Wood Buffalo Environmental Association

JANUARY 2016
MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
February 25, 2016

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


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February 25, 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 January 2016
Wood Buffalo Environmental Association

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

The continuous ambient air quality monitoring network stations are:

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

WBEA commissioned a permanent air monitoring station at the Brion MacKay River SAGD facility in early January 2016 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 254465-00-00. The station is located approximately 30 km northwest of Fort McMurray. This station is equipped with ambient air quality analyzers for SO_2, H_2S, THC, NO, NO_2, and NO_x. Temperature, wind speed and direction, and relative humidity are also continuously measured.

In early December 2015, WBEA commissioned a portable air monitoring station at the Cenovus Energy Christina Lake facility. The survey at this location will be conducted from January to December 2016 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 48522-01-00. This station is equipped with ambient air quality analyzers for SO_2, H_2S, NO, NO_2, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

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

Member	**EPEA Approval No.**
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01
Cenovus Energy	48522-01-00
Connacher Oil and Gas Ltd.	240008-00-03
ConocoPhillips Canada	48263-00-00
Devon Canada Corporation	224816-00-03
Finning Canada Ltd.	Not Applicable
Hammerstone Corporation	189942-00-02
Husky Oil Operations Ltd.	206355-00-00
Imperial Oil Ltd.	00046586-00-00
MEG Energy Corporation	00216466-00-04
Nexen Energy ULC.	137467-00-00
Shell Canada Energy	20809-01-00
Statoil Canada Ltd.	241311-00-02
Suncor Energy Inc.	094-02-00
Sunshine Oilsands Ltd.	305529-00-00
Syncrude Canada Ltd.	026-02-00
Teck Resources Ltd.	EIA Application
Total E&P Canada Ltd.	228044-00-00
Williams Energy (Canada) Inc.	73203-01-00

Aboriginal Communities

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

Government and Non-Industrial Organizations

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

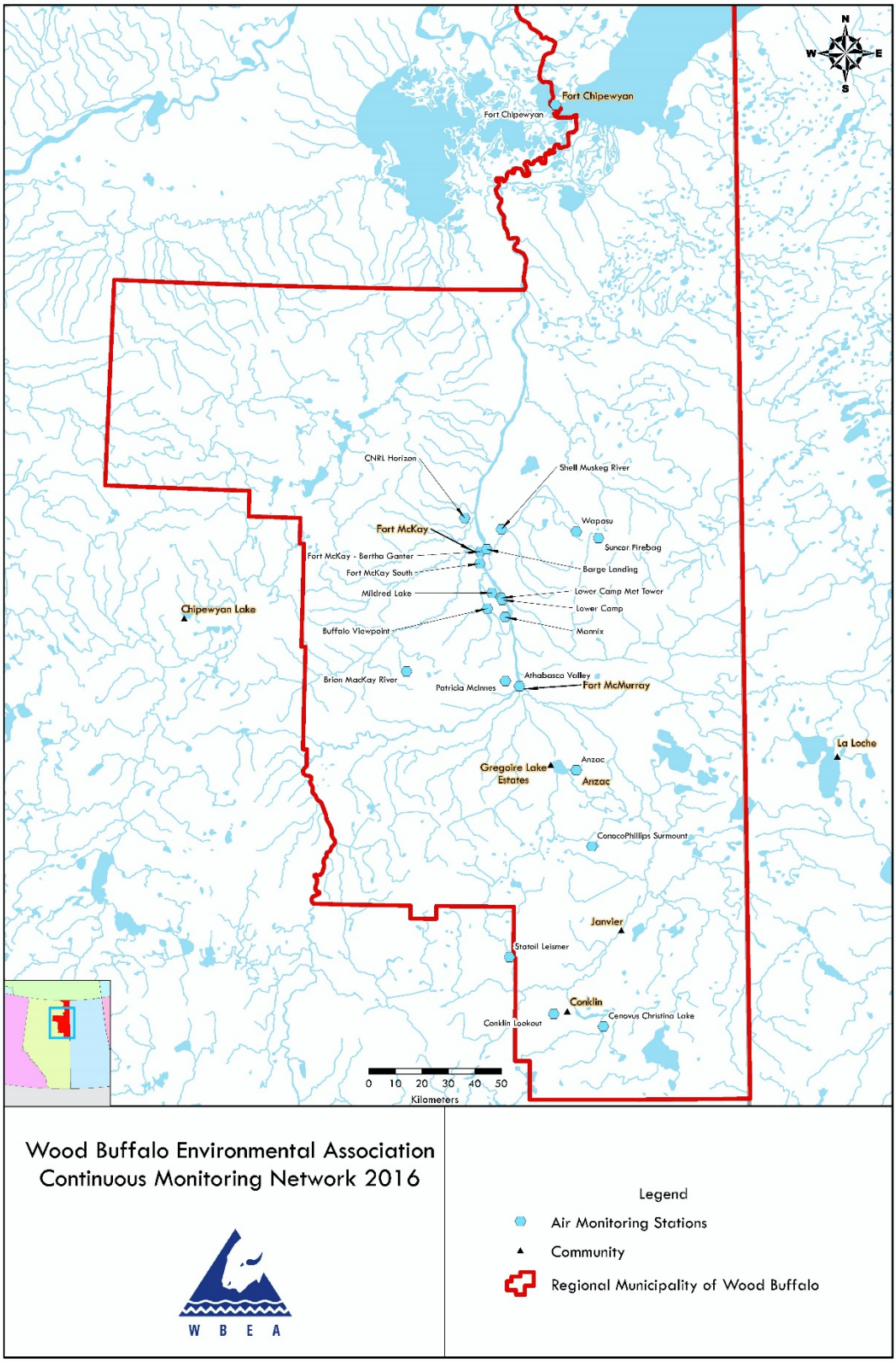

Figure 1: Map of WBEA Air Monitoring Network.

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

1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

There were no ambient concentrations in excess of the air quality objectives as indicated in the Air Monitoring Directive Section III.A.3 (a & b) for SO_2, CO, NO_2, NH_3, and O_3.

There were 3 H_2S ambient ground level concentrations in excess of the 1-hour and 24-hour H_2S air quality objectives reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there was 1 concentration in excess of the 1-hour H_2S air quality objective. There were 1 1-hour and 1 24-hour objective exceedances reported in real-time that were found not to be in exceedance after data processing.

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

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

					Concentration ppb or ug/m^3		
Site	Parameter	Date / Time	Reference	Period	Reported	Final	Status
AMS 2 Mildred Lake	H_2S	26Jan16:24:00	307675	24hr	4	3.3	nae
AMS 11 Lower Camp	H_2S	24Jan16:13:00	307599	1hr	11	11	exc
AMS 14 Anzac	TRS	08Jan16:04:00	307152	1hr	10	-	ret
AMS 16 Shell Muskeg River	$PM_{2.5}$	16Jan16:24:00	307379	24hr	35	34.6	exc

*status legend:

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

1.1 Data Processing and Validation

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

After data processing and validation, NO_2 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 NO_2 concentration. In cases where the NO_X and/or NO values exceeded the operating range of the analyzer, values reported for NO_2 were determined as the largest of either the difference between baseline-corrected NO_X and NO values, or the NO_2 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.

2.0 Operational Status

Continuous Monitoring

The wind speed and direction sensors at AMS 8 – Fort Chipewyan operated less than 90% of the time in January 2016. Data was invalidated during periods of flat-line in the sensors output signal, which coincided with freezing temperatures and precipitation. The remote location of this air monitoring station prevented an immediate response to repair the frozen sensors.

On February 2, 2016, the frozen sensors were removed and replaced with backup sensors to restore normal operations during a monthly station visit for routine calibrations and maintenance.

After data processing and validation, wind sensor data was valid for 88% of the time in January, 2016. This incident was reported to Alberta Environment and Parks on February 1, 2016 (reference number 307830).

Intermittent Monitoring

The results for passive and integrated monitoring of PAH, VOC, RSC, $PM_{2.5}$ and PM_{10} 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 (NH_3) analyzer currently operates on a 0 to 2500 ppb operating range with a detection level of 5 ppb in the WBEA network. In data processing, values less than 5 ppb have been considered below detection levels and are reported as zero.

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

Station 1, Fort McKay - Bertha Ganter

The NH_3 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 NH_3 gas is an inherent behavior in the NH_3 analyzer operations resulting from the properties of the NH_3 gas. Data for 1 to 2 hours following the daily spans have been reported as invalid for a total of 49 hours this month. Recovery following a routine monthly calibration on January 20 interrupted the normal operations of the analyzer for 7 hours; this additional recovery time was due to preventative maintenance performed during the calibration.

Maintenance to confirm calibration points for the ozone calibration on January 22 interrupted the routine operations of the NO_2 analyzer for 2 hours.

Station operator activities on January 7 interrupted the routine operations of the $PM_{2.5}$ analyzer for 1 hour. Unstable operation due to negative baseline drift on January 29 affected the normal operations of the $PM_{2.5}$ analyzer for 5 hours.

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

Station 2, Mildred Lake

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

Station 3, Lower Camp B - Meteorology

Flat lines in output signals of the sonic wind sensors at 45, 100, and 167 m elevations resulted in 10, 41, and 19 hours of downtime for each respective sensor.

Station 4, Buffalo Viewpoint

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

Station 5, Mannix

Maintenance and cleaning of the sample manifold on January 12 interrupted the normal operations of the H_2S analyzer for 2 hours.

Flat lines in output signals of the sonic wind sensors at 20, 45, 75, and 90 m elevations resulted in 1, 4, 34, and 10 hour(s) of downtime for each respective sensor.

Station 6, Patricia McInnes

The NH_3 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 NH_3 gas is an inherent behavior in the NH_3 analyzer operations resulting from the properties of the NH_3 gas. Data for 1 hour following each daily span has been reported as invalid for a total of 31 hours this month.

Maintenance and cleaning of the sample manifold on January 11 interrupted the normal operations of the TRS, O_3, NO_2, and NH_3 analyzers for 4 hours.

Depletion and replacement of the carrier gas cylinder at the station on January 15 interrupted the normal operations of the THC analyzer for 2 hours.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on January 8 interrupted the normal operations of the SO_2, TRS, THC, NO_2, and CO analyzers for 1 hour.

Multiple instances of unstable operation due to excessive baseline drift on January 29 affected the normal operations of the $PM_{2.5}$ analyzer for 7 hours.

Station 8, Fort Chipewyan

Maintenance and repairs to the sample manifold on January 7 and 8 interrupted the normal operations of the SO_2, NO_2, and O_3 analyzers for a total of 3 hours.

Maintenance to confirm the baseline response of the $PM_{2.5}$ analyzer on January 8 resulted in 1 hour of invalid data.

A manually initiated remote check of the daily zero/span response on January 11 interrupted the normal operations of the O_3 analyzer for 1 hour.

An observable shift in the baseline of the leaf wetness sensor on January 28 corresponds with a period of warmer temperature and precipitation; station operator observations on February 2 indicate built up ice on surfaces at this location.

Flat-lines in the output signal of the wind sensor resulted in 88 hours of invalid data this reporting period. The sensor was replaced on February 2 during a routine site visit.

Station 9, Barge Landing

Station operator activities with the zero air generator on January 7 affected the normal operations of the THC analyzer for 1 hour.

A power spike at the monitoring station on January 24 interrupted the normal operations of the THC analyzer for 1 hour.

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

Station 11, Lower Camp

Maintenance and cleaning of the sample manifold on January 14 interrupted the normal operations of the SO_2 analyzer for 2 hours.

Maintenance to lower the meteorological tower for access to the visibility sensor on January 8 affected the normal operations of the wind sensor for 1 hour.

Station 13, Fort McKay South

Flat-lines in the output signal of the wind sensor resulted in 42 hours of invalid data this reporting period.

Station 14, Anzac

Low shelter temperature on January 3 affected the normal operations of the THC analyzer, resulting in 22 hours of invalid data. The HVAC system was repaired on January 4 and station temperature was stabilized.

The SO_2 analyzer experienced instances of unstable operations resulting in 45 hours of invalid data this reporting period.

A station power spike on January 23 affected the normal operations of the SO_2 and NO_2 analyzers for 1 hour; a subsequent station power failure interrupted the operations of all air quality analyzers for 2 to 3 hours.

The sample pump of the TRS analyzer became disconnected on January 7 interrupting the normal operations of the analyzer for 25 hours. Maintenance to secure the pump and verify analyzer operation resulted in an additional 1 hour of invalid data.

The $PM_{2.5}$ analyzer experienced multiple instances of excessive baseline drift resulting in a total of 6 hours of invalid data this reporting period. Maintenance to restart the analyzer on January 25 interrupted the routine operations of the $PM_{2.5}$ analyzer for 1 hour. Maintenance to adjust the baseline on January 27 affected the normal operations of the analyzer for 1 hour.

Maintenance to clean and confirm the functionality of the precipitation collector on January 15 resulted in 1 hour of invalid data.

Flat-lines in the output signal of the wind sensor resulted in 22 hours of invalid data this reporting period.

Station 15, CNRL Horizon

A station power outage on January 26 interrupted the normal operations of all air quality analyzers for 7 hours. The SO_2 and THC analyzers required an additional hour to stabilize after power was restored.

The TRS converter failed to return to operating conditions after the station power outage on January 26 resulting in 20 hours of invalid data. An additional 4 hours of maintenance was required to replace the converter and re-calibrate the analyzer.

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

Station 16, Shell Muskeg River

Station operator maintenance activities on January 4 interrupted the normal operations of the THC analyzer for 2 hours.

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

Station 17, Wapasu

Unstable operation caused by excessive baseline drift on January 30 interrupted the normal operations of the $PM_{2.5}$ analyzer for 3 hours.

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

Station 18, Conklin Lookout

Maintenance and cleaning of the sample manifold on January 15 interrupted the normal operations of the TRS and O_3 analyzers for 3 hours.

Maintenance to confirm ozone calibration points on January 20 interrupted the normal operations of the NO_2 analyzer for 2 hours.

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

Unstable operation due to exceeding the upper range of the surface leaf wetness sensor on January 29 resulted in 3 hours of invalid data.

Station 19, Firebag

Maintenance and cleaning of the sample manifold on January 12 interrupted the normal operations of the H_2S and NO_2 analyzers for 2 hours.

Unstable operation due to low shelter temperature on January 13 affected the normal operations of the NO_2 analyzer for 33 hours.

Flat-lines in the output signal of the wind sensor resulted in 20 hours of invalid data this reporting period. Maintenance on January 12 to remove ice build-up from the wind sensor resulted in an additional 1 hour of invalid data.

Station 20, Brion MacKay River

Maintenance to the datalogger on January 11 resulted in the interruption of H_2S and NO_2 analyzer data capture for 1 hour.

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

Station 500, Cenovus Christina Lake

Unstable operation due to low shelter temperature on January 16 affected the normal operations of the NO_2 analyzer for 34 hours. A portable space heater was installed to supplement the HVAC system on January 17; once shelter temperature was stabilized, maintenance to confirm analyzer function interrupted the operations of the NO_2 analyzer for 1 hour.

Station 501, Statoil Leismer

Maintenance on January 19 to remotely verify the daily zero and span response interrupted the normal operations of the SO_2 and H_2S analyzers for 1 hour.

The automated daily zero/span response of the H_2S analyzer did not meet operational criteria on January 19. Station operator activities to investigate and verify analyzer response interrupted the routine operations of the H_2S analyzer for 2 hours.

The H_2S analyzer experienced multiple instances of unstable operations due to excessive baseline drift resulting in 17 hours of invalid data this reporting period.

Station 502, ConocoPhillips Surmont

The H_2S analyzer experienced multiple instances of unstable operations due to excessive baseline drift resulting in 7 hours of invalid data this reporting period.

The SO_2 analyzer experienced multiple instances of unstable operations due to excessive baseline drift resulting in 35 hours of invalid data this reporting period.

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

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

Yours sincerely,

Wood Buffalo Environmental Association

Michael Martineau
Data Technician

Sanjay Prasad
Air Quality Scientist

R00_1601_L01

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

JANUARY 2016

Prepared: Feb 22 2016 11:23

APPROVAL NUMBERS	REPORT DATE MONTH	REPORT DATE YEAR
289664-00-00	1	2016
254465-00-00		
149968-00-01		
48522-01-00		
240008-00-03		
48263-00-00		
224816-00-03		
189942-00-02		
206355-00-00		
46586-00-00		
216466-00-04		
137467-00-00		
20809-01-00		
241311-00-00		
094-02-00		
305529-00-00		
026-02-00		
228044-00-00		
73203-01-00		

CONTINUOUS AMBIENT MONITORING

PARAMETER	STN. NO.	% TIME OPERATIONAL	ONE-HOUR AVERAGE MAXIMUM CONCENTRATION	ONE-HOUR AVERAGE NO. READINGS > REGULATION	24-HOUR AVERAGE MAXIMUM CONCENTRATION	24-HOUR AVERAGE NO. READINGS > REGULATION
SO2(ppm)	1	100.00	0.014	0	0.002	0
SO2(ppm)	2	100.00	0.039	0	0.012	0
SO2(ppm)	4	100.00	0.018	0	0.003	0
SO2(ppm)	5	100.00	0.042	0	0.009	0
SO2(ppm)	6	100.00	0.036	0	0.005	0
SO2(ppm)	7	99.87	0.015	0	0.003	0
SO2(ppm)	8	99.60	0.010	0	0.004	0
SO2(ppm)	11	99.73	0.087	0	0.017	0
SO2(ppm)	13	100.00	0.005	0	0.001	0
SO2(ppm)	14	93.41	0.016	0	0.003	0
SO2(ppm)	15	98.92	0.019	0	0.006	0
SO2(ppm)	16	100.00	0.032	0	0.015	0
SO2(ppm)	17	100.00	0.053	0	0.006	0
SO2(ppm)	18	100.00	0.005	0	0.002	0
SO2(ppm)	19	100.00	0.082	0	0.009	0
SO2(ppm)	20	100.00	0.044	0	0.003	0
SO2(ppm)	500	100.00	0.016	0	0.002	0
SO2(ppm)	501	99.87	0.013	0	0.002	0
SO2(ppm)	502	95.30	0.018	0	0.004	0
H2S(ppm)	2	100.00	0.010	0	0.003	0
H2S(ppm)	4	100.00	0.005	0	0.001	0
H2S(ppm)	5	99.73	0.005	0	0.002	0
H2S(ppm)	11	100.00	0.011	1	0.002	0
H2S(ppm)	17	100.00	0.001	0	0.001	0
H2S(ppm)	19	99.73	0.002	0	0.001	0
H2S(ppm)	20	99.82	0.004	0	0.001	0
H2S(ppm)	500	100.00	0.001	0	0.000	0
H2S(ppm)	501	97.31	0.001	0	0.000	0
H2S(ppm)	502	99.06	0.001	0	0.001	0
TRS(ppm)	1	100.00	0.005	0	0.003	0
TRS(ppm)	6	99.46	0.001	0	0.001	0
TRS(ppm)	7	99.87	0.002	0	0.001	0
TRS(ppm)	9	100.00	0.004	0	0.002	0
TRS(ppm)	13	100.00	0.003	0	0.001	0
TRS(ppm)	14	96.10	0.002	0	0.001	0
TRS(ppm)	15	95.83	0.001	0	0.001	0
TRS(ppm)	18	99.60	0.001	0	0.001	0
THC(ppm)	1	100.00	3.4	-	2.7	-
THC(ppm)	2	100.00	5.8	-	3.4	-
THC(ppm)	4	100.00	4.1	-	2.9	-
THC(ppm)	5	100.00	4.4	-	3.1	-
THC(ppm)	6	99.73	3.3	-	2.6	-
THC(ppm)	7	99.87	3.1	-	2.4	-
THC(ppm)	9	99.73	4.2	-	3.3	-
THC(ppm)	11	100.00	4.7	-	3.1	-
THC(ppm)	13	100.00	4.8	-	3.1	-
THC(ppm)	14	96.51	3.1	-	2.3	-
THC(ppm)	15	98.92	5.5	-	3.1	-
THC(ppm)	16	99.73	5.8	-	3.7	-
THC(ppm)	17	100.00	3.7	-	2.5	-
THC(ppm)	18	100.00	2.6	-	2.4	-
THC(ppm)	19	100.00	2.7	-	2.5	-
THC(ppm)	20	100.00	3.0	-	2.8	-
O3(ppm)	1	100.00	0.040	0	0.033	-
O3(ppm)	6	99.46	0.043	0	0.038	-
O3(ppm)	7	100.00	0.037	0	0.031	-
O3(ppm)	8	99.46	0.040	0	0.036	-

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JANUARY 2016

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137467-00-00		
20809-01-00		
241311-00-02		
094-02-00		
305529-00-00		
026-02-00		
228044-00-00		
73203-01-00		

CONTINUOUS AMBIENT MONITORING

PARAMETER	STN. NO.	% TIME OPERATIONAL	ONE-HOUR AVERAGE MAXIMUM CONCENTRATION	ONE-HOUR AVERAGE NO. READINGS > REGULATION	24-HOUR AVERAGE MAXIMUM CONCENTRATION	24-HOUR AVERAGE NO. READINGS > REGULATION
O3(ppm)	13	100.00	0.039	0	0.032	-
O3(ppm)	14	99.60	0.044	0	0.042	-
O3(ppm)	17	100.00	0.041	0	0.036	-
O3(ppm)	18	99.60	0.048	0	0.044	-
NO2(ppm)	1	99.73	0.033	0	0.024	-
NO2(ppm)	6	99.46	0.041	0	0.022	-
NO2(ppm)	7	99.87	0.032	0	0.017	-
NO2(ppm)	8	99.60	0.021	0	0.008	-
NO2(ppm)	13	100.00	0.034	0	0.021	-
NO2(ppm)	14	99.46	0.025	0	0.010	-
NO2(ppm)	15	99.06	0.030	0	0.019	-
NO2(ppm)	16	100.00	0.042	0	0.027	-
NO2(ppm)	17	100.00	0.030	0	0.010	-
NO2(ppm)	18	99.73	0.019	0	0.007	-
NO2(ppm)	19	95.30	0.035	0	0.015	-
NO2(ppm)	20	99.84	0.046	0	0.025	-
NO2(ppm)	500	95.30	0.036	0	0.016	-
NO2(ppm)	501	100.00	0.015	0	0.007	-
NO2(ppm)	502	100.00	0.029	0	0.010	-
CO(ppm)	7	99.87	0.7	0	0.3	-
NH3(ppm)	1	92.47	0.000	0	0.000	-
NH3(ppm)	6	95.30	0.011	0	0.000	-
PM2.5(ug/m3)	1	99.19	44.3	-	15.2	0
PM2.5(ug/m3)	6	100.00	81.1	-	15.7	0
PM2.5(ug/m3)	7	99.06	148.1	-	23.8	0
PM2.5(ug/m3)	8	99.87	15.9	-	7.6	0
PM2.5(ug/m3)	13	100.00	20	-	12.7	0
PM2.5(ug/m3)	14	98.66	44.3	-	18.7	0
PM2.5(ug/m3)	15	99.06	59.7	-	18	0
PM2.5(ug/m3)	16	100.00	150.7	-	34.6	1
PM2.5(ug/m3)	17	99.60	18.4	-	10.2	0
PM2.5(ug/m3)	18	100.00	23.2	-	9.3	0
WIND	1	100.00	-	-	-	-
WIND	2	99.73	-	-	-	-
WIND	4	99.87	-	-	-	-
WIND	5	99.87	-	-	-	-
WIND	6	100.00	-	-	-	-
WIND	7	100.00	-	-	-	-
WIND	8	88.17	-	-	-	-
WIND	9	98.79	-	-	-	-
WIND	11	99.87	-	-	-	-
WIND	13	94.35	-	-	-	-
WIND	14	97.04	-	-	-	-
WIND	15	99.46	-	-	-	-
WIND	16	99.73	-	-	-	-
WIND	17	99.06	-	-	-	-
WIND	18	99.06	-	-	-	-
WIND	19	97.18	-	-	-	-
WIND	20	99.02	-	-	-	-
WIND	500	100.00	-	-	-	-
WIND	501	100.00	-	-	-	-
WIND	502	98.92	-	-	-	-

SIGNATURE OF ASSOCIATION REPRESENTATIVE

FOR ALBERTA ENVIRONMENT USE ONLY

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)
JANUARY 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	14	0	2	0
TRS(ppb) Average	709	35	35	100.00	5	0	3	0
THC(ppm) Average	709	35	35	100.00	3.4	-	2.7	-
NMHC(ppm) Average	709	35	35	100.00	0.529	-	0.233	-
CH4(ppm) Average	709	35	35	100.00	3.1	-	2.5	-
O3 (ppb) Average	709	35	35	100.00	40	0	33	-
NO2 (ppb) Average	706	36	38	99.73	33	0	24	-
NO (ppb) Average	706	36	38	99.73	84	-	34	-
NOX (ppb) Average	706	36	38	99.73	113	-	53	-
NH3 (ppb) Average	646	42	98	92.47	0	0	0	-
PM2.5 (ug/m3) Average	736	2	8	99.19	44.3	-	15.2	0
Wind Speed 10 m (km/h) Average	744	0	0	100.00	18	-	7	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	6.9	-	2.1	-
Temperature 10 m (C) Average	744	0	0	100.00	6.9	-	3.3	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	92	-
Precipitation (mm) Total	744	0	0	100.00	1.6	-	3.6	-
Leaf Wetness (% of range) Average	744	0	0	100.00	60	-	13	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	236	-	44	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.9	1	-	0	0	0	0	1	2	14
TRS (ppb) Average	709	0.8	1	-	0	0	0	1	1	1	5
THC (ppm) Average	709	2.18	0.3	-	1.8	1.9	1.9	2.1	2.3	2.6	3.4
NMHC(ppm) Average	709	0.071	0.1	-	0	0	0	0	0.1	0.2	0.529
CH4(ppm) Average	709	2.11	0.2	-	1.8	1.9	1.9	2.1	2.2	2.4	3.1
O3 (ppb) Average	709	15	10	-	2	3	6	13	23	30	40
NO2 (ppb) Average	706	13.3	8	-	0	2	8	13	19	23	33
NO (ppb) Average	706	7.1	13	-	0	0	0	1	9	22	84
NOX (ppb) Average	706	20.4	18	-	0	2	8	15	28	45	113
NH3 (ppb) Average	646	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	736	6.48	5.6	-	0.1	1.4	2.4	4.6	9	13.6	44.3
Wind Speed 10 m (km/h) Average	744	4.5	2	-	0	2	3	4	6	8	18
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-13.53	8.1	-	-35.7	-22.6	-18.6	-13.7	-8.6	-3.1	6.9
Temperature 10 m (C) Average	744	-13.01	8	-	-34.2	-21.9	-18.1	-13.4	-8.4	-2.7	6.9
Relative Humidity (%) Average	744	79.5	7	-	50	70	76	79	84	88	97
Precipitation (mm) Total	744	-	-	14.77	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	1.4	4	-	0	0	0	1	1	2	60
Global Solar Radiation (W/m2) Average	744	15.7	37	-	0	0	0	0	12	54	236

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	22 Jan 2016 10:00	22 Jan 2016 11:00	2	Maintenance - confirmed calibration points for Ozone
NH3	01 Jan 2016 04:00	31 Jan 2016 05:00	56	Stabilization after calibration and daily spans
PM2.5	07 Jan 2016 14:00	07 Jan 2016 14:00	1	Maintenance - analyzer restart
PM2.5	29 Jan 2016 13:00	29 Jan 2016 17:00	5	Unstable operation - excessive baseline drift

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 14 ppb on Jan 8 04:00 Maximum Daily Average: 2.2 ppb on Jan 8

Minimum Value: 0 ppb on Jan 30 00:00 Minimum Daily Average: 0.1 ppb on Jan 30

Maximum Diurnal Average: 1.5 ppb at hour 15 Minimum Diurnal Average: 0.5 ppb at hour 19

Monthly Average: 0.9 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	2	4	10	8	3	1	1	1	1	2	1	1	1.7	10
3-Jan	1	1	Z	4	3	1	1	2	3	2	3	4	2	2	1	1	1	1	1	1	1	1	0	0	1.6	4
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	2	1	2	1	1	1.0	2
5-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0.9	1
6-Jan	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
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Jan	3	Z	11	14	2	1	1	1	0	0	0	1	2	4	3	2	1	1	1	1	1	1	1	1	2.2	14
9-Jan	1	1	Z	1	2	1	1	1	1	1	1	3	3	3	2	3	3	1	1	2	4	4	2	2	1.9	4
10-Jan	2	3	4	Z	4	4	7	3	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1.7	7
11-Jan	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Jan	0	0	0	0	1	Z	1	2	1	1	1	1	2	2	2	2	2	3	2	2	2	2	1	1	1.4	3
13-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Jan	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Jan	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0.5	1
17-Jan	1	1	2	2	Z	4	3	2	3	3	3	2	1	2	2	1	1	1	0	0	0	0	0	0	1.5	4
18-Jan	0	0	1	1	1	Z	1	1	2	1	1	4	3	2	2	1	1	1	1	1	0	0	0	1	1.2	4
19-Jan	Z	1	1	0	0	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
20-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	2	2	1	1	0.8	2
21-Jan	1	1	Z	1	1	1	1	1	1	1	1	2	2	4	7	2	1	1	1	1	2	2	4	2	1.6	7
22-Jan	1	1	1	Z	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	0.5	1
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	0.5	1
24-Jan	1	1	1	1	1	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Jan	Z	0	0	0	0	0	1	1	0	0	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0.6	3
26-Jan	0	Z	0	0	0	1	2	5	3	7	3	3	4	4	5	4	2	1	2	1	1	0	0	0	2.1	7
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	4	0.8	5
28-Jan	2	2	2	Z	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0.7	2
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	0.8	0.6	1.0	1.1	0.8	0.8	0.9	0.8	0.7	0.8	0.9	1.1	1.1	1.2	1.5	1.1	0.7	0.6	0.5	0.6	0.7	0.8	0.8	0.7	Diurnal Average	
	3	3	11	14	4	4	7	5	3	7	3	4	4	4	10	8	3	3	2	2	4	4	5	4	Diurnal Maximum	

Z - zerospan C - Calibration

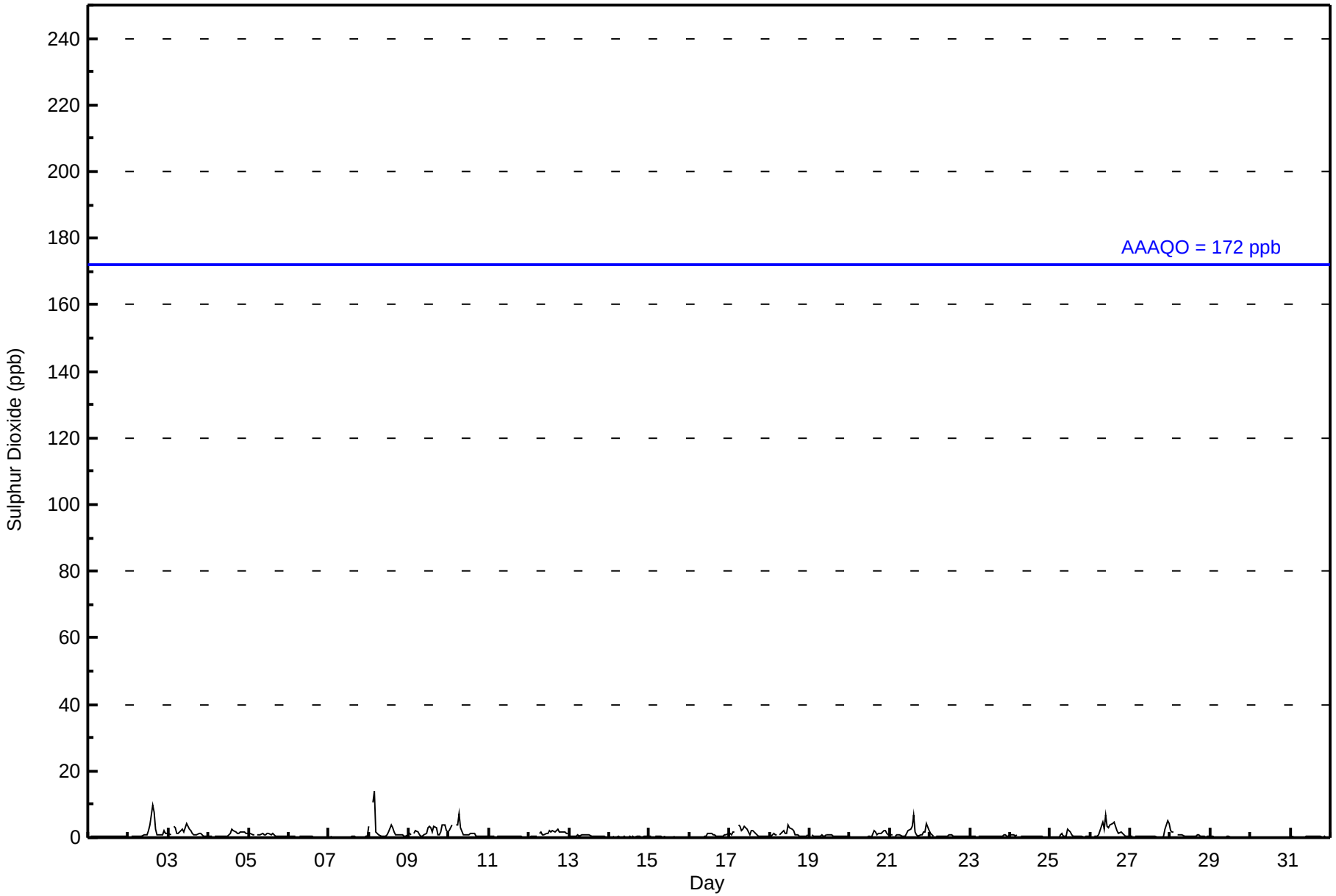
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - January 2016



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Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.72	99.72
11 - 20	2	0.28	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	96	55	15	7	2	0	2	39	171	92	41	38	35	22	43	49	707
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	55	15	7	2	0	2	39	171	92	41	38	35	22	44	50	709

Total Number of Valid Hours: 709

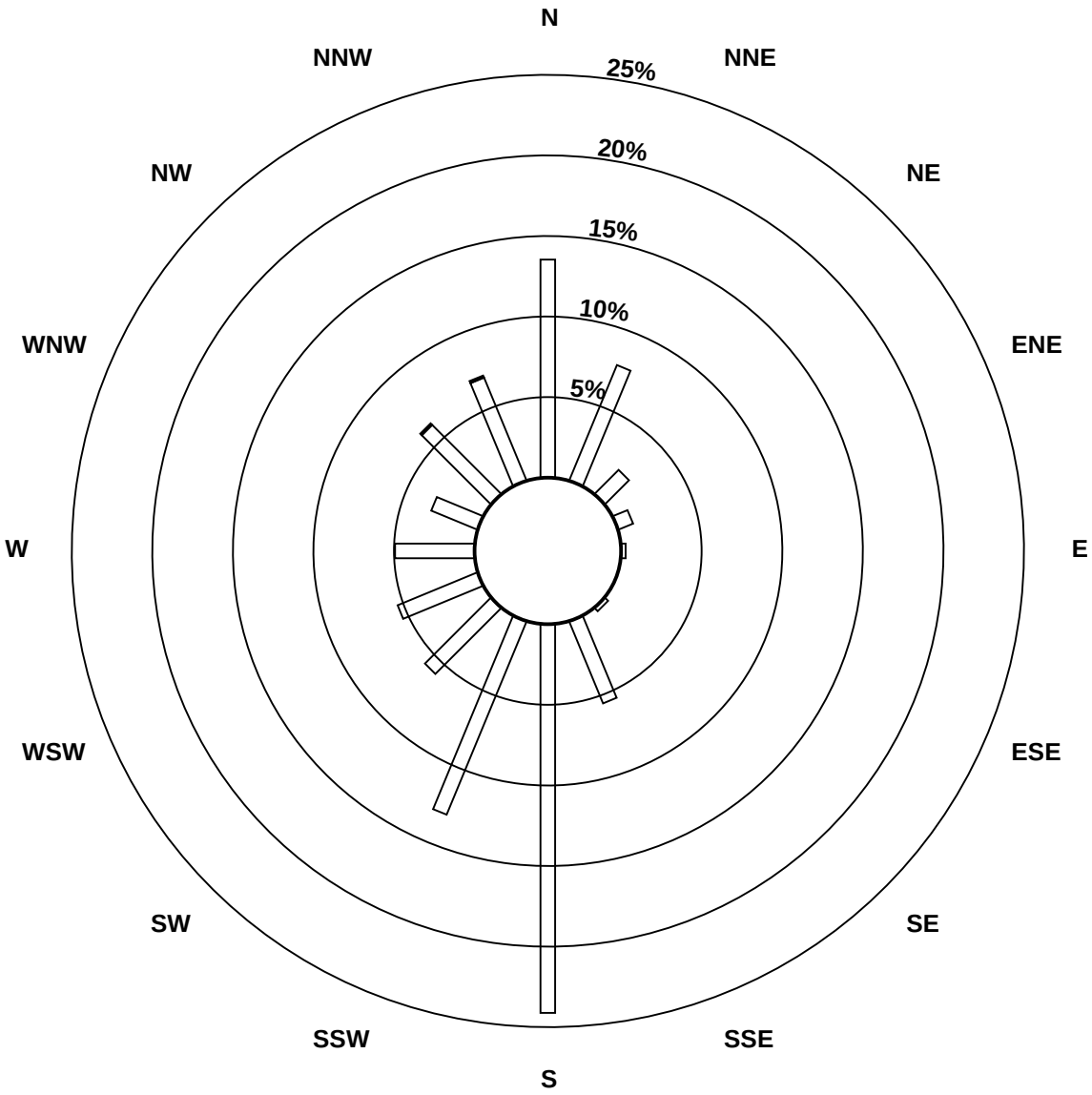
Total Number of Hours: 744

Wood Buffalo Environmental Association

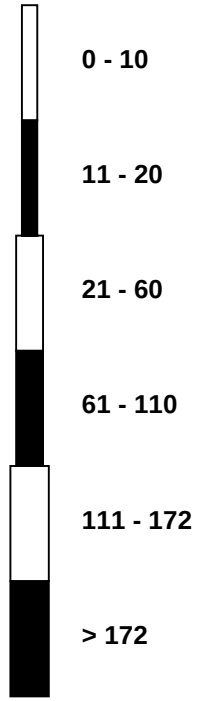
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



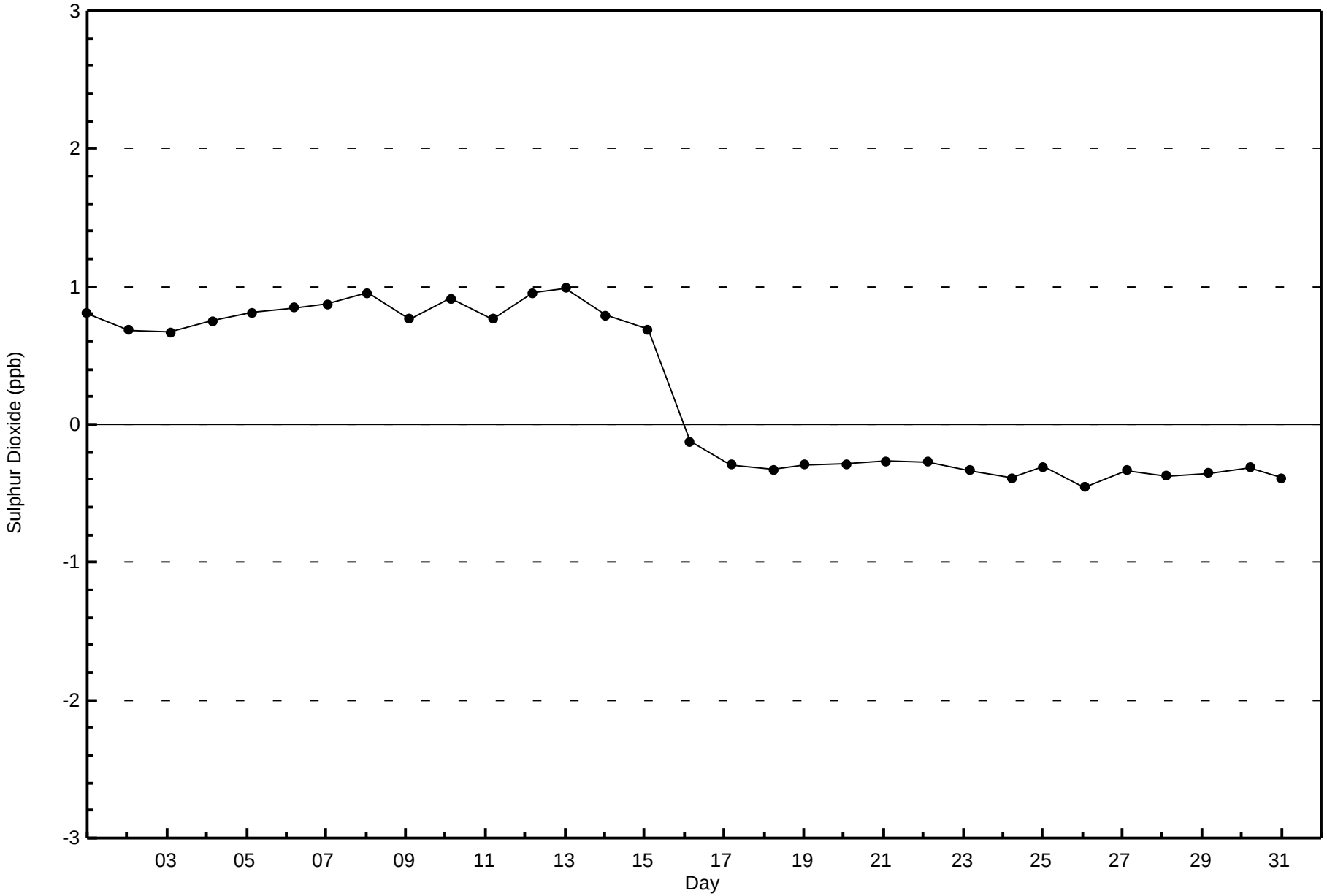
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

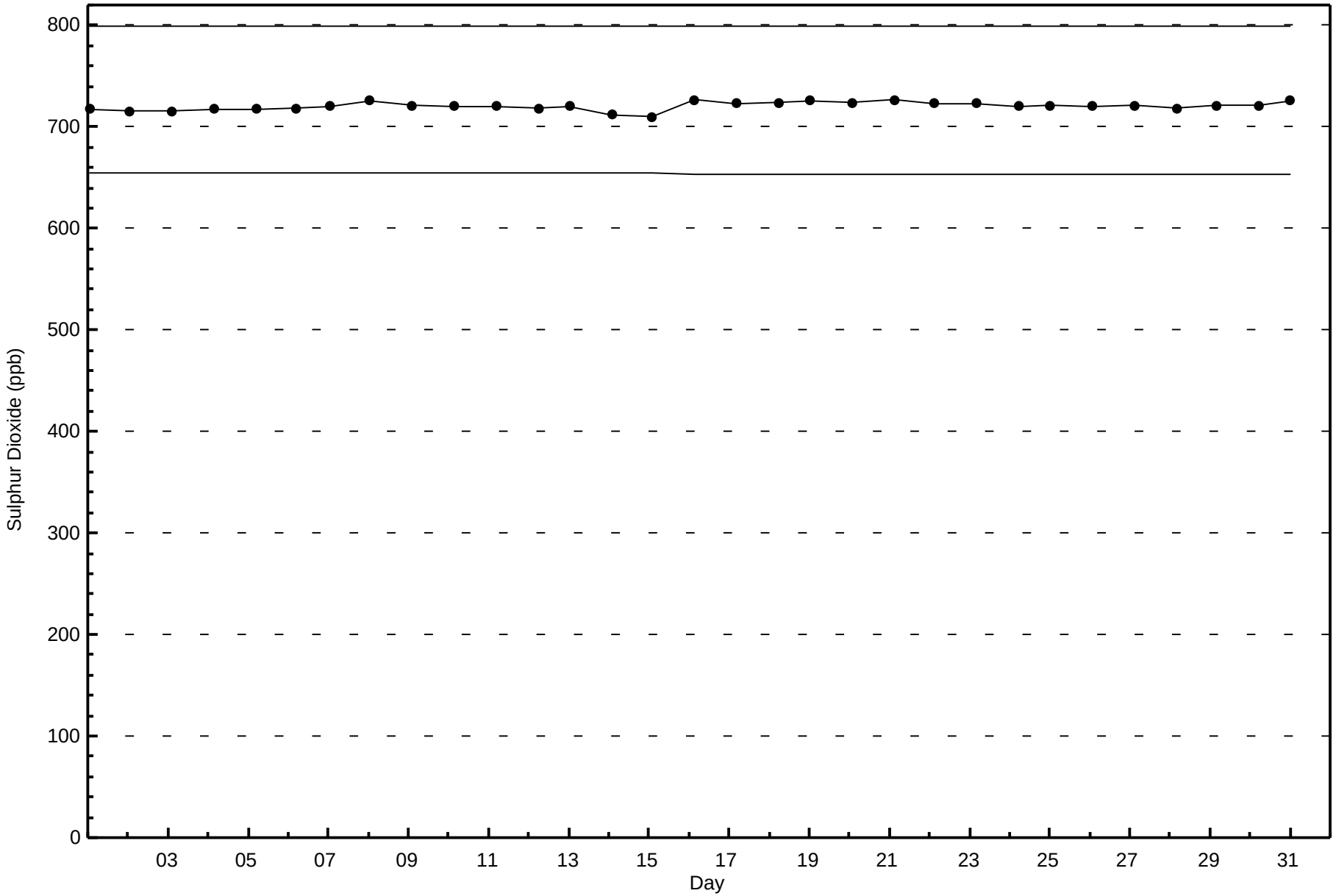


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 5 ppb on Jan 26 10:00

Maximum Daily Average: 2.5 ppb on Jan 26

Minimum Value: 0 ppb on Jan 25 21:00

Minimum Daily Average: 0.4 ppb on Jan 14

Maximum Diurnal Average: 0.9 ppb at hour 15

Minimum Diurnal Average: 0.7 ppb at hour 1

Monthly Average: 0.8 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
2-Jan	0	0	Z	0	0	0	0	1	1	1	1	1	1	3	4	2	2	2	2	1	1	2	2	1	1.3	4
3-Jan	1	1	1	Z	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1.3	2
4-Jan	1	1	1	1	Z	1	1	0	1	1	1	1	1	1	2	3	3	3	2	3	2	2	2	2	1.5	3
5-Jan	2	2	2	2	2	Z	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1.3	2
6-Jan	1	1	1	1	1	1	Z	1	1	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0.6	1
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
8-Jan	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0.5	1
9-Jan	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1.0	2
10-Jan	1	1	2	2	Z	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.8	2
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
12-Jan	0	0	0	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
13-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
16-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	0.9	2
17-Jan	1	1	1	1	2	Z	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2
18-Jan	1	1	1	1	1	1	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0.7	1
19-Jan	1	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0.6	1
20-Jan	1	1	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	2	1	1	0.7	2
21-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1.0	2
22-Jan	1	1	1	1	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1
23-Jan	0	0	0	1	0	Z	1	0	0	0	1	1	0	0	1	1	0	0	1	1	1	1	1	1	0.6	1
24-Jan	1	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	0.6	1
25-Jan	1	Z	0	0	0	0	1	1	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.4	1
26-Jan	0	1	Z	1	1	2	4	5	3	5	4	3	3	4	3	3	4	3	3	2	2	1	0	0	2.5	5
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	1	1	1	1	0.5	1
28-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	0	0	1	1	2	2	2	1	1	0	0	0	0.9	2
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
30-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	0	0.5	1
31-Jan	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	Diurnal Average	
	2	2	2	2	2	2	4	5	3	5	4	3	3	4	4	3	4	3	3	3	2	2	2	2	Diurnal Maximum	

Z - zerospan C - Calibration

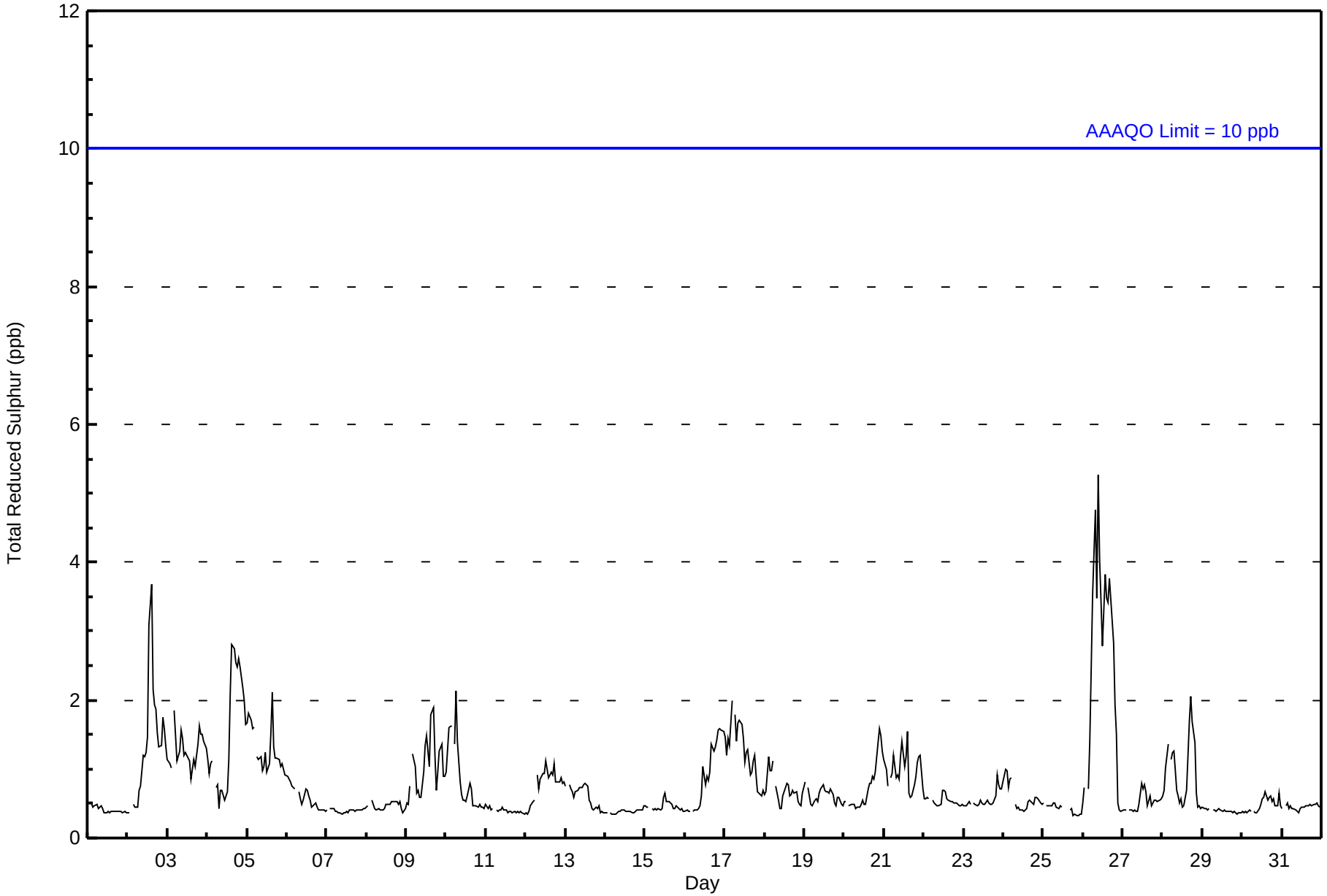
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	690	97.32	97.32
3 - 4	17	2.40	99.72
5 - 7	2	0.28	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

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	101	54	15	6	2	0	2	39	162	82	38	40	36	21	44	48	690
3 - 4	0	0	0	0	0	0	0	0	9	7	1	0	0	0	0	0	17
5 - 7	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	54	15	6	2	0	2	39	171	91	39	40	36	21	44	48	709

Total Number of Valid Hours: 709

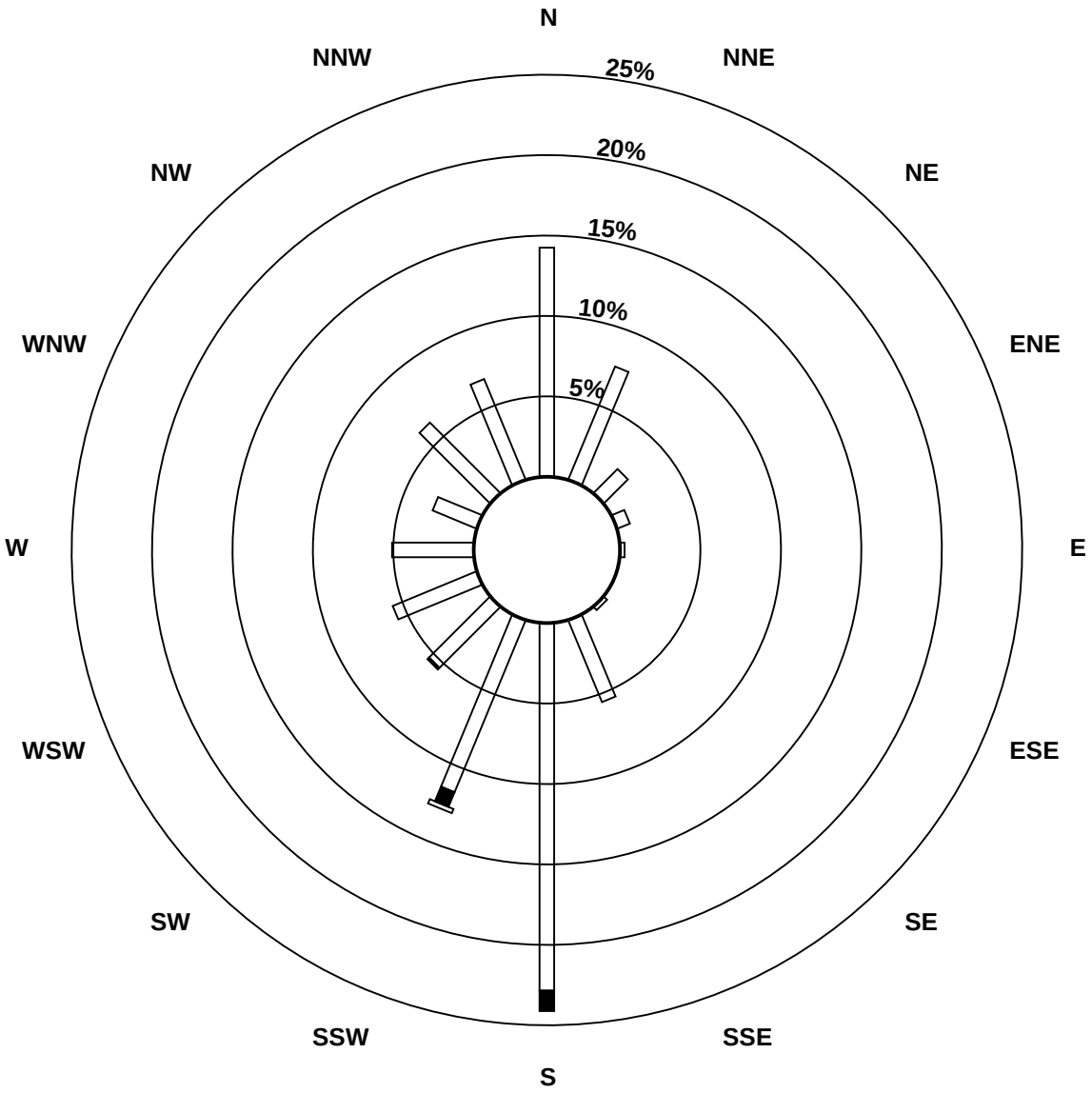
Total Number of Hours: 744

Wood Buffalo Environmental Association

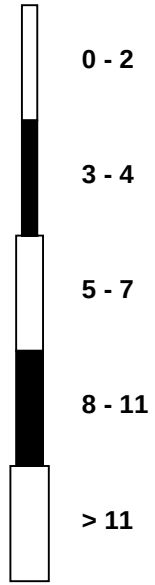
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



0 - 2

3 - 4

5 - 7

8 - 11

> 11

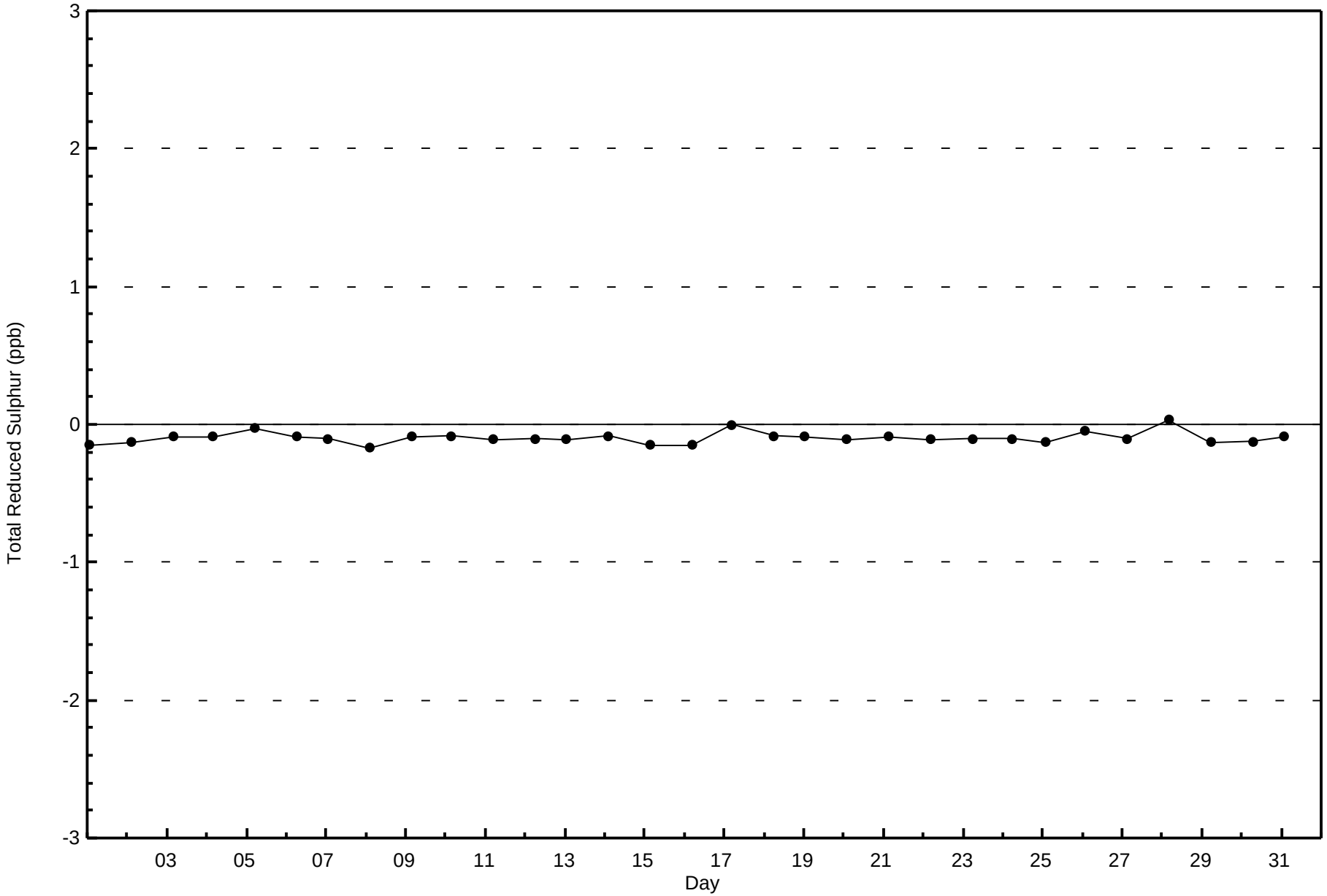
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - January 2016

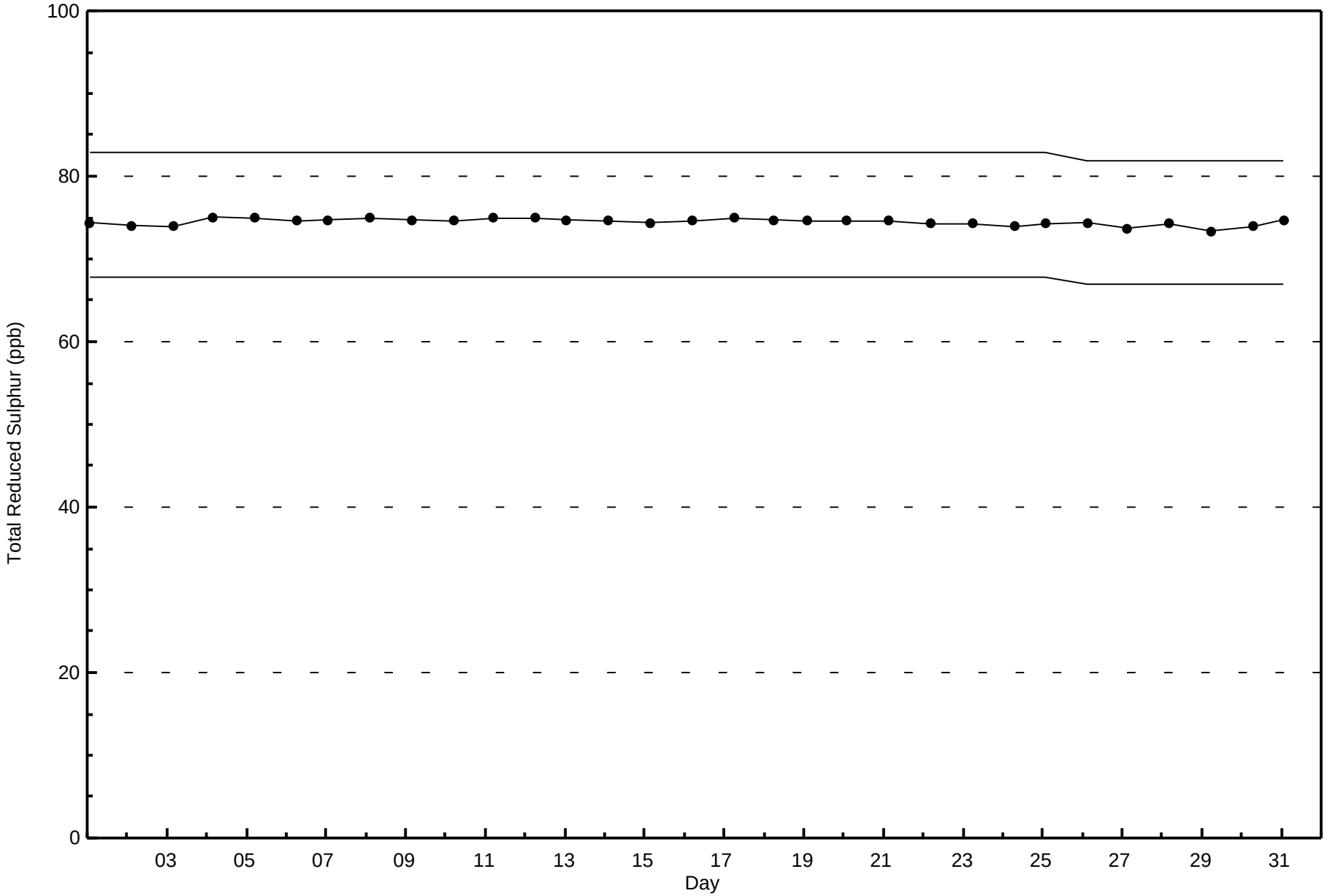


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - January 2016



Maximum Value: 3.4 ppm on Jan 3 17:00

Maximum Daily Average: 2.7 ppm on Jan 4

Minimum Value: 1.8 ppm on Jan 29 16:00

Minimum Daily Average: 1.8 ppm on Jan 29

Maximum Diurnal Average: 2.3 ppm at hour 18

Minimum Diurnal Average: 2.1 ppm at hour 10

Monthly Average: 2.18 ppm

Percentiles: P_1 = 1.8 P_{10} = 1.9 Q_1 = 1.9 Median = 2.1 Q_3 = 2.3 P_{90} = 2.6 P_{99} = 3.2

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1.9	2.3	1.9	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.3
2-Jan	1.9	Z	1.9	2.1	2.1	2.0	2.0	2.2	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.7	2.8	2.6	2.6	2.7	2.6	2.4	2.3	2.8
3-Jan	2.3	2.4	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.6	2.3	2.4	2.3	2.5	3.4	2.8	2.6	2.5	2.5	2.5	2.6	2.6	2.4	3.4
4-Jan	2.6	2.6	2.5	Z	2.5	2.4	2.4	2.2	2.4	2.4	2.3	2.4	2.4	2.6	2.8	3.0	3.2	3.3	3.2	3.3	3.2	3.1	3.0	2.9	2.7	3.3
5-Jan	2.8	2.7	2.7	2.7	Z	2.7	2.6	2.7	2.8	2.7	2.6	2.5	2.4	2.5	2.7	2.7	2.6	2.6	2.7	2.8	2.7	2.8	2.8	2.8	2.7	2.8
6-Jan	2.9	2.8	2.9	2.9	2.9	Z	2.5	2.3	2.2	2.0	2.1	2.6	2.4	2.3	2.1	2.0	2.0	2.1	2.0	2.2	1.9	1.9	1.9	1.9	2.3	2.9
7-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Jan	1.9	Z	1.9	2.1	2.5	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.5
9-Jan	2.1	2.1	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.4	2.2	2.2	2.5	2.3	2.3	2.3	2.4	2.1	2.2	2.3	2.1	2.1	2.1	2.2	2.5
10-Jan	2.2	2.2	2.3	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.5	2.2	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.5
11-Jan	2.2	2.1	2.1	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
12-Jan	2.0	2.0	2.1	2.2	2.3	Z	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3
13-Jan	Z	2.1	2.1	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.2	2.0	2.0	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	2.1	2.4
14-Jan	1.9	Z	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
15-Jan	1.9	1.9	Z	2.0	1.9	1.9	2.0	2.0	2.0	2.0	C	C	C	C	2.2	2.1	2.1	2.1	2.1	2.3	2.0	1.9	2.0	2.0	2.0	2.3
16-Jan	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.4	2.6	2.7	2.8	2.8	3.0	3.2	3.3	3.3	3.1	2.5	3.3
17-Jan	3.0	3.1	2.7	2.5	Z	2.6	2.6	2.5	2.4	2.4	2.5	2.6	2.7	2.8	2.8	2.4	2.6	2.6	2.5	2.4	2.3	2.3	2.4	2.4	2.6	3.1
18-Jan	2.4	2.4	2.3	2.3	2.5	Z	2.3	2.2	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.4	2.3	2.3	2.1	2.0	2.0	2.0	2.0	2.1	2.5
19-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.3	2.3	2.0	2.0	2.0	2.0	2.0	1.9	2.1	2.3
20-Jan	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.3	2.3	2.3	2.4	2.3	2.4	2.6	2.5	2.5	2.4	2.2	2.6
21-Jan	2.2	2.1	Z	2.0	2.2	2.3	2.3	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.7	2.7	2.4	2.4	2.3	2.7
22-Jan	2.4	2.5	2.5	Z	2.6	2.5	2.4	2.4	2.3	2.3	2.3	3.3	2.8	2.6	2.3	2.2	2.2	2.3	2.1	2.1	2.2	2.2	2.1	2.1	2.4	3.3
23-Jan	2.1	2.1	2.1	2.4	Z	2.1	2.0	2.0	2.0	2.0	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.3	2.8	2.8	2.7	2.6	2.2	2.8
24-Jan	2.6	2.6	2.6	2.5	2.5	Z	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.3	2.2	2.2	2.2	2.1	2.0	2.1	2.0	2.2	2.6
25-Jan	Z	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	2.0	2.1	2.1	1.9	2.0	2.1	1.9	2.0	2.0	2.1	2.1	2.1	2.0	2.1
26-Jan	2.1	Z	2.2	2.0	2.3	2.5	2.6	2.5	2.7	2.5	2.5	2.6	2.4	2.5	2.5	2.6	2.8	2.8	2.7	2.5	2.4	1.9	1.8	1.8	2.4	2.8
27-Jan	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.2	2.2	2.1	2.0	1.9	2.0	1.9	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2
28-Jan	2.0	2.2	2.4	Z	2.4	2.4	2.4	2.5	2.3	2.2	2.0	2.1	1.9	2.1	3.0	2.4	2.4	2.3	2.5	2.4	2.1	1.9	1.8	1.8	2.2	3.0
29-Jan	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
30-Jan	1.8	1.9	1.9	1.8	1.8	Z	1.8	1.8	1.8	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.1
31-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0
	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	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	Diurnal Average	
	3.0	3.1	2.9	2.9	2.9	2.7	2.6	2.7	2.8	2.7	2.6	3.3	2.8	2.8	3.0	3.0	3.4	3.3	3.2	3.3	3.2	3.3	3.3	3.1	Diurnal Maximum	

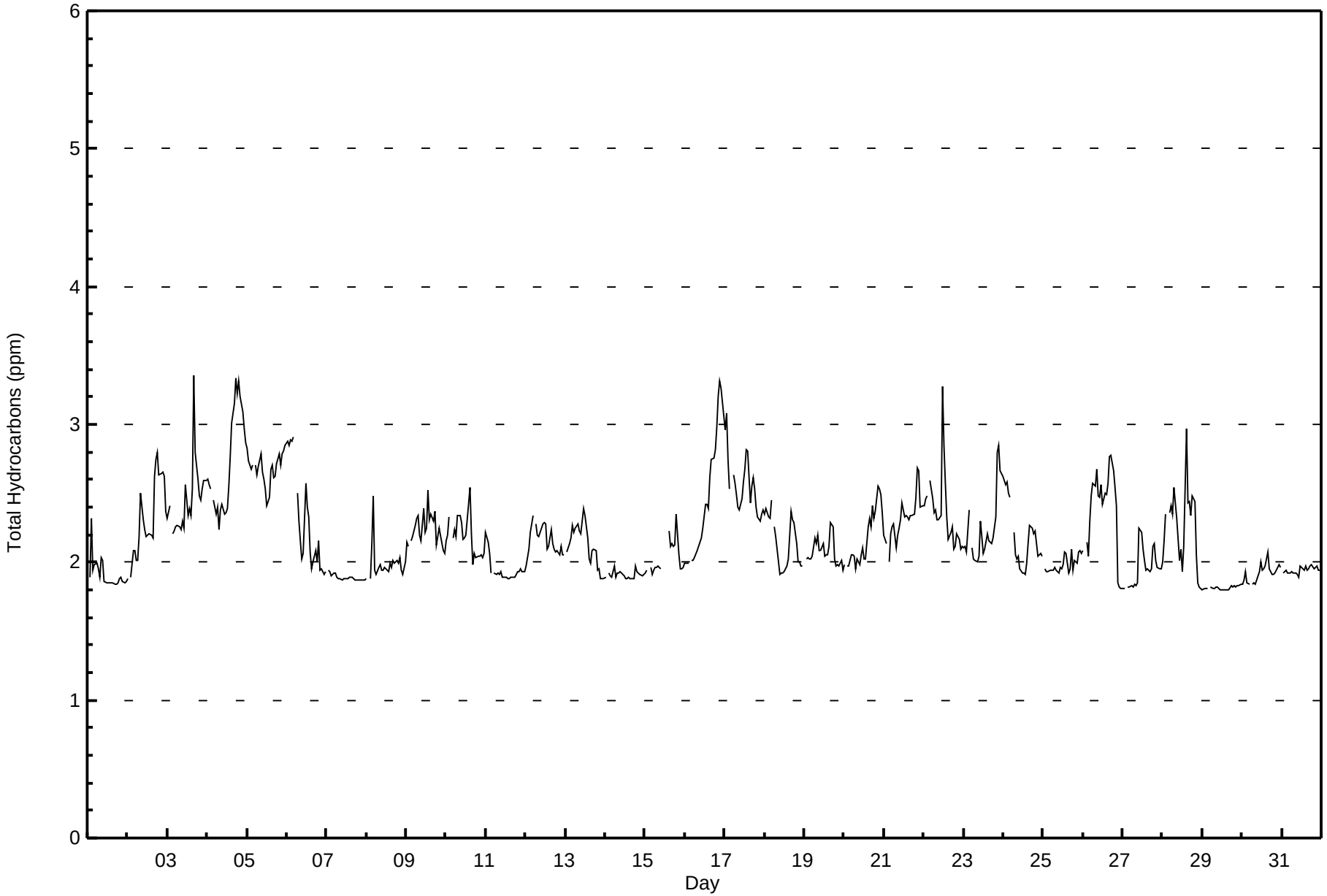
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - January 2016



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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	314	44.29	44.29
2.1 - 3.0	382	53.88	98.17
3.1 - 10.0	13	1.83	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

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	40	47	11	6	1	0	2	13	24	32	21	23	28	18	29	19	314
2.1 - 3.0	56	8	4	1	1	0	0	26	144	52	19	15	7	4	15	30	382
3.1 - 10.0	0	0	0	0	0	0	0	0	3	8	1	0	0	0	0	1	13
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	55	15	7	2	0	2	39	171	92	41	38	35	22	44	50	709

Total Number of Valid Hours: 709

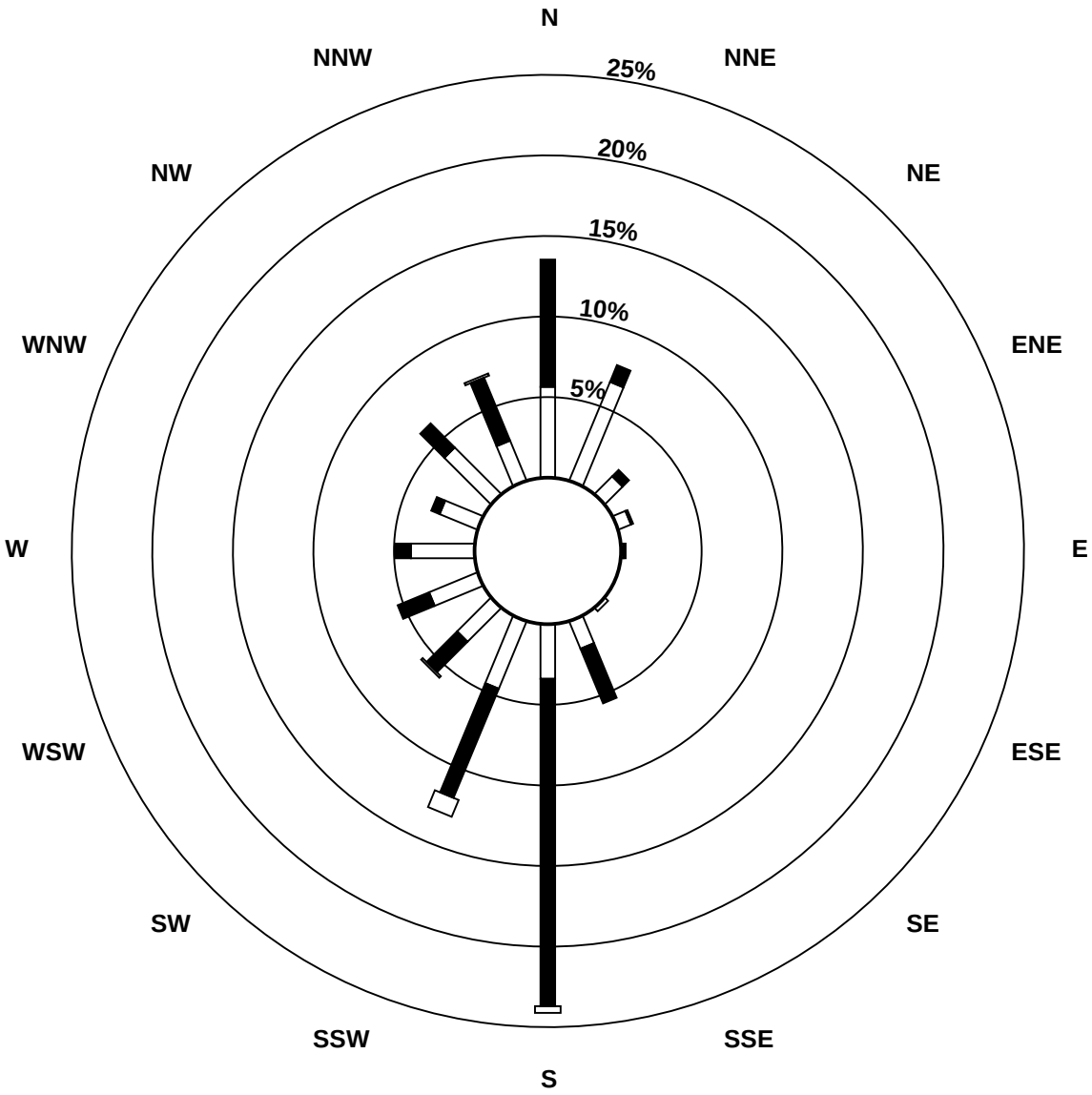
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

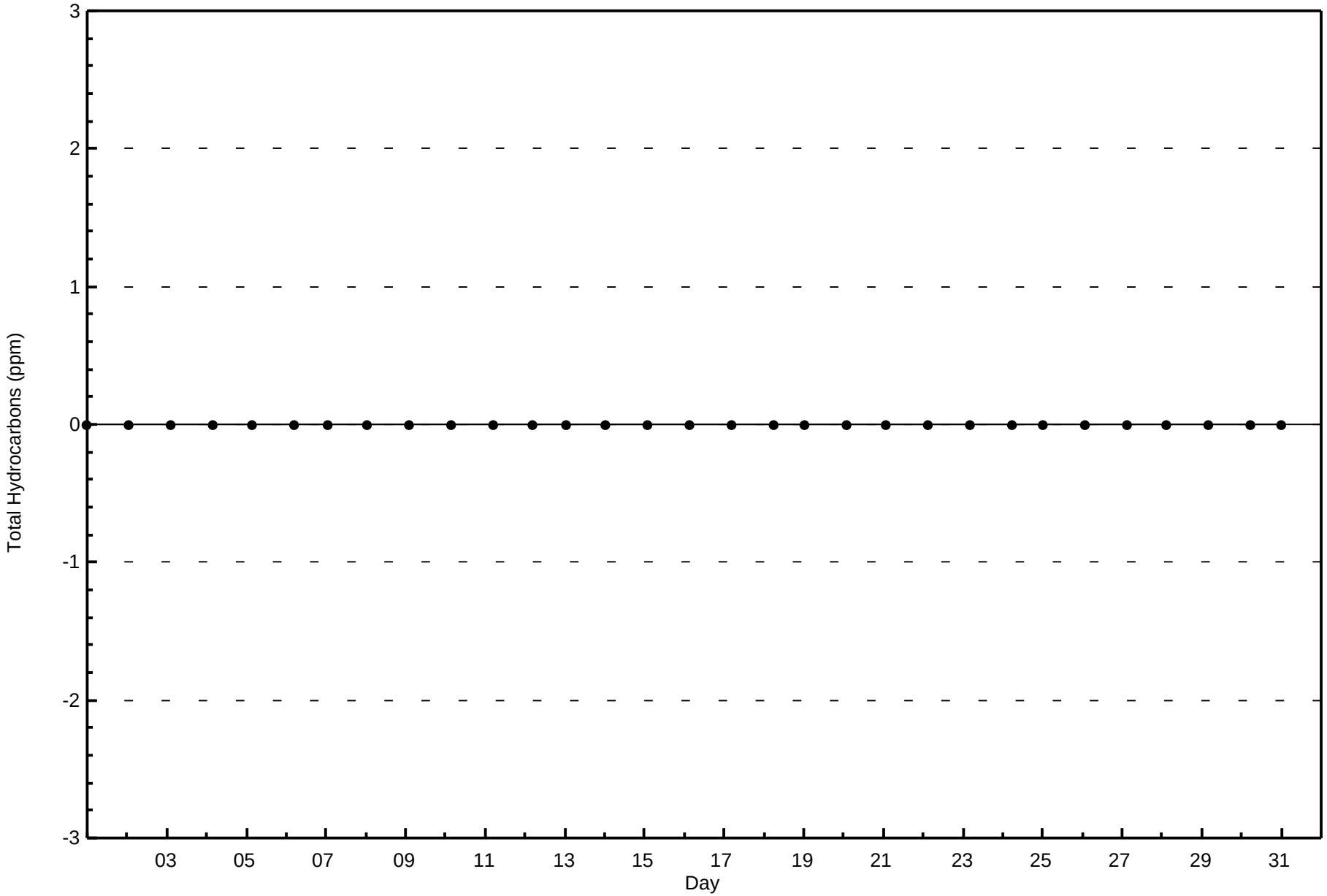
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - January 2016

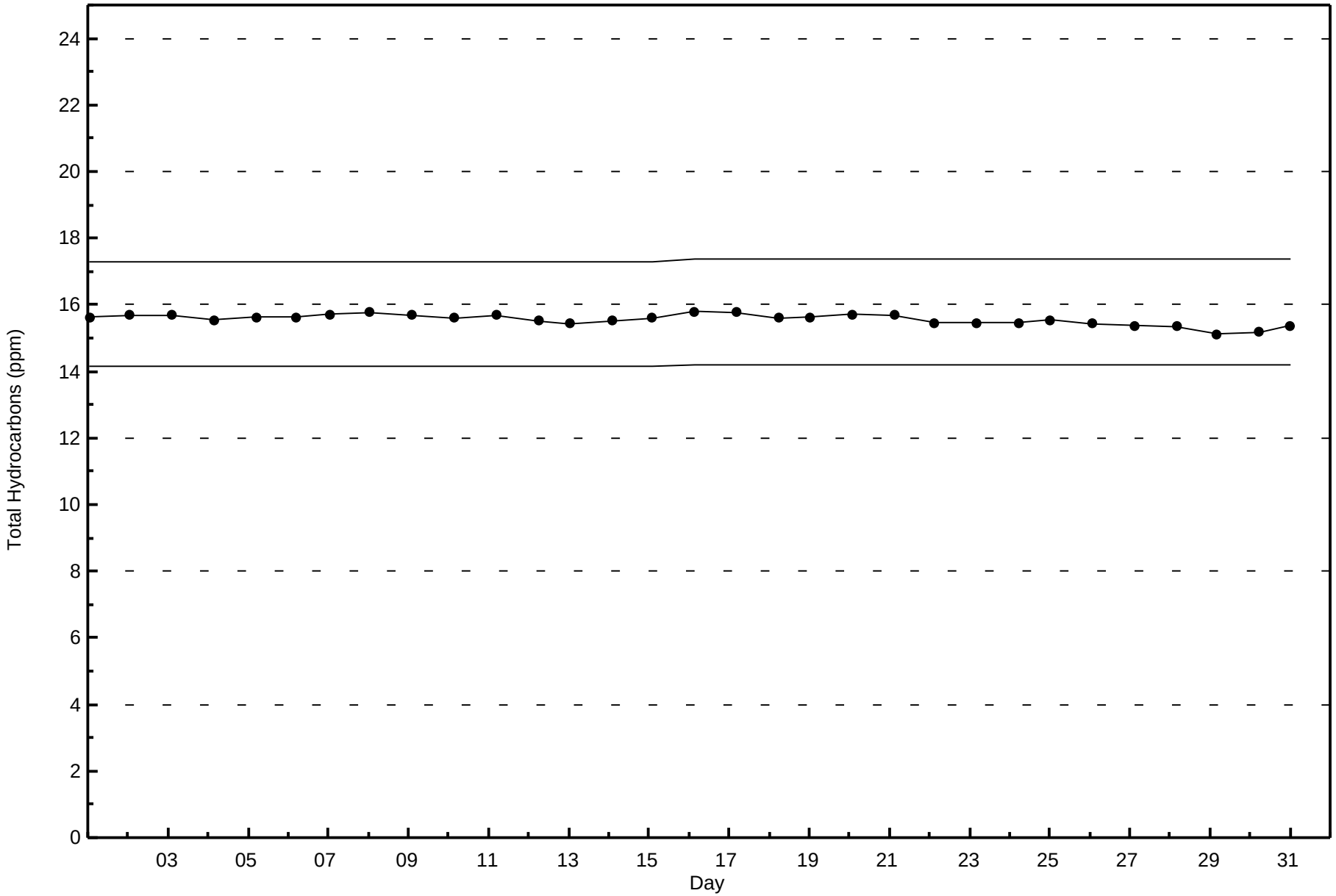


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - January 2016



Maximum Value: 0.529 ppm on Jan 4 18:00

Maximum Daily Average: 0.233 ppm on Jan 5

Minimum Value: 0.000 ppm on Jan 1 02:00

Minimum Daily Average: 0.000 ppm on Jan 7

Maximum Diurnal Average: 0.105 ppm at hour 18

Minimum Diurnal Average: 0.047 ppm at hour 10

Monthly Average: 0.071 ppm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.1 P_{90} = 0.2 P_{99} = 0.4

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0.000	0.006	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.000	0.000	0.001	0.006
2-Jan	0.000	Z	0.000	0.002	0.003	0.000	0.000	0.090	0.217	0.103	0.076	0.098	0.097	0.114	0.144	0.136	0.278	0.309	0.289	0.237	0.253	0.241	0.227	0.147	0.133	0.309
3-Jan	0.137	0.194	Z	0.111	0.138	0.128	0.112	0.116	0.125	0.131	0.117	0.211	0.167	0.210	0.179	0.238	0.475	0.280	0.238	0.204	0.199	0.224	0.238	0.236	0.192	0.475
4-Jan	0.219	0.182	0.177	Z	0.134	0.102	0.109	0.019	0.106	0.139	0.116	0.122	0.131	0.177	0.226	0.291	0.348	0.529	0.417	0.414	0.382	0.343	0.299	0.287	0.229	0.529
5-Jan	0.286	0.261	0.239	0.234	Z	0.213	0.192	0.223	0.237	0.202	0.213	0.204	0.162	0.218	0.254	0.249	0.233	0.230	0.247	0.258	0.223	0.254	0.263	0.273	0.233	0.286
6-Jan	0.280	0.270	0.279	0.267	0.272	Z	0.145	0.101	0.049	0.000	0.002	0.090	0.056	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.280
7-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8-Jan	0.000	Z	0.000	0.071	0.157	0.000	0.000	0.009	0.017	0.005	0.008	0.026	0.000	0.000	0.051	0.026	0.060	0.022	0.013	0.003	0.000	0.000	0.000	0.000	0.020	0.157
9-Jan	0.027	0.005	Z	0.105	0.087	0.114	0.083	0.090	0.064	0.037	0.143	0.061	0.099	0.271	0.192	0.123	0.101	0.155	0.052	0.114	0.119	0.039	0.035	0.009	0.092	0.271
10-Jan	0.061	0.056	0.042	Z	0.038	0.074	0.034	0.109	0.114	0.098	0.037	0.055	0.084	0.141	0.155	0.097	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052	0.155
11-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
12-Jan	0.000	0.000	0.000	0.000	0.010	Z	0.060	0.041	0.035	0.059	0.096	0.098	0.093	0.035	0.044	0.067	0.031	0.013	0.027	0.022	0.000	0.016	0.000	0.002	0.033	0.098
13-Jan	Z	0.000	0.000	0.008	0.058	0.055	0.079	0.085	0.079	0.074	0.081	0.058	0.066	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.085
14-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.001	0.000	0.000	0.000	0.004
15-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.002	0.008	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.008
16-Jan	0.000	0.000	0.000	Z	0.003	0.001	0.001	0.049	0.076	0.085	0.096	0.080	0.074	0.079	0.083	0.160	0.253	0.274	0.425	0.485	0.466	0.440	0.372	0.307	0.166	0.485
17-Jan	0.262	0.236	0.235	0.193	Z	0.203	0.180	0.156	0.114	0.122	0.184	0.261	0.308	0.402	0.431	0.195	0.238	0.250	0.210	0.118	0.048	0.046	0.043	0.059	0.195	0.431
18-Jan	0.059	0.075	0.091	0.079	0.149	Z	0.060	0.124	0.043	0.000	0.000	0.000	0.000	0.004	0.010	0.157	0.343	0.263	0.243	0.092	0.000	0.000	0.000	0.000	0.078	0.343
19-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.057	0.030	0.027	0.022	0.021	0.032	0.017	0.029	0.004	0.012	0.040	0.016	0.001	0.000	0.000	0.000	0.005	0.007	0.014	0.057
20-Jan	0.024	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.001	0.000	0.190	0.202	0.169	0.235	0.190	0.204	0.259	0.232	0.217	0.160	0.091	0.259
21-Jan	0.078	0.065	Z	0.001	0.096	0.107	0.103	0.029	0.093	0.095	0.109	0.123	0.103	0.064	0.025	0.005	0.001	0.001	0.023	0.110	0.231	0.224	0.077	0.096	0.081	0.231
22-Jan	0.083	0.075	0.097	Z	0.097	0.054	0.002	0.010	0.000	0.000	0.010	0.214	0.164	0.101	0.088	0.054	0.088	0.093	0.000	0.000	0.005	0.005	0.000	0.000	0.054	0.214
23-Jan	0.000	0.000	0.000	0.024	Z	0.000	0.000	0.000	0.000	0.000	0.012	0.004	0.000	0.011	0.057	0.037	0.012	0.007	0.041	0.098	0.154	0.178	0.164	0.196	0.043	0.196
24-Jan	0.219	0.199	0.179	0.111	0.137	Z	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.080	0.092	0.091	0.064	0.076	0.008	0.005	0.000	0.000	0.058	0.219
25-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.000	0.000	0.014	0.000	0.001	0.061	0.054	0.011	0.000	0.028	0.005	0.031	0.009	0.081	0.017	0.000	0.014	0.081
26-Jan	0.018	Z	0.069	0.023	0.134	0.187	0.229	0.228	0.360	0.228	0.221	0.245	0.195	0.212	0.226	0.246	0.276	0.299	0.266	0.246	0.175	0.006	0.000	0.000	0.178	0.360
27-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.202	0.127	0.077	0.018	0.001	0.000	0.000	0.002	0.001	0.100	0.053	0.016	0.004	0.006	0.026	0.202
28-Jan	0.044	0.106	0.176	Z	0.152	0.155	0.154	0.204	0.078	0.058	0.017	0.053	0.000	0.067	0.219	0.159	0.150	0.156	0.195	0.156	0.027	0.000	0.000	0.000	0.101	0.219
29-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.015
30-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	0.137	0.018	0.000	0.000	0.000	0.000	0.001	0.001	0.010	0.009	0.137
31-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.072	0.066	0.061	0.047	0.064	0.054	0.054	0.055	0.059	0.047	0.059	0.072	0.063	0.076	0.087	0.087	0.103	0.105	0.095	0.096	0.084	0.076	0.063	0.058	Diurnal Average	
	0.286	0.270	0.279	0.267	0.272	0.213	0.229	0.228	0.360	0.228	0.221	0.261	0.308	0.402	0.431	0.291	0.475	0.529	0.425	0.485	0.466	0.440	0.372	0.307	Diurnal Maximum	

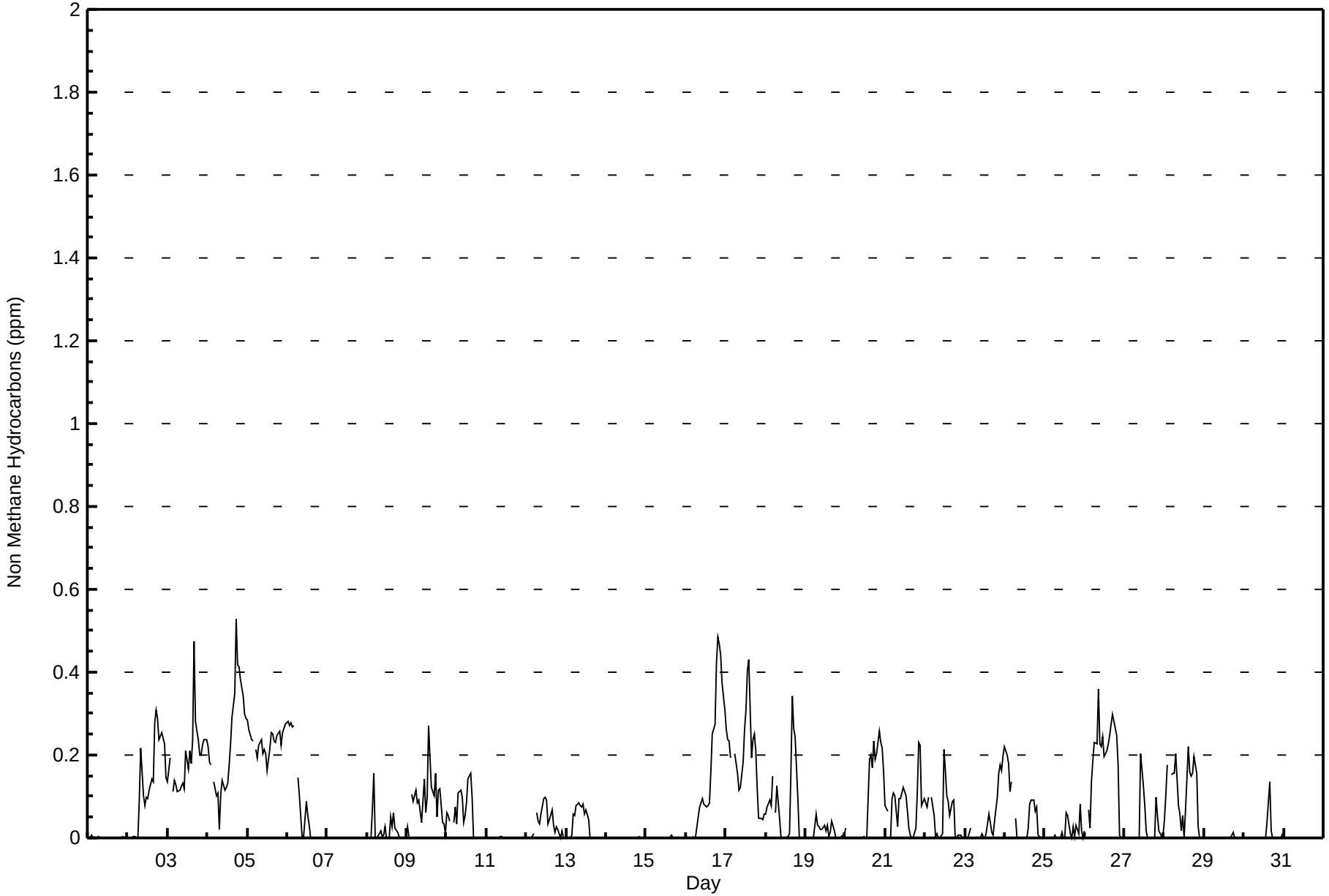
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	337	47.53	47.53
0.006 - 0.05	93	13.12	60.65
0.06 - 0.1	132	18.62	79.27
> 0.1	147	20.73	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	67	46	7	5	1	0	1	10	26	33	21	21	27	18	28	26	337
0.006 - 0.05	9	7	5	1	0	0	1	7	25	11	6	4	2	3	7	5	93
0.06 - 0.1	15	2	2	1	0	0	0	12	57	13	6	5	3	0	6	10	132
> 0.1	5	0	1	0	1	0	0	10	63	35	8	8	3	1	3	9	147
Totals	96	55	15	7	2	0	2	39	171	92	41	38	35	22	44	50	709

Total Number of Valid Hours: 709

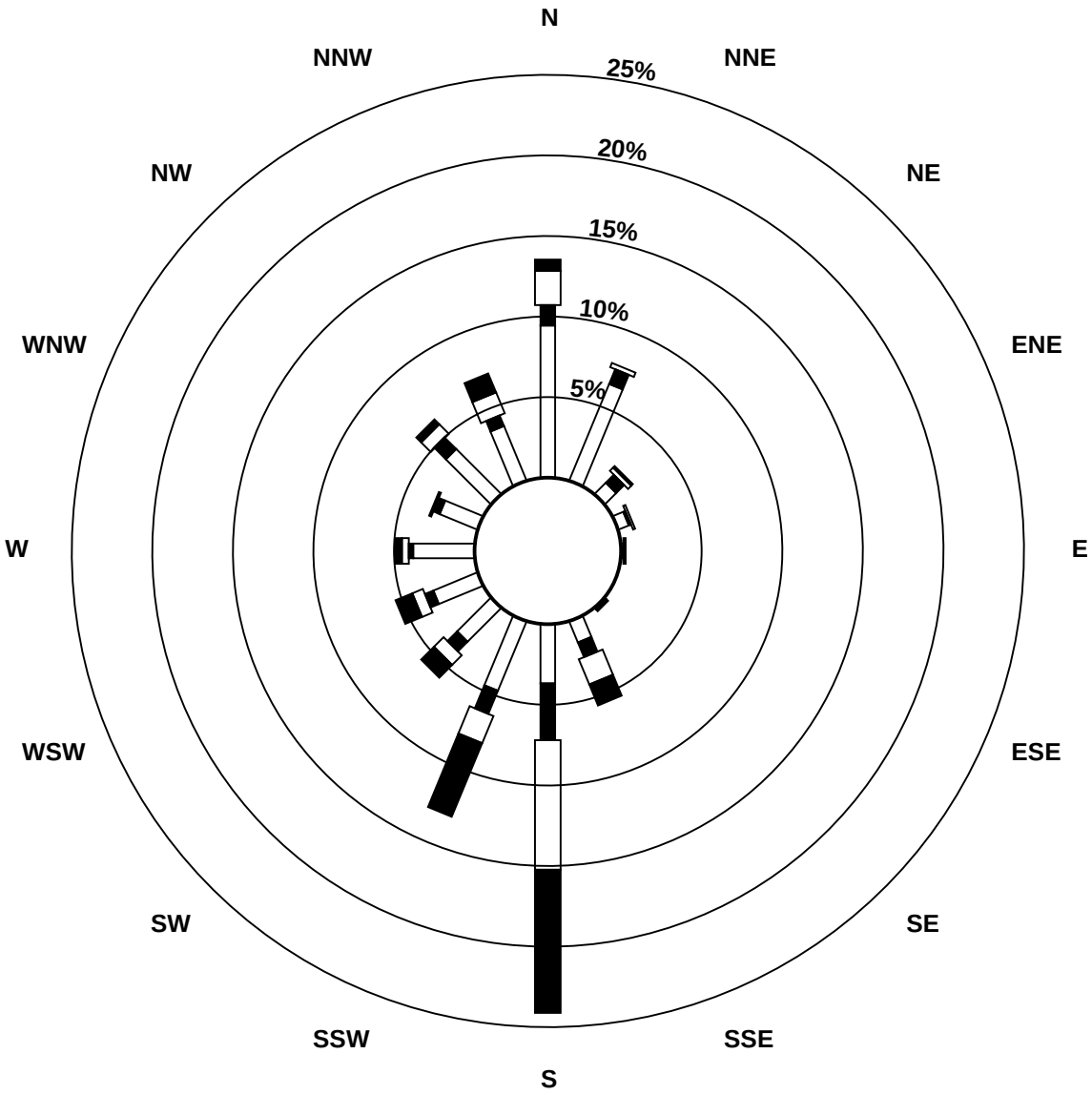
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

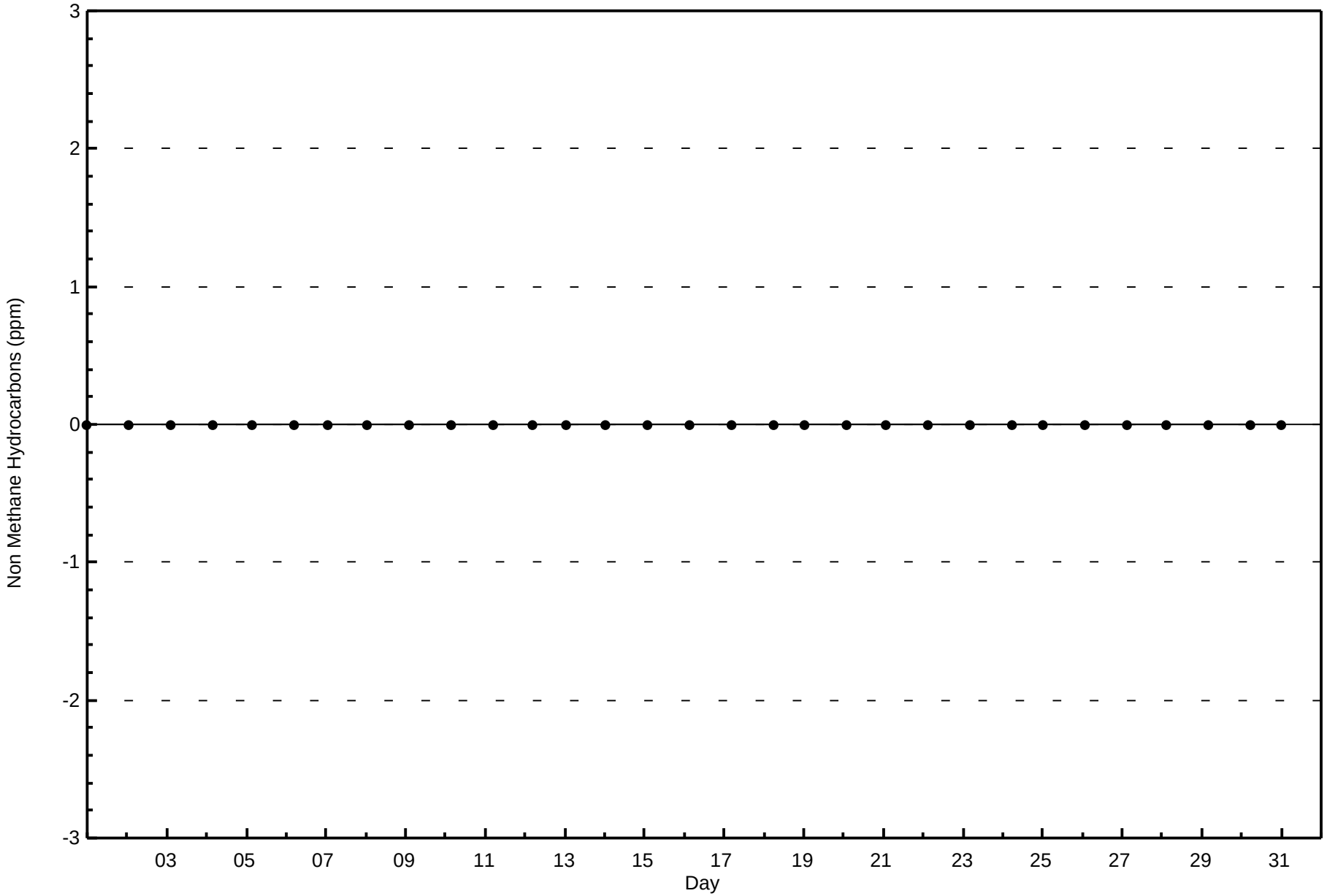
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - January 2016

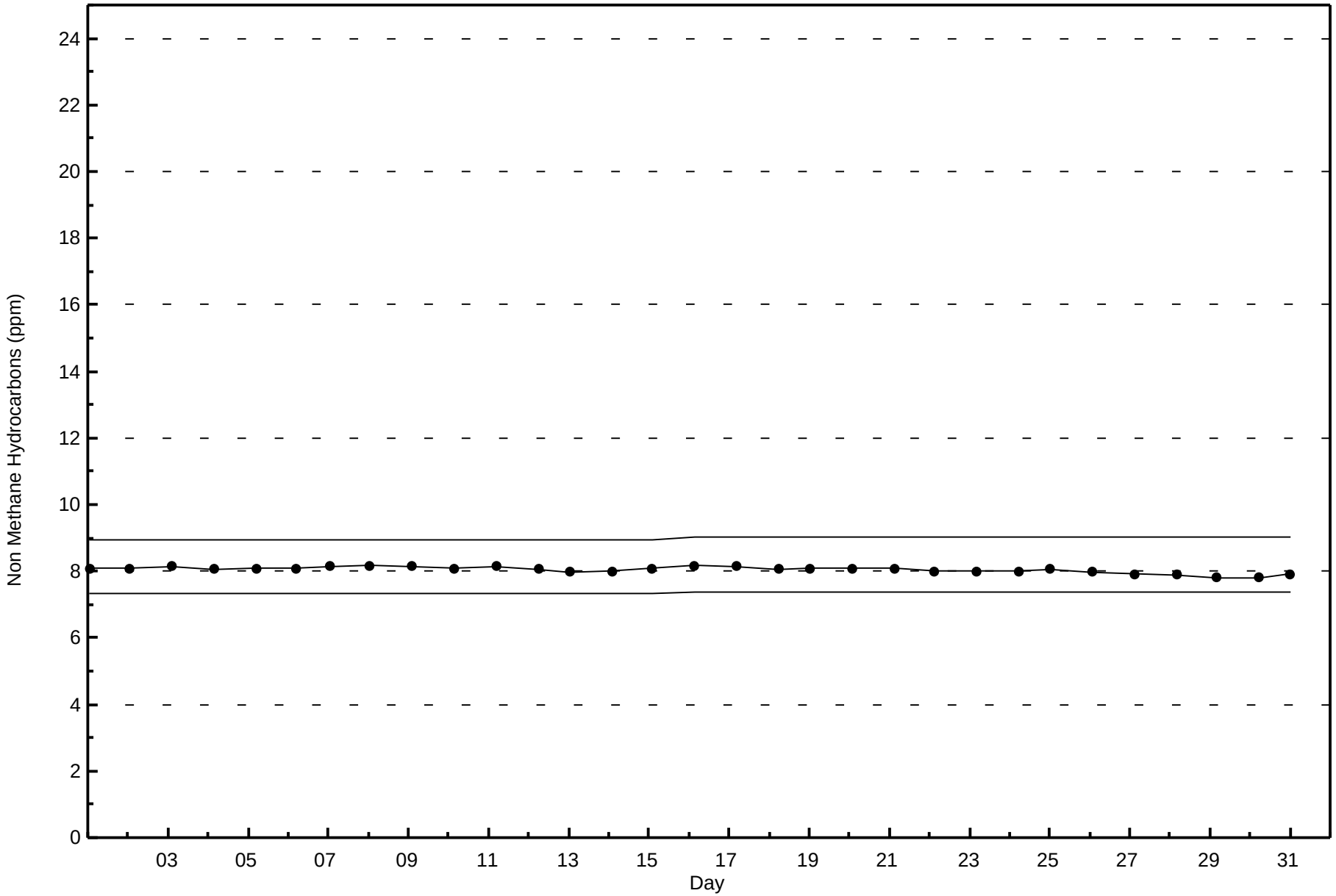


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 3.1 ppm on Jan 22 12:00

Maximum Daily Average: 2.5 ppm on Jan 4

Minimum Value: 1.8 ppm on Jan 29 16:00

Minimum Daily Average: 1.8 ppm on Jan 29

Maximum Diurnal Average: 2.2 ppm at hour 18

Minimum Diurnal Average: 2.1 ppm at hour 10

Monthly Average: 2.11 ppm

Percentiles: $P_1 = 1.8$ $P_{10} = 1.9$ $Q_1 = 1.9$ Median = 2.1 $Q_3 = 2.2$ $P_{90} = 2.4$ $P_{99} = 2.8$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1.9	2.3	1.9	2.0	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.3
2-Jan	1.9	Z	1.9	2.1	2.1	2.0	2.0	2.1	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.2	2.2	2.5
3-Jan	2.2	2.2	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.3	2.2	2.2	2.2	2.3	2.9	2.5	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.9
4-Jan	2.4	2.4	2.4	Z	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.4	2.5	2.7	2.8	2.8	2.8	2.9	2.8	2.8	2.7	2.6	2.5	2.9
5-Jan	2.5	2.5	2.4	2.5	Z	2.5	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.4	2.6
6-Jan	2.6	2.6	2.6	2.6	2.6	Z	2.4	2.2	2.1	2.0	2.1	2.5	2.3	2.3	2.1	2.0	2.0	2.1	2.0	2.2	1.9	1.9	1.9	1.9	2.2	2.6
7-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Jan	1.9	Z	1.9	2.1	2.3	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.3
9-Jan	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.3	2.1	2.1	2.2	2.2	2.1	2.3	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
10-Jan	2.1	2.1	2.3	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.4	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4
11-Jan	2.2	2.1	2.1	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
12-Jan	2.0	2.0	2.1	2.2	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.3
13-Jan	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.3	2.1	2.0	2.0	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	2.1	2.3
14-Jan	1.9	Z	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
15-Jan	1.9	1.9	Z	2.0	1.9	1.9	2.0	2.0	2.0	2.0	C	C	C	C	2.2	2.1	2.1	2.1	2.1	2.3	2.0	1.9	2.0	2.0	2.0	2.3
16-Jan	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.3	2.5	2.5	2.5	2.4	2.5	2.7	2.9	2.9	2.8	2.3	2.9
17-Jan	2.7	2.8	2.5	2.3	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.8
18-Jan	2.3	2.3	2.2	2.2	2.3	Z	2.2	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3
19-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.3	2.2	2.0	2.0	2.0	2.0	2.0	1.9	2.1	2.3
20-Jan	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.2	2.3	2.3	2.3	2.2	2.1	2.3
21-Jan	2.1	2.1	Z	2.0	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.3	2.3	2.2	2.5
22-Jan	2.3	2.4	2.4	Z	2.5	2.4	2.4	2.4	2.3	2.3	2.3	3.1	2.7	2.5	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.3	3.1
23-Jan	2.1	2.1	2.1	2.4	Z	2.1	2.0	2.0	2.0	2.0	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	2.7	2.5	2.4	2.2	2.7
24-Jan	2.4	2.4	2.4	2.4	2.3	Z	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.4
25-Jan	Z	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.1	1.9	2.0	2.0	2.0	2.1	2.1	2.0	2.1
26-Jan	2.1	Z	2.1	2.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.5	2.5	2.4	2.3	2.2	1.8	1.8	1.8	2.2	2.5
27-Jan	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.1	2.0	2.0	1.9	2.0	1.9	1.9	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.1
28-Jan	2.0	2.0	2.2	Z	2.2	2.3	2.2	2.3	2.2	2.1	2.0	2.0	1.9	2.0	2.7	2.3	2.3	2.2	2.3	2.3	2.0	1.9	1.8	1.8	2.1	2.7
29-Jan	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
30-Jan	1.8	1.9	1.9	1.8	1.8	Z	1.8	1.8	1.8	1.9	1.9	2.0	1.9	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
31-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0
	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
	2.7	2.8	2.6	2.6	2.6	2.5	2.4	2.5	2.5	2.4	2.4	3.1	2.7	2.5	2.7	2.7	2.9	2.8	2.8	2.9	2.8	2.9	2.9	2.8	Diurnal Maximum	

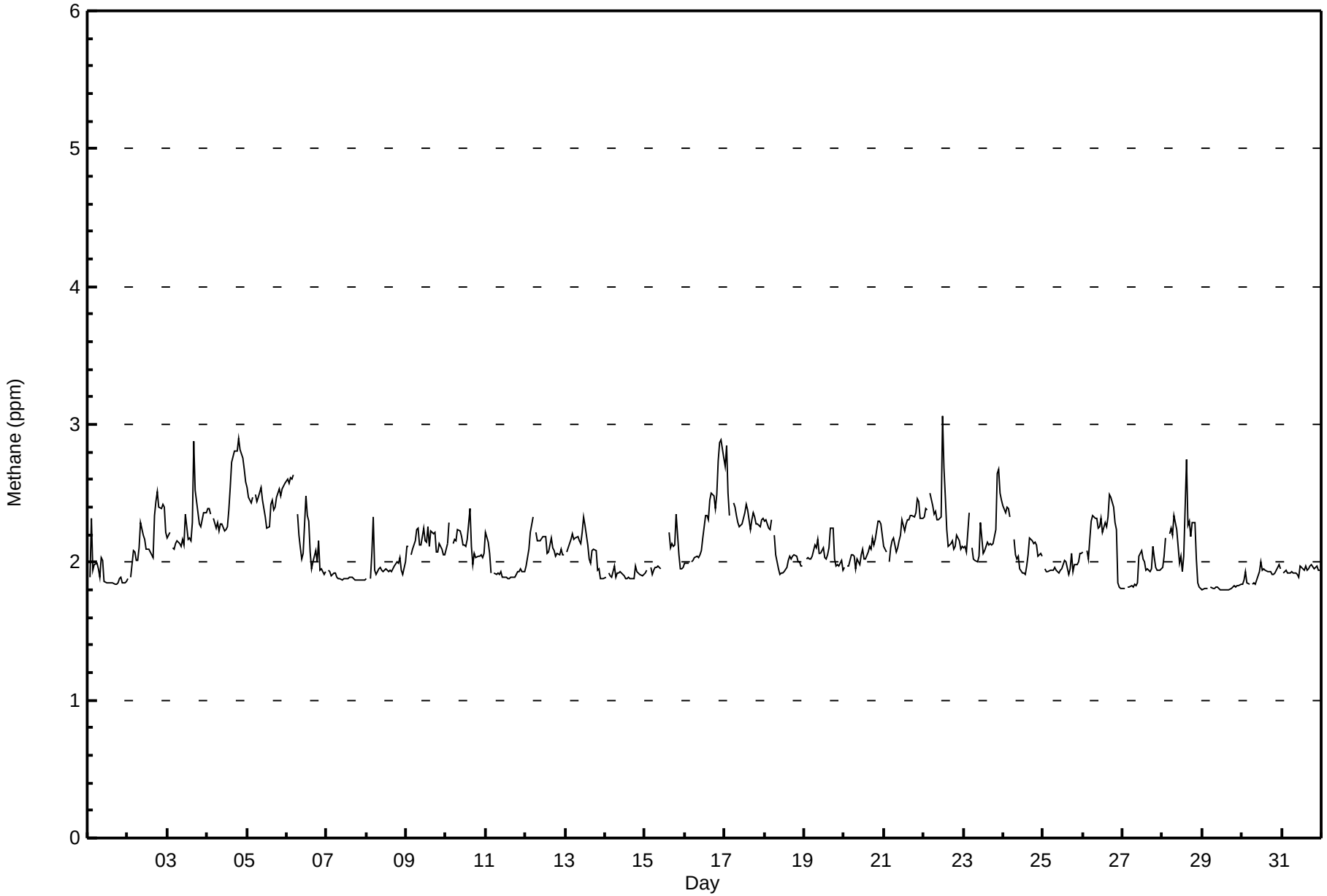
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	336	47.39	47.39
2.1 - 3.0	372	52.47	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association **Methane (CH_4) - ppm**

Frequency Distribution **Fort McKay - Bertha Ganter - January 2016**

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	40	49	13	7	1	0	2	14	26	39	25	24	29	18	30	19	336
2.1 - 3.0	56	6	2	0	1	0	0	25	145	53	16	14	6	4	14	30	372
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	55	15	7	2	0	2	39	171	92	41	38	35	22	44	50	709

Total Number of Valid Hours: 709

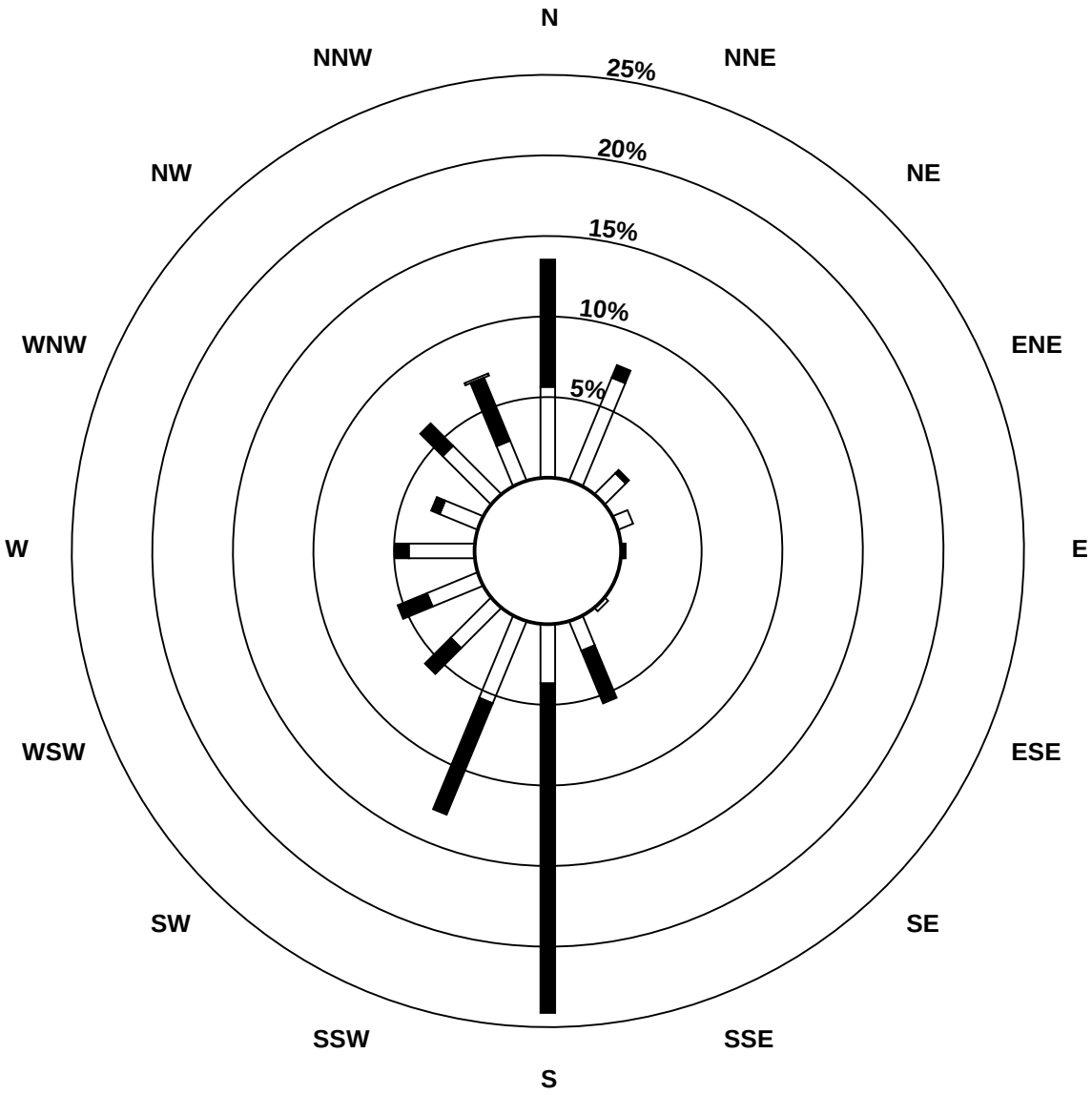
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

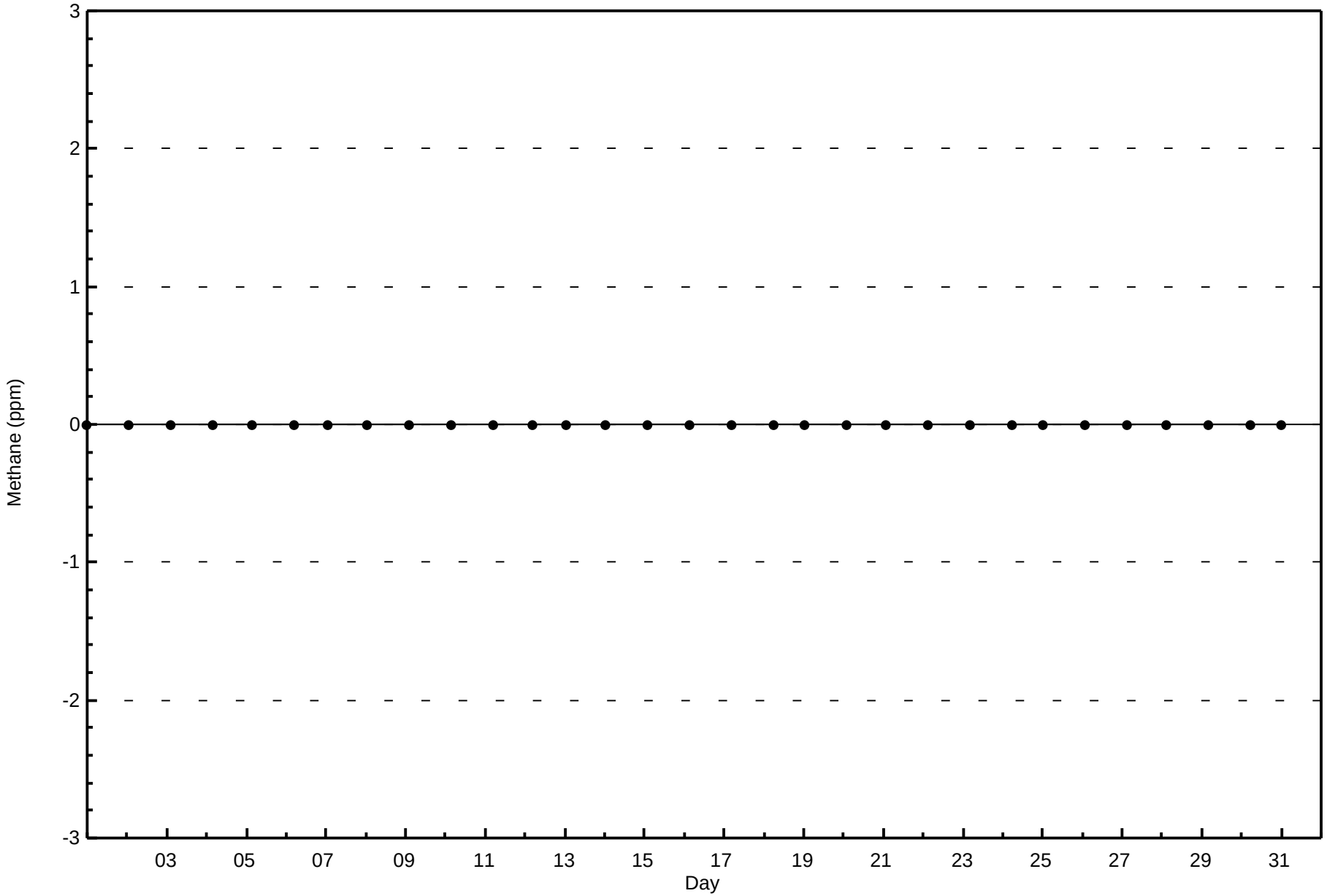
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - January 2016

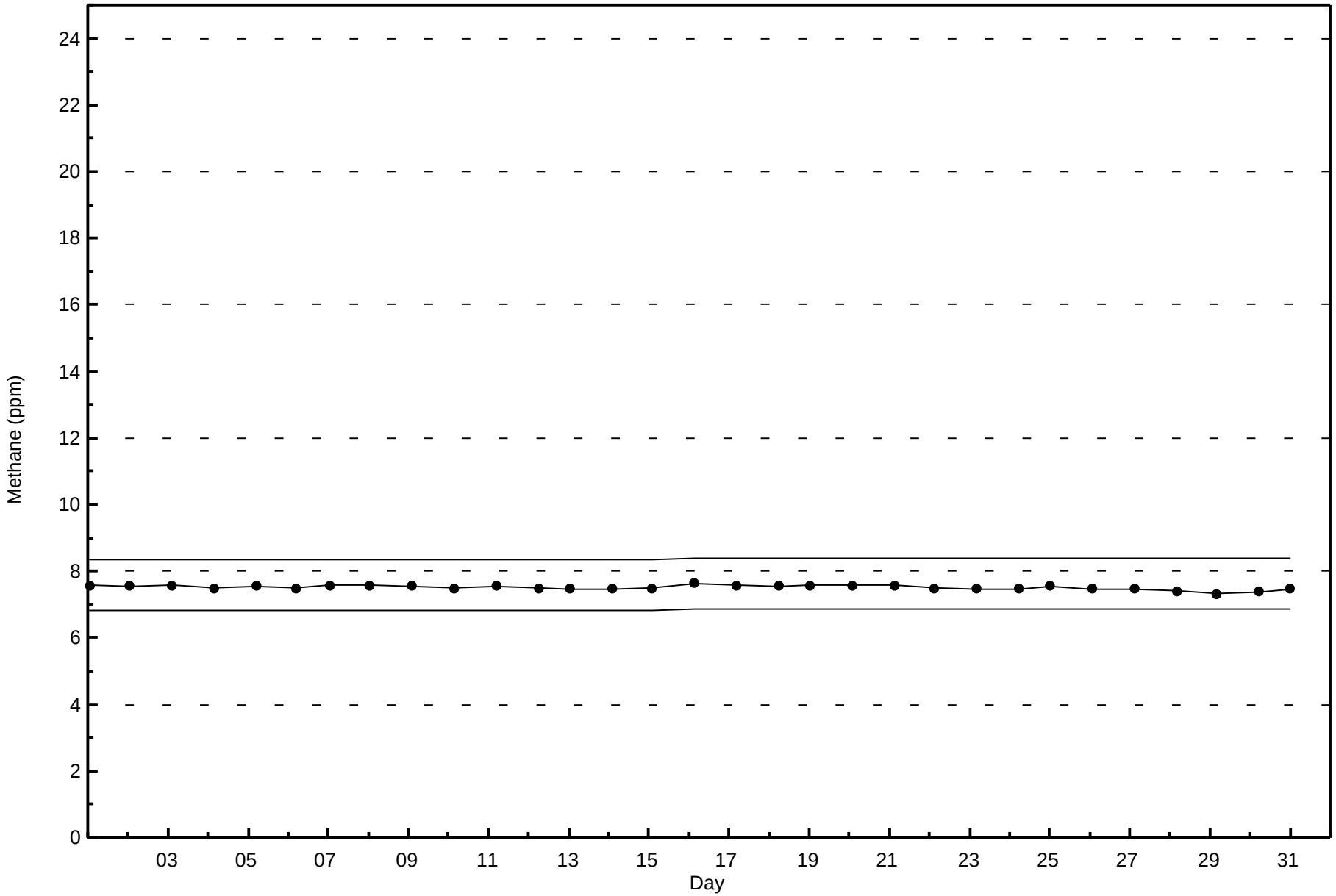


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - January 2016

Maximum Value: 84 ppb on Jan 17 02:00

Maximum Daily Average: 33.8 ppb on Jan 4

Minimum Value: 0 ppb on Jan 7 19:00

Minimum Daily Average: 0.0 ppb on Jan 7

Maximum Diurnal Average: 11.5 ppb at hour 12

Minimum Diurnal Average: 2.9 ppb at hour 6

Monthly Average: 7.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 9$ $P_{90} = 22$ $P_{99} = 64$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	Z	0	0	0	0	0	0	0	2	4	5	4	2	3	3	0	0	0	3	7	6	3	1	1.9	7
3-Jan	1	0	Z	0	0	0	0	0	0	2	4	6	4	4	3	1	0	0	1	2	1	4	5	5	2.0	6
4-Jan	8	12	12	Z	8	3	12	3	14	22	21	23	28	33	39	51	62	69	66	72	64	59	55	43	33.8	72
5-Jan	36	28	24	24	Z	22	20	29	53	39	33	23	21	17	14	9	11	14	21	29	28	33	31	31	25.6	53
6-Jan	33	31	31	31	33	Z	10	2	1	1	3	25	18	12	4	1	0	0	0	0	0	0	0	0	10.2	33
7-Jan	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
8-Jan	0	Z	0	1	4	0	0	0	0	1	3	4	9	6	8	5	5	6	6	2	8	0	0	6	3.3	9
9-Jan	13	10	Z	0	0	0	0	1	2	2	3	5	8	8	4	3	1	1	0	0	0	0	0	0	2.7	13
10-Jan	0	0	0	Z	0	0	0	2	5	9	7	8	7	8	24	5	0	0	0	0	0	0	0	0	3.3	24
11-Jan	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
12-Jan	0	2	7	16	23	Z	20	11	14	12	19	19	12	5	4	3	1	0	0	0	0	0	0	0	7.4	23
13-Jan	Z	0	0	1	4	6	4	7	11	14	20	23	21	14	4	1	0	0	0	0	0	0	0	0	5.7	23
14-Jan	0	Z	0	0	0	0	0	0	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0.3	2
15-Jan	0	0	Z	0	0	0	0	0	0	1	4	14	15	10	9	6	1	0	0	3	1	0	1	0	2.9	15
16-Jan	1	1	0	Z	2	2	6	8	7	8	17	31	47	46	35	28	25	25	18	20	40	62	71	81	25.3	81
17-Jan	74	84	54	34	Z	23	15	13	12	16	25	28	18	20	29	34	30	26	22	19	20	20	20	24	28.7	84
18-Jan	21	22	17	16	24	Z	13	4	1	1	2	3	2	2	1	0	0	0	0	0	0	0	0	0	5.6	24
19-Jan	Z	0	0	0	0	0	0	0	1	5	7	10	10	10	5	6	10	2	0	0	0	0	0	0	2.9	10
20-Jan	0	Z	0	0	0	0	0	0	0	0	3	5	3	4	8	6	1	1	1	4	16	21	21	13	4.7	21
21-Jan	5	1	Z	0	0	0	0	2	2	4	9	11	8	7	16	15	12	10	9	9	14	17	3	0	6.7	17
22-Jan	12	12	13	Z	29	11	3	4	1	M	M	48	37	22	8	2	1	0	0	0	0	0	0	0	9.7	48
23-Jan	0	0	0	1	Z	0	0	0	0	1	10	9	4	5	8	5	4	4	5	21	60	45	23	16	9.7	60
24-Jan	11	9	13	16	15	Z	3	0	0	1	0	0	0	1	6	9	21	18	9	4	0	0	0	0	6.0	21
25-Jan	Z	0	0	0	0	0	0	1	0	1	1	2	3	4	5	1	2	11	0	2	1	4	10	6	2.3	11
26-Jan	6	Z	1	0	3	4	4	14	20	17	25	23	16	17	14	15	14	18	16	13	4	0	0	0	10.6	25
27-Jan	0	0	Z	0	0	0	0	0	0	0	2	4	5	3	2	1	1	0	0	0	0	0	0	0	0.8	5
28-Jan	0	2	3	Z	0	2	2	14	21	10	4	9	1	5	35	7	1	0	0	0	0	0	0	0	5.1	35
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	1	3	3	3	2	1	0	0	0	0	0	0	0	0	0.6	3
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	0	0	0	0	0	0	0	0	0.4	2
	8.9	8.3	6.8	5.5	5.6	2.9	3.6	3.7	5.4	5.9	7.9	11.5	10.3	9.0	9.5	7.1	6.6	6.7	5.7	6.6	8.6	8.8	7.9	7.4	Diurnal Average	
	74	84	54	34	33	23	20	29	53	39	33	48	47	46	39	51	62	69	66	72	64	62	71	81	Diurnal Maximum	

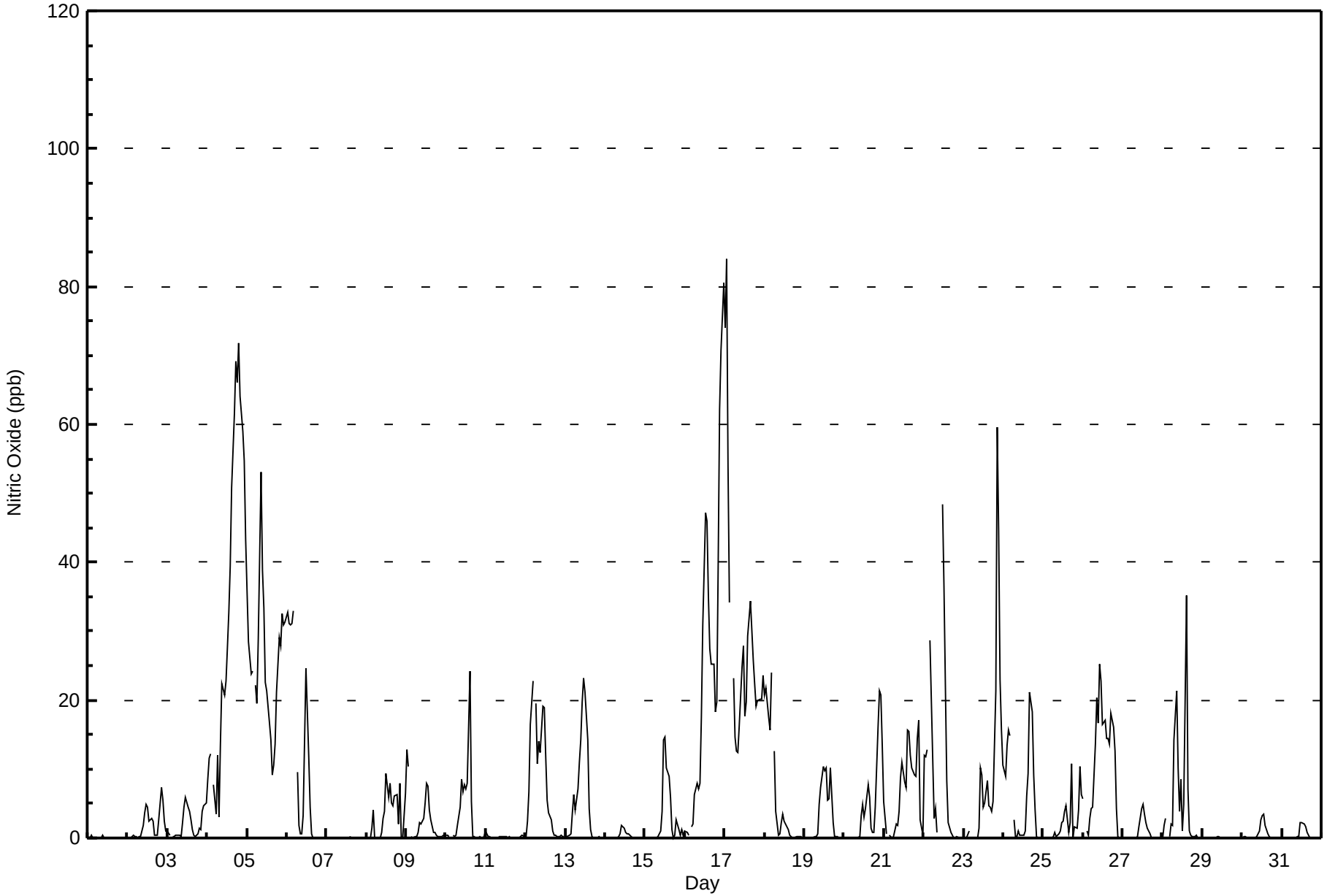
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	622	88.10	88.10
21 - 40	63	8.92	97.03
11 - 80	19	2.69	99.72
81 - 159	1	0.14	99.86
> 159	0	0.00	99.86

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association | **Nitric Oxide (NO) - ppb**

Frequency Distribution | **Fort McKay - Bertha Ganter - January 2016**

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	89	55	15	7	2	0	2	29	146	71	38	35	31	20	40	42	622
21 - 40	7	0	0	0	0	0	0	8	19	10	2	3	4	1	3	6	63
11 - 80	0	0	0	0	0	0	0	2	6	9	1	0	0	0	0	1	19
81 - 159	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	55	15	7	2	0	2	39	171	91	41	38	35	21	43	49	705

Total Number of Valid Hours: 706

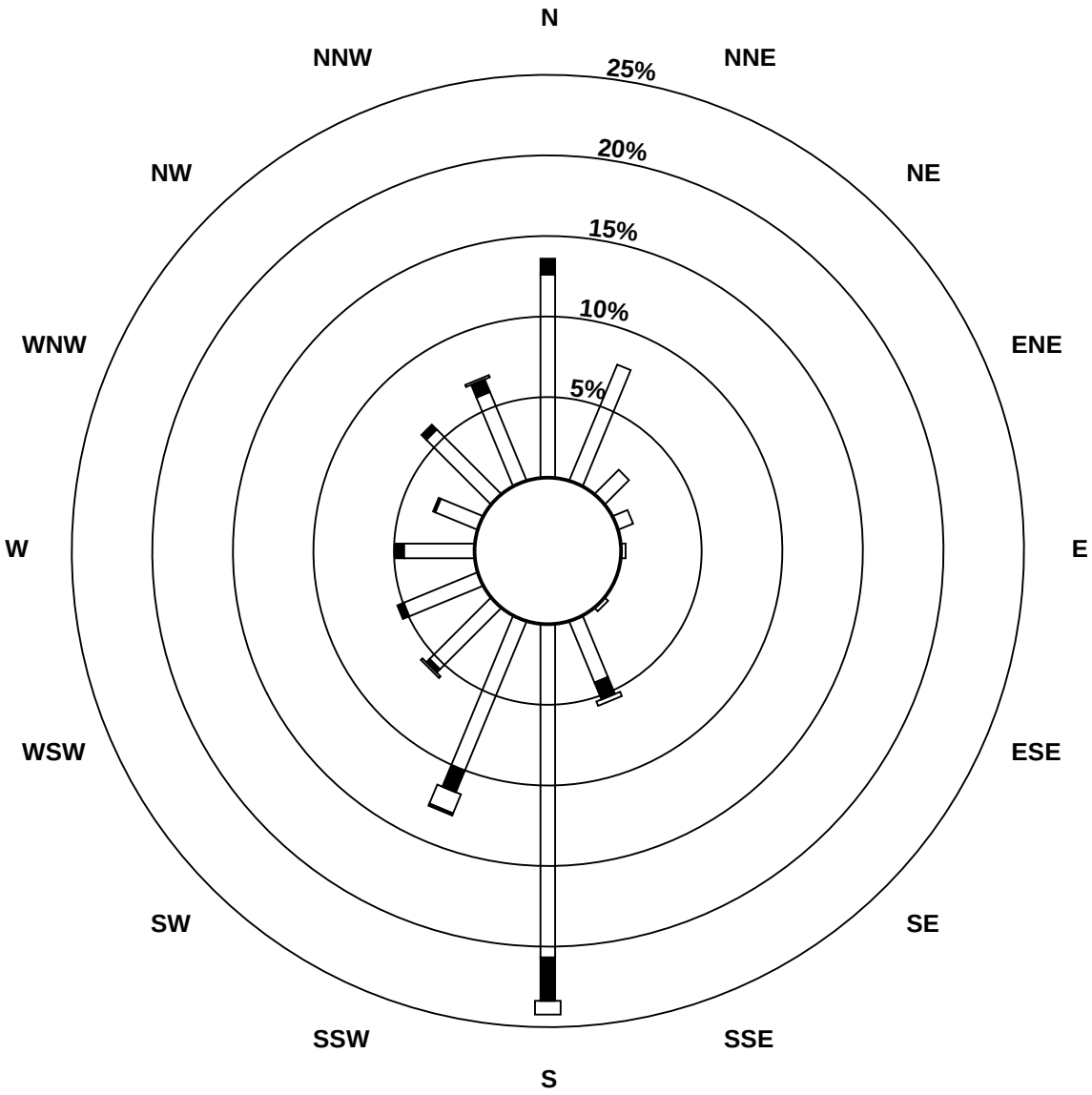
Total Number of Hours: 744

Wood Buffalo Environmental Association

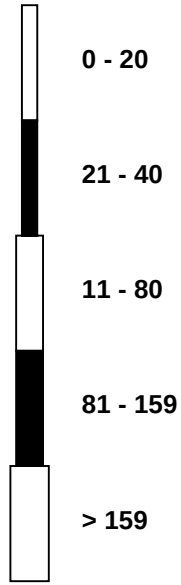
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

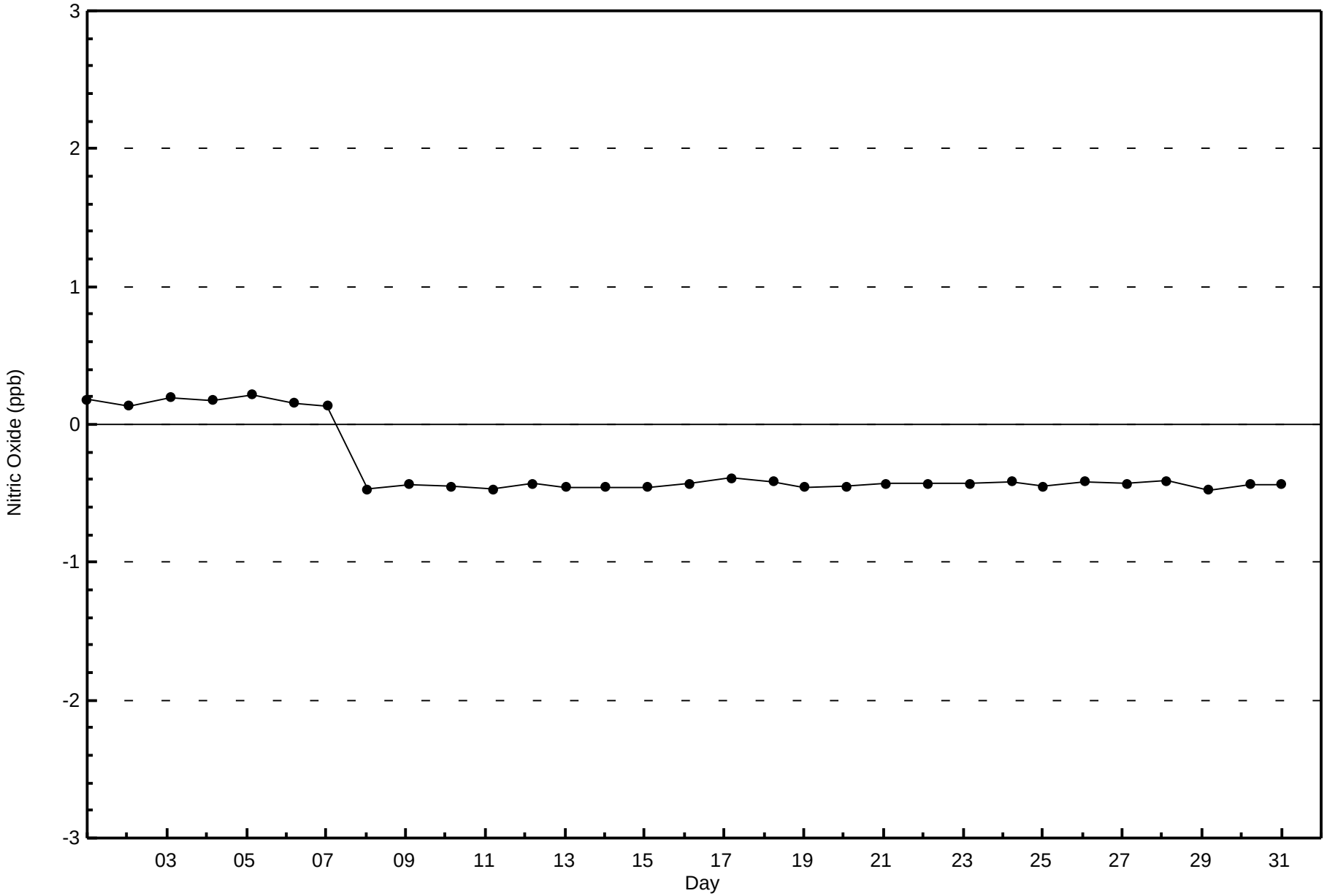
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - January 2016

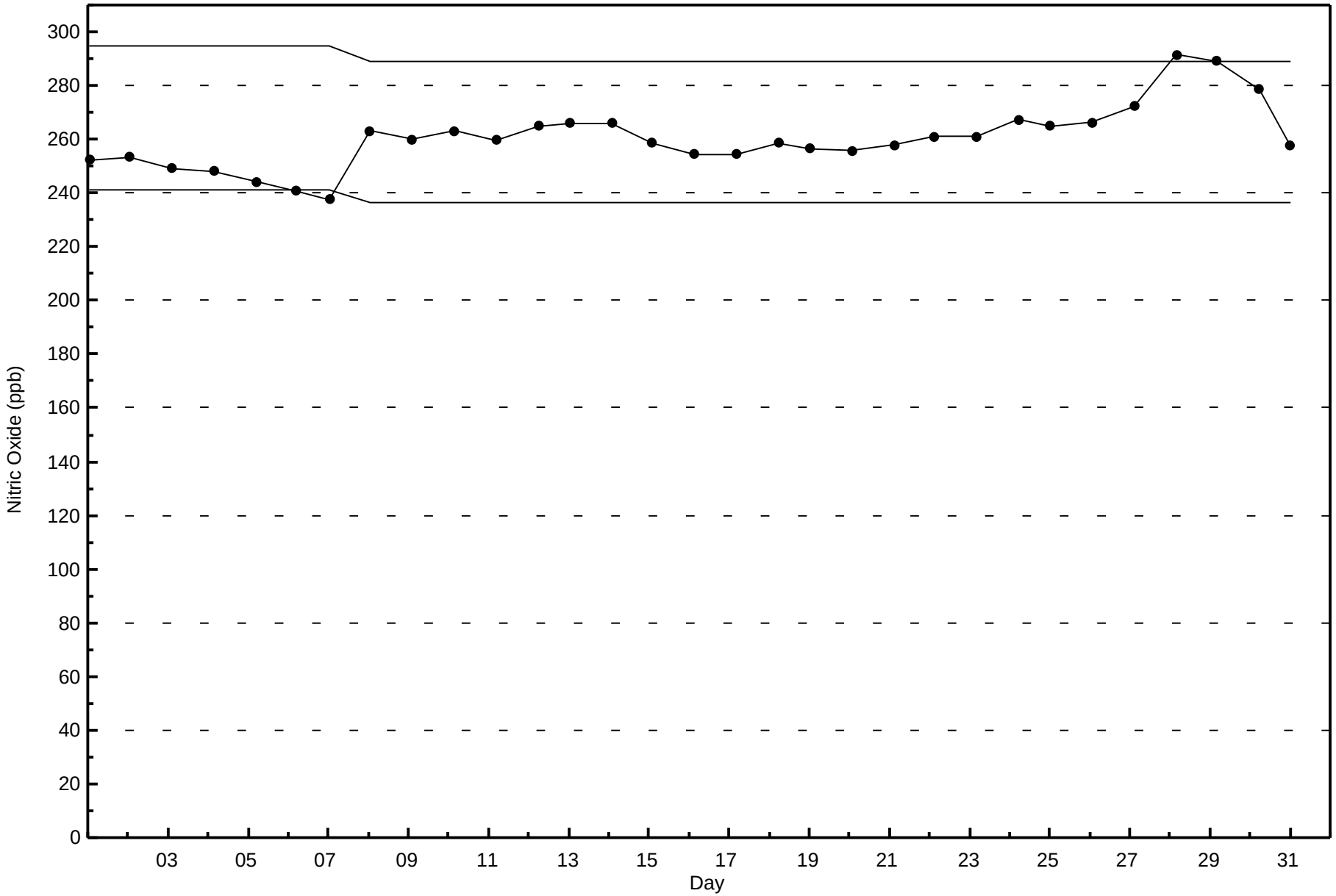


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 33 ppb on Jan 9 01:00

Maximum Daily Average: 24.0 ppb on Jan 17

Minimum Value: 0 ppb on Jan 29 13:00

Minimum Daily Average: 0.8 ppb on Jan 29

Maximum Diurnal Average: 16.0 ppb at hour 18

Minimum Diurnal Average: 10.9 ppb at hour 6

Monthly Average: 13.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 8$ Median = 13 $Q_3 = 19$ $P_{90} = 23$ $P_{99} = 30$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2	21	5	5	5	3	2	10	10	1	1	1	1	1	1	1	1	2	6	8	1	1	2	3.7	21
2-Jan	5	Z	6	18	15	12	11	13	15	17	14	12	11	9	13	20	19	19	21	26	26	24	24	20	16.0	26
3-Jan	18	17	Z	13	12	13	13	12	12	13	12	11	9	9	10	12	17	15	17	19	20	21	19	19	14.5	21
4-Jan	19	18	19	Z	16	14	15	11	12	15	13	13	13	17	20	25	27	27	29	28	26	25	24	24	19.5	29
5-Jan	24	23	22	22	Z	21	22	22	23	21	20	17	17	18	20	22	22	21	21	22	22	23	21	20	21.1	24
6-Jan	19	18	17	16	16	Z	18	16	13	9	11	22	21	18	15	8	9	13	6	11	2	4	5	6	12.8	22
7-Jan	Z	5	2	4	5	3	2	1	1	C	C	C	C	C	2	3	2	1	1	0	1	1	1	2	2.1	5
8-Jan	6	Z	14	26	27	10	4	7	7	8	8	9	13	12	16	18	22	25	23	21	28	10	7	29	15.1	29
9-Jan	33	30	Z	9	9	12	14	18	22	16	12	12	13	14	13	15	18	21	19	15	17	17	16	17	16.7	33
10-Jan	16	16	15	Z	15	14	17	17	20	19	15	14	14	14	21	15	10	14	10	11	15	13	12	13	14.7	21
11-Jan	18	12	13	4	Z	6	5	6	6	5	3	2	2	1	1	1	1	4	5	6	8	12	13	9	6.2	18
12-Jan	12	18	22	25	24	Z	25	26	25	24	24	21	19	15	13	15	17	17	17	15	17	17	15	12	18.9	26
13-Jan	Z	12	12	13	15	17	16	16	20	22	21	21	20	19	14	12	12	9	13	10	14	5	5	4	13.9	22
14-Jan	5	Z	4	4	4	5	5	12	17	12	14	10	6	5	5	5	6	8	5	10	9	13	11	11	7.9	17
15-Jan	14	13	Z	8	6	9	10	11	11	11	14	23	21	19	21	24	21	15	20	27	25	20	20	16	16.4	27
16-Jan	17	15	14	Z	16	15	16	18	18	15	14	17	22	22	23	26	28	28	28	27	28	29	27	32	21.5	32
17-Jan	31	30	28	26	Z	24	23	23	22	20	18	19	16	19	25	28	29	28	26	25	25	24	23	22	24.0	31
18-Jan	22	22	24	21	22	Z	26	27	19	11	12	13	11	9	8	8	8	11	12	21	20	22	20	9	16.4	27
19-Jan	Z	8	7	7	4	6	16	13	19	17	13	12	12	13	11	17	23	23	17	15	17	13	9	5	12.9	23
20-Jan	11	Z	12	9	10	12	9	6	8	7	16	17	12	10	16	19	21	26	25	29	31	31	30	28	17.2	31
21-Jan	25	20	Z	9	7	7	10	13	15	13	14	13	11	12	16	18	19	19	19	18	20	21	20	14	15.4	25
22-Jan	26	25	21	Z	23	19	15	15	10	M	M	19	19	17	13	10	11	13	9	9	12	10	7	9	14.9	26
23-Jan	8	8	7	16	Z	11	8	9	8	12	17	15	13	11	14	13	16	17	18	19	23	21	19	17	13.9	23
24-Jan	16	16	15	15	14	Z	9	5	4	5	2	1	1	2	11	19	27	26	21	16	11	11	7	7	11.4	27
25-Jan	Z	4	3	3	4	5	7	12	8	6	6	8	7	8	10	6	11	22	6	13	15	13	16	20	9.2	22
26-Jan	19	Z	15	12	21	23	23	25	23	22	21	21	19	20	19	21	22	23	22	23	21	3	2	2	18.3	25
27-Jan	1	1	Z	1	1	1	1	3	1	3	6	9	10	8	7	9	12	10	17	11	8	8	12	11	6.5	17
28-Jan	10	14	18	Z	9	11	14	17	18	12	8	12	6	14	22	15	15	16	13	14	7	2	1	1	11.6	22
29-Jan	1	1	1	1	Z	2	0	1	1	2	1	0	0	0	0	0	0	1	2	1	1	1	1	1	0.8	2
30-Jan	1	4	10	1	1	Z	2	2	2	3	6	11	9	10	9	6	9	9	5	7	6	11	15	12	6.5	15
31-Jan	Z	12	10	8	9	8	6	9	6	4	1	11	9	10	10	9	11	15	11	10	11	8	7	6	8.8	15
	15.0	14.0	13.6	11.3	11.9	10.9	11.7	12.4	12.8	12.1	11.6	12.9	11.8	11.8	12.8	13.4	15.1	16.0	14.8	15.7	15.8	13.9	13.1	12.9	Diurnal Average	
	33	30	28	26	27	24	26	27	25	24	24	23	22	22	25	28	29	28	29	29	31	31	30	32	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

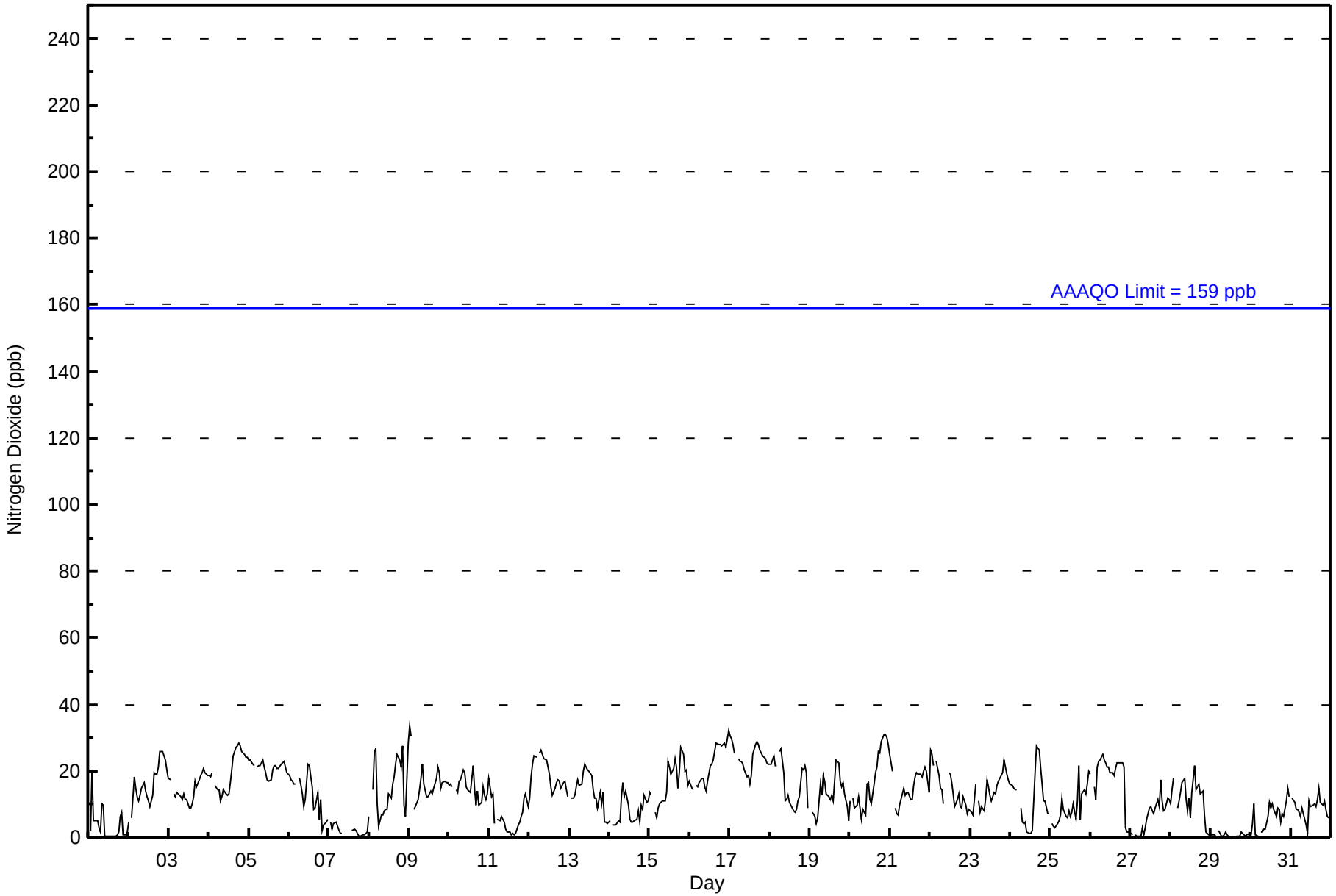
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - January 2016



Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	563	79.75	79.75
21 - 40	143	20.25	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	82	54	15	7	1	0	2	31	131	53	27	34	31	19	38	38	563
21 - 40	14	1	0	0	1	0	0	8	40	39	14	4	4	2	5	11	143
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	55	15	7	2	0	2	39	171	92	41	38	35	21	43	49	706

Total Number of Valid Hours: 706

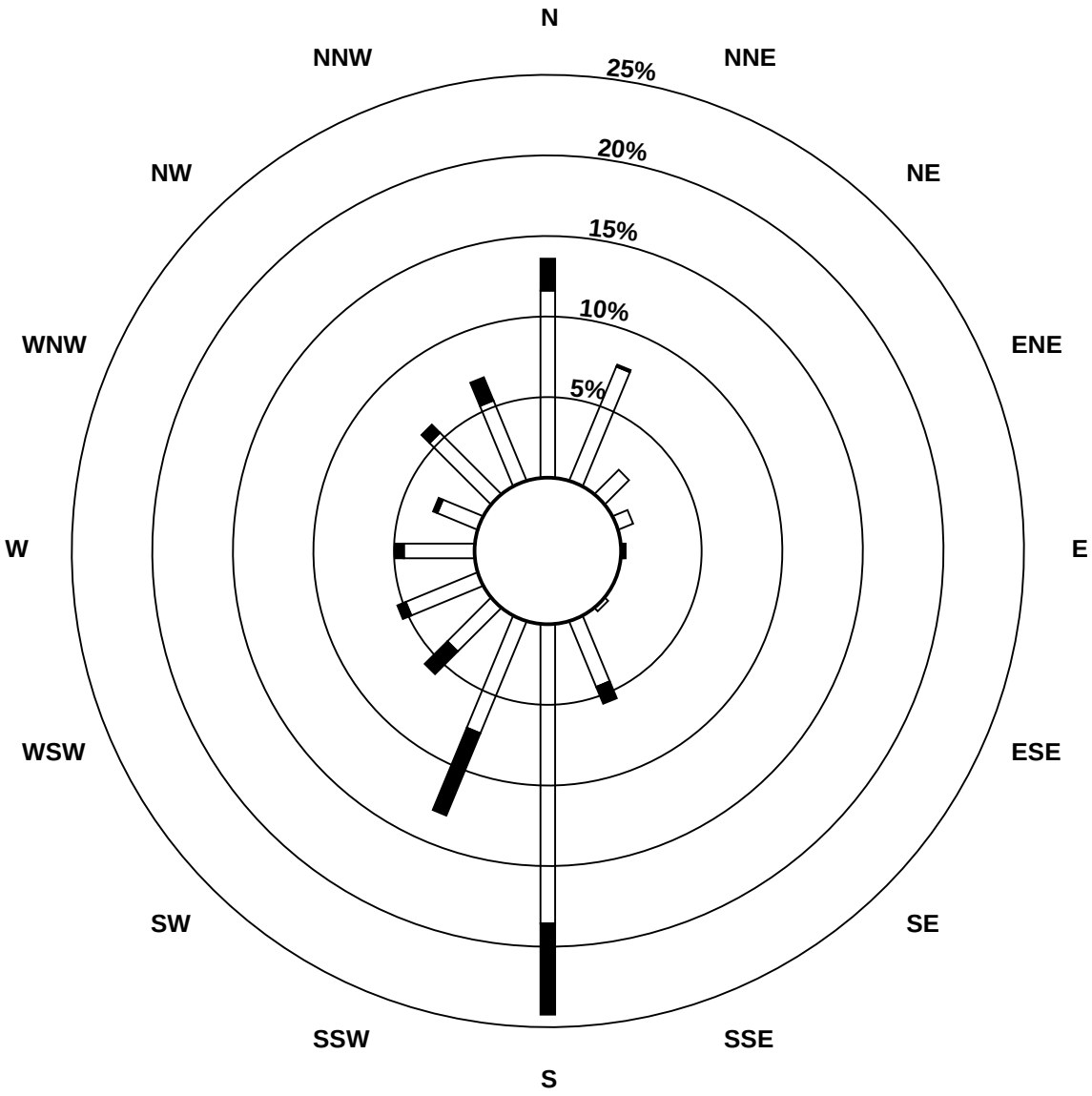
Total Number of Hours: 744

Wood Buffalo Environmental Association

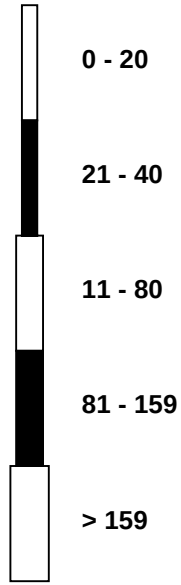
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

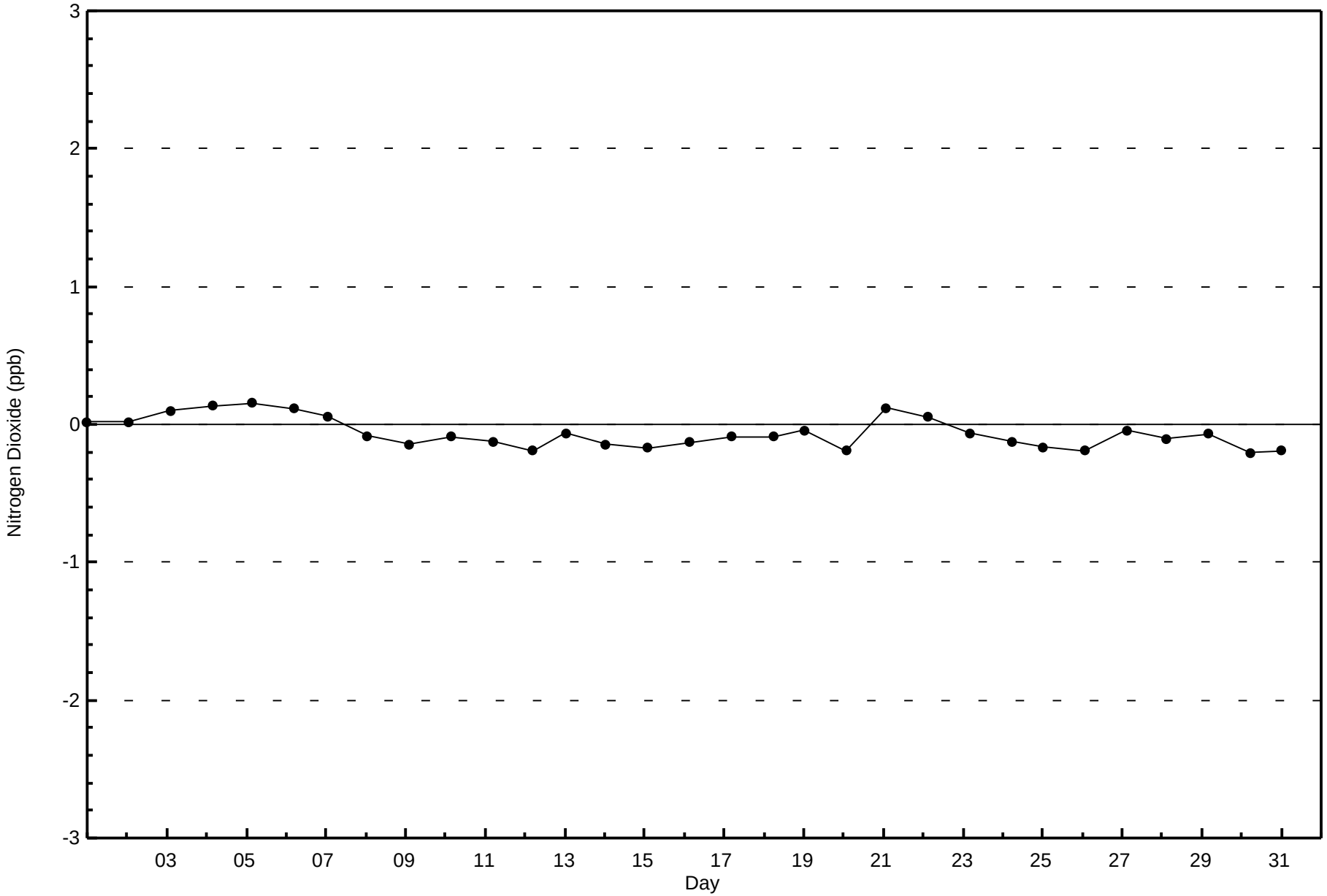
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - January 2016

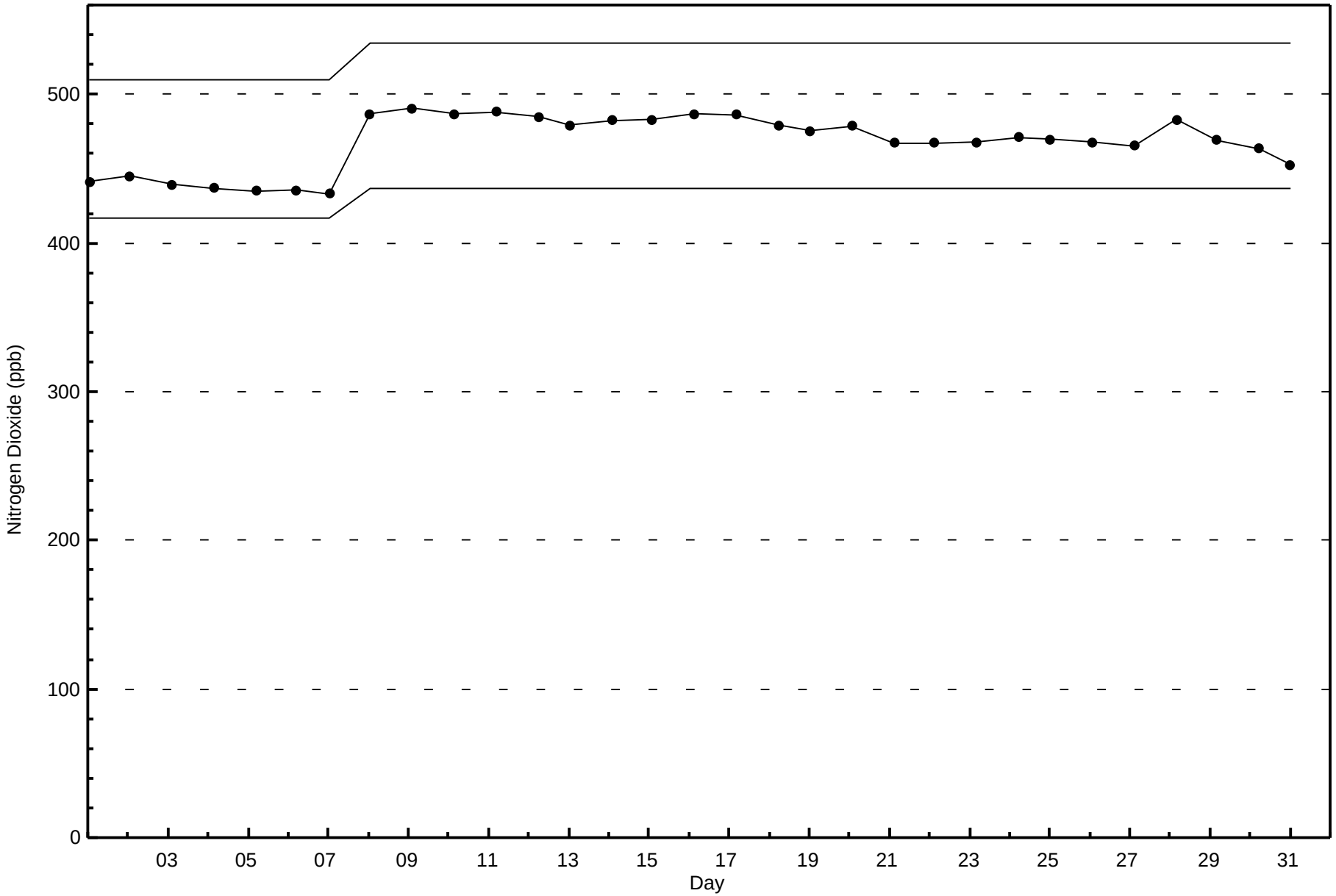


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - January 2016

Maximum Value: 113 ppb on Jan 17 02:00

Maximum Daily Average: 53.3 ppb on Jan 4

Minimum Value: 0 ppb on Jan 29 16:00

Minimum Daily Average: 0.8 ppb on Jan 29

Maximum Diurnal Average: 24.4 ppb at hour 21

Minimum Diurnal Average: 13.9 ppb at hour 6

Monthly Average: 20.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 8$ Median = 15 $Q_3 = 28$ $P_{90} = 45$ $P_{99} = 93$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2	21	5	5	5	3	2	10	10	1	1	0	0	1	1	1	1	2	6	8	1	1	2	3.8	21
2-Jan	5	Z	6	18	15	12	11	13	15	18	18	17	15	12	15	22	19	20	21	29	33	30	26	21	17.9	33
3-Jan	19	18	Z	13	12	14	14	13	12	15	16	17	13	13	13	14	17	15	18	20	21	25	24	24	16.5	25
4-Jan	27	30	32	Z	24	18	26	14	26	37	34	35	41	49	60	76	89	96	95	99	90	84	79	68	53.3	99
5-Jan	59	52	46	46	Z	43	41	51	76	60	53	40	38	34	34	31	33	35	42	51	50	56	52	51	46.7	76
6-Jan	52	49	48	48	49	Z	27	18	14	10	15	47	40	30	20	9	9	13	6	11	2	4	5	6	23.0	52
7-Jan	Z	5	2	4	4	3	2	1	1	C	C	C	C	C	2	3	2	1	1	0	1	1	1	2	2.1	5
8-Jan	6	Z	14	27	31	10	4	7	7	9	11	12	22	18	24	23	27	31	30	23	36	10	7	35	18.4	36
9-Jan	46	41	Z	9	9	12	15	19	24	18	15	17	21	22	17	18	18	22	20	15	17	17	17	17	19.4	46
10-Jan	16	17	16	Z	15	14	17	19	25	28	22	22	21	22	46	20	10	14	10	11	15	13	12	13	18.1	46
11-Jan	19	12	13	4	Z	6	5	6	6	5	3	2	2	1	1	1	1	4	4	6	8	12	13	10	6.3	19
12-Jan	12	21	29	41	47	Z	45	37	39	36	43	40	31	21	16	17	18	18	18	15	17	17	15	13	26.3	47
13-Jan	Z	12	12	13	19	24	20	23	31	36	41	44	41	33	19	13	12	9	14	10	14	5	5	4	19.7	44
14-Jan	5	Z	4	4	4	5	5	13	17	13	16	11	6	5	5	5	6	8	5	10	9	13	11	11	8.2	17
15-Jan	14	13	Z	8	6	9	10	11	11	12	17	37	36	29	30	30	22	15	20	30	26	20	21	16	19.3	37
16-Jan	18	16	15	Z	17	17	23	26	25	23	31	48	69	68	58	53	54	53	46	47	68	91	98	113	46.8	113
17-Jan	105	113	82	60	Z	47	38	35	34	36	43	47	34	39	54	63	59	54	49	45	44	44	43	45	52.7	113
18-Jan	43	44	42	37	46	Z	38	31	20	12	14	16	13	11	9	8	8	11	12	21	21	22	20	9	22.1	46
19-Jan	Z	8	7	7	4	6	16	13	19	22	20	23	21	23	16	22	33	25	17	15	17	13	9	5	15.8	33
20-Jan	11	Z	12	9	10	12	9	5	8	7	19	22	15	15	24	25	23	27	26	33	47	52	51	41	21.9	52
21-Jan	30	20	Z	9	7	7	10	15	17	17	22	24	20	19	31	34	31	29	28	27	34	38	23	14	22.1	38
22-Jan	38	37	34	Z	51	30	18	19	11	M	M	68	56	39	22	12	12	14	9	9	12	10	7	9	24.6	68
23-Jan	8	8	7	17	Z	11	8	9	8	13	28	24	17	16	22	18	20	21	23	41	83	66	42	33	23.6	83
24-Jan	27	24	28	30	29	Z	12	5	4	6	2	2	2	3	17	29	49	45	30	20	11	11	7	7	17.4	49
25-Jan	Z	4	3	3	4	5	7	12	9	7	7	10	9	12	15	6	13	33	6	15	16	17	26	26	11.6	33
26-Jan	25	Z	16	12	24	27	28	39	44	39	47	44	36	37	33	35	36	41	38	35	25	3	2	2	29.0	47
27-Jan	1	1	Z	1	1	1	1	3	1	3	7	13	14	11	9	11	12	9	18	11	8	8	12	11	7.3	18
28-Jan	10	16	20	Z	9	13	15	31	39	22	12	20	7	19	57	22	16	16	13	14	7	2	1	1	16.7	57
29-Jan	1	1	1	1	Z	2	0	0	1	2	1	0	0	0	0	0	0	1	2	1	1	1	1	1	0.8	2
30-Jan	1	5	10	1	0	Z	2	2	2	3	7	13	12	13	10	7	9	9	4	7	6	11	15	12	7.1	15
31-Jan	Z	12	10	8	9	8	6	9	6	4	2	13	12	12	12	10	12	15	11	10	11	9	6	6	9.2	15
	23.9	22.3	20.5	16.7	17.4	13.9	15.3	16.1	18.1	18.0	19.5	24.3	22.1	20.8	22.4	20.5	21.7	22.7	20.5	22.2	24.4	22.7	21.0	20.3	Diurnal Average	
	105	113	82	60	51	47	45	51	76	60	53	68	69	68	60	76	89	96	95	99	90	91	98	113	Diurnal Maximum	

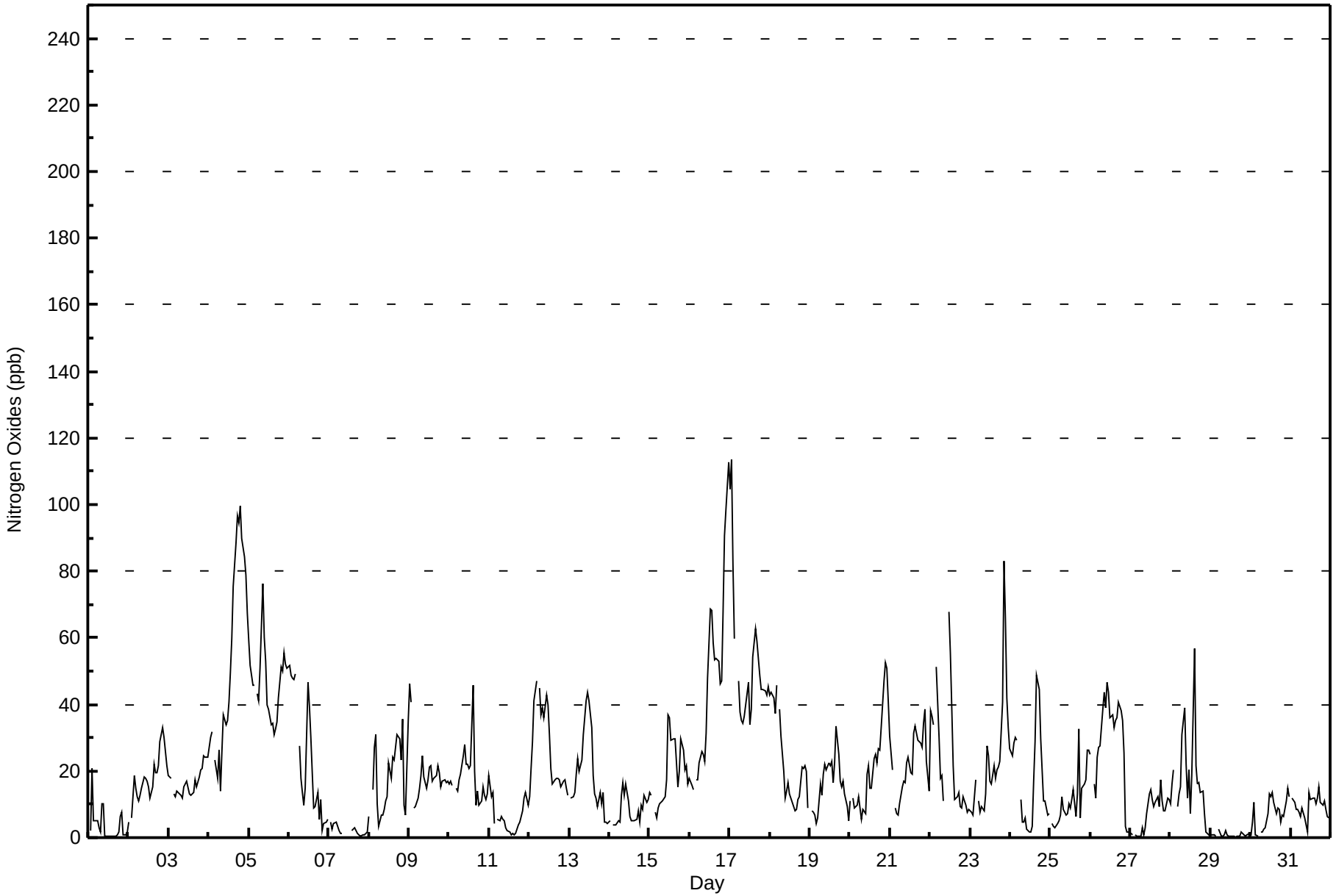
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - January 2016



Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	453	64.16	64.16
21 - 40	157	22.24	86.40
11 - 80	83	11.76	98.16
81 - 159	13	1.84	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	72	49	14	7	1	0	1	15	95	41	23	26	28	19	34	28	453
21 - 40	17	6	1	0	0	0	1	15	51	26	12	8	2	0	5	13	157
11 - 80	7	0	0	0	1	0	0	9	22	16	5	4	5	2	4	8	83
81 - 159	0	0	0	0	0	0	0	0	3	9	1	0	0	0	0	0	13
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	55	15	7	2	0	2	39	171	92	41	38	35	21	43	49	706

Total Number of Valid Hours: 706

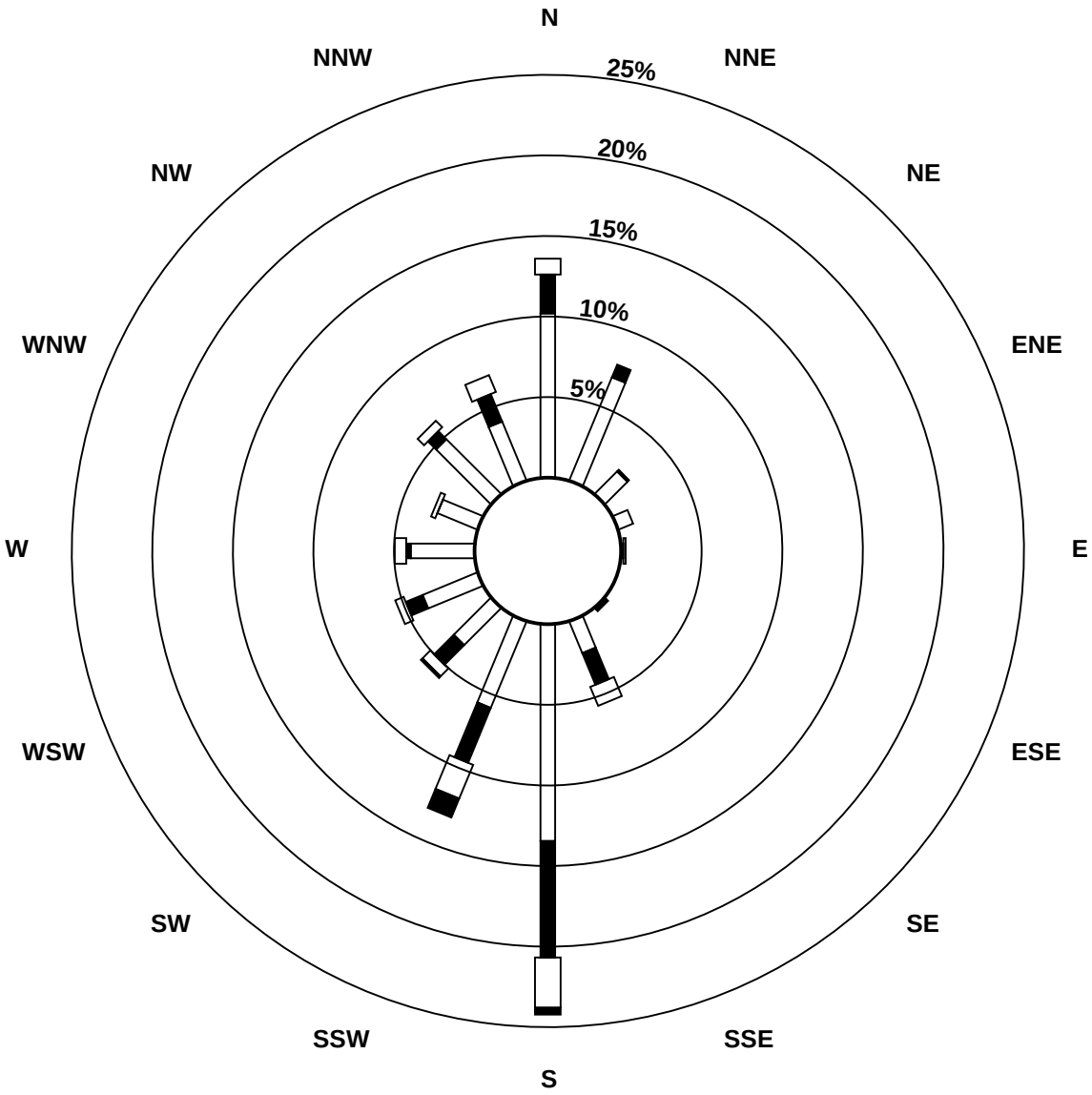
Total Number of Hours: 744

Wood Buffalo Environmental Association

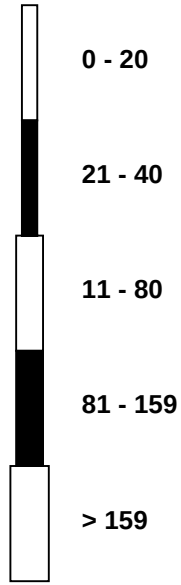
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

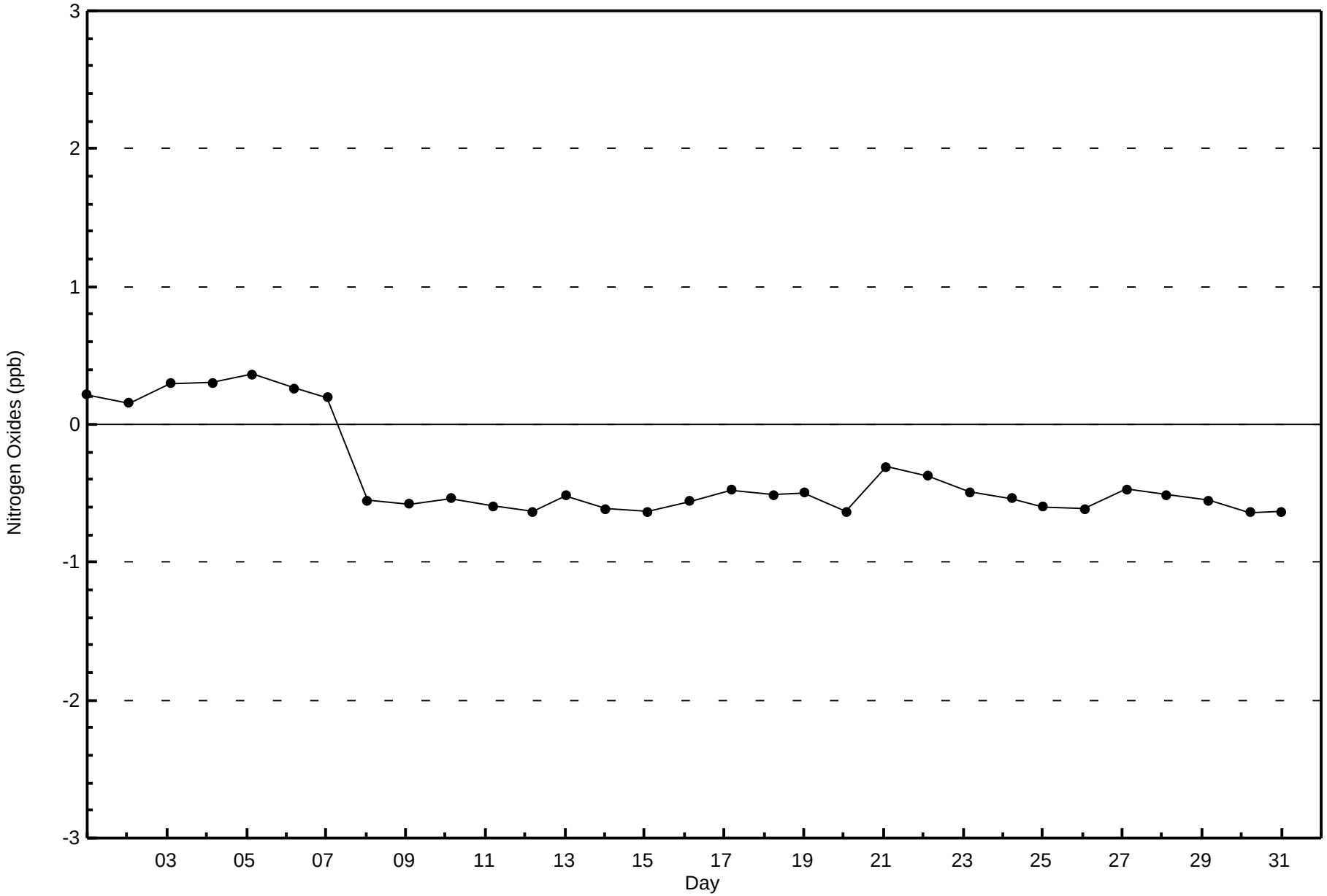
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - January 2016

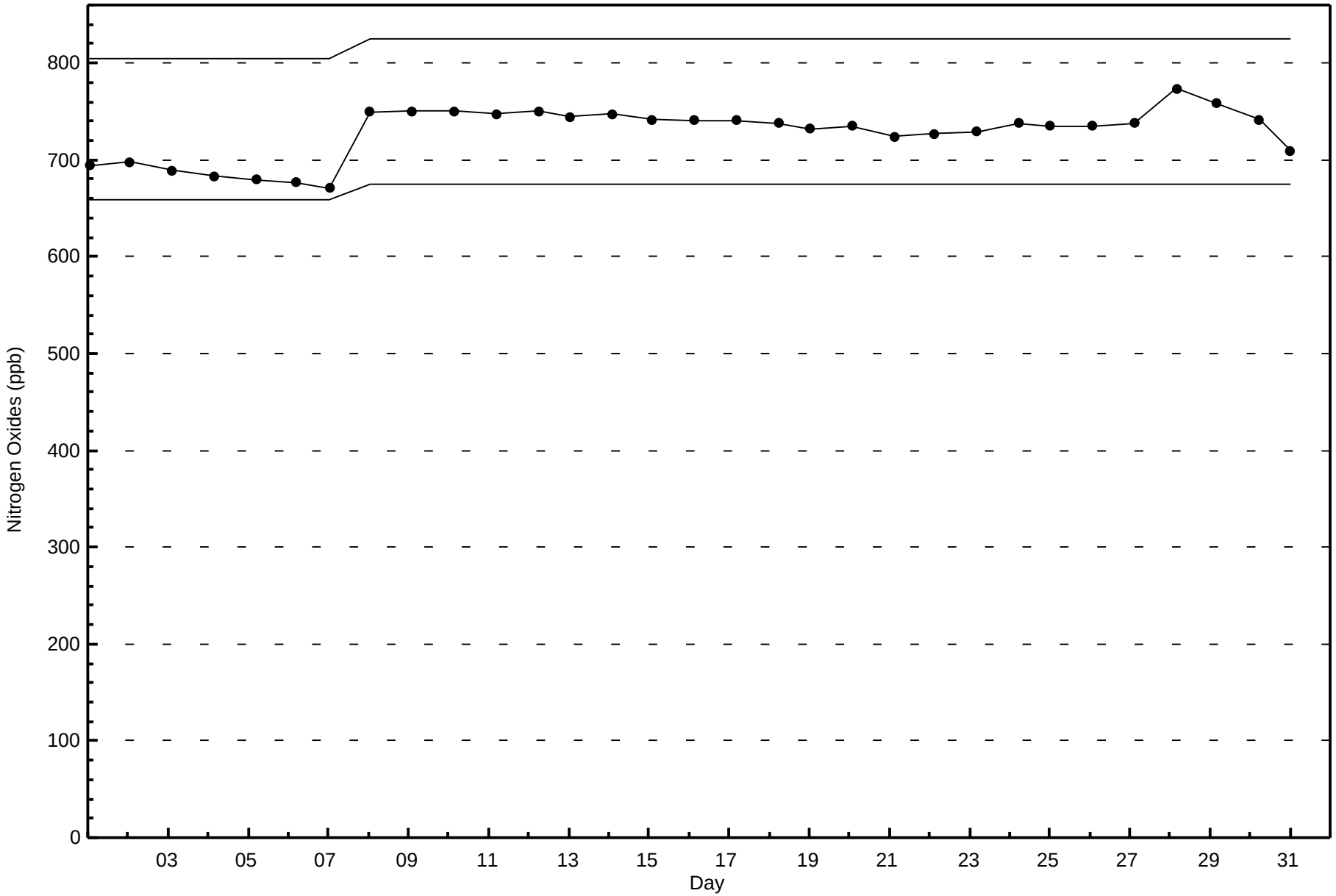


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 40 ppb on Jan 29 16:00 Maximum Daily Average: 32.8 ppb on Jan 7

