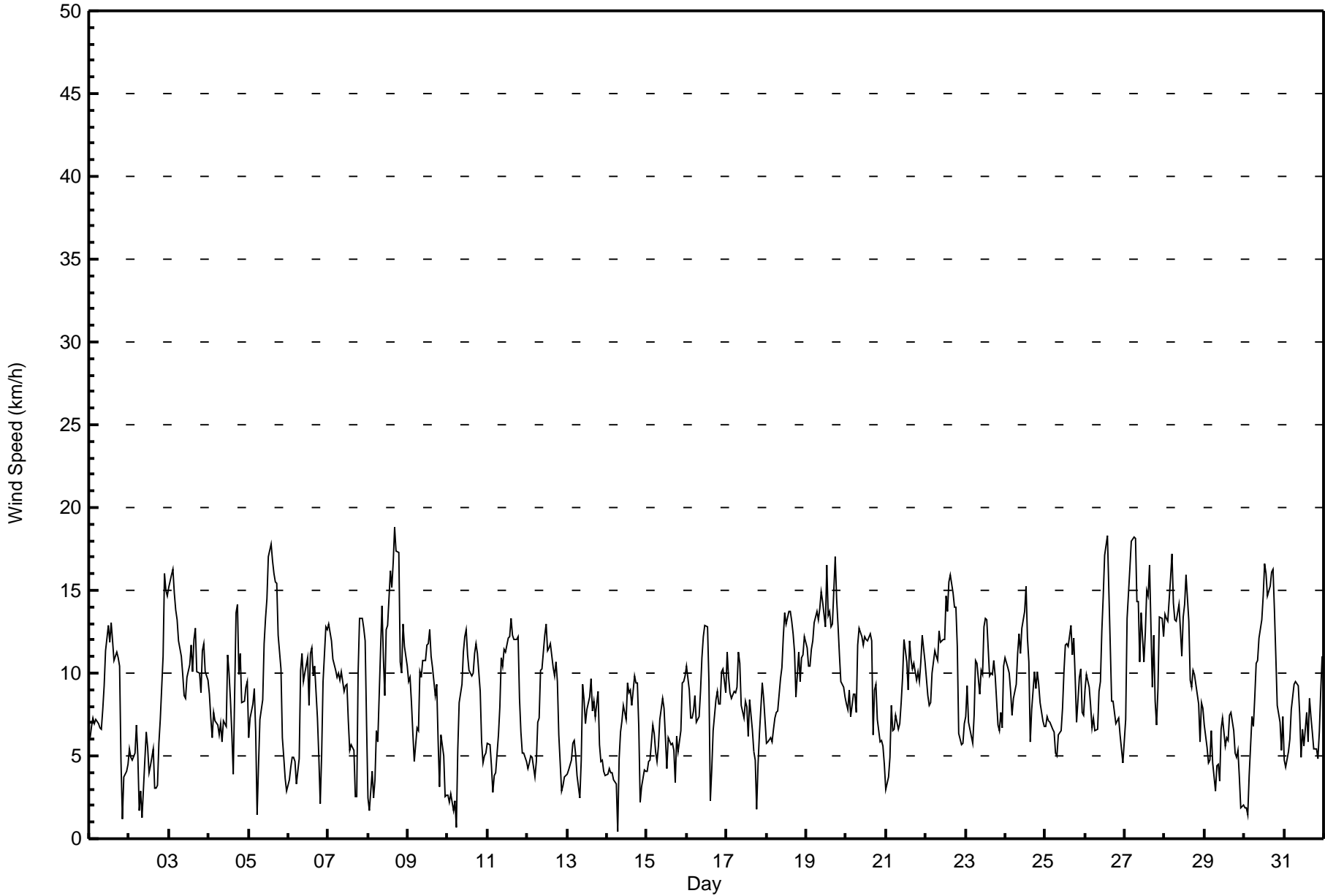
ESE3.4 ESE3.5 ESE3.4 ESE3.4 ESE3.1 ESE2.8 ESE1.8 NW0.3/NW1.3/NW2.7/NW3.2/NW3.5 NW3.5 NW3.6 NW4.1/NW3.5/NW3.7/NW3.5 N2.9 NNE3.0 ENE3.4 E3.6 E3.2 ESE2.8	Diurnal Average
ESE15 ESE16 ESE16 ESE16 ESE18 ESE18 ESE18 SE14 SE14 N15 N14 NNW15 NNW17 NNW18 W17 SW17 SW19 SW17 SW17 ESE13 ESE13 ESE16 ESE15 ESE15	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	150	20.16	20.16
6 - 11	415	55.78	75.94
12 - 19	179	24.06	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: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	11	9	8	5	21	23	7	9	7	4	2	9	9	6	10	150
6 - 11	38	63	14	6	6	17	34	63	25	8	11	15	33	25	21	36	415
12 - 19	26	22	8	5	0	23	23	6	3	6	11	9	6	9	2	20	179
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	74	96	31	19	11	61	80	76	37	21	26	26	48	43	29	66	744

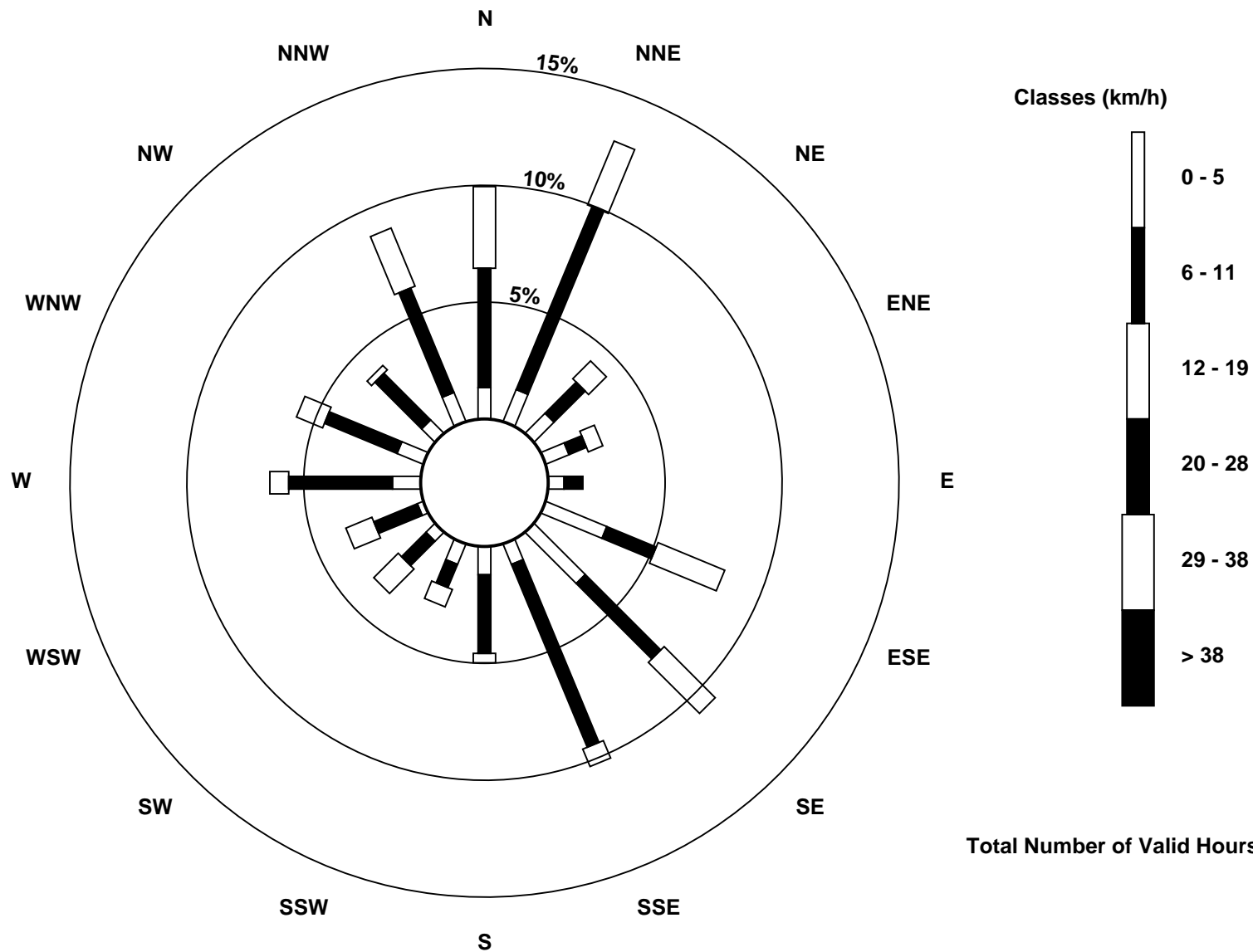
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Wapasu (AMS 17)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on May 19 18:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 0 km/h on May 14 05:00																									
Percentiles: P ₁ = 0 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-May	1	1	1	1	1	1	2	2	3	3	4	4	5	5	4	4	4	4	4	2	1	1	1	1	5
2-May	1	1	0	1	1	1	1	1	1	2	3	2	2	2	4	3	2	2	2	1	3	4	3	4	4
3-May	3	4	4	4	3	3	3	3	3	3	3	4	5	4	4	5	4	3	2	3	3	3	2	5	
4-May	2	2	1	2	1	1	2	2	2	2	3	4	3	4	3	5	5	5	4	4	3	3	3	5	
5-May	2	3	2	2	2	1	2	2	3	4	4	5	6	6	6	5	5	5	5	4	2	2	1	1	6
6-May	1	1	1	0	1	1	3	3	3	4	5	4	4	4	5	4	4	3	2	1	1	3	3	3	5
7-May	3	3	3	3	3	3	3	3	4	3	3	3	3	2	2	2	2	2	3	3	3	3	3	3	4
8-May	1	1	1	2	2	2	3	4	5	4	3	4	4	5	5	6	6	6	5	5	4	4	5	3	6
9-May	4	4	3	2	2	2	2	3	3	4	4	4	4	4	3	3	3	3	3	1	3	2	1	1	4
10-May	1	1	1	1	1	1	2	3	3	4	4	4	5	4	4	4	4	4	4	3	1	1	1	1	5
11-May	1	1	1	0	1	1	2	3	4	4	4	4	5	5	5	5	5	5	5	3	2	1	1	1	5
12-May	1	1	1	1	1	2	2	3	4	4	5	5	4	5	5	4	4	4	4	2	1	0	0	1	5
13-May	1	1	1	1	0	1	1	1	2	3	4	4	4	5	4	4	4	3	3	2	1	1	1	1	5
14-May	1	1	1	0	0	1	1	2	2	3	4	4	4	5	4	4	4	4	3	2	2	1	1	1	5
15-May	1	1	1	1	1	1	1	2	2	3	4	4	3	3	3	3	3	3	2	1	2	2	2	3	4
16-May	3	2	2	2	2	2	2	2	3	4	4	5	5	4	1	1	2	2	2	2	2	2	3	2	5
17-May	3	3	2	3	2	3	3	4	3	2	2	3	3	3	3	3	3	1	2	1	2	2	2	2	4
18-May	2	1	1	1	1	2	2	3	4	4	4	5	4	4	4	4	4	4	4	4	3	4	4	4	5
19-May	4	4	4	5	5	5	5	5	5	5	5	5	6	5	5	5	5	6	6	5	4	3	3	3	6
20-May	3	3	3	3	3	3	3	4	4	3	4	4	4	4	4	4	2	3	3	3	2	2	2	1	4
21-May	1	1	2	3	2	2	3	2	2	3	3	4	4	3	4	4	3	4	3	4	4	4	4	4	4
22-May	4	3	3	3	4	4	4	4	5	5	5	4	5	5	6	6	5	5	5	4	2	1	1	2	6
23-May	2	3	1	2	2	2	3	4	3	4	4	5	5	5	4	5	4	4	3	2	1	1	1	3	5
24-May	3	3	3	2	2	2	3	4	4	4	5	5	5	4	3	2	3	3	2	2	2	2	2	2	5
25-May	2	2	2	2	2	2	2	2	2	3	3	4	4	4	4	4	4	4	4	2	3	3	3	2	4
26-May	3	3	3	2	2	2	3	2	3	3	4	4	5	5	5	4	3	2	2	2	2	2	1	1	5
27-May	5	4	4	4	5	5	5	5	5	4	5	4	5	5	4	5	4	4	3	2	2	4	4	3	5
28-May	4	3	4	4	5	4	4	4	4	5	4	5	5	5	5	3	3	3	2	2	2	1	2	2	5
29-May	2	2	1	1	2	2	1	1	1	1	2	2	2	2	2	2	3	2	2	2	2	1	1	1	3
30-May	1	1	1	1	1	2	2	3	4	3	4	4	5	5	5	4	5	5	4	4	2	2	2	2	5
31-May	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	3	2	2	1	1	2	2	4
																	Diurnal Maximum								
																	5 4 4 5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6 5 4 4 5 4								



Wood Buffalo Environmental Association
Summary of Hour Averages

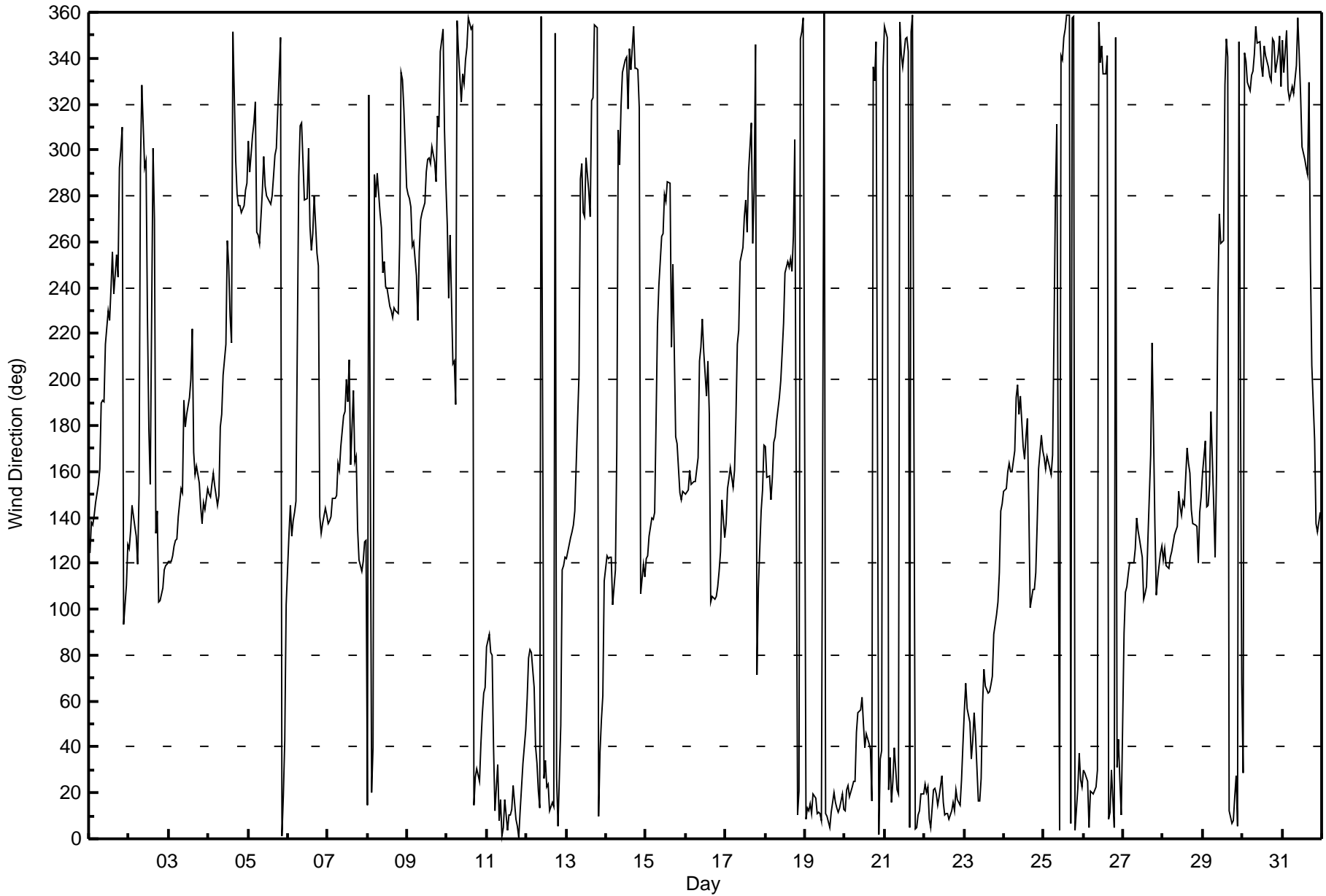
Wind Direction (WD) - deg
Wapasu - May 2016

Direction of Maximum Speed: 231 deg on May 8 17:00 Direction of Maximum Daily Speed Average: 12.1 deg on May 19																							Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0		
Direction of Minimum Speed: 171 deg on May 14 07:00											Direction of Minimum Daily Speed Average: 0.4 deg on May 29												Percent Operational Time: 100.0		
Monthly Average Direction: 285.6 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-May	124	138	137	141	147	154	161	189	191	190	215	230	226	240	256	238	254	245	292	300	310	94	111	128	208.1
2-May	126	134	145	136	132	119	150	293	328	292	295	227	179	154	301	270	133	143	103	104	109	117	119	120	130.2
3-May	121	121	123	127	130	131	140	152	151	191	180	185	192	200	222	169	159	162	155	145	138	147	143	152	151.5
4-May	150	149	154	159	154	145	149	179	185	202	215	261	249	228	216	352	295	280	276	276	273	276	283	286	236.0
5-May	304	290	307	312	321	264	263	259	282	297	284	280	279	277	280	289	298	301	318	349	1	19	42	102	296.6
6-May	132	145	132	138	142	147	288	311	312	295	278	279	301	267	256	264	280	255	250	141	133	137	144	141	245.3
7-May	137	138	140	148	148	149	164	161	171	184	186	200	190	209	163	195	164	166	135	122	117	121	129	130	151.0
8-May	15	324	20	40	289	280	290	273	266	247	251	240	240	232	230	227	231	230	229	259	334	331	318	284	257.7
9-May	281	279	275	258	260	245	226	256	270	273	277	290	296	297	294	302	294	286	315	310	343	353	309	285	284.4
10-May	267	236	263	207	208	189	357	343	321	333	329	339	345	358	353	354	15	27	31	25	42	55	63	66	358.1
11-May	84	89	81	80	41	12	32	8	17	1	5	17	4	10	10	13	23	8	5	1	12	23	33	47	18.6
12-May	61	79	82	81	66	41	33	20	13	358	26	34	22	24	12	16	14	351	27	6	49	117	119	122	29.2
13-May	122	125	131	134	137	143	163	202	287	294	273	271	296	282	271	322	323	354	353	10	38	52	62	112	313.0
14-May	123	122	123	122	102	117	171	309	293	319	334	339	341	318	344	335	354	336	336	335	319	107	119	114	346.5
15-May	122	123	132	140	139	142	182	223	241	262	264	281	278	286	286	214	250	213	175	172	151	148	151	151	191.4
16-May	150	152	160	154	155	156	156	166	208	214	226	213	193	208	185	103	106	104	106	110	117	125	148	131	160.0
17-May	137	153	157	162	153	161	183	215	222	252	257	271	278	264	290	312	259	283	346	71	109	143	152	171	196.7
18-May	171	158	158	148	157	173	175	182	192	200	212	224	247	252	249	253	247	263	305	10	21	348	352	358	237.8
19-May	9	13	12	15	11	19	17	11	11	11	8	360	11	10	7	5	11	20	16	14	12	13	19	13	12.1
20-May	12	21	23	18	22	25	25	47	55	56	62	50	40	46	42	39	17	336	330	347	2	35	39	336	29.6
21-May	354	349	21	35	16	25	40	21	19	356	342	336	348	349	343	5	351	359	5	5	11	12	19	19	4.6
22-May	24	20	23	9	5	21	22	20	15	18	27	16	11	11	11	8	12	16	12	22	17	14	26	41	16.6
23-May	55	67	57	51	35	43	55	45	17	16	26	58	74	67	63	64	67	71	89	98	103	116	143	146	65.4
24-May	151	153	160	164	160	160	169	192	198	185	193	171	166	175	183	146	101	108	109	116	137	161	176	169	161.4
25-May	166	161	167	164	158	167	220	279	311	4	341	339	349	353	359	359	7	357	358	4	22	37	26	22	2.9
26-May	30	29	25	5	21	20	20	23	30	356	338	345	333	333	341	9	11	30	5	349	31	44	26	11	4.4
27-May	90	107	110	116	120	120	120	126	140	134	131	123	104	107	110	130	167	216	178	138	106	113	125	127	124.4
28-May	121	126	119	117	123	125	129	132	136	151	145	141	147	145	170	164	159	144	137	137	136	120	142	149	137.3
29-May	159	173	144	145	155	186	145	123	160	236	272	259	261	328	348	341	12	7	8	18	27	6	347	68	346.6
30-May	28	342	339	329	326	333	334	342	354	347	347	337	332	345	341	336	332	330	348	347	334	342	350	327	339.5
31-May	348	334	352	326	322	325	328	324	337	357	342	324	301	296	292	289	329	251	206	174	137	133	138	142	316.4
108.4 115.0 110.4 114.5 114.1 114.3 108.4 308.9 302.8 303.5 299.1 298.6 310.5 307.1 314.3 330.8 332.5 329.5 359.7 27.9 58.4 80.9 97.7 109.0 Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Wapasu - May 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on May 2 09:00 Minimum Value: 3 deg on May 13 05:00 Percentiles: P ₁ = 6 P ₁₀ = 16 Q ₁ = 22 Median = 30 Q ₃ = 37 P ₉₀ = 47 P ₉₉ = 84																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	12	7	7	13	16	19	25	39	37	42	34	33	38	39	31	32	32	27	30	21	68	20	15	18	68
2-May	11	9	6	9	8	24	74	59	97	66	49	55	73	70	79	89	77	81	25	13	16	19	17	17	97
3-May	17	17	16	17	17	16	21	27	27	36	42	41	41	43	44	35	34	31	27	19	16	22	19	23	44
4-May	23	19	17	23	17	11	30	36	49	40	53	33	35	25	33	85	32	27	29	27	26	28	26	26	85
5-May	20	25	21	19	20	85	28	30	28	29	30	30	32	31	29	31	29	26	32	37	34	25	20	40	85
6-May	20	16	7	10	11	38	45	23	26	38	48	46	53	35	40	43	34	39	32	37	7	17	20	20	53
7-May	18	20	20	22	22	24	27	29	33	34	37	32	40	45	40	50	82	94	19	19	19	17	16	66	94
8-May	81	77	29	65	75	34	51	28	25	24	27	32	26	27	29	28	27	28	25	50	32	31	23	26	81
9-May	27	27	27	26	40	22	28	26	25	27	28	26	26	25	27	23	25	25	28	31	36	41	34	27	41
10-May	23	23	41	45	55	73	35	33	36	34	33	38	43	46	45	44	42	32	33	31	20	16	18	17	73
11-May	14	12	13	11	14	27	37	37	40	44	38	41	43	43	43	46	37	40	40	36	32	22	20	14	46
12-May	13	9	7	9	13	22	31	40	40	45	40	40	42	43	46	48	45	38	33	31	36	6	4	7	48
13-May	6	9	4	5	3	9	26	69	51	33	48	69	61	60	39	55	41	41	40	35	18	9	11	21	69
14-May	8	8	15	11	10	13	92	34	41	53	64	67	48	51	61	54	47	40	36	35	20	21	9	9	92
15-May	30	8	13	4	7	12	29	37	38	37	57	70	87	72	71	60	78	72	33	24	16	21	23	23	87
16-May	23	22	21	21	23	20	26	31	37	31	31	38	41	34	62	9	12	16	17	17	16	16	22	19	62
17-May	18	23	24	26	23	27	33	31	28	32	41	37	31	51	34	51	61	35	59	22	14	21	20	26	61
18-May	29	17	20	15	20	29	33	37	38	34	33	30	31	30	27	29	27	29	49	37	38	38	37	36	49
19-May	39	34	35	36	37	34	40	39	39	35	39	36	36	38	36	37	36	36	35	39	36	36	33	39	40
20-May	33	33	35	37	31	30	37	27	27	25	29	34	32	34	32	28	39	42	29	40	36	28	26	40	42
21-May	47	41	34	29	32	34	30	34	41	40	36	35	43	41	35	38	37	37	37	36	38	36	34	33	47
22-May	32	34	37	36	39	33	36	36	36	35	35	37	37	40	40	40	39	37	38	32	29	25	26	19	40
23-May	23	19	19	42	25	25	25	30	41	42	41	41	36	39	50	49	38	36	26	20	13	20	14	19	50
24-May	24	23	27	26	25	24	32	30	30	38	32	34	33	31	30	32	22	21	19	19	15	25	28	22	38
25-May	22	21	25	22	19	28	32	46	45	46	45	42	33	34	34	34	35	32	32	33	28	24	27	25	46
26-May	24	26	27	31	32	30	45	36	29	31	23	29	23	24	28	32	37	24	34	32	26	19	23	29	45
27-May	51	20	20	19	20	20	20	26	27	27	26	32	32	28	27	22	46	22	30	35	18	19	19	18	51
28-May	19	18	19	20	20	20	21	20	27	32	30	30	26	26	33	30	24	22	19	17	17	12	16	25	33
29-May	26	25	18	13	24	28	46	23	33	31	21	29	45	21	32	27	36	40	32	28	27	26	59	41	59
30-May	27	30	25	20	14	19	19	23	30	26	25	26	23	26	26	25	24	21	28	27	18	26	33	15	33
31-May	32	32	30	18	19	17	18	21	29	40	77	60	62	51	69	46	50	48	51	29	12	6	13	17	77
81 77 41 65 75 85 92 69 97 66 77 70 87 72 79 89 82 94 59 50 68 41 59 66																									
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 3, 2016	Last Calibration	April 13, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:20
Gas Cert Reference	SA130010A	Station temp.	22 Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-654
Analyzer IP address	192.168.1.43		Lamp voltage	881	996
Calculated slope	0.988879	1.001416	Chamber temp	44.8	44.9
Calculated intercept	1.657100	1.984724	Pressure	688.9	693.4
Analyzer Background	8.7	8.8	Flow	0.452	0.455
Analyzer Coefficient	0.855	1.004	Intensity	82	93

Analyzer make Thermo 43i Analyzer serial # 1218153459

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	60.4	577.4	578.1	0.999
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.4	577.4	575.6	1.003
second point	5000	30.2	288.7	285.3	1.012
third point	5000	15.2	145.3	141.3	1.028
as left zero					
as left span					
Average Correction Factor					1.015

Corrected As found 578.2 Previous response 582.3 % change 0.7%

Notes:

As founds completed. Slow span response. Flash lamp voltage is down to 875 V. Flash lamp voltage adjusted to 1000 V. Initial flash reference set to 4.47 V. PMT adjustment completed. Zero and span adjustment. As lefts not completed.

Calibration Performed By: Devin Russell



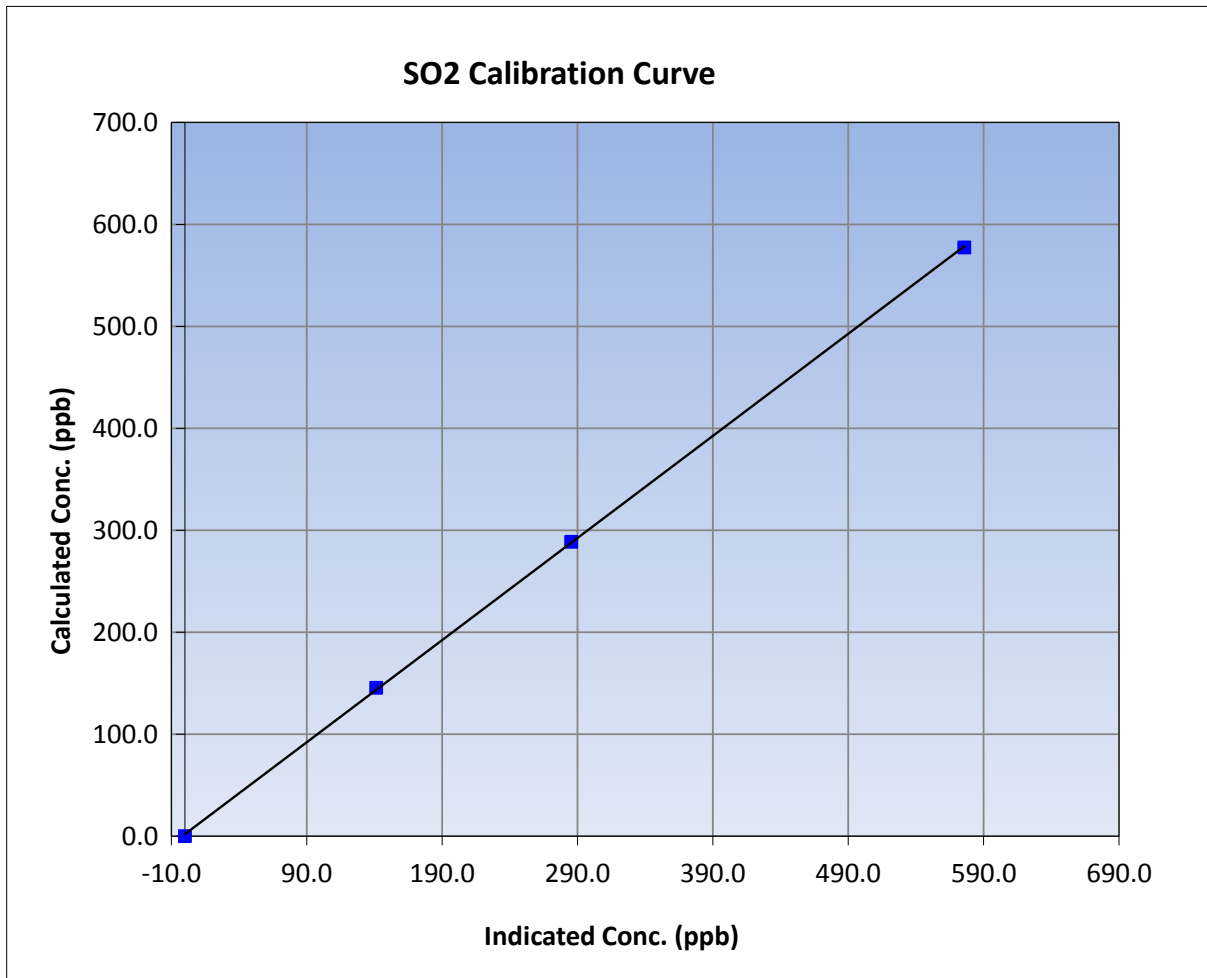
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:00	End Time (MST)	13:20
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

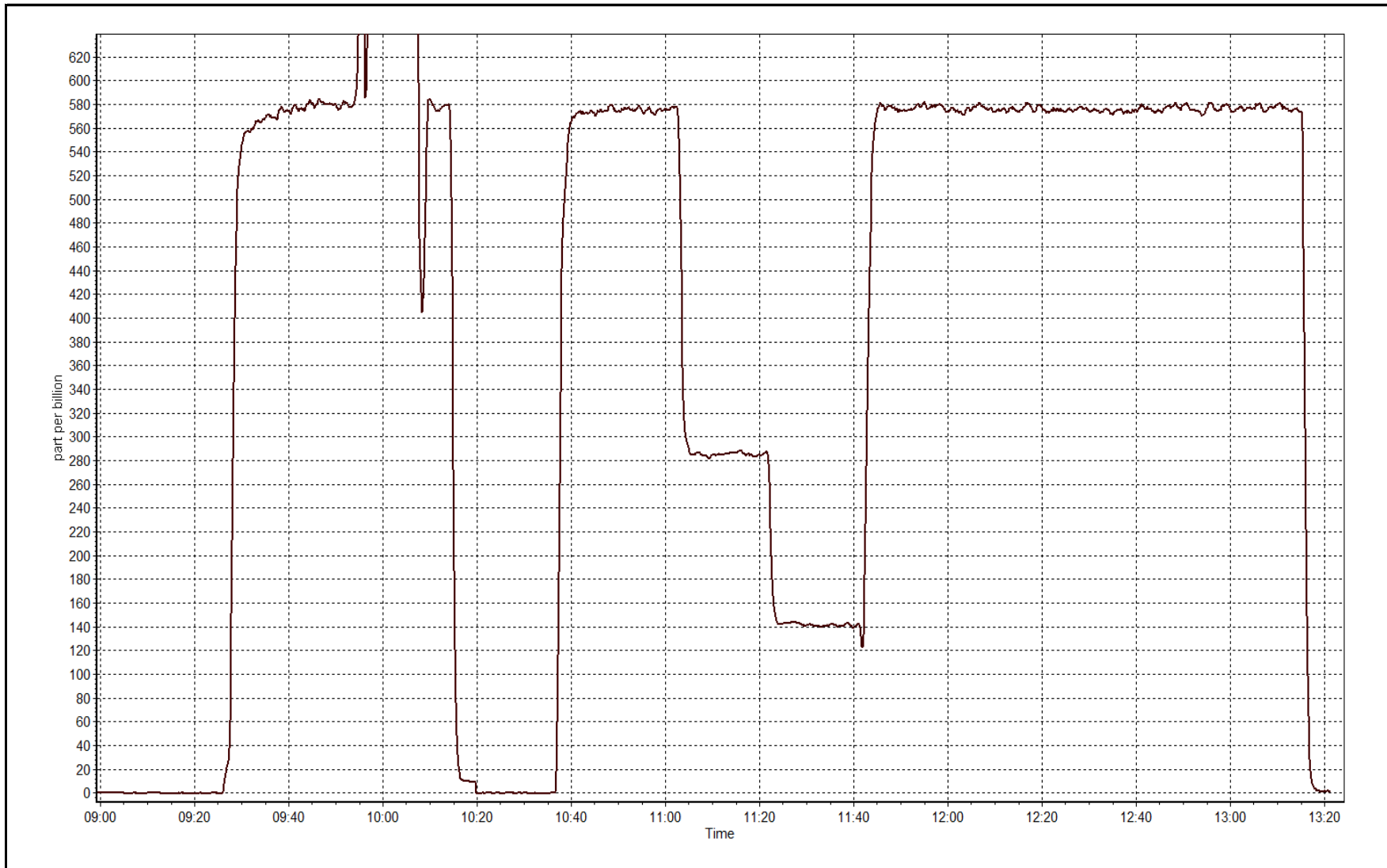
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999951
577.4	575.6	1.0032		
288.7	285.3	1.0121	Slope	1.001416
145.3	141.3	1.0282		
			Intercept	1.984724



SO2 Calibration Plot

Date: May 3, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 2, 2016	Last Calibration	April 14, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	13:00	End Time (MST)	16:05
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	797	796
Calculated slope	0.987279	1.007866	Chamber temp	45	45
Calculated intercept	0.383508	-0.895953	Pressure	551.3	554.6
Analyzer Background	15	14.7	Flow	0.980	0.984
Analyzer Coefficient	1.246	1.225	Intensity	112	112
			Converter temp.	343	342

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
Converter make/model	na	Converter serial #	na

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	78.4	80.0	81.1	0.987
SO2 scrubber check	5000	20.9	199.8	0.0	----
calibrator zero	5000	0.0	0.0	1.6	----
high point	5000	78.4	80.0	80.6	0.993
second point	5000	39.3	40.1	40.3	0.994
third point	5000	19.7	20.1	20.2	0.996
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.5	80.1	80.2	0.999
Average Correction Factor					0.994

Corrected As found	81.3	Previous response	80.6	% change	-0.8%
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Notes:

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

Calibration Performed By: Devin Russell



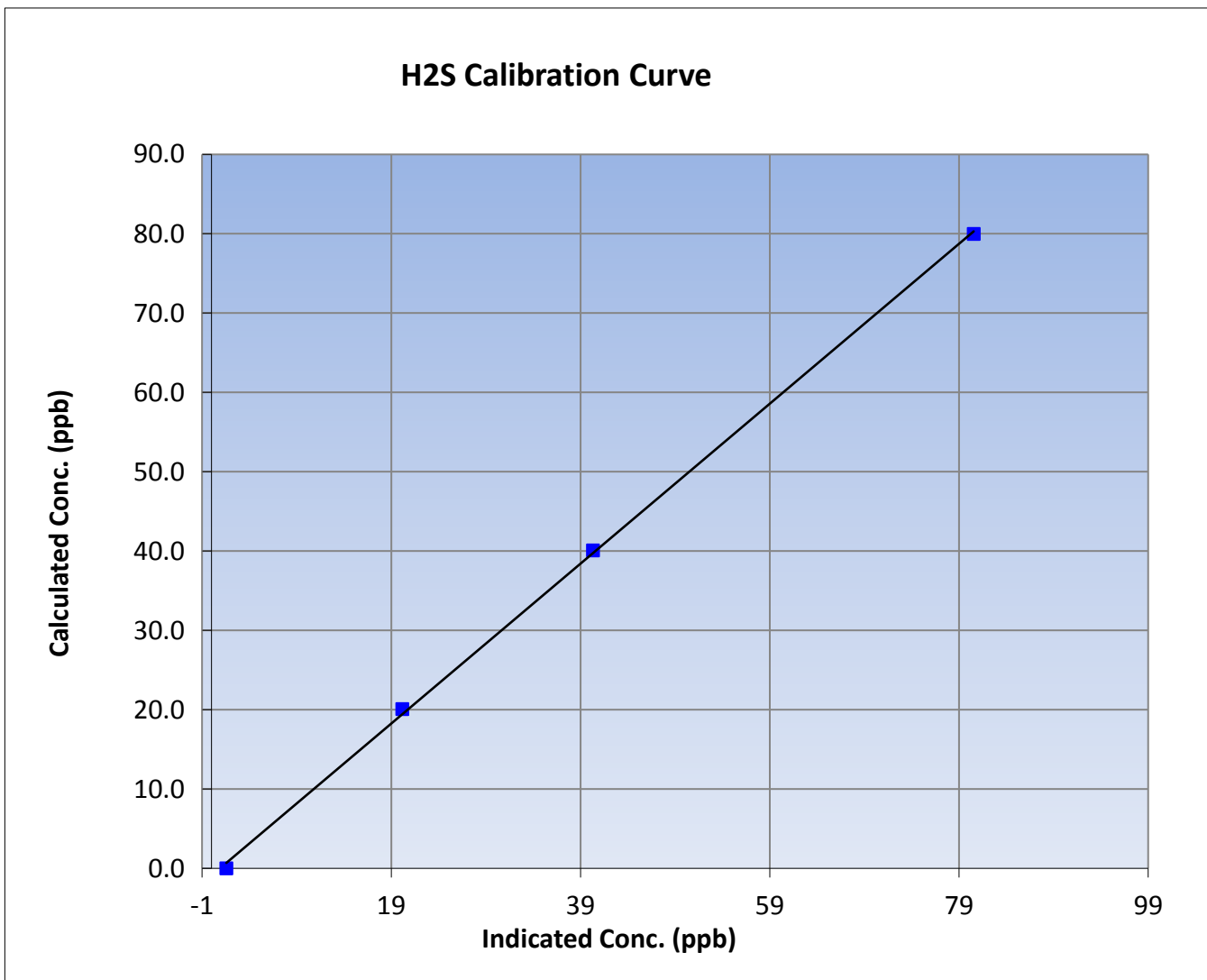
Wood Buffalo Environmental Association H2S Calibration Report

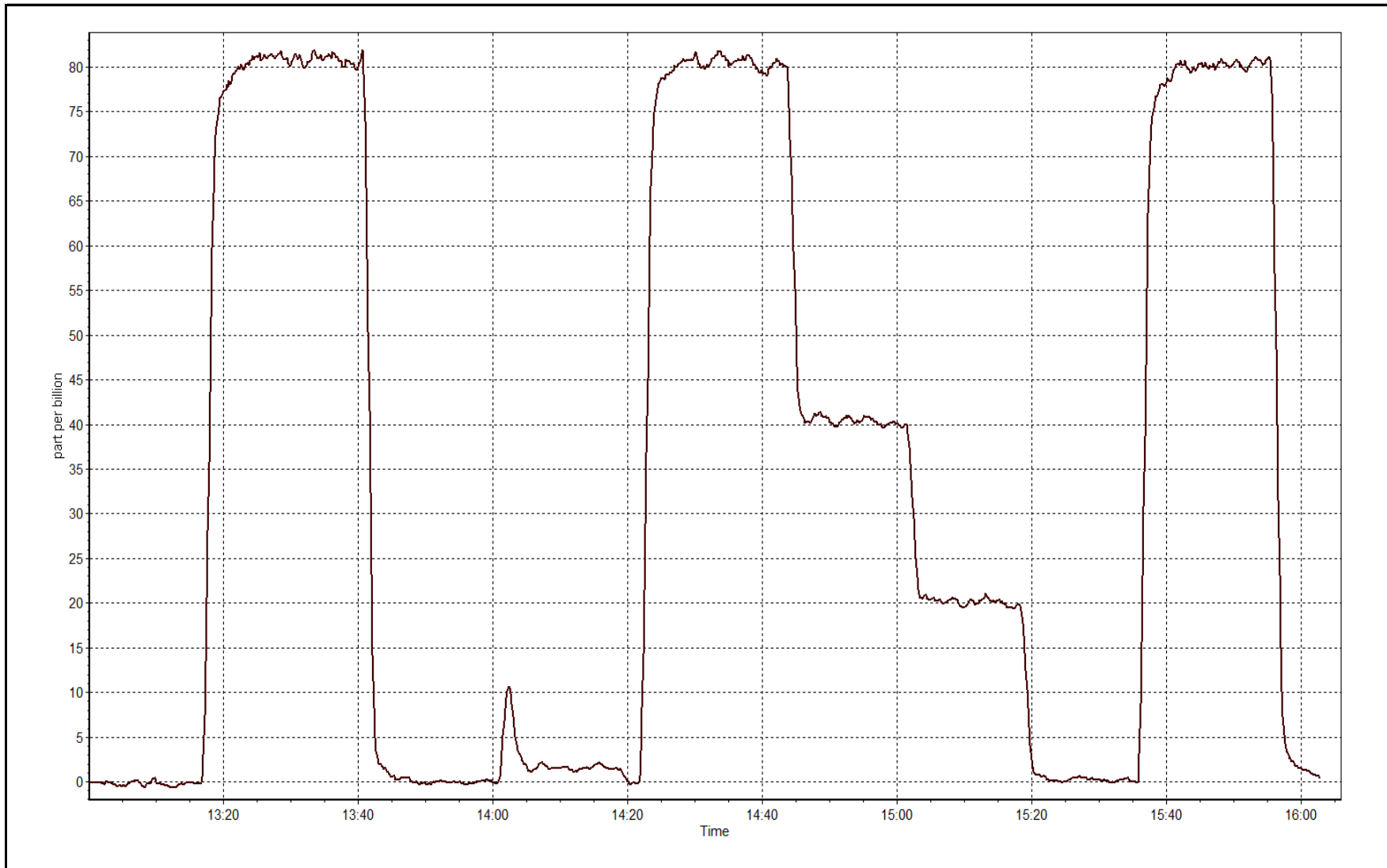
Station Information

Calibration Date	May 2, 2016	Previous Calibration	April 14, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	13:00	End Time (MST)	16:05
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	1.6	----	Correlation Coefficient	0.999673
80.0	80.6	0.9927		
40.1	40.3	0.9944	Slope	1.007866
20.1	20.2	0.9962		
			Intercept	-0.895953







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 3, 2016	Last Calibration	April 13, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:20
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

	<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	41.0	41.0
Calculated slope	0.997871	0.994609	Fuel Pressure	24.8	24.8
Calculated intercept	0.002821	0.036620	Analyzer Coeff	4.3	4.3
			Analyzer BKG	2.880	2.940

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	0.04	----
as found span	5000	60.4	13.19	13.31	0.991
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	60.4	13.19	13.24	0.997
second point	5000	30.2	6.60	6.58	1.003
third point	5000	15.2	3.32	3.29	1.009
as left zero					
as left span					
Average Correction Factor					1.003

Corrected As found 13.27 Previous response 13.22 % change -0.4%

Notes:

Inlet filter changed after as founds. Zero and span adjusted. As lefts not completed.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association THC Calibration Report

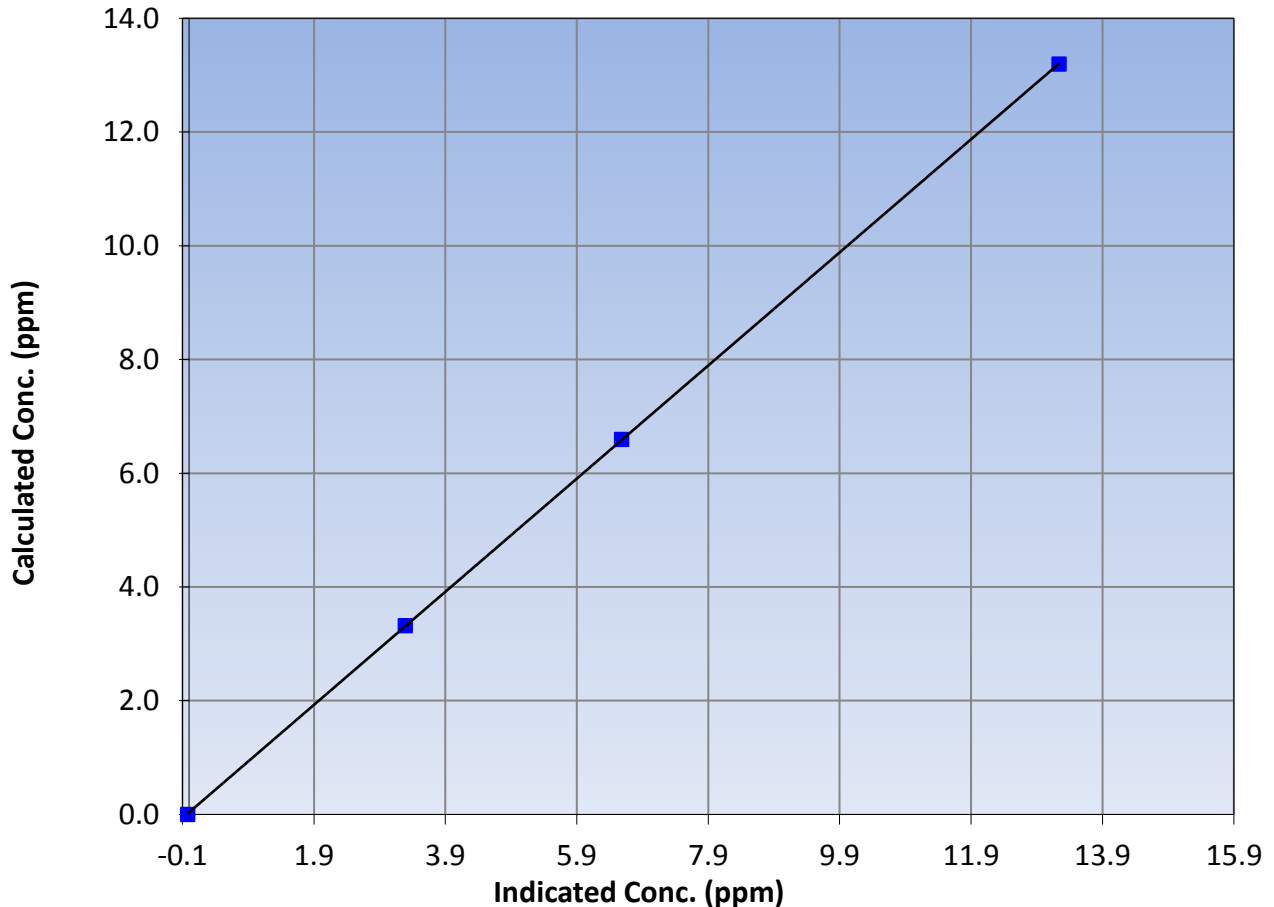
Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:00	End Time (MST)	13:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

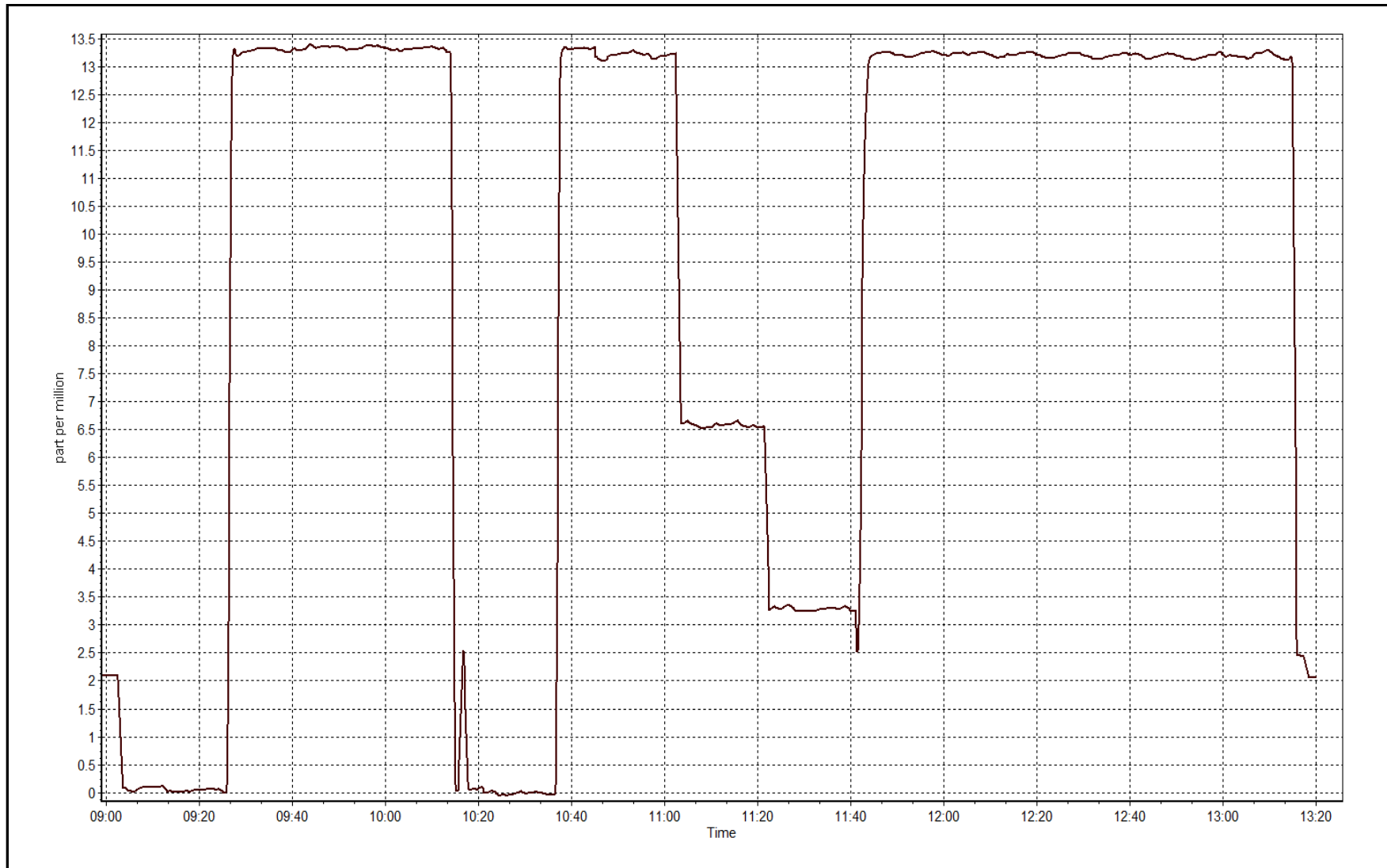
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	----	Correlation Coefficient	0.999992
13.19	13.24	0.9966		
6.60	6.58	1.0026	Slope	0.994609
3.32	3.29	1.0093		
			Intercept	0.036620

THC Calibration Curve



THC Calibration Plot

Date: May 3, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 17, 2016	Previous Calibration	April 14, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	13:50	End Time (MST)	15:05
NO2 GPT Ref date	May 17, 2016	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.4	27.4
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.996497	0.991434	Pressure	25.7	26.0
Calculated intercept	0.404988	-0.703441	Flow cell A	707	717
Analyzer Background	6.2	6.2	Flow cell B	722	717
Analyzer Coefficient	0.986	0.986	O3 measure	4536	4536
			O3 reference	4538	4538

Analyzer make	Teledyne API T400	Analyzer serial #	824
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000		0.0	-0.1	----
as found span	5000	713.6/1082.0	368.5	371.7	0.992
calibrator zero	5000		0.0	-0.1	----
high point	5000	713.6/1082.0	368.5	371.7	0.992
second point	5000	496.5/973.6	247.5	251.0	0.986
third point	5000	260.3/849.3	126.1	128.9	0.979
as left zero					
as left span					
Average Correction Factor					0.985

Corrected As found	371.8	Previous response	369.4	% change	-0.6%
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Notes:

Remote calibration. No adjustments made. As lefts not completed.

Calibration Performed By: Devin Russell



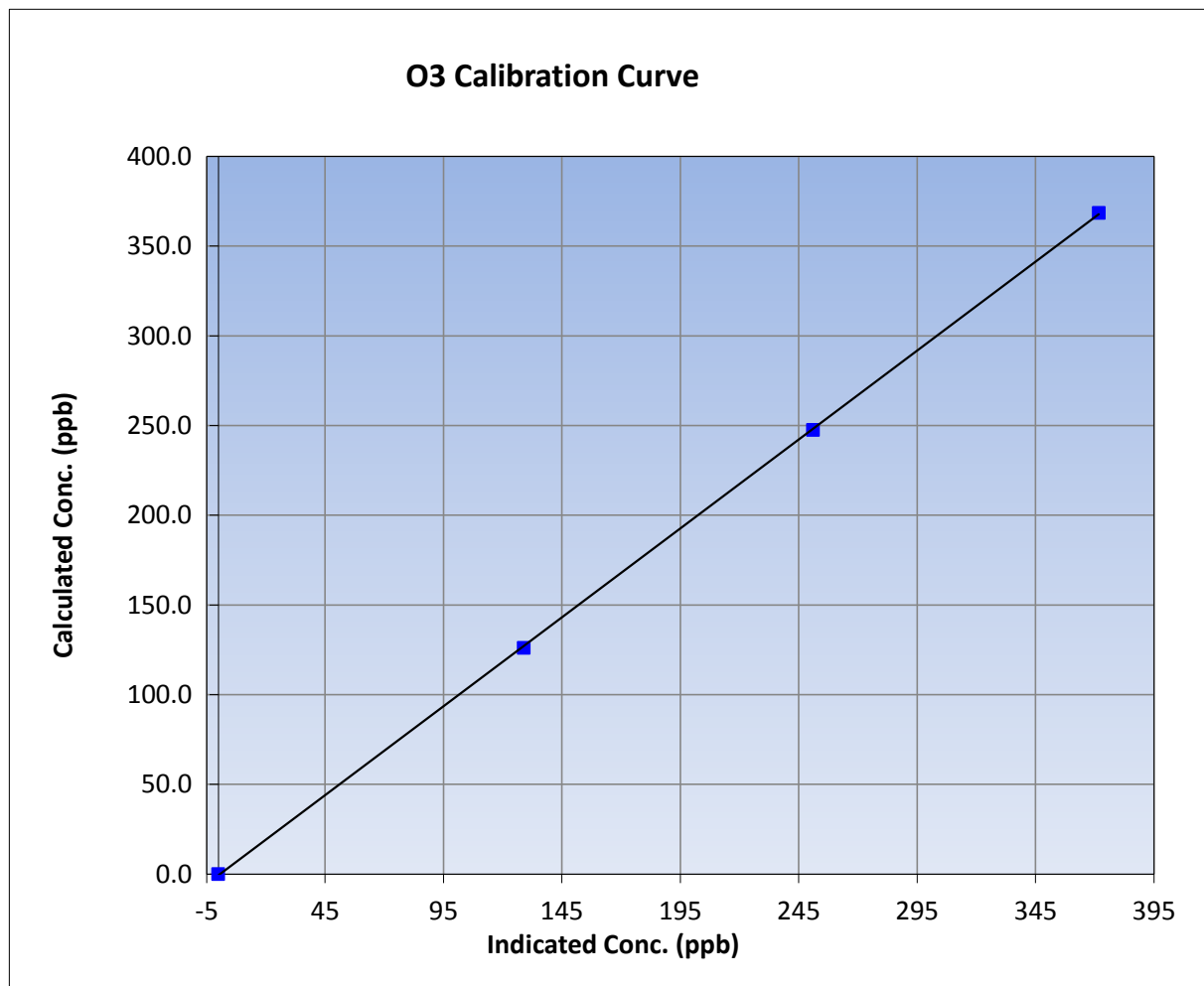
Wood Buffalo Environmental Association O3 Calibration Report

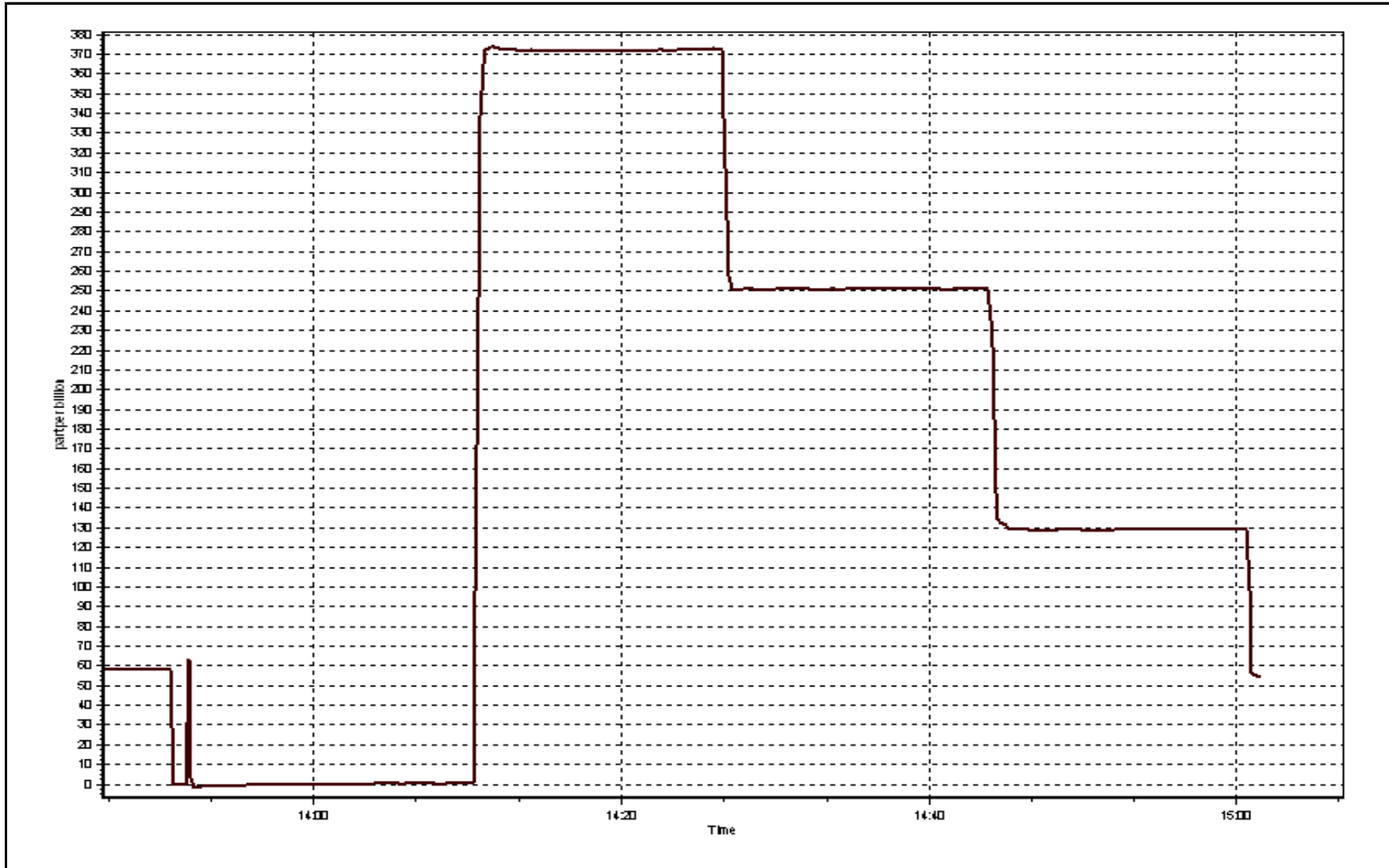
Station Information

Calibration Date	May-17-16	Previous Calibration	April 14, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	13:50	End Time (MST)	15:05
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	-0.1	----	Correlation Coefficient	0.999967
368.5	371.7	0.9915		
247.5	251.0	0.9863	Slope	0.991434
126.1	128.9	0.9785		
			Intercept	-0.703441







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:20
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOX Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	12/1216
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.993655	0.993733	1.005839
	Data Offset	3.221371	2.388407	0.770084
Current Calibration	Data Slope	0.998357	0.998388	1.002798
	Data Offset	2.890889	3.122420	-0.447583

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.001		0.996	
NOX coefficient	0.999		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.7		0.7	
NOX bkgrnd	1.4		1.4	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	314.1	Deg C	314.9	Deg C
PMT voltage	781	V	781	V
PMT Temp	7	Deg C	7	Deg C
O3 flow	71	ccm	71	ccm
R Cell press NO	5.8	mmHg	6.2	mmHg
R Cell Press Nox	5.8	mmHg	6.2	mmHg
NO sample flow	0.442	lpm	0.441	lpm
Nox sample Flow	0.442	lpm	0.445	lpm

Notes:

Inlet filter changed after as founds. Span adjusted. As lefts not completed.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 3, 2016

Station Number:

AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
as found span	5000	60.4	600.4	600.4	0.0	604.0	604.4	-0.5	0.9940	0.9933
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	----	----
high point	5000	60.4	600.4	600.4	0.0	599.8	599.8	-0.1	1.0010	1.0009
second point	5000	30.2	300.2	300.2	0.0	296.3	295.6	0.7	1.0132	1.0154
third point	5000	15.2	151.1	151.1	0.0	146.2	145.5	0.7	1.0337	1.0388
as left zero										
as left span										
Average Correction Factor									1.0160	1.0184

Corrcctd As found NO_x= 604.3 NO= 604.6 Percent Change NO_x= -0.5% NO= -0.5%
 Previous Response NO_x= 601.0 NO= 601.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 60.40 ccm NOx ref calc conc = 600.4 ppb NO ref calc conc = 600.4 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	599.7	597.9	-0.3	1.0011	1.0042	----	----
1st NO2 (300)	226.5	371.4	596.6	226.5	370.1	1.0063	----	1.0035	99.7%
2nd NO2 (200)	346.6	251.2	598.2	346.6	251.5	1.0037	----	0.9988	100.1%
3rd NO2 (100)	469.5	128.4	598.9	469.5	129.4	1.0025	----	0.9920	100.8%
2nd NO ref point	----	0.0	599.4	597.0	2.4	1.0016	1.0057	----	----
Average Correction Factor						1.0035		0.9981	100.2%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

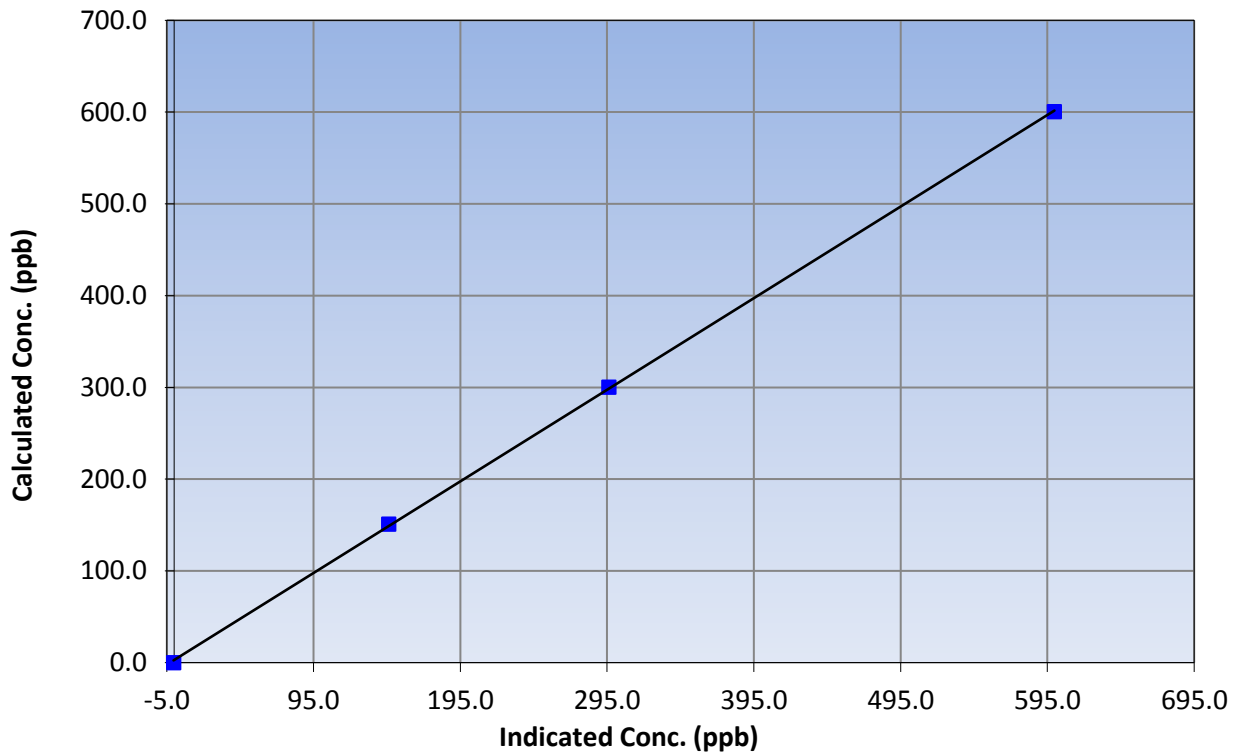
Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:00	End Time (MST)	13:20
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999922
600.4	599.8	1.0010		
300.2	296.3	1.0132	Slope	0.998357
151.1	146.2	1.0337		
			Intercept	2.890889

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

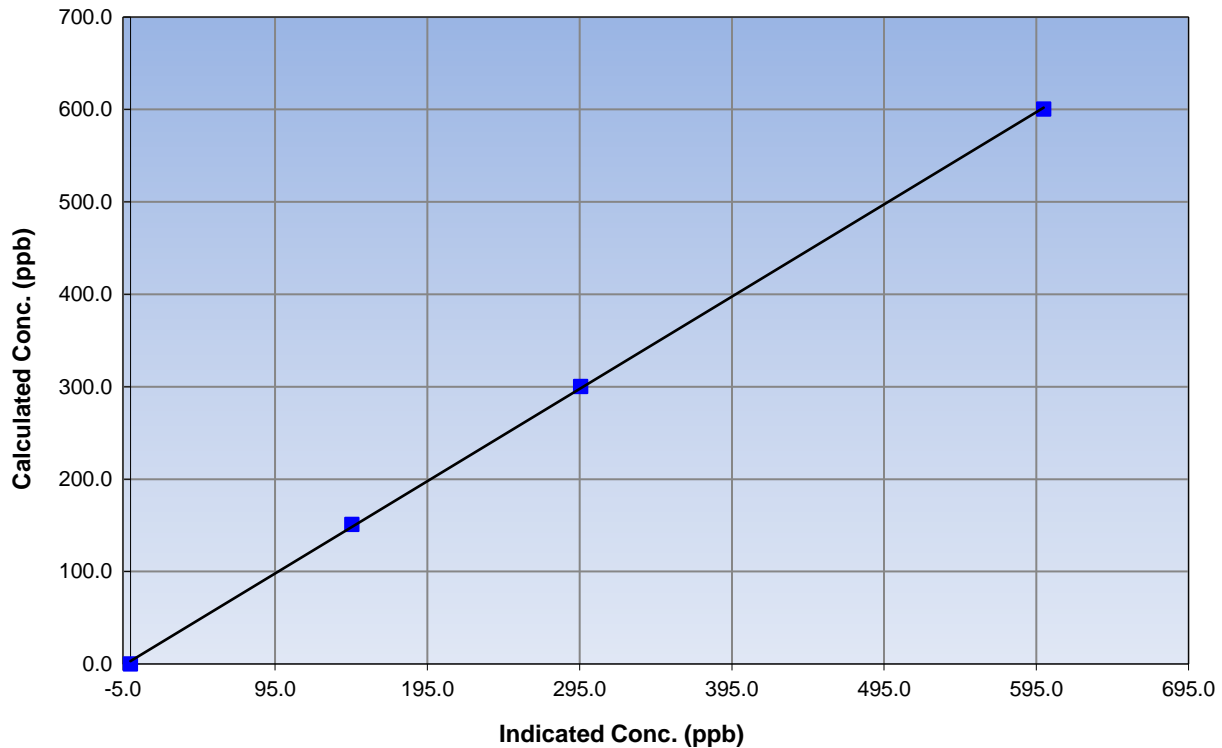
Station Information

Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:00	End Time (MST)	13:20
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	-0.1	N/A	Correlation Coefficient	0.999883
600.4	599.8	1.0009		
300.2	295.6	1.0154	Slope	0.998388
151.1	145.5	1.0388		
			Intercept	3.122420

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

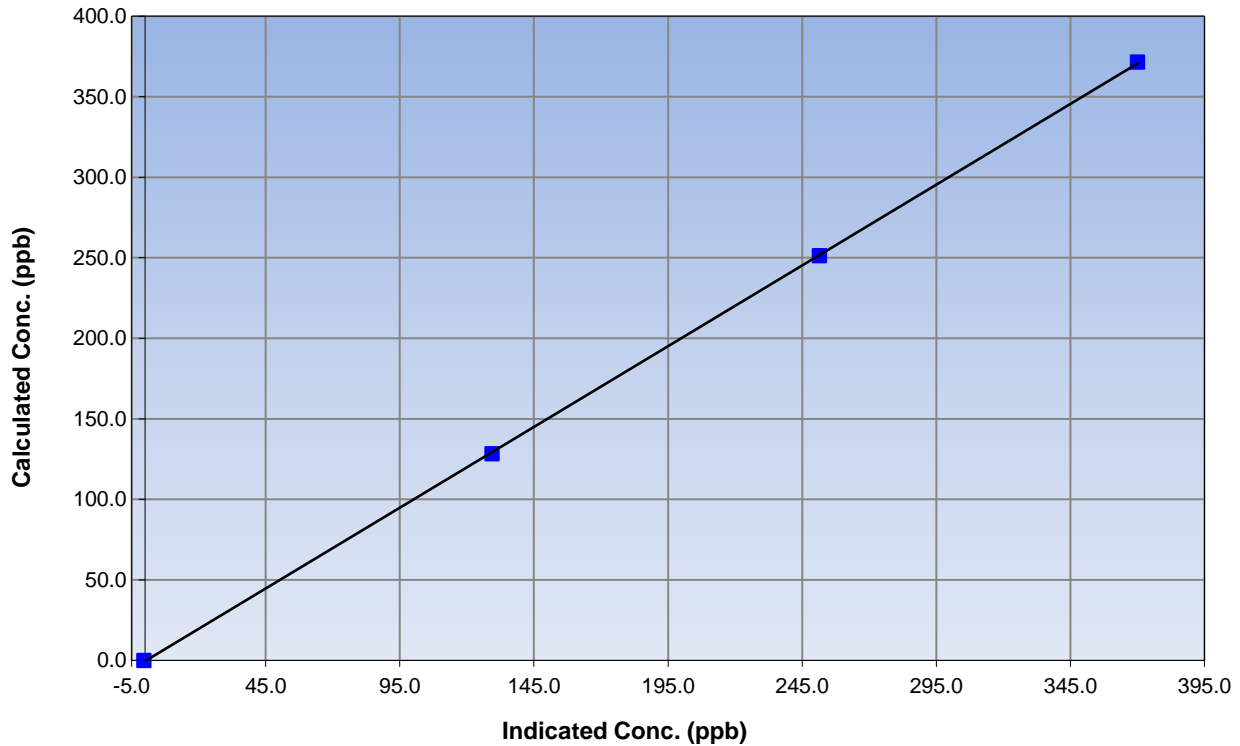
Station Information

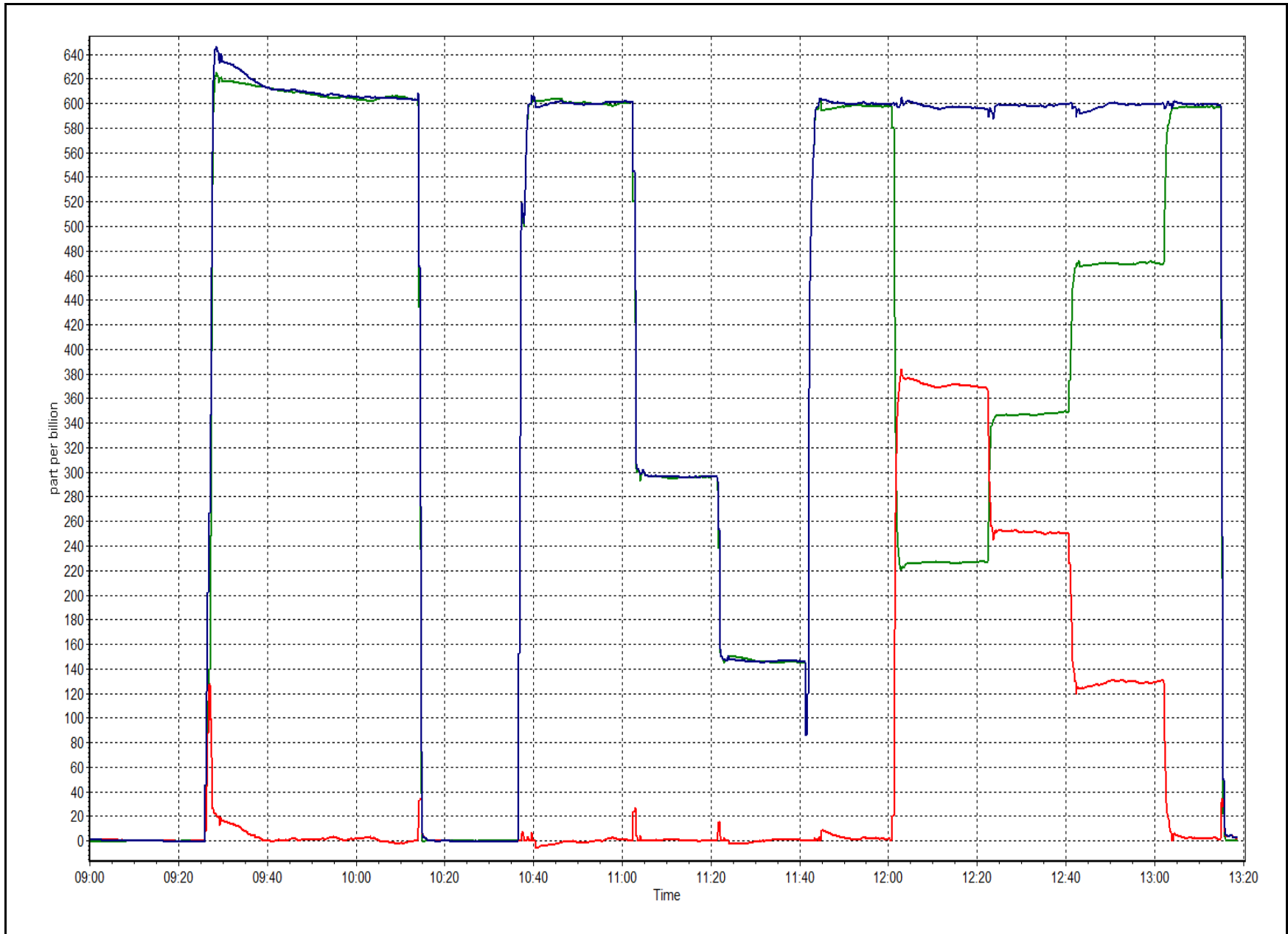
Calibration Date	May 3, 2016	Previous Calibration	April 13, 2016
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	9:00	End Time (MST)	13:20
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999970
371.4	370.1	1.0035		
251.2	251.5	0.9988	Slope	1.002798
128.4	129.4	0.9920		
			Intercept	-0.447583

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>May 3, 2016</u>	Previous Calibration:	<u>April 14, 2016</u>
Station Name:	<u>Wapasu</u>	Station Number:	<u>AMS 17</u>
Start Time (MST):	<u>10:39</u>	End Time (MST):	<u>11:30</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>141228</u>

SHARP INFORMATION			
Particulate Fraction:	<u>PM2.5</u>		
Make/Model:	<u>Thermo / SHARP 5030</u>		
Serial Number	<u>E-1107</u>		
C ₁₄ Source SN:	<u>2518</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	26.0	25.8	-0.2	26.0
T2	24.0	na	na	
T3	23.0	na	na	
T4	26.0	na	na	
RH (%)	26.0	na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	950	949.9	-0.1	950

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	201		201
Neph	0.1		0.1
C14	19.5		19.5
Indicated Concentration (ug/m3)	0.1	no	0.1
Offset 1	199.8		199.8
Offset 2	32		32

Leak Check (Quarterly)			
Leak Check Date:	<u>March 29, 2016</u>	Previous Leak Check Date:	<u>February 17, 2016</u>
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.71		0.03
*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:	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 / clean	03/05/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Zero checked. No adjustments made. Filter tape has about 25% of the roll left.

Calibration Performed By: Devin Russell



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 18
STONY MOUNTAIN
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	709	35	35	100.00	11	0	4	0
TRS(ppb) Average	710	34	34	100.00	1	0	1	0
THC(ppm) Average	707	35	37	99.73	2.5	-	2.2	-
NMHC(ppm) Average	707	35	37	99.73	0.426	-	0.188	-
CH4(ppm) Average	707	35	37	99.73	2.1	-	2	-
O3 (ppb) Average	710	34	34	100.00	66	0	57	-
NO2 (ppb) Average	709	35	35	100.00	11	0	4	-
NO (ppb) Average	709	35	35	100.00	2	-	0	-
NOX (ppb) Average	709	35	35	100.00	11	-	4	-
PM2.5 (ug/m3) Average	742	2	2	100.00	389.4	-	152.6	8
Wind Speed 10 m (km/h) Average	743	0	1	99.87	19	-	14	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	29.1	-	22.9	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	99.0	-
Precipitation (mm) Total	744	0	0	100.00	5	-	34.0	-
Leaf Wetness (% of range) Average	744	0	0	100.00	51	-	29.0	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	944	-	326.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.6	1	-	0	0	0	0	1	2	11
TRS (ppb) Average	710	0.4	0	-	0	0	0	0	0	0	1
THC (ppm) Average	707	1.99	0.1	-	1.9	1.9	1.9	2	2.1	2.1	2.5
NMHC(ppm) Average	707	0.042	0.055	-	0	0	0	0	0.1	0.1	0.426
CH4(ppm) Average	707	1.95	0.1	-	1.8	1.9	1.9	1.9	2	2	2.1
O3 (ppb) Average	710	41.7	11	-	18	27	32	43	50	55	66
NO2 (ppb) Average	709	1.2	1	-	0	0	1	1	1	3	11
NO (ppb) Average	709	0.1	0	-	0	0	0	0	0	0	2
NOX (ppb) Average	709	1.3	1	-	0	0	1	1	1	3	11
PM2.5 (ug/m3) Average	742	21.85	45	-	0.2	1.6	2.8	4.8	14.5	75	389.4
Wind Speed 10 m (km/h) Average	743	7.9	4	-	0	3	5	7	10	13	19
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	12.55	6.2	-	-2.2	5.2	8.5	11.8	16.4	21.5	29.1
Relative Humidity (%) Average	744	56.7	27	-	14	22	34	52	85	97	100
Precipitation (mm) Total	744	-	-	94.44	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	744	5.9	11	-	0	0	1	1	3	24	51
Global Solar Radiation (W/m2) Average	744	228.1	282	-	0	0	0	77	430	714	944

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	19 May 2016 12:00	19 May 2016 13:00	2	Maintenance - replaced fuel and carrier gas cylinders
Wind Speed, Wind Direction	18 May 2016 21:00	18 May 2016 21:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Stony Mountain - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 11 ppb on May 19 04:00	Maximum Daily Average: 4.0 ppb on May 19		Hours of Data:	709
Minimum Value: 0 ppb on May 1 02:00	Minimum Daily Average: 0.1 ppb on May 31		Hours of Missing Data:	35
Maximum Diurnal Average: 0.9 ppb at hour 4	Minimum Diurnal Average: 0.4 ppb at hour 3		Hours of Calibration:	35
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 5		Percent Operational Time:	100.0

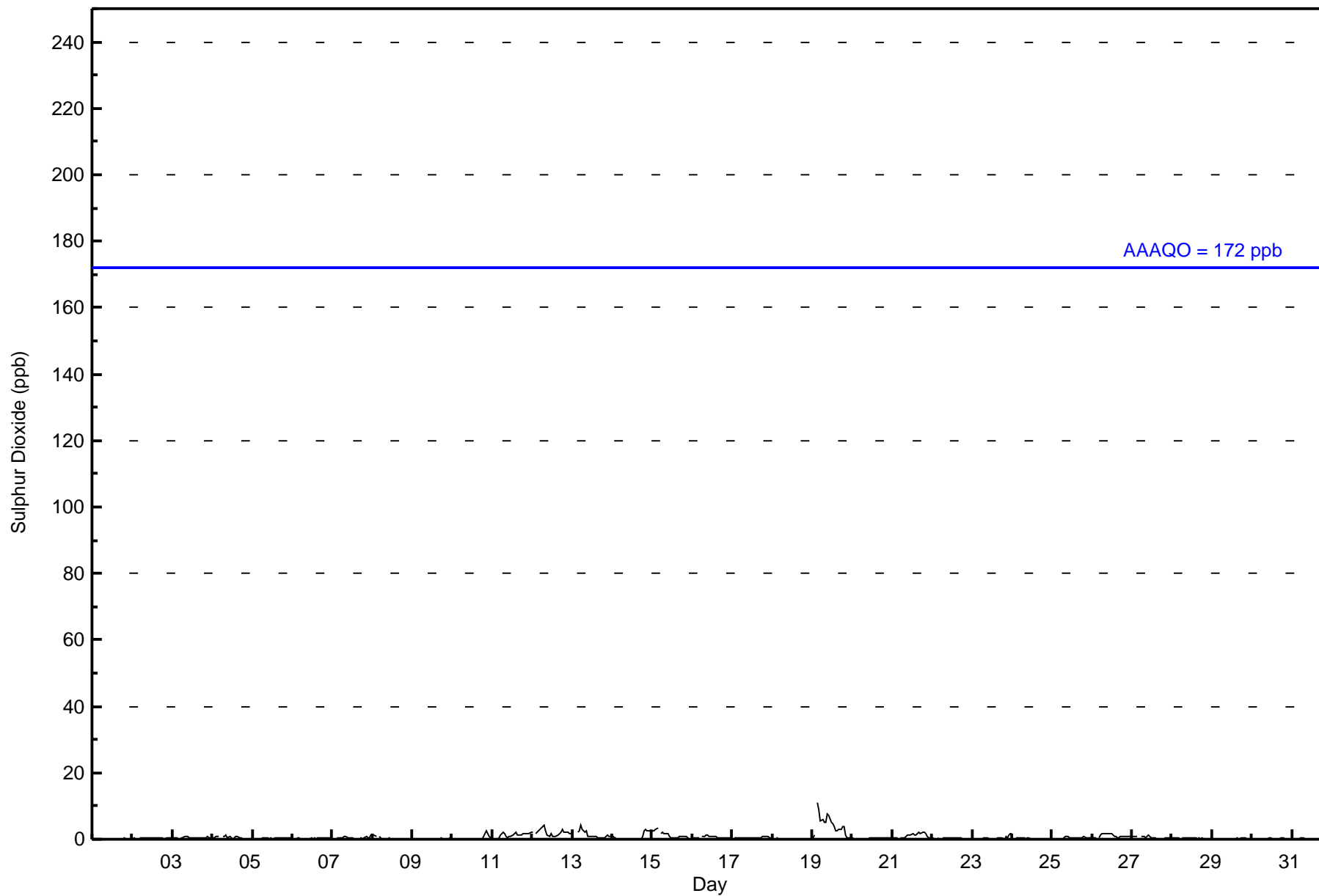
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-May	0	0	0	0	Z	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
4-May	0	1	1	1	1	Z	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0.5	1
5-May	Z	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
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-May	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1
8-May	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
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	0.4	2
11-May	Z	0	0	0	0	1	2	2	1	1	1	1	2	2	1	1	1	1	2	2	2	2	2	2	1.2	2
12-May	2	Z	2	2	3	4	4	4	2	1	1	2	1	1	1	1	2	2	3	2	2	2	2	2	2.0	4
13-May	2	2	Z	2	2	4	3	2	3	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1.4	4
14-May	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	3	2	2	0.7	3
15-May	2	2	3	3	Z	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1.2	3
16-May	0	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
17-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0.5	1
18-May	0	Z	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-May	0	1	Z	11	9	6	6	5	5	8	7	5	5	4	3	3	3	3	4	4	1	1	0	0	4.0	11
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
21-May	1	0	1	0	Z	0	0	1	1	1	1	1	2	1	1	2	2	2	2	2	2	2	1	0	1.1	2
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0.3	2
24-May	2	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	2
25-May	0	0	Z	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0.4	1
26-May	1	0	0	Z	0	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.1	2
27-May	1	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
28-May	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	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
																								Diurnal Average		
																								Diurnal Maximum		

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	708	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	707
11 - 20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	708

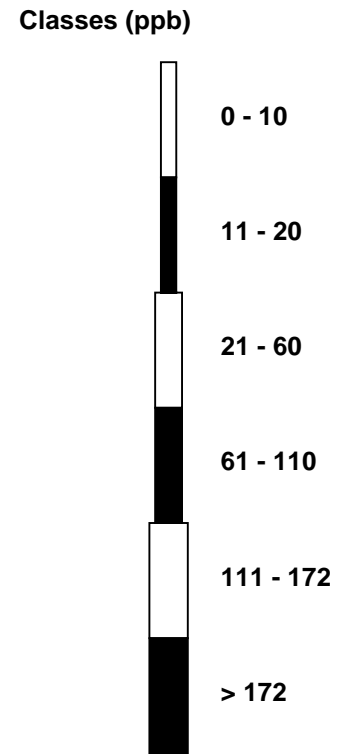
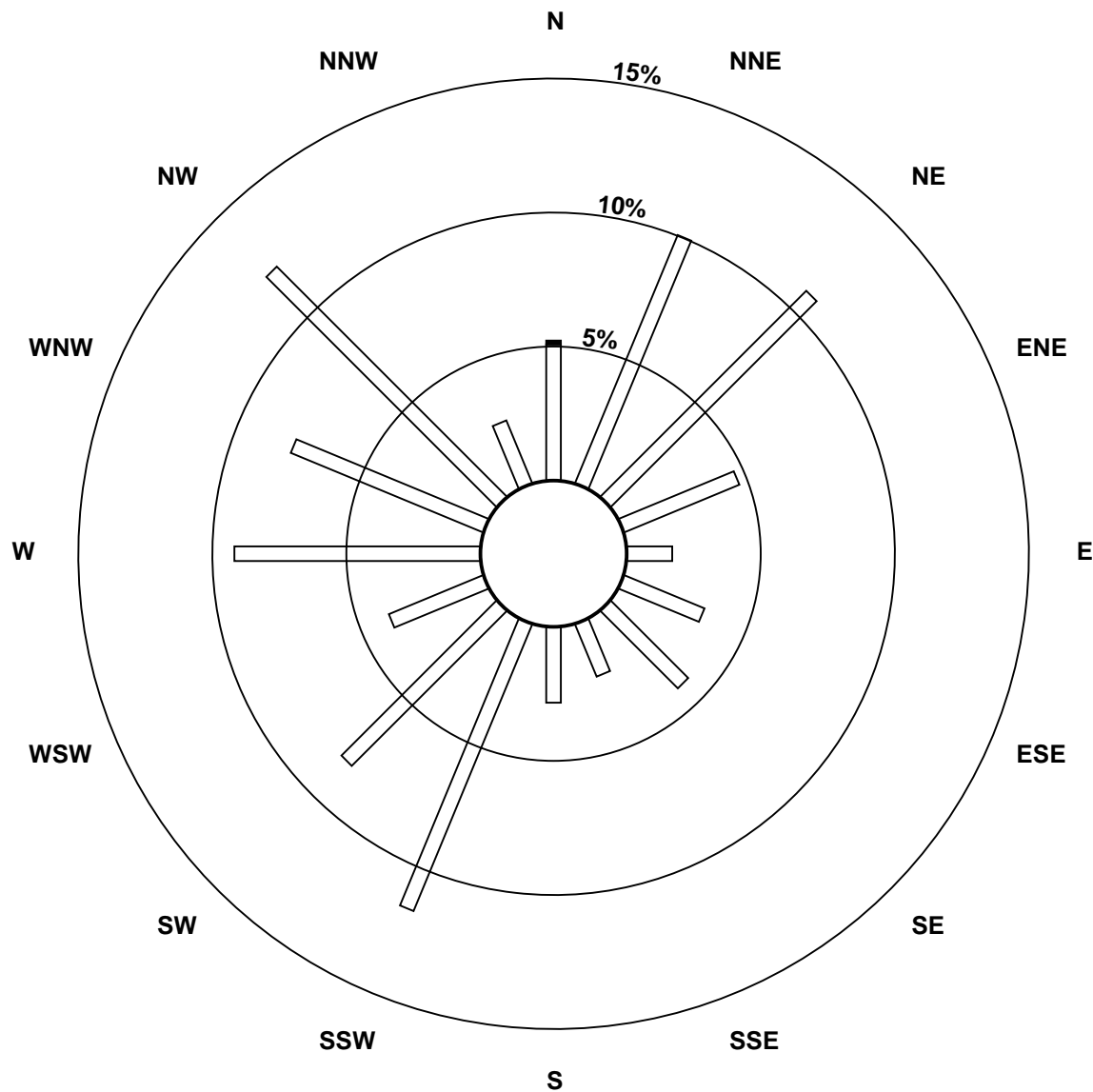
Total Number of Valid Hours: 708

Total Number of Hours: 744

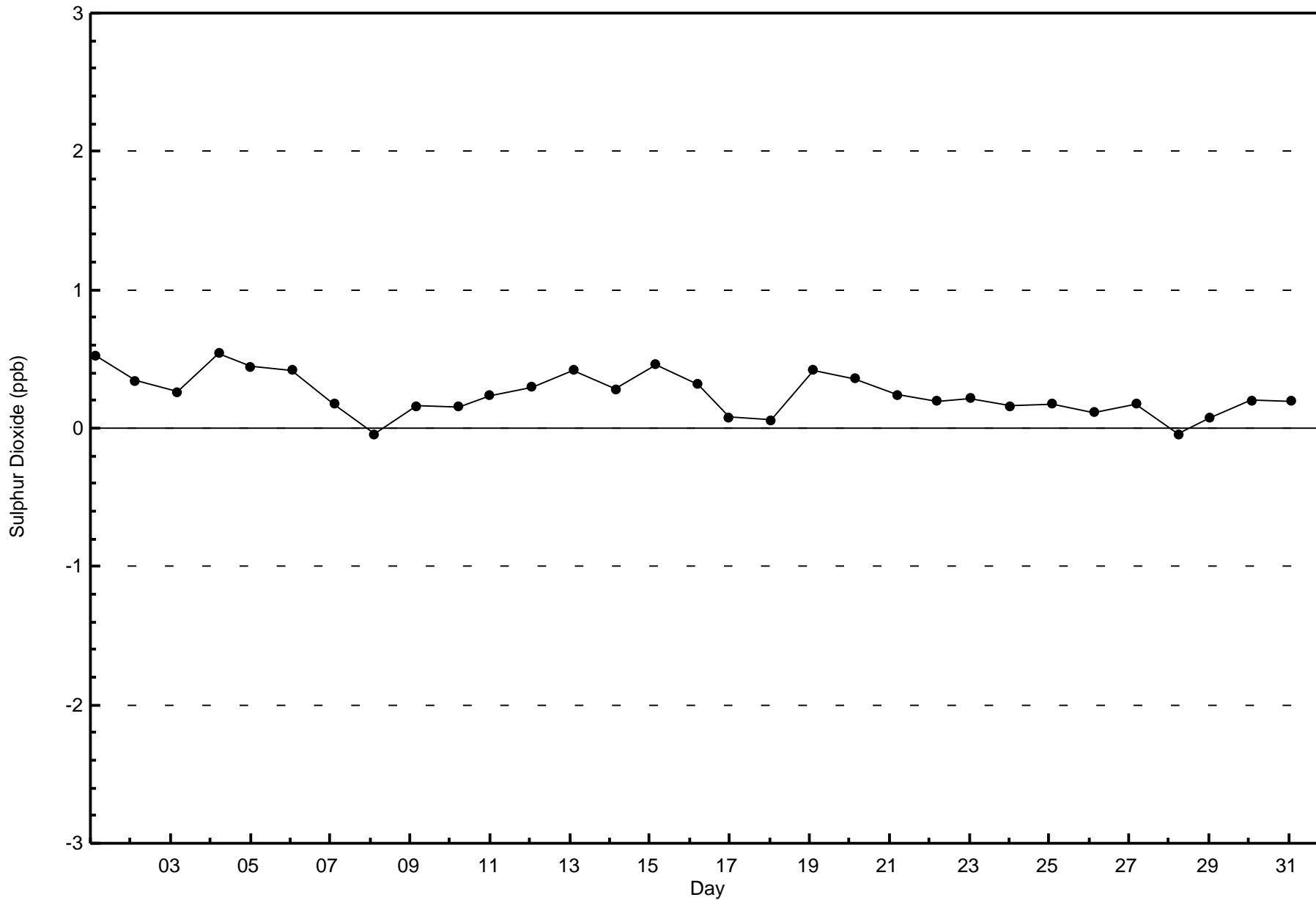


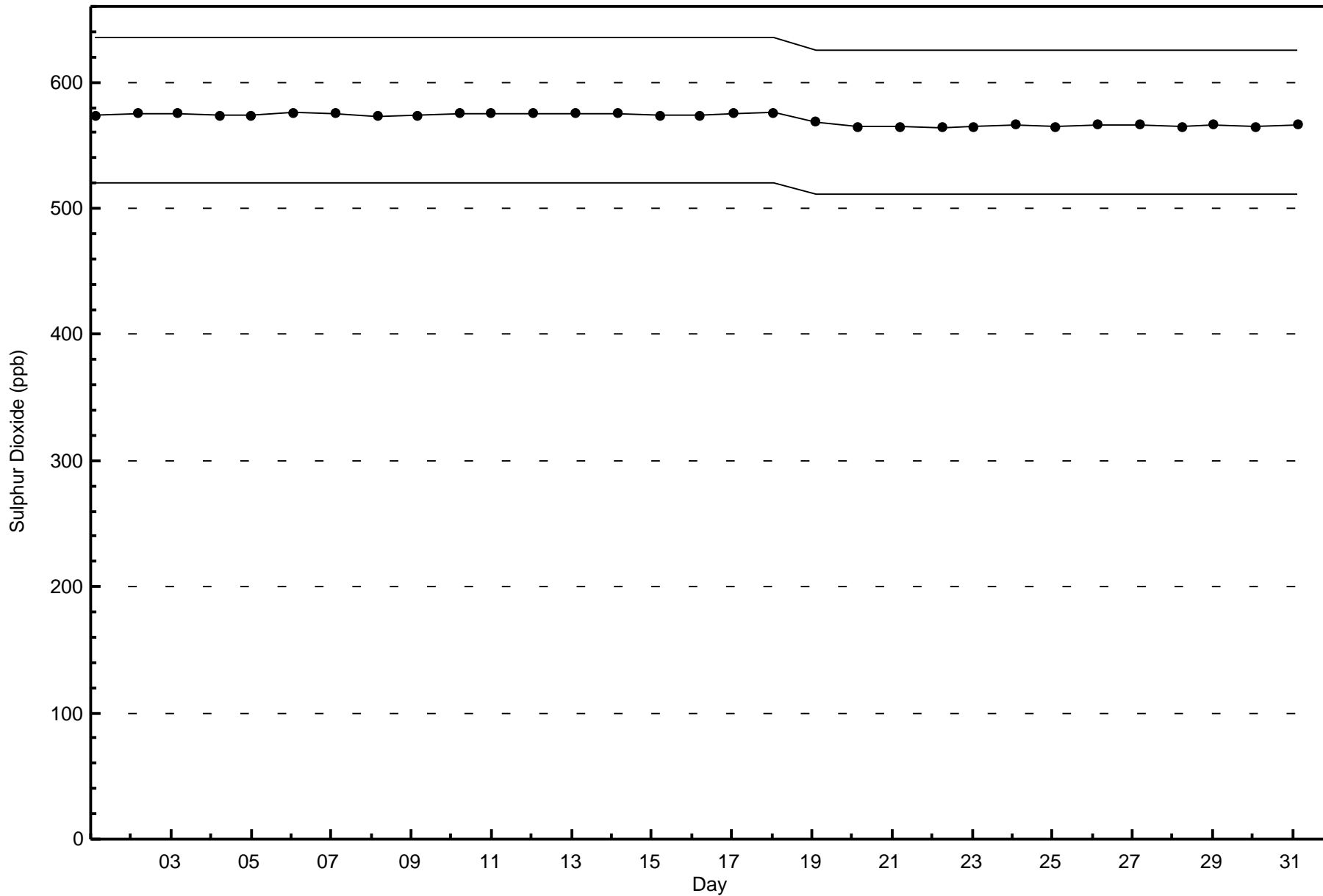
Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Stony Mountain (AMS 18)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Stony Mountain - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on May 19 03:00	Maximum Daily Average: 0.9 ppb on May 19		Hours of Data:	710
Minimum Value: 0 ppb on May 20 08:00	Minimum Daily Average: 0.3 ppb on May 20		Hours of Missing Data:	34
Maximum Diurnal Average: 0.4 ppb at hour 7	Minimum Diurnal Average: 0.3 ppb at hour 24		Hours of Calibration:	34
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 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-May	0	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
2-May	0	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
3-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
5-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-May	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
11-May	0	Z	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0.5	1
12-May	0	0	Z	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1
13-May	0	0	0	Z	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
15-May	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
16-May	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
17-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0.4	0
18-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-May	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.9	1
20-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-May	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
22-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
26-May	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-May	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
29-May	0	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
30-May	0	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
31-May	0	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

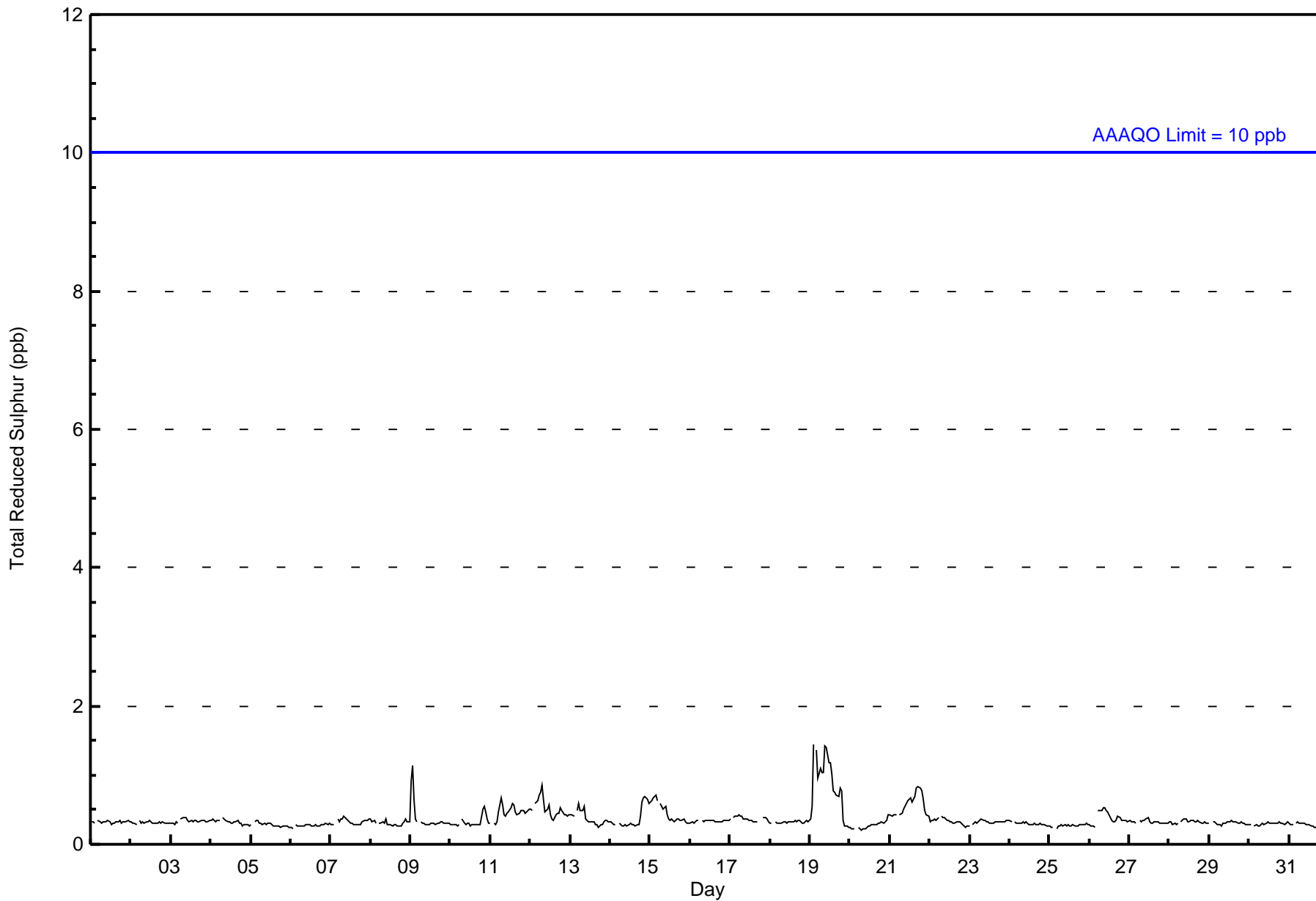
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1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	710	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	36	70	78	33	11	21	28	15	21	81	59	29	69	53	86	19	709
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	70	78	33	11	21	28	15	21	81	59	29	69	53	86	19	709

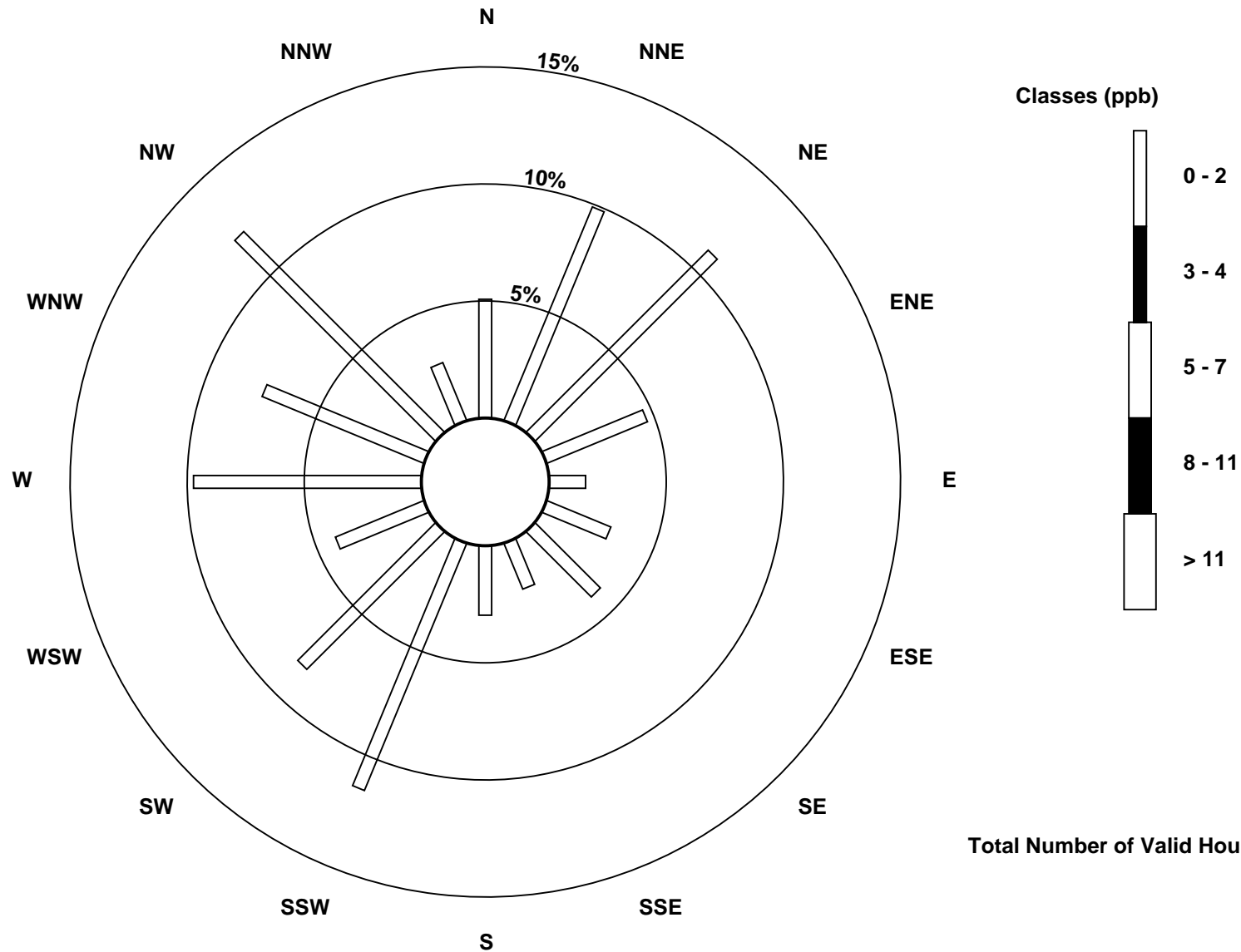
Total Number of Valid Hours: 709

Total Number of Hours: 744

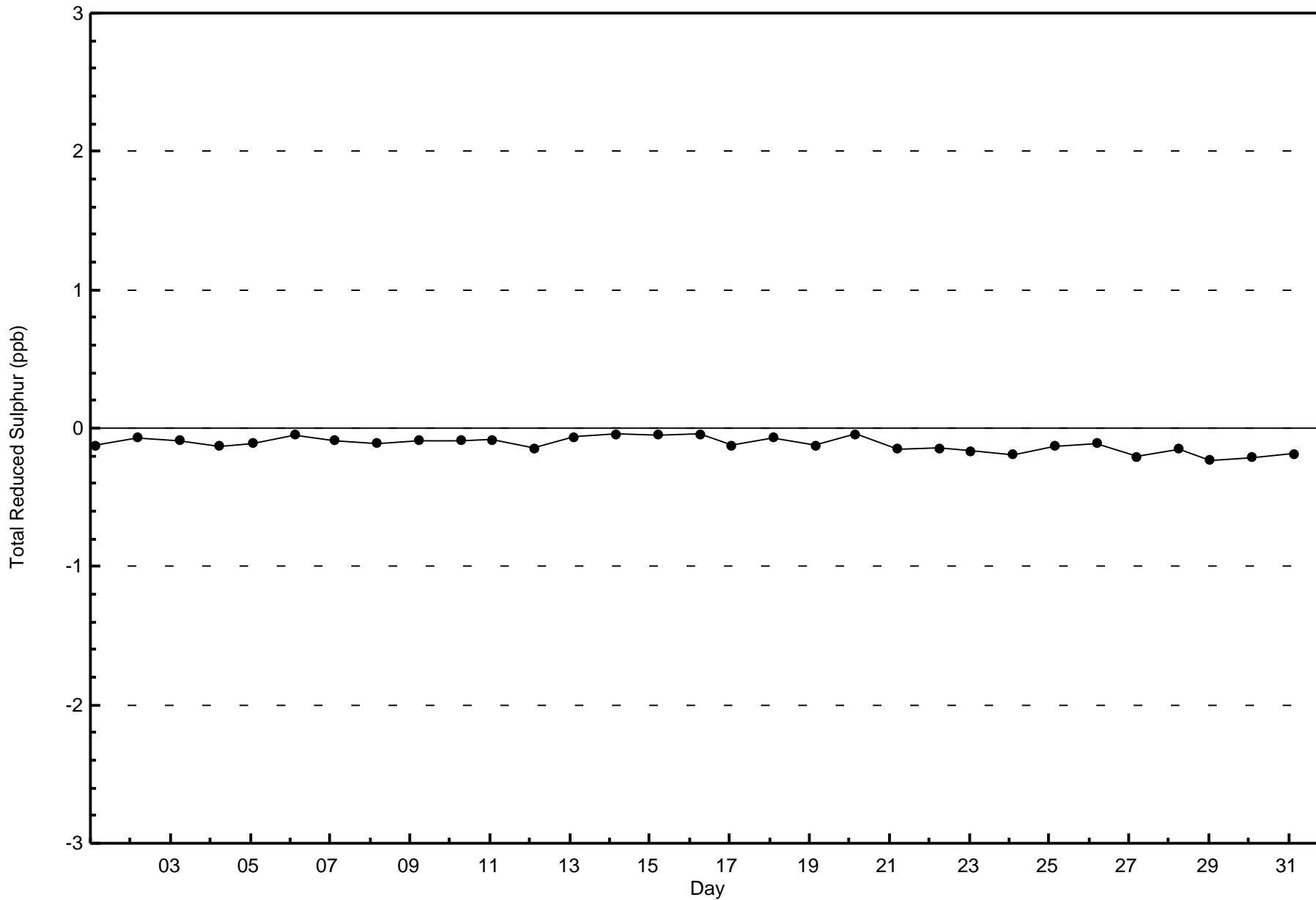


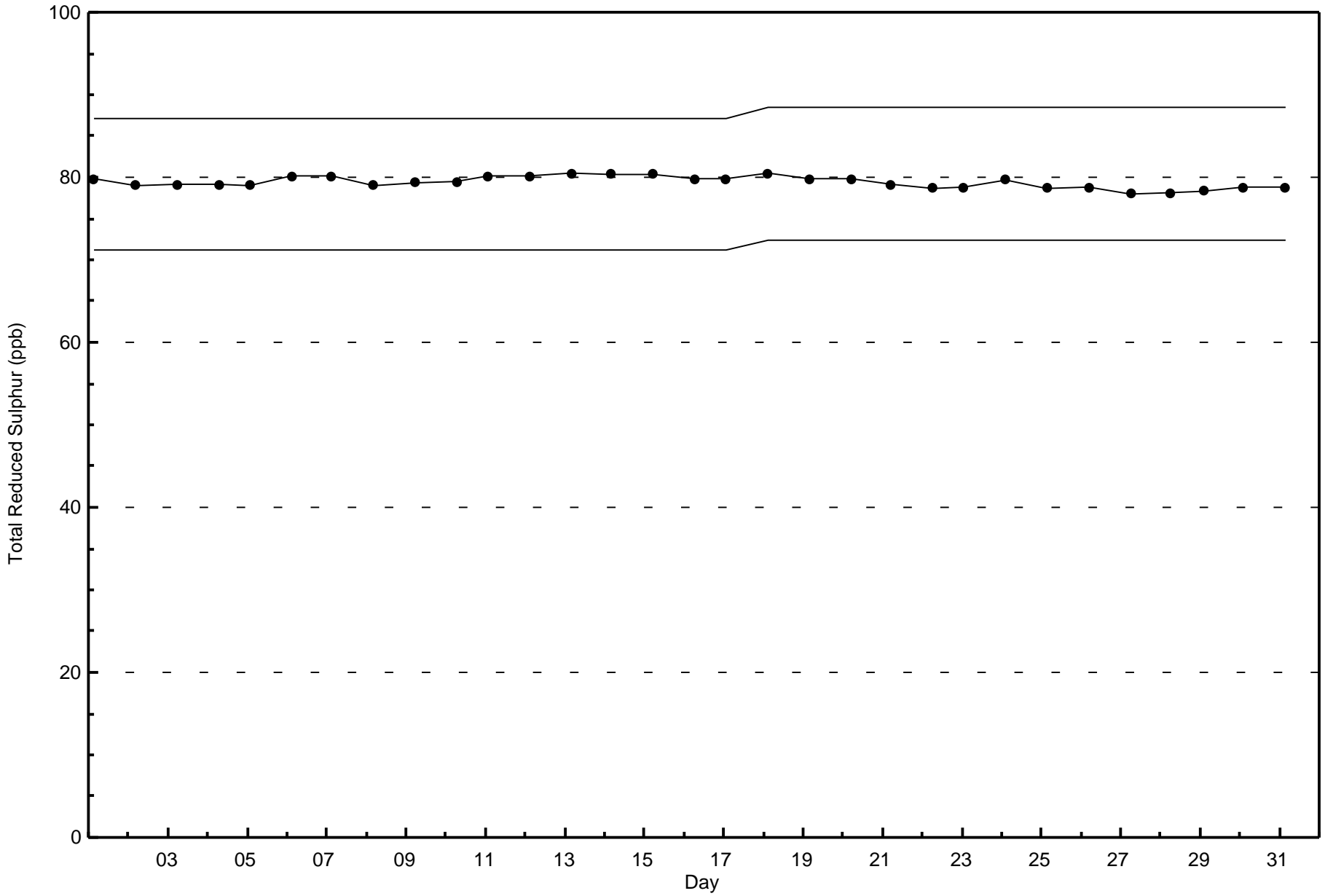
Wood Buffalo Environmental Association
Wind Rose May 2016

Total Reduced Sulphur (TRS) - ppb
Stony Mountain (AMS 18)



Total Number of Valid Hours: 709

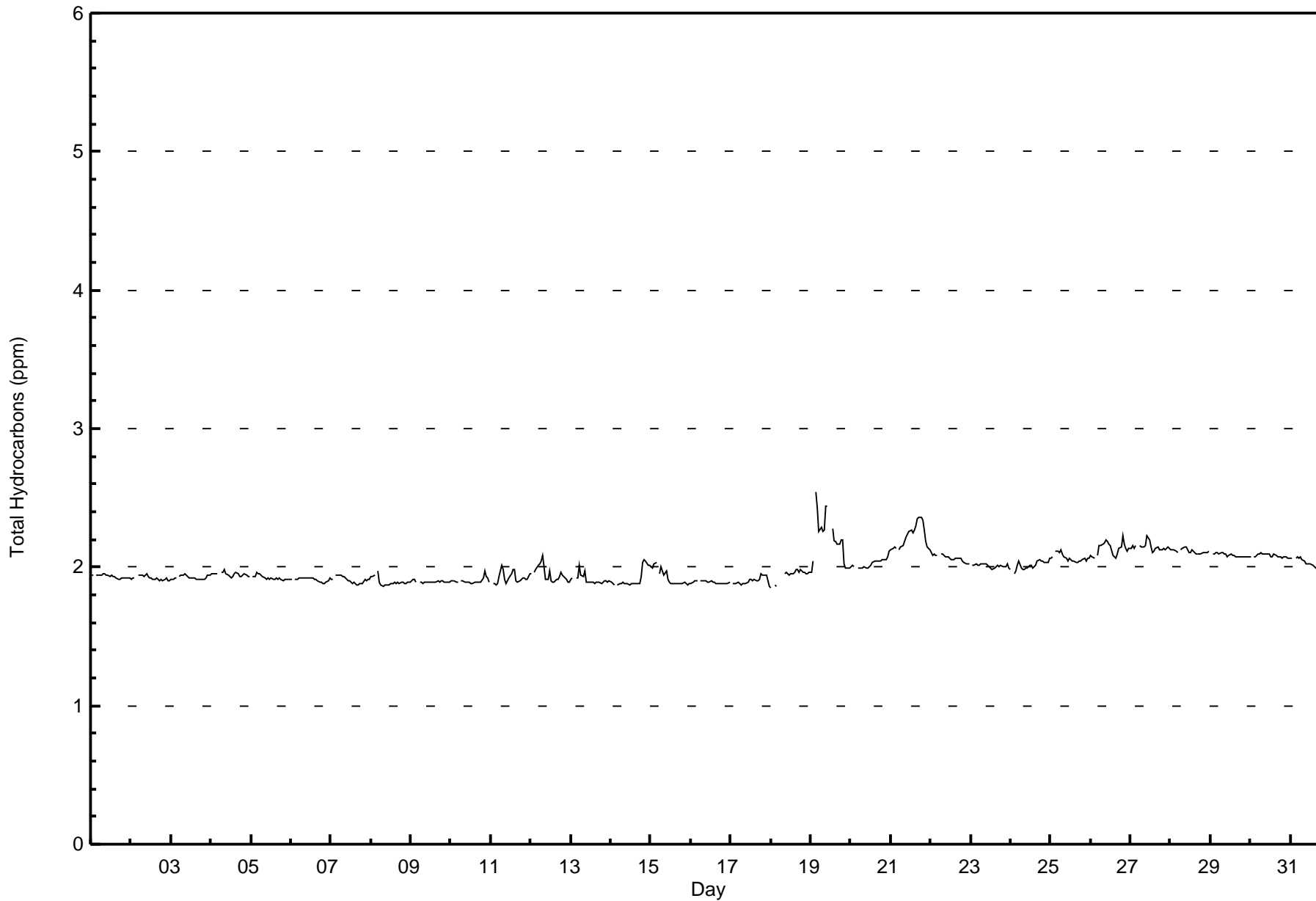






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Stony Mountain - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	507	71.71	71.71
2.1 - 3.0	200	28.29	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Stony Mountain - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	28	30	42	21	5	8	13	13	16	60	54	25	62	45	71	13	506
2.1 - 3.0	9	40	34	12	7	15	16	2	4	22	4	2	3	10	15	5	200
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	37	70	76	33	12	23	29	15	20	82	58	27	65	55	86	18	706

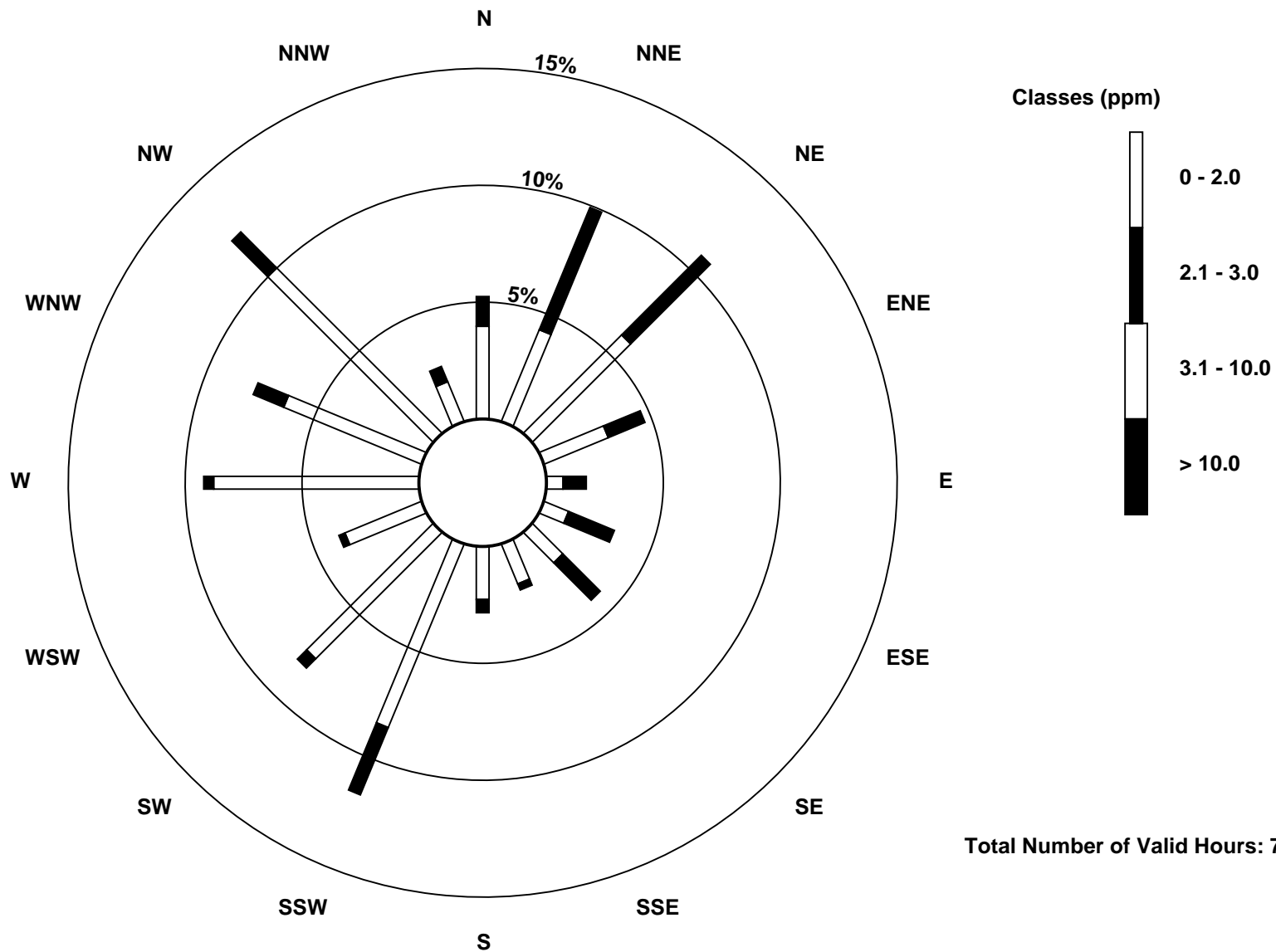
Total Number of Valid Hours: 706

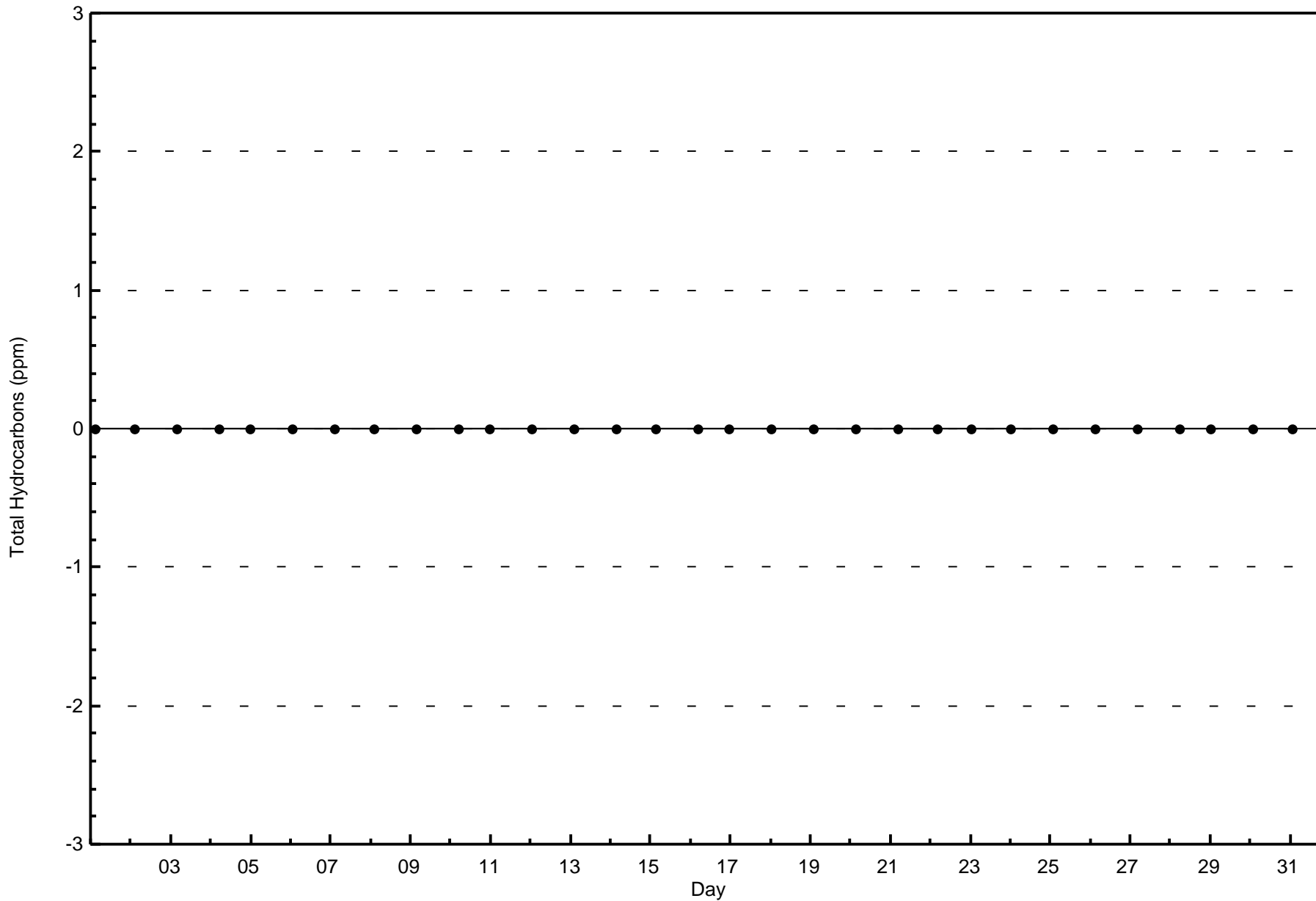
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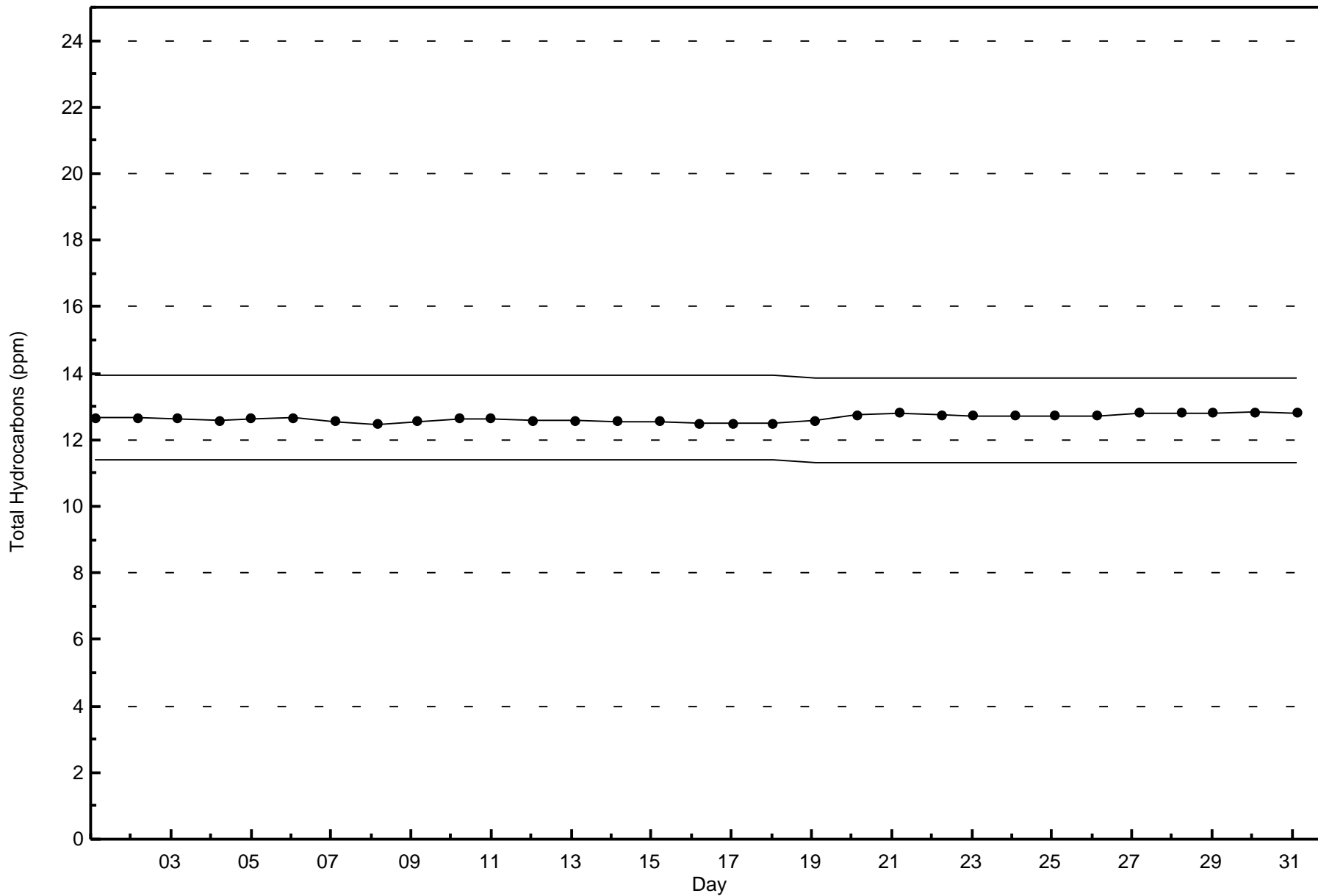


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Stony Mountain (AMS 18)





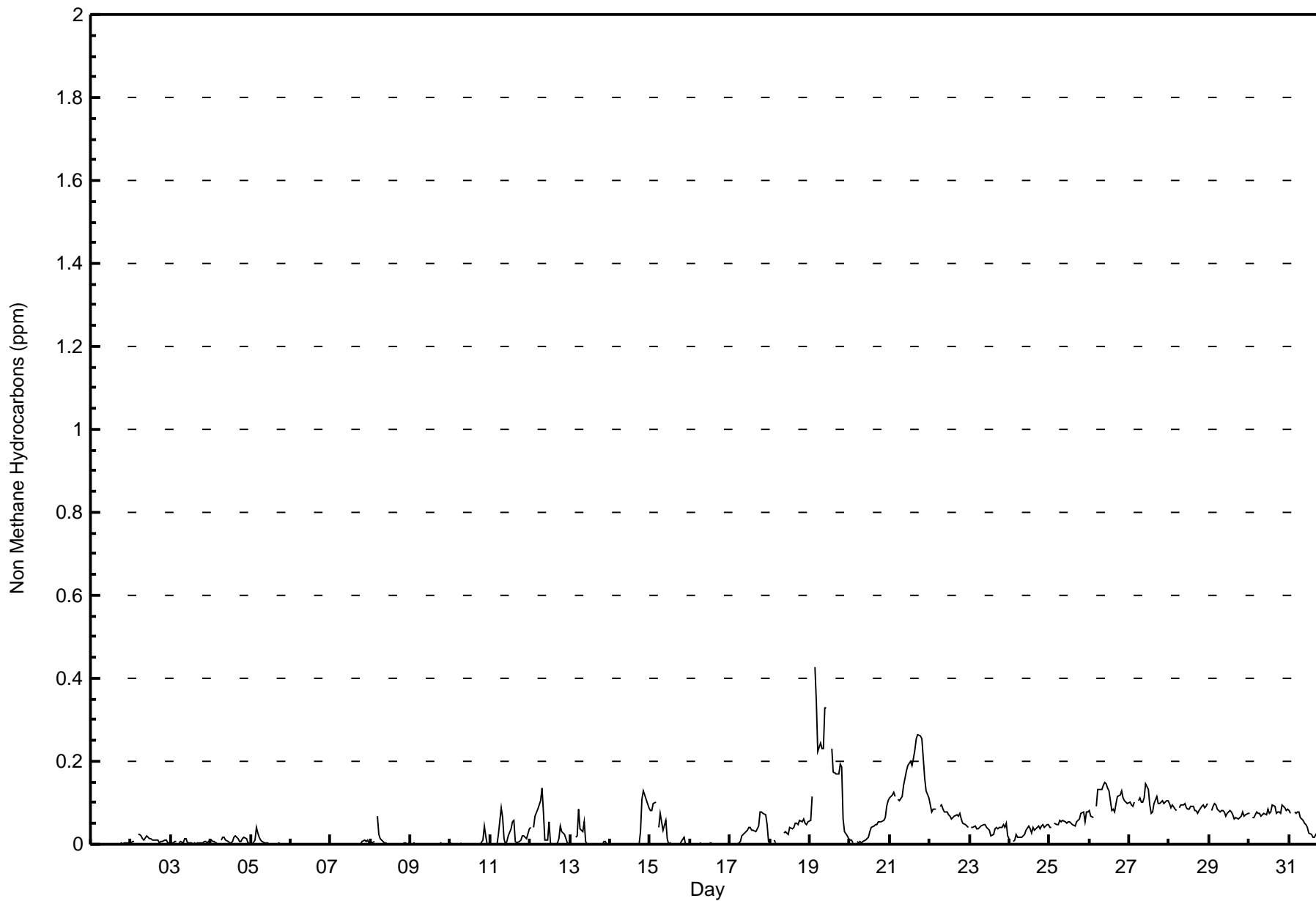




Summary of Hour Averages

Stony Mountain - May 2016

Maximum Value: 0.426 ppm on May 19 04:00		Maximum Daily Average: 0.188 ppm on May 19		Hours in Service:	744																					
Minimum Value: 0.000 ppm on May 1 01:00		Minimum Daily Average: 0.000 ppm on May 6		Hours of Data:	707																					
Maximum Diurnal Average: 0.054 ppm at hour 4		Minimum Diurnal Average: 0.034 ppm at hour 3		Hours of Missing Data:	37																					
Monthly Average: 0.042 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.3		Hours of Calibration:	35																					
				Percent Operational Time:	99.7																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	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	0.003	0.002	0.002	0.002	0.005	0.003	0.001	0.005
2-May	0.002	0.007	0.005	Z	0.023	0.024	0.021	0.013	0.010	0.021	0.016	0.013	0.013	0.009	0.009	0.011	0.009	0.004	0.008	0.006	0.010	0.009	0.003	0.003	0.011	0.024
3-May	0.002	0.002	0.006	0.006	Z	0.003	0.007	0.005	0.013	0.013	0.002	0.002	0.002	0.001	0.004	0.001	0.003	0.002	0.004	0.004	0.006	0.007	0.005	0.009	0.005	0.013
4-May	0.009	0.008	0.007	0.004	0.004	Z	0.009	0.018	0.018	0.009	0.005	0.003	0.002	0.006	0.017	0.020	0.013	0.005	0.006	0.013	0.016	0.014	0.004	0.003	0.009	0.020
5-May	Z	0.002	0.009	0.040	0.029	0.018	0.012	0.006	0.003	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.006	0.040
6-May	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	0.001	0.000	0.000	0.000	0.000	0.001
7-May	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.009	0.007	0.010	0.004	0.002	0.010
8-May	0.006	0.003	0.006	Z	0.067	0.024	0.015	0.005	0.005	0.005	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.002	0.006	0.067
9-May	0.000	0.000	0.002	0.001	Z	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	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.003
10-May	0.002	0.000	0.001	0.001	0.000	Z	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.009	0.042	0.020	0.001	0.000	0.004	0.042
11-May	Z	0.000	0.001	0.001	0.002	0.025	0.088	0.064	0.015	0.001	0.006	0.019	0.036	0.056	0.058	0.006	0.002	0.006	0.011	0.020	0.019	0.016	0.015	0.038	0.022	0.088
12-May	0.041	Z	0.042	0.067	0.086	0.095	0.104	0.136	0.077	0.009	0.010	0.054	0.002	0.000	0.000	0.002	0.004	0.013	0.043	0.030	0.022	0.014	0.003	0.002	0.037	0.136
13-May	0.014	0.014	Z	0.017	0.020	0.086	0.037	0.032	0.055	0.006	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.007	0.000	0.000	0.013	0.086
14-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.030	0.109	0.130	0.117	0.099	0.087	0.025	0.130
15-May	0.081	0.081	0.100	0.102	Z	0.040	0.075	0.054	0.035	0.057	0.012	0.001	0.002	0.001	0.000	0.000	0.000	0.001	0.000	0.006	0.017	0.002	0.000	0.001	0.029	0.102
16-May	0.000	0.001	0.002	0.001	0.000	Z	0.002	0.001	0.001	0.001	0.000	0.001	0.002	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.002
17-May	Z	0.001	0.001	0.001	0.002	0.003	0.008	0.020	0.023	0.027	0.033	0.040	0.041	0.033	0.035	0.030	0.036	0.044	0.079	0.078	0.073	0.072	0.047	0.007	0.032	0.079
18-May	0.003	Z	0.010	0.004	C	C	C	C	0.028	0.030	0.026	0.024	0.039	0.037	0.040	0.050	0.051	0.046	0.057	0.054	0.062	0.051	0.049	0.056	0.038	0.062
19-May	0.057	0.114	Z	0.426	0.343	0.224	0.243	0.229	0.229	0.330	0.327	M	M	0.232	0.174	0.172	0.170	0.170	0.192	0.187	0.061	0.032	0.021	0.015	0.188	0.426
20-May	0.011	0.009	0.004	Z	0.006	0.005	0.007	0.004	0.008	0.009	0.013	0.016	0.031	0.039	0.044	0.049	0.046	0.053	0.054	0.056	0.057	0.064	0.090	0.106	0.034	0.106
21-May	0.112	0.119	0.127	0.115	Z	0.107	0.106	0.117	0.141	0.160	0.176	0.189	0.199	0.189	0.207	0.227	0.255	0.265	0.260	0.253	0.208	0.160	0.130	0.111	0.171	0.265
22-May	0.096	0.077	0.084	0.086	0.085	Z	0.091	0.093	0.084	0.079	0.078	0.072	0.068	0.062	0.066	0.067	0.070	0.068	0.074	0.060	0.049	0.048	0.044	0.040	0.071	0.096
23-May	Z	0.041	0.039	0.044	0.037	0.037	0.042	0.044	0.046	0.047	0.040	0.038	0.033	0.020	0.023	0.036	0.040	0.037	0.041	0.039	0.047	0.040	0.050	0.021	0.038	0.050
24-May	0.013	Z	0.007	0.011	0.023	0.018	0.016	0.018	0.021	0.024	0.034	0.045	0.037	0.027	0.039	0.036	0.038	0.043	0.038	0.043	0.049	0.041	0.046	0.046	0.031	0.049
25-May	0.041	0.042	Z	0.052	0.046	0.048	0.056	0.056	0.059	0.056	0.051	0.055	0.056	0.050	0.047	0.045	0.055	0.059	0.060	0.073	0.077	0.054	0.077	0.079	0.056	0.079
26-May	0.080	0.067	0.063	Z	0.092	0.133	0.132	0.132	0.143	0.148	0.146	0.135	0.129	0.081	0.084	0.077	0.098	0.116	0.120	0.128	0.113	0.107	0.101	0.099	0.110	0.148
27-May	0.100	0.096	0.093	0.103	Z	0.106	0.114	0.103	0.100	0.113	0.144	0.131	0.096	0.074	0.078	0.097	0.117	0.099	0.097	0.100	0.105	0.097	0.105	0.106	0.103	0.144
28-May	0.097	0.089	0.094	0.085	0.083	Z	0.088	0.095	0.095	0.098	0.088	0.085	0.086	0.093	0.091	0.082	0.081	0.076	0.082	0.091	0.094	0.090	0.090	0.099	0.089	0.099
29-May	Z	0.082	0.093	0.098	0.094	0.084	0.079	0.080	0.080	0.079	0.069	0.074	0.080	0.078	0.072	0.062	0.065	0.062	0.064	0.068	0.079	0.067	0.073	0.076	0.076	0.098
30-May	0.075	Z	0.064	0.066	0.078	0.073	0.076	0.067	0.071	0.074	0.071	0.084	0.076	0.079	0.094	0.091	0.075	0.079	0.078	0.074	0.095	0.088	0.082	0.084	0.078	0.095
31-May	0.081	0.075	Z	0.077	0.075	0.077	0.077	0.065	0.057	0.051	0.046	0.040	0.027	0.023	0.017	0.016	0.024	0.020	0.025	0.019	0.019	0.011	0.013	0.015	0.041	0.081
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	259	36.63	36.63
0.006 - 0.05	217	30.69	67.33
0.06 - 0.1	203	28.71	96.04
> 0.1	28	3.96	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	10	8	8	6	1	0	3	2	10	39	27	14	42	24	54	11	259
0.006 - 0.05	12	15	29	15	4	4	9	11	4	25	22	11	19	21	14	2	217
0.06 - 0.1	13	35	25	12	7	19	17	2	6	18	9	2	4	10	18	5	202
> 0.1	2	12	14	0	0	0	0	0	0	0	0	0	0	0	0	0	28
Totals	37	70	76	33	12	23	29	15	20	82	58	27	65	55	86	18	706

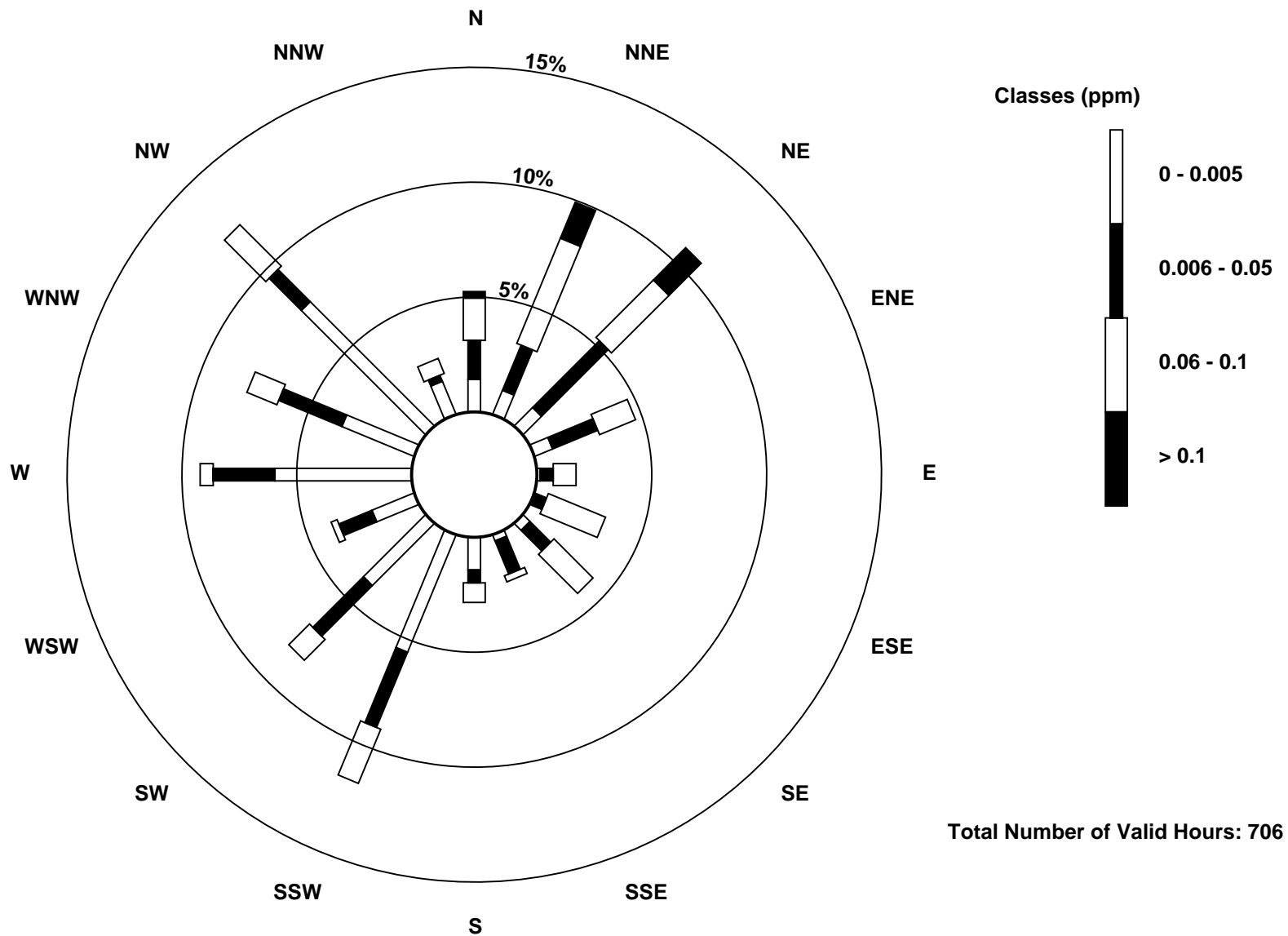
Total Number of Valid Hours: 706

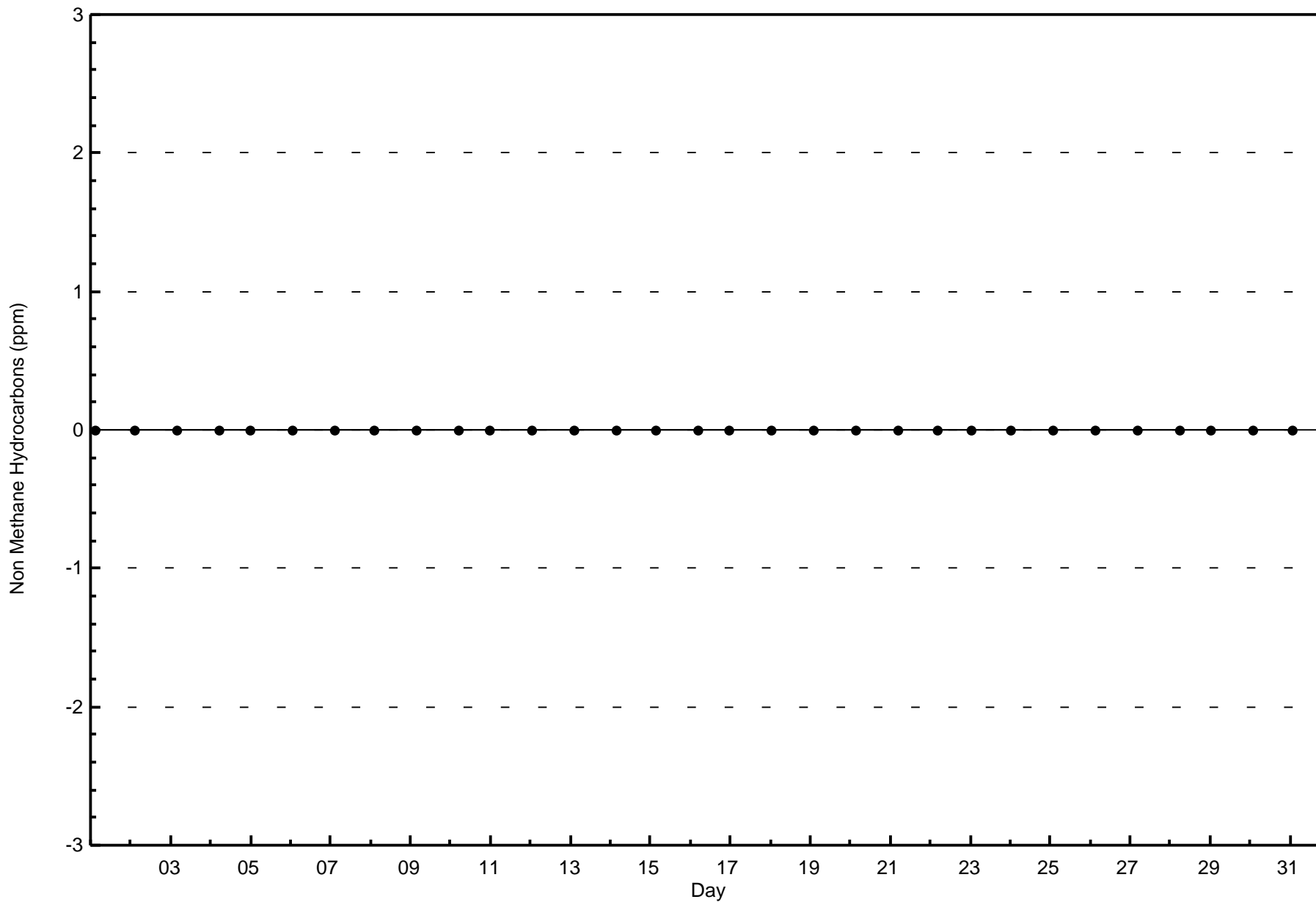
Total Number of Hours: 744

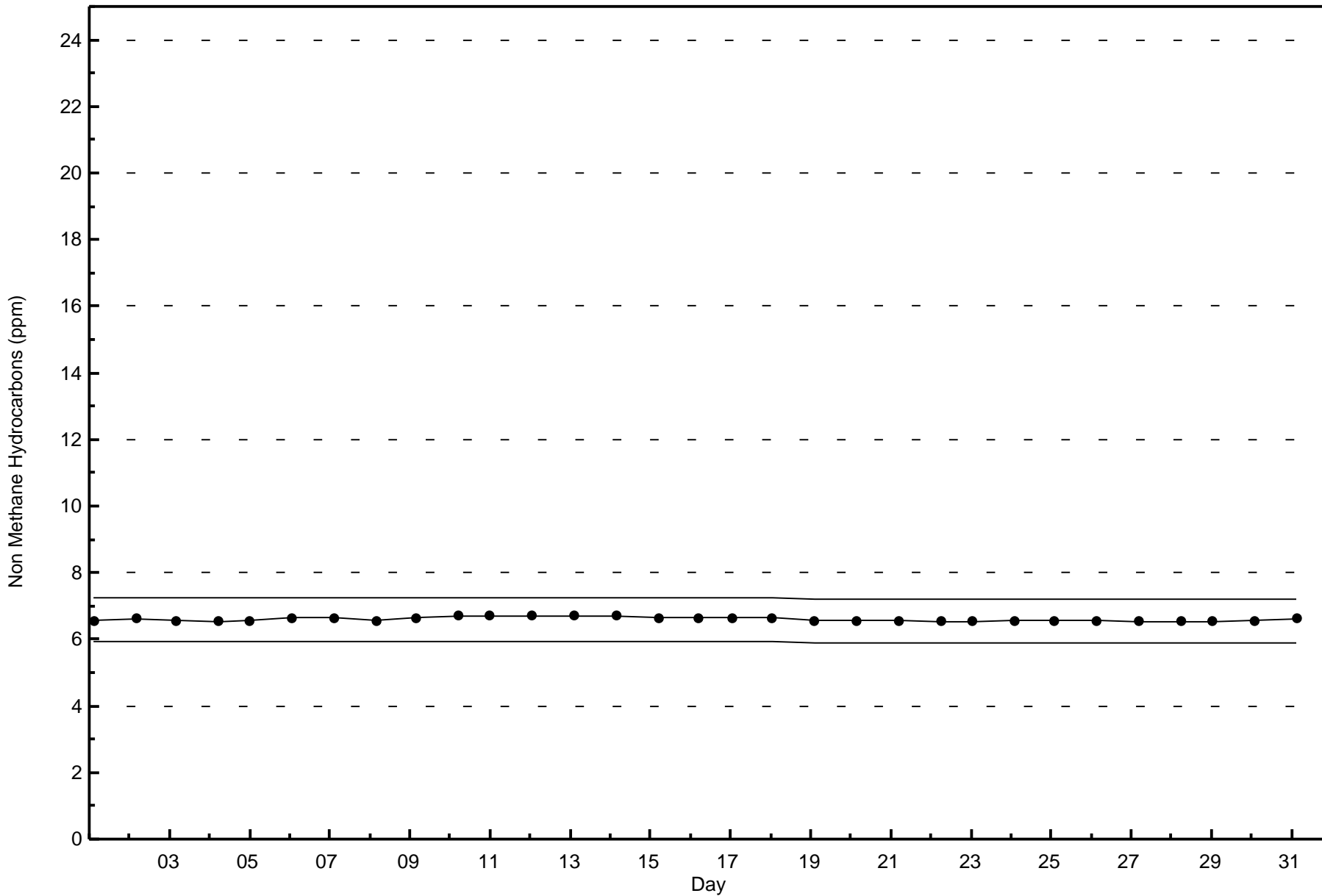


Wood Buffalo Environmental Association
Wind Rose May 2016

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain (AMS 18)



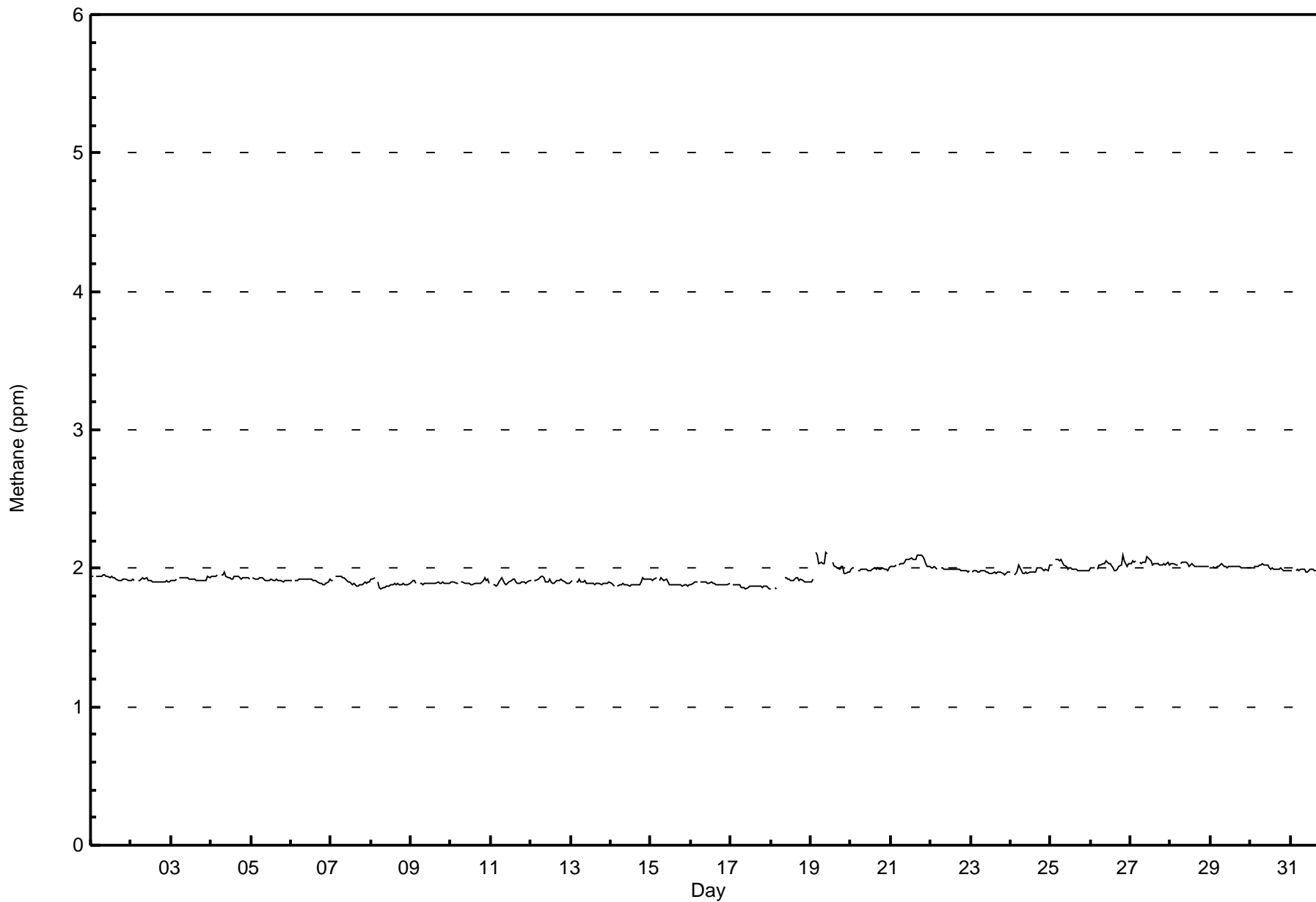






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Stony Mountain - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	681	96.32	96.32
2.1 - 3.0	26	3.68	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Stony Mountain - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	62	70	29	12	21	29	15	20	78	58	27	65	55	86	18	680
2.1 - 3.0	2	8	6	4	0	2	0	0	0	4	0	0	0	0	0	0	26
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	37	70	76	33	12	23	29	15	20	82	58	27	65	55	86	18	706

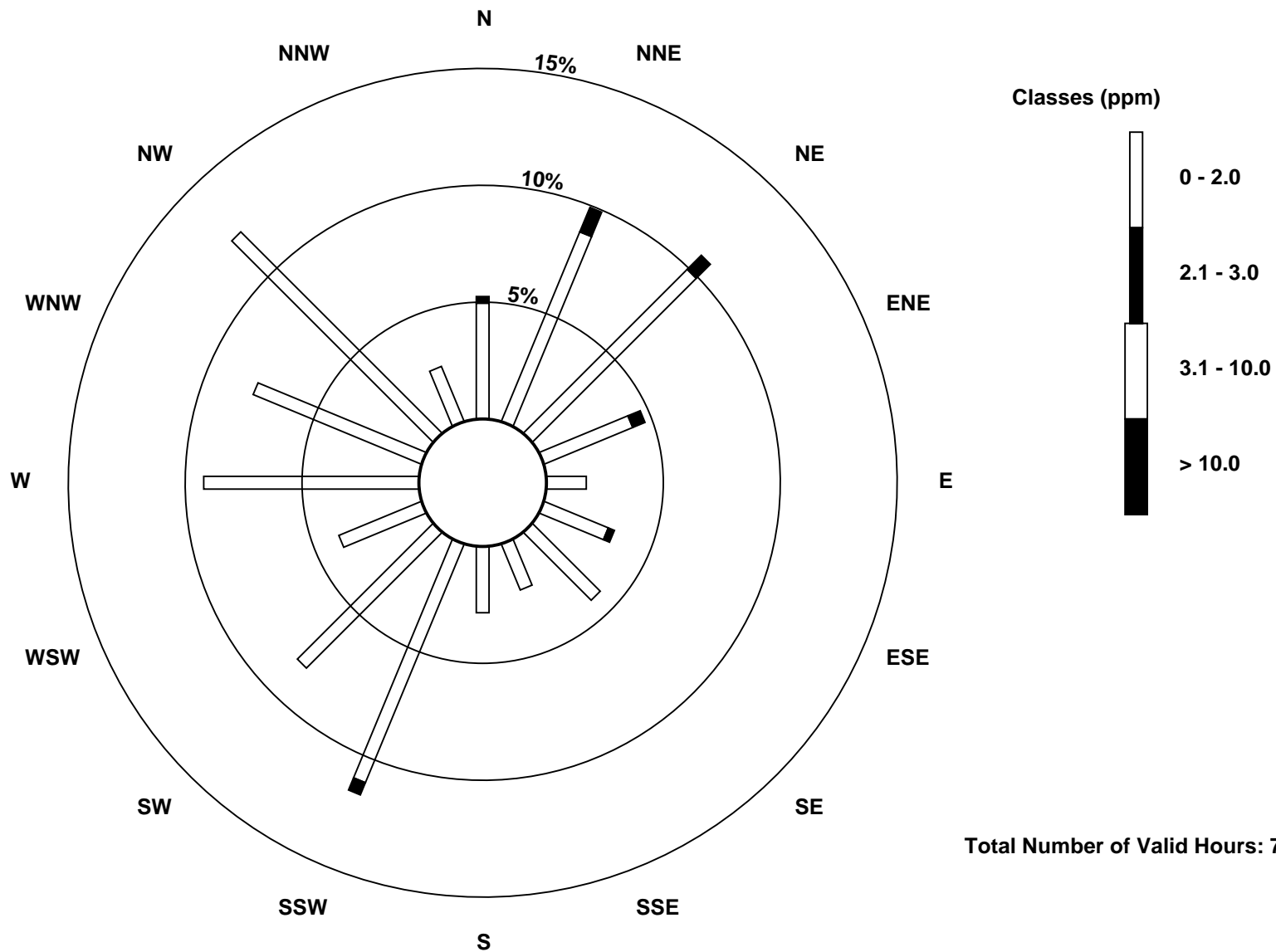
Total Number of Valid Hours: 706

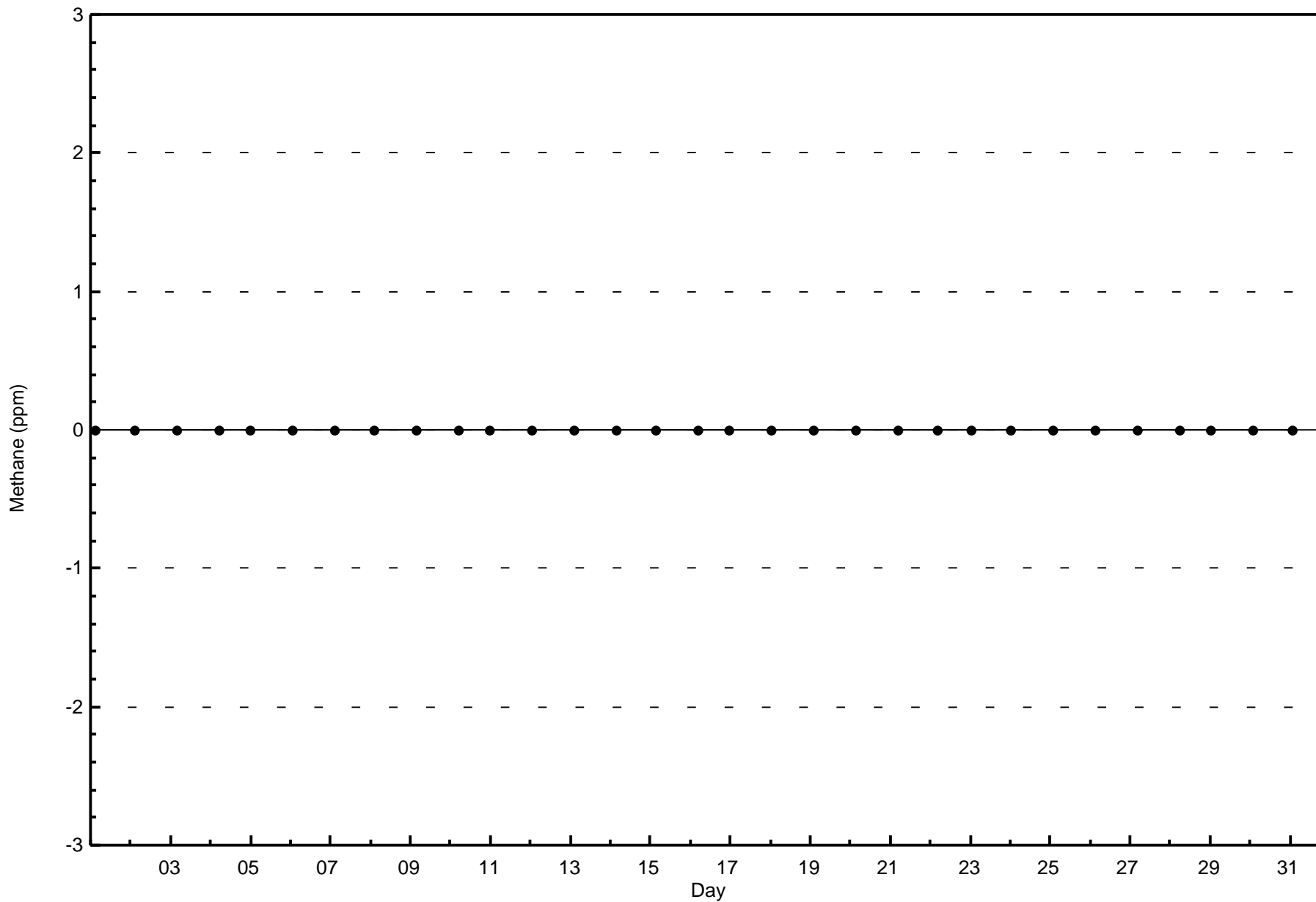
Total Number of Hours: 744

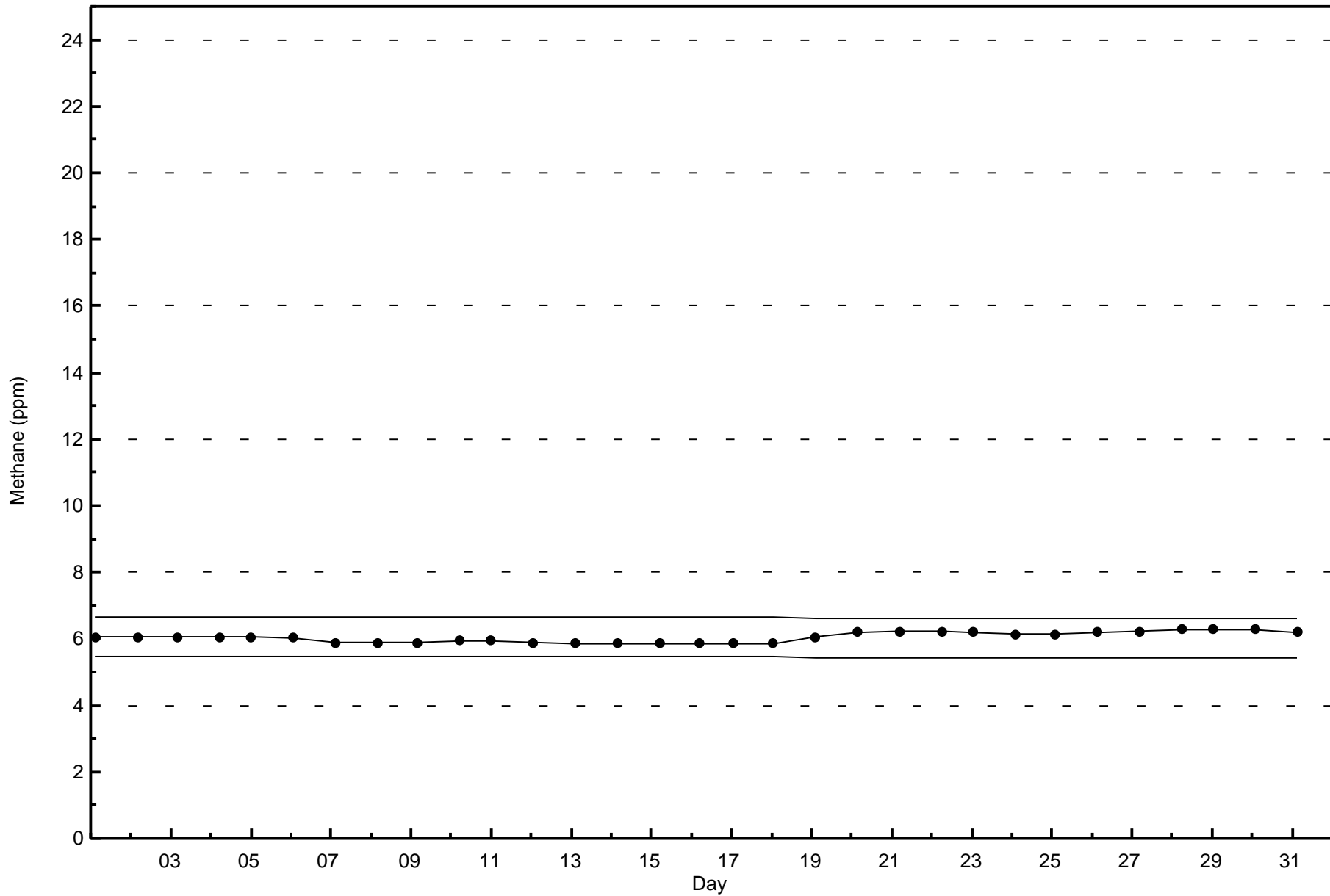


Wood Buffalo Environmental Association
Wind Rose May 2016

Methane (CH₄) - ppm
Stony Mountain (AMS 18)







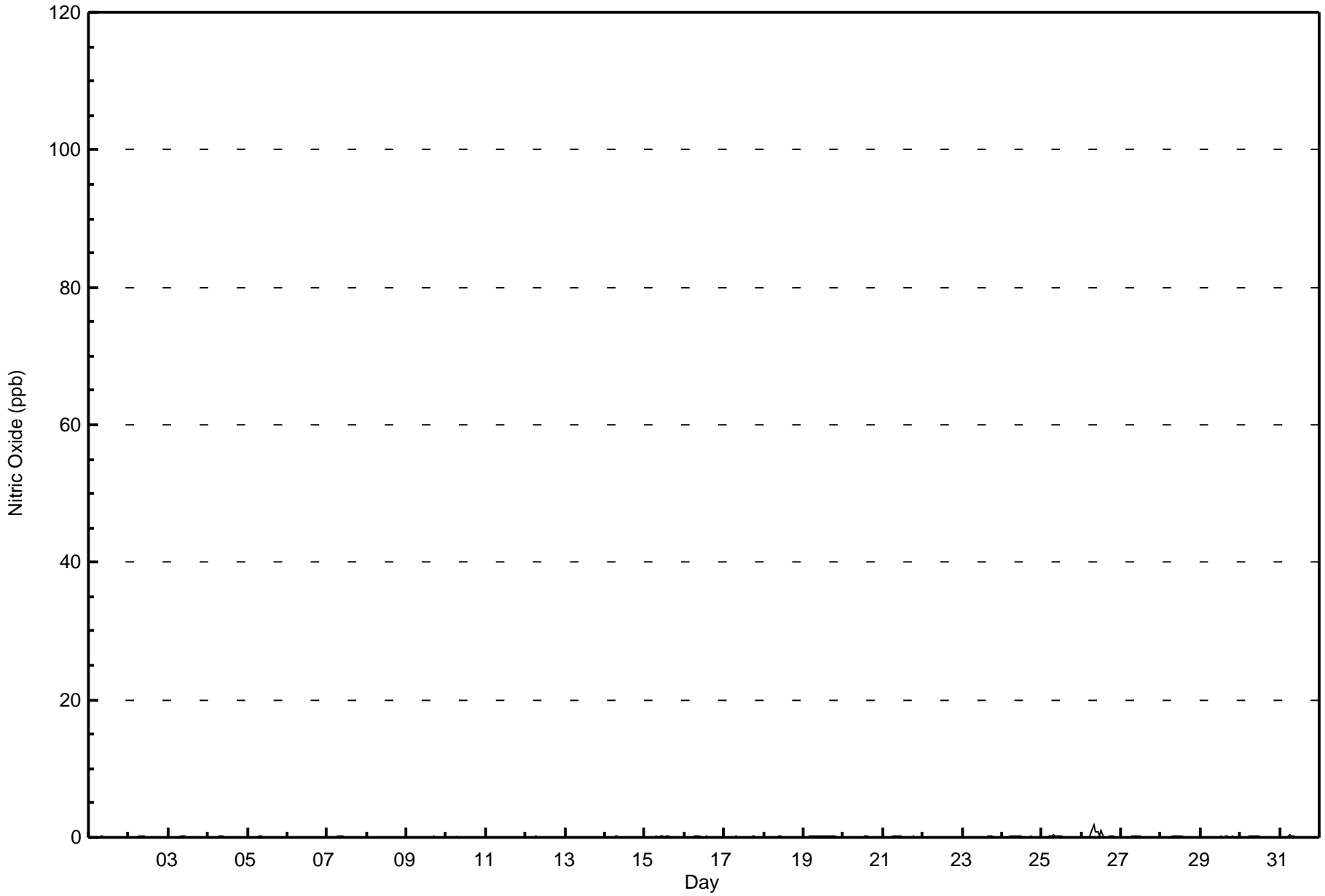


Maximum Value: 2 ppb on May 26 08:00																		Maximum Daily Average: 0.3 ppb on May 26						Hours in Service: 744			
Minimum Value: 0 ppb on May 11 03:00																		Minimum Daily Average: 0.0 ppb on May 8						Hours of Data: 709			
Maximum Diurnal Average: 0.2 ppb at hour 8																		Minimum Diurnal Average: 0.0 ppb at hour 24						Hours of Missing Data: 35			
Monthly Average: 0.1 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0						Hours of Calibration: 35			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-May	0	0	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
4-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-May	Z	0	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
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-May	0	0	0	Z	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-May	Z	0	0	0	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-May	0	Z	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-May	0	0	0	Z	0	0	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-May	Z	0	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-May	0	Z	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
31-May	0	0	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
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Stony Mountain - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	37	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	708

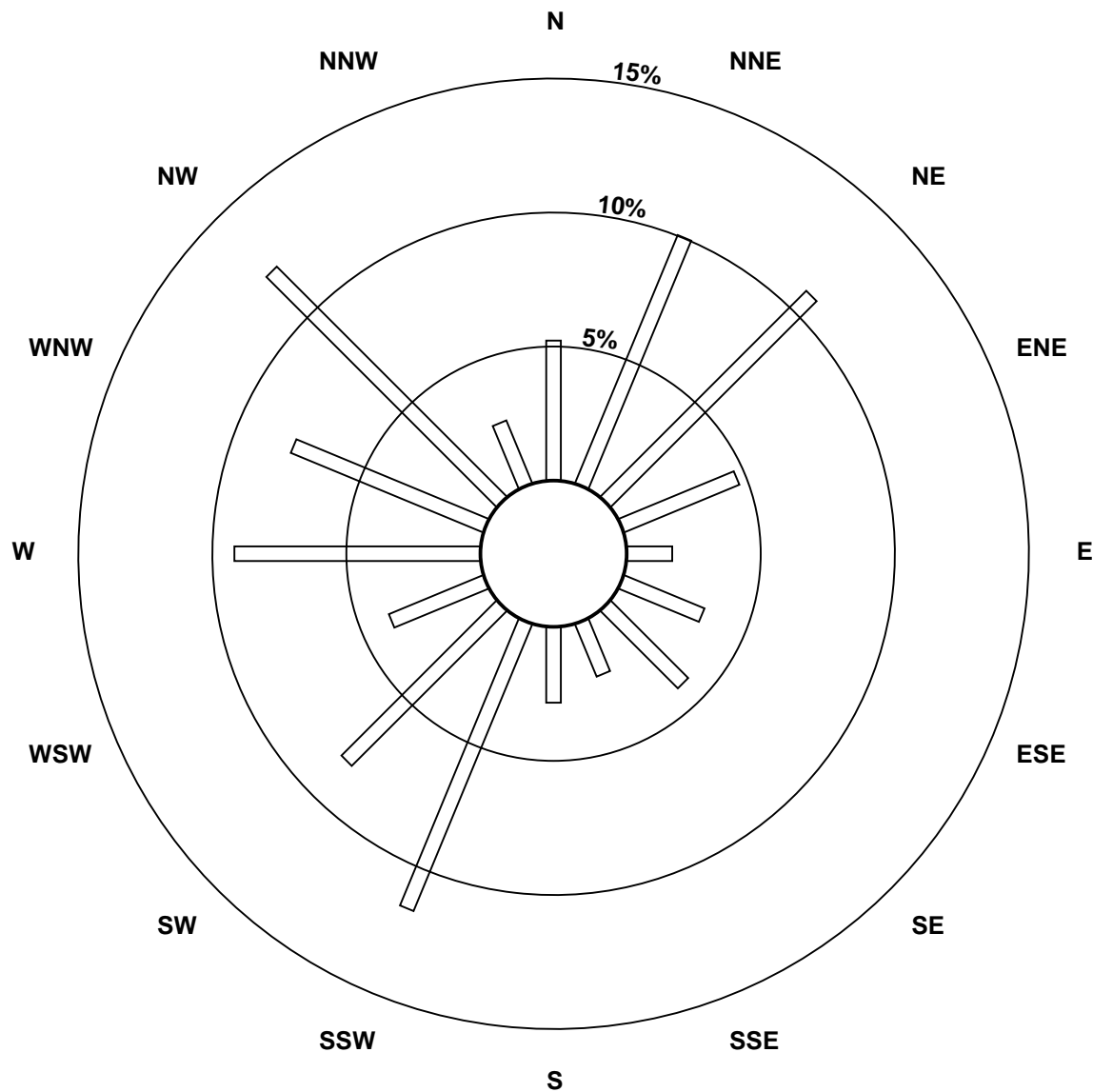
Total Number of Valid Hours: 708

Total Number of Hours: 744

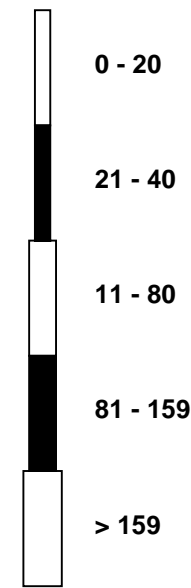


Wood Buffalo Environmental Association
Wind Rose May 2016

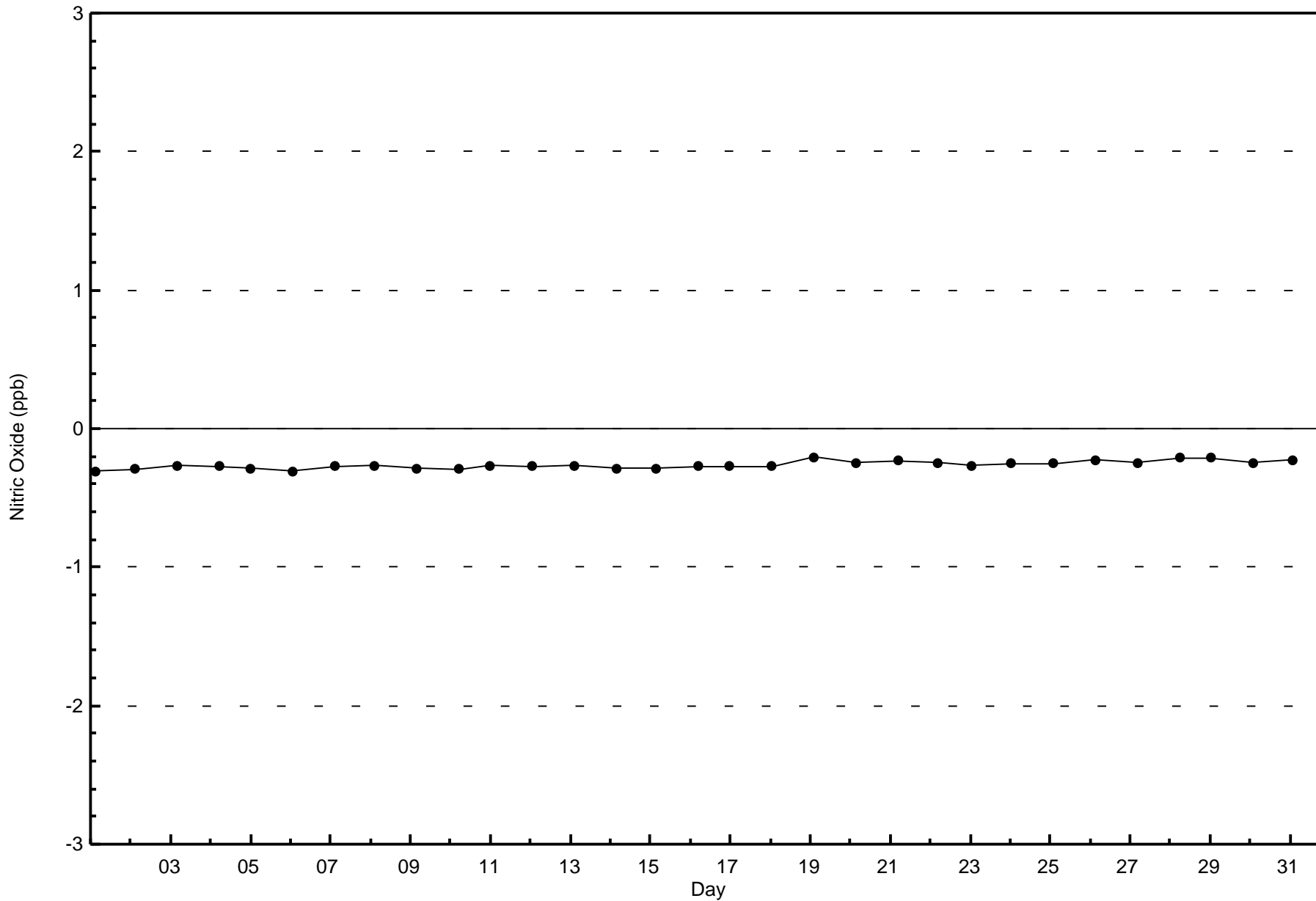
Nitric Oxide (NO) - ppb
Stony Mountain (AMS 18)



Classes (ppb)



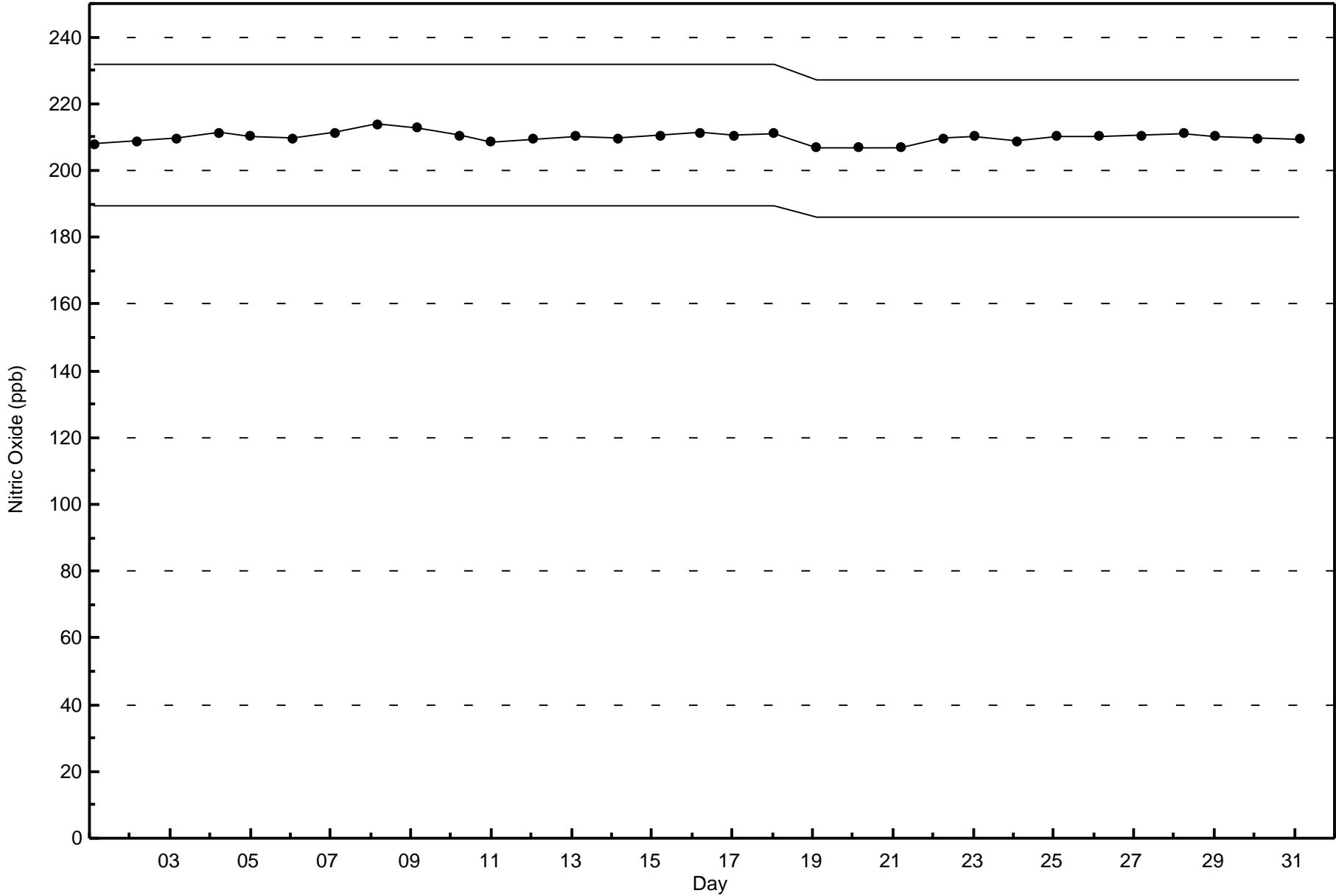
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Stony Mountain - May 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Stony Mountain - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 11 ppb on May 19 04:00	Maximum Daily Average: 3.7 ppb on May 19		Hours of Data:	709
Minimum Value: 0 ppb on May 9 03:00	Minimum Daily Average: 0.2 ppb on May 9		Hours of Missing Data:	35
Maximum Diurnal Average: 1.7 ppb at hour 4	Minimum Diurnal Average: 0.9 ppb at hour 15		Hours of Calibration:	35
Monthly Average: 1.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 6		Percent Operational Time:	100.0

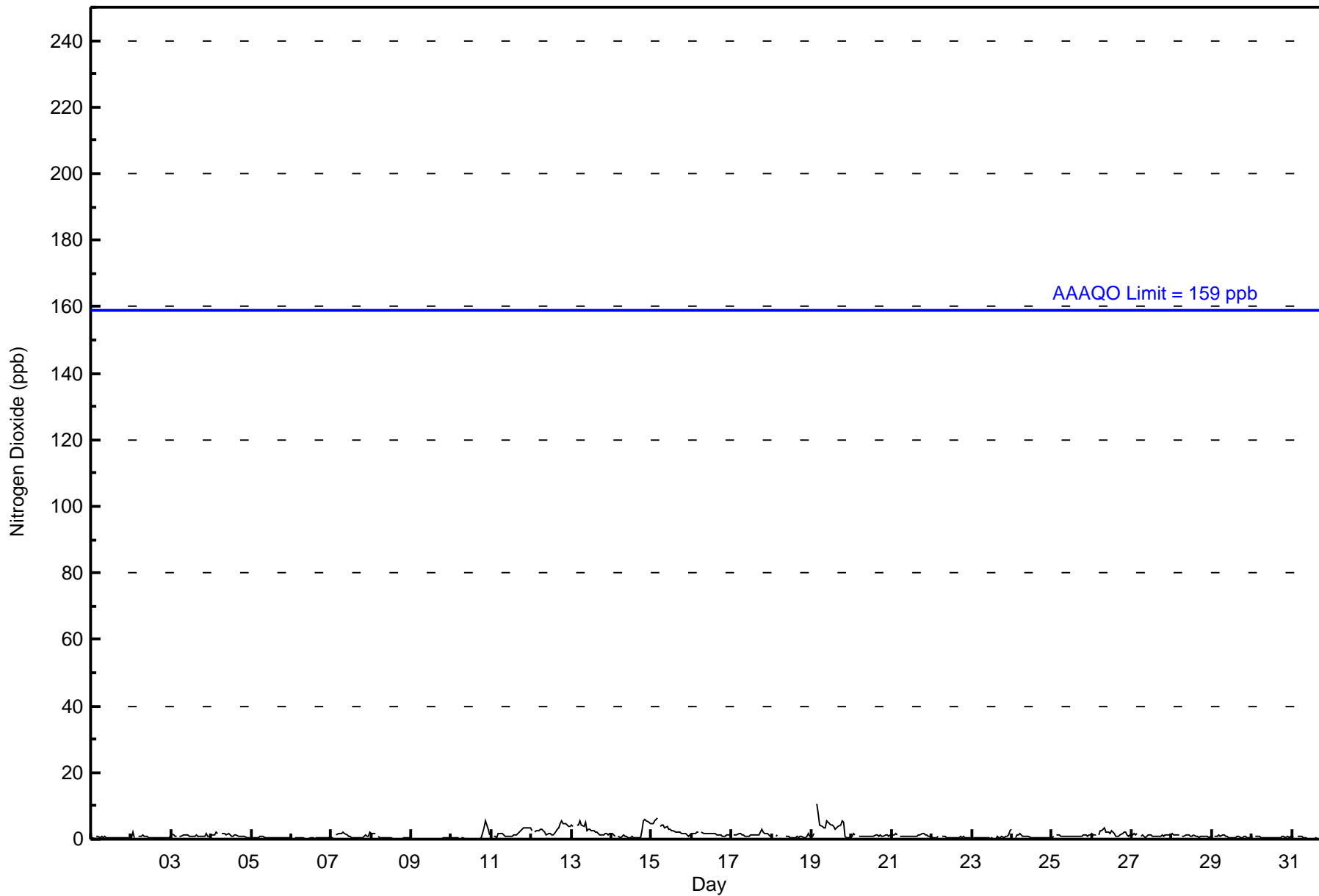
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1
2-May	1	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	0.7	2
3-May	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1.1	2
4-May	1	1	1	2	2	Z	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
5-May	Z	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0.5	1
6-May	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
7-May	1	1	Z	1	2	2	2	2	2	1	1	1	1	1	0	0	1	1	1	1	1	1	1	2	1.0	2
8-May	2	2	2	Z	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0.6	2
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
10-May	0	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	4	3	1	1.0	6
11-May	Z	1	1	1	2	2	2	1	1	1	1	1	1	1	1	2	3	3	3	4	3	3	4	1.7	4	
12-May	3	Z	2	3	3	3	3	3	2	1	2	2	1	1	2	3	4	5	5	5	5	4	4	4	2.9	5
13-May	4	4	Z	4	4	6	4	4	5	3	3	3	3	3	2	2	2	1	1	1	2	2	1	2	2.8	6
14-May	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	6	6	6	5	5	1.8	6
15-May	5	5	5	6	Z	4	4	4	4	4	3	3	3	2	2	2	2	2	2	2	1	1	1	1	3.0	6
16-May	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1.5	2
17-May	Z	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	2	1	1	1.4	3
18-May	1	Z	1	1	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	0.8	2
19-May	1	2	Z	11	8	4	4	3	4	5	5	4	4	4	3	3	4	4	6	5	1	1	1	1	3.7	11
20-May	1	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
21-May	1	1	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1.1	2
22-May	1	1	1	1	1	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
23-May	Z	0	1	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	3	0.6	3	
24-May	3	Z	0	1	1	2	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0.8	3
25-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1
26-May	2	1	1	Z	1	2	3	3	2	2	2	2	3	2	1	1	1	1	2	2	2	1	1	1	1.7	3
27-May	1	2	1	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
28-May	2	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	2
29-May	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0.7	1
30-May	1	Z	1	1	1	1	1	0	0	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	0.6	1
31-May	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
1.4 1.3 1.2 1.7 1.5 1.5 1.4 1.3 1.2 1.1 1.1 1.0 1.0 0.9 0.9 0.9 1.0 1.1 1.3 1.4 1.4 1.3 1.2 1.2																								Diurnal Average		
5 5 5 11 8 6 4 4 5 5 5 4 4 4 3 3 4 5 6 6 6 6 6 5 5																								Diurnal Maximum		

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	37	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	708

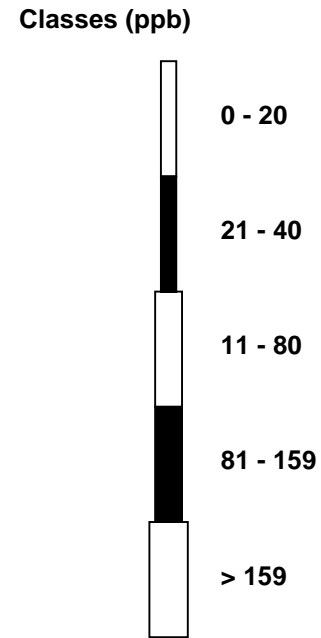
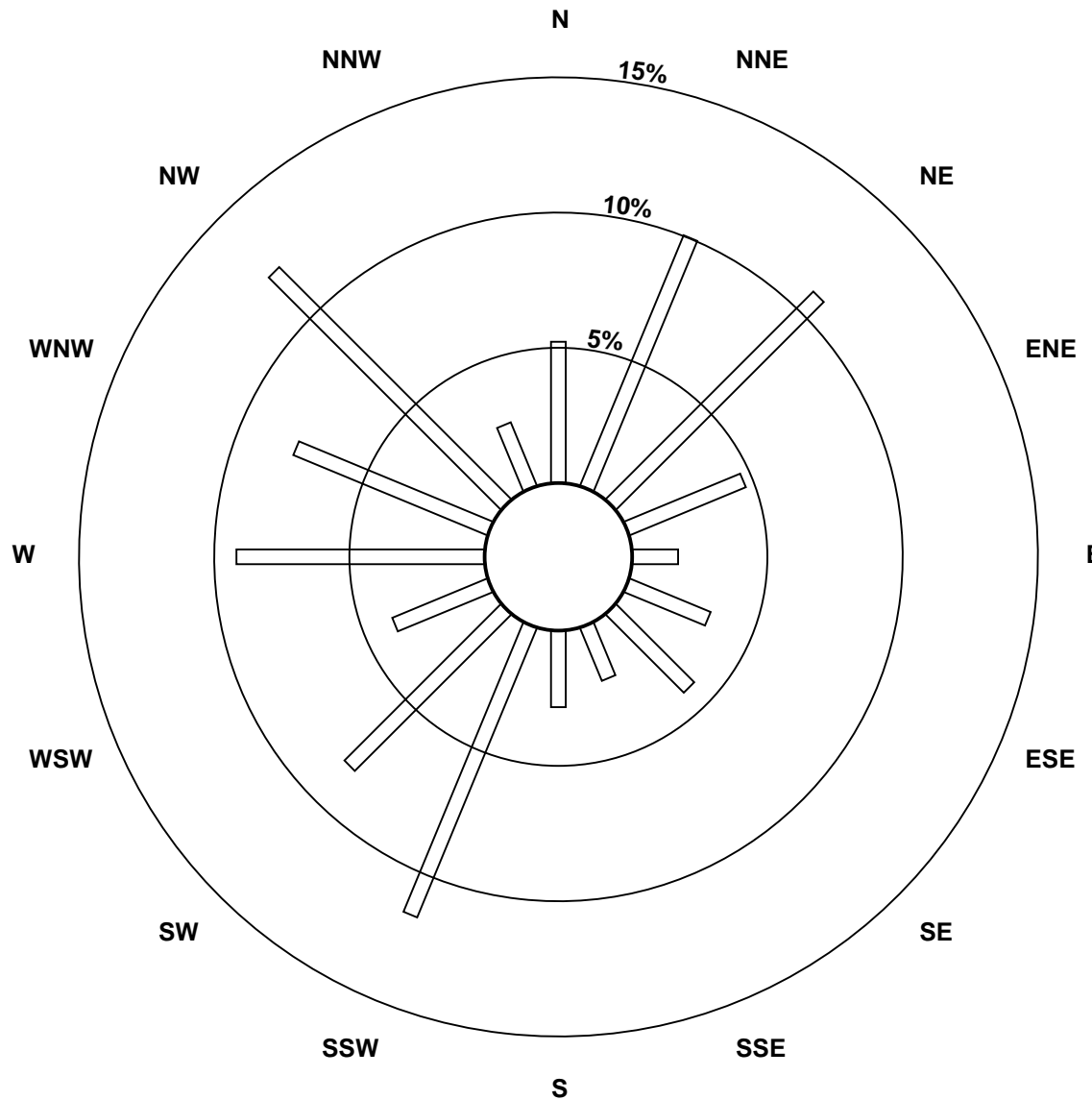
Total Number of Valid Hours: 708

Total Number of Hours: 744

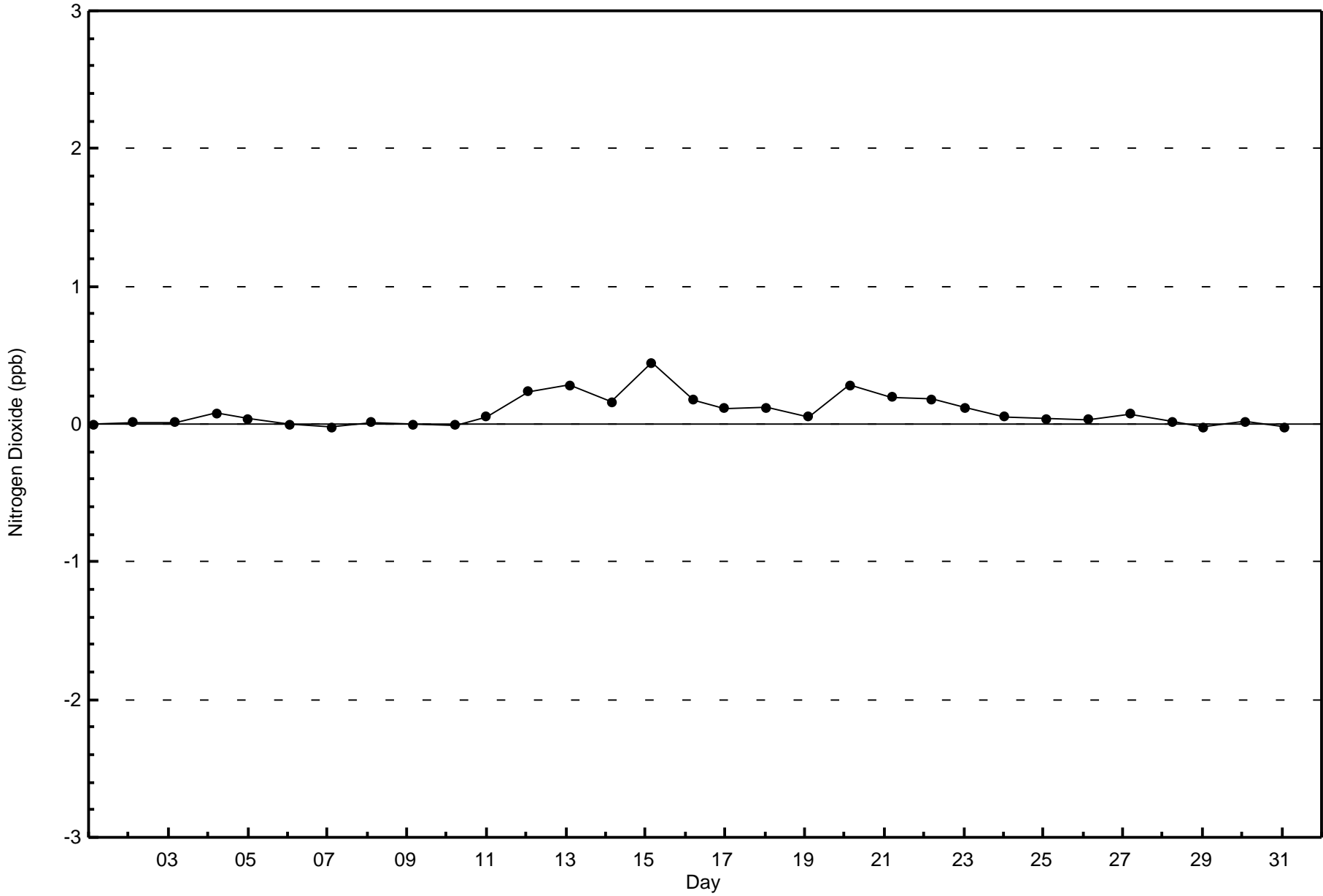


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain (AMS 18)



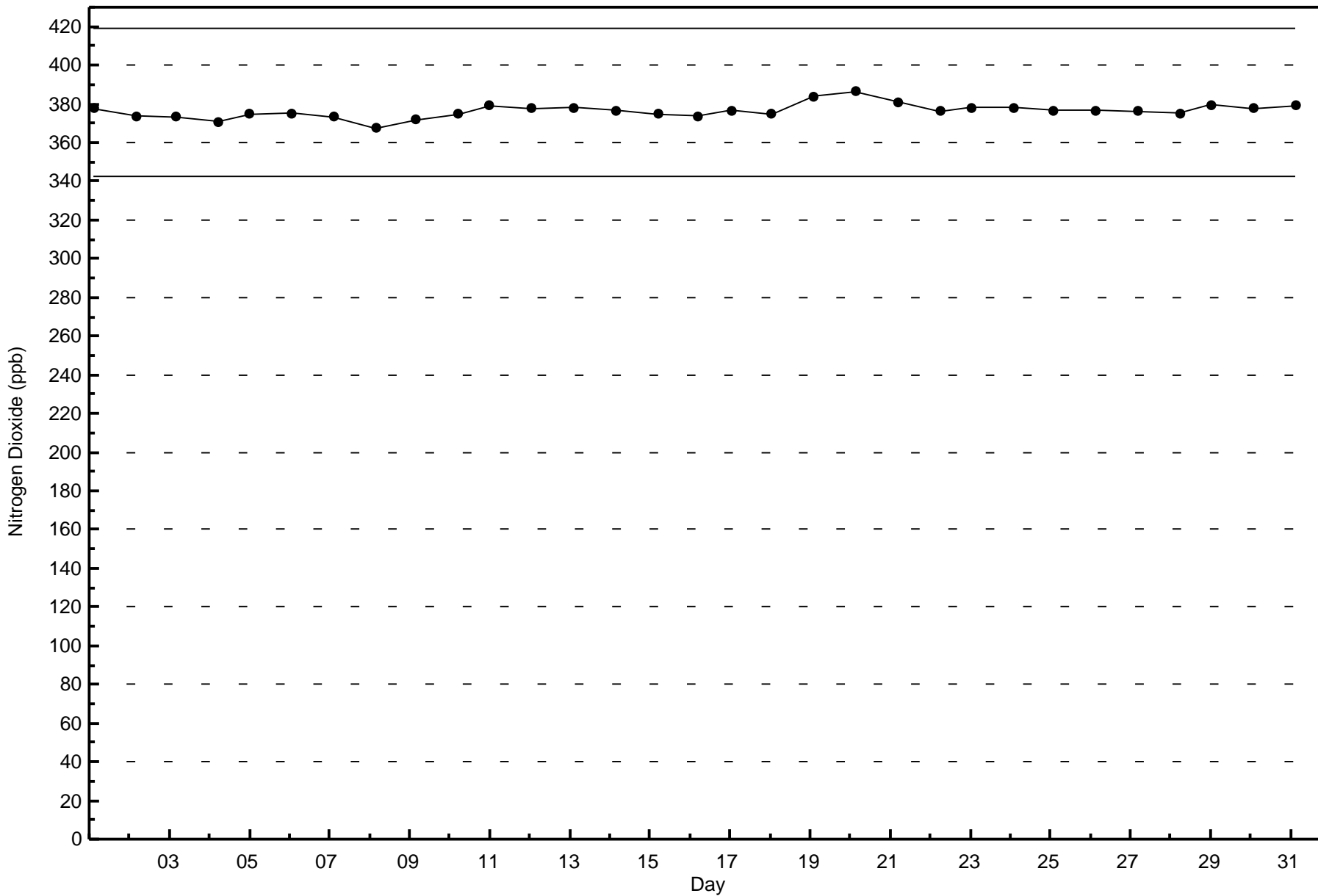
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - May 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

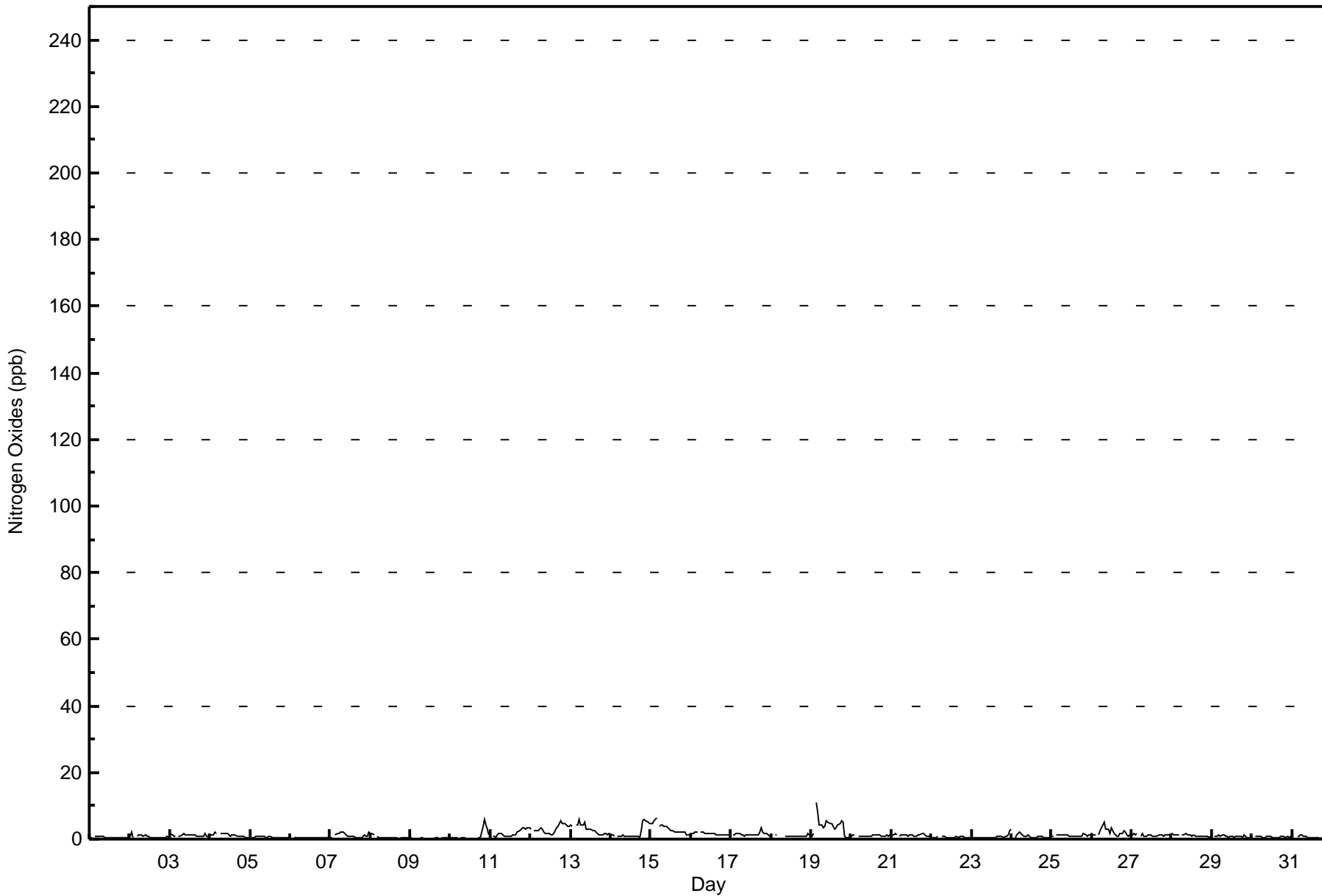
Stony Mountain - May 2016

Maximum Value: 11 ppb on May 19 04:00		Maximum Daily Average: 3.8 ppb on May 19		Hours in Service: 744																																												
Minimum Value: 0 ppb on May 9 13:00		Minimum Daily Average: 0.2 ppb on May 9		Hours of Data: 709																																												
Maximum Diurnal Average: 1.8 ppb at hour 4		Minimum Diurnal Average: 1.0 ppb at hour 15		Hours of Missing Data: 35																																												
Monthly Average: 1.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 1 P ₉₀ = 3 P ₉₉ = 6		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-May	1	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	0	0	0	0	0.6	1																						
2-May	1	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0.8	2																						
3-May	2	1	1	1	Z	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1.1	2																						
4-May	1	1	1	2	2	Z	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2																						
5-May	Z	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	1	0	0	0	0	1	0	1	0.6	1																						
6-May	1	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.4	1																						
7-May	1	1	Z	1	2	2	2	2	2	1	1	1	1	1	0	0	1	1	1	1	1	1	1	2	1.1	2																						
8-May	2	2	1	Z	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2																						
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
10-May	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	4	3	1	1.0	6																						
11-May	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2	3	3	3	4	3	3	4	1.8	4																							
12-May	3	Z	2	2	3	3	3	3	2	2	1	2	1	1	2	3	4	5	5	5	5	4	4	4	3.0	5																						
13-May	4	4	Z	4	4	6	4	4	5	3	3	3	3	2	2	2	1	1	1	2	2	1	2	2.9	6																							
14-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	6	6	6	5	5	1.9	6																						
15-May	5	5	5	6	Z	4	4	4	4	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1	3.1	6																						
16-May	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1.6	2																						
17-May	Z	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	2	1	1	1.5	3																						
18-May	1	Z	1	1	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	0.9	2																						
19-May	1	2	Z	11	8	4	4	3	4	5	5	5	4	4	3	4	4	4	6	5	1	1	1	1	3.8	11																						
20-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1																						
21-May	1	1	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1.2	2																						
22-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0.6	1																						
23-May	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	3	0.7	3																							
24-May	3	Z	0	1	1	2	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0.9	3																						
25-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.1	2																						
26-May	2	1	1	Z	1	3	3	5	3	3	3	2	3	2	1	1	1	2	2	2	2	1	1	1	2.1	5																						
27-May	1	2	1	2	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2																						
28-May	2	1	1	1	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2																						
29-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.8	1																						
30-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0.7	1																						
31-May	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
																								1.4	1.3	1.2	1.8	1.5	1.6	1.5	1.5	1.4	1.3	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.3	1.5	1.5	1.3	1.2	1.3	Diurnal Average
																								5	5	5	11	8	6	4	5	5	5	5	5	4	4	3	4	4	5	6	6	6	6	5	5	Diurnal Maximum
Z - zerospan		C - Calibration																																														



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	37	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	71	77	33	12	23	29	15	20	82	58	27	65	55	86	18	708

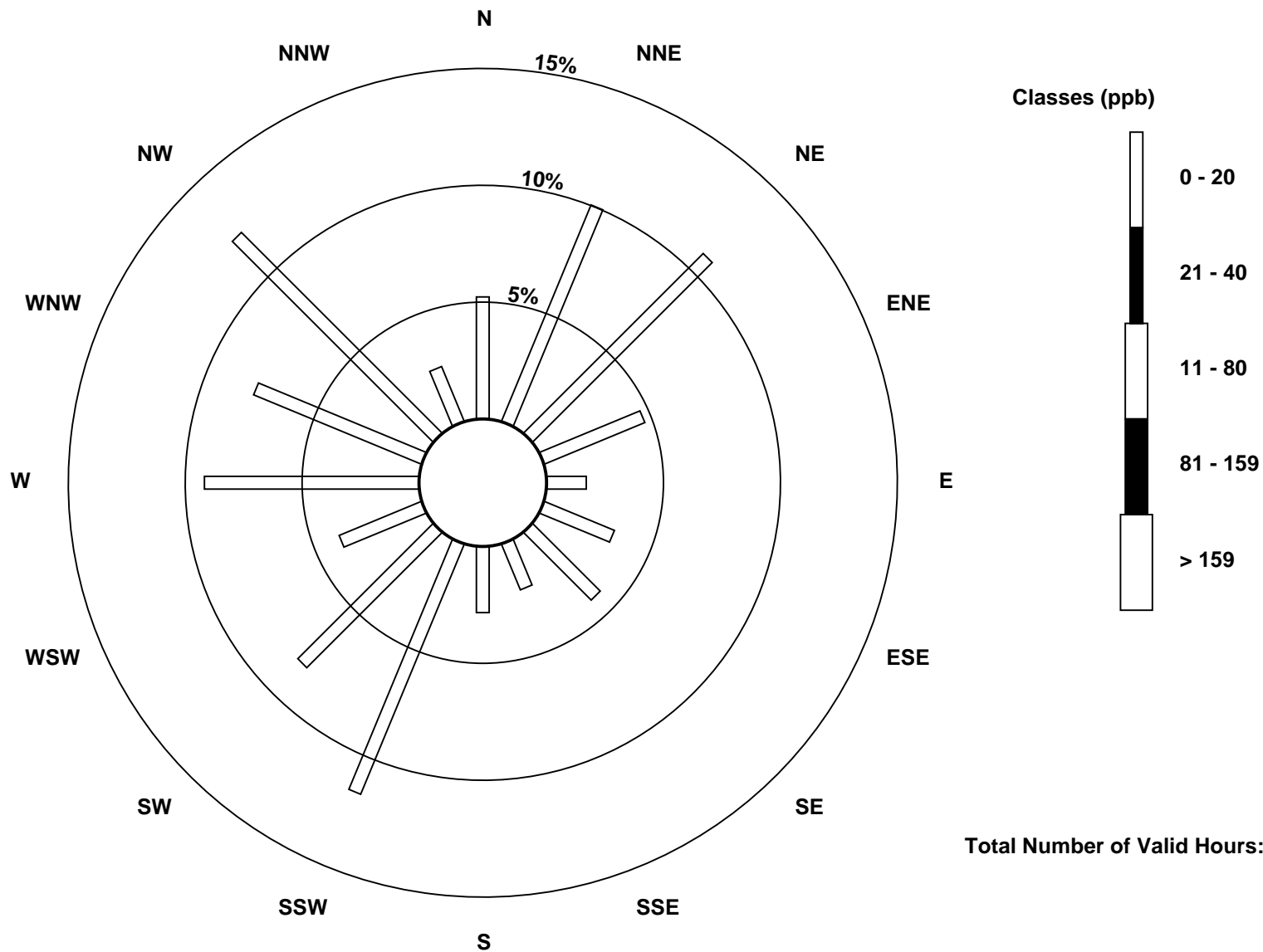
Total Number of Valid Hours: 708

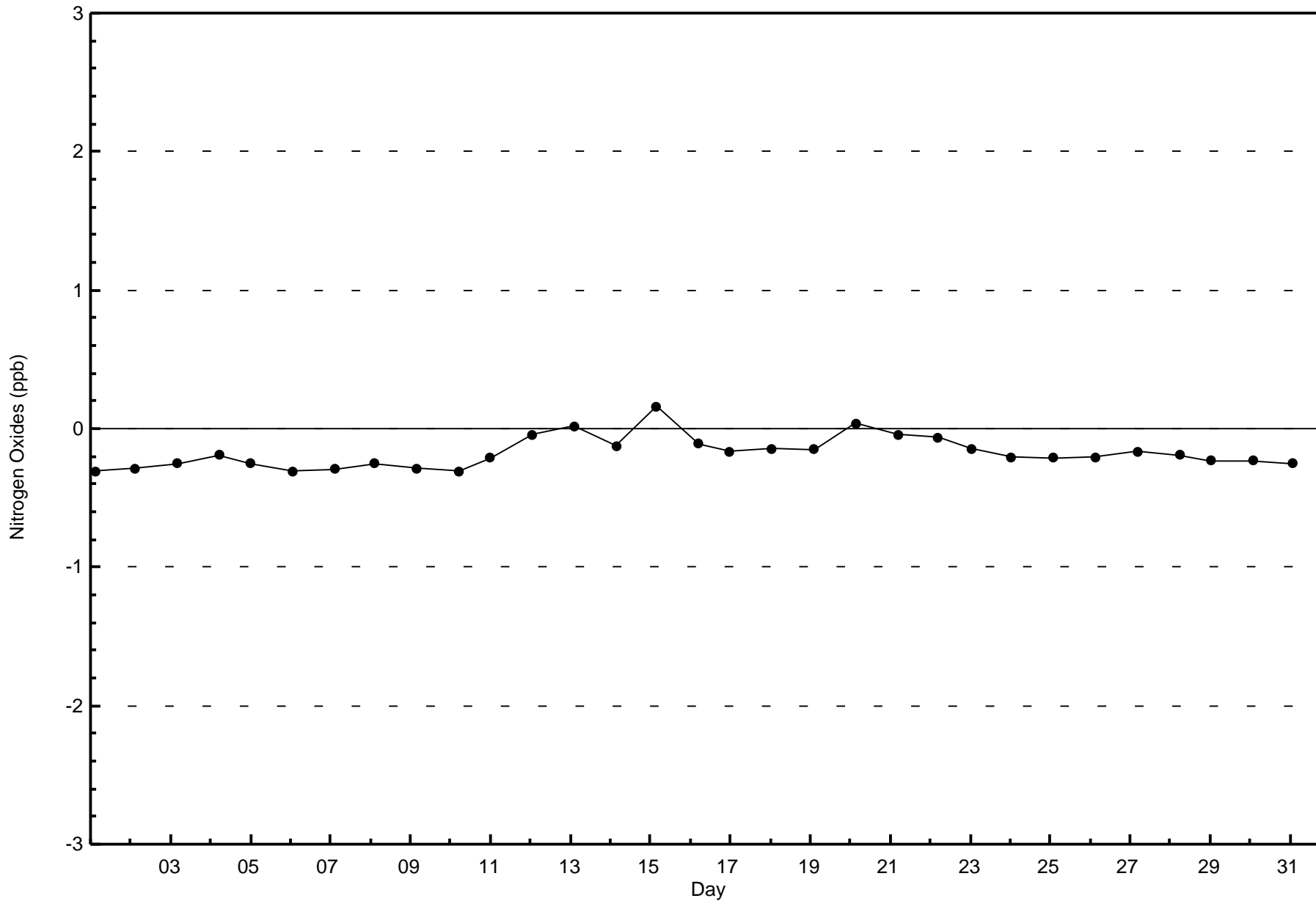
Total Number of Hours: 744

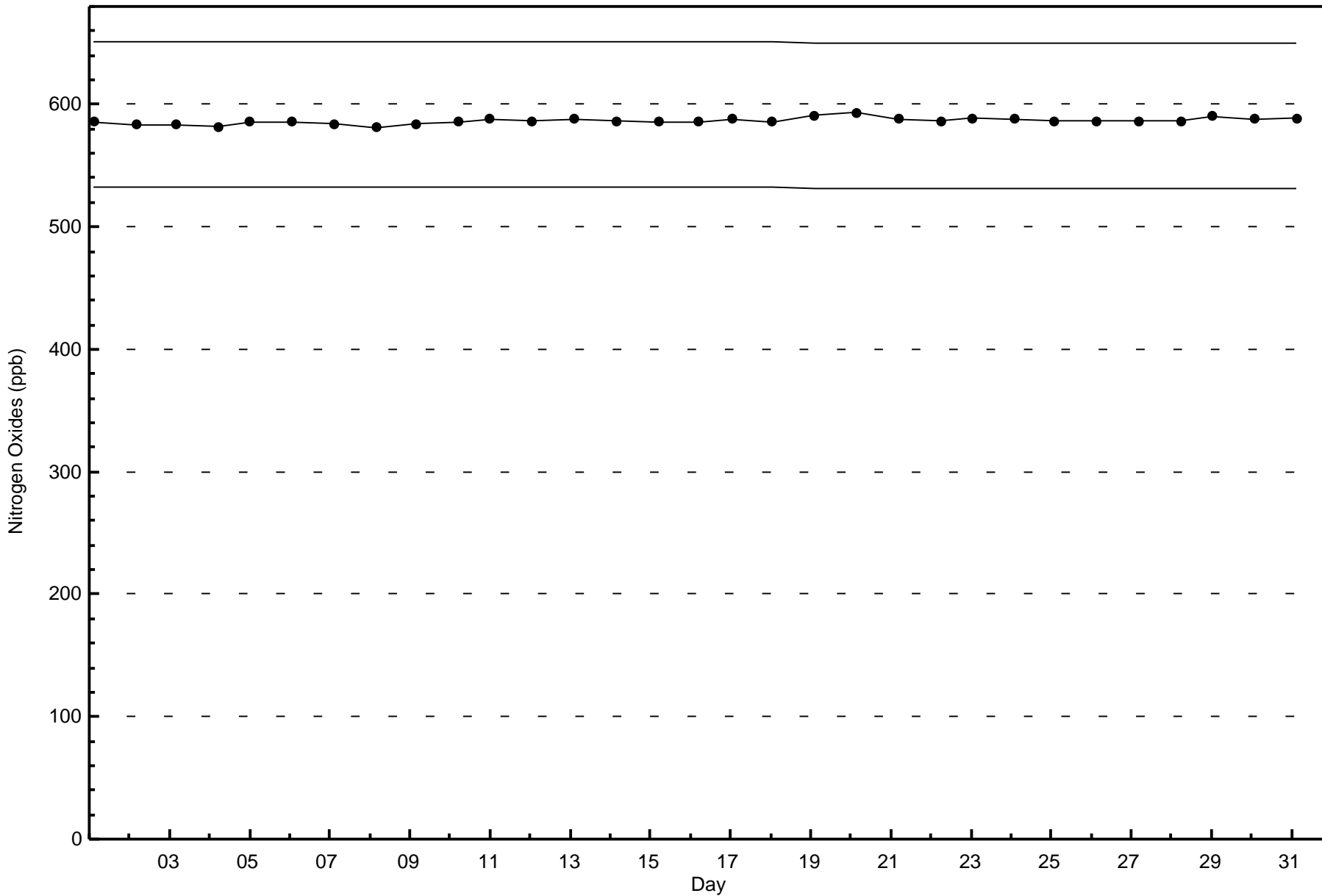


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

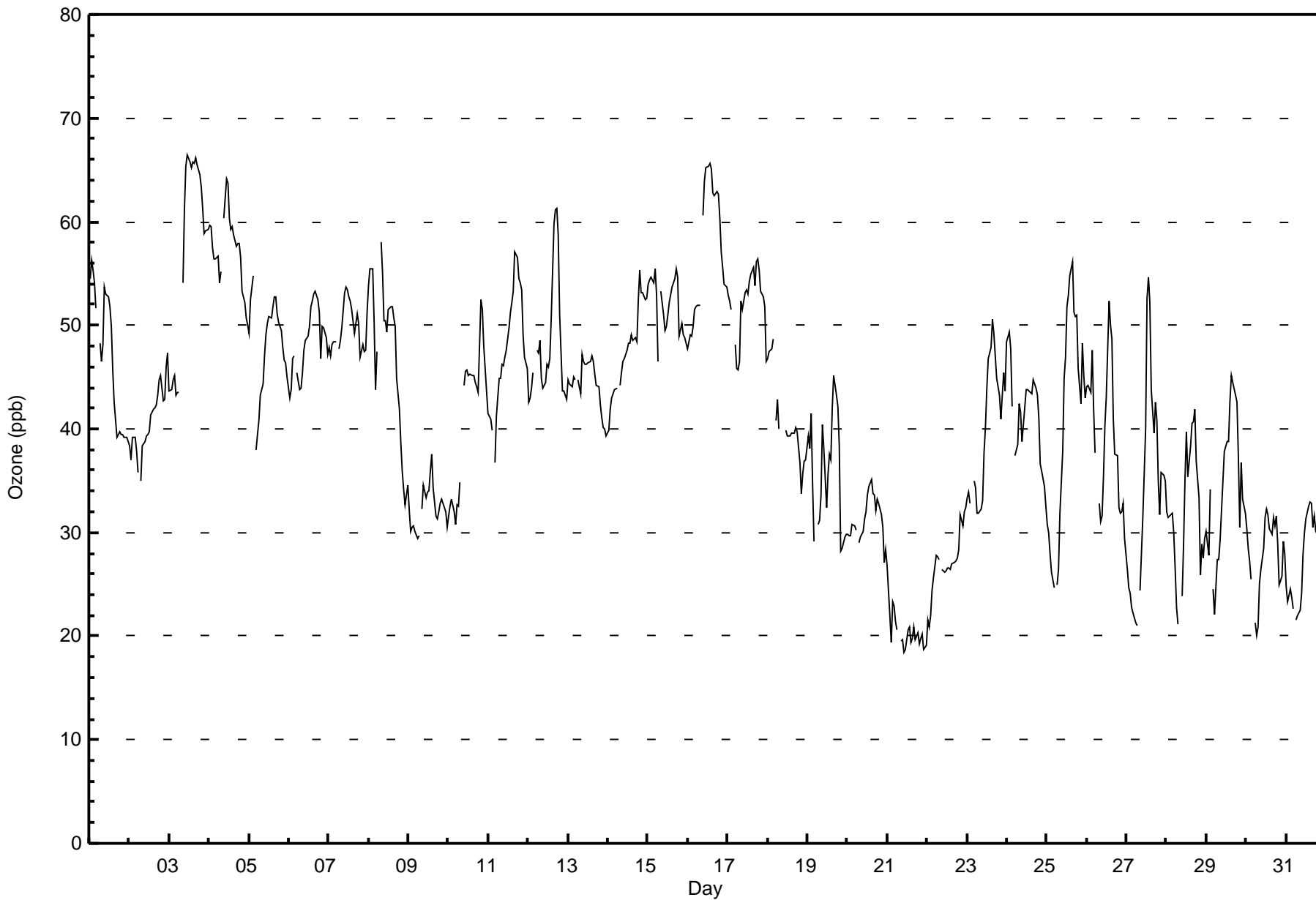
Stony Mountain - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 66 ppb on May 3 12:00										Maximum Daily Average: 57.4 ppb on May 16										Hours of Data: 710																													
Minimum Value: 18 ppb on May 21 11:00										Minimum Daily Average: 20.5 ppb on May 21										Hours of Missing Data: 34																													
Maximum Diurnal Average: 46.1 ppb at hour 16										Minimum Diurnal Average: 36.6 ppb at hour 7										Hours of Calibration: 34																													
Monthly Average: 41.7 ppb										Percentiles: P ₁ = 19 P ₁₀ = 27 Q ₁ = 32 Median = 43 Q ₃ = 50 P ₉₀ = 55 P ₉₉ = 65										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	54	56	55	54	52	Z	48	47	48	54	53	53	52	50	46	43	39	39	40	39	40	39	39	39	46.9	56																							
2-May	38	37	39	39	38	36	Z	35	38	39	39	40	40	41	42	42	42	43	45	45	43	43	46	47	40.8	47																							
3-May	44	44	45	45	43	44	44	Z	54	61	65	66	66	65	66	66	66	66	64	63	61	59	59	59	57.2	66																							
4-May	60	59	58	56	56	57	54	55	Z	60	64	64	60	59	60	59	58	58	58	56	53	52	51	50	57.3	64																							
5-May	49	53	55	Z	38	39	41	43	44	47	49	50	51	51	52	53	53	51	50	49	48	47	46	45	48.0	55																							
6-May	43	44	47	47	Z	45	44	44	45	48	49	49	50	52	52	53	53	52	51	47	50	50	49	47	48.3	53																							
7-May	48	47	48	48	48	Z	48	49	50	53	54	53	53	52	52	49	50	51	50	47	48	47	48	51	49.8	54																							
8-May	54	55	56	50	44	47	Z	58	55	50	50	49	51	52	52	51	50	45	42	39	36	34	33	35	47.3	58																							
9-May	32	30	31	31	30	29	30	Z	32	35	33	34	34	36	38	34	32	31	32	33	33	32	32	31	32.4	38																							
10-May	32	33	33	32	31	33	33	35	Z	44	46	46	45	45	45	45	44	44	44	52	51	48	46	44	41.3	52																							
11-May	42	41	40	Z	37	41	45	45	46	46	47	48	50	51	52	53	57	57	54	54	53	49	47	46	47.9	57																							
12-May	43	43	44	45	Z	48	47	49	45	44	44	46	46	47	51	60	61	61	59	51	44	44	43	43	48.1	61																							
13-May	45	44	44	45	45	Z	45	43	47	47	46	46	46	47	47	45	44	44	42	41	40	40	39	44.4	47																								
14-May	40	42	43	43	44	44	Z	44	45	46	47	48	48	49	49	49	48	53	55	53	53	52	53	55	47.7	55																							
15-May	54	54	55	54	55	53	47	Z	53	51	50	50	51	52	54	54	54	55	55	49	50	49	49	48	52.0	55																							
16-May	48	49	49	50	52	52	52	52	Z	61	64	65	65	66	65	63	62	63	63	60	57	56	54	54	57.4	66																							
17-May	53	52	52	Z	48	46	46	46	52	51	53	53	53	54	55	56	54	56	56	55	53	53	52	47	52.0	56																							
18-May	47	48	48	49	Z	41	43	40	C	C	C	40	39	39	40	40	40	40	40	37	34	36	37	37	40.6	49																							
19-May	39	38	42	35	29	Z	31	31	34	40	38	32	36	38	37	42	45	43	42	38	28	29	30	30	35.9	45																							
20-May	30	30	30	31	31	30	Z	29	30	30	31	32	34	34	35	34	34	32	33	33	32	31	27	28	31.3	35																							
21-May	27	22	19	23	23	21	21	Z	20	20	18	19	21	21	19	20	21	20	20	19	20	20	19	19	20.5	27																							
22-May	22	21	22	24	26	28	28	27	Z	26	26	26	27	27	26	27	27	27	28	28	32	31	32	32	27.0	32																							
23-May	33	34	33	Z	35	34	32	32	32	33	38	40	44	47	48	51	49	47	45	43	41	43	45	44	40.1	51																							
24-May	48	49	48	42	Z	37	39	42	42	39	40	44	44	44	43	45	44	43	41	37	36	34	33	41.6	49																								
25-May	31	30	28	26	25	Z	25	26	32	38	45	47	52	53	55	56	51	51	51	46	42	48	45	43	41.1	56																							
26-May	44	44	43	48	42	38	Z	33	31	32	35	40	43	52	50	49	41	38	37	32	32	32	29	39.1	52																								
27-May	26	25	24	23	22	21	21	Z	24	28	32	40	53	55	52	44	40	43	41	35	32	36	35	34.2	55																								
28-May	32	31	32	32	30	27	23	21	Z	24	29	35	40	35	38	41	41	42	37	33	26	29	28	29	31.9	42																							
29-May	30	28	34	Z	25	22	27	27	29	32	35	38	39	39	43	45	44	43	43	37	30	37	33	32	34.5	45																							
30-May	30	29	27	25	Z	21	20	21	25	26	28	31	32	32	30	30	31	31	32	29	25	26	29	28	27.8	32																							
31-May	25	23	25	24	23	Z	22	22	22	24	28	30	31	33	33	33	30	32	30	31	29	31	29	30	27.8	33																							
																								40.1	39.8	40.2	39.3	37.3	37.4	36.6	38.4	39.1	41.0	42.6	43.7	45.0	45.7	46.0	46.1	45.5	45.1	44.5	42.7	40.5	40.6	40.1	39.6	Diurnal Average	
																								60	59	58	56	56	57	54	58	55	61	65	66	66	66	66	66	66	66	66	64	63	61	59	59	59	Diurnal Maximum
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Stony Mountain - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	15	2.11	2.11
21 - 50	531	74.79	76.90
51 - 82	164	23.10	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Stony Mountain - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	2	5	7	0	0	0	0	0	0	0	0	0	0	0	1	0	15
21 - 50	34	58	60	29	9	18	22	13	10	50	34	10	56	42	68	17	530
51 - 82	0	5	12	3	3	4	8	2	11	32	26	17	11	15	15	0	164
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	68	79	32	12	22	30	15	21	82	60	27	67	57	84	17	709

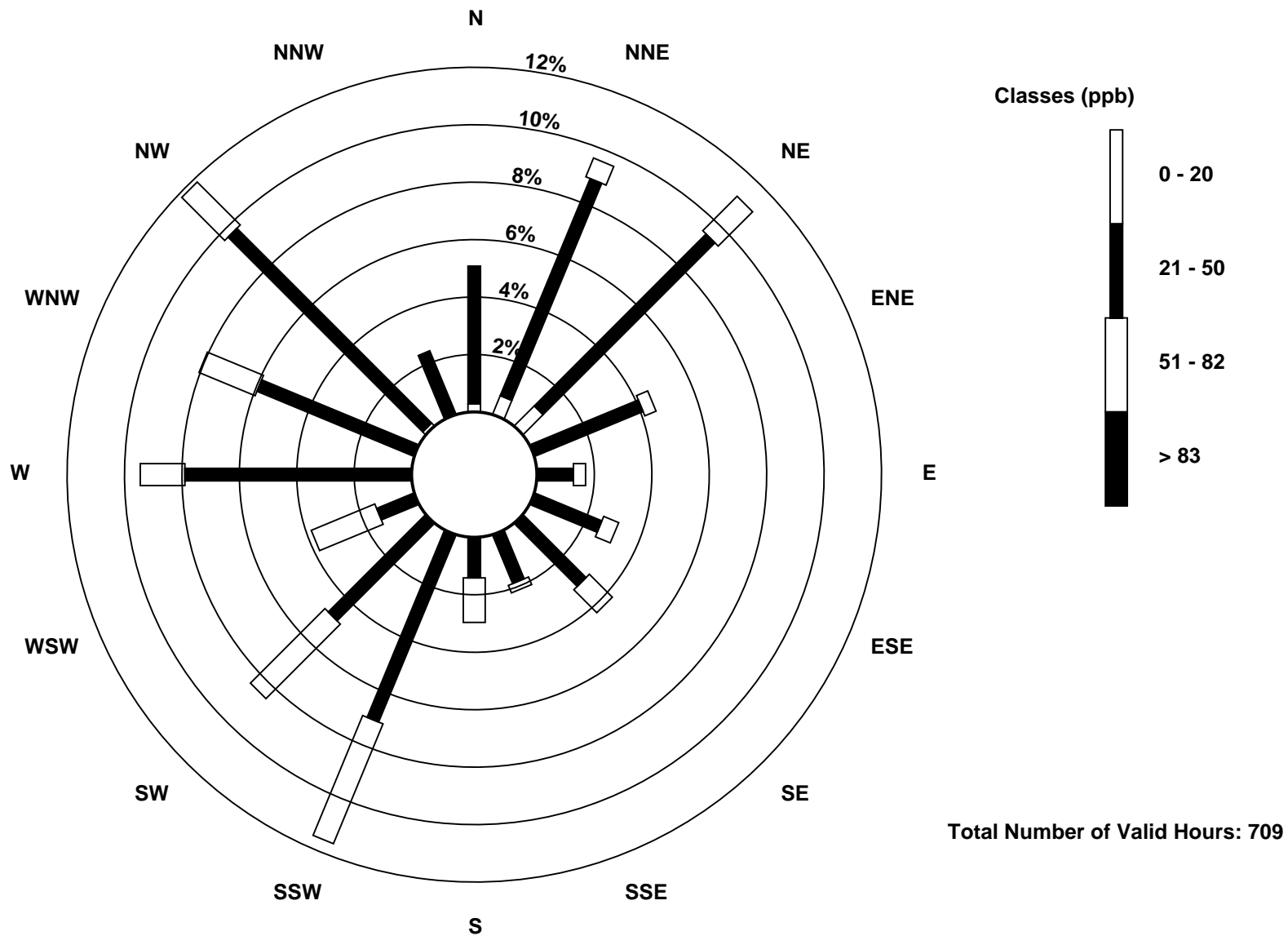
Total Number of Valid Hours: 709

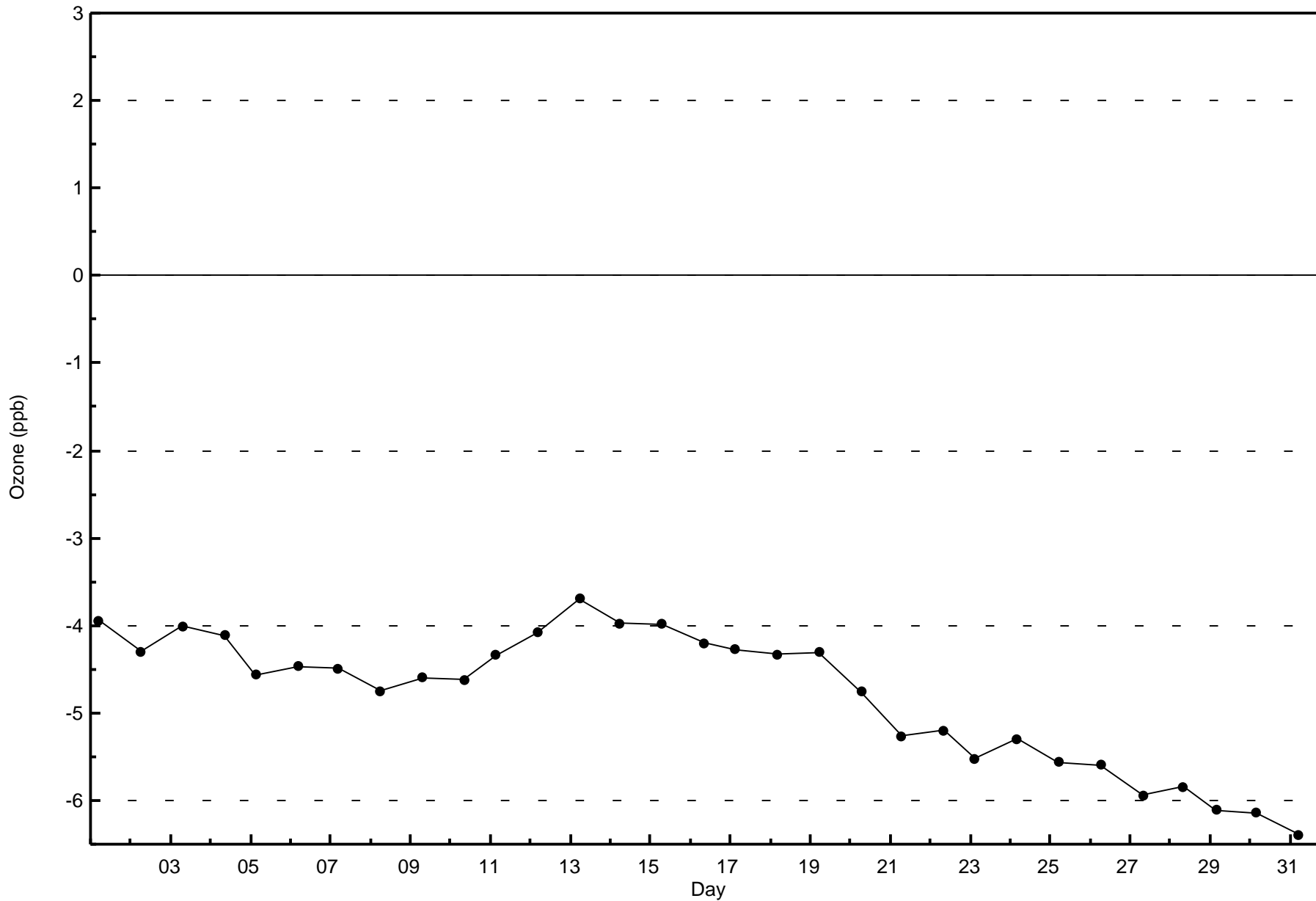
Total Number of Hours: 744

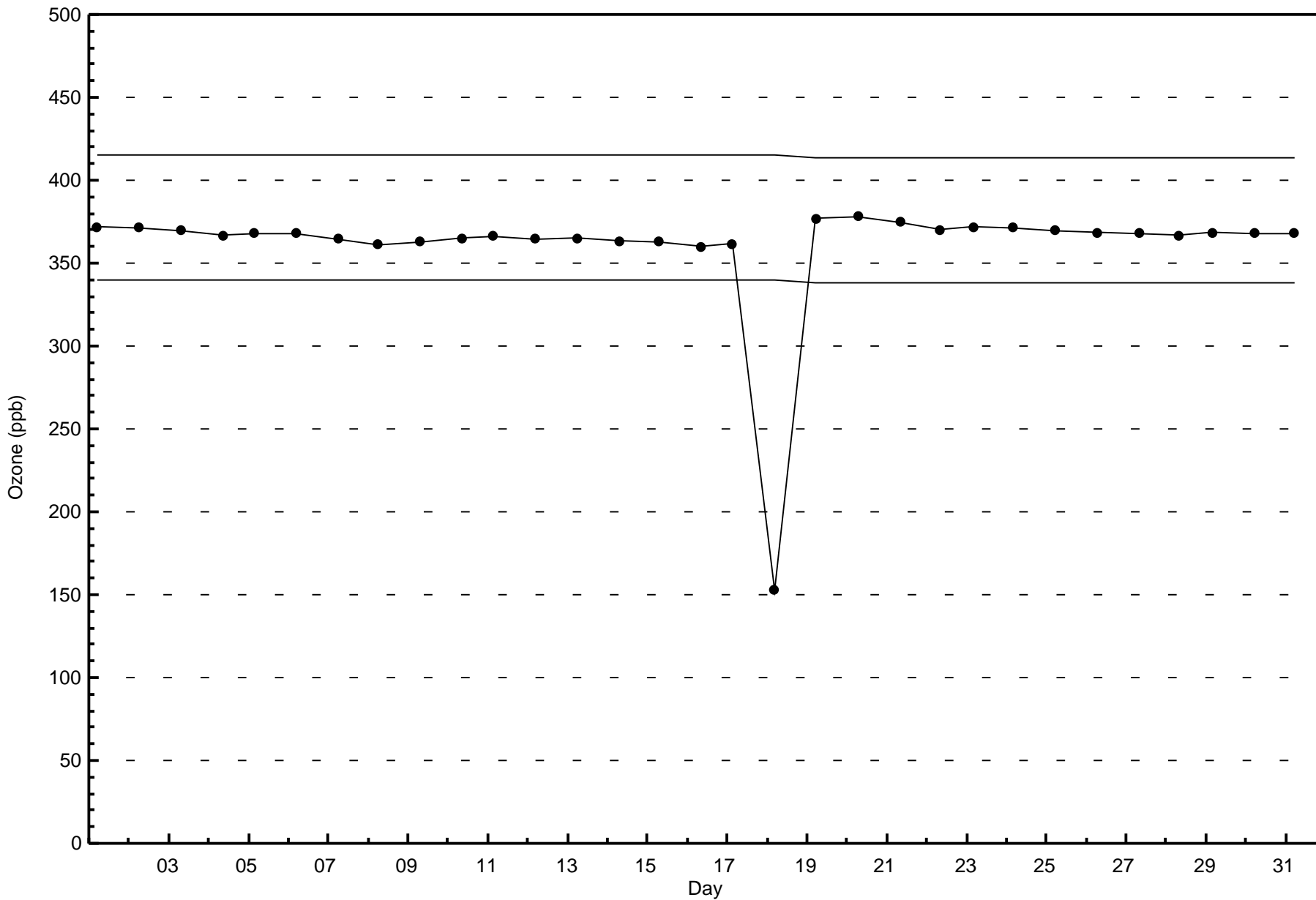


Wood Buffalo Environmental Association
Wind Rose May 2016

Ozone (O₃) - ppb
Stony Mountain (AMS 18)









Summary of Hour Averages

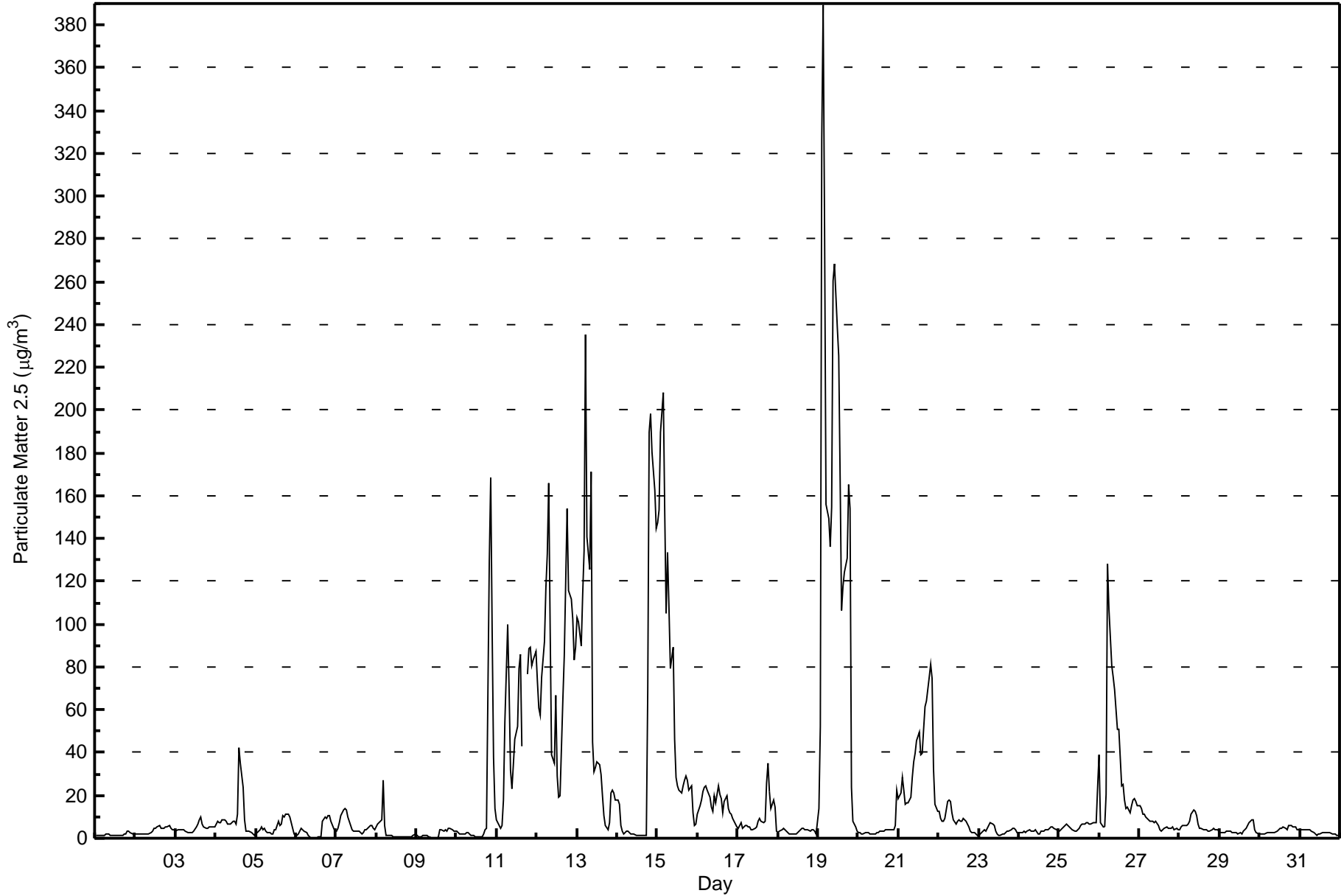
Stony Mountain - May 2016

Number of Exceedences (AAAQO): 24-hr: 8		Hours in Service: 744																																													
Maximum Value: 389.4 µg/m ³ on May 19 04:00		Maximum Daily Average: 152.6 µg/m ³ on May 19																																													
Minimum Value: 0.2 µg/m ³ on May 6 11:00		Hours of Data: 742																																													
Maximum Diurnal Average: 30.8 µg/m ³ at hour 6		Hours of Missing Data: 2																																													
Monthly Average: 21.85 µg/m ³		Hours of Calibration: 2																																													
Minimum Daily Average: 1.7 µg/m ³ on May 1		Percent Operational Time: 100.0																																													
Minimum Diurnal Average: 15.3 µg/m ³ at hour 16		Percentiles: P ₁ = 0.3 P ₁₀ = 1.6 Q ₁ = 2.8 Median = 4.8 Q ₃ = 14.5 P ₉₀ = 75.0 P ₉₉ = 231.4																																													
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-May	1.6	1.5	1.4	1.5	1.6	1.6	1.7	2.1	2.1	1.4	1.2	1.0	1.1	1.2	1.2	1.2	1.7	2.2	3.0	3.2	2.6	1.8	1.7	1.7	3.2																						
2-May	1.8	1.9	2.0	1.9	2.1	2.2	2.1	2.2	2.2	2.8	3.1	4.7	4.9	5.5	5.7	4.3	4.4	4.7	5.2	5.5	5.8	4.6	4.0	3.8	5.8																						
3-May	3.6	3.9	4.1	4.0	4.0	3.9	3.3	2.7	2.4	2.4	2.9	3.6	5.1	6.9	8.3	9.7	6.5	5.1	4.3	4.6	5.3	5.3	5.4	5.3	9.7																						
4-May	6.7	7.7	7.0	7.1	8.5	8.4	7.8	6.6	6.4	6.7	8.2	7.7	6.4	11.1	42.3	35.1	23.5	8.8	3.6	3.3	3.4	2.8	1.9	1.5	42.3																						
5-May	2.3	2.7	4.1	5.2	4.3	4.4	3.1	2.4	2.8	2.0	2.0	3.6	4.0	8.0	6.1	6.4	10.2	10.1	10.9	11.4	9.6	7.2	4.5	2.1	11.4																						
6-May	1.6	2.0	3.4	4.9	3.7	3.4	2.5	1.1	0.5	0.2	0.2	0.3	0.3	0.4	0.6	1.0	7.6	10.0	9.3	10.9	10.3	8.1	4.8	3.3	10.9																						
7-May	3.6	4.8	7.2	10.3	12.9	14.0	13.0	10.1	7.7	3.9	3.0	3.6	3.3	3.4	3.6	2.3	2.5	3.7	4.3	4.4	6.1	5.7	4.8	4.0	14.0																						
8-May	5.5	6.8	7.7	8.4	27.3	5.8	1.6	1.1	1.3	1.1	0.9	0.8	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.7	0.8	1.1	1.8	27.3																						
9-May	1.1	0.9	0.9	0.9	1.0	1.1	1.2	1.0	0.6	0.2	0.3	0.2	0.2	0.5	4.0	4.2	3.4	4.1	3.3	4.9	4.3	4.2	3.6	3.3	4.9																						
10-May	3.0	2.4	2.1	2.0	2.2	2.2	2.9	2.9	1.4	1.3	1.3	0.6	0.7	0.9	0.9	1.0	1.8	4.0	4.7	129.3	168.3	97.6	37.9	14.0	168.3																						
11-May	8.5	6.0	4.4	5.7	18.0	54.1	100.1	69.2	31.4	23.4	34.5	46.3	52.0	79.1	85.6	43.0	C	C	76.5	88.4	88.9	80.6	83.2	87.3	100.1																						
12-May	73.6	60.8	57.2	75.1	92.1	116.9	132.9	165.7	99.1	39.0	35.2	66.6	29.4	19.3	19.9	65.1	85.2	119.9	153.7	115.7	111.7	102.6	83.6	89.3	165.7																						
13-May	103.3	100.9	89.6	114.0	134.0	235.0	141.0	125.7	171.5	45.1	31.1	32.8	35.6	34.3	29.9	19.6	10.3	5.9	4.1	7.3	20.9	22.3	20.9	17.8	235.0																						
14-May	17.7	15.8	5.8	3.2	2.3	3.4	3.3	2.7	2.3	1.7	1.7	1.5	1.3	1.2	1.1	1.2	1.2	1.2	69.0	189.6	198.3	180.6	162.8	144.4	198.3																						
15-May	147.5	153.5	189.6	208.1	153.0	104.8	133.5	107.6	79.5	89.4	46.4	28.3	24.5	22.2	21.2	24.4	27.1	28.9	26.9	22.2	24.3	11.6	5.7	6.3	208.1																						
16-May	11.4	15.2	18.1	21.7	24.1	24.5	22.5	18.8	14.4	12.7	20.2	16.6	24.7	20.4	18.7	12.0	17.3	20.1	13.6	12.0	10.9	9.5	7.9	5.5	24.7																						
17-May	4.9	6.0	7.4	4.6	6.1	5.7	5.2	5.0	3.8	3.9	4.8	5.1	7.8	9.4	7.8	7.5	7.6	26.0	34.8	22.1	14.2	18.0	14.5	3.1	34.8																						
18-May	2.4	3.2	4.0	4.7	4.1	3.5	2.6	2.2	2.0	1.8	1.8	1.9	2.5	3.7	4.4	4.7	3.7	3.8	3.7	3.5	4.0	3.9	3.2	2.2	4.7																						
19-May	14.2	52.0	326.5	389.4	283.9	156.1	149.6	136.4	154.6	260.6	268.7	238.9	225.7	168.0	106.4	117.4	124.0	131.0	165.5	153.7	24.0	7.8	5.4	3.4	389.4																						
20-May	2.5	2.4	2.2	2.2	2.3	2.4	2.4	2.1	2.3	2.3	2.3	2.7	2.9	3.4	3.5	3.5	3.7	4.0	4.3	3.8	3.9	4.0	6.2	22.3	22.3																						
21-May	18.7	21.3	28.5	22.7	15.7	16.8	16.5	18.9	28.7	35.5	39.6	45.3	49.3	38.9	39.7	51.2	61.3	64.0	75.3	81.1	74.5	32.3	15.5	12.6	81.1																						
22-May	12.3	9.3	8.0	8.0	9.5	17.2	18.1	17.1	12.0	8.4	6.7	8.0	8.4	8.1	8.1	9.3	7.9	6.3	5.2	3.6	2.8	2.4	1.7	1.5	18.1																						
23-May	1.6	1.8	2.5	4.0	3.1	4.5	5.8	7.3	6.4	5.9	3.3	2.1	1.6	1.5	1.7	2.2	2.5	3.0	3.4	4.1	4.4	4.5	3.8	2.6	7.3																						
24-May	2.4	2.5	2.8	3.0	2.9	3.0	3.8	3.2	3.4	3.5	4.0	2.2	2.2	3.1	3.4	3.6	3.8	4.0	4.3	5.1	5.0	4.4	3.8	3.4	5.1																						
25-May	3.3	3.9	4.7	5.3	6.5	5.7	5.5	4.6	3.9	3.3	3.3	4.0	4.9	5.9	6.3	6.7	7.5	7.2	6.7	6.5	7.2	7.6	7.2	23.9	23.9																						
26-May	39.0	7.2	5.4	5.4	20.5	128.3	107.3	80.9	75.6	69.2	60.4	51.2	50.9	24.2	25.3	17.7	13.7	14.7	12.0	15.2	17.6	18.6	16.9	15.2	128.3																						
27-May	15.2	14.0	11.3	11.1	10.0	8.4	8.1	8.1	7.7	7.6	7.8	5.8	3.7	3.6	3.7	4.7	5.6	4.7	4.7	4.9	5.4	4.3	4.4	4.0	15.2																						
28-May	4.2	5.1	5.7	5.8	5.8	6.4	7.8	11.3	12.9	12.3	10.5	6.9	4.7	4.5	3.8	3.9	3.9	3.6	3.5	3.9	4.3	4.3	4.1	4.1	12.9																						
29-May	2.9	2.4	2.4	2.9	3.3	3.1	3.1	2.9	2.7	2.7	2.5	2.3	2.4	2.2	3.5	4.0	4.9	7.0	7.8	8.7	8.7	3.7	2.8	2.3	8.7																						
30-May	1.7	1.7	2.0	2.1	2.6	2.9	2.9	2.5	2.6	2.9	3.4	4.0	4.4	4.9	5.2	4.5	4.3	5.7	6.3	5.7	5.3	5.1	4.3	4.0	6.3																						
31-May	4.1	4.1	3.9	3.9	3.7	3.7	4.0	3.4	2.7	2.1	1.6	1.7	2.0	2.5	2.6	2.5	2.4	2.4	2.4	2.1	2.2	1.8	1.6	1.6	4.1																						
Diurnal Average																								16.8	16.9	26.5	30.6	28.1	30.8	29.5	26.7	24.1	21.1	19.8	19.4	18.3	16.1	15.3	15.3	15.3	17.2	23.6	30.2	27.6	21.6	17.1	16.1
Diurnal Maximum																								147.5	153.5	326.5	389.4	283.9	235.0	149.6	165.7	171.5	260.6	268.7	238.9	225.7	168.0	106.4	117.4	124.0	131.0	165.5	189.6	198.3	180.6	162.8	144.4
C - Calibration																																															
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																															



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	373	50.27	50.27
6 - 15	154	20.75	71.02
16 - 25	54	7.28	78.30
26 - 80	58	7.82	86.12
> 81.0	68	9.16	95.28

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - May 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	12	15	25	20	5	8	14	9	12	40	33	20	51	34	63	11	372
6 - 15	2	20	8	6	5	13	10	6	6	30	16	5	5	10	10	2	154
16 - 25	0	7	9	4	0	1	3	0	1	15	6	1	1	3	1	2	54
26 - 80	10	15	17	2	2	1	2	0	1	0	0	0	3	1	3	1	58
> 81.0	10	14	19	2	0	1	1	0	1	1	7	0	3	4	2	3	68
Totals	34	71	78	34	12	24	30	15	21	86	62	26	63	52	79	19	706

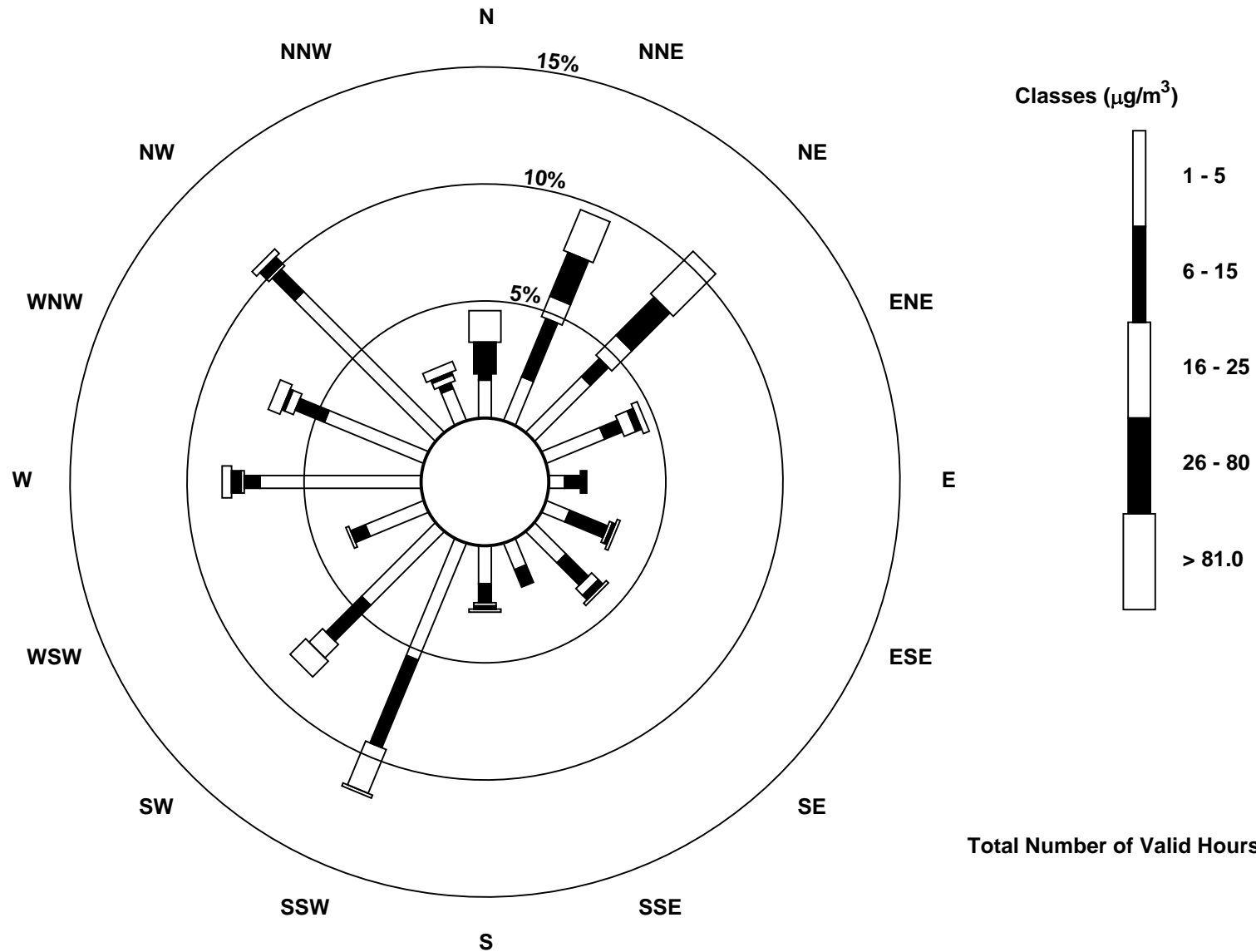
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain (AMS 18)



Total Number of Valid Hours: 741

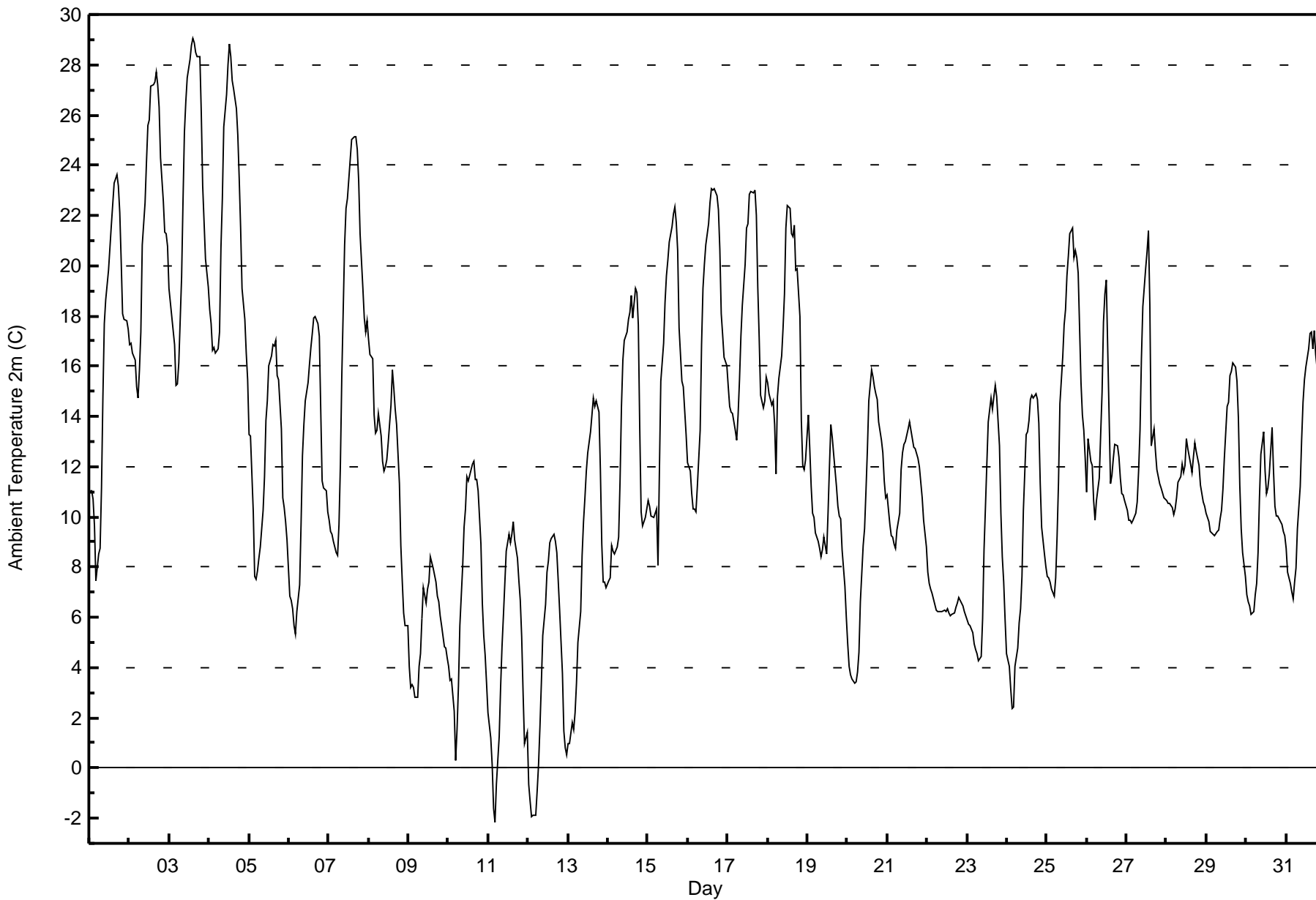


Maximum Value: 29.1 C on May 3 15:00																				Maximum Daily Average: 22.9 C on May 3					Hours in Service: 744																							
Minimum Value: -2.2 C on May 11 05:00																				Minimum Daily Average: 3.7 C on May 12					Hours of Data: 744																							
Maximum Diurnal Average: 17.0 C at hour 15																				Minimum Diurnal Average: 7.8 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 12.55 C																				Percentiles: P ₁ = -0.7 P ₁₀ = 5.2 Q ₁ = 8.5 Median = 11.8 Q ₃ = 16.4 P ₉₀ = 21.5 P ₉₉ = 28.3					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-May	11.0	11.1	10.7	9.7	7.5	8.5	8.7	11.2	14.8	17.7	18.6	19.8	20.7	21.6	22.5	23.3	23.6	23.2	22.1	20.2	18.1	17.9	17.8	17.5	16.6	23.6																						
2-May	16.8	16.9	16.5	16.2	15.2	14.8	15.8	17.4	20.8	22.5	24.1	25.6	25.8	27.1	27.2	27.3	27.7	27.2	26.3	24.3	22.6	21.3	21.3	20.8	21.7	27.7																						
3-May	19.1	18.0	17.4	16.9	15.2	15.3	16.1	19.5	22.6	25.3	26.5	27.5	28.2	28.8	29.1	28.9	28.5	28.3	28.3	26.1	23.2	21.7	20.3	19.2	22.9	29.1																						
4-May	18.3	17.7	16.7	16.7	16.5	16.7	17.4	20.7	22.7	25.5	26.8	28.0	28.8	28.3	27.4	27.0	26.3	25.2	23.5	21.5	19.1	17.9	16.5	15.5	21.7	28.8																						
5-May	13.3	13.2	10.2	7.6	7.5	7.9	8.3	8.8	10.3	11.6	13.8	14.6	16.0	16.4	16.9	16.8	17.0	15.6	15.5	13.5	10.8	10.4	9.8	9.1	12.3	17.0																						
6-May	6.8	6.7	6.3	5.7	5.4	6.2	7.3	9.7	12.5	13.7	14.6	15.3	16.1	16.8	17.3	17.9	18.0	17.7	17.2	14.3	11.4	11.2	11.0	10.2	12.1	18.0																						
7-May	9.9	9.4	9.3	9.0	8.6	8.5	9.7	12.1	15.6	20.8	22.3	22.7	23.5	24.3	25.0	25.1	25.1	24.6	23.4	21.3	19.1	17.9	17.4	17.8	17.6	25.1																						
8-May	17.1	16.4	16.3	14.1	13.3	13.4	14.1	13.2	12.2	11.8	12.0	12.3	13.0	14.5	15.9	15.1	14.3	13.7	11.3	8.9	7.4	6.2	5.7	5.7	12.4	17.1																						
9-May	4.1	3.2	3.3	3.2	2.8	2.8	4.1	4.6	6.0	7.2	6.5	7.1	7.4	8.4	8.2	8.0	7.4	6.9	6.6	6.1	5.7	4.9	4.8	4.4	5.6	8.4																						
10-May	4.0	3.5	3.5	2.3	0.3	1.5	3.3	5.7	8.0	9.6	10.3	11.6	11.4	11.7	12.1	12.2	11.5	11.5	11.1	8.9	6.6	5.3	4.5	3.4	7.2	12.2																						
11-May	2.2	1.2	0.1	-1.6	-2.2	-0.6	1.3	3.2	4.8	6.1	7.3	8.6	9.3	9.0	9.3	9.8	9.1	8.4	7.5	6.7	5.2	3.0	1.0	1.4	4.6	9.8																						
12-May	-0.7	-1.3	-2.0	-1.9	-1.9	-0.9	0.1	1.6	3.4	5.3	6.5	7.8	8.2	9.0	9.2	9.3	9.0	8.6	7.5	6.3	3.8	1.5	0.8	0.5	3.7	9.3																						
13-May	1.0	1.0	1.8	1.5	2.2	3.4	5.0	6.3	8.5	9.8	10.8	11.8	12.6	13.4	14.1	14.7	14.4	14.6	14.2	11.9	8.9	7.4	7.4	7.2	8.5	14.7																						
14-May	7.5	7.6	8.9	8.7	8.5	8.8	9.2	11.4	14.4	16.2	17.0	17.4	17.9	18.1	18.8	17.9	19.1	18.9	17.6	13.6	10.2	9.7	10.0	10.3	13.2	19.1																						
15-May	10.6	10.4	10.0	10.0	10.2	10.3	8.1	11.8	15.4	16.9	18.5	19.6	20.2	20.9	21.5	22.0	22.4	21.7	20.6	17.5	15.4	15.2	14.2	13.3	15.7	22.4																						
16-May	12.2	11.8	11.0	10.3	10.3	10.2	11.2	13.5	16.9	19.1	20.0	20.8	21.7	22.5	23.1	23.0	23.1	22.8	22.2	20.7	18.1	17.2	16.3	16.0	17.2	23.1																						
17-May	15.2	14.4	14.2	14.1	13.5	13.0	14.1	15.5	17.2	18.4	20.0	21.5	21.7	22.8	23.0	22.9	23.0	22.0	19.1	17.1	14.8	14.4	14.6	15.5	17.6	23.0																						
18-May	15.3	14.9	14.5	14.6	13.7	11.7	14.8	15.5	16.4	17.6	18.9	21.5	22.4	22.3	21.3	21.2	21.6	19.8	19.9	18.0	13.9	12.0	11.9	12.3	16.9	22.4																						
19-May	14.1	12.7	11.2	10.2	10.0	9.4	9.0	8.7	8.4	8.7	9.2	8.5	10.2	12.0	13.7	13.2	12.5	11.2	10.4	10.0	9.9	8.7	7.2	6.0	10.2	14.1																						
20-May	5.0	4.1	3.7	3.6	3.4	3.4	3.8	4.6	6.6	8.9	9.5	11.1	12.6	14.6	15.8	15.6	15.2	14.9	14.7	13.8	13.0	12.6	11.4	10.8	9.7	15.8																						
21-May	10.9	9.7	9.3	9.2	8.9	8.8	9.5	10.2	11.9	12.6	12.9	13.0	13.5	13.8	13.4	13.1	12.8	12.7	12.4	12.0	11.4	10.8	9.9	8.8	11.3	13.8																						
22-May	7.8	7.3	7.1	7.0	6.7	6.3	6.2	6.2	6.2	6.2	6.3	6.2	6.3	6.2	6.1	6.1	6.2	6.4	6.6	6.8	6.7	6.5	6.2	6.1	6.5	7.8																						
23-May	5.9	5.7	5.6	5.4	5.0	4.7	4.6	4.3	4.4	5.9	8.7	10.4	12.1	13.8	14.7	14.3	14.8	15.3	14.8	12.8	10.1	8.4	7.4	5.9	9.0	15.3																						
24-May	4.5	4.0	3.2	2.4	2.4	4.0	4.8	5.8	6.4	7.6	10.3	13.3	13.4	13.9	14.7	14.8	14.7	14.9	14.7	13.7	11.3	9.6	8.5	8.0	9.2	14.9																						
25-May	7.6	7.6	7.4	7.1	6.8	7.6	9.2	11.4	14.5	16.3	17.6	18.2	19.6	20.4	21.3	21.5	20.3	20.6	20.3	19.7	15.3	14.1	13.4	12.3	14.6	21.5																						
26-May	11.0	13.1	12.2	12.0	10.6	9.9	10.7	11.6	13.3	15.0	17.7	18.9	19.4	14.0	11.3	11.6	12.4	12.9	12.8	12.4	11.6	10.9	10.9	10.7	12.8	19.4																						
27-May	10.3	9.8	9.9	9.7	9.9	10.2	10.6	11.8	13.5	16.3	18.4	19.9	20.6	21.4	18.4	12.8	13.5	12.6	11.9	11.6	11.3	11.1	10.8	10.7	13.2	21.4																						
28-May	10.6	10.6	10.5	10.3	10.1	10.3	10.8	11.4	11.6	12.1	11.8	12.0	13.1	12.7	12.1	11.8	12.4	12.9	12.6	12.1	11.3	11.0	10.6	10.4	11.5	13.1																						
29-May	10.1	9.8	9.4	9.4	9.3	9.3	9.4	9.5	9.9	10.3	11.1	12.3	14.4	14.6	15.6	15.8	16.1	15.9	15.4	13.9	11.2	9.5	8.6	7.6	11.6	16.1																						
30-May	6.9	6.6	6.5	6.1	6.2	6.9	7.3	8.6	10.7	12.5	13.4	11.8	11.0	11.1	11.7	13.5	11.8	10.4	10.0	10.0	9.9	9.7	9.4	9.3	9.6	13.5																						
31-May	8.8	7.8	7.4	7.0	6.7	7.4	8.0	9.5	11.2	13.0	14.6	15.5	16.0	16.7	17.3	17.3	16.7	17.4	16.5	15.3	11.4	10.8	11.5	11.2	12.3	17.4																						
																								9.6	9.2	8.8	8.3	7.8	8.1	8.8	10.2	12.0	13.6	14.7	15.6	16.3	16.8	17.0	16.9	16.8	16.4	15.7	14.2	12.2	11.2	10.7	10.3	Diurnal Average
																								19.1	18.0	17.4	16.9	16.5	16.7	17.4	20.7	22.7	25.5	26.8	28.0	28.8	28.8	29.1	28.9	28.5	28.3	28.3	26.1	23.2	21.7	21.3	20.8	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Stony Mountain - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Stony Mountain - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	9	1.21	1.21
0 - 10	259	34.81	36.02
10 - 20	374	50.27	86.29
> 20	102	13.71	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



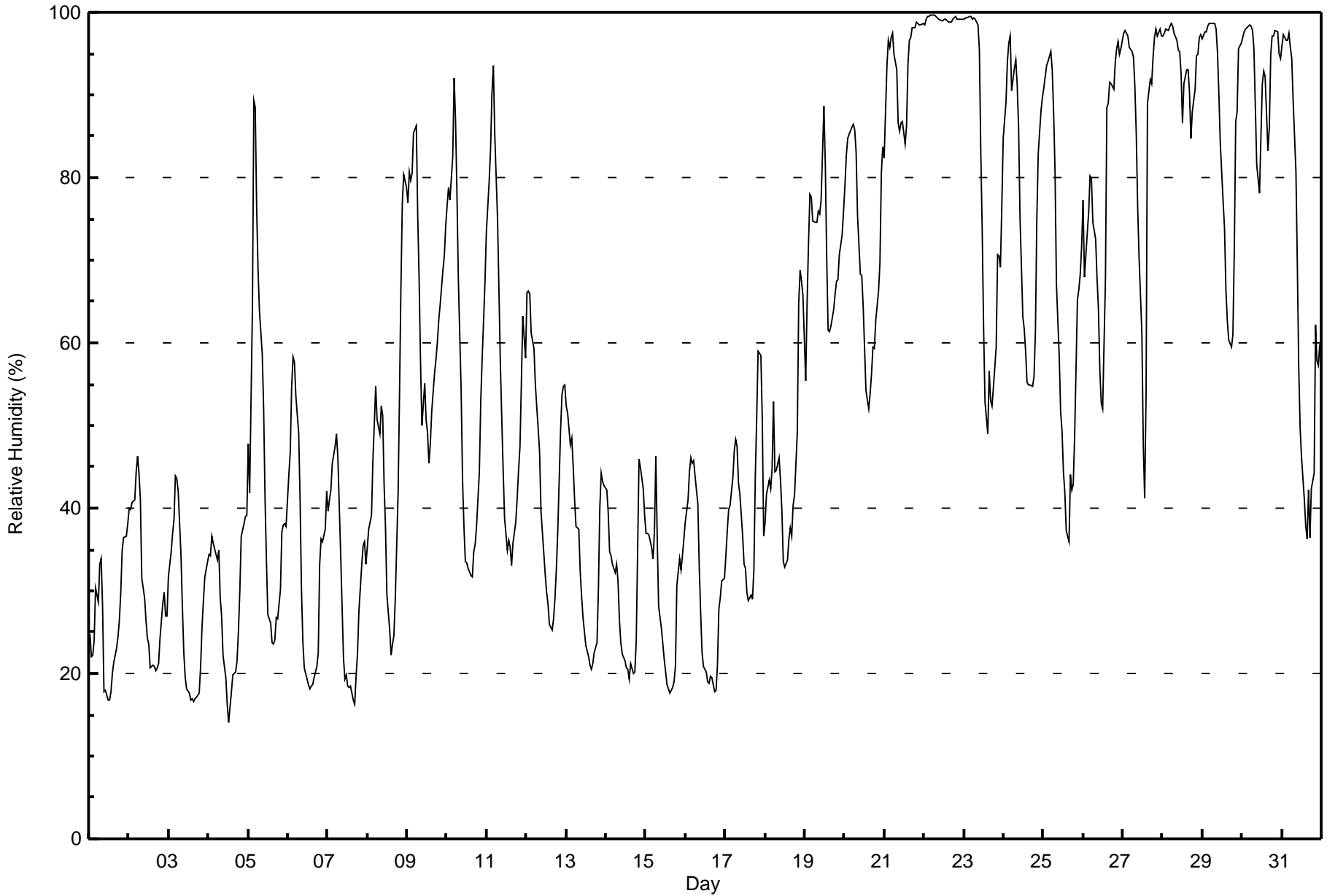
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Stony Mountain - May 2016

Maximum Value: 100 % on May 22 06:00 Maximum Daily Average: 99.2 % on May 22																	Hours in Service: 744 Hours of Data: 744										
Minimum Value: 14 % on May 4 13:00 Minimum Daily Average: 26.1 % on May 1 Maximum Diurnal Average: 70.8 % at hour 5 Minimum Diurnal Average: 42.5 % at hour 14 Monthly Average: 56.7 % Percentiles: P ₁ = 17 P ₁₀ = 22 Q ₁ = 34 Median = 52 Q ₃ = 85 P ₉₀ = 97 P ₉₉ = 99																	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-May	25	22	22	24	30	29	33	34	28	18	18	17	17	18	20	21	23	24	26	30	35	36	37	38	26.1	38	
2-May	40	40	41	41	44	46	44	41	31	29	26	24	23	21	21	21	20	21	21	24	28	30	27	27	30.6	46	
3-May	32	35	37	39	44	44	42	34	28	23	19	18	17	17	17	17	17	18	21	26	29	32	33	27.3	44		
4-May	34	34	37	36	35	34	35	29	27	22	20	16	14	16	18	20	20	22	25	30	37	38	39	39	28.2	39	
5-May	48	42	64	89	88	76	69	64	59	52	41	34	27	26	24	24	24	27	27	30	37	38	38	38	45.2	89	
6-May	44	47	55	58	58	53	49	41	30	24	21	19	19	18	19	19	20	21	23	33	36	36	37	42	34.2	58	
7-May	40	41	42	45	47	49	46	40	34	22	19	20	18	18	18	17	16	20	22	27	33	35	36	33	30.9	49	
8-May	35	37	39	46	50	55	51	49	52	51	43	38	30	25	22	24	25	29	42	54	67	77	80	79	45.8	80	
9-May	77	81	80	81	85	86	75	68	58	50	55	51	49	45	48	52	56	58	60	63	65	69	71	74	64.8	86	
10-May	77	79	77	82	92	87	78	68	54	43	38	34	33	33	32	32	35	36	38	44	53	58	62	67	55.5	92	
11-May	73	80	83	90	93	85	75	66	58	51	45	39	35	36	35	33	36	38	41	45	47	55	63	58	56.7	93	
12-May	66	66	66	61	59	55	52	50	47	40	35	32	30	29	26	25	27	29	33	37	50	54	55	55	44.9	66	
13-May	52	52	48	49	45	41	38	37	32	29	27	25	23	22	21	21	21	23	24	30	40	44	43	43	34.6	52	
14-May	42	40	35	34	33	32	33	31	26	24	22	22	21	20	19	21	20	20	24	35	46	45	42	39	30.3	46	
15-May	37	37	37	35	34	37	46	36	28	25	24	22	20	19	18	18	18	19	21	31	34	33	34	36	29.1	46	
16-May	38	41	44	46	45	46	44	40	33	27	22	21	20	19	19	20	19	18	18	21	28	29	31	32	30.1	46	
17-May	34	37	40	40	44	47	48	48	43	42	37	33	33	30	29	30	29	33	44	51	59	59	51	37	40.6	59	
18-May	38	42	43	42	45	53	44	45	46	43	40	34	33	34	36	38	37	40	41	49	65	69	67	66	45.4	69	
19-May	55	65	72	78	78	75	75	75	76	76	77	89	82	70	62	61	62	64	66	67	68	71	73	76	71.3	89	
20-May	79	83	85	85	86	86	86	83	75	68	68	65	59	54	52	54	56	60	59	63	66	70	81	84	71.1	86	
21-May	82	94	97	96	97	97	95	93	87	86	87	87	84	86	94	97	97	98	98	99	99	99	98	99	93.5	99	
22-May	98	99	99	100	100	100	100	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99.2	100
23-May	99	99	99	99	99	99	99	99	98	95	83	74	62	53	49	57	53	52	55	59	71	71	69	77	78.0	99	
24-May	85	89	94	96	97	90	93	94	91	86	75	63	62	59	55	55	55	55	56	61	75	83	88	90	77.0	97	
25-May	91	92	94	94	95	93	88	81	67	58	52	49	44	42	37	36	44	42	43	49	65	66	68	72	65.1	95	
26-May	77	68	73	76	80	80	75	73	68	64	57	53	52	68	89	89	92	91	91	94	96	97	95	96	78.7	97	
27-May	97	98	97	97	96	95	95	91	85	76	70	61	48	41	54	89	92	91	95	97	98	97	98	97	85.7	98	
28-May	97	97	98	98	98	99	98	97	97	95	95	93	87	91	93	93	90	85	88	91	95	95	97	97	94.4	99	
29-May	97	98	98	98	99	99	99	99	98	95	90	84	77	74	66	63	60	60	61	71	87	88	96	96	85.5	99	
30-May	97	98	98	98	98	98	98	96	89	82	78	85	91	93	92	83	86	95	97	97	98	98	95	94	93.1	98	
31-May	96	97	97	97	98	96	94	89	81	69	57	50	46	41	38	36	42	36	42	44	62	58	57	60	66.0	98	
	64.0	65.4	67.4	69.4	70.8	69.8	67.7	64.2	58.9	53.7	49.7	46.7	43.7	42.5	42.6	43.9	44.9	45.9	48.3	53.1	60.1	62.1	63.3	63.6	Diurnal Average		
	99	99	99	100	100	100	100	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	Diurnal Maximum		





Wood Buffalo Environmental Association

Summary of Hour Averages

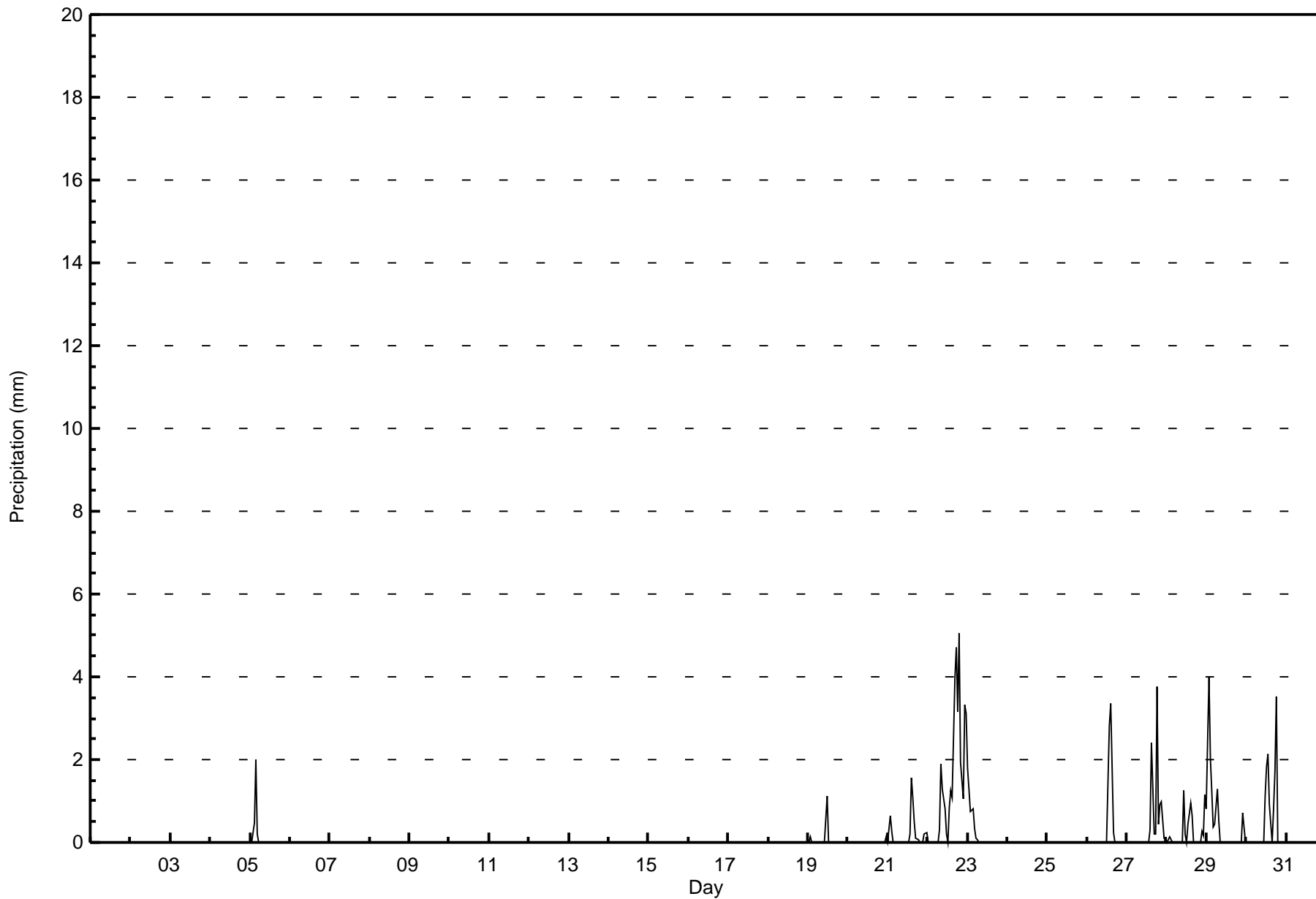
**Precipitation (PC) - mm
Stony Mountain - May 2016**

Maximum Value: 5.0 mm on May 22 20:00 Maximum Daily Total: 34.0 mm on May 22		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Minimum Value: 0.0 mm on May 1 01:00 Maximum Diurnal Total: 10.5 mm at hour 19 Monthly Total: 94.44 mm		Minimum Daily Total: 0.0 mm on May 1 Minimum Diurnal Total: 0.5 mm at hour 6 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 3.2																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.5	2.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
6-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
20-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
21-May	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.6	1.1	0.5	0.1	0.1	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	4.9
22-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.9	1.3	0.8	0.2	0.0	0.9	1.3	1.1	4.0	4.7	3.1	5.0	1.9	1.1	3.3	3.1	0.0	0.0	0.0	34.0
23-May	1.8	1.3	0.7	0.8	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1
24-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	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	3.4	1.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
27-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.4	0.2	0.2	3.8	0.5	0.9	1.0	0.1	0.1	0.0	0.0	0.0	9.4
28-May	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.2	0.0	0.5	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.3	0.2	1.1	0.0	0.0	0.0	5.3
29-May	0.8	4.0	2.0	1.2	0.4	0.4	1.3	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	0.7	0.0	0.0	0.0	11.4	
30-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.8	2.1	0.9	0.0	0.8	1.7	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.1
31-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2.6	6.1	3.6	4.0	0.9	0.5	1.4	0.8	1.9	1.3	2.0	2.6	1.8	6.5	8.3	7.0	5.7	6.8	10.5	5.5	2.9	2.3	4.5	4.8			Diurnal Average
		1.8	4.0	2.0	2.0	0.4	0.4	1.3	0.5	1.9	1.3	1.2	1.1	1.8	2.8	3.4	2.4	4.0	4.7	3.8	5.0	1.9	1.1	3.3	3.1			Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Stony Mountain - May 2016

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	690	92.74	92.74
0.4 - 0.5	7	0.94	93.68
0.6 - 0.7	4	0.54	94.22
0.8 - 1.4	21	2.82	97.04
1.5 - 10	22	2.96	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

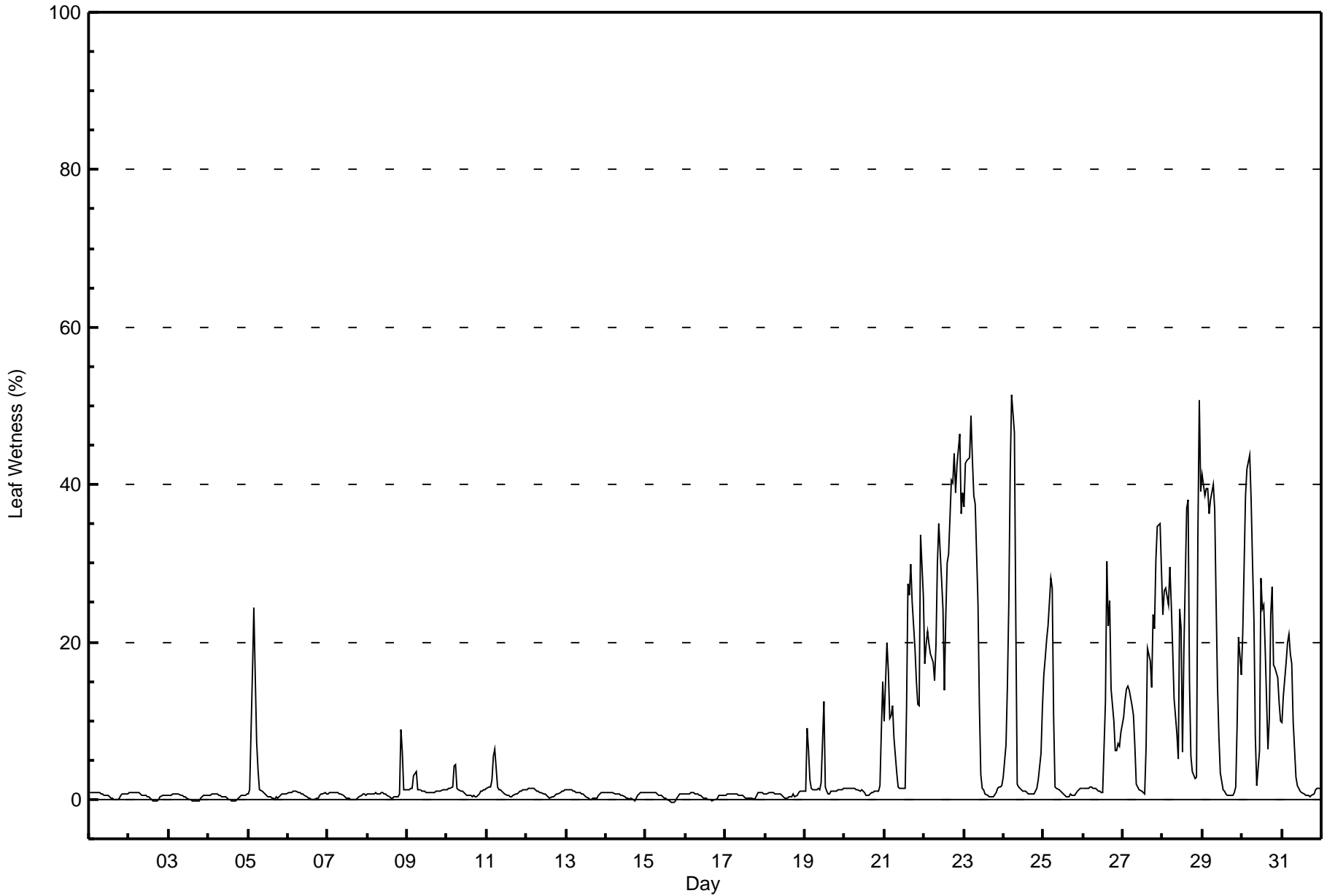
Leaf Wetness (LW) - %
Stony Mountain - May 2016

Maximum Value: 51 % on May 24 06:00																	Maximum Daily Average: 28.8 % on May 22																	Hours in Service: 744	
Minimum Value: 0 % on May 15 17:00																	Minimum Daily Average: 0.3 % on May 3																	Hours of Data: 744	
Maximum Diurnal Average: 10.9 % at hour 5																	Minimum Diurnal Average: 1.9 % at hour 13																	Hours of Missing Data: 0	
Monthly Average: 5.9 %																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 24 P ₉₉ = 44																	Hours of Calibration: 0	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1									
2-May	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.4	1									
3-May	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1										
4-May	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1										
5-May	1	1	16	24	16	7	4	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	3.3	24										
6-May	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0.6	1										
7-May	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1										
8-May	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	9	6	1	1	1.2	9										
9-May	1	1	1	1	3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4										
10-May	1	1	1	2	4	4	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1.2	4										
11-May	1	2	2	3	5	6	2	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1.4	6										
12-May	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0.9	1										
13-May	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0.7	1										
14-May	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1										
15-May	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1										
16-May	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1										
17-May	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1										
18-May	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	1	1	1	1	0.7	1										
19-May	1	9	6	3	1	1	1	1	1	1	2	12	2	1	1	1	1	1	1	1	1	1	1	2.3	12										
20-May	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	2	9	15	2.0	15									
21-May	10	20	16	10	11	12	8	3	2	1	1	1	12	27	26	30	25	19	15	12	12	34	26	14.0	34										
22-May	17	20	21	20	19	17	15	20	30	35	28	24	14	23	30	31	41	40	44	39	43	46	39	28.8	46										
23-May	37	43	43	43	49	43	39	38	25	12	3	1	1	0	0	0	0	0	1	1	2	2	2	16.1	49										
24-May	3	7	14	25	42	51	47	23	2	1	1	1	1	1	1	1	1	1	1	1	2	6	12	10.2	51										
25-May	16	18	20	22	28	27	10	2	1	1	1	1	1	0	0	1	0	1	0	1	1	1	1	6.5	28										
26-May	1	1	1	1	2	2	1	1	1	1	1	1	13	30	22	25	14	10	6	6	7	7	9	6.9	30										
27-May	10	13	14	14	14	12	11	7	2	1	1	1	1	7	19	18	14	23	22	30	35	35	29	13.9	35										
28-May	24	26	27	25	30	25	19	13	8	5	24	22	6	19	37	38	15	6	4	3	3	34	51	20.8	51										
29-May	41	39	40	39	36	38	40	37	25	14	8	3	1	1	0	0	0	0	1	2	9	21	16	17.3	41										
30-May	21	30	39	42	44	38	30	23	8	2	6	28	24	25	19	6	10	24	27	17	17	15	10	21.6	44										
31-May	10	13	17	20	21	19	17	10	3	2	1	1	1	1	0	1	0	1	1	1	1	1	1	6.0	21										
6.8 8.3 9.4 9.9 10.9 10.3 8.4 6.2 4.0 2.9 2.9 3.4 1.9 3.3 5.1 4.8 4.7 4.2 4.4 3.8 4.6 6.1 7.5 7.0																								Diurnal Average											
41 43 43 43 49 51 47 38 30 35 28 28 24 25 37 38 41 40 44 39 43 46 51 39																								Diurnal Maximum											



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (LW) - %
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Stony Mountain - May 2016

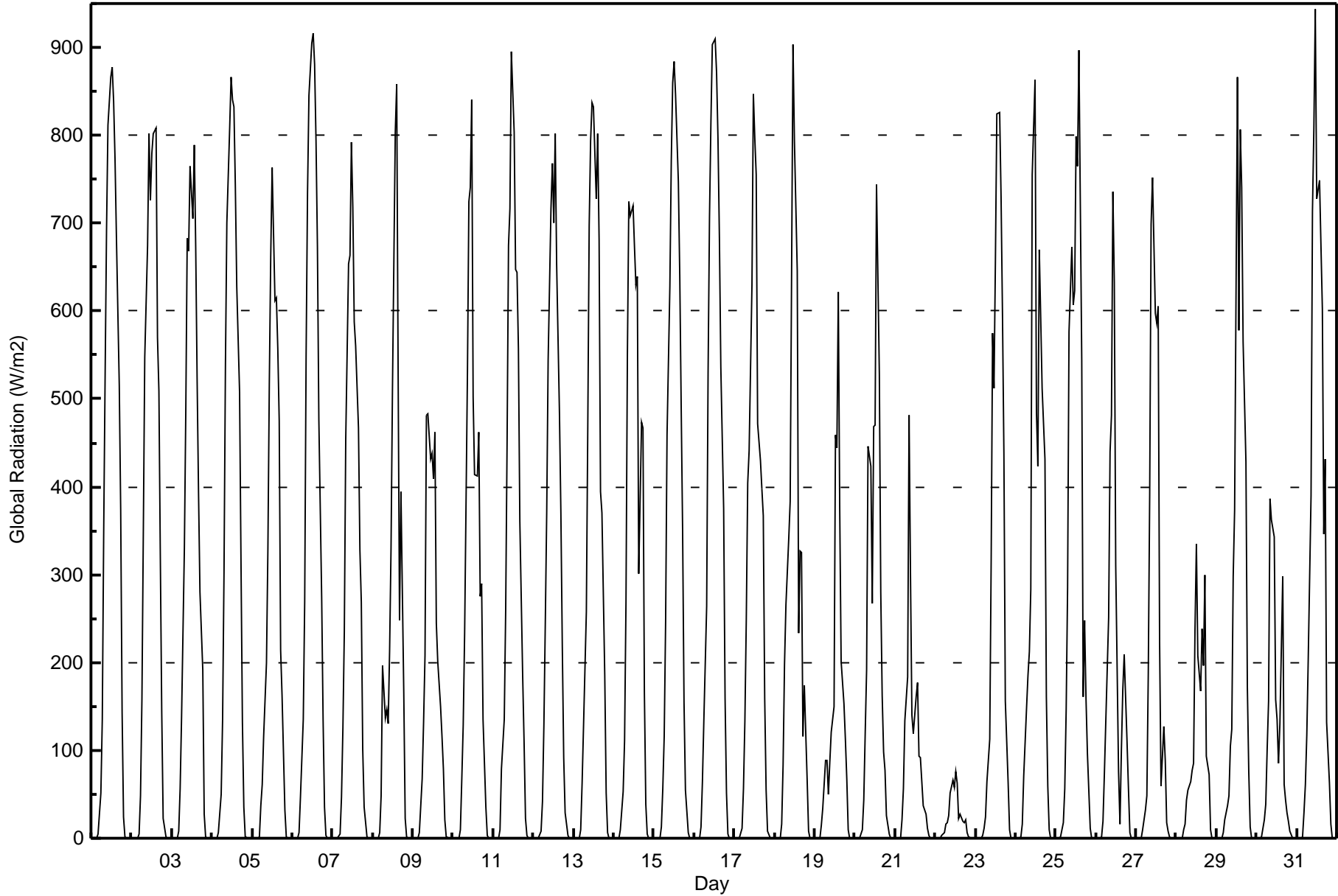
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	84	11.78	11.78
0.4 - 0.5	70	9.82	21.60
0.6 - 0.7	102	14.31	35.90
0.8 - 1.4	237	33.24	69.14
1.5 - 10	65	9.12	78.26
> 10	146	20.48	98.74

Total Number of Valid Hours: 713

Total Number of Hours: 744



Maximum Value: 944 W/m2 on May 31 12:00		Maximum Daily Average: 325.6 W/m2 on May 16		Hours in Service: 744																						
Minimum Value: 0 W/m2 on May 2 22:00		Minimum Daily Average: 20.9 W/m2 on May 22		Hours of Data: 744																						
Maximum Diurnal Average: 634.1 W/m2 at hour 12		Minimum Diurnal Average: 0.0 W/m2 at hour 3		Hours of Missing Data: 0																						
Monthly Average: 228.1 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 77 Q ₃ = 430 P ₉₀ = 714 P ₉₉ = 891		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	0	0	0	4	52	135	349	527	693	812	867	878	839	772	683	515	374	144	24	1	0	0	0	319.5	878
2-May	0	0	0	0	4	48	158	350	548	674	802	726	780	801	809	570	509	320	144	23	1	0	0	0	302.7	809
3-May	0	0	0	0	8	56	138	330	486	683	669	765	705	789	674	522	394	281	192	28	1	0	0	0	280.0	789
4-May	0	0	0	0	6	49	135	302	537	701	809	866	840	832	743	628	507	314	132	36	2	0	0	0	310.0	866
5-May	0	0	0	0	2	37	62	116	199	329	517	661	763	612	615	557	475	214	163	32	2	0	0	0	223.1	763
6-May	0	0	0	0	7	47	135	268	549	734	845	904	916	881	794	673	477	274	136	36	3	0	0	0	320.0	916
7-May	0	0	0	0	5	46	126	235	455	654	663	792	718	588	560	467	328	270	102	35	2	0	0	0	251.9	792
8-May	0	0	0	0	7	49	196	137	147	130	214	331	509	804	859	535	249	394	166	23	1	0	0	0	197.9	859
9-May	0	0	0	0	6	68	131	208	481	483	432	438	408	462	245	201	150	115	78	20	1	0	0	0	163.7	483
10-May	0	0	0	0	9	68	129	233	532	724	740	840	503	414	412	462	276	291	136	36	3	0	0	0	242.0	840
11-May	0	0	0	0	10	78	135	260	452	675	716	895	804	647	644	557	361	185	109	23	4	0	0	0	273.2	895
12-May	0	0	0	0	9	43	129	247	372	545	717	769	700	801	654	482	371	219	92	29	3	0	0	0	257.6	801
13-May	0	0	0	0	10	62	127	258	467	697	795	838	833	728	801	682	394	370	186	52	6	0	0	0	304.4	838
14-May	0	0	0	0	10	53	112	268	550	724	708	719	673	630	639	300	473	467	166	39	5	0	0	0	272.4	724
15-May	0	0	0	0	13	56	116	246	459	627	771	859	884	848	747	640	490	351	154	55	7	0	0	0	305.2	884
16-May	0	0	0	0	12	65	134	265	529	706	815	903	910	871	795	683	537	375	159	51	5	0	0	0	325.6	910
17-May	0	0	0	0	11	57	133	249	404	442	629	847	798	756	472	429	398	366	160	55	8	0	0	0	258.9	847
18-May	0	0	0	0	17	84	198	265	341	384	642	904	794	646	233	327	325	115	174	65	7	0	0	0	230.1	904
19-May	0	0	0	0	14	34	89	89	50	87	120	150	459	444	622	375	202	152	113	67	10	0	0	0	128.2	622
20-May	0	0	0	0	10	44	120	192	446	423	267	468	470	744	529	281	163	98	77	26	5	0	0	0	181.8	744
21-May	0	0	0	0	21	57	133	184	482	300	140	119	161	177	94	92	65	37	28	12	3	0	0	0	87.8	482
22-May	0	0	0	0	3	7	16	18	26	52	66	59	76	63	23	28	20	18	20	7	1	0	0	0	20.9	76
23-May	0	0	0	0	3	12	24	65	113	315	575	512	656	825	827	729	596	439	157	63	9	0	0	0	246.7	827
24-May	0	0	0	1	17	71	148	185	212	284	755	863	485	424	670	592	513	431	161	60	10	0	0	0	245.0	863
25-May	0	0	0	1	17	56	147	285	576	674	608	623	799	765	897	545	161	248	159	96	11	0	0	0	277.8	897
26-May	0	0	0	1	19	74	133	252	439	482	736	633	311	76	16	99	169	209	109	57	6	0	0	0	159.3	736
27-May	0	0	0	0	10	32	48	186	391	699	752	597	585	606	224	59	127	88	18	8	1	0	0	0	184.7	752
28-May	0	0	0	1	9	17	43	55	65	77	86	237	335	208	167	238	196	300	94	72	10	0	0	0	92.1	335
29-May	0	0	0	0	7	21	37	48	104	124	298	373	866	578	807	740	566	428	172	76	13	0	0	0	219.1	866
30-May	0	0	0	2	20	38	102	157	387	362	344	157	135	86	130	297	60	44	29	19	8	0	0	0	99.0	387
31-May	0	0	0	1	29	61	118	204	389	714	809	944	728	748	675	602	346	432	133	64	15	1	0	0	292.2	944
		0.0	0.0	0.0	0.3	10.6	49.7	115.6	209.9	378.0	490.2	575.8	634.1	628.4	603.0	553.1	454.1	335.9	265.1	124.6	41.6	5.4	0.1	0.0	0.0	Diurnal Average
		0	0	0	2	29	84	198	350	576	734	845	944	916	881	897	740	596	467	192	96	15	1	0	0	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Stony Mountain - May 2016

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	292	39.25	39.25
21 - 100	97	13.04	52.28
101 - 300	123	16.53	68.82
301 - 600	110	14.78	83.60
601 - 900	116	15.59	99.19
> 900	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Stony Mountain - May 2016

Maximum Speed: 19 km/h on May 8 18:00	Maximum Daily Speed Average: 12.4 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 15 15:00	Minimum Daily Speed Average: 1.4 km/h on May 26	Hours of Data: 743
Maximum Diurnal Speed Average: 3.3 km/h at hour 3	Minimum Diurnal Speed Average: 0.4 km/h at hour 21	Hours of Missing Data: 1
Monthly Average Velocity: 1.6 km/h 290.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 17	Percent Operational Time: 99.9

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-May	W10	W10	W12	W10	WSW9	WSW9	SW8	SW10	SW9	W11	WSW11	WSW12	W12	W11	W12	W13	WNW13	NW10	NW10	WNW6	W6	W7	W7	W8	W8.9	WNW13
2-May	W7	W7	W6	W7	WNW8	WNW8	NW6	N4	ENE4	ENE6	SSE3	WNW4	WSW6	W7	W6	SW5	WSW5	W5	SW5	SW5	SW7	SW9	SW9	SW9	WSW4.5	SW9
3-May	SW10	SW11	SW12	SW12	SW11	SW12	SW12	SW13	SW13	SW14	SW15	SW14	SW12	SSW12	SSW12	SSW14	S11	SSW9	S7	S5	SSE5	SSW8	SSW10	SSW10	SSW10.7	SW15
4-May	SW10	SW12	SW12	SW12	SW12	SW9	SSW9	SSW9	SW12	SW14	SSW16	SW15	WSW14	WNW16	W17	WNW16	WNW16	NW14	WNW13	NW8	NW7	NW8	NW9	WNW11	WSW9.5	W17
5-May	NW8	NW9	NW9	WNW4	W5	NW6	NW8	NW8	NW7	NNW7	NNW8	NW8	NW10	NW9	NW9	NW10	NW9	NW7	NW7	NW5	WNW4	WNW4	WNW6	NW6	NW7.0	NW10
6-May	NW5	NW7	WNW6	W7	W7	W10	W10	W9	NW9	NW10	NW9	WNW10	W9	WNW10	WNW11	WNW11	WNW11	WNW7	WNW4	ENE1	SE3	SSE4	SSW7	SSW9	WNW6.3	WNW11
7-May	SSW11	SSW12	SSW13	SSW14	SSW13	SSW13	SSW14	SSW14	SW11	WSW11	WSW13	SW14	WSW15	WSW14	SW13	W14	W10	SSW10	SSW6	S5	SSE5	SSE6	SSE8	S10	SSW10.0	WSW15
8-May	S12	S11	SSW11	W8	NW15	NW15	NW17	WNW16	WNW17	W12	W12	W14	WSW15	WSW16	WSW15	W15	W14	W19	W16	W13	W12	W11	W11	NW13	W12.0	W19
9-May	NW13	NW10	NW9	WNW10	WNW9	WNW8	NW11	NW11	NW13	NW12	NW11	NW11	NW10	NW9	NW9	NNW7	NW8	NW8	NW9	NW5	NW6	NW4	NW5	NW3	NW8.8	NW13
10-May	NW4	NW4	NW4	NW3	WNW3	NW5	NW3	NNW4	N7	N8	N9	N9	N7	N7	N7	NNE8	NNE8	NNE8	NNE5	NE9	NE7	NE6	NE7	NE9	N5.4	NE9
11-May	NE8	NNE6	NNE5	NNW3	NNW3	N4	NNE5	NE7	NNE10	NE10	NNE10	NNE10	NE13	NE14	NNE12	NNE11	NE12	NE11	NE10	NNE7	NNE6	N4	N3	N5	NNE7.7	NE14
12-May	N4	N4	N4	N4	N4	N5	N5	NNE8	NNE8	NNE10	NE12	NE11	NE13	NNE11	NE11	NE11	NE10	ENE8	ENE7	NE5	N3	NNE4	N2	NNW2	NNE6.5	NE13
13-May	NW3	WNW4	WNW5	W6	W6	W7	WNW6	WNW6	NW6	N5	NNW3	NNE3	W2	W1	NW5	WNW5	WNW6	N4	N6	ENE5	SE4	SSW6	SW8	SW8	WNW3.0	SW8
14-May	SW9	SW8	W8	W8	W9	W9	W10	WNW9	NW7	NW8	NNW7	NNW8	WNW9	NW7	NW8	NNW6	NW7	NW7	NNE4	ESE4	SE4	S3	SSW6	SW8	WNW4.9	W10
15-May	SW7	SW7	SW7	SW7	SW7	SW3	NNE4	NNW2	NE4	NE6	NE4	NW3	W3	WSW4	NW0	ENE2	E2	SE3	SE4	SE3	S5	SW6	SSW7	SSW8	SSW2.0	SSW8
16-May	SW10	SW9	SW10	SW9	SW10	SSW9	SSW10	SSW9	SSW8	SSW10	SSW16	SSW17	SSW18	SSW17	SSW15	SSW17	SSW17	SSW16	SSW12	S7	SSE6	S9	S10	SSW12	SSW11.6	SSW18
17-May	SSW12	SSW12	SSW14	SSW13	SSW9	SW8	SW7	WSW6	WSW7	WSW6	WSW7	W10	W10	WNW6	NW5	WNW6	WNW7	E3	ESE7	ESE7	S4	SSW7	SW8	W9	SSW5.5	SSW14
18-May	W9	W9	W9	W8	WSW7	SW6	W7	W7	W6	W8	W8	WNW9	W8	W10	WNW9	NW6	NW7	WNW5	NW4	WNW3	AF	WNW0	N2	N3	W6.0	W10
19-May	NNE6	N5	NNW4	N4	NNE9	NNE13	NE13	NE16	NE14	NE14	NE12	NE12	NE17	NE16	NE18	NE16	NE16	NNE15	NNE14	NE13	NE14	NE14	NE14	NE15	NE12.4	NE18
20-May	NE15	ENE13	ENE13	ENE13	ENE13	ENE13	ENE13	ENE14	ENE14	ENE12	ENE13	ENE13	E10	ENE10	ENE10	E7	NE8	NE7	NE9	NNE7	NNE6	N4	NNW3	NNE5	ENE9.7	NE15
21-May	NE4	NNW3	N3	NNE6	NE7	NE6	NE6	NE6	NE6	NE5	NNE3	N3	NNE4	NNE5	NNE3	NNE4	NNE4	NE5	NNE6	NE7	NE9	NNE9	NE9	NE10	NNE5.3	NE10
22-May	NNE11	NNE9	NNE11	NNE12	NNE12	NNE13	NNE13	NNE13	NNE13	NNE14	NNE15	NNE16	NNE17	NNE16	NE12	NNE12	NNE10	NE10	NNE10	NE11	NE12	NE10	NE11	NE11	NNE12.1	NNE17
23-May	NE11	NE11	NE10	NNE10	NE12	NNE10	NNE10	NNE9	NNE10	NE13	NE11	NE12	NE13	ENE11	SE8	ESE7	ESE6	ESE6	ESE5	SE5	SE6	SSE5	SSE4	NE6.8	NE13	
24-May	SSE3	S2	SE2	N2	ENE2	SE5	SSE7	SSE7	SSE6	SE5	SE7	S8	S8	S8	SSW9	SSW11	SSW13	SSW12	SSW11	SSW7	SW5	SSW5	SSW5	SSW6	S5.4	SSW13
25-May	SSW7	SSW8	SSW9	SSW10	SSW10	SSW11	SSW12	SSW10	SSW11	SSW9	SSW9	SW7	SSW7	WSW7	WSW3	E3	ESE4	SE4	SE2	SS1	SSW3	N1	NE3	SSW5.8	SSW12	
26-May	S1	SW6	WSW6	WSW5	WNW5	N3	NNE5	NE6	ENE5	ENE2	NE5	N4	NE2	SE12	SSW7	SSW7	SE5	ESE5	ENE4	ENE5	ENE5	ENE4	ENE5	NE5	E1.4	SE12
27-May	NE5	ENE6	E4	ENE4	ESE5	ESE5	ESE4	ESE3	SE4	ESE8	E8	ESE7	SE12	SE12	SW12	SSW3	NNE5	NNE9	N4	NNE2	ENE4	SE4	ESE6	SE6	ESE3.9	SE12
28-May	ESE7	SE7	SE7	SE6	ESE5	SE5	SE6	ESE7	ESE7	ESE6	SSE7	SE6	SE6	SE9	S8	S6	S6	SSW6	SSW3	SSW4	SSW4	SSW5	SSW5	W4	SSE4.8	SE9
29-May	W3	SW5	WNW6	NW2	NW1	NE2	NE4	NE5	ENE3	NNE3	NE3	NE4	E7	E7	E8	ESE7	ESE7	E6	E5	E4	W2	WNW8	NW6	WNW6	NE1.7	WNW8
30-May	NW6	NW7	WNW7	NW6	NW5	NW4	NW5	N4	NNE6	NE5	ENE5	WNW4	W5	NNE2	NNW1	NNW3	NW3	SSW5	SSW6	WSW3	WNW2	WNW3	WNW4	NW5	NW2.9	WNW7
31-May	NW3	WNW3	WNW5	NW4	NW4	NW4	NW5	NNW4	NNE4	N5	NNW4	WNW4	WNW5	W3	W4	W3	WSW3	WSW3	WSW3	SW4	SSW3	SSW5	SW8	SW8	W2.9	SW8

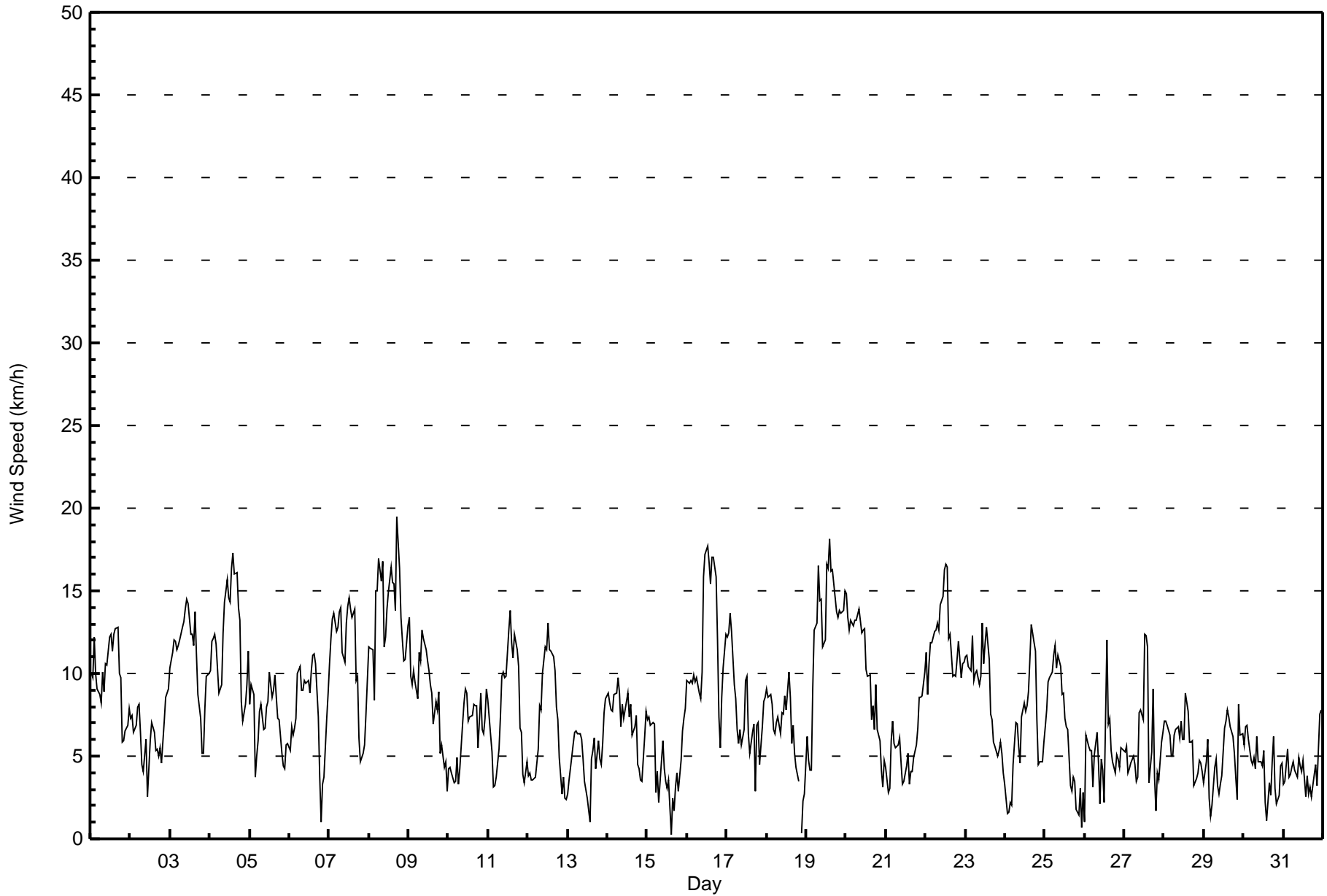
W1.9	WSW2.6	W3.3	W3.0	W2.7	WNW2.3	WNW2.1	NW1.7	NNW1.8	NNW1.8	NNW1.4	NW2.4	WNW2.2	NW1.5	WNW2.6	WNW2.5	NW2.2	NW1.3	NNW1.1	NE1.0	ENE0.4	SW1.0	WSW1.5	W1.6	Diurnal Average
NE15	ENE13	SSW14	SSW14	NW15	NW15	NW17	NE16	WNW17	NE14	SSW16	SSW17	SSW18	SSW17	NE18	SSW17	SSW17	W19	W16	W13	NE14	NE14	NE14	NE15	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Stony Mountain - May 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	232	31.22	31.22
6 - 11	366	49.26	80.48
12 - 19	145	19.52	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Stony Mountain - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	30	21	16	16	6	9	16	8	7	12	7	8	12	21	30	13	232
6 - 11	8	34	37	7	6	15	11	7	13	46	35	13	46	29	53	6	366
12 - 19	0	17	27	11	0	0	3	0	1	28	20	8	15	8	7	0	145
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	38	72	80	34	12	24	30	15	21	86	62	29	73	58	90	19	743

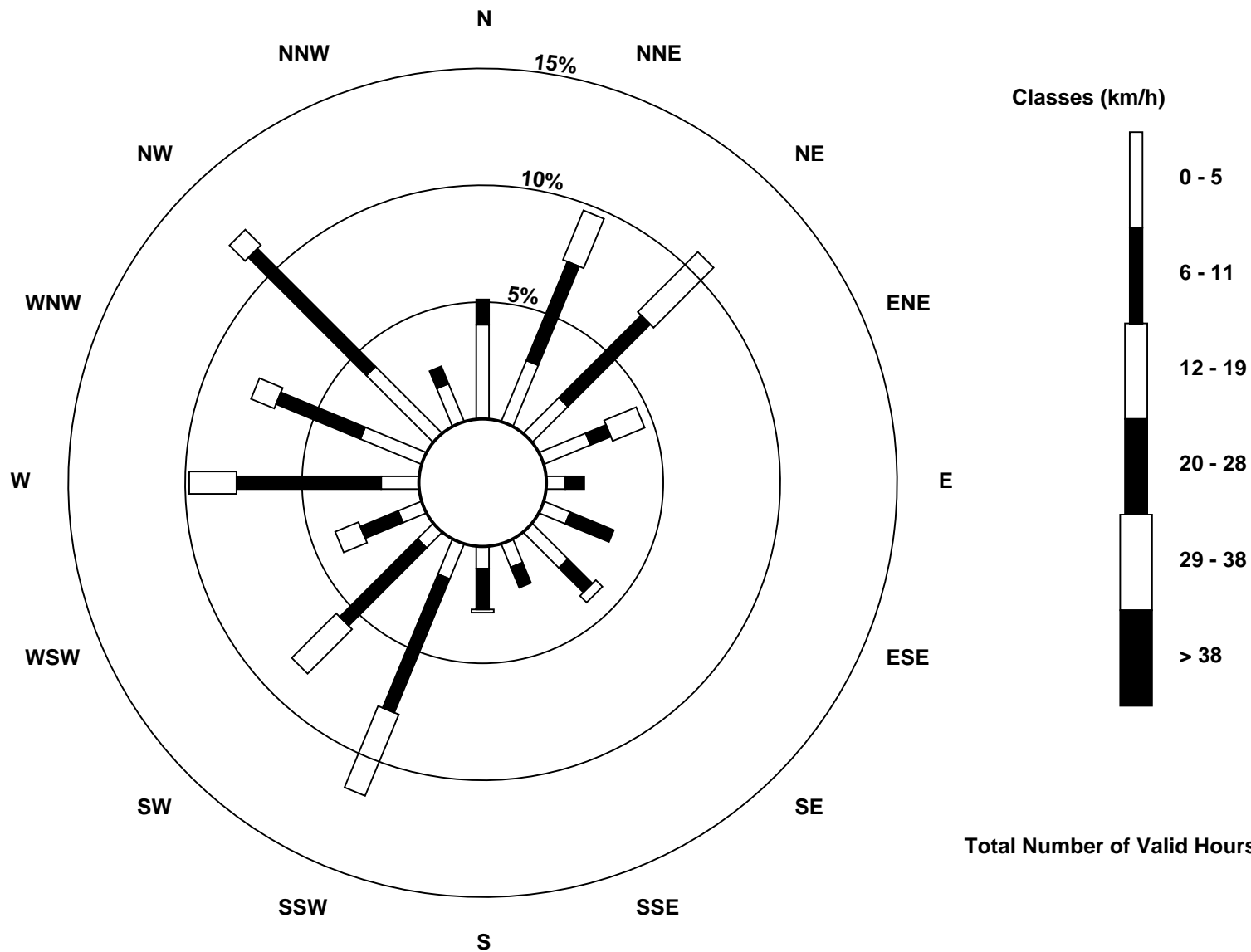
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Stony Mountain (AMS 18)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Stony Mountain - May 2016

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



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Stony Mountain - May 2016

Direction of Maximum Speed: 260 deg on May 8 18:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 39.6 deg on May 19	Hours of Data: 743
Direction of Minimum Speed: 305 deg on May 15 15:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 1.4 deg on May 26	Percent Operational Time: 99.9
Monthly Average Direction: 274.6 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-May	265	266	271	265	241	241	223	216	217	270	249	256	276	274	280	275	298	315	309	302	274	269	264	274	266.9
2-May	266	263	267	274	286	302	311	351	60	68	162	288	251	278	260	232	246	267	233	226	216	218	226	224	258.0
3-May	216	218	222	222	218	221	221	225	226	220	220	221	216	199	196	197	190	195	180	172	165	193	202	212	210.3
4-May	216	217	215	221	223	223	212	213	214	220	207	235	255	288	280	285	292	304	301	311	316	309	311	303	256.3
5-May	307	307	308	297	279	318	309	313	321	329	329	317	313	319	307	304	326	324	324	309	291	296	303	317	312.4
6-May	320	322	299	280	279	274	281	281	315	326	308	294	274	286	296	296	295	295	298	77	139	167	202	207	287.2
7-May	204	205	210	212	213	210	211	210	216	242	250	236	241	252	234	263	260	209	194	177	166	168	168	176	219.5
8-May	191	189	210	265	309	310	309	300	294	273	271	270	252	254	253	273	264	260	264	261	271	274	274	307	270.0
9-May	313	319	312	301	295	301	308	311	314	304	312	324	307	322	324	335	321	320	313	321	318	320	314	317	313.4
10-May	304	311	317	306	298	307	322	337	3	352	5	1	5	6	3	25	33	30	19	49	48	47	55	48	9.6
11-May	41	32	16	348	335	357	20	37	30	48	24	30	39	41	31	31	43	38	39	23	22	10	358	7	30.1
12-May	359	3	356	351	354	357	6	24	31	32	35	35	41	24	38	37	42	61	57	39	9	18	0	329	28.7
13-May	307	294	287	280	279	278	282	298	315	350	336	21	280	275	314	291	298	350	9	67	143	198	214	222	290.8
14-May	226	235	259	264	272	276	281	294	316	305	327	331	303	324	312	327	325	316	30	104	136	183	204	215	286.8
15-May	216	220	221	223	226	230	32	347	44	42	47	325	279	241	305	59	87	141	146	134	178	217	212	210	210.5
16-May	214	218	215	215	215	213	206	201	205	194	200	197	200	200	207	200	194	199	195	184	168	185	190	192	200.6
17-May	197	200	204	211	205	214	234	239	256	245	244	265	267	303	310	300	295	92	115	106	174	205	234	259	228.7
18-May	273	277	269	273	252	224	260	275	281	273	279	298	264	275	291	313	313	301	308	286	AF	282	11	351	280.2
19-May	24	11	342	359	18	26	38	44	42	47	51	34	40	45	47	39	34	31	33	36	53	54	55	54	39.6
20-May	54	58	60	65	64	64	67	64	58	62	67	70	82	72	72	81	45	36	42	31	17	4	339	19	58.3
21-May	34	347	349	33	40	47	49	48	52	50	15	356	12	18	23	19	24	38	33	40	36	28	39	38	32.5
22-May	26	24	24	28	28	32	30	30	30	26	30	32	32	33	38	32	26	35	33	40	44	42	40	35	32.1
23-May	38	36	35	29	35	27	25	24	19	26	37	47	49	54	78	142	119	120	111	109	136	139	154	156	55.5
24-May	157	178	129	3	61	133	153	148	149	125	131	176	191	183	207	203	204	199	209	208	217	210	198	200	184.1
25-May	205	206	209	205	201	201	201	197	204	197	194	211	223	210	237	240	95	103	128	135	153	200	9	47	200.4
26-May	183	228	242	258	303	356	30	53	62	78	40	10	38	142	206	200	141	105	57	66	58	73	67	50	85.1
27-May	53	61	96	78	102	107	109	112	135	115	101	113	138	142	220	204	18	33	7	13	75	127	119	134	109.1
28-May	123	131	135	136	123	136	125	120	121	123	156	132	141	128	181	182	186	202	196	203	207	210	212	261	153.0
29-May	263	216	299	320	323	53	45	47	71	16	36	49	82	90	94	112	106	95	92	85	269	294	304	303	54.1
30-May	306	304	302	306	309	311	315	358	20	49	67	293	279	14	347	334	304	193	207	244	295	297	301	306	310.3
31-May	310	303	302	308	306	304	306	345	25	8	329	300	290	278	275	275	256	244	250	231	205	209	219	226	280.5

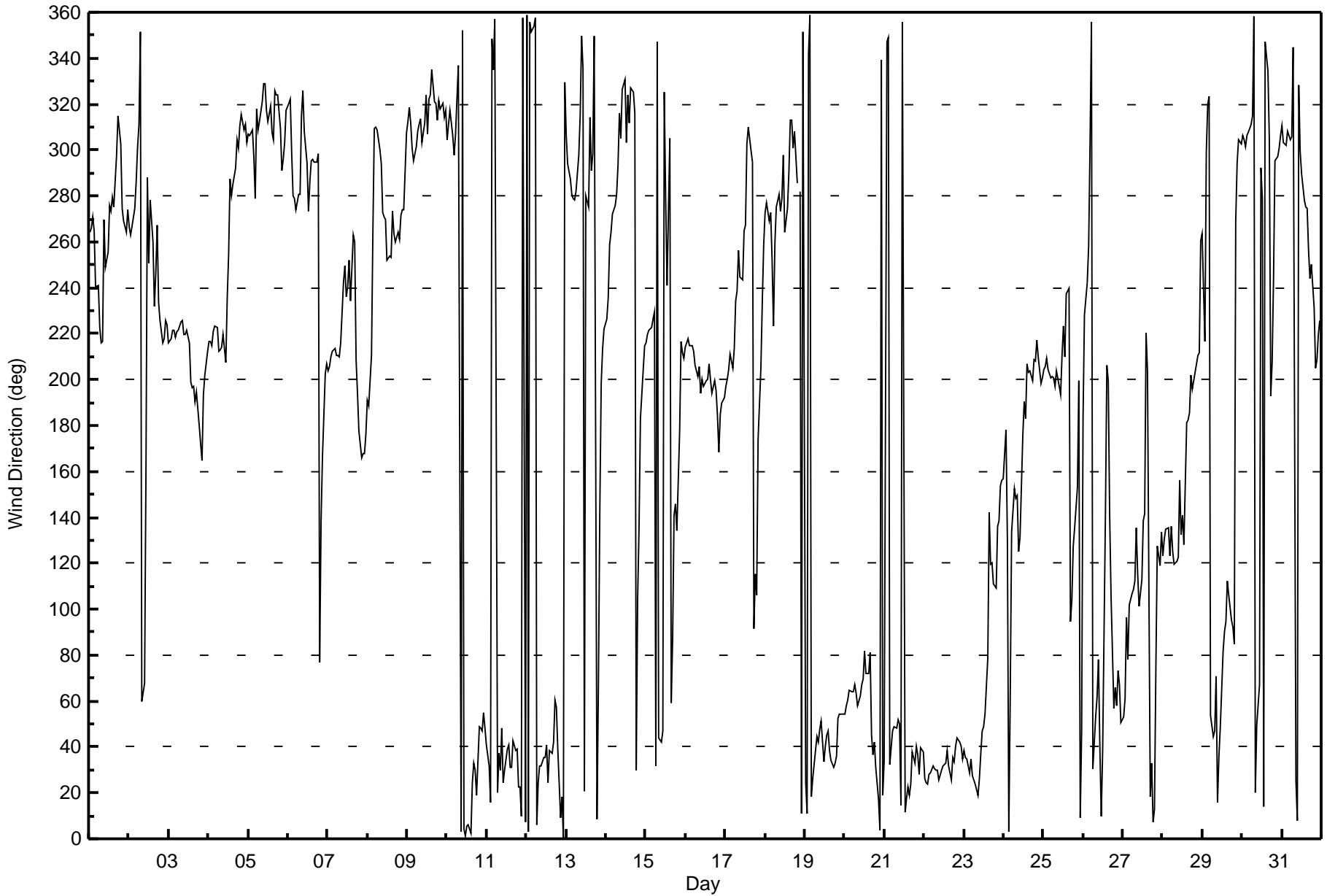
263.1 255.4 260.7 265.8 275.9 283.0 298.3 322.5 339.0 344.6 328.8 305.0 287.1 307.1 286.4 289.3 313.6 324.8 345.3 37.6 70.7 230.7 237.4 261.4
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Stony Mountain - May 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Stony Mountain - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on May 13 14:00 Minimum Value: 11 deg on May 28 21:00 Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 22 Median = 29 O ₃ = 37 P ₉₀ = 51 P ₉₉ = 92		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																																													
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-May	21	20	22	26	20	21	19	19	27	34	44	34	33	37	34	34	32	32	27	20	15	14	16	16	44																						
2-May	16	16	14	12	14	17	20	35	56	43	93	88	66	54	67	75	74	51	32	13	12	15	16	16	93																						
3-May	16	18	18	18	16	18	18	21	23	23	27	28	39	35	33	29	32	28	31	27	23	18	17	17	39																						
4-May	16	16	17	18	18	21	20	21	22	23	25	32	34	32	29	27	29	26	26	27	23	23	22	26	34																						
5-May	26	24	28	52	33	23	21	24	29	38	43	45	39	43	48	35	42	36	38	28	20	27	25	28	52																						
6-May	19	28	23	23	24	26	27	30	33	42	42	50	52	48	40	41	39	32	45	45	25	19	13	16	52																						
7-May	18	19	19	20	20	20	21	20	23	32	34	31	33	34	32	34	38	27	26	30	25	25	30	31	38																						
8-May	22	22	28	45	26	27	28	28	29	32	33	31	33	36	38	34	34	28	30	30	29	30	28	31	45																						
9-May	28	38	32	29	27	28	33	33	33	34	42	40	40	43	38	50	36	38	32	30	32	32	33	25	50																						
10-May	23	27	29	17	19	23	44	50	49	51	44	52	49	46	46	40	29	37	38	21	17	18	20	19	52																						
11-May	19	20	20	16	14	25	33	30	30	35	38	41	33	28	34	34	29	27	23	24	20	27	25	23	41																						
12-May	23	22	21	22	24	25	30	29	30	32	31	37	33	42	33	30	26	31	21	18	32	18	18	14	42																						
13-May	14	12	15	15	15	18	27	29	43	67	82	90	88	112	76	67	43	65	56	38	27	18	17	18	112																						
14-May	19	21	24	26	25	28	29	29	46	44	55	52	45	51	50	48	50	46	64	21	17	13	13	15	64																						
15-May	15	13	12	14	14	76	26	53	55	47	67	84	96	84	109	86	96	73	36	25	36	20	14	16	109																						
16-May	20	21	21	20	20	20	21	24	34	36	31	29	30	32	29	31	28	30	34	36	31	24	22	36	36																						
17-May	21	21	21	23	20	22	27	34	39	40	46	42	43	60	62	40	42	93	25	26	28	15	22	29	93																						
18-May	29	28	31	32	30	24	32	31	34	33	42	41	57	36	34	55	51	35	46	24	AF	74	24	27	74																						
19-May	24	31	32	35	25	22	23	20	20	21	23	26	21	22	21	22	22	23	23	21	22	21	22	21	35																						
20-May	22	22	24	24	24	26	28	24	25	28	25	29	34	41	39	33	22	22	22	22	21	47	28	29	47																						
21-May	36	50	34	22	20	19	21	24	33	47	37	34	35	29	29	33	22	22	26	26	22	21	22	23	50																						
22-May	25	25	26	25	27	25	23	24	23	24	24	22	24	23	24	23	24	24	21	24	23	24	26	24	27																						
23-May	23	25	23	26	24	25	25	26	28	25	25	29	29	28	41	43	39	40	33	22	28	23	29	27	43																						
24-May	21	36	57	36	21	27	32	37	44	48	38	45	38	43	44	34	25	30	27	23	15	15	13	14	57																						
25-May	16	19	19	20	20	20	23	26	27	31	39	34	53	55	54	94	37	21	31	51	46	17	89	28	94																						
26-May	64	18	31	31	23	32	34	29	40	78	38	77	68	29	29	32	38	33	38	25	21	24	20	16	78																						
27-May	18	24	25	23	25	25	35	39	54	41	36	38	34	37	45	70	50	21	80	76	38	46	25	29	80																						
28-May	23	26	28	29	25	29	25	25	25	28	37	32	35	31	42	37	41	35	27	17	11	17	22	31	42																						
29-May	62	43	20	31	48	34	22	30	31	38	46	45	35	39	35	34	33	36	32	32	97	27	23	19	97																						
30-May	17	19	20	22	25	36	37	51	37	50	36	70	34	72	96	62	84	59	24	30	24	26	29	30	96																						
31-May	27	31	30	33	29	28	29	54	53	59	69	73	64	89	78	83	57	87	36	18	15	12	16	19	89																						
Diurnal Maximum																								64	50	57	52	48	76	44	54	56	78	93	90	96	112	109	94	96	93	80	76	97	74	89	31
AF - Analyzer Failure																																															



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Last Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	4:30	End Time (MST)	8:05
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-601	-608
Analyzer IP address	192.168.1.43		Lamp voltage	896	894
Calculated slope	0.984816	1.000866	Chamber temp	45.0	44.9
Calculated intercept	0.316996	0.428029	Pressure	659.0	655.0
Analyzer Background	21.6	20.9	Flow	0.395	0.389
Analyzer Coefficient	0.918	0.902	Intensity	86	85
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	0.1	----
as found span	5000	58.6	574.3	581.2	0.988
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	58.6	574.3	573.8	1.001
second point	5000	29.3	287.1	285.8	1.005
third point	5000	14.6	143.1	142.3	1.006
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	58.6	574.3	574.4	1.000
Average Correction Factor					1.004

Corrected As found 581.2 Previous response 582.8 % change 0.3%

Notes:

Remotely calibrating due to inhibited access to site during forest fires. Span adjusted, zero not adjusted.

Calibration Performed By: Zack Eastman



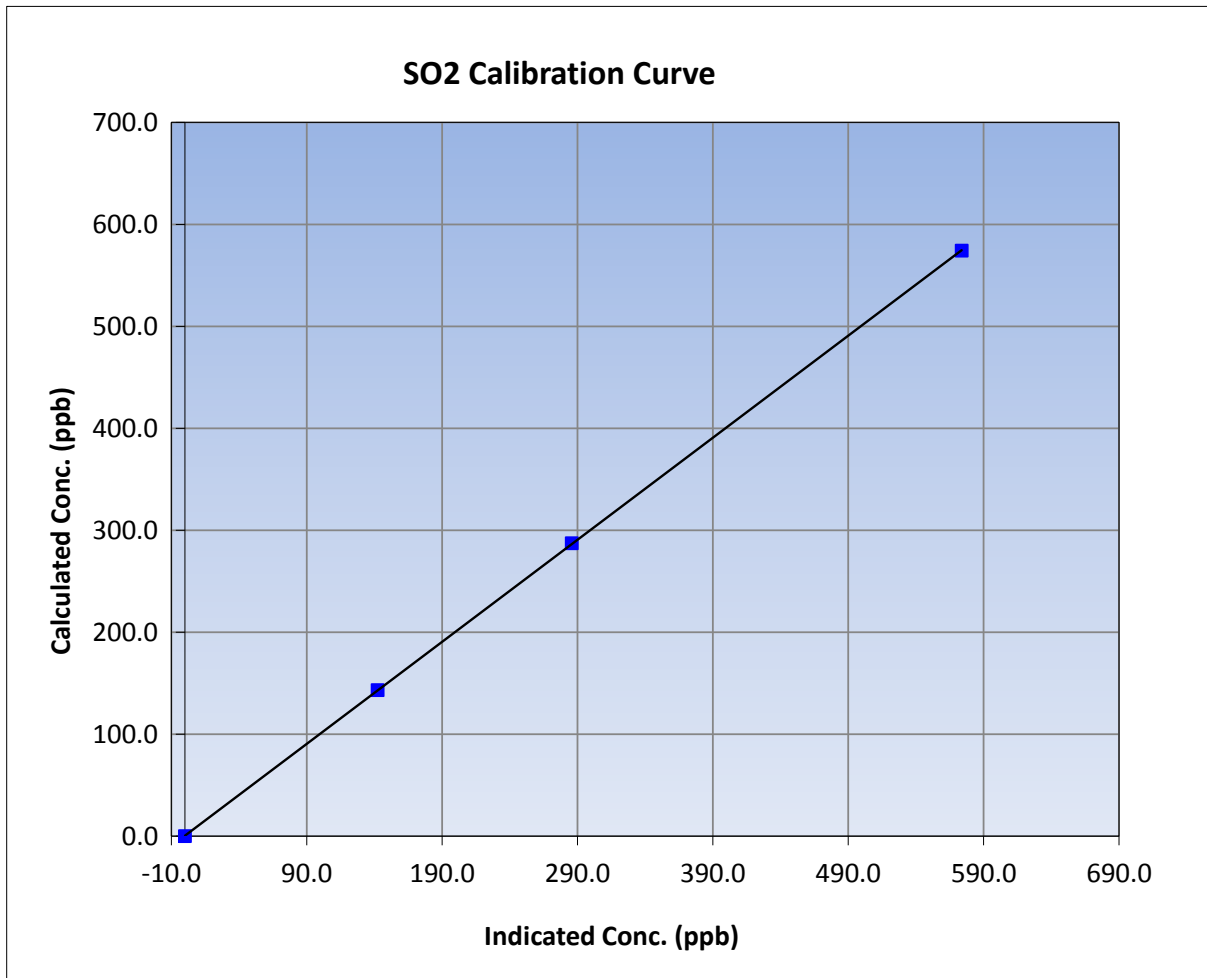
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	4:30	End Time (MST)	8:05
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

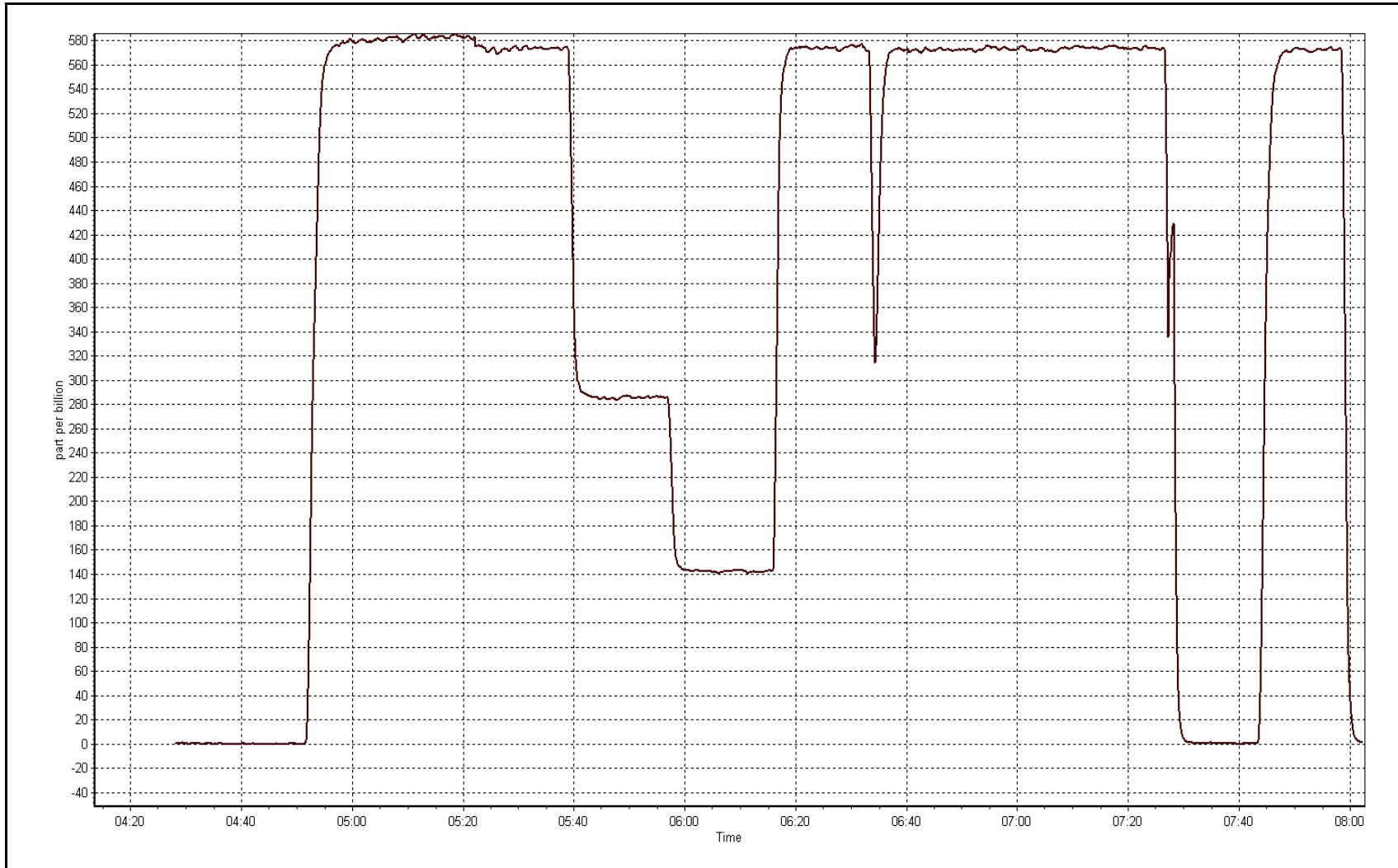
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999995
574.3	573.8	1.0009		
287.1	285.8	1.0047	Slope	1.000866
143.1	142.3	1.0057		
			Intercept	0.428029



SO2 Calibration Plot

Date: May 18, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 17, 2016	Last Calibration	April 27, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Other:		
Start Time (MST)	17:00	End Time (MST)	19:15
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	-698	-698
Analyzer IP address	192.168.1.42		Lamp voltage	1011	1011
Calculated slope	1.010643	1.011262	Chamber temp	45	45
Calculated intercept	-0.080571	0.074906	Pressure	634.0	634.0
Analyzer Background	2.9	2.9	Flow	0.409	0.409
Analyzer Coefficient	1.121	1.121	Intensity	90	90
			Converter temp.	850	850
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	-0.09	----
as found span	5000	82.0	80.0	79.1	1.012
SO2 scrubber check	5000	10.2	100.0	0.3	----
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	39.4	1.015
third point	5000	20.5	20.0	19.8	1.012
as left zero	5000	0.0	0.0	0.07	----
as left span	5000	82.0	80.0	79.6	1.005
Average Correction Factor					1.013

Corrected As found	79.2	Previous response	79.3	% change	0.1%
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Notes:

Calibration performed remotely due to inaccessibility during the forest fire in the area at this time. SO2 scrubber test performed after AF Zero but before AF Span. No adjustments made.

Calibration Performed By: Zach Eastman



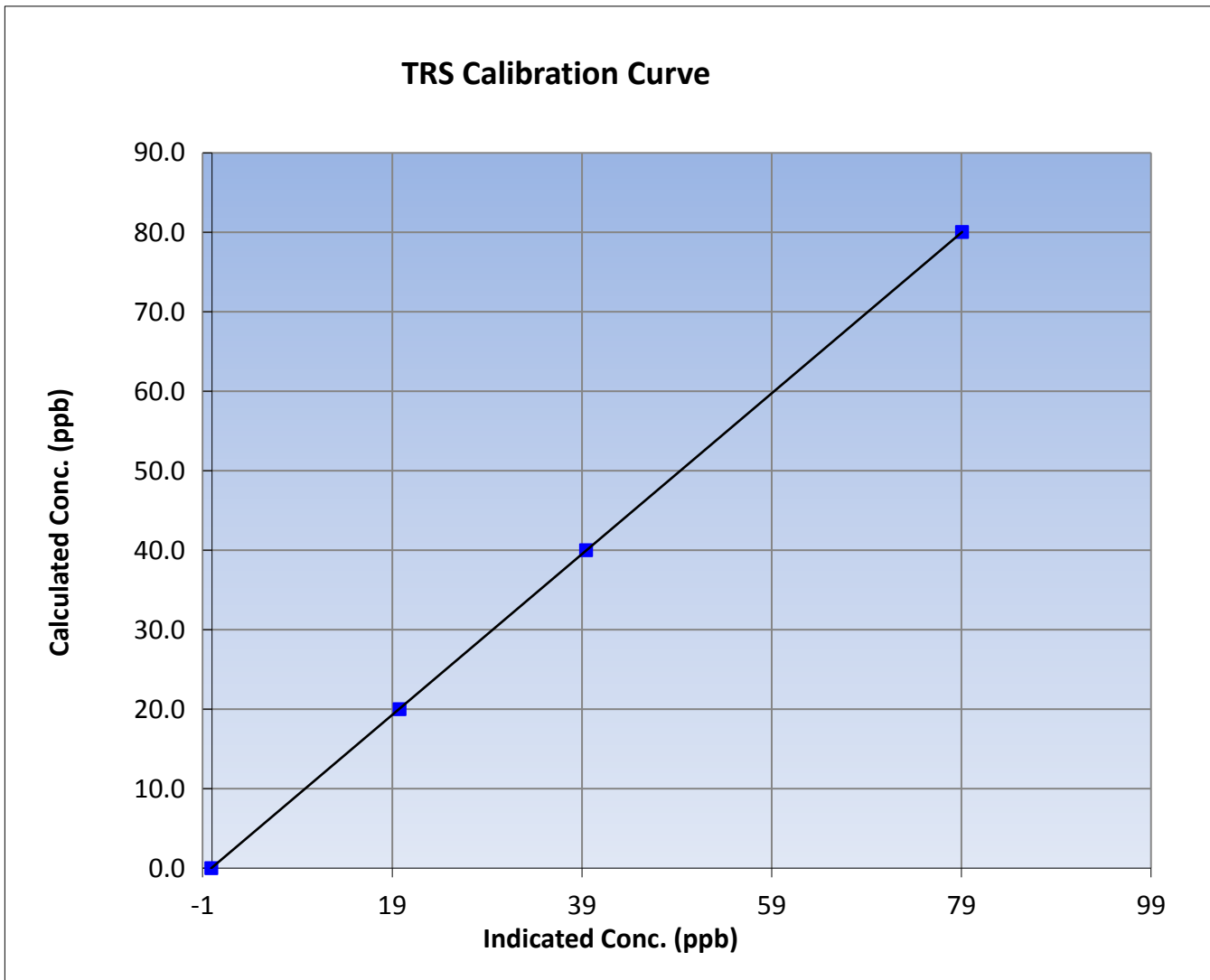
Wood Buffalo Environmental Association TRS Calibration Report

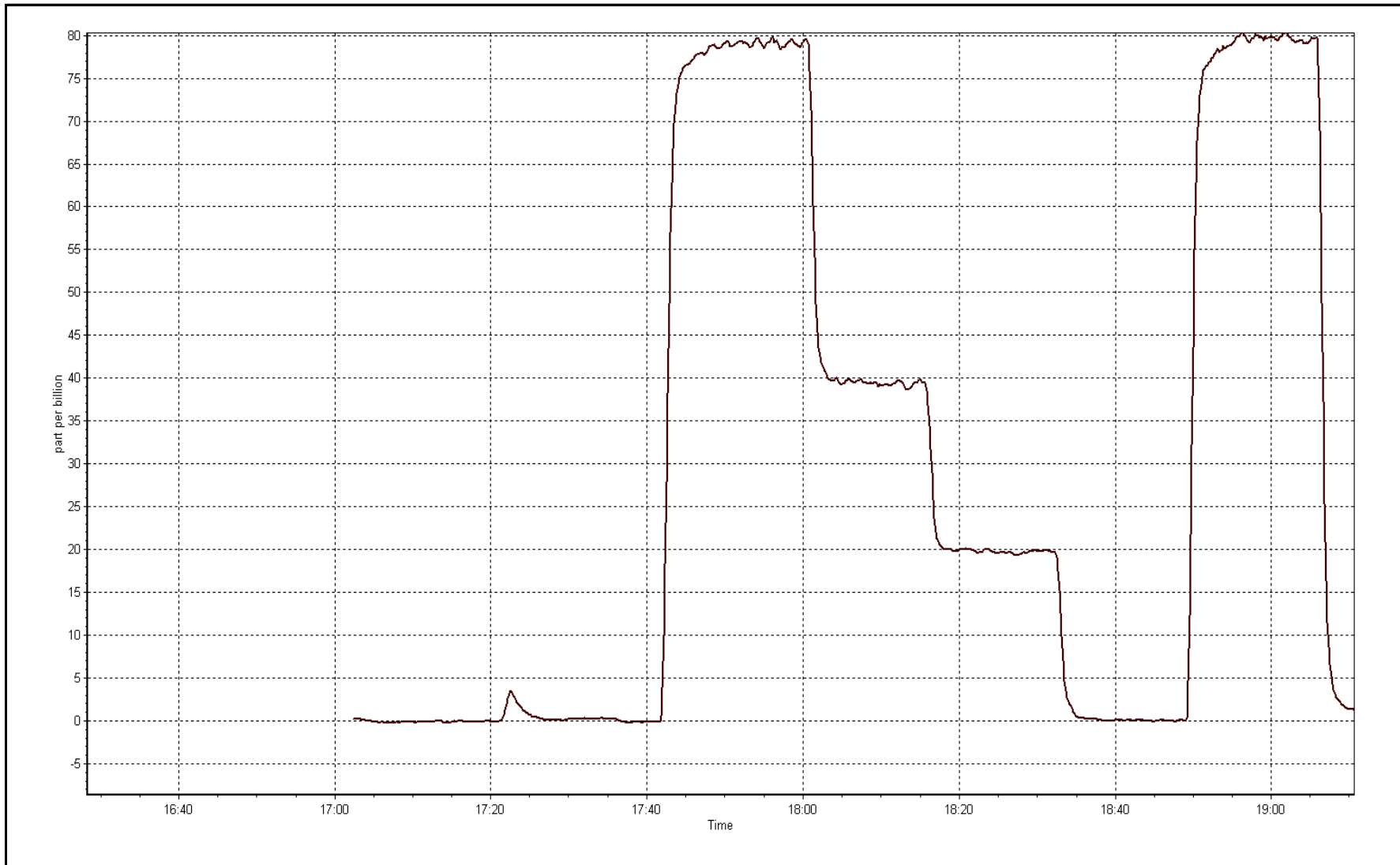
Station Information

Calibration Date	May 17, 2016	Previous Calibration	April 27, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	17:00	End Time (MST)	19:15
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	0.999998
80.0	79.1	1.0120		
40.0	39.4	1.0146	Slope	1.011262
20.0	19.8	1.0120		
			Intercept	0.074906







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May 18, 2016	Last Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	4:30	End Time (MST)	8:05
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	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	174.8	175.0
Analyzer IP address	192.168.1.55		Flame Temp	404.6	405.0
THC Calc slope	1.000559	0.999743	Carrier Pressure	30.9	30.0
THC Calc intercept	-0.002303	-0.000302	Fuel Pressure	44.3	44.0
NMHC Calc slope	0.998170	1.000965	Air Pressure	34.4	34.0
NMHC Calc intercept	-0.006213	-0.004230			

Analyzer make Thermo 55i Analyzer serial # 1218153354

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	58.6	12.61	12.45	1.013
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	6.30	1.001
third point	5000	14.6	3.14	3.15	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	12.61	12.61	1.000
Average Correction Factor					0.999

Corrected As found 12.45 Previous response 12.61 % change 1.3%

Notes:

Remote calibration performed due to inhibited access to site during forest fire. Span adjusted, zero not adjusted. Percent change for CH4 below threshold for concern but slightly high. No diagnostic issues noted to account for a 4% change, all appears to be ok. Chromatograms look good, no issues to note.

Calibration Performed By: Zach Eastman



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.6	6.54	6.64	0.985
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.54	6.54	1.000
second point	5000	29.3	3.27	3.27	1.000
third point	5000	14.6	1.63	1.64	0.994
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.54	6.54	1.000
Average Correction Factor					0.998

Corrected As found 6.64 Previous response 6.56 % change -1.2%

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	58.6	6.07	5.81	1.045
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	3.03	1.002
third point	5000	14.6	1.51	1.51	1.002
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.07	6.07	1.000
Average Correction Factor					1.001

Corrected As found 5.81 Previous response 6.05 % change 4.1%



Wood Buffalo Environmental Association

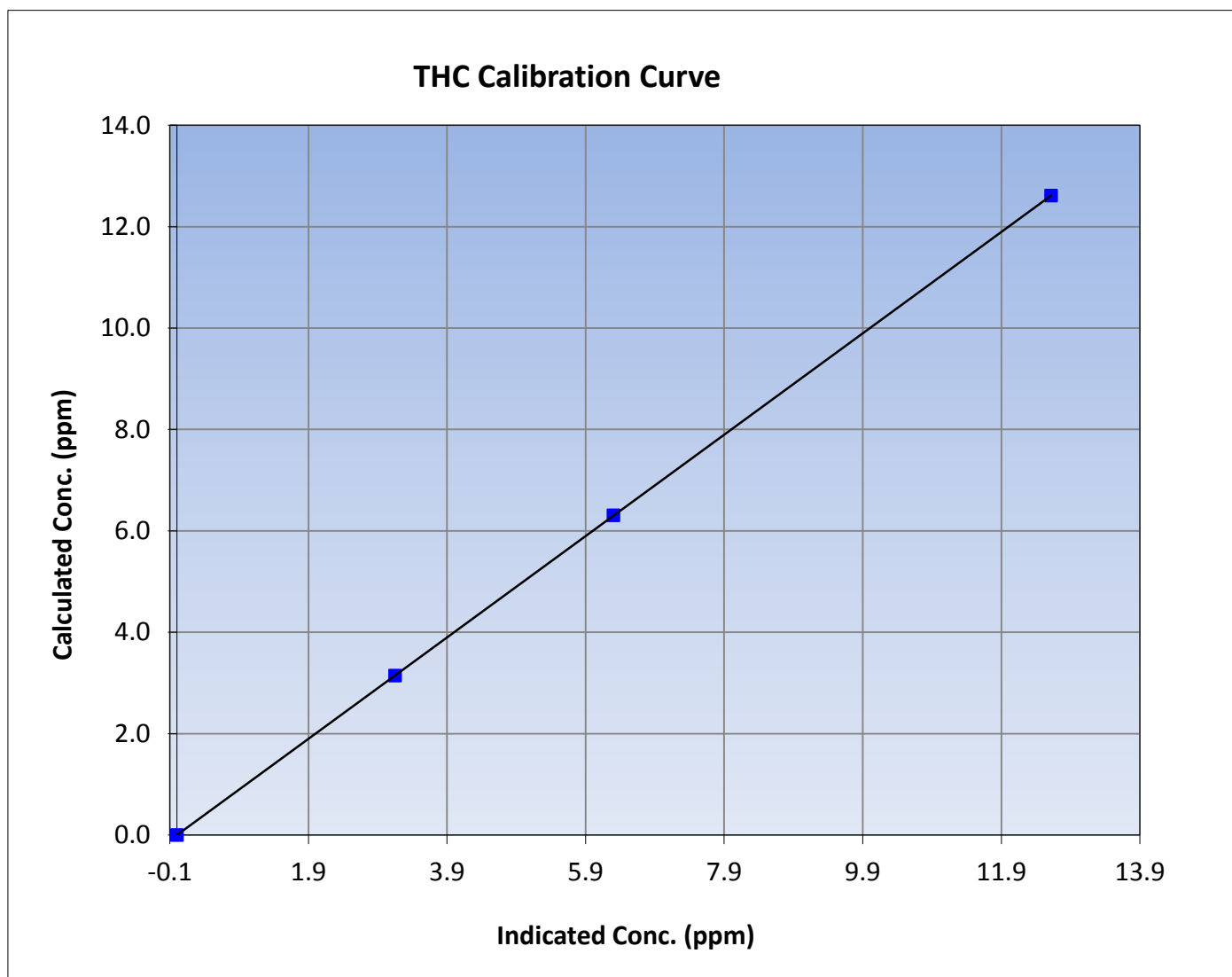
THC Calibration Summary

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	4:30	End Time (MST)	8:05
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	0.999999
12.61	12.62	0.9995		
6.31	6.30	1.0011	Slope	0.999743
3.14	3.15	0.9977		
			Intercept	-0.000302





Wood Buffalo Environmental Association

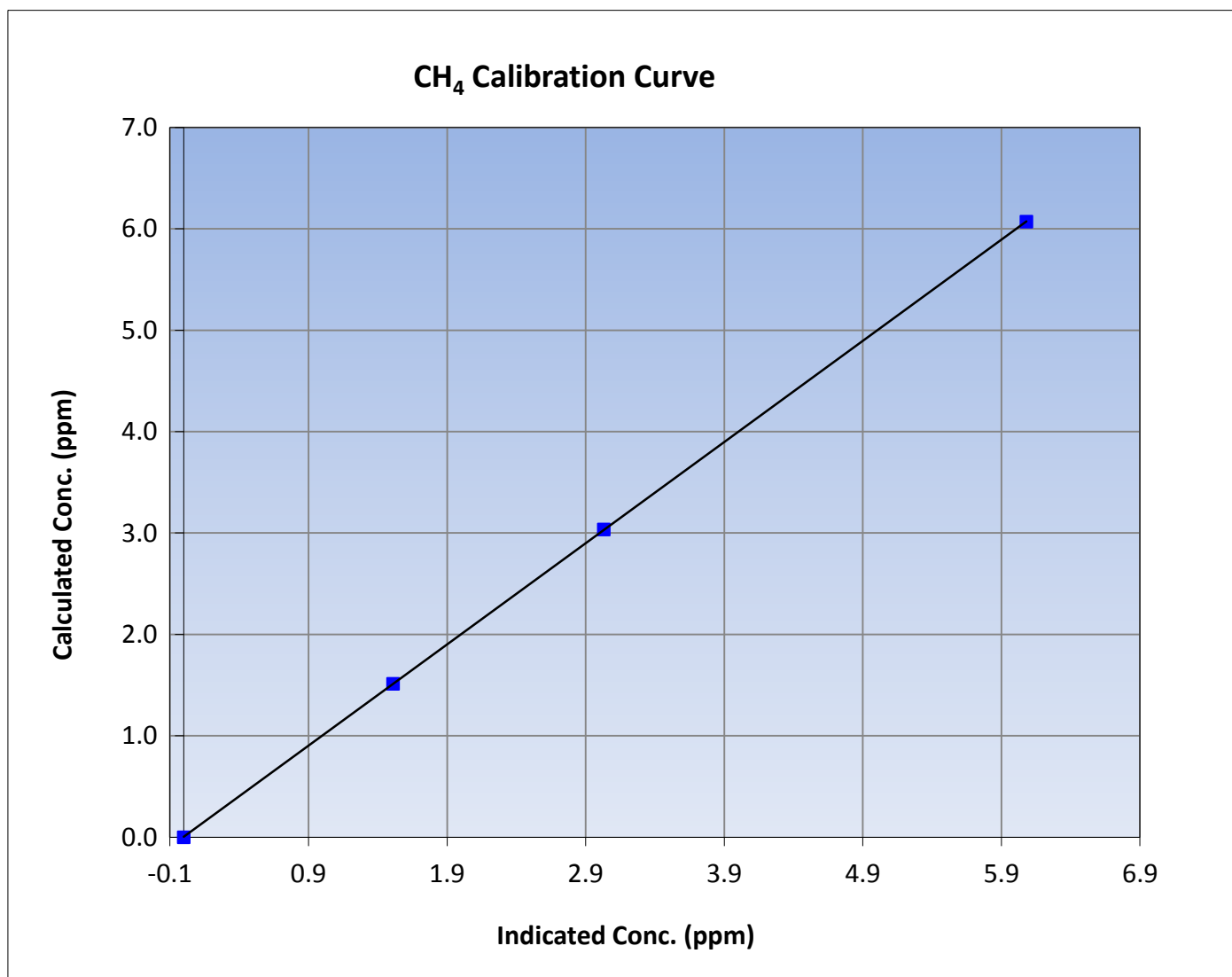
CH₄ Calibration Summary

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	4:30	End Time (MST)	8:05
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999997
6.07	6.08	0.9985		
3.04	3.03	1.0018	Slope	0.998426
1.51	1.51	1.0017		
			Intercept	0.003928





Wood Buffalo Environmental Association

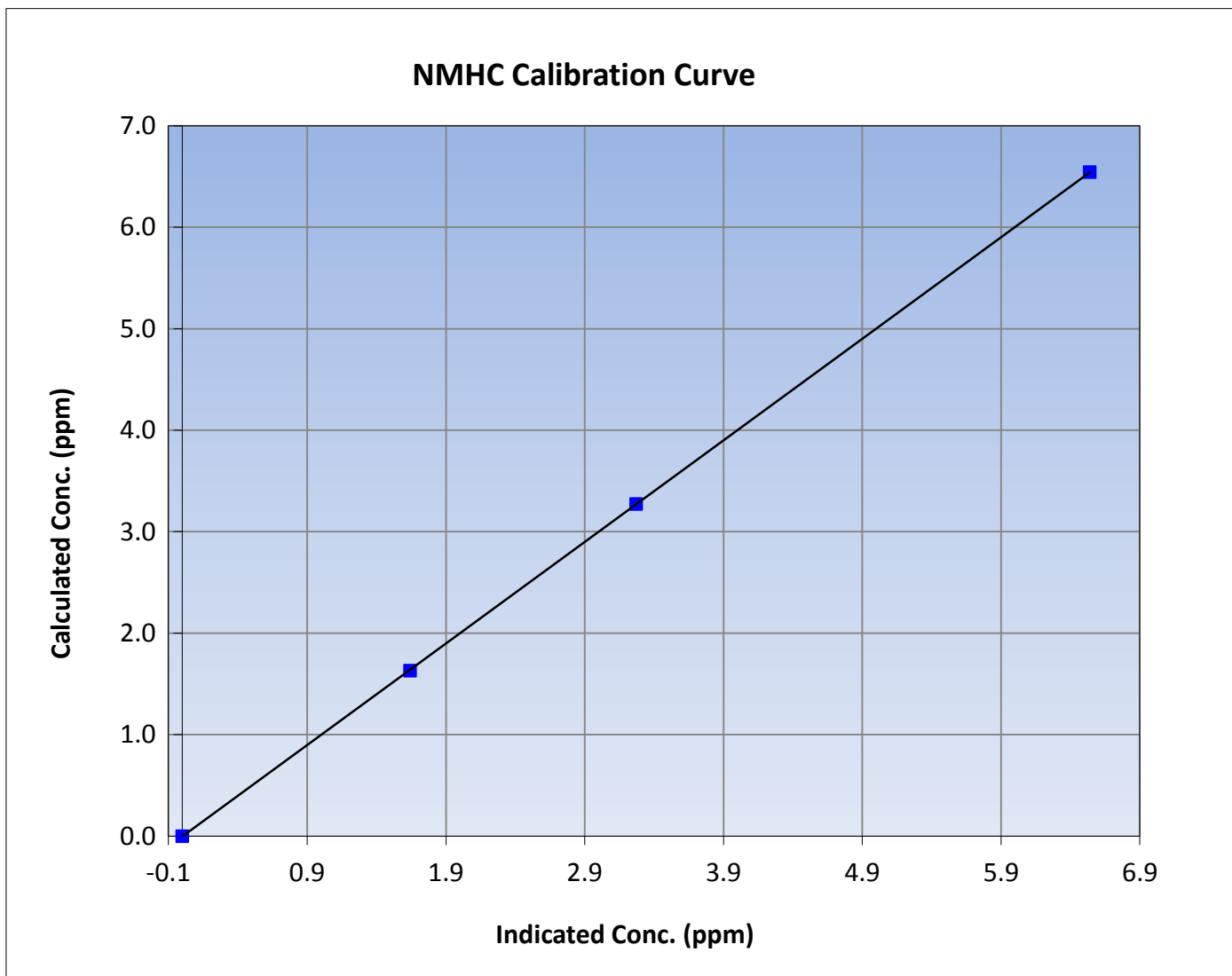
NMHC Calibration Summary

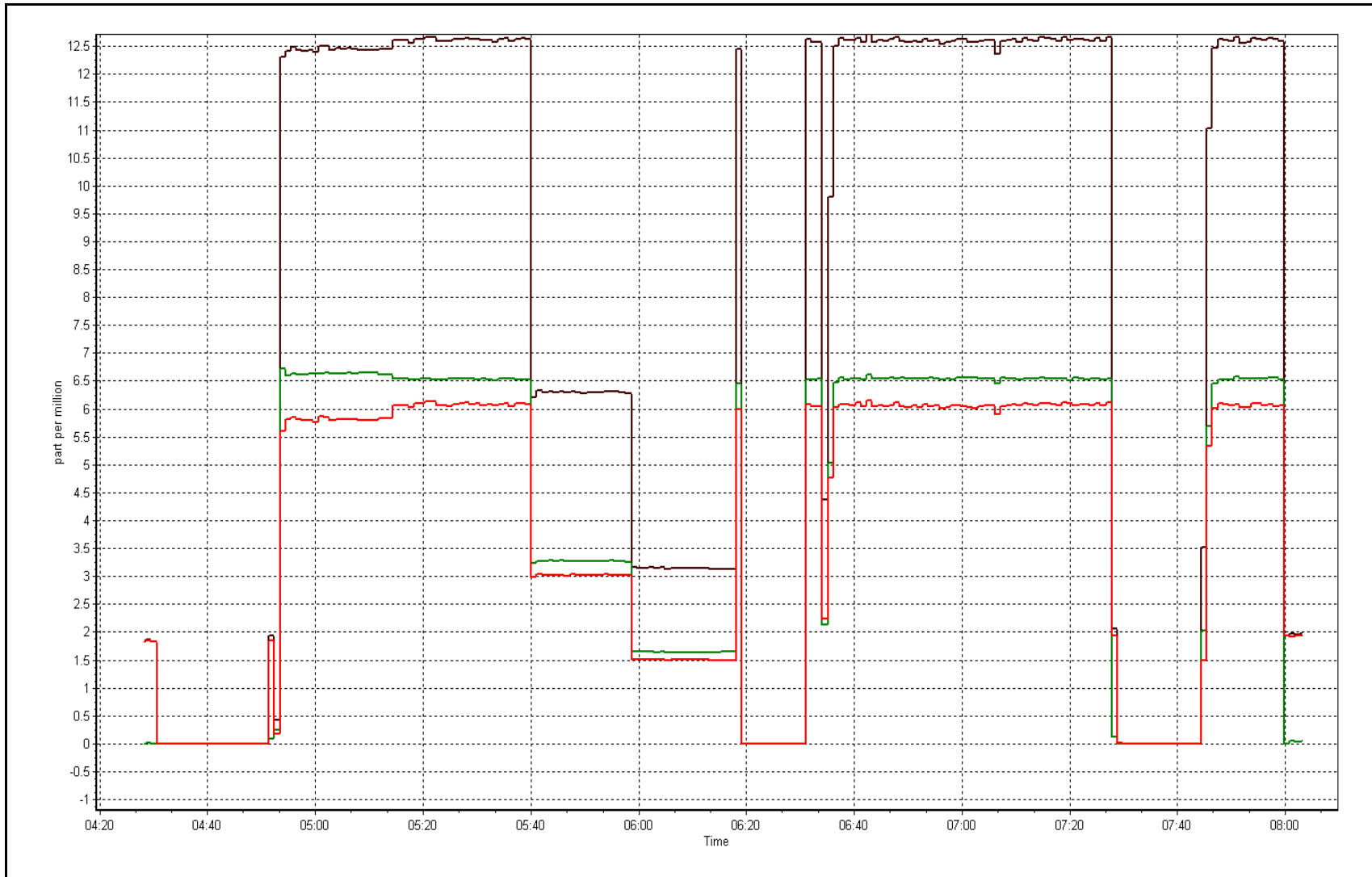
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	4:30	End Time (MST)	8:05
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999997
6.54	6.54	1.0004		
3.27	3.27	1.0004	Slope	1.000965
1.63	1.64	0.9940		
			Intercept	-0.004230







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 27, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Other:	REMOTE	
Start Time (MST)	8:00	End Time (MST)	10:40
NO2 GPT Ref date	May-18-16	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9305

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	29.6	29.6
Analyzer IP address	192.168.1.48		Lamp temp.	53.3	53.3
Calculated slope	0.995645	1.004992	Pressure	626.0	626.0
Calculated intercept	0.540049	0.487897	Flow cell A	0.686	0.686
Analyzer Background	-1.2	-1.1	Flow cell B	0.699	0.699
Analyzer Coefficient	1.174	1.213	Cell A Intensity	64xxx	64xxx
			Cell B Intensity	62xxx	62xxx

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-1.8	----
as found span	5000	1076	385.3	367.3	1.049
calibrator zero	5000	0.00	0.0	-0.1	----
high point	5000	1076	385.3	383.6	1.004
second point	5000	968	262.2	259.4	1.011
third point	5000	816	135.2	134.0	1.009
as left zero	5000	0.00	0.0	-2.0	----
as left span	5000	1076	385.3	385.0	1.001
Average Correction Factor					1.008

Corrected As found	369.1	Previous response	386.4	% change	4.7%
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Notes:

Remote calibration performed due to inhibited access from forest fire activity. Both zero and span adjusted slightly. % change of almost 5% does not exhibit any diagnostic issues noticeable from this remote calibration. Calibration passed with no issues of note.