Minimum Value: 2 ppb on Jan 16 08:00 Minimum Daily Average: 4.0 ppb on Jan 4
Maximum Diurnal Average: 19.0 ppb at hour 14 Minimum Diurnal Average: 12.9 ppb at hour 4
Monthly Average: 15.0 ppb Percentiles: $P_1 = 3$ $P_{10} = 3$ $Q_1 = 6$ Median = 13 $Q_3 = 23$ $P_{90} = 30$ $P_{99} = 38$

Hours in Service: 744
Hours of Data: 709
Hours of Missing Data: 35
Hours of Calibration: 35
Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	31	31	12	Z	29	30	33	34	25	27	37	38	38	38	38	38	38	38	36	30	26	34	35	32	32.5	38
2-Jan	26	28	23	12	Z	18	18	17	16	14	18	20	22	24	21	14	13	10	9	5	4	4	5	7	15.1	28
3-Jan	8	9	12	12	12	Z	12	12	12	11	14	17	19	19	19	17	13	13	10	7	6	4	4	3	11.4	19
4-Jan	3	3	3	3	3	4	Z	4	3	4	5	6	8	7	6	4	3	4	4	3	3	3	3	3	4.0	8
5-Jan	3	3	3	3	3	3	3	Z	3	4	6	9	9	11	9	6	3	3	3	3	3	3	3	3	4.5	11
6-Jan	3	3	3	3	3	3	3	6	Z	16	14	7	8	11	13	21	20	15	24	19	31	28	28	28	13.4	31
7-Jan	31	29	32	Z	28	29	32	34	35	34	34	34	34	34	33	33	33	34	34	34	34	33	33	32	32.8	35
8-Jan	28	25	20	9	Z	19	24	19	18	17	14	16	14	16	13	9	4	4	4	7	7	23	27	7	15.0	28
9-Jan	4	4	15	19	18	Z	15	11	8	15	19	20	19	19	20	16	12	8	10	13	12	11	11	10	13.4	20
10-Jan	10	9	9	9	9	10	Z	6	3	5	8	9	9	10	6	10	16	12	18	16	12	13	13	12	10.1	18
11-Jan	9	13	15	23	22	21	19	Z	21	24	26	27	29	28	28	29	27	25	23	21	19	16	16	19	21.7	29
12-Jan	15	7	4	3	3	3	3	4	Z	5	6	8	10	14	16	14	11	10	10	11	10	9	9	11	8.6	16
13-Jan	8	8	7	Z	4	3	3	3	3	4	6	6	6	8	11	14	15	18	15	19	17	26	27	28	11.3	28
14-Jan	27	28	29	29	Z	30	31	24	22	26	25	29	32	32	32	31	30	28	31	26	27	23	25	24	27.9	32
15-Jan	21	21	21	24	25	Z	19	18	17	16	17	13	15	17	16	12	12	16	12	4	6	8	7	9	15.1	25
16-Jan	6	7	6	6	5	4	Z	2	3	6	8	10	9	9	8	6	3	2	3	2	3	3	3	3	5.1	10
17-Jan	3	3	3	3	3	3	3	Z	3	5	9	10	13	12	8	5	3	3	3	3	3	3	3	3	4.5	13
18-Jan	3	3	3	3	3	3	3	8	Z	25	24	24	25	27	28	28	25	21	16	12	12	10	12	21	14.7	28
19-Jan	22	20	15	Z	17	17	10	14	8	9	12	13	14	14	15	10	4	4	12	13	12	15	19	25	13.7	25
20-Jan	21	20	20	22	Z	18	21	25	22	22	15	15	19	21	18	14	11	6	7	4	3	3	3	3	14.6	25
21-Jan	4	7	10	15	16	Z	13	10	8	10	11	11	13	12	9	7	4	3	3	3	3	3	7	14	8.6	16
22-Jan	4	4	5	5	3	4	Z	4	6	8	C	C	C	C	8	10	9	8	11	11	8	12	16	14	7.8	16
23-Jan	15	15	15	6	8	11	14	Z	13	10	6	7	10	11	10	9	5	4	3	3	4	4	3	4	8.2	15
24-Jan	3	3	3	3	3	4	8	14	Z	15	23	25	27	27	20	13	5	4	6	7	10	12	17	17	11.7	27
25-Jan	14	21	21	Z	19	18	17	15	20	23	22	20	22	23	21	25	18	8	19	11	9	9	5	5	16.8	25
26-Jan	5	5	11	14	Z	4	4	4	4	6	6	7	8	9	10	8	5	4	4	4	5	28	31	32	9.4	32
27-Jan	34	33	31	37	38	Z	36	29	29	24	24	21	21	22	22	20	17	18	10	17	19	18	14	14	23.7	38
28-Jan	14	9	5	8	7	4	Z	4	4	7	11	9	16	10	6	13	11	9	11	10	16	21	23	27	11.0	27
29-Jan	30	30	27	25	19	23	29	Z	30	27	33	36	38	39	39	40	35	33	32	32	32	25	31	30	31.1	40
30-Jan	30	24	16	28	29	28	27	26	Z	23	21	19	19	20	22	23	22	22	26	25	27	23	19	20	23.5	30
31-Jan	22	20	21	Z	22	24	25	22	26	30	32	23	26	25	25	25	23	19	23	24	23	25	24	21	23.9	32
	14.7	14.4	13.6	12.9	13.6	13.0	16.4	14.2	14.0	15.1	16.8	17.0	18.4	19.0	17.6	16.8	14.5	13.1	13.8	12.9	13.0	14.6	15.3	15.5	Diurnal Average	
	34	33	32	37	38	30	36	34	35	34	37	38	38	39	39	40	38	38	36	34	34	34	35	32	Diurnal Maximum	

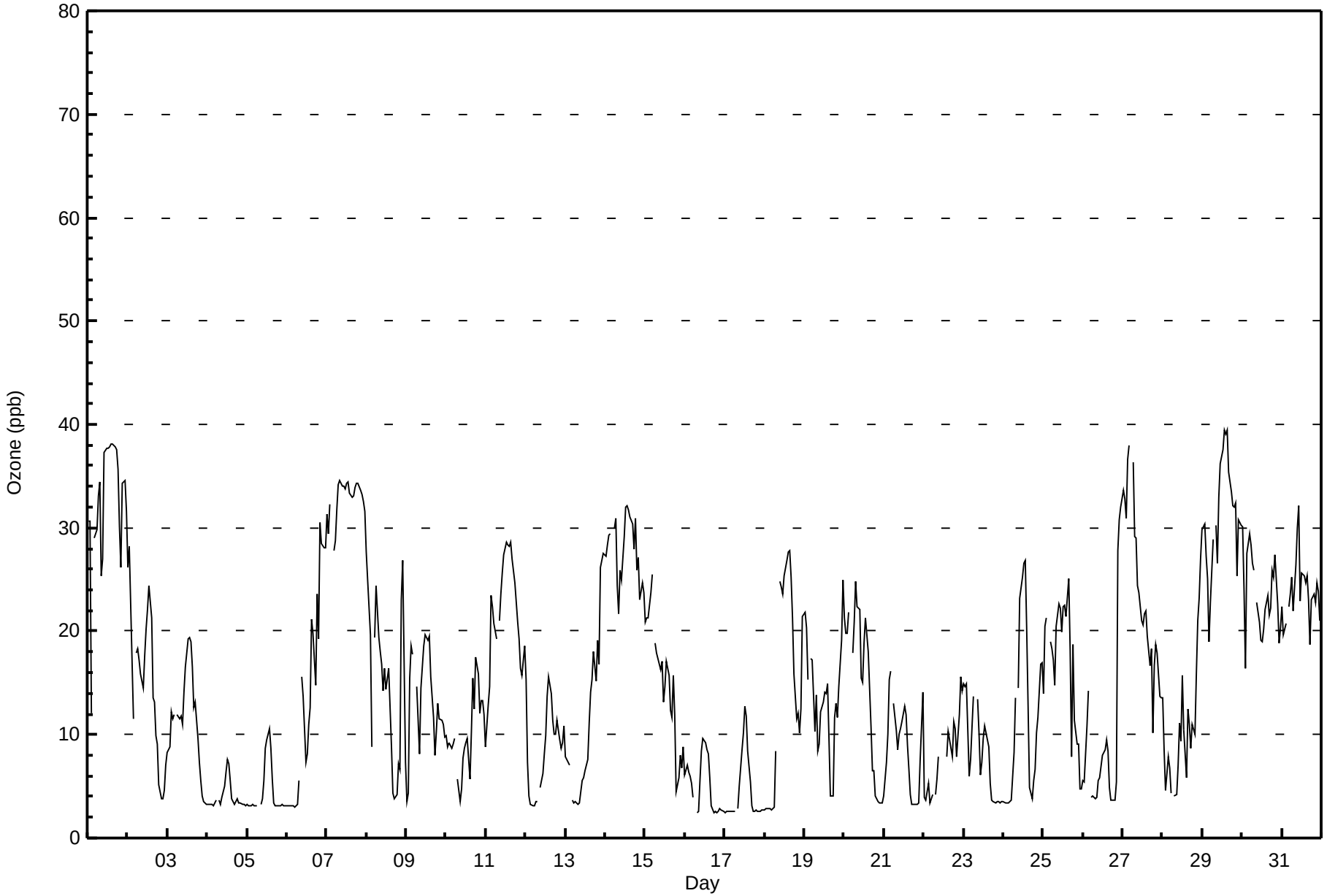
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	490	69.11	69.11
21 - 50	219	30.89	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association **Ozone (O_3) - ppb**

Frequency Distribution **Fort McKay - Bertha Ganter - January 2016**

Concentration Ranges (ppb)	Wind Direction N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Totals
0 - 20	64	26	1	3	2	0	1	31	157	72	30	20	11	4	27	41	490
21 - 50	32	30	14	4	0	0	0	6	16	19	10	22	25	18	13	10	219
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	56	15	7	2	0	1	37	173	91	40	42	36	22	40	51	709

Total Number of Valid Hours: 709

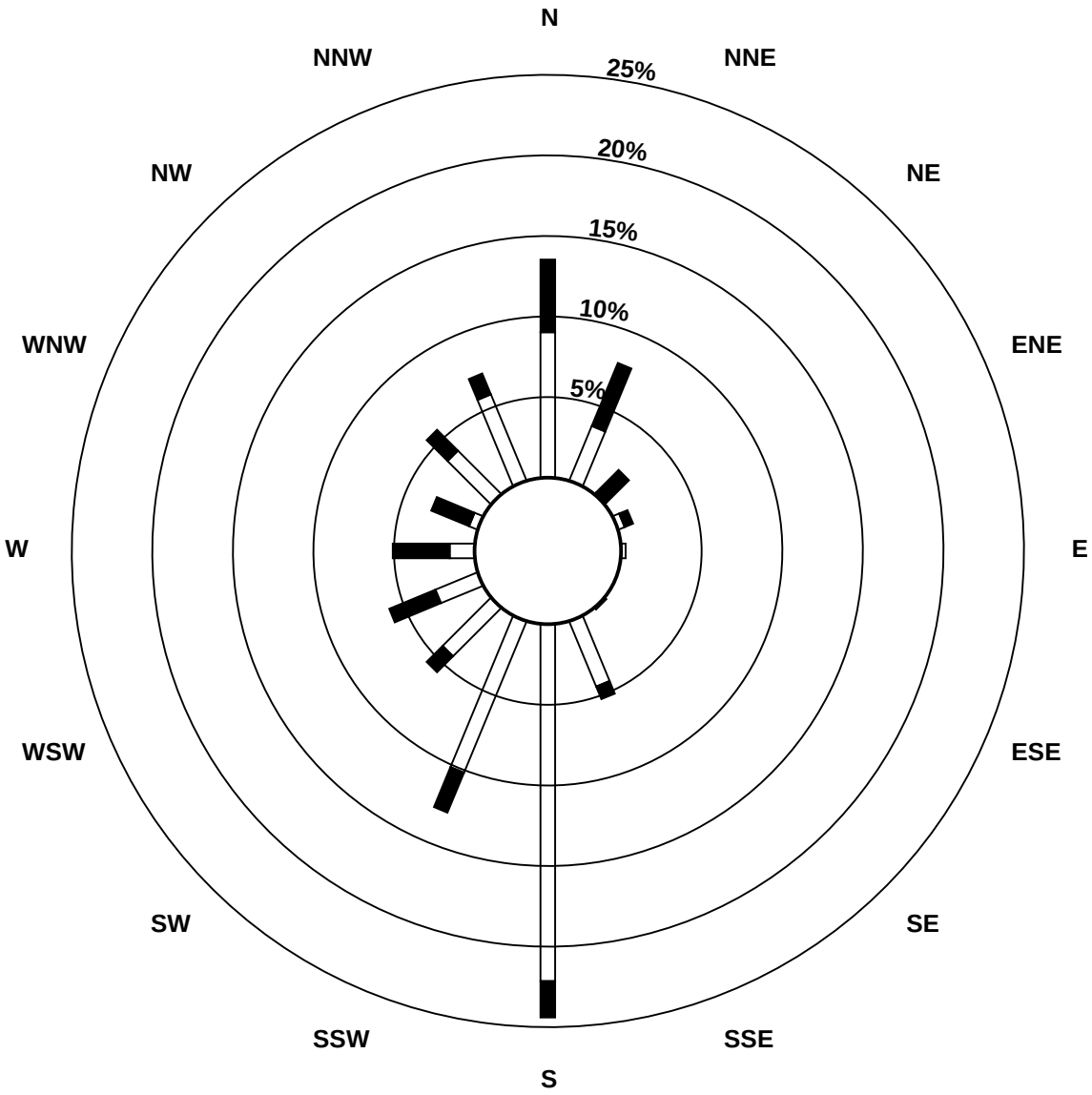
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)

0 - 20

21 - 50

51 - 82

> 83

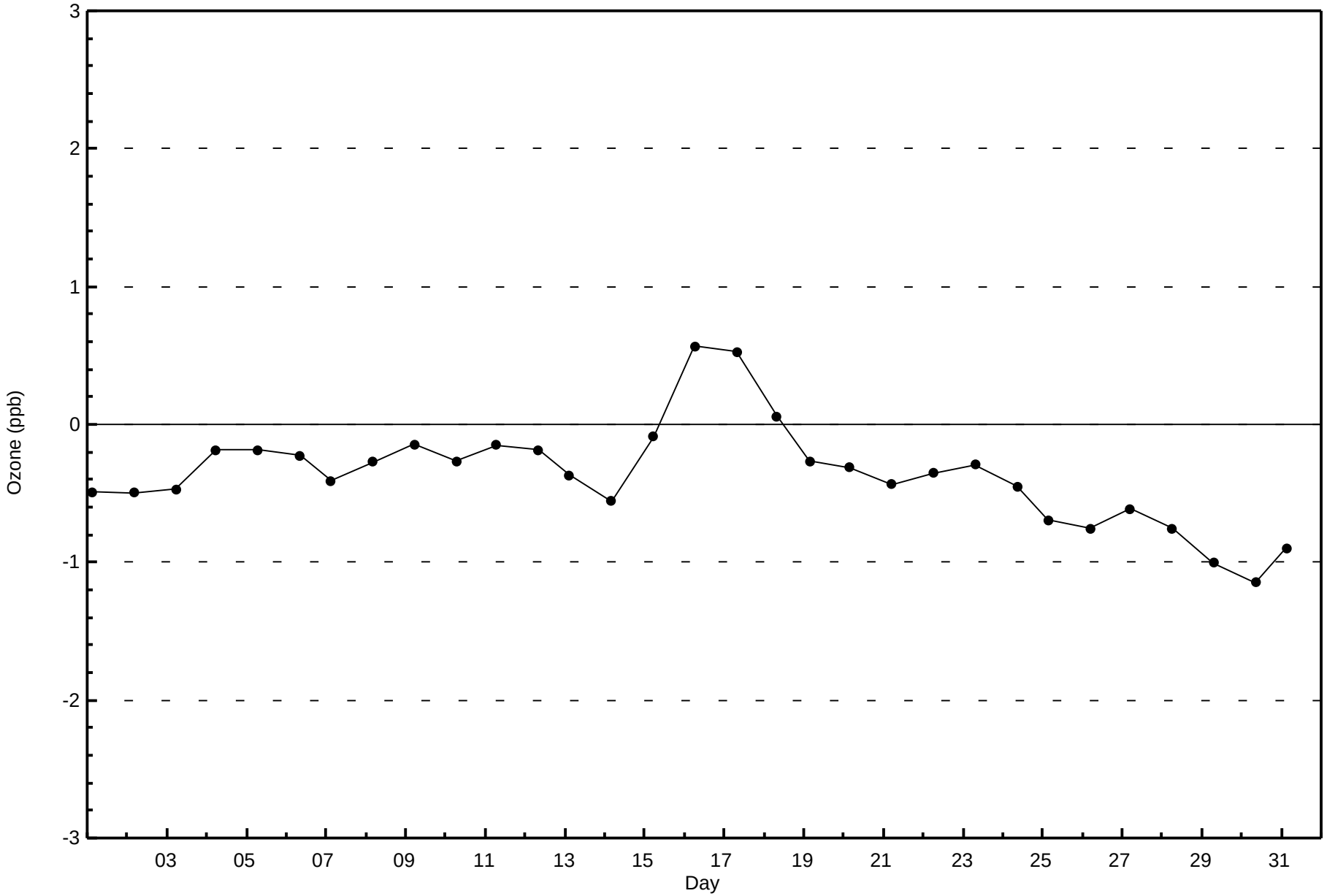
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - January 2016

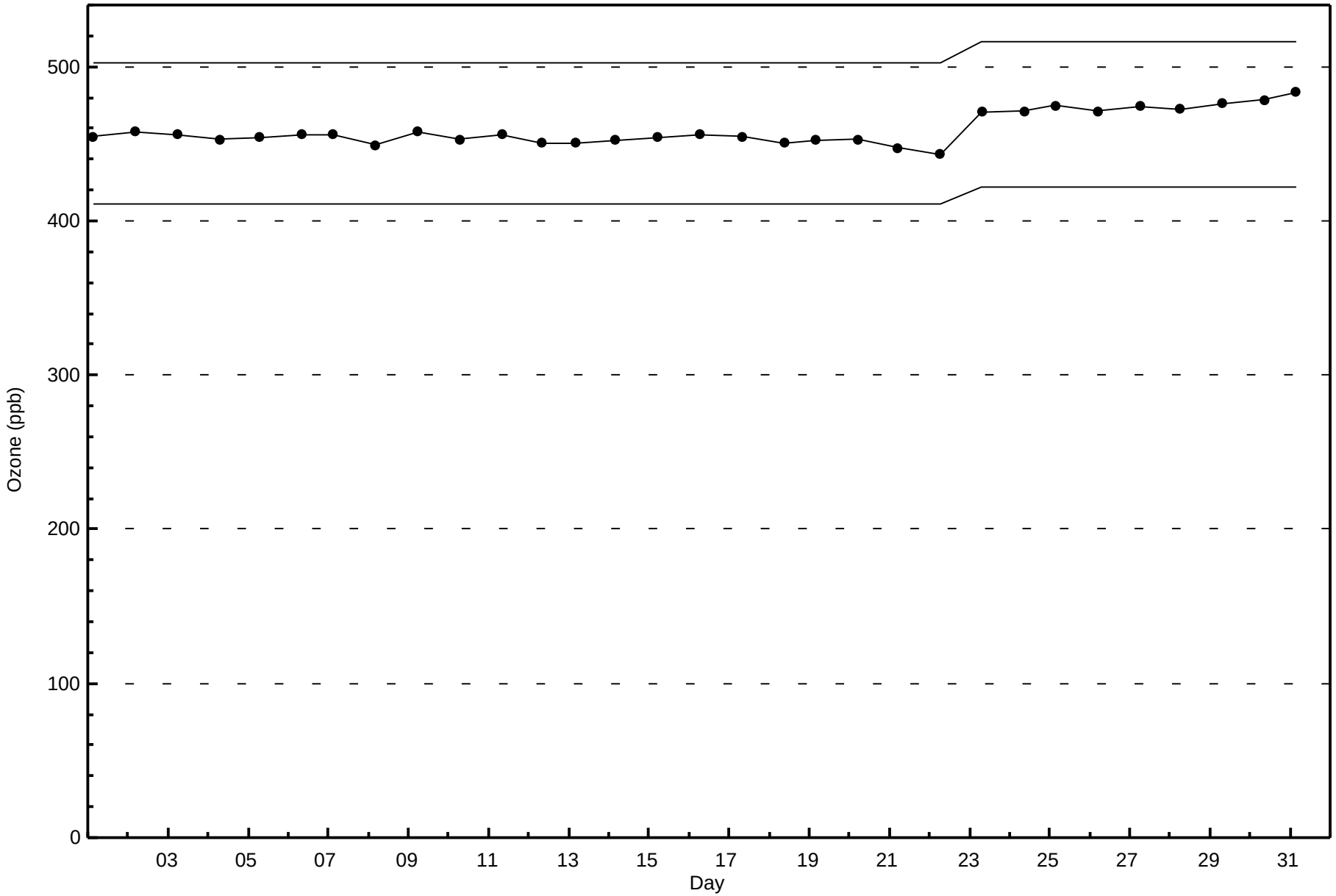


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Fort McKay - Bertha Ganter - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 44.3 $\mu g/m^3$ on Jan 16 19:00

Maximum Daily Average: 15.2 $\mu g/m^3$ on Jan 4

Minimum Value: 0.1 $\mu g/m^3$ on Jan 29 12:00

Minimum Daily Average: 0.5 $\mu g/m^3$ on Jan 29

Maximum Diurnal Average: 8.7 $\mu g/m^3$ at hour 19

Minimum Diurnal Average: 5.0 $\mu g/m^3$ at hour 8

Monthly Average: 6.48 $\mu g/m^3$

Percentiles: $P_1 = 0.2$ $P_{10} = 1.4$ $Q_1 = 2.4$ Median = 4.6 $Q_3 = 9.0$ $P_{90} = 13.6$ $P_{99} = 27.8$

Hours in Service:	744
Hours of Data:	736
Hours of Missing Data:	8
Hours of Calibration:	2
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	5.9	4.7	4.5	3.4	3.0	3.0	3.0	2.4	3.1	2.4	1.7	1.6	1.8	1.4	1.1	1.1	1.5	1.7	1.8	2.0	2.0	2.1	1.6	4.4	2.5	5.9
2-Jan	5.5	1.7	2.7	3.0	4.4	3.2	2.8	3.1	3.7	4.8	3.7	3.8	4.9	5.6	8.8	11.0	17.0	18.0	16.1	18.0	13.9	10.9	10.4	10.7	7.8	18.0
3-Jan	9.6	18.7	10.9	9.2	8.8	9.7	9.0	7.2	6.3	8.8	7.2	9.8	8.3	7.3	7.5	9.7	10.3	8.7	10.4	10.5	10.3	18.9	12.1	10.0	10.0	18.9
4-Jan	8.4	9.3	11.5	10.2	7.9	6.7	6.2	4.5	5.8	8.2	6.9	7.7	13.6	12.1	16.9	26.3	28.5	34.8	40.8	29.6	24.9	18.2	13.6	11.7	15.2	40.8
5-Jan	11.9	11.6	11.4	10.8	10.4	8.9	8.0	8.0	9.5	7.5	6.7	7.8	8.1	9.4	10.6	16.5	11.1	9.7	9.4	9.3	9.0	12.9	8.6	9.0	9.8	16.5
6-Jan	9.0	7.9	7.5	7.6	7.1	6.6	6.3	5.5	5.4	5.5	6.4	11.4	8.1	6.8	5.6	2.9	2.7	3.0	2.3	1.8	1.4	1.6	1.3	1.2	5.2	11.4
7-Jan	1.1	1.2	1.0	1.0	1.1	1.2	1.3	1.5	1.7	1.6	1.8	1.6	1.4	M	1.7	1.6	1.4	1.7	1.2	1.1	1.1	1.3	1.2	1.4	1.3	1.8
8-Jan	2.1	3.1	6.2	8.2	2.5	2.1	1.6	1.9	2.1	5.3	4.5	3.8	7.2	6.9	8.7	8.2	11.0	14.0	15.9	7.4	3.7	2.0	1.8	3.1	5.6	15.9
9-Jan	3.8	3.7	4.9	5.5	6.0	5.7	5.3	5.4	5.4	5.3	6.0	10.7	12.5	14.7	13.4	15.7	14.6	13.1	9.4	7.8	8.7	9.3	10.0	12.3	8.7	15.7
10-Jan	14.1	14.9	14.2	15.0	12.5	19.1	18.2	15.8	14.9	13.5	11.7	11.6	10.7	11.4	14.2	9.8	5.8	5.4	4.4	4.5	4.1	4.0	4.0	3.9	10.7	19.1
11-Jan	4.3	4.5	3.5	3.0	2.5	2.8	4.6	3.9	2.5	2.4	2.3	2.0	2.1	2.0	1.8	1.9	2.3	8.7	4.1	4.3	4.1	12.2	3.4	4.1	3.7	12.2
12-Jan	7.1	4.4	4.6	4.8	3.5	4.1	3.6	3.3	3.1	3.5	6.0	5.2	4.9	4.0	4.0	4.9	4.5	5.3	6.1	7.3	7.8	8.6	9.2	7.6	5.3	9.2
13-Jan	6.9	5.5	5.9	5.3	5.5	5.3	5.2	5.6	9.6	13.1	13.8	11.6	10.8	10.6	9.6	7.8	7.0	6.7	6.5	6.5	5.5	3.6	3.6	3.7	7.3	13.8
14-Jan	3.5	3.2	3.0	3.2	2.7	2.1	1.5	1.4	1.5	1.4	1.8	1.4	1.4	1.6	1.4	1.5	1.6	1.8	2.2	2.8	3.1	3.2	2.9	2.9	2.2	3.5
15-Jan	2.9	2.9	3.5	4.0	3.5	3.5	3.7	3.7	3.7	3.3	3.4	3.9	3.6	C	C	3.0	2.8	3.2	3.7	6.1	2.9	2.2	4.6	2.4	3.5	6.1
16-Jan	2.4	2.0	1.8	2.0	2.0	2.1	4.0	3.6	4.6	5.8	11.1	6.2	4.6	6.6	6.7	8.9	18.5	27.3	44.3	34.9	28.1	27.9	19.0	14.8	12.1	44.3
17-Jan	12.5	12.1	10.4	8.2	9.3	9.4	8.1	7.1	7.2	7.3	11.8	12.4	8.6	13.7	12.0	8.9	10.1	8.1	7.8	5.7	4.6	3.9	4.2	6.5	8.7	13.7
18-Jan	4.1	4.4	5.4	3.7	4.2	4.3	4.1	3.5	2.7	1.9	2.2	2.3	2.3	2.4	13.9	2.0	2.0	2.7	2.6	3.7	3.7	3.6	4.8	4.1	3.8	13.9
19-Jan	3.5	4.0	4.4	3.2	2.1	1.9	3.2	4.1	4.5	3.3	2.8	2.4	2.3	2.3	2.4	3.3	4.5	4.6	6.9	6.1	4.9	4.4	4.5	3.9	3.7	6.9
20-Jan	2.3	1.4	1.0	1.0	1.5	1.6	1.7	1.7	1.5	1.7	1.7	1.9	1.7	1.7	9.4	9.5	9.6	12.6	8.5	12.8	12.9	12.2	11.0	9.0	5.4	12.9
21-Jan	5.9	3.6	3.5	3.9	4.5	5.8	5.8	5.2	6.7	7.1	6.4	7.8	10.5	15.6	17.7	16.5	15.2	14.4	14.1	16.7	26.5	25.0	8.6	8.4	10.6	26.5
22-Jan	5.5	5.9	6.8	7.4	8.0	8.2	8.5	8.1	7.6	7.6	8.4	10.4	10.9	10.4	10.0	11.3	11.7	9.9	8.6	9.7	9.5	6.9	6.0	6.5	8.5	11.7
23-Jan	6.8	7.6	10.0	12.3	14.3	15.5	16.3	16.2	16.0	16.4	19.9	19.3	15.5	13.1	14.9	12.9	14.0	14.6	11.8	9.9	13.0	13.6	13.8	13.6	13.8	19.9
24-Jan	13.1	13.6	12.6	10.9	11.7	11.7	7.3	5.2	4.7	4.4	3.5	3.3	3.0	3.3	3.5	4.1	5.9	6.0	5.1	9.0	9.7	10.6	9.6	7.9	7.5	13.6
25-Jan	6.0	4.2	3.9	4.0	4.1	4.7	5.6	7.0	4.3	3.2	4.1	5.2	4.8	3.3	2.4	1.7	2.9	4.4	3.4	6.6	6.3	9.6	4.1	3.6	4.6	9.6
26-Jan	4.1	4.1	3.3	2.3	3.3	5.0	6.7	8.7	8.3	7.6	9.3	8.3	6.2	8.1	7.7	9.4	12.1	15.1	9.0	7.2	5.2	1.1	0.3	0.2	6.4	15.1
27-Jan	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.1	0.5	1.4	1.5	1.8	1.7	1.6	1.6	1.8	2.0	2.3	2.6	3.8	9.6	19.6	19.6	3.1	19.6
28-Jan	14.2	21.6	21.0	11.7	9.7	8.7	7.1	6.8	7.2	7.0	6.2	4.5	3.2	3.1	4.8	3.9	4.3	4.3	3.8	4.2	3.6	1.9	0.8	0.5	6.8	21.6
29-Jan	0.3	0.3	0.3	0.3	0.5	0.7	0.5	0.3	0.3	0.6	0.2	0.1	UO	UO	UO	UO	UO	0.4	0.9	1.2	0.6	0.9	0.9	1.0	0.5	1.2
30-Jan	0.5	0.9	1.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.7	1.7	1.5	1.3	1.2	1.4	1.6	1.6	1.8	1.4	1.4	1.6	1.7	1.3	1.8
31-Jan	1.5	1.6	1.8	2.1	2.6	3.2	3.6	3.4	3.6	4.1	8.3	5.2	4.4	3.8	3.5	3.1	3.4	3.5	3.4	3.5	3.6	3.2	3.1	4.8	3.5	8.3
	5.8	6.0	5.9	5.4	5.2	5.4	5.3	5.0	5.1	5.4	5.9	6.0	6.0	6.6	7.5	7.3	8.0	8.6	8.7	8.2	7.7	8.0	6.4	6.3	Diurnal Average	
	14.2	21.6	21.0	15.0	14.3	19.1	18.2	16.2	16.0	16.4	19.9	19.3	15.5	15.6	17.7	26.3	28.5	34.8	44.3	34.9	28.1	27.9	19.6	19.6	Diurnal Maximum	

C - Calibration M - Maintenance UO - Unstable Operation

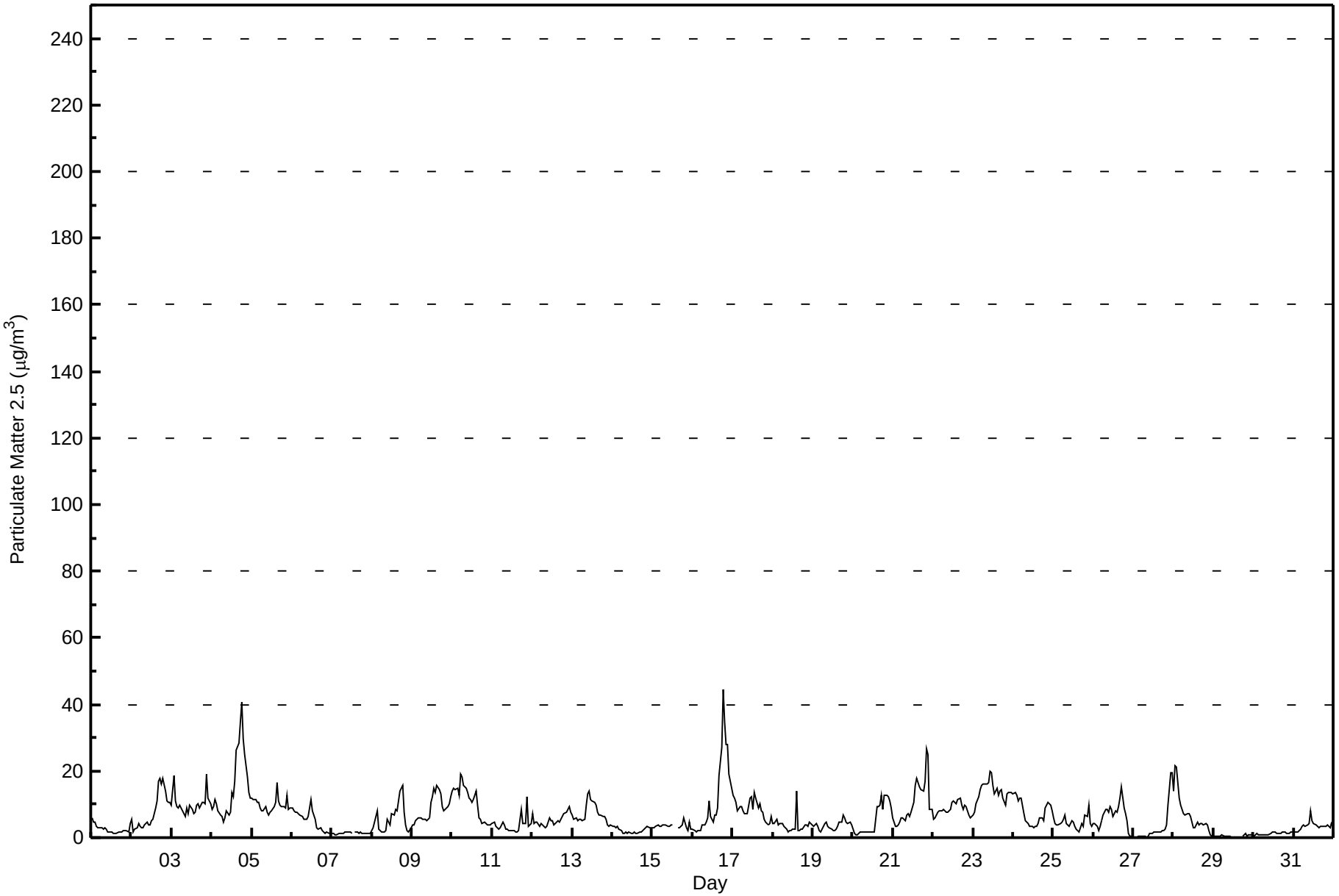
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	365	49.59	49.59
6 - 15	289	39.27	88.86
16 - 25	32	4.35	93.21
26 - 80	11	1.49	94.70
> 81.0	0	0.00	94.70

Total Number of Valid Hours: 736

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	55	48	15	7	1	0	1	17	56	41	24	23	22	4	25	26	365
6 - 15	44	8	0	0	0	0	1	20	109	43	13	14	4	2	9	22	289
16 - 25	2	0	0	0	0	0	0	2	13	7	1	0	0	0	3	4	32
26 - 80	0	0	0	0	1	0	0	0	1	5	2	1	0	0	0	1	11
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	56	15	7	2	0	2	39	179	96	40	38	26	6	37	53	697

Total Number of Valid Hours: 736

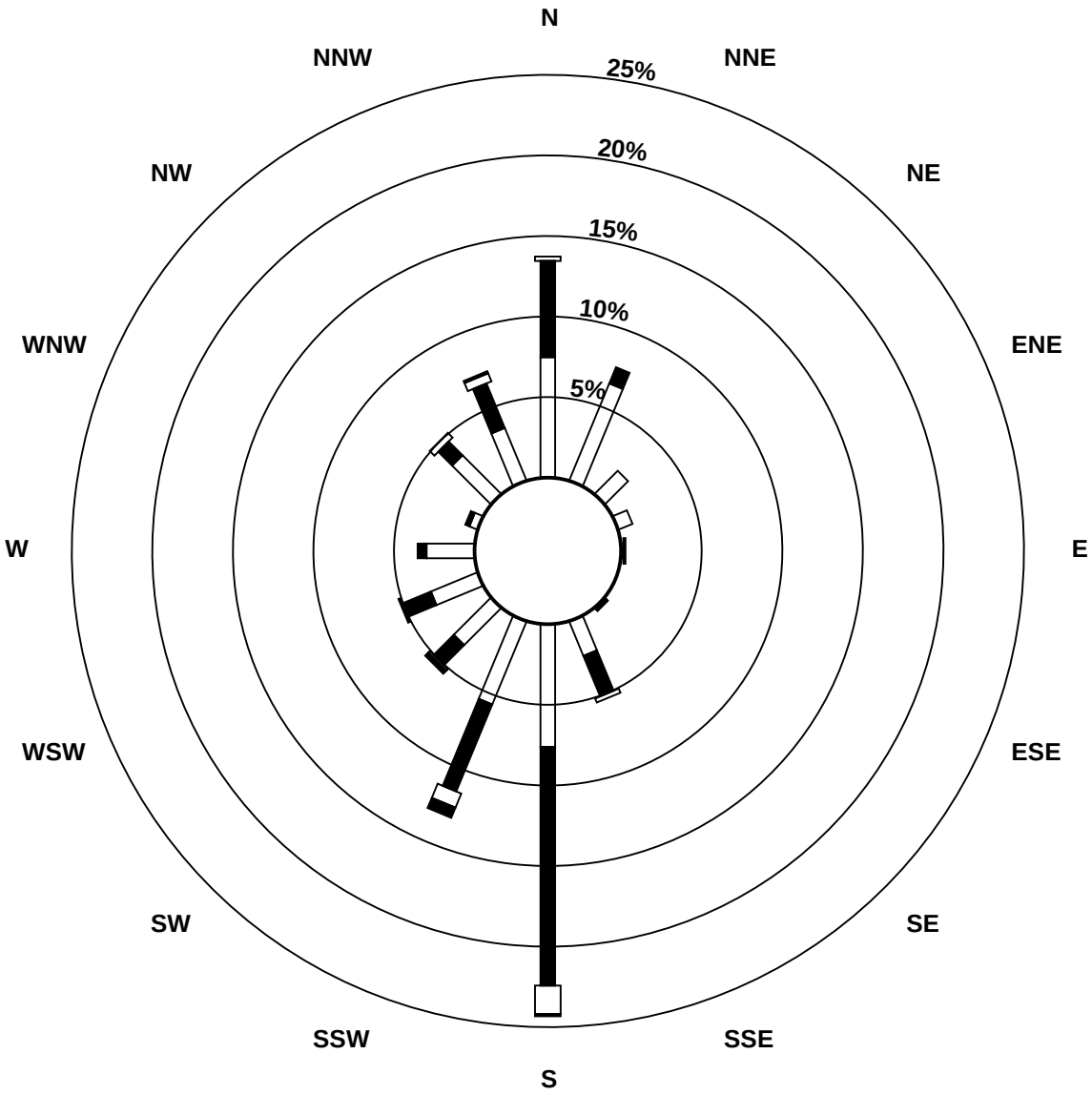
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

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

Fort McKay - Bertha Ganter (AMS 1)



Classes ($\mu g/m^3$)

- **1 - 5**
- **6 - 15**
- **16 - 25**
- **26 - 80**
- **> 81.0**

Total Number of Valid Hours: 736

Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - January 2016

Number of Exceedences (AAAQO): 1-hr: 0
Maximum Value: 0 ppb on Jan 1 01:00 Maximum Daily Average: 0.0 ppb on Jan 1

Minimum Value: 0 ppb on Jan 1 01:00 Minimum Daily Average: 0.0 ppb on Jan 1
Maximum Diurnal Average: 0.0 ppb at hour 1 Minimum Diurnal Average: 0.0 ppb at hour 1
Monthly Average: 0.0 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 0$

Hours in Service:	744
Hours of Data:	646
Hours of Missing Data:	98
Hours of Calibration:	42
Percent Operational Time:	92.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	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-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Jan	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
4-Jan	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Jan	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Jan	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
7-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Jan	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
11-Jan	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
12-Jan	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
13-Jan	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
14-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Jan	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
17-Jan	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
18-Jan	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
19-Jan	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
20-Jan	0	0	0	Z	RE	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	RE	RE	RE	RE	--	0
21-Jan	RE	RE	RE	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Jan	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Jan	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Jan	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
28-Jan	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
29-Jan	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
30-Jan	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
31-Jan	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum	

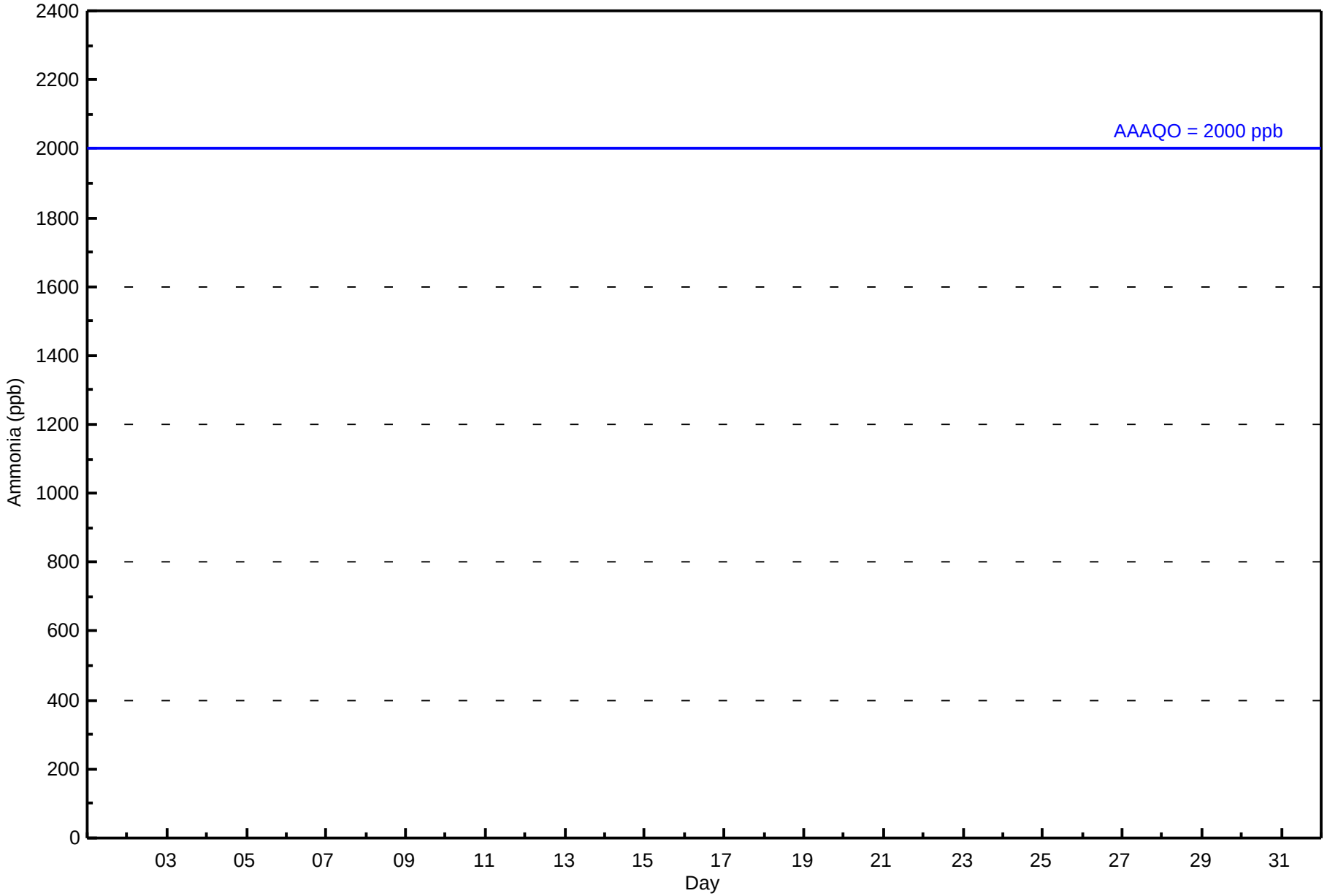
Z - zerospan C - Calibration RE - Recovery
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	646	100.00	100.00
6 - 10	0	0.00	100.00
11 - 15	0	0.00	100.00
16 - 20	0	0.00	100.00
21 - 25	0	0.00	100.00
> 26	0	0.00	100.00

Total Number of Valid Hours: 646

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	94	55	14	6	2	0	1	31	156	80	36	40	34	19	29	49	646
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	94	55	14	6	2	0	1	31	156	80	36	40	34	19	29	49	646

Total Number of Valid Hours: 646

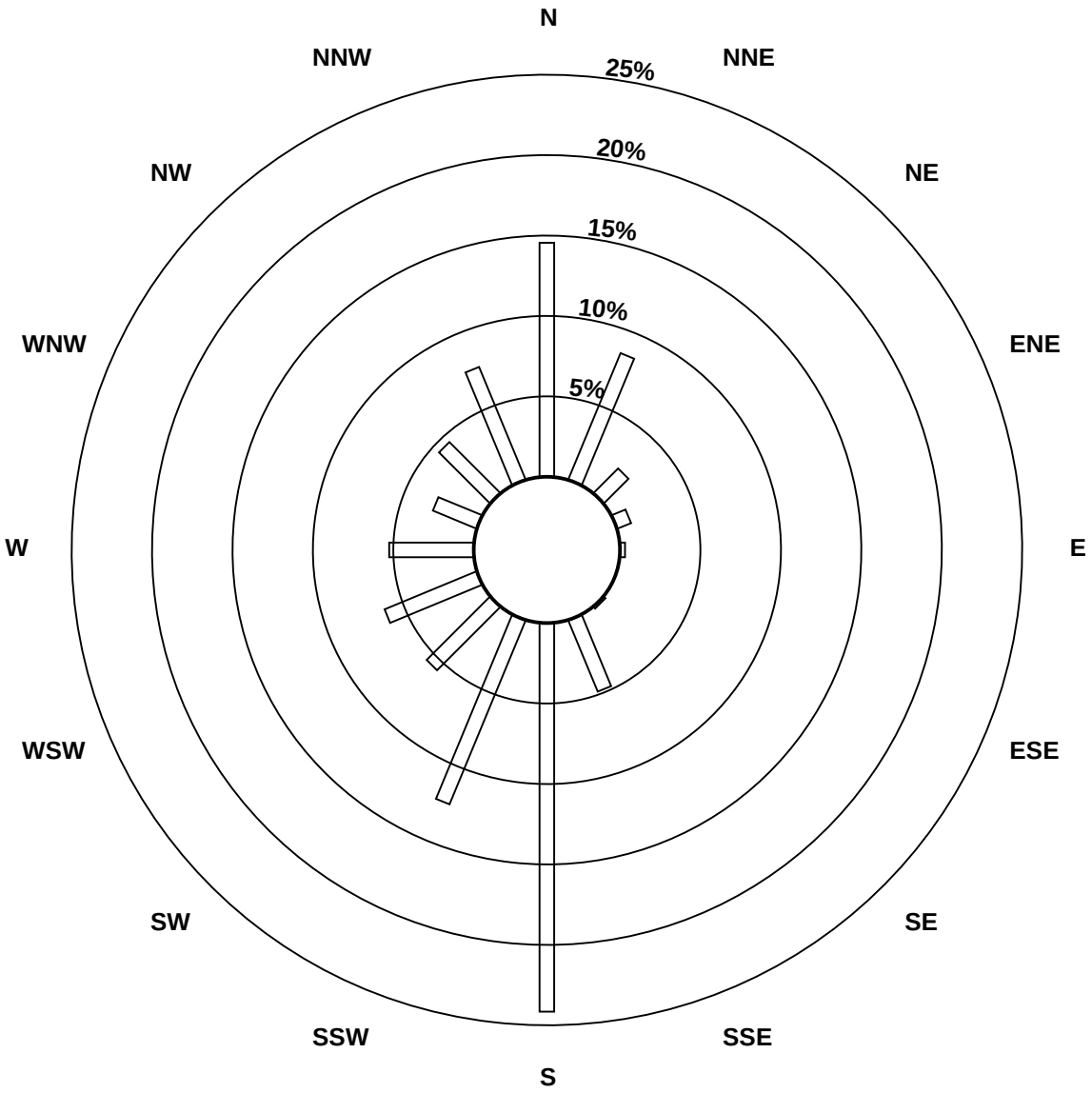
Total Number of Hours: 744

Wood Buffalo Environmental Association

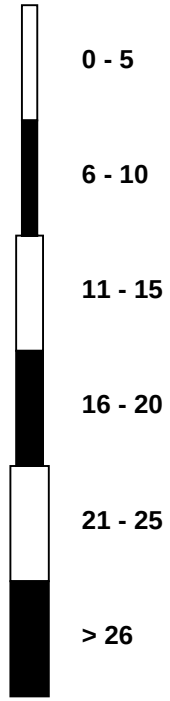
Wind Rose Jan 2016

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



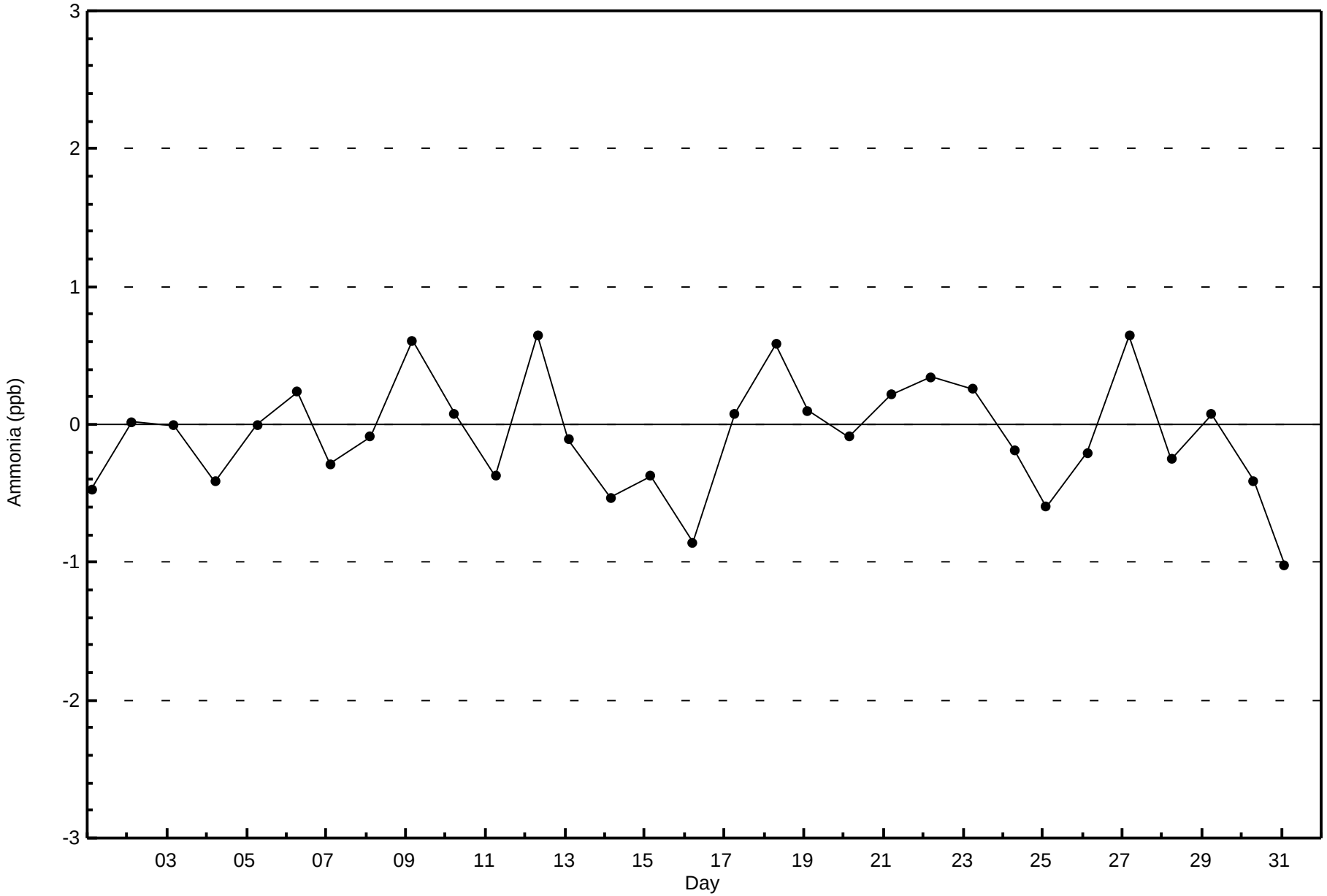
Total Number of Valid Hours: 646

Wood Buffalo Environmental Association

Zero Responses

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - January 2016

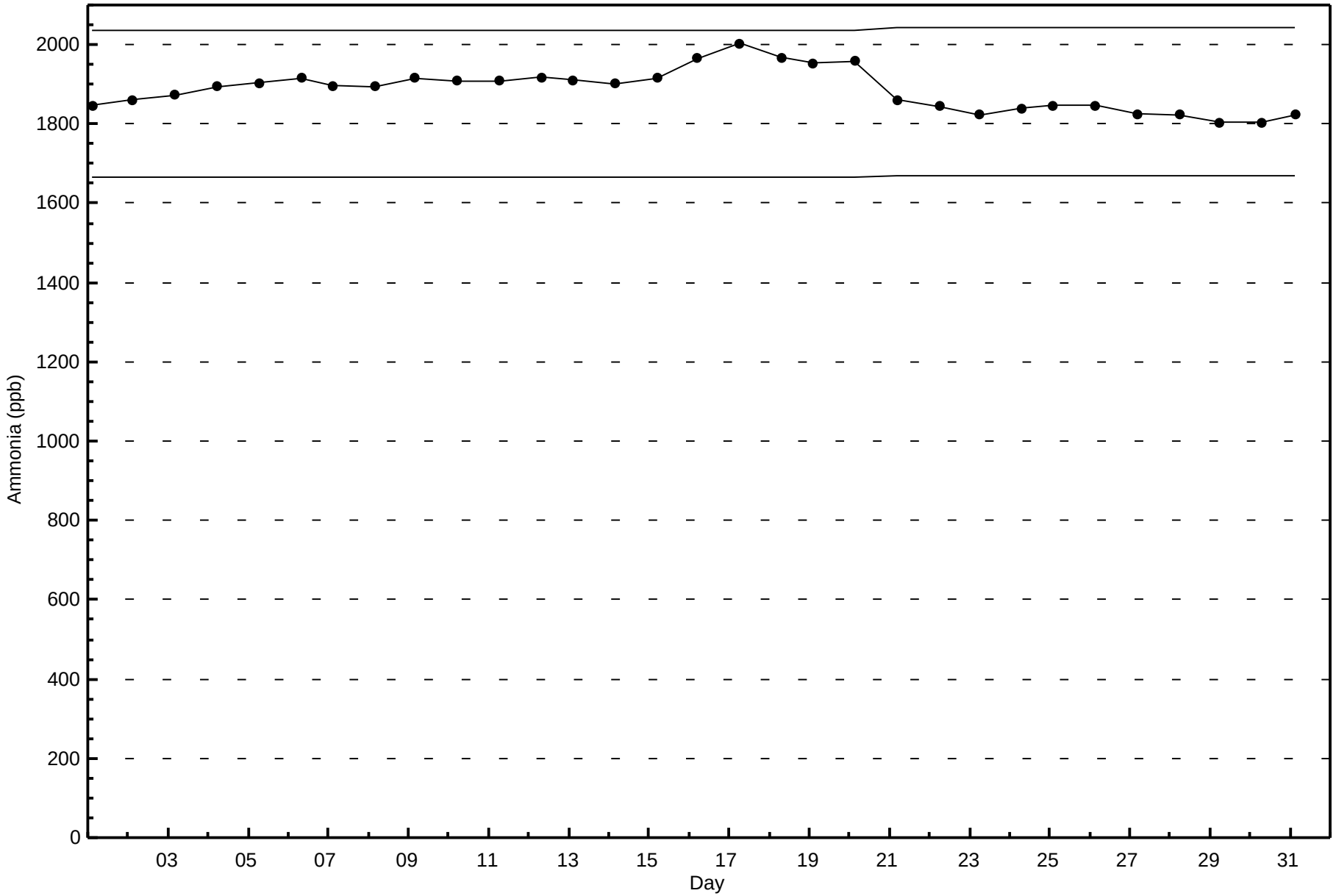


Wood Buffalo Environmental Association

Span Responses

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - January 2016



Maximum Value: 6.9 C on Jan 29 15:00

Maximum Daily Average: 3.3 C on Jan 29

Minimum Value: -34.2 C on Jan 16 09:00

Minimum Daily Average: -30.3 C on Jan 16

Maximum Diurnal Average: -10.8 C at hour 15

Minimum Diurnal Average: -14.2 C at hour 9

Monthly Average: -13.01 C

Percentiles: P_1 = -32.3 P_{10} = -21.9 Q_1 = -18.1 Median = -13.4 Q_3 = -8.4 P_{90} = -2.7 P_{99} = 4.8

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

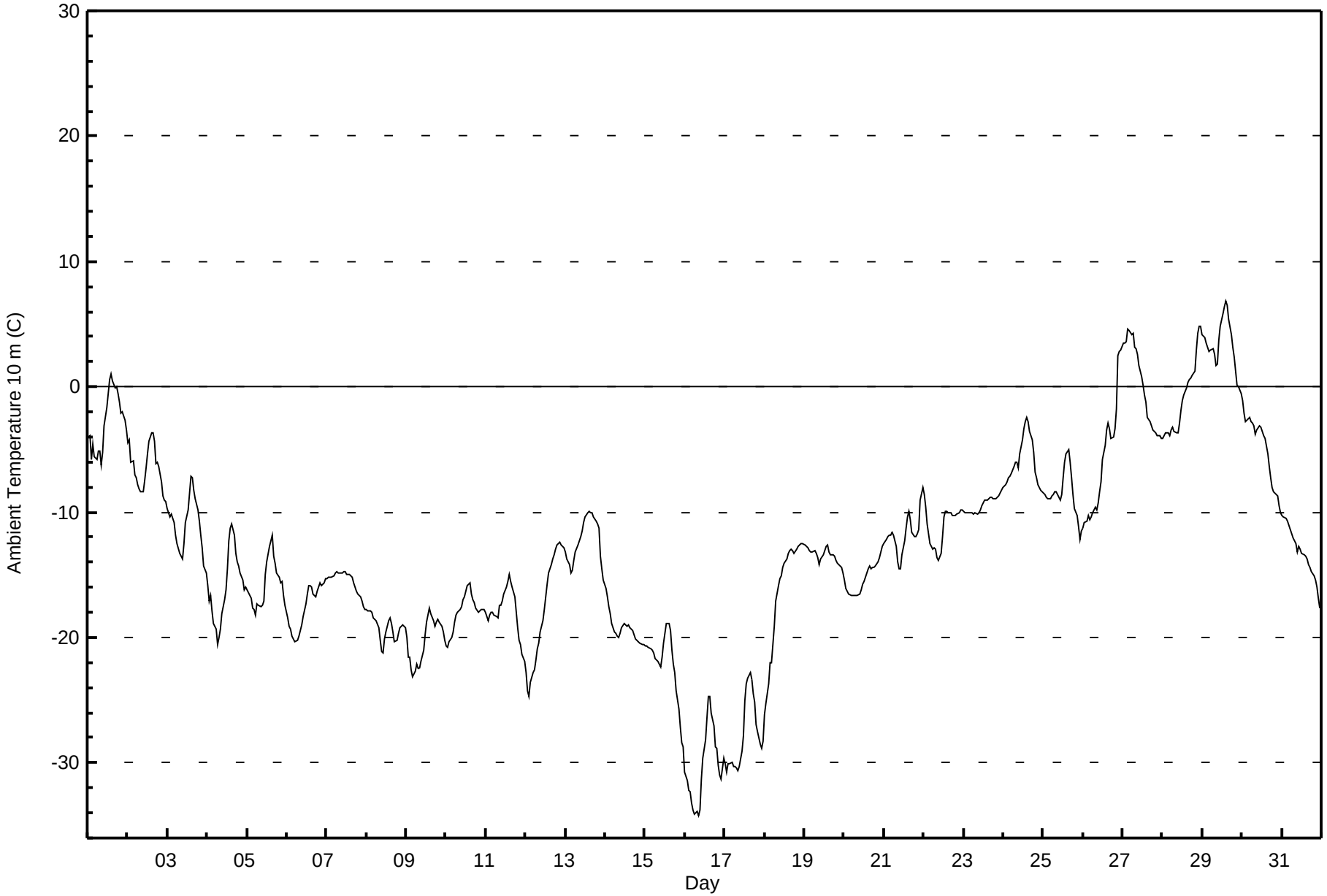
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-4.0	-3.9	-5.8	-4.6	-5.6	-5.7	-5.2	-5.1	-6.2	-5.3	-3.1	-1.7	-0.6	0.6	1.1	0.5	-0.1	0.1	-0.6	-1.3	-2.1	-2.0	-2.6	-3.4	-2.8	1.1
2-Jan	-4.4	-4.2	-6.0	-5.9	-7.0	-7.2	-7.8	-8.2	-8.3	-8.4	-7.5	-6.5	-5.3	-4.3	-3.7	-3.6	-4.3	-6.1	-6.1	-6.4	-7.6	-8.7	-9.0	-9.1	-6.5	-3.6
3-Jan	-9.7	-10.4	-10.1	-10.5	-10.8	-11.9	-12.5	-13.3	-13.5	-13.7	-12.5	-10.8	-9.8	-8.4	-7.2	-7.3	-8.2	-9.0	-9.9	-10.7	-11.8	-12.9	-14.3	-14.9	-11.0	-7.2
4-Jan	-15.9	-17.1	-16.6	-17.8	-18.9	-19.3	-20.6	-20.0	-19.4	-18.1	-17.0	-16.1	-14.5	-12.3	-11.3	-10.9	-11.8	-13.3	-14.0	-14.3	-14.9	-15.4	-16.2	-16.0	-15.9	-10.9
5-Jan	-16.2	-16.4	-16.8	-17.6	-17.8	-18.2	-17.3	-17.5	-17.6	-17.4	-17.1	-15.0	-14.0	-12.8	-12.3	-11.8	-13.5	-14.1	-14.8	-15.2	-15.7	-15.6	-16.7	-17.5	-15.8	-11.8
6-Jan	-18.4	-19.1	-19.3	-19.9	-20.1	-20.3	-20.2	-19.9	-19.5	-19.0	-18.4	-17.3	-16.5	-15.9	-15.9	-16.0	-16.5	-16.8	-16.4	-15.9	-15.6	-15.8	-15.6	-15.4	-17.7	-15.4
7-Jan	-15.3	-15.2	-15.2	-15.2	-15.1	-14.9	-14.8	-14.9	-14.9	-14.9	-14.8	-14.7	-14.9	-14.9	-14.9	-15.2	-15.6	-16.0	-16.3	-16.5	-16.8	-17.1	-17.5	-17.8	-15.6	-14.7
8-Jan	-17.8	-17.8	-17.8	-18.0	-18.4	-18.6	-18.7	-19.2	-20.2	-21.1	-21.2	-20.2	-19.6	-18.7	-18.5	-18.8	-19.6	-20.3	-20.2	-19.6	-19.2	-19.1	-19.0	-19.2	-19.2	-17.8
9-Jan	-20.0	-21.6	-21.6	-22.6	-23.1	-22.6	-22.1	-22.4	-22.5	-21.9	-21.0	-19.8	-18.8	-18.2	-17.6	-18.1	-18.7	-19.1	-18.8	-18.6	-18.8	-19.1	-19.6	-20.2	-20.3	-17.6
10-Jan	-20.7	-20.8	-20.3	-20.0	-19.5	-18.8	-18.2	-18.0	-17.8	-17.5	-17.0	-16.8	-16.3	-15.9	-15.7	-16.5	-17.0	-17.2	-17.7	-18.0	-17.9	-17.8	-17.8	-17.7	-18.0	-15.7
11-Jan	-18.0	-18.7	-18.2	-18.0	-18.0	-18.2	-18.3	-18.4	-17.4	-17.5	-17.1	-16.5	-16.0	-15.5	-15.0	-15.5	-16.0	-16.7	-17.9	-19.2	-20.2	-20.6	-21.3	-22.0	-17.9	-15.0
12-Jan	-22.9	-24.2	-24.7	-23.6	-22.8	-22.5	-21.8	-20.9	-20.5	-19.6	-18.7	-17.8	-16.8	-15.8	-14.8	-14.2	-13.8	-13.4	-12.9	-12.7	-12.4	-12.6	-12.8	-12.9	-17.7	-12.4
13-Jan	-13.2	-13.8	-14.2	-14.9	-14.6	-13.8	-13.2	-12.7	-12.3	-11.9	-11.5	-10.8	-10.4	-10.0	-10.0	-10.1	-10.1	-10.4	-10.7	-10.9	-11.3	-13.5	-14.5	-15.4	-12.3	-10.0
14-Jan	-16.1	-16.8	-17.6	-18.1	-18.9	-19.6	-19.6	-19.8	-20.0	-19.6	-19.2	-18.9	-19.0	-19.1	-19.0	-19.3	-19.5	-19.8	-20.1	-20.2	-20.4	-20.5	-20.5	-20.6	-19.3	-16.1
15-Jan	-20.7	-20.7	-20.8	-20.9	-21.0	-21.2	-21.7	-21.8	-21.9	-22.3	-21.6	-20.5	-19.7	-18.8	-18.9	-19.4	-21.0	-22.1	-22.8	-24.3	-25.7	-27.2	-28.4	-28.8	-22.2	-18.8
16-Jan	-30.8	-31.5	-32.2	-32.3	-33.2	-33.8	-34.1	-33.9	-34.2	-33.8	-31.3	-29.7	-28.1	-26.3	-24.7	-24.7	-26.0	-27.0	-28.7	-28.8	-30.1	-31.0	-31.4	-29.6	-30.3	-24.7
17-Jan	-30.1	-30.8	-30.1	-30.1	-29.9	-30.2	-30.3	-30.5	-30.7	-30.3	-29.0	-27.8	-25.1	-23.7	-23.3	-22.8	-23.4	-24.4	-25.2	-26.9	-27.5	-28.5	-28.8	-28.3	-27.8	-22.8
18-Jan	-26.2	-25.3	-23.6	-22.0	-22.0	-20.5	-19.1	-17.1	-15.9	-15.3	-15.1	-14.4	-14.1	-13.8	-13.3	-13.0	-13.0	-13.1	-13.2	-13.0	-12.8	-12.7	-12.5	-12.5	-16.4	-12.5
19-Jan	-12.6	-12.7	-12.9	-13.1	-13.2	-13.1	-13.1	-13.3	-13.7	-14.2	-13.8	-13.4	-13.1	-12.7	-12.6	-13.2	-13.4	-13.4	-13.5	-13.9	-14.1	-14.2	-14.4	-14.8	-13.4	-12.6
20-Jan	-15.4	-16.1	-16.4	-16.5	-16.6	-16.7	-16.7	-16.7	-16.7	-16.5	-16.2	-15.8	-15.5	-15.1	-14.5	-14.4	-14.6	-14.4	-14.4	-14.3	-14.0	-13.6	-13.2	-12.8	-15.3	-12.8
21-Jan	-12.5	-12.2	-12.0	-11.8	-11.8	-11.6	-11.8	-12.7	-14.0	-14.5	-14.5	-13.4	-12.3	-11.3	-10.4	-9.9	-10.6	-11.6	-11.9	-12.0	-11.7	-11.4	-9.0	-8.0	-11.8	-8.0
22-Jan	-8.6	-9.6	-11.0	-11.7	-12.5	-13.0	-12.9	-13.0	-13.6	-13.8	-13.2	-11.9	-10.4	-10.0	-9.9	-10.1	-10.1	-10.3	-10.3	-10.3	-10.1	-10.0	-9.8	-9.9	-11.1	-8.6
23-Jan	-10.0	-10.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1	-9.8	-9.4	-9.3	-9.0	-9.0	-8.9	-8.8	-8.8	-8.9	-9.0	-8.8	-8.7	-8.4	-8.2	-9.4	-8.2
24-Jan	-8.1	-7.9	-7.6	-7.2	-7.1	-6.9	-6.4	-6.0	-6.0	-6.4	-5.4	-4.2	-3.3	-2.8	-2.5	-2.8	-3.6	-4.2	-5.3	-6.7	-7.2	-7.8	-8.2	-8.4	-5.9	-2.5
25-Jan	-8.5	-8.6	-8.8	-8.9	-8.9	-8.7	-8.6	-8.3	-8.3	-8.9	-9.1	-8.6	-7.3	-6.0	-5.4	-5.0	-6.0	-7.3	-8.6	-9.7	-10.3	-11.1	-12.1	-11.5	-8.5	-5.0
26-Jan	-11.2	-10.8	-10.7	-10.3	-10.6	-10.4	-10.1	-9.6	-9.8	-9.3	-8.4	-7.6	-5.8	-4.7	-3.4	-2.9	-3.3	-4.1	-4.1	-3.4	-1.8	2.5	2.8	2.9	-6.0	2.9
27-Jan	3.5	3.5	3.6	4.6	4.5	4.2	4.3	3.1	3.0	2.6	1.7	0.8	0.1	-0.7	-1.2	-2.4	-2.8	-3.1	-3.4	-3.5	-3.6	-3.8	-3.9	-4.1	0.3	4.6
28-Jan	-4.1	-3.9	-3.7	-3.7	-3.9	-3.4	-3.2	-3.6	-3.6	-3.7	-2.9	-1.9	-1.1	-0.6	-0.1	0.4	0.6	0.7	0.9	1.2	3.0	4.3	4.8	4.8	-0.9	4.8
29-Jan	4.2	3.9	3.5	3.1	2.8	2.9	3.0	2.6	1.7	1.8	3.7	4.8	5.8	6.4	6.9	6.6	5.3	4.2	3.2	2.4	1.2	0.1	0.0	-0.6	3.3	6.9
30-Jan	-1.1	-2.1	-2.8	-2.7	-2.4	-2.8	-2.9	-3.1	-3.8	-3.4	-3.1	-3.2	-3.5	-3.9	-4.1	-5.4	-6.3	-7.2	-8.1	-8.4	-8.5	-8.8	-9.5	-10.0	-4.9	-1.1
31-Jan	-10.3	-10.4	-10.5	-10.7	-11.0	-11.4	-11.8	-12.1	-12.5	-13.1	-12.8	-12.9	-13.3	-13.4	-13.5	-13.7	-14.2	-14.4	-14.8	-15.1	-15.4	-16.0	-16.9	-17.7	-13.2	-10.3
	-13.4	-13.7	-13.9	-13.9	-14.1	-14.1	-14.1	-14.1	-14.2	-14.1	-13.4	-12.7	-11.9	-11.2	-10.8	-10.9	-11.5	-12.0	-12.4	-12.7	-13.0	-13.2	-13.4	-13.5	Diurnal Average	
	4.2	3.9	3.6	4.6	4.5	4.2	4.3	3.1	3.0	2.6	3.7	4.8	5.8	6.4	6.9	6.6	5.3	4.2	3.2	2.4	3.0	4.3	4.8	4.8	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 10 m (AT 10m) - C

Fort McKay - Bertha Ganter - January 2016



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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	119	15.99	15.99
-20 - 0	574	77.15	93.15
0 - 10	51	6.85	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 6.9 C on Jan 29 15:00

Maximum Daily Average: 2.1 C on Jan 29

Minimum Value: -35.7 C on Jan 16 09:00

Minimum Daily Average: -31.4 C on Jan 16

Maximum Diurnal Average: -10.5 C at hour 15

Minimum Diurnal Average: -14.8 C at hour 6

Monthly Average: -13.53 C

Percentiles: P_1 = -34.0 P_{10} = -22.6 Q_1 = -18.6 Median = -13.7 Q_3 = -8.6 P_{90} = -3.1 P_{99} = 4.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

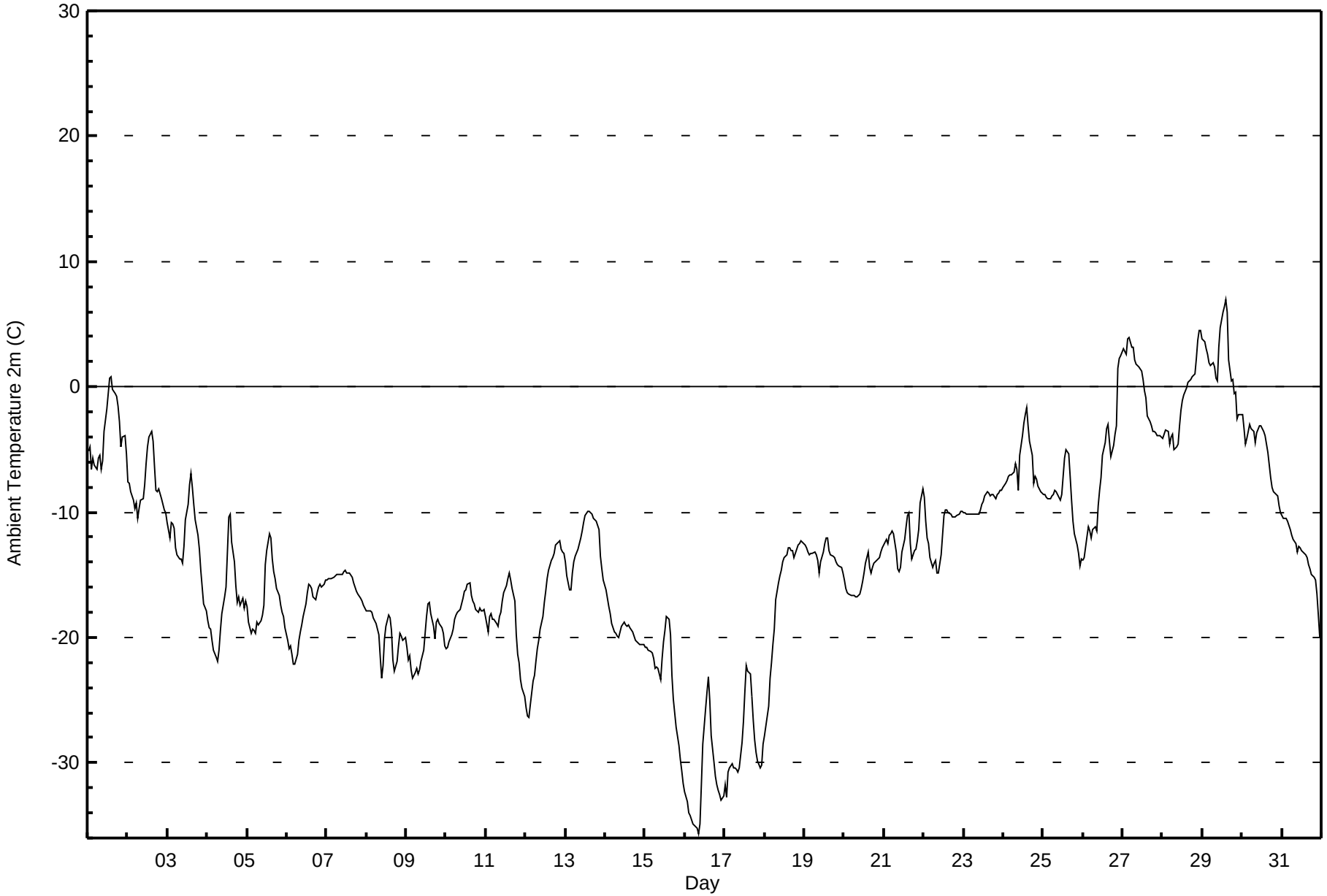
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-5.1	-4.8	-6.6	-5.7	-6.2	-6.6	-5.7	-5.5	-6.6	-5.9	-3.5	-1.7	-0.6	0.6	0.8	-0.2	-0.5	-0.8	-1.6	-2.8	-4.8	-4.0	-3.9	-5.4	-3.6	0.8
2-Jan	-7.5	-7.7	-8.4	-9.0	-9.8	-9.3	-10.4	-9.7	-9.1	-8.9	-7.8	-6.1	-4.8	-4.1	-3.6	-4.3	-6.4	-8.3	-8.4	-8.2	-9.0	-9.4	-9.8	-10.1	-7.9	-3.6
3-Jan	-10.8	-12.0	-10.8	-11.0	-11.2	-12.8	-13.4	-13.8	-13.8	-14.1	-12.7	-10.6	-9.4	-7.8	-6.9	-8.0	-9.4	-10.6	-11.9	-13.0	-14.6	-16.0	-17.3	-17.9	-12.1	-6.9
4-Jan	-18.6	-19.2	-19.4	-20.2	-21.0	-21.6	-21.9	-21.0	-19.5	-18.1	-16.8	-16.0	-13.2	-10.4	-10.1	-12.4	-14.0	-15.8	-17.2	-16.8	-17.4	-16.9	-17.7	-17.1	-17.2	-10.1
5-Jan	-17.5	-18.8	-19.7	-19.4	-19.5	-19.6	-18.7	-19.0	-18.7	-18.2	-17.4	-14.2	-13.0	-11.8	-12.1	-13.7	-14.7	-15.3	-16.0	-16.7	-17.4	-17.9	-18.4	-19.2	-17.0	-11.8
6-Jan	-20.3	-20.9	-20.6	-21.3	-22.1	-22.1	-21.3	-20.2	-19.6	-19.0	-18.4	-17.3	-16.5	-15.8	-15.9	-16.1	-16.7	-17.0	-16.5	-16.0	-15.7	-15.9	-15.7	-15.5	-18.2	-15.5
7-Jan	-15.4	-15.3	-15.4	-15.3	-15.2	-15.1	-15.0	-15.0	-15.0	-15.0	-14.7	-14.6	-14.8	-14.8	-14.9	-15.2	-15.6	-15.9	-16.3	-16.6	-16.9	-17.1	-17.5	-17.7	-15.6	-14.6
8-Jan	-17.8	-17.8	-17.9	-18.0	-18.4	-18.6	-18.8	-19.8	-21.6	-23.3	-22.2	-20.1	-19.1	-18.2	-18.4	-19.5	-21.8	-22.6	-21.9	-20.7	-19.6	-19.8	-20.2	-20.0	-19.8	-17.8
9-Jan	-20.8	-21.8	-21.4	-22.6	-23.2	-22.8	-22.4	-22.9	-22.5	-21.9	-21.0	-19.6	-18.4	-17.3	-17.2	-18.1	-19.1	-20.1	-18.7	-18.5	-18.9	-19.2	-19.7	-20.7	-20.4	-17.2
10-Jan	-20.9	-20.8	-20.4	-19.8	-19.3	-18.5	-18.2	-18.0	-17.7	-17.3	-16.9	-16.3	-16.2	-15.8	-15.6	-16.6	-17.1	-17.3	-17.7	-18.0	-17.7	-17.8	-17.9	-17.8	-17.9	-15.6
11-Jan	-18.3	-19.6	-18.4	-18.1	-18.5	-18.5	-18.9	-19.1	-18.3	-18.0	-17.1	-16.4	-15.9	-15.3	-14.9	-15.4	-16.0	-17.1	-19.8	-21.4	-22.0	-23.4	-24.1	-24.7	-18.7	-14.9
12-Jan	-25.6	-26.2	-26.4	-25.4	-23.4	-23.0	-21.9	-20.9	-20.2	-19.4	-18.3	-17.2	-16.3	-15.3	-14.6	-13.8	-13.6	-13.3	-12.7	-12.5	-12.3	-12.9	-13.1	-13.3	-18.0	-12.3
13-Jan	-13.9	-15.1	-16.2	-16.2	-14.8	-13.9	-13.5	-13.0	-12.6	-12.0	-11.5	-10.8	-10.3	-9.9	-9.9	-10.1	-10.1	-10.5	-10.8	-11.0	-11.4	-13.5	-14.5	-15.4	-12.5	-9.9
14-Jan	-16.1	-16.8	-17.6	-18.1	-18.9	-19.6	-19.7	-19.9	-20.0	-19.6	-19.2	-18.8	-18.9	-19.1	-19.0	-19.3	-19.6	-19.9	-20.2	-20.3	-20.4	-20.5	-20.5	-20.6	-19.3	-16.1
15-Jan	-20.8	-20.8	-21.0	-21.1	-21.2	-21.6	-22.4	-22.4	-22.4	-23.3	-21.7	-20.4	-19.4	-18.4	-18.6	-19.8	-23.0	-24.9	-26.0	-27.1	-28.6	-29.7	-30.7	-31.6	-23.2	-18.4
16-Jan	-32.3	-33.1	-34.0	-34.2	-34.6	-34.9	-35.0	-35.2	-35.7	-34.9	-31.7	-28.5	-25.7	-24.4	-23.2	-25.0	-27.9	-29.9	-31.1	-31.7	-32.1	-32.6	-33.0	-32.6	-31.4	-23.2
17-Jan	-31.7	-32.8	-30.7	-30.4	-30.1	-30.4	-30.5	-30.5	-30.7	-30.4	-28.4	-26.7	-24.3	-22.3	-22.7	-22.9	-24.7	-26.6	-28.2	-29.2	-29.8	-30.4	-30.2	-28.5	-28.5	-22.3
18-Jan	-27.8	-27.1	-25.4	-23.3	-22.0	-20.6	-19.3	-17.0	-15.7	-15.1	-14.7	-14.0	-13.7	-13.4	-12.9	-12.8	-13.0	-13.1	-13.6	-13.0	-12.7	-12.5	-12.3	-12.4	-16.6	-12.3
19-Jan	-12.6	-12.9	-13.2	-13.4	-13.3	-13.3	-13.2	-13.4	-13.9	-14.8	-14.0	-13.2	-12.5	-12.0	-12.0	-13.0	-13.4	-13.5	-13.6	-13.9	-14.1	-14.3	-14.4	-14.8	-13.4	-12.0
20-Jan	-15.4	-16.1	-16.4	-16.6	-16.7	-16.7	-16.7	-16.8	-16.7	-16.5	-16.1	-15.5	-14.8	-14.1	-13.1	-14.4	-14.9	-14.4	-14.1	-13.9	-13.8	-13.6	-13.2	-12.8	-15.1	-12.8
21-Jan	-12.6	-12.2	-12.5	-11.9	-11.7	-11.5	-11.8	-13.1	-14.6	-14.8	-14.5	-13.2	-12.1	-11.1	-10.3	-10.0	-12.5	-13.7	-13.0	-13.0	-12.3	-11.4	-9.2	-8.1	-12.1	-8.1
22-Jan	-8.8	-10.7	-12.1	-12.5	-13.6	-14.4	-14.0	-13.9	-14.9	-14.8	-13.4	-11.9	-10.3	-9.9	-9.8	-10.0	-10.1	-10.4	-10.4	-10.3	-10.2	-10.1	-9.9	-10.0	-11.5	-8.8
23-Jan	-10.1	-10.1	-10.2	-10.2	-10.2	-10.1	-10.2	-10.2	-10.2	-10.1	-9.8	-9.4	-9.2	-8.7	-8.3	-8.5	-8.7	-8.6	-8.6	-8.9	-8.6	-8.5	-8.3	-8.2	-9.3	-8.2
24-Jan	-8.0	-7.7	-7.5	-7.2	-7.0	-7.0	-6.8	-6.2	-6.5	-8.3	-5.5	-3.9	-2.9	-2.2	-1.7	-3.1	-4.4	-5.5	-7.6	-7.1	-7.3	-7.9	-8.3	-8.4	-6.2	-1.7
25-Jan	-8.6	-8.6	-8.8	-8.9	-8.9	-8.7	-8.6	-8.3	-8.4	-8.9	-9.0	-8.6	-7.2	-5.7	-5.0	-5.3	-7.1	-9.1	-10.7	-11.7	-12.6	-13.3	-14.3	-13.7	-9.2	-5.0
26-Jan	-13.9	-13.6	-12.0	-11.1	-11.5	-12.1	-11.4	-11.1	-11.5	-9.5	-8.2	-7.3	-5.5	-4.5	-3.3	-3.0	-4.3	-5.5	-4.7	-3.8	-3.1	1.5	2.2	2.5	-6.9	2.5
27-Jan	3.1	2.9	2.5	3.9	4.0	3.1	3.2	2.2	1.8	1.7	1.6	1.2	0.6	-0.3	-0.9	-2.4	-2.8	-3.1	-3.5	-3.6	-3.7	-3.9	-3.9	-4.0	0.0	4.0
28-Jan	-4.1	-3.8	-3.4	-3.6	-4.6	-4.0	-3.8	-5.0	-4.8	-4.6	-3.1	-1.9	-1.1	-0.6	-0.1	0.3	0.5	0.6	0.8	1.1	2.3	3.7	4.5	4.5	-1.3	4.5
29-Jan	3.8	3.6	3.0	2.6	2.0	1.7	1.9	1.6	0.7	0.5	3.2	4.8	6.0	6.4	6.9	5.9	2.1	0.5	0.5	-0.5	-0.4	-2.6	-2.2	-2.2	2.1	6.9
30-Jan	-2.2	-3.3	-4.6	-4.1	-3.0	-3.3	-3.4	-3.5	-4.5	-3.7	-3.1	-3.2	-3.3	-3.6	-3.9	-5.2	-6.3	-7.2	-8.1	-8.4	-8.5	-8.8	-9.5	-10.1	-5.2	-2.2
31-Jan	-10.3	-10.5	-10.5	-10.7	-11.1	-11.4	-11.8	-12.1	-12.6	-13.2	-12.7	-12.8	-13.1	-13.3	-13.4	-13.7	-14.2	-14.5	-14.9	-15.2	-15.4	-16.5	-18.2	-20.0	-13.4	-10.3
	-14.2	-14.6	-14.7	-14.6	-14.7	-14.8	-14.6	-14.6	-14.7	-14.6	-13.5	-12.4	-11.5	-10.7	-10.5	-11.2	-12.2	-13.0	-13.4	-13.6	-13.8	-14.0	-14.2	-14.4	Diurnal Average	
	3.8	3.6	3.0	3.9	4.0	3.1	3.2	2.2	1.8	1.7	3.2	4.8	6.0	6.4	6.9	5.9	2.1	0.6	0.8	1.1	2.3	3.7	4.5	4.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Fort McKay - Bertha Ganter - January 2016



Ambient Temperature 2m (AT 2m) - C

Fort McKay - Bertha Ganter - January 2016

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	132	17.74	17.74
-20 - 0	566	76.08	93.82
0 - 10	46	6.18	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 97 % on Jan 29 06:00

Maximum Daily Average: 91.9 % on Jan 28

Minimum Value: 50 % on Jan 29 15:00

Minimum Daily Average: 67.5 % on Jan 16

Maximum Diurnal Average: 81.8 % at hour 3

Minimum Diurnal Average: 72.6 % at hour 15

Monthly Average: 79.5 %

Percentiles: P_1 = 59 P_{10} = 70 Q_1 = 76 Median = 79 Q_3 = 84 P_{90} = 88 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

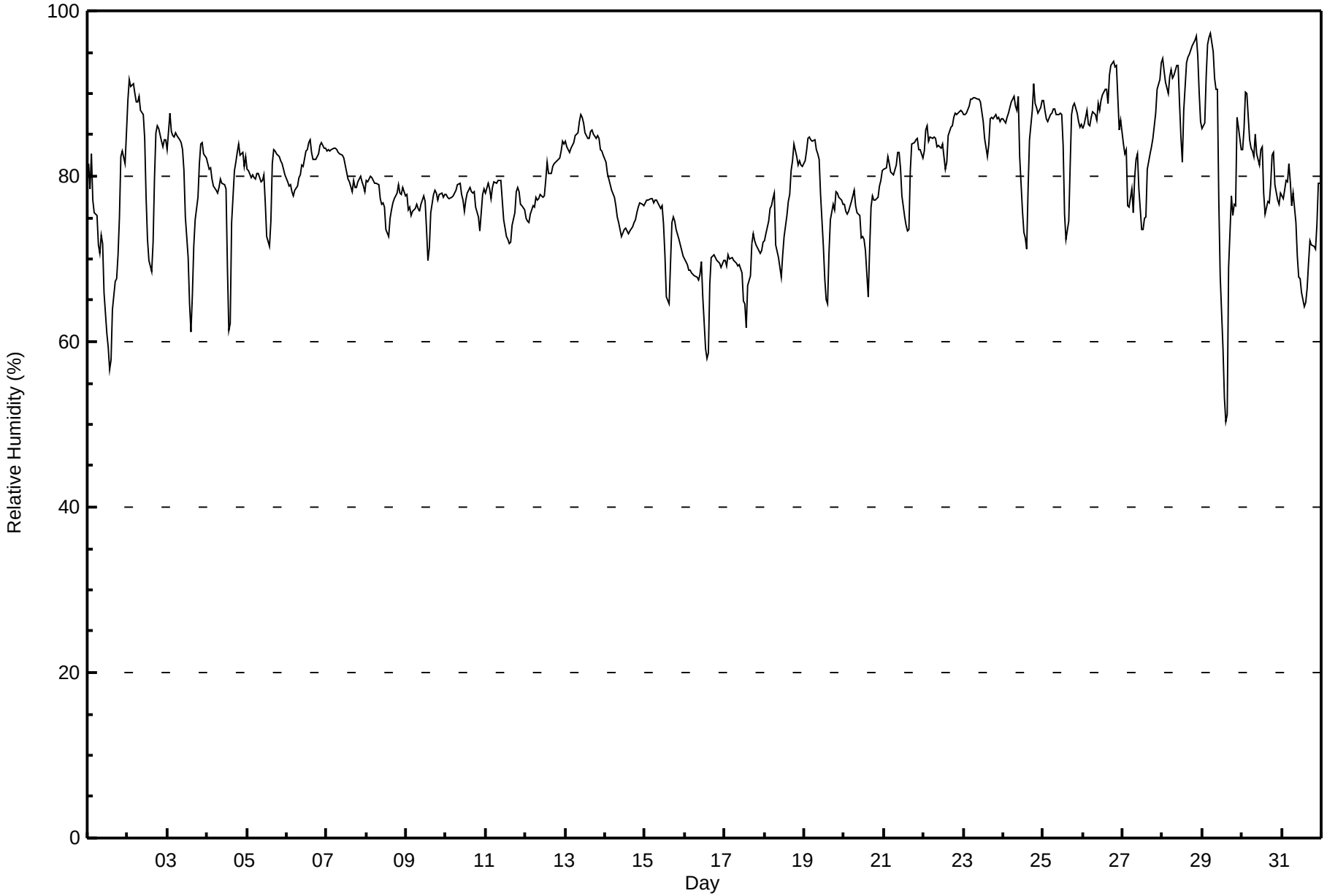
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	82	78	83	77	76	75	72	71	73	72	66	61	59	57	58	64	67	68	71	75	82	83	81	85	72.3	85
2-Jan	89	92	91	91	90	89	89	90	88	87	85	77	72	70	68	72	80	85	86	86	84	84	84	84	83.9	92
3-Jan	83	88	85	85	85	85	85	84	84	83	81	75	70	64	61	66	72	75	77	82	84	84	83	82	79.3	88
4-Jan	82	81	81	80	79	78	78	79	80	79	79	78	69	61	62	74	81	82	83	84	83	83	81	82	78.2	84
5-Jan	81	81	80	80	80	80	80	80	79	80	80	77	73	72	74	82	83	83	83	82	82	81	81	80	79.7	83
6-Jan	79	79	79	78	78	78	79	80	80	81	81	83	83	84	84	83	82	82	82	83	84	84	83	83	81.4	84
7-Jan	83	83	83	83	83	83	83	83	83	83	82	81	80	80	79	78	79	79	79	79	80	79	79	78	81.0	83
8-Jan	79	79	80	80	80	79	79	79	77	77	77	76	74	73	75	76	77	77	78	79	78	78	79	78	77.6	80
9-Jan	78	76	76	75	76	76	77	76	76	77	78	77	74	70	71	76	78	78	78	77	78	78	77	78	76.2	78
10-Jan	78	77	77	77	78	78	78	79	79	78	77	76	77	78	79	78	78	78	76	75	73	76	78	78	77.4	79
11-Jan	78	79	78	77	79	79	79	80	79	79	77	75	73	72	72	72	74	76	78	79	78	77	76	76	76.8	80
12-Jan	75	75	74	75	77	76	77	77	77	78	77	78	79	82	80	80	81	82	82	82	82	83	84	84	79.1	84
13-Jan	84	84	83	83	84	84	85	85	87	87	87	86	85	85	85	85	86	85	85	85	85	83	83	83	84.7	87
14-Jan	82	80	80	79	78	77	76	75	74	73	73	74	74	73	73	73	74	74	75	76	76	77	77	76	75.9	82
15-Jan	77	77	77	77	77	77	77	77	77	76	76	74	70	65	65	69	74	75	75	74	72	72	71	70	73.9	77
16-Jan	70	69	69	69	68	68	68	68	67	68	70	65	59	58	59	67	70	71	70	70	70	70	69	70	67.5	71
17-Jan	70	69	70	70	70	70	70	69	69	69	68	65	65	62	67	68	72	73	72	72	71	71	71	72	69.4	73
18-Jan	72	73	75	76	76	77	78	72	70	69	68	71	73	75	77	78	81	82	84	82	81	82	81	81	76.4	84
19-Jan	82	83	85	85	84	84	84	83	83	82	78	72	68	65	65	71	75	77	76	78	78	77	77	77	77.8	85
20-Jan	77	76	75	76	77	78	78	76	76	75	73	73	72	71	65	71	76	78	77	77	77	79	79	81	75.6	81
21-Jan	81	81	82	82	80	80	80	81	83	83	81	78	75	74	73	74	81	84	84	84	85	83	83	82	80.6	85
22-Jan	83	86	86	84	85	85	85	85	84	84	83	84	82	81	82	85	86	86	87	88	88	88	88	88	85.0	88
23-Jan	87	87	88	88	89	89	89	90	89	89	89	88	87	85	82	84	87	87	87	87	87	87	87	87	87.4	90
24-Jan	87	87	87	88	88	89	90	88	88	90	82	76	73	73	71	78	84	88	91	89	88	88	88	89	85.0	91
25-Jan	89	88	87	87	88	88	88	88	87	87	88	87	84	75	72	75	81	87	88	89	88	87	86	86	85.4	89
26-Jan	86	86	88	86	86	87	88	88	87	89	88	89	90	91	91	89	92	93	94	93	93	90	86	87	89.0	94
27-Jan	84	83	83	76	76	78	76	80	82	83	78	74	74	75	75	81	83	84	85	86	88	90	92	94	81.6	94
28-Jan	94	93	91	90	92	93	92	92	93	93	89	85	82	88	94	94	95	95	96	96	97	95	90	87	91.9	97
29-Jan	86	86	92	96	97	97	95	92	91	90	77	68	59	53	50	51	69	78	75	77	76	87	86	83	79.7	97
30-Jan	83	86	90	90	84	83	83	82	85	83	81	83	84	78	75	77	77	79	83	83	79	77	77	78	81.7	90
31-Jan	78	77	79	79	81	79	77	78	74	70	68	68	66	64	65	66	69	72	72	72	71	74	79	79	73.3	81
	81.2	81.3	81.8	81.3	81.3	81.4	81.1	80.9	80.7	80.5	78.6	76.5	74.3	72.7	72.6	75.4	78.8	80.4	80.9	81.3	81.2	81.5	81.2	81.3	Diurnal Average	
	94	93	92	96	97	97	95	92	93	93	89	89	90	91	94	94	95	95	96	96	97	95	92	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Fort McKay - Bertha Ganter - January 2016



Maximum Value: 1.6 mm on Jan 29 04:00

Maximum Daily Total: 3.6 mm on Jan 28

Minimum Value: 0.0 mm on Jan 1 01:00

Minimum Daily Total: 0.0 mm on Jan 1

Maximum Diurnal Total: 3.8 mm at hour 14

Minimum Diurnal Total: 0.0 mm at hour 2

Monthly Total: 14.77 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} = 0.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

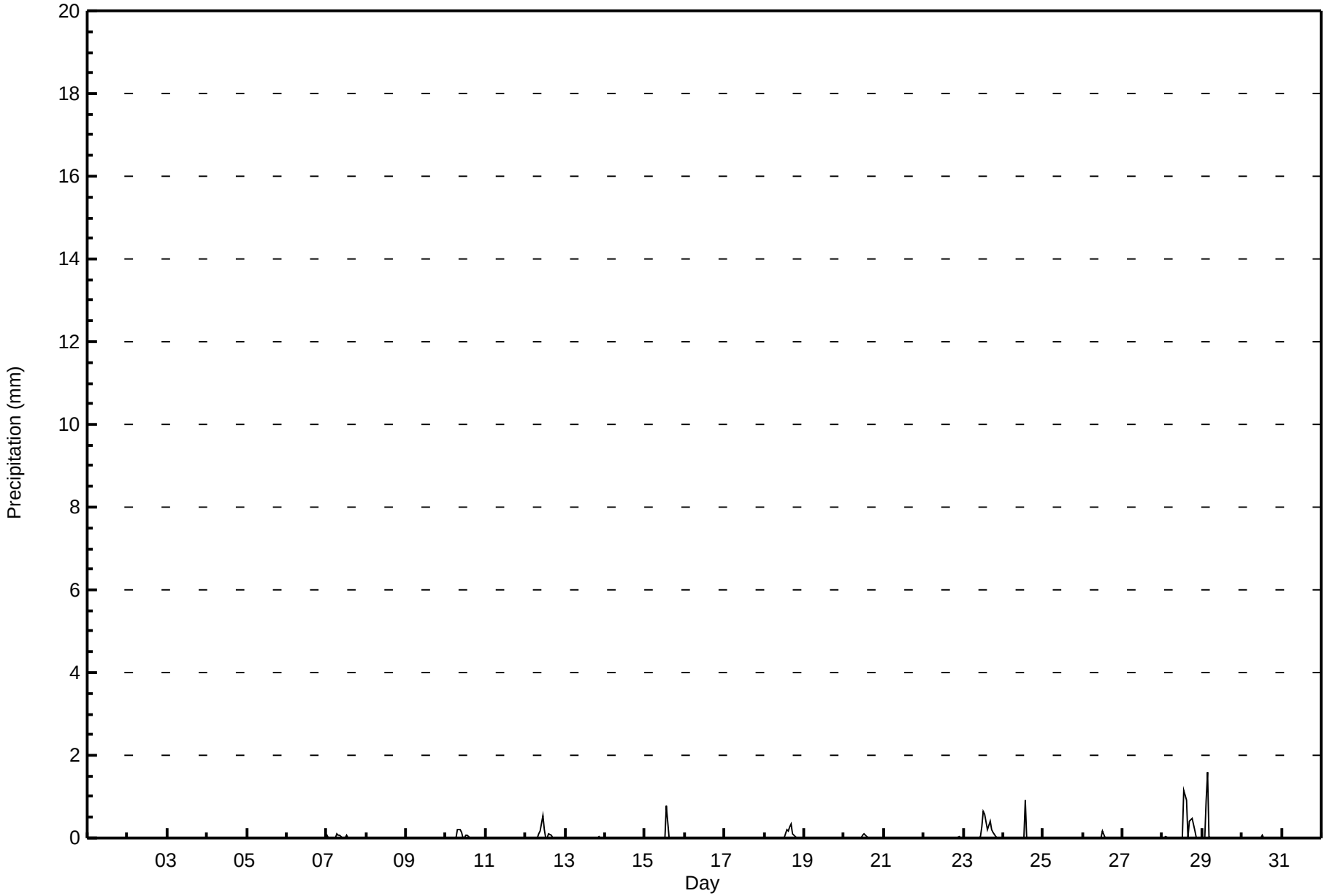
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Jan	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.2
11-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.5
13-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1
14-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8
16-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	1.2	0.3
19-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1
23-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.6	0.6	0.2	0.3	0.4	0.2	0.2	0.1	0.0	0.0	0.0	0.0	2.9	0.6
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9
25-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	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
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Jan	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.9	0.0	0.4	0.4	0.5	0.2	0.0	0.0	0.0	0.0	3.6	1.1
29-Jan	0.0	0.0	0.9	1.6	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	0.0	0.0	0.0	0.0	0.0	0.0	2.6	1.6
30-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.1	0.0	1.0	1.6	0.1	0.0	0.1	0.3	0.4	0.3	0.6	0.5	1.1	3.8	1.4	0.6	1.2	0.8	0.7	0.2	0.1	0.1	0.0	0.0	Diurnal Average	
	0.1	0.0	0.9	1.6	0.1	0.0	0.1	0.2	0.2	0.2	0.5	0.3	0.6	1.1	0.9	0.3	0.4	0.4	0.5	0.2	0.1	0.1	0.0	0.0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	731	98.25	98.25
0.4 - 0.5	5	0.67	98.92
0.6 - 0.7	2	0.27	99.19
0.8 - 1.4	5	0.67	99.87
1.5 - 10	1	0.13	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 60 % on Jan 28 15:00

Maximum Daily Average: 12.7 % on Jan 28

Minimum Value: 0 % on Jan 16 12:00

Minimum Daily Average: 0.1 % on Jan 16

Maximum Diurnal Average: 2.4 % at hour 15

Minimum Diurnal Average: 0.8 % at hour 13

Monthly Average: 1.4 %

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 22$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

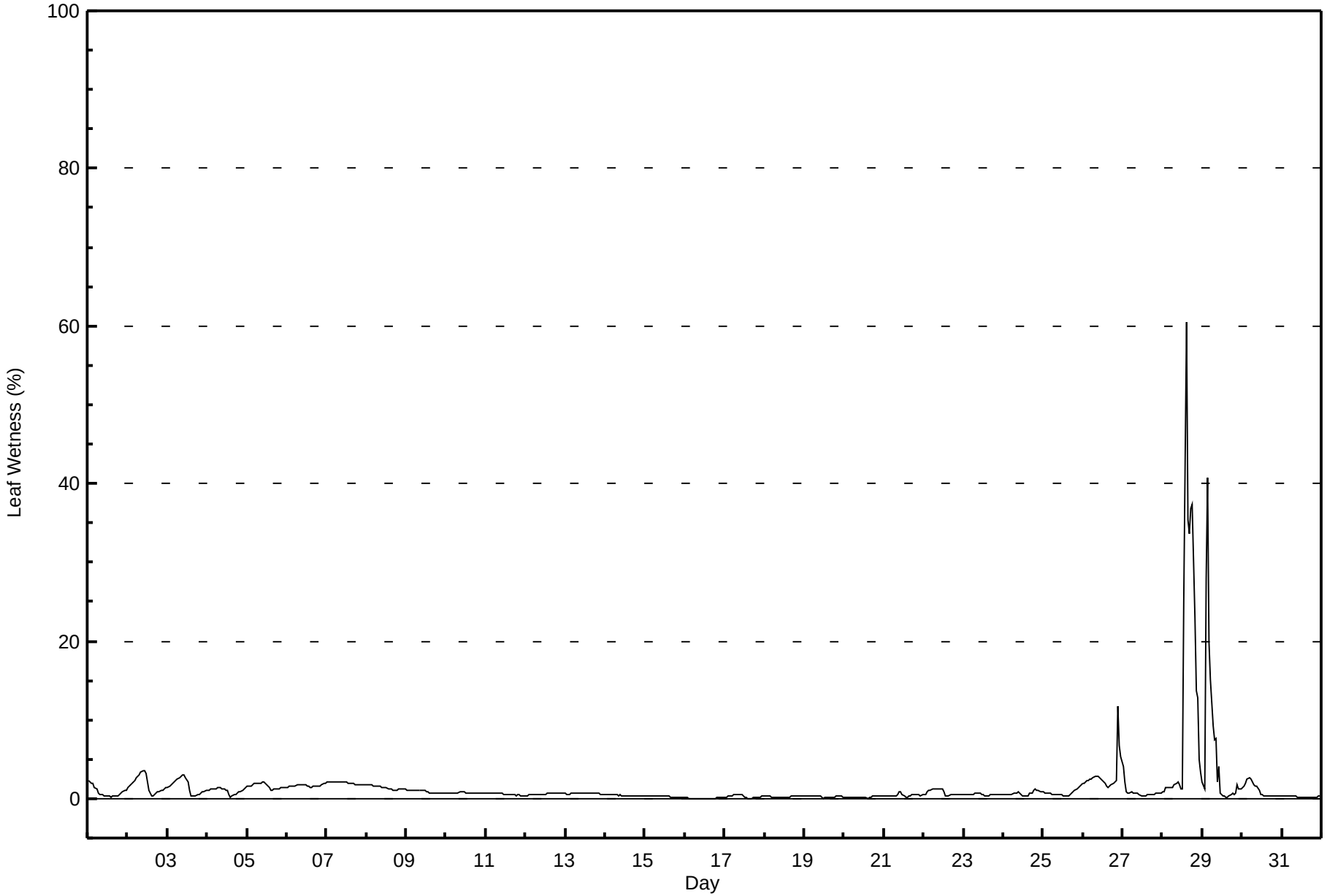
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.8	2
2-Jan	1	2	2	2	2	3	3	3	3	4	4	3	2	1	0	0	1	1	1	1	1	1	1	1	1.8	4
3-Jan	1	2	2	2	2	2	2	3	3	3	3	3	2	1	0	0	0	0	0	1	1	1	1	1	1.5	3
4-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1.0	1
5-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.6	2
6-Jan	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	1.6	2
7-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
8-Jan	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2
9-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
10-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
11-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
12-Jan	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
13-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
14-Jan	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Jan	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
20-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-Jan	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0.4	1
22-Jan	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.8	1
23-Jan	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1
24-Jan	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0.7	1
25-Jan	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	2	2	0.8	2
26-Jan	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	1	2	2	2	2	2	12	7	5	2.9	12
27-Jan	4	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.8	4
28-Jan	1	1	1	1	1	1	1	2	2	2	2	1	1	25	60	35	34	37	37	23	14	13	5	3	12.7	60
29-Jan	2	1	28	41	20	15	9	8	8	2	4	1	0	0	0	0	0	1	1	1	1	2	1	1	6.1	41
30-Jan	1	2	2	2	3	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.1	3
31-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	1.0	1.0	1.8	2.3	1.6	1.5	1.3	1.3	1.3	1.1	1.1	0.9	0.8	1.4	2.4	1.6	1.6	1.8	1.8	1.4	1.1	1.5	1.1	1.0	Diurnal Average	
	4	2	28	41	20	15	9	8	8	4	4	3	2	25	60	35	34	37	37	23	14	13	7	5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (LW) - %

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	173	23.35	23.35
0.4 - 0.5	149	20.11	43.45
0.6 - 0.7	128	17.27	60.73
0.8 - 1.4	124	16.73	77.46
1.5 - 10	142	19.16	96.63
> 10	14	1.89	98.52

Total Number of Valid Hours: 741

Total Number of Hours: 744

Maximum Value: 236 W/m2 on Jan 3 13:00

Maximum Daily Average: 43.7 W/m2 on Jan 29

Minimum Value: 0 W/m2 on Jan 1 01:00

Minimum Daily Average: 2.9 W/m2 on Jan 23

Maximum Diurnal Average: 86.1 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 5

Monthly Average: 15.7 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 12$ $P_{90} = 54$ $P_{99} = 205$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

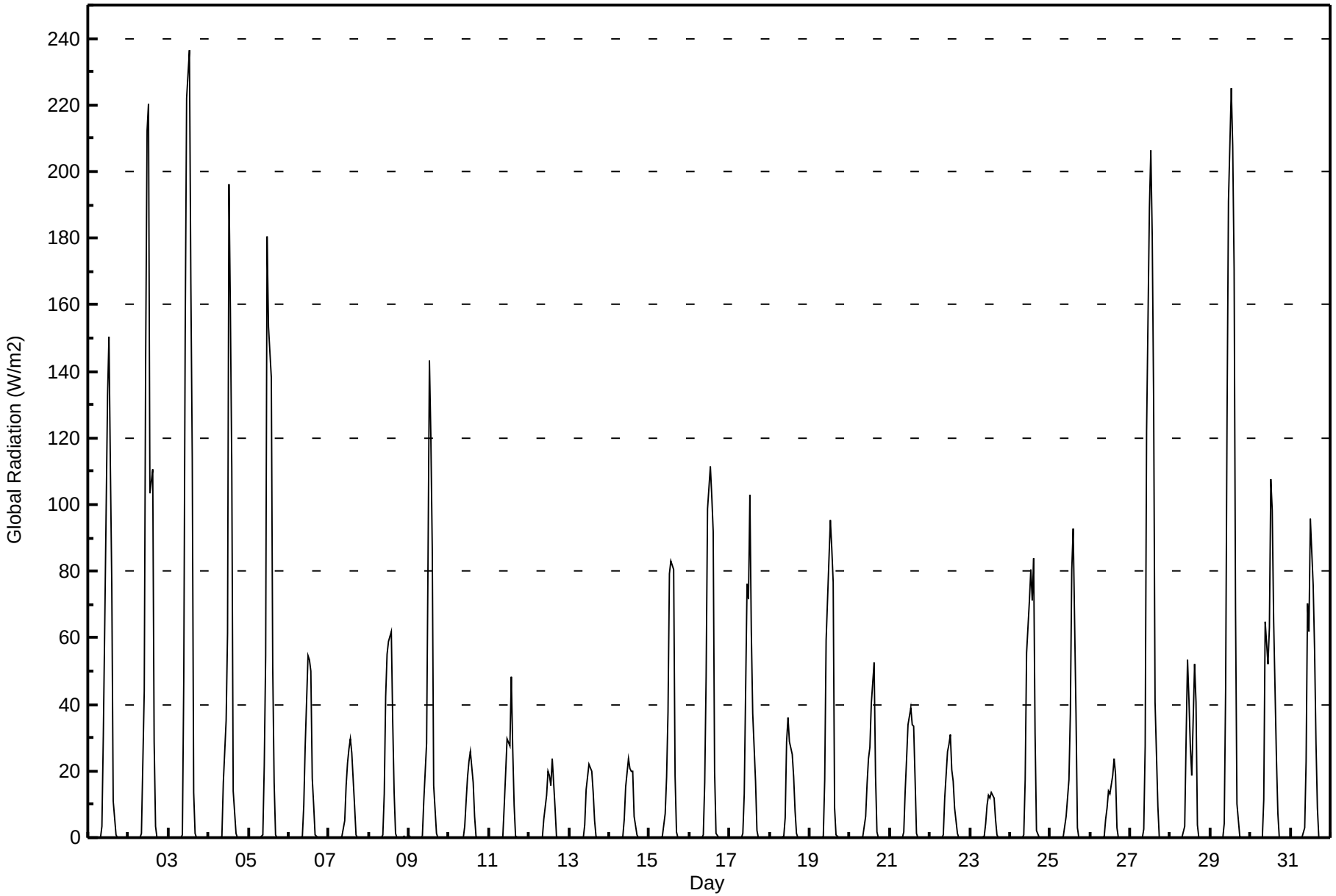
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	0	0	0	0	0	0	0	3	31	64	133	150	111	76	11	1	0	0	0	0	0	0	0	24.2	150
2-Jan	0	0	0	0	0	0	0	0	1	44	144	212	221	103	111	29	3	0	0	0	0	0	0	0	36.2	221
3-Jan	0	0	0	0	0	0	0	0	1	48	151	222	236	167	114	13	1	0	0	0	0	0	0	0	39.7	236
4-Jan	0	0	0	0	0	0	0	0	0	16	35	61	196	159	111	14	1	0	0	0	0	0	0	0	24.7	196
5-Jan	0	0	0	0	0	0	0	0	1	22	55	180	153	138	51	17	1	0	0	0	0	0	0	0	25.7	180
6-Jan	0	0	0	0	0	0	0	0	0	10	27	55	53	50	18	10	1	0	0	0	0	0	0	0	9.3	55
7-Jan	0	0	0	0	0	0	0	0	0	5	16	22	27	30	25	9	1	0	0	0	0	0	0	0	5.6	30
8-Jan	0	0	0	0	0	0	0	0	1	13	43	55	59	62	35	13	1	0	0	0	0	0	0	0	11.8	62
9-Jan	0	0	0	0	0	0	0	0	1	11	28	83	143	121	87	16	1	0	0	0	0	0	0	0	20.4	143
10-Jan	0	0	0	0	0	0	0	0	0	3	11	18	23	26	17	6	0	0	0	0	0	0	0	0	4.4	26
11-Jan	0	0	0	0	0	0	0	0	1	10	20	30	28	48	27	10	1	0	0	0	0	0	0	0	7.2	48
12-Jan	0	0	0	0	0	0	0	0	0	5	13	20	19	16	24	9	1	0	0	0	0	0	0	0	4.4	24
13-Jan	0	0	0	0	0	0	0	0	0	4	14	18	22	20	14	5	0	0	0	0	0	0	0	0	4.1	22
14-Jan	0	0	0	0	0	0	0	0	0	5	15	24	21	20	20	6	1	0	0	0	0	0	0	0	4.7	24
15-Jan	0	0	0	0	0	0	0	0	0	7	18	38	79	83	80	19	2	0	0	0	0	0	0	0	13.6	83
16-Jan	0	0	0	0	0	0	0	0	1	16	48	99	111	102	92	20	1	0	0	0	0	0	0	0	20.5	111
17-Jan	0	0	0	0	0	0	0	0	1	13	76	72	103	62	37	17	2	0	0	0	0	0	0	0	16.0	103
18-Jan	0	0	0	0	0	0	0	0	0	6	29	36	29	25	18	8	1	0	0	0	0	0	0	0	6.4	36
19-Jan	0	0	0	0	0	0	0	0	1	17	59	84	95	87	77	9	1	0	0	0	0	0	0	0	17.9	95
20-Jan	0	0	0	0	0	0	0	0	0	6	16	24	27	40	53	19	2	0	0	0	0	0	0	0	7.8	53
21-Jan	0	0	0	0	0	0	0	0	2	14	24	34	39	34	33	18	1	0	0	0	0	0	0	0	8.3	39
22-Jan	0	0	0	0	0	0	0	0	1	12	26	28	31	20	17	9	1	0	0	0	0	0	0	0	6.1	31
23-Jan	0	0	0	0	0	0	0	0	0	4	10	13	12	14	12	5	1	0	0	0	0	0	0	0	2.9	14
24-Jan	0	0	0	0	0	0	0	0	1	17	56	71	80	71	84	31	2	0	0	0	0	0	0	0	17.2	84
25-Jan	0	0	0	0	0	0	0	0	0	6	12	17	37	80	93	37	3	0	0	0	0	0	0	0	12.0	93
26-Jan	0	0	0	0	0	0	0	0	1	6	9	14	13	19	24	19	3	0	0	0	0	0	0	0	4.4	24
27-Jan	0	0	0	0	0	0	0	0	3	27	122	189	206	181	131	41	9	0	0	0	0	0	0	0	37.9	206
28-Jan	0	0	0	0	0	0	0	0	3	30	54	41	27	19	52	41	4	0	0	0	0	0	0	0	11.3	54
29-Jan	0	0	0	0	0	0	0	0	4	45	126	191	225	208	171	69	10	0	0	0	0	0	0	0	43.7	225
30-Jan	0	0	0	0	0	0	0	0	12	65	52	63	108	98	65	23	7	0	0	0	0	0	0	0	20.6	108
31-Jan	0	0	0	0	0	0	0	0	3	23	70	62	96	76	57	29	9	0	0	0	0	0	0	0	17.6	96
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	17.5	46.6	71.2	86.1	73.8	58.8	18.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	0	12	65	151	222	236	208	171	69	10	0	0	0	0	0	0	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

Fort McKay - Bertha Ganter - January 2016



Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	606	81.45	81.45
21 - 100	103	13.84	95.30
101 - 300	35	4.70	100.00
301 - 600	0	0.00	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter - January 2016

Maximum Speed: 18 km/h on Jan 27 04:00

Maximum Daily Speed Average: 6.2 km/h on Jan 3

Minimum Speed Value: 0 km/h on Jan 16 19:00

Minimum Daily Speed Average: 0.2 km/h on Jan 10

Maximum Diurnal Speed Average: 1.7 km/h at hour 1

Minimum Diurnal Speed Average: 0.5 km/h at hour 18

Monthly Average Velocity: 1.1 km/h 231.4 deg

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 3$ Median = 4 $Q_3 = 6$ $P_{90} = 8$ $P_{99} = 11$

Hours in Service: 744

Hours of Data: 744

Hours of Missing Data: 0

Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SSW6	SSW7	SSW6	SSW8	S9	S10	SSW10	SSW9	S9	SSW8	WSW8	W8	W9	WSW7	WSW8	WSW7	W10	SSW5	SSW7	S7	WSW4	W6	W4	SW2	SW6.1	W10
2-Jan	S4	SSW4	S3	S5	S5	S6	S4	S7	S7	S8	S8	S8	S9	S8	S7	S5	S4	SSE4	S5	SSW5	S6	S6	S6	S6	S5.8	S9
3-Jan	S5	S5	S7	S8	S8	S7	S7	S8	S8	S7	S7	S9	S10	S8	S7	S8	S6	SSW6	S6	SSW5	SSW3	SSW3	SW2	SW2	S6.2	S10
4-Jan	WSW2	SSW3	SSW3	WSW1	NNW2	NW2	SSW2	NW1	S1	S2	SSE1	S2	SSE3	SSE4	S5	SSW5	SSW5	SSW4	S3	SSW4	SSW5	S5	S4	S6	SSW2.6	SSW6
5-Jan	S4	SSW3	SSW3	SSW5	SSW4	S4	SSW3	SSW4	S3	S4	S4	S5	SSE5	S4	S3	NW1	N5	N4	NNW3	NNW3	N2	NW1	WNW2	WSW2	SSW1.7	SSE5
6-Jan	W2	NNW3	NW2	NNW2	NNW3	N3	NNW2	N2	NW2	NW2	N2	N4	NNW3	N4	NNW6	NNW6	N5	N4	N5	N5	N8	N7	N6	N6	N3.6	N8
7-Jan	N5	N5	N5	N2	NW3	NNW3	NNW5	N4	N4	NNW4	N3	NNW4	NW7	WNW6	NW4	W4	W4	WSW5	WSW3	W4	W3	WSW3	SW3	SW3	NW2.9	NW7
8-Jan	W3	WSW3	NW3	NNW3	N3	NNW3	NW2	NNE3	NW2	WSW2	NW1	W1	SSE2	SSE1	SE1	SSE0	WSW2	SW2	SSW2	SSW3	SW4	SSW5	SW5	SSW4	WSW1.2	SW5
9-Jan	SSW6	SSW6	S7	S8	S7	S6	S7	S5	S6	S7	S8	S8	S9	S8	S6	S6	SSW5	S4	S5	S5	S5	S6	S6	S5	S6.1	S9
10-Jan	S7	S6	S5	S3	S3	S3	SW2	NW3	WSW0	S2	WSW1	SSE2	NNE2	N5	N6	N7	N5	N5	N4	E2	S2	S0	NNW2	N3	N0.2	S7
11-Jan	N4	N4	N3	W2	WSW2	WSW2	SSW1	NW2	NW3	WNW4	W4	W5	SW3	WSW4	WSW5	WSW6	WSW4	SW4	SSW4	SW4	SSW2	SSW3	SW4	SW3	WSW2.4	WSW6
12-Jan	SW2	SSW2	SSW2	SW3	SSW1	WSW1	SW2	SSW2	S2	SSE1	SSE1	SSE3	SSE4	SSE5	S5	SSE6	S8	S5	SSE4	S4	S4	S4	S2	SSW2	S2.9	S8
13-Jan	NW0	NNE3	WNW3	WNW2	SW1	NW2	NNW3	NNW2	N3	N5	N4	N4	N4	N4	N5	N5	N5	N6	N6	NNE7	NNE8	N10	N9	N8	N4.2	N10
14-Jan	N9	N9	N8	N8	N9	N8	N6	NNE4	NNE3	NNE4	NNE6	NE5	NNE7	NNE7	NNE7	NNE7	NNE7	NNE7	N7	N7	NNE5	NNE4	NE2	NE2	NNE6.2	N9
15-Jan	N3	N3	NNW2	NNW2	N2	NW1	NNW3	NW3	NNW3	NNW3	NNW1	N4	N4	N4	N5	NNE4	NNW5	NNW4	NNW4	NNW1	NW1	NW3	W1	NW1	NNW2.5	N5
16-Jan	SW2	W2	WNW2	W2	SW1	SW2	SSW2	SW1	W1	WSW1	S1	SSE3	SSE5	SSE5	S4	S5	S4	SW2	E0	WSW2	SW2	SSW3	SSW2	SSW5	SSW2.0	SSE5
17-Jan	SW3	SSW4	SSW5	SSW6	S7	SSW7	S7	S7	S5	SSW5	SSE5	SSE6	SSW3	SSE4	S4	SSE4	W2	WSW2	W3	W2	WNW2	NW2	W2	NW0	SSW3.4	S7
18-Jan	W2	SSW1	SW2	N1	N3	NNW2	NNW0	S6	SSE6	SSE8	SSE6	SSE8	SSE8	S7	SSE5	SSW3	WSW2	S2	WSW1	SW2	S3	S3	SSE4	S4	S3.0	SSE8
19-Jan	S3	SSW2	NW1	NW2	NW3	NNW3	NNW4	N5	NNE3	N3	N5	NNE6	NNE5	NNE4	NNE5	NE4	NNW3	N3	NNE3	NNE3	N3	NNE3	ENE3	NE4	N2.8	NNE6
20-Jan	NE5	NNE5	NNE5	N4	N4	N3	NNW3	N4	NNW4	NNW4	NW0	S2	SSE3	SSE4	SSE4	S4	SW1	SW1	S3	SSE4	S3	SSW1	SSW2	SSW1	NNE0.4	NNE5
21-Jan	SSW3	SSW3	SSW4	S7	S8	S8	S8	S6	S5	S6	S5	S6	S8	S9	S9	S5	SSW1	N5	NNW5	N3	NNW2	S4	SSW7	SSW8	S4.3	S9
22-Jan	SSW7	SW4	SW5	SSW5	S3	S4	SSW2	NNW1	NNW3	N2	N1	NNW3	N4	N4	NW7	NNW6	N5	N6	N5	N5	N5	N4	N4	N5	NNW1.9	SSW7
23-Jan	N5	N4	N4	N5	NNW5	NNW4	NNW4	NNW4	N4	NNW3	NNW3	NW3	NW3	SSW2	SSE3	S3	S2	S3	S4	S4	S4	S5	S5	S3	NW0.7	S5
24-Jan	S4	S5	S6	S7	S7	S4	W3	W4	SSW4	S5	SSW6	SW8	SW7	SSW7	SSW8	S8	S6	NNW1	NNW5	N6	N5	NNE6	N6	N4	SSW2.5	SW8
25-Jan	N2	ENE2	ENE3	SE2	SSE2	S4	SSW5	S6	SW9	SSW6	S11	SSW7	S9	SSW10	SSW10	SSW7	SW4	SSW2	WSW2	SSW2	SW2	SSW3	S5	SW2	SSW4.2	S11
26-Jan	S5	S5	S6	S6	SSE6	S5	SSW5	SSW5	S4	SSW5	S2	S3	S3	SSW4	SSW3	S3	SW3	S3	S6	S6	S6	W9	W11	WNW14	SSW4.0	WNW14
27-Jan	W13	WNW9	WNW9	WNW18	NW16	NW10	WNW6	WSW4	WNW5	NNE3	NE5	NE6	NE7	NE8	NNE7	NNE7	NNE5	NNE4	N4	NW3	NW3	NW1	SSW2	S2	NW4.2	WNW18
28-Jan	S3	SSW2	SSE6	S4	NNW3	WSW2	S5	WSW2	WSW2	WSW3	WSW4	SW3	SW4	SSW7	S7	S8	S9	S9	S9	S6	SW5	WSW8	WSW9	WSW9	SSW4.5	WSW9
29-Jan	W6	W6	WNW8	WNW4	S3	WNW4	NW8	WNW5	W6	SSW3	WSW4	NW7	NW11	NW12	NW10	NW10	WNW4	WNW6	WNW5	SW5	W4	WNW3	W6	WSW5	WNW5.4	NW12
30-Jan	W6	SW3	SW2	W6	W9	WNW8	WNW5	WNW6	NNW3	NW3	N3	NNE6	NE6	ENE6	ENE7	ENE7	NE6	NE7	NE7	NE5	NNE5	NE4	ENE5	NNE3	N2.6	W9
31-Jan	NNE5	NNE3	NE4	NNE5	NNE5	NNE5	NNE6	NNE6	NNE7	N7	N6	NNE6	NNE7	NNE7	NNE6	NNE6	NNE6	NNE5	N5	NNE3	NNE3	N2	S2	W3	NNE4.6	N7
	WSW1.7	WSW1.3	SW1.3	WSW1.6	WSW1.3	WSW1.4	WSW1.5	WSW1.3	SW1.1	SSW1.3	SSW1.1	SSW1.0	SSW1.1	S1.4	SSW1.2	SW1.0	W0.9	WNW0.5	W0.6	SW0.6	W0.7	WSW1.2	SW1.4	WSW1.6		Diurnal Average	
	W13	WNW9	WNW9	WNW18	NW16	NW10	SSW10	SSW9	S9	SSE8	S11	S9	NW11	NW12	NW10	NW10	W10	S9	S9	S7	N8	N10	W11	WNW14		Diurnal Maximum	

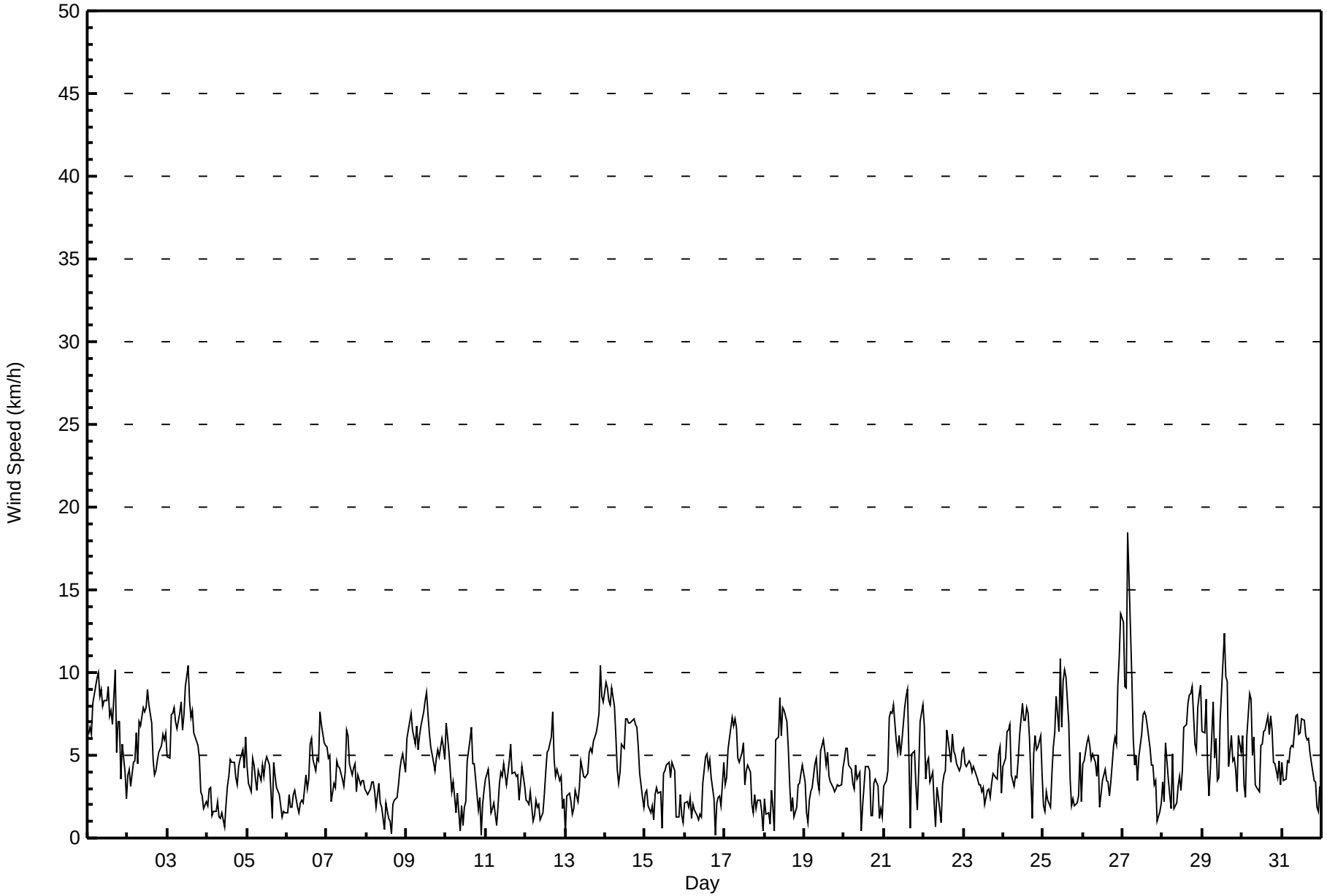
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	518	69.62	69.62
6 - 11	221	29.70	99.33
12 - 19	5	0.67	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 - Bertha Ganter - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	78	32	10	4	2	0	2	30	95	70	39	34	22	14	35	51	518
6 - 11	25	25	5	3	0	0	0	9	85	27	2	8	13	8	8	3	221
12 - 19	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	5
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	103	57	15	7	2	0	2	39	180	97	41	42	36	24	45	54	744

Total Number of Valid Hours: 744

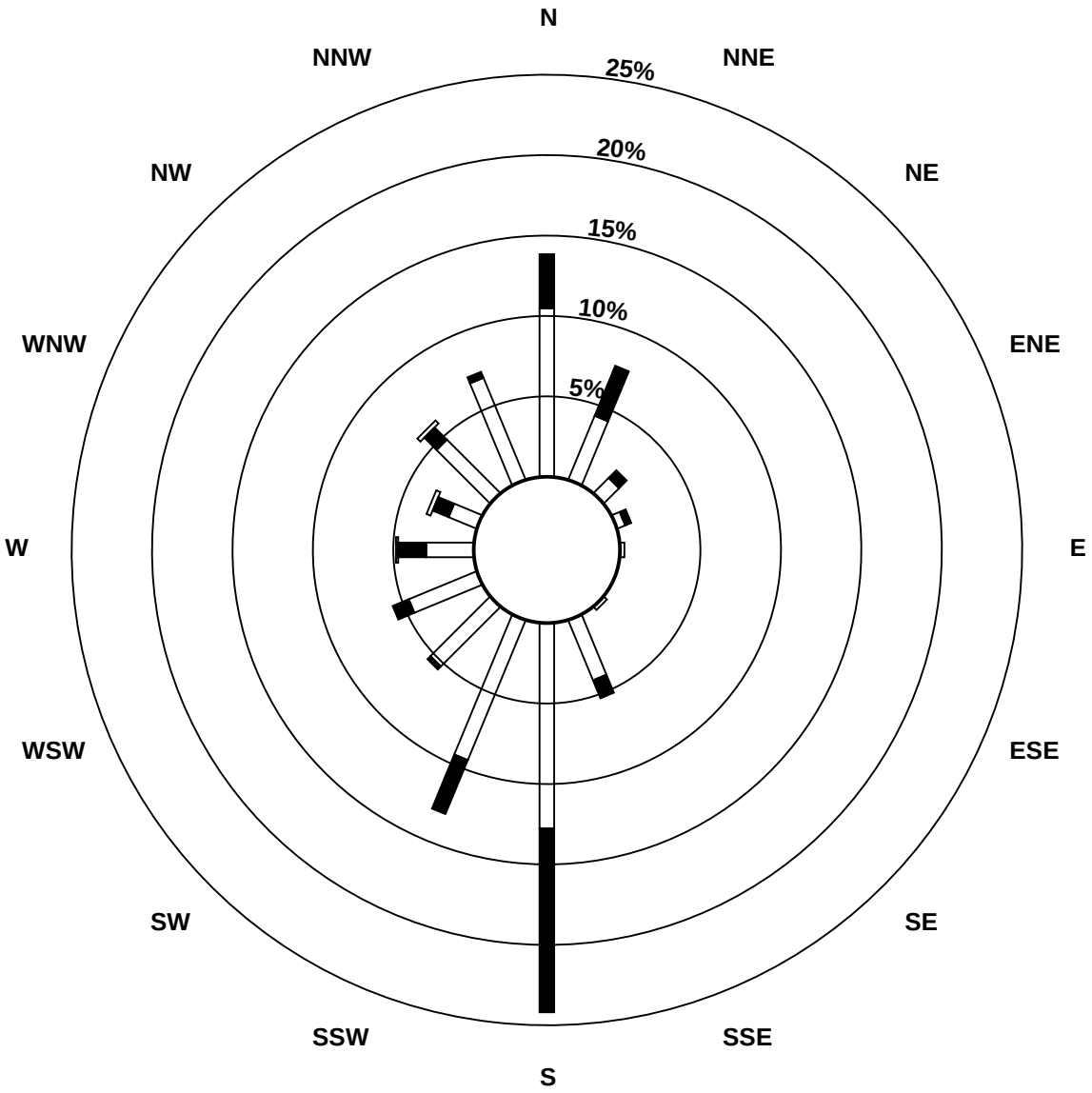
Total Number of Hours: 744

Wood Buffalo Environmental Association

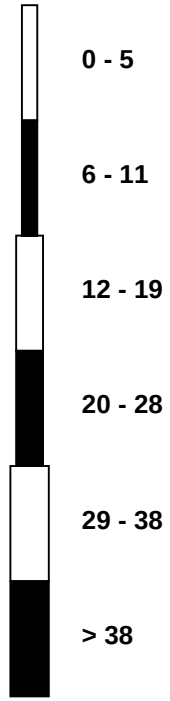
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter (AMS 1)



Classes (km/h)



Total Number of Valid Hours: 744

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 6 km/h on Jan 27 05:00

Minimum Value: 0 km/h on Jan 23 15:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 4$

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

Direction of Maximum Speed: 297 deg on Jan 27 04:00
Direction of Maximum Daily Speed Average: 185.3 deg on Jan 3

Direction of Minimum Speed: 97 deg on Jan 16 19:00

Direction of Minimum Daily Speed Average: 0.2 deg on Jan 10

Monthly Average Direction: 253.0 deg

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	205	204	196	204	184	187	199	204	191	202	251	269	279	241	243	242	265	200	196	177	248	269	264	219	220.6
2-Jan	180	202	185	178	177	180	170	188	182	185	182	177	175	179	182	191	188	167	184	193	180	180	187	190	182.3
3-Jan	186	187	188	182	184	180	182	178	180	181	188	184	174	175	183	190	190	192	189	195	197	203	226	233	185.3
4-Jan	245	213	207	251	327	326	204	325	181	169	159	172	160	162	170	202	198	193	188	195	192	191	183	191	193.5
5-Jan	182	198	195	194	195	187	195	199	185	187	170	177	164	170	179	313	3	352	331	339	349	304	300	248	196.7
6-Jan	273	339	309	339	339	359	346	350	314	308	358	2	343	5	346	348	351	350	353	355	2	360	2	8	350.7
7-Jan	3	359	7	354	318	332	345	351	349	343	359	328	304	299	307	273	267	246	255	276	279	244	214	221	311.7
8-Jan	269	251	311	347	350	344	324	12	320	253	319	280	152	164	146	168	250	223	207	213	222	203	217	200	251.2
9-Jan	206	193	170	172	187	191	186	191	179	181	183	177	175	170	185	185	196	181	186	180	179	186	183	179	182.7
10-Jan	178	182	182	172	183	177	231	321	256	181	255	152	20	359	351	358	2	9	11	90	171	169	339	2	353.6
11-Jan	354	359	353	277	244	258	204	305	313	283	276	275	232	238	237	252	248	216	204	231	210	194	224	215	254.1
12-Jan	226	211	210	223	204	252	224	211	176	149	152	154	166	158	187	166	170	185	166	169	171	182	169	212	181.2
13-Jan	317	13	296	295	236	309	339	347	11	8	10	2	5	3	353	2	9	2	11	19	12	2	0	2	0.4
14-Jan	2	8	9	3	2	358	4	32	17	27	24	35	18	15	24	25	27	21	10	10	15	17	36	36	14.6
15-Jan	5	359	330	338	349	321	346	315	333	327	338	3	2	4	7	17	346	344	342	339	325	326	275	314	346.6
16-Jan	234	268	296	269	232	214	196	219	273	238	182	159	151	161	173	189	190	218	97	248	222	210	204	213	203.0
17-Jan	215	207	196	195	190	193	189	182	181	199	161	164	209	161	175	164	260	255	269	266	289	308	259	317	195.5
18-Jan	259	198	231	354	359	348	340	178	166	164	162	167	166	169	165	194	244	180	248	230	191	183	168	182	177.8
19-Jan	187	205	314	323	318	328	340	357	13	10	10	23	21	24	31	35	336	358	16	15	5	26	68	56	11.0
20-Jan	43	13	13	2	10	350	341	355	348	346	325	174	152	154	158	186	235	230	173	153	178	211	201	201	32.6
21-Jan	199	192	196	177	176	170	177	173	175	187	184	176	186	184	178	190	204	358	348	2	345	184	198	206	185.4
22-Jan	199	222	214	194	188	191	207	339	347	353	359	337	360	353	325	328	350	355	358	349	355	3	3	358	330.3
23-Jan	356	355	351	355	346	331	347	333	358	340	346	313	304	193	157	173	185	178	172	191	177	182	174	180	308.6
24-Jan	188	184	184	184	175	169	259	262	203	185	212	220	221	212	192	189	188	328	341	358	11	13	10	356	208.6
25-Jan	349	76	60	125	164	188	197	184	214	209	187	203	190	194	202	211	215	207	256	208	229	205	169	217	196.6
26-Jan	186	185	189	180	167	185	206	198	177	199	179	184	179	194	209	182	229	183	187	181	171	263	276	285	207.3
27-Jan	280	282	289	297	304	313	299	258	296	25	55	52	37	49	33	17	23	19	351	325	311	323	207	185	325.8
28-Jan	184	211	162	183	334	255	188	237	244	252	242	221	221	205	181	182	180	181	183	179	231	241	243	244	206.7
29-Jan	262	268	297	296	184	303	305	286	274	192	250	306	309	309	310	316	298	284	288	235	275	285	275	256	288.3
30-Jan	265	232	218	279	278	284	302	290	327	323	0	15	34	65	58	62	34	34	41	36	25	48	67	30	0.8
31-Jan	14	12	42	24	23	18	16	15	15	7	4	29	33	30	17	25	15	13	6	25	20	355	171	260	17.5
	241.1	241.4	231.0	236.8	236.4	240.5	240.4	237.8	227.6	212.2	204.4	201.4	197.9	185.5	201.3	220.7	266.5	285.7	280.9	230.9	261.8	250.3	233.1	242.3	
	Diurnal Average																								

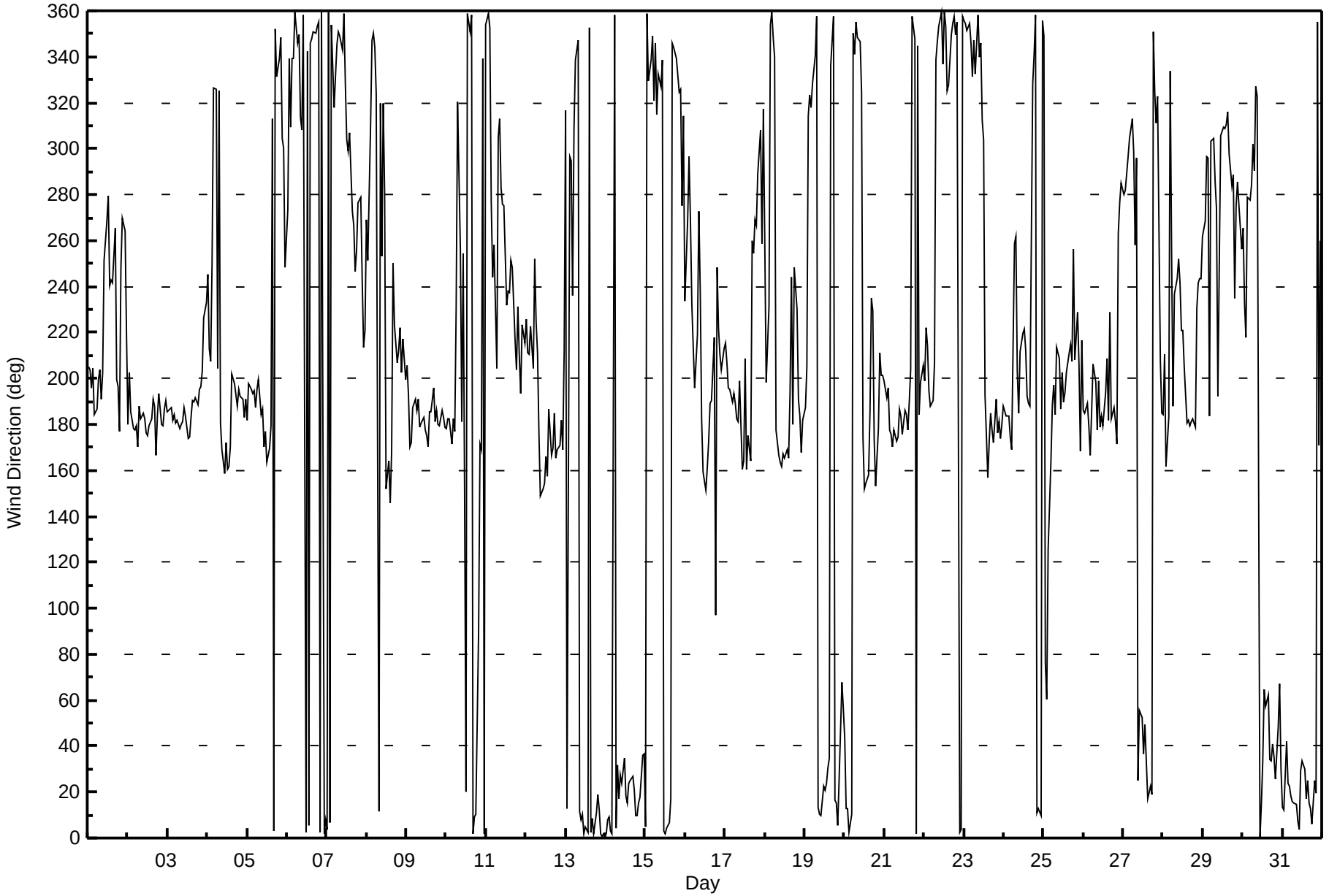
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - January 2016



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 98 deg on Jan 18 00:00

Minimum Value: 9 deg on Jan 3 06:00

Percentiles: P_1 = 11 P_{10} = 14 Q_1 = 19 Median = 30 Q_3 = 41 P_{90} = 54 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	22	26	21	19	21	16	18	26	15	32	49	46	34	42	47	58	42	52	34	32	46	27	35	44	58
2-Jan	29	18	25	17	22	10	23	13	14	13	14	14	13	13	18	17	16	25	17	13	16	17	14	16	29
3-Jan	26	13	16	13	11	9	10	11	13	12	12	15	12	14	14	11	12	13	21	19	31	57	59	19	59
4-Jan	21	25	29	60	57	53	38	58	56	42	93	37	19	18	17	17	20	20	31	17	15	17	22	15	93
5-Jan	24	17	38	19	16	19	27	16	14	13	19	15	14	16	21	56	16	29	36	33	57	62	57	47	62
6-Jan	55	44	58	64	19	52	52	29	36	34	43	37	45	50	26	25	22	22	25	27	30	29	35	39	64
7-Jan	34	31	34	35	21	22	23	25	30	40	34	33	18	20	28	34	34	37	48	38	46	44	35	39	48
8-Jan	35	38	46	37	29	45	60	58	37	33	58	72	27	81	49	85	33	21	19	31	26	19	16	19	85
9-Jan	20	13	16	17	15	13	12	13	13	14	15	14	14	15	13	15	19	16	16	20	16	15	15	16	20
10-Jan	15	16	16	39	26	56	60	41	90	48	72	81	56	33	28	25	33	39	42	54	44	92	42	35	92
11-Jan	23	25	34	42	41	28	79	33	31	20	32	36	46	50	43	42	40	21	12	21	40	25	15	12	79
12-Jan	18	30	32	39	65	42	26	40	28	45	37	29	23	17	17	17	15	29	27	47	43	29	50	64	65
13-Jan	83	36	24	31	48	47	27	38	27	28	30	31	37	32	30	26	31	32	35	39	36	25	31	31	83
14-Jan	29	35	36	31	27	26	38	53	57	43	39	45	43	39	41	39	42	39	33	31	41	33	51	64	64
15-Jan	32	32	28	55	50	88	34	23	31	21	88	31	43	43	35	36	14	15	25	40	43	40	68	67	88
16-Jan	29	26	58	29	59	48	41	45	61	44	54	28	12	15	22	17	13	27	72	13	21	18	26	12	72
17-Jan	16	19	14	12	12	12	12	14	19	17	17	18	44	30	35	22	43	66	53	40	31	32	71	98	98
18-Jan	53	43	48	75	24	28	94	16	15	15	14	16	14	14	16	30	33	27	32	34	21	18	16	16	94
19-Jan	16	36	36	21	16	19	21	24	37	38	31	42	45	49	49	49	23	29	55	37	32	36	40	43	55
20-Jan	41	39	37	33	37	31	27	23	30	25	96	39	26	12	20	22	41	54	20	13	30	70	26	49	96
21-Jan	15	19	14	15	14	15	14	16	16	13	23	24	21	16	17	17	82	14	16	65	91	24	22	23	91
22-Jan	17	38	35	27	34	16	36	88	26	36	93	29	43	36	22	21	22	22	26	25	22	27	27	26	93
23-Jan	23	29	26	26	26	19	23	22	34	26	26	32	22	47	10	14	19	15	11	12	22	16	14	36	47
24-Jan	14	14	13	14	16	33	31	35	28	13	26	29	29	31	22	10	11	73	22	29	34	38	29	32	73
25-Jan	50	80	37	53	54	25	17	15	25	26	18	22	17	21	22	21	39	44	32	32	33	35	27	62	80
26-Jan	22	18	16	13	13	13	17	17	24	17	38	42	24	21	27	26	38	32	19	14	21	42	38	34	42
27-Jan	36	34	29	19	19	18	41	39	42	44	45	44	40	41	44	39	41	40	32	35	35	79	70	41	79
28-Jan	23	60	25	45	47	68	53	77	45	27	39	46	43	26	18	14	15	14	14	12	39	40	41	44	77
29-Jan	52	39	19	27	35	58	16	41	45	47	68	23	21	19	20	19	29	14	49	35	33	83	22	28	83
30-Jan	30	58	50	30	38	29	42	33	30	21	85	39	43	41	38	35	40	43	46	52	54	50	35	48	85
31-Jan	34	44	55	43	38	40	36	33	36	39	33	41	42	39	38	42	37	36	30	39	51	81	46	11	81
	83	80	58	75	65	88	94	88	90	48	96	81	56	81	49	85	82	73	72	65	91	92	71	98	
	Diurnal Maximum																								

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 15, 2016	Last Calibration	December 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:35
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	-613	-614
Analyzer IP address	192.168.1.43		Lamp voltage	816	819
Calculated slope	0.964090	1.000542	Chamber temp	45.1	45.4
Calculated intercept	1.424436	2.113788	Pressure	683.3	691.0
Analyzer Background	11.3	12.4	Flow	0.499	0.505
Analyzer Coefficient	0.932	0.951	Intensity	90	90

Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	0.7	----
as found span	5500	81.3	734.7	718.5	1.022
calibrator zero	5500	0.0	0.0	-0.1	----
high point	5500	81.3	734.7	733.5	1.002
second point	5500	45.6	412.1	408.2	1.009
third point	5500	22.8	206.0	201.9	1.020
as left zero	5500	0.0	0.0	0.2	----
as left span	5500	81.3	734.7	732.6	1.003
				Average Correction Factor	1.010

Corrected As found	717.8	Previous response	760.6	% change	6.0%

Notes:

Inlet filter changed after as founds. Zero and span adjusted.

Calibration Performed By: Devin Russell

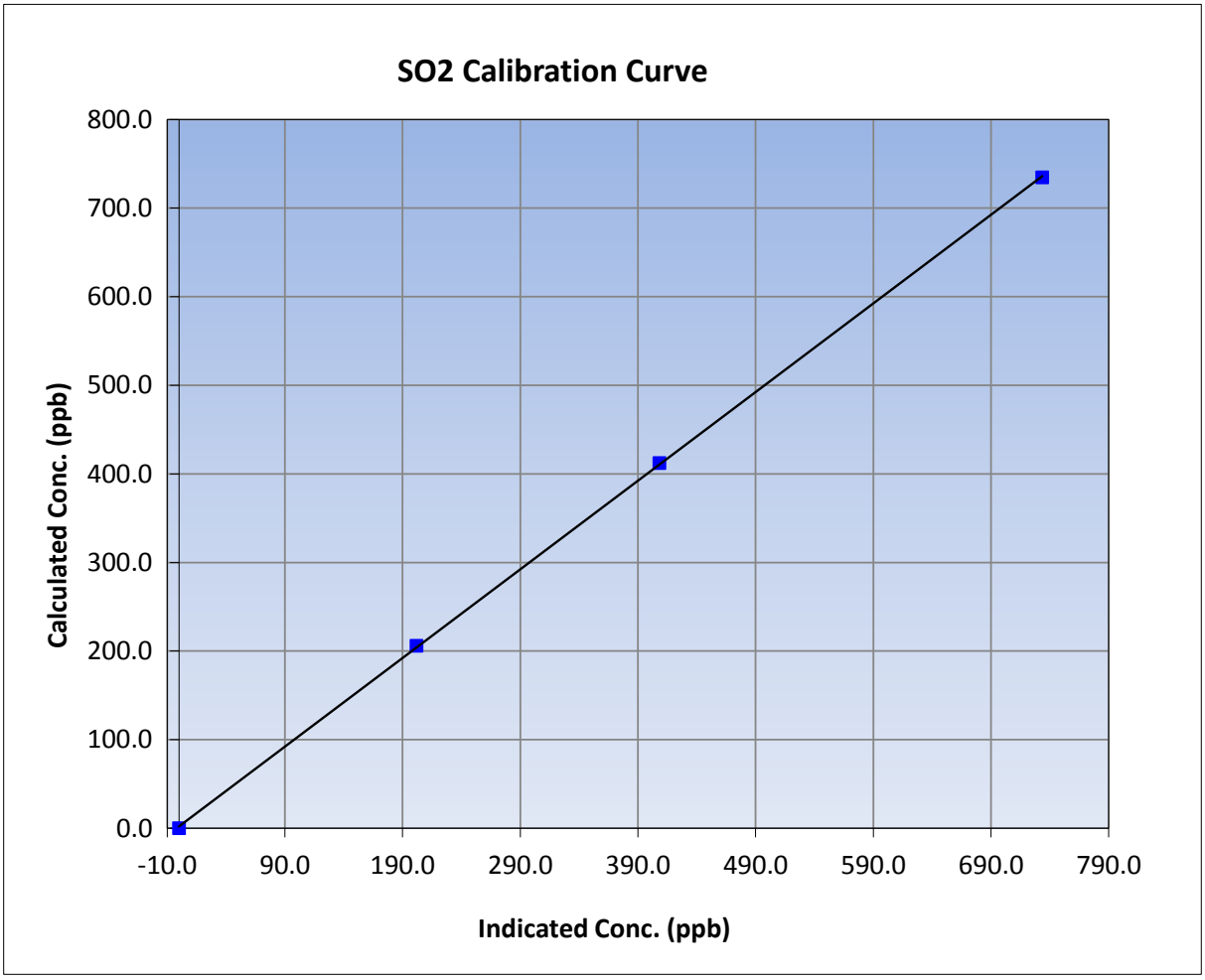
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

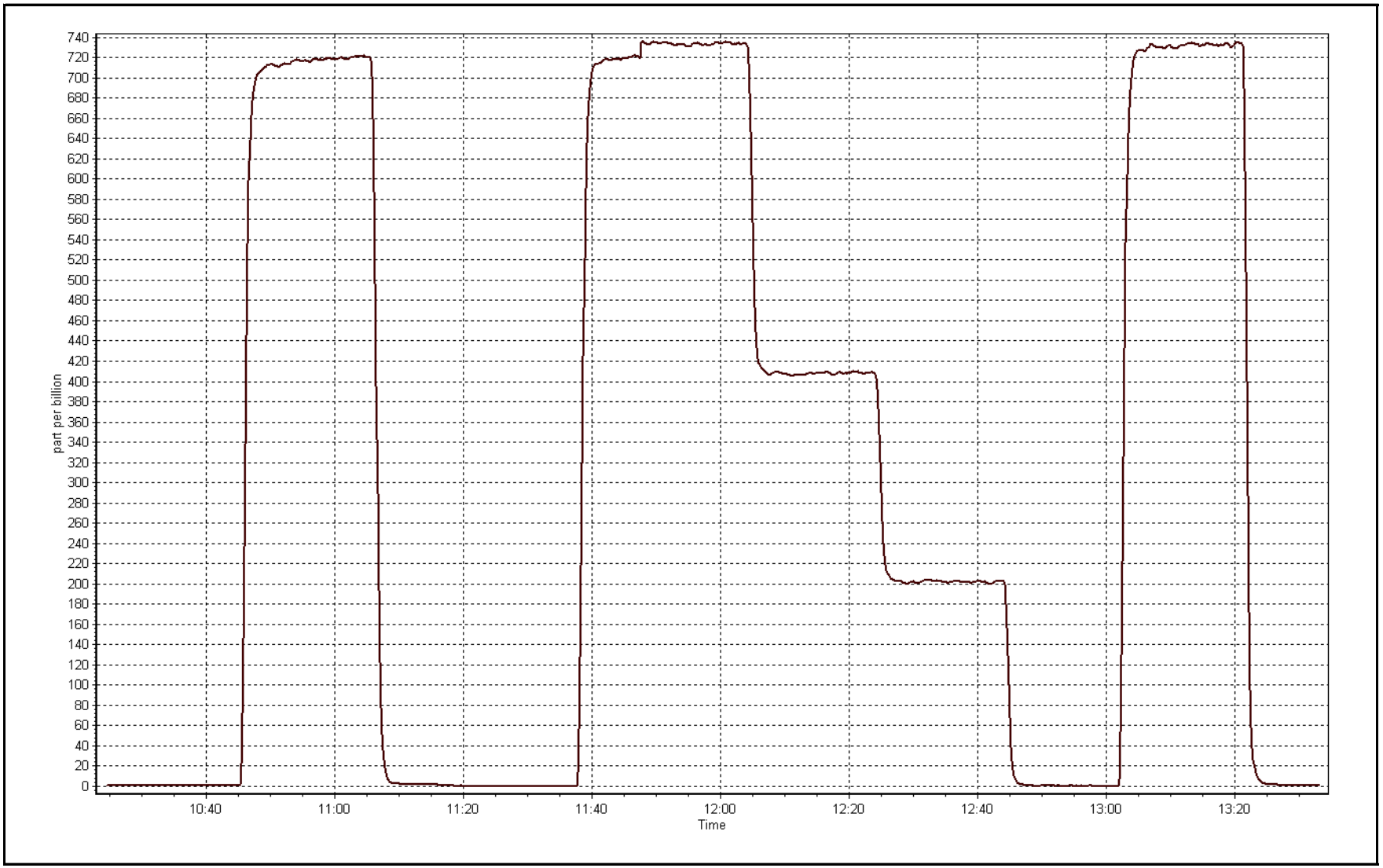
Calibration Date	January 15, 2016	Previous Calibration	December 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	13:35
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999959
734.7	733.5	1.0015		
412.1	408.2	1.0095	Slope	1.000542
206.0	201.9	1.0204		
			Intercept	2.113788



SO2 Calibration Plot Date: January 15, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 25, 2016	Last Calibration	December 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:13	End Time (MST)	15:48
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	SA140071A 26/Sep/17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-859	-859
Analyzer IP address	192.168.1.42		Lamp voltage	1157	1166
Calculated slope	0.998917	0.998535	Chamber temp	45	45
Calculated intercept	0.166653	0.306831	Pressure	682.0	678.4
Analyzer Background	1.84	1.86	Flow	0.415	0.413
Analyzer Coefficient	1.015	1.018	Intensity	80	80
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153461
Converter make/model	CDN-101	Converter serial #	470

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.2	----
as found span	6500	46.0	75.0	74.2	1.011
SO2 scrubber check	5500	22.8	206.0	0.5	----
calibrator zero	6500	0.0	0.0	-0.2	----
high point	6500	46.0	75.0	75.0	1.001
second point	6500	24.6	40.1	39.7	1.012
third point	6500	12.3	20.1	19.7	1.018
as left zero	6000	0.0	0.0	0.0	----
as left span	6500	46.0	75.0	75.2	0.997
				Average Correction Factor	1.010

Corrected As found	74.4	Previous response	74.9	% change	0.7%

Notes:

Filter changed after as founds. Scrubber check completed after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat

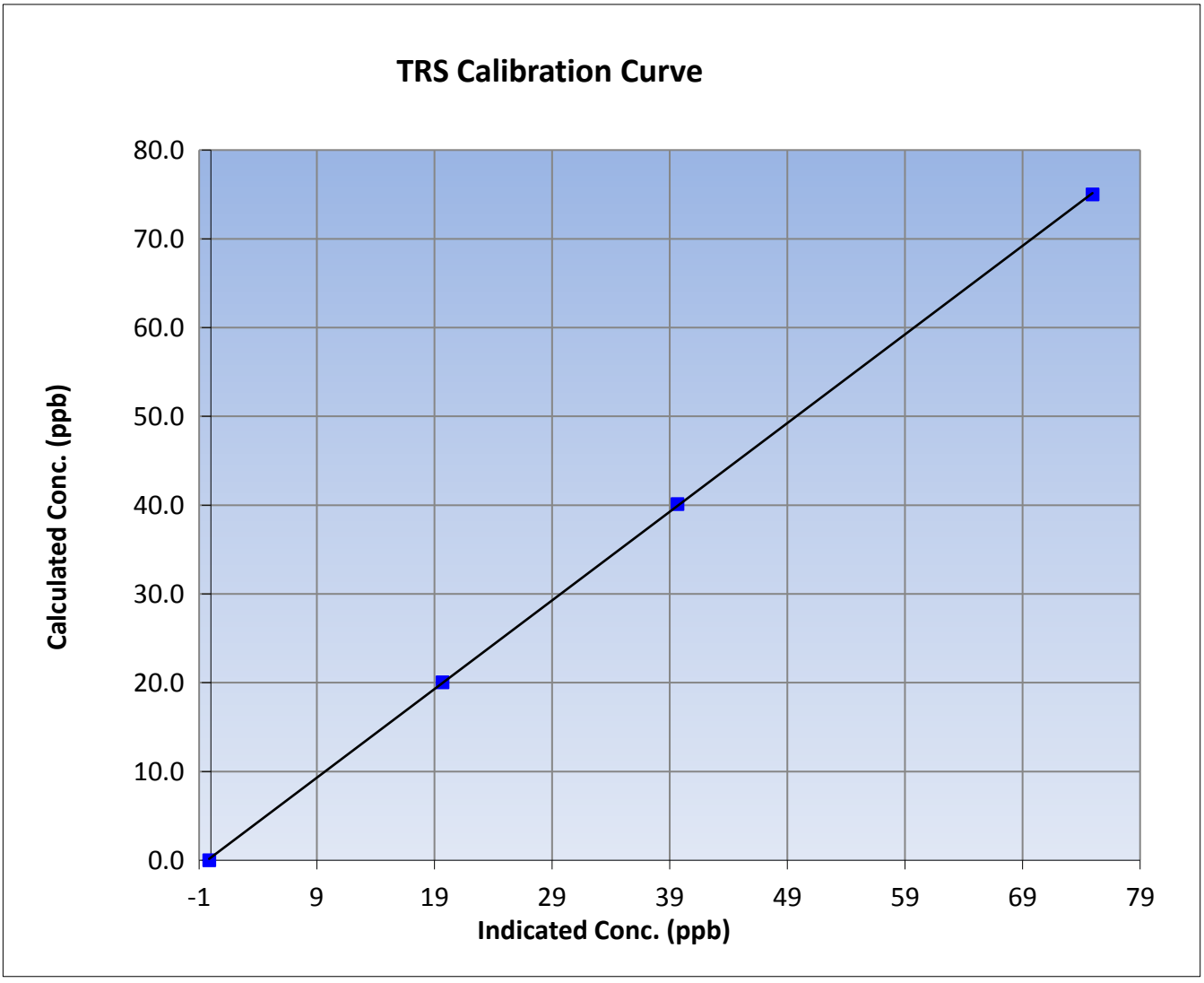
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

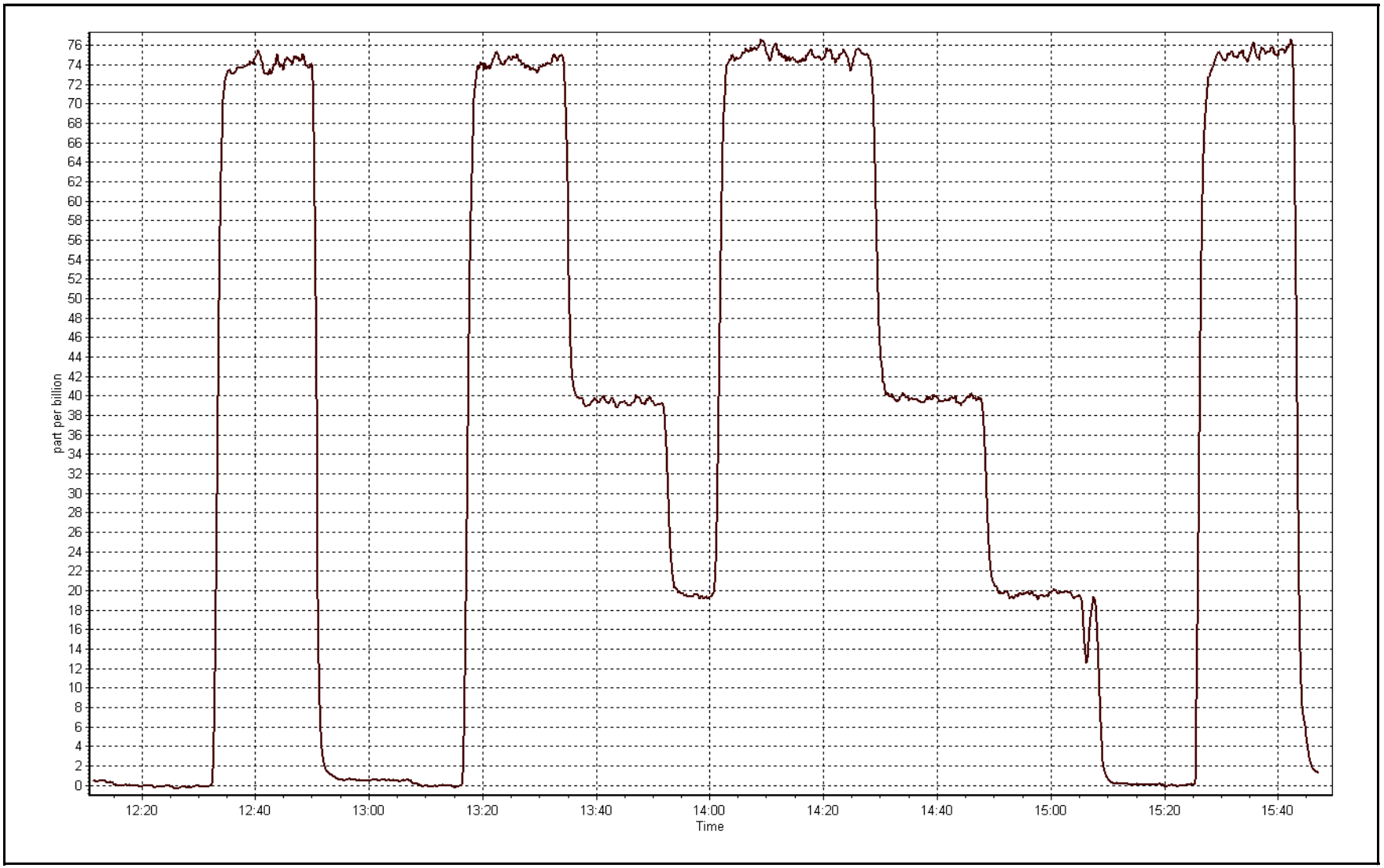
Calibration Date	January 25, 2016	Previous Calibration	December 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:13	End Time (MST)	15:48
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999970
75.0	75.0	1.0009		
40.1	39.7	1.0115	Slope	0.998535
20.1	19.7	1.0182		
			Intercept	0.306831



TRS Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

Station Information

Calibration Date	January 15, 2016	Last Calibration	December 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:35
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	515.0 ppm	CH4 Equiv Conc.	1065.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	*After*		*Before*	*After*
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.4
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.998948	0.998204	Carrier Pressure	37.3	37.3
THC Calc intercept	0.079388	0.083483	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.997804	0.998431	Air Pressure	35.0	35.0
NMHC Calc intercept	0.023186	0.020847			

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	15.67	1.005
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.75	1.000
second point	5500	45.6	8.83	8.68	1.017
third point	5500	22.8	4.41	4.28	1.033
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	15.74	15.74	1.000
				Average Correction Factor	1.017

Corrected As found	15.67	Previous response	15.68	% change	0.1%

Notes:

Sample inlet filter changed after as founds. N2 changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	8.13	8.12	1.001
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.14	0.999
second point	5500	45.6	4.56	4.52	1.009
third point	5500	22.8	2.28	2.25	1.013
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	8.13	8.13	1.000
				Average Correction Factor	1.007

Corrected As found	8.12	Previous response	8.12	% 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	7.54	1.010
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.61	1.000
second point	5500	45.6	4.27	4.16	1.026
third point	5500	22.8	2.13	2.04	1.049
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	7.61	7.61	1.000
				Average Correction Factor	1.025

Corrected As found	7.54	Previous response	7.56	% change	0.2%

Wood Buffalo Environmental Association

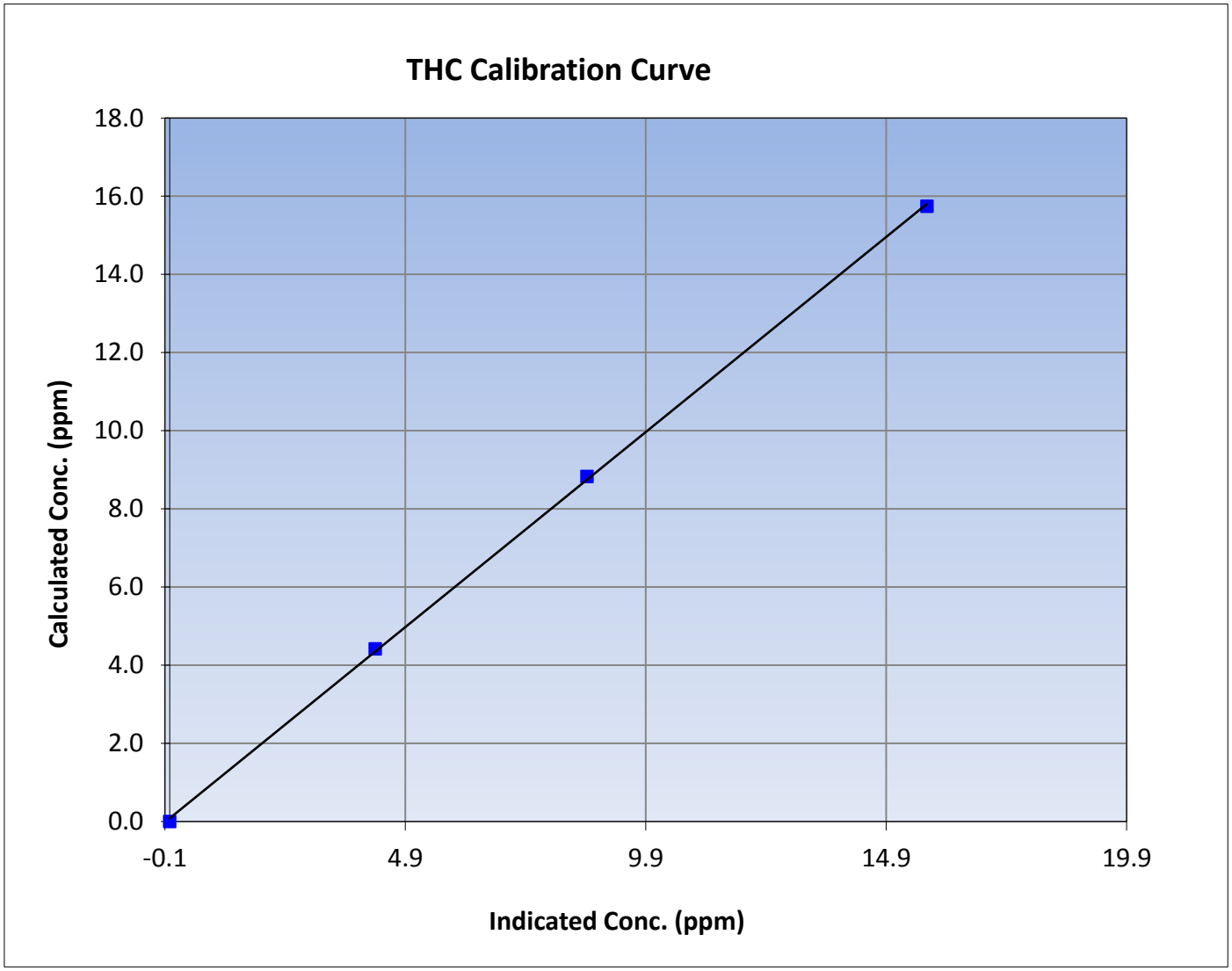
THC Calibration Summary

Station Information

Calibration Date	January 15, 2016	Previous Calibration	December 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	13:35
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	0.999839
15.74	15.75	0.9995		
8.83	8.68	1.0173	Slope	0.998204
4.41	4.28	1.0327		
			Intercept	0.083483



Wood Buffalo Environmental Association

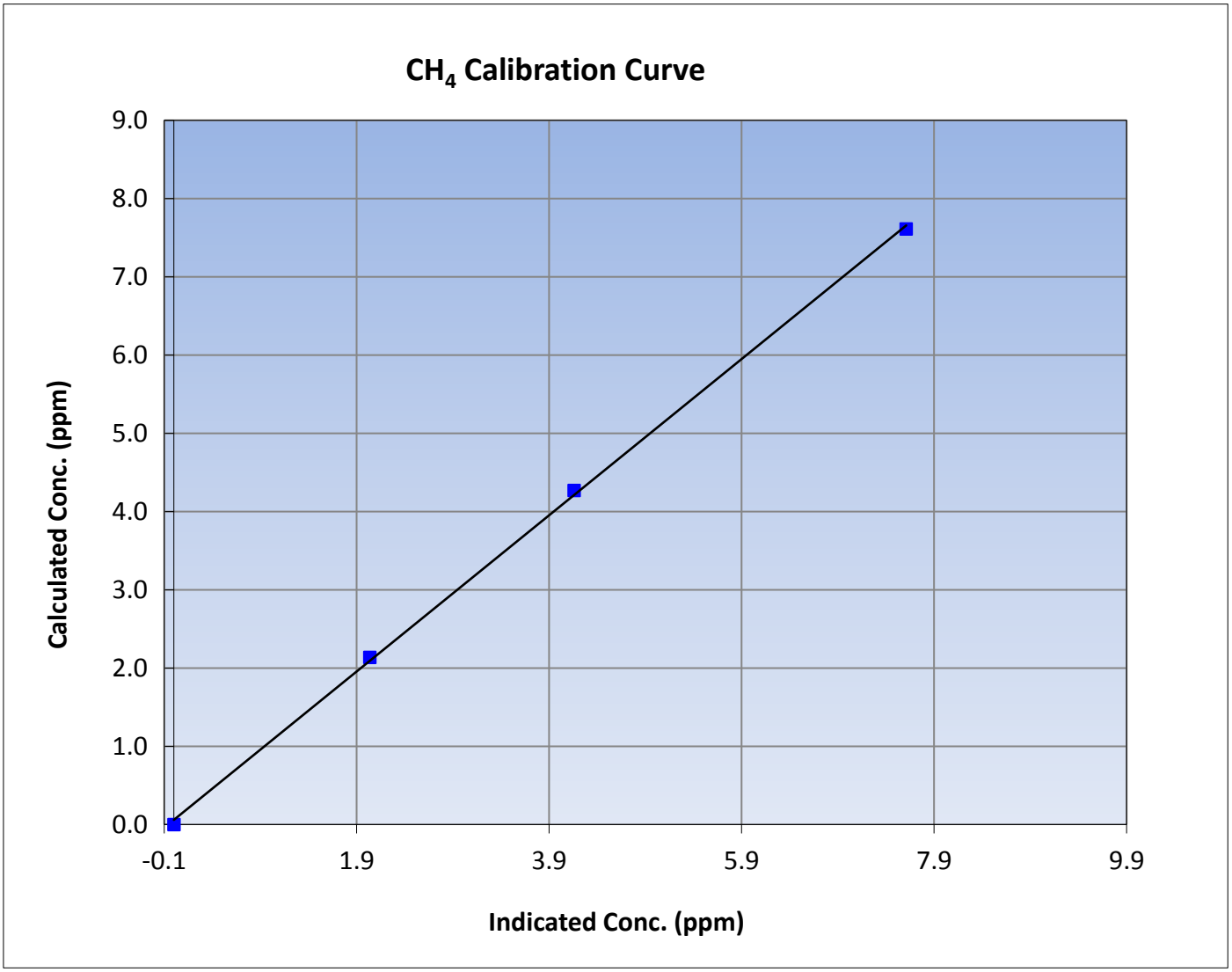
CH_4 Calibration Summary

Station Information

Calibration Date	January 15, 2016	Previous Calibration	December 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	13:35
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	0.999662
7.61	7.61	1.0003		
4.27	4.16	1.0264	Slope	0.998338
2.13	2.04	1.0491		
			Intercept	0.058826



Wood Buffalo Environmental Association

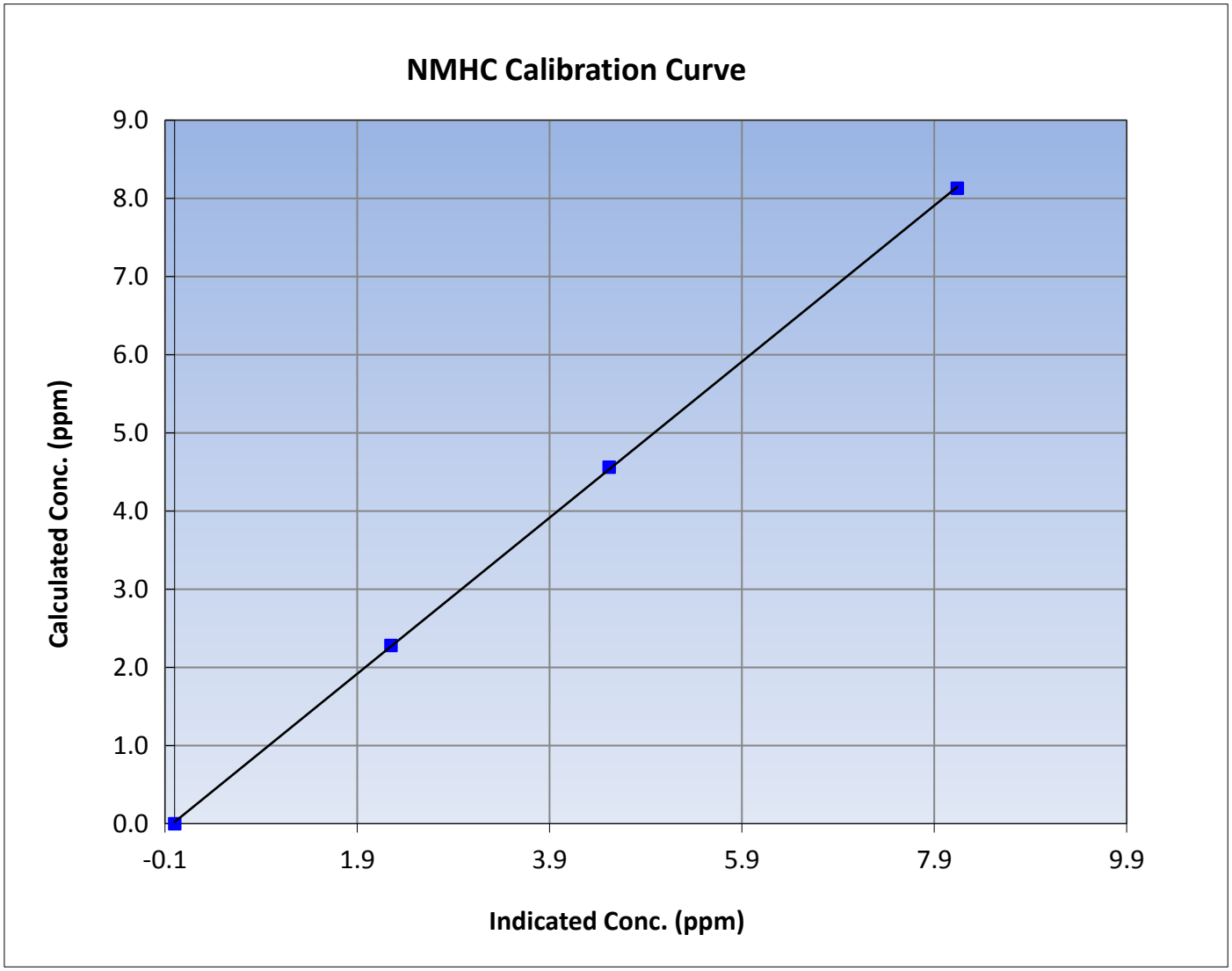
NMHC Calibration Summary

Station Information

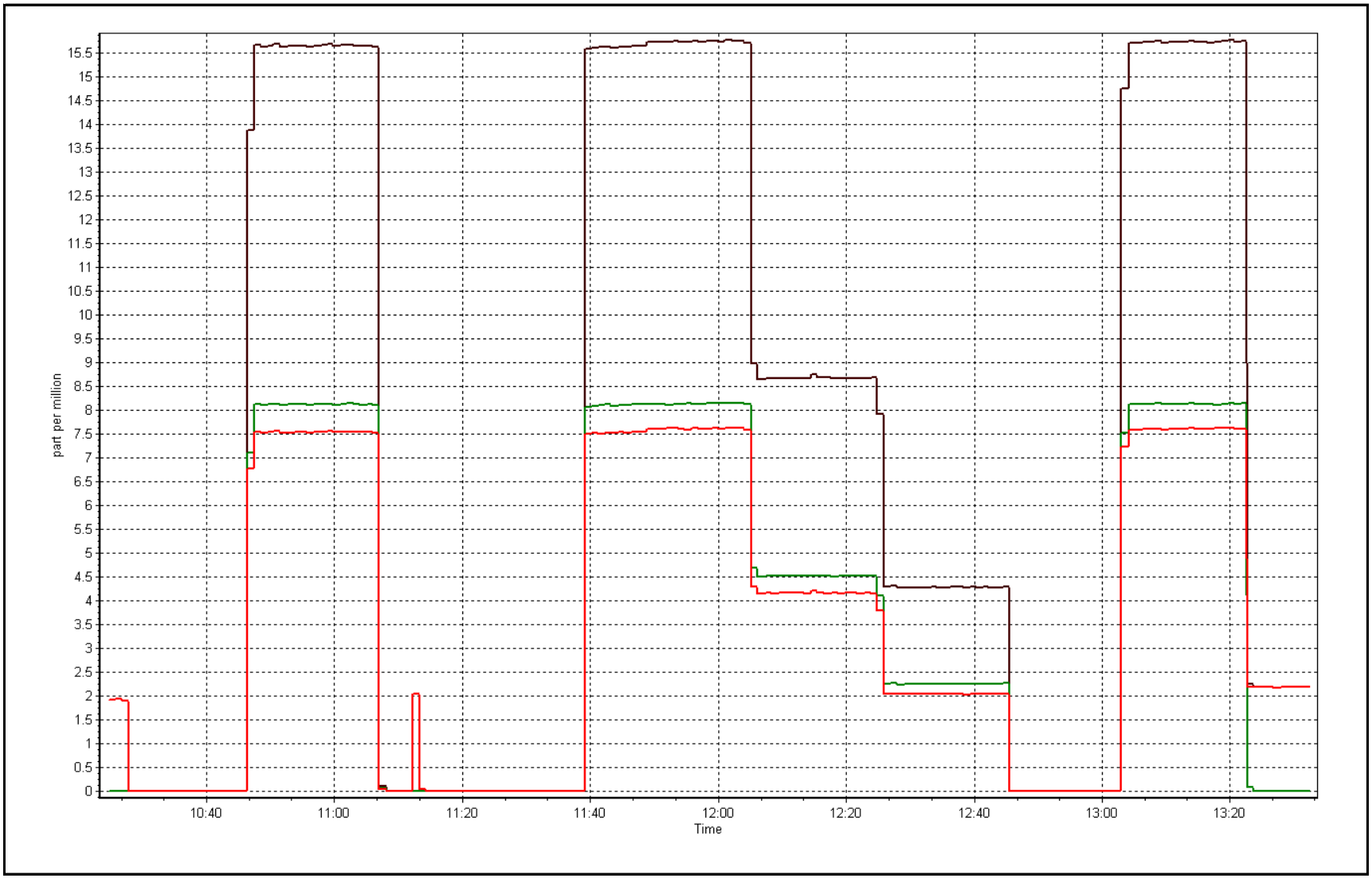
Calibration Date	January 15, 2016	Previous Calibration	December 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	13:35
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999955
8.13	8.14	0.9988		
4.56	4.52	1.0088	Slope	0.998431
2.28	2.25	1.0133		
			Intercept	0.020847



THC Calibration Plot Date: January 15, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 17, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	13:10
NO2 GPT Ref date	January-20-16	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.	28.1	28.6
Analyzer IP address	192.168.1.48		Lamp temp.	53.6	53.6
Calculated slope	1.001740	1.002286	Pressure	725.6	712.2
Calculated intercept	-0.193501	0.921726	Flow cell A	0.767	0.756
Analyzer Background	-2.5	-2.7	Flow cell B	0.769	0.759
Analyzer Coefficient	1.032	1.094	Cell A Intensity	73414	71867
			Cell B Intensity	69066	68064

Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	1.2	----
as found span	5000	0.98	456.2	428.7	1.064
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	0.98	456.2	454.4	1.004
second point	5000	0.56	239.9	239.4	1.002
third point	5000	0.34	129.0	125.5	1.028
as left zero	5500	0.00	0.0	1.4	----
as left span	5000	0.98	456.2	462.0	0.987
				Average Correction Factor	1.011

Corrected As found	427.5	Previous response	455.6	% change	6.6%

Notes:

Sample inlet filter replaced after as founds. As found span was 6.4% low. Span adjusted.

Calibration Performed By: Devin Russell

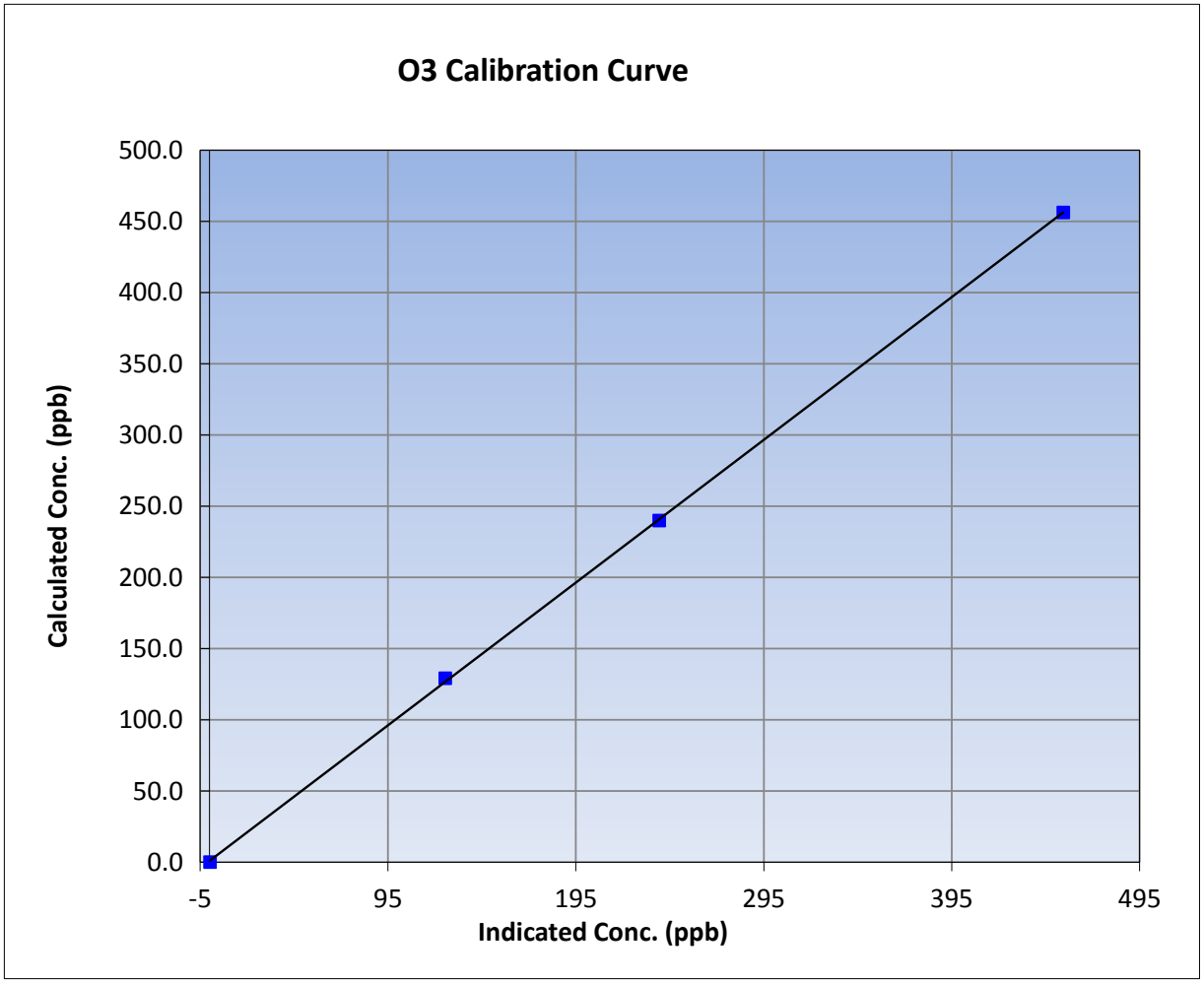
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

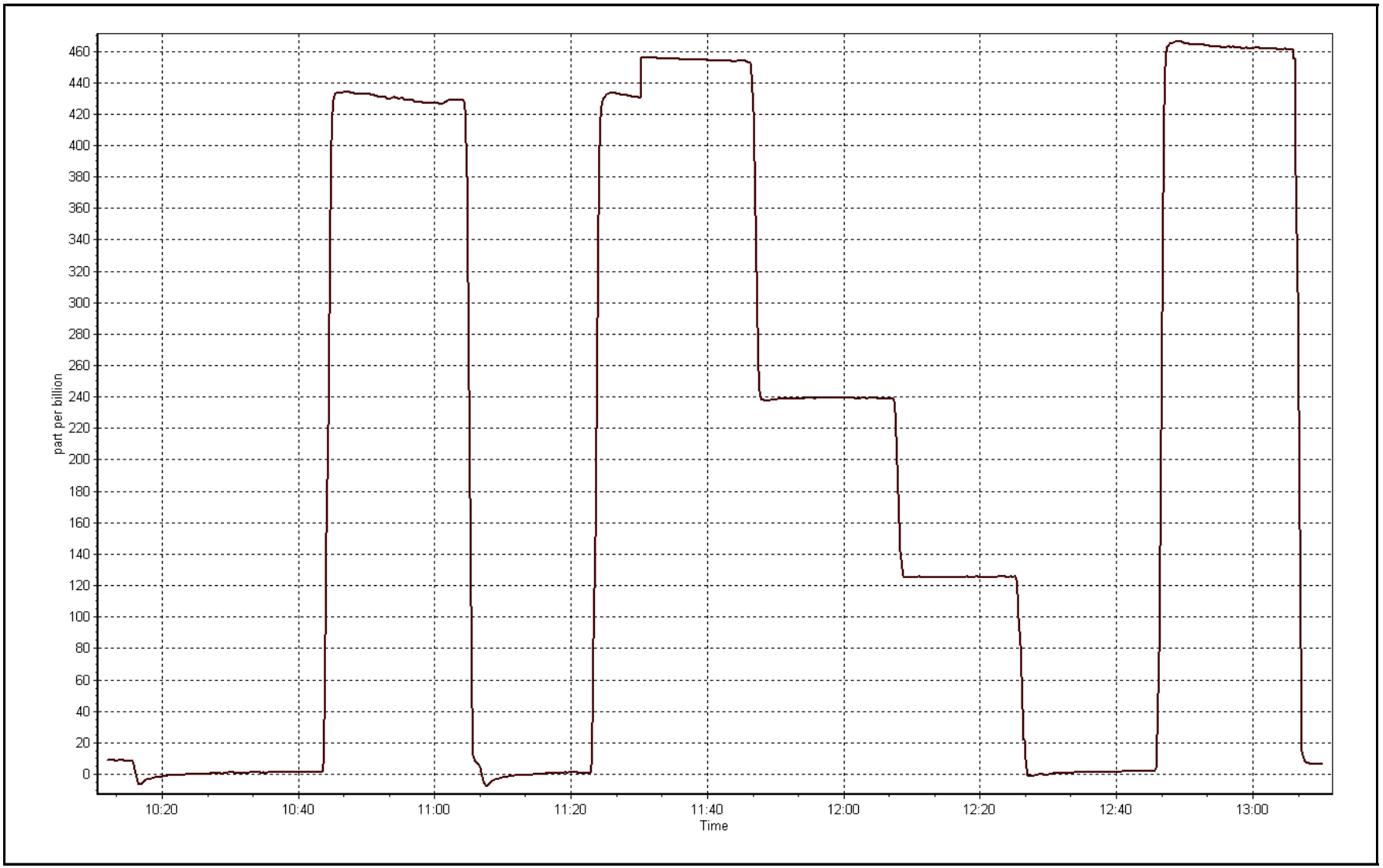
Calibration Date	January-22-16	Previous Calibration	December 17, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:10	End Time (MST)	13:10
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999931
456.2	454.4	1.0040		
239.9	239.4	1.0022	Slope	1.002286
129.0	125.5	1.0280		
			Intercept	0.921726



O3 Calibration Plot Date: January 22, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 7, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other: Repair		
Start Time (MST)	9:45	End Time (MST)	13:36
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL107945
NOx Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	09/08/2018
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

DACS Information

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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000024	0.999379	1.002860
	Data Offset	1.780278	2.049139	0.729530
Current Calibration	Data Slope	0.999012	0.998813	1.005396
	Data Offset	2.632056	2.720436	-0.735706

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.587		0.890	
NOX coefficient	0.999		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.7		5.8	
NOX bkgrnd	4.8		6.1	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	324.7	Deg C	324.7	Deg C
PMT voltage	-849.5	V	-816	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	153.6	mmHg	169.9	mmHg
R Cell Press Nox	153.6	mmHg	169.9	mmHg
NO sample flow	0.685	lpm	0.631	lpm
Nox sample Flow	0.685	lpm	0.631	lpm

Notes:

Maintenance performed the previous month resulted in a shift in flow / pressure conditions in instrument. PMT voltage was adjusted in order to return NO coefficient to a value within normal operational range. Noted a "bubble" effect on the GPT for the first point which stabilized after about 10 minutes. Effect was cause of calibrator and not related to instrument performance.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 7, 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	0.2	0.1	0.1	----	----
as found span	5500	81.4	750.4	750.4	0.0	669.1	668.8	0.3	1.121	1.122
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
high point	5500	81.4	750.4	750.4	0.0	750.0	750.1	0.1	1.000	1.000
second point	5500	45.6	420.3	420.3	0.0	416.5	416.4	0.1	1.009	1.009
third point	5500	22.8	210.2	210.2	0.0	205.5	205.4	0.1	1.023	1.023
as left zero	5500	0.0	0.0	0.0	0.0	-0.2	-0.3	0.1	----	----
as left span	5500	81.4	750.4	284.6	465.8	745.9	286.9	459.0	1.006	0.992
								Average Correction Factor	1.011	1.011

Corrcted As found NO_X= 668.9 NO= 668.7 Percent Change NO_X= 11.9% NO= 12.0%

Previous Response NO_X= 748.6 NO= 748.8

GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 81.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (400)	----	284.6	465.1	747.4	284.6	462.8	0.989	1.000	1.005	0.995
2nd NO2 (200)	----	512.8	236.9	749.9	512.8	237.1	0.986	1.000	0.999	1.001
3rd NO2 (100)	----	628.7	121.0	750.3	628.7	121.6	0.985	1.000	0.995	1.005
4th NO2 (0)	749.7	----	-0.1	749.6	749.7	-0.1	0.986	1.000	N/A	----
					Average Correction Factor		0.987	1.000	1.000	100.0%

Calibration Performed By: Zach Eastman

Wood Buffalo Environmental Association

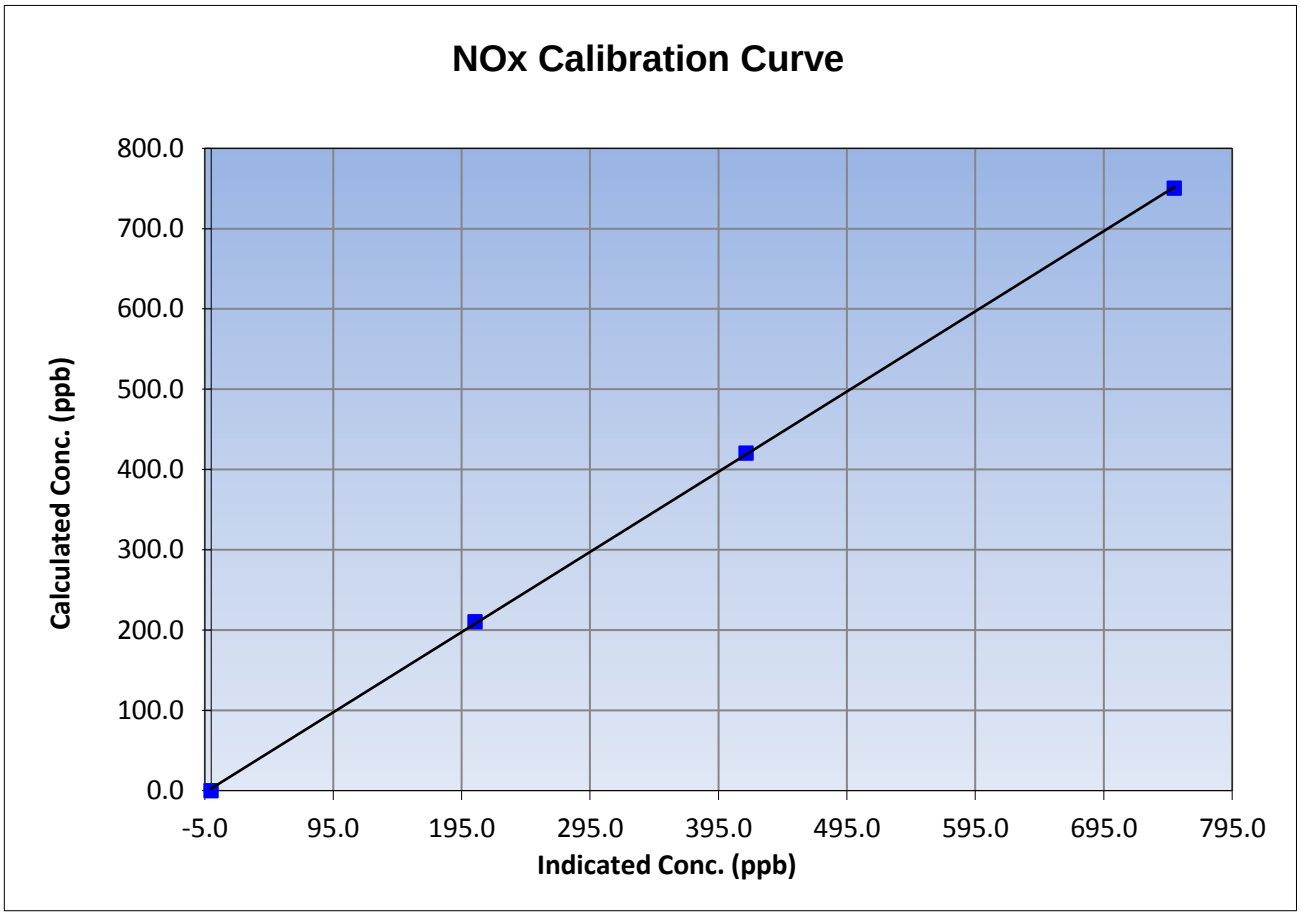
NO_X Calibration Summary

Station Information

Calibration Date	January 7, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:45	End Time (MST)	13:36
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	-0.3	----	Correlation Coefficient	0.999949
750.4	750.0	1.0005		
420.3	416.5	1.0093	Slope	0.999012
210.2	205.5	1.0227		
			Intercept	2.632056



Wood Buffalo Environmental Association

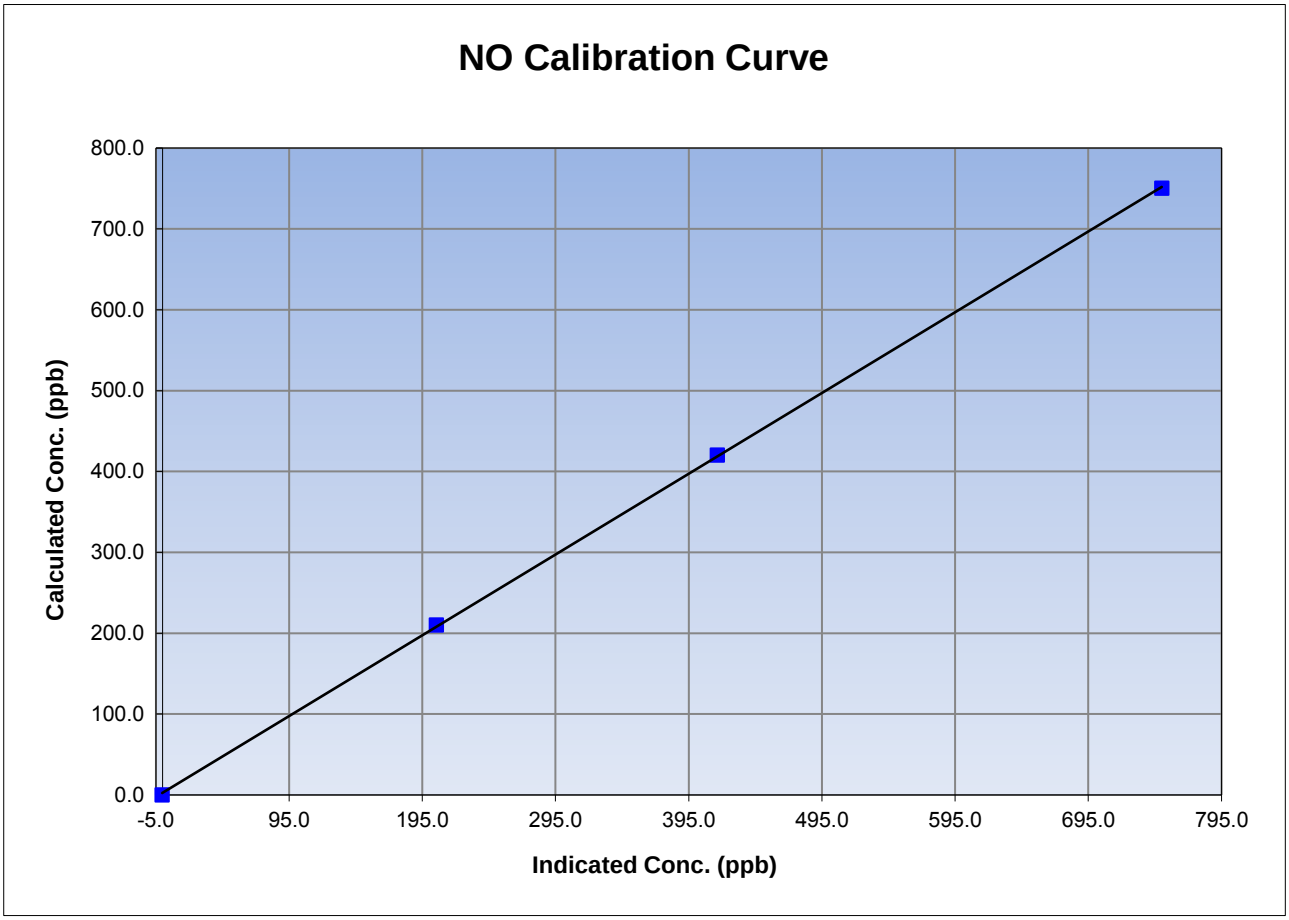
NO Calibration Summary

Station Information

Calibration Date	January 7, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:45	End Time (MST)	13:36
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	-0.3	N/A	Correlation Coefficient	0.999946
750.4	750.1	1.0003		
420.3	416.4	1.0094	Slope	0.998813
210.2	205.4	1.0232		
			Intercept	2.720436



Wood Buffalo Environmental Association

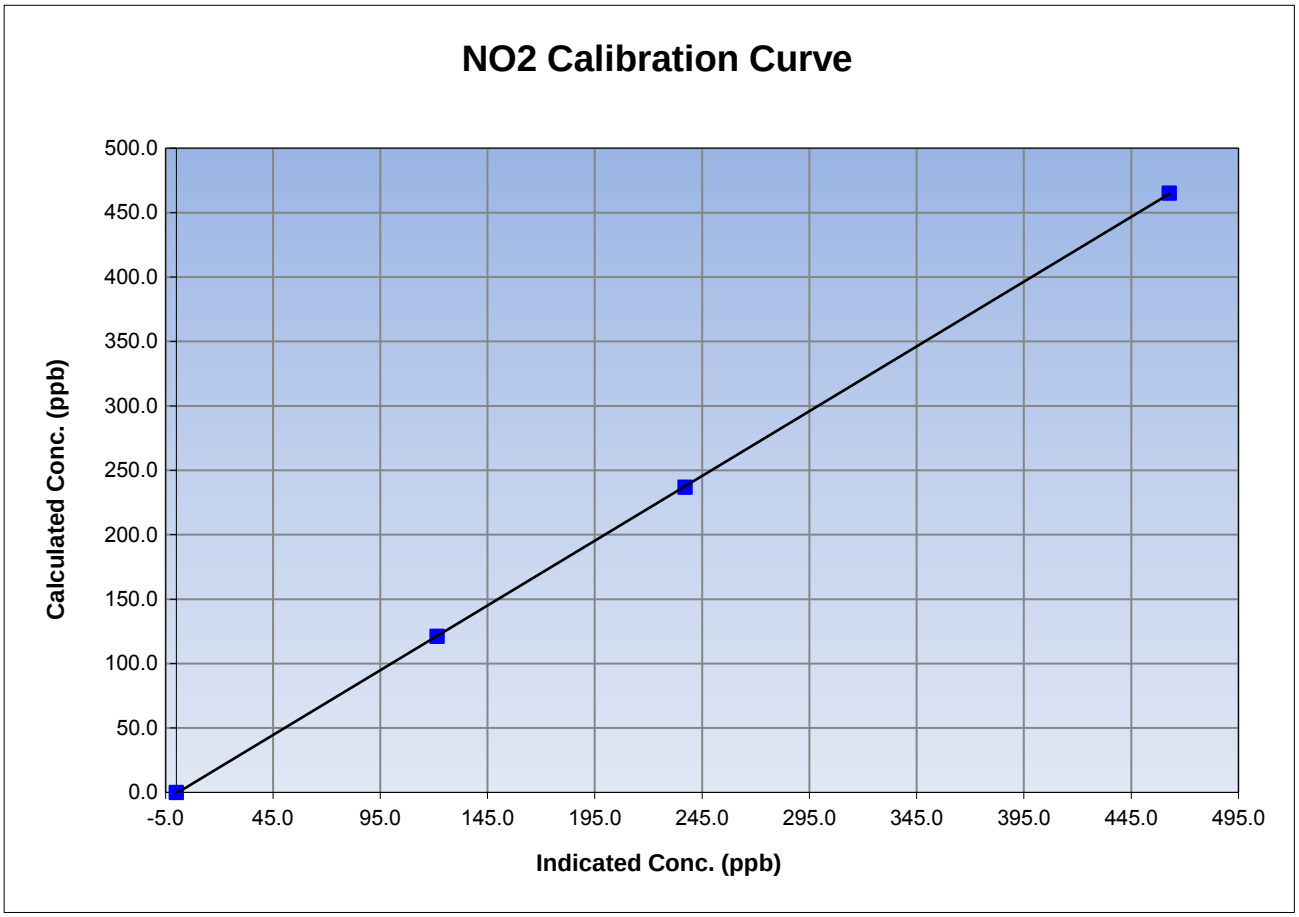
NO_2 Calibration Summary

Station Information

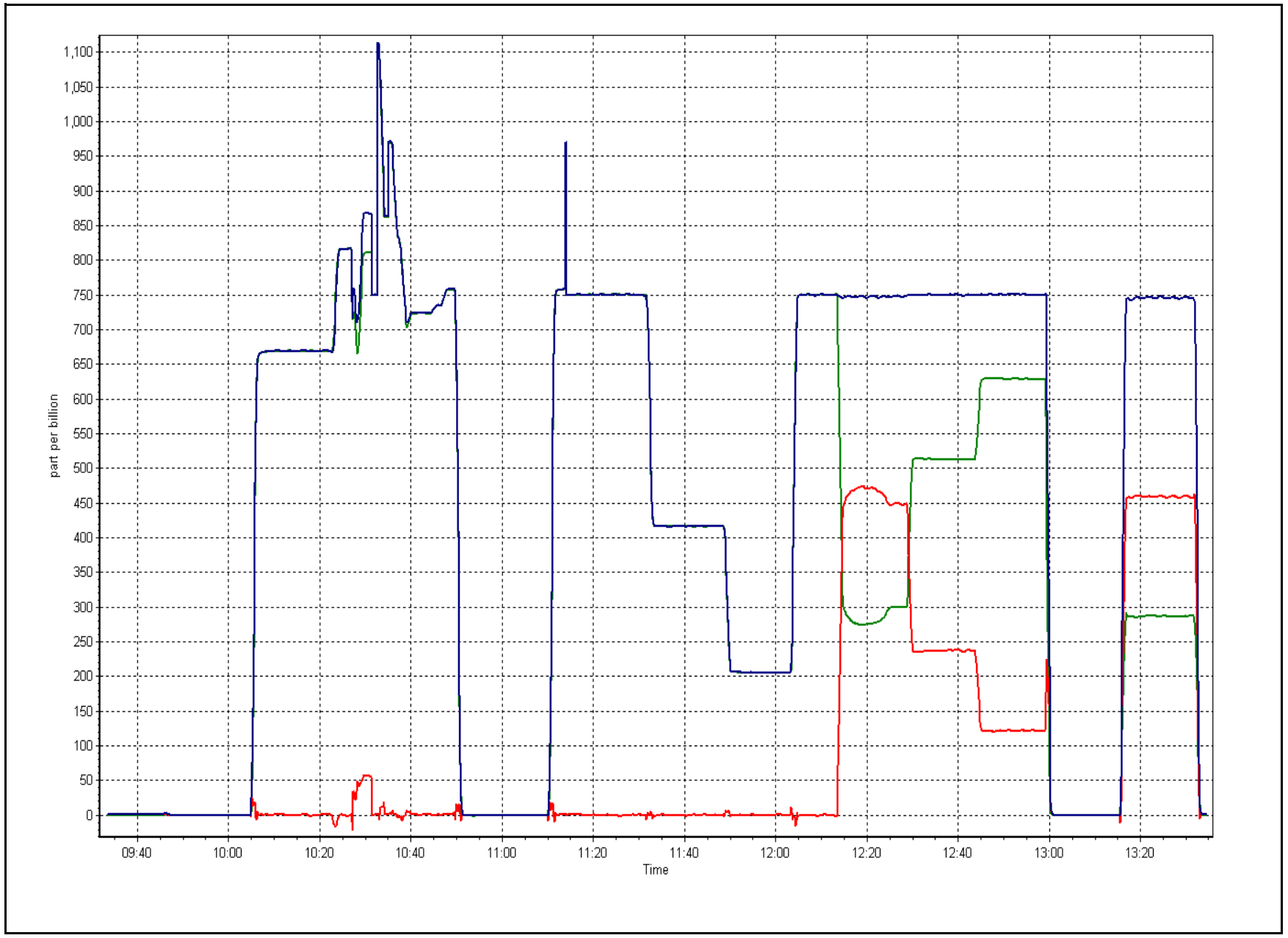
Calibration Date	January 7, 2016	Previous Calibration	December 16, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:45	End Time (MST)	13:36
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999985
465.1	462.8	1.0050		
236.9	237.1	0.9990	Slope	1.005396
121.0	121.6	0.9951		
			Intercept	-0.735706



NOX Calibration Plot Date: January 7, 2016



Wood Buffalo Environmental Association
N_t-NO_X-NH_3 Calibration Report

Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	January 20, 2016	NOX Previous Cal Date	December 16, 2015
NH3 Calibration Date	January 20, 2016	NH3 Previous Cal Date	December 16, 2015
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	17:15
		Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	14300410
NH3 Cal Gas Conc	192 ppm	NH3 Expiry Date / SN	3/Mar/2012 LL156612
NOx Cal Gas Conc	50.9 ppm	NO Expiry Date / SN	14/Jan/2016 3222140
NO Cal Gas Conc	50.7 ppm		

DACS Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.000149	0.987806	1.005290	1.002862	1.005711
	Data Offset	3.015158	0.673222	0.152261	0.752901	-4.205814
Cal Stats After	Data Slope	1.000028	0.987433	1.003122	1.000403	1.014353
	Data Offset	1.218514	-0.529194	2.238588	1.995034	-0.333712
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152
Converter	API 501 NH3	Converter serial #	147

Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOX Conc range	0-1000	ppb	1000	ppb
NO BKG	-0.3	ppb	-0.3	ppb
NOx BKG	-0.1	ppb	-0.1	ppb
Nt BKG	0.1		0.1	
NO coefficient	1.166		1.247	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.296		1.383	
NH3 coefficient	0.951		0.940	
Nt coefficient	1.307		1.390	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.3	Deg C	316.3	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	85.0	ccm
R Cell Press	5.3	mmHg	4.4	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	519.0	ccm	560.0	ccm
Sample Flow 2 Nox	519.0	ccm	560.0	ccm
Sample Flow 3 Nt	519.0	ccm	560.0	ccm

Notes:

Pump and charcoal scrubber changed after as founds. Slight drift throughout calibration. Most likely due to pump settling in. Nox span adjusted. NH3 span adjusted.

Wood Buffalo Environmental Association

$Nt\text{-}NO_x\text{-}NH_3$ Calibration Report

Station Information

Calibration Date: January 20, 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 NH3 conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH3 conc (ppb)	Nt Correction factor	NH3 Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.2	0.5	-0.3	----	----
as found NO	5500	81.3	752.4	752.4	----	802.0	796.9	5.1	0.938	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.9	0.8	0.1	----	----
high NO point	5500	81.3	752.4	752.4	----	750.5	751.2	-0.7	1.003	----
NO/O3 point	5500	81.3	752.4	752.4	----	748.8	748.9	-0.1	1.005	----
as found NH3	6500	67.7	1999.8	NA	1999.8	1989.9	26.0	1963.7	1.005	1.018
first NH3	6500	67.7	1999.8	NA	1999.8	2024.6	26.2	1998.4	0.988	1.001
second NH3	6500	33.9	1001.4	NA	1001.4	1018.5	16.8	1001.6	0.983	1.000
third NH3	6500	17.0	502.2	NA	502.2	506.1	7.8	498.2	0.992	1.008
								Average Correction Factor	1.0037	1.0028

NH3 Corrected As Found	NH3 =	1964.0 ppb	Previous Response	NH3 =	1996.4 ppb	NH3 percent change	1.7%
Nt Corrected As Found	Nt =	801.9 ppb	Previous Response	Nt =	761.0 ppb	Nt percent change	-5.1%
NOx Corrected As Found	NOx =	796.4 ppb	Previous Response	NOx =	748.3 ppb	NOx percent change	-6.0%

Wood Buffalo Environmental Association

$NO_X(NH_3)$ Calibration Report

Station Information

Calibration Date: January 20, 2016 Station Number: AMS 1

NOX / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.5	0.9	0.2	----	----
as found span	5500	81.4	753.3	750.4	753.3	796.9	798.7	802.0	0.9453	0.9395
calibrator zero	5500	0.0	0.0	0.0	0.0	0.8	1.1	0.9	----	----
high point	5500	81.4	753.3	750.4	753.3	751.2	750.3	750.5	1.0029	1.0001
second point	5500	45.6	422.0	420.3	422.0	415.1	415.5	416.0	1.0166	1.0117
third point	5500	22.8	211.0	210.2	211.0	206.1	205.6	205.4	1.0240	1.0225
as left zero	5500	0.0	0.0	0.0	0.0	0.9	0.9	1.0	----	----
as left span	5500	81.4	753.3	289.3	753.3	738.4	282.4	738.9	1.0202	1.0245
								Average Correction Factor	1.0145	1.0115

	Nt	NOX	NO	NO2
Corrected As found	801.9	796.4	797.8	448.4
Previous Response	761.9	749.2	747.5	457.8
Percent Change	-5.0%	-5.9%	-6.3%	2.1%

GPT Calibration Data

Total Flow 5500 ccm Source Gas Flow 81.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			3.4			----	
1st NO2 (300)	----	289.3	456.2	741.2	289.3	451.8	1.0164	1.0000	1.0097	99.0%
2nd NO2 (200)	----	505.6	239.9	740.6	505.6	235.1	1.0171	1.0000	1.0207	98.0%
3rd NO2 (100)	----	616.5	129.0	741.0	616.5	124.5	1.0167	1.0000	1.0364	96.5%
4th NO2 (0)	745.5	----	3.4	748.9	745.5	3.4	1.0059	1.0000	----	----
					Average Correction Factor		1.0140	1.0000	1.0223	97.8%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

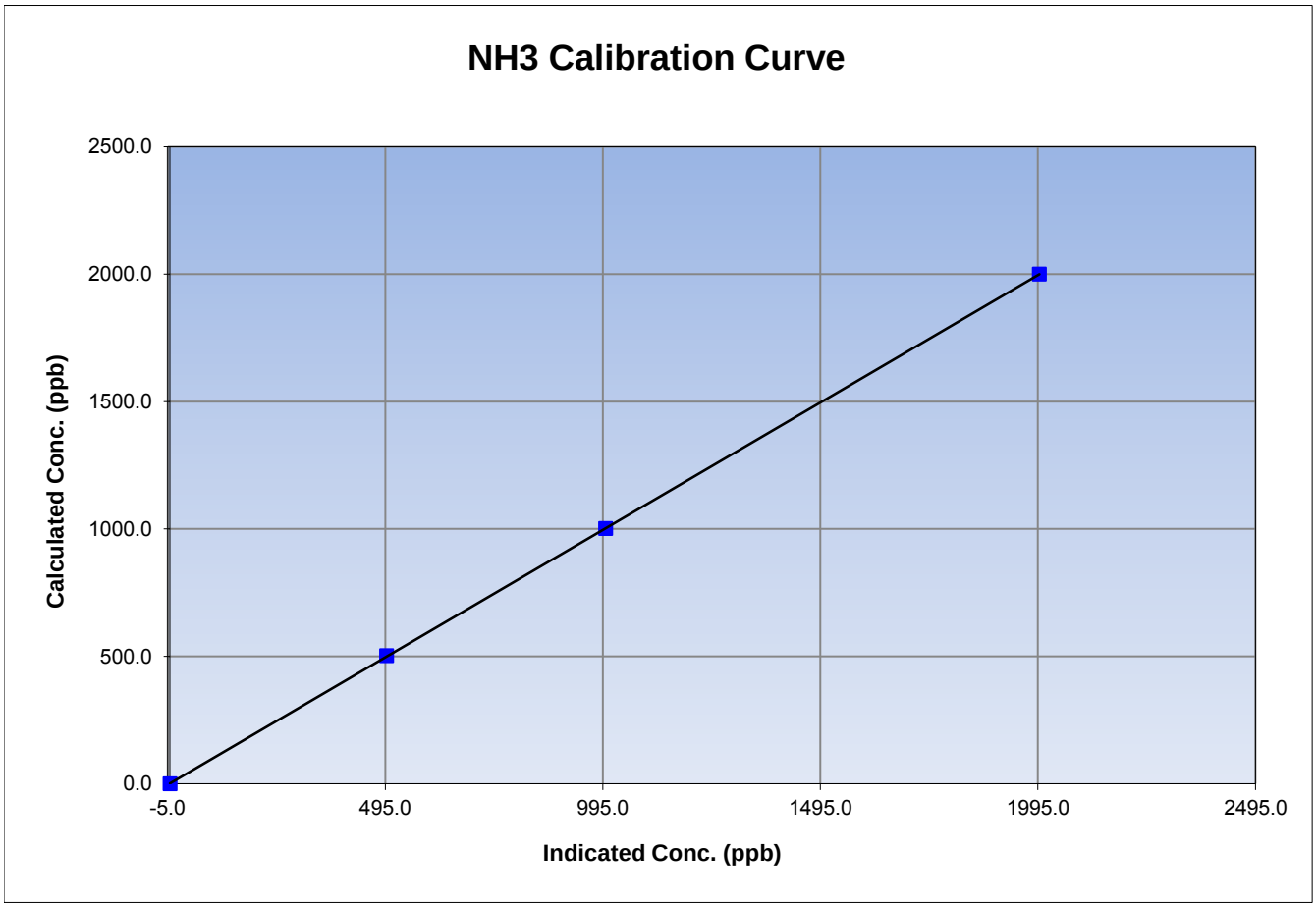
NH3 Calibration Summary

Station Information

Calibration Date	January 20, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	17:15
Analyzer make	API T201	Analyzer serial #	152

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999995
1999.8	1998.4	1.0007		
1001.4	1001.6	0.9998	Slope	1.000028
502.2	498.2	1.0079		
			Intercept	1.218514



Wood Buffalo Environmental Association

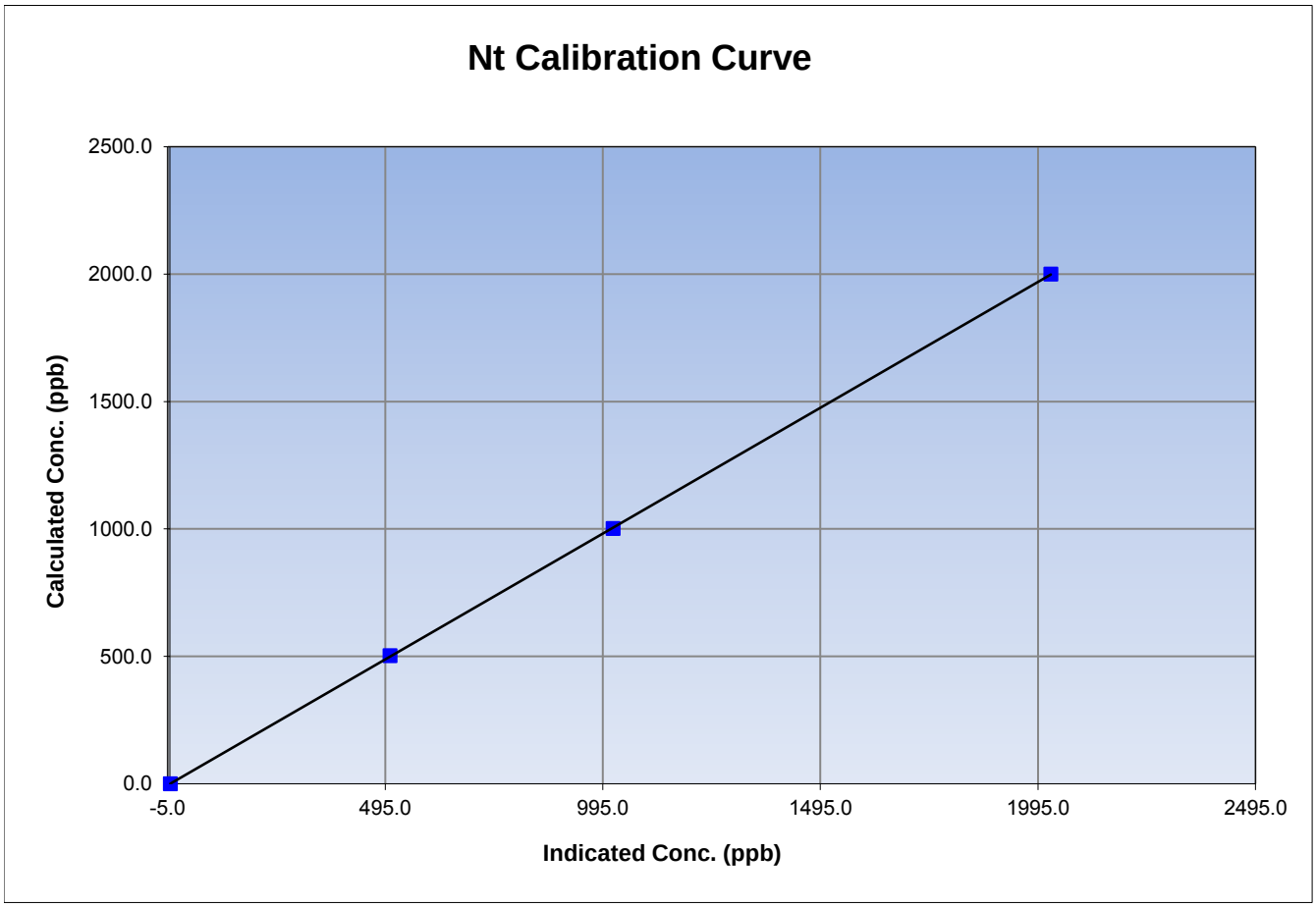
Nt Calibration Summary

Station Information

Calibration Date	January 20, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	17:15
Analyzer make	API T201	Analyzer serial #	152

Nt (NH_3) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	----	Correlation Coefficient	0.999989
1999.8	2024.6	0.9877		
1001.4	1018.5	0.9832	Slope	0.987433
502.2	506.1	0.9922		
			Intercept	-0.529194



Wood Buffalo Environmental Association

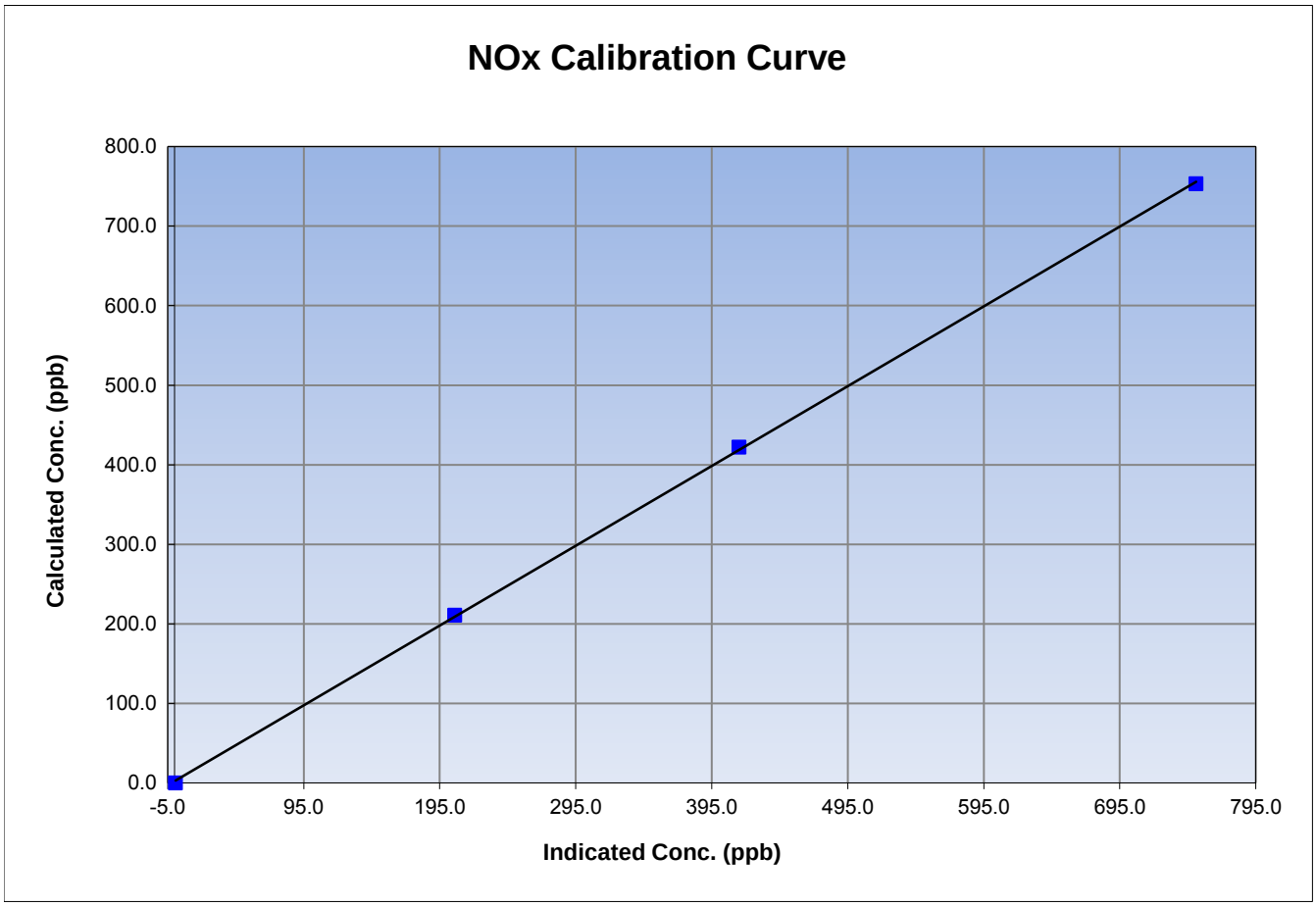
NOx Calibration Summary

Station Information

Calibration Date	January 20, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	17:15
Analyzer make	API T201	Analyzer serial #	152

NO_X Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	----	Correlation Coefficient	0.999901
753.3	751.2	1.0029		
422.0	415.1	1.0166	Slope	1.003122
211.0	206.1	1.0240		
			Intercept	2.238588



Wood Buffalo Environmental Association

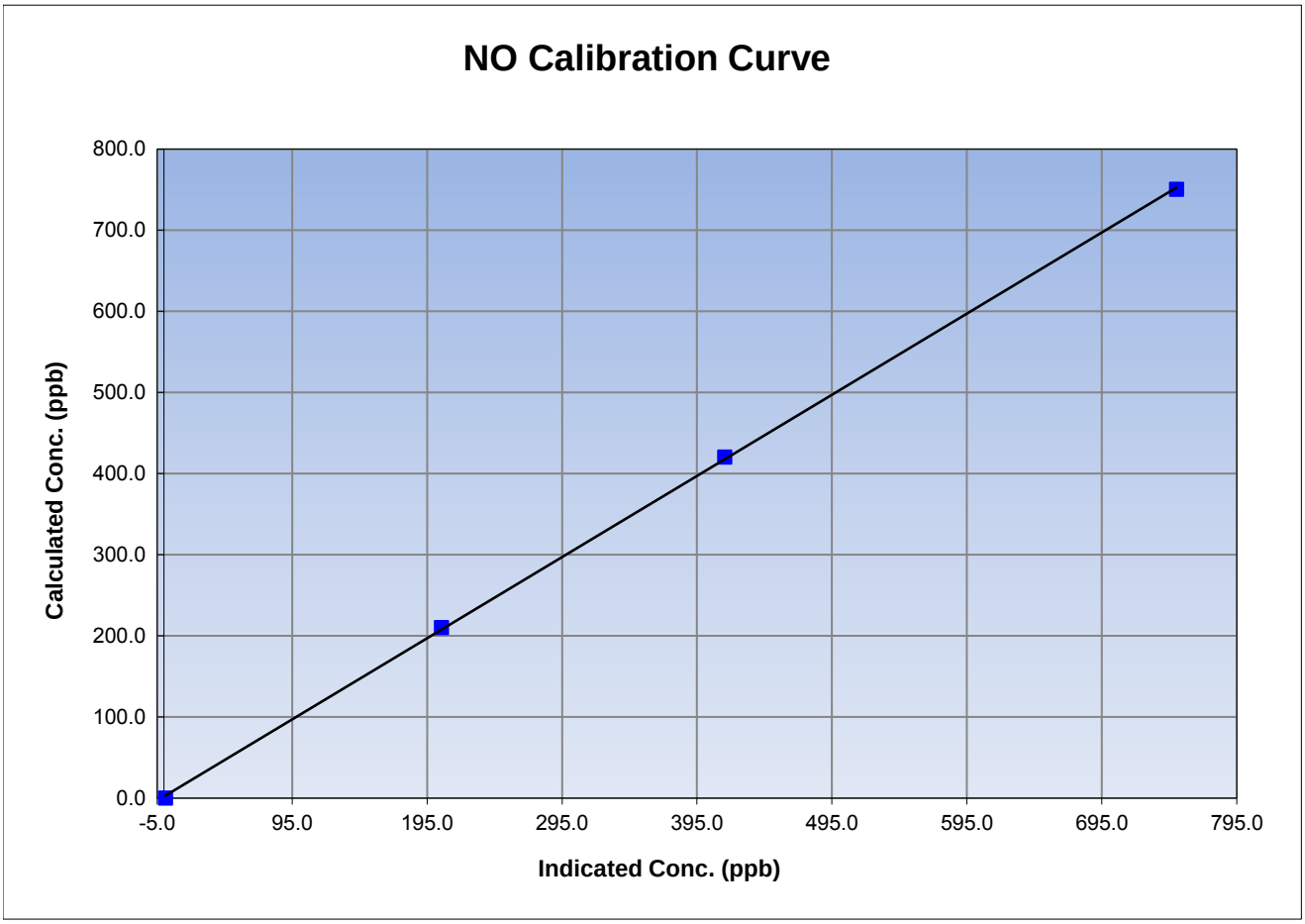
NO Calibration Summary

Station Information

Calibration Date	January 20, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	17:15
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.1	----	Correlation Coefficient	0.999909
750.4	750.3	1.0001		
420.3	415.5	1.0117	Slope	1.000403
210.2	205.6	1.0225		
			Intercept	1.995034



Wood Buffalo Environmental Association

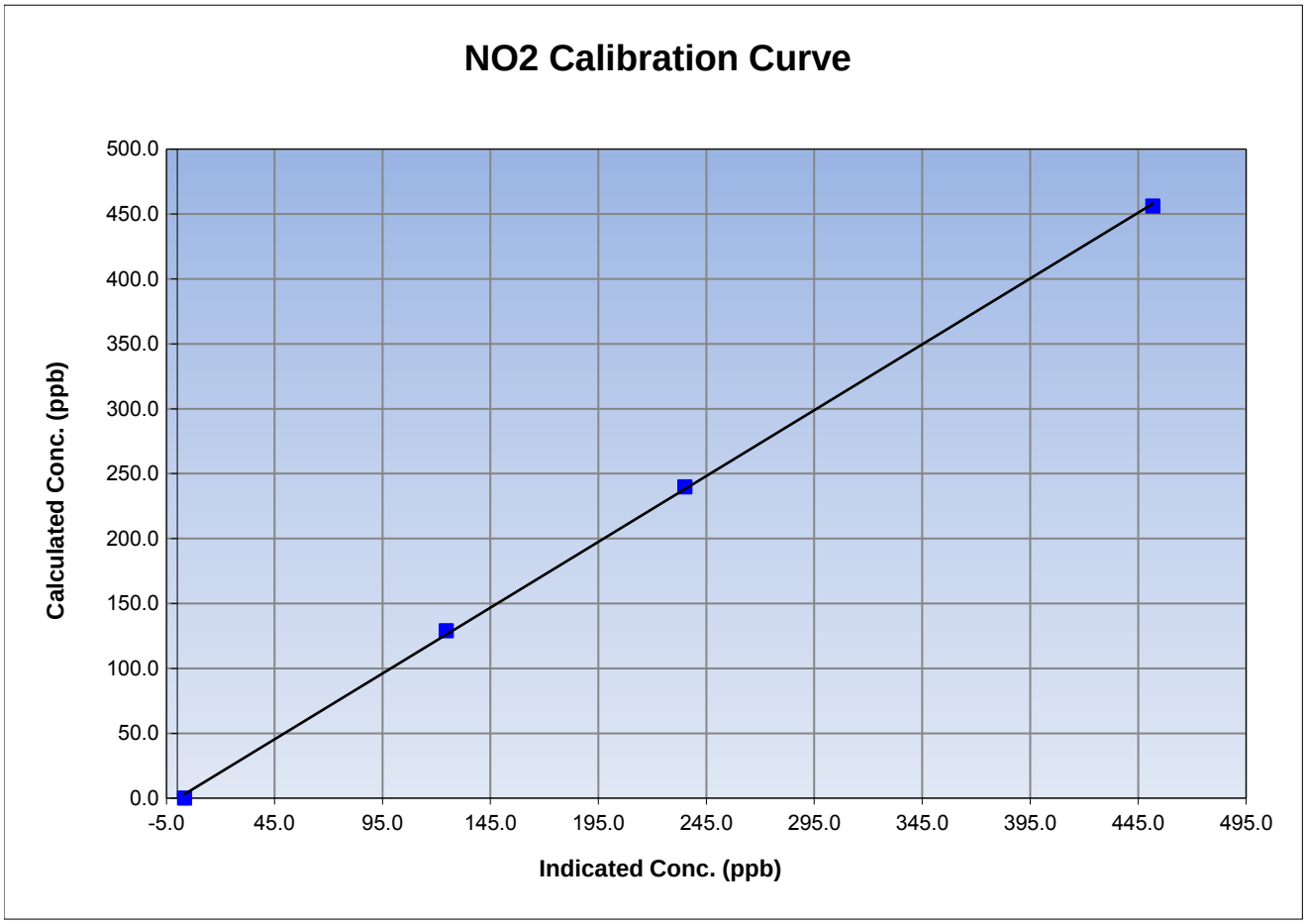
NO_2 Calibration Summary

Station Information

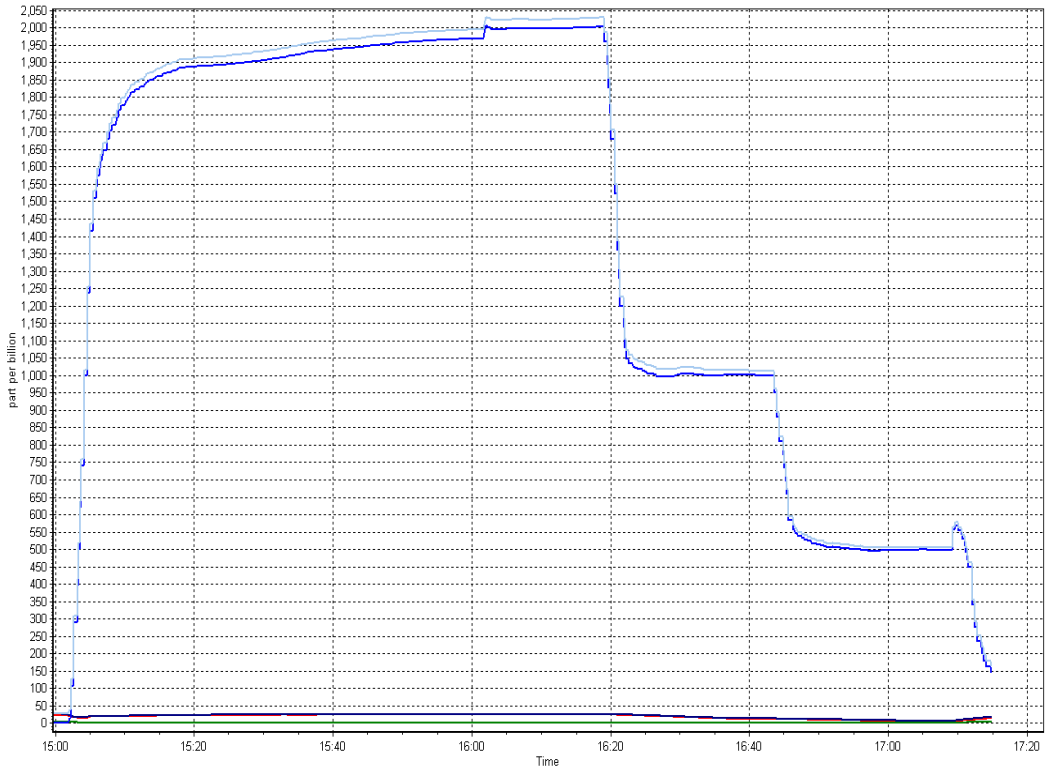
Calibration Date	January 20, 2016	Previous Calibration	December 16, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	17:15
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

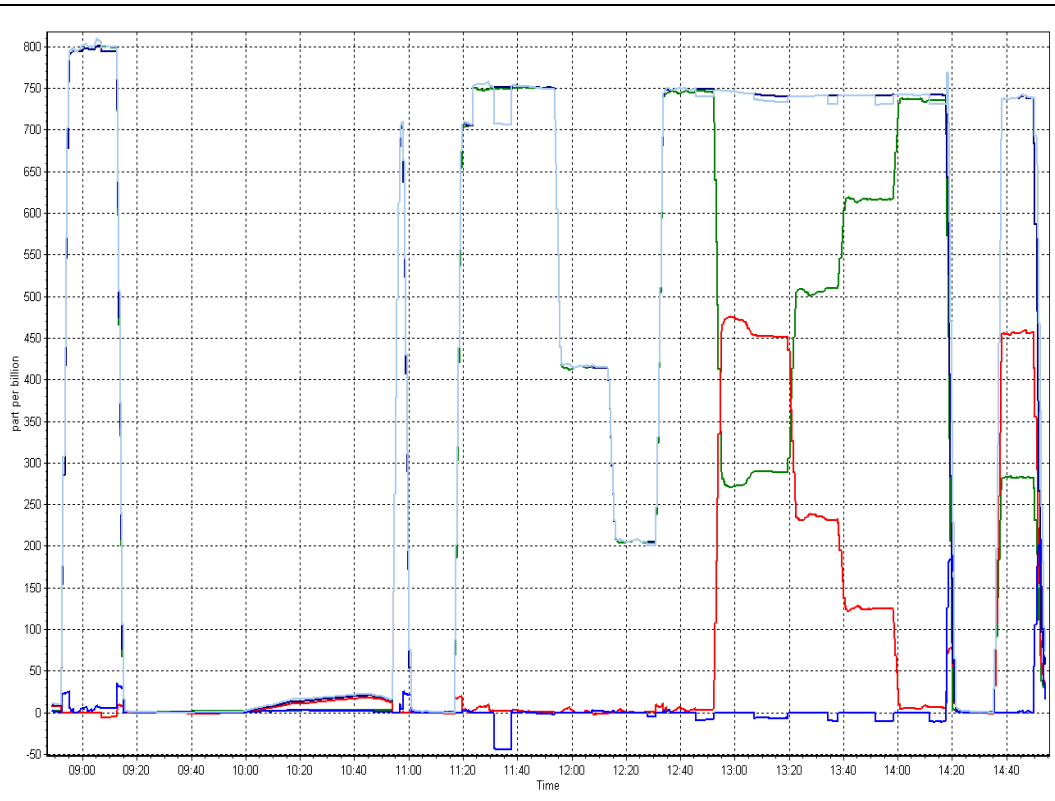
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	3.4	----	Correlation Coefficient	0.999771
456.2	451.8	1.0097		
239.9	235.1	1.0207	Slope	1.014353
129.0	124.5	1.0364		
			Intercept	-0.333712



NH_3 Calibration Plot Date: January 20, 2016



NOX Calibration Plot Date: January 20, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 15, 2016	Previous Calibration:	December 14, 2015
Station Name:	Bertha Ganter - Fort McKay	Station Number:	AMS 1
Start Time (MST):	12:46	End Time (MST):	14:16
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 ☑	No ☐									
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑			

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-18.0	-18.5	-0.5	-18.0
T2	19.0	na	na	
T3	22.0	na	na	
T4	16.0	na	na	
RH (%)	5.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	992	985.5	-6.5	992

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1008	8	1008	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	222		219
Neph	0.6		-0.1
C14	28		25.2
Indicated Concentration (ug/m3)	**0.5**	**yes**	**0**
Offset 1	220.2		219.1
Offset 2	34.5		34.2

Leak Check (Quarterly)

Leak Check Date: | Previous Leak Check Date: April 20, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):		0.00
*Flow with adaptor (LPM):		

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

Mass Foil Calibration (Annualy)

Foil Calibration Date: | Previous Foil Calibration:

Zeroed?:

Foil Mass: | **Mass foil set S/N:**

Previous Correction Factor:

New Correction Factor:

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good/cleaned	14/12/2015
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Status showing error 02 "analog out range 2". Reset analyzer, cleared error. Cyclone head cleaned full of black residue; looked like soot. Cleaned thoroughly. Nephalometer zero adjusted.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 2
MILDRED LAKE
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
JANUARY 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	598	26	26	100.00	39	0	12	0
H2S (ppb) Average	598	26	26	100.00	10	0	3	0
THC (ppm) Average	598	26	26	100.00	5.8	-	3.4	-
Temperature (C) Average	624	0	0	100.00	5.7	-	3.1	-
Relative Humidity (%) Average	624	0	0	100.00	98	-	92	-
Wind Speed 10 m (km/h) Average	622	0	2	99.68	23	-	12	-
Wind Direction 10 m (deg) Average	622	0	2	99.68	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	598	2.1	4	-	0	0	0	0	2	6	39
H2S (ppb) Average	598	0.5	1	-	0	0	0	0	1	1	10
THC (ppm) Average	598	2.6	0.5	-	2.1	2.2	2.3	2.4	2.8	3.3	5.8
Temperature 2 m (C) Average	624	-13.45	8.3	-	-32.2	-22.4	-18.8	-14.3	-8.8	-1.6	5.7
Relative Humidity (%) Average	624	83	7	-	54	75	79	83	87	92	98
Wind Speed 10 m (km/h) Average	622	6.8	4	-	0	3	4	6	8	12	23
Wind Direction 10 m (deg) Average	622	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	13 Jan 2016 05:00	13 Jan 2016 05:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	19 Jan 2016 04:00	19 Jan 2016 04:00	1	Flat line in sensor output signal - Sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 39 ppb on Jan 26 06:00 Maximum Daily Average: 12.2 ppb on Jan 26

Minimum Value: 0 ppb on Jan 1 03:00 Minimum Daily Average: 0.0 ppb on Jan 14

Maximum Diurnal Average: 4.5 ppb at hour 19 Minimum Diurnal Average: 1.2 ppb at hour 4

Monthly Average: 2.2 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 2$ $P_{90} = 7$ $P_{99} = 24$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	2	1	0	1	0	0	0	3	14	28	25	5	6	21	16	22	1	1	1	1	1	6.5	28
2-Jan	0	Z	0	0	0	0	0	1	0	0	0	0	2	9	7	4	1	2	34	7	4	1	0	0	3.2	34
3-Jan	1	0	Z	0	0	0	0	0	1	0	1	0	1	0	1	1	1	0	0	2	1	2	1	0	0.7	2
4-Jan	0	0	0	Z	1	1	1	4	1	1	2	1	2	6	9	4	5	3	1	2	1	0	0	0	1.9	9
5-Jan	0	1	3	0	Z	0	0	0	0	0	C	C	C	C	11	11	5	2	1	1	1	1	1	1	2.1	11
6-Jan	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0.4	1
8-Jan	0	Z	0	1	3	5	4	2	1	1	1	2	5	3	19	5	3	1	1	1	0	0	1	2	2.6	19
9-Jan	1	0	Z	2	0	0	0	0	0	0	0	3	0	0	2	1	0	0	1	2	2	3	1	0	0.9	3
10-Jan	1	2	0	Z	2	4	1	0	2	3	2	2	1	1	1	1	1	0	0	0	0	0	0	0	1.1	4
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Jan	Z	2	7	3	8	2	9	1	6	3	1	1	0	2	3	0	0	1	1	1	0	1	0	0	2.3	9
13-Jan	0	Z	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Jan	0	0	0	0	Z	1	0	1	4	1	1	1	4	5	4	17	8	7	3	7	3	1	2	5	3.3	17
17-Jan	1	1	5	0	0	Z	0	0	14	3	1	9	7	3	1	9	6	3	8	5	4	6	10	13	4.7	14
18-Jan	Z	7	21	9	10	9	9	4	1	1	0	2	1	1	1	3	2	1	2	1	0	0	0	0	3.6	21
19-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	3	6	2	20	14	4	3	4	2	0	2.7	20
21-Jan	0	0	0	Z	1	1	0	0	0	1	8	1	5	1	8	5	22	30	19	14	18	8	4	1	6.4	30
22-Jan	1	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0.7	1
23-Jan	1	1	1	1	1	Z	0	0	0	0	1	0	0	1	1	0	0	1	1	1	1	1	0	2	0.6	2
24-Jan	Z	0	0	0	0	0	1	2	8	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	1.0	8
25-Jan	0	Z	0	0	0	5	3	0	0	0	0	0	0	7	0	0	0	0	6	0	0	0	0	0	1.0	7
26-Jan	0	0	Z	2	12	39	12	17	28	16	6	15	11	10	17	9	5	4	12	4	4	20	19	18	12.2	39
27-Jan	21	34	15	Z	1	4	7	1	2	2	5	1	0	0	0	0	0	0	0	0	0	0	2	1	4.2	34
28-Jan	2	1	4	5	Z	1	0	0	0	1	1	1	1	1	0	0	0	0	1	3	2	3	4	10	1.9	10
29-Jan	8	9	3	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	8	7	3	3	0	0	2.0	9
30-Jan	Z	0	0	0	1	10	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	10
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
	1.6	2.4	2.4	1.2	1.6	3.2	1.8	1.2	2.3	1.3	1.2	1.9	2.4	2.7	3.1	2.8	2.8	3.2	4.5	2.1	1.6	1.9	1.6	1.9	Diurnal Average	
	21	34	21	9	12	39	12	17	28	16	8	15	28	25	19	17	22	30	34	14	18	20	19	18	Diurnal Maximum	

Z - zerospan C - Calibration

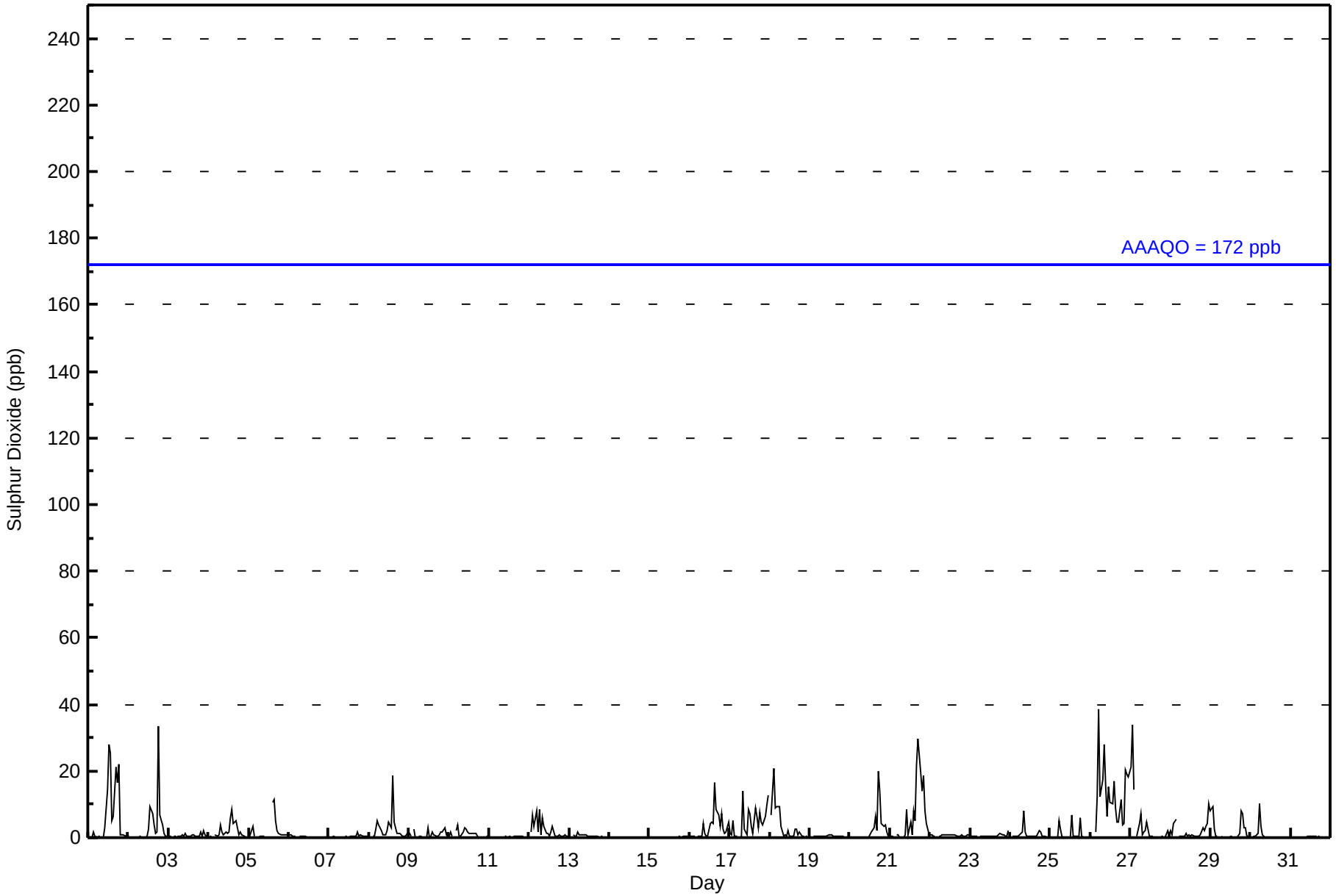
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - January 2016



Sulphur Dioxide (SO_2) - ppb
Mildred Lake - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	672	94.78	94.78
11 - 20	25	3.53	98.31
21 - 60	12	1.69	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 (SO_2) - ppb

Mildred Lake - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	94	97	41	9	7	4	14	58	137	83	25	28	19	19	17	18	670
11 - 20	0	0	0	0	0	1	5	8	5	0	0	0	3	3	0	0	25
21 - 60	0	0	0	0	0	0	1	5	0	0	0	0	4	2	0	0	12
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	94	97	41	9	7	5	20	71	142	83	25	28	26	24	17	18	707

Total Number of Valid Hours: 707

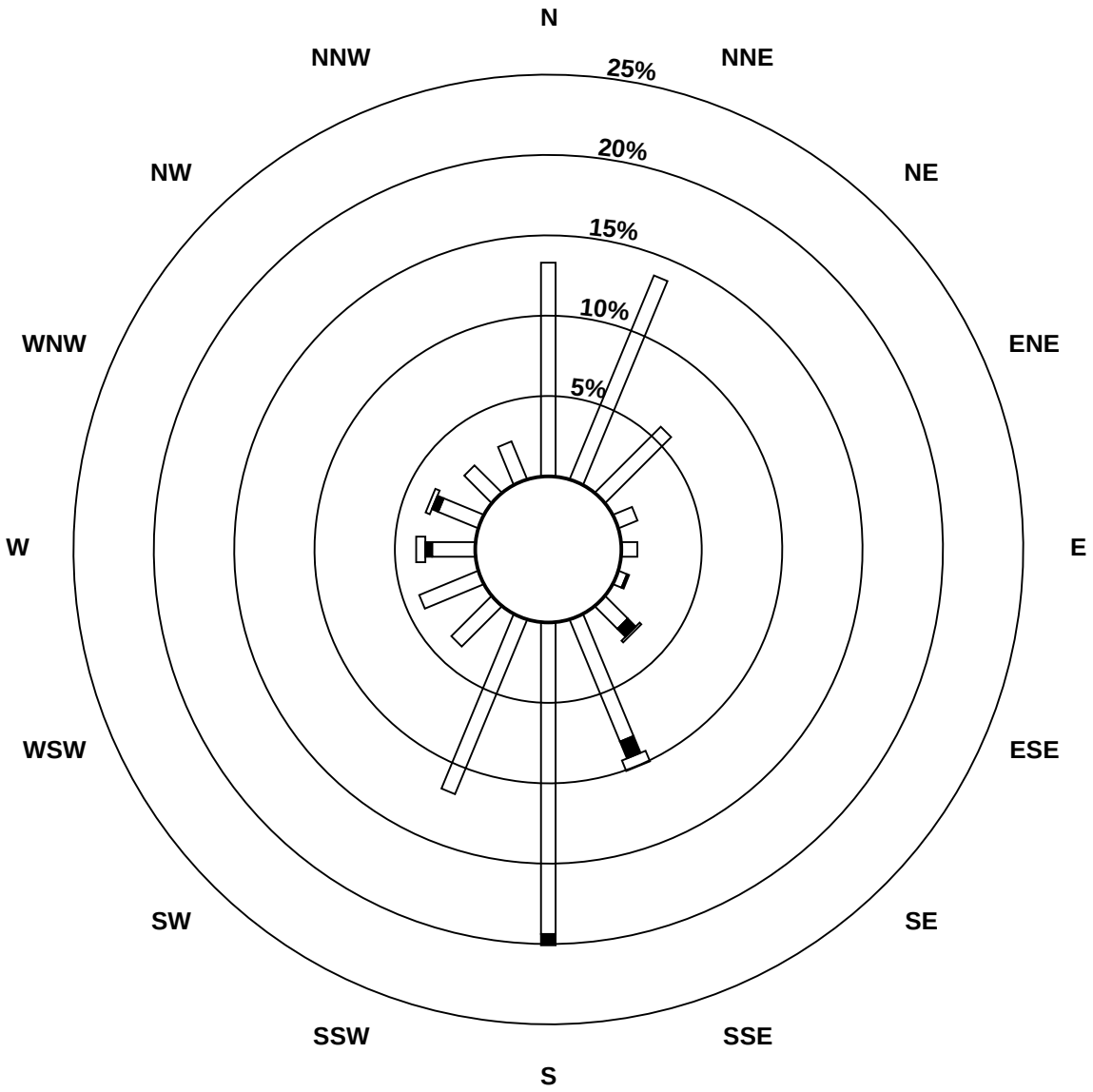
Total Number of Hours: 744

Wood Buffalo Environmental Association

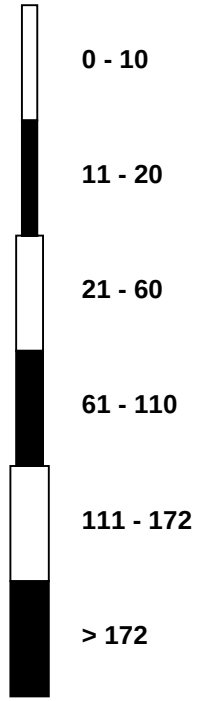
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Mildred Lake (AMS 2)



Classes (ppb)



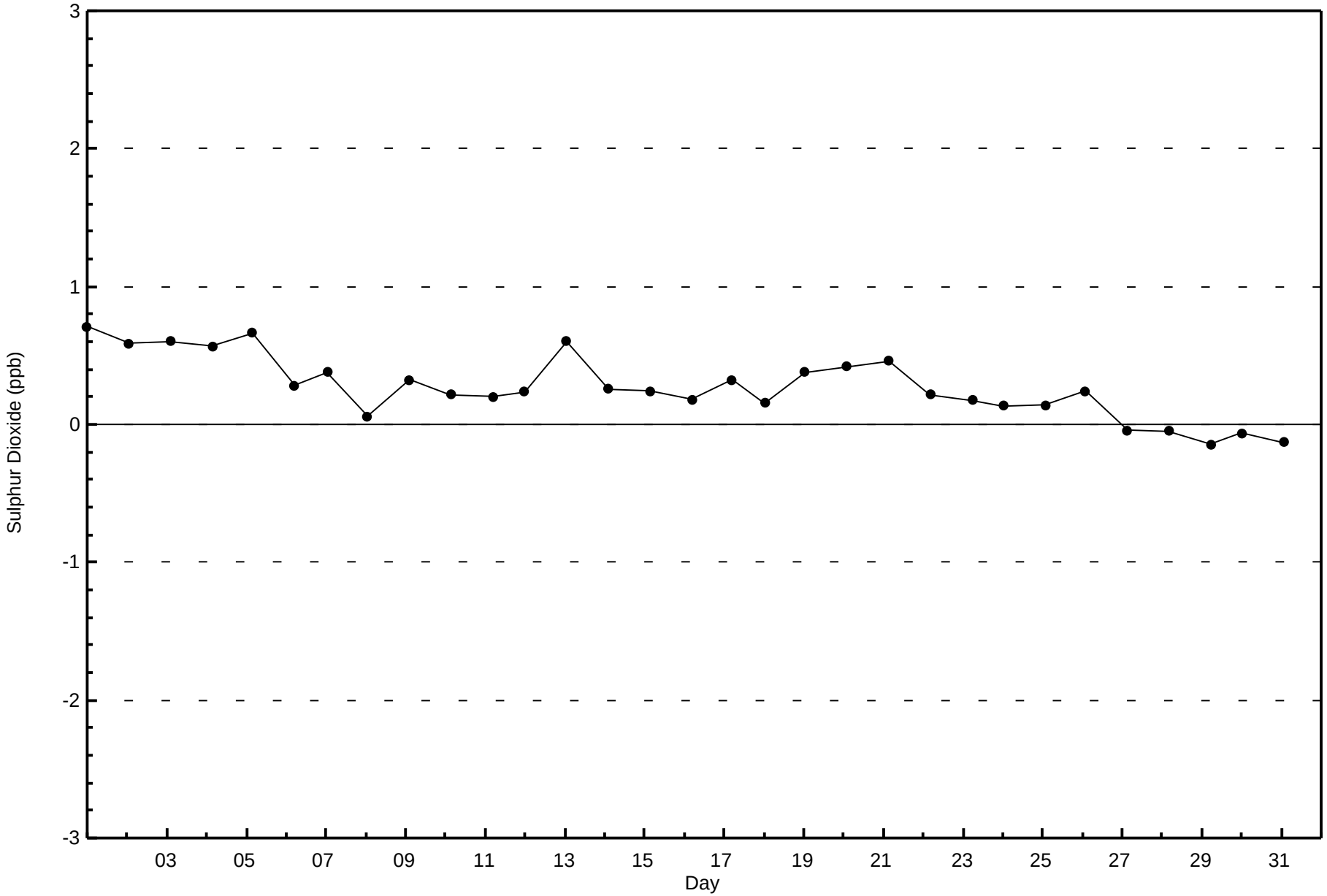
Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - January 2016

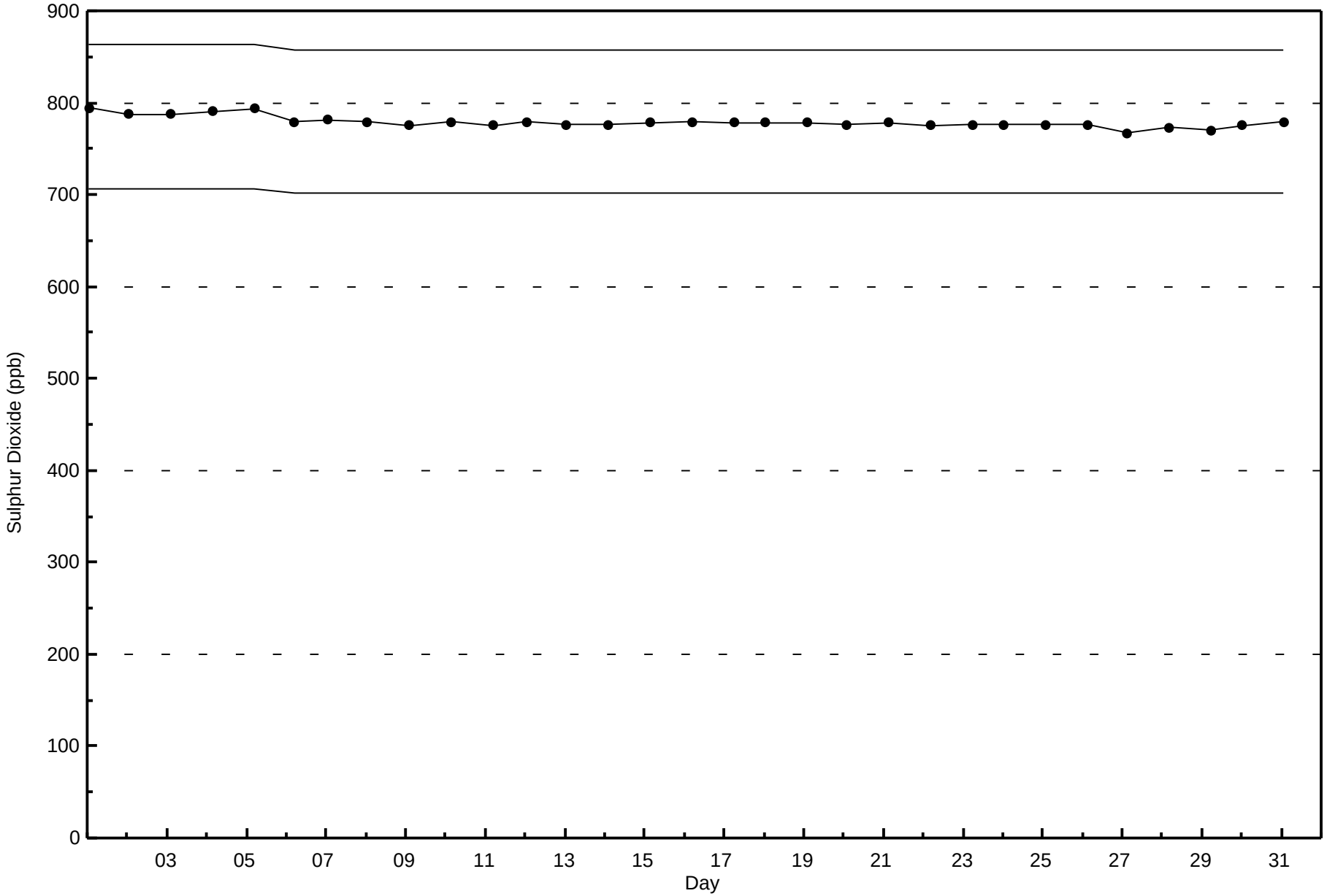


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 10 ppb on Jan 26 06:00 Maximum Daily Average: 3.3 ppb on Jan 26

Minimum Value: 0 ppb on Jan 2 02:00 Minimum Daily Average: 0.1 ppb on Jan 11
Maximum Diurnal Average: 1.0 ppb at hour 19 Minimum Diurnal Average: 0.3 ppb at hour 2
Monthly Average: 0.6 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0.3	1
2-Jan	0	0	Z	0	0	0	0	0	1	0	0	1	1	2	1	1	1	1	5	2	1	1	0	0	0.8	5
3-Jan	0	0	0	Z	1	0	1	1	1	0	1	0	0	1	1	1	1	0	0	1	1	2	1	1	0.7	2
4-Jan	0	1	1	1	Z	1	1	3	2	1	1	1	2	3	3	2	4	1	1	1	1	1	0	0	1.4	4
5-Jan	0	1	2	1	0	Z	0	0	1	1	0	1	2	C	C	C	C	2	1	1	1	1	1	1	0.9	2
6-Jan	1	1	1	1	1	1	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Jan	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	3	1	1	1	0	0	0	0	0	0	0.4	3
9-Jan	0	0	0	Z	0	0	0	0	0	1	0	1	0	1	1	0	0	1	1	1	0	1	0	0	0.4	1
10-Jan	0	1	0	0	Z	1	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
11-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Jan	1	Z	1	1	1	0	2	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.5	2
13-Jan	0	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
14-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
16-Jan	1	1	1	0	1	Z	1	0	1	1	1	0	1	1	2	2	2	1	1	1	1	1	1	1	1.0	2
17-Jan	1	1	1	0	0	0	Z	1	3	1	0	2	1	1	1	2	2	1	2	2	2	2	2	2	1.3	3
18-Jan	1	Z	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
19-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	5	4	2	1	1	1	0	0.8	5
21-Jan	0	0	0	0	Z	1	0	0	0	1	2	0	1	0	1	1	2	2	2	2	2	1	1	0	0.9	2
22-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0.3	1
24-Jan	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	2	2	2	1	1	2	0	0	0.5	2
26-Jan	0	0	3	Z	4	10	3	5	6	4	2	6	4	5	5	3	2	3	6	2	0	1	1	0	3.3	10
27-Jan	0	1	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
28-Jan	1	1	1	2	1	Z	0	0	0	1	1	1	1	0	0	0	1	1	1	4	0	0	0	0	0.8	4
29-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Jan	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Jan	0	0	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
	0.3	0.3	0.6	0.4	0.5	0.7	0.5	0.5	0.7	0.5	0.5	0.7	0.6	0.7	0.7	0.7	0.7	0.9	1.0	0.8	0.5	0.5	0.4	0.4	Diurnal Average	
	1	1	3	2	4	10	3	5	6	4	2	6	4	5	5	3	4	5	6	4	2	2	2	2	Diurnal Maximum	

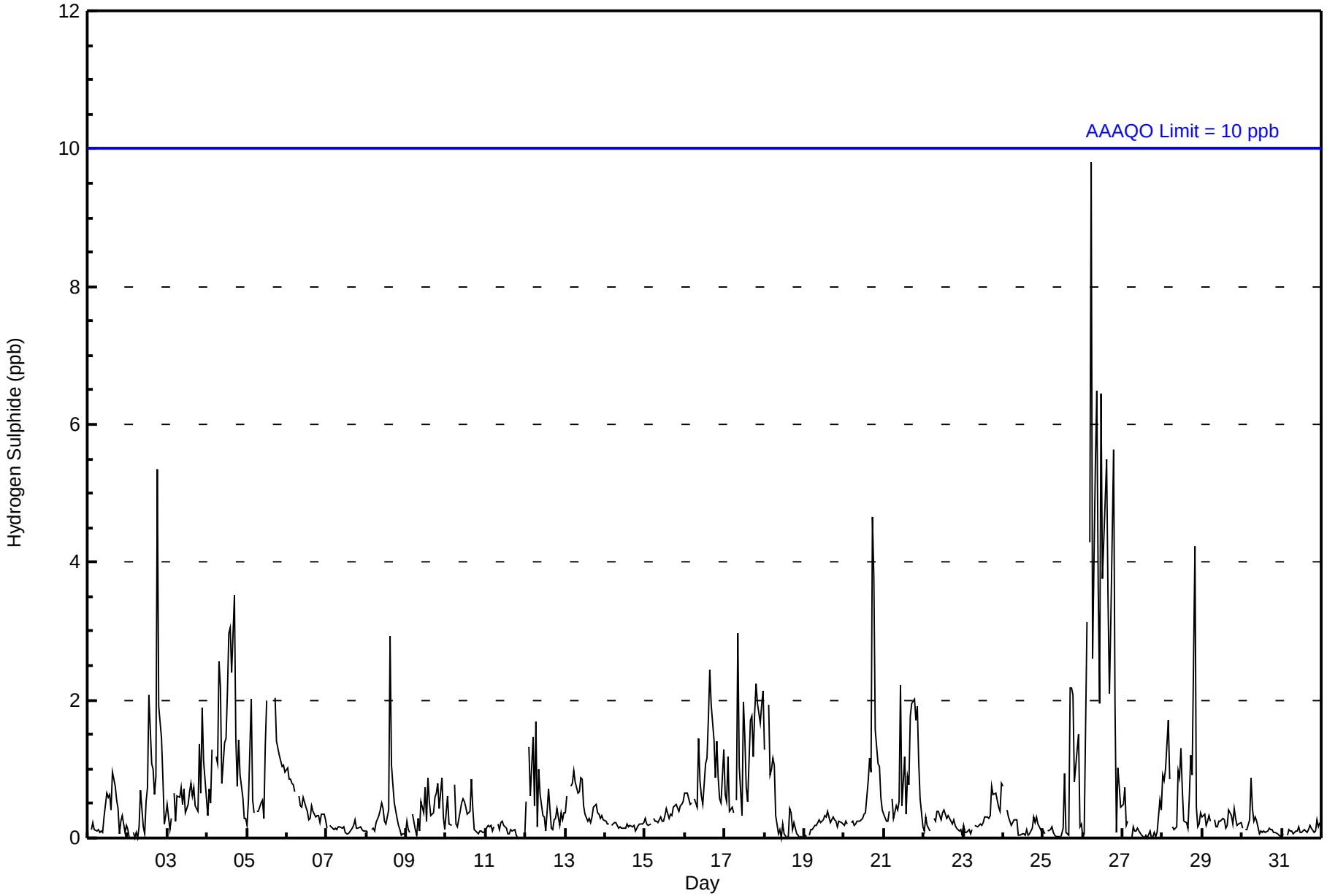
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	96.61	96.62
3 - 4	15	2.12	98.73
5 - 7	8	1.13	99.86
8 - 11	1	0.14	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	91	97	43	9	6	3	14	63	134	83	26	27	27	25	16	19	683
3 - 4	0	0	0	0	0	1	1	5	6	2	0	0	0	0	0	0	15
5 - 7	0	0	0	0	0	1	4	2	1	0	0	0	0	0	0	0	8
8 - 11	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	97	43	9	6	5	19	71	141	85	26	27	27	25	16	19	707

Total Number of Valid Hours: 707

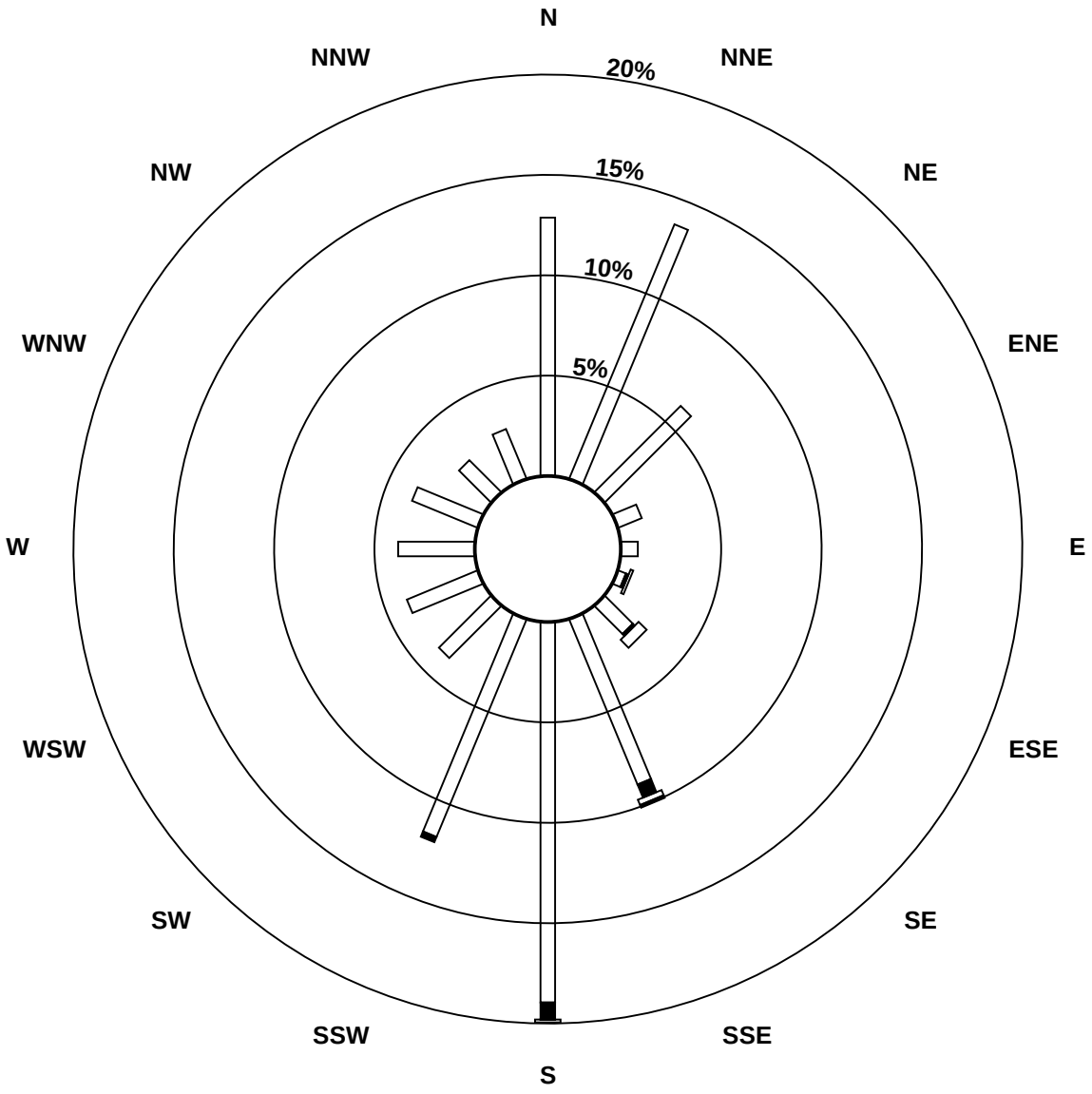
Total Number of Hours: 744

Wood Buffalo Environmental Association

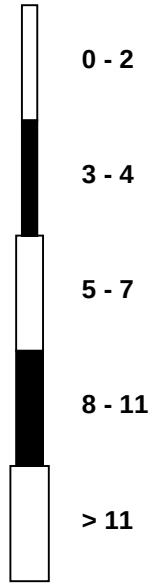
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake (AMS 2)



Classes (ppb)



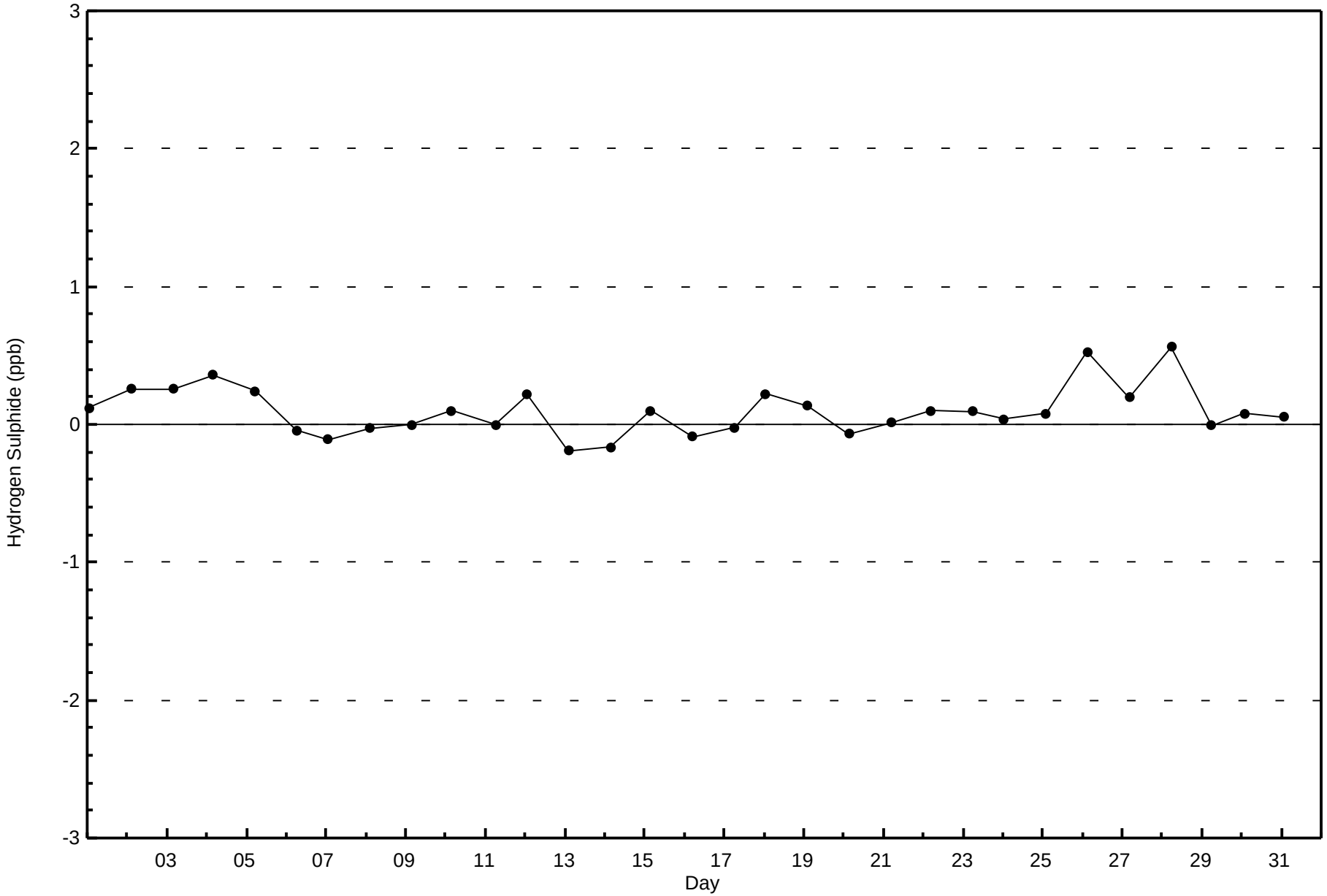
Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - January 2016

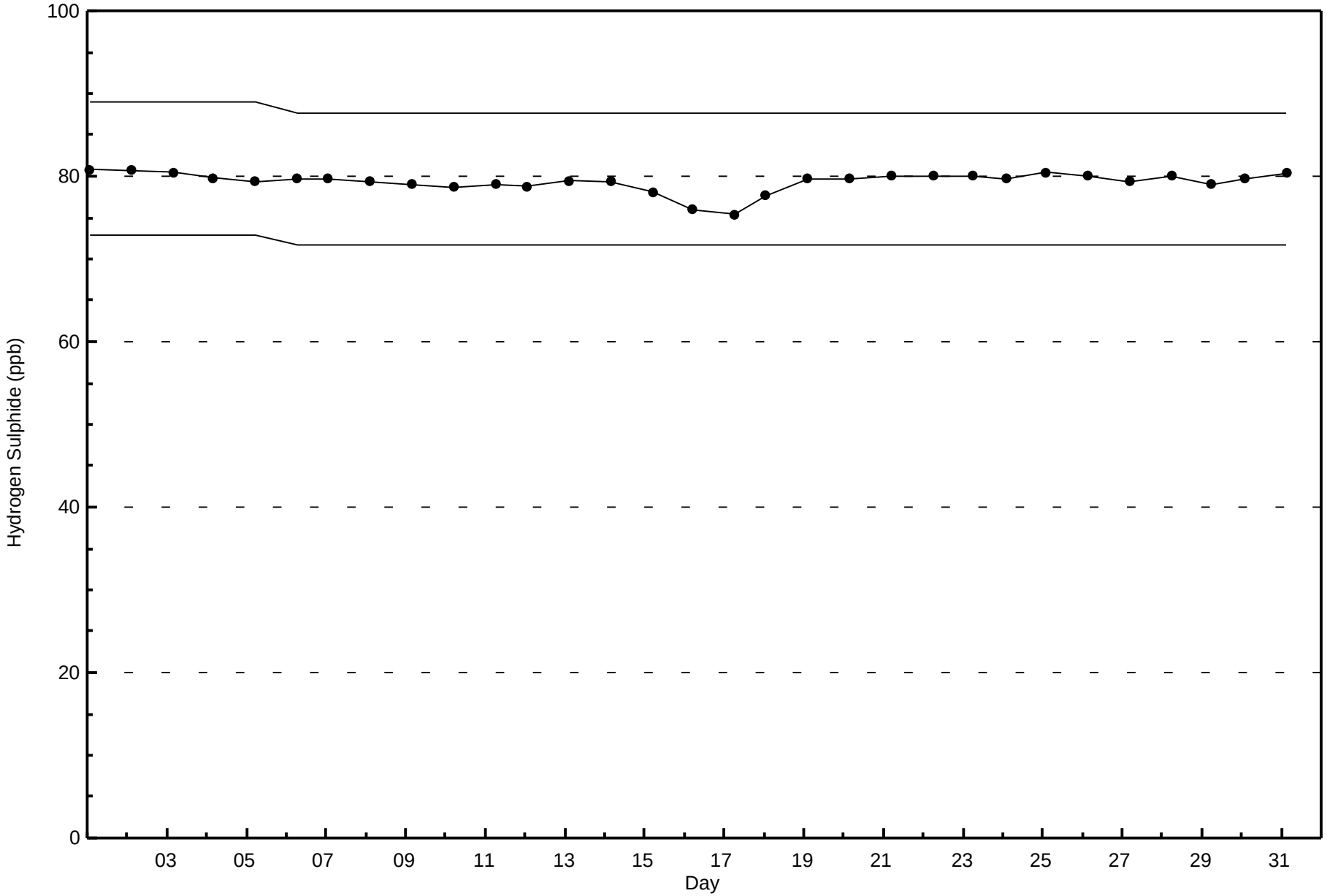


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mildred Lake - January 2016

Maximum Value: 5.8 ppm on Jan 26 04:00

Maximum Daily Average: 3.4 ppm on Jan 26

Minimum Value: 2.1 ppm on Jan 30 20:00

Minimum Daily Average: 2.2 ppm on Jan 14

Maximum Diurnal Average: 2.9 ppm at hour 17

Minimum Diurnal Average: 2.5 ppm at hour 24

Monthly Average: 2.65 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.3 Median = 2.5 Q_3 = 2.8 P_{90} = 3.4 P_{99} = 4.6

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.5	2.7	3.2	2.5	2.5	2.4	2.2	2.5	2.6	2.4	2.3	2.4	3.2
2-Jan	2.7	Z	2.3	2.2	2.2	2.2	2.3	2.6	4.2	2.2	2.2	3.8	3.7	2.6	3.2	3.5	3.3	3.5	4.0	2.8	3.5	3.1	2.3	2.4	2.9	4.2
3-Jan	2.6	2.3	Z	2.7	3.3	2.4	2.8	2.7	3.2	3.3	2.7	2.9	3.7	4.0	4.1	3.6	4.3	2.6	2.6	3.0	2.8	3.5	3.4	2.8	3.1	4.3
4-Jan	2.8	3.1	2.8	Z	3.2	2.9	2.9	3.1	3.1	2.8	3.1	3.4	4.4	3.8	3.8	3.4	3.7	2.8	2.8	3.0	2.8	2.6	2.5	2.5	3.1	4.4
5-Jan	2.4	2.7	3.0	2.4	Z	2.4	2.4	2.4	2.5	2.4	C	C	C	C	2.9	3.4	3.6	3.0	3.3	3.7	3.6	3.6	3.7	3.4	3.0	3.7
6-Jan	3.4	3.5	3.5	3.4	3.5	Z	3.0	2.9	2.7	2.7	3.0	2.8	2.5	2.4	2.5	2.8	2.5	2.4	2.4	2.5	2.3	2.4	2.4	2.3	2.8	3.5
7-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.4	2.5	2.4	2.4	2.3	2.5
8-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.4	2.5	2.6	2.5	2.4	2.5	2.3	2.4	2.7	2.7	2.4	2.4	2.4	2.3	2.2	2.2	2.1	2.2	2.4	2.7
9-Jan	2.5	2.2	Z	3.3	2.9	2.2	2.2	2.6	2.2	3.4	3.0	3.1	3.5	3.4	3.6	3.8	3.3	2.9	3.2	3.2	2.5	3.7	2.5	2.3	2.9	3.8
10-Jan	3.8	3.9	3.4	Z	3.3	3.3	2.4	2.5	2.6	2.7	2.7	2.9	2.7	2.6	2.7	3.4	2.6	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.8	3.9
11-Jan	2.3	2.4	2.4	2.4	2.4	Z	2.6	2.4	2.4	2.6	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.3	2.2	2.2	2.2	2.2	2.4	2.6
12-Jan	Z	3.6	2.9	2.8	3.0	2.9	3.2	2.3	2.8	2.7	2.5	2.5	2.4	2.6	2.9	2.2	2.2	3.0	2.5	2.5	2.2	2.4	2.3	2.4	2.6	3.6
13-Jan	2.3	Z	2.6	2.7	2.8	2.7	2.7	2.6	2.7	2.9	2.7	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.4	2.3	2.5	2.9
14-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
15-Jan	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.3	2.5
16-Jan	2.6	2.8	2.8	2.7	Z	2.8	2.8	2.6	2.9	2.8	2.7	2.5	2.6	2.6	2.9	3.3	4.1	3.4	2.8	3.0	2.7	2.5	2.5	2.7	2.8	4.1
17-Jan	2.6	2.5	2.9	2.5	2.5	Z	2.4	2.4	2.7	2.6	2.4	2.9	2.8	2.5	2.6	2.8	2.9	3.1	3.2	3.3	3.2	2.9	2.5	2.4	2.7	3.3
18-Jan	Z	2.7	2.5	2.3	2.3	2.2	2.2	2.3	2.5	2.6	2.6	2.7	2.8	2.7	2.7	2.6	2.5	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.4	2.8
19-Jan	2.2	Z	2.3	2.3	2.4	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.4
20-Jan	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.4	2.3	2.7	2.4	2.4	2.6	3.1	3.0	2.7	2.6	2.6	2.5	2.4	3.1
21-Jan	2.4	2.3	2.3	Z	2.9	2.9	2.4	3.2	2.4	3.1	3.1	3.5	3.2	3.3	2.8	2.8	2.8	2.7	2.6	2.5	2.6	3.0	2.7	2.5	2.8	3.5
22-Jan	2.5	2.8	2.6	2.7	Z	3.4	3.1	3.1	3.5	3.4	2.9	3.0	3.1	3.1	3.0	2.8	2.7	2.5	2.7	2.7	2.6	2.5	2.4	2.4	2.8	3.5
23-Jan	2.4	2.4	2.4	2.4	2.4	Z	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.6	2.6	2.6	2.7	3.5	3.3	3.5	3.1	2.9	2.8	2.9	2.7	3.5
24-Jan	Z	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.4	2.6	3.1	2.5	2.4	2.5	2.4	2.6	2.8	3.3	3.0	2.7	2.3	2.3	2.3	2.6	3.3
25-Jan	2.3	Z	2.3	2.3	2.3	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.6	2.5	2.5	2.2	4.0	4.6	3.4	4.2	4.5	3.5	2.2	2.4	2.8	4.6
26-Jan	2.3	2.3	Z	5.8	3.8	3.4	2.6	2.6	2.6	2.7	3.6	2.9	3.8	4.6	4.1	3.7	4.9	4.6	4.3	2.5	2.4	3.0	2.4	2.3	3.4	5.8
27-Jan	2.2	2.3	2.2	Z	3.0	2.7	2.6	2.6	2.5	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	2.5	2.4	2.4	3.0
28-Jan	2.7	2.7	2.6	3.9	Z	2.6	2.2	2.2	2.5	3.9	4.6	3.9	2.5	2.9	2.9	2.2	2.5	3.0	3.0	4.6	2.2	2.2	2.1	2.3	2.9	4.6
29-Jan	2.3	2.3	2.4	3.2	3.8	Z	3.0	2.8	2.8	3.5	2.9	2.8	3.4	3.3	3.3	3.7	3.6	3.5	2.3	2.5	2.5	2.5	3.9	3.4	3.0	3.9
30-Jan	Z	2.4	2.5	2.7	2.6	3.0	2.7	3.0	3.6	3.1	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.4	3.6
31-Jan	2.1	Z	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.4
	2.5	2.6	2.5	2.7	2.7	2.6	2.5	2.5	2.6	2.7	2.6	2.7	2.7	2.7	2.8	2.8	2.9	2.8	2.7	2.7	2.6	2.6	2.5	2.5	Diurnal Average	
	3.8	3.9	3.5	5.8	3.8	3.4	3.2	3.2	4.2	3.9	4.6	3.9	4.4	4.6	4.1	3.8	4.9	4.6	4.3	4.6	4.5	3.7	3.9	3.4	Diurnal Maximum	

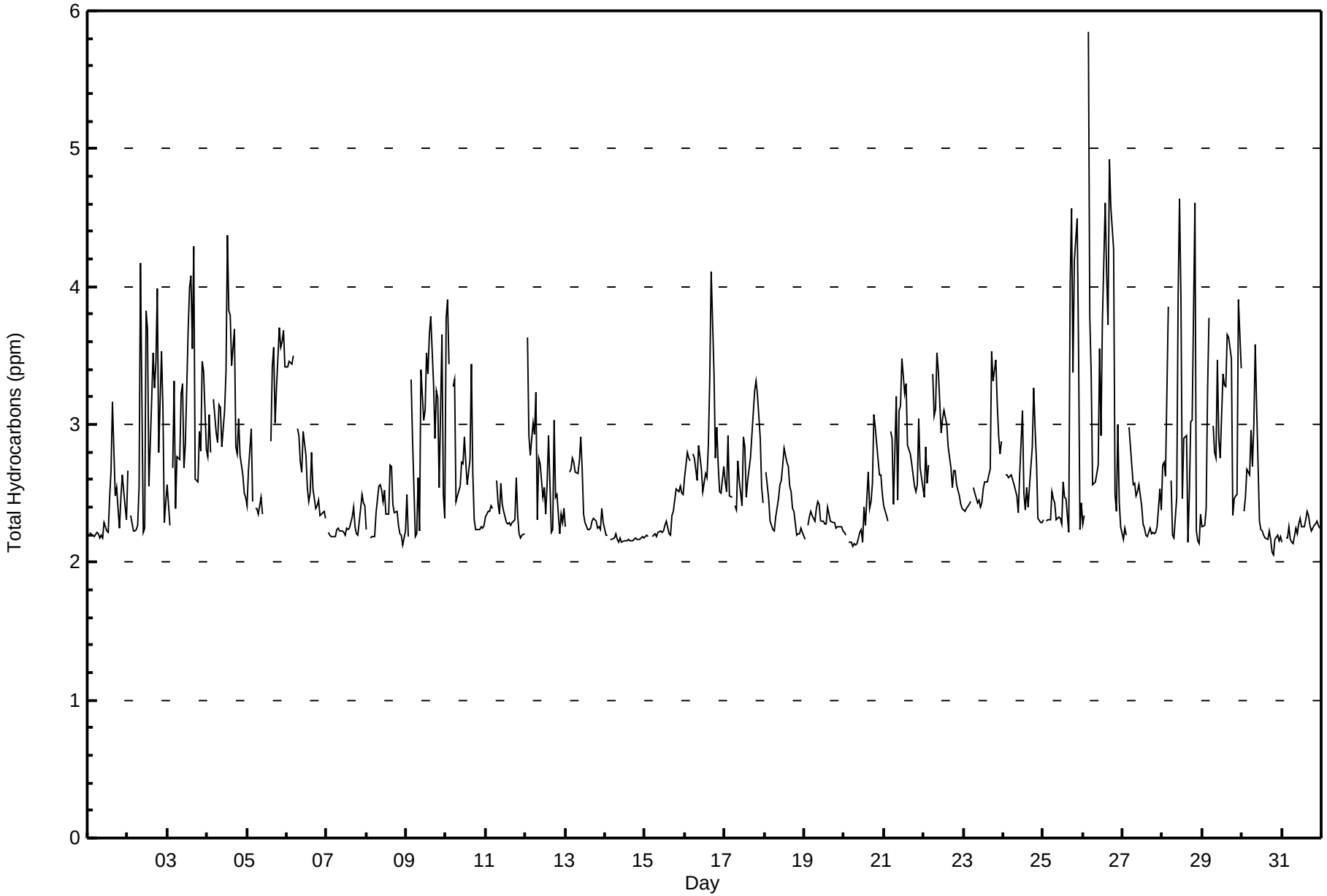
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Mildred Lake - January 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	583	82.23	82.23
3.1 - 10.0	126	17.77	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

Mildred Lake - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	84	93	41	9	6	3	13	44	103	72	21	24	25	21	8	14	581
3.1 - 10.0	10	4	0	0	1	2	7	27	39	11	4	4	1	3	9	4	126
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	94	97	41	9	7	5	20	71	142	83	25	28	26	24	17	18	707

Total Number of Valid Hours: 707

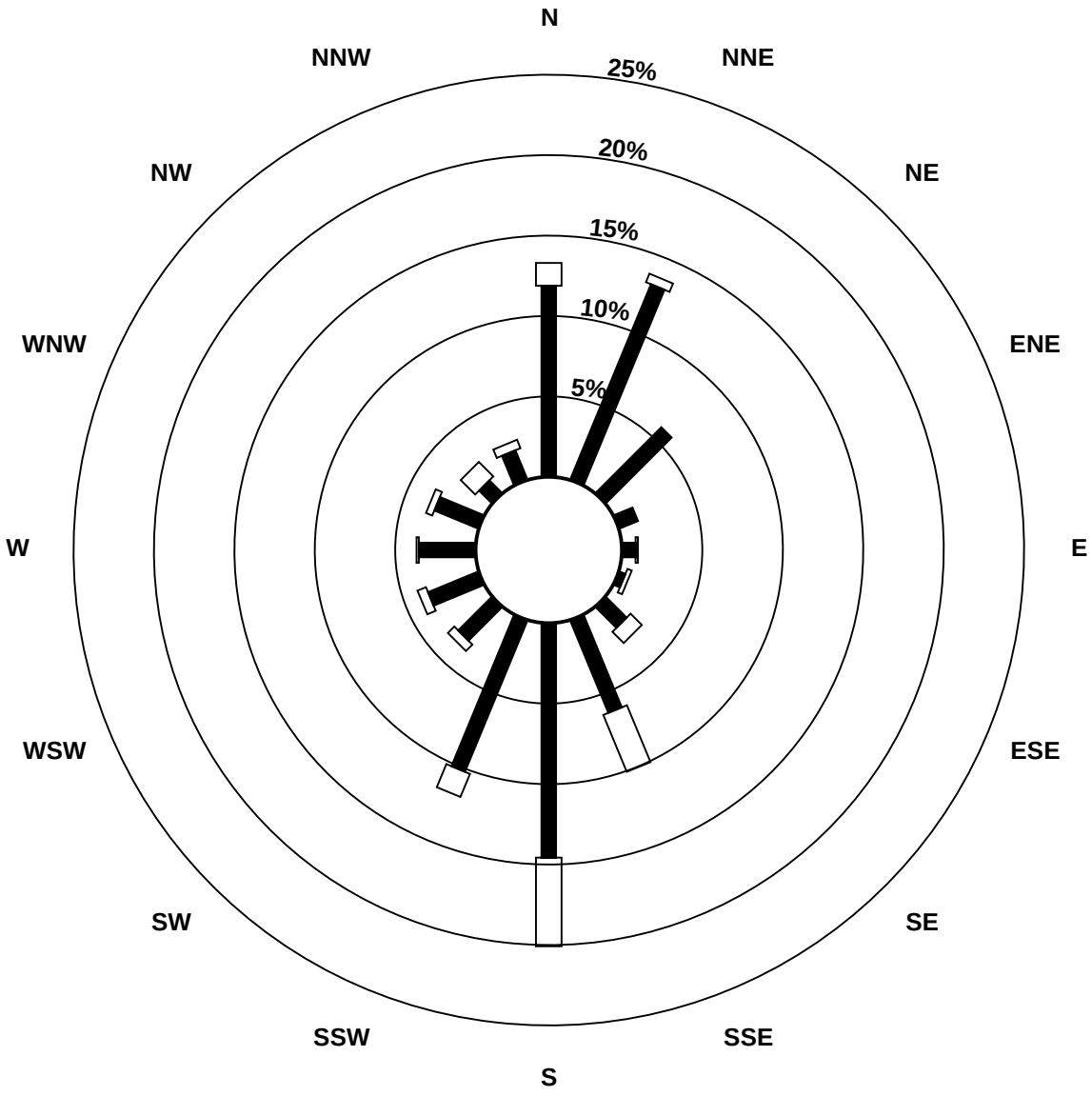
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Mildred Lake (AMS 2)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

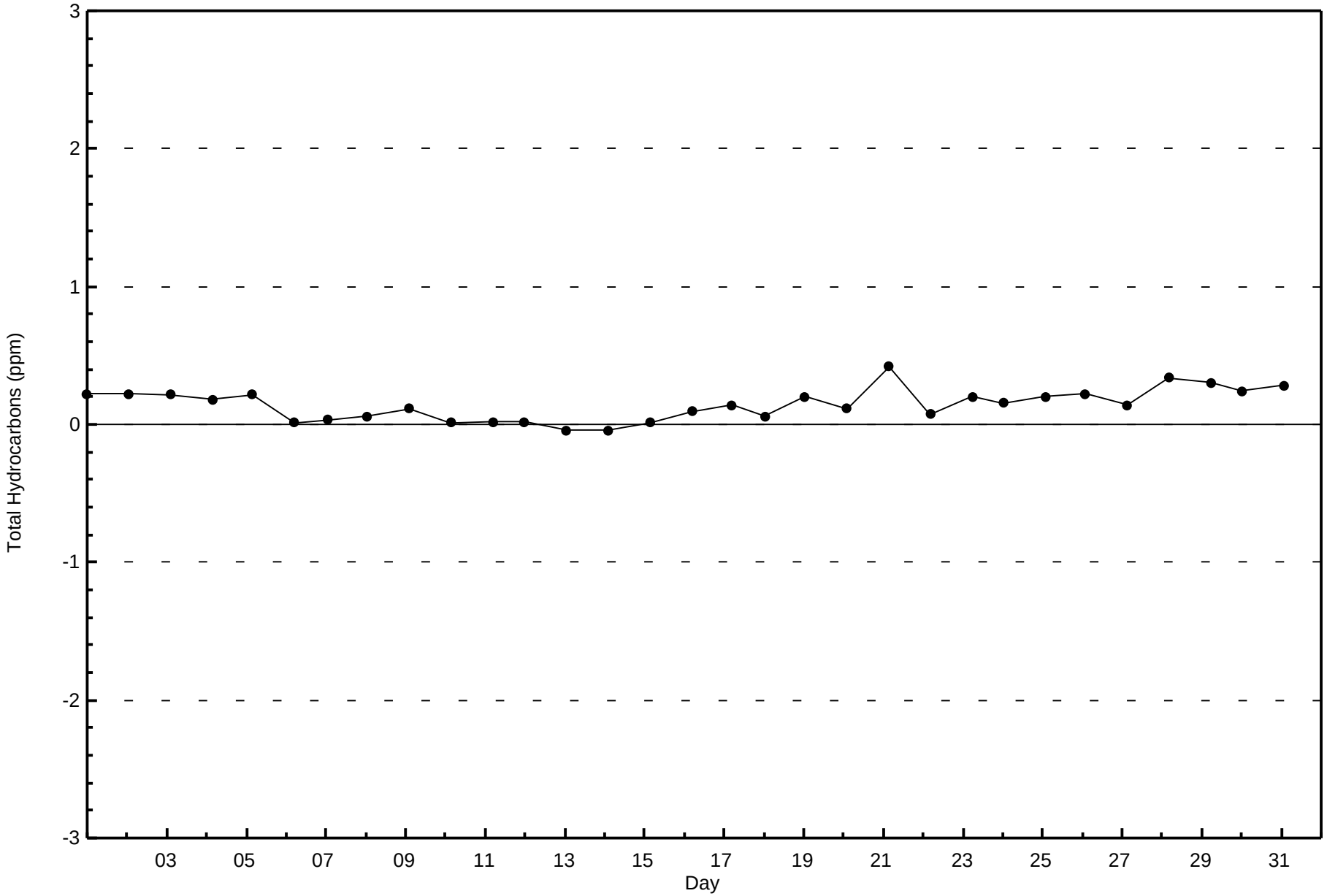
Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Mildred Lake - January 2016

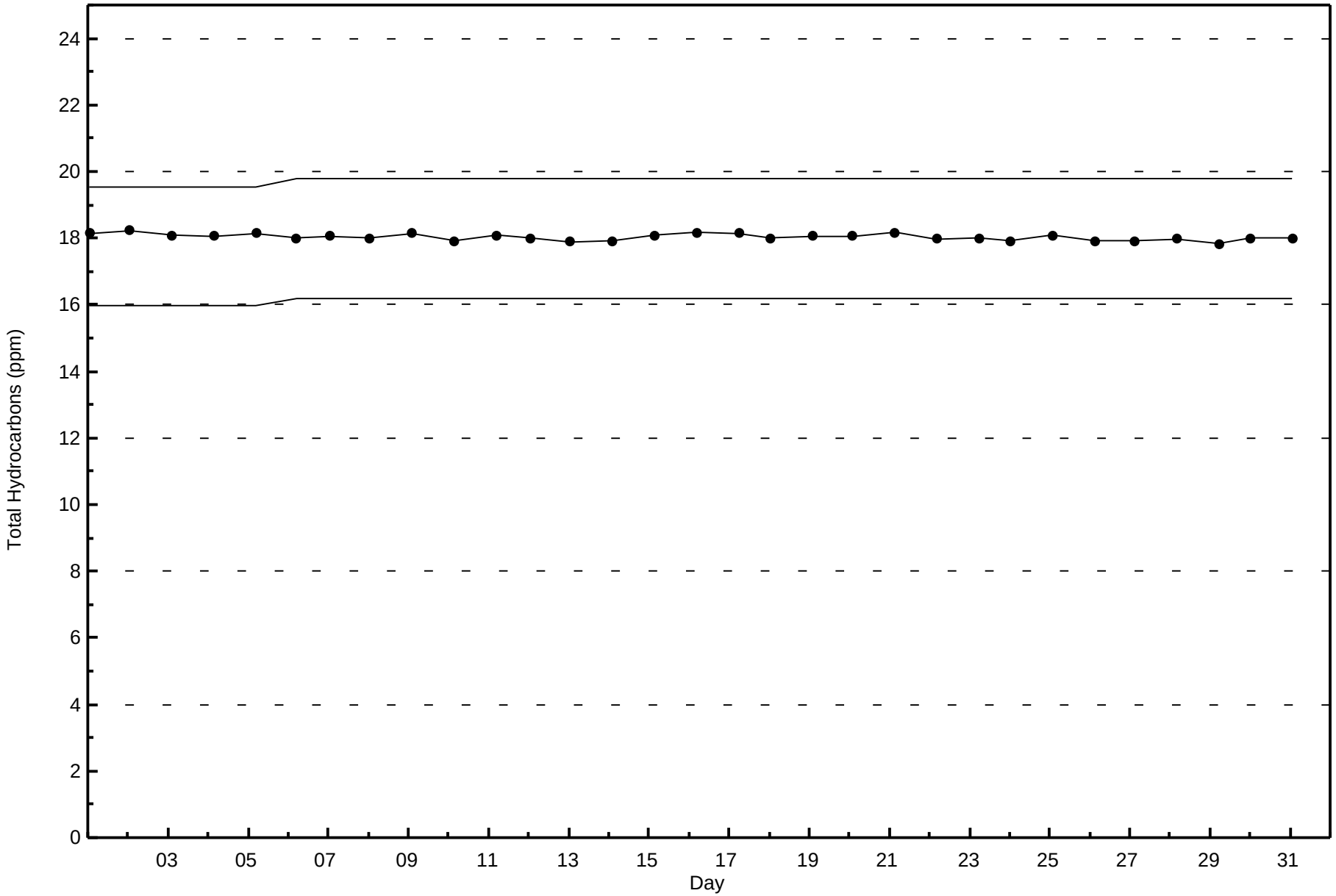


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Mildred Lake - January 2016



Maximum Value: 5.7 C on Jan 29 15:00

Maximum Daily Average: 3.1 C on Jan 29

Minimum Value: -32.2 C on Jan 16 10:00

Minimum Daily Average: -29.2 C on Jan 16

Maximum Diurnal Average: -11.0 C at hour 15

Minimum Diurnal Average: -14.1 C at hour 9

Monthly Average: -12.92 C

Percentiles: P_1 = -31.8 P_{10} = -21.8 Q_1 = -18.3 Median = -13.5 Q_3 = -8.3 P_{90} = -2.6 P_{99} = 4.6

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

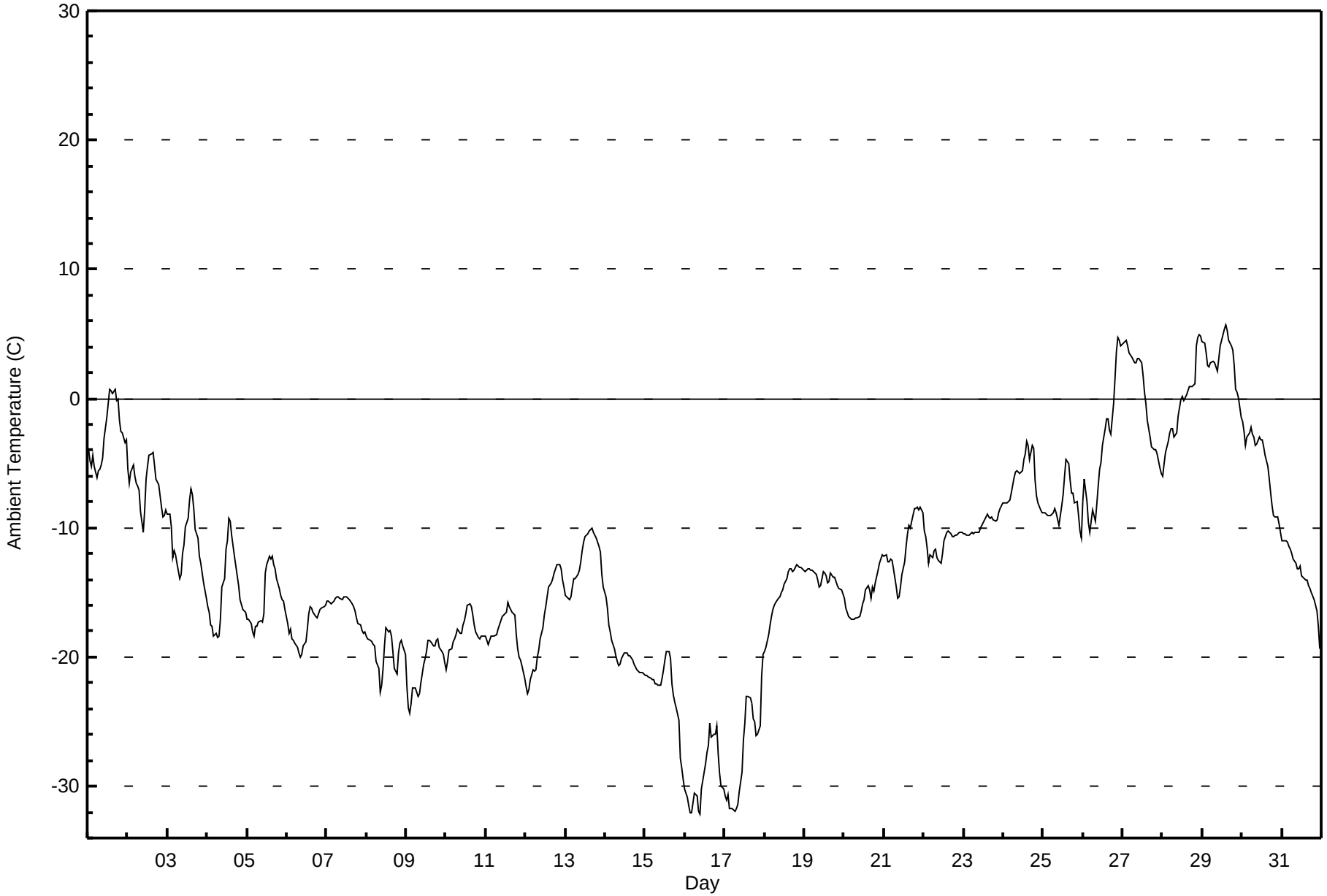
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-4.0	-4.8	-5.2	-4.4	-5.2	-6.1	-5.6	-5.5	-5.2	-4.6	-3.1	-1.5	-0.4	0.7	0.6	0.4	0.7	-0.1	0.0	-1.6	-2.5	-2.7	-3.4	-3.2	-2.8	0.7
2-Jan	-5.5	-6.5	-5.7	-5.2	-6.0	-6.5	-6.8	-7.1	-8.8	-10.4	-8.7	-6.2	-5.2	-4.4	-4.3	-4.2	-5.1	-6.2	-6.5	-6.6	-8.4	-9.2	-9.0	-8.6	-6.7	-4.2
3-Jan	-8.9	-9.0	-10.0	-12.3	-11.8	-12.1	-12.7	-13.9	-13.6	-12.0	-11.3	-9.9	-9.2	-7.8	-7.0	-7.4	-8.5	-10.2	-10.8	-12.1	-12.7	-13.5	-14.2	-15.4	-11.1	-7.0
4-Jan	-16.1	-16.5	-17.5	-17.7	-18.4	-18.1	-18.5	-18.4	-17.0	-14.6	-13.9	-11.6	-11.0	-9.3	-9.5	-10.6	-12.2	-12.9	-13.7	-14.5	-15.6	-16.3	-16.4	-16.5	-14.9	-9.3
5-Jan	-17.0	-17.1	-17.4	-18.0	-18.3	-17.6	-17.6	-17.3	-17.2	-17.3	-16.7	-13.5	-12.8	-12.2	-12.5	-12.2	-12.9	-13.2	-14.0	-14.7	-15.2	-15.5	-15.6	-16.3	-15.5	-12.2
6-Jan	-17.4	-18.2	-17.8	-18.6	-18.8	-18.9	-19.2	-19.7	-20.1	-19.8	-19.1	-18.8	-17.8	-16.7	-16.1	-16.2	-16.6	-16.8	-16.9	-16.6	-16.4	-16.2	-16.1	-16.0	-17.7	-16.0
7-Jan	-15.7	-15.7	-15.8	-15.9	-15.7	-15.5	-15.4	-15.4	-15.5	-15.5	-15.3	-15.3	-15.4	-15.5	-15.6	-15.8	-16.1	-16.5	-17.0	-17.4	-17.6	-17.9	-18.2	-18.1	-16.2	-15.3
8-Jan	-18.4	-18.6	-18.7	-18.9	-19.0	-19.2	-20.4	-20.8	-22.7	-22.2	-20.9	-19.1	-17.7	-18.0	-18.0	-18.4	-19.6	-20.8	-21.3	-19.7	-18.9	-18.7	-19.1	-19.8	-19.5	-17.7
9-Jan	-22.3	-23.9	-24.3	-23.6	-22.4	-22.4	-22.7	-23.0	-22.8	-22.0	-20.6	-20.1	-19.6	-18.7	-18.7	-18.8	-19.1	-19.1	-18.7	-18.6	-19.2	-19.6	-19.7	-20.4	-20.8	-18.6
10-Jan	-20.9	-20.4	-19.5	-19.3	-18.8	-18.6	-18.2	-17.8	-18.2	-18.1	-17.5	-17.2	-16.6	-15.9	-15.8	-16.1	-16.8	-17.5	-18.0	-18.5	-18.6	-18.4	-18.4	-18.3	-18.1	-15.8
11-Jan	-18.4	-19.0	-18.7	-18.4	-18.4	-18.4	-18.3	-17.9	-17.5	-17.2	-16.9	-16.8	-16.5	-15.8	-16.1	-16.3	-16.5	-16.8	-18.2	-19.3	-20.0	-20.2	-20.6	-21.6	-18.1	-15.8
12-Jan	-22.3	-22.8	-22.6	-21.8	-20.9	-21.1	-21.0	-20.0	-19.5	-18.6	-17.8	-16.8	-16.1	-15.4	-14.6	-14.2	-13.9	-13.5	-13.2	-12.9	-12.9	-13.2	-14.1	-14.6	-17.2	-12.9
13-Jan	-15.3	-15.4	-15.5	-15.3	-14.6	-14.0	-13.9	-13.6	-13.2	-12.6	-11.8	-11.1	-10.7	-10.5	-10.2	-10.2	-10.0	-10.4	-10.8	-11.1	-11.4	-11.9	-13.6	-14.6	-12.6	-10.0
14-Jan	-15.3	-16.2	-17.5	-18.1	-18.7	-19.4	-19.9	-20.4	-20.7	-20.6	-20.1	-19.7	-19.7	-19.7	-19.8	-19.9	-20.3	-20.6	-20.8	-21.0	-21.1	-21.2	-21.2	-21.3	-19.7	-15.3
15-Jan	-21.4	-21.5	-21.5	-21.6	-21.7	-21.8	-22.1	-22.0	-22.2	-22.2	-21.7	-21.0	-20.2	-19.5	-19.6	-20.2	-22.1	-22.9	-23.4	-23.9	-24.9	-27.8	-28.6	-29.4	-22.6	-19.5
16-Jan	-30.2	-30.8	-31.5	-32.0	-32.0	-31.3	-30.5	-30.8	-31.9	-32.2	-30.2	-29.6	-28.3	-27.4	-26.9	-25.1	-26.2	-26.0	-26.0	-25.3	-27.5	-29.0	-30.0	-30.2	-29.2	-25.1
17-Jan	-30.7	-31.1	-30.7	-31.8	-31.8	-31.9	-31.9	-31.7	-31.4	-30.4	-29.0	-26.5	-25.1	-23.0	-23.0	-23.2	-23.5	-24.8	-25.0	-26.1	-26.0	-25.3	-21.4	-19.8	-27.3	-19.8
18-Jan	-19.6	-19.3	-18.3	-17.5	-16.9	-16.4	-16.0	-15.7	-15.5	-15.4	-15.1	-14.8	-14.3	-13.9	-13.4	-13.2	-13.2	-13.4	-13.2	-12.8	-12.9	-13.0	-13.1	-13.2	-15.0	-12.8
19-Jan	-13.3	-13.2	-13.1	-13.2	-13.3	-13.3	-13.5	-13.6	-14.0	-14.6	-14.4	-13.4	-13.5	-13.7	-14.2	-14.2	-13.5	-13.8	-13.9	-14.2	-14.5	-14.7	-14.8	-15.2	-13.9	-13.1
20-Jan	-15.5	-16.2	-16.6	-16.9	-17.1	-17.1	-17.0	-17.0	-17.0	-16.8	-16.4	-15.8	-15.5	-14.8	-14.4	-14.8	-15.5	-14.6	-14.9	-14.3	-13.3	-12.7	-12.5	-12.1	-15.4	-12.1
21-Jan	-12.2	-12.1	-12.6	-12.6	-12.5	-12.6	-13.2	-14.6	-15.5	-15.4	-14.5	-13.6	-12.6	-11.4	-10.5	-9.8	-10.0	-9.5	-8.5	-8.5	-8.4	-8.6	-8.4	-8.8	-11.5	-8.4
22-Jan	-10.2	-10.7	-11.6	-12.7	-12.1	-12.3	-11.8	-11.7	-12.3	-12.6	-12.7	-12.0	-11.0	-10.6	-10.3	-10.2	-10.4	-10.7	-10.7	-10.6	-10.5	-10.4	-10.3	-10.3	-11.2	-10.2
23-Jan	-10.4	-10.5	-10.5	-10.6	-10.5	-10.4	-10.4	-10.4	-10.4	-10.3	-10.0	-9.8	-9.6	-9.4	-8.9	-9.1	-9.2	-9.2	-9.4	-9.5	-9.4	-8.8	-8.5	-8.3	-9.7	-8.3
24-Jan	-8.1	-8.1	-8.1	-8.0	-7.8	-7.3	-6.1	-5.7	-5.5	-5.7	-5.8	-5.6	-4.7	-4.3	-3.3	-3.7	-4.7	-3.6	-3.9	-6.3	-7.6	-8.1	-8.6	-8.8	-6.2	-3.3
25-Jan	-8.8	-8.9	-9.0	-9.0	-9.0	-9.0	-8.8	-8.5	-8.8	-9.8	-9.1	-8.3	-7.4	-6.0	-4.7	-5.0	-6.3	-7.3	-7.3	-8.1	-8.0	-9.1	-10.3	-10.8	-8.2	-4.7
26-Jan	-8.0	-6.3	-8.0	-9.6	-10.3	-9.5	-8.6	-9.4	-8.2	-6.8	-5.4	-4.9	-3.7	-2.3	-1.5	-1.6	-2.4	-2.8	-0.4	1.6	3.6	4.7	4.6	4.1	-3.8	4.7
27-Jan	4.3	4.4	4.5	4.1	3.6	3.2	3.0	2.7	2.8	3.2	3.1	2.8	1.8	0.5	-0.3	-1.7	-3.0	-3.8	-3.9	-4.0	-4.0	-4.2	-5.4	-5.8	0.3	4.5
28-Jan	-6.1	-5.0	-4.2	-3.3	-2.6	-2.3	-2.3	-3.0	-2.7	-1.4	-0.7	0.0	0.2	-0.1	0.3	0.6	0.9	0.9	1.0	1.1	4.1	4.7	5.0	4.8	-0.4	5.0
29-Jan	4.4	4.3	3.6	2.6	2.4	2.8	2.8	2.8	2.4	2.1	3.1	4.1	5.0	5.4	5.7	5.3	4.5	4.0	3.8	2.5	0.7	0.5	0.1	-1.5	3.1	5.7
30-Jan	-1.8	-2.6	-3.6	-3.0	-2.7	-2.2	-2.8	-3.0	-3.6	-3.5	-3.0	-3.2	-3.2	-3.7	-4.4	-5.3	-6.3	-7.3	-8.3	-9.0	-9.1	-9.2	-9.7	-10.4	-5.0	-1.8
31-Jan	-11.0	-11.0	-11.0	-11.1	-11.4	-11.6	-11.9	-12.4	-12.7	-13.2	-13.2	-12.9	-13.7	-13.9	-14.0	-14.0	-14.4	-14.7	-15.1	-15.6	-16.0	-16.5	-17.7	-19.4	-13.7	-11.0
	-13.4	-13.6	-13.8	-14.0	-14.0	-13.9	-13.9	-14.0	-14.1	-13.9	-13.2	-12.3	-11.8	-11.2	-11.0	-11.1	-11.7	-12.1	-12.2	-12.5	-12.7	-13.0	-13.2	-13.5	Diurnal Average	
	4.4	4.4	4.5	4.1	3.6	3.2	3.0	2.8	2.8	3.2	3.1	4.1	5.0	5.4	5.7	5.3	4.5	4.0	3.8	2.5	4.1	4.7	5.0	4.8	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Mildred Lake - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	116	15.59	15.59
-20 - 0	571	76.75	92.34
0 - 10	57	7.66	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 98 % on Jan 28 20:00

Maximum Daily Average: 91.9 % on Jan 23

Minimum Value: 54 % on Jan 29 15:00

Minimum Daily Average: 68.9 % on Jan 1

Maximum Diurnal Average: 84.0 % at hour 4

Minimum Diurnal Average: 78.5 % at hour 15

Monthly Average: 82.4 %

Percentiles: P_1 = 58 P_{10} = 74 Q_1 = 79 Median = 83 Q_3 = 87 P_{90} = 92 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

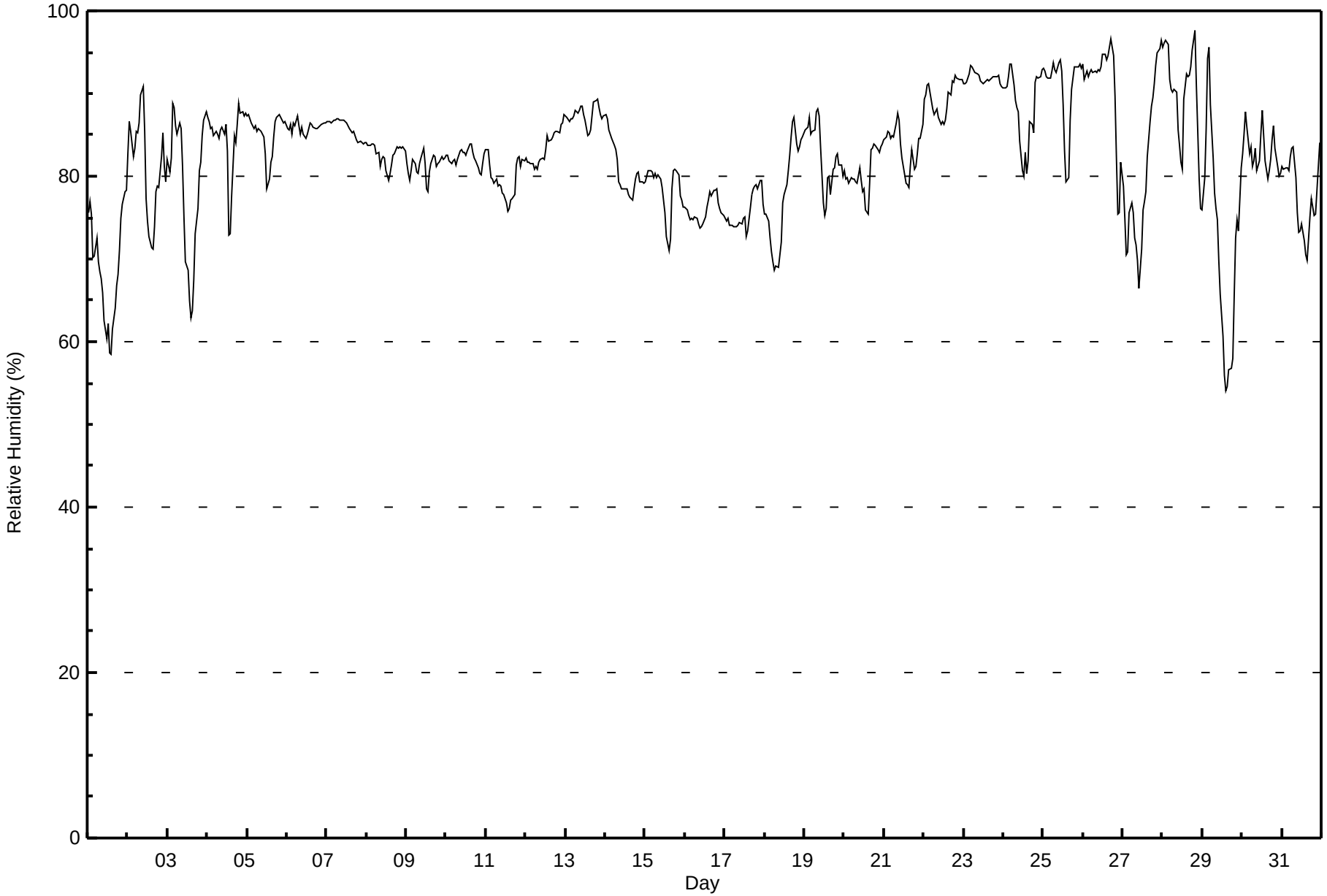
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	76	77	75	70	70	73	70	68	68	66	63	60	62	59	59	62	64	67	68	71	75	77	78	78	68.9	78
2-Jan	83	87	85	82	83	85	85	86	90	91	85	77	75	73	71	71	74	78	79	79	82	85	81	79	81.2	91
3-Jan	82	81	82	89	88	86	85	86	86	81	75	70	69	65	63	64	68	73	76	81	82	85	87	88	78.8	89
4-Jan	87	87	86	86	85	85	85	85	86	86	85	86	83	73	73	78	85	84	86	89	88	88	87	88	84.5	89
5-Jan	87	87	86	86	86	86	85	86	85	85	85	83	78	80	82	82	85	87	87	87	87	87	86	87	85.1	87
6-Jan	86	86	86	85	86	86	87	86	85	86	85	85	85	86	86	86	86	86	86	86	86	86	86	87	85.9	87
7-Jan	87	87	87	87	87	87	87	87	87	87	87	87	86	86	86	85	85	85	84	84	84	84	84	84	85.8	87
8-Jan	84	84	84	84	84	84	83	83	81	82	82	82	81	80	80	81	82	83	84	83	84	83	84	83	82.7	84
9-Jan	81	80	80	81	82	81	81	80	82	82	83	81	78	78	80	81	82	82	81	81	82	82	82	82	81.2	83
10-Jan	83	83	82	82	82	82	81	82	83	83	83	83	82	83	84	84	83	82	82	81	80	80	82	83	82.2	84
11-Jan	83	83	81	80	80	79	80	79	79	79	78	78	77	76	76	77	77	78	81	82	82	81	82	82	79.6	83
12-Jan	82	82	82	82	82	81	81	81	82	82	82	82	83	85	84	84	85	85	85	85	85	86	87	87	83.4	87
13-Jan	87	87	87	87	87	87	88	88	88	89	89	88	87	85	85	86	87	89	89	89	88	87	87	87	87.4	89
14-Jan	88	87	86	85	85	84	83	82	79	79	78	78	79	78	78	77	77	79	80	80	80	79	79	79	80.8	88
15-Jan	79	80	81	81	80	80	80	80	80	80	79	77	76	73	71	72	78	81	81	81	80	78	77	76	78.4	81
16-Jan	76	76	75	75	75	75	75	75	74	74	74	74	75	76	77	78	78	78	78	78	77	76	76	75	75.8	78
17-Jan	75	75	75	74	74	74	74	74	74	74	74	75	75	73	73	76	78	78	79	79	78	79	79	77	75.7	79
18-Jan	75	75	74	73	71	70	69	69	69	70	72	77	78	79	81	83	85	87	87	84	83	84	84	85	77.6	87
19-Jan	86	86	86	87	85	85	86	88	88	87	84	77	75	76	80	80	78	81	81	82	83	81	81	80	82.6	88
20-Jan	81	80	80	79	80	80	80	79	79	81	79	78	78	76	75	79	83	83	84	84	83	83	84	84	80.5	84
21-Jan	84	85	85	85	85	85	85	86	88	87	84	82	80	79	79	79	81	83	81	81	83	85	85	86	83.4	88
22-Jan	89	90	91	91	90	88	87	88	88	87	86	87	86	87	88	90	90	91	91	92	92	92	92	92	89.4	92
23-Jan	91	91	91	92	93	93	93	93	92	92	92	91	91	91	92	92	92	92	92	92	92	92	91	91	91.9	93
24-Jan	91	91	91	92	94	94	91	89	88	88	84	81	80	83	80	82	87	86	85	91	92	92	92	93	88.2	94
25-Jan	93	93	92	92	92	93	94	93	93	94	94	93	89	83	79	80	87	91	92	93	93	93	94	93	90.8	94
26-Jan	94	92	93	92	93	93	93	93	93	93	93	93	95	95	94	95	96	97	95	90	82	75	76	82	90.9	97
27-Jan	79	75	70	71	76	77	76	73	72	70	66	71	76	77	78	82	87	88	90	91	93	95	96	96	80.2	96
28-Jan	96	96	96	96	92	91	90	91	90	86	84	82	81	89	92	92	92	93	95	98	91	85	80	76	89.7	98
29-Jan	76	80	86	94	96	89	82	78	76	75	70	66	61	56	54	55	57	57	58	66	73	75	73	81	72.1	96
30-Jan	83	85	88	86	83	84	81	82	83	81	82	85	88	85	82	80	81	82	84	86	83	81	80	80	83.1	88
31-Jan	81	81	81	81	81	82	83	84	80	76	73	73	74	72	71	70	72	75	77	75	75	78	81	84	77.6	84
	84.0	84.0	84.0	84.0	84.0	83.8	83.2	83.0	82.8	82.3	81.0	80.0	79.5	78.6	78.5	79.4	81.3	82.6	83.2	84.0	83.9	83.8	83.6	84.0	Diurnal Average	
	96	96	96	96	96	94	94	93	93	94	94	93	95	95	94	95	96	97	95	98	93	95	96	96	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Mildred Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mildred Lake - January 2016

Maximum Speed: 23 km/h on Jan 27 00:00

Maximum Daily Speed Average: 11.4 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 6 01:00

Minimum Daily Speed Average: 0.1 km/h on Jan 8

Maximum Diurnal Speed Average: 1.6 km/h at hour 1

Minimum Diurnal Speed Average: 0.2 km/h at hour 19

Monthly Average Velocity: 0.7 km/h 237.6 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 4$ Median = 6 $Q_3 = 9$ $P_{90} = 12$ $P_{99} = 18$

Hours in Service: 744

Hours of Data: 742

Hours of Missing Data: 2

Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SW9	SSW10	SSW11	WSW12	SW11	SSW11	SW11	WSW14	WSW12	SW11	WSW12	W21	WNW18	W18	W13	W12	W18	W17	W15	WSW9	W8	W9	W9	W8	WSW11.4	W21
2-Jan	SW6	SW7	WSW9	WSW10	SW9	SW7	SSW5	SSW7	SSW8	SSW10	S8	S8	S8	SSE9	SSE7	SSE5	S5	SSE6	SE6	SSE7	S5	SSW6	SSW9	S6	SSW6.0	WSW10
3-Jan	SSW8	S8	S6	SSE5	S6	SSW8	S6	S6	S8	S10	S7	S8	S10	S8	SSE10	SSE9	S8	SSW7	S6	S5	S4	S4	SSW4	SSW3	S6.6	S10
4-Jan	S4	SSW3	SSE2	SW2	SSW1	SSE1	SE3	ESE1	N4	N2	SW1	NW1	WSW2	SSW3	S3	SE5	S5	SSW7	SSW6	SSE4	SSW6	SSW6	SSW6	SSW6	S2.5	SSW7
5-Jan	SSW6	SSE4	S4	SSW6	SSW6	S4	SSW5	S5	SSW6	SSW6	SSW6	S5	S5	SSE4	SE4	SE1	NNE3	N8	N9	N5	NNW4	NNW4	N4	SE1	S1.6	N9
6-Jan	E0	NNE3	NNE5	N4	N6	N8	N6	N5	N5	N4	N4	N7	N5	NNE5	N4	N6	N7	N6	N5	N6	NNE7	N7	N6	NNE5	N5.2	N8
7-Jan	NNE5	N6	NNE5	NNE4	N3	N1	NNW2	N3	N3	NNW3	N3	NNW5	NNW6	NNW6	NNW6	NW5	WNW5	W5	W5	W5	WNW5	NW6	NNW4	NNW6	NNW3.6	NNW6
8-Jan	N5	N4	N4	NNE4	N4	N4	N3	N4	N3	N3	N3	NNE3	ESE0	SSE3	SSE4	S3	S4	SSW3	SSW3	SSW4	SSW4	SSW5	S5	S6	NW0.1	S6
9-Jan	S5	SSW5	SSW7	SSE6	S6	S7	S6	S5	S5	S6	S7	SSE7	S7	SSE5	SSE5	SSE5	S4	S5	SSE6	S6	S4	S5	S4	S5	S5.5	SSE7
10-Jan	S4	SSE5	S6	S5	SSE5	SSE4	S5	SW1	ESE3	E2	ENE2	E3	NNE4	NNE5	N8	N9	NNE8	NNE7	NNE7	NE5	ENE3	NE1	NNE2	NNE4	NE1.7	N9
11-Jan	NNE5	N6	N7	N5	NNW4	NNW4	N3	NNW5	NNW7	WNW7	WNW8	WNW6	WSW4	WSW6	WSW6	W6	W5	WSW5	SW6	SW6	WSW3	SSW4	S3	SSW5	WNW2.9	WNW8
12-Jan	SSE4	S4	S4	S4	S3	S3	SSW2	SSW6	S4	S4	S3	S4	SSW5	S5	S5	S5	S7	S7	S5	S6	S3	SSW4	S3	SSW4	S4.3	S7
13-Jan	SSE2	NE3	NNE3	SSE1	AF	NNE3	N5	N5	NNE5	N5	NE5	ENE4	ENE5	E6	ENE5	ENE5	NE4	NNE5	NNE6	N7	NNE7	NNE8	N12	NNE13	NNE4.7	NNE13
14-Jan	NNE12	NNE13	NNE14	NNE12	NNE11	N12	NNE10	NNE10	NNE7	NNE6	NNE9	NNE10	NNE11	N11	NNE11	NNE12	NNE13	NNE11	NNE13	NNE11	NNE10	NNE7	NE6	NE6	NNE10.2	NNE14
15-Jan	NE4	N3	N4	N5	N6	N6	NNE5	N8	NNE7	N7	NNE7	N8	NNE7	N7	NNE7	NNE6	N7	N8	N8	NNE7	NNE7	NNE5	N3	WSW1	N5.7	N8
16-Jan	SSW3	SSW3	SSW3	SSW3	SE1	SSW3	SSW2	S4	SE3	SSW2	SW5	SSE2	SSW3	SSE3	SE3	S4	S3	SSW4	S4	S3	SSW4	SSW4	S4	S3	S2.9	SW5
17-Jan	SSW6	SSW5	SSW5	SSW5	SSW5	SSW5	SSW5	SSW4	S4	SW4	S5	SE4	S4	SW4	SW2	SE6	S3	SSE3	S5	ESE2	SW4	S4	S9	SSE13	S4.4	SSE13
18-Jan	SSE9	SSE9	SSE10	SSE13	SSE17	SSE17	SSE17	SSE14	SSE15	SSE11	S12	S10	SSE9	SSE11	SSE9	SSE7	SE5	E4	SE4	S8	S9	S9	SE3	SSE4	SSE9.5	SSE17
19-Jan	ENE2	SSE3	S4	AF	N4	N5	N6	N6	NNE5	NNE5	NNE9	NNE9	NNE8	NNE7	N6	NNE4	NNE5	N7	N6	N7	NNE7	NE6	NE6	NNE6	NNE5.0	NNE9
20-Jan	NE9	NNE9	NNE9	N8	NNE8	N6	N7	N7	NNE6	NNE6	NNE3	S2	S4	S4	SSE4	SSE4	SE2	ESE2	S5	S4	S4	S5	S7	S8	NE1.6	NNE9
21-Jan	S8	S7	S6	SSE9	S9	SSE10	S10	S8	SSW7	S8	S8	S8	S9	S9	SSE10	SSE10	SSE11	SSE12	SSE18	SSE14	SSE12	SSE12	SSE14	SSW9	SSE9.5	SSE18
22-Jan	SSW4	S5	SSW6	SSW7	WSW2	SW5	WSW3	SE1	NNE3	N6	N4	NNW5	N6	N9	N11	N9	N8	N9	NNE8	NNE7	N6	NNE5	NNE5	N7	N3.3	N11
23-Jan	NNE8	NNE7	NNE7	NNE7	N6	N6	N7	N6	NNE5	NNE4	NE2	NNW3	N4	NE2	S1	SSW2	SW2	WSW1	S2	SSW4	SSW4	SSW5	SSW7	SE5	N1.7	NNE8
24-Jan	S5	S6	S8	S8	S9	SW6	W8	W9	W9	WSW10	SW9	SW9	SW11	WSW11	SW9	SSW8	SSW8	WNW6	NW10	N12	NNE14	NNE12	NNE9	NNE8	WSW3.7	NNE14
25-Jan	NNE5	NE2	E5	E3	SSE3	S6	SSW9	S8	S10	S11	S12	S12	S12	SSE12	S10	SSW4	S7	SSE8	SSE8	S8	S8	SSW7	S7	SSW6	S6.5	S12
26-Jan	SW7	SW7	SSW7	S6	SE5	SSE7	SSE7	SE6	SSE6	S7	S5	SE6	SSE6	SE6	SSE8	SSE8	SSE8	SSE7	S9	SW8	WSW13	W19	WNW23	WNW23	SSW5.2	WNW23
27-Jan	WNW23	W22	WNW21	WNW19	NW11	WSW6	WNW10	NW13	WNW12	WNW12	NW13	N11	NE8	NE12	NE11	NNE11	N11	NNE10	N8	NNW8	N5	ENE3	S2	SSW3	NW7.6	WNW23
28-Jan	SSW4	SSW5	S6	S8	SSW8	SW3	SSW8	S7	S7	SSE13	S8	S6	SSW4	S4	S6	S9	S8	S8	S8	S6	WSW14	WSW14	WSW16	W14	SSW6.6	WSW16
29-Jan	WSW14	WNW14	WNW17	NW12	WNW9	NW13	NW15	NW16	WNW16	NW9	WNW11	WNW11	NW12	NW15	NW14	NW11	NW10	WNW12	WNW14	W8	W6	WNW8	NNW6	WSW6	WNW11.1	WNW17
30-Jan	W7	WSW7	SSW3	W7	WSW9	W7	WSW5	NW4	WNW8	NNW7	N7	NNE8	NNE8	NE10	NE11	NE12	NE12	NE11	NE13	NE10	NE8	NE6	NE8	NE7	NNE4.5	NE13
31-Jan	NE7	NE7	NE7	NE8	NE9	NE7	NE10	NE9	NE10	NNE14	NNE10	NNE10	NE12	NE12	NNE13	NNE9	NNE9	NE7	NE7	NE7	NE7	NE6	NE4	ENE3	NE8.4	NNE14
	WSW1.6	SW1.5	SW1.0	WSW1.4	SW1.1	SW1.2	WSW1.4	W1.2	W1.0	WSW1.0	WSW1.0	WSW0.3	S0.3	E0.3	ESE0.5	E0.8	NE0.2	N0.5	NNE0.2	SSE0.3	WSW0.7	WSW1.3	WSW1.2	SW1.2	Diurnal Average	
	WNW23	W22	WNW21	WNW19	SSE17	SSE17	SSE17	NW16	WNW16	NNE14	NW13	W21	WNW18	W18	NW14	W12	W18	W17	SSE18	SSE14	WSW14	W19	WNW23	WNW23	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Mildred Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Jan 26 23:00

Minimum Value: 0 km/h on Jan 8 16:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 6$

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

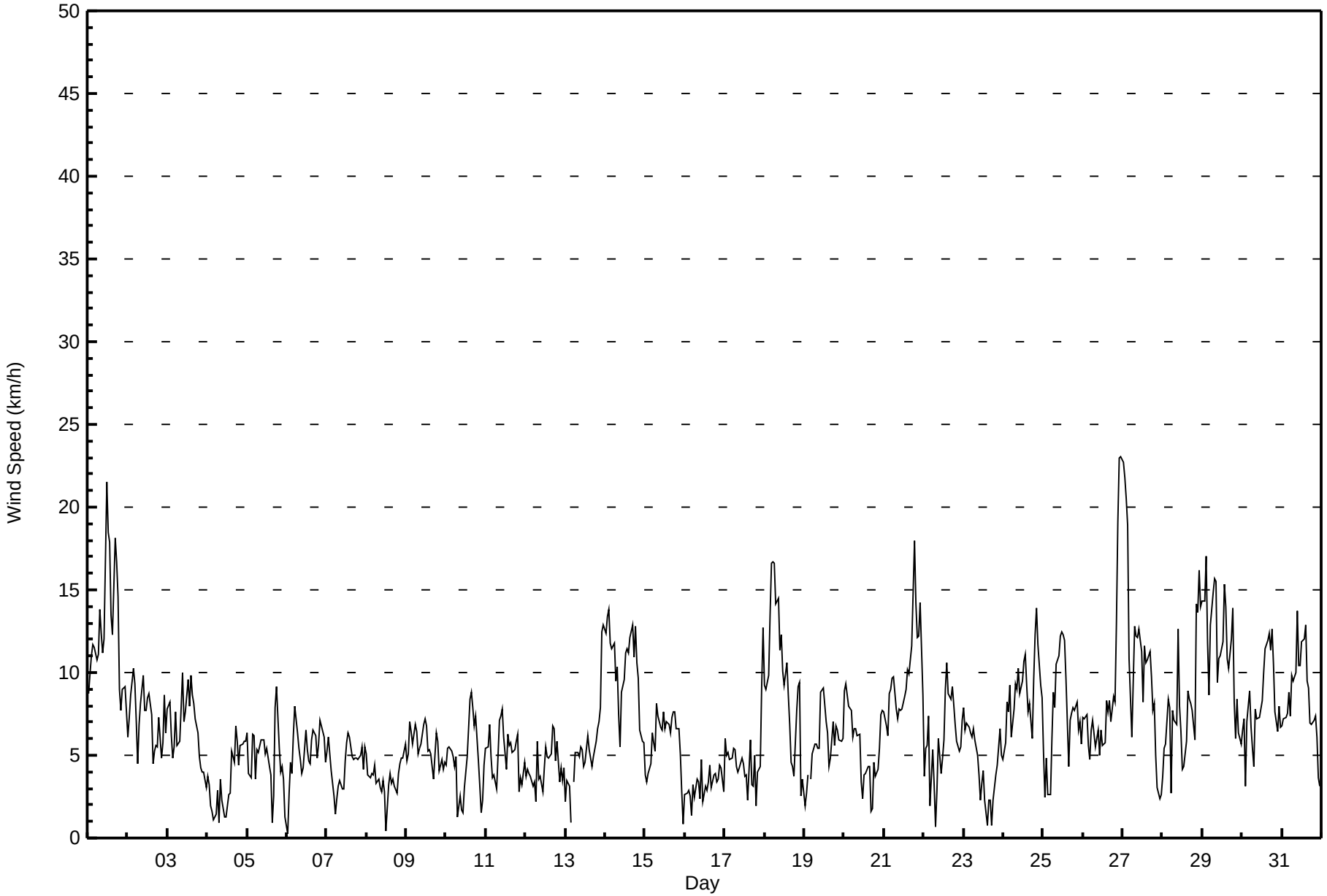
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Mildred Lake - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	305	41.11	41.11
6 - 11	356	47.98	89.08
12 - 19	75	10.11	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: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Mildred Lake - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	40	33	10	9	6	5	16	26	72	48	11	9	4	2	3	11	305
6 - 11	55	55	28	0	1	0	5	35	71	41	17	11	13	10	6	8	356
12 - 19	3	12	6	0	0	0	0	15	4	0	0	9	8	9	9	0	75
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	2	4	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	98	100	44	9	7	5	21	76	147	89	28	29	27	25	18	19	742

Total Number of Valid Hours: 742

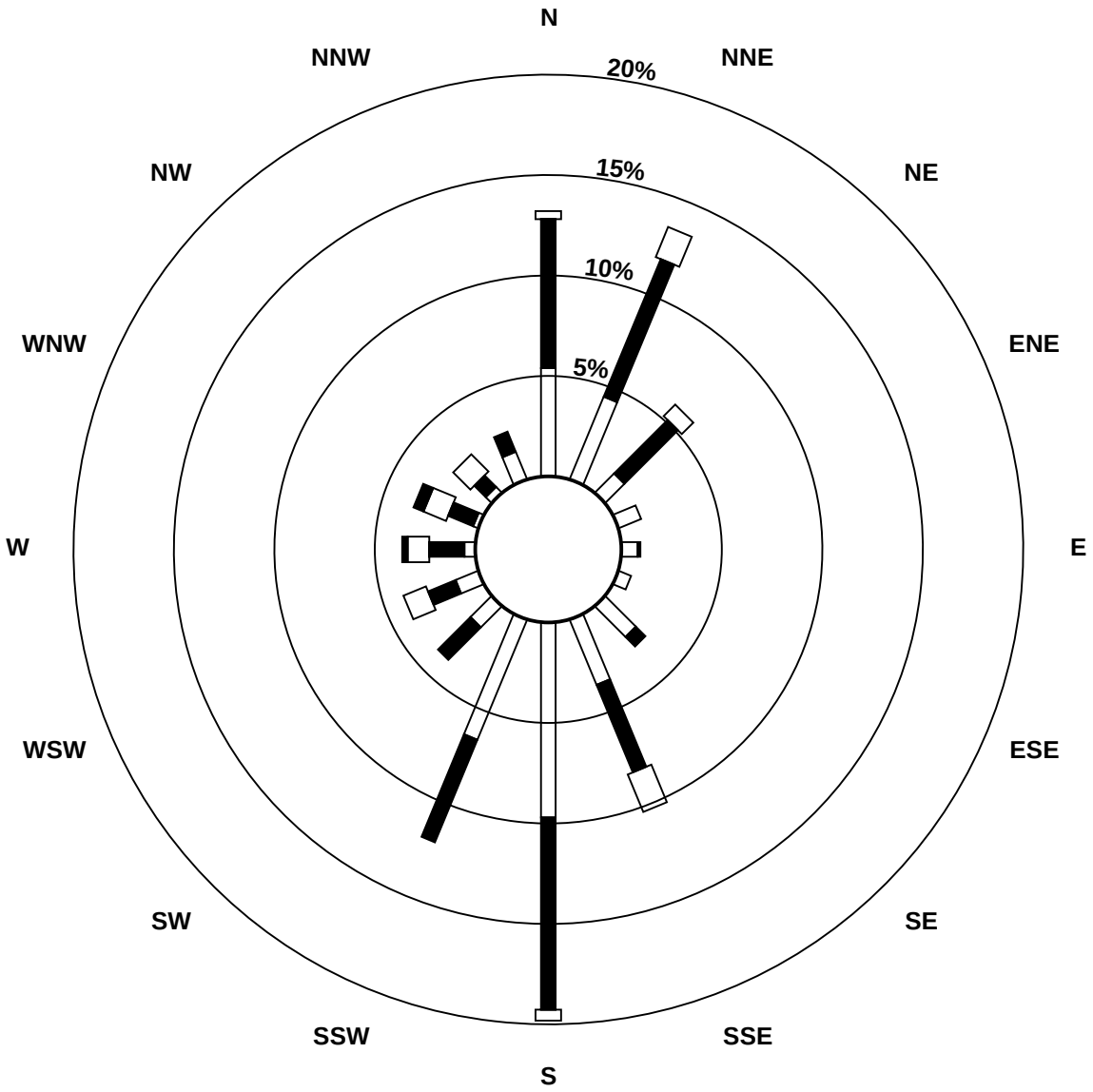
Total Number of Hours: 744

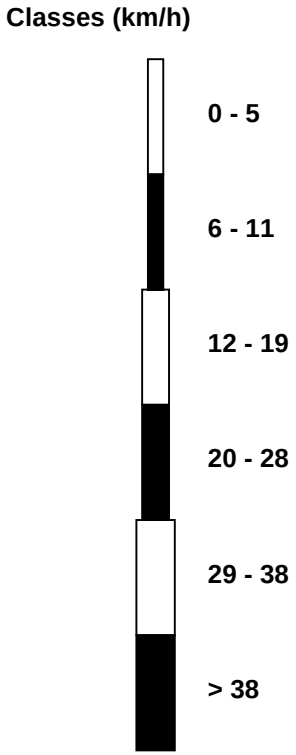
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

Mildred Lake (AMS 2)





Total Number of Valid Hours: 742

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Mildred Lake - January 2016

Direction of Maximum Speed: 285 deg on Jan 27 00:00
Direction of Maximum Daily Speed Average: 254.8 deg on Jan 1

Direction of Minimum Speed: 91 deg on Jan 6 01:00

Direction of Minimum Daily Speed Average: 0.1 deg on Jan 8

Monthly Average Direction: 214.4 deg

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	224	212	202	247	221	208	232	243	241	233	242	279	284	279	260	267	279	274	276	244	264	270	262	273	254.8
2-Jan	229	223	248	258	235	226	210	195	192	211	187	176	170	148	167	157	173	167	133	153	185	192	197	171	194.4
3-Jan	201	191	172	166	190	195	182	189	175	181	191	190	169	169	165	168	179	192	177	169	180	185	192	208	181.3
4-Jan	173	206	150	234	195	158	142	112	8	358	225	316	249	198	175	129	173	210	193	166	208	203	201	197	189.5
5-Jan	205	154	173	201	200	170	203	186	201	202	193	172	184	149	142	133	28	10	6	1	333	347	4	145	187.5
6-Jan	91	19	23	7	10	4	358	1	6	10	11	10	9	28	4	8	9	5	5	0	13	9	9	14	8.8
7-Jan	12	11	18	25	6	2	348	3	359	346	2	348	333	332	341	324	288	278	266	263	290	304	332	339	333.8
8-Jan	356	9	8	15	9	355	355	7	10	6	11	17	121	160	167	180	181	198	209	206	205	201	188	175	315.7
9-Jan	182	194	192	161	185	191	180	187	188	179	169	167	170	167	162	162	181	170	167	174	172	175	188	189	176.8
10-Jan	180	168	171	188	162	162	189	225	111	99	73	88	32	12	6	5	22	25	17	41	57	46	24	17	55.1
11-Jan	13	8	2	357	343	341	5	343	333	297	294	296	250	240	254	269	261	242	215	215	246	205	190	198	287.7
12-Jan	162	181	172	177	183	187	198	199	179	176	186	190	193	171	189	185	184	177	177	182	183	197	184	205	184.0
13-Jan	147	54	13	167	AF	22	3	6	14	8	40	63	66	82	78	76	43	31	12	6	17	21	3	12	28.5
14-Jan	19	19	20	17	21	8	15	21	17	26	21	17	19	11	27	24	22	26	20	16	21	30	36	41	20.5
15-Jan	44	8	1	7	356	6	29	2	16	6	12	4	13	2	27	27	4	5	8	16	12	19	4	245	10.8
16-Jan	199	200	203	213	127	205	193	179	132	203	215	160	193	157	129	182	175	198	186	182	213	208	186	181	186.9
17-Jan	207	200	193	208	209	211	211	195	177	215	189	144	188	218	229	127	179	166	183	118	226	190	179	165	188.2
18-Jan	162	166	149	158	162	157	160	163	166	166	169	169	168	166	167	159	137	98	129	182	184	191	128	154	162.8
19-Jan	63	162	171	AF	358	357	356	4	12	20	17	27	28	15	2	20	14	4	5	10	22	47	46	30	18.7
20-Jan	34	23	16	7	24	7	1	7	14	13	31	190	190	170	150	147	139	110	183	173	177	183	170	175	54.8
21-Jan	187	188	178	166	170	162	184	181	192	169	175	171	169	174	154	152	150	150	155	148	156	165	165	194	166.5
22-Jan	196	185	200	212	247	233	247	138	15	5	360	345	1	0	353	353	5	7	15	19	10	14	12	11	355.1
23-Jan	14	22	19	16	9	0	4	359	12	22	40	338	4	39	175	211	218	243	179	200	196	200	199	146	10.6
24-Jan	182	173	187	177	191	218	266	267	277	255	224	215	227	244	229	209	207	282	322	353	13	16	24	18	252.7
25-Jan	15	39	80	97	147	169	198	186	188	176	186	185	170	162	189	198	170	165	152	173	169	194	188	205	175.0
26-Jan	230	219	197	179	127	151	167	144	157	169	176	142	158	144	158	148	163	148	182	214	243	275	282	285	205.6
27-Jan	284	279	292	301	323	256	291	304	296	289	310	8	45	35	34	24	11	13	0	346	4	76	170	195	321.8
28-Jan	199	213	169	190	192	215	201	190	171	163	178	182	194	190	188	183	178	180	171	187	253	255	258	261	204.3
29-Jan	258	282	295	311	300	308	316	305	300	314	299	296	313	315	309	308	306	301	295	275	260	285	331	254	299.0
30-Jan	266	258	201	272	249	274	252	317	301	344	11	32	28	40	48	49	46	40	42	51	56	35	49	46	18.1
31-Jan	51	49	52	43	45	48	51	44	41	29	21	28	43	38	27	30	31	34	40	44	46	49	55	62	39.7
	239.1	234.5	223.9	241.5	217.3	222.6	239.8	268.4	265.0	243.1	238.0	257.8	182.1	89.9	111.1	97.9	50.9	353.6	18.8	151.1	256.6	250.2	239.3	235.3	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Mildred Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 90 deg on Jan 22 08:00

Minimum Value: 9 deg on Jan 15 19:00

Percentiles: P_1 = 10 P_{10} = 12 Q_1 = 14 Median = 17 Q_3 = 22 P_{90} = 35 P_{99} = 75

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	24	20	18	26	30	20	23	20	19	22	30	19	19	20	22	21	20	20	22	27	16	19	15	20	30
2-Jan	15	12	18	16	23	22	44	29	12	10	13	12	14	19	13	22	24	26	24	20	18	15	11	26	44
3-Jan	19	15	20	20	20	14	19	11	12	14	15	16	12	12	12	9	11	9	39	52	28	20	16	25	52
4-Jan	32	19	61	49	78	67	17	59	18	49	50	76	45	33	36	18	37	11	13	27	12	18	14	15	78
5-Jan	14	33	40	17	14	24	17	11	10	15	18	19	17	20	20	63	36	10	11	18	18	12	52	69	69
6-Jan	84	25	20	17	11	11	13	12	11	15	19	13	12	15	13	13	12	13	12	12	13	12	13	14	84
7-Jan	16	15	19	22	14	46	20	18	12	13	17	16	15	13	10	20	21	22	30	22	21	17	26	28	46
8-Jan	13	13	15	14	12	10	17	12	12	11	13	17	77	17	15	13	11	19	17	16	18	17	14	12	77
9-Jan	14	14	16	13	17	13	17	19	15	16	11	10	12	16	15	11	15	11	12	15	18	11	19	15	19
10-Jan	10	13	14	20	19	31	22	75	26	19	37	25	20	19	13	14	18	18	15	21	27	34	33	14	75
11-Jan	11	11	13	12	15	14	19	25	15	18	15	21	28	26	28	28	28	31	13	15	47	22	27	17	47
12-Jan	14	21	16	22	23	17	33	16	20	24	25	23	19	19	19	16	15	18	19	21	49	31	18	11	49
13-Jan	52	30	25	71	AF	22	14	10	13	12	16	19	20	15	15	16	22	17	12	11	14	17	14	14	71
14-Jan	15	15	16	17	17	15	16	17	16	19	16	17	17	15	17	17	16	17	14	14	15	18	17	16	19
15-Jan	17	19	17	11	14	29	23	11	19	12	13	11	16	19	20	18	9	11	9	9	10	14	46	58	58
16-Jan	47	18	24	25	45	22	53	21	35	32	20	48	35	29	25	15	27	19	17	25	17	13	37	41	53
17-Jan	10	23	21	14	14	10	11	18	21	19	29	36	36	25	56	22	48	54	26	63	31	28	15	12	63
18-Jan	15	14	17	15	14	14	13	13	11	12	13	14	13	11	11	14	21	15	25	17	16	16	48	26	48
19-Jan	53	35	10	AF	15	10	12	12	13	13	13	16	20	16	14	16	17	12	11	11	17	16	18	16	53
20-Jan	16	17	15	13	15	15	12	13	16	15	40	65	25	19	27	15	51	49	18	21	24	24	15	15	65
21-Jan	15	13	17	12	14	11	13	15	13	12	16	14	15	15	20	17	14	17	17	18	15	12	15	15	20
22-Jan	52	20	10	14	84	30	37	90	43	14	26	18	17	10	9	11	11	11	14	15	12	16	13	13	90
23-Jan	14	15	14	13	10	11	11	12	17	19	24	9	19	35	75	14	41	50	15	13	17	23	19	20	75
24-Jan	20	18	16	15	19	52	24	20	18	24	26	16	21	23	20	13	28	60	31	14	13	14	18	14	60
25-Jan	23	63	15	29	46	19	14	15	16	16	16	16	12	14	19	35	11	14	14	13	13	18	13	41	63
26-Jan	22	32	20	36	25	13	16	17	15	18	23	28	19	17	16	16	12	16	18	16	24	19	19	18	36
27-Jan	18	17	18	19	33	35	23	16	16	22	27	14	26	19	17	17	15	13	17	16	23	59	48	41	59
28-Jan	29	36	20	21	19	64	21	17	20	14	15	17	18	32	29	15	14	16	15	28	22	23	22	22	64
29-Jan	23	22	16	15	15	17	15	17	16	15	19	16	17	16	14	15	14	15	17	28	28	45	37	23	45
30-Jan	25	20	52	27	23	50	42	49	26	13	15	21	22	21	18	18	16	18	19	19	18	25	20	18	52
31-Jan	16	17	16	17	16	17	18	16	18	18	17	20	18	19	18	18	17	18	17	16	17	17	23	11	23
	84	63	61	71	84	67	53	90	43	49	50	76	77	35	75	63	51	60	39	63	49	59	52	69	
	Diurnal Maximum																								

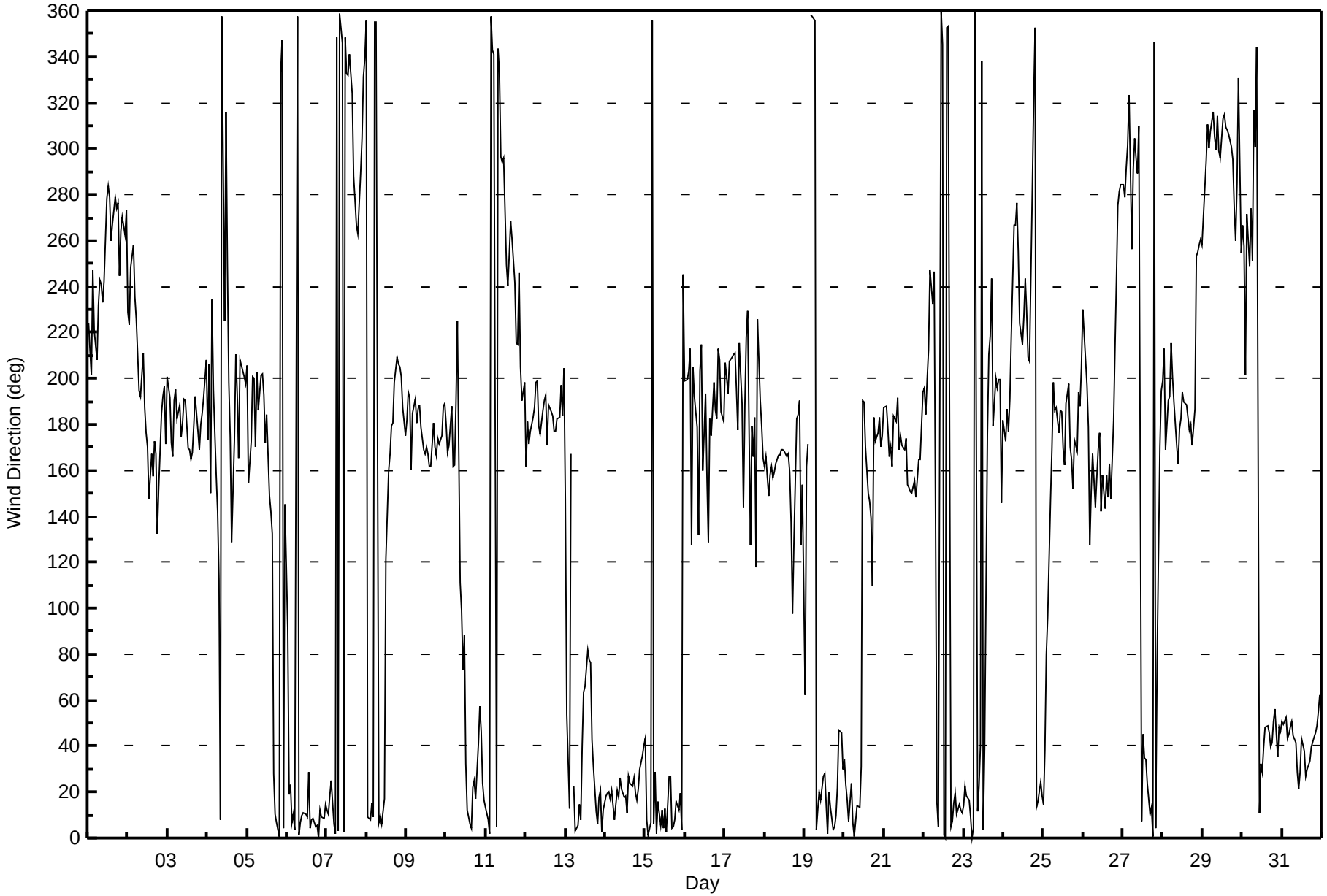
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Mildred Lake - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 5, 2016	Last Calibration	December 3, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	13:20
Gas Cert Reference	SA1301009	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	792	798
Calculated slope	0.998497	1.000702	Chamber temp	45.0	45.0
Calculated intercept	0.410876	1.280703	Pressure	682.5	699.4
Analyzer Background	21.5	21.3	Flow	0.482	0.496
Analyzer Coefficient	0.980	0.963	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	791.4	0.986
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	82.7	780.7	779.8	1.001
second point	5000	41.5	391.8	388.9	1.007
third point	5000	20.8	196.4	193.8	1.013
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	82.7	780.7	780.5	1.000
				Average Correction Factor	1.007

Corrected As found	790.9	Previous response	781.5	% change	-1.2%

Notes:

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

Calibration Performed By: Evan Magill

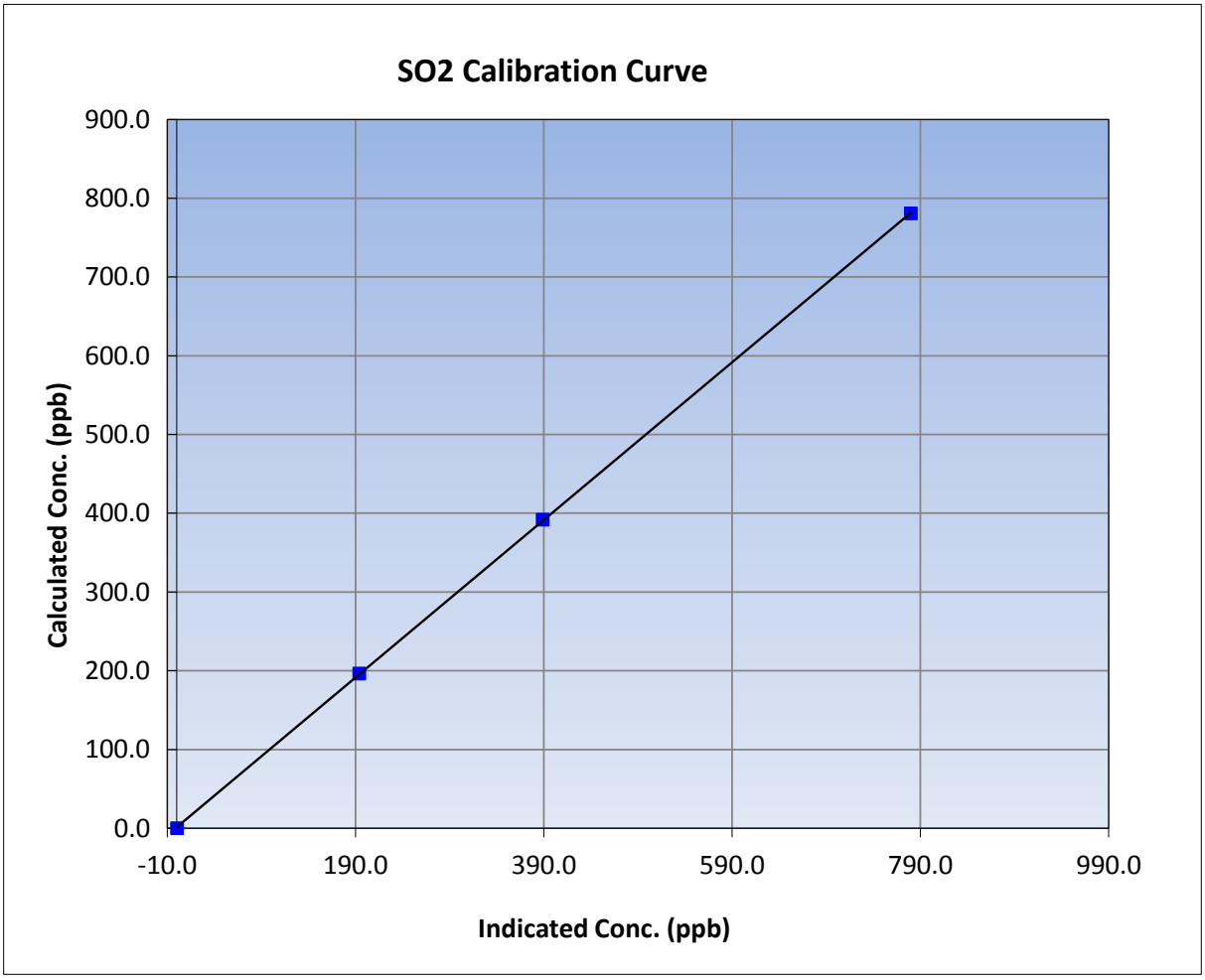
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

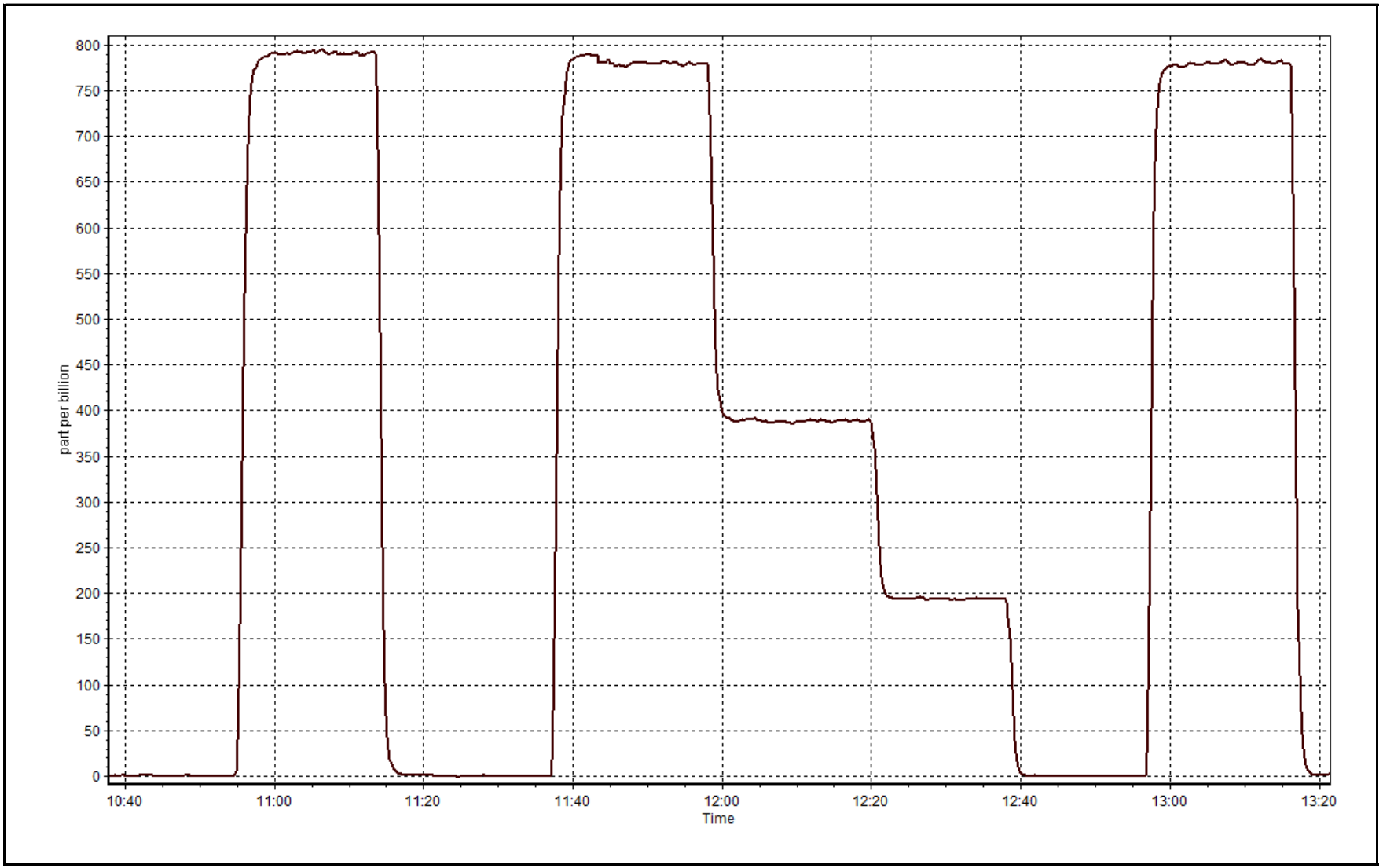
Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:40	End Time (MST)	13:20
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999981
780.7	779.8	1.0011		
391.8	388.9	1.0075	Slope	1.000702
196.4	193.8	1.0131		
			Intercept	1.280703



SO2 Calibration Plot Date: January 5, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 5, 2016	Last Calibration	December 3, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	13:25	End Time (MST)	16:35
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	-600
Analyzer IP address	192.168.1.42		Lamp voltage	781	784
Calculated slope	0.992494	0.992638	Chamber temp	45	45
Calculated intercept	0.135986	0.066376	Pressure	616.6	649.2
Analyzer Background	14.4	14.3	Flow	0.644	0.534
Analyzer Coefficient	0.971	0.971	Intensity	88	87
			Converter temp.	327	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	4000	64.1	80.8	81.3	0.993
SO2 scrubber check	5000	21.2	200.1	1.8	----
calibrator zero	4000	0.0	0.0	0.0	----
high point	4000	64.1	80.8	81.3	0.993
second point	4000	32.1	40.4	40.7	0.994
third point	4000	16.1	20.3	20.3	1.001
as left zero	5000	0.0	0.0	0.1	----
as left span	4000	64.1	80.8	82.0	0.984
				Average Correction Factor	0.996

Corrected As found	81.0	Previous response	81.2	% change	0.3%

Notes:

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

Calibration Performed By: Evan Magill

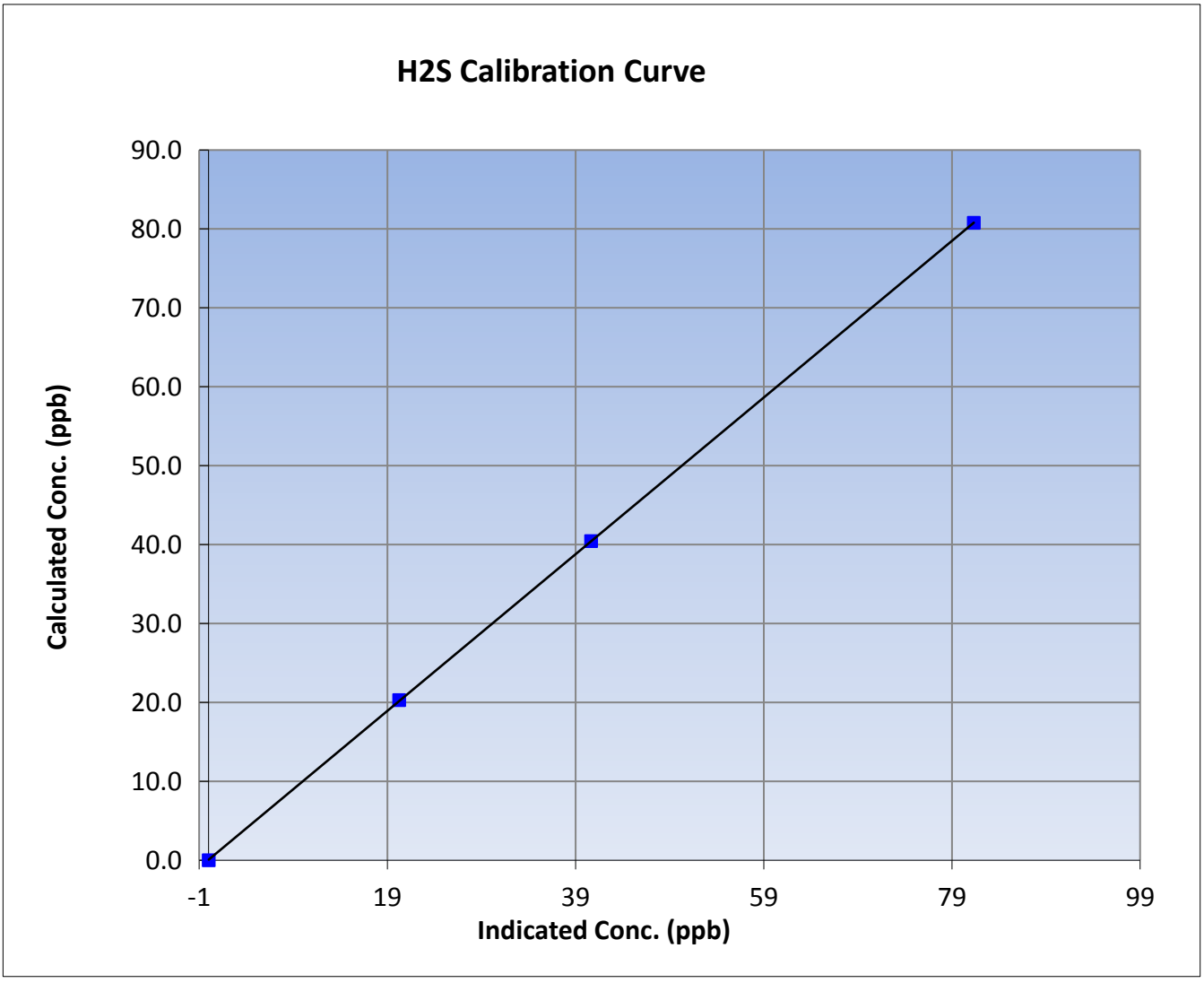
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