Calibration Performed By: Zach Eastman



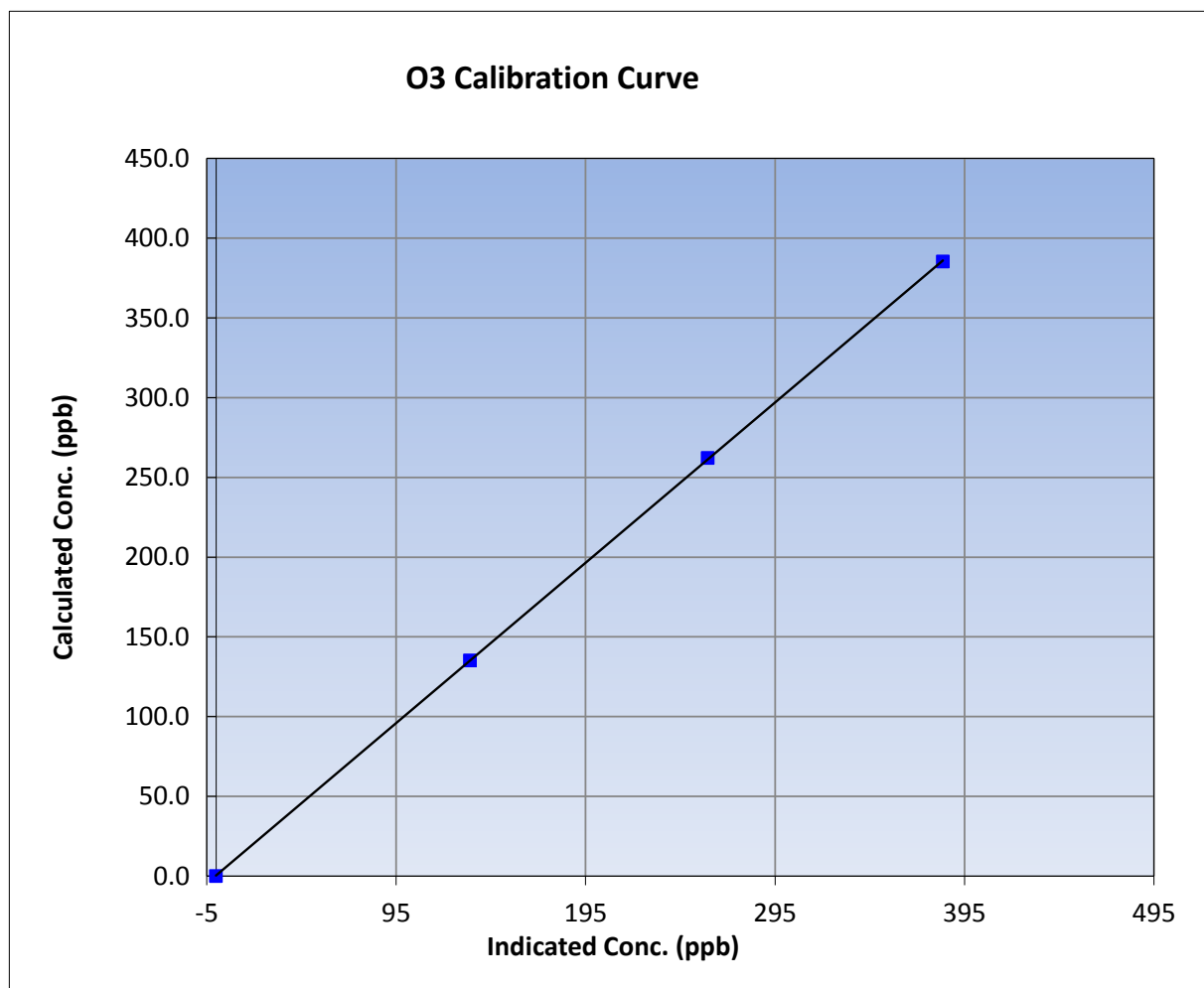
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-18-16	Previous Calibration	April 27, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	8:00	End Time (MST)	10:40
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

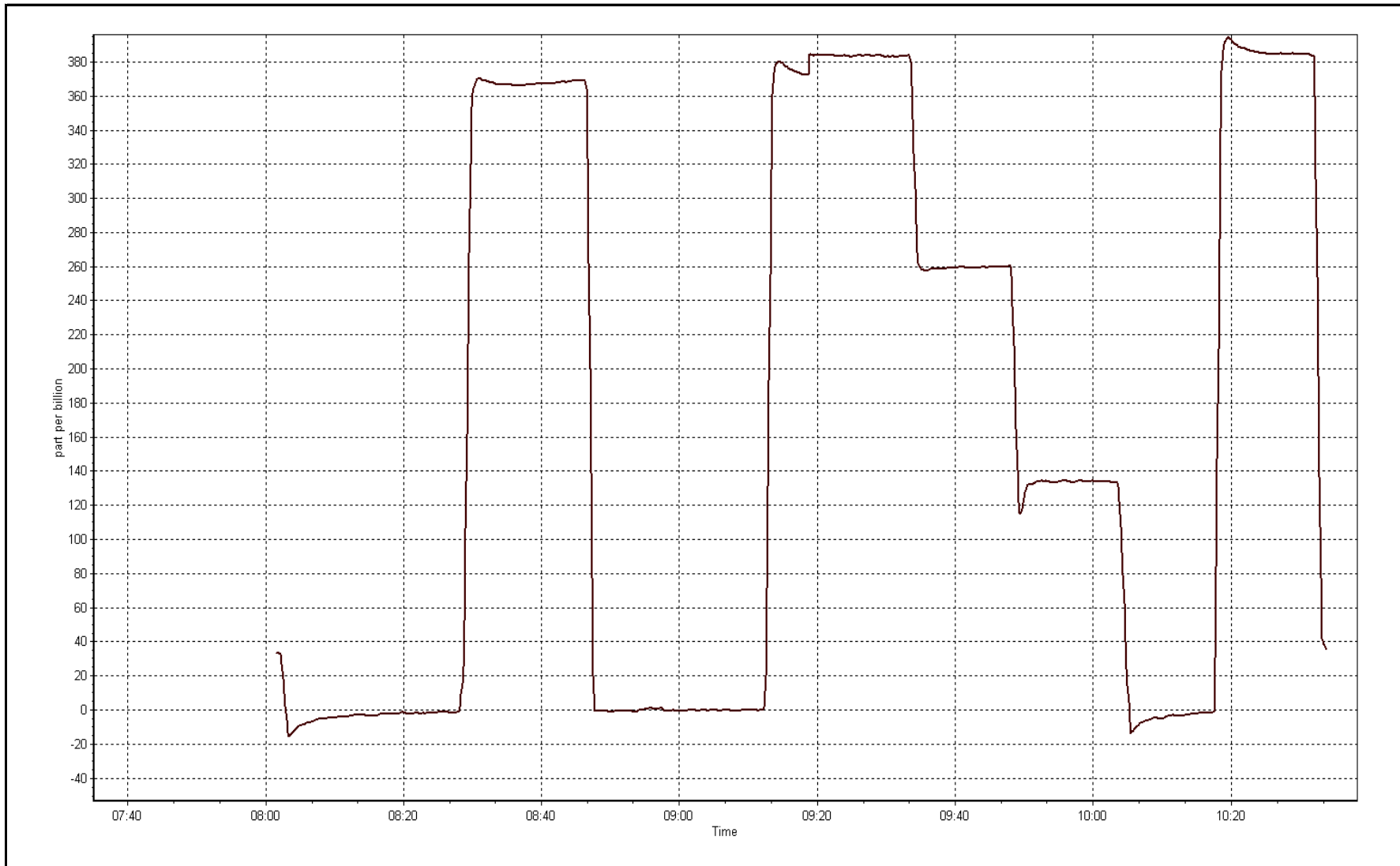
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999980
385.3	383.6	1.0044		
262.2	259.4	1.0108	Slope	1.004992
135.2	134.0	1.0090		
			Intercept	0.487897



O3 Calibration Plot

Date: May 18, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	4:30	End Time (MST)	8:05
NO Cal Gas Conc	51.2 ppm	Gas Cert Reference	EY0000368
NOx Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	10/06/2016
Calibrator	API T700	Serial Number	1222
Zero air Generator	Teledyne API T701	Serial Number	5610

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	9035
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002345	1.003148	0.999229
	Data Offset	0.036097	0.377666	0.248333
Current Calibration	Data Slope	0.995282	0.995631	0.999892
	Data Offset	0.125700	0.464546	-0.118796

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.005		1.014	
NOx coefficient	0.997		0.999	
NO2 coefficient	0.999		0.997	
NO bkgnd	1.8		1.8	
NOx bkgnd	1.9		1.9	
Chamber Temp	50.2	Deg C	50.4	Deg C
Moly Temp	326.6	Deg C	327	Deg C
PMT voltage	-814	V	-814	V
PMT Temp	-2.7	Deg C	-3.1	Deg C
O3 flow	Ok	ccm	ok	ccm
R Cell press NO	153.6	mmHg	153.6	mmHg
R Cell Press Nox	153.6	mmHg	153.6	mmHg
NO sample flow	0.972	lpm	0.97	lpm
Nox sample Flow	0.972	lpm	0.970	lpm

Notes:

Remotely calibrated due to forest fires in the area inhibiting site access. Span adjusted, zero not adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 18, 2016

Station Number:

AMS 18

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.3	0.1	----	----
as found span	5000	58.6	600.1	600.1	0.0	594.8	594.1	0.8	1.0088	1.0101
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	0.3	0.1	----	----
high point	5000	58.6	600.1	600.1	0.0	602.7	602.6	0.1	0.9956	0.9958
second point	5000	29.3	300.0	300.0	0.0	301.5	300.5	0.9	0.9951	0.9984
third point	5000	14.6	149.5	149.5	0.0	150.1	149.0	1.1	0.9962	1.0036
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	----	----
as left span	5000	58.6	600.1	217.6	382.5	602.4	210.6	391.7	0.9961	1.0332
Average Correction Factor									0.9957	0.9993

Corrced As found NO_x= 595.0 NO= 593.8 Percent Change NO_x= 0.6% NO= 0.7%
 Previous Response NO_x= 598.6 NO= 597.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.60 ccm NOx ref calc conc = 600.1 ppb NO ref calc conc = 600.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	602.3	602.9	0.1	0.9963	0.9953	----	----
1st NO2 (300)	217.6	385.3	602.9	217.6	385.3	0.9953	----	1.0000	100.0%
2nd NO2 (200)	340.7	262.2	603.3	340.7	262.6	0.9946	----	0.9985	100.2%
3rd NO2 (100)	467.7	135.2	603.0	467.7	135.3	0.9951	----	0.9993	100.1%
2nd NO ref point		0.0							
Average Correction Factor						0.9950		0.9992	100.1%

Calibration Performed By: Zach Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

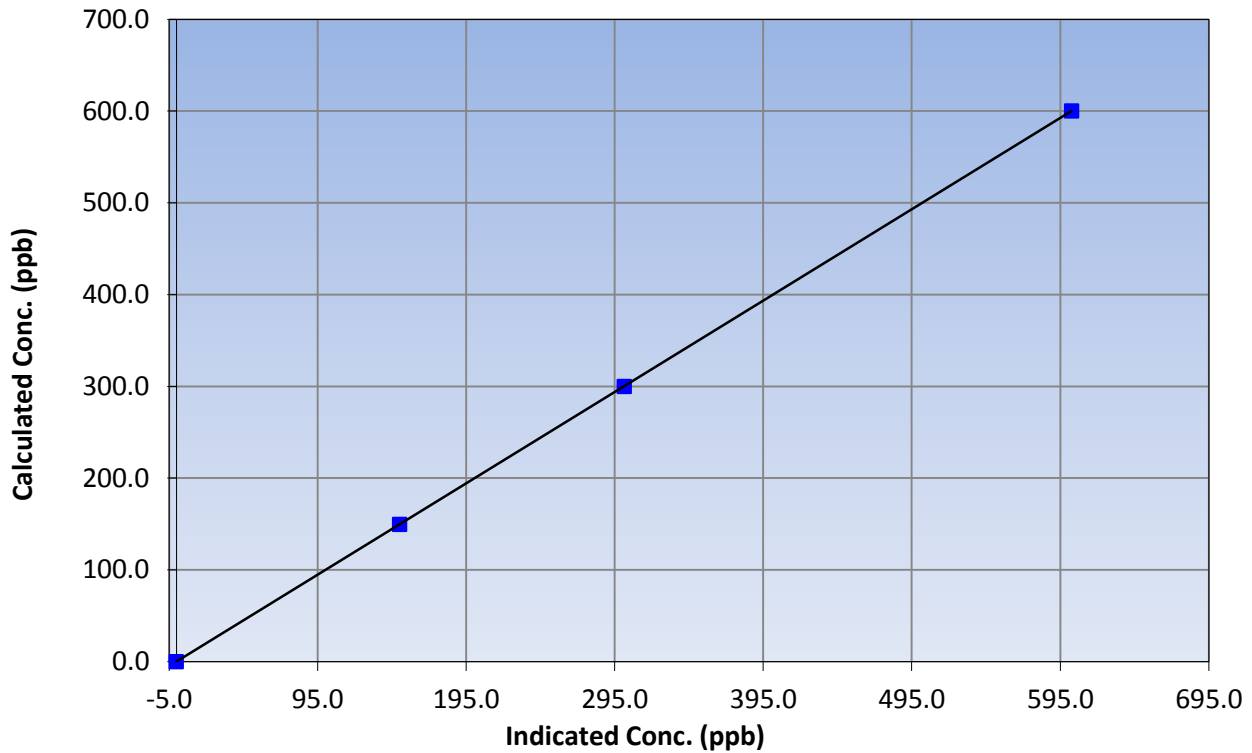
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	4:30	End Time (MST)	8:05
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	1.000000
600.1	602.7	0.9956		
300.0	301.5	0.9951	Slope	0.995282
149.5	150.1	0.9962		
			Intercept	0.125700

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

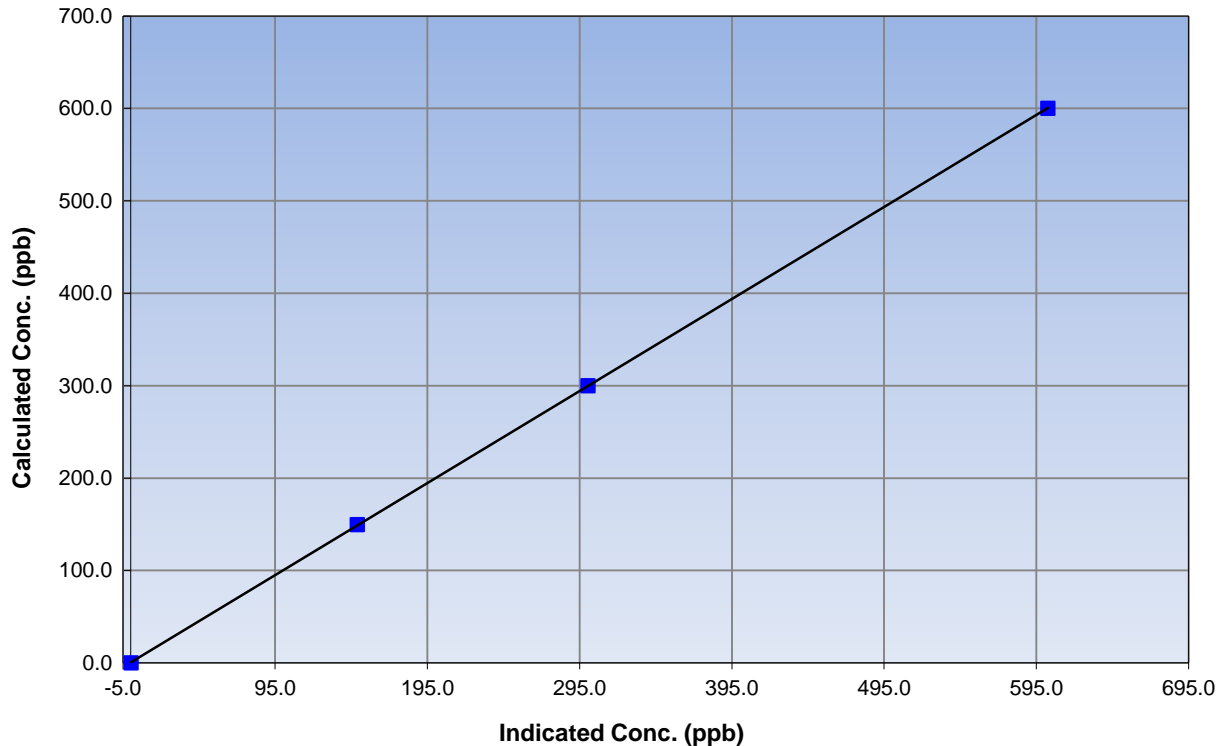
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	4:30	End Time (MST)	8:05
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999993
600.1	602.6	0.9958		
300.0	300.5	0.9984	Slope	0.995631
149.5	149.0	1.0036		
			Intercept	0.464546

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

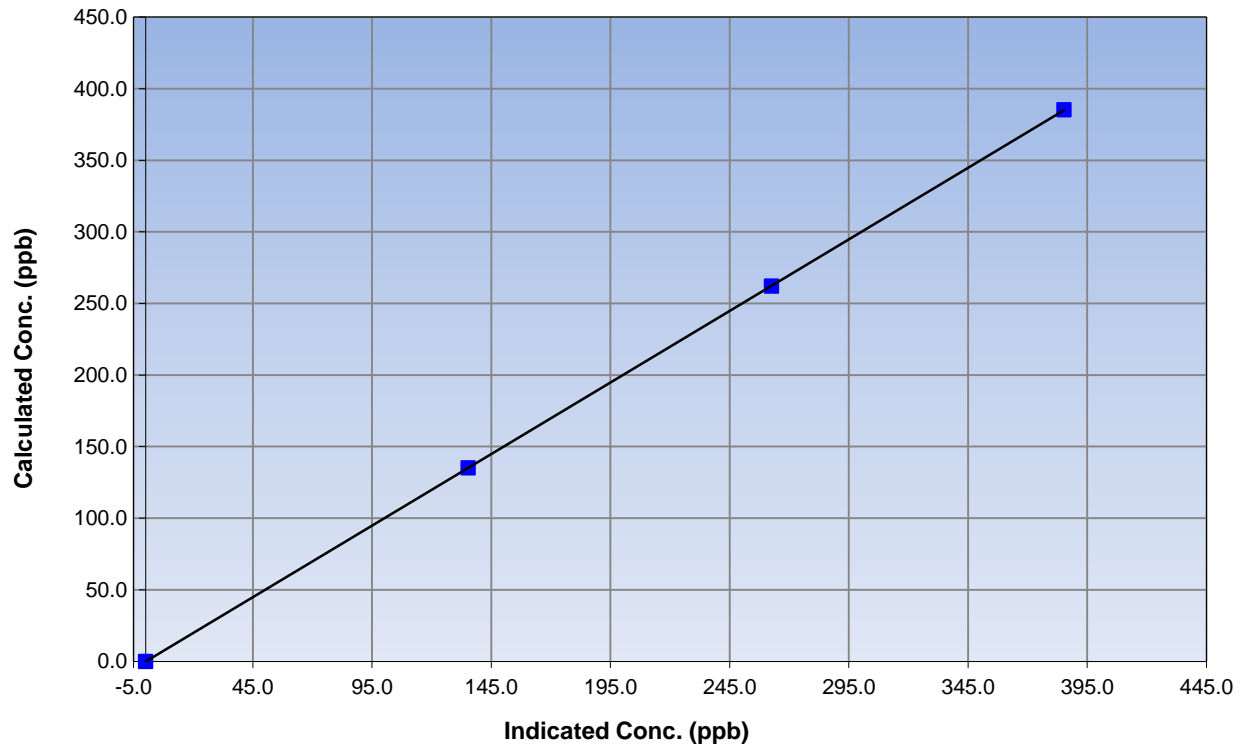
Station Information

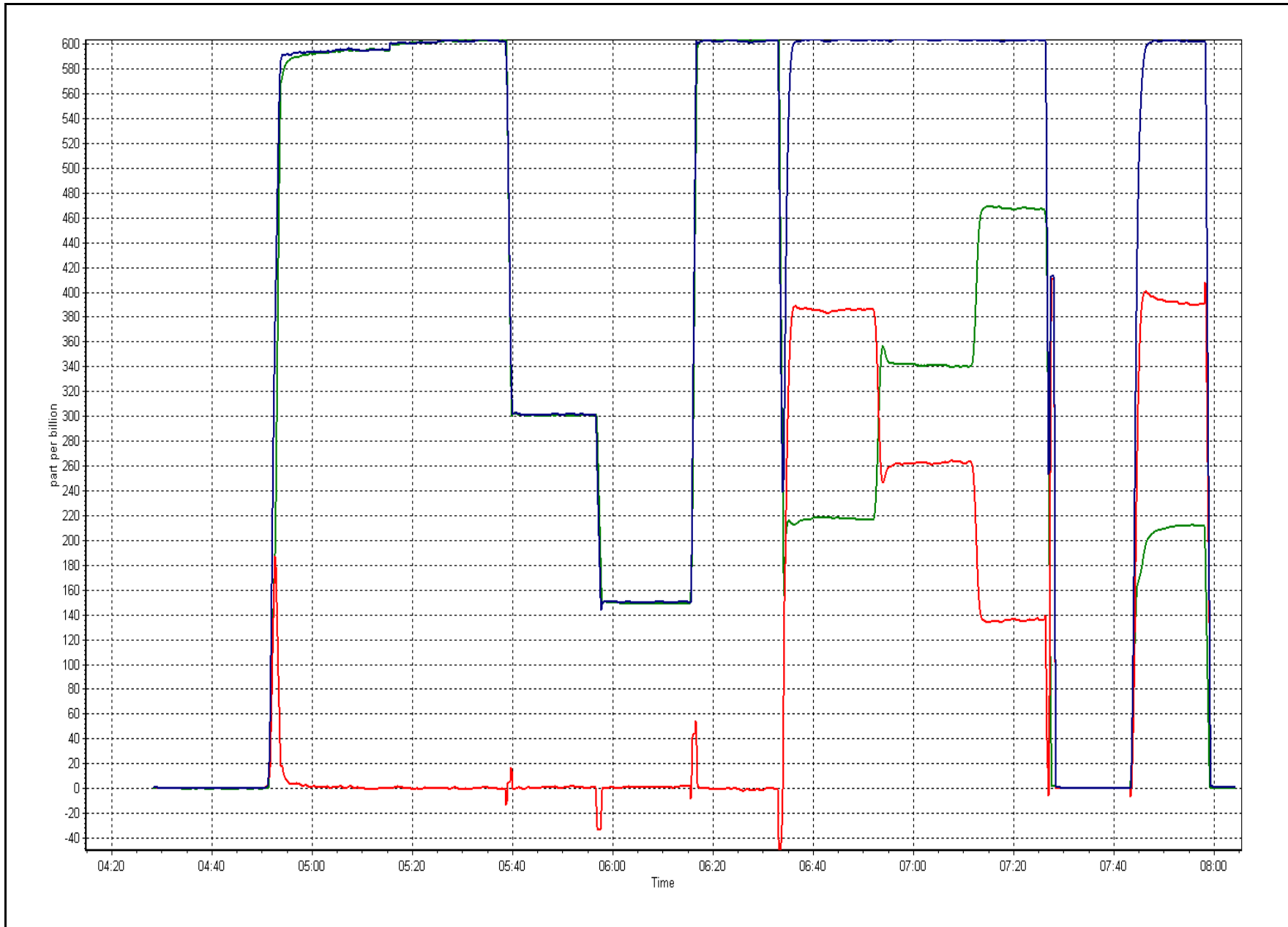
Calibration Date	May 18, 2016	Previous Calibration	April 26, 2016
Station Number	Stony Mountain	Station Number	AMS 18
Start Time (MST)	4:30	End Time (MST)	8:05
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999999
385.3	385.3	1.0000		
262.2	262.6	0.9985	Slope	0.999892
135.2	135.3	0.9993		
			Intercept	-0.118796

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>May 11, 2016</u>	Previous Calibration:	<u>April 27, 2016</u>
Station Name:	<u>Stony Mountain</u>	Station Number:	<u>AMS 18</u>
Start Time (MST):	<u>16:18</u>	End Time (MST):	<u>17:35</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1019</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	9.0	10.3	1.3	10.3
T2	24.0	na	na	24.0
T3	31.0	na	na	31.0
T4	23.0	na	na	23.0
RH (%)	15.0	na	na	15.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	948	942.6	-5.4	948

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	994	-6	1003	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	294		296
Neph	0.1		0.2
C14	57		3292
Indicated Concentration (ug/m3)	0	No	0
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	<u>March 13, 2016</u>	Previous Leak Check Date:	<u>February 18, 2016</u>
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.70	0.16	
*Flow with adaptor (LPM):	16.54		

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	<u>March 13, 2015</u>	Previous Foil Calibration:	June 30, 2015
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1337</u>		
Previous Correction Factor:	<u>7050</u>	Mass foil set S/N:	5872
New Correction Factor:	<u>7027</u>		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	May 11, 2016
Pump	Good	Jun 30, 2015
Filter Tape	Good	Jun 30, 2015
Mass Foil Cal Set	na	NA
HEPA filter	Good	Jun 30, 2015

NOTES:

Flow adjusted. PM head cleaned. Nephelometer checked. No adjustments required. Filter tape had only 10% left on roll. Filter tape changed with spare roll at station. Zero checked again.

Calibration Performed By: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 19
SUNCOR FIREBAG
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)

MAY 2016
 MONTHLY SUMMARY for
 AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	9	0	3	0
H2S (ppb) Average	710	34	34	100.00	4	0	1	0
THC (ppm) Average	707	37	37	100.00	4.7	-	3	-
NO2 (ppb) Average	707	37	37	100.00	30	0	10	-
NO (ppb) Average	707	37	37	100.00	7	-	1	-
NOX (ppb) Average	707	37	37	100.00	32	-	11	-
Temperature 2 m (C) Average	744	0	0	100.00	29.2	-	21.8	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	92	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	30	-	24	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.5	1	-	0	0	0	0	0	1	9
H2S (ppb) Average	710	0.3	0	-	0	0	0	0	0	1	4
THC (ppm) Average	707	2.26	0.3	-	2	2.1	2.1	2.2	2.3	2.5	4.7
NO2 (ppb) Average	707	2.3	4	-	0	0	1	1	2	7	30
NO (ppb) Average	707	0.3	0	-	0	0	0	0	0	1	7
NOX (ppb) Average	707	2.6	4	-	0	0	1	1	3	8	32
Temperature 2 m (C) Average	744	11.72	6.3	-	-2.3	2.9	7.2	11.5	15.9	20.4	29.2
Relative Humidity (%) Average	744	56.7	25	-	17	26	34	53	78	93	100
Wind Speed 10 m (km/h) Average	743	14.1	6	-	0	6	10	14	18	22	30
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	12 May 2016 22:00	12 May 2016 22:00	1	Flat line in sensor output signal



Summary of Hour Averages

Firebag - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 9 ppb on May 1 09:00	Maximum Daily Average: 3.1 ppb on May 4		Hours of Data:	707
Minimum Value: 0 ppb on May 4 21:00	Minimum Daily Average: 0.0 ppb on May 14		Hours of Missing Data:	37
Maximum Diurnal Average: 0.8 ppb at hour 9	Minimum Diurnal Average: 0.4 ppb at hour 21		Hours of Calibration:	37
Monthly Average: 0.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 5		Percent Operational Time:	100.0

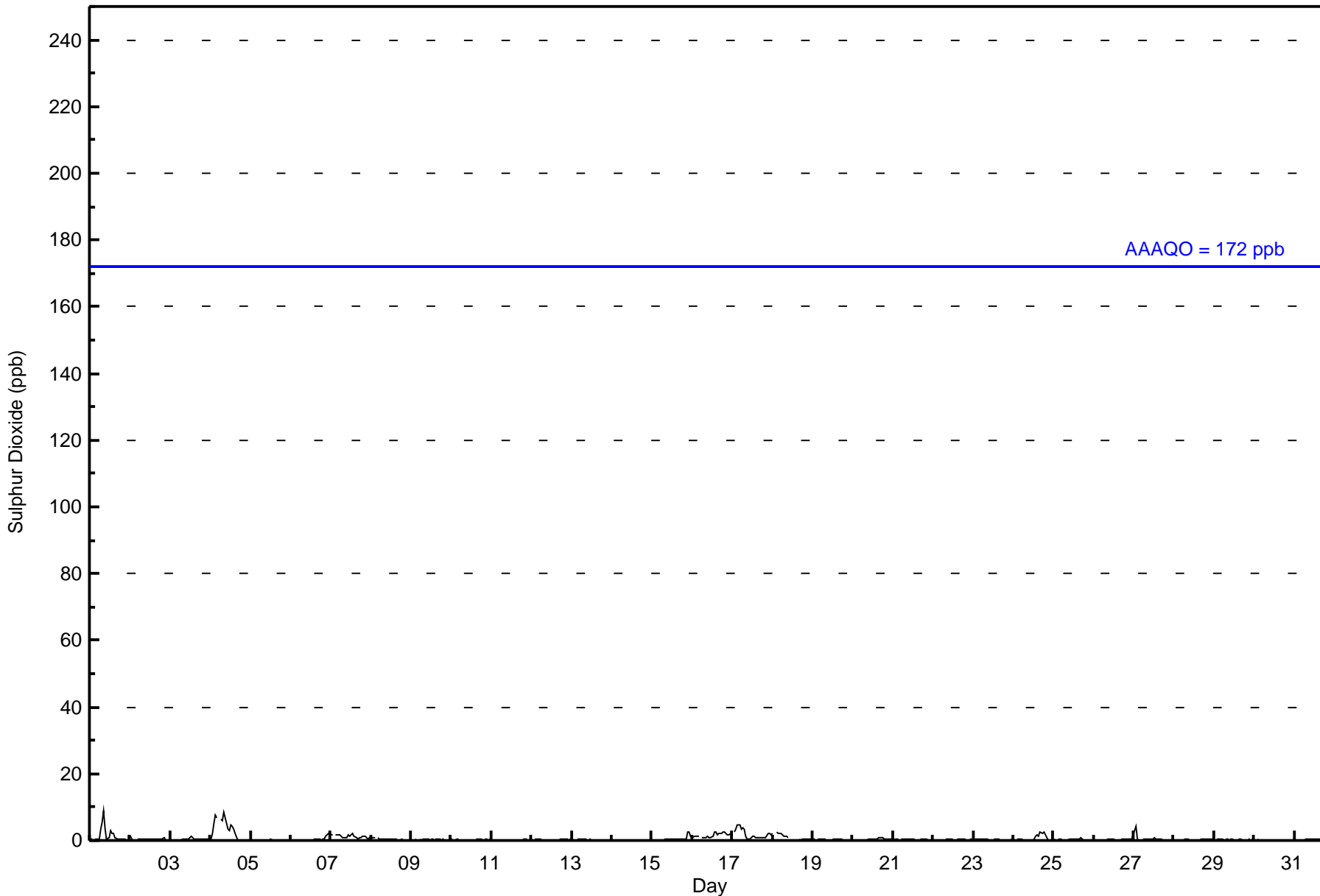
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	0	Z	0	0	0	4	6	9	4	0	1	3	2	2	1	0	0	0	0	0	0	0	0	1.6	9
2-May	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0.4	1
3-May	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	1	1	0.4	1
4-May	0	2	5	8	7	Z	6	6	8	7	3	3	5	4	4	2	0	0	0	0	0	0	0	0	3.1	8
5-May	Z	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
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.4	2
7-May	2	2	Z	2	2	2	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1.2	2
8-May	1	1	1	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-May	Z	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
12-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	1	0.5	3
16-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	2	3	2	2	2	3	2	2	2	2	2	1.6	3
17-May	Z	3	4	5	5	3	4	4	1	0	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.9	5
18-May	2	Z	3	2	2	2	2	1	1	1	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	3
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.4	1
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-May	Z	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
24-May	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	3	2	3	2	1	0	0	0	0	0	0.8	3
25-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-May	3	4	1	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	4
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-May	Z	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
0.5 0.6 0.7 0.8 0.8 0.5 0.7 0.7 0.8 0.6 0.4 0.4 0.6 0.6 0.6 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4																								Diurnal Average		
3 4 5 8 7 3 6 6 9 7 3 3 5 4 4 2 3 2 3 2 2 3 2 2																								Diurnal Maximum		

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	48	115	40	36	15	24	42	24	61	46	41	29	41	51	42	51	706
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	48	115	40	36	15	24	42	24	61	46	41	29	41	51	42	51	706

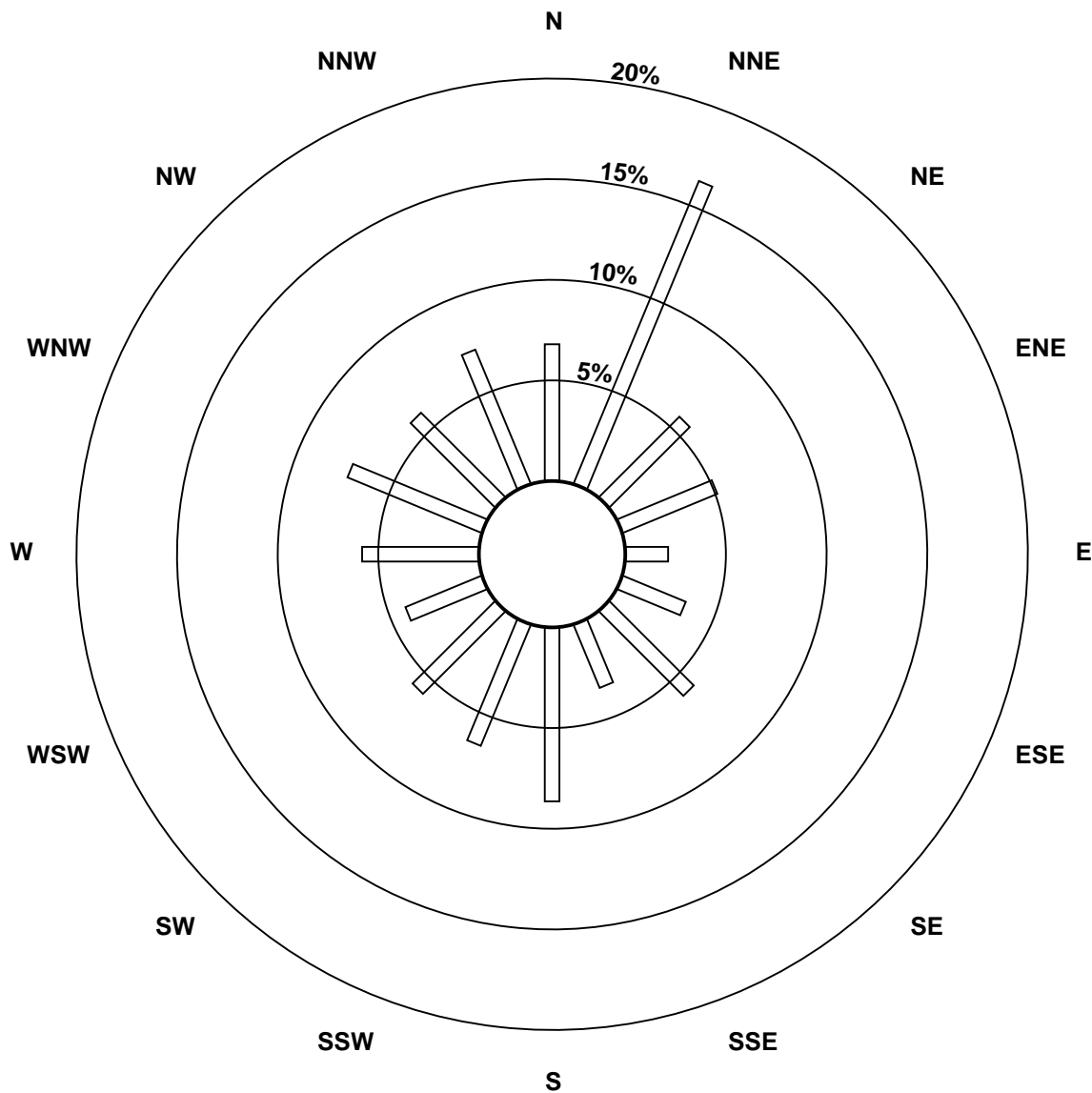
Total Number of Valid Hours: 706

Total Number of Hours: 744

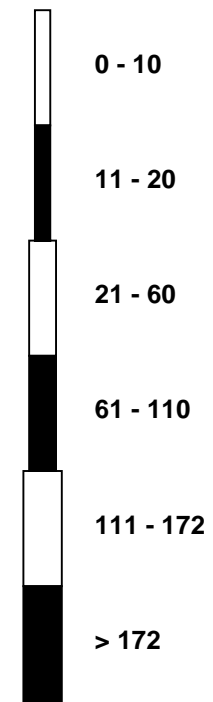


Wood Buffalo Environmental Association
Wind Rose May 2016

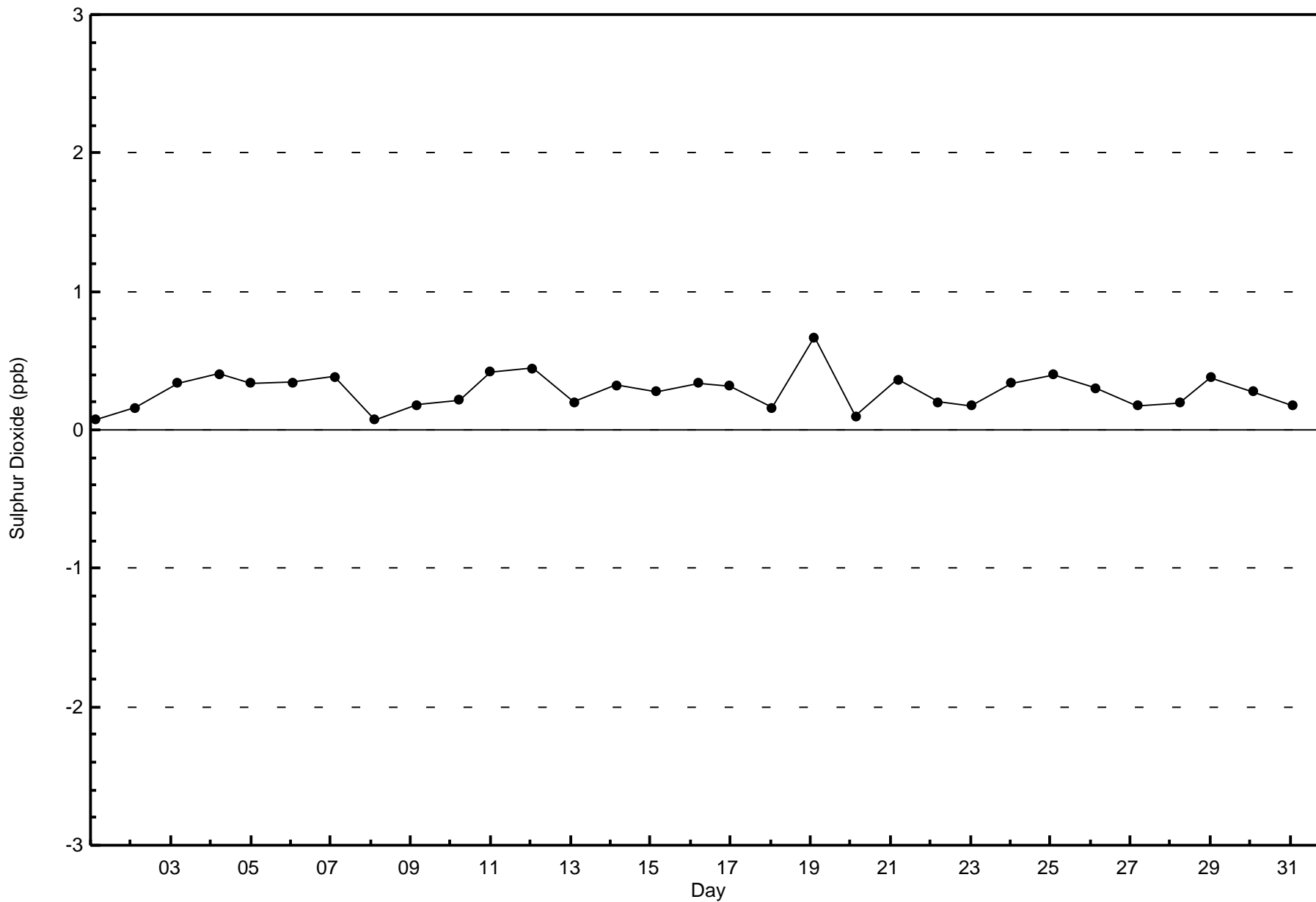
Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)

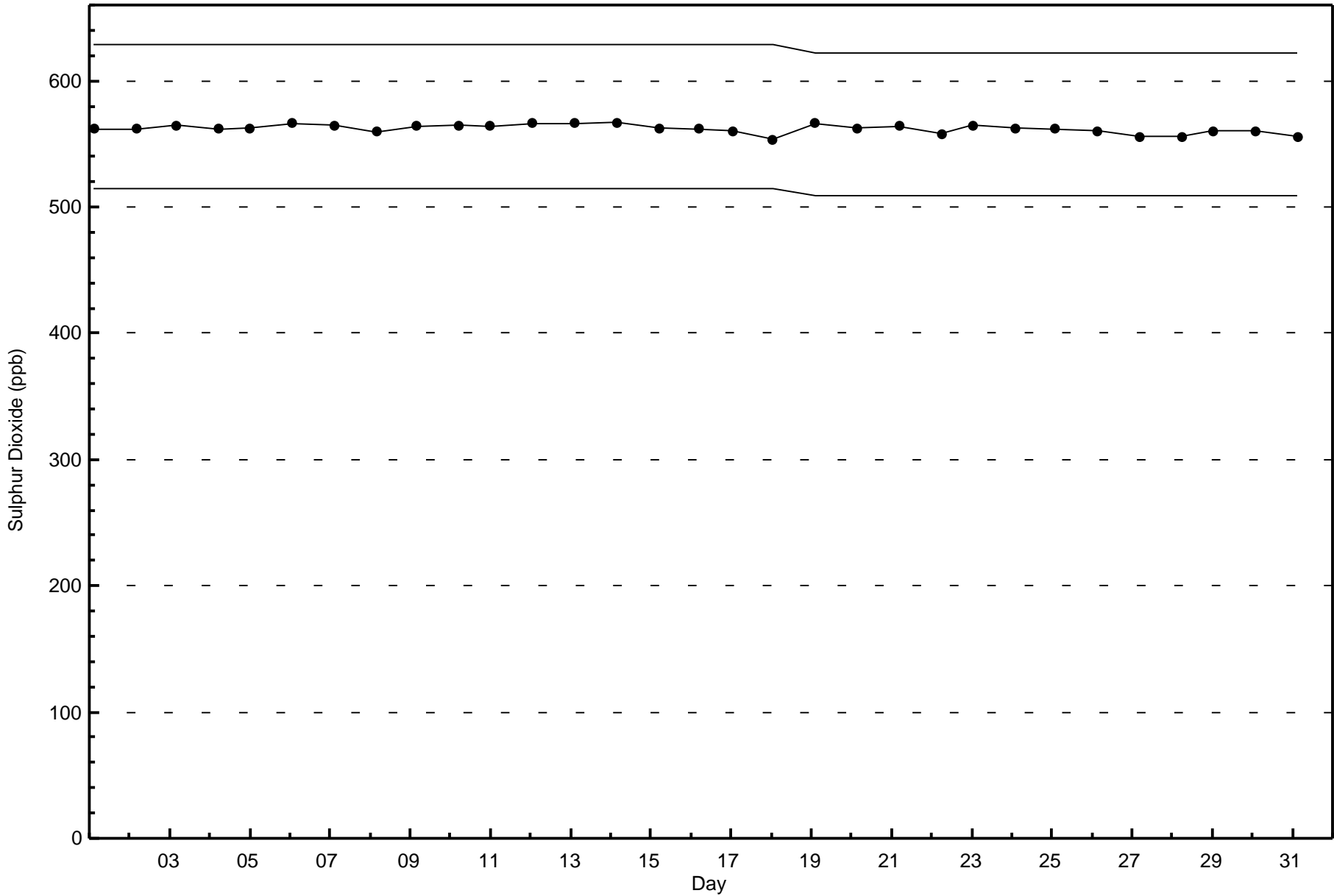


Classes (ppb)



Total Number of Valid Hours: 706







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4 ppb on May 15 02:00	Maximum Daily Average: 1.0 ppb on May 17		Hours of Data:	710
Minimum Value: 0 ppb on May 22 16:00	Minimum Daily Average: 0.0 ppb on May 22		Hours of Missing Data:	34
Maximum Diurnal Average: 0.6 ppb at hour 5	Minimum Diurnal Average: 0.2 ppb at hour 14		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-May	0	0	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-May	0	Z	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
6-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
7-May	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.5	1
8-May	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	1
9-May	2	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
10-May	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
11-May	0	Z	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-May	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-May	0	4	2	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	4
16-May	1	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.7	1
17-May	2	Z	2	3	3	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1.0	3
18-May	1	2	Z	2	2	3	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	3
19-May	0	0	0	Z	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0.3	1
25-May	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-May	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
29-May	0	Z	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
30-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
31-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

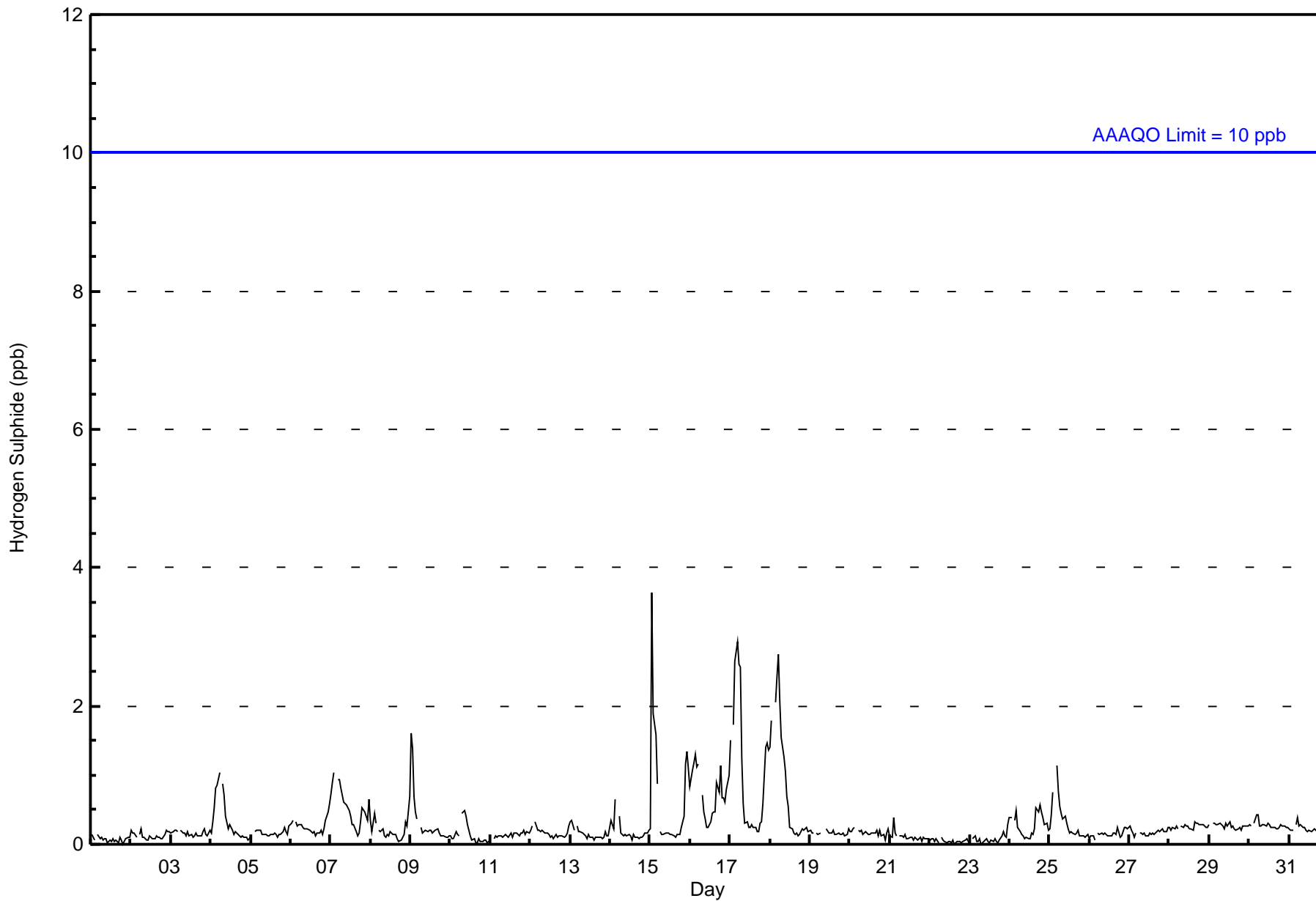
0.4	0.5	0.4	0.5	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	Diurnal Average
2	4	2	3	3	3	3	2	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.15	99.15
3 - 4	6	0.85	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	49	111	41	36	16	24	41	26	62	44	38	29	44	52	41	49	703
3 - 4	0	0	0	0	0	0	1	0	0	3	2	0	0	0	0	0	6
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	111	41	36	16	24	42	26	62	47	40	29	44	52	41	49	709

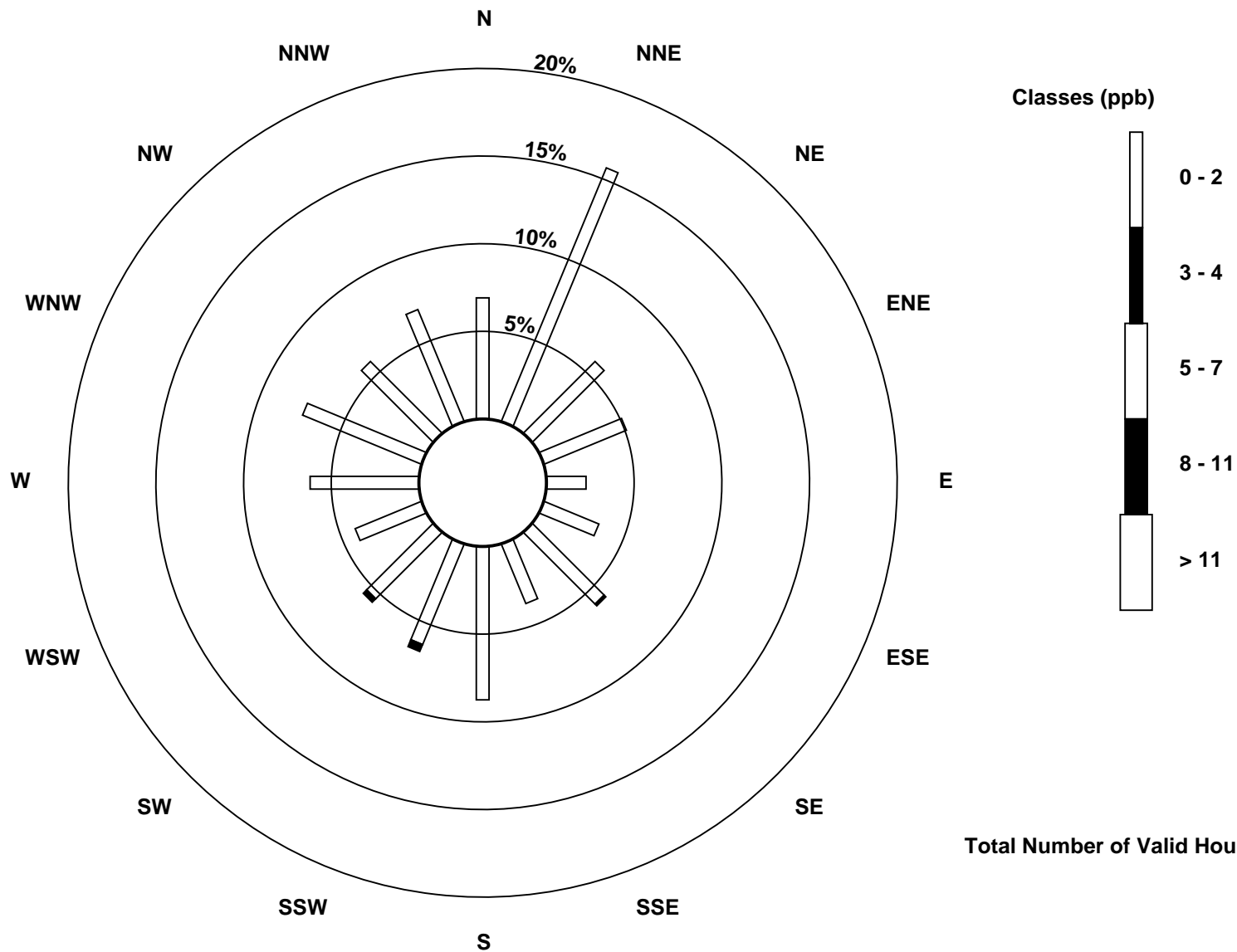
Total Number of Valid Hours: 709

Total Number of Hours: 744

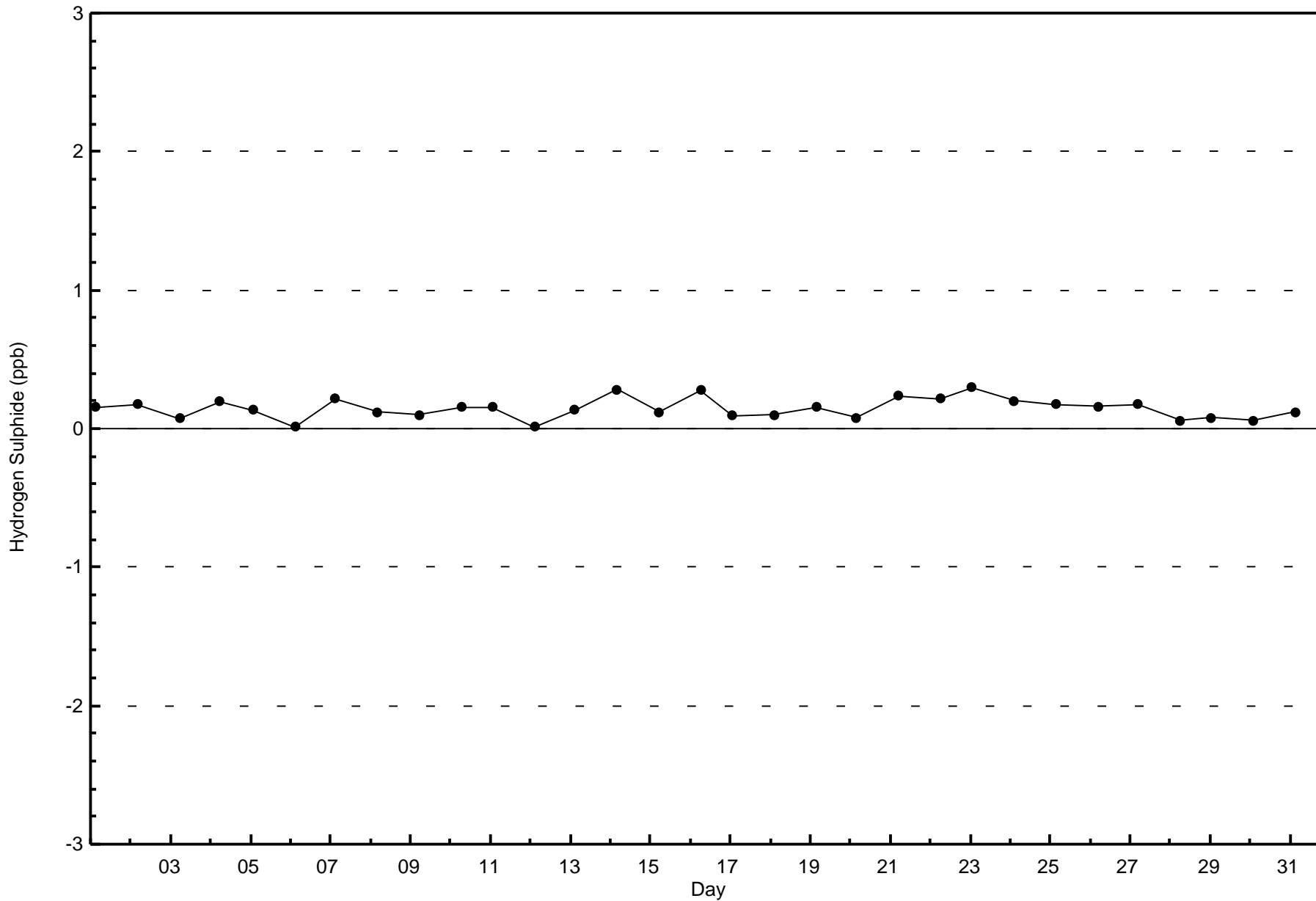


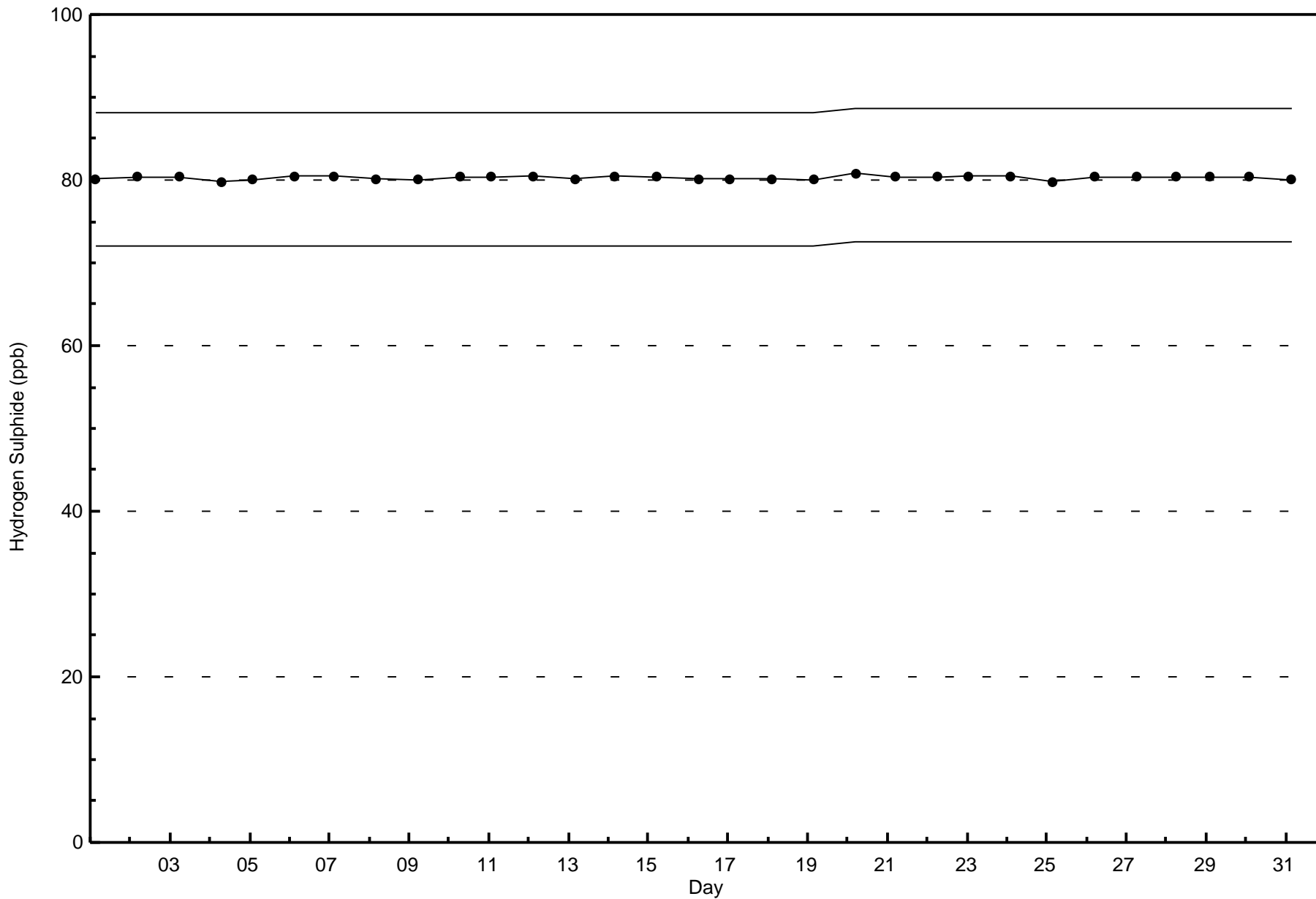
Wood Buffalo Environmental Association
Wind Rose May 2016

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 709





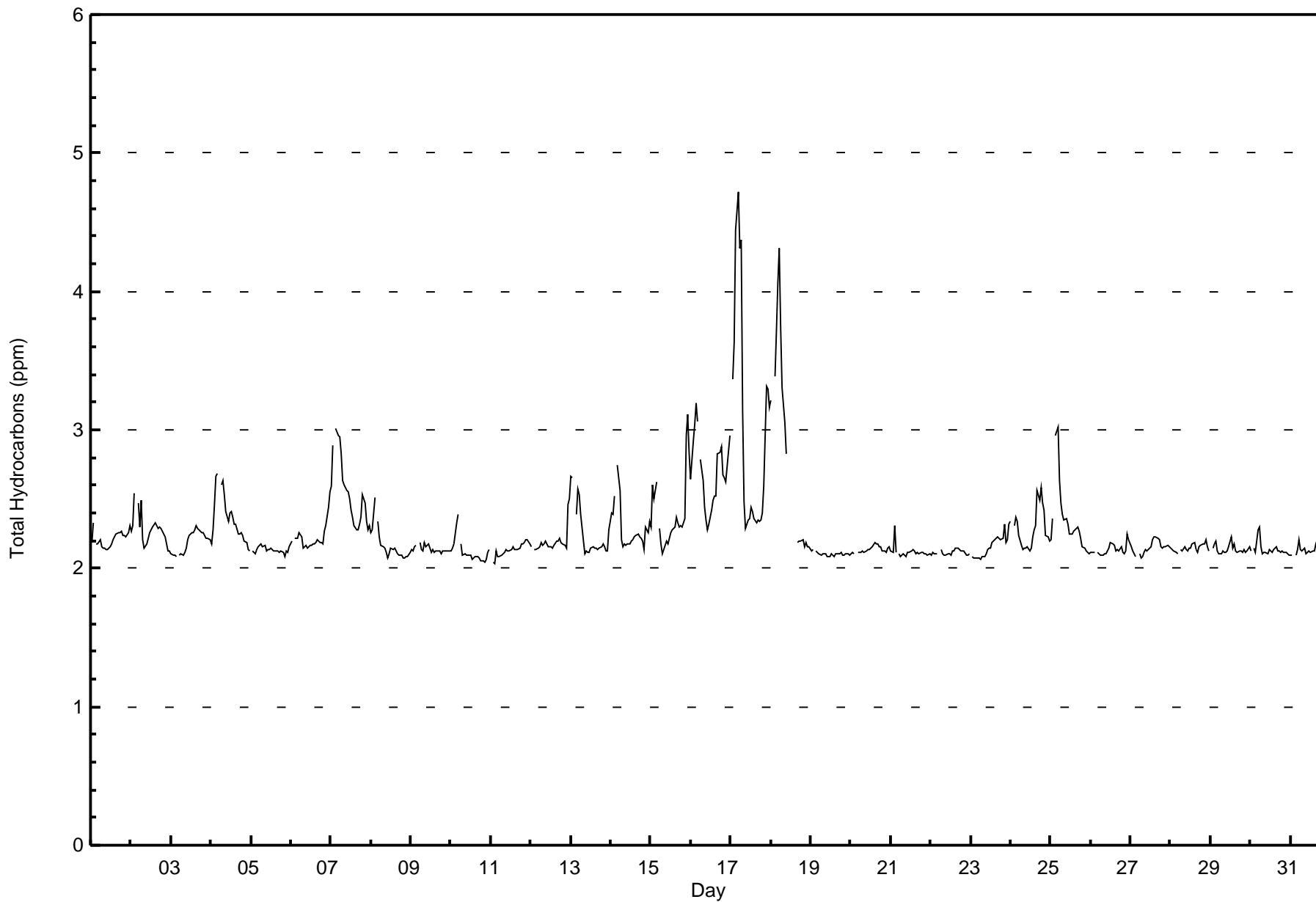


Maximum Value: 4.7 ppm on May 17 05:00																				Maximum Daily Average: 3.0 ppm on May 17					Hours in Service: 744		
Minimum Value: 2.0 ppm on May 11 03:00																				Minimum Daily Average: 2.1 ppm on May 19					Hours of Data: 707		
Maximum Diurnal Average: 2.5 ppm at hour 5																				Minimum Diurnal Average: 2.2 ppm at hour 11					Hours of Missing Data: 37		
Monthly Average: 2.26 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.6					Hours of Calibration: 37		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	2.2	2.3	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.3	
2-May	2.3	2.3	2.5	Z	2.5	2.3	2.5	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.3	2.5	
3-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	
4-May	2.2	2.3	2.5	2.7	2.7	Z	2.1	2.6	2.6	2.5	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.4	2.7	
5-May	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
6-May	2.2	Z	2.2	2.2	2.2	2.3	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	2.3	2.3	2.4	2.5	2.2	2.5
7-May	2.6	2.9	Z	3.0	3.0	2.9	2.8	2.6	2.6	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.3	2.3	2.3	2.5	3.0	
8-May	2.3	2.3	2.5	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
9-May	2.1	2.1	2.2	2.2	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
10-May	2.1	2.1	2.2	2.3	2.4	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.4	
11-May	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2
12-May	2.2	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.5	2.5	2.2	2.5	
13-May	2.7	2.7	Z	2.4	2.6	2.5	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.7	
14-May	2.4	2.4	2.5	Z	2.7	2.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.3	2.3	2.7	
15-May	2.3	2.6	2.5	2.6	Z	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.4	3.0	3.1	2.8	3.1	
16-May	2.6	2.9	3.0	3.2	3.1	Z	2.8	2.6	2.4	2.3	2.3	2.3	2.4	2.5	2.5	2.5	2.8	2.8	2.9	2.7	2.7	2.6	2.7	3.0	2.7	3.2	
17-May	Z	3.4	3.6	4.4	4.7	4.3	4.4	3.1	2.5	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.6	3.3	3.3	3.2	3.0	4.7	
18-May	3.2	Z	3.4	3.7	4.1	4.3	3.7	3.3	3.1	2.8	C	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	--	4.3	
19-May	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
20-May	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	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	
21-May	2.1	2.1	2.3	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
22-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
23-May	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3	
24-May	2.3	Z	2.3	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.6	2.5	2.6	2.5	2.4	2.2	2.2	2.2	2.3	2.6	
25-May	2.2	2.4	Z	3.0	3.0	2.6	2.5	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.3	3.0	
26-May	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	
27-May	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	
28-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	
29-May	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
30-May	2.1	Z	2.1	2.1	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
31-May	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.1	2.2	2.4	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	3	0.42	0.42
2.1 - 3.0	683	96.61	97.03
3.1 - 10.0	21	2.97	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - May 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	3
2.1 - 3.0	48	115	39	34	15	24	42	24	58	38	31	29	41	51	42	51	682
3.1 - 10.0	0	0	0	0	0	0	0	0	3	8	10	0	0	0	0	0	21
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	115	40	36	15	24	42	24	61	46	41	29	41	51	42	51	706

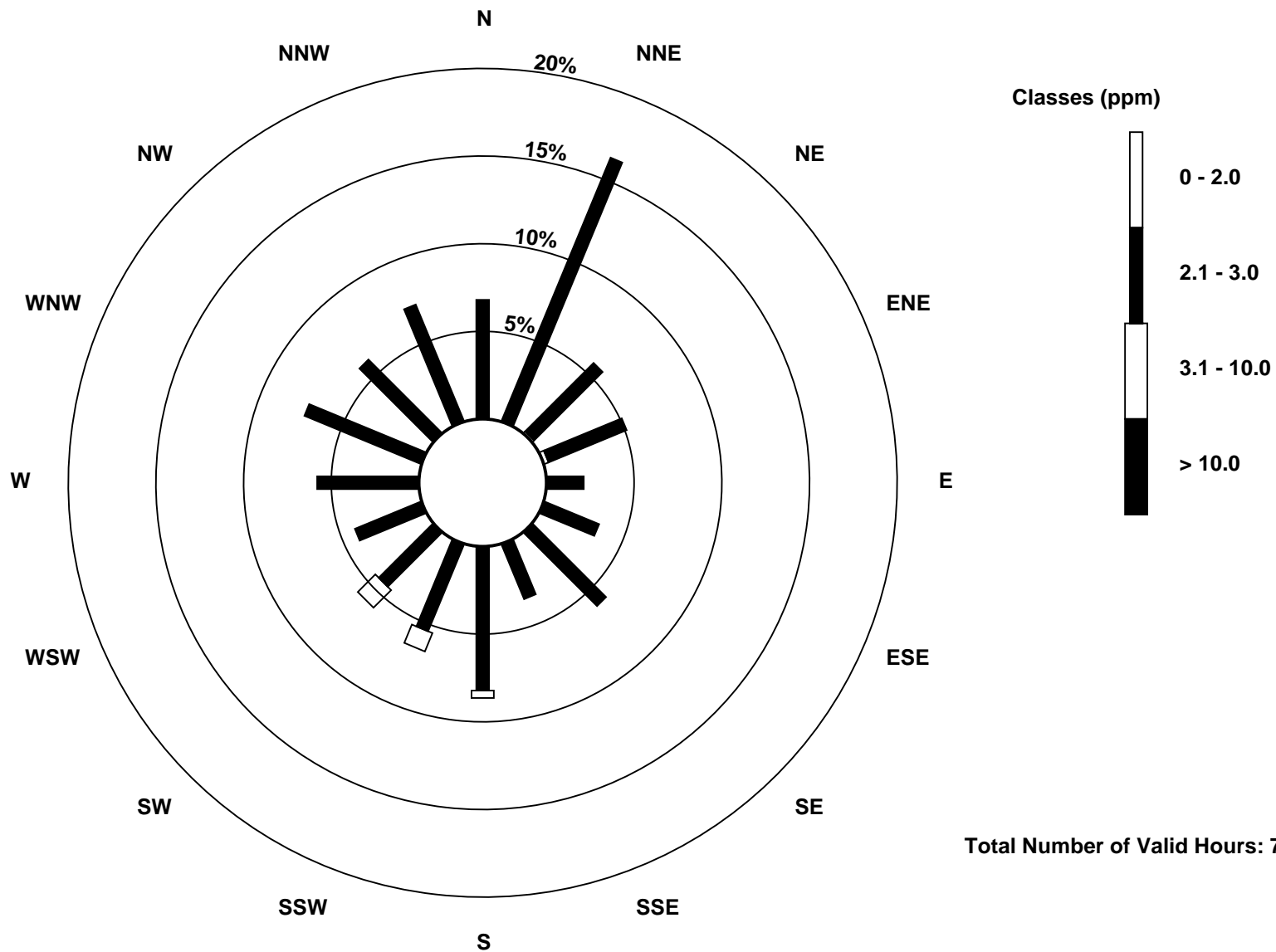
Total Number of Valid Hours: 706

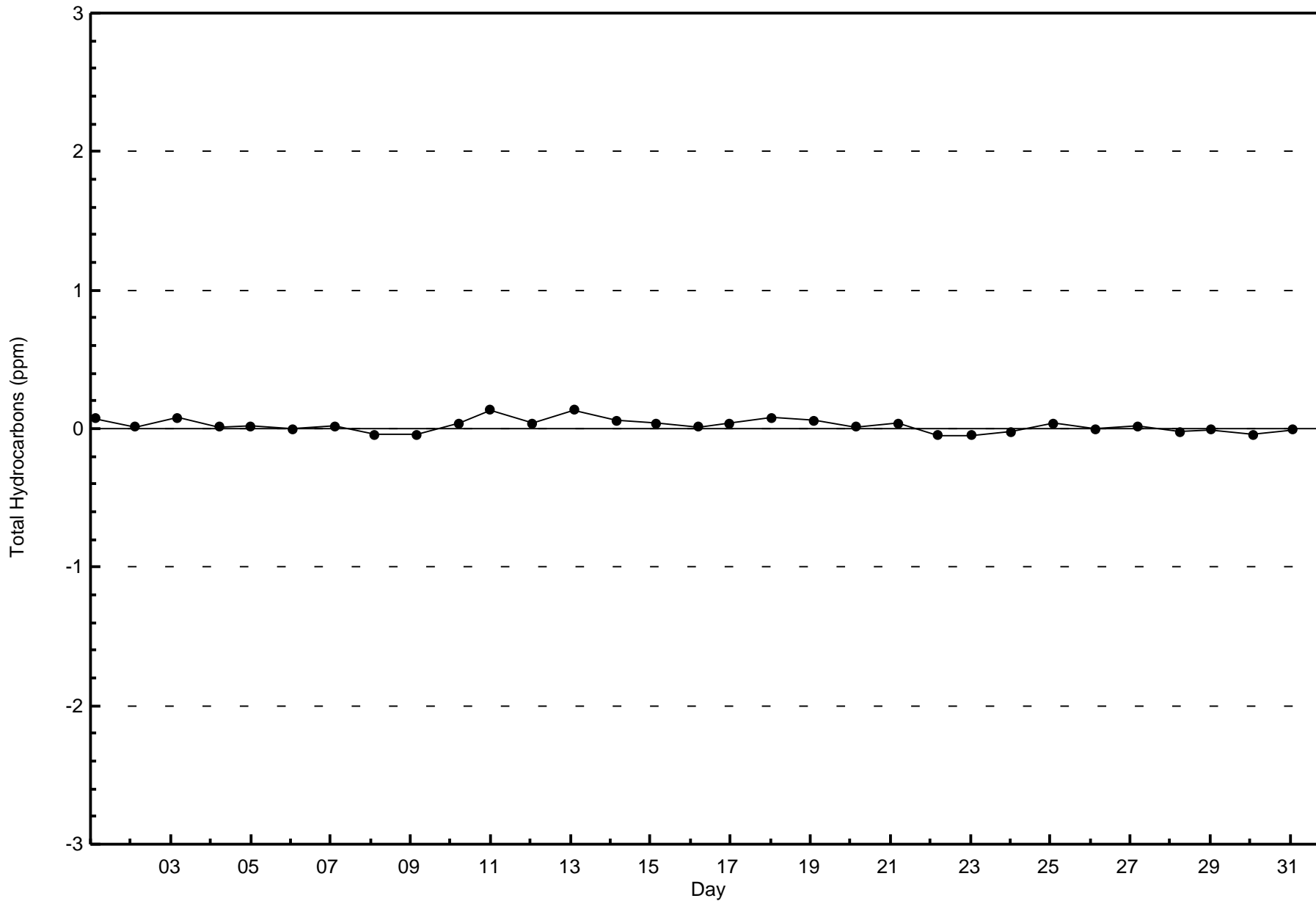
Total Number of Hours: 744

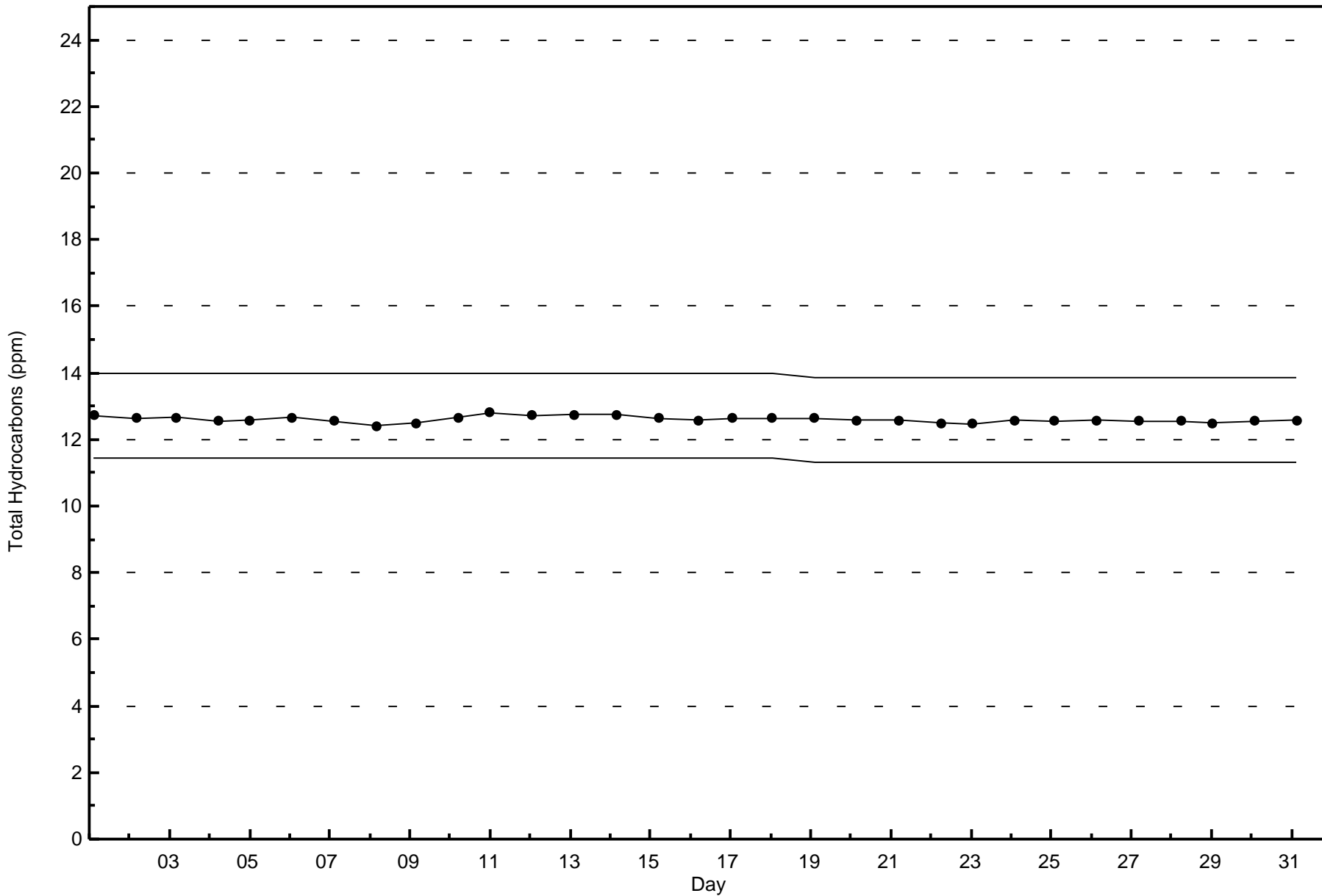


Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)







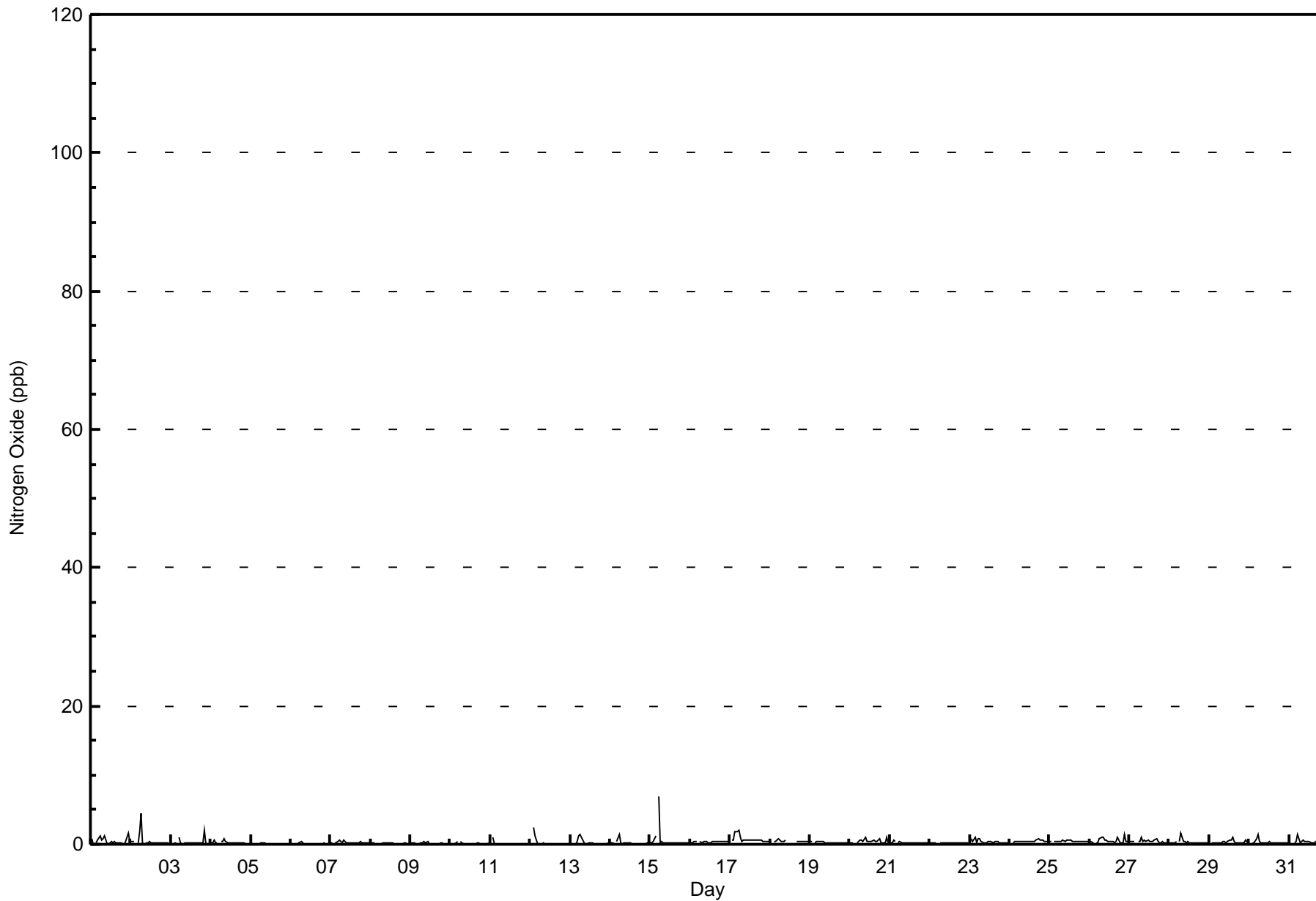


Maximum Value: 7 ppb on May 15 06:00																		Maximum Daily Average: 0.8 ppb on May 17						Hours in Service: 744																									
Minimum Value: 0 ppb on May 6 20:00																		Minimum Daily Average: 0.1 ppb on May 5						Hours of Data: 707																									
Maximum Diurnal Average: 0.9 ppb at hour 6																		Minimum Diurnal Average: 0.2 ppb at hour 20						Hours of Missing Data: 37																									
Monthly Average: 0.3 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2						Hours of Calibration: 37																									
																		Percent Operational Time: 100.0																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	1	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.5	2																							
2-May	0	0	0	Z	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	5																							
3-May	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.3	2																							
4-May	0	0	1	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
5-May	Z	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																							
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
7-May	0	0	Z	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
8-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
11-May	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																							
12-May	0	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																							
13-May	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
14-May	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
15-May	0	0	0	1	Z	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	7																							
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
17-May	Z	1	1	2	2	2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.8	2																							
18-May	0	Z	0	0	1	1	1	0	0	1	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	1																							
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
20-May	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0.4	1																							
21-May	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																							
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
23-May	Z	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
24-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.4	1																							
25-May	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1																							
26-May	0	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0.5	1																							
27-May	0	0	0	0	Z	0	0	1	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1																							
28-May	0	0	0	0	0	Z	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
29-May	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0.3	1																							
30-May	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
31-May	0	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
																								0.2	0.3	0.4	0.4	0.4	0.9	0.6	0.4	0.4	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.2	Diurnal Average	
																								1	1	2	2	2	7	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	0	Diurnal Maximum
Z - zerospan		C - Calibration																																															



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	48	115	40	36	15	24	42	24	61	46	41	29	41	51	42	51	706
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	48	115	40	36	15	24	42	24	61	46	41	29	41	51	42	51	706

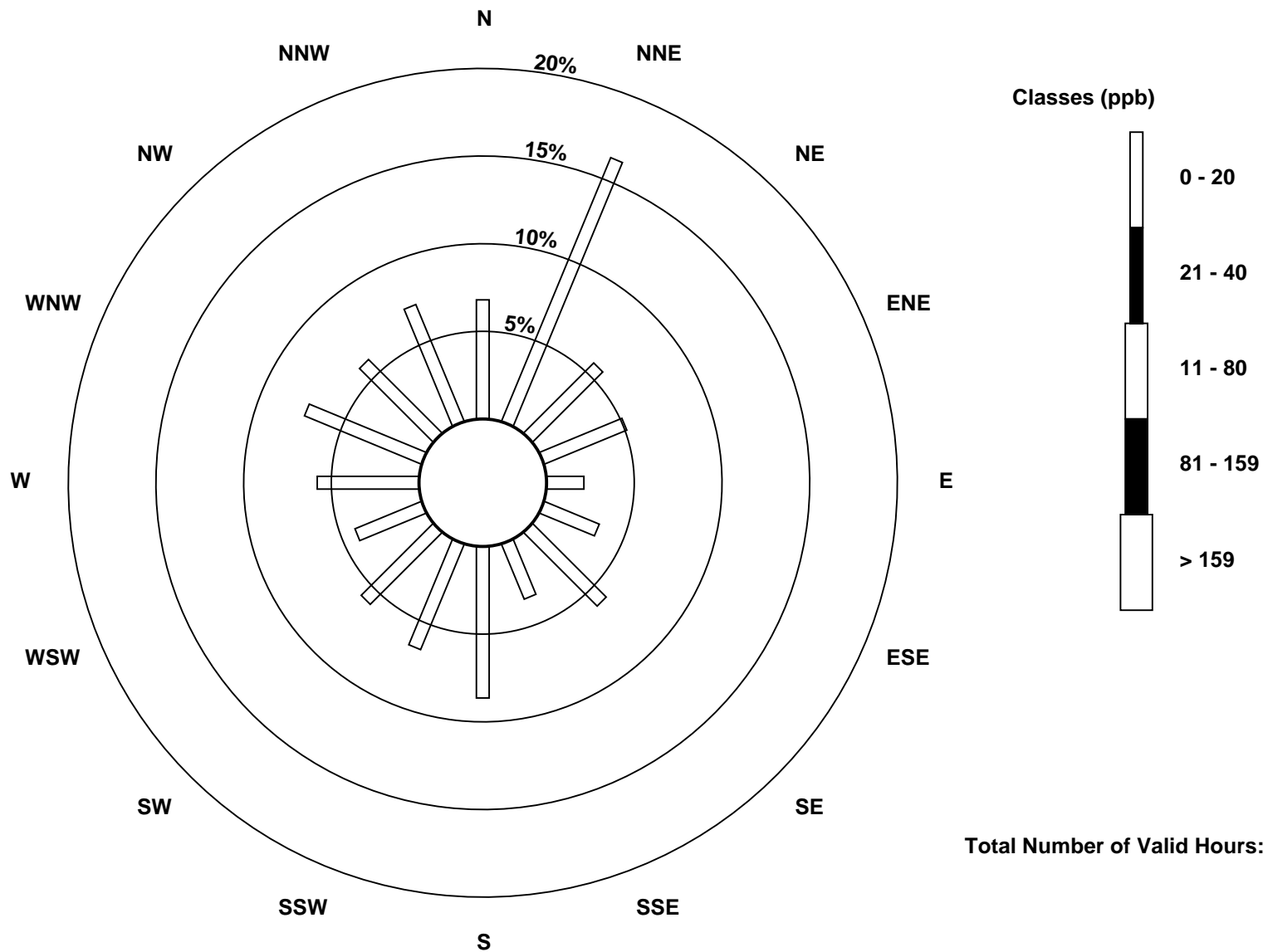
Total Number of Valid Hours: 706

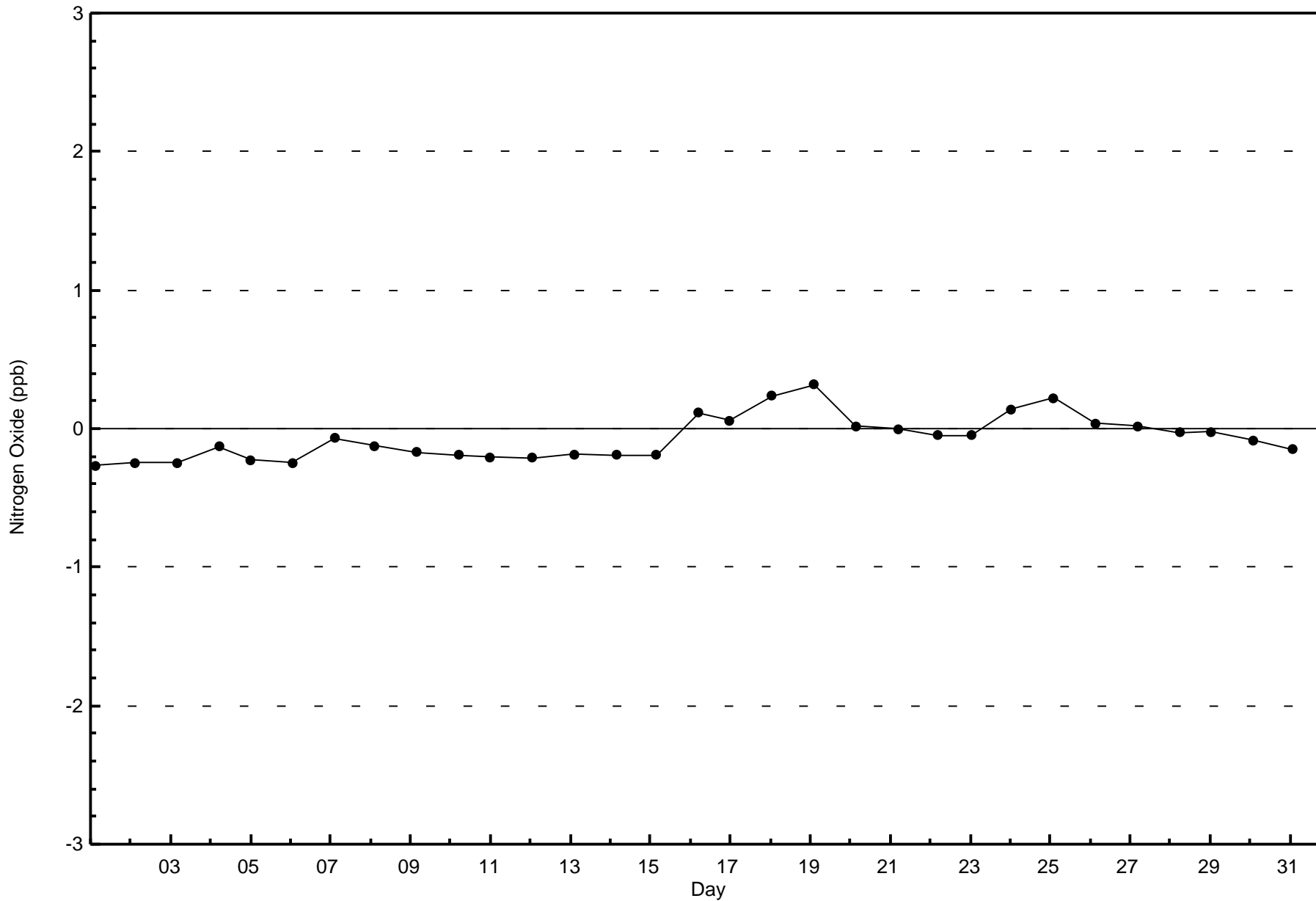
Total Number of Hours: 744

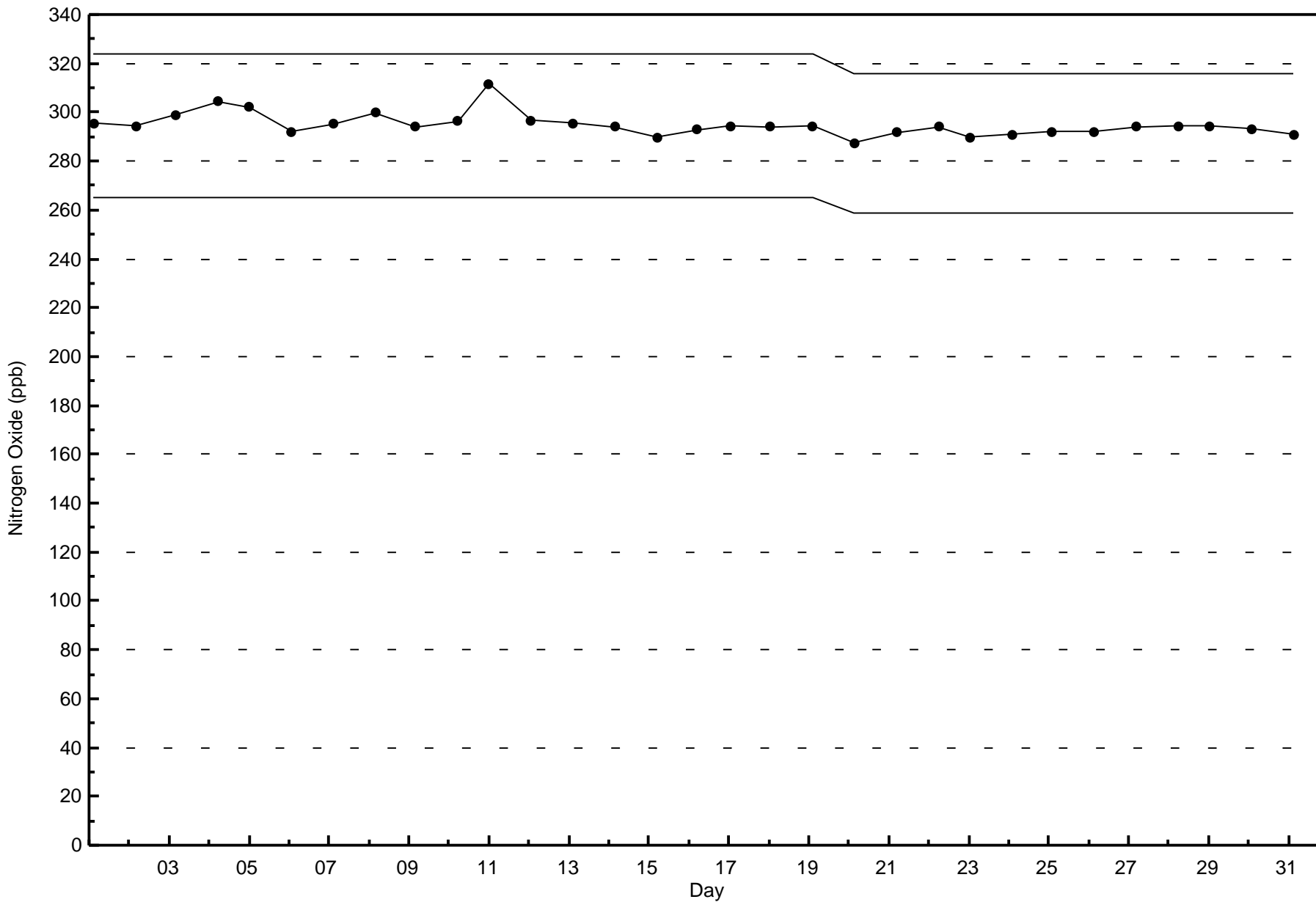


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Firebag - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 30 ppb on May 17 04:00	Maximum Daily Average: 10.2 ppb on May 17		Hours of Data:	707
Minimum Value: 0 ppb on May 10 21:00	Minimum Daily Average: 0.3 ppb on May 11		Hours of Missing Data:	37
Maximum Diurnal Average: 4.9 ppb at hour 5	Minimum Diurnal Average: 1.1 ppb at hour 12		Hours of Calibration:	37
Monthly Average: 2.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 2 P ₉₀ = 7 P ₉₉ = 17		Percent Operational Time:	100.0

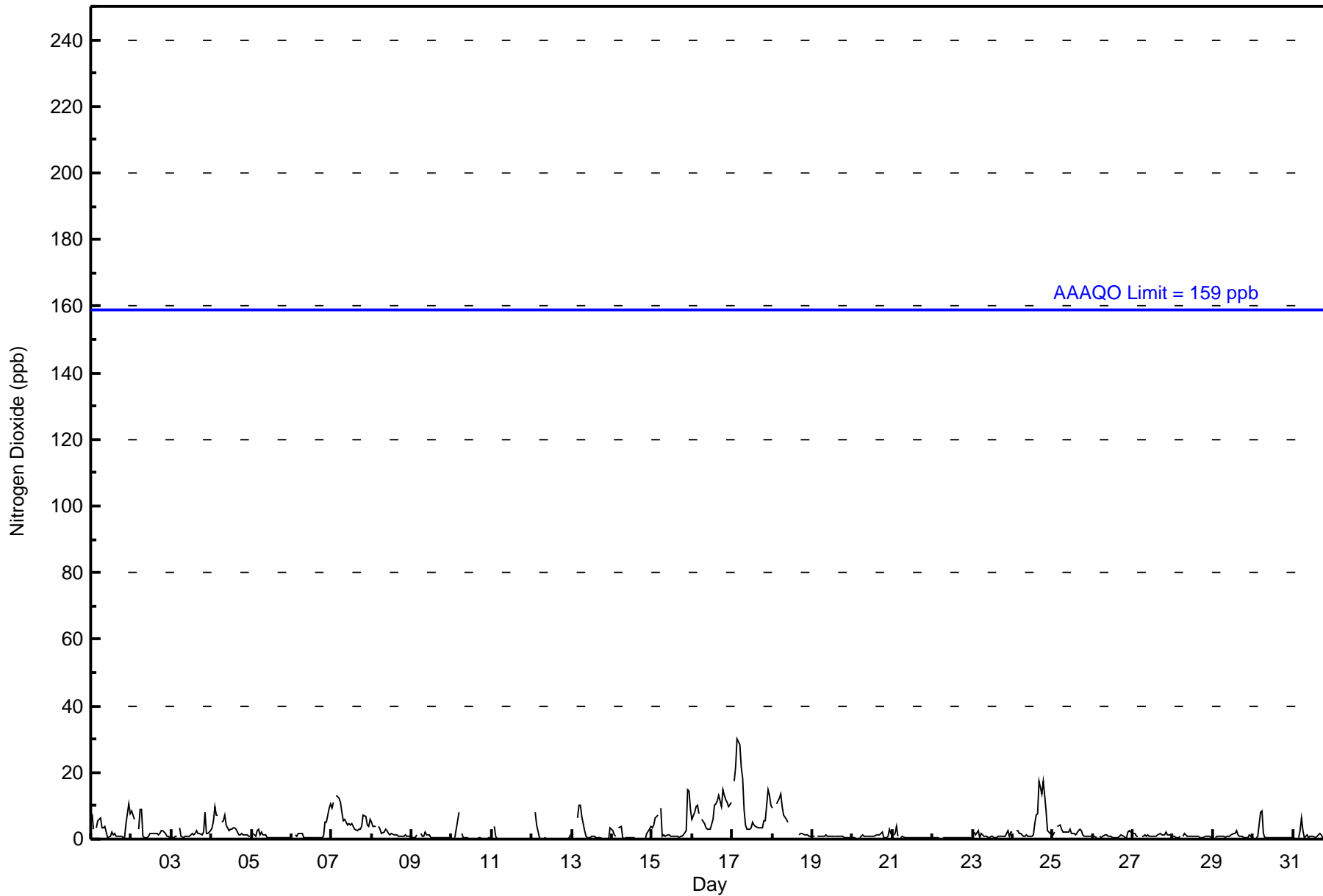
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	8	3	Z	4	6	6	4	3	4	2	1	1	2	1	2	1	1	1	1	0	0	5	11	8	3.2	11
2-May	8	7	6	Z	3	9	9	1	0	1	1	2	2	2	2	2	1	2	2	3	2	1	1	0	2.8	9
3-May	0	0	1	1	Z	4	1	0	1	1	1	1	2	1	2	3	2	2	1	2	8	2	2	2	1.7	8
4-May	3	5	10	7	7	Z	5	5	7	4	3	3	3	3	4	3	1	1	2	1	1	1	1	1	3.6	10
5-May	Z	2	1	3	3	1	2	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.8	3
6-May	0	Z	1	1	2	2	2	1	1	0	0	0	0	0	1	1	1	1	1	1	5	5	9	11	1.9	11
7-May	9	11	Z	13	12	11	8	6	6	4	5	4	5	4	3	3	3	3	4	7	7	4	4	6	6.1	13
8-May	5	4	4	Z	4	3	2	2	3	3	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1.9	5
9-May	1	1	1	1	Z	2	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
10-May	0	0	1	6	8	Z	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	8
11-May	Z	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4
12-May	0	Z	8	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.8	8
13-May	2	1	Z	7	10	10	7	2	1	0	0	1	1	1	0	0	0	0	0	0	0	0	3	3	2.1	10
14-May	3	1	1	Z	4	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3	4	4	1.1	4
15-May	4	4	6	7	Z	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	15	14	9	3.6	15
16-May	6	8	10	10	8	Z	6	5	4	3	3	3	6	10	11	12	13	10	15	13	12	11	10	11	8.6	15
17-May	Z	17	22	30	29	22	18	9	4	3	3	3	5	4	4	4	4	3	3	5	6	15	13	10	10.2	30
18-May	9	Z	11	12	12	13	10	7	6	5	C	C	C	C	C	C	1	2	2	1	1	1	1	1	--	13
19-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
20-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	3	2	1.1	3
21-May	1	2	4	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	4
22-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0.5	1
23-May	Z	2	1	3	0	2	1	1	1	0	1	1	1	1	1	1	1	1	1	1	2	2	1	2	1.1	3
24-May	2	Z	3	3	2	2	1	1	1	1	1	1	1	5	7	8	17	14	17	13	8	2	2	1	4.9	17
25-May	1	2	Z	4	4	3	2	2	2	2	3	2	2	2	1	2	3	2	1	1	1	1	1	1	2.0	4
26-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	2	3	2	1.0	3
27-May	2	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1.1	2
28-May	1	1	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
29-May	Z	1	1	1	1	1	1	1	1	1	1	2	2	3	1	1	1	1	1	1	1	1	1	1	0.9	3
30-May	1	Z	1	1	8	8	2	0	0	1	0	1	1	0	1	1	0	1	0	0	0	0	0	0	1.2	8
31-May	0	0	Z	0	3	6	3	1	1	1	1	1	1	1	1	1	2	1	1	0	1	1	1	0	1.2	6
	2.7	3.1	3.7	4.6	4.9	4.7	3.0	1.9	1.7	1.4	1.1	1.1	1.3	1.5	1.6	1.6	1.9	1.7	2.0	1.9	2.1	2.5	2.8	2.6	Diurnal Average	
	9	17	22	30	29	22	18	9	7	5	5	4	6	10	11	12	17	14	17	13	12	15	14	11	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.43	99.43
21 - 40	4	0.57	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	48	115	40	36	15	24	42	24	61	42	41	29	41	51	42	51	702
21 - 40	0	0	0	0	0	0	0	0	0	4	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	48	115	40	36	15	24	42	24	61	46	41	29	41	51	42	51	706

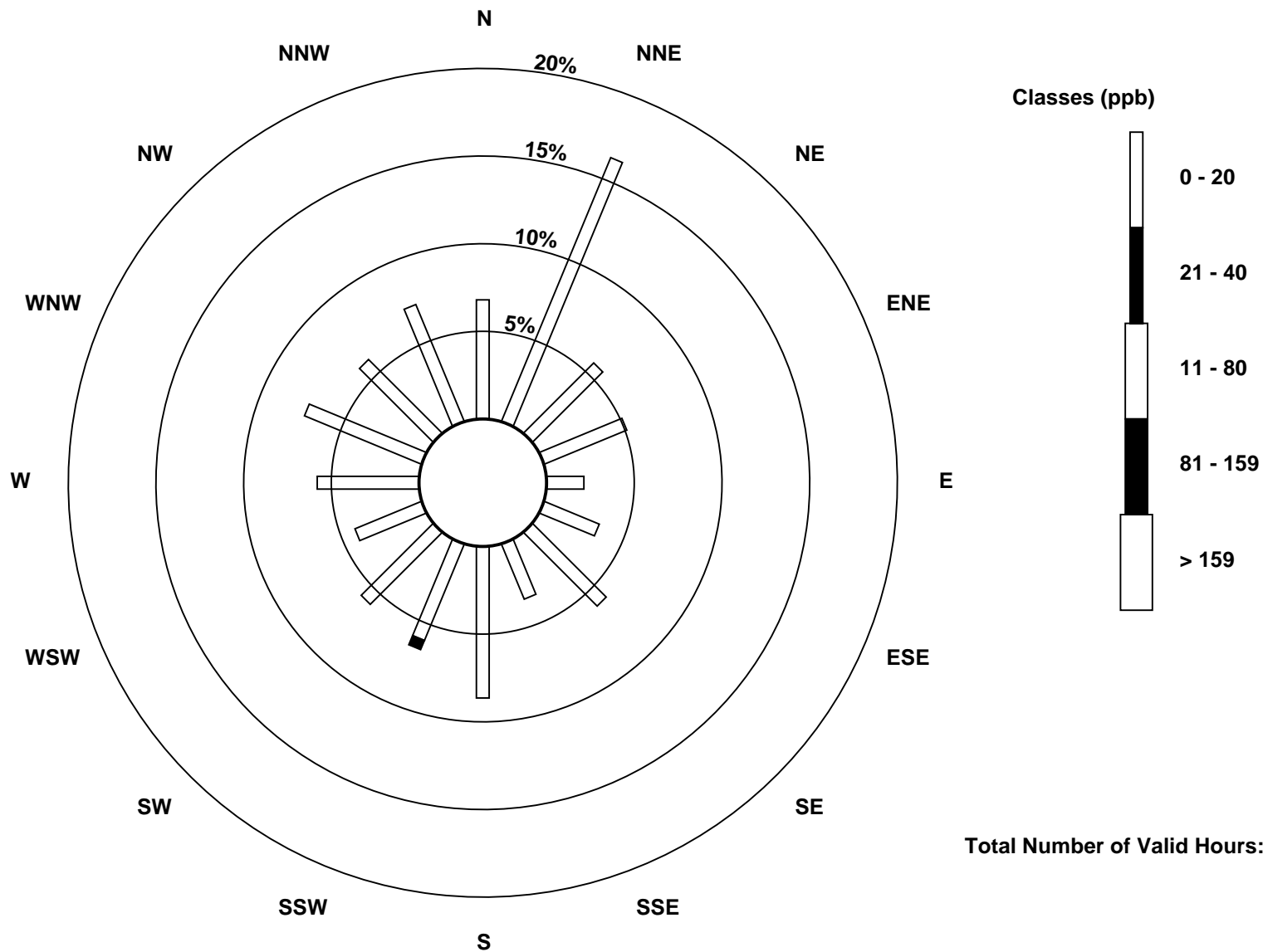
Total Number of Valid Hours: 706

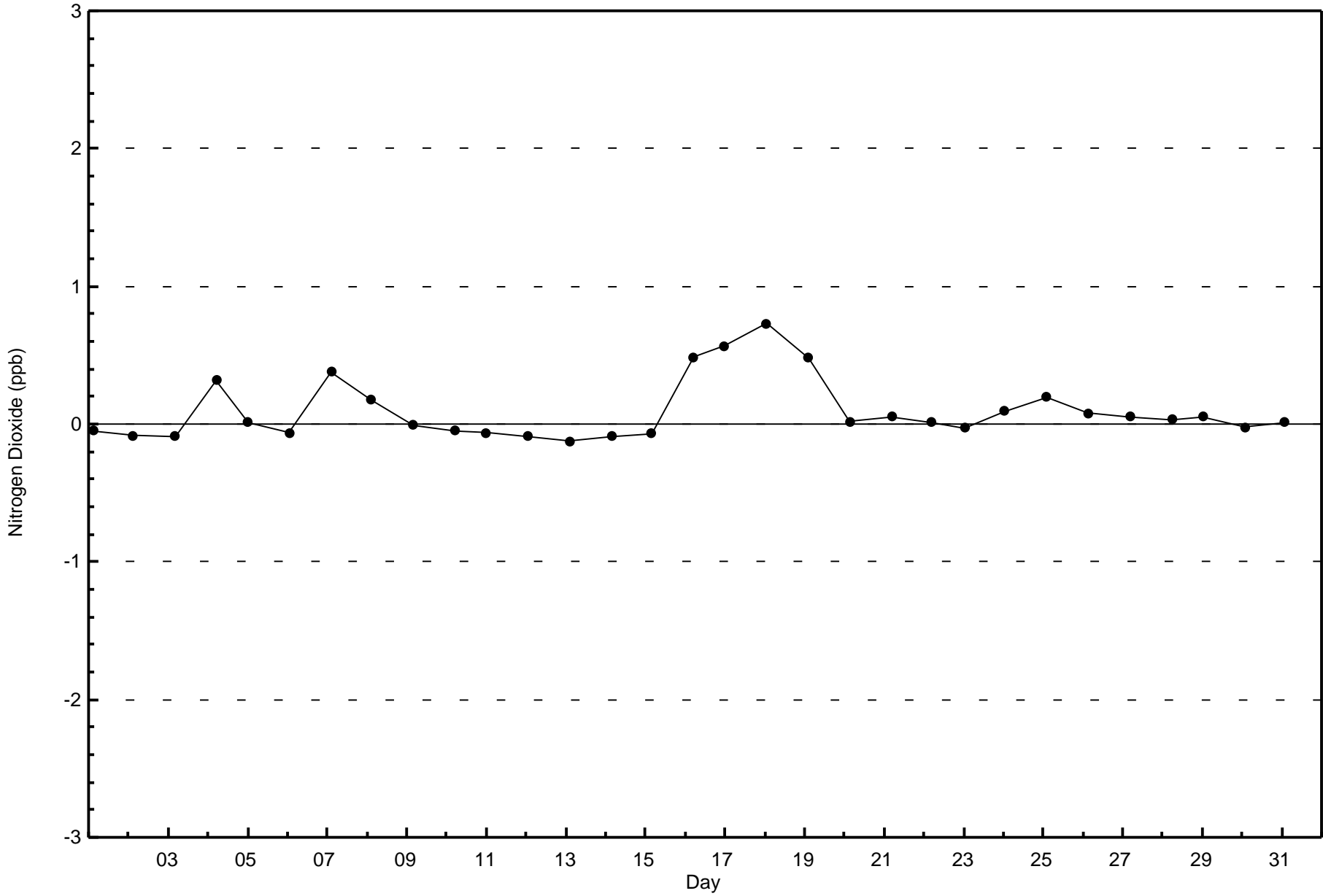
Total Number of Hours: 744

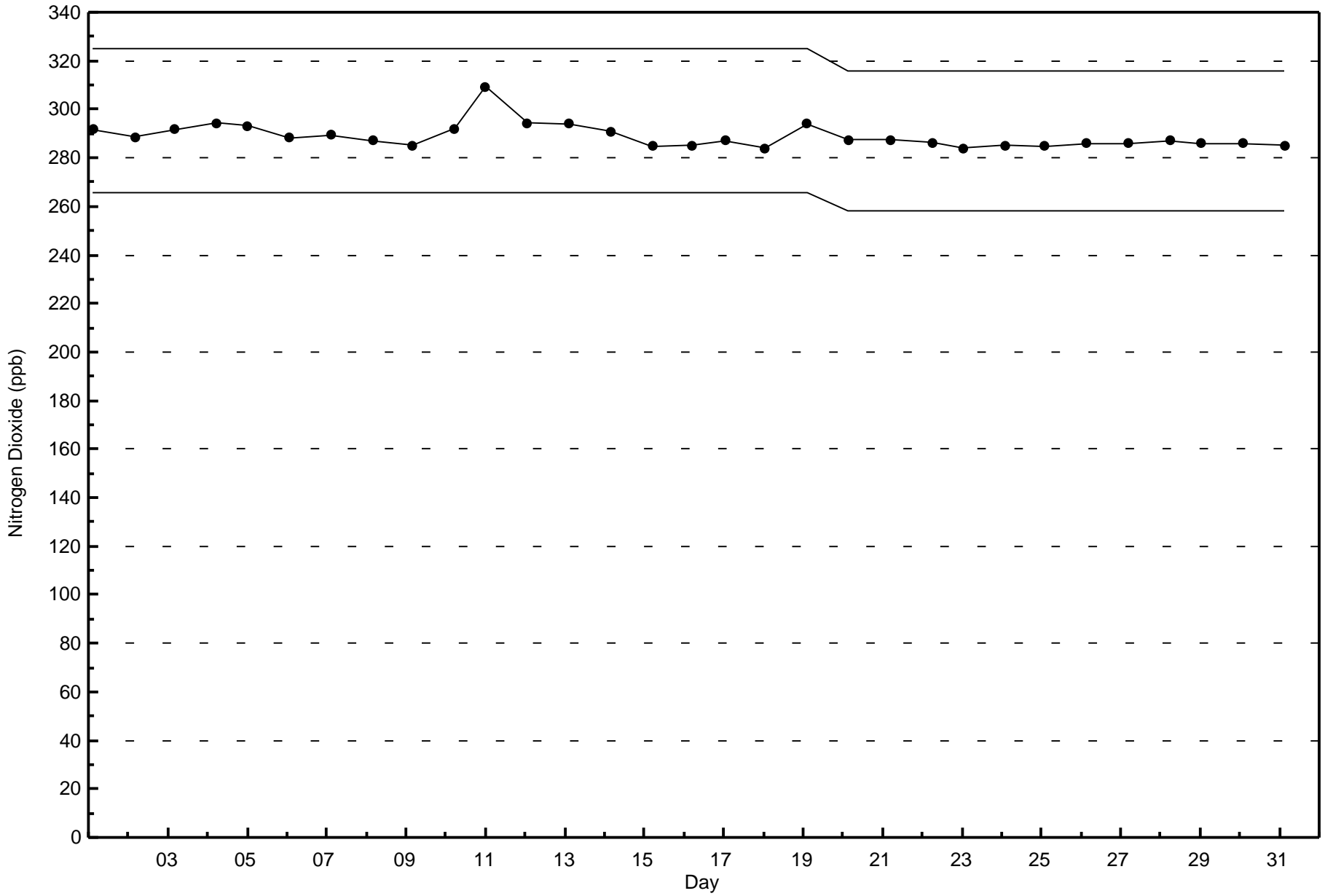


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)







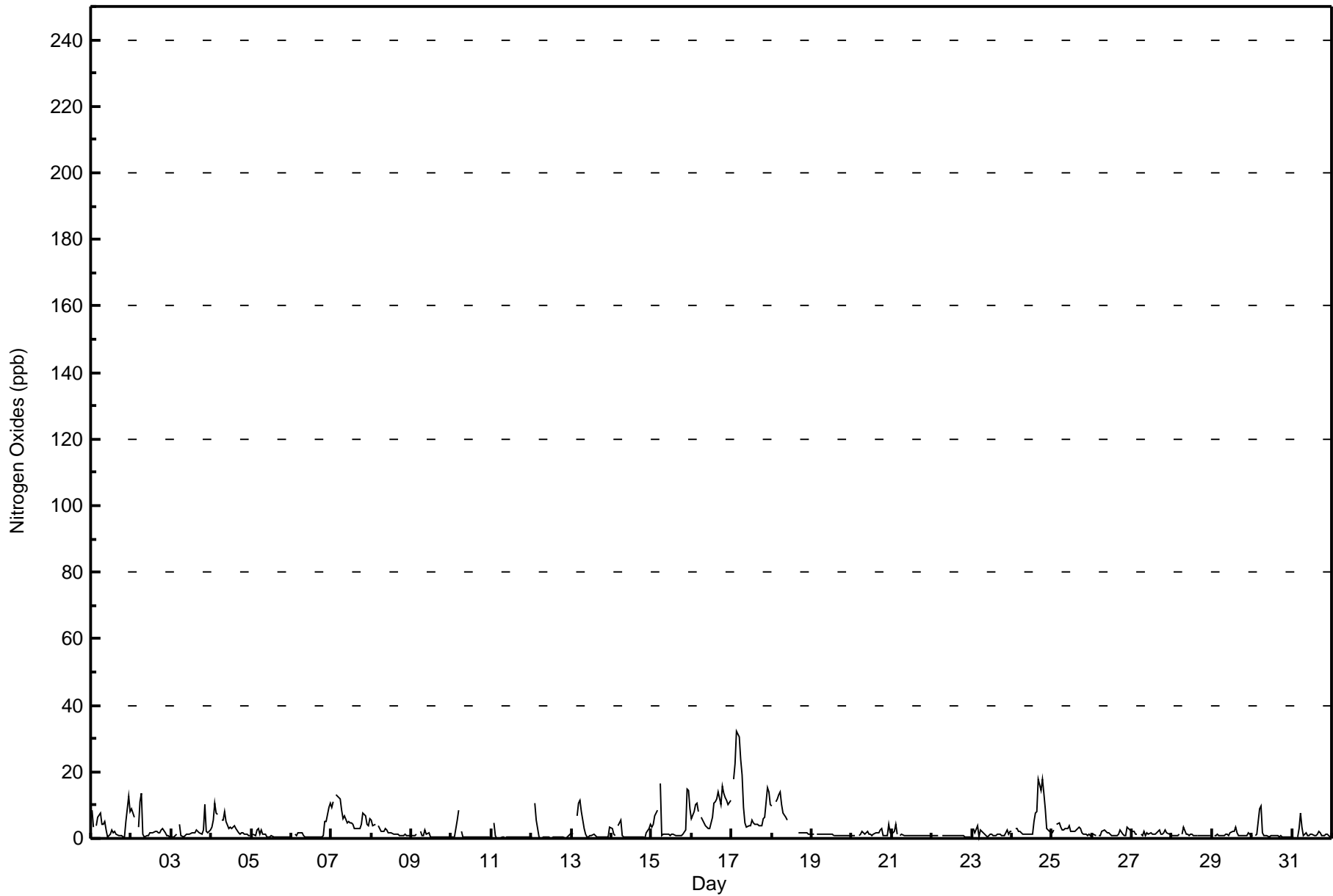


Maximum Value: 32 ppb on May 17 04:00		Maximum Daily Average: 11.0 ppb on May 17		Hours in Service: 744																						
Minimum Value: 0 ppb on May 11 05:00		Minimum Daily Average: 0.4 ppb on May 11		Hours of Data: 707																						
Maximum Diurnal Average: 5.6 ppb at hour 6		Minimum Diurnal Average: 1.3 ppb at hour 11		Hours of Missing Data: 37																						
Monthly Average: 2.6 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 3 P ₉₀ = 8 P ₉₉ = 18		Hours of Calibration: 37																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	9	3	Z	4	6	8	4	4	5	3	0	1	2	2	2	1	1	1	1	0	0	5	13	8	3.6	13
2-May	9	8	6	Z	3	11	13	1	0	1	1	2	2	2	2	2	2	2	3	3	2	1	1	1	3.3	13
3-May	1	0	1	1	Z	4	1	1	1	1	1	1	2	2	2	3	2	2	1	2	10	2	2	2	2.0	10
4-May	3	5	11	8	7	Z	5	6	8	5	3	3	3	3	4	3	2	1	2	1	1	1	1	1	3.8	11
5-May	Z	1	1	3	3	1	2	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.9	3
6-May	0	Z	1	1	2	2	2	1	1	0	0	0	0	0	1	1	0	0	1	1	5	5	9	11	1.9	11
7-May	9	11	Z	13	12	12	9	6	7	5	5	5	5	4	3	3	3	3	4	7	7	4	4	6	6.4	13
8-May	5	4	4	Z	4	3	2	2	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2.0	5
9-May	1	1	1	1	Z	2	1	1	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	3
10-May	0	0	1	6	8	Z	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	8
11-May	Z	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	5
12-May	0	Z	11	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.0	11
13-May	2	1	Z	7	11	11	8	3	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	3	2.3	11
14-May	3	1	1	Z	4	5	1	0	1	1	1	1	1	0	0	0	0	0	0	0	2	3	4	4	1.3	5
15-May	4	4	7	8	Z	16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	15	14	9	4.2	16
16-May	6	8	10	10	8	Z	6	5	4	3	3	3	6	10	11	12	14	10	16	13	12	11	10	11	8.9	16
17-May	Z	18	22	32	30	24	19	9	5	4	4	4	6	5	4	4	4	4	4	6	6	15	14	10	11.0	32
18-May	10	Z	11	12	13	14	10	8	6	6	C	C	C	C	C	C	2	2	2	2	2	2	1	1	--	14
19-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1
20-May	1	1	1	Z	1	1	2	2	1	2	1	1	1	1	2	2	2	2	3	1	1	1	4	2	1.5	4
21-May	1	2	4	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	4
22-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
23-May	Z	3	2	4	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	2	1.5	4
24-May	2	Z	3	3	2	2	1	1	1	1	1	1	5	8	8	18	14	18	14	9	3	2	2	2	5.3	18
25-May	2	2	Z	4	5	3	3	3	3	3	4	2	2	2	3	3	3	3	2	1	1	1	1	1	2.4	5
26-May	1	1	1	Z	1	1	2	2	2	2	2	1	1	1	1	1	1	2	1	1	1	3	3	2	1.5	3
27-May	2	2	1	1	Z	1	1	2	1	2	1	2	1	1	1	2	2	1	1	2	3	2	1	1	1.5	3
28-May	1	1	1	1	1	Z	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	3
29-May	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	4	2	1	1	1	1	1	1	2	1	1.2	4
30-May	1	Z	1	1	9	10	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	10
31-May	1	1	Z	1	3	8	3	1	2	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1.5	8
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.43	99.43
21 - 40	4	0.57	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	48	115	40	36	15	24	42	24	61	42	41	29	41	51	42	51	702
21 - 40	0	0	0	0	0	0	0	0	0	4	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	48	115	40	36	15	24	42	24	61	46	41	29	41	51	42	51	706

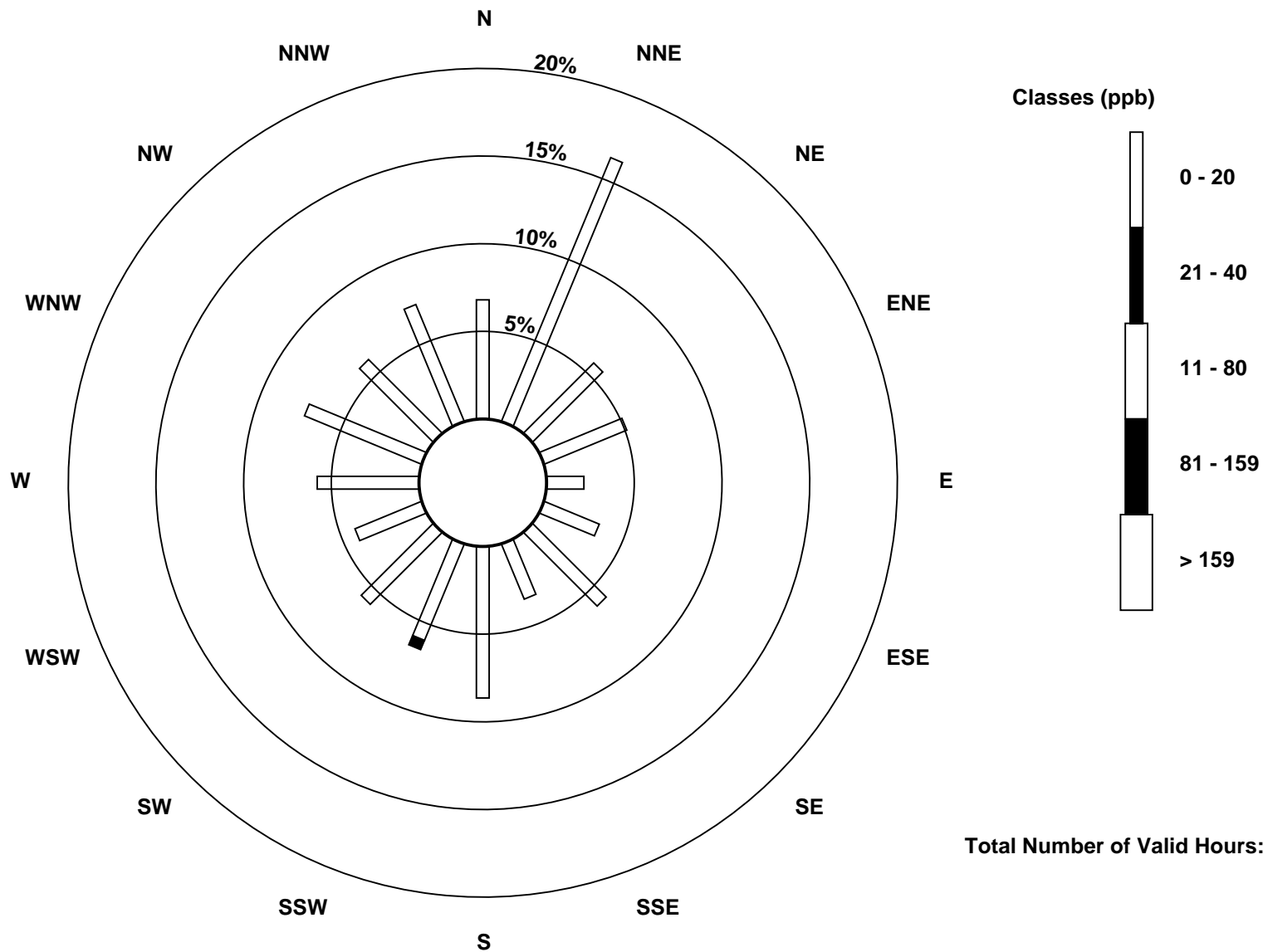
Total Number of Valid Hours: 706

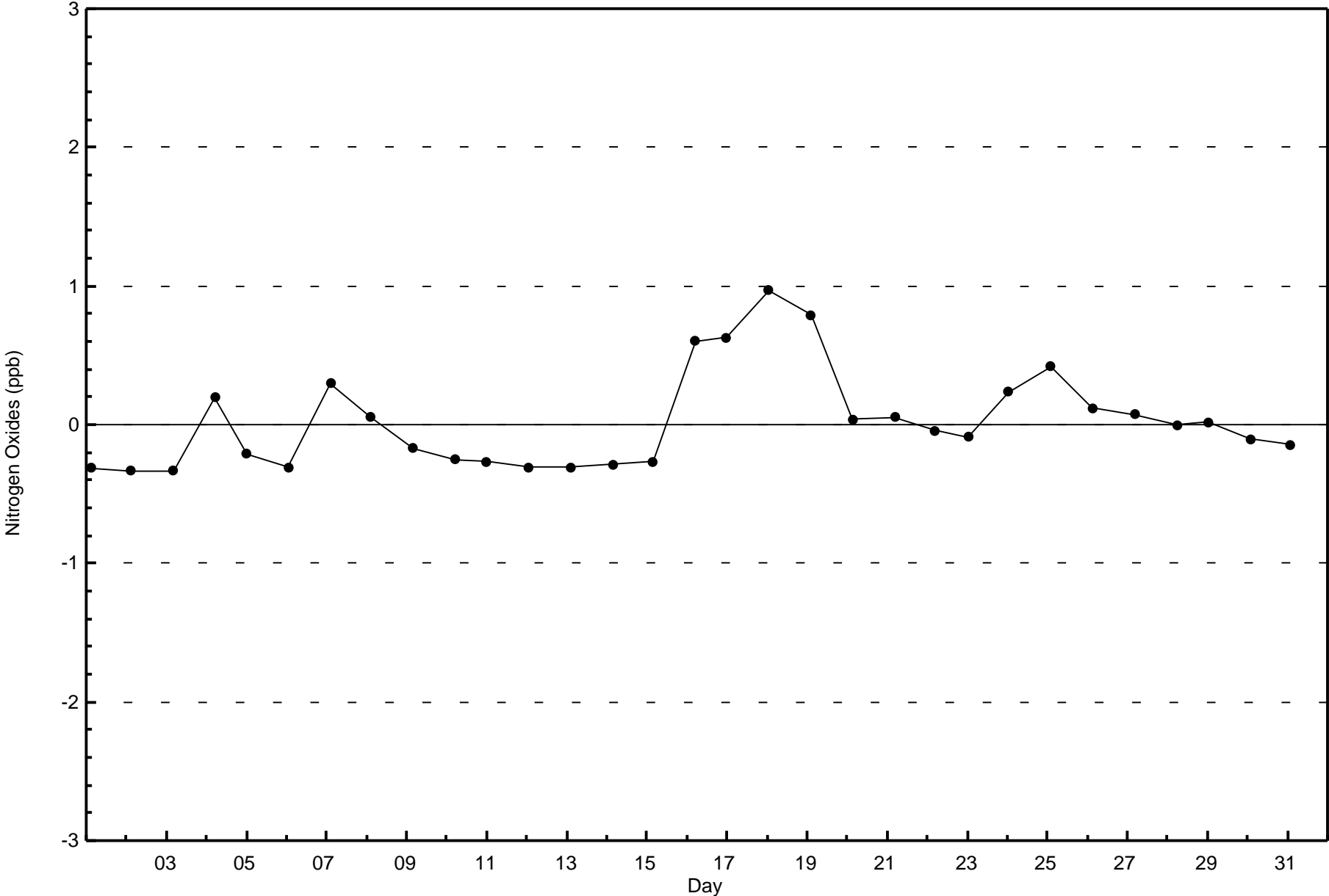
Total Number of Hours: 744

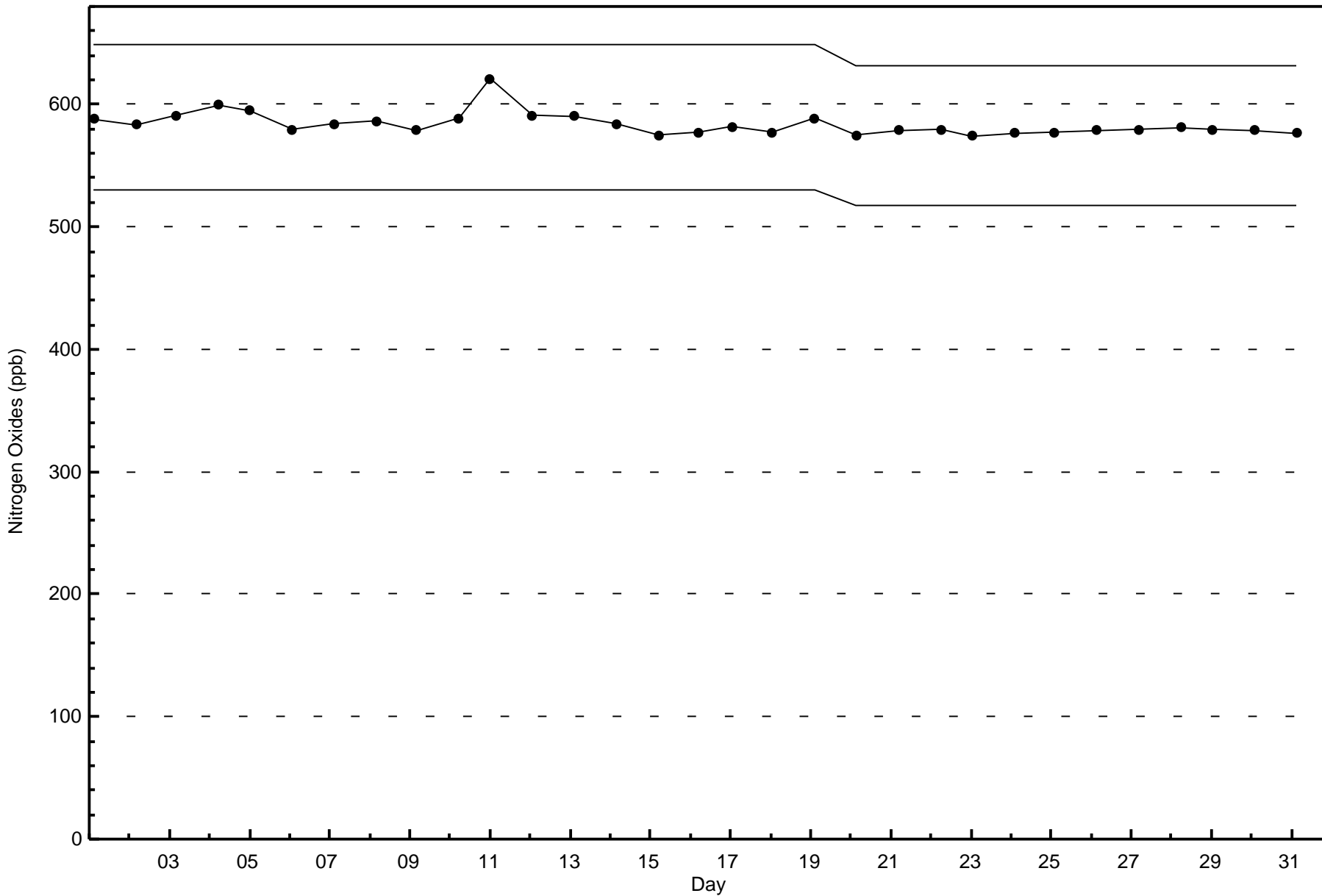


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)





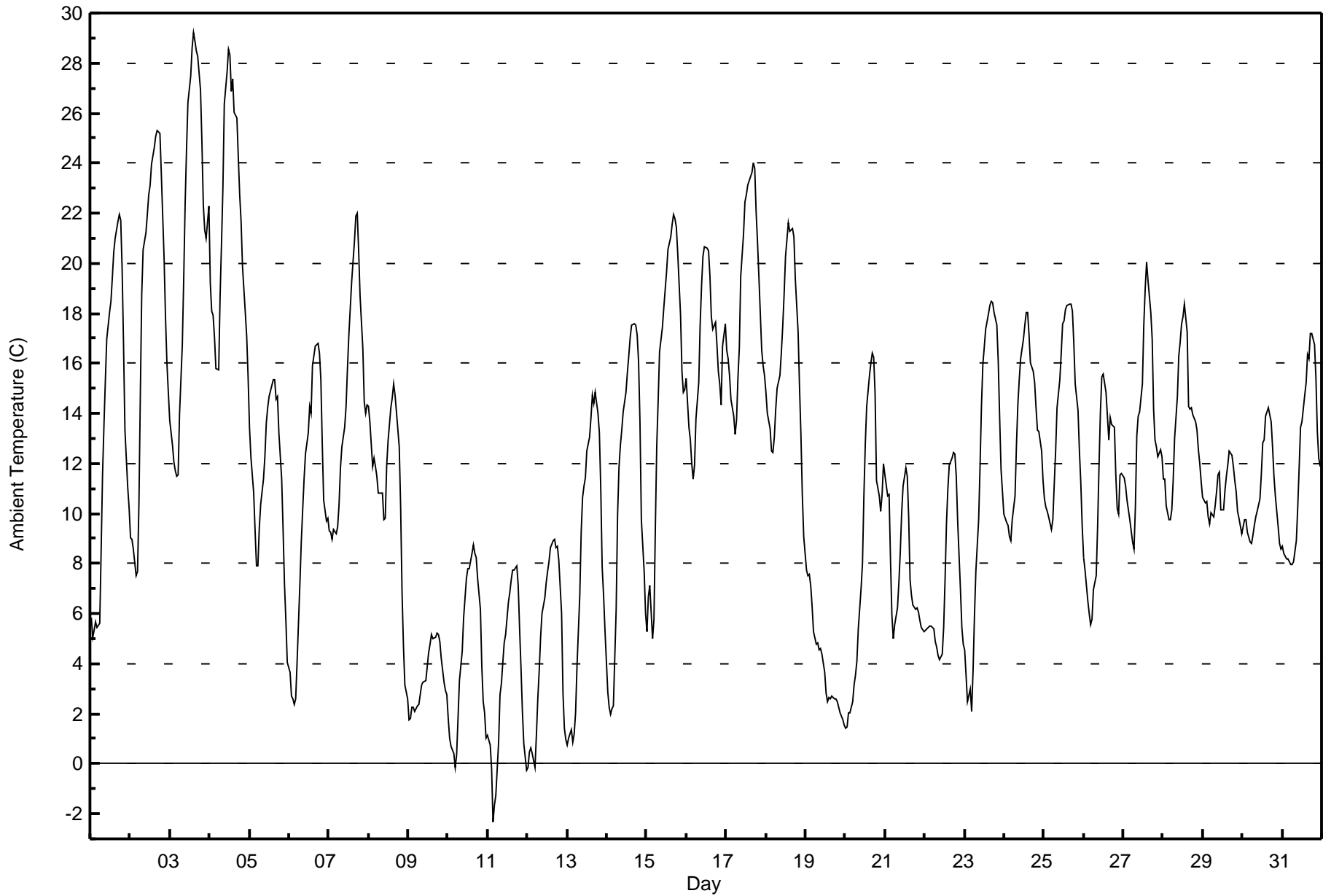




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Firebag - May 2016

Maximum Value: 29.2 C on May 3 15:00 Maximum Daily Average: 21.8 C on May 4																				Hours in Service: 744 Hours of Data: 744						
Minimum Value: -2.3 C on May 11 04:00 Minimum Daily Average: 3.4 C on May 11 Maximum Diurnal Average: 16.0 C at hour 15 Minimum Diurnal Average: 6.8 C at hour 5 Monthly Average: 11.72 C Percentiles: P₁ = -0.2 P₁₀ = 2.9 Q₁ = 7.2 Median = 11.5 Q₃ = 15.9 P₉₀ = 20.4 P₉₉ = 28.2																				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-May	5.9	5.1	5.3	5.7	5.5	5.6	8.5	11.5	13.5	15.3	17.0	18.0	18.5	19.4	20.4	21.0	21.7	21.9	21.7	19.7	16.8	13.4	11.1	10.2	13.9	21.9
2-May	9.0	9.0	8.6	7.5	7.7	10.3	14.7	18.8	20.6	21.2	21.9	22.7	23.1	23.9	24.6	25.1	25.3	25.3	25.2	23.6	20.2	17.8	16.0	14.8	18.2	25.3
3-May	13.7	12.7	12.0	11.7	11.5	11.6	14.0	16.7	19.4	22.3	24.5	26.4	27.5	28.6	29.2	28.9	28.5	28.3	26.9	24.9	22.3	21.3	21.0	22.3	21.1	29.2
4-May	19.2	18.1	17.9	17.0	15.8	15.8	18.7	20.8	23.0	26.4	27.6	28.6	28.3	26.9	27.4	26.1	25.8	24.2	22.7	21.7	19.9	18.0	17.1	15.5	21.8	28.6
5-May	13.4	12.2	10.8	9.3	7.9	7.9	9.4	10.4	11.4	12.3	13.6	14.2	14.7	15.1	15.3	15.3	14.6	14.7	13.2	11.4	9.4	7.2	5.7	4.1	11.4	15.3
6-May	3.6	2.7	2.6	2.4	2.6	4.1	7.2	8.9	10.2	11.4	12.4	13.2	14.3	14.0	15.9	16.3	16.7	16.8	16.4	15.3	12.8	10.5	9.7	9.8	10.4	16.8
7-May	9.3	9.2	9.0	9.4	9.2	9.5	10.4	11.8	12.7	13.5	14.3	15.8	17.1	18.2	19.3	20.9	21.9	22.0	20.5	18.7	16.6	14.5	14.0	14.3	14.7	22.0
8-May	14.3	13.7	11.9	12.2	11.9	11.5	10.8	10.8	10.8	9.8	9.8	11.9	12.9	14.2	14.6	15.2	14.7	14.0	12.7	10.2	6.8	4.7	3.2	2.6	11.0	15.2
9-May	1.8	1.8	2.3	2.3	2.1	2.3	2.4	2.7	3.1	3.3	3.3	3.9	4.4	4.8	5.2	5.0	5.0	5.2	5.1	4.9	4.2	3.3	3.0	2.8	3.5	5.2
10-May	1.8	1.0	0.7	0.4	-0.2	0.4	1.8	3.3	4.5	5.8	6.6	7.4	7.8	7.8	8.4	8.8	8.4	8.2	7.4	6.2	3.9	2.5	2.0	1.0	4.4	8.8
11-May	1.2	0.8	-0.2	-2.3	-1.7	-1.3	0.8	2.7	3.2	4.1	4.8	5.2	6.5	6.8	7.3	7.7	7.7	7.9	7.1	5.4	3.8	2.1	0.8	-0.2	3.4	7.9
12-May	-0.1	0.5	0.7	0.4	-0.1	1.1	2.6	3.7	5.1	6.0	6.6	7.2	7.7	8.1	8.6	8.9	9.0	8.6	8.7	8.2	6.0	2.8	1.4	1.0	4.7	9.0
13-May	0.8	1.0	1.4	0.9	1.2	2.0	3.9	6.8	9.3	10.7	11.1	11.4	12.5	13.1	13.8	14.7	14.4	14.8	14.0	13.2	11.0	7.8	6.8	5.3	8.4	14.8
14-May	2.9	2.3	2.0	2.2	2.3	6.2	9.9	11.8	12.7	13.3	14.1	14.8	15.6	16.3	17.0	17.5	17.6	17.5	17.1	16.1	13.7	9.7	7.7	6.0	11.1	17.6
15-May	5.3	6.7	7.1	5.0	5.8	9.5	12.7	14.5	16.5	17.4	18.2	18.9	19.6	20.5	21.0	21.6	22.0	21.8	21.5	20.4	17.9	15.7	14.8	14.9	15.4	22.0
16-May	15.4	13.4	13.0	12.0	11.4	11.9	13.8	15.3	17.5	19.1	20.2	20.7	20.6	20.5	19.5	17.9	17.4	17.7	16.8	15.7	15.2	14.4	16.7	17.6	16.4	20.7
17-May	16.5	16.2	15.5	14.5	13.9	13.2	13.7	15.4	16.6	19.5	21.2	22.5	22.7	23.1	23.3	23.6	24.0	23.8	22.0	20.8	19.4	16.5	15.9	15.5	18.7	24.0
18-May	14.8	14.0	13.4	12.5	12.4	13.0	14.2	15.0	15.5	16.4	17.4	18.8	20.3	21.6	21.3	21.3	21.4	21.1	19.4	17.3	15.1	13.1	10.8	9.1	16.2	21.6
19-May	7.8	7.5	7.6	7.1	6.3	5.3	4.8	4.8	4.5	4.6	4.4	3.7	2.8	2.5	2.7	2.6	2.7	2.6	2.6	2.5	2.3	2.0	1.7	1.6	4.0	7.8
20-May	1.4	1.5	2.0	2.0	2.5	3.1	3.5	4.1	5.4	7.0	8.0	10.7	12.8	14.3	15.5	16.0	16.4	16.3	14.8	11.3	10.7	10.1	10.8	12.0	8.8	16.4
21-May	11.5	10.7	10.8	8.2	6.0	5.0	5.6	6.2	7.2	8.5	10.0	11.1	11.8	11.5	9.9	7.4	6.7	6.3	6.2	6.2	6.0	5.7	5.5	5.3	7.9	11.8
22-May	5.3	5.4	5.4	5.5	5.5	5.4	4.9	4.7	4.3	4.2	4.4	5.4	7.3	9.6	11.0	11.9	12.2	12.4	12.4	11.5	9.7	7.0	5.4	4.8	7.3	12.4
23-May	4.6	3.6	2.5	3.0	2.1	3.7	5.9	7.7	9.7	11.9	14.3	15.9	16.6	17.4	18.0	18.3	18.5	18.4	18.0	17.5	16.1	13.8	11.7	10.8	11.7	18.5
24-May	10.0	9.7	9.6	9.1	8.9	9.7	10.7	12.7	14.4	15.3	16.2	16.9	17.6	18.0	18.0	17.2	16.0	15.7	15.2	14.2	13.3	13.3	12.5	11.3	13.6	18.0
25-May	10.6	10.3	10.1	9.9	9.4	9.8	11.1	12.5	14.2	15.4	16.4	17.6	17.7	18.1	18.3	18.4	18.4	18.1	16.8	15.2	14.1	12.5	11.2	9.5	14.0	18.4
26-May	8.3	7.7	6.5	6.0	5.6	5.8	7.0	7.5	9.5	11.9	14.0	15.4	15.6	14.8	13.9	13.0	13.8	13.6	13.4	11.5	10.2	10.0	11.5	11.6	10.8	15.6
27-May	11.4	11.1	10.5	10.2	9.8	8.9	8.6	10.2	13.1	13.9	14.1	15.2	17.5	19.0	20.1	19.3	18.0	17.0	14.2	13.0	12.7	12.3	12.5	12.3	13.5	20.1
28-May	11.3	11.4	10.3	9.8	9.7	10.2	11.3	13.0	14.7	16.3	16.9	17.6	17.8	18.4	17.2	14.3	14.2	14.2	13.9	13.7	13.4	12.5	12.0	11.2	13.6	18.4
29-May	10.6	10.4	10.5	9.9	9.6	10.0	9.9	10.3	10.9	11.6	11.7	10.2	10.1	10.9	11.5	11.9	12.5	12.3	11.9	11.3	10.9	10.1	9.8	9.2	10.7	12.5
30-May	9.5	9.7	9.8	9.2	8.9	8.8	9.1	9.6	9.8	10.1	10.6	11.6	12.8	12.9	13.9	14.2	14.0	13.7	12.7	11.5	10.7	9.4	8.8	8.6	10.8	14.2
31-May	8.7	8.4	8.2	8.2	8.1	8.0	8.0	8.1	8.9	10.3	11.8	13.5	13.7	14.7	15.2	16.4	16.2	17.2	17.2	16.7	15.4	13.3	12.2	11.9	12.1	17.2
8.4 8.0 7.7 7.1 6.8 7.4 8.7 10.1 11.4 12.5 13.5 14.4 15.1 15.7 16.0 16.0 16.0 15.9 15.1 13.9 12.3 10.6 9.8 9.2																								Diurnal Average		
19.2 18.1 17.9 17.0 15.8 15.8 18.7 20.8 23.0 26.4 27.6 28.6 28.3 28.6 29.2 28.9 28.5 28.3 26.9 24.9 22.3 21.3 21.0 22.3																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Firebag - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	8	1.08	1.08
0 - 10	289	38.84	39.92
10 - 20	369	49.60	89.52
> 20	78	10.48	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



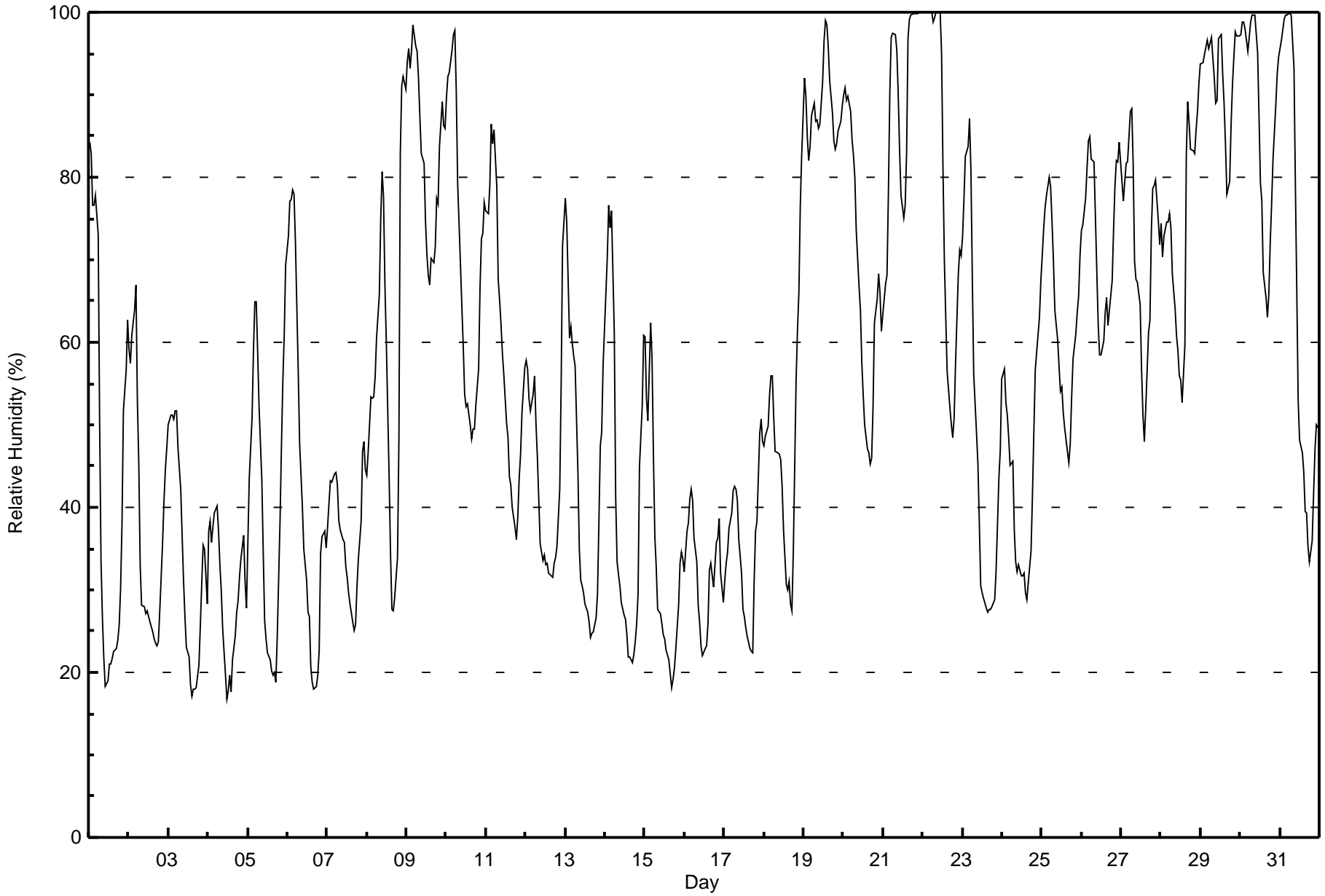
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Firebag - May 2016

Maximum Value: 100 % on May 22 00:00 Maximum Daily Average: 92.2 % on May 29																	Hours in Service: 744									
Minimum Value: 17 % on May 4 12:00 Minimum Daily Average: 29.5 % on May 4																	Hours of Data: 744									
Maximum Diurnal Average: 72.6 % at hour 5 Minimum Diurnal Average: 41.9 % at hour 15																	Hours of Missing Data: 0									
Monthly Average: 56.7 % Percentiles: P ₁ = 18 P ₁₀ = 26 Q ₁ = 34 Median = 53 Q ₃ = 78 P ₉₀ = 93 P ₉₉ = 100																	Hours of Calibration: 0									
																	Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	84	83	77	77	78	73	50	34	27	22	18	19	21	21	22	23	23	24	26	30	38	52	57	63	43.3	84
2-May	59	58	61	64	67	53	46	33	28	28	27	27	27	26	25	24	24	23	24	27	36	41	45	47	38.3	67
3-May	50	51	51	51	52	52	47	42	37	31	27	23	22	18	17	18	18	18	21	26	31	35	35	28	33.4	52
4-May	37	38	36	38	39	40	37	33	30	25	20	17	18	20	18	22	24	27	29	32	34	37	31	28	29.5	40
5-May	36	44	51	59	65	65	59	52	43	34	26	24	22	22	20	20	20	19	24	38	47	55	61	69	40.7	69
6-May	73	77	77	78	78	72	57	48	44	40	35	31	27	27	21	19	18	18	20	23	34	36	37	35	42.7	78
7-May	38	40	43	43	44	44	43	38	37	36	36	33	31	30	28	26	25	26	30	34	38	47	48	45	36.8	48
8-May	44	47	53	53	53	56	61	66	75	81	78	67	60	44	34	28	27	29	34	48	83	91	92	91	58.1	92
9-May	94	96	93	95	98	96	95	92	87	83	82	75	71	68	67	70	70	72	77	77	84	89	86	86	83.4	98
10-May	90	92	93	95	97	98	90	79	69	64	60	54	52	53	50	48	49	49	52	57	67	73	73	77	70.1	98
11-May	76	76	79	86	84	86	79	68	65	62	59	56	50	48	44	43	40	38	36	39	43	46	51	57	58.8	86
12-May	58	57	53	52	54	56	50	46	41	36	34	34	33	33	32	32	32	33	34	35	42	55	72	75	44.9	75
13-May	77	75	61	62	60	58	57	44	35	31	31	30	28	27	26	24	25	25	27	30	38	47	49	57	42.7	77
14-May	66	70	77	74	76	61	41	33	32	30	28	27	26	25	22	22	21	22	24	26	29	45	52	61	41.3	77
15-May	61	53	50	62	58	46	36	33	28	27	26	25	24	23	22	20	18	19	20	23	28	33	35	34	33.5	62
16-May	32	37	38	41	42	41	36	33	28	26	23	22	23	23	26	32	33	30	33	36	36	39	32	28	32.2	42
17-May	31	33	35	38	39	42	43	42	41	36	32	28	27	25	24	23	23	22	31	37	38	49	51	48	34.9	51
18-May	47	49	50	53	56	56	51	47	47	46	46	43	37	31	30	31	28	28	35	55	61	66	77	83	48.0	83
19-May	92	90	85	82	84	88	89	87	87	86	87	92	97	99	98	96	92	88	84	83	84	86	87	89	88.7	99
20-May	90	91	89	90	88	85	83	80	74	67	64	57	54	50	47	47	45	46	52	62	65	68	66	61	67.5	91
21-May	63	67	68	78	90	97	97	97	95	90	83	78	75	77	83	97	99	100	100	100	100	100	100	100	89.0	100
22-May	100	100	100	100	100	100	99	99	100	100	100	95	81	70	63	56	52	50	48	51	57	68	71	71	80.5	100
23-May	73	77	83	84	87	81	68	56	49	45	38	31	30	29	28	27	28	28	28	29	32	38	44	47	48.2	87
24-May	56	57	53	51	48	45	46	37	33	32	33	32	32	32	30	29	31	35	42	49	57	59	63	67	43.6	67
25-May	70	74	76	78	80	79	75	70	64	60	57	54	55	52	50	47	45	48	53	58	61	64	66	71	62.7	80
26-May	74	74	77	81	84	85	82	82	75	69	62	59	58	60	64	65	62	64	67	74	79	82	82	84	72.7	85
27-May	79	77	79	82	82	88	88	82	70	68	67	65	57	51	48	52	61	63	73	79	79	80	75	72	71.5	88
28-May	74	70	73	75	75	76	74	68	64	61	59	56	55	53	60	82	89	87	83	83	83	86	88	91	73.5	91
29-May	94	94	95	96	97	96	97	94	92	89	89	97	97	93	89	84	78	79	86	91	95	98	97	97	92.2	98
30-May	97	99	99	98	95	97	99	100	100	100	95	87	79	77	68	65	63	66	72	77	82	89	92	95	87.1	100
31-May	96	97	99	100	100	100	100	100	93	79	66	53	48	47	44	39	39	35	33	36	41	47	50	50	66.3	100
																	Diurnal Average									
																	Diurnal Maximum									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	21	2.82	2.82
20 - 40	226	30.38	33.20
40 - 60	175	23.52	56.72
60 - 80	155	20.83	77.55
80 - 100	157	21.10	98.66

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 30 km/h on May 19 13:00	Maximum Daily Speed Average: 24.1 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 16 16:00	Minimum Daily Speed Average: 1.7 km/h on May 29	Hours of Data: 743
Maximum Diurnal Speed Average: 6.0 km/h at hour 16	Minimum Diurnal Speed Average: 0.2 km/h at hour 7	Hours of Missing Data: 1
Monthly Average Velocity: 1.9 km/h 354.9 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 14 Q ₃ = 18 P ₉₀ = 22 P ₉₉ = 27	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-May	SE7	S6	SSW8	SSW9	S11	S10	SW11	SW12	SW15	SW16	SW17WSW20	SW19WSW21	W18	W16	W16	W17WNW15	NW8	WNW4	NNW4	NE4	ESE3	WSW9.1	WSW21					
2-May	SE6	SSE5	SSE5	S4	SW6	S5	S4	N3	SSE2	NW3	S4	WSW5	NNE3	NW4	WNW7	WNW4	S2	ESE4	SE5	ESE10	ESE14	SE14	SE15	SE16	SSE3.7	SE16		
3-May	SE16	ESE17	SE18	SE16	SE14	SE16	SSE19	S16	S15	SSW12	SSW15	SSW17	SSW20	SW20	SW19	SSW25	S24	S21	S19	S16	S17	S15	S12	S17	S15.4	SSW25		
4-May	S14	S13	SSW12	SSW14	SW14	SW9	SW6	SW10	S7	SW9	SW7	W12	W15WSW12WSW11	WSW5	NW17WNW23WNW16WNW17WNW17WNW13WNW15WNW14	WSW9.1	WNW23	WNW25	WNW19	N17	N10	NNE9	NNE8	NNW5	WSW9.1	WNW23		
5-May	NW12	NW11	NW14	NNW12	N10	NW6	WNW9	WNW13	NW13	NW17	NW16	WNW24	WNW24	NW25	WNW25	NW23	NW22	NW21	NNW19	N17	N10	NNE9	NNE8	NNW5	NW13.9	WNW25		
6-May	NW6	W10	WSW8	WSW9	W8	W9	NW11	NNW18	NW17	NW16	NW18	WNW14	W15	NW8	W16	W14	W14	WNW14	W11	WSW6	S5	S14	S17	S19	W8.6	S19		
7-May	S19	S18	SSE16	S17	S15	S13	S15	SSW18	SSW19	SSW18	SSW17	SW18	SW15	SW7	SSW8	WSW8	SSE3	S11	SSE15	SE16	SE15	SE13	SE13	SE12	S12.0	S19		
8-May	SE10	SE7	NNE7	E3	NW11	NW17	NW15	WNW21	WNW26	W20	W17	W19	W18	WSW25	WSW26	WSW26	WSW27	WSW28	WSW28	WSW20	NNW17	NNW21	NNW21	WNW15	W14.0	WSW28		
9-May	WNW18	WNW19	WNW18	W13	W11	W12	W14	W19	W18	WNW18	WNW17	NW20	WNW19	NW18	NW17	NW15	NW14	WNW15	NW13	NW8	N11	N10	NW8	NW8	WNW13.8	NW20		
10-May	WNW8	WNW8	WNW9	W8	W7	WNW7	NNW8	NNW13	NNW15	NNW17	NNW18	N19	N17	NNE17	NNE17	NNE18	NE18	NNE18	NNE19	NNE16	NE11	ENE10	NE11	NE10	N10.5	N19		
11-May	ENE9	ENE7	ENE6	NE5	NNE8	NNE8	NE9	NNE15	NNE15	NNE15	NNE18	NNE20	NNE20	NNE21	NNE22	NNE22	NNE21	NNE20	NNE21	NNE15	NNE13	NNE11	NNE10	NE8	NNE13.6	NNE22		
12-May	NE7	ENE7	ENE7	ENE7	ENE7	NE9	NE13	NE15	NNE17	NNE17	NNE19	NNE19	NNE20	NNE19	NNE19	NNE19	NNE16	NNE18	N17	NNE16	NE7	AF	W2	W2	NNE12.2	NNE20		
13-May	W4	W4	W7	W8	W9	W9	W8	WNW8	NW11	NW13	WNW13	NW10	WNW11	NW12	WNW13	NW15	NW14	NNW14	N17	N12	NNE7	NE8	NE8	ESE2	NW7.5	N17		
14-May	ENE3	E2	SSW3	SSW4	WSW4	W3	NNW5	NNW7	NNW10	N11	NNW12	NW12	NNW10	NNW9	NNW9	NNW14	N12	N13	N12	N9	NNW6	NNW3	NNW3	NNE2	NNW6.3	NNW14		
15-May	E4	SE6	SSE5	S6	S5	SSW6	SW7	WSW9	WNW12	W10	WNW9	W6	WSW6	WSW3	SSW3	SW6	W9	WNW6	SSW7	SSW10	S12	S15	S13	S14	SW5.5	S15		
16-May	S17	S13	SSW12	SSW14	SSW15	SSW14	SW13	SW14	WSW16	SW18	WSW20	SW23	SW20	SW18	WSW8	E0	ESE8	ESE11	ESE13	ESE14	SE13	SE12	S17	SSE12	SSW10.4	SW23		
17-May	SSE16	S17	SSW16	SSW17	SSW17	SSW17	SW19	SW20	WSW18	W12	WNW11	WSW10	WNW13	WNW8	NW10	WNW9	NNW5	NNW5	NNW5	ENE6	SE9	S13	SSW13	SW15	SW8.1	SW20		
18-May	SW14	SSW11	SW13	SW12	SSW12	SW14	SW16	SW16	SW19	SW20	SW20	SW20	WSW21	WSW21	W20	W18	W17	WNW16	NW14	NNE21	NNE18	NNE19	NNE21	N22	W9.3	N22		
19-May	NNE21	NNE20	NNE18	NNE21	NNE22	NNE27	NNE26	NNE26	NNE27	NNE27	NNE29	NNE25	NNE30	NNE28	NNE26	NNE24	NNE24	NNE30	NNE28	NNE23	NNE22	NNE19	NNE19	NNE17	NNE24.1	NNE30		
20-May	NNE15	NE15	NE14	NE12	NE15	ENE18	ENE18	ENE21	ENE20	E19	E19	ENE19	ENE20	ENE17	ENE18	ENE19	E19	E14	NE8	N12	NNE12	NE11	E12	ESE15	ENE14.7	ENE21		
21-May	SE10	ESE8	E9	NE9	NNE9	NNE11	NE10	NE9	NNE10	N14	NNE15	NNE17	NNE17	N15	N19	NNE17	N19	N20	NNE20	NNE18	NNE20	NNE20	NNE21	NNE20	NNE13.4	NNE21		
22-May	NE18	NNE16	NNE15	NNE17	NNE20	NNE21	NNE23	NNE20	NNE22	NNE23	NNE22	NNE23	NNE26	NNE24	NNE27	NNE28	NNE27	NNE26	NNE27	NNE23	NNE14	NNE11	NNE12	NE15	NNE20.8	NNE28		
23-May	ENE12	ENE12	ENE11	ENE14	NE13	ENE14	E17	ENE17	NE18	NE17	NE19	ENE23	ENE24	ENE20	ENE15	ENE16	ENE16	E15	E13	ESE9	SE10	S11	S16	ENE13.2	ENE24			
24-May	S17	S16	SSW19	SSW18	SSW16	SSW19	SSW19	SSW21	SSW22	SSW19	S20	S24	S24	S24	SSE22	SSE11	ESE13	ESE16	ESE14	SE11	SSE12	S15	SSW14	SSW13	S15.6	S24		
25-May	SSW13	SSW12	SSW14	SSW14	SW12	SW12	SW9	W6	WNW6	WNW5	N9	N10	N15	NNE14	NNE16	NNE19	NNE18	N19	NNE17	NNE13	NE15	NE16	ENE14	NE11	N4.9	NNE19		
26-May	ENE11	NE12	NE13	NE14	NNE11	NE9	NE13	ENE13	E15	NE14	NE15	NE17	N20	N23	N20	NNE22	NE18	ENE11	NE9	NE11	NE9	E9	E12	E16	NE12.2	N23		
27-May	ESE20	ESE20	ESE19	ESE20	SE23	SE21	SE22	SE21	SE25	SE19	SSE20	SE17	ESE22	SE24	SE24	SSE23	SSE16	SSW21	SW16	S10	ESE12	ESE14	SE15	SE13	SE17.3	SE25		
28-May	SE14	SE16	SE14	SE18	SE21	SE18	SE18	SE18	SE19	SSE19	S17	SE19	SSE22	SSE23	S28	SSW23	S16	SSE18	SSE16	SSE12	SSE12	SSE9	S12	S11	SSE16.1	S28		
29-May	S12	SSW10	S7	S7	S11	SSW9	SSW6	S5	SSW6	SW4	W6	WNW10	WNW11	NNW10	N10	N10	N10	N13	N10	N9	NE9	NNE7	N4	NNE6	NW1.7	N13		
30-May	N7	N9	N9	NNW8	NNW9	NNW10	N14	N16	N18	N18	N19	NNW20	NNW21	N22	NNW22	NNW22	NNW22	NNW22	N21	N15	N10	N10	N9	NNW9	N14.9	NNW22		
31-May	NNW10	N10	N10	NNW11	NNW12	NNW12	NNW12	NNW12	NNW12	NNW12	NNW12	NNW10	NW7	WNW8	NNW7	W5	WNW10	NW8	WNW1	W3	WSW7	SW9	S7	SSE10	SSE13	S16	NW4.7	S16

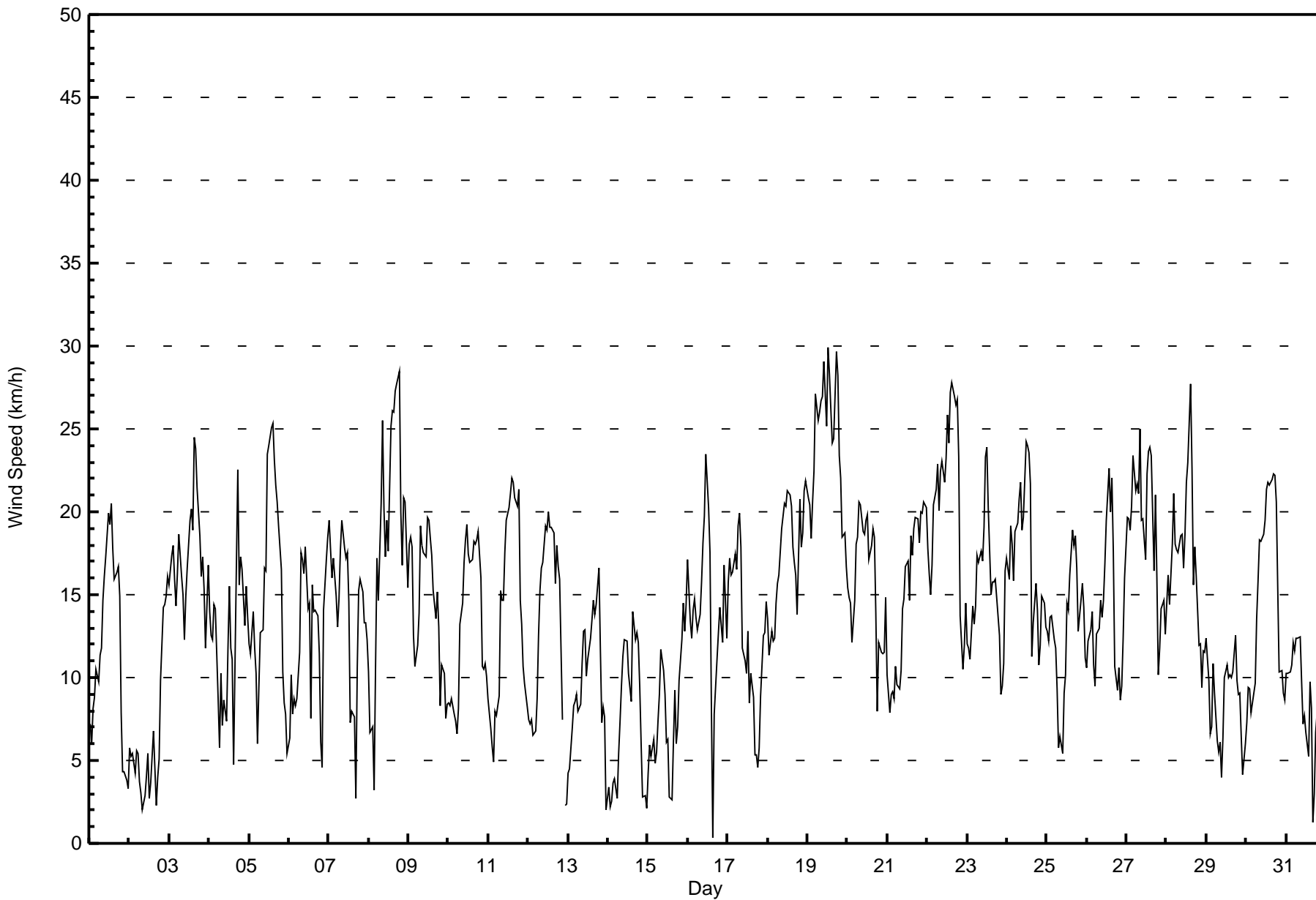
SE2.9 SE2.6 SE1.9 SSE2.0 S1.5 S1.0SSW0.2 NW1.8 NW2.8 NW3.9 NW4.2 NW4.7 NW4.8NNW5.0 NW5.7NNW6.0 N5.6 N5.2 N5.4 NNE5.2 NE4.8 ENE3.9 E2.7 ESE2.6	Diurnal Average
NNE21 NNE20 SSW19 NNE21 SE23 NNE27 NNE26 NNE26 NNE27 NNE27 NNE29 NNE25 NNE30 NNE28 S28 NNE28 WSW27 NNE30 WSW28 NNE23 NNE22 NNW21 NNE21 N22	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Firebag - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	57	7.67	7.67
6 - 11	200	26.92	34.59
12 - 19	350	47.11	81.70
20 - 28	133	17.90	99.60
29 - 38	3	0.40	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	2	2	1	4	3	1	5	8	3	1	4	7	4	2	8	57
6 - 11	19	17	18	13	2	6	8	3	13	11	12	10	17	18	15	18	200
12 - 19	22	46	22	19	10	11	28	13	36	32	24	5	20	23	22	17	350
20 - 28	7	50	0	6	0	4	8	5	7	6	7	12	2	7	4	8	133
29 - 38	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	118	42	39	16	24	45	26	64	52	44	31	46	52	43	51	743

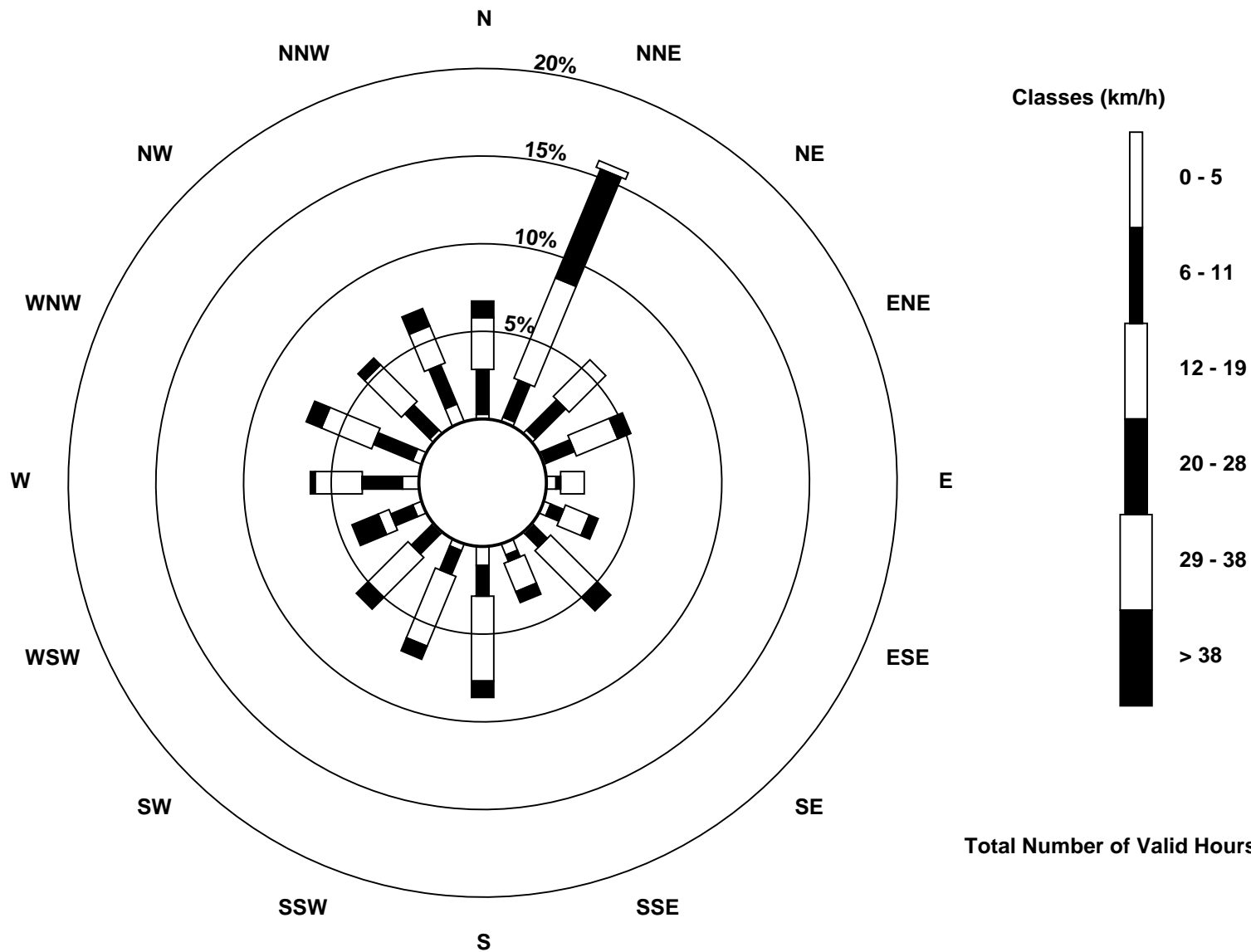
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Firebag (AMS 19)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - May 2016

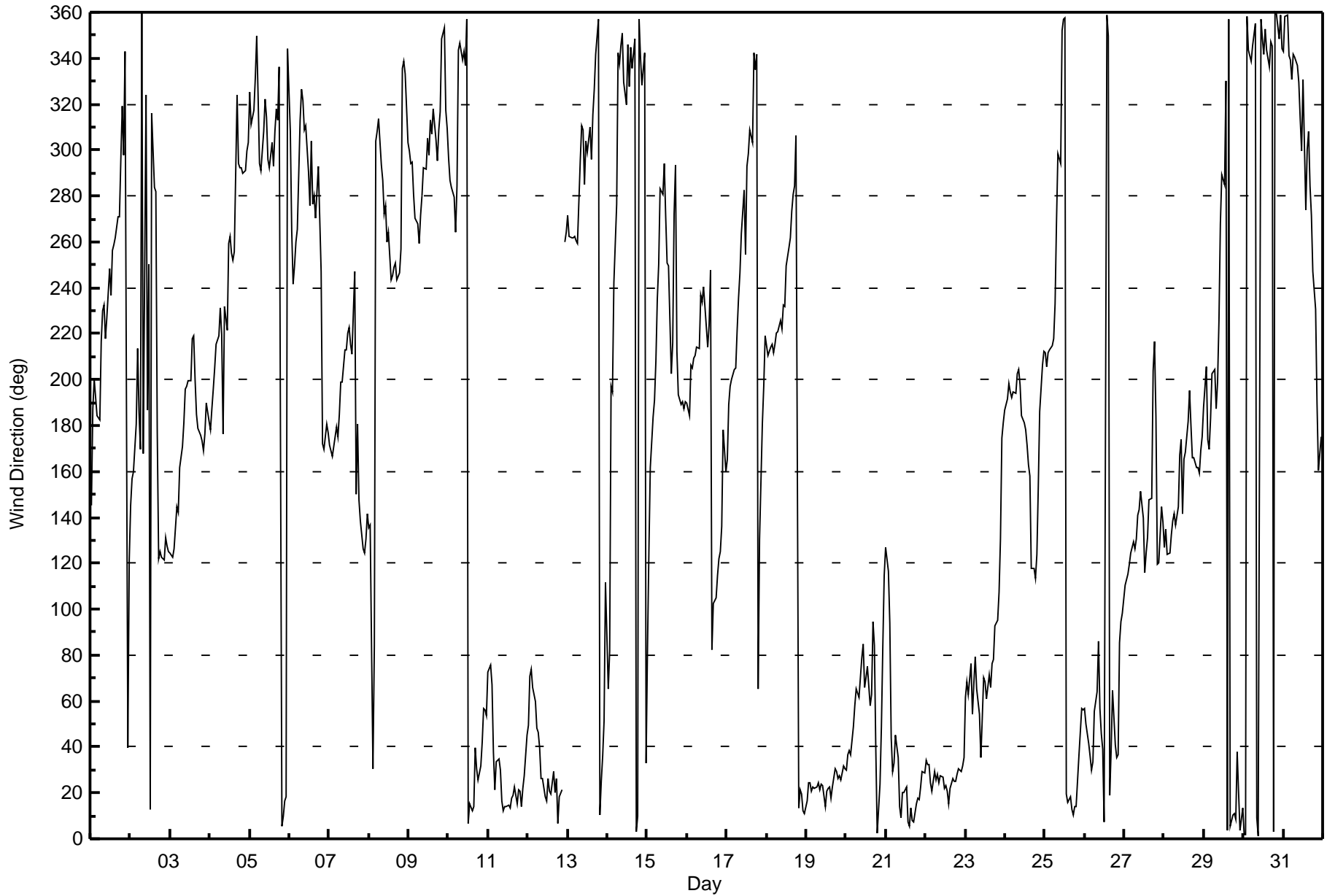
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on May 8 17:00 Minimum Value: 0 km/h on May 14 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2	1	0	2	1	1	2	2	3	4	5	4	5	5	5	5	4	4	3	3	1	1	1	1	5	
2-May	1	1	1	1	1	1	1	2	1	2	3	3	3	2	4	4	2	2	3	2	3	3	2	2	4	
3-May	3	3	3	2	2	2	3	2	2	2	4	4	5	6	5	3	3	3	2	3	4	5	4	6		
4-May	2	1	1	2	2	2	1	5	2	3	3	6	4	3	3	4	5	6	5	4	3	2	4	3	6	
5-May	2	2	3	2	2	1	2	3	3	4	5	6	6	6	6	6	5	5	5	5	3	2	2	1	6	
6-May	1	1	1	1	1	1	3	3	4	4	5	5	6	5	5	5	6	4	3	1	1	3	3	3	6	
7-May	3	2	2	2	2	2	2	3	3	3	3	3	3	2	3	4	3	4	3	3	2	2	2	2	4	
8-May	2	2	2	2	5	3	4	4	6	4	4	5	4	6	5	6	7	5	5	5	4	4	5	4	7	
9-May	5	4	4	3	2	2	3	4	4	4	4	4	4	4	4	4	3	3	4	2	3	3	1	1	5	
10-May	1	1	1	1	1	1	2	3	4	5	5	4	5	6	5	5	5	4	3	3	1	1	2	1	6	
11-May	1	1	0	1	1	1	3	3	3	4	5	4	5	5	5	5	5	4	5	4	3	1	1	1	5	
12-May	1	1	1	1	0	2	2	4	4	5	5	5	6	5	5	5	5	5	4	3	2	AF	1	1	6	
13-May	1	1	1	1	1	2	1	2	3	3	4	5	5	6	5	5	4	4	4	2	2	1	1	1	6	
14-May	2	1	1	0	0	1	1	2	3	4	5	5	5	4	5	5	6	4	3	2	2	2	2	1	6	
15-May	1	2	1	1	0	1	2	2	3	4	4	4	3	3	4	4	4	4	3	2	2	1	1	1	4	
16-May	3	1	2	2	2	2	2	2	3	4	4	5	4	4	3	2	2	1	2	2	2	2	3	2	5	
17-May	3	2	2	2	2	2	3	4	4	2	3	3	3	3	3	3	3	3	2	1	2	2	2	2	4	
18-May	2	2	2	1	2	2	2	3	4	3	4	4	5	5	5	4	4	4	4	4	3	3	4	4	5	
19-May	4	4	3	4	6	5	6	5	6	6	6	5	6	6	5	5	5	6	6	4	4	3	3	3	6	
20-May	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	3	3	3	2	2	2	4	4	
21-May	2	2	2	2	1	2	1	2	1	3	3	3	3	3	4	4	4	4	4	4	4	4	4	3	4	
22-May	4	3	3	3	4	5	5	4	5	5	4	5	5	5	6	6	5	5	5	5	3	1	1	2	6	
23-May	2	2	1	3	2	3	3	3	4	4	6	6	5	6	5	6	4	4	3	2	1	1	1	3	6	
24-May	2	2	2	2	2	2	3	3	3	3	5	5	5	5	5	3	3	3	2	1	2	2	2	2	5	
25-May	2	2	2	2	2	2	2	2	2	2	3	4	3	4	3	3	4	3	3	2	2	3	2	1	4	
26-May	1	2	2	2	2	2	2	2	3	3	4	5	4	4	4	4	6	2	3	2	2	2	2	3	6	
27-May	3	3	3	4	4	4	4	4	6	4	4	4	5	5	5	5	4	5	3	5	2	3	3	2	6	
28-May	3	3	2	3	4	4	3	3	4	4	4	4	5	5	6	6	3	3	3	2	2	2	2	2	6	
29-May	1	2	2	3	1	3	3	1	2	1	2	3	2	2	2	2	3	2	2	2	2	1	2	2	3	
30-May	1	1	2	1	1	2	3	3	4	4	4	4	4	4	4	5	4	4	4	3	2	2	1	2	5	
31-May	2	2	2	2	3	2	2	2	2	3	3	4	3	3	3	4	3	4	4	2	1	1	1	2	4	
																	Diurnal Maximum									
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - May 2016

Direction of Maximum Speed: 21 deg on May 19 13:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 23.6 deg on May 19																						Hours of Data: 743			
Direction of Minimum Speed: 82 deg on May 16 16:00											Direction of Minimum Daily Speed Average: 1.7 deg on May 29											Hours of Missing Data: 1			
Monthly Average Direction: 274.7 deg																						Percent Operational Time: 99.9			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	145	187	200	192	184	183	217	230	233	218	227	249	236	256	259	262	271	271	296	319	298	343	40	121	240.9
2-May	145	157	160	181	214	185	170	360	168	324	187	250	13	316	284	282	177	122	125	123	122	131	127	125	147.2
3-May	124	123	126	136	145	142	161	171	181	196	197	199	200	218	219	200	185	178	176	174	169	176	190	182	175.3
4-May	178	187	196	205	215	219	231	220	177	232	222	259	263	255	252	255	324	294	292	292	290	291	299	303	256.8
5-May	325	311	318	331	350	324	294	291	308	322	314	296	292	304	293	308	318	313	336	6	10	17	19	344	317.6
6-May	308	265	241	249	260	265	313	327	322	309	311	291	276	304	276	280	270	293	270	247	172	169	180	177	274.3
7-May	171	169	167	171	179	175	185	199	199	213	213	220	223	215	211	247	150	181	148	138	126	124	131	142	178.8
8-May	136	137	31	84	304	308	314	293	287	272	276	260	264	243	245	249	251	243	247	257	335	339	333	303	274.5
9-May	299	294	295	280	271	268	259	272	280	292	292	305	298	313	307	318	304	295	309	317	349	353	317	309	297.8
10-May	297	287	284	279	264	284	344	347	339	343	337	357	7	15	12	14	40	31	26	31	42	57	56	54	3.6
11-May	72	76	67	38	21	33	35	30	16	12	14	14	15	14	18	19	23	16	21	21	14	22	27	45	22.9
12-May	49	71	74	66	60	48	47	39	27	26	18	16	26	21	19	30	20	26	6	18	21	AF	260	264	28.2
13-May	272	262	262	262	262	260	259	296	311	309	285	304	299	310	296	316	326	342	357	10	25	36	51	111	312.4
14-May	66	82	197	195	242	276	342	338	346	351	330	320	346	327	345	335	349	3	10	357	340	329	343	33	342.9
15-May	83	125	161	184	191	208	235	250	283	280	294	271	251	249	202	216	272	293	212	193	189	190	187	190	221.1
16-May	190	184	206	205	209	211	214	214	237	233	240	232	214	224	247	82	103	105	114	122	125	136	178	160	196.9
17-May	165	189	197	200	205	205	221	236	246	264	283	254	293	299	309	303	342	335	342	65	131	180	197	219	226.9
18-May	215	211	214	216	212	215	220	221	226	222	232	232	250	257	262	274	281	284	306	13	21	20	12	11	259.0
19-May	17	25	25	21	23	22	23	24	22	24	23	14	21	22	23	18	22	31	30	26	27	25	32	31	23.6
20-May	30	37	38	37	49	58	66	64	62	79	85	66	70	75	58	63	95	84	39	2	24	49	84	114	61.8
21-May	127	116	94	44	29	33	45	35	14	9	20	20	22	7	5	13	8	7	15	18	17	22	29	29	24.1
22-May	34	32	32	25	21	30	26	28	24	28	27	22	23	21	15	22	26	25	25	28	31	29	32	35	25.8
23-May	61	68	63	76	54	67	80	65	54	35	53	70	68	61	72	66	77	78	92	95	108	130	174	181	74.6
24-May	186	191	198	194	192	195	194	203	204	197	184	181	178	171	163	158	118	118	114	124	153	186	206	212	180.0
25-May	212	206	212	213	215	218	233	268	298	294	352	357	358	19	16	19	13	10	14	14	36	46	57	56	1.7
26-May	57	50	42	36	30	34	56	64	86	56	46	39	7	359	350	19	38	65	41	35	37	85	94	98	42.0
27-May	111	113	116	120	124	129	126	130	141	143	151	140	116	124	131	148	148	204	217	184	119	120	145	138	136.2
28-May	127	135	124	125	133	139	142	137	145	167	174	142	165	168	182	196	180	166	166	162	162	159	169	175	156.4
29-May	188	206	174	170	183	202	204	187	199	226	268	289	285	330	3	357	6	10	11	9	38	20	3	14	309.3
30-May	2	2	358	343	339	345	350	355	9	1	357	348	342	352	344	336	347	345	3	360	359	349	359	344	351.7
31-May	343	358	359	341	339	331	342	341	337	329	314	300	331	274	300	308	284	272	247	231	190	161	168	175	313.6
125.3 137.3 144.9 159.2 182.1 180.2 202.4 316.9 314.5 315.4 315.4 312.9 323.5 328.9 324.1 338.0 356.9 353.3 3.0 24.3 48.9 69.7 88.7 120.1																									
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
Firebag - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 99 deg on May 31 17:00	Hours of Data: 743
Minimum Value: 4 deg on May 15 04:00	Hours of Missing Data: 1
Percentiles: P ₁ = 6 P ₁₀ = 8 Q ₁ = 11 Median = 14 Q ₃ = 19 P ₉₀ = 30 P ₉₉ = 80	Hours of Calibration: 0
	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	18	11	6	5	7	9	10	12	13	14	17	17	18	20	27	22	20	18	19	10	17	23	27	28	28
2-May	8	15	11	19	10	11	30	58	64	78	54	62	80	81	53	81	84	54	63	10	11	12	11	11	84
3-May	11	11	11	12	10	11	8	9	10	16	15	14	17	21	23	13	13	9	8	7	8	30	19	13	30
4-May	8	4	6	7	7	7	14	24	31	23	45	49	20	15	17	53	26	13	11	11	11	12	12	15	53
5-May	11	13	14	10	10	23	11	13	17	19	24	18	24	18	20	20	19	19	19	14	10	8	6	18	24
6-May	14	10	7	7	7	21	15	14	17	20	23	30	34	70	29	31	36	23	15	17	15	9	9	8	70
7-May	8	8	7	8	8	11	14	7	8	9	10	10	16	26	26	55	79	25	11	12	11	11	13	10	79
8-May	11	67	27	62	26	16	20	18	12	12	14	18	17	16	13	16	16	15	12	36	12	13	12	16	67
9-May	13	12	12	14	13	13	11	12	12	14	16	15	14	17	15	14	16	14	16	11	17	15	13	12	17
10-May	8	7	8	10	10	18	14	14	20	18	19	17	21	29	21	22	21	20	12	11	7	8	8	9	29
11-May	12	11	6	14	5	9	12	15	19	24	21	19	22	21	17	19	19	18	15	13	9	8	7	9	24
12-May	10	9	8	8	6	9	10	14	24	22	22	23	18	24	23	22	24	18	19	15	7	AF	9	16	24
13-May	9	5	5	7	7	9	9	20	22	25	36	43	52	40	29	32	21	31	17	15	9	5	6	42	52
14-May	50	27	27	11	10	27	13	22	30	30	37	52	46	70	31	42	27	19	13	10	26	18	36	70	
15-May	17	24	8	4	7	12	20	14	24	31	51	80	57	90	91	63	38	57	45	10	7	6	6	6	91
16-May	7	8	10	8	8	8	9	10	13	18	19	18	19	15	17	78	10	7	8	9	10	13	11	14	78
17-May	15	8	7	8	7	8	9	10	11	18	24	29	23	38	25	29	56	53	34	17	26	9	11	10	56
18-May	9	9	8	8	8	8	11	9	10	11	12	14	17	19	18	20	19	17	35	13	11	10	12	12	35
19-May	13	11	11	11	11	11	12	12	12	12	12	14	12	11	11	12	11	11	11	11	10	10	9	10	14
20-May	9	10	9	10	11	11	12	13	14	17	19	18	18	21	20	21	14	15	44	18	11	11	16	14	44
21-May	14	16	14	11	15	15	15	10	17	17	17	17	17	18	16	14	14	14	13	14	12	12	11	10	18
22-May	11	11	11	11	12	13	12	12	12	12	12	13	14	15	14	16	15	13	13	10	9	6	9	8	16
23-May	15	11	10	13	8	12	12	17	18	17	19	20	18	19	29	25	24	26	16	11	9	17	10	8	29
24-May	7	7	7	7	7	7	8	11	11	17	19	17	20	17	13	28	11	13	10	12	14	11	10	8	28
25-May	8	8	8	8	8	9	23	39	43	54	36	37	21	23	18	17	16	14	13	12	13	10	8	7	54
26-May	8	11	9	11	17	16	16	14	15	19	21	20	21	16	20	18	22	15	14	14	19	12	9	10	22
27-May	10	10	10	11	12	12	12	13	14	14	18	24	15	17	19	16	15	27	11	38	12	11	14	12	38
28-May	13	12	12	12	14	11	13	14	14	15	17	17	15	15	22	9	11	9	9	8	9	11	8	12	22
29-May	13	16	14	30	18	24	24	16	19	27	26	16	22	17	17	17	19	13	13	15	15	10	50	30	50
30-May	12	12	12	10	10	11	12	13	14	16	14	16	17	16	17	17	15	15	17	14	12	10	12	15	17
31-May	13	14	13	19	13	11	12	14	16	28	43	58	47	71	25	49	99	90	51	12	17	7	7	8	99
	50	67	27	62	26	27	30	58	64	78	54	80	80	90	91	81	99	90	63	38	26	30	50	42	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Last Calibration	April 28, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	15:10
Gas Cert Reference	SA130123A	Station temp.	Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-605
Analyzer IP address	192.168.1.43		Lamp voltage	800	798
Calculated slope	0.997202	1.017074	Chamber temp	44.9	44.9
Calculated intercept	-1.127161	-0.402951	Pressure	687.7	678.3
Analyzer Background	7.6	7.6	Flow	0.456	0.451
Analyzer Coefficient	0.974	0.974	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 1410661308

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	58.3	574.8	567.4	1.013
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	58.3	574.8	565.6	1.016
second point	5000	29.3	288.9	284.2	1.017
third point	5000	14.7	144.9	143.2	1.012
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	58.3	574.8	563.8	1.020
Average Correction Factor					1.015

Corrected As found 567.1 Previous response 577.6 % change 1.8%

Notes:

Remote calibration. No adjustments made.

Calibration Performed By: Devin Russell



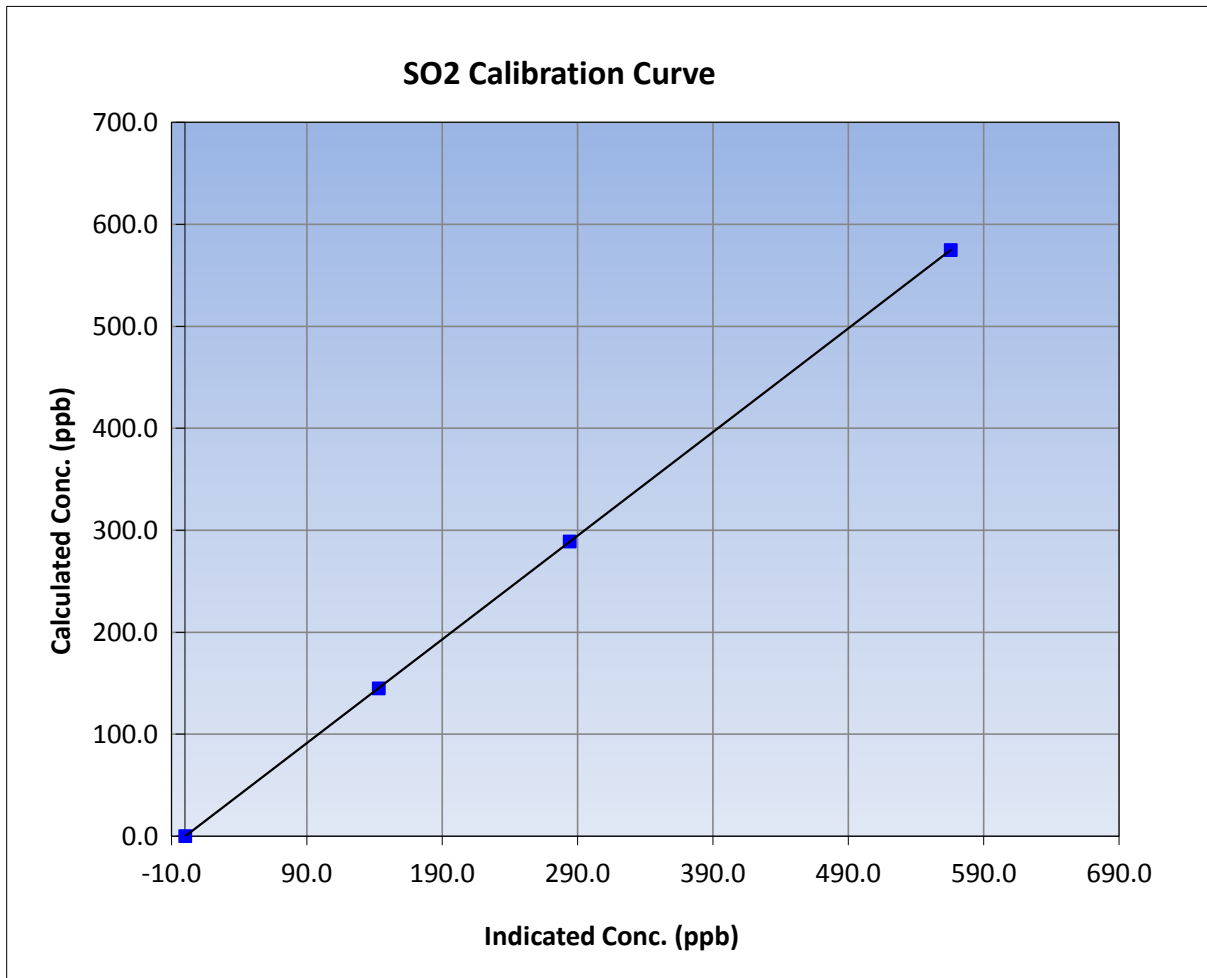
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 28, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	15:10
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

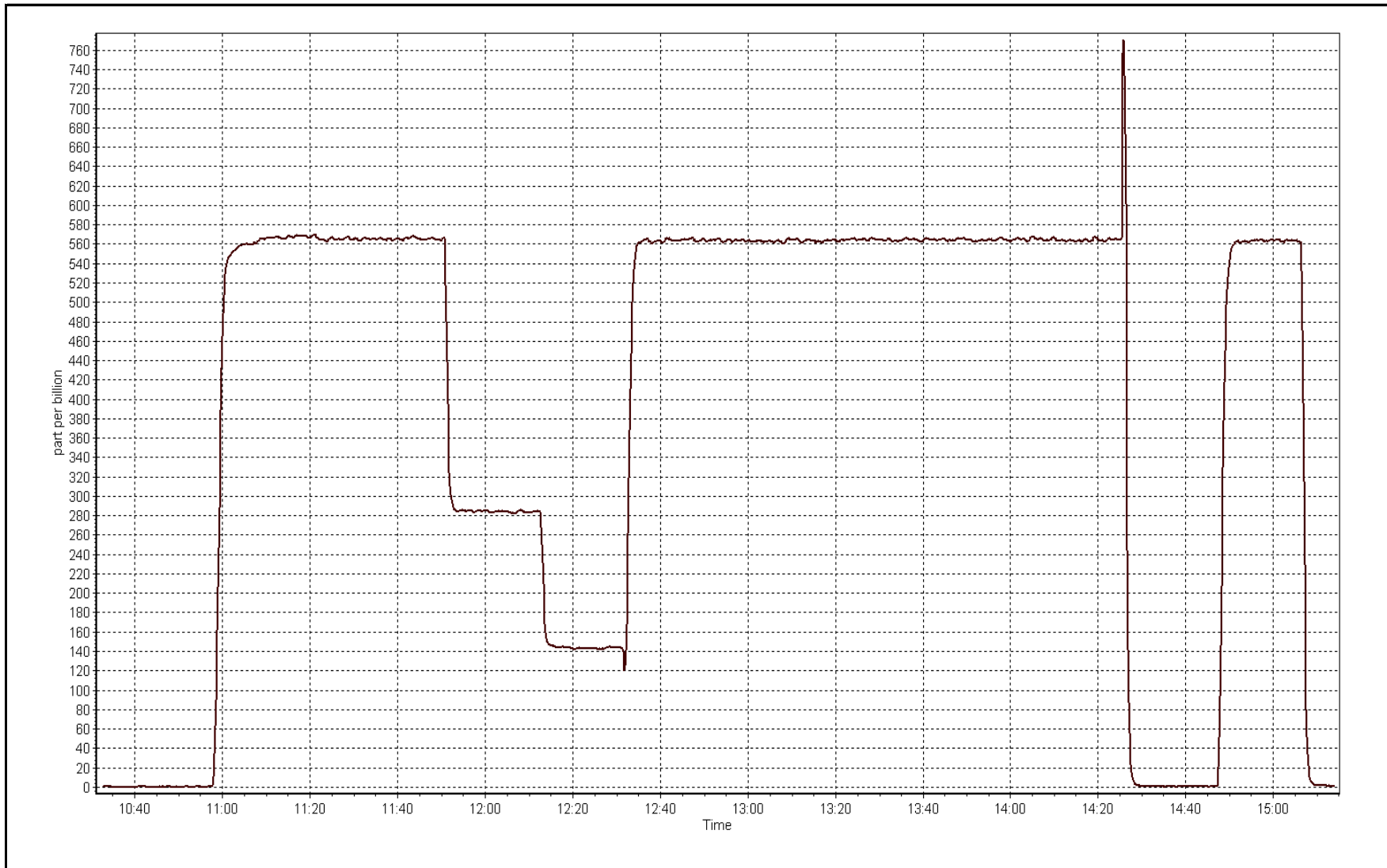
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999999
574.8	565.6	1.0163		
288.9	284.2	1.0165	Slope	1.017074
144.9	143.2	1.0121		
			Intercept	-0.402951



SO2 Calibration Plot

Date: May 18, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 19, 2016	Last Calibration	April 27, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:00	End Time (MST)	9:51
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	932
Calculated slope	1.000515	1.000142	Chamber temp	45	45
Calculated intercept	-0.289121	-0.085784	Pressure	547.3	534.0
Analyzer Background	13	13.1	Flow	0.969	0.949
Analyzer Coefficient	1.164	1.164	Intensity	85	85
			Converter temp.	334	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	0.2	----
as found span	5000	83.3	80.8	81.0	0.997
SO2 scrubber check	5000	15.2	149.9	1.3	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	83.3	80.8	81.0	0.997
second point	5000	41.8	40.5	40.3	1.006
third point	5000	21.0	20.4	20.6	0.990
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	83.4	80.9	80.9	0.999
Average Correction Factor					0.998

Corrected As found	80.9	Previous response	81.0	% change	0.2%
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Notes:

Remote calibration. No adjustments made.