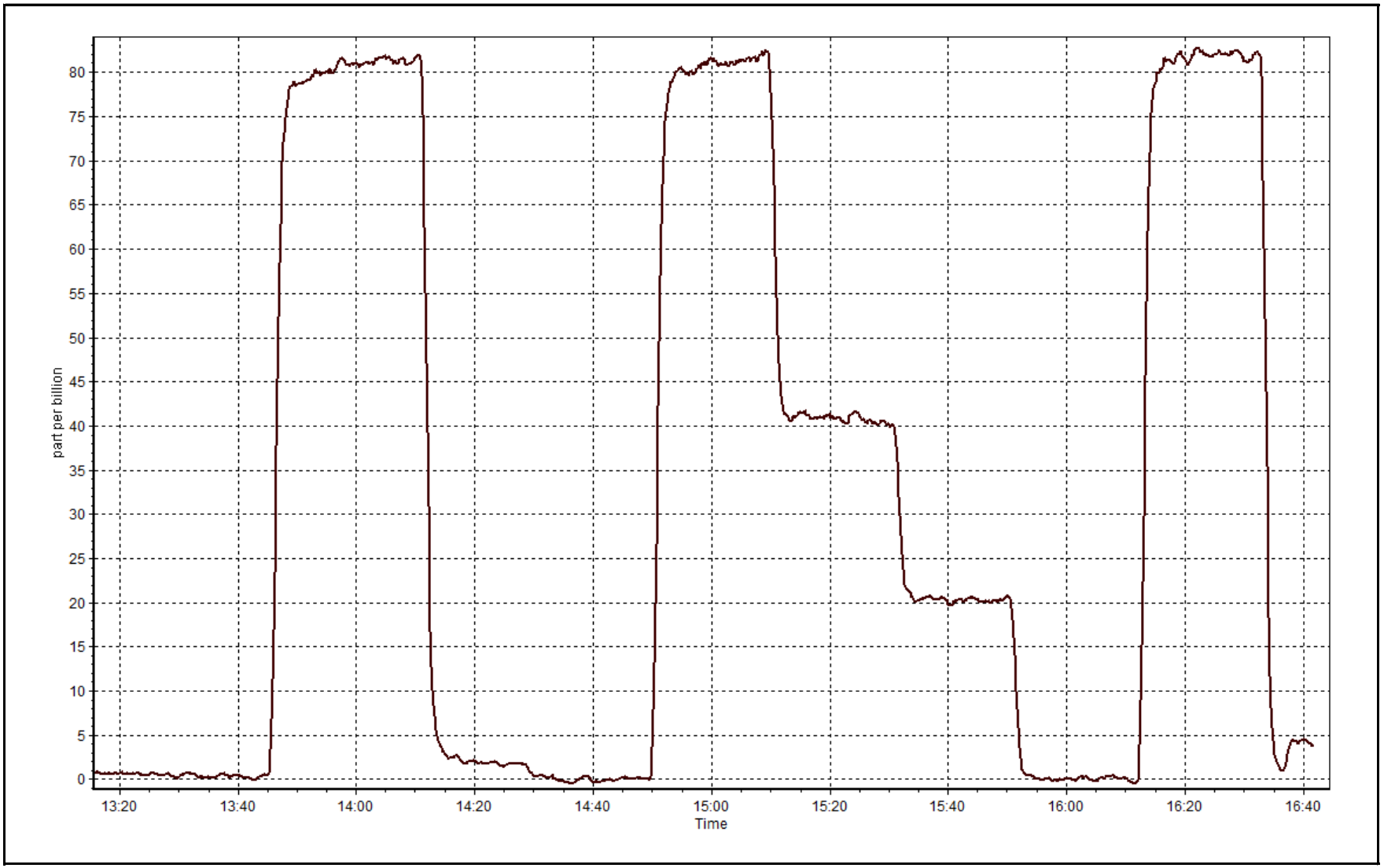
Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:25	End Time (MST)	16:35
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999994
80.8	81.3	0.9931		
40.4	40.7	0.9945	Slope	0.992638
20.3	20.3	1.0013		
			Intercept	0.066376



H2S Calibration Plot Date: January 5, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-05-16	Last Calibration	December-03-15
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	13:20
Gas Cert Reference	SA1301009	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1087.5 ppm
C3H8 Cal Gas Conc.	210 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.8	39.8
Calculated slope	0.997475	0.997897	Fuel Pressure	25.6	25.6
Calculated intercept	0.009760	0.033424	Analyzer Coeff	4.749	4.750
			Analyzer BKG	2.37	2.58

Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.20	----
as found span	5000	82.7	17.99	18.20	0.988
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	82.7	17.99	18.01	0.999
second point	5000	41.5	9.03	8.99	1.004
third point	5000	20.8	4.52	4.47	1.012
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	82.7	17.99	17.86	1.007
				Average Correction Factor	1.005

Corrected As found	18.00	Previous response	18.02	% change	0.1%

Notes:

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

Calibration Performed By: Evan Magill

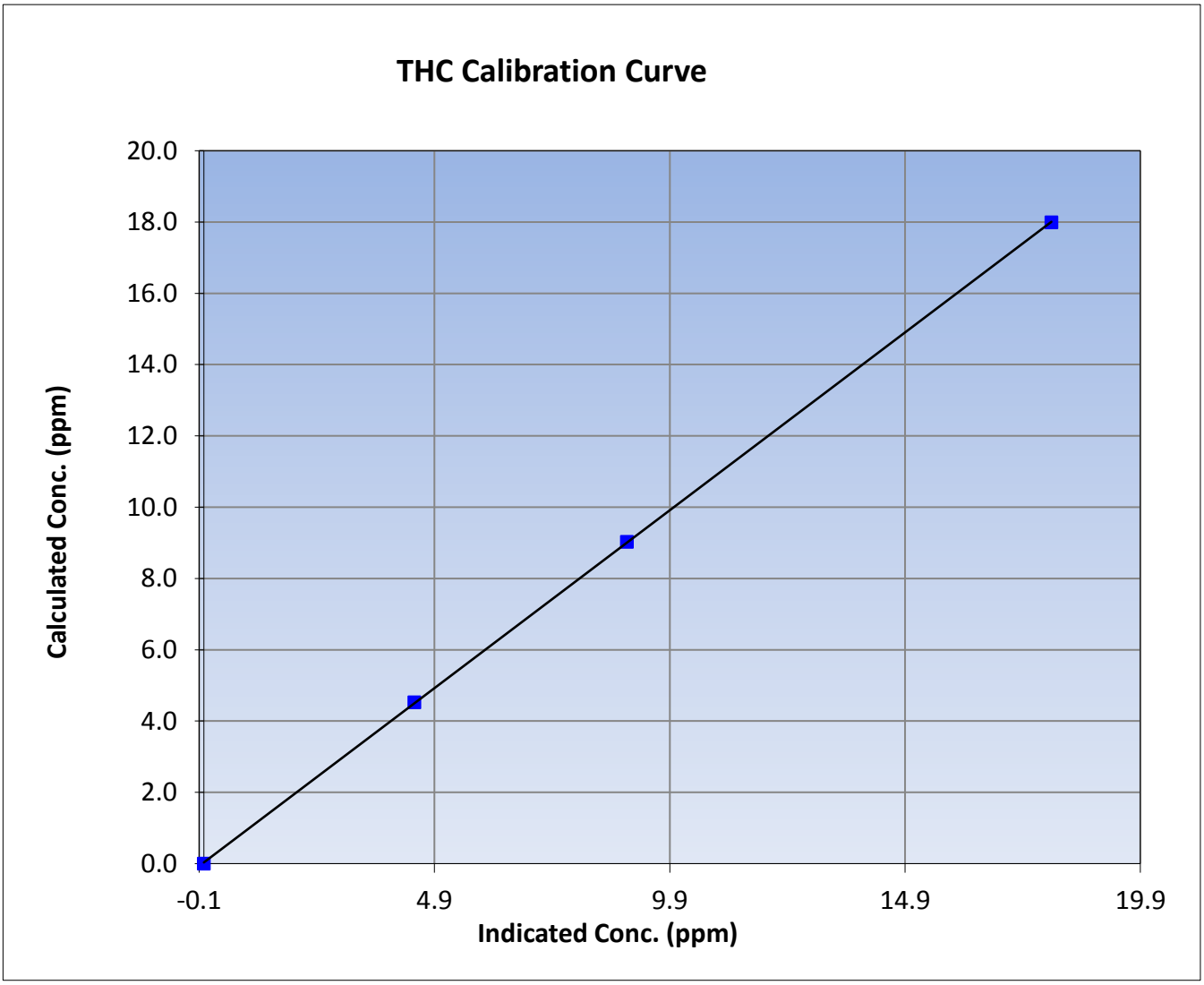
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

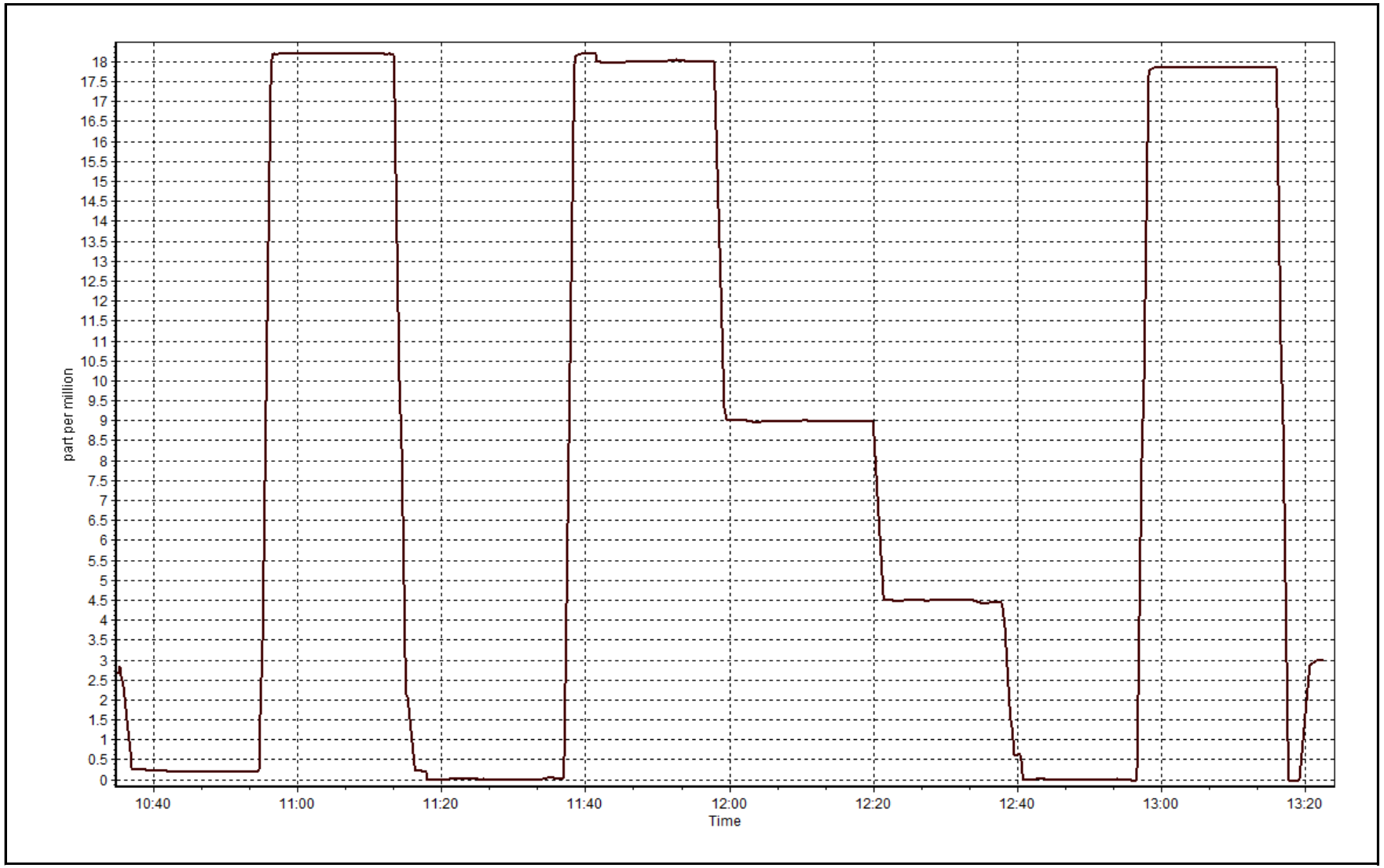
Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:40	End Time (MST)	13:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999984
17.99	18.01	0.9987		
9.03	8.99	1.0040	Slope	0.997897
4.52	4.47	1.0121		
			Intercept	0.033424



THC Calibration Plot Date: January 5, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3
LOWER CAMP METEOROLOGY
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
JANUARY 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	6.7	-	3.6	-
Temperature 45 m (C) Average	744	0	0	100.00	6.4	-	3.7	-
Temperature 100 m (C) Average	744	0	0	100.00	6.1	-	3.9	-
Temperature 167 m (C) Average	744	0	0	100.00	6	-	3.7	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	95	-	89.0	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	94	-	89.0	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	94	-	90.0	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	96	-	89.0	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	24	-	15.0	-
Wind Speed 45 m (km/h) Average	734	0	10	98.66	32	-	17.0	-
Wind Speed 100 m (km/h) Average	703	0	41	94.49	46	-	26.0	-
Wind Speed 167 m (km/h) Average	725	0	19	97.45	57	-	33.0	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	734	0	10	98.66	-	-	-	-
Wind Direction 100 m (deg) Average	703	0	41	94.49	-	-	-	-
Wind Direction 167 m (deg) Average	725	0	19	97.45	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	0.6	-	0.1	-
Vertical Wind Speed 45 m (km/h) Average	734	0	10	98.66	2.1	-	0.8	-
Vertical Wind Speed 100 m (km/h) Average	703	0	41	94.49	3.5	-	1.3	-
Vertical Wind Speed 167 m (km/h) Average	725	0	19	97.45	4	-	1.5	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	-12.99	8.1	-	-33	-21.8	-18.2	-13.5	-8.1	-2.3	6.7
Temperature 45 m (C) Average	744	-12.83	8	-	-32	-21.6	-18.1	-13.5	-8.1	-2.1	6.4
Temperature 100 m (C) Average	744	-12.16	8	-	-31.1	-21.3	-18.2	-13.2	-6.6	-0.8	6.1
Temperature 167 m (C) Average	744	-11.76	8	-	-28.8	-21.3	-17.9	-12.8	-5.7	0	6
Relative Humidity 20 m (%) Average	744	80.1	7	-	48	72	76	80	85	89	95
Relative Humidity 45 m (%) Average	744	78.8	7	-	48	70	75	79	84	88	94
Relative Humidity 100 m (%) Average	744	79.1	8	-	47	68	76	80	84	89	94
Relative Humidity 167 m (%) Average	744	78.6	9	-	37	65	76	81	84	88	96
Wind Speed 20 m (km/h) Average	744	6.6	4	-	0	2	3	6	9	13	24
Wind Speed 45 m (km/h) Average	734	8.8	6	-	0	2	4	8	12	16	32
Wind Speed 100 m (km/h) Average	703	12	8	-	0	4	7	10	15	22	46
Wind Speed 167 m (km/h) Average	725	14.3	9	-	0	5	8	12	18	28	57
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	734	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	703	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	725	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	-0.03	0.2	-	-0.9	-0.3	-0.1	0	0.1	0.2	0.6
Vertical Wind Speed 45 m (km/h) Average	734	0.15	0.5	-	-1.6	-0.3	-0.1	0	0.4	0.9	2.1
Vertical Wind Speed 100 m (km/h) Average	703	0.24	0.6	-	-2.5	-0.3	0	0.1	0.4	1	3.5
Vertical Wind Speed 167 m (km/h) Average	725	0.48	0.8	-	-2.7	-0.2	0.1	0.3	0.8	1.5	4

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	06 Jan 2016 23:00	07 Jan 2016 08:00	10	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	06 Jan 2016 08:00	07 Jan 2016 19:00	36	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	09 Jan 2016 11:00	09 Jan 2016 15:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	06 Jan 2016 17:00	07 Jan 2016 05:00	13	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	17 Jan 2016 10:00	17 Jan 2016 11:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	23 Jan 2016 16:00	23 Jan 2016 19:00	4	Flat line in sensor output signal - Sensor frozen

Maximum Value: 6.7 C on Jan 29 15:00

Maximum Daily Average: 3.6 C on Jan 29

Minimum Value: -33.0 C on Jan 16 05:00

Minimum Daily Average: -29.9 C on Jan 16

Maximum Diurnal Average: -11.0 C at hour 15

Minimum Diurnal Average: -14.3 C at hour 10

Monthly Average: -12.99 C

Percentiles: P_1 = -31.9 P_{10} = -21.8 Q_1 = -18.2 Median = -13.5 Q_3 = -8.1 P_{90} = -2.3 P_{99} = 5.2

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

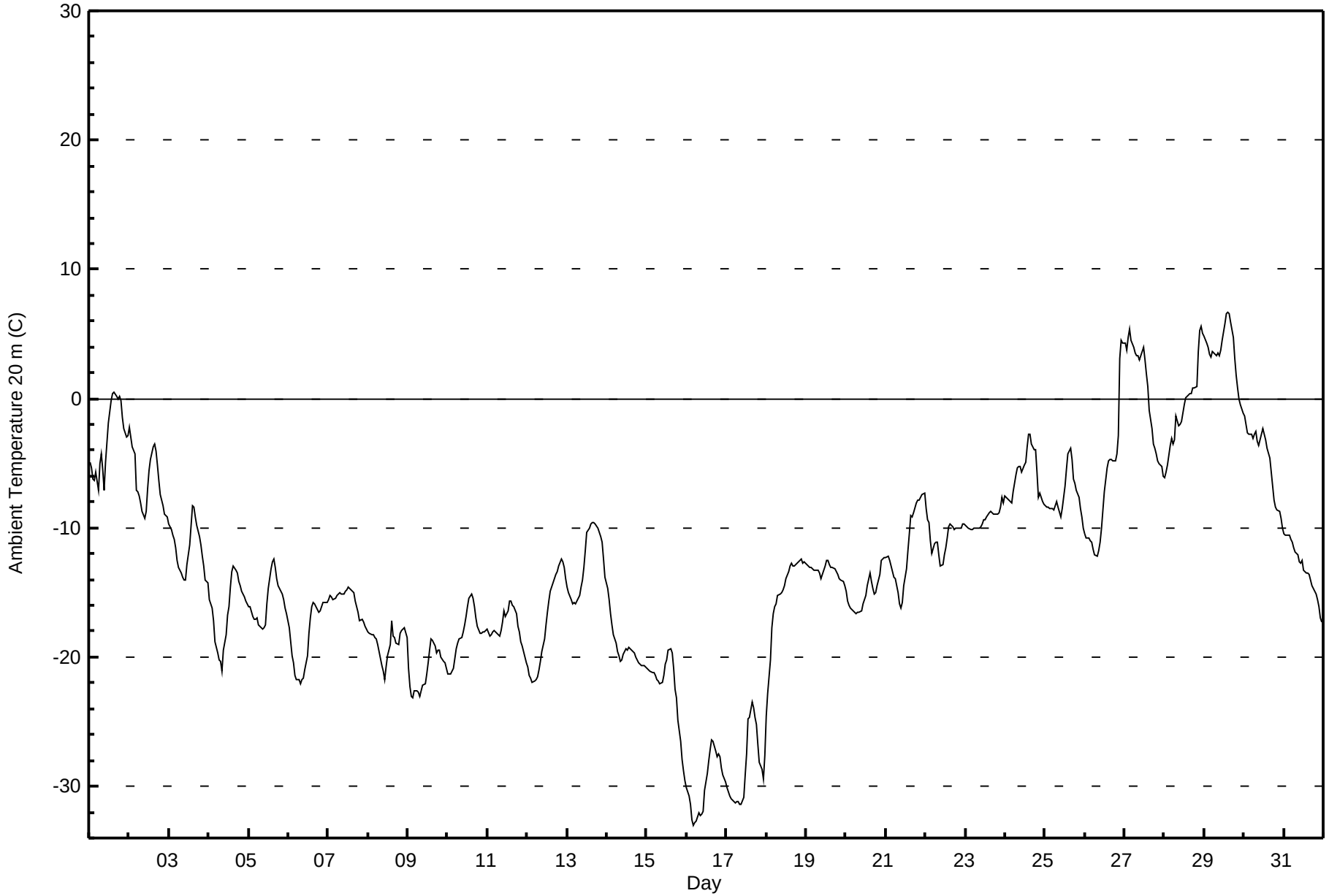
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-4.9	-5.4	-6.3	-6.3	-5.7	-7.1	-5.1	-4.3	-5.5	-7.1	-4.9	-1.9	-1.1	-0.1	0.4	0.5	0.2	0.0	0.2	-0.2	-1.5	-2.3	-2.9	-2.9	-3.1	0.5
2-Jan	-2.2	-3.0	-3.7	-4.3	-7.1	-7.2	-7.5	-8.1	-8.7	-9.2	-8.8	-7.0	-5.6	-4.7	-3.8	-3.6	-4.1	-5.2	-6.4	-7.4	-8.3	-9.0	-9.1	-9.1	-6.4	-2.2
3-Jan	-9.7	-10.2	-10.6	-10.9	-11.5	-12.5	-13.0	-13.5	-13.8	-14.1	-14.0	-12.9	-11.3	-9.8	-8.3	-8.4	-9.1	-9.8	-10.6	-11.4	-12.2	-12.9	-14.1	-14.3	-11.6	-8.3
4-Jan	-15.6	-15.9	-16.3	-17.2	-18.8	-19.6	-20.3	-20.4	-21.1	-19.5	-18.3	-16.7	-16.1	-14.5	-13.4	-13.0	-13.2	-13.6	-14.1	-14.4	-14.9	-15.4	-15.6	-15.9	-16.4	-13.0
5-Jan	-16.1	-16.2	-16.9	-17.1	-17.1	-17.0	-17.5	-17.6	-17.8	-17.8	-17.5	-15.8	-14.7	-13.1	-12.6	-12.5	-13.1	-13.9	-14.5	-14.9	-15.2	-15.5	-16.2	-16.6	-15.7	-12.5
6-Jan	-17.7	-18.9	-19.9	-20.5	-21.4	-21.8	-21.7	-22.0	-21.8	-21.6	-21.0	-19.9	-18.2	-17.0	-16.1	-15.8	-15.9	-16.3	-16.5	-16.4	-16.1	-15.8	-15.7	-15.7	-18.5	-15.7
7-Jan	-15.5	-15.2	-15.4	-15.6	-15.4	-15.2	-15.1	-15.0	-15.1	-15.2	-15.0	-14.8	-14.6	-14.7	-14.8	-15.1	-15.6	-16.1	-16.5	-17.2	-17.1	-17.3	-17.6	-17.8	-15.7	-14.6
8-Jan	-18.1	-18.2	-18.2	-18.3	-18.4	-18.6	-19.0	-20.1	-20.7	-21.1	-21.8	-20.8	-19.9	-19.1	-17.2	-18.4	-18.5	-19.0	-19.1	-18.1	-18.0	-17.8	-17.7	-18.5	-18.9	-17.2
9-Jan	-20.8	-22.3	-23.1	-23.2	-22.6	-22.6	-22.7	-23.1	-22.6	-22.2	-22.1	-21.4	-20.5	-19.5	-18.6	-18.7	-19.2	-19.7	-19.5	-19.5	-20.0	-20.3	-20.4	-20.8	-21.1	-18.6
10-Jan	-21.3	-21.3	-21.3	-20.9	-20.1	-19.4	-18.9	-18.6	-18.4	-18.1	-17.5	-16.9	-16.1	-15.5	-15.1	-15.4	-16.1	-17.0	-17.6	-18.1	-18.2	-18.1	-18.0	-17.9	-18.2	-15.1
11-Jan	-17.9	-18.4	-18.3	-18.0	-17.9	-18.0	-18.3	-18.4	-18.0	-17.3	-16.4	-16.8	-16.4	-15.6	-15.7	-16.0	-16.1	-16.7	-17.6	-18.1	-18.8	-19.1	-19.6	-20.5	-17.7	-15.6
12-Jan	-20.8	-21.4	-21.7	-22.0	-21.8	-21.7	-21.5	-21.0	-20.3	-19.5	-18.6	-17.5	-16.5	-15.6	-14.9	-14.3	-13.9	-13.6	-13.4	-13.0	-12.4	-12.6	-13.0	-14.0	-17.3	-12.4
13-Jan	-14.6	-15.1	-15.6	-15.9	-15.7	-15.9	-15.7	-15.2	-14.6	-14.0	-13.1	-11.8	-10.3	-10.0	-9.7	-9.6	-9.6	-9.7	-10.0	-10.3	-10.7	-11.1	-12.4	-13.8	-12.7	-9.6
14-Jan	-14.7	-15.6	-16.7	-17.5	-18.2	-18.9	-19.6	-19.9	-20.3	-20.2	-19.7	-19.4	-19.5	-19.2	-19.3	-19.4	-19.7	-20.0	-20.3	-20.5	-20.5	-20.6	-20.7	-20.8	-19.2	-14.7
15-Jan	-20.9	-21.0	-21.1	-21.2	-21.2	-21.4	-21.7	-21.9	-22.1	-22.0	-21.4	-20.6	-20.2	-19.5	-19.3	-19.7	-20.9	-22.5	-23.1	-24.9	-26.5	-28.0	-28.8	-29.6	-22.5	-19.3
16-Jan	-30.1	-30.8	-31.4	-32.6	-33.0	-32.8	-32.8	-32.0	-32.2	-32.1	-31.9	-30.4	-29.0	-28.0	-27.2	-26.4	-26.5	-27.2	-27.7	-27.5	-27.7	-28.6	-29.2	-29.7	-29.9	-26.4
17-Jan	-30.1	-30.4	-30.7	-31.0	-31.2	-31.3	-31.2	-31.2	-31.4	-31.3	-30.8	-29.1	-27.5	-24.8	-24.7	-23.5	-23.9	-24.7	-25.2	-26.7	-28.2	-28.7	-29.4	-27.6	-28.5	-23.5
18-Jan	-24.5	-22.8	-20.2	-17.7	-16.6	-16.1	-15.9	-15.2	-15.1	-15.0	-14.7	-14.5	-13.9	-13.4	-13.0	-12.8	-12.9	-13.0	-12.8	-12.6	-12.5	-12.4	-12.7	-12.7	-15.1	-12.4
19-Jan	-12.8	-12.9	-13.0	-13.0	-13.1	-13.3	-13.3	-13.3	-13.5	-13.9	-13.6	-13.0	-12.5	-12.6	-12.9	-13.1	-13.0	-13.2	-13.4	-13.6	-13.9	-14.1	-14.2	-14.5	-13.3	-12.5
20-Jan	-15.0	-15.6	-16.0	-16.2	-16.5	-16.6	-16.6	-16.6	-16.5	-16.4	-15.9	-15.6	-15.2	-14.5	-13.5	-14.2	-14.7	-15.1	-15.0	-14.4	-13.6	-12.6	-12.4	-12.3	-15.0	-12.3
21-Jan	-12.3	-12.2	-12.6	-12.9	-13.4	-13.8	-14.0	-15.0	-15.9	-16.3	-15.8	-14.5	-13.2	-11.8	-10.5	-9.1	-9.2	-8.8	-8.1	-7.9	-7.9	-7.6	-7.4	-7.4	-11.6	-7.4
22-Jan	-8.5	-9.3	-9.6	-11.0	-12.0	-11.2	-11.1	-11.1	-12.1	-12.9	-12.9	-12.1	-11.6	-10.8	-9.9	-9.7	-9.9	-10.2	-10.1	-10.0	-10.1	-10.0	-9.7	-9.7	-10.6	-8.5
23-Jan	-9.8	-9.9	-10.0	-10.1	-10.1	-10.1	-10.0	-10.0	-10.0	-10.0	-9.7	-9.4	-9.3	-9.2	-8.8	-8.8	-8.9	-8.9	-9.0	-9.0	-8.9	-8.4	-7.7	-8.1	-9.3	-7.7
24-Jan	-7.5	-7.7	-7.8	-8.0	-8.1	-7.2	-5.9	-5.4	-5.2	-5.2	-5.7	-5.2	-4.9	-3.8	-2.8	-2.8	-3.6	-3.9	-4.0	-5.7	-7.6	-7.4	-8.0	-8.2	-5.9	-2.8
25-Jan	-8.3	-8.4	-8.5	-8.5	-8.5	-8.6	-8.3	-7.9	-8.4	-9.2	-8.5	-7.7	-6.8	-5.4	-4.3	-3.8	-4.7	-6.2	-6.6	-7.1	-7.7	-8.5	-9.1	-10.0	-7.5	-3.8
26-Jan	-10.4	-10.8	-10.8	-11.0	-11.1	-11.6	-12.0	-12.2	-11.8	-11.2	-10.0	-8.6	-7.2	-5.4	-4.8	-4.8	-4.8	-4.9	-4.8	-4.3	-2.9	3.1	4.5	4.2	-6.8	4.5
27-Jan	4.3	3.7	4.7	5.4	4.6	4.0	3.5	3.3	3.3	3.0	3.3	4.0	3.0	1.9	0.9	-0.9	-2.3	-3.5	-3.8	-4.2	-4.9	-5.0	-5.3	-6.0	0.7	5.4
28-Jan	-6.1	-5.7	-5.1	-3.6	-3.1	-3.6	-3.2	-1.3	-2.2	-2.0	-1.8	-1.1	-0.5	0.0	0.3	0.4	0.4	0.8	0.8	1.0	3.6	5.2	5.6	5.0	-0.7	5.6
29-Jan	4.8	4.3	4.0	3.4	3.2	3.7	3.5	3.3	3.5	3.4	3.7	4.5	5.8	6.6	6.7	6.5	5.9	4.8	3.1	1.8	0.9	-0.1	-0.5	-1.1	3.6	6.7
30-Jan	-1.3	-2.0	-2.7	-2.8	-2.7	-3.1	-2.8	-2.5	-3.3	-3.7	-2.8	-2.3	-2.7	-3.2	-3.9	-4.6	-5.7	-6.7	-7.8	-8.5	-8.6	-8.8	-9.2	-10.0	-4.7	-1.3
31-Jan	-10.5	-10.5	-10.5	-10.6	-10.9	-11.1	-11.5	-11.9	-12.1	-12.6	-12.7	-12.5	-13.2	-13.5	-13.5	-13.6	-14.0	-14.5	-14.7	-15.1	-15.6	-16.1	-16.9	-17.3	-13.1	-10.5
	-13.2	-13.5	-13.7	-13.8	-14.1	-14.2	-14.2	-14.1	-14.3	-14.3	-13.9	-13.0	-12.2	-11.5	-11.0	-11.0	-11.4	-11.9	-12.2	-12.5	-12.8	-12.8	-13.0	-13.3	Diurnal Average	
	4.8	4.3	4.7	5.4	4.6	4.0	3.5	3.3	3.5	3.4	3.7	4.5	5.8	6.6	6.7	6.5	5.9	4.8	3.1	1.8	3.6	5.2	5.6	5.0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 20 m (AT20m) - C

Lower Camp Met Tower - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	128	17.20	17.20
-20 - 0	561	75.40	92.61
0 - 10	55	7.39	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 6.4 C on Jan 29 15:00

Maximum Daily Average: 3.7 C on Jan 29

Minimum Value: -32.0 C on Jan 16 05:00

Minimum Daily Average: -29.3 C on Jan 16

Maximum Diurnal Average: -10.9 C at hour 16

Minimum Diurnal Average: -14.1 C at hour 10

Monthly Average: -12.83 C

Percentiles: P_1 = -31.4 P_{10} = -21.6 Q_1 = -18.1 Median = -13.5 Q_3 = -8.1 P_{90} = -2.1 P_{99} = 5.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

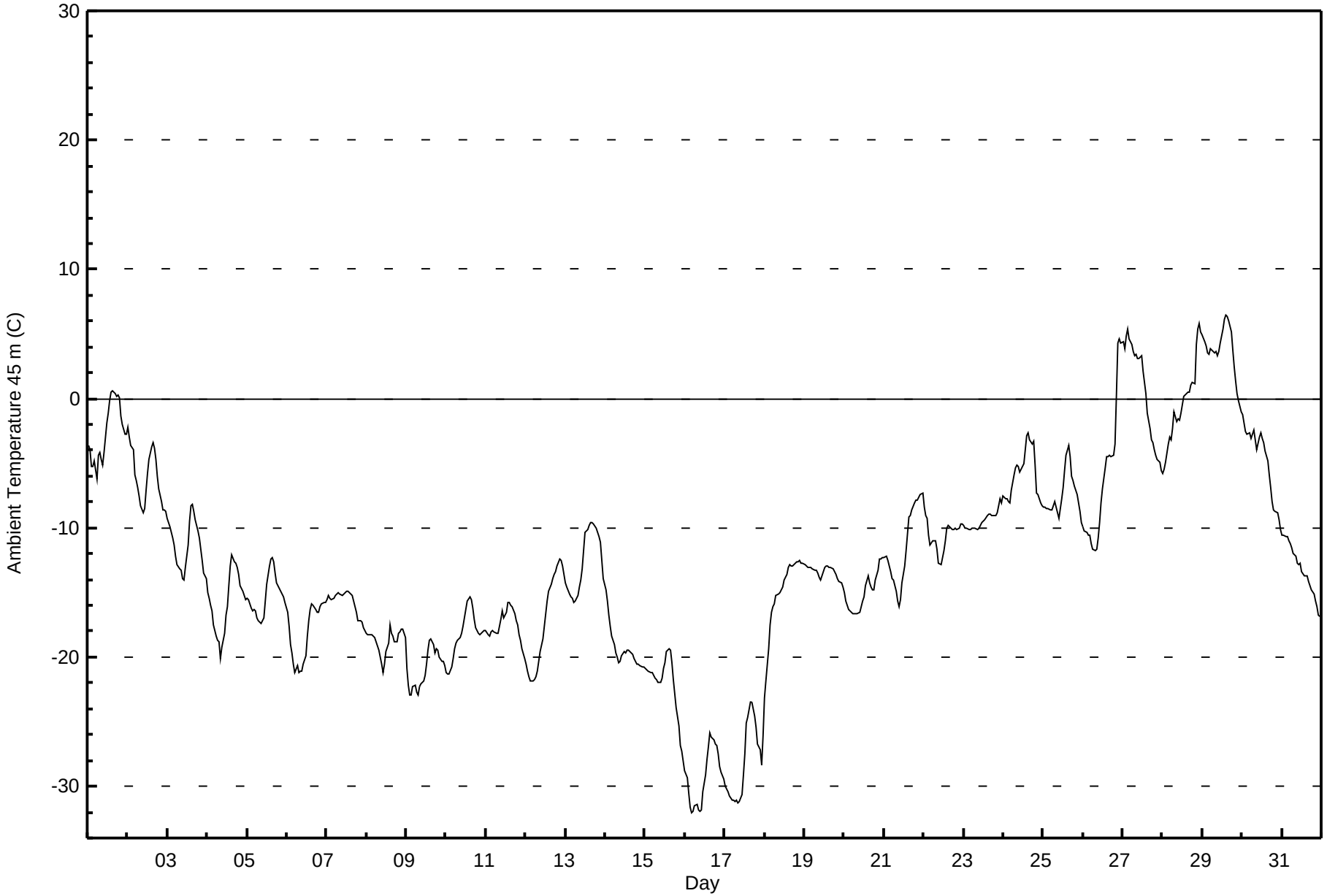
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-3.7	-3.9	-5.3	-5.2	-4.8	-6.3	-4.4	-4.2	-4.7	-5.1	-4.1	-1.9	-1.1	-0.2	0.5	0.6	0.3	0.1	0.3	0.0	-1.4	-2.0	-2.7	-2.8	-2.6	0.6
2-Jan	-2.2	-2.9	-3.6	-3.9	-5.9	-6.3	-6.9	-7.5	-8.3	-8.8	-8.5	-7.1	-5.8	-4.7	-3.8	-3.4	-3.8	-4.7	-6.0	-7.0	-7.9	-8.6	-8.6	-8.7	-6.0	-2.2
3-Jan	-9.2	-9.9	-10.4	-10.8	-11.3	-12.2	-12.8	-13.2	-13.3	-13.9	-14.0	-13.0	-11.4	-9.5	-8.3	-8.2	-8.7	-9.4	-10.2	-10.8	-11.6	-12.5	-13.5	-13.9	-11.3	-8.2
4-Jan	-15.0	-15.5	-16.0	-16.5	-17.6	-18.4	-18.7	-18.8	-20.1	-19.2	-18.1	-16.8	-16.1	-14.5	-13.0	-12.1	-12.6	-12.7	-13.1	-13.6	-14.5	-14.9	-15.2	-15.5	-15.8	-12.1
5-Jan	-15.4	-15.6	-16.2	-16.4	-16.4	-16.4	-17.0	-17.2	-17.4	-17.2	-17.0	-15.6	-14.4	-13.0	-12.4	-12.3	-12.6	-13.5	-14.3	-14.7	-14.9	-15.1	-15.4	-15.8	-15.3	-12.3
6-Jan	-16.5	-17.6	-19.0	-19.7	-20.6	-21.2	-20.6	-21.2	-21.1	-21.0	-20.6	-20.0	-18.4	-17.2	-16.3	-15.9	-16.0	-16.3	-16.6	-16.5	-16.1	-15.8	-15.8	-15.8	-18.2	-15.8
7-Jan	-15.5	-15.2	-15.4	-15.6	-15.4	-15.3	-15.1	-15.0	-15.2	-15.2	-15.1	-15.0	-14.9	-14.9	-15.0	-15.2	-15.7	-16.1	-16.6	-17.2	-17.2	-17.3	-17.7	-17.9	-15.8	-14.9
8-Jan	-18.2	-18.3	-18.3	-18.3	-18.4	-18.5	-18.8	-19.4	-20.0	-20.5	-21.2	-20.6	-19.6	-19.0	-17.5	-18.2	-18.3	-18.8	-18.8	-18.1	-18.0	-17.9	-17.8	-18.5	-18.8	-17.5
9-Jan	-20.8	-22.2	-23.0	-22.9	-22.3	-22.2	-22.7	-23.0	-22.3	-22.0	-21.8	-21.4	-20.6	-19.5	-18.7	-18.6	-19.0	-19.6	-19.4	-19.4	-20.0	-20.3	-20.4	-20.7	-21.0	-18.6
10-Jan	-21.2	-21.4	-21.3	-20.8	-20.2	-19.3	-18.9	-18.7	-18.5	-18.2	-17.6	-17.0	-16.3	-15.7	-15.3	-15.5	-16.2	-17.0	-17.7	-18.2	-18.2	-18.2	-18.1	-18.0	-18.2	-15.3
11-Jan	-17.9	-18.3	-18.3	-18.0	-17.9	-18.0	-18.2	-18.2	-17.6	-17.1	-16.5	-16.9	-16.6	-15.8	-15.8	-16.0	-16.1	-16.6	-17.2	-17.6	-18.3	-18.7	-19.3	-20.2	-17.5	-15.8
12-Jan	-20.5	-21.1	-21.5	-21.9	-21.8	-21.7	-21.6	-21.0	-20.4	-19.6	-18.7	-17.6	-16.6	-15.7	-14.9	-14.3	-14.0	-13.7	-13.4	-13.0	-12.4	-12.5	-13.0	-13.6	-17.3	-12.4
13-Jan	-14.3	-14.6	-15.1	-15.3	-15.5	-15.8	-15.6	-15.2	-14.6	-14.0	-13.1	-11.7	-10.4	-10.1	-9.8	-9.6	-9.6	-9.7	-10.0	-10.4	-10.7	-11.1	-12.5	-13.9	-12.6	-9.6
14-Jan	-14.8	-15.7	-16.8	-17.6	-18.3	-19.0	-19.7	-20.0	-20.4	-20.3	-19.9	-19.6	-19.7	-19.4	-19.5	-19.5	-19.8	-20.1	-20.3	-20.5	-20.6	-20.7	-20.7	-20.8	-19.3	-14.8
15-Jan	-20.9	-21.0	-21.1	-21.2	-21.2	-21.4	-21.6	-21.8	-22.0	-22.0	-21.6	-20.9	-20.4	-19.6	-19.4	-19.5	-20.4	-21.8	-22.8	-24.0	-25.4	-26.8	-27.2	-28.0	-22.2	-19.4
16-Jan	-28.8	-29.4	-30.5	-31.6	-32.0	-31.9	-31.5	-31.4	-31.9	-31.9	-31.8	-30.4	-29.1	-27.9	-27.0	-25.8	-26.2	-26.4	-26.8	-26.8	-27.5	-28.4	-28.9	-29.5	-29.3	-25.8
17-Jan	-30.0	-30.2	-30.5	-30.8	-31.0	-31.1	-31.1	-31.1	-31.3	-31.2	-30.6	-29.1	-27.5	-25.1	-24.7	-23.5	-23.5	-24.0	-24.5	-25.4	-26.8	-27.2	-28.4	-26.1	-28.1	-23.5
18-Jan	-23.2	-21.8	-19.4	-17.5	-16.6	-16.1	-15.9	-15.3	-15.2	-15.0	-14.8	-14.6	-14.0	-13.6	-13.1	-12.9	-13.0	-13.0	-12.8	-12.6	-12.6	-12.5	-12.8	-12.7	-15.0	-12.5
19-Jan	-12.9	-12.9	-13.0	-13.1	-13.1	-13.2	-13.3	-13.3	-13.5	-13.9	-14.0	-13.4	-13.1	-13.0	-13.0	-13.1	-13.0	-13.2	-13.4	-13.6	-13.9	-14.1	-14.2	-14.5	-13.4	-12.9
20-Jan	-15.0	-15.7	-16.0	-16.3	-16.5	-16.6	-16.7	-16.6	-16.6	-16.5	-16.2	-15.6	-15.3	-14.5	-13.7	-14.2	-14.6	-14.8	-14.8	-14.1	-13.3	-12.5	-12.4	-12.3	-15.0	-12.3
21-Jan	-12.3	-12.2	-12.6	-13.0	-13.4	-13.9	-14.0	-15.0	-15.7	-16.1	-15.6	-14.2	-13.0	-11.7	-10.5	-9.1	-9.0	-8.7	-8.1	-7.8	-7.8	-7.6	-7.4	-7.3	-11.5	-7.3
22-Jan	-8.4	-9.1	-9.2	-10.6	-11.3	-11.1	-11.0	-11.0	-11.6	-12.7	-12.8	-12.3	-11.8	-11.0	-10.1	-9.8	-10.0	-10.2	-10.1	-10.0	-10.1	-10.0	-9.7	-9.7	-10.6	-8.4
23-Jan	-9.8	-10.0	-10.1	-10.2	-10.1	-10.1	-10.0	-10.0	-10.1	-10.1	-9.8	-9.6	-9.5	-9.4	-9.1	-9.0	-8.9	-9.0	-9.0	-9.0	-8.9	-8.3	-7.8	-8.1	-9.4	-7.8
24-Jan	-7.5	-7.8	-7.8	-8.0	-8.1	-7.1	-5.9	-5.4	-5.2	-5.2	-5.6	-5.3	-5.0	-4.0	-2.9	-2.6	-3.2	-3.5	-3.3	-5.1	-7.4	-7.4	-8.1	-8.3	-5.8	-2.6
25-Jan	-8.4	-8.4	-8.5	-8.5	-8.6	-8.6	-8.3	-8.0	-8.4	-9.3	-8.6	-7.8	-6.9	-5.5	-4.4	-3.6	-4.5	-6.0	-6.4	-6.8	-7.5	-8.1	-8.7	-9.6	-7.5	-3.6
26-Jan	-9.9	-10.3	-10.3	-10.6	-10.6	-11.3	-11.7	-11.8	-11.6	-10.8	-9.6	-8.1	-7.0	-5.4	-4.5	-4.5	-4.4	-4.5	-4.4	-3.5	0.2	4.3	4.7	4.3	-6.3	4.7
27-Jan	4.4	3.8	4.8	5.4	4.6	4.2	3.6	3.4	3.4	3.1	3.1	3.3	2.1	1.2	0.4	-1.1	-2.4	-3.2	-3.5	-3.9	-4.4	-4.7	-5.0	-5.6	0.7	5.4
28-Jan	-5.8	-5.5	-4.9	-3.5	-2.9	-3.2	-2.3	-1.0	-1.8	-1.5	-1.6	-1.2	-0.5	0.1	0.4	0.5	0.5	1.0	1.2	1.2	4.2	5.4	5.8	5.1	-0.4	5.8
29-Jan	5.0	4.4	4.1	3.5	3.4	3.8	3.6	3.5	3.6	3.3	3.7	4.3	5.4	6.1	6.4	6.4	6.0	5.2	3.7	2.5	1.4	0.4	-0.1	-1.0	3.7	6.4
30-Jan	-1.2	-1.9	-2.6	-2.8	-2.6	-3.1	-2.8	-2.4	-3.2	-3.9	-3.0	-2.7	-3.0	-3.5	-4.1	-4.8	-5.9	-6.9	-7.9	-8.6	-8.7	-8.9	-9.3	-10.1	-4.7	-1.2
31-Jan	-10.6	-10.6	-10.6	-10.7	-11.0	-11.2	-11.6	-12.0	-12.2	-12.7	-12.9	-12.8	-13.4	-13.7	-13.7	-13.8	-14.2	-14.5	-14.7	-15.1	-15.6	-16.1	-16.8	-16.9	-13.2	-10.6
	-12.9	-13.3	-13.5	-13.6	-13.8	-13.9	-13.9	-13.9	-14.1	-14.1	-13.8	-13.1	-12.4	-11.6	-11.1	-10.9	-11.3	-11.7	-12.0	-12.3	-12.5	-12.5	-12.8	-13.1	Diurnal Average	
	5.0	4.4	4.8	5.4	4.6	4.2	3.6	3.5	3.6	3.3	3.7	4.3	5.4	6.1	6.4	6.4	6.0	5.2	3.7	2.5	4.2	5.4	5.8	5.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 45 m (AT45m) - C

Lower Camp Met Tower - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	123	16.53	16.53
-20 - 0	563	75.67	92.20
0 - 10	58	7.80	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 6.1 C on Jan 28 23:00
Maximum Daily Average: 3.9 C on Jan 29

Minimum Value: -31.1 C on Jan 16 10:00
Minimum Daily Average: -27.8 C on Jan 16
Maximum Diurnal Average: -10.8 C at hour 17
Minimum Diurnal Average: -13.3 C at hour 8
Monthly Average: -12.16 C
Percentiles: P_1 = -29.9 P_{10} = -21.3 Q_1 = -18.2 Median = -13.2 Q_3 = -6.6 P_{90} = -0.8 P_{99} = 5.6

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

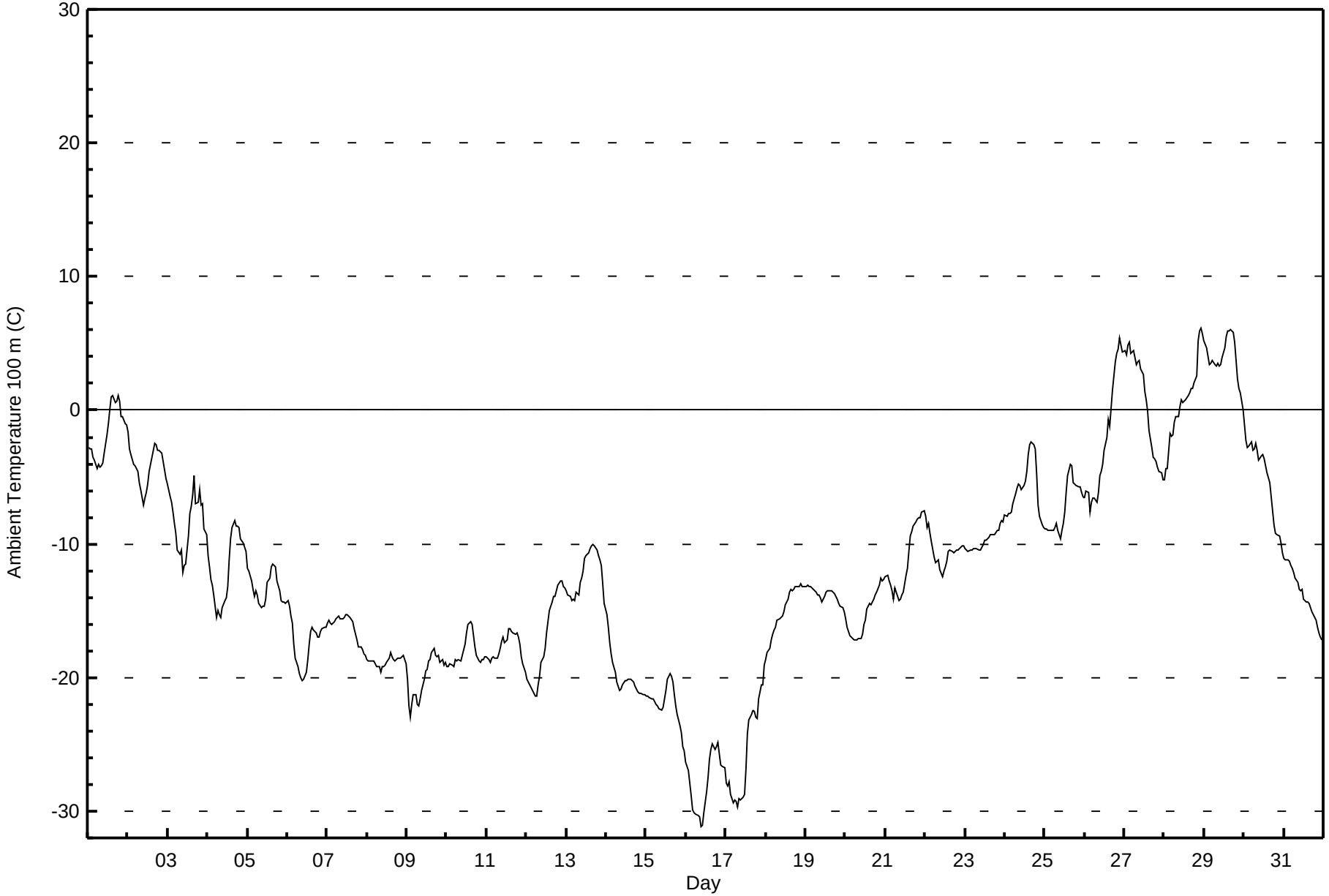
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.8	-2.9	-2.9	-3.5	-3.7	-4.4	-4.1	-4.3	-4.1	-4.0	-3.2	-1.9	-1.0	0.0	1.0	1.1	0.5	0.7	1.1	0.6	-0.5	-0.4	-1.0	-1.1	-1.7	1.1
2-Jan	-1.6	-2.9	-3.3	-4.1	-4.1	-4.3	-4.6	-5.4	-5.9	-7.1	-6.5	-6.1	-5.5	-4.5	-3.5	-3.0	-2.5	-2.5	-3.0	-3.0	-3.2	-3.9	-4.5	-5.1	-4.2	-1.6
3-Jan	-5.5	-6.5	-6.9	-7.6	-8.5	-9.2	-10.4	-10.7	-10.5	-12.1	-11.6	-11.5	-9.4	-7.7	-7.2	-6.4	-4.9	-7.0	-6.9	-6.0	-7.1	-7.0	-8.8	-9.3	-8.3	-4.9
4-Jan	-10.8	-11.7	-12.6	-13.1	-13.8	-15.5	-15.0	-15.3	-15.5	-14.8	-14.2	-14.0	-13.2	-11.2	-9.6	-8.8	-8.2	-8.7	-8.7	-8.7	-9.6	-10.0	-10.2	-10.5	-11.8	-8.2
5-Jan	-11.8	-12.0	-12.7	-13.4	-13.9	-13.5	-13.8	-14.4	-14.8	-14.7	-14.7	-14.1	-12.9	-12.5	-11.7	-11.5	-11.6	-11.8	-12.8	-13.5	-14.2	-14.4	-14.4	-14.4	-13.3	-11.5
6-Jan	-14.3	-14.7	-15.3	-15.9	-17.5	-18.5	-19.2	-19.7	-20.1	-20.3	-20.1	-19.6	-18.6	-17.5	-16.5	-16.3	-16.4	-16.7	-17.0	-16.9	-16.6	-16.3	-16.3	-16.3	-17.4	-14.3
7-Jan	-15.9	-15.7	-15.9	-16.0	-15.8	-15.6	-15.5	-15.4	-15.6	-15.7	-15.5	-15.2	-15.3	-15.4	-15.5	-15.8	-16.3	-16.8	-17.2	-17.7	-17.7	-17.9	-18.2	-18.4	-16.3	-15.2
8-Jan	-18.7	-18.8	-18.8	-18.8	-18.8	-18.9	-19.1	-19.2	-19.5	-19.1	-19.2	-19.1	-18.8	-18.5	-18.1	-18.5	-18.7	-18.8	-18.6	-18.6	-18.5	-18.4	-18.4	-19.0	-18.8	-18.1
9-Jan	-20.1	-22.1	-22.9	-22.0	-21.3	-21.3	-22.0	-22.2	-21.6	-21.0	-20.1	-19.5	-19.4	-18.8	-18.6	-18.1	-17.8	-18.3	-18.4	-18.3	-18.8	-18.7	-19.0	-18.9	-20.0	-17.8
10-Jan	-19.2	-19.2	-18.9	-19.1	-19.2	-18.6	-18.8	-18.6	-18.7	-18.4	-17.9	-17.5	-16.7	-16.0	-15.8	-16.0	-16.8	-17.7	-18.3	-18.8	-18.8	-18.7	-18.6	-18.5	-18.1	-15.8
11-Jan	-18.4	-18.7	-18.8	-18.5	-18.5	-18.5	-18.5	-18.2	-17.8	-17.3	-17.0	-17.4	-17.2	-16.4	-16.3	-16.6	-16.6	-16.7	-16.6	-17.0	-17.5	-18.4	-19.0	-19.6	-17.7	-16.3
12-Jan	-20.1	-20.4	-20.6	-20.8	-21.2	-21.4	-21.4	-20.5	-19.9	-18.9	-18.5	-17.8	-16.7	-15.9	-15.0	-14.3	-13.9	-13.9	-13.5	-13.1	-12.8	-12.8	-13.2	-13.3	-17.1	-12.8
13-Jan	-13.6	-13.9	-13.9	-14.2	-14.2	-14.2	-13.6	-13.8	-12.9	-12.6	-12.0	-11.1	-10.8	-10.6	-10.4	-10.1	-10.0	-10.1	-10.5	-10.9	-11.2	-11.7	-13.0	-14.4	-12.2	-10.0
14-Jan	-15.3	-16.2	-17.4	-18.2	-18.9	-19.6	-20.4	-20.7	-21.0	-20.9	-20.5	-20.3	-20.3	-20.1	-20.1	-20.1	-20.4	-20.7	-20.9	-21.1	-21.2	-21.2	-21.3	-21.3	-19.9	-15.3
15-Jan	-21.4	-21.4	-21.5	-21.6	-21.6	-21.8	-22.0	-22.1	-22.3	-22.4	-22.2	-21.6	-20.9	-20.1	-19.7	-19.9	-20.4	-21.2	-22.1	-22.8	-23.6	-24.1	-25.2	-25.5	-22.0	-19.7
16-Jan	-26.3	-26.9	-27.9	-28.9	-29.9	-30.1	-30.3	-30.3	-30.4	-31.1	-31.1	-30.1	-28.6	-27.5	-26.1	-25.3	-25.0	-25.3	-25.2	-24.8	-25.7	-26.5	-26.7	-26.7	-27.8	-24.8
17-Jan	-27.9	-28.1	-27.8	-28.7	-29.3	-29.1	-29.3	-29.7	-29.1	-29.2	-28.9	-28.7	-26.9	-24.2	-23.1	-22.7	-22.5	-22.5	-23.0	-23.1	-21.6	-20.5	-20.6	-19.1	-25.6	-19.1
18-Jan	-18.6	-18.1	-17.8	-17.2	-16.8	-16.5	-16.2	-15.7	-15.6	-15.5	-15.4	-15.1	-14.6	-14.1	-13.6	-13.4	-13.5	-13.4	-13.1	-13.2	-13.2	-13.0	-13.2	-13.2	-15.0	-13.0
19-Jan	-13.2	-13.1	-13.2	-13.2	-13.3	-13.3	-13.6	-13.8	-13.8	-14.0	-14.3	-13.9	-13.7	-13.5	-13.5	-13.5	-13.5	-13.7	-13.9	-14.1	-14.5	-14.6	-14.8	-15.1	-13.8	-13.1
20-Jan	-15.6	-16.3	-16.6	-16.9	-17.1	-17.2	-17.2	-17.2	-17.1	-17.1	-16.8	-16.0	-15.7	-14.9	-14.4	-14.6	-14.4	-14.1	-13.8	-13.6	-13.1	-12.5	-12.8	-12.7	-15.3	-12.5
21-Jan	-12.4	-12.3	-12.7	-13.1	-13.5	-14.1	-13.3	-14.0	-14.2	-14.2	-13.9	-13.6	-12.3	-11.8	-10.6	-9.5	-9.1	-8.7	-8.4	-8.1	-8.0	-8.0	-7.6	-7.5	-11.3	-7.5
22-Jan	-7.9	-8.8	-8.5	-9.2	-9.9	-11.0	-11.4	-11.2	-11.2	-11.9	-12.4	-12.0	-11.7	-11.3	-10.6	-10.4	-10.5	-10.6	-10.6	-10.5	-10.5	-10.3	-10.1	-10.2	-10.5	-7.9
23-Jan	-10.3	-10.5	-10.6	-10.5	-10.5	-10.4	-10.4	-10.4	-10.4	-10.5	-10.2	-10.0	-9.8	-9.7	-9.5	-9.3	-9.3	-9.3	-9.3	-9.0	-8.9	-8.5	-8.3	-8.3	-9.7	-8.3
24-Jan	-7.8	-8.0	-7.8	-7.8	-7.7	-7.0	-6.2	-5.8	-5.5	-5.7	-5.9	-5.7	-5.3	-4.6	-3.3	-2.6	-2.4	-2.6	-2.9	-4.8	-7.1	-7.9	-8.6	-8.8	-5.9	-2.4
25-Jan	-8.9	-8.9	-9.0	-9.0	-9.0	-9.0	-8.8	-8.5	-8.9	-9.6	-8.9	-8.4	-7.7	-6.1	-4.9	-4.0	-4.2	-5.4	-5.5	-5.6	-5.7	-5.7	-6.1	-6.5	-7.3	-4.0
26-Jan	-6.6	-6.0	-6.2	-7.6	-6.9	-6.6	-6.6	-6.8	-6.2	-4.9	-4.5	-4.1	-3.0	-2.0	-0.7	-1.2	0.1	1.5	3.6	4.3	4.6	5.5	4.9	4.3	-2.1	5.5
27-Jan	4.5	4.2	4.8	5.1	4.3	4.4	4.0	3.4	3.6	3.8	3.1	2.7	1.5	0.8	-0.1	-1.5	-2.8	-3.5	-3.7	-3.9	-4.2	-4.5	-4.6	-5.2	0.7	5.1
28-Jan	-5.2	-4.4	-4.4	-1.7	-1.9	-1.8	-0.8	-0.5	-0.5	0.3	0.8	0.6	0.7	0.7	1.1	1.3	1.7	1.6	2.1	2.6	5.2	5.9	6.1	5.7	0.6	6.1
29-Jan	5.2	4.7	4.1	3.4	3.5	3.8	3.4	3.3	3.5	3.3	3.4	3.9	4.7	5.5	5.9	6.0	6.1	5.8	5.1	3.8	2.4	1.7	1.4	0.0	3.9	6.1
30-Jan	-1.1	-2.2	-2.8	-2.7	-2.4	-3.0	-2.8	-2.5	-3.0	-3.8	-3.4	-3.3	-3.7	-4.1	-4.7	-5.4	-6.5	-7.5	-8.6	-9.2	-9.3	-9.5	-9.9	-10.7	-5.1	-1.1
31-Jan	-11.1	-11.2	-11.2	-11.3	-11.6	-11.8	-12.2	-12.6	-12.8	-13.4	-13.5	-13.4	-14.1	-14.4	-14.4	-14.4	-14.8	-15.1	-15.3	-15.7	-16.2	-16.7	-17.0	-17.2	-13.8	-11.1
	-12.0	-12.4	-12.6	-12.8	-13.0	-13.2	-13.2	-13.3	-13.3	-13.3	-13.1	-12.7	-12.1	-11.5	-11.0	-10.8	-10.8	-11.1	-11.2	-11.3	-11.5	-11.6	-11.9	-12.1	Diurnal Average	
	5.2	4.7	4.8	5.1	4.3	4.4	4.0	3.4	3.6	3.8	3.4	3.9	4.7	5.5	5.9	6.0	6.1	5.8	5.1	4.3	5.2	5.9	6.1	5.7	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 100 m (AT100m) - C

Lower Camp Met Tower - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	109	14.65	14.65
-20 - 0	567	76.21	90.86
0 - 10	68	9.14	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 6.0 C on Jan 28 23:00

Maximum Daily Average: 3.7 C on Jan 29

Minimum Value: -28.8 C on Jan 16 11:00

Minimum Daily Average: -26.0 C on Jan 16

Maximum Diurnal Average: -10.5 C at hour 17

Minimum Diurnal Average: -12.7 C at hour 8

Monthly Average: -11.76 C

Percentiles: P_1 = -27.6 P_{10} = -21.3 Q_1 = -17.9 Median = -12.8 Q_3 = -5.7 P_{90} = 0.0 P_{99} = 5.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

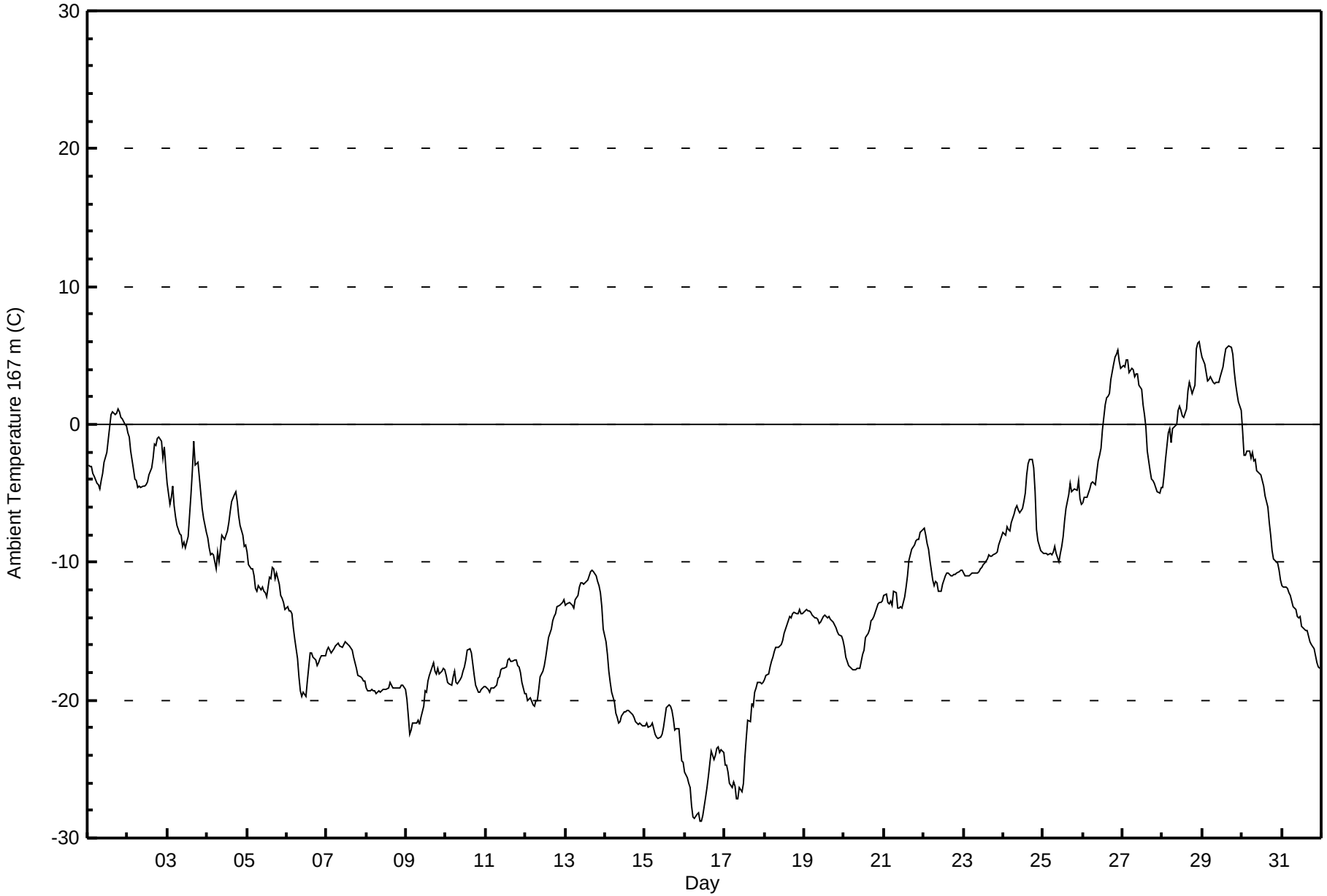
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.9	-3.1	-3.1	-3.6	-3.8	-4.3	-4.4	-4.6	-4.1	-3.6	-2.8	-2.1	-1.1	-0.3	0.7	0.9	0.7	0.8	1.1	0.9	0.5	0.4	0.0	-0.1	-1.6	1.1
2-Jan	-0.6	-0.9	-1.9	-3.3	-4.0	-4.1	-4.6	-4.5	-4.6	-4.5	-4.5	-4.3	-4.2	-3.7	-3.2	-2.4	-1.4	-1.5	-1.1	-1.0	-1.2	-2.5	-1.7	-3.0	-2.9	-0.6
3-Jan	-4.2	-5.8	-5.3	-4.4	-5.9	-6.7	-7.3	-7.9	-8.0	-8.9	-8.5	-9.0	-8.1	-6.6	-5.1	-3.3	-1.2	-2.9	-2.8	-3.8	-4.9	-6.1	-6.8	-7.8	-5.9	-1.2
4-Jan	-8.3	-8.9	-9.5	-9.4	-9.4	-10.5	-9.3	-10.0	-9.1	-8.1	-8.3	-8.1	-7.7	-7.1	-6.3	-5.6	-5.1	-4.9	-5.6	-6.6	-7.3	-8.0	-8.9	-8.8	-7.9	-4.9
5-Jan	-9.2	-10.2	-10.5	-10.5	-11.0	-11.9	-12.1	-11.7	-12.1	-11.8	-12.1	-12.2	-12.5	-11.1	-11.2	-10.4	-10.5	-11.1	-10.7	-11.6	-12.4	-12.6	-12.9	-13.4	-11.5	-9.2
6-Jan	-13.3	-13.5	-13.5	-13.7	-14.7	-15.5	-17.0	-18.3	-19.3	-19.7	-19.4	-19.7	-18.7	-17.5	-16.6	-16.6	-16.9	-17.1	-17.5	-17.3	-17.0	-16.8	-16.8	-16.8	-16.8	-13.3
7-Jan	-16.4	-16.2	-16.4	-16.6	-16.3	-16.0	-15.9	-15.9	-16.1	-16.2	-16.0	-15.7	-15.9	-16.0	-16.1	-16.4	-16.9	-17.3	-17.7	-18.2	-18.3	-18.4	-18.6	-18.6	-16.7	-15.7
8-Jan	-19.1	-19.3	-19.3	-19.3	-19.3	-19.3	-19.5	-19.4	-19.4	-19.4	-19.3	-19.2	-19.2	-19.1	-18.7	-18.9	-19.1	-19.1	-19.1	-19.1	-19.1	-18.9	-18.9	-19.2	-19.2	-18.7
9-Jan	-19.9	-21.2	-22.5	-22.2	-21.7	-21.7	-21.6	-21.4	-21.8	-21.3	-20.4	-19.3	-19.4	-18.6	-18.2	-17.9	-17.2	-17.9	-18.1	-17.7	-18.1	-17.9	-17.7	-17.8	-19.6	-17.2
10-Jan	-18.2	-18.7	-18.9	-19.0	-18.3	-17.9	-18.7	-18.8	-18.5	-18.3	-17.9	-17.6	-17.0	-16.4	-16.3	-16.5	-17.4	-18.3	-18.9	-19.4	-19.4	-19.2	-19.1	-19.0	-18.2	-16.3
11-Jan	-19.0	-19.2	-19.4	-19.1	-19.1	-19.1	-18.9	-18.4	-18.3	-17.8	-17.7	-17.7	-17.6	-17.1	-17.0	-17.2	-17.2	-17.1	-17.1	-17.5	-17.6	-18.0	-18.8	-19.5	-18.1	-17.0
12-Jan	-19.5	-20.1	-20.0	-19.8	-20.3	-20.5	-20.0	-20.0	-19.2	-18.4	-17.9	-17.5	-16.9	-16.2	-15.4	-14.8	-14.2	-13.9	-13.7	-13.2	-13.1	-13.0	-12.9	-12.8	-16.8	-12.8
13-Jan	-13.1	-13.1	-12.9	-13.1	-13.1	-13.3	-12.7	-12.5	-11.8	-11.5	-11.5	-11.6	-11.4	-11.3	-11.0	-10.7	-10.6	-10.7	-11.0	-11.4	-11.7	-12.2	-13.3	-14.8	-12.1	-10.6
14-Jan	-15.7	-16.7	-17.9	-18.7	-19.4	-20.1	-20.9	-21.2	-21.6	-21.5	-21.1	-20.9	-20.9	-20.7	-20.8	-20.8	-21.0	-21.3	-21.5	-21.7	-21.8	-21.7	-21.8	-21.9	-20.5	-15.7
15-Jan	-21.8	-21.7	-21.9	-21.9	-21.7	-22.1	-22.5	-22.6	-22.8	-22.7	-22.5	-21.9	-21.2	-20.5	-20.3	-20.4	-20.8	-21.3	-22.1	-22.1	-22.1	-23.3	-24.4	-24.5	-22.0	-20.3
16-Jan	-25.2	-25.6	-26.1	-26.3	-27.6	-28.4	-28.6	-28.3	-28.1	-28.8	-28.8	-28.4	-27.1	-26.3	-25.6	-24.7	-23.7	-24.3	-23.9	-23.5	-23.4	-23.8	-23.6	-23.8	-26.0	-23.4
17-Jan	-24.7	-24.7	-25.2	-26.1	-26.3	-25.9	-26.2	-27.1	-27.2	-26.3	-26.6	-26.0	-24.2	-22.8	-21.5	-21.5	-20.2	-20.4	-19.4	-19.1	-18.7	-18.8	-18.8	-18.7	-23.2	-18.7
18-Jan	-18.5	-18.2	-18.1	-17.6	-17.2	-16.9	-16.5	-16.1	-16.2	-16.0	-16.0	-15.7	-15.1	-14.6	-14.2	-13.9	-14.0	-13.7	-13.6	-13.7	-13.8	-13.5	-13.7	-13.7	-15.4	-13.5
19-Jan	-13.5	-13.5	-13.5	-13.5	-13.6	-13.8	-14.0	-14.0	-14.1	-14.4	-14.4	-14.0	-13.9	-14.0	-14.0	-14.0	-14.1	-14.4	-14.6	-14.7	-15.1	-15.2	-15.4	-15.7	-14.2	-13.5
20-Jan	-16.2	-16.9	-17.2	-17.5	-17.7	-17.8	-17.8	-17.8	-17.7	-17.7	-17.2	-16.6	-16.4	-15.5	-15.1	-14.9	-14.3	-14.2	-14.0	-13.7	-13.0	-12.9	-12.9	-12.9	-15.7	-12.9
21-Jan	-12.4	-12.3	-12.9	-13.0	-12.8	-13.1	-12.1	-12.2	-13.4	-13.3	-13.2	-13.3	-12.5	-11.8	-11.0	-9.9	-9.5	-9.1	-8.8	-8.4	-8.3	-8.4	-7.9	-7.6	-11.1	-7.6
22-Jan	-7.6	-8.0	-8.6	-9.0	-9.8	-11.3	-11.7	-11.4	-11.5	-12.1	-12.1	-11.6	-11.3	-11.0	-10.8	-10.8	-11.0	-11.0	-10.9	-10.9	-10.8	-10.6	-10.6	-10.6	-10.6	-7.6
23-Jan	-10.8	-10.9	-11.0	-11.0	-10.9	-10.8	-10.8	-10.8	-10.8	-10.7	-10.5	-10.3	-10.2	-10.1	-9.8	-9.5	-9.5	-9.5	-9.4	-9.3	-9.2	-8.8	-8.4	-8.2	-10.1	-8.2
24-Jan	-7.8	-8.0	-7.4	-7.7	-7.7	-7.1	-6.5	-6.1	-5.9	-6.2	-6.5	-6.1	-5.6	-4.9	-3.7	-2.9	-2.5	-2.6	-3.1	-4.9	-7.6	-8.5	-9.1	-9.3	-6.2	-2.5
25-Jan	-9.3	-9.3	-9.4	-9.4	-9.4	-9.4	-9.2	-8.9	-9.4	-10.0	-9.4	-8.9	-8.1	-7.0	-6.1	-5.1	-4.3	-4.9	-4.8	-4.7	-4.8	-4.1	-5.4	-5.8	-7.4	-4.1
26-Jan	-5.7	-5.3	-5.3	-5.0	-4.6	-4.3	-4.2	-4.3	-3.5	-2.7	-2.2	-1.7	-0.4	1.5	2.0	2.0	2.3	3.3	4.4	4.9	5.1	5.4	4.6	4.1	-0.4	5.4
27-Jan	4.3	4.2	4.7	4.7	3.8	4.1	3.9	3.5	3.7	3.7	2.9	2.5	1.4	0.7	-0.2	-1.9	-3.4	-3.9	-4.1	-4.3	-4.6	-4.8	-5.0	-4.6	0.5	4.7
28-Jan	-4.6	-3.6	-2.5	-0.6	-0.3	-1.4	-0.3	-0.2	0.0	1.0	1.3	1.0	0.6	0.5	1.2	2.4	3.1	2.6	2.3	2.8	5.5	5.9	6.0	5.4	1.2	6.0
29-Jan	4.9	4.3	3.8	3.1	3.2	3.5	3.1	3.0	3.1	3.0	3.1	3.4	4.1	4.9	5.5	5.6	5.7	5.6	5.1	3.8	3.0	2.3	1.7	1.1	3.7	5.7
30-Jan	-0.5	-2.2	-2.2	-2.0	-2.0	-2.5	-2.0	-2.6	-2.6	-3.4	-3.6	-3.7	-4.0	-4.5	-5.2	-6.0	-7.1	-8.1	-9.2	-9.8	-9.9	-10.1	-10.6	-11.3	-5.2	-0.5
31-Jan	-11.7	-11.8	-11.8	-11.9	-12.2	-12.4	-12.8	-13.2	-13.4	-13.9	-14.0	-13.9	-14.6	-14.9	-14.9	-15.0	-15.4	-15.7	-15.9	-16.3	-16.8	-17.3	-17.6	-17.7	-14.4	-11.7
	-11.6	-11.9	-12.1	-12.2	-12.4	-12.6	-12.6	-12.7	-12.7	-12.6	-12.5	-12.3	-11.9	-11.3	-10.9	-10.7	-10.5	-10.8	-10.8	-11.0	-11.2	-11.3	-11.6	-11.8	Diurnal Average	
	4.9	4.3	4.7	4.7	3.8	4.1	3.9	3.5	3.7	3.7	3.1	3.4	4.1	4.9	5.5	5.6	5.7	5.6	5.1	4.9	5.5	5.9	6.0	5.4	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 167 m (AT167m) - C

Lower Camp Met Tower - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	100	13.44	13.44
-20 - 0	571	76.75	90.19
0 - 10	73	9.81	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 95 % on Jan 28 00:00

Maximum Daily Average: 89.2 % on Jan 23

Minimum Value: 48 % on Jan 29 16:00

Minimum Daily Average: 68.7 % on Jan 1

Maximum Diurnal Average: 81.9 % at hour 5

Minimum Diurnal Average: 75.7 % at hour 15

Monthly Average: 80.1 %

Percentiles: P_1 = 59 P_{10} = 72 Q_1 = 76 Median = 80 Q_3 = 85 P_{90} = 89 P_{99} = 93

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

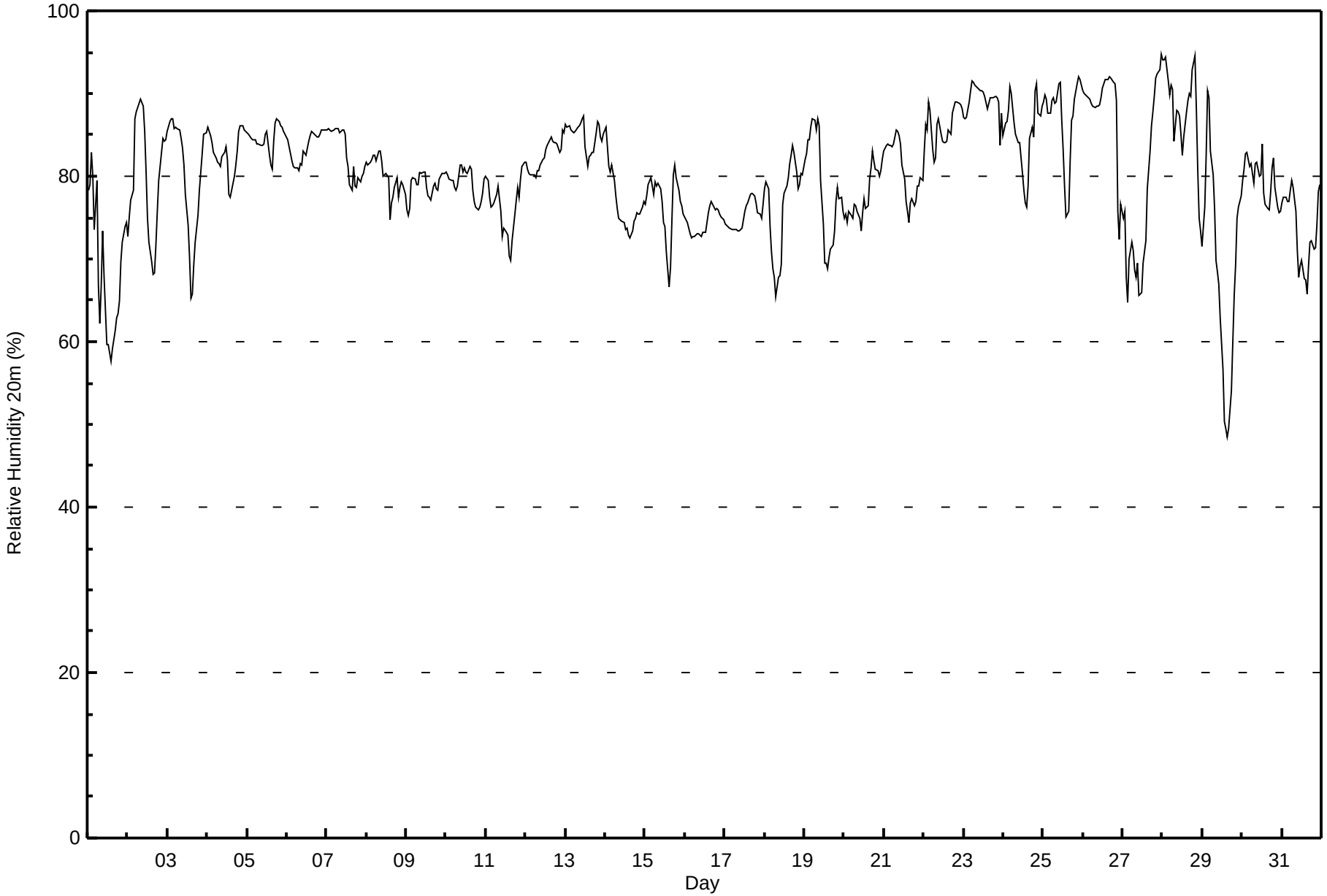
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	78	79	83	80	74	79	67	62	67	73	68	60	60	59	58	59	61	63	63	65	70	72	74	74	68.7	83
2-Jan	73	75	77	78	87	88	88	89	89	88	85	80	75	72	70	68	68	72	76	79	83	85	84	84	79.8	89
3-Jan	85	87	87	87	86	86	86	86	85	83	81	78	74	70	65	66	69	72	75	78	81	83	85	85	80.0	87
4-Jan	86	85	85	84	83	82	82	82	81	82	83	84	82	78	77	78	80	81	83	85	86	86	86	85	82.8	86
5-Jan	85	85	85	84	84	84	84	84	84	84	84	85	85	82	81	81	84	86	87	87	86	86	86	85	84.6	87
6-Jan	84	84	83	82	81	81	81	81	81	81	83	83	83	84	85	85	85	85	85	85	85	86	86	86	83.5	86
7-Jan	86	86	86	85	86	86	86	86	85	86	86	85	82	81	79	78	81	79	79	80	79	80	80	81	82.8	86
8-Jan	82	81	82	82	83	83	82	83	83	82	80	80	80	80	75	77	78	79	80	77	79	79	79	78	80.1	83
9-Jan	76	75	76	79	80	80	79	79	80	80	80	81	79	78	78	77	79	79	79	78	80	80	80	80	78.9	81
10-Jan	80	80	80	79	79	79	78	79	81	81	81	81	81	80	81	81	78	77	76	76	76	77	78	80	79.2	81
11-Jan	80	80	78	76	76	77	78	79	77	76	73	74	73	73	70	70	72	75	77	79	78	80	81	82	76.3	82
12-Jan	82	81	80	80	80	80	80	81	81	81	82	82	83	84	84	85	84	84	84	84	83	83	86	85	82.5	86
13-Jan	86	86	86	86	85	85	85	86	86	87	87	87	84	81	82	83	83	83	85	87	86	85	84	85	85.0	87
14-Jan	86	84	81	81	81	80	78	76	75	75	75	74	74	74	73	72	73	75	75	76	75	75	76	77	76.7	86
15-Jan	77	78	79	80	79	78	79	79	79	79	77	74	74	71	67	69	75	80	81	80	78	77	76	75	76.7	81
16-Jan	75	74	74	73	73	73	73	73	73	73	73	73	73	74	76	76	77	76	76	76	76	75	75	75	74.4	77
17-Jan	74	74	74	74	74	74	74	73	73	73	74	75	76	77	77	78	78	78	78	77	76	75	75	77	75.2	78
18-Jan	78	79	78	74	71	69	68	65	68	68	69	77	78	79	80	82	83	84	83	81	78	79	80	80	76.3	84
19-Jan	82	83	84	84	86	87	87	86	87	86	80	74	69	69	69	70	71	72	73	77	79	77	77	76	78.6	87
20-Jan	75	75	74	76	75	75	77	77	76	75	73	76	77	76	76	80	81	83	82	81	81	80	81	82	77.6	83
21-Jan	83	84	84	84	84	84	84	86	85	85	84	81	80	77	76	74	77	77	76	77	79	79	80	79	80.7	86
22-Jan	83	86	86	89	88	83	82	82	86	87	85	84	84	84	84	86	85	88	88	89	89	89	89	88	86.0	89
23-Jan	87	87	87	89	90	92	91	91	91	90	90	90	90	90	88	89	90	89	89	90	90	89	84	88	89.2	92
24-Jan	85	86	87	88	91	90	87	85	85	84	84	80	78	77	76	79	85	86	85	90	91	88	87	89	85.1	91
25-Jan	89	90	89	88	88	89	90	89	89	91	91	87	83	79	75	76	82	87	87	89	91	92	92	91	87.2	92
26-Jan	90	90	90	90	89	89	88	88	89	88	89	89	91	92	92	92	92	92	91	91	89	76	72	77	88.2	92
27-Jan	75	76	68	65	70	72	71	69	68	70	66	66	70	71	72	78	83	86	88	90	92	92	93	95	76.8	95
28-Jan	94	94	94	92	90	91	91	84	88	88	87	85	83	85	88	89	90	90	93	95	88	81	75	73	87.8	95
29-Jan	72	76	83	90	90	83	80	76	70	68	67	63	57	50	49	48	49	54	60	66	69	75	76	78	68.7	90
30-Jan	80	81	83	83	81	81	80	79	81	82	80	80	84	78	77	76	76	78	81	82	79	76	76	76	79.6	84
31-Jan	77	77	78	77	77	78	79	79	76	71	68	69	70	68	67	66	69	72	72	71	71	74	78	79	73.5	79
	81.5	81.9	81.9	81.9	81.9	81.8	81.1	80.4	80.6	80.6	79.5	78.6	77.8	76.5	75.7	76.4	78.0	79.4	80.3	81.2	81.4	81.0	81.0	81.4	Diurnal Average	
	94	94	94	92	91	92	91	91	91	91	91	90	91	92	92	92	92	92	93	95	92	92	93	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 20m (RH20m) - %

Lower Camp Met Tower - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	12	1.61	1.61
60 - 80	338	45.43	47.04
80 - 100	394	52.96	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 45m (RH45m) - %

Lower Camp Met Tower - January 2016

Maximum Value: 94 % on Jan 28 00:00

Maximum Daily Average: 88.9 % on Jan 23

Minimum Value: 48 % on Jan 29 16:00

Minimum Daily Average: 65.5 % on Jan 1

Maximum Diurnal Average: 80.6 % at hour 2

Minimum Diurnal Average: 75.0 % at hour 15

Monthly Average: 78.8 %

Percentiles: $P_1 = 57$ $P_{10} = 70$ $Q_1 = 75$ Median = 79 $Q_3 = 84$ $P_{90} = 88$ $P_{99} = 91$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

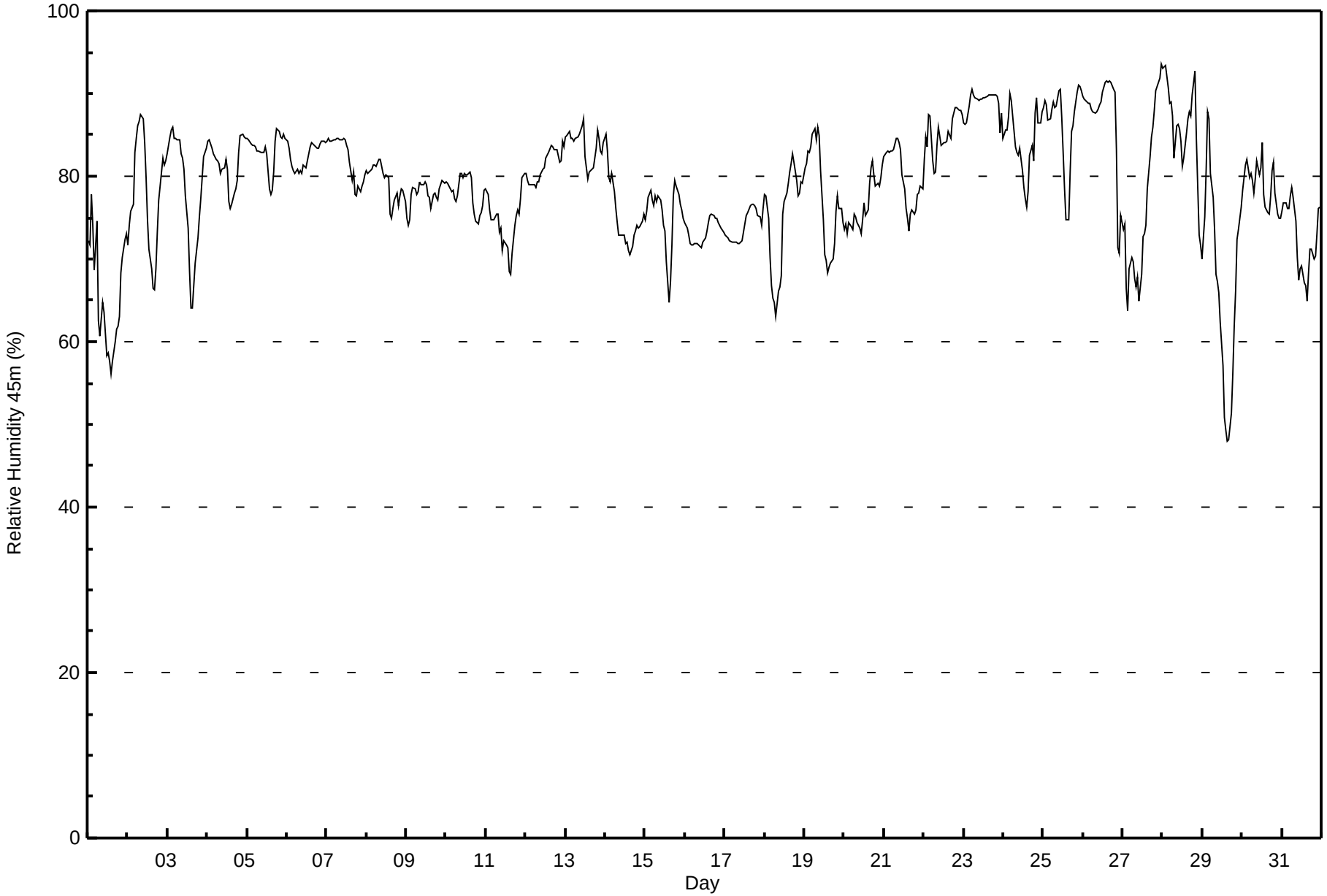
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	72	72	78	74	69	75	63	61	63	65	64	58	59	58	56	58	60	61	62	63	68	70	72	73	65.5	78
2-Jan	72	74	76	77	83	85	86	87	87	87	84	80	75	71	69	66	66	69	73	77	80	82	81	82	77.9	87
3-Jan	83	85	86	86	85	85	84	84	83	82	81	78	74	68	64	64	67	69	73	75	77	80	82	83	78.2	86
4-Jan	84	84	84	83	83	82	82	82	80	81	81	82	81	77	76	77	78	78	80	83	85	85	85	85	81.5	85
5-Jan	85	84	84	84	84	84	83	83	83	83	83	84	83	78	78	78	81	84	86	85	85	85	85	85	83.1	86
6-Jan	84	83	82	81	81	80	81	80	81	80	81	81	82	83	84	84	84	84	83	83	84	84	84	84	82.5	84
7-Jan	84	85	84	84	84	84	85	85	84	84	85	84	84	83	82	80	81	78	78	79	78	79	79	80	82.2	85
8-Jan	81	80	81	81	81	81	81	82	82	81	80	80	80	80	76	75	76	77	78	76	78	78	78	77	79.2	82
9-Jan	75	74	75	78	79	79	78	78	79	79	79	79	79	78	77	76	78	78	77	77	79	79	79	79	77.9	79
10-Jan	79	79	79	78	78	77	77	78	80	80	80	80	80	80	81	80	77	75	75	74	75	76	76	78	78.1	81
11-Jan	79	78	76	75	75	75	75	75	73	74	71	72	72	71	69	68	71	74	75	76	75	77	80	80	74.4	80
12-Jan	80	79	79	79	79	79	79	79	79	80	81	81	82	83	83	84	84	83	83	83	82	82	84	84	81.3	84
13-Jan	85	85	85	85	85	84	85	85	85	86	86	87	82	80	81	81	81	81	83	86	85	83	83	84	83.8	87
14-Jan	85	83	80	79	80	78	76	74	73	73	73	73	72	72	71	71	72	73	73	74	74	74	75	75	75.1	85
15-Jan	75	76	77	78	77	77	78	77	78	77	76	74	73	70	65	67	72	78	79	79	78	77	76	75	75.3	79
16-Jan	74	74	73	72	72	72	72	72	72	71	71	72	72	73	74	75	75	75	75	75	74	74	74	73	73.3	75
17-Jan	73	73	73	72	72	72	72	72	72	72	72	73	74	75	76	76	77	77	76	76	75	75	74	76	74.0	77
18-Jan	78	78	75	70	67	65	65	63	66	67	68	75	77	78	79	81	82	83	82	80	78	78	79	79	74.6	83
19-Jan	81	82	83	83	84	85	86	84	86	85	81	75	70	70	68	69	69	70	72	76	78	76	76	74	77.6	86
20-Jan	74	74	73	74	74	73	75	75	74	74	73	75	77	75	76	79	81	82	80	79	79	79	80	81	76.5	82
21-Jan	82	83	83	83	83	83	83	84	84	84	83	80	79	76	75	73	75	76	75	76	78	78	79	78	79.8	84
22-Jan	82	85	84	87	87	82	80	81	84	86	84	84	84	84	84	85	85	87	88	88	88	88	88	87	85.1	88
23-Jan	87	86	86	88	90	90	90	89	89	89	89	89	89	89	90	90	90	90	90	90	90	89	85	88	88.9	90
24-Jan	85	86	86	87	90	89	85	84	83	83	83	81	79	77	76	78	83	84	82	88	89	86	86	88	84.0	90
25-Jan	88	89	89	87	87	88	89	88	88	90	91	87	83	79	75	75	80	85	86	88	90	91	91	90	86.4	91
26-Jan	90	89	89	89	89	88	88	88	88	88	89	89	90	91	92	91	92	91	91	90	83	71	71	75	87.1	92
27-Jan	74	74	66	64	69	70	70	68	67	68	65	68	73	73	74	78	82	85	86	88	90	91	92	94	76.2	94
28-Jan	93	93	93	91	89	89	87	82	86	86	86	84	81	82	85	87	88	87	90	93	85	79	73	72	85.9	93
29-Jan	70	75	81	88	87	80	78	73	68	67	66	62	57	51	49	48	48	51	56	62	66	72	73	76	66.9	88
30-Jan	78	80	81	82	80	80	79	78	80	82	80	81	84	78	76	76	75	78	81	82	78	75	75	75	78.9	84
31-Jan	76	77	77	76	76	78	79	77	75	70	67	69	69	67	67	65	68	71	71	70	70	73	76	76	72.5	79
	80.2	80.6	80.5	80.5	80.5	80.3	79.7	79.0	79.1	79.2	78.5	78.0	77.3	75.9	75.0	75.3	76.6	77.9	78.7	79.7	79.8	79.6	79.8	80.3	Diurnal Average	
	93	93	93	91	90	90	90	89	89	90	91	89	90	91	92	91	92	91	91	93	90	91	92	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 45m (RH45m) - %

Lower Camp Met Tower - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	12	1.61	1.61
60 - 80	384	51.61	53.23
80 - 100	348	46.77	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 94 % on Jan 28 00:00

Maximum Daily Average: 89.7 % on Jan 23

Minimum Value: 47 % on Jan 29 17:00

Minimum Daily Average: 61.1 % on Jan 1

Maximum Diurnal Average: 80.6 % at hour 5

Minimum Diurnal Average: 76.4 % at hour 16

Monthly Average: 79.1 %

Percentiles: P_1 = 52 P_{10} = 68 Q_1 = 76 Median = 80 Q_3 = 84 P_{90} = 89 P_{99} = 92

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

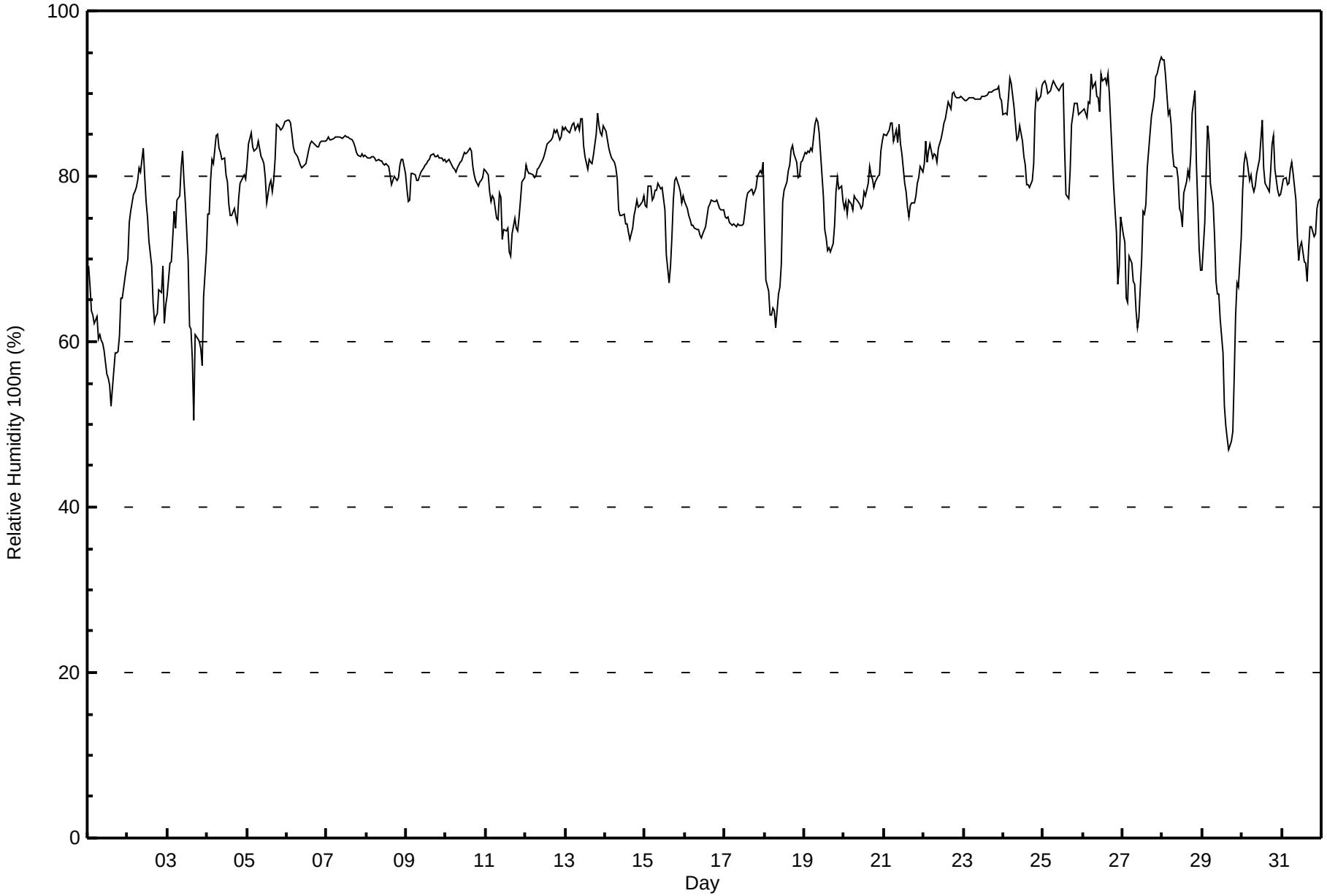
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	69	67	64	63	62	63	60	61	60	60	59	56	56	55	52	54	59	59	59	61	65	65	68	69	61.1	69
2-Jan	70	74	76	78	78	79	79	81	81	83	80	77	75	72	69	65	62	63	63	66	66	69	62	64	72.3	83
3-Jan	66	69	70	73	76	74	77	78	81	83	79	77	70	62	62	58	51	61	60	60	59	57	65	71	68.2	83
4-Jan	75	75	79	82	81	85	85	83	83	82	82	80	79	77	75	75	76	75	74	77	79	80	80	80	79.3	85
5-Jan	81	84	85	84	83	83	83	84	82	82	82	80	77	79	80	78	79	82	86	86	86	86	86	87	82.7	87
6-Jan	87	87	87	85	84	83	82	82	81	81	81	82	82	83	84	84	84	84	84	84	84	84	84	84	83.6	87
7-Jan	84	85	84	84	85	85	85	85	85	85	85	85	85	85	85	84	84	83	83	83	82	83	82	82	84.1	85
8-Jan	82	82	82	82	82	82	82	82	82	82	81	81	81	81	80	79	80	80	80	80	81	82	82	80	81.3	82
9-Jan	78	77	77	80	80	80	80	80	80	80	81	81	81	82	82	83	83	82	82	82	82	82	82	82	80.9	83
10-Jan	82	82	82	81	81	81	81	81	82	82	82	83	83	83	83	83	81	80	80	79	79	80	80	81	81.3	83
11-Jan	81	80	78	77	78	77	75	75	78	77	72	74	73	74	71	70	73	75	74	73	75	77	79	80	75.7	81
12-Jan	81	81	80	80	80	80	80	81	81	81	82	83	83	84	84	84	85	86	85	86	84	85	86	86	82.8	86
13-Jan	86	86	85	86	86	86	86	86	86	87	87	84	82	81	82	82	82	83	85	88	86	85	85	86	84.8	88
14-Jan	85	84	83	83	82	82	81	80	76	75	75	75	74	74	73	72	74	75	76	77	76	76	77	78	77.8	85
15-Jan	76	76	79	79	77	77	78	78	79	79	79	77	76	71	67	69	73	77	80	80	79	78	77	78	76.6	80
16-Jan	77	76	75	75	74	74	74	74	73	73	73	73	74	75	76	77	77	77	77	77	77	76	76	76	75.2	77
17-Jan	75	75	75	74	74	74	74	74	74	74	74	74	76	77	78	78	79	78	78	79	80	81	80	82	76.5	82
18-Jan	74	68	66	63	63	64	64	62	66	67	69	77	78	79	81	81	83	84	83	82	80	80	82	82	74.0	84
19-Jan	83	83	83	83	83	83	86	87	87	85	83	78	74	73	71	71	71	72	74	78	80	78	79	77	79.2	87
20-Jan	76	77	75	77	77	76	78	77	77	77	76	76	78	78	79	81	80	80	79	79	80	80	83	84	78.4	84
21-Jan	85	85	85	86	86	86	84	86	84	86	84	83	79	78	76	75	76	77	77	78	79	80	81	81	81.5	86
22-Jan	82	84	82	83	84	82	83	82	82	83	85	85	86	87	88	89	88	90	90	90	89	90	90	90	86.0	90
23-Jan	89	89	89	89	89	90	89	89	89	89	89	90	90	90	90	90	90	90	90	90	91	91	90	89	89.7	91
24-Jan	87	88	87	90	92	91	88	86	84	85	86	84	82	81	79	79	79	80	81	88	90	89	90	91	85.8	92
25-Jan	91	92	91	90	90	91	91	91	91	90	91	91	91	84	78	77	81	86	87	89	89	87	88	88	88.1	92
26-Jan	88	88	87	89	89	92	91	91	90	89	88	92	91	92	91	92	90	86	79	76	73	67	69	75	85.7	92
27-Jan	73	72	65	65	70	69	67	67	64	62	63	70	76	75	77	81	85	87	88	90	92	92	94	94	76.6	94
28-Jan	94	94	92	87	88	86	83	81	81	80	76	76	74	78	79	81	80	83	88	90	82	77	71	69	82.0	94
29-Jan	69	74	81	86	84	79	77	73	67	66	66	63	59	52	50	48	47	48	49	56	63	67	67	73	65.1	86
30-Jan	78	81	83	82	80	80	79	78	79	80	82	84	87	81	79	79	78	81	84	85	81	78	78	78	80.6	87
31-Jan	79	80	80	79	79	81	82	80	77	73	70	72	72	70	69	67	71	74	74	73	73	76	77	77	75.2	82
	80.2	80.5	80.3	80.5	80.6	80.5	80.1	79.8	79.4	79.3	78.8	78.8	78.3	77.1	76.5	76.4	76.8	77.9	78.4	79.3	79.5	79.3	79.6	80.4	Diurnal Average	
	94	94	92	90	92	92	91	91	91	90	91	92	91	92	91	92	90	90	90	90	92	92	94	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 100m (RH100m) - %

Lower Camp Met Tower - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	23	3.09	3.09
60 - 80	334	44.89	47.98
80 - 100	387	52.02	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 167m (RH167m) - %

Lower Camp Met Tower - January 2016

Maximum Value: 96 % on Jan 27 22:00

Maximum Daily Average: 89.2 % on Jan 23

Minimum Value: 37 % on Jan 3 17:00

Minimum Daily Average: 56.5 % on Jan 3

Maximum Diurnal Average: 79.8 % at hour 2

Minimum Diurnal Average: 76.3 % at hour 17

Monthly Average: 78.6 %

Percentiles: P_1 = 48 P_{10} = 65 Q_1 = 76 Median = 81 Q_3 = 84 P_{90} = 88 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

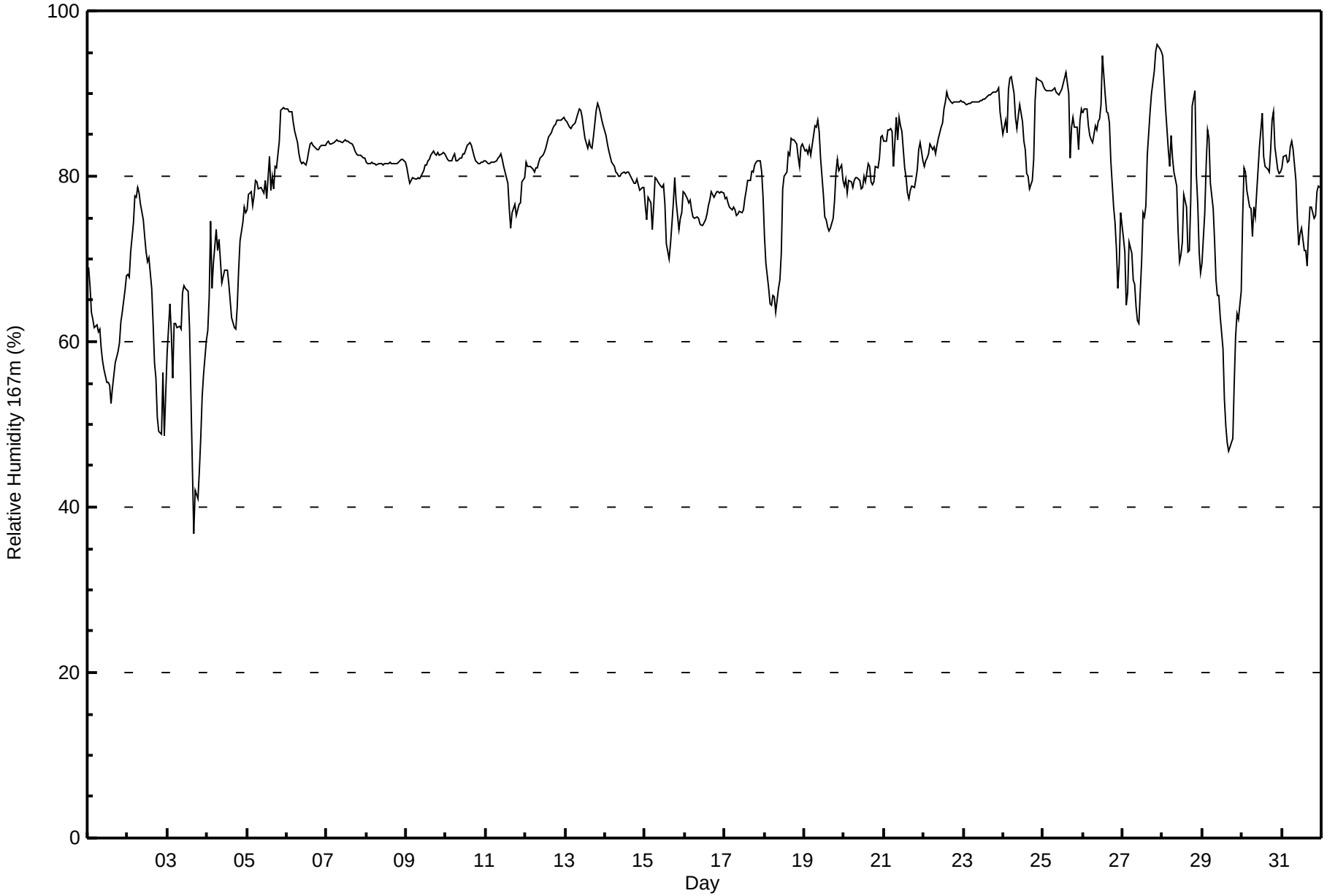
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	69	67	64	63	62	62	61	61	59	58	57	55	55	55	53	54	57	58	59	60	62	64	66	68	60.3	69
2-Jan	68	68	71	74	78	77	79	78	77	75	73	71	70	70	66	62	57	56	51	49	49	56	49	54	65.7	79
3-Jan	59	65	61	56	62	62	62	62	62	66	67	66	66	62	53	45	37	42	41	44	48	53	56	60	56.5	67
4-Jan	61	65	75	66	70	74	71	72	70	67	69	69	69	67	65	63	62	62	64	69	72	74	76	76	68.6	76
5-Jan	76	78	78	77	78	80	79	78	79	78	78	79	77	82	78	80	79	81	81	84	88	88	88	88	80.5	88
6-Jan	88	88	88	88	86	86	84	83	82	82	82	81	82	83	84	84	84	83	83	83	84	84	84	84	84.1	88
7-Jan	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	83	83	83	83	82	82	82	83.6	84
8-Jan	82	82	82	82	82	81	81	82	81	81	81	81	81	82	82	82	82	82	82	82	82	82	82	82	81.6	82
9-Jan	81	80	79	80	80	80	80	80	80	80	81	81	81	82	82	83	83	83	83	83	83	83	83	83	81.3	83
10-Jan	82	82	82	82	82	83	82	82	82	82	83	83	83	84	84	84	83	82	82	81	82	82	82	82	82.4	84
11-Jan	82	82	82	82	82	82	82	82	82	83	82	81	80	79	76	74	76	77	75	76	77	77	79	80	79.5	83
12-Jan	82	81	81	81	81	81	81	81	82	82	83	83	83	84	85	85	86	86	86	87	87	87	87	87	83.7	87
13-Jan	87	87	86	86	86	86	86	88	88	88	87	86	85	83	84	84	83	85	88	89	88	88	87	86	86.3	89
14-Jan	85	84	83	82	82	81	81	80	80	80	80	80	80	81	80	80	80	79	79	80	79	78	79	79	80.5	85
15-Jan	76	75	77	77	74	76	80	80	79	79	79	79	77	72	70	72	74	77	80	77	74	75	76	78	76.3	80
16-Jan	78	77	77	77	76	75	75	75	75	74	74	74	75	76	76	77	78	77	78	78	78	78	78	78	76.5	78
17-Jan	77	77	77	76	76	76	76	75	75	76	76	76	77	78	79	79	81	80	81	82	82	82	80	77	78.1	82
18-Jan	73	70	66	65	64	66	65	64	66	68	71	78	80	80	83	82	85	84	84	84	82	81	84	84	75.4	85
19-Jan	83	83	83	84	82	84	86	86	87	85	82	78	75	75	74	73	74	75	77	80	82	81	81	79	80.4	87
20-Jan	79	80	78	80	79	79	80	80	80	79	79	79	80	79	82	81	79	79	79	81	81	82	85	85	80.1	85
21-Jan	84	84	86	86	86	85	81	87	84	87	86	85	81	80	78	77	78	79	79	80	81	83	84	82	82.6	87
22-Jan	81	82	82	83	84	83	84	83	84	84	86	86	88	89	90	89	89	89	89	89	89	89	89	89	86.3	90
23-Jan	89	89	89	89	89	89	89	89	89	89	89	89	89	89	90	90	90	90	90	90	90	91	88	87	89.2	91
24-Jan	85	87	85	90	92	92	90	87	86	87	89	87	84	83	80	80	79	79	82	89	92	92	92	91	86.7	92
25-Jan	91	91	90	90	90	90	91	91	90	90	90	91	91	92	93	90	82	86	87	86	86	83	87	88	89.0	93
26-Jan	88	88	88	86	85	84	84	86	86	87	87	89	95	90	88	88	87	82	76	74	71	66	70	76	83.3	95
27-Jan	73	71	64	66	72	71	68	67	64	63	62	70	76	75	76	83	88	90	91	93	95	96	95	95	77.6	96
28-Jan	95	92	88	83	81	85	82	80	79	73	70	71	72	78	76	71	71	77	88	90	80	77	71	68	79.1	95
29-Jan	69	76	81	86	85	79	76	72	67	66	66	63	59	53	50	48	47	48	48	55	61	63	63	66	64.4	86
30-Jan	75	81	81	78	76	76	73	76	75	78	84	86	88	82	81	81	81	83	87	88	84	81	80	80	80.6	88
31-Jan	81	82	82	82	82	84	84	83	80	75	72	73	74	71	71	69	73	76	76	75	75	78	79	79	77.3	84
	79.4	79.8	79.7	79.3	79.6	79.8	79.2	79.2	78.5	78.3	78.2	78.6	78.6	78.1	77.2	76.6	76.3	77.1	77.8	78.7	78.9	79.2	79.4	79.7	Diurnal Average	
	95	92	90	90	92	92	91	91	90	90	90	91	95	92	93	90	90	90	91	93	95	96	95	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 167m (RH167m) - %

Lower Camp Met Tower - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	1	0.13	0.13
40 - 60	38	5.11	5.24
60 - 80	292	39.25	44.49
80 - 100	413	55.51	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - January 2016

Maximum Speed: 24 km/h on Jan 1 19:00

Maximum Daily Speed Average: 10.9 km/h on Jan 26

Minimum Speed Value: 0 km/h on Jan 22 08:00

Minimum Daily Speed Average: 1.4 km/h on Jan 8

Maximum Diurnal Speed Average: 2.5 km/h at hour 10

Minimum Diurnal Speed Average: 0.6 km/h at hour 17

Monthly Average Velocity: 1.4 km/h 172.2 deg

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 3$ Median = 6 $Q_3 = 9$ $P_{90} = 13$ $P_{99} = 18$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SSE12	SE11	SE12	SSE9	SSE11	SE12	S9	SW11	SSE12	SSE18	SW8	W17	W19	W14	W21	W18	W13	W19	W24	W18	WNW7	W15	W13	W6	WSW8.2	W24
2-Jan	S3	SE2	WSW2	SSE5	SSE12	SSE11	SSE12	SSE12	SSE12	SSE12	SSE12	SSE9	SSE9	SSE9	SSE8	SSE7	SSE6	SSE9	SSE9	SE9	SSE11	SSE11	SSE13	SE12	SSE8.9	SSE13
3-Jan	SE12	SSE12	SE12	SE13	SE9	SE10	SE8	SSE9	SSE13	SE9	SE10	SE7	SE10	SSE11	SSE4	SSE8	SSE9	SSE10	SSE11	SSE9	SSE11	SSE9	SSE9	S4	SSE9.4	SSE13
4-Jan	SSE7	SSE7	S3	W1	NNE0	N1	NNW0	NE0	NNW2	NW0	SE2	SSE6	SSE7	SSE8	SSE9	SSE11	SSE8	SSE7	SSE10	SSE10	SSE11	SSE11	SSE12	SSE12	SSE5.8	SSE12
5-Jan	SSE11	SSE8	SSE8	SSE10	SSE8	SSE7	SSE8	SSE9	SSE10	SSE10	SSE10	SSE7	SSE7	SSE4	SSE5	SSW1	NNW3	NNW3	NNW4	NNW3	NW3	NNW3	NW2	NNW1	SSE4.3	SSE11
6-Jan	NNW3	NNW3	NW3	NNW3	NNW2	NNW2	N3	NW3	NW3	NW3	WNW2	NW2	NNW4	NNW3	NNW3	N5	N5	NNW4	NNW5	NNW5	N5	N8	N6	N5	NNW3.6	N8
7-Jan	NNW4	N7	N7	NNW5	NNW3	NW2	NW3	NNW5	N4	NNW2	N2	NNW4	NW5	NNW6	NNW6	NW6	WNW8	W9	W10	W8	W6	NW5	N5	N6	NW4.4	W10
8-Jan	N5	NNE3	N2	NNW4	NNW3	NW3	WNW2	NNW2	NW2	NNW3	NW3	NW2	WNW1	NW1	SW1	SSW4	S2	SW2	SW3	SSW6	SSW7	SW8	S9	S12	WSW1.4	S12
9-Jan	S15	S12	SSE10	SSE13	SSE14	SSE14	SSE10	SSE8	SE7	SSE11	SSE15	SSE12	SSE10	SSE10	SSE6	SSE8	SSE6	SSE7	SSE9	SSE8	SSE8	SE9	SE11	SSE11	SSE10.1	SSE15
10-Jan	SE8	SE9	SE8	SSE11	SSE8	SSE9	SE7	SE4	SE5	SE2	ESE1	SSE1	NNW3	NNW3	NNW5	NNW7	N8	NNE8	NNE8	NNE4	E1	N2	NNW3	NNW3	ESE1.9	SSE11
11-Jan	N6	NNW5	NNW6	NW4	NW3	NW3	N2	W1	NW2	NW3	W9	W12	W7	WSW9	WSW13	WSW13	W7	WSW3	SW5	SW5	SW2	SE4	SSE6	SSE2	W3.8	WSW13
12-Jan	SSE9	SSE8	SSE8	SSE6	SE4	SE2	SSE3	SSE4	SSE4	SE2	SSE1	SSE2	SSE2	SSE5	SSE3	SE5	SSE7	SE3	SE4	SSE5	SSW2	SW3	S0	SSW3	SSE3.8	SSE9
13-Jan	SSE3	NNW2	NNW3	ESE1	NNW1	NNW2	NW2	WNW3	NW2	WNW2	NNW2	WNW2	ENE3	E6	ENE3	E3	NE3	E3	N2	NNW1	N5	N6	NNW9	N11	N2.1	N11
14-Jan	N11	N10	N11	N10	N12	N10	N10	N8	N6	N4	N7	N8	NNE8	NNE6	N9	N10	N9	NNE8	N10	N8	NNE8	NE7	NE4	NE2	N8.0	N12
15-Jan	NE2	NNE2	NNW2	NNW3	NNW6	N4	NNW3	NNW3	N3	NNW2	N2	N3	NNW4	NNW4	N4	NNE5	N5	N5	NW3	NNW3	NW3	NNW2	NNW2	NNW3	NNW3.2	NNW6
16-Jan	W1	NW1	NW2	NNW3	NNW2	W1	SW1	SE3	SSE2	SSE3	S2	SSE2	SSE4	SSE5	SSE6	SE6	SSE2	SSW1	S1	SSE4	S4	SSE6	SSE11	SSE10	SSE2.5	SSE11
17-Jan	S7	SSE10	SSE11	SSE10	SSE8	SSE12	SSE10	SSE11	SSE9	SSE10	SSE8	SSE8	SSE5	SSE2	SSE3	SSE4	SSE4	ESE0	S1	NNW3	NNW4	NNW4	NNW4	NW1	SSE4.9	SSE12
18-Jan	SSE3	SSE3	SE7	SSE12	SE14	SE15	SE14	SSE14	SSE11	SSE11	SSE14	SSE11	SE7	SE5	SSE4	SE4	SE4	ESE2	SE4	SSE5	SSE5	S5	SSE5	SSE6	SSE7.7	SE15
19-Jan	SE3	NE2	SE1	SSE1	NNW1	N2	NNW1	NNW3	NNW3	N3	N6	N6	N7	NNW6	NNE7	NNE4	N4	N5	N5	N5	N5	N4	NE3	NNE4	N3.3	NNE7
20-Jan	NNE6	N7	N7	NNW5	N5	NNW4	NW5	NNW4	N4	N5	N3	SW2	WSW2	SSW1	WSW1	W1	W2	N2	WSW1	N1	SW0	S2	ENE2	ENE3	NNW2.1	N7
21-Jan	ENE1	E1	E3	E5	ESE4	E3	SE3	SSE2	SSE6	SSE4	S3	SSE4	SSE8	SSE8	SSE9	SE9	SE9	SE13	SE14	SE13	SSE9	SSE17	SSE16	S9	SSE6.7	SSE17
22-Jan	S6	SE4	S4	SSE7	WNW3	SW4	SW1	W0	NNW3	NNW2	NNW3	NNW3	N4	N5	NNW6	N6	NNW5	NNW5	N5	N4	NNW4	N3	N4	N5	NNW1.8	SSE7
23-Jan	N6	N5	N5	N4	NNW3	NNW4	NNW4	NNW5	NNW3	NNW2	NW3	NNW2	NNE4	N3	NW1	WNW1	W2	WNW1	ESE0	S1	ESE1	SSE7	S5	SE5	NNW1.5	SSE7
24-Jan	SE5	SSE7	SSE8	SSE9	SE9	SSE4	SW9	WSW9	WSW9	WSW12	WSW9	SSW4	SW4	SSW2	S4	S4	SSE5	S4	WNW6	NNW5	N9	NNE8	NNE8	N6	SW2.1	WSW12
25-Jan	NNW3	NNW3	NE1	N1	W0	SSE4	SSW7	SSE9	SSW10	SSW10	S14	S14	S14	S12	SSE14	S8	SSE10	SSE7	SSE8	SSE9	SSE8	SSE11	SSE11	SSE14	S7.5	SSE14
26-Jan	SE14	SSE12	SSE14	SSE11	SSE12	SSE13	SSE13	SSE11	SSE10	SSE16	SSE15	SSE14	SSE13	SSE10	SSE15	SSE12	SE15	SSE14	SSE19	SE21	SE16	W14	W22	W22	SSE10.9	W22
27-Jan	W22	W18	WNW16	NW11	ESE1	W15	W15	WNW16	W17	W18	WNW12	N8	N7	N10	N9	N10	N8	N4	NNW4	WNW2	S2	SSE2	S1	SSW1	WNW7.4	W22
28-Jan	SW1	SE2	SSE1	SSE6	ENE2	NNW4	SSW1	S7	SSE9	SSE13	SE9	SE4	SSE2	SE3	SSE5	SSE9	SSE9	SSE13	SSE14	SSE13	SW6	W11	W15	W13	S4.6	W15
29-Jan	W15	W15	WNW16	NW11	WNW8	NW10	NNW10	NNW9	WNW18	NW12	WNW12	WNW10	NW8	NW12	NW14	NW10	NW12	WNW9	W16	W14	W7	WNW6	WNW6	W2	WNW10.3	WNW18
30-Jan	E1	SW1	SSE1	SE2	SW5	W9	WNW4	NW3	NNW3	NW2	NNW3	N5	NNE7	NNE8	NNE8	NE8	NNE8	NNE9	NNE10	NE6	NNE5	NNE5	NE5	NE5	NNE3.5	NNE10
31-Jan	N3	NNE2	NE4	NNE5	NE6	NE5	NE7	NNE6	NNE7	N8	N9	NNE8	NNE9	NNE9	NNE7	NNE8	NNE6	NNE5	NNE5	NE4	NNE4	NNE4	NNW1	NW2	NNE5.4	N9
	SSE2.0	SSE1.5	SSE1.3	SE2.0	SE2.2	SSE1.8	S1.5	S1.7	S1.8	S2.5	S2.2	S1.4	SSE0.9	SSE0.7	SSW0.7	SSE0.6	SE0.6	SSE0.7	S1.2	S1.8	S1.2	SSW1.2	SSW1.5	SSW1.2	Diurnal Average	
	W22	W18	WNW16	SSE13	SSE14	SSE15	W15	WNW16	WNW18	SSE18	SSE15	W17	W19	W14	W21	W18	SE15	W19	W24	SE21	SE16	SSE17	W22	W22	Diurnal Maximum	

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 km/h on Jan 26 22:00

Minimum Value: 0 km/h on Jan 23 20:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

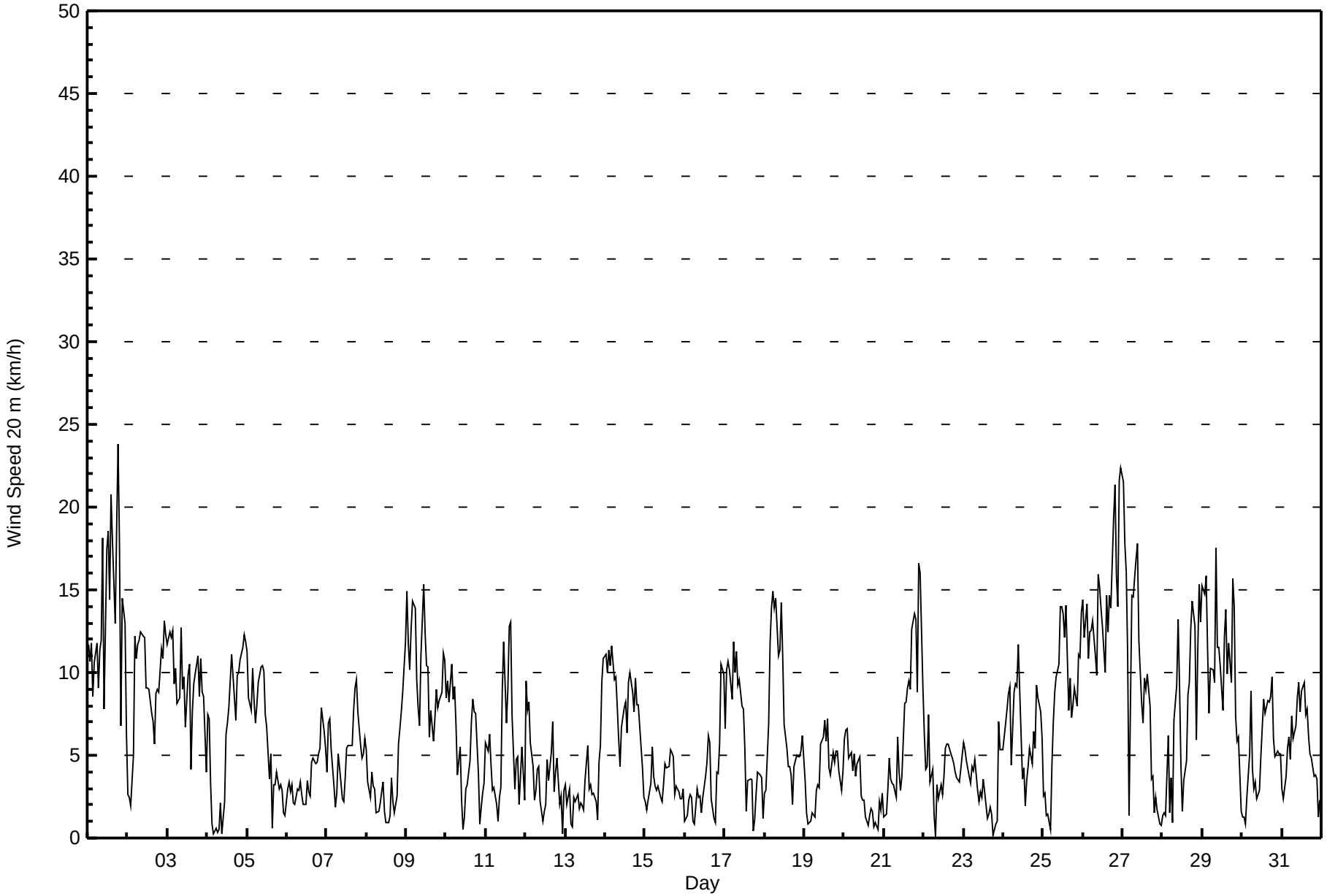
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	5	3	2	3	4	4	3	4	4	4	7	6	6	6	5	7	6	7	7	6	5	5	6	4	7
2-Jan	2	1	3	3	2	2	1	2	2	3	3	3	3	3	2	2	2	2	2	3	3	3	3	3	3
3-Jan	3	2	3	4	2	3	2	2	3	3	2	2	4	3	2	4	3	3	4	2	2	2	2	3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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	370	49.73	49.73
6 - 11	266	35.75	85.48
12 - 19	102	13.71	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

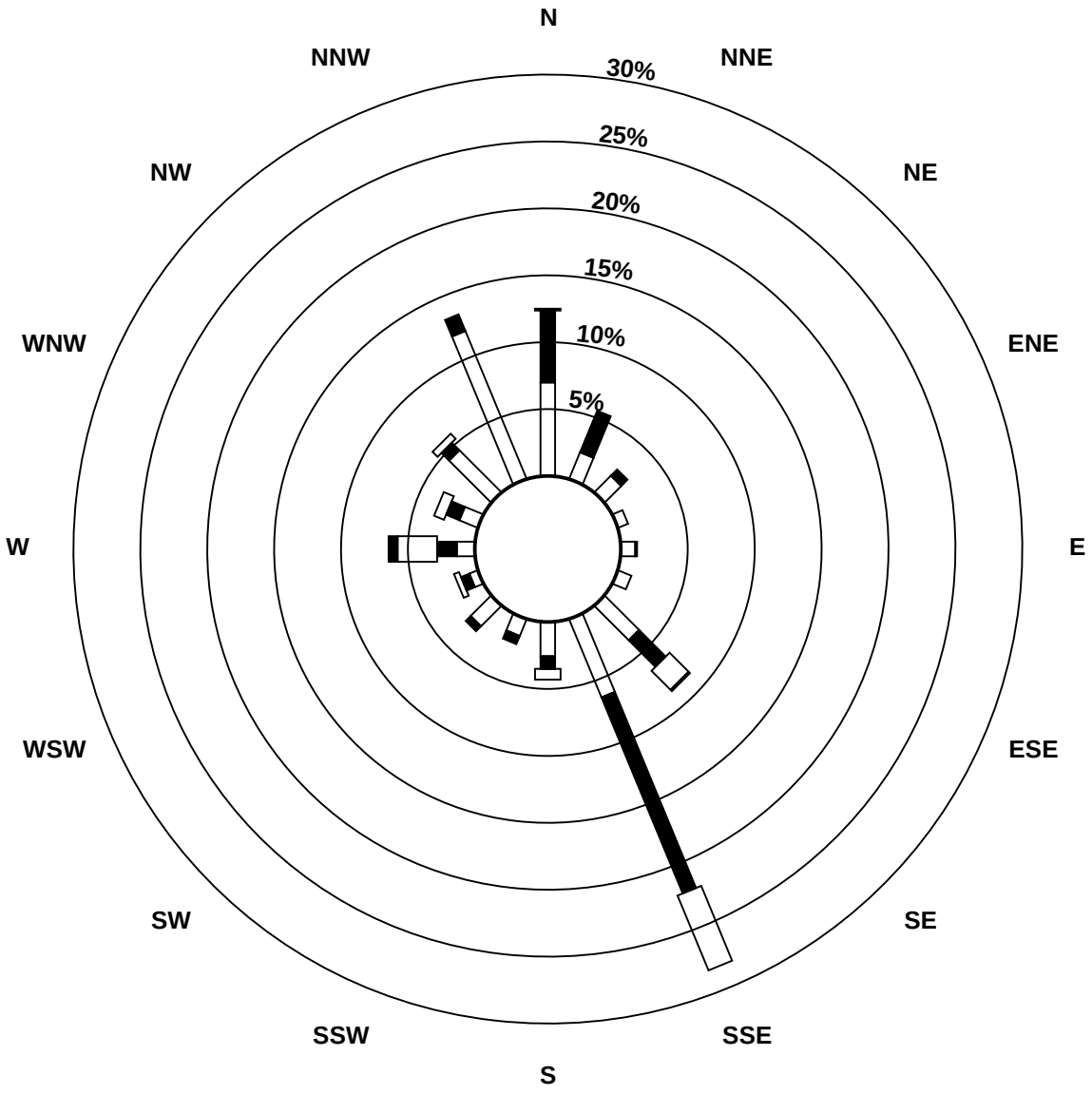
Total Number of Hours: 744

Wood Buffalo Environmental Association

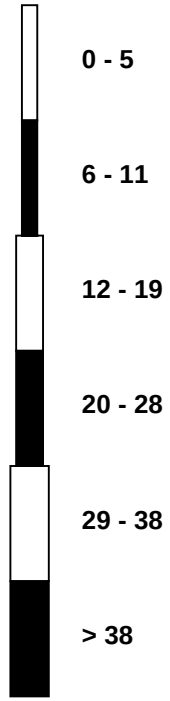
Wind Rose Jan 2016

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower (AMS 3)



Classes (km/h)



Total Number of Valid Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - January 2016

Maximum Speed: 32 km/h on Jan 1 19:00

Maximum Daily Speed Average: 14.0 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 20 19:00

Minimum Daily Speed Average: 1.3 km/h on Jan 8

Maximum Diurnal Speed Average: 2.7 km/h at hour 5

Minimum Diurnal Speed Average: 0.5 km/h at hour 15

Monthly Average Velocity: 1.5 km/h 152.4 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 4$ Median = 8 $Q_3 = 12$ $P_{90} = 16$ $P_{99} = 25$

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SSE11	SSE9	SE13	SSE8	SSE11	SE13	S9	SW15	S10	SSE15	SW11	W24	W25	W20	WSW28	W24	W18	W26	W32	WSW25	W11	WSW23	WSW20	W9	WSW12.5	W32
2-Jan	SSW4	SE2	WSW4	S5	SE15	SE14	SE13	SE14	SE15	SE16	SE16	SE13	SE12	SE12	SE11	SSE9	SE8	SE11	SE10	SE11	SE14	SE13	SE15	SE15	SE10.9	SE16
3-Jan	SE16	SE15	SE17	SE16	SE12	SE13	SE11	SE10	SE14	SE11	SE12	SE8	SE12	SE12	SE5	SE10	SE12	SE12	SE13	SE10	SE13	SE11	SE11	SSE6	SE11.6	SE17
4-Jan	SSE10	SE9	SSE5	SSW1	ENE0	S1	SW1	N0	NNW4	NNW1	SE3	SE7	SE9	SE10	SE11	SE13	SSE11	SSE11	SE13	SE12	SE13	SE14	SE14	SE14	SE7.2	SE14
5-Jan	SE13	SE10	SE10	SE12	SE9	SE9	SE10	SE12	SE11	SE12	SE11	SE9	SE7	SE4	SE6	SSE1	NNW4	NNW6	NNW7	NNW5	NNW5	NNW4	NNW2	NNW1	SE4.8	SE13
6-Jan	NW3	NW4	NNW5	NNW5	NW4	NW4	NNW5	NNW5	NNW5	NW4	NNW3	NW3	NNW4	NNW3	NNW3	NNW7	N7	NNW7	NNW6	NW7	NNW8	NNW10	AF	AF	NNW5.0	NNW10
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	N6	NW3	NNW3	NNW4	NW6	NW7	NW7	WNW7	W10	W12	W12	W10	WSW8	NW6	N7	N8	----	W12
8-Jan	N8	N5	N4	NNW6	NNW5	NW4	WNW1	NNW2	NW3	NW3	NNW5	WNW2	WSW2	WNW1	S2	S4	SSE3	S3	SSW5	SSW7	S8	SSW9	S10	S12	SW1.3	S12
9-Jan	SSE16	SSE13	SSE13	SE15	SSE16	SSE14	SE13	SE10	SE8	SE13	SE18	SE16	SE13	SE12	SE8	SE10	SE7	SE10	SE13	SE10	SE11	SE11	SE15	SE15	SE12.5	SE18
10-Jan	SE12	SE12	SE12	SE13	SE12	SE11	SE9	ESE5	SE7	ESE3	E1	SE1	NNW4	NNW3	NNW7	NNW10	N13	NNE12	NNE13	NNE6	ENE1	NNW3	NNW4	NNW5	E2.9	N13
11-Jan	NNW8	NNW8	NW8	NW6	NW4	NW4	N3	NW2	NW5	WNW5	W12	WSW16	WSW10	WSW13	WSW18	WSW19	W10	WSW5	SW7	SSW7	SSW4	SSE5	SE7	SE5	W5.2	WSW19
12-Jan	SE12	SE10	SE10	SE7	SE6	SE3	SE4	SE5	SE5	SE3	SE1	SE2	SE2	SE5	SE4	SE7	SE9	SE4	SE5	SSE6	S3	SSW3	SSE1	S4	SE4.8	SE12
13-Jan	SE5	N2	NNW4	SSE1	NW1	NNW4	NW3	NW4	NW2	WNW3	NNW3	NNW2	ENE6	E8	ENE5	ENE5	NE5	ENE5	N3	NNW2	NNW7	N8	NNW14	NNW15	N3.2	NNW15
14-Jan	N16	N15	N17	N15	N17	N14	N14	N12	N9	N6	N9	N11	NNE13	NNE10	N14	N16	N13	NNE12	N14	N12	NNE13	NNE10	NNE7	NNE4	N12.1	N17
15-Jan	NNE4	NNE3	NNW4	NNW5	NNW8	N6	NNW5	NNW5	N5	NNW4	NNW3	NNW4	NNW6	NNW6	N7	NNE9	NNW9	NNW7	NNW4	NNW4	NW4	NW4	WNW4	NW3	NNW4.8	NNE9
16-Jan	W2	WSW2	W1	WNW2	NW2	WSW2	SSE3	SE6	SE5	SE4	SSE3	SE3	SE4	SE5	SE7	SE8	SE4	S2	SE2	SSE7	SSE5	SSE8	SE12	SE11	SSE3.9	SE12
17-Jan	SSE8	SE12	SE12	SE12	SE10	SE14	SE13	SE14	SE12	SE12	SE9	SE9	SE6	ESE2	SSE5	SE4	SE5	SE2	SSE2	SE1	NNW5	NNW3	NNW7	SE1	SE6.3	SE14
18-Jan	SSE9	SSE7	SE13	SE18	SE20	SE21	SE19	SE19	SE15	SE15	SSE17	SSE13	SE9	SE7	SE6	SE6	SE5	ESE3	ESE6	SE6	SE6	S6	SE7	SSE7	SE10.7	SE21
19-Jan	SE5	ENE2	SE2	SE2	NW0	N2	NW2	NNW4	NNW5	NNW5	NNW8	N8	N9	NNW8	N11	N7	N6	N8	N7	N7	N8	N6	NE5	NNE7	N4.8	N11
20-Jan	NNE9	N9	N9	NNW7	N8	NNW6	NW6	NNW5	N6	N7	NNW3	SW2	WSW2	S1	WNW1	WNW1	NW1	NNW3	NW0	SSE1	S2	SSE4	E3	E4	N2.9	N9
21-Jan	E2	E2	E4	E7	ESE5	E5	ESE4	SE3	SE6	SE5	SE5	SE6	SSE11	SSE9	SE12	SE13	SE14	SE18	SE18	SE18	SSE11	SE21	SE21	S12	SE9.4	SE21
22-Jan	SSE8	SE7	SSE5	SE9	W3	SW7	SW3	WSW1	NNW5	NNW4	NNW6	NNW4	N5	N7	NNW8	NNW8	NNW8	NNW8	NNW7	NNW6	NNW5	N5	N7	N8	NNW2.9	SE9
23-Jan	NNW8	N8	NNW7	NNW6	NNW5	NNW6	NNW6	NW7	NNW4	NNW3	NW3	NNW3	N5	N4	NW1	W2	W2	WNW2	WNW0	S1	ESE2	SSE8	S6	SE7	NNW2.3	NNW8
24-Jan	SE6	SE9	SE9	SE11	SE11	SSE5	SW12	WSW14	WSW15	WSW17	SW12	SSW5	SW5	SSW2	S4	SSE7	SSE7	S5	W10	NNW9	N14	N13	NNE12	N9	SW2.8	WSW17
25-Jan	NNW4	NW4	NE2	N2	N0	SE5	SSW8	SSE9	S11	S12	S15	S15	SSE14	SSE13	SSE15	SSE10	SSE12	SE11	SE12	SSE13	SSE12	SE15	SE15	SE18	SSE9.0	SE18
26-Jan	SE17	SE14	SE16	SE12	SE15	SE15	SE16	SE13	SE12	SE18	SE16	SE16	SE14	SE12	SE17	SE16	SE18	SE17	SE22	SE24	SE13	W22	W29	W30	SSE12.2	W30
27-Jan	W29	WSW24	W21	WNW14	ENE1	W20	W20	W21	W23	WSW24	W15	N11	N9	N13	N12	N14	NNW12	NNW6	NNW6	NNW3	S2	SE2	SW1	SSW1	WNW9.8	W29
28-Jan	SW3	ESE3	SE3	SE8	E2	NNW6	S2	SSE9	SSE12	SE16	SE16	SE8	SE3	SE5	SE6	SE12	SE15	SE17	SE18	SE17	SW11	WSW16	WSW23	WSW18	SSE6.6	WSW23
29-Jan	WSW22	W20	W22	WNW15	WNW11	WNW14	NW13	NW13	WNW23	WNW16	W15	WNW13	NW10	NW15	WNW18	WNW13	WNW16	W13	W22	W20	WSW12	W10	WNW9	W4	WNW14.0	WNW23
30-Jan	ESE1	SW3	S1	SSE3	WSW9	W13	W8	WNW5	NNW6	NW4	NW4	N7	N9	NNE13	NNE11	NE12	NNE13	NNE13	NNE15	NNE9	NNE7	N8	NNE8	NNE7	N5.1	NNE15
31-Jan	N4	NNE3	NNE5	NNE8	NNE9	NE7	NNE11	NNE9	NNE11	N13	N13	NNE11	NNE13	NNE14	NNE11	NNE12	NNE9	NNE7	NNE7	NNE6	NNE5	NNE5	N3	WNW2	NNE8.2	NNE14
	SSE2.6	SSE2.1	SE2.1	SE2.6	SE2.7	SSE1.9	SSE1.8	S1.8	S1.4	SSE2.3	S2.1	S1.4	ESE0.9	E0.8	SE0.5	ESE0.9	E1.1	ESE0.9	SSE1.1	SSE2.1	SSE1.1	SSW1.3	S1.6	S1.5	Diurnal Average	
	W29	WSW24	W22	SE18	SE20	SE21	W20	W21	W23	WSW24	SE18	W24	W25	W20	WSW28	W24	SE18	W26	W32	WSW25	SE14	WSW23	W29	W30	Diurnal Maximum	

AF - Analyzer Failure

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 km/h on Jan 26 22:00

Minimum Value: 0 km/h on Jan 5 22:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 2 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 7

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

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

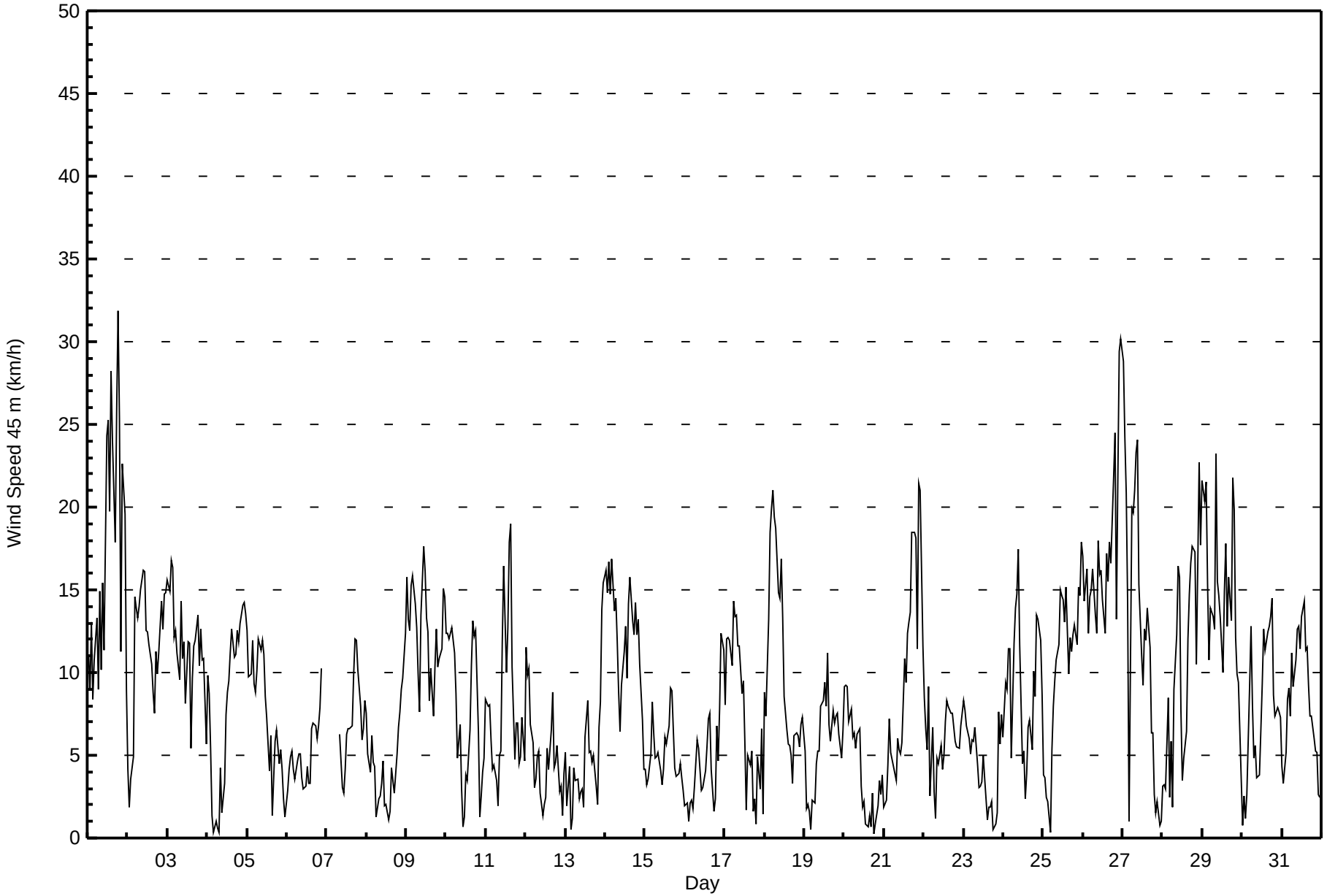
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - January 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	256	34.88	34.88
6 - 11	246	33.51	68.39
12 - 19	198	26.98	95.37
20 - 28	30	4.09	99.46
29 - 38	4	0.54	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 734

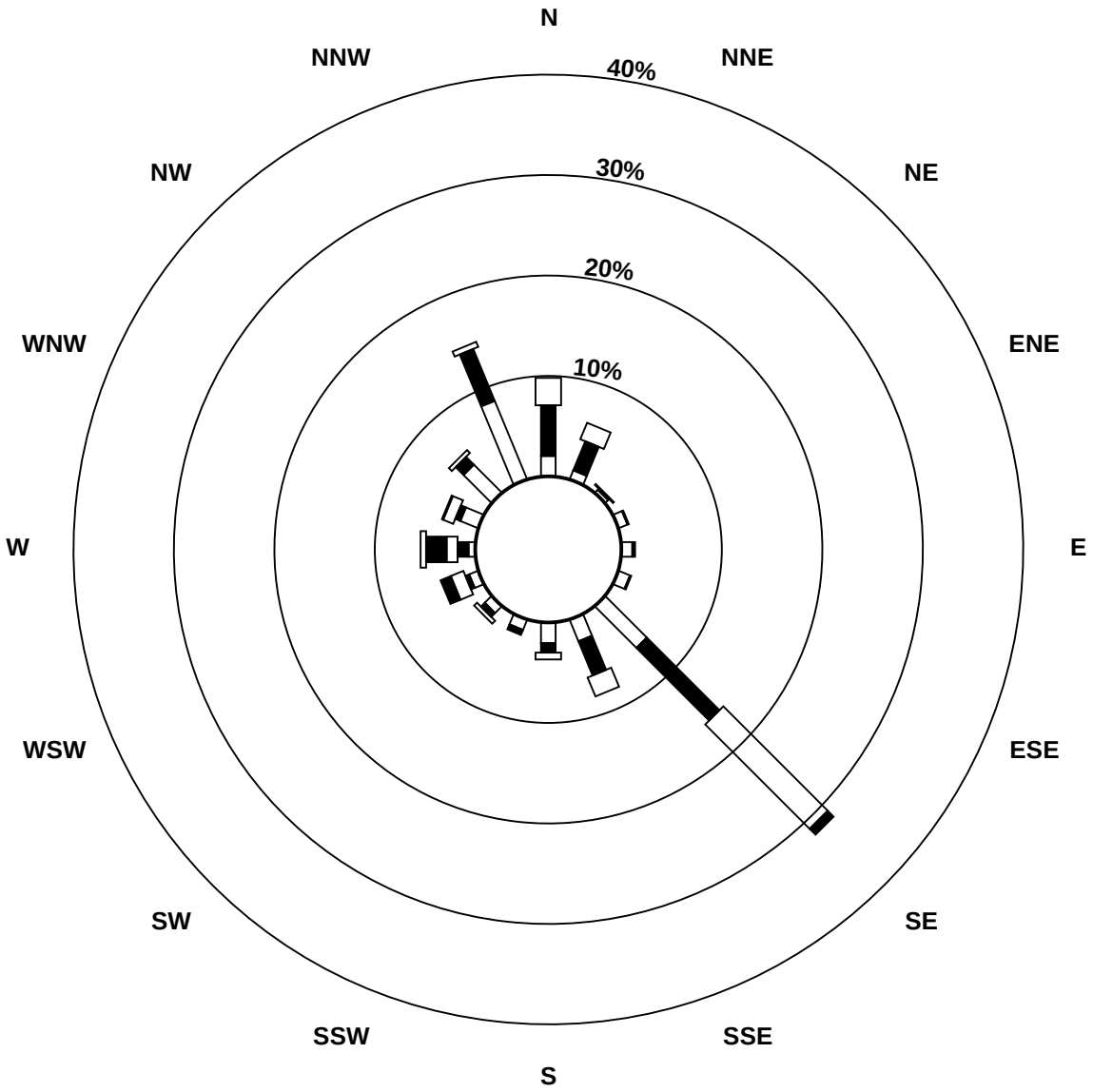
Total Number of Hours: 744

Wood Buffalo Environmental Association

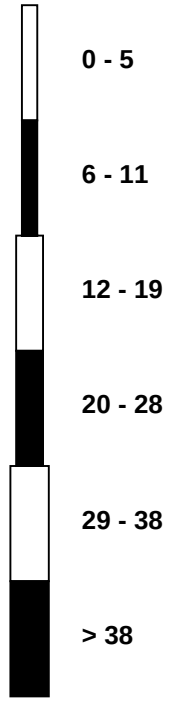
Wind Rose Jan 2016

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower (AMS 3)



Classes (km/h)



Total Number of Valid Hours: 734

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - January 2016

Maximum Speed: 46 km/h on Jan 26 23:00

Maximum Daily Speed Average: 25.4 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 20 14:00

Minimum Daily Speed Average: 1.6 km/h on Jan 8

Maximum Diurnal Speed Average: 3.8 km/h at hour 1

Minimum Diurnal Speed Average: 0.4 km/h at hour 14

Monthly Average Velocity: 2.1 km/h 205.3 deg

Percentiles: P_1 = 1 P_{10} = 4 Q_1 = 7 Median = 10 Q_3 = 15 P_{90} = 22 P_{99} = 38

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Percent Operational Time:	94.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SW17	SW16	SSW8	WSW17	SW15	SW12	SW17	SW23	SW18	SW14	WSW24	WSW38	W39	W32	WSW40	WSW39	WSW32	WSW40	W42	WSW34	WSW26	W35	W31	W20	WSW25.4	W42
2-Jan	SW16	WSW13	WSW15	SW11	SSW7	SSW7	S6	SSE11	S10	SSE10	SSE11	SSE10	SSE13	SE17	SE15	SSE12	S6	SSE11	SE14	SSE14	SSE15	SSE15	S14	SSE15	S10.0	SE17
3-Jan	SSE16	SSE13	SSE12	SSE16	SSE17	SSE18	SSE18	SSE15	SSE21	SSE21	SSE15	SSE12	SSE12	SSE6	SSE12	SSE14	SSE16	SSE12	SSE10	SSE10	SSE7	S7	SSE8	SSE9	SSE13.1	SSE21
4-Jan	SSE9	SSE8	SSE8	SSE3	W1	SE3	SE3	SE2	NNW2	NNW6	WSW5	SW3	SSE4	SSE5	SSE4	SE8	SSE9	SSE7	S7	SSE8	S7	S7	S8	S9	SSE4.5	SSE9
5-Jan	S9	SSE10	SSE11	SSE9	S6	SSE9	SSE9	SSE7	SSE8	S8	S5	SSE7	S4	SE8	SSE6	SE1	NE2	N9	NNW11	NNW12	NW8	NW5	NW2	WNW1	SSE2.8	NNW12
6-Jan	WNW2	NW2	N6	NNW5	NNW10	NNW13	NW9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNW13
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW9	WSW6	NW7	NNW6	NNW10	----	NNW10
8-Jan	NNW9	N6	N5	NNW9	NNW8	NNW9	NNW5	NNW6	NNW6	NNW4	NNW5	NNW4	NW2	SE3	SSE4	S6	SSE5	S7	SSW11	SSW7	SSW8	SSW10	S10	S13	WSW1.6	S13
9-Jan	S14	S15	S13	S12	S13	S12	S12	SSE11	SSW7	S9	AF	AF	AF	AF	AF	SSE11	SSE11	SSE14	SE17	SSE13	SSE13	SSE12	SSE10	SSE10	SSE11.9	SSE17
10-Jan	SSE10	SSE15	SSE13	S10	SSE11	SSE11	SSE8	SSE1	ESE8	SE5	ENE2	E3	N5	NNW5	NNW10	NNW17	NNE18	NNE17	NNE18	NNE10	NE2	NNW3	N5	N7	ENE2.5	NNE18
11-Jan	N13	N14	NNW14	NNW9	NNW6	NNW7	NNW7	NW8	NW12	WNW14	W16	W19	WSW13	WSW14	WSW18	WSW20	WSW12	WSW10	SW11	SW17	SW15	SSW7	SSE7	SSE9	W7.7	WSW20
12-Jan	SE16	SSE14	SSE12	SSE12	S5	SSE4	SSE4	SSE5	SSE6	SSE7	SE7	SE4	SSE5	SSE7	S6	SSE6	SSE9	SSE9	SSE6	SSE6	SSE5	SSE5	SE5	S5	SSE7.1	SE16
13-Jan	SSE5	E5	N4	NNE1	NW3	N7	NNE5	N10	NE9	NNE8	NE9	E12	E11	E12	ENE8	E9	E8	ENE7	NNE5	N6	N10	N11	N19	N21	NE6.2	N21
14-Jan	N21	N21	N23	N20	N22	N19	N20	N17	N12	N9	N12	N15	NNE16	NNE13	N19	N22	N18	NNE17	N19	NNE17	NNE18	NE14	NE10	NE7	N16.4	N23
15-Jan	NE7	NE7	N5	N7	NNW12	N10	N6	NNW9	N8	N7	NNW5	NNW5	NNW8	N8	N9	NNE13	N14	N12	N9	N8	NNE4	NNE4	E2	W3	N7.2	N14
16-Jan	SE2	SE4	ESE4	SE6	SE9	SSW4	SSE2	S2	SE10	S4	SW3	SE4	SSE3	SE3	ESE5	SSE4	SE8	S4	SSE3	SSE6	SSE12	SSE5	SSE7	SSE14	SSE5.0	SSE14
17-Jan	SSE5	S6	SSE8	SSE7	SSE7	SSE8	SSE8	SSE11	SSE13	SSE8	SSE4	SE12	SSE7	SW4	SSE7	SE13	SE8	S5	SE7	SE13	SSE15	SSE23	SSE18	SSE27	SSE9.9	SSE27
18-Jan	SE31	SE29	SE30	SE32	SE32	SE31	SE29	SE32	SE24	SE24	SE22	SE18	SE13	SE11	SE9	SE10	SE8	SE6	SE8	SSE9	SE10	S7	SSE9	SSE8	SE18.3	SE32
19-Jan	SSE7	S2	SE3	SSW1	W1	NW3	NNW8	NNW9	N8	NNE9	N11	N10	N12	N11	NNE13	NNE10	N9	N11	N10	N11	N10	NNE9	NE7	NNE8	N6.8	NNE13
20-Jan	NNE12	N13	N14	N10	N11	N9	NNW8	NNW8	N8	N8	N3	SE1	WSW2	NE0	NNE1	NNE1	SE2	SSE2	SSE6	SSE8	SSE10	SSE9	SE4	SE8	NNE2.8	N14
21-Jan	SE9	SE9	SE9	SE7	SE7	SE6	SSE12	SSE9	S8	SSE11	SSE15	SSE14	SE20	SE17	SE23	SE22	SE25	SE31	SE30	SE29	SE23	SE32	SE29	SSE15	SE17.0	SE32
22-Jan	S16	SSE11	SSW10	SSW7	SW7	WSW14	WSW7	WSW6	NNW6	N11	NNW6	NNW5	NNW6	NNW9	NNW12	NNW12	NNW11	N13	N11	N9	N8	NNE8	NNE10	N11	NNW4.1	S16
23-Jan	N12	N10	N10	N9	N8	NNW8	NNW9	NNW8	N7	N5	NNW3	NW4	NW3	N3	N1	WNW2	W2	W5	SW4	SSW2	SE3	SSW8	SSW9	SE10	NNW2.9	N12
24-Jan	S5	SSE9	S6	S8	S8	SW11	WSW18	WSW19	WSW20	WSW20	SW18	SW12	WSW13	SW7	SW10	S8	SW9	WSW11	W17	NNW16	N20	NNE19	NNE17	N12	WSW6.6	WSW20
25-Jan	N6	N4	NE5	NE3	E3	SE7	SSW10	S10	S12	S14	S16	S16	SSE17	SSE15	SSE13	SSE12	SSE15	SE19	SE21	SE19	SSE16	SSE17	SSE13	S10	SSE10.4	SE21
26-Jan	SSW6	S5	SSE10	SSE10	SSE14	SSE17	SSE15	SE17	SSE16	SSE19	SSE17	SSE20	SSE14	SSE13	SSE16	SSE19	SSE15	SSE9	SSW10	SW12	WSW15	W39	W46	W46	S11.4	W46
27-Jan	W45	WSW39	W34	WNW21	NNW4	W25	W30	W32	W38	W34	W23	NNW12	N11	N13	N13	N18	N16	N12	NNW12	NNW9	N3	NE3	WNW2	SSE3	WNW14.6	W45
28-Jan	SE4	S6	SE8	SE19	SE13	NNW1	S10	SSE14	SSE15	SSE22	SSE23	SSE17	S8	S5	S7	SSE15	SSE19	SSE18	SSE15	S11	WSW26	WSW29	WSW35	WSW31	S11.0	WSW35
29-Jan	WSW33	W33	W32	WNW26	WNW20	WNW23	NW22	NW22	WNW36	WNW27	WNW21	WNW21	NW15	NW22	WNW26	WNW21	WNW27	WNW23	W34	W31	W23	WSW23	WNW16	WSW16	WNW23.5	WNW36
30-Jan	WSW11	WSW8	SW8	WSW13	WSW21	WSW25	W21	WNW12	NW10	NNW10	NNW7	N8	NNE12	NNE15	NNE15	NE15	NNE16	NNE18	NNE19	NNE12	NNE9	NNE11	NNE10	NNE9	NNW6.4	WSW25
31-Jan	NNE6	NNE4	NNE7	NNE11	NNE12	NE10	NE14	NNE13	NNE15	N18	N17	NNE14	NNE17	NNE18	NNE15	NNE15	NNE12	NNE10	NNE9	NNE8	NNE8	NNE7	NNE6	N3	NNE11.0	NNE18
	SSW3.8	SSW3.4	SSW2.3	SSW2.0	S2.0	SW2.5	SW2.7	SW2.4	SW2.7	SSW2.3	SW2.7	SSW2.1	SSW1.0	SE0.4	SSW0.5	SE1.3	SE1.2	S1.0	SW1.5	SSW2.2	SSW2.4	SSW3.4	SW3.0	SSW3.1	Diurnal Average	
	W45	WSW39	W34	SE32	SE32	SE31	W30	SE32	W38	W34	WSW24	WSW38	W39	W32	WSW40	WSW39	WSW32	WSW40	W42	WSW34	WSW26	WSW39	W46	W46	Diurnal Maximum	

AF - Analyzer Failure

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 12 km/h on Jan 1 11:00

Minimum Value: 0 km/h on Jan 23 16:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 2 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 8

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	0
Percent Operational Time:	94.5

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

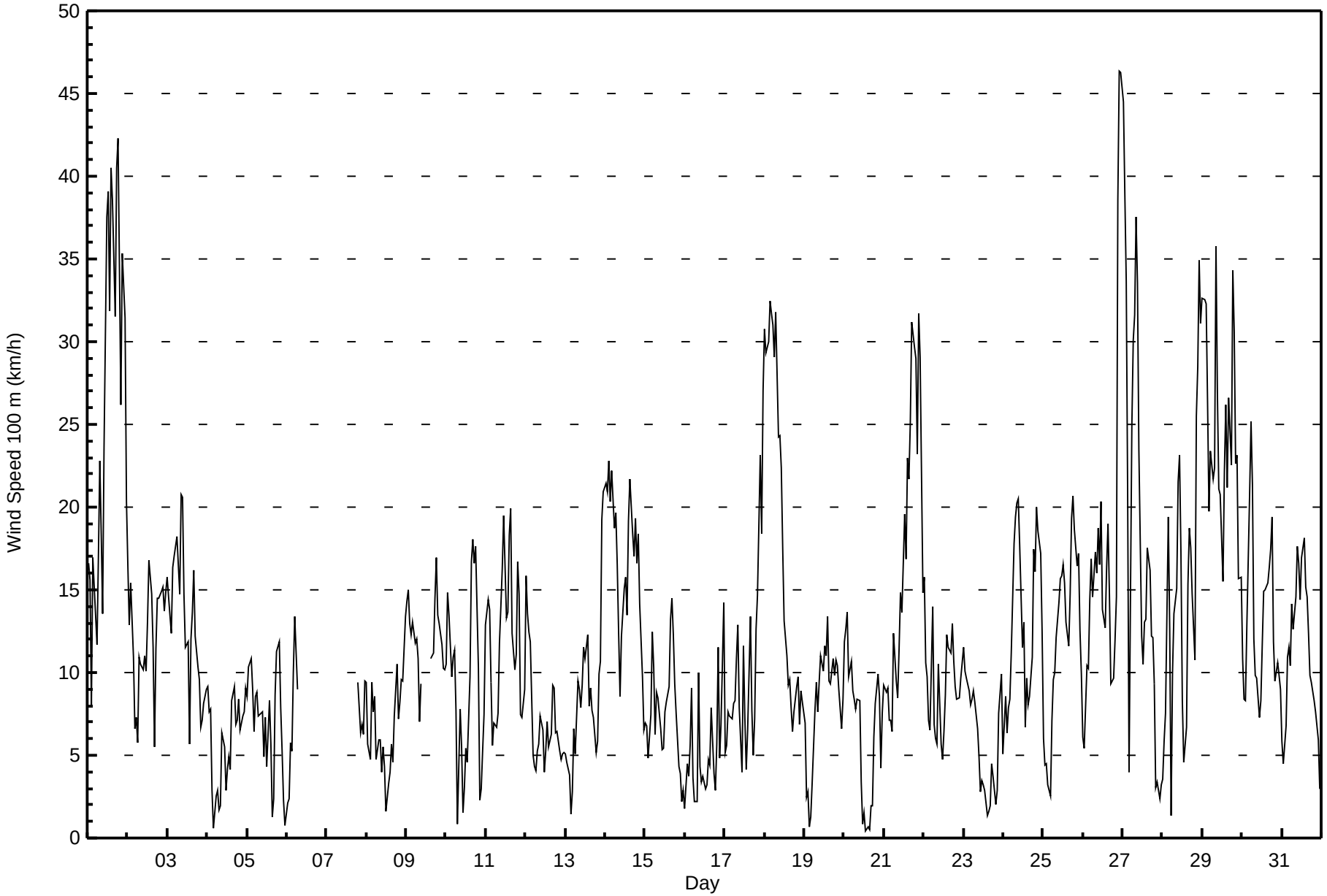
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - January 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	126	17.92	17.92
6 - 11	280	39.83	57.75
12 - 19	200	28.45	86.20
20 - 28	54	7.68	93.88
29 - 38	33	4.69	98.58
> 38	10	1.42	100.00

Total Number of Valid Hours: 703

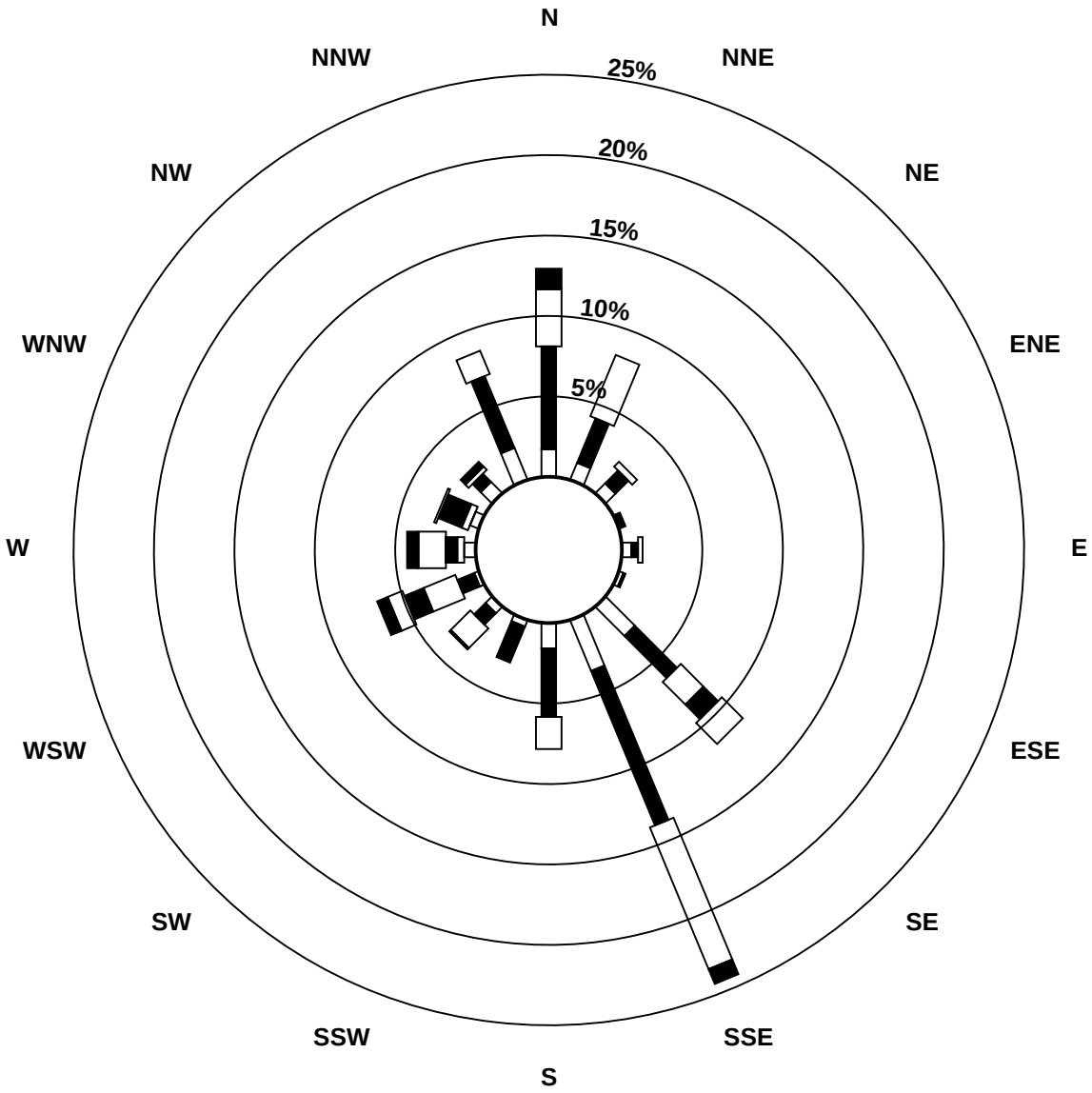
Total Number of Hours: 744

Wood Buffalo Environmental Association

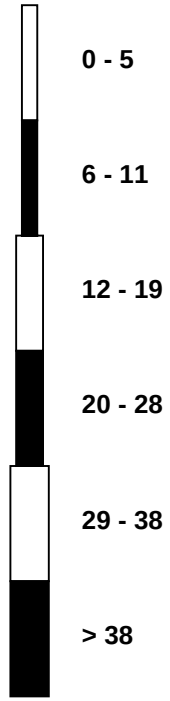
Wind Rose Jan 2016

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower (AMS 3)



Classes (km/h)



Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - January 2016

Maximum Speed: 57 km/h on Jan 27 00:00

Maximum Daily Speed Average: 32.1 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 20 14:00

Minimum Daily Speed Average: 1.7 km/h on Jan 8

Maximum Diurnal Speed Average: 6.7 km/h at hour 1

Minimum Diurnal Speed Average: 1.1 km/h at hour 14

Monthly Average Velocity: 3.6 km/h 232.0 deg

Percentiles: P_1 = 2 P_{10} = 5 Q_1 = 8 Median = 12 Q_3 = 18 P_{90} = 28 P_{99} = 47

Hours in Service:	744
Hours of Data:	725
Hours of Missing Data:	19
Percent Operational Time:	97.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	WSW27	SW24	SW16	WSW27	SW24	SW21	SW24	WSW32	SW28	WSW25	WSW37	W46	W45	W38	WSW48	W46	W43	W49	W45	W36	W26	W34	WNW32	WNW25	WSW32.1	W49
2-Jan	W19	W25	WSW27	WSW26	SW15	SW14	SW10	SSW8	SSW12	SSW15	SSW15	SSW10	SSW9	SSE11	SSE12	S13	SW13	SSW10	S9	S10	S11	S19	S19	S20	SSW12.4	WSW27
3-Jan	S19	S16	SSW20	S22	S26	S26	S24	S26	S29	S30	SSE24	SSE23	SSE20	SSE16	SSE20	S19	S19	SSW17	SSW14	SW11	SW10	SW8	SW6	SW4	S18.0	S30
4-Jan	SW5	S9	SSE6	WSW5	WNW8	NW12	NNW15	NNW13	NNW17	N16	NNW13	NNW12	NW11	WNW10	W9	WNW1	SW8	SW14	SW14	SW11	SW12	SW13	SW14	SW12	W6.2	NNW17
5-Jan	SW13	SW12	SSW8	SW10	SW12	SW9	SSW8	SSW7	SSW10	SW9	SSW8	SSE8	S8	SSE6	SSE5	SE9	S4	NNE6	NNE11	N13	N10	N8	N6	NNE4	SSW3.2	SW13
6-Jan	NW2	NNW4	NNE8	NE4	NNE4	N9	N9	NNE10	NNE5	NNE5	NNE6	N7	NNE4	NNE4	N5	NNW9	AF	AF	AF	AF	AF	AF	AF	AF	----	NNE10
7-Jan	AF	AF	AF	AF	AF	NE6	NNW6	NNW11	N8	NNE4	NNW4	NW4	NW6	NW6	NW6	NW6	WNW3	WSW7	WSW8	WSW12	WSW9	NW3	NW3	NW5	NW4.5	WSW12
8-Jan	NW8	NNW7	NNW6	NNW9	NNW7	NNW6	NNW3	NE5	E5	ENE3	ENE2	E5	ESE3	SE3	S3	SSW6	SSW6	SSW8	SSW10	SSW8	SSW9	SSW10	S9	S11	SW1.7	S11
9-Jan	SSW12	SW20	SW18	SSW10	SSW9	SSW8	SSW10	SSW8	SW10	SSW7	S8	S8	SSE10	S9	S11	S13	S16	SSE22	SSE17	S15	S16	S15	S10	SSW9	S11.5	SSE22
10-Jan	S13	SSE20	S20	S12	SSE11	SSE12	S8	WSW5	SSE2	S1	WNW3	NE4	N8	N6	N11	N18	NNE19	NNE17	NNE19	NNE12	NE3	NNW4	N7	N9	NE1.9	S20
11-Jan	N15	N18	N17	N11	N6	NNW9	NW10	NW15	NW16	WNW17	W16	W17	W13	WSW16	WSW21	WSW23	WSW15	WSW13	SW14	SW16	WSW15	SW13	SSW9	SSW8	W9.2	WSW23
12-Jan	S10	SSE14	SSE16	SSE13	SSE11	SSE12	SSE13	S8	S10	S11	SSE10	S9	S7	SSE10	S8	S8	SSE12	SSE14	SSE9	SSE11	SSE8	SSE9	SSE8	S9	SSE10.2	SSE16
13-Jan	S7	ESE11	E8	SE8	SSE6	ESE4	ESE10	ENE9	ENE12	E13	E15	E14	E12	E13	E9	E11	E10	ENE8	NE4	NNE7	NNE9	NNE11	N18	N21	ENE7.9	N21
14-Jan	N21	NNE20	NNE22	N20	N22	N19	N20	N17	NNE13	N10	NNE13	N15	NNE16	NNE14	N19	NNE23	NNE19	NNE18	NNE19	NNE18	NNE21	NE17	NE12	NE10	NNE17.1	NNE23
15-Jan	NE10	ENE10	NE7	NNE7	N12	N11	NNE8	N10	NNE9	NNE9	NNE6	N6	N8	N9	NNE9	NNE14	NNE17	NNE17	NE13	ENE10	E12	ESE10	SE6	SSW7	NNE8.0	NNE17
16-Jan	SSW3	SSE3	SSE3	SW6	SW2	WSW5	WNW6	NW4	ENE2	S4	SW7	WSW6	WSW5	WSW1	ESE3	SSW3	S3	SSW3	SSW5	S5	S6	S9	SSW9	S6	SSW3.5	S9
17-Jan	S7	SW8	SW4	SSE9	S7	S6	S8	SSE9	SSE13	AF	AF	SSE11	SSE9	SSW8	SSW8	SSE8	SE11	SSE11	SSE17	SE20	SSE28	SE36	SSE32	SSE34	SSE13.3	SSE36
18-Jan	SSE36	SE33	SE34	SE36	SE35	SE32	SE31	SE33	SE28	SE28	SSE24	SSE18	SSE13	SE12	SSE8	SSE9	SE9	SSE6	SSE7	SSE9	SSE8	SSW8	S7	S7	SSE19.3	SSE36
19-Jan	SSW7	SW5	SW4	W4	NNW4	NNW4	NNW8	N9	NNE11	NE12	NNE13	NNE10	N11	N11	NNE13	NNE10	NNE10	NNE12	N10	N11	NNE11	NNE11	NE7	NNE9	N7.3	NNE13
20-Jan	NNE12	NNE13	N15	N11	NNE11	N10	N9	N8	N9	N8	NNE4	ESE1	SW3	ESE0	E2	SE3	S6	S7	S9	SSE11	SSE15	SSE10	SSE10	SSE14	ENE2.2	SSE15
21-Jan	SSE15	SSE14	SSE14	SSE15	SSE16	SSE17	S21	SSE15	S17	SSE15	SSE19	SSE15	SSE22	SE23	SE26	SE25	SE30	SE37	SE36	SE35	SE29	SSE31	SSE27	S18	SSE21.8	SE37
22-Jan	S19	SSW19	SW15	SW15	WSW14	WSW19	WSW13	W7	NNW6	N11	NE7	NNE6	NNE6	N10	N13	NNW13	N12	N14	NNE12	NNE10	NNE9	NE10	NNE11	NNE11	NNW3.7	S19
23-Jan	NNE11	NNE10	NNE10	NNE9	N8	N7	N9	N7	NNE6	NE4	NE2	WNW3	WNW4	NW2	NE2	AF	AF	AF	AF	S3	SSW5	SW14	SW17	S10	N2.2	SW17
24-Jan	SSW10	SSW8	SSW12	SSW11	SW14	WSW17	WSW23	W23	W23	WSW24	SW20	SW15	SW18	SW14	SW15	SW13	SW16	W20	W23	NNW18	NNE22	NNE20	NNE19	N13	WSW10.6	WSW24
25-Jan	N7	N5	NE5	NE4	E3	SSE7	SSW10	S11	S13	S15	S18	S18	SSE16	SSE15	S14	S14	S18	SSE20	SSE20	S20	S18	SSW16	SSW15	SW15	S10.9	SSE20
26-Jan	WSW16	WSW14	SW10	SSW11	SSW10	S9	S10	SSE12	S13	S16	SSW12	S12	SSW13	SSW14	S14	S16	SSW16	SW15	WSW19	SW21	WSW27	W49	W54	W57	SW15.9	W57
27-Jan	W54	W48	W44	WNW30	NW9	WNW28	WNW31	WNW32	W35	W32	W29	NNW13	N11	NNE12	NNE12	N17	N17	N15	N13	NNW11	NNW7	NNE5	N2	SSE7	WNW16.4	W54
28-Jan	S10	S12	SSE17	SSE27	SSE27	S7	SSE16	SSE20	SSE21	SSE25	S25	SSE22	S15	S8	S12	S17	SSW18	SSW20	SSW15	SW18	WSW40	WSW41	WSW46	W40	SSW16.3	WSW46
29-Jan	WSW41	W40	W38	WNW35	WNW25	WNW31	NW30	WNW32	WNW43	WNW33	WNW28	WNW25	WNW21	NW28	WNW33	WNW28	WNW33	WNW27	W39	W37	W30	W30	WNW23	W19	WNW30.2	WNW43
30-Jan	WSW24	WSW20	WSW21	WSW23	WSW29	W32	W29	WNW20	WNW20	NNW13	N9	N9	NNE12	NNE14	NNE15	NE16	NNE16	NNE17	NNE21	NNE14	NNE10	NNE11	NE10	NNE10	NW8.8	W32
31-Jan	NNE7	NNE5	NNE8	NNE12	NE12	NE11	NE15	NNE13	NNE15	NNE17	N17	NNE15	NNE17	NNE19	NNE16	NNE15	NNE12	NNE11	NNE10	NNE9	NNE9	NNE8	NNE8	NE6	NNE12.0	NNE19
	SW6.7	SW6.4	SW4.9	SW4.6	SW4.1	WSW4.3	WSW4.3	WSW3.6	WSW3.4	SW2.8	SW3.6	SW2.5	SW1.8	SW1.1	WSW2.0	SW1.7	SW2.8	SW3.1	SW3.5	SW3.3	SW3.6	SW5.1	WSW4.9	SW4.7	Diurnal Average	
	W54	W48	W44	SE36	SE35	SE32	SE31	SE33	WNW43	WNW33	WSW37	W46	W45	W38	WSW48	W46	W43	W49	W45	W37	WSW40	W49	W54	W57	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 11 km/h on Jan 1 11:00

Minimum Value: 0 km/h on Jan 23 14:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	725
Hours of Missing Data:	19
Hours of Calibration:	0
Percent Operational Time:	97.5

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

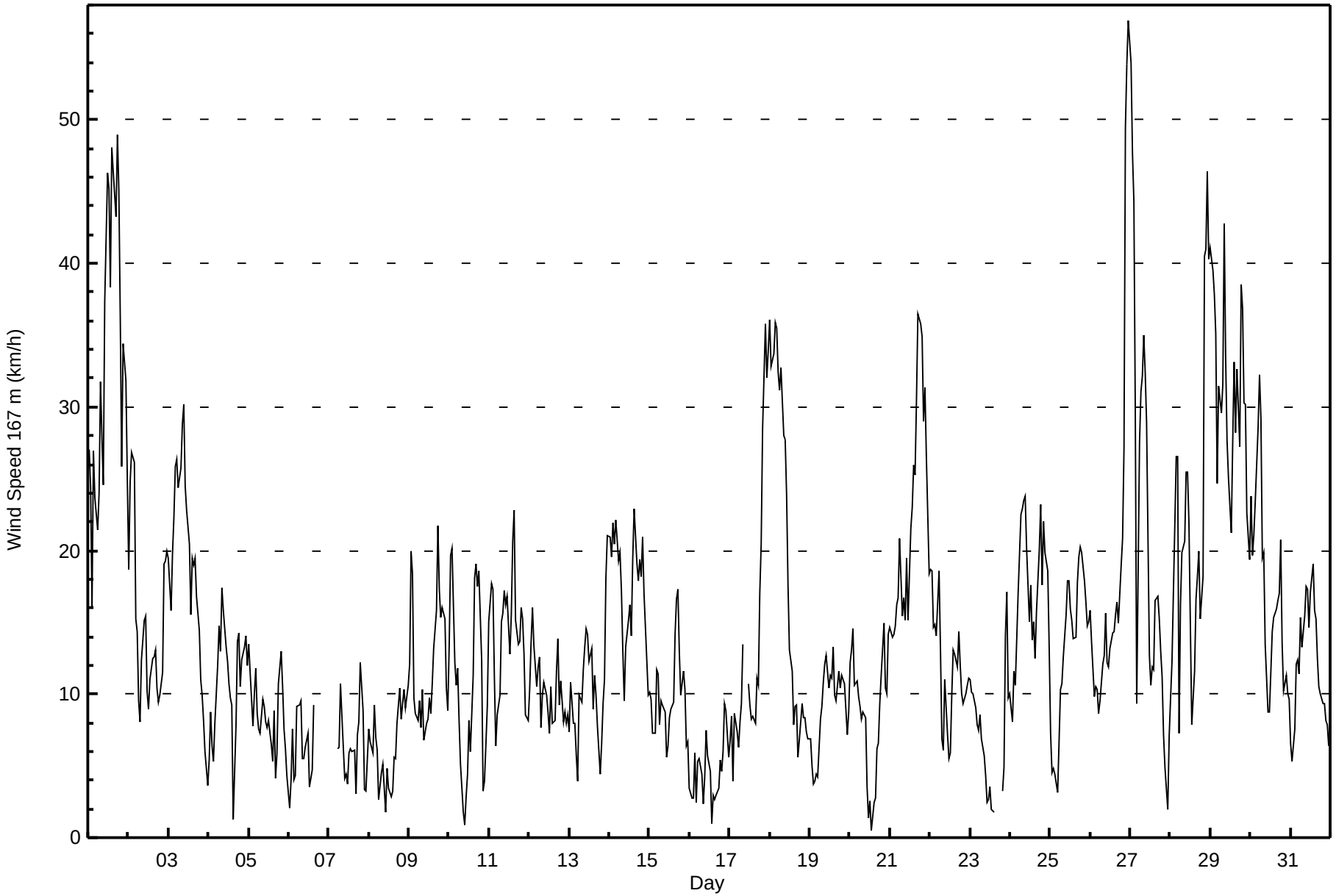
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - January 2016



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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	84	11.59	11.59
6 - 11	267	36.83	48.41
12 - 19	220	30.34	78.76
20 - 28	88	12.14	90.90
29 - 38	45	6.21	97.10
> 38	21	2.90	100.00

Total Number of Valid Hours: 725

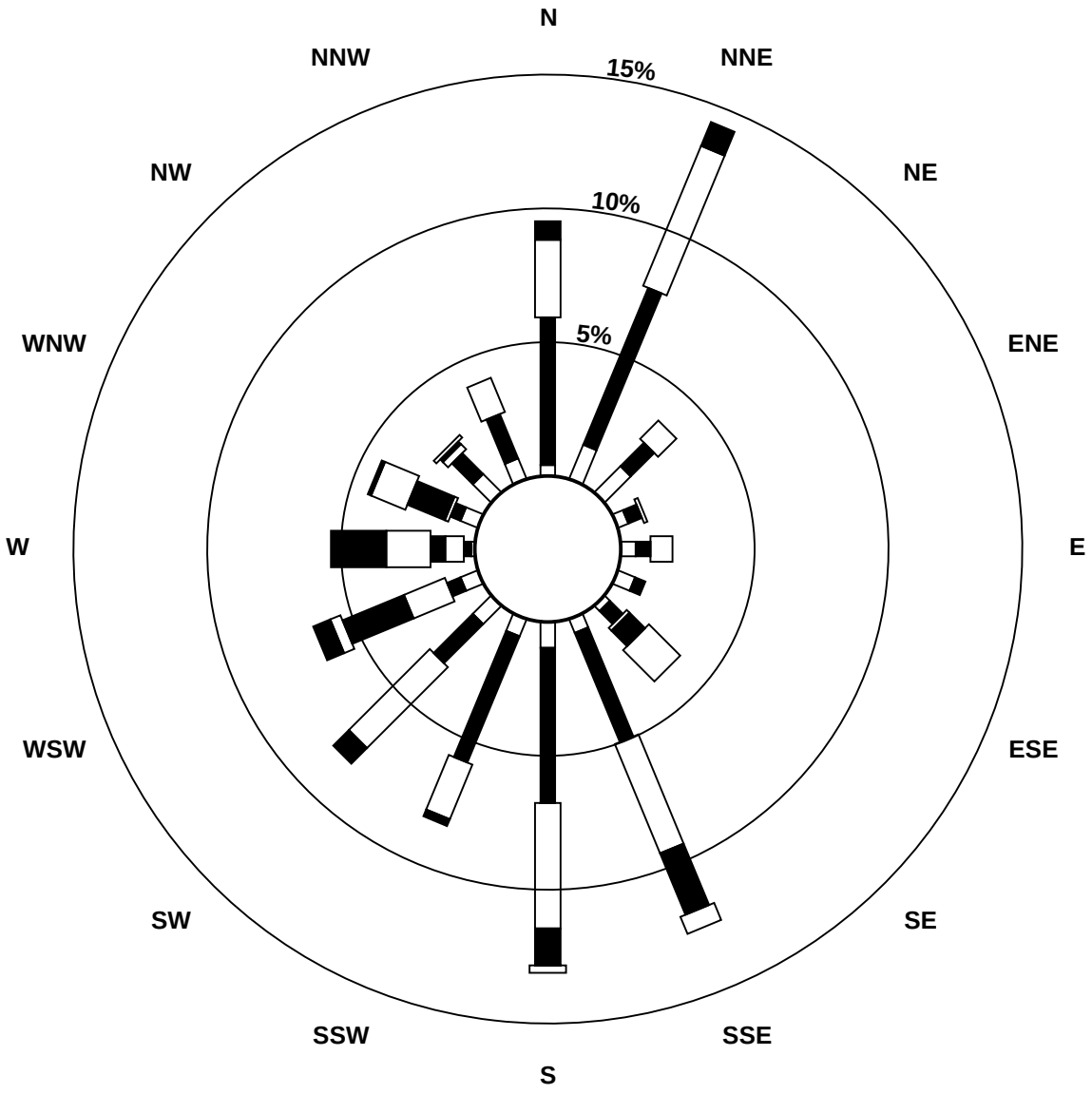
Total Number of Hours: 744

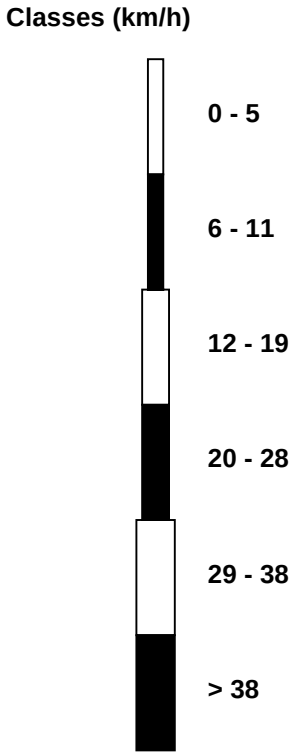
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower (AMS 3)





Total Number of Valid Hours: 725

Direction of Maximum Speed: 272 deg on Jan 1 19:00
Direction of Maximum Daily Speed Average: 160.2 deg on Jan 26

Direction of Minimum Speed: 276 deg on Jan 22 08:00

Direction of Minimum Daily Speed Average: 1.4 deg on Jan 8

Monthly Average Direction: 298.4 deg

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	155	146	140	150	156	143	173	222	162	151	224	270	273	269	268	275	276	276	272	263	285	267	266	270	238.6
2-Jan	183	130	239	166	150	155	150	154	148	152	150	151	151	157	156	159	152	153	148	146	148	152	148	143	151.8
3-Jan	144	149	145	146	144	146	139	151	156	144	139	138	145	153	157	149	147	152	151	160	155	158	156	173	149.2
4-Jan	155	162	172	270	14	353	335	38	340	318	146	152	155	161	156	155	163	167	157	157	158	157	158	155	157.9
5-Jan	154	154	153	153	154	154	156	152	155	155	151	154	153	150	153	202	333	343	347	336	325	337	326	343	153.1
6-Jan	332	345	323	331	327	333	351	324	305	308	302	324	335	341	337	349	2	342	343	330	351	354	353	355	339.9
7-Jan	338	0	355	345	330	314	326	345	8	327	358	338	322	331	328	311	284	275	280	273	271	314	1	1	321.0
8-Jan	0	12	1	348	337	313	284	336	320	333	313	326	290	324	233	213	174	233	216	210	199	216	191	177	240.8
9-Jan	172	169	153	147	153	153	147	153	144	150	152	153	157	151	159	152	149	152	154	156	152	143	146	150	153.2
10-Jan	143	142	142	147	149	148	140	129	146	128	109	164	346	331	336	342	11	18	28	26	93	357	335	347	101.7
11-Jan	353	343	328	321	325	322	4	280	318	324	274	262	267	257	257	255	273	249	228	225	224	145	148	162	271.6
12-Jan	155	152	153	151	141	144	152	157	157	139	156	160	153	149	148	144	152	134	136	158	194	229	169	197	154.1
13-Jan	151	339	329	119	328	330	325	301	307	288	338	302	60	87	73	80	52	84	349	339	349	359	346	350	3.3
14-Jan	5	5	4	359	1	352	2	8	360	11	4	3	24	19	9	11	10	20	7	8	28	41	36	36	9.6
15-Jan	44	18	339	335	337	6	334	345	0	337	359	350	338	331	358	15	355	360	321	329	324	335	335	328	347.1
16-Jan	267	321	314	335	331	260	218	144	150	152	189	168	148	153	152	138	165	213	175	163	169	163	160	162	162.5
17-Jan	169	157	159	158	157	156	155	156	158	160	162	154	157	148	162	153	149	117	186	336	333	333	335	315	158.4
18-Jan	154	160	146	147	143	141	138	156	156	155	160	157	146	141	149	144	137	118	131	158	153	180	148	157	149.7
19-Jan	141	50	133	161	333	0	330	340	339	350	356	356	357	345	12	12	1	4	351	354	356	10	44	27	2.6
20-Jan	19	359	357	342	4	348	326	335	355	356	349	226	254	203	252	270	266	349	246	349	230	176	71	69	347.0
21-Jan	60	83	84	96	111	93	130	153	154	158	170	166	162	167	151	139	136	145	142	138	167	157	154	188	147.8
22-Jan	173	138	173	149	292	232	226	276	334	331	348	348	7	356	345	350	345	342	352	351	342	352	4	356	344.9
23-Jan	354	355	351	352	336	331	334	330	339	335	323	343	15	11	312	287	264	302	108	190	115	157	182	145	341.1
24-Jan	144	149	147	149	144	149	235	253	252	252	238	212	229	207	184	183	165	182	284	342	359	13	17	1	215.2
25-Jan	331	328	44	355	274	157	204	168	197	193	185	181	173	173	165	175	158	156	157	164	165	151	151	150	170.1
26-Jan	146	150	151	152	154	148	149	151	149	148	154	152	152	153	151	148	145	152	150	146	144	269	274	278	160.2
27-Jan	277	269	287	310	118	273	281	287	278	266	284	357	359	356	353	355	351	356	341	283	186	158	169	199	296.4
28-Jan	232	136	163	158	76	338	202	178	167	156	146	133	158	140	155	150	150	149	153	148	236	264	261	268	175.9
29-Jan	262	270	283	311	290	307	327	327	302	312	284	292	317	318	307	306	308	285	270	271	267	291	301	278	294.3
30-Jan	82	230	158	137	236	269	290	319	340	309	327	355	13	29	30	41	29	20	31	36	28	14	34	35	12.3
31-Jan	10	31	37	33	40	44	41	33	17	11	355	20	29	21	21	25	27	26	25	35	19	24	342	306	23.1
	167.7	159.2	155.8	140.9	143.2	163.5	170.9	184.4	186.0	175.9	188.7	188.8	161.0	153.0	193.1	158.1	131.9	162.3	187.2	178.3	171.0	200.2	193.3	194.9	
	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 Jan 4 10:00

Minimum Value: 5 deg on Jan 26 03:00

Percentiles: P_1 = 6 P_{10} = 9 Q_1 = 15 Median = 21 Q_3 = 31 P_{90} = 55 P_{99} = 93

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

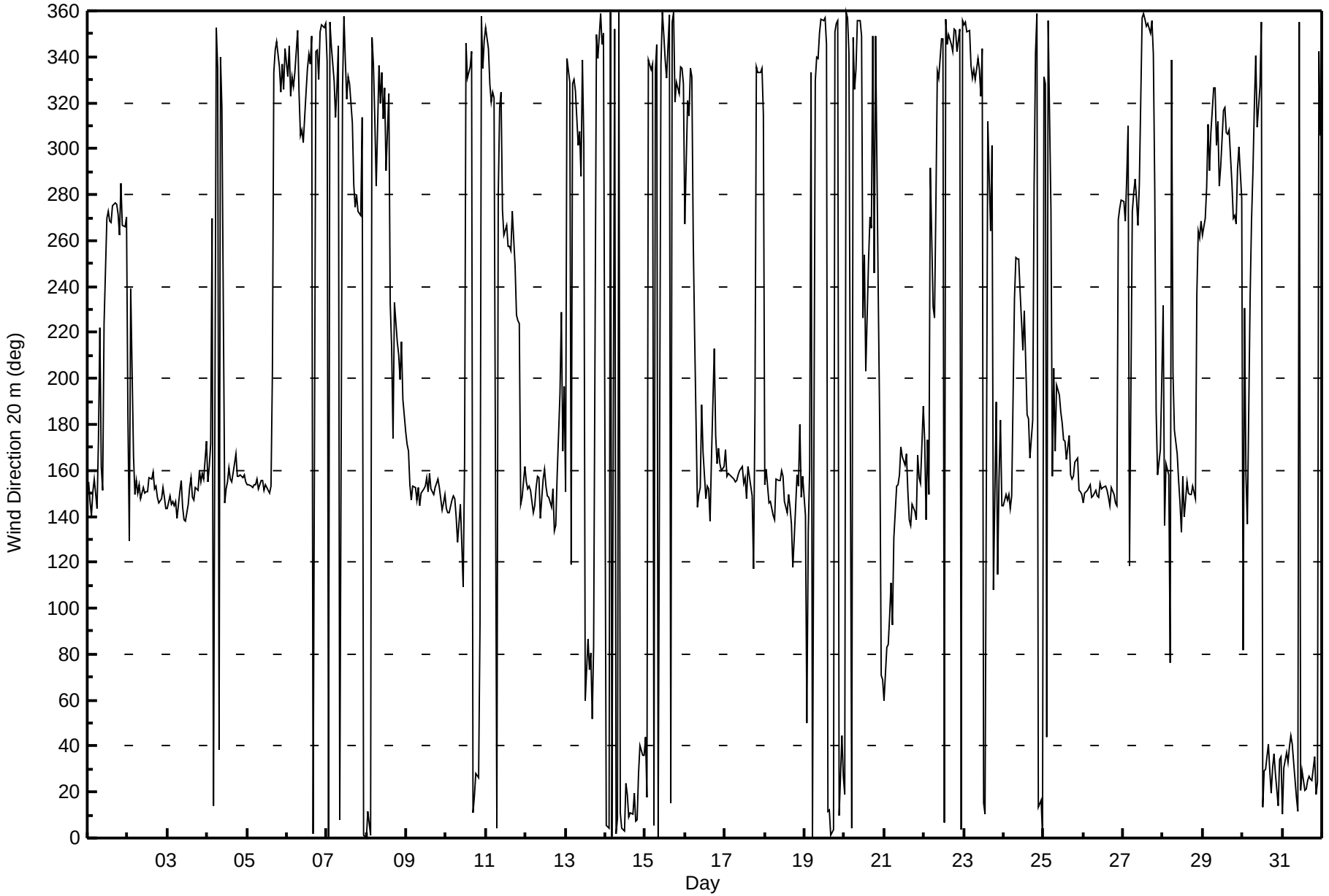
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	18	16	6	16	27	18	23	16	15	8	60	15	15	17	13	17	28	16	13	17	51	20	21	43	60
2-Jan	53	54	90	53	6	7	7	6	6	10	10	13	15	12	11	12	10	13	9	13	9	9	6	9	90
3-Jan	11	8	12	11	12	10	14	10	7	18	12	19	13	9	27	18	12	10	9	9	6	8	8	53	53
4-Jan	8	7	16	67	88	91	97	83	34	104	33	13	12	10	9	8	9	8	7	7	6	8	7	8	104
5-Jan	6	9	8	7	8	7	10	9	7	8	8	12	11	23	9	80	29	29	23	23	16	15	52	54	80
6-Jan	31	29	28	26	39	26	21	17	16	26	19	43	24	29	26	19	23	18	19	15	19	16	18	20	43
7-Jan	19	24	21	20	20	44	33	17	35	42	26	22	24	24	19	20	17	17	19	22	24	24	16	19	44
8-Jan	27	26	29	16	25	48	49	61	49	15	18	36	51	74	64	17	34	45	75	14	18	15	13	11	75
9-Jan	9	12	15	9	6	6	13	29	28	8	8	13	13	14	24	22	23	19	16	20	16	12	13	11	29
10-Jan	15	14	20	11	27	15	22	28	17	40	76	73	26	26	23	18	23	23	27	33	82	38	29	26	82
11-Jan	17	18	16	17	15	23	15	54	38	37	16	16	27	18	14	14	20	31	14	13	72	46	15	61	72
12-Jan	6	9	11	16	24	55	26	27	19	31	74	80	64	20	23	21	14	53	22	28	73	74	80	40	80
13-Jan	19	71	27	85	88	27	50	27	37	32	42	44	48	25	39	27	35	33	50	73	17	18	17	16	88
14-Jan	21	21	21	19	18	19	20	24	23	28	25	22	25	26	22	22	22	25	20	24	23	19	21	25	28
15-Jan	24	35	22	17	16	52	30	33	31	20	31	26	21	21	18	18	12	12	34	30	19	25	22	34	52
16-Jan	58	35	32	30	25	93	79	56	38	85	30	33	21	17	12	22	48	48	54	17	12	10	7	9	93
17-Jan	10	11	7	8	9	8	10	8	11	10	8	15	21	41	37	27	39	87	66	30	29	19	33	89	89
18-Jan	56	44	20	18	16	18	19	18	18	18	12	13	22	22	26	23	23	28	17	19	28	22	18	12	56
19-Jan	24	35	69	53	51	51	49	19	12	13	15	17	17	19	23	25	26	19	19	16	15	25	30	24	69
20-Jan	23	18	19	19	22	20	15	17	17	17	31	35	43	38	64	49	47	81	70	88	76	41	76	29	88
21-Jan	70	67	53	25	30	34	30	86	10	18	45	25	14	14	22	17	19	16	16	16	25	15	13	20	86
22-Jan	32	79	38	46	49	34	67	95	28	66	32	30	22	23	18	17	16	18	19	18	17	14	18	16	95
23-Jan	14	15	15	19	16	15	17	14	19	22	16	26	28	28	52	34	21	26	90	41	81	10	26	25	90
24-Jan	20	14	10	12	11	50	49	15	17	13	16	32	27	48	24	18	15	30	34	20	14	24	25	21	50
25-Jan	25	32	42	40	74	16	17	11	14	17	12	12	10	13	7	15	10	30	21	13	22	10	9	8	74
26-Jan	9	7	5	8	7	9	8	11	15	8	8	9	10	14	9	12	10	11	6	7	9	36	15	16	36
27-Jan	17	15	19	38	94	17	16	17	16	11	28	20	18	15	15	15	19	28	20	74	41	54	81	83	94
28-Jan	79	86	70	19	71	59	88	25	16	7	23	46	71	44	23	15	19	14	8	10	80	16	16	13	88
29-Jan	15	14	17	15	23	26	16	22	17	21	19	25	25	18	16	16	15	17	15	12	58	39	34	99	99
30-Jan	90	100	100	77	57	25	91	67	45	37	38	22	27	25	25	23	24	24	26	30	35	26	27	23	100
31-Jan	29	39	26	23	28	27	22	26	24	26	18	27	24	23	23	22	25	24	25	30	29	32	56	34	56
	90	100	100	85	94	93	97	95	49	104	76	80	71	74	64	80	48	87	90	88	82	74	81	99	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 20 m (WD20m) - deg

Lower Camp Met Tower - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - January 2016

Direction of Maximum Speed: 262 deg on Jan 1 19:00
Direction of Maximum Daily Speed Average: 283.9 deg on Jan 29

Direction of Minimum Speed: 320 deg on Jan 20 19:00
Direction of Minimum Daily Speed Average: 1.3 deg on Jan 8

Monthly Average Direction: 305.4 deg

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	164	154	135	155	159	138	183	221	169	151	229	260	263	259	257	264	265	264	262	252	267	255	253	259	238.6
2-Jan	197	145	238	175	139	142	136	140	137	140	137	139	140	144	144	148	138	140	133	135	135	138	135	131	140.5
3-Jan	133	136	136	138	134	134	130	136	142	133	131	130	136	139	139	136	135	139	137	143	138	143	141	156	136.8
4-Jan	147	144	154	210	67	191	234	353	337	328	141	140	141	146	139	143	149	152	141	141	143	141	142	139	143.7
5-Jan	136	139	142	137	136	139	145	138	138	139	134	139	133	129	136	161	332	346	345	332	328	347	329	335	132.4
6-Jan	325	318	330	335	317	323	328	339	327	325	344	325	327	332	332	344	357	338	341	325	346	348	AF	AF	335.4
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	7	326	344	334	315	326	322	302	274	265	268	261	258	304	354	358	--
8-Jan	356	7	358	345	334	318	296	331	311	318	329	287	247	300	174	181	159	187	211	196	191	205	178	169	233.5
9-Jan	165	163	148	140	147	150	139	144	140	140	142	142	145	141	141	141	139	140	141	143	140	135	137	139	143.8
10-Jan	136	133	135	137	138	140	133	120	134	120	97	136	344	328	331	337	9	15	21	20	66	346	332	345	83.9
11-Jan	348	340	326	317	321	318	357	316	312	303	265	253	256	249	248	246	261	244	215	209	207	148	135	146	262.9
12-Jan	142	140	140	137	134	132	141	143	142	134	132	144	139	139	138	133	139	129	130	147	172	210	149	188	142.3
13-Jan	134	356	329	154	321	332	326	307	320	291	341	345	61	84	72	78	55	75	350	339	345	354	339	346	6.0
14-Jan	4	5	4	356	358	349	359	5	358	11	4	1	20	14	6	9	8	16	3	6	24	33	28	26	7.1
15-Jan	33	16	337	331	332	2	329	338	355	331	346	348	333	329	357	14	348	344	330	342	311	323	303	324	342.9
16-Jan	260	255	259	287	312	255	147	146	145	146	163	144	135	143	146	141	146	173	141	148	155	150	144	146	151.5
17-Jan	152	142	142	142	140	141	142	142	145	146	145	140	142	120	147	141	140	142	148	131	334	328	339	141	141.5
18-Jan	149	149	136	138	136	132	130	141	139	140	148	147	137	130	133	132	127	112	123	146	141	174	137	147	138.7
19-Jan	135	69	130	140	312	349	325	334	335	340	348	350	353	341	10	11	3	2	349	349	351	8	37	22	359.7
20-Jan	16	356	355	337	1	343	322	331	350	352	348	222	257	189	282	291	312	342	320	165	171	163	81	83	350.3
21-Jan	99	97	88	94	106	94	123	132	135	137	146	145	148	155	136	131	132	137	135	130	149	144	142	172	136.0
22-Jan	163	133	159	139	264	231	233	257	337	329	337	338	357	352	337	344	339	338	346	347	337	349	2	353	340.5
23-Jan	348	351	346	347	335	328	329	326	335	333	321	338	7	6	319	281	269	298	292	172	109	152	176	137	339.5
24-Jan	139	140	141	141	138	160	230	243	243	243	230	207	229	203	180	161	155	170	272	330	352	9	13	359	216.0
25-Jan	331	326	41	5	0	142	195	161	184	179	174	171	163	162	157	163	148	145	143	147	149	141	138	139	156.3
26-Jan	134	136	137	136	138	136	137	137	135	134	139	139	137	138	139	135	136	138	136	135	141	262	264	267	149.4
27-Jan	267	258	275	301	75	263	271	277	268	258	275	352	357	354	351	349	345	343	332	330	169	139	215	208	289.2
28-Jan	231	121	135	143	91	344	180	161	154	146	139	132	139	131	143	139	140	142	144	139	236	251	250	258	166.0
29-Jan	253	261	273	300	284	296	317	317	291	302	278	283	310	308	297	298	299	281	263	261	256	264	284	272	283.9
30-Jan	112	234	185	155	238	261	272	302	335	323	321	349	11	23	27	34	22	15	24	29	25	11	29	30	3.7
31-Jan	6	24	30	25	32	38	33	26	14	7	351	15	23	14	14	19	21	19	21	29	15	21	1	295	17.8
	157.6	149.8	139.4	127.8	128.3	152.4	159.7	171.0	176.4	166.3	173.5	170.1	119.7	100.3	136.8	109.8	92.4	119.0	165.6	158.1	156.7	193.3	180.1	172.1	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 101 deg on Jan 27 05:00

Minimum Value: 3 deg on Jan 26 19:00

Percentiles: P_1 = 4 P_{10} = 6 Q_1 = 10 Median = 15 Q_3 = 23 P_{90} = 47 P_{99} = 90

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	25	24	7	25	31	16	22	12	18	10	55	10	10	12	8	11	23	11	8	9	34	11	12	30	55
2-Jan	45	68	86	54	6	5	5	4	4	5	4	8	9	8	6	9	5	8	7	9	6	6	4	5	86
3-Jan	5	4	7	7	8	8	9	8	5	12	9	13	9	6	14	12	8	7	6	6	5	7	6	21	21
4-Jan	17	6	11	59	90	62	75	93	11	60	20	8	6	7	6	6	7	5	5	5	3	3	5	5	93
5-Jan	4	9	7	6	8	5	10	5	5	6	7	13	9	15	6	75	18	15	21	20	17	6	37	38	75
6-Jan	30	26	17	14	14	17	7	8	9	14	13	25	17	22	19	15	18	14	15	11	15	13	AF	AF	30
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	30	32	23	21	21	22	14	18	10	10	12	14	17	20	12	13	32
8-Jan	16	16	21	13	20	19	69	20	37	16	19	28	30	66	42	11	25	29	48	14	17	16	9	8	69
9-Jan	8	11	14	6	7	8	8	20	19	4	3	7	8	10	22	10	16	12	11	15	10	8	7	6	22
10-Jan	8	9	11	7	17	14	15	20	12	34	71	80	21	24	16	13	17	15	14	19	70	33	18	20	80
11-Jan	13	14	13	14	11	17	16	39	22	26	12	9	14	10	8	7	13	21	9	10	28	25	13	33	39
12-Jan	4	8	8	14	18	54	17	20	14	23	67	84	72	18	19	14	10	37	16	21	59	63	57	34	84
13-Jan	14	67	25	77	82	23	38	25	32	35	31	72	26	14	19	20	29	24	45	62	14	14	13	12	82
14-Jan	16	16	15	15	13	15	16	18	17	21	18	18	15	18	15	15	16	16	13	17	13	12	13	17	21
15-Jan	12	23	19	12	12	33	17	17	24	13	19	19	16	19	16	11	8	11	27	24	17	8	32	25	33
16-Jan	42	26	79	39	25	82	33	9	20	21	16	26	15	13	11	15	26	30	31	7	12	7	5	8	82
17-Jan	8	8	4	4	6	4	5	5	8	6	7	10	16	42	29	22	28	63	40	87	19	71	13	91	91
18-Jan	11	20	11	10	10	10	12	14	14	14	9	10	15	16	19	18	14	17	11	16	24	20	14	10	24
19-Jan	16	34	30	31	77	34	31	15	9	11	11	12	14	14	17	17	19	15	15	12	12	17	19	18	77
20-Jan	17	15	16	14	17	16	11	12	14	12	22	47	47	58	83	40	79	58	100	68	37	24	56	23	100
21-Jan	72	62	41	16	17	23	23	47	11	12	26	16	11	13	16	11	11	10	10	11	20	11	10	16	72
22-Jan	25	33	19	14	73	21	32	53	18	29	19	24	15	18	13	13	12	14	14	14	13	10	14	13	73
23-Jan	11	11	11	14	12	12	13	11	13	15	12	17	19	17	50	26	21	19	81	31	87	15	23	19	87
24-Jan	19	10	10	6	7	52	44	7	7	6	14	32	29	49	24	8	11	39	30	15	11	18	16	16	52
25-Jan	19	21	25	27	96	16	17	8	12	15	9	9	8	12	6	7	11	16	14	8	13	5	5	4	96
26-Jan	6	5	3	4	4	6	3	5	9	4	4	5	7	8	7	8	6	5	3	3	22	15	10	11	22
27-Jan	12	9	15	30	101	14	12	12	11	6	27	18	13	11	10	10	14	15	13	49	54	51	85	74	101
28-Jan	56	77	44	13	66	27	81	20	10	4	10	24	28	24	16	10	9	8	5	4	59	11	9	9	81
29-Jan	9	10	13	11	19	22	13	19	12	18	15	21	19	15	12	14	11	13	10	8	44	32	21	73	73
30-Jan	101	75	94	72	43	16	63	54	34	31	25	16	22	18	20	17	18	16	18	22	26	17	21	18	101
31-Jan	22	32	20	16	22	21	16	19	16	19	12	21	17	15	18	15	19	18	17	19	22	22	52	25	52
	101	77	94	77	101	82	81	93	37	60	71	84	72	66	83	75	79	63	100	87	87	71	85	91	
	Diurnal Maximum																								

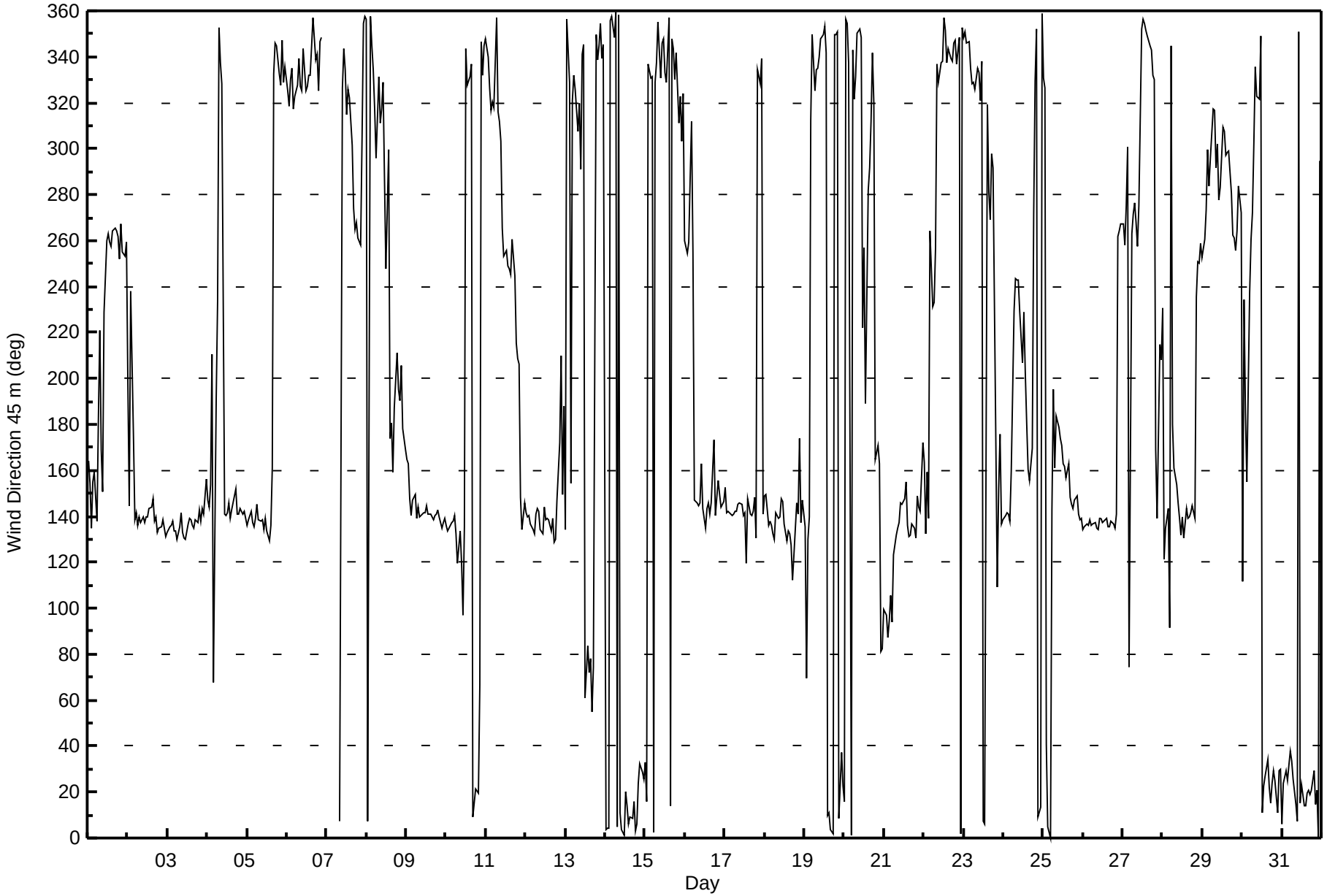
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - January 2016

Direction of Maximum Speed: 262 deg on Jan 26 23:00
Direction of Maximum Daily Speed Average: 250.9 deg on Jan 1

Direction of Minimum Speed: 50 deg on Jan 20 14:00

Direction of Minimum Daily Speed Average: 1.6 deg on Jan 8

Monthly Average Direction: 235.6 deg

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Percent Operational Time:	94.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	230	228	210	237	222	217	226	234	226	221	247	258	262	259	256	258	258	257	263	254	258	260	262	267	250.9
2-Jan	236	241	246	234	196	193	170	158	175	166	162	161	148	136	145	151	185	153	145	149	152	152	173	163	171.1
3-Jan	164	167	167	163	160	158	154	158	153	150	159	158	167	168	148	158	163	157	161	160	167	169	160	152	159.2
4-Jan	152	159	148	156	277	133	143	128	339	335	257	216	168	159	159	141	155	167	171	160	170	176	170	169	164.1
5-Jan	171	153	157	166	169	157	164	163	168	169	169	152	172	139	151	137	40	1	347	340	316	320	318	295	160.7
6-Jan	296	319	357	336	337	334	322	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	238	247	307	331	336	--
8-Jan	339	356	356	340	336	327	327	335	336	335	335	335	326	140	155	175	166	191	212	193	197	206	178	172	257.8
9-Jan	179	178	174	171	176	180	173	160	192	175	AF	AF	AF	AF	AF	156	164	152	146	153	148	161	163	166	165.8
10-Jan	162	153	163	169	157	157	153	147	123	127	59	87	4	342	342	342	12	16	20	18	53	346	352	357	59.0
11-Jan	358	352	344	343	339	329	342	323	315	289	269	259	254	243	244	243	250	248	232	224	219	194	161	155	268.2
12-Jan	146	151	153	149	169	158	153	149	154	151	140	145	156	150	173	165	157	148	156	164	162	155	139	174	153.7
13-Jan	148	96	1	20	321	353	23	7	35	25	56	96	80	90	78	89	81	72	19	357	3	9	349	354	36.3
14-Jan	6	7	7	1	360	352	359	5	6	8	8	5	20	12	5	9	10	14	7	13	28	38	34	39	9.5
15-Jan	39	38	3	351	339	0	360	345	358	349	339	342	338	351	11	21	11	359	0	9	17	27	80	276	1.5
16-Jan	138	137	119	138	133	202	166	169	135	171	215	127	158	140	116	165	140	172	153	158	148	165	149	150	149.0
17-Jan	167	173	156	163	163	159	168	154	153	160	151	135	147	221	163	137	137	187	142	138	151	148	147	147	152.0
18-Jan	144	141	140	141	140	137	136	141	139	141	145	145	139	136	136	137	132	133	142	147	142	189	147	151	141.2
19-Jan	151	177	142	193	280	322	334	341	3	14	2	360	0	350	12	21	9	8	359	356	3	18	35	24	5.3
20-Jan	17	5	2	350	5	356	337	346	1	360	3	141	241	50	12	31	136	147	159	150	149	153	124	130	22.3
21-Jan	142	138	133	129	137	133	154	151	169	147	152	150	142	143	136	138	140	141	139	137	140	144	146	166	143.0
22-Jan	171	168	208	201	228	239	244	255	332	349	344	331	328	339	339	344	347	352	2	5	360	21	15	7	328.8
23-Jan	360	5	0	3	353	344	344	341	351	354	340	314	321	2	358	292	259	263	233	193	145	195	206	143	340.4
24-Jan	179	162	182	171	181	219	239	245	246	244	232	228	238	222	220	186	214	256	274	329	1	13	15	6	250.8
25-Jan	351	351	48	38	85	143	199	169	182	174	171	172	162	160	163	165	158	143	144	146	155	162	168	178	159.6
26-Jan	197	175	163	158	149	148	152	146	153	153	149	148	155	154	156	149	165	168	206	217	238	259	262	265	189.8
27-Jan	264	258	272	296	331	273	272	276	269	265	276	347	1	4	3	0	353	351	345	337	353	48	282	149	290.7
28-Jan	144	189	130	145	145	340	170	160	161	154	154	155	174	174	171	157	158	161	167	180	248	247	250	257	185.5
29-Jan	253	260	273	299	289	293	310	304	290	297	285	288	305	306	297	297	295	284	268	263	261	255	285	251	282.5
30-Jan	241	243	232	242	243	258	261	287	304	336	339	353	13	23	26	35	24	17	26	30	25	16	31	31	336.9
31-Jan	14	26	30	27	31	37	34	26	19	9	357	17	25	17	15	21	20	21	24	27	23	20	18	3	20.6
	205.8	198.9	201.2	194.5	182.8	230.2	224.6	221.9	222.8	209.1	216.1	195.4	197.4	129.4	204.9	143.1	144.2	175.7	216.6	197.4	197.4	211.7	221.3	208.2	
	Diurnal Average																								

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 99 deg on Jan 20 14:00

Minimum Value: 2 deg on Jan 18 04:00

Percentiles: P_1 = 3 P_{10} = 5 Q_1 = 8 Median = 10 Q_3 = 16 P_{90} = 26 P_{99} = 78

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	0
Percent Operational Time:	94.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	11	9	15	10	21	20	11	6	9	12	21	4	3	6	2	3	10	5	4	4	7	4	3	14	21
2-Jan	6	18	21	25	19	18	13	7	10	13	9	8	10	7	4	17	15	11	10	7	5	9	7	6	25
3-Jan	8	10	7	6	7	8	8	7	5	8	10	12	7	12	8	10	6	16	18	18	10	20	8	6	20
4-Jan	9	10	10	50	78	42	25	63	65	9	13	44	22	19	28	12	8	10	8	8	9	11	9	9	78
5-Jan	9	13	11	8	8	8	13	9	7	10	13	11	10	8	11	56	51	12	5	5	15	8	27	73	73
6-Jan	29	29	10	21	10	6	12	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	29
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	18	29	17	8	9	29
8-Jan	8	15	11	7	6	2	4	5	7	12	8	10	78	14	16	14	25	22	13	17	17	15	11	8	78
9-Jan	11	15	17	10	8	9	11	18	18	11	AF	AF	AF	AF	AF	12	11	9	9	12	14	8	11	10	18
10-Jan	8	7	10	15	11	19	20	76	9	9	49	29	20	18	10	7	11	9	7	10	46	30	11	14	76
11-Jan	7	7	9	9	11	8	7	18	7	12	7	4	6	6	5	5	7	8	9	4	8	17	17	15	18
12-Jan	5	10	15	10	20	19	23	13	17	13	12	31	21	20	25	12	13	25	20	17	43	38	21	26	43
13-Jan	12	24	27	53	47	28	40	13	7	19	28	9	9	8	9	12	18	21	33	21	10	11	11	7	53
14-Jan	9	9	8	9	7	8	8	11	10	14	11	10	8	9	7	7	8	8	7	11	8	7	8	11	14
15-Jan	10	13	22	9	7	20	13	8	6	10	10	9	8	10	10	7	4	6	11	7	11	28	59	50	59
16-Jan	46	11	12	12	4	38	27	34	10	23	22	28	20	13	14	24	8	25	28	12	8	11	20	5	46
17-Jan	10	18	9	11	8	7	8	9	7	26	26	12	19	32	33	9	30	38	26	9	9	4	7	3	38
18-Jan	3	3	2	2	2	4	4	4	6	6	5	5	7	6	7	9	8	9	8	10	16	17	9	9	17
19-Jan	12	22	13	57	67	13	5	4	15	7	12	11	9	8	11	11	8	7	9	7	8	11	12	12	67
20-Jan	11	10	9	10	9	11	7	8	9	7	20	65	66	99	81	78	23	44	11	7	10	10	29	19	99
21-Jan	12	16	18	16	14	17	11	18	12	8	10	9	5	6	4	4	4	3	4	5	7	4	4	11	18
22-Jan	12	23	10	14	22	11	16	15	17	6	16	20	6	9	7	8	6	6	8	8	10	10	7	8	23
23-Jan	6	6	6	8	6	6	6	5	10	8	10	11	21	11	42	17	11	13	22	25	24	19	14	16	42
24-Jan	22	12	13	11	21	19	16	5	4	4	6	13	12	28	14	14	13	14	27	17	8	10	9	10	28
25-Jan	12	18	17	13	34	17	15	8	10	12	9	7	8	8	8	7	10	4	3	2	7	6	9	11	34
26-Jan	25	22	10	10	7	4	4	7	5	5	5	8	8	6	9	10	15	10	16	13	16	5	4	5	25
27-Jan	6	4	11	20	92	13	9	6	4	3	23	21	9	9	8	5	8	6	8	12	39	35	63	34	92
28-Jan	29	38	31	6	15	96	17	9	6	4	4	8	9	19	20	10	7	10	10	13	11	5	5	4	96
29-Jan	5	6	10	7	15	14	9	15	6	7	11	12	14	10	8	9	6	10	5	4	12	9	12	17	17
30-Jan	32	34	30	14	11	7	11	18	22	9	12	9	17	11	11	10	11	8	12	14	18	10	12	16	34
31-Jan	14	20	13	12	16	13	12	14	9	10	7	15	11	9	10	9	11	11	12	12	14	15	9	27	27
	46	38	31	57	92	96	40	76	65	26	49	65	78	99	81	78	51	44	33	25	46	38	63	73	
	Diurnal Maximum																								

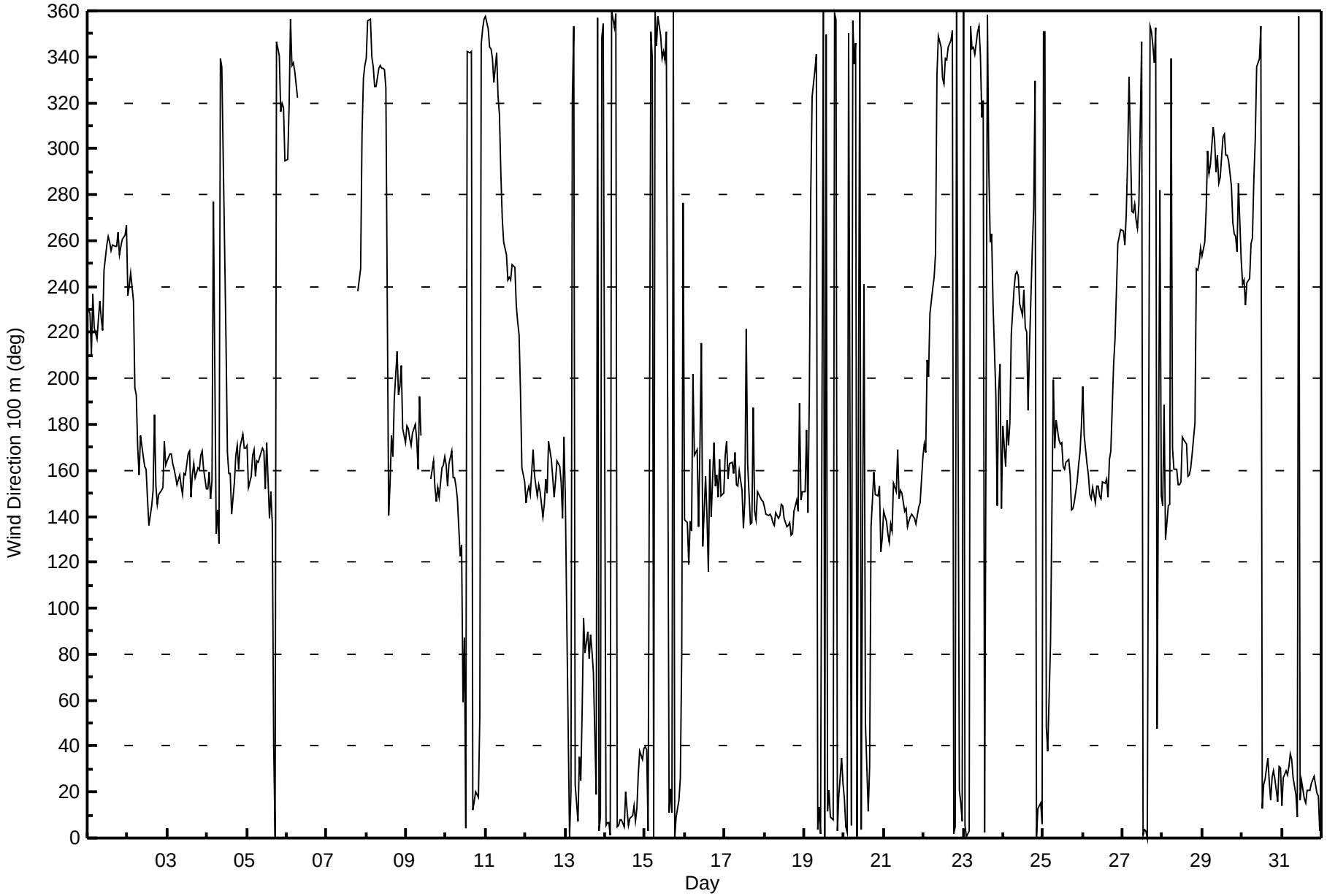
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Lower Camp Met Tower - January 2016

Maximum Value: 0.6 km/h on Jan 9 01:00

Maximum Daily Average: 0.1 km/h on Jan 5

Minimum Value: -0.9 km/h on Jan 1 19:00

Minimum Daily Average: -0.3 km/h on Jan 27

Maximum Diurnal Average: 0.0 km/h at hour 7

Minimum Diurnal Average: -0.1 km/h at hour 19

Monthly Average: -0.03 km/h

Percentiles: P_1 = -0.6 P_{10} = -0.3 Q_1 = -0.1 Median = 0.0 Q_3 = 0.1 P_{90} = 0.2 P_{99} = 0.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.4	0.5	0.4	0.2	0.3	0.1	0.3	-0.1	0.6	0.5	0.0	-0.6	-0.6	-0.4	-0.7	-0.7	-0.5	-0.6	-0.9	-0.4	0.0	-0.4	-0.4	-0.6	-0.1	0.6
2-Jan	-0.1	0.1	0.0	0.1	0.4	0.2	0.3	0.1	-0.1	-0.3	-0.4	-0.1	0.1	-0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.3	-0.1	0.1	0.4
3-Jan	-0.2	-0.1	0.0	0.0	-0.2	-0.2	0.0	0.0	-0.1	-0.2	-0.2	-0.1	0.0	0.1	0.1	0.1	0.3	0.0	0.0	0.2	0.1	0.2	0.1	0.1	0.0	0.3
4-Jan	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.3
5-Jan	0.2	0.1	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.1	0.2	0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.1	0.3
6-Jan	0.0	0.0	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.3	-0.2	-0.2	-0.1	0.0
7-Jan	-0.1	-0.3	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.2	-0.2	-0.1	-0.2	-0.1	-0.2	-0.3	-0.3	-0.3	-0.4	-0.2	-0.2	-0.3	-0.3	-0.2	0.0
8-Jan	-0.2	-0.2	0.0	0.0	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.2	0.0	0.1	0.0	0.3	0.5	0.0	0.5
9-Jan	0.6	0.5	0.2	0.1	0.2	0.3	0.0	0.1	0.2	0.2	0.1	-0.1	-0.6	0.0	-0.2	0.0	0.1	-0.2	-0.4	0.1	-0.1	-0.1	-0.2	0.0	0.0	0.6
10-Jan	0.0	-0.3	0.0	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.1	0.1	0.2	-0.2	-0.1	0.1	-0.1	-0.1	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
11-Jan	-0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	-0.1	-0.1	-0.3	-0.3	-0.2	-0.2	-0.3	-0.1	-0.2	0.0	-0.1	0.0	0.1	0.1	0.2	0.1	-0.1	0.2
12-Jan	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.2	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.2	-0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2
13-Jan	0.1	0.0	0.0	0.1	0.0	0.0	0.0	-0.1	0.0	0.0	-0.1	0.0	-0.2	-0.4	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.1
14-Jan	-0.3	-0.2	-0.2	-0.3	-0.5	-0.2	-0.3	-0.2	-0.1	0.0	-0.3	-0.2	-0.1	-0.1	-0.1	0.0	-0.2	0.1	-0.2	-0.1	-0.1	-0.1	0.0	0.0	-0.2	0.1
15-Jan	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.3	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.1
16-Jan	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2
17-Jan	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.2	-0.1	0.2	0.0	0.1	0.1	0.1	-0.1	0.1	0.0	-0.1	0.0	-0.1	0.0	0.1	0.2
18-Jan	0.1	0.1	0.1	0.0	-0.2	-0.3	-0.2	0.2	0.0	0.1	-0.3	-0.1	0.0	-0.2	0.0	0.1	0.0	-0.1	-0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.3
19-Jan	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.3	-0.3	-0.3	-0.1	-0.3	0.0	0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.1
20-Jan	-0.1	-0.2	-0.1	0.1	-0.1	0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.0	-0.1	0.0	0.0	0.2
21-Jan	0.0	0.0	0.0	-0.4	-0.2	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	-0.1	0.0	-0.2	0.0	-0.1	-0.2	-0.2	0.0	0.0	0.0	0.1	0.0	0.2
22-Jan	0.2	0.1	0.2	0.3	-0.1	0.0	0.1	0.1	-0.1	0.0	0.0	0.1	-0.1	-0.3	0.0	0.0	0.1	0.2	0.0	0.1	0.1	0.0	0.0	-0.1	0.0	0.3
23-Jan	0.0	-0.2	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.0	-0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.1	0.1	0.3	0.4	-0.1	0.1	0.4
24-Jan	0.0	0.2	0.0	0.0	0.2	0.3	0.2	0.1	0.1	0.1	0.0	-0.1	-0.1	-0.1	0.1	0.2	0.2	0.2	-0.2	0.0	-0.2	-0.1	-0.1	-0.1	0.0	0.3
25-Jan	0.1	0.1	0.0	-0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.3	0.3	0.5	0.2	0.1	0.2	0.2	-0.4	-0.5	-0.5	-0.2	0.4	0.2	0.2	0.1	0.5
26-Jan	0.3	0.3	0.1	-0.1	0.0	0.1	0.1	0.0	0.0	-0.1	0.1	-0.2	0.0	0.0	0.0	-0.3	-0.3	0.1	0.2	0.4	0.6	-0.5	-0.6	-0.8	0.0	0.6
27-Jan	-0.7	-0.6	-0.7	-0.4	-0.1	-0.3	-0.5	-0.6	-0.5	-0.6	-0.5	-0.5	-0.4	-0.6	-0.4	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-0.3	0.1
28-Jan	0.0	0.0	0.0	0.1	-0.1	-0.2	0.0	0.0	0.2	0.2	-0.3	-0.1	0.1	0.1	0.1	-0.4	-0.3	-0.4	0.0	0.0	-0.2	-0.3	-0.2	-0.5	-0.1	0.2
29-Jan	-0.4	-0.4	-0.5	-0.2	-0.2	-0.4	-0.2	-0.1	-0.4	-0.1	-0.4	-0.3	0.0	-0.4	-0.5	-0.3	-0.4	-0.3	-0.5	-0.4	-0.1	-0.1	-0.3	-0.1	-0.3	0.0
30-Jan	0.0	-0.2	0.1	0.1	0.1	-0.4	0.1	0.0	-0.1	0.1	-0.1	-0.1	-0.2	-0.1	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.2	-0.1	0.1
31-Jan	0.0	0.0	-0.1	0.1	-0.1	0.1	-0.1	0.0	0.0	-0.2	-0.4	0.0	0.0	-0.2	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.2
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	Diurnal Average	
	0.6	0.5	0.4	0.3	0.4	0.3	0.3	0.2	0.6	0.5	0.3	0.3	0.5	0.2	0.2	0.3	0.3	0.2	0.2	0.4	0.6	0.4	0.4	0.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Lower Camp Met Tower - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.0 km/h on Jan 27 00:00

Minimum Value: 0.1 km/h on Jan 5 22:00

Percentiles: P_1 = 0.1 P_{10} = 0.3 Q_1 = 0.6 Median = 1.0 Q_3 = 1.5 P_{90} = 2.0 P_{99} = 3.1

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	1.7	1.3	0.7	1.3	1.3	1.4	1.3	1.3	1.6	2.0	2.2	3.0	3.1	2.4	3.0	3.2	2.6	3.3	3.6	2.6	2.0	2.5	2.2	1.6	3.6
2-Jan	1.3	0.9	1.2	1.4	0.8	0.7	0.5	0.7	0.9	1.5	1.6	1.5	1.7	1.4	1.1	0.7	0.4	0.8	0.8	0.8	1.2	1.2	1.1	1.4	1.7
3-Jan	1.5	1.2	1.8	1.7	1.5	1.3	1.2	0.9	1.2	1.3	1.3	1.3	1.4	1.3	0.8	0.9	1.1	1.1	1.1	0.7	0.8	0.7	0.7	0.4	1.8
4-Jan	0.5	0.6	0.4	0.2	0.2	0.1	0.1	0.3	0.2	0.2	0.5	1.0	1.0	1.1	1.0	0.8	0.6	0.5	0.7	0.6	0.7	1.1	1.2	1.3	1.3
5-Jan	1.0	0.7	0.7	1.0	0.7	0.5	0.6	1.0	1.0	1.1	1.2	1.1	0.9	0.5	0.5	0.3	0.2	0.5	0.6	0.5	0.3	0.1	0.1	0.1	1.2
6-Jan	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.6	0.8	0.8	0.6	1.0	1.1	0.9	0.9	1.0	1.1	1.6	1.4	1.1	1.6
7-Jan	0.9	1.7	1.6	1.1	0.5	0.4	0.5	1.0	1.1	0.4	0.5	0.8	1.2	1.2	1.1	1.1	1.4	1.6	1.8	1.6	1.1	0.9	0.9	1.2	1.8
8-Jan	1.1	0.8	0.6	0.7	0.5	0.5	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.5	0.5	0.5	0.4	0.6	0.8	0.9	1.1	1.0	1.2	1.2
9-Jan	1.4	1.5	1.5	1.4	1.3	1.2	1.4	1.5	0.7	1.3	1.7	1.9	1.8	1.6	1.4	1.1	0.9	1.4	1.7	1.4	1.3	1.3	1.7	1.4	1.9
10-Jan	1.4	1.5	1.9	1.4	1.9	1.6	1.2	0.8	1.0	0.6	0.5	0.6	0.8	0.8	1.2	1.6	2.1	1.9	2.0	1.2	0.6	0.4	0.5	0.6	2.1
11-Jan	1.1	1.0	1.2	0.7	0.4	0.3	0.2	0.2	0.3	0.7	1.5	2.0	1.5	1.6	1.9	2.0	1.3	0.5	0.4	0.6	0.6	0.7	0.5	0.7	2.0
12-Jan	0.8	0.8	0.9	0.7	0.7	0.5	0.6	0.8	0.7	0.6	0.5	0.6	0.6	0.9	0.7	0.8	1.1	0.9	0.5	0.6	0.7	0.5	0.3	0.4	1.1
13-Jan	0.3	0.2	0.3	0.2	0.1	0.3	0.5	0.5	0.4	0.3	0.5	0.5	1.1	1.5	0.9	0.9	0.6	0.6	0.6	0.5	0.8	1.1	1.9	2.1	2.1
14-Jan	2.5	2.3	2.7	2.3	2.3	2.0	2.1	1.9	1.5	1.2	1.7	1.9	2.2	1.7	2.3	2.5	2.2	2.0	2.2	1.9	2.0	1.6	1.0	0.6	2.7
15-Jan	0.5	0.4	0.4	0.5	1.1	0.9	0.4	0.6	0.6	0.4	0.7	0.9	0.8	0.7	0.7	0.9	0.6	0.6	0.5	0.2	0.1	0.2	0.2	0.1	1.1
16-Jan	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.3	0.4	0.5	0.3	0.5	0.7	0.7	0.5	0.5	0.2	0.1	0.2	0.3	0.4	0.6	1.0	1.0	1.0
17-Jan	0.6	1.1	0.9	1.0	0.9	1.3	1.2	1.2	1.3	1.1	0.8	1.3	0.9	0.6	0.7	0.6	0.5	0.4	0.2	0.3	0.4	0.3	0.4	0.3	1.3
18-Jan	0.7	0.7	1.4	2.4	2.8	3.1	3.0	3.1	2.4	2.5	2.1	1.7	1.4	1.2	1.0	1.0	0.8	0.4	0.7	1.0	1.3	0.9	1.0	0.9	3.1
19-Jan	0.7	0.2	0.2	0.1	0.1	0.2	0.3	0.5	0.5	0.4	0.9	1.2	1.3	1.2	1.6	1.1	0.8	1.1	0.9	0.9	1.0	1.0	0.8	1.0	1.6
20-Jan	1.4	1.4	1.4	1.0	1.2	0.9	0.8	0.7	0.9	0.9	0.9	0.7	0.8	0.5	0.6	0.3	0.2	0.2	0.2	0.2	0.3	0.5	0.7	0.7	1.4
21-Jan	0.6	0.7	0.7	1.0	1.0	1.0	0.8	0.5	0.5	0.5	0.7	0.6	1.0	1.1	1.8	1.7	1.8	2.4	2.6	2.6	1.8	3.0	2.6	1.2	3.0
22-Jan	1.0	0.8	0.5	0.6	0.4	0.9	0.5	0.3	0.3	0.5	0.6	0.7	0.9	1.2	1.3	1.2	1.0	1.0	0.9	0.8	0.7	0.6	0.8	0.9	1.3
23-Jan	1.1	1.0	0.8	0.8	0.6	0.8	0.9	0.9	0.7	0.5	0.5	0.7	1.2	0.9	0.5	0.5	0.3	0.3	0.2	0.1	0.2	0.7	0.8	1.1	1.2
24-Jan	0.8	1.1	0.9	1.3	1.0	1.1	1.4	1.5	1.6	1.8	1.1	0.9	1.0	0.9	0.7	0.6	0.6	0.5	1.1	0.8	1.5	2.1	1.9	1.3	2.1
25-Jan	0.5	0.4	0.3	0.3	0.1	0.5	1.0	0.9	1.3	1.5	1.5	1.6	1.4	1.4	1.4	0.9	1.0	1.3	1.7	1.4	1.5	1.3	1.2	1.4	1.7
26-Jan	1.5	0.9	1.0	1.2	1.2	1.3	1.4	1.4	1.4	1.7	1.5	1.8	1.5	1.6	1.7	1.8	1.6	1.3	1.6	1.7	1.8	2.7	3.5	4.0	4.0
27-Jan	3.8	2.7	3.1	2.7	1.8	2.2	2.5	2.9	3.0	2.3	2.2	1.5	1.4	1.6	1.6	1.8	1.5	0.7	0.7	0.4	0.3	0.2	0.3	0.2	3.8
28-Jan	0.3	0.5	0.4	1.0	0.7	0.5	0.4	0.9	1.1	1.3	2.0	1.3	0.5	0.5	0.6	1.5	2.0	1.8	1.3	1.6	1.9	1.9	2.6	2.0	2.6
29-Jan	2.4	2.3	2.7	2.1	1.2	2.1	1.8	1.8	3.1	2.1	2.1	2.2	1.8	2.4	2.4	1.8	2.0	1.2	2.0	1.6	1.2	1.4	1.1	1.1	3.1
30-Jan	0.8	1.1	0.8	1.0	1.5	2.0	1.8	0.9	0.9	0.7	0.7	1.1	1.6	2.3	2.0	2.0	2.1	2.2	2.5	1.6	1.4	1.5	1.4	1.2	2.5
31-Jan	0.8	0.7	1.0	1.4	1.6	1.3	1.7	1.6	1.9	2.3	1.9	1.9	2.3	2.4	2.0	1.9	1.7	1.3	1.2	1.1	1.0	0.9	0.3	0.3	2.4
	3.8	2.7	3.1	2.7	2.8	3.1	3.0	3.1	3.1	2.5	2.2	3.0	3.1	2.4	3.0	3.2	2.6	3.3	3.6	2.6	2.0	3.0	3.5	4.0	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Summary of Hour Averages

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

Lower Camp Met Tower - January 2016

Maximum Value: 2.1 km/h on Jan 26 20:00

Maximum Daily Average: 0.8 km/h on Jan 26

Minimum Value: -1.6 km/h on Jan 27 01:00

Minimum Daily Average: -0.7 km/h on Jan 29

Maximum Diurnal Average: 0.2 km/h at hour 5

Minimum Diurnal Average: 0.0 km/h at hour 12

Monthly Average: 0.15 km/h

Percentiles: P_1 = -1.2 P_{10} = -0.3 Q_1 = -0.1 Median = 0.0 Q_3 = 0.4 P_{90} = 0.9 P_{99} = 1.3

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.9	0.9	1.2	0.6	0.9	1.1	0.2	-0.1	0.7	1.3	0.2	-0.9	-1.0	-0.8	-1.3	-1.1	-0.9	-1.3	-1.4	-0.6	0.2	-0.3	-0.4	-0.8	-0.1	1.3
2-Jan	-0.5	0.3	0.0	0.0	1.5	1.2	1.1	1.0	0.6	0.5	0.6	0.5	0.7	0.6	0.6	0.5	0.6	1.0	0.8	0.9	1.3	0.9	1.1	0.7	0.7	1.5
3-Jan	0.7	0.7	0.9	0.8	0.2	0.5	0.7	0.5	0.6	0.3	0.2	0.3	0.4	0.8	0.4	0.5	1.0	0.7	0.8	0.9	1.0	0.9	0.9	0.4	0.6	1.0
4-Jan	0.7	0.7	0.3	0.0	0.1	0.1	0.0	0.1	-0.1	0.0	0.2	0.4	0.6	0.7	1.0	1.2	0.8	0.5	1.1	1.0	1.0	1.2	1.1	1.1	0.6	1.2
5-Jan	1.0	0.8	0.9	1.1	0.9	0.9	0.8	1.1	1.0	1.0	0.9	0.6	0.6	0.3	0.7	0.1	-0.1	-0.2	-0.1	-0.2	-0.3	-0.1	0.0	0.0	0.5	1.1
6-Jan	-0.1	-0.1	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.2	-0.1	-0.1	-0.3	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	-0.2	-0.3	AF	AF	-0.2	0.0
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.6	-0.4	-0.5	-0.3	-0.2	-0.3	-0.3	-0.4	--	0.1
8-Jan	-0.3	-0.2	0.0	-0.1	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.0	0.0	0.2	-0.2	0.1	0.0	0.3	0.0	0.0	-0.1	-0.2	0.5	0.0	0.5
9-Jan	0.9	0.9	0.7	0.9	1.0	0.9	0.8	0.3	0.5	1.0	1.1	0.8	-0.1	0.4	0.1	0.6	0.5	0.2	0.1	0.5	0.3	0.3	0.6	0.9	0.6	1.1
10-Jan	0.7	0.3	0.5	0.7	0.2	0.4	0.3	0.3	0.3	0.2	0.2	0.3	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	0.0	0.1	0.0	-0.1	-0.1	0.1	0.7
11-Jan	-0.2	-0.3	-0.2	-0.1	0.0	-0.2	-0.1	0.0	-0.2	-0.2	-0.2	-0.4	0.0	-0.1	-0.3	0.0	-0.4	0.0	-0.2	-0.1	0.0	0.3	0.5	0.4	-0.1	0.5
12-Jan	0.6	0.6	0.7	0.4	0.5	0.4	0.4	0.2	0.4	0.3	0.2	0.2	0.2	0.4	0.2	0.4	0.6	-0.1	0.2	0.3	0.0	0.0	0.1	0.1	0.3	0.7
13-Jan	0.4	-0.1	-0.2	0.1	-0.1	-0.2	-0.1	-0.3	-0.1	-0.1	0.0	0.0	0.1	0.2	0.3	0.2	0.1	0.2	-0.1	0.0	0.0	-0.2	-0.3	-0.5	0.0	0.4
14-Jan	-0.3	-0.2	-0.4	-0.4	-0.5	-0.3	-0.3	-0.4	-0.1	-0.1	-0.3	-0.2	-0.1	0.1	-0.2	-0.2	-0.2	0.0	-0.2	-0.3	0.1	0.1	0.2	0.1	-0.2	0.2
15-Jan	0.0	0.0	-0.1	-0.1	-0.3	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.2	-0.2	-0.1	0.0	-0.3	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.0
16-Jan	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.4	0.3	0.3	0.1	0.0	0.3	0.4	0.6	0.6	0.3	0.0	0.2	0.5	0.2	0.6	1.0	0.7	0.3	1.0
17-Jan	0.4	0.9	1.0	1.0	0.8	1.0	1.1	0.8	0.9	0.9	0.8	0.4	0.4	0.1	0.3	0.3	0.4	0.1	0.2	0.1	-0.1	0.0	-0.1	0.1	0.5	1.1
18-Jan	0.5	0.4	0.8	0.9	0.8	0.8	0.8	1.1	0.6	0.9	0.5	0.5	0.3	0.2	0.4	0.3	0.2	0.1	0.1	0.3	0.3	0.5	0.2	0.3	0.5	1.1
19-Jan	0.3	0.1	0.2	0.1	0.0	0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.3	-0.2	-0.2	0.0	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.1	0.0	-0.1	0.3
20-Jan	0.0	-0.1	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.2	-0.2	0.0	-0.1	0.1	0.2	0.3	0.1	0.0	-0.1	0.0	0.1	0.1	0.0	-0.1	0.0	0.0	0.3
21-Jan	0.1	0.1	0.2	-0.2	-0.1	0.1	0.2	0.2	0.4	0.3	0.4	0.3	0.5	0.0	0.7	0.5	0.6	0.7	0.7	0.8	0.7	0.9	0.9	0.0	0.4	0.9
22-Jan	0.3	0.4	0.3	0.9	-0.1	0.0	0.0	0.0	-0.3	-0.1	-0.2	-0.1	-0.2	-0.4	-0.3	-0.2	-0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.9
23-Jan	-0.1	-0.2	-0.1	0.0	0.1	-0.1	-0.1	-0.2	0.0	0.0	-0.2	0.0	-0.2	0.0	0.1	0.3	0.0	0.0	0.0	0.1	0.2	0.7	0.4	0.2	0.0	0.7
24-Jan	0.3	0.7	0.4	0.6	0.8	0.7	0.6	0.4	0.5	0.2	0.1	0.0	-0.1	-0.2	0.1	0.5	0.4	0.3	-0.3	-0.4	-0.3	-0.2	-0.1	-0.2	0.2	0.8
25-Jan	0.0	0.0	0.0	-0.1	0.1	0.2	0.0	0.3	-0.2	-0.1	-0.2	0.0	0.8	0.5	0.5	0.5	0.8	0.1	0.0	-0.1	0.2	1.7	1.3	1.5	0.3	1.7
26-Jan	1.5	1.3	1.2	0.7	1.1	1.1	1.2	1.0	0.9	0.8	1.1	0.7	0.9	0.7	1.1	0.7	0.7	1.3	1.7	2.1	1.3	-1.0	-1.2	-1.6	0.8	2.1
27-Jan	-1.6	-1.0	-1.2	-0.8	-0.2	-0.8	-0.9	-1.0	-1.1	-0.7	-0.7	-0.5	-0.4	-0.5	-0.4	-0.4	-0.3	-0.1	-0.1	0.0	0.1	0.1	0.1	0.1	-0.5	0.1
28-Jan	0.0	0.2	0.2	0.5	-0.1	-0.3	0.1	0.3	0.8	1.4	0.7	0.2	0.4	0.4	0.4	0.2	0.4	0.3	1.1	1.3	-0.1	-0.4	-0.3	-0.8	0.3	1.4
29-Jan	-0.7	-0.9	-1.2	-1.0	-0.5	-0.9	-0.9	-0.6	-1.2	-0.8	-0.6	-0.5	-0.3	-0.9	-1.0	-0.9	-1.1	-0.6	-0.8	-0.7	-0.2	-0.1	-0.6	-0.2	-0.7	-0.1
30-Jan	0.1	-0.3	0.0	0.1	0.4	-0.3	0.0	-0.2	-0.1	0.1	-0.2	-0.2	-0.1	0.0	0.1	-0.1	0.0	-0.1	0.0	0.1	-0.1	0.0	0.1	0.0	0.0	0.4
31-Jan	0.0	0.1	0.0	0.1	0.0	0.2	0.1	0.1	-0.1	-0.1	-0.4	0.1	0.0	-0.3	0.2	0.0	0.1	0.1	0.0	0.1	0.0	0.0	-0.1	0.0	0.0	0.2
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	Diurnal Average	
	1.5	1.3	1.2	1.1	1.5	1.2	1.2	1.1	1.0	1.4	1.1	0.8	0.9	0.8	1.1	1.2	1.0	1.3	1.7	2.1	1.3	1.7	1.3	1.5	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Lower Camp Met Tower - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.5 km/h on Jan 27 00:00

Minimum Value: 0.1 km/h on Jan 5 23:00

Percentiles: P_1 = 0.1 P_{10} = 0.3 Q_1 = 0.6 Median = 0.9 Q_3 = 1.4 P_{90} = 2.1 P_{99} = 3.2

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	2.0	1.6	0.8	1.6	1.6	1.7	1.6	1.7	1.9	1.7	2.5	3.0	3.2	2.4	2.7	3.3	3.1	3.5	3.3	2.2	2.3	2.3	1.9	2.0	3.5
2-Jan	1.5	1.2	1.6	1.7	0.7	0.6	0.5	0.5	0.8	1.1	1.0	1.2	1.5	1.1	0.9	0.7	0.4	0.7	0.6	0.6	0.8	0.9	1.0	1.1	1.7
3-Jan	0.9	0.9	1.4	1.5	1.5	1.1	1.1	0.9	1.1	1.3	1.3	1.2	1.3	0.9	0.7	1.0	1.2	1.1	0.8	0.6	0.5	0.5	0.6	0.5	1.5
4-Jan	0.5	0.5	0.4	0.2	0.2	0.2	0.1	0.4	0.2	0.3	0.4	0.8	0.7	0.9	0.8	0.5	0.5	0.3	0.5	0.4	0.5	0.7	0.7	0.8	0.9
5-Jan	0.5	0.5	0.5	0.6	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.4	0.3	0.3	0.2	0.5	0.6	0.5	0.4	0.1	0.1	0.1	0.7
6-Jan	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.8	0.8	0.6	1.1	1.1	1.1	1.0	1.1	1.2	1.5	AF	AF	1.5
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	1.0	0.5	0.5	0.8	1.3	1.2	1.2	1.1	1.4	1.7	1.9	1.8	1.1	1.0	0.8	1.1	1.9
8-Jan	1.2	0.9	0.7	0.8	0.6	0.6	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.6	0.6	0.6	0.8	0.9	1.1	1.2	1.2	1.2	1.2
9-Jan	1.6	1.6	1.7	0.9	0.8	0.9	1.1	1.5	0.8	0.8	1.0	1.6	1.4	1.4	1.5	1.0	1.0	1.4	1.5	1.3	1.1	1.1	1.2	1.0	1.7
10-Jan	1.3	1.3	1.7	1.1	1.6	1.4	1.1	0.7	0.8	0.6	0.5	0.6	0.8	0.9	1.4	1.8	2.1	1.9	1.8	1.2	0.6	0.4	0.5	0.6	2.1
11-Jan	1.2	1.1	1.3	0.9	0.5	0.4	0.2	0.2	0.4	1.0	1.7	1.7	1.6	1.5	1.6	1.6	1.3	0.6	0.4	0.8	0.8	1.0	0.6	0.9	1.7
12-Jan	0.7	0.8	0.9	0.7	0.7	0.6	0.6	0.7	0.7	0.5	0.5	0.7	0.6	0.9	0.7	0.7	1.0	1.0	0.5	0.7	0.9	0.5	0.3	0.5	1.0
13-Jan	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.6	0.5	0.4	0.6	0.7	1.3	1.4	1.0	0.9	0.7	0.7	0.6	0.6	1.0	1.1	2.3	2.2	2.3
14-Jan	2.6	2.5	2.8	2.3	2.4	2.0	2.2	2.0	1.6	1.3	1.7	2.0	2.1	1.7	2.3	2.5	2.2	2.0	2.2	1.9	2.0	1.4	1.0	0.7	2.8
15-Jan	0.5	0.4	0.4	0.6	1.3	1.0	0.4	0.6	0.6	0.5	0.7	1.0	0.9	0.9	0.8	0.9	0.6	0.5	0.6	0.2	0.1	0.2	0.2	0.2	1.3
16-Jan	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.5	0.5	0.3	0.4	0.6	0.5	0.4	0.4	0.3	0.2	0.3	0.4	0.4	0.6	0.8	0.8	0.8
17-Jan	0.5	0.8	0.7	0.6	0.6	0.8	0.8	0.9	1.1	0.9	0.6	1.2	0.7	0.6	0.7	0.6	0.6	0.4	0.3	0.3	0.4	0.5	0.6	0.6	1.2
18-Jan	0.9	1.1	1.7	2.3	2.6	2.7	2.8	3.1	2.5	2.6	2.0	1.6	1.3	1.1	1.1	1.1	0.7	0.6	0.6	1.0	1.5	1.1	1.0	0.9	3.1
19-Jan	0.7	0.3	0.2	0.2	0.1	0.2	0.4	0.7	0.5	0.5	0.8	1.1	1.3	1.3	1.4	1.1	0.9	1.2	1.0	1.0	1.0	1.0	0.8	1.1	1.4
20-Jan	1.4	1.4	1.5	1.2	1.3	1.0	0.9	0.8	0.9	0.9	0.9	0.6	1.0	0.7	0.7	0.4	0.2	0.2	0.3	0.2	0.4	0.6	0.8	0.8	1.5
21-Jan	0.7	0.8	0.8	1.0	1.0	1.0	0.8	0.7	0.5	0.5	0.8	0.7	1.0	1.1	1.7	1.7	1.7	2.3	2.3	2.3	2.0	2.8	2.4	1.4	2.8
22-Jan	1.3	0.9	0.7	0.6	0.5	1.2	0.8	0.3	0.3	0.5	0.5	0.7	0.8	1.1	1.4	1.3	1.2	1.2	1.0	0.9	0.7	0.6	0.9	1.0	1.4
23-Jan	1.1	0.9	0.9	0.9	0.7	0.9	1.0	1.0	0.8	0.6	0.5	0.6	1.2	0.9	0.5	0.5	0.3	0.3	0.2	0.1	0.3	0.7	0.9	0.9	1.2
24-Jan	0.9	1.0	0.9	1.0	1.0	1.3	1.5	1.5	1.4	1.5	1.1	1.0	1.0	1.0	0.9	0.7	0.7	0.8	1.2	1.0	1.6	2.1	2.0	1.4	2.1
25-Jan	0.7	0.4	0.3	0.3	0.2	0.5	1.1	1.0	1.4	1.8	1.8	1.9	1.6	1.5	1.3	1.0	0.9	1.2	1.6	1.1	1.5	1.0	0.9	0.9	1.9
26-Jan	1.1	0.6	0.6	0.7	0.7	1.0	0.8	1.0	1.2	1.2	1.1	1.3	1.1	1.2	1.2	1.4	1.3	0.8	0.8	1.0	1.6	3.1	4.0	4.5	4.5
27-Jan	4.1	3.0	3.6	3.2	2.3	2.1	2.7	3.3	3.5	2.0	2.4	1.5	1.3	1.4	1.4	1.7	1.6	0.9	0.9	0.5	0.2	0.3	0.4	0.2	4.1
28-Jan	0.4	0.6	0.5	1.1	0.9	0.6	0.6	1.2	1.1	1.0	1.7	1.4	0.7	0.5	0.7	1.3	1.7	1.6	0.9	1.0	2.2	2.1	2.6	2.2	2.6
29-Jan	2.4	2.3	2.9	2.3	1.3	2.5	1.9	2.3	3.3	2.3	2.4	2.5	2.2	2.7	2.6	2.1	2.1	1.4	1.8	1.3	1.1	1.5	1.2	1.5	3.3
30-Jan	1.2	1.4	1.0	1.3	1.8	2.2	2.2	1.1	1.1	0.9	0.7	1.2	1.6	2.0	2.0	1.8	2.0	2.2	2.5	1.7	1.4	1.4	1.4	1.2	2.5
31-Jan	0.8	0.8	1.0	1.5	1.6	1.3	1.7	1.6	2.0	2.4	1.8	2.1	2.1	2.3	2.1	1.8	1.6	1.3	1.2	1.1	1.2	0.9	0.3	0.4	2.4
	4.1	3.0	3.6	3.2	2.6	2.7	2.8	3.3	3.5	2.6	2.5	3.0	3.2	2.7	2.7	3.3	3.1	3.5	3.3	2.3	2.3	3.1	4.0	4.5	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Vertical Wind Speed 100 m (VW100m) - km/h

Lower Camp Met Tower - January 2016

Maximum Value: 3.5 km/h on Jan 18 08:00

Maximum Daily Average: 1.3 km/h on Jan 18

Minimum Value: -2.5 km/h on Jan 2 01:00

Minimum Daily Average: -0.5 km/h on Jan 29

Maximum Diurnal Average: 0.4 km/h at hour 21

Minimum Diurnal Average: 0.1 km/h at hour 14

Monthly Average: 0.24 km/h

Percentiles: P_1 = -1.1 P_{10} = -0.3 Q_1 = 0.0 Median = 0.1 Q_3 = 0.4 P_{90} = 1.0 P_{99} = 2.5

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	0
Percent Operational Time:	94.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	1.1	0.3	0.0	1.4	0.9	0.4	0.6	1.1	1.0	0.5	1.0	0.1	0.3	0.0	-0.2	0.3	-0.4	0.0	-0.1	0.7	3.3	1.8	1.1	-0.5	0.6	3.3
2-Jan	-2.5	-0.3	0.6	-1.4	0.0	-0.1	0.0	0.5	0.1	0.3	0.3	0.3	0.8	0.9	1.0	0.3	-0.1	0.8	1.0	1.1	1.3	0.8	0.0	0.6	0.3	1.3
3-Jan	0.5	-0.2	0.4	0.3	0.2	0.6	1.0	0.0	0.4	-0.1	-0.7	-0.2	-0.3	0.0	1.0	0.5	0.8	0.9	0.3	0.3	0.2	0.2	0.2	0.5	0.3	1.0
4-Jan	0.7	0.3	0.6	0.2	0.0	0.1	0.1	0.1	0.0	-0.1	0.0	0.0	0.2	0.4	0.3	0.9	0.6	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.2	0.9
5-Jan	0.1	0.7	0.6	0.2	0.1	0.4	0.2	0.2	0.0	0.0	0.2	0.4	0.0	0.5	0.4	0.1	0.1	0.0	-0.1	-0.1	-0.3	-0.1	0.0	0.0	0.1	0.7
6-Jan	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.0
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.8	1.1	-0.5	-0.2	0.3	--	2.8
8-Jan	0.9	0.9	1.0	0.9	0.6	-0.3	-0.3	0.5	0.5	0.2	0.4	0.2	-0.1	-0.6	-0.4	-0.5	-0.4	-0.4	0.3	-0.4	-0.5	-0.5	-1.0	-1.0	0.0	1.0
9-Jan	-0.3	0.5	0.0	-0.6	-0.5	-0.3	-0.3	-0.2	-0.3	-0.4	AF	AF	AF	AF	AF	-0.2	-0.9	-0.6	-0.8	-0.2	-1.0	-1.0	-0.5	-0.5	-0.4	0.5
10-Jan	-0.4	-0.8	-0.2	-0.6	-0.4	-0.5	-0.5	0.0	-0.5	-0.1	0.0	0.0	0.2	0.0	0.3	0.6	0.9	0.7	0.4	0.4	0.1	-0.1	0.1	0.2	0.0	0.9
11-Jan	0.3	0.2	0.1	0.0	0.0	-0.1	0.0	-0.3	-0.8	-0.5	-0.1	0.1	0.8	0.5	0.4	0.4	0.2	0.4	0.1	0.5	0.4	-0.1	0.3	0.8	0.1	0.8
12-Jan	0.7	0.3	0.5	0.4	0.2	0.4	0.4	0.6	0.1	0.4	0.5	0.2	0.3	0.0	0.2	0.1	0.2	0.3	0.1	-0.1	0.1	0.0	0.1	0.2	0.3	0.7
13-Jan	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.2	1.1	0.6	0.2	0.3	0.1	0.2	0.2	0.4	0.4	0.2	-0.2	0.1	0.0	0.2	1.1
14-Jan	0.4	0.9	0.3	0.3	-0.3	0.2	-0.2	0.3	0.6	0.4	0.0	0.1	-0.2	0.2	0.1	0.0	0.5	0.5	0.3	0.1	0.4	0.2	0.2	0.1	0.2	0.9
15-Jan	-0.1	0.1	0.1	-0.1	0.1	0.0	0.1	0.0	-0.1	-0.1	-0.1	0.1	-0.1	-0.1	0.1	0.1	0.0	0.0	-0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.2
16-Jan	0.1	0.2	0.1	0.3	0.5	0.1	0.1	0.1	0.7	0.1	0.1	0.2	0.1	0.2	0.4	0.3	0.5	0.1	0.1	0.2	0.6	0.1	0.4	1.0	0.3	1.0
17-Jan	0.1	0.1	0.5	0.3	0.2	0.2	0.1	0.5	1.0	0.6	0.2	0.2	0.2	0.1	0.5	0.4	0.4	0.2	0.3	0.6	0.7	1.4	1.0	1.6	0.5	1.6
18-Jan	2.0	2.2	2.2	2.0	1.5	1.6	2.0	3.5	2.7	2.5	1.2	0.6	0.6	0.9	1.1	0.9	0.1	0.2	0.1	0.7	1.2	1.1	0.7	0.3	1.3	3.5
19-Jan	0.3	-0.1	0.2	0.0	0.0	0.0	-0.2	0.0	-0.1	0.0	0.0	-0.4	-0.1	-0.1	-0.1	0.4	0.4	0.1	0.1	0.0	0.1	0.1	0.1	-0.1	0.0	0.4
20-Jan	0.1	0.2	0.4	0.1	0.2	0.1	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.1	0.2	0.5	0.0	0.2	0.1	0.2	0.5	0.3	0.0	0.0	0.5	0.1	0.5
21-Jan	1.0	0.8	0.5	-0.3	0.0	0.1	0.7	0.3	0.1	0.7	1.0	0.5	0.8	0.2	1.2	1.0	1.5	1.4	1.1	1.8	2.6	2.2	2.3	0.8	0.9	2.6
22-Jan	0.7	0.1	-0.1	0.2	-0.2	0.2	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	-0.2	-0.3	-0.1	0.1	0.1	0.1	-0.1	0.0	0.2	0.1	0.0	0.7
23-Jan	0.2	0.1	0.1	0.2	0.1	0.1	0.1	-0.1	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.2	-0.1	0.2	0.2	0.5	0.6	0.4	0.1	0.6
24-Jan	-0.1	1.0	0.2	0.3	0.4	1.8	1.8	1.2	1.3	1.0	1.1	0.8	1.2	0.1	0.8	0.4	0.3	0.1	0.5	-0.4	0.1	0.1	0.0	0.1	0.6	1.8
25-Jan	0.0	0.0	-0.1	-0.1	0.2	0.3	0.1	-0.2	-0.4	0.0	0.0	-0.6	0.6	0.7	0.1	0.2	0.9	1.3	1.5	0.3	0.5	1.2	0.6	0.1	0.3	1.5
26-Jan	0.0	0.1	0.3	0.4	1.2	1.8	1.1	1.5	1.2	0.6	1.0	0.7	0.7	0.7	0.8	0.8	0.2	0.0	-0.3	-0.1	0.0	0.2	0.1	-0.6	0.5	1.8
27-Jan	-0.6	-0.1	-1.2	0.0	-0.5	-0.5	-0.4	-0.1	-0.5	0.0	-0.2	-0.1	-0.3	0.0	-0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	-0.2	0.2
28-Jan	0.2	0.1	0.2	1.0	0.4	0.0	0.0	-0.1	0.6	1.6	2.3	1.3	0.1	0.0	0.0	0.4	0.8	-0.4	0.0	-0.3	0.3	0.3	0.6	-0.2	0.4	2.3
29-Jan	0.1	-0.2	-0.7	-1.3	-0.6	-0.8	-1.1	-0.9	-1.2	-1.0	-0.1	-0.5	-0.2	-1.2	-0.8	-0.9	-1.1	-0.5	-0.4	-0.3	0.9	1.7	-0.1	0.2	-0.5	1.7
30-Jan	1.5	0.8	-0.1	1.7	2.8	1.1	2.3	-0.2	0.1	0.0	-0.1	-0.2	0.3	0.1	0.5	-0.3	0.2	-0.1	0.1	-0.1	0.1	-0.3	0.4	0.4	0.5	2.8
31-Jan	0.1	0.1	0.0	0.0	-0.3	0.4	-0.1	0.1	0.0	0.9	-0.1	0.1	0.3	-0.3	0.5	0.5	0.8	0.2	0.0	0.4	0.0	-0.1	0.0	-0.1	0.1	0.9
	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.2	Diurnal Average	
	2.0	2.2	2.2	2.0	2.8	1.8	2.3	3.5	2.7	2.5	2.3	1.3	1.2	0.9	1.2	1.0	1.5	1.4	1.5	2.8	3.3	2.2	2.3	1.6	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 100 m (VW100m) - km/h

Lower Camp Met Tower - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.0 km/h on Jan 27 04:00

Minimum Value: 0.1 km/h on Jan 6 01:00

Percentiles: P_1 = 0.2 P_{10} = 0.4 Q_1 = 0.6 Median = 1.0 Q_3 = 1.4 P_{90} = 2.0 P_{99} = 2.9

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	0
Percent Operational Time:	94.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	2.3	2.2	1.3	2.2	2.1	2.0	2.2	2.3	2.2	1.6	2.4	1.9	1.3	1.6	1.4	1.5	2.6	2.1	1.2	1.3	2.1	1.2	1.0	1.9	2.6
2-Jan	1.6	2.5	2.5	2.6	0.9	0.8	0.8	0.8	1.0	1.1	0.9	0.8	0.9	1.1	0.9	0.9	0.6	1.0	0.9	0.8	0.7	1.0	1.0	1.0	2.6
3-Jan	1.2	1.0	1.0	1.1	1.2	1.2	1.4	0.9	1.0	1.4	1.2	1.4	1.1	0.8	1.1	1.2	1.2	1.3	0.9	0.9	0.7	0.6	0.6	0.5	1.4
4-Jan	0.6	0.6	0.5	0.3	0.2	0.3	0.3	0.2	0.2	0.4	0.5	0.6	0.7	0.8	0.8	0.6	0.7	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.8
5-Jan	0.8	0.8	0.8	0.8	0.6	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.5	0.4	0.5	0.2	0.2	0.2	0.2	0.4	0.5	0.2	0.2	0.2	0.8
6-Jan	0.1	0.2	0.1	0.2	0.3	0.2	0.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.5
7-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.0	1.7	1.2	0.9	1.2	2.0
8-Jan	0.9	0.7	0.5	0.6	0.5	0.8	0.4	0.4	0.5	0.5	0.4	0.3	0.4	0.4	0.6	0.9	0.9	0.9	1.2	1.3	1.4	1.4	1.4	1.2	1.4
9-Jan	1.5	1.7	1.6	1.1	1.1	1.2	1.0	1.2	1.1	0.9	AF	AF	AF	AF	AF	0.9	1.4	1.2	1.1	1.0	1.1	1.0	1.0	0.9	1.7
10-Jan	1.0	0.9	1.3	1.0	0.9	0.9	0.9	0.6	0.3	0.4	0.3	0.4	0.5	0.8	1.3	1.5	1.6	1.6	1.5	1.1	0.6	0.5	0.3	0.4	1.6
11-Jan	0.9	1.1	1.5	0.8	0.5	0.4	0.3	0.7	0.7	1.2	1.2	1.2	1.1	1.2	1.4	1.3	0.9	0.8	0.5	0.6	1.0	1.3	1.1	1.1	1.5
12-Jan	0.8	1.1	1.3	1.1	0.8	0.5	0.6	0.6	0.6	0.7	0.7	0.5	0.7	0.9	0.7	0.7	0.9	1.4	0.8	0.9	1.1	0.8	0.5	0.6	1.4
13-Jan	0.5	0.3	0.3	0.3	0.2	0.5	0.5	0.5	0.3	0.5	0.8	1.1	1.3	1.3	1.1	0.9	1.0	0.9	1.0	1.0	0.8	1.3	1.6	1.5	1.6
14-Jan	2.0	2.0	2.2	1.8	1.6	1.7	1.5	1.9	1.5	1.3	1.8	1.7	1.9	1.6	1.9	2.0	1.9	2.2	1.8	2.0	2.0	1.2	0.9	1.0	2.2
15-Jan	0.6	0.5	0.4	0.4	0.7	0.6	0.6	0.7	0.4	0.5	0.5	0.8	0.7	0.8	0.8	0.7	0.6	0.4	0.7	0.3	0.4	0.4	0.7	0.2	0.8
16-Jan	0.2	0.2	0.2	0.3	0.4	0.6	0.3	0.4	0.4	0.5	0.3	0.4	0.3	0.3	0.4	0.6	0.4	0.3	0.3	0.5	0.6	0.4	0.7	0.7	0.7
17-Jan	0.5	0.6	0.8	0.7	0.7	0.6	0.7	0.9	1.0	0.9	0.5	0.8	0.8	0.4	0.8	0.8	0.7	0.8	0.8	0.7	1.3	1.0	1.5	1.4	1.5
18-Jan	1.3	1.2	0.9	1.1	1.4	1.8	1.7	2.1	2.1	2.3	1.9	1.6	1.4	1.2	1.3	1.2	0.8	0.6	0.7	1.2	1.6	1.0	0.9	1.0	2.3
19-Jan	0.8	0.5	0.2	0.2	0.2	0.2	0.4	0.4	0.3	0.6	0.8	1.1	0.9	1.0	0.9	1.2	0.7	0.9	0.8	0.6	0.8	1.0	0.9	1.1	1.2
20-Jan	1.5	1.5	1.4	1.2	1.0	0.9	0.8	0.6	0.6	0.6	0.7	0.6	1.0	1.1	0.9	0.3	0.5	0.6	0.8	0.6	0.9	1.0	1.1	1.5	1.5
21-Jan	1.3	1.4	1.7	1.4	1.3	1.3	1.5	1.1	0.9	0.9	1.1	1.1	1.1	1.5	1.5	1.3	1.3	1.5	1.9	1.9	2.1	2.1	1.9	1.6	2.1
22-Jan	1.4	1.5	0.8	0.9	0.8	1.5	1.4	0.6	0.2	0.2	0.3	0.3	0.3	0.7	1.1	1.1	0.8	0.7	0.8	0.7	0.5	0.6	0.7	0.7	1.5
23-Jan	0.7	0.5	0.6	0.6	0.4	0.4	0.6	0.4	0.4	0.3	0.3	0.4	0.5	0.2	0.3	0.2	0.2	0.5	0.4	0.4	0.6	1.0	1.2	0.8	1.2
24-Jan	1.0	1.1	1.1	0.8	1.2	2.1	1.9	1.4	1.0	1.1	1.1	1.2	1.5	1.2	1.0	0.9	0.9	1.0	1.5	1.0	1.2	2.1	1.8	1.3	2.1
25-Jan	0.7	0.3	0.4	0.4	0.4	0.6	1.3	1.1	1.5	1.9	2.2	1.8	1.8	1.8	1.3	1.1	1.1	1.4	1.4	1.0	1.3	1.5	1.1	1.0	2.2
26-Jan	0.9	0.8	0.9	0.7	0.6	0.9	0.7	1.0	1.0	1.1	0.8	1.0	1.1	0.8	1.0	1.2	1.3	1.0	0.9	1.1	1.5	2.4	2.5	3.6	3.6
27-Jan	3.4	2.2	3.7	4.0	2.9	2.2	1.9	2.5	1.8	0.8	2.2	1.5	1.0	1.0	0.9	1.0	1.2	0.8	0.7	0.5	0.3	0.3	0.3	0.3	4.0
28-Jan	0.5	1.0	0.8	1.3	1.8	0.8	1.0	1.5	1.3	1.3	1.3	1.5	0.9	0.7	0.9	1.4	1.4	1.7	1.3	1.4	2.2	1.8	2.3	1.8	2.3
29-Jan	1.9	1.5	2.3	2.3	1.5	2.9	2.2	3.1	2.6	1.7	2.9	2.4	2.7	2.8	2.6	1.9	2.0	1.4	1.5	0.7	1.5	1.3	1.2	1.6	3.1
30-Jan	1.8	2.0	1.8	2.1	2.2	1.9	2.3	1.6	1.7	0.7	0.7	1.1	1.4	1.9	2.0	1.9	2.2	2.0	2.5	2.0	1.9	1.4	1.6	1.7	2.5
31-Jan	1.1	0.9	1.3	1.8	1.5	1.9	1.7	1.7	1.9	2.1	1.5	1.8	2.2	2.2	2.3	2.0	1.8	1.6	1.4	1.4	1.6	1.5	0.5	0.7	2.3
	3.4	2.5	3.7	4.0	2.9	2.9	2.3	3.1	2.6	2.3	2.9	2.4	2.7	2.8	2.6	2.0	2.6	2.2	2.5	2.0	2.2	2.4	2.5	3.6	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Vertical Wind Speed 167 m (VW167m) - km/h

Lower Camp Met Tower - January 2016

Maximum Value: 4.0 km/h on Jan 18 08:00

Maximum Daily Average: 1.5 km/h on Jan 1

Minimum Value: -2.7 km/h on Jan 9 00:00

Minimum Daily Average: -0.9 km/h on Jan 9

Maximum Diurnal Average: 0.7 km/h at hour 22

Minimum Diurnal Average: 0.2 km/h at hour 14

Monthly Average: 0.48 km/h

Percentiles: P_1 = -1.7 P_{10} = -0.2 Q_1 = 0.1 Median = 0.3 Q_3 = 0.8 P_{90} = 1.5 P_{99} = 3.3

Hours in Service:	744
Hours of Data:	725
Hours of Missing Data:	19
Hours of Calibration:	0
Percent Operational Time:	97.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	2.4	1.5	0.9	2.5	2.5	1.8	1.9	2.5	2.6	2.1	2.7	1.3	0.9	0.7	1.1	1.6	0.6	1.1	-0.1	0.9	3.0	1.6	1.0	-0.4	1.5	3.0
2-Jan	-1.9	-0.2	1.5	-1.9	0.9	0.7	0.5	0.7	1.1	1.5	1.3	1.0	0.7	0.7	0.6	0.7	0.9	0.6	0.8	0.4	0.5	0.3	0.9	0.8	0.5	1.5
3-Jan	1.0	0.5	1.7	1.2	-0.1	-0.4	-0.1	-0.5	0.2	0.2	-0.5	0.0	0.4	0.5	0.9	0.5	1.0	1.2	1.2	0.7	0.6	0.5	0.5	0.2	0.5	1.7
4-Jan	0.4	0.3	0.3	0.1	-0.1	-0.2	-0.1	-0.1	-0.2	0.1	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.5	0.8	0.9	0.6	0.6	0.7	0.7	0.6	0.2	0.9
5-Jan	0.8	0.6	0.6	0.8	0.7	0.6	0.6	0.5	0.6	0.6	0.5	0.4	0.2	0.5	0.3	0.7	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.4	0.8
6-Jan	0.1	0.1	0.1	0.1	0.2	0.7	1.3	1.9	1.7	1.4	0.8	0.7	1.3	0.8	0.6	0.7	AF	AF	AF	AF	AF	AF	AF	AF	--	1.9
7-Jan	AF	AF	AF	AF	AF	1.4	1.3	0.7	0.8	0.6	0.6	0.0	-0.2	-0.4	-0.2	0.0	2.6	2.2	2.4	2.4	1.5	0.8	-0.1	-0.5	0.8	2.6
8-Jan	-0.7	0.0	0.1	-0.2	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	-0.2	-0.5	-1.0	-0.9	-1.0	-0.6	-1.5	-1.4	-1.0	-2.2	-2.7	-0.6	0.1
9-Jan	-1.6	-0.1	0.2	-1.2	-1.0	-1.0	-0.5	-1.4	-0.3	-0.9	-2.0	-1.6	-1.9	-2.2	-1.5	-1.3	-1.7	-0.4	0.1	-0.2	-0.5	-0.8	0.4	0.3	-0.9	0.4
10-Jan	-0.6	-0.4	0.2	0.1	0.4	0.5	0.3	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.5	0.5	0.6	0.4	0.6	0.6	0.1	-0.2	0.1	0.3	0.2	0.6
11-Jan	0.1	0.1	0.2	0.2	0.0	0.1	-0.1	-0.3	-0.4	0.3	0.5	0.3	1.2	1.2	1.3	1.1	0.8	1.2	0.7	1.1	1.0	0.8	0.8	0.7	0.5	1.3
12-Jan	0.2	0.3	0.5	0.3	0.6	0.8	1.0	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.5	0.1	0.2	0.9	0.3	0.3	0.4	0.5	0.4	0.3	0.4	1.0
13-Jan	0.2	0.7	0.5	0.5	0.3	0.2	0.7	0.2	0.5	0.8	1.0	1.6	1.4	0.5	0.6	0.3	0.6	0.8	0.8	1.0	0.1	-0.2	0.3	0.2	0.6	1.6
14-Jan	0.2	1.4	0.5	0.6	-0.2	0.6	-0.1	0.4	0.9	0.5	0.1	0.1	-0.2	0.4	0.2	0.0	0.5	0.7	0.3	0.4	0.4	0.3	0.1	0.1	0.3	1.4
15-Jan	0.0	0.4	0.3	0.0	0.3	0.1	0.3	0.2	0.1	0.0	0.1	0.2	0.2	0.0	0.2	0.3	0.5	0.2	0.1	0.2	0.3	0.6	0.5	0.7	0.2	0.7
16-Jan	0.3	0.2	0.2	0.4	0.2	0.2	0.0	0.0	0.1	0.2	0.4	0.3	0.2	0.1	0.3	0.2	0.2	0.3	0.4	0.2	0.3	0.3	0.6	0.2	0.3	0.6
17-Jan	0.0	0.4	0.3	0.3	0.2	0.0	0.0	0.2	1.0	AF	AF	1.4	0.3	0.4	0.4	0.4	1.2	0.8	1.4	3.3	2.5	2.6	1.6	1.9	0.9	3.3
18-Jan	2.7	2.0	1.9	1.7	1.2	1.7	2.2	4.0	3.8	3.5	1.5	0.3	0.3	1.0	1.0	1.1	0.2	0.2	0.0	0.6	1.5	2.1	0.5	0.2	1.5	4.0
19-Jan	0.5	0.2	0.2	0.1	0.0	0.0	-0.1	0.1	-0.1	0.2	0.4	-0.2	0.0	0.1	-0.3	0.6	0.5	0.2	0.0	0.0	0.1	0.2	0.3	0.0	0.1	0.6
20-Jan	0.1	0.3	0.5	0.5	0.3	0.2	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	0.1	0.4	0.1	0.3	0.3	0.0	0.6	0.7	0.1	0.4	1.6	0.3	1.6
21-Jan	1.8	1.2	0.6	-0.7	0.1	0.4	0.9	0.8	0.3	0.9	1.7	0.8	1.2	1.0	1.6	1.0	1.8	1.5	1.3	2.2	3.4	2.4	1.8	1.2	1.2	3.4
22-Jan	1.1	0.8	0.6	1.4	0.3	0.8	0.5	0.1	-0.1	0.1	0.1	-0.1	-0.1	0.2	0.0	-0.2	-0.1	0.1	0.2	0.1	0.0	0.0	0.3	0.3	0.3	1.4
23-Jan	0.2	0.3	0.2	0.4	0.2	0.3	0.3	0.2	0.3	0.1	0.1	0.1	0.2	0.0	0.2	AF	AF	AF	AF	0.2	0.6	2.7	3.4	0.9	0.5	3.4
24-Jan	0.7	1.5	1.2	1.2	1.8	3.1	2.4	1.9	1.8	1.5	2.1	2.3	2.4	1.4	2.2	1.4	1.5	0.8	1.4	-0.2	0.0	0.0	0.1	0.2	1.4	3.1
25-Jan	0.1	-0.1	0.0	-0.1	0.4	0.3	0.9	0.0	-0.1	0.1	-0.2	-0.8	0.2	0.2	-0.1	0.0	0.6	1.2	1.2	0.0	0.5	2.0	1.3	1.2	0.4	2.0
26-Jan	0.5	0.4	0.6	0.8	0.9	0.3	0.3	0.8	0.3	0.1	0.9	0.4	0.9	1.1	0.5	0.5	0.8	0.6	0.5	0.8	0.9	1.2	1.0	0.1	0.6	1.2
27-Jan	0.5	0.7	-0.4	0.3	-0.2	-0.7	-0.1	0.2	0.0	0.1	0.3	0.0	-0.2	0.0	0.1	0.1	0.1	0.3	0.2	0.1	0.1	0.2	0.0	0.2	0.1	0.7
28-Jan	0.2	0.4	1.0	1.6	1.7	0.3	0.6	0.1	1.3	1.2	1.7	1.5	0.1	0.3	0.2	0.5	1.6	0.1	1.1	1.1	1.6	1.3	1.5	0.7	0.9	1.7
29-Jan	0.9	0.4	-0.3	-1.1	-0.2	-0.5	-1.4	-1.0	-1.1	-1.0	0.4	0.0	-0.3	-1.1	-0.9	-1.0	-1.0	0.1	0.0	0.0	1.3	1.8	0.3	1.3	-0.2	1.8
30-Jan	3.8	3.4	0.7	2.5	3.6	2.5	3.8	0.6	0.0	0.0	0.1	-0.2	0.2	0.2	0.6	-0.6	0.2	0.0	0.0	-0.1	0.0	-0.4	0.4	0.4	0.9	3.8
31-Jan	0.3	0.1	0.1	0.0	-0.3	0.2	-0.2	0.3	0.0	1.1	-0.2	0.1	0.4	-0.4	0.4	0.5	0.8	0.3	-0.2	0.6	-0.3	-0.3	0.1	-0.1	0.1	1.1
	0.5	0.6	0.5	0.4	0.5	0.5	0.6	0.4	0.5	0.5	0.5	0.3	0.3	0.2	0.4	0.3	0.5	0.5	0.5	0.6	0.7	0.7	0.6	0.4	Diurnal Average	
	3.8	3.4	1.9	2.5	3.6	3.1	3.8	4.0	3.8	3.5	2.7	2.3	2.4	1.4	2.2	1.6	2.6	2.2	2.4	3.3	3.4	2.7	3.4	1.9	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 167 m (VW167m) - km/h

Lower Camp Met Tower - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.8 km/h on Jan 27 04:00

Minimum Value: 0.1 km/h on Jan 23 14:00

Percentiles: P_1 = 0.1 P_{10} = 0.4 Q_1 = 0.6 Median = 0.9 Q_3 = 1.4 P_{90} = 1.9 P_{99} = 2.8

Hours in Service:	744
Hours of Data:	725
Hours of Missing Data:	19
Hours of Calibration:	0
Percent Operational Time:	97.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	1.9	2.2	2.0	2.0	2.3	2.5	2.2	1.8	1.9	1.5	2.4	1.5	1.2	1.4	1.1	1.4	2.5	1.8	1.1	1.1	1.8	1.5	1.2	1.6	2.5
2-Jan	1.1	2.3	1.4	2.6	1.1	0.7	1.0	1.0	0.8	0.9	0.8	0.6	0.7	1.1	0.7	0.9	0.6	0.7	0.6	0.6	0.6	1.0	1.1	0.9	2.6
3-Jan	0.9	0.9	1.1	1.2	0.9	0.8	1.0	0.9	1.0	0.9	1.1	1.2	0.8	0.7	0.8	1.0	1.0	0.9	0.8	1.0	1.1	0.6	0.5	0.4	1.2
4-Jan	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.6	0.6	0.7	0.3	0.5	0.7	0.3	0.4	0.4	0.4	0.3	0.4	0.5	0.5	0.7	0.7
5-Jan	0.6	0.7	0.6	0.7	0.8	0.6	0.5	0.6	0.6	0.5	0.6	0.5	0.4	0.4	0.4	0.5	0.4	0.2	0.3	0.3	0.2	0.1	0.1	0.2	0.8
6-Jan	0.1	0.1	0.1	0.2	0.4	1.0	1.8	2.4	1.4	1.4	0.9	0.8	1.4	1.1	1.1	0.9	AF	AF	AF	AF	AF	AF	AF	AF	2.4
7-Jan	AF	AF	AF	AF	AF	1.5	2.0	1.3	0.9	1.0	1.7	0.7	1.1	1.2	1.3	1.3	1.1	1.1	1.0	1.0	0.8	0.7	0.7	0.8	2.0
8-Jan	0.5	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.4	0.2	0.1	0.1	0.3	0.4	0.7	0.7	0.8	0.9	1.5	1.1	1.3	1.3	1.1	1.2	1.5
9-Jan	1.1	1.2	2.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	1.0	0.9	1.1	1.0	1.3	1.0	1.2	1.3	1.3	1.1	1.0	1.0	0.9	0.8	2.0
10-Jan	0.7	0.9	1.0	0.8	0.9	0.9	0.8	0.9	0.3	0.3	0.3	0.3	0.4	0.6	1.0	0.9	1.7	1.7	1.3	0.9	0.8	0.5	0.4	0.5	1.7
11-Jan	1.0	1.3	1.7	1.0	0.7	0.6	0.4	0.7	0.6	1.1	1.2	0.8	1.1	0.9	1.2	1.1	0.9	0.7	0.5	0.5	0.6	1.3	1.4	1.0	1.7
12-Jan	0.6	0.7	0.9	0.9	0.8	0.8	1.0	0.4	0.5	0.7	0.7	0.6	0.6	1.2	0.7	0.5	0.7	1.3	0.7	0.9	1.0	0.9	0.7	0.5	1.3
13-Jan	0.4	0.4	0.5	0.5	0.5	0.6	0.9	0.5	0.4	0.5	0.7	1.2	1.1	1.1	1.1	0.7	1.0	1.1	1.1	1.1	0.8	1.4	1.3	1.2	1.4
14-Jan	2.1	2.4	2.3	2.0	1.6	1.6	1.6	2.0	1.9	1.5	1.9	1.8	1.7	1.9	2.1	1.9	2.1	2.3	1.8	2.1	1.5	0.8	1.0	1.1	2.4
15-Jan	0.6	0.7	0.7	0.6	0.6	0.5	0.7	0.9	0.7	0.6	0.4	0.6	0.5	0.9	0.8	0.5	0.3	0.4	0.9	0.4	0.4	0.5	0.5	0.4	0.9
16-Jan	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.3	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.5	0.6	0.5	0.4	0.6
17-Jan	0.4	0.3	0.4	0.4	0.6	0.4	0.3	0.7	1.3	AF	AF	1.2	0.7	0.7	0.7	0.7	1.1	1.1	1.4	1.4	1.6	0.9	1.1	1.5	1.6
18-Jan	1.4	1.4	1.2	1.5	1.5	2.0	2.1	2.4	2.0	2.0	1.6	1.8	1.9	1.7	1.5	1.5	0.8	0.7	0.7	1.3	1.6	1.0	0.8	0.7	2.4
19-Jan	0.6	0.7	0.4	0.2	0.3	0.4	0.3	0.2	0.3	0.6	0.9	1.1	1.0	1.0	0.9	1.2	0.8	0.9	0.9	0.6	0.9	1.0	0.8	1.2	1.2
20-Jan	1.6	1.6	1.6	1.1	1.1	1.0	0.6	0.6	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.3	0.5	0.6	0.6	0.8	1.0	1.3	1.6	1.9	1.9
21-Jan	1.5	1.6	1.9	1.9	1.7	1.4	0.9	0.9	0.6	1.0	1.2	0.9	1.3	1.4	1.6	1.2	1.2	1.7	2.0	2.1	2.3	2.3	2.0	1.1	2.3
22-Jan	1.1	1.2	0.7	0.9	0.9	1.3	1.0	0.6	0.4	0.2	0.4	0.4	0.2	0.6	0.5	0.9	0.4	0.5	0.9	0.9	0.7	0.7	0.7	0.8	1.3
23-Jan	0.7	0.6	0.8	0.7	0.4	0.3	0.4	0.3	0.3	0.2	0.2	0.3	0.4	0.1	0.3	AF	AF	AF	AF	0.4	0.8	0.9	1.0	0.8	1.0
24-Jan	1.2	1.1	1.4	0.9	1.4	1.3	1.4	1.2	0.7	0.9	1.0	1.1	1.4	1.2	1.2	0.8	0.9	0.8	1.8	0.9	1.4	1.8	1.6	1.3	1.8
25-Jan	0.6	0.4	0.4	0.4	0.5	0.8	1.0	0.8	0.9	1.2	1.7	1.1	1.4	1.3	0.9	0.7	0.7	1.3	1.3	1.1	1.4	1.0	1.2	0.9	1.7
26-Jan	1.0	1.0	0.8	0.7	0.6	0.7	0.7	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.8	0.9	1.2	1.1	1.5	1.7	2.1	2.4	2.5	2.5	2.5
27-Jan	2.9	1.6	3.0	4.8	3.5	2.7	1.8	1.6	1.2	1.1	2.2	1.7	1.0	1.2	1.0	1.0	1.1	0.8	0.6	0.4	0.4	0.3	0.5	0.6	4.8
28-Jan	0.7	0.8	1.1	1.3	1.6	0.9	1.1	1.3	1.1	1.4	0.9	1.0	0.7	0.6	1.0	1.0	1.0	1.5	1.1	1.4	1.9	1.7	2.1	1.8	2.1
29-Jan	2.0	1.5	2.0	1.8	1.8	2.8	2.2	3.3	2.3	1.8	3.5	2.6	2.5	2.8	2.2	1.3	1.6	1.6	1.2	0.8	1.8	1.1	1.3	1.3	3.5
30-Jan	1.1	1.9	1.7	2.0	2.3	1.6	1.9	2.0	2.1	0.8	0.8	1.1	1.3	2.1	2.3	1.8	2.1	1.9	2.4	2.1	2.0	1.5	1.5	1.8	2.4
31-Jan	1.4	1.1	1.4	1.8	1.3	2.0	1.6	1.5	1.9	2.2	1.4	1.8	2.1	2.2	2.4	2.0	1.9	1.7	1.4	1.3	1.6	1.6	0.7	1.0	2.4
	2.9	2.4	3.0	4.8	3.5	2.8	2.2	3.3	2.3	2.2	3.5	2.6	2.5	2.8	2.4	2.0	2.5	2.3	2.4	2.1	2.3	2.4	2.5	2.5	
	Diurnal Maximum																								

AF - Analyzer Failure

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 4
BUFFALO VIEWPOINT
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
JANUARY 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	18	0	3	0
H2S (ppb) Average	709	35	35	100.00	5	0	1	0
THC (ppm) Average	709	35	35	100.00	4.1	-	2.9	-
Temperature (C) Average	744	0	0	100.00	5.8	-	3	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	90	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	32	-	16	-
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 - BUFFALO VIEWPOINT (AMS 4)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.5	1	-	0	0	0	0	0	1	18
H2S (ppb) Average	709	0.4	0	-	0	0	0	0	0	1	5
THC (ppm) Average	709	2.42	0.3	-	2.1	2.2	2.2	2.3	2.5	2.8	4.1
Temperature 2 m (C) Average	744	-13.13	8.4	-	-35	-22.5	-18.3	-13.6	-8.7	-1.8	5.8
Relative Humidity (%) Average	744	81	8	-	53	71	78	82	86	91	97
Wind Speed 10 m (km/h) Average	743	7.8	5	-	1	3	4	7	10	13	32
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	08 Jan 2016 11:00	08 Jan 2016 11:00	1	Flat line in sensor output signal - Sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 18 ppb on Jan 20 17:00 Maximum Daily Average: 2.7 ppb on Jan 20

Minimum Value: 0 ppb on Jan 2 05:00 Minimum Daily Average: 0.0 ppb on Jan 30
Maximum Diurnal Average: 1.1 ppb at hour 17 Minimum Diurnal Average: 0.3 ppb at hour 2
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 in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0.2	1
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	1	0.4	2
6-Jan	1	1	1	1	1	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Jan	0	Z	0	0	1	3	6	5	5	4	3	2	2	3	2	1	1	1	1	1	0	0	1	1	1.9	6
9-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
10-Jan	0	0	0	Z	0	0	0	0	0	0	1	5	12	1	1	1	1	0	0	0	1	2	0	0	1.2	12
11-Jan	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	Z	1	11	4	2	5	4	2	1	1	1	1	3	6	6	5	5	3	1	0	0	0	0	0	2.7	11
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Jan	0	0	Z	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	2	3	4	3	2	1	1	1	0	0.9	4
17-Jan	1	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
18-Jan	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
20-Jan	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	2	7	18	9	7	4	1	1	0	0	2.7	18
21-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
22-Jan	1	0	0	Z	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.4	1
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Jan	Z	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.2	2
28-Jan	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
	0.3	0.3	0.6	0.3	0.4	0.5	0.5	0.4	0.3	0.3	0.3	0.5	0.8	0.6	0.6	0.8	1.1	0.8	0.6	0.5	0.3	0.3	0.3	0.3	Diurnal Average	
	1	1	11	4	4	5	6	5	5	4	3	5	12	6	6	7	18	9	7	4	1	2	1	2	Diurnal Maximum	

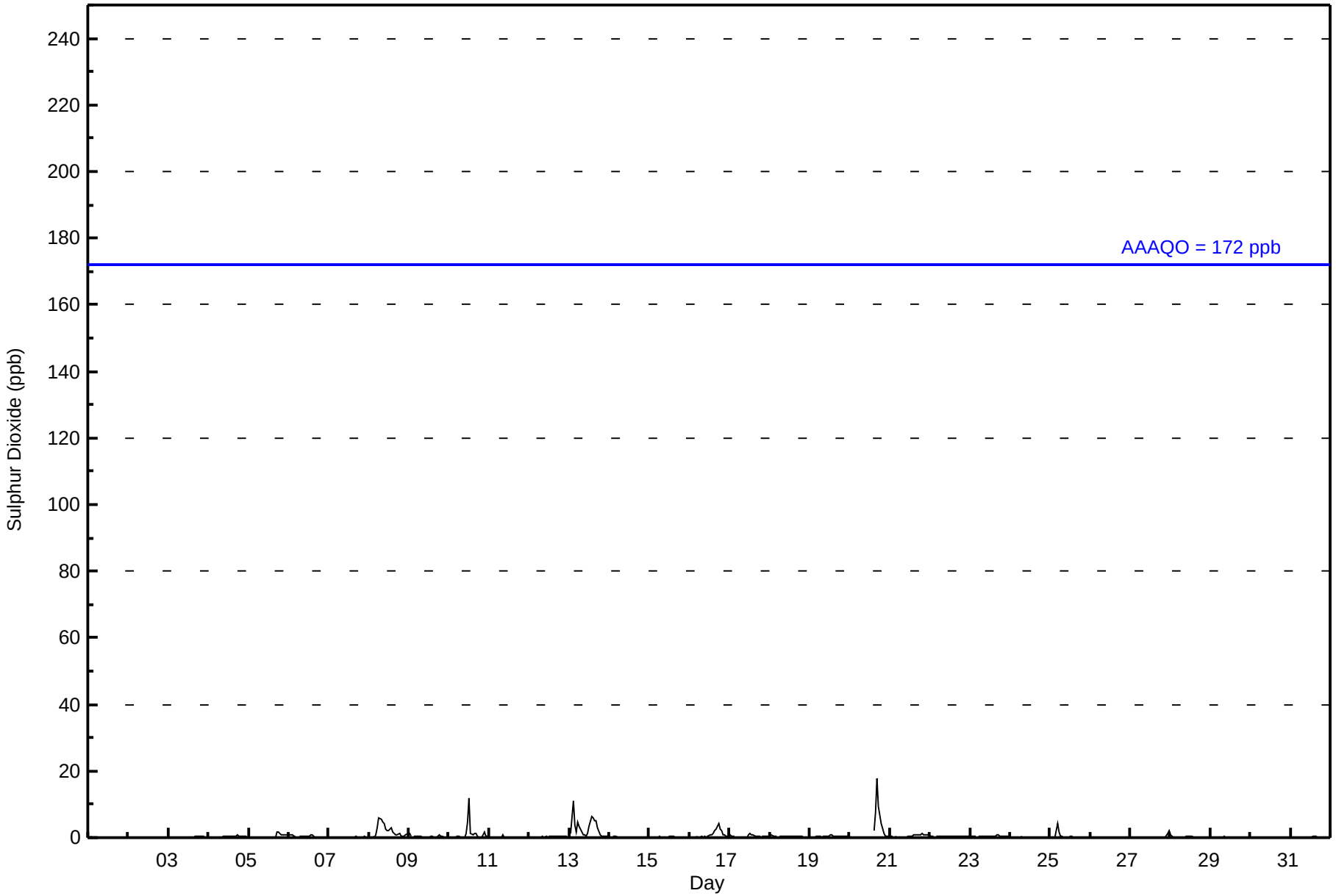
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	706	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	118	62	16	4	2	8	92	195	23	11	25	51	24	24	24	26	705
11 - 20	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	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	118	63	16	4	3	8	92	195	23	11	25	51	24	24	25	26	708

Total Number of Valid Hours: 708

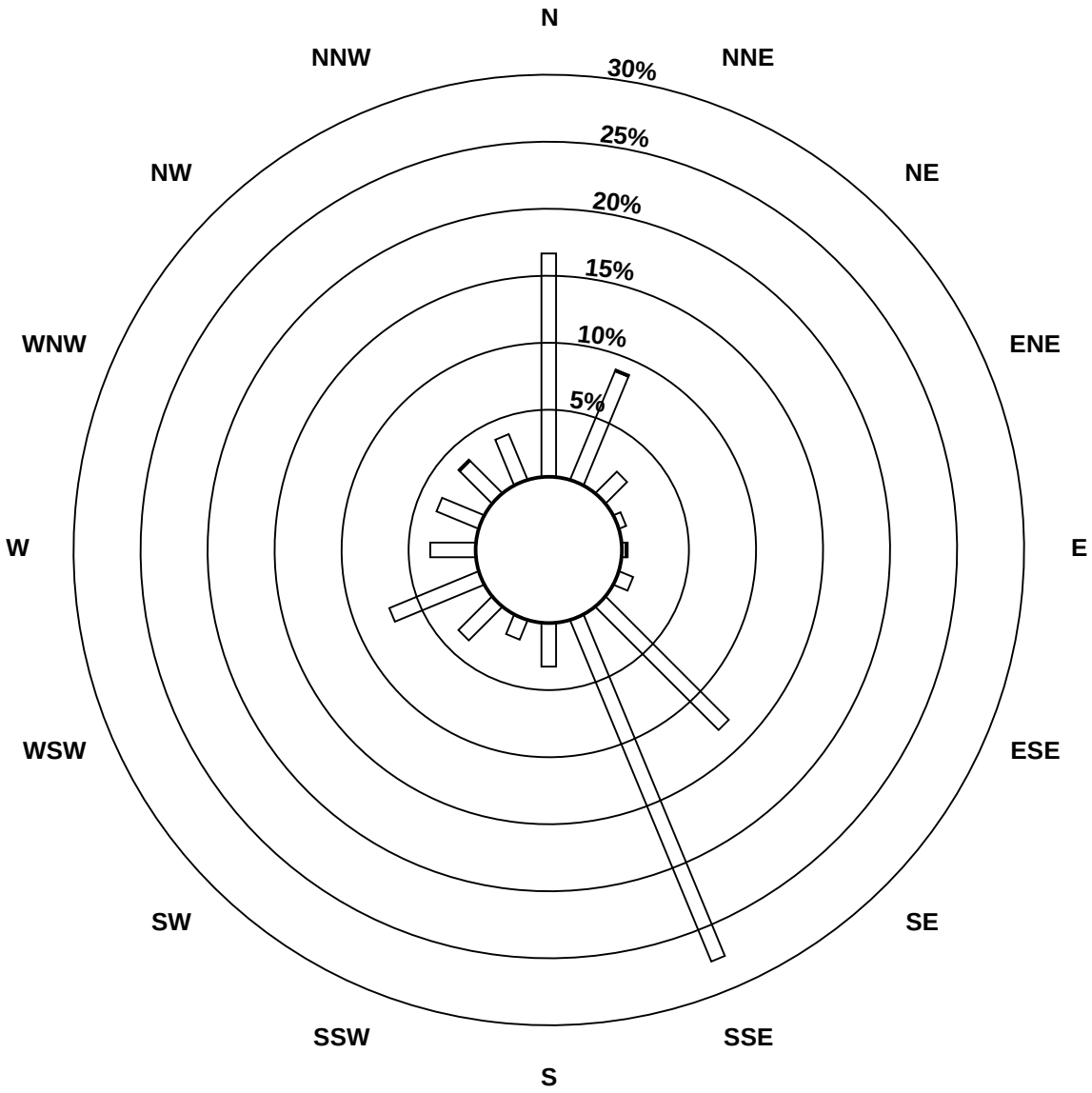
Total Number of Hours: 744

Wood Buffalo Environmental Association

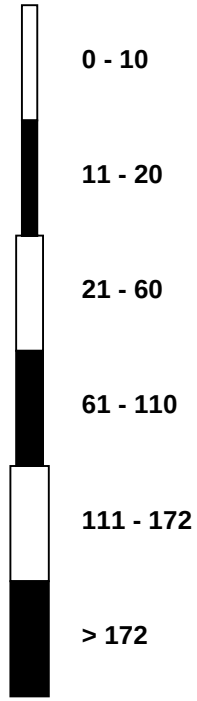
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint (AMS 4)



Classes (ppb)



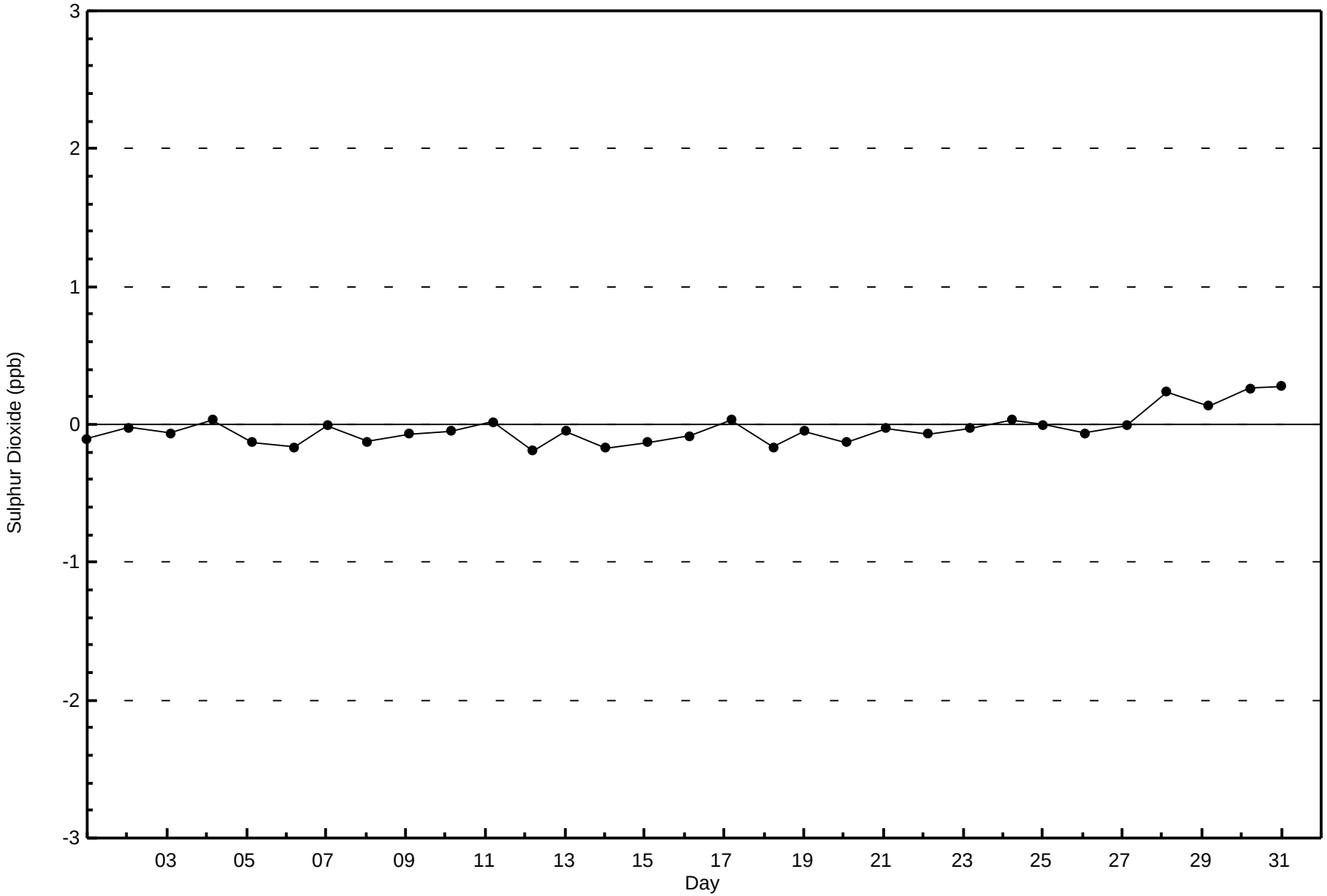
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - January 2016

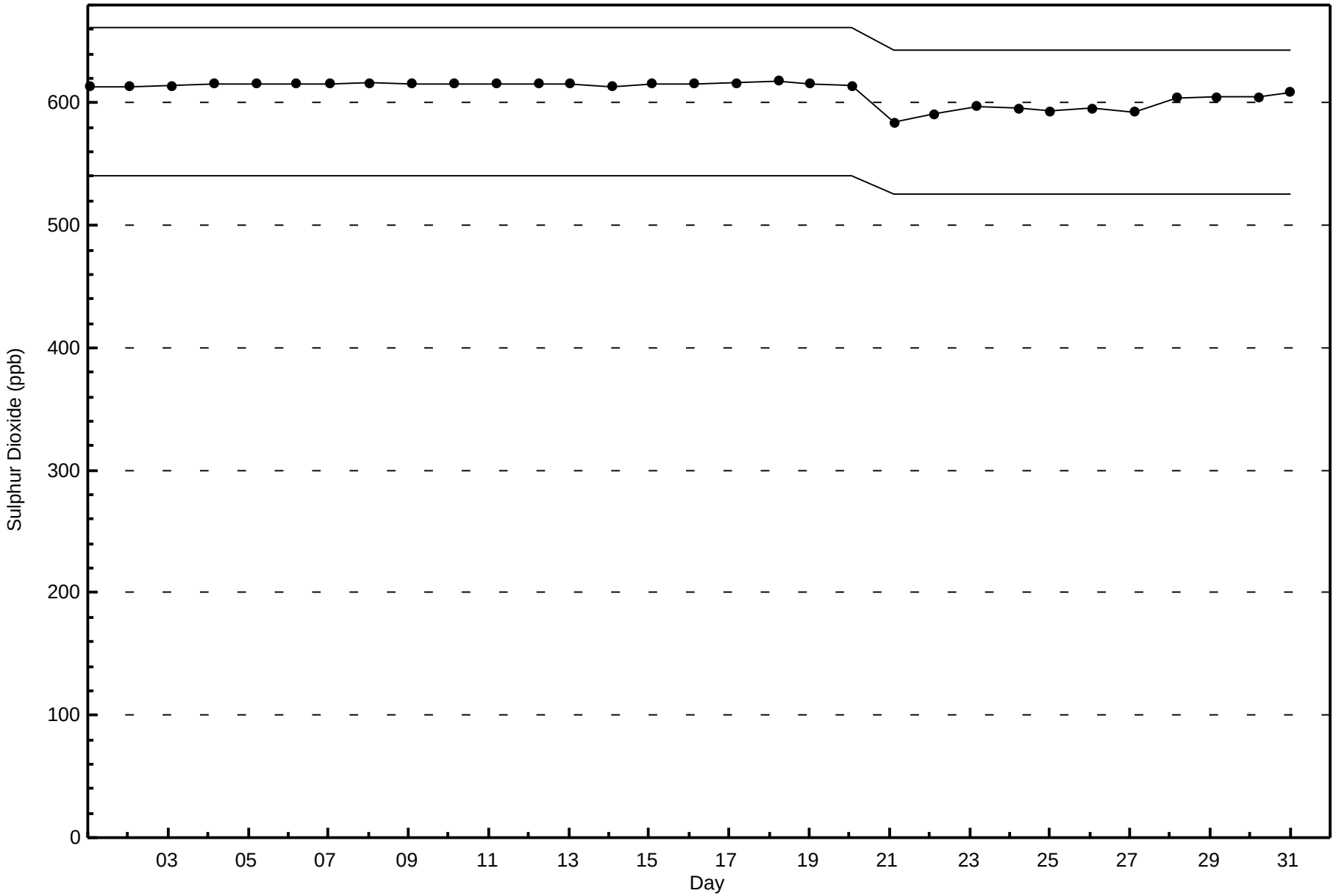


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 5 ppb on Jan 20 17:00

Maximum Daily Average: 1.0 ppb on Jan 20

Minimum Value: 0 ppb on Jan 2 05:00

Minimum Daily Average: 0.1 ppb on Jan 1

Maximum Diurnal Average: 0.5 ppb at hour 17

Minimum Diurnal Average: 0.3 ppb at hour 5

Monthly Average: 0.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 2$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

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

Z - zerospan C - Calibration

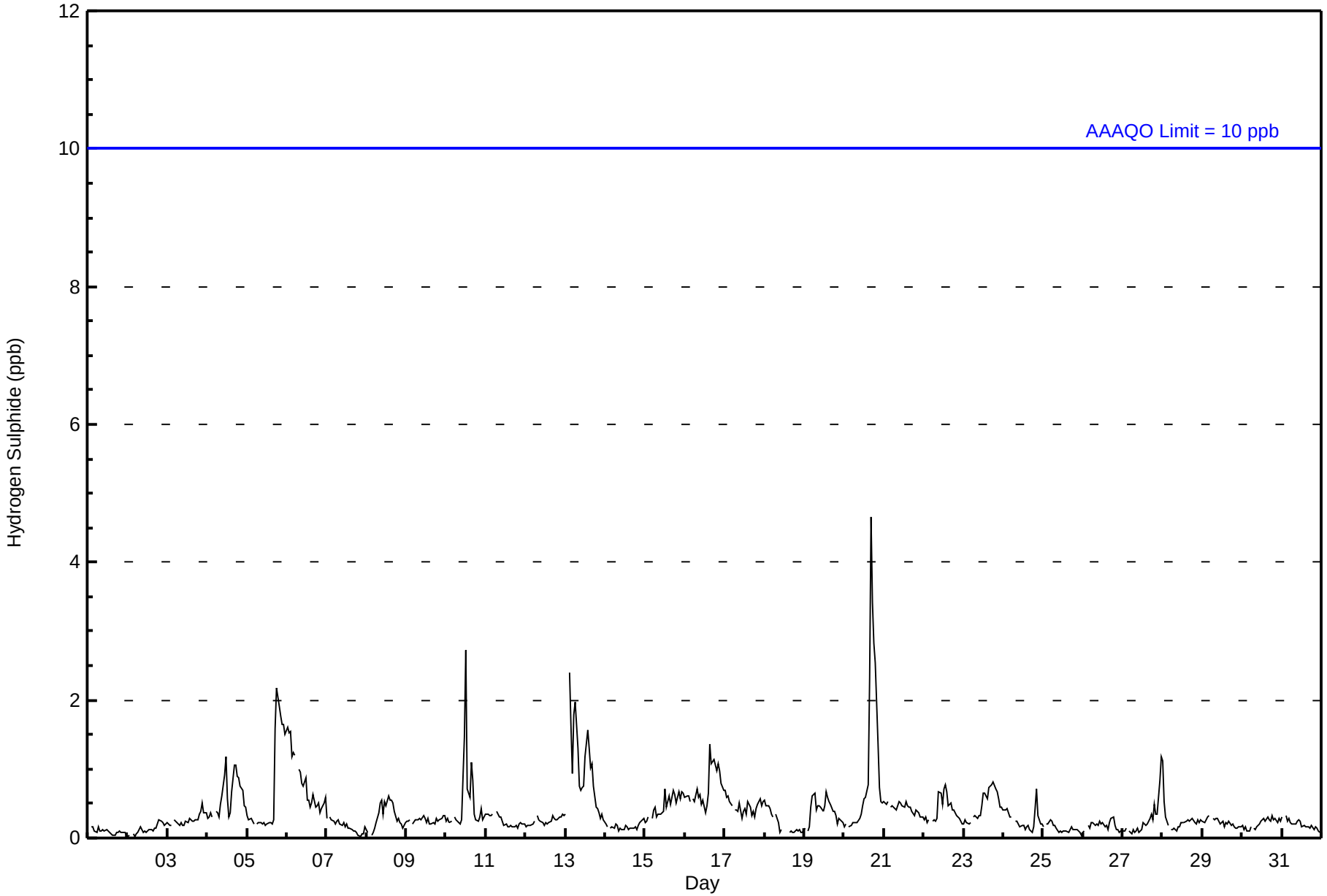
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.29	99.29
3 - 4	4	0.56	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	119	63	16	3	2	8	95	189	24	11	21	53	24	23	27	25	703
3 - 4	0	1	0	0	0	0	0	2	0	0	1	0	0	0	0	0	4
5 - 7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	119	64	16	3	3	8	95	191	24	11	22	53	24	23	27	25	708

Total Number of Valid Hours: 708

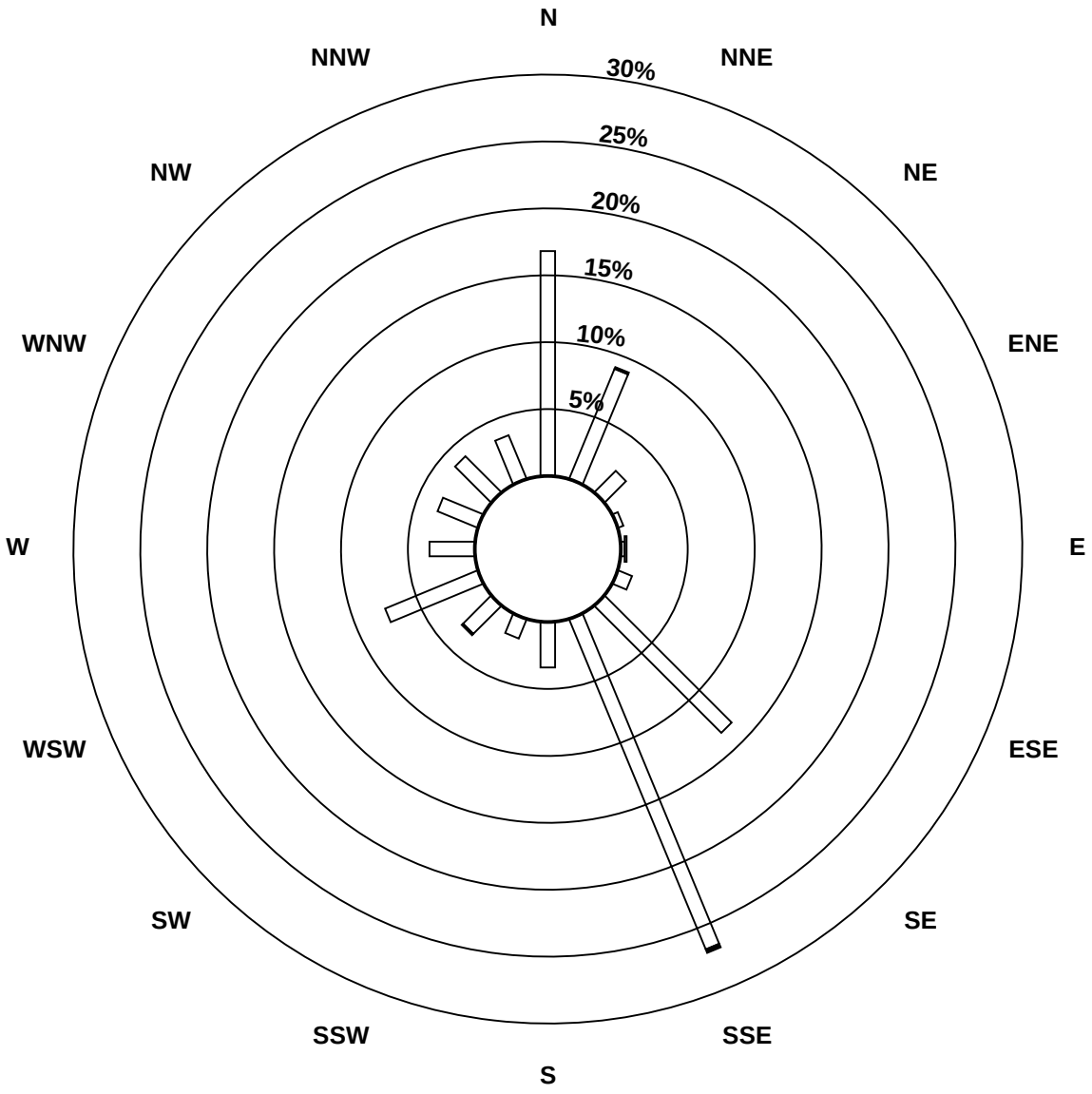
Total Number of Hours: 744

Wood Buffalo Environmental Association

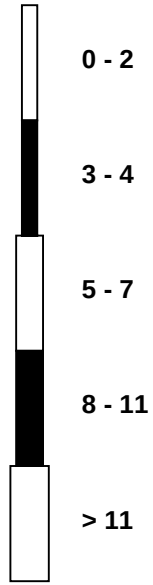
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint (AMS 4)



Classes (ppb)



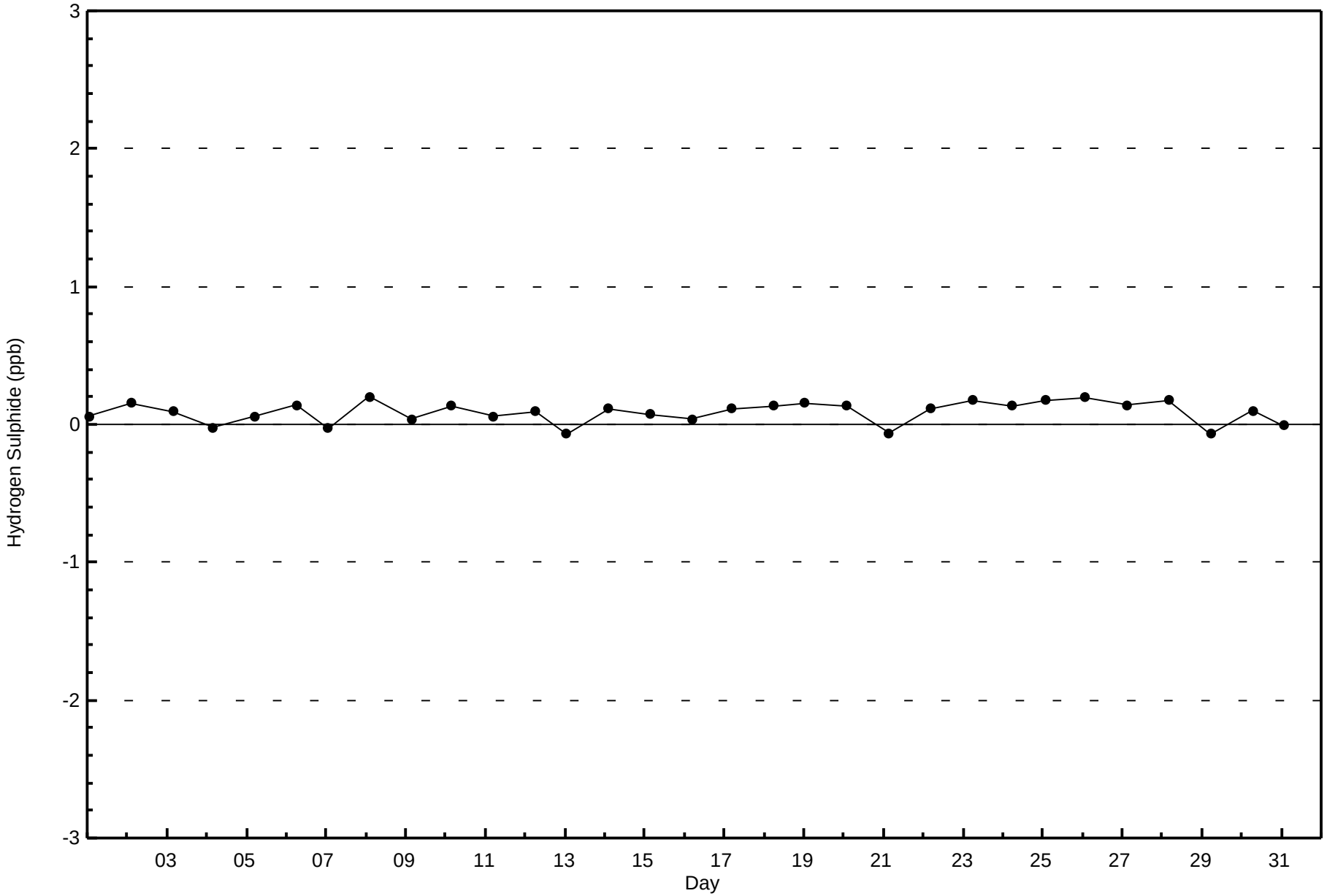
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - January 2016

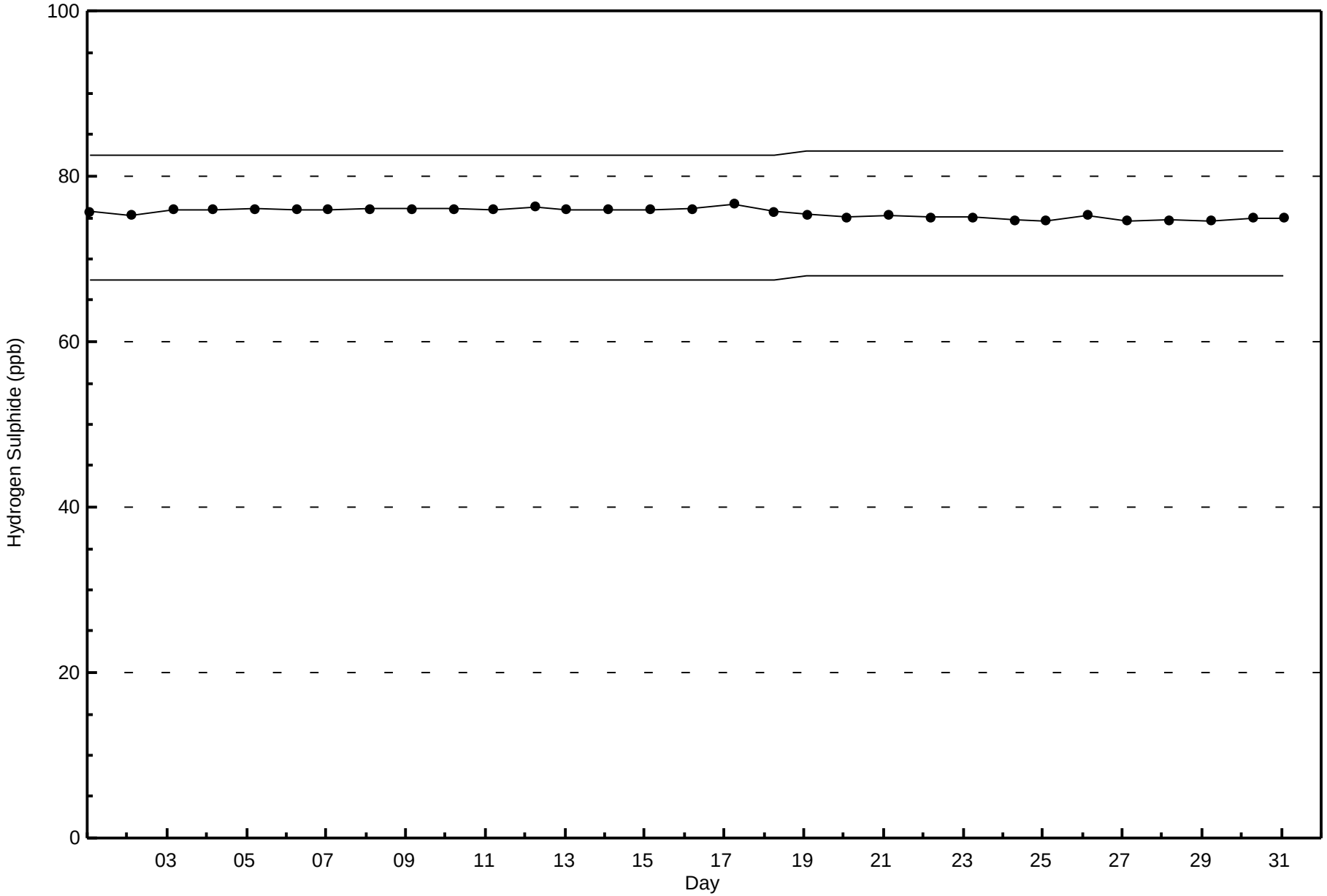


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - January 2016

Maximum Value: 4.1 ppm on Jan 5 23:00

Maximum Daily Average: 2.9 ppm on Jan 6

Minimum Value: 2.1 ppm on Jan 26 23:00

Minimum Daily Average: 2.2 ppm on Jan 30

Maximum Diurnal Average: 2.5 ppm at hour 20

Minimum Diurnal Average: 2.4 ppm at hour 4

Monthly Average: 2.42 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.2 Median = 2.3 Q_3 = 2.5 P_{90} = 2.8 P_{99} = 3.8

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
2-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
3-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.5
4-Jan	2.4	2.5	2.5	Z	2.5	2.7	2.6	2.6	2.8	2.9	3.4	3.8	3.0	2.5	2.6	2.7	2.8	2.8	2.8	2.8	2.7	2.7	2.5	2.5	2.8	3.8
5-Jan	2.5	2.5	2.5	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	3.5	3.2	3.8	3.9	3.9	4.1	3.8	2.8	4.1
6-Jan	3.8	3.8	3.9	3.6	3.6	Z	3.4	3.2	3.2	3.0	2.8	2.9	2.7	2.6	2.5	2.6	2.7	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.9	3.9
7-Jan	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.4
8-Jan	2.4	Z	2.4	2.3	2.3	2.3	2.4	2.5	2.6	2.7	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.7
9-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4
10-Jan	2.4	2.4	2.4	Z	2.4	2.4	2.5	2.5	2.5	2.5	2.9	2.8	3.1	2.7	2.7	3.2	2.9	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.5	3.2
11-Jan	2.4	2.4	2.4	2.4	Z	2.5	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.5
12-Jan	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
13-Jan	Z	2.5	3.1	2.8	2.6	2.9	3.5	2.9	2.6	2.6	2.6	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.5	2.4	2.6	3.5
14-Jan	2.3	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3
15-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.7	2.4	2.5	2.5	2.5	2.4	2.4	2.5	2.5	2.6	2.8	2.8	2.4	2.8
16-Jan	2.8	2.7	2.7	Z	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.5	2.5	2.6	3.0	3.2	3.1	3.1	3.0	2.8	2.7	2.7	2.7	2.6	2.8	3.2
17-Jan	2.6	2.6	2.6	2.5	Z	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.6
18-Jan	2.3	2.3	2.3	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
19-Jan	Z	2.3	2.3	2.3	2.7	2.8	2.9	2.6	2.7	2.6	2.5	2.4	2.5	2.9	2.7	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.5	2.9
20-Jan	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	C	C	C	C	2.5	2.6	2.7	2.7	2.7	2.6	2.5	2.3	2.3	2.3	2.4	2.7
21-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.5	2.5	2.5	2.7
22-Jan	2.5	2.5	2.5	Z	2.6	2.6	2.6	2.7	3.2	3.7	3.1	2.9	3.6	3.1	3.1	2.7	2.7	2.6	2.7	2.6	2.6	2.5	2.4	2.4	2.8	3.7
23-Jan	2.4	2.4	2.4	2.4	Z	2.6	2.5	2.6	2.6	2.5	2.6	2.8	2.9	3.0	3.0	3.2	3.0	3.0	3.1	3.1	3.1	2.9	2.7	2.7	2.8	3.2
24-Jan	2.6	2.6	2.6	2.6	2.5	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.3	3.1	3.0	2.3	2.3	2.3	2.4	3.1
25-Jan	Z	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4
26-Jan	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3
27-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.6	3.4	2.9	3.1	3.0	3.0	2.4	3.4
28-Jan	2.9	2.6	2.4	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.2	2.9
29-Jan	2.1	2.1	2.1	2.3	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.4	2.5	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
30-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
31-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.4	Diurnal Average	
	3.8	3.8	3.9	3.6	3.6	2.9	3.5	3.2	3.2	3.7	3.4	3.8	3.6	3.1	3.1	3.2	3.1	3.5	3.2	3.8	3.9	3.9	4.1	3.8	Diurnal Maximum	

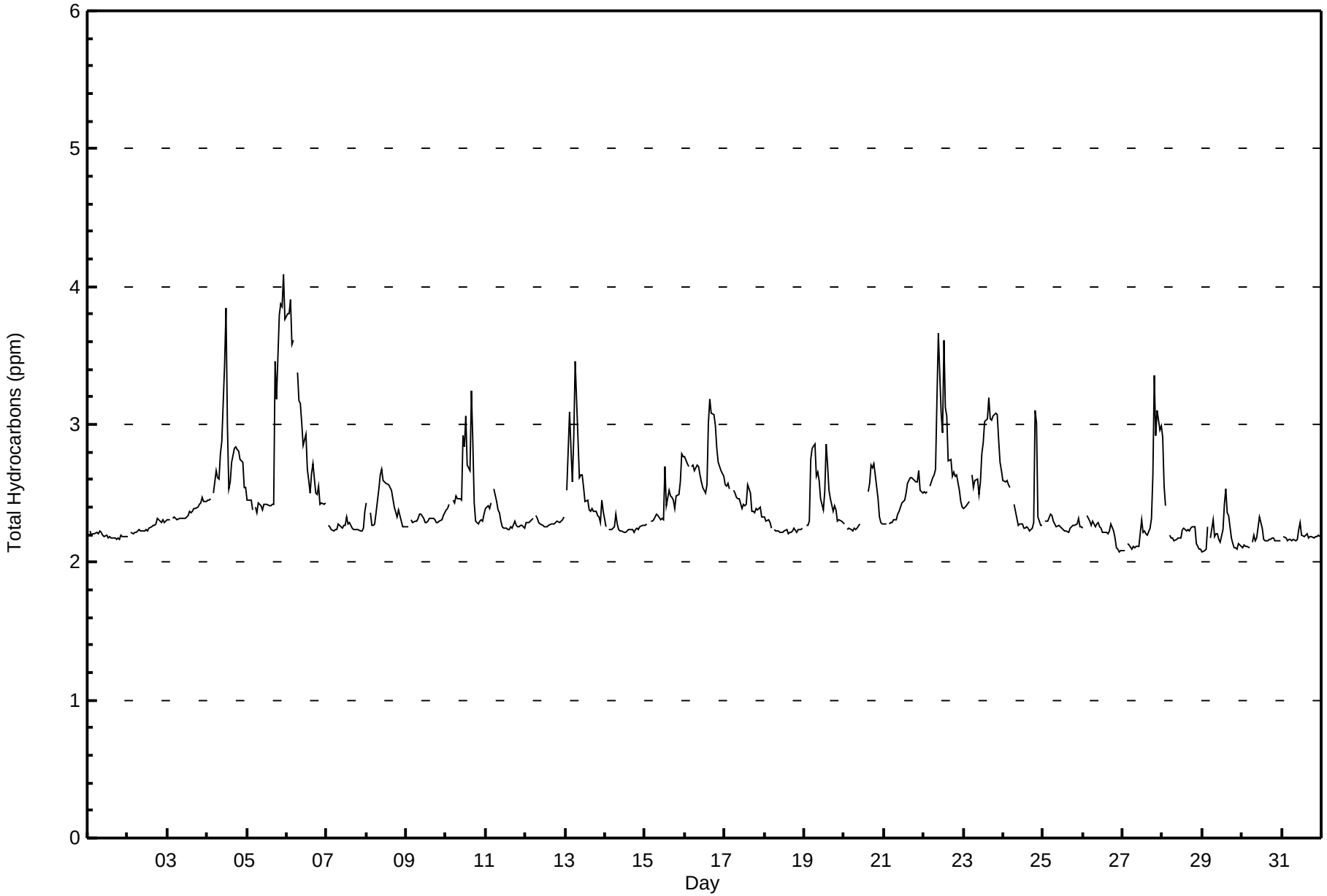
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	672	94.78	94.78
3.1 - 10.0	37	5.22	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

Buffalo Viewpoint - January 2016

Concentration Ranges (ppm)	**Wind Direction**																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	109	60	16	4	3	8	90	192	21	11	25	51	21	20	18	22	671
3.1 - 10.0	9	3	0	0	0	0	2	3	2	0	0	0	3	4	7	4	37
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	118	63	16	4	3	8	92	195	23	11	25	51	24	24	25	26	708

Total Number of Valid Hours: 708

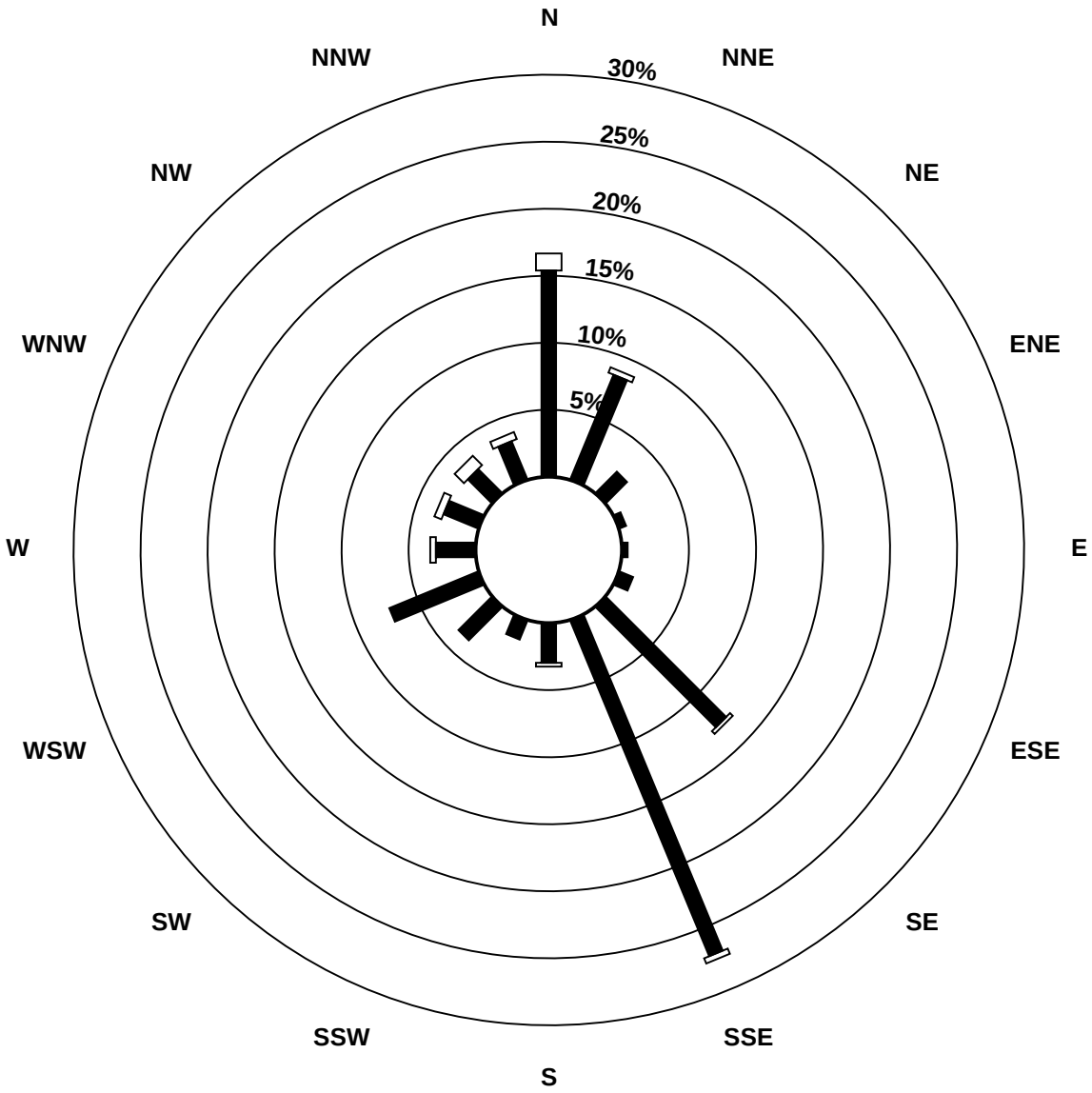
Total Number of Hours: 744

Wood Buffalo Environmental Association

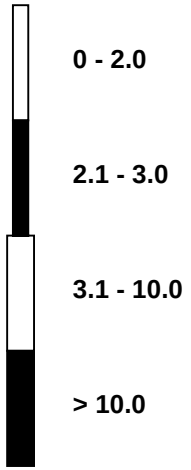
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint (AMS 4)



Classes (ppm)



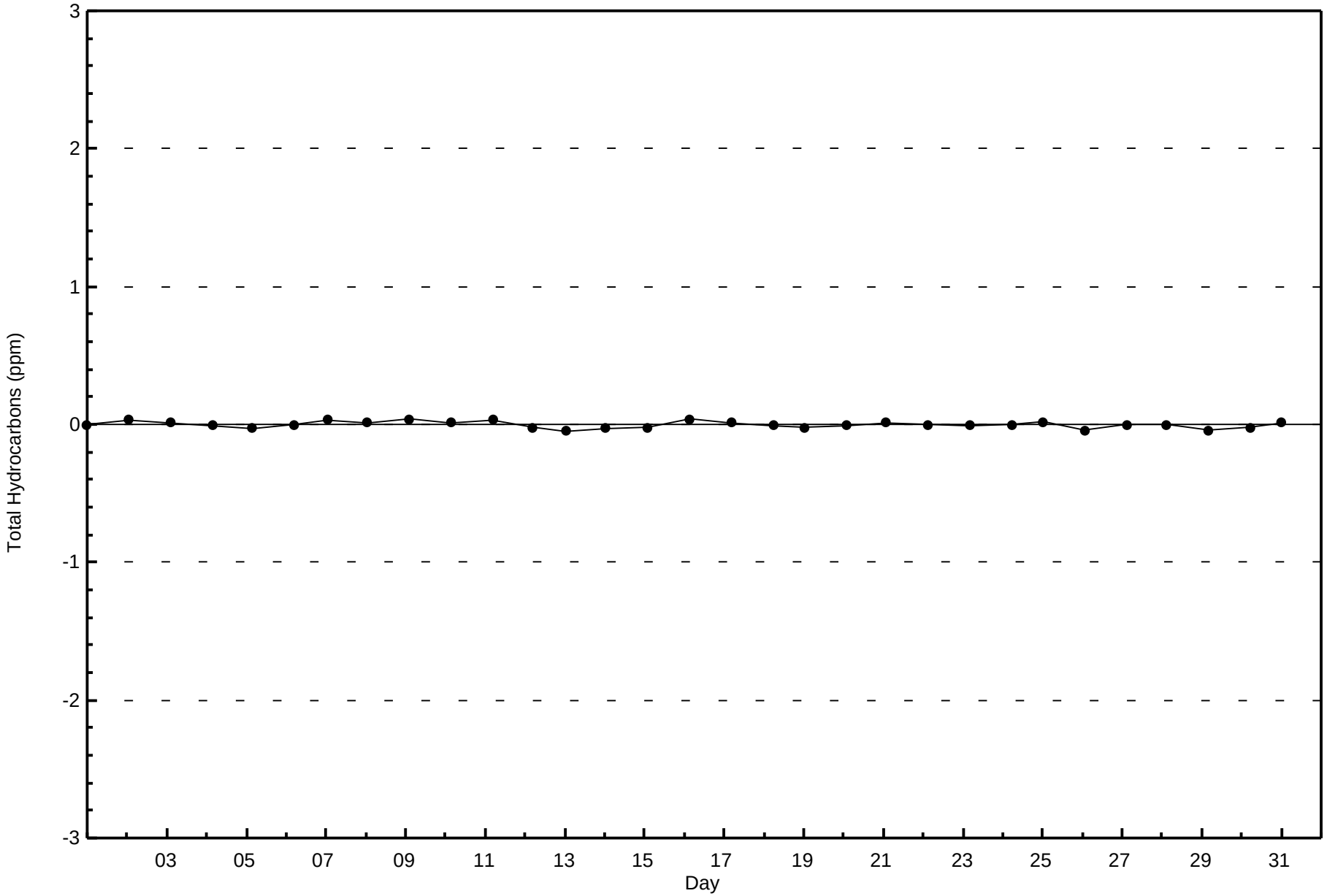
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - January 2016

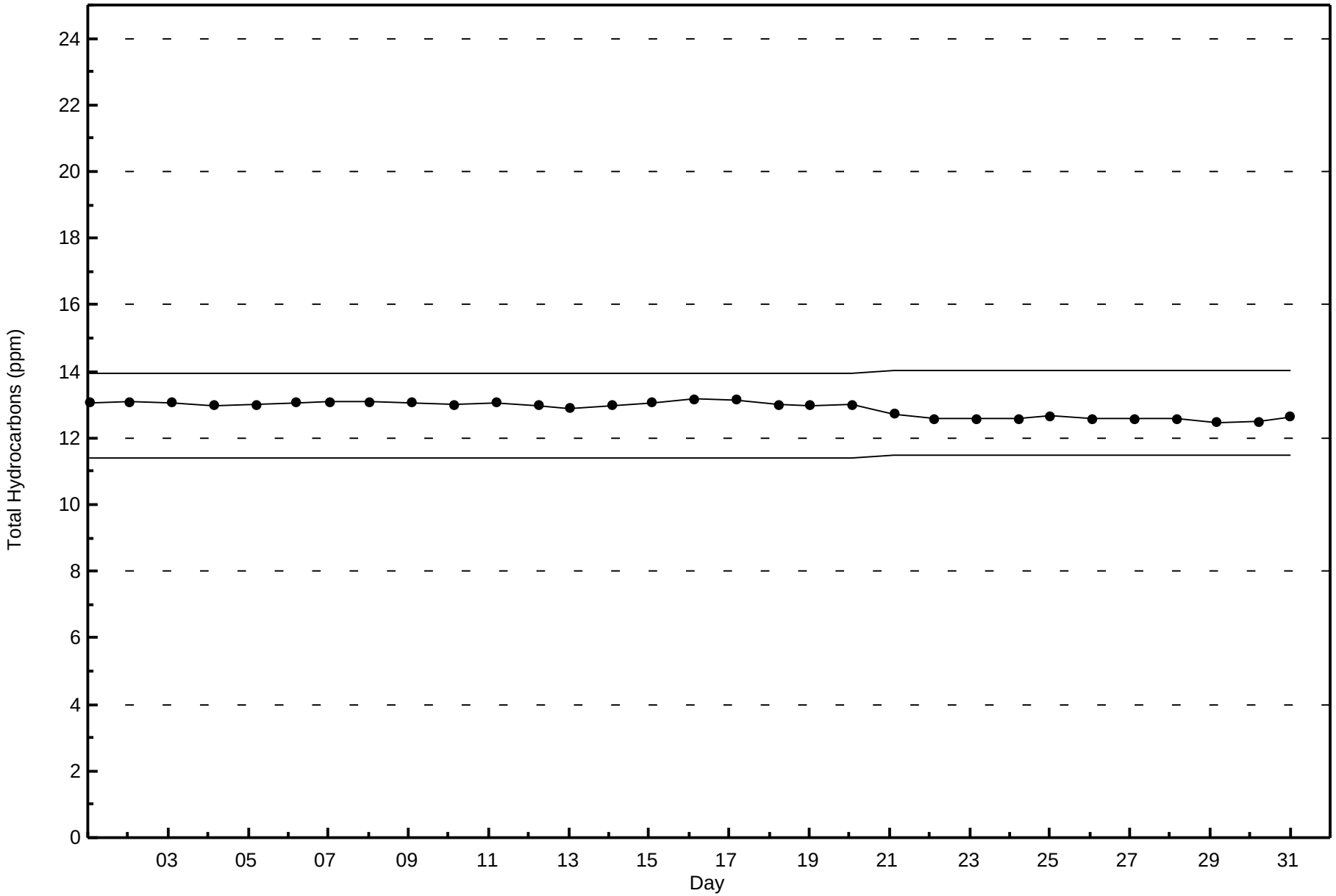


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - January 2016



Maximum Value: 5.8 C on Jan 29 15:00

Maximum Daily Average: 3.0 C on Jan 29

Minimum Value: -35.0 C on Jan 16 09:00

Minimum Daily Average: -31.2 C on Jan 16

Maximum Diurnal Average: -10.5 C at hour 15

Minimum Diurnal Average: -14.6 C at hour 9

Monthly Average: -13.13 C

Percentiles: P_1 = -33.8 P_{10} = -22.5 Q_1 = -18.3 Median = -13.6 Q_3 = -8.7 P_{90} = -1.8 P_{99} = 5.2

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

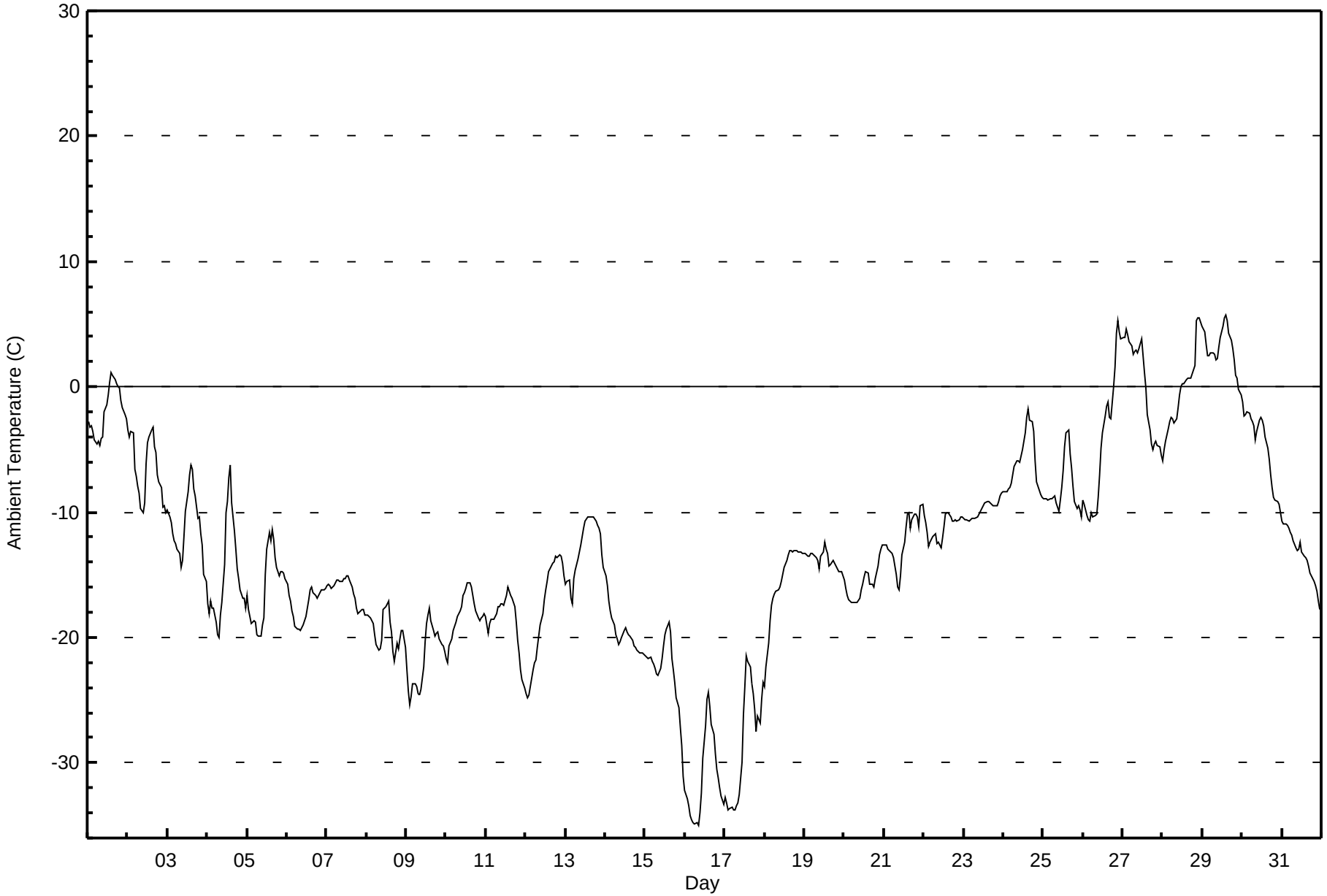
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.7	-3.3	-3.2	-3.5	-4.2	-4.6	-4.3	-4.7	-4.2	-4.0	-2.0	-1.4	-0.7	0.3	1.1	0.9	0.6	0.3	0.0	-0.1	-1.1	-1.6	-2.2	-2.5	-2.0	1.1
2-Jan	-3.4	-4.0	-3.6	-3.6	-6.6	-7.1	-7.9	-8.5	-9.8	-10.1	-9.2	-6.2	-4.4	-4.0	-3.5	-3.2	-4.8	-5.3	-7.1	-7.6	-8.0	-9.6	-9.5	-10.1	-6.5	-3.2
3-Jan	-9.8	-10.4	-10.8	-11.8	-12.3	-12.6	-13.0	-13.3	-14.5	-13.8	-11.9	-9.9	-8.3	-7.0	-6.3	-6.6	-8.2	-8.7	-10.5	-10.4	-11.8	-12.6	-14.9	-15.5	-11.0	-6.3
4-Jan	-17.3	-18.1	-17.1	-17.7	-17.7	-18.7	-19.8	-20.0	-18.2	-17.2	-14.2	-10.0	-9.2	-7.2	-6.2	-9.2	-11.5	-12.9	-14.6	-15.3	-16.2	-16.9	-16.9	-17.6	-15.0	-6.2
5-Jan	-16.7	-17.8	-18.8	-18.8	-18.6	-18.8	-19.8	-19.9	-19.9	-19.0	-18.4	-15.0	-12.9	-11.6	-12.3	-11.4	-12.1	-13.6	-14.5	-15.1	-14.7	-14.8	-14.8	-15.3	-16.0	-11.4
6-Jan	-15.7	-16.7	-17.1	-17.9	-18.3	-19.1	-19.4	-19.3	-19.4	-19.2	-19.0	-18.3	-17.6	-16.9	-16.1	-16.0	-16.4	-16.7	-16.9	-16.6	-16.4	-16.2	-16.2	-16.1	-17.4	-15.7
7-Jan	-15.8	-15.8	-15.8	-16.0	-15.9	-15.6	-15.4	-15.4	-15.5	-15.6	-15.3	-15.3	-15.1	-15.1	-15.5	-16.0	-16.5	-16.9	-17.7	-18.1	-17.9	-17.7	-17.8	-18.2	-16.3	-15.1
8-Jan	-18.3	-18.2	-18.4	-18.6	-18.9	-19.7	-20.5	-21.0	-20.9	-20.2	-17.8	-17.7	-17.5	-17.1	-18.7	-19.6	-21.1	-21.9	-20.4	-20.9	-20.1	-19.5	-19.5	-20.7	-19.5	-17.1
9-Jan	-22.5	-24.2	-25.3	-24.7	-23.7	-23.7	-23.9	-24.4	-24.6	-24.1	-22.3	-20.3	-18.9	-18.2	-17.6	-18.7	-19.4	-19.9	-19.7	-19.5	-20.1	-20.6	-20.7	-21.1	-21.6	-17.6
10-Jan	-21.7	-22.0	-20.7	-20.1	-19.5	-19.2	-18.8	-18.3	-17.9	-17.6	-16.7	-16.4	-16.1	-15.7	-15.6	-16.0	-16.6	-17.3	-17.9	-18.4	-18.6	-18.5	-18.3	-18.1	-18.2	-15.6
11-Jan	-18.3	-19.6	-18.8	-18.6	-18.5	-18.5	-18.1	-17.5	-17.5	-17.3	-17.4	-17.4	-16.7	-16.0	-16.4	-16.6	-16.9	-17.5	-18.8	-20.3	-21.2	-22.6	-23.3	-24.0	-18.7	-16.0
12-Jan	-24.4	-24.8	-24.6	-23.9	-22.6	-22.0	-21.8	-20.8	-19.9	-19.0	-18.1	-17.0	-16.2	-15.6	-14.7	-14.3	-14.1	-13.9	-13.5	-13.7	-13.3	-13.6	-14.1	-15.1	-18.0	-13.3
13-Jan	-15.8	-15.6	-15.5	-16.9	-17.3	-15.3	-14.6	-13.7	-13.2	-12.7	-12.0	-11.3	-10.7	-10.3	-10.4	-10.4	-10.4	-10.4	-10.7	-11.1	-11.3	-11.7	-13.5	-14.4	-12.9	-10.3
14-Jan	-15.1	-15.8	-17.1	-17.9	-18.4	-19.0	-19.8	-20.1	-20.6	-20.3	-20.0	-19.4	-19.2	-19.6	-19.7	-19.9	-20.3	-20.6	-20.8	-21.0	-21.1	-21.2	-21.3	-21.4	-19.6	-15.1
15-Jan	-21.5	-21.6	-21.7	-21.6	-21.9	-22.2	-22.5	-23.0	-23.0	-22.5	-21.6	-20.7	-19.8	-19.3	-18.8	-19.6	-21.6	-22.5	-23.6	-24.8	-25.6	-27.2	-28.6	-31.1	-22.8	-18.8
16-Jan	-32.2	-32.8	-33.4	-34.2	-34.5	-34.8	-34.9	-34.8	-35.0	-34.0	-32.4	-29.6	-27.0	-25.0	-24.3	-25.5	-26.9	-27.8	-29.3	-30.5	-31.2	-32.0	-32.7	-33.3	-31.2	-24.3
17-Jan	-32.7	-33.2	-33.8	-33.7	-33.5	-33.7	-33.8	-33.4	-33.2	-32.6	-30.0	-26.2	-23.9	-21.4	-21.9	-22.4	-23.7	-24.5	-25.7	-27.5	-26.3	-26.8	-24.9	-23.6	-28.4	-21.4
18-Jan	-24.0	-22.3	-20.4	-18.7	-17.4	-16.9	-16.5	-16.3	-16.2	-16.0	-15.5	-15.0	-14.4	-13.9	-13.4	-13.1	-13.1	-13.2	-13.1	-13.1	-13.2	-13.2	-13.2	-13.3	-15.6	-13.1
19-Jan	-13.3	-13.4	-13.5	-13.5	-13.3	-13.3	-13.5	-13.6	-13.9	-14.5	-13.5	-13.2	-12.4	-13.0	-13.3	-14.3	-14.1	-13.9	-14.1	-14.3	-14.6	-14.7	-14.8	-15.0	-13.8	-12.4
20-Jan	-15.4	-16.1	-16.6	-17.0	-17.2	-17.2	-17.2	-17.2	-17.2	-16.9	-16.2	-15.8	-15.2	-14.7	-14.8	-15.7	-15.8	-15.8	-16.0	-15.3	-14.3	-13.5	-12.9	-12.6	-15.7	-12.6
21-Jan	-12.6	-12.6	-13.0	-13.1	-13.2	-13.2	-13.6	-15.0	-15.9	-16.2	-15.1	-13.4	-12.3	-11.1	-10.2	-10.1	-11.3	-10.6	-10.1	-10.2	-10.4	-11.2	-9.5	-9.3	-12.2	-9.3
22-Jan	-10.3	-10.9	-11.6	-12.7	-12.4	-12.0	-11.8	-11.7	-12.5	-12.4	-12.8	-12.0	-11.2	-10.1	-10.0	-10.0	-10.3	-10.7	-10.8	-10.7	-10.7	-10.6	-10.4	-10.4	-11.2	-10.0
23-Jan	-10.5	-10.6	-10.6	-10.7	-10.6	-10.5	-10.5	-10.5	-10.4	-10.2	-9.9	-9.8	-9.5	-9.3	-9.1	-9.1	-9.3	-9.4	-9.5	-9.5	-9.5	-9.1	-8.7	-8.5	-9.8	-8.5
24-Jan	-8.4	-8.4	-8.3	-8.1	-8.0	-7.7	-6.4	-6.1	-5.9	-6.0	-6.0	-5.0	-4.4	-3.6	-2.5	-1.7	-2.7	-2.8	-3.6	-5.9	-7.6	-7.9	-8.6	-8.8	-6.0	-1.7
25-Jan	-8.9	-8.9	-9.0	-9.0	-8.9	-8.9	-8.8	-8.7	-9.2	-9.9	-9.0	-8.0	-6.7	-4.8	-3.7	-3.5	-5.4	-6.5	-8.0	-9.1	-9.7	-9.5	-9.9	-10.4	-8.1	-3.5
26-Jan	-9.0	-9.4	-10.3	-10.6	-10.7	-10.1	-10.4	-10.2	-10.1	-8.8	-7.0	-4.9	-3.6	-2.3	-1.5	-1.2	-2.4	-2.6	0.0	1.6	4.3	5.2	4.4	3.9	-4.4	5.2
27-Jan	3.9	3.9	4.6	4.2	3.5	3.3	2.6	2.8	2.9	2.7	3.0	3.8	2.5	1.1	-0.1	-2.2	-3.4	-4.5	-5.1	-4.6	-4.3	-4.7	-4.8	-5.5	0.2	4.6
28-Jan	-5.9	-5.0	-4.3	-3.4	-2.8	-2.5	-2.6	-2.9	-2.6	-1.7	-0.7	0.0	0.3	0.3	0.6	0.7	0.7	0.7	1.0	1.7	5.3	5.5	5.5	5.2	-0.3	5.5
29-Jan	4.8	4.4	3.3	2.4	2.5	2.8	2.7	2.6	2.1	2.2	3.2	4.0	4.9	5.5	5.8	5.3	4.3	3.7	3.1	2.1	0.9	0.7	-0.2	-0.7	3.0	5.8
30-Jan	-1.2	-2.3	-2.3	-2.0	-2.2	-2.6	-2.8	-3.2	-4.2	-3.6	-2.7	-2.4	-2.7	-3.2	-4.0	-4.9	-5.8	-7.0	-8.0	-8.9	-9.0	-9.1	-9.4	-10.0	-4.7	-1.2
31-Jan	-10.7	-10.9	-10.9	-11.0	-11.3	-11.6	-11.8	-12.3	-12.8	-13.1	-13.0	-12.4	-13.2	-13.5	-13.7	-13.9	-14.3	-14.8	-15.1	-15.5	-15.9	-16.4	-17.1	-17.7	-13.4	-10.7
	-13.7	-14.1	-14.2	-14.3	-14.3	-14.4	-14.5	-14.5	-14.6	-14.3	-13.3	-12.1	-11.4	-10.7	-10.5	-10.9	-11.7	-12.2	-12.6	-13.0	-13.0	-13.3	-13.5	-13.9	Diurnal Average	
	4.8	4.4	4.6	4.2	3.5	3.3	2.7	2.8	2.9	2.7	3.2	4.0	4.9	5.5	5.8	5.3	4.3	3.7	3.1	2.1	5.3	5.5	5.5	5.2	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Buffalo Viewpoint - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	126	16.94	16.94
-20 - 0	559	75.13	92.07
0 - 10	59	7.93	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 97 % on Jan 28 20:00

Maximum Daily Average: 90.1 % on Jan 23

Minimum Value: 53 % on Jan 1 15:00

Minimum Daily Average: 61.9 % on Jan 1

Maximum Diurnal Average: 82.9 % at hour 20

Minimum Diurnal Average: 76.4 % at hour 15

Monthly Average: 81.0 %

Percentiles: $P_1 = 55$ $P_{10} = 71$ $Q_1 = 78$ Median = 82 $Q_3 = 86$ $P_{90} = 91$ $P_{99} = 96$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

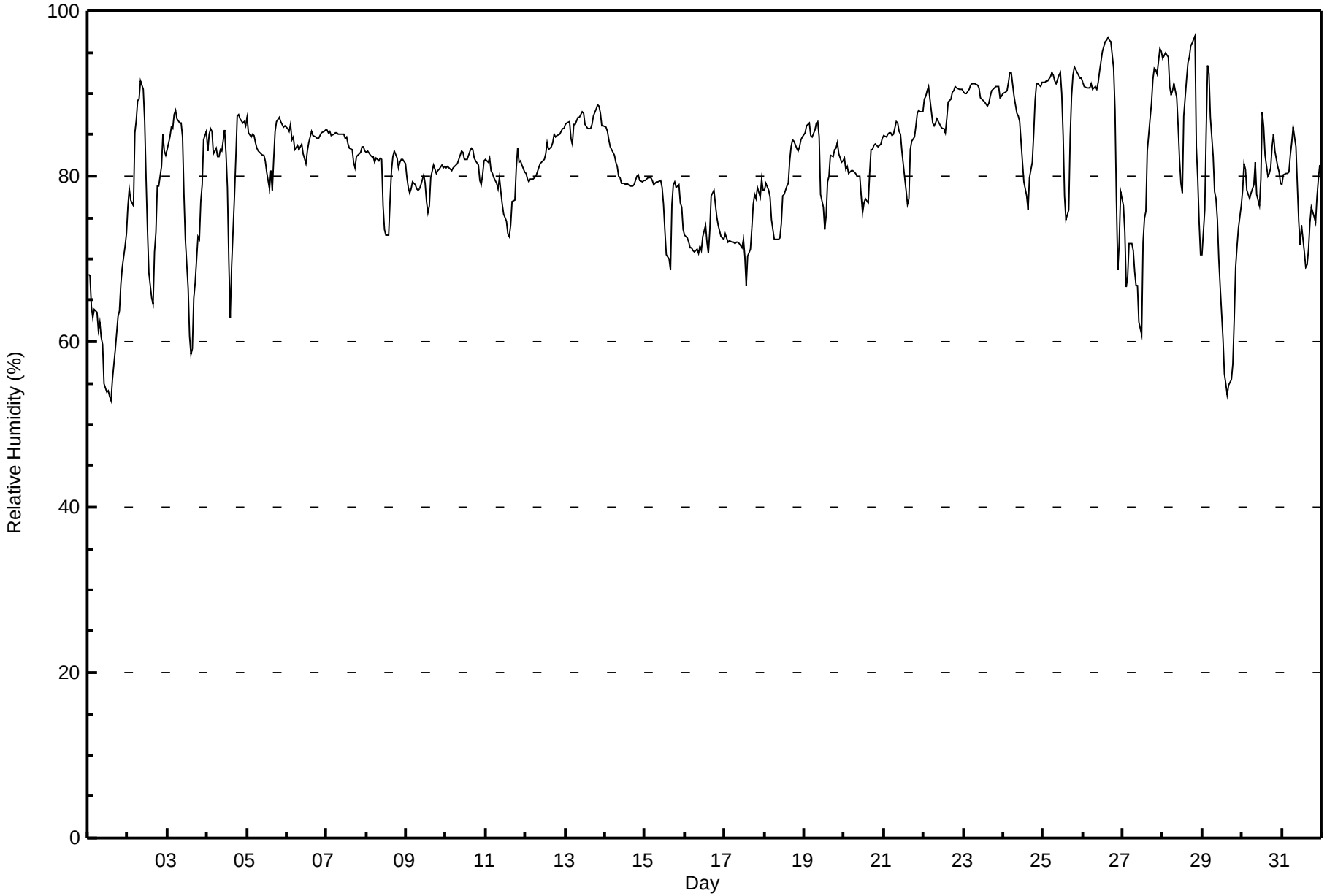
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	68	68	64	63	64	64	61	62	60	60	55	54	54	53	53	56	59	61	63	64	67	69	71	73	61.9	73
2-Jan	76	78	77	76	85	87	89	89	91	91	87	80	73	68	65	65	71	73	79	79	81	85	83	83	79.7	91
3-Jan	83	85	86	86	88	88	87	86	87	85	78	72	66	61	58	59	65	67	73	72	77	79	84	85	77.4	88
4-Jan	83	85	86	85	83	83	82	82	83	83	86	83	79	70	63	69	77	82	87	87	87	86	87	86	81.9	87
5-Jan	87	85	85	85	85	84	83	83	83	82	83	82	80	78	81	78	82	85	87	87	87	86	86	86	83.8	87
6-Jan	86	85	86	84	85	83	84	83	84	84	83	82	83	84	85	85	85	85	85	85	85	85	86	86	84.4	86
7-Jan	86	85	85	85	85	85	85	85	85	85	85	85	85	84	83	83	82	81	82	83	83	84	84	83	84.1	86
8-Jan	83	83	83	82	82	82	82	82	82	82	77	74	73	73	77	81	82	83	82	81	82	82	82	82	80.5	83
9-Jan	80	79	78	78	79	79	78	78	79	79	80	79	77	76	76	80	81	81	80	81	81	81	81	81	79.3	81
10-Jan	81	81	81	81	81	81	81	82	83	83	83	82	82	82	83	83	83	82	82	81	80	79	80	82	81.6	83
11-Jan	82	82	82	81	80	80	79	78	80	78	77	75	75	73	73	74	77	77	81	83	82	82	81	81	78.9	83
12-Jan	80	80	79	80	80	80	80	81	81	81	82	82	83	84	83	84	84	85	85	85	85	85	86	86	82.5	86
13-Jan	86	87	87	85	84	86	86	87	87	87	88	88	86	86	86	86	86	87	88	89	88	88	86	86	86.7	89
14-Jan	86	86	84	84	83	83	82	81	80	80	79	79	79	79	79	79	79	79	80	80	80	79	79	80	80.8	86
15-Jan	80	80	80	80	80	79	79	79	79	79	79	77	73	71	70	69	77	79	79	79	79	77	76	74	77.1	80
16-Jan	73	73	72	71	71	71	71	71	71	71	71	73	74	72	71	73	78	78	77	75	74	73	73	72	72.9	78
17-Jan	73	73	72	72	72	72	72	72	72	72	71	72	70	67	70	71	74	77	78	77	79	78	80	78	73.5	80
18-Jan	78	79	78	77	75	73	72	72	72	73	74	78	78	79	79	82	83	84	84	83	83	84	84	85	78.8	85
19-Jan	85	86	86	86	85	85	86	86	87	85	78	76	74	75	79	80	83	82	83	83	84	83	82	82	82.5	87
20-Jan	82	81	81	80	81	81	81	80	80	80	78	76	77	77	77	80	83	83	84	84	84	84	84	85	80.9	85
21-Jan	85	85	85	85	85	85	85	87	86	85	85	83	80	78	77	77	83	84	85	86	88	88	88	88	84.3	88
22-Jan	89	90	90	91	89	86	86	86	87	87	86	86	86	85	87	89	89	90	90	91	91	91	90	90	88.5	91
23-Jan	90	90	90	90	91	91	91	91	91	91	89	89	89	89	89	89	90	90	91	91	91	91	90	90	90.1	91
24-Jan	90	90	90	91	93	93	90	89	88	87	87	82	79	79	78	76	80	82	85	89	91	91	91	91	86.7	93
25-Jan	91	91	92	92	92	92	92	92	91	92	93	90	85	78	75	76	85	90	92	93	93	92	92	92	89.2	93
26-Jan	91	91	91	91	91	91	91	91	91	91	93	94	95	96	97	97	96	96	93	88	77	69	72	78	89.6	97
27-Jan	76	73	67	68	72	72	71	68	67	67	62	61	72	75	76	83	87	89	92	93	93	92	95	95	77.8	95
28-Jan	94	95	95	94	91	90	90	91	89	86	82	79	78	87	92	94	94	96	96	97	84	80	74	70	88.3	97
29-Jan	71	76	85	93	92	87	82	78	77	75	70	67	60	56	55	54	55	55	57	63	69	72	74	76	70.8	93
30-Jan	78	81	81	78	77	78	79	79	82	78	76	80	88	86	83	80	80	81	84	85	83	81	80	79	80.7	88
31-Jan	79	80	80	80	80	83	84	86	83	79	75	72	74	71	69	69	71	74	76	75	74	77	80	81	77.3	86
	82.4	82.6	82.6	82.5	82.6	82.4	82.0	82.0	81.9	81.2	79.6	78.3	77.7	76.5	76.4	77.4	80.1	81.3	82.6	82.9	82.6	82.3	82.6	82.8	Diurnal Average	
	94	95	95	94	93	93	92	92	91	92	93	94	95	96	97	97	96	96	96	97	93	92	95	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Buffalo Viewpoint - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - January 2016

Maximum Speed: 32 km/h on Jan 27 00:00

Maximum Daily Speed Average: 16.0 km/h on Jan 1

Minimum Speed Value: 1 km/h on Jan 17 15:00

Minimum Daily Speed Average: 0.2 km/h on Jan 8

Maximum Diurnal Speed Average: 2.2 km/h at hour 1

Minimum Diurnal Speed Average: 0.3 km/h at hour 15

Monthly Average Velocity: 0.8 km/h 202.3 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 4$ Median = 7 $Q_3 = 10$ $P_{90} = 13$ $P_{99} = 27$

Hours in Service: 744

Hours of Data: 743

Hours of Missing Data: 1

Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	WSW13	SW10	SW9	WSW12	SW11	SW11	WSW14	WSW15	SSW10	SSW9	WSW25	WSW29	WSW28	WSW24	WSW23	WSW22	WSW26	WSW15	WSW14	WSW14	WSW19	WSW17	WSW14	WSW9	WSW16.0	WSW29
2-Jan	SSW9	SSW7	SW8	SW9	SSE7	SSE8	SE8	SE10	SE9	SSE10	SE9	SSE7	SE5	ESE6	SE6	SSE5	SE7	SSE8	SE9	SE8	SSE8	SSE10	SSE11	SE13	SSE7.3	SE13
3-Jan	SSE13	SE14	SE12	SE13	SSE12	SSE12	SSE10	SSE10	SSE11	SSE9	SE9	SE7	SSE8	SE5	SE8	SSE9	SSE11	SSE10	SE7	SSE6	SE9	SE9	SSE8	SE7	SSE9.4	SE14
4-Jan	SSE8	SE10	SE7	SSE4	SW2	WNW1	SSE2	ESE1	N5	NNW2	WNW7	WNW6	W6	W7	SW4	SE7	SSE8	SSE10	SE11	SE11	SE11	SSE10	SSE12	SSE11	SSE4.2	SSE12
5-Jan	SSE9	SSE10	SSE8	SSE8	SSE7	SSE7	SSE8	SE8	SSE7	SSE7	SSE7	SE5	SSE4	SE3	SE4	SE3	SSE2	NNE6	N7	NW6	NW5	NW5	WNW3	W2	SSE3.2	SSE10
6-Jan	W1	NW2	N4	NNW2	NNW4	NNE4	N4	N4	N3	N4	NNE3	N4	N4	N4	NNW2	N4	N6	N6	N6	N5	N7	N7	N8	N6	N4.3	N8
7-Jan	N5	N5	N4	N4	N2	NNE2	NNE3	NNE3	N3	N2	NNW2	N3	NW4	NW4	WNW5	WNW5	W4	WSW5	WSW6	WSW4	SW3	WSW2	NW3	NW5	NW2.6	WSW6
8-Jan	NW4	NW1	NE2	NNE4	N4	NNW2	NNW3	NNW3	NNW2	NNW2	AF	NNE2	NNE2	N1	SSW2	SSE2	SSE3	S3	SSW3	S3	S3	S3	S3	SSE4	NNE0.2	NNE4
9-Jan	SSE4	SSE4	SSE4	SSE4	S3	S3	SSE3	SSE3	SE3	SSE3	SSE3	SSE4	SSE4	SE4	SSE4	SE4	SSE4	SSE5	SSE5	SSE4	SSE4	SSE4	SSE4	SSE4	SSE3.7	SSE5
10-Jan	SSE4	SSE4	SSE5	SSE4	SSE4	SE4	SSE3	SSW2	SE3	S2	NNW2	NE3	NNE3	N3	N7	N9	N8	N6	N8	NNE5	E2	SW1	NW1	NNE3	NE1.3	N9
11-Jan	N5	N6	N8	N6	NW3	NW2	NW6	NW8	NW8	W6	WSW7	WSW6	WSW4	SW6	WSW7	WSW5	SW5	WSW5	S4	S5	SSE5	SE7	SE7	SE7	W2.1	NW8
12-Jan	SE8	SSE8	SSE8	SE7	SSE6	SE6	SSE5	SSE5	SSE6	SSE6	SSE6	SSE6	SSE6	SSE6	SSE5	SSE5	SSE6	SSE5	SSE6	SSE6	SSE5	SSE5	SSE4	SSE5	SSE5.8	SE8
13-Jan	SSE4	ENE3	NW2	ESE2	S2	NNE3	NNE4	NNE4	NE5	NNE4	NE5	NE4	NE5	NE5	NE5	ENE5	NE5	NE5	NNE6	N7	N7	N9	N14	N13	NNE4.4	N14
14-Jan	N14	N15	N15	N15	N15	N15	N15	N13	N11	N7	N9	N11	N13	N15	N13	N14	N15	N15	N13	N12	N12	NNE11	NNE9	NNE7	N12.6	N15
15-Jan	NE4	NNE4	NNE4	NNE6	N8	NNE4	NNE6	N5	N6	NNE6	NNW3	N5	N4	WNW3	WNW3	NNW4	N7	NNE8	NNE6	NNW6	N3	NNW2	NW1	SSE2	N4.2	NNE8
16-Jan	SSE5	SE5	SE5	SSE4	SSE5	SSE5	SSE6	SE6	SSE6	SE7	SSE5	SE2	SSE2	NE2	E3	SE6	SE7	SSE6	SE7	SSE7	SSE8	SSE7	SE8	SSE8	SE5.3	SE8
17-Jan	SSE8	SE8	SSE8	SSE9	SE9	SSE9	SSE8	SSE8	SSE8	SSE7	SSE6	SE6	SSE6	S4	ENE1	ESE6	SE5	SE5	SE6	SE7	SE5	SE6	SSE3	SE5	SE6.3	SE9
18-Jan	SSE5	SSE5	SE5	SE6	SE8	SE9	SSE9	SSE10	SSE11	SSE9	SSE10	SSE9	SSE9	SSE7	SSE8	SSE5	SSE4	SSE4	SSE5	SSE7	SSE7	SSE5	SE5	SSE4	SSE6.9	SSE11
19-Jan	SSE3	SSE4	SSE4	S3	NW5	NW5	NW6	NNW6	N6	N6	N9	N7	NNW7	NW8	NNW7	N5	N5	N8	N8	N10	N12	NNE10	NNE7	NNE8	N5.1	N12
20-Jan	NNE9	NNE14	N15	N13	N11	N8	N10	N9	N9	N7	N3	SW2	NW1	NNE5	NNE6	NE5	E1	SW1	SSE4	SE5	SE6	SSE7	SSE8	SSE7	NNE3.8	N15
21-Jan	SSE7	SSE9	SSE8	SSE9	SSE9	SSE8	SSE10	SSE7	SSE7	SE7	SSE6	SSE8	SE8	SE8	SE9	ESE7	ESE8	SE10	SE5	ESE2	SSE3	SSE7	SSE9	S7	SSE7.4	SSE10
22-Jan	SSE8	SSE8	SSE7	SSE6	SSW6	SW5	WSW4	W2	N5	N8	N5	NNW3	WNW4	N7	NNW6	N10	N10	N13	N12	N9	N9	N10	N9	N10	N3.8	N13
23-Jan	N12	N10	N9	N7	N6	NNW5	N6	NNW4	N4	N3	NW2	WNW4	NW6	N3	NNE2	W2	SSW2	SW2	S2	S4	SSE4	SSE4	SSE5	SE7	N2.1	N12
24-Jan	SSE6	SSE7	SSE6	SSE7	SSE7	S7	SW9	SW9	SW10	WSW11	SW9	SW10	SW11	SW9	SSW8	SSW6	SW9	W9	W12	NW11	NNW12	N15	N13	N10	WSW4.3	N15
25-Jan	N4	NNE2	NE3	ESE1	S3	SSE5	S5	S6	SSE9	SSE9	SSE10	SSE10	SE9	SSE9	S11	S7	SSE8	SSE10	SE10	SE10	SSE10	SSE10	SSE9	SE10	SSE6.6	S11
26-Jan	SSW9	SE8	SE9	SE8	SE9	SE7	SE10	SE9	SSE8	SSE8	SSE7	SE9	SSE9	SE9	SE9	SE9	SE12	SE12	SSE9	SE8	SW13	WSW29	WSW31	WSW32	S7.2	WSW32
27-Jan	WSW31	WSW28	W27	W26	W16	WSW12	W16	W19	W20	W16	WSW22	WNW9	NNE10	NNE12	N11	N14	N11	N10	NNW8	NW6	WNW2	SE2	SE1	SE3	W10.0	WSW31
28-Jan	SSE5	SSE5	SE8	SSE11	SSE11	SSE4	SSE7	SSE10	SSE14	SE11	SSE5	SSE5	S4	SSE4	SSE6	SSE10	SE9	SSE11	SSE8	S10	WSW18	SW17	WSW19	WSW19	S7.3	WSW19
29-Jan	WSW19	WSW23	W20	WNW14	W11	WNW19	WNW23	WNW22	WNW14	W11	WSW13	W11	WNW17	WNW19	WNW12	WNW16	WNW12	W14	WSW16	WSW13	WSW12	WSW16	W11	SW10	W14.3	WSW23
30-Jan	WSW10	W11	WSW13	WSW12	WSW15	WSW20	W15	WNW12	W11	WNW5	NW4	N8	N7	NNE11	NNE13	NNE13	NNE13	NNE14	NNE17	NNE14	NNE11	NNE8	NNE9	NE8	NNW5.8	WSW20
31-Jan	NE8	NNE10	NE7	NNE9	NNE10	NNE8	NE10	NNE11	NNE14	NNE15	N9	N12	NNE14	NNE14	N12	N13	NNE11	NNE11	NNE10	NNE10	NNE9	NNE8	NE4	SE2	NNE9.7	NNE15
	SSW2.2	S2.0	S1.3	SSW1.1	S1.6	SSW1.6	SW1.3	WSW1.0	SSW0.9	S1.0	SW2.1	SW1.2	W0.9	NW1.0	NW0.3	NE0.6	ESE0.6	E0.5	E0.5	ESE0.5	SSW0.9	SSW1.3	SSW1.2	S1.6	Diurnal Average	
	WSW31	WSW28	W27	W26	W16	WSW20	WNW23	WNW22	W20	W16	WSW25	WSW29	WSW28	WSW24	WSW23	WSW22	WSW26	WSW15	NNE17	WSW14	WSW19	WSW29	WSW31	WSW32	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