Calibration Performed By: Devin Russell



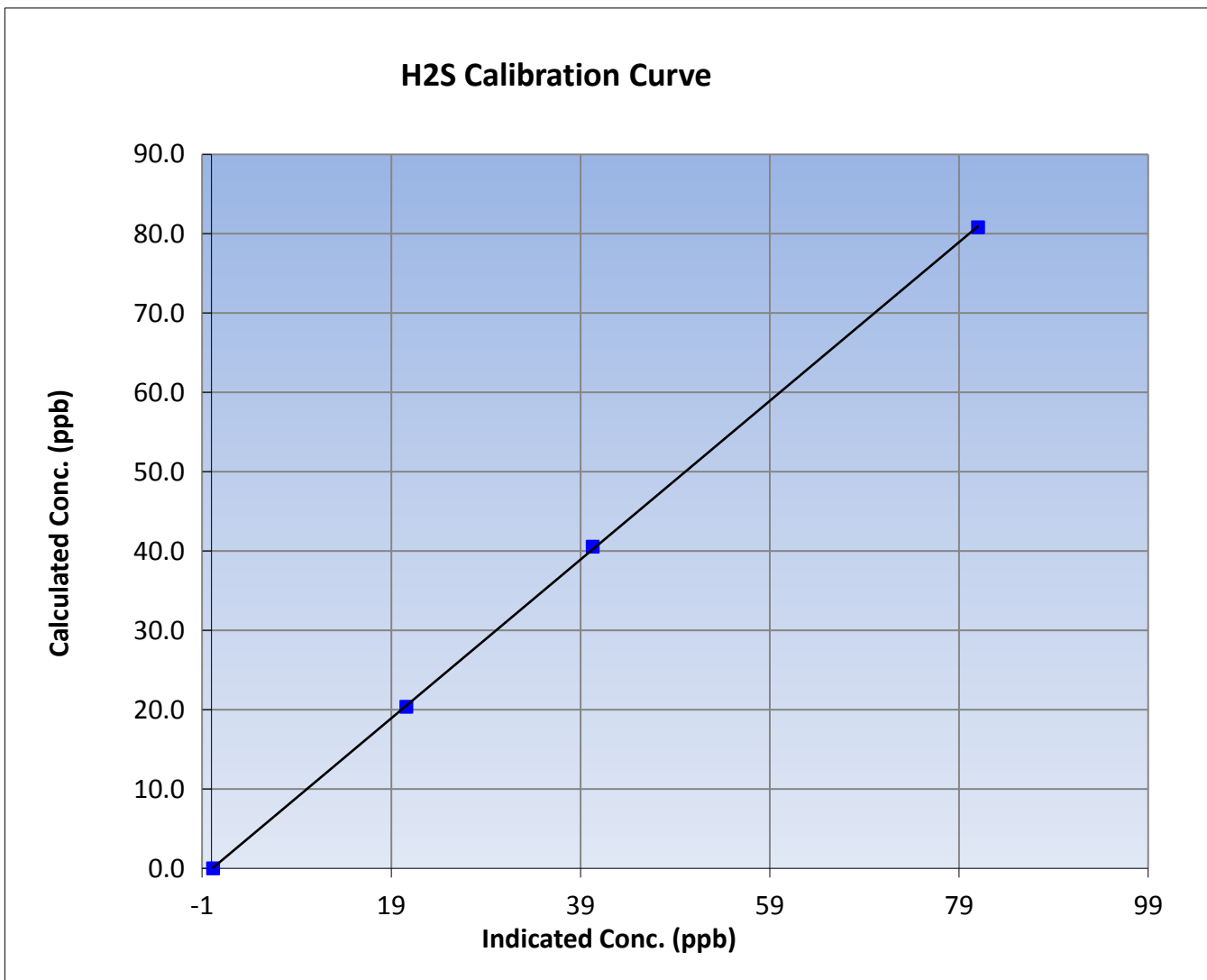
Wood Buffalo Environmental Association H2S Calibration Report

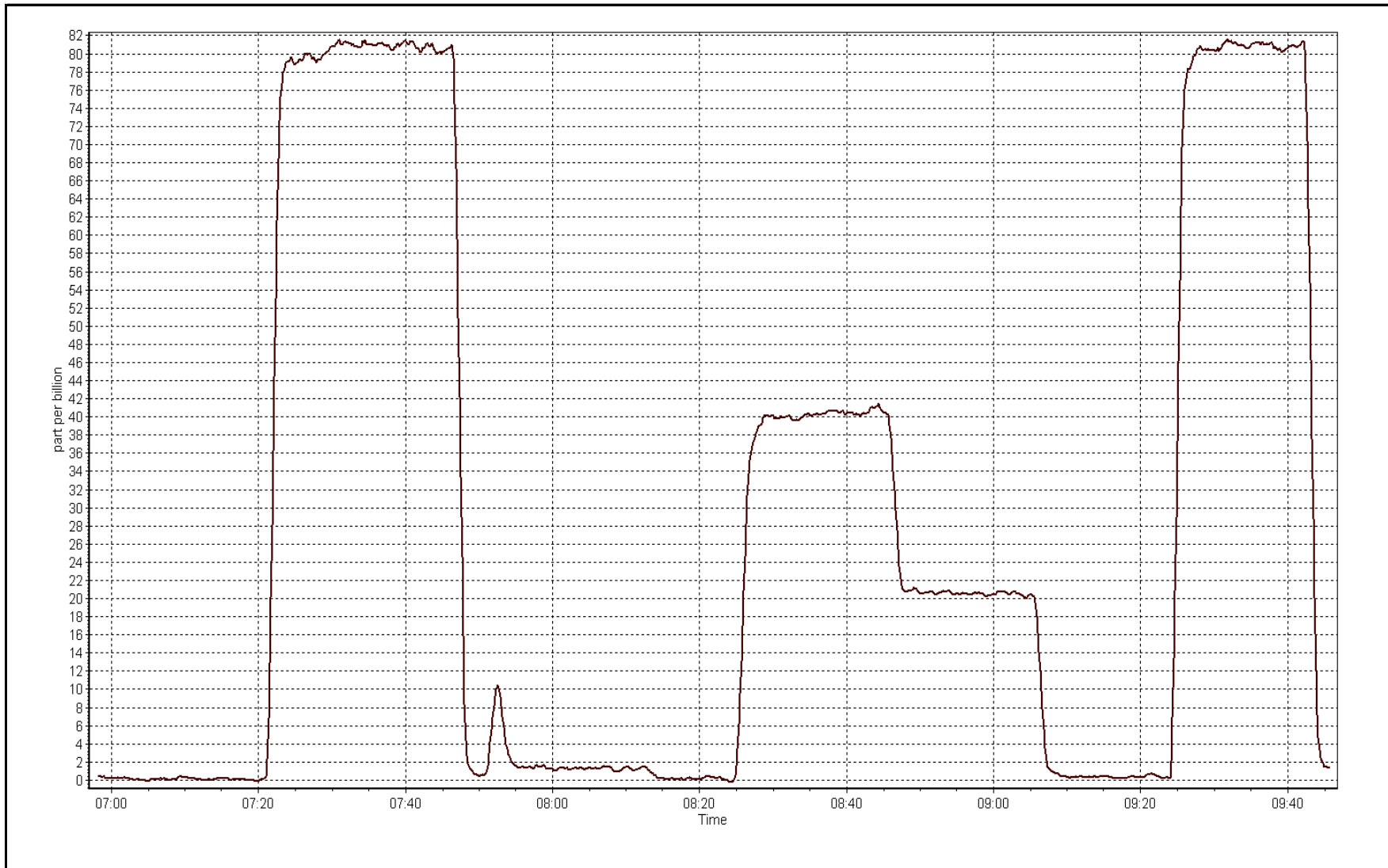
Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 27, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:00	End Time (MST)	9:51
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	0.2	----	Correlation Coefficient	0.999957
80.8	81.0	0.9974		
40.5	40.3	1.0064	Slope	1.000142
20.4	20.6	0.9898		
			Intercept	-0.085784







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 18, 2016	Last Calibration	April 28, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	15:10
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.013065	1.016725	Fuel Pressure	23.0	23.0
Calculated intercept	-0.144554	-0.132219	Analyzer Coeff	3.514	3.5
			Analyzer BKG	4.840	4.840

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.07	----
as found span	5000	58.3	12.74	12.59	1.012
calibrator zero	5000	0.0	0.00	0.07	----
high point	5000	58.3	12.74	12.63	1.008
second point	5000	29.3	6.40	6.44	0.994
third point	5000	14.7	3.21	3.36	0.956
as left zero	5000	0.0	0.00	0.16	----
as left span	5000	58.3	12.74	12.65	1.007
Average Correction Factor					0.986

Corrected As found	12.52	Previous response	12.72	% change	1.6%
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Notes:

Remote calibration. No adjustments made.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association THC Calibration Report

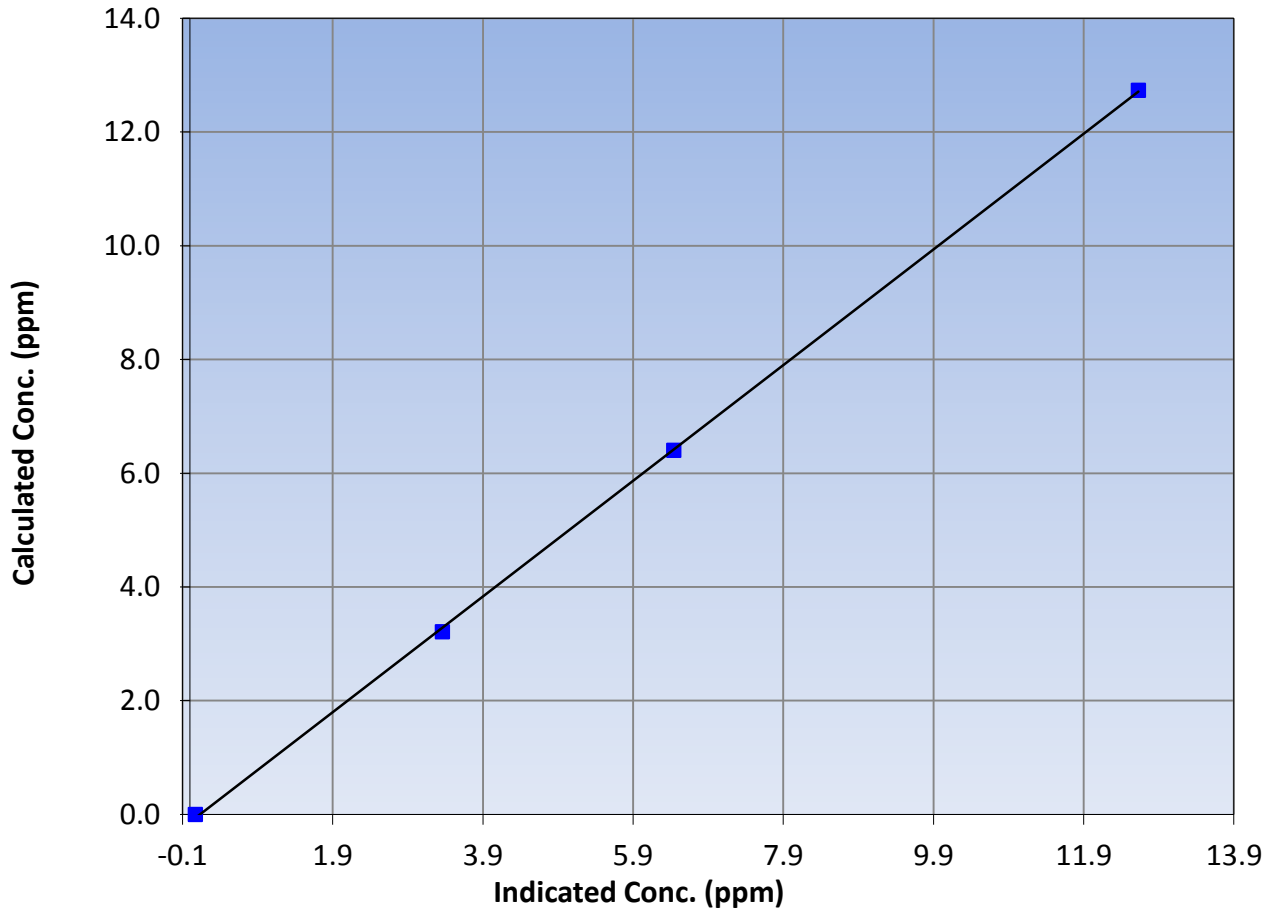
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 28, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	15:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

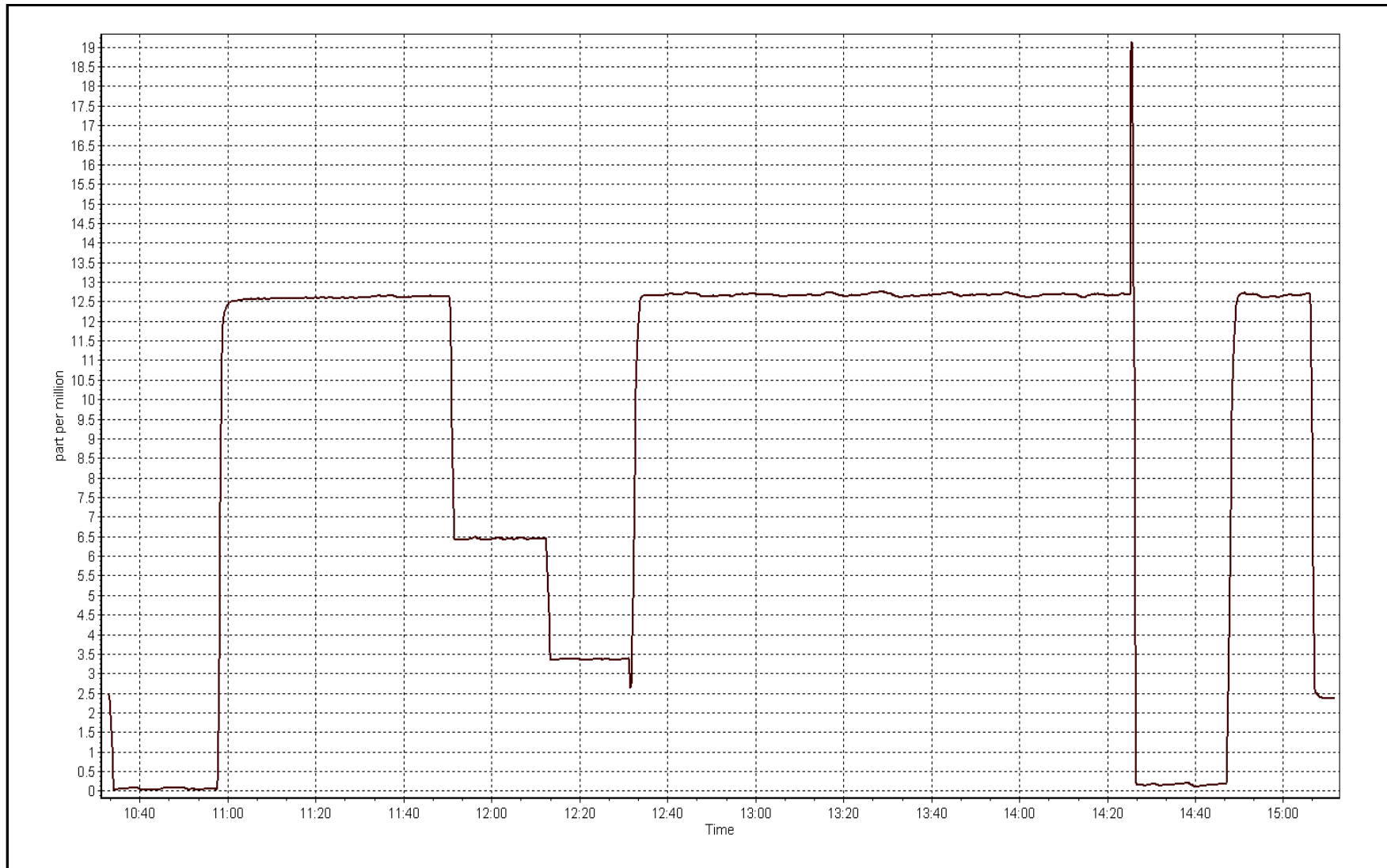
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.07	----	Correlation Coefficient	0.999888
12.74	12.63	1.0084		
6.40	6.44	0.9939	Slope	1.016725
3.21	3.36	0.9557		
			Intercept	-0.132219

THC Calibration Curve



THC Calibration Plot

Date: May 18, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 28, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	15:10
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOX Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9037
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002360	1.001576	0.998345
	Data Offset	-0.584046	-0.490358	-0.421270
Current Calibration	Data Slope	1.001467	1.000566	0.999055
	Data Offset	-1.378009	-0.942056	-0.602309

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.985		1.013	
NOX coefficient	0.998		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.4		4.6	
NOX bkgrnd	4.6		4.7	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	327.1	Deg C	325.8	Deg C
PMT voltage	-780.3	V	-780.3	V
PMT Temp	-2.7	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	175	mmHg	171	mmHg
R Cell Press Nox	175	mmHg	171	mmHg
NO sample flow	0.591	lpm	0.582	lpm
Nox sample Flow	0.591	lpm	0.582	lpm

Notes:

Remote calibration. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 18, 2016

Station Number:

AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.7	0.3	0.4	----	----
as found span	5000	58.3	600.5	600.5	0.0	582.7	582.7	0.0	1.0305	1.0305
calibrator zero	5000	0.0	0.0	0.0	0.0	0.7	0.3	0.4	----	----
high point	5000	58.3	600.5	600.5	0.0	600.7	600.8	-0.1	0.9997	0.9995
second point	5000	29.3	301.8	301.8	0.0	303.0	302.8	0.2	0.9960	0.9968
third point	5000	14.7	151.4	151.4	0.0	153.3	153.0	0.3	0.9879	0.9899
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
as left span	5000	58.3	600.5	307.8	292.7	600.6	302.3	298.4	0.9998	1.0183
Average Correction Factor									0.9945	0.9954

Corrced As found NO_x= 582.0 NO= 582.4 Percent Change NO_x= 3.0% NO= 3.0%
 Previous Response NO_x= 599.7 NO= 600.0

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.30 ccm NOx ref calc conc = 600.5 ppb NO ref calc conc = 600.5 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	600.1	599.7	0.4	1.0006	1.0014	----	----
1st NO2 (300)	307.8	291.9	600.4	307.8	292.6	1.0001	----	0.9975	100.2%
2nd NO2 (200)	402.1	197.6	600.6	402.1	198.5	0.9999	----	0.9956	100.4%
3rd NO2 (100)	498.8	100.9	600.6	498.8	101.9	0.9998	----	0.9904	101.0%
2nd NO ref point	----	0.0	600.7	600.0	0.7	0.9997	1.0009	----	----
Average Correction Factor						0.9999		0.9945	100.6%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

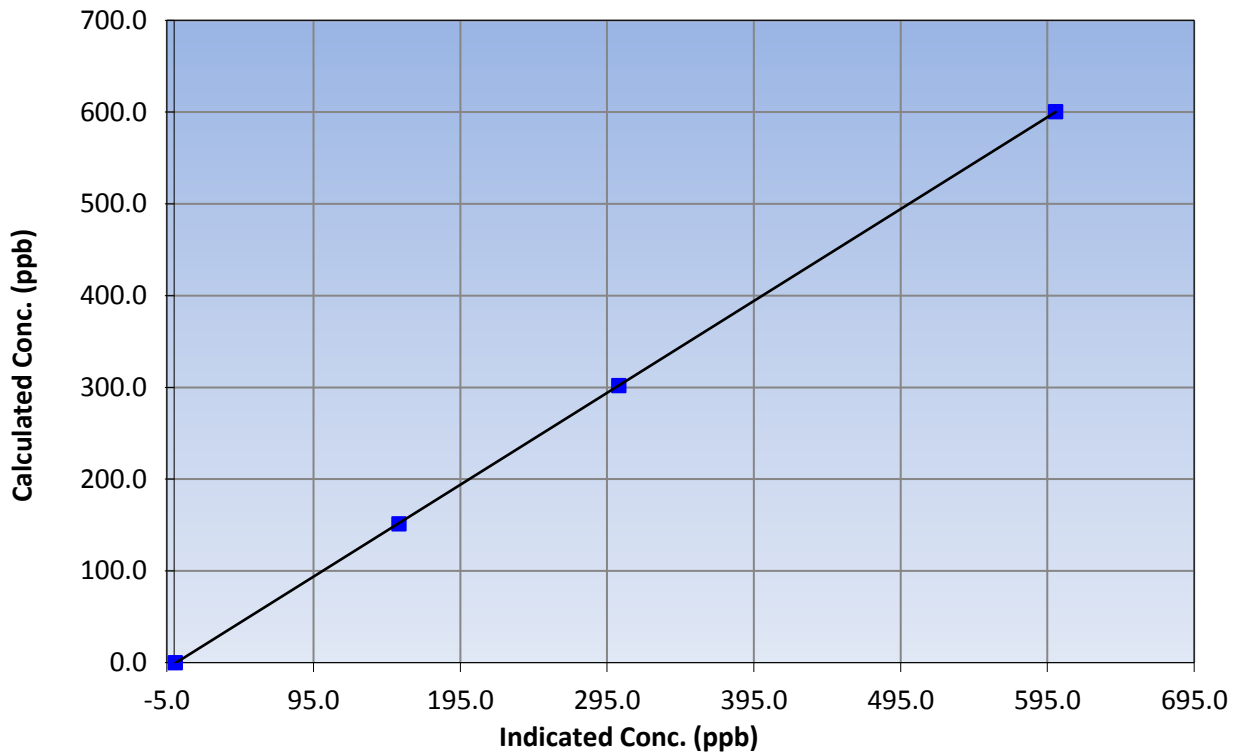
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 28, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	15:10
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	0.7	----	Correlation Coefficient	0.999994
600.5	600.7	0.9997		
301.8	303.0	0.9960	Slope	1.001467
151.4	153.3	0.9879		
			Intercept	-1.378009

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

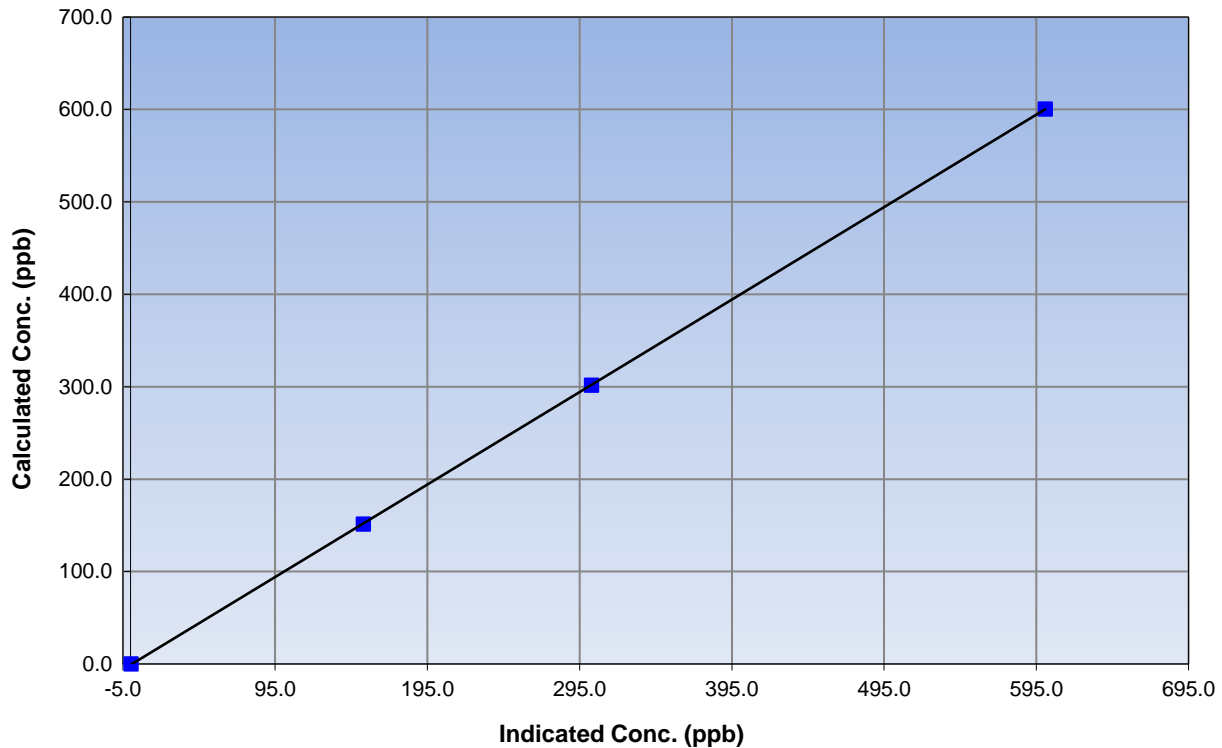
Station Information

Calibration Date	May 18, 2016	Previous Calibration	April 28, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	15:10
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	0.999995
600.5	600.8	0.9995		
301.8	302.8	0.9968	Slope	1.000566
151.4	153.0	0.9899		
			Intercept	-0.942056

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

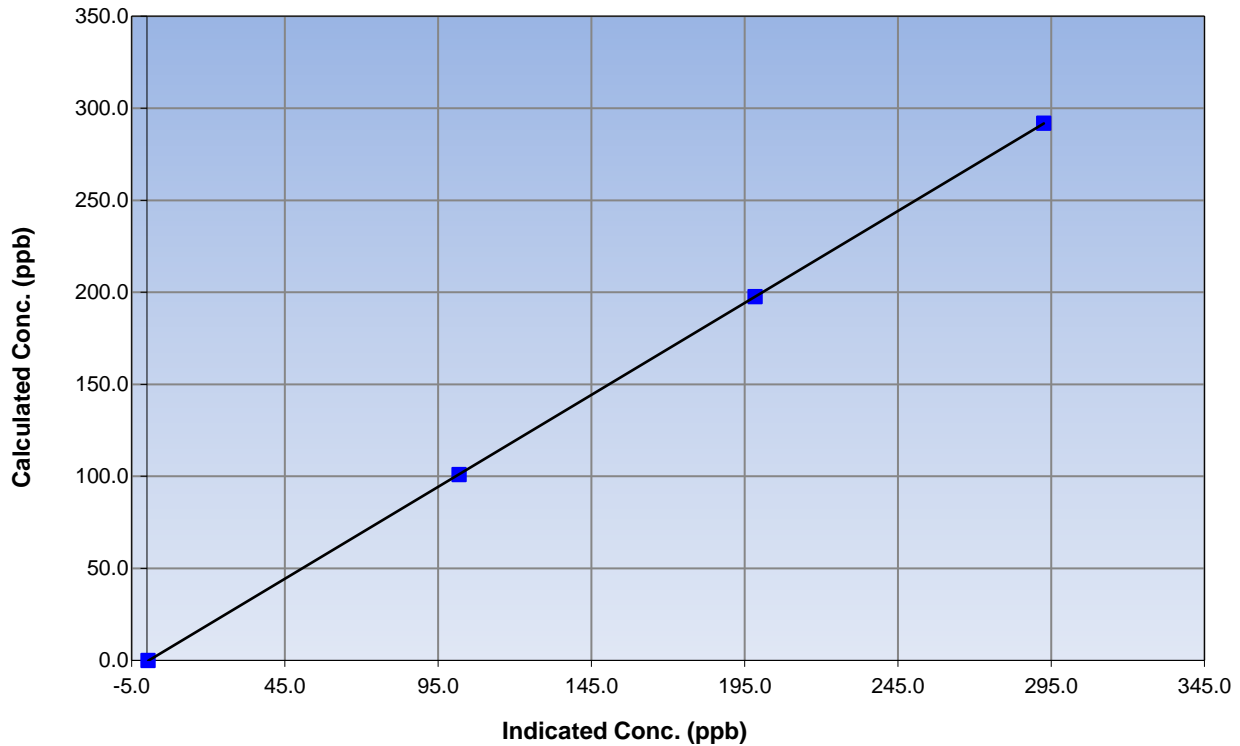
Station Information

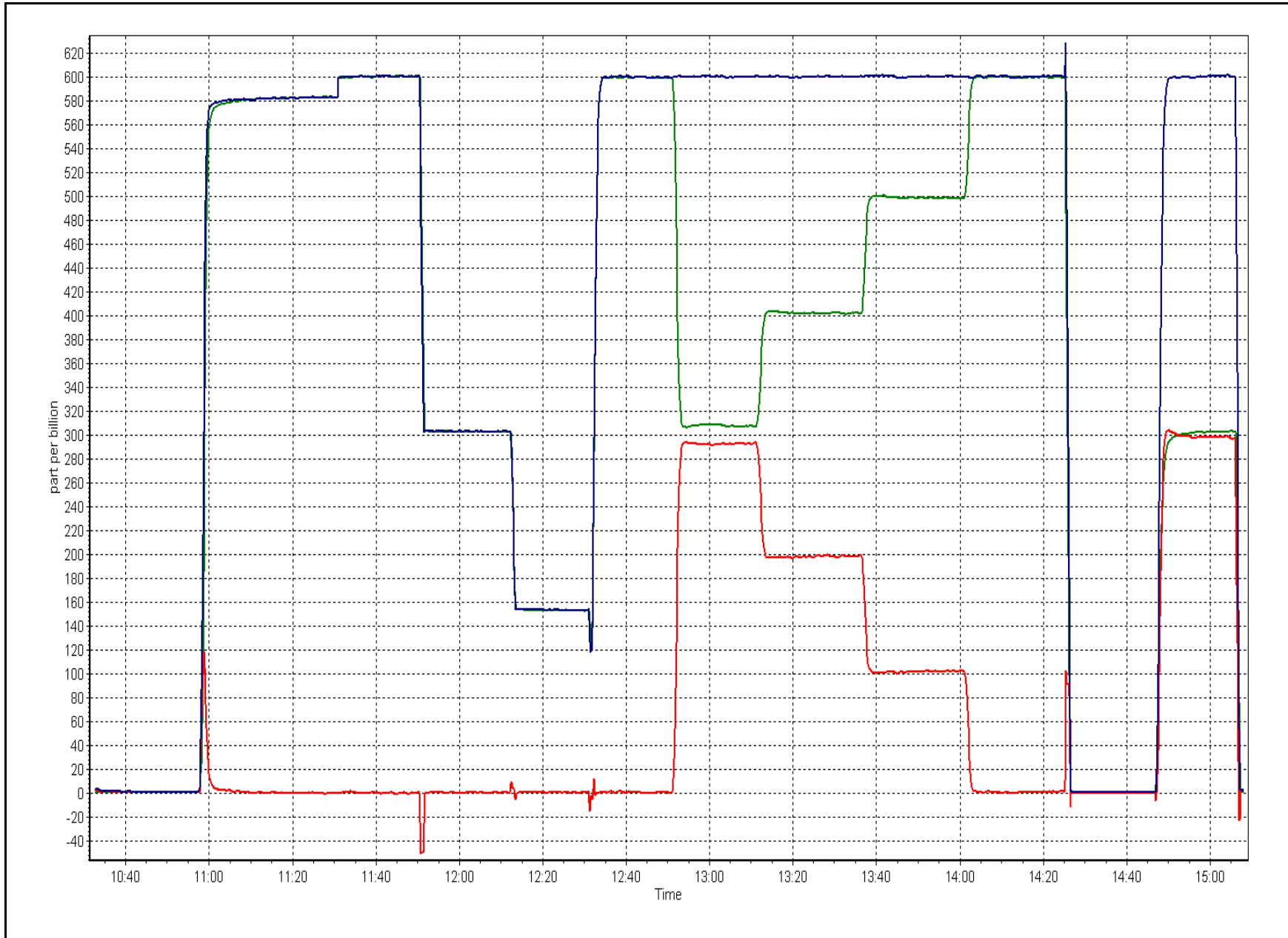
Calibration Date	May 18, 2016	Previous Calibration	April 28, 2016
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	15:10
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999997
291.9	292.6	0.9975		
197.6	198.5	0.9956	Slope	0.999055
100.9	101.9	0.9904		
			Intercept	-0.602309

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 20
BRION MACKAY RIVER
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)

MAY 2016
 MONTHLY SUMMARY for
 AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	36	38	99.73	23	0	2	0
H2S (ppb) Average	705	35	39	99.46	2	0	0	0
THC (ppm) Average	706	36	38	99.73	3.6	-	2.3	-
NO2 (ppb) Average	706	36	38	99.73	11	0	2	-
NO (ppb) Average	706	36	38	99.73	3	-	0	-
NOX (ppb) Average	706	36	38	99.73	11	-	2	-
Temperature 2 m (C) Average	744	0	0	100.00	31.1	-	21.1	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	92	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	22	-	17	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	706	0.2	1	-	0	0	0	0	0	0	0	23
H2S (ppb) Average	705	0.2	0	-	0	0	0	0	0	0	0	2
THC (ppm) Average	706	2.13	0.1	-	2	2	2.1	2.1	2.2	2.2	2.2	3.6
NO2 (ppb) Average	706	0.9	1	-	0	0	0	1	1	2	2	11
NO (ppb) Average	706	0.1	0	-	0	0	0	0	0	0	0	3
NOX (ppb) Average	706	1	1	-	0	0	0	1	1	2	2	11
Temperature 2 m (C) Average	744	11.65	7.3	-	-4.8	2.5	6.7	11	16.2	21.8	21.8	31.1
Relative Humidity (%) Average	744	56.5	26	-	13	22	32	56	81	93	93	99
Wind Speed 10 m (km/h) Average	744	7.8	4	-	0	2	5	8	11	13	13	22
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC, NO2	31 May 2016 13:00	31 May 2016 14:00	2	Maintenance - inlet filter replacement
H2S	30 May 2016 20:00	30 May 2016 21:00	2	Unstable operation - excessive baseline drift
H2S	31 May 2016 14:00	31 May 2016 15:00	2	Maintenance - inlet filter replacement



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on May 25 18:00	Maximum Daily Average: 1.6 ppb on May 25		Hours of Data:	706
Minimum Value: 0 ppb on May 1 22:00	Minimum Daily Average: 0.0 ppb on May 19		Hours of Missing Data:	38
Maximum Diurnal Average: 0.8 ppb at hour 18	Minimum Diurnal Average: 0.1 ppb at hour 3		Hours of Calibration:	36
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
2-May	0	0	Z	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
3-May	0	0	0	Z	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
4-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
7-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-May	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	
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
11-May	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
12-May	Z	0	0	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-May	0	Z	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
15-May	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0.4	2
16-May	1	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
17-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
18-May	Z	0	0	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-May	0	Z	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.1	1	
24-May	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0.1	1	
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	23	1	0	0	0	0	0	1.6	23	
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
30-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0.0	0	

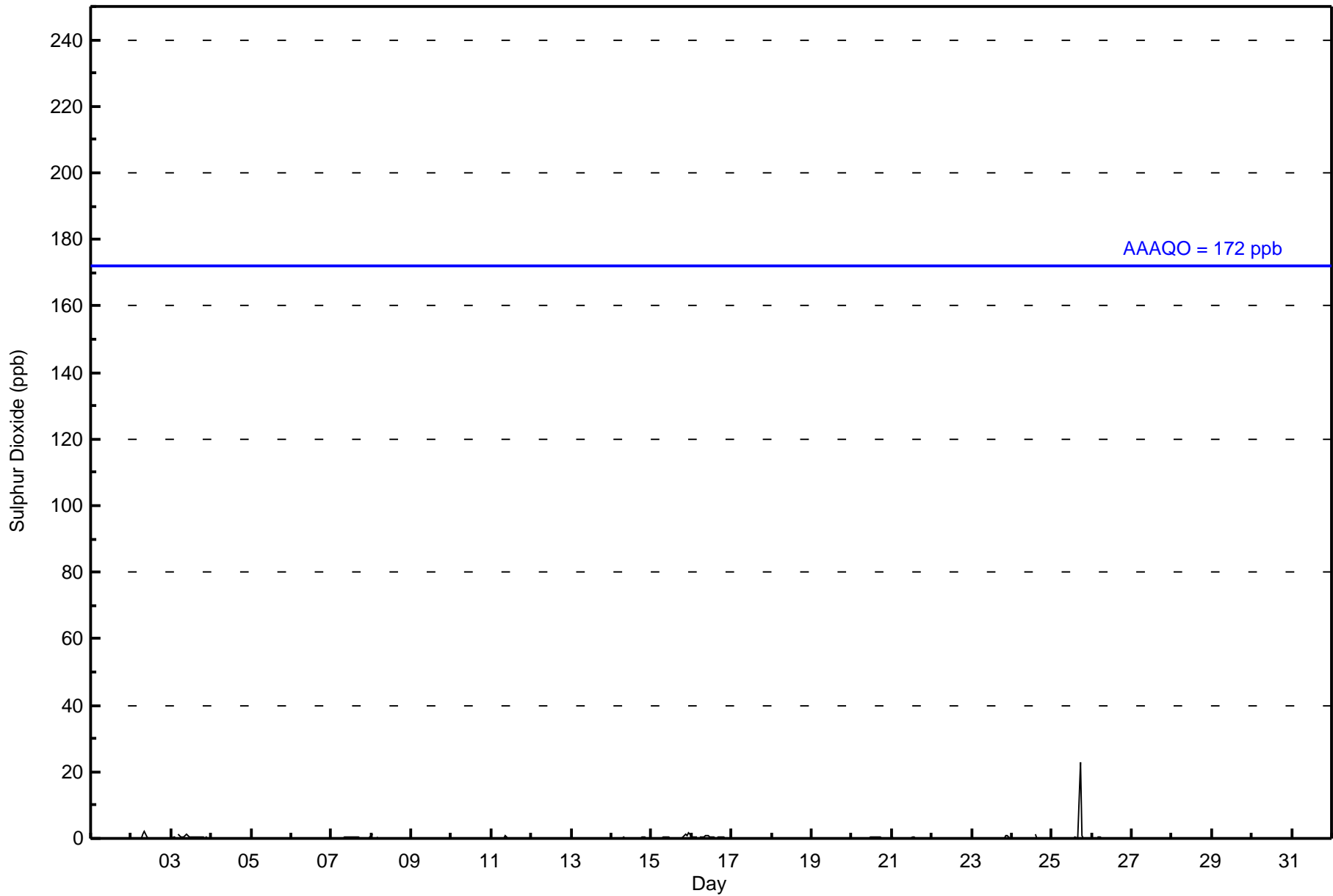
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
1	1	0	0	1	1	0	1	2	1	1	1	1	0	0	1	0	11	23	1	0	1	1	2	1	1	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	704	99.72	99.72
11 - 20	1	0.14	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	28	129	59	3	5	22	29	59	65	47	23	37	63	59	51	25	704
11 - 20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706

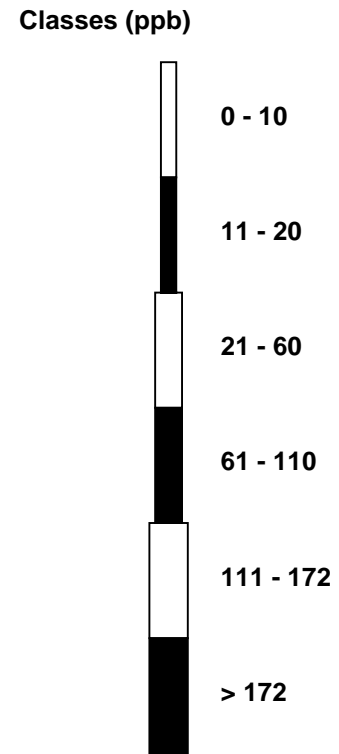
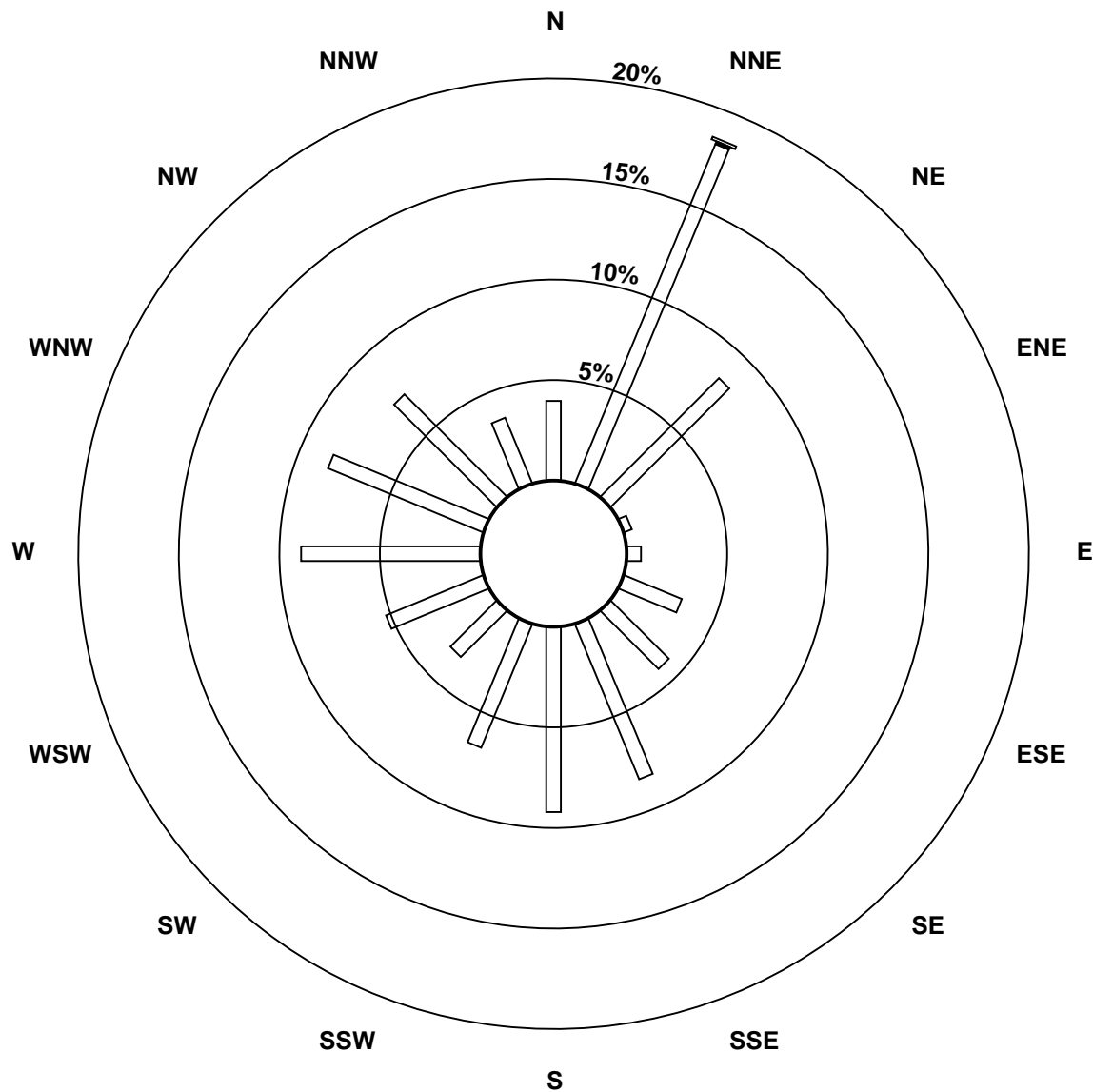
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River (AMS 20)

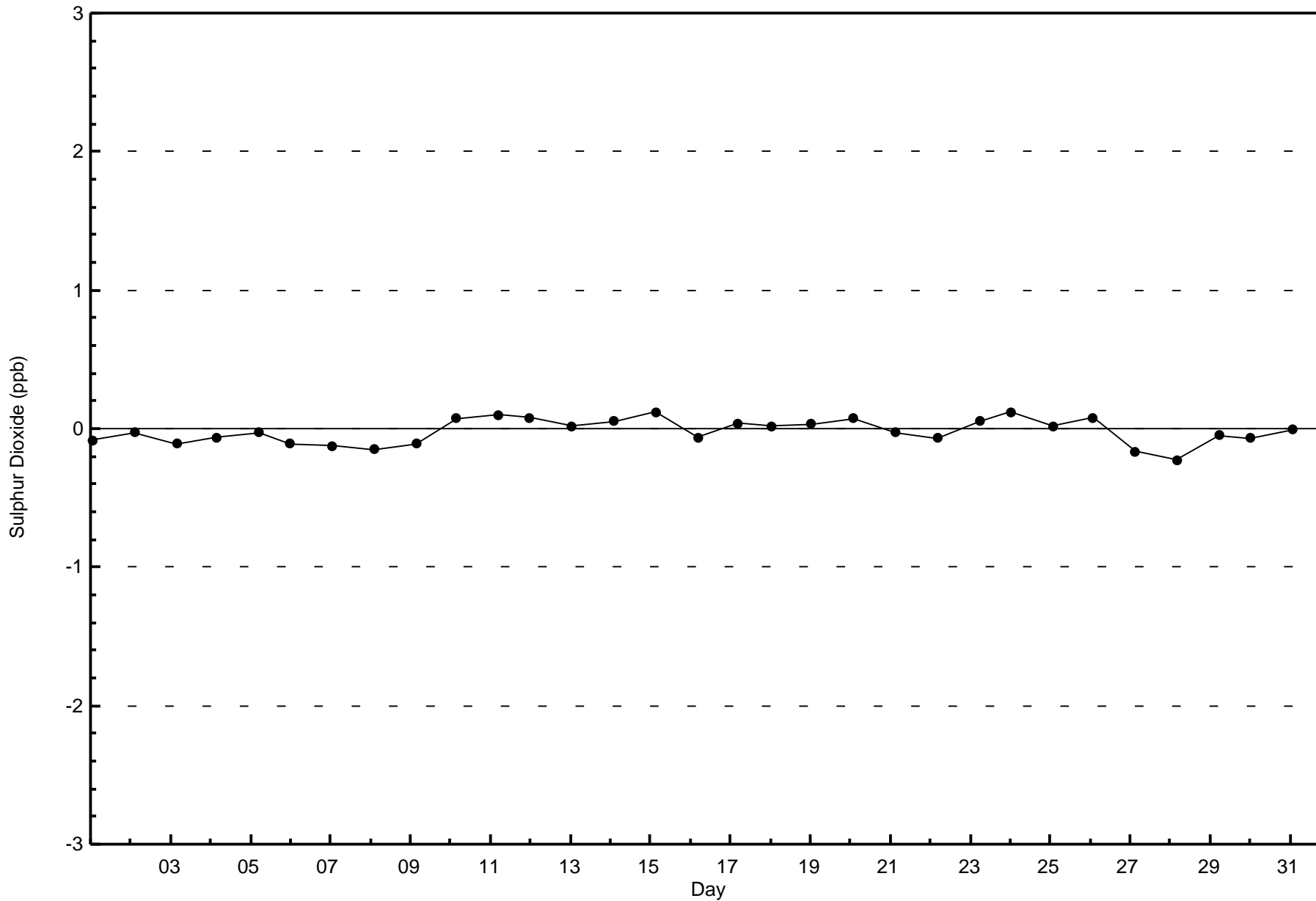


Total Number of Valid Hours: 706



Wood Buffalo Environmental Association
Zero Responses

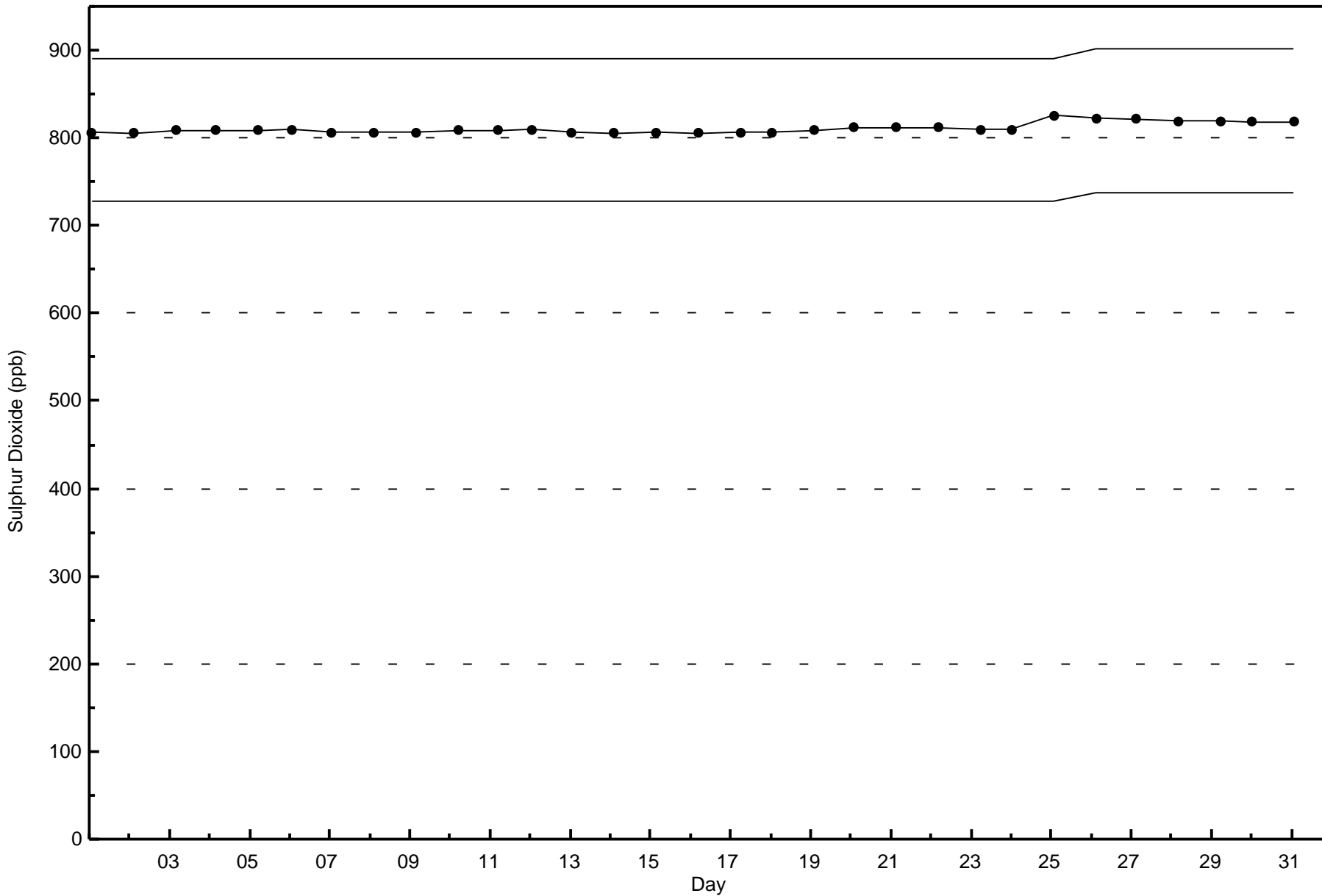
Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - May 2016





Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - May 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

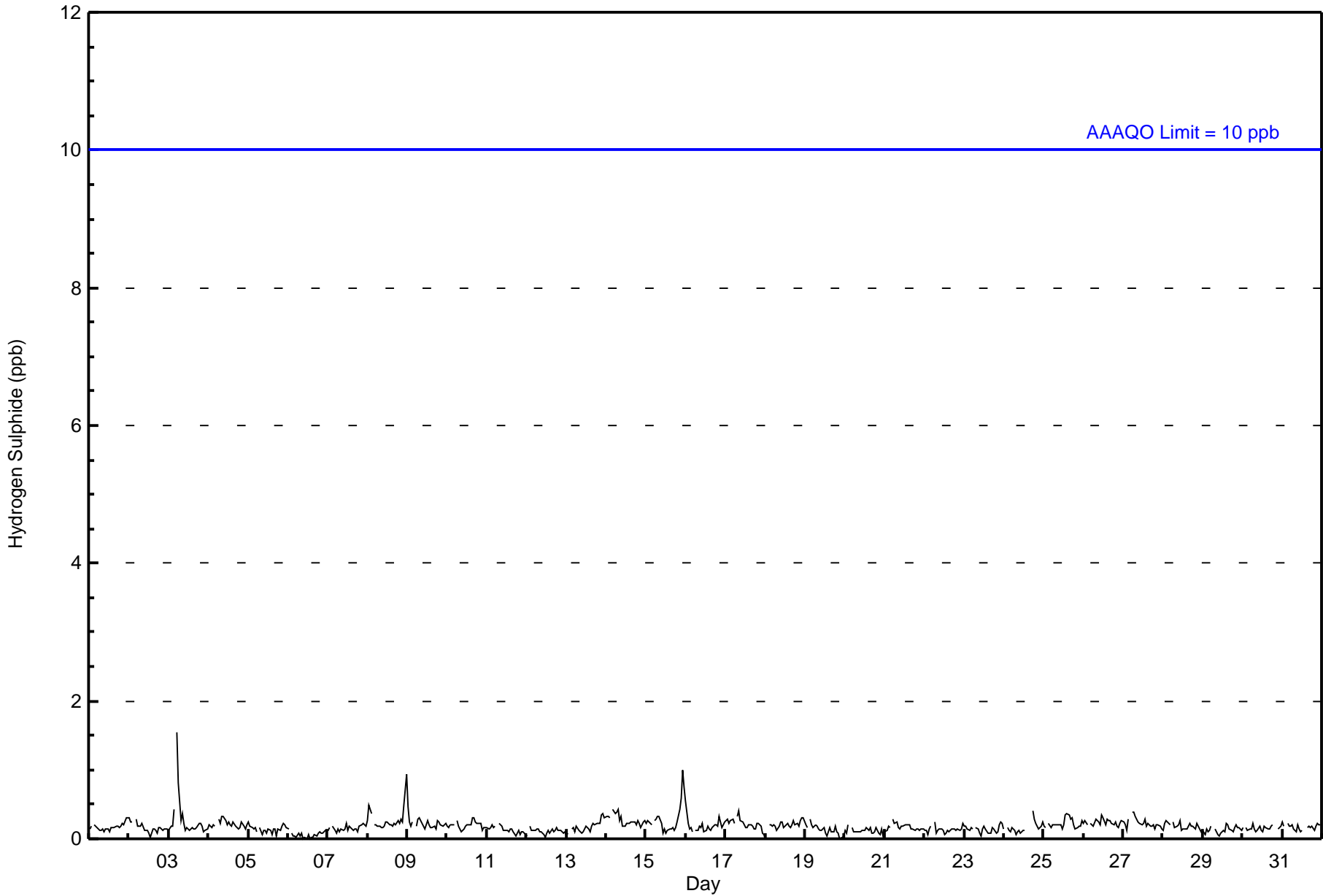
Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on May 3 06:00 Maximum Daily Average: 0.3 ppb on May 15																	Hours in Service: 744 Hours of Data: 705										
Minimum Value: 0 ppb on May 6 10:00 Minimum Daily Average: 0.1 ppb on May 6 Maximum Diurnal Average: 0.2 ppb at hour 7 Minimum Diurnal Average: 0.1 ppb at hour 11 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																	Hours of Missing Data: 39 Hours of Calibration: 35 Percent Operational Time: 99.5										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-May	0	0	0	0	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
4-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-May	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
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-May	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	0.3	1
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-May	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
12-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
16-May	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	0.2	1
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-May	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
24-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.2	0
25-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-May	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
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0.2	0
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0.2	0
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	29	130	60	3	5	22	29	63	64	46	22	37	61	59	52	23	705
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	130	60	3	5	22	29	63	64	46	22	37	61	59	52	23	705

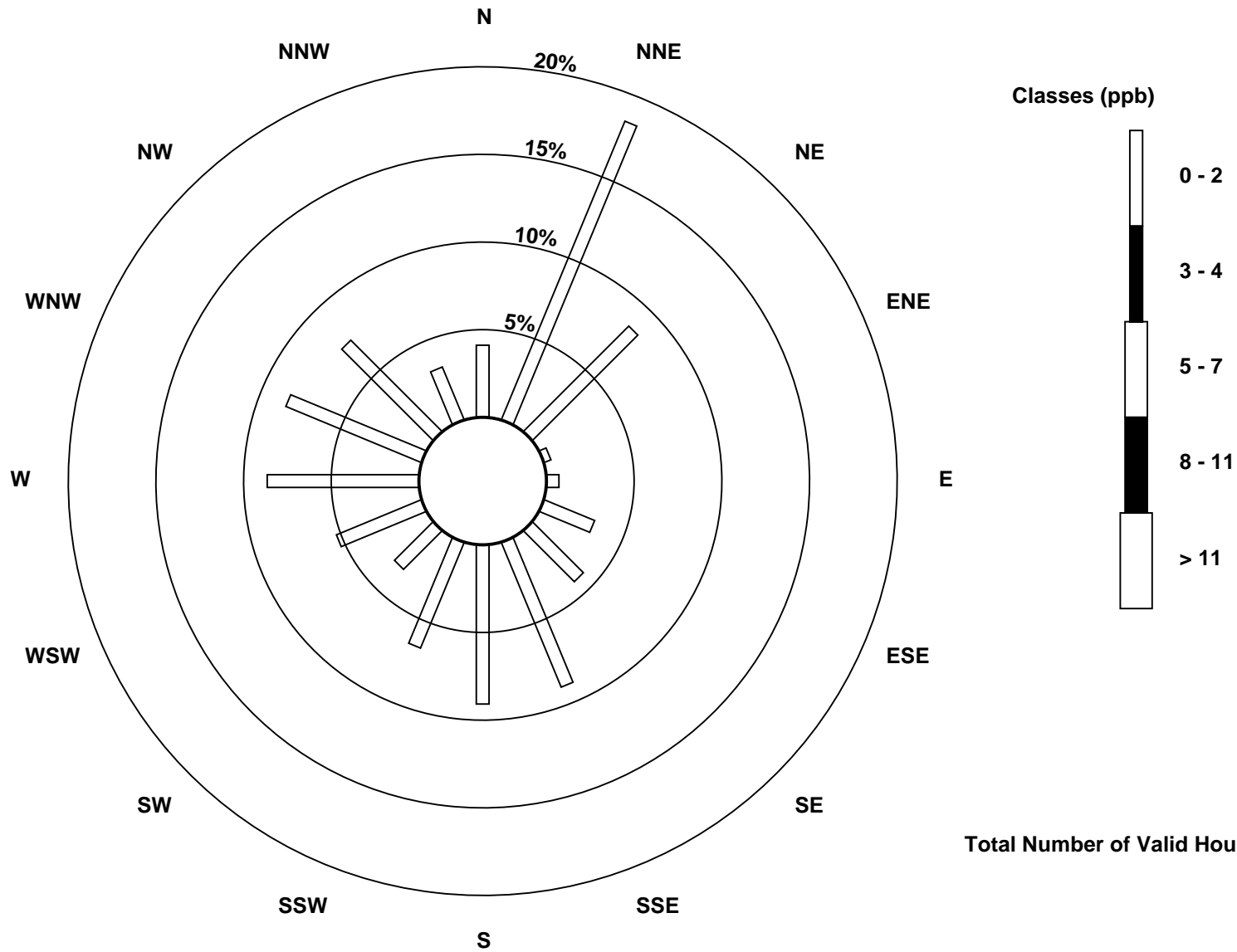
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River (AMS 20)

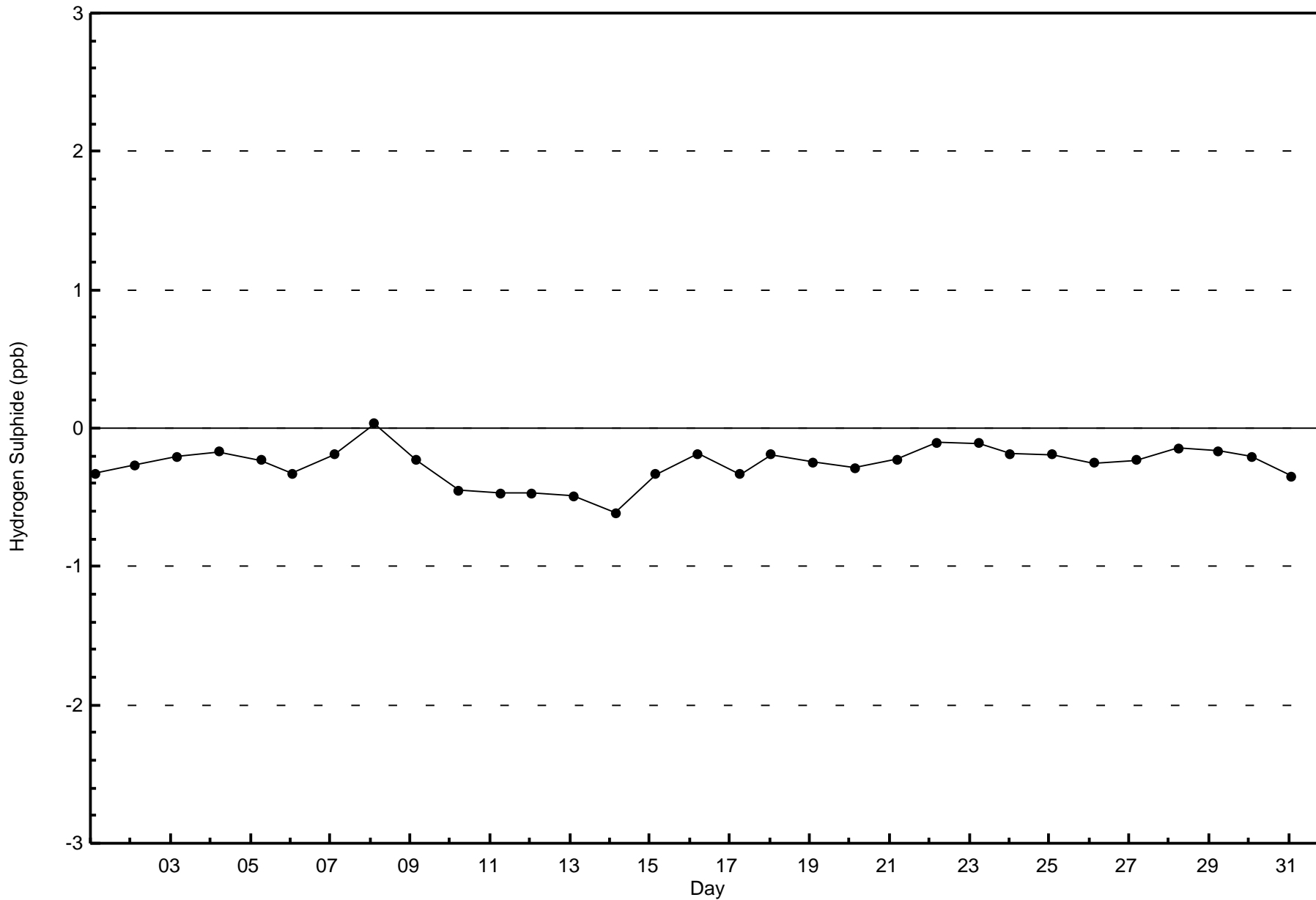


Total Number of Valid Hours: 705



Wood Buffalo Environmental Association
Zero Responses

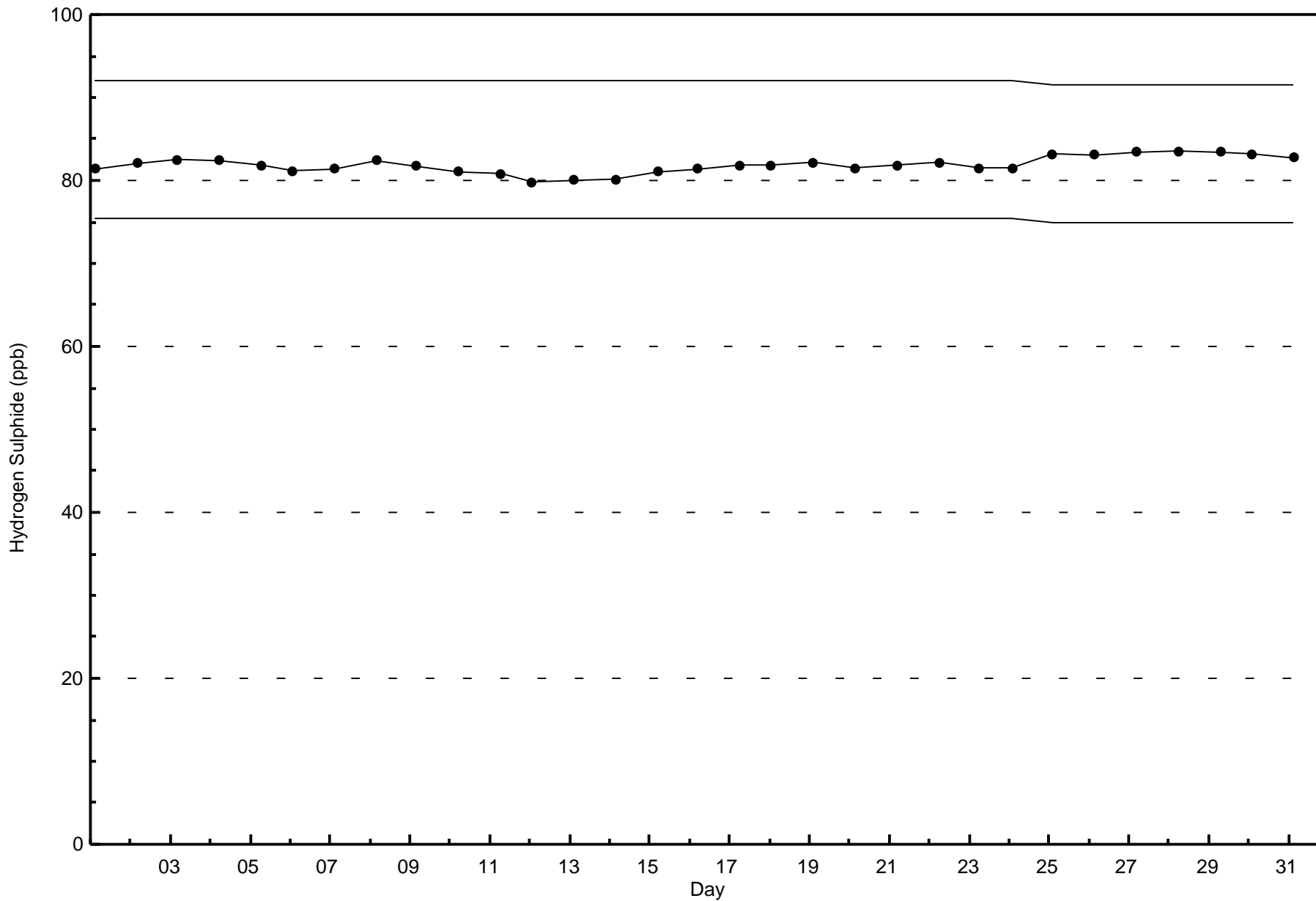
Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - May 2016





Wood Buffalo Environmental Association
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - May 2016

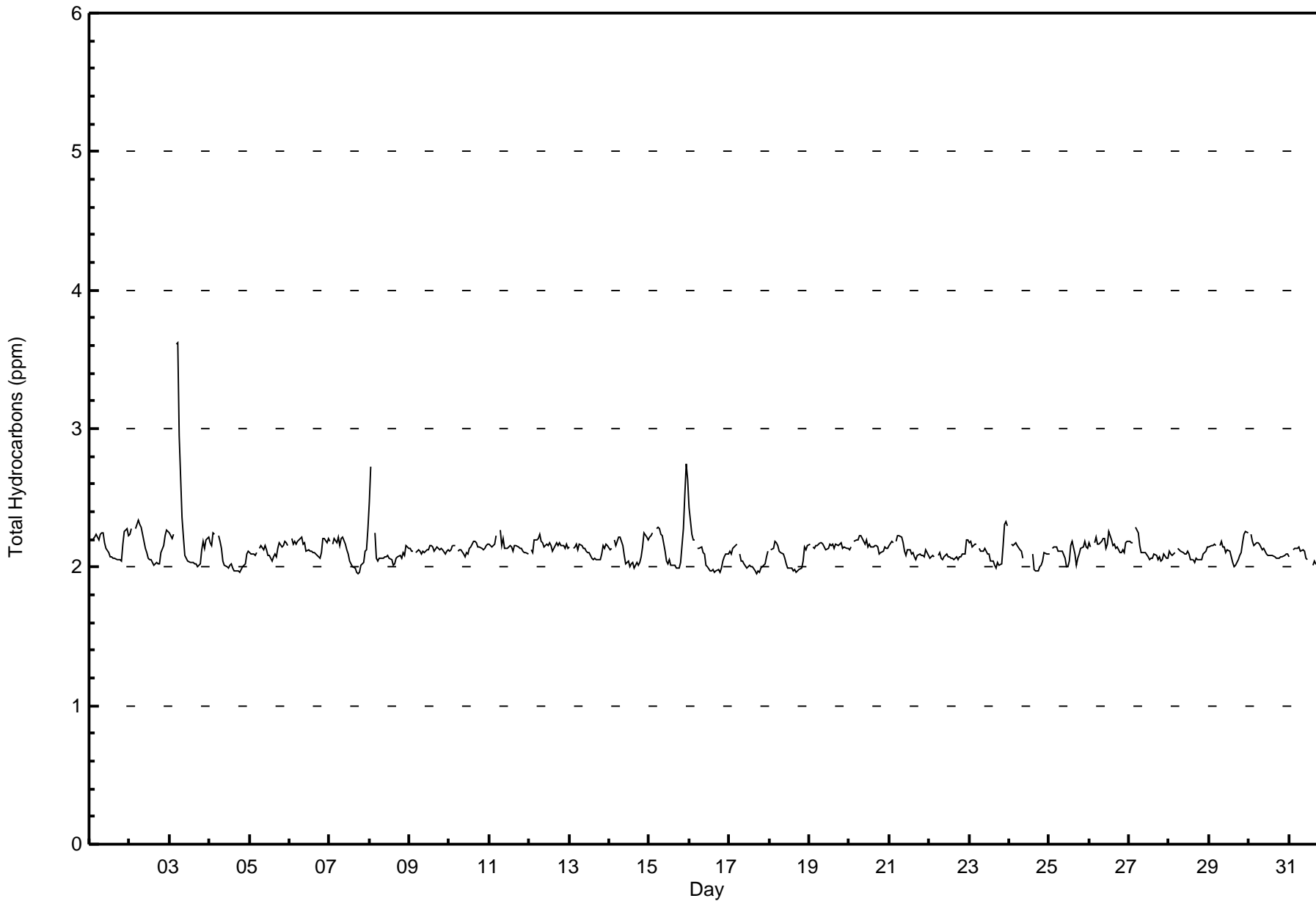




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Brion MacKay River - May 2016

Maximum Value: 3.6 ppm on May 3 06:00 Maximum Daily Average: 2.3 ppm on May 3		Hours in Service: 744 Hours of Data: 706 Hours of Missing Data: 38 Hours of Calibration: 36 Percent Operational Time: 99.7																																															
Minimum Value: 2.0 ppm on May 7 18:00 Maximum Diurnal Average: 2.2 ppm at hour 5 Monthly Average: 2.13 ppm		Minimum Daily Average: 2.0 ppm on May 17 Minimum Diurnal Average: 2.1 ppm at hour 17 Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.2 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-May	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.3	2.3	2.2	2.2	2.3																							
2-May	2.2	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.3	2.2	2.3																							
3-May	2.2	2.2	2.2	Z	3.6	3.6	2.9	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.2	2.2	2.3	3.6																							
4-May	2.2	2.2	2.3	2.2	Z	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	2.1	2.1	2.1	2.3																							
5-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2																							
6-May	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2																							
7-May	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.1	2.3																							
8-May	2.5	2.7	Z	2.3	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.7																							
9-May	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2																							
10-May	2.1	2.1	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2																							
11-May	2.2	2.1	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																							
12-May	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2																							
13-May	2.1	Z	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2																							
14-May	2.1	2.1	Z	2.2	2.2	2.2	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	2.1	2.1	2.2	2.2	2.1	2.2																							
15-May	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.2	2.2	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.5	2.7	2.6	2.7																							
16-May	2.4	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.4																							
17-May	2.1	2.1	2.1	2.1	2.2	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.2																							
18-May	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.2																							
19-May	2.2	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2																							
20-May	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2																							
21-May	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2																							
22-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2																							
23-May	2.2	2.2	2.1	2.2	2.2	Z	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	2.2	2.3	2.3	2.3	2.1	2.3																							
24-May	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	C	C	C	C	C	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2																							
25-May	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2																							
26-May	2.2	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3																							
27-May	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.3																							
28-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																							
29-May	2.1	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.1	2.3																							
30-May	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2																							
31-May	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.2																							
																								2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	Diurnal Average		
																								2.5	2.7	2.3	2.3	3.6	3.6	2.9	2.4	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.7	2.6	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Brion MacKay River - May 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	125	17.71	17.71
2.1 - 3.0	579	82.01	99.72
3.1 - 10.0	2	0.28	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Brion MacKay River - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	3	6	7	3	1	1	2	3	13	21	8	8	28	11	4	6	125
2.1 - 3.0	25	125	52	0	4	21	27	54	52	26	15	29	35	48	47	19	579
3.1 - 10.0	0	0	0	0	0	0	0	2	0	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	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706

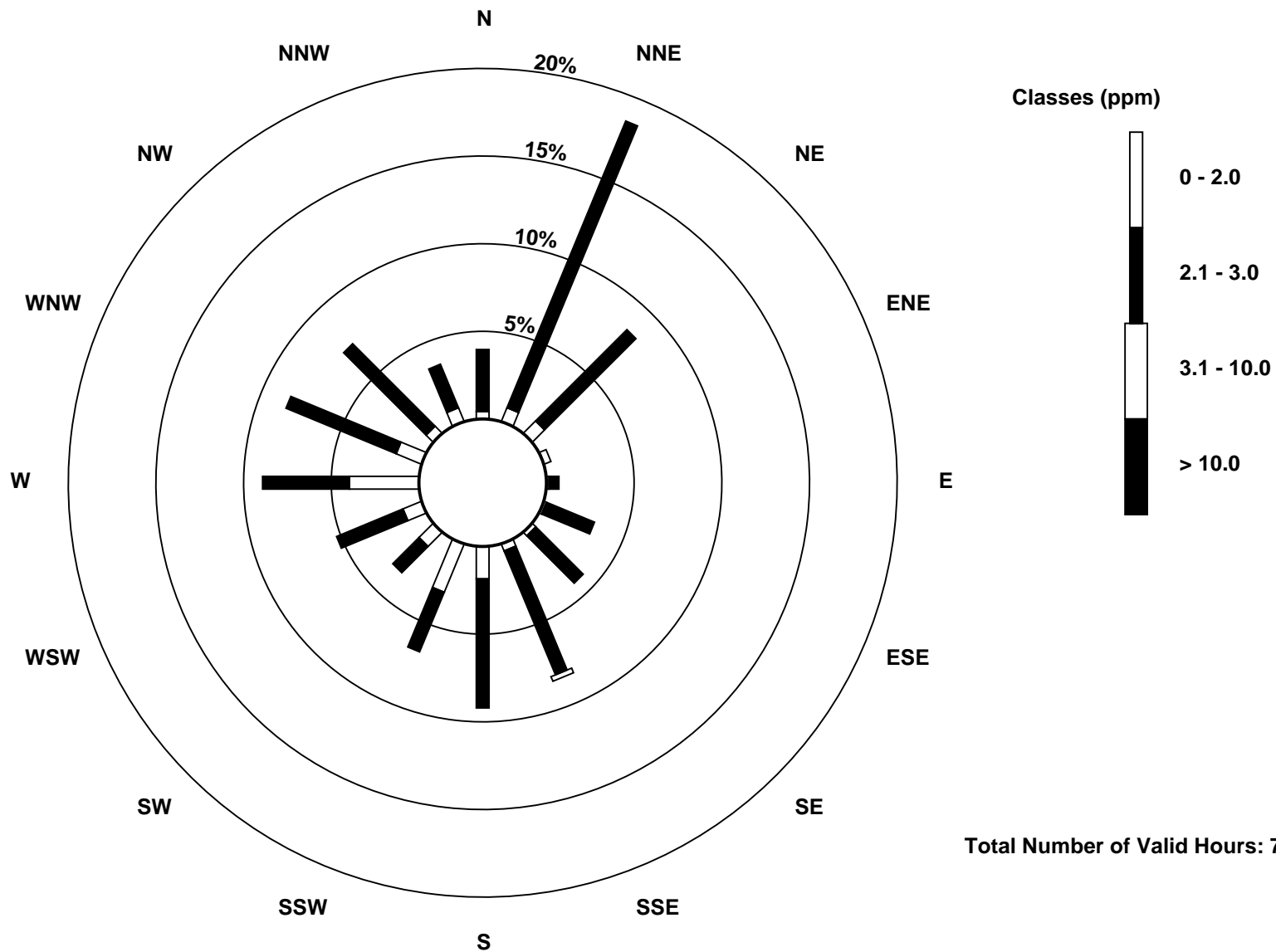
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

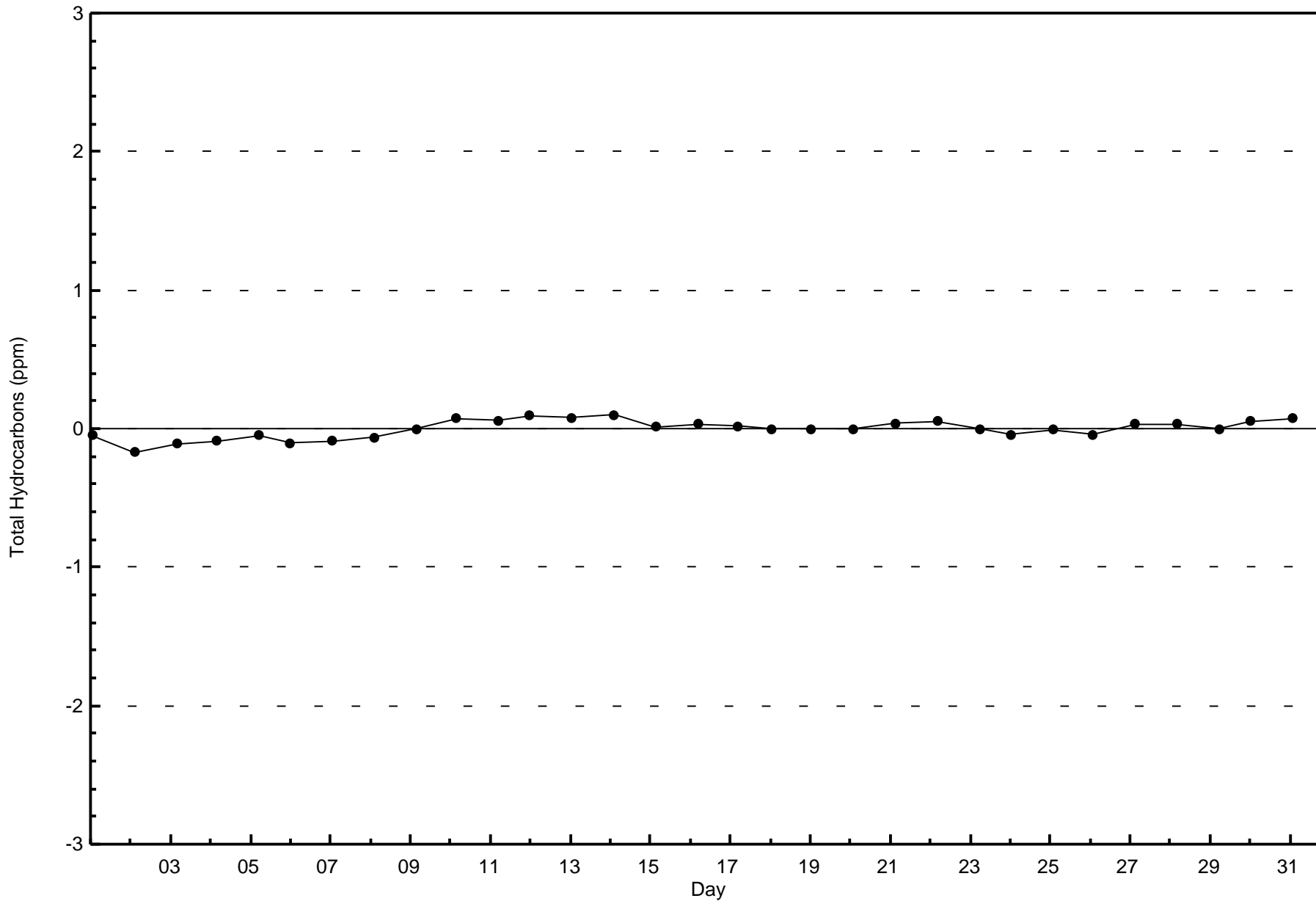
Total Hydrocarbons (THC) - ppm
Brion MacKay River (AMS 20)

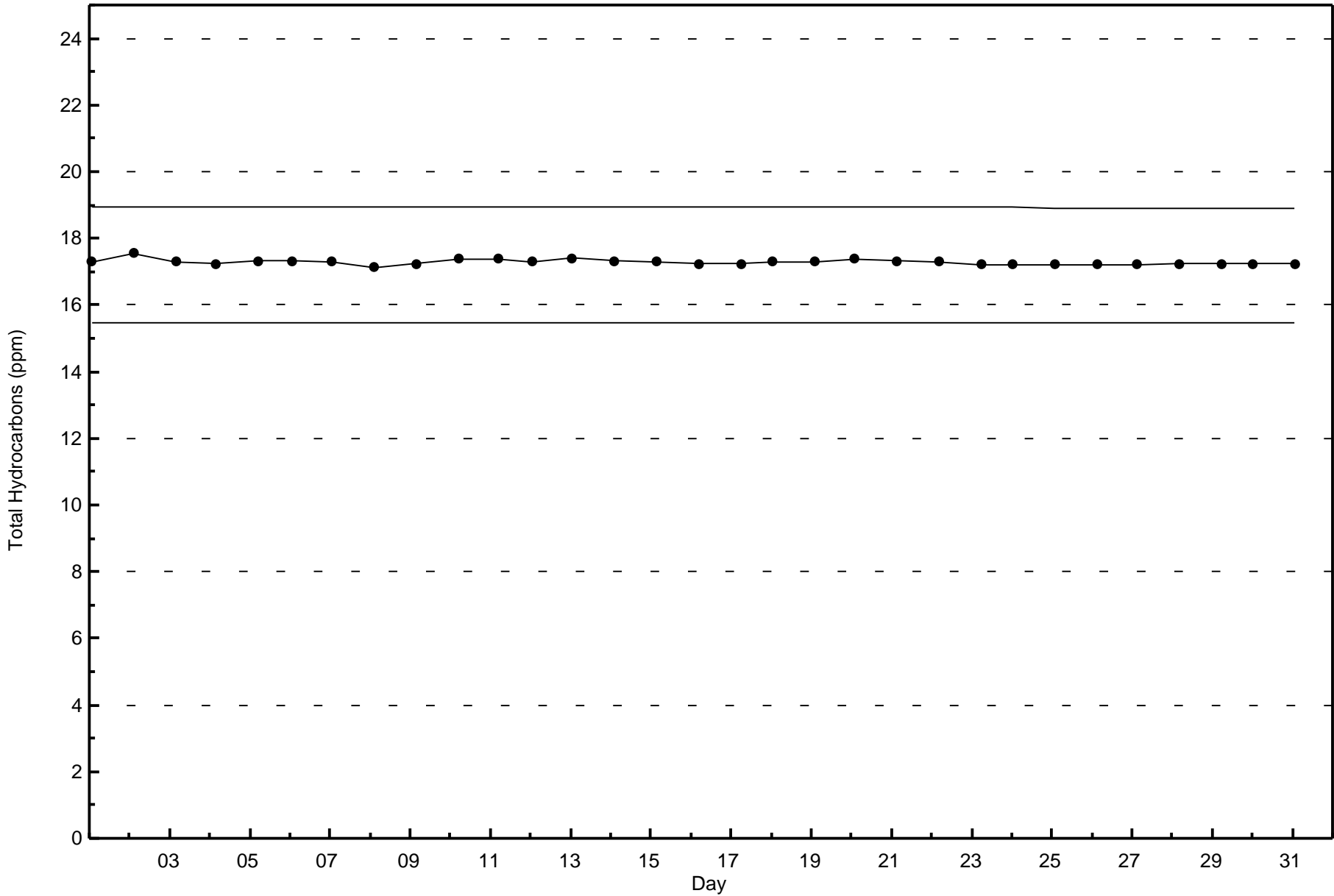




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Brion MacKay River - May 2016







Wood Buffalo Environmental Association

Summary of Hour Averages

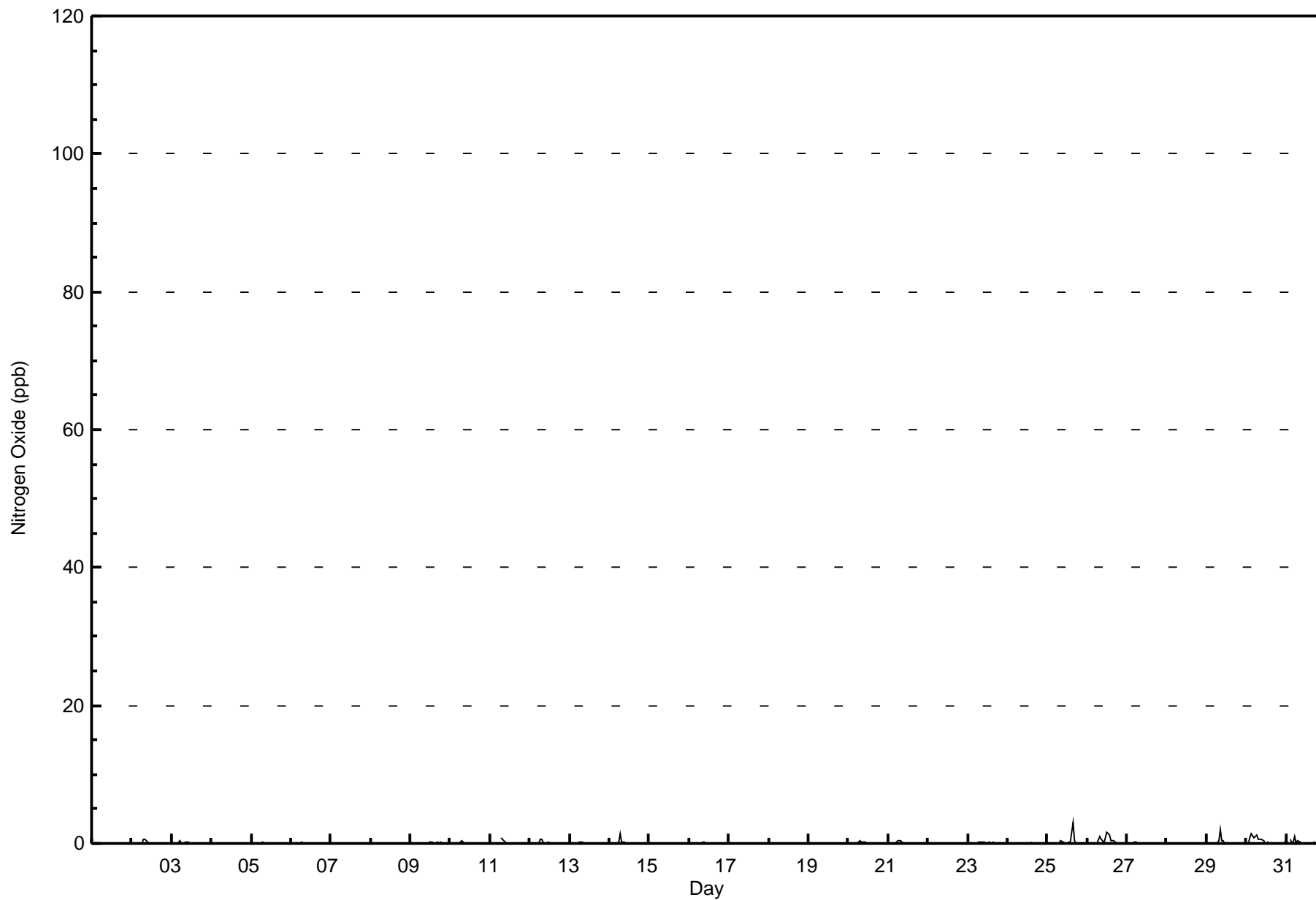
Nitrogen Oxide (NO) - ppb
Brion MacKay River - May 2016

Maximum Value: 3 ppb on May 25 16:00																		Maximum Daily Average: 0.3 ppb on May 30						Hours in Service: 744			
Minimum Value: 0 ppb on May 1 04:00																		Minimum Daily Average: 0.0 ppb on May 19						Hours of Data: 706			
Maximum Diurnal Average: 0.2 ppb at hour 9																		Minimum Diurnal Average: 0.0 ppb at hour 2						Hours of Missing Data: 38			
Monthly Average: 0.1 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1						Hours of Calibration: 36			
																		Percent Operational Time: 99.7									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	Z	0	0	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-May	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
3-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-May	0	0	0	0	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-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-May	Z	0	0	0	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-May	0	Z	0	0	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-May	0	0	Z	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-May	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	0.1	1
12-May	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
13-May	0	Z	0	0	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-May	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	0.1	2
15-May	0	0	0	Z	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-May	Z	0	0	0	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-May	0	Z	0	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0.2	3
26-May	0	0	Z	0	0	0	0	1	1	1	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2
27-May	0	0	0	Z	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-May	0	0	0	0	0	Z	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
30-May	Z	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
31-May	0	Z	1	0	0	1	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.1	1
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Brion MacKay River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706
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	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706

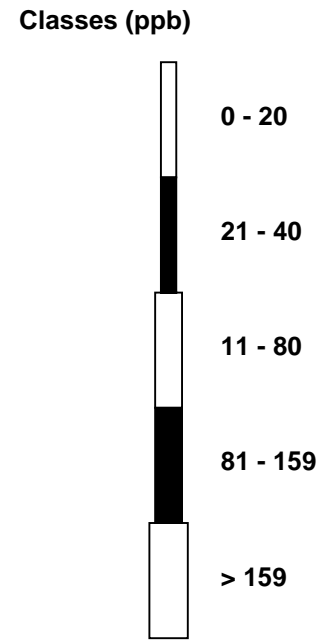
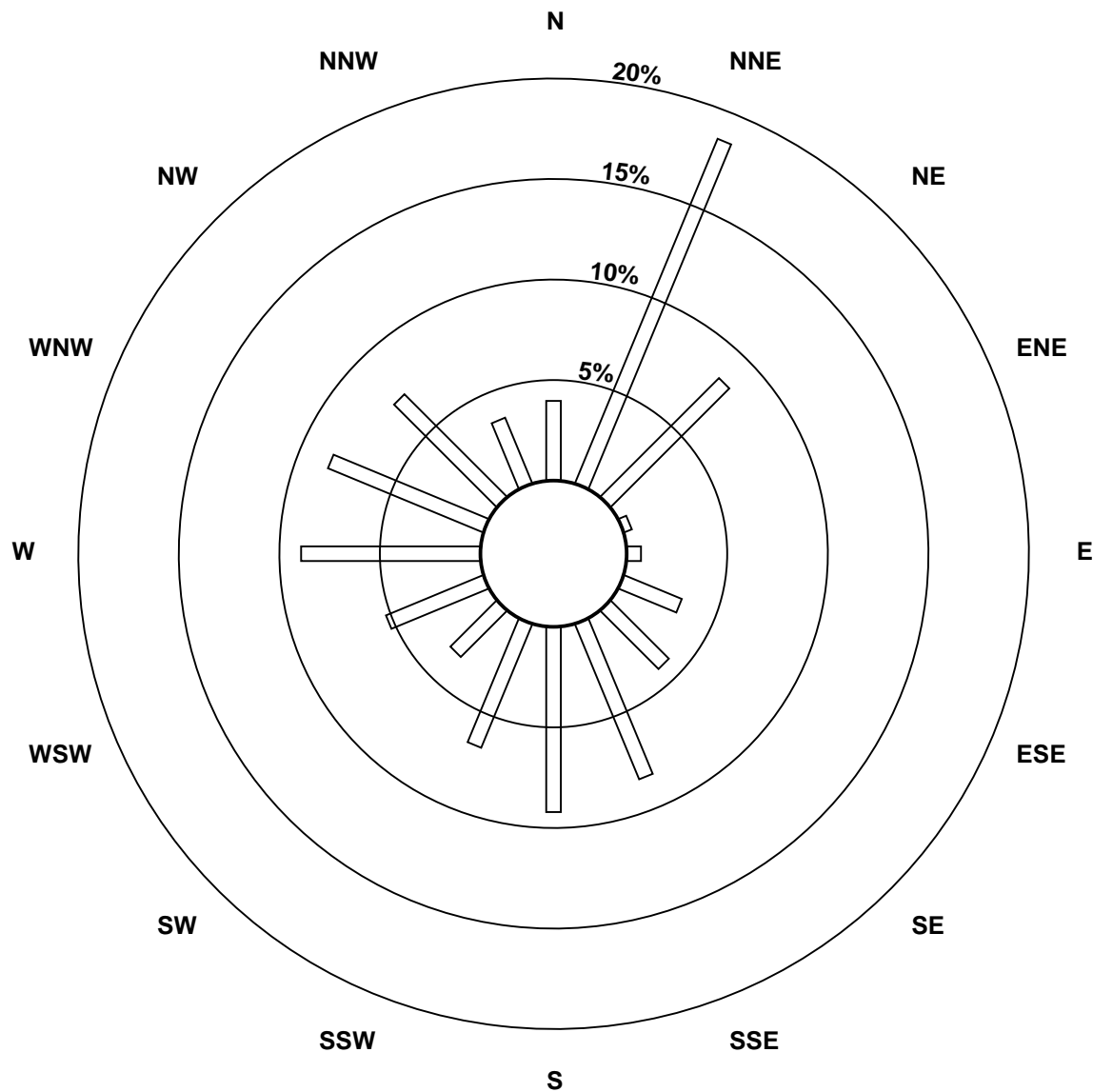
Total Number of Valid Hours: 706

Total Number of Hours: 744

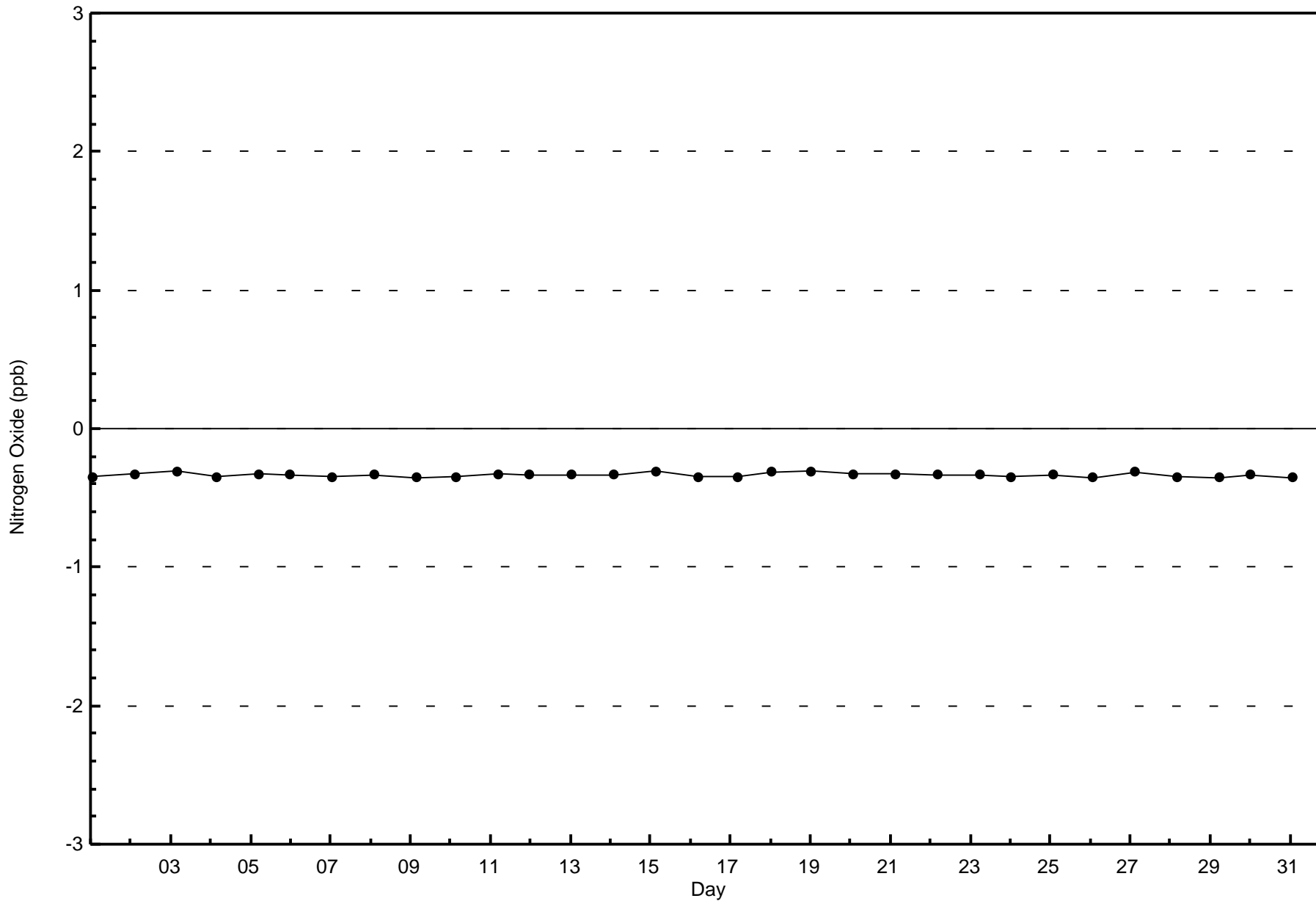


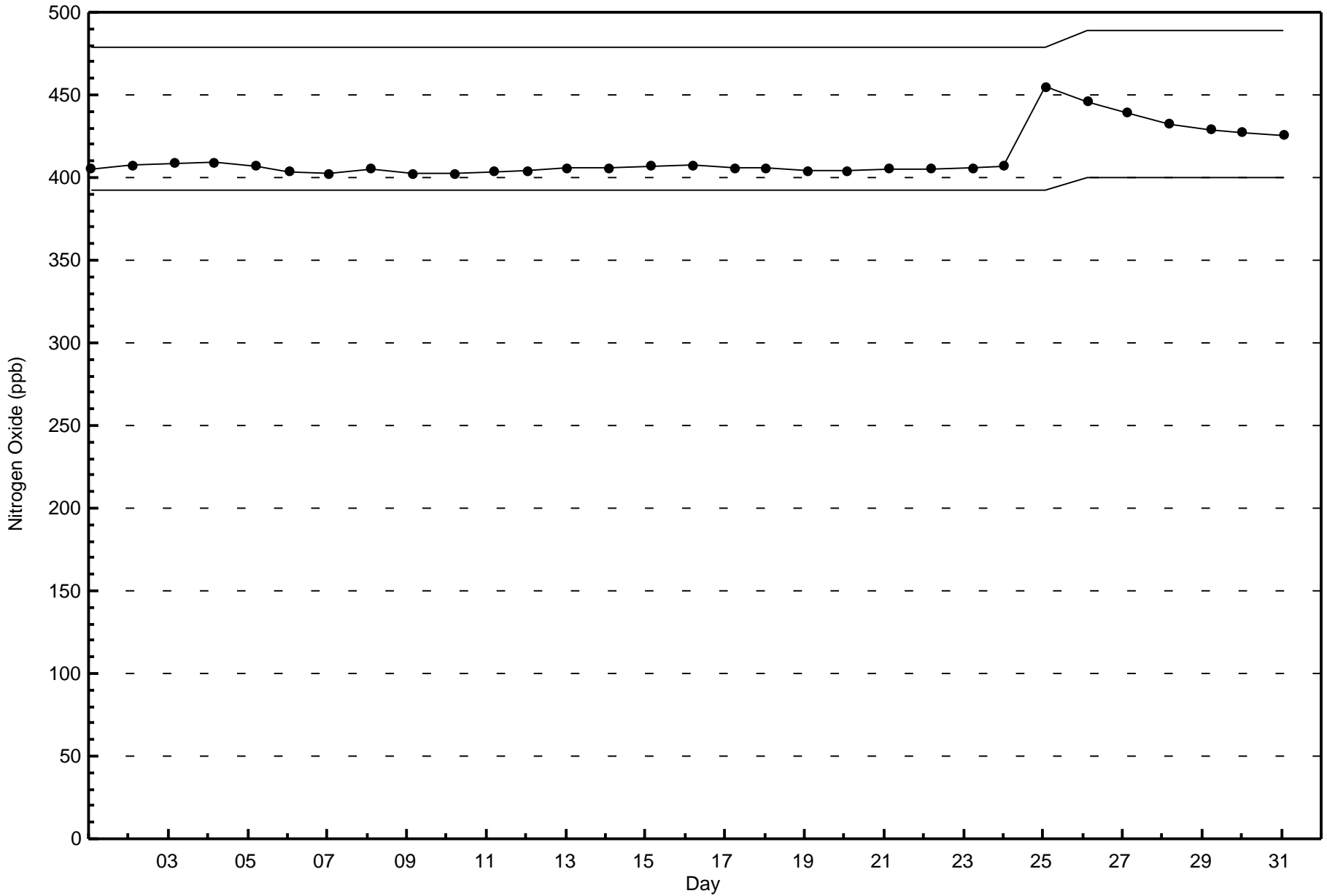
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxide (NO) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 11 ppb on May 3 05:00	Maximum Daily Average: 2.0 ppb on May 15		Hours of Data:	706
Minimum Value: 0 ppb on May 30 21:00	Minimum Daily Average: 0.3 ppb on May 19		Hours of Missing Data:	38
Maximum Diurnal Average: 1.4 ppb at hour 5	Minimum Diurnal Average: 0.6 ppb at hour 17		Hours of Calibration:	36
Monthly Average: 0.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1	Z	0	0	0	0	1	1	1	1	1	0	1	1	1	0	0	0	1	1	2	1	1	0	0.6	2
2-May	0	0	Z	1	0	0	0	2	2	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0.7	2
3-May	0	1	1	Z	11	6	3	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	11
4-May	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
5-May	1	2	0	0	1	Z	1	1	1	1	1	0	1	1	0	1	1	1	1	1	3	2	2	1	0.9	3
6-May	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.5	1
7-May	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.8	2
8-May	5	8	Z	4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	1.3	8
9-May	0	0	0	Z	1	1	0	0	0	0	0	1	1	1	1	1	1	1	2	1	0	0	0	0	0.6	2
10-May	1	1	1	0	Z	0	1	1	0	0	1	0	0	0	1	1	0	0	1	1	0	0	0	1	0.5	1
11-May	0	0	0	0	1	Z	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
12-May	Z	1	0	1	1	1	3	2	1	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0.7	3
13-May	1	Z	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-May	1	1	Z	1	1	1	4	2	1	1	0	1	0	0	0	0	0	0	1	1	1	1	1	1	0.7	4
15-May	0	0	0	Z	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	5	6	10	2.0	10
16-May	4	2	2	1	Z	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	4
17-May	1	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	1
18-May	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	1	1	1	0.6	1
19-May	1	Z	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-May	1	1	Z	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0.9	2
21-May	1	2	1	Z	1	4	4	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1.1	4
22-May	0	0	1	0	Z	2	2	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1	3	2	0.7	3
23-May	2	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	4	4	3	1	1	1.2	4
24-May	Z	1	1	1	0	0	1	0	0	C	C	C	C	C	7	2	1	1	1	1	1	1	1	1	0.9	7
25-May	1	Z	1	0	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	1	1	2	2	1.3	3
26-May	2	2	Z	2	3	2	1	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	2	2	1.4	3
27-May	3	2	2	Z	2	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	3
28-May	1	1	1	1	Z	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0.4	1
29-May	1	1	1	0	0	Z	1	1	3	1	1	0	0	0	0	0	0	1	1	2	3	2	1	1	0.9	3
30-May	Z	1	5	7	4	4	3	1	1	1	1	0	0	1	1	0	0	0	0	0	0	1	1	3	1.5	7
31-May	4	Z	3	0	1	3	0	1	0	0	0	0	M	M	0	0	0	1	0	0	0	0	0	0	0.7	4

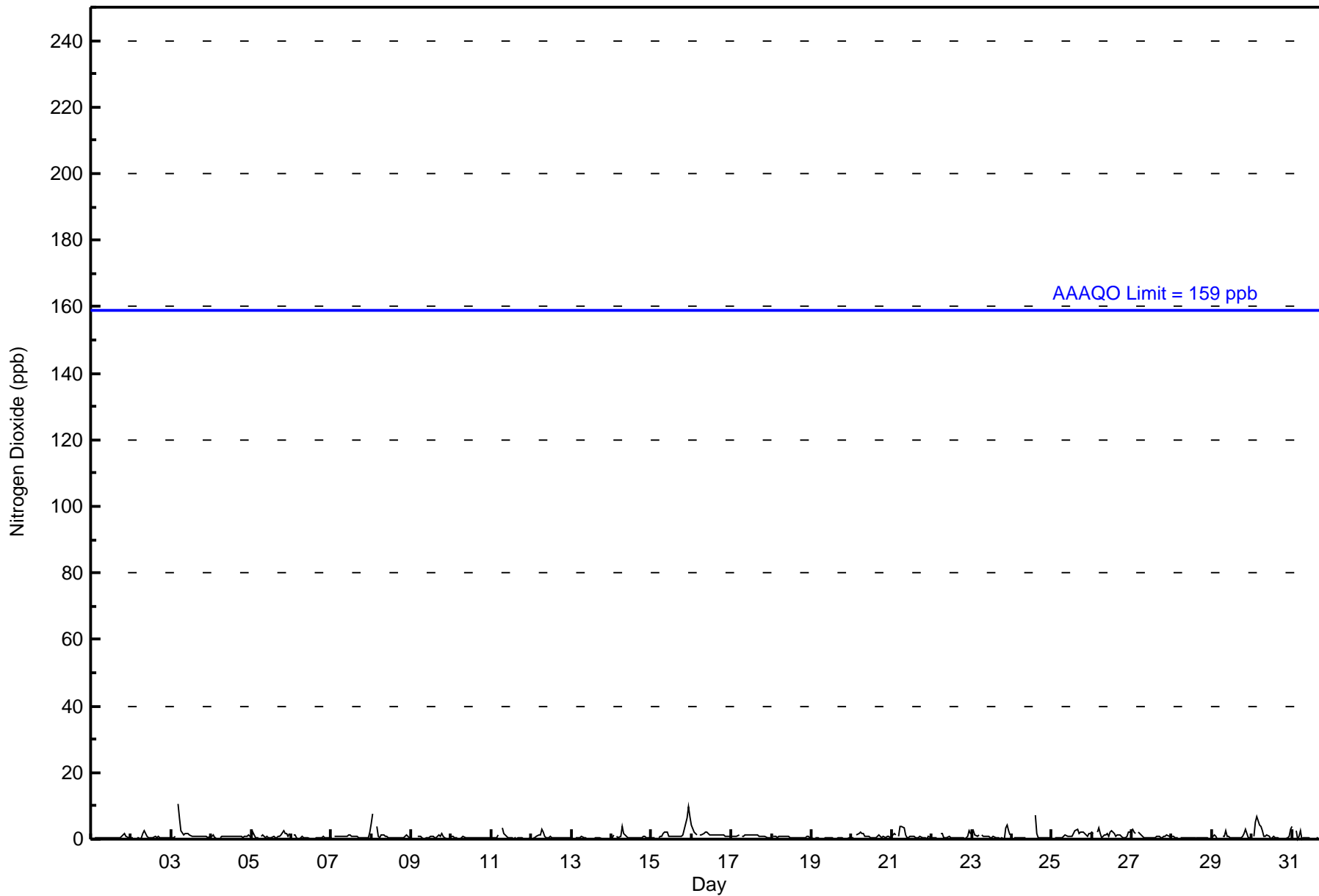
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5	8	5	7	11	6	4	3	3	2	2	2	2	2	7	3	2	2	2	2	3	5	6	10	7	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706
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	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706

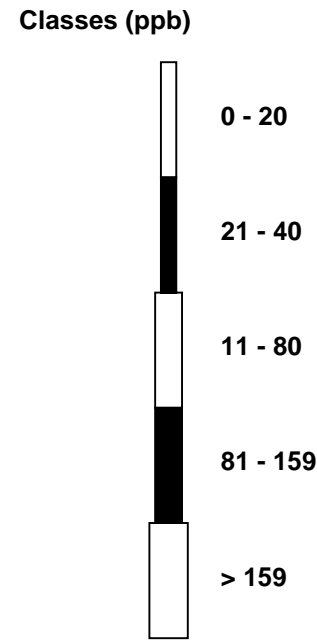
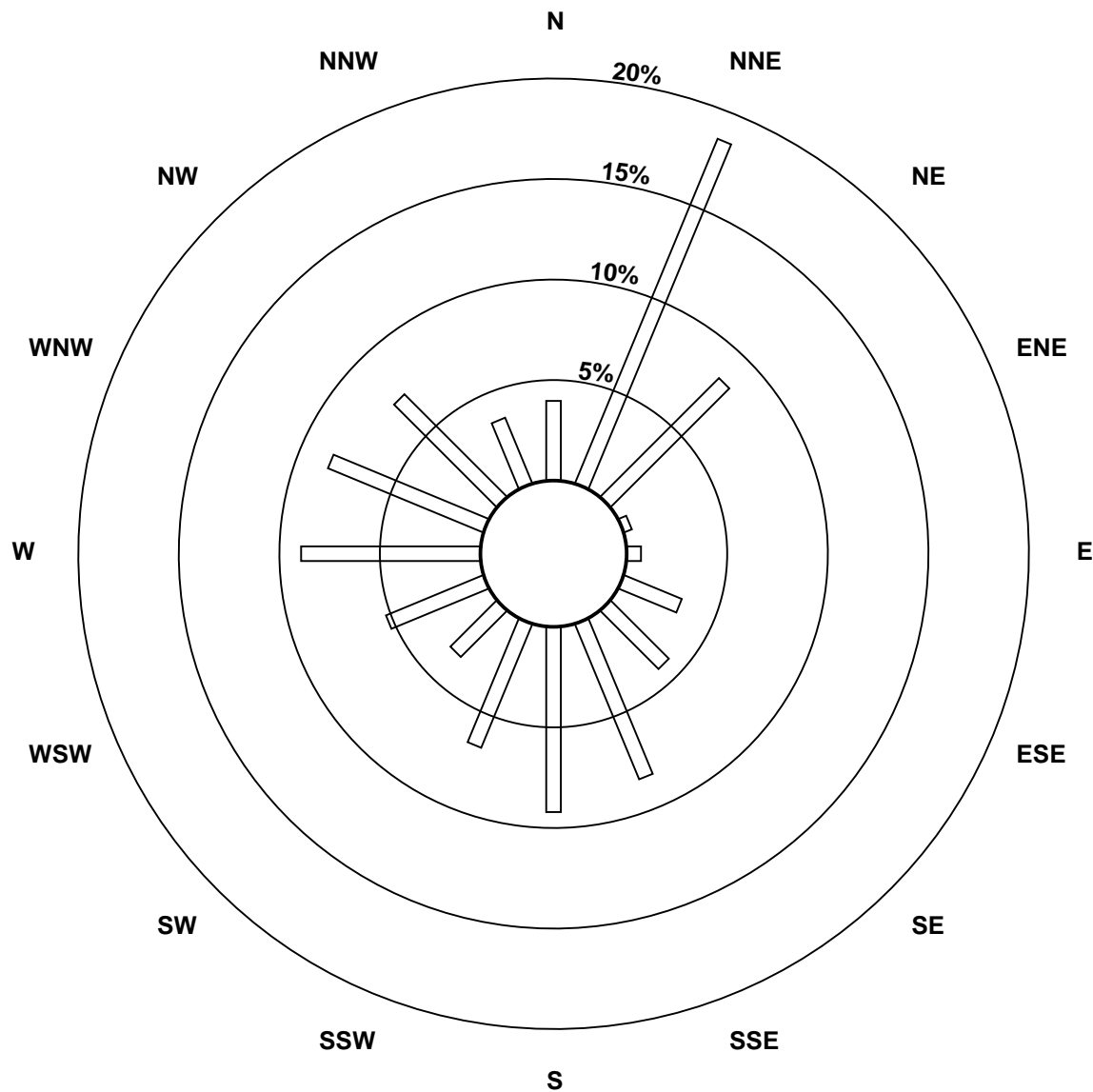
Total Number of Valid Hours: 706

Total Number of Hours: 744

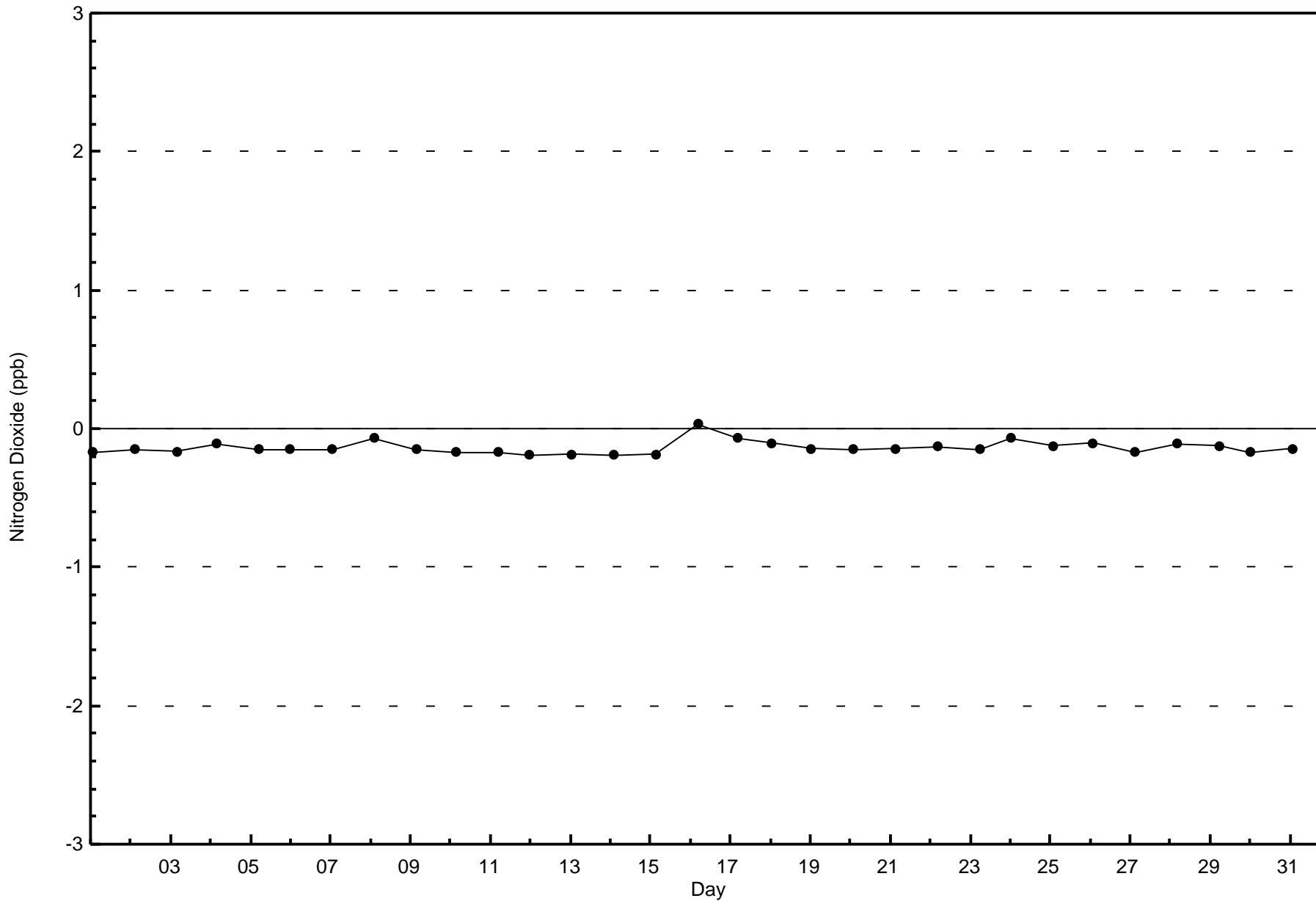


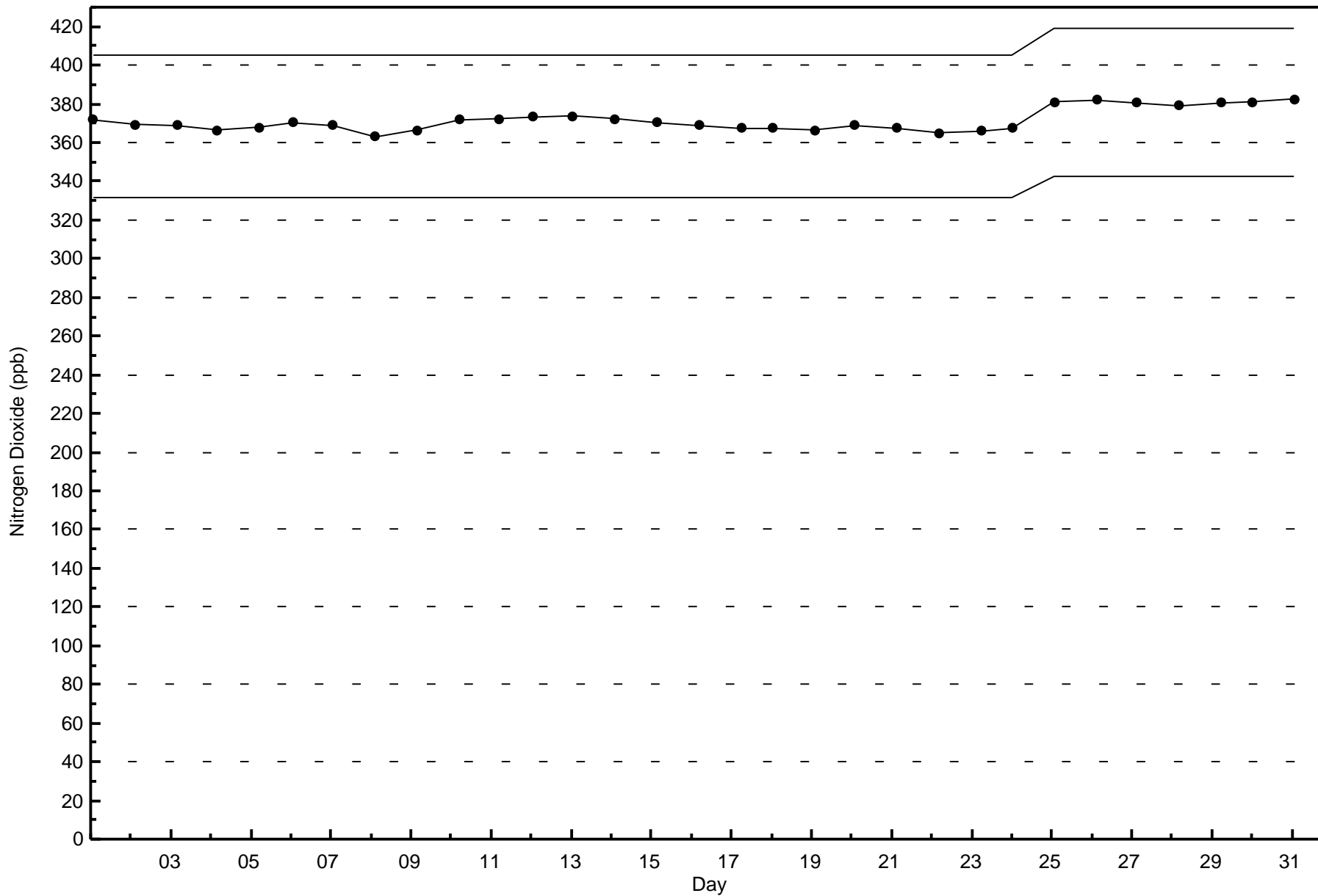
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association
Summary of Hour Averages

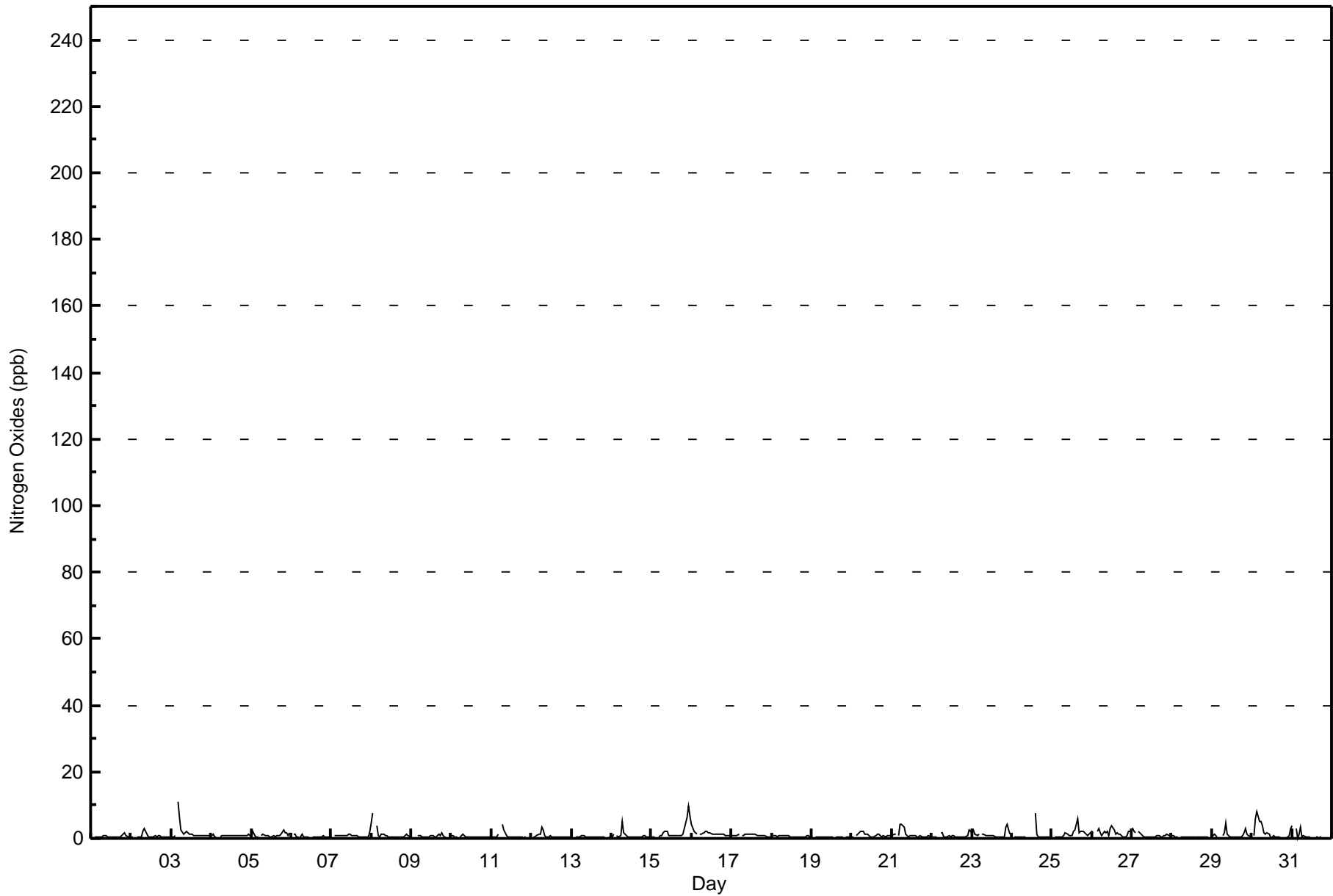
Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - May 2016

Maximum Value: 11 ppb on May 3 05:00																	Maximum Daily Average: 2.0 ppb on May 15																	Hours in Service: 744			
Minimum Value: 0 ppb on Jun 1 00:00																	Minimum Daily Average: 0.3 ppb on May 19																	Hours of Data: 706			
Maximum Diurnal Average: 1.5 ppb at hour 5																	Minimum Diurnal Average: 0.6 ppb at hour 17																	Hours of Missing Data: 38			
Monthly Average: 1.0 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6																	Hours of Calibration: 36			
																																		Percent Operational Time: 99.7			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-May	1	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	2	1	0	0	0.6	2											
2-May	0	0	Z	0	0	0	1	2	3	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0.7	3												
3-May	0	1	1	Z	11	7	3	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.8	11												
4-May	1	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1												
5-May	1	2	0	0	1	Z	1	1	1	1	1	0	0	1	0	1	1	1	1	1	3	2	2	1.0	3												
6-May	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.5	1												
7-May	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.8	2												
8-May	5	8	Z	4	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	1.3	8												
9-May	0	0	0	Z	1	1	0	0	0	0	0	1	1	1	1	1	1	1	2	1	0	0	0	0.6	2												
10-May	1	1	1	0	Z	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0.5	1												
11-May	0	0	0	0	1	Z	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4												
12-May	Z	1	0	1	1	1	3	3	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0.8	3												
13-May	0	Z	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1												
14-May	1	1	Z	1	1	1	5	2	1	1	0	1	0	0	0	0	0	0	0	1	1	1	0	0.8	5												
15-May	0	0	0	Z	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	5	6	2.0	10												
16-May	4	2	2	1	Z	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.5	4												
17-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1												
18-May	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.6	1												
19-May	0	Z	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1												
20-May	1	1	Z	1	2	2	2	2	1	1	1	1	0	0	1	1	1	1	1	0	1	0	1	1.0	2												
21-May	1	1	1	Z	1	4	4	3	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	1.1	4												
22-May	0	0	1	0	Z	2	2	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1	3	0.7	3												
23-May	2	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	4	4	3	1	1.2	4												
24-May	Z	1	1	0	0	0	1	0	0	C	C	C	C	C	8	1	1	1	1	0	1	1	1	1.0	8												
25-May	1	Z	0	0	0	1	1	1	2	1	1	1	1	2	3	6	2	2	2	2	1	1	2	1.5	6												
26-May	2	2	Z	2	3	2	1	2	2	2	1	3	4	3	1	2	1	1	1	1	1	1	2	1.7	4												
27-May	3	2	2	Z	2	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.9	3												
28-May	1	1	1	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1												
29-May	1	1	1	0	0	Z	1	2	5	1	1	0	0	0	0	0	0	1	1	2	3	1	1	1.0	5												
30-May	Z	1	6	8	5	5	4	2	1	2	1	0	0	1	1	0	0	0	0	0	0	1	1	1.8	8												
31-May	4	Z	3	0	1	4	0	1	1	0	0	0	M	M	0	0	0	1	0	0	0	0	0	0.8	4												
																	1.2 1.3 1.0 1.0 1.5 1.4 1.4 1.2 1.2 0.9 0.7 0.7 0.7 0.7 0.9 0.8 0.6 0.6 0.6 0.6 0.7 0.9 0.9 1.1 1.0																	Diurnal Average			
																	5 8 6 8 11 7 5 3 5 2 2 3 4 3 8 6 2 2 2 2 3 5 6 10 7																	Diurnal Maximum			
Z - zerospan																	C - Calibration																	M - Maintenance			



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706
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	28	131	59	3	5	22	29	59	65	47	23	37	63	59	51	25	706

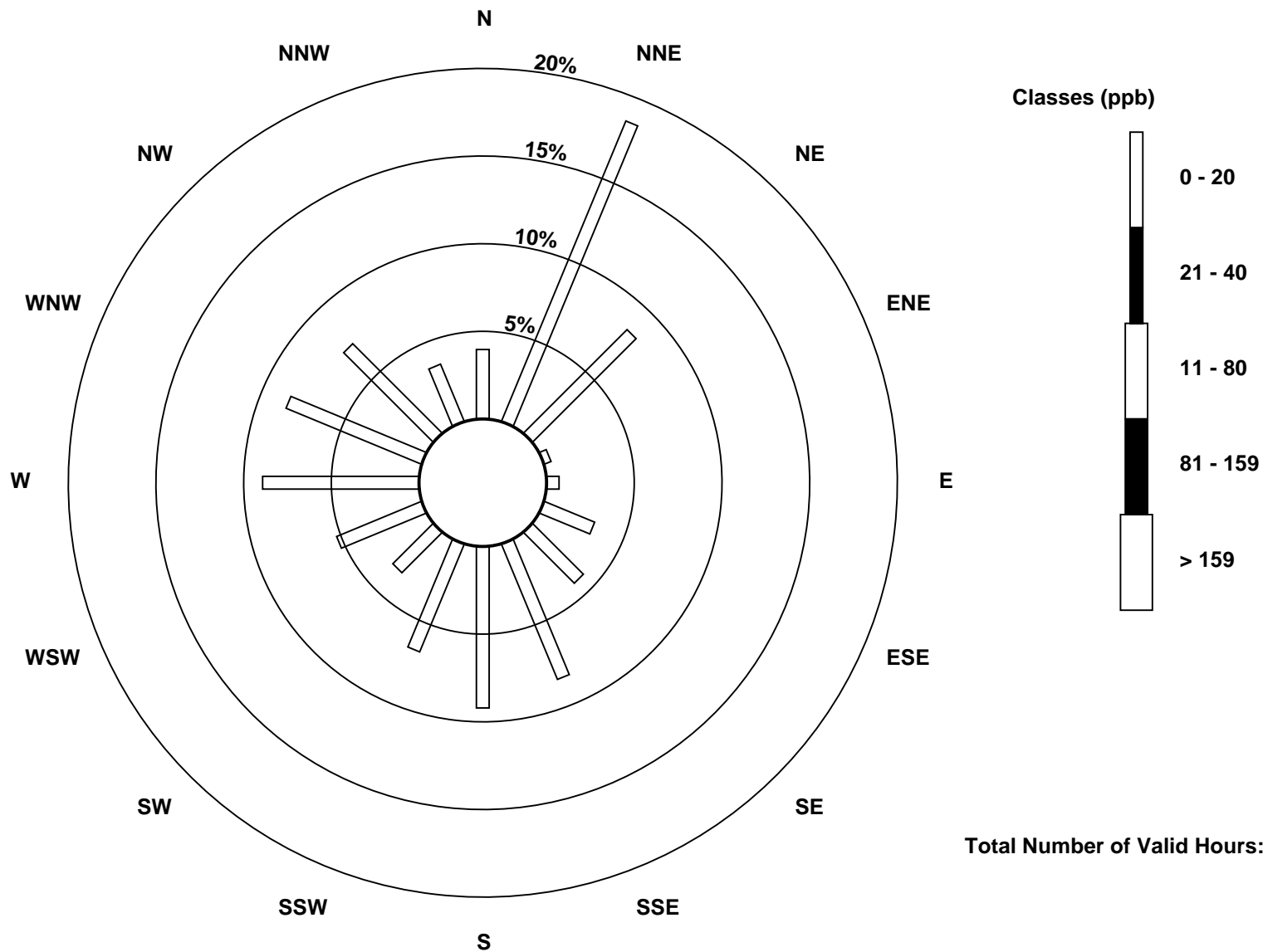
Total Number of Valid Hours: 706

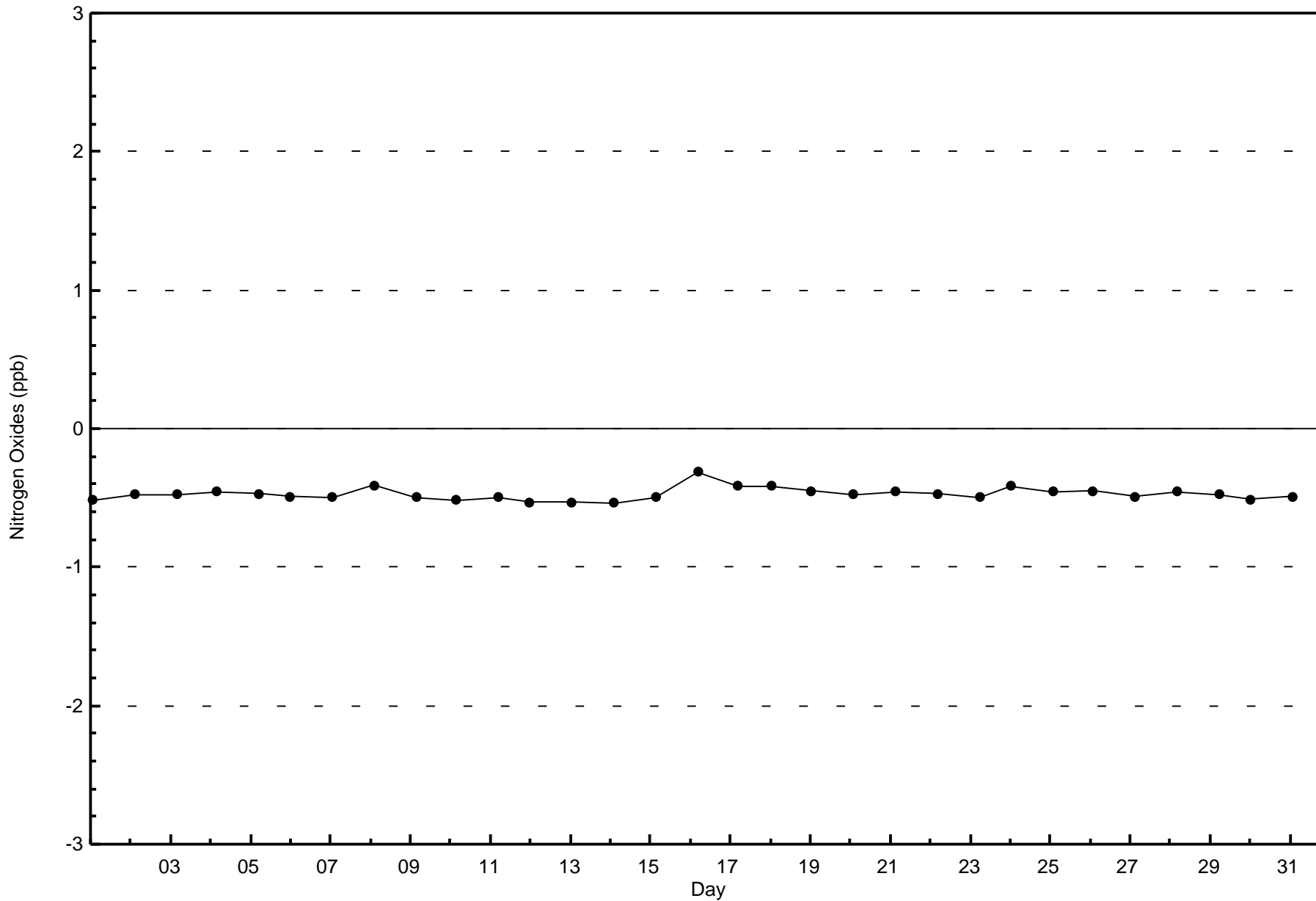
Total Number of Hours: 744

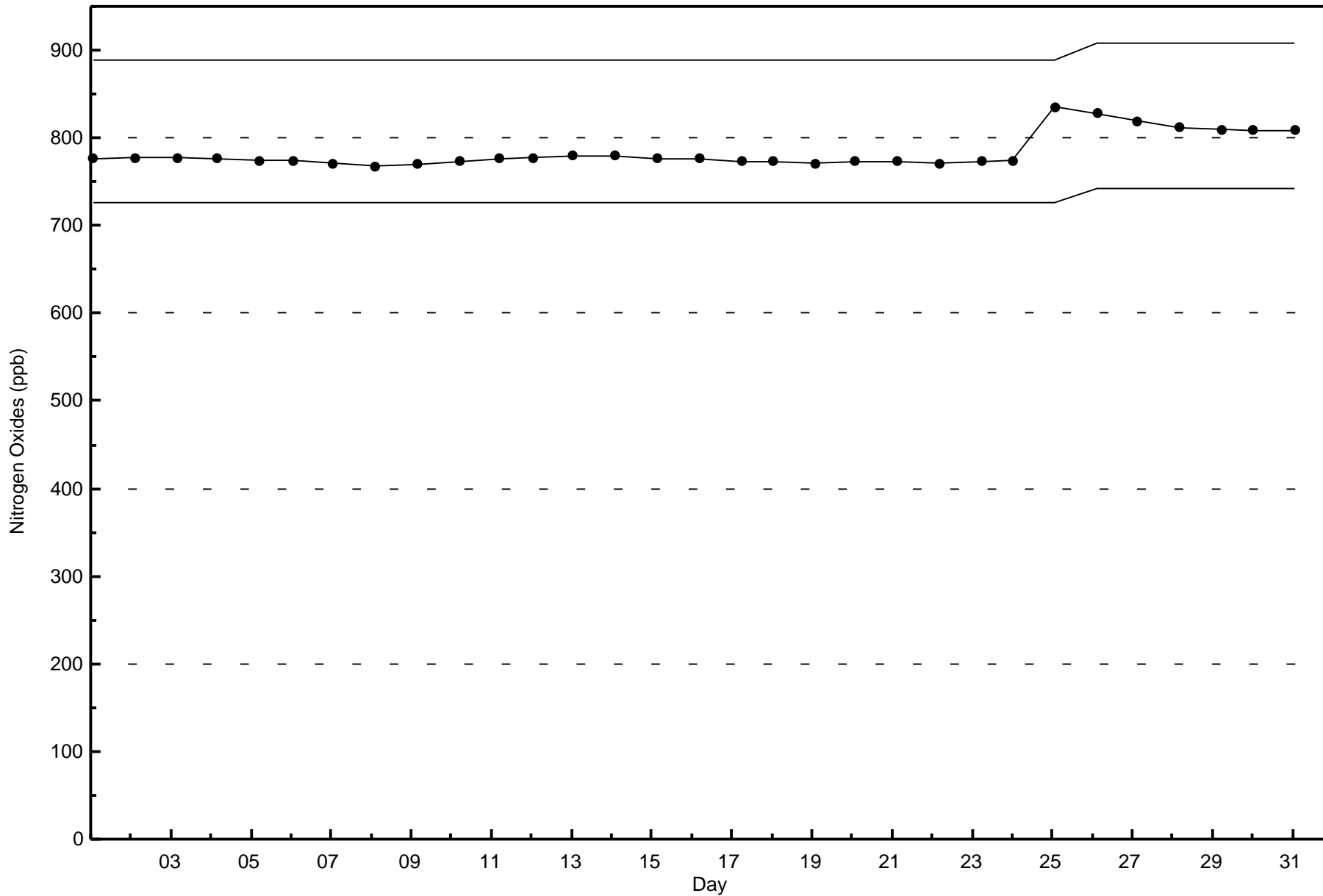


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

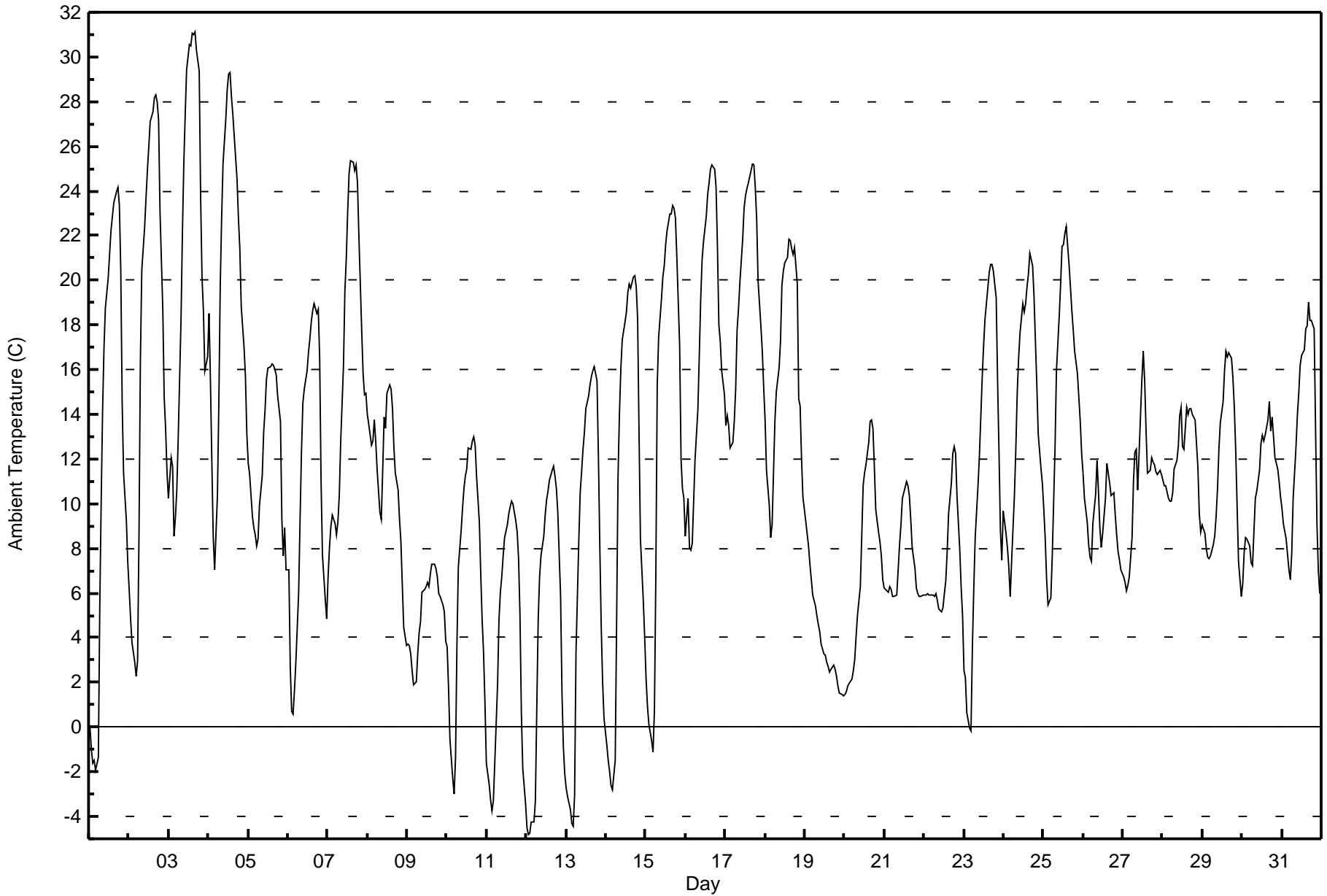
Ambient Temperature (AT) - C
Brion MacKay River - May 2016

Maximum Value: 31.1 C on May 3 17:00 Maximum Daily Average: 21.1 C on May 3																						Hours in Service: 744																									
Minimum Value: -4.8 C on May 12 02:00 Minimum Daily Average: 3.9 C on May 11																						Hours of Data: 744																									
Maximum Diurnal Average: 17.4 C at hour 17 Minimum Diurnal Average: 4.6 C at hour 5																						Hours of Missing Data: 0																									
Monthly Average: 11.65 C Percentiles: P₁ = -3.8 P₁₀ = 2.5 Q₁ = 6.7 Median = 11.0 Q₃ = 16.2 P₉₀ = 21.8 P₉₉ = 28.6																						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-May	0.0	-1.0	-1.6	-1.5	-1.9	-1.3	5.4	10.0	14.1	17.0	18.7	20.1	21.1	22.2	22.9	23.5	24.0	24.2	23.3	20.5	14.5	11.4	9.2	7.3	12.6	24.2																					
2-May	6.2	4.8	3.8	2.9	2.3	3.0	8.5	16.4	20.5	22.3	23.7	24.9	26.0	27.1	27.5	28.2	28.3	28.0	27.1	23.1	18.7	14.7	13.4	11.5	17.2	28.3																					
3-May	10.2	12.0	11.7	8.5	9.4	10.6	12.9	18.2	22.1	25.2	27.4	29.4	30.5	30.5	31.1	31.0	31.1	30.3	29.3	23.8	20.2	18.7	15.9	16.6	21.1	31.1																					
4-May	18.5	15.6	11.9	8.6	7.1	10.4	14.5	19.7	22.8	25.2	27.3	28.5	29.2	29.3	28.2	27.4	25.5	24.5	22.8	21.4	18.8	17.0	15.7	13.1	20.1	29.3																					
5-May	11.8	11.3	9.4	8.9	8.6	8.1	8.4	9.9	11.3	13.2	14.2	15.6	16.0	16.1	16.2	16.2	16.0	15.8	14.8	13.7	9.3	7.7	8.9	7.0	12.0	16.2																					
6-May	7.0	2.7	0.7	0.6	1.7	2.9	6.0	9.3	12.3	14.5	15.1	16.0	16.7	17.4	18.2	18.7	18.9	18.5	18.7	16.5	11.0	7.7	5.7	4.9	10.9	18.9																					
7-May	6.7	8.1	9.0	9.5	9.1	8.6	9.2	10.4	12.8	16.2	19.5	21.0	23.1	24.8	25.4	25.3	24.9	25.2	24.3	22.0	17.8	15.8	14.9	14.9	16.6	25.4																					
8-May	14.0	13.5	12.6	12.8	13.8	12.8	11.6	9.6	9.3	11.5	13.9	13.4	14.9	15.3	15.1	14.2	12.5	11.4	10.6	9.3	8.3	6.3	4.5	3.6	11.5	15.3																					
9-May	3.7	3.7	3.3	2.5	1.9	2.1	3.3	4.2	4.7	6.1	6.2	6.3	6.4	6.3	6.9	7.3	7.3	7.1	6.7	6.0	5.9	5.5	5.2	3.9	5.1	7.3																					
10-May	3.6	1.8	-0.5	-2.3	-3.0	-1.4	3.7	7.2	8.8	9.8	10.7	11.2	11.6	12.5	12.4	12.8	13.0	12.6	11.2	9.2	6.8	4.8	3.4	1.1	6.7	13.0																					
11-May	-1.6	-2.5	-3.2	-3.7	-3.3	-1.6	1.9	4.8	6.0	6.7	7.6	8.5	9.1	9.5	9.9	10.1	10.0	9.2	8.8	7.5	5.0	0.6	-1.9	-3.4	3.9	10.1																					
12-May	-4.5	-4.8	-4.8	-4.2	-4.3	-3.3	0.9	4.8	6.7	7.7	8.6	9.5	10.2	10.6	11.0	11.5	11.7	11.2	10.7	9.6	5.9	1.5	-0.9	-2.1	4.3	11.7																					
13-May	-2.7	-3.1	-3.7	-4.3	-4.4	-3.1	3.3	8.3	10.5	11.4	12.4	13.2	14.2	14.8	15.3	15.7	16.0	16.2	15.5	12.1	8.1	4.5	2.0	0.4	7.2	16.2																					
14-May	-0.8	-1.5	-2.0	-2.6	-2.8	-1.5	4.7	11.2	14.0	16.0	17.3	18.2	18.6	19.4	19.9	19.6	20.2	20.2	19.7	18.2	13.2	8.4	5.7	4.1	10.7	20.2																					
15-May	2.2	0.9	0.1	-0.6	-1.1	0.8	6.8	15.3	17.5	19.1	20.1	20.7	21.6	22.2	23.0	23.0	23.3	23.2	22.8	21.0	17.1	12.0	10.7	10.3	13.8	23.3																					
16-May	8.5	10.2	8.0	7.9	8.2	10.1	12.0	14.2	16.6	19.1	20.9	21.7	22.9	23.9	24.3	25.0	25.2	25.0	24.2	21.4	18.0	17.2	16.0	14.9	17.3	25.2																					
17-May	13.5	13.9	13.5	12.5	12.8	13.7	15.1	17.7	18.7	19.9	21.9	23.2	23.8	24.1	24.3	24.9	25.3	25.2	24.2	22.7	20.0	17.9	16.9	15.2	19.2	25.3																					
18-May	13.7	11.5	9.9	8.5	9.0	11.4	13.7	15.0	16.1	17.3	19.7	20.4	20.7	21.0	21.8	21.8	21.4	21.1	21.4	19.8	14.7	14.4	12.1	10.3	16.1	21.8																					
19-May	9.2	8.7	8.1	7.3	6.6	5.9	5.4	4.9	4.6	4.3	3.7	3.3	3.2	2.9	2.7	2.5	2.6	2.8	2.6	2.3	1.8	1.5	1.4	1.4	4.2	9.2																					
20-May	1.5	1.6	1.8	1.9	2.2	2.5	3.0	4.1	5.0	6.3	8.5	10.8	11.4	11.8	12.7	13.7	13.7	13.4	11.7	9.7	8.7	8.3	7.7	6.6	7.4	13.7																					
21-May	6.2	6.1	6.1	6.3	6.2	5.9	5.9	5.9	7.0	8.2	9.1	10.2	10.7	11.0	10.8	10.4	9.3	8.1	7.1	6.2	6.0	5.8	5.9	5.9	7.5	11.0																					
22-May	5.9	5.9	6.0	5.9	5.9	5.9	5.8	6.0	5.7	5.3	5.1	5.3	6.0	6.5	7.9	9.5	11.0	12.2	12.6	12.3	10.4	7.9	6.2	5.0	7.3	12.6																					
23-May	2.5	2.2	0.7	0.0	-0.2	3.6	6.3	8.5	10.8	12.1	13.9	15.6	17.1	18.2	19.6	20.3	20.7	20.7	20.4	19.2	15.4	12.3	8.8	7.5	11.5	20.7																					
24-May	9.6	8.7	8.1	7.2	5.8	7.4	10.4	12.4	15.0	16.5	17.7	18.9	18.5	18.9	19.7	20.2	21.2	20.6	19.2	17.3	15.3	13.1	11.6	10.8	14.3	21.2																					
25-May	9.7	8.4	6.6	5.5	5.8	7.6	10.0	12.5	15.9	18.4	19.8	21.5	21.6	22.1	22.4	20.7	19.7	18.7	17.7	16.8	15.8	14.8	13.7	12.2	14.9	22.4																					
26-May	11.4	10.2	9.2	8.2	7.6	7.4	9.1	10.4	12.0	10.6	8.9	8.0	8.6	10.3	11.8	11.4	10.9	10.4	10.5	9.5	8.6	7.9	7.5	7.0	9.5	12.0																					
27-May	6.7	6.5	6.1	6.4	6.7	8.5	11.0	12.3	12.5	10.6	12.2	15.6	16.8	15.5	13.3	11.4	11.5	12.1	11.9	11.7	11.5	11.3	11.5	11.3	11.0	16.8																					
28-May	11.0	10.8	10.8	10.3	10.1	10.1	10.5	11.6	12.0	12.5	13.9	14.3	12.6	12.4	14.3	14.0	14.3	14.2	14.0	13.7	12.7	11.6	9.5	8.8	12.1	14.3																					
29-May	9.1	8.7	8.0	7.6	7.5	7.7	8.1	8.6	9.4	10.7	12.4	13.6	14.6	16.0	16.9	16.6	16.8	16.5	15.6	14.3	12.4	9.9	7.4	5.8	11.4	16.9																					
30-May	6.4	7.8	8.5	8.4	8.1	7.3	7.2	8.7	10.2	10.6	11.5	12.7	13.1	12.8	13.1	13.7	14.5	13.3	13.9	13.0	12.1	11.5	11.0	10.3	10.8	14.5																					
31-May	9.8	9.1	8.4	7.7	7.1	6.6	7.8	10.2	12.5	13.9	15.0	16.2	16.6	16.9	17.8	18.0	19.0	18.2	18.2	17.8	13.4	9.1	7.0	6.0	12.6	19.0																					
																						6.8	6.2	5.4	4.7	4.6	5.4	7.8	10.4	12.2	13.5	14.7	15.7	16.4	16.9	17.3	17.4	17.4	17.1	16.5	14.9	12.2	10.0	8.6	7.5	Diurnal Average	
																						18.5	15.6	13.5	12.8	13.8	13.7	15.1	19.7	22.8	25.2	27.4	29.4	30.5	30.5	31.1	31.0	31.1	30.3	29.3	23.8	20.2	18.7	16.9	16.6	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Brion MacKay River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Brion MacKay River - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	42	5.65	5.65
0 - 10	279	37.50	43.15
10 - 20	316	42.47	85.62
> 20	107	14.38	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

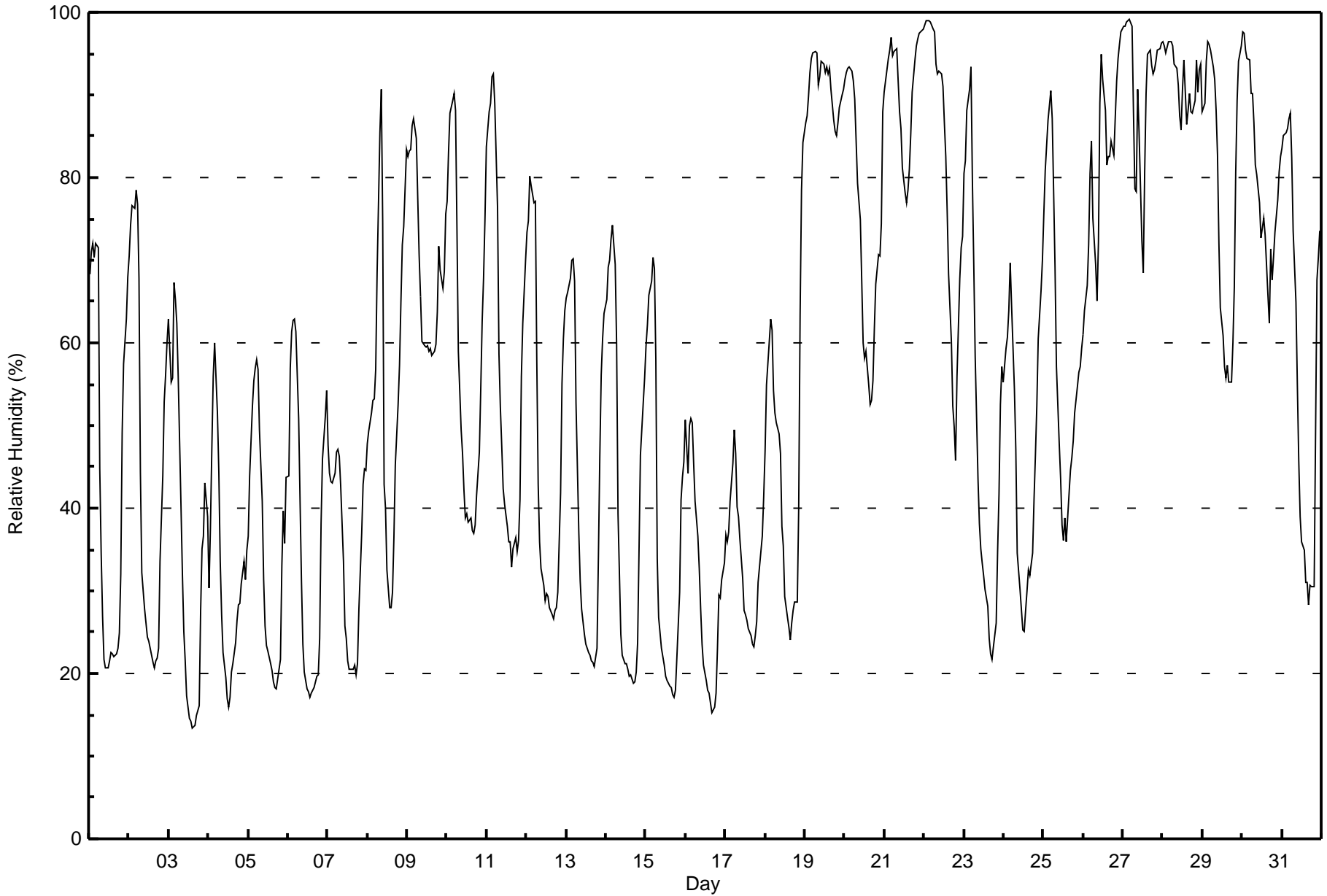


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Brion MacKay River - May 2016**

Maximum Value: 99 % on May 27 05:00																			Maximum Daily Average: 92.1 % on May 28																			Hours in Service: 744						
Minimum Value: 13 % on May 3 15:00																			Minimum Daily Average: 30.9 % on May 16																			Hours of Data: 744						
Maximum Diurnal Average: 77.5 % at hour 5																			Minimum Diurnal Average: 40.6 % at hour 17																			Hours of Missing Data: 0						
Monthly Average: 56.5 %																			Percentiles: P ₁ = 16 P ₁₀ = 22 Q ₁ = 32 Median = 56 Q ₃ = 81 P ₉₀ = 93 P ₉₉ = 99																			Hours of Calibration: 0						
																																						Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-May	68	71	72	70	72	72	45	35	27	22	21	21	21	23	22	22	22	23	25	32	49	57	63	68	42.6	72																		
2-May	71	74	77	76	79	77	68	44	32	28	26	24	24	23	21	21	22	22	23	34	44	53	56	60	44.9	79																		
3-May	63	55	56	67	65	62	56	40	32	25	21	17	15	14	13	14	14	15	16	27	35	37	43	39	35.1	67																		
4-May	30	38	47	56	60	52	44	33	27	23	20	17	16	17	20	21	24	26	28	29	31	34	31	35	31.6	60																		
5-May	37	44	52	55	57	58	57	49	41	31	26	23	23	21	20	19	18	18	19	22	33	40	36	44	35.1	58																		
6-May	44	57	61	63	63	61	51	41	31	24	20	18	18	17	18	18	18	20	20	24	38	46	51	54	36.5	63																		
7-May	48	44	43	43	44	47	47	46	43	33	26	24	21	20	20	20	21	20	21	28	37	43	45	44	34.6	48																		
8-May	48	49	51	53	53	57	69	85	91	75	43	40	32	28	28	30	36	45	53	57	65	72	74	83	54.9	91																		
9-May	83	83	83	86	87	85	78	71	66	60	60	59	60	59	59	59	59	60	64	72	69	67	69	76	69.6	87																		
10-May	77	83	88	89	90	88	74	59	49	47	42	39	39	38	39	37	37	38	41	47	54	63	68	75	58.4	90																		
11-May	84	88	89	92	93	89	76	59	52	48	42	41	38	36	36	33	35	36	35	36	41	56	62	70	56.9	93																		
12-May	73	75	80	79	77	77	58	43	36	33	31	29	30	29	28	27	27	28	28	30	42	55	60	64	47.4	80																		
13-May	65	66	68	70	70	67	53	37	31	28	26	25	24	22	22	22	21	21	23	34	46	56	61	64	42.6	70																		
14-May	65	69	70	73	74	69	60	39	32	25	22	21	21	20	20	20	19	19	20	24	35	46	53	56	40.5	74																		
15-May	60	62	66	67	70	69	58	34	27	23	22	21	20	19	19	18	17	17	18	22	30	41	44	46	37.1	70																		
16-May	51	44	50	51	50	45	41	37	33	28	24	21	19	18	18	16	15	16	18	23	30	29	31	33	30.9	51																		
17-May	37	36	37	41	45	49	47	40	39	36	31	28	27	26	25	25	24	23	25	26	31	35	37	41	33.8	49																		
18-May	47	55	60	63	62	54	52	50	49	47	38	35	29	27	26	24	26	28	29	29	40	63	79	84	45.6	84																		
19-May	87	88	90	93	94	95	95	95	91	92	94	94	93	93	93	93	91	87	86	85	87	88	90	91	91.0	95																		
20-May	92	93	93	93	93	92	89	84	79	75	68	60	58	59	55	53	53	56	62	67	71	70	74	88	74.0	93																		
21-May	90	93	94	95	97	95	95	96	92	88	86	81	78	77	78	81	85	90	94	96	97	97	98	98	90.5	98																		
22-May	98	99	99	99	99	98	98	94	93	93	93	91	87	83	76	68	60	52	50	46	56	68	71	73	80.9	99																		
23-May	80	82	88	91	93	80	69	58	44	38	35	33	32	30	28	24	22	22	23	26	35	42	52	57	49.4	93																		
24-May	55	59	61	64	70	64	54	47	35	32	30	25	25	28	30	32	32	35	41	46	52	60	66	70	46.5	70																		
25-May	76	81	84	87	90	87	78	69	57	48	44	38	36	39	36	42	45	46	48	52	55	56	57	59	58.7	90																		
26-May	61	64	67	72	80	84	75	70	65	72	89	95	92	88	81	82	83	84	83	87	92	94	96	98	81.5	98																		
27-May	98	98	99	99	99	98	88	79	78	91	86	72	68	81	90	95	95	93	93	93	94	95	96	96	90.6	99																		
28-May	96	96	95	96	97	96	96	94	93	91	87	86	91	94	86	88	90	88	88	89	94	90	93	94	92.1	97																		
29-May	88	89	94	96	96	95	93	92	88	83	72	64	61	57	56	57	55	55	60	67	81	89	94	96	78.3	96																		
30-May	98	97	95	94	94	90	90	87	82	80	77	73	74	75	73	66	62	71	68	70	73	77	81	83	80.5	98																		
31-May	84	85	85	86	87	88	82	73	65	55	46	39	36	35	31	31	28	31	30	31	49	68	70	74	57.8	88																		
																			69.5	71.5	74.1	76.2	77.5	75.6	68.9	60.7	54.8	50.7	46.7	43.7	42.2	41.9	40.9	40.6	40.6	41.5	42.9	46.8	54.4	60.9	64.5	68.1	Diurnal Average	
																			98	99	99	99	99	98	98	96	93	93	94	95	93	94	93	95	95	93	94	96	97	97	98	98	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Brion MacKay River - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	43	5.78	5.78
20 - 40	209	28.09	33.87
40 - 60	158	21.24	55.11
60 - 80	141	18.95	74.06
80 - 100	193	25.94	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 22 km/h on May 19 15:00	Maximum Daily Speed Average: 16.9 km/h on May 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 11 22:00	Minimum Daily Speed Average: 1.3 km/h on May 13	Hours of Data: 744
Maximum Diurnal Speed Average: 3.9 km/h at hour 16	Minimum Diurnal Speed Average: 0.0 km/h at hour 3	Hours of Missing Data: 0
Monthly Average Velocity: 1.8 km/h 346.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 13 P ₉₉ = 19	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	SSE3	S3	S5	S6	S5	S6	S6	SSW5	SW6	SW8	WSW11	WSW11	WSW10	W10	W10	W10	WNW10	WNW8	W7	W3	SE1	SSE2	SSE3	SSE3	SW4.5	WSW11	
2-May	SSE3	SSE2	SSE1	SE3	SSE3	SSE2	S3	SE5	SE7	SSE9	SE8	SE7	S5	SW5	SSW5	WNW4	SW2	S4	SSW4	SE2	SE4	SE5	SE5	SSE4	SSE3.5	SSE9	
3-May	SSE5	SSE7	SSE7	SSE5	SSE7	SSE8	SSE8	S7	S7	SSW7	S8	SSW10	S12	S12	SSW11	SSW10	SSW9	SSW8	S7	SSE3	S3	SSW3	S4	WSW5	S6.8	S12	
4-May	WSW6	W5	S2	SSE3	S4	SW4	W2	WSW4	WSW6	W8	W9	W7	W10	W13	WNW16	W16	W17	WNW12	W12	WNW10	W8	W8	W7	W6	W7.4	W17	
5-May	W5	NW10	WNW9	WNW9	W6	W5	W6	WNW7	WNW8	NW10	NW9	WNW12	WNW12	NW16	WNW16	WNW13	NW13	NW14	NW12	NW9	NW4	WNW3	WNW4	WSW2	WNW8.6	NW16	
6-May	NW2	SW2	WSW4	WSW4	W5	W6	W6	W7	WNW11	WNW11	WNW11	WNW11	W10	W11	W10	W9	W8	W8	WSW5	SW4	SSE4	SSE4	SSE5	SSE5	W5.3	WNW11	
7-May	SSE6	SSE6	S8	S9	S10	S9	S9	S8	SSW6	SW7	WSW9	SW7	WSW9	W9	W10	WSW8	SW10	SW10	SSW7	S4	S4	E1	ESE2	NNE4	SSW5.4	W10	
8-May	N4	NNW8	NW4	NW11	WNW15	WNW10	W9	WNW7	SSW5	SW8	WSW12	WSW14	WSW15	WSW14	WSW14	SW15	SW13	WSW13	WSW12	WSW9	WNW11	NW18	NW15	WNW13	W9.3	NW18	
9-May	WNW11	WNW8	WNW8	WNW7	W7	W7	W9	WNW11	WNW12	WNW16	WNW14	NW13	NW14	NW14	NW13	NW11	NW10	NW11	NW8	NW5	WNW5	WNW7	WNW6	W3	WNW9.3	WNW16	
10-May	NW3	SW1	WSW3	SW2	SW2	W3	WSW3	NW4	WNW7	NW9	NW8	NNW9	N8	N8	NE9	NNE9	NNE11	NE11	NE12	NE11	NE7	NE6	NE5	ESE3	N4.1	NE12	
11-May	WNW1	N1	W1	NNW2	NNW2	NNE3	NNE7	NNE10	NNE13	NNE14	NNE14	NNE13	NE13	NNE13	NNE14	N15	NNE14	NNE13	NNE12	NNE11	NNE6	NNE0	SSW1	WSW1	NNE7.7	N15	
12-May	N2	WNW1	NW1	WNW1	WNW1	NNW3	NNE6	NNE8	NNE12	NNE13	NNE14	NNE15	NNE10	NNE13	NE12	NNE11	NNE12	NE10	NE10	NE8	NE3	SSE1	SSW1	SSW1	NNE6.4	NNE15	
13-May	SSE2	SSE2	S2	SSW1	SSE1	SSE1	WNW2	WNW6	WNW7	NW5	W6	NW2	NNW4	NW5	NNE3	NW3	N4	NW3	NNE4	S0	SSE2	SSE2	SSE2	SSE2	WNW1.3	WNW7	
14-May	SSE2	S1	SSE2	SSE3	S1	SSE1	W0	WNW4	W3	NW8	NNW9	NW8	NNW6	NNW10	NNW9	N6	NNW7	NNE6	NE2	NE6	ESE2	SE2	SSE2	SSE3	NNW2.3	NNW10	
15-May	SSE3	SSE3	SSE3	SSE2	SSE3	SSE1	WSW1	SSW1	SSW4	NW2	NW4	SW4	N6	ENE1	N4	S3	SSW5	S5	S5	SSE4	SE5	SE5	SE5	SE5	SSE1.8	N6	
16-May	S5	S6	S6	S6	S7	S8	S8	SSW8	SSW8	SSW8	SSW11	SSW12	SSW13	S14	SSW15	SSW14	SSW12	S11	S9	SSE3	SE5	SSE6	S5	S7	S8.3	SSW15	
17-May	S7	S7	S8	SSW6	SW8	SW8	WSW9	W11	W10	W11	W11	W11	W11	WNW11	WNW11	WNW8	WNW8	WNW6	W5	SW8	SW6	SSW7	SSW7	SSW6	WSW6.7	WNW11	
18-May	SSW5	SSW5	SSW5	SSW5	SSW5	SSW5	SW6	WSW8	WSW10	WSW10	W11	W12	WSW12	WSW12	W12	W11	W9	W7	WNW8	NW5	ESE1	NNE10	NNE15	NNE14	W4.9	NNE15	
19-May	NNE14	NNE15	NNE14	NNE13	NNE12	NNE15	NNE16	NNE18	NNE16	NNE18	NNE17	NNE19	NNE18	NNE19	NNE22	NNE20	NNE19	NNE19	NNE19	NNE17	NNE17	NNE18	NNE16	NNE17	NNE16.9	NNE22	
20-May	NNE16	NNE15	NNE13	NNE12	NE11	NE11	NE12	NE12	NE12	NE12	NE13	NE13	NE14	NE14	NE12	NE12	NE10	NE9	NNE9	NE10	NNE10	NNE7	N6	NNW5	NW6	NE10.7	NNE16
21-May	NNW6	NNW3	NW1	W2	NNW6	NNE6	NNE7	NNE8	N8	N9	N9	N11	NNE8	NNE8	NNE9	NNE10	N10	NNE10	NNE10	NNE11	NNE10	N10	N11	NNE12	NNE7.8	NNE12	
22-May	NNE11	NNE11	NNE11	NNE13	NNE14	NNE13	NNE12	NNE14	NNE17	NNE15	NNE15	NNE16	NNE17	NNE16	NNE16	NNE15	NNE16	NNE18	NNE16	NNE15	NNE10	N7	N7	N6	NNE13.2	NNE18	
23-May	NE4	NE4	NNE3	NNE4	NNE5	NE7	NNE11	NNE11	NE10	NNE11	NE12	NE11	NNE12	NNE14	NNE12	NNE13	NNE12	NE10	NE10	ENE6	SE4	SE5	SSE4	SSE5	NE7.1	NNE14	
24-May	S8	S7	S6	S5	S5	S5	S6	S7	S7	SSE8	SE9	SSE11	SSE10	SE10	SSE10	S9	SSW11	SSW10	SSW13	SSW12	SSW9	S6	SSW6	S5	S7.5	SSW13	
25-May	S6	S5	SSE4	SSE5	S6	S6	SSW8	SW5	NE1	E2	E3	ENE5	NE5	NE7	NE8	NNE12	NNE13	NNE12	NE12	NE9	NE9	NE9	NE11	NE11	NE3.9	NNE13	
26-May	NNE10	N9	N9	NNW8	NNE7	NNE10	NE9	NE8	NNE8	NNE9	NNE7	NNW6	N8	N9	NNE11	NNE11	NNE10	NNE10	NNE10	NNE10	NNE8	NE8	NE8	NNE7	NNE8.5	NNE11	
27-May	NNE7	NE7	NE6	NE5	NNE4	E5	ESE9	ESE11	ESE11	ESE9	ESE11	ESE11	ESE9	E5	ESE7	SE5	ESE7	ESE9	ESE12	SE9	SE10	SE11	SE9	SE6	ESE7.1	ESE12	
28-May	ESE8	ESE10	ESE10	ESE8	ESE6	ESE7	ESE8	SE10	SE9	SE9	SE9	ESE9	S7	SSE7	SSE9	SSE8	SE6	SE8	SSE8	S5	SSW3	WSW3	WSW3	WSW3	SE6.2	SE10	
29-May	W4	W3	SSE1	S3	SSW2	W2	W3	WNW3	NW5	W3	NW4	N5	NNE5	NE6	NE7	NE10	NE10	NNE10	NNE10	NE9	NE4	NE1	SSE0	NNW2	NNE2.9	NE10	
30-May	N2	NNW3	WNW4	NW4	WNW4	NW8	NW9	NW11	NW12	NW9	NW9	NNE9	NE10	N10	N10	NNW10	NNW13	NNE10	N8	N7	N4	NNW6	NW6	NW6	NNW6.9	NNW13	
31-May	NW5	WNW6	WNW6	WNW6	WNW5	WNW5	WNW7	NW7	NNW7	NNW6	NW4	NNW6	NNW6	NNW5	W5	W3	WSW4	WSW3	SW3	S5	SSE2	SSE3	SSE4	S5	WNW3.0	WNW7	

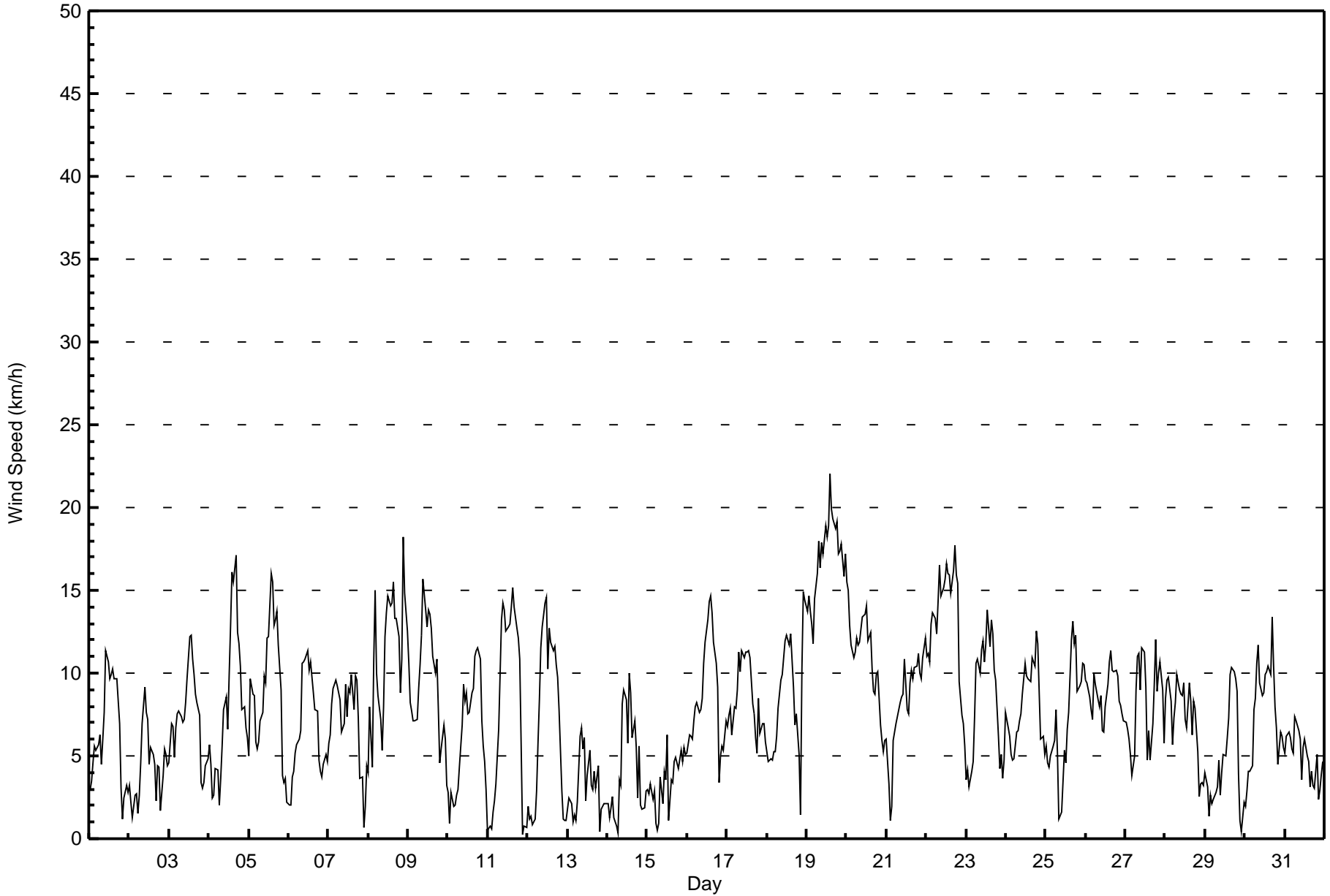
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NNE16 NNE15 NNE14 NNE13 WNW15 NNE15 NNE16 NNE18 NNE17 NNE18 NNE17 NNE19 NNE18 NNE19 NNE22 NNE20 NNE19 NNE19 NNE19 NNE17 NNE17 NW18 NNE16 NNE17	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Brion MacKay River - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Brion MacKay River - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	246	33.06	33.06
6 - 11	361	48.52	81.59
12 - 19	135	18.15	99.73
20 - 28	2	0.27	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Brion MacKay River - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	10	10	2	5	4	15	51	30	20	10	16	20	16	20	9	246
6 - 11	22	55	36	1	0	18	16	17	37	21	12	13	40	34	22	17	361
12 - 19	1	69	14	0	0	1	0	0	3	7	2	9	6	11	11	1	135
20 - 28	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	136	60	3	5	23	31	68	70	48	24	38	66	61	53	27	744

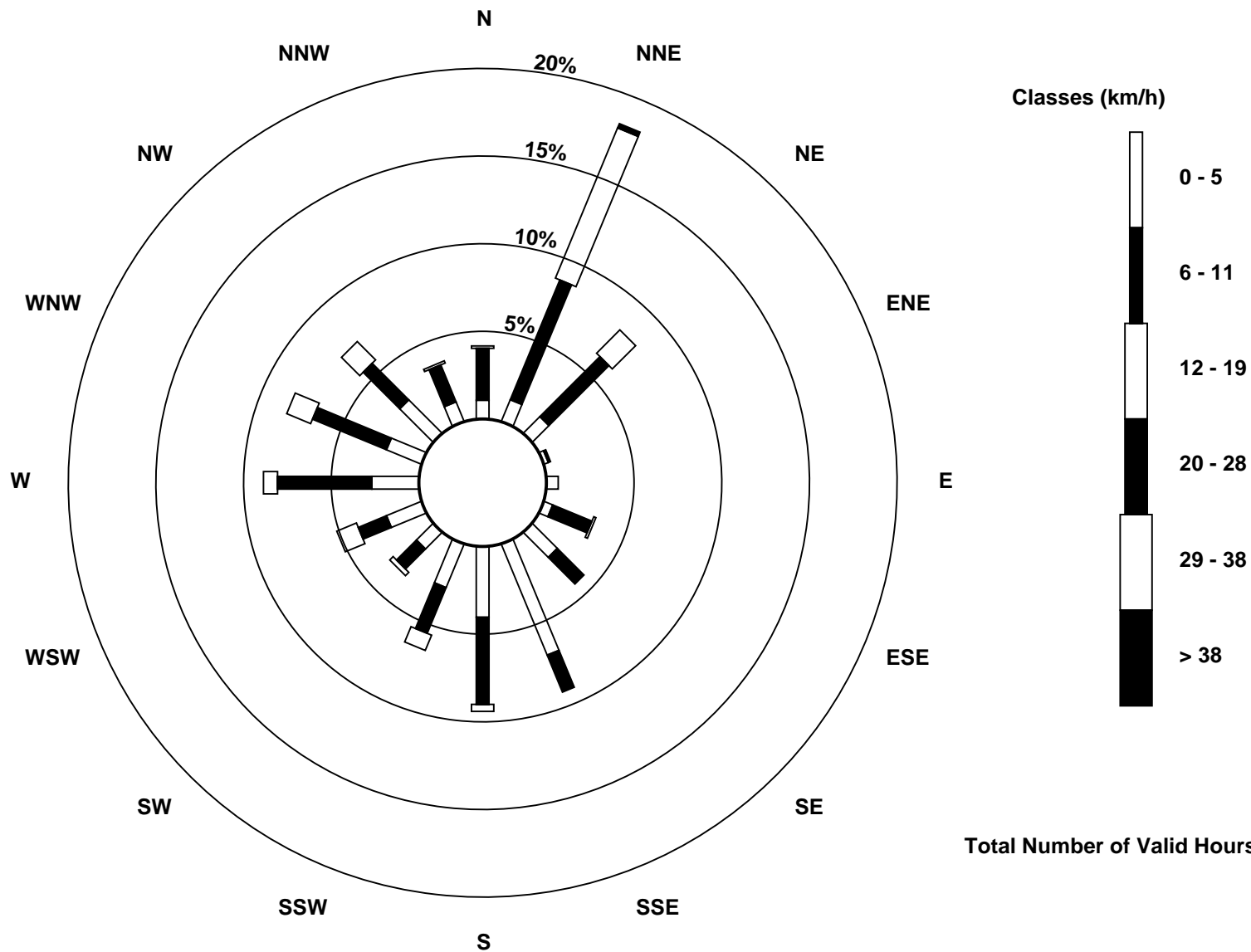
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Brion MacKay River (AMS 20)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Brion MacKay River - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on May 19 14:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 0 km/h on May 13 21:00																									
Percentiles: P ₁ = 0 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-May	1	1	1	1	1	1	2	2	2	3	4	5	4	4	4	5	4	3	3	2	1	1	1	1	5
2-May	1	1	1	0	0	1	2	1	2	3	4	3	3	3	3	3	3	3	2	3	1	1	1	1	4
3-May	1	1	1	1	1	2	2	2	2	3	3	4	4	5	5	4	4	3	3	1	2	1	1	2	5
4-May	2	1	1	1	2	2	1	2	2	3	3	3	5	7	7	6	7	5	6	4	3	3	3	2	7
5-May	2	3	2	2	2	2	2	2	3	3	4	5	5	5	6	5	5	5	4	3	1	1	2	1	6
6-May	2	1	1	1	2	2	2	2	4	4	5	4	4	5	4	4	4	4	3	2	1	1	1	1	5
7-May	1	2	2	2	3	3	2	2	2	3	4	3	5	4	5	3	4	4	3	1	1	2	2	3	5
8-May	1	3	2	7	6	4	4	4	2	4	5	6	6	6	6	6	5	6	5	4	6	6	5	4	7
9-May	4	3	3	2	3	3	4	4	4	5	5	4	4	5	4	3	4	3	3	2	2	2	2	1	5
10-May	2	1	1	1	1	1	1	2	3	4	3	3	3	4	3	4	4	4	4	4	3	2	1	1	4
11-May	1	1	1	1	1	1	3	4	4	5	5	5	5	5	5	5	5	5	4	4	2	1	1	1	5
12-May	1	1	1	1	1	1	3	3	4	4	5	5	4	5	5	5	5	5	4	3	2	1	1	1	5
13-May	1	1	1	1	1	1	1	2	3	3	3	3	4	4	3	3	3	4	2	1	0	1	0	0	4
14-May	0	1	1	0	1	1	1	1	2	3	4	4	5	4	4	3	3	4	2	2	1	1	1	1	5
15-May	1	1	1	0	0	1	1	2	2	2	3	3	3	2	3	3	3	3	2	2	1	1	1	1	3
16-May	1	1	2	1	2	2	3	3	3	3	4	5	5	5	5	5	5	4	4	1	1	2	2	1	5
17-May	1	2	2	2	3	2	3	5	4	4	5	5	4	4	4	4	4	3	2	4	2	2	2	2	5
18-May	1	1	1	1	1	1	2	3	4	4	5	4	5	5	5	4	4	2	3	2	2	4	5	5	5
19-May	5	5	5	5	4	5	6	6	6	6	6	7	7	8	7	7	6	6	7	6	6	6	5	6	8
20-May	6	5	5	4	4	4	4	4	4	5	5	5	5	4	4	4	3	3	3	3	3	2	2	2	6
21-May	2	1	1	1	3	2	2	3	2	3	3	3	2	3	3	3	3	4	3	4	3	3	3	4	4
22-May	4	4	4	4	4	4	4	5	5	5	5	5	6	5	5	5	5	6	6	5	4	2	2	2	6
23-May	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	4	5	4	3	3	1	1	1	2	5
24-May	3	2	2	1	1	2	2	2	3	3	3	5	3	3	3	4	4	3	4	4	3	2	2	1	5
25-May	1	1	1	1	1	2	2	2	1	2	3	2	3	3	3	3	4	4	4	4	3	3	3	3	4
26-May	3	3	3	2	4	4	3	3	3	3	3	2	3	3	3	4	3	3	3	3	3	3	3	2	4
27-May	2	2	2	2	1	4	3	3	4	3	4	4	3	2	5	2	2	4	4	2	3	5	3	2	5
28-May	2	3	3	2	2	2	2	3	3	3	3	3	3	3	3	3	2	3	3	2	1	1	1	1	3
29-May	1	1	1	2	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	2	1	1	1	3
30-May	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	4	5	2	2	1	2	1	1	5
31-May	1	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	2	2	2	1	0	1	1	3
Diurnal Maximum																									
6 5 5 7 6 5 6 6 6 6 6 7 7 8 7 7 7 6 7 6 6 6 6 5 6																									



Wood Buffalo Environmental Association
Summary of Hour Averages

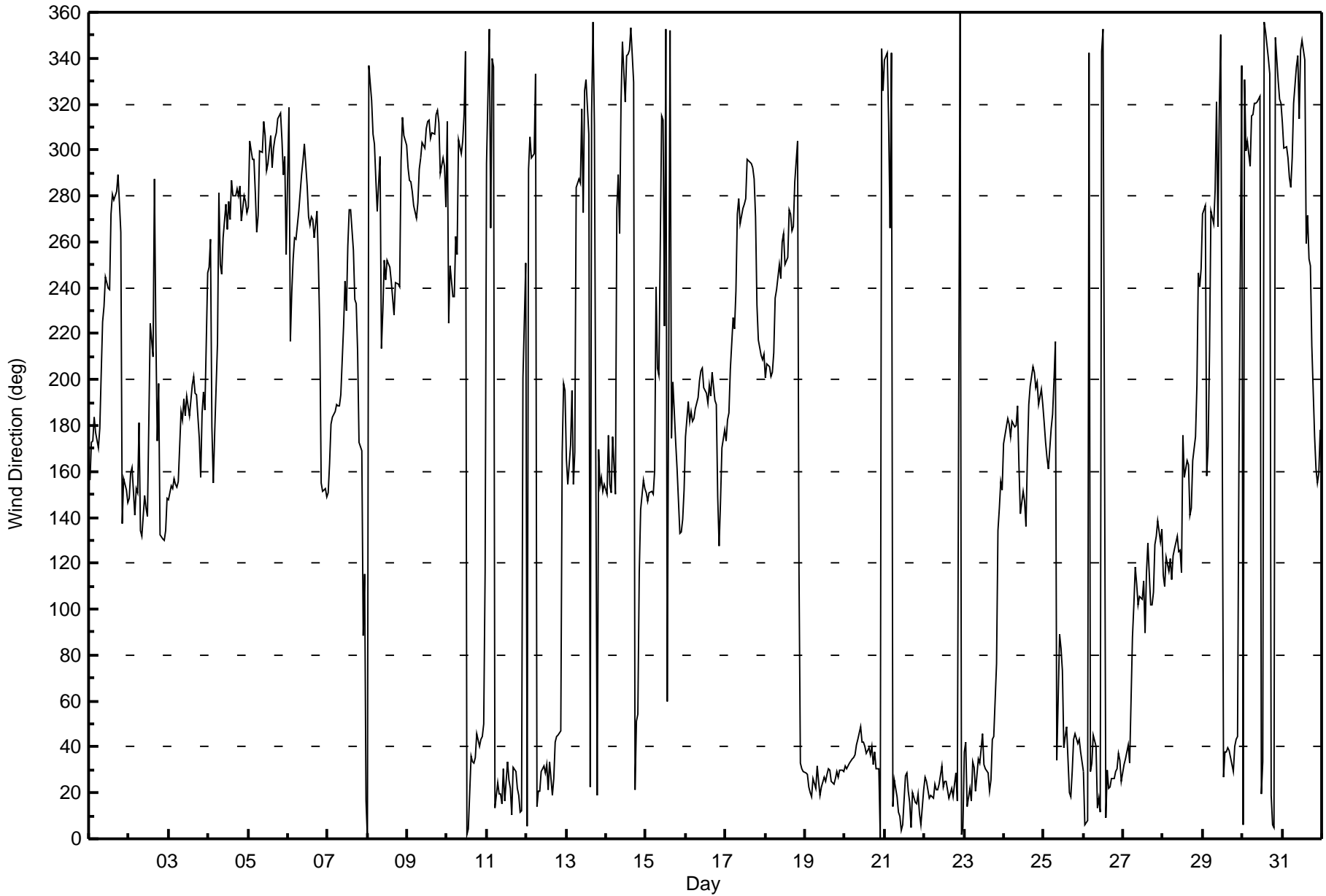
Wind Direction (WD) - deg
Brion MacKay River - May 2016

Direction of Maximum Speed: 31 deg on May 19 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 26.3 deg on May 19	Hours of Data: 744
Direction of Minimum Speed: 12 deg on May 11 22:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.3 deg on May 13	Percent Operational Time: 100.0
Monthly Average Direction: 263.3 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-May	156	173	173	184	177	170	179	203	225	232	245	240	239	272	281	278	282	289	277	264	137	157	152	147	235.3
2-May	148	159	162	141	153	151	181	134	132	150	144	141	182	224	210	287	220	173	198	133	130	130	134	149	159.2
3-May	148	153	153	157	154	153	156	186	183	192	184	193	185	191	198	201	194	193	174	157	186	195	187	246	181.2
4-May	249	261	180	155	177	216	281	250	246	262	276	266	278	270	287	280	280	283	280	284	269	280	278	273	270.8
5-May	275	304	296	296	281	264	272	300	299	312	306	291	294	307	292	301	305	307	314	316	304	289	297	254	298.7
6-May	318	217	238	253	262	261	274	281	289	296	303	284	271	267	271	270	262	274	252	221	155	152	152	149	266.5
7-May	151	164	181	183	186	189	189	188	193	223	243	230	258	274	274	257	235	233	212	173	169	89	115	16	213.4
8-May	0	337	322	307	303	287	274	297	213	230	252	243	252	249	243	235	228	242	242	241	295	314	306	302	269.8
9-May	292	286	286	282	276	271	277	292	297	303	301	309	313	313	305	307	307	315	317	312	290	297	293	275	299.0
10-May	312	224	250	236	236	263	255	304	298	304	316	343	2	4	36	33	33	35	46	40	43	45	50	117	8.1
11-May	294	353	266	340	336	13	24	20	19	15	30	16	34	25	22	10	31	29	22	19	12	12	200	251	20.7
12-May	5	292	306	296	299	333	14	21	21	29	32	29	32	22	34	19	27	42	45	45	47	168	198	195	27.2
13-May	166	155	171	196	154	168	283	288	286	318	273	326	331	307	23	315	356	311	19	170	154	157	151	154	298.9
14-May	150	176	154	151	175	150	275	289	264	321	347	321	341	341	344	353	329	21	51	54	116	143	156	153	345.1
15-May	150	147	151	152	150	160	241	205	202	315	313	224	353	60	352	175	199	186	173	161	133	134	139	152	165.3
16-May	175	190	182	186	182	183	187	192	199	204	205	196	194	190	198	193	203	191	189	149	128	147	170	178	188.7
17-May	174	183	185	204	227	222	239	272	279	268	275	276	279	296	295	294	292	287	271	233	217	211	209	211	252.7
18-May	201	207	205	201	203	212	235	239	250	244	260	264	250	253	274	272	265	266	286	304	118	33	31	29	262.8
19-May	28	28	23	20	18	26	22	32	25	19	23	27	25	28	31	30	25	24	26	29	27	30	30	29	26.3
20-May	32	31	32	33	35	35	36	41	43	49	42	42	40	37	40	37	40	32	38	31	31	1	344	326	34.2
21-May	339	343	312	266	342	14	26	18	11	10	4	6	28	29	21	16	5	20	16	15	19	11	6	21	11.8
22-May	27	25	22	18	19	18	24	21	22	24	31	22	25	25	21	18	22	19	24	28	16	360	2	5	21.2
23-May	38	42	14	22	17	34	31	21	35	33	39	46	32	30	29	21	26	43	44	76	134	144	156	152	38.7
24-May	172	180	183	181	175	182	180	180	189	162	142	151	147	136	166	189	197	206	203	196	199	189	196	189	179.0
25-May	181	172	166	161	179	185	199	217	34	89	83	74	39	44	49	20	18	29	43	46	42	43	38	34	54.1
26-May	29	6	8	342	29	33	45	40	13	18	12	343	353	9	30	22	22	26	26	29	30	37	34	25	21.2
27-May	33	35	38	41	33	88	102	118	111	102	105	104	112	90	116	129	102	102	108	128	132	139	129	135	104.2
28-May	114	110	123	117	122	113	123	126	132	125	125	116	176	157	165	163	141	144	165	175	198	246	241	249	139.2
29-May	272	276	158	171	212	273	268	282	321	267	319	350	27	38	38	39	38	33	29	40	43	45	166	337	14.4
30-May	6	331	300	304	293	315	315	320	320	321	323	19	34	356	352	340	333	19	6	5	349	330	322	321	339.2
31-May	312	301	301	297	288	284	297	320	336	341	314	344	348	339	259	271	252	250	215	175	161	155	159	178	294.9

36.3 11.6 203.0 288.0 274.4 309.3 324.6 334.6 333.1 333.3 339.3 337.5 336.0 336.7 333.7 337.3 354.9 9.7 28.0 46.5 27.2 28.1 17.7
 Diurnal Average

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Brion MacKay River - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on May 13 16:00 Minimum Value: 5 deg on May 14 01:00 Percentiles: P ₁ = 10 P ₁₀ = 19 Q ₁ = 24 Median = 29 Q ₃ = 40 P ₉₀ = 55 P ₉₉ = 91		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	13	20	20	17	17	14	21	41	42	43	41	47	52	46	44	47	42	37	38	41	40	13	7	15	52
2-May	11	14	53	13	17	48	36	23	29	30	53	47	84	68	71	72	88	55	29	65	14	10	11	12	88
3-May	13	12	11	10	10	15	19	29	29	40	37	37	34	33	43	35	43	36	26	20	37	32	26	36	43
4-May	35	31	54	31	26	39	56	52	46	42	41	58	44	44	35	38	36	35	37	35	38	34	36	34	58
5-May	38	20	19	20	31	44	41	30	28	29	35	39	39	27	34	31	27	23	22	19	24	36	55	51	55
6-May	74	29	19	25	32	38	41	38	32	41	37	41	46	47	50	49	48	42	52	43	12	7	11	15	74
7-May	16	20	20	21	23	21	23	23	26	38	38	44	48	51	43	45	39	40	33	14	13	72	80	53	80
8-May	36	29	39	26	25	33	40	31	29	40	44	43	46	41	44	38	36	42	40	40	40	22	22	23	46
9-May	28	31	31	30	34	41	42	35	28	28	30	27	25	23	26	29	24	24	22	29	26	22	20	29	42
10-May	48	50	31	30	36	42	54	59	45	41	44	35	40	49	39	36	33	29	28	24	23	21	28	28	59
11-May	69	56	49	22	19	22	24	29	29	31	32	40	32	35	35	28	33	32	32	27	23	77	61	69	77
12-May	24	35	16	30	14	18	27	30	30	31	33	32	44	34	38	42	39	35	31	27	22	25	47	55	55
13-May	34	10	40	63	28	58	47	37	46	67	65	97	85	70	92	103	75	81	32	90	13	11	17	12	103
14-May	5	26	21	8	35	72	89	43	69	42	40	54	84	38	47	52	42	65	90	27	53	20	44	12	90
15-May	7	18	8	12	6	65	74	80	59	89	93	70	57	97	88	83	77	60	62	36	14	10	14	20	97
16-May	15	17	14	17	17	24	27	28	33	35	37	39	39	35	33	36	39	33	29	26	14	21	22	16	39
17-May	15	18	23	23	30	28	36	41	39	41	45	45	44	37	36	47	50	49	46	38	26	22	23	23	50
18-May	20	18	18	19	19	22	33	37	48	40	44	43	41	43	42	42	47	43	38	38	51	23	25	27	51
19-May	27	25	27	26	28	24	24	26	27	26	26	24	25	25	24	27	25	25	25	26	25	25	25	22	28
20-May	26	25	25	27	27	25	25	26	28	28	28	29	26	28	27	26	29	28	25	26	35	29	26	19	35
21-May	23	26	80	64	18	31	24	25	29	29	32	28	27	29	24	26	27	26	25	25	27	27	25	27	80
22-May	25	24	25	25	24	25	26	25	26	26	26	25	25	25	26	27	26	27	27	26	26	22	21	24	27
23-May	30	29	20	29	24	24	24	25	33	33	30	41	39	33	37	33	33	36	30	38	14	16	21	21	41
24-May	28	24	25	21	21	26	28	36	41	50	43	45	31	27	36	39	36	33	27	25	23	24	23	20	50
25-May	18	17	13	13	15	20	25	40	91	99	81	62	66	59	42	26	26	25	25	27	27	25	25	25	99
26-May	27	26	24	26	38	26	29	35	40	28	42	37	28	29	28	27	27	27	25	23	22	26	26	22	42
27-May	22	23	25	22	23	43	29	21	23	27	28	28	28	36	50	50	25	30	24	20	22	24	21	25	50
28-May	17	21	20	19	25	18	20	22	24	22	22	23	35	33	28	29	24	26	26	22	31	34	26	27	35
29-May	35	32	63	42	29	55	60	49	28	63	65	53	63	69	50	33	35	30	32	28	31	44	78	26	78
30-May	31	20	22	24	27	22	20	22	22	24	29	32	30	29	29	30	28	29	27	25	22	19	18	17	32
31-May	20	21	21	23	28	37	27	32	47	58	76	79	64	72	71	80	69	59	60	29	25	11	13	14	80
	74	56	80	64	38	72	89	80	91	99	93	97	85	97	92	103	88	81	90	90	53	77	80	69	
	Diurnal Maximum																								



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 24, 2016	Last Calibration	April 4, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	13:10
Gas Cert Reference	EY0000372	Station temp.	22 Deg C
Cal Gas Concentration	50.7 ppm	Cal Gas Exp Date	10-Jun-16
Calibrator Make/Model	API T700	Serial Number	1220
ZAG Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9627

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-633
Analyzer IP address	192.168.1.43		Lamp voltage	836	833
Calculated slope	0.995691	0.988129	Chamber temp	45	45.1
Calculated intercept	1.531712	0.510167	Pressure	667.5	665.0
Analyzer Background	12.5	12.4	Flow	0.485	0.482
Analyzer Coefficient	0.987	0.987	Intensity	88	88

Analyzer make Thermo 43i Analyzer serial # 1501301450

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	79.8	809.2	818.3	0.989
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	79.8	809.2	818.3	0.989
second point	5000	40.1	406.6	411.8	0.987
third point	5000	20.1	203.8	204.6	0.996
as left zero	5000	0.0	0.0	0.7	----
as left span	5000	79.8	809.2	827.9	0.977
Average Correction Factor					0.991

Corrected As found 818.3 Previous response 811.1 % change -0.9%

Notes:

Remote calibration. No adjustments made.

Calibration Performed By: Devin Russell



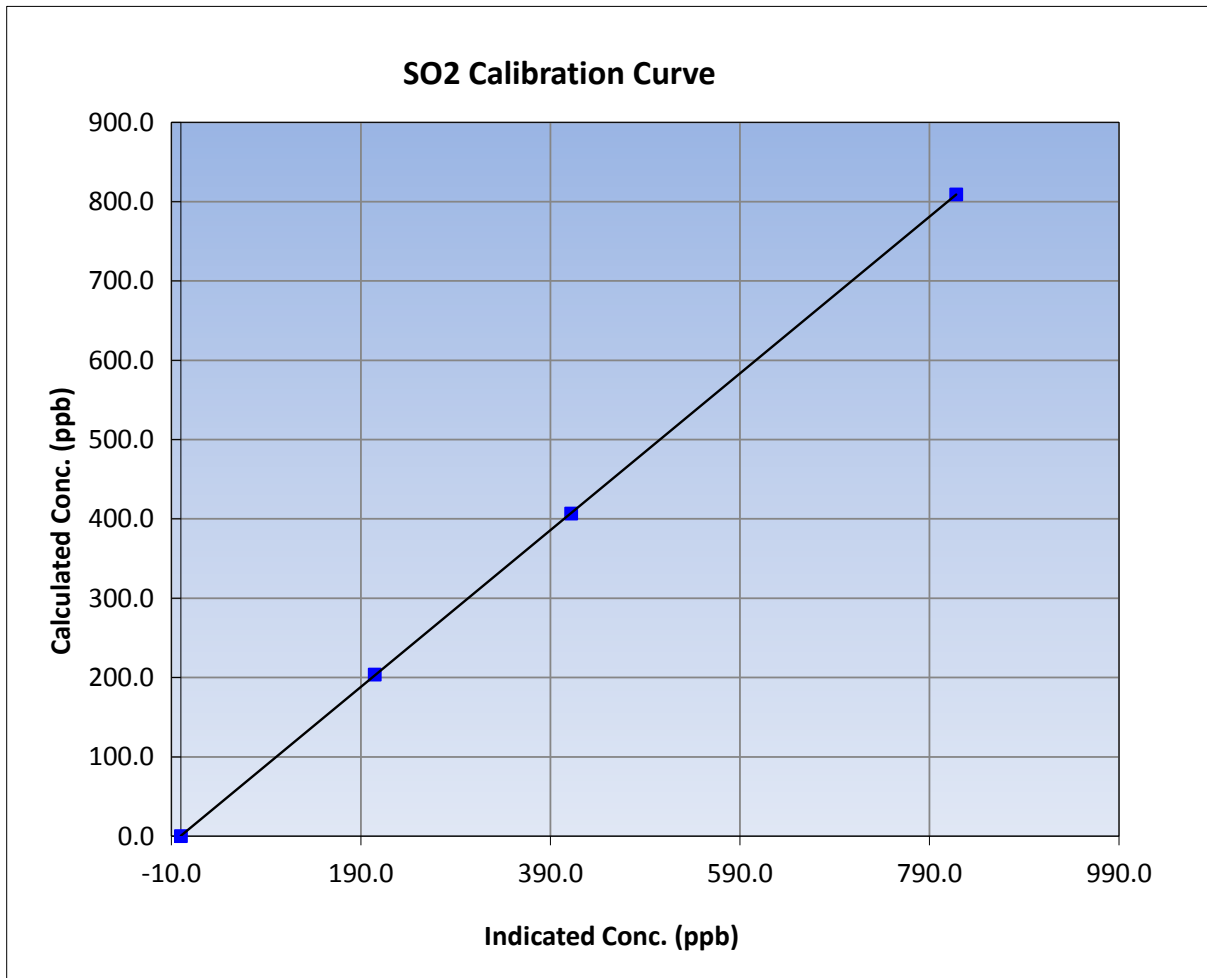
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 24, 2016	Previous Calibration	April 4, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	8:50	End Time (MST)	13:10
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

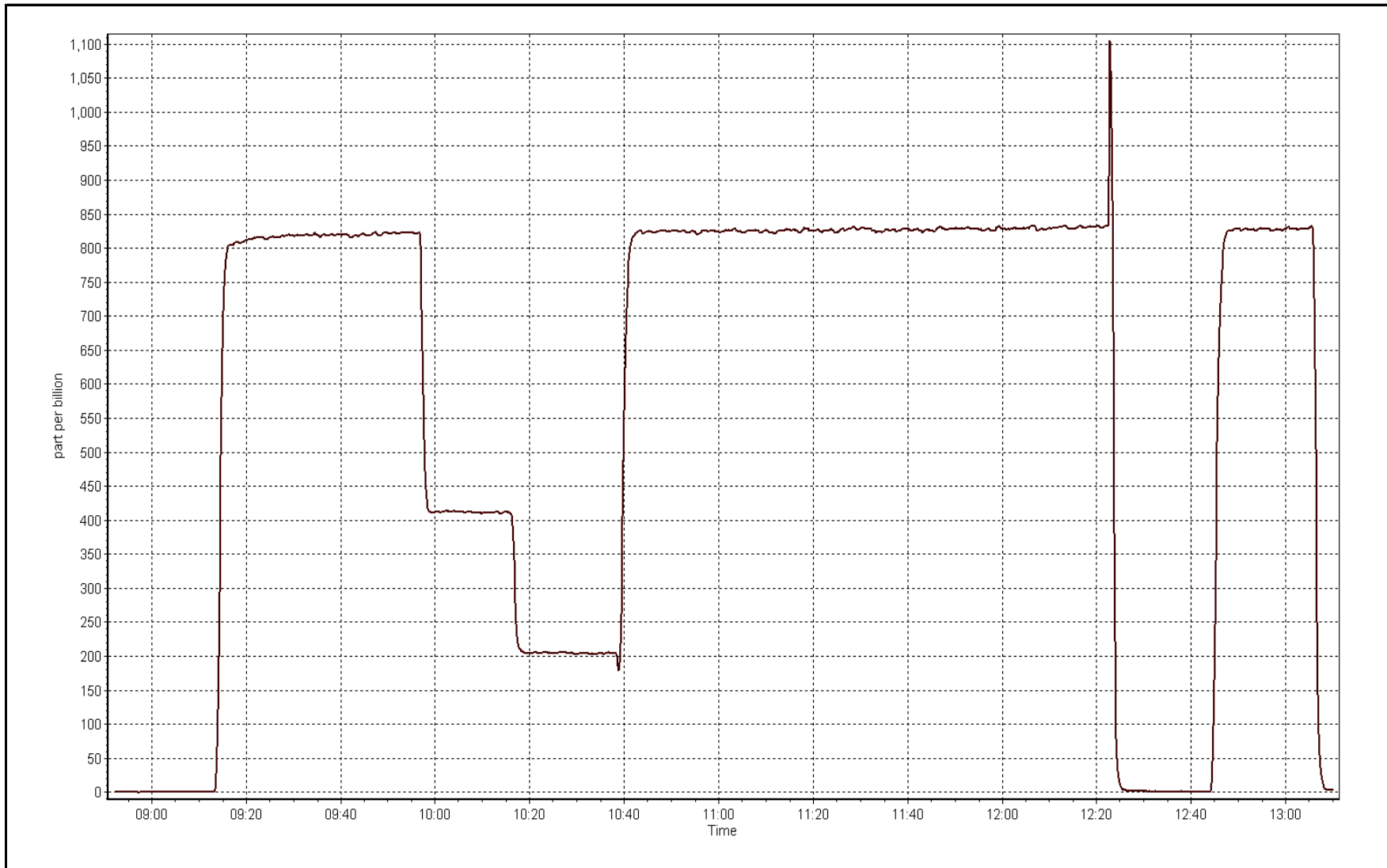
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999994
809.2	818.3	0.9889		
406.6	411.8	0.9874	Slope	0.988129
203.8	204.6	0.9962		
			Intercept	0.510167



SO2 Calibration Plot

Date: May 24, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 24, 2016	Last Calibration	April 12, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	13:05	End Time (MST)	16:25
Gas Cert Reference	LL119508	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	API 700	Serial Number	1220
ZAG air Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627
SO2 gas concentration	50.7 ppm	SO2 gas cert/exp	EY0000372 10-Jun-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	504	504
Analyzer IP address	192.168.1.75		Lamp voltage	3133	3133
Calculated slope	0.993329	1.001472	Chamber temp	50	50
Calculated intercept	0.168154	0.427275	Pressure	23.1	23.0
Analyzer Background	25.2	25.2	Flow	0.613	0.608
Analyzer Coefficient	1.072	1.072	Intensity	77	74
			Converter temp.	317	317

Analyzer make/model	API T101	Analyzer serial #	196
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	75.6	80.9	80.6	1.004
SO2 scrubber check	5000	19.8	200.8	3.9	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	75.6	80.9	80.6	1.004
second point	5000	37.9	40.6	39.6	1.024
third point	5000	19.0	20.3	19.9	1.024
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	75.6	80.9	74.3	1.088
Average Correction Factor					1.017

Corrected As found	80.8	Previous response	81.3	% change	0.6%
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Notes:

Remote calibration. No adjustments made. As left span was slow to stabilize and under target by 8.8%. No changes diagnostically.

Calibration Performed By: Devin Russell



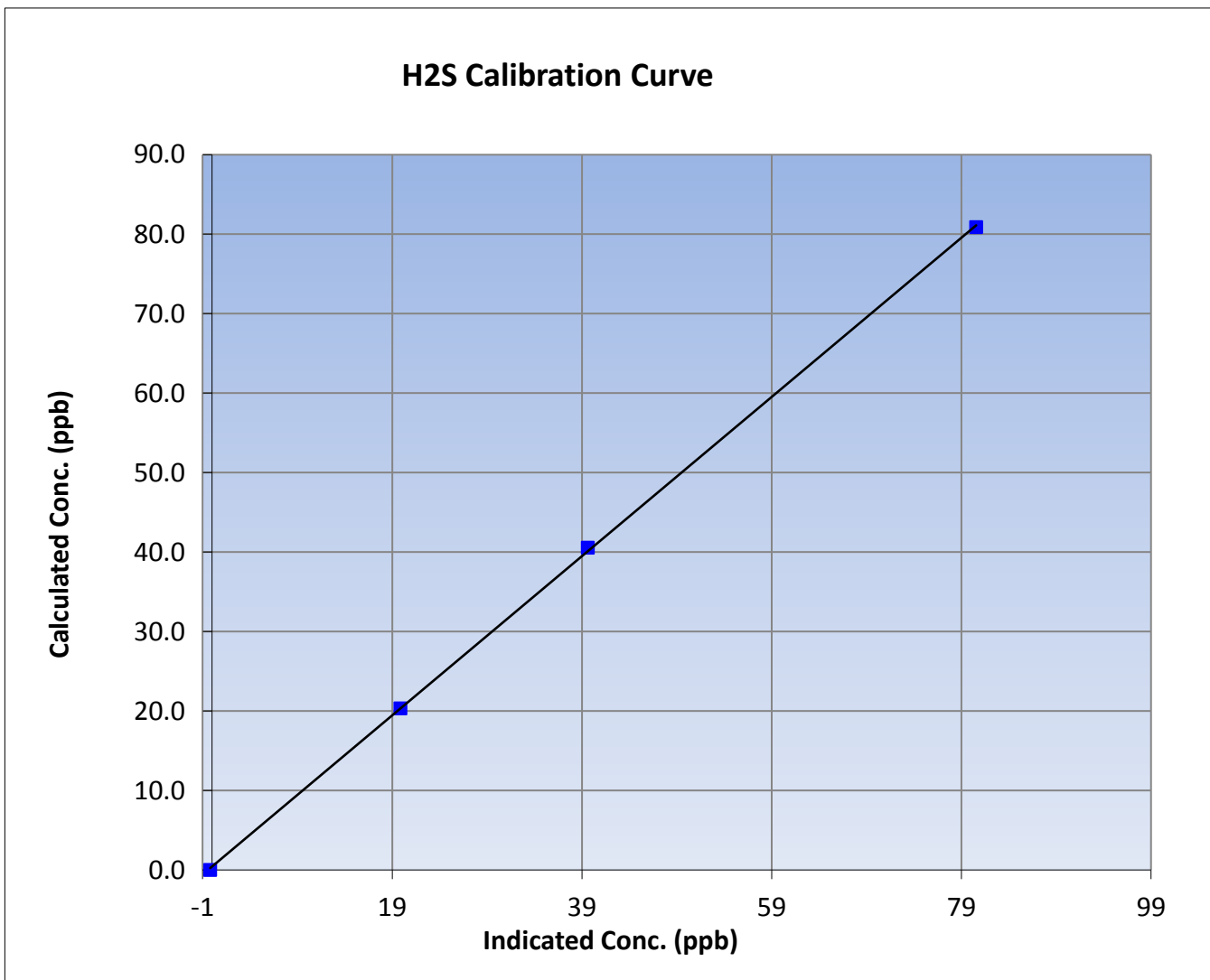
Wood Buffalo Environmental Association H2S Calibration Report

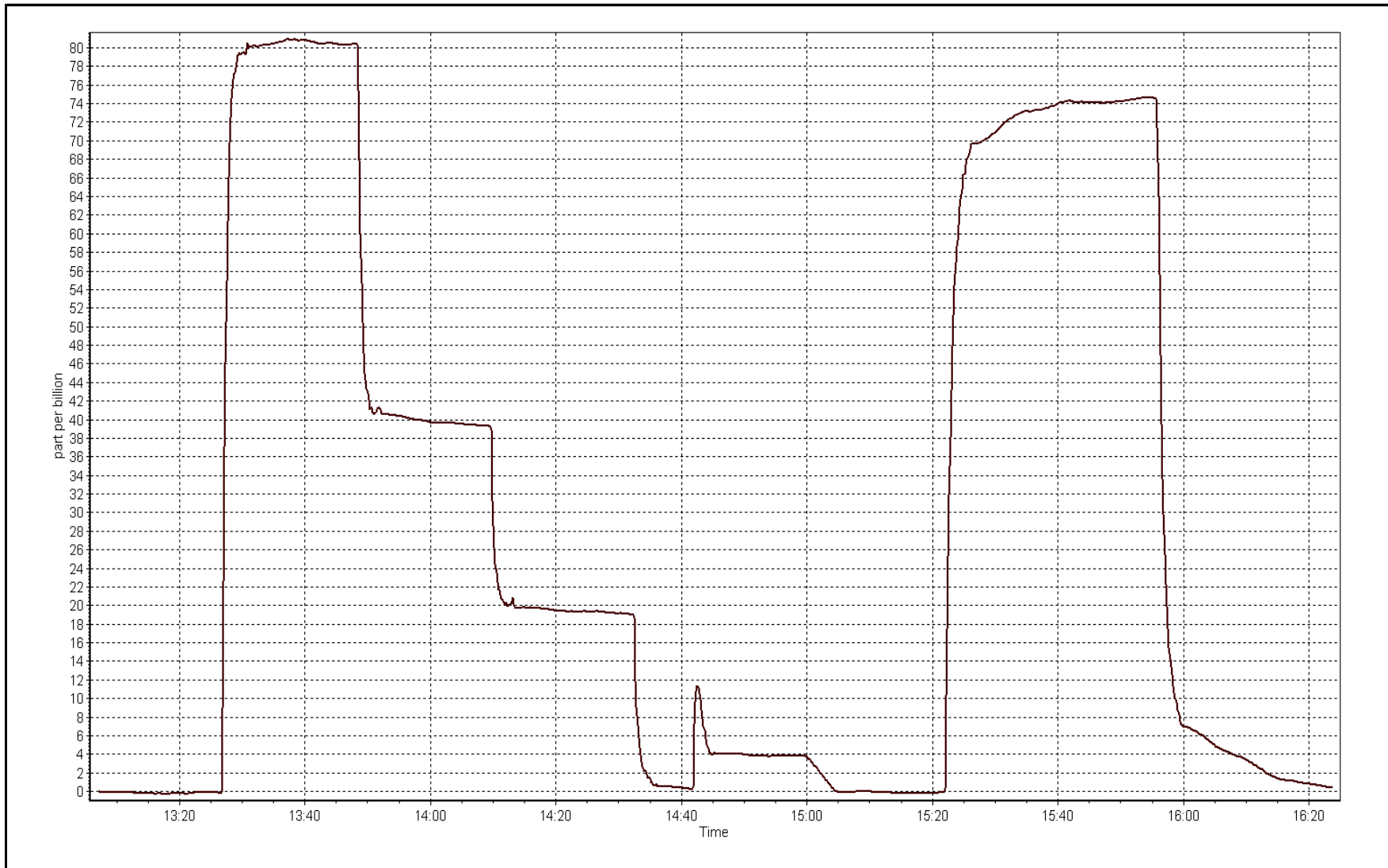
Station Information

Calibration Date	May 24, 2016	Previous Calibration	April 12, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	13:05	End Time (MST)	16:25
Analyzer make	API T101	Analyzer serial #	196

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999914
80.9	80.6	1.0040		
40.6	39.6	1.0235	Slope	1.001472
20.3	19.9	1.0237		
			Intercept	0.427275







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-24-16	Last Calibration	April-04-16
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:10
Gas Cert Reference	EY0000372	Cal Gas Expiry Date	10/06/2016
CH4 Cal Gas Conc.	517 ppm	CH4 Equiv Conc.	1072.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
ZAG make/model	Teledyne API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.3	34.3
Calculated slope	0.998798	0.984789	Fuel Pressure	23.9	23.9
Calculated intercept	0.021506	0.143742	Analyzer Coeff	4.5	4.5
			Analyzer BKG	2.100	2.100

Analyzer make	51i-LT	Analyzer serial #	1501663727
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.10	----
as found span	5000	79.8	17.12	17.27	0.991
calibrator zero	5000	0.0	0.00	-0.10	----
high point	5000	79.8	17.12	17.27	0.991
second point	5000	40.1	8.60	8.53	1.008
third point	5000	20.1	4.31	4.21	1.024
as left zero	5000	0.0	0.00	-0.13	----
as left span	5000	79.9	17.14	17.20	0.996
Average Correction Factor					1.008

Corrected As found	17.37	Previous response	17.12	% change	-1.5%
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Notes:

Remote calibration. No adjustments made.

Calibration Performed By:

Devin Russell



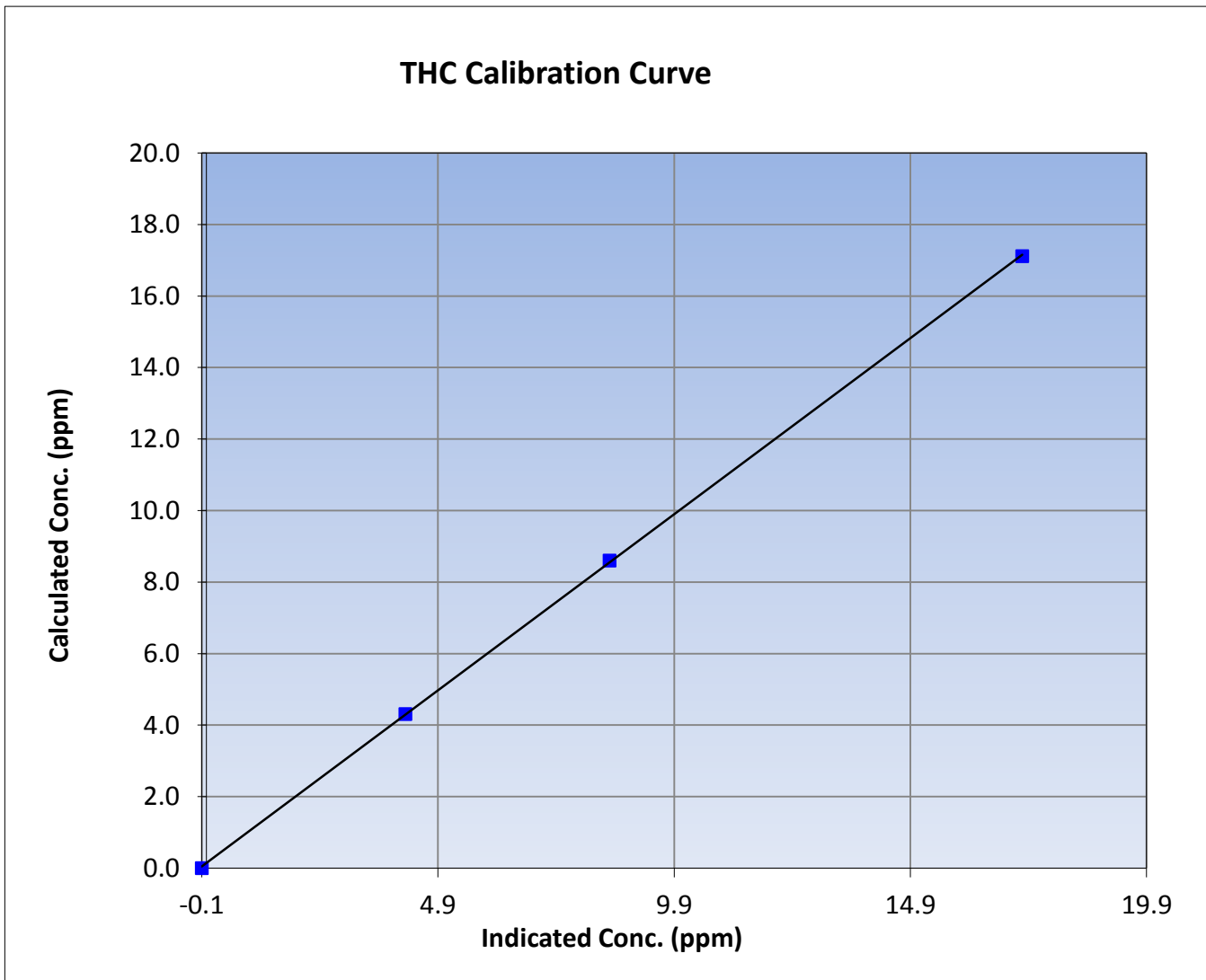
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 24, 2016	Previous Calibration	April 4, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	9:50	End Time (MST)	13:10
Analyzer make	51i-LT	Analyzer serial #	1501663727

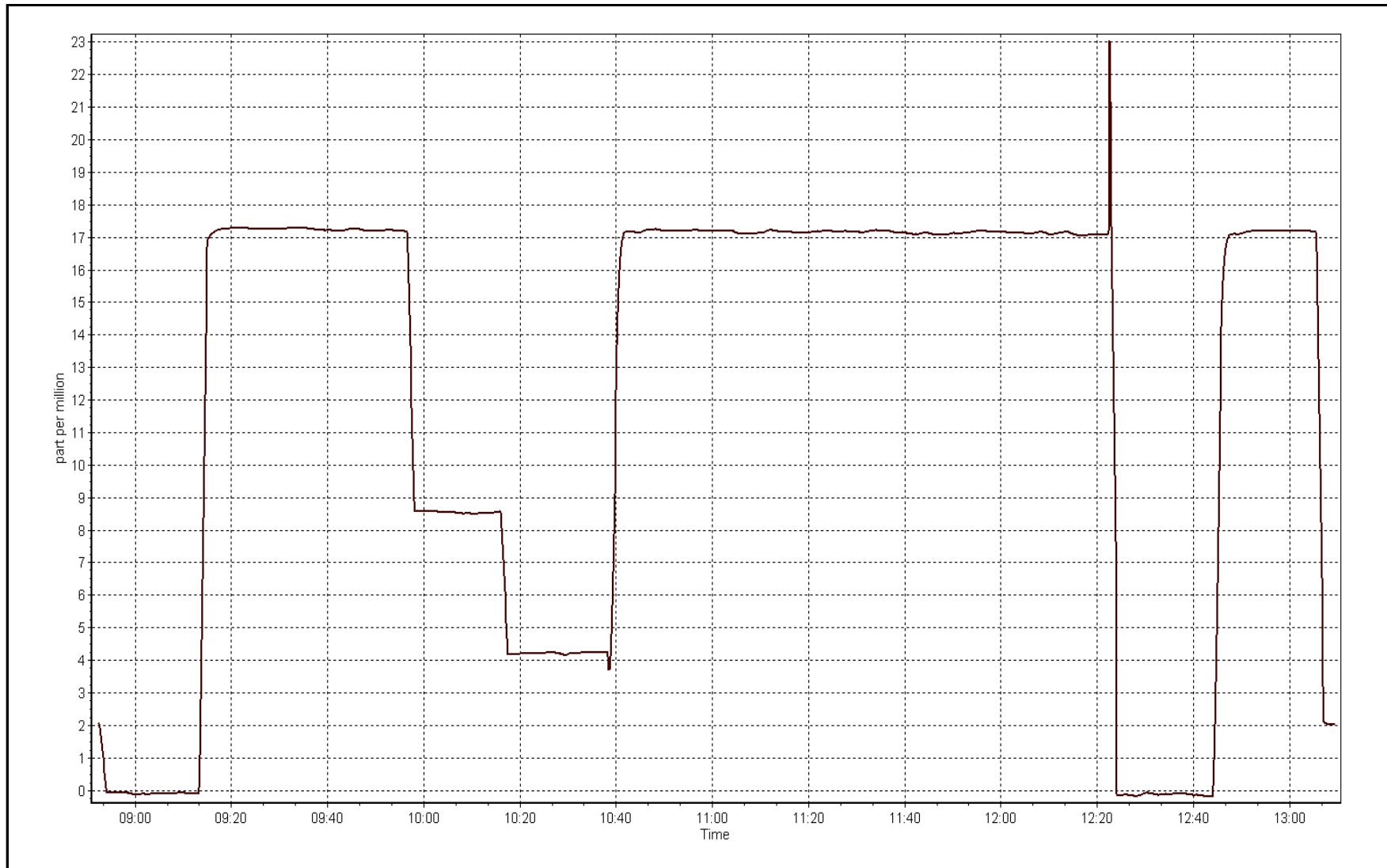
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.10	----	Correlation Coefficient	0.999956
17.12	17.27	0.9911		
8.60	8.53	1.0084	Slope	0.984789
4.31	4.21	1.0241		
			Intercept	0.143742



THC Calibration Plot

Date: May 24, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 24, 2016	Previous Calibration	April 5, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	13:10
NO Cal Gas Conc	50.1 ppm	Gas Cert Reference	EY0000372
NOX Cal Gas Conc	50.4 ppm	Cal Gas Expiry Date	June 10, 2016
Calibrator	API T700	Serial Number	1220
Zero air Generator	Teledyne API T701	Serial Number	4766

DACs Information

DACs make & model	Cambell Scientific CR3000	DACs serial No.	9627
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000564	0.999749	0.996005
	Data Offset	0.366278	0.620307	-1.582589
Current Calibration	Data Slope	0.998988	0.997924	1.001559
	Data Offset	-0.781749	-0.604062	-0.758571

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1505164379
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.084		1.128	
NOX coefficient	1.004		1.003	
NO2 coefficient	0.995		0.995	
NO bkgnd	3.3		3.4	
NOX bkgnd	3.5		3.7	
Chamber Temp	50.6	Deg C	50.3	Deg C
Moly Temp	322.4	Deg C	323.4	Deg C
PMT voltage	-767	V	-767.4	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	170.8	mmHg	170.8	mmHg
R Cell Press Nox	171.1	mmHg	170.8	mmHg
NO sample flow	0.803	lpm	0.806	lpm
Nox sample Flow	0.802	lpm	0.806	lpm

Notes:

Remote calibration. Span adjusted. Nox drifted during GPT; second high NO point used for GPT reference.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 24, 2016

Station Number:

AMS 20

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.3	-0.1	----	----
as found span	5000	79.9	805.4	800.6	4.8	772.8	768.3	4.6	1.0421	1.0421
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.3	-0.1	----	----
high point	5000	79.9	805.4	800.6	4.8	805.6	801.7	4.0	0.9997	0.9987
second point	5000	40.0	403.2	400.8	2.4	407.1	404.9	2.3	0.9903	0.9899
third point	5000	20.1	202.6	201.4	1.2	203.4	201.9	1.5	0.9959	0.9974
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as left span	5000	79.9	805.4	453.4	352.0	838.7	458.1	380.6	0.9603	0.9896
Average Correction Factor									0.9953	0.9953

Corrced As found NO_x= 773.3 NO= 768.6 Percent Change NO_x= 4.0% NO= 4.1%
 Previous Response NO_x= 804.6 NO= 800.2

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.90 ccm NOx ref calc conc = 805.4 ppb NO ref calc conc = 800.6 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		4.8	834.7	828.6	-0.1	0.9649	0.9662	----	----
1st NO2 (300)	453.4	380.1	832.6	453.4	379.3	0.9673	----	1.0020	99.8%
2nd NO2 (200)	575.1	258.3	834.6	575.1	259.6	0.9650	----	0.9953	100.5%
3rd NO2 (100)	699.9	133.5	834.9	699.9	135.0	0.9646	----	0.9888	101.1%
2nd NO ref point		4.8	823.1	817.4	5.8	0.9784	0.9795	----	----
Average Correction Factor						0.9688		0.9954	100.5%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

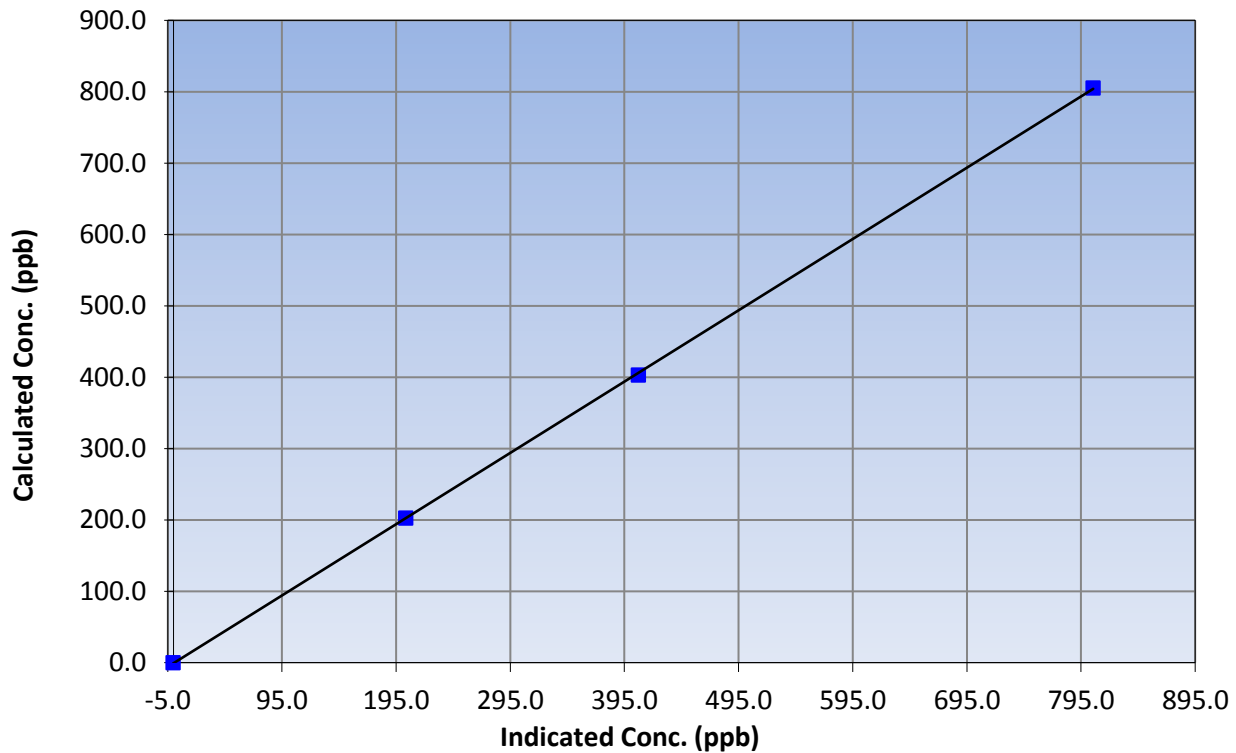
Station Information

Calibration Date	May 24, 2016	Previous Calibration	April 5, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	8:50	End Time (MST)	13:10
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999969
805.4	805.6	0.9997		
403.2	407.1	0.9903	Slope	0.998988
202.6	203.4	0.9959		
			Intercept	-0.781749

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

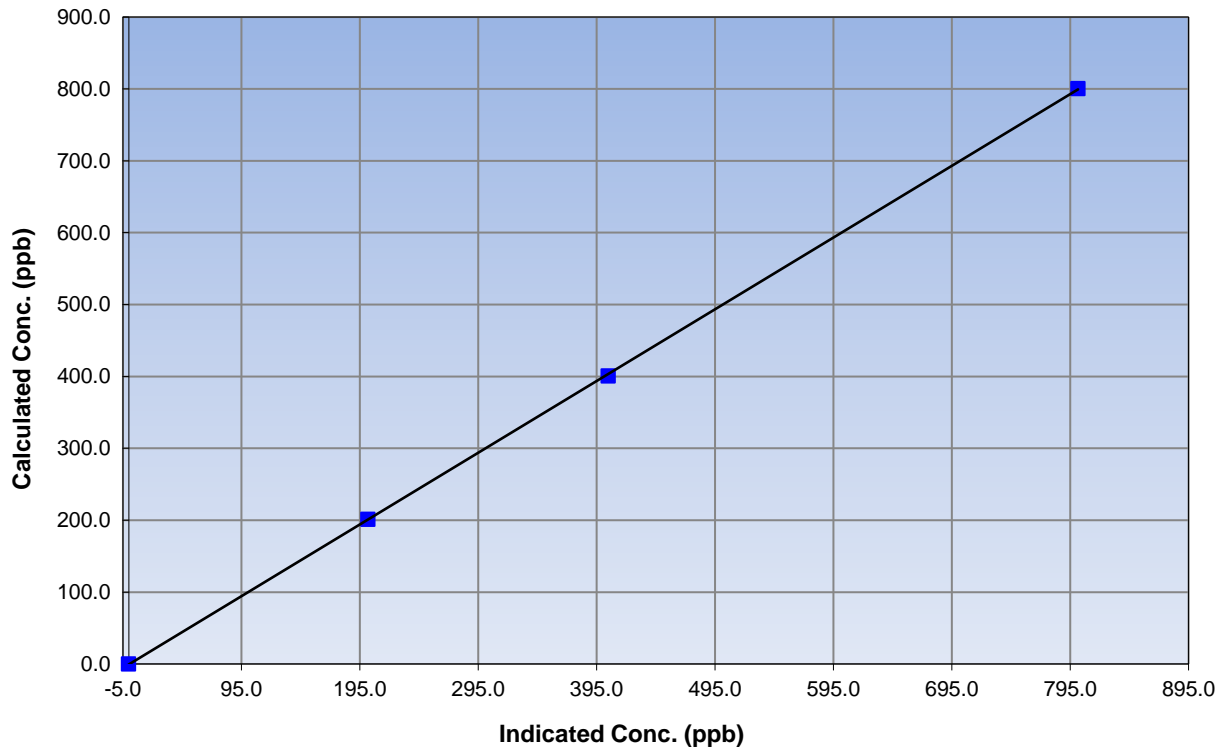
Station Information

Calibration Date	May 24, 2016	Previous Calibration	April 5, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	8:50	End Time (MST)	13:10
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999973
800.6	801.7	0.9987		
400.8	404.9	0.9899	Slope	0.997924
201.4	201.9	0.9974		
			Intercept	-0.604062

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

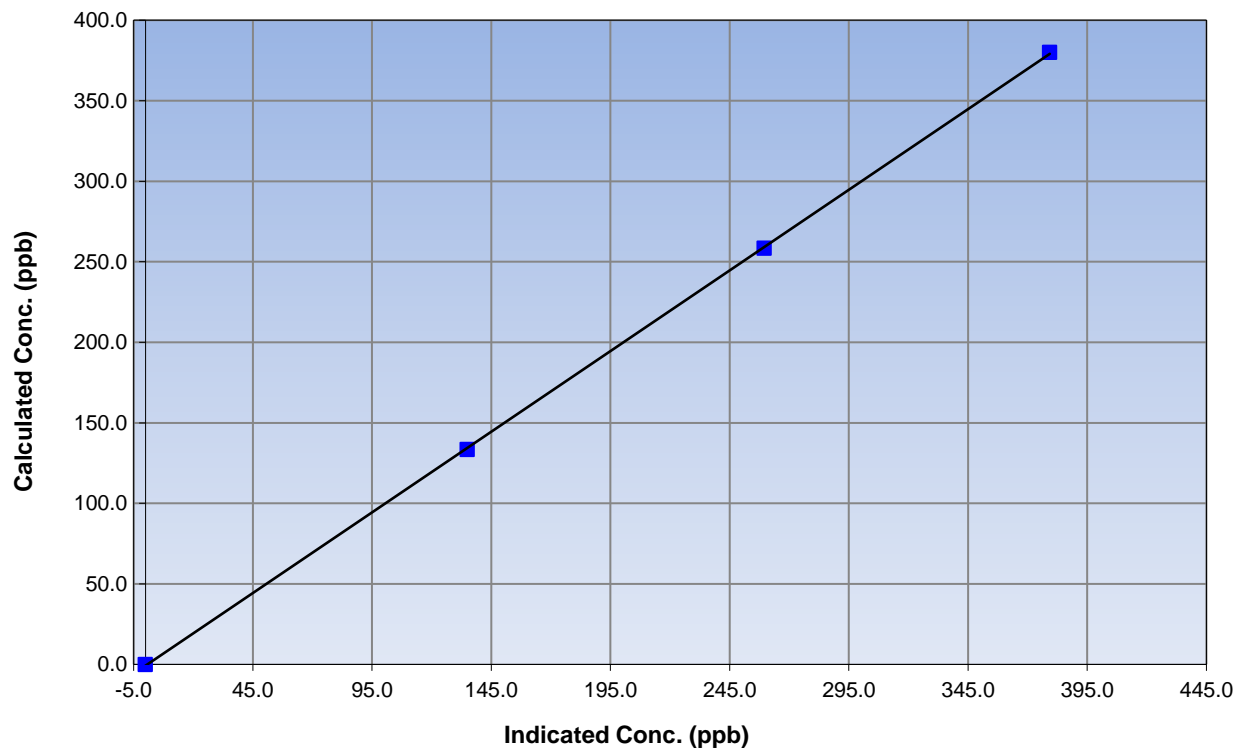
Station Information

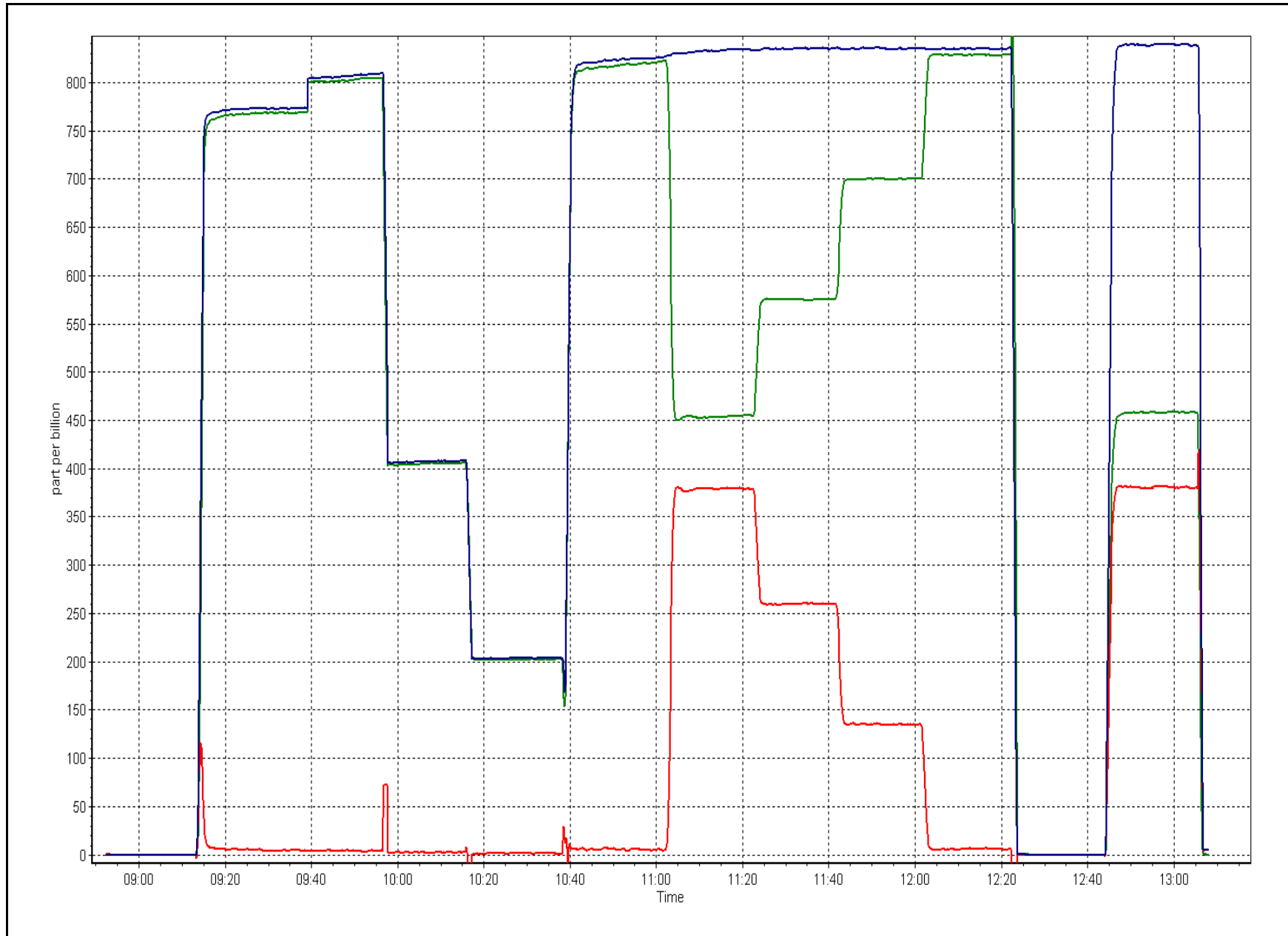
Calibration Date	May 24, 2016	Previous Calibration	April 5, 2016
Station Number	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	8:50	End Time (MST)	13:10
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999959
380.1	379.3	1.0020		
258.3	259.6	0.9953	Slope	1.001559
133.5	135.0	0.9888		
			Intercept	-0.758571

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 21
CONKLIN COMMUNITY
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN COMMUNITY (AMS 21)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	703	36	41	99.33	2	0	0	0
TRS(ppb) Average	701	35	43	98.92	1	0	1	0
THC(ppm) Average	702	35	42	99.06	2.3	-	2	-
NMHC(ppm) Average	702	35	42	99.06	0.225	-	0.035	-
CH4(ppm) Average	702	35	42	99.06	2.3	-	1.9	-
O3 (ppb) Average	706	33	38	99.33	63	0	50	-
NO2 (ppb) Average	703	36	41	99.33	14	0	3	-
NO (ppb) Average	703	36	41	99.33	6	-	1	-
NOX (ppb) Average	703	36	41	99.33	15	-	3	-
PM2.5 (ug/m3) Average	597	1	147	80.38	353.7	-	137	7
Wind Speed 10 m (km/h) Average	741	0	3	99.60	18	-	13	-
Wind Direction 10 m (deg) Average	741	0	3	99.60	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	29.8	-	20.6	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	97.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN COMMUNITY (AMS 21)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	703	0.3	0	-	0	0	0	0	0	0	0	2
TRS (ppb) Average	701	0.3	0	-	0	0	0	0	0	0	0	1
THC (ppm) Average	702	1.88	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2	2.3
NMHC(ppm) Average	702	0.002	0.013	-	0	0	0	0	0	0	0	0.225
CH4(ppm) Average	702	1.88	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2	2.3
O3 (ppb) Average	706	32	14	-	4	13	21	31	44	50	63	63
NO2 (ppb) Average	703	1.3	1	-	0	0	1	1	2	3	14	14
NO (ppb) Average	703	0.2	0	-	0	0	0	0	0	0	6	6
NOX (ppb) Average	703	1.4	1	-	0	0	1	1	2	3	15	15
PM2.5 (ug/m3) Average	597	23.88	43.6	-	0	1.5	2.9	6.8	19.4	84.5	353.7	353.7
Wind Speed 10 m (km/h) Average	741	6.9	4	-	0	2	4	6	10	13	18	18
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	11.59	7.3	-	-6.2	2.5	6.9	11.3	16.1	21.9	29.8	29.8
Relative Humidity (%) Average	744	60.8	27	-	14	21	36	62	87	96	99	99

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN COMMUNITY (AMS 21)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, TRS, O3, NO2	05 May 2016 08:00	05 May 2016 12:00	5	Station power failure
NMHC, CH4, THC	05 May 2016 08:00	05 May 2016 13:00	6	Station power failure
PM2.5	05 May 2016 09:00	05 May 2016 12:00	4	Station power failure
TRS	20 May 2016 12:00	20 May 2016 13:00	2	Maintenance - reinitiated daily QA check
TRS	28 May 2016 12:00	28 May 2016 12:00	1	Maintenance - reinitiated daily QA check
NMHC, CH4, THC	26 May 2016 15:00	26 May 2016 15:00	1	Maintenance - replaced carrier gas cylinder
PM2.5	05 May 2016 03:00	05 May 2016 08:00	6	Analyzer Failure - sample pump failure
PM2.5	06 May 2016 00:00	11 May 2016 15:00	136	Analyzer Failure - sample pump failure
Wind Speed, Wind Direction	12 May 2016 22:00	12 May 2016 22:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	14 May 2016 03:00	14 May 2016 04:00	2	Flat line in sensor output signal

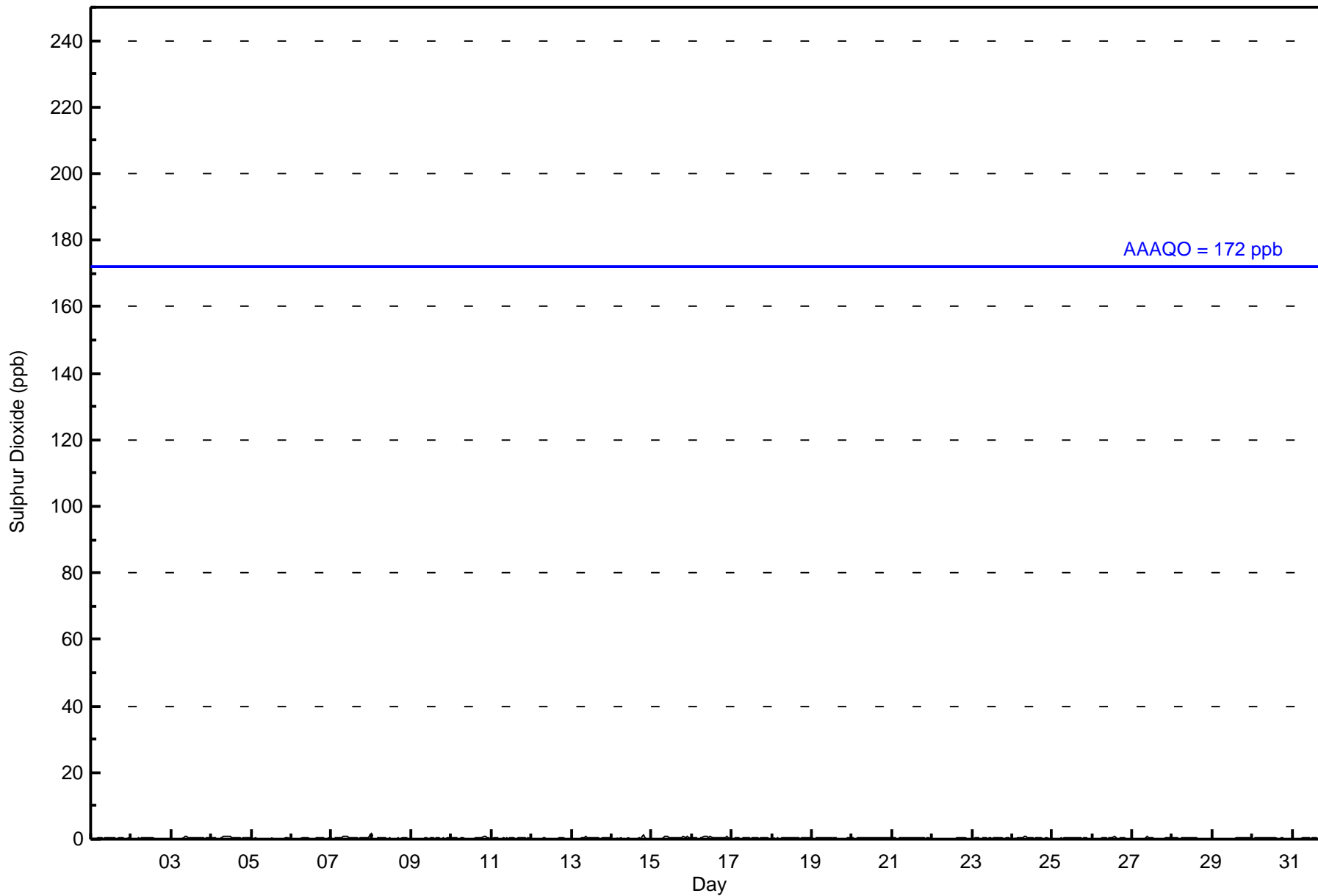


Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																																												
Maximum Value: 2 ppb on May 8 01:00		Maximum Daily Average: 0.5 ppb on May 16		Hours of Data:		703																																												
Minimum Value: 0 ppb on May 12 14:00		Minimum Daily Average: 0.2 ppb on May 12		Hours of Missing Data:		41																																												
Maximum Diurnal Average: 0.4 ppb at hour 9		Minimum Diurnal Average: 0.2 ppb at hour 3		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 = 1		Percent Operational Time:		99.3																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
3-May	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1																								
4-May	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
5-May	0	0	0	0	0	Z	0	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
7-May	0	Z	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1																								
8-May	2	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																								
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1																								
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
12-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	1																								
13-May	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.3	1																								
15-May	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1																								
16-May	0	0	0	0	Z	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0.5	1																								
17-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
18-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
19-May	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0.4	1																								
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	0	0	0.4	1																								
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
23-May	0	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																								
24-May	Z	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
25-May	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0.2	1																								
27-May	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																								
28-May	0	0	0	0	Z	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1																								
30-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
																								0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	Diurnal Average	
																								2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration PF - Power Failure																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																		



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Conklin Community - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	703	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: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	67	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701
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	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701

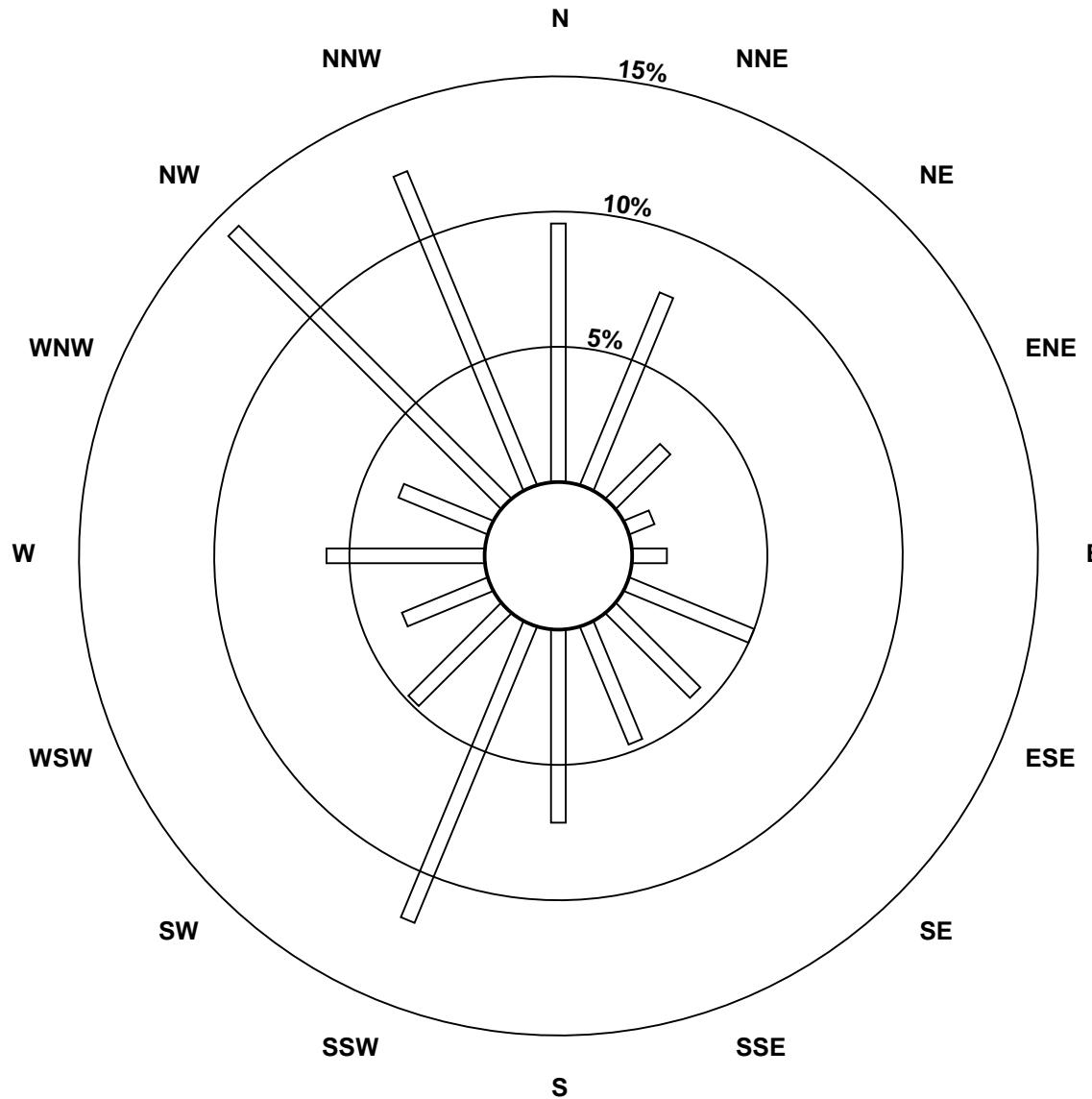
Total Number of Valid Hours: 701

Total Number of Hours: 744

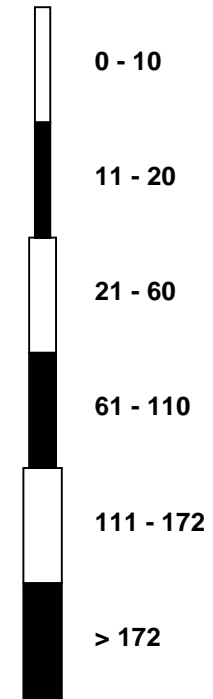


**Wood Buffalo Environmental Association
Wind Rose May 2016**

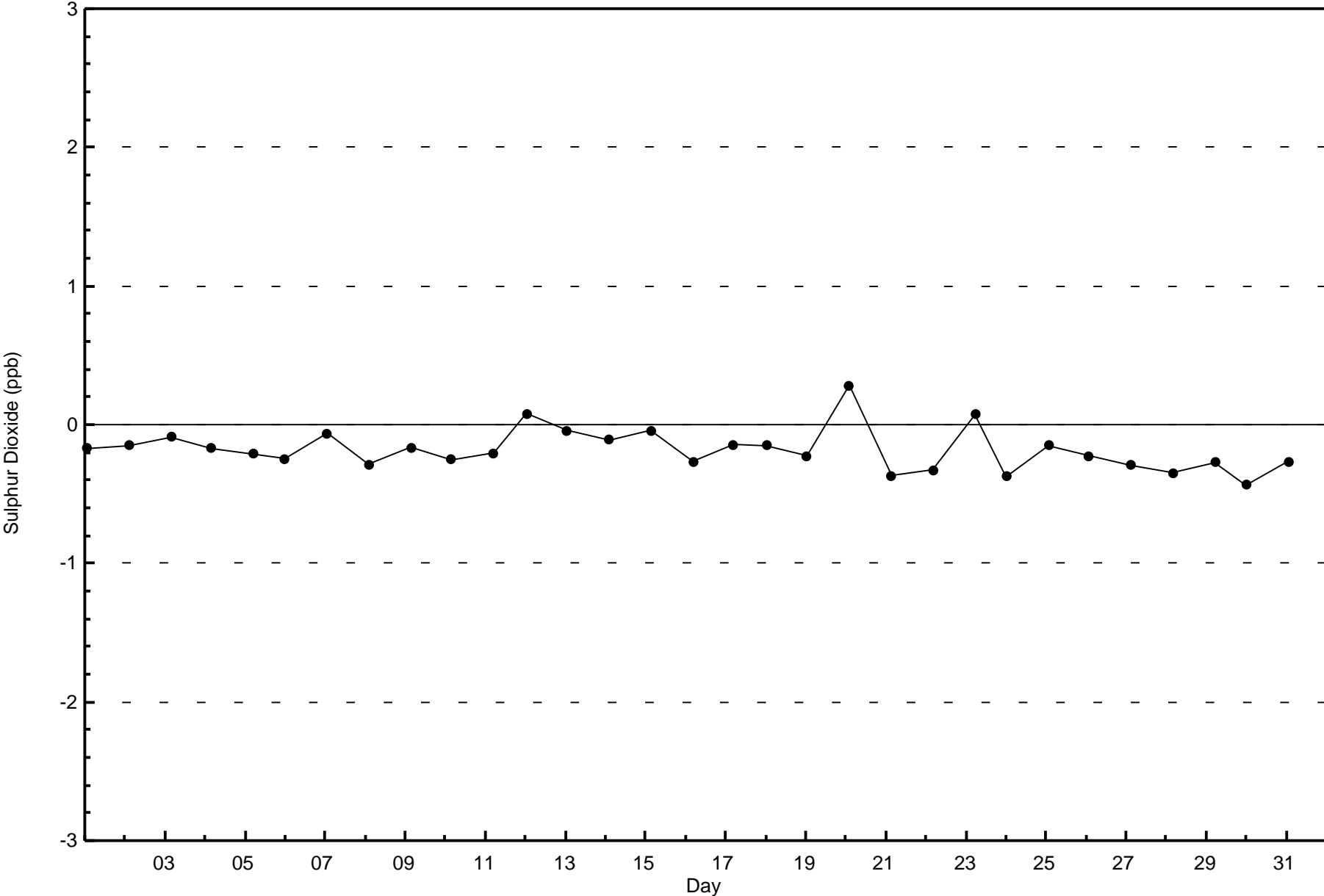
**Sulphur Dioxide (SO₂) - ppb
Conklin Community (AMS 21)**

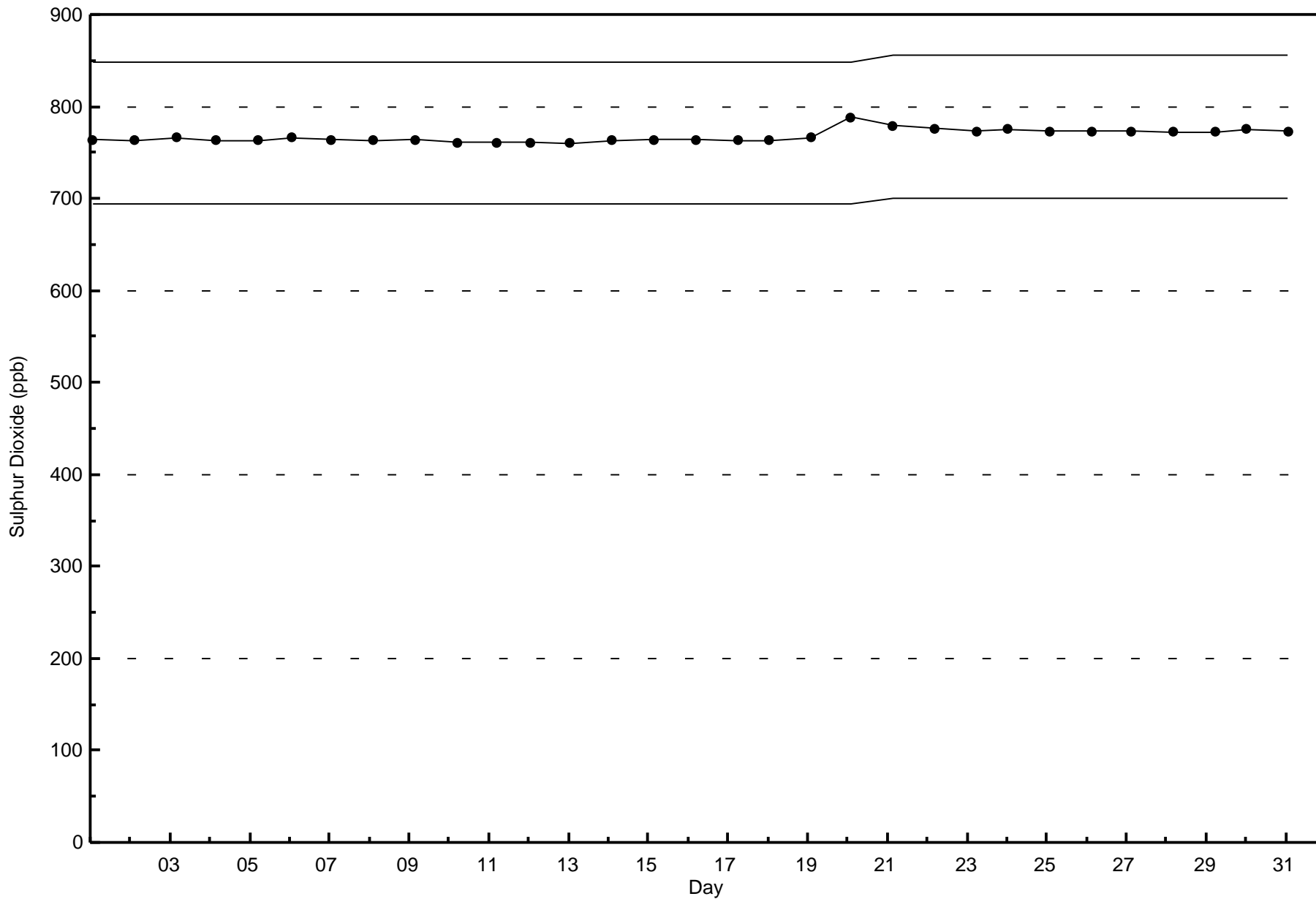


Classes (ppb)



Total Number of Valid Hours: 701







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Conklin Community - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on May 19 04:00	Maximum Daily Average: 0.7 ppb on May 19		Hours of Data:	701
Minimum Value: 0 ppb on May 31 04:00	Minimum Daily Average: 0.2 ppb on May 8		Hours of Missing Data:	43
Maximum Diurnal Average: 0.4 ppb at hour 21	Minimum Diurnal Average: 0.2 ppb at hour 6		Hours of Calibration:	35
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-May	0	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
5-May	0	0	0	0	0	0	Z	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-May	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
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-May	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-May	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-May	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
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-May	0	0	Z	1	1	1	1	1	1	1	1	C	C	C	C	1	1	1	1	1	1	1	0	0	0.7	1
20-May	0	0	0	Z	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-May	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
22-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
25-May	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
26-May	0	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0.5	1
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	0.4	1
28-May	0	0	0	0	0	Z	0	0	1	1	1	M	1	1	1	1	1	0	0	0	1	0	0	0	0.5	1
29-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0.4	1
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0

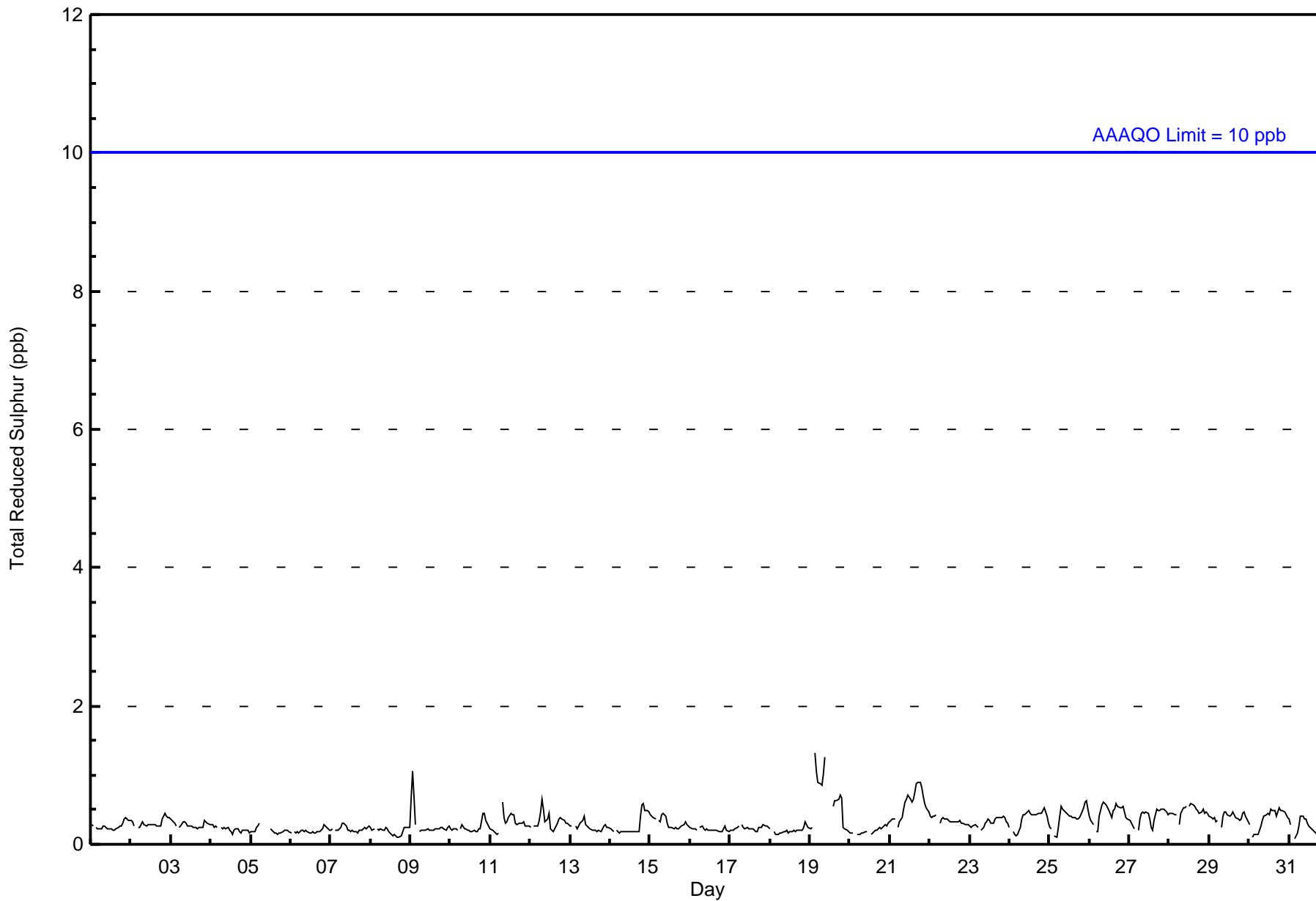
0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	Diurnal Average
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Conklin Community - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Conklin Community - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	701	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: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	69	51	21	5	8	36	30	33	49	86	32	24	41	24	99	91	699
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	51	21	5	8	36	30	33	49	86	32	24	41	24	99	91	699

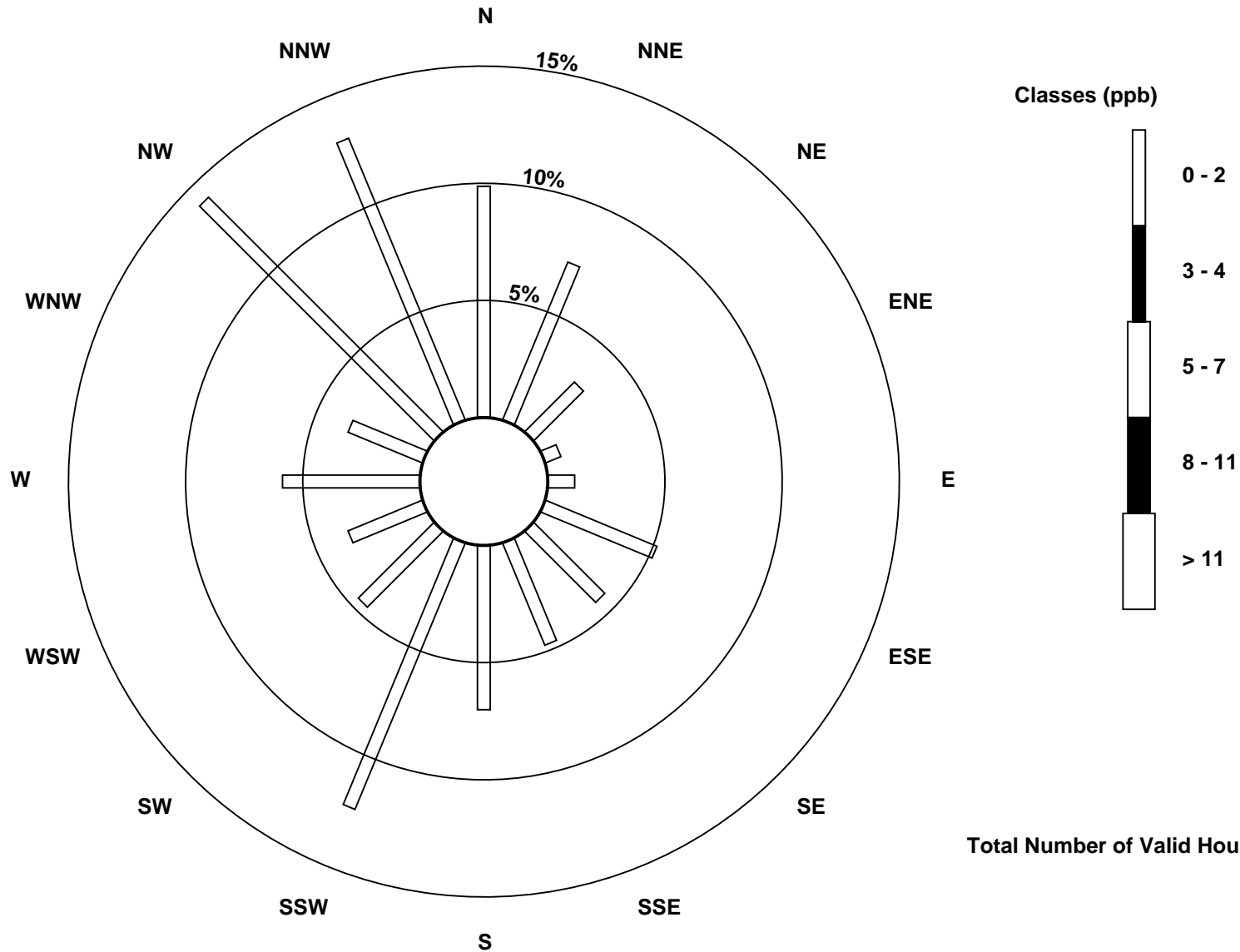
Total Number of Valid Hours: 699

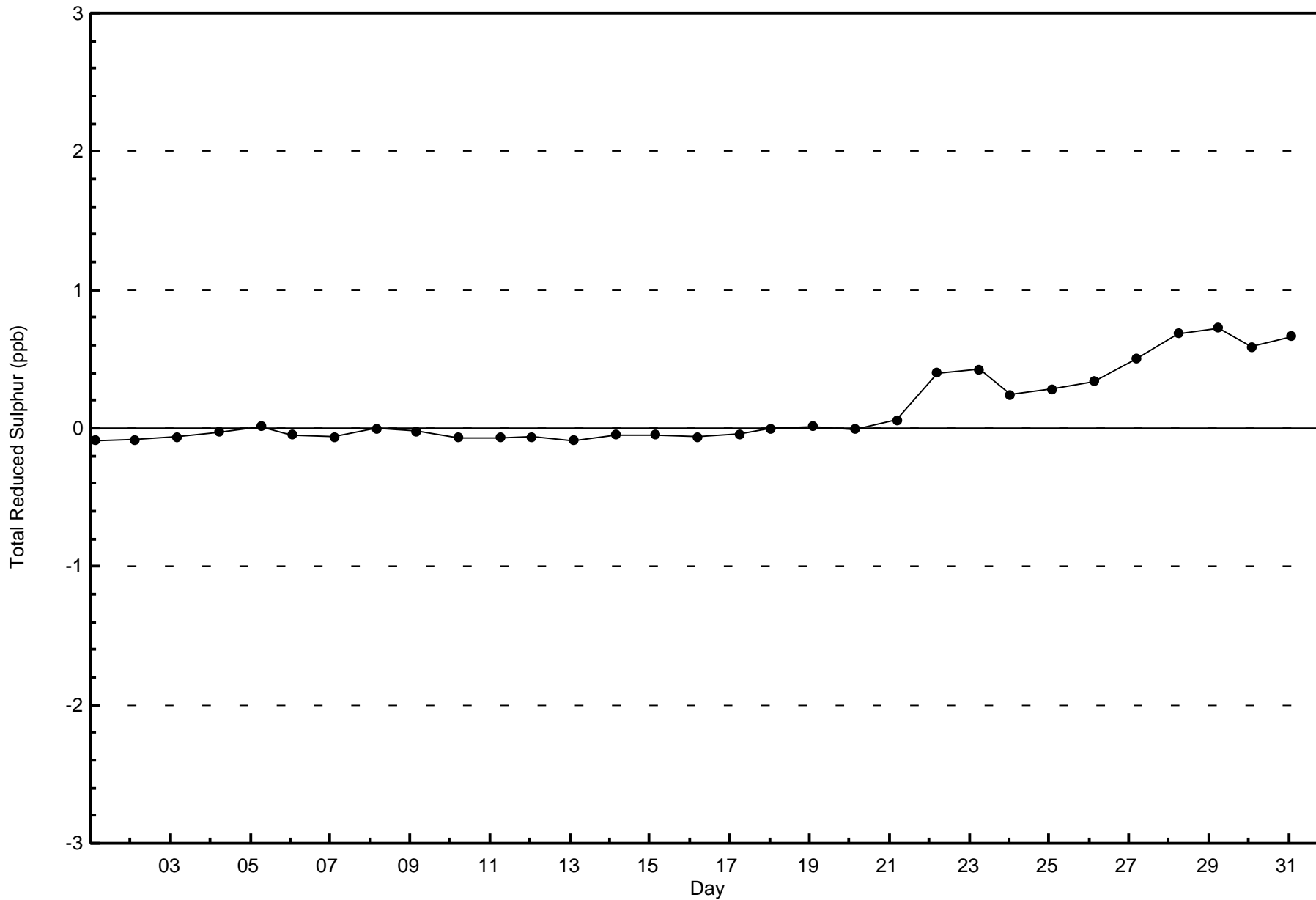
Total Number of Hours: 744

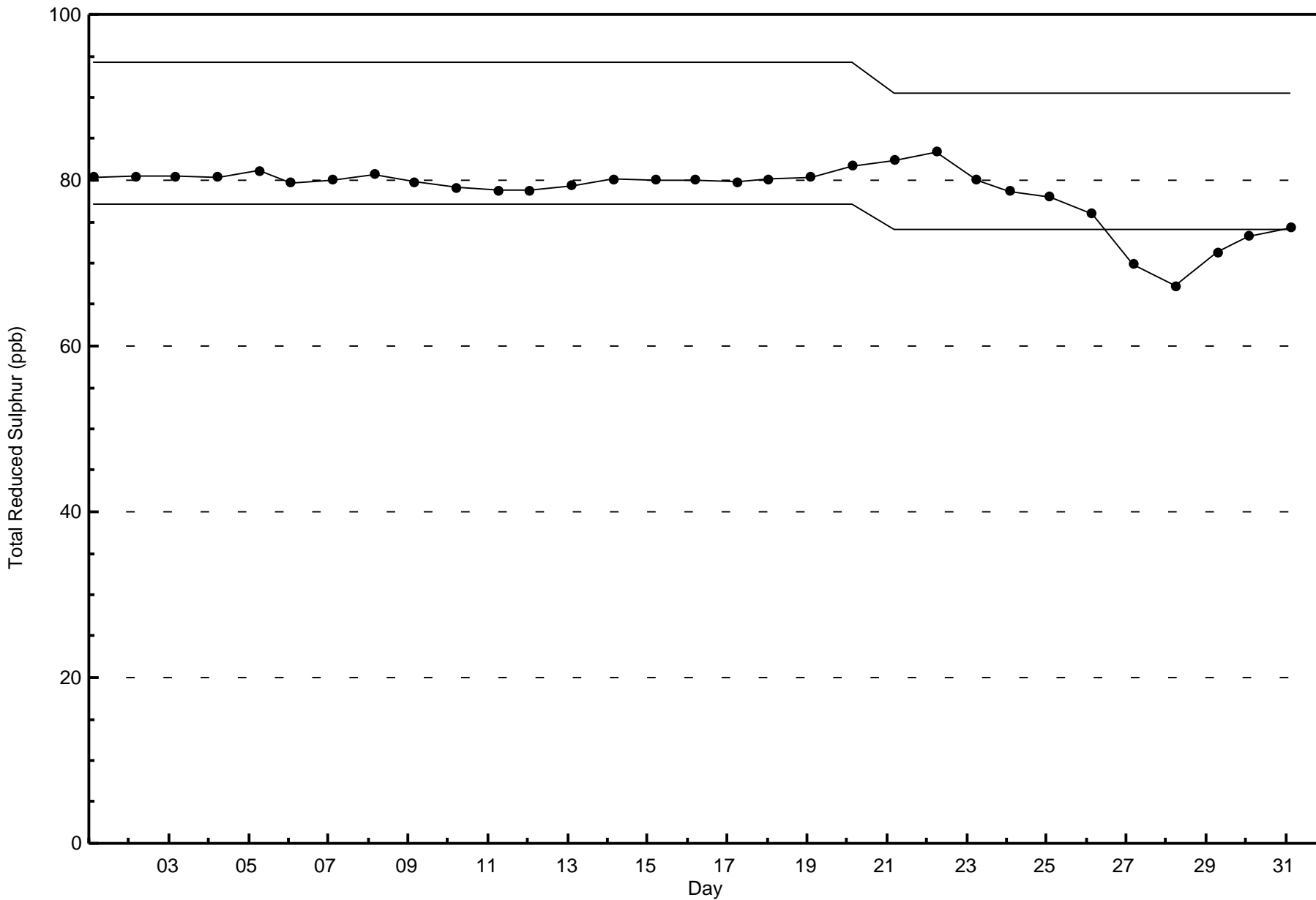


**Wood Buffalo Environmental Association
Wind Rose May 2016**

**Total Reduced Sulphur (TRS) - ppb
Conklin Community (AMS 21)**









Wood Buffalo Environmental Association
Summary of Hour Averages

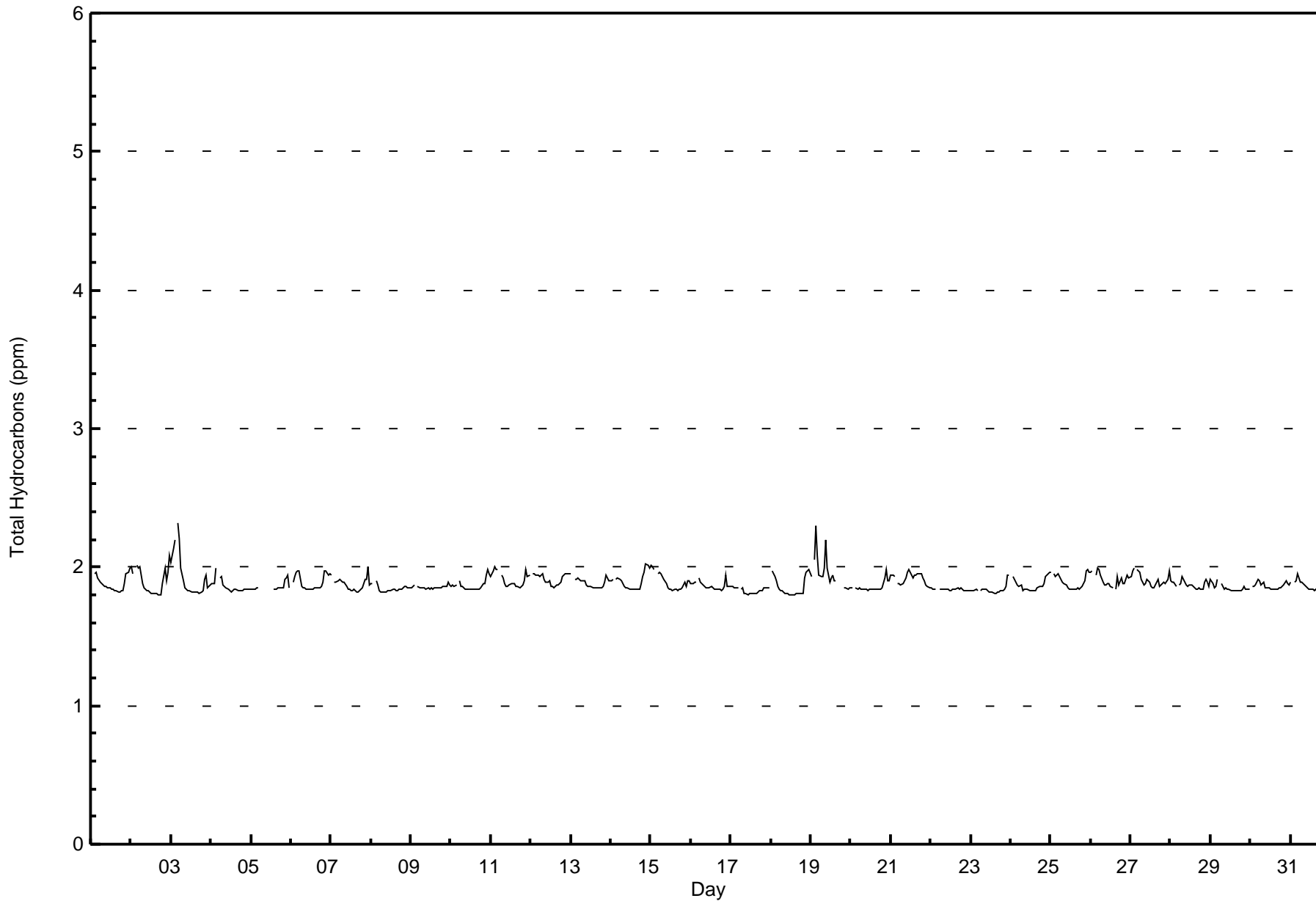
Total Hydrocarbons (THC) - ppm
Conklin Community - May 2016

Maximum Value: 2.3 ppm on May 3 05:00 Maximum Daily Average: 2.0 ppm on May 19 Minimum Value: 1.8 ppm on May 18 13:00 Minimum Daily Average: 1.8 ppm on May 17 Maximum Diurnal Average: 1.9 ppm at hour 5 Minimum Diurnal Average: 1.8 ppm at hour 16 Monthly Average: 1.88 ppm Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.1																				Hours in Service: 744 Hours of Data: 702 Hours of Missing Data: 42 Hours of Calibration: 35 Percent Operational Time: 99.1						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	2.0	1.9	2.0
2-May	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	2.0	2.1	1.9	2.1
3-May	2.0	2.1	2.2	Z	2.3	2.2	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.9	2.3
4-May	1.9	1.9	1.9	2.0	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0
5-May	1.8	1.8	1.8	1.9	1.9	Z	1.8	PF	PF	PF	PF	PF	PF	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	--	1.9
6-May	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	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0
7-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.9	1.9	2.0
8-May	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9
9-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9
10-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.9	1.9	2.0
11-May	1.9	2.0	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0
12-May	Z	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0
13-May	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
14-May	1.9	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	1.9	2.0	2.0	2.0	2.0	1.9	2.0
15-May	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0
16-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9
17-May	1.9	1.9	1.9	1.9	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
18-May	Z	2.0	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	1.9	2.0	2.0	2.0	1.9	2.0
19-May	1.9	Z	2.1	2.3	2.1	1.9	1.9	1.9	2.0	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	1.9	1.9	1.8	1.8	2.0
20-May	1.8	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.9	1.9	2.0
21-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0
22-May	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
23-May	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.9
24-May	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	1.9	1.9	2.0	2.0	2.0	1.9	2.0
25-May	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	1.9
26-May	2.0	2.0	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	M	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
27-May	1.9	2.0	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
28-May	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	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9
29-May	1.9	1.9	1.8	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
30-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9
31-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.9	1.9	2.0
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Conklin Community - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin Community - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	693	98.72	98.72
2.1 - 3.0	9	1.28	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin Community - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	66	53	21	6	9	34	30	31	50	83	33	24	41	25	98	87	691
2.1 - 3.0	1	1	0	1	0	1	1	2	0	0	0	0	0	0	1	1	9
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	54	21	7	9	35	31	33	50	83	33	24	41	25	99	88	700

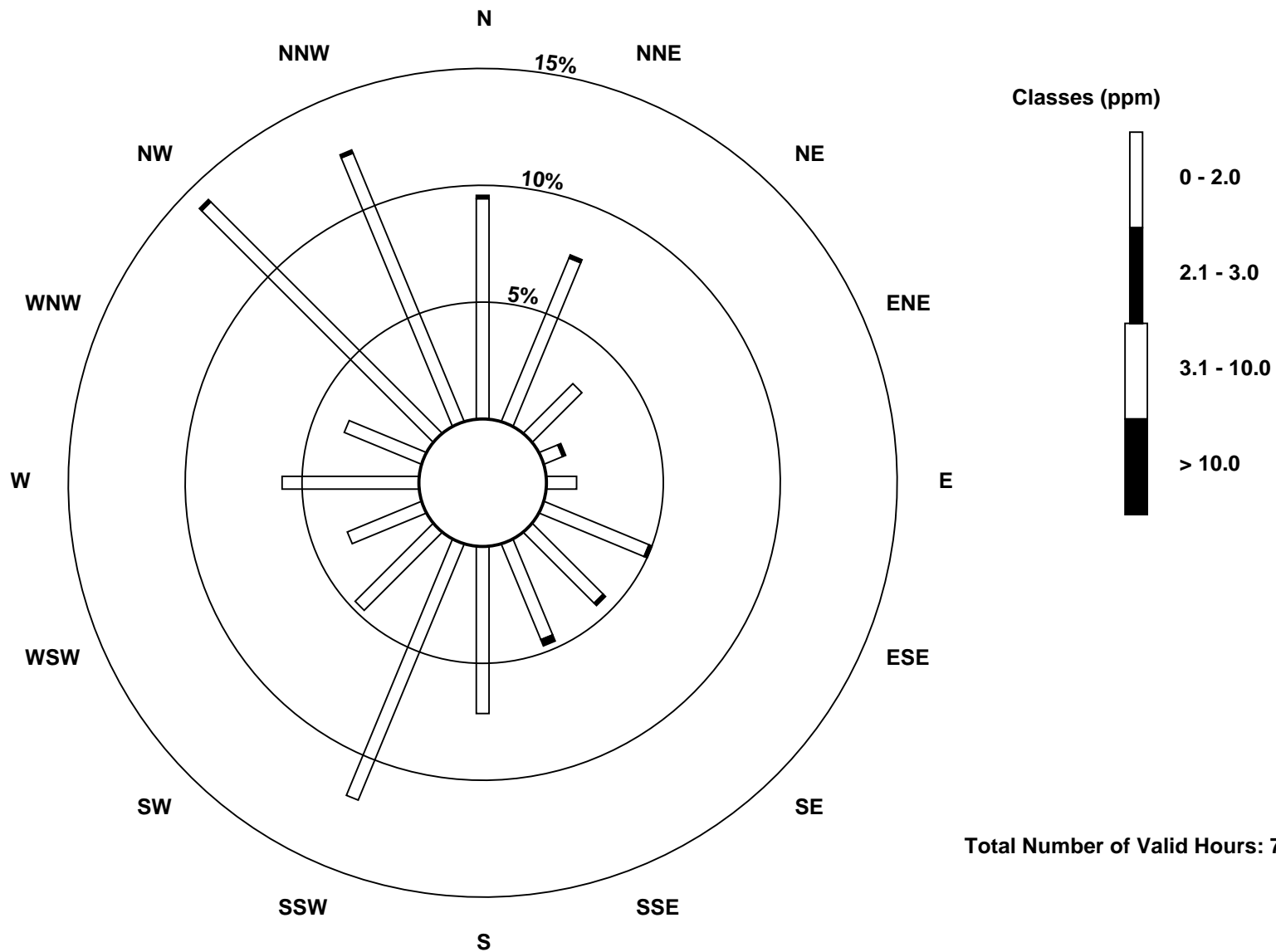
Total Number of Valid Hours: 700

Total Number of Hours: 744

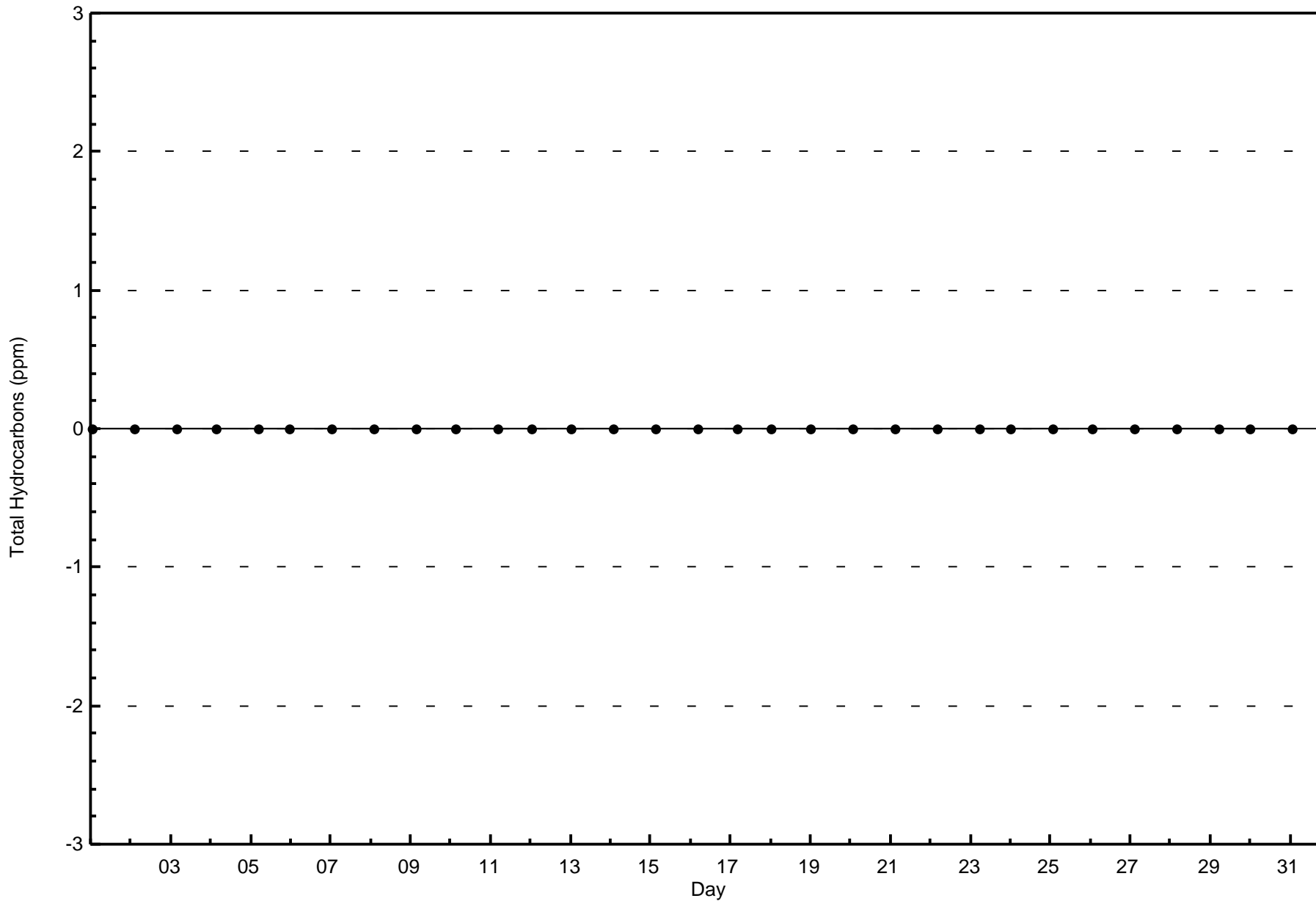


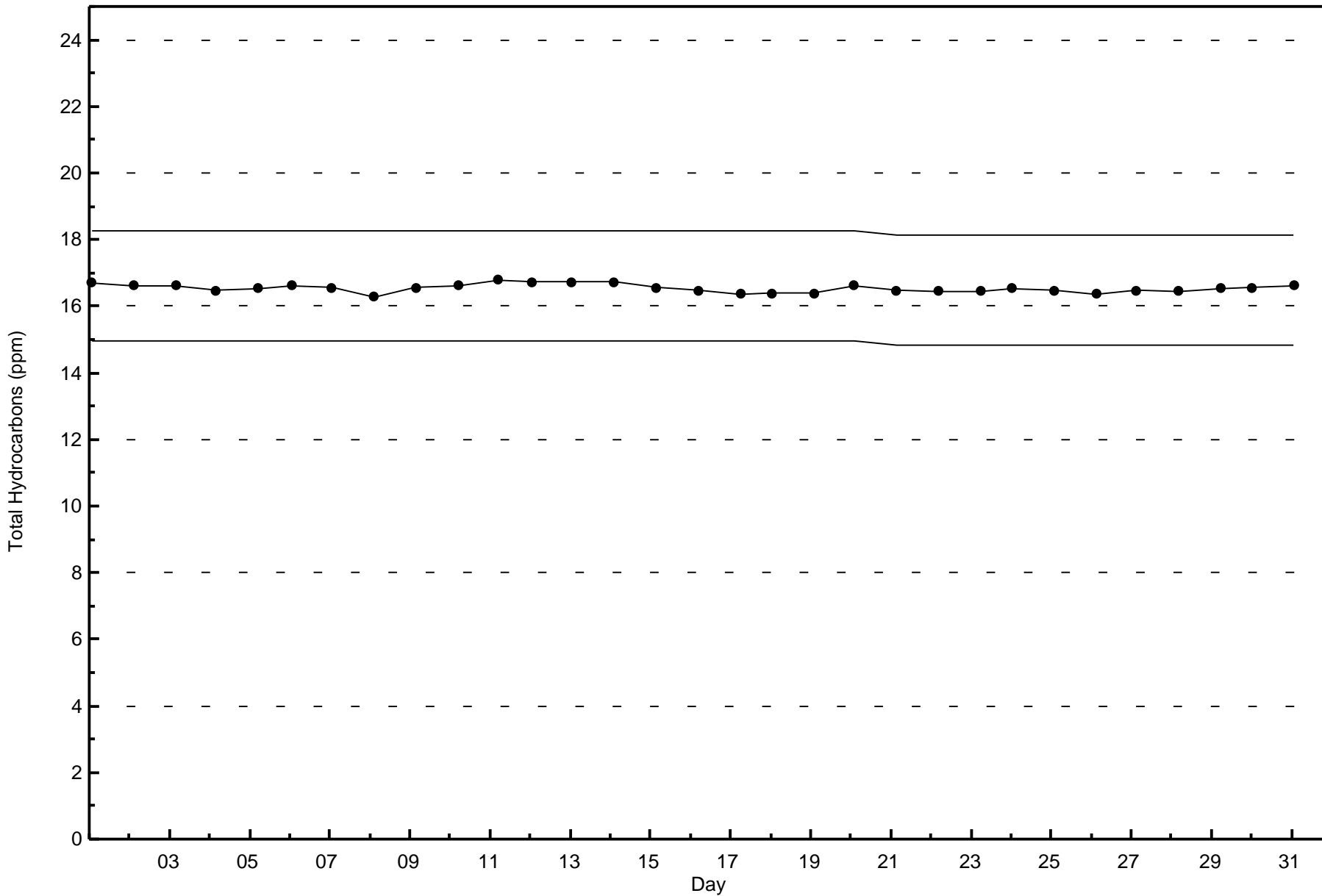
Wood Buffalo Environmental Association
Wind Rose May 2016

Total Hydrocarbons (THC) - ppm
Conklin Community (AMS 21)



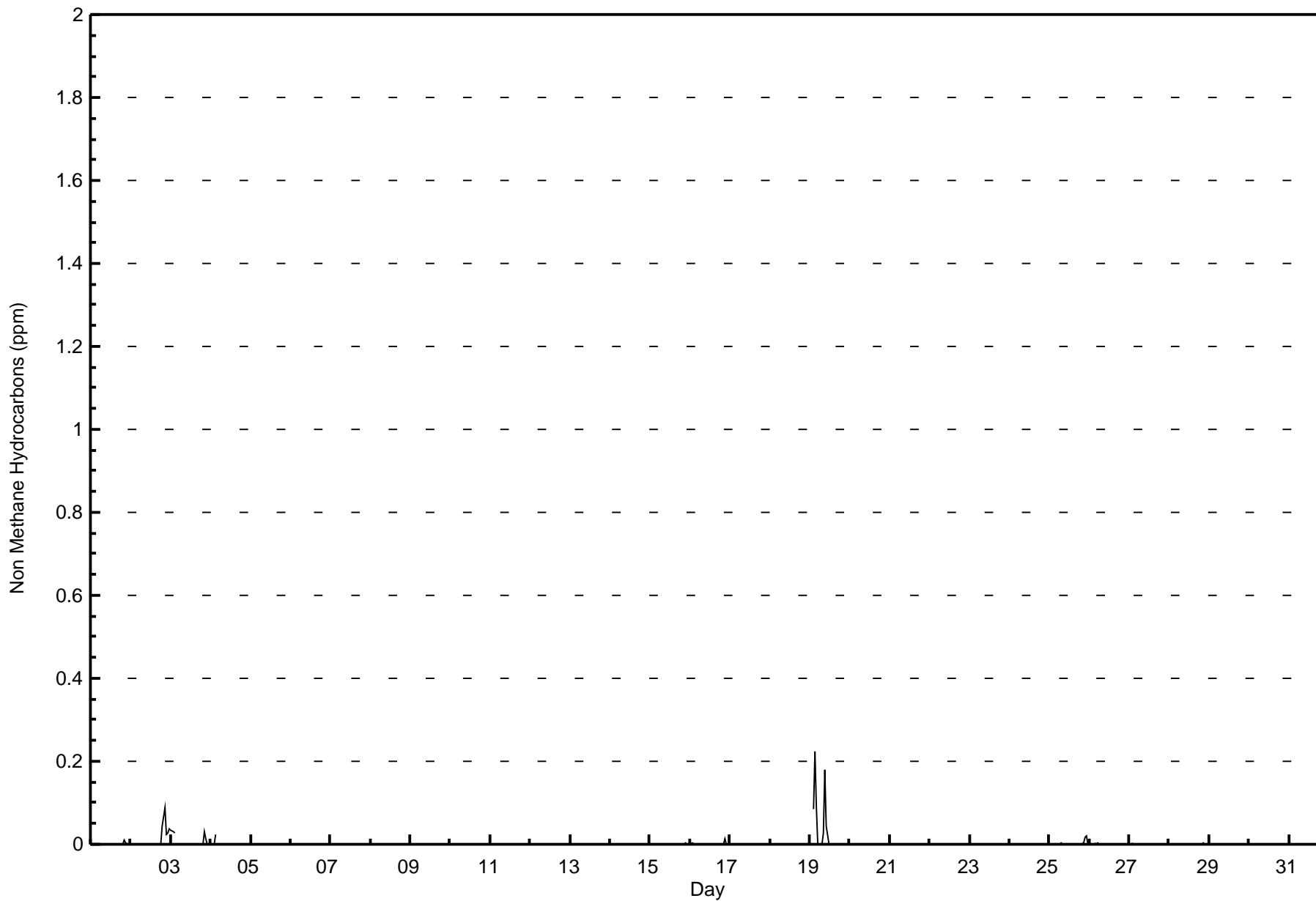
Total Number of Valid Hours: 700







Maximum Value: 0.225 ppm on May 19 04:00		Maximum Daily Average: 0.035 ppm on May 19		Hours in Service:	744																					
Minimum Value: 0.000 ppm on May 1 01:00		Minimum Daily Average: 0.000 ppm on May 8		Hours of Data:	702																					
Maximum Diurnal Average: 0.010 ppm at hour 4		Minimum Diurnal Average: 0.000 ppm at hour 7		Hours of Missing Data:	42																					
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:	35																					
				Percent Operational Time:	99.1																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	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	0.010	0.003	0.000	0.000	0.001	0.010
2-May	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	0.044	0.089	0.023	0.027	0.039	0.010	0.089
3-May	0.035	0.032	0.029	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	0.029	0.012	0.000	0.000	0.006	0.035
4-May	0.000	0.000	0.000	0.022	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	0.022
5-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	PF	PF	PF	PF	PF	PF	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-May	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	0.001
7-May	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
8-May	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9-May	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
10-May	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
11-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12-May	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14-May	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
15-May	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	0.004	0.002	0.000	0.000	0.004
16-May	0.000	0.003	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	0.015	0.000	0.000	0.001	0.015
17-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
18-May	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
19-May	0.000	Z	0.086	0.225	0.092	0.000	0.000	0.000	0.028	0.181	0.042	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.001	0.000	0.000	0.035	0.225
20-May	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
21-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22-May	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
23-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-May	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.001
25-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.017	0.019	0.002	0.002	0.019
26-May	0.000	0.003	Z	0.002	0.000	0.004	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	0.004
27-May	0.000	0.000	0.003	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
28-May	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	0.002	0.000	0.000	0.000	0.000	0.002
29-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-May	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
31-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.002	0.000	0.000	0.000	0.009
		0.001	0.001	0.005	0.010	0.004	0.000	0.000	0.001	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.003	0.002	0.001	Diurnal Average	
		0.035	0.032	0.086	0.225	0.092	0.004	0.000	0.003	0.028	0.181	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.044	0.089	0.023	0.027	0.039	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance				PF - Power Failure																





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	680	96.87	96.87
0.006 - 0.05	17	2.42	99.29
0.06 - 0.1	3	0.43	99.72
> 0.1	2	0.28	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	66	51	21	7	9	35	30	30	48	80	32	23	37	24	98	87	678
0.006 - 0.05	0	2	0	0	0	0	1	3	2	2	1	1	4	1	0	0	17
0.06 - 0.1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3
> 0.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Totals	67	54	21	7	9	35	31	33	50	83	33	24	41	25	99	88	700

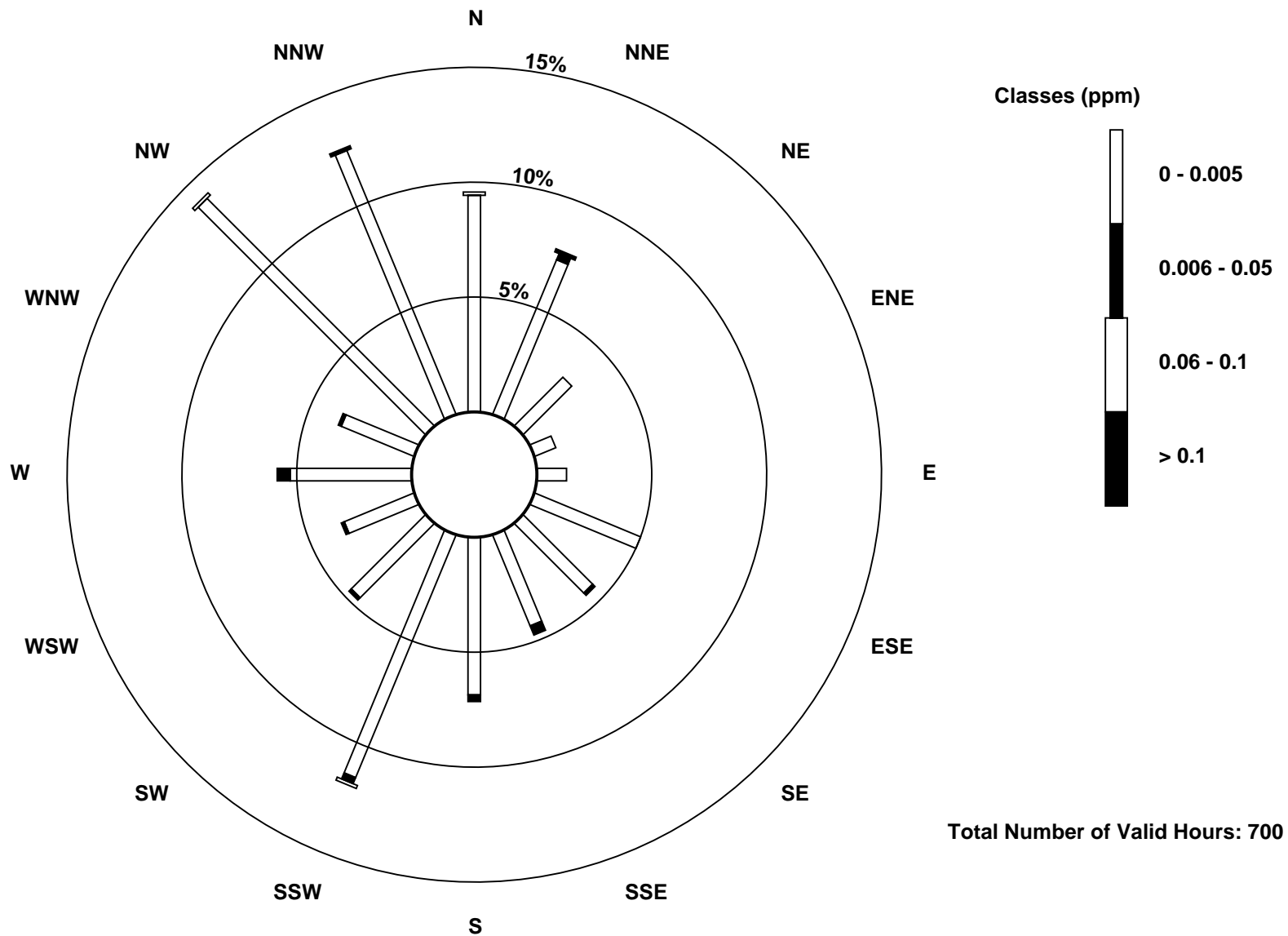
Total Number of Valid Hours: 700

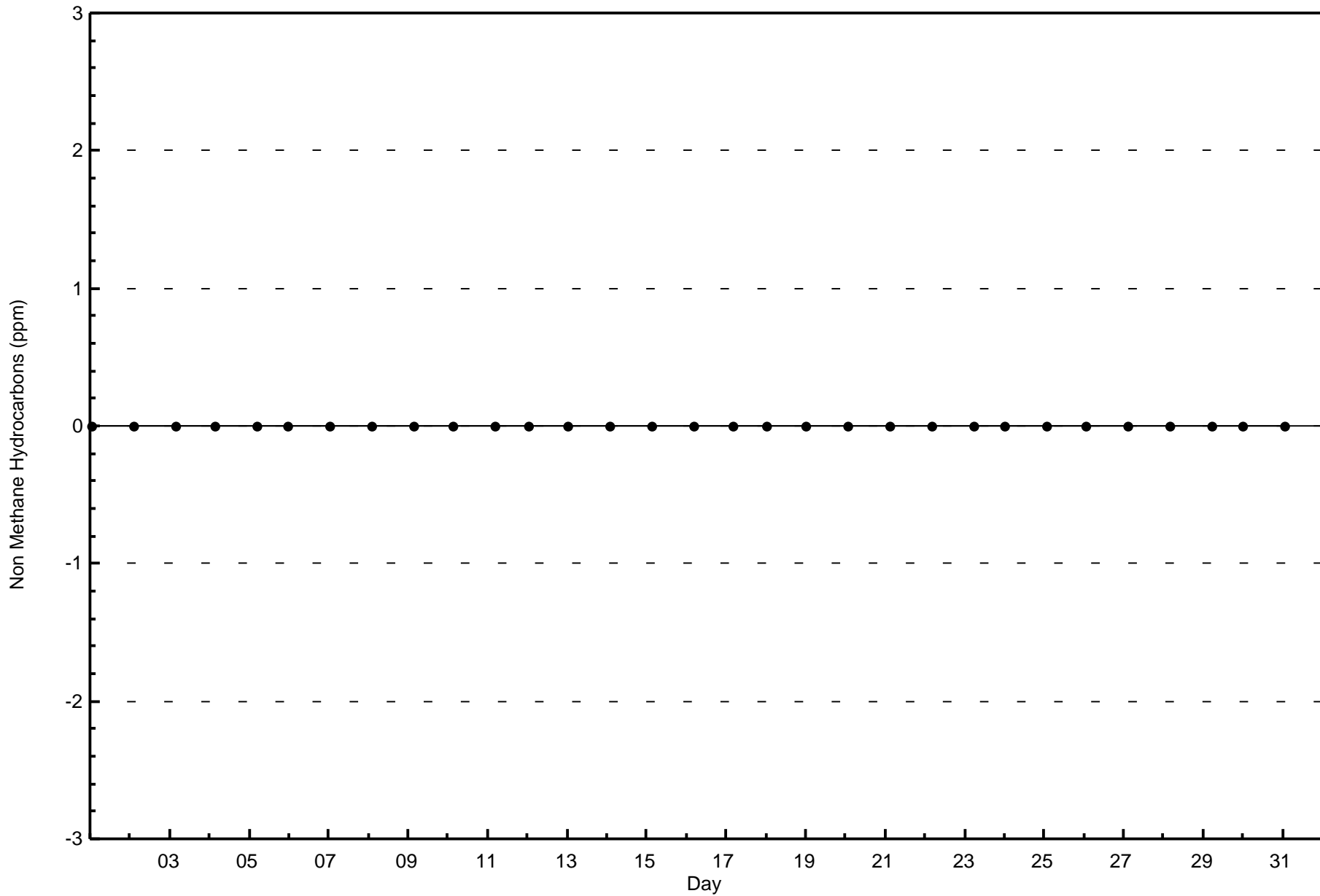
Total Number of Hours: 744

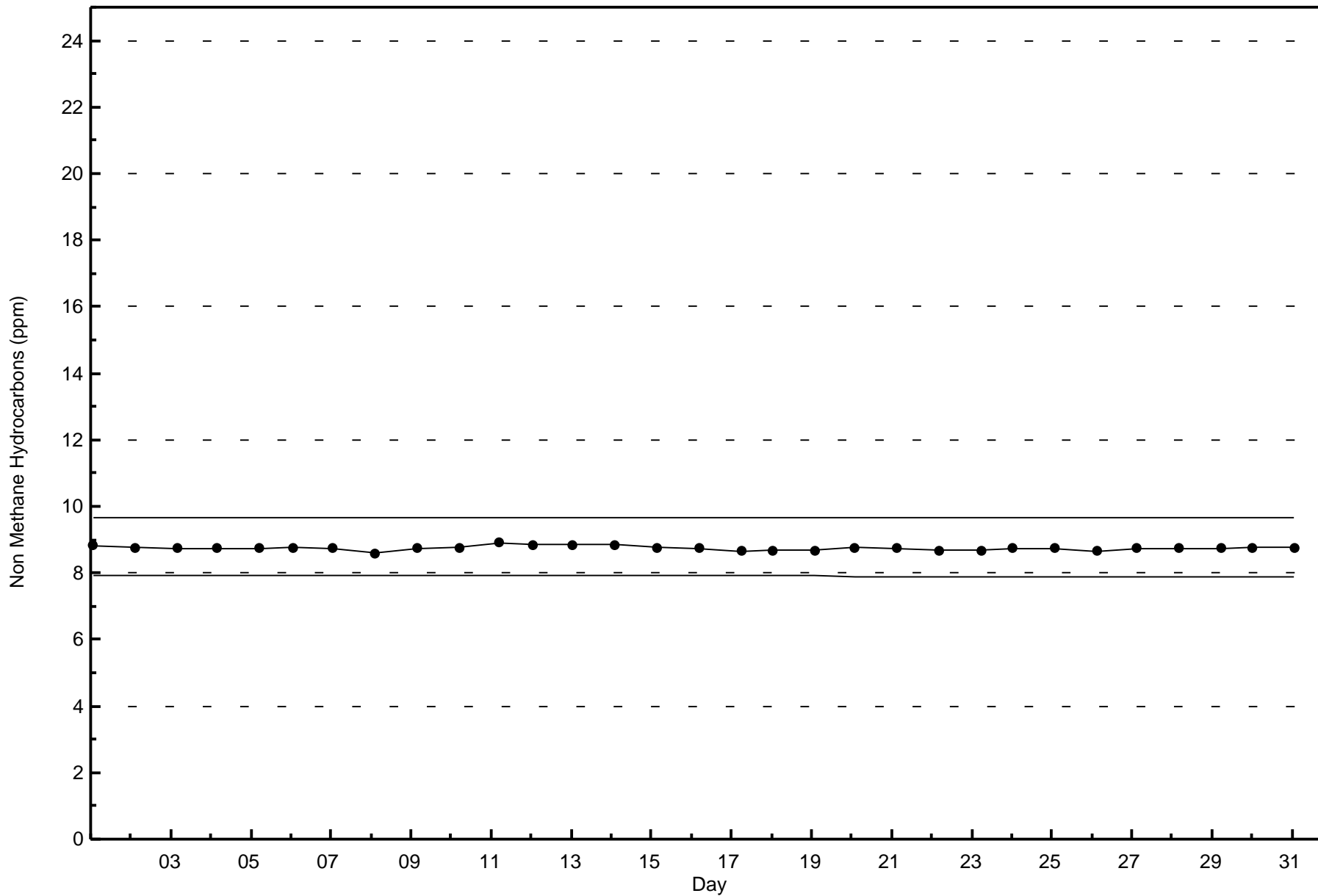


Wood Buffalo Environmental Association
Wind Rose May 2016

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm Conklin Community - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.3 ppm on May 3 05:00	Maximum Daily Average: 1.9 ppm on May 19		Hours of Data:	702
Minimum Value: 1.8 ppm on May 18 13:00	Minimum Daily Average: 1.8 ppm on May 17		Hours of Missing Data:	42
Maximum Diurnal Average: 1.9 ppm at hour 5	Minimum Diurnal Average: 1.8 ppm at hour 16		Hours of Calibration:	35
Monthly Average: 1.88 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.0		Percent Operational Time:	99.1

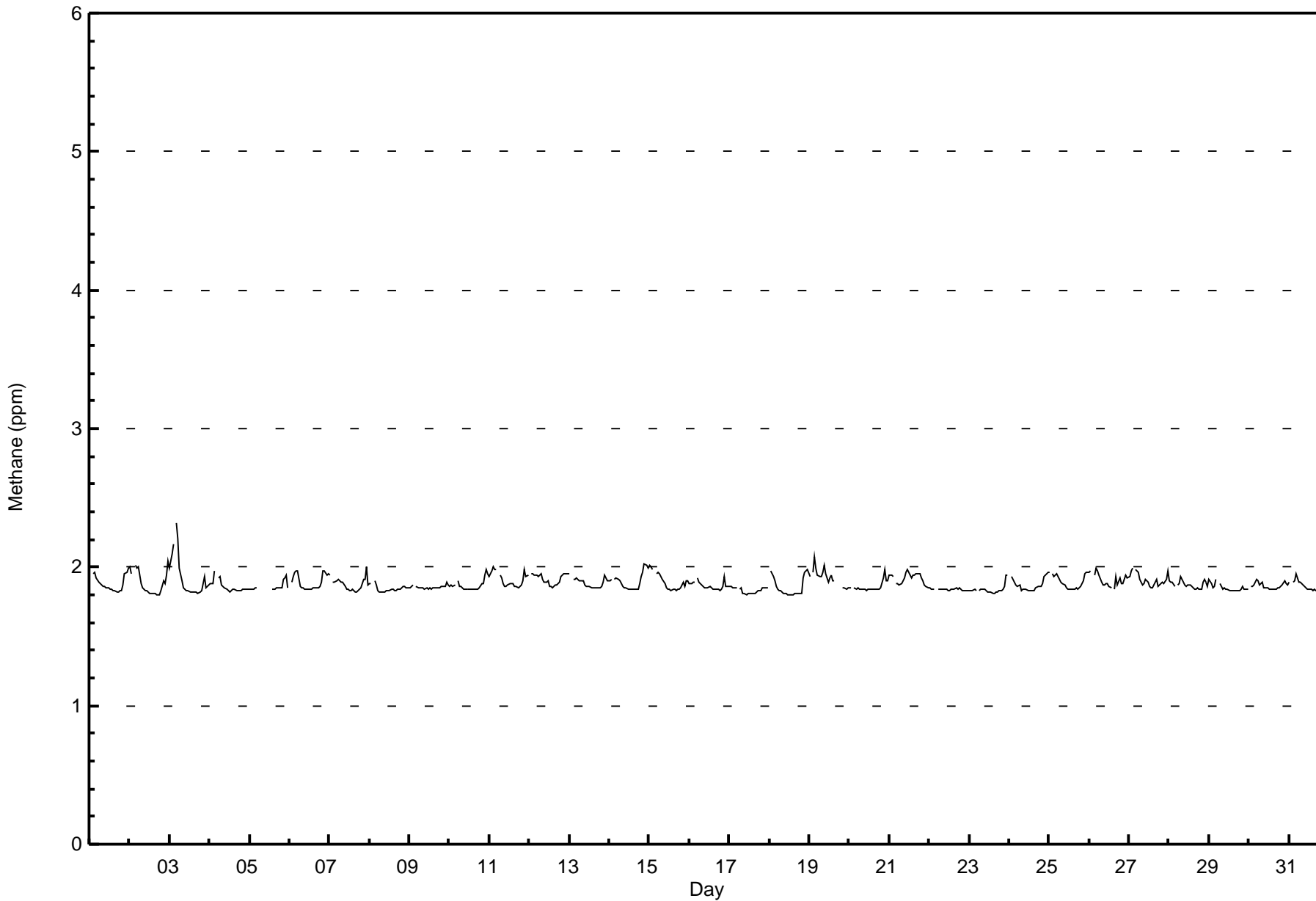
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	1.9	2.0
2-May	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.8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

1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	Diurnal Average
2.0	2.1	2.2	2.1	2.3	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	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Conklin Community - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Conklin Community - May 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	697	99.29	99.29
2.1 - 3.0	5	0.71	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Conklin Community - May 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	67	54	21	6	9	34	31	31	50	83	33	24	41	25	99	87	695
2.1 - 3.0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	1	5
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	54	21	7	9	35	31	33	50	83	33	24	41	25	99	88	700

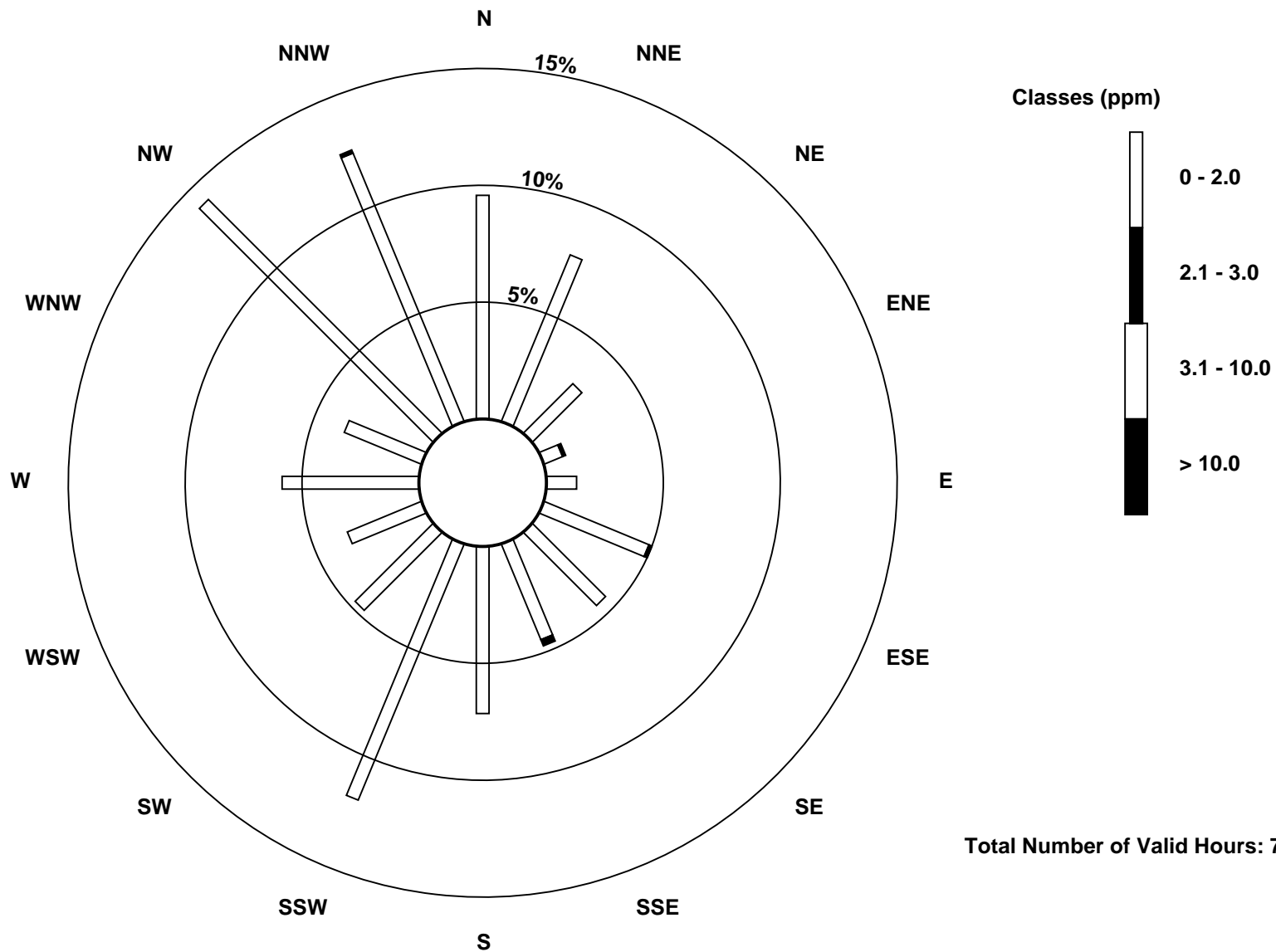
Total Number of Valid Hours: 700

Total Number of Hours: 744

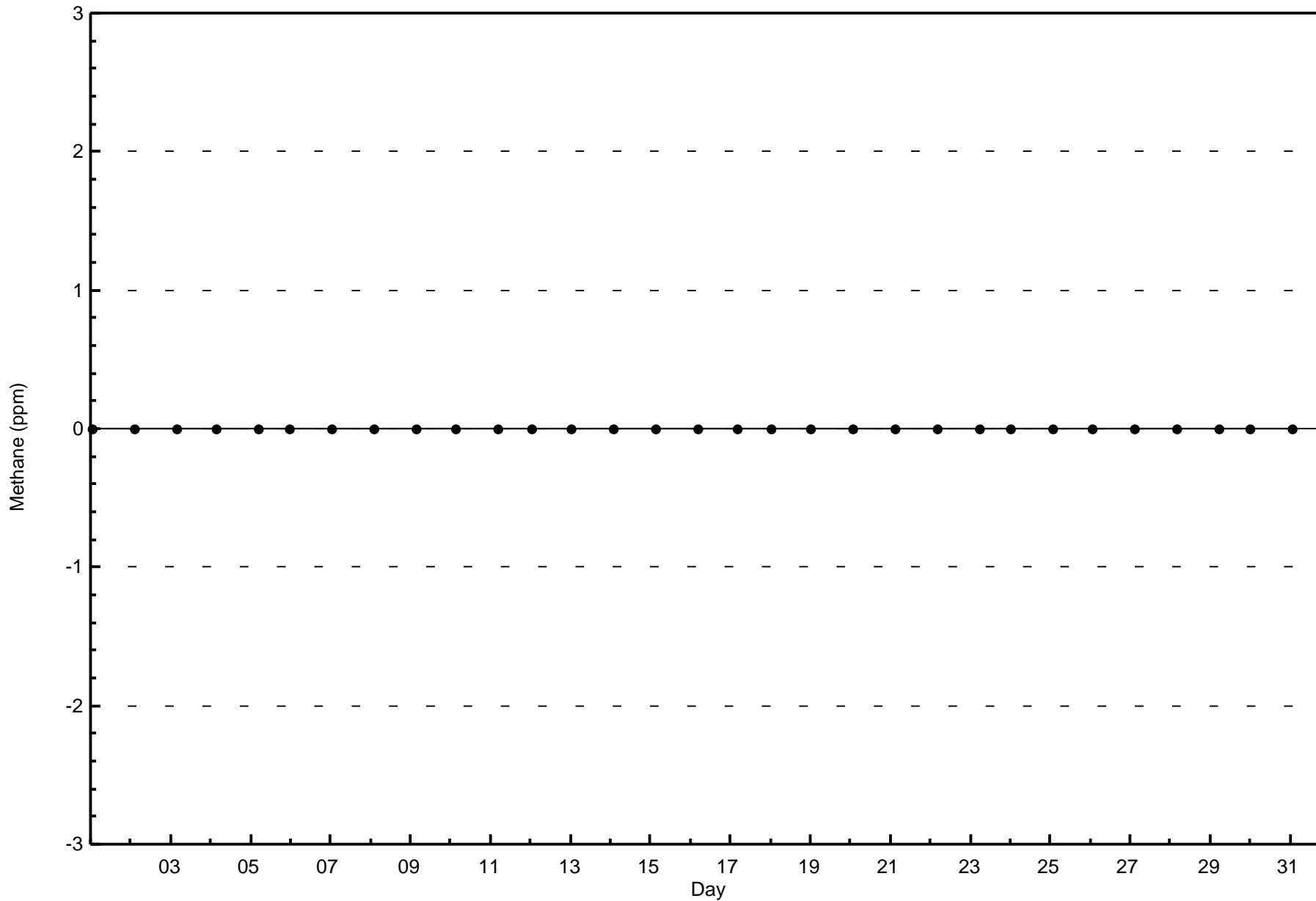


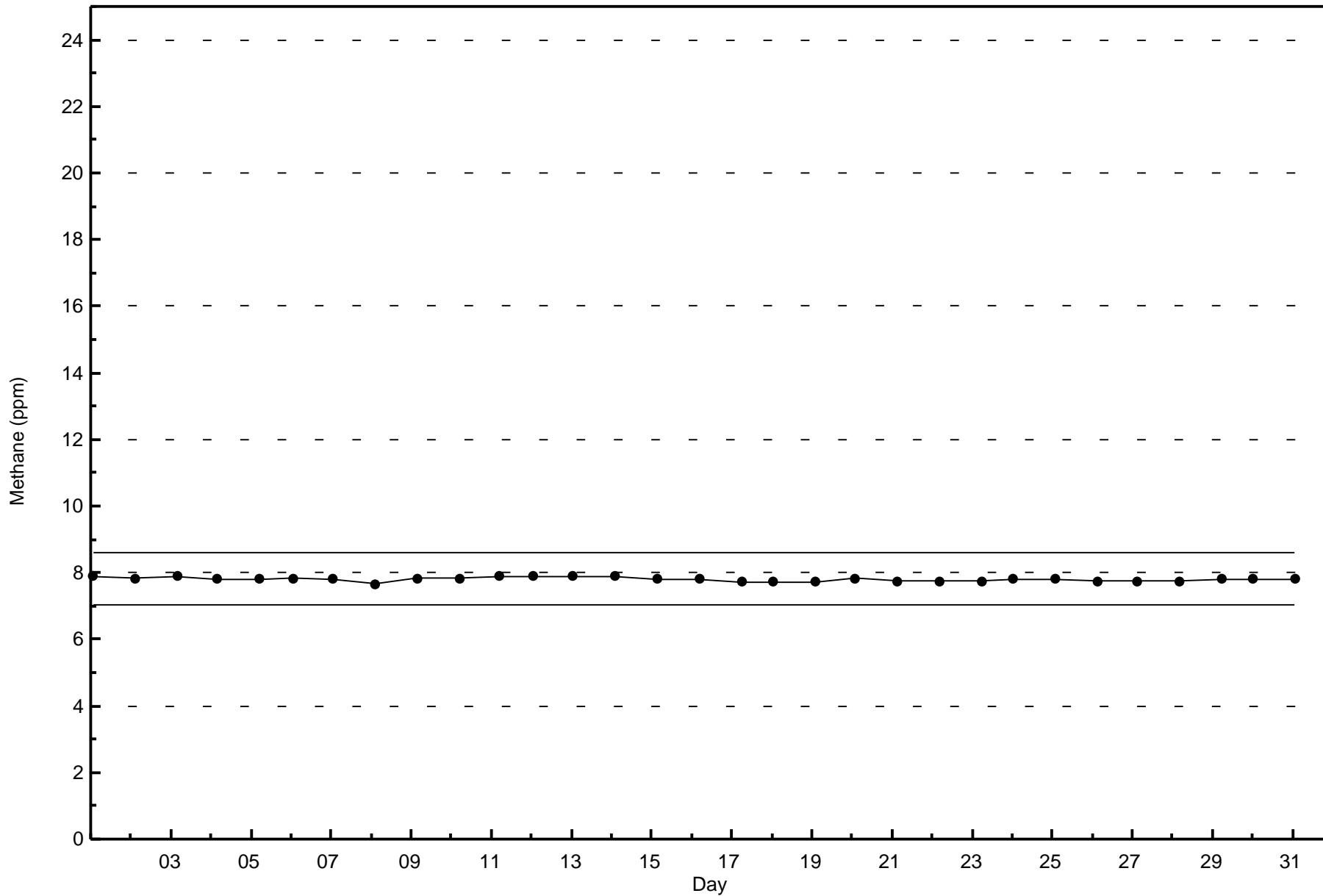
Wood Buffalo Environmental Association
Wind Rose May 2016

Methane (CH₄) - ppm
Conklin Community (AMS 21)



Total Number of Valid Hours: 700





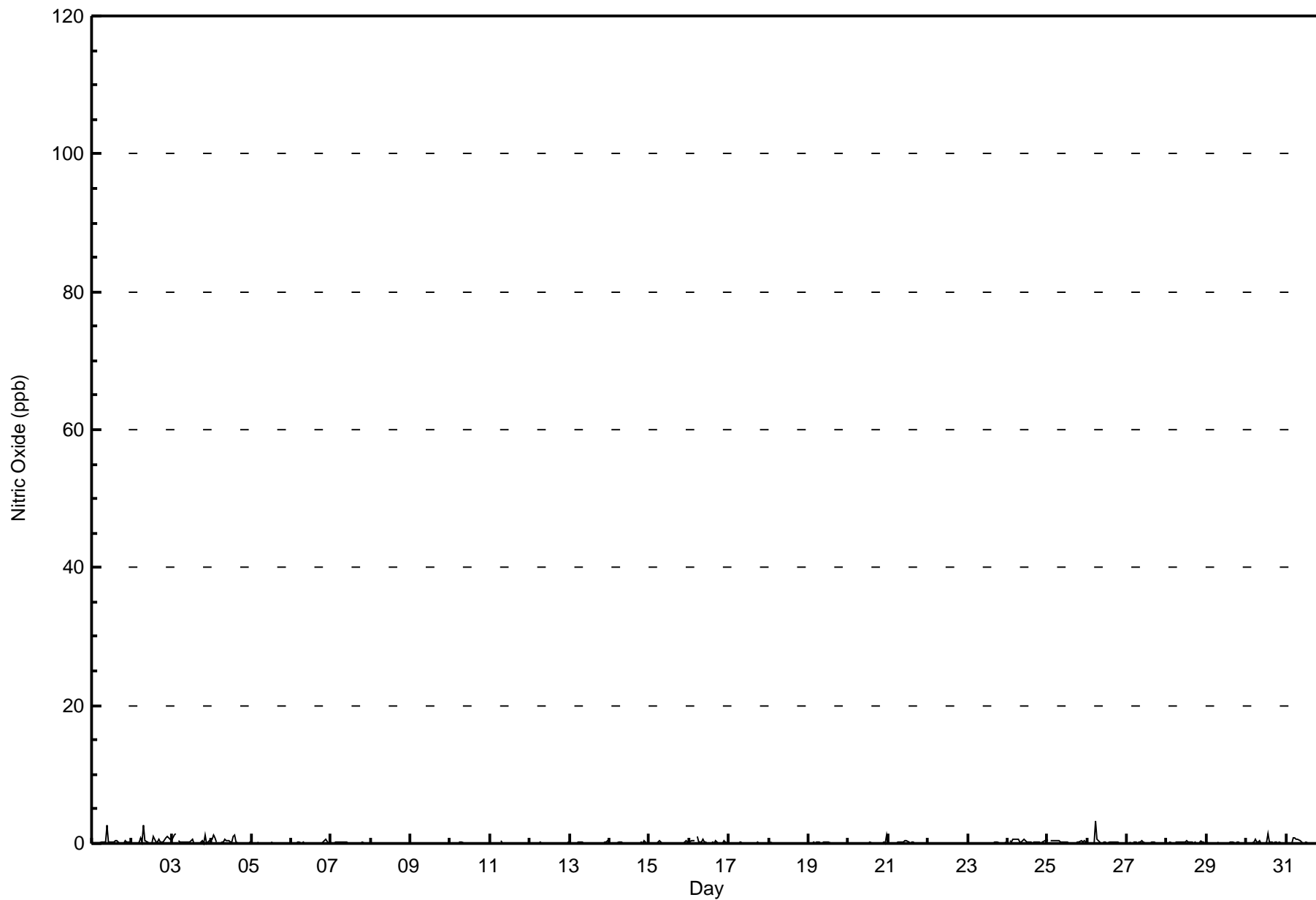


Maximum Value: 6 ppb on May 31 22:00																	Maximum Daily Average: 0.6 ppb on May 31							Hours in Service: 744																		
Minimum Value: 0 ppb on May 9 22:00																	Minimum Daily Average: 0.0 ppb on May 22							Hours of Data: 703																		
Maximum Diurnal Average: 0.4 ppb at hour 6																	Minimum Diurnal Average: 0.1 ppb at hour 18							Hours of Missing Data: 41																		
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							Hours of Calibration: 36																		
																	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-May	0	Z	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3																
2-May	0	0	Z	0	0	1	0	3	0	0	0	0	1	0	0	1	0	0	0	1	1	1	1	1	0.5	3																
3-May	0	1	1	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0.4	1																	
4-May	1	1	1	0	Z	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1																	
5-May	0	0	0	0	0	Z	0	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1																	
7-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
8-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																	
10-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																	
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																	
12-May	Z	0	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
16-May	0	0	0	0	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																	
17-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
18-May	Z	0	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0.1	0																	
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0.1	1																	
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																	
23-May	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																	
24-May	Z	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1																	
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																	
26-May	0	0	Z	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3																	
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																	
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																	
30-May	Z	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.2	2																	
31-May	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	6	2	0	0.6	6																
																	0.1	0.2	0.2	0.1	0.1	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	Diurnal Average	
																	1	1	1	1	1	3	1	3	1	3	1	0	1	2	1	0	1	0	0	0	1	6	2	1	Diurnal Maximum	
Z - zerospan			C - Calibration			PF - Power Failure																																				



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Conklin Community - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701
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	67	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701

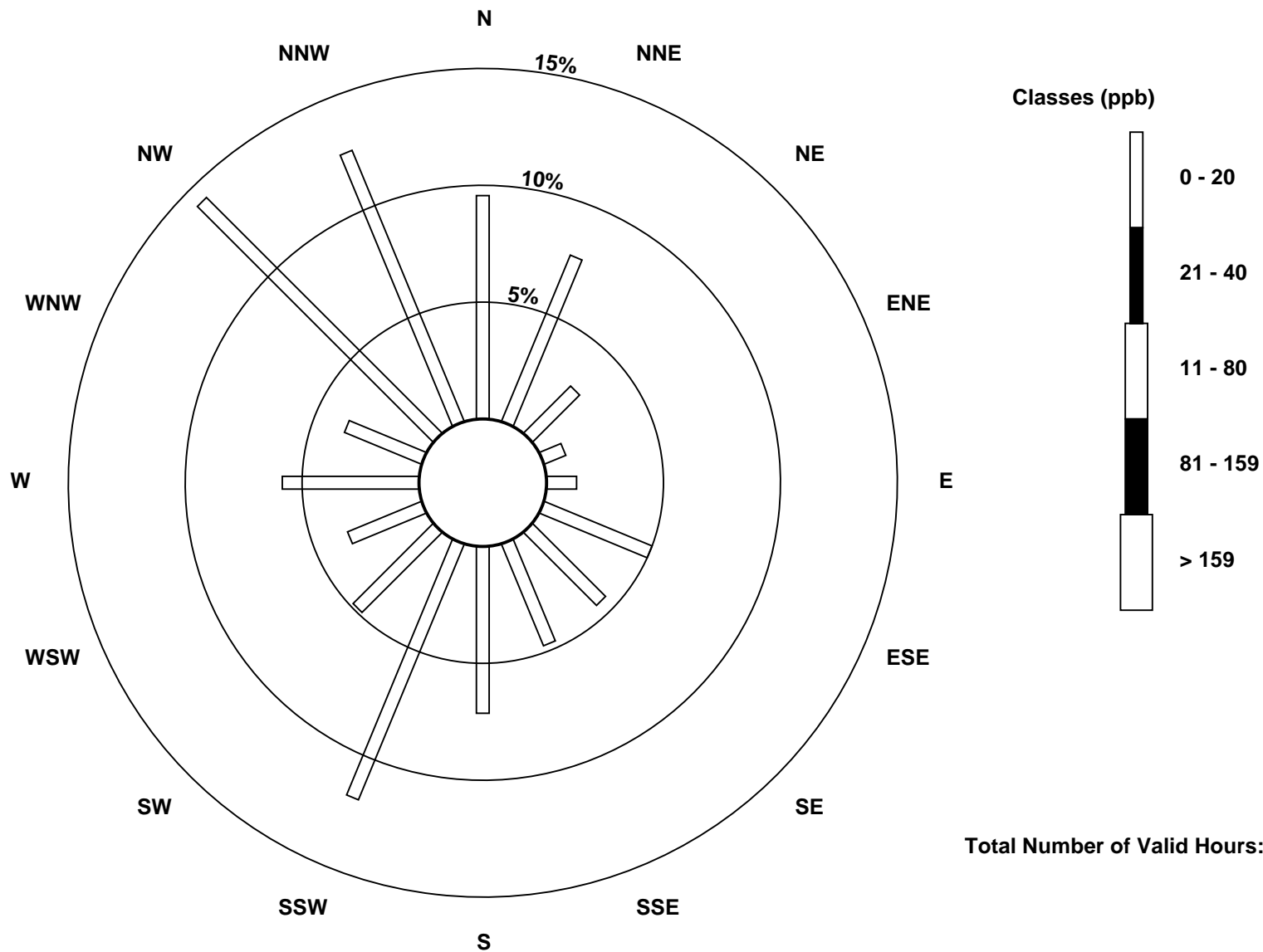
Total Number of Valid Hours: 701

Total Number of Hours: 744

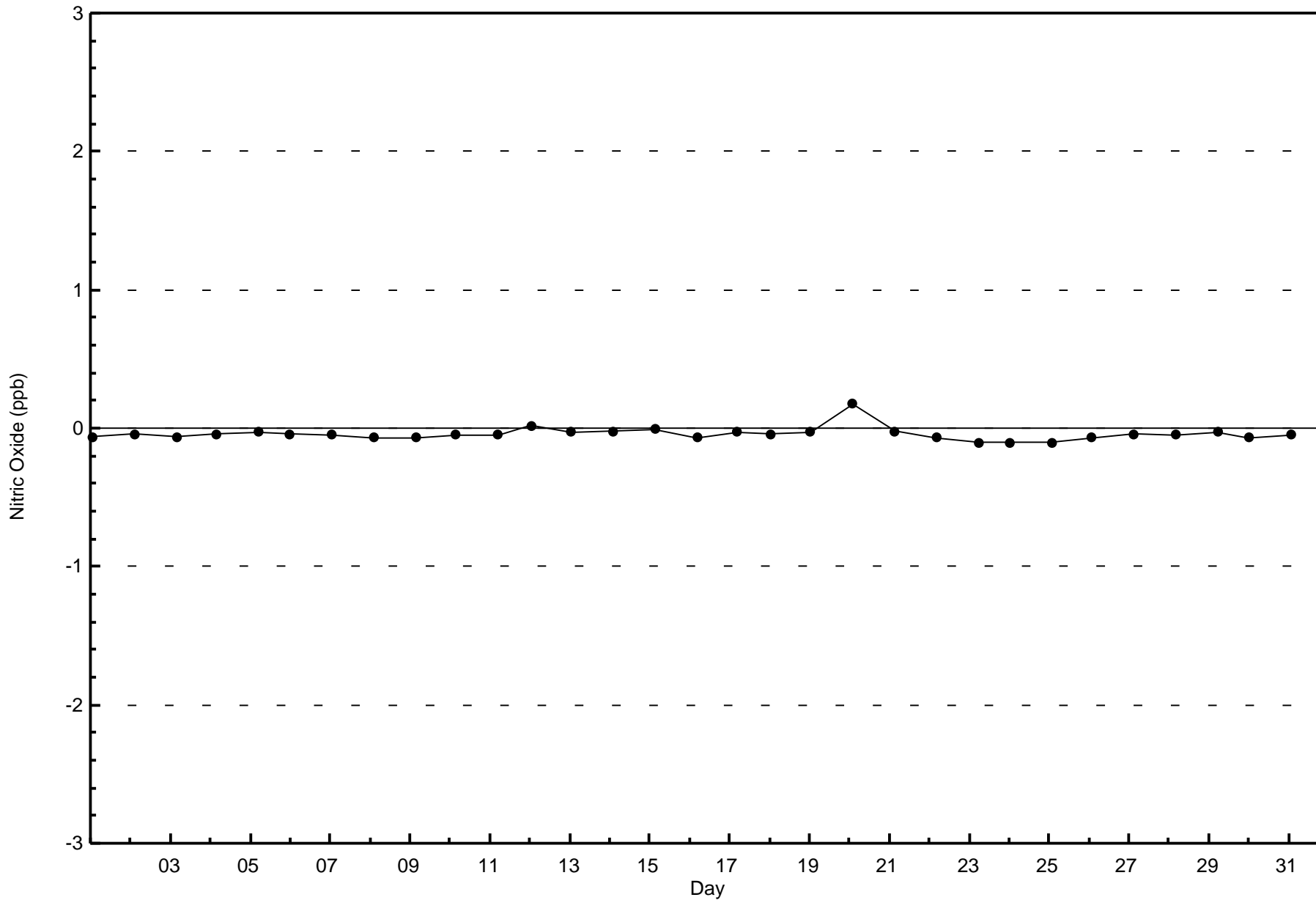


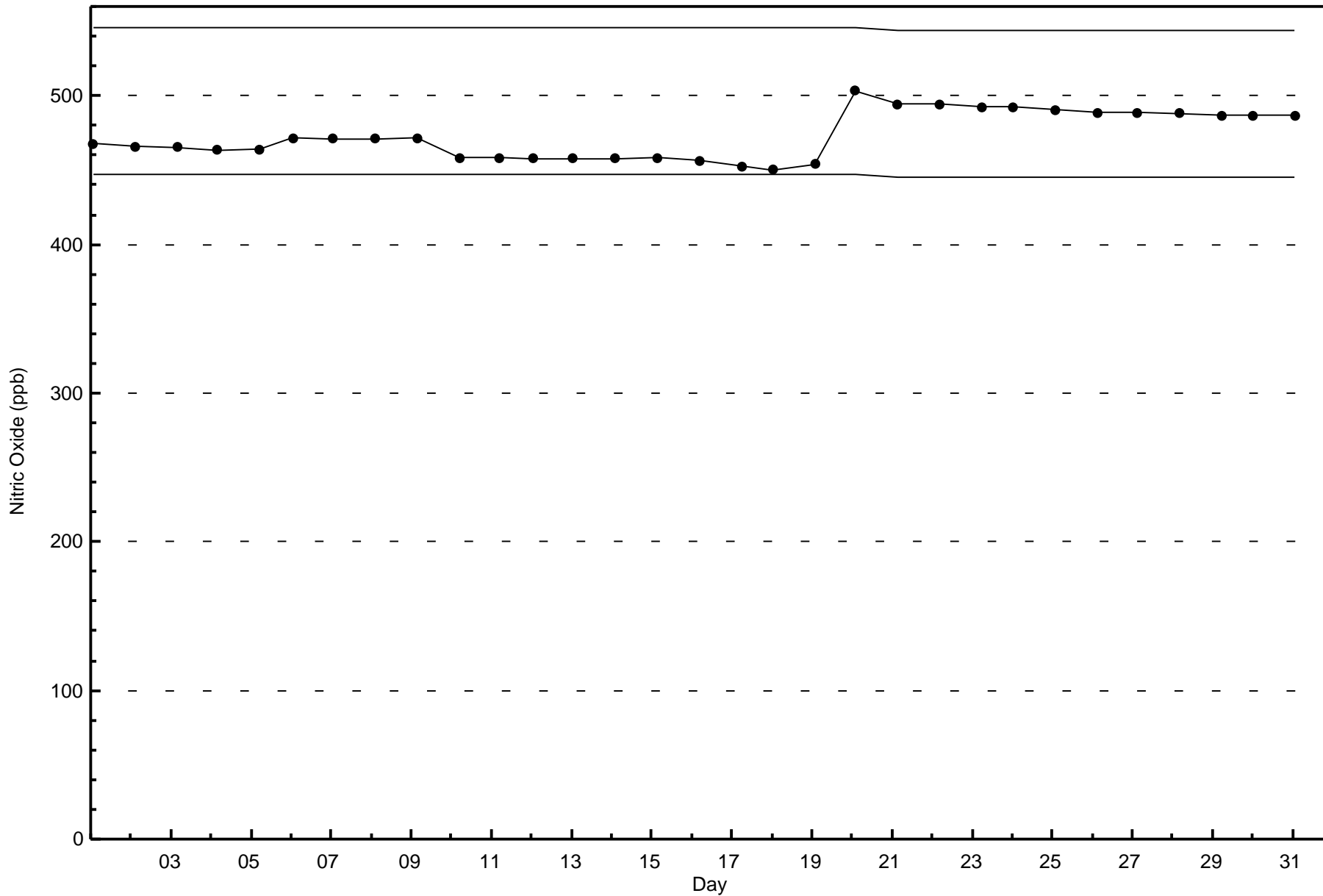
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitric Oxide (NO) - ppb
Conklin Community (AMS 21)



Total Number of Valid Hours: 701







Wood Buffalo Environmental Association
Summary of Hour Averages

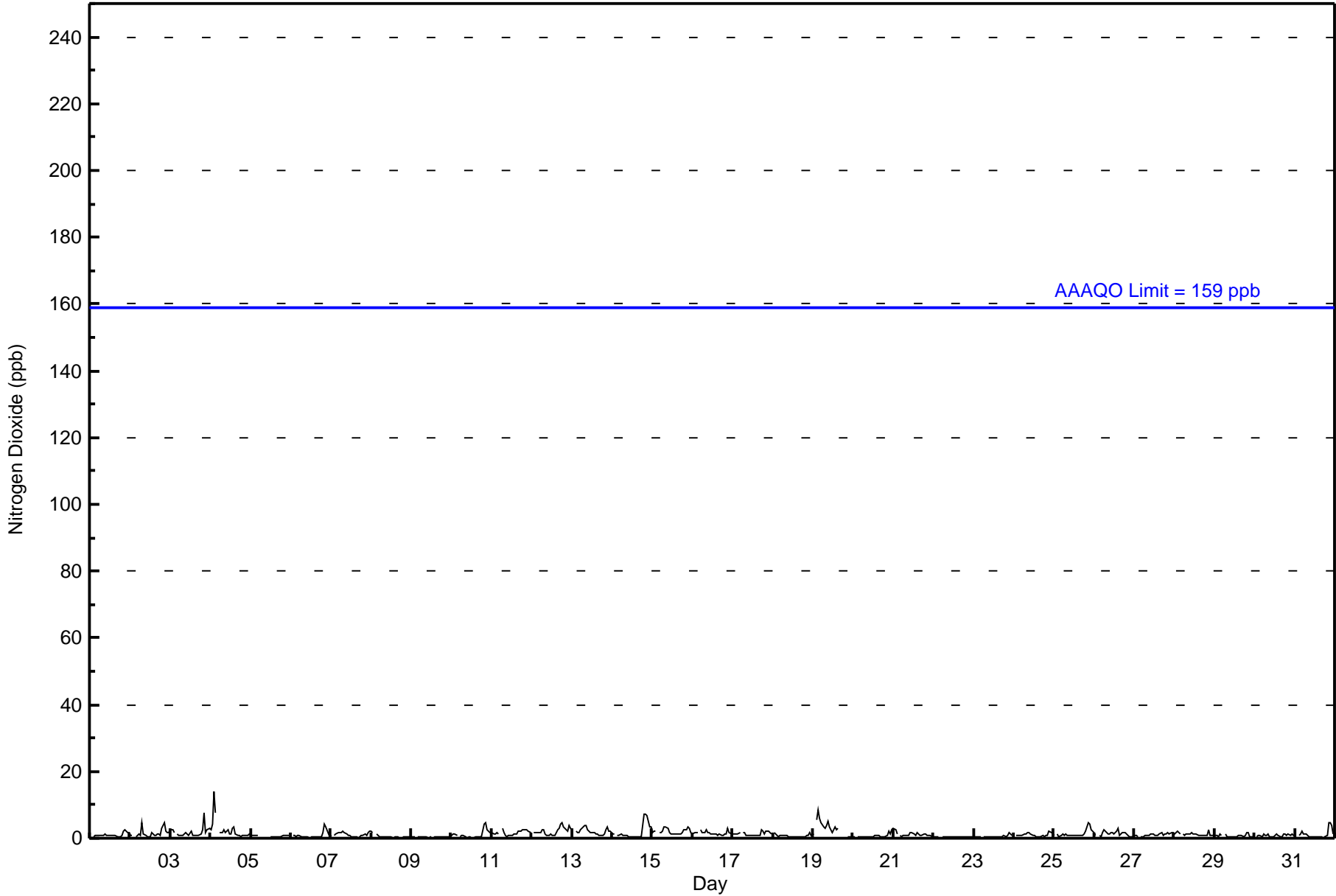
Nitrogen Dioxide (NO₂) - ppb
Conklin Community - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 ppb on May 4 03:00 Maximum Daily Average: 3.3 ppb on May 19																	Hours in Service: 744 Hours of Data: 703									
Minimum Value: 0 ppb on May 9 13:00 Minimum Daily Average: 0.3 ppb on May 9 Maximum Diurnal Average: 2.3 ppb at hour 21 Minimum Diurnal Average: 0.8 ppb at hour 13 Monthly Average: 1.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 7																	Hours of Missing Data: 41 Hours of Calibration: 36 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-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	2	3	2	2	1.0	3	
2-May	1	1	Z	1	1	1	1	5	1	1	1	1	0	2	1	1	1	1	1	3	5	2	2	2	1.4	5
3-May	2	2	2	Z	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	3	8	2	3	3	1.8	8
4-May	2	4	14	8	Z	2	2	2	3	2	3	1	1	3	3	1	1	1	1	1	1	1	1	1	2.5	14
5-May	1	1	1	1	1	Z	1	PF	PF	PF	PF	PF	1	1	1	0	1	1	1	1	1	1	1	1	0.7	1
6-May	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	2	4	3	1	1	0.9	4
7-May	1	Z	1	1	2	2	2	2	2	1	1	1	1	0	1	0	0	1	1	1	1	1	2	2	1.1	2
8-May	2	2	Z	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	2
9-May	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-May	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	4	5	3	2	2	1.1	5
11-May	2	1	1	2	1	Z	3	2	1	1	1	1	1	1	1	2	2	3	2	2	3	2	2	2	1.6	3
12-May	Z	2	2	2	2	2	3	3	1	1	1	1	1	1	2	3	4	5	3	2	2	4	3	3	2.1	5
13-May	2	Z	2	2	2	3	3	4	4	2	2	2	2	2	1	1	1	1	1	1	3	4	2	2	2.1	4
14-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	1	4	7	7	7	3	3	3	1.9	7
15-May	2	2	2	Z	2	2	2	3	4	3	2	1	1	1	1	1	1	1	2	3	3	3	2	2	2.0	4
16-May	1	2	2	2	Z	3	2	2	3	2	2	1	1	1	1	1	1	1	1	1	3	2	1	1	1.5	3
17-May	1	1	1	1	2	Z	2	2	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	1	1.3	2
18-May	Z	2	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	2	1	1	0.7	2
19-May	1	Z	6	8	6	5	3	3	4	5	3	2	3	3	3	3	C	C	C	C	C	0	0	0	3.3	8
20-May	0	0	Z	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	2	1	3	0.7	3
21-May	3	3	1	Z	1	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1.2	3
22-May	1	1	0	0	Z	1	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.4	1
23-May	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	1	0.5	2
24-May	Z	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1.0	2
25-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	4	2	2	1.4	5
26-May	2	1	Z	1	1	2	3	2	1	1	2	2	1	2	3	1	1	2	2	1	1	1	1	1	1.4	3
27-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	2	1.1	2
28-May	1	2	2	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	3	1	1	1	1.2	3
29-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	0	0	0.8	2
30-May	Z	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
31-May	1	Z	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	5	5	4	1	1.2	5
1.3 1.3 1.8 1.5 1.2 1.3 1.3 1.4 1.3 1.1 1.0 0.8 0.8 0.9 0.9 0.9 0.9 0.8 0.9 1.1 1.6 2.3 2.0 1.6 1.4																								Diurnal Average		
3 4 14 8 6 5 3 5 4 5 3 2 3 3 3 3 3 3 4 5 7 8 7 4 3																								Diurnal Maximum		
Z - zerospan C - Calibration PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Conklin Community - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



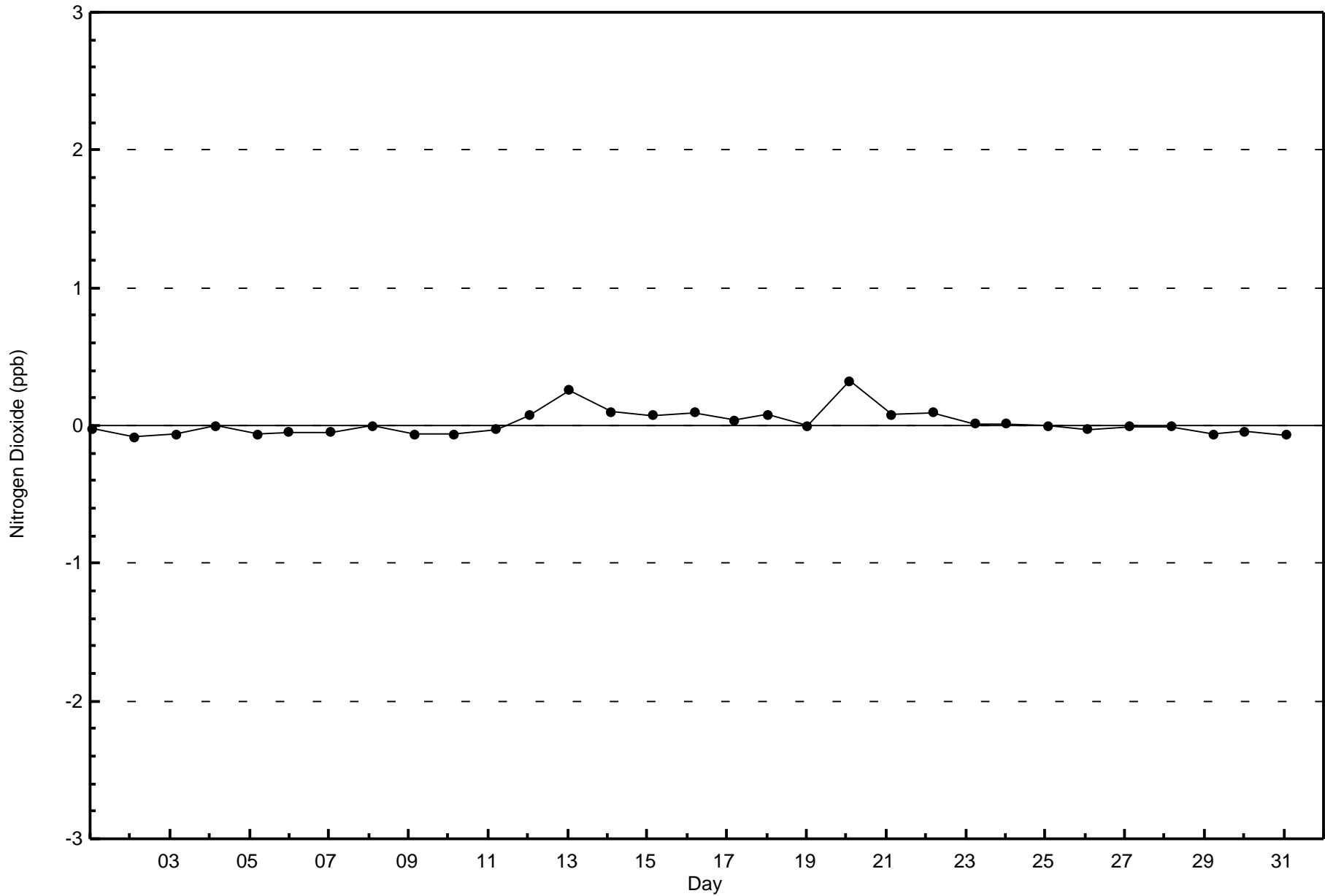
**Wood Buffalo Environmental Association
Frequency Distribution**

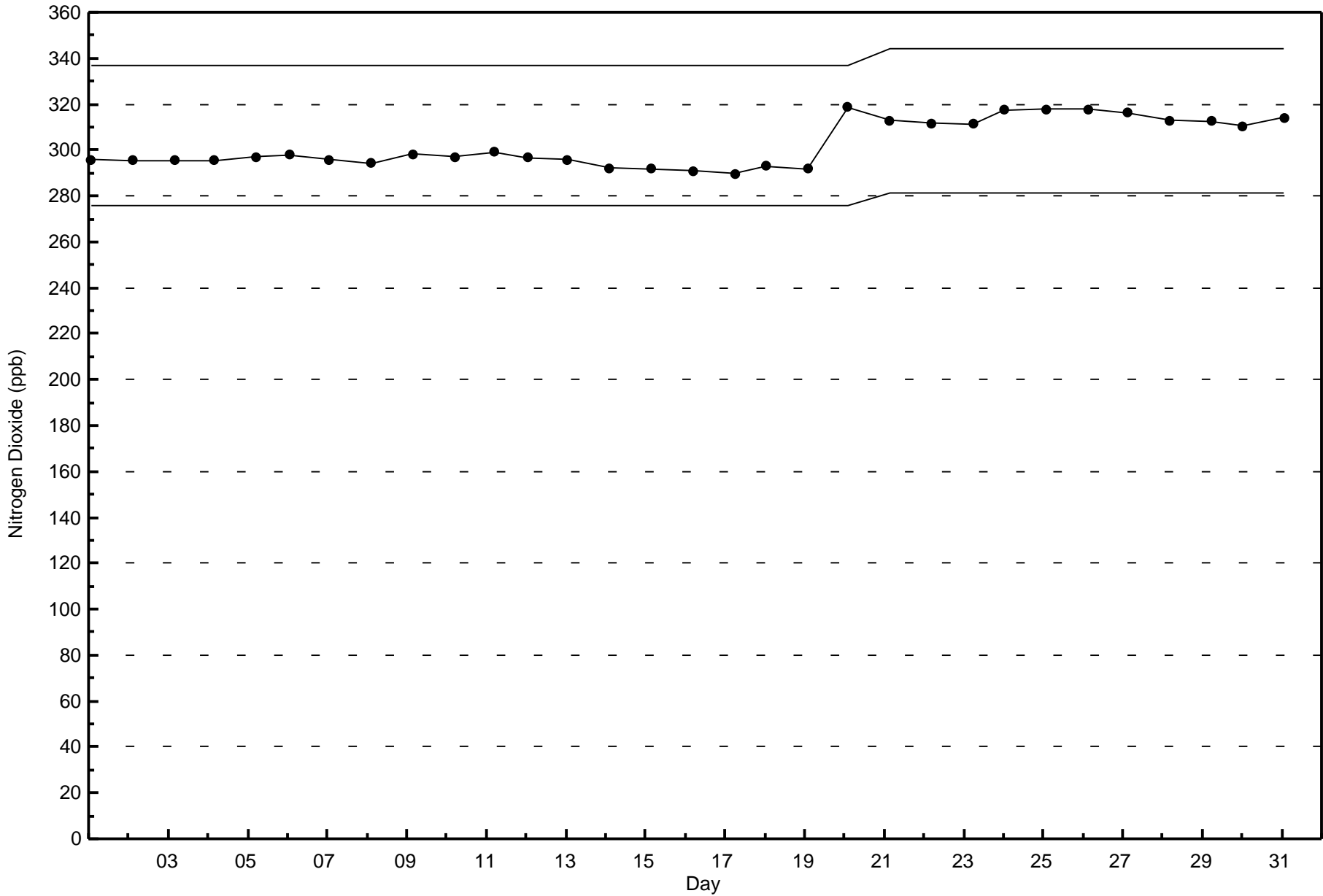
**Nitrogen Dioxide (NO₂) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701
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	67	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701

Total Number of Valid Hours: 701

Total Number of Hours: 744







Wood Buffalo Environmental Association
Summary of Hour Averages

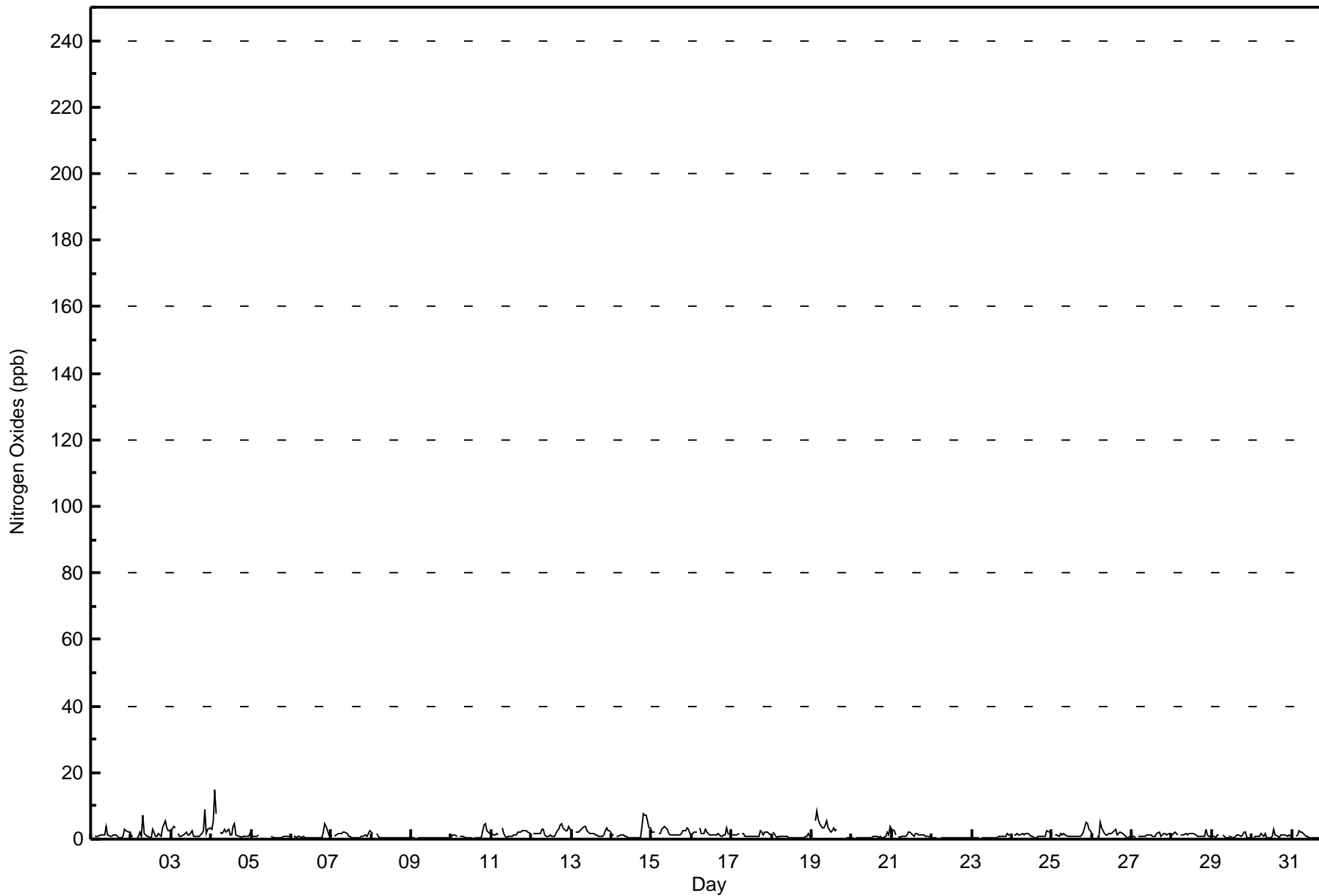
Nitrogen Oxides (NO_x) - ppb
Conklin Community - May 2016

Maximum Value: 15 ppb on May 4 03:00																	Maximum Daily Average: 3.3 ppb on May 19																	Hours in Service: 744														
Minimum Value: 0 ppb on May 10 14:00																	Minimum Daily Average: 0.3 ppb on May 9																	Hours of Data: 703														
Maximum Diurnal Average: 2.5 ppb at hour 21																	Minimum Diurnal Average: 0.9 ppb at hour 12																	Hours of Missing Data: 41														
Monthly Average: 1.4 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 7																	Hours of Calibration: 36														
																																		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-May	1	Z	1	1	1	1	1	1	1	4	1	1	1	1	1	1	0	0	0	1	3	3	2	2	1.3	4																						
2-May	1	1	Z	1	1	2	1	7	2	1	1	1	3	1	1	2	1	1	3	5	3	3	3	3	1.9	7																						
3-May	3	4	3	Z	2	1	1	1	2	2	1	1	3	1	1	1	1	2	3	9	2	3	3	3	2.1	9																						
4-May	3	5	15	8	Z	2	2	2	3	2	3	1	1	4	5	1	1	1	1	1	1	1	2	2	2.8	15																						
5-May	1	1	1	1	1	Z	1	PF	PF	PF	PF	PF	1	1	1	0	1	0	1	1	1	1	1	1	0.7	1																						
6-May	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	2	5	4	1	1	0.9	5																						
7-May	1	Z	1	1	2	2	2	2	2	2	1	1	1	1	0	0	1	1	1	1	1	1	2	2	1.2	2																						
8-May	2	2	Z	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0.6	2																						
9-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
10-May	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	4	5	3	2	2	1.1	5																						
11-May	2	1	1	2	1	Z	3	1	1	1	1	1	1	1	1	2	2	3	2	2	3	2	2	2	1.6	3																						
12-May	Z	2	2	2	1	2	3	3	1	1	1	1	1	1	2	3	4	5	3	2	2	4	3	3	2.2	5																						
13-May	2	Z	2	2	2	3	3	4	4	2	2	2	2	2	1	1	1	1	1	2	4	2	3	3	2.2	4																						
14-May	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	4	8	7	7	3	3	3	2.0	8																						
15-May	2	2	2	Z	2	2	3	4	4	3	2	1	1	1	1	1	1	2	3	3	4	3	2	2	2.1	4																						
16-May	1	2	2	2	Z	4	2	2	3	2	2	1	1	1	1	2	1	1	1	1	3	2	1	1	1.8	4																						
17-May	1	1	1	1	2	Z	2	2	1	1	1	1	1	1	1	1	1	3	2	1	2	2	2	1	1.3	3																						
18-May	Z	2	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	1	1	1	2	1	1	0.8	2																						
19-May	1	Z	5	8	6	5	3	3	4	5	3	2	3	3	3	3	C	C	C	C	C	0	0	0	3.3	8																						
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1	2	1	4	0.7	4																						
21-May	3	3	1	Z	1	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1.3	3																						
22-May	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	1	0.6	2																						
24-May	Z	1	1	2	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	1.3	2																						
25-May	1	Z	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	5	3	2	1.6	5																						
26-May	2	1	Z	1	1	5	3	2	1	1	2	2	1	2	3	1	1	2	2	1	1	1	1	1	1.7	5																						
27-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	1	2	2	1.2	2																						
28-May	1	2	2	1	Z	1	1	1	2	1	2	2	2	2	1	1	1	1	1	3	1	1	1	1	1.3	3																						
29-May	1	1	1	1	1	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	2	2	1	0	0	0.9	2																						
30-May	Z	1	1	1	1	2	1	1	2	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1.1	3																						
31-May	1	Z	1	1	3	2	2	2	1	1	0	0	1	0	0	0	0	0	0	1	6	11	6	2	1.8	11																						
																								1.4	1.4	1.9	1.6	1.3	1.6	1.5	1.6	1.5	1.3	1.1	0.9	0.9	1.1	1.1	0.9	0.9	1.0	1.2	1.7	2.5	2.3	1.8	1.6	Diurnal Average
																								3	5	15	8	6	5	3	7	4	5	3	2	3	4	5	3	3	4	5	8	9	11	6	4	Diurnal Maximum
Z - zerospan																								C - Calibration				PF - Power Failure																				



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Conklin Community - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701
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	67	54	20	7	9	35	31	33	50	83	34	24	41	25	100	88	701

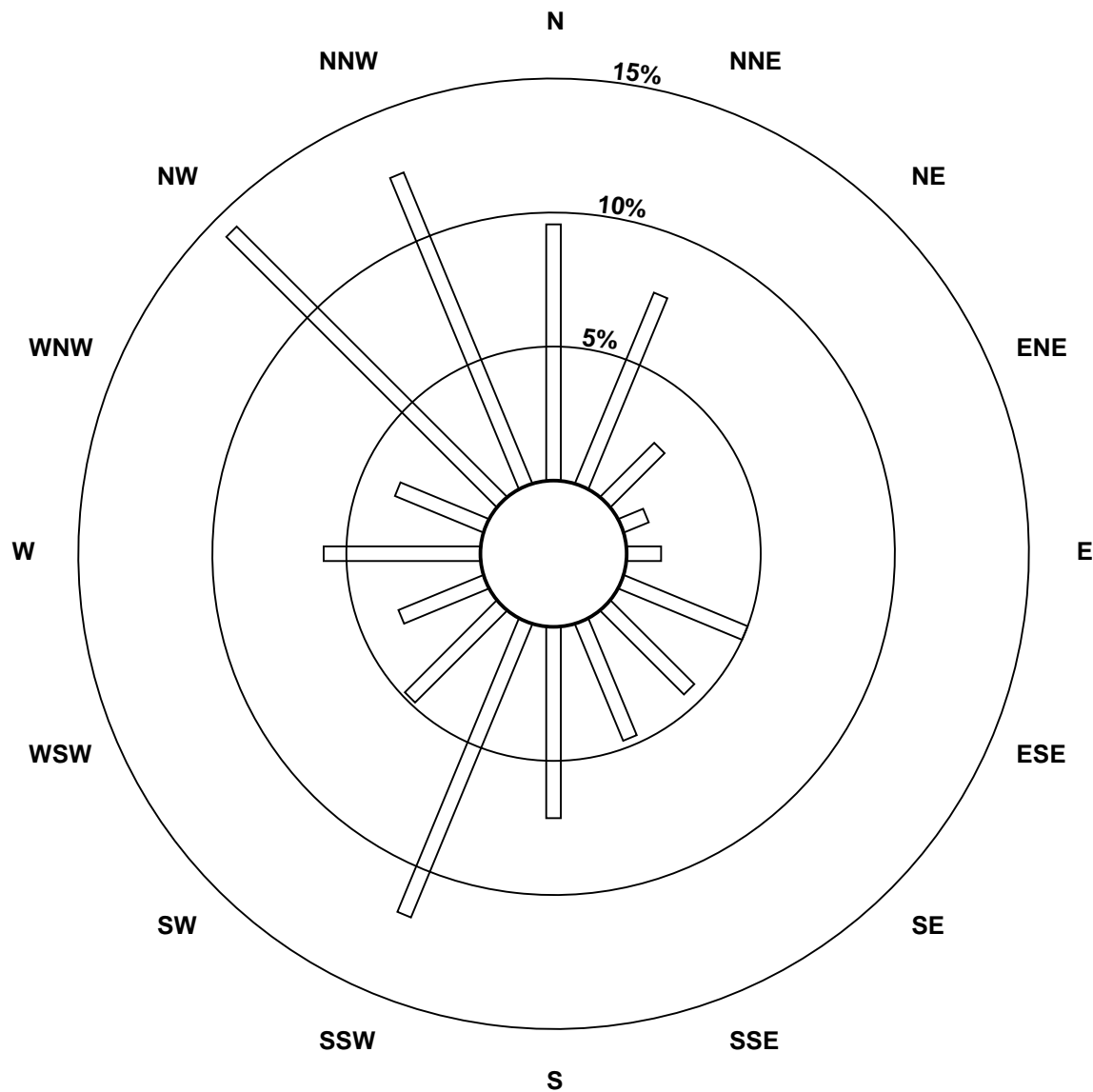
Total Number of Valid Hours: 701

Total Number of Hours: 744

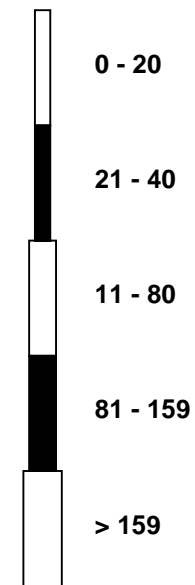


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Conklin Community (AMS 21)



Classes (ppb)

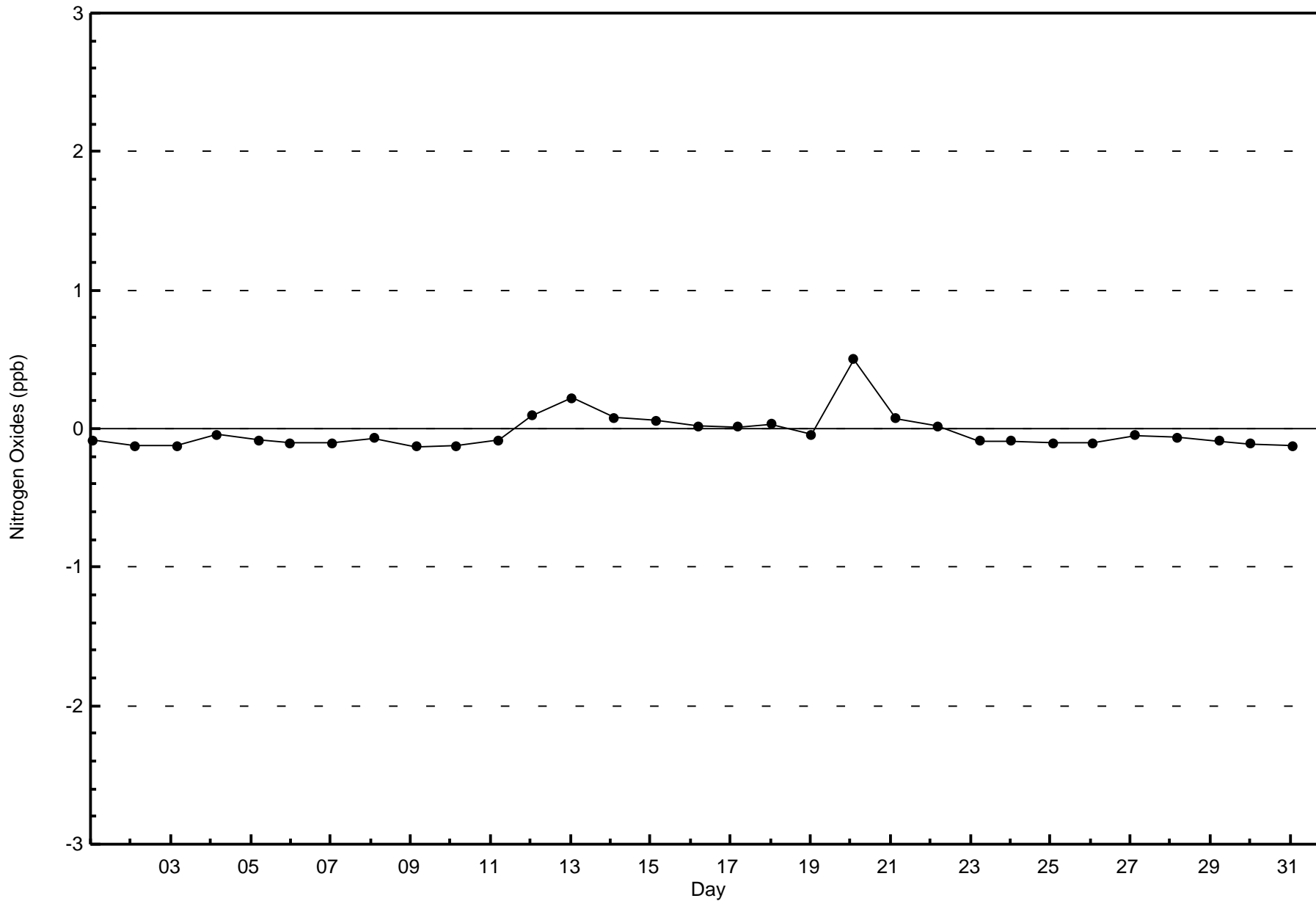


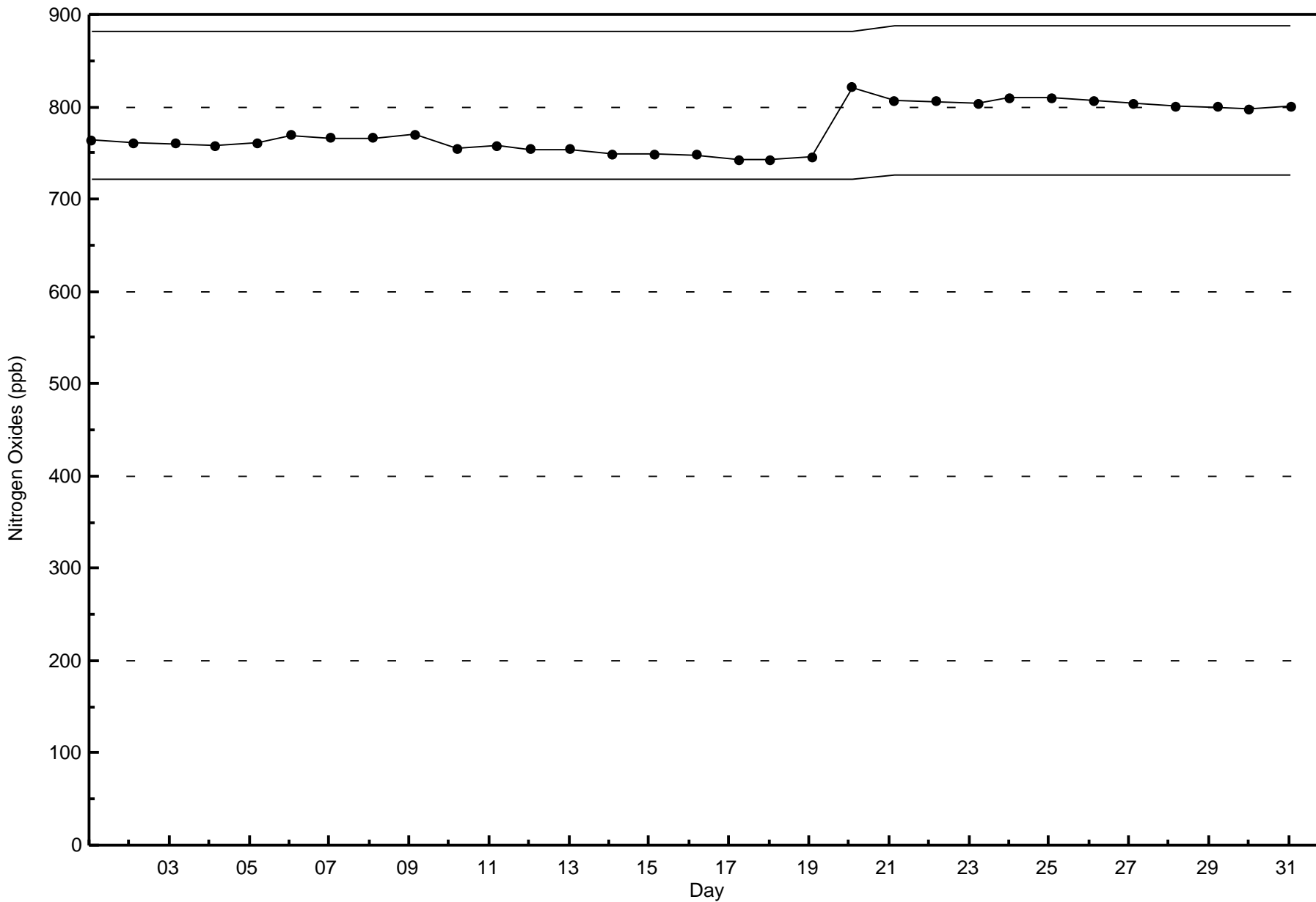
Total Number of Valid Hours: 701



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Conklin Community - May 2016