Buffalo Viewpoint - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 1 11:00

Minimum Value: 0 km/h on Jan 8 17:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 6$

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

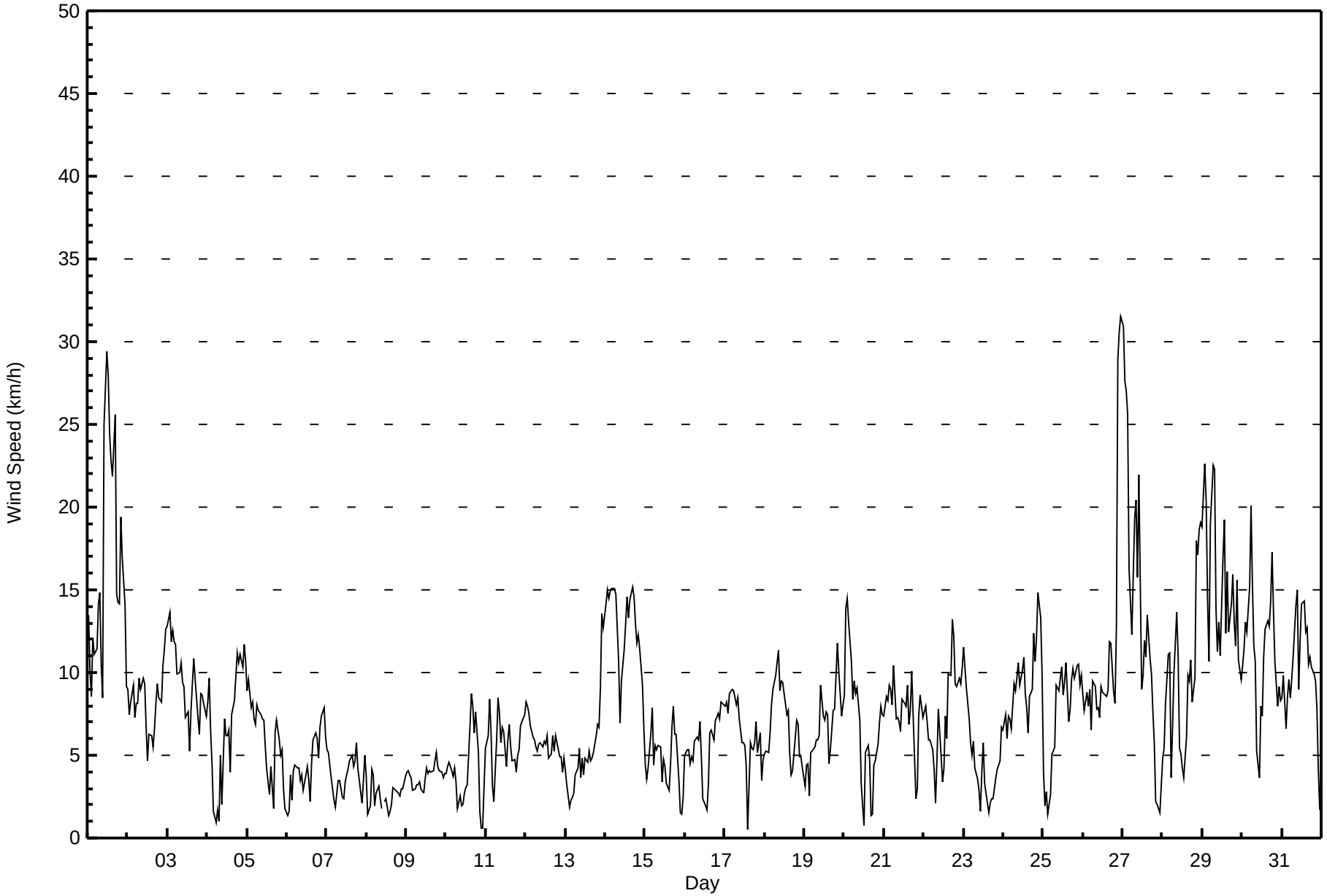
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	272	36.61	36.61
6 - 11	354	47.64	84.25
12 - 19	96	12.92	97.17
20 - 28	16	2.15	99.33
29 - 38	5	0.67	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

Buffalo Viewpoint - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	34	22	14	4	3	4	24	77	18	4	8	8	5	10	19	18	272
6 - 11	58	33	3	0	0	4	67	123	6	8	16	7	10	3	9	7	354
12 - 19	31	12	0	0	0	0	6	5	0	0	2	23	7	9	0	1	96
20 - 28	0	0	0	0	0	0	0	0	0	0	0	10	4	2	0	0	16
29 - 38	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	123	67	17	4	3	8	97	205	24	12	26	53	26	24	28	26	743

Total Number of Valid Hours: 743

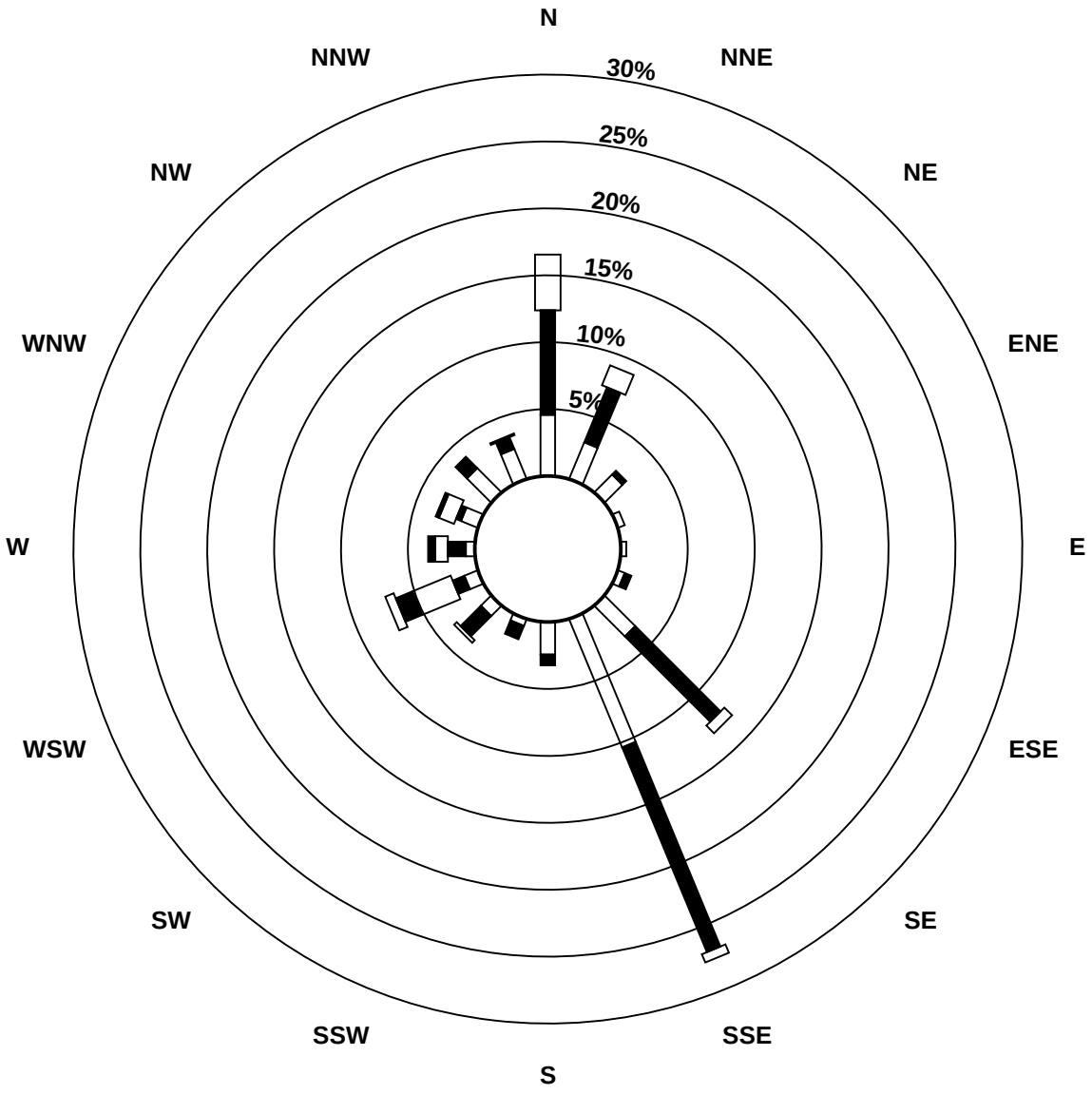
Total Number of Hours: 744

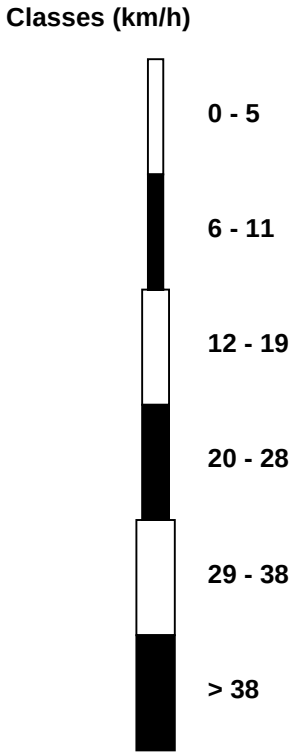
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

Buffalo Viewpoint (AMS 4)





Total Number of Valid Hours: 743

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Buffalo Viewpoint - January 2016

Direction of Maximum Speed: 253 deg on Jan 27 00:00
Direction of Maximum Daily Speed Average: 242.4 deg on Jan 1

Direction of Minimum Speed: 58 deg on Jan 17 15:00

Direction of Minimum Daily Speed Average: 0.2 deg on Jan 8

Monthly Average Direction: 230.3 deg

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	244	219	216	245	216	224	238	247	212	203	240	252	252	246	246	241	248	239	251	244	251	253	257	253	242.4
2-Jan	198	210	220	231	162	167	142	126	145	158	143	154	135	121	139	152	133	168	129	137	149	155	148	144	155.9
3-Jan	147	136	141	141	148	152	154	157	153	160	146	146	151	130	138	148	154	159	142	156	142	136	154	144	147.5
4-Jan	147	145	132	154	228	289	164	121	7	341	288	290	274	277	217	132	156	150	142	145	145	147	150	153	157.7
5-Jan	155	151	151	164	160	151	163	144	161	163	157	136	150	144	139	137	164	17	359	326	304	305	291	268	154.9
6-Jan	269	315	354	327	344	16	9	3	0	357	15	8	356	354	328	351	359	356	354	350	359	358	355	360	355.7
7-Jan	359	352	355	11	349	23	22	20	11	1	346	356	313	305	299	292	271	252	249	240	229	237	307	322	318.8
8-Jan	326	321	48	19	2	336	337	347	346	329	AF	20	17	4	205	159	155	172	202	175	175	170	169	161	13.9
9-Jan	159	155	151	148	182	174	156	167	140	151	161	158	153	143	156	139	161	154	153	155	153	159	168	163	156.0
10-Jan	159	153	157	154	152	146	165	199	144	172	337	36	30	10	352	354	358	10	9	17	87	226	317	21	39.6
11-Jan	7	1	357	359	324	304	308	310	316	278	256	251	239	233	238	239	236	239	180	172	162	141	145	145	262.7
12-Jan	140	148	148	143	147	140	149	150	155	160	160	160	163	153	158	164	155	158	158	159	157	166	164	153	153.7
13-Jan	148	72	315	113	182	26	22	21	39	18	37	36	44	46	52	61	56	36	15	9	11	11	357	7	27.4
14-Jan	5	1	1	355	360	356	354	3	4	2	359	0	0	353	2	8	7	4	3	6	9	19	20	27	3.1
15-Jan	35	28	18	17	2	21	26	349	2	15	347	352	0	303	301	348	5	21	15	345	349	339	305	168	3.6
16-Jan	148	141	142	154	151	156	151	133	159	135	164	136	160	41	92	134	146	151	138	148	161	147	138	155	145.3
17-Jan	152	143	150	153	144	154	151	149	152	160	147	129	148	171	58	114	138	145	142	130	145	129	149	142	145.3
18-Jan	147	151	146	145	142	141	147	154	153	157	154	157	157	158	154	147	162	165	155	158	159	154	138	159	152.4
19-Jan	159	154	147	189	318	310	316	337	358	6	6	353	332	317	347	3	355	351	352	1	4	19	32	19	355.2
20-Jan	17	14	5	354	359	356	352	356	3	2	4	236	316	15	15	45	93	224	164	146	143	151	149	149	17.2
21-Jan	157	160	151	149	154	155	154	155	149	140	151	151	139	146	129	122	122	135	146	113	167	151	159	174	147.6
22-Jan	161	159	158	152	201	226	245	276	354	359	0	337	302	349	343	358	0	360	354	359	352	354	0	360	351.2
23-Jan	2	9	9	10	357	330	357	343	349	355	310	295	311	359	12	275	212	233	177	172	148	167	166	139	354.5
24-Jan	152	150	154	159	165	176	227	227	232	240	221	218	229	232	206	208	219	261	262	322	343	355	360	7	238.2
25-Jan	5	19	43	123	191	160	172	170	164	160	163	163	145	159	187	185	149	156	135	143	150	156	148	142	155.4
26-Jan	201	141	132	139	139	130	137	133	147	156	154	141	147	137	144	141	137	128	157	140	232	249	253	253	178.4
27-Jan	253	248	260	281	272	250	272	267	259	263	253	290	14	17	8	1	351	351	335	305	299	146	129	143	279.4
28-Jan	152	162	138	156	155	148	153	158	151	146	155	159	185	156	166	154	145	150	152	176	239	235	245	249	179.3
29-Jan	246	248	263	288	265	283	299	289	289	275	257	270	298	302	299	296	282	270	248	244	242	246	259	233	272.1
30-Jan	246	260	257	249	247	256	270	301	270	289	310	0	9	24	29	20	27	16	23	19	17	20	31	34	330.1
31-Jan	37	32	43	29	25	31	34	33	19	13	8	2	20	16	7	5	20	23	22	17	26	24	49	135	21.6
	195.3	178.5	183.9	198.1	191.1	208.0	231.8	245.9	193.3	188.2	218.3	235.5	278.1	324.5	323.7	43.1	119.3	88.7	95.2	121.4	211.3	206.9	208.7	183.4	
	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

Buffalo Viewpoint - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 93 deg on Jan 20 13:00

Minimum Value: 4 deg on Jan 11 23:00

Percentiles: $P_1 = 6$ $P_{10} = 10$ $Q_1 = 13$ Median = 16 $Q_3 = 19$ $P_{90} = 30$ $P_{99} = 75$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	17	16	32	17	21	23	18	16	19	36	16	13	12	12	13	14	13	17	22	16	12	12	14	17	36
2-Jan	11	13	15	13	28	30	18	11	18	9	10	19	30	25	16	22	15	11	11	13	15	8	6	6	30
3-Jan	8	6	10	6	8	6	10	9	10	9	13	18	17	18	14	12	9	8	45	32	11	10	16	12	45
4-Jan	12	7	7	50	65	77	79	88	14	73	15	14	14	12	29	10	16	7	7	9	5	7	8	5	88
5-Jan	6	10	15	5	10	9	10	6	9	8	10	13	22	28	17	19	61	12	19	20	16	9	63	41	63
6-Jan	41	68	37	32	17	9	10	9	15	11	13	12	14	17	32	20	14	13	13	14	15	15	14	15	68
7-Jan	16	16	16	18	15	26	18	16	16	26	20	20	14	16	16	19	18	15	13	16	15	23	19	14	26
8-Jan	16	48	30	15	13	18	16	10	13	12	AF	15	9	52	11	27	8	13	14	19	15	20	16	16	52
9-Jan	15	14	19	17	18	19	13	12	11	18	20	19	17	17	18	9	14	17	14	17	12	10	13	12	20
10-Jan	9	9	14	20	18	26	18	34	17	25	51	24	20	25	14	15	16	12	14	20	30	69	54	18	69
11-Jan	13	12	15	15	20	50	14	12	14	21	13	12	18	16	16	18	14	12	24	6	12	5	4	8	50
12-Jan	11	13	11	10	11	10	13	14	17	18	18	19	19	19	22	17	16	17	16	19	28	24	20	17	28
13-Jan	14	36	44	39	26	58	24	11	11	12	14	16	19	18	18	17	17	19	17	14	13	13	15	15	58
14-Jan	14	15	15	17	16	14	15	15	14	15	13	14	15	16	16	14	16	14	15	15	14	13	14	16	17
15-Jan	16	16	16	13	15	51	23	19	14	21	24	14	12	35	26	20	11	11	37	15	38	82	78	50	82
16-Jan	7	10	9	14	21	17	14	11	25	14	18	36	43	74	41	9	9	8	7	10	6	6	9	10	74
17-Jan	8	10	9	6	7	7	6	8	10	12	19	17	21	24	93	24	21	35	24	7	19	14	28	16	93
18-Jan	17	13	16	18	17	18	18	18	17	18	18	18	21	21	19	20	19	14	16	18	16	15	17	17	21
19-Jan	19	9	7	34	16	14	13	16	13	9	11	11	22	19	22	22	14	13	13	12	13	14	14	13	34
20-Jan	13	14	14	13	13	16	12	12	13	14	26	74	93	16	12	21	57	61	17	14	16	16	16	16	93
21-Jan	18	17	15	16	17	17	15	15	14	13	21	17	19	19	20	16	13	18	27	58	31	15	21	15	58
22-Jan	25	12	11	26	33	24	38	65	25	13	19	32	24	14	17	14	13	13	13	13	12	11	13	13	65
23-Jan	13	13	12	13	22	19	15	18	25	19	36	17	17	22	29	41	18	11	31	12	18	24	23	19	41
24-Jan	14	12	15	15	12	22	13	13	14	14	17	16	16	16	15	23	15	18	16	27	14	14	14	14	27
25-Jan	18	26	29	58	32	24	20	19	23	21	20	20	19	24	19	16	14	14	10	8	8	6	8	11	58
26-Jan	32	22	9	10	11	14	12	7	19	12	18	18	12	11	18	13	10	7	19	18	36	13	13	12	36
27-Jan	12	11	18	16	20	18	18	17	14	16	12	46	15	14	12	13	15	10	29	29	49	53	73	35	73
28-Jan	24	46	14	16	21	52	35	13	13	18	36	22	14	32	21	13	13	24	12	32	14	15	12	11	52
29-Jan	12	12	17	14	17	18	13	14	15	14	20	21	15	12	13	12	13	12	12	12	13	14	12	17	21
30-Jan	15	12	14	15	13	14	17	25	15	22	46	15	14	19	16	15	15	14	15	15	14	19	18	16	46
31-Jan	16	15	22	18	17	18	17	16	15	14	16	16	16	16	17	16	15	15	15	16	16	16	48	53	53
	41	68	44	58	65	77	79	88	25	73	51	74	93	74	93	41	61	61	45	58	49	82	78	53	
	Diurnal Maximum																								

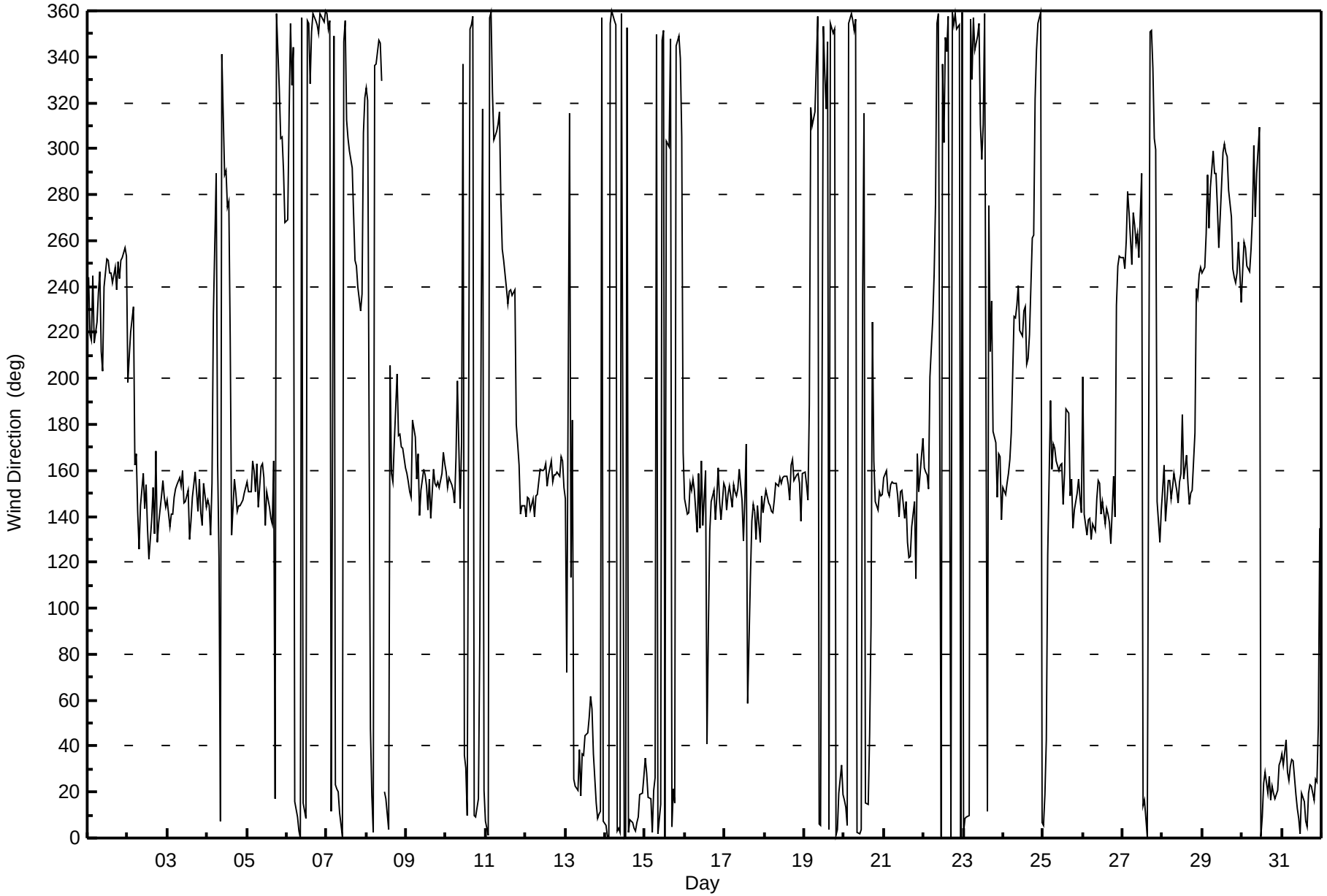
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Buffalo Viewpoint - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	January 20, 2016	Last Calibration	December 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:41	End Time (MST)	13:42
Gas Cert Reference	LL107924	Station temp.	21 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	08-Spet-2018
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-593	-593
Analyzer IP address	192.168.1.43		Lamp voltage	839	840
Calculated slope	0.987853	0.994972	Chamber temp	45.0	45.0
Calculated intercept	0.847746	0.375268	Pressure	686.1	703.0
Analyzer Background	10.9	10.5	Flow	0.488	0.501
Analyzer Coefficient	0.856	0.833	Intensity	85	85

Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	60.2	599.6	616.5	0.973
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.2	599.6	601.8	0.996
second point	5000	30.1	299.8	302.4	0.991
third point	5000	15.1	150.4	149.4	1.007
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.2	599.6	600.8	0.998
				Average Correction Factor	0.998

Corrected As found	616.6	Previous response	606.1	% change	-1.7%

Notes:

Inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat

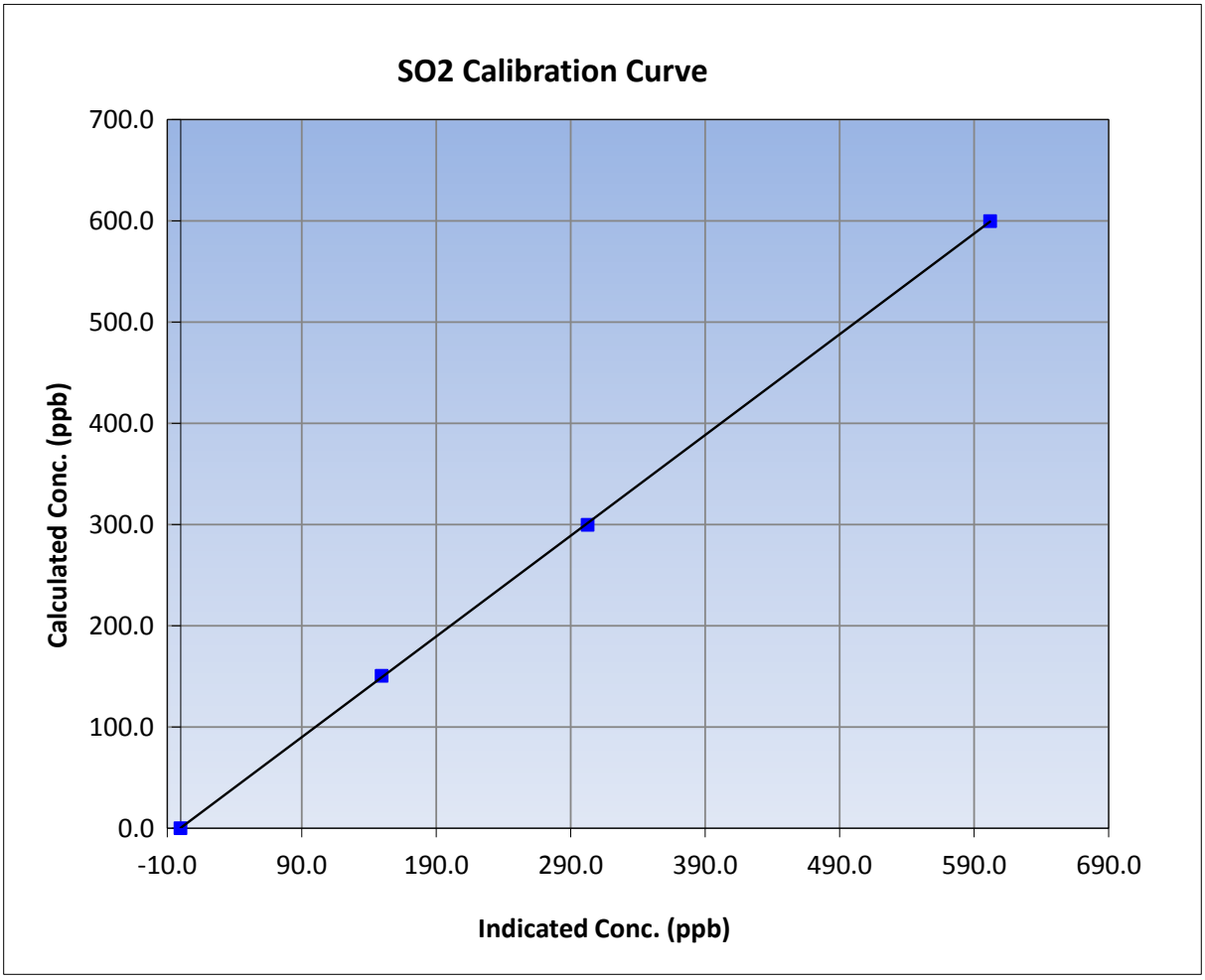
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

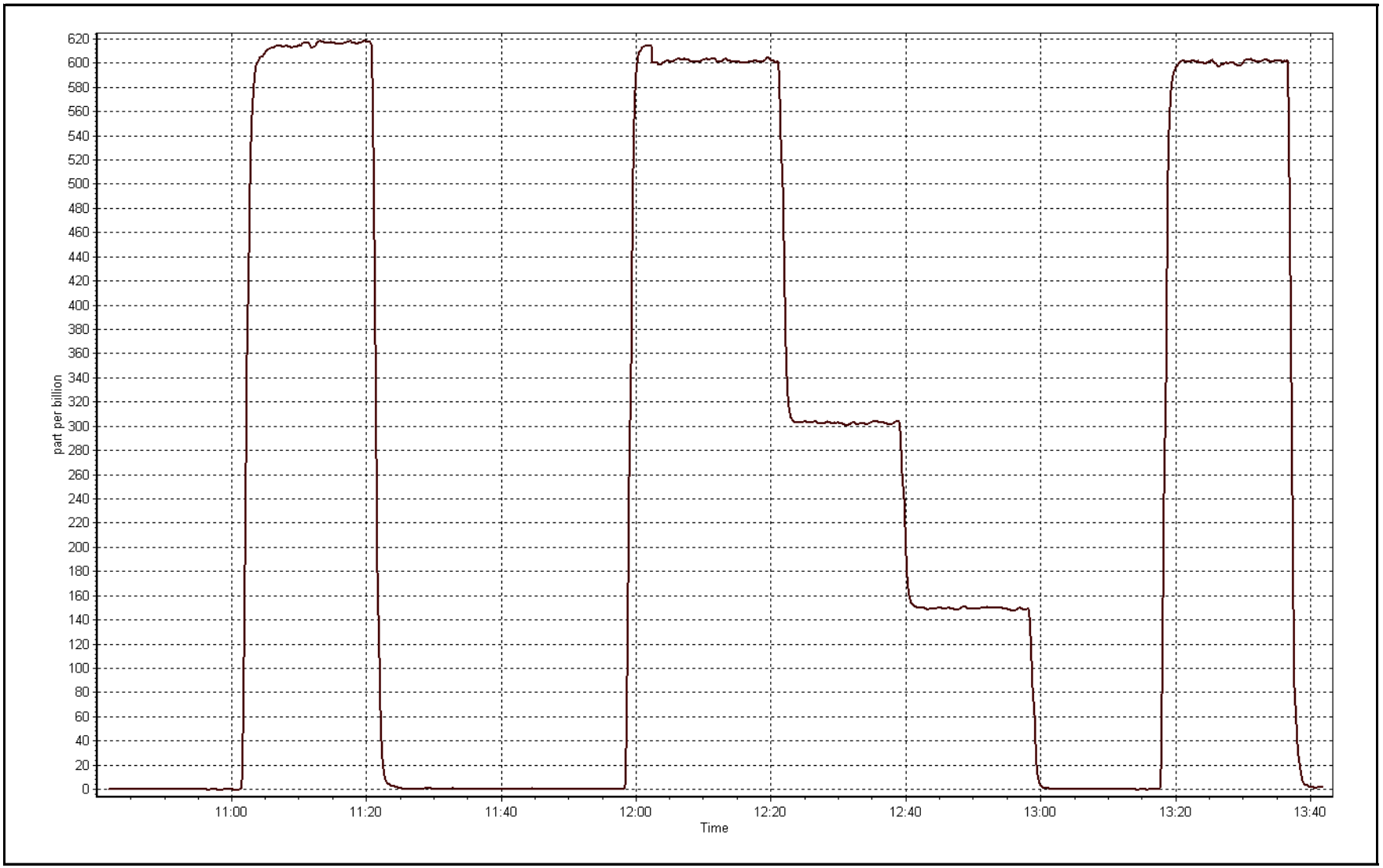
Calibration Date	January 20, 2016	Previous Calibration	December 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:41	End Time (MST)	13:42
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999978
599.6	601.8	0.9963		
299.8	302.4	0.9913	Slope	0.994972
150.4	149.4	1.0067		
			Intercept	0.375268



SO2 Calibration Plot Date: January 20, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 18, 2016	Last Calibration	December 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:22	End Time (MST)	14:10
Gas Cert Reference	LL101590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	2/22/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL107924 29-May-14

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-616	-617
Analyzer IP address	192.168.1.42		Lamp voltage	876	878
Calculated slope	0.994351	0.990715	Chamber temp	45	45
Calculated intercept	-0.072488	0.002987	Pressure	541.8	549.9
Analyzer Background	14.2	14	Flow	1.031	1.037
Analyzer Coefficient	0.870	0.862	Intensity	95	94
			Converter temp.	331	331

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	46.1	74.9	76.0	0.986
SO2 scrubber check	5000	15.1	150.4	1.7	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	46.1	74.9	75.6	0.991
second point	6000	25.8	41.9	42.4	0.989
third point	6000	15.4	25.0	25.1	0.998
as left zero	5000	0.0	0.0	0.2	----
as left span	6000	46.1	74.9	75.4	0.993
				Average Correction Factor	0.992

Corrected As found	75.9	Previous response	75.4	% change	-0.7%

Notes:

Scrubber check done and sample inlet filter replaced after as founds. Also, changed out the pump after as founds for preventative maintenance. No adjustments.

Calibration Performed By: Asad Hidayat

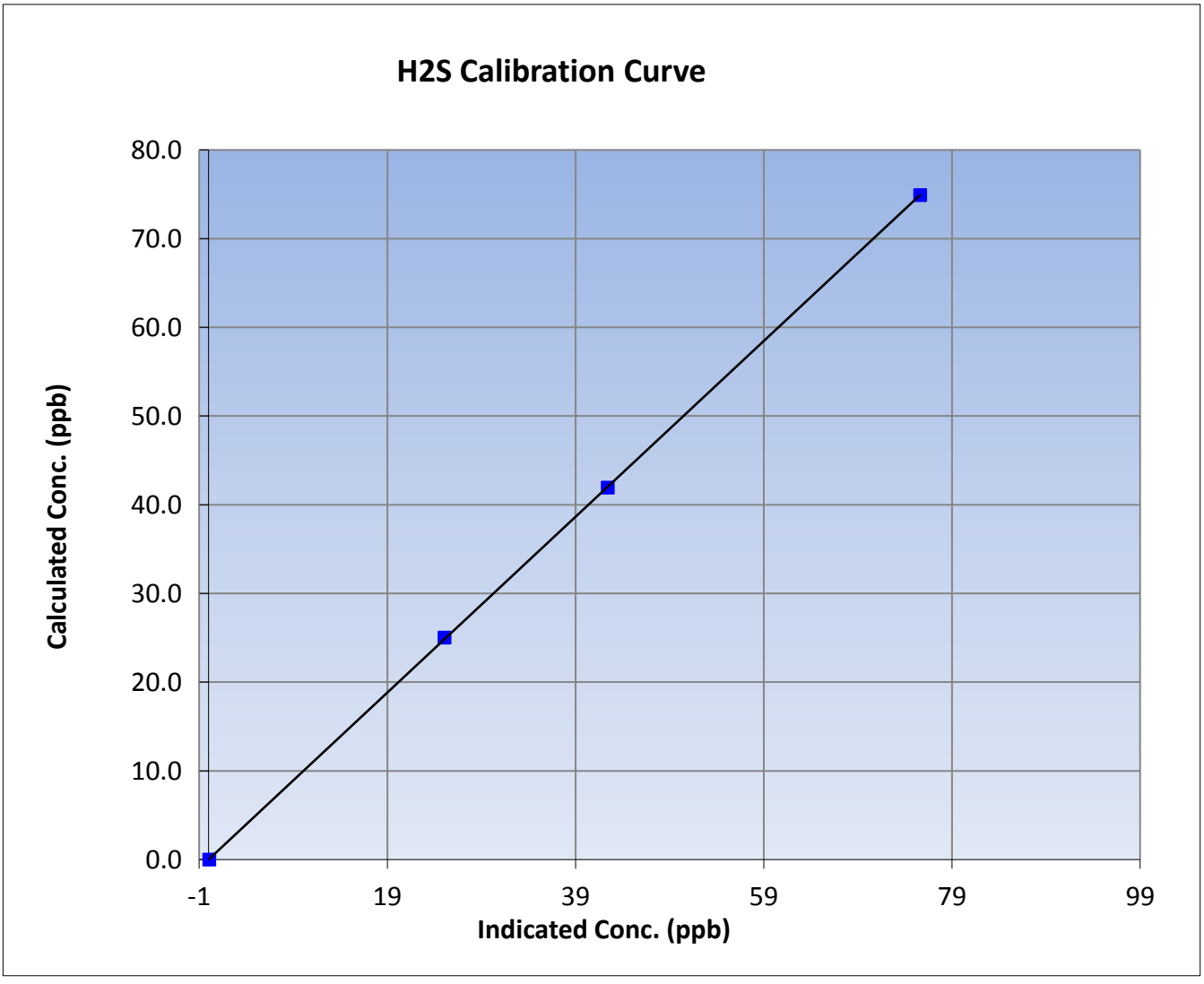
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

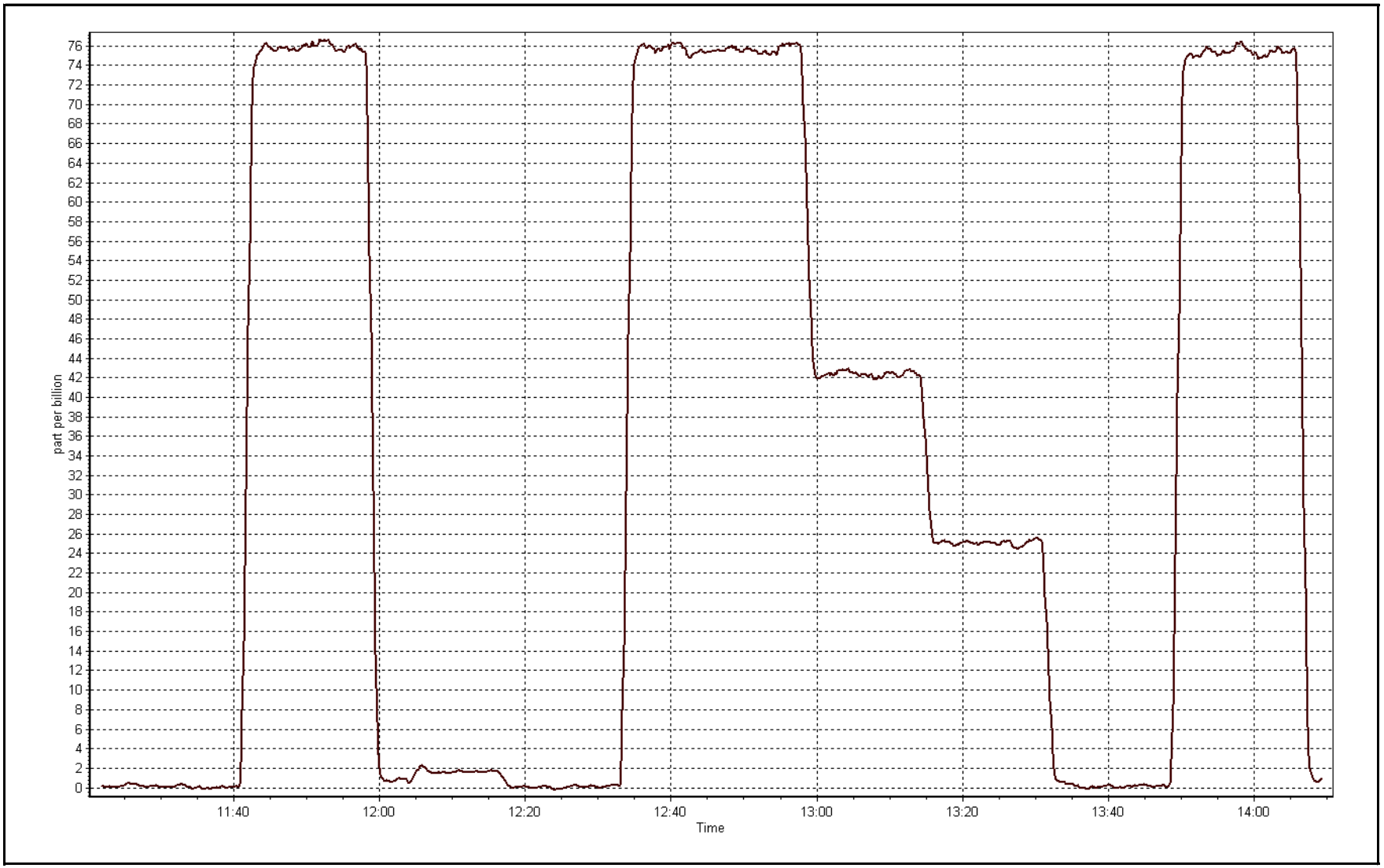
Calibration Date	January 18, 2016	Previous Calibration	December 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:22	End Time (MST)	14:10
Analyzer make	TEI 450i	Analyzer serial #	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999983
74.9	75.6	0.9906		
41.9	42.4	0.9886	Slope	0.990715
25.0	25.1	0.9982		
			Intercept	0.002987



H2S Calibration Plot Date: January 18, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-20-16	Last Calibration	December-03-15
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:41	End Time (MST)	13:40
Gas Cert Reference	LL107924	Cal Gas Expiry Date	08-Sep-18
CH4 Cal Gas Conc.	511 ppm	CH4 Equiv Conc.	1058.3 ppm
C3H8 Cal Gas Conc.	199 ppm	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG make/model	Teledyne API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	1.003422	1.006436	Fuel Pressure	19.9	19.9
Calculated intercept	0.010493	-0.054033	Analyzer Coeff	4.18	4.07
			Analyzer BKG	0.880	0.850

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	0.03	----
as found span	5000	60.2	12.74	12.96	0.983
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	60.2	12.74	12.70	1.003
second point	5000	30.1	6.37	6.42	0.992
third point	5000	15.1	3.20	3.21	0.996
as left zero	5000	0.0	0.00	0.05	----
as left span	5000	60.2	12.74	12.67	1.006
				Average Correction Factor	0.997

Corrected As found	12.93	Previous response	12.69	% change	-1.9%

Notes:

Inlet filter replaced after as founds. Changed out hydrogen cylinder after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat

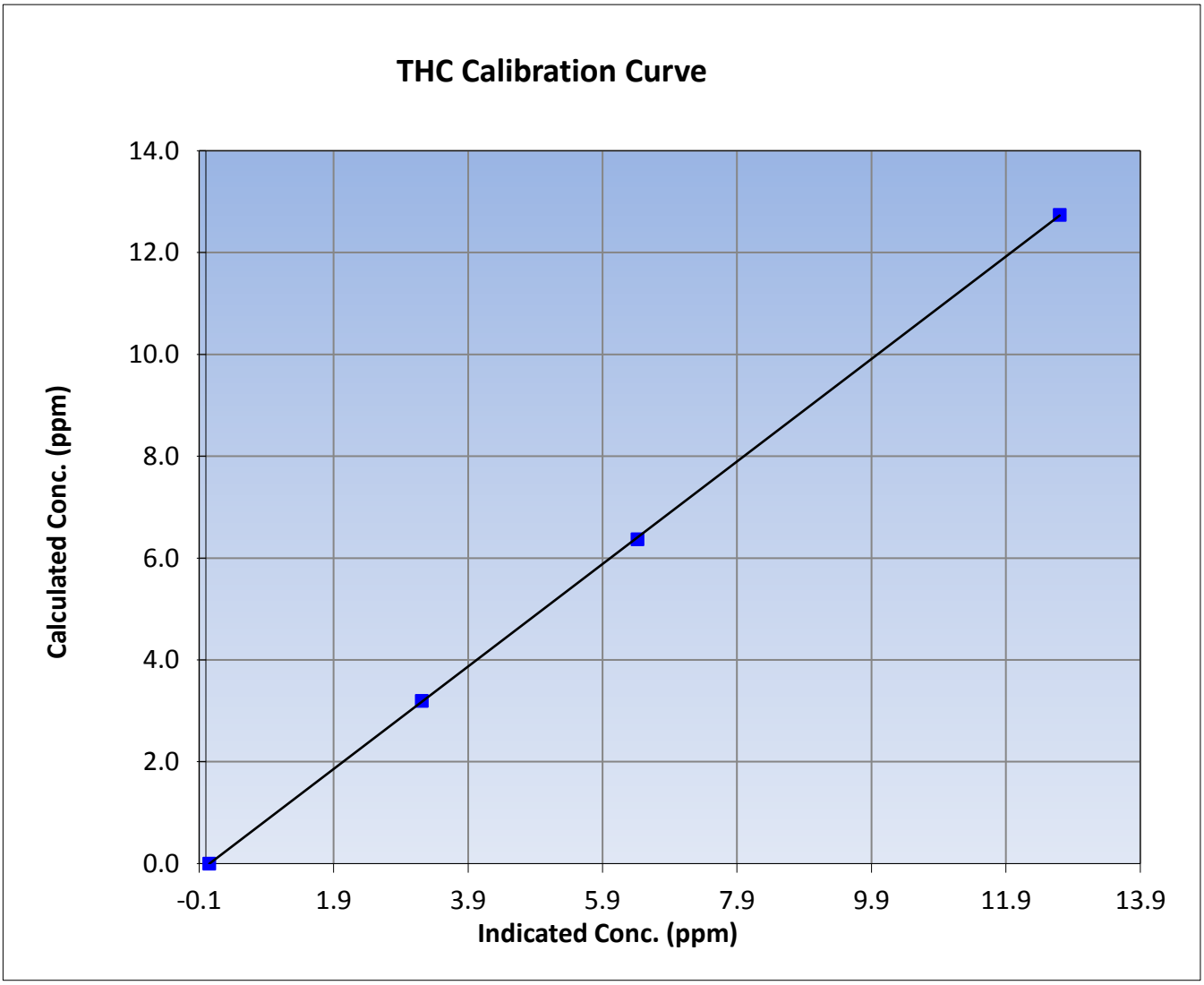
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

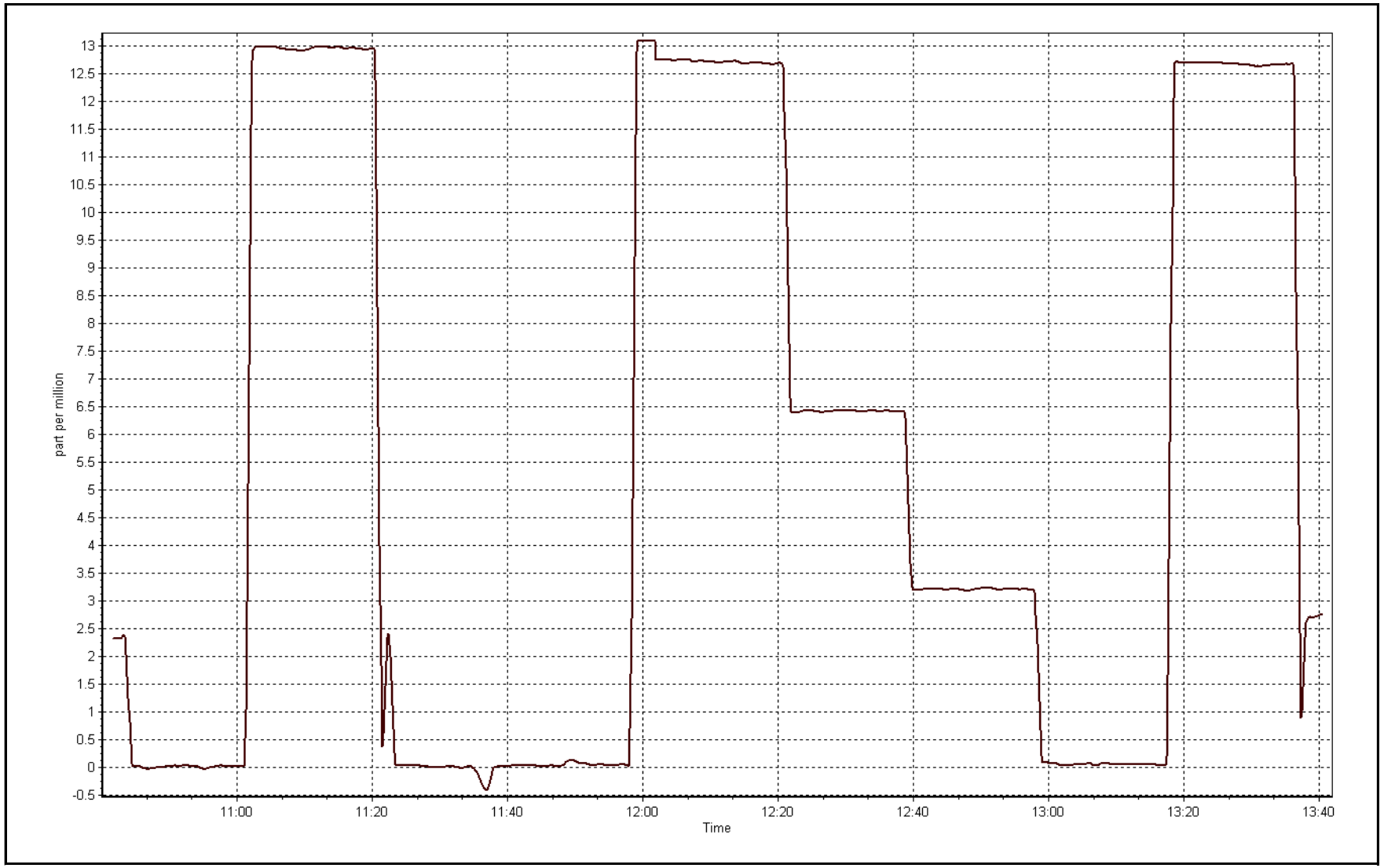
Calibration Date	January 20, 2016	Previous Calibration	December 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:41	End Time (MST)	13:40
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999978
12.74	12.70	1.0033		
6.37	6.42	0.9923	Slope	1.006436
3.20	3.21	0.9956		
			Intercept	-0.054033



THC Calibration Plot Date: January 20, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 5
MANNIX
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
JANUARY 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	42	0	9	0
H2S (ppb) Average	698	44	46	99.73	5	0	2	0
THC (ppm) Average	707	37	37	100.00	4.4	-	3.1	-
Temperature 2 m (C) Average	744	0	0	100.00	5.2	-	2.4	-
Temperature 20 m (C) Average	744	0	0	100.00	5.9	-	3.1	-
Temperature 45 m (C) Average	744	0	0	100.00	6	-	3.3	-
Temperature 75 m (C) Average	744	0	0	100.00	6	-	3.2	-
Temperature 90 m (C) Average	744	0	0	100.00	5.9	-	3.2	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	96	-	90	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	95	-	89	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	96	-	89	-
Relative Humidity 75 m (%) Average	744	0	0	100.00	95	-	89	-
Relative Humidity 90 m (%) Average	744	0	0	100.00	95	-	89	-
Wind Speed 20 m (km/h) Average	743	0	1	99.87	35	-	17	-
Wind Speed 45 m (km/h) Average	740	0	4	99.46	40	-	23	-
Wind Speed 75 m (km/h) Average	710	0	34	95.43	45	-	27	-
Wind Speed 90 m (km/h) Average	734	0	10	98.66	46	-	28	-
Wind Direction 20 m (deg) Average	743	0	1	99.87	-	-	-	-
Wind Direction 45 m (deg) Average	740	0	4	99.46	-	-	-	-
Wind Direction 75 m (deg) Average	710	0	34	95.43	-	-	-	-
Wind Direction 90 m (deg) Average	734	0	10	98.66	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	743	0	1	99.87	0.9	-	0.6	-
Vertical Wind Speed 45 m (km/h) Average	740	0	4	99.46	2.1	-	1.4	-
Vertical Wind Speed 75 m (km/h) Average	710	0	34	95.43	1.8	-	1	-
Vertical Wind Speed 90 m (km/h) Average	734	0	10	98.66	3.2	-	2.2	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.8	4	-	0	0	0	0	1	5	42
H2S (ppb) Average	698	0.8	1	-	0	0	0	1	1	2	5
THC (ppm) Average	707	2.47	0.4	-	2	2.2	2.3	2.4	2.5	2.9	4.4
Temperature 2 m (C) Average	744	-12.98	7.8	-	-32.5	-21.6	-18.2	-13.5	-8.6	-2.5	5.2
Temperature 20 m (C) Average	744	-12.49	7.9	-	-32	-21.3	-18.1	-13.5	-7.7	-1.5	5.9
Temperature 45 m (C) Average	744	-12.18	8	-	-30.7	-21.5	-18.2	-13.4	-6.5	-0.9	6
Temperature 75 m (C) Average	744	-11.84	8	-	-29.6	-21.4	-18.1	-12.8	-5.4	-0.4	6
Temperature 90 m (C) Average	744	-11.71	8	-	-29.1	-21.5	-18.2	-12.5	-5.2	-0.8	5.9
Relative Humidity 2 m (%) Average	744	80.7	7	-	55	73	77	81	85	90	96
Relative Humidity 20 m (%) Average	744	79.3	8	-	50	70	75	80	84	89	95
Relative Humidity 45 m (%) Average	744	78.9	9	-	45	67	75	80	84	89	96
Relative Humidity 75 m (%) Average	744	78.3	10	-	39	63	75	81	84	89	95
Relative Humidity 90 m (%) Average	744	78.4	10	-	38	63	76	81	84	89	95
Wind Speed 20 m (km/h) Average	743	8.8	5	-	0	3	5	8	11	14	35
Wind Speed 45 m (km/h) Average	740	12.7	7	-	0	5	8	12	17	21	40
Wind Speed 75 m (km/h) Average	710	14.8	8	-	1	5	9	14	20	26	45
Wind Speed 90 m (km/h) Average	734	15.5	9	-	1	5	9	14	21	28	46
Wind Direction 20 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	710	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	734	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	743	0.11	0.3	-	-0.9	-0.3	-0.1	0.1	0.3	0.5	0.9
Vertical Wind Speed 45 m (km/h) Average	740	0.19	0.6	-	-1.2	-0.5	-0.3	0.1	0.6	1	2.1
Vertical Wind Speed 75 m (km/h) Average	710	0.19	0.4	-	-1	-0.2	0	0.1	0.4	0.7	1.8
Vertical Wind Speed 90 m (km/h) Average	734	0.63	0.7	-	-1.8	0	0.2	0.5	0.9	1.6	3.2

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	12 Jan 2016 14:00	12 Jan 2016 15:00	2	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	07 Jan 2016 03:00	07 Jan 2016 03:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	07 Jan 2016 03:00	07 Jan 2016 06:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	06 Jan 2016 08:00	06 Jan 2016 11:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	06 Jan 2016 18:00	07 Jan 2016 01:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	09 Jan 2016 09:00	09 Jan 2016 16:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	17 Jan 2016 03:00	17 Jan 2016 13:00	11	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	25 Jan 2016 11:00	25 Jan 2016 13:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	09 Jan 2016 08:00	09 Jan 2016 13:00	6	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	25 Jan 2016 11:00	25 Jan 2016 14:00	4	Flat line in sensor output signal - Sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 42 ppb on Jan 14 04:00 Maximum Daily Average: 9.3 ppb on Jan 14

Minimum Value: 0 ppb on Jan 29 05:00 Minimum Daily Average: 0.1 ppb on Jan 29
Maximum Diurnal Average: 2.6 ppb at hour 9 Minimum Diurnal Average: 0.9 ppb at hour 3
Monthly Average: 1.8 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 5$ $P_{99} = 23$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jan	0	0	Z	0	0	0	0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
4-Jan	1	0	0	Z	0	0	1	1	1	4	3	1	1	1	1	1	1	1	2	1	1	0	0	0	1.0	4
5-Jan	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	1	5	10	2	1	1	1	1.1	10
6-Jan	1	1	2	1	1	Z	1	4	9	6	4	7	11	19	11	8	4	3	2	4	5	4	5	23	5.9	23
7-Jan	Z	6	7	1	3	0	0	5	4	2	1	2	1	1	0	0	0	0	0	0	0	0	0	0	1.6	7
8-Jan	4	Z	0	2	12	8	5	7	5	4	4	2	2	1	1	1	1	1	1	1	1	1	2	2	2.9	12
9-Jan	1	1	Z	1	0	1	0	0	0	0	1	0	1	1	1	0	0	0	1	1	0	0	0	0	0.5	1
10-Jan	0	0	0	Z	1	1	1	1	1	1	0	1	3	3	15	8	6	2	1	1	1	2	7	9	2.8	15
11-Jan	2	4	4	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	4
12-Jan	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
13-Jan	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	25	1.5	25
14-Jan	23	25	Z	42	5	3	3	4	21	34	11	20	5	7	7	2	1	1	0	0	0	0	0	0	9.3	42
15-Jan	0	0	0	Z	2	10	2	8	4	0	0	7	6	3	3	4	0	1	1	1	0	1	1	1	2.5	10
16-Jan	0	0	0	0	Z	0	1	1	1	0	0	1	2	1	4	6	10	7	3	3	2	2	2	2	2.1	10
17-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
18-Jan	Z	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
19-Jan	0	Z	0	0	0	0	0	2	11	1	1	6	13	3	4	1	2	3	6	8	2	1	0	0	2.8	13
20-Jan	0	0	Z	7	8	6	9	13	9	4	5	6	3	2	1	1	1	1	1	1	0	0	0	0	3.4	13
21-Jan	0	0	0	Z	0	0	0	0	1	0	1	1	1	1	1	1	2	2	2	2	1	1	1	1	0.9	2
22-Jan	1	1	1	1	Z	1	1	1	1	4	7	6	3	3	2	8	9	8	1	1	1	1	1	1	2.6	9
23-Jan	1	1	1	1	1	Z	7	10	8	3	4	2	1	1	1	1	1	1	1	1	1	1	1	1	2.2	10
24-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	13	7	4	1.8	13
25-Jan	6	Z	2	0	5	9	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	9
26-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	8	7	5	5	6	23	16	1	1	1	1	0	3.3	23
28-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	Z	0	0	0	0	0	0	0	0	0	3	4	1	0	0	0	0	0	0	0	0	1	0	0	0.5	4
31-Jan	0	Z	0	0	0	0	0	0	0	1	4	2	1	1	2	1	0	0	0	0	0	0	0	0	0.7	4
	1.7	1.7	0.9	2.4	1.6	1.7	1.2	2.1	2.6	2.3	1.8	2.4	2.2	2.0	2.2	1.8	1.6	1.9	1.5	1.2	1.1	1.1	1.1	2.4	Diurnal Average	
	23	25	7	42	12	10	9	13	21	34	11	20	13	19	15	8	10	23	16	10	11	13	7	25	Diurnal Maximum	

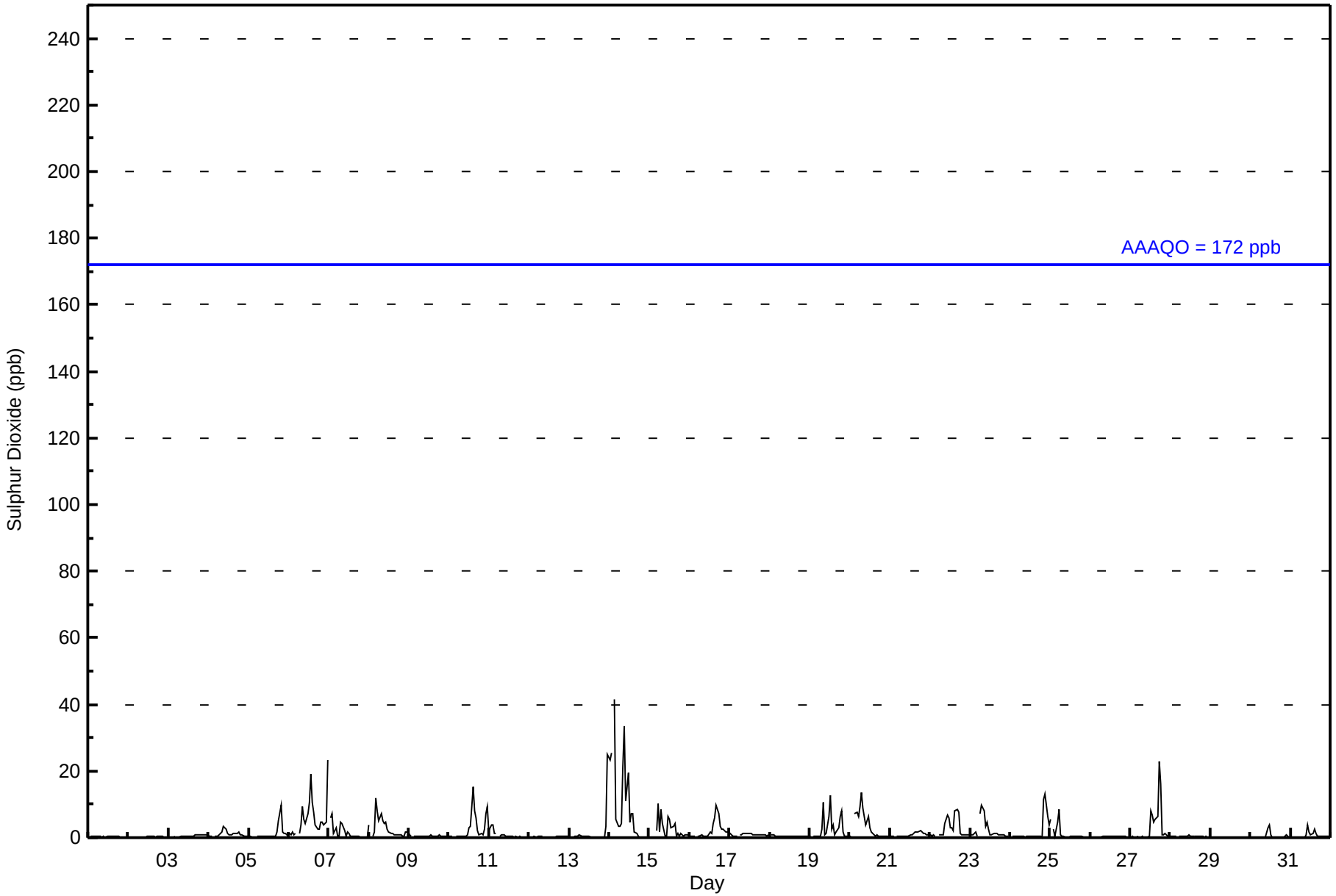
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Mannix - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Mannix - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	97.03	97.03
11 - 20	13	1.84	98.87
21 - 60	8	1.13	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 (SO_2) - ppb

Mannix - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	61	59	8	7	11	4	76	199	39	16	26	39	48	29	18	45	685
11 - 20	5	0	0	0	0	0	0	0	0	0	0	0	1	2	0	5	13
21 - 60	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	60	8	7	11	4	76	199	39	16	26	39	49	31	18	51	706

Total Number of Valid Hours: 706

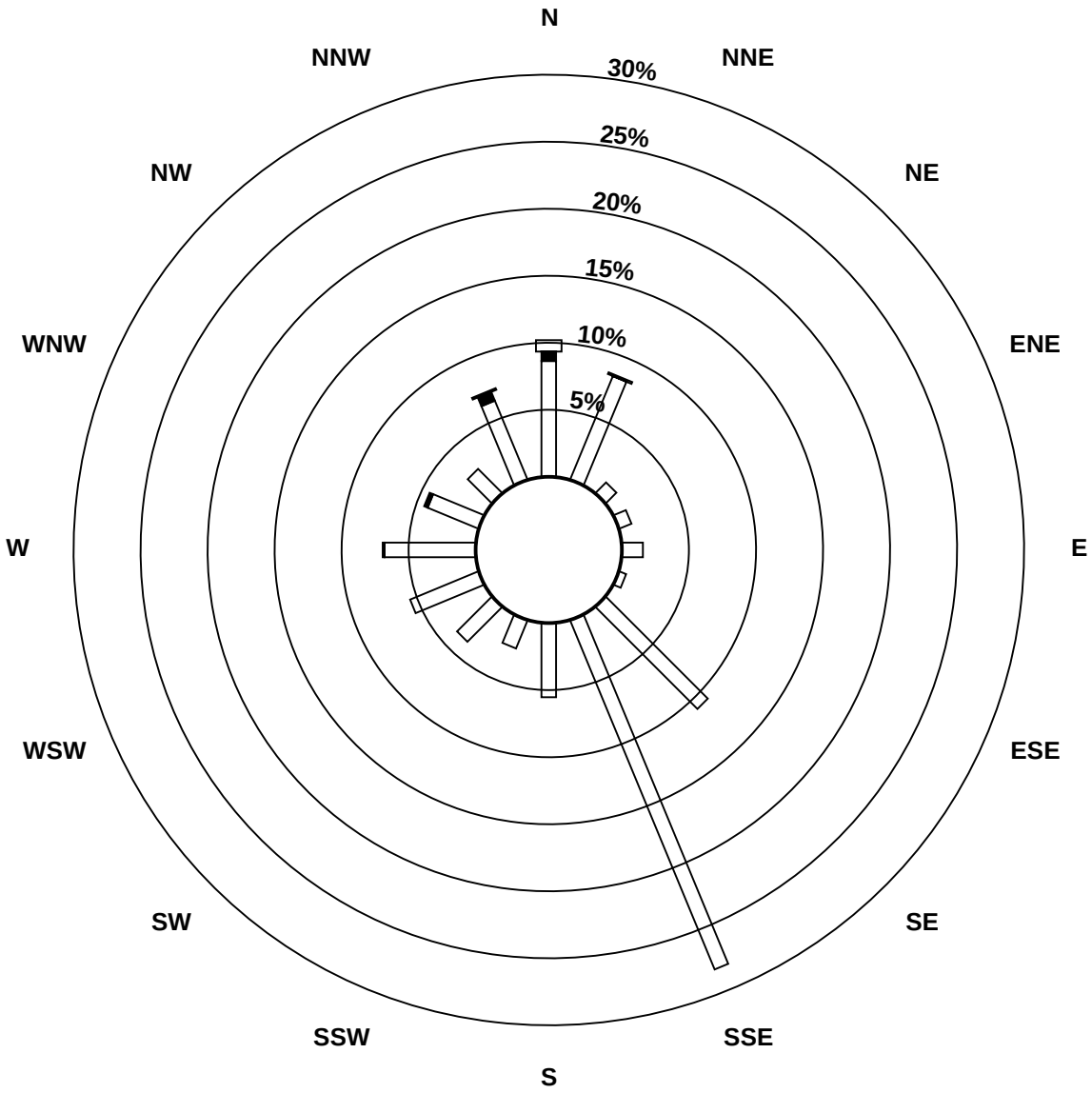
Total Number of Hours: 744

Wood Buffalo Environmental Association

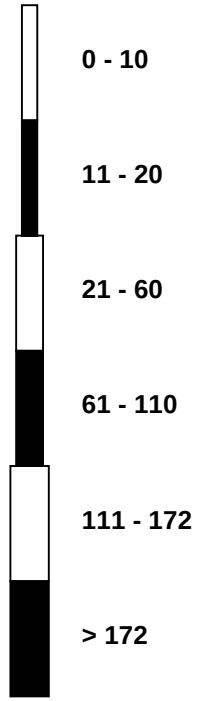
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Mannix (AMS 5)



Classes (ppb)



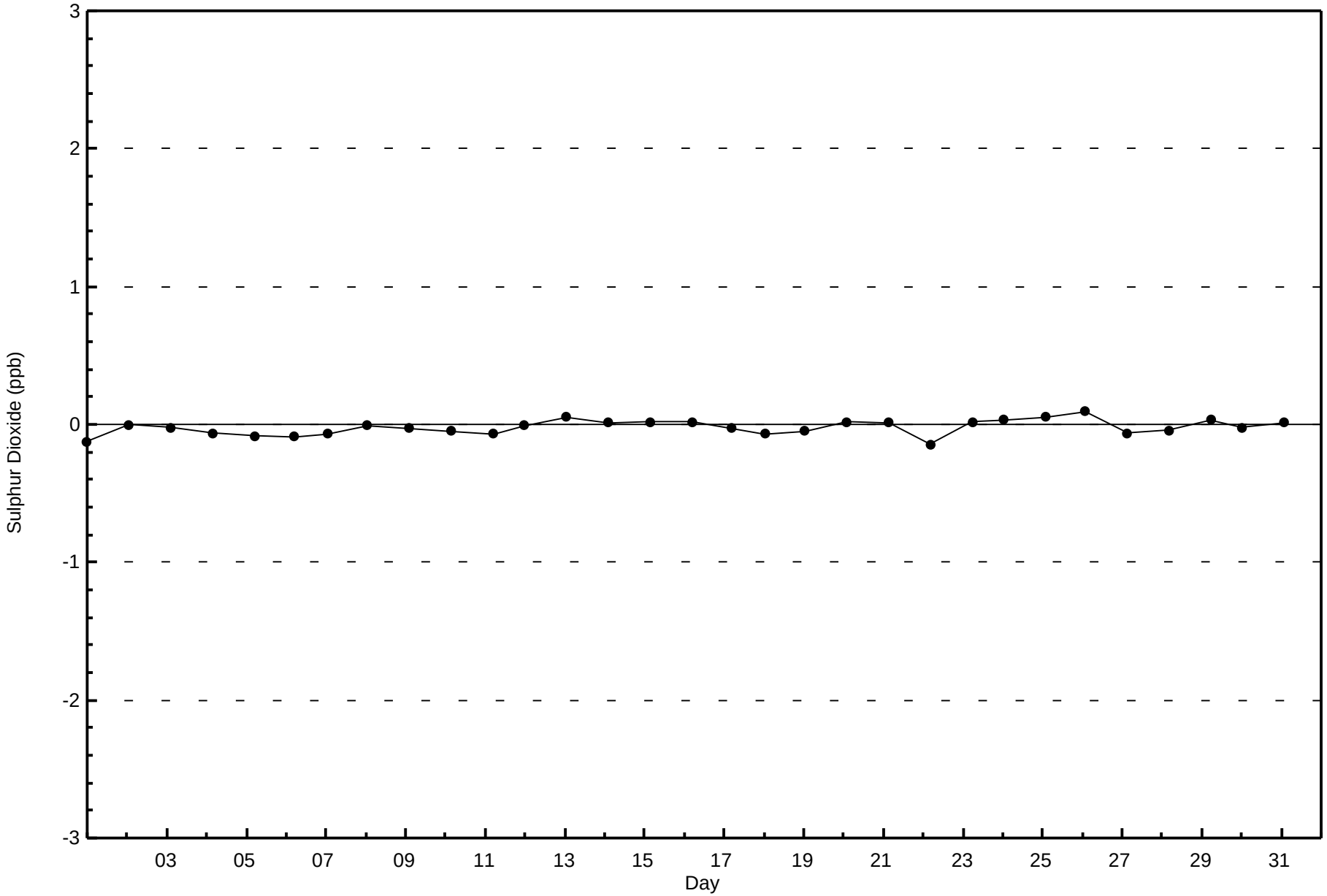
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Mannix - January 2016

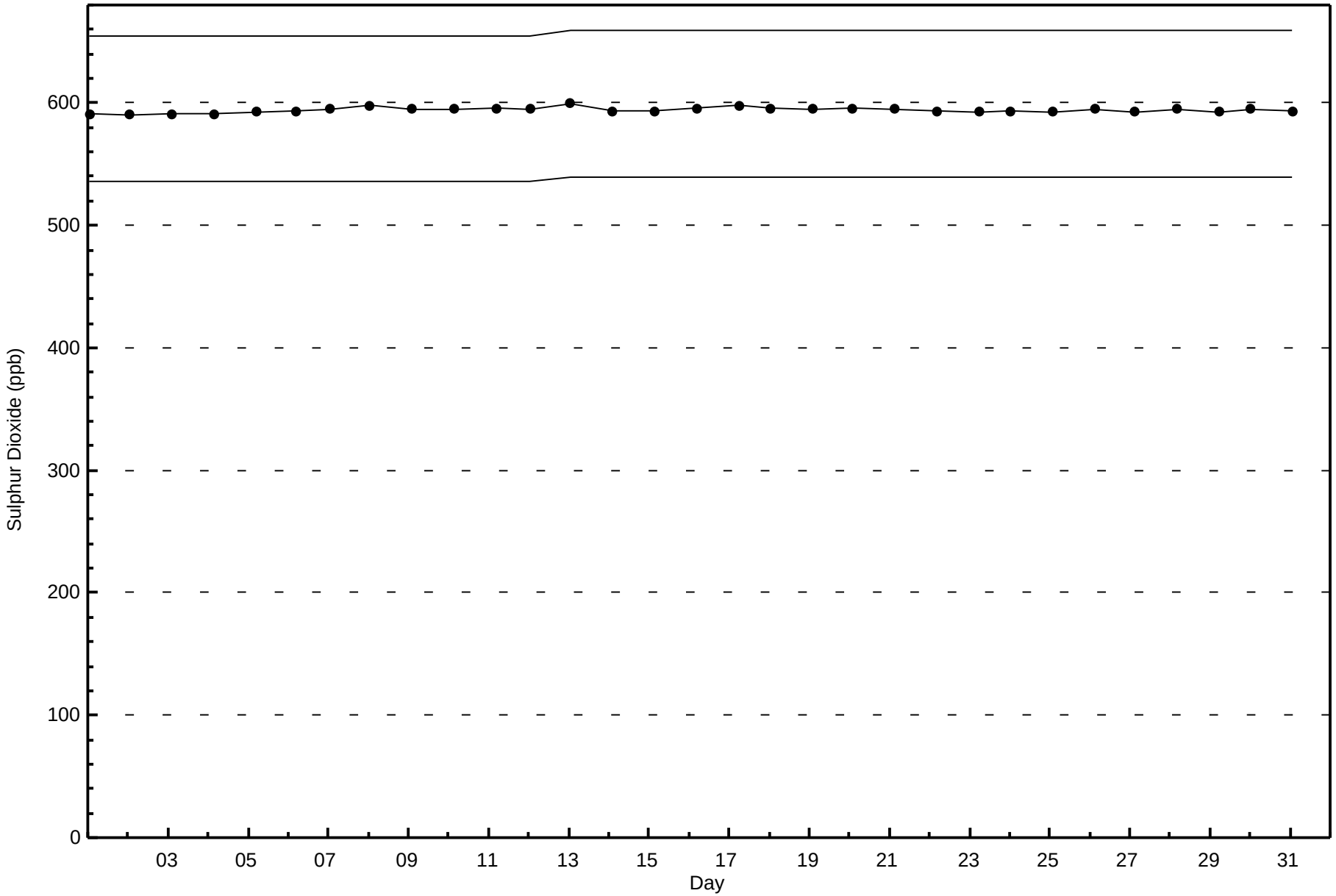


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Mannix - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 5 ppb on Jan 4 10:00

Maximum Daily Average: 1.9 ppb on Jan 6

Minimum Value: 0 ppb on Jan 1 22:00

Minimum Daily Average: 0.1 ppb on Jan 1

Maximum Diurnal Average: 1.0 ppb at hour 9

Minimum Diurnal Average: 0.5 ppb at hour 4

Monthly Average: 0.8 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	698
Hours of Missing Data:	46
Hours of Calibration:	44
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Jan	0	0	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	0.6	1
4-Jan	1	0	0	1	Z	1	1	3	2	5	2	1	1	1	1	1	1	1	1	1	1	1	0	0	1.2	5
5-Jan	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	1	1	1	2	3	4	2	2	2	2	1.1	4
6-Jan	2	2	3	2	2	3	Z	3	4	2	2	2	2	4	3	2	1	1	1	1	1	1	0	1	1.9	4
7-Jan	1	Z	1	1	1	1	1	1	0	0	C	C	C	C	C	C	1	1	1	1	1	1	1	0	--	1
8-Jan	1	1	Z	1	3	2	1	1	1	1	1	C	C	C	C	C	C	C	1	1	1	1	1	1	--	3
9-Jan	1	1	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
10-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	2	1	3	2	2	1	1	1	1	1	2	2	1.1	3
11-Jan	1	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1
12-Jan	1	Z	0	0	1	1	1	0	1	0	1	0	0	M	M	0	1	1	0	1	0	0	0	0	0.5	1
13-Jan	1	1	Z	0	1	1	2	2	3	2	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1.0	3
14-Jan	1	1	1	Z	1	1	0	0	1	1	1	1	0	0	0	0	0	1	1	1	0	1	1	1	0.6	1
15-Jan	1	1	1	0	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2	1	1	1.0	2
16-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1	1.1	2
17-Jan	1	1	1	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
18-Jan	1	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-Jan	0	0	Z	0	0	0	0	1	3	1	1	2	3	1	1	1	1	1	1	1	1	1	1	1	0.9	3
20-Jan	1	1	1	Z	1	1	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	0	1	1	0.9	2
21-Jan	0	0	0	0	Z	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.5	1
22-Jan	0	1	0	1	0	Z	1	1	1	2	2	2	1	1	1	2	2	1	1	5	1	2	1	0	1.3	5
23-Jan	0	0	0	1	1	1	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	2
24-Jan	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	4	3	2	1	0.7	4
25-Jan	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.5	1
26-Jan	0	1	0	Z	0	0	0	1	1	1	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0.5	1
27-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	3	2	1	1	2	1	1	0.8	3
28-Jan	1	1	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
29-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	0	Z	0	0	0	0	0	0	0	0	1	2	0	1	2	1	1	1	1	1	1	1	0	1	0.7	2
31-Jan	0	0	Z	1	1	1	1	1	1	2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
	0.6	0.6	0.6	0.5	0.6	0.7	0.7	1.0	1.0	0.9	0.7	0.8	0.8	0.8	0.9	0.8	0.8	0.9	0.9	0.9	0.8	0.8	0.7	0.7	Diurnal Average	
	2	2	3	2	3	3	2	3	4	5	2	2	3	4	3	2	2	3	3	5	4	3	2	2	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

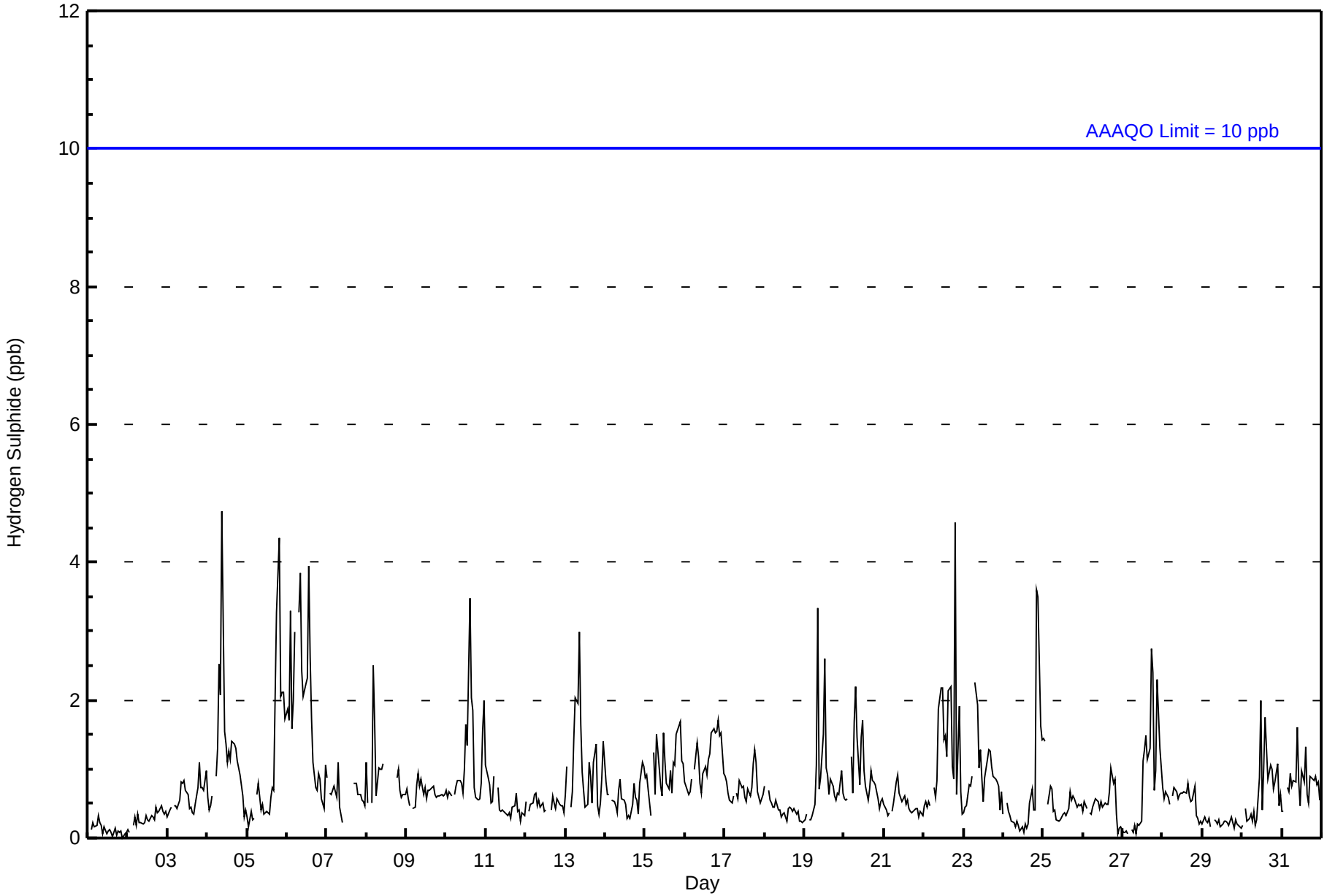
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Mannix - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Mannix - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	679	97.28	97.28
3 - 4	17	2.44	99.71
5 - 7	2	0.29	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Mannix - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	64	56	9	7	11	3	75	201	38	17	25	38	47	27	19	41	678
3 - 4	5	2	0	0	0	0	0	0	0	0	0	0	0	2	0	8	17
5 - 7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	59	9	7	11	3	75	201	38	17	25	38	47	29	20	49	697

Total Number of Valid Hours: 697

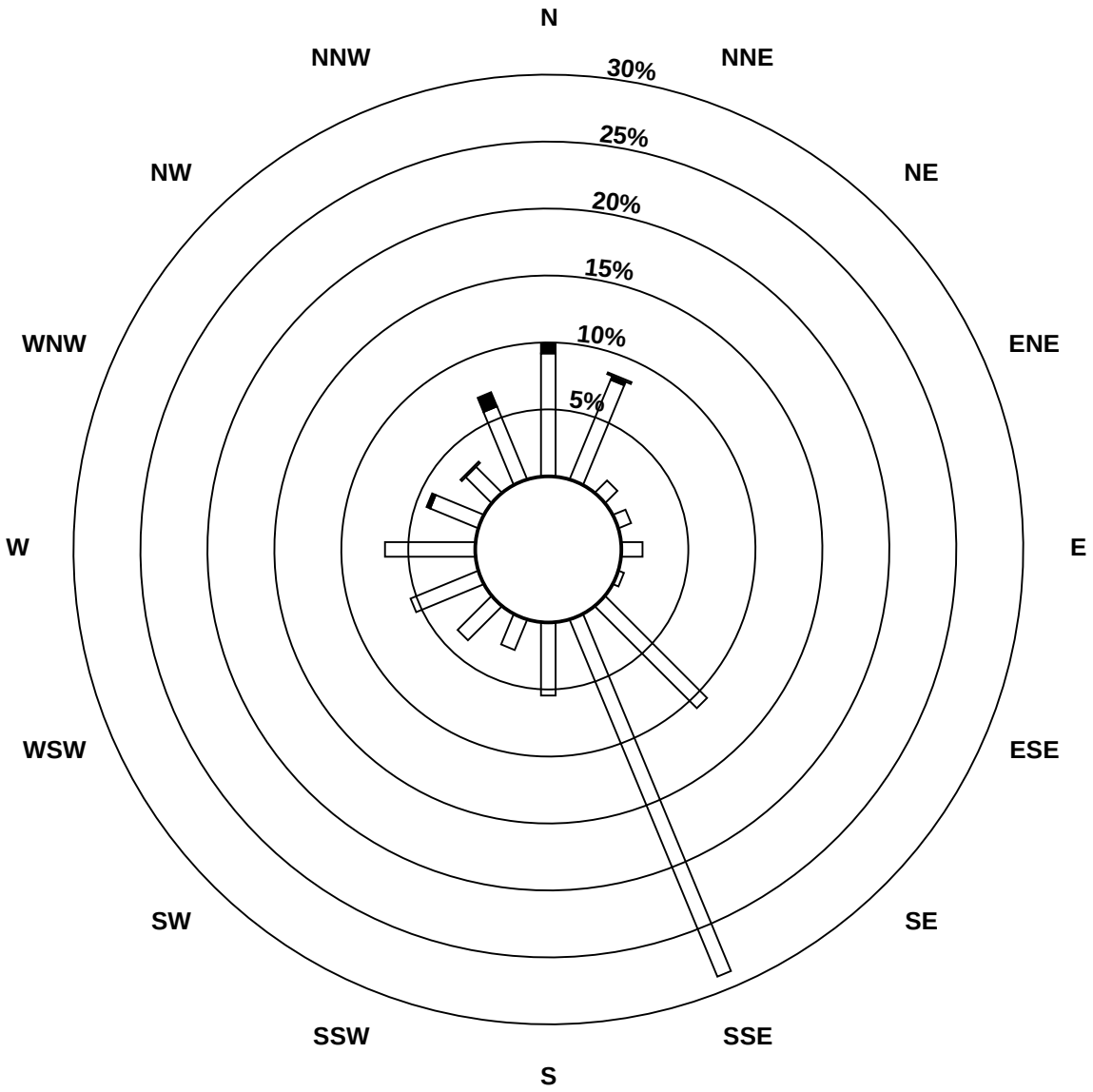
Total Number of Hours: 744

Wood Buffalo Environmental Association

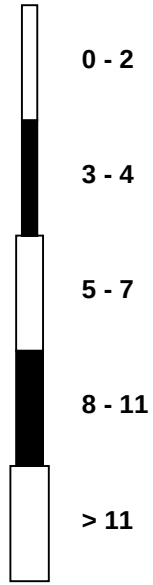
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Mannix (AMS 5)



Classes (ppb)



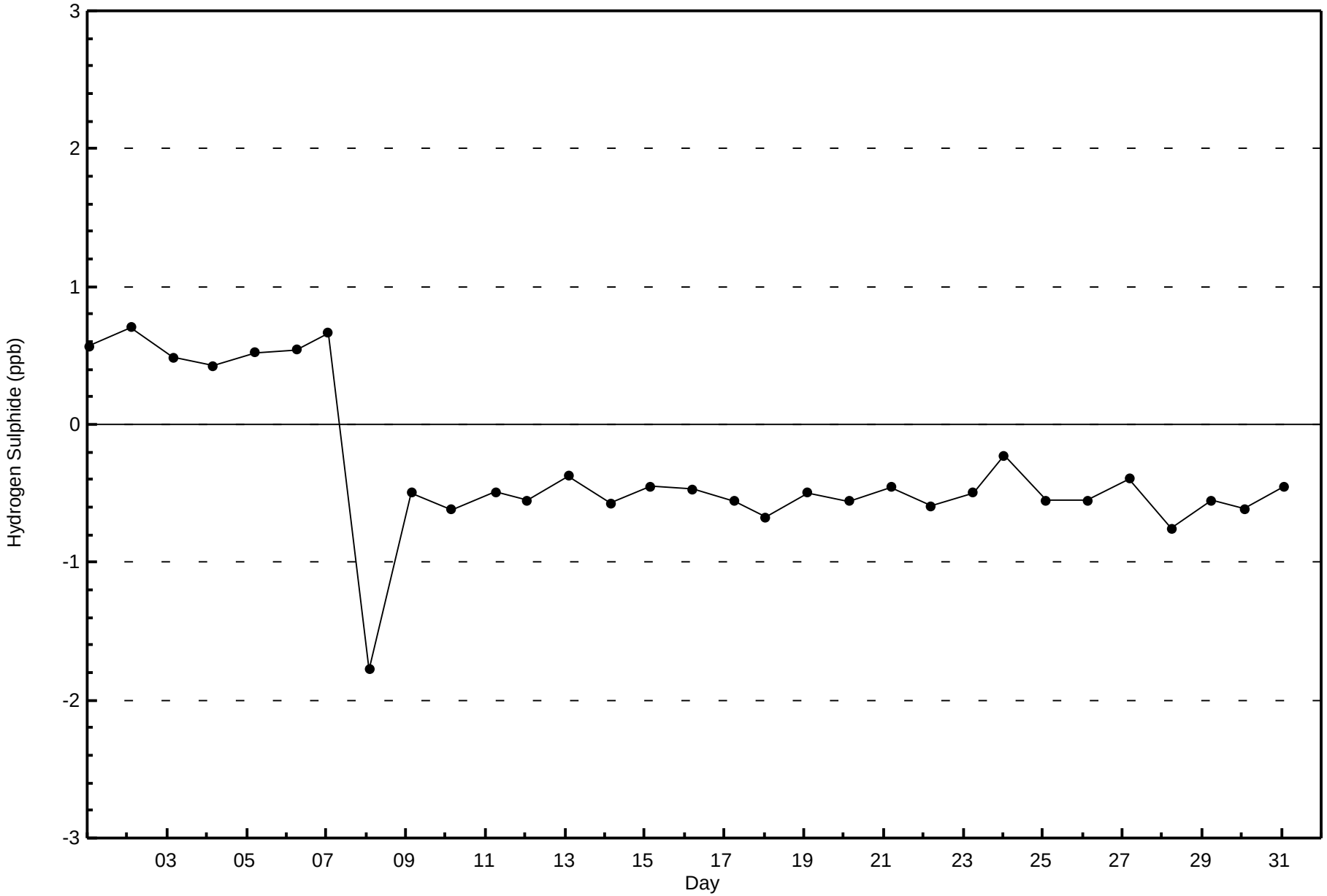
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Mannix - January 2016

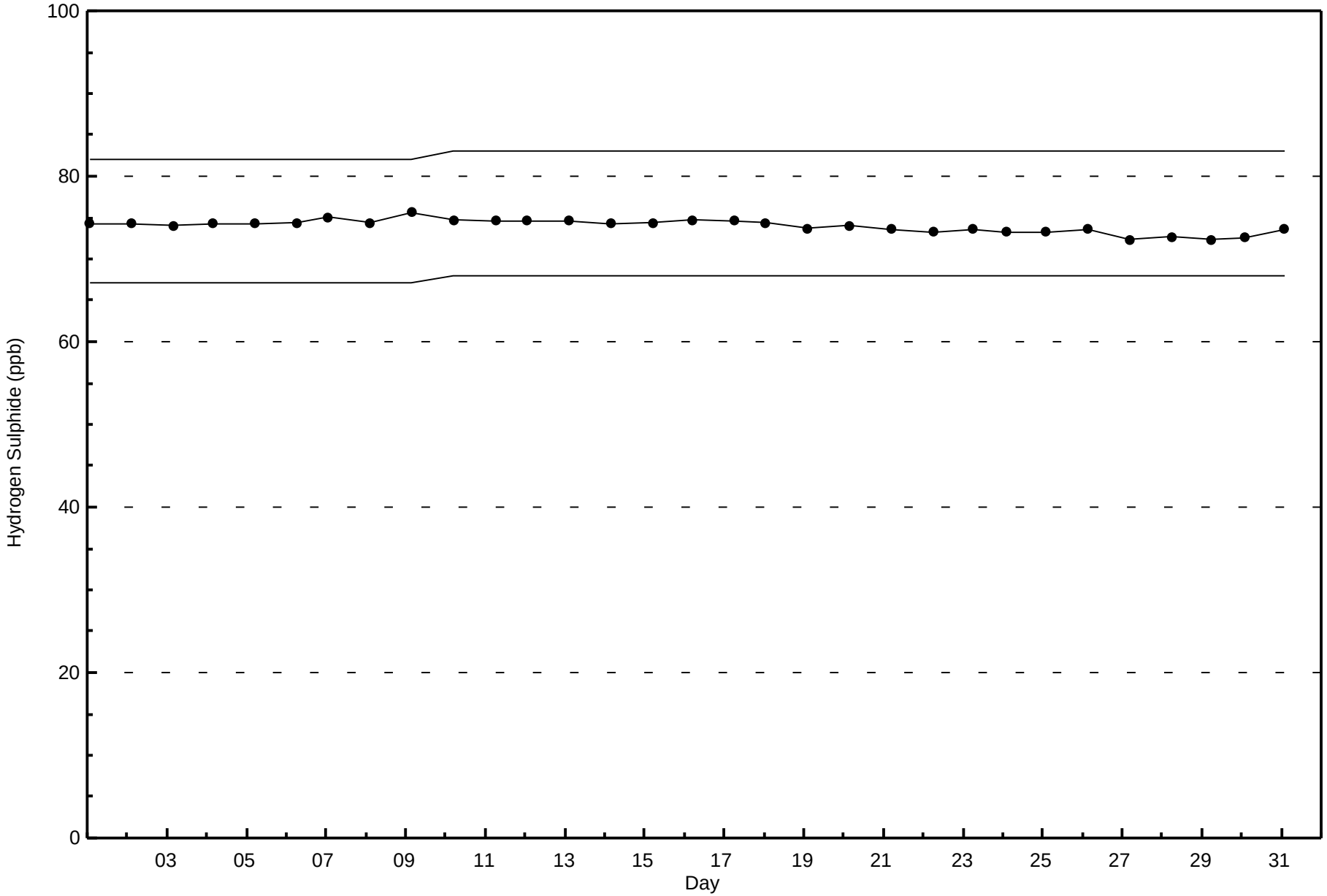


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Mannix - January 2016



Maximum Value: 4.4 ppm on Jan 22 11:00

Maximum Daily Average: 3.1 ppm on Jan 22

Minimum Value: 2.0 ppm on Jan 27 00:00

Minimum Daily Average: 2.2 ppm on Jan 29

Maximum Diurnal Average: 2.6 ppm at hour 15

Minimum Diurnal Average: 2.4 ppm at hour 5

Monthly Average: 2.47 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.3 Median = 2.4 Q_3 = 2.5 P_{90} = 2.9 P_{99} = 4.0

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	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-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.5	2.3	2.4	2.4	2.3	2.5
3-Jan	2.3	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.7	2.4	2.7
4-Jan	2.6	2.5	2.6	Z	2.6	2.7	2.7	2.9	2.8	3.3	3.1	2.9	2.9	2.9	2.9	3.0	3.0	2.8	2.7	2.6	2.5	2.4	2.4	2.4	2.8	3.3
5-Jan	2.4	2.4	2.4	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.5	2.4	3.3	3.4	3.3	3.6	4.0	4.1	3.9	2.8	4.1
6-Jan	3.9	3.8	4.2	3.5	3.6	Z	3.5	3.9	3.5	3.4	3.6	2.9	3.0	3.0	3.3	2.6	2.5	2.5	2.4	2.5	2.4	2.3	2.2	2.2	3.1	4.2
7-Jan	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.3	2.5
8-Jan	2.6	Z	2.2	2.3	2.3	3.5	4.0	3.5	3.8	2.8	3.0	3.6	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.7	4.0
9-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4
10-Jan	2.3	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.8	3.0	3.0	2.8	3.1	3.1	2.4	2.4	2.4	2.4	2.4	2.5	2.6	2.6	3.1
11-Jan	2.5	2.3	2.3	2.2	2.3	Z	2.5	2.8	2.8	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.8
12-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	C	C	C	C	C	C	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	--	2.3
13-Jan	2.3	Z	2.4	2.5	2.6	2.7	3.6	3.4	3.5	3.0	2.7	2.6	2.5	2.7	2.4	2.6	2.6	2.5	2.5	2.4	2.4	2.5	2.4	2.3	2.7	3.6
14-Jan	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.4
15-Jan	2.4	2.4	2.5	Z	2.3	2.4	2.3	2.4	2.4	2.3	2.4	2.5	2.5	2.6	2.6	2.4	2.3	2.4	2.6	2.7	3.0	2.7	2.6	2.6	2.5	3.0
16-Jan	2.6	2.6	2.6	2.6	Z	2.6	2.6	2.6	2.4	2.4	2.4	2.5	2.6	2.5	3.1	3.1	2.9	2.7	2.6	2.6	2.6	2.6	2.6	2.5	2.6	3.1
17-Jan	2.5	2.5	2.4	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.3	2.4	2.5
18-Jan	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
19-Jan	2.2	Z	2.2	2.3	2.4	2.4	2.5	3.1	2.7	2.5	2.5	2.6	3.2	2.6	3.0	2.4	2.6	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.5	3.2
20-Jan	2.3	2.3	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.4	2.6	2.6	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.6
21-Jan	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.5	2.5	2.7
22-Jan	2.5	2.6	2.6	2.6	Z	2.6	2.7	2.7	3.5	3.8	4.4	3.9	3.7	4.4	4.2	3.2	2.9	2.8	2.7	2.9	2.5	2.7	2.6	2.6	3.1	4.4
23-Jan	2.5	2.6	2.5	2.6	2.6	Z	3.4	3.3	3.3	2.6	2.8	2.7	2.7	3.2	4.1	4.1	3.8	3.3	3.2	3.1	3.0	2.8	2.7	2.8	3.0	4.1
24-Jan	Z	2.7	2.7	2.7	2.7	2.7	2.6	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.6	3.0	2.4	2.4	2.4	2.5	3.0
25-Jan	2.4	Z	2.4	2.4	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.5
26-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.1	2.0	2.0	2.0	2.3	2.4
27-Jan	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.9	2.4	2.7	3.5	3.0	2.9	2.4	3.5
28-Jan	2.7	2.5	2.4	2.3	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.1	2.1	2.1	2.1	2.3	2.7
29-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.3	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3
30-Jan	Z	2.1	2.2	2.2	2.2	2.2	2.1	2.3	2.2	2.2	3.0	2.4	2.2	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.3	3.0
31-Jan	2.2	Z	2.3	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.5
	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	Diurnal Average	
	3.9	3.8	4.2	3.5	3.6	3.5	4.0	3.9	3.8	3.8	4.4	3.9	3.7	4.4	4.2	4.1	3.8	3.3	3.4	3.3	3.6	4.0	4.1	3.9	Diurnal Maximum	

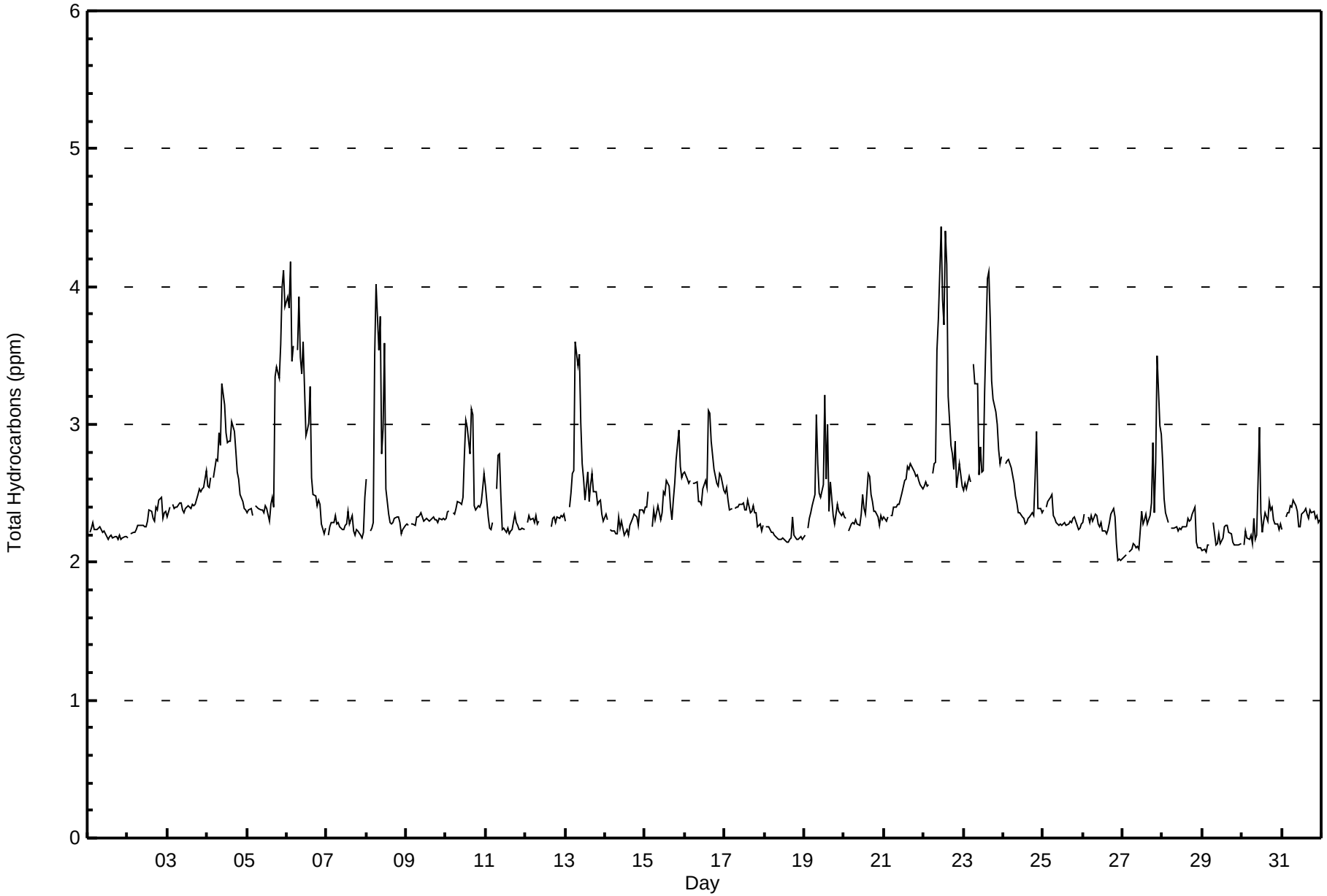
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Mannix - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Mannix - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	5	0.71	0.71
2.1 - 3.0	649	91.80	92.50
3.1 - 10.0	53	7.50	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

Mannix - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	5
2.1 - 3.0	68	56	8	6	10	3	76	199	37	16	25	31	42	22	9	40	648
3.1 - 10.0	4	4	0	1	1	1	0	0	2	0	1	4	6	9	9	11	53
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	60	8	7	11	4	76	199	39	16	26	39	49	31	18	51	706

Total Number of Valid Hours: 706

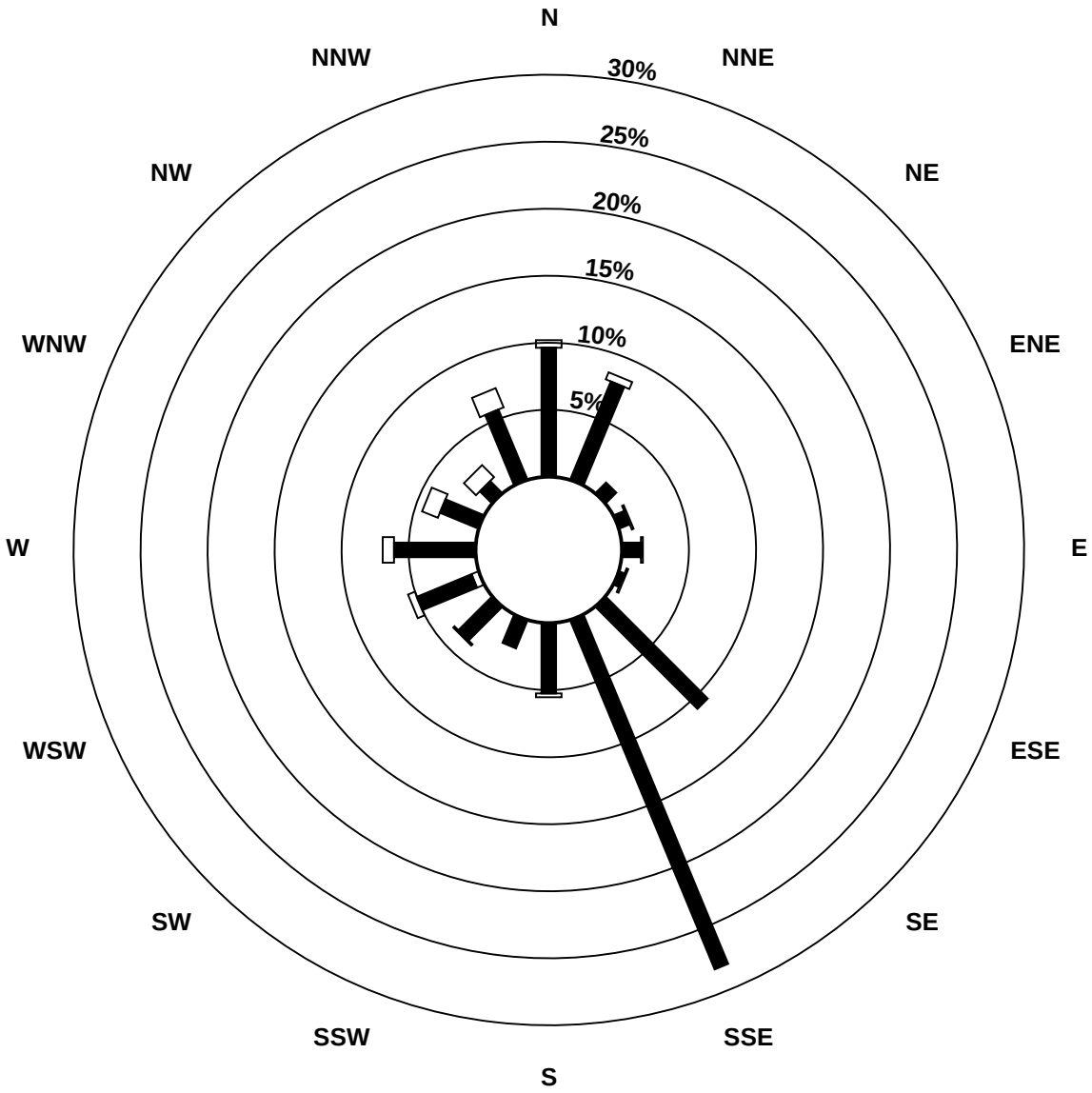
Total Number of Hours: 744

Wood Buffalo Environmental Association

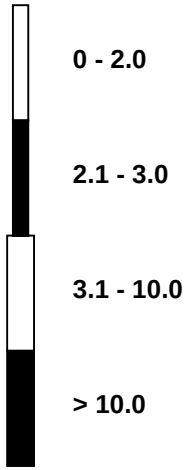
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Mannix (AMS 5)



Classes (ppm)



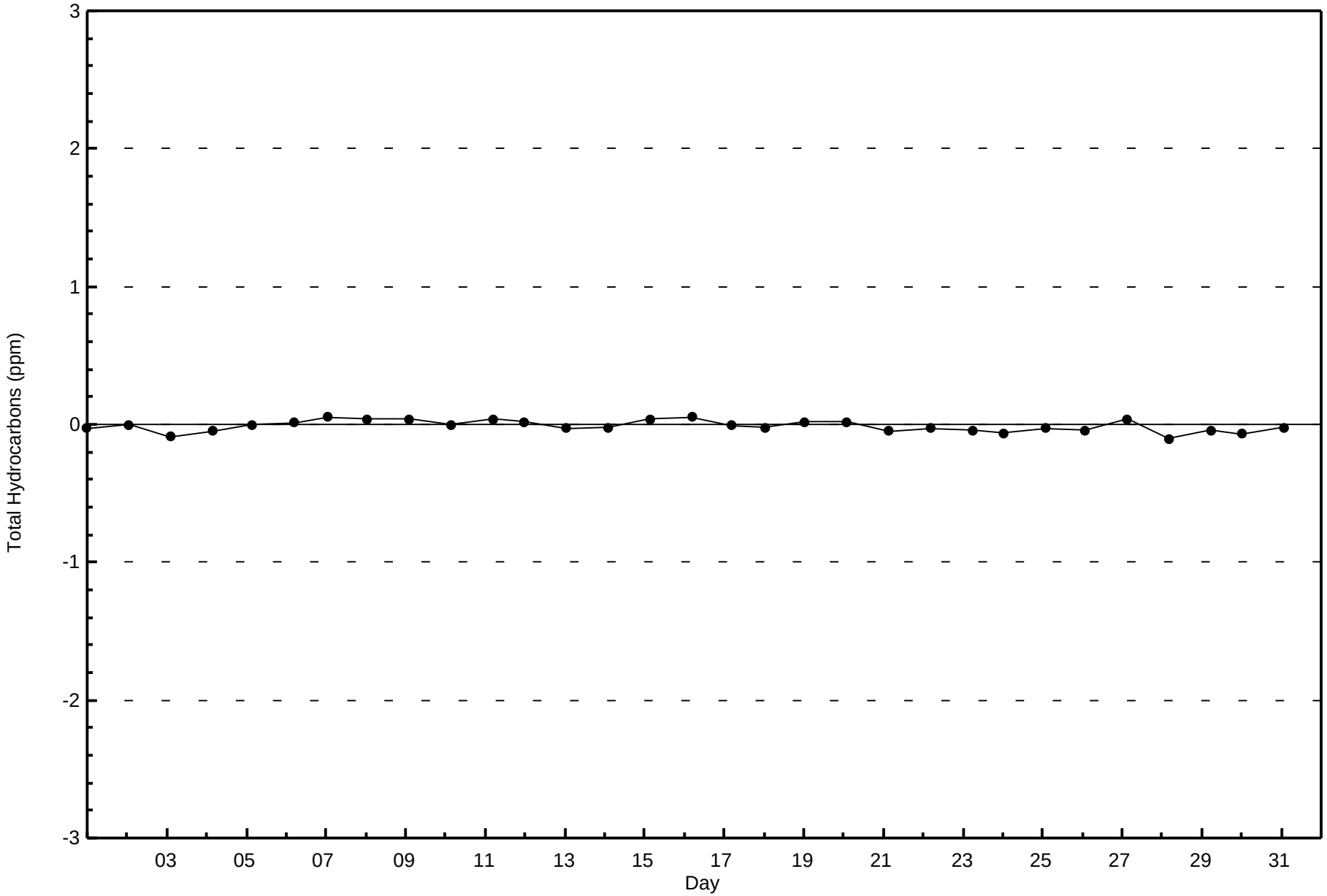
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Mannix - January 2016

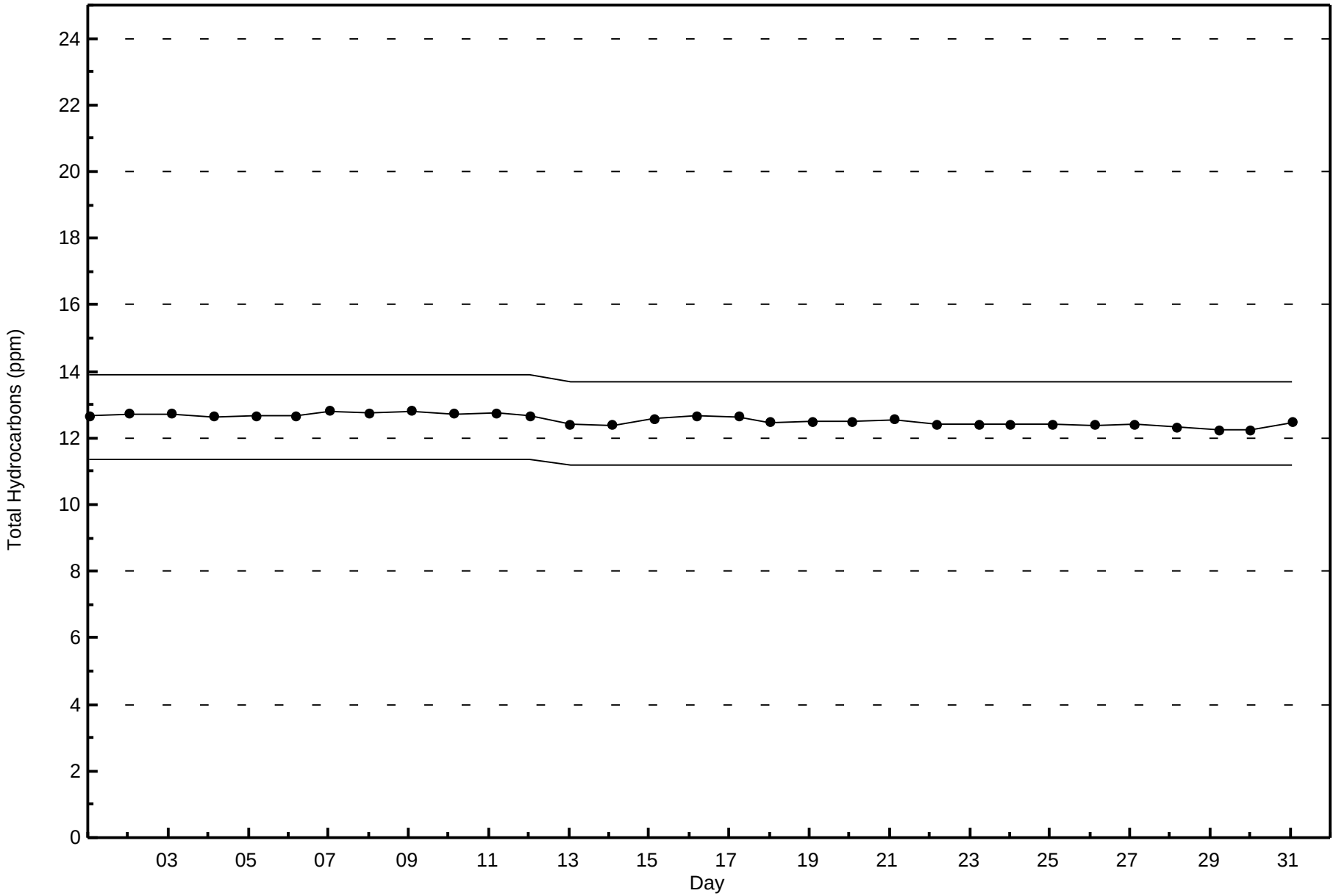


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Mannix - January 2016



Maximum Value: 5.2 C on Jan 28 23:00
Maximum Daily Average: 2.4 C on Jan 29

Minimum Value: -32.5 C on Jan 16 07:00
Minimum Daily Average: -29.6 C on Jan 16
Maximum Diurnal Average: -11.0 C at hour 15
Minimum Diurnal Average: -14.2 C at hour 6
Monthly Average: -12.98 C
Percentiles: P_1 = -31.2 P_{10} = -21.6 Q_1 = -18.2 Median = -13.5 Q_3 = -8.6 P_{90} = -2.5 P_{99} = 4.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

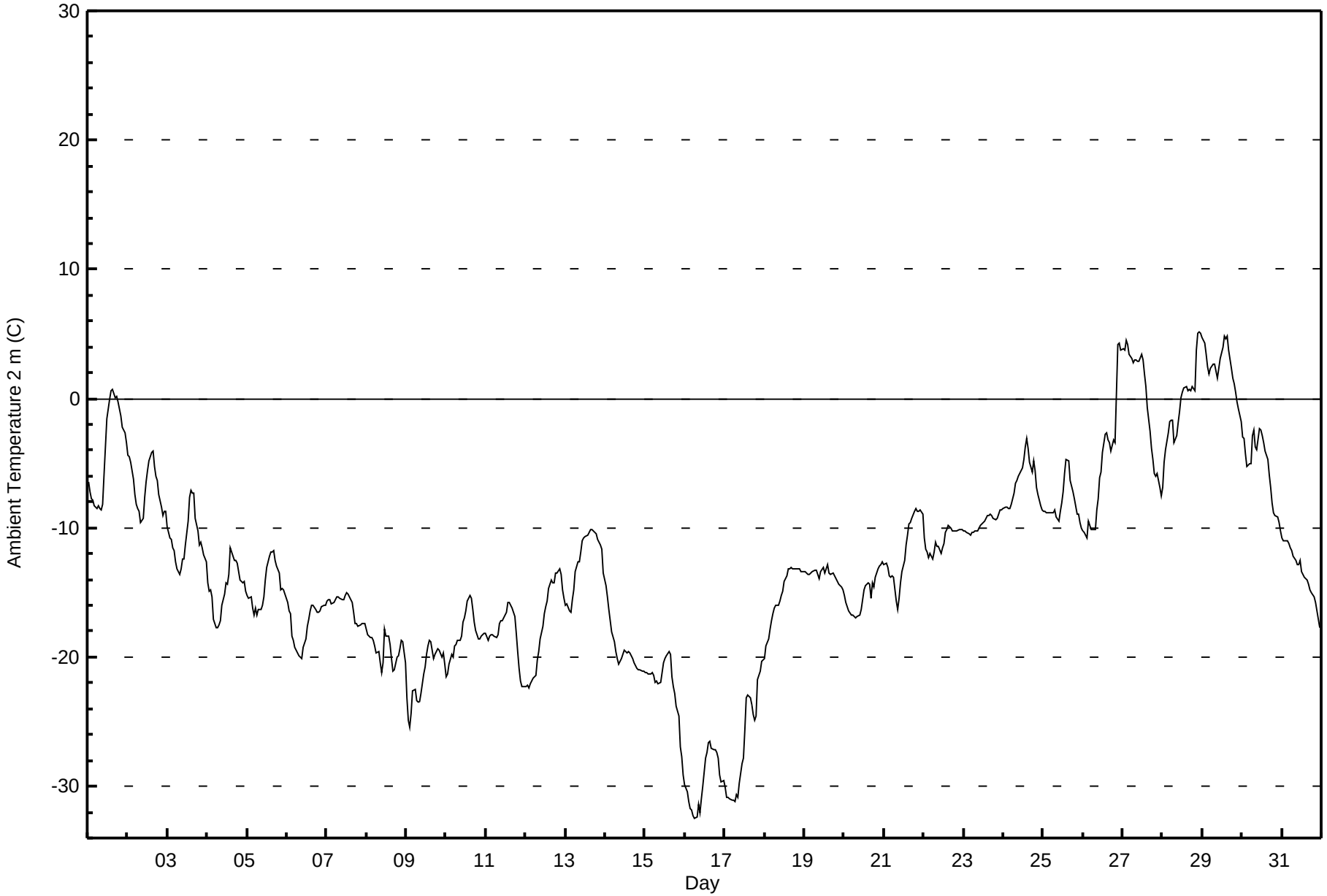
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-6.5	-7.2	-7.8	-7.9	-8.3	-8.5	-8.3	-8.5	-8.6	-8.2	-5.9	-1.5	-0.8	0.0	0.6	0.7	0.1	0.2	-0.3	-0.8	-1.3	-2.2	-2.7	-3.4	-4.0	0.7
2-Jan	-4.3	-4.5	-4.9	-6.3	-7.4	-8.2	-8.5	-8.7	-9.6	-9.3	-7.6	-6.4	-5.6	-4.8	-4.1	-4.1	-5.2	-6.0	-6.4	-7.4	-8.4	-9.0	-8.7	-8.8	-6.8	-4.1
3-Jan	-9.9	-10.8	-10.9	-11.6	-11.8	-12.6	-13.1	-13.6	-13.1	-12.4	-12.4	-11.3	-9.5	-7.6	-7.1	-7.3	-7.4	-9.3	-10.2	-11.3	-11.2	-11.5	-12.1	-12.6	-10.9	-7.1
4-Jan	-14.3	-14.9	-14.8	-15.3	-17.1	-17.7	-17.7	-17.5	-17.2	-16.0	-15.2	-14.2	-14.4	-13.6	-11.6	-11.9	-12.6	-12.5	-12.7	-13.4	-14.0	-14.3	-14.2	-14.9	-14.7	-11.6
5-Jan	-15.2	-15.5	-15.4	-16.2	-16.8	-16.2	-16.7	-16.3	-16.4	-16.0	-15.3	-14.1	-13.1	-12.2	-11.9	-11.8	-11.8	-12.5	-12.9	-13.5	-14.8	-14.6	-14.8	-15.1	-14.5	-11.8
6-Jan	-15.8	-16.4	-16.7	-18.4	-18.7	-19.3	-19.7	-20.0	-20.0	-20.1	-19.2	-18.6	-17.6	-17.0	-16.4	-16.0	-16.0	-16.3	-16.5	-16.5	-16.4	-16.1	-16.0	-15.9	-17.5	-15.8
7-Jan	-15.7	-15.6	-15.6	-15.9	-15.7	-15.6	-15.4	-15.3	-15.4	-15.6	-15.5	-15.3	-15.0	-15.1	-15.3	-15.8	-16.6	-17.4	-17.4	-17.6	-17.5	-17.4	-17.4	-17.4	-16.1	-15.0
8-Jan	-17.9	-18.3	-18.4	-18.5	-18.7	-19.1	-19.7	-19.6	-20.5	-21.2	-20.4	-17.8	-18.4	-18.4	-19.0	-20.1	-21.1	-20.9	-20.0	-19.9	-19.4	-18.7	-18.8	-20.4	-19.4	-17.8
9-Jan	-23.1	-24.9	-25.4	-24.4	-22.6	-22.5	-23.3	-23.5	-23.5	-22.8	-21.3	-20.8	-19.8	-19.1	-18.7	-18.8	-20.1	-19.8	-19.6	-19.4	-19.5	-20.1	-19.6	-20.5	-21.4	-18.7
10-Jan	-21.6	-21.3	-20.5	-19.8	-20.0	-19.2	-19.0	-18.7	-18.7	-18.3	-17.3	-17.0	-16.5	-15.7	-15.2	-15.5	-16.3	-17.3	-18.0	-18.6	-18.6	-18.4	-18.2	-18.2	-18.2	-15.2
11-Jan	-18.2	-18.7	-18.3	-18.3	-18.3	-18.3	-18.5	-18.3	-17.4	-17.2	-17.2	-17.0	-16.6	-15.8	-15.8	-16.0	-16.2	-16.9	-18.2	-19.6	-20.9	-21.8	-22.3	-22.3	-18.2	-15.8
12-Jan	-22.3	-22.2	-22.4	-22.1	-21.6	-21.5	-21.5	-20.2	-19.6	-18.6	-17.7	-16.7	-16.1	-15.7	-14.7	-14.0	-14.3	-14.2	-13.5	-13.5	-13.1	-13.6	-14.8	-15.4	-17.5	-13.1
13-Jan	-16.0	-15.9	-16.4	-16.6	-15.5	-14.8	-13.4	-12.6	-12.7	-11.8	-11.0	-10.8	-10.6	-10.6	-10.3	-10.2	-10.2	-10.3	-10.5	-10.9	-11.1	-11.3	-11.7	-13.5	-12.4	-10.2
14-Jan	-14.4	-15.3	-16.4	-17.2	-18.1	-18.8	-19.6	-20.2	-20.6	-20.3	-20.1	-19.5	-19.5	-19.7	-19.5	-19.7	-20.1	-20.5	-20.7	-20.9	-21.0	-21.0	-21.1	-21.0	-19.4	-14.4
15-Jan	-21.2	-21.2	-21.3	-21.3	-21.2	-21.4	-21.9	-21.9	-22.0	-22.0	-21.2	-20.5	-20.1	-19.9	-19.6	-19.8	-21.5	-22.3	-22.9	-23.8	-24.5	-27.0	-27.8	-29.1	-22.3	-19.6
16-Jan	-29.9	-30.4	-31.2	-31.8	-31.9	-32.3	-32.5	-32.4	-31.4	-32.1	-30.9	-30.0	-27.8	-27.4	-26.6	-26.5	-27.0	-27.2	-27.1	-27.4	-27.8	-29.2	-29.7	-29.5	-29.6	-26.5
17-Jan	-30.1	-30.8	-30.9	-30.9	-31.1	-31.0	-31.1	-30.6	-30.9	-29.7	-28.3	-27.8	-25.6	-23.2	-22.9	-23.1	-23.7	-24.4	-24.9	-24.5	-21.7	-21.1	-20.3	-20.2	-26.6	-20.2
18-Jan	-20.1	-19.2	-18.6	-17.9	-17.2	-16.6	-16.2	-16.0	-15.9	-15.6	-15.2	-14.9	-14.2	-13.7	-13.2	-13.2	-13.0	-13.2	-13.2	-13.2	-13.2	-13.2	-13.4	-13.4	-15.2	-13.0
19-Jan	-13.4	-13.5	-13.6	-13.6	-13.4	-13.3	-13.3	-13.3	-13.6	-13.9	-13.4	-13.0	-13.5	-13.2	-12.9	-13.5	-13.7	-13.5	-13.7	-13.9	-14.1	-14.3	-14.6	-14.8	-13.6	-12.9
20-Jan	-15.2	-15.8	-16.1	-16.4	-16.7	-16.8	-16.9	-16.9	-16.9	-16.7	-16.3	-15.6	-14.8	-14.4	-14.3	-14.4	-15.5	-14.2	-14.5	-13.8	-13.1	-13.0	-12.8	-12.6	-15.2	-12.6
21-Jan	-12.9	-12.8	-13.1	-13.7	-13.8	-13.7	-13.9	-15.7	-16.3	-15.5	-14.3	-13.4	-12.5	-11.4	-10.5	-9.7	-9.6	-9.3	-8.7	-8.5	-8.7	-8.7	-8.6	-8.9	-11.8	-8.5
22-Jan	-10.8	-11.6	-11.9	-12.3	-12.0	-12.5	-11.8	-11.2	-11.5	-11.5	-12.0	-11.5	-11.2	-10.4	-10.1	-9.8	-10.0	-10.2	-10.3	-10.2	-10.2	-10.1	-10.1	-10.2	-11.0	-9.8
23-Jan	-10.2	-10.3	-10.4	-10.5	-10.5	-10.4	-10.3	-10.3	-10.2	-10.0	-9.8	-9.7	-9.6	-9.4	-9.1	-9.1	-8.9	-9.1	-9.2	-9.4	-9.2	-8.9	-8.6	-8.7	-9.7	-8.6
24-Jan	-8.5	-8.4	-8.4	-8.5	-8.5	-8.2	-7.4	-6.5	-6.3	-6.1	-5.8	-5.4	-4.7	-3.8	-3.1	-3.9	-5.0	-5.7	-4.8	-5.5	-6.8	-7.5	-8.3	-8.6	-6.5	-3.1
25-Jan	-8.7	-8.7	-8.8	-8.9	-8.8	-8.9	-8.8	-8.6	-9.2	-9.5	-8.7	-8.1	-7.2	-5.8	-4.7	-4.8	-6.3	-6.8	-7.2	-7.8	-9.0	-9.0	-9.6	-10.0	-8.1	-4.7
26-Jan	-10.3	-10.3	-10.8	-9.5	-9.9	-10.1	-10.1	-10.2	-8.6	-7.8	-6.1	-5.7	-4.2	-2.8	-2.6	-3.2	-3.4	-4.0	-3.2	-3.4	0.4	4.2	4.3	3.7	-5.1	4.3
27-Jan	3.8	3.7	4.5	4.2	3.4	3.1	2.7	3.0	3.0	2.8	2.8	3.4	3.0	1.9	0.9	-0.7	-2.5	-3.8	-4.7	-5.8	-6.0	-5.8	-6.8	-7.5	0.1	4.5
28-Jan	-6.9	-4.9	-4.0	-2.6	-1.8	-1.7	-1.7	-3.4	-2.8	-1.9	-1.0	0.1	0.5	0.8	0.9	0.6	0.7	0.6	1.0	0.6	3.8	5.1	5.2	5.1	-0.3	5.2
29-Jan	4.7	4.3	3.5	2.4	1.9	2.3	2.6	2.6	2.1	1.6	2.3	3.1	4.0	4.8	4.6	4.9	3.7	2.4	1.6	1.1	0.5	-0.3	-0.9	-1.8	2.4	4.9
30-Jan	-3.0	-3.1	-4.3	-5.2	-5.0	-5.1	-2.9	-2.4	-3.7	-4.0	-2.3	-2.4	-2.9	-3.4	-4.1	-4.7	-5.9	-6.8	-8.0	-8.9	-9.0	-9.1	-9.5	-10.2	-5.3	-2.3
31-Jan	-10.8	-11.0	-11.0	-11.0	-11.3	-11.6	-11.8	-12.3	-12.5	-12.9	-12.9	-12.5	-13.4	-13.8	-13.9	-14.0	-14.4	-14.8	-15.0	-15.4	-15.7	-16.4	-17.1	-17.7	-13.5	-10.8
	-13.5	-13.7	-13.9	-14.1	-14.1	-14.2	-14.2	-14.2	-14.2	-13.9	-13.2	-12.4	-11.9	-11.3	-11.0	-11.1	-11.7	-12.1	-12.3	-12.7	-12.6	-12.7	-12.9	-13.4	Diurnal Average	
	4.7	4.3	4.5	4.2	3.4	3.1	2.7	3.0	3.0	2.8	2.8	3.4	4.0	4.8	4.6	4.9	3.7	2.4	1.6	1.1	3.8	5.1	5.2	5.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2 m (AT2m) - C

Mannix - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	120	16.13	16.13
-20 - 0	567	76.21	92.34
0 - 10	57	7.66	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 5.9 C on Jan 28 22:00

Maximum Daily Average: 3.1 C on Jan 29

Minimum Value: -32.0 C on Jan 16 10:00

Minimum Daily Average: -28.2 C on Jan 16

Maximum Diurnal Average: -10.9 C at hour 16

Minimum Diurnal Average: -13.7 C at hour 9

Monthly Average: -12.49 C

Percentiles: P_1 = -30.4 P_{10} = -21.3 Q_1 = -18.1 Median = -13.5 Q_3 = -7.7 P_{90} = -1.5 P_{99} = 5.1

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

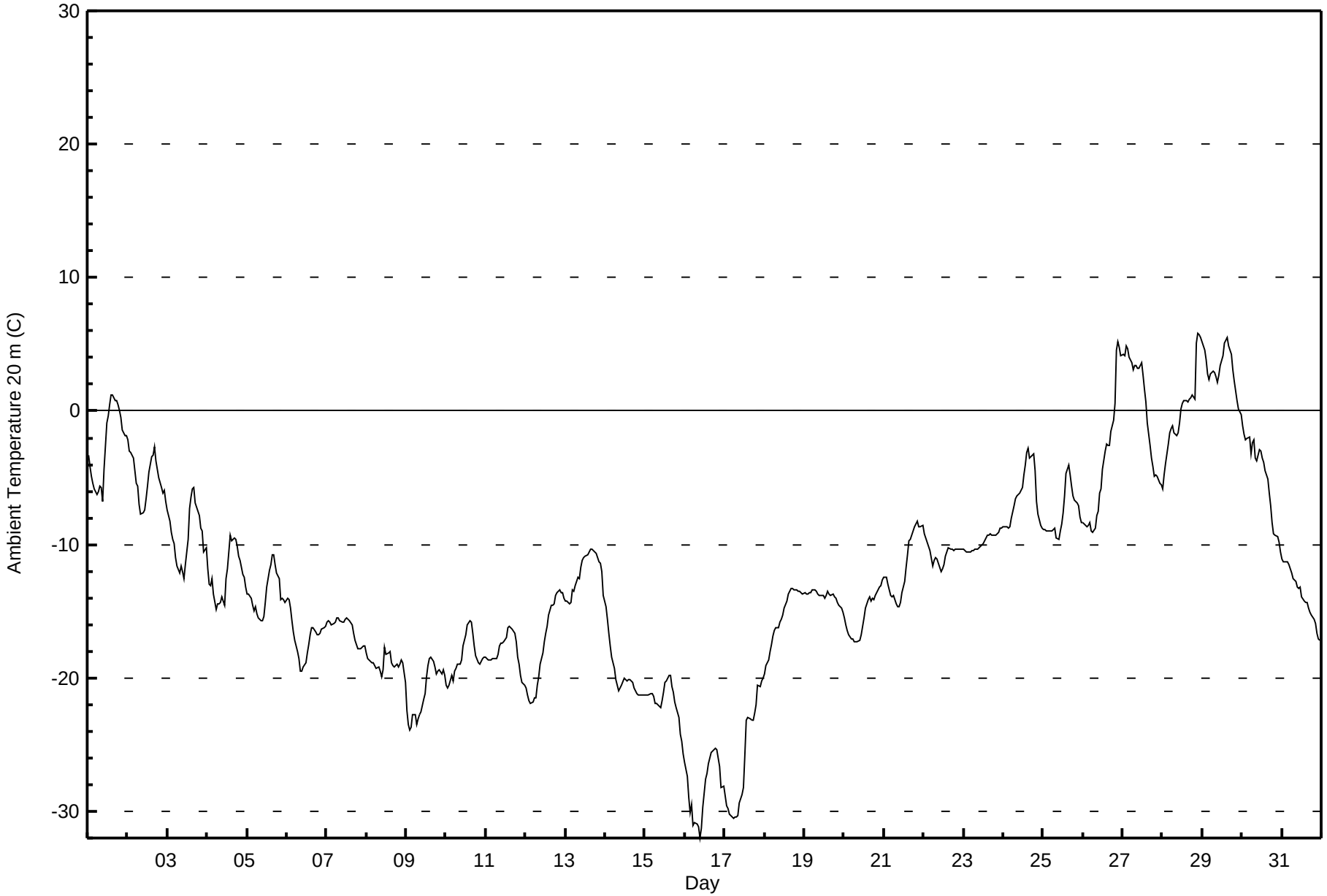
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-3.3	-4.2	-4.9	-5.4	-5.9	-6.3	-6.0	-5.6	-5.7	-6.8	-4.4	-0.9	-0.3	0.5	1.2	1.2	0.8	0.7	0.4	0.0	-0.5	-1.4	-1.8	-1.9	-2.5	1.2
2-Jan	-2.1	-3.0	-3.2	-3.6	-4.5	-5.4	-5.6	-6.9	-7.7	-7.7	-7.4	-6.6	-5.6	-4.6	-3.4	-3.3	-2.7	-3.7	-4.4	-4.9	-5.7	-6.2	-5.9	-6.7	-5.0	-2.1
3-Jan	-7.4	-8.2	-9.1	-9.6	-9.9	-11.0	-11.6	-12.2	-11.6	-12.0	-12.6	-11.5	-9.6	-7.3	-6.5	-5.9	-5.7	-6.9	-7.5	-7.9	-8.8	-9.0	-10.6	-10.2	-9.3	-5.7
4-Jan	-11.9	-13.0	-13.1	-12.5	-13.7	-14.9	-14.5	-14.5	-14.3	-14.0	-14.5	-12.5	-11.8	-10.6	-9.3	-9.7	-9.5	-9.6	-10.1	-10.9	-11.2	-12.2	-12.5	-13.2	-12.3	-9.3
5-Jan	-13.7	-13.7	-14.1	-14.6	-15.0	-14.7	-15.2	-15.5	-15.7	-15.7	-15.4	-14.4	-13.2	-11.9	-11.6	-10.8	-10.8	-11.5	-12.1	-12.5	-14.1	-14.1	-14.1	-14.3	-13.7	-10.8
6-Jan	-14.0	-14.1	-14.8	-15.7	-16.5	-17.2	-18.1	-18.5	-19.5	-19.5	-19.2	-18.9	-18.1	-17.5	-16.7	-16.2	-16.2	-16.5	-16.8	-16.8	-16.7	-16.4	-16.2	-16.1	-16.9	-14.0
7-Jan	-15.8	-15.7	-15.8	-16.1	-15.9	-15.8	-15.5	-15.5	-15.7	-15.8	-15.9	-15.6	-15.5	-15.6	-15.8	-16.0	-16.7	-17.2	-17.5	-17.8	-17.8	-17.7	-17.6	-17.6	-16.3	-15.5
8-Jan	-18.1	-18.6	-18.7	-18.9	-18.9	-19.0	-19.3	-19.2	-19.5	-19.9	-19.4	-17.7	-18.2	-18.1	-18.0	-18.9	-19.1	-19.2	-19.0	-19.2	-19.0	-18.7	-18.9	-20.3	-18.9	-17.7
9-Jan	-22.4	-23.5	-23.9	-23.7	-22.7	-22.8	-23.5	-23.1	-22.7	-22.5	-21.6	-21.1	-20.0	-19.1	-18.5	-18.4	-18.8	-19.2	-19.7	-19.5	-19.4	-19.7	-19.4	-19.8	-21.0	-18.4
10-Jan	-20.5	-20.8	-20.6	-19.9	-20.3	-19.5	-19.3	-18.9	-19.0	-18.7	-17.6	-17.2	-16.8	-16.1	-15.7	-15.9	-16.6	-17.6	-18.3	-18.9	-18.9	-18.7	-18.5	-18.5	-18.4	-15.7
11-Jan	-18.4	-18.7	-18.6	-18.6	-18.6	-18.6	-18.6	-18.2	-17.6	-17.4	-17.4	-17.3	-16.9	-16.3	-16.1	-16.2	-16.3	-16.6	-17.3	-18.5	-19.0	-19.8	-20.3	-20.6	-18.0	-16.1
12-Jan	-20.8	-21.3	-21.7	-21.9	-21.8	-21.5	-21.5	-20.6	-19.9	-19.0	-18.1	-17.3	-16.7	-16.2	-15.3	-14.5	-14.5	-14.4	-13.8	-13.7	-13.4	-13.6	-13.6	-14.1	-17.5	-13.4
13-Jan	-14.2	-14.2	-14.4	-14.3	-13.4	-13.5	-13.1	-12.4	-12.6	-11.7	-11.2	-11.0	-10.8	-10.8	-10.6	-10.3	-10.3	-10.4	-10.7	-11.0	-11.3	-11.4	-12.0	-13.8	-12.1	-10.3
14-Jan	-14.7	-15.6	-16.7	-17.6	-18.5	-19.3	-20.1	-20.6	-20.9	-20.7	-20.5	-20.1	-20.1	-20.2	-20.1	-20.1	-20.4	-20.7	-21.0	-21.2	-21.3	-21.2	-21.3	-21.2	-19.8	-14.7
15-Jan	-21.3	-21.3	-21.3	-21.2	-21.2	-21.4	-21.9	-21.9	-22.1	-22.2	-21.7	-21.1	-20.4	-20.2	-19.8	-19.8	-20.7	-21.1	-21.8	-22.3	-23.0	-24.2	-24.8	-25.7	-21.8	-19.8
16-Jan	-26.3	-27.4	-29.0	-30.1	-29.5	-31.0	-30.8	-30.9	-31.1	-32.0	-31.3	-29.7	-27.5	-27.2	-26.4	-26.0	-25.6	-25.4	-25.3	-25.4	-26.0	-26.7	-28.2	-28.1	-28.2	-25.3
17-Jan	-28.8	-29.6	-29.8	-30.2	-30.4	-30.5	-30.4	-30.4	-30.3	-29.4	-28.7	-28.3	-25.8	-23.2	-22.9	-23.0	-23.2	-23.1	-22.7	-22.0	-20.6	-20.6	-20.2	-20.1	-26.0	-20.1
18-Jan	-19.7	-19.1	-18.7	-18.1	-17.5	-16.9	-16.4	-16.3	-16.2	-15.9	-15.6	-15.3	-14.8	-14.2	-13.7	-13.5	-13.3	-13.3	-13.4	-13.4	-13.5	-13.5	-13.6	-13.7	-15.4	-13.3
19-Jan	-13.6	-13.7	-13.7	-13.7	-13.6	-13.5	-13.5	-13.5	-13.7	-13.8	-13.8	-13.8	-14.1	-13.8	-13.5	-13.7	-13.8	-13.7	-13.9	-14.1	-14.3	-14.6	-14.8	-15.1	-13.9	-13.5
20-Jan	-15.5	-16.0	-16.4	-16.7	-17.0	-17.1	-17.3	-17.3	-17.3	-17.2	-16.8	-16.1	-15.5	-14.7	-14.1	-13.9	-14.3	-14.1	-14.1	-13.8	-13.4	-13.2	-13.0	-12.7	-15.3	-12.7
21-Jan	-12.5	-12.5	-13.0	-13.4	-13.8	-13.9	-13.8	-14.4	-14.6	-14.7	-14.4	-13.7	-12.8	-11.7	-10.8	-9.7	-9.6	-9.3	-8.7	-8.4	-8.3	-8.7	-8.7	-8.5	-11.7	-8.3
22-Jan	-9.2	-9.6	-9.8	-10.1	-10.5	-11.6	-11.2	-11.0	-11.1	-11.4	-12.1	-11.8	-11.5	-10.8	-10.6	-10.2	-10.4	-10.4	-10.4	-10.4	-10.4	-10.3	-10.3	-10.3	-10.6	-9.2
23-Jan	-10.4	-10.5	-10.5	-10.6	-10.6	-10.5	-10.4	-10.4	-10.3	-10.3	-10.2	-10.1	-9.9	-9.7	-9.3	-9.3	-9.2	-9.3	-9.3	-9.3	-9.2	-9.0	-8.8	-8.8	-9.8	-8.8
24-Jan	-8.7	-8.6	-8.7	-8.8	-8.7	-8.1	-7.1	-6.6	-6.4	-6.3	-6.2	-5.8	-4.8	-4.0	-3.1	-2.7	-3.5	-3.3	-3.3	-4.5	-6.8	-7.7	-8.6	-8.8	-6.3	-2.7
25-Jan	-8.9	-8.9	-9.0	-9.0	-8.9	-9.0	-8.9	-8.8	-9.5	-9.6	-9.0	-8.4	-7.7	-6.3	-4.7	-4.1	-4.8	-5.6	-6.3	-6.7	-6.9	-7.1	-7.9	-8.4	-7.7	-4.1
26-Jan	-8.3	-8.5	-8.7	-8.6	-8.3	-9.0	-9.1	-8.8	-7.8	-7.5	-6.2	-5.9	-4.3	-3.0	-2.4	-2.6	-2.6	-1.5	-0.7	0.5	4.5	5.2	4.7	4.1	-3.9	5.2
27-Jan	4.3	4.1	4.9	4.7	4.1	3.6	3.1	3.4	3.4	3.2	3.2	3.6	2.7	1.7	0.7	-0.9	-2.6	-3.5	-4.1	-4.9	-4.8	-4.8	-5.4	-5.5	0.6	4.9
28-Jan	-5.8	-4.8	-4.0	-2.5	-1.7	-1.3	-1.1	-1.7	-1.9	-1.7	-0.9	0.1	0.6	0.7	0.7	0.7	0.8	1.0	1.2	0.9	5.1	5.9	5.7	5.5	0.1	5.9
29-Jan	5.2	4.6	3.8	2.8	2.4	2.8	3.0	2.9	2.5	2.2	2.7	3.4	4.2	5.1	5.3	5.5	4.8	4.2	3.1	2.2	1.5	0.8	0.1	-0.2	3.1	5.5
30-Jan	-1.1	-1.7	-2.2	-2.1	-1.9	-3.2	-2.3	-2.1	-3.5	-3.8	-2.9	-3.0	-3.5	-3.8	-4.5	-5.1	-6.2	-7.1	-8.3	-9.2	-9.3	-9.4	-9.8	-10.5	-4.9	-1.1
31-Jan	-11.1	-11.3	-11.3	-11.3	-11.6	-11.9	-12.1	-12.5	-12.8	-13.2	-13.3	-13.2	-13.9	-14.3	-14.3	-14.4	-14.8	-15.1	-15.3	-15.6	-16.0	-16.6	-17.1	-17.2	-13.8	-11.1
	-12.6	-12.9	-13.1	-13.3	-13.4	-13.6	-13.6	-13.6	-13.7	-13.7	-13.3	-12.6	-12.0	-11.4	-11.0	-10.9	-11.1	-11.4	-11.6	-11.9	-11.9	-12.1	-12.4	-12.7	Diurnal Average	
	5.2	4.6	4.9	4.7	4.1	3.6	3.1	3.4	3.4	3.2	3.2	3.6	4.2	5.1	5.3	5.5	4.8	4.2	3.1	2.2	5.1	5.9	5.7	5.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 20 m (AT20m) - C

Mannix - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	115	15.46	15.46
-20 - 0	566	76.08	91.53
0 - 10	63	8.47	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 6.0 C on Jan 28 22:00

Maximum Daily Average: 3.3 C on Jan 29

Minimum Value: -30.7 C on Jan 16 10:00

Minimum Daily Average: -26.9 C on Jan 16

Maximum Diurnal Average: -10.8 C at hour 16

Minimum Diurnal Average: -13.4 C at hour 9

Monthly Average: -12.18 C

Percentiles: P_1 = -30.0 P_{10} = -21.5 Q_1 = -18.2 Median = -13.4 Q_3 = -6.5 P_{90} = -0.9 P_{99} = 5.3

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

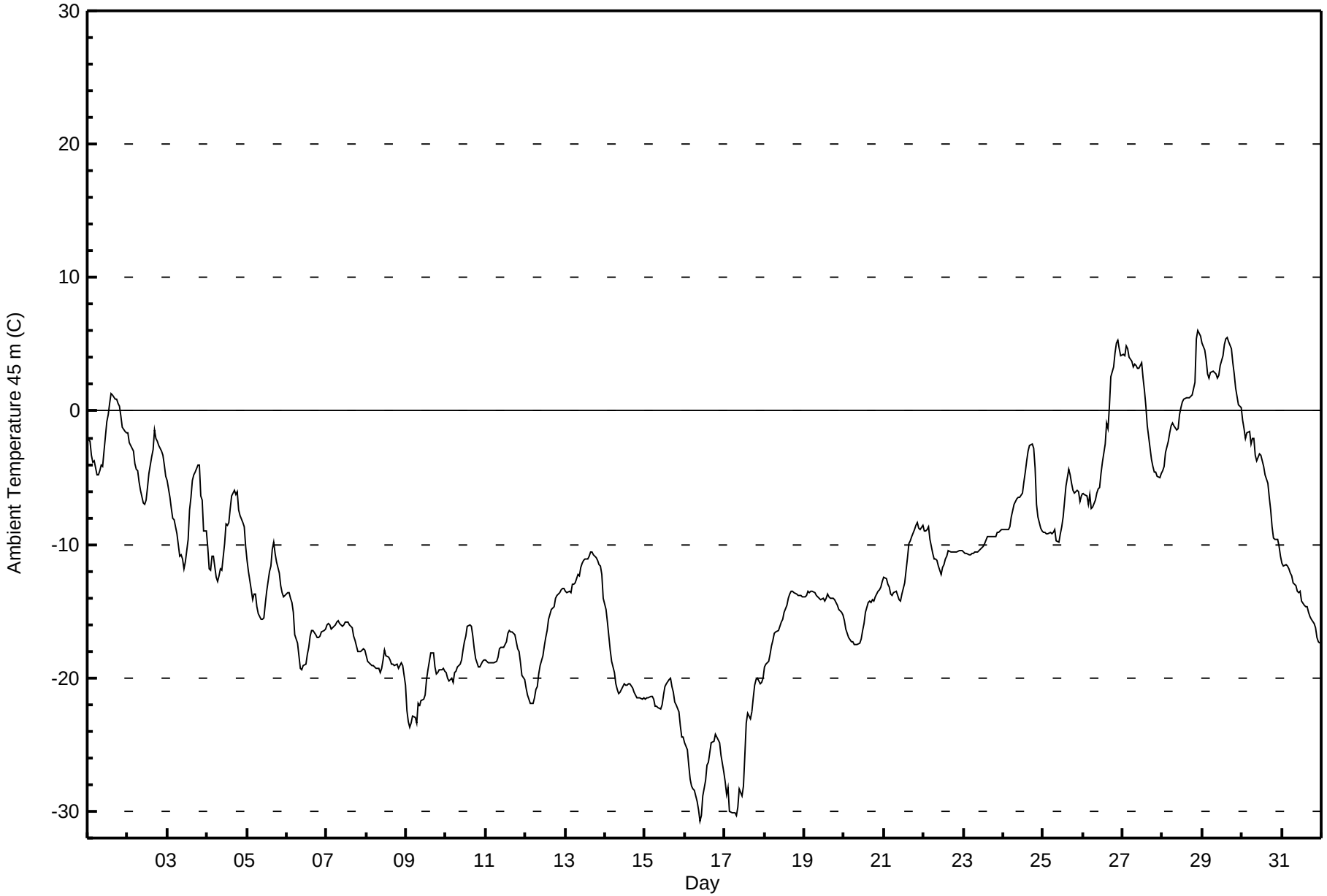
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.1	-2.3	-3.3	-3.8	-3.7	-4.8	-4.7	-4.5	-4.0	-4.2	-3.0	-0.8	-0.3	0.5	1.3	1.2	0.9	0.9	0.6	0.3	-0.3	-1.2	-1.6	-1.7	-1.7	1.3
2-Jan	-1.7	-2.4	-2.6	-3.0	-4.0	-4.4	-4.4	-5.3	-5.9	-6.8	-7.0	-6.7	-5.7	-4.7	-3.4	-2.9	-1.4	-2.1	-2.2	-2.5	-3.0	-3.3	-4.0	-4.9	-3.9	-1.4
3-Jan	-5.3	-6.5	-7.3	-8.0	-8.2	-8.6	-9.2	-10.9	-10.8	-11.1	-11.8	-11.3	-9.7	-7.4	-6.5	-5.2	-4.8	-4.6	-4.0	-4.1	-6.4	-6.6	-9.0	-8.9	-7.8	-4.0
4-Jan	-10.2	-11.9	-12.0	-10.9	-10.9	-12.4	-12.8	-12.3	-11.8	-12.0	-9.9	-8.4	-8.6	-8.3	-7.3	-6.4	-5.9	-6.2	-6.1	-7.4	-7.8	-8.4	-8.7	-10.1	-9.4	-5.9
5-Jan	-11.1	-12.0	-13.4	-14.1	-13.7	-13.8	-14.6	-15.2	-15.6	-15.6	-15.6	-14.5	-13.5	-12.1	-11.7	-10.4	-9.8	-10.6	-11.3	-12.1	-13.1	-13.6	-13.9	-13.9	-13.1	-9.8
6-Jan	-13.6	-13.6	-14.0	-14.4	-15.0	-16.7	-17.4	-18.4	-19.3	-19.3	-19.0	-18.9	-18.3	-17.7	-16.9	-16.4	-16.4	-16.7	-17.0	-17.0	-16.9	-16.6	-16.5	-16.3	-16.8	-13.6
7-Jan	-16.0	-16.0	-16.0	-16.3	-16.1	-16.0	-15.8	-15.7	-15.9	-16.1	-16.1	-15.8	-15.8	-15.9	-16.0	-16.3	-16.8	-17.2	-17.6	-18.0	-18.0	-17.9	-17.8	-17.9	-16.5	-15.7
8-Jan	-18.3	-18.8	-19.0	-19.1	-19.1	-19.2	-19.3	-19.2	-19.6	-19.3	-18.6	-18.0	-18.4	-18.5	-18.7	-19.0	-19.0	-19.0	-19.0	-19.2	-19.1	-18.8	-19.1	-20.5	-19.0	-18.0
9-Jan	-22.5	-23.3	-23.7	-23.4	-22.8	-23.0	-23.4	-21.9	-22.1	-21.7	-21.6	-21.3	-20.1	-19.4	-18.8	-18.2	-18.1	-19.2	-19.7	-19.6	-19.4	-19.4	-19.3	-19.5	-20.9	-18.1
10-Jan	-19.6	-20.0	-20.2	-20.0	-20.3	-19.6	-19.5	-19.2	-18.9	-18.6	-17.9	-17.3	-16.9	-16.2	-16.0	-16.1	-16.9	-17.8	-18.5	-19.1	-19.2	-19.0	-18.8	-18.7	-18.5	-16.0
11-Jan	-18.7	-18.9	-18.9	-18.9	-18.9	-18.9	-18.8	-18.4	-17.9	-17.7	-17.8	-17.7	-17.3	-16.6	-16.5	-16.5	-16.6	-16.8	-17.3	-17.8	-18.0	-18.9	-19.8	-20.1	-18.1	-16.5
12-Jan	-20.8	-21.2	-21.6	-21.9	-21.9	-21.5	-20.8	-20.7	-19.7	-19.1	-18.3	-17.7	-17.0	-16.4	-15.6	-14.9	-14.8	-14.6	-14.0	-13.8	-13.6	-13.4	-13.3	-13.3	-17.5	-13.3
13-Jan	-13.5	-13.6	-13.5	-13.6	-13.0	-13.0	-12.9	-12.3	-12.4	-11.7	-11.4	-11.2	-11.1	-11.1	-10.9	-10.6	-10.6	-10.7	-11.0	-11.2	-11.5	-11.6	-12.2	-14.0	-12.0	-10.6
14-Jan	-14.9	-15.8	-16.9	-17.9	-18.7	-19.6	-20.4	-20.9	-21.2	-21.0	-20.8	-20.4	-20.5	-20.6	-20.5	-20.4	-20.7	-21.0	-21.3	-21.5	-21.5	-21.5	-21.6	-21.5	-20.0	-14.9
15-Jan	-21.6	-21.5	-21.5	-21.4	-21.4	-21.6	-22.1	-22.1	-22.2	-22.4	-22.0	-21.3	-20.6	-20.5	-20.1	-20.1	-20.6	-21.1	-21.8	-22.0	-22.5	-23.6	-24.4	-24.4	-21.8	-20.1
16-Jan	-24.9	-25.4	-26.5	-27.5	-28.1	-28.4	-28.4	-29.3	-29.9	-30.7	-30.3	-28.9	-27.7	-26.5	-26.3	-25.6	-24.9	-24.8	-24.2	-24.5	-24.6	-24.8	-25.8	-27.1	-26.9	-24.2
17-Jan	-27.8	-28.8	-28.3	-30.0	-30.1	-30.1	-30.1	-30.3	-29.7	-28.3	-28.9	-28.1	-25.8	-23.4	-22.6	-23.1	-22.5	-21.5	-20.6	-20.1	-20.0	-20.4	-20.3	-20.0	-25.4	-20.0
18-Jan	-19.1	-19.0	-18.8	-18.3	-17.7	-17.1	-16.7	-16.5	-16.4	-16.1	-15.8	-15.6	-15.1	-14.6	-14.0	-13.7	-13.5	-13.5	-13.6	-13.7	-13.8	-13.8	-13.9	-13.9	-15.6	-13.5
19-Jan	-13.9	-13.8	-13.5	-13.6	-13.5	-13.6	-13.7	-13.8	-13.9	-14.0	-14.2	-14.0	-14.3	-14.1	-13.7	-13.9	-14.1	-14.0	-14.2	-14.3	-14.6	-14.9	-15.1	-15.3	-14.1	-13.5
20-Jan	-15.7	-16.3	-16.7	-17.0	-17.3	-17.3	-17.5	-17.5	-17.5	-17.4	-17.1	-16.4	-15.9	-15.0	-14.3	-14.2	-14.4	-14.2	-14.2	-13.9	-13.5	-13.4	-13.2	-12.7	-15.5	-12.7
21-Jan	-12.4	-12.5	-13.0	-13.2	-13.8	-13.8	-13.6	-13.6	-13.8	-14.1	-14.3	-13.7	-12.9	-11.9	-10.9	-9.9	-9.7	-9.4	-8.9	-8.5	-8.3	-8.8	-8.9	-8.5	-11.6	-8.3
22-Jan	-9.0	-9.0	-8.9	-8.7	-9.6	-10.7	-11.1	-11.1	-11.2	-11.6	-12.2	-11.7	-11.5	-11.1	-10.9	-10.5	-10.6	-10.6	-10.6	-10.6	-10.5	-10.5	-10.5	-10.5	-10.5	-8.7
23-Jan	-10.6	-10.7	-10.7	-10.8	-10.7	-10.7	-10.6	-10.6	-10.5	-10.5	-10.3	-10.3	-10.2	-10.0	-9.5	-9.4	-9.4	-9.4	-9.4	-9.4	-9.1	-9.1	-9.0	-8.9	-10.0	-8.9
24-Jan	-8.9	-8.9	-8.8	-8.9	-8.6	-7.9	-7.0	-6.7	-6.6	-6.5	-6.5	-6.1	-5.3	-4.6	-3.7	-3.0	-2.6	-2.4	-2.8	-4.3	-7.0	-7.9	-8.8	-9.0	-6.4	-2.4
25-Jan	-9.1	-9.1	-9.2	-9.2	-9.1	-9.2	-9.1	-8.9	-9.7	-9.8	-9.2	-8.7	-7.9	-6.8	-5.6	-4.3	-4.7	-5.4	-6.0	-6.1	-5.9	-6.1	-6.8	-6.4	-7.6	-4.3
26-Jan	-6.2	-6.2	-6.3	-7.0	-6.3	-7.3	-7.2	-6.7	-6.1	-5.8	-5.7	-4.7	-3.9	-2.5	-0.9	-1.3	0.4	2.6	3.3	4.3	5.0	5.3	4.7	4.1	-2.3	5.3
27-Jan	4.3	4.1	4.9	4.7	4.1	3.7	3.3	3.5	3.4	3.2	3.3	3.6	2.5	1.5	0.4	-1.1	-2.8	-3.7	-4.1	-4.5	-4.5	-4.9	-5.0	-4.7	0.6	4.9
28-Jan	-4.5	-4.1	-3.1	-2.2	-1.6	-1.1	-0.9	-1.1	-1.4	-1.3	-0.3	0.3	0.6	0.8	1.0	1.0	1.0	1.1	1.2	2.1	5.4	6.0	5.8	5.6	0.4	6.0
29-Jan	5.1	4.6	3.8	2.8	2.5	2.9	3.0	2.9	2.8	2.5	2.7	3.4	4.1	5.0	5.4	5.5	5.2	4.6	3.6	2.8	1.8	1.1	0.5	0.3	3.3	5.5
30-Jan	-0.7	-1.3	-2.0	-1.6	-1.5	-2.5	-2.1	-2.1	-3.4	-3.7	-3.2	-3.3	-3.8	-4.1	-4.8	-5.4	-6.5	-7.4	-8.6	-9.5	-9.6	-9.7	-10.1	-10.8	-4.9	-0.7
31-Jan	-11.4	-11.6	-11.6	-11.6	-11.9	-12.2	-12.4	-12.9	-13.1	-13.5	-13.6	-13.5	-14.2	-14.6	-14.6	-14.7	-15.0	-15.4	-15.6	-15.9	-16.3	-16.9	-17.3	-17.4	-14.0	-11.4
	-12.1	-12.4	-12.7	-12.9	-12.9	-13.2	-13.2	-13.3	-13.4	-13.4	-13.1	-12.6	-12.1	-11.5	-11.0	-10.8	-10.8	-11.0	-11.1	-11.3	-11.5	-11.7	-12.0	-12.3	Diurnal Average	
	5.1	4.6	4.9	4.7	4.1	3.7	3.3	3.5	3.4	3.2	3.3	3.6	4.1	5.0	5.4	5.5	5.2	4.6	3.6	4.3	5.4	6.0	5.8	5.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 45 m (AT45m) - C

Mannix - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	116	15.59	15.59
-20 - 0	561	75.40	90.99
0 - 10	67	9.01	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 6.0 C on Jan 28 22:00

Maximum Daily Average: 3.2 C on Jan 29

Minimum Value: -29.6 C on Jan 16 10:00

Minimum Daily Average: -26.1 C on Jan 16

Maximum Diurnal Average: -10.7 C at hour 17

Minimum Diurnal Average: -12.8 C at hour 8

Monthly Average: -11.84 C

Percentiles: P_1 = -27.4 P_{10} = -21.4 Q_1 = -18.1 Median = -12.8 Q_3 = -5.4 P_{90} = -0.4 P_{99} = 5.2

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

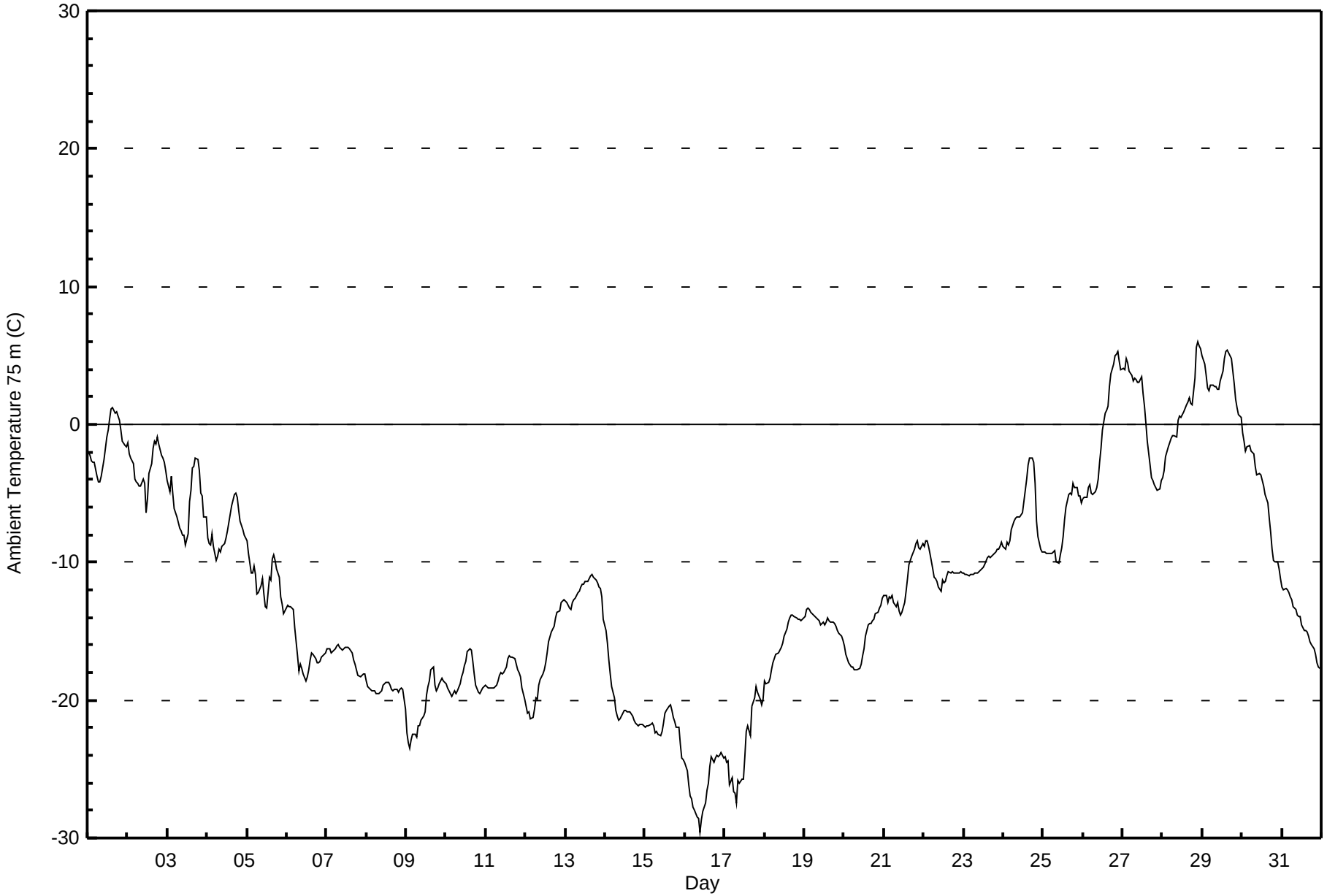
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.0	-2.2	-2.7	-2.7	-2.8	-3.7	-4.1	-4.2	-3.8	-3.2	-2.6	-1.0	-0.4	0.4	1.2	1.2	0.8	0.9	0.6	0.3	-0.4	-1.2	-1.6	-1.6	-1.5	1.2
2-Jan	-1.3	-2.1	-2.4	-2.8	-4.0	-4.2	-4.2	-4.5	-4.5	-3.9	-4.3	-6.4	-5.3	-3.6	-2.8	-1.8	-1.2	-1.4	-0.9	-1.5	-2.2	-2.5	-2.7	-3.4	-3.1	-0.9
3-Jan	-4.1	-4.9	-3.8	-5.0	-6.1	-6.4	-6.7	-7.6	-7.7	-8.0	-8.1	-8.8	-7.9	-5.6	-4.8	-3.1	-3.0	-2.5	-2.5	-3.3	-5.0	-5.2	-6.7	-6.7	-5.6	-2.5
4-Jan	-8.2	-8.6	-8.8	-8.0	-8.8	-9.8	-9.5	-9.1	-9.3	-8.8	-8.6	-8.2	-7.7	-7.1	-6.5	-5.9	-5.1	-5.0	-5.3	-6.2	-7.0	-7.7	-8.0	-8.3	-7.7	-5.0
5-Jan	-8.5	-9.3	-10.8	-10.7	-10.3	-10.9	-12.3	-12.2	-11.7	-11.2	-12.3	-13.2	-13.3	-11.1	-11.2	-9.7	-9.5	-9.8	-10.4	-11.1	-12.5	-13.0	-13.8	-13.6	-11.3	-8.5
6-Jan	-13.1	-13.2	-13.2	-13.3	-13.5	-14.8	-16.8	-17.9	-17.4	-17.7	-18.1	-18.6	-18.4	-17.8	-17.1	-16.6	-16.7	-17.0	-17.3	-17.3	-17.1	-16.8	-16.7	-16.6	-16.4	-13.1
7-Jan	-16.3	-16.3	-16.3	-16.6	-16.4	-16.3	-16.1	-16.0	-16.2	-16.4	-16.3	-16.1	-16.2	-16.2	-16.3	-16.6	-17.1	-17.4	-17.8	-18.2	-18.3	-18.2	-18.1	-18.1	-16.8	-16.0
8-Jan	-18.6	-19.0	-19.3	-19.3	-19.3	-19.3	-19.6	-19.5	-19.5	-19.4	-18.9	-18.8	-18.7	-18.7	-18.9	-19.2	-19.3	-19.3	-19.2	-19.4	-19.2	-19.1	-19.2	-20.7	-19.2	-18.6
9-Jan	-22.3	-23.1	-23.5	-22.9	-22.5	-22.5	-22.7	-21.8	-21.9	-21.4	-21.1	-20.9	-19.6	-19.1	-18.6	-17.8	-17.6	-18.9	-19.3	-19.2	-18.8	-18.4	-18.6	-18.7	-20.5	-17.6
10-Jan	-18.8	-19.2	-19.3	-19.8	-19.5	-19.3	-19.6	-19.3	-18.8	-18.3	-18.0	-17.5	-17.2	-16.5	-16.3	-16.4	-17.2	-18.1	-18.9	-19.5	-19.5	-19.3	-19.1	-19.0	-18.5	-16.3
11-Jan	-18.9	-19.1	-19.1	-19.1	-19.1	-19.1	-18.9	-18.6	-18.2	-17.9	-18.1	-18.0	-17.6	-16.9	-16.8	-16.9	-16.9	-17.0	-17.4	-17.8	-18.0	-18.3	-19.1	-19.9	-18.2	-16.8
12-Jan	-20.5	-21.0	-20.8	-21.3	-21.2	-20.6	-19.8	-19.9	-18.9	-18.5	-18.1	-17.8	-17.3	-16.6	-15.8	-15.1	-14.9	-14.6	-14.0	-13.6	-13.5	-12.9	-12.8	-12.7	-17.2	-12.7
13-Jan	-12.8	-12.9	-13.3	-13.4	-12.9	-12.8	-12.6	-12.2	-12.1	-11.7	-11.6	-11.5	-11.4	-11.4	-11.2	-10.9	-10.9	-11.0	-11.3	-11.5	-11.8	-11.9	-12.5	-14.1	-12.1	-10.9
14-Jan	-14.9	-15.9	-17.1	-18.1	-19.0	-19.9	-20.7	-21.2	-21.4	-21.3	-21.1	-20.7	-20.8	-20.9	-20.8	-20.8	-21.1	-21.4	-21.6	-21.8	-21.9	-21.7	-21.8	-21.9	-20.3	-14.9
15-Jan	-21.9	-21.9	-21.9	-21.7	-21.6	-21.8	-22.4	-22.3	-22.5	-22.6	-22.2	-21.7	-21.0	-20.8	-20.4	-20.4	-20.7	-21.2	-21.5	-22.0	-22.0	-23.2	-24.2	-24.3	-21.9	-20.4
16-Jan	-24.5	-25.1	-26.1	-26.9	-27.1	-27.7	-28.0	-28.5	-28.6	-29.6	-28.7	-28.1	-27.4	-26.6	-26.0	-24.8	-24.1	-24.5	-24.2	-24.0	-24.1	-24.1	-23.8	-24.2	-26.1	-23.8
17-Jan	-24.1	-24.6	-24.4	-26.1	-25.7	-26.7	-26.8	-27.4	-25.8	-26.1	-25.8	-25.8	-24.1	-22.2	-21.8	-22.6	-20.4	-20.2	-19.8	-19.1	-19.4	-19.9	-20.4	-20.0	-23.3	-19.1
18-Jan	-18.6	-18.8	-18.7	-18.4	-17.8	-17.3	-17.0	-16.7	-16.6	-16.4	-16.1	-15.9	-15.4	-14.8	-14.3	-14.0	-13.8	-13.8	-13.9	-14.0	-14.1	-14.1	-14.2	-14.2	-15.8	-13.8
19-Jan	-13.9	-13.4	-13.3	-13.4	-13.6	-13.7	-13.9	-14.1	-14.2	-14.2	-14.5	-14.4	-14.5	-14.3	-14.0	-14.2	-14.4	-14.3	-14.5	-14.6	-14.9	-15.2	-15.4	-15.7	-14.3	-13.3
20-Jan	-16.1	-16.7	-17.0	-17.3	-17.6	-17.6	-17.8	-17.8	-17.8	-17.7	-17.4	-16.7	-16.3	-15.4	-14.6	-14.4	-14.5	-14.3	-14.1	-13.8	-13.6	-13.4	-13.1	-12.6	-15.7	-12.6
21-Jan	-12.4	-12.4	-12.9	-12.5	-12.6	-12.4	-12.9	-13.2	-13.0	-13.5	-13.8	-13.6	-12.9	-12.1	-11.1	-10.2	-9.9	-9.6	-9.1	-8.6	-8.4	-8.9	-9.0	-8.6	-11.4	-8.4
22-Jan	-8.8	-8.4	-8.5	-8.8	-9.4	-10.5	-11.1	-11.2	-11.3	-11.8	-12.1	-11.3	-11.5	-11.4	-11.0	-10.7	-10.8	-10.7	-10.8	-10.8	-10.8	-10.8	-10.7	-10.8	-10.6	-8.4
23-Jan	-10.8	-10.9	-10.9	-11.0	-10.9	-10.9	-10.9	-10.8	-10.8	-10.7	-10.6	-10.5	-10.4	-10.1	-9.7	-9.5	-9.6	-9.5	-9.5	-9.3	-9.1	-9.1	-8.8	-8.6	-10.1	-8.6
24-Jan	-8.8	-9.0	-8.6	-8.7	-8.4	-7.7	-7.0	-6.9	-6.7	-6.7	-6.7	-6.4	-5.6	-4.8	-4.0	-3.0	-2.4	-2.5	-2.8	-4.2	-7.1	-8.2	-9.1	-9.2	-6.4	-2.4
25-Jan	-9.3	-9.3	-9.4	-9.4	-9.3	-9.4	-9.3	-9.1	-9.9	-10.0	-9.4	-8.9	-8.1	-7.0	-6.0	-5.1	-4.9	-5.1	-4.3	-4.6	-4.6	-5.2	-5.2	-5.7	-7.4	-4.3
26-Jan	-5.4	-5.3	-5.3	-4.6	-4.4	-5.0	-5.0	-4.8	-4.6	-4.0	-2.7	-1.8	-0.4	0.9	1.0	1.4	2.7	3.7	4.4	5.0	5.1	5.3	4.6	4.0	-0.6	5.3
27-Jan	4.1	4.0	4.8	4.5	3.9	3.5	3.2	3.4	3.3	3.0	3.1	3.4	2.2	1.3	0.1	-1.2	-3.0	-3.8	-4.1	-4.4	-4.5	-4.8	-4.6	-4.1	0.6	4.8
28-Jan	-3.9	-3.4	-2.3	-1.6	-1.4	-1.0	-0.8	-0.8	-0.9	0.3	0.6	0.5	0.7	0.9	1.5	1.6	1.9	1.5	1.4	3.4	5.6	6.0	5.7	5.5	0.9	6.0
29-Jan	5.0	4.4	3.6	2.7	2.5	2.8	2.9	2.7	2.7	2.5	2.5	3.2	3.9	4.7	5.2	5.4	5.2	4.8	3.9	2.9	1.8	1.2	0.8	0.5	3.2	5.4
30-Jan	-0.6	-1.3	-2.0	-1.6	-1.5	-2.0	-2.0	-2.1	-3.1	-3.6	-3.5	-3.7	-4.1	-4.5	-5.1	-5.7	-6.8	-7.8	-9.0	-9.8	-9.9	-10.0	-10.4	-11.2	-5.1	-0.6
31-Jan	-11.8	-12.0	-11.9	-12.0	-12.2	-12.5	-12.7	-13.2	-13.5	-13.8	-14.0	-13.9	-14.6	-14.9	-15.0	-15.0	-15.4	-15.8	-16.0	-16.3	-16.6	-17.3	-17.6	-17.7	-14.4	-11.8
	-11.7	-12.0	-12.1	-12.3	-12.3	-12.6	-12.7	-12.8	-12.7	-12.7	-12.5	-12.4	-12.0	-11.4	-11.0	-10.7	-10.7	-10.8	-11.0	-11.1	-11.4	-11.5	-11.8	-12.0	Diurnal Average	
	5.0	4.4	4.8	4.5	3.9	3.5	3.2	3.4	3.3	3.0	3.1	3.4	3.9	4.7	5.2	5.4	5.2	4.8	4.4	5.0	5.6	6.0	5.7	5.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 75 m (AT75m) - C

Mannix - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	104	13.98	13.98
-20 - 0	568	76.34	90.32
0 - 10	72	9.68	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 5.9 C on Jan 28 22:00

Maximum Daily Average: 3.2 C on Jan 29

Minimum Value: -29.1 C on Jan 16 10:00

Minimum Daily Average: -25.8 C on Jan 16

Maximum Diurnal Average: -10.6 C at hour 17

Minimum Diurnal Average: -12.6 C at hour 8

Monthly Average: -11.71 C

Percentiles: P_1 = -27.2 P_{10} = -21.5 Q_1 = -18.2 Median = -12.5 Q_3 = -5.2 P_{90} = -0.8 P_{99} = 5.1

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

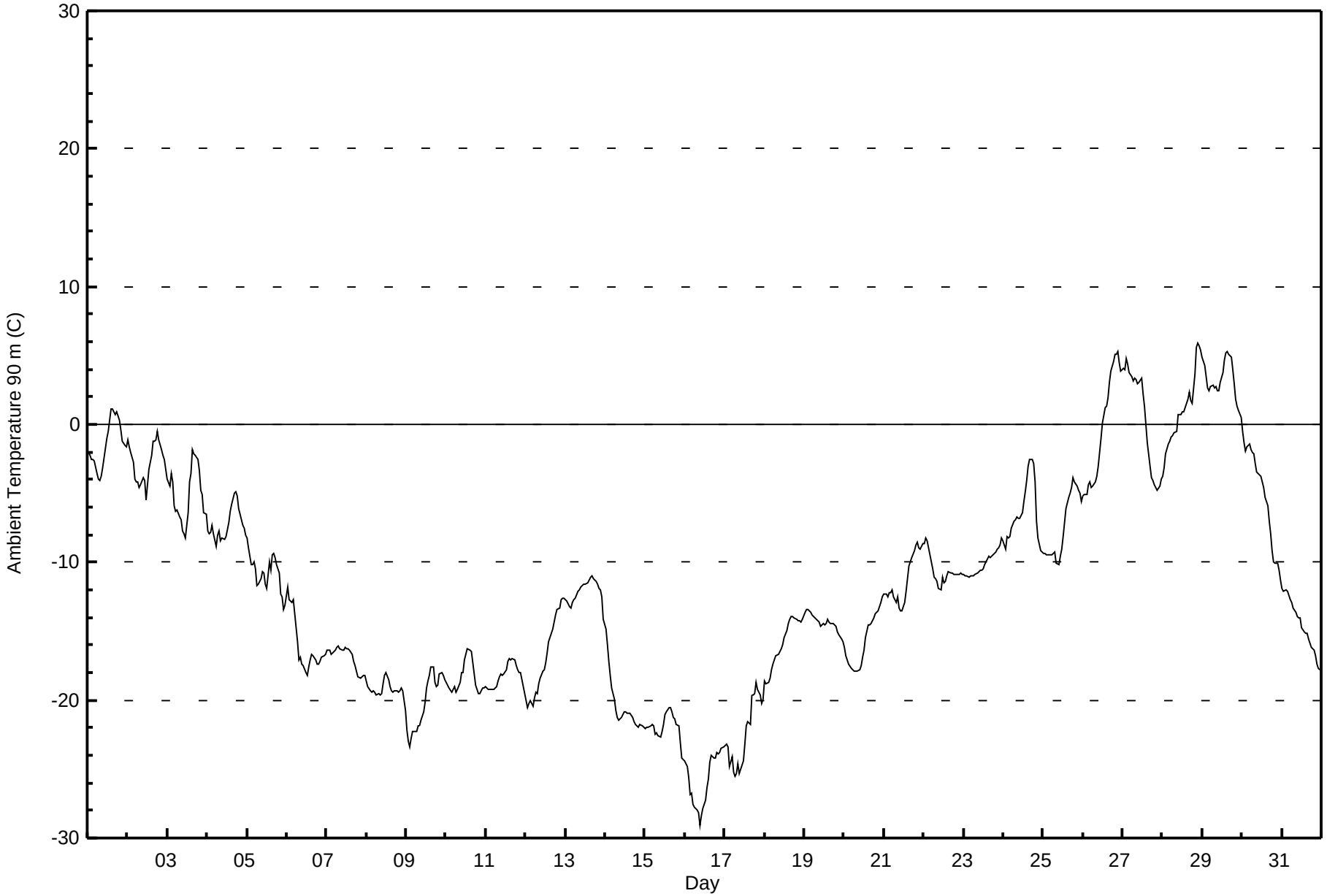
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.0	-2.2	-2.6	-2.6	-2.7	-3.5	-4.0	-4.1	-3.8	-3.1	-2.5	-1.0	-0.5	0.3	1.1	1.1	0.7	0.9	0.6	0.3	-0.4	-1.2	-1.5	-1.6	-1.4	1.1
2-Jan	-1.1	-1.7	-2.1	-2.7	-4.0	-4.1	-4.2	-4.5	-4.4	-3.8	-4.0	-5.4	-4.4	-3.2	-2.2	-1.3	-1.2	-1.1	-0.5	-1.2	-1.9	-2.2	-2.5	-3.3	-2.8	-0.5
3-Jan	-3.9	-4.4	-3.5	-4.2	-5.9	-6.3	-6.2	-6.7	-6.9	-7.7	-7.9	-8.3	-6.4	-4.1	-3.6	-1.8	-2.1	-2.2	-2.5	-3.3	-4.8	-5.1	-6.4	-6.5	-5.0	-1.8
4-Jan	-7.8	-7.9	-7.8	-7.4	-7.9	-8.8	-8.0	-7.8	-8.4	-8.2	-8.3	-8.1	-7.6	-7.1	-6.3	-5.8	-5.0	-4.9	-5.2	-6.1	-6.5	-7.4	-7.5	-8.0	-7.2	-4.9
5-Jan	-8.2	-8.9	-10.2	-10.2	-10.0	-10.5	-11.7	-11.6	-11.2	-10.7	-10.8	-11.6	-11.9	-9.9	-10.6	-9.4	-9.4	-9.7	-10.2	-10.8	-12.3	-12.5	-13.4	-13.1	-10.8	-8.2
6-Jan	-11.8	-12.8	-12.8	-12.9	-12.7	-13.7	-15.8	-17.1	-16.9	-17.4	-17.5	-18.0	-18.2	-17.6	-17.1	-16.7	-16.8	-17.1	-17.4	-17.4	-17.2	-16.9	-16.8	-16.6	-16.1	-11.8
7-Jan	-16.4	-16.4	-16.4	-16.7	-16.5	-16.4	-16.1	-16.1	-16.3	-16.4	-16.4	-16.2	-16.3	-16.3	-16.4	-16.7	-17.2	-17.5	-17.9	-18.3	-18.4	-18.3	-18.2	-18.2	-16.9	-16.1
8-Jan	-18.7	-19.1	-19.3	-19.4	-19.4	-19.4	-19.7	-19.5	-19.7	-19.5	-18.8	-18.2	-18.0	-18.6	-19.0	-19.3	-19.4	-19.4	-19.3	-19.4	-19.3	-19.2	-19.3	-20.7	-19.2	-18.0
9-Jan	-22.2	-22.9	-23.4	-22.8	-22.3	-22.2	-22.3	-21.9	-21.9	-21.5	-20.9	-20.2	-19.1	-18.6	-18.2	-17.6	-17.6	-18.7	-19.0	-18.9	-18.1	-18.0	-18.2	-18.5	-20.2	-17.6
10-Jan	-18.8	-19.0	-19.1	-19.4	-19.2	-19.1	-19.4	-19.3	-18.7	-18.0	-18.0	-17.1	-16.7	-16.2	-16.3	-16.5	-17.3	-18.1	-18.9	-19.5	-19.6	-19.4	-19.2	-19.1	-18.4	-16.2
11-Jan	-19.0	-19.2	-19.2	-19.2	-19.2	-19.2	-19.0	-18.6	-18.3	-18.1	-18.2	-18.1	-17.8	-17.2	-17.0	-17.0	-17.0	-17.1	-17.4	-17.8	-18.0	-18.0	-18.5	-19.5	-18.2	-17.0
12-Jan	-20.0	-20.6	-20.2	-20.0	-20.4	-19.9	-19.5	-19.6	-18.8	-18.4	-17.9	-17.8	-17.3	-16.6	-15.8	-15.1	-14.8	-14.3	-13.8	-13.4	-13.4	-12.8	-12.7	-12.6	-16.9	-12.6
13-Jan	-12.7	-12.8	-13.2	-13.4	-13.0	-12.7	-12.6	-12.1	-12.0	-11.8	-11.7	-11.6	-11.6	-11.5	-11.3	-11.1	-11.0	-11.2	-11.4	-11.6	-11.9	-12.0	-12.5	-14.1	-12.1	-11.0
14-Jan	-14.9	-15.9	-17.2	-18.2	-19.1	-20.0	-20.8	-21.3	-21.5	-21.4	-21.2	-20.8	-20.9	-21.0	-20.9	-20.9	-21.2	-21.5	-21.7	-21.9	-22.0	-21.8	-21.8	-22.0	-20.4	-14.9
15-Jan	-22.0	-22.0	-22.0	-21.9	-21.7	-21.9	-22.5	-22.4	-22.5	-22.7	-22.2	-21.7	-21.0	-20.9	-20.6	-20.5	-20.8	-21.2	-21.4	-21.8	-21.8	-23.1	-24.2	-24.3	-22.0	-20.5
16-Jan	-24.4	-24.8	-25.7	-26.8	-26.8	-27.6	-27.8	-28.0	-28.2	-29.1	-28.4	-27.9	-27.2	-26.4	-25.8	-24.5	-24.0	-24.2	-24.2	-23.8	-23.9	-23.8	-23.5	-23.4	-25.8	-23.4
17-Jan	-23.3	-23.2	-23.4	-24.8	-24.1	-25.2	-25.6	-25.3	-24.6	-25.3	-24.7	-24.5	-23.2	-21.9	-21.5	-21.7	-19.7	-19.7	-19.5	-18.7	-19.2	-19.7	-20.3	-19.9	-22.5	-18.7
18-Jan	-18.6	-18.8	-18.7	-18.4	-17.8	-17.4	-17.0	-16.8	-16.6	-16.4	-16.2	-16.0	-15.5	-15.0	-14.4	-14.1	-13.9	-13.9	-14.0	-14.2	-14.2	-14.2	-14.3	-14.1	-15.9	-13.9
19-Jan	-13.7	-13.4	-13.4	-13.5	-13.7	-13.8	-14.0	-14.1	-14.3	-14.3	-14.6	-14.4	-14.6	-14.4	-14.1	-14.4	-14.5	-14.4	-14.6	-14.7	-15.0	-15.3	-15.5	-15.8	-14.4	-13.4
20-Jan	-16.2	-16.8	-17.1	-17.4	-17.7	-17.8	-17.9	-17.9	-17.9	-17.8	-17.4	-16.8	-16.4	-15.5	-14.6	-14.5	-14.5	-14.3	-14.1	-13.7	-13.5	-13.2	-12.9	-12.5	-15.8	-12.5
21-Jan	-12.3	-12.3	-12.5	-12.2	-12.2	-12.0	-12.5	-12.9	-12.5	-13.3	-13.6	-13.5	-12.9	-12.1	-11.2	-10.2	-10.0	-9.7	-9.1	-8.7	-8.5	-9.0	-9.0	-8.7	-11.3	-8.5
22-Jan	-8.7	-8.3	-8.5	-8.9	-9.4	-10.5	-11.1	-11.2	-11.3	-11.9	-12.0	-11.1	-11.5	-11.4	-11.0	-10.7	-10.8	-10.8	-10.9	-10.9	-10.9	-10.9	-10.8	-10.9	-10.6	-8.3
23-Jan	-10.9	-11.0	-11.0	-11.1	-11.0	-11.0	-11.0	-10.9	-10.8	-10.7	-10.6	-10.5	-10.4	-10.2	-9.8	-9.6	-9.7	-9.5	-9.5	-9.3	-9.0	-8.9	-8.7	-8.2	-10.1	-8.2
24-Jan	-8.5	-9.0	-8.2	-8.2	-8.2	-7.5	-7.0	-6.9	-6.7	-6.8	-6.8	-6.4	-5.6	-4.9	-4.0	-3.0	-2.5	-2.5	-2.8	-4.2	-7.0	-8.2	-9.1	-9.3	-6.4	-2.5
25-Jan	-9.4	-9.4	-9.4	-9.5	-9.4	-9.5	-9.4	-9.2	-10.0	-10.1	-9.5	-9.0	-8.2	-7.1	-6.1	-5.3	-5.0	-4.6	-3.8	-4.2	-4.5	-4.7	-5.0	-5.5	-7.4	-3.8
26-Jan	-5.2	-5.0	-5.0	-4.4	-4.2	-4.6	-4.4	-4.2	-3.8	-3.1	-2.0	-1.0	0.1	1.2	1.3	2.0	3.0	3.8	4.6	5.1	5.1	5.3	4.5	3.9	-0.3	5.3
27-Jan	4.0	4.0	4.7	4.4	3.8	3.5	3.1	3.3	3.2	2.9	3.0	3.4	2.3	1.3	0.0	-1.3	-3.0	-3.8	-4.0	-4.4	-4.6	-4.8	-4.5	-3.9	0.5	4.7
28-Jan	-3.8	-3.2	-2.1	-1.4	-1.3	-0.9	-0.8	-0.6	-0.6	0.8	0.7	0.7	0.9	0.9	1.6	1.8	2.3	1.8	1.6	3.6	5.6	5.9	5.7	5.4	1.0	5.9
29-Jan	4.9	4.3	3.5	2.6	2.4	2.7	2.8	2.7	2.7	2.5	2.4	3.1	3.8	4.7	5.2	5.3	5.1	4.9	4.0	2.9	1.8	1.3	1.0	0.5	3.2	5.3
30-Jan	-0.6	-1.3	-2.0	-1.6	-1.5	-1.9	-2.0	-2.1	-2.8	-3.5	-3.6	-3.8	-4.2	-4.6	-5.3	-5.9	-7.0	-7.9	-9.1	-10.0	-10.1	-10.1	-10.6	-11.3	-5.1	-0.6
31-Jan	-11.9	-12.1	-12.0	-12.1	-12.4	-12.7	-12.9	-13.4	-13.6	-14.0	-14.1	-14.0	-14.7	-15.1	-15.1	-15.2	-15.5	-15.9	-16.1	-16.4	-16.8	-17.4	-17.7	-17.8	-14.5	-11.9
	-11.5	-11.8	-11.9	-12.1	-12.2	-12.4	-12.6	-12.6	-12.6	-12.5	-12.4	-12.1	-11.8	-11.3	-10.9	-10.6	-10.6	-10.8	-10.9	-11.1	-11.3	-11.5	-11.7	-11.9	Diurnal Average	
	4.9	4.3	4.7	4.4	3.8	3.5	3.1	3.3	3.2	2.9	3.0	3.4	3.8	4.7	5.2	5.3	5.1	4.9	4.6	5.1	5.6	5.9	5.7	5.4	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 90 m (AT90m) - C

Mannix - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	100	13.44	13.44
-20 - 0	571	76.75	90.19
0 - 10	73	9.81	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Mannix - January 2016

Maximum Value: 96 % on Jan 28 20:00

Maximum Daily Average: 89.7 % on Jan 26

Minimum Value: 55 % on Jan 29 16:00

Minimum Daily Average: 71.8 % on Jan 1

Maximum Diurnal Average: 82.9 % at hour 5

Minimum Diurnal Average: 77.0 % at hour 15

Monthly Average: 80.7 %

Percentiles: $P_1 = 59$ $P_{10} = 73$ $Q_1 = 77$ Median = 81 $Q_3 = 85$ $P_{90} = 90$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

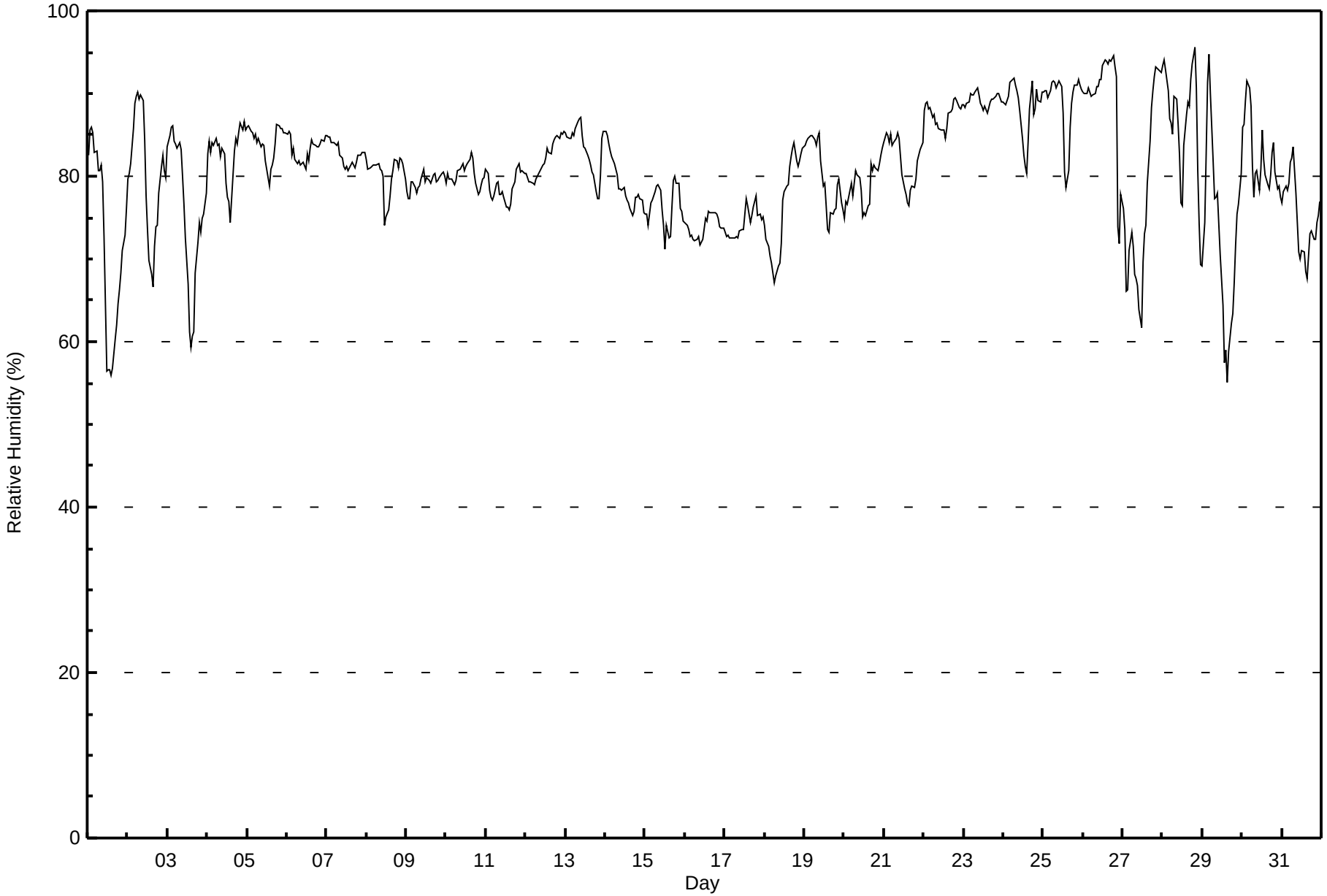
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	83	86	86	85	83	83	81	81	81	79	73	56	57	57	56	57	60	62	65	66	68	71	73	76	71.8	86
2-Jan	80	80	82	86	89	90	90	89	90	89	84	78	74	70	68	67	72	74	74	78	81	83	81	80	80.3	90
3-Jan	84	85	86	86	84	84	83	84	83	80	77	72	67	61	59	61	61	68	72	74	73	75	75	78	75.6	86
4-Jan	83	84	83	84	84	85	84	84	82	83	83	79	77	77	74	77	83	85	84	85	86	86	87	86	82.7	87
5-Jan	86	86	85	85	85	85	84	85	84	84	84	82	81	79	81	81	82	84	86	86	86	86	85	85	84.0	86
6-Jan	85	85	85	83	83	82	82	82	81	82	82	81	83	82	83	84	84	84	84	84	84	84	84	85	83.2	85
7-Jan	85	85	85	84	84	84	84	84	83	82	81	81	81	81	81	82	81	81	82	83	83	83	83	83	82.7	85
8-Jan	82	81	81	81	81	81	81	82	81	81	80	74	75	76	78	80	81	82	82	81	82	82	81	80	80.2	82
9-Jan	78	77	77	79	79	79	78	79	79	80	81	79	80	80	79	79	80	80	79	79	80	80	80	80	79.3	81
10-Jan	79	80	80	80	79	79	80	81	81	81	82	81	81	82	82	83	82	80	79	78	78	79	80	80	80.2	83
11-Jan	81	80	78	78	77	78	79	79	78	78	78	77	76	76	76	77	78	79	81	81	82	80	81	80	78.7	82
12-Jan	80	80	79	79	79	79	80	80	80	81	81	81	82	83	83	83	84	84	85	85	85	85	85	85	82.1	85
13-Jan	85	85	85	85	85	85	86	87	87	87	85	84	83	83	82	81	80	80	78	77	77	80	85	85	83.2	87
14-Jan	85	85	84	83	82	82	81	80	79	79	78	79	78	77	77	76	75	76	77	77	78	77	77	76	79.1	85
15-Jan	75	75	74	77	77	78	78	79	79	78	76	74	71	74	73	73	76	79	80	79	79	76	76	75	76.3	80
16-Jan	74	74	74	73	73	72	72	72	73	72	72	72	75	75	76	76	76	76	76	75	75	74	74	74	73.9	76
17-Jan	73	73	73	73	72	73	72	73	73	73	73	74	75	77	76	74	75	76	77	78	75	76	75	75	74.4	78
18-Jan	74	72	72	70	70	68	67	68	69	69	72	77	78	79	79	81	82	83	84	82	81	82	83	83	76.1	84
19-Jan	84	84	85	85	85	85	84	84	85	85	82	79	79	76	74	73	76	75	76	76	79	80	77	76	80.1	85
20-Jan	75	77	77	77	79	78	79	81	80	80	78	75	76	75	76	77	82	81	81	81	81	82	83	83	78.9	83
21-Jan	84	85	85	84	85	84	84	85	85	85	82	80	79	78	77	76	78	79	79	80	82	83	83	84	81.9	85
22-Jan	88	89	89	88	88	87	88	86	87	86	86	86	86	85	86	88	88	88	89	90	89	88	88	89	87.5	90
23-Jan	89	88	89	89	90	90	90	90	91	90	89	88	88	88	88	88	89	89	89	90	90	90	89	89	89.2	91
24-Jan	89	89	89	90	91	92	92	91	90	89	88	85	83	81	80	84	88	91	88	88	90	89	89	90	88.2	92
25-Jan	90	90	90	89	90	91	92	91	91	92	91	91	88	81	79	81	86	89	90	91	91	92	91	91	89.0	92
26-Jan	90	90	90	91	90	90	90	90	91	91	92	92	93	94	94	94	94	94	95	93	92	74	72	78	89.7	95
27-Jan	76	73	66	66	71	73	72	68	68	67	64	62	70	73	74	79	84	88	90	92	93	93	93	93	77.0	93
28-Jan	93	94	93	90	87	86	85	90	89	86	83	77	77	84	87	89	89	92	94	96	91	81	74	69	86.4	96
29-Jan	69	74	83	91	95	90	82	77	77	78	74	70	64	57	59	55	59	62	63	67	72	75	77	80	73.0	95
30-Jan	86	86	89	92	91	88	81	78	80	81	78	81	86	82	80	79	78	80	83	84	81	78	79	78	82.4	92
31-Jan	77	78	79	78	79	82	82	84	78	74	71	70	71	71	68	68	70	73	73	72	72	74	75	77	74.9	84
	82.0	82.4	82.3	82.6	82.9	82.6	82.0	82.0	81.7	81.3	80.0	78.0	77.8	77.2	77.0	77.5	79.2	80.5	81.1	81.6	81.8	81.2	81.1	81.3	Diurnal Average	
	93	94	93	92	95	92	92	91	91	92	92	92	93	94	94	94	94	94	95	96	93	93	93	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Mannix - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	10	1.34	1.34
60 - 80	309	41.53	42.88
80 - 100	425	57.12	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 95 % on Jan 26 15:00

Maximum Daily Average: 89.3 % on Jan 23

Minimum Value: 50 % on Jan 29 16:00

Minimum Daily Average: 64.2 % on Jan 1

Maximum Diurnal Average: 80.9 % at hour 6

Minimum Diurnal Average: 75.8 % at hour 15

Monthly Average: 79.3 %

Percentiles: $P_1 = 52$ $P_{10} = 70$ $Q_1 = 75$ Median = 80 $Q_3 = 84$ $P_{90} = 89$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

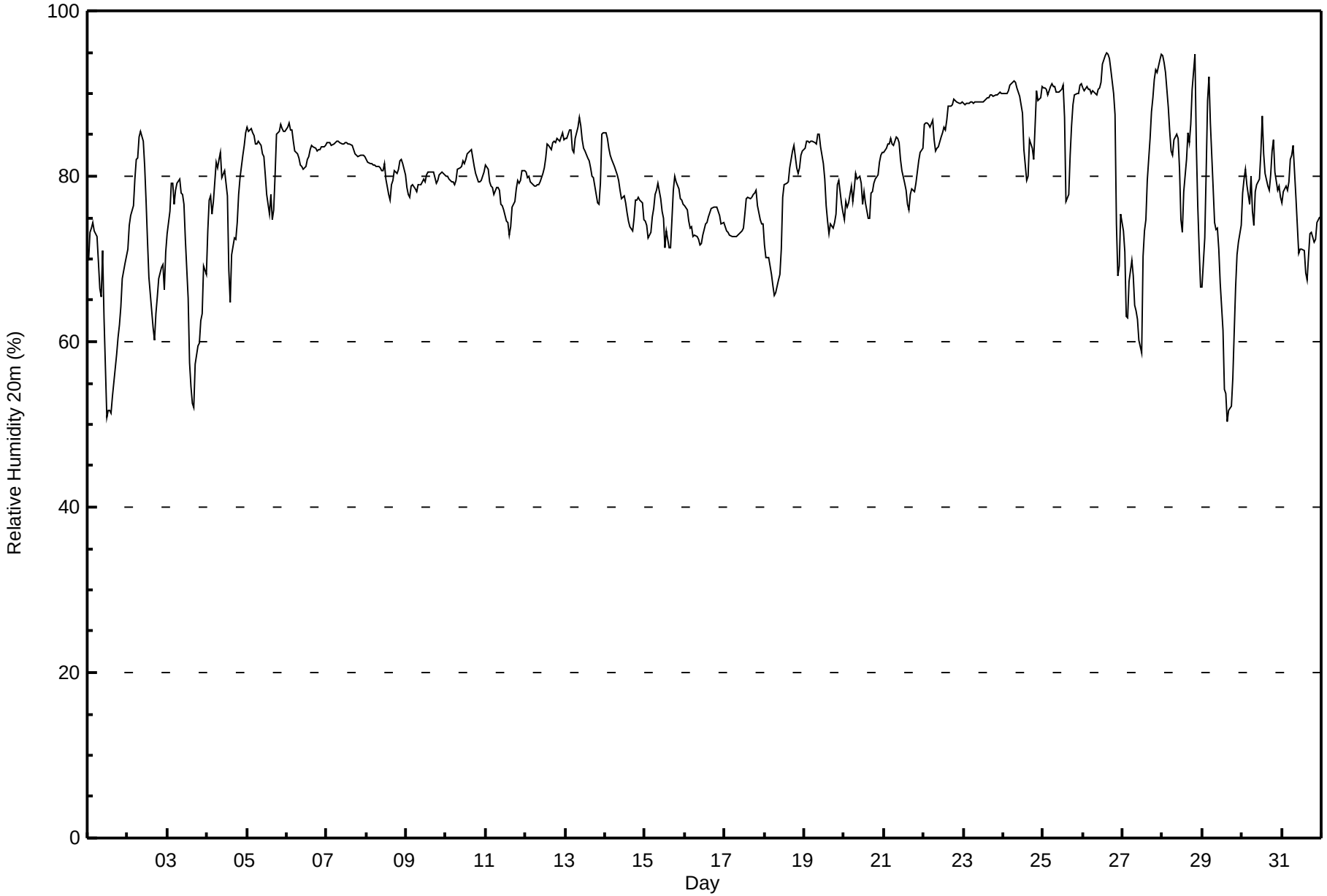
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	70	73	74	74	73	73	70	66	65	71	63	51	52	52	51	53	57	59	61	62	64	68	69	70	64.2	74
2-Jan	71	74	75	76	80	82	82	85	86	84	81	77	72	68	64	62	60	63	65	68	69	69	66	71	73.0	86
3-Jan	73	76	79	79	77	78	79	80	78	78	77	72	65	58	55	53	52	57	59	60	63	63	69	68	68.6	80
4-Jan	73	77	78	75	77	82	81	82	83	80	81	79	78	69	65	71	73	72	74	78	80	83	84	85	77.4	85
5-Jan	86	85	86	85	85	84	84	84	84	83	82	80	78	75	78	75	76	80	85	85	86	86	85	85	82.7	86
6-Jan	86	86	86	86	84	83	83	82	81	81	81	81	82	82	83	84	84	83	83	83	83	84	84	84	83.3	86
7-Jan	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	83	83	83	82	82	83	83	82	83.5	84
8-Jan	82	82	82	81	81	81	81	81	81	81	81	82	80	78	77	79	79	81	80	81	82	82	82	80	80.7	82
9-Jan	79	78	78	79	79	79	78	79	79	79	80	79	80	80	81	81	81	80	79	80	80	80	80	80	79.4	81
10-Jan	80	80	80	79	79	79	80	81	81	81	82	81	82	83	83	83	82	81	80	79	79	79	80	81	80.7	83
11-Jan	81	81	79	79	79	78	79	79	78	77	77	76	75	74	73	74	76	77	79	80	79	80	81	81	77.8	81
12-Jan	80	80	80	79	79	79	79	79	79	79	80	81	82	84	84	83	84	84	84	85	84	85	85	84	81.8	85
13-Jan	85	85	86	86	83	83	85	86	87	86	84	83	83	82	82	81	80	80	78	77	77	79	85	85	82.8	87
14-Jan	85	84	83	83	82	81	81	80	79	78	77	78	77	76	75	74	73	75	77	77	78	77	77	75	78.4	85
15-Jan	75	74	73	73	75	76	78	78	79	77	76	75	71	73	71	71	75	78	80	79	78	77	77	77	75.8	80
16-Jan	76	76	74	74	74	73	73	73	72	72	72	73	74	74	75	76	76	76	76	76	76	75	74	74	74.4	76
17-Jan	74	73	73	73	73	73	73	73	73	73	73	74	75	77	77	77	78	78	78	78	76	75	74	74	74.8	78
18-Jan	72	70	70	69	68	67	66	66	67	68	71	77	79	79	79	81	82	83	84	81	80	81	83	83	75.3	84
19-Jan	83	84	84	84	84	84	84	84	85	85	83	82	80	76	75	73	74	74	74	75	79	79	77	76	80.0	85
20-Jan	75	77	76	77	79	77	79	80	80	80	79	77	78	77	75	75	78	78	79	80	80	82	83	83	78.4	83
21-Jan	83	83	84	84	85	84	84	85	85	84	82	81	79	78	77	76	78	78	78	79	80	82	83	83	81.4	85
22-Jan	86	87	86	86	86	87	84	83	83	84	85	85	86	86	87	89	88	89	89	89	89	89	89	89	86.7	89
23-Jan	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	90	90	90	90	90	90	90	90	90	89.3	90
24-Jan	90	90	90	90	91	91	92	91	91	90	90	88	83	81	80	80	84	83	82	86	90	89	89	91	87.6	92
25-Jan	91	91	91	90	91	91	91	91	90	90	90	91	91	87	77	78	83	86	89	90	90	90	91	91	88.7	91
26-Jan	91	90	91	91	90	90	90	90	90	90	91	91	94	95	95	95	94	93	90	87	74	68	69	75	88.1	95
27-Jan	73	71	63	63	67	70	68	64	64	63	60	59	70	73	75	79	85	88	89	92	93	93	94	95	75.4	95
28-Jan	95	94	92	88	86	83	83	84	85	85	81	75	73	78	82	85	84	86	90	95	84	76	71	67	83.4	95
29-Jan	67	73	80	89	92	86	79	74	74	74	71	67	61	54	54	50	52	52	56	61	67	70	72	74	68.7	92
30-Jan	78	80	81	79	77	80	76	74	78	79	80	83	87	83	80	79	78	80	83	84	80	78	79	77	79.7	87
31-Jan	77	78	79	78	79	82	82	84	77	74	71	71	71	71	68	68	70	73	73	72	72	74	75	75	74.8	84
	80.3	80.8	80.8	80.7	80.9	80.9	80.4	80.4	80.3	80.0	79.1	78.1	77.8	76.7	75.8	76.0	77.1	78.1	79.0	79.7	79.6	79.6	80.0	80.2	Diurnal Average	
	95	94	92	91	92	91	92	91	91	90	91	91	94	95	95	95	94	93	90	95	93	93	94	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 20m (RH20m) - %

Mannix - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	21	2.82	2.82
60 - 80	357	47.98	50.81
80 - 100	366	49.19	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 96 % on Jan 26 15:00

Maximum Daily Average: 89.5 % on Jan 23

Minimum Value: 45 % on Jan 3 19:00

Minimum Daily Average: 59.9 % on Jan 1

Maximum Diurnal Average: 80.3 % at hour 6

Minimum Diurnal Average: 76.4 % at hour 16

Monthly Average: 78.9 %

Percentiles: $P_1 = 49$ $P_{10} = 67$ $Q_1 = 75$ Median = 80 $Q_3 = 84$ $P_{90} = 89$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

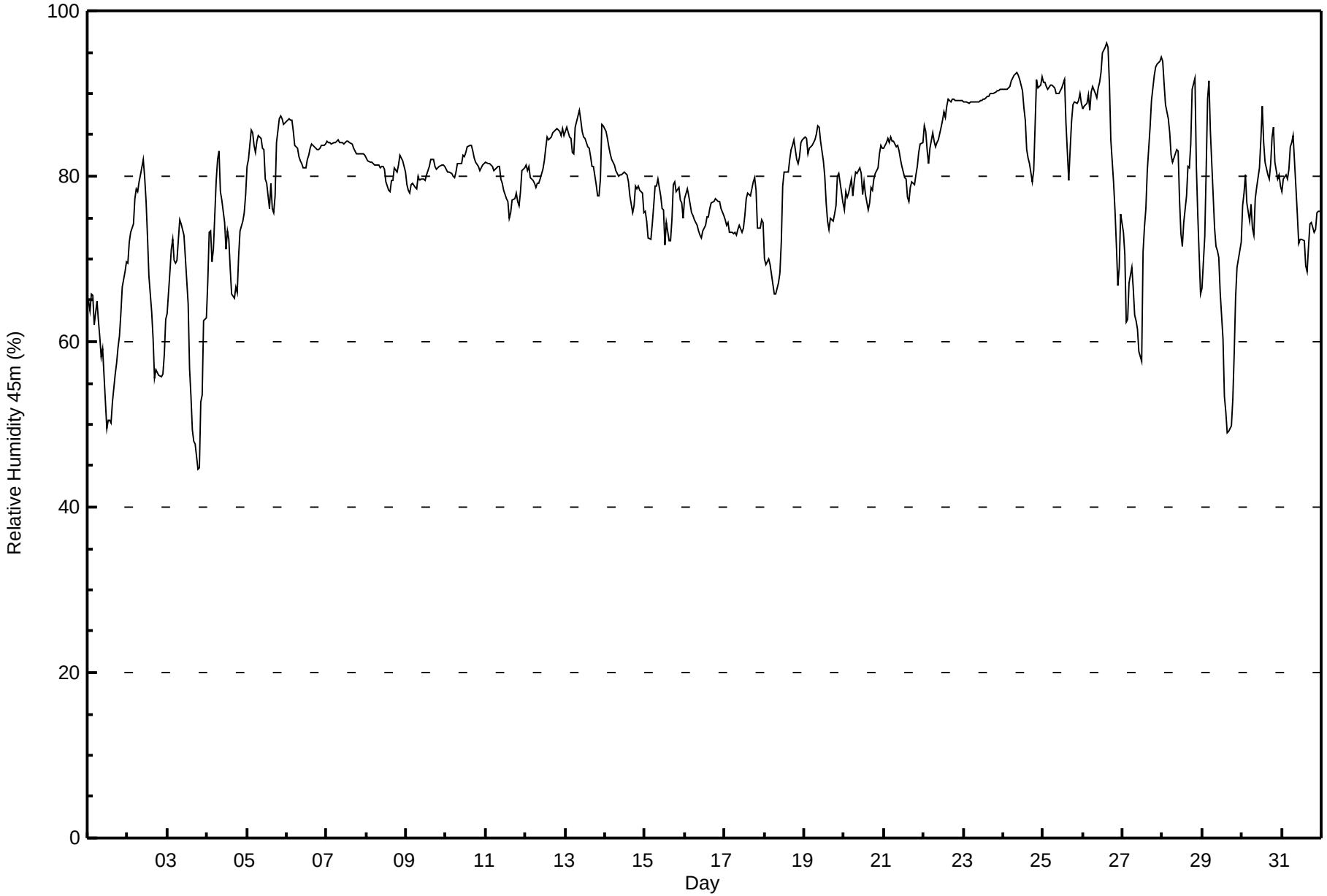
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	65	64	66	66	62	65	63	60	58	59	56	49	51	51	50	53	56	57	59	61	63	67	69	70	59.9	70
2-Jan	69	72	73	74	77	78	78	79	80	82	80	77	73	68	64	60	56	57	56	56	56	56	59	63	68.5	82
3-Jan	63	69	71	72	70	70	70	75	74	74	73	70	65	57	53	49	48	48	45	45	53	54	63	63	62.1	75
4-Jan	67	73	73	70	71	79	82	83	78	77	74	71	73	72	69	66	65	67	66	70	73	75	76	78	72.9	83
5-Jan	81	82	86	85	84	83	84	85	85	83	83	80	79	76	79	76	76	78	84	87	87	87	86	86	82.6	87
6-Jan	87	87	87	87	85	84	83	82	82	81	81	81	82	83	83	84	84	83	83	83	83	84	84	84	83.7	87
7-Jan	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	83	83	83	83	83	83	83	83	83.7	84
8-Jan	82	82	82	82	82	81	81	81	81	81	81	81	79	78	78	79	80	81	81	81	83	82	82	81	80.9	83
9-Jan	79	78	78	79	79	79	78	80	80	80	80	79	80	81	81	82	82	81	81	81	81	81	81	81	80.1	82
10-Jan	81	81	80	80	80	80	81	82	82	82	83	82	83	84	84	84	83	82	82	81	81	81	81	81	81.6	84
11-Jan	82	82	82	81	81	81	81	81	81	80	79	78	77	77	75	76	77	77	78	77	76	78	81	81	79.1	82
12-Jan	81	81	81	80	80	79	79	79	79	80	81	82	83	85	84	85	85	85	86	86	85	85	86	85	82.6	86
13-Jan	86	86	85	85	83	83	86	87	88	87	85	85	85	83	83	82	81	81	79	78	78	80	86	86	83.6	88
14-Jan	85	85	84	83	82	81	81	80	80	80	80	80	80	80	79	78	76	77	79	79	79	78	78	76	80.0	85
15-Jan	76	75	73	72	74	76	79	79	80	78	76	76	72	74	72	72	75	79	79	78	79	77	77	75	75.9	80
16-Jan	77	78	78	77	76	75	75	74	73	73	73	73	74	75	75	76	77	77	77	77	77	77	76	75	75.6	78
17-Jan	75	74	74	73	73	73	73	73	74	74	73	74	75	77	78	78	79	79	80	78	74	74	75	74	75.2	80
18-Jan	70	69	70	69	68	67	66	66	67	68	72	79	80	81	81	82	83	84	84	82	82	82	84	84	75.9	84
19-Jan	85	84	83	83	84	84	84	85	86	86	84	82	80	77	75	74	75	75	75	76	80	80	78	77	80.5	86
20-Jan	76	78	77	78	80	78	79	80	80	81	80	78	79	78	76	77	79	78	80	80	81	83	84	83	79.3	84
21-Jan	83	84	85	84	85	84	84	84	84	83	82	81	80	80	77	77	79	79	79	80	81	83	84	84	81.9	85
22-Jan	86	85	83	82	83	85	84	84	84	84	86	87	88	87	88	89	89	89	89	89	89	89	89	89	86.6	89
23-Jan	89	89	89	89	89	89	89	89	89	89	89	89	89	89	90	90	90	90	90	90	90	90	90	90	89.5	90
24-Jan	90	91	91	91	91	92	92	92	92	92	92	90	88	87	83	82	82	79	81	86	92	91	91	92	88.7	92
25-Jan	91	91	91	91	91	91	91	91	90	90	90	91	91	92	86	79	83	87	89	89	89	89	90	89	89.2	92
26-Jan	88	88	89	90	88	90	91	90	90	91	91	93	95	96	96	96	91	84	79	76	72	67	69	75	86.4	96
27-Jan	73	71	62	63	67	69	66	63	63	62	59	58	71	74	76	81	86	89	91	92	93	94	94	94	75.4	94
28-Jan	94	91	89	87	85	83	82	82	83	83	77	73	72	74	78	81	81	84	91	92	81	75	71	66	81.4	94
29-Jan	66	73	81	89	92	85	78	74	71	71	70	66	60	53	52	49	49	50	53	59	65	69	70	72	67.4	92
30-Jan	76	78	80	77	75	77	74	73	77	79	81	84	88	84	82	80	80	82	85	86	82	80	80	79	79.9	88
31-Jan	78	80	80	80	81	84	84	85	79	75	72	72	72	72	69	69	71	74	74	73	74	76	76	76	76.1	85
	79.6	80.1	80.2	80.0	80.0	80.3	80.1	80.1	79.8	79.6	79.0	78.3	78.4	77.7	76.8	76.4	76.7	77.3	78.0	78.4	78.8	78.9	79.7	79.8	Diurnal Average	
	94	91	91	91	92	92	92	92	92	92	92	93	95	96	96	96	91	90	91	92	93	94	94	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 45m (RH45m) - %

Mannix - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	36	4.84	4.84
60 - 80	311	41.80	46.64
80 - 100	397	53.36	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 95 % on Jan 27 22:00

Maximum Daily Average: 89.4 % on Jan 23

Minimum Value: 39 % on Jan 3 19:00

Minimum Daily Average: 52.9 % on Jan 3

Maximum Diurnal Average: 79.5 % at hour 24

Minimum Diurnal Average: 76.5 % at hour 16

Monthly Average: 78.3 %

Percentiles: $P_1 = 48$ $P_{10} = 63$ $Q_1 = 75$ Median = 81 $Q_3 = 84$ $P_{90} = 89$ $P_{99} = 92$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

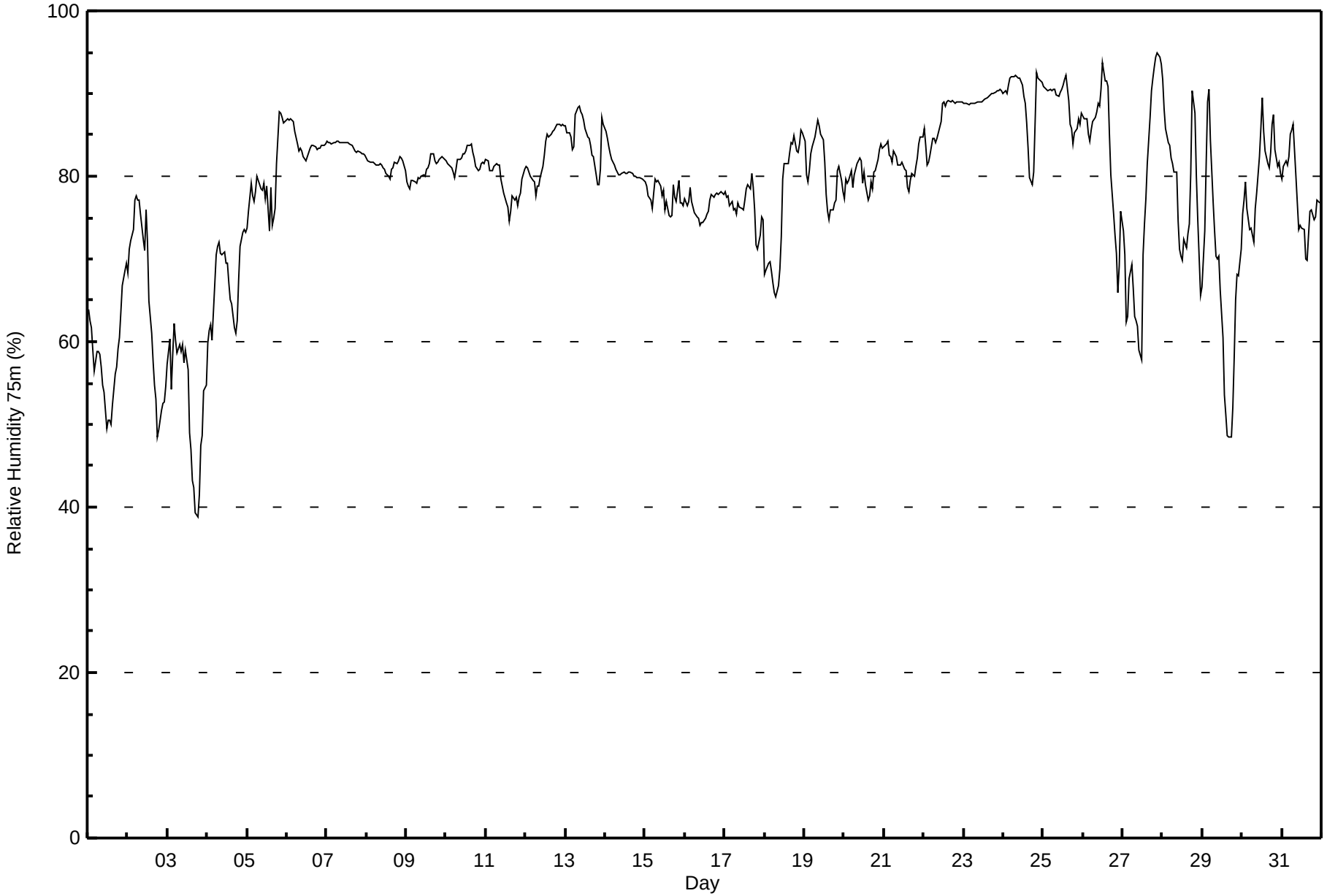
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	64	63	62	59	56	59	59	59	57	55	54	50	51	50	50	52	56	57	59	60	64	67	69	70	58.3	70
2-Jan	68	71	72	74	77	78	77	77	75	72	71	76	72	65	61	58	55	53	49	49	52	53	53	55	65.1	78
3-Jan	57	60	54	58	62	60	59	60	59	60	57	59	57	49	47	43	42	39	39	42	47	49	54	55	52.9	62
4-Jan	60	61	62	60	64	70	72	72	71	70	71	70	70	67	65	65	62	61	63	67	72	73	74	73	67.2	74
5-Jan	74	76	79	78	77	78	80	79	78	78	79	77	79	73	79	74	75	76	82	88	88	87	86	87	79.5	88
6-Jan	87	87	87	87	87	85	84	83	83	83	82	82	82	83	83	84	84	84	83	83	83	84	84	84	84.1	87
7-Jan	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	83	83	83	83	83	83	83	83	83.7	84
8-Jan	82	82	82	82	82	82	81	81	81	81	81	81	80	80	80	81	81	82	82	82	82	82	82	81	81.3	82
9-Jan	79	79	78	79	80	79	79	80	80	80	80	80	81	81	81	83	83	82	82	82	82	82	82	82	80.7	83
10-Jan	82	82	81	81	81	80	81	82	82	82	83	83	83	84	84	84	83	82	81	81	81	81	82	82	81.9	84
11-Jan	82	82	81	81	81	81	81	81	81	80	79	78	77	76	75	76	78	77	77	76	77	78	80	81	79.0	82
12-Jan	81	81	81	80	80	79	78	79	79	80	81	82	84	85	85	85	85	86	86	86	86	86	86	86	82.8	86
13-Jan	86	85	85	85	83	84	87	88	88	88	87	87	86	85	85	84	83	82	80	79	79	81	87	86	84.6	88
14-Jan	85	85	84	83	82	81	81	80	80	80	80	81	80	80	81	81	80	80	80	80	80	80	80	80	81.0	85
15-Jan	79	79	78	77	76	78	80	79	80	79	78	78	76	77	75	75	75	79	77	77	80	77	77	76	77.6	80
16-Jan	77	76	77	79	77	76	76	75	75	74	74	74	75	75	76	77	78	77	78	78	78	78	78	78	76.5	79
17-Jan	78	78	78	76	77	76	76	75	77	76	76	76	77	79	79	78	80	79	76	72	71	73	75	75	76.4	80
18-Jan	68	69	69	70	68	67	66	65	67	69	73	80	82	82	82	83	84	84	85	83	83	84	86	85	76.3	86
19-Jan	84	80	79	81	83	84	85	86	87	86	85	84	82	78	76	75	76	76	77	77	81	81	79	78	80.8	87
20-Jan	77	80	79	79	81	79	80	81	82	82	82	79	80	79	77	78	79	79	80	81	82	83	84	83	80.3	84
21-Jan	84	84	84	82	82	82	83	82	81	81	81	82	81	81	79	78	80	80	80	81	82	84	85	85	81.9	85
22-Jan	86	84	81	82	82	84	85	84	85	85	87	89	89	88	89	89	89	89	89	89	89	89	89	89	86.7	89
23-Jan	89	89	89	89	89	89	89	89	89	89	89	89	89	89	90	90	90	90	90	90	90	90	90	90	89.4	90
24-Jan	90	90	90	91	92	92	92	92	92	92	92	91	90	89	86	83	80	79	81	86	93	92	92	91	89.1	93
25-Jan	91	91	90	90	90	90	90	90	90	90	90	90	91	92	92	89	86	86	84	85	86	87	86	88	89.0	92
26-Jan	87	87	87	85	84	86	87	87	88	89	89	91	94	92	91	91	85	80	75	73	71	66	69	76	83.7	94
27-Jan	73	71	62	63	68	69	66	63	62	62	59	58	71	74	77	81	87	90	92	93	94	95	94	94	75.8	95
28-Jan	92	88	86	84	84	82	81	81	81	75	71	70	70	72	71	73	74	80	90	88	80	75	70	66	78.5	92
29-Jan	67	73	81	89	91	84	77	73	70	70	70	66	61	53	51	49	48	49	52	58	65	68	68	71	66.9	91
30-Jan	76	77	79	76	74	74	73	72	76	78	82	86	90	85	83	81	81	83	86	88	83	81	82	80	80.3	90
31-Jan	80	81	82	81	82	85	86	86	80	77	74	74	74	73	70	70	73	76	76	75	75	77	77	77	77.5	86
	79.0	79.1	78.9	78.8	79.2	79.3	79.2	79.0	78.7	78.3	78.1	78.3	78.5	77.5	76.9	76.5	76.6	76.8	77.2	77.8	78.7	78.9	79.4	79.5	Diurnal Average	
	92	91	90	91	92	92	92	92	92	92	92	91	94	92	92	91	90	90	92	93	94	95	94	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 75m (RH75m) - %

Mannix - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	2	0.27	0.27
40 - 60	54	7.26	7.53
60 - 80	284	38.17	45.70
80 - 100	404	54.30	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 95 % on Jan 27 22:00

Maximum Daily Average: 89.4 % on Jan 24

Minimum Value: 38 % on Jan 3 18:00

Minimum Daily Average: 50.7 % on Jan 3

Maximum Diurnal Average: 79.6 % at hour 24

Minimum Diurnal Average: 76.8 % at hour 18

Monthly Average: 78.4 %

Percentiles: P_1 = 46 P_{10} = 63 Q_1 = 76 Median = 81 Q_3 = 84 P_{90} = 89 P_{99} = 92

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

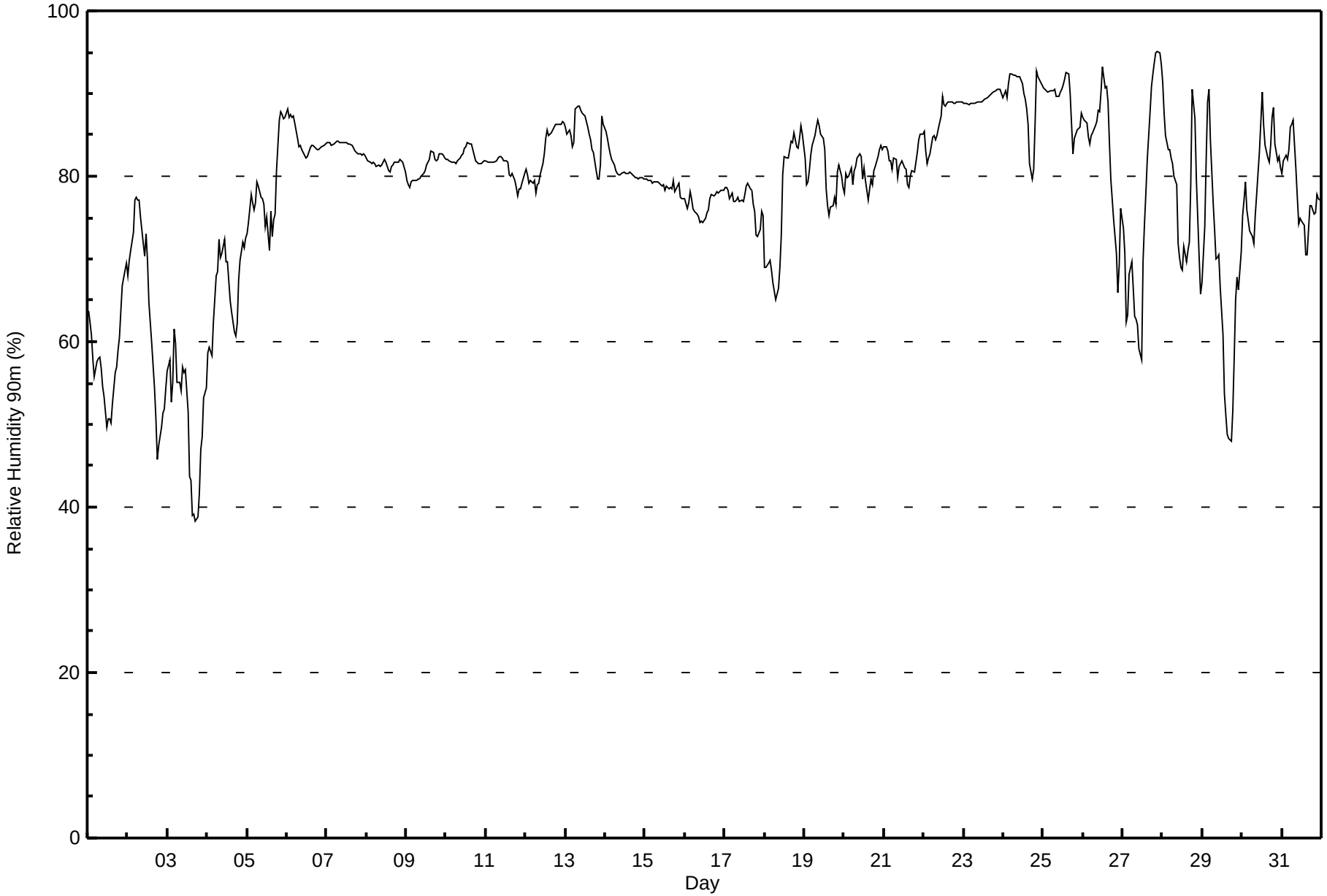
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	64	62	61	58	56	58	58	58	57	55	53	50	51	51	50	53	56	57	59	61	64	67	69	70	58.1	70
2-Jan	68	70	71	73	77	77	77	77	75	72	70	73	70	65	60	57	54	51	46	47	50	51	52	54	64.1	77
3-Jan	56	58	53	55	61	60	55	55	54	57	56	57	52	44	43	39	39	38	39	42	47	49	53	54	50.7	61
4-Jan	59	59	59	58	62	68	68	72	70	71	72	70	70	67	65	64	61	61	62	67	70	72	71	72	66.3	72
5-Jan	73	74	78	77	76	77	79	79	78	77	77	74	75	71	76	73	75	75	81	87	88	87	87	87	78.3	88
6-Jan	88	87	87	87	87	86	85	84	84	83	83	82	82	83	83	84	84	83	83	83	83	84	84	84	84.3	88
7-Jan	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	83	83	83	83	83	83	83	83	83.6	84
8-Jan	82	82	82	82	82	82	81	81	81	81	82	82	82	81	80	81	81	82	82	82	82	82	82	81	81.5	82
9-Jan	79	79	79	79	79	79	79	80	80	80	80	81	81	82	82	83	83	82	82	82	83	83	83	82	80.9	83
10-Jan	82	82	82	82	82	82	81	82	82	83	83	83	84	84	84	84	83	83	82	82	81	82	82	82	82.3	84
11-Jan	82	82	82	82	82	82	82	82	82	82	82	82	82	82	80	80	80	80	79	78	78	78	79	80	80.8	82
12-Jan	81	80	79	79	79	80	78	79	79	80	81	83	85	86	85	85	86	86	86	86	86	86	87	86	82.9	87
13-Jan	86	85	86	85	84	84	88	89	89	88	88	87	87	86	85	84	83	83	81	80	80	81	87	86	85.1	89
14-Jan	85	85	84	83	82	81	81	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80.9	85
15-Jan	80	80	79	79	79	79	79	79	79	79	79	79	78	79	79	79	79	79	78	78	79	78	77	77	78.8	80
16-Jan	77	76	77	78	77	76	76	75	75	74	75	74	75	76	76	77	78	78	78	78	78	78	78	78	76.7	78
17-Jan	79	79	78	77	78	77	77	77	77	77	77	77	78	79	79	78	78	77	76	73	73	74	76	75	76.9	79
18-Jan	69	69	70	70	69	67	66	65	67	69	73	80	82	82	82	83	84	84	85	84	83	85	86	85	76.6	86
19-Jan	82	79	79	81	83	84	85	86	87	86	85	85	83	79	76	75	76	77	77	77	81	81	80	79	80.9	87
20-Jan	78	80	80	80	81	79	81	81	82	83	82	80	81	80	77	78	80	79	81	81	82	83	84	83	80.7	84
21-Jan	83	84	83	82	82	81	82	82	80	81	81	82	81	81	79	79	80	81	81	82	83	84	85	85	81.8	85
22-Jan	85	83	82	82	83	85	85	84	85	86	87	90	89	88	89	89	89	89	89	89	89	89	89	89	86.8	90
23-Jan	89	89	89	89	89	89	89	89	89	89	89	89	89	89	90	90	90	90	90	90	90	91	91	90	89.4	91
24-Jan	89	90	90	91	92	92	92	92	92	92	92	91	90	89	88	86	81	80	81	86	93	92	91	91	89.4	93
25-Jan	91	90	90	90	90	90	90	90	90	90	90	90	91	92	93	92	90	86	83	85	86	86	86	88	89.1	93
26-Jan	87	87	87	85	84	85	85	86	87	88	88	90	93	91	91	89	84	80	75	73	71	66	69	76	83.1	93
27-Jan	74	71	62	63	68	70	66	63	63	62	59	58	70	74	78	82	88	91	92	94	95	95	95	94	76.1	95
28-Jan	91	88	85	83	83	82	82	80	79	72	70	69	69	72	70	71	72	79	90	87	80	75	70	66	77.7	91
29-Jan	67	74	82	89	91	84	77	74	70	70	71	67	61	54	51	49	48	48	52	58	65	68	66	71	66.9	91
30-Jan	75	77	79	76	73	73	73	72	75	78	83	87	90	86	84	82	82	84	87	88	84	82	82	81	80.5	90
31-Jan	80	82	83	82	83	86	86	87	81	77	74	75	75	74	70	70	74	76	76	75	76	78	77	77	78.1	87
	78.9	78.9	78.7	78.8	79.3	79.3	79.0	78.9	78.5	78.3	78.3	78.4	78.7	77.7	77.1	76.8	76.8	76.8	77.2	77.9	78.8	79.0	79.4	79.6	Diurnal Average	
	91	90	90	91	92	92	92	92	92	92	92	91	93	92	93	92	90	91	92	94	95	95	95	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 90m (RH90m) - %

Mannix - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	4	0.54	0.54
40 - 60	58	7.80	8.33
60 - 80	272	36.56	44.89
80 - 100	410	55.11	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 20 m (WS20m) - km/h

Mannix - January 2016

Maximum Speed: 35 km/h on Jan 27 01:00

Maximum Daily Speed Average: 16.5 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 13 04:00

Minimum Daily Speed Average: 0.9 km/h on Jan 20

Maximum Diurnal Speed Average: 2.6 km/h at hour 1

Minimum Diurnal Speed Average: 0.3 km/h at hour 19

Monthly Average Velocity: 1.6 km/h 191.6 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 5$ Median = 8 $Q_3 = 11$ $P_{90} = 14$ $P_{99} = 27$

Hours in Service: 744

Hours of Data: 743

Hours of Missing Data: 1

Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	S9	S11	SSE11	SE8	SSE11	SSE12	SSE9	S10	SSW12	S12	SW11	WSW23	WSW26	W24	WSW25	WSW18	WSW16	WSW25	W27	WSW18	W20	W20	WSW15	WSW11	WSW12.5	W27
2-Jan	WSW16	WSW15	WSW13	SW11	S7	SSE9	SSE9	SSE10	SSE13	SSE12	SSE10	SSE11	SE7	SE9	SE8	SSE10	SSE9	SE8	SE8	SE7	SE8	SE10	SSE12	SSE11	SSE8.1	WSW16
3-Jan	SSE11	SSE13	SSE12	SSE11	SSE12	SSE10	SSE14	SSE10	SE13	SE13	SE14	SE14	SSE14	SSE13	SSE13	SSE16	SSE18	SSE14	SE9	SSE11	SSE9	SE8	SE8	SE4	SSE11.8	SSE18
4-Jan	SSE9	SE8	SE6	WSW1	N1	E2	NE2	NNE2	NNW4	NW4	WNW5	WSW3	SW2	SSE2	SSE2	SE4	SE6	SSE7	SSE8	SSE8	SSE8	SSE11	SSE11	SSE10	SSE3.6	SSE11
5-Jan	SSE10	SSE7	SE8	SSE9	SSE9	SE5	SSE7	SSE9	SSE8	SSE8	SSE6	SSE7	SSE6	SE5	SSE4	SSE4	SW2	NNE7	NNW5	NNW4	W7	WNW4	WNW2	WNW4	SSE3.6	SSE10
6-Jan	WNW3	WNW4	N4	W5	NNW3	NNW2	W1	N3	NNW5	NW3	NNW1	NNW3	NNW5	NNW3	WNW4	NW5	NNW6	NNW6	NNW7	NNW6	NNW8	NNW8	NNW10	N11	NNW4.4	N11
7-Jan	N12	N9	AF	N9	NNE9	NE7	N4	N6	N9	N6	N5	N5	NNW6	WNW7	WNW8	WNW8	WNW9	W10	W10	W9	W7	WNW5	NW5	NW5	NW5.5	N12
8-Jan	N5	NNE6	N5	NNW7	NNW6	NW3	NW3	NNW4	NW3	WNW4	NNW2	ENE1	ESE4	SSE6	S5	S6	S6	S5	S6	SSE6	S6	S6	SSE9	SSE13	S1.3	SSE13
9-Jan	SSE14	SSE13	SSE9	SSE10	SSE9	SSE9	SSE7	SSE9	SSE7	SSE6	SSE9	SSE11	SSE10	SSE11	SSE14	SSE11	SSE13	SSE12	SSE9	SSE11	SSE10	SSE11	SSE12	SSE11	SSE10.3	SSE14
10-Jan	SSE11	SSE11	SSE11	SSE8	SSE8	SSE10	SSE5	S2	SE3	S4	SW2	E3	NNE3	NNW3	NNW8	NNW9	N10	N11	N12	NNE9	NNE3	WSW2	WNW2	N5	E1.2	N12
11-Jan	N7	N10	N16	NNW12	NNW7	WNW7	W4	WNW4	NW12	WNW11	W10	W11	WSW9	WSW9	WSW11	WSW10	SW7	SW5	SW6	SSW9	S8	S8	SSE8	SSE7	W4.6	NNW16
12-Jan	SE8	SE8	SSE8	SE6	SSE6	SSE5	SSE7	SSE7	SSE10	SSE8	SSE8	S5	S5	SSE5	S5	SSE6	SSE6	SSE7	SSE6	SSE7	S4	SSW5	SSE3	SSW6	SSE6.2	SSE10
13-Jan	SSE5	ENE3	W5	WNW0	SSE4	E2	NNE3	NNE3	NNE4	ENE2	E6	E8	E6	ENE10	NE8	ENE10	ENE12	ENE10	ENE10	E10	E9	E3	NNW8	N16	ENE4.8	N16
14-Jan	N19	N17	N16	N13	NNW10	NNW13	NNW14	N12	N13	N11	N11	N9	N11	N11	N10	N11	NNE15	NNE14	NNE13	NNE15	N13	NNE12	NNE11	NNE10	N12.2	NNE19
15-Jan	NNE7	NE6	NE5	N8	N7	N6	N6	NNW3	N6	N5	N4	NNW3	NNW3	WNW6	NW5	N6	N8	N9	N9	NNE5	NE4	SE2	S3	SW4	N4.3	N9
16-Jan	SSW3	SW5	WSW6	SW6	S4	SW7	SSW4	S3	SSE4	S5	SSW5	SSE1	SSE1	E2	ESE3	S4	S4	S5	S4	SE4	SSE4	S5	SSE5	SE7	S3.6	SE7
17-Jan	SSE6	S5	SSE8	SSE6	SSE8	SSE7	SSE10	SSE9	SSE8	SSE7	SSE5	SE8	S6	SSW6	SSE4	SE6	S5	S5	SSE7	SE8	SE12	SE14	SE12	SE12	SSE7.4	SE14
18-Jan	SSE14	SE13	SE12	SE12	SE13	SE11	SE13	SE12	SE12	SE11	SE11	SSE9	SSE6	SSE8	SSE8	SSE6	SSE4	SSE5	SSE6	SSE8	SSE9	SSE8	SSE5	SSE7	SSE9.1	SSE14
19-Jan	SSE6	S3	S5	S3	SW4	WSW5	W6	NW5	N4	N5	N7	NNW6	WNW8	NW10	NNW10	N7	NW3	N6	N7	NNE13	NNE12	N10	NNE8	NNE5	NNW4.0	NNE13
20-Jan	NNE10	NNE12	N10	NNW7	N6	N7	NNW7	NNW6	NNW5	NNW4	WNW3	SSW3	SSW4	SE2	ESE3	SE1	SE5	SSE5	SSE5	SSE6	SSE5	S5	SSE7	SSE10	NE0.9	NNE12
21-Jan	SSE11	SSE8	SSE12	SSE10	SSE9	SSE8	SSE8	SSE11	SSE11	SSE11	SSE10	SSE9	SE10	SE7	SE9	SE13	SE14	SE18	SE17	SE10	SE7	SE11	SE14	SSE8	SE10.5	SE18
22-Jan	SSE7	SSE9	S8	S9	SSW6	SW5	W3	WSW1	NNW4	N3	NW4	W4	W4	WNW5	NW9	NNW7	NNW8	N9	NNE11	NNE8	N9	NNE9	NNE9	N9	NNW2.3	NNE11
23-Jan	N9	NNE8	N7	N6	N6	NW4	NNW4	NW5	NNW4	N2	W3	W5	W7	W3	WSW1	WSW3	WSW3	WSW4	SW2	S4	S5	SSE5	SSE5	SE6	NW1.6	N9
24-Jan	SSE5	SSE7	S6	SSE7	SSE7	SSW5	SSW9	SW10	SW11	SW11	SW11	SW9	SW8	SW10	S6	SSE7	SSE8	SSW3	W13	WNW12	N11	N13	N12	N7	SW3.9	W13
25-Jan	NNW5	NW2	NNE4	ESE0	S4	S6	SSE8	SSE8	S10	SSE10	SSE14	SSE16	SSE12	SE14	SSE14	SSE12	SSE10	SE10	SE10	SE10	SSE12	SSE11	SSE10	SSE12	SSE8.3	SSE16
26-Jan	SSE9	SE7	SSE10	SSE8	SSE8	SE7	SE7	SE6	SE8	SE9	SSE9	SE8	SSE8	SE8	SSE12	SSE10	SSE9	SE8	SE6	S7	SW12	WSW27	WSW32	W32	S7.0	WSW32
27-Jan	W35	WSW28	W32	WNW19	W13	W29	W22	W21	W21	W22	W22	WNW15	NNW7	N9	N7	N7	NNW10	NNW7	W5	W7	NW2	E2	WSW2	SSE5	W12.5	W35
28-Jan	SSW7	SSE7	SSE8	SE13	SE15	SSE8	SSE11	SSE10	SSE11	SSE13	SE12	SSE13	SSE13	SSE6	SSE6	SSE10	SSE11	SSE12	SSE7	SSE9	WSW19	WSW21	WSW18	WSW18	S8.8	WSW21
29-Jan	WSW19	WSW20	W25	W18	W12	W17	WNW18	WNW18	W27	W20	W16	W19	WNW15	WNW18	W19	WNW17	W14	W12	W14	W15	WSW14	W16	W14	WSW10	W16.5	W27
30-Jan	SW8	WSW7	SSE3	SW7	SW12	SW5	W15	WNW12	W20	W9	NW6	N6	N9	NNE11	NNE13	NNE13	NNE14	NNE15	NNE18	NNE13	NNE10	NNE8	N8	NNE9	NNW5.2	W20
31-Jan	NE8	NE9	NNE8	NNE11	NE12	NNE11	NNE12	NNE13	NNE13	NNE14	N10	N9	NNE15	NNE14	NNE14	NNE10	NNE9	NNE10	NNE11	NNE11	NNE9	NNE9	NNE7	N5	NNE10.4	NNE15
	S2.6	S2.2	SSW2.2	S1.5	S2.3	SSW2.1	SSW2.1	SSW1.6	SW1.8	SSW2.2	SSW2.4	SSW2.3	SSW1.6	SW1.1	SW1.3	SSE1.3	SSE1.3	SE0.8	SE0.3	SE1.1	S1.4	SSW2.1	SSW2.0	SSW2.0	Diurnal Average	
	W35	WSW28	W32	WNW19	SE15	W29	W22	W21	W27	W22	W22	WSW23	WSW26	W24	WSW25	WSW18	SSE18	WSW25	W27	WSW18	W20	WSW27	WSW32	WSW32	Diurnal Maximum	

AF - Analyzer Failure

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 7 km/h on Jan 26 22:00

Minimum Value: 0 km/h on Jan 20 16:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 6$

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

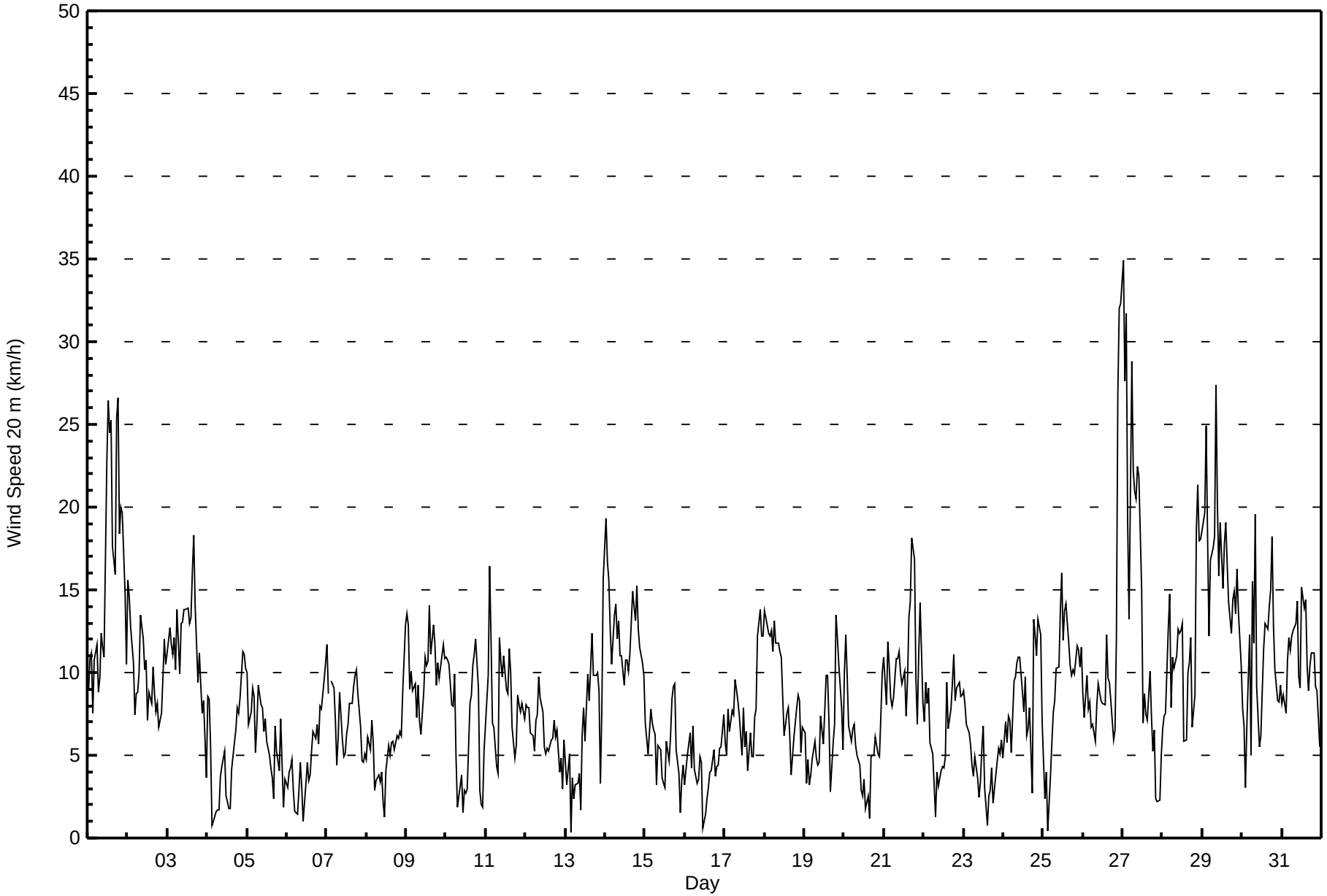
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 20 m (WS20m) - km/h

Mannix - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	197	26.51	26.51
6 - 11	381	51.28	77.79
12 - 19	139	18.71	96.50
20 - 28	21	2.83	99.33
29 - 38	5	0.67	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 20 m (WS20m) - km/h

Mannix - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	16	9	3	3	6	4	10	28	25	10	10	11	10	14	16	22	197
6 - 11	50	29	5	4	5	0	45	147	19	6	15	8	10	9	3	26	381
12 - 19	10	23	1	1	0	0	23	36	1	1	2	12	14	10	1	4	139
20 - 28	0	0	0	0	0	0	0	0	0	0	0	8	13	0	0	0	21
29 - 38	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	76	61	9	8	11	4	78	211	45	17	27	41	50	33	20	52	743

Total Number of Valid Hours: 743

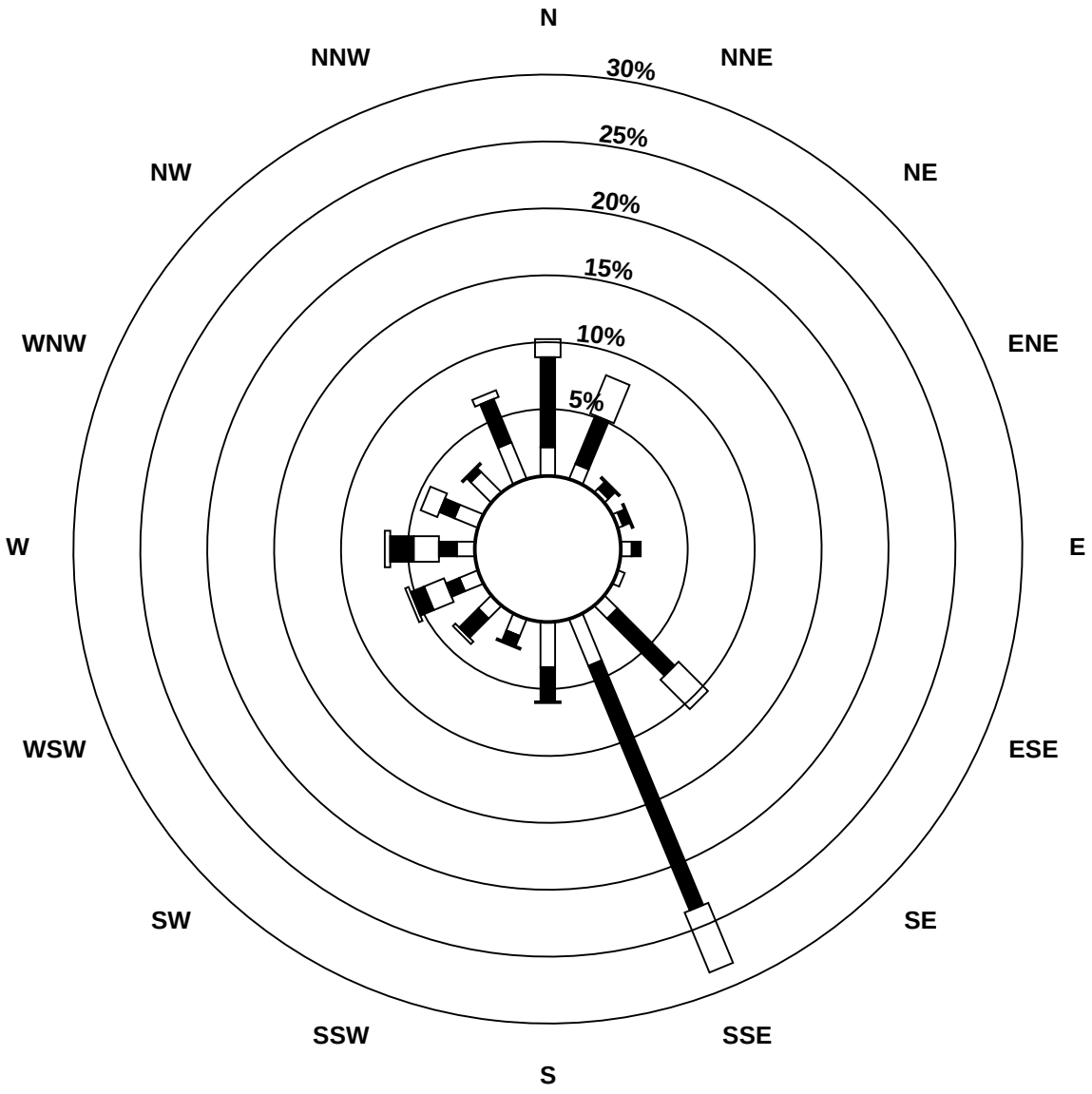
Total Number of Hours: 744

Wood Buffalo Environmental Association

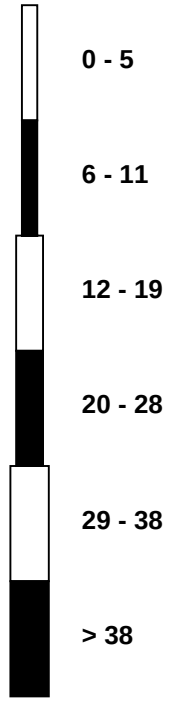
Wind Rose Jan 2016

Wind Speed 20 m (WS20m) - km/h

Mannix (AMS 5)



Classes (km/h)



Total Number of Valid Hours: 743

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Mannix - January 2016

Maximum Speed: 40 km/h on Jan 27 01:00

Maximum Daily Speed Average: 22.1 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 23 15:00

Minimum Daily Speed Average: 1.0 km/h on Jan 20

Maximum Diurnal Speed Average: 4.8 km/h at hour 1

Minimum Diurnal Speed Average: 1.6 km/h at hour 19

Monthly Average Velocity: 3.1 km/h 182.6 deg

Percentiles: P_1 = 2 P_{10} = 5 Q_1 = 8 Median = 12 Q_3 = 17 P_{90} = 21 P_{99} = 33

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SSW14	SSW16	S17	SSE12	S16	SSE18	S12	SSW12	SSW17	SSW19	SW20	WSW28	WSW32	WSW29	WSW32	WSW26	WSW22	WSW33	WSW32	WSW25	WSW26	WSW25	WSW21	WSW15	SW18.7	WSW33
2-Jan	WSW20	WSW22	WSW18	SW16	SSW13	S12	S12	SSE16	SSE20	SSE20	SSE17	SSE14	SE10	SE14	SE13	SSE15	S11	SSE12	SSE16	SE15	SE17	SSE21	SSE21	SSE21	S13.3	WSW22
3-Jan	SSE22	SSE21	SSE20	SSE22	SSE25	SSE23	SSE26	SSE20	SE23	SE23	SE23	SE21	SE21	SSE20	SSE22	SSE26	SSE27	SSE23	SSE18	S14	SSE16	SSE15	SSE16	SSE7	SSE20.4	SSE27
4-Jan	SE12	SSE17	SE11	SW2	NNW5	NW6	NNW6	NNW6	NNW12	NW12	NW11	WNW12	W11	W10	W7	WSW3	S4	S8	S11	S8	S9	S11	S10	SSE16	SW3.0	SSE17
5-Jan	SSE16	SSE13	SE15	SSE16	SSE16	SE12	SSE15	SSE15	SSE14	SSE13	SSE11	SE10	SSE8	SE6	SE7	SE7	SSE7	N7	N12	NNW9	NW6	NW7	NNW3	NW4	SE6.4	SSE16
6-Jan	NW4	NNW3	N6	WNW3	NNW3	NNW6	WNW1	NNW4	N8	NW5	N2	NNW4	NNW5	NNW5	WNW4	NW7	NNW8	NNW8	NNW9	NNW7	NNW11	NNW11	NNW12	N13	NNW6.1	N13
7-Jan	N16	N12	AF	AF	AF	AF	N6	N8	N12	N7	N6	N7	NNW8	WNW9	WNW11	WNW11	W14	W14	WSW14	WSW12	WSW9	WNW6	WNW6	NW7	NW7.4	N16
8-Jan	N5	N7	N7	NNW10	NNW9	NW5	NW6	N5	N2	NNE2	NE2	ENE2	ESE5	SSE6	S9	S8	S9	S8	S11	SSE10	S11	S10	SSE12	SSE18	SSE2.3	SSE18
9-Jan	SSE20	SSE20	SSE17	SSE16	SSE13	SSE13	SSE11	SSE16	SSE11	SSE10	SE13	SE15	SSE14	SSE15	SSE19	SSE19	SSE20	SSE18	SE14	SSE17	SSE16	SSE18	SSE18	SSE18	SSE15.7	SSE20
10-Jan	SSE19	SE19	SSE18	SSE13	SSE14	SSE15	SSE8	SSW3	SE4	SSE5	SW2	NE3	NNE3	NNW4	NNW11	NNW12	N15	N15	N16	N12	NNE4	WSW2	WNW3	N7	E1.7	SSE19
11-Jan	N9	N15	NNW23	NNW17	NNW10	WNW8	WNW6	NW7	NW16	WNW13	WSW11	WSW12	WSW10	WSW11	SW14	WSW13	SW10	SW8	SSW9	SSW16	SSW14	S16	SSE16	SSE15	WSW6.2	NNW23
12-Jan	SE13	SE14	SE13	SSE12	SSE11	SSE10	SE12	SSE12	SSE15	SSE13	SSE11	SSE9	S7	SSE7	S7	SSE8	SSE8	SE10	SSE9	SSE11	S7	S9	SE6	S11	SSE9.9	SSE15
13-Jan	SSE10	E7	NNW1	ESE3	SE7	ESE8	ENE6	NE4	NE6	E5	E9	E9	E7	ENE11	NE10	ENE12	ENE14	NE11	NE11	ENE12	E10	E5	NNW10	N22	ENE6.7	N22
14-Jan	N26	N24	N21	NNW17	NNW14	NNW17	NNW19	NNW16	N18	N15	N14	N12	N14	N14	NNW13	N14	N19	NNE17	NNE17	N19	N16	NNE15	NNE14	NNE13	N16.2	N26
15-Jan	NNE8	NE7	NE6	N11	N10	N9	N7	NNW5	N7	N7	NNW4	NW4	NW4	WNW7	NW6	N8	N13	N13	N11	NNE7	NE5	E4	SE6	SSE8	N5.6	N13
16-Jan	SSE6	SSE7	SSE7	SSW5	SSE7	SW7	WSW4	SSW4	SE6	SSE10	SSW8	SSW2	SSW2	ESE1	E3	SSE4	SSE3	S6	S6	SE6	SE8	SSE11	SSE12	SE12	SSE5.4	SE12
17-Jan	SSE15	SSE11	SSE14	SSE13	SSE14	SSE13	SSE17	SE15	SE17	SSE16	SSE8	SE10	SSE7	SSW9	SSE8	SE8	SSE10	SSE12	SE15	SE16	SE19	SE21	SE17	SE18	SE13.1	SE21
18-Jan	SE22	SE21	SE18	SE17	SE18	SE16	SE17	SE16	SE17	SE15	SE14	SE10	SSE7	SSE9	SSE9	SE7	SSE5	SSE7	SSE8	SSE10	SSE11	SSE10	SSE6	SSE8	SE12.1	SE22
19-Jan	SSE8	S7	S9	S7	WSW6	W6	WNW7	NW7	N6	N7	N10	NNW6	NW9	NW11	NNW12	N9	NNW4	N8	NNW10	N16	N16	N13	NNE10	NNE8	NNW5.2	N16
20-Jan	N13	N16	N12	NNW9	N8	N9	NW9	NNW7	NNW7	NNW6	WNW3	SSW3	S5	SE2	ESE3	SE2	SE7	SSE7	SSE7	SE8	SSE7	SSE9	SSE12	SSE15	NE1.0	N16
21-Jan	SSE16	SSE14	SSE17	SE16	SE14	SE13	SSE13	SE16	SSE18	SE17	SE15	SE12	SE13	SE9	ESE12	ESE18	ESE19	ESE23	ESE21	ESE14	SE10	SE15	SE20	SSE12	SE15.0	ESE23
22-Jan	SSE13	SSE17	S14	S16	SSW13	SW10	W8	W4	NW7	NNW5	NNW6	NW4	NW5	WNW6	NW11	NNW9	NNW11	N14	N14	NNE11	N12	NNE12	NNE11	N11	NW2.8	SSE17
23-Jan	N11	N10	N9	N9	N8	NW6	NNW5	NW6	NNW5	N3	W3	W6	W7	WNW3	NW0	SW2	SW4	SW5	SSW4	SSE7	S9	S10	S9	SE9	WNW1.5	N11
24-Jan	SSE8	SSE10	S10	SSE11	SSE11	SSW10	SW15	SW14	SW15	SW14	SW14	SW12	SSW10	SW13	S11	SSE9	S10	WSW9	W19	W17	N16	N18	N17	N9	SW6.4	W19
25-Jan	NNW6	NW3	NNE5	SE1	S5	S8	SSE10	SSE11	S16	SSE13	SSE17	SSE20	SE14	SE16	SSE17	SSE16	SSE15	SE15	SE17	SE17	SSE20	SSE19	SSE19	S17	SSE11.8	SSE20
26-Jan	SSW15	S10	SSE15	SSE15	SSE16	SE17	SE18	SE18	SE19	SE21	SSE16	SE18	SSE15	SSE15	SSE22	SSE19	SSE17	S13	SSW12	SSW17	SW19	WSW34	WSW38	WSW39	S13.8	WSW39
27-Jan	WSW40	WSW35	WSW38	W25	W17	W34	W27	W26	W25	W26	W26	W18	NNW9	N11	NNW10	NNW11	NNW14	NNW11	NW6	WNW7	N4	NE4	WSW1	SE9	W14.8	WSW40
28-Jan	SSE14	SSE15	SE14	SE19	SE22	SE13	SE17	SSE17	SSE18	SE20	SE20	SSE20	SSE19	SSE11	SSE11	SSE17	SSE17	SSE20	SSE13	S15	SW27	SW29	WSW25	WSW25	SSE14.2	WSW29
29-Jan	WSW25	WSW25	WSW29	W24	W17	W22	WNW25	W25	W33	W26	W19	W23	W20	WNW24	W25	WNW23	W20	W18	WSW22	WSW22	WSW20	WSW22	WSW20	WSW17	W22.1	W33
30-Jan	WSW14	WSW14	SW5	WSW11	WSW16	WSW12	WSW22	WNW17	W25	W13	NW7	NNW7	N11	N14	N16	NNE15	NNE17	NNE19	NNE23	NNE16	NNE13	N10	N10	NNE11	NW7.5	W25
31-Jan	NNE9	NNE10	NNE8	NNE13	NNE14	NNE14	NNE14	NNE16	NNE16	N18	NNW13	N11	NNE19	NNE17	NNE18	NNE13	NNE12	NNE13	NNE14	NNE13	NNE11	NNE11	NNE9	N7	NNE12.9	NNE19
	S4.8	S4.6	S4.3	S3.7	S4.7	SSW4.2	SSW3.4	SSW2.8	SSW2.8	S3.6	S3.6	S3.0	SSW2.1	SSW1.7	SSW2.2	SSE2.3	SSE2.2	S1.9	S1.6	SSE2.3	S2.7	S3.8	S3.5	S3.7	Diurnal Average	
	WSW40	WSW35	WSW38	W25	SSE25	W34	W27	W26	W33	W26	W26	WSW28	WSW32	WSW29	WSW32	SSE26	SSE27	WSW33	WSW32	WSW25	SW27	WSW34	WSW38	WSW39	Diurnal Maximum	

AF - Analyzer Failure

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Jan 1 16:00

Minimum Value: 0 km/h on Jan 23 15:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

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

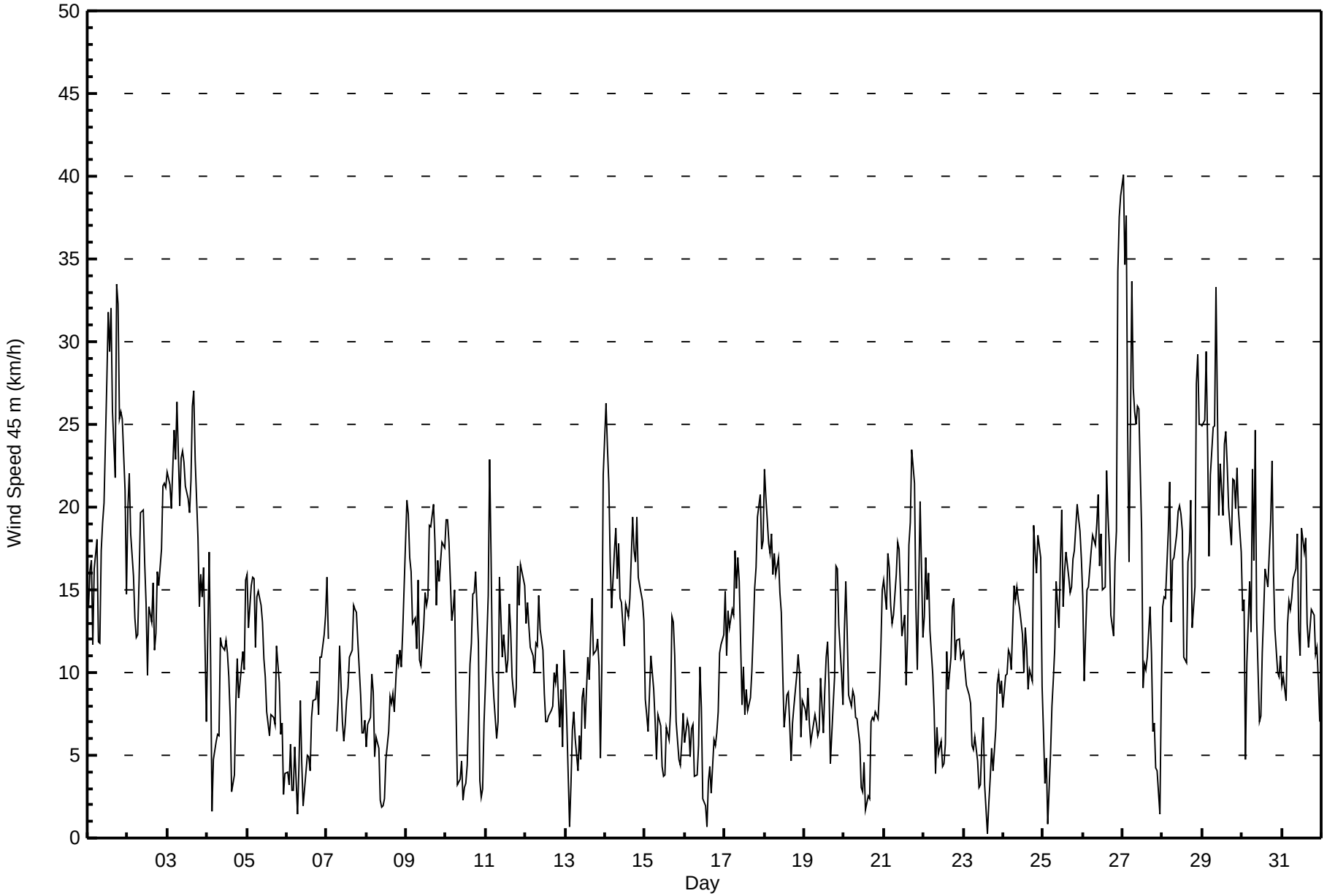
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 45 m (WS45m) - km/h

Mannix - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	86	11.62	11.62
6 - 11	263	35.54	47.16
12 - 19	290	39.19	86.35
20 - 28	86	11.62	97.97
29 - 38	13	1.76	99.73
> 38	2	0.27	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed 45 m (WS45m) - km/h

Mannix - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	5	4	5	1	4	4	4	4	2	8	5	5	2	6	10	17	86
6 - 11	38	14	6	2	5	1	22	59	31	5	4	7	7	11	18	33	263
12 - 19	37	25	0	3	0	4	54	93	13	12	10	11	10	3	2	13	290
20 - 28	4	1	0	0	0	2	13	26	0	0	2	19	15	3	0	1	86
29 - 38	0	0	0	0	0	0	0	0	0	0	0	11	2	0	0	0	13
> 38	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Totals	84	44	11	6	9	11	93	182	46	25	21	55	36	23	30	64	740

Total Number of Valid Hours: 740

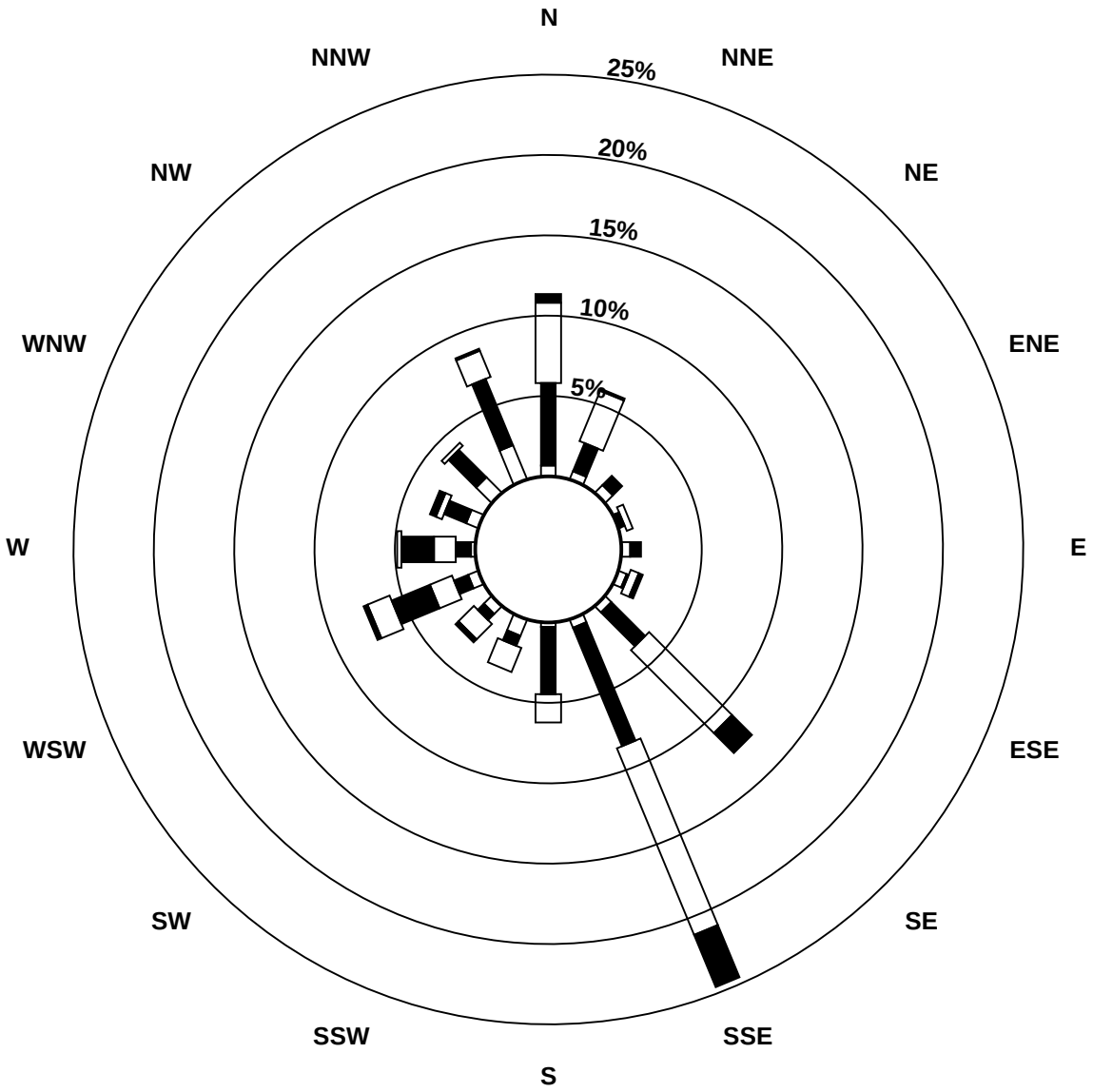
Total Number of Hours: 744

Wood Buffalo Environmental Association

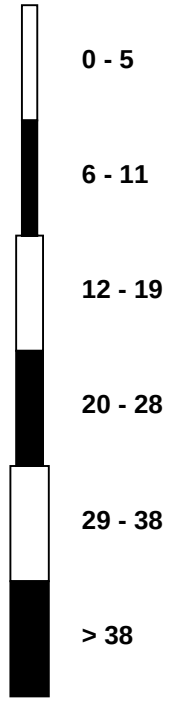
Wind Rose Jan 2016

Wind Speed 45 m (WS45m) - km/h

Mannix (AMS 5)



Classes (km/h)



Total Number of Valid Hours: 740

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 75 m (WS75m) - km/h

Mannix - January 2016

Maximum Speed: 45 km/h on Jan 27 01:00

Maximum Daily Speed Average: 26.0 km/h on Jan 29

Minimum Speed Value: 1 km/h on Jan 16 16:00

Minimum Daily Speed Average: 0.9 km/h on Jan 23

Maximum Diurnal Speed Average: 6.0 km/h at hour 1

Minimum Diurnal Speed Average: 1.8 km/h at hour 14

Monthly Average Velocity: 3.3 km/h 195.3 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 9$ Median = 14 $Q_3 = 20$ $P_{90} = 26$ $P_{99} = 40$

Hours in Service:	744
Hours of Data:	710
Hours of Missing Data:	34
Percent Operational Time:	95.4

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SW16	SSW18	SSW19	SSW11	SSW17	SSW18	SSW14	SW15	SW21	SW21	WSW27	WSW31	WSW35	WSW33	WSW36	WSW33	WSW27	WSW40	WSW37	WSW30	W30	WSW30	W26	W19	WSW23.7	WSW40
2-Jan	WSW22	WSW26	WSW23	WSW20	SSW15	SSW14	SSW13	S11	S15	S17	S16	SSE18	SSE14	SE17	SSE21	SSE18	SSW12	S12	S15	SSE15	SE17	SSE25	S29	SSE26	S14.7	SSE29
3-Jan	SSE29	S30	S32	SSE27	SSE31	SSE32	SSE33	SSE33	SSE34	SSE36	SSE35	SSE32	SSE30	SSE29	SSE31	SSE30	SSE32	S24	S16	SSW13	S11	S5	SSE9	S3	SSE25.2	SSE36
4-Jan	SSE7	SSE12	S5	NW6	NW10	NW12	NNW16	NNW15	NNW19	NNW20	NNW16	NW14	WNW12	WNW13	W11	W4	SSW4	SSW9	SSW10	SW7	SW9	SW9	SW10	SSW9	WNW5.7	NNW20
5-Jan	SSW10	SSW6	SSE10	SSE10	SSW8	SSW4	SSE11	SSE11	SSE10	S7	SSE11	SE12	SSE11	SE6	SSE11	SE10	SE9	NE3	N14	N15	NNW8	NNW9	NW5	NNW5	SSE3.8	N15
6-Jan	NNW4	NNW4	N7	NNE4	NNE5	N7	NNW6	AF	AF	AF	AF	N5	NNW5	N6	NW4	NNW8	N9	AF	AF	AF	AF	AF	AF	AF	----	N9
7-Jan	AF	N14	N12	N15	N13	NNE10	N8	N10	N14	N8	N6	N8	NNW9	WNW8	WNW9	WNW11	W15	W15	W16	WSW15	WSW10	W6	WNW5	NW5	NW7.5	WSW16
8-Jan	N5	N6	N8	N11	NNW8	NNW5	NNW6	N5	NE3	ENE4	ENE3	ENE4	ESE4	SSE6	S9	S7	S8	S7	S12	SSE12	S14	S12	SSE15	SSE20	SE2.9	SSE20
9-Jan	SSE24	SSE24	SSE21	S16	SSE15	S15	S14	SSE14	AF	AF	AF	AF	AF	AF	AF	AF	SSE22	SE23	SE20	SE23	SSE21	SSE23	SSE21	SSE20	----	SSE24
10-Jan	SSE22	SSE25	SSE27	SSE20	SSE21	SSE22	S12	SSW5	SSE2	SSW4	W4	NNE4	NNE4	NNW6	NNW11	NNW14	N18	N16	N18	NNE14	NE4	W3	WNW3	N8	SE2.2	SSE27
11-Jan	N11	N18	N27	NNW20	NNW13	WNW9	WNW8	NW10	NW18	WNW15	WSW12	WSW13	WSW10	WSW12	SW15	WSW14	SW11	SSW10	SSW12	SSW18	SSW14	SSW17	S20	S19	W6.9	N27
12-Jan	SSE19	SSE22	SSE21	SE17	SE16	SE13	SE13	SE17	SE18	SE16	SE14	SSE12	SSE9	SSE9	S9	SSE9	SSE12	SSE15	SSE14	SSE15	SSE10	SSE12	SE7	SSE12	SSE13.7	SSE22
13-Jan	SE11	E8	ESE3	ESE5	SE8	ESE8	E8	ENE6	ENE7	ESE6	E8	E8	E6	ENE11	NE10	ENE13	ENE15	NE13	NE13	ENE12	E10	ENE5	NNW11	N24	ENE7.7	N24
14-Jan	N28	N27	N25	N19	NNW16	NNW20	NNW21	NNW18	N21	N16	N16	N13	N16	N15	N15	N16	NNE22	NNE20	NNE19	NNE22	NNE17	NNE19	NNE19	NNE17	N18.5	N28
15-Jan	NE10	NE9	NE8	N13	N13	N10	N8	NNW6	N8	NNE6	N3	NW4	NNW4	NW6	NNW6	N8	N16	N15	NE12	ENE7	E4	E5	SE6	S8	NNE6.1	N16
16-Jan	SSE7	SE8	SE9	S8	S5	SW6	W7	W4	ENE3	SE5	SSW6	SW3	WSW3	WNW3	NE4	S1	S1	S3	S4	SSE5	SSE7	SSE10	S9	SSE8	S3.7	SSE10
17-Jan	SSE7	S7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	S12	SSE13	SE13	SE14	SE18	SE19	SE22	SE24	SE23	SE21	SE19	----	SE24
18-Jan	SE28	SE26	SE20	SE20	SE19	SE18	SE19	SE21	SE21	SE18	SE16	SE11	SSE7	SSE9	SSE9	SE7	SSE6	SSE8	SSE10	SSE11	SSE12	SSE11	SSE6	S10	SE14.0	SE28
19-Jan	S10	SSW10	SSW9	SW8	W7	WNW6	WNW8	NNW8	N7	NNE8	N12	N7	NW8	NW11	NNW13	N11	N6	N10	N11	NNE17	NNE18	N14	NNE12	NNE10	NNW6.2	NNE18
20-Jan	NNE14	N17	N14	NNW9	N9	N10	NNW9	NNW7	N8	N6	NW2	S3	S5	SE2	ESE2	SE4	SSE10	SSE10	SSE10	SE9	SSE11	SSE14	SSE17	SSE21	E2.0	SSE21
21-Jan	SSE21	SSE19	SSE23	SE24	SE22	SE21	SE17	SE17	SE23	SE22	SE20	SE15	SE14	SE10	ESE10	ESE15	ESE17	SE22	SE20	SE15	SE13	SE17	SE24	SSE15	SE17.9	SE24
22-Jan	SSE19	S22	SSW17	SSW16	SW13	SW13	WSW10	W7	NW9	NNW8	N7	NNE7	N5	NW5	NW11	NNW10	N12	N17	N16	NNE13	NNE13	NNE15	NNE13	NNE13	NNW3.3	S22
23-Jan	N13	NNE12	N10	N10	N9	NW6	NNW6	NW6	N5	NNE3	WNW3	W5	WNW7	NW3	NE1	S1	SSW5	SSW6	SSW5	S10	S12	S14	S13	SSE14	WNW0.9	S14
24-Jan	SSE12	SSE12	S14	S15	S14	SW14	SW18	SW17	SW18	SW16	SW14	SW14	SW11	SW13	S13	S11	SSW11	WSW14	W23	WNW21	N19	N21	N20	N10	SW8.1	W23
25-Jan	NNW7	NW3	NNE5	ESE1	S5	S8	SSE10	SSE13	SSE16	SE14	AF	AF	AF	SE17	SSE18	SSE18	SE18	SSE21	SSE24	SSE24	SSE26	S24	S19	SSW17	SSE12.7	SSE26
26-Jan	SW19	SW14	S10	SSW11	S14	SSE17	SSE17	SSE18	SSE20	SSE24	S18	SSE16	S21	S19	SSE24	SSE23	SSW20	SW16	SW18	SW22	SW23	WSW41	WSW42	WSW44	SSW17.0	WSW44
27-Jan	WSW45	WSW40	WSW42	W28	W19	W37	W31	W29	W29	W29	W29	W21	NW11	N11	N12	N14	NNW16	N15	NNW9	NNW7	N6	NE6	S2	SE15	W16.0	WSW45
28-Jan	SE19	SE20	SE13	SE19	SE26	SE18	SE21	SSE23	SSE26	SE28	SE28	SSE27	SSE24	SSE16	SSE16	SSE23	SSE23	SSE27	S18	SSW22	WSW34	WSW35	WSW31	WSW30	S18.0	WSW35
29-Jan	WSW30	WSW30	W33	WNW28	W21	W26	WNW29	W29	W37	W30	W22	W24	WNW21	WNW27	W27	WNW25	W24	W23	WSW29	WSW28	WSW26	WSW28	W25	WSW23	W26.0	W37
30-Jan	WSW19	WSW20	WSW10	WSW14	WSW19	WSW20	WSW27	W19	W27	WNW16	NNW7	NNW8	N12	N15	NNE18	NNE17	NNE20	NNE21	NNE26	NNE19	NNE14	NNE12	NNE11	NNE13	NW8.9	W27
31-Jan	NNE10	NNE11	NNE9	NNE14	NNE16	NNE16	NNE16	NNE17	NNE18	NNE21	NNW14	N12	NNE20	NNE19	NNE21	NNE14	NNE13	NNE14	NNE16	NNE15	NNE13	NNE14	NNE11	NNE9	NNE14.6	NNE21
	S6.0	S5.4	SSW4.3	SSW3.1	S3.7	SSW4.1	SW3.5	SSW3.1	SSW2.6	S2.9	SSW3.7	SSW2.8	SW2.2	SW1.8	SSW2.4	S2.1	S2.3	S2.8	SSW2.6	S3.1	S3.7	SSW4.6	SSW4.6	S4.6	Diurnal Average	
	WSW45	WSW40	WSW42	WNW28	SSE31	W37	SSE33	SSE33	W37	SSE36	SSE35	SSE32	WSW35	WSW33	WSW36	WSW33	SSE32	WSW40	WSW37	WSW30	WSW34	WSW41	WSW42	WSW44	Diurnal Maximum	

AF - Analyzer Failure

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 11 08:00

Minimum Value: 0 km/h on Jan 16 20:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	710
Hours of Missing Data:	34
Hours of Calibration:	0
Percent Operational Time:	95.4

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

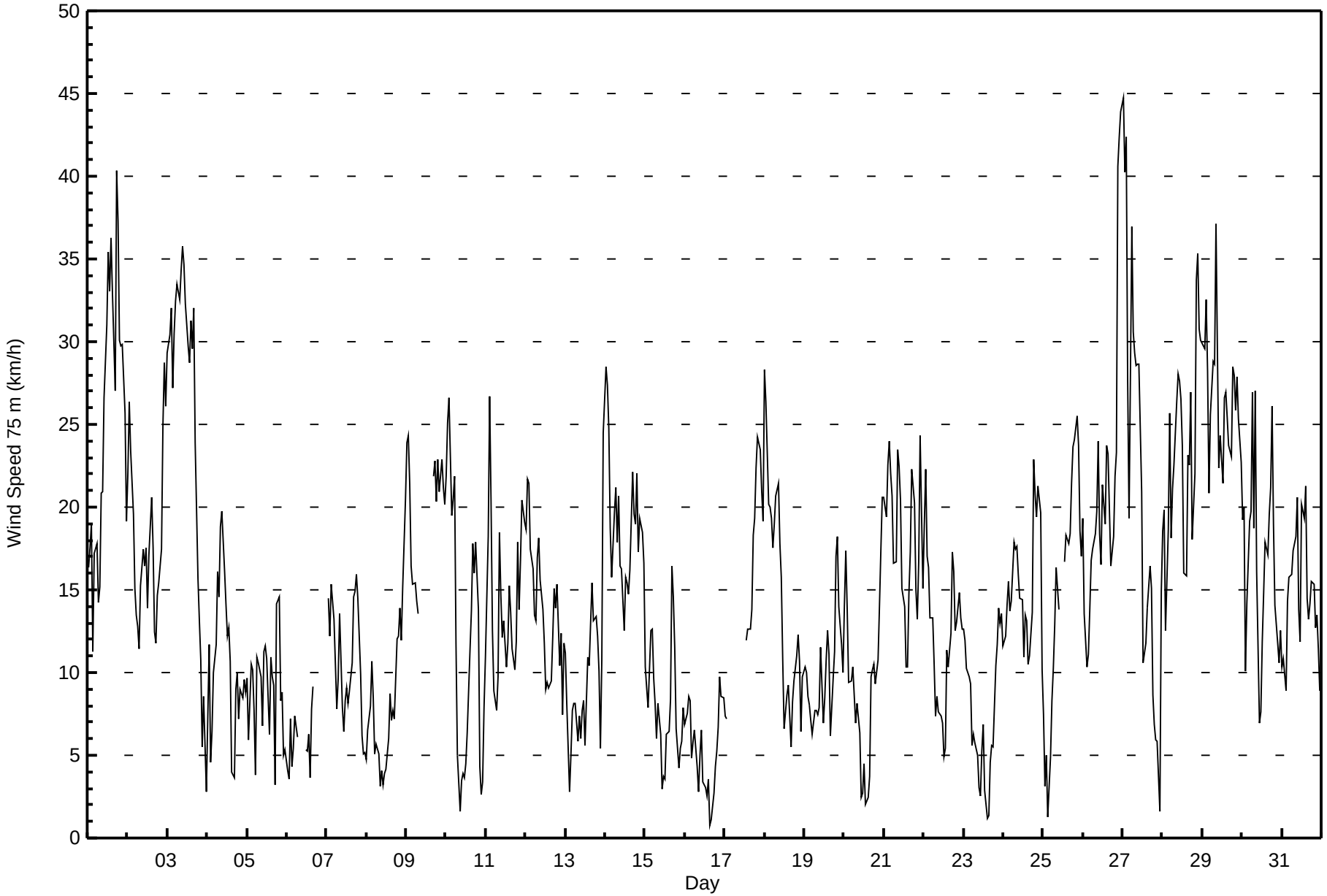
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 75 m (WS75m) - km/h

Mannix - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	78	10.99	10.99
6 - 11	203	28.59	39.58
12 - 19	249	35.07	74.65
20 - 28	129	18.17	92.82
29 - 38	44	6.20	99.01
> 38	7	0.99	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed 75 m (WS75m) - km/h

Mannix - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	6	6	5	5	2	5	3	3	12	6	1	1	5	4	8	6	78
6 - 11	35	11	5	4	6	3	13	34	18	14	8	4	5	8	10	25	203
12 - 19	37	37	3	3	0	2	36	38	26	18	15	11	5	4	3	11	249
20 - 28	8	9	0	0	0	1	26	39	5	2	4	13	13	5	0	4	129
29 - 38	0	0	0	0	0	0	0	15	2	0	0	16	10	1	0	0	44
> 38	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7
Totals	86	63	13	12	8	11	78	129	63	40	28	52	38	22	21	46	710

Total Number of Valid Hours: 710

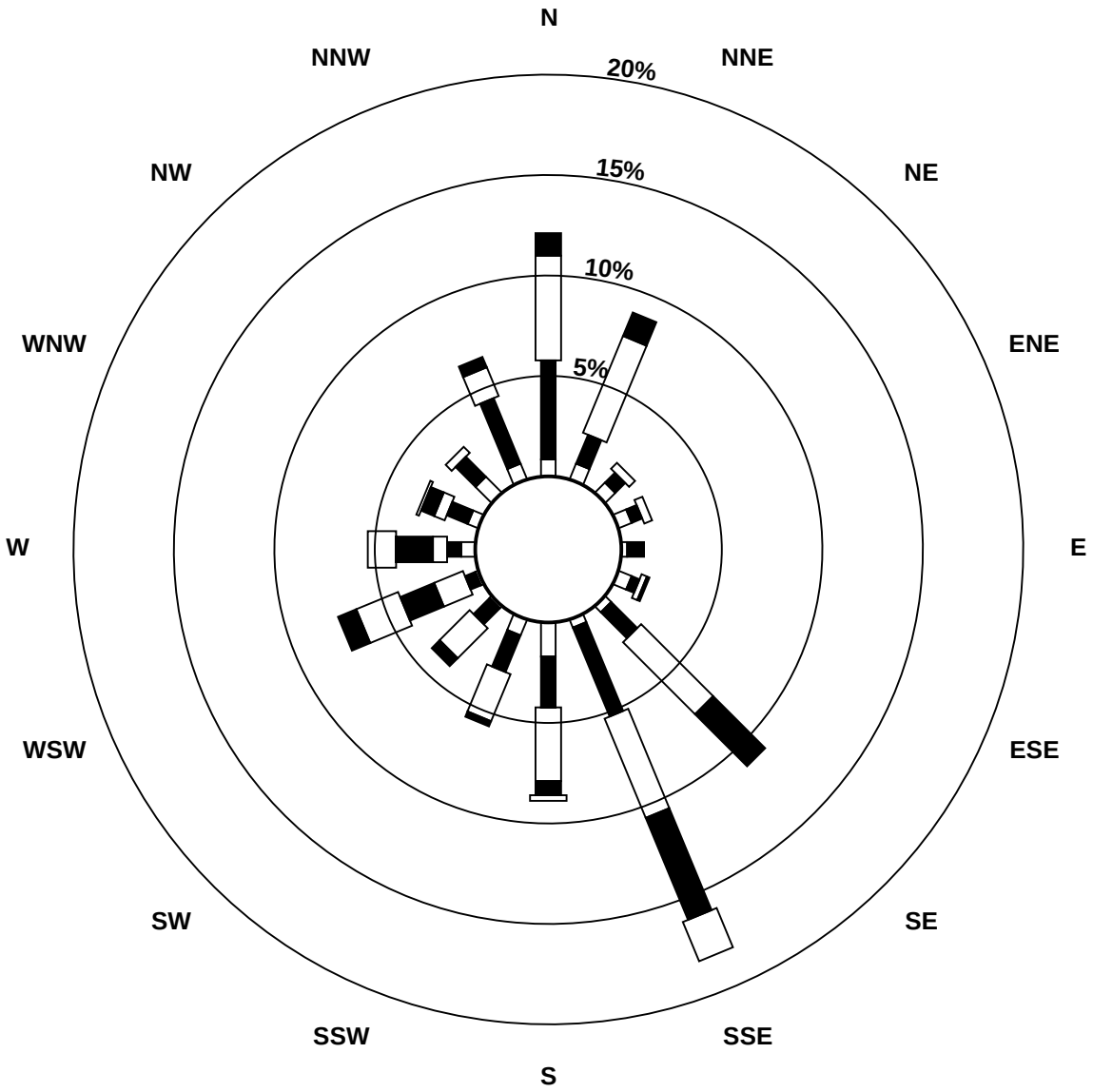
Total Number of Hours: 744

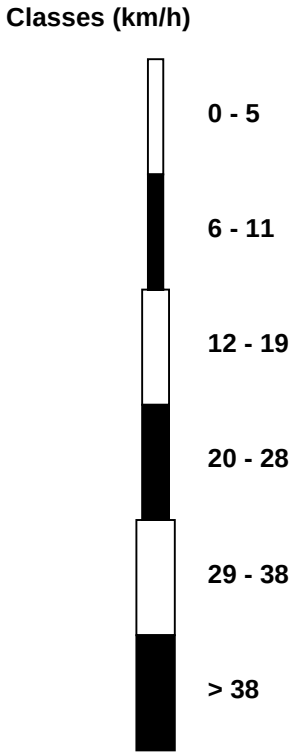
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed 75 m (WS75m) - km/h

Mannix (AMS 5)





Total Number of Valid Hours: 710

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - January 2016

Maximum Speed: 46 km/h on Jan 27 01:00

Maximum Daily Speed Average: 27.3 km/h on Jan 29

Minimum Speed Value: 1 km/h on Jan 16 16:00

Minimum Daily Speed Average: 1.0 km/h on Jan 23

Maximum Diurnal Speed Average: 5.7 km/h at hour 2

Minimum Diurnal Speed Average: 2.0 km/h at hour 14

Monthly Average Velocity: 3.4 km/h 200.5 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 9$ Median = 14 $Q_3 = 21$ $P_{90} = 28$ $P_{99} = 42$

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SW18	SW19	SW21	SW12	SSW18	SSW18	SW16	WSW17	SW22	SW22	WSW29	WSW32	WSW37	WSW34	WSW37	WSW35	WSW29	WSW42	W39	WSW32	W31	W32	W28	W21	WSW25.6	WSW42
2-Jan	W21	WSW27	WSW26	WSW21	SW17	SW15	SW14	SSW11	SSW14	SSW17	SSW16	S18	S14	SSE16	SSE21	S17	SSW14	SSW14	S14	SSE13	SSE15	SSE23	S28	S27	SSW14.8	S28
3-Jan	S31	S34	S33	S28	SSE30	SSE33	S34	S33	SSE34	SSE38	SSE36	SSE33	SSE30	SSE28	SSE30	S28	S33	S23	SSW15	SW13	SSW10	SW5	SSE4	SW1	S25.1	SSE38
4-Jan	SSE5	SSE8	S3	NW5	NW9	NW13	NNW18	NNW16	NNW20	N21	N17	NNW14	NW11	WNW11	W9	WNW3	SSW6	SSW11	SW11	WSW9	WSW11	WSW10	WSW12	SW9	WNW6.2	N21
5-Jan	SW10	WSW7	S6	S6	SW8	WSW5	S7	S7	S7	S5	S6	SE9	SSE12	SE6	SSE10	SE10	SE10	E3	NNE13	N15	N9	NNW10	NNW7	N6	SSE2.1	N15
6-Jan	NNE4	N3	N8	NE5	ENE5	NNE5	N8	N9	NNE8	E4	ENE2	N5	NNW6	N7	NNW4	N8	N10	N10	N12	N9	N13	N14	N15	N15	N7.3	N15
7-Jan	N20	N15	N12	N17	N15	N10	N8	N10	N14	N8	N7	N8	NNW9	NW8	WNW9	WNW11	WNW13	W14	W15	WSW14	WSW10	W6	WNW5	NW5	NNW8.3	N20
8-Jan	N4	N6	N8	N11	NNW8	NNW6	N6	N5	E3	ESE5	E4	ENE4	ESE5	SSE6	S8	S7	S7	S7	S12	S12	S14	S12	SSE16	SSE21	SSE3.3	SSE21
9-Jan	SSE24	S24	S19	S14	S14	S13	S14	AF	AF	AF	AF	AF	AF	SSE20	SSE22	SSE22	SSE25	SE25	SE25	SSE24	SSE19	S17	S14	S14	SSE18.9	SSE25
10-Jan	SSE18	SSE24	SSE28	S21	SSE19	SSE23	S14	SW7	SSW2	WSW4	W5	N4	N5	NNW7	NNW12	NNW15	N19	N16	N19	NNE14	NE5	W3	NW3	N8	SE1.5	SSE28
11-Jan	N11	N19	N29	N22	NNW14	WNW9	WNW8	NW11	NW19	WNW15	W13	W13	WSW11	WSW12	WSW15	WSW14	SW12	SSW11	SSW14	SW18	SW14	SSW16	SSW18	S18	W7.5	N29
12-Jan	SSE18	SSE25	SSE25	SE21	SE19	SE16	SE15	SE20	SE19	SE17	SE14	SSE14	SSE11	SSE12	SSE10	SSE11	SSE15	SSE19	SSE16	SSE18	SSE13	SSE12	SE10	SSE14	SSE15.7	SSE25
13-Jan	SE13	E13	ESE5	ESE9	SE11	ESE13	E12	E8	E9	ESE10	E12	E11	E7	ENE11	NE11	ENE14	ENE16	ENE14	ENE14	E13	E11	ENE6	N10	N25	E9.4	N25
14-Jan	N29	N28	N26	N20	N17	NNW21	NNW22	N19	N22	N17	N17	N13	N16	N16	N15	N17	NNE23	NNE20	NNE19	NNE23	NNE18	NNE21	NE20	NNE18	N19.2	N29
15-Jan	NE11	NE10	NE8	N13	N13	N10	NNE9	N7	N8	NNE6	N2	NW3	NNW4	NW6	NNW7	N9	NNE16	NNE15	NE12	E7	ESE6	ESE10	SE7	S9	NNE6.0	NNE16
16-Jan	S8	SE7	SE8	S9	SSW5	WSW6	W7	WNW6	NE2	SE5	SSW5	W4	WNW4	WNW4	NE4	SSW1	SSW1	SSE3	S4	SSE5	SSE7	S9	S7	SSE6	S3.2	SSW9
17-Jan	S5	SSW7	SSW3	SSE7	SSW6	S5	SSE9	SSE13	S19	SSE19	SSE15	SE14	SE16	SSE15	SSE15	SE18	SE18	SE22	SE23	SE27	SE29	SE27	SE26	SE22	SE14.8	SE29
18-Jan	SE31	SE30	SE24	SE23	SE22	SE21	SE22	SE24	SE25	SE21	SE18	SE12	SSE7	SSE9	SSE10	SE8	SSE6	SSE9	SSE11	SSE12	SSE13	S11	SSE7	S10	SE15.7	SE31
19-Jan	SSW10	SW9	SW8	SW8	W7	WNW6	WNW8	NNW7	NNE8	NNE8	N12	N7	NW8	NW10	NNW13	N12	N7	N10	N11	NNE17	NNE18	N14	NNE12	NNE11	N6.5	NNE18
20-Jan	NNE14	NNE18	N14	NNW9	N10	N11	NNW8	NNW7	N8	N6	NW2	S3	S5	SE3	SE3	SSE5	SSE11	S12	SSE12	SE10	SSE14	SSE17	SSE21	SSE24	ESE2.6	SSE24
21-Jan	SSE24	SSE23	SSE27	SSE28	SSE26	SSE25	SE20	SE20	SE28	SE26	SE22	SE18	SE18	SE13	ESE15	ESE19	ESE22	ESE27	ESE26	SE20	SE16	SE20	SE28	SSE17	SE21.5	SSE28
22-Jan	SSE22	S24	SSW18	SSW17	SW14	WSW14	WSW12	W9	NW9	NNW9	NNE8	NNE8	N5	NNW5	NNW11	NNW11	N13	N18	NNE17	NNE13	NNE13	NNE15	NNE14	NNE13	NNW3.4	S24
23-Jan	NNE13	NNE13	N10	N10	N11	NNW6	N8	NNW9	N6	NNE3	WNW2	W5	WNW8	WNW4	E1	SSE3	S5	S6	SSW7	S12	SSW14	SSW16	SSW16	SSE16	W1.0	SSW16
24-Jan	S14	SSE14	S15	S16	SSW14	SW16	WSW19	SW18	WSW19	WSW16	SW15	SW15	SW11	SW14	S14	S11	SW12	WSW15	W24	WNW22	N20	N22	N20	N11	SW9.1	W24
25-Jan	NNW7	NW3	NNE5	ESE1	S5	S9	SSE11	SSE14	S17	SSE14	AF	AF	AF	AF	SSE19	SSE19	SSE20	SSE25	SSE25	SSE25	S24	S21	SSW18	SW18	S12.9	SSE25
26-Jan	SW22	SW17	SSW10	SW12	SSW13	S14	SSE14	SSE15	SSE16	SSE21	SSW18	S14	SSW20	S18	S22	S22	SSW22	SW18	SW21	SW24	WSW26	WSW43	WSW44	WSW45	SW17.8	WSW45
27-Jan	W46	WSW42	W44	W29	W20	W38	W32	W30	W30	W29	W30	W22	NW11	N11	N12	N15	N17	N17	N10	NNW7	N6	ENE6	SSE4	SE18	W16.2	W46
28-Jan	SE21	SE24	ESE16	SE20	SE29	SE21	SE24	SSE26	SSE30	SSE33	SSE30	SSE29	SSE26	SSE18	SSE18	S25	S25	S29	S20	SW25	WSW36	WSW37	WSW32	WSW31	S19.7	WSW37
29-Jan	WSW31	WSW31	W33	WNW30	W22	W27	WNW30	WNW30	W38	W30	W23	W25	WNW22	WNW27	WNW27	WNW26	W25	W25	WSW31	WSW30	WSW28	W30	W27	WSW25	W27.3	W38
30-Jan	WSW21	WSW22	WSW13	WSW16	WSW21	WSW22	WSW29	W20	W27	WNW17	NNW7	N7	N12	NNE15	NNE18	NNE18	NNE20	NNE22	NNE27	NNE20	NNE15	NNE12	NNE11	NNE13	NW9.6	WSW29
31-Jan	NNE11	NNE11	NNE9	NNE15	NNE16	NNE17	NNE16	NNE18	NNE19	NNE21	N14	N12	NNE20	NNE20	NNE22	NNE15	NNE14	NNE15	NNE16	NNE16	NNE13	NNE14	NNE12	NNE10	NNE15.1	NNE22
	SSW5.4	SSW5.7	SSW4.5	SSW3.3	SSW3.8	SSW4.3	SW3.6	SW3.0	SSW2.8	S3.4	SSW3.8	SSW3.1	SW2.4	SW2.0	SSW2.8	S2.8	S2.9	S3.0	SSW2.7	SSW3.2	SSW3.5	SSW3.9	SSW3.9	SSW4.0	Diurnal Average	
	W46	WSW42	W44	WNW30	SSE30	W38	S34	S33	W38	SSE38	SSE36	SSE33	WSW37	WSW34	WSW37	WSW35	S33	WSW42	W39	WSW32	WSW36	WSW43	WSW44	WSW45	Diurnal Maximum	

AF - Analyzer Failure

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 11 08:00

Minimum Value: 0 km/h on Jan 16 20:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 2 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 7

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

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

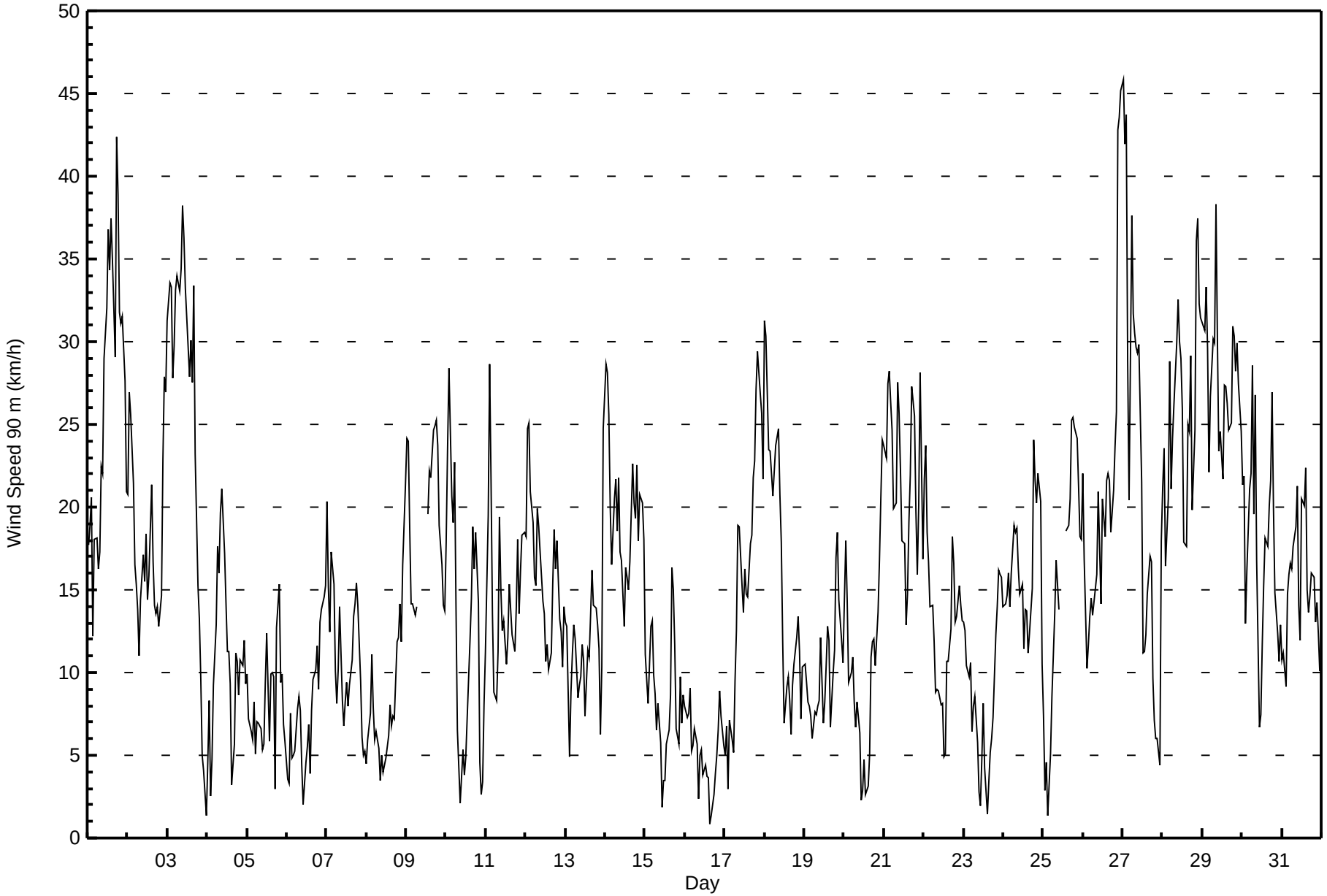
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	76	10.35	10.35
6 - 11	194	26.43	36.78
12 - 19	252	34.33	71.12
20 - 28	146	19.89	91.01
29 - 38	58	7.90	98.91
> 38	8	1.09	100.00

Total Number of Valid Hours: 734

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed 90 m (WS90m) - km/h

Mannix - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	8	4	4	4	4	4	3	7	9	6	2	2	4	6	6	3	76
6 - 11	45	13	3	4	6	5	10	19	18	12	9	7	5	9	9	20	194
12 - 19	40	40	1	4	4	4	18	40	28	21	22	14	4	3	2	7	252
20 - 28	11	12	1	0	0	3	29	33	15	2	7	10	15	5	0	3	146
29 - 38	2	0	0	0	0	0	4	12	7	0	0	17	13	3	0	0	58
> 38	0	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0	8
Totals	106	69	9	12	14	16	64	111	77	41	40	55	44	26	17	33	734

Total Number of Valid Hours: 734

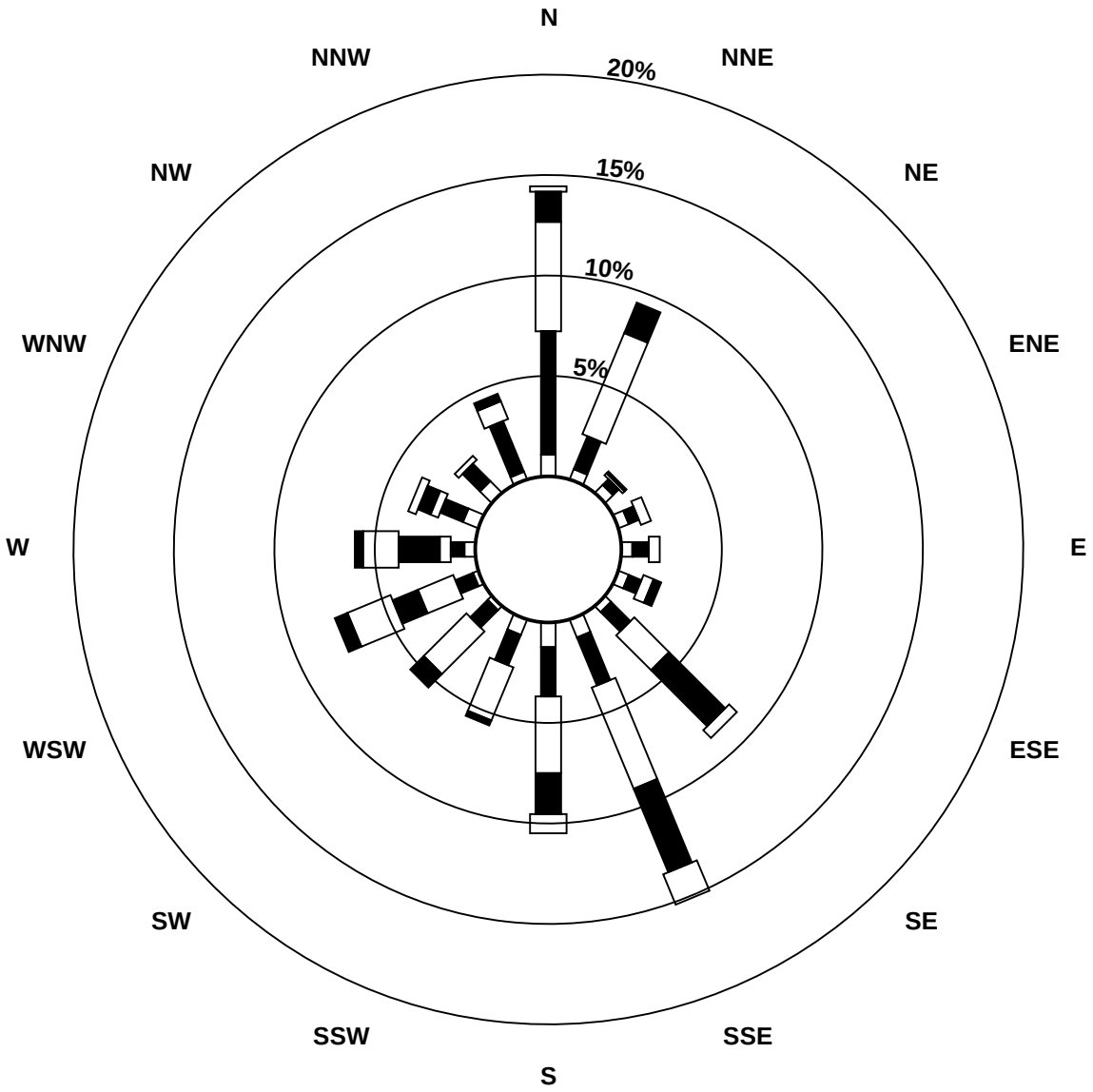
Total Number of Hours: 744

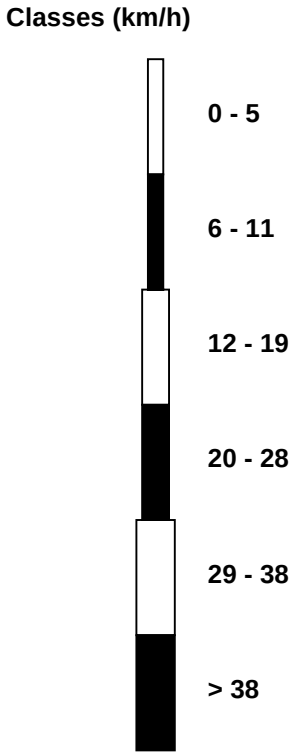
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed 90 m (WS90m) - km/h

Mannix (AMS 5)





Total Number of Valid Hours: 734

Direction of Maximum Speed: 261 deg on Jan 27 01:00
Direction of Maximum Daily Speed Average: 270.4 deg on Jan 29

Direction of Minimum Speed: 283 deg on Jan 13 04:00
Direction of Minimum Daily Speed Average: 0.9 deg on Jan 20

Monthly Average Direction: 235.0 deg

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	191	174	165	141	155	156	154	180	192	175	228	258	258	260	257	247	257	257	262	255	262	261	256	247	236.9
2-Jan	238	240	244	222	177	160	157	148	158	164	158	152	144	134	144	153	167	142	141	129	137	146	158	151	167.6
3-Jan	158	157	154	150	152	151	151	147	145	145	145	144	149	154	154	156	156	156	145	159	147	145	144	130	150.8
4-Jan	149	146	135	248	358	80	50	19	345	314	283	256	220	163	149	137	142	152	158	147	157	159	157	153	154.5
5-Jan	154	147	144	149	159	134	160	153	153	154	162	147	164	144	150	149	220	12	341	330	274	294	287	291	158.4
6-Jan	300	300	3	263	331	347	259	354	345	311	336	348	341	342	283	313	345	340	347	331	338	341	346	0	334.8
7-Jan	6	359	AF	8	12	39	5	350	359	359	11	355	331	302	298	300	289	275	261	268	259	293	304	310	326.0
8-Jan	8	14	360	348	333	311	317	343	304	288	341	58	109	156	178	173	182	190	180	167	172	177	158	155	174.1
9-Jan	158	162	165	158	163	165	160	159	157	160	151	150	157	156	156	156	163	154	150	153	150	154	157	153	156.9
10-Jan	152	149	156	156	152	154	158	172	145	170	232	85	32	345	331	337	3	5	6	17	33	252	288	357	81.5
11-Jan	355	358	349	341	342	283	259	302	322	286	260	261	253	241	238	243	235	232	228	206	183	180	168	165	267.9
12-Jan	144	145	151	146	162	156	166	168	168	163	165	173	171	157	178	166	152	150	162	163	183	194	166	196	162.9
13-Jan	148	74	274	283	158	93	30	16	27	77	91	84	100	71	53	64	74	61	59	85	92	96	342	356	62.8
14-Jan	11	10	9	350	341	336	341	349	11	3	6	356	7	4	351	6	18	23	23	17	11	25	31	32	6.6
15-Jan	33	41	48	3	352	358	9	328	6	3	351	335	330	296	325	349	359	359	10	17	37	132	187	222	0.7
16-Jan	199	224	241	228	174	230	199	185	152	184	206	152	160	94	107	189	172	191	185	145	165	172	150	146	183.6
17-Jan	167	181	147	155	154	150	156	147	150	163	159	144	170	211	165	137	170	191	154	132	141	133	135	139	151.9
18-Jan	148	146	136	134	133	133	135	146	145	144	145	153	166	168	160	149	163	156	152	155	161	167	152	166	147.8
19-Jan	165	173	174	184	227	246	275	323	2	359	5	329	300	311	338	1	305	354	350	13	12	9	26	13	344.3
20-Jan	15	14	6	339	350	351	330	331	338	335	286	213	195	132	117	135	145	151	160	148	152	170	153	160	33.9
21-Jan	161	165	163	155	150	150	160	157	160	147	148	147	139	143	130	130	128	128	127	124	129	129	140	158	143.0
22-Jan	163	163	172	173	196	233	264	255	335	354	326	281	280	295	309	339	347	6	12	18	10	22	15	10	342.0
23-Jan	8	13	358	2	359	306	327	307	342	355	267	272	276	279	252	252	241	246	218	169	170	168	167	146	306.0
24-Jan	167	155	171	163	164	196	207	221	229	233	223	214	217	223	190	155	159	206	273	285	357	358	3	356	224.0
25-Jan	342	311	16	103	186	179	164	161	176	154	157	159	148	145	158	158	154	145	139	139	153	158	157	165	155.4
26-Jan	164	146	150	148	150	137	135	132	135	146	150	144	150	145	154	147	148	143	139	175	230	250	258	259	183.5
27-Jan	261	256	260	283	280	271	270	274	271	269	265	285	341	2	350	349	331	341	279	266	322	82	241	166	276.5
28-Jan	196	168	151	145	144	155	150	155	148	150	145	150	161	158	164	156	152	164	162	160	238	240	247	251	175.8
29-Jan	244	252	263	281	264	272	294	286	271	270	264	271	284	294	280	288	279	272	260	264	258	259	259	253	270.4
30-Jan	235	245	162	230	231	228	259	291	268	281	326	349	1	14	15	32	19	19	23	31	31	18	11	31	341.8
31-Jan	46	46	26	33	40	26	24	33	24	15	349	356	19	18	19	20	19	23	27	23	33	27	25	10	23.4
	188.1	181.3	192.1	186.5	168.9	199.0	203.7	205.2	216.4	201.6	200.8	202.4	206.9	215.6	216.5	158.2	151.6	137.9	146.0	140.6	184.7	201.0	196.9	194.6	
	Diurnal Average																								

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 94 deg on Jan 13 04:00

Minimum Value: 3 deg on Jan 2 01:00

Percentiles: P_1 = 6 P_{10} = 8 Q_1 = 10 Median = 13 Q_3 = 18 P_{90} = 30 P_{99} = 70

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	14	10	13	24	12	11	13	17	11	9	32	8	8	8	9	14	15	10	6	9	8	7	8	13	32
2-Jan	3	5	9	17	9	14	16	8	7	12	11	10	15	11	12	11	8	15	12	12	10	8	6	12	17
3-Jan	7	6	7	8	9	10	10	9	8	9	8	9	10	10	9	8	7	7	32	16	10	9	10	11	32
4-Jan	8	10	13	71	68	40	50	71	23	34	17	31	55	33	35	16	11	6	10	10	8	5	8	7	71
5-Jan	7	14	15	8	9	9	17	9	10	11	14	18	15	22	20	24	37	20	22	23	13	11	55	15	55
6-Jan	33	19	39	19	44	61	49	18	14	27	64	23	19	21	17	33	17	19	16	16	15	14	11	14	64
7-Jan	13	17	AF	13	15	14	34	18	15	18	17	26	16	15	10	10	10	9	7	8	15	15	19	15	34
8-Jan	28	14	12	13	15	15	16	19	14	19	44	62	30	18	19	9	10	10	13	12	13	16	11	9	62
9-Jan	8	7	15	9	11	9	10	8	10	13	10	9	10	10	9	8	6	7	10	10	10	8	8	9	15
10-Jan	8	8	11	22	16	16	27	59	35	19	75	39	41	55	16	20	18	12	15	15	58	48	67	16	75
11-Jan	17	14	14	13	24	13	19	76	11	22	10	10	11	13	11	10	12	22	15	10	9	9	9	13	76
12-Jan	10	12	11	15	14	14	13	14	12	14	14	23	21	20	21	21	13	17	17	17	57	39	35	24	57
13-Jan	20	42	17	94	30	63	43	16	24	56	20	15	17	11	12	12	11	12	11	13	11	61	17	15	94
14-Jan	9	12	14	17	17	12	12	17	13	13	14	17	17	14	17	15	12	12	13	11	12	10	11	13	17
15-Jan	12	15	33	10	14	19	14	52	27	10	17	28	39	13	21	24	8	11	5	14	21	38	29	20	52
16-Jan	26	18	12	9	21	15	28	38	38	27	30	81	50	23	21	18	17	11	29	14	18	10	20	9	81
17-Jan	10	32	9	10	10	10	9	10	10	15	24	14	21	18	39	14	42	46	17	10	9	10	10	9	46
18-Jan	8	9	11	9	9	10	10	10	9	9	10	15	13	10	11	10	15	13	10	12	11	8	12	10	15
19-Jan	8	13	9	22	13	20	13	27	18	15	16	29	13	10	15	22	39	15	16	7	11	9	17	21	39
20-Jan	13	11	16	20	21	21	11	12	13	15	24	41	29	55	32	25	10	11	12	8	13	17	12	7	55
21-Jan	6	13	8	7	9	8	8	8	6	8	12	10	12	13	13	11	12	11	11	12	11	10	12	9	13
22-Jan	21	14	8	8	30	16	33	64	20	30	28	36	21	19	12	14	12	13	11	12	9	11	10	10	64
23-Jan	10	12	14	12	15	17	20	18	28	30	18	9	7	15	72	11	16	8	38	15	19	15	18	19	72
24-Jan	22	12	14	14	12	17	12	11	9	9	14	16	15	12	16	13	14	62	9	20	21	13	15	15	62
25-Jan	19	27	20	88	18	18	17	19	16	14	11	9	10	11	8	8	7	8	7	6	8	6	6	7	88
26-Jan	14	13	6	11	10	14	10	11	11	10	11	10	13	10	10	18	12	10	16	29	10	13	10	9	29
27-Jan	8	10	10	11	12	7	8	7	8	6	7	26	17	16	18	18	16	20	39	23	43	62	79	15	79
28-Jan	21	18	22	9	9	15	9	11	7	8	8	9	7	19	16	10	10	12	20	17	12	10	11	10	22
29-Jan	10	11	9	8	11	13	9	10	5	5	7	8	9	10	7	10	7	8	12	8	12	10	9	13	13
30-Jan	14	20	34	16	4	60	9	15	8	13	23	21	17	13	11	16	13	12	13	14	13	19	16	15	60
31-Jan	12	13	15	15	14	12	12	10	12	14	24	21	13	13	13	16	16	14	12	12	11	19	22	17	24
	33	42	39	94	68	63	50	76	38	56	75	81	55	55	72	33	42	62	39	29	58	62	79	24	
	Diurnal Maximum																								

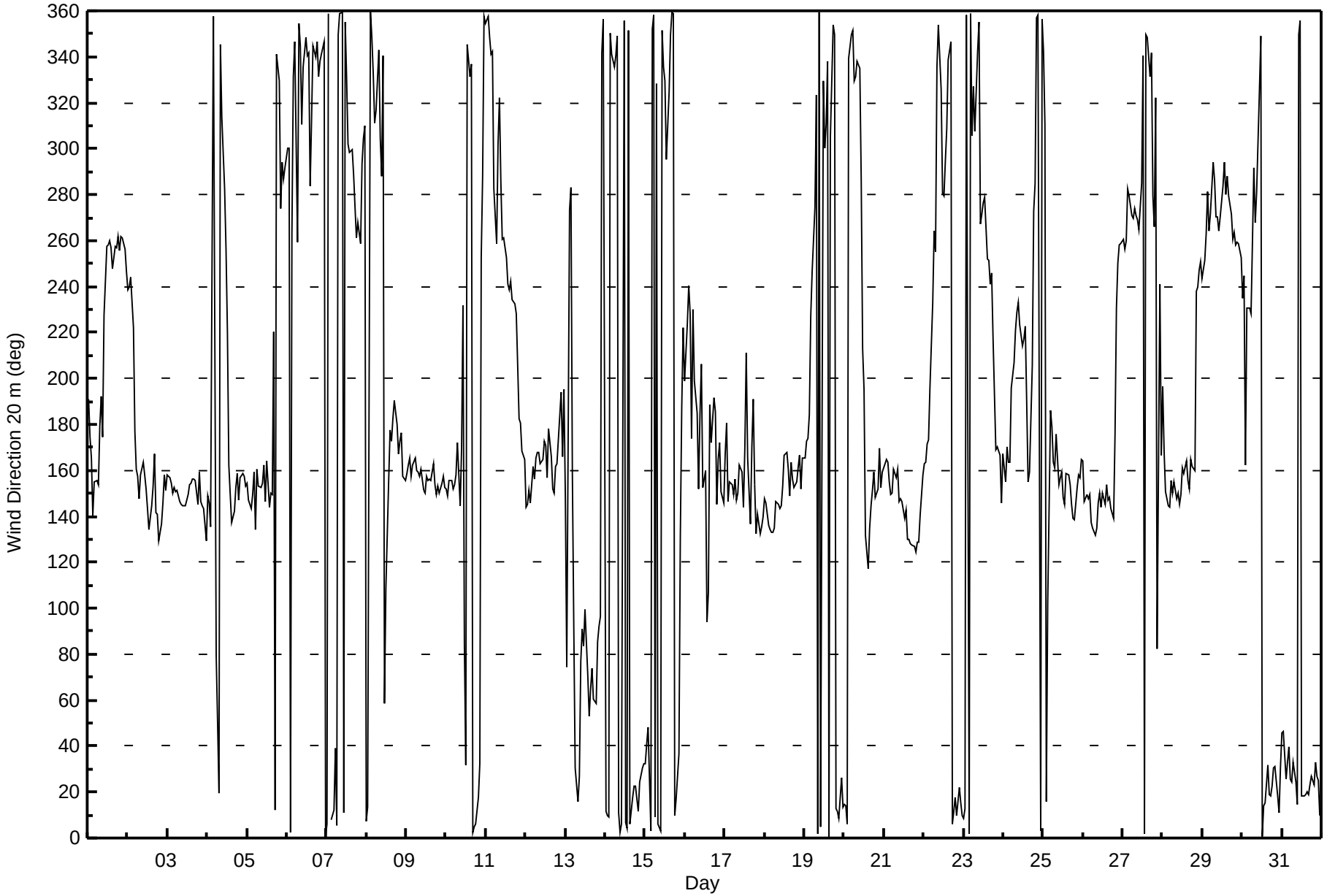
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 20 m (WD20m) - deg

Mannix - January 2016



Direction of Maximum Speed: 255 deg on Jan 27 01:00
Direction of Maximum Daily Speed Average: 266.0 deg on Jan 29

Direction of Minimum Speed: 309 deg on Jan 23 15:00

Direction of Minimum Daily Speed Average: 1.0 deg on Jan 20

Monthly Average Direction: 247.1 deg

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	209	194	182	160	169	164	178	207	211	193	232	252	252	254	250	244	250	250	256	250	257	256	255	253	234.1
2-Jan	243	239	245	230	193	186	178	155	159	166	162	147	141	134	142	153	186	156	150	135	136	148	160	154	169.8
3-Jan	160	160	161	152	153	153	152	147	143	144	141	143	145	149	151	152	154	162	163	175	153	152	147	157	152.4
4-Jan	142	147	136	226	332	323	343	341	332	321	308	301	280	275	263	252	191	182	186	178	186	174	182	158	219.6
5-Jan	160	151	139	147	157	142	153	148	147	149	159	142	159	134	146	133	155	9	357	347	310	319	328	326	145.7
6-Jan	320	329	358	297	337	332	303	340	349	325	353	332	328	339	294	319	342	337	344	330	336	341	343	355	336.9
7-Jan	1	358	AF	AF	AF	AF	4	351	357	356	2	350	329	296	291	291	279	266	253	256	248	282	295	304	308.7
8-Jan	360	11	354	346	330	317	324	349	355	19	36	60	102	150	173	170	177	181	172	163	172	170	152	150	156.1
9-Jan	153	157	161	155	156	161	162	164	159	168	143	144	149	150	148	151	153	147	143	148	149	152	155	152	152.9
10-Jan	148	145	151	156	148	150	164	195	142	167	236	46	19	340	328	331	358	360	2	11	32	253	289	350	101.2
11-Jan	350	351	345	340	337	284	284	305	317	283	255	256	247	237	234	238	223	215	212	203	197	182	165	159	256.9
12-Jan	142	143	144	147	159	154	143	156	148	151	157	166	169	154	177	163	151	146	161	159	174	177	136	180	155.4
13-Jan	161	86	330	112	126	102	64	48	39	94	88	79	92	64	46	59	67	50	52	77	84	81	339	352	64.0
14-Jan	4	3	3	347	340	332	335	344	5	358	2	349	0	359	347	2	11	14	14	11	8	19	23	25	0.8
15-Jan	29	37	36	1	352	352	5	330	0	3	346	320	326	295	325	349	2	356	10	26	49	101	144	161	4.5
16-Jan	150	150	156	198	158	215	242	194	137	158	192	209	197	107	93	153	153	178	172	139	145	165	159	138	162.9
17-Jan	154	160	148	152	150	147	151	146	146	159	160	136	159	203	168	126	151	160	139	128	130	124	127	131	145.2
18-Jan	139	136	127	127	125	126	127	139	137	135	139	146	158	160	152	144	162	156	150	151	155	162	149	164	140.3
19-Jan	161	178	185	187	245	270	285	322	359	1	359	334	304	308	337	0	329	350	347	7	7	4	18	12	340.5
20-Jan	9	8	359	337	349	349	326	328	339	338	288	201	186	131	112	143	143	155	166	138	148	164	152	151	46.5
21-Jan	152	159	155	146	142	141	154	139	150	135	137	134	127	131	120	122	120	120	119	119	127	125	133	156	135.3
22-Jan	161	166	185	182	197	223	265	280	320	343	335	324	312	300	308	333	344	2	6	14	7	17	13	7	326.1
23-Jan	5	10	354	357	355	309	327	308	340	355	273	267	276	291	309	223	221	232	208	168	175	171	169	143	296.0
24-Jan	161	152	170	163	167	208	218	222	227	232	219	214	213	218	183	155	178	238	265	281	351	355	1	351	223.8
25-Jan	333	307	14	126	184	176	162	159	170	147	150	154	142	141	153	152	147	143	140	139	151	160	161	177	153.3
26-Jan	198	176	152	157	157	143	138	132	133	140	149	143	153	151	153	150	164	179	193	208	230	245	252	253	178.5
27-Jan	255	250	255	275	273	266	265	267	264	263	259	279	333	352	347	346	333	343	307	292	349	50	238	144	274.0
28-Jan	162	155	132	133	136	142	138	153	150	144	142	147	155	157	164	155	151	162	167	183	236	236	243	247	168.7
29-Jan	241	247	257	278	263	268	289	280	268	267	260	266	280	288	277	284	274	267	253	254	253	255	257	250	266.0
30-Jan	244	249	227	243	239	247	255	282	264	278	323	343	356	8	9	24	13	12	15	21	20	11	9	22	324.5
31-Jan	32	33	22	24	29	19	18	26	17	9	345	350	12	12	12	14	15	17	19	17	25	17	15	11	15.9
	179.7	173.2	175.8	175.2	169.1	191.5	196.1	193.0	192.4	180.5	186.9	191.2	201.4	213.2	202.1	158.8	160.5	173.8	182.9	168.5	180.1	188.6	185.8	180.2	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 100 deg on Jan 23 15:00

Minimum Value: 2 deg on Jan 2 02:00

Percentiles: P_1 = 3 P_{10} = 5 Q_1 = 7 Median = 9 Q_3 = 14 P_{90} = 22 P_{99} = 64

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	10	8	13	18	13	9	20	20	8	9	18	7	6	7	6	9	11	7	5	6	6	5	5	8	20
2-Jan	3	2	6	11	7	12	15	6	6	10	9	7	11	5	9	11	10	12	12	9	6	6	3	5	15
3-Jan	4	3	4	4	3	3	3	4	4	5	5	5	7	6	5	4	4	5	13	12	10	7	5	17	17
4-Jan	11	4	8	66	24	20	14	18	4	8	8	3	8	6	8	41	10	9	13	13	11	7	11	10	66
5-Jan	10	14	7	5	5	6	11	5	6	7	8	17	14	10	9	8	10	50	9	7	11	11	37	27	50
6-Jan	20	16	20	26	20	13	52	17	6	22	45	14	13	12	18	22	12	14	10	13	12	10	7	9	52
7-Jan	8	10	AF	AF	AF	AF	22	11	8	10	12	19	12	15	8	8	7	7	5	5	11	12	15	12	22
8-Jan	29	12	6	7	12	12	10	9	29	58	63	36	29	18	9	5	5	9	9	9	9	10	8	5	63
9-Jan	4	3	9	6	7	5	8	5	9	19	6	6	7	6	5	4	4	4	6	6	6	5	4	6	19
10-Jan	3	4	6	15	9	14	17	34	34	18	64	36	29	41	12	16	16	8	10	10	58	29	47	12	64
11-Jan	12	10	10	8	19	9	10	38	9	21	8	8	8	10	8	7	8	17	15	5	4	6	5	6	38
12-Jan	7	8	7	11	9	10	10	8	9	11	9	16	19	20	17	16	13	15	13	11	48	27	17	12	48
13-Jan	13	28	77	54	15	29	22	19	23	26	16	15	16	11	10	10	9	8	8	11	9	52	14	11	77
14-Jan	5	7	8	13	13	9	9	14	9	10	10	13	13	9	12	11	8	9	9	8	9	8	8	10	14
15-Jan	11	11	25	6	12	12	13	43	21	7	11	20	31	12	19	20	4	7	8	7	14	22	20	13	43
16-Jan	16	7	10	15	8	23	27	20	22	11	25	67	44	76	17	24	22	9	16	9	8	6	14	7	76
17-Jan	3	14	6	5	5	5	4	5	4	7	19	11	20	14	31	9	29	28	11	10	5	6	6	5	31
18-Jan	4	6	7	6	5	6	7	7	6	7	8	10	10	8	10	9	12	8	8	9	8	6	10	6	12
19-Jan	7	4	5	11	12	9	7	21	17	14	11	21	13	8	14	14	34	10	12	4	5	6	13	13	34
20-Jan	9	7	12	15	17	17	7	7	9	11	24	35	18	56	31	19	8	10	10	12	13	11	8	4	56
21-Jan	4	8	4	4	6	5	8	6	4	5	9	8	9	10	11	7	9	8	7	8	10	7	8	10	11
22-Jan	11	15	4	3	13	17	11	38	14	19	25	34	22	16	11	10	8	8	7	8	5	8	8	7	38
23-Jan	6	8	12	7	10	14	14	13	25	24	15	8	8	9	100	14	10	8	22	6	10	9	15	12	100
24-Jan	13	10	8	10	5	17	5	6	5	6	12	10	11	8	9	9	21	14	6	21	14	8	10	12	21
25-Jan	13	21	16	78	17	12	15	14	10	12	9	6	8	9	6	5	5	4	4	3	4	3	3	17	78
26-Jan	12	20	5	9	7	9	4	6	5	7	6	5	7	6	5	9	13	9	11	10	8	10	8	7	20
27-Jan	7	7	8	9	10	6	6	6	7	5	6	26	14	10	13	11	13	14	32	29	35	63	89	13	89
28-Jan	13	12	9	6	6	10	6	6	4	4	5	5	5	9	10	8	6	9	10	19	9	7	8	7	19
29-Jan	8	9	8	7	10	11	6	9	3	3	6	7	7	8	5	7	6	8	5	5	8	9	5	7	11
30-Jan	8	7	35	8	3	17	4	13	7	15	18	17	14	12	7	11	9	9	10	11	9	15	12	11	35
31-Jan	11	9	10	11	10	9	9	7	9	10	20	19	10	9	10	12	12	10	9	10	10	14	15	15	20
	29	28	77	78	24	29	52	43	34	58	64	67	44	76	100	41	34	50	32	29	58	63	89	27	
	Diurnal Maximum																								

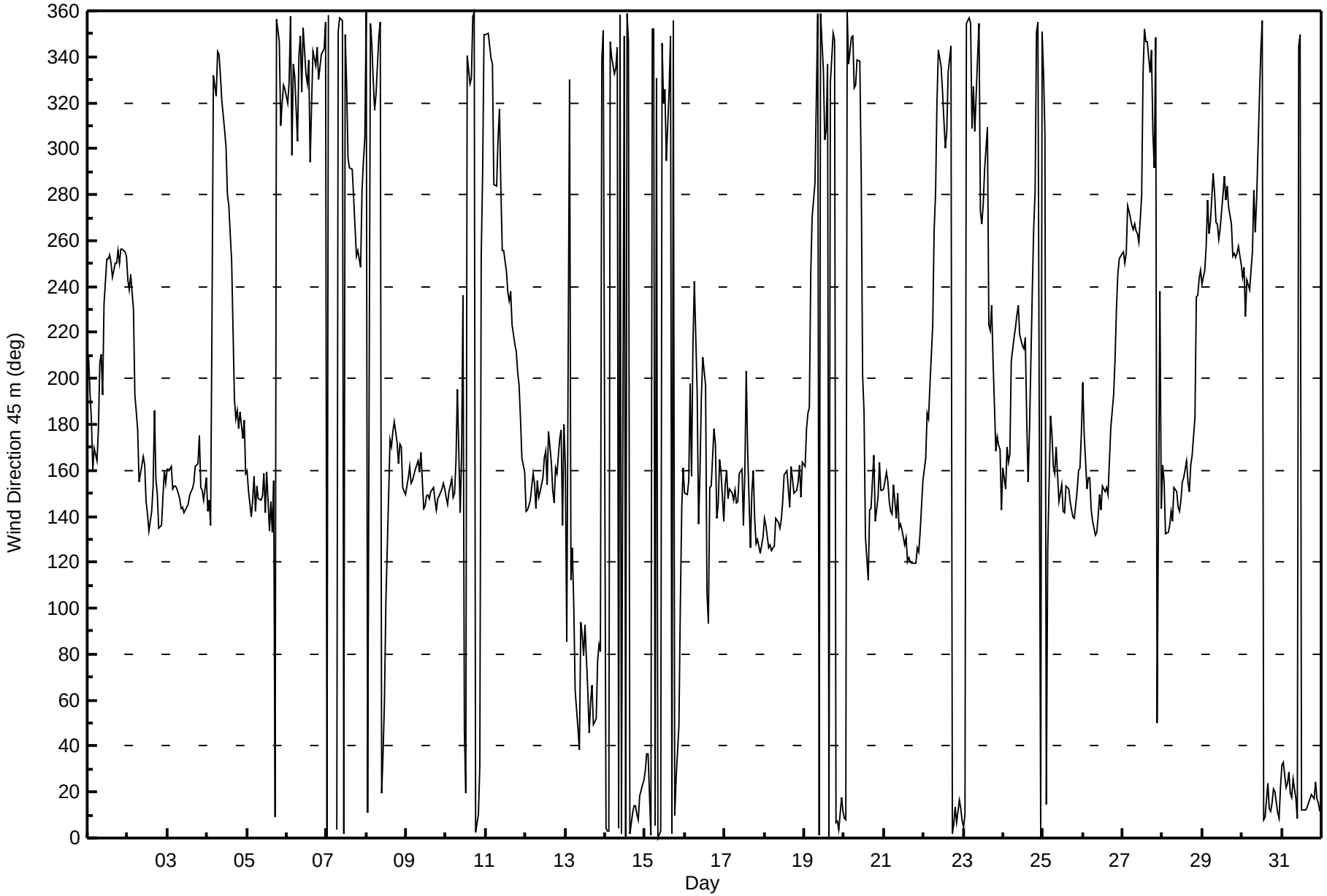
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 45 m (WD45m) - deg

Mannix - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - January 2016

Direction of Maximum Speed: 256 deg on Jan 27 01:00
Direction of Maximum Daily Speed Average: 268.0 deg on Jan 29

Direction of Minimum Speed: 183 deg on Jan 16 16:00

Direction of Minimum Daily Speed Average: 0.9 deg on Jan 23

Monthly Average Direction: 242.2 deg

Hours in Service:	744
Hours of Data:	710
Hours of Missing Data:	34
Percent Operational Time:	95.4

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	226	209	207	202	195	192	210	229	224	216	241	253	253	255	251	246	251	251	257	252	259	258	259	261	241.9
2-Jan	256	245	249	239	210	213	205	180	182	191	189	156	155	141	149	168	201	182	173	154	146	157	169	165	186.0
3-Jan	168	171	176	168	157	159	160	160	154	154	150	150	152	152	155	162	165	181	185	205	175	190	152	171	162.3
4-Jan	155	150	172	311	304	315	332	334	338	343	338	317	300	291	268	270	199	200	208	235	231	222	227	200	289.2
5-Jan	209	209	153	154	195	204	161	154	165	173	162	140	156	139	151	131	141	46	11	4	345	341	322	348	151.2
6-Jan	342	338	4	17	20	352	345	AF	AF	AF	AF	351	336	351	326	336	349	AF	AF	AF	AF	AF	AF	AF	--
7-Jan	AF	359	2	2	5	19	8	357	360	360	2	352	336	299	293	289	281	268	259	257	250	279	288	309	321.7
8-Jan	356	9	354	350	343	334	347	358	47	64	65	60	104	148	171	174	176	175	170	164	174	170	151	150	144.1
9-Jan	157	162	166	169	161	169	173	167	AF	AF	AF	AF	AF	AF	AF	AF	149	139	139	145	153	161	163	163	--
10-Jan	158	153	151	161	155	152	171	209	167	207	259	16	12	345	336	334	1	3	6	13	39	265	301	351	124.1
11-Jan	353	354	350	346	343	292	299	316	321	288	256	258	248	238	235	237	221	208	202	208	209	198	179	169	261.8
12-Jan	151	149	149	144	144	138	128	136	130	133	138	157	167	152	170	162	155	147	156	150	164	153	130	153	147.1
13-Jan	140	88	112	120	125	115	86	78	67	104	92	85	92	68	52	64	68	53	56	75	81	72	347	356	70.1
14-Jan	5	4	6	352	347	338	339	348	6	2	6	352	4	3	350	7	14	17	16	13	14	25	31	29	4.7
15-Jan	35	42	38	6	1	359	10	348	6	19	353	321	332	309	337	360	9	6	39	57	89	97	142	172	16.0
16-Jan	166	144	141	191	178	229	271	275	76	134	195	233	256	285	56	183	180	170	175	158	147	164	178	152	175.1
17-Jan	160	181	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	169	165	131	132	140	135	131	130	127	128	128	--
18-Jan	132	132	127	129	127	128	128	138	135	133	138	142	148	153	149	141	161	160	150	150	156	164	152	171	139.0
19-Jan	178	203	210	216	269	290	293	328	8	14	4	351	318	316	344	8	349	358	354	12	12	8	22	17	346.3
20-Jan	14	11	4	342	358	356	335	338	351	351	308	183	173	131	115	146	156	165	167	131	149	155	150	147	88.1
21-Jan	148	153	150	145	141	139	136	132	144	132	136	134	127	128	121	123	122	125	124	125	134	130	132	157	135.8
22-Jan	161	177	204	194	219	235	256	271	314	344	4	19	350	319	320	339	355	7	11	20	15	23	19	14	332.9
23-Jan	11	16	1	1	1	322	339	319	356	20	293	270	288	320	35	170	194	207	199	177	191	185	188	155	283.0
24-Jan	168	158	181	173	181	224	230	230	234	236	220	215	215	216	186	172	207	244	265	285	356	1	5	356	229.7
25-Jan	340	315	25	106	184	174	164	163	167	145	AF	AF	AF	143	155	153	145	148	157	155	163	172	190	205	161.5
26-Jan	225	223	183	202	187	160	154	148	148	155	174	163	182	176	167	168	198	214	224	222	234	246	253	254	201.4
27-Jan	256	252	257	274	273	268	266	268	265	264	261	280	326	353	354	354	344	352	337	327	2	44	169	138	276.8
28-Jan	144	138	126	127	132	135	134	149	152	141	146	150	155	157	162	162	166	168	176	207	239	239	245	247	169.0
29-Jan	242	248	260	282	268	272	291	280	272	271	263	268	284	289	281	287	277	270	254	253	254	257	263	251	268.0
30-Jan	251	251	249	250	247	253	255	277	269	289	332	347	359	11	13	26	16	14	18	23	21	15	14	24	321.5
31-Jan	31	32	29	26	30	23	20	26	20	12	348	354	15	15	14	16	20	19	21	20	24	20	18	21	18.5
	188.7	185.9	194.8	198.5	183.1	208.6	220.6	212.2	212.0	187.7	199.4	208.5	225.2	214.0	202.1	173.8	169.8	181.1	191.5	183.6	189.2	196.6	196.1	188.2	
	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 75 m (WD75m) - deg

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 78 deg on Jan 16 16:00

Minimum Value: 1 deg on Jan 2 02:00

Percentiles: P_1 = 2 P_{10} = 4 Q_1 = 6 Median = 8 Q_3 = 13 P_{90} = 21 P_{99} = 54

Hours in Service:	744
Hours of Data:	710
Hours of Missing Data:	34
Hours of Calibration:	0
Percent Operational Time:	95.4

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	9	9	9	21	17	10	18	15	5	6	11	6	6	6	6	6	9	5	4	5	5	4	5	6	21
2-Jan	5	1	4	7	7	8	13	8	9	14	12	7	9	4	6	17	6	16	14	7	3	6	2	3	17
3-Jan	2	3	2	5	2	2	2	2	2	2	2	2	3	3	3	3	4	5	4	10	19	31	6	64	64
4-Jan	46	5	30	21	12	5	4	5	5	6	9	6	10	5	7	26	71	5	16	7	8	7	8	18	71
5-Jan	17	25	11	7	18	28	14	13	9	18	10	11	9	14	10	7	6	55	5	3	7	7	23	17	55
6-Jan	19	23	10	9	13	13	6	AF	AF	AF	AF	14	11	6	20	14	8	AF	AF	AF	AF	AF	AF	AF	23
7-Jan	AF	5	8	5	9	6	13	8	4	6	8	15	12	19	10	8	3	7	5	4	9	10	19	22	22
8-Jan	26	12	4	3	9	9	4	18	24	21	28	16	28	20	8	7	7	14	9	8	9	10	6	6	28
9-Jan	4	3	5	8	7	6	9	8	AF	AF	AF	AF	AF	AF	AF	AF	2	3	4	3	4	5	4	5	9
10-Jan	3	2	4	10	5	11	13	22	57	21	42	32	19	25	11	14	15	6	8	9	61	35	35	10	61
11-Jan	10	8	8	6	15	8	9	26	8	21	7	7	6	8	7	6	7	14	13	6	6	8	5	6	26
12-Jan	6	4	4	7	6	10	7	6	4	5	8	13	18	13	15	12	9	11	9	8	32	21	13	8	32
13-Jan	12	19	28	16	14	20	17	21	23	20	19	16	18	10	8	10	8	6	5	9	11	43	13	8	43
14-Jan	4	5	6	10	11	9	7	12	8	9	9	11	11	8	12	10	6	7	6	6	9	7	6	7	12
15-Jan	9	9	19	4	10	9	12	31	18	9	25	14	31	15	19	20	3	8	13	8	17	17	27	14	31
16-Jan	14	8	15	12	22	30	19	21	53	18	27	33	47	35	36	78	48	26	14	10	15	7	16	6	78
17-Jan	16	12	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	12	16	10	12	14	6	7	5	6	7	7	16
18-Jan	3	5	7	5	6	7	7	5	5	7	7	8	11	8	9	9	11	7	6	8	7	6	9	6	11
19-Jan	7	6	3	9	11	5	6	19	15	12	8	16	13	9	13	8	27	8	9	4	4	5	9	10	27
20-Jan	7	5	10	16	13	13	6	7	9	10	28	52	16	50	29	16	5	7	10	10	9	5	4	3	52
21-Jan	3	6	3	3	3	4	5	7	6	4	6	8	9	9	13	10	12	8	9	9	9	7	6	13	13
22-Jan	9	15	5	5	10	10	6	12	12	14	22	26	18	13	12	10	6	5	6	7	5	5	6	5	26
23-Jan	5	6	11	5	7	13	11	13	20	24	18	6	9	17	50	48	6	8	19	6	7	6	11	9	50
24-Jan	10	6	10	6	8	15	5	5	5	6	11	8	10	7	9	10	14	10	5	25	10	5	7	10	25
25-Jan	10	21	15	64	19	14	14	12	8	10	AF	AF	AF	8	6	4	4	3	6	6	3	4	7	15	64
26-Jan	7	8	24	15	8	12	2	4	5	8	11	10	4	5	4	8	16	7	8	7	8	9	7	6	24
27-Jan	6	6	8	9	10	6	6	6	6	5	5	24	15	12	10	7	11	11	24	29	22	53	67	8	67
28-Jan	10	9	10	6	5	6	6	4	5	3	4	3	3	7	7	7	8	7	8	11	7	6	6	6	11
29-Jan	6	7	8	7	10	10	5	8	3	3	6	7	7	7	5	7	6	7	3	5	5	8	4	6	10
30-Jan	5	4	11	6	3	8	3	11	4	18	20	16	11	12	5	8	7	7	8	8	10	12	10	8	20
31-Jan	9	8	8	9	8	7	7	5	8	9	17	19	9	8	7	10	11	8	8	8	8	11	11	11	19
	46	25	30	64	22	30	19	31	57	24	42	52	47	50	50	78	71	55	24	29	61	53	67	64	
	Diurnal Maximum																								

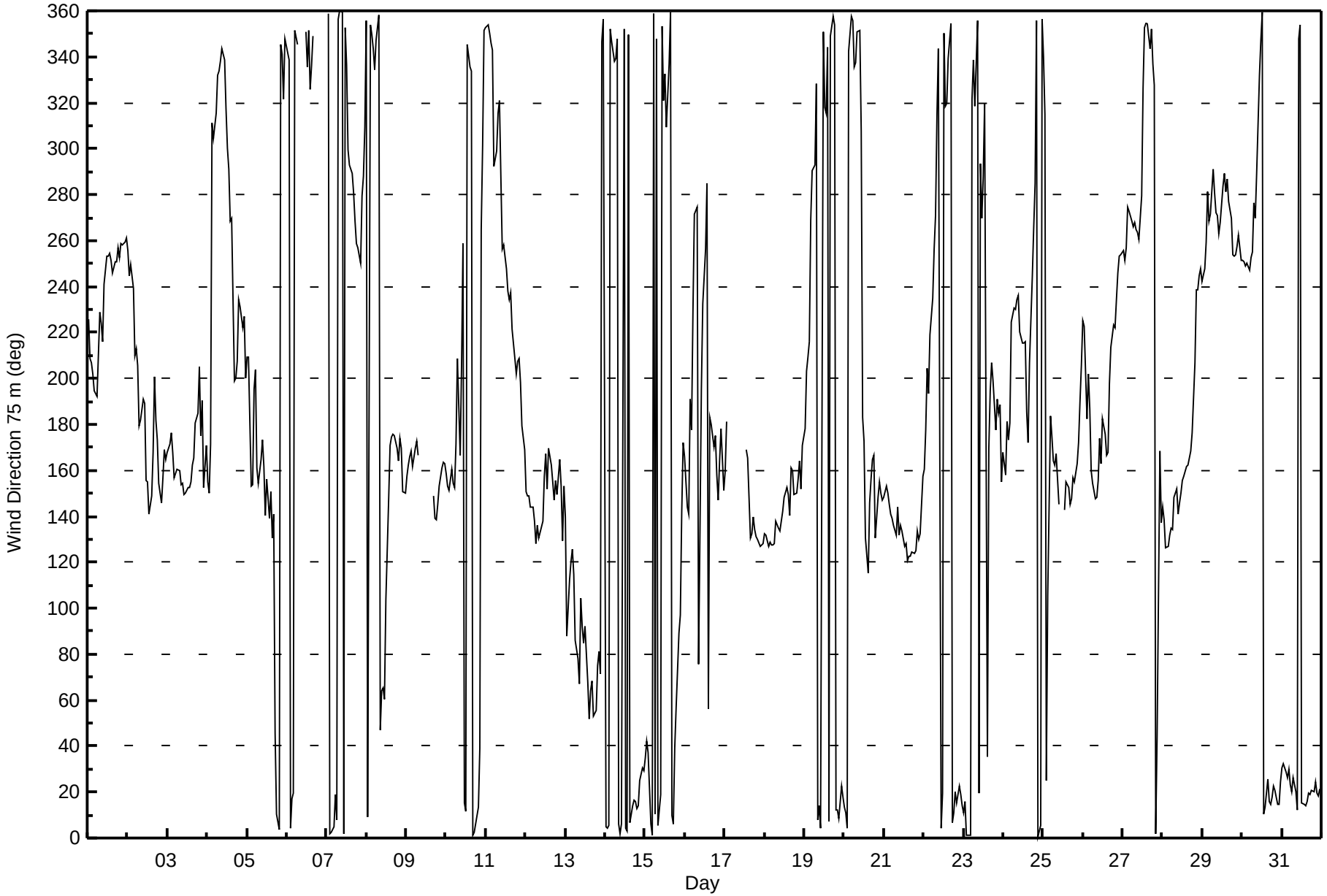
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 75 m (WD75m) - deg

Mannix - January 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 90 m (WD90m) - deg

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 100 deg on Jan 23 15:00

Minimum Value: 1 deg on Jan 21 00:00

Percentiles: P_1 = 2 P_{10} = 4 Q_1 = 6 Median = 8 Q_3 = 13 P_{90} = 21 P_{99} = 58

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	8	9	8	18	17	10	15	12	5	5	8	7	5	6	6	6	8	4	4	5	5	4	5	5	18
2-Jan	6	3	4	6	6	6	12	9	8	12	10	8	9	6	7	17	5	13	14	10	4	6	2	2	17
3-Jan	3	3	2	5	2	2	2	4	2	3	2	2	2	3	3	4	5	6	5	11	20	31	18	64	64
4-Jan	54	4	47	19	11	5	8	7	5	5	8	7	12	7	12	43	36	7	14	5	5	6	6	15	54
5-Jan	17	14	20	16	17	14	18	17	11	11	21	10	12	13	14	9	7	54	7	3	6	5	16	15	54
6-Jan	28	18	15	15	16	19	8	18	31	38	41	11	12	7	21	13	8	11	9	18	11	9	6	5	41
7-Jan	5	7	8	7	13	17	20	15	11	15	8	13	10	22	13	10	4	7	5	4	8	12	22	27	27
8-Jan	23	13	6	7	13	19	21	47	59	40	24	15	23	19	8	9	9	15	9	8	8	10	6	7	59
9-Jan	3	3	4	8	7	6	11	AF	AF	AF	AF	AF	AF	6	3	3	2	2	3	3	4	6	5	7	11
10-Jan	3	2	4	11	4	9	10	20	59	25	34	33	21	24	10	14	15	7	7	8	72	31	31	10	72
11-Jan	9	7	7	5	14	8	8	24	7	20	7	7	6	7	6	6	7	11	11	7	7	6	6	8	24
12-Jan	7	3	3	8	4	6	6	4	5	5	7	13	16	10	14	9	7	8	8	6	25	20	10	7	25
13-Jan	13	13	16	10	11	13	11	16	19	14	14	13	15	12	9	11	8	6	5	10	11	40	12	6	40
14-Jan	4	4	5	9	10	8	7	12	7	8	8	10	10	7	10	9	5	6	6	5	8	6	5	7	12
15-Jan	11	9	19	4	8	9	12	27	15	15	41	14	28	18	19	19	3	10	12	8	9	7	28	17	41
16-Jan	19	9	15	14	17	32	17	16	61	19	33	19	27	31	45	75	51	26	13	11	17	8	14	10	75
17-Jan	16	4	30	26	29	34	9	8	5	5	10	7	8	11	14	10	9	11	7	7	5	4	4	3	34
18-Jan	3	4	4	4	4	4	5	4	4	5	6	8	10	7	8	8	10	6	5	7	6	5	8	8	10
19-Jan	6	5	4	9	10	7	6	20	14	10	7	14	14	9	13	8	22	7	7	5	4	5	8	9	22
20-Jan	6	5	9	15	11	11	7	8	8	10	29	54	14	41	25	14	5	6	10	8	7	3	3	1	54
21-Jan	2	5	2	2	3	2	4	7	6	3	5	8	7	7	6	5	7	5	5	6	9	7	6	12	12
22-Jan	7	15	5	5	10	7	5	7	15	11	20	23	16	15	12	9	5	4	6	7	4	4	4	5	23
23-Jan	4	5	10	5	11	26	18	24	17	22	24	11	27	55	100	50	24	20	16	7	6	8	9	8	100
24-Jan	9	5	10	5	10	12	4	4	4	6	10	7	9	7	10	12	10	9	5	26	8	5	7	10	26
25-Jan	10	24	16	57	19	15	13	10	7	11	AF	AF	AF	AF	6	4	3	4	4	4	4	5	7	12	57
26-Jan	5	4	24	11	7	13	5	3	6	8	15	15	4	5	5	9	14	7	7	7	7	9	7	6	24
27-Jan	6	6	8	8	9	5	6	6	6	5	5	22	16	16	8	6	9	9	19	25	18	50	39	6	50
28-Jan	9	7	7	4	5	6	6	4	4	3	3	3	3	6	7	7	8	6	10	8	6	6	6	6	10
29-Jan	6	7	8	6	10	10	5	7	3	3	6	7	7	7	5	6	5	7	3	5	4	8	3	6	10
30-Jan	4	4	8	6	3	6	3	10	3	17	20	14	10	11	5	7	7	6	8	8	9	11	9	7	20
31-Jan	9	8	8	9	8	6	6	5	7	8	17	18	8	7	7	9	10	7	7	7	7	10	10	9	18
	54	24	47	57	29	34	21	47	61	40	41	54	28	55	100	75	51	54	19	26	72	50	39	64	
	Diurnal Maximum																								

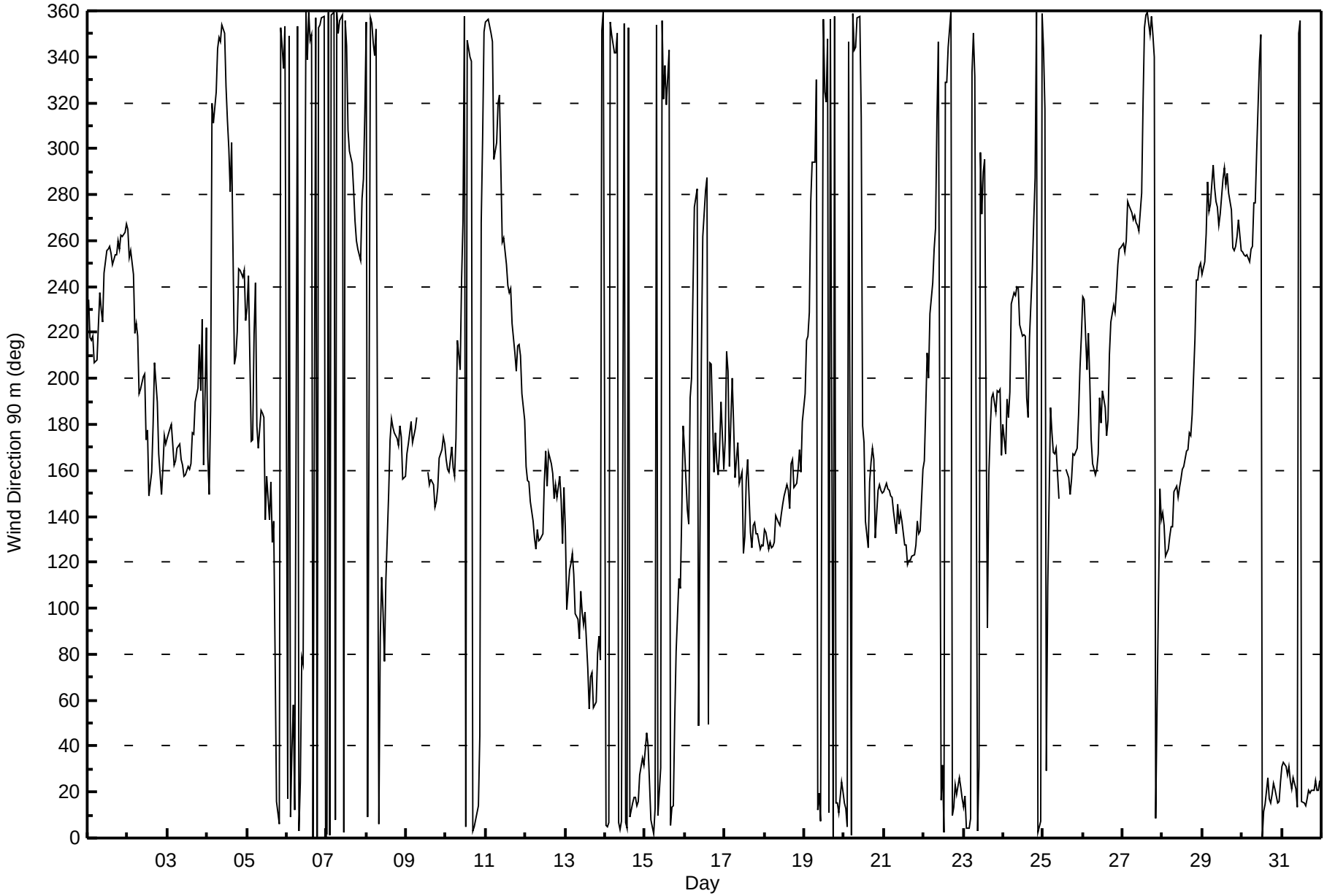
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 90 m (WD90m) - deg

Mannix - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Mannix - January 2016

Maximum Value: 0.9 km/h on Jan 3 17:00

Maximum Daily Average: 0.6 km/h on Jan 3

Minimum Value: -0.9 km/h on Jan 27 01:00

Minimum Daily Average: -0.4 km/h on Jan 29

Maximum Diurnal Average: 0.2 km/h at hour 17

Minimum Diurnal Average: 0.0 km/h at hour 10

Monthly Average: 0.11 km/h

Percentiles: P_1 = -0.8 P_{10} = -0.3 Q_1 = -0.1 Median = 0.1 Q_3 = 0.3 P_{90} = 0.5 P_{99} = 0.7

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Hours of Calibration:	0
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-0.2	-0.2	0.0	0.4	0.3	0.3	0.2	-0.3	-0.4	-0.2	-0.3	-0.6	-0.7	-0.5	-0.7	-0.4	-0.3	-0.8	-0.7	-0.6	-0.5	-0.4	-0.5	-0.4	-0.3	0.4
2-Jan	-0.6	-0.6	-0.6	-0.3	-0.1	0.1	0.1	0.5	0.4	0.3	0.4	0.5	0.3	0.4	0.4	0.4	0.0	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.2	0.6
3-Jan	0.5	0.7	0.5	0.6	0.6	0.5	0.8	0.5	0.7	0.8	0.8	0.6	0.6	0.5	0.7	0.8	0.9	0.6	0.4	0.2	0.4	0.3	0.3	0.2	0.6	0.9
4-Jan	0.4	0.4	0.3	0.0	0.1	0.1	0.1	0.1	0.0	-0.1	-0.3	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.4
5-Jan	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.0	0.0	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	0.1	0.4
6-Jan	0.0	-0.1	0.0	-0.2	-0.1	0.0	0.0	0.0	-0.2	-0.1	0.1	0.2	-0.1	0.0	0.0	0.0	-0.1	-0.2	-0.2	-0.2	-0.3	-0.1	-0.2	-0.3	-0.1	0.2
7-Jan	-0.1	-0.1	AF	0.0	-0.1	0.3	0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	-0.2	-0.2	-0.3	-0.3	-0.3	-0.1	-0.1	0.0	-0.1	0.0	-0.1	0.3
8-Jan	0.2	0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	-0.3	-0.4	-0.1	0.2	0.5	0.2	0.2	0.0	-0.1	-0.2	0.0	0.2	0.1	0.1	0.4	0.6	0.0	0.6
9-Jan	0.7	0.6	0.3	0.5	0.3	0.4	0.3	0.4	0.3	0.1	0.4	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.7	0.6	0.5	0.7
10-Jan	0.6	0.6	0.4	0.3	0.4	0.4	0.3	0.2	0.3	0.1	0.3	0.3	0.4	0.2	0.0	-0.1	0.1	-0.2	0.0	0.2	0.2	0.0	0.1	0.0	0.2	0.6
11-Jan	-0.1	0.0	-0.2	-0.2	0.0	0.0	-0.1	-0.1	-0.4	-0.2	-0.2	-0.1	-0.2	0.0	-0.3	-0.3	0.0	0.0	-0.1	-0.2	-0.1	-0.1	0.1	0.2	-0.1	0.2
12-Jan	0.5	0.4	0.3	0.4	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.0	0.2	0.4	0.3	0.3	0.2	0.1	0.0	0.1	-0.1	0.2	0.5
13-Jan	0.3	0.2	-0.2	0.1	0.0	0.2	0.1	0.1	0.1	0.2	0.5	0.5	0.3	0.5	0.5	0.7	0.8	0.7	0.7	0.6	0.4	0.3	-0.1	-0.3	0.3	0.8
14-Jan	0.0	0.2	0.0	-0.2	-0.1	-0.3	-0.4	-0.2	0.1	-0.2	0.1	0.1	0.0	-0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.0	0.5	0.3	0.4	0.1	0.5
15-Jan	0.4	0.4	0.3	-0.2	-0.2	0.0	0.0	-0.1	0.0	-0.1	0.1	0.2	0.1	0.1	0.0	0.0	-0.2	-0.2	-0.1	0.1	0.1	0.1	0.0	-0.2	0.0	0.4
16-Jan	0.0	-0.2	-0.3	-0.4	0.0	-0.5	-0.1	0.0	0.1	-0.1	-0.1	0.0	0.1	0.2	0.3	-0.1	0.0	-0.2	0.0	0.2	0.1	0.0	0.1	0.2	0.0	0.3
17-Jan	0.1	0.0	0.2	0.2	0.2	0.2	0.4	0.3	0.3	0.2	0.3	0.2	0.1	-0.2	0.2	0.2	0.0	0.0	0.2	0.4	0.5	0.5	0.4	0.6	0.2	0.6
18-Jan	0.5	0.6	0.6	0.4	0.5	0.5	0.6	0.6	0.6	0.3	0.4	0.3	0.0	0.0	0.2	0.1	0.2	0.3	0.3	0.4	0.5	0.2	0.2	0.2	0.3	0.6
19-Jan	0.1	0.1	0.0	0.1	-0.1	-0.1	0.0	0.1	0.0	0.0	0.2	0.2	-0.1	-0.2	-0.1	-0.2	0.0	0.0	0.1	0.0	0.1	-0.1	0.3	0.2	0.0	0.3
20-Jan	0.1	0.1	0.1	0.0	-0.1	0.0	-0.2	-0.1	0.0	0.0	-0.1	0.1	0.3	0.2	0.3	0.1	0.3	0.2	0.2	0.2	0.3	0.1	0.3	0.4	0.1	0.4
21-Jan	0.5	0.4	0.4	0.5	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.3	0.4	0.5	0.3	0.5	0.3	0.2	0.2	0.3	0.4	0.5	0.3	0.4	0.5
22-Jan	0.3	0.4	0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-0.2	0.0	-0.1	0.1	-0.1	0.2	0.0	0.2	0.1	-0.1	0.0	0.4
23-Jan	-0.1	0.1	-0.1	0.0	0.0	0.1	0.0	-0.1	0.1	0.1	0.0	0.1	-0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.2	0.2	0.3	0.5	0.1	0.5
24-Jan	0.3	0.4	0.2	0.5	0.5	0.1	-0.3	-0.3	-0.3	-0.2	-0.4	-0.3	-0.2	-0.2	0.2	0.4	0.3	0.0	-0.1	-0.2	0.0	-0.1	0.0	-0.1	0.0	0.5
25-Jan	0.0	0.1	0.2	0.1	0.0	0.1	0.2	0.3	0.2	0.3	0.5	0.7	0.5	0.6	0.6	0.5	0.5	0.6	0.7	0.8	0.7	0.6	0.3	0.0	0.4	0.8
26-Jan	0.0	0.2	0.4	0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.3	0.2	0.2	0.0	-0.4	-0.7	-0.8	-0.9	0.1	0.5
27-Jan	-0.9	-0.8	-0.9	-0.4	-0.2	-0.5	-0.4	-0.3	-0.3	-0.3	-0.4	-0.3	0.0	0.0	0.0	0.1	-0.2	-0.1	0.0	-0.1	0.0	0.1	0.0	0.1	-0.2	0.1
28-Jan	-0.2	0.1	0.3	0.4	0.5	0.2	0.4	0.5	0.6	0.5	0.5	0.6	0.5	0.3	0.2	0.5	0.5	0.4	0.3	0.2	-0.8	-0.8	-0.6	-0.6	0.2	0.6
29-Jan	-0.7	-0.5	-0.5	-0.3	-0.3	-0.2	-0.5	-0.4	-0.4	-0.3	-0.3	-0.2	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2	-0.4	-0.3	-0.4	-0.4	-0.4	-0.3	-0.4	-0.2
30-Jan	-0.3	-0.3	0.1	-0.2	-0.5	-0.2	-0.4	-0.2	-0.4	-0.2	0.1	0.0	0.1	0.0	0.0	0.4	0.3	0.1	0.2	0.3	0.0	0.1	0.1	0.5	0.0	0.5
31-Jan	0.5	0.5	0.4	0.5	0.4	0.2	0.3	0.5	0.2	-0.1	-0.1	0.0	0.0	0.2	0.1	0.4	0.5	0.3	0.4	0.5	0.6	0.6	0.1	0.1	0.3	0.6
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average	
	0.7	0.7	0.6	0.6	0.6	0.5	0.8	0.6	0.7	0.8	0.8	0.7	0.6	0.6	0.7	0.8	0.9	0.7	0.7	0.8	0.7	0.6	0.7	0.6	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 3.4 km/h on Jan 27 02:00

Minimum Value: 0.1 km/h on Jan 6 01:00

Percentiles: P_1 = 0.2 P_{10} = 0.4 Q_1 = 0.6 Median = 0.9 Q_3 = 1.2 P_{90} = 1.7 P_{99} = 2.9

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	0.7	0.8	0.9	0.7	0.9	1.0	0.9	0.8	0.8	1.1	1.7	2.2	2.5	2.3	2.5	2.9	2.1	3.0	1.8	1.7	1.6	1.4	1.4	0.8	3.0
2-Jan	0.4	0.9	0.6	0.6	0.5	0.5	0.6	0.7	0.9	1.0	1.0	1.2	1.1	1.2	1.0	0.9	0.4	0.6	0.8	0.6	0.6	0.7	0.7	0.9	1.2
3-Jan	0.7	0.8	0.8	1.1	1.2	1.0	1.3	1.1	1.4	1.5	1.6	1.6	1.8	1.6	1.6	1.5	1.5	1.0	0.6	0.4	0.9	0.7	0.9	0.4	1.8
4-Jan	0.5	0.7	0.6	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.7
5-Jan	0.5	0.6	0.8	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.8	1.0	0.9	0.6	0.4	0.3	0.2	0.4	0.6	0.5	0.3	0.2	0.2	0.2	1.0
6-Jan	0.1	0.2	0.2	0.2	0.2	0.4	0.3	0.2	0.4	0.3	0.3	0.7	0.7	0.7	0.5	0.8	0.9	1.1	1.1	0.9	1.2	1.1	1.1	1.4	1.4
7-Jan	1.7	1.3	AF	1.2	1.3	1.0	0.9	0.9	1.2	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.0	0.6	0.8	0.7	0.7	0.6	0.6	0.7	1.7
8-Jan	0.8	0.7	0.7	0.9	0.7	0.3	0.5	0.4	0.3	0.3	0.3	0.4	0.8	0.9	0.9	0.5	0.5	0.3	0.8	0.7	0.9	1.0	1.0	1.3	1.3
9-Jan	1.4	1.1	1.2	1.0	1.0	1.0	0.8	0.8	0.7	0.7	1.1	1.3	1.2	1.4	1.5	1.1	0.8	1.0	1.0	1.1	1.0	1.0	1.2	1.1	1.5
10-Jan	0.9	1.0	1.1	1.1	1.2	1.3	1.0	0.5	0.6	0.6	0.6	0.6	0.8	0.8	1.1	1.5	1.7	1.5	1.7	1.4	0.8	0.4	0.5	0.7	1.7
11-Jan	1.0	1.5	2.5	1.8	1.1	0.7	0.6	1.0	1.6	1.1	0.9	1.0	1.1	1.2	1.4	1.2	0.9	0.6	0.4	0.8	0.7	0.7	0.6	0.7	2.5
12-Jan	0.9	1.1	1.0	0.9	0.8	0.7	0.8	0.9	1.1	1.0	1.0	1.1	1.0	1.0	0.9	0.9	0.8	1.1	0.8	0.9	0.9	0.8	0.4	0.5	1.1
13-Jan	0.4	0.3	0.2	0.3	0.5	0.7	0.6	0.4	0.7	0.7	1.0	1.1	0.9	1.0	1.0	1.2	1.4	1.2	1.2	1.1	1.0	0.7	1.1	2.1	2.1
14-Jan	2.2	2.3	2.3	1.9	1.6	1.8	2.0	1.9	2.0	1.6	1.7	1.5	1.7	1.6	1.7	1.7	2.1	1.8	1.8	2.1	1.6	1.6	1.4	1.5	2.3
15-Jan	1.0	1.0	0.8	0.8	0.8	0.8	0.6	0.6	0.6	0.6	0.7	0.8	1.0	0.8	0.8	0.8	0.7	0.7	0.5	0.3	0.3	0.3	0.3	0.3	1.0
16-Jan	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.6	0.7	0.5	0.6	0.4	0.4	0.4	0.3	0.4	0.3	0.2	0.3	0.4	0.5	0.4	0.7
17-Jan	0.4	0.4	0.7	0.6	0.7	0.7	1.0	1.1	1.0	0.8	1.0	1.0	1.1	1.0	0.8	1.0	0.8	0.7	0.5	0.9	1.4	2.1	1.7	1.4	2.1
18-Jan	1.2	1.5	1.9	1.7	1.9	1.7	1.8	1.5	1.5	1.4	1.4	1.1	0.9	0.9	0.8	0.7	0.6	0.6	0.7	1.0	1.0	0.8	0.6	0.6	1.9
19-Jan	0.6	0.5	0.5	0.4	0.3	0.5	0.6	0.8	0.6	0.6	1.3	1.0	0.8	0.9	1.3	1.0	0.7	0.9	1.0	1.1	1.4	1.1	1.2	1.1	1.4
20-Jan	1.4	1.5	1.3	1.0	0.9	1.0	0.8	0.7	0.8	0.7	0.6	0.9	1.0	0.8	0.7	0.4	0.4	0.5	0.4	0.6	0.7	0.8	0.9	0.8	1.5
21-Jan	0.7	0.8	1.0	0.9	0.9	0.9	0.6	0.5	0.5	0.8	1.0	1.1	1.3	1.1	1.7	2.2	2.5	3.0	2.8	1.7	1.0	1.7	2.0	0.7	3.0
22-Jan	0.8	0.7	0.5	0.5	0.5	0.4	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.9	1.0	1.0	1.3	1.4	1.2	1.0	1.2	1.1	1.0	1.4
23-Jan	1.1	1.1	0.9	0.8	0.8	0.5	0.6	0.6	0.5	0.4	0.3	0.5	0.5	0.4	0.3	0.2	0.4	0.4	0.3	0.4	0.5	0.7	0.7	0.9	1.1
24-Jan	0.7	0.9	0.8	0.9	0.7	0.8	1.1	1.1	1.1	1.1	1.3	1.2	1.1	1.1	1.0	0.7	0.5	0.3	0.8	0.9	1.7	2.0	1.7	1.0	2.0
25-Jan	0.7	0.4	0.6	0.3	0.5	1.0	0.9	1.2	1.6	1.3	1.5	1.7	1.5	1.6	1.4	1.1	0.6	0.8	1.1	0.9	0.7	0.9	0.7	0.6	1.7
26-Jan	0.6	0.5	0.6	0.7	0.7	0.9	0.8	0.8	1.0	1.1	1.1	1.1	1.0	1.1	1.0	1.2	0.8	0.6	0.7	0.8	1.3	3.2	3.3	3.3	3.3
27-Jan	3.2	3.4	3.3	2.1	1.4	1.7	1.4	1.6	1.4	1.4	1.5	1.4	1.1	1.2	1.2	1.3	1.4	1.1	0.6	0.3	0.1	0.3	0.3	0.3	3.4
28-Jan	0.5	0.7	0.8	1.3	1.7	0.9	0.9	0.7	1.0	1.2	1.2	1.4	1.1	0.6	0.5	0.9	1.1	1.4	1.0	0.7	2.4	2.6	2.4	2.4	2.6
29-Jan	2.5	2.6	2.2	1.8	0.9	1.4	2.0	2.0	1.4	1.0	1.2	1.2	1.5	1.9	1.4	1.7	1.0	0.5	1.2	1.1	1.1	1.0	1.1	0.7	2.6
30-Jan	0.6	0.9	0.5	0.5	0.5	0.7	1.5	1.0	1.1	0.7	1.0	0.9	1.3	1.6	1.6	1.8	1.8	1.9	2.3	2.0	1.6	1.4	1.3	1.4	2.3
31-Jan	1.2	1.3	1.2	1.6	1.6	1.5	1.6	1.7	1.8	2.0	1.7	1.6	1.9	2.0	2.1	1.8	1.6	1.6	1.6	1.5	1.5	1.6	1.1	0.7	2.1
	3.2	3.4	3.3	2.1	1.9	1.8	2.0	2.0	2.0	2.0	1.7	2.2	2.5	2.3	2.5	2.9	2.5	3.0	2.8	2.1	2.4	3.2	3.3	3.3	
	Diurnal Maximum																								