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Conklin Community - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 63 ppb on May 16 14:00	Maximum Daily Average: 49.5 ppb on May 16		Hours of Data:	706
Minimum Value: 4 ppb on May 25 03:00	Minimum Daily Average: 13.2 ppb on May 21		Hours of Missing Data:	38
Maximum Diurnal Average: 42.5 ppb at hour 16	Minimum Diurnal Average: 19.5 ppb at hour 5		Hours of Calibration:	33
Monthly Average: 32.0 ppb	Percentiles: P ₁ = 5 P ₁₀ = 13 Q ₁ = 21 Median = 31 Q ₃ = 44 P ₉₀ = 50 P ₉₉ = 61		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-May	21	21	22	18	Z	34	37	40	45	47	50	49	48	46	43	39	36	36	36	32	21	15	12	10	32.9	50
2-May	11	14	8	7	6	Z	16	23	32	36	36	36	37	36	38	38	38	38	39	28	15	18	19	15	25.5	39
3-May	10	9	7	8	7	11	Z	30	46	56	61	61	59	61	62	62	61	59	53	26	29	49	43	40.6	62	
4-May	39	37	29	34	42	41	41	Z	51	56	58	61	57	53	54	54	53	53	53	48	45	45	43	47.7	61	
5-May	44	45	49	41	32	20	31	PF	PF	PF	PF	PF	47	47	48	48	50	48	47	45	33	24	19	39	39.8	50
6-May	30	31	28	Z	15	20	39	40	42	44	45	46	47	48	49	50	50	49	48	38	22	19	20	18	36.5	50
7-May	18	25	34	41	Z	42	43	45	47	49	50	50	49	49	49	46	46	48	46	42	33	27	23	46	41.3	50
8-May	49	52	51	47	40	Z	50	54	53	47	47	45	48	48	48	47	47	42	39	36	32	30	29	31	44.0	54
9-May	29	27	27	27	26	25	Z	27	29	31	30	30	31	33	34	32	29	29	29	31	28	27	23	27	28.7	34
10-May	26	25	27	23	11	12	27	Z	38	41	43	44	43	43	43	42	42	42	42	51	45	27	16	18	33.5	51
11-May	17	13	10	9	8	13	29	36	Z	42	43	45	46	46	48	52	55	52	50	48	40	24	25	21	33.5	55
12-May	14	16	16	Z	18	21	28	37	39	40	41	42	42	43	44	55	57	58	53	39	26	19	16	18	34.0	58
13-May	14	15	19	16	Z	22	27	30	40	45	45	44	44	45	44	43	41	41	40	29	21	27	30	33.4	45	
14-May	27	21	17	16	14	Z	20	34	42	44	45	45	47	47	47	47	47	52	44	29	18	20	22	34.3	52	
15-May	13	14	14	15	13	13	Z	33	43	45	44	46	47	49	50	51	52	52	52	48	36	36	26	23	35.4	52
16-May	28	30	32	31	28	24	39	Z	55	59	61	63	63	63	63	61	60	61	60	58	50	49	51	51	49.5	63
17-May	50	49	48	47	44	42	42	41	Z	49	49	51	51	53	53	55	54	55	54	53	43	43	46	41	48.4	55
18-May	28	20	23	Z	30	33	35	36	34	34	36	37	36	35	36	36	36	37	38	36	25	16	11	9	30.3	38
19-May	10	12	21	15	Z	21	21	23	26	29	26	24	26	31	32	36	40	38	35	31	25	25	26	26	26.0	40
20-May	26	27	27	27	27	Z	26	C	C	C	27	29	30	31	31	31	30	30	29	28	21	14	19	16	26.4	31
21-May	10	10	9	10	11	11	Z	12	12	13	13	12	14	16	14	15	16	14	14	15	16	16	15	15	13.2	16
22-May	16	15	16	19	21	23	23	Z	22	22	22	23	22	22	22	22	22	21	21	23	26	26	27	28	21.9	28
23-May	27	29	27	28	30	30	28	27	Z	29	34	38	41	43	46	48	45	44	43	43	40	34	18	9	33.9	48
24-May	6	6	6	Z	5	8	22	39	38	35	34	39	41	41	40	40	41	41	40	38	28	13	8	5	26.7	41
25-May	5	4	4	4	Z	15	20	25	29	36	41	45	47	50	51	51	50	51	47	46	27	16	13	11	29.9	51
26-May	7	6	5	8	6	Z	18	26	27	28	33	37	40	48	38	34	32	37	34	28	20	10	7	7	23.3	48
27-May	9	6	5	4	5	8	Z	15	21	24	30	38	50	52	50	42	38	39	34	26	23	31	26	21	25.9	52
28-May	22	23	24	28	25	19	15	Z	21	24	23	23	31	30	34	39	38	40	39	35	18	10	14	16	25.6	40
29-May	14	18	24	20	12	13	15	19	Z	25	30	35	36	36	38	41	40	39	42	35	25	31	29	24	27.8	42
30-May	21	17	19	Z	11	11	15	15	20	23	24	29	31	26	28	29	31	28	27	23	16	15	17	19	21.6	31
31-May	15	14	15	14	Z	8	13	18	20	20	23	25	27	29	30	31	30	30	29	28	13	6	10	11	19.9	31

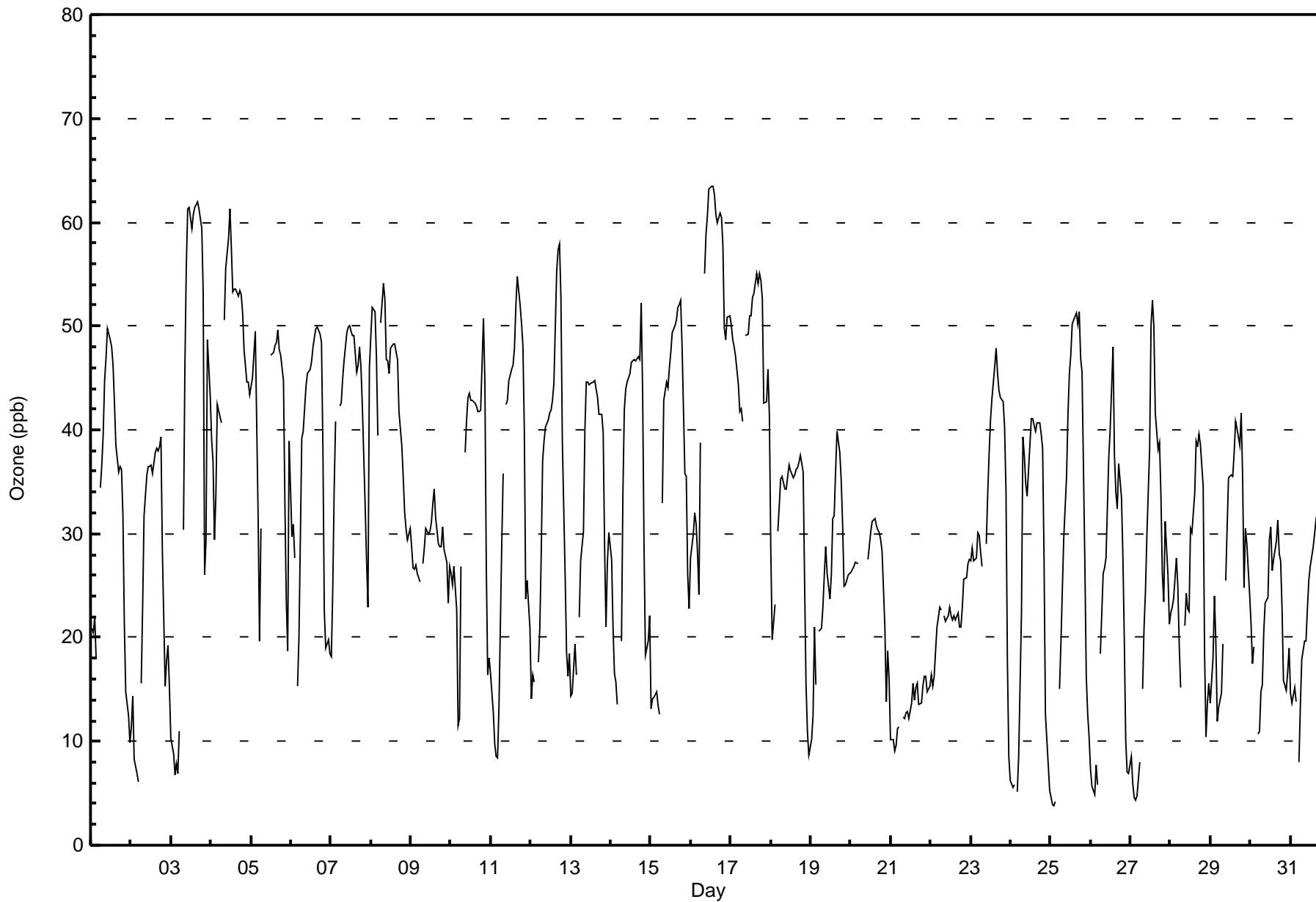
21.2	20.9	21.4	21.3	19.5	20.8	27.6	30.2	34.8	36.9	38.1	39.8	41.2	42.0	42.1	42.5	42.3	41.9	41.1	37.8	28.4	23.6	22.8	23.0	Diurnal Average
50	52	51	47	44	42	50	54	55	59	61	63	63	63	63	62	62	61	60	58	50	49	51	51	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Conklin Community - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Conklin Community - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	171	24.22	24.22
21 - 50	468	66.29	90.51
51 - 82	67	9.49	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Conklin Community - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	18	4	0	2	1	2	8	12	16	18	6	3	9	5	15	49	168
21 - 50	48	43	17	4	7	26	23	19	24	50	19	21	30	16	77	44	468
51 - 82	0	8	1	0	1	6	2	3	7	15	9	0	2	5	8	0	67
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	55	18	6	9	34	33	34	47	83	34	24	41	26	100	93	703

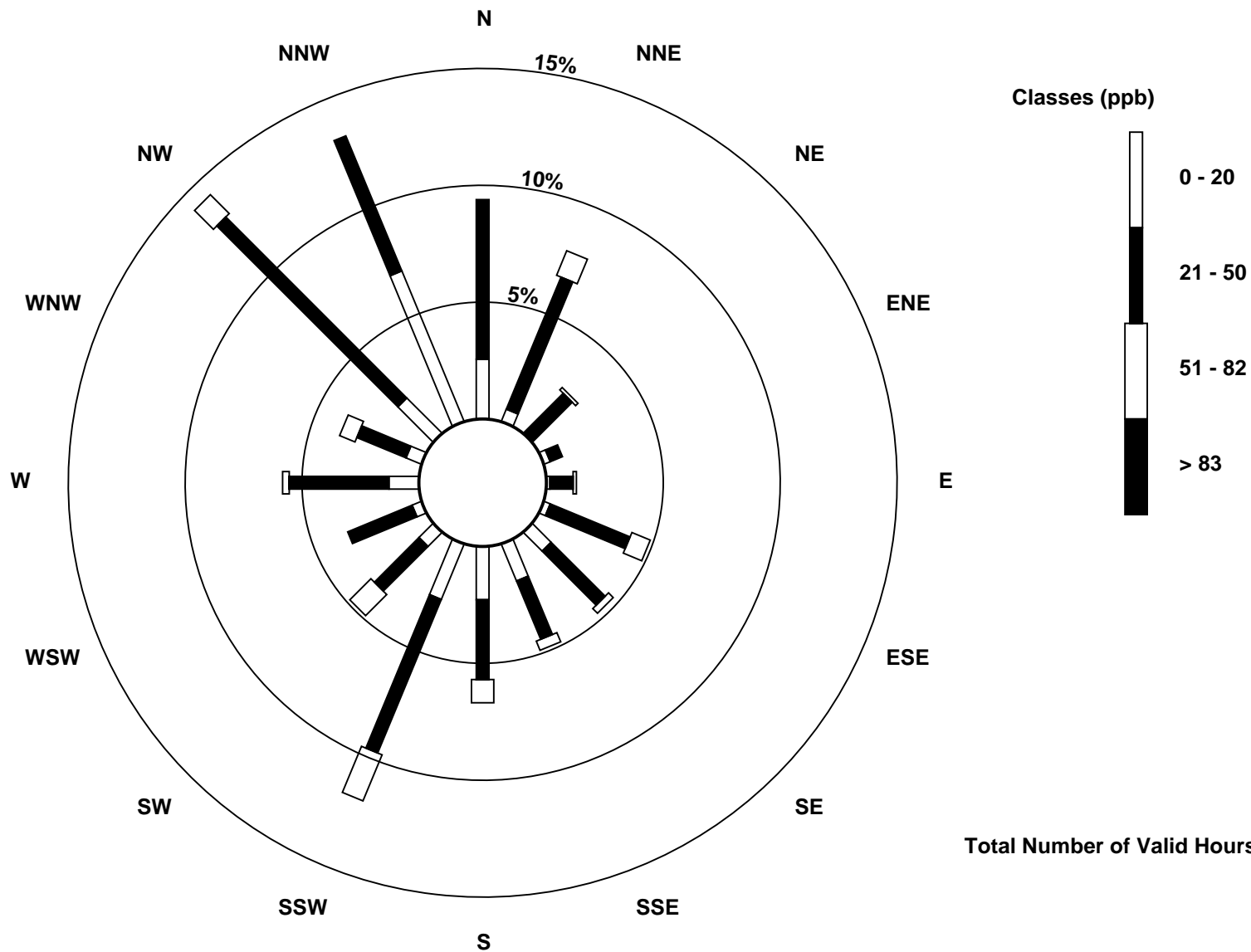
Total Number of Valid Hours: 703

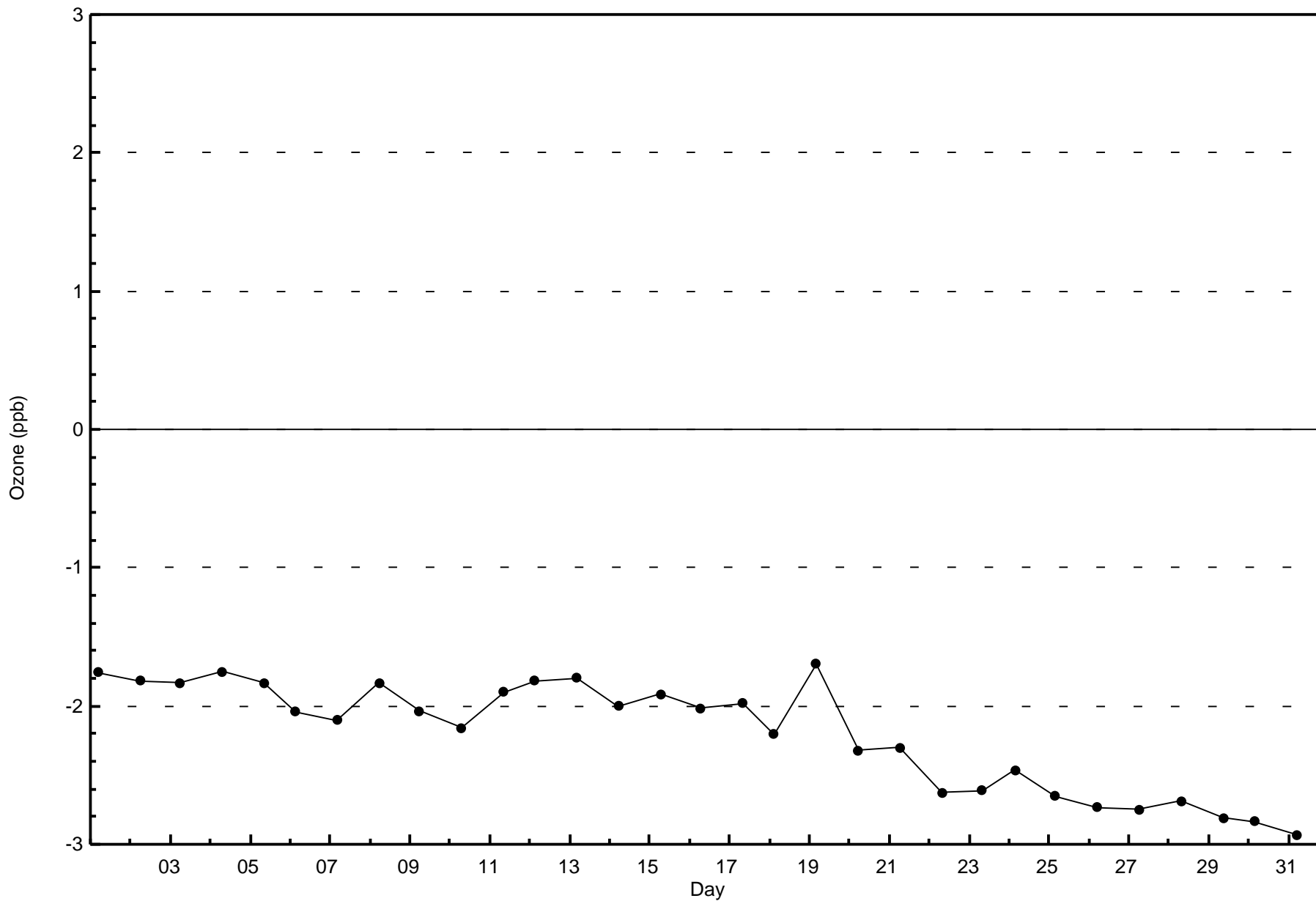
Total Number of Hours: 744

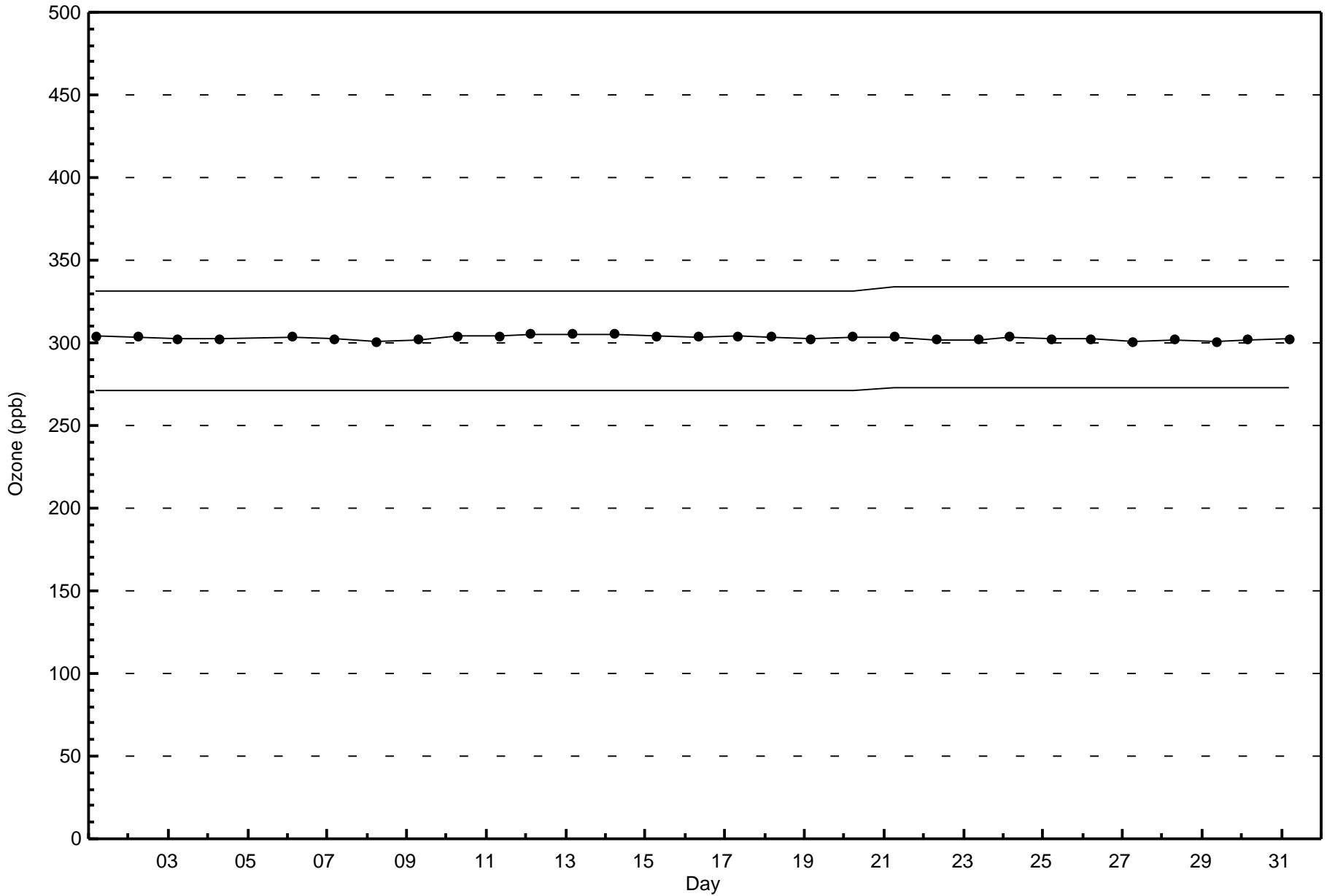


Wood Buffalo Environmental Association
Wind Rose May 2016

Ozone (O₃) - ppb
Conklin Community (AMS 21)









Number of Exceedences (AAAQO):	24-hr: 7	Hours in Service:	744
Maximum Value: 353.7 µg/m ³ on May 19 04:00	Maximum Daily Average: 137.0 µg/m ³ on May 19	Hours of Data:	597
Minimum Value: 0.0 µg/m ³ on May 23 02:00	Minimum Daily Average: 1.9 µg/m ³ on May 20	Hours of Missing Data:	147
Maximum Diurnal Average: 34.1 µg/m ³ at hour 8	Minimum Diurnal Average: 12.6 µg/m ³ at hour 15	Hours of Calibration:	1
Monthly Average: 23.88 µg/m ³	Percentiles: P ₁ = 0.0 P ₁₀ = 1.5 Q ₁ = 2.9 Median = 6.8 Q ₃ = 19.4 P ₉₀ = 84.5 P ₉₉ = 193.4	Percent Operational Time:	80.4

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-May	4.0	3.4	2.8	3.1	3.6	3.4	2.6	2.1	2.3	2.1	1.7	2.1	1.4	1.5	2.3	1.8	1.3	1.2	1.3	2.6	13.4	22.5	4.6	7.0	3.9	22.5	
2-May	5.1	4.2	5.8	5.0	5.2	9.8	4.5	2.4	2.2	2.8	2.2	2.6	2.7	2.4	3.0	2.5	3.2	2.5	7.1	30.8	35.0	21.1	7.0	6.2	7.3	35.0	
3-May	6.4	5.7	5.1	4.3	7.1	6.1	6.4	4.6	3.7	3.3	3.1	3.5	4.3	4.9	5.7	6.4	5.7	5.2	5.2	13.3	31.5	7.8	11.1	11.1	7.1	31.5	
4-May	7.0	7.3	7.7	10.4	8.1	8.1	8.5	8.2	6.9	5.6	6.4	6.6	5.8	9.9	25.8	33.3	25.5	9.6	4.1	4.6	3.5	4.8	3.0	3.2	9.3	33.3	
5-May	3.2	3.4	AF	AF	AF	AF	AF	AF	PF	PF	PF	PF	6.5	11.2	9.7	8.7	9.5	8.6	9.2	11.5	11.9	13.8	12.0	AF	--	13.8	
6-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
7-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
8-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
9-May	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	--	--
10-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
11-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	133.3	94.8	102.2	84.8	86.0	80.8	82.9	75.4	--	133.3	
12-May	65.1	64.2	62.0	61.5	59.8	69.1	99.5	171.2	111.9	48.0	52.1	74.7	11.7	8.3	5.5	54.4	79.0	125.6	148.5	120.9	110.0	101.9	106.4	102.0	79.7	171.2	
13-May	93.2	89.4	90.0	84.1	84.5	102.0	121.0	143.4	158.2	63.7	52.6	38.9	32.0	26.9	22.8	15.2	8.9	5.0	4.7	17.3	27.9	30.8	30.8	34.0	57.4	158.2	
14-May	24.1	22.1	20.2	19.6	18.7	17.6	15.0	6.5	2.9	2.0	1.7	1.2	0.8	0.7	0.6	0.6	0.6	2.5	111.2	196.2	183.4	149.8	143.1	138.2	45.0	196.2	
15-May	131.4	129.7	119.4	110.4	99.3	96.8	100.6	111.9	115.2	97.2	53.8	26.0	22.7	22.6	20.0	21.5	23.3	26.5	26.5	27.0	27.1	28.9	24.4	20.7	61.8	131.4	
16-May	12.8	11.9	12.7	14.7	15.5	23.0	23.1	19.5	14.5	12.5	21.3	19.5	20.4	39.5	18.7	13.7	11.8	29.2	22.1	11.7	17.4	10.7	15.1	9.9	17.6	39.5	
17-May	15.8	12.0	5.9	6.0	13.6	13.6	8.0	8.1	5.3	4.2	4.8	22.2	51.7	15.6	10.8	8.7	8.1	50.1	42.2	15.5	21.7	22.6	19.4	38.6	17.7	51.7	
18-May	24.5	18.3	11.6	10.6	9.9	14.6	8.0	7.8	4.2	1.9	3.5	5.0	4.0	5.2	4.4	3.8	3.7	3.7	3.1	2.7	2.8	7.5	12.6	5.9	7.5	24.5	
19-May	7.6	7.8	290.7	353.7	248.0	188.4	143.6	148.2	202.3	298.5	190.3	94.5	133.7	155.7	103.1	114.9	130.2	141.7	168.2	144.6	9.6	6.9	4.1	2.5	137.0	353.7	
20-May	1.4	1.1	0.9	0.8	0.8	0.8	0.9	0.9	1.3	3.0	1.1	1.5	1.6	1.7	1.6	1.6	1.6	1.7	1.7	4.9	2.8	3.6	3.4	5.2	1.9	5.2	
21-May	6.4	10.7	12.0	15.1	10.8	11.8	14.0	17.8	36.1	44.2	47.6	54.6	46.8	35.6	34.6	42.6	48.6	50.5	61.0	69.5	33.5	12.8	10.0	9.6	30.7	69.5	
22-May	10.7	10.8	11.9	16.1	19.9	16.6	14.3	13.3	9.4	7.7	6.0	6.5	7.3	6.8	7.6	8.7	7.8	6.1	4.9	2.9	1.6	1.1	0.2	0.1	8.3	19.9	
23-May	0.0	0.0	0.6	2.4	1.9	3.0	4.2	7.1	6.3	5.6	2.6	0.6	0.3	0.4	2.0	0.6	0.6	0.7	1.0	2.0	3.3	5.1	5.1	6.6	2.6	7.1	
24-May	5.8	14.0	9.4	7.7	3.3	3.4	4.8	6.6	7.7	5.2	6.5	4.2	3.4	2.8	2.8	2.7	2.6	3.0	2.6	2.3	4.1	10.2	7.3	7.5	5.4	14.0	
25-May	3.4	3.7	2.2	2.4	4.2	6.0	4.2	3.3	2.4	1.8	2.2	2.7	3.5	4.1	5.0	4.1	8.6	6.1	8.5	10.6	52.0	24.3	9.9	7.9	7.6	52.0	
26-May	7.2	7.3	8.3	11.5	10.0	11.1	114.0	114.5	84.8	71.6	67.6	52.5	46.9	18.1	18.0	19.1	15.4	11.0	10.3	11.6	12.1	12.3	12.3	12.7	31.7	114.5	
27-May	12.7	11.7	12.1	11.7	11.4	7.7	5.7	5.6	6.0	6.5	5.7	3.5	1.5	1.4	1.6	2.4	1.7	1.5	2.2	2.6	2.3	1.7	2.5	13.0	5.6	13.0	
28-May	2.1	2.2	2.6	2.6	3.2	5.5	7.4	9.3	9.8	9.3	10.8	8.2	3.8	2.4	1.5	1.7	1.9	2.8	4.5	3.0	3.8	3.1	3.6	4.0	4.6	10.8	
29-May	4.2	3.1	2.2	3.0	3.2	3.0	2.7	1.6	1.3	1.4	1.5	1.8	3.0	3.6	3.8	3.7	5.2	6.8	10.7	8.4	8.0	1.7	1.0	0.8	3.6	10.7	
30-May	0.6	0.6	0.7	0.9	1.5	2.0	1.5	1.1	1.4	1.7	1.8	2.1	2.2	2.8	3.2	3.3	3.8	5.9	5.5	5.6	5.1	4.7	4.6	3.8	2.8	5.9	
31-May	3.3	3.0	3.0	2.8	2.4	1.9	2.2	2.7	1.7	0.9	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.8	9.4	7.2	5.5	5.2	2.2	9.4	

18.3	17.9	29.2	31.7	26.9	26.0	29.9	34.1	33.2	29.2	22.8	18.1	16.7	15.4	12.6	15.0	20.8	23.2	29.6	31.1	27.7	23.0	20.8	21.2	Diurnal Average	
131.4	129.7	290.7	353.7	248.0	188.4	143.6	171.2	202.3	298.5	190.3	94.5	133.7	155.7	103.1	114.9	133.3	141.7	168.2	196.2	183.4	149.8	143.1	138.2	Diurnal Maximum	

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

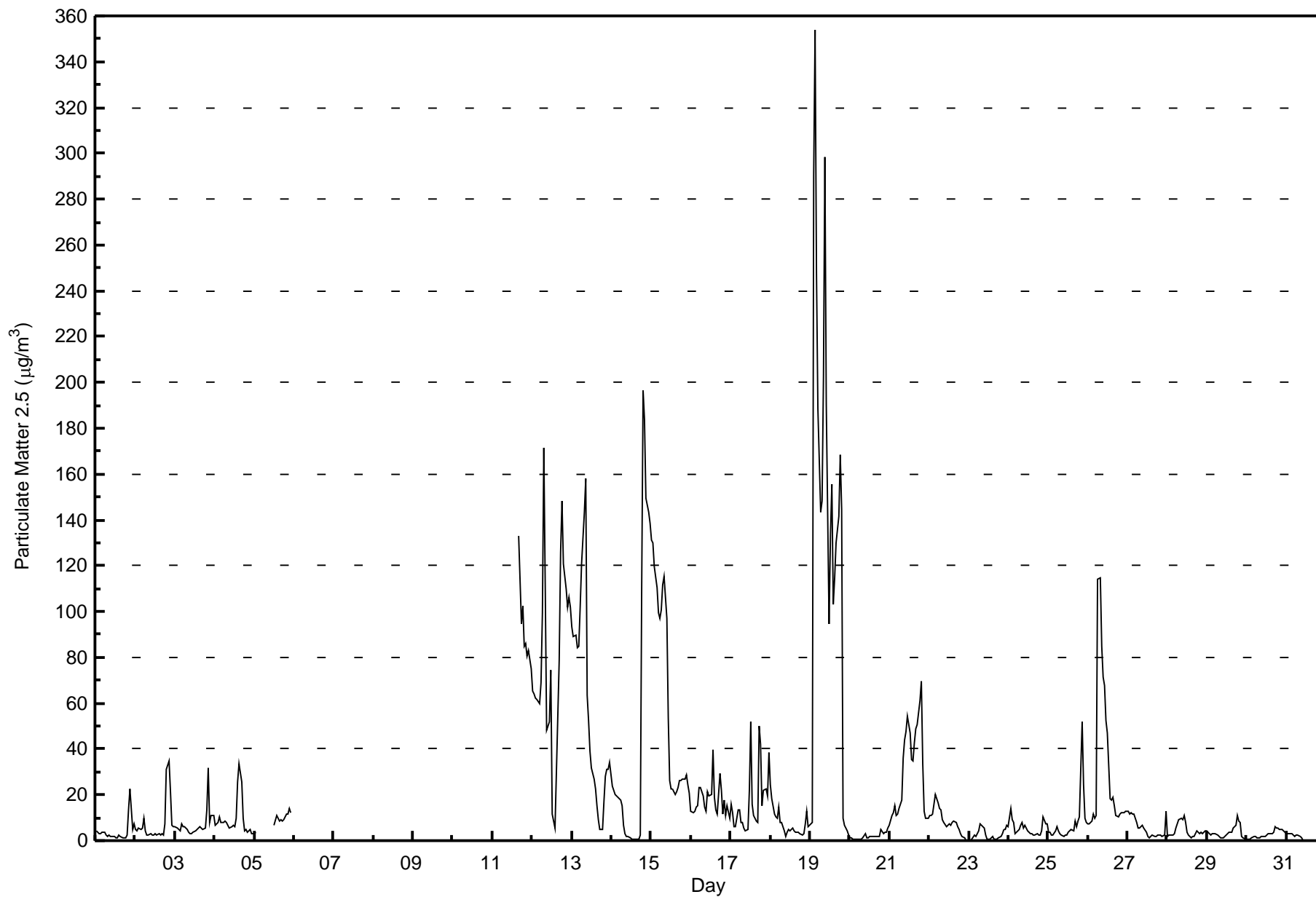


Wood Buffalo Environmental Association

Hourly Averages

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

Conklin Community - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community - May 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	220	36.85	36.85
6 - 15	174	29.15	66.00
16 - 25	43	7.20	73.20
26 - 80	58	9.72	82.91
> 81.0	63	10.55	93.47

Total Number of Valid Hours: 597

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Conklin Community - May 2016

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	17	7	10	5	4	13	14	15	15	23	10	9	14	9	31	24	220
6 - 15	18	13	3	1	2	12	9	10	13	32	11	3	6	5	20	16	174
16 - 25	2	1	1	0	2	3	4	3	8	10	1	0	4	0	1	1	41
26 - 80	11	6	1	0	0	5	1	0	1	9	3	1	1	4	5	10	58
> 81.0	9	17	0	0	1	2	0	1	7	6	4	2	2	0	1	10	62
Totals	57	44	15	6	9	35	28	29	44	80	29	15	27	18	58	61	555

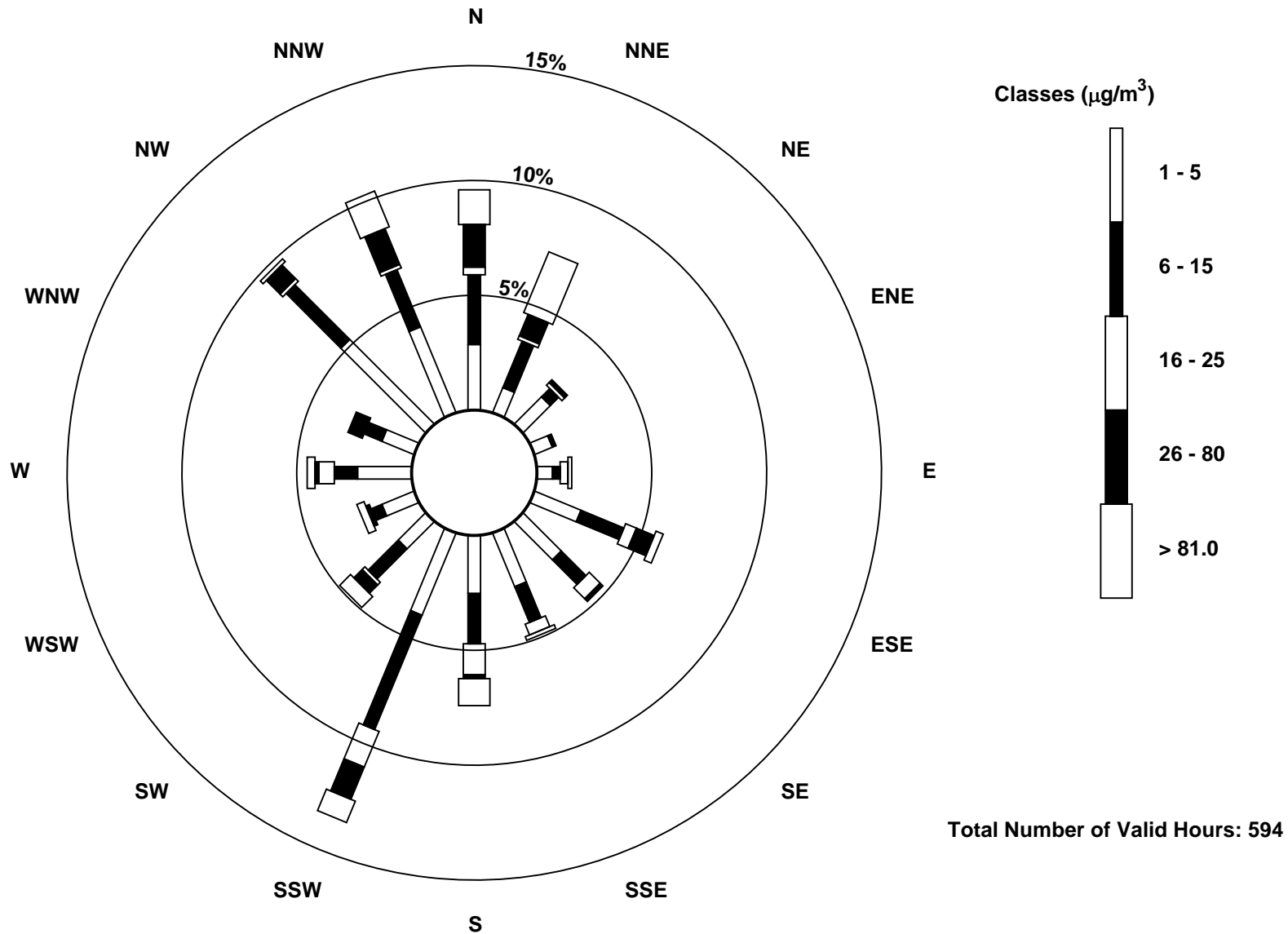
Total Number of Valid Hours: 594

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community (AMS 21)

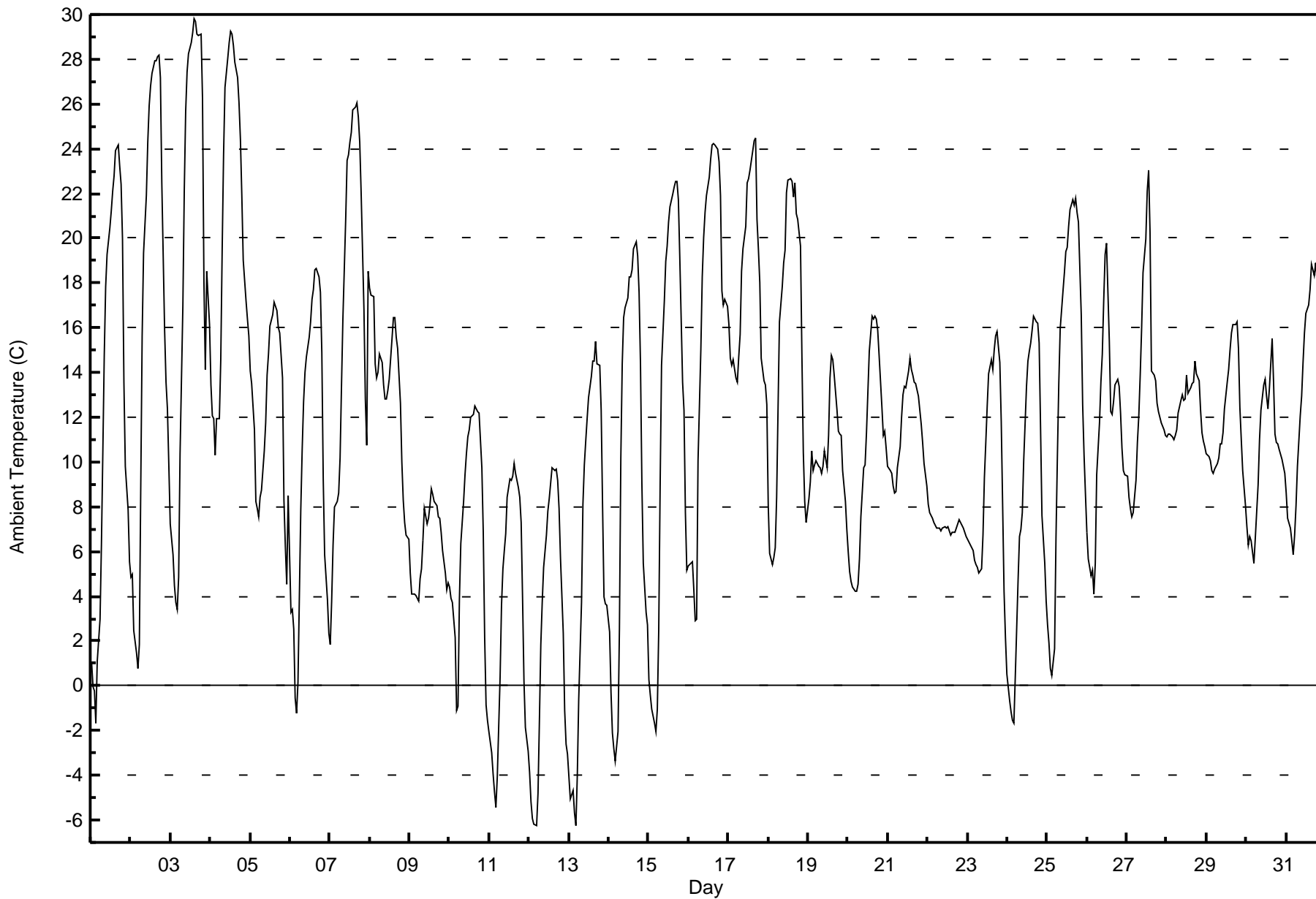




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Conklin Community - May 2016

Maximum Value: 29.8 C on May 3 15:00 Minimum Value: -6.2 C on May 12 05:00 Maximum Diurnal Average: 17.7 C at hour 16 Monthly Average: 11.59 C		Maximum Daily Average: 20.6 C on May 4 Minimum Daily Average: 2.4 C on May 12 Minimum Diurnal Average: 4.1 C at hour 5 Percentiles: P ₁ = -5.1 P ₁₀ = 2.5 Q ₁ = 6.9 Median = 11.3 Q ₃ = 16.1 P ₉₀ = 21.9 P ₉₉ = 29.1		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1.0	0.0	-0.2	-1.7	1.1	2.9	6.3	10.5	14.8	17.8	19.3	20.5	21.2	22.1	22.8	23.9	24.2	23.2	22.4	20.0	13.6	9.8	7.9	5.5	12.9	24.2
2-May	4.8	5.0	2.5	1.5	0.8	1.9	8.8	15.6	19.3	21.9	24.3	25.9	26.8	27.3	27.9	27.9	28.1	28.2	27.2	22.4	15.9	13.6	12.4	9.9	16.7	28.2
3-May	7.2	5.9	4.5	3.7	3.4	4.9	10.4	17.0	22.1	25.6	27.4	28.2	28.8	29.2	29.8	29.7	29.1	29.1	29.1	26.2	18.1	14.1	18.5	16.1	19.1	29.8
4-May	13.4	12.0	11.9	10.3	11.9	11.9	14.6	19.5	23.7	26.8	28.0	28.8	29.3	29.1	28.6	27.9	27.2	26.1	24.4	21.9	19.0	17.2	16.4	15.6	20.6	29.3
5-May	14.1	13.5	11.4	8.2	7.9	7.5	8.4	8.7	10.5	11.8	13.9	14.8	16.1	16.6	17.2	17.0	16.8	16.0	15.8	13.8	8.3	6.2	4.5	8.5	12.0	17.2
6-May	3.3	3.4	2.6	-0.5	-1.2	0.2	7.9	10.6	12.7	14.0	14.7	15.6	16.3	17.3	17.7	18.6	18.6	18.3	17.6	14.9	9.3	5.8	3.8	2.3	10.1	18.6
7-May	1.8	3.8	6.3	8.0	8.3	8.6	10.2	13.4	16.4	20.8	23.5	23.7	24.3	24.7	25.7	25.9	26.0	25.4	24.3	22.1	16.8	12.8	10.8	18.5	16.8	26.0
8-May	17.8	17.5	17.4	14.4	13.8	14.0	14.8	14.4	13.5	12.8	12.8	13.2	13.7	15.5	16.5	16.5	15.6	15.0	12.6	10.0	8.3	7.3	6.7	6.6	13.4	17.8
9-May	5.0	4.1	4.1	4.1	4.0	3.8	4.8	5.2	6.5	7.9	7.2	7.5	8.0	8.8	8.6	8.2	8.0	7.5	7.5	6.9	6.1	5.0	4.3	4.6	6.2	8.8
10-May	4.4	3.9	3.7	2.1	-1.1	-0.9	3.8	6.3	8.2	9.4	10.3	11.1	11.4	12.0	12.2	12.5	12.4	12.2	12.2	9.7	6.8	2.2	-0.9	-1.5	6.8	12.5
11-May	-2.0	-3.0	-3.9	-4.7	-5.4	-4.1	0.4	3.6	5.2	6.0	6.8	8.4	9.3	9.2	9.4	9.9	9.5	8.9	8.4	7.3	3.9	0.2	-1.9	-2.9	3.3	9.9
12-May	-3.9	-5.2	-5.9	-6.2	-6.2	-4.8	-1.6	1.9	3.7	5.3	6.7	7.8	8.3	9.0	9.7	9.6	9.7	9.2	7.9	5.7	2.4	-1.1	-2.6	-3.0	2.4	9.7
13-May	-4.1	-5.1	-4.7	-5.7	-6.2	-4.0	-0.6	3.7	8.1	9.9	11.0	12.0	12.9	13.8	14.5	14.5	15.4	14.4	14.3	12.3	8.0	4.0	3.7	3.6	6.1	15.4
14-May	2.4	-0.3	-2.1	-2.8	-3.4	-2.0	2.5	10.2	14.4	16.5	16.9	17.3	18.3	18.3	18.6	19.5	19.9	19.2	17.6	14.4	9.1	5.5	3.3	2.7	9.8	19.9
15-May	0.3	-0.4	-1.0	-1.7	-2.0	-1.1	2.5	8.9	14.3	17.2	18.9	19.7	20.7	21.4	21.9	22.3	22.5	22.5	21.7	19.2	13.6	12.3	7.7	5.2	11.9	22.5
16-May	5.3	5.5	5.6	4.3	2.9	3.0	10.1	15.0	18.3	20.1	21.2	21.9	22.7	23.5	24.2	24.2	24.2	24.0	23.4	21.9	17.7	17.0	17.3	17.0	16.3	24.2
17-May	16.2	14.6	14.3	14.6	13.8	13.6	14.7	15.7	18.5	19.5	20.5	22.5	22.7	23.0	23.5	24.3	24.5	20.8	19.6	18.0	14.6	13.6	13.5	12.6	17.9	24.5
18-May	8.1	5.9	5.4	5.7	6.1	8.4	12.4	16.3	17.8	18.9	19.5	22.0	22.6	22.7	22.5	21.8	22.5	21.1	20.8	19.7	14.8	10.4	8.2	7.3	15.0	22.7
19-May	8.4	9.1	10.5	9.6	9.9	10.0	9.8	9.8	9.5	9.8	10.5	9.8	11.2	13.8	14.8	14.6	13.9	12.3	11.4	11.2	11.2	9.6	8.2	7.0	10.7	14.8
20-May	6.0	5.1	4.6	4.4	4.2	4.2	4.5	5.6	7.6	9.7	9.9	11.3	13.1	15.0	16.5	16.4	16.5	16.4	15.9	14.8	12.4	11.2	11.4	10.6	10.3	16.5
21-May	9.8	9.6	9.5	9.0	8.6	8.7	9.8	10.7	12.0	13.0	13.4	13.3	14.1	14.6	14.2	13.9	13.6	13.5	13.0	12.3	11.7	10.9	9.9	8.9	11.6	14.6
22-May	8.1	7.7	7.6	7.5	7.3	7.0	7.0	7.0	6.9	7.1	7.1	7.0	7.1	6.9	6.7	6.9	6.8	7.0	7.2	7.4	7.3	7.0	6.9	6.7	7.2	8.1
23-May	6.5	6.4	6.3	6.0	5.6	5.4	5.3	5.1	5.2	6.7	9.3	10.9	12.5	14.0	14.6	14.2	15.0	15.6	15.8	14.5	11.8	8.1	4.2	2.1	9.2	15.8
24-May	0.5	-0.6	-1.2	-1.5	-1.7	0.4	4.7	6.7	7.0	7.8	10.1	13.4	14.5	15.0	15.3	15.9	16.5	16.3	16.2	15.3	11.5	7.6	5.5	3.8	8.3	16.5
25-May	2.7	1.9	0.8	0.5	1.7	6.6	10.3	13.5	16.0	17.6	18.5	19.4	19.6	20.6	21.3	21.7	21.5	21.8	21.2	20.7	16.6	12.5	10.3	8.6	13.6	21.8
26-May	6.8	5.6	4.9	5.2	4.1	5.5	9.4	11.7	13.5	14.8	17.2	19.3	19.8	15.4	12.3	12.1	12.7	13.4	13.7	13.4	12.2	10.6	9.6	9.4	11.4	19.8
27-May	9.4	8.5	7.9	7.5	7.7	9.2	10.8	12.1	13.9	16.0	18.4	19.9	22.1	23.0	20.3	14.1	13.9	13.6	12.6	12.3	12.0	11.8	11.4	11.2	13.3	23.0
28-May	11.1	11.2	11.3	11.1	11.0	11.2	11.4	12.2	12.7	13.0	12.7	12.8	13.9	13.1	13.3	13.5	13.6	14.5	14.0	13.6	12.3	11.3	10.9	10.7	12.4	14.5
29-May	10.4	10.2	10.1	9.6	9.5	9.7	9.9	10.2	10.8	10.8	11.3	12.4	13.6	14.1	15.0	15.8	16.2	16.1	16.3	15.1	12.4	11.0	9.6	8.1	12.0	16.3
30-May	7.1	6.3	6.7	6.5	5.5	6.6	7.8	9.0	11.0	12.3	13.4	13.7	12.9	12.4	13.3	15.5	13.5	11.3	10.9	10.8	10.5	10.1	9.8	9.5	10.3	15.5
31-May	8.6	7.5	7.1	6.5	5.9	6.7	8.1	9.8	12.1	12.9	14.5	15.8	16.7	17.0	17.7	18.8	18.6	18.3	18.9	17.3	12.5	8.1	7.5	6.4	12.2	18.9
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Conklin Community - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	48	6.45	6.45
0 - 10	274	36.83	43.28
10 - 20	324	43.55	86.83
> 20	98	13.17	100.00

Total Number of Valid Hours: 744

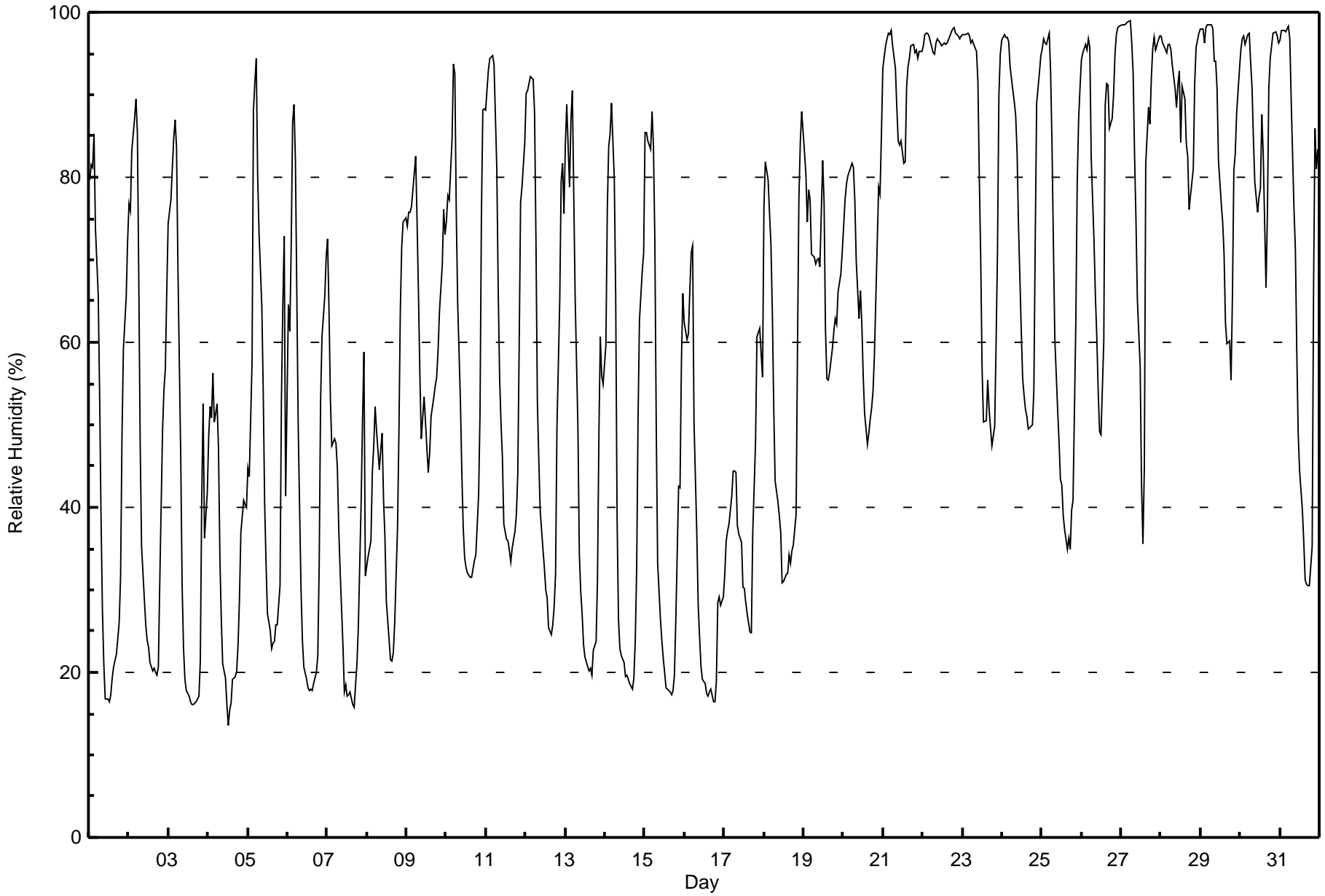
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Conklin Community - May 2016

Maximum Value: 99 % on May 27 06:00 Maximum Daily Average: 96.7 % on May 22																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 14 % on May 4 13:00 Minimum Daily Average: 32.9 % on May 4 Maximum Diurnal Average: 84.4 % at hour 5 Minimum Diurnal Average: 40.5 % at hour 14 Monthly Average: 60.8 % Percentiles: P ₁ = 16 P ₁₀ = 21 Q ₁ = 36 Median = 62 Q ₃ = 87 P ₉₀ = 96 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-May	80	82	81	85	74	66	54	39	28	21	17	17	16	17	19	21	22	24	26	32	49	59	65	72	44.4	85	
2-May	77	76	83	87	90	85	68	48	35	29	26	24	23	21	20	20	20	20	21	31	49	54	57	66	47.1	90	
3-May	74	77	81	85	87	84	69	46	30	23	19	18	17	16	16	16	16	17	21	41	53	36	42	41.7	87		
4-May	49	52	51	56	50	52	47	34	26	21	19	16	14	15	16	19	20	23	29	37	41	40	40	32.9	56		
5-May	45	44	58	88	92	94	80	73	64	54	40	33	27	25	23	24	24	26	26	30	53	65	73	41	50.1	94	
6-May	65	61	72	87	89	82	50	40	30	24	21	19	18	18	18	18	19	20	22	33	53	61	66	70	43.9	89	
7-May	72	64	53	47	48	48	45	37	32	23	18	19	17	17	18	16	16	18	21	26	41	51	59	32	34.9	72	
8-May	33	34	36	44	48	52	49	45	47	49	41	36	29	24	22	21	22	26	37	49	64	71	75	75	42.9	75	
9-May	74	76	76	76	78	82	75	66	56	48	53	50	47	44	47	51	53	55	56	59	64	69	76	73	62.7	82	
10-May	75	78	77	85	94	93	76	65	53	44	37	34	33	32	32	31	33	34	34	41	52	75	88	88	57.6	94	
11-May	88	93	94	95	95	94	81	67	56	50	46	38	36	36	35	33	35	37	39	44	60	77	79	84	62.1	95	
12-May	90	90	91	92	92	88	72	53	46	40	35	33	30	29	25	25	26	28	32	50	65	79	82	76	57.0	92	
13-May	84	89	79	87	91	78	66	50	34	30	27	23	22	21	20	21	20	23	24	31	49	61	56	55	47.4	91	
14-May	60	76	84	85	89	80	66	39	26	23	22	21	19	20	19	19	18	19	24	32	51	63	69	71	45.6	89	
15-May	85	85	84	83	88	84	72	50	33	26	24	22	20	18	18	18	17	18	20	26	43	42	58	66	45.9	88	
16-May	62	60	61	66	71	72	50	37	28	24	21	19	19	17	17	18	18	16	16	19	28	29	28	29	34.5	72	
17-May	32	36	37	38	41	44	44	44	38	37	36	30	30	28	27	25	25	37	42	48	61	62	59	56	39.9	62	
18-May	76	82	80	76	72	64	52	43	41	39	37	31	31	32	32	34	33	35	35	39	59	77	84	88	53.0	88	
19-May	83	80	75	79	77	71	70	69	70	70	69	82	77	62	56	55	56	59	61	63	62	66	68	71	68.9	83	
20-May	74	77	79	80	81	82	81	77	70	63	66	62	56	51	48	49	51	52	54	59	72	79	78	85	67.7	85	
21-May	93	96	97	97	97	98	96	93	88	84	84	84	82	82	91	93	94	96	96	95	95	94	95	95	92.4	98	
22-May	96	97	97	98	97	96	95	95	96	97	96	96	96	96	96	96	97	98	98	98	97	97	97	97	96.7	98	
23-May	97	97	97	97	97	96	97	96	95	92	80	70	57	50	50	55	52	50	47	50	60	71	90	95	76.6	97	
24-May	97	97	97	97	96	93	90	89	88	83	74	61	56	53	52	51	50	50	50	54	73	89	93	95	76.2	97	
25-May	96	97	96	96	97	93	84	72	60	52	48	43	43	39	37	35	36	35	40	41	62	79	87	91	64.9	97	
26-May	94	95	96	95	97	96	82	72	66	61	54	49	49	60	89	91	91	86	87	90	95	97	98	98	82.9	98	
27-May	98	98	99	99	99	99	96	93	83	75	65	57	43	36	45	82	88	86	92	96	97	95	97	97	83.9	99	
28-May	97	96	96	95	96	96	95	94	91	89	91	93	84	91	90	84	83	76	78	81	91	96	97	97	90.7	97	
29-May	98	98	96	98	98	99	98	98	98	94	94	91	82	77	75	71	62	60	60	55	66	81	83	88	93	83.9	99
30-May	95	97	97	96	97	97	94	91	85	79	76	78	79	88	83	67	76	91	94	96	97	98	97	96	89.3	98	
31-May	97	98	98	98	98	98	97	89	76	71	59	49	44	40	36	31	31	31	30	35	67	86	81	83	67.6	98	
																			78.6				Diurnal Average				
																			98				Diurnal Maximum				





Wood Buffalo Environmental Association
Summary of Hour Averages

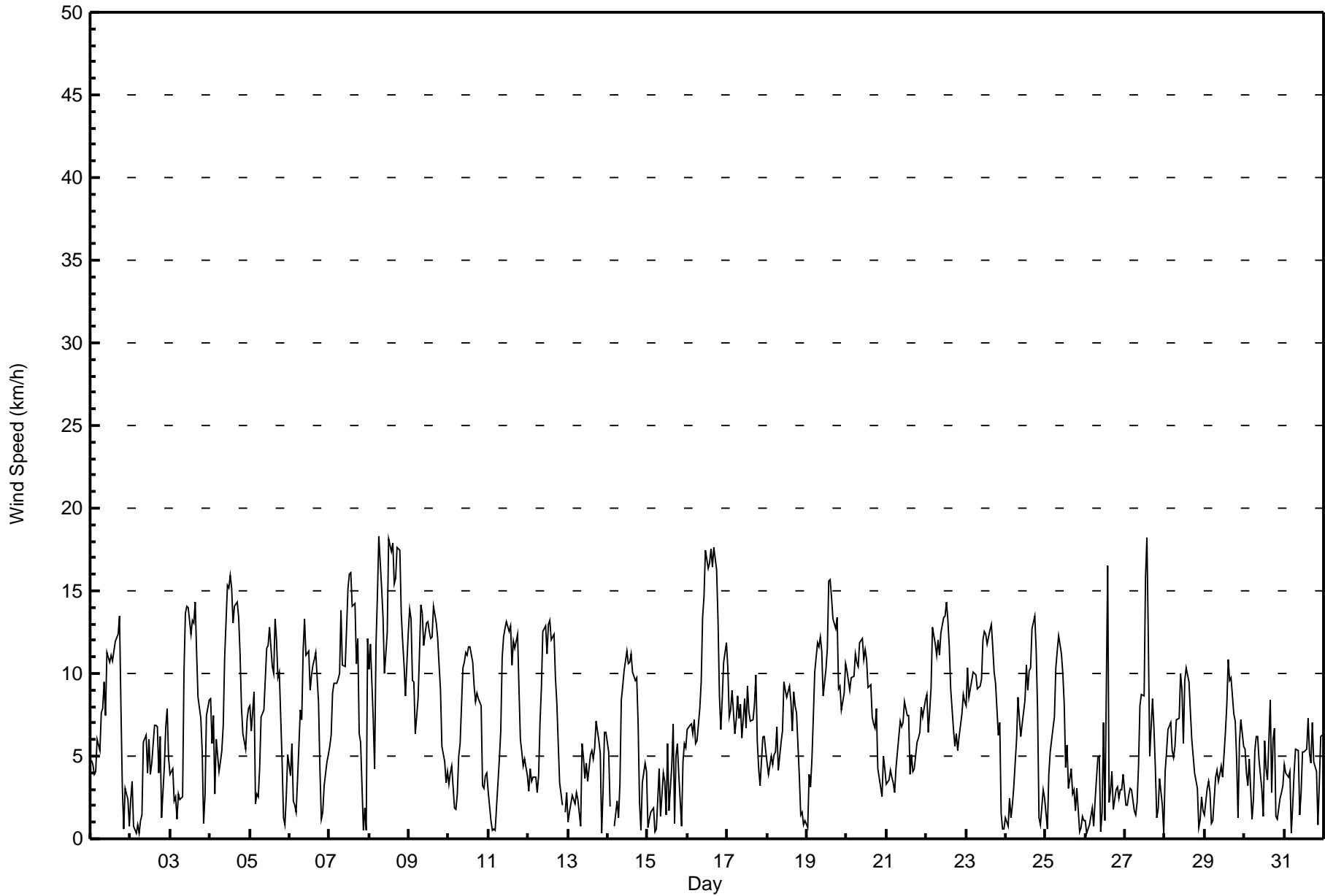
Wind Speed (WS) - km/h
Conklin Community - May 2016

Maximum Speed: 18 km/h on May 8 07:00	Maximum Daily Speed Average: 11.0 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 31 05:00	Minimum Daily Speed Average: 0.6 km/h on May 26	Hours of Data: 741
Maximum Diurnal Speed Average: 3.3 km/h at hour 16	Minimum Diurnal Speed Average: 0.4 km/h at hour 5	Hours of Missing Data: 3
Monthly Average Velocity: 1.7 km/h 305.7 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 6 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 17	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	S5	SSE4	SSE4	SSE4	S6	S5	SSW8	SW8	SW10	WSW7	WSW11	W11	W11	W11	W11	WNW12	NW12	NNW13	NW8	NW3	WSW1	S3	S2	NW1	WSW4.7	NNW13
2-May	SSW2	SSW3	NNW1	WNW0	SSE1	S0	SSE1	NW1	SE6	SE6	SE4	ESE6	ESE4	W5	WNW7	NW7	W7	WNW4	WSW6	W1	SSW4	SSW7	SSW8	SE5	SSW1.6	SSW8
3-May	SSE4	SSE4	SSE2	SE3	ENE1	ESE3	ESE2	S3	SW10	SW14	SW14	SSW14	SW12	SW13	SSW13	SSW14	SSW11	SSW9	S7	SSE5	SW1	W3	SSW7	SSW8	SSW6.5	SSW14
4-May	SSW8	S6	SSW7	S3	S6	S4	SSE5	SSW5	SW7	SW11	SW15	SW15	SW16	W15	WNW13	WNW14	WNW14	NW13	NW11	NW8	NW6	NW5	NW7	NW8	WSW6.5	SSW16
5-May	NW8	NW7	NW9	W2	S3	NW3	NW4	NW7	NW8	NW10	NW12	NW12	NW13	NW10	NW10	NNW13	NW12	NW10	NW10	NW5	NW1	W1	NNW3	NW5	NW7.1	NNW13
6-May	NNW4	NNW6	NW2	NNW2	SE2	SE4	WNW8	NW7	NW11	NNW13	NW11	NW11	WNW9	WNW10	W10	WNW11	WNW11	NW8	NNW4	NNE1	S2	S3	S5	S5	WNW5.0	NNW13
7-May	S6	SSW6	SSW9	SSW9	SSW9	SSW10	SSW10	SSW14	SW11	WSW10	W13	SW15	WSW16	WSW16	SW14	WSW14	W11	SSW12	S6	SSE6	W0	NNW2	SSE1	SSE12	SW8.2	WSW16
8-May	SSE10	S12	SSW7	SW4	NW12	NW15	NW18	NW15	NW13	W10	W11	W12	WSW18	WSW17	WSW18	W15	W16	W18	W17	W14	W12	W11	W9	NW12	W10.9	NW18
9-May	NW14	NW13	NW10	NW10	WNW6	NW8	NW11	NW14	NW14	NW12	NW13	NW13	NW13	NW12	NNW12	NNW14	NNW13	NNW12	NW11	NNW9	NW6	NW5	NW3	NW4	NW10.4	NW14
10-May	NW3	NW4	NNW4	NNW2	NNW2	NNW3	NW5	NNW6	N10	NNW11	NNW11	N11	NNW12	NNW12	N11	N9	NNE8	N9	NNE8	NNE8	NNE3	NNW3	NNW4	NNW4	N6.5	NNW12
11-May	NW3	NW1	WNW1	NNW1	NNW1	NNW2	NNW5	N7	N11	N12	N13	NNE13	NNE13	NNE13	NNE11	NNE12	NNE12	NNE12	NNE9	N6	NNW5	NNW4	NNW5	NNW4	N6.8	NNE13
12-May	NNW3	NNW4	NNW4	N4	N4	N3	NNW4	N7	N9	N13	NNE13	NNE11	NNE13	N13	NNE12	NNE12	NNE10	NNE8	NNE6	NNW3	NNW2	AF	WSW2	S3	N6.4	N13
13-May	WSW1	SW2	S3	SW2	SW2	S3	SSW2	W1	NW6	NW5	SW4	WSW5	WNW3	NW5	W5	WNW5	N6	N7	NNE6	E5	S0	SSW3	SSW6	SSW6	W1.5	N7
14-May	S5	SE2	AF	AF	E1	S2	SE1	NNW3	NW8	WNW9	NNW10	NNW11	NW11	NW11	NNW11	NW10	NW10	NNW10	E7	ESE2	SSW1	S3	S5	S4	NW3.5	NNW11
15-May	NNW1	SW1	SSW2	SSW2	W0	SSW1	SSW2	S4	ESE1	SSE4	SE3	NW1	W6	SE2	ESE4	ESE7	NE1	ESE5	ESE6	ESE4	SW1	SSW5	SSW6	S6	SSE1.9	ESE7
16-May	SSW7	SSW7	SSW7	SSW6	SSW7	SSW6	S6	SSW8	SSW10	SSW13	SSW15	SSW17	SSW16	SSW17	S18	SSW16	SSW18	SSW16	S13	S9	SSE7	S8	S11	S12	SSW11.0	SSW18
17-May	SSW10	SSW7	SSW8	SSW9	SSW6	SSW7	SW9	SW7	W8	WSW6	SSW8	W7	NW9	NW8	NW7	WNW7	WNW8	ESE10	ESE6	ESE4	S3	SSW6	SSW6	SSW5	SW4.3	SSW10
18-May	SE5	SE4	SSE5	S4	S5	S5	SSW7	WSW4	WNW6	WNW7	WSW9	NW9	NW9	NW9	NW8	NW7	NW9	NW8	NNW8	NW4	NNW1	NW2	W1	NW1	WNW3.1	WSW9
19-May	SW1	NNW4	NW3	NNW5	N7	N10	NNE12	NNE12	NNE12	NNE11	NNE9	NNE10	NNE12	NNE16	NNE16	NNE15	N13	N13	NNE13	NNE9	NE9	NE8	NE9	NE11	NNE9.5	NNE16
20-May	NE10	NE10	NE9	NE10	NE10	NE11	NE11	ENE10	NE12	NE12	NE11	ENE11	E11	ENE9	ENE9	ENE7	NNE7	NNE7	NNE8	N4	NW3	WNW3	NNW5	NNW4	NE7.6	NE12
21-May	NNW3	NW4	NNW4	NNW4	NW3	NW3	NNW4	NNW6	N7	NNW7	NNW7	NNW8	N7	NNW7	NNW4	NNW5	N4	N4	N6	N6	NNE6	N8	NNE7	NNE8	N5.4	NNE8
22-May	N9	N6	N8	N9	N13	NNE12	N11	N12	N11	N12	N13	NNE14	NNE14	NNE13	NNE12	N9	N7	NNE6	N6	N5	N6	NNE8	NNE9	N8	N9.7	NNE14
23-May	N8	N10	N9	N10	N10	N10	N9	N9	N9	N10	NNE12	NNE13	NE12	NE12	E13	SE13	SE12	SE10	ESE9	ESE6	SE7	SSE1	W1	W1	NE5.5	SE13
24-May	SSW1	SW1	SSW2	SSW1	SSW2	S3	SSE6	SE9	SE7	ESE6	SE7	SSE8	S11	S9	SSW10	SSW10	SSW13	SSW13	SSW11	SSW8	NW1	SSE1	SSE3	SSE2	S5.3	SSW13
25-May	SSE2	S1	S4	SSE5	S7	SSW7	SSW10	SSW11	SSW12	S11	SSW10	SW8	WSW4	W6	SE3	SE4	SE3	SSE3	SW2	SE3	NW0	W1	NNW1	SW1	SSW4.2	SSW12
26-May	SSW1	NW0	WNW1	SSW1	NW2	SSW1	NNW2	N5	N5	NE0	SSW2	N7	NNE1	SSE17	SW2	SSE3	ESE4	ESE2	NNE3	NNE3	N2	NNW3	NNW3	NNW4	NNE0.6	SSE17
27-May	NW2	NW2	NNW3	NNW3	NNW3	N2	NNE1	NNE2	E4	ESE8	ESE9	ESE9	SSE16	SSE18	SSW12	WSW5	N8	N7	NNW4	W1	NE2	E4	SE2	ESE0	ESE1.8	SSE18
28-May	ESE4	ESE5	SE7	SE7	ESE5	SE5	ESE6	ESE7	SE7	SE10	SSE9	SE6	SE10	SE10	SSE10	SSW8	SSE6	WSW5	SSW4	SW3	WSW1	S1	S3	W2	SE4.7	SE10
29-May	SE1	SSW3	N4	NNW3	W1	W1	N4	N4	NE3	N4	N4	NE4	E6	ESE8	ESE11	ESE10	ESE10	ESE8	ESE7	E5	NE1	NW6	NW7	NNW6	ENE2.1	ESE11
30-May	NNW5	NNW4	NNW3	NNW5	NNW1	NNW2	NNW5	NW6	NNW6	NNE5	ESE3	NW1	WNW6	W4	NW4	NW8	WSW3	SSW6	SW7	NW1	NW1	NNW2	NNW3	NNW3	NW2.7	NW8
31-May	NNW4	NNW4	NNW4	NNW4	NNW0	N2	NNW4	N5	ENE5	SSE1	NNW3	NNW5	NW5	N5	NNW7	WNW5	NNW5	WSW7	SW5	SW4	W1	S3	SSW6	SSW6	NW2.1	NNW7

W0.7	W0.9	W0.5	W0.4	W0.5	NW1.6	NW2.2	NW3.0	NW2.5	NNW2.6	NW3.1	NNW3.0	NNW2.8	NNW2.5	NNW3.3	NW3.3	NW2.3	NNW1.7	NNW0.8	NNW1.0	W1.0	WSW1.2	W0.8	Diurnal Average		
NW14	NW13	NW10	NE10	N13	NW15	NW18	NW15	NW14	SW14	SW15	SSW17	WSW18	SSE18	WSW18	SSW16	SSW18	W18	W17	W14	W12	W11	S11	NW12	Diurnal Maximum	

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin Community - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	314	42.38	42.38
6 - 11	302	40.76	83.13
12 - 19	125	16.87	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: 741

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin Community - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	8	6	2	5	16	18	22	33	23	16	10	19	9	39	70	314
6 - 11	43	23	12	5	3	20	13	8	15	49	10	7	15	13	47	19	302
12 - 19	10	25	4	0	1	0	2	4	4	17	9	7	8	4	21	9	125
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	71	56	22	7	9	36	33	34	52	89	35	24	42	26	107	98	741

Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Conklin Community - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on May 8 18:00 Minimum Value: 0 km/h on May 12 04:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1	1	1	1	1	1	2	2	3	3	4	4	4	5	4	5	5	4	3	3	1	1	1	1	5	
2-May	1	1	1	1	2	1	1	1	2	2	3	3	3	3	4	3	3	2	2	1	3	1	1	2	4	
3-May	1	1	1	1	1	1	1	3	4	4	4	4	4	5	5	4	4	3	2	3	1	2	2	1	5	
4-May	2	2	3	2	2	1	1	2	2	3	4	5	7	6	6	6	6	5	4	3	3	3	2	4	7	
5-May	4	4	3	2	2	1	2	2	2	3	4	4	5	4	4	5	4	3	4	3	1	1	4	3	5	
6-May	1	2	1	1	1	1	3	2	4	5	5	5	4	4	5	5	4	3	2	1	1	1	1	1	5	
7-May	1	1	2	2	2	2	3	3	3	3	5	5	5	6	5	5	4	3	2	1	1	1	2	3	6	
8-May	3	3	5	2	4	5	7	6	5	4	5	5	6	6	7	6	6	8	7	5	6	4	4	5	8	
9-May	5	4	3	4	2	3	4	4	5	5	5	5	5	4	4	4	4	4	3	2	1	2	1	1	5	
10-May	1	1	1	1	1	1	2	2	3	4	4	4	4	4	3	4	4	3	3	4	1	1	1	1	4	
11-May	2	1	1	1	1	1	1	2	4	5	4	4	4	5	4	4	4	5	3	2	1	1	1	1	5	
12-May	1	1	0	0	1	1	1	2	3	4	4	4	5	5	5	4	4	3	3	1	1	AF	1	1	5	
13-May	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	3	2	2	1	2	1	1	3	
14-May	1	1	AF	AF	1	0	1	4	3	4	4	5	5	4	4	4	3	3	2	1	1	1	1	2	5	
15-May	1	1	0	1	1	1	2	1	1	2	2	2	3	3	3	3	3	2	2	1	2	1	1	1	3	
16-May	1	1	1	1	1	1	1	2	3	4	5	6	6	5	6	6	6	6	5	2	1	2	3	3	6	
17-May	3	2	2	3	1	2	3	2	3	2	3	4	4	3	3	3	3	4	2	3	1	1	1	3	4	
18-May	1	1	1	1	1	1	2	2	2	3	3	3	4	4	3	3	3	3	2	2	2	1	1	1	4	
19-May	1	3	1	1	3	3	5	4	4	4	3	4	4	5	5	5	4	4	5	3	4	3	4	3	5	
20-May	4	3	4	3	4	4	4	4	5	5	4	4	4	4	4	3	2	2	2	2	1	2	1	2	5	
21-May	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	2	3	3	
22-May	2	2	3	3	4	4	3	4	4	4	4	4	5	4	4	3	2	2	2	2	3	3	3	3	5	
23-May	2	3	3	3	3	3	3	3	3	3	4	5	5	4	5	3	3	3	3	2	3	2	1	2	5	
24-May	1	1	1	1	1	1	2	2	2	2	2	4	4	3	3	3	4	4	4	3	1	1	1	1	4	
25-May	1	1	1	1	1	2	3	3	3	3	3	4	4	3	2	3	2	2	1	1	1	1	2	2	4	
26-May	1	1	1	2	1	1	2	2	2	1	2	3	2	6	2	2	2	2	2	2	1	1	1	1	6	
27-May	1	1	1	1	1	1	1	1	2	2	3	5	5	5	5	4	4	2	3	2	1	2	1	2	5	
28-May	1	2	2	2	2	1	1	2	2	3	2	2	3	3	3	2	2	2	1	1	1	1	1	1	3	
29-May	1	2	2	1	1	1	1	2	1	1	1	2	2	3	3	3	3	3	2	2	1	3	2	1	3	
30-May	1	1	1	1	1	2	2	3	2	2	2	3	3	1	1	4	3	3	2	1	1	1	1	1	4	
31-May	1	1	1	1	1	2	1	2	2	2	2	3	3	3	3	3	3	3	2	1	1	2	1	1	3	
																	Diurnal Maximum									
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Averages

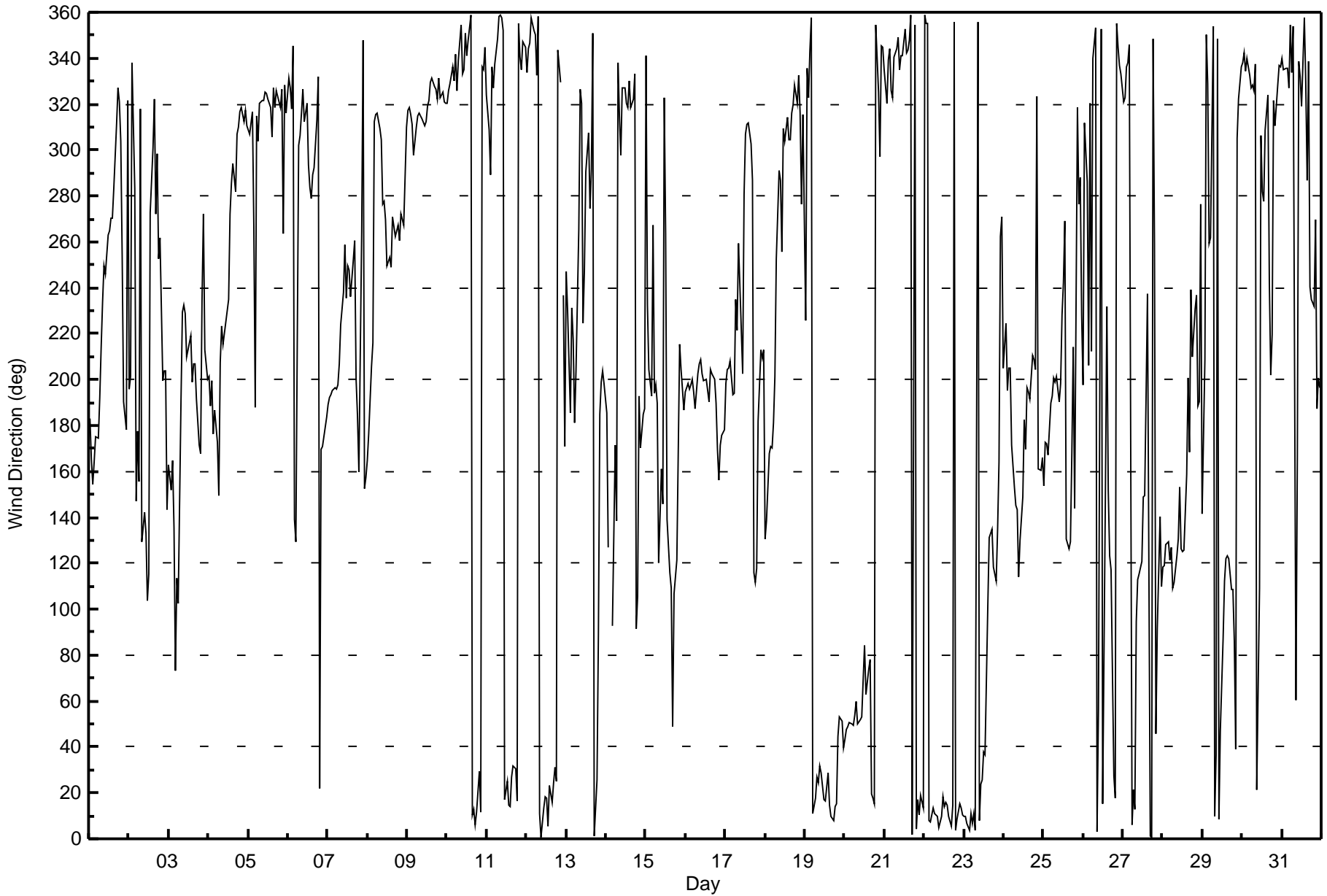
Wind Direction (WD) - deg
Conklin Community - May 2016

Direction of Maximum Speed: 316 deg on May 8 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 194.4 deg on May 16	Hours of Data: 741
Direction of Minimum Speed: 327 deg on May 31 05:00	Hours of Missing Data: 3
Direction of Minimum Daily Speed Average: 0.6 deg on May 26	Percent Operational Time: 99.6
Monthly Average Direction: 293.5 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-May	183	165	154	164	175	175	192	214	234	250	246	263	265	270	270	283	311	327	321	304	254	191	178	321	253.6
2-May	196	201	338	283	147	177	155	318	129	142	133	104	116	273	301	322	272	298	253	262	200	204	204	144	209.5
3-May	163	152	165	135	73	114	102	191	229	232	229	210	216	219	199	207	207	192	172	168	234	272	213	200	204.9
4-May	201	189	200	176	187	173	149	208	223	216	225	230	235	272	286	294	282	307	310	317	319	313	317	311	257.7
5-May	309	307	316	266	188	315	304	320	322	322	325	325	322	318	305	327	318	326	323	319	326	263	328	316	317.9
6-May	331	327	318	345	139	129	302	306	316	327	313	320	294	284	279	289	292	313	332	22	170	171	179	184	301.9
7-May	189	192	194	195	197	196	197	207	224	238	259	236	249	248	236	252	260	200	185	160	264	348	152	157	219.7
8-May	165	176	205	216	313	315	316	309	304	276	277	270	250	253	249	271	267	262	267	261	272	270	267	310	270.9
9-May	318	318	315	311	298	310	315	316	315	314	310	312	319	322	330	331	327	327	322	331	323	325	321	320	319.0
10-May	320	326	329	336	330	342	326	339	354	333	335	351	341	348	359	10	13	6	12	29	12	336	335	345	350.5
11-May	324	309	289	336	327	337	348	358	359	358	352	17	25	15	14	27	32	30	17	355	340	335	347	345	7.4
12-May	334	344	347	358	352	350	332	358	11	1	13	18	18	5	23	16	24	31	25	343	329	AF	237	171	9.0
13-May	247	230	186	231	217	182	204	265	326	321	224	248	290	308	275	292	351	1	26	89	185	199	204	198	272.3
14-May	185	127	AF	AF	93	171	139	338	315	298	327	327	320	319	330	318	322	333	92	106	193	170	185	187	318.2
15-May	341	233	205	193	267	194	198	190	120	161	146	323	264	139	116	109	49	107	114	122	216	204	196	187	161.5
16-May	194	198	196	198	200	194	187	203	207	209	203	200	200	195	190	204	203	200	190	169	156	171	175	178	194.4
17-May	198	204	205	208	194	194	235	221	260	241	203	281	307	311	312	302	287	116	112	118	182	213	209	213	226.7
18-May	130	139	168	171	170	181	201	253	291	287	256	309	304	314	304	305	316	320	328	320	333	316	276	315	284.9
19-May	226	336	323	344	357	11	18	27	24	32	29	17	16	22	29	15	10	8	14	15	45	53	51	40	20.5
20-May	43	48	49	51	50	50	53	60	50	52	53	69	84	63	74	78	20	18	15	354	325	297	346	345	47.4
21-May	335	321	339	344	326	323	341	344	349	335	341	341	353	342	344	348	359	2	354	4	17	10	19	14	351.2
22-May	359	355	355	8	7	14	11	10	10	5	10	18	14	16	15	10	6	15	356	4	9	15	13	11	9.4
23-May	9	10	6	4	11	6	11	4	356	8	24	26	38	37	101	131	133	135	118	112	135	164	262	271	43.7
24-May	205	225	195	205	205	171	153	145	144	114	130	149	183	170	196	194	192	210	208	204	323	161	160	166	178.5
25-May	154	172	172	167	190	193	201	199	202	190	198	228	242	269	131	126	129	168	214	144	318	277	288	228	195.3
26-May	198	312	286	206	321	212	340	354	3	56	202	352	15	153	232	152	123	117	27	18	355	345	337	333	20.2
27-May	321	323	336	338	346	6	21	13	94	113	115	121	149	150	193	237	1	0	348	259	46	91	141	110	117.8
28-May	118	119	128	130	122	127	110	112	124	131	153	126	125	126	159	201	168	239	210	231	237	188	190	276	143.0
29-May	142	209	350	329	260	262	354	10	37	349	9	47	88	112	122	123	122	108	109	86	39	305	322	336	72.8
30-May	338	342	334	340	333	327	328	326	338	21	109	306	282	278	309	324	243	202	220	321	310	328	337	337	316.1
31-May	340	335	336	336	327	354	334	354	60	167	338	332	319	358	330	287	339	240	235	232	270	187	201	196	308.9

266.1 283.5 276.7 293.0 290.4 327.0 317.4 320.0 325.3 311.7 296.5 315.3 299.6 302.7 292.3 302.2 307.8 314.2 328.7 348.5 334.8 276.5 252.0 263.2
 Diurnal Average

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Conklin Community - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on May 15 12:00 Minimum Value: 4 deg on May 2 22:00 Percentiles: P ₁ = 7 P ₁₀ = 16 Q ₁ = 22 Median = 29 Q ₃ = 43 P ₉₀ = 71 P ₉₉ = 94																			Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	18	15	34	26	16	25	23	29	26	48	37	45	37	38	36	36	27	20	21	17	77	31	47	34	77
2-May	51	36	75	86	81	88	91	78	47	32	84	56	88	71	55	48	52	45	24	39	33	4	6	23	91
3-May	28	25	50	64	71	54	55	77	26	24	27	27	31	27	36	28	28	27	26	22	73	38	17	13	77
4-May	12	56	51	86	31	34	25	32	27	28	26	29	30	33	34	34	32	27	25	19	19	21	15	22	86
5-May	29	30	17	73	77	49	27	19	18	19	28	24	29	34	38	25	27	22	21	22	22	40	43	18	77
6-May	16	18	33	16	80	52	38	32	28	29	39	34	46	45	42	40	38	31	36	72	75	26	17	12	80
7-May	17	9	14	19	18	20	20	16	26	27	30	26	26	28	29	35	38	28	23	15	78	16	90	15	90
8-May	17	16	59	45	25	23	24	29	33	36	36	33	23	29	30	32	31	31	28	27	27	25	29	30	59
9-May	23	20	24	28	36	28	27	23	27	33	31	30	32	28	22	23	20	19	19	18	15	16	14	15	36
10-May	15	17	15	22	46	15	24	39	28	35	33	33	27	31	28	35	47	30	29	24	20	13	10	20	47
11-May	22	27	43	22	28	20	19	28	30	28	27	29	36	35	38	30	30	26	24	17	9	7	6	12	43
12-May	18	5	7	7	11	10	14	26	27	26	30	37	40	32	38	28	33	31	28	17	14	AF	44	26	44
13-May	50	40	44	35	44	40	37	99	41	66	72	68	88	72	71	59	57	26	36	34	91	46	12	11	99
14-May	20	67	AF	AF	89	45	77	80	34	40	38	37	46	37	32	35	41	31	35	86	93	24	15	72	93
15-May	23	54	45	71	65	90	62	28	94	69	81	108	67	88	77	58	103	40	20	27	80	23	8	12	108
16-May	8	11	12	9	6	10	17	21	28	25	29	27	32	28	29	31	26	26	21	19	10	14	16	19	32
17-May	22	21	22	24	21	21	32	21	34	54	36	67	36	49	50	51	43	59	34	68	52	17	18	46	68
18-May	15	15	15	29	18	25	22	54	42	39	32	40	42	34	38	39	37	24	22	26	15	34	68	55	68
19-May	85	31	23	15	21	24	26	25	25	26	28	26	25	25	27	27	25	24	24	26	32	35	36	27	85
20-May	33	31	39	35	35	34	38	41	36	38	35	39	39	48	43	44	28	24	25	25	14	51	14	49	51
21-May	21	37	22	20	15	14	20	17	23	29	23	18	22	18	19	19	22	25	19	24	26	23	27	24	37
22-May	22	22	23	26	25	25	25	24	23	24	25	27	25	24	24	24	23	23	17	22	28	26	25	22	28
23-May	24	22	21	21	24	23	23	22	20	25	27	28	34	37	45	20	20	20	21	24	20	88	56	72	88
24-May	64	69	53	73	43	26	21	27	34	36	41	46	33	31	37	31	28	26	28	25	50	95	29	46	95
25-May	73	87	14	10	12	19	19	20	24	27	33	40	81	40	84	71	57	54	64	34	59	49	65	60	87
26-May	52	91	88	90	53	76	81	26	50	108	85	43	95	18	66	61	55	77	48	36	22	15	15	14	108
27-May	16	18	44	17	19	50	77	70	52	31	29	32	26	21	48	74	33	25	54	93	69	69	76	93	93
28-May	41	29	19	19	33	24	20	19	19	19	18	32	23	21	26	28	35	45	31	30	96	90	73	66	96
29-May	87	58	30	22	63	74	18	46	38	15	25	46	46	36	29	28	25	33	27	40	69	44	23	16	87
30-May	16	14	25	17	27	56	21	29	28	40	78	87	54	38	37	37	82	43	24	35	29	16	20	17	87
31-May	11	13	21	17	82	16	20	32	56	96	77	58	64	62	42	64	61	32	40	24	27	57	9	12	96
87 91 88 90 89 90 91 99 94 108 85 108 95 88 84 74 103 77 64 93 96 95 90 93																								Diurnal Maximum	
AF - Analyzer Failure																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 19, 2016	Last Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	16:50	End Time (MST)	21:10
Gas Cert Reference	EY0000359	Station temp.	22 Deg C
Cal Gas Concentration	51.4 ppm	Cal Gas Exp Date	Feb-09-2018
Calibrator Make/Model	API T700	Serial Number	1221
ZAG Make/Model	API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9628

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-655	-656
Analyzer IP address	192.168.1.43		Lamp voltage	846	844
Calculated slope	0.996229	1.017486	Chamber temp	45.0	45.0
Calculated intercept	2.504102	0.454339	Pressure	664.6	655.2
Analyzer Background	20.9	20.7	Flow	0.489	0.482
Analyzer Coefficient	0.916	0.916	Intensity	92	92

Analyzer make Thermo 43i Analyzer serial # JC1428701363

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	76.5	786.4	772.1	1.019
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	76.5	786.4	772.1	1.019
second point	5000	38.2	392.7	386.7	1.015
third point	5000	19.3	198.4	193.4	1.026
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	76.5	786.4	788.1	0.998
Average Correction Factor					1.020

Corrected As found 772.4 Previous response 786.9 % change 1.9%

Notes:

Remote calibration. No adjustments made.

Calibration Performed By: Devin Russell



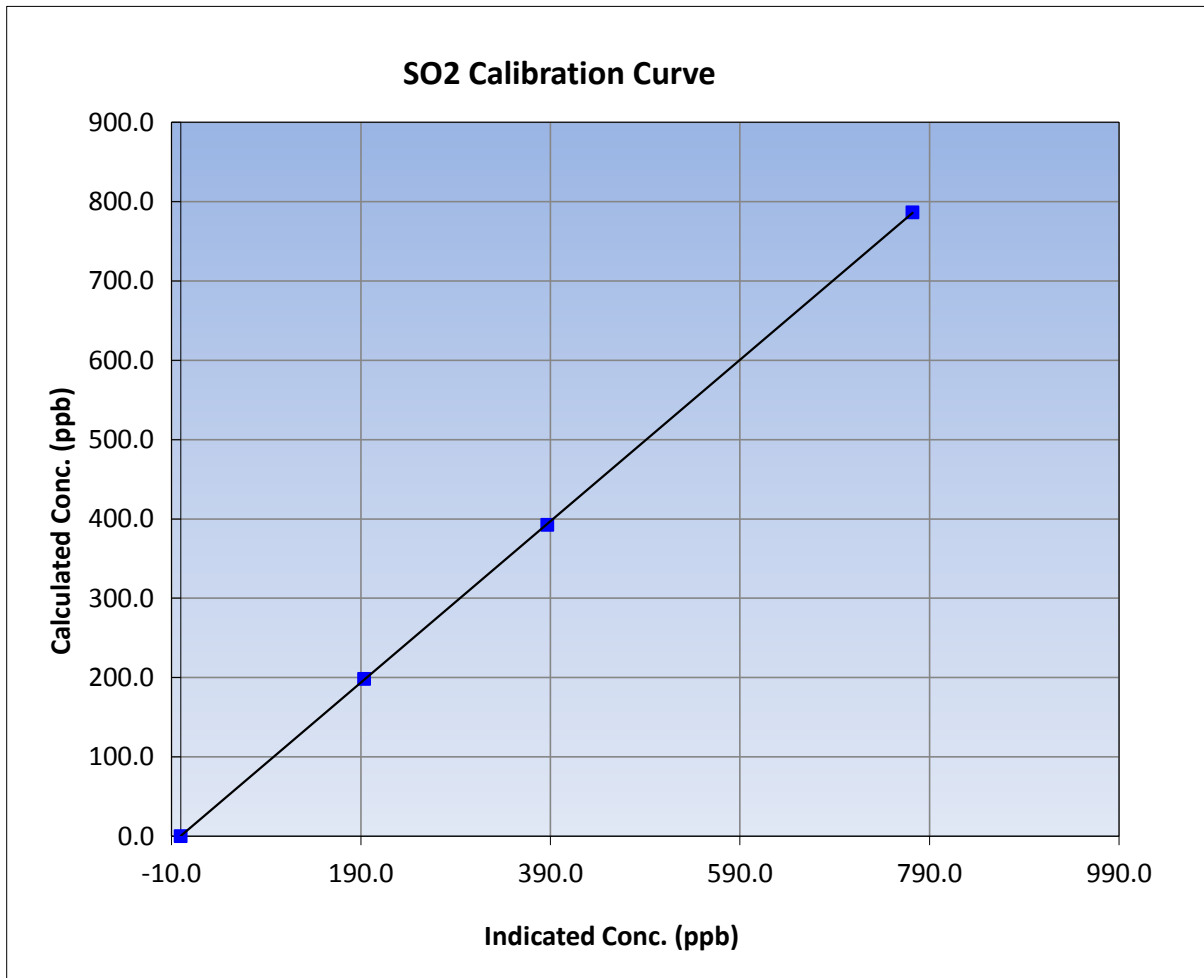
Wood Buffalo Environmental Association SO2 Calibration Report

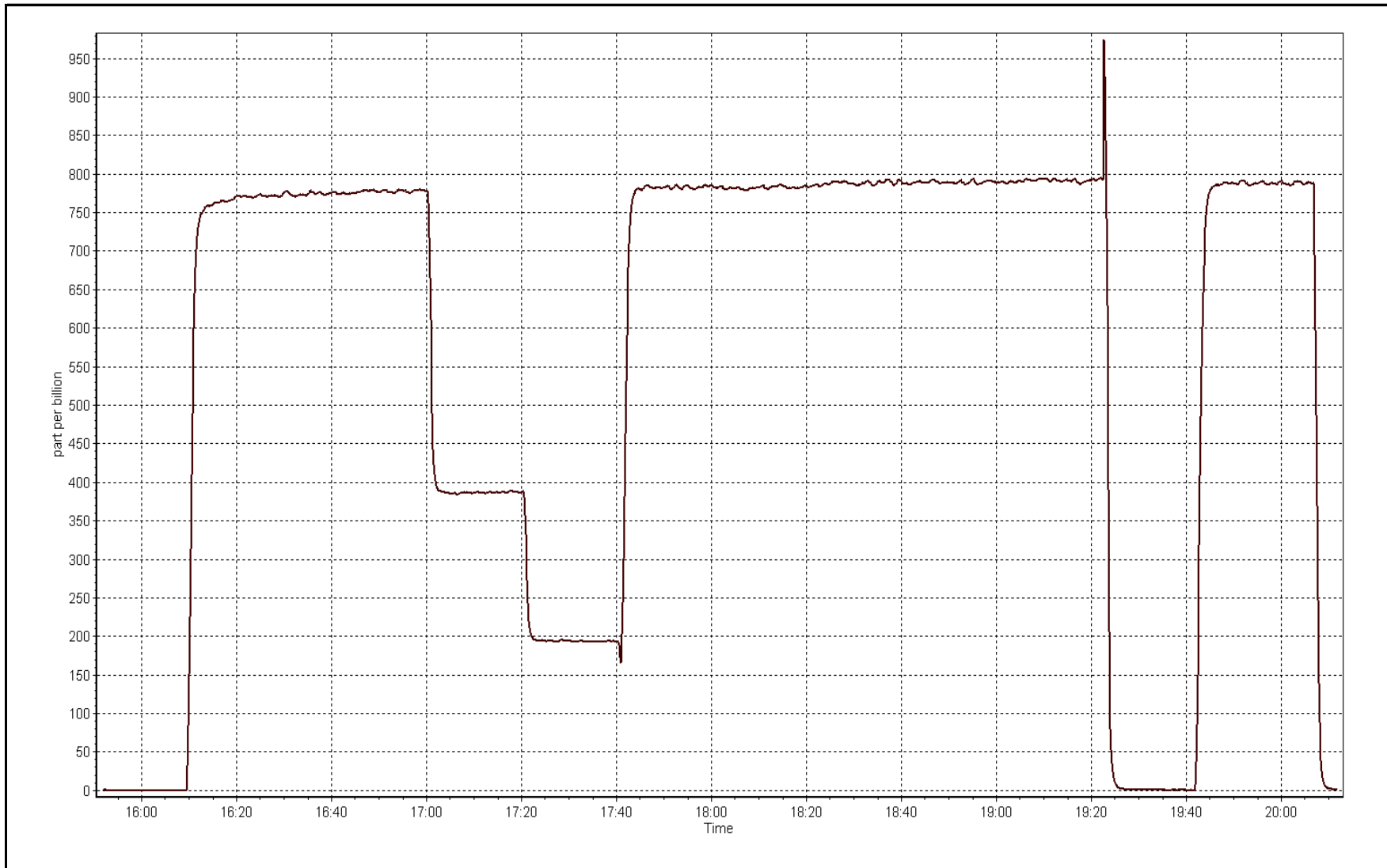
Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	16:50	End Time (MST)	21:10
Analyzer make	Thermo 43i	Analyzer serial #	JC1428701363

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999991
786.4	772.1	1.0185		
392.7	386.7	1.0154	Slope	1.017486
198.4	193.4	1.0257		
			Intercept	0.454339







Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 20, 2016	Last Calibration	May 19, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Other: Remote testing with purged calibration system		
Start Time (MST)	11:25	End Time (MST)	12:45
Gas Cert Reference	LL119411	Station temp.	22 Deg C
Cal Gas Concentration	4.97 ppm	Cal Gas Exp Date	12/02/2019
Calibrator Make/Model	API T700	Serial Number	1221
Dil air Make/Model	API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9628
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	EY0000359 9/Feb/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-637	-636
Analyzer IP address	192.168.1.44		Lamp voltage	922	922
Calculated slope	0.977671	0.982319	Chamber temp	45	45
Calculated intercept	0.462364	0.462760	Pressure	665.5	665.5
Analyzer Background	2.9	2.9	Flow	0.427	0.427
Analyzer Coefficient	1.078	1.078	Intensity	90	90
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1410661331
Converter make/model	CDN-101	Converter serial #	521

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	80.5	80.0	81.2	0.985
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	80.5	80.0	81.2	0.985
second point	5000	40.2	40.0	40.0	0.999
third point	5000	20.1	20.0	19.4	1.030
as left zero					
as left span					
Average Correction Factor					1.005

Corrected As found	81.2	Previous response	81.4	% change	0.3%
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Notes:

Remote calibration; re-test of TRS response after purging of the calibration system. All responses verified within specifications.

Calibration Performed By:

Kelly Baragar



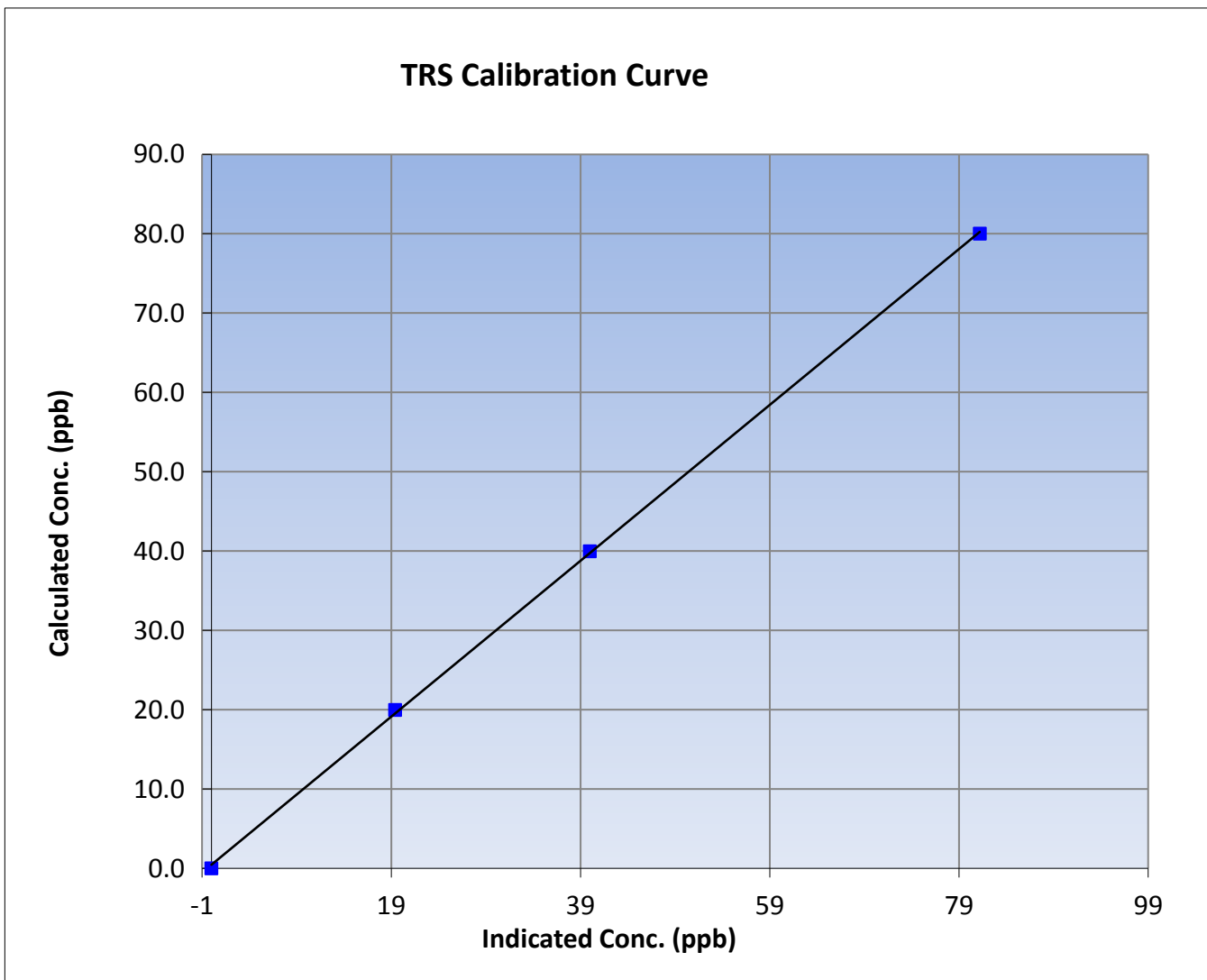
Wood Buffalo Environmental Association TRS Calibration Report

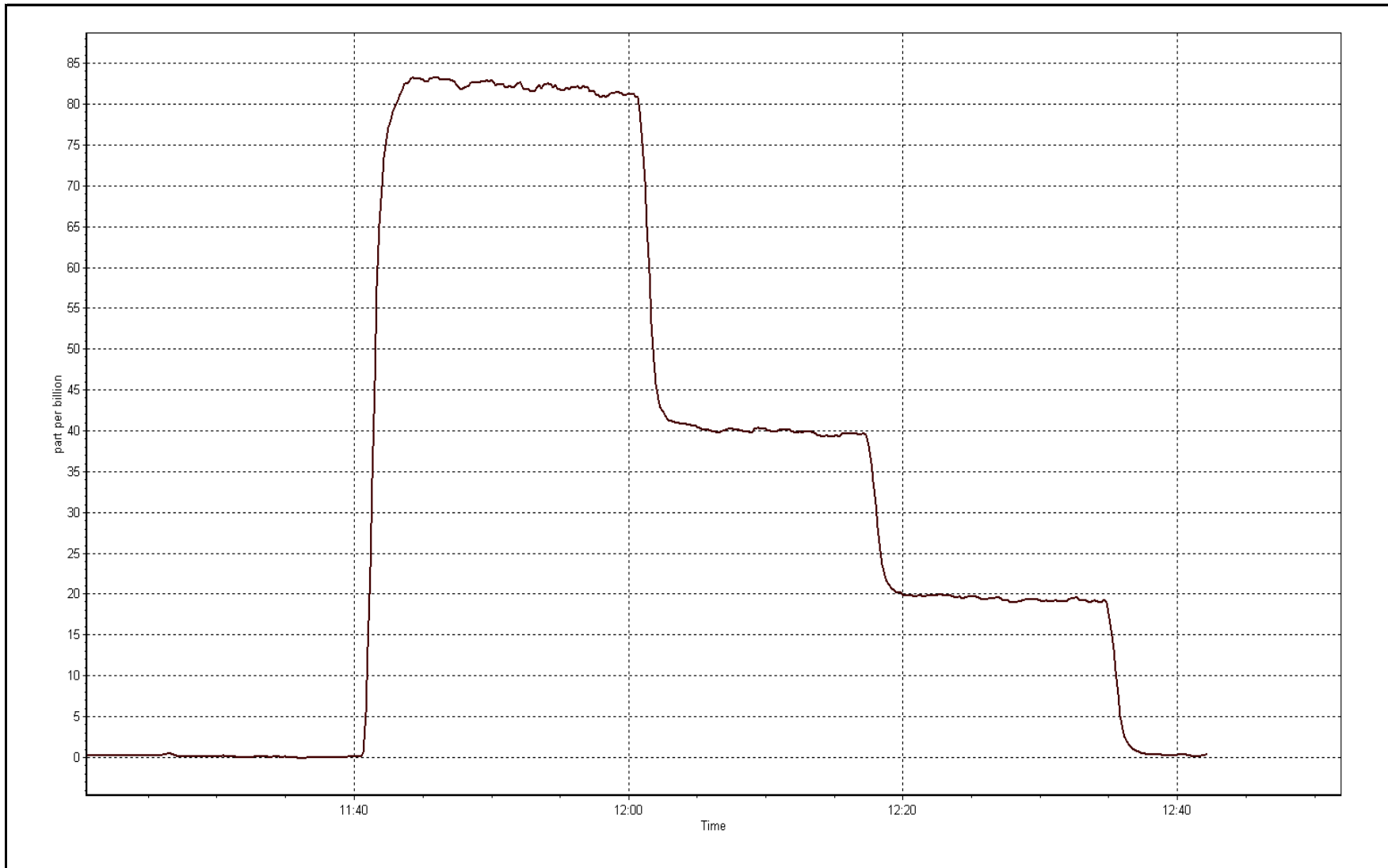
Station Information

Calibration Date	May 20, 2016	Previous Calibration	May 19, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	11:25	End Time (MST)	12:45
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1410661331

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999857
80.0	81.2	0.9854		
40.0	40.0	0.9990	Slope	0.982319
20.0	19.4	1.0299		
			Intercept	0.462760







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-19-16	Last Calibration	April-07-16
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	16:50	End Time (MST)	21:10
Gas Cert Reference	EY0000359	Cal Gas Expiry Date	Feb-09-2018
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1084.0 ppm
C3H8 Cal Gas Conc.	208.0 ppm	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	1221
ZAG make/model	Teledyne API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	Serial Number	9628

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.1
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.996139	1.001328	Carrier Pressure	37.0	37.0
THC Calc intercept	0.078884	0.069105	Fuel Pressure	49.6	49.6
NMHC Calc slope	0.996208	0.996038	Air Pressure	34.3	34.3
NMHC Calc intercept	0.030388	0.038506			

Analyzer make Thermo 55i Analyzer serial # 1152430011

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	76.5	16.59	16.50	1.005
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.3	16.54	16.50	1.003
second point	5000	38.2	8.28	8.12	1.020
third point	5000	19.1	4.14	4.03	1.028
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	16.59	16.53	1.003
Average Correction Factor					1.017

Corrected As found 16.50 Previous response 16.57 % change 0.4%

Notes:

Remote calibration. No adjustments made.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
	5000	0	0.00	0.00	----
	5000	76.5	8.75	8.75	1.000
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.3	8.73	8.75	0.998
second point	5000	38.2	4.37	4.31	1.014
third point	5000	19.1	2.19	2.13	1.026
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	8.75	8.76	0.999
Average Correction Factor					1.012

Corrected As found 8.75 Previous response 8.75 % change 0.1%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
	5000	0	0.00	0.00	----
	5000	76.5	7.83	7.75	1.011
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.3	7.81	7.75	1.008
second point	5000	38.2	3.91	3.81	1.027
third point	5000	19.1	1.96	1.89	1.035
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	7.83	7.78	1.007
Average Correction Factor					1.023

Corrected As found 7.75 Previous response 7.82 % change 0.9%



Wood Buffalo Environmental Association

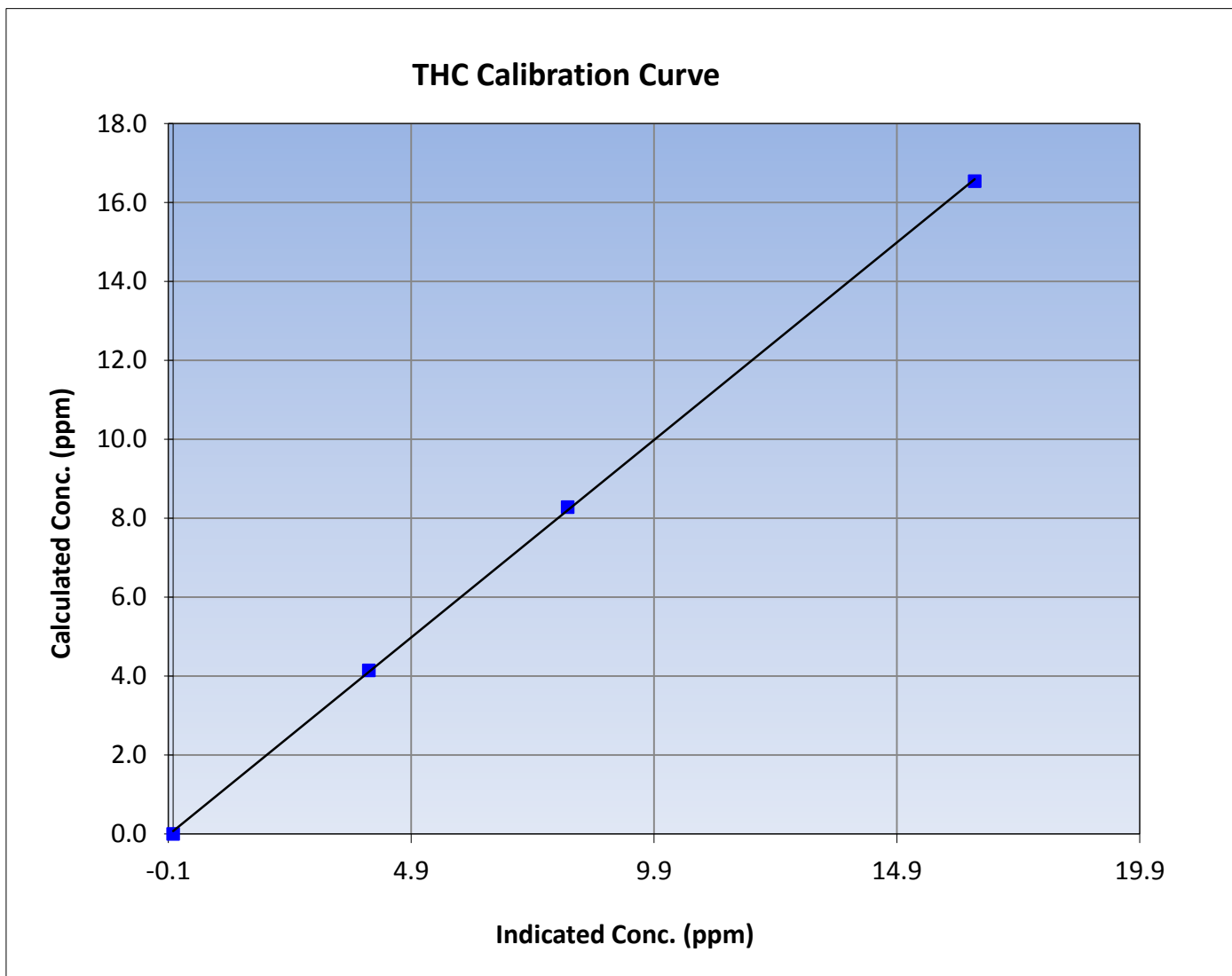
THC Calibration Summary

Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	16:50	End Time (MST)	21:10
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999898
16.54	16.50	1.0025		
8.28	8.12	1.0199	Slope	1.001328
4.14	4.03	1.0275		
			Intercept	0.069105





Wood Buffalo Environmental Association

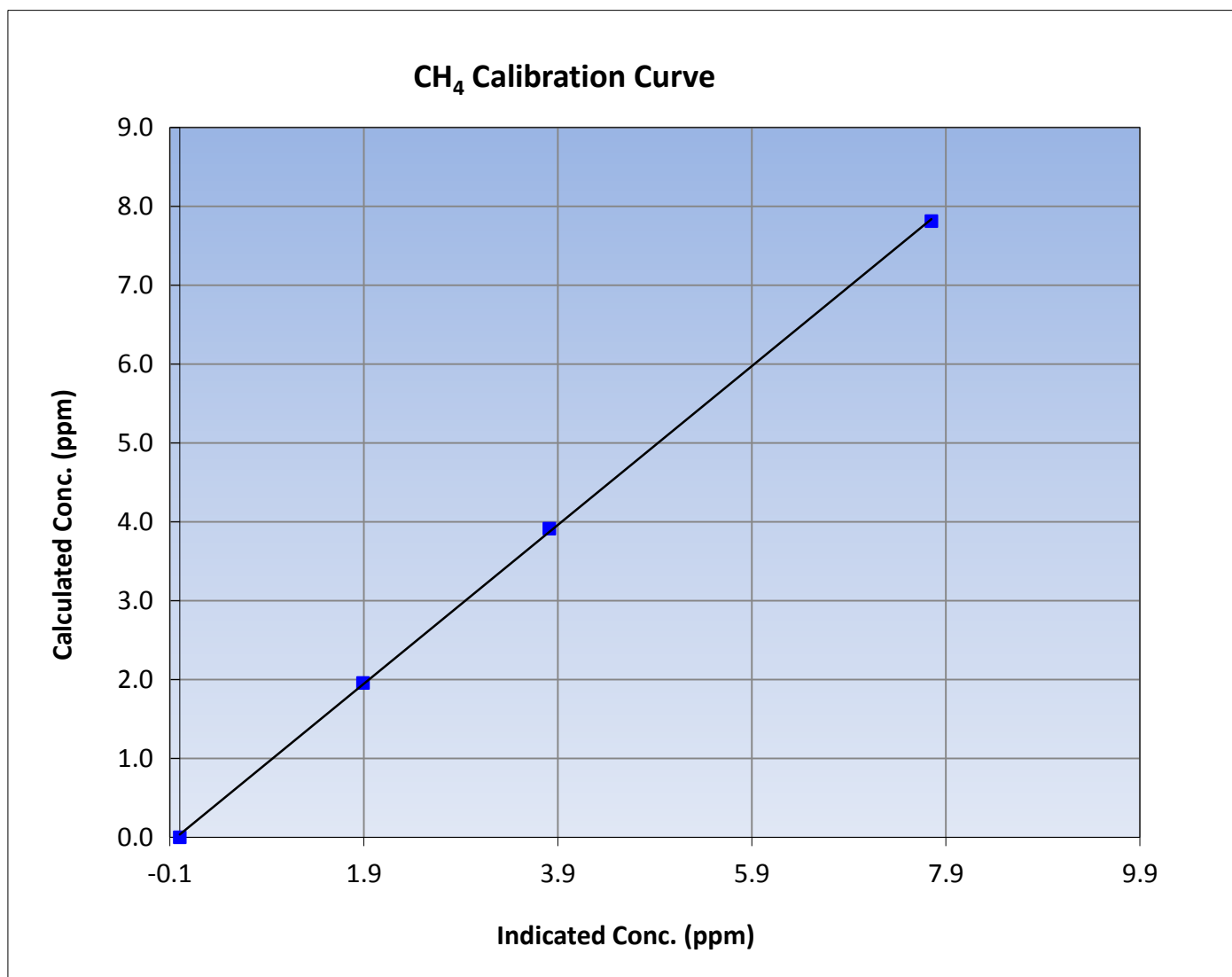
CH₄ Calibration Summary

Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	16:50	End Time (MST)	21:10
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999886
7.81	7.75	1.0081		
3.91	3.81	1.0267	Slope	1.006849
1.96	1.89	1.0348		
			Intercept	0.034632





Wood Buffalo Environmental Association

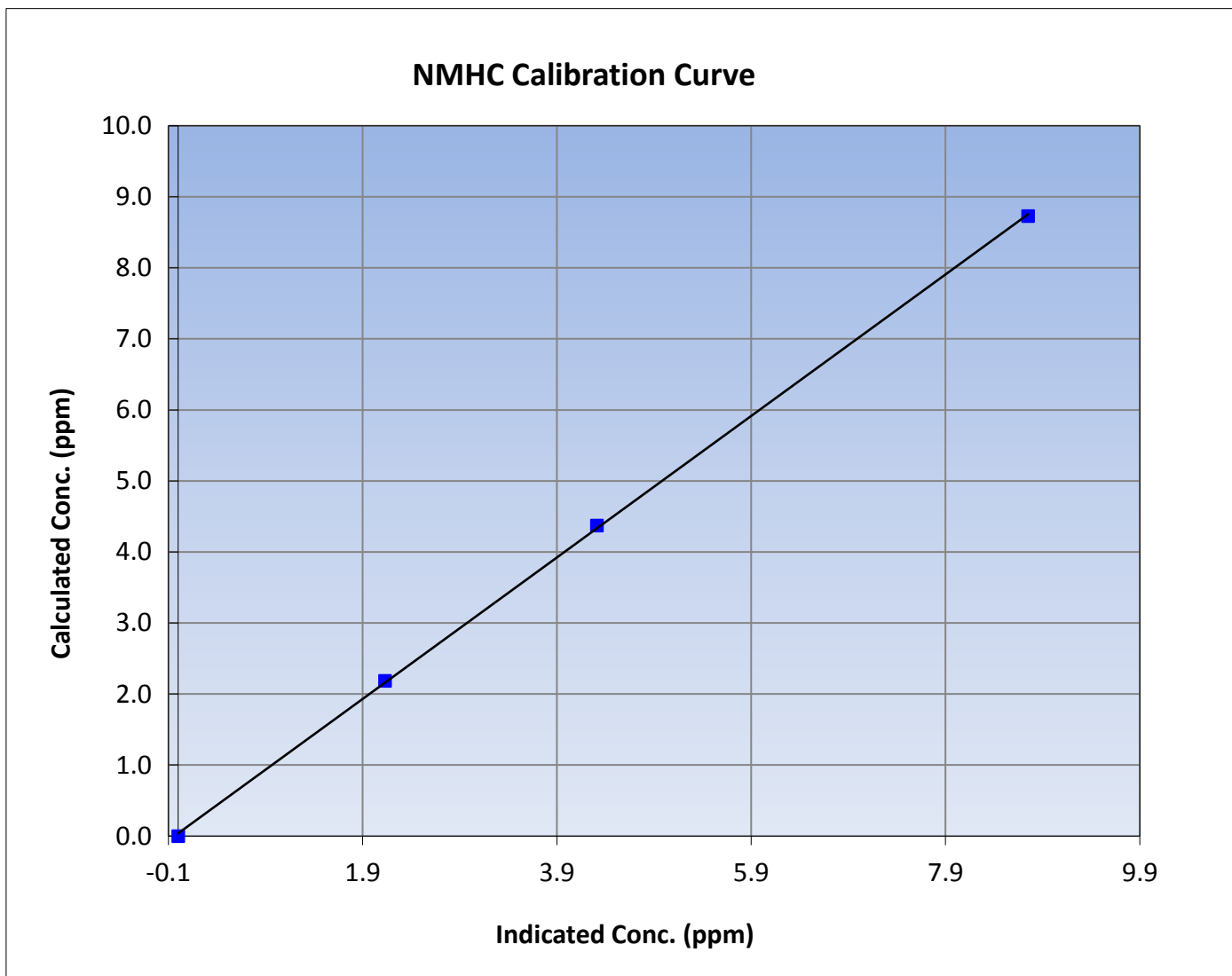
NMHC Calibration Summary

Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	16:50	End Time (MST)	21:10
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

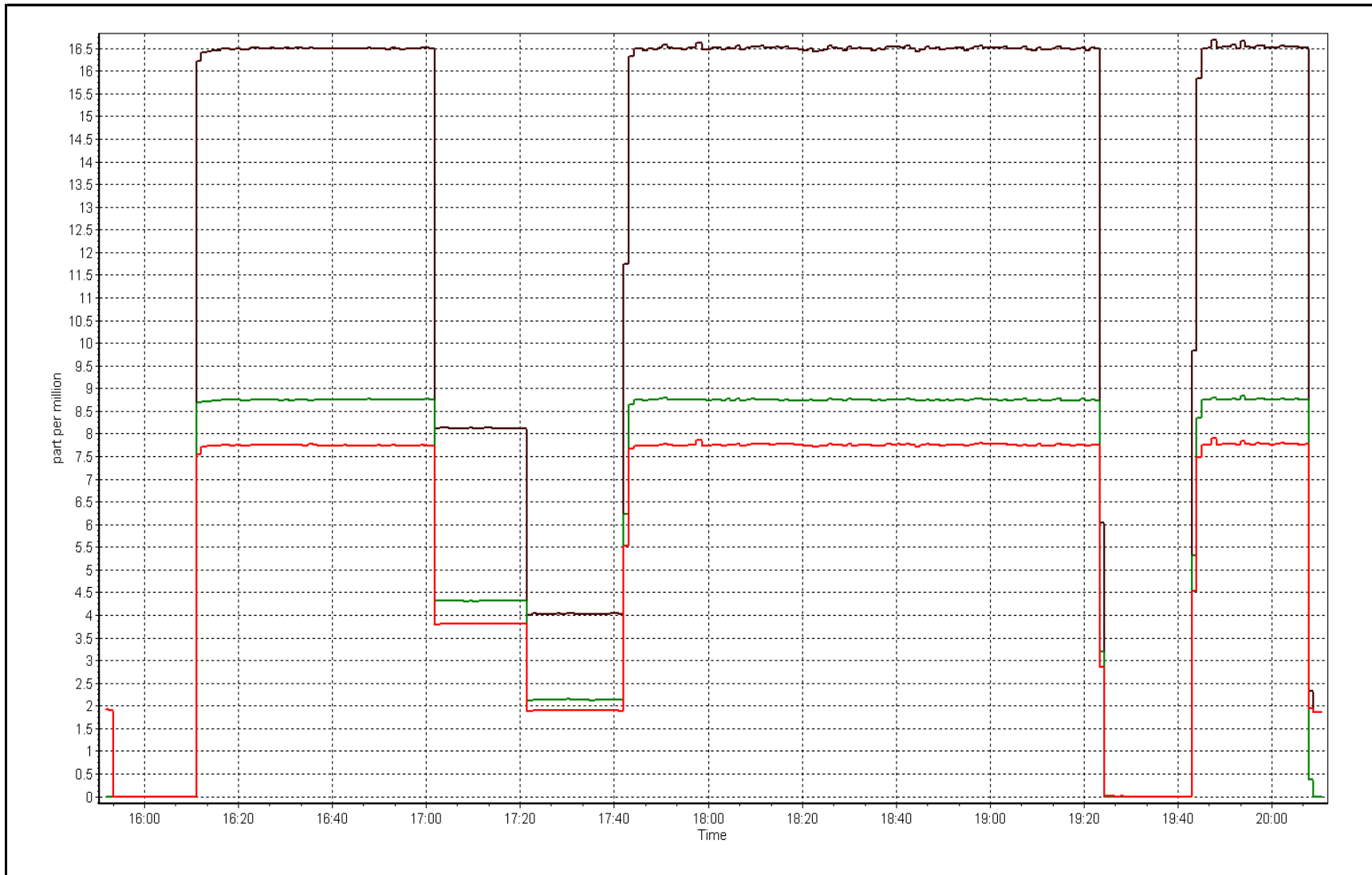
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999898
8.73	8.75	0.9976		
4.37	4.31	1.0139	Slope	0.996038
2.19	2.13	1.0258		
			Intercept	0.038506



THC Calibration Plot

Date: May 19, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 20, 2016	Previous Calibration	April 13, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	7:05	End Time (MST)	9:20
NO2 GPT Ref date	May-19-16	Transfer Standard	23
		Station temp.	21 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1221
ZAG make/model	Teledyne API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	Serial Number	9628

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.0	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	53.4	53.4
Calculated slope	0.999930	1.048894	Pressure	647.7	645.8
Calculated intercept	0.922978	-0.504763	Flow cell A	0.726	0.726
Analyzer Background	-0.6	-0.6	Flow cell B	0.728	0.726
Analyzer Coefficient	1.012	1.012	Cell A Intensity	73420	73075
			Cell B Intensity	78866	75905

Analyzer make	Thermo 49i	Analyzer serial #	1501663734
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	185.2/800	0.0	-0.5	----
as found span	5000	570.4/1004.8	319.8	303.9	1.052
calibrator zero	5000	185.2/800	0.0	-0.5	----
high point	5000	569.7/1004.9	319.8	303.9	1.052
second point	5000	381.6/914.1	208.5	201.2	1.036
third point	5000	191.5/804	105.3	101.4	1.039
as left zero	5000	184.7/800	0.0	0.3	----
as left span	5000	569.7/1003.3	319.8	304.7	1.050
Average Correction Factor					1.042

Corrected As found	304.4	Previous response	318.9	% change	4.8%
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Notes:

Remote calibration. No adjustments made.

Calibration Performed By:

Devin Russell



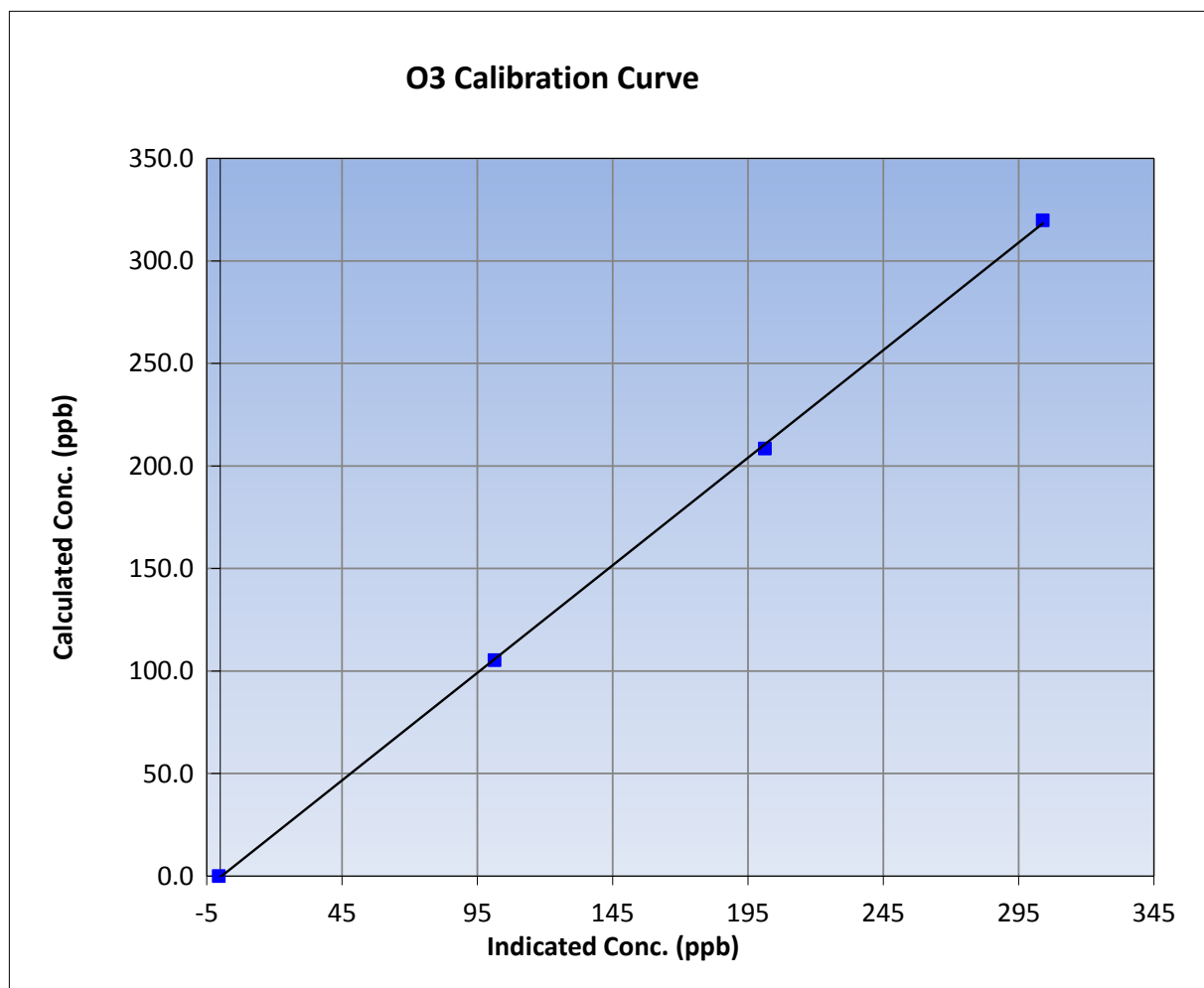
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-20-16	Previous Calibration	April 13, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	7:05	End Time (MST)	9:20
Analyzer make	Thermo 49i	Analyzer serial #	1501663734

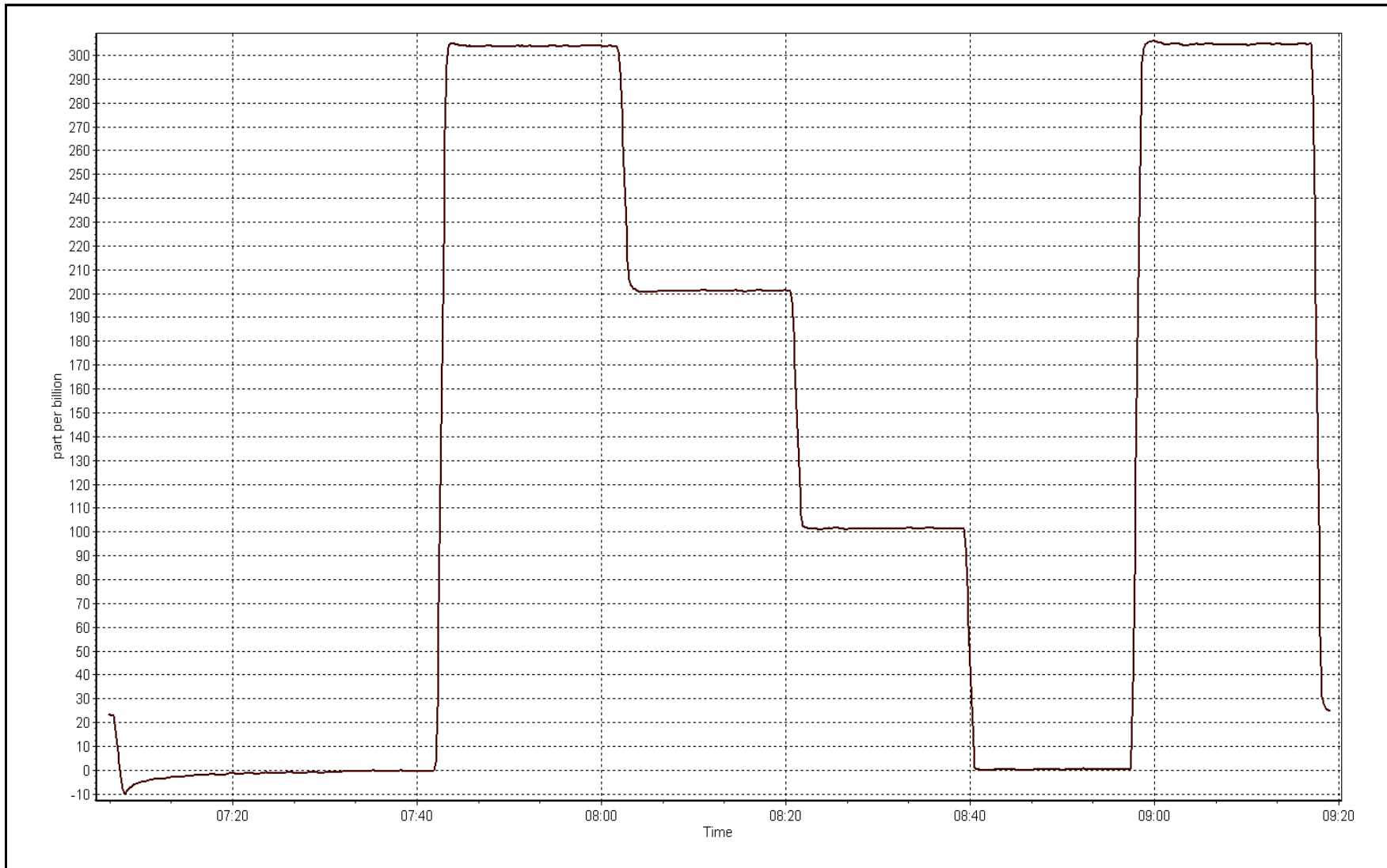
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999860
319.8	303.9	1.0523		
208.5	201.2	1.0362	Slope	1.048894
105.3	101.4	1.0386		
			Intercept	-0.504763



O3 Calibration Plot

Date: May 20, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	16:50	End Time (MST)	21:10
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	EY0000359
NOX Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	Feb-09-2018
Calibrator	API T700	Serial Number	1221
Zero air Generator	API 701	Serial Number	5611

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9628
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000560	0.998710	0.997795
	Data Offset	1.684580	2.135822	0.984790
Current Calibration	Data Slope	0.997622	0.997793	1.024054
	Data Offset	0.715099	1.403368	-2.005212

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1501663731
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000 ppb		0-1000 ppb	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.989		1.066	
NOX coefficient	0.997		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	6.4		6.9	
NOX bkgrnd	6.5		7.0	
Chamber Temp	49.9	Deg C	49.7	Deg C
Moly Temp	327.9	Deg C	323.4	Deg C
PMT voltage	-841	V	-841	V
PMT Temp	-2.8	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	164.7	mmHg	167	mmHg
R Cell Press Nox	165.1	mmHg	167	mmHg
NO sample flow	0.685	lpm	0.655	lpm
Nox sample Flow	0.685	lpm	0.655	lpm

Notes:

Remote calibration. Span adjusted. Second high NO point used for GPT reference.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 19, 2016

Station Number:

AMS 21

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3	----	----
as found span	5000	76.5	801.7	801.7	0.0	743.8	744.3	-0.4	1.0778	1.0772
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3	----	----
high point	5000	76.5	801.7	801.7	0.0	803.3	802.6	0.7	0.9981	0.9989
second point	5000	38.2	400.3	400.3	0.0	400.5	399.6	1.0	0.9995	1.0019
third point	5000	19.3	202.3	202.3	0.0	200.7	199.6	1.1	1.0077	1.0135
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.0	----	----
as left span	5000	76.5	801.7	493.9	307.8	815.6	500.6	314.9	0.9830	0.9866
Average Correction Factor									1.0018	1.0047

Corrected As found
Previous Response

NO_x= 743.5
NO_x= 799.6

NO= 744.3
NO= 800.6

Percent Change

NO_x= 7.5%

NO= 7.6%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 76.50 ccm NOx ref calc conc = 801.7 ppb NO ref calc conc = 801.7 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	815.4	813.7	0.3	0.9832	0.9853	----	----
1st NO2 (300)	493.9	319.8	805.8	493.9	312.0	0.9950	----	1.0249	97.6%
2nd NO2 (200)	605.1	208.5	813.5	605.1	208.4	0.9856	----	1.0009	99.9%
3rd NO2 (100)	708.4	105.3	814.2	708.4	105.9	0.9847	----	0.9941	100.6%
2nd NO ref point		0.0	803.2	801.4	1.8	0.9981	1.0004	----	----
Average Correction Factor						0.9908		1.0066	99.4%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

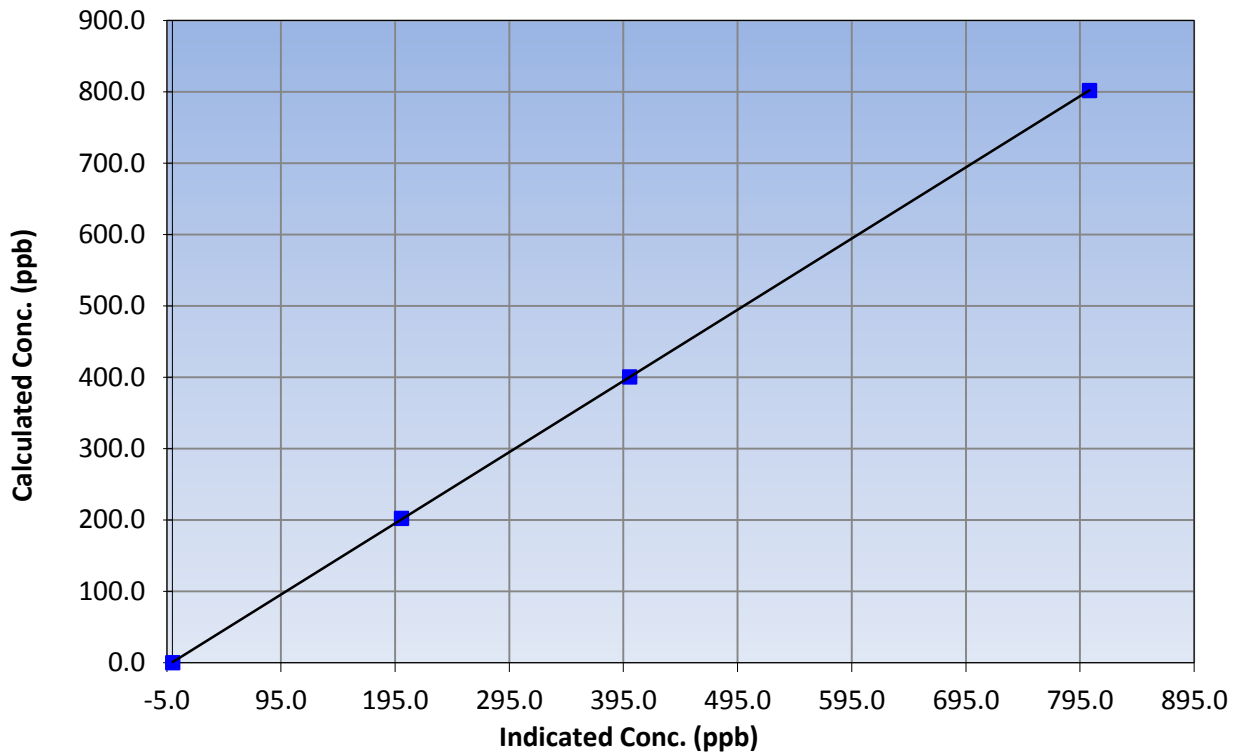
Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	16:50	End Time (MST)	21:10
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999992
801.7	803.3	0.9981		
400.3	400.5	0.9995	Slope	0.997622
202.3	200.7	1.0077		
			Intercept	0.715099

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

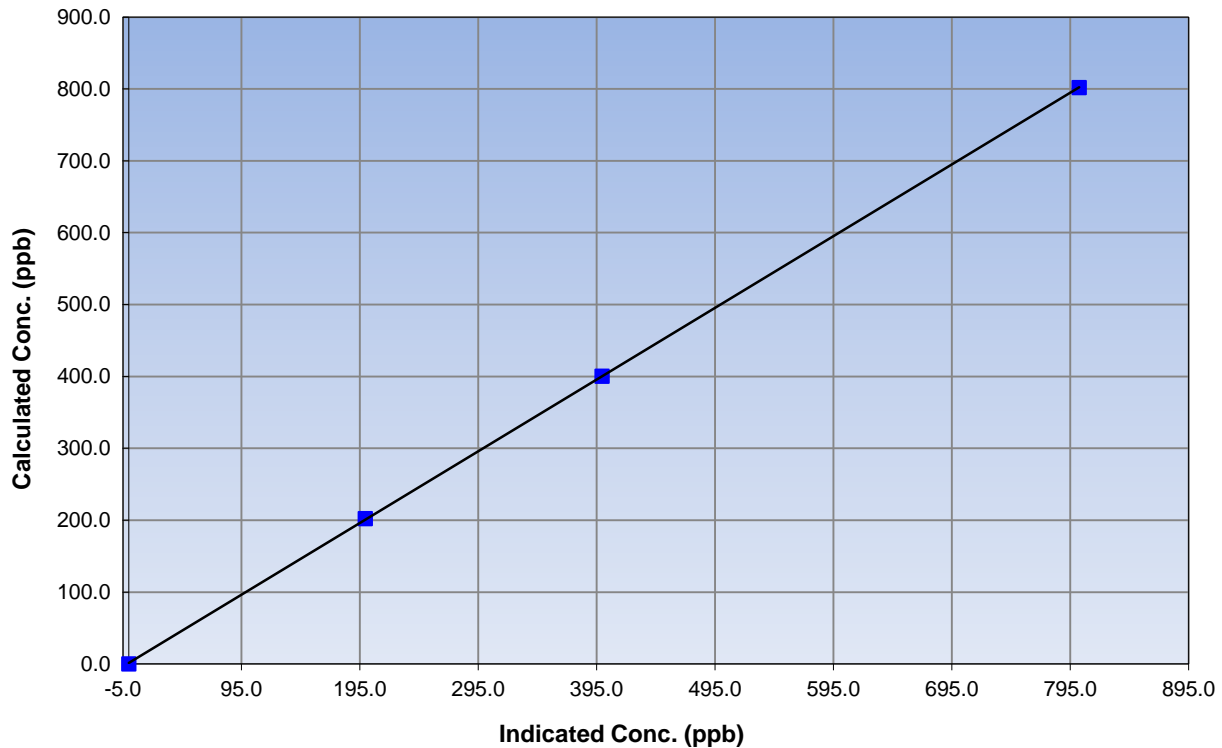
Station Information

Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	16:50	End Time (MST)	21:10
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999985
801.7	802.6	0.9989		
400.3	399.6	1.0019	Slope	0.997793
202.3	199.6	1.0135		
			Intercept	1.403368

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

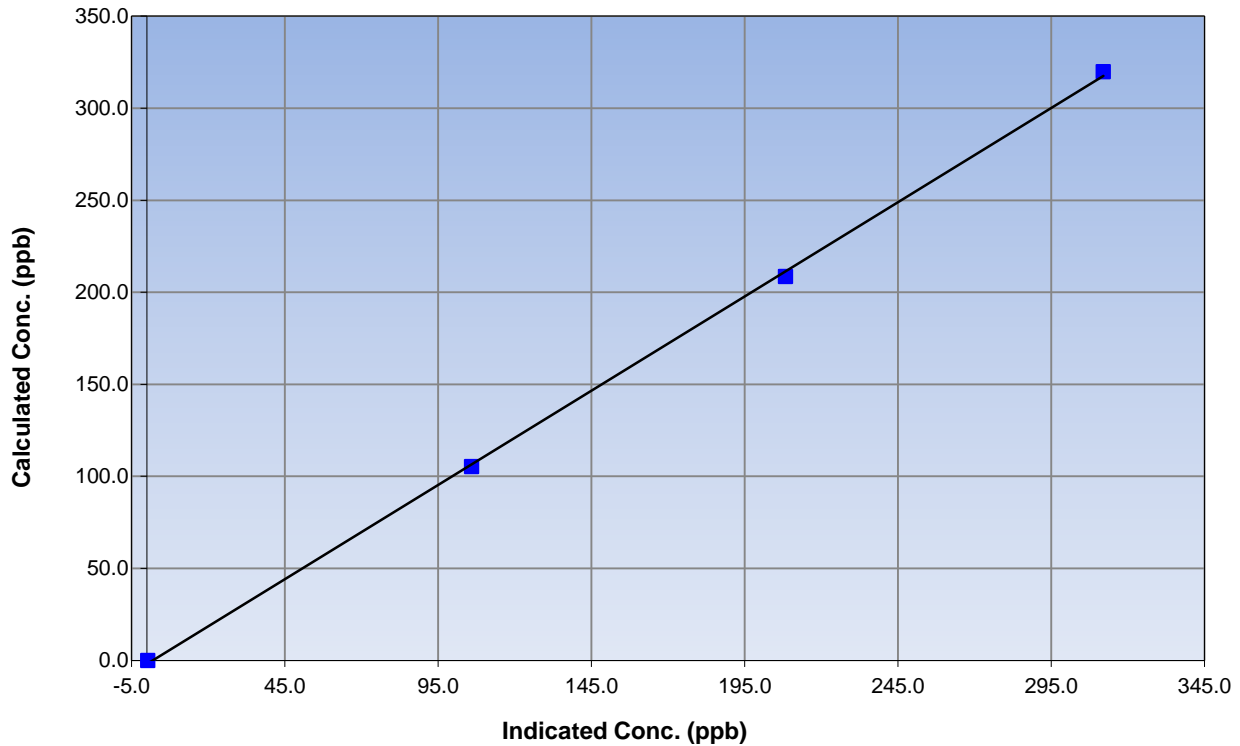
Station Information

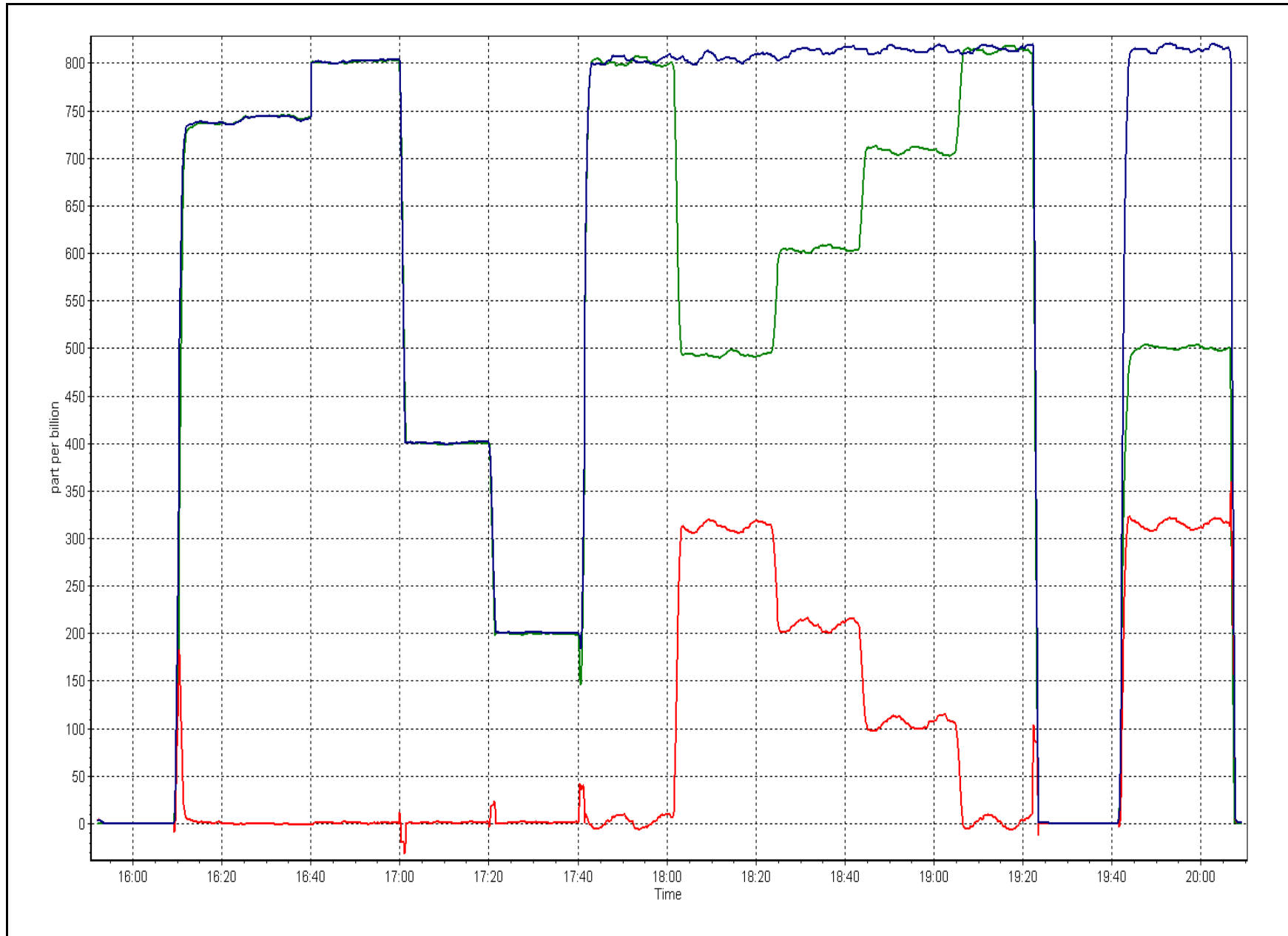
Calibration Date	May 19, 2016	Previous Calibration	April 7, 2016
Station Number	Conklin Community	Station Number	AMS 21
Start Time (MST)	16:50	End Time (MST)	21:10
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999691
319.8	312.0	1.0249		
208.5	208.4	1.0009	Slope	1.024054
105.3	105.9	0.9941		
			Intercept	-2.005212

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>May 11, 2016</u>	Previous Calibration:	<u>April 8, 2016</u>
Station Name:	<u>Conklin Community</u>	Station Number:	<u>AMS 21</u>
Start Time (MST):	<u>14:45</u>	End Time (MST):	<u>15:55</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>7494</u>		
C ₁₄ Source SN:	<u>CM-0404</u>		
Confirmation of Time settings:	Yes <input 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	10.0	10.3	0.3	10.0
T2	23.0	na	na	23.0
T3	24.0	na	na	24.0
T4	25.0	na	na	25.0
RH (%)	41.0	na	na	41.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	963	956.6	-6.4	956

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1013	13	1013	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	170		170
Neph	1.6		0
C14	49.2		64.3
Indicated Concentration (ug/m3)	1.7	yes	0
Offset 1			169.7
Offset 2			27.2

Leak Check (Quarterly)			
Leak Check Date:	<u>March 24, 2016</u>	Previous Leak Check Date:	NA
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.70	0.16	
*Flow with adaptor (LPM):	16.54		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	<u>March 24, 2016</u>	Previous Foil Calibration:	NA
Zeroed?:			
Foil Mass:	<u>1337</u>	Mass foil set S/N:	5872
Previous Correction Factor:	<u>7048</u>		
New Correction Factor:	<u>7056</u>		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	08/04/2016
Pump	Good	21/03/2016
Filter Tape	Good	21/03/2016
Mass Foil Cal Set	na	24/03/2016
HEPA filter	Good	24/03/2016

NOTES:

Pump was not running upon arrival. Pump would not start manually. Removed pump power connection and connected it again. Pump started. Flows temperatures and pressure checked. All good. Nephelometer zeroed. PM head cleaned.

Calibration Performed By: Devin Russell



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 500
CENOVUS
CHRISTINA LAKE
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100	11	0	3	0
H2S (ppb) Average	710	34	34	100	3	0	0	0
NO2 (ppb) Average	708	36	36	100	19	0	5	-
NO (ppb) Average	708	36	36	100	13	-	4	-
NOX (ppb) Average	708	36	36	100	30	-	9	-
Temperature 2 m (C) Average	744	0	0	100	29.5	-	21.7	-
Relative Humidity (%) Average	744	0	0	100	98	-	96	-
Wind Speed 10 m (km/h) Average	744	0	0	100	28	-	18	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.8	2	-	0	0	0	0	1	2	11
H2S (ppb) Average	710	0.1	0	-	0	0	0	0	0	0	3
NO2 (ppb) Average	708	2	2	-	0	0	1	1	2	5	19
NO (ppb) Average	708	0.8	2	-	0	0	0	0	1	2	13
NOX (ppb) Average	708	2.8	4	-	0	0	1	2	3	6	30
Temperature 2 m (C) Average	744	12.48	6.5	-	-4.5	5	8	11.8	16.3	21.6	29.5
Relative Humidity (%) Average	744	57.8	25	-	14	23	37	57	80	93	98
Wind Speed 10 m (km/h) Average	744	10.1	6	-	0	3	5	9	14	19	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Cenovus - Christina Lake - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 11 ppb on May 16 23:00	Maximum Daily Average: 3.2 ppb on May 9		Hours of Data:	708
Minimum Value: 0 ppb on May 6 21:00	Minimum Daily Average: 0.1 ppb on May 29		Hours of Missing Data:	36
Maximum Diurnal Average: 1.3 ppb at hour 8	Minimum Diurnal Average: 0.3 ppb at hour 21		Hours of Calibration:	36
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 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-May	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	2	3	3	0	0	0	0	0	0	0.5	3
2-May	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
3-May	0	0	0	0	0	Z	0	1	1	1	1	1	0	1	1	0	0	0	1	0	1	2	0	0.5	2	
4-May	Z	2	1	1	1	0	0	1	3	2	1	1	0	0	2	5	3	10	11	6	1	3	5	5	2.8	11
5-May	8	Z	3	0	1	6	8	5	1	2	1	2	2	1	2	3	2	4	1	0	0	2	1	1	2.5	8
6-May	1	0	Z	0	0	0	0	5	4	2	3	3	2	1	2	3	5	3	0	0	0	0	0	0	1.5	5
7-May	0	1	1	Z	1	0	1	2	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.6	2
8-May	1	2	1	2	Z	10	9	10	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2.3	11
9-May	10	4	2	7	5	Z	8	5	6	4	7	7	4	3	0	0	0	1	0	0	0	0	0	0	3.2	10
10-May	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
11-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-May	0	0	0	Z	0	0	0	1	1	1	1	0	1	0	1	2	1	0	0	0	0	0	0	0	0.5	2
14-May	1	1	1	0	Z	0	1	3	1	1	4	2	2	1	2	1	1	1	1	1	1	1	0	0	1.2	4
15-May	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0.5	1
16-May	Z	1	3	3	1	0	1	2	1	1	0	1	1	1	0	0	0	0	0	1	0	2	11	1	1.4	11
17-May	0	Z	0	1	1	1	1	0	0	1	1	0	1	2	2	3	0	0	0	0	0	1	1	1	0.8	3
18-May	0	0	Z	1	1	1	1	0	1	0	0	4	2	3	1	2	1	1	0	0	0	0	0	0	0.7	4
19-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.3	1
20-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	Z	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
23-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	0	0	Z	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2
25-May	0	1	0	Z	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0.5	1
26-May	0	0	0	0	Z	0	0	0	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0	0.2	1
27-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
28-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
29-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-May	2	1	Z	0	0	0	0	0	1	0	0	0	0	1	2	1	0	0	0	1	3	8	2	2	1.1	8
31-May	0	0	9	Z	4	3	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1.1	9

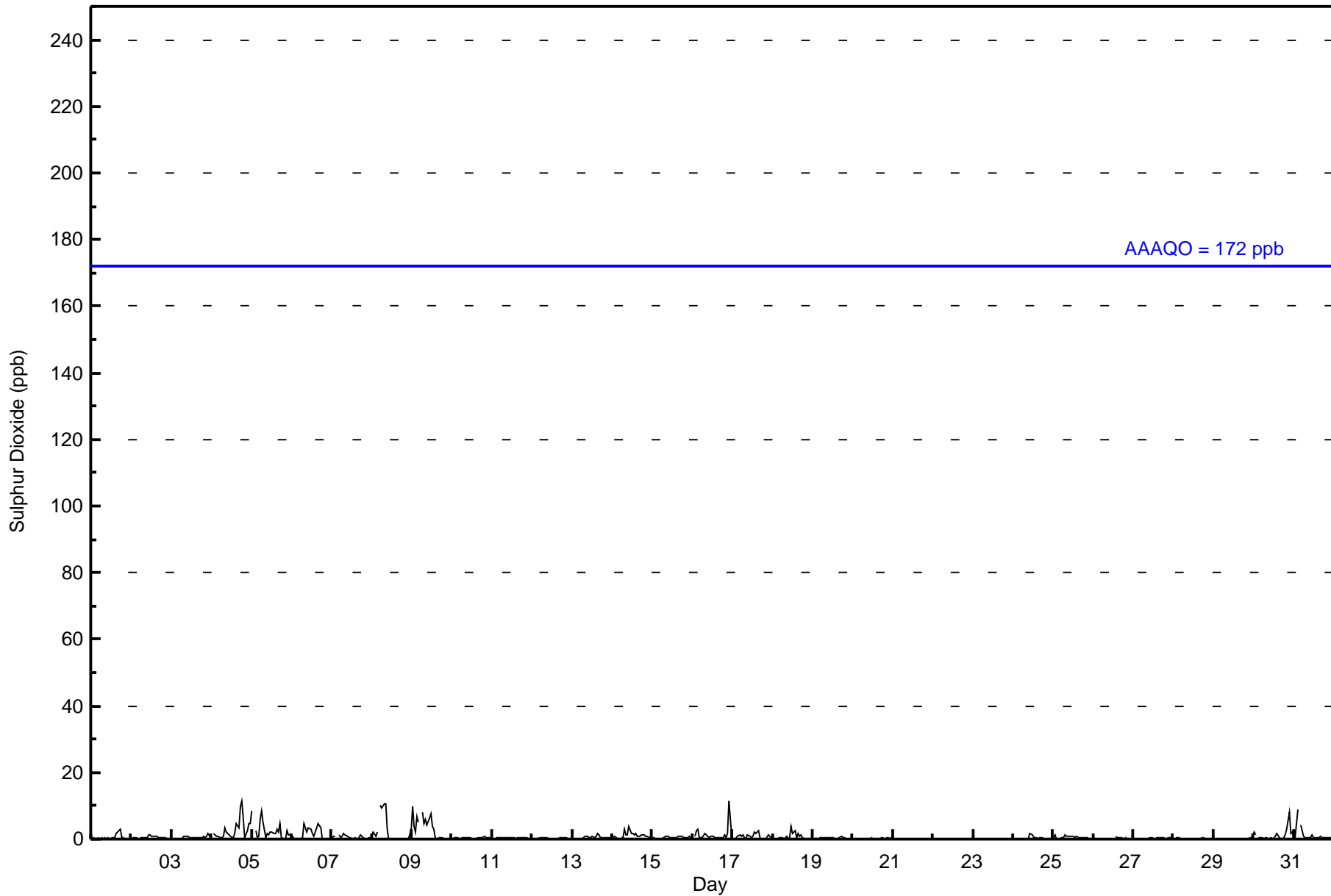
1.0	0.6	0.9	0.7	0.7	1.0	1.1	1.3	1.2	0.8	0.9	1.0	0.7	0.6	0.6	0.9	0.7	1.0	0.7	0.6	0.3	0.7	0.9	0.5	Diurnal Average
10	4	9	7	5	10	9	10	11	4	7	7	4	3	2	5	5	10	11	6	3	8	11	5	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.58	99.58
11 - 20	3	0.42	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	44	93	45	21	27	23	35	44	75	70	25	33	22	40	90	18	705
11 - 20	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	93	45	21	27	23	35	44	76	70	25	33	22	42	90	18	708

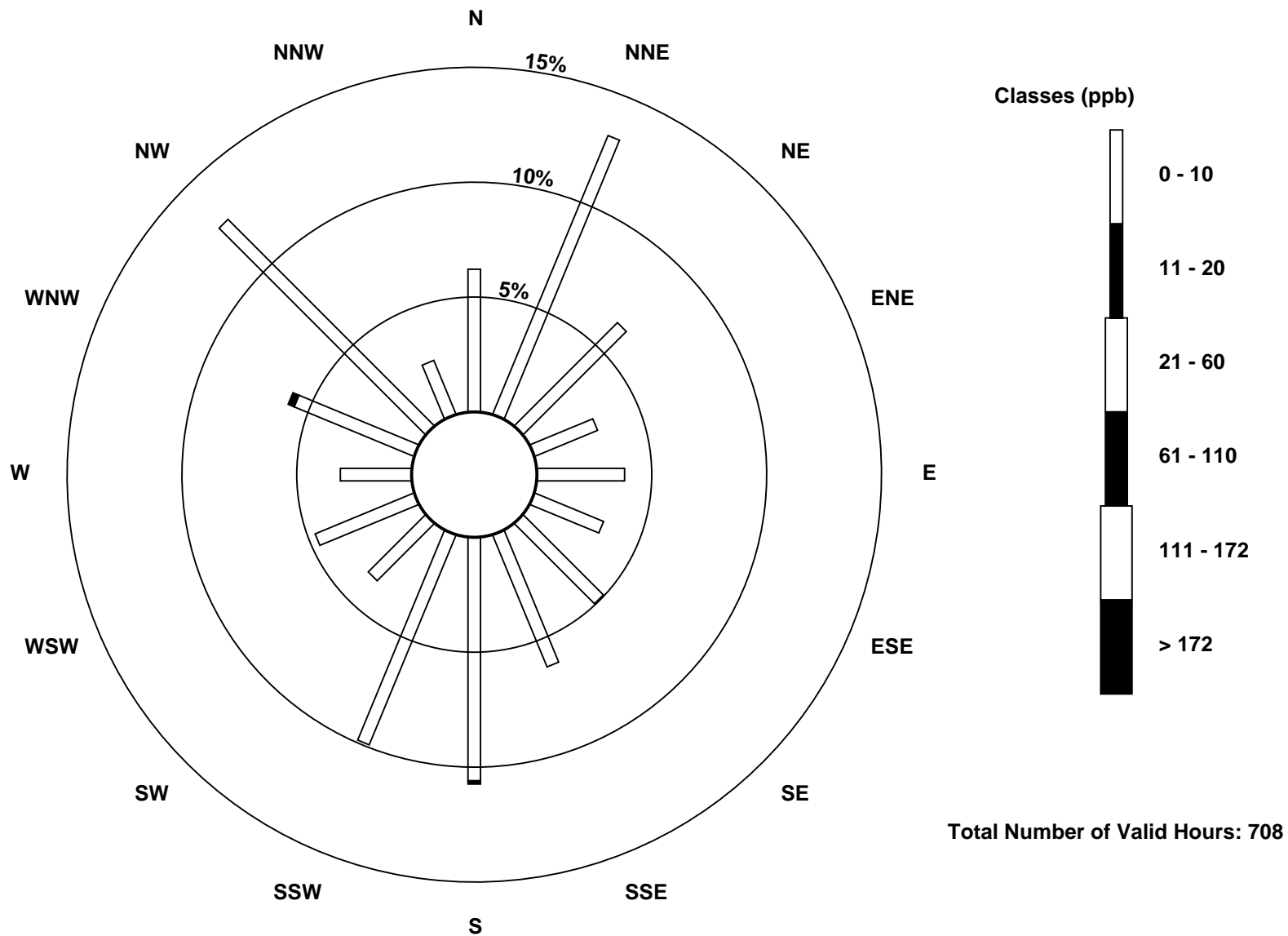
Total Number of Valid Hours: 708

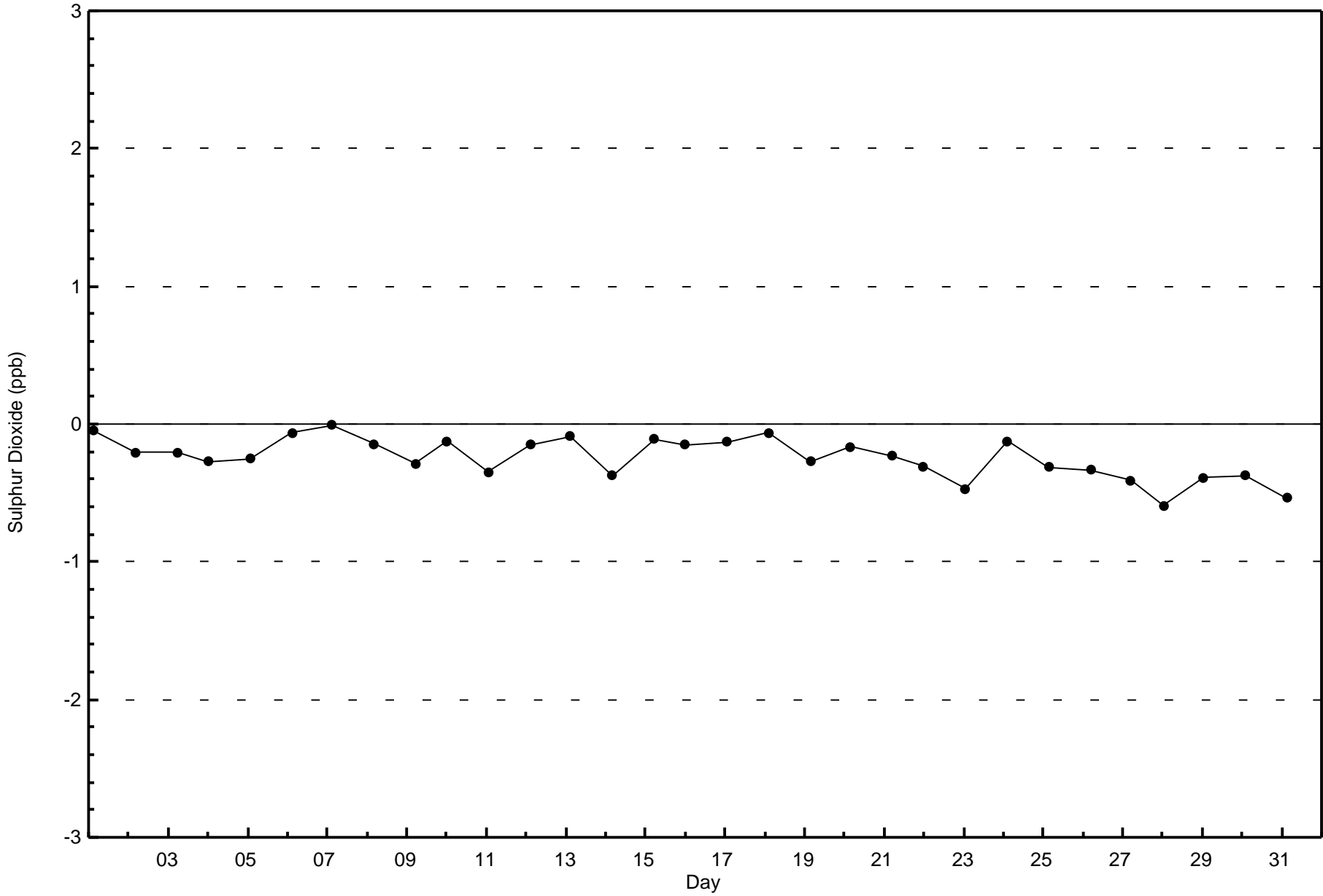
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake (AMS500)

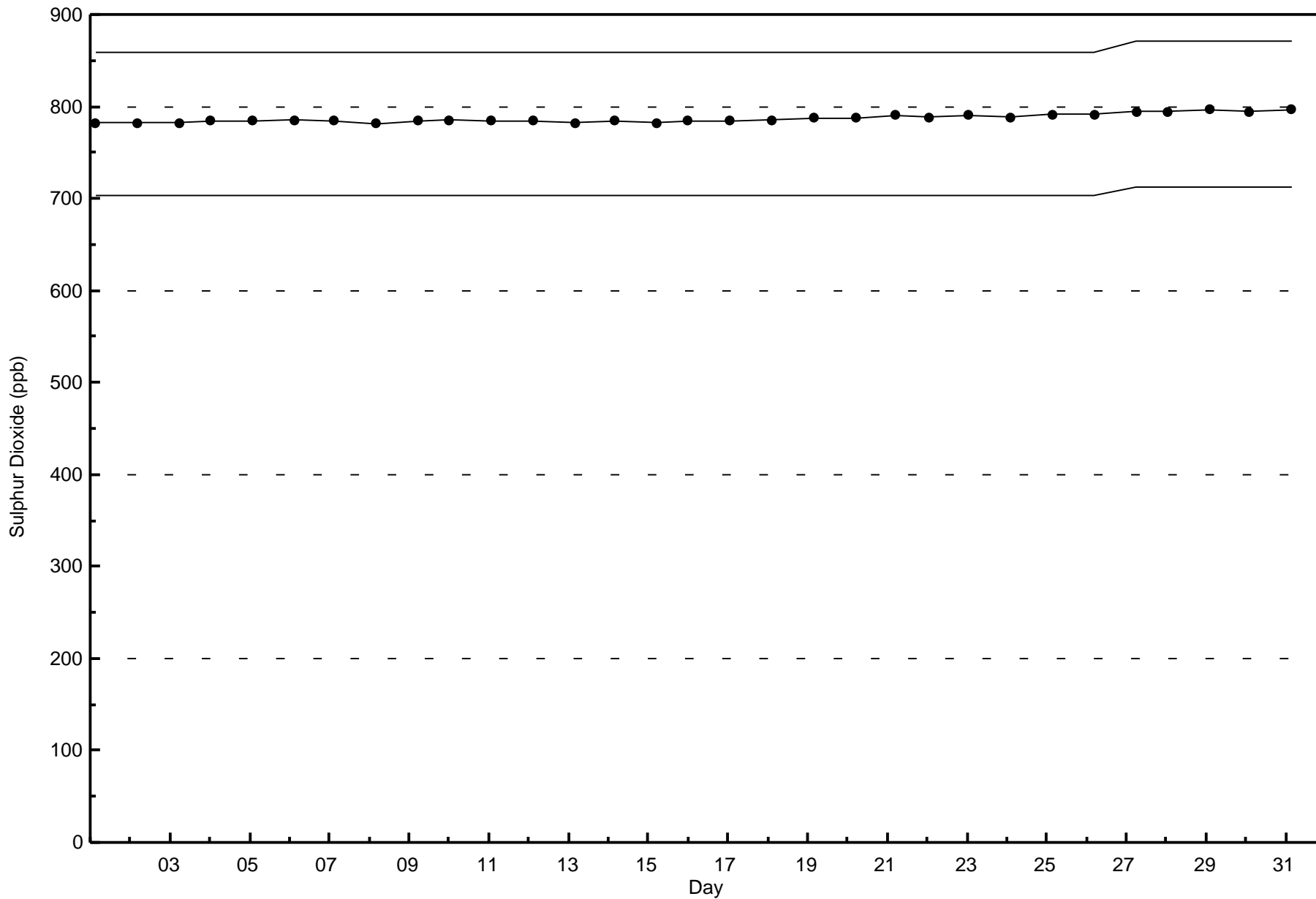


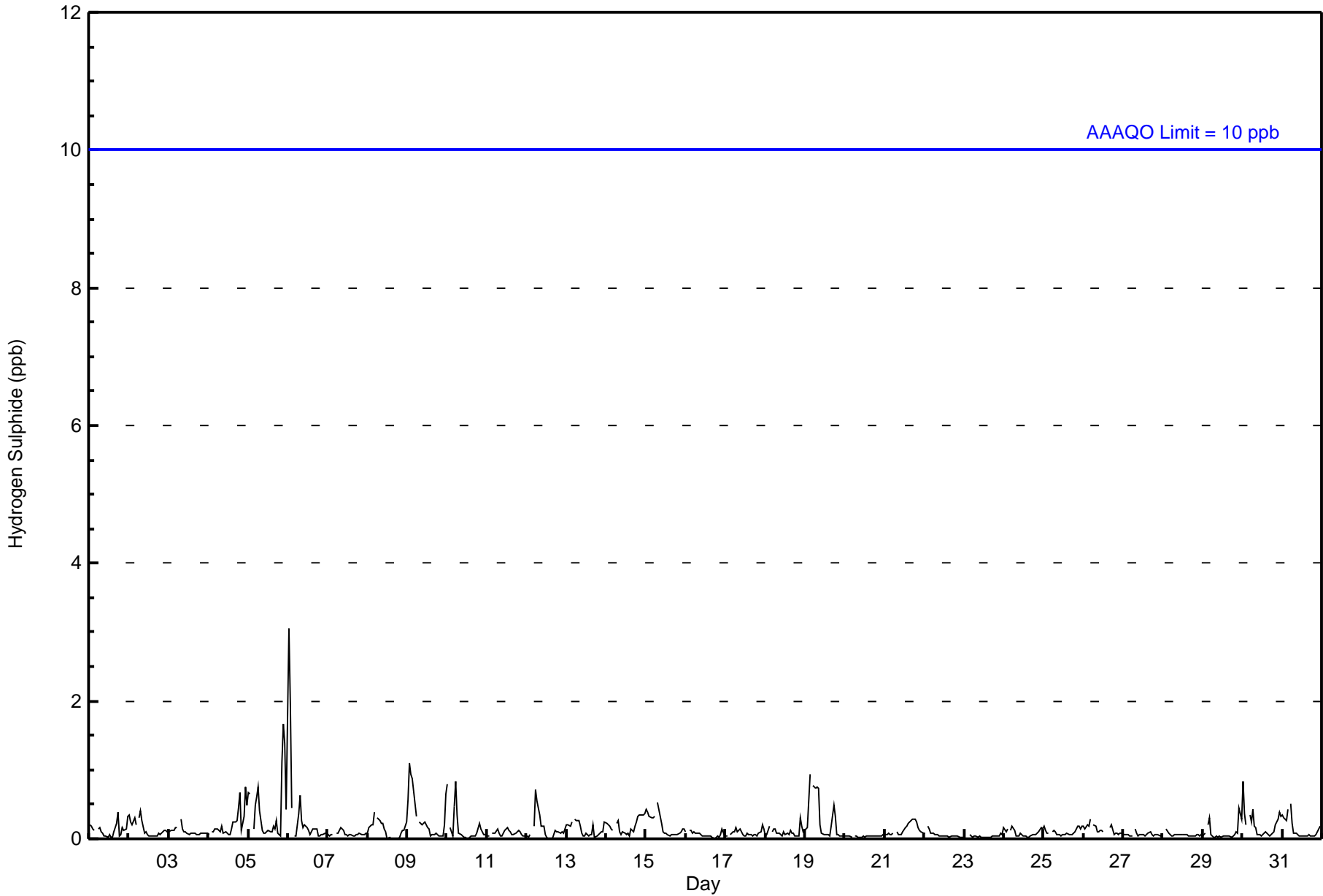




Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - May 2016







**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	709	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	43	96	45	21	27	24	33	43	81	65	26	33	23	40	89	20	709
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	43	96	45	21	27	24	33	43	81	65	26	33	23	40	90	20	710

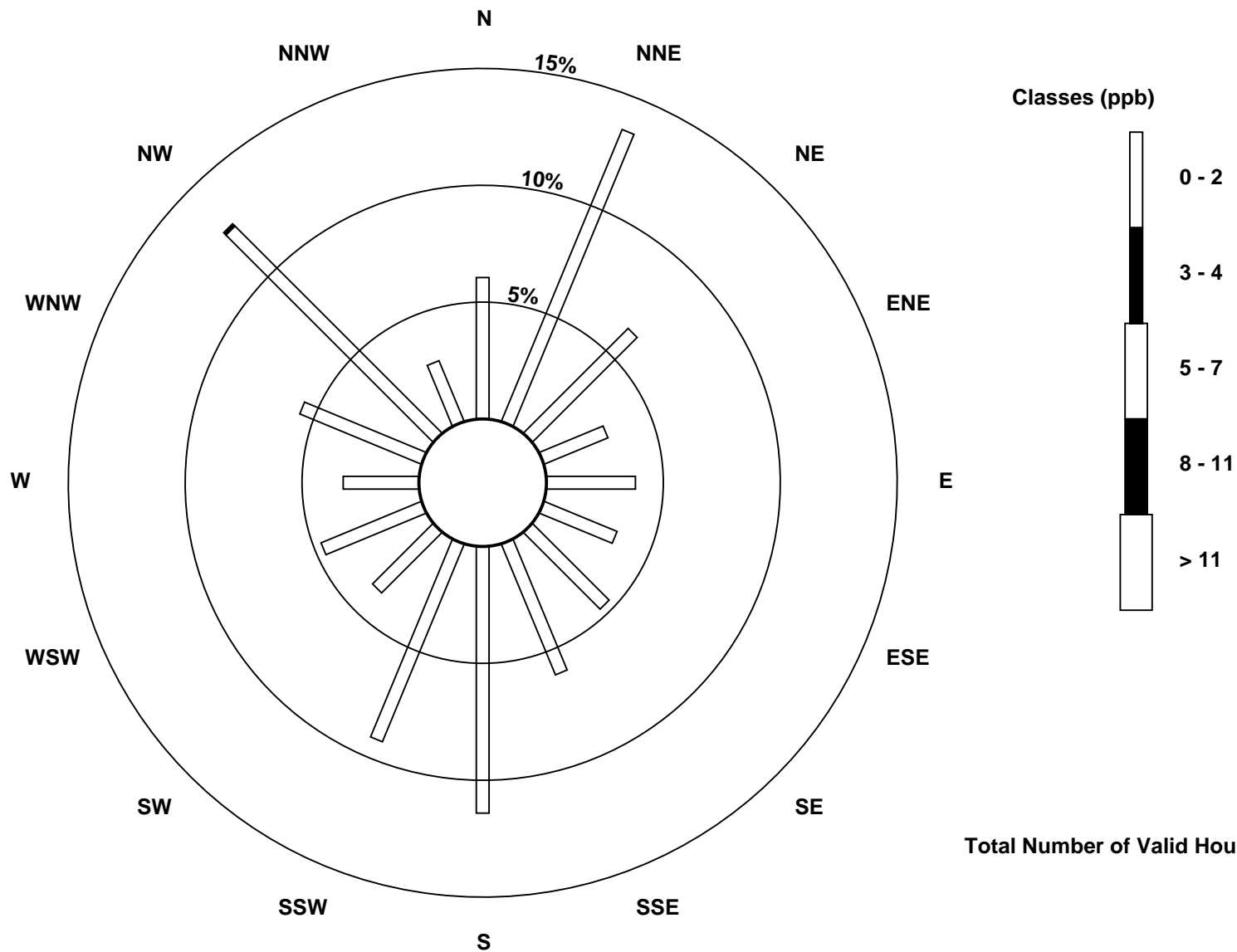
Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

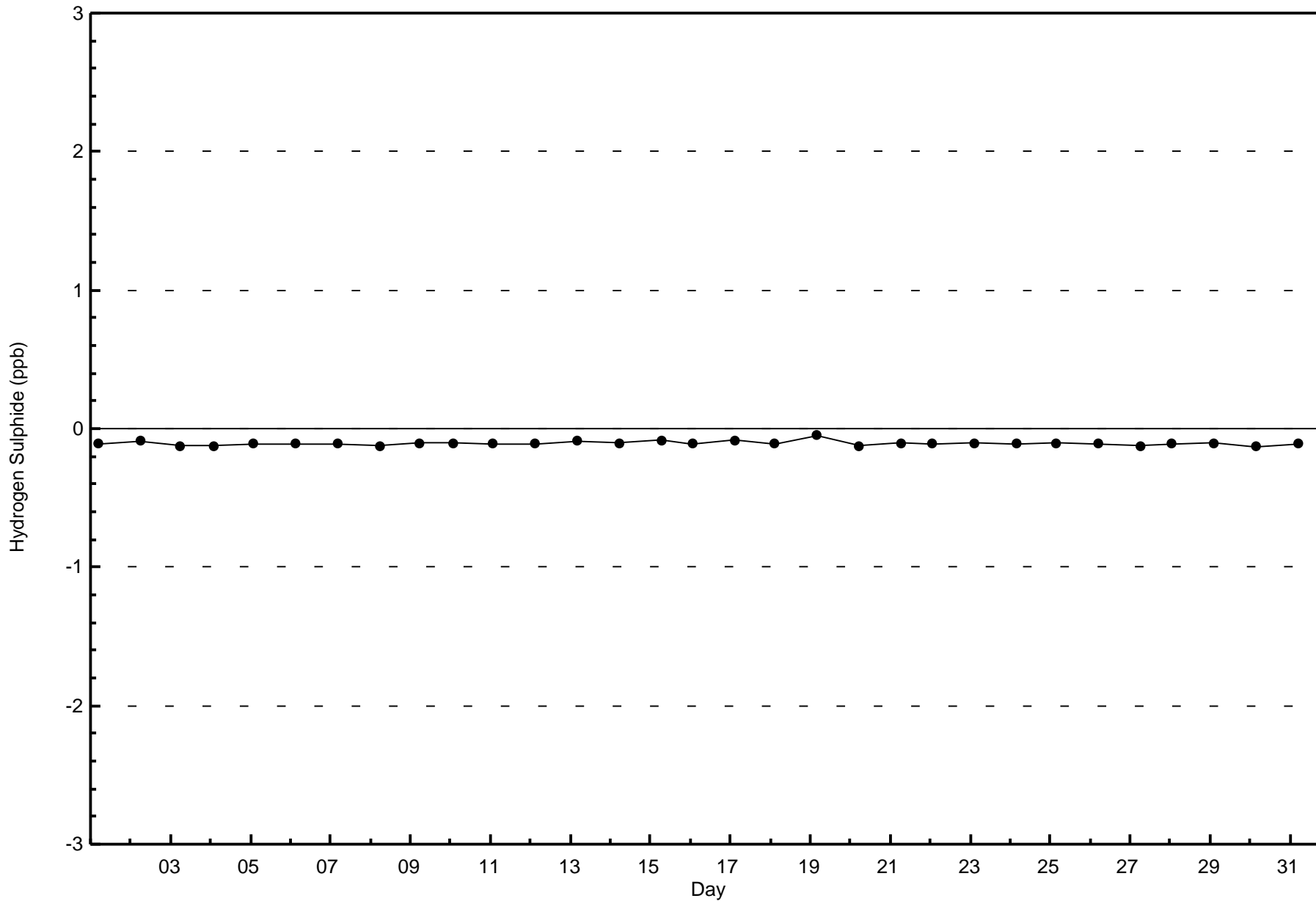
Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake (AMS500)

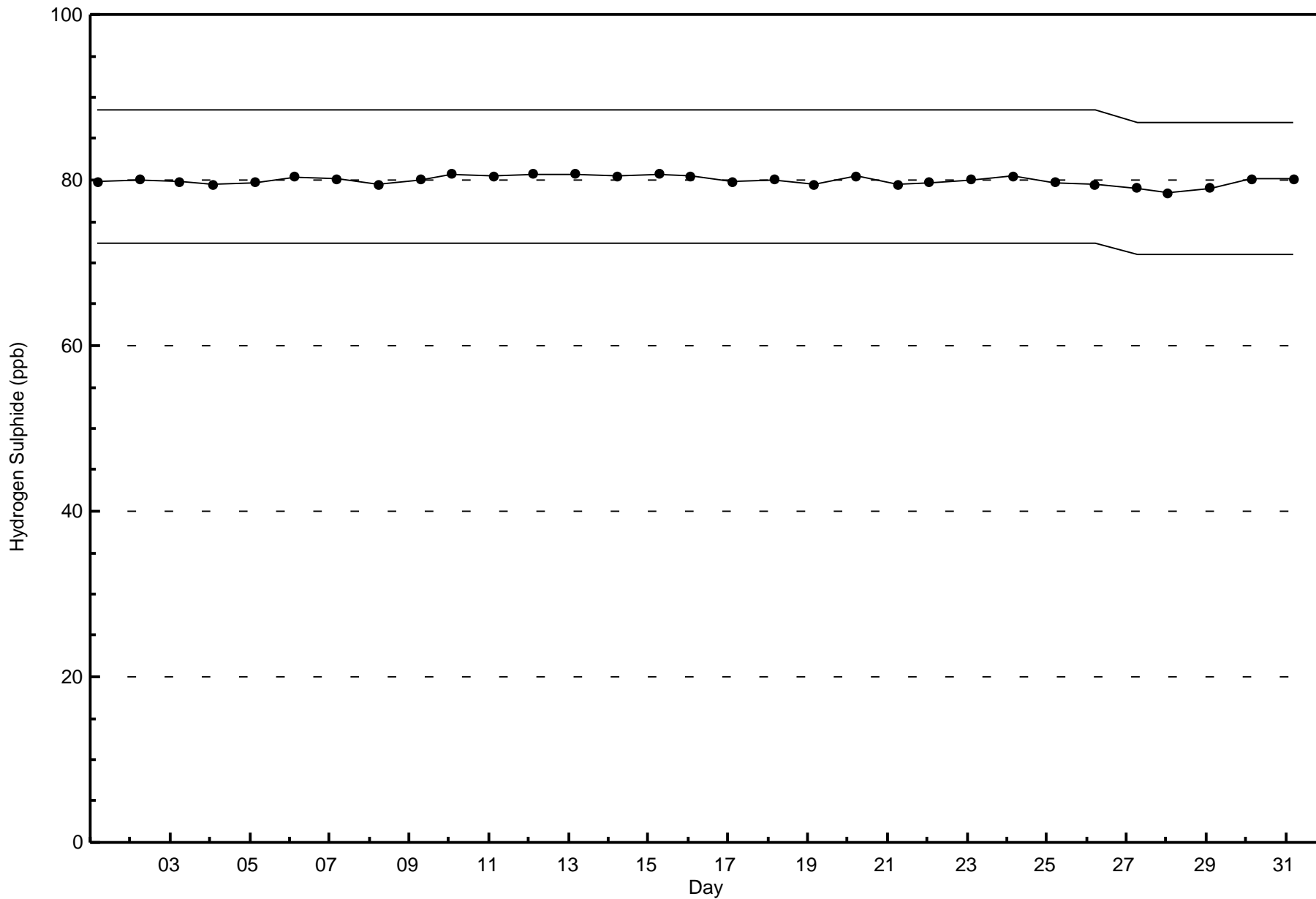




Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - May 2016







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - May 2016

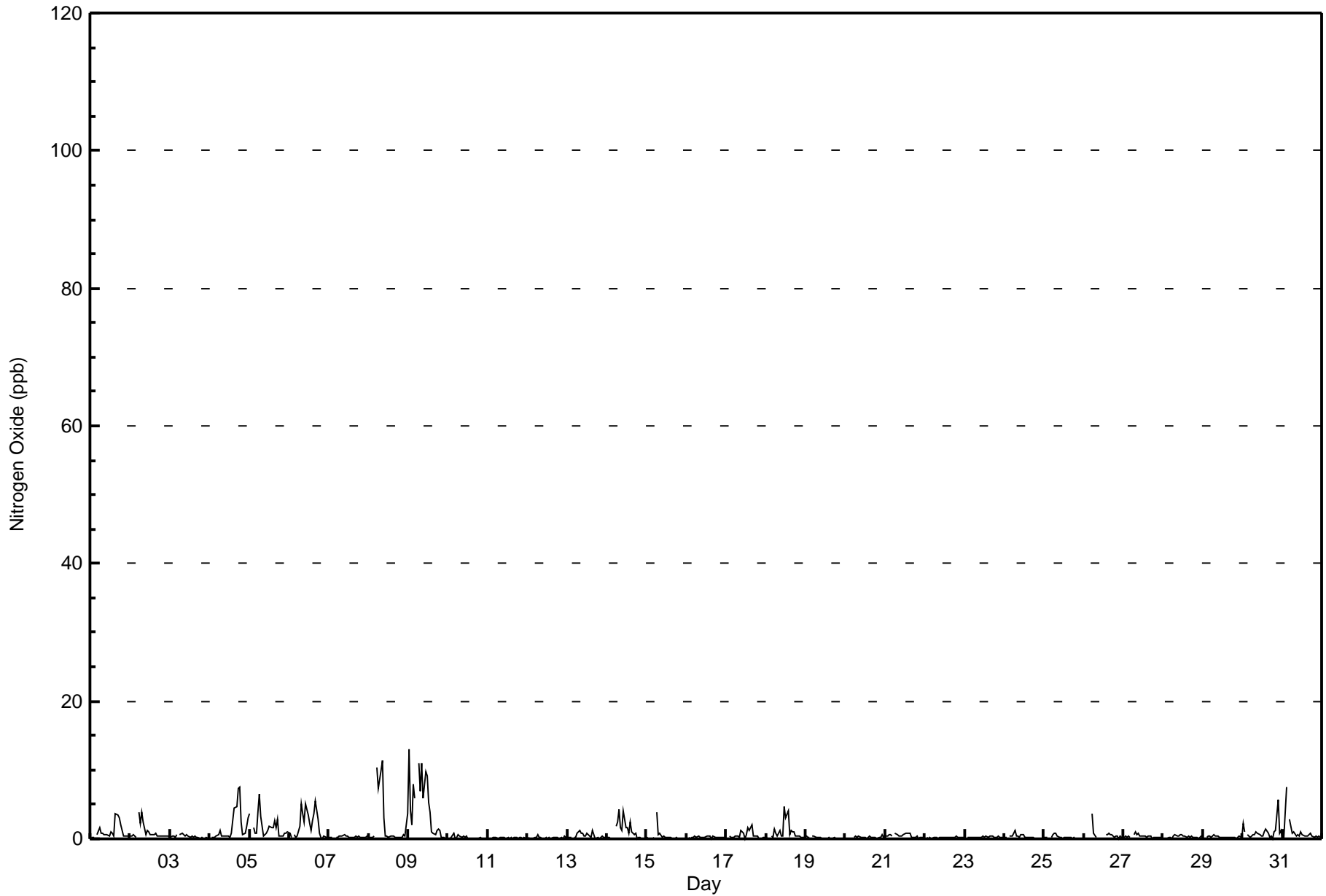
Maximum Value: 13 ppb on May 9 01:00																	Maximum Daily Average: 4.5 ppb on May 9																	Hours in Service: 744			
Minimum Value: 0 ppb on May 3 22:00																	Minimum Daily Average: 0.1 ppb on May 11																	Hours of Data: 708			
Maximum Diurnal Average: 1.6 ppb at hour 7																	Minimum Diurnal Average: 0.2 ppb at hour 21																	Hours of Missing Data: 36			
Monthly Average: 0.8 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 9																	Hours of Calibration: 36			
																	Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-May	0	0	0	Z	1	2	1	1	1	1	1	0	1	1	0	4	3	3	2	1	0	0	0	0	1.0	4											
2-May	0	0	1	0	Z	4	2	4	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1.0	4											
3-May	0	0	0	0	1	Z	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
4-May	Z	0	0	0	0	1	1	0	0	0	0	0	0	1	3	5	5	7	8	3	1	1	2	3	1.8	8											
5-May	4	Z	2	1	1	4	7	3	0	1	1	1	2	2	3	2	3	0	0	0	1	1	1	1	1.7	7											
6-May	1	0	Z	1	0	0	2	5	4	3	5	4	2	1	3	4	5	3	1	0	0	0	0	0	1.9	5											
7-May	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1											
8-May	0	0	0	0	Z	10	7	10	11	3	0	0	0	0	0	0	0	0	0	0	1	0	4	4	2.2	11											
9-May	13	4	2	8	6	Z	11	7	11	6	10	9	5	4	1	1	1	1	1	1	0	0	0	0	4.5	13											
10-May	Z	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
11-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0											
12-May	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
13-May	0	0	0	Z	0	0	1	1	1	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0.4	1											
14-May	0	0	0	0	Z	2	3	4	2	1	4	2	2	1	2	1	1	1	0	0	0	0	0	0	1.1	4											
15-May	0	0	0	0	0	Z	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4											
16-May	Z	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											
17-May	0	Z	0	0	0	0	0	0	0	1	1	0	1	2	1	2	0	0	0	0	0	0	0	0	0.5	2											
18-May	0	0	Z	0	0	2	1	0	1	0	0	5	3	4	1	1	1	1	0	0	0	0	0	0	1.0	5											
19-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0											
20-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1											
21-May	0	0	1	1	0	Z	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1											
22-May	Z	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											
23-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0											
24-May	0	0	Z	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
25-May	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
26-May	0	0	0	0	Z	4	1	0	C	C	C	C	C	1	1	1	1	1	0	0	0	0	0	0	0.5	4											
27-May	0	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1											
28-May	Z	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
29-May	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
30-May	2	1	Z	1	0	0	1	1	1	1	1	0	0	1	1	1	0	0	0	1	1	6	1	1	1.0	6											
31-May	0	0	8	Z	3	2	1	1	0	1	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0.9	8											
																	Diurnal Average				Diurnal Maximum																
																	0.9				13																
																	0.4				4																
																	0.6				8																
																	0.6				8																
																	0.6				6																
																	1.3				10																
																	1.6				11																
																	1.5				10																
																	1.4				11																
																	0.8				6																
																	1.0				10																
																	1.0				9																
																	0.8				5																
																	0.7				4																
																	0.7				3																
																	0.9				5																
																	0.8				5																
																	0.8				7																
																	0.6				8																
																	0.4				3																
																	0.2				1																
																	0.4				6																
																	0.3				2																
																	0.4				4																

Z - zerospan C - Calibration



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	44	93	45	21	27	23	35	44	76	70	25	33	22	42	90	18	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	93	45	21	27	23	35	44	76	70	25	33	22	42	90	18	708

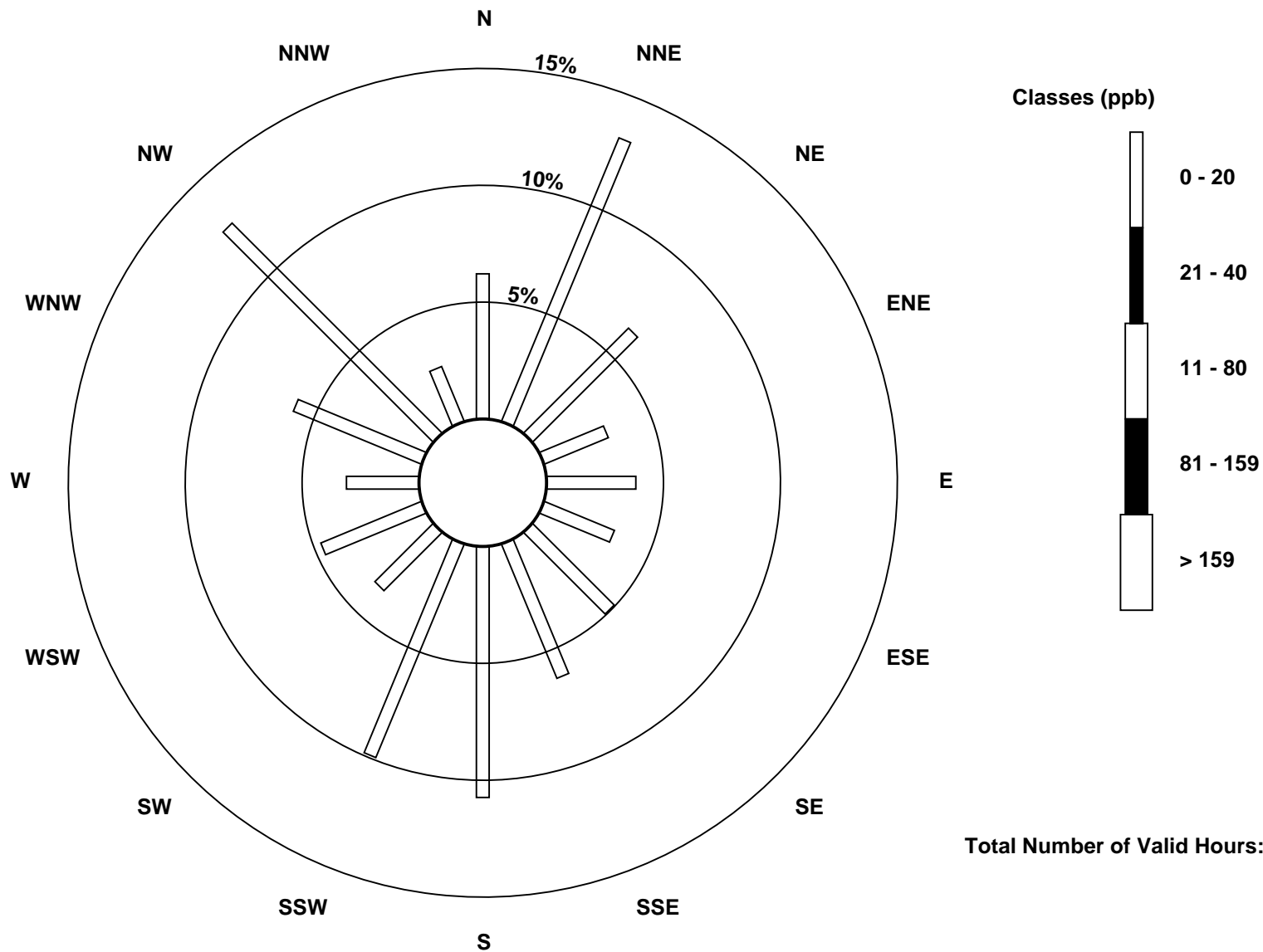
Total Number of Valid Hours: 708

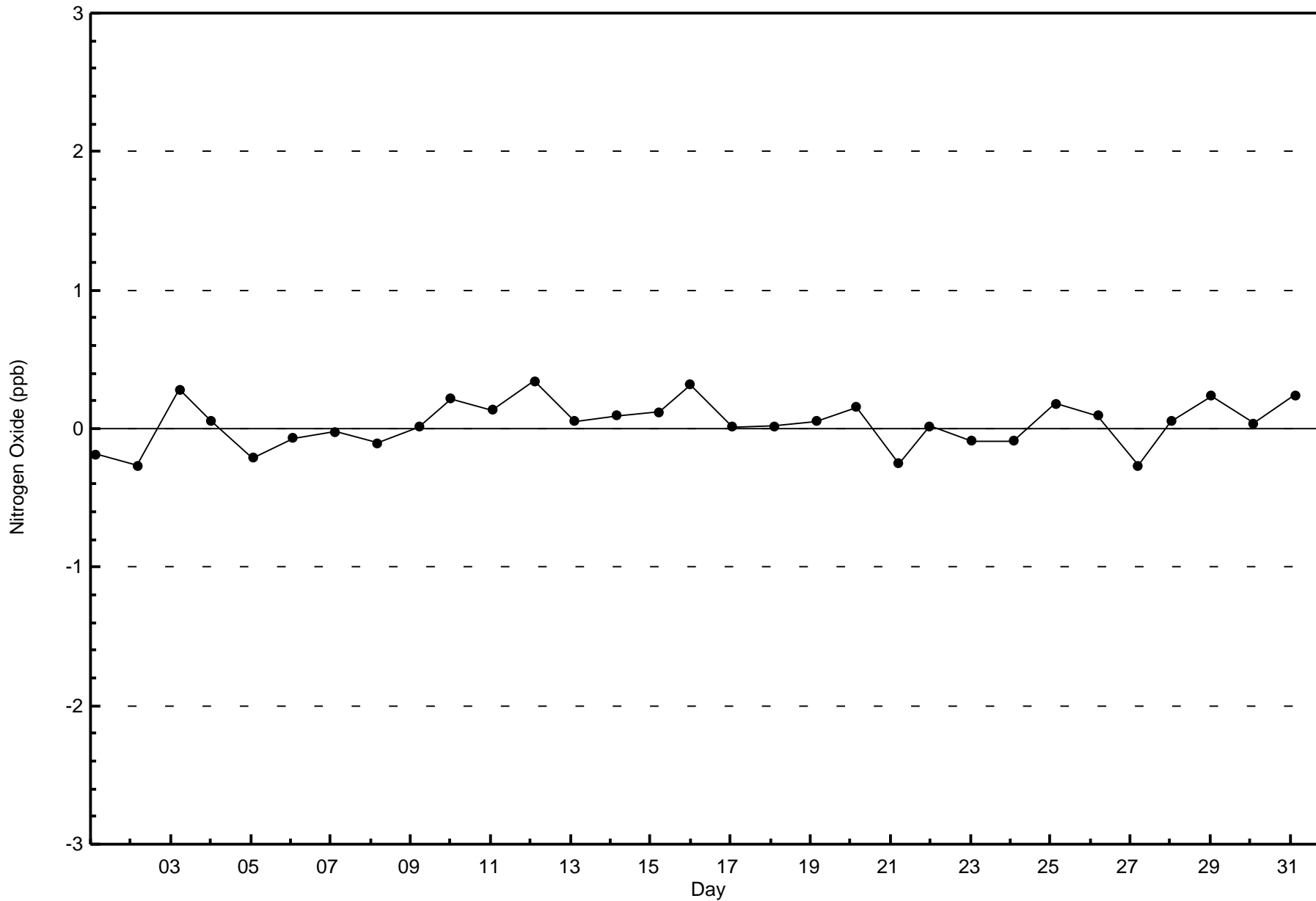
Total Number of Hours: 744

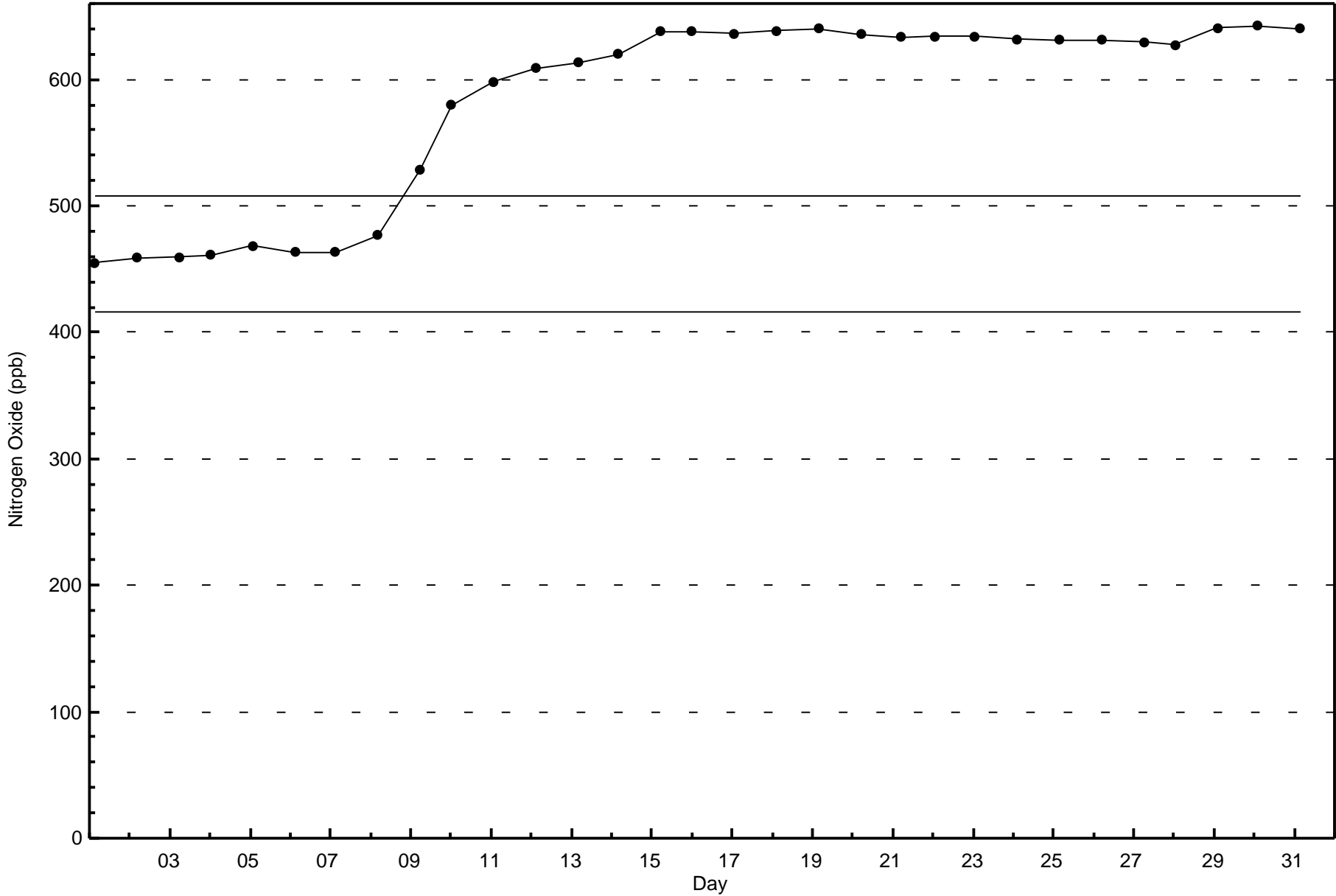


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake (AMS500)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Cenovus - Christina Lake - May 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 19 ppb on May 4 19:00	Maximum Daily Average: 5.2 ppb on May 4		Hours of Data:	708
Minimum Value: 0 ppb on May 1 12:00	Minimum Daily Average: 0.2 ppb on May 23		Hours of Missing Data:	36
Maximum Diurnal Average: 3.3 ppb at hour 6	Minimum Diurnal Average: 1.3 ppb at hour 13		Hours of Calibration:	36
Monthly Average: 2.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 11		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1	1	1	Z	1	7	2	2	1	0	0	0	1	1	0	5	4	4	5	5	2	1	1	1	1.9	7
2-May	1	1	1	1	Z	4	2	5	4	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	1.3	5
3-May	1	1	1	1	2	Z	1	3	2	2	2	1	0	1	1	1	0	1	1	1	1	1	5	1	1.3	5
4-May	Z	3	2	2	3	5	4	2	3	2	1	1	1	1	6	9	10	15	19	10	1	4	7	9	5.2	19
5-May	11	Z	5	2	4	9	12	6	1	1	1	2	3	2	3	5	3	7	1	0	1	6	4	3	4.0	12
6-May	1	0	Z	2	1	0	3	8	5	3	6	5	3	2	4	6	9	7	3	1	1	1	1	1	3.1	9
7-May	1	2	2	Z	2	2	2	2	2	1	1	0	0	0	0	0	0	1	1	1	1	1	1	2	1.1	2
8-May	2	5	3	2	Z	17	13	19	19	6	1	1	0	0	0	0	0	0	0	0	0	1	1	4	4.1	19
9-May	12	4	2	8	7	Z	8	5	8	4	7	7	5	4	2	1	1	2	2	3	1	1	0	0	4.1	12
10-May	Z	1	1	3	1	1	2	1	1	1	1	1	0	0	0	0	0	0	1	5	3	2	1	1	1.1	5
11-May	1	Z	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	2	3	3	3	2	1	1	1.1	3
12-May	0	0	Z	2	2	2	4	3	2	1	1	1	0	0	0	1	2	4	3	3	3	2	2	2	1.7	4
13-May	2	2	2	Z	1	2	4	6	5	3	1	1	3	2	2	4	3	1	1	1	2	1	1	1	2.2	6
14-May	2	2	2	2	Z	4	6	9	4	3	5	3	4	3	5	3	2	4	5	6	7	5	4	4	4.0	9
15-May	4	3	3	2	5	Z	9	6	7	4	2	2	1	2	2	2	2	2	2	2	6	1	3	1	3.1	9
16-May	Z	2	3	3	2	3	2	2	2	1	2	2	2	2	2	1	1	1	1	2	1	2	9	2	2.0	9
17-May	1	Z	1	2	3	2	3	2	1	3	2	1	2	4	4	6	2	3	2	1	2	2	2	2	2.3	6
18-May	1	1	Z	3	3	6	3	2	3	1	1	6	3	6	1	4	3	3	2	3	6	2	1	1	2.8	6
19-May	2	2	3	Z	8	6	6	6	6	3	2	1	1	1	1	3	9	5	1	1	1	0	1	1	2.9	9
20-May	1	0	0	0	Z	1	1	1	1	0	1	1	0	0	0	0	1	1	0	0	0	0	2	1	0.5	2
21-May	1	1	2	1	0	Z	1	1	0	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1.0	2
22-May	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
23-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.2	2
24-May	0	1	Z	0	0	0	2	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.7	2
25-May	2	4	2	Z	2	2	2	2	1	1	1	1	1	1	2	2	1	1	2	1	1	1	3	4	1.7	4
26-May	2	1	2	1	Z	5	4	2	C	C	C	C	C	4	7	5	4	3	1	2	1	1	1	1	2.5	7
27-May	0	0	1	0	0	Z	1	2	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	2	0.9	2
28-May	Z	1	1	1	0	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	2	0.9	2
29-May	1	Z	2	2	1	2	2	1	1	1	1	1	1	1	1	0	0	0	1	1	0	3	2	1	1.1	3
30-May	5	4	Z	2	2	2	2	1	2	1	1	1	1	2	3	2	0	1	1	3	5	8	2	3	2.3	8
31-May	1	1	7	Z	4	2	1	1	1	0	1	1	1	0	0	1	1	1	0	0	1	1	0	1	1.2	7

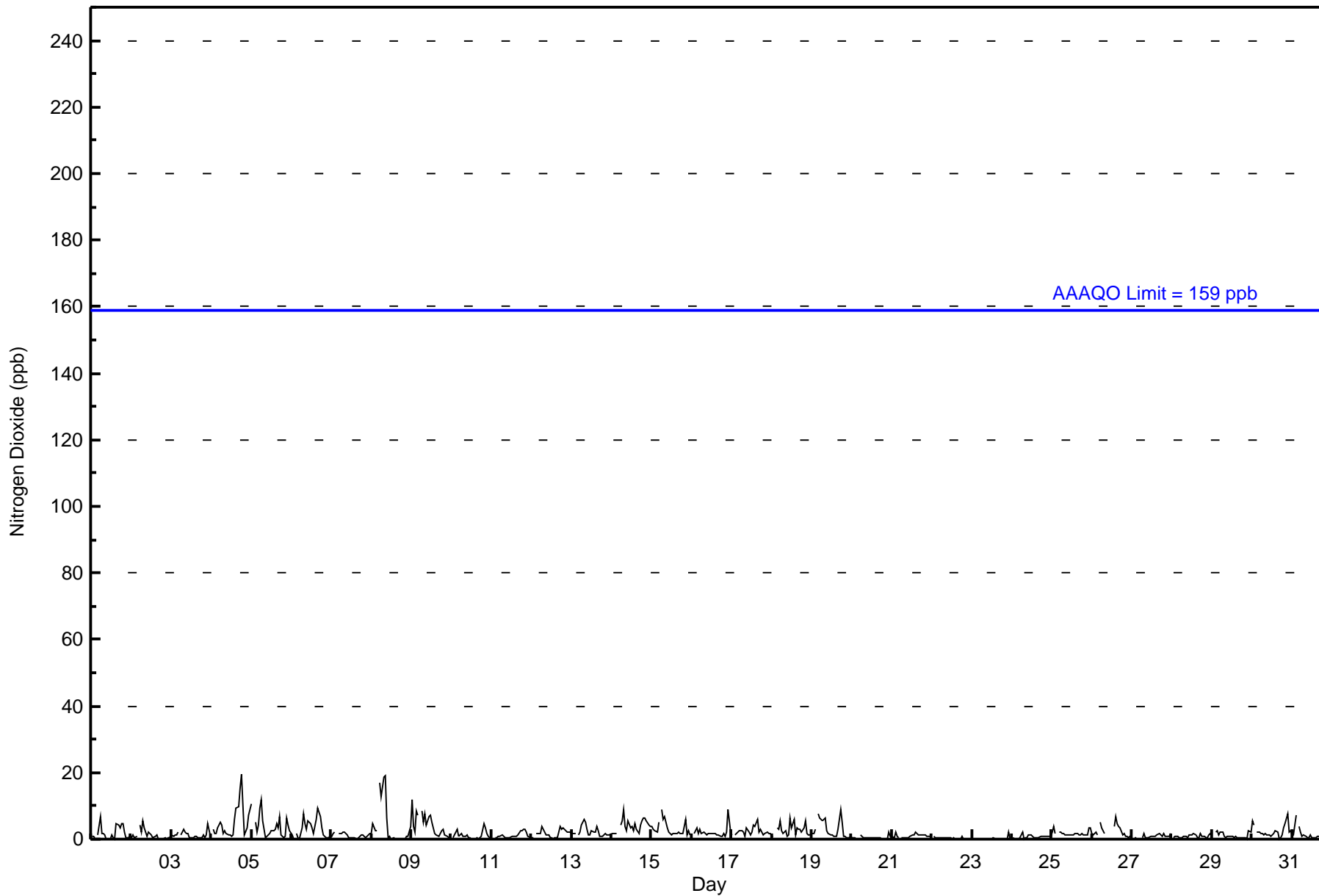
2.1	1.6	1.9	1.8	2.2	3.3	3.2	3.2	2.7	1.6	1.5	1.6	1.3	1.4	1.7	2.1	1.9	2.5	2.1	1.9	1.7	1.6	2.0	1.7	Diurnal Average	
12	5	7	8	8	17	13	19	19	6	7	7	5	6	7	9	10	15	19	19	10	7	8	9	9	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	44	93	45	21	27	23	35	44	76	70	25	33	22	42	90	18	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	93	45	21	27	23	35	44	76	70	25	33	22	42	90	18	708

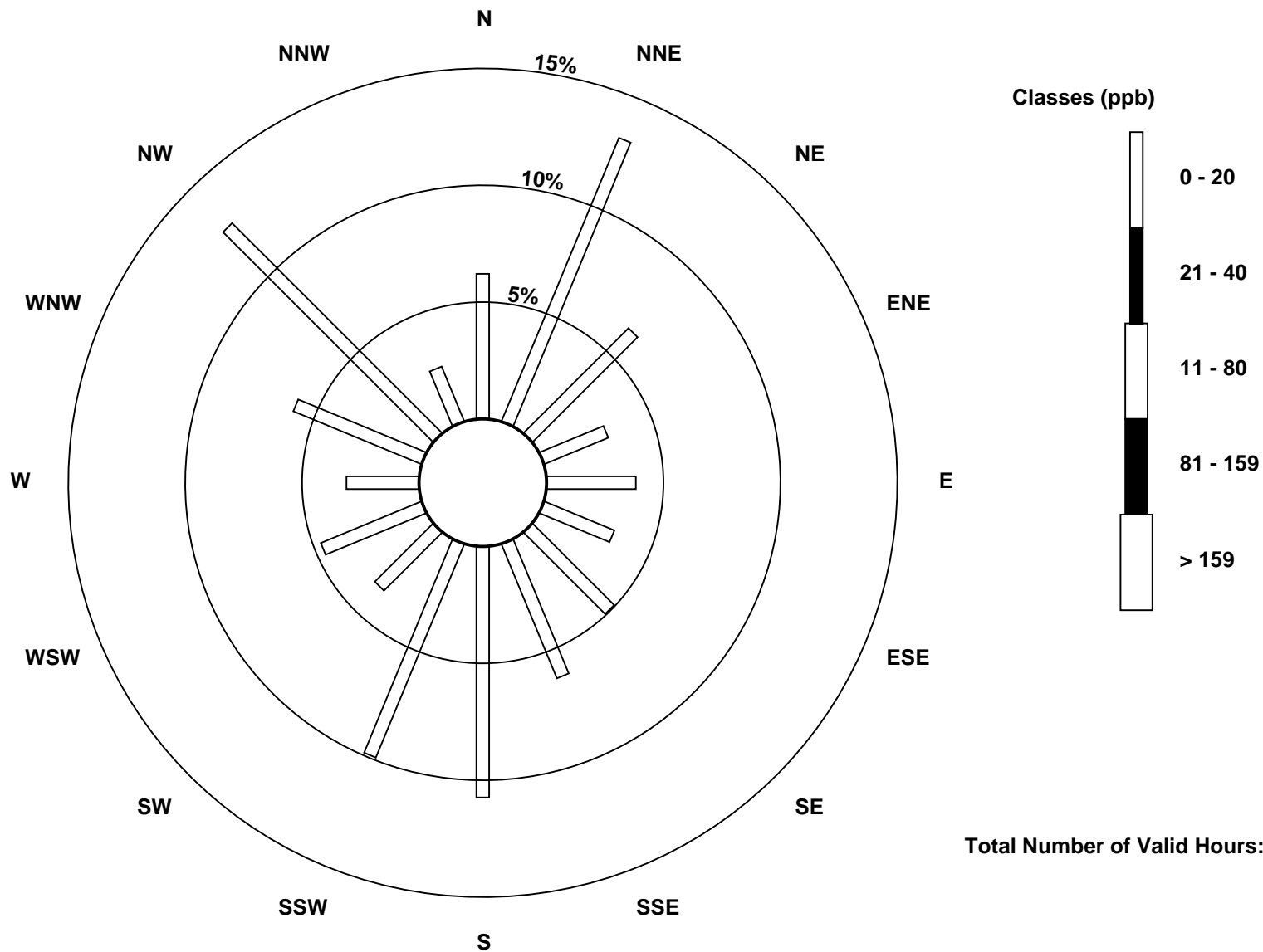
Total Number of Valid Hours: 708

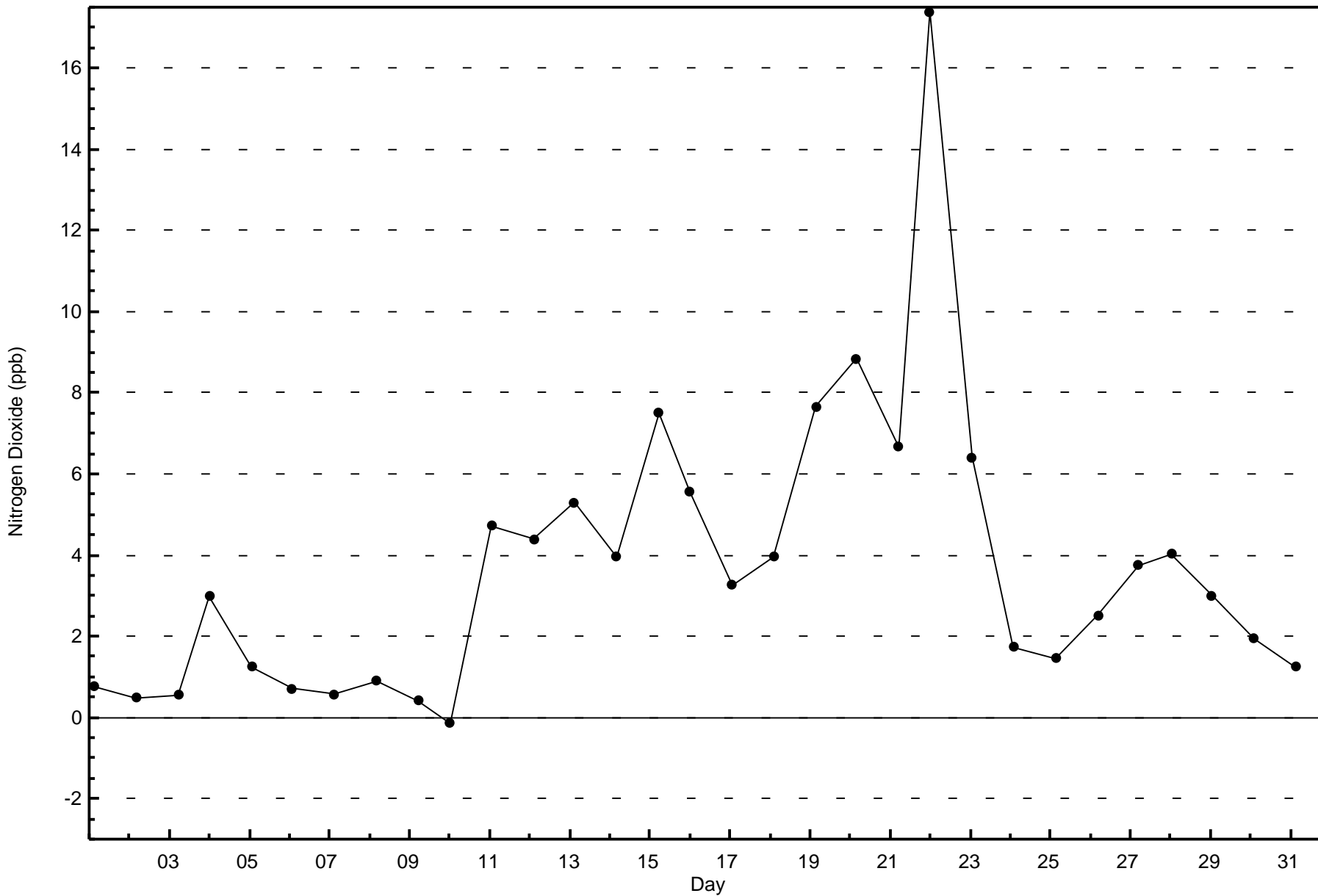
Total Number of Hours: 744

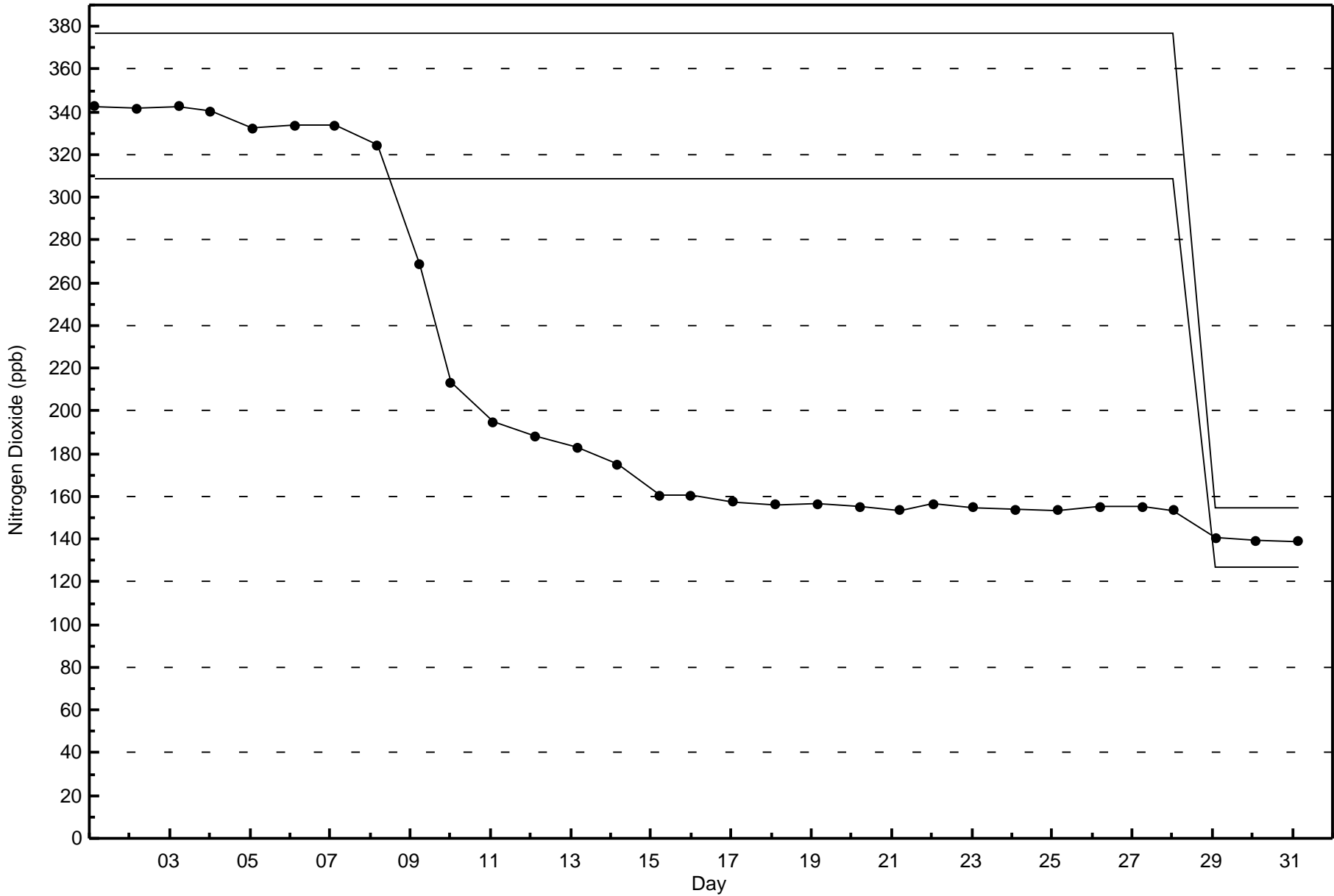


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake (AMS500)









Wood Buffalo Environmental Association
Summary of Hour Averages

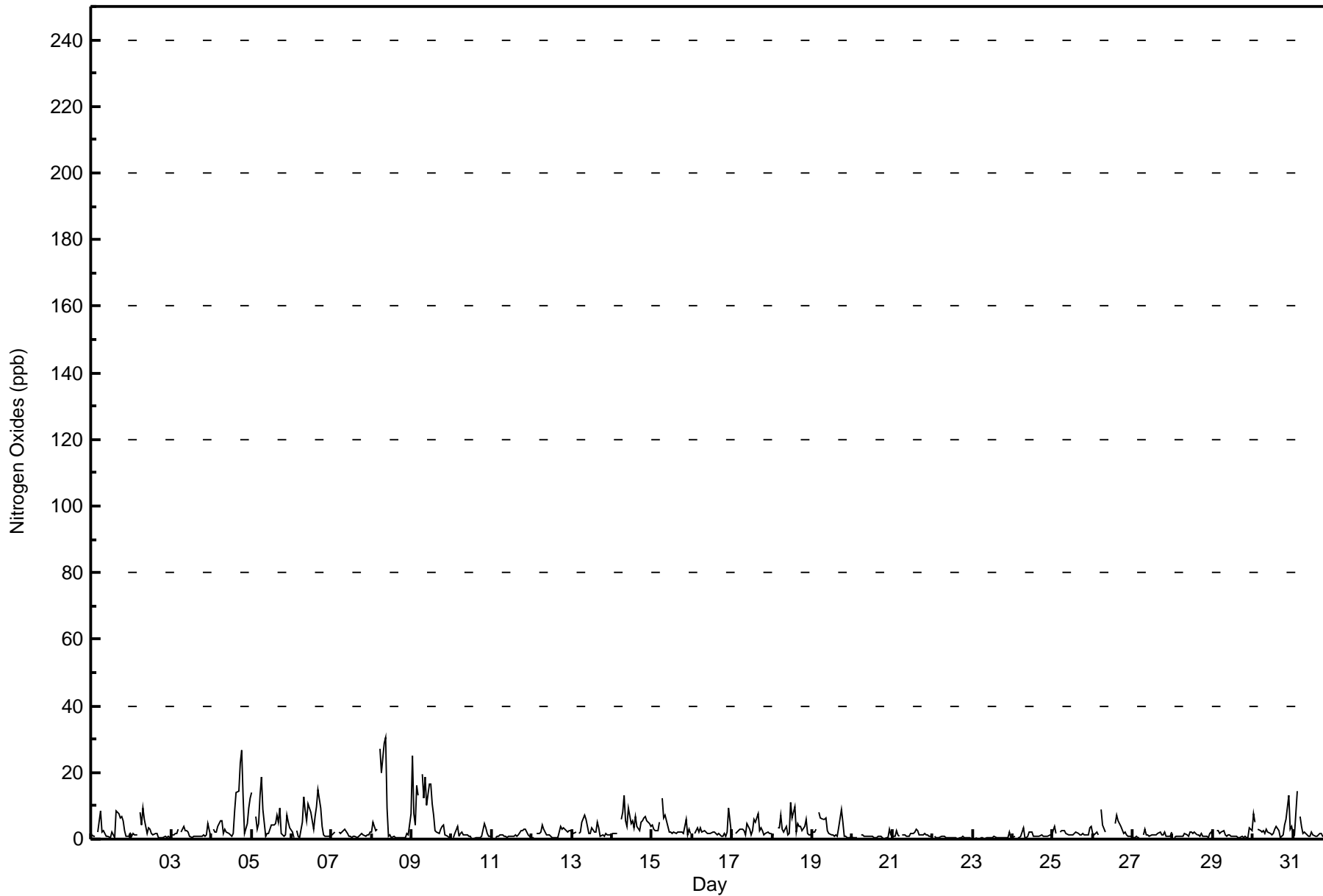
Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - May 2016

Maximum Value: 30 ppb on May 8 09:00																	Maximum Daily Average: 8.6 ppb on May 9																	Hours in Service: 744			
Minimum Value: 0 ppb on May 23 01:00																	Minimum Daily Average: 0.4 ppb on May 23																	Hours of Data: 708			
Maximum Diurnal Average: 4.8 ppb at hour 7																	Minimum Diurnal Average: 1.9 ppb at hour 21																	Hours of Missing Data: 36			
Monthly Average: 2.8 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 19																	Hours of Calibration: 36			
																																		Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-May	1	1	1	Z	2	8	2	3	2	1	1	1	2	1	1	8	8	6	7	6	3	1	1	2	2.9	8											
2-May	1	2	1	1	Z	8	4	9	6	2	3	3	2	1	2	2	0	0	0	1	1	1	1	1	2.2	9											
3-May	1	1	2	2	3	Z	2	4	3	2	2	1	1	1	1	1	1	1	1	1	1	1	5	1	1.6	5											
4-May	Z	3	2	2	4	6	2	3	2	2	1	1	2	8	14	15	23	27	13	2	4	9	12	7.0	27												
5-May	14	Z	7	3	5	13	19	9	1	2	2	3	4	4	4	7	5	9	2	1	1	7	5	4	5.7	19											
6-May	2	0	Z	2	1	1	5	13	9	6	11	8	5	3	7	10	15	10	4	1	1	1	1	1	5.0	15											
7-May	1	2	2	Z	2	2	2	3	3	2	1	1	0	1	1	0	1	1	2	1	1	1	1	2	1.4	3											
8-May	2	5	3	3	Z	27	20	29	30	9	1	1	0	1	1	0	0	0	0	0	0	2	1	8	6.3	30											
9-May	25	8	4	16	13	Z	19	12	19	10	17	16	10	7	3	2	2	3	4	4	1	1	0	0	8.6	25											
10-May	Z	1	1	4	1	1	2	1	1	1	1	1	0	0	0	0	0	0	1	5	3	2	1	1	1.3	5											
11-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	3	2	1	1	1.3	3											
12-May	0	1	Z	2	2	2	4	3	2	1	1	1	0	0	0	1	2	4	3	3	3	2	3	2	1.9	4											
13-May	2	2	2	Z	2	2	5	7	6	4	2	2	4	2	2	5	3	1	1	1	2	1	1	1	2.6	7											
14-May	2	2	2	2	Z	6	8	13	5	4	10	5	5	3	7	4	2	5	5	6	7	5	5	4	5.1	13											
15-May	4	3	3	2	5	Z	12	6	7	4	2	2	2	2	2	2	2	2	2	2	6	1	3	2	3.4	12											
16-May	Z	2	3	3	2	3	2	3	2	2	2	2	2	2	2	1	2	1	1	2	1	2	9	2	2.2	9											
17-May	1	Z	2	2	3	3	3	2	1	4	3	1	3	6	5	8	2	3	2	1	2	2	2	2	2.8	8											
18-May	1	1	Z	4	3	7	3	2	4	1	2	11	6	10	2	5	4	4	3	4	6	2	1	1	3.8	11											
19-May	2	2	3	Z	8	7	6	6	6	3	2	1	1	1	1	3	9	5	1	1	1	0	1	1	3.1	9											
20-May	0	0	0	0	Z	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	3	1	0.7	3											
21-May	1	1	3	1	1	Z	1	1	1	1	1	2	2	2	3	3	1	1	1	2	1	1	1	1	1.4	3											
22-May	Z	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0.5	1											
23-May	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	0	0	0.4	2											
24-May	1	1	Z	1	0	1	3	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.0	3											
25-May	2	4	2	Z	2	3	2	2	2	1	1	1	1	2	2	2	1	1	2	1	1	1	3	4	2.0	4											
26-May	2	1	2	1	Z	9	4	2	C	C	C	C	C	4	7	5	5	4	2	2	1	1	1	1	3.0	9											
27-May	0	0	1	1	0	Z	1	3	1	1	1	1	1	1	1	2	2	1	1	2	1	1	1	2	1.2	3											
28-May	Z	1	1	1	1	1	1	2	1	1	2	2	2	2	1	1	1	2	1	1	1	1	2	2	1.2	2											
29-May	1	Z	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	3	2	1.3	3											
30-May	7	5	Z	3	3	2	2	2	3	2	2	1	2	3	4	3	0	1	1	4	6	13	3	4	3.3	13											
31-May	1	1	15	Z	7	4	2	2	1	1	1	2	1	1	1	1	2	2	1	0	1	1	1	1	2.1	15											
																	Diurnal Average																				
3.0																	1.9																	25			
8																	15																	16			
2.4																	2.8																	4.6			
16																	13																	27			
4.8																	4.7																	4.1			
29																	30																	10			
2.4																	2.5																	2.6			
17																	16																	2.1			
2.2																	2.3																	2.3			
8																	14																	15			
3.0																	2.7																	3.3			
23																	27																	27			
2.7																	2.3																	1.9			
7																	13																	9			
2.1																	2.3																	2.1			
12																	9																	12			
Z - zerospan																	C - Calibration																				



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	99.15	99.15
21 - 40	6	0.85	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	44	93	45	21	27	23	35	44	76	70	25	33	22	36	90	18	702
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	93	45	21	27	23	35	44	76	70	25	33	22	42	90	18	708

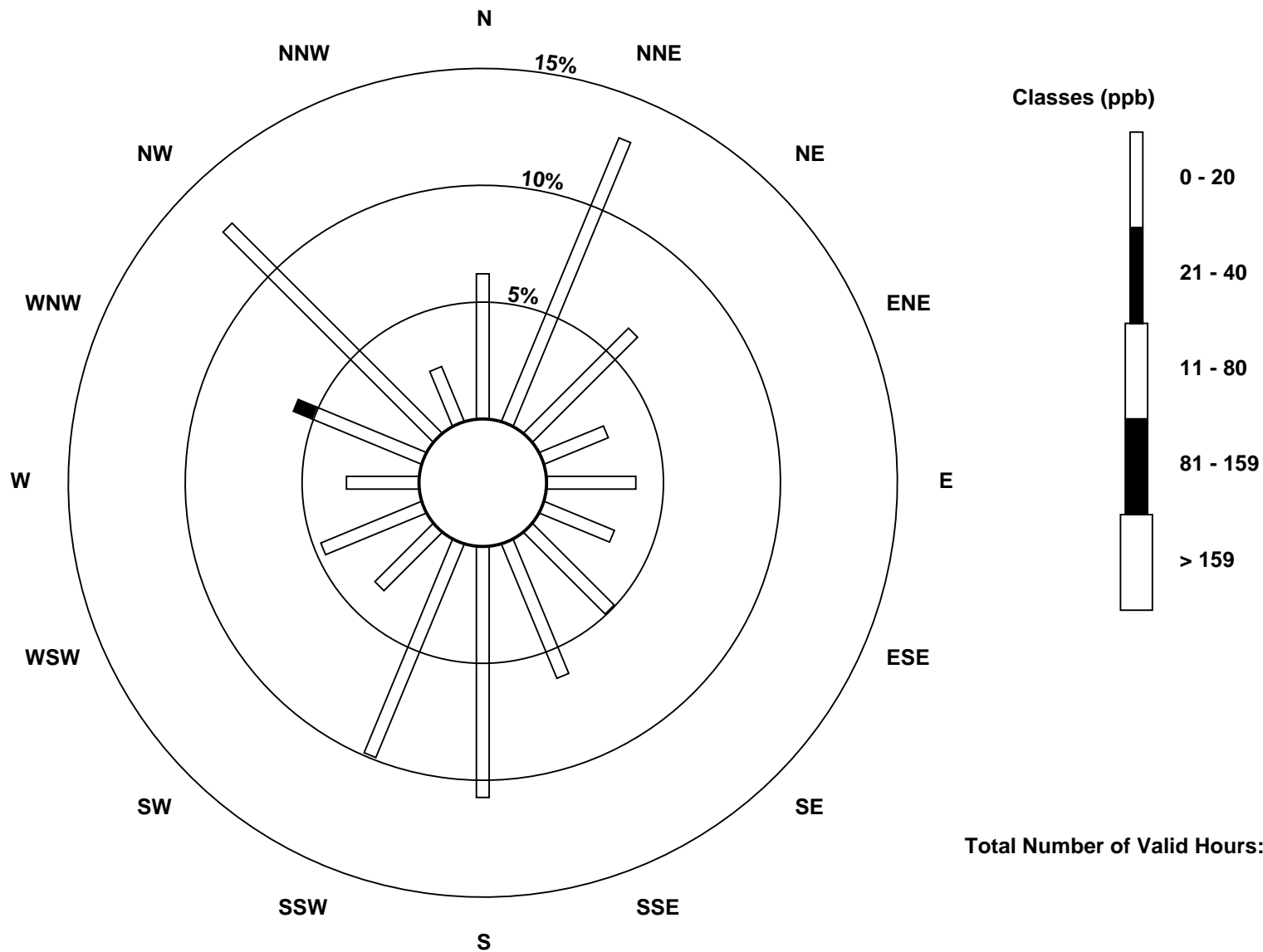
Total Number of Valid Hours: 708

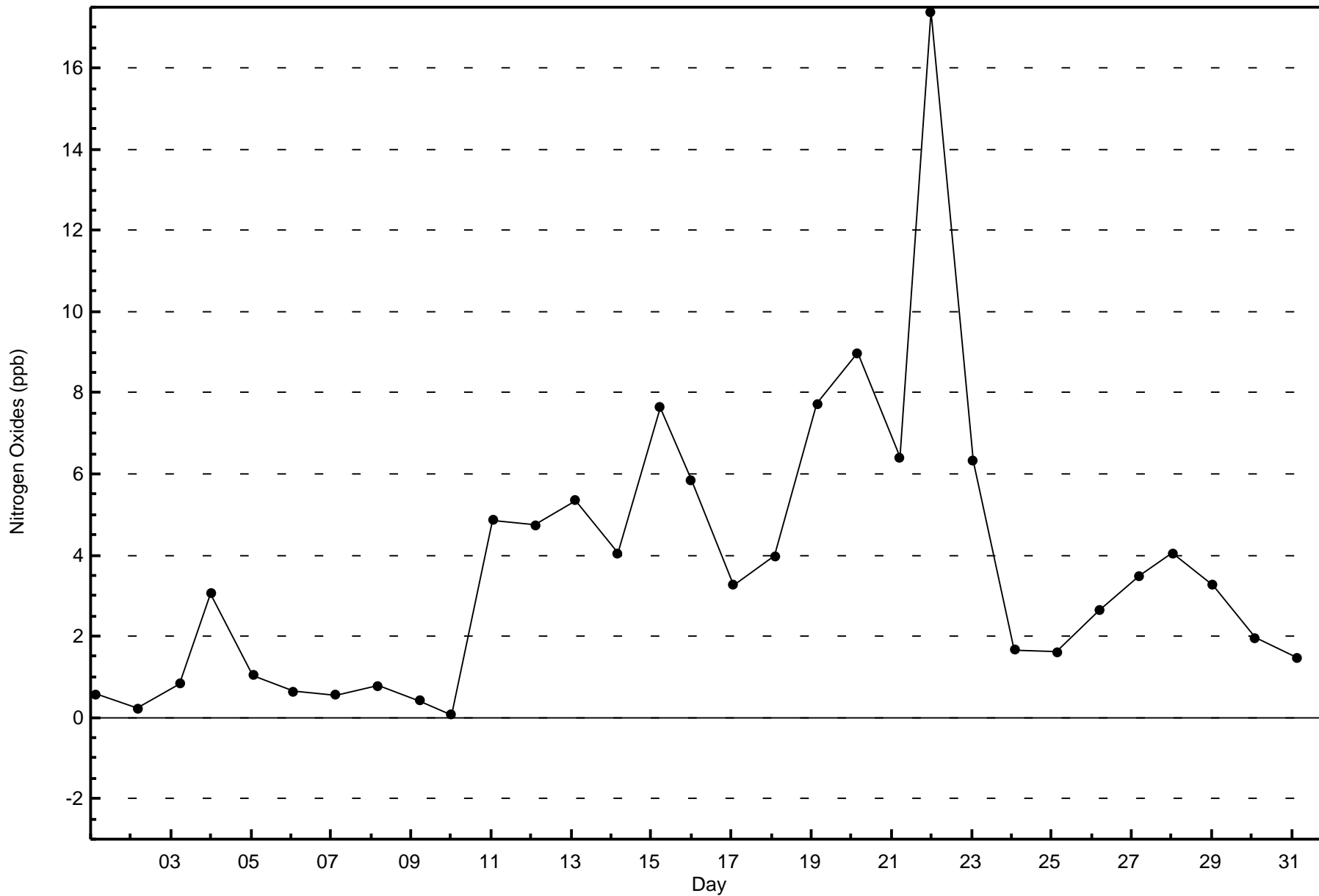
Total Number of Hours: 744

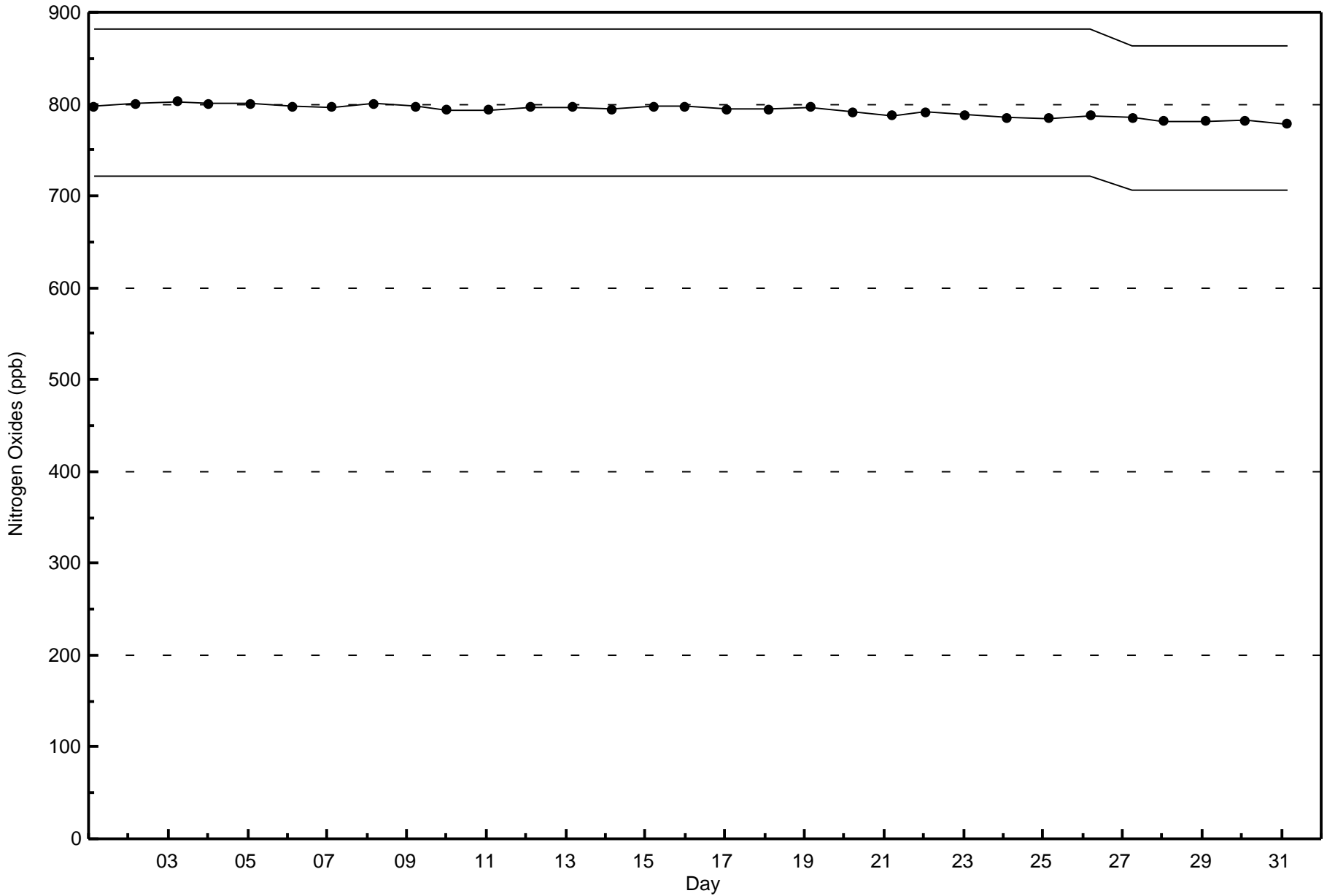


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake (AMS500)









Wood Buffalo Environmental Association
Summary of Hour Averages

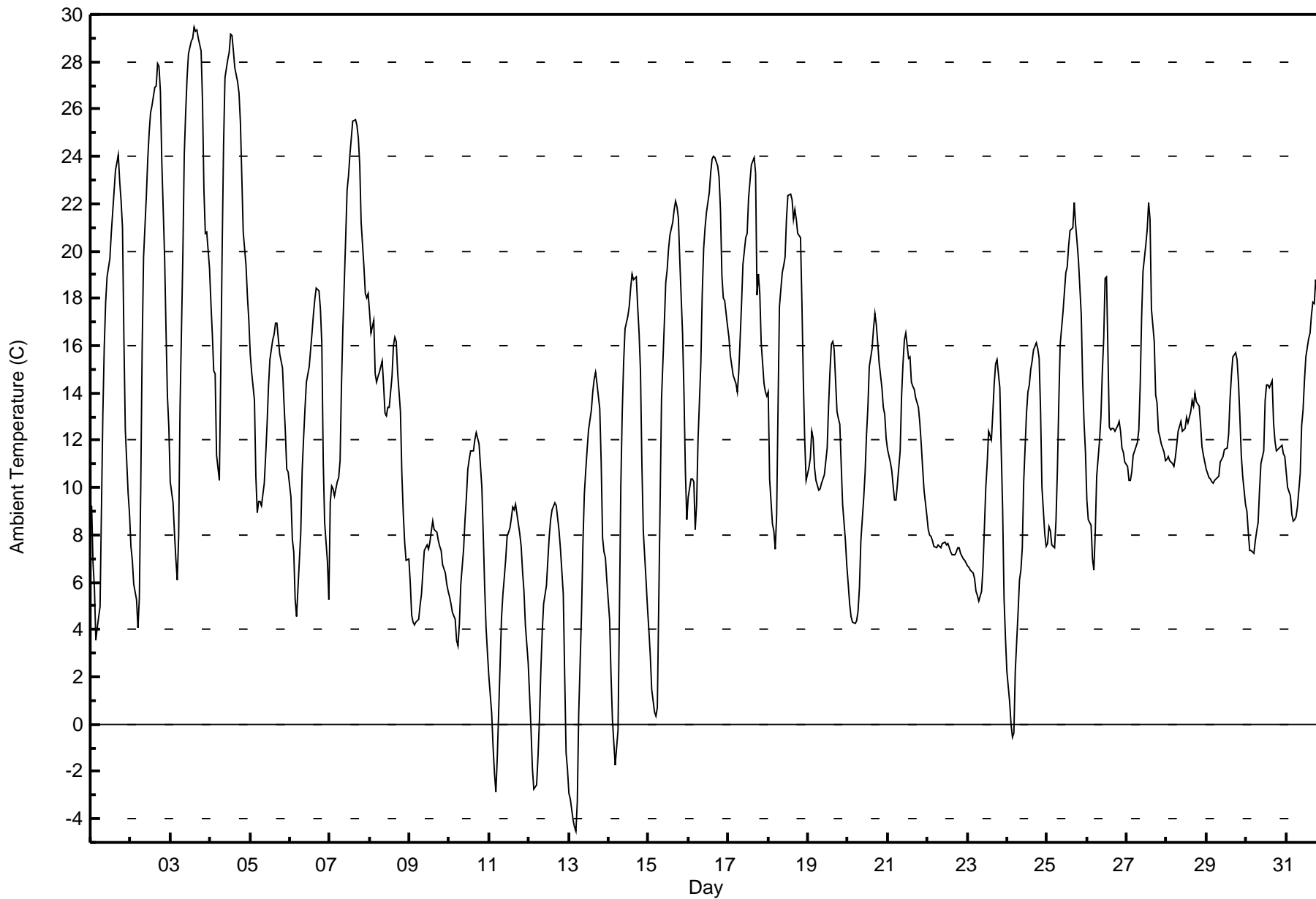
Ambient Temperature (AT) - C
Cenovus - Christina Lake - May 2016

Maximum Value: 29.5 C on May 3 15:00		Maximum Daily Average: 21.7 C on May 4		Hours in Service: 744																																												
Minimum Value: -4.5 C on May 13 05:00		Minimum Daily Average: 3.7 C on May 12		Hours of Data: 744																																												
Maximum Diurnal Average: 17.6 C at hour 17		Minimum Diurnal Average: 6.1 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 12.48 C		Percentiles: P ₁ = -2.8 P ₁₀ = 5.0 Q ₁ = 8.0 Median = 11.8 Q ₃ = 16.3 P ₉₀ = 21.6 P ₉₉ = 29.0		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-May	9.3	6.8	5.7	3.6	4.1	5.0	9.1	13.1	15.9	17.8	18.9	19.7	20.8	21.6	22.5	23.4	24.1	22.9	22.1	21.0	16.3	12.4	9.8	8.9	14.8	24.1																						
2-May	7.5	6.9	5.9	5.3	4.1	5.3	10.0	15.9	19.7	22.4	23.9	25.0	25.8	26.2	26.9	27.0	27.9	27.8	26.7	23.8	19.7	16.7	13.9	12.6	17.8	27.9																						
3-May	10.2	9.3	8.1	7.0	6.1	7.9	13.4	19.8	24.1	25.8	27.3	28.4	28.9	29.0	29.5	29.3	29.3	29.0	28.5	26.3	22.6	20.7	20.8	19.3	20.9	29.5																						
4-May	17.8	16.5	14.9	14.8	11.4	10.3	15.0	20.1	24.5	27.4	28.1	28.4	29.2	29.1	28.4	27.8	27.1	26.7	25.4	23.1	20.8	19.4	18.1	17.1	21.7	29.2																						
5-May	15.6	14.9	13.7	10.5	8.9	9.4	9.4	9.2	10.2	11.4	12.7	14.3	15.4	16.2	16.5	17.0	16.9	16.3	15.6	15.0	13.6	12.4	10.8	10.7	13.2	17.0																						
6-May	9.6	7.8	7.3	5.3	4.6	5.7	8.1	10.7	12.1	13.4	14.4	15.1	15.8	16.6	17.3	18.0	18.4	18.3	17.5	16.1	11.1	8.5	6.8	5.3	11.8	18.4																						
7-May	9.4	10.1	10.0	9.6	10.3	10.4	11.1	14.3	16.8	20.5	22.6	23.2	24.1	24.8	25.5	25.5	25.3	24.8	23.7	21.2	19.3	18.2	18.0	18.2	18.2	25.5																						
8-May	17.4	16.6	17.1	14.8	14.4	14.7	14.9	15.4	14.4	13.2	13.0	13.4	13.4	14.7	16.0	16.4	16.2	14.9	13.2	10.6	9.0	7.7	6.9	7.0	13.5	17.4																						
9-May	6.0	4.6	4.3	4.2	4.3	4.4	5.0	5.5	6.5	7.4	7.6	7.4	7.7	8.1	8.6	8.3	8.1	7.8	7.5	7.3	6.7	6.4	5.9	5.6	6.5	8.6																						
10-May	5.4	5.1	4.7	4.4	3.6	3.3	4.2	5.9	7.4	8.7	9.6	10.8	11.2	11.5	11.6	12.0	12.3	12.1	11.9	10.0	8.0	5.8	4.1	3.0	7.8	12.3																						
11-May	2.0	0.5	-1.0	-2.1	-2.9	-1.4	2.5	4.5	5.5	6.2	7.0	7.9	8.3	8.7	9.2	9.0	9.3	8.5	8.1	7.5	6.4	5.6	4.2	2.6	4.8	9.3																						
12-May	1.3	-0.2	-1.9	-2.8	-2.6	-1.4	0.1	2.2	3.9	5.1	5.8	6.9	7.9	8.6	9.0	9.4	9.2	8.7	8.2	7.4	5.5	2.0	-1.2	-1.9	3.7	9.4																						
13-May	-2.9	-3.2	-4.0	-4.3	-4.5	-3.3	0.5	4.7	7.6	9.7	10.7	11.6	12.4	13.3	14.0	14.6	14.9	14.4	13.4	11.1	7.9	7.3	7.0	6.1	6.6	14.9																						
14-May	4.4	2.1	0.2	-0.8	-1.7	-0.2	4.7	10.1	13.2	15.3	16.7	17.3	17.7	18.5	19.0	18.8	18.9	17.7	16.5	14.9	11.0	8.2	6.1	4.9	10.6	19.0																						
15-May	3.9	2.9	1.5	0.5	0.3	0.7	5.0	9.4	13.8	16.9	18.6	19.2	20.1	20.7	21.2	21.8	22.1	21.9	21.4	19.6	16.5	13.9	10.6	8.6	13.0	22.1																						
16-May	9.6	10.4	10.4	10.2	8.2	9.3	12.0	15.2	18.2	20.1	21.0	21.7	22.5	23.3	23.9	24.0	24.0	23.6	23.1	21.7	19.0	18.0	17.9	16.9	17.7	24.0																						
17-May	16.3	15.6	15.2	14.7	14.4	14.1	14.9	16.3	17.8	19.4	20.5	20.7	22.2	23.0	23.7	23.9	23.3	18.1	19.0	18.2	16.1	14.4	14.0	13.9	17.9	23.9																						
18-May	14.0	10.4	8.4	8.2	7.4	8.8	13.4	17.6	19.1	19.4	19.7	21.3	22.4	22.4	22.1	21.3	21.8	21.3	20.8	20.6	17.8	14.6	12.0	10.3	16.5	22.4																						
19-May	10.8	11.3	12.4	12.1	10.8	10.3	9.9	10.0	10.2	10.3	10.6	11.6	13.5	14.9	16.1	16.2	15.8	13.2	12.9	12.7	11.0	9.3	7.8	6.7	11.7	16.2																						
20-May	5.9	5.1	4.5	4.3	4.3	4.4	4.8	5.8	7.7	9.6	10.6	12.2	13.4	15.1	15.9	16.7	17.4	16.9	16.1	15.3	14.2	13.4	13.1	12.1	10.8	17.4																						
21-May	11.6	11.1	10.7	10.1	9.5	9.5	10.1	11.6	13.9	15.2	16.2	16.5	15.5	15.5	14.5	14.3	14.2	13.8	13.4	12.7	11.9	10.8	9.9	8.8	12.6	16.5																						
22-May	8.2	8.0	7.9	7.7	7.5	7.5	7.6	7.5	7.5	7.6	7.7	7.5	7.6	7.4	7.3	7.2	7.2	7.3	7.5	7.4	7.2	7.0	6.9	6.8	7.5	8.2																						
23-May	6.7	6.6	6.5	6.4	6.1	5.6	5.4	5.2	5.6	6.6	8.3	10.0	11.0	12.4	12.0	13.2	14.4	15.3	15.4	14.2	11.6	9.0	5.3	3.7	9.0	15.4																						
24-May	2.2	0.9	0.0	-0.6	-0.4	2.2	4.7	6.1	6.5	7.4	10.2	13.1	14.0	14.4	15.0	15.3	15.8	16.1	15.9	15.5	13.2	10.0	8.0	7.5	8.9	16.1																						
25-May	7.7	8.3	8.2	7.6	7.5	8.6	10.7	13.6	16.1	17.4	18.3	19.1	19.3	20.2	20.9	21.0	22.0	21.1	20.4	19.6	17.3	14.5	12.7	11.5	15.1	22.0																						
26-May	9.5	8.6	8.4	7.0	6.5	8.2	10.5	11.9	13.0	14.9	16.3	18.9	18.9	12.5	12.4	12.5	12.5	12.4	12.6	12.8	12.4	11.7	11.5	11.1	12.0	18.9																						
27-May	10.9	10.3	10.3	10.6	11.4	11.7	11.9	12.4	14.4	17.2	19.2	20.3	20.9	22.0	21.3	17.5	16.2	13.9	13.6	12.4	12.2	11.8	11.5	11.2	14.4	22.0																						
28-May	11.2	11.3	11.2	11.0	10.9	11.3	11.8	12.4	12.8	12.4	12.5	12.5	13.0	12.7	13.2	13.7	13.5	14.0	13.7	13.4	12.6	11.7	11.4	11.1	12.3	14.0																						
29-May	10.8	10.4	10.4	10.2	10.2	10.3	10.4	10.5	11.1	11.2	11.3	11.6	11.7	12.3	13.8	14.7	15.5	15.7	15.4	14.4	12.9	11.4	10.5	9.3	11.9	15.7																						
30-May	9.0	8.1	7.3	7.3	7.2	7.7	8.2	8.5	9.9	11.0	11.6	13.7	14.3	14.3	14.2	14.5	12.7	12.0	11.6	11.6	11.7	11.8	11.4	11.3	10.9	14.5																						
31-May	10.7	10.0	9.6	8.9	8.6	8.6	8.7	9.2	10.6	12.6	13.3	14.5	15.5	16.3	16.5	17.3	17.9	17.8	18.8	17.6	15.3	11.6	10.5	8.7	12.9	18.8																						
																								8.8	8.0	7.4	6.6	6.1	6.7	8.6	10.8	12.6	14.0	15.0	15.9	16.6	17.0	17.4	17.5	17.6	16.9	16.4	15.3	13.3	11.5	10.2	9.3	Diurnal Average
																								17.8	16.6	17.1	14.8	14.4	14.7	15.0	20.1	24.5	27.4	28.1	28.4	29.2	29.1	29.5	29.3	29.3	29.0	28.5	26.3	22.6	20.7	20.8	19.3	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Cenovus - Christina Lake - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Cenovus - Christina Lake - May 2016

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	22	2.96	2.96
0 - 10	246	33.06	36.02
10 - 20	373	50.13	86.16
> 20	103	13.84	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



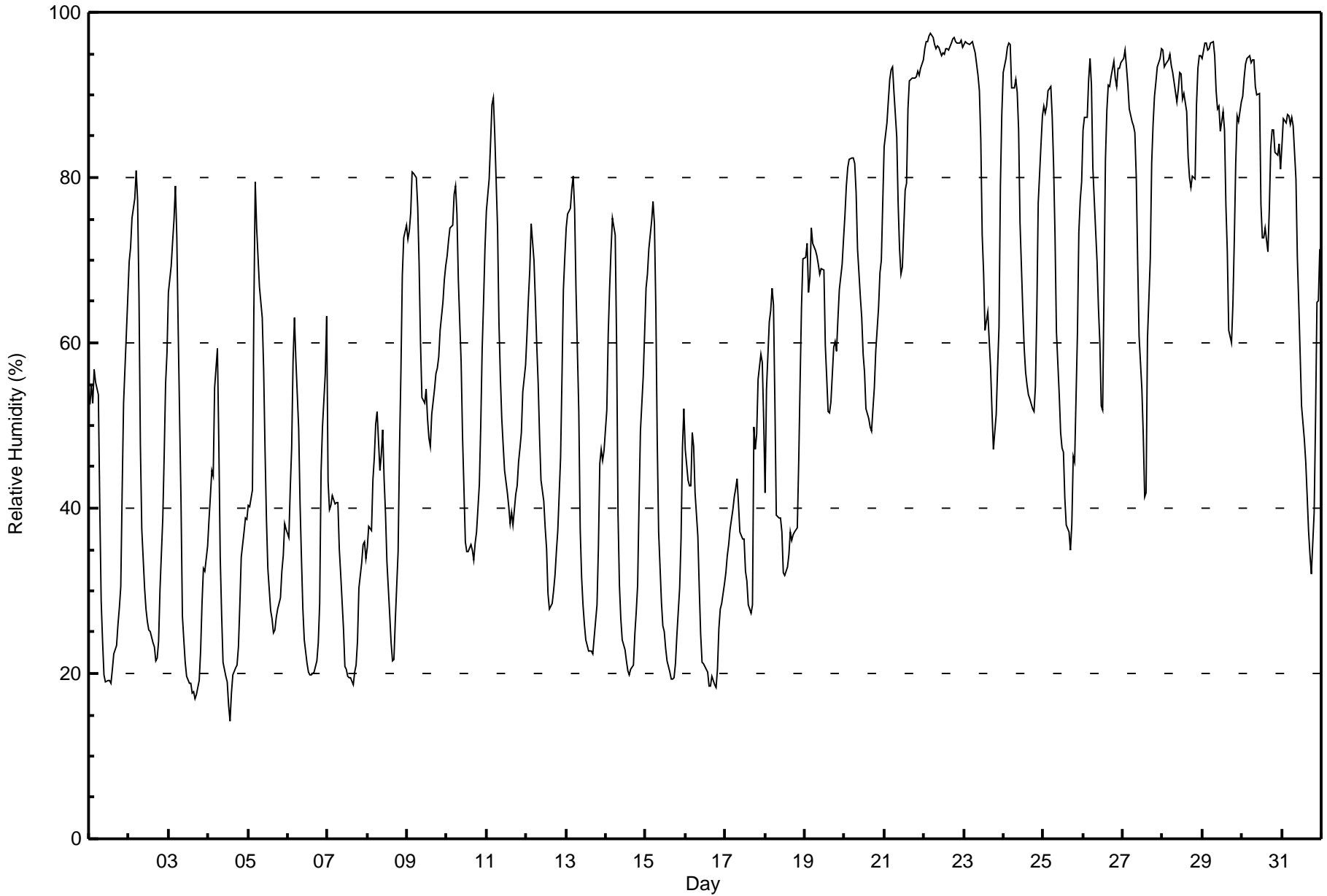
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Cenovus - Christina Lake - May 2016

Maximum Value: 98 % on May 22 05:00																			Maximum Daily Average: 96.1 % on May 22						Hours in Service: 744																								
Minimum Value: 14 % on May 4 14:00																			Minimum Daily Average: 29.8 % on May 16						Hours of Data: 744																								
Maximum Diurnal Average: 77.1 % at hour 5																			Minimum Diurnal Average: 42.6 % at hour 15						Hours of Missing Data: 0																								
Monthly Average: 57.8 %																			Percentiles: P ₁ = 18 P ₁₀ = 23 Q ₁ = 37 Median = 57 Q ₃ = 80 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-May	52	55	53	57	55	54	40	29	24	20	19	19	19	19	20	22	23	26	28	31	42	53	61	65	37.0	65																							
2-May	70	72	75	78	81	77	66	48	37	30	28	26	25	25	24	23	22	22	24	30	39	46	55	59	45.1	81																							
3-May	66	69	72	75	79	73	61	41	27	24	21	20	19	19	18	18	17	18	19	23	29	33	32	35	37.8	79																							
4-May	39	42	45	44	55	59	48	34	27	21	20	19	16	14	18	20	21	21	23	28	34	37	39	39	31.7	59																							
5-May	40	40	42	64	79	74	70	67	63	57	47	39	33	28	27	25	25	27	28	29	32	34	38	37	43.6	79																							
6-May	37	42	47	58	63	58	50	41	34	28	24	21	20	20	20	20	22	24	29	44	50	56	63	37.1	63																								
7-May	43	40	40	41	41	41	41	35	32	25	21	21	20	19	20	19	20	21	24	30	33	36	36	34	30.5	43																							
8-May	35	38	37	43	46	50	52	45	46	49	44	39	34	27	24	21	22	26	35	47	56	68	73	74	43.0	74																							
9-May	73	74	76	81	81	80	76	70	60	53	53	54	51	48	48	51	54	56	57	58	61	65	68	69	63.2	81																							
10-May	70	72	74	74	78	79	76	68	58	49	42	36	35	35	36	35	34	36	37	43	50	59	65	71	54.6	79																							
11-May	76	80	84	89	90	85	74	62	56	51	48	44	42	40	38	40	38	42	43	46	47	49	54	57	57.3	90																							
12-May	61	65	69	74	70	65	60	55	49	43	41	38	35	30	28	28	30	32	35	37	46	56	66	70	49.3	74																							
13-May	74	76	76	79	80	76	66	52	38	32	28	26	24	23	23	23	22	24	28	35	45	47	46	47	45.4	80																							
14-May	52	61	67	71	75	73	60	39	31	27	24	23	22	20	20	20	21	25	27	31	40	49	56	61	41.5	75																							
15-May	67	68	71	75	77	74	64	48	37	29	26	25	23	21	20	19	19	20	21	25	30	36	47	52	41.5	77																							
16-May	47	43	43	43	49	47	42	37	30	25	21	21	21	20	19	18	20	19	18	20	25	28	29	31	29.8	49																							
17-May	32	34	36	37	40	41	42	44	40	37	36	36	32	31	28	27	28	50	47	49	56	59	58	51	40.5	59																							
18-May	42	54	63	64	67	65	53	39	39	39	37	32	32	33	34	37	36	37	37	38	46	55	64	70	46.3	70																							
19-May	70	72	66	68	74	72	71	70	70	68	69	69	60	56	52	52	53	59	60	59	63	66	70	72	65.0	74																							
20-May	75	79	81	82	82	82	82	78	71	66	63	59	56	52	51	50	49	52	55	59	64	68	70	77	66.9	82																							
21-May	84	87	89	92	93	93	90	85	77	71	68	69	78	79	88	92	92	92	92	92	93	92	93	94	86.5	94																							
22-May	96	96	97	97	98	97	96	96	96	96	95	95	95	96	96	95	96	97	97	96	96	96	97	96	96	96.1	98																						
23-May	96	96	96	96	96	96	96	95	92	90	84	73	68	62	64	60	57	52	47	51	57	62	79	88	77.3	96																							
24-May	93	94	96	96	96	91	91	92	90	86	75	64	59	57	55	54	53	52	52	55	64	77	84	87	75.5	96																							
25-May	89	88	89	91	91	87	81	73	61	54	49	47	47	41	38	37	35	38	46	46	61	73	77	80	63.3	91																							
26-May	86	87	87	92	94	91	81	74	70	64	60	52	52	82	88	91	91	92	94	92	91	93	93	94	83.0	94																							
27-May	94	95	93	91	88	87	86	85	80	70	61	54	49	41	42	60	70	82	86	90	92	93	94	96	78.4	96																							
28-May	96	93	94	94	95	94	93	92	89	91	93	93	89	90	88	82	80	79	80	80	89	93	95	95	89.8	96																							
29-May	94	96	96	95	96	96	96	95	91	88	89	86	88	86	77	71	62	60	65	73	82	87	87	89	85.2	96																							
30-May	90	92	94	94	95	94	94	94	91	90	90	77	73	73	74	71	76	83	86	86	83	83	84	81	85.3	95																							
31-May	84	87	87	88	88	86	87	86	80	70	65	59	52	48	46	41	37	34	32	39	51	65	65	71	64.6	88																							
																								68.5	70.6	72.1	74.9	77.1	75.5	70.5	63.4	57.6	53.0	49.7	46.3	44.1	43.1	42.6	42.7	42.7	45.0	46.7	49.9	56.2	61.6	65.5	68.0	Diurnal Average	
																								96	96	97	97	98	97	96	96	96	96	95	95	95	96	96	95	96	97	97	96	96	97	97	96	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Cenovus - Christina Lake - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	34	4.57	4.57
20 - 40	191	25.67	30.24
40 - 60	171	22.98	53.23
60 - 80	163	21.91	75.13
80 - 100	185	24.87	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

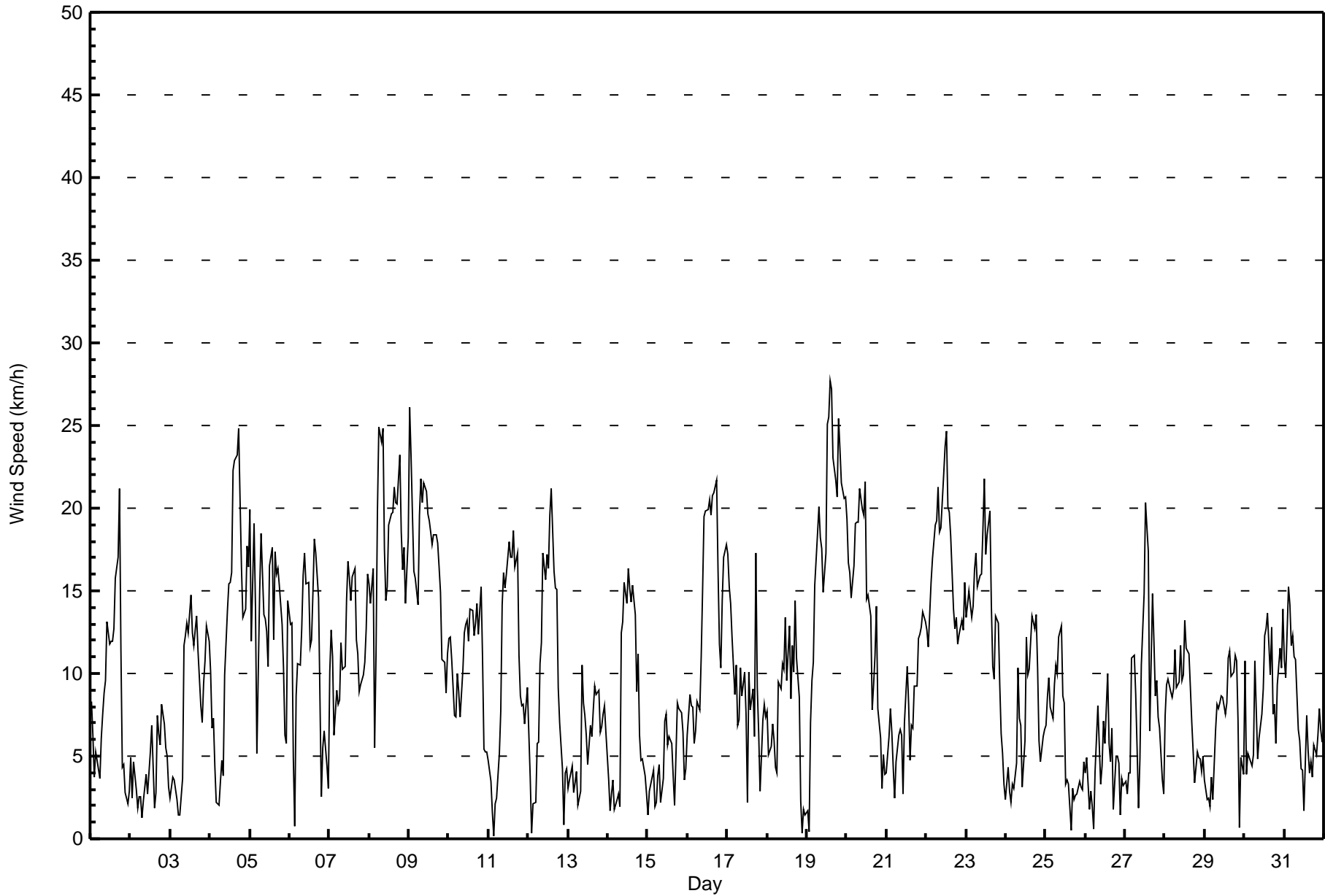
Cenovus - Christina Lake - May 2016

Maximum Speed: 28 km/h on May 19 15:00	Maximum Daily Speed Average: 17.3 km/h on May 9	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 11 04:00	Minimum Daily Speed Average: 1.1 km/h on May 26	Hours of Data: 744
Maximum Diurnal Speed Average: 4.4 km/h at hour 16	Minimum Diurnal Speed Average: 0.6 km/h at hour 22	Hours of Missing Data: 0
Monthly Average Velocity: 2.0 km/h 326.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 14 P ₉₀ = 19 P ₉₉ = 25	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SSW8	SSW6	SSW4	S5	S5	S4	SSW6	SW8	SSW9	SW10	SW13	SW12	WSW12	WSW12	WSW13	W16	WNW17	NW21	NW11	NW4	SSW5	SE3	SE2	S3	WSW6.3	NW21
2-May	SSW5	SE2	S5	SSW3	SSE2	SSE3	E3	NE1	NE2	NE4	SE3	SE4	ENE5	NNE7	NW2	E3	SW7	SW6	SSE6	SSE8	S7	SSW6	ESE5	E3	SSE2.2	SSE8
3-May	ESE2	E4	E4	ESE3	ESE2	ESE1	E1	SSW4	SW12	SW12	SW13	SSW12	SSW15	SSW12	SW12	SSW13	SSW13	SSW11	S8	SSE7	SSE9	SSE11	S13	S12	SSW7.3	SSW15
4-May	S10	SSW7	S7	SSW4	ESE2	SE2	SSE3	SSW5	SSW4	SSW10	SSW14	SW15	SW15	WSW16	W22	W23	W23	WNW25	WNW21	NW16	NW13	NW14	NW18	WNW16	W9.3	WNW25
5-May	NW20	WNW12	NW19	NW14	WSW5	NW10	NW15	NW18	NW14	NW13	NW13	NW10	NW16	NW18	NW12	WNW17	NW16	NW16	NW15	NW13	NW10	WNW6	W6	NW14	NW13.3	NW20
6-May	NW13	NW13	W5	W1	WSW9	WSW11	WSW11	WNW13	NW16	NW17	WNW15	W16	WNW12	W12	WNW15	WNW18	WNW17	WNW15	NW8	SE3	SSE6	S7	SSE4	ESE3	WNW8.6	WNW18
7-May	S10	S13	SSW11	S6	SSW9	S8	S8	SSW12	SSW10	SW10	SW14	SW17	SW16	SW14	SW16	WSW16	SW12	SSW11	S9	SSE9	SSE10	SSE11	SSE13	SSE16	SSW10.3	SW17
8-May	SSE15	SSE14	S16	SSW6	W11	WNW20	WNW25	WNW24	WNW25	W18	WSW14	WSW15	WSW19	WSW20	WSW20	WSW21	WSW20	WSW20	WSW23	WSW19	W16	W18	W14	W18	WSW15.1	WNW25
9-May	WNW26	NW23	NW20	NW16	WNW16	WNW14	WNW20	WNW22	WNW20	NW22	WNW21	WNW20	WNW19	NW19	NW18	NW18	NW18	NW18	NW16	NW15	NW11	NW11	NW9	NW11	NW17.3	WNW26
10-May	NW12	NW12	NW11	NNW7	WNW7	WNW10	NW9	NW7	NW10	NNW12	N13	NNW13	N12	NNE14	NNE14	NNE12	N13	NNE14	NNE12	NE15	NE11	NE5	ENE5	NE5	N8.9	NE15
11-May	NNE5	NE4	NE2	W0	SSW2	SSE2	NNE5	NE8	NNE14	N16	N15	N16	N18	N17	N17	NNE19	NNE16	NNE17	N11	N9	N8	N8	NNE7	NNE9	NNE9.7	NNE19
12-May	NNE6	NNE4	NW0	WNW2	NNW2	NW6	NW6	N11	N12	N17	N16	N17	N16	NNE20	NE21	NE16	NNE15	NNE15	NNE9	N7	NNE4	W1	SSE4	SSW4	NNE8.4	NE21
13-May	SSW3	SSW4	S4	SW3	SSW3	SSW4	SSW2	N3	NNW11	NW8	N7	NNE6	NW4	NNW7	NNW6	NW8	NNW9	NNE9	NE9	ESE6	S7	SSW8	SSW8	SSW6	NW1.4	NNW11
14-May	SSW4	E2	SE3	S4	SSE2	SSE2	ESE3	NNE2	NW12	NW13	WNW16	NW14	NW16	NW15	NW14	NW15	NW14	NNE9	ENE11	E6	SSE5	SSW5	S4	SSW3	NW4.0	NW16
15-May	ENE1	SSW3	S3	S4	SE2	SSE2	SSW4	S4	NE2	ENE4	NNW7	NNE8	NE6	SE6	SE6	ESE4	E2	E5	SE8	SE8	SE8	S6	ESE4	SSW4	SE2.6	SE8
16-May	SSW6	SSW9	SSW8	SSW8	SSW6	S7	S8	SSW8	SSW11	SSW15	S19	S20	SSW20	S21	S20	SSW21	S21	S22	S16	S12	SSE10	SSE14	S17	S18	S13.8	S22
17-May	S17	S15	S14	S12	S9	S10	SSW7	SW7	WSW10	W9	WSW10	SW8	SW2	WNW10	NW8	NW9	WNW6	ENE17	E9	E6	S3	SSW7	SSW8	SW7	SSW5.1	ENE17
18-May	WSW8	SSW5	S6	SSE7	SSE6	SSE4	SSE4	WSW10	W9	WSW11	WSW10	NNW13	WNW10	NNW13	W8	WNW12	NW10	NW14	NW11	NNW9	N2	W0	SSW2	SE1	W5.0	NW14
19-May	S2	NNW0	NW7	NNW10	N11	N15	NNE19	NNE20	NNE18	NNE18	NNE15	N17	NNE25	NNE25	NE28	NNE27	NNE23	NNE22	NNE21	NE25	NE24	NE22	NE21	NE21	NNE17.2	NE28
20-May	NE19	NE17	NE16	NE15	NE17	NE19	NE19	NE19	NE21	NE20	NE20	NE22	NE14	ENE15	ENE14	NE8	NNE9	N11	NNE14	NNE8	NNE6	N3	NNW5	NE4	NE13.4	NE22
21-May	N4	N6	NW8	NNE6	NE4	ENE2	ENE5	NE6	NE7	E6	ENE3	NW7	NW10	NNW8	WNW5	NNW7	NNE7	NNE9	NNE9	NNE12	NNE12	NNE13	N14	N13	N6.4	NNE14
22-May	N13	N12	N14	NNE16	N17	NNE19	NNE19	NNE21	NNE19	NNE19	NNE22	NNE24	NNE25	NNE20	NNE20	NNE18	NNE14	NNE13	NNE13	NNE12	NNE12	NNE13	NNE13	NNE16	NNE16.6	NNE25
23-May	NNE13	NNE14	NNE15	NNE13	N14	N16	NNE17	N15	N16	NNE16	NNE19	NNE22	NNE17	NE18	E20	E14	E10	E10	ENE13	E13	ESE9	SE6	SSE5	SSW3	NE10.9	NNE22
24-May	SSE2	S4	S3	S2	SSE3	SE3	ESE5	ESE10	SSE7	SE7	SSW3	S6	SSE12	S10	S10	S12	S14	SSW13	SSW14	S10	S6	S5	SSE6	SSE7	S6.6	SSW14
25-May	SSE7	S9	S10	S8	S7	S9	S10	SSW10	SSW12	S13	S9	SSW8	WSW3	S4	NW3	W0	SW3	E2	SSE3	S3	SSE3	S3	ESE3	SSW5	S5.5	S13
26-May	S4	SSE5	S2	SSW3	E2	SSW1	N4	NNE8	NNE6	NNE3	NNE4	NNW7	S6	SSE10	WSW6	SE5	SE7	SSE2	NNE5	ENE5	NE5	NNE1	NE4	NNE3	ENE1.1	SSE10
27-May	NNE3	NE3	SE4	ENE4	ESE11	ESE11	ESE9	SE5	S2	E5	E10	SE15	SE20	SE19	SSE17	SW7	N15	N12	ENE9	SE10	E7	E7	SE4	S3	ESE5.9	SE20
28-May	ESE7	ESE9	ESE10	SE9	ESE9	SE9	ESE11	ESE9	SE10	ESE12	SE10	SE10	SE13	SE11	SE11	S9	S7	E5	S3	SSW5	S5	S5	SSW4	SW5	SE7.2	SE13
29-May	S4	S2	SE2	WSW2	WNW4	NW2	N7	NNE8	NNE8	NNE8	NNE9	NNE9	NE8	NE8	ENE11	ENE11	ENE10	ENE10	ENE11	NE11	ENE7	E1	NW5	WSW4	NE4.8	ENE11
30-May	NW11	W4	WSW5	NW5	W4	W5	NW11	NW8	NW5	NNW6	N8	NW9	NNW12	WNW13	NW14	NNW10	E13	S8	SW8	NW6	NW9	NW12	NW10	NW14	NW6.4	NW14
31-May	NW11	NW10	NW15	NW14	WNW12	WNW12	NW11	N11	NNE7	NNE6	NNE4	E4	ENE2	NNE7	NNE5	NE4	N5	ESE4	WSW6	SSE5	SE6	SSE8	S7	S6	NW3.1	NW15

WNW1.6	WSW0.9	WSW1.6	WNW1.0	WNW0.7	NW1.3	NNW2.4	NNW3.5	NNW4.2	NNW4.0	NW3.9	NW3.5	NW2.9	NNW2.9	NW2.8	NW4.4	NW3.8	NNW4.1	N2.9	NE2.2	ENE1.4	S0.6	S0.6	W1.1	Diurnal Average
WNW26	NW23	NW20	NW16	N17	WNW20	WNW25	WNW24	WNW25	NW22	NNE22	NNE24	NNE25	NNE25	NE28	NNE27	W23	WNW25	WSW23	NE25	NE24	NE22	NE21	NE21	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Cenovus - Christina Lake - May 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	199	26.75	26.75
6 - 11	256	34.41	61.16
12 - 19	228	30.65	91.80
20 - 28	61	8.20	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Cenovus - Christina Lake - May 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	13	14	10	15	13	16	20	29	30	4	5	9	3	9	3	199
6 - 11	13	26	10	8	9	12	15	20	35	28	9	12	5	6	34	14	256
12 - 19	26	43	12	4	3	1	3	7	16	11	13	11	7	23	45	3	228
20 - 28	0	15	11	0	1	0	1	0	5	2	0	6	3	12	5	0	61
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	45	97	47	22	28	26	35	47	85	71	26	34	24	44	93	20	744

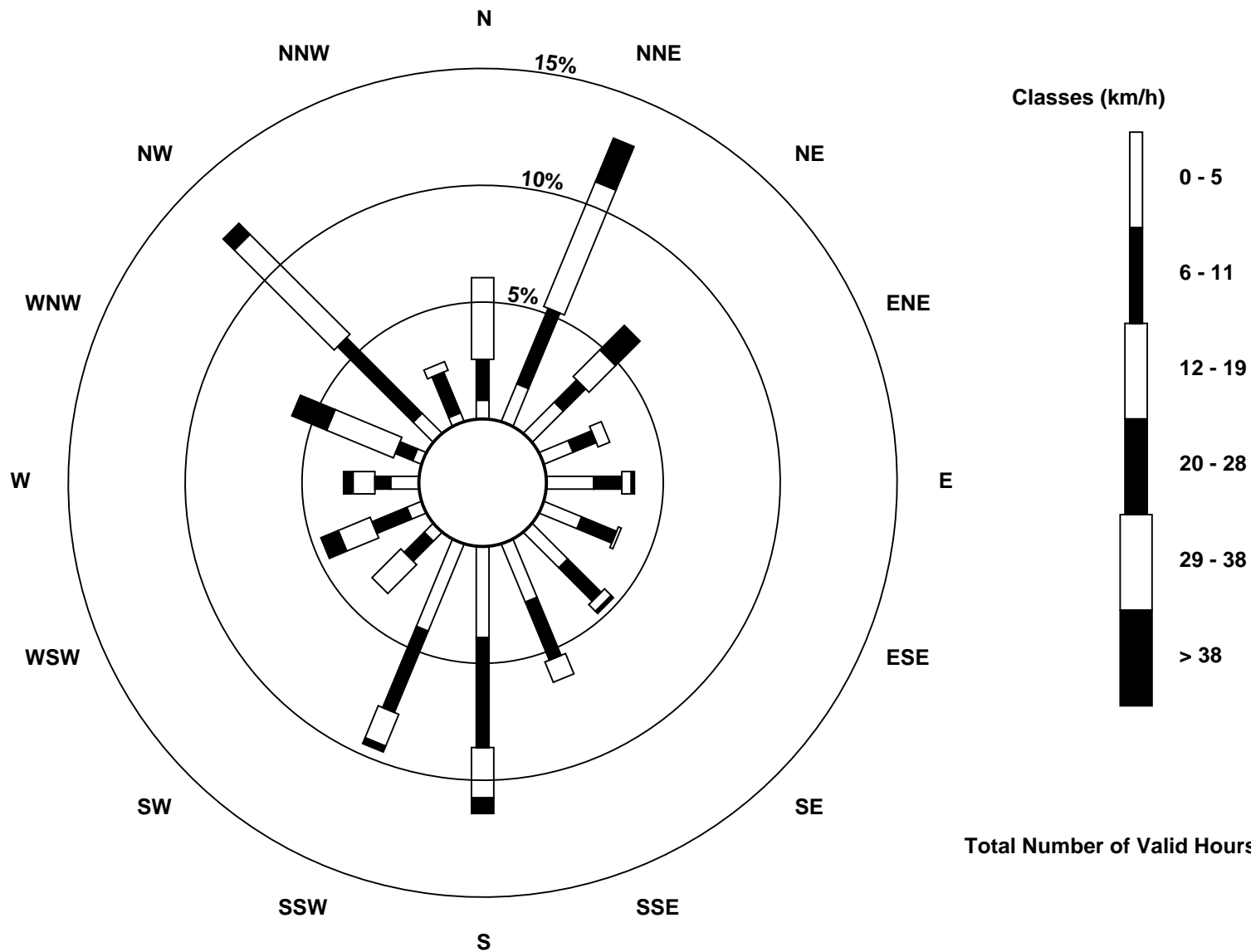
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
Cenovus - Christina Lake (AMS500)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Cenovus - Christina Lake - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on May 26 14:00 Minimum Value: 0 km/h on May 13 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	1	1	1	2	1	1	2	2	3	4	4	5	4	5	6	5	5	4	3	2	1	2	1	6
2-May	1	1	1	2	2	1	1	1	1	2	2	2	4	4	2	2	3	3	2	2	1	1	2	1	4
3-May	1	1	1	1	1	1	1	3	4	4	4	5	4	4	4	5	4	4	2	1	1	1	2	2	5
4-May	2	3	2	2	1	2	2	2	2	4	5	5	5	6	7	6	6	6	5	4	4	3	4	4	7
5-May	4	4	5	5	2	5	5	3	3	3	4	8	5	5	5	6	4	4	3	4	2	3	3	3	8
6-May	3	3	3	1	3	2	3	4	4	5	5	6	6	5	5	5	6	5	3	1	2	2	1	1	6
7-May	3	3	3	1	2	2	2	3	4	3	5	5	5	4	5	5	4	3	2	1	1	1	2	3	5
8-May	3	3	5	2	4	6	6	7	7	5	5	5	6	7	6	7	7	6	7	6	5	5	4	8	8
9-May	7	5	4	5	4	4	5	5	5	5	5	5	6	5	4	4	4	3	3	3	2	2	1	2	7
10-May	2	2	3	2	2	2	2	2	4	4	4	5	4	4	4	4	4	3	4	3	2	2	1	2	5
11-May	1	1	1	1	1	1	2	2	5	4	4	4	5	4	5	4	5	4	2	2	2	2	1	2	5
12-May	3	1	1	1	1	2	1	3	3	4	4	5	6	5	6	5	4	3	2	1	1	1	1	1	6
13-May	1	1	1	1	0	1	1	3	2	4	4	4	4	4	4	4	3	3	4	2	1	1	1	1	4
14-May	1	1	1	1	1	1	1	3	3	4	6	5	5	6	5	5	4	4	2	1	1	1	1	2	6
15-May	1	1	1	2	1	1	1	1	1	2	4	4	3	3	4	2	3	3	2	1	1	2	1	1	4
16-May	2	1	1	1	2	2	2	2	3	4	7	6	6	7	6	6	6	6	5	3	1	3	4	4	7
17-May	4	3	3	3	2	3	2	2	3	3	4	3	6	4	5	5	7	7	2	5	3	1	1	1	7
18-May	2	2	2	1	1	1	1	3	3	3	3	4	5	5	4	5	4	3	2	2	2	1	2	1	5
19-May	1	1	1	3	2	5	4	4	4	4	4	4	5	5	5	5	6	4	7	6	5	5	4	4	7
20-May	4	3	3	3	4	4	4	4	4	4	4	5	4	5	5	3	3	2	3	3	2	2	2	2	5
21-May	2	1	1	1	1	2	1	2	2	2	2	3	2	2	2	2	2	2	2	2	3	3	3	3	3
22-May	3	2	3	4	4	4	4	4	4	4	6	5	6	4	4	4	3	3	3	3	4	2	3	3	6
23-May	2	3	3	2	3	3	4	3	4	3	5	5	4	4	5	4	3	4	3	3	3	1	1	1	5
24-May	1	1	1	2	2	2	2	2	3	2	3	3	3	3	4	4	3	4	4	3	1	1	1	0	4
25-May	1	2	2	3	2	2	3	2	3	3	4	3	3	2	3	2	2	2	1	1	1	2	1	1	4
26-May	1	1	2	2	1	2	1	2	2	1	2	2	9	10	2	2	2	2	2	1	1	1	1	2	10
27-May	1	1	2	2	2	2	2	2	1	3	3	5	5	5	6	3	4	3	6	3	2	2	1	1	6
28-May	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	1	1	1	1	1	2	2	3
29-May	2	1	1	2	2	1	2	3	2	1	2	2	2	2	3	3	3	3	2	2	2	2	4	2	4
30-May	2	2	2	2	2	3	2	2	2	2	2	2	3	3	4	5	4	2	2	2	2	2	2	3	5
31-May	2	2	3	3	2	2	3	2	2	2	2	2	2	3	3	2	3	3	3	2	2	1	1	1	3
Diurnal Maximum																								8	



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Cenovus - Christina Lake - May 2016

Direction of Maximum Speed: 38 deg on May 19 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 306.8 deg on May 9	Hours of Data: 744
Direction of Minimum Speed: 265 deg on May 11 04:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.1 deg on May 26	Percent Operational Time: 100.0
Monthly Average Direction: 259.7 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-May	213	192	199	187	181	174	194	220	213	234	239	227	242	245	247	269	282	312	326	313	199	138	143	188	244.0
2-May	198	134	175	201	168	164	83	41	52	50	124	128	62	28	326	88	227	215	165	159	175	194	115	95	149.9
3-May	109	94	99	117	110	103	88	213	229	228	225	206	196	198	218	200	209	196	170	157	154	164	179	184	191.8
4-May	190	197	187	209	120	128	149	192	196	210	213	222	225	240	268	278	273	289	293	308	313	313	309	300	264.0
5-May	307	301	306	308	257	305	306	313	311	317	319	316	313	311	304	299	306	311	315	318	315	284	272	314	308.1
6-May	305	304	276	262	239	242	255	297	312	307	290	281	289	266	283	294	288	294	326	142	154	169	163	119	284.1
7-May	182	186	192	183	196	191	190	202	209	223	232	225	232	236	229	243	214	202	174	157	154	154	155	154	200.3
8-May	156	162	181	201	267	291	302	289	284	269	253	251	246	250	249	248	250	255	256	253	259	260	260	281	256.8
9-May	300	308	310	306	296	286	297	302	297	306	302	290	298	310	324	322	316	316	324	322	317	315	312	307	306.8
10-May	312	308	309	330	301	302	314	323	325	340	352	344	3	20	28	15	10	23	24	34	43	40	59	48	355.6
11-May	31	47	42	265	205	161	29	41	14	2	6	8	10	10	10	23	20	18	358	357	7	8	17	25	13.8
12-May	21	20	324	283	348	313	315	359	353	6	5	4	7	31	41	34	24	26	26	8	23	280	156	207	14.1
13-May	192	207	173	214	201	198	212	2	327	305	350	26	314	348	327	319	331	20	45	111	169	195	197	198	310.4
14-May	198	98	146	175	150	166	106	21	323	322	301	307	306	307	316	317	320	31	77	94	162	196	183	204	316.2
15-May	69	198	172	191	126	167	201	182	43	57	337	25	54	127	135	110	88	92	136	131	145	187	112	196	129.3
16-May	198	194	196	195	193	187	191	194	194	198	184	181	192	180	185	202	185	188	183	172	154	164	173	180	185.1
17-May	182	183	187	188	190	188	194	236	247	259	245	221	230	289	304	305	290	70	94	88	183	192	195	218	206.9
18-May	242	194	190	158	154	159	162	247	264	252	255	293	289	297	266	299	309	317	324	328	6	267	208	140	273.7
19-May	173	343	312	337	358	11	19	25	31	27	20	10	32	21	38	29	23	12	27	44	46	44	43	41	26.9
20-May	44	44	42	47	48	50	52	48	47	55	44	45	49	68	65	39	27	9	17	15	16	357	344	38	43.1
21-May	6	8	317	17	51	61	78	43	45	81	62	322	317	328	297	330	16	15	25	22	13	19	11	3	9.4
22-May	8	3	358	12	7	18	20	19	19	13	16	20	23	21	22	21	23	24	23	29	19	20	19	23	17.8
23-May	20	17	15	15	9	7	14	10	10	15	16	27	31	51	86	86	87	79	72	96	106	134	159	196	39.3
24-May	147	179	171	176	168	140	103	119	149	146	203	175	166	183	191	187	186	207	199	187	173	169	160	153	173.6
25-May	154	177	183	183	187	189	190	198	197	183	189	208	238	176	307	260	215	93	155	177	166	182	111	212	187.3
26-May	189	167	190	199	90	207	0	16	24	33	28	332	181	166	248	140	126	164	21	65	51	29	39	29	77.1
27-May	13	40	140	64	112	114	122	134	189	89	95	145	133	142	163	223	10	7	71	129	100	87	132	173	115.4
28-May	118	118	113	124	106	124	123	121	132	105	132	129	131	129	140	189	186	96	187	199	174	169	192	220	135.5
29-May	176	191	131	255	294	315	359	33	32	16	16	12	37	45	61	72	71	63	60	45	70	91	308	251	41.5
30-May	307	272	252	310	260	281	311	312	315	338	6	324	336	291	308	344	85	177	236	305	304	304	307	305	308.7
31-May	309	308	306	305	303	301	306	353	18	31	33	80	64	26	33	40	10	107	239	157	146	165	188	171	325.6

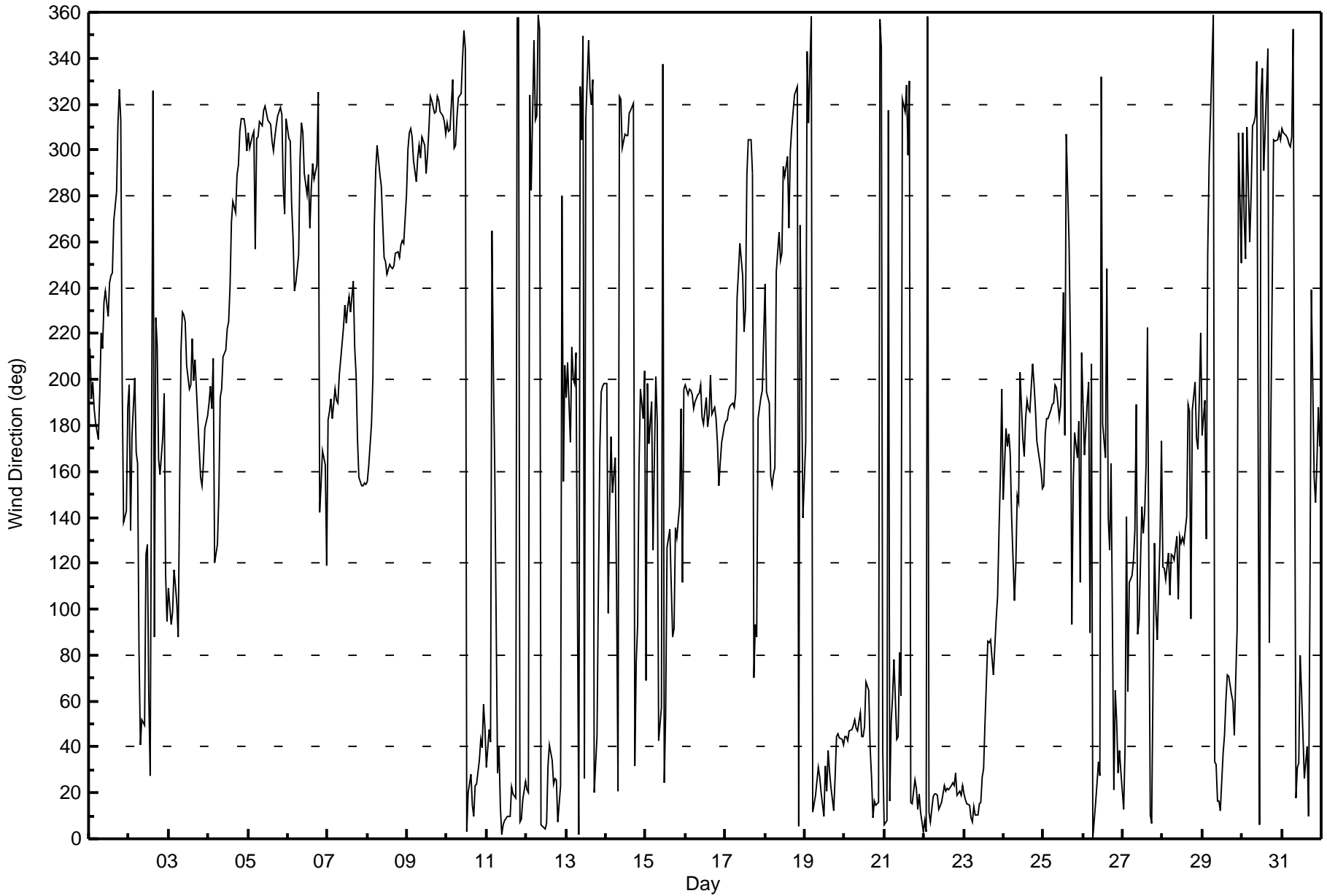
281.8 255.3 254.7 291.6 289.8 307.2 337.1 338.6 328.4 332.2 322.7 320.5 325.9 327.7 320.8 315.9 321.3 344.5 2.5 42.6 71.3 178.5 185.6 266.9
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Cenovus - Christina Lake - May 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Cenovus - Christina Lake - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on May 6 04:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 4 deg on May 25 00:00																									
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 15 Median = 21 Q ₃ = 32 P ₉₀ = 55 P ₉₉ = 90																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	12	15	39	14	24	34	29	22	25	29	29	39	38	33	32	26	26	12	15	50	37	35	42	17	50
2-May	14	46	18	59	59	30	42	66	73	52	80	68	63	38	92	67	40	34	31	13	16	10	42	28	92
3-May	35	17	14	32	36	47	24	68	21	23	23	34	29	31	28	30	25	23	17	13	4	8	10	12	68
4-May	12	29	12	76	75	49	32	29	51	29	23	23	26	24	21	21	19	15	16	13	11	12	10	23	76
5-May	11	21	16	26	50	45	20	10	12	14	33	51	17	23	37	23	25	15	12	11	13	27	37	11	51
6-May	10	9	42	104	36	14	18	25	15	22	31	28	48	42	31	26	23	25	18	62	28	7	22	34	104
7-May	14	13	15	19	15	16	16	17	21	24	25	22	27	29	26	25	24	18	13	7	6	7	8	10	29
8-May	10	11	23	28	37	18	14	17	17	22	20	22	21	24	25	23	22	20	17	17	17	17	17	27	37
9-May	15	13	13	15	19	19	16	17	19	19	18	22	24	17	16	17	15	14	14	13	11	12	11	11	24
10-May	12	10	11	22	15	12	21	26	28	30	34	34	29	25	21	28	29	22	17	9	10	9	12	17	34
11-May	12	18	45	79	35	25	33	32	24	25	28	28	25	25	24	18	18	14	18	16	13	14	13	11	79
12-May	17	27	95	54	48	24	17	23	22	21	23	24	27	23	19	26	20	12	13	14	22	71	35	14	95
13-May	26	17	11	27	12	14	81	61	16	45	50	62	82	68	76	55	38	30	42	13	8	10	11	10	82
14-May	15	53	21	13	20	18	26	76	17	23	32	46	27	33	37	23	17	57	13	18	33	11	14	17	76
15-May	60	18	17	27	27	30	18	22	66	57	50	54	59	57	58	60	91	48	30	9	9	21	42	14	91
16-May	11	9	10	10	12	15	17	20	20	20	20	22	22	24	23	21	20	17	16	16	7	10	12	13	24
17-May	13	13	14	16	18	16	17	21	19	35	43	39	91	35	61	49	55	20	21	46	76	12	11	18	91
18-May	17	27	9	10	13	16	33	22	33	21	26	27	54	29	41	29	27	16	13	15	68	96	71	53	96
19-May	50	94	11	19	18	17	14	12	13	12	17	17	14	17	16	14	19	16	20	10	11	11	11	11	94
20-May	12	11	10	11	12	12	12	13	15	15	14	16	22	24	23	37	32	16	13	15	16	51	20	58	58
21-May	37	23	12	29	14	31	21	18	30	33	56	27	15	19	45	17	24	13	11	12	15	13	17	17	56
22-May	17	17	18	17	17	15	13	14	13	16	16	16	14	15	13	13	13	13	12	11	14	12	13	12	18
23-May	13	13	15	15	16	17	17	16	17	16	16	15	15	20	15	18	24	31	16	24	16	12	12	33	33
24-May	57	8	35	44	27	37	24	15	35	32	81	69	24	28	32	24	23	21	19	16	12	19	11	4	81
25-May	8	13	14	17	21	16	17	20	20	26	42	35	87	64	80	98	70	79	27	28	32	80	58	32	98
26-May	17	20	91	40	51	76	28	21	32	51	42	27	99	82	28	40	30	74	26	19	26	53	19	41	99
27-May	30	48	43	40	16	15	23	25	81	53	25	21	16	19	35	64	28	19	49	23	16	15	29	33	81
28-May	10	13	13	13	16	14	12	12	16	11	15	18	14	15	14	25	25	23	53	17	8	10	47	24	53
29-May	55	68	56	71	36	49	20	20	21	15	16	16	21	21	21	18	23	24	18	15	17	88	74	46	88
30-May	12	40	34	34	28	32	13	15	25	26	24	25	24	31	19	37	26	27	21	41	15	11	12	9	41
31-May	12	11	9	10	12	10	14	23	35	46	70	73	92	46	53	60	54	69	61	42	18	11	10	16	92
60 94 95 104 75 76 81 76 81 57 81 73 99 82 92 98 91 79 61 62 76 96 74 58																									
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Last Calibration	April 21, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	12:50
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	Sep-8-2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-697	-698
Analyzer IP address	192.168.1.43		Lamp voltage	841	834
Calculated slope	0.998080	0.996124	Chamber temp	44.8	45.1
Calculated intercept	0.835819	0.580368	Pressure	684.1	677.0
Analyzer Background	12.8	12.8	Flow	0.590	0.591
Analyzer Coefficient	1.017	1.017	Intensity	91	90

Analyzer make Thermo 43i Analyzer serial # 118148497

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	79.3	793.0	795.6	0.997
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	79.3	793.0	795.6	0.997
second point	5000	39.7	397.0	398.1	0.997
third point	5000	19.8	198.0	197.7	1.002
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	79.3	793.0	794.2	0.999
Average Correction Factor					0.999

Corrected As found 795.8 Previous response 793.7 % change -0.3%

Notes:

Remote Calibration. No adjustments made.

Calibration Performed By: Devin Russell



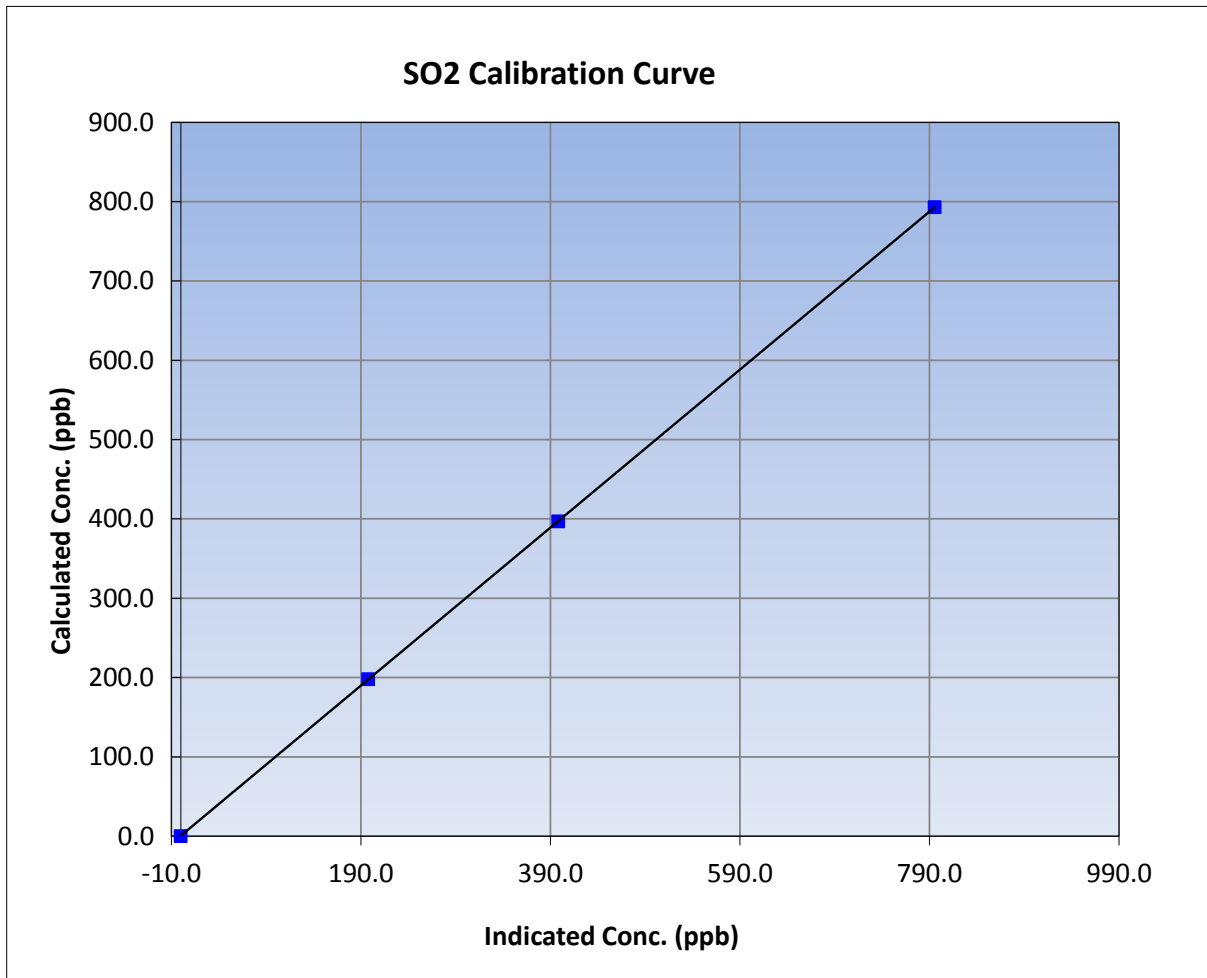
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 21, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Start Time (MST)	7:55	End Time (MST)	12:50
Analyzer make	Thermo 43i	Analyzer serial #	118148497

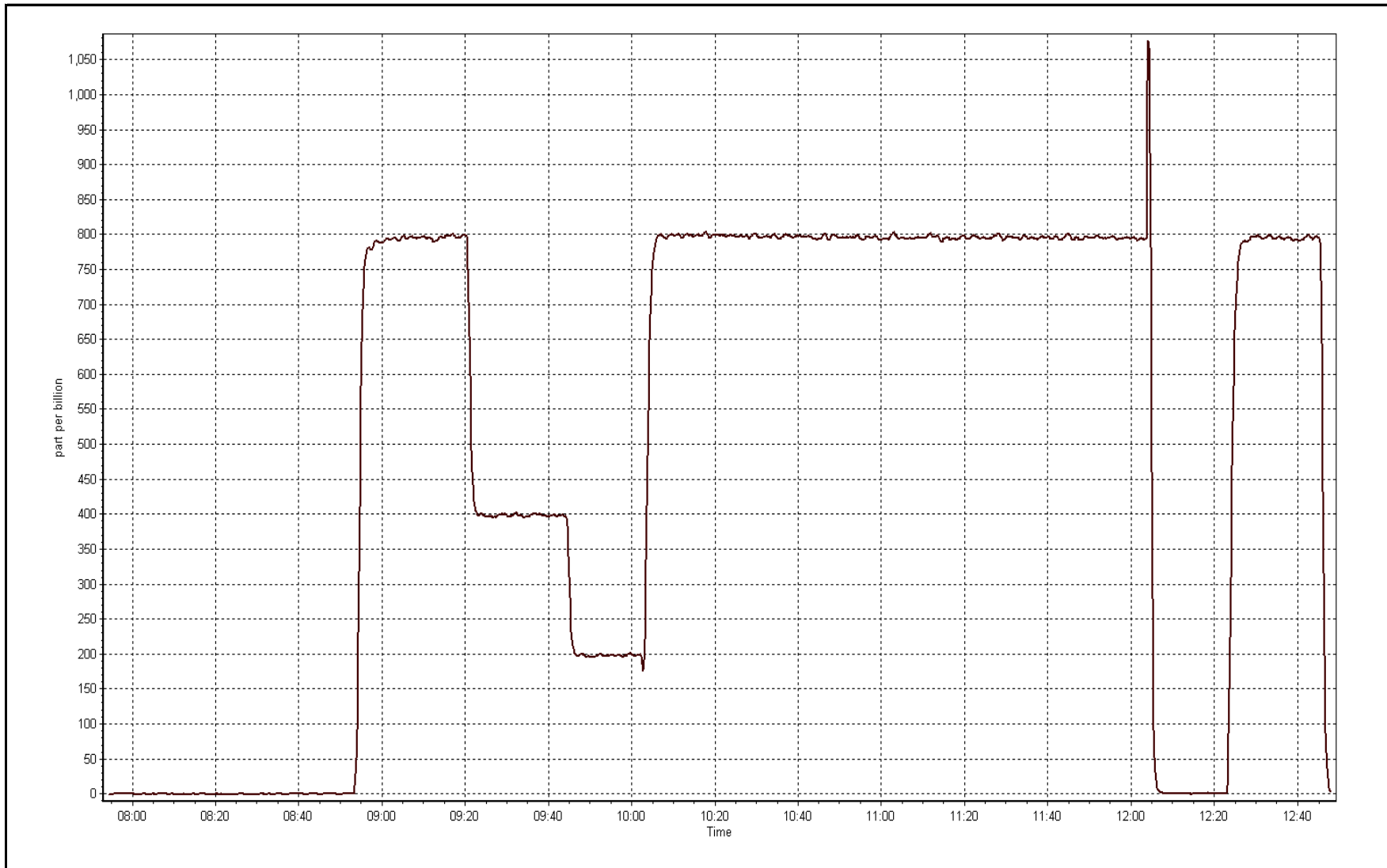
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999999
793.0	795.6	0.9968		
397.0	398.1	0.9972	Slope	0.996124
198.0	197.7	1.0017		
			Intercept	0.580368



SO2 Calibration Plot

Date: May 26, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 26, 2016	Last Calibration	April 22, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	12:50	End Time (MST)	16:45
Gas Cert Reference	LL23598	Station temp.	22 Deg C
Cal Gas Concentration	10.2 ppm	Cal Gas Exp Date	5/30/2016
Calibrator Make/Model	API 700	Serial Number	451
ZAG air Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	Serial Number	2575
SO2 gas concentration	50 ppm	SO2 gas cert/exp	LL107928 09-Aug-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-680	-681
Analyzer IP address	192.168.1.42		Lamp voltage	984	977
Calculated slope	0.992376	0.991460	Chamber temp	45	45
Calculated intercept	0.109198	0.020073	Pressure	666.5	673.0
Analyzer Background	1.72	1.72	Flow	0.430	0.319
Analyzer Coefficient	0.882	0.882	Intensity	91	91
			Converter temp.	310	310

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1008841400
Converter make/model	Thermo 340	Converter serial #	328702539

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	39.3	80.2	80.7	0.994
SO2 scrubber check	5000	20.0	200.0	1.4	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	39.3	80.2	80.7	0.994
second point	5000	19.7	40.2	40.9	0.982
third point	6000	11.9	20.2	20.2	1.000
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	39.3	80.2	81.9	0.979
Average Correction Factor					0.992

Corrected As found	80.8	Previous response	80.7	% change	-0.1%
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Notes:

Remote calibration. No adjustments made. Low flow alarm present.

Calibration Performed By: Devin Russell



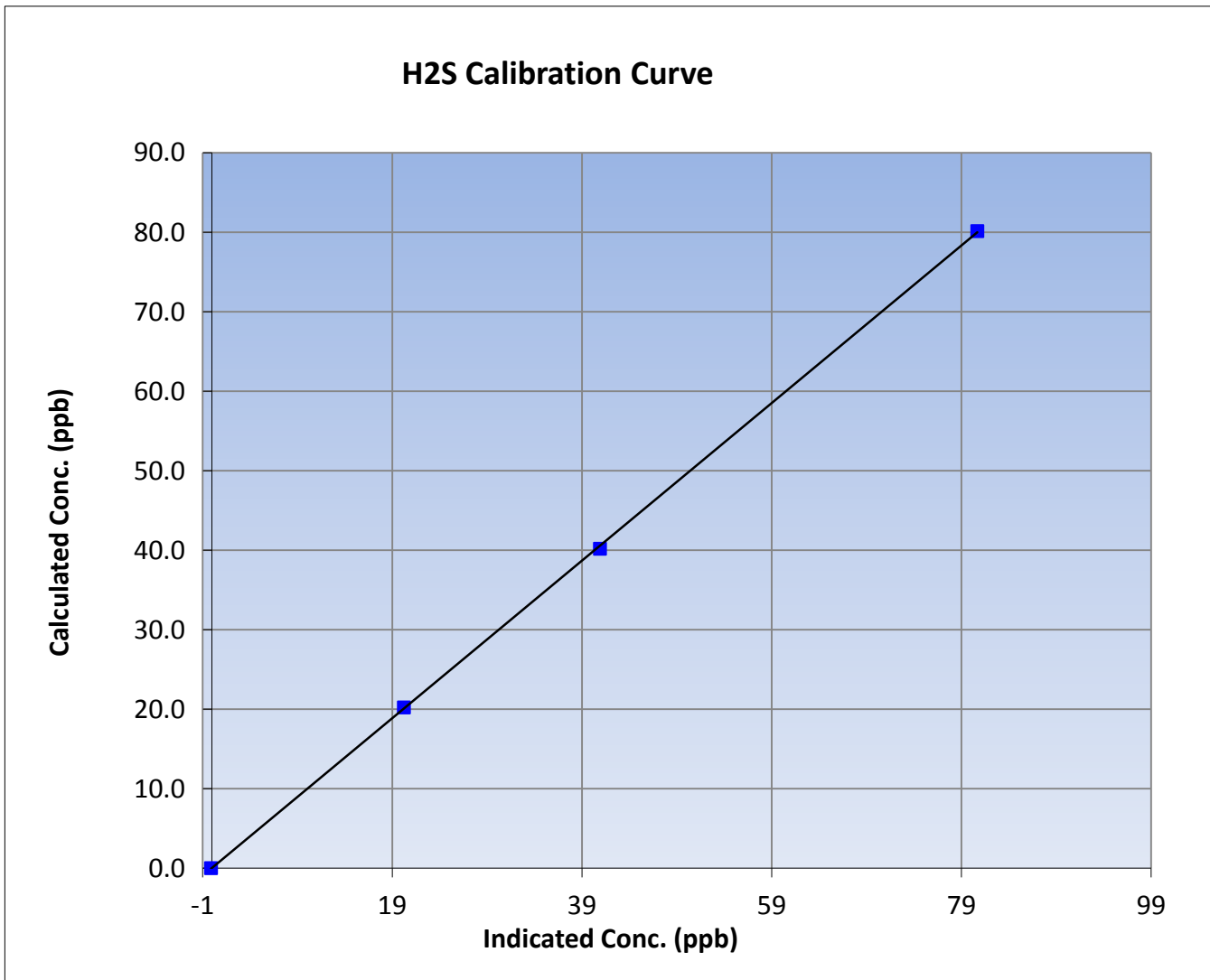
Wood Buffalo Environmental Association H2S Calibration Report

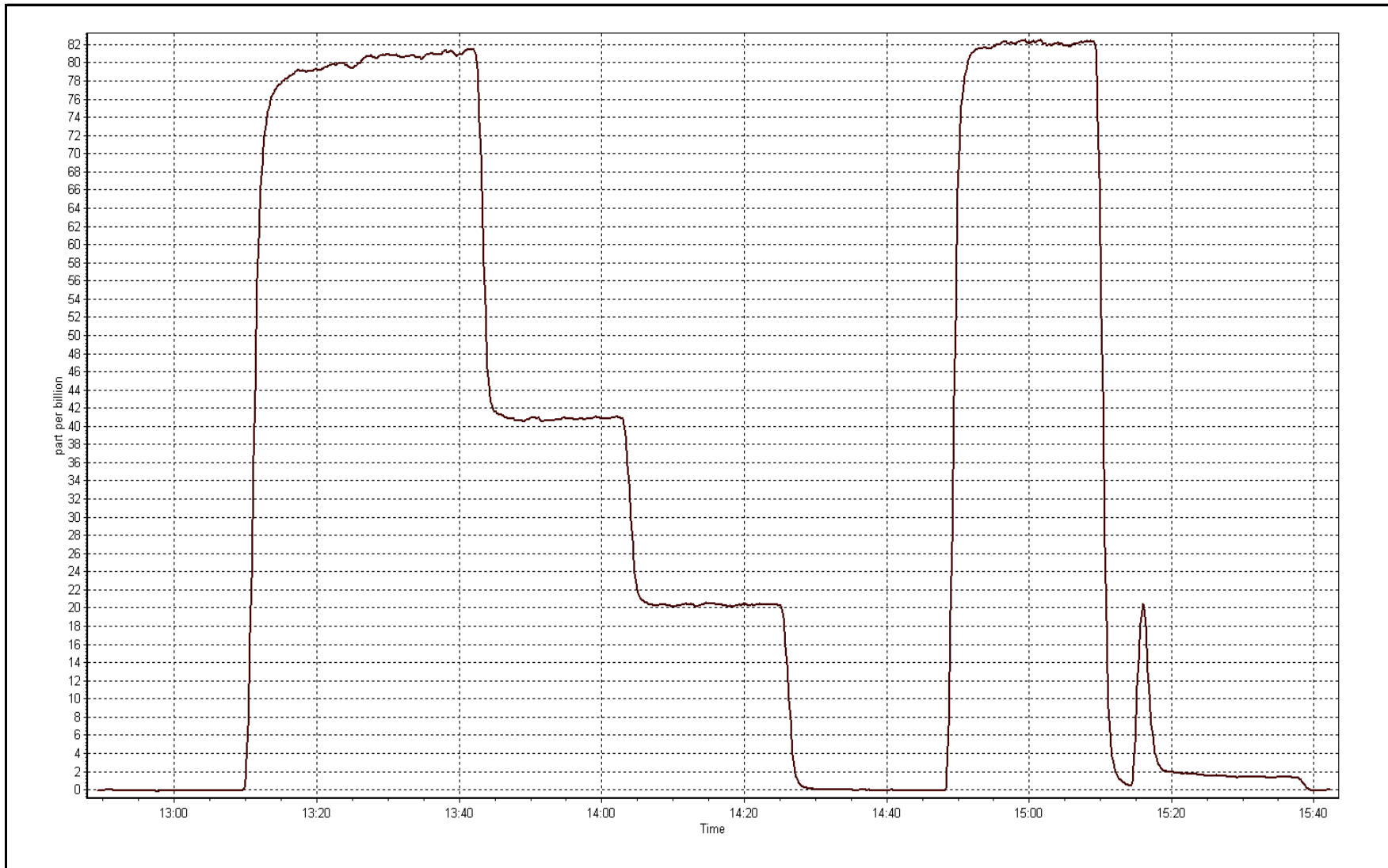
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 22, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	12:50	End Time (MST)	16:45
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999940
80.2	80.7	0.9937		
40.2	40.9	0.9824	Slope	0.991460
20.2	20.2	1.0000		
			Intercept	0.020073







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	12:50
NO Cal Gas Conc	50.5 ppm	Gas Cert Reference	LL107928
NOx Cal Gas Conc	50.8 ppm	Cal Gas Expiry Date	Sep-8-2018
Calibrator	API T700	Serial Number	451
Zero air Generator	Teledyne API T701	Serial Number	4604

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2575
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997822	0.999615	0.997417
	Data Offset	2.007545	1.549150	-0.681966
Current Calibration	Data Slope	1.019696	1.022837	1.000883
	Data Offset	1.566051	0.908503	-0.464784

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	0.876		0.876	
NOx coefficient	0.879		0.879	
NO2 coefficient	1.000		1.000	
NO bkgnd	-0.1		-0.1	
NOx bkgnd	2.4		2.4	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	314.4	Deg C	315.3	Deg C
PMT voltage	826	V	827	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	86	ccm	85	ccm
R Cell press NO	106.7	mmHg	4.2	mmHg
R Cell Press Nox	104.1	mmHg	4.2	mmHg
NO sample flow	0.49	lpm	0.488	lpm
Nox sample Flow	0.485	lpm	0.488	lpm

Notes:

Remote calibration. As found zero slow to stabilize. NO2 values during GPT are lower than expected. No adjustments made.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 26, 2016

Station Number:

AMS 500

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.1	-0.4	----	----
as found span	5000	79.3	805.7	800.9	4.8	788.7	782.2	6.6	1.0215	1.0240
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.1	-0.4	----	----
high point	5000	79.3	805.7	800.9	4.8	788.7	782.2	6.6	1.0215	1.0240
second point	5000	39.6	402.3	400.0	2.4	393.7	390.9	2.8	1.0220	1.0233
third point	5000	19.8	201.2	200.0	1.2	193.9	193.1	0.8	1.0374	1.0358
as left zero	5000	0.0	0.0	0.0	0.0	-0.6	0.8	-1.4	----	----
as left span	5000	79.3	805.7	637.6	168.1	793.6	641.5	152.1	1.0153	0.9939
Average Correction Factor									1.0270	1.0277

Corrected As found
Previous Response

NO_x= 789.2
NO_x= 805.4

NO= 782.3
NO= 799.7

Percent Change

NO_x= 2.1%

NO= 2.2%

GPT Calibration Data

Dilution Flow (total) 5000 ccm

Source Gas Flow 79.30 ccm

NOx ref calc conc = 805.7 ppb

NO ref calc conc = 800.9 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		4.8	790.6	785.3	-0.4	1.0191	1.0199	----	----
1st NO2 (300)	637.6	152.5	789.8	637.6	152.2	1.0201	----	1.0020	99.8%
2nd NO2 (200)	696.6	93.5	790.9	696.6	94.3	1.0187	----	0.9913	100.9%
3rd NO2 (100)	739.6	50.5	791.6	739.6	52.0	1.0179	----	0.9715	102.9%
2nd NO ref point		4.8	792.9	786.5	6.3	1.0162	1.0184	----	----
Average Correction Factor						1.0182		0.9883	101.2%

Calibration Performed By:

Evan Magill



Wood Buffalo Environmental Association

NO_x Calibration Summary

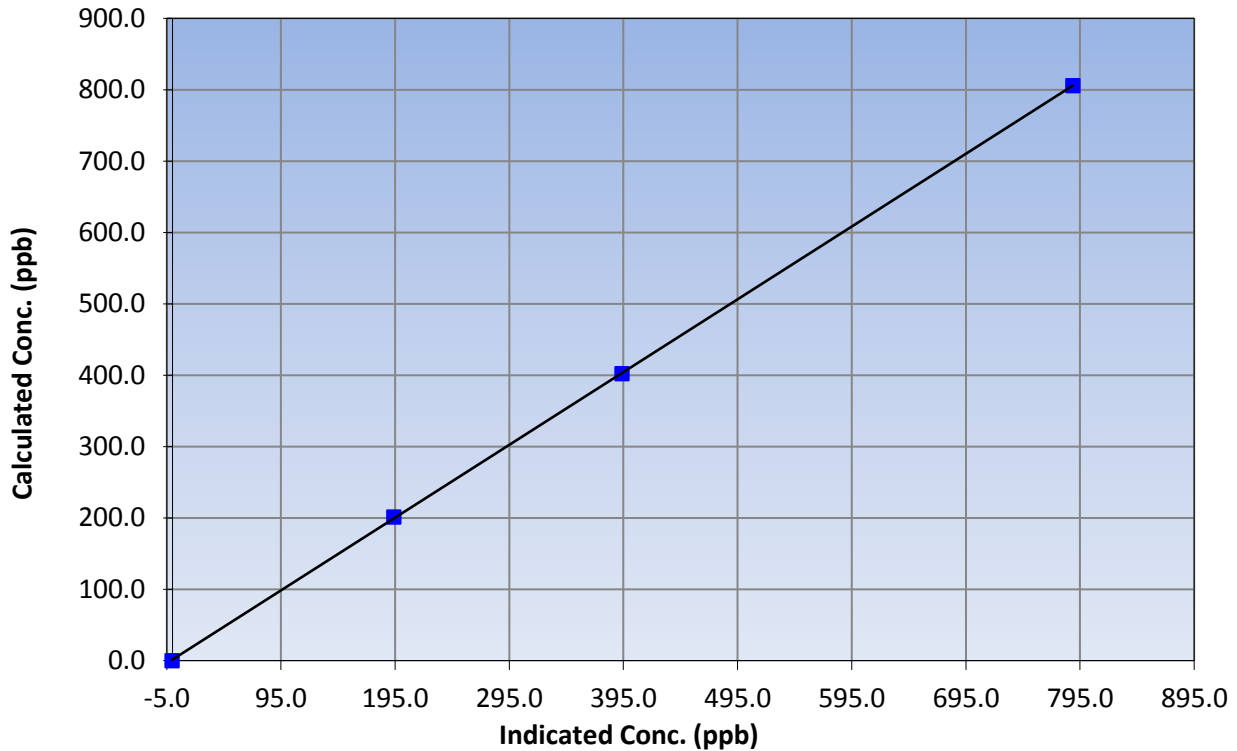
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	7:55	End Time (MST)	12:50
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999986
805.7	788.7	1.0215		
402.3	393.7	1.0220	Slope	1.019696
201.2	193.9	1.0374		
			Intercept	1.566051

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

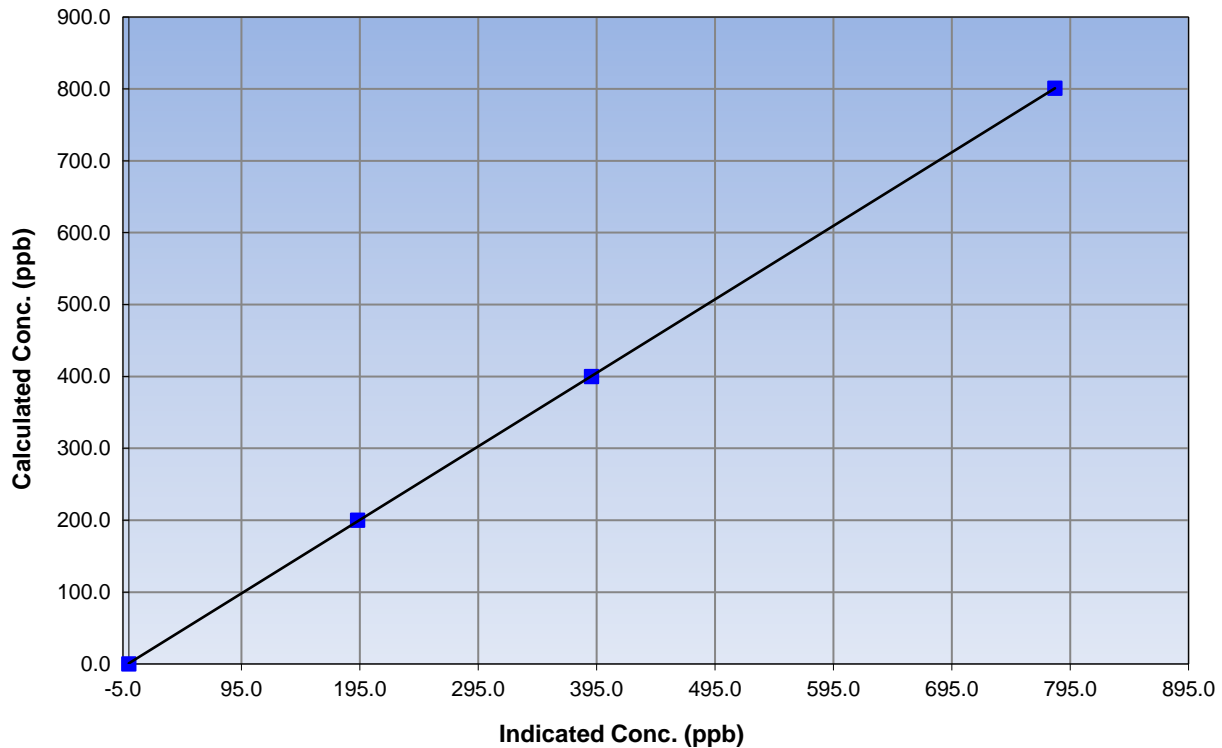
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	7:55	End Time (MST)	12:50
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999989
800.9	782.2	1.0240		
400.0	390.9	1.0233	Slope	1.022837
200.0	193.1	1.0358		
			Intercept	0.908503

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

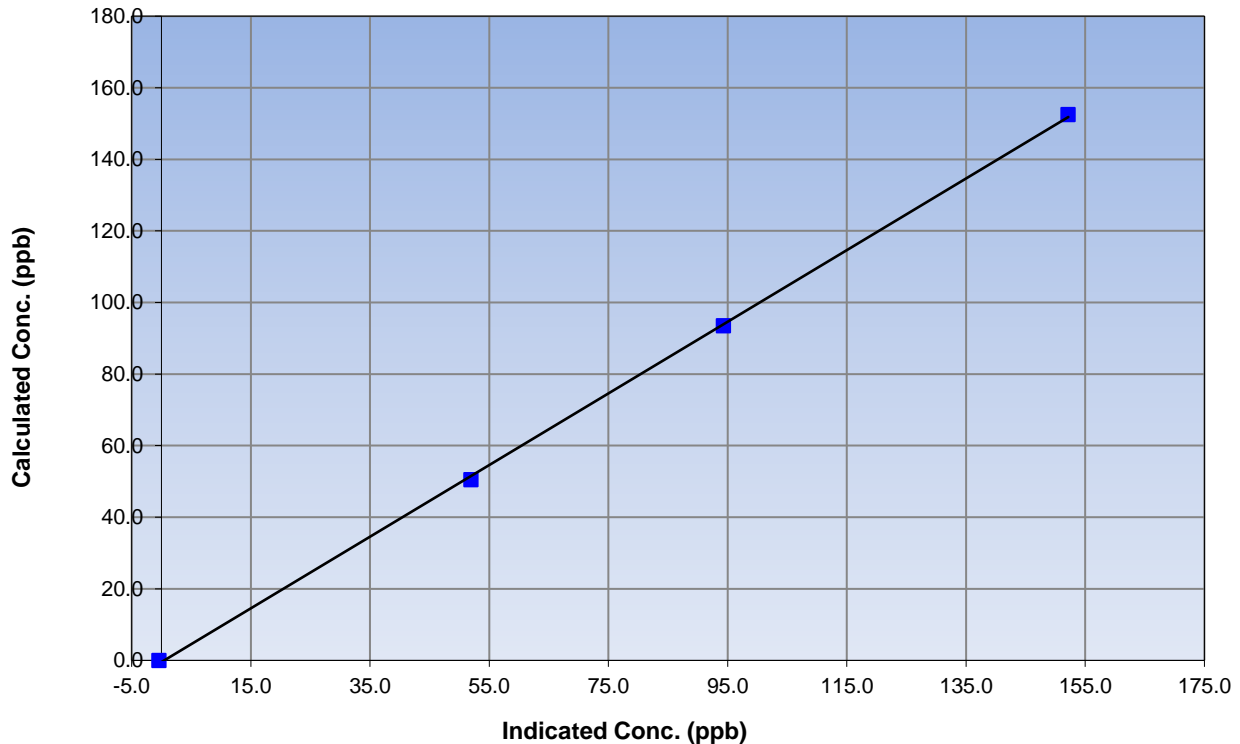
Station Information

Calibration Date	May 26, 2016	Previous Calibration	April 26, 2016
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	7:55	End Time (MST)	12:50
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999803
152.5	152.2	1.0020		
93.5	94.3	0.9913	Slope	1.000883
50.5	52.0	0.9715		
			Intercept	-0.464784

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
MAY 2016**

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

June 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MAY 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	199	15	545	28.76	11	0	2	0
H2S (ppb) Average	191	12	553	27.28	1	0	0	0
NO2 (ppb) Average	196	13	548	28.09	9	0	3	-
NO (ppb) Average	196	13	548	28.09	11	-	3	-
NOX (ppb) Average	196	13	548	28.09	20	-	6	-
Temperature 2 m (C) Average	309	0	435	41.53	29.4	-	23.8	-
Relative Humidity (%) Average	309	0	435	41.53	100	-	92	-
Wind Speed 10 m (km/h) Average	308	0	436	41.40	37	-	19	-
Wind Direction 10 m (deg) Average	308	0	436	41.40	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MAY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	199	0.6	1	-	0	0	0	0	1	1	11
H2S (ppb) Average	191	0.1	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	196	1.3	1	-	0	0	1	1	1	2	9
NO (ppb) Average	196	1	2	-	0	0	0	1	1	2	11
NOX (ppb) Average	196	2.3	3	-	0	1	1	2	2	4	20
Temperature 2 m (C) Average	309	15.35	5.8	-	6.1	9.3	11	13.7	19.2	24.3	29.4
Relative Humidity (%) Average	309	52.9	29	-	14	21	27	40	87	94	100
Wind Speed 10 m (km/h) Average	308	12.8	6	-	2	6	8	12	16	20	37
Wind Direction 10 m (deg) Average	308	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MAY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	05 May 2016 02:00	26 May 2016 13:00	516	Site power shutdown due to forest fire
SO2	26 May 2016 14:00	27 May 2016 03:00	14	Unstable Operation - required daily QA check
H2S	05 May 2016 02:00	26 May 2016 13:00	516	Site power shutdown due to forest fire
H2S	26 May 2016 14:00	27 May 2016 04:00	15	Unstable Operation - required daily QA check
H2S	28 May 2016 23:00	29 May 2016 00:00	2	Unstable operation - excessive baseline drift
H2S	29 May 2016 08:00	29 May 2016 08:00	1	Unstable operation - excessive baseline drift
H2S	29 May 2016 17:00	29 May 2016 18:00	2	Unstable operation - excessive baseline drift
H2S	29 May 2016 22:00	29 May 2016 22:00	1	Unstable operation - excessive baseline drift
H2S	30 May 2016 05:00	30 May 2016 05:00	1	Unstable operation - excessive baseline drift
H2S	31 May 2016 12:00	31 May 2016 13:00	2	Unstable operation - excessive baseline drift
H2S	31 May 2016 18:00	31 May 2016 18:00	1	Unstable operation - excessive baseline drift
NO2, NO, NOX	05 May 2016 02:00	26 May 2016 13:00	516	Site power shutdown due to forest fire
NO2, NO, NOX	26 May 2016 14:00	27 May 2016 08:00	19	Unstable Operation - required daily QA check
Temperature/ Relative Humidity	08 May 2016 11:00	26 May 2016 13:00	435	Site power shutdown due to forest fire
Wind Speed, Wind Direction	08 May 2016 11:00	26 May 2016 13:00	435	Site power shutdown due to forest fire
Wind Speed, Wind Direction	31 May 2016 20:00	31 May 2016 20:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

ConocoPhillips - Surmont - May 2016

Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 11 ppb on May 1 17:00	Maximum Daily Average: 1.6 ppb on May 1		Hours of Data:	199
Minimum Value: 0 ppb on May 28 00:00	Minimum Daily Average: 0.1 ppb on May 28		Hours of Missing Data:	545
Maximum Diurnal Average: 2.2 ppb at hour 17	Minimum Diurnal Average: 0.3 ppb at hour 11		Hours of Calibration:	15
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 7		Percent Operational Time:	28.8

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-May	1	Z	0	0	0	1	0	0	0	0	0	2	2	0	1	1	11	8	4	1	1	1	0	1	1.6	11
2-May	1	3	Z	1	1	4	2	0	0	0	1	0	0	0	2	1	6	1	0	0	1	1	1	1	1.2	6
3-May	0	1	0	Z	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0.6	1
4-May	1	1	1	0	Z	0	0	1	0	0	0	0	0	0	0	0	1	1	1	2	2	3	3	2	0.9	3
5-May	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--
27-May	UO	UO	UO	Z	0	0	0	C	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0	--	1
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
30-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1

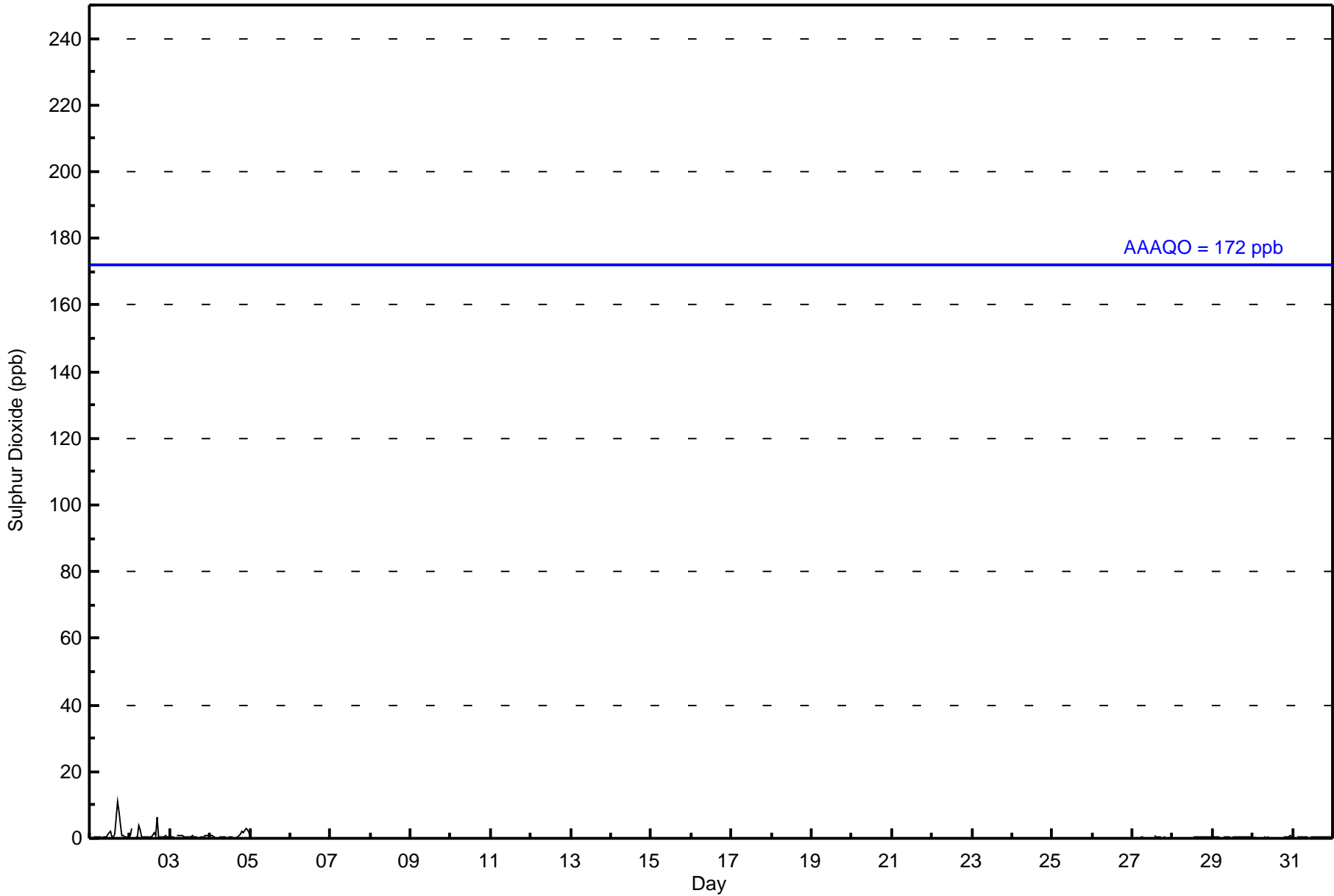
0.5	0.8	0.4	0.3	0.4	0.8	0.6	0.4	0.3	0.3	0.3	0.4	0.6	0.4	0.5	0.4	2.2	1.3	0.9	0.6	0.6	0.7	0.7	0.6	Diurnal Average	
1	3	1	1	1	4	2	1	1	0	1	2	2	1	2	1	11	8	4	2	2	3	3	2	Diurnal Maximum	

Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	198	99.50	99.50
11 - 20	1	0.50	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: 199

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	9	5	2	9	10	3	15	16	10	14	11	26	12	19	16	20	197
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	9	5	2	9	10	3	15	16	10	14	11	26	12	20	16	20	198

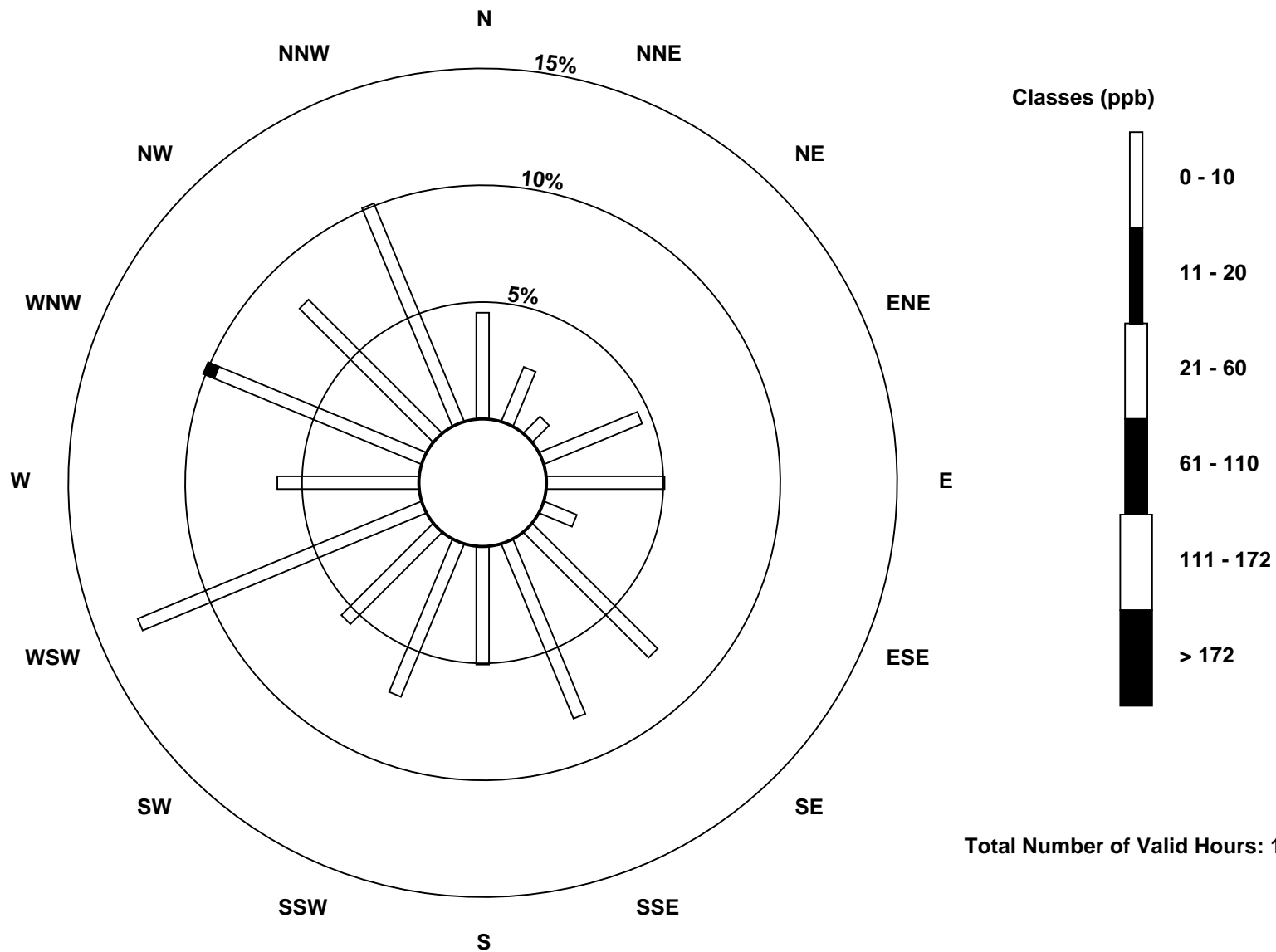
Total Number of Valid Hours: 198

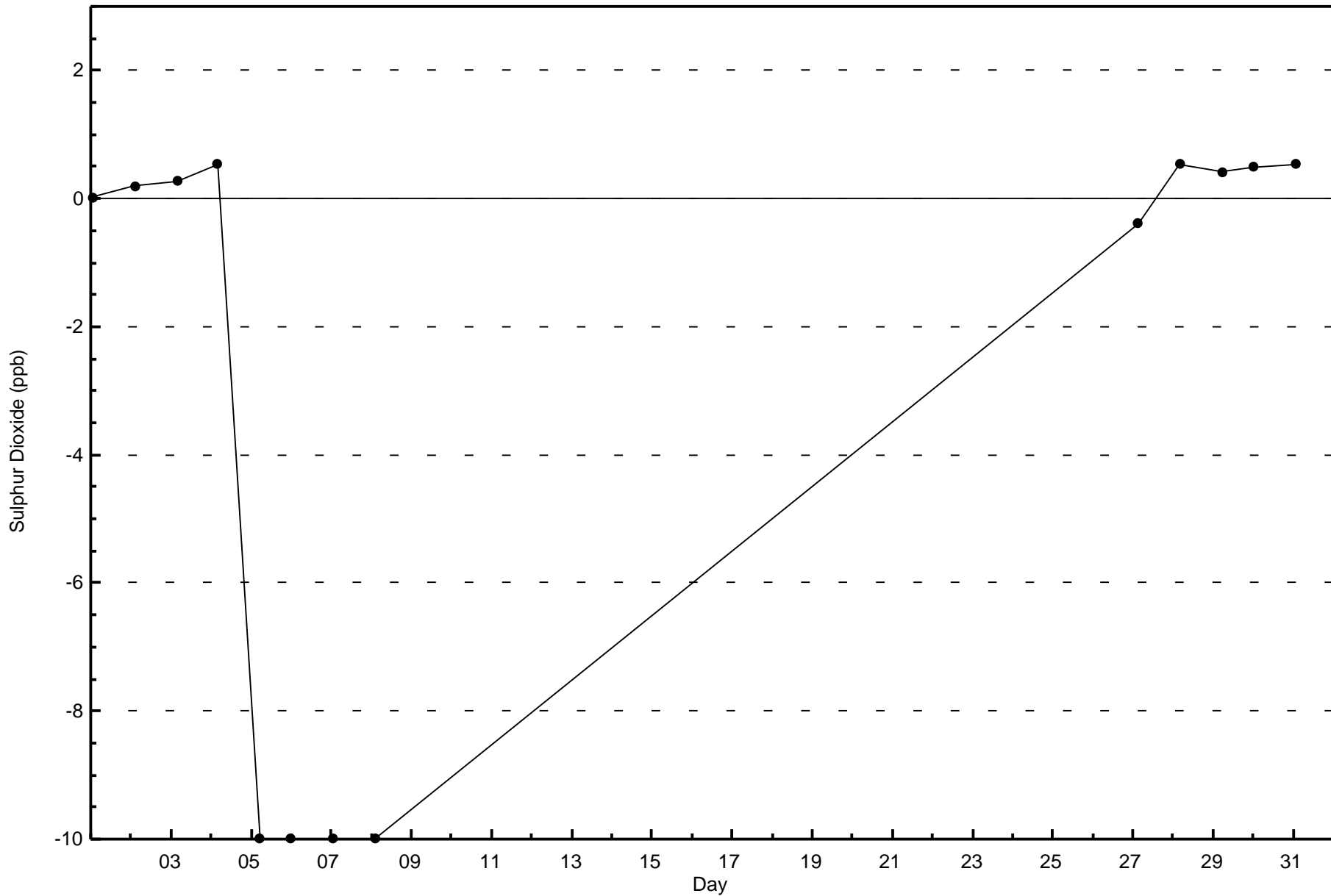
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)





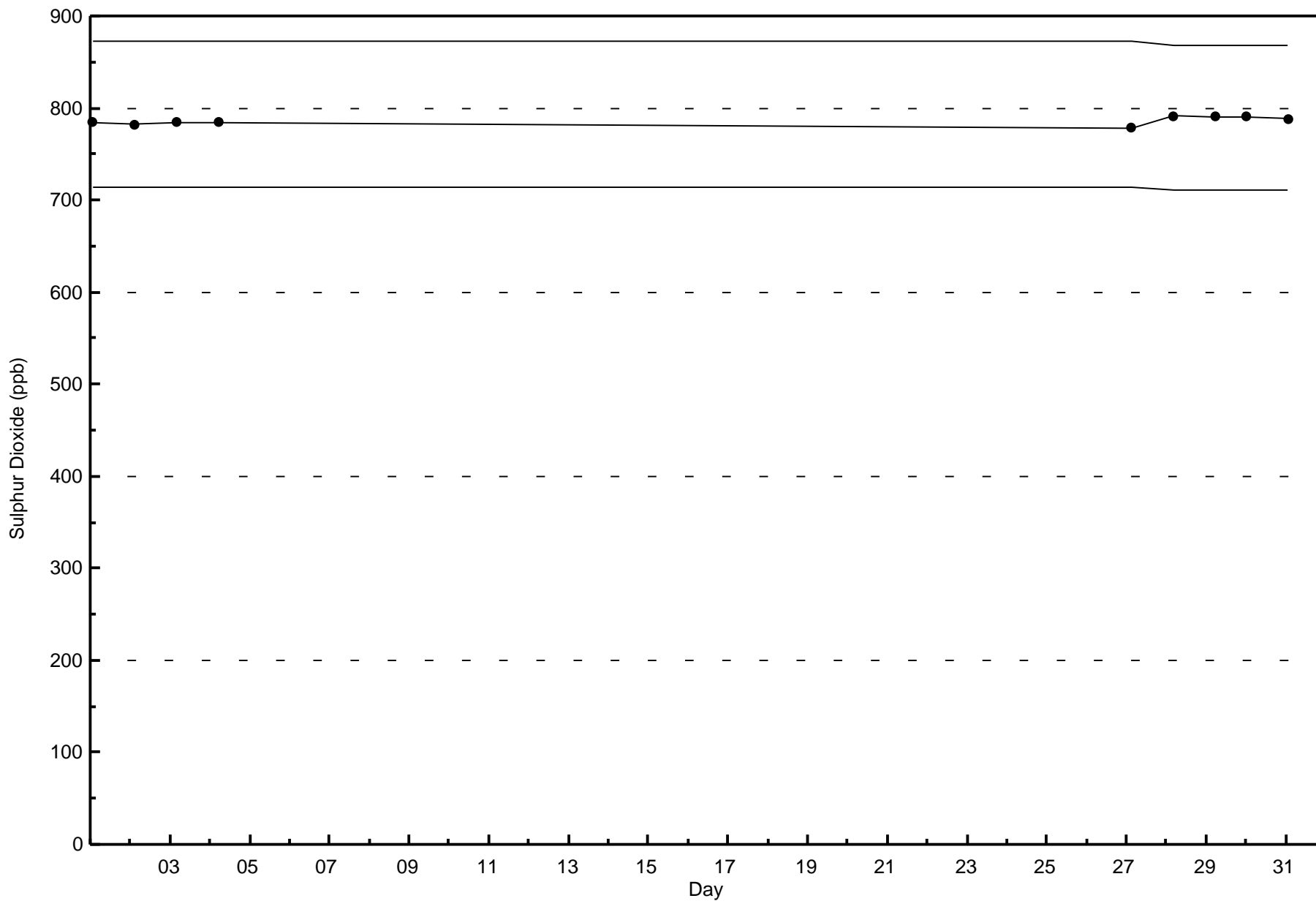


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO₂) - ppb

ConocoPhillips - Surmont - May 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

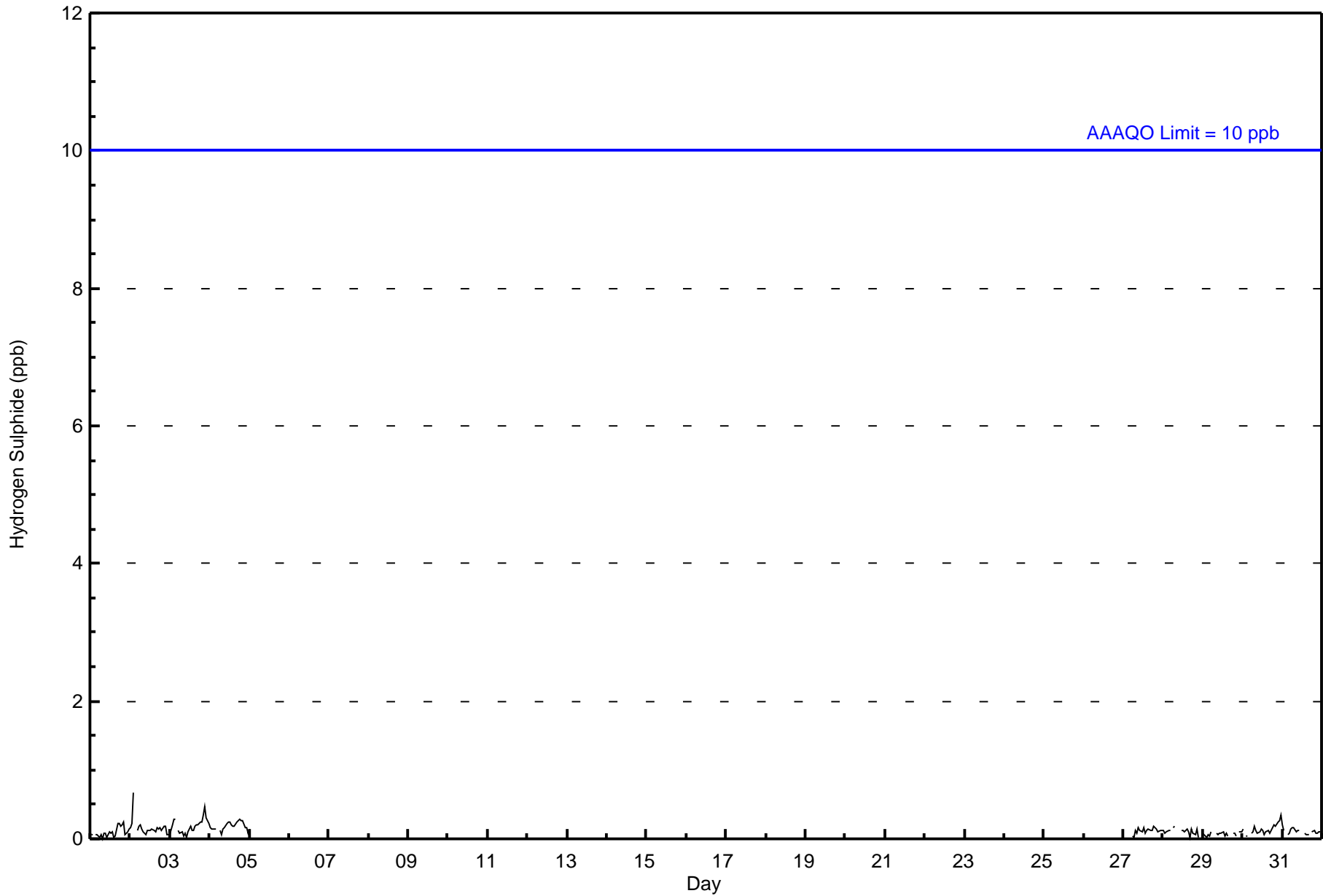
ConocoPhillips - Surmont - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily	Daily						
Maximum Value: 1 ppb on May 2 03:00										Maximum Daily Average: 0.2 ppb on May 3										Hours of Data: 191	Average	Maximum					
Minimum Value: 0 ppb on May 1 08:00										Minimum Daily Average: 0.1 ppb on May 29										Hours of Missing Data: 553							
Maximum Diurnal Average: 0.2 ppb at hour 3										Minimum Diurnal Average: 0.1 ppb at hour 9										Hours of Calibration: 12							
Monthly Average: 0.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0										Percent Operational Time: 27.3							
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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-May	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--
27-May	UO	UO	UO	UO	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-May	0	0	0	0	0	Z	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0.1	0
29-May	0	0	0	0	0	0	Z	UO	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0	UO	0	0	0.1	0
30-May	0	Z	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-May	0	0	Z	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	UO	0	0	0	0	0	0	0	0.1	0
0.1 0.1 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.1																								Diurnal Average			
0 0 1 0																								Diurnal Maximum			
Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	191	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: 191

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	7	5	2	7	10	5	16	13	9	14	12	25	12	19	14	20	190
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	5	2	7	10	5	16	13	9	14	12	25	12	19	14	20	190

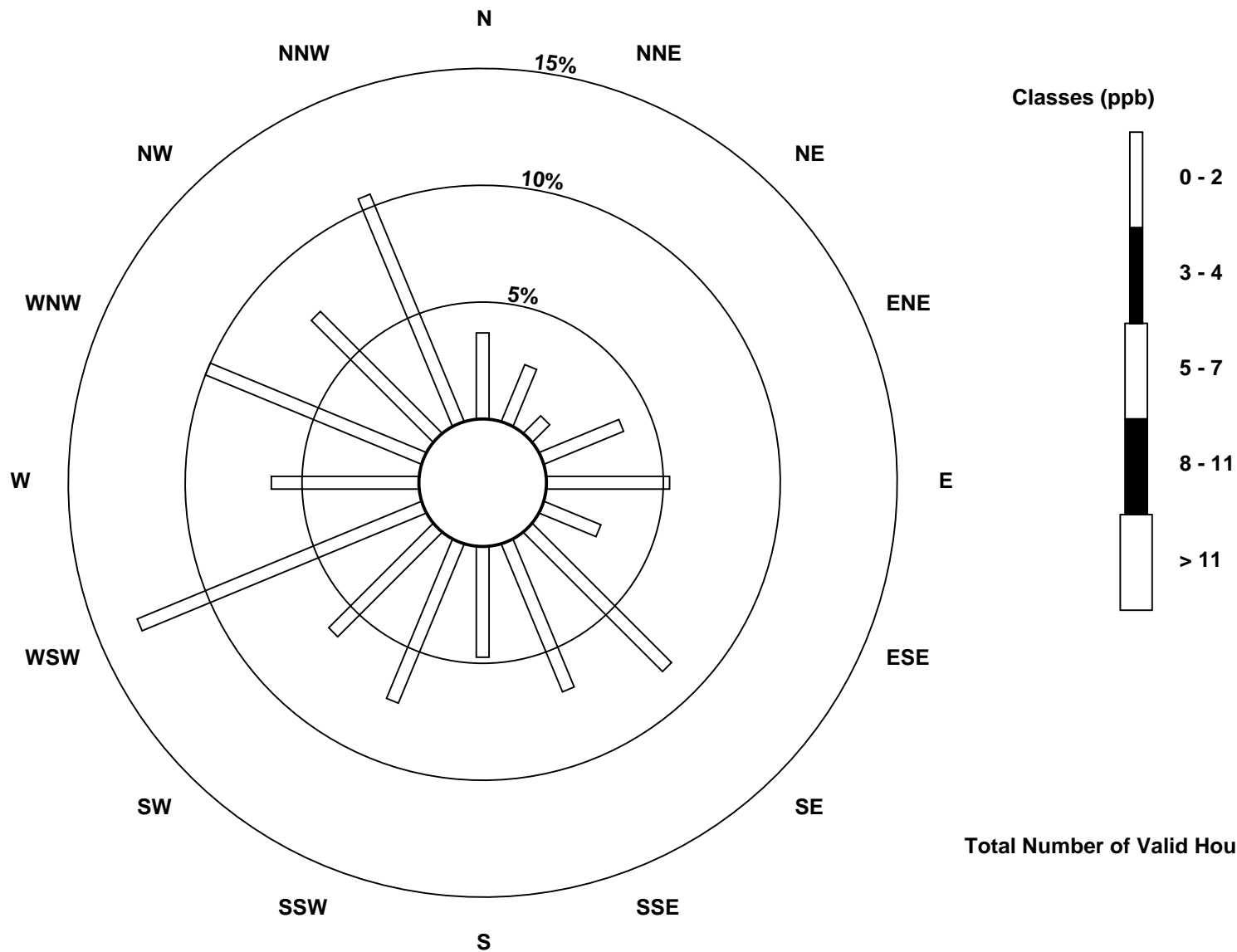
Total Number of Valid Hours: 190

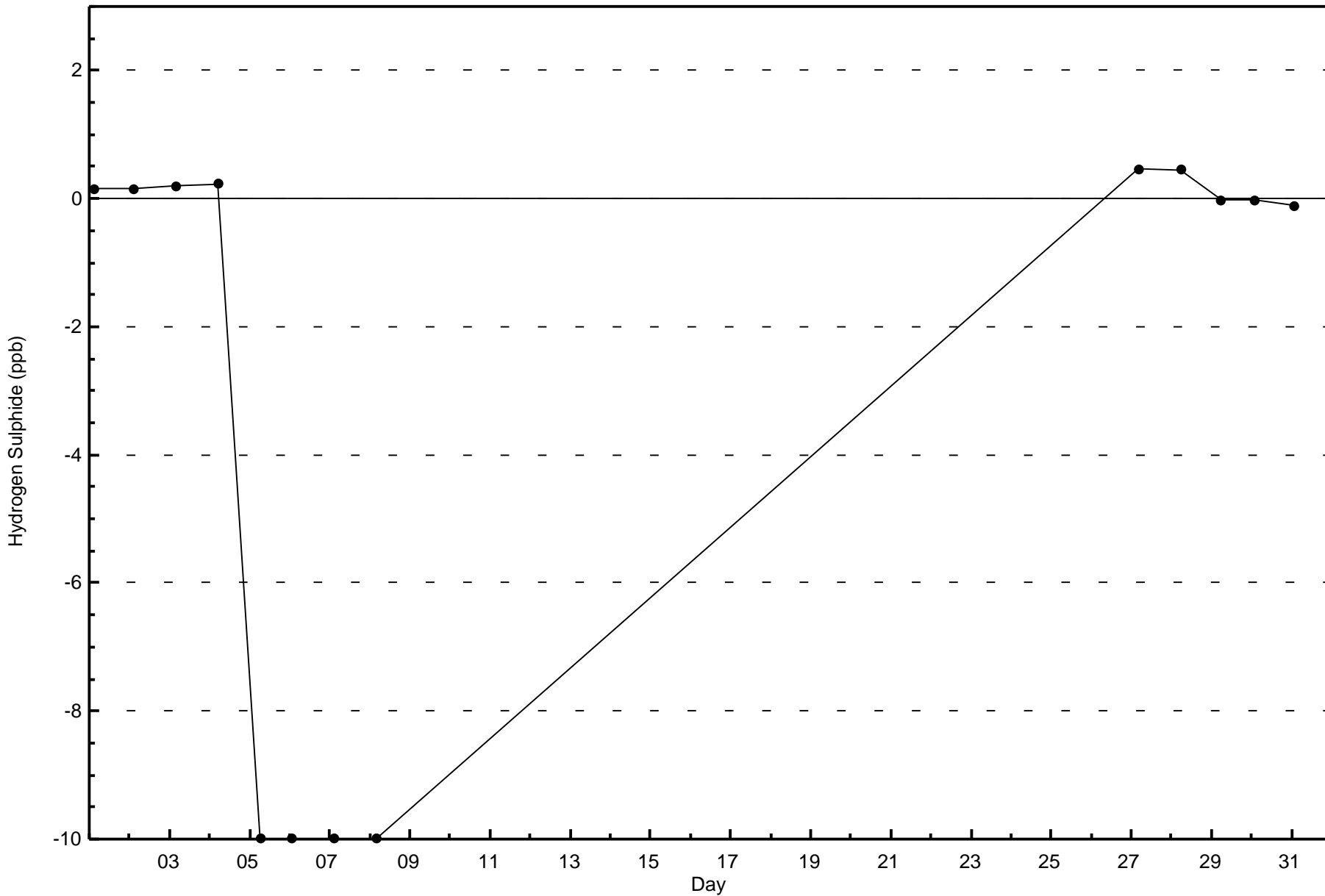
Total Number of Hours: 744

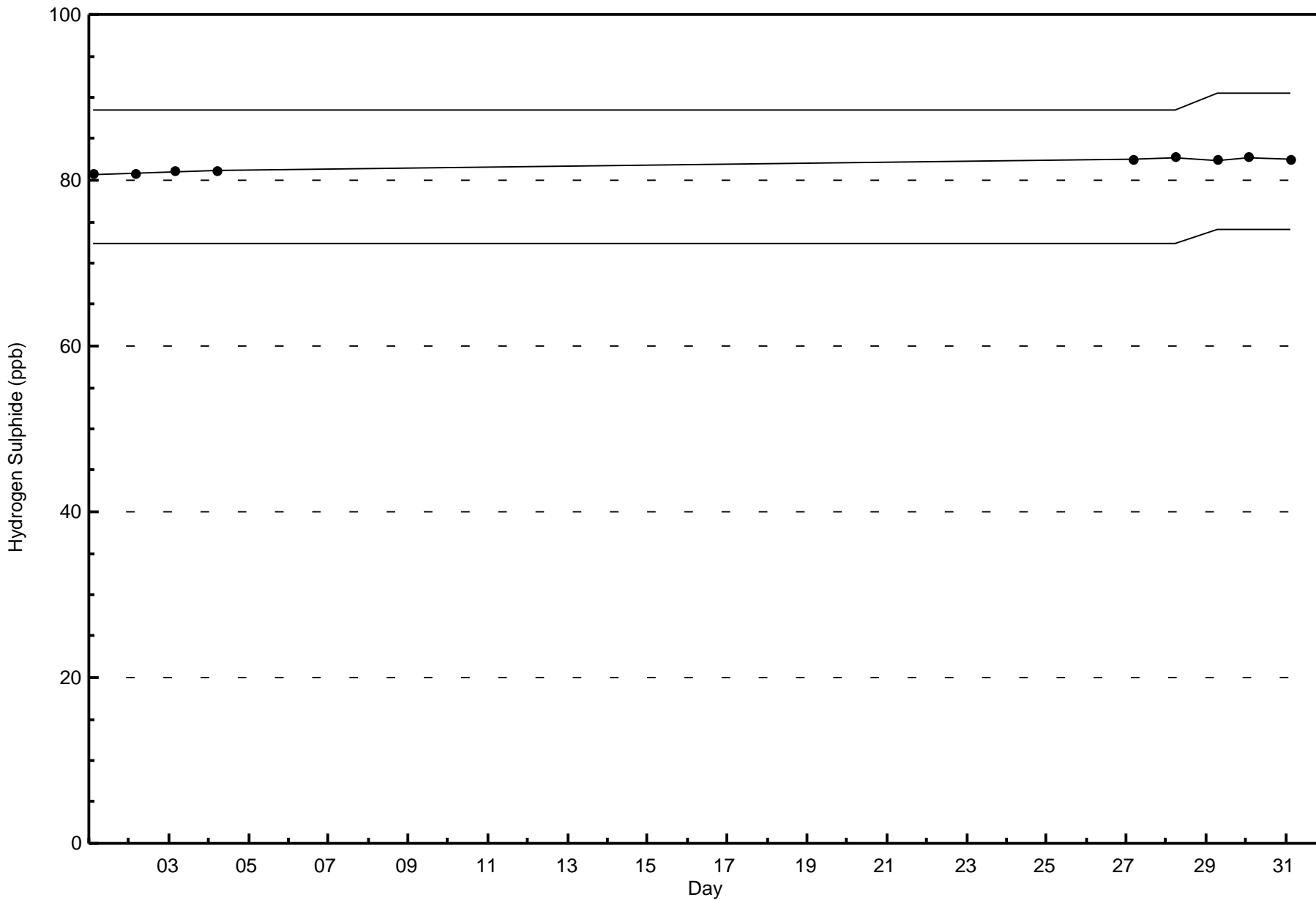


Wood Buffalo Environmental Association
Wind Rose May 2016

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

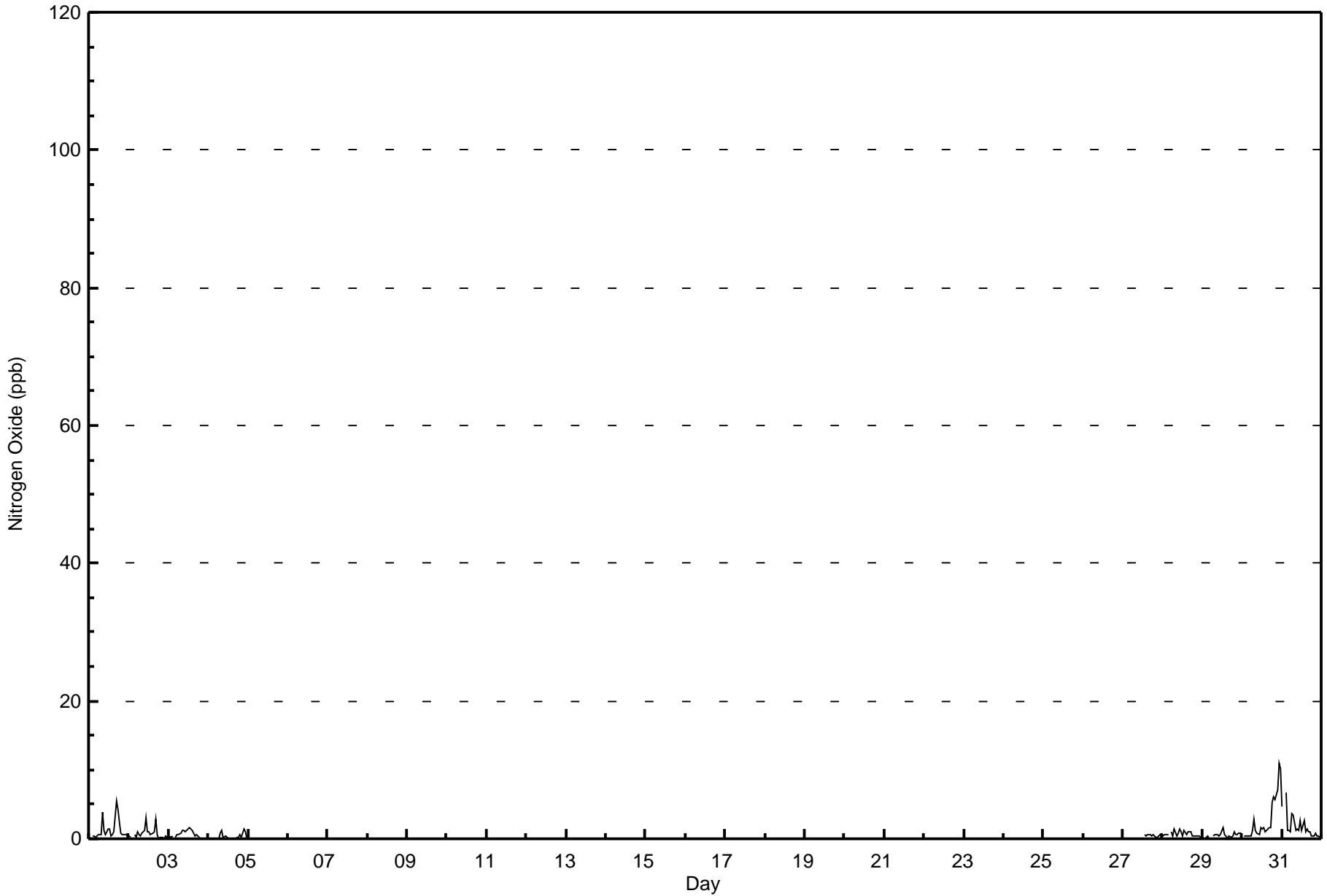
ConocoPhillips - Surmont - May 2016

Maximum Value: 11 ppb on May 30 23:00		Maximum Daily Average: 2.8 ppb on May 30		Hours in Service: 744																																												
Minimum Value: 0 ppb on May 2 22:00		Minimum Daily Average: 0.3 ppb on May 4		Hours of Data: 196																																												
Maximum Diurnal Average: 1.7 ppb at hour 23		Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Missing Data: 548																																												
Monthly Average: 1.0 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 10		Hours of Calibration: 13																																												
				Percent Operational Time: 28.1																																												
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-May	1	Z	0	0	0	1	1	1	4	1	1	1	2	0	1	1	6	4	2	1	1	1	1	1	1.3	6																						
2-May	0	0	Z	1	0	1	1	0	1	1	3	1	1	1	1	1	3	1	0	0	0	0	0	0	0.8	3																						
3-May	0	0	0	Z	0	1	1	1	1	1	1	1	2	2	1	1	0	1	0	0	0	0	0	0	0.6	2																						
4-May	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0.3	1																						
5-May	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0																						
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--																						
27-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	1	0	1	1	0	1	0	0	0	1	--	1																						
28-May	0	1	1	1	Z	1	0	1	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0.7	1																						
29-May	0	0	0	0	0	Z	0	1	1	1	0	1	2	1	0	0	0	0	0	1	1	1	1	1	0.5	2																						
30-May	Z	0	0	0	0	0	1	3	1	1	1	2	2	2	1	1	2	2	5	6	6	7	11	10	2.8	11																						
31-May	5	Z	7	1	1	1	4	3	1	1	1	3	1	3	1	1	1	1	0	0	1	0	0	0	1.7	7																						
																								0.9	0.2	1.2	0.5	0.4	0.7	0.9	1.4	1.3	1.0	1.1	1.2	1.1	1.0	0.7	0.8	1.5	1.1	1.1	1.1	1.0	1.2	1.7	1.4	Diurnal Average
																								5	1	7	1	1	1	4	3	4	1	3	3	2	3	1	1	6	4	5	6	6	7	11	10	Diurnal Maximum
Z - zerospan																								C - Calibration				UO - Unstable Operation				PF - Power Failure																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	196	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: 196

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	5	2	9	10	2	13	16	10	14	11	26	12	20	16	20	195
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	9	5	2	9	10	2	13	16	10	14	11	26	12	20	16	20	195

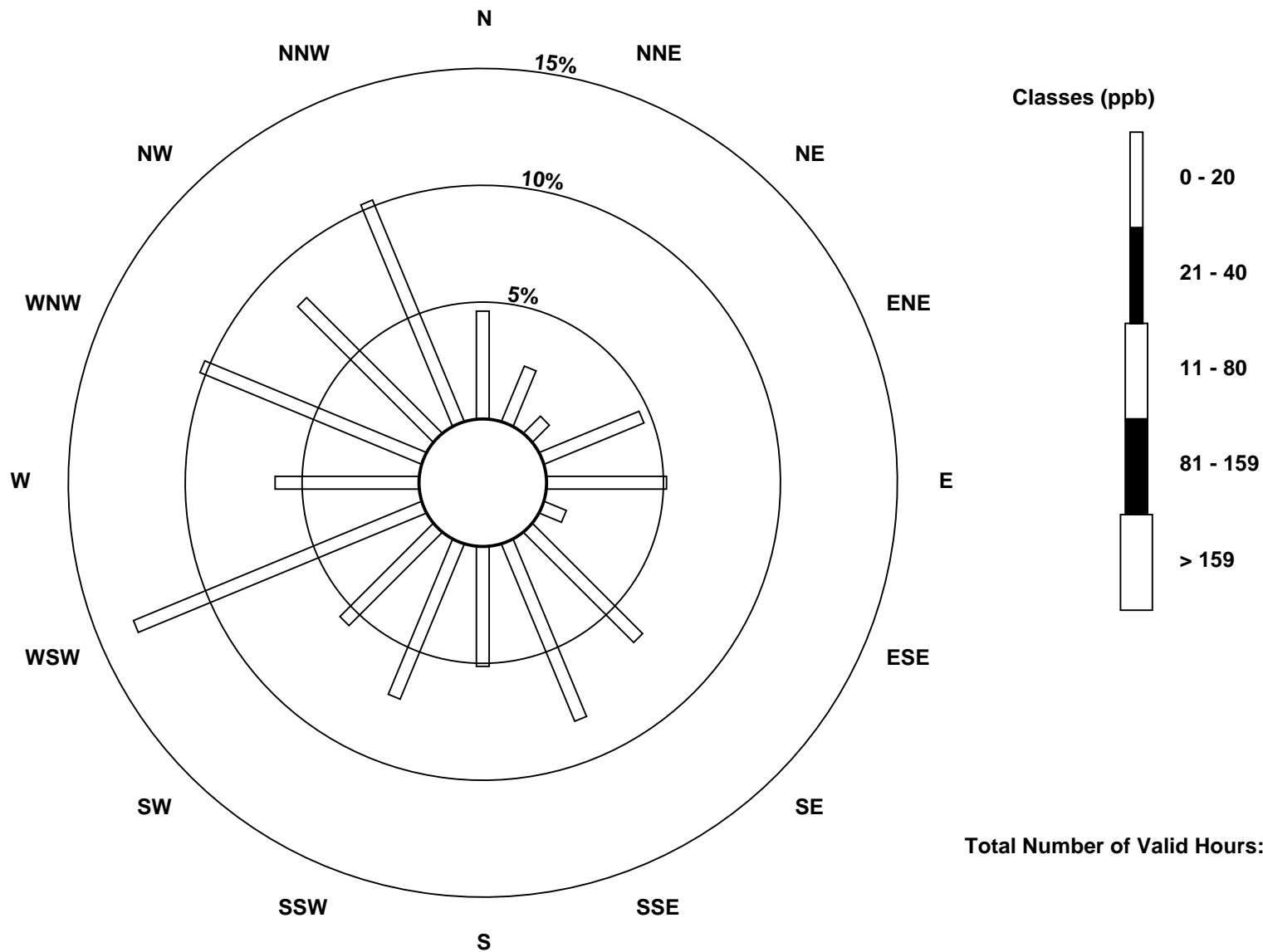
Total Number of Valid Hours: 195

Total Number of Hours: 744

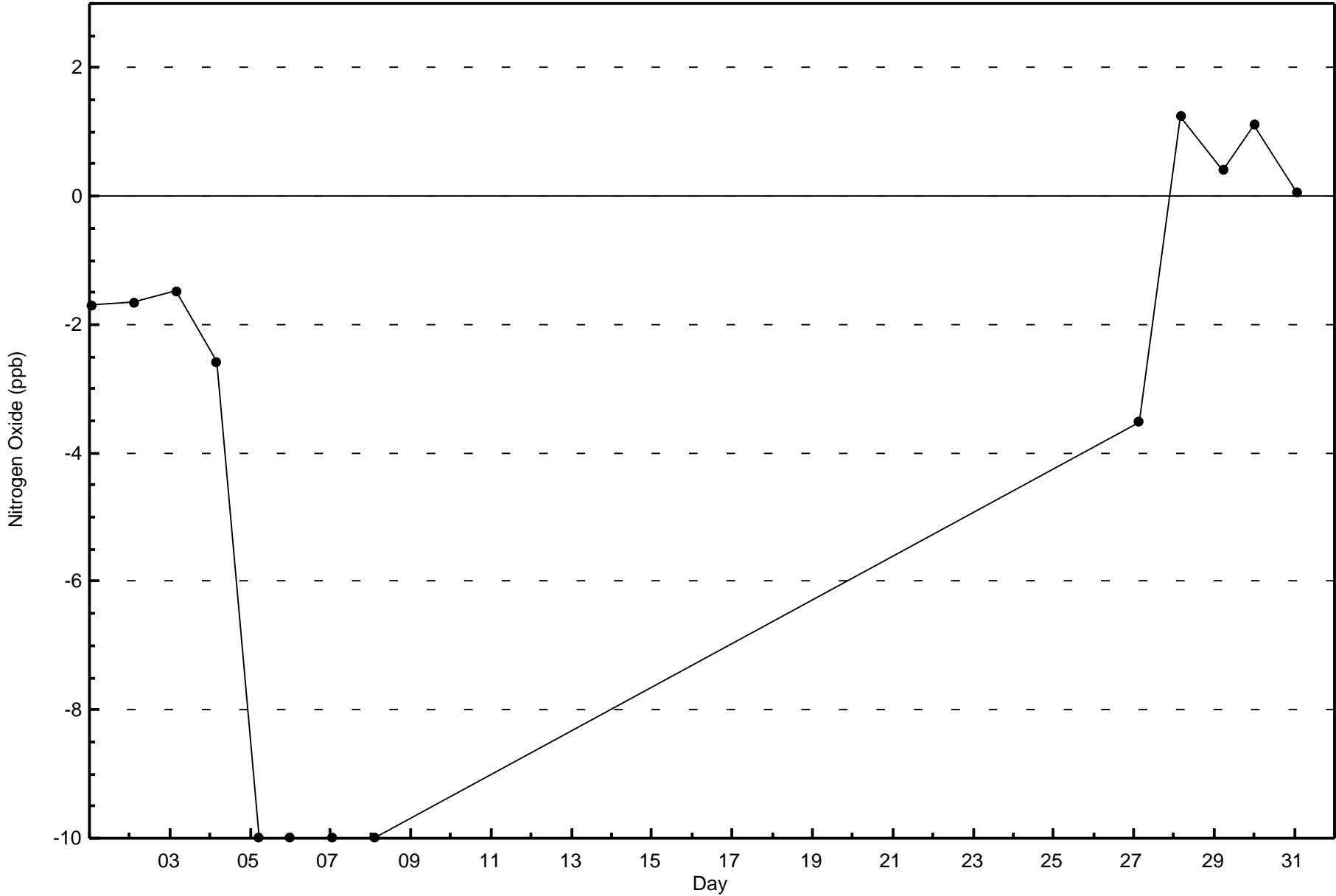


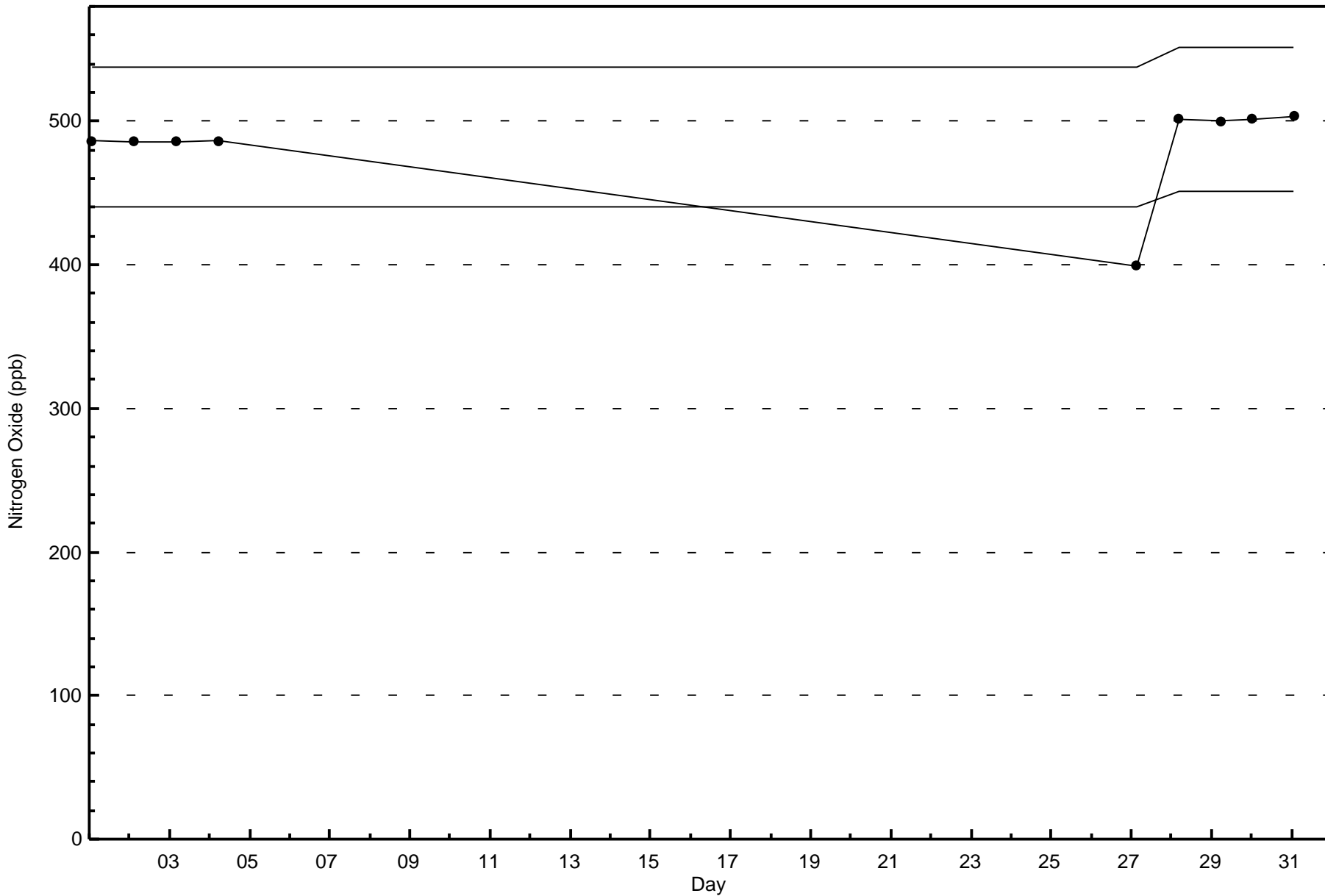
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 195







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

ConocoPhillips - Surmont - May 2016

Number of Exceedences (AAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 9 ppb on May 30 23:00	Maximum Daily Average: 2.9 ppb on May 30		Hours of Data:	196
Minimum Value: 0 ppb on May 5 01:00	Minimum Daily Average: 0.7 ppb on May 29		Hours of Missing Data:	548
Maximum Diurnal Average: 1.8 ppb at hour 23	Minimum Diurnal Average: 0.6 ppb at hour 4		Hours of Calibration:	13
Monthly Average: 1.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7		Percent Operational Time:	28.1

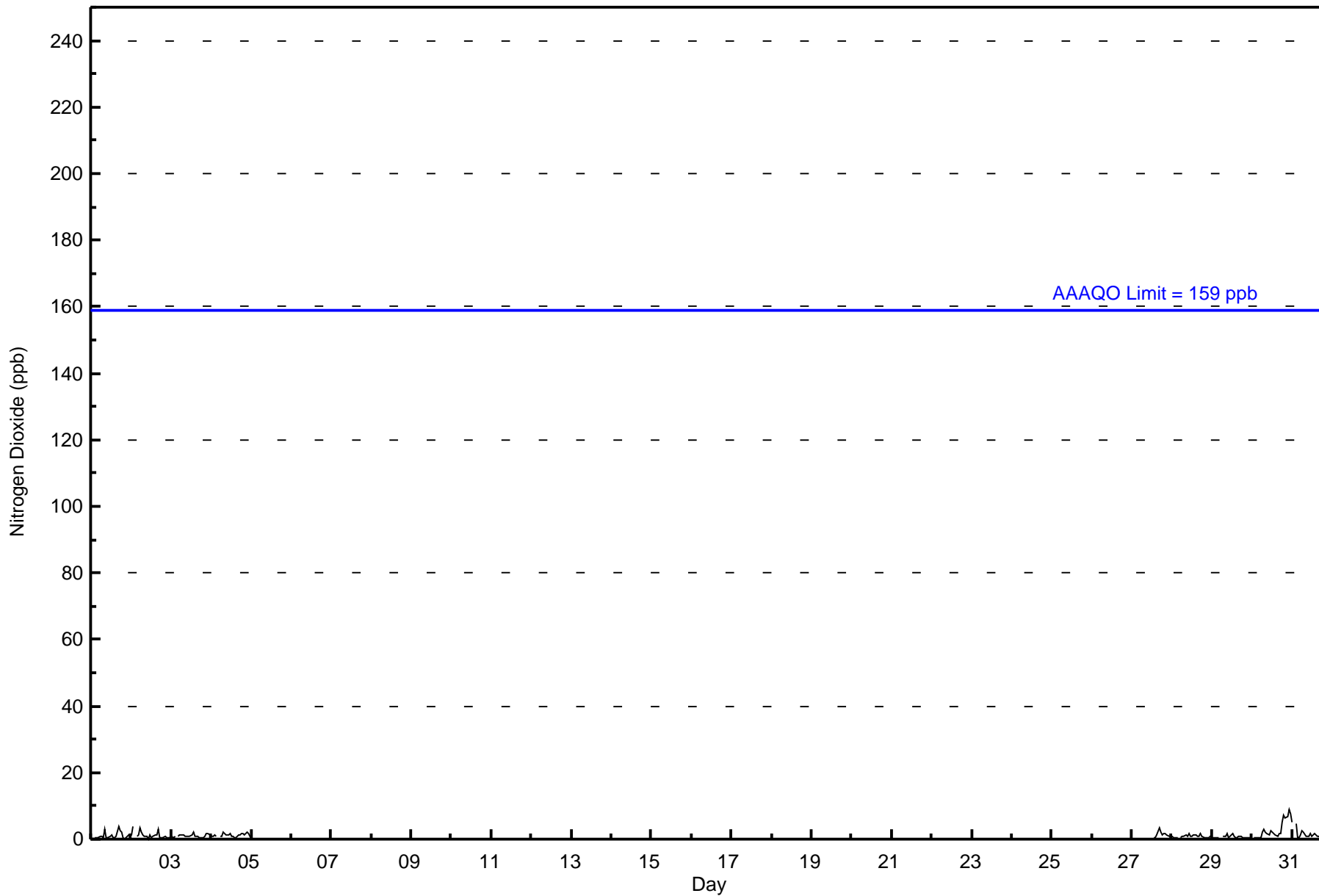
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	1	Z	1	1	1	1	1	0	3	0	0	1	1	0	0	1	4	3	2	0	0	0	1	1	1.0	4																						
2-May	1	4	Z	1	1	3	2	1	1	1	0	1	1	1	1	1	3	1	1	1	1	0	0	1	1.2	4																						
3-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0	1	2	2	1	1.0	2																						
4-May	1	1	1	1	Z	1	1	2	2	1	1	2	1	0	0	1	1	2	2	1	2	2	1	1	1.2	2																						
5-May	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0																						
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--																						
27-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	1	1	1	3	2	1	2	2	1	1	--	3																						
28-May	1	1	0	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	0.9	2																						
29-May	0	1	1	1	0	Z	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0.7	2																						
30-May	Z	1	0	0	0	1	2	3	2	2	1	3	2	2	1	1	2	2	5	7	6	7	9	8	2.9	9																						
31-May	5	Z	5	1	1	1	3	2	1	1	1	2	1	2	1	1	1	1	1	0	1	1	0	0	1.3	5																						
																								1.2	1.2	1.3	0.6	0.7	1.2	1.4	1.5	1.4	1.0	0.8	1.4	1.2	1.1	0.8	0.9	1.8	1.3	1.5	1.5	1.4	1.6	1.8	1.5	Diurnal Average
																								5	4	5	1	1	3	3	3	3	2	2	3	2	2	1	1	4	3	5	7	6	7	9	8	Diurnal Maximum

Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	196	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: 196

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	5	2	9	10	2	13	16	10	14	11	26	12	20	16	20	195
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	9	5	2	9	10	2	13	16	10	14	11	26	12	20	16	20	195

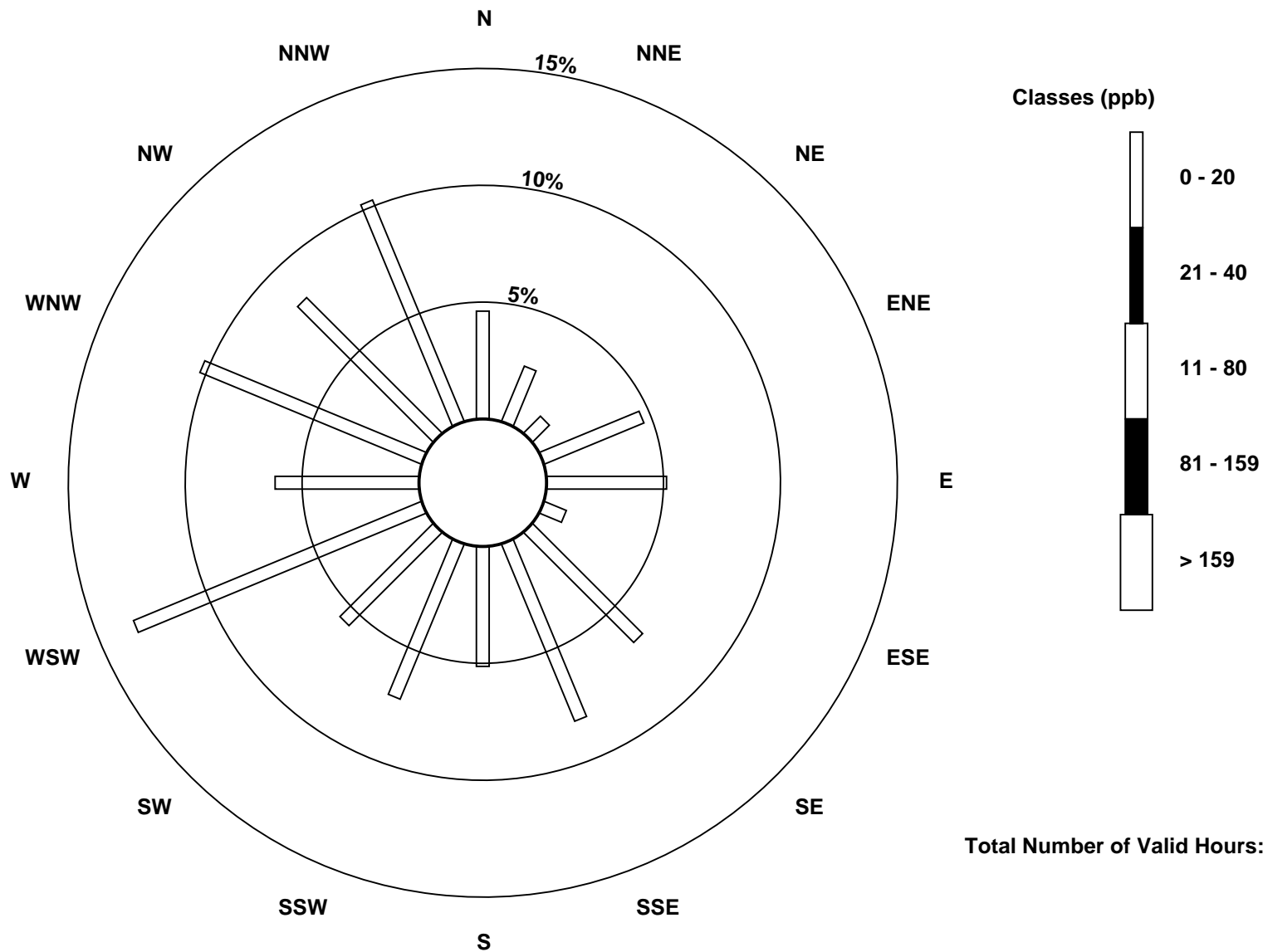
Total Number of Valid Hours: 195

Total Number of Hours: 744

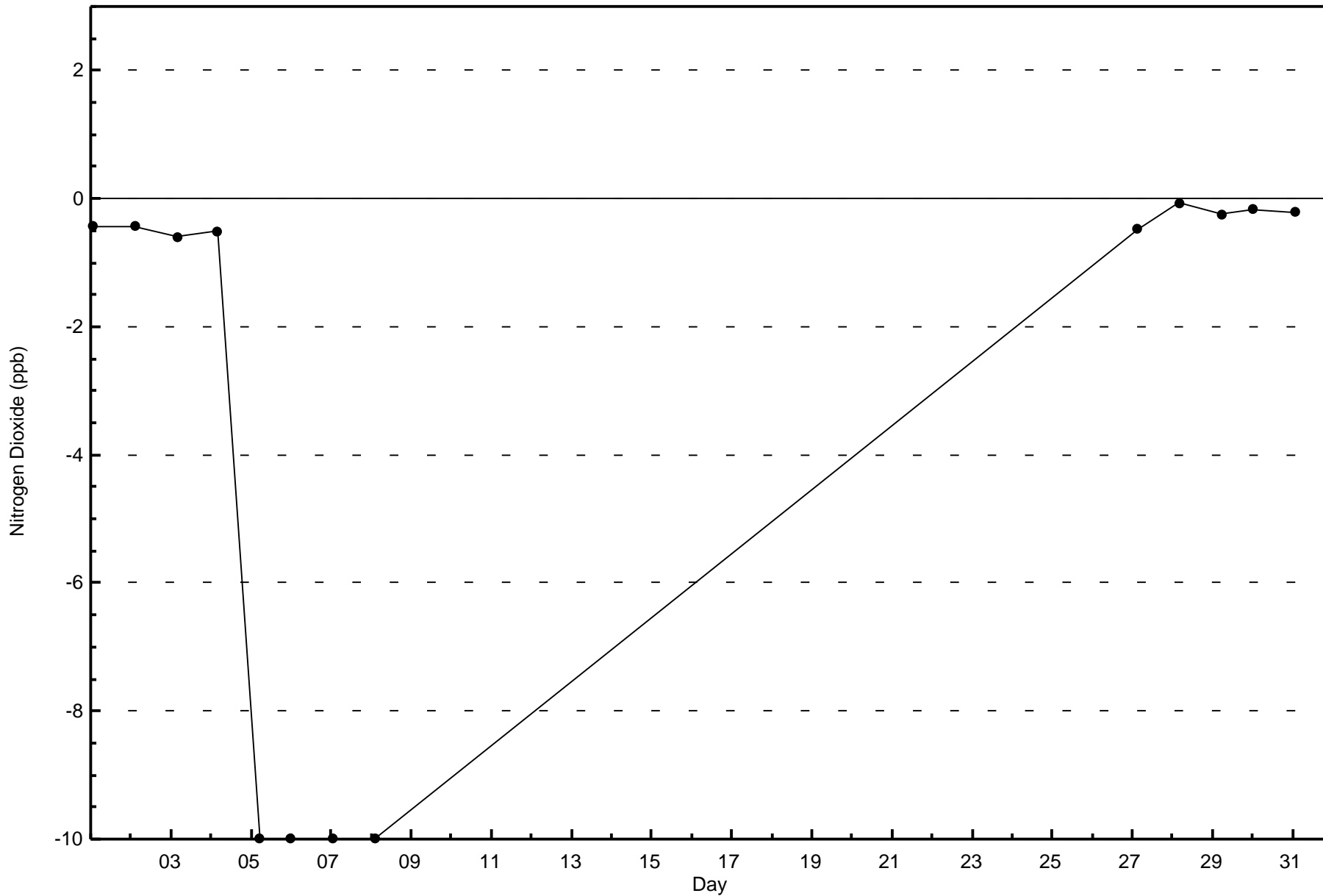


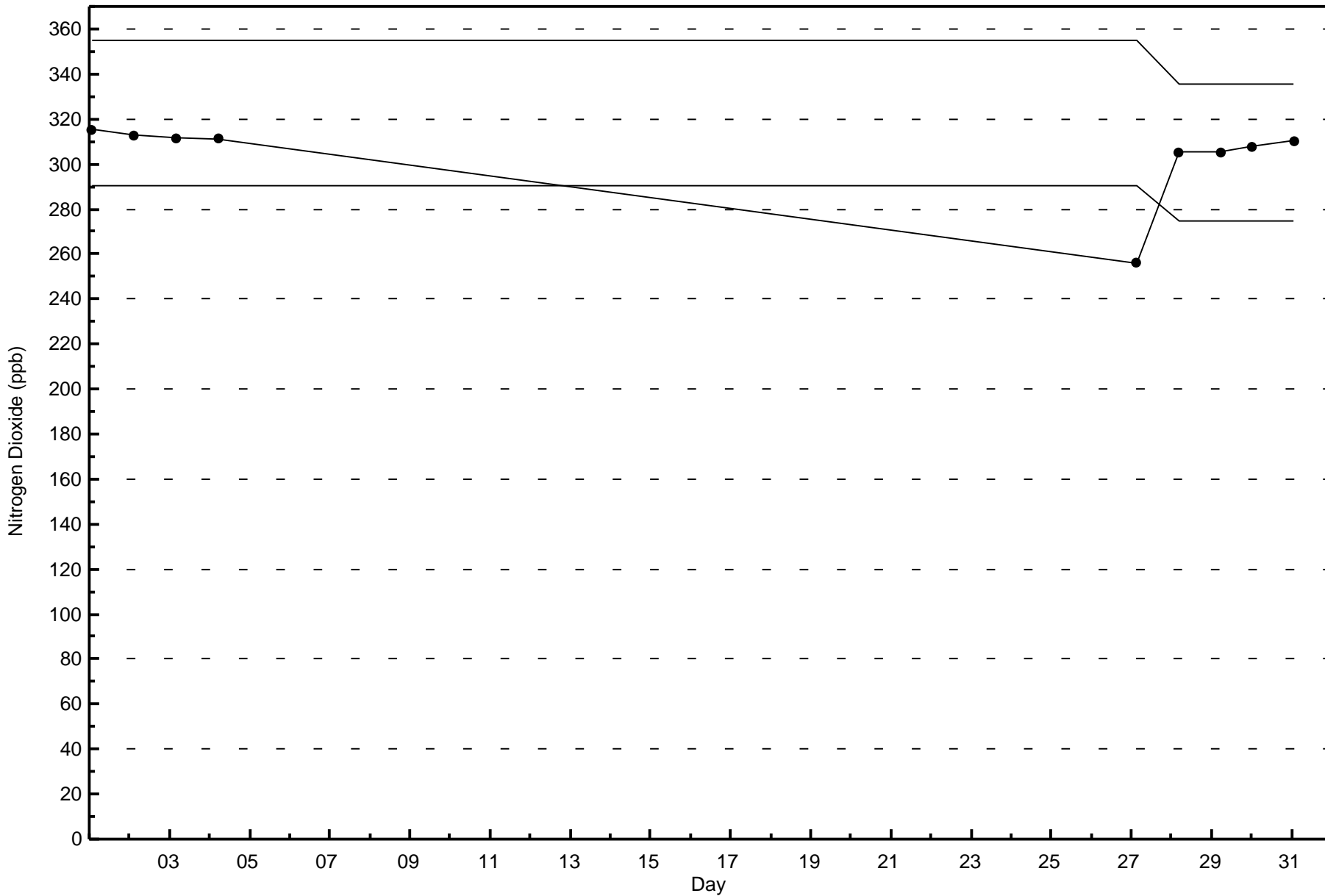
Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 195







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

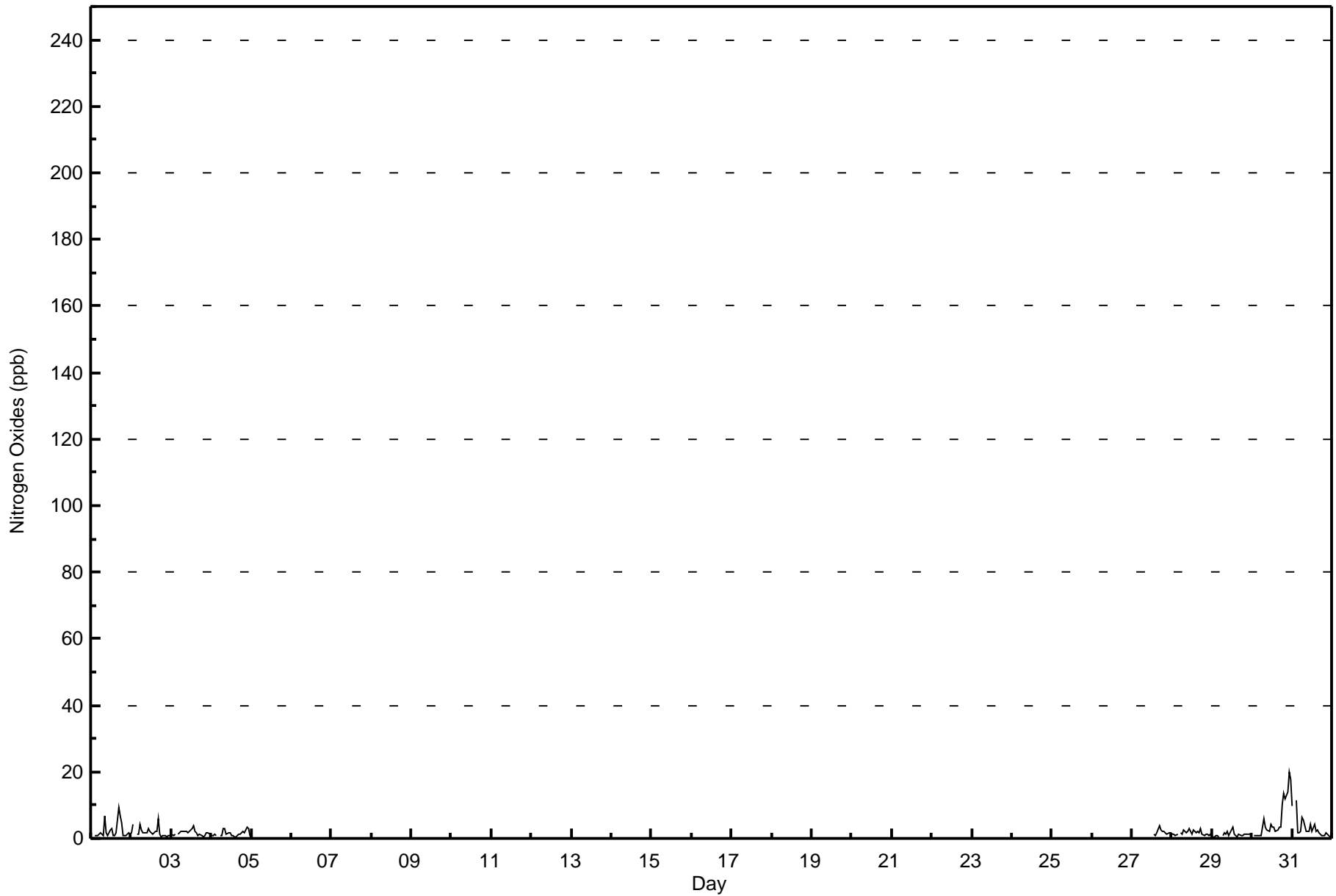
ConocoPhillips - Surmont - May 2016

Maximum Value: 20 ppb on May 30 23:00		Maximum Daily Average: 5.7 ppb on May 30		Hours in Service: 744																																												
Minimum Value: 0 ppb on May 5 01:00		Minimum Daily Average: 1.2 ppb on May 29		Hours of Data: 196																																												
Maximum Diurnal Average: 3.5 ppb at hour 23		Minimum Diurnal Average: 1.0 ppb at hour 5		Hours of Missing Data: 548																																												
Monthly Average: 2.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 17		Hours of Calibration: 13																																												
				Percent Operational Time: 28.1																																												
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-May	2	Z	1	1	1	2	1	1	7	2	1	2	3	1	1	2	9	7	5	1	1	1	2	1	2.3	9																						
2-May	2	4	Z	1	1	4	3	2	2	2	3	2	2	1	2	2	6	1	0	1	1	0	1	1	1.9	6																						
3-May	1	1	1	Z	1	2	2	2	2	2	2	3	4	2	2	1	1	1	0	1	2	2	1	1.6	4																							
4-May	1	1	1	1	Z	1	1	3	3	1	2	1	1	0	0	1	1	2	2	3	3	1	1	1.4	3																							
5-May	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0																						
6-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
7-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
8-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																						
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--																						
27-May	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	1	1	2	4	3	2	2	1	2	2	--	4																						
28-May	1	1	1	1	Z	2	1	2	2	2	3	2	1	3	2	2	2	3	1	1	1	1	1	1	1.6	3																						
29-May	0	1	1	1	0	Z	1	2	1	2	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1.2	3																						
30-May	Z	1	1	1	1	1	3	6	3	2	2	4	3	3	2	2	3	3	10	13	12	14	20	18	5.7	20																						
31-May	10	Z	11	2	2	2	6	6	2	2	2	4	2	4	2	2	2	1	1	1	2	1	1	1	3.0	11																						
																								2.1	1.4	2.5	1.1	1.0	1.9	2.3	2.9	2.8	1.9	1.9	2.6	2.3	2.1	1.4	1.7	3.2	2.4	2.6	2.6	2.4	2.7	3.5	2.9	Diurnal Average
																								10	4	11	2	2	4	6	6	7	2	3	4	3	4	2	2	9	7	10	13	12	14	20	18	Diurnal Maximum
Z - zerospan																								C - Calibration				UO - Unstable Operation				PF - Power Failure																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	196	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: 196

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	5	2	9	10	2	13	16	10	14	11	26	12	20	16	20	195
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	9	5	2	9	10	2	13	16	10	14	11	26	12	20	16	20	195

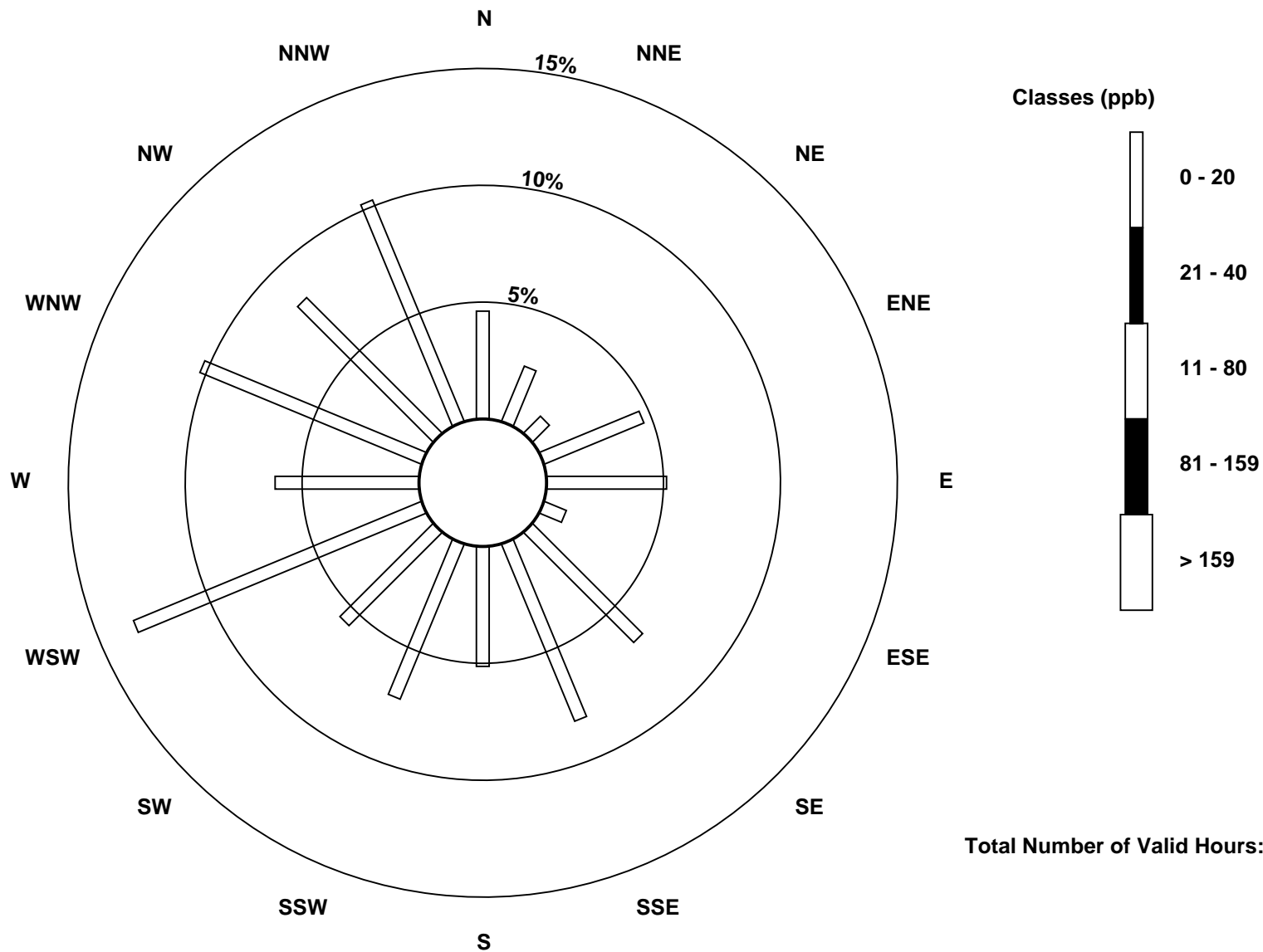
Total Number of Valid Hours: 195

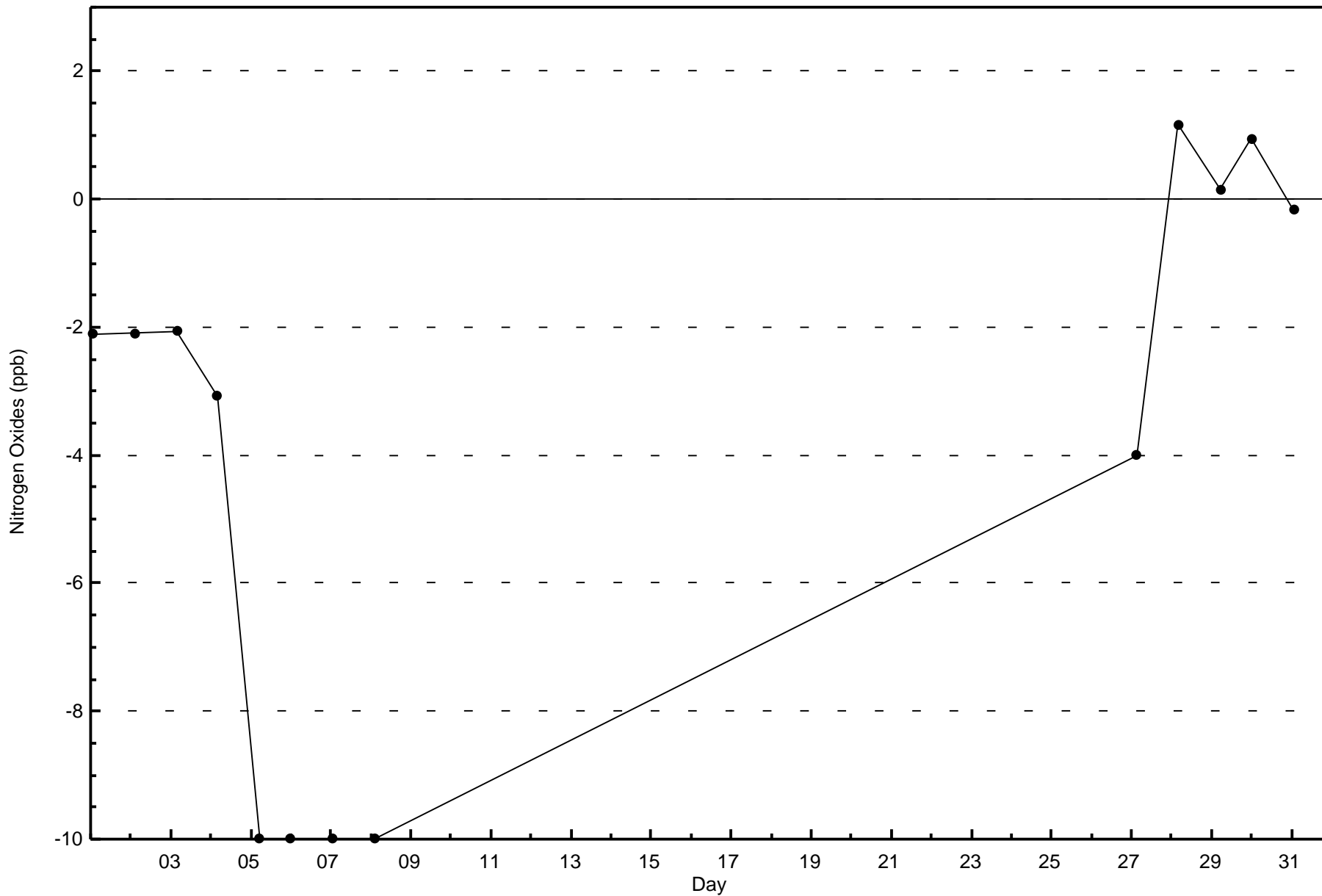
Total Number of Hours: 744

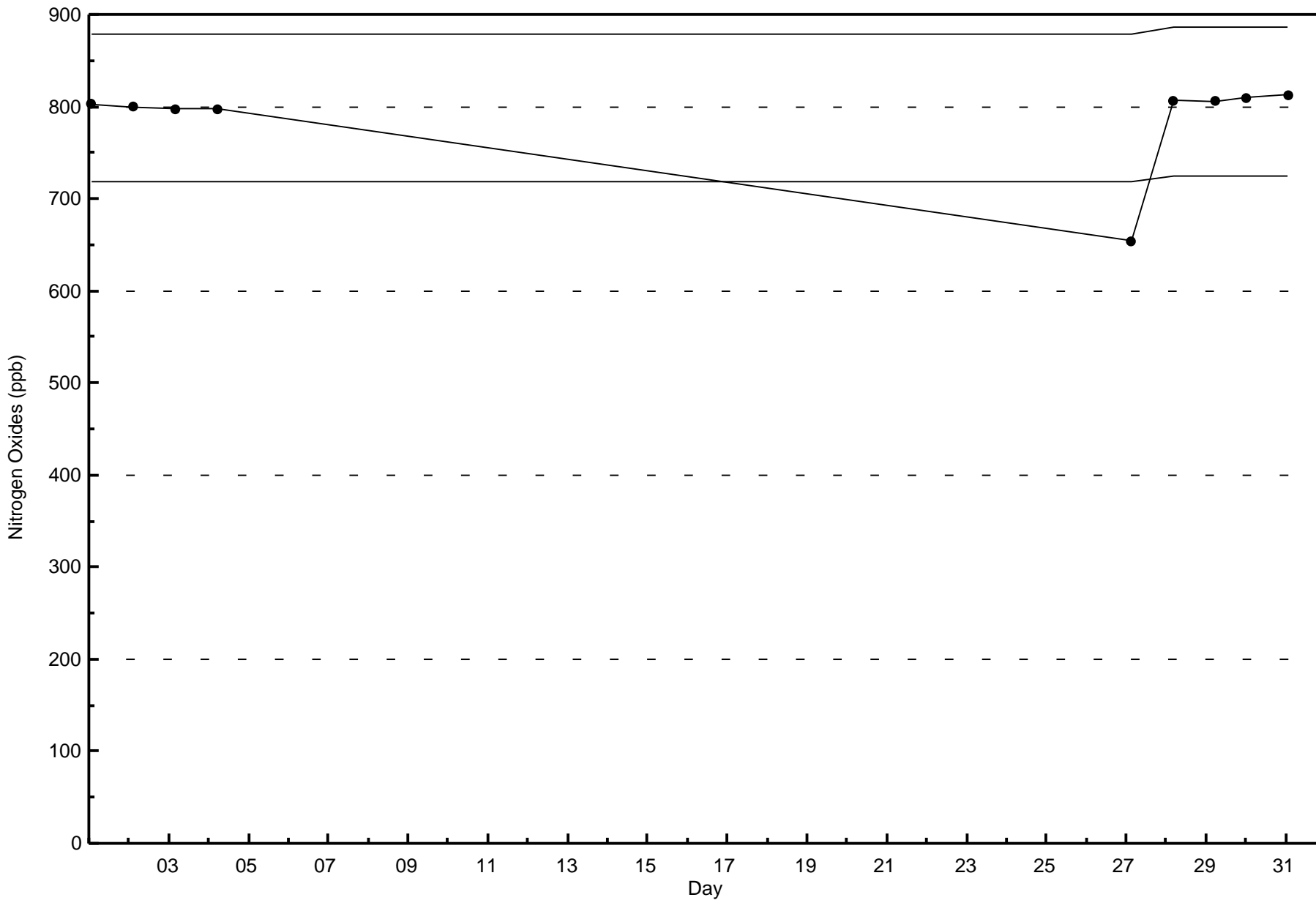


Wood Buffalo Environmental Association
Wind Rose May 2016

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)









Wood Buffalo Environmental Association
Summary of Hour Averages

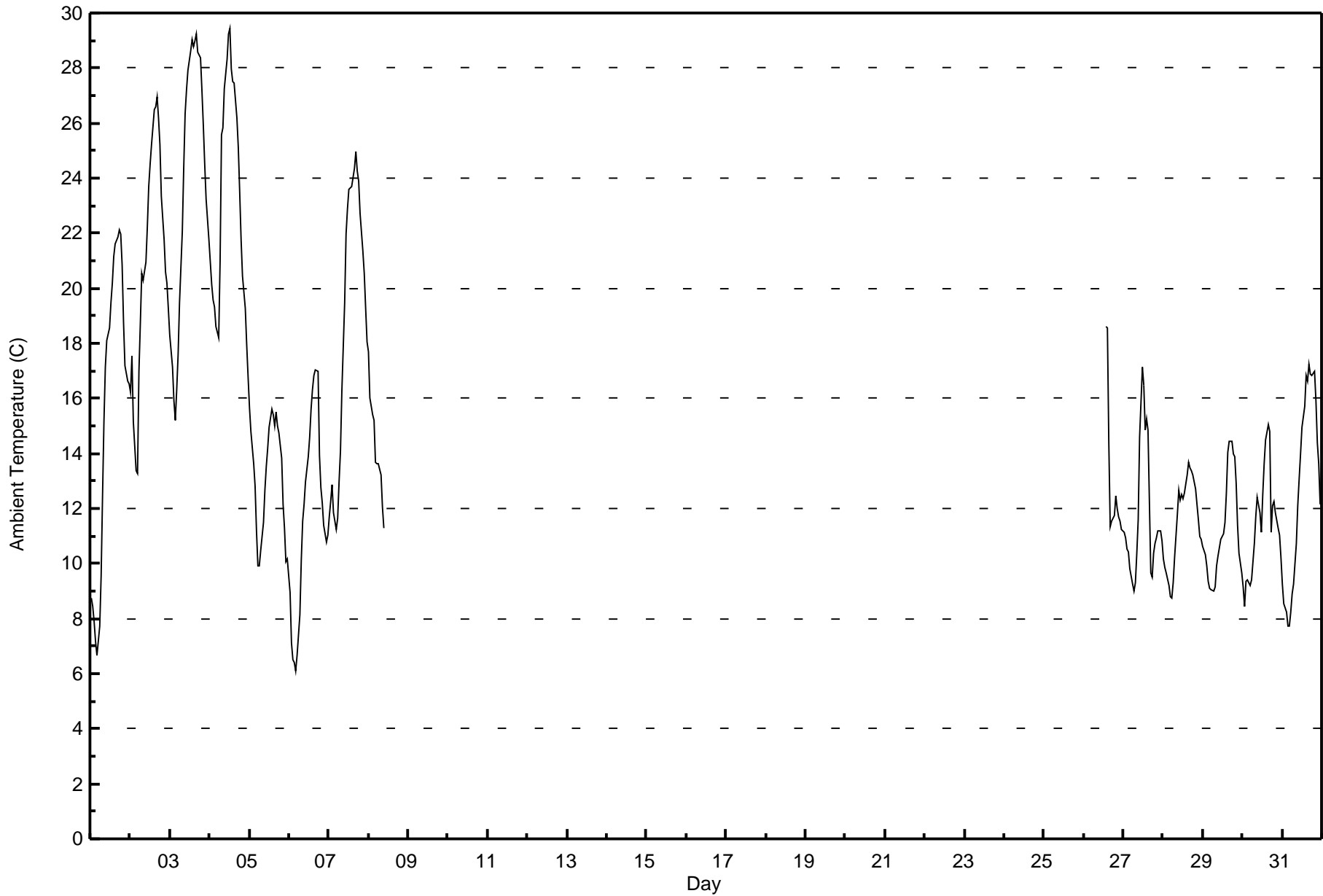
Ambient Temperature (AT) - C
ConocoPhillips - Surmont - May 2016

Maximum Value: 29.4 C on May 4 13:00 Maximum Daily Average: 23.8 C on May 3																				Hours in Service: 744 Hours of Data: 309 Hours of Missing Data: 435 Hours of Calibration: 0 Percent Operational Time: 41.5						
Minimum Value: 6.1 C on May 6 05:00 Minimum Daily Average: 11.2 C on May 29 Maximum Diurnal Average: 19.2 C at hour 15 Minimum Diurnal Average: 10.9 C at hour 5 Monthly Average: 15.35 C Percentiles: P ₁ = 6.6 P ₁₀ = 9.3 Q ₁ = 11.0 Median = 13.7 Q ₃ = 19.2 P ₉₀ = 24.3 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-May	8.8	8.5	7.9	7.2	6.7	7.7	9.6	12.5	15.1	17.1	18.1	18.5	19.5	20.2	21.1	21.6	21.9	22.1	22.0	20.9	18.8	17.2	16.6	16.5	15.7	22.1
2-May	16.2	17.5	15.1	13.4	13.3	17.0	18.7	20.5	20.3	20.9	22.2	23.7	24.5	25.2	26.5	26.6	27.0	26.2	25.2	23.3	21.8	20.6	20.2	19.3	21.0	27.0
3-May	18.3	17.1	15.9	15.2	16.3	17.6	19.5	22.1	24.4	26.3	27.2	27.9	28.6	29.0	28.8	29.0	29.2	28.6	28.4	27.2	25.9	24.5	23.2	21.8	23.8	29.2
4-May	20.9	20.1	19.6	19.3	18.6	18.2	21.0	25.6	25.8	27.3	28.3	29.2	29.4	28.0	27.5	27.4	26.2	25.1	23.5	21.7	20.4	19.3	17.9	16.8	23.2	29.4
5-May	15.7	14.8	13.6	12.8	11.2	9.9	9.9	10.5	11.5	12.7	13.5	14.2	14.9	15.6	15.4	15.0	15.5	15.0	14.7	13.8	12.1	11.3	10.1	10.2	13.1	15.7
6-May	9.0	7.1	6.5	6.4	6.1	6.7	8.1	10.1	11.6	12.1	13.0	13.9	14.6	15.6	16.3	16.8	17.0	17.0	14.0	12.8	12.2	11.4	10.8	11.1	11.7	17.0
7-May	11.7	12.3	12.8	11.9	11.2	11.6	13.0	14.1	16.3	19.5	21.9	22.9	23.6	23.6	23.7	24.3	25.0	24.3	23.9	22.7	21.3	20.6	19.3	18.1	18.7	25.0
8-May	17.7	16.0	15.4	15.2	13.7	13.6	13.6	13.2	12.1	11.3	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	17.7
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	18.6	18.6	14.4	11.3	11.6	11.8	12.5	12.0	11.7	11.6	11.2	--	18.6
27-May	11.1	10.9	10.5	10.4	9.8	9.3	9.0	9.3	10.4	11.6	14.6	17.2	16.5	14.9	15.3	14.9	9.7	9.5	10.4	10.7	10.9	11.2	11.2	10.8	11.7	17.2
28-May	10.2	9.9	9.7	9.2	8.8	8.7	9.3	10.2	11.8	12.6	12.3	12.5	12.4	12.5	13.2	13.7	13.5	13.4	13.2	12.7	12.1	11.6	11.0	10.9	11.5	13.7
29-May	10.6	10.3	9.9	9.4	9.1	9.0	9.0	9.2	9.9	10.3	10.6	10.9	11.1	11.5	12.6	14.0	14.5	14.4	14.0	13.9	12.9	11.4	10.4	9.7	11.2	14.5
30-May	9.2	8.4	9.3	9.4	9.2	9.4	10.0	10.7	11.7	12.4	11.8	11.2	12.5	13.6	14.5	15.1	14.8	11.2	12.1	12.2	11.9	11.3	11.0	10.2	11.4	15.1
31-May	9.3	8.5	8.3	7.7	7.7	8.3	8.9	9.2	10.7	12.1	13.1	14.0	15.0	15.7	16.8	16.6	17.2	16.9	16.8	17.0	15.9	14.4	13.6	12.2	12.7	17.2
																								Diurnal Average		
																								Diurnal Maximum		
PF - Power Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - May 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
ConocoPhillips - Surmont - May 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	50	16.18	16.18
10 - 20	190	61.49	77.67
> 20	69	22.33	100.00

Total Number of Valid Hours: 309

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

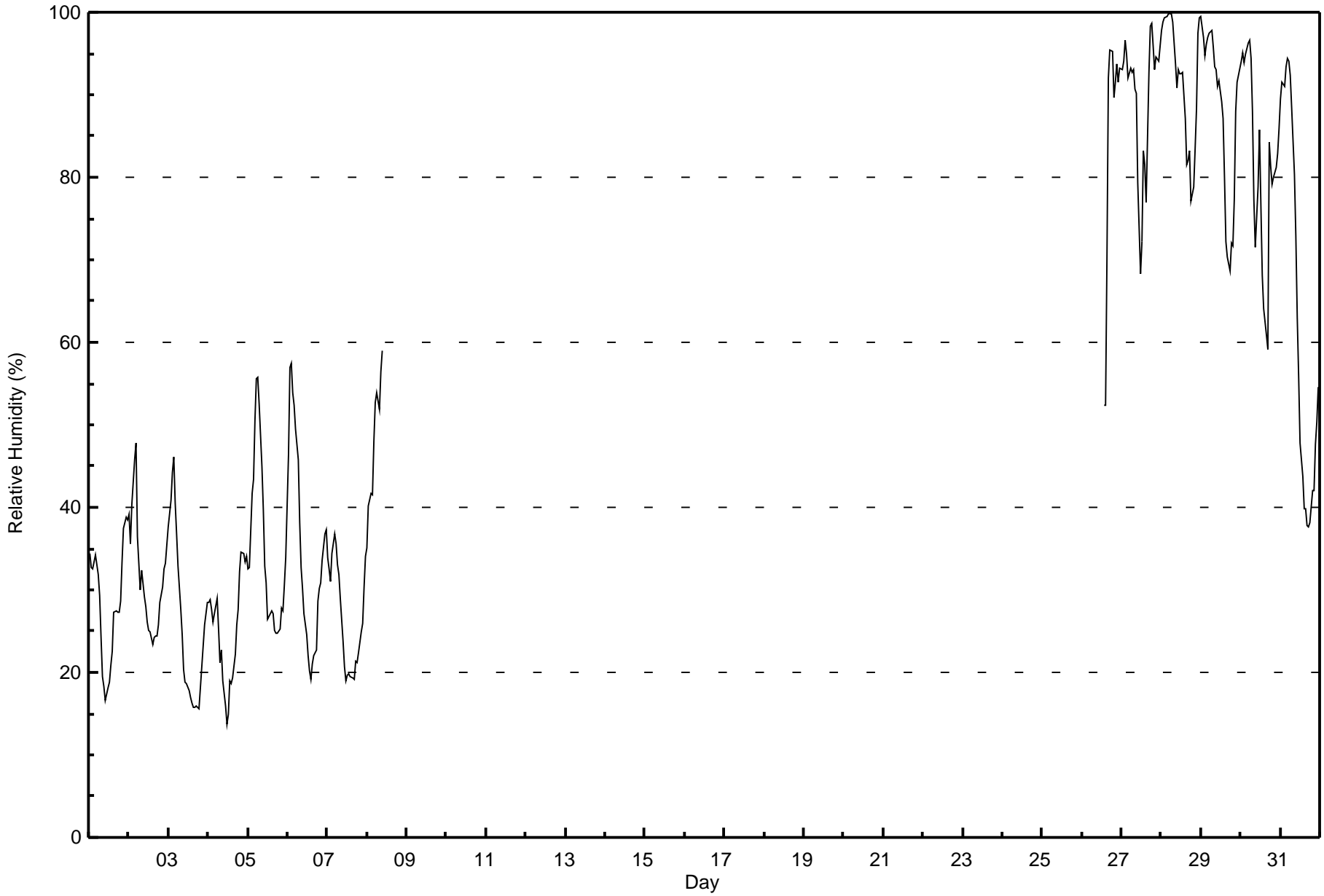
ConocoPhillips - Surmont - May 2016

Maximum Value: 100 % on May 28 06:00																								Maximum Daily Average: 92.0 % on May 28																								Hours in Service: 744	
Minimum Value: 14 % on May 4 12:00																								Minimum Daily Average: 25.0 % on May 4																								Hours of Data: 309	
Maximum Diurnal Average: 62.8 % at hour 5																								Minimum Diurnal Average: 42.5 % at hour 15																								Hours of Missing Data: 435	
Monthly Average: 52.9 %																								Percentiles: P ₁ = 16 P ₁₀ = 21 Q ₁ = 27 Median = 40 Q ₃ = 87 P ₉₀ = 94 P ₉₉ = 100																								Hours of Calibration: 0	
																																																Percent Operational Time: 41.5	
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-May	34	33	33	33	34	32	29	24	20	18	17	18	19	21	23	27	27	27	27	29	33	37	39	38	28.1	39																							
2-May	39	36	40	46	48	36	33	30	32	29	28	26	25	25	23	24	24	24	26	28	30	33	33	35	31.5	48																							
3-May	38	41	44	46	40	37	33	28	25	20	19	19	18	17	16	16	16	16	18	21	23	26	29	25.8	46																								
4-May	28	29	28	26	27	29	25	21	23	19	16	14	15	19	19	22	26	28	32	35	34	33	34	25.0	35																								
5-May	32	33	42	43	50	56	56	53	45	40	33	31	26	27	28	27	25	25	25	25	28	27	31	34	35.0	56																							
6-May	46	57	57	54	52	49	46	38	33	30	27	25	22	20	19	21	22	23	29	30	31	34	37	37	35.0	57																							
7-May	34	32	31	34	37	36	33	32	29	24	21	19	20	20	19	19	19	21	21	22	25	26	30	34	26.6	37																							
8-May	35	40	42	41	48	53	54	52	56	59	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	59																							
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--																							
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	52	52	70	92	95	95	90	92	94	92	93	93	--	95																							
27-May	93	94	97	95	92	93	93	93	91	90	79	68	72	83	81	77	93	98	99	96	93	95	94	96	89.8	99																							
28-May	98	99	99	99	100	100	100	99	94	91	93	93	93	93	87	82	82	83	77	79	83	88	97	99	92.0	100																							
29-May	100	97	95	96	97	97	98	96	93	93	91	92	89	87	80	72	70	69	72	72	77	88	92	93	87.7	100																							
30-May	94	95	94	95	96	97	94	88	77	71	79	86	77	68	64	61	59	84	81	79	80	81	83	86	82.1	97																							
31-May	89	91	91	93	94	94	92	88	80	73	63	56	48	44	40	40	38	38	38	42	42	48	50	55	63.7	94																							
																								58.6	59.7	60.9	61.8	62.8	62.2	60.5	57.0	53.7	50.6	47.1	45.4	43.6	44.3	42.5	42.8	45.4	48.4	48.7	49.4	51.5	54.5	56.7	58.7	Diurnal Average	
																								100	99	99	99	100	100	100	99	94	93	93	93	93	93	87	82	93	98	99	96	93	95	97	99	Diurnal Maximum	
PF - Power Failure																																																	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - May 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - May 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	29	9.39	9.39
20 - 40	124	40.13	49.51
40 - 60	41	13.27	62.78
60 - 80	24	7.77	70.55
80 - 100	91	29.45	100.00

Total Number of Valid Hours: 309

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

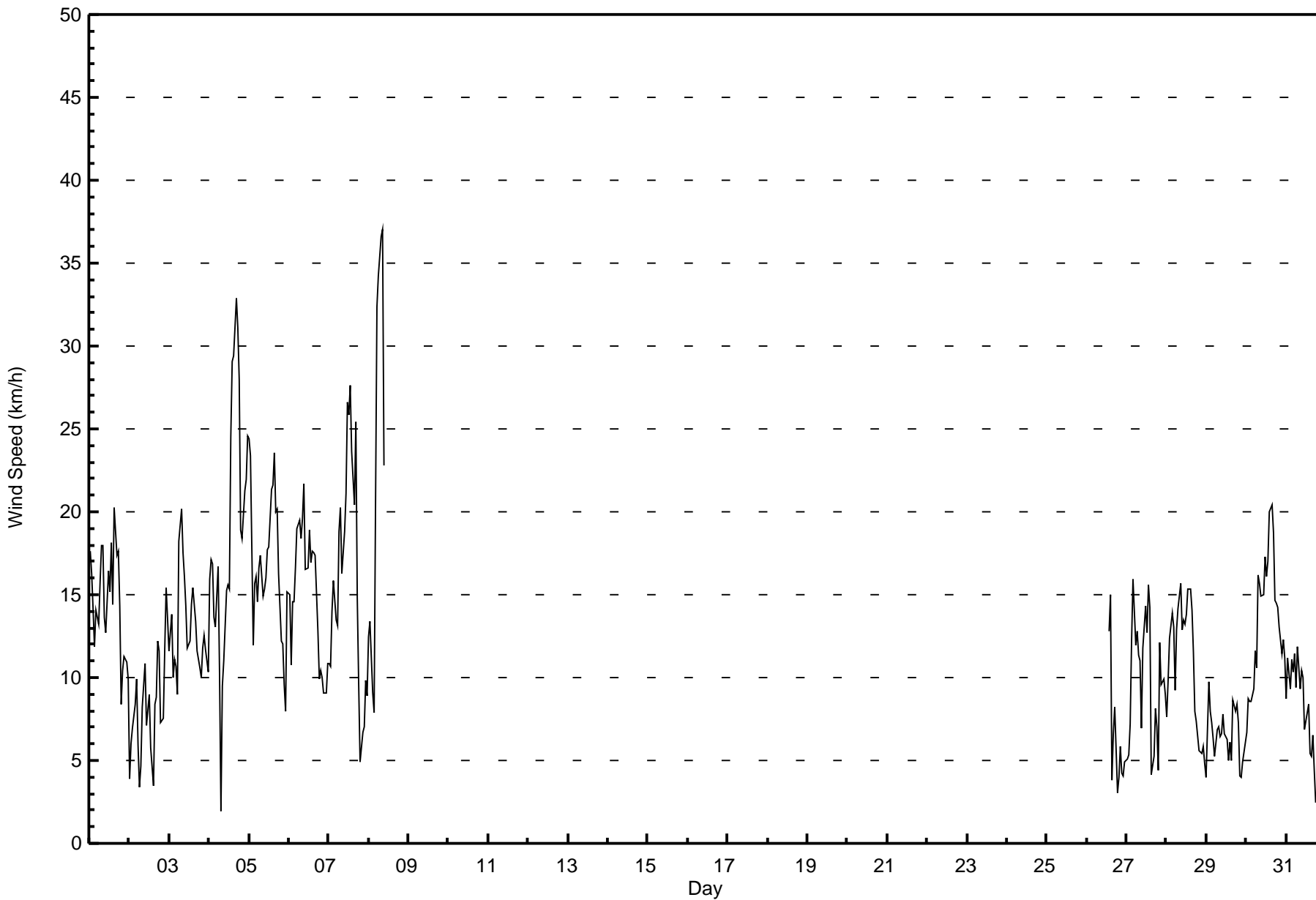
ConocoPhillips - Surmont - May 2016

Maximum Speed: 37 km/h on May 8 09:00	Maximum Daily Speed Average: 16.3 km/h on May 5	Hours in Service: 744
Minimum Speed Value: 2 km/h on May 4 08:00	Minimum Daily Speed Average: 2.8 km/h on May 2	Hours of Data: 308
Maximum Diurnal Speed Average: 10.5 km/h at hour 17	Minimum Diurnal Speed Average: 2.1 km/h at hour 20	Hours of Missing Data: 436
Monthly Average Velocity: 5.8 km/h 268.8 deg	Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 12 Q ₃ = 16 P ₉₀ = 20 P ₉₉ = 33	Percent Operational Time: 41.4

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-May	WSW18	WSW16	WSW14	WSW12	WSW14	WSW13	WSW16	WSW18	WSW18	W14	WSW13	W16	W15	W18	WSW14	W20	WNW17	WNW18	WNW14	W8	WSW10	SW11	WSW11	W10	W13.8	W20
2-May	WNW4	W6	WSW7	WSW8	WSW10	WNW6	W3	ENE5	ESE8	SE11	SE7	E8	E9	ENE6	SW3	WSW8	WNW9	E12	E12	E7	ESE8	SE12	SE15	SSE14	SE2.8	SE15
3-May	S12	SSW14	S10	SSW11	SW11	SW9	WSW18	WSW20	WSW18	WSW16	WSW14	SW12	SW12	SSW14	SSW15	SSW14	SW13	SW12	SSW11	S10	SSW12	SSW13	S12	SW10	SW12.1	WSW20
4-May	WSW16	WSW17	WSW17	WSW14	SW13	WSW17	SW10	SW2	SE9	SE11	SE15	SSW16	SW15	W25	W29	W29	WNW33	WNW31	WNW28	WNW19	WNW18	WNW21	WNW22	WNW25	W14.7	WNW33
5-May	WNW24	WNW23	NW12	NW16	NW16	WNW15	NW17	NW17	NNW15	NNW15	NNW16	NW18	NW18	NW21	WNW22	NW24	WNW20	WNW20	WNW16	WNW12	WNW12	WNW10	NW8	NW15	NW16.3	WNW24
6-May	NW15	WSW11	WSW15	W15	W17	W19	WNW19	NW18	NW20	NW22	WNW17	WNW17	WNW19	WNW17	WNW18	WNW18	WNW17	W13	ESE10	SE10	SSE10	S9	SSW9	SSW11	W11.0	NW22
7-May	SSW11	SSW11	SW14	WSW16	WSW13	WSW13	WSW19	WSW20	WSW16	WSW19	WSW21	WSW27	WSW26	WSW28	W24	W20	W25	W15	W10	SW5	S7	S7	S10	S9	WSW14.7	WSW28
8-May	SSE12	SSE13	S9	SSW8	WNW20	NW32	WNW34	WNW37	WNW37	WNW23	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	WNW37	
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	----	----	
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	NW13	NNW15	S4	NW7	NW8	WNW3	NE4	NE6	NE4	NE4	ESE5	----	NNW15
27-May	ESE5	ESE5	ESE7	SE12	SE16	ESE12	SE13	SE11	SE11	SE7	E12	ESE14	ESE13	E16	E14	NNE4	NW5	NNW8	NNW7	ENE4	SSE12	S10	SSE10	SSE9	ESE7.5	SE16
28-May	SE8	SE10	SE12	SE14	SE13	SE9	SSE13	SSE14	SSE16	SSE13	SSE13	SSE13	SSE14	SSE15	SSE15	SSE14	S12	S8	S7	SSW6	S6	SSE5	SE6	S5	SSE10.4	SSE16
29-May	SSW4	W10	WNW8	NW7	NW6	N5	N7	NW7	NW6	NW7	N8	NNE7	ENE6	ENE5	E6	E5	E9	ENE8	ENE8	NE7	ENE4	WNW4	WNW5	WNW6	N3.1	WSW10
30-May	WNW7	WNW9	NW9	NW9	NW9	NW12	NNW11	NNW16	NNW16	NNW15	NNW15	NNW17	NW16	NNW17	NNW20	NNW20	NNW19	N15	NNW14	NNW14	NNW13	NNW11	NNW12	NNW11	NNW13.4	NNW20
31-May	NW9	NW11	NW9	NW11	NW10	NW11	NNW9	N12	N9	NNE10	N10	N7	N7	NNW8	NNE5	N5	NNE6	ENE4	NE2	AF	SSE8	SSW7	SSW8	SSW7	NNW5.0	N12

WSW5.8	WSW7.0	WSW6.3	WSW6.5	W7.3	W8.2	W8.7	WNW8.3	W6.5	NNW5.5	W2.8	W5.3	W5.7	W7.6	W7.0	W8.1	NNW10.5	NNW7.4	NNW4.4	NNW2.1	SW2.7	SW3.7	SW3.8	WSW4.7	Diurnal Average
WNW24	WNW23	WSW17	WSW16	WNW20	NW32	WNW34	WNW37	WNW37	WNW23	WSW21	WSW27	WSW26	WSW28	W29	W29	WNW33	WNW31	WNW28	WNW19	WNW18	WNW21	WNW22	WNW25	Diurnal Maximum

AF - Analyzer Failure PF - Power 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 - May 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	30	9.74	9.74
6 - 11	111	36.04	45.78
12 - 19	131	42.53	88.31
20 - 28	28	9.09	97.40
29 - 38	8	2.60	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 308

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - May 2016

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	3	2	6	1	3	0	1	2	1	3	0	1	4	1	0	30
6 - 11	6	3	2	4	5	4	12	4	12	12	4	8	4	7	17	7	111
12 - 19	2	0	0	0	5	3	9	14	3	7	7	27	9	17	13	15	131
20 - 28	0	0	0	0	0	0	0	0	0	0	0	6	5	11	4	2	28
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	2	5	1	0	8
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	10	6	4	10	11	10	21	19	17	20	14	41	21	44	36	24	308

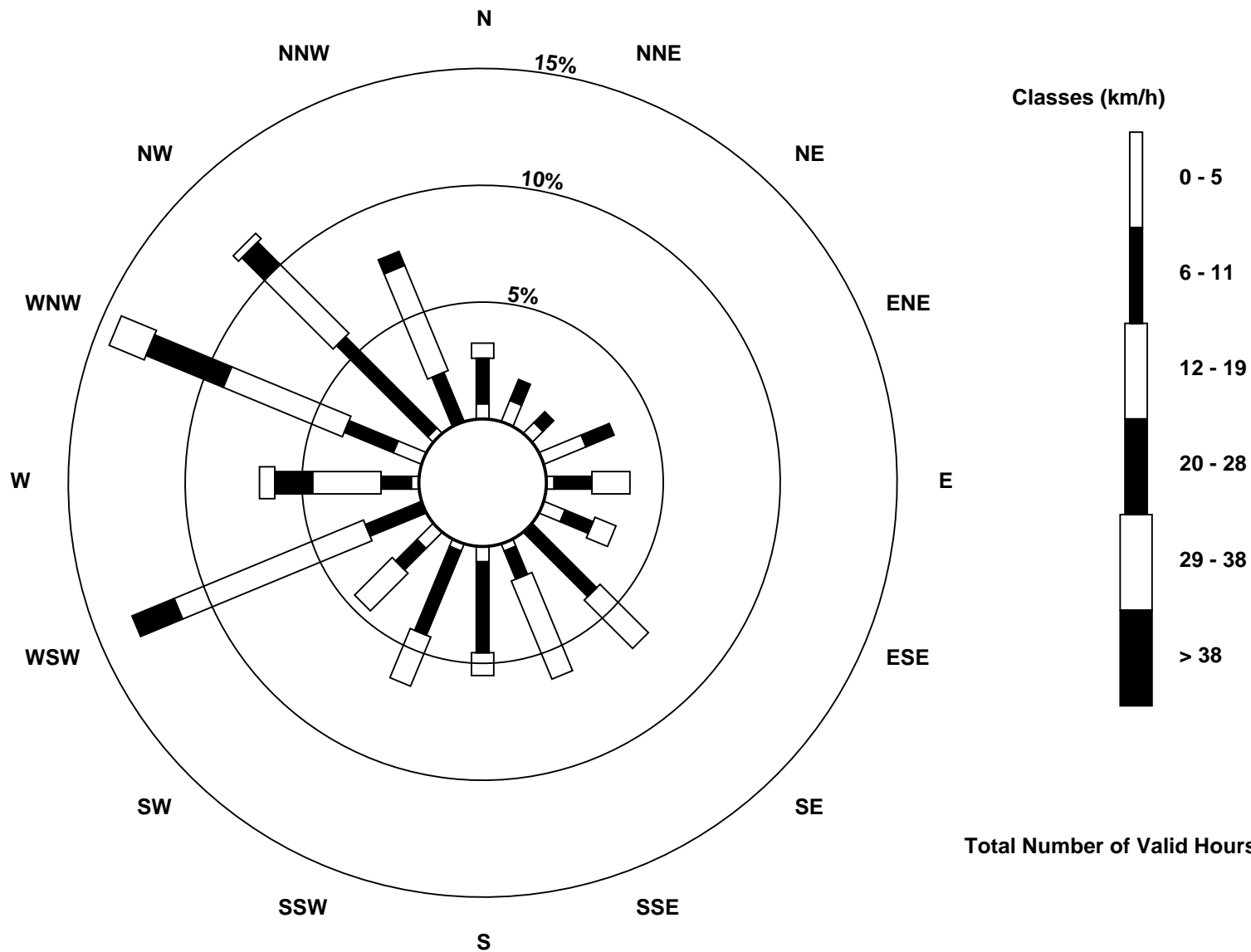
Total Number of Valid Hours: 308

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2016

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on May 8 08:00	Hours of Data: 308
Minimum Value: 1 km/h on May 27 00:00	Hours of Missing Data: 436
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 41.4

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

AF - Analyzer Failure PF - Power Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - May 2016

Direction of Maximum Speed: 287 deg on May 8 09:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 306.8 deg on May 5	Hours of Data: 308
Direction of Minimum Speed: 232 deg on May 4 08:00	Hours of Missing Data: 436
Direction of Minimum Daily Speed Average: 2.8 deg on May 2	Percent Operational Time: 41.4
Monthly Average Direction: 277.4 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-May	255	253	251	247	239	237	242	242	243	260	239	277	270	267	255	280	290	299	291	267	241	235	245	273	259.3
2-May	291	281	240	249	256	288	266	71	106	135	139	97	87	59	229	248	295	80	81	82	121	131	145	149	135.4
3-May	169	193	187	198	214	228	246	248	243	244	237	232	219	210	196	202	226	220	204	191	197	201	191	225	216.0
4-May	241	244	248	241	232	243	236	232	124	136	139	196	226	263	268	268	282	286	288	292	292	296	296	291	263.3
5-May	283	297	310	309	310	303	313	315	334	338	337	309	310	308	299	314	303	289	300	294	292	293	311	310	306.8
6-May	305	258	256	270	270	275	291	308	307	317	302	291	287	283	283	286	286	269	116	140	158	178	194	193	278.3
7-May	197	213	228	239	238	239	243	241	244	249	253	253	251	258	262	259	263	274	262	217	186	170	180	186	243.3
8-May	153	151	174	208	296	307	295	292	287	286	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	321	345	175	311	318	293	36	42	34	56	113	--
27-May	108	104	110	126	129	123	125	129	129	129	99	113	110	98	91	20	310	334	332	67	152	171	151	154	117.7
28-May	131	139	137	140	133	135	148	148	154	157	148	161	162	154	147	155	189	183	189	193	188	148	139	190	154.3
29-May	211	259	288	320	315	351	354	325	307	323	357	31	59	61	89	88	83	70	68	54	67	300	295	303	1.0
30-May	302	302	313	312	317	326	331	342	336	337	344	335	325	331	340	335	346	353	337	329	338	334	329	329	332.8
31-May	318	312	319	311	309	310	334	350	4	13	7	353	3	342	15	10	16	71	36	AF	150	199	193	207	337.6

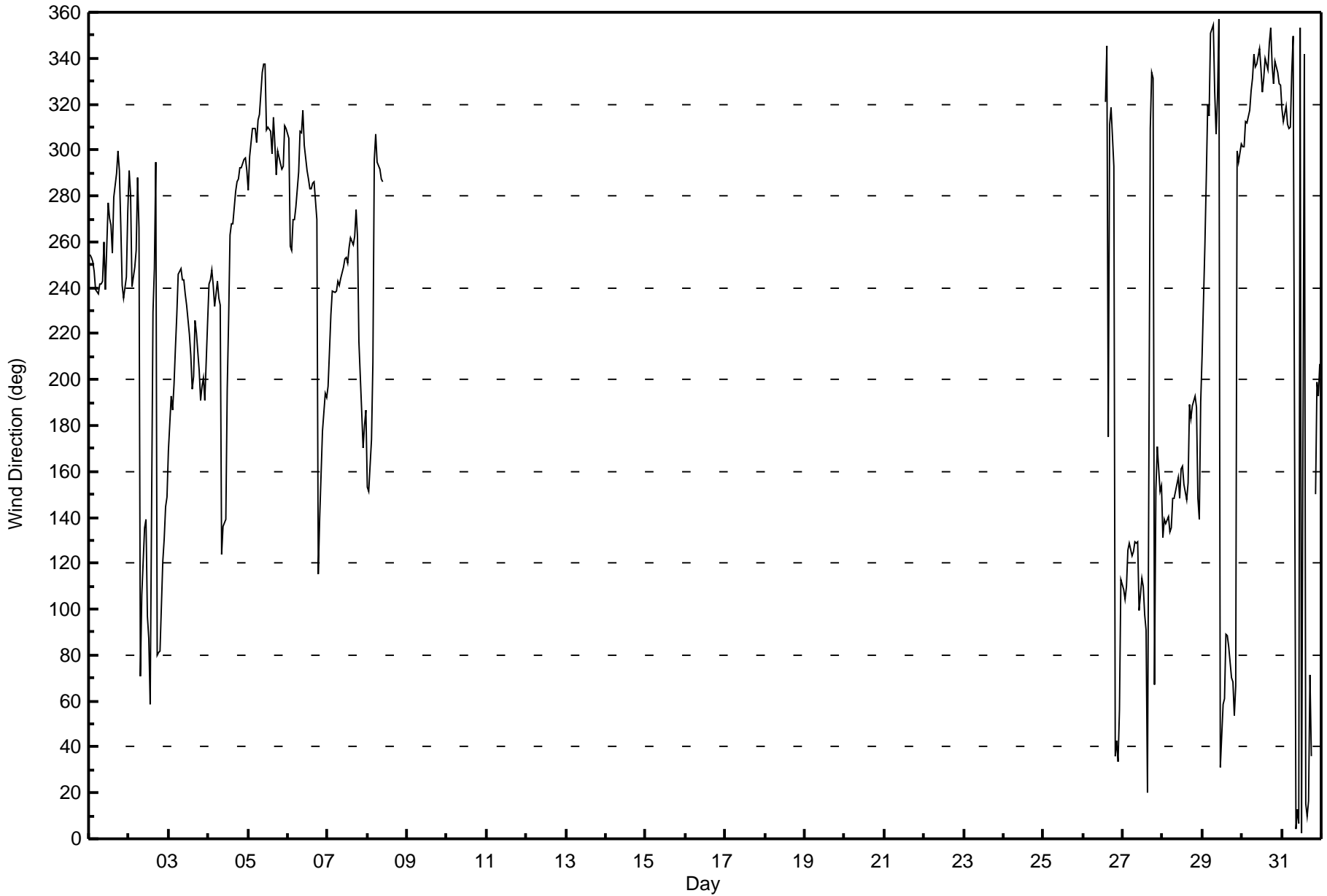
246.6 247.2 244.7 249.5 260.5 276.7 274.7 283.6 278.2 284.1 278.7 268.3 266.1 279.9 279.0 277.4 287.6 295.9 297.4 285.9 213.9 226.5 219.5 243.6
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - May 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
ConocoPhillips - Surmont - May 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 91 deg on May 4 08:00	Hours of Data: 308
Minimum Value: 5 deg on May 1 21:00	Hours of Missing Data: 436
Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 12 Median = 16 Q ₃ = 24 P ₉₀ = 36 P ₉₉ = 85	Hours of Calibration: 0
	Percent Operational Time: 41.4

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-May	7	6	7	8	8	8	9	9	12	23	30	22	31	24	26	19	18	18	14	12	5	6	15	5	31
2-May	64	19	17	22	46	26	36	42	23	18	54	46	36	66	88	42	43	26	13	13	13	12	8	19	88
3-May	20	11	25	9	18	15	9	9	12	16	21	29	34	32	25	27	22	21	22	14	12	12	15	16	34
4-May	10	9	7	8	9	9	11	91	26	18	22	28	32	16	13	16	15	13	12	10	9	10	10	11	91
5-May	12	11	20	13	13	12	13	16	15	22	24	27	29	27	23	19	19	17	18	16	12	38	30	21	38
6-May	18	10	7	11	8	12	11	15	17	18	29	29	28	24	31	26	21	52	17	14	11	14	13	14	52
7-May	15	16	17	13	13	12	11	12	14	14	20	16	17	16	18	18	16	12	11	15	11	13	12	14	20
8-May	10	9	29	32	21	13	12	11	11	16	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	32
9-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
10-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
11-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
12-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
13-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
14-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
15-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
16-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
17-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
18-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
19-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
20-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
21-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
22-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
23-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
24-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
25-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
26-May	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	24	20	86	24	24	40	33	21	36	24	12	86
27-May	15	13	10	11	12	11	12	16	15	31	22	22	15	14	14	70	72	38	14	51	15	25	22	15	72
28-May	12	10	11	11	12	14	11	13	14	16	12	15	14	13	13	19	21	21	23	21	18	28	15	28	28
29-May	24	29	56	14	14	20	17	19	17	16	18	22	28	30	36	52	29	23	18	16	15	45	12	8	56
30-May	7	8	10	11	15	10	14	12	14	20	15	16	18	20	14	19	23	16	13	14	12	14	13	16	23
31-May	15	10	17	10	10	11	19	18	24	29	27	44	36	27	58	56	43	31	42	AF	20	17	15	16	58
Diurnal Maximum																									
64 29 56 32 46 26 36 91 26 31 54 46 36 66 88 86 72 52 42 51 21 45 30 28																									

AF - Analyzer Failure PF - Power Failure



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 27, 2016	Last Calibration	April 18, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Other: Restart calibration after extended power failure		
Start Time (MST)	7:05	End Time (MST)	12:30
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	1886	1851
Calculated slope	1.004425	0.993759	Chamber temp	50.0	49.9
Calculated intercept	-0.190777	1.391122	Pressure	22.1	21.5
Analyzer Background	21.1	21.1	Flow	0.549	0.532
Analyzer Coefficient	1.020	1.020	Intensity	47	46
Analyzer make			Analyzer serial #		
API T100			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					
as found span					
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	83.2	803.7	807.9	0.995
second point	5000	41.6	401.9	402.5	0.998
third point	5000	20.8	200.9	199.5	1.007
as left zero	5000	0.0	0.0	1.1	----
as left span	5000	83.2	803.7	797.7	1.008
Average Correction Factor					1.000

Corrected As found NA Previous response NA % change NA

Notes:

Remote calibration. No adjustments. Long span point due to logmein connection issues.

Calibration Performed By:

Devin Russell



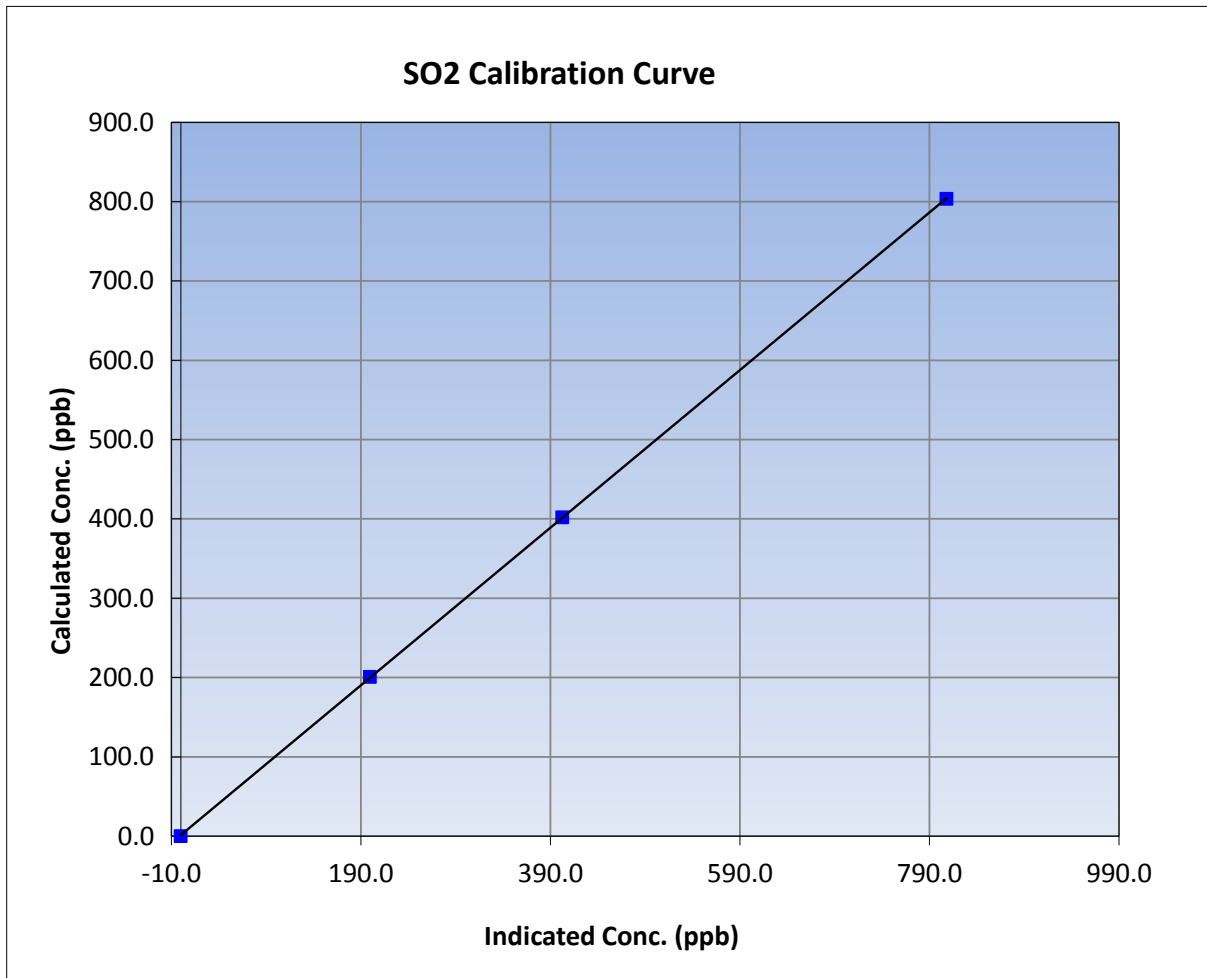
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 18, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	7:05	End Time (MST)	12:30
Analyzer make	API T100	Analyzer serial #	598

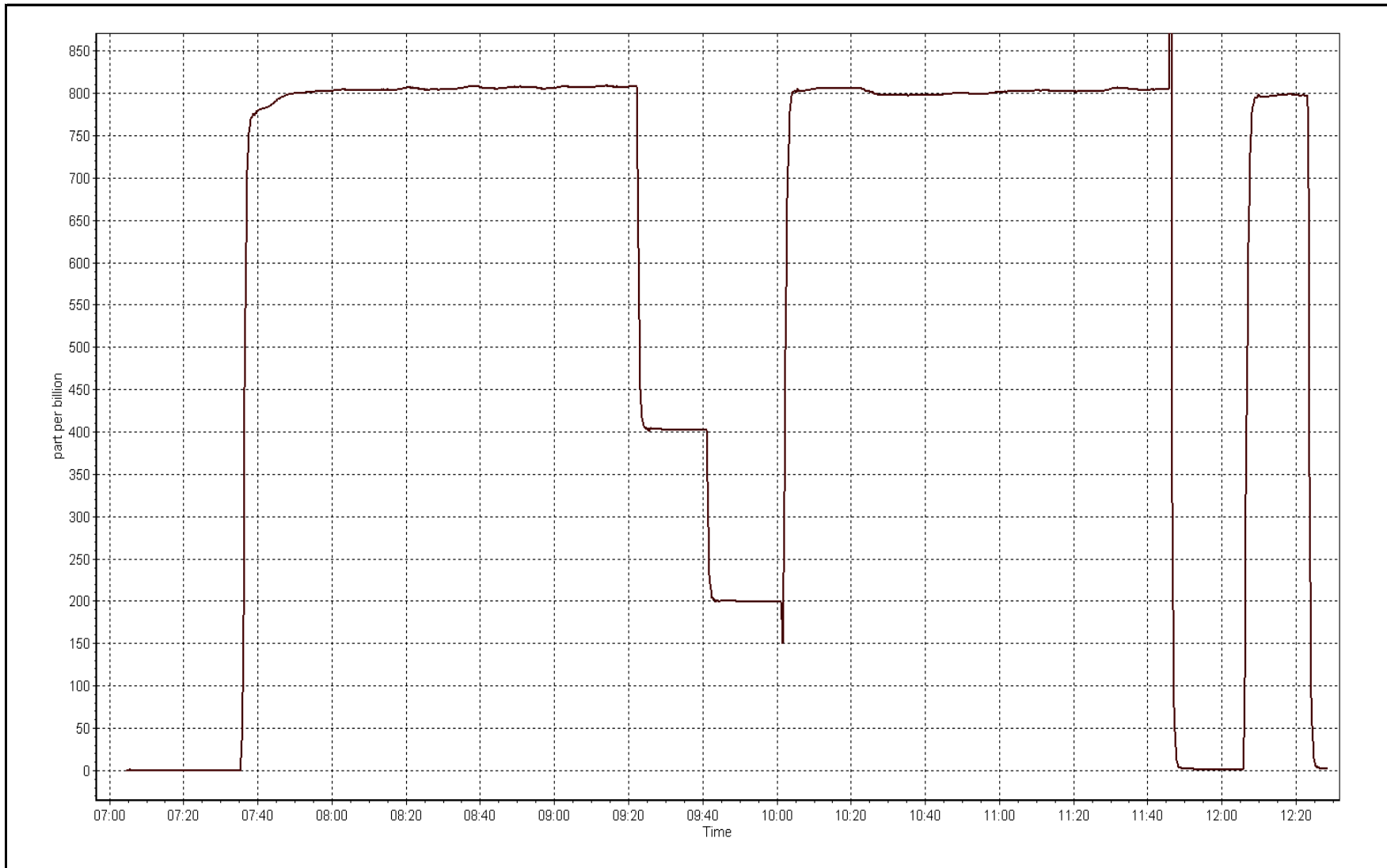
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999989
803.7	807.9	0.9948		
401.9	402.5	0.9985	Slope	0.993759
200.9	199.5	1.0073		
			Intercept	1.391122



SO2 Calibration Plot

Date: May 27, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 28, 2016	Last Calibration	April 20, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Other: Restart calibration after extended power failure		
Start Time (MST)	8:15	End Time (MST)	10:35
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	NA	497
Analyzer IP address	192.168.1.75		Lamp voltage	NA	2447
Calculated slope	0.991615	0.966664	Chamber temp	NA	50
Calculated intercept	0.166433	0.115033	Pressure	NA	23.3
Analyzer Background	NA	19.2	Flow (SLPM)	NA	0.616
Analyzer Coefficient	NA	1.01	Intensity	NA	54
			Converter temp.	NA	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					
as found span					
SO2 scrubber check	5000	20.7	200.0	3.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	82.8	0.967
second point	5000	19.3	40.1	41.3	0.972
third point	5000	12.1	25.2	25.9	0.973
as left zero					
as left span					
Average Correction Factor					0.971

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

Remote calibration conducted; SOX scrubber test conducted following calibration.

Calibration Performed By: Kelly Baragar



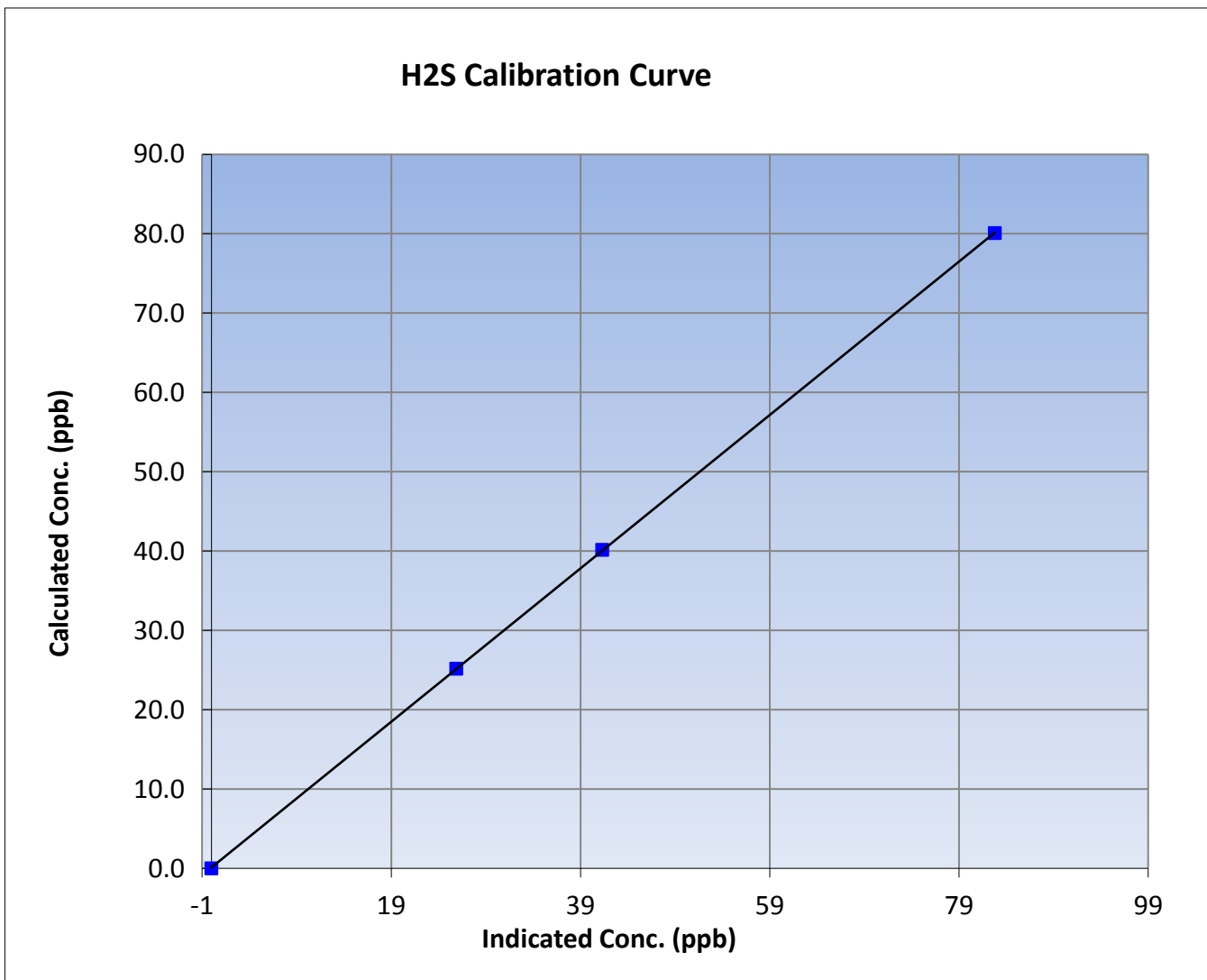
Wood Buffalo Environmental Association H2S Calibration Report

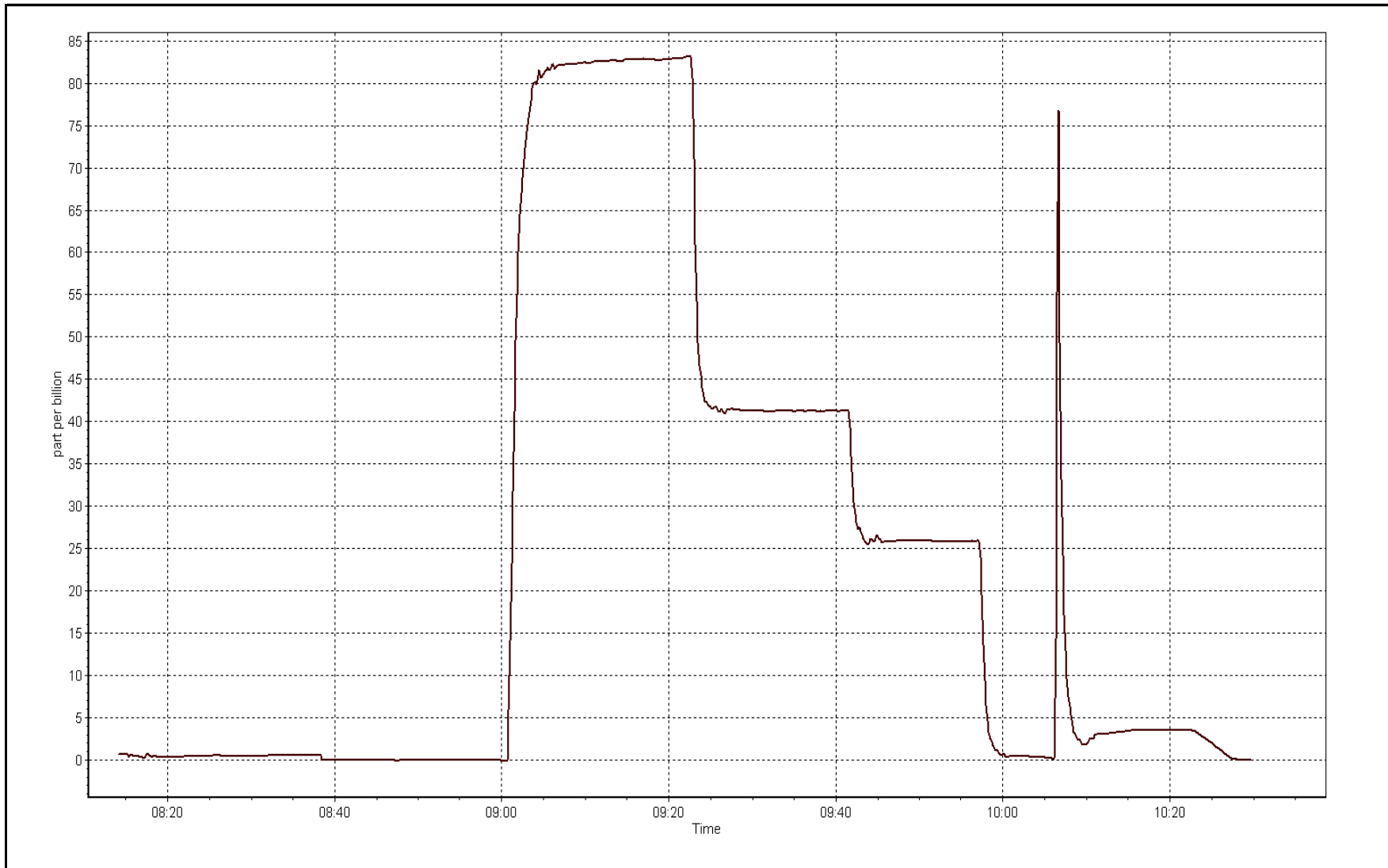
Station Information

Calibration Date	May 28, 2016	Previous Calibration	April 20, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	8:15	End Time (MST)	10:35
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
80.1	82.8	0.9671		
40.1	41.3	0.9722	Slope	0.966664
25.2	25.9	0.9732		
			Intercept	0.115033







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Other: Restart calibration after extended power failure at site		
Start Time (MST)	7:05	End Time (MST)	12:30
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOX Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	12-Feb-18
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001777	1.001944	0.997466
	Data Offset	1.652240	1.428812	-0.700943
Current Calibration	Data Slope	0.995733	0.991459	1.007386
	Data Offset	1.571671	1.372604	0.993460

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.949		1.161	
NOX coefficient	1.000		0.996	
NO2 coefficient	1.000		1.000	
NO bkgnd	8.5		6.2	
NOX bkgnd	9.2		6.5	
Chamber Temp	50.5	Deg C	50.3	Deg C
Moly Temp	328.1	Deg C	323.9	Deg C
PMT voltage	-866.5	V	-867.3	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	162.9	mmHg	164.1	mmHg
R Cell Press Nox	162.7	mmHg	164.1	mmHg
NO sample flow	0.661	lpm	0.661	lpm
Nox sample Flow	0.663	lpm	0.661	lpm

Notes:

Remote calibration. Zero and span adjusted. Long span point due to logmein connection errors.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 27, 2016

Station Number:

AMS 502

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	----	----
high point	5000	83.2	800.4	800.4	0.0	803.0	806.7	-3.8	0.9968	0.9922
second point	5000	41.6	400.2	400.2	0.0	399.6	401.6	-1.9	1.0014	0.9966
third point	5000	20.8	200.1	200.1	0.0	197.7	198.8	-1.1	1.0121	1.0068
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.7	-0.3	----	----
as left span	5000	83.2	800.4	502.4	298.0	801.8	501.7	300.1	0.9983	1.0015
Average Correction Factor									1.0034	0.9985

Corrected As found

NO_x=

NA

NO=

NA

Percent Change

NO_x=

N/A

NO=

N/A

Previous Response

NO_x=

NA

NO=

NA

GPT Calibration Data

Dilution Flow (total)

5000

ccm

Source Gas Flow

83.20

ccm

NOx ref calc conc =

800.4 ppb

NO ref calc conc =

800.4 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	801.0	803.1	-0.2	0.9992	0.9967	----	----
1st NO2 (300)	502.4	300.6	800.3	502.4	297.9	1.0001	----	1.0094	99.1%
2nd NO2 (200)	595.7	207.4	80.7	595.7	205.0	9.9168	----	1.0118	98.8%
3rd NO2 (100)	692.5	110.6	800.0	692.5	107.5	1.0005	----	1.0286	97.2%
2nd NO ref point		0.0	800.0	802.1	-2.2	1.0005	0.9978	----	----
Average Correction Factor						3.2295		1.0166	98.4%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

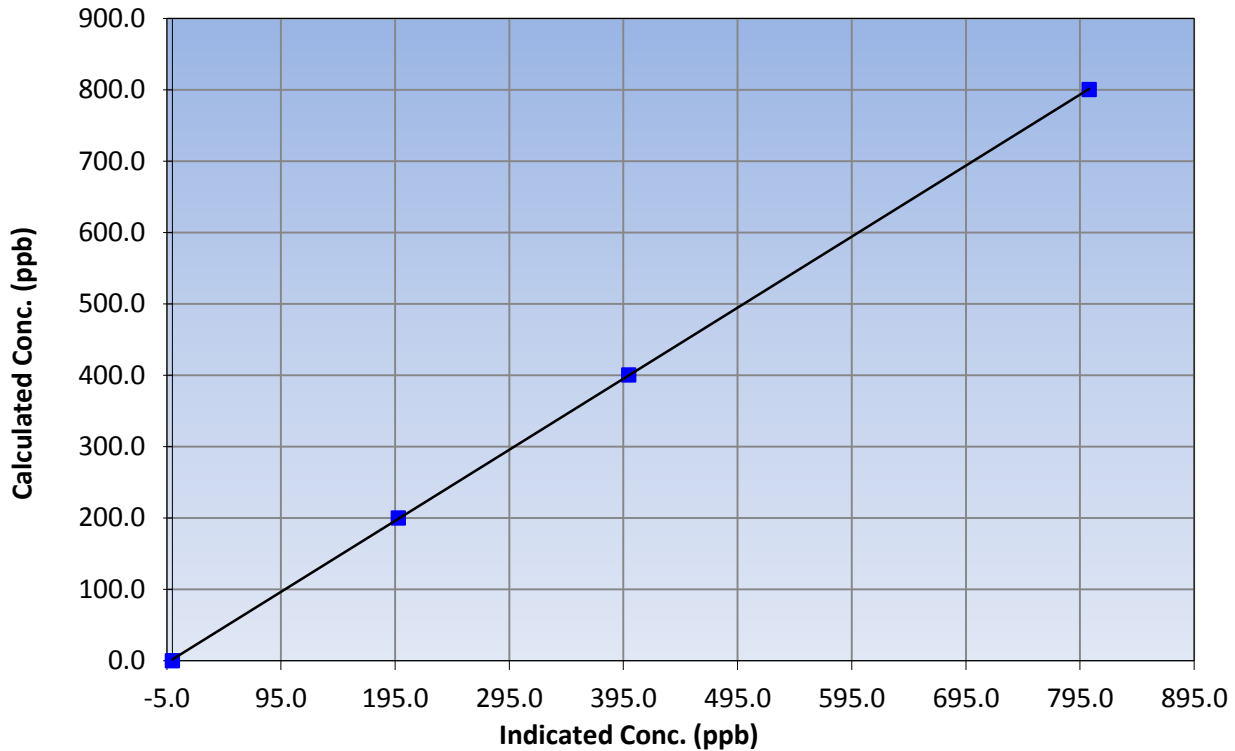
Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	7:05	End Time (MST)	12:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999982
800.4	803.0	0.9968		
400.2	399.6	1.0014	Slope	0.995733
200.1	197.7	1.0121		
			Intercept	1.571671

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

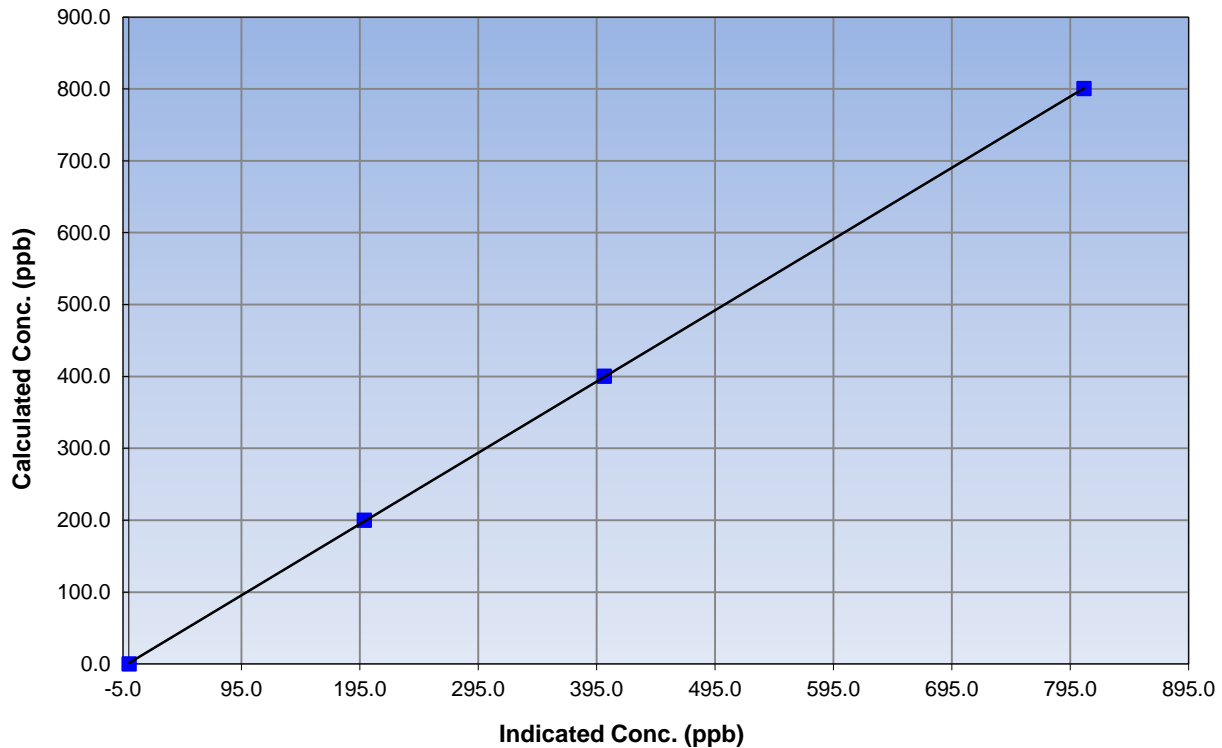
Station Information

Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	7:05	End Time (MST)	12:30
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	0.999982
800.4	806.7	0.9922		
400.2	401.6	0.9966	Slope	0.991459
200.1	198.8	1.0068		
			Intercept	1.372604

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

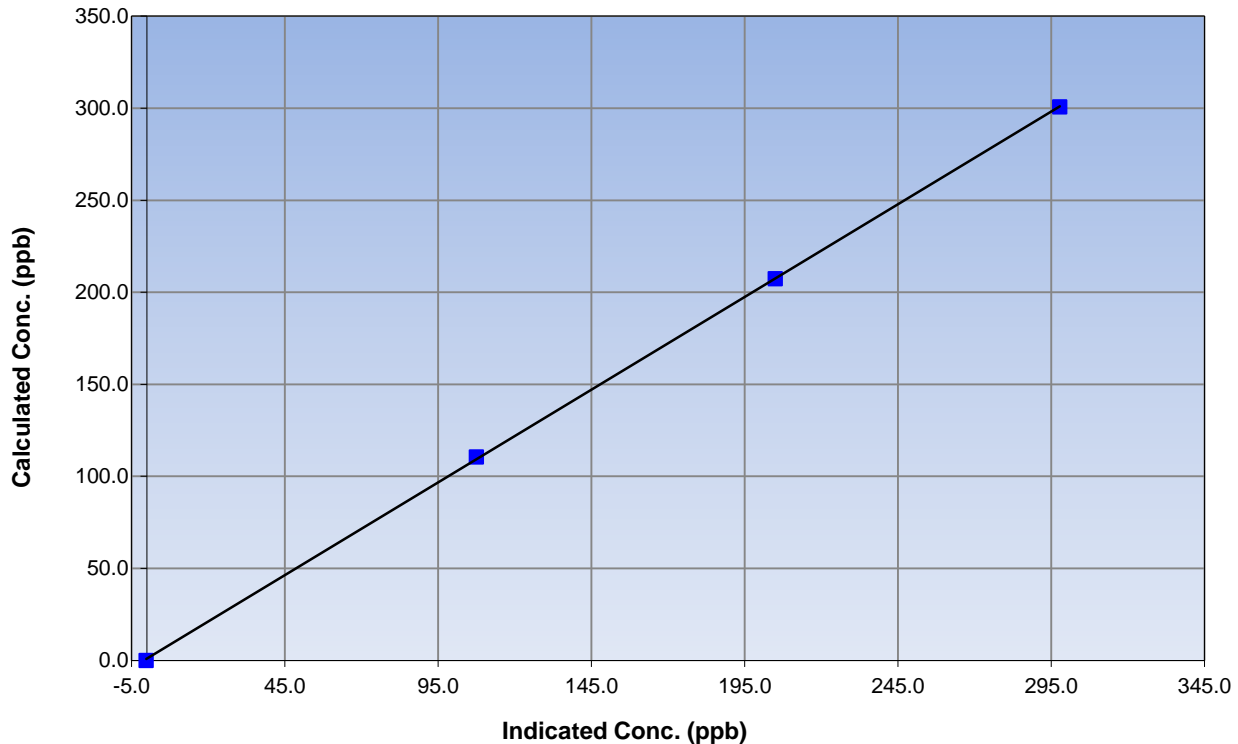
Station Information

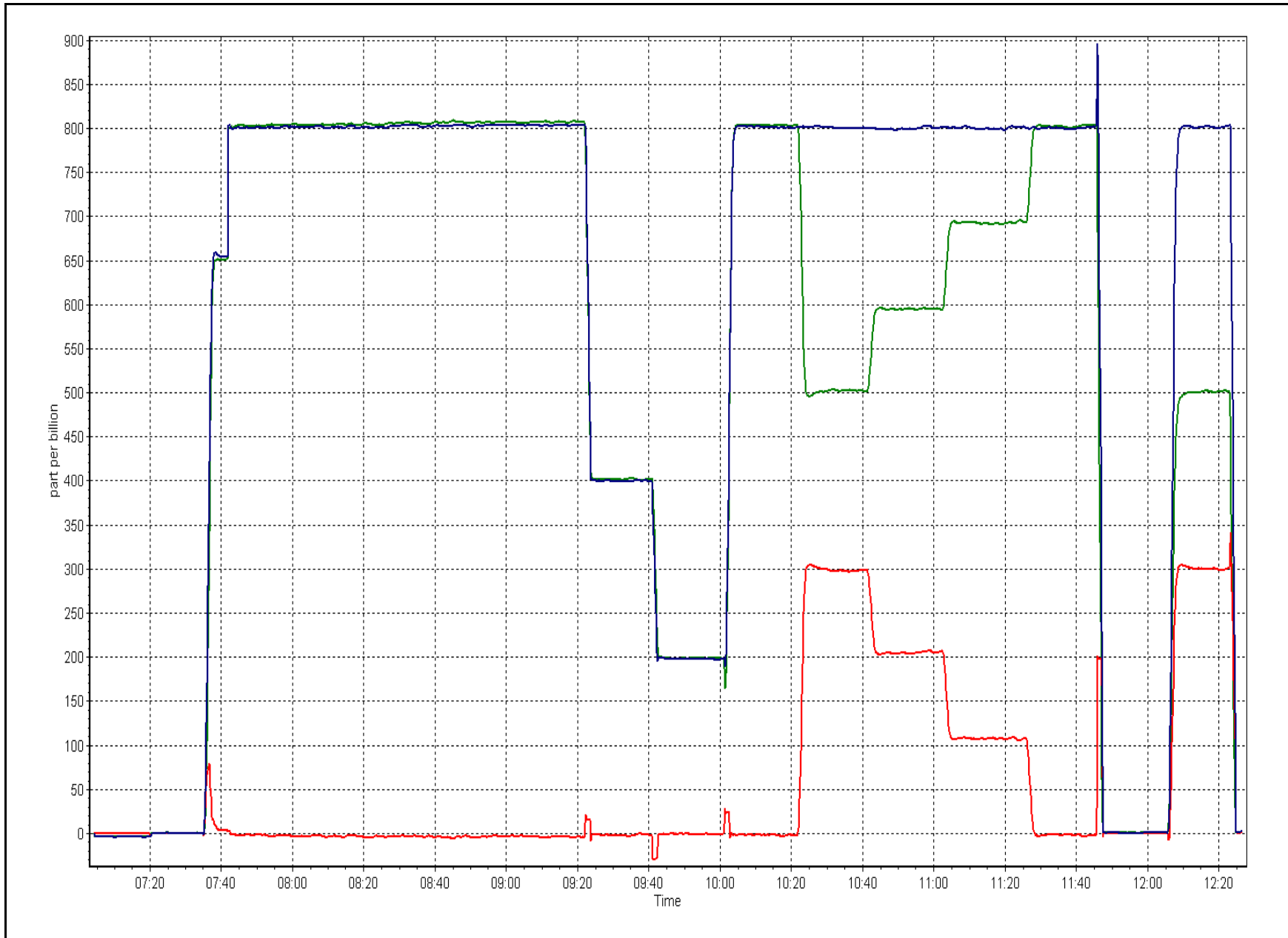
Calibration Date	May 27, 2016	Previous Calibration	April 19, 2016
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	7:05	End Time (MST)	12:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999951
300.6	297.9	1.0094		
207.4	205.0	1.0118	Slope	1.007386
110.6	107.5	1.0286		
			Intercept	0.993460

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT**

**REVISED H₂S CALIBRATIONS
JULY 2015 – MARCH 2016**

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

June 24, 2016



Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	July 21, 2015	Last Calibration	June 24, 2015
Station Name	ConocoPhillips-Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:00
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30 May, 2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12/02/2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	84	81
Analyzer IP address	192.168.1.75		Lamp voltage	2404	2337
Calculated slope	0.999914	0.999826	Chamber temp	50	50
Calculated intercept	-0.091368	0.021809	Pressure	22.9	22.6
Analyzer Background	20.1	20.6	Flow	0.567	0.560
Analyzer Coefficient	0.942	0.93	Intensity	53	52
			Converter temp.	316	317

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	38.5	80.1	81.5	0.983
SO2 scrubber check	5000	20.8	200.9	3.6	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.1	1.000
second point	5000	19.3	40.1	40.1	1.001
third point	5000	12.1	25.2	25.1	1.001
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	38.5	80.1	79.7	1.005
Average Correction Factor					1.001

Corrected As found	81.2	Previous response	80.2	% change	-1.3%
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Notes:

Inlet filter replaced and scrubber check done after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



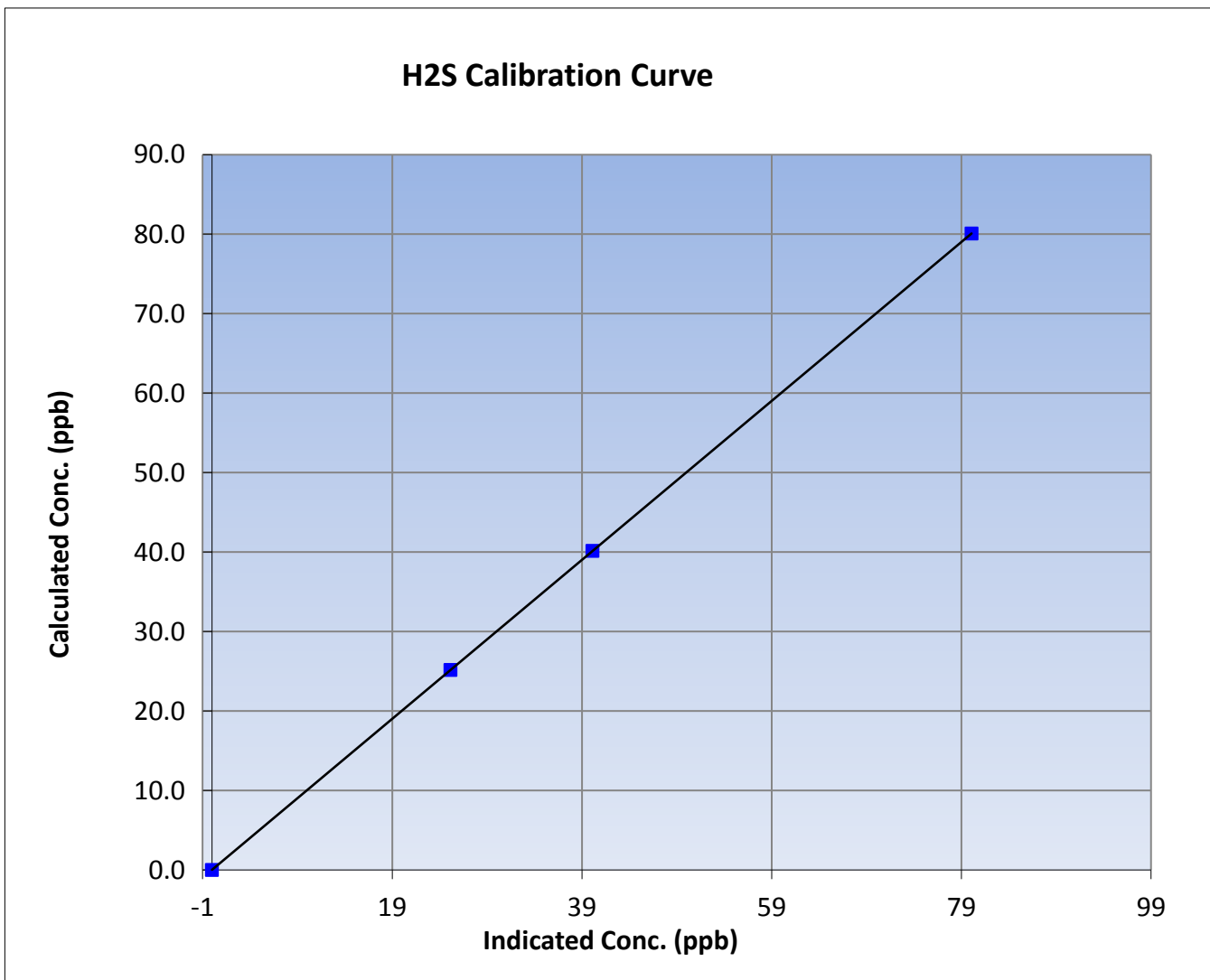
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	July 21, 2015	Previous Calibration	June 24, 2015
Station Name	AMS 502	Station Number	AMS 502
Start Time (MST)	8:40	End Time (MST)	12:00
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

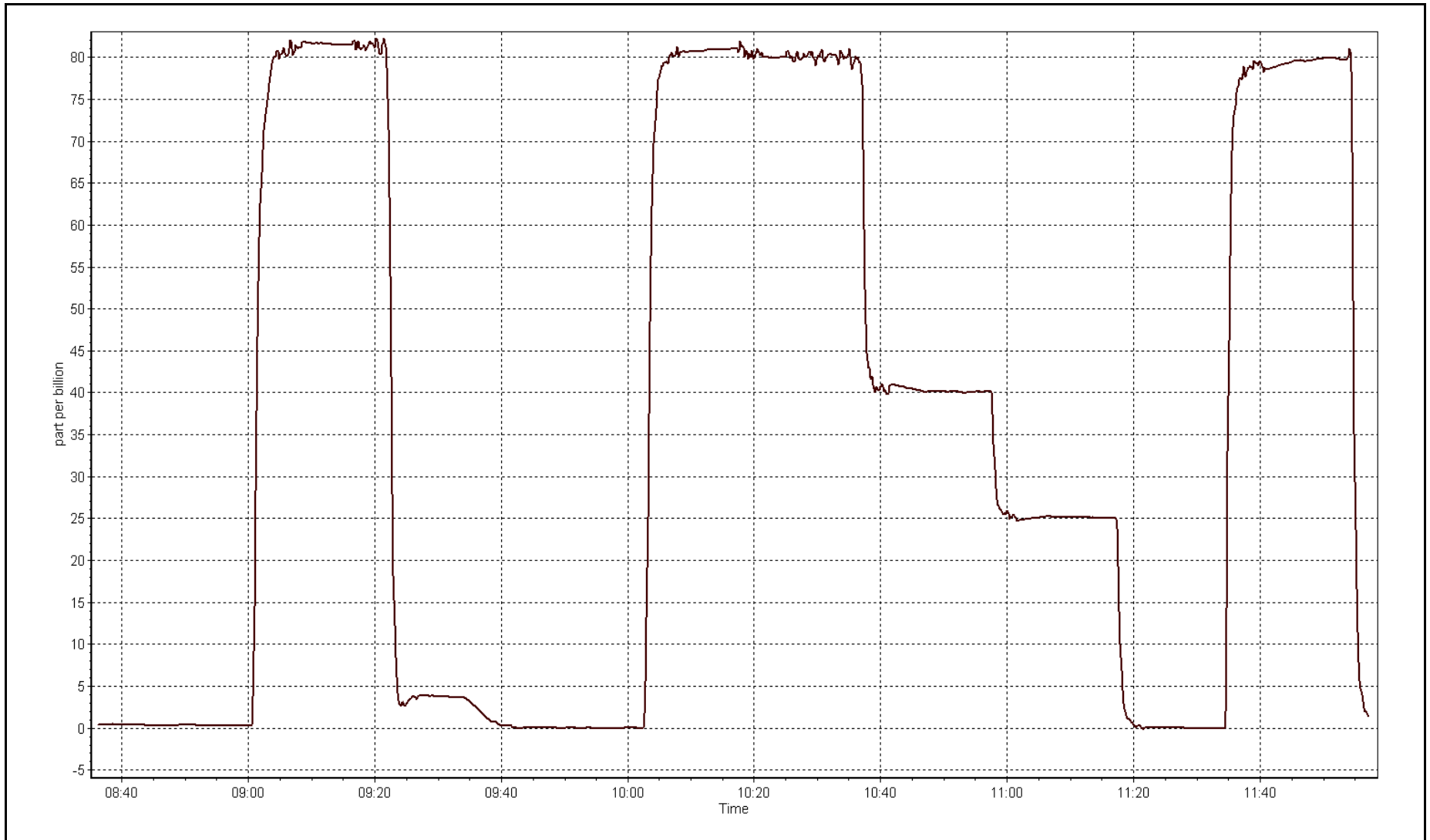
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
80.1	80.1	1.0000		
40.1	40.1	1.0006	Slope	0.999826
25.2	25.1	1.0011		
			Intercept	0.021809



H2S Calibration Plot

Date:

July 21, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	August 17, 2015	Last Calibration	July 21, 2015
Station Name	ConocoPhillips-Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:50
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 2/12/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	81	81
Analyzer IP address	192.168.1.75		Lamp voltage	2337	2267
Calculated slope	0.999826	0.999826	Chamber temp	50	50
Calculated intercept	0.021809	0.021809	Pressure	22.6	22.9
Analyzer Background	20.6	20.6	Flow	0.560	0.579
Analyzer Coefficient	0.930	0.93	Intensity	52	50
			Converter temp.	317	315

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	38.5	80.1	80.3	0.997
SO2 scrubber check	5000	20.7	200.0	3.7	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	38.5	80.1	80.3	0.997
second point	5000	19.3	40.1	40.0	1.003
third point	5000	12.0	25.0	25.0	0.998
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	38.5	80.1	79.5	1.008
Average Correction Factor					1.000

Corrected As found	80.4	Previous response	80.1	% change	-0.4%
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Notes:

Inlet filter replaced after as founds. No adjustments.

Calibration Performed By:

Asad Hidayat



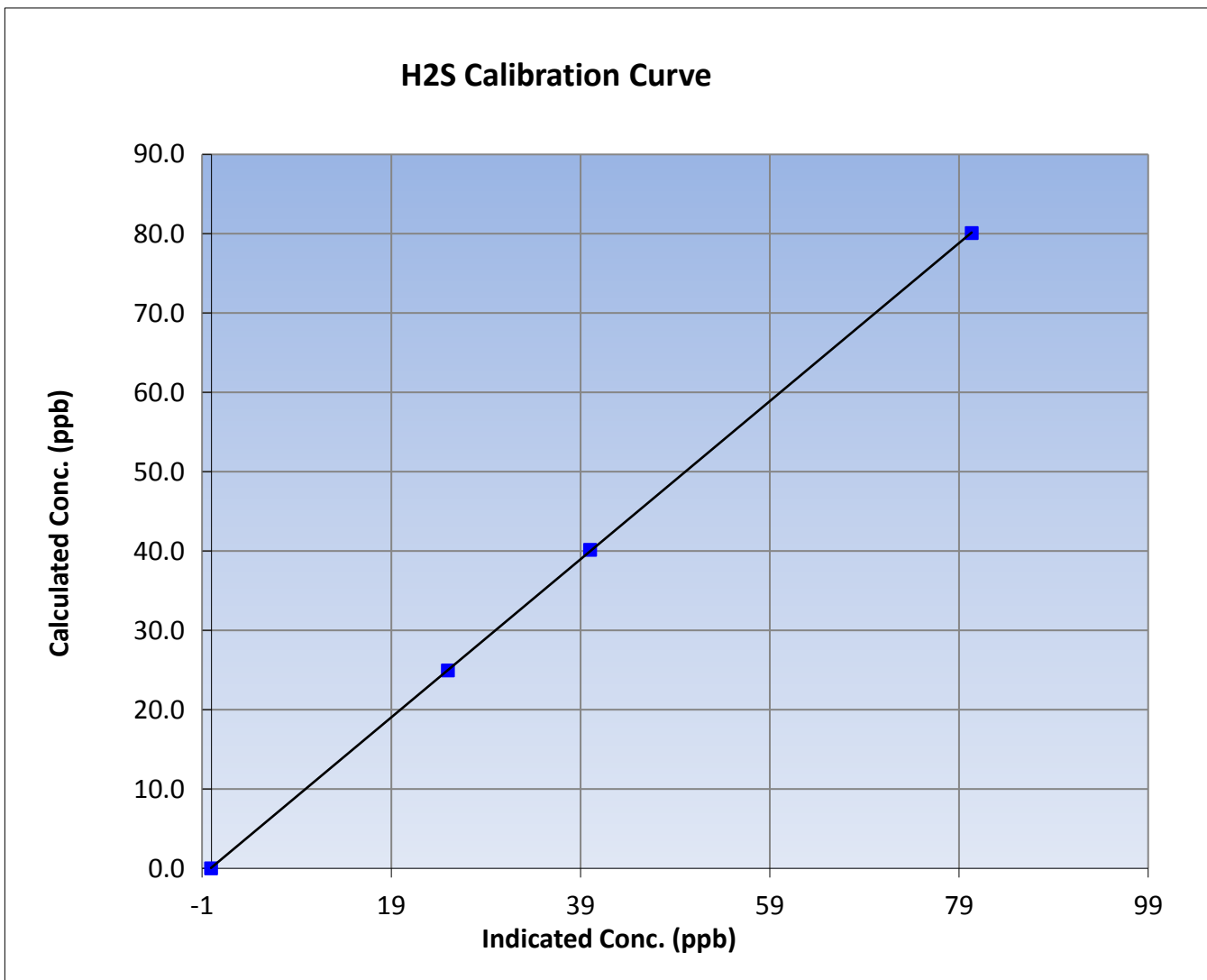
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	August 17, 2015	Previous Calibration	July 21, 2015
Station Name	AMS 502	Station Number	AMS 502
Start Time (MST)	10:00	End Time (MST)	12:50
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

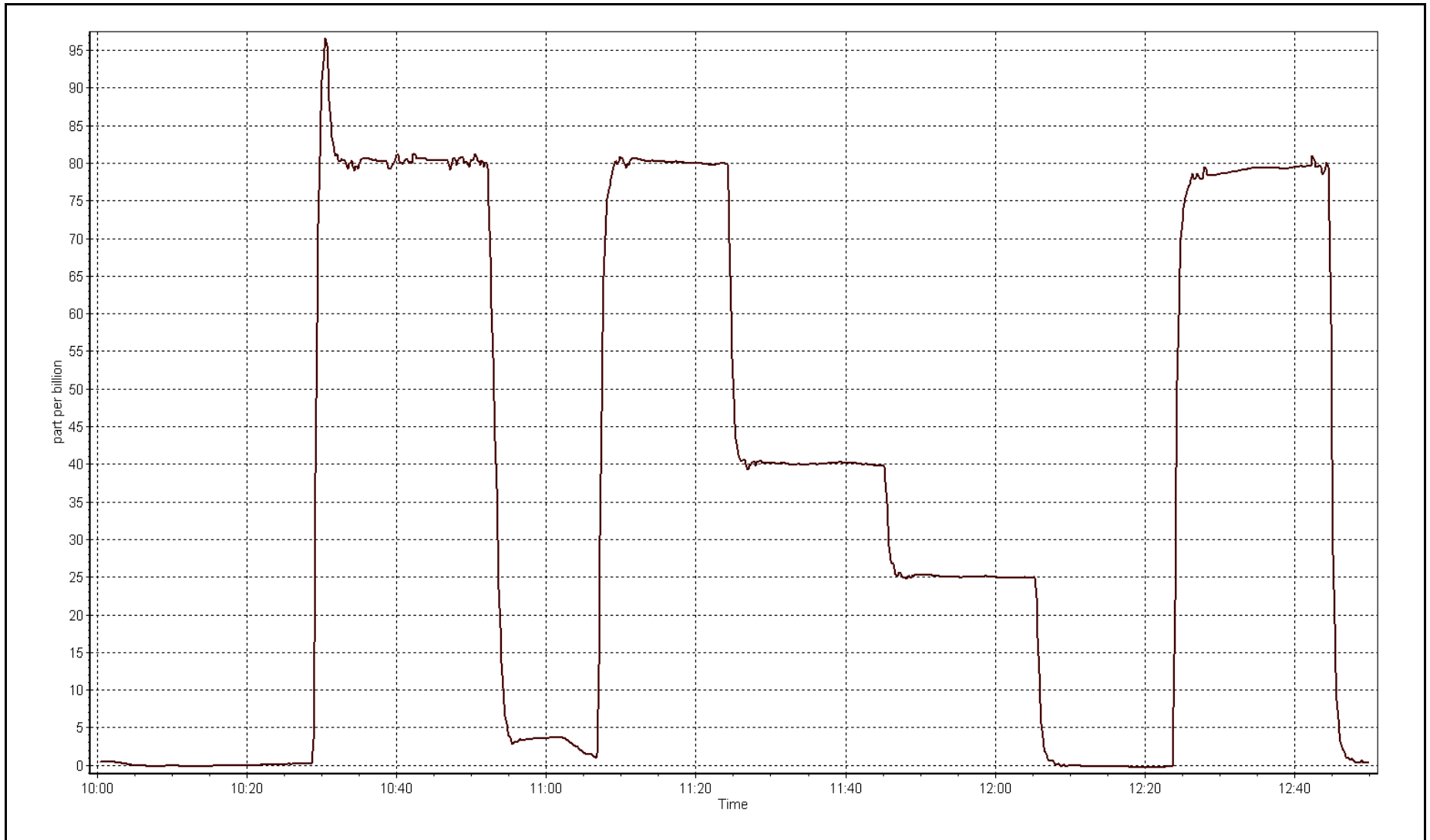
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999988
80.1	80.3	0.9968		
40.1	40.0	1.0033	Slope	0.996380
25.0	25.0	0.9984		
			Intercept	0.102492



H2S Calibration Plot

Date:

August 17, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	September 11, 2015	Last Calibration	August 17, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:15
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30 May, 2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	81	80
Analyzer IP address	192.168.1.75		Lamp voltage	2267	2218
Calculated slope	0.999826	0.992310	Chamber temp	50	50
Calculated intercept	0.021809	-0.166537	Pressure	22.9	22.8
Analyzer Background	20.6	20.6	Flow	0.579	0.565
Analyzer Coefficient	0.930	0.93	Intensity	50	49
			Converter temp.	315	315

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	38.5	80.1	80.9	0.989
SO2 scrubber check	5000	20.7	200.0	3.5	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	38.5	80.1	80.9	0.989
second point	5000	19.3	40.1	40.5	0.991
third point	5000	12.1	25.2	25.5	0.986
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	38.5	80.1	80.4	0.997
Average Correction Factor					0.989

Corrected As found	80.7	Previous response	80.1	% change	-0.8%
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Notes:

Scrubber check done after as founds. Inlet filter replaced after sox scrubber check. No adjustments.

Calibration Performed By: Asad Hidayat



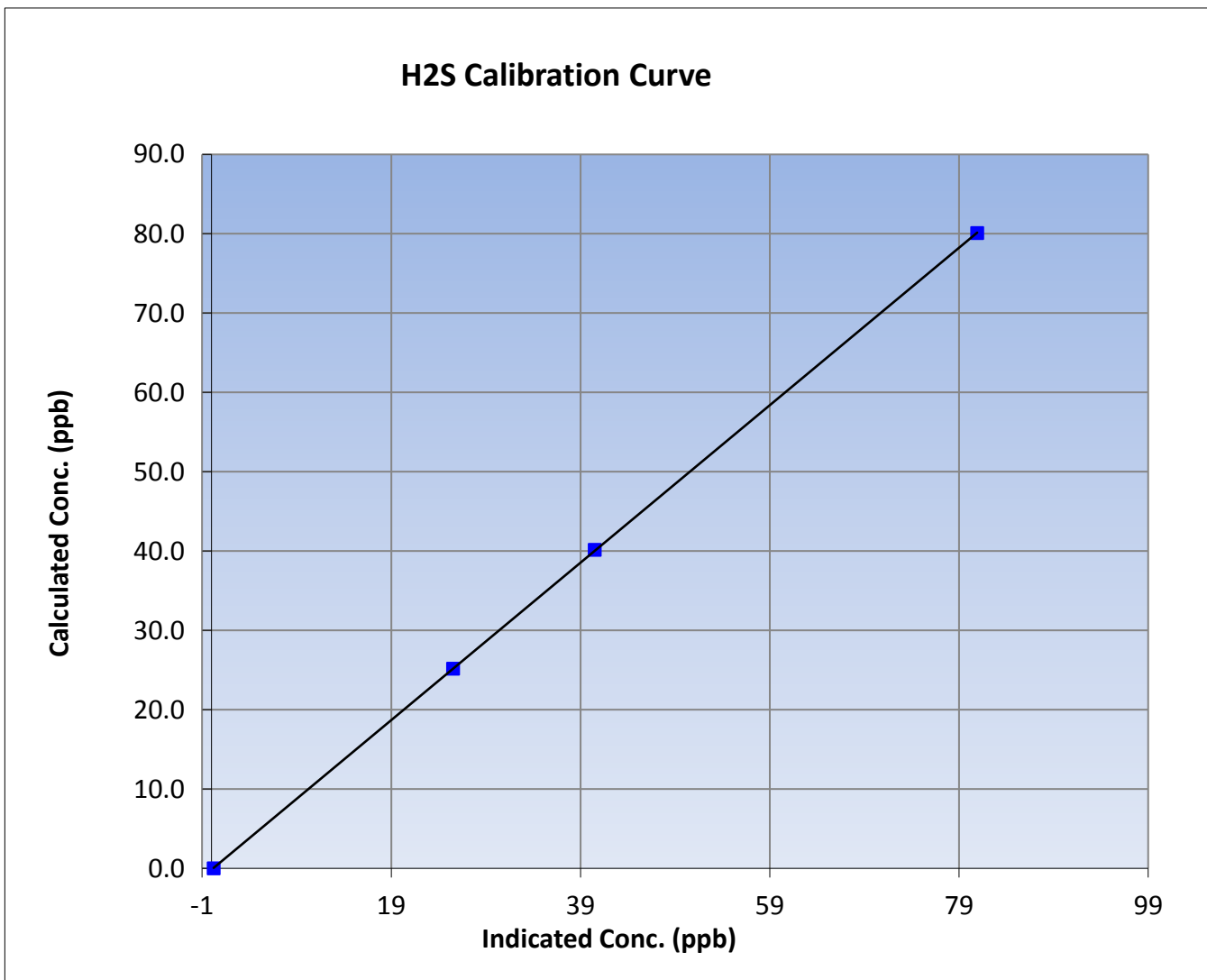
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 17, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:00	End Time (MST)	12:15
Analyzer make	API T101	Analyzer serial #	197

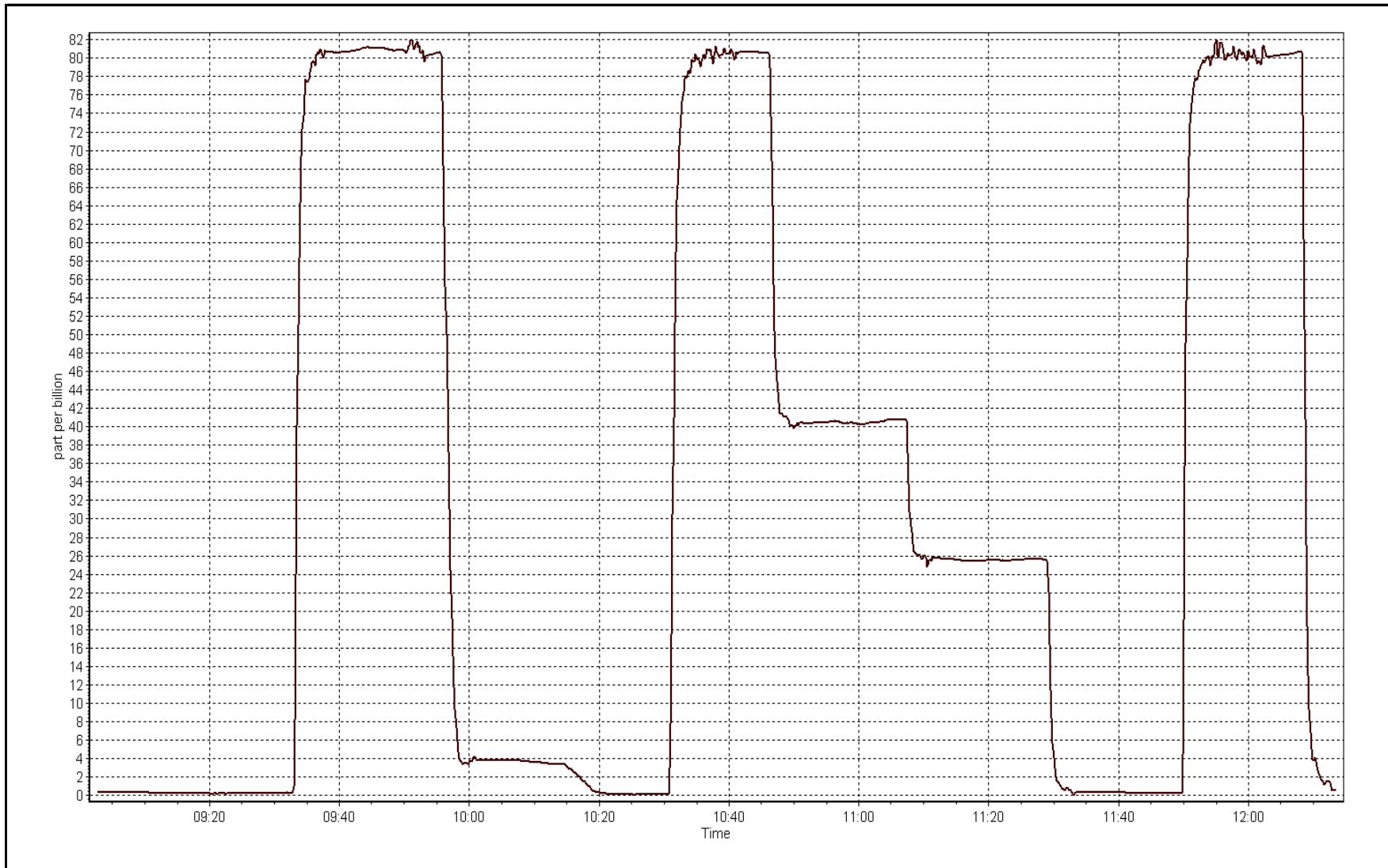
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999993
80.1	80.9	0.9895		
40.1	40.5	0.9912	Slope	0.992310
25.2	25.5	0.9858		
			Intercept	-0.166537



H2S Calibration Plot

Date: September 11, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	October 7, 2015	Last Calibration	September 11, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	11:48
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	80	513
Analyzer IP address	192.168.1.75		Lamp voltage	2218	2172
Calculated slope	0.992310	1.004300	Chamber temp	50	50
Calculated intercept	-0.166537	-0.226105	Pressure	22.8	22.7
Analyzer Background	20.6	20.6	Flow	0.565	0.564
Analyzer Coefficient	0.930	0.92	Intensity	49	48
			Converter temp.	315	316

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	38.5	80.1	81.0	0.989
SO2 scrubber check	5000	20.7	200.0	3.7	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	38.5	80.1	80.0	1.001
second point	5000	19.3	40.1	40.1	1.000
third point	5000	12.1	25.2	25.3	0.994
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	38.5	80.1	79.6	1.006
Average Correction Factor					0.998

Corrected As found	80.8	Previous response	80.9	% change	0.1%
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Notes:

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

Calibration Performed By: Asad Hidayat



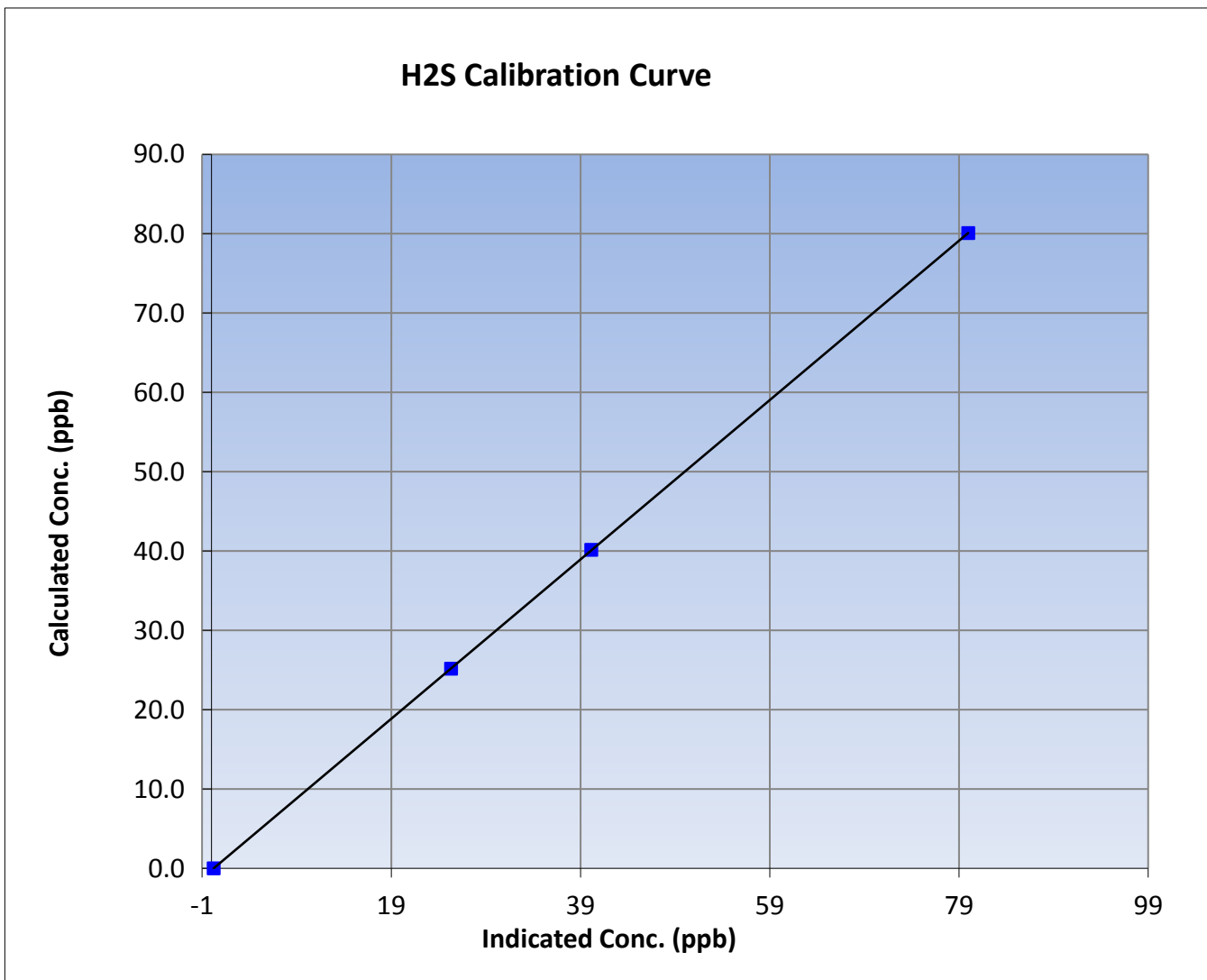
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 11, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	8:55	End Time (MST)	11:48
Analyzer make	API T101	Analyzer serial #	197

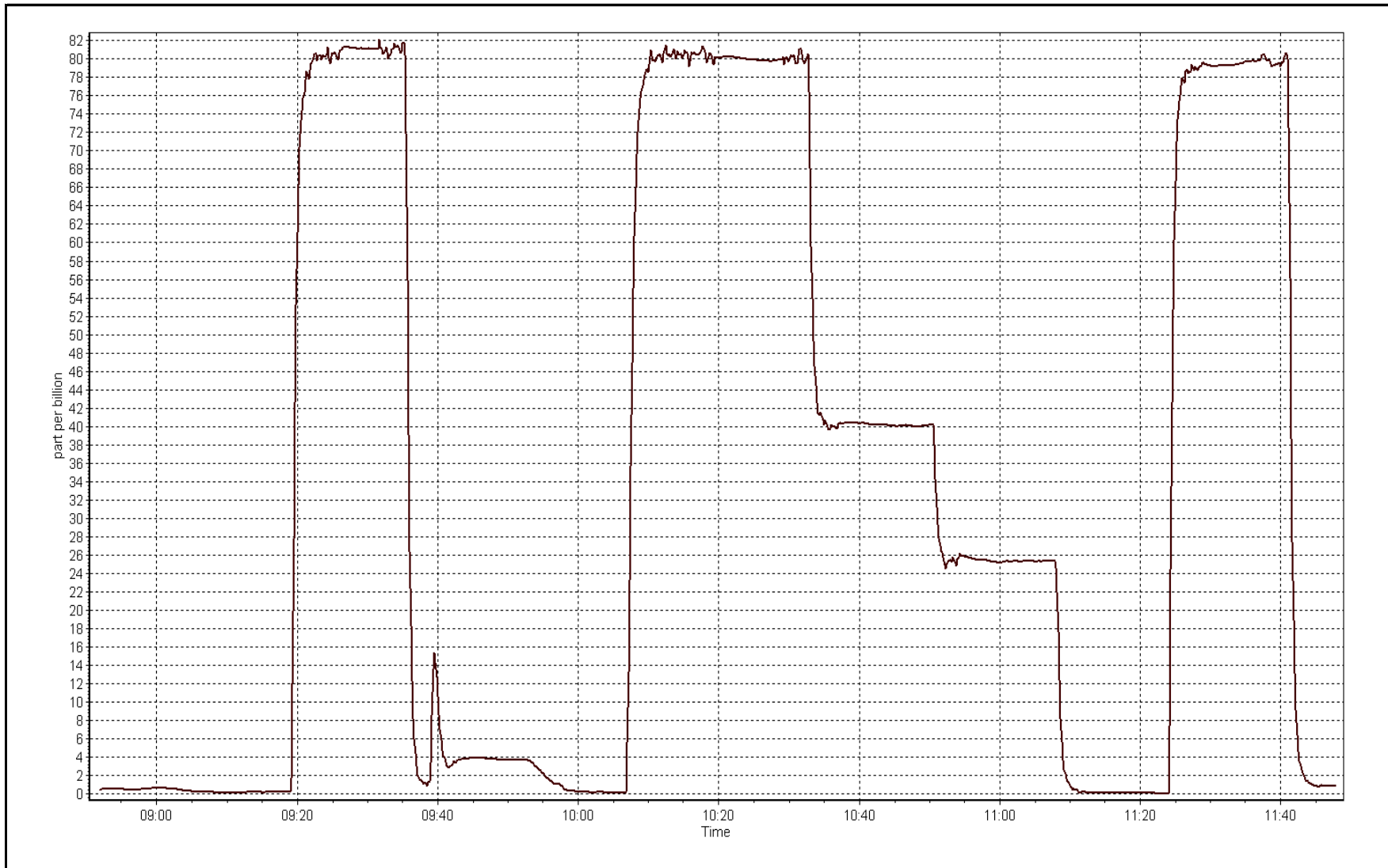
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999999
80.1	80.0	1.0013		
40.1	40.1	1.0001	Slope	1.004300
25.2	25.3	0.9940		
			Intercept	-0.226105



H2S Calibration Plot

Date: October 7, 2015





Wood Buffalo Environmental Association 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	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	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	200.0	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%
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Notes:

Inlet filter replaced and scrubber check done after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



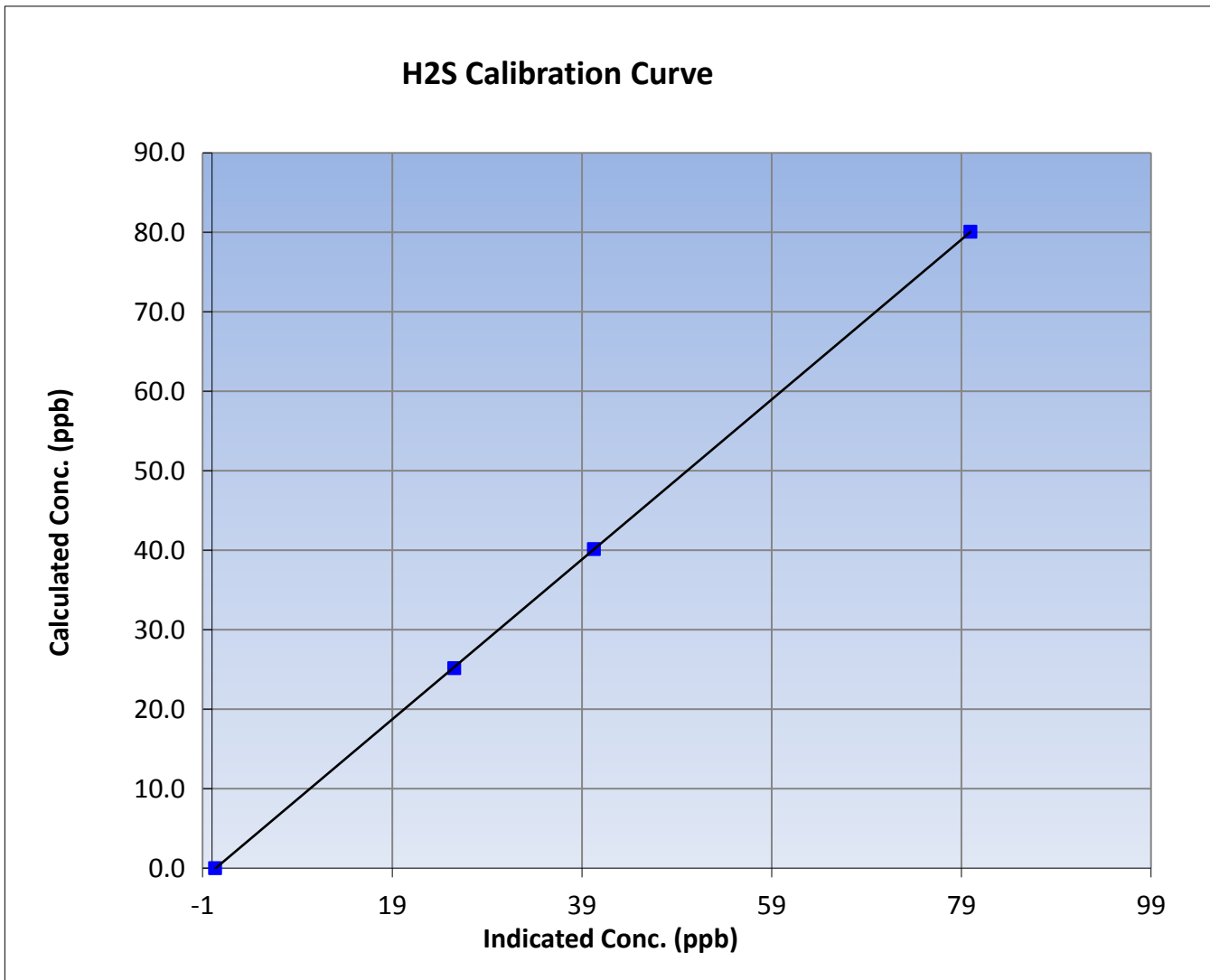
Wood Buffalo Environmental Association H2S Calibration Report

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

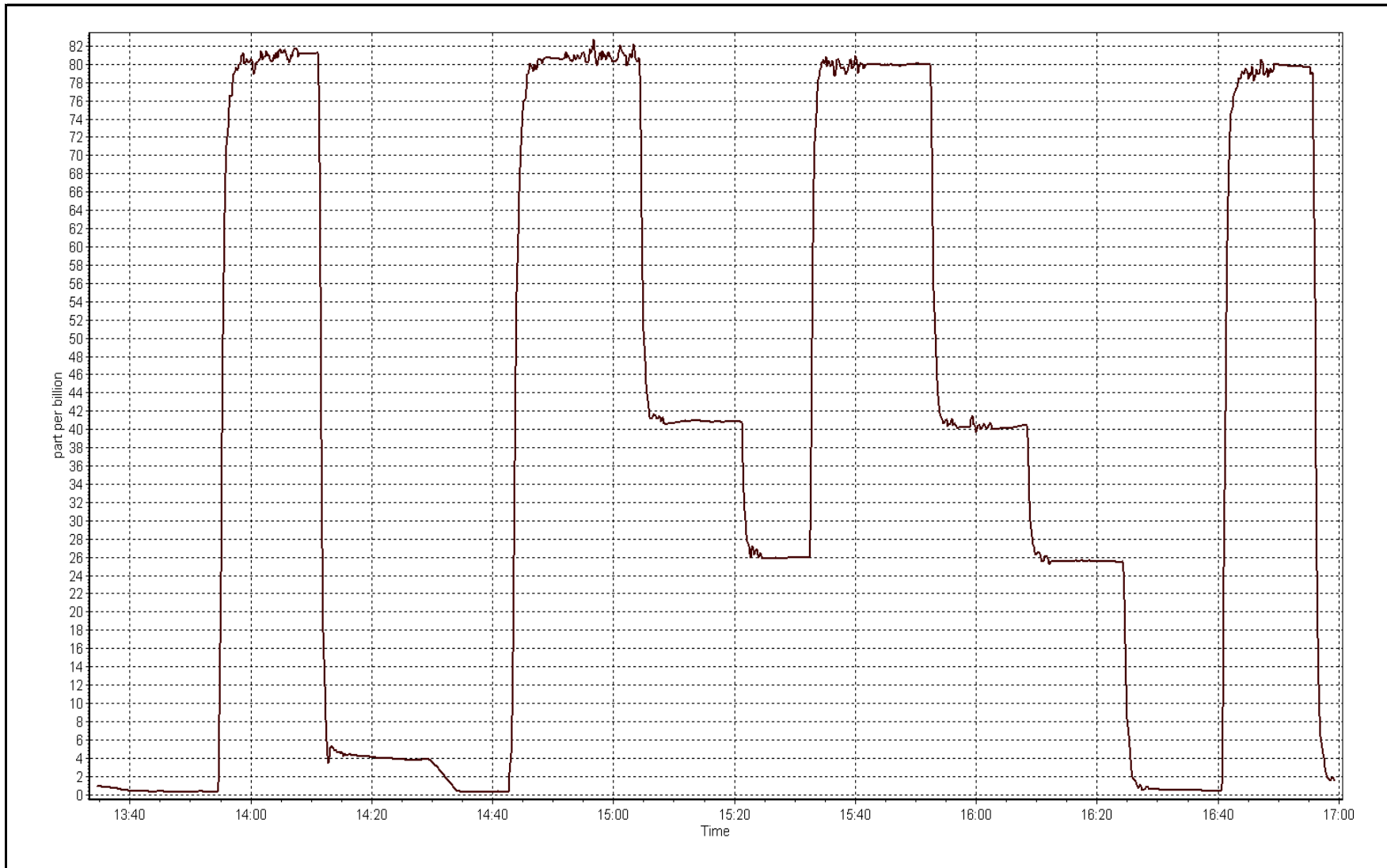
Calibration Data

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



H2S Calibration Plot

Date: November 5, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	December 4, 2015	Last Calibration	November 5, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	14:50	End Time (MST)	17:30
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	513	513
Analyzer IP address	192.168.1.75		Lamp voltage	2114	2067
Calculated slope	1.005983	0.996511	Chamber temp	50	50
Calculated intercept	-0.387990	-0.106875	Pressure	22.9	22.4
Analyzer Background	20.6	21.9	Flow	0.569	0.557
Analyzer Coefficient	0.908	0.915	Intensity	47	47
			Converter temp.	314	315

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	0.6	----
as found span	5000	38.5	80.1	80.5	0.995
SO2 scrubber check	5000	20.7	200.0	4.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.4	0.996
second point	5000	19.3	40.1	40.4	0.993
third point	5000	12.1	25.2	25.5	0.987
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	38.5	80.1	80.3	0.997
Average Correction Factor					0.992

Corrected As found	79.9	Previous response	80.0	% change	0.2%
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Notes:

Inlet filter replaced and scrubber check done after as founds. Adjusted zero.

Calibration Performed By: Asad Hidayat



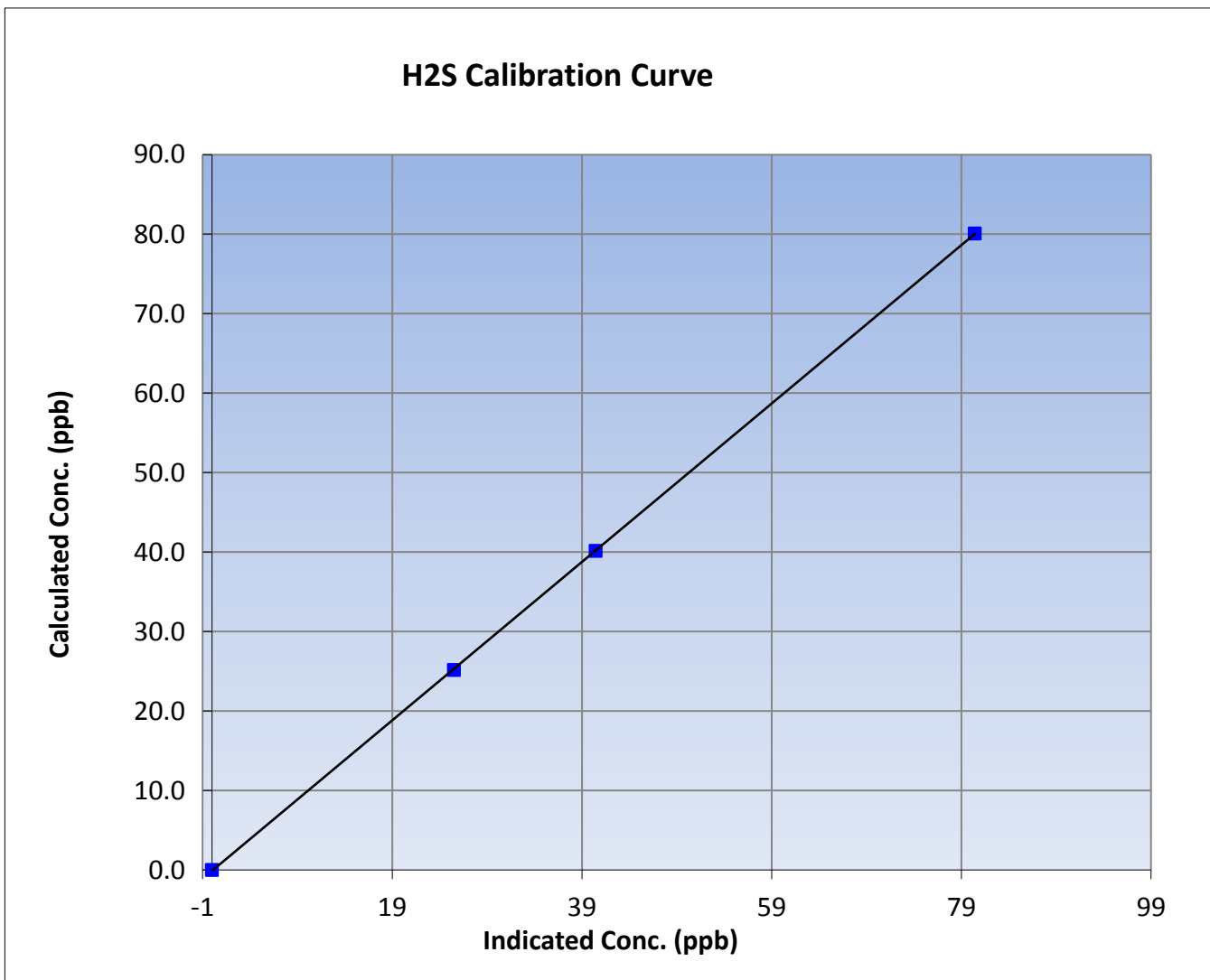
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	December 4, 2015	Previous Calibration	November 5, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	14:50	End Time (MST)	17:30
Analyzer make	API T101	Analyzer serial #	197

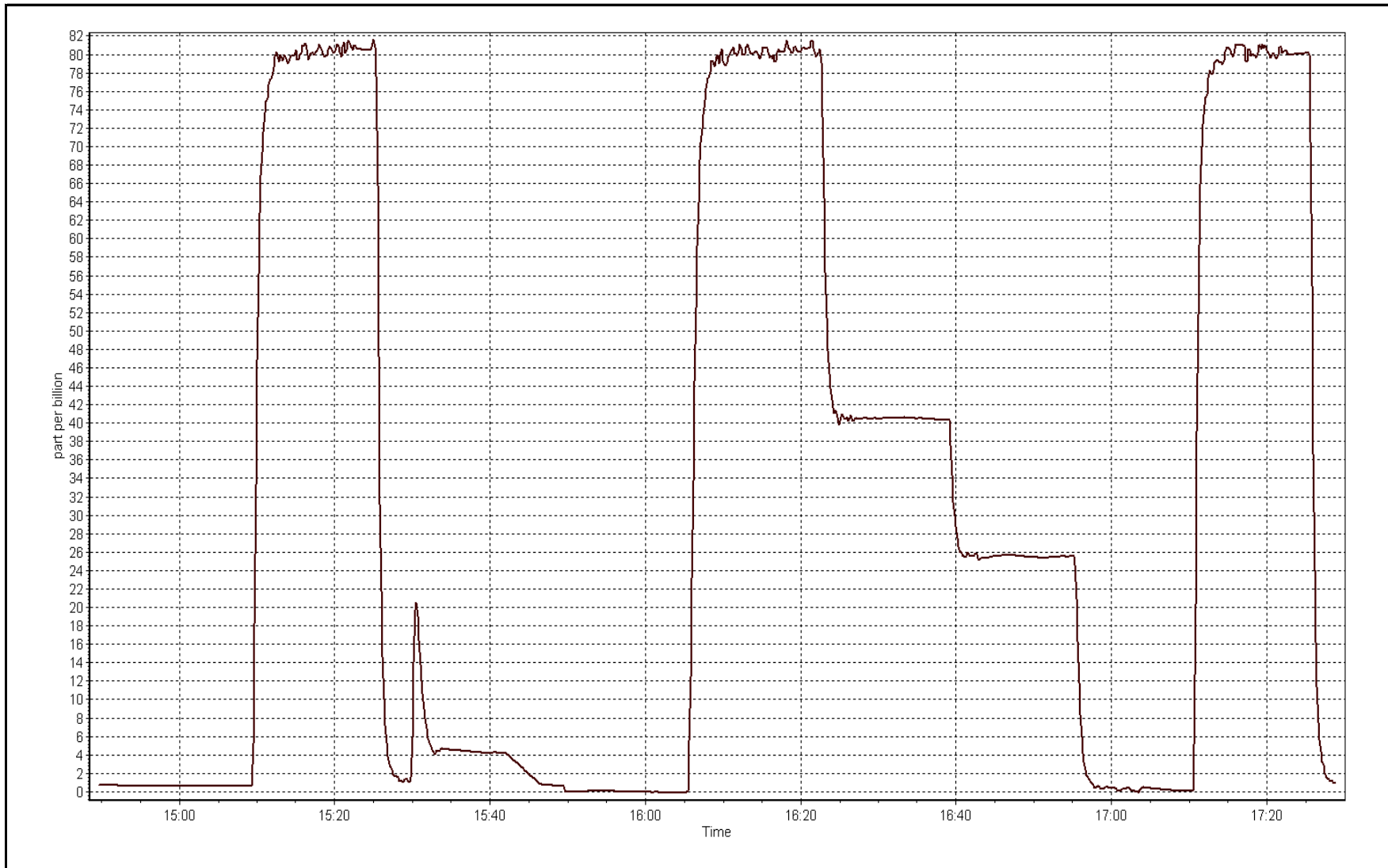
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999988
80.1	80.4	0.9960		
40.1	40.4	0.9927	Slope	0.996511
25.2	25.5	0.9870		
			Intercept	-0.106875



H2S Calibration Plot

Date: December 4, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 21, 2016	Last Calibration	December 4, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	17:52
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	513	497
Analyzer IP address	192.168.1.75		Lamp voltage	2067	2598
Calculated slope	0.996511	0.989837	Chamber temp	50	50
Calculated intercept	-0.106875	-0.169574	Pressure	22.4	23.3
Analyzer Background	21.9	17.4	Flow	0.557	0.613
Analyzer Coefficient	0.915	1.016	Intensity	47	58
			Converter temp.	315	316

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	38.5	80.1	80.2	0.999
SO2 scrubber check	5000	20.7	200.0	3.0	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.9	0.989
second point	5000	19.3	40.1	40.9	0.982
third point	5000	12.1	25.2	25.8	0.976
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	38.5	80.1	81.0	0.989
Average Correction Factor					0.982

Corrected As found	80.2	Previous response	80.5	% change	0.4%
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Notes:

Inlet filter replaced after as founds. Installed new scrubber with new Sox beads. Tweaked lamp voltage up. Also, adjusted PMT since few changes were made to the analyzer (see DOCIT note). Adjusted zero and span.

Calibration Performed By: Asad Hidayat



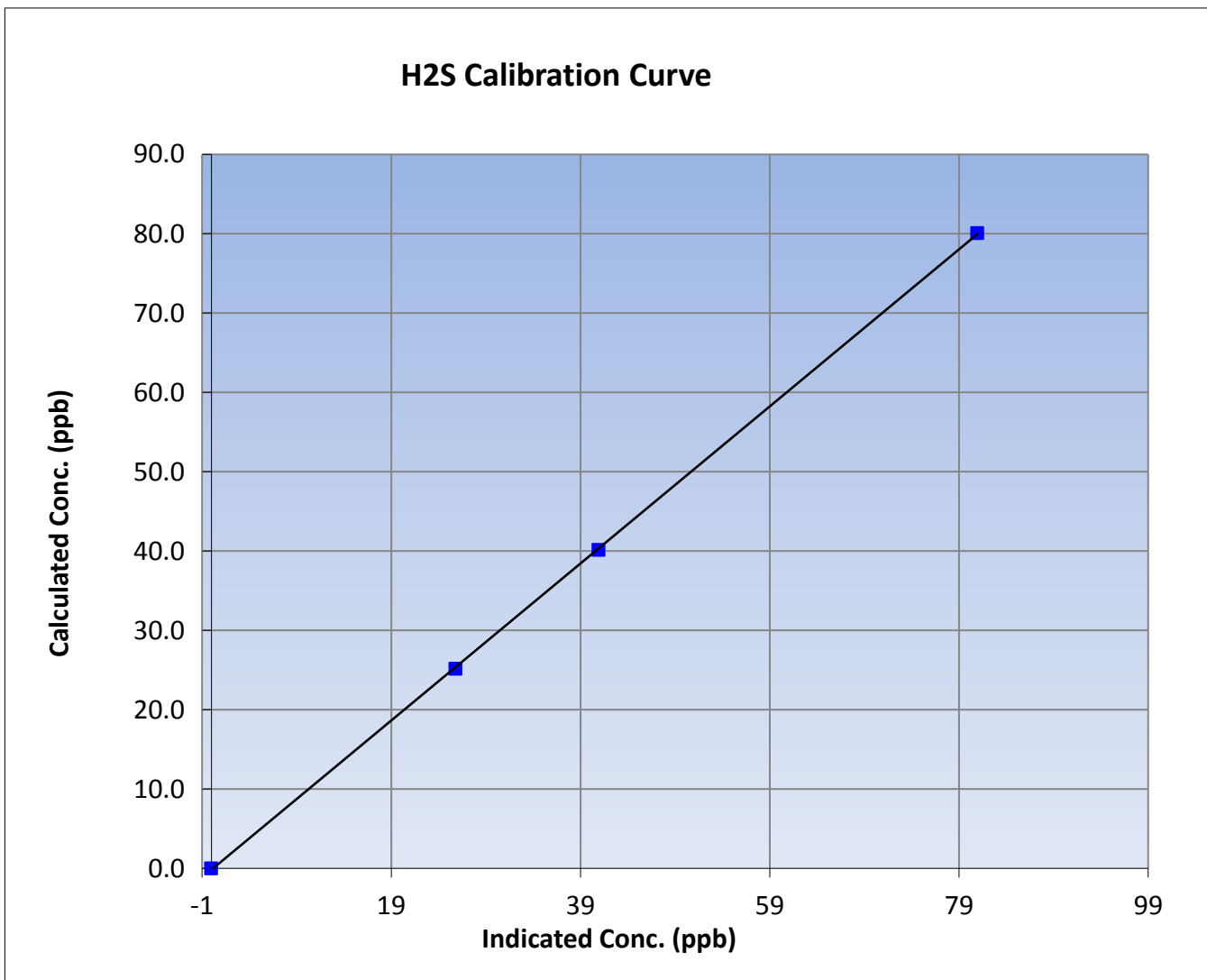
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 21, 2016	Previous Calibration	December 4, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	12:30	End Time (MST)	17:52
Analyzer make	API T101	Analyzer serial #	197

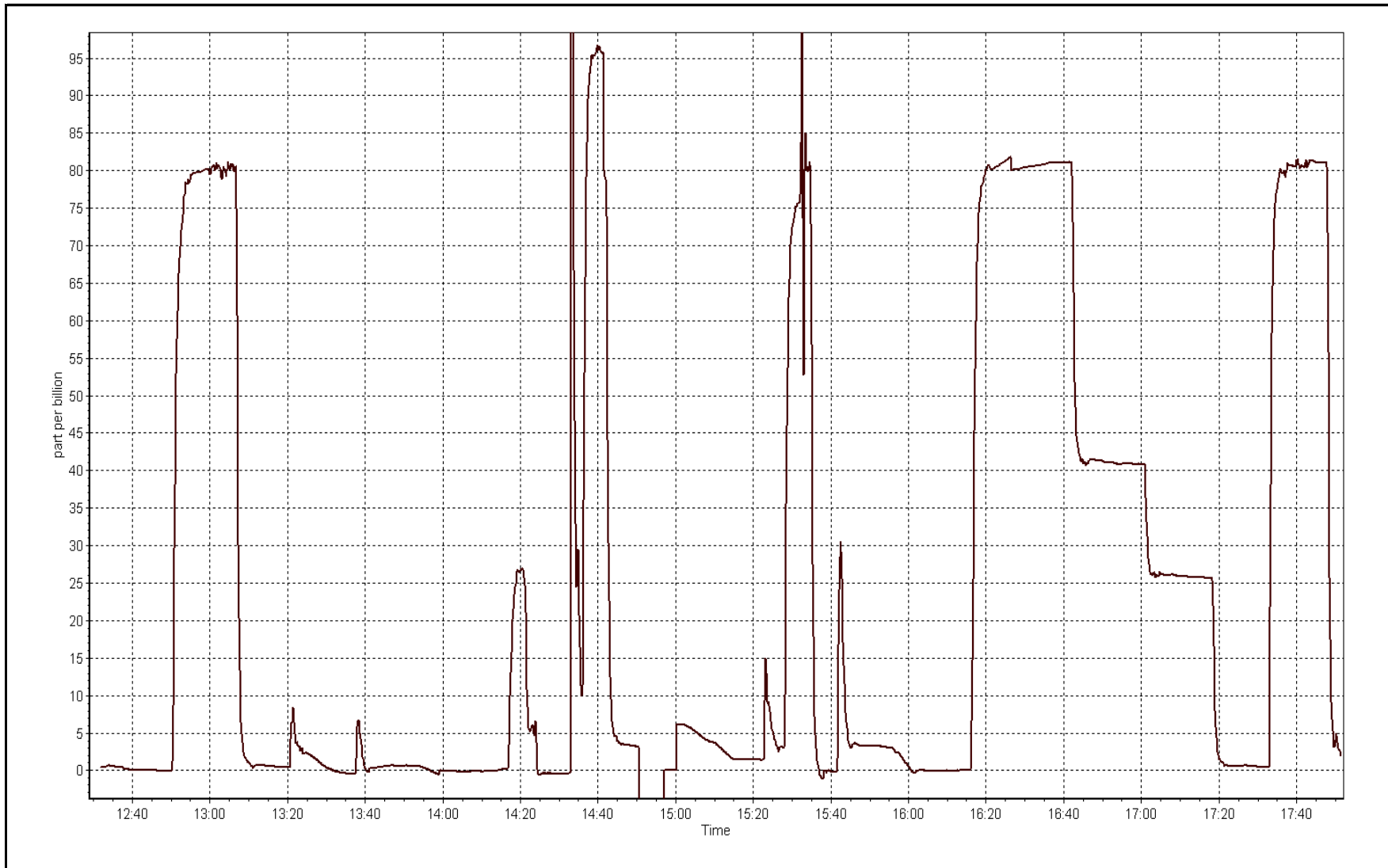
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999963
80.1	80.9	0.9895		
40.1	40.9	0.9818	Slope	0.989837
25.2	25.8	0.9759		
			Intercept	-0.169574



H2S Calibration Plot

Date: January 21, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 16, 2016	Last Calibration	January 21, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	13:18	End Time (MST)	15:55
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	497	496
Analyzer IP address	192.168.1.75		Lamp voltage	2598	2568
Calculated slope	0.989837	0.995422	Chamber temp	50	50
Calculated intercept	-0.169574	0.114634	Pressure	23.3	23.1
Analyzer Background	17.4	17.4	Flow	0.613	0.611
Analyzer Coefficient	1.016	0.999	Intensity	58	57
			Converter temp.	316	316

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	38.5	80.1	81.7	0.981
SO2 scrubber check	5000	20.7	200.0	3.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.4	0.996
second point	5000	19.3	40.1	40.1	1.000
third point	5000	12.1	25.2	25.1	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	38.5	80.1	80.2	0.999
Average Correction Factor					0.999

Corrected As found	81.6	Previous response	81.1	% change	-0.6%
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Notes:

Sample inlet filter replaced after as founds. Scrubber check done after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association H2S Calibration Report

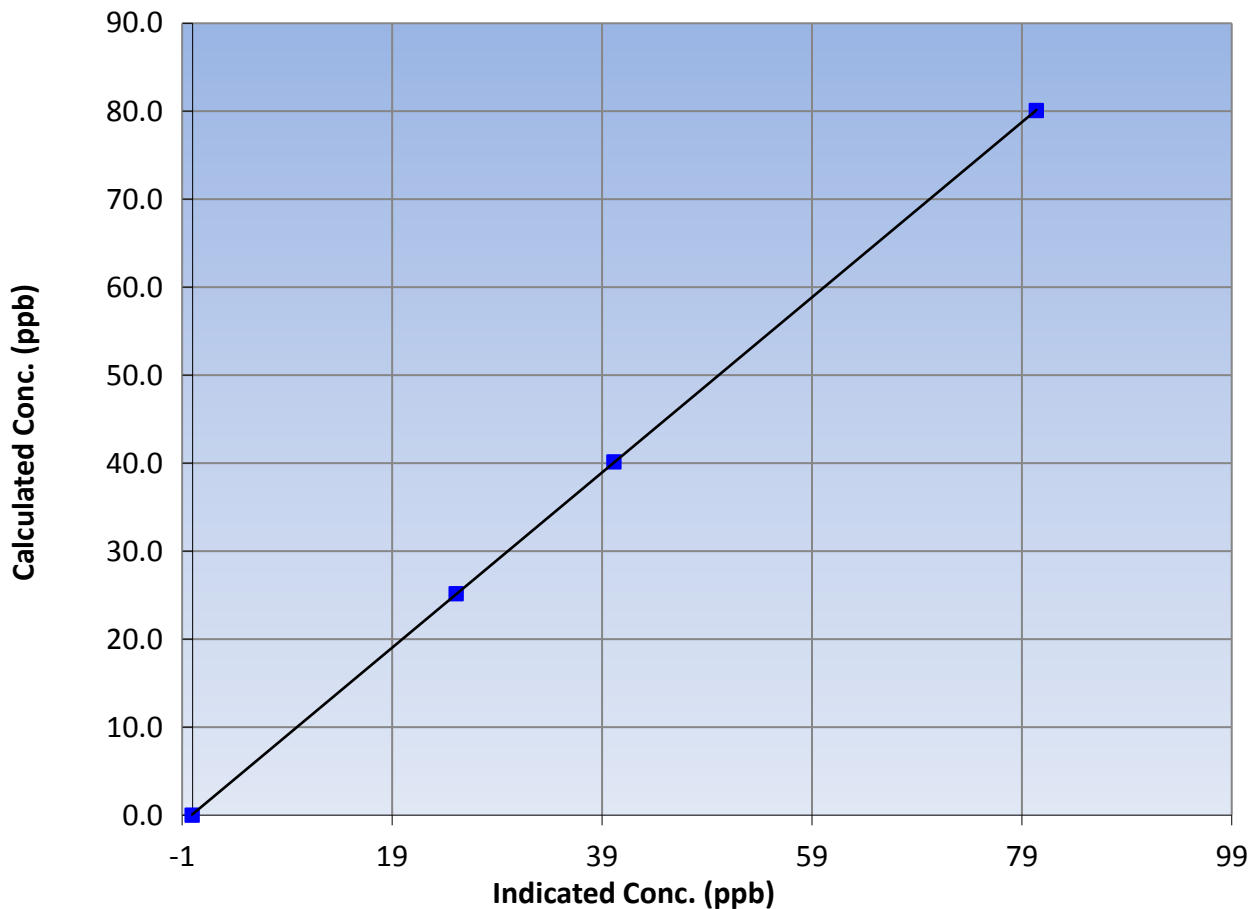
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 21, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:18	End Time (MST)	15:55
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

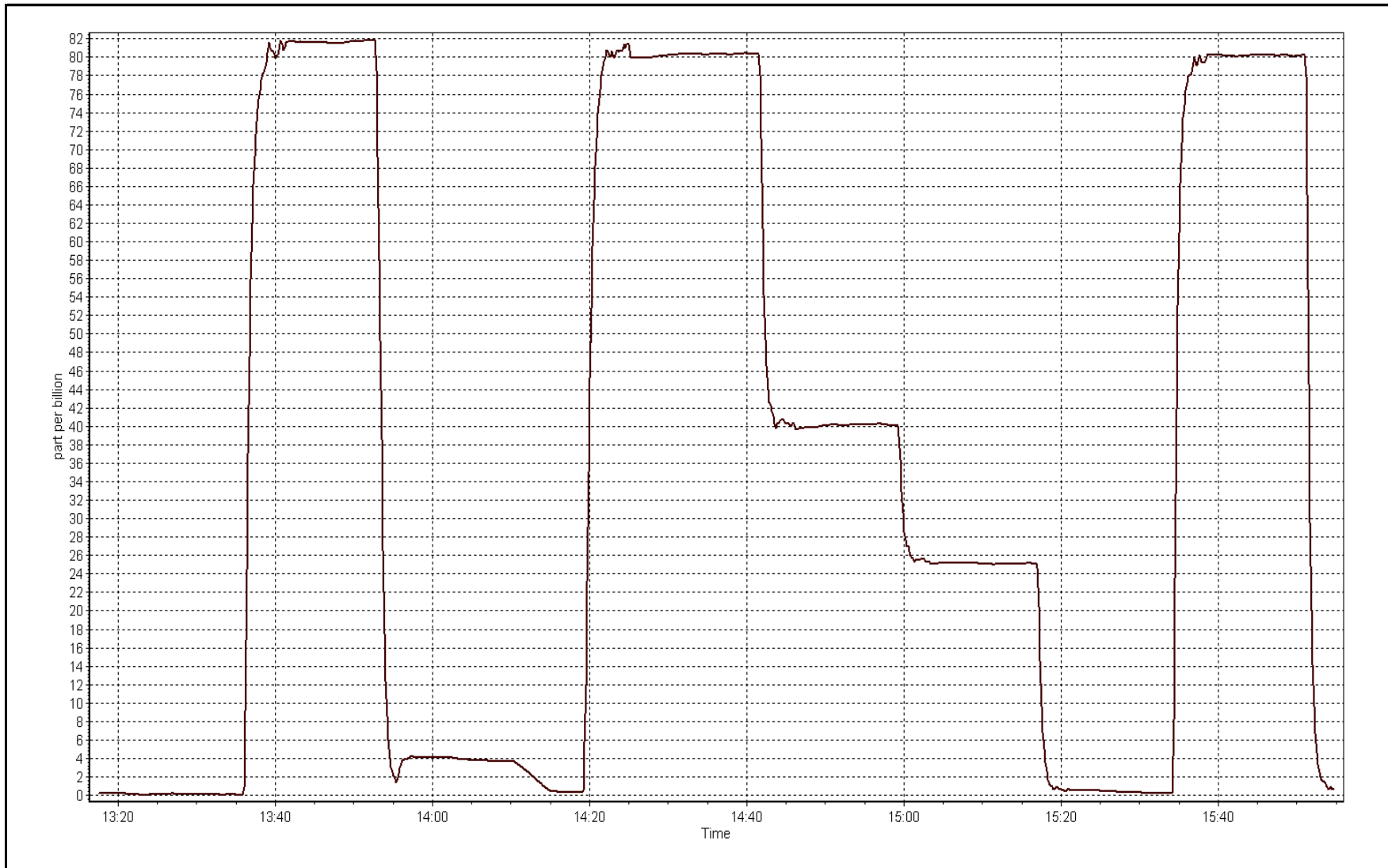
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999995
80.1	80.4	0.9961		
40.1	40.1	1.0003	Slope	0.995422
25.2	25.1	1.0019		
			Intercept	0.114634

H2S Calibration Curve



H2S Calibration Plot

Date: February 16, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 24, 2016	Last Calibration	February 16, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	12:20
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	496	497
Analyzer IP address	192.168.1.75		Lamp voltage	2568	2537
Calculated slope	0.995422	0.995783	Chamber temp	50	50
Calculated intercept	0.114634	0.123892	Pressure	23.1	23.4
Analyzer Background	17.4	18.1	Flow	0.611	0.631
Analyzer Coefficient	0.999	1.003	Intensity	57	56
			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	0.4	----
as found span	5000	38.5	80.1	80.4	0.996
SO2 scrubber check	5000	20.7	200.0	3.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.4	0.996
second point	5000	19.3	40.1	40.1	1.002
third point	5000	12.1	25.2	25.1	1.003
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	38.5	80.1	80.1	1.000
Average Correction Factor					1.000

Corrected As found	80.0	Previous response	80.3	% change	0.4%
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Notes:

Sample inlet filter replaced after as founds. Scrubber check done after as founds. Slightly adjusted zero.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association H2S Calibration Report

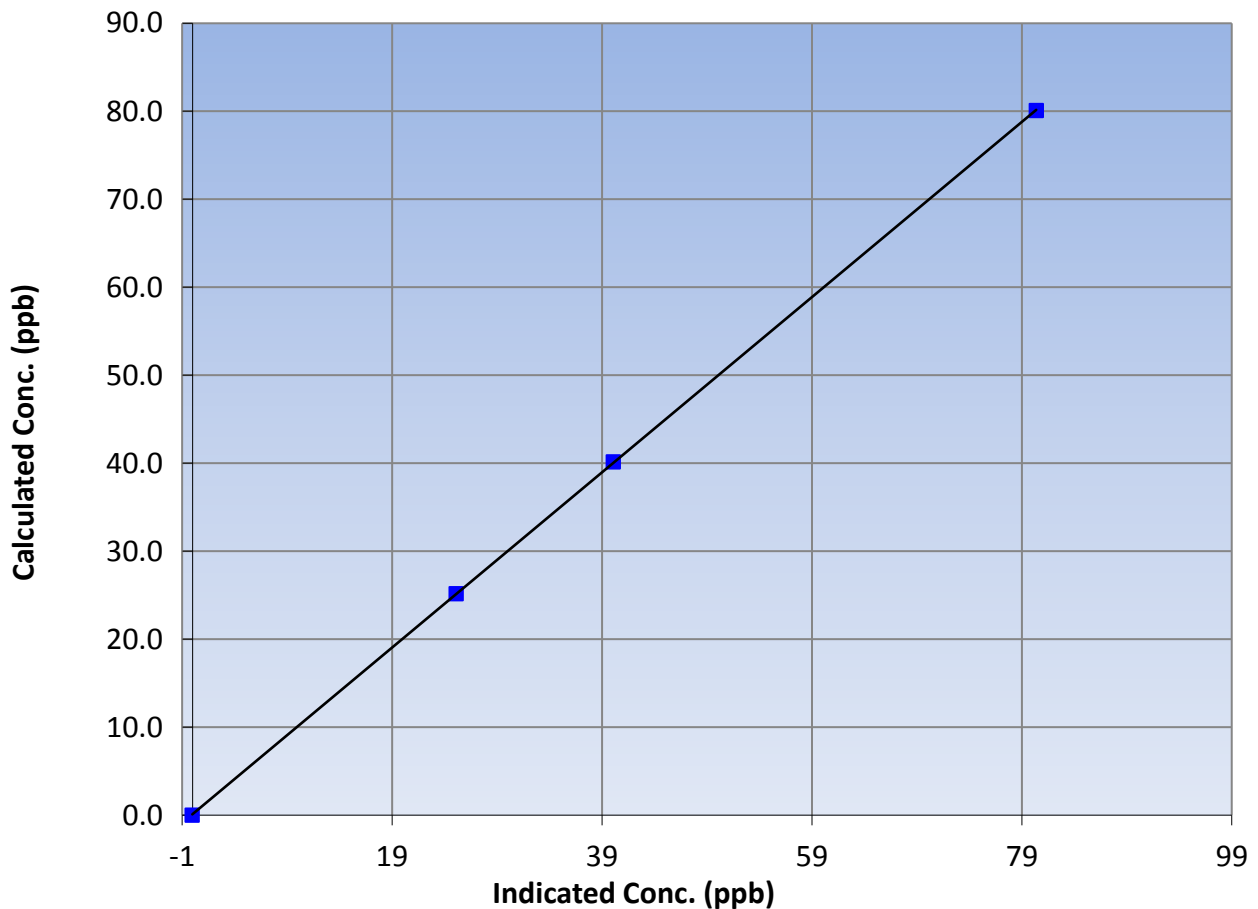
Station Information

Calibration Date	March 24, 2016	Previous Calibration	February 16, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:30	End Time (MST)	12:20
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
80.1	80.4	0.9964		
40.1	40.1	1.0018	Slope	0.995783
25.2	25.1	1.0027		
			Intercept	0.123892

H2S Calibration Curve



H2S Calibration Plot

Date: March 24, 2016