AF - Analyzer Failure

Maximum Value: 2.1 km/h on Jan 3 17:00

Maximum Daily Average: 1.4 km/h on Jan 3

Minimum Value: -1.2 km/h on Jan 14 07:00

Minimum Daily Average: -0.6 km/h on Jan 29

Maximum Diurnal Average: 0.3 km/h at hour 2

Minimum Diurnal Average: 0.1 km/h at hour 19

Monthly Average: 0.19 km/h

Percentiles: P_1 = -0.9 P_{10} = -0.5 Q_1 = -0.3 Median = 0.1 Q_3 = 0.6 P_{90} = 1.0 P_{99} = 1.5

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-0.1	-0.1	0.3	0.6	0.5	0.8	0.4	-0.2	-0.4	-0.1	-0.2	-0.6	-0.7	-0.6	-0.6	-0.4	-0.2	-0.4	-0.8	-0.6	-0.5	-0.4	-0.5	-0.5	-0.2	0.8
2-Jan	-0.5	-0.5	-0.6	-0.1	0.1	0.2	0.4	1.0	1.0	0.7	0.8	1.0	0.5	1.0	0.9	0.9	0.1	0.7	1.0	1.1	1.3	1.6	1.3	1.4	0.6	1.6
3-Jan	1.4	1.4	1.0	1.5	1.8	1.8	2.0	1.4	1.6	1.8	1.6	1.3	1.6	1.5	1.6	1.9	2.1	1.3	0.7	0.4	1.0	0.9	1.0	0.3	1.4	2.1
4-Jan	0.9	1.1	0.7	0.0	-0.2	-0.2	-0.4	-0.3	-0.7	-0.7	-0.8	-0.3	-0.3	-0.2	-0.1	0.0	0.1	0.3	0.3	0.3	0.2	0.2	0.1	0.7	0.0	1.1
5-Jan	0.6	0.7	0.7	1.0	0.9	0.6	0.8	0.8	0.7	0.5	0.5	0.4	0.3	0.4	0.3	0.5	0.4	-0.1	-0.5	-0.5	-0.2	-0.3	0.0	-0.1	0.4	1.0
6-Jan	-0.1	-0.1	-0.2	-0.1	0.0	-0.2	0.0	-0.1	-0.3	-0.1	0.0	0.1	-0.1	-0.2	0.1	-0.3	-0.3	-0.4	-0.2	-0.2	-0.4	-0.1	-0.5	-0.4	-0.2	0.1
7-Jan	-0.4	-0.4	AF	AF	AF	AF	0.2	-0.2	-0.3	-0.4	-0.3	-0.1	-0.4	-0.2	-0.6	-0.5	-0.9	-0.8	-0.9	-0.7	-0.5	-0.2	-0.2	0.1	-0.4	0.2
8-Jan	0.2	0.2	-0.3	-0.4	-0.3	-0.1	-0.2	-0.1	-0.1	0.1	0.1	0.3	0.4	0.2	0.3	0.1	0.0	-0.1	0.2	0.6	0.5	0.5	0.7	1.1	0.2	1.1
9-Jan	1.3	1.2	0.9	1.0	0.7	0.8	0.4	0.6	0.5	0.4	0.7	0.9	0.8	0.9	0.9	1.2	1.2	0.9	0.7	1.0	1.0	1.0	1.2	1.1	0.9	1.3
10-Jan	1.2	1.2	0.9	0.7	0.7	0.8	0.4	0.2	0.3	0.1	0.2	0.1	0.5	0.2	-0.5	-0.6	-0.3	-0.6	-0.7	-0.1	-0.2	0.0	0.1	-0.4	0.2	1.2
11-Jan	-0.2	-0.2	-0.9	-0.9	-0.3	-0.1	-0.1	-0.3	-0.9	-0.4	-0.1	-0.1	-0.2	0.1	-0.1	-0.2	0.1	0.1	0.1	-0.1	-0.1	0.3	0.7	0.8	-0.1	0.8
12-Jan	1.0	0.9	0.9	0.7	0.6	0.5	0.8	0.6	0.6	0.5	0.5	0.5	0.3	0.4	0.0	0.3	0.7	0.6	0.5	0.6	0.3	0.3	0.3	0.2	0.5	1.0
13-Jan	0.6	0.2	0.1	0.3	0.2	0.4	0.2	0.1	0.0	0.4	0.5	0.5	0.5	0.2	0.3	0.5	0.4	0.4	0.3	0.5	0.1	0.2	-0.5	-1.1	0.2	0.6
14-Jan	-0.9	-0.5	-0.6	-0.7	-0.5	-0.9	-1.2	-0.8	-0.3	-0.8	-0.3	-0.5	-0.5	-0.7	-0.4	-0.3	-0.3	-0.4	-0.4	-0.8	-0.3	0.1	-0.1	0.0	-0.5	0.1
15-Jan	0.3	0.1	0.1	-0.5	-0.4	-0.4	-0.2	-0.3	-0.2	-0.3	0.0	0.2	0.0	0.0	-0.1	-0.2	-0.5	-0.6	-0.4	0.0	0.1	0.2	0.3	0.3	-0.1	0.3
16-Jan	0.3	0.5	0.4	0.0	0.4	-0.2	-0.1	0.1	0.3	0.3	0.0	0.0	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.3	0.4	0.4	0.3	0.5	0.2	0.5
17-Jan	0.7	0.3	0.6	0.5	0.4	0.5	0.9	0.8	0.7	0.6	0.5	0.5	0.3	0.0	0.3	0.4	0.3	0.5	0.9	0.8	1.1	1.0	1.0	1.0	0.6	1.1
18-Jan	1.3	1.3	1.1	1.0	1.0	0.9	1.0	1.1	1.1	0.7	0.6	0.6	0.5	0.4	0.4	0.1	0.4	0.4	0.3	0.6	1.0	0.5	0.3	0.4	0.7	1.3
19-Jan	0.3	0.3	0.1	0.2	-0.1	0.0	0.0	-0.1	-0.3	-0.2	-0.3	0.0	-0.3	-0.6	-0.4	-0.6	-0.2	-0.2	-0.4	-0.6	-0.3	-0.7	0.0	0.2	-0.2	0.3
20-Jan	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5	-0.5	-0.4	-0.2	-0.3	-0.1	0.1	0.4	0.2	0.4	0.3	0.4	0.4	0.3	0.5	0.4	0.4	0.8	0.9	0.1	0.9
21-Jan	0.9	0.8	1.0	1.0	0.9	0.8	0.8	1.1	1.2	1.1	0.9	0.8	0.7	0.6	0.6	0.4	0.8	0.5	0.4	0.3	0.5	0.6	1.1	0.7	0.8	1.2
22-Jan	0.8	0.8	0.2	0.3	0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	0.2	0.0	-0.4	-0.4	-0.5	-0.4	-0.7	-0.1	-0.5	-0.3	-0.1	-0.5	-0.1	0.8
23-Jan	-0.5	-0.2	-0.5	-0.4	-0.4	-0.1	-0.2	-0.1	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.5	0.6	0.6	0.9	0.0	0.9
24-Jan	0.6	0.6	0.7	0.9	0.7	0.2	-0.3	-0.1	-0.1	0.1	0.0	0.2	0.4	0.2	0.6	0.7	0.3	0.0	-0.3	-0.5	-0.8	-0.7	-0.4	-0.4	0.1	0.9
25-Jan	-0.3	0.1	0.2	0.0	0.1	0.2	0.4	0.7	0.7	0.9	1.0	1.1	0.8	0.9	1.1	1.0	1.0	1.1	1.4	1.4	1.6	1.3	0.9	0.4	0.8	1.6
26-Jan	0.0	0.2	0.9	0.5	0.8	1.2	1.2	1.2	1.3	1.4	0.9	1.1	0.7	0.8	1.5	1.3	0.7	0.3	0.2	0.0	-0.2	-0.6	-0.6	-0.9	0.6	1.5
27-Jan	-0.9	-0.7	-0.9	-0.7	-0.5	-0.7	-0.6	-0.5	-0.6	-0.3	-0.3	-0.4	-0.3	-0.4	-0.3	-0.5	-0.7	-0.5	-0.1	-0.1	-0.1	0.0	0.0	0.5	-0.4	0.5
28-Jan	0.5	0.7	1.0	0.9	1.3	0.7	0.9	1.0	1.2	1.1	1.2	1.2	1.2	0.7	0.5	1.1	1.1	1.1	0.6	0.3	-0.7	-0.5	-0.4	-0.5	0.7	1.3
29-Jan	-0.6	-0.4	-0.6	-0.6	-0.5	-0.5	-1.0	-0.9	-0.8	-0.6	-0.4	-0.3	-0.7	-0.8	-0.7	-0.6	-0.5	-0.6	-0.5	-0.3	-0.6	-0.5	-0.5	-0.4	-0.6	-0.3
30-Jan	-0.4	-0.4	0.0	-0.1	-0.4	-0.2	-0.4	-0.5	-0.5	-0.4	-0.1	-0.3	-0.4	-0.4	-0.6	0.0	0.0	-0.5	-0.6	-0.1	-0.5	0.0	0.0	0.1	-0.3	0.1
31-Jan	0.3	0.2	0.2	0.0	0.1	-0.3	-0.2	-0.1	-0.6	-0.7	-0.6	-0.5	-0.7	-0.3	-0.3	0.0	0.3	0.2	-0.1	0.1	0.3	0.2	-0.2	-0.1	-0.1	0.3
	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	Diurnal Average	
	1.4	1.4	1.1	1.5	1.8	1.8	2.0	1.4	1.6	1.8	1.6	1.3	1.6	1.5	1.6	1.9	2.1	1.3	1.4	1.4	1.6	1.6	1.3	1.4	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 3.8 km/h on Jan 26 23:00

Minimum Value: 0.1 km/h on Jan 6 02:00

Percentiles: P_1 = 0.2 P_{10} = 0.3 Q_1 = 0.6 Median = 0.8 Q_3 = 1.3 P_{90} = 1.8 P_{99} = 3.0

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

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

Mannix - January 2016

Maximum Value: 1.8 km/h on Jan 3 10:00

Maximum Daily Average: 1.0 km/h on Jan 3

Minimum Value: -1.0 km/h on Jan 8 17:00

Minimum Daily Average: -0.1 km/h on Jan 14

Maximum Diurnal Average: 0.3 km/h at hour 2

Minimum Diurnal Average: 0.1 km/h at hour 19

Monthly Average: 0.19 km/h

Percentiles: P_1 = -0.7 P_{10} = -0.2 Q_1 = 0.0 Median = 0.1 Q_3 = 0.4 P_{90} = 0.7 P_{99} = 1.4

Hours in Service:	744
Hours of Data:	710
Hours of Missing Data:	34
Hours of Calibration:	0
Percent Operational Time:	95.4

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.0	-0.3	-0.1	0.2	0.1	0.2	0.1	-0.2	-0.2	-0.2	0.3	0.0	0.0	0.2	0.3	0.7	0.7	0.5	0.0	-0.1	0.3	0.3	0.0	-0.1	0.1	0.7
2-Jan	-0.1	-0.1	-0.3	0.1	-0.1	0.0	0.0	0.2	0.2	0.1	0.3	0.6	0.2	0.4	0.7	0.5	-0.1	0.2	0.4	0.7	0.7	1.1	0.5	0.7	0.3	1.1
3-Jan	0.8	0.7	0.6	0.7	1.5	1.6	1.5	1.2	1.4	1.8	1.6	1.1	1.3	1.4	1.6	1.2	1.1	0.5	0.2	0.1	0.3	0.3	0.3	0.2	1.0	1.8
4-Jan	0.4	0.6	0.2	0.0	0.1	0.0	-0.3	-0.2	-0.3	-0.4	-0.4	-0.1	0.3	0.2	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.6
5-Jan	0.0	0.1	0.2	0.5	0.1	0.1	0.3	0.4	0.3	0.2	0.3	0.2	0.4	0.3	0.3	0.0	0.2	0.1	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.1	0.5
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	AF	AF	AF	AF	0.2	0.2	0.0	0.1	-0.1	-0.4	AF	AF	AF	AF	AF	AF	AF	--	0.2
7-Jan	AF	-0.5	0.2	0.3	0.5	0.9	0.6	-0.3	-0.1	-0.5	-0.3	-0.1	-0.2	1.1	0.7	0.7	0.3	0.0	0.0	0.2	0.1	0.4	0.4	0.9	0.2	1.1
8-Jan	0.4	0.5	-0.1	-0.3	0.0	0.2	0.0	0.1	0.2	0.2	0.3	0.3	-0.1	-0.7	-0.9	-0.9	-1.0	-0.9	-0.2	0.6	0.5	0.4	0.7	0.9	0.0	0.9
9-Jan	1.2	0.8	0.4	0.4	0.5	0.5	0.3	0.4	AF	AF	AF	AF	AF	AF	AF	AF	1.3	0.8	0.5	1.1	1.0	0.8	1.0	0.7	--	1.3
10-Jan	0.8	1.0	0.7	0.6	0.8	0.6	0.3	0.1	0.1	0.0	0.1	0.1	0.3	0.3	-0.2	-0.3	0.0	-0.4	-0.3	0.0	-0.2	0.1	0.1	-0.3	0.2	1.0
11-Jan	0.3	0.6	0.0	0.0	0.4	0.2	0.2	0.0	-0.2	0.1	0.1	0.2	-0.1	0.3	0.2	0.0	0.2	0.1	0.1	-0.1	-0.1	0.0	0.3	0.4	0.1	0.6
12-Jan	0.9	0.9	0.9	0.6	0.6	0.3	-0.2	0.1	-0.2	-0.1	0.1	0.3	0.1	0.2	-0.1	0.2	0.5	0.3	0.4	0.5	0.4	0.3	0.1	0.4	0.3	0.9
13-Jan	0.3	0.2	0.2	0.1	0.1	0.4	0.4	0.1	0.2	0.5	0.5	0.4	0.4	0.1	0.3	0.6	0.1	0.3	0.1	0.1	-0.2	0.1	-0.1	-0.4	0.2	0.6
14-Jan	-0.3	0.2	0.4	-0.3	0.2	-0.3	-0.4	-0.1	0.4	-0.3	0.2	0.0	-0.1	-0.4	0.1	0.2	0.0	-0.2	-0.2	-0.6	0.0	0.2	0.0	0.1	-0.1	0.4
15-Jan	0.3	0.0	0.0	-0.3	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.2	0.3	0.3	0.3	0.1	0.1	0.0	-0.3	-0.1	0.2	0.1	0.4	0.1	0.2	0.1	0.4
16-Jan	0.2	0.3	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.5	0.5	0.4	0.2	0.5
17-Jan	0.4	0.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.2	0.4	-0.2	-0.2	0.0	-0.1	-0.4	-0.2	-0.6	-0.4	-0.3	--	0.5
18-Jan	-0.1	-0.1	-0.4	-0.3	-0.5	-0.3	-0.4	0.1	0.0	-0.2	-0.1	0.2	0.5	0.3	0.1	-0.1	0.2	0.2	0.2	0.3	0.6	0.2	0.2	0.2	0.0	0.6
19-Jan	0.2	0.0	0.0	-0.1	0.0	0.3	0.3	0.2	0.0	0.0	-0.1	0.2	0.0	-0.2	0.0	-0.2	0.0	0.0	-0.1	-0.3	0.3	-0.6	0.2	0.4	0.0	0.4
20-Jan	0.0	0.0	0.2	0.0	-0.3	-0.2	-0.2	0.0	0.0	-0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.3	0.3	-0.1	0.3	0.6	1.0	0.8	0.2	1.0
21-Jan	0.8	0.9	0.8	0.8	0.7	0.4	0.2	-0.1	0.9	-0.1	0.3	0.1	-0.3	0.1	-0.3	-0.8	-0.3	-0.8	-0.9	-0.5	0.0	-0.3	-0.1	0.4	0.1	0.9
22-Jan	0.8	0.5	-0.2	0.0	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.0	0.3	0.3	0.1	-0.1	-0.2	0.0	-0.4	0.1	-0.2	0.0	0.1	-0.1	0.1	0.8
23-Jan	-0.1	0.1	-0.2	-0.2	-0.2	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.4	0.1	0.1	0.6	0.3	0.5	0.3	1.1	0.2	1.1
24-Jan	0.8	0.7	0.8	1.0	0.5	0.3	0.1	0.2	0.1	0.4	0.2	0.3	0.5	-0.2	0.2	0.4	-0.1	0.1	0.3	0.2	-0.2	0.0	0.1	-0.1	0.3	1.0
25-Jan	-0.2	0.3	0.3	0.0	0.1	0.1	0.3	0.5	0.6	0.6	AF	AF	AF	0.7	0.7	0.7	0.6	1.0	1.1	1.2	1.1	0.6	0.2	0.0	0.5	1.2
26-Jan	0.0	0.0	0.2	0.0	0.1	0.6	0.9	0.8	0.8	0.9	0.3	0.6	0.3	0.4	0.6	0.7	0.1	-0.1	0.2	0.2	0.1	0.2	0.4	0.0	0.4	0.9
27-Jan	0.2	0.2	0.3	0.3	0.2	0.3	0.2	0.4	0.2	0.4	0.5	0.5	0.0	-0.1	0.1	-0.2	-0.2	-0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.5
28-Jan	0.3	0.2	-0.3	-0.3	0.0	0.0	-0.1	0.7	0.9	0.1	0.7	0.9	1.0	0.6	0.5	0.6	0.6	0.5	0.4	0.0	0.0	-0.1	0.1	0.2	0.3	1.0
29-Jan	0.0	0.3	0.2	0.6	0.4	0.7	0.3	0.2	0.4	0.3	0.2	0.4	0.1	0.4	0.3	0.3	0.3	0.0	0.2	0.3	-0.1	0.0	0.1	0.1	0.3	0.7
30-Jan	0.0	0.2	0.1	0.2	-0.2	0.4	0.3	0.2	0.3	0.1	0.3	0.0	0.0	-0.1	-0.2	0.2	0.5	-0.1	-0.3	-0.1	-0.3	0.2	0.4	0.2	0.1	0.5
31-Jan	0.1	0.2	0.1	0.1	0.3	-0.3	0.2	0.0	-0.3	-0.1	0.1	-0.2	-0.3	0.1	0.0	0.3	0.3	0.3	0.1	0.2	0.4	0.4	0.0	-0.1	0.1	0.4
	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	1.2	1.0	0.9	1.0	1.5	1.6	1.5	1.2	1.4	1.8	1.6	1.1	1.3	1.4	1.6	1.2	1.3	1.0	1.1	1.2	1.1	1.1	1.0	1.1	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.1 km/h on Jan 27 01:00

Minimum Value: 0.1 km/h on Jan 6 02:00

Percentiles: P_1 = 0.2 P_{10} = 0.3 Q_1 = 0.5 Median = 0.8 Q_3 = 1.3 P_{90} = 1.8 P_{99} = 2.7

Hours in Service:	744
Hours of Data:	710
Hours of Missing Data:	34
Hours of Calibration:	0
Percent Operational Time:	95.4

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	1.3	1.2	1.1	1.3	1.7	1.5	1.7	1.4	0.8	0.6	1.8	2.6	2.5	2.6	2.5	2.6	2.8	2.3	1.9	1.4	1.6	1.3	1.3	0.8	2.8
2-Jan	0.2	0.2	0.3	0.4	0.6	0.5	0.6	0.6	0.5	0.4	0.5	1.0	0.8	0.7	0.8	0.7	0.4	0.3	0.7	0.6	0.4	0.4	0.4	0.4	1.0
3-Jan	0.6	0.6	0.4	0.4	0.5	0.5	0.5	0.8	0.8	0.8	0.7	0.9	1.2	1.0	1.0	0.8	0.5	0.5	0.5	0.5	0.8	0.7	0.5	0.3	1.2
4-Jan	0.4	0.3	0.2	0.2	0.4	0.2	0.2	0.3	0.3	0.5	0.5	0.5	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.5	0.5
5-Jan	0.4	0.4	0.5	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.7	0.6	0.5	0.4	0.6	0.3	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.7
6-Jan	0.1	0.1	0.2	0.2	0.2	0.2	0.3	AF	AF	AF	AF	0.4	0.3	0.4	0.4	0.5	0.7	AF	AF	AF	AF	AF	AF	AF	0.7
7-Jan	AF	1.4	1.3	1.1	1.1	0.9	1.3	1.3	1.3	1.0	1.0	1.1	1.1	1.0	0.7	0.8	0.6	0.5	0.7	0.6	0.7	0.9	0.8	1.0	1.4
8-Jan	0.9	0.7	0.5	0.4	0.4	0.5	0.2	0.3	0.4	0.6	0.5	0.6	1.0	0.9	0.4	0.3	0.3	0.4	1.2	0.6	1.1	0.9	0.7	0.8	1.2
9-Jan	0.6	0.6	0.6	0.7	0.8	0.7	0.5	0.5	AF	AF	AF	AF	AF	AF	AF	AF	0.5	0.5	0.6	0.4	0.6	0.5	0.4	0.5	0.8
10-Jan	0.5	0.6	0.5	0.8	0.7	0.8	0.7	0.5	0.4	0.3	0.6	0.7	0.8	0.9	1.2	1.7	1.7	1.3	1.7	1.5	0.9	0.5	0.7	0.6	1.7
11-Jan	1.1	2.0	2.8	1.7	1.2	0.6	0.5	1.2	1.7	1.2	0.9	1.0	0.9	1.1	1.2	0.9	0.8	0.4	0.4	0.3	0.2	0.3	0.4	0.5	2.8
12-Jan	0.6	0.7	0.6	0.7	0.5	0.7	1.1	0.7	0.8	0.7	0.7	1.0	1.0	0.9	0.7	0.6	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.3	1.1
13-Jan	0.6	1.5	0.7	1.0	1.2	1.7	1.4	1.1	1.2	1.5	1.9	1.7	1.5	1.5	1.2	1.5	1.5	1.2	1.0	1.6	1.6	1.1	1.0	1.3	1.9
14-Jan	1.0	1.5	1.8	1.7	1.8	1.9	1.7	1.9	1.9	1.6	1.9	1.7	1.9	1.5	2.0	1.8	1.8	1.7	1.6	1.8	1.6	1.6	1.0	1.5	2.0
15-Jan	1.1	0.9	1.2	0.5	0.8	0.7	0.8	0.9	0.6	0.5	0.4	0.7	1.1	0.9	1.0	0.8	0.4	0.5	0.3	0.3	0.6	1.3	0.7	0.3	1.3
16-Jan	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.2	0.2	0.5	0.3	0.6	0.4	0.2	0.2	0.2	0.1	0.2	0.3	0.4	0.3	0.6
17-Jan	0.2	0.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.6	0.4	1.1	1.3	1.3	0.7	1.3	1.4	2.3	2.1	1.5	2.3
18-Jan	1.0	1.3	2.1	1.7	1.8	1.8	1.9	1.4	1.3	1.6	1.5	1.2	1.2	0.9	0.8	0.8	0.7	0.4	0.6	1.1	1.2	0.7	0.6	0.3	2.1
19-Jan	0.3	0.2	0.1	0.3	0.2	0.3	0.4	0.7	0.8	0.7	1.3	1.3	0.9	1.1	1.6	1.1	1.0	1.0	1.0	0.6	1.0	0.8	1.0	1.4	1.6
20-Jan	1.2	1.4	1.5	1.3	1.0	1.1	0.6	0.4	0.5	0.6	0.8	0.9	1.1	1.3	0.9	0.5	0.3	0.5	0.3	0.9	0.6	0.5	0.6	0.6	1.5
21-Jan	0.6	0.5	0.8	0.8	0.5	0.5	0.6	1.0	0.7	0.7	0.7	1.1	1.5	1.4	2.0	2.1	2.6	2.7	2.6	1.9	1.1	1.5	1.8	0.6	2.7
22-Jan	0.9	0.8	0.3	0.5	0.4	0.5	0.3	0.5	0.5	0.9	0.6	0.7	0.7	0.7	0.9	0.9	0.6	0.9	1.1	1.1	0.7	0.8	0.9	0.8	1.1
23-Jan	0.8	1.1	0.6	0.5	0.4	0.5	0.4	0.5	0.5	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.3	0.1	0.2	0.3	0.2	0.4	0.4	0.6	1.1
24-Jan	0.4	0.6	0.6	0.5	0.5	0.7	0.6	0.7	0.7	1.0	1.2	1.0	1.0	0.8	0.6	0.6	0.8	0.7	1.2	1.0	1.4	1.5	1.5	1.0	1.5
25-Jan	0.7	0.5	0.6	0.4	0.6	1.0	1.2	1.0	1.2	1.4	AF	AF	AF	1.3	1.3	0.7	0.6	0.8	0.5	0.5	0.6	0.5	0.7	1.0	1.4
26-Jan	0.7	0.7	0.7	0.5	0.4	0.5	0.4	0.4	0.7	0.5	0.8	0.5	0.5	0.4	0.5	0.9	0.8	1.0	1.5	1.5	2.4	3.9	3.7	3.5	3.9
27-Jan	4.1	3.3	3.9	2.9	2.3	1.9	1.6	2.3	1.9	2.0	1.9	1.7	1.2	0.8	1.2	1.0	1.1	1.1	0.7	0.3	0.1	0.4	0.6	0.6	4.1
28-Jan	0.7	0.7	1.5	1.6	1.6	1.1	1.0	0.7	0.7	0.7	0.9	1.0	0.8	0.5	0.4	0.7	0.7	1.0	0.7	0.9	2.5	2.8	2.5	2.4	2.8
29-Jan	2.5	2.8	2.4	1.8	0.9	1.8	2.0	2.2	1.4	0.8	1.6	1.6	1.7	2.1	1.5	1.8	1.2	0.8	0.9	1.2	1.0	1.0	0.8	0.5	2.8
30-Jan	0.5	0.8	1.0	1.1	0.7	0.7	1.0	0.8	0.4	0.8	1.4	1.6	1.0	1.5	1.3	1.7	1.6	1.5	1.9	2.1	1.7	1.8	1.5	1.6	2.1
31-Jan	1.4	1.4	1.4	1.5	1.4	1.5	1.5	1.3	1.8	2.0	1.8	2.0	1.8	2.2	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.8	1.2	0.9	2.2
	4.1	3.3	3.9	2.9	2.3	1.9	2.0	2.3	1.9	2.0	1.9	2.6	2.5	2.6	2.5	2.6	2.8	2.7	2.6	2.1	2.5	3.9	3.7	3.5	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

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

Mannix - January 2016

Maximum Value: 3.2 km/h on Jan 29 09:00

Maximum Daily Average: 2.2 km/h on Jan 29

Minimum Value: -1.8 km/h on Jan 21 18:00

Minimum Daily Average: 0.0 km/h on Jan 21

Maximum Diurnal Average: 0.8 km/h at hour 9

Minimum Diurnal Average: 0.5 km/h at hour 19

Monthly Average: 0.63 km/h

Percentiles: P_1 = -1.3 P_{10} = 0.0 Q_1 = 0.2 Median = 0.5 Q_3 = 0.9 P_{90} = 1.6 P_{99} = 2.8

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.4	-0.2	-0.1	0.2	-0.1	0.0	0.3	0.1	0.0	0.0	1.2	1.4	1.6	1.8	2.0	2.3	2.1	2.4	2.0	1.4	2.0	1.9	1.6	1.2	1.1	2.4
2-Jan	1.2	1.0	0.8	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.6	0.1	0.6	0.8	0.3	-0.2	0.0	0.2	0.4	0.6	0.8	0.8	0.5	0.4	1.2
3-Jan	1.0	1.2	0.9	0.8	1.2	1.4	0.8	0.8	1.1	1.6	1.5	1.1	1.2	1.2	1.3	0.9	1.0	0.3	0.0	0.1	0.2	0.4	0.2	0.2	0.8	1.6
4-Jan	0.3	0.3	0.2	0.5	1.0	1.1	1.2	1.1	1.4	1.2	0.9	1.1	1.4	1.5	1.1	0.4	0.0	-0.1	0.1	0.4	0.4	0.3	0.3	0.1	0.7	1.5
5-Jan	0.1	0.3	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.4	0.2	0.2	0.0	0.3	0.2	0.8	0.8	0.6	0.7	0.6	0.4	0.3	0.8
6-Jan	0.2	0.3	0.4	0.2	0.3	0.4	0.4	0.3	1.0	0.0	0.2	0.2	0.3	0.1	0.2	0.1	0.1	0.0	0.1	0.5	0.2	1.0	0.0	-0.4	0.3	1.0
7-Jan	1.3	1.0	1.5	2.2	2.5	0.5	0.7	0.1	0.7	0.2	0.2	0.6	0.6	1.8	2.2	2.4	2.1	1.7	1.3	1.3	0.5	1.1	1.0	1.5	1.2	2.5
8-Jan	0.8	0.9	0.5	0.6	0.9	0.7	0.2	0.2	0.8	1.2	0.4	0.2	-0.4	-1.2	-1.7	-1.4	-1.6	-1.5	-0.8	0.2	0.1	0.2	0.4	0.2	0.0	1.2
9-Jan	-0.4	-0.6	-0.1	0.2	0.1	0.7	0.0	AF	AF	AF	AF	AF	AF	2.8	1.9	1.7	2.2	1.2	-0.1	1.0	0.0	0.2	0.9	0.4	0.7	2.8
10-Jan	-0.4	0.3	0.5	0.5	0.6	0.7	0.4	0.1	0.2	0.1	0.4	0.3	0.6	0.9	0.9	1.0	1.4	0.7	1.0	0.8	-0.1	0.3	0.4	0.3	0.5	1.4
11-Jan	1.2	2.2	2.2	1.6	1.6	1.1	1.0	1.0	1.4	1.4	0.7	0.9	0.3	0.6	0.5	0.2	0.2	0.1	0.0	-0.2	-0.1	-0.2	0.1	0.3	0.8	2.2
12-Jan	0.8	0.9	1.0	0.7	0.6	0.0	-0.5	0.2	-0.5	-0.2	0.0	0.2	0.1	0.3	0.0	0.2	0.5	0.4	0.4	0.5	0.3	0.1	-0.1	0.4	0.2	1.0
13-Jan	0.2	-0.1	0.1	0.1	-0.1	-0.3	0.1	0.0	0.1	0.2	0.1	0.3	0.2	0.3	0.5	0.8	0.4	0.6	0.4	0.2	0.0	0.2	0.7	1.2	0.3	1.2
14-Jan	1.4	2.1	2.2	1.1	1.8	1.5	1.4	1.5	2.0	0.9	1.3	1.0	0.9	0.7	1.4	1.5	1.3	0.8	0.7	0.5	1.0	0.9	0.4	0.5	1.2	2.2
15-Jan	0.5	0.2	0.2	0.4	1.0	0.6	0.4	0.3	0.5	0.1	0.4	0.6	0.5	0.8	0.7	0.7	1.0	0.5	0.2	0.2	0.0	0.0	0.0	0.1	0.4	1.0
16-Jan	0.2	0.2	0.0	0.2	0.1	0.3	0.8	0.6	0.2	0.0	0.0	0.3	0.5	0.4	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.6	0.4	0.4	0.3	0.8
17-Jan	0.3	0.0	0.3	1.0	0.6	1.1	0.8	2.1	1.3	0.8	0.6	-0.3	-0.1	0.2	0.5	0.0	-0.4	0.0	0.1	-0.2	0.0	-1.0	-0.6	-0.6	0.3	2.1
18-Jan	0.3	0.1	-0.7	-0.4	-0.7	-0.5	-0.5	0.3	0.3	0.1	0.1	0.2	0.5	0.3	0.1	-0.1	0.2	0.2	0.1	0.3	0.6	0.2	0.2	0.2	0.1	0.6
19-Jan	0.1	0.0	0.0	0.1	0.6	0.9	1.1	1.0	0.4	0.5	0.6	0.7	0.8	0.7	1.0	0.5	0.5	0.7	0.6	0.6	1.5	0.2	0.7	1.1	0.6	1.5
20-Jan	0.8	1.0	1.2	0.8	0.4	0.6	0.5	0.5	0.7	0.4	0.3	0.1	0.2	0.1	0.1	0.2	0.3	0.3	0.3	-0.3	0.3	0.7	1.0	0.6	0.5	1.2
21-Jan	0.7	0.8	0.6	0.7	0.9	0.7	0.5	-0.1	0.6	0.5	0.7	0.2	-0.4	-0.2	-0.7	-1.4	-1.1	-1.8	-1.5	-0.5	0.2	-0.3	-0.1	0.4	0.0	0.9
22-Jan	0.8	0.3	-0.2	-0.1	0.3	0.4	0.6	0.6	1.2	0.9	0.6	0.3	0.5	0.7	1.0	0.9	0.7	1.2	0.6	0.6	0.5	0.6	0.7	0.6	0.6	1.2
23-Jan	0.7	0.8	0.5	0.5	-0.4	0.0	-0.1	1.1	0.3	0.1	0.2	0.7	1.7	1.2	0.8	0.6	0.7	0.5	0.4	0.7	0.4	0.4	0.4	1.1	0.6	1.7
24-Jan	0.8	0.6	0.6	0.7	0.1	0.6	0.5	0.5	0.5	0.7	0.2	0.3	0.5	-0.1	0.1	0.4	0.0	0.8	2.0	2.2	1.4	1.7	1.5	0.7	0.7	2.2
25-Jan	0.4	0.6	0.4	0.1	0.1	0.1	0.3	0.6	0.6	1.1	AF	AF	AF	AF	0.4	0.5	0.5	0.9	0.9	1.0	0.9	0.8	0.0	0.1	0.5	1.1
26-Jan	0.5	0.3	0.2	0.0	0.0	0.5	0.5	0.6	0.6	0.7	0.3	0.4	0.2	0.3	0.5	0.6	0.1	0.1	0.5	0.4	0.5	1.7	2.3	2.0	0.6	2.3
27-Jan	2.6	2.0	2.6	2.4	1.5	2.8	2.2	2.5	2.1	2.1	2.1	2.3	1.1	0.9	1.1	0.9	1.3	1.2	0.8	0.7	0.3	0.2	0.0	0.3	1.5	2.8
28-Jan	0.3	0.2	-0.8	-0.9	0.0	0.1	0.0	0.7	0.8	0.6	0.9	0.9	0.9	0.6	0.4	0.6	0.4	0.6	0.3	0.0	0.9	0.7	1.2	1.4	0.5	1.4
29-Jan	0.9	1.6	2.1	2.9	2.0	2.8	3.2	2.6	3.2	2.5	1.8	2.1	1.9	2.8	2.6	2.6	2.3	1.9	1.9	1.9	1.4	1.8	2.2	1.4	2.2	3.2
30-Jan	1.2	1.4	0.8	0.9	0.7	1.7	1.8	1.6	2.3	1.7	0.9	0.6	0.9	0.8	0.7	0.8	1.6	1.1	1.0	0.8	0.4	0.8	1.0	0.7	1.1	2.3
31-Jan	0.4	0.5	0.4	0.5	0.8	0.3	0.9	0.6	0.5	1.2	1.4	0.8	0.8	1.2	1.3	1.2	0.8	1.0	0.8	0.9	0.9	1.0	0.6	0.3	0.8	1.4
	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.7	0.8	0.7	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.6	Diurnal Average	
	2.6	2.2	2.6	2.9	2.5	2.8	3.2	2.6	3.2	2.5	2.1	2.3	1.9	2.8	2.6	2.6	2.3	2.4	2.0	2.2	2.0	1.9	2.3	2.0	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Mannix - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.1 km/h on Jan 27 03:00

Minimum Value: 0.1 km/h on Jan 16 20:00

Percentiles: P_1 = 0.2 P_{10} = 0.4 Q_1 = 0.5 Median = 0.8 Q_3 = 1.3 P_{90} = 1.8 P_{99} = 2.8

Hours in Service:	744
Hours of Data:	734
Hours of Missing Data:	10
Hours of Calibration:	0
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	1.5	1.3	1.3	1.5	2.0	1.7	1.8	1.5	0.9	0.7	2.1	2.8	2.6	2.8	2.6	2.8	2.8	2.5	1.9	1.4	1.7	1.3	1.3	0.9	2.8
2-Jan	0.2	0.4	0.4	0.5	0.6	0.5	0.5	0.7	0.5	0.4	0.5	0.8	0.6	0.6	0.6	0.6	0.4	0.3	0.8	0.6	0.4	0.4	0.3	0.4	0.8
3-Jan	0.6	0.5	0.5	0.4	0.5	0.6	0.5	0.6	0.6	0.7	0.6	0.8	0.8	0.6	0.7	0.5	0.4	0.4	0.5	0.6	0.8	0.7	0.6	0.4	0.8
4-Jan	0.3	0.2	0.2	0.2	0.5	0.3	0.3	0.4	0.5	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.7
5-Jan	0.5	0.6	0.4	0.4	0.3	0.4	0.4	0.3	0.4	0.2	0.2	0.4	0.4	0.4	0.4	0.5	0.3	0.3	0.5	0.4	0.3	0.3	0.3	0.5	0.6
6-Jan	0.2	0.2	0.3	0.2	0.4	0.9	0.5	0.8	1.7	1.5	0.4	0.3	0.4	0.5	0.5	0.7	1.0	1.4	1.5	1.6	1.7	1.8	1.6	1.4	1.8
7-Jan	1.9	2.1	1.4	2.5	2.7	1.6	1.6	1.8	2.3	1.7	1.1	1.0	0.9	1.0	0.7	0.7	0.6	0.6	0.6	0.5	0.7	0.8	0.8	0.9	2.7
8-Jan	0.8	0.7	0.8	1.1	1.0	1.2	1.4	1.6	1.5	1.7	0.9	0.6	0.9	0.8	0.4	0.3	0.4	0.5	1.3	0.7	1.0	0.9	0.7	0.7	1.7
9-Jan	0.5	0.4	0.4	0.7	1.0	1.0	1.5	AF	AF	AF	AF	AF	AF	1.6	0.7	0.6	0.4	0.5	1.6	0.6	0.8	1.4	1.1	1.0	1.6
10-Jan	0.6	0.6	0.4	0.6	0.5	0.6	0.7	0.5	0.4	0.2	0.8	0.7	0.7	1.1	1.2	1.7	1.6	1.4	1.7	1.5	0.9	0.5	0.8	0.6	1.7
11-Jan	1.2	2.0	2.7	1.8	1.2	0.7	0.6	1.4	1.7	1.3	1.0	1.1	0.9	1.0	1.3	1.0	0.8	0.4	0.4	0.4	0.2	0.2	0.4	0.6	2.7
12-Jan	0.5	0.6	0.4	0.5	0.4	0.7	0.8	0.6	0.9	0.6	0.7	0.8	0.9	0.9	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.2	0.9
13-Jan	0.6	0.8	0.7	0.9	1.1	1.1	1.0	0.9	1.0	1.0	1.3	1.2	1.0	1.3	1.1	1.3	1.1	1.0	0.8	1.2	1.1	0.9	1.2	1.3	1.3
14-Jan	1.2	1.5	2.0	1.7	1.9	2.0	1.6	2.0	2.0	1.6	2.0	1.7	1.8	1.6	2.0	1.9	1.8	1.8	1.5	1.8	1.7	1.5	0.8	1.4	2.0
15-Jan	1.1	0.9	1.1	0.5	0.9	0.7	0.8	0.9	0.6	0.5	0.4	0.7	1.2	0.9	1.1	0.9	0.4	0.6	0.3	0.3	0.6	0.9	0.6	0.3	1.2
16-Jan	0.2	0.2	0.5	0.2	0.1	0.4	0.2	0.3	0.3	0.3	0.2	0.3	0.6	0.3	0.4	0.2	0.2	0.2	0.2	0.1	0.2	0.4	0.4	0.3	0.6
17-Jan	0.2	0.1	0.5	1.6	1.2	1.6	1.8	1.8	1.2	0.3	0.5	1.1	0.8	0.5	0.4	0.9	1.1	1.1	0.7	1.2	0.9	1.8	1.4	1.1	1.8
18-Jan	0.8	1.0	1.6	1.2	1.4	1.4	1.4	1.2	1.2	1.3	1.4	1.2	1.3	0.9	0.8	0.7	0.7	0.4	0.6	1.1	1.1	0.7	0.7	0.3	1.6
19-Jan	0.3	0.2	0.1	0.3	0.3	0.3	0.4	0.7	0.8	0.8	1.3	1.3	0.9	1.1	1.6	1.2	1.0	1.0	1.0	0.6	1.0	0.8	1.0	1.4	1.6
20-Jan	1.2	1.4	1.6	1.4	1.1	1.2	0.6	0.4	0.6	0.6	0.8	0.8	1.0	1.3	0.8	0.5	0.2	0.4	0.3	0.7	0.4	0.4	0.4	0.5	1.6
21-Jan	0.4	0.5	0.7	0.7	0.4	0.4	0.5	0.7	0.6	0.5	0.4	0.8	1.1	1.2	1.7	1.8	2.2	2.3	2.2	1.5	1.0	1.2	1.4	0.6	2.3
22-Jan	1.1	0.7	0.3	0.5	0.5	0.6	0.4	0.6	0.6	1.0	0.7	0.7	0.8	0.7	0.9	1.0	0.6	0.8	1.1	1.2	0.7	0.7	0.8	0.7	1.2
23-Jan	0.7	1.0	0.6	0.6	1.7	1.7	1.7	2.1	1.3	0.4	0.2	0.7	2.0	1.9	1.7	1.5	1.3	1.2	1.1	0.9	0.8	0.8	0.6	0.5	2.1
24-Jan	0.5	0.5	0.6	0.6	0.5	0.7	0.6	0.8	0.7	1.0	1.2	1.0	1.0	0.8	0.6	0.6	0.8	0.9	1.4	1.1	1.6	1.7	1.5	1.0	1.7
25-Jan	0.7	0.6	0.6	0.3	0.6	1.1	1.2	1.0	1.2	1.7	AF	AF	AF	AF	1.4	0.7	0.5	0.9	0.5	0.5	0.6	0.6	0.8	1.0	1.7
26-Jan	0.7	0.8	0.8	0.5	0.4	0.5	0.4	0.4	0.7	0.5	0.9	0.5	0.4	0.3	0.4	0.8	0.9	1.2	1.7	1.7	2.5	4.0	3.9	3.6	4.0
27-Jan	3.9	3.3	4.1	3.0	2.4	1.9	1.7	2.4	2.0	2.1	2.1	1.9	1.3	0.9	1.2	1.0	1.2	1.1	0.7	0.4	0.2	0.3	0.6	0.4	4.1
28-Jan	0.7	0.6	1.3	1.2	1.3	0.9	0.8	0.6	0.5	0.6	0.9	0.8	0.7	0.5	0.4	0.7	0.6	0.9	0.8	1.0	2.6	2.8	2.7	2.6	2.8
29-Jan	2.6	2.9	2.6	2.0	1.0	1.8	2.1	2.3	1.5	0.8	1.6	1.7	1.7	2.1	1.6	1.8	1.3	0.9	0.9	1.3	1.0	1.1	0.7	0.6	2.9
30-Jan	0.5	0.9	1.1	1.2	0.8	0.9	1.0	1.0	0.5	0.9	1.4	1.7	1.0	1.4	1.3	1.6	1.6	1.4	1.8	2.0	1.7	1.8	1.5	1.5	2.0
31-Jan	1.5	1.4	1.4	1.4	1.4	1.5	1.4	1.2	1.8	2.1	2.0	2.1	1.8	2.1	2.1	2.0	1.8	1.8	1.7	1.5	1.4	1.6	1.2	0.9	2.1
	3.9	3.3	4.1	3.0	2.7	2.0	2.1	2.4	2.3	2.1	2.1	2.8	2.6	2.8	2.6	2.8	2.8	2.5	2.2	2.0	2.6	4.0	3.9	3.6	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 12, 2016	Last Calibration	December 2, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:50 MST
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-634
Analyzer IP address	192.168.1.43		Lamp voltage	823	827
Calculated slope	1.001811	0.996194	Chamber temp	44.8	45.0
Calculated intercept	0.481454	0.500873	Pressure	682.7	688.2
Analyzer Background	7.5	7.5	Flow	0.487	0.492
Analyzer Coefficient	0.995	0.995	Intensity	90	90

Analyzer make	TEI 43i	Analyzer serial #	1008841399

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	60.0	600.0	601.2	0.998
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.0	600.0	601.2	0.998
second point	5000	30.0	300.0	302.7	0.991
third point	5000	15.0	150.0	148.2	1.012
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.0	600.0	605.6	0.991
				Average Correction Factor	1.000

Corrected As found	601.3	Previous response	598.4	% change	-0.5%

Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By: Evan Magill

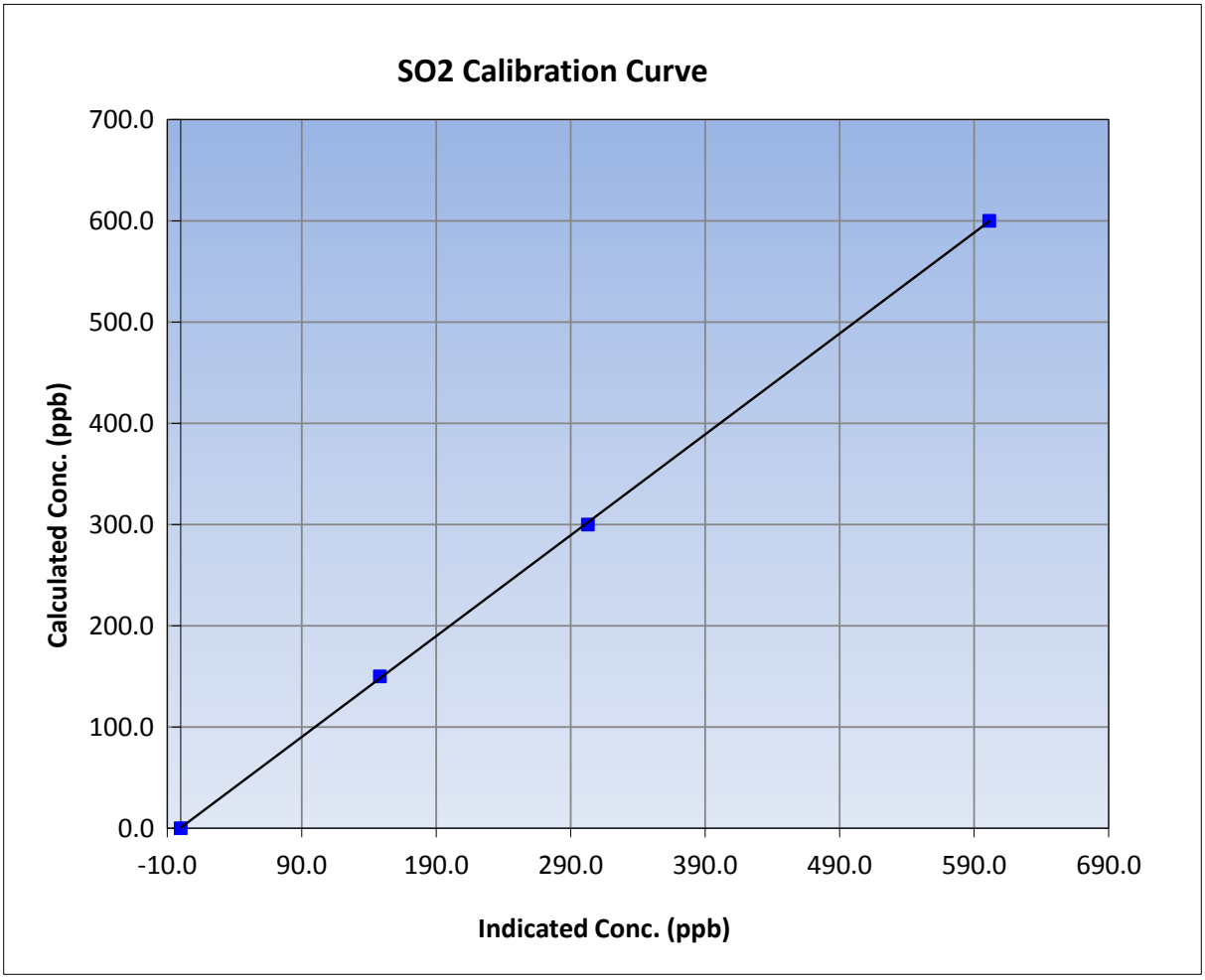
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

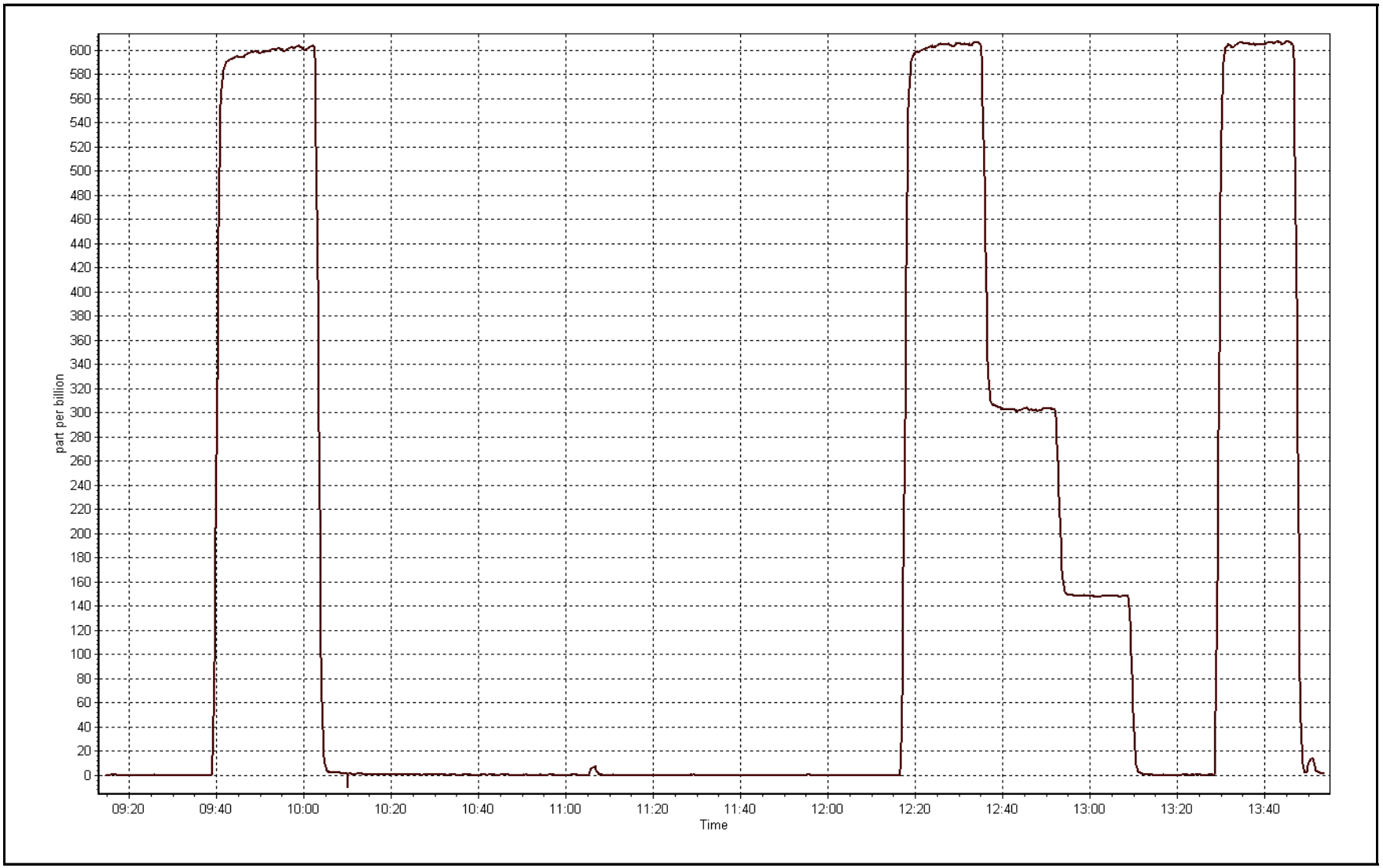
Calibration Date	January 12, 2016	Previous Calibration	December 2, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:20	End Time (MST)	
Analyzer make	TEI 43i	Analyzer serial #	1008841399

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999959
600.0	601.2	0.9979		
300.0	302.7	0.9912	Slope	0.996194
150.0	148.2	1.0123		
			Intercept	0.500873



SO2 Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 7, 2016	Last Calibration	December 2, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	15:10
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	138
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 09-Sep-17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-657	-657
Analyzer IP address	192.168.1.42		Lamp voltage	812	817
Calculated slope	1.003028	0.993518	Chamber temp	45	45
Calculated intercept	-0.494372	0.435253	Pressure	511.0	515.6
Analyzer Background	19.2	22.2	Flow	1.057	1.054
Analyzer Coefficient	1.254	1.275	Intensity	90	91
			Converter temp.	323	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	0.4	----
as found span	5000	74.4	75.0	75.6	0.992
SO2 scrubber check	5000	15.0	150.0	2.7	----
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	74.4	75.0	75.1	0.999
second point	5000	41.6	41.9	41.9	1.001
third point	5000	24.8	25.0	24.5	1.019
as left zero	5000	0.0	0.0	-1.0	----
as left span	5000	74.4	75.0	75.1	0.999
				Average Correction Factor	1.006

Corrected As found	75.1	Previous response	75.3	% change	0.2%

Notes:

Changed inlet filter and scrubber check done after as founds. Replaced the SOx scrubber with a teflon type. Conducted 2nd scrubber check (0.8 ppb) with new Sox scrubber after the calibrator zero. Adjusted zero and span.

Calibration Performed By: Evan Magill

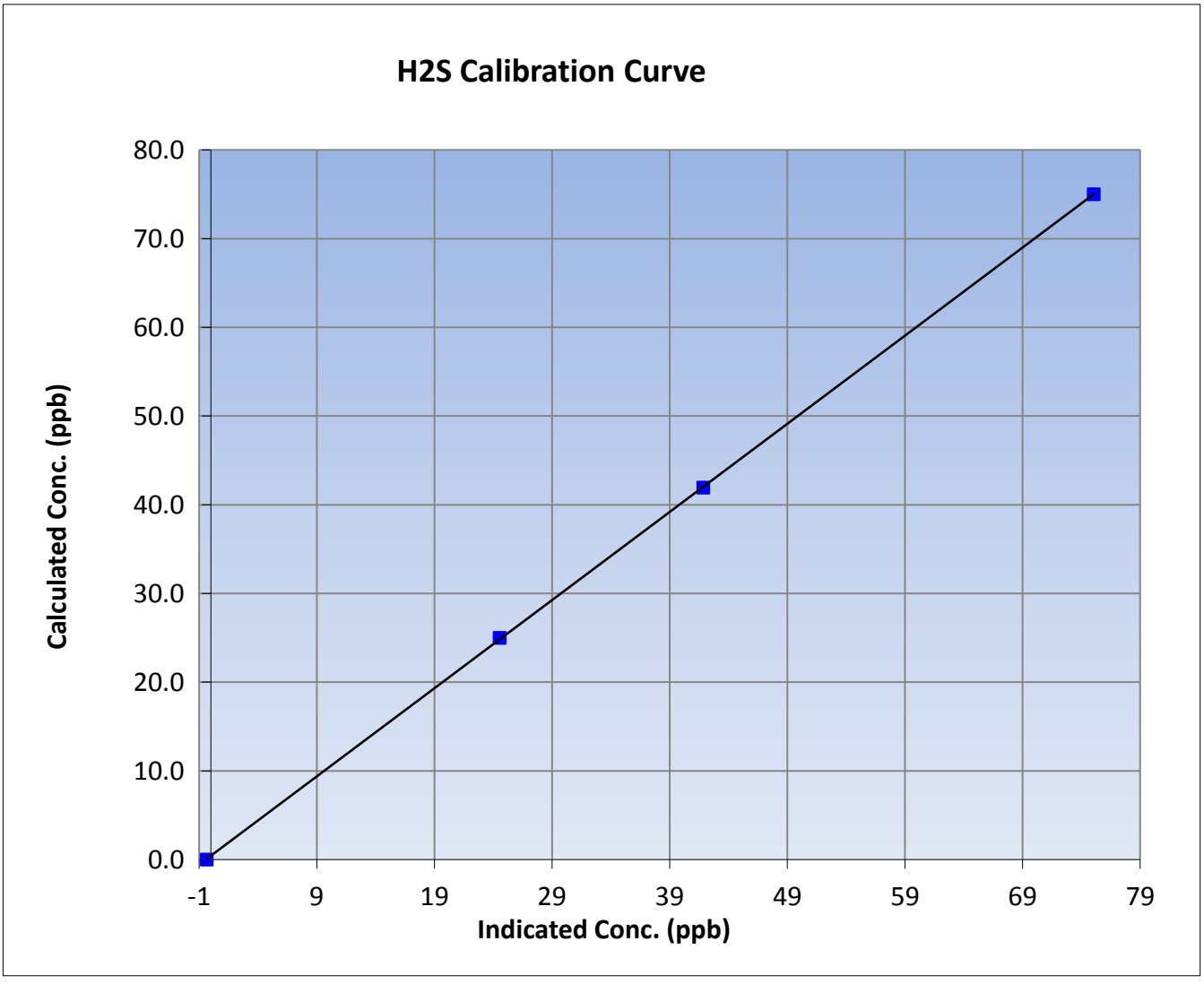
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

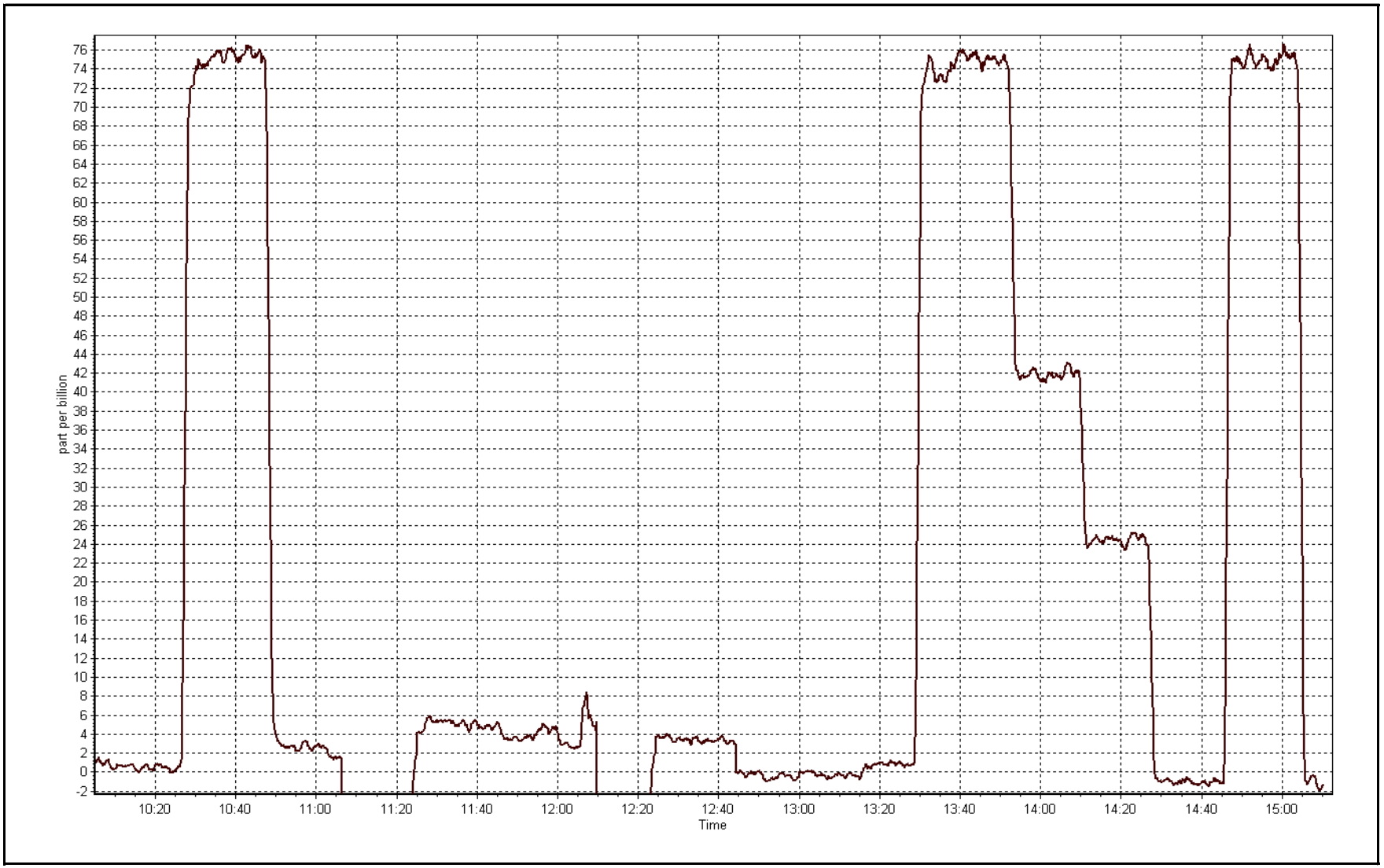
Calibration Date	January 7, 2016	Previous Calibration	December 2, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	10:05	End Time (MST)	15:10
Analyzer make	Thermo 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999983
75.0	75.1	0.9993		
41.9	41.9	1.0015	Slope	0.993518
25.0	24.5	1.0187		
			Intercept	0.435253



H2S Calibration Plot Date: January 7, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 8, 2016	Last Calibration	January 7, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	17:00
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	138
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 09-Sep-17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-657	-657
Analyzer IP address	192.168.1.42		Lamp voltage	817	816
Calculated slope	0.993518	0.991257	Chamber temp	45	45
Calculated intercept	0.435253	0.111066	Pressure	515.6	516.5
Analyzer Background	22.2	19.6	Flow	1.054	1.064
Analyzer Coefficient	1.275	0.956	Intensity	91	103
			Converter temp.	325	45

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	-1.9	----
as found span	5000	74.4	75.0	75.0	1.000
SO2 scrubber check	5000	15.0	150.0	-0.3	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.4	75.0	75.5	0.993
second point	5000	41.6	41.9	42.4	0.989
third point	5000	24.8	25.0	24.9	1.003
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	74.4	75.0	75.9	0.988
				Average Correction Factor	0.995

Corrected As found	76.8	Previous response	75.0	% change	-2.3%

Notes:

Scrubber check done after as founds. Attempted to address the noisy response by replacing the trigger pack then the lamp. Both did not have any effect on the noise. Adjusted flash voltage back to the pre-calibration value, restoring coefficient near to value of 1.0.

Calibration Performed By: Evan Magill

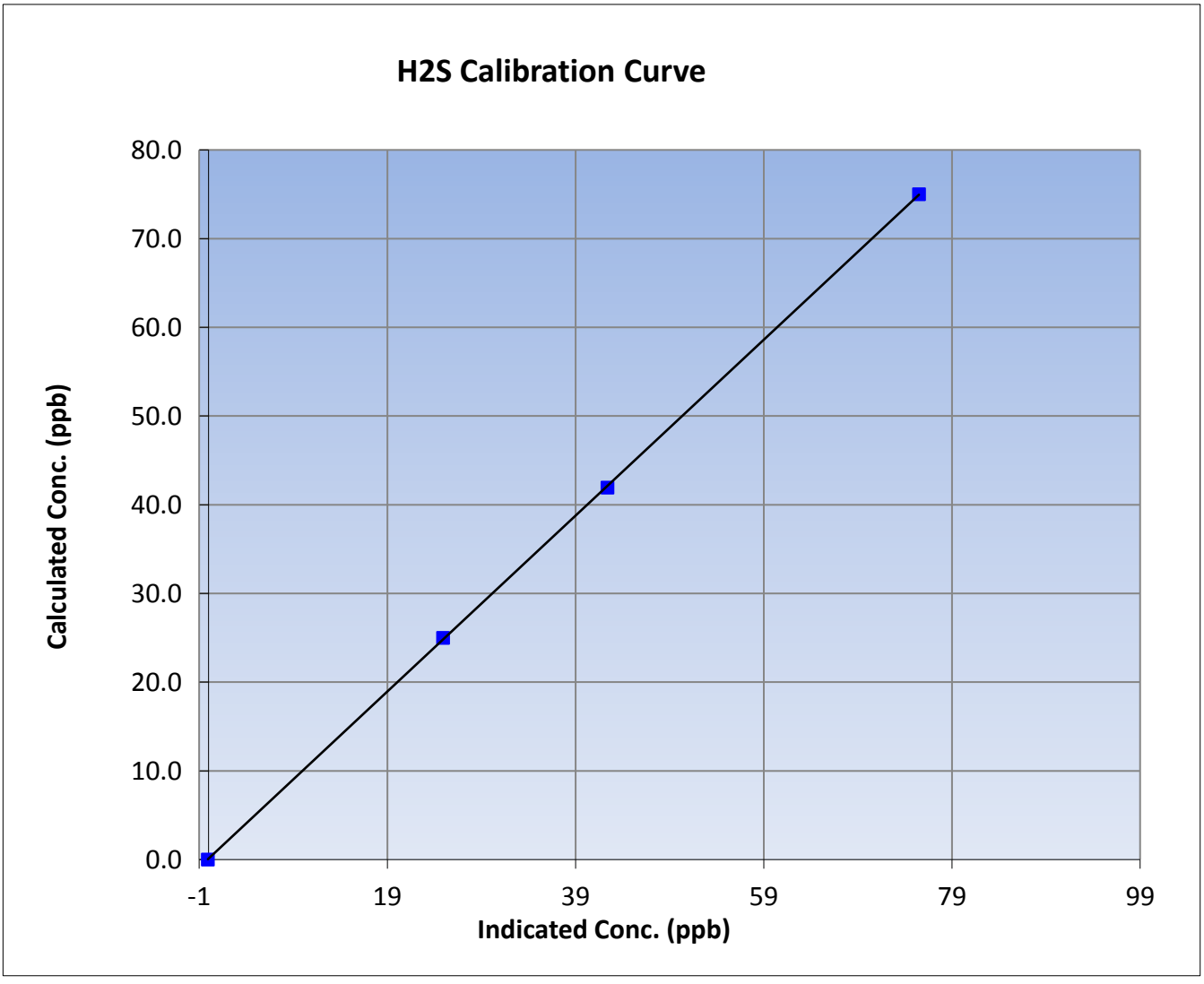
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

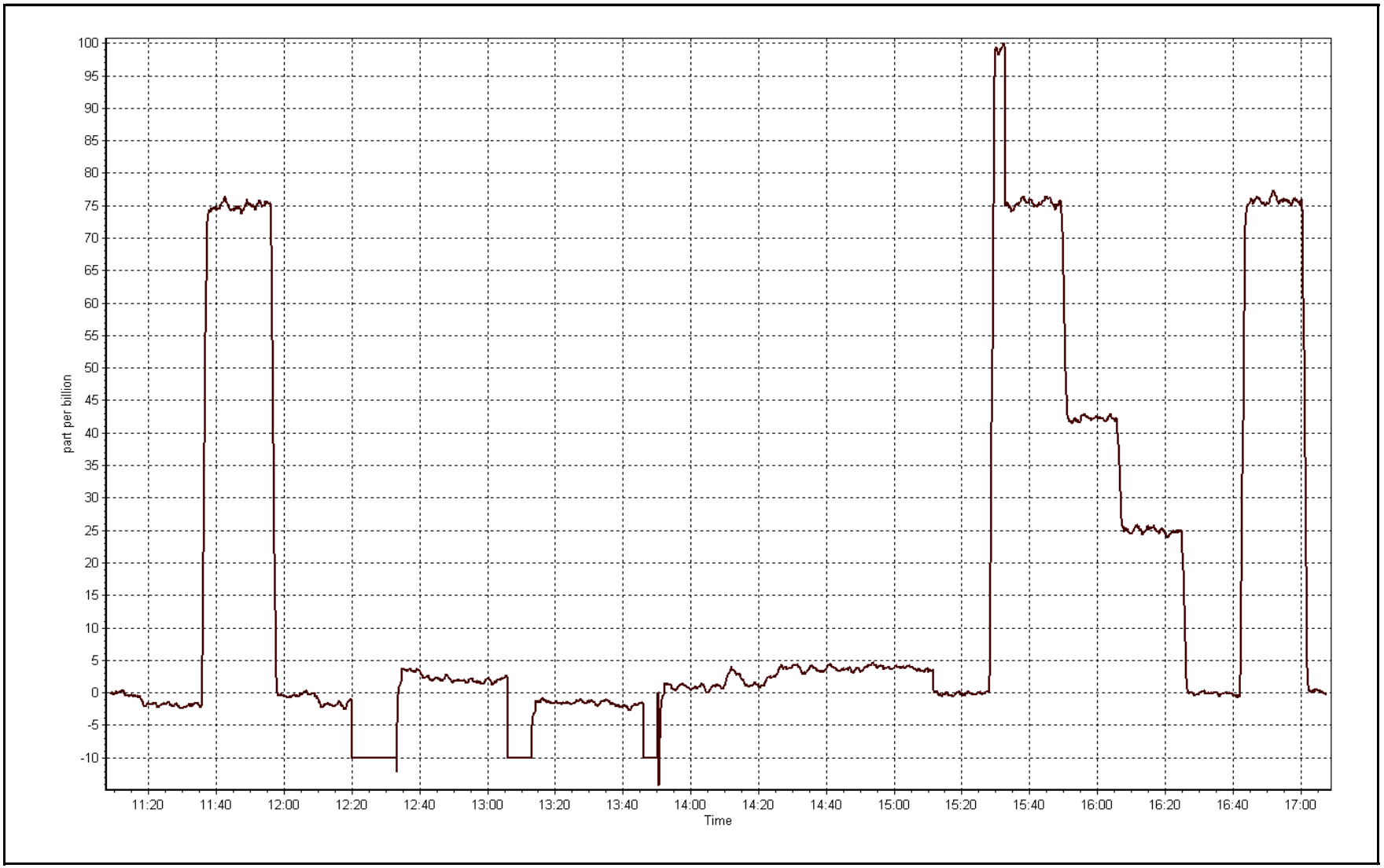
Calibration Date	January 8, 2016	Previous Calibration	January 7, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:10	End Time (MST)	17:00
Analyzer make	Thermo 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999975
75.0	75.5	0.9933		
41.9	42.4	0.9894	Slope	0.991257
25.0	24.9	1.0031		
			Intercept	0.111066



H2S Calibration Plot Date: January 8, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-12-16	Last Calibration	December-02-15
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:50
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	0.992752	1.006460	Fuel Pressure	20.2	20.2
Calculated intercept	0.053893	0.022166	Analyzer Coeff	3.9	3.4
			Analyzer BKG	3.240	2.850
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	0.02	----
as found span	5000	60.0	12.46	12.57	0.991
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	60.0	12.46	12.36	1.008
second point	5000	30.0	6.23	6.16	1.011
third point	5000	15.0	3.11	3.06	1.018
as left zero	5000	0.0	0.00	-0.06	----
as left span	5000	60.0	12.46	12.38	1.006
				Average Correction Factor	1.012

Corrected As found	12.55	Previous response	12.49	% change	-0.5%

Notes:

Changed inlet filter after as founds. Changed pump after as founds and allowed analyzer an hour to warm up and stabilize after pump change. Small adjustment on zero and large adjustment on span because of new pump.

Calibration Performed By: Evan Magill

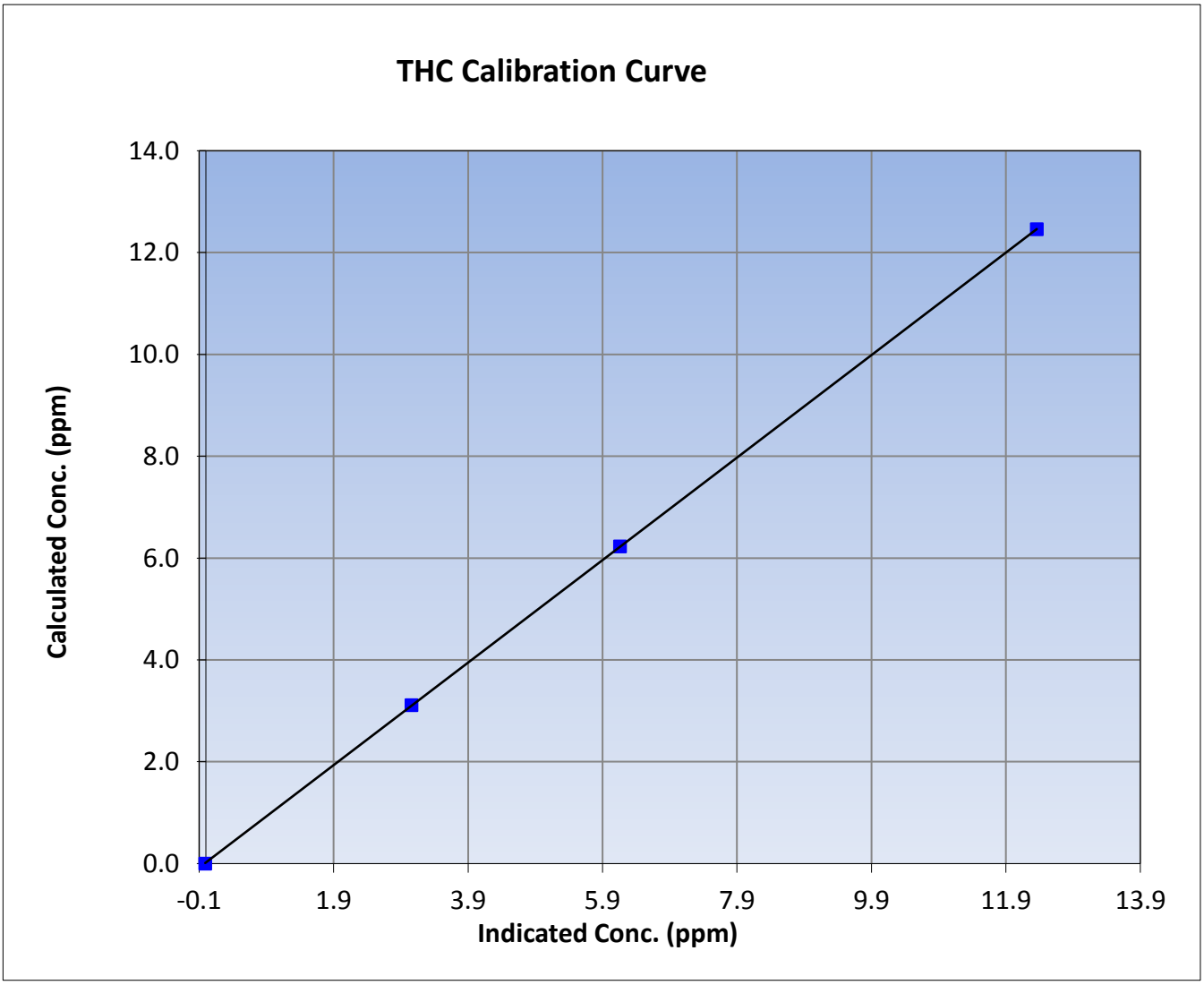
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

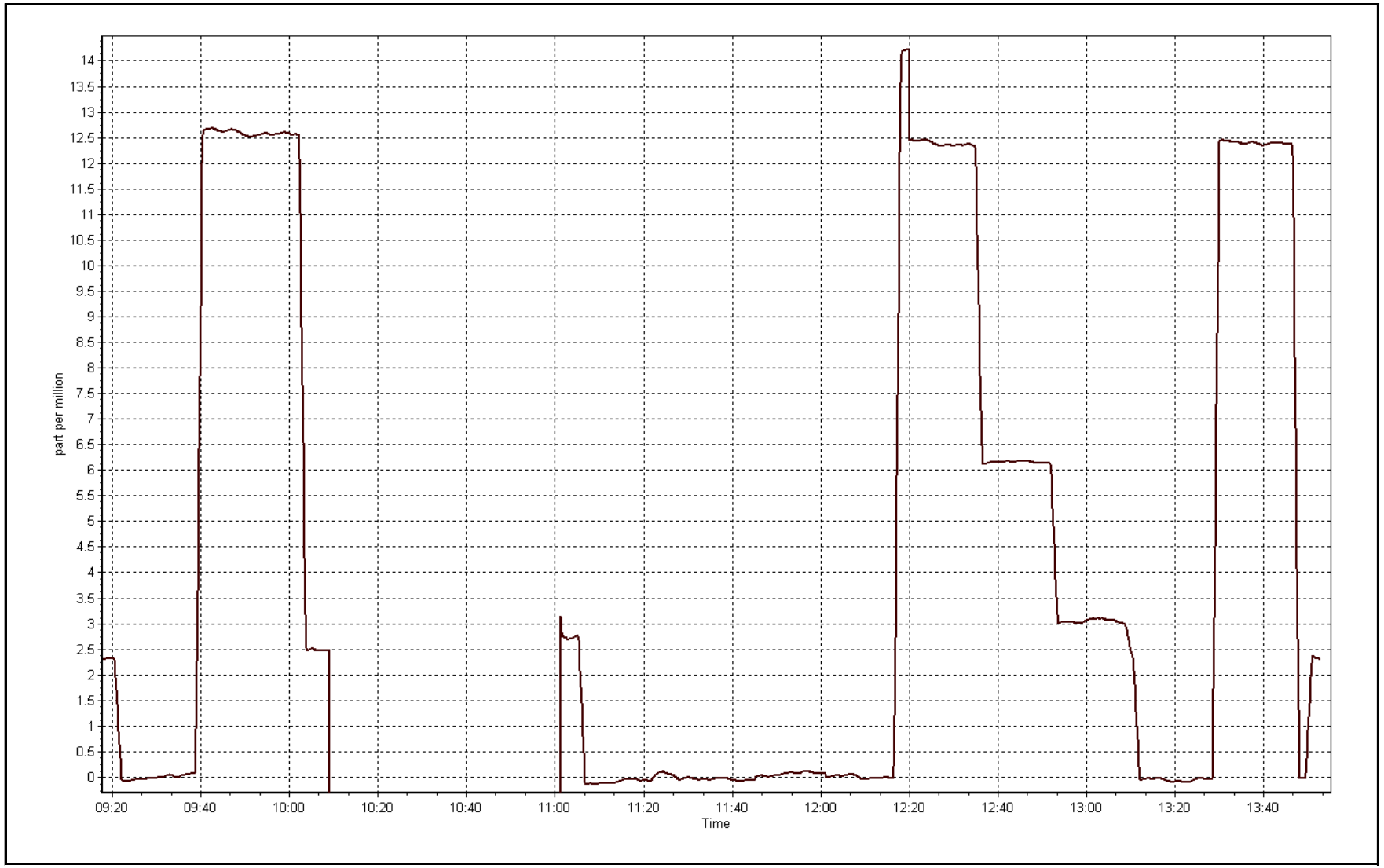
Calibration Date	January 12, 2016	Previous Calibration	December 2, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:20	End Time (MST)	13:50
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999996
12.46	12.36	1.0078		
6.23	6.16	1.0110	Slope	1.006460
3.11	3.06	1.0176		
			Intercept	0.022166



THC Calibration Plot Date: January 12, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
JANUARY 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	36	0	5	0
TRS (ppb) Average	705	35	39	99.46	1	0	1	0
THC (ppm) Average	706	36	38	99.73	3.3	-	2.6	-
NMHC(ppm) Average	706	36	38	99.73	0.307	-	0.102	-
CH4(ppm) Average	706	36	38	99.73	3	-	2.5	-
O3 (ppb) Average	705	35	39	99.46	43	0	38	-
NO2 (ppb) Average	704	36	40	99.46	41	0	22	-
NO (ppb) Average	704	36	40	99.46	74	-	26	-
NOX (ppb) Average	704	36	40	99.46	108	-	48	-
NH3 (ppb) Average	668	41	76	95.30	11	0	0	-
PM2.5 (ug/m3) Average	742	2	2	100.00	81.1	-	15.7	0
Temperature 2 m (C) Average	744	0	0	100.00	6.3	-	3.3	-
Relative Humidity (%) Average	744	0	0	100.00	93	-	87	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	33	-	16	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1	2	-	0	0	0	0	1	3	36
TRS (ppb) Average	705	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	706	2.11	0.2	-	1.9	2	2	2.1	2.2	2.3	3.3
NMHC(ppm) Average	706	0.006	0.033	-	0	0	0	0	0	0	0.307
CH4(ppm) Average	706	2.1	0.2	-	1.9	2	2	2.1	2.2	2.3	3
O3 (ppb) Average	705	19.4	11	-	2	5	10	19	27	34	43
NO2 (ppb) Average	704	10.9	8	-	0	2	5	9	16	22	41
NO (ppb) Average	704	5.3	10	-	0	0	0	2	6	12	74
NOX (ppb) Average	704	16.2	16	-	0	2	6	12	21	34	108
NH3 (ppb) Average	668	0	0	-	0	0	0	0	0	0	11
PM2.5 (ug/m3) Average	742	5.68	5.9	-	0.3	0.9	2	3.9	7.6	12.5	81.1
Temperature 2 m (C) Average	744	-12.65	8.3	-	-34.2	-21.7	-18	-13.3	-7.7	-1.4	6.3
Relative Humidity (%) Average	744	78.2	8	-	46	68	74	80	84	88	93
Wind Speed 10 m (km/h) Average	744	7.9	5	-	0	3	4	7	10	15	33
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS, O3, NOX, NH3	11 Jan 2016 12:00	11 Jan 2016 15:00	4	Maintenance - sample manifold cleaned
THC	15 Jan 2016 15:00	15 Jan 2016 16:00	2	Maintenance - replaced carrier gas
NH3	01 Jan 2016 04:00	31 Jan 2016 05:00	31	Stabilization after daily span

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 36 ppb on Jan 6 17:00

Maximum Daily Average: 4.9 ppb on Jan 14

Minimum Value: 0 ppb on Jan 1 16:00

Minimum Daily Average: 0.0 ppb on Jan 29

Maximum Diurnal Average: 2.2 ppb at hour 17

Minimum Diurnal Average: 0.3 ppb at hour 3

Monthly Average: 1.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 3$ $P_{99} = 11$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	1	0.5	2
4-Jan	1	1	0	Z	0	0	0	0	0	0	1	1	2	2	2	4	1	1	0	0	0	0	0	0	0.7	4
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	3	3	0.8	5
6-Jan	2	1	1	1	1	Z	1	1	1	2	3	3	3	3	1	10	36	12	6	1	2	4	6	5	4.5	36
7-Jan	Z	2	0	0	1	0	0	0	0	1	4	1	1	5	3	2	1	0	0	0	0	0	0	0	1.0	5
8-Jan	0	Z	0	0	0	0	2	3	4	6	6	6	3	2	1	1	1	1	1	1	1	2	1	1	1.9	6
9-Jan	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.5	1
10-Jan	0	0	0	Z	0	0	0	1	0	0	0	1	1	0	1	2	5	4	4	2	6	5	4	2	1.7	6
11-Jan	2	2	2	1	Z	1	1	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.6	2
12-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Jan	6	7	Z	7	6	5	2	1	4	3	18	20	10	9	2	6	3	0	0	0	0	0	0	0	4.9	20
15-Jan	0	0	0	Z	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	2	8	4	2	1	1	1	1	0	0	0.9	8
17-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	2	1	1	1	1	1	1	1	1	0	1	1	0.6	2
18-Jan	Z	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
19-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	2	4	4	1	2	2	1	2	1	0	0	1.1	4
20-Jan	0	0	Z	6	5	3	3	5	5	5	2	2	2	1	1	1	0	0	0	0	0	0	0	0	1.8	6
21-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	1	1	1	1	1	0.7	2
22-Jan	1	0	0	0	Z	1	1	0	1	0	0	1	2	2	2	2	2	2	2	1	1	0	1	1	1.0	2
23-Jan	1	1	1	1	2	Z	2	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	1.0	2
24-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	17	1.3	17
25-Jan	11	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	11
26-Jan	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	4	0	5	6	3	2	2	1	1.1	6
28-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	2	3	4	5	7	0	0	0	0	0	0	0	2	1.0	7
31-Jan	1	Z	0	0	0	0	0	0	0	0	2	7	2	7	6	13	3	3	3	2	2	0	0	0	2.2	13
	1.1	0.7	0.3	0.8	0.7	0.5	0.5	0.5	0.7	0.7	1.4	1.7	1.2	1.4	1.2	2.2	2.2	1.1	1.0	0.7	0.9	0.9	1.0	1.2	Diurnal Average	
	11	7	2	7	6	5	3	5	5	6	18	20	10	9	6	13	36	12	6	6	6	5	8	17	Diurnal Maximum	

Z - zerospan C - Calibration

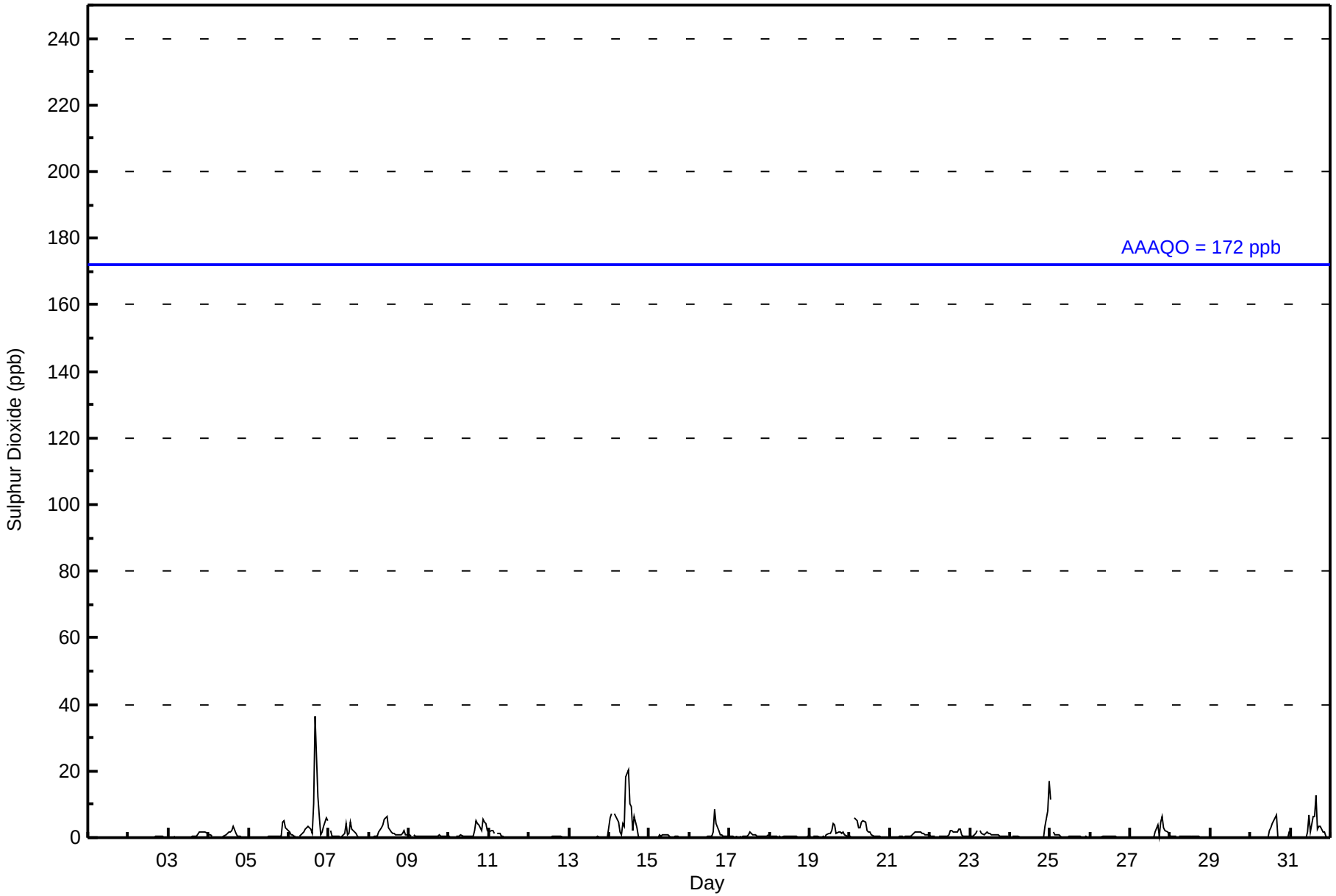
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - January 2016



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

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	103	19	8	11	12	23	83	55	54	64	55	49	42	29	20	74	701
11 - 20	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6
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	108	19	8	11	12	23	83	55	54	64	55	49	42	29	20	76	708

Total Number of Valid Hours: 708

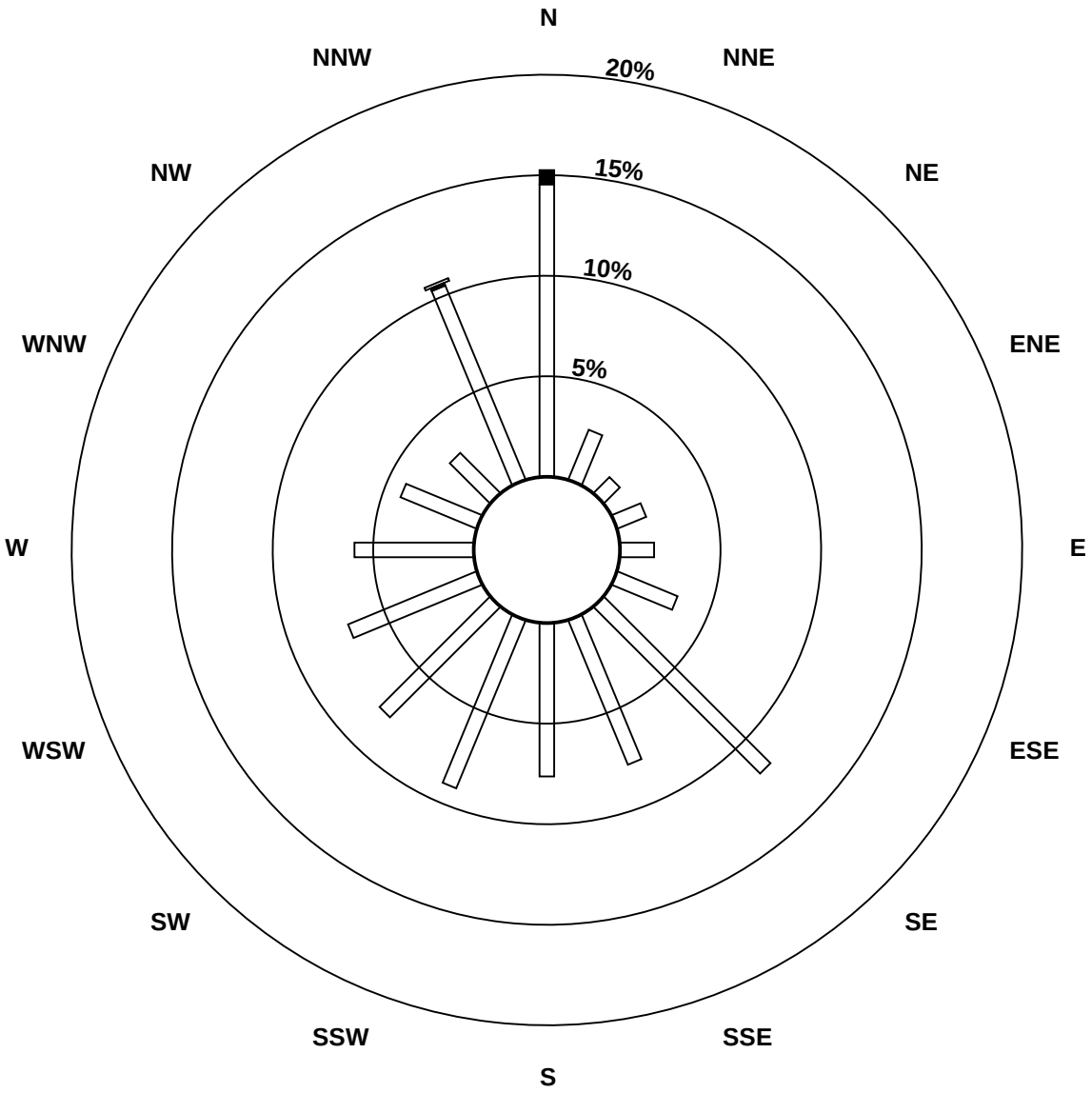
Total Number of Hours: 744

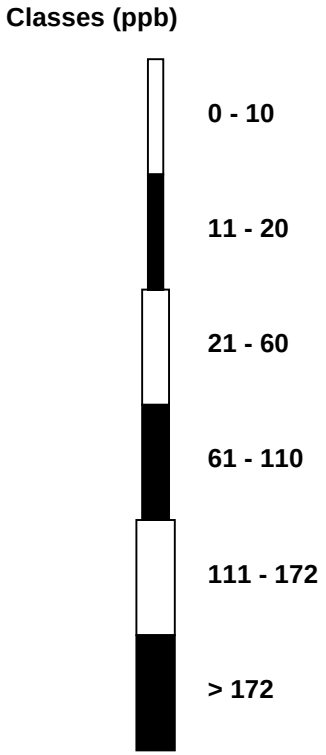
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes (AMS 6)





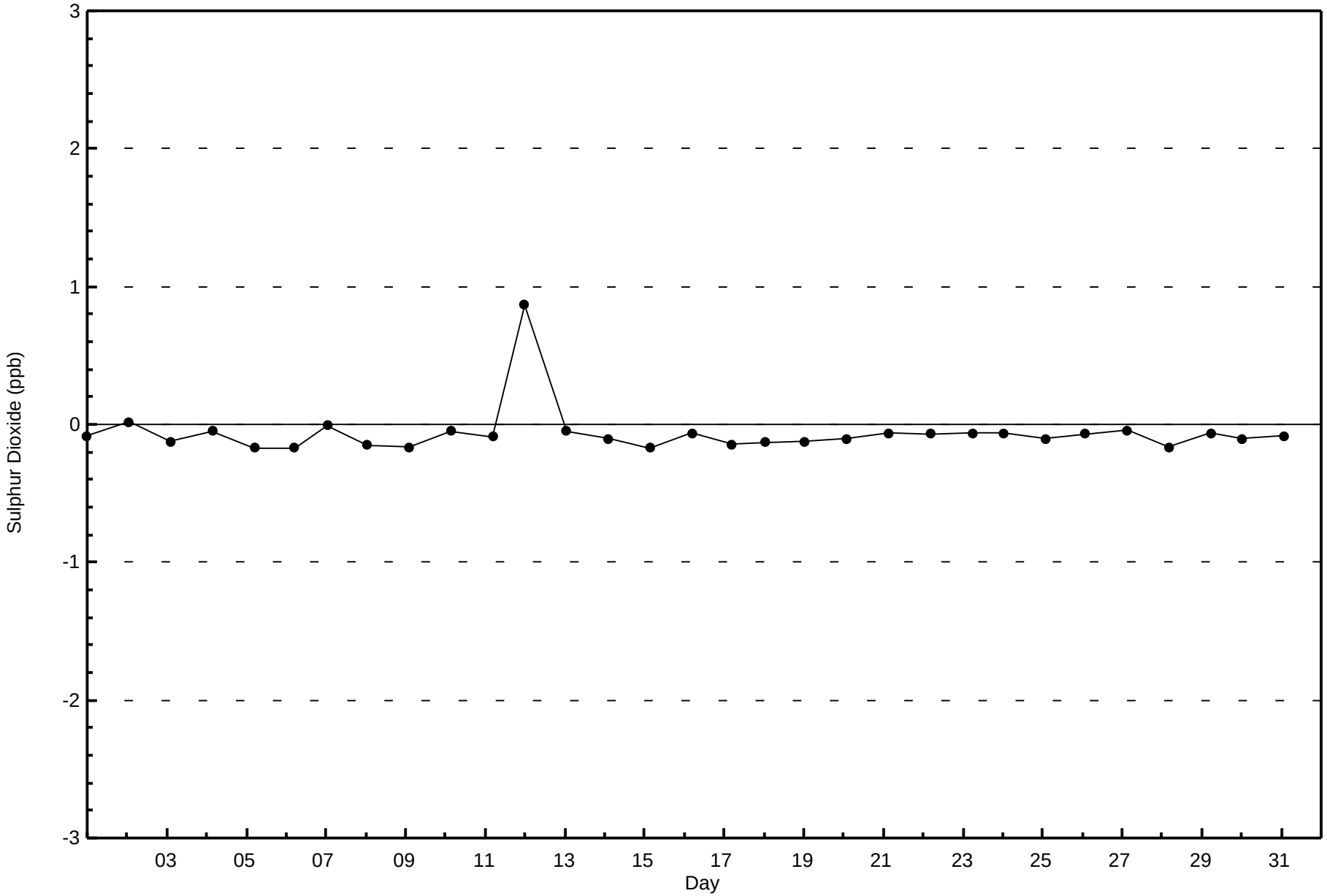
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - January 2016

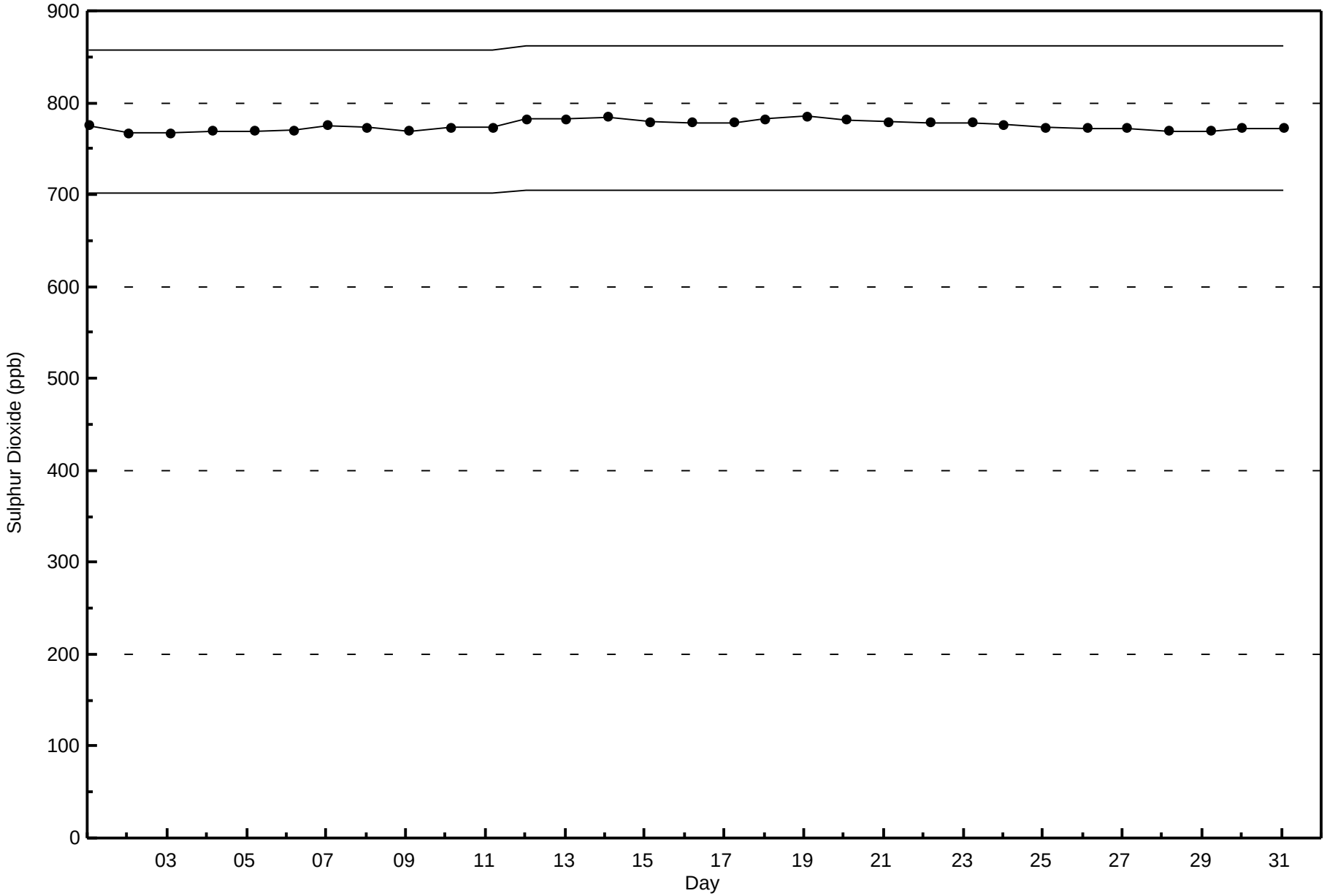


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Jan 25 00:00 Maximum Daily Average: 0.7 ppb on Jan 6

Minimum Value: 0 ppb on Jan 27 07:00 Minimum Daily Average: 0.1 ppb on Jan 29

Maximum Diurnal Average: 0.3 ppb at hour 17 Minimum Diurnal Average: 0.2 ppb at hour 7

Monthly Average: 0.3 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	35
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
5-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1
6-Jan	1	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.7	1
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
10-Jan	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.4	1
11-Jan	0	1	1	0	0	Z	0	0	0	0	0	M	M	M	M	0	0	0	0	0	0	0	0	0	0.3	1
12-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Jan	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.3	1
17-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Jan	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Jan	0	0	Z	0	0	0	0	0	0	C	C	C	C	1	1	1	1	1	1	0	0	0	0	0	0.4	1
20-Jan	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
23-Jan	0	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
25-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
28-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average	
	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

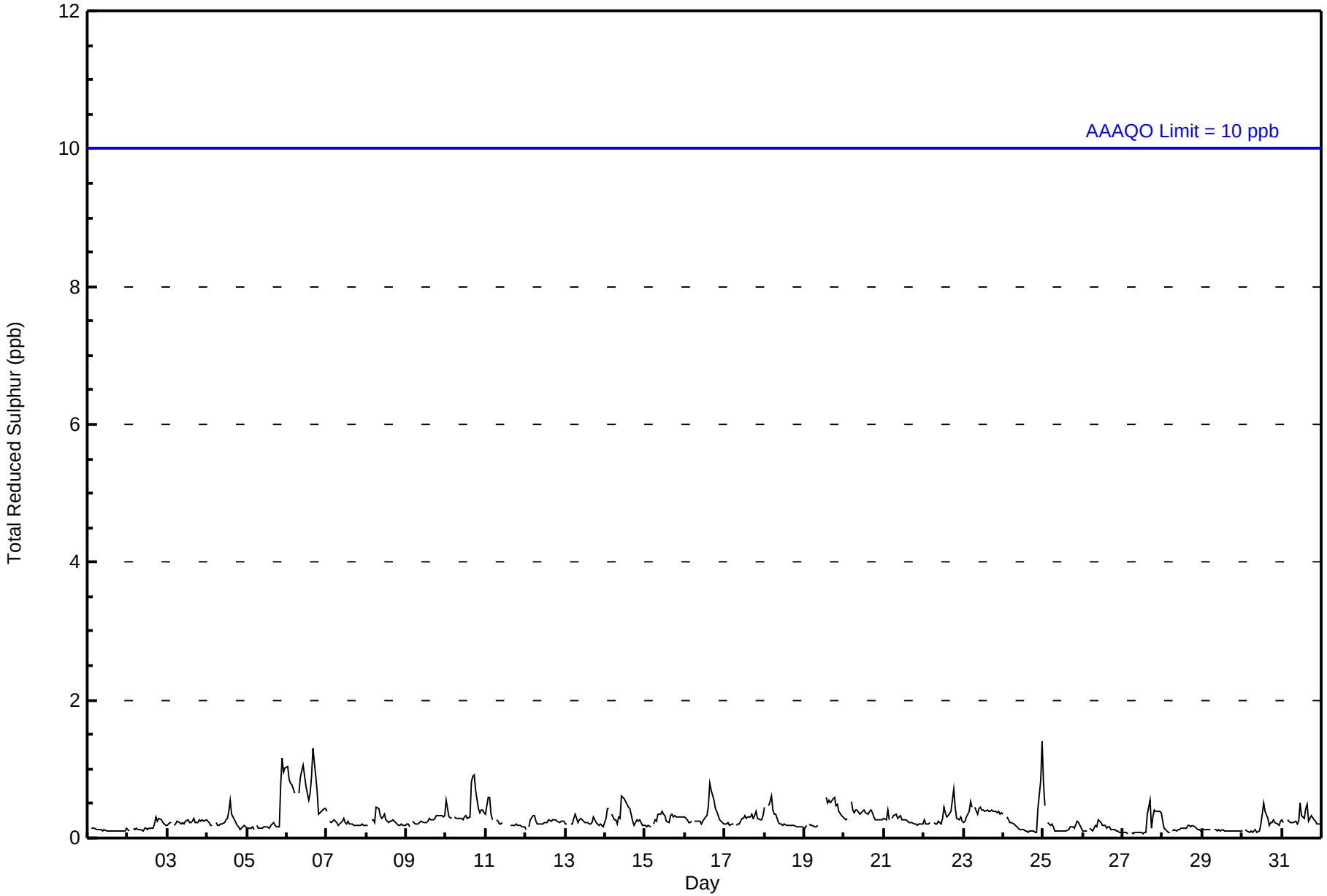
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - January 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

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	108	18	8	11	12	22	83	55	56	64	56	47	44	27	22	72	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	108	18	8	11	12	22	83	55	56	64	56	47	44	27	22	72	705

Total Number of Valid Hours: 705

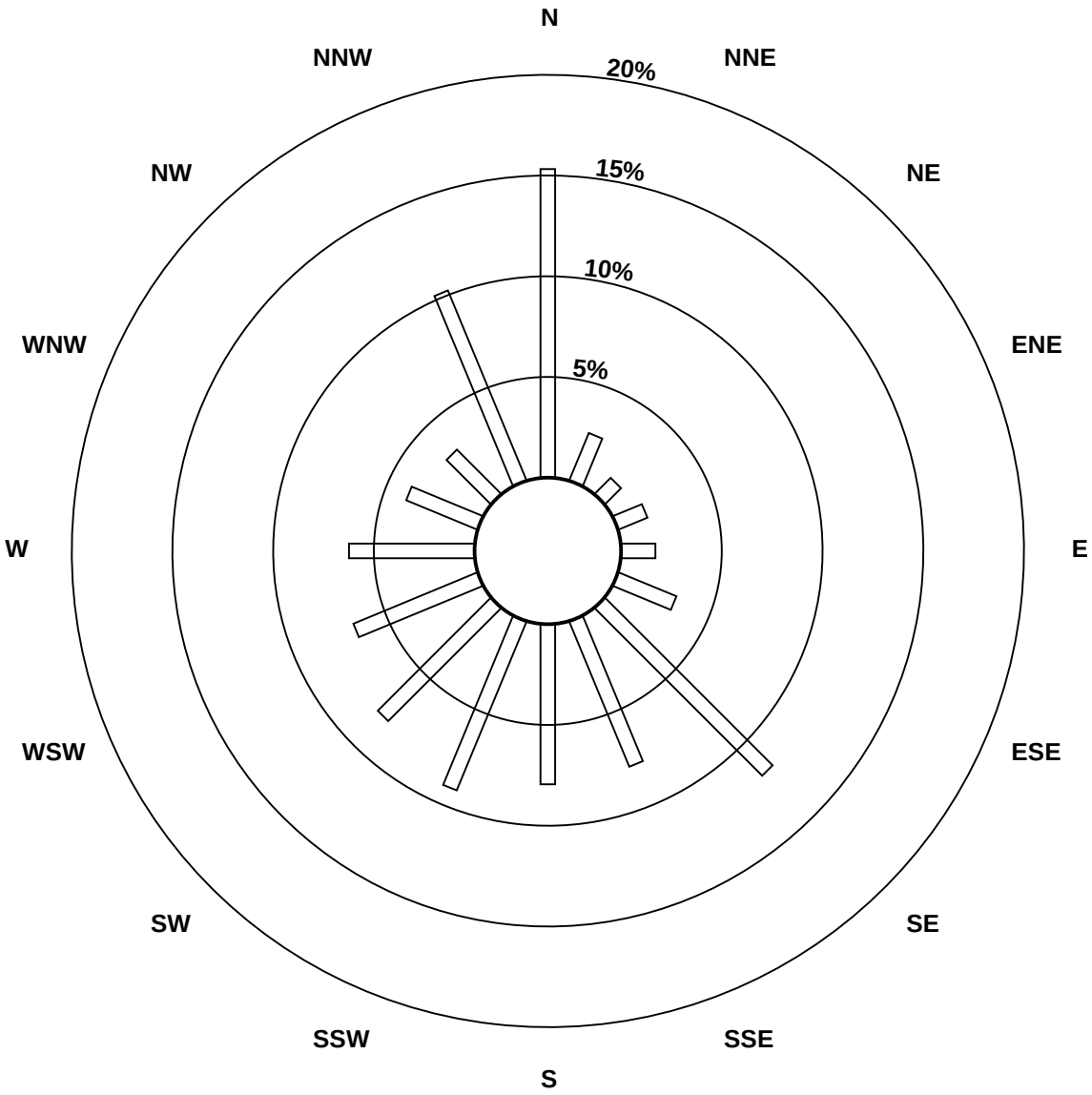
Total Number of Hours: 744

Wood Buffalo Environmental Association

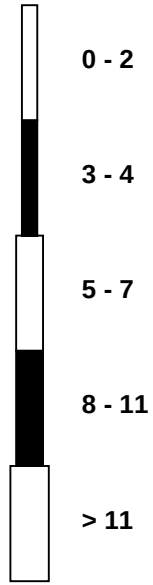
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



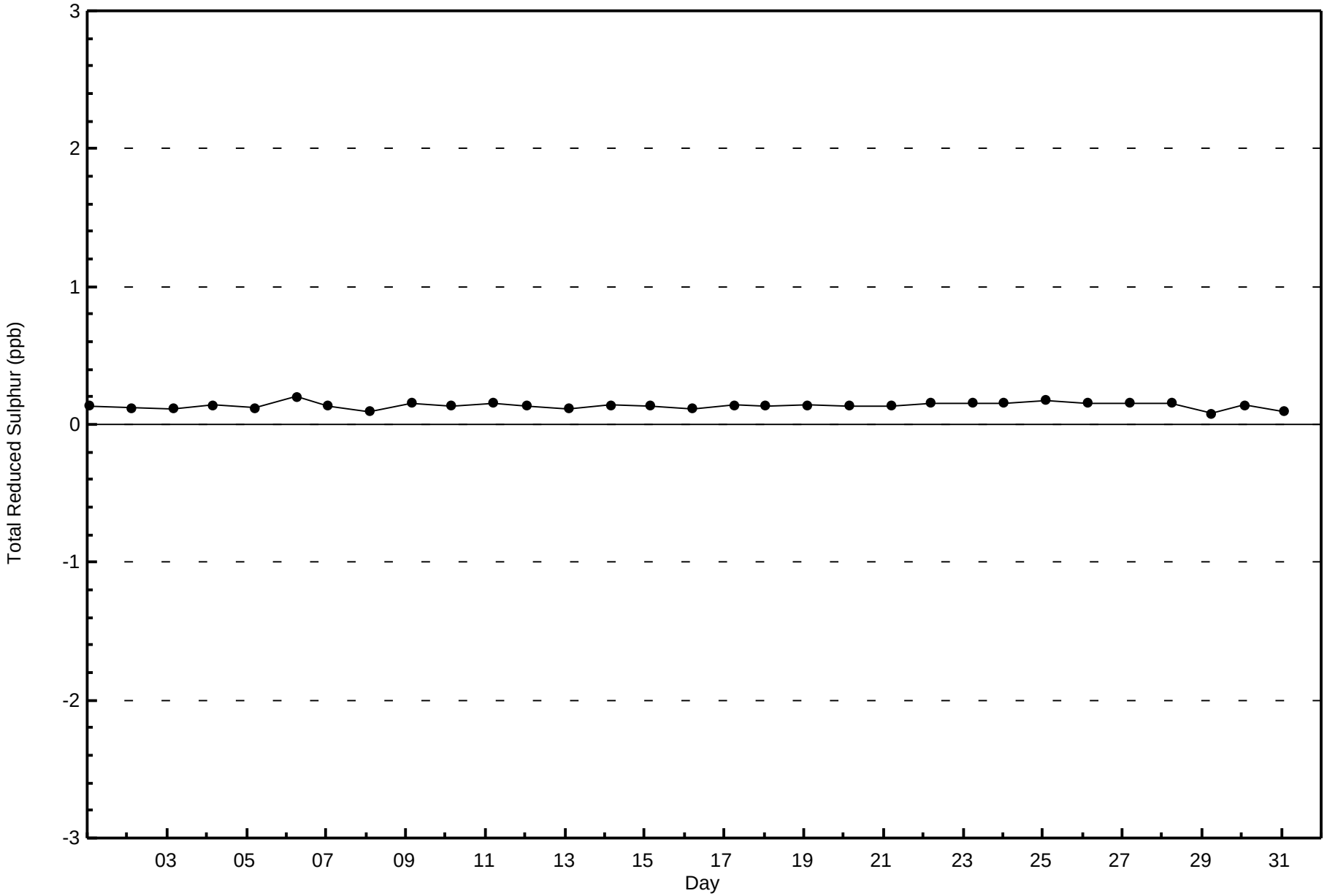
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - January 2016

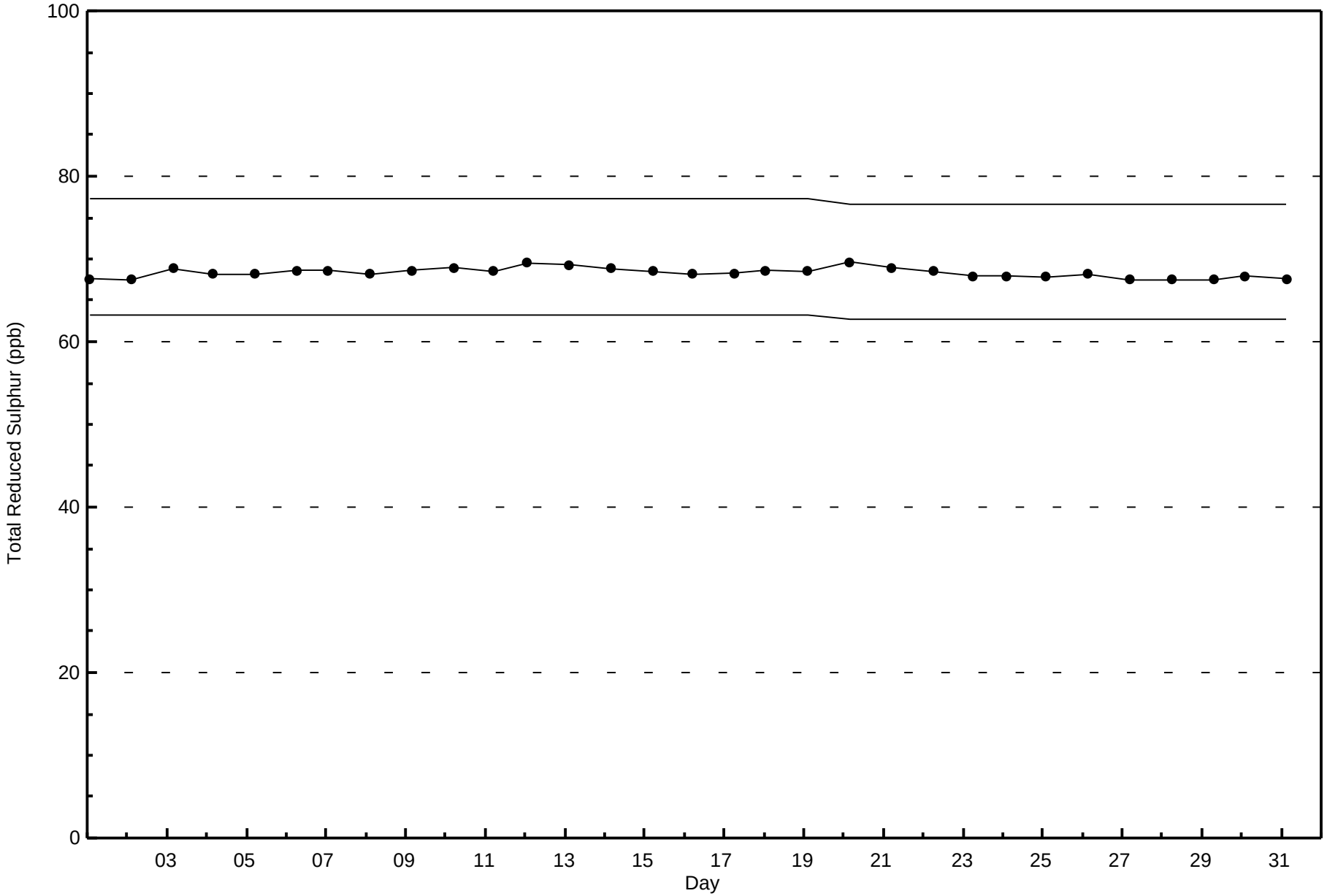


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Patricia McInnes - January 2016

Maximum Value: 3.3 ppm on Jan 6 10:00

Maximum Daily Average: 2.6 ppm on Jan 6

Minimum Value: 1.9 ppm on Jan 29 11:00

Minimum Daily Average: 1.9 ppm on Jan 29

Maximum Diurnal Average: 2.1 ppm at hour 11

Minimum Diurnal Average: 2.1 ppm at hour 6

Monthly Average: 2.11 ppm

Percentiles: P_1 = 1.9 P_{10} = 2.0 Q_1 = 2.0 Median = 2.1 Q_3 = 2.2 P_{90} = 2.3 P_{99} = 2.9

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2
3-Jan	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.3
4-Jan	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.5	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.2	2.5
5-Jan	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.4	2.5	2.7	3.1	2.2	3.1
6-Jan	3.0	2.9	2.9	2.9	2.9	Z	2.9	2.9	3.3	3.3	3.1	2.5	2.4	2.3	2.4	2.3	2.4	2.4	2.3	2.2	2.1	2.2	2.1	2.1	2.6	3.3
7-Jan	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
8-Jan	2.0	Z	2.0	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2
9-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.1	2.3
10-Jan	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.5	2.7	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.7
11-Jan	2.1	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.0	2.0	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2
12-Jan	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1
13-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
14-Jan	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
15-Jan	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	M	M	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2
16-Jan	2.2	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2
17-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1
18-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
19-Jan	2.1	Z	2.1	2.1	2.2	2.3	2.3	2.3	2.2	2.2	2.3	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	2.4
20-Jan	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
21-Jan	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.4
22-Jan	2.4	2.4	2.4	2.4	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.5	2.6	2.5	2.4	2.4	2.5	2.6	2.5	2.3	2.2	2.2	2.2	2.2	2.4	2.6
23-Jan	2.2	2.2	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4
24-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.2	2.1	2.1	2.3
25-Jan	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
26-Jan	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2
27-Jan	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.2
28-Jan	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.3	2.2	2.1	2.0	2.0	1.9	1.9	2.1	2.3
29-Jan	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
30-Jan	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
31-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
	3.0	2.9	2.9	2.9	2.9	2.3	2.9	2.9	3.3	3.3	3.1	2.5	2.6	2.5	2.5	2.5	2.5	2.7	2.5	2.3	2.4	2.5	2.7	3.1	Diurnal Maximum	

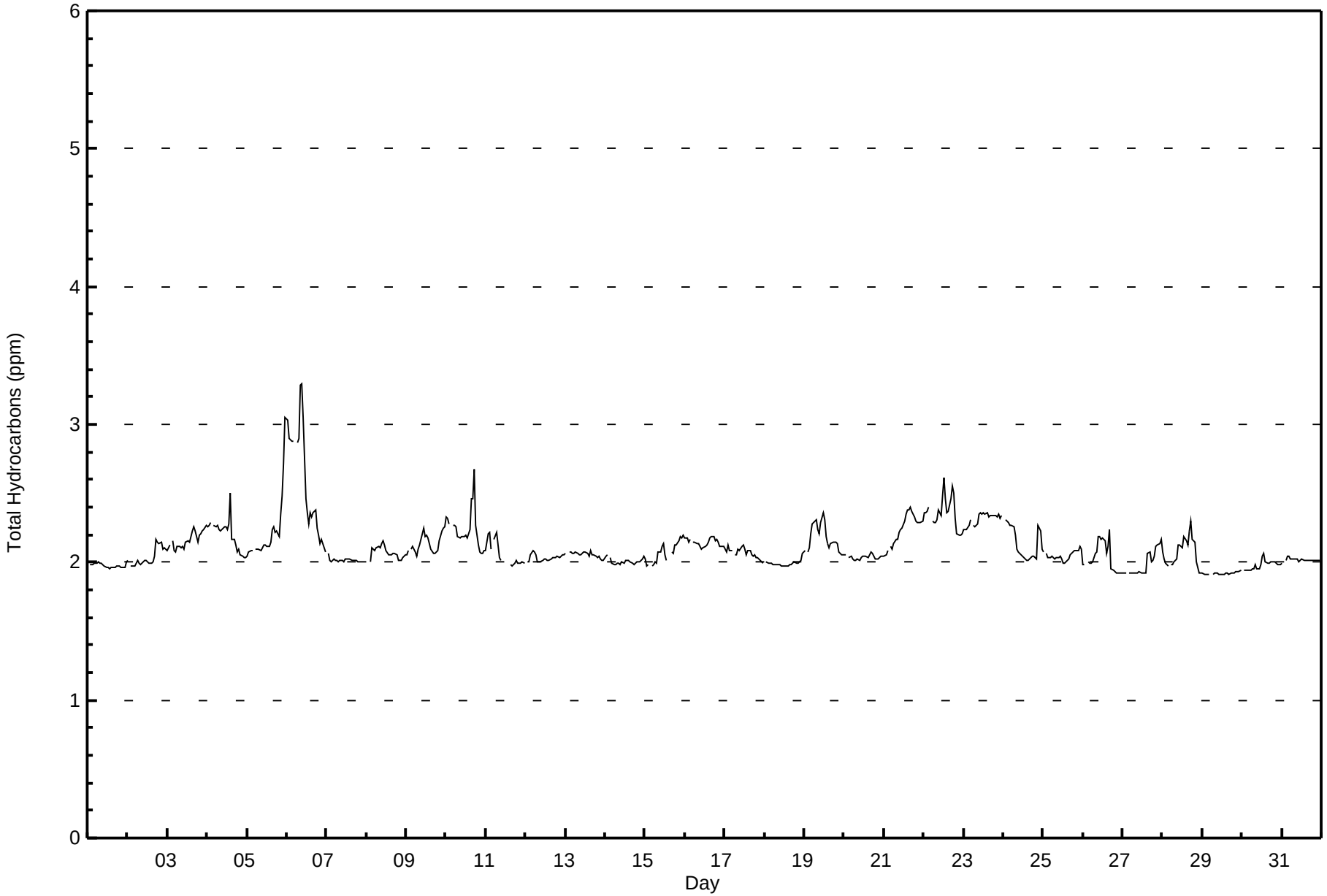
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Patricia McInnes - January 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	318	45.04	45.04
2.1 - 3.0	384	54.39	99.43
3.1 - 10.0	4	0.57	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Patricia McInnes - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	48	8	6	4	1	12	41	9	15	26	28	32	32	19	9	28	318
2.1 - 3.0	57	9	2	7	11	11	42	46	39	38	27	17	10	10	11	47	384
3.1 - 10.0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	18	8	11	12	23	83	55	54	64	55	49	42	29	20	76	706

Total Number of Valid Hours: 706

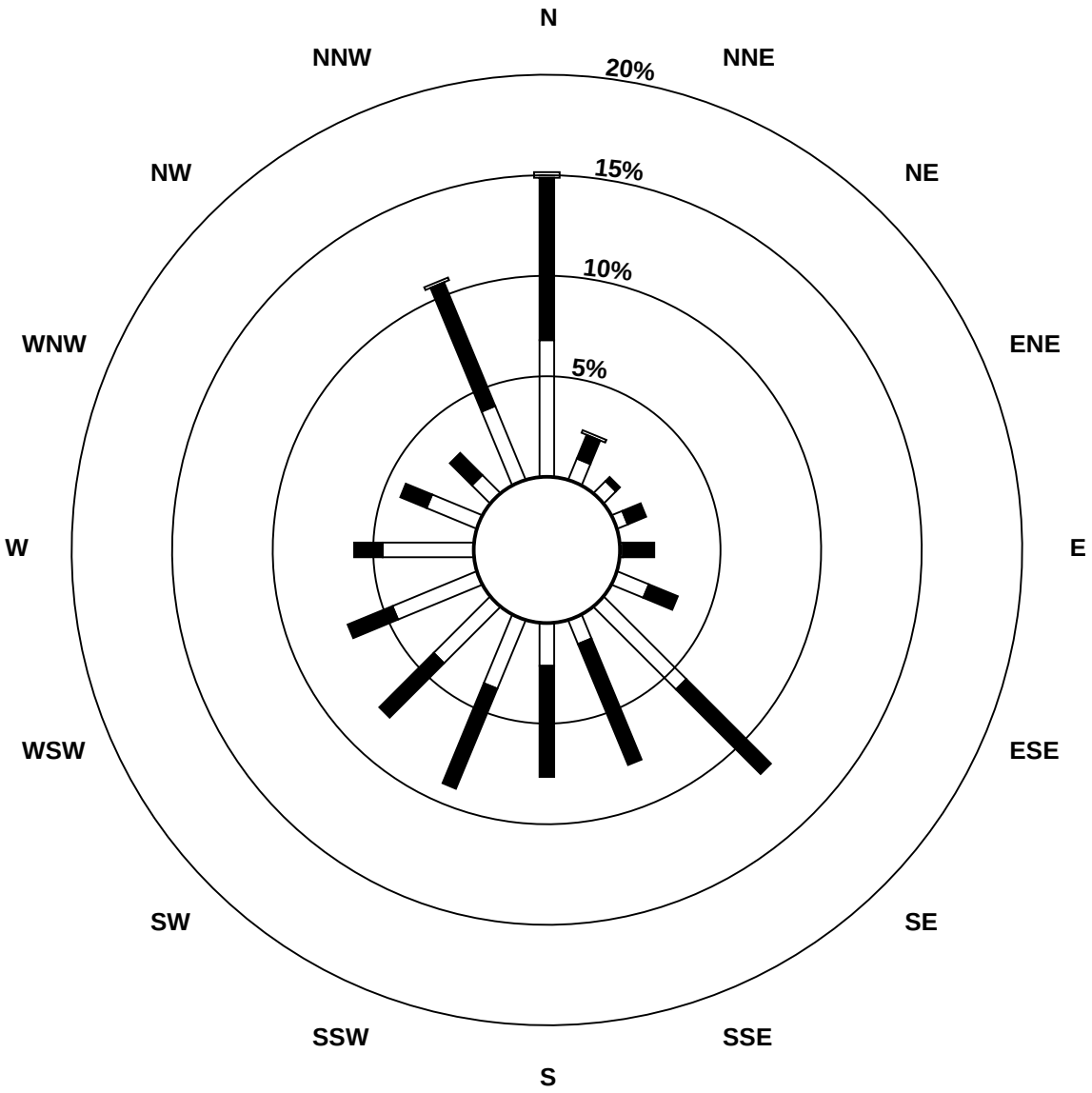
Total Number of Hours: 744

Wood Buffalo Environmental Association

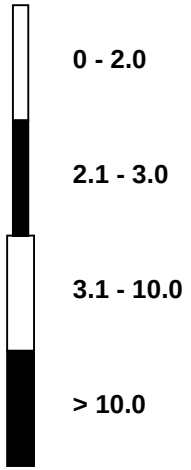
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Patricia McInnes (AMS 6)



Classes (ppm)



0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

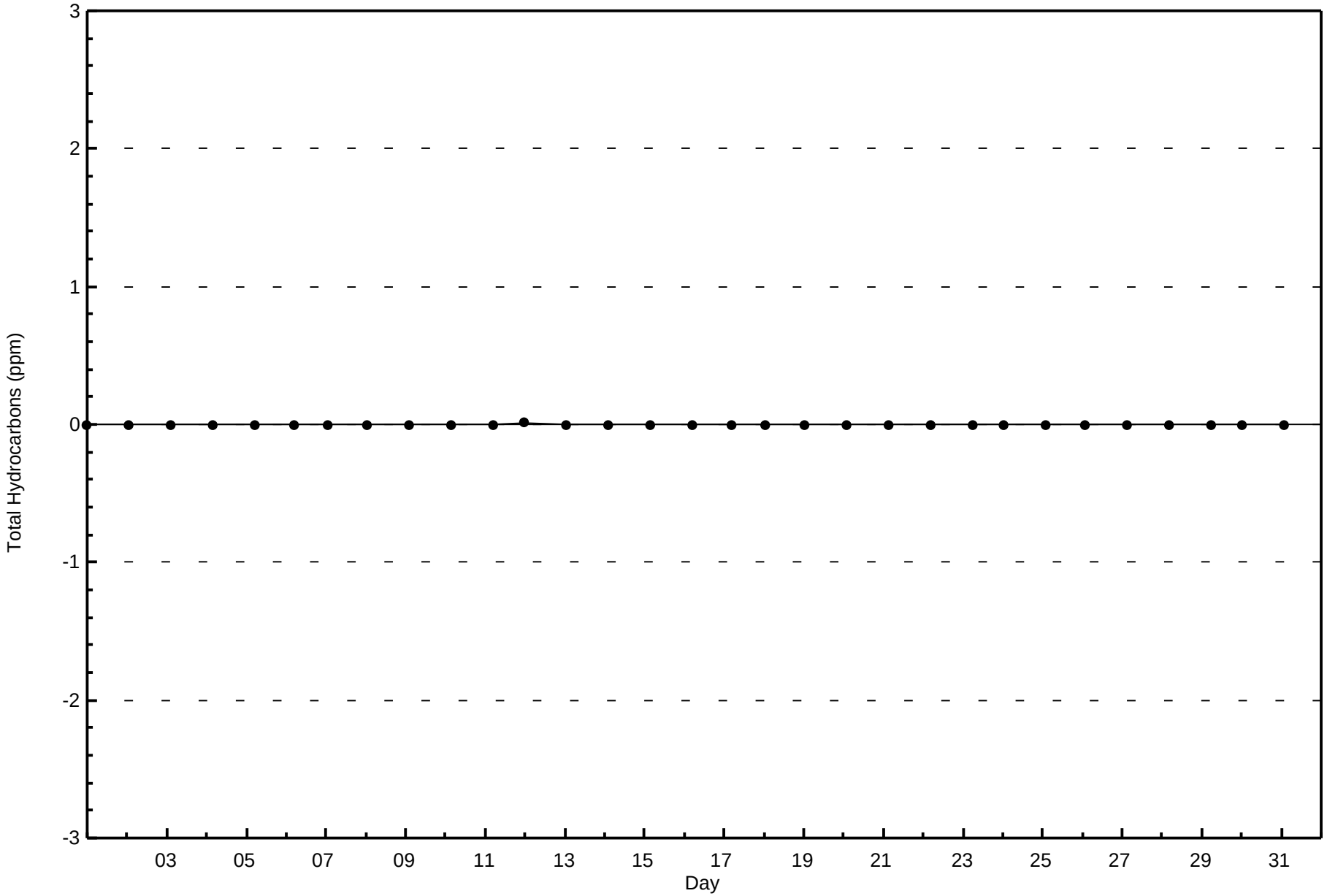
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Patricia McInnes - January 2016

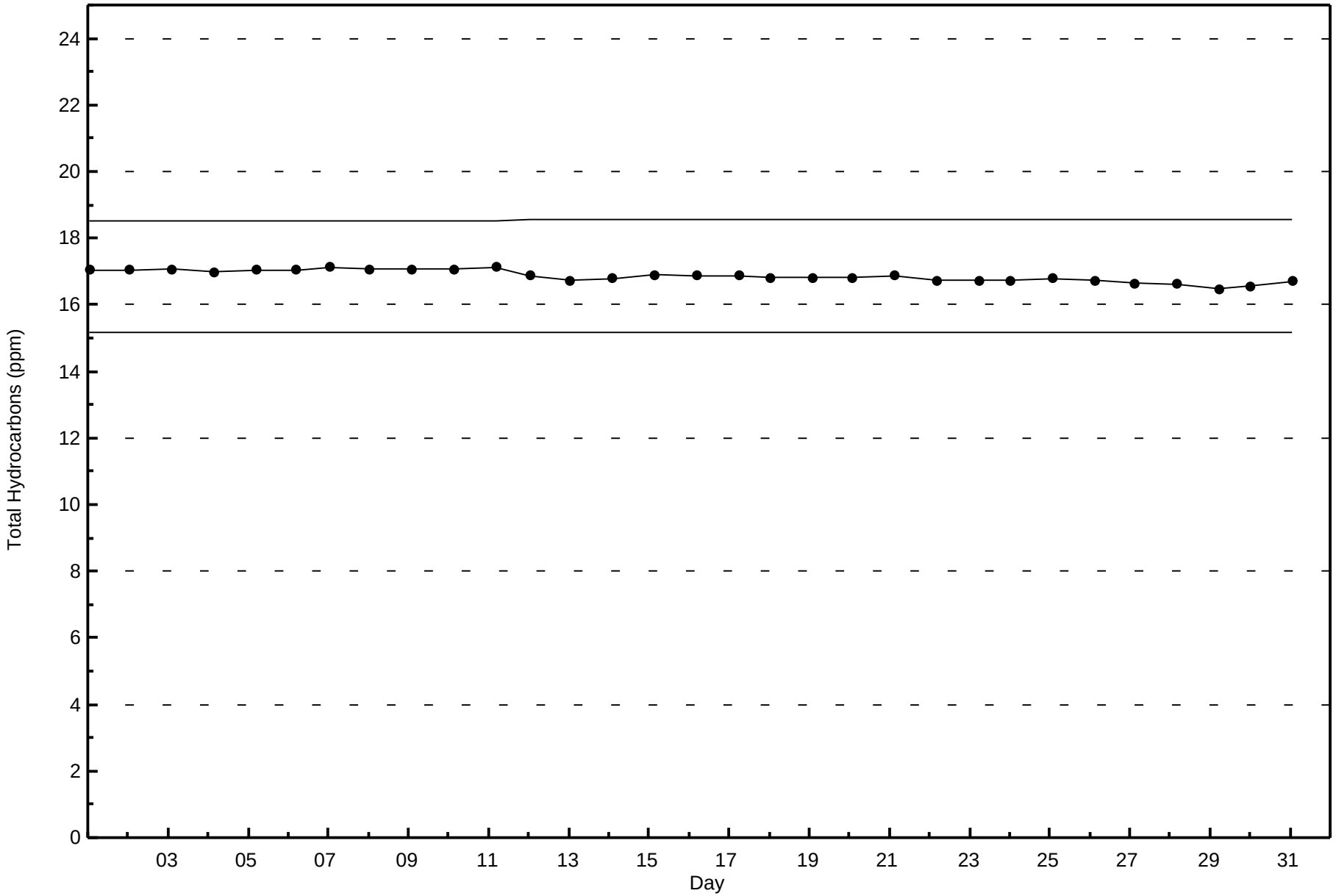


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - January 2016

Maximum Value: 0.307 ppm on Jan 6 09:00

Maximum Daily Average: 0.102 ppm on Jan 6

Minimum Value: 0.000 ppm on Jan 1 02:00

Minimum Daily Average: 0.000 ppm on Jan 1

Maximum Diurnal Average: 0.010 ppm at hour 1

Minimum Diurnal Average: 0.000 ppm at hour 13

Monthly Average: 0.006 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} = 0.2

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.079	0.069	0.012	0.010	0.000	0.000	0.000	0.008	0.079
3-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009
4-Jan	0.001	0.002	0.000	Z	0.000	0.001	0.005	0.000	0.000	0.000	0.000	0.000	0.001	0.021	0.196	0.024	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.196
5-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.113	0.094	0.005	0.006	0.000	0.000	0.004	0.127	0.288	0.028	0.288
6-Jan	0.256	0.189	0.194	0.207	0.226	Z	0.234	0.231	0.307	0.295	0.198	0.010	0.000	0.000	0.001	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.307
7-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9-Jan	0.000	0.000	Z	0.000	0.000	0.002	0.000	0.000	0.000	0.016	0.068	0.000	0.000	0.000	0.005	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.068
10-Jan	0.000	0.000	0.000	Z	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.035
11-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.008
12-Jan	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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.002
13-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.038
14-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	M	0.000	0.000	0.000	0.000	0.013	0.018	0.000	0.000	0.001	0.018
16-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.006	0.000	0.004	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.013
17-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
18-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.006
22-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	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	0.004
23-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.003	0.012	0.000	0.000	0.000	0.000	0.001	0.012
26-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.006	0.000	0.000	0.001	0.001	0.016	0.180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.180
27-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.001	0.012
28-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.042	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.042
29-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.010	0.008	0.007	0.008	0.009	0.000	0.008	0.008	0.010	0.010	0.009	0.000	0.000	0.001	0.009	0.007	0.010	0.004	0.003	0.001	0.001	0.001	0.005	0.010	Diurnal Average	
	0.256	0.189	0.194	0.207	0.226	0.003	0.234	0.231	0.307	0.295	0.198	0.010	0.004	0.021	0.196	0.113	0.180	0.079	0.069	0.012	0.013	0.018	0.127	0.288	Diurnal Maximum	

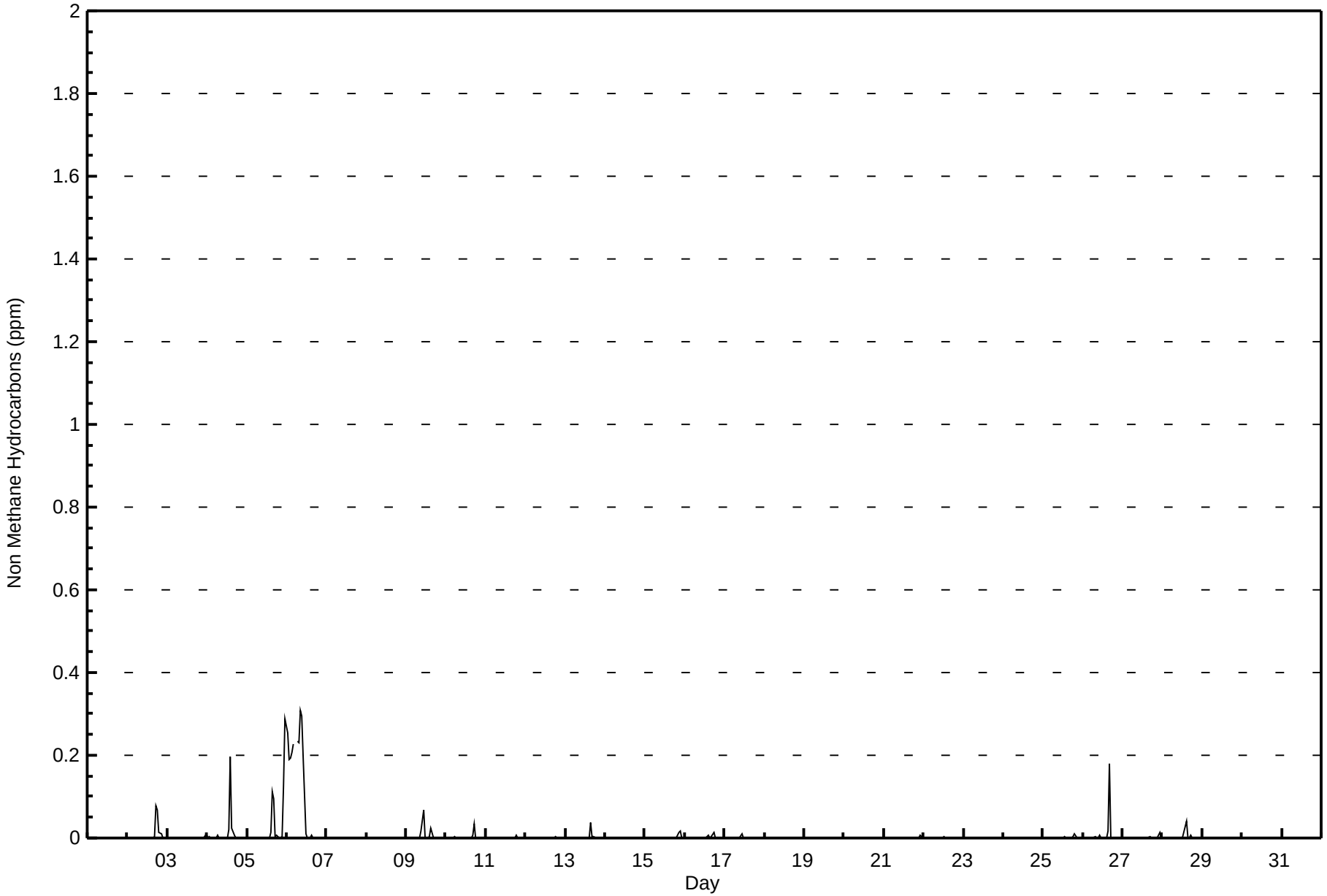
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - January 2016



Wood Buffalo Environmental Association | **Non Methane Hydrocarbons (NMHC) - ppm**

Cumulative Frequency Distribution | **Patricia McInnes - January 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	660	93.48	93.48
0.006 - 0.05	27	3.82	97.31
0.06 - 0.1	6	0.85	98.16
> 0.1	13	1.84	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 - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	100	16	8	10	8	23	79	49	51	60	53	48	41	28	17	69	660
0.006 - 0.05	2	0	0	1	2	0	4	5	2	3	1	0	1	1	1	4	27
0.06 - 0.1	1	0	0	0	2	0	0	1	1	1	0	0	0	0	0	0	6
> 0.1	4	2	0	0	0	0	0	0	0	0	1	1	0	0	2	3	13
Totals	107	18	8	11	12	23	83	55	54	64	55	49	42	29	20	76	706

Total Number of Valid Hours: 706

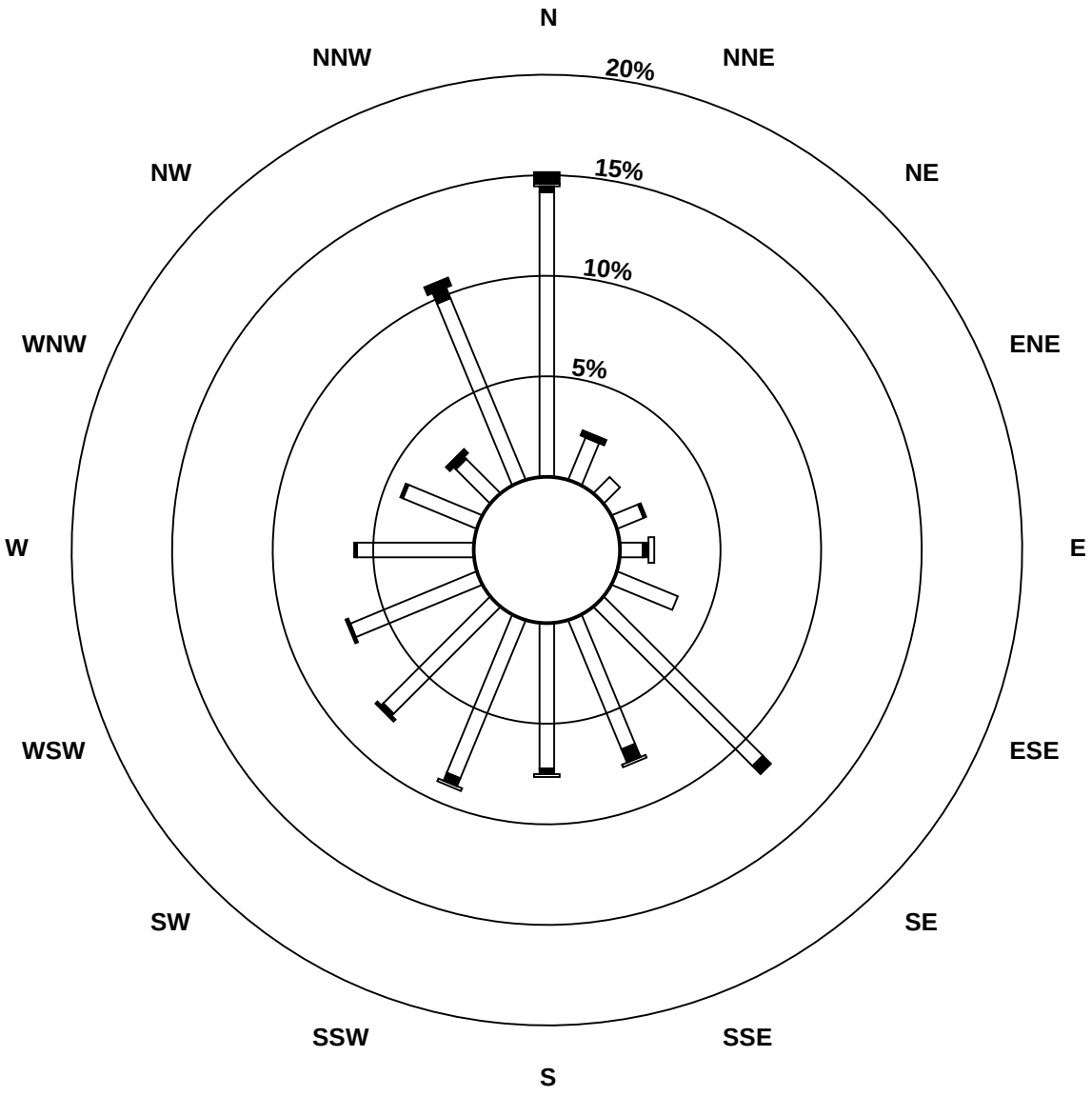
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes (AMS 6)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

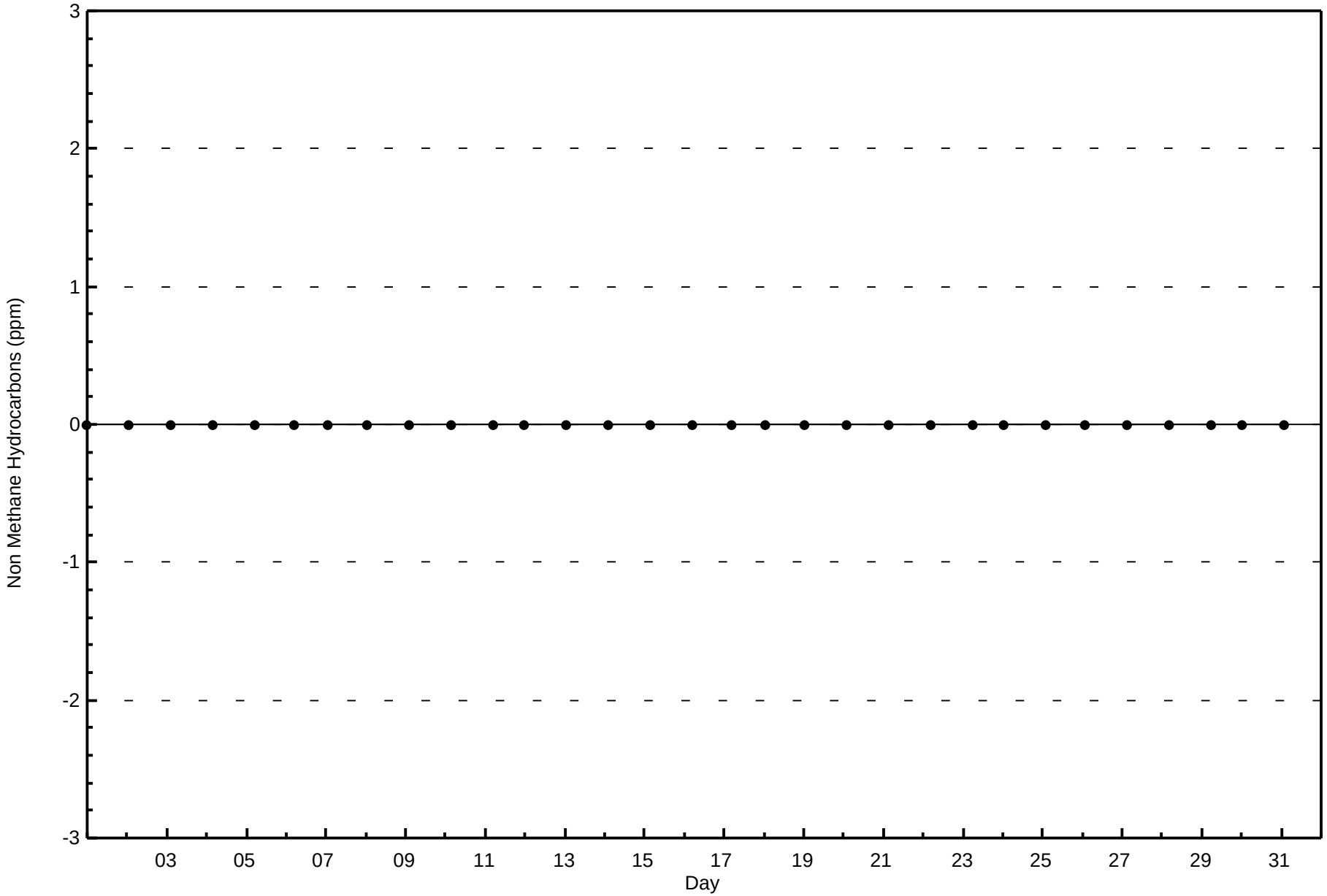
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - January 2016

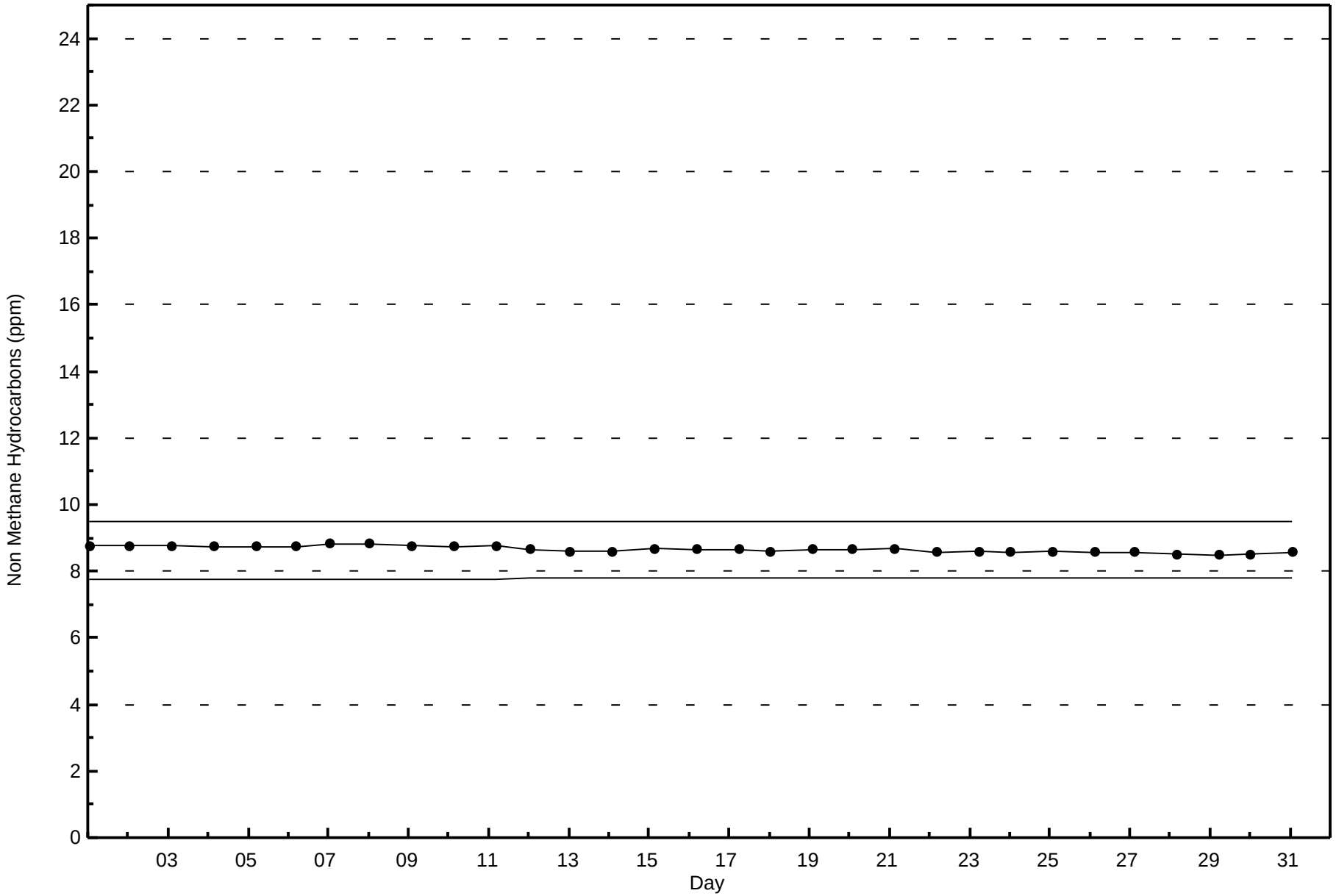


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 3.0 ppm on Jan 6 10:00

Maximum Daily Average: 2.5 ppm on Jan 6

Minimum Value: 1.9 ppm on Jan 29 11:00

Minimum Daily Average: 1.9 ppm on Jan 29

Maximum Diurnal Average: 2.1 ppm at hour 18

Minimum Diurnal Average: 2.1 ppm at hour 6

Monthly Average: 2.10 ppm

Percentiles: $P_1 = 1.9$ $P_{10} = 2.0$ $Q_1 = 2.0$ Median = 2.1 $Q_3 = 2.2$ $P_{90} = 2.3$ $P_{99} = 2.7$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
3-Jan	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.3
4-Jan	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.2	2.3
5-Jan	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.5	2.6	2.8	2.2	2.8
6-Jan	2.8	2.7	2.7	2.7	2.7	Z	2.6	2.7	3.0	3.0	2.9	2.4	2.4	2.3	2.4	2.3	2.4	2.4	2.3	2.2	2.1	2.2	2.1	2.1	2.5	3.0
7-Jan	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
8-Jan	2.0	Z	2.0	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2
9-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.1	2.3
10-Jan	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.5	2.6	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.6
11-Jan	2.1	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.0	2.0	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2
12-Jan	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1
13-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
14-Jan	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
15-Jan	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	M	M	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2
16-Jan	2.2	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2
17-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1
18-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
19-Jan	2.1	Z	2.1	2.1	2.2	2.3	2.3	2.3	2.2	2.2	2.3	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	2.4
20-Jan	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
21-Jan	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.4
22-Jan	2.4	2.4	2.4	2.4	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.5	2.6	2.5	2.4	2.4	2.5	2.6	2.5	2.3	2.2	2.2	2.2	2.2	2.4	2.6
23-Jan	2.2	2.2	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4
24-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.2	2.1	2.1	2.3
25-Jan	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
26-Jan	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2
27-Jan	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.2
28-Jan	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.3	2.2	2.1	2.0	2.0	1.9	1.9	2.1	2.3
29-Jan	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
30-Jan	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
31-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
	2.8	2.7	2.7	2.7	2.7	2.3	2.6	2.7	3.0	3.0	2.9	2.5	2.6	2.5	2.4	2.5	2.5	2.6	2.5	2.3	2.4	2.5	2.6	2.8	Diurnal Maximum	

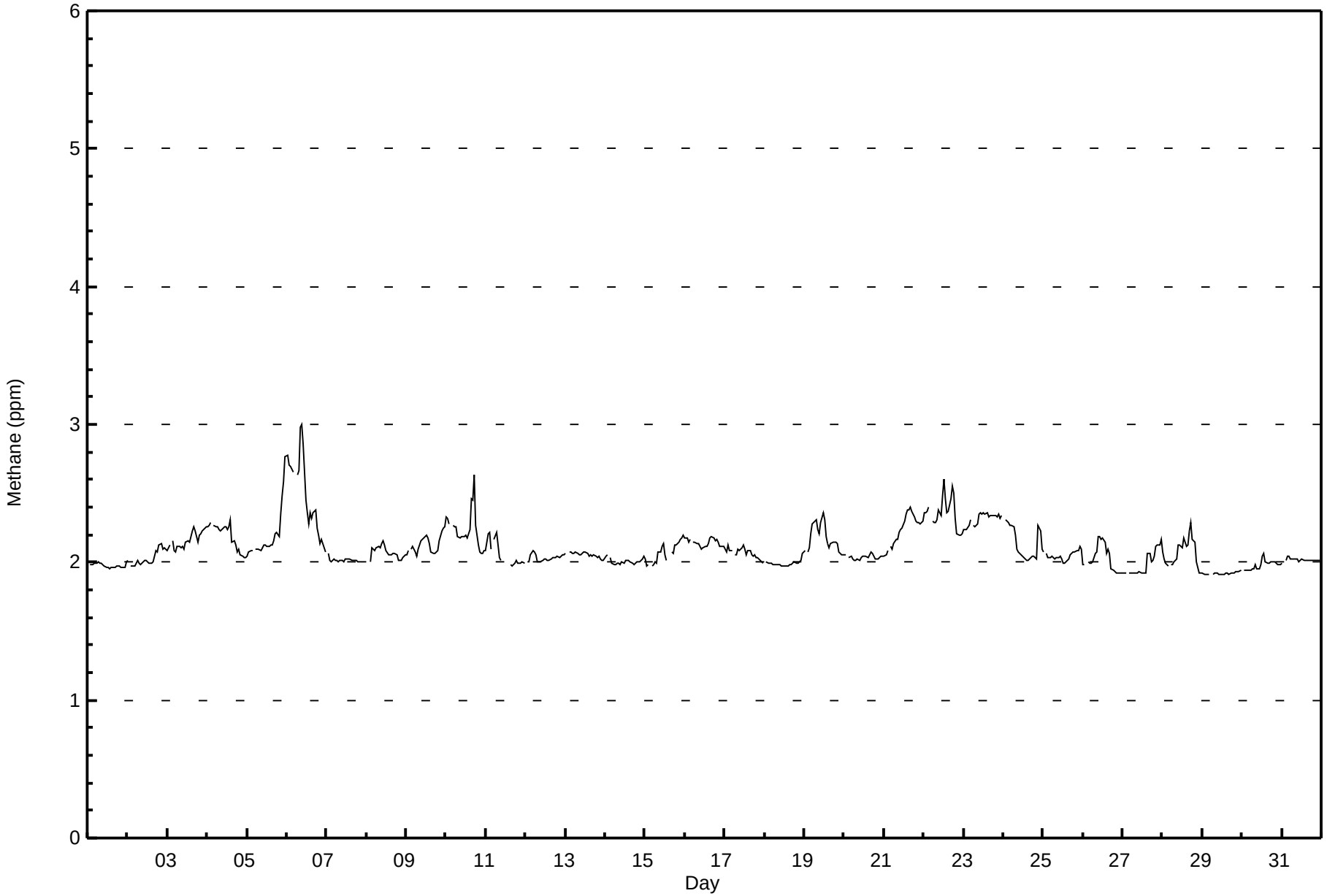
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Patricia McInnes - January 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	319	45.18	45.18
2.1 - 3.0	387	54.82	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association | **Methane (CH_4) - ppm**

Frequency Distribution | **Patricia McInnes - January 2016**

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	48	8	6	5	1	12	41	9	15	26	28	32	32	19	9	28	319
2.1 - 3.0	59	10	2	6	11	11	42	46	39	38	27	17	10	10	11	48	387
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	107	18	8	11	12	23	83	55	54	64	55	49	42	29	20	76	706

Total Number of Valid Hours: 706

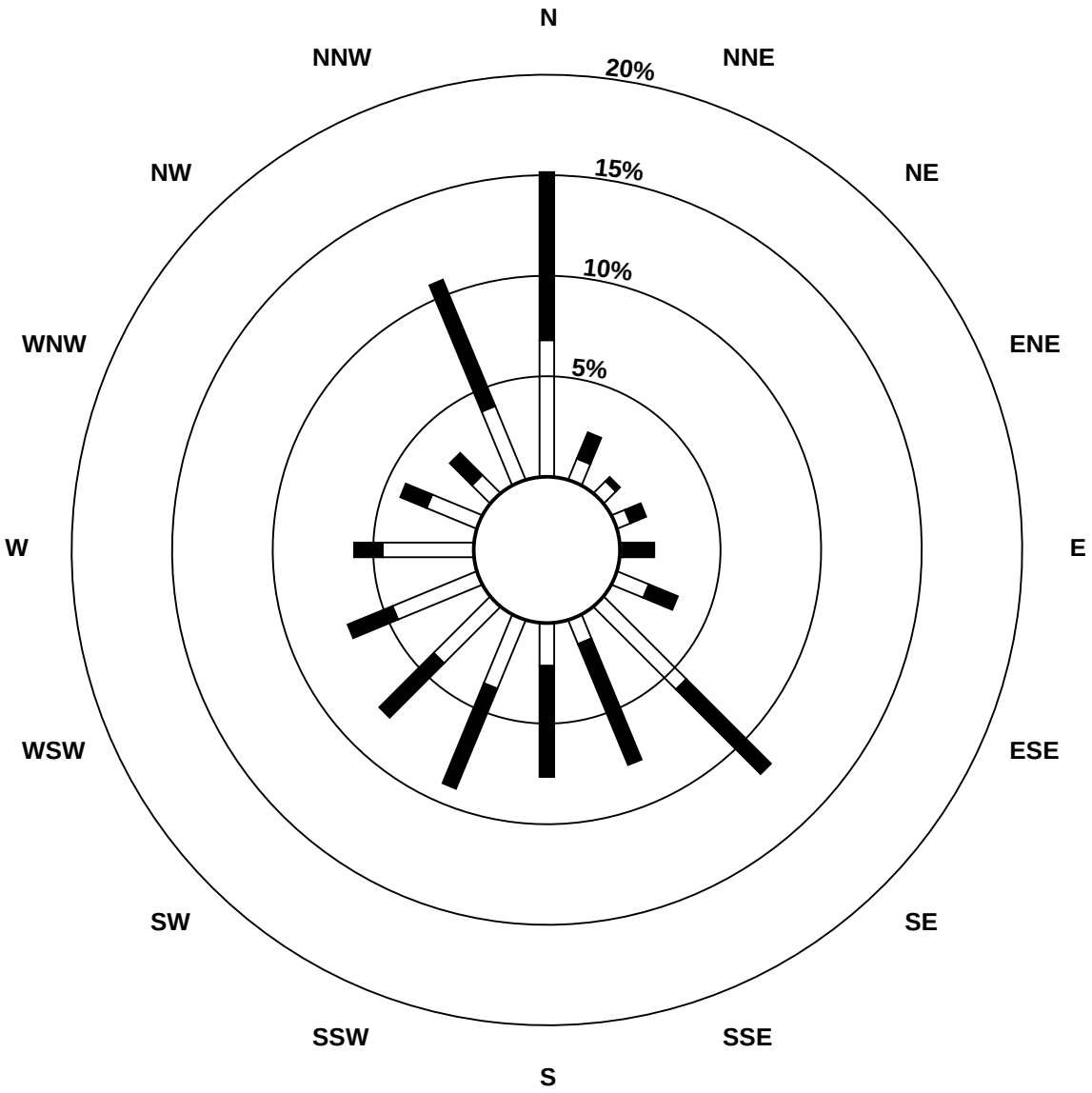
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Methane (CH_4) - ppm

Patricia McInnes (AMS 6)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

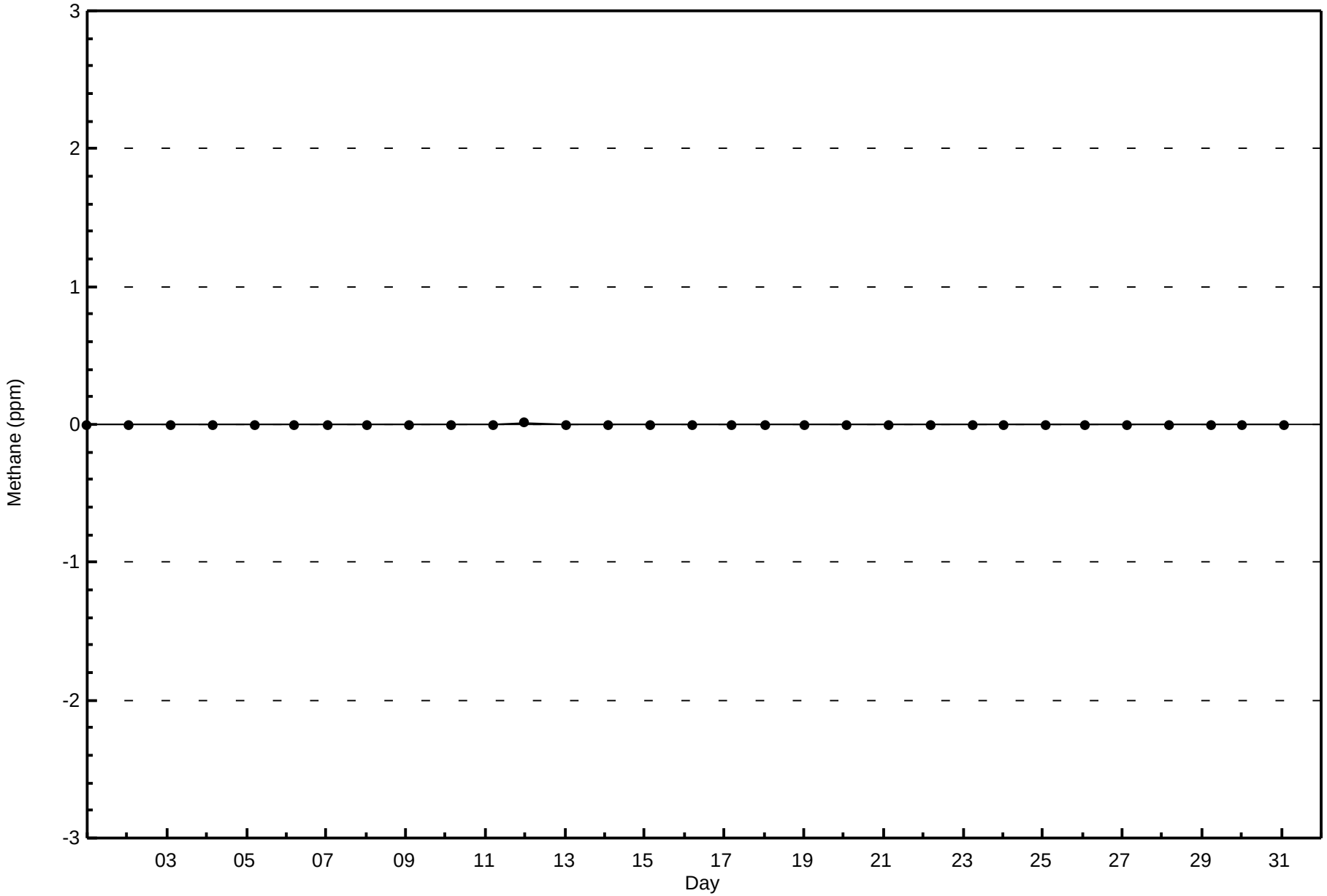
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Patricia McInnes - January 2016

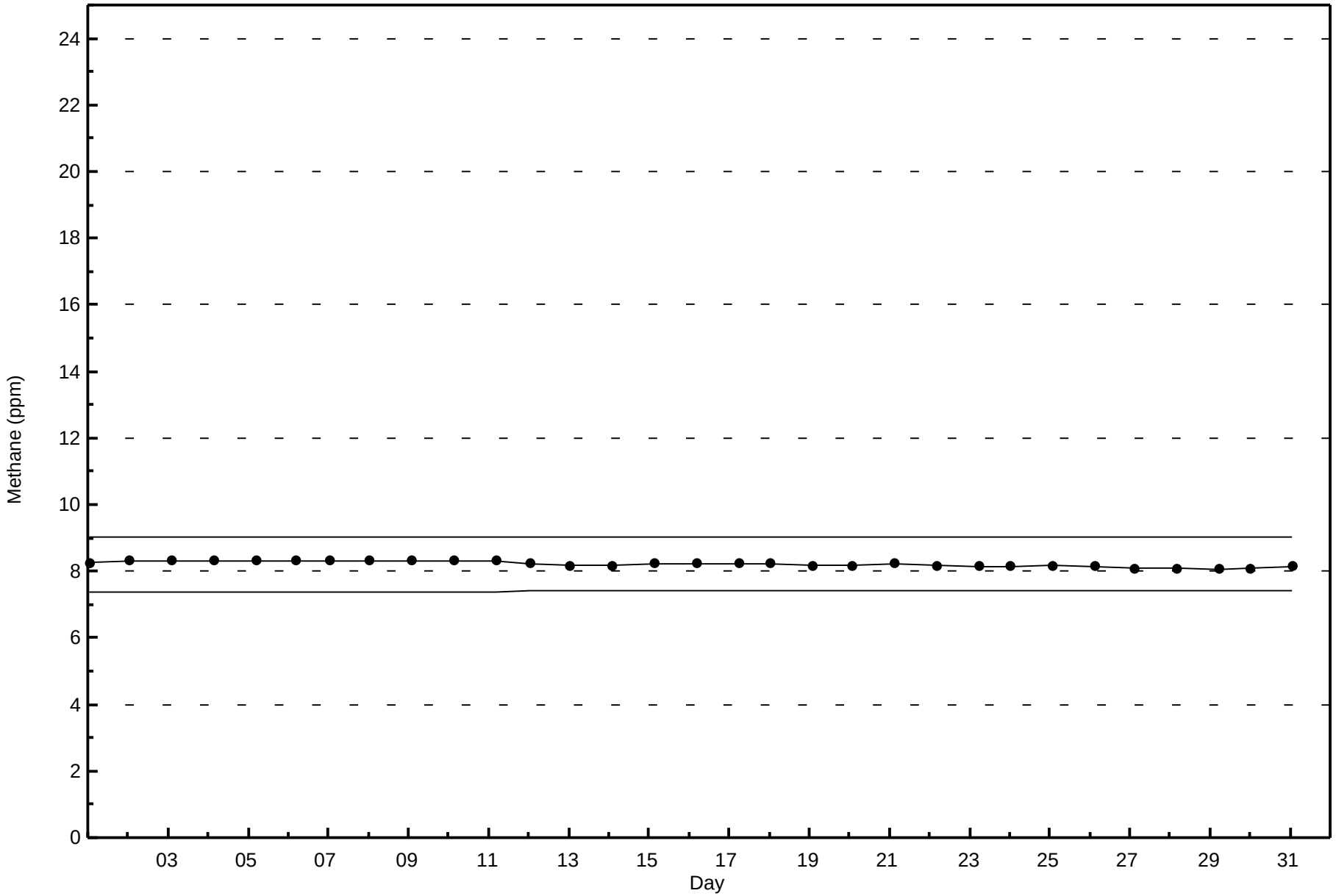


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 43 ppb on Jan 1 13:00 Maximum Daily Average: 38.4 ppb on Jan 1

Minimum Value: 2 ppb on Jan 16 19:00 Minimum Daily Average: 5.9 ppb on Jan 16

Maximum Diurnal Average: 22.1 ppb at hour 14 Minimum Diurnal Average: 16.5 ppb at hour 18

Monthly Average: 19.4 ppb Percentiles: $P_1 = 3$ $P_{10} = 5$ $Q_1 = 10$ Median = 19 $Q_3 = 27$ $P_{90} = 34$ $P_{99} = 41$

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	35
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	34	35	37	Z	35	37	36	37	37	37	40	42	43	43	43	42	41	39	40	38	40	40	40	28	38.4	43
2-Jan	28	36	36	36	Z	32	28	32	33	28	27	31	35	36	35	31	16	8	18	5	5	4	6	7	24.0	36
3-Jan	9	9	8	5	14	Z	18	8	12	12	20	21	24	21	19	12	6	20	24	16	20	17	19	14	15.2	24
4-Jan	15	14	12	9	9	9	Z	9	9	9	10	11	12	7	6	8	6	12	22	14	24	26	26	28	13.3	28
5-Jan	25	24	25	24	24	18	18	Z	21	19	18	19	20	20	12	9	4	3	3	6	4	3	3	3	14.1	25
6-Jan	3	3	3	3	3	3	3	3	Z	4	6	11	12	13	9	6	3	4	5	10	15	15	21	24	7.7	24
7-Jan	27	30	33	Z	33	33	28	29	29	32	34	34	33	31	31	33	33	34	36	36	35	35	35	36	32.6	36
8-Jan	35	33	32	25	Z	25	23	23	23	17	17	19	24	26	25	22	19	22	27	32	30	28	25	22	25.1	35
9-Jan	18	14	23	17	16	Z	23	15	8	7	14	18	18	18	16	20	18	14	9	5	7	5	6	5	13.7	23
10-Jan	4	4	7	9	7	7	Z	9	5	7	10	6	8	12	9	7	3	3	6	19	19	20	21	19	9.6	21
11-Jan	18	17	17	24	25	15	11	Z	28	32	31	M	M	M	M	31	36	23	14	24	25	25	20	19	22.8	36
12-Jan	18	18	19	Z	15	18	17	22	22	23	22	20	19	21	20	16	11	11	10	8	11	11	8	13	16.3	23
13-Jan	12	10	9	10	Z	8	8	14	14	15	16	18	C	C	C	C	20	15	18	23	23	24	26	26	16.4	26
14-Jan	22	24	24	26	28	Z	29	27	30	32	28	28	32	33	33	31	31	31	29	29	29	28	25	20	28.3	33
15-Jan	25	33	32	32	31	30	Z	28	20	19	20	20	26	24	25	22	19	19	12	9	7	5	4	3	20.3	33
16-Jan	5	4	6	6	5	5	4	Z	4	10	13	13	11	12	10	8	4	2	2	2	2	2	2	2	5.9	13
17-Jan	4	9	5	11	8	5	9	12	Z	10	12	17	18	20	16	14	11	16	12	18	21	25	28	29	14.3	29
18-Jan	30	32	33	Z	34	34	33	31	30	32	32	30	30	31	30	29	28	24	20	26	25	20	21	16	28.4	34
19-Jan	19	15	12	14	Z	18	19	19	16	13	17	15	15	17	16	15	13	14	14	14	14	17	18	19	15.9	19
20-Jan	21	22	25	26	25	Z	28	26	24	26	24	21	19	21	19	14	6	7	8	15	20	18	18	18	19.6	28
21-Jan	18	16	11	9	7	15	Z	5	4	8	15	15	16	16	16	15	14	16	18	19	19	21	22	18	14.4	22
22-Jan	10	11	14	9	11	18	21	Z	14	9	13	12	12	11	10	9	5	3	3	4	10	10	11	7	10.4	21
23-Jan	7	9	10	13	14	12	12	12	Z	6	9	9	8	8	7	6	4	3	3	3	3	3	3	3	7.4	14
24-Jan	3	4	3	Z	6	6	7	12	20	22	25	27	28	28	28	27	23	23	26	24	24	8	7	13	17.1	28
25-Jan	17	17	19	24	Z	19	23	25	22	23	23	25	27	26	22	19	8	4	4	4	4	3	3	13	16.3	27
26-Jan	28	27	22	25	22	Z	20	10	9	4	5	5	6	9	13	8	13	23	24	30	34	35	37	38	19.5	38
27-Jan	38	36	38	40	40	39	Z	39	40	39	40	41	41	41	41	18	18	19	17	8	5	4	4	4	28.2	41
28-Jan	11	18	21	23	23	23	18	Z	17	12	13	13	11	13	16	10	6	11	19	22	24	25	33	38	18.3	38
29-Jan	41	41	39	35	33	33	35	34	Z	34	35	37	38	39	40	41	41	41	39	37	36	35	32	32	36.8	41
30-Jan	32	31	32	Z	31	31	32	33	19	33	30	23	22	22	23	23	23	22	24	23	25	30	31	29	27.1	33
31-Jan	27	26	22	18	Z	24	22	23	23	26	27	26	27	26	27	27	27	25	26	27	27	27	28	27	25.4	28
	19.5	20.0	20.3	18.9	19.9	19.9	20.3	20.7	19.7	19.4	20.8	21.0	21.9	22.1	21.3	19.1	16.6	16.5	17.2	17.8	19.0	18.4	18.8	18.5	Diurnal Average	
	41	41	39	40	40	39	36	39	40	39	40	42	43	43	43	42	41	41	40	38	40	40	40	38	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

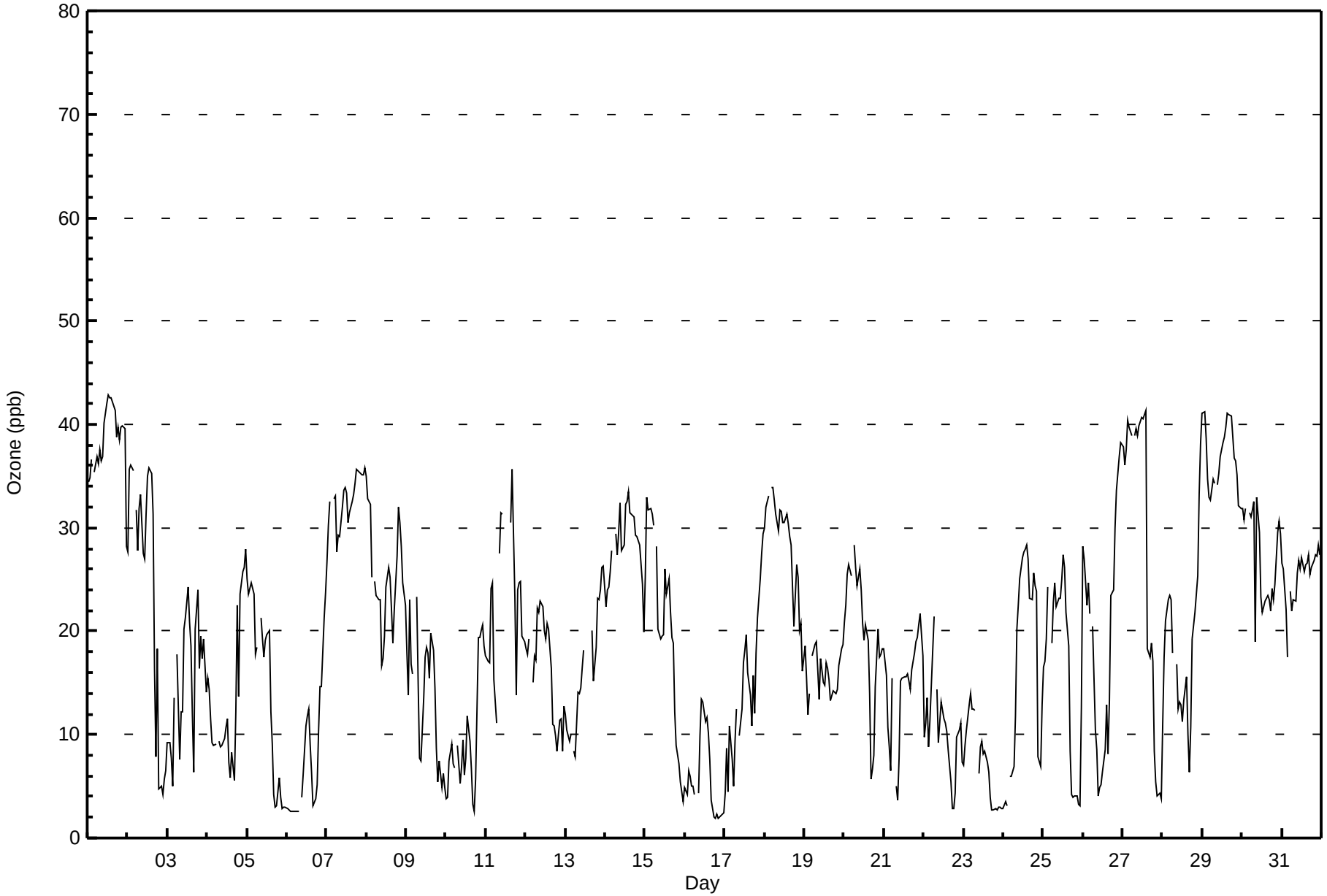
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Patricia McInnes - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	388	55.04	55.04
21 - 50	317	44.96	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association **Ozone (O_3) - ppb**

Frequency Distribution **Patricia McInnes - January 2016**

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	54	9	2	6	11	15	56	45	43	38	20	14	10	10	12	43	388
21 - 50	52	9	6	2	0	8	31	7	13	24	35	33	32	20	10	35	317
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	106	18	8	8	11	23	87	52	56	62	55	47	42	30	22	78	705

Total Number of Valid Hours: 705

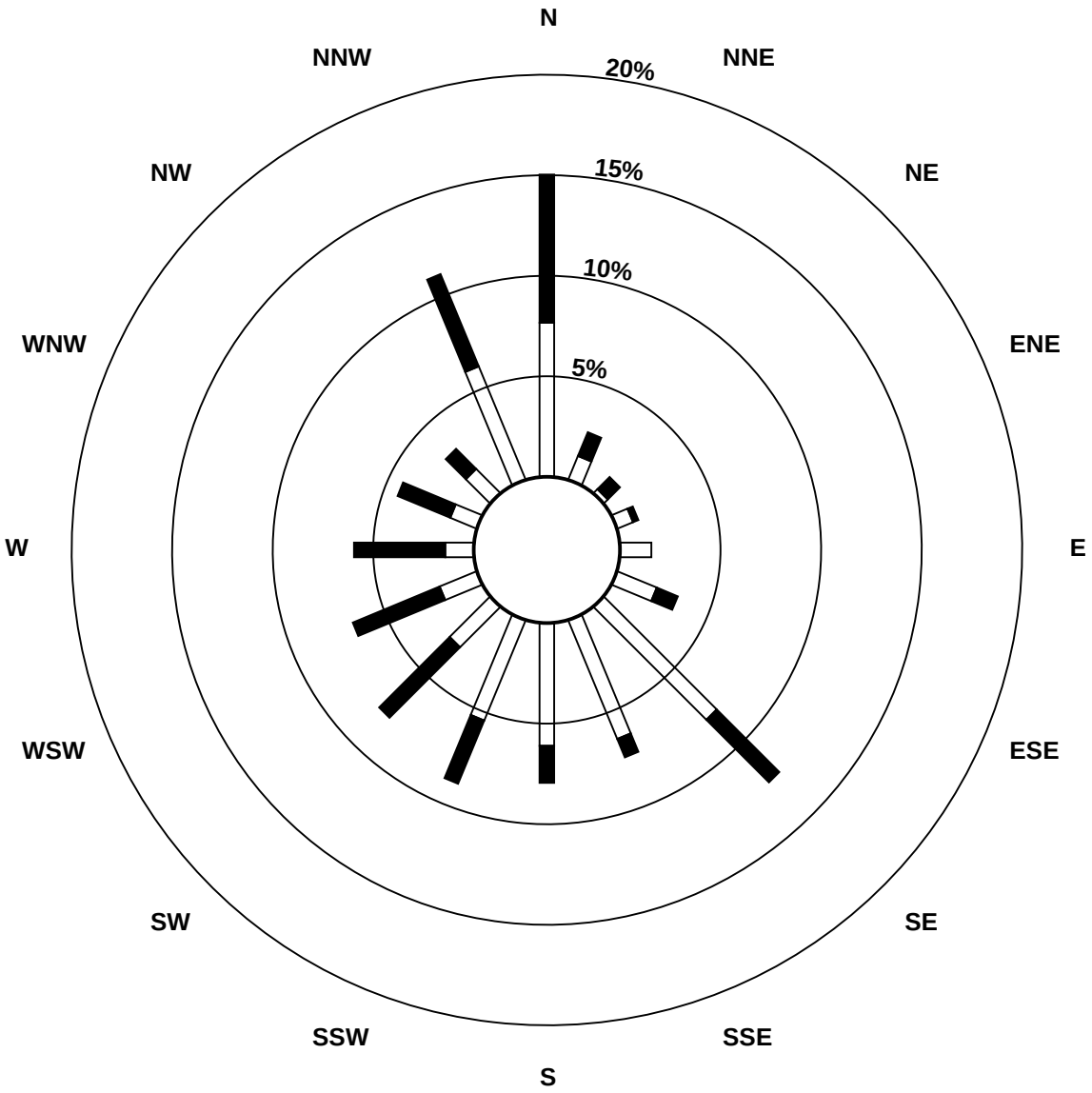
Total Number of Hours: 744

Wood Buffalo Environmental Association

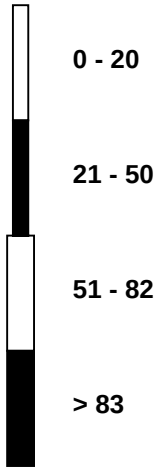
Wind Rose Jan 2016

Ozone (O_3) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



0 - 20

21 - 50

51 - 82

> 83

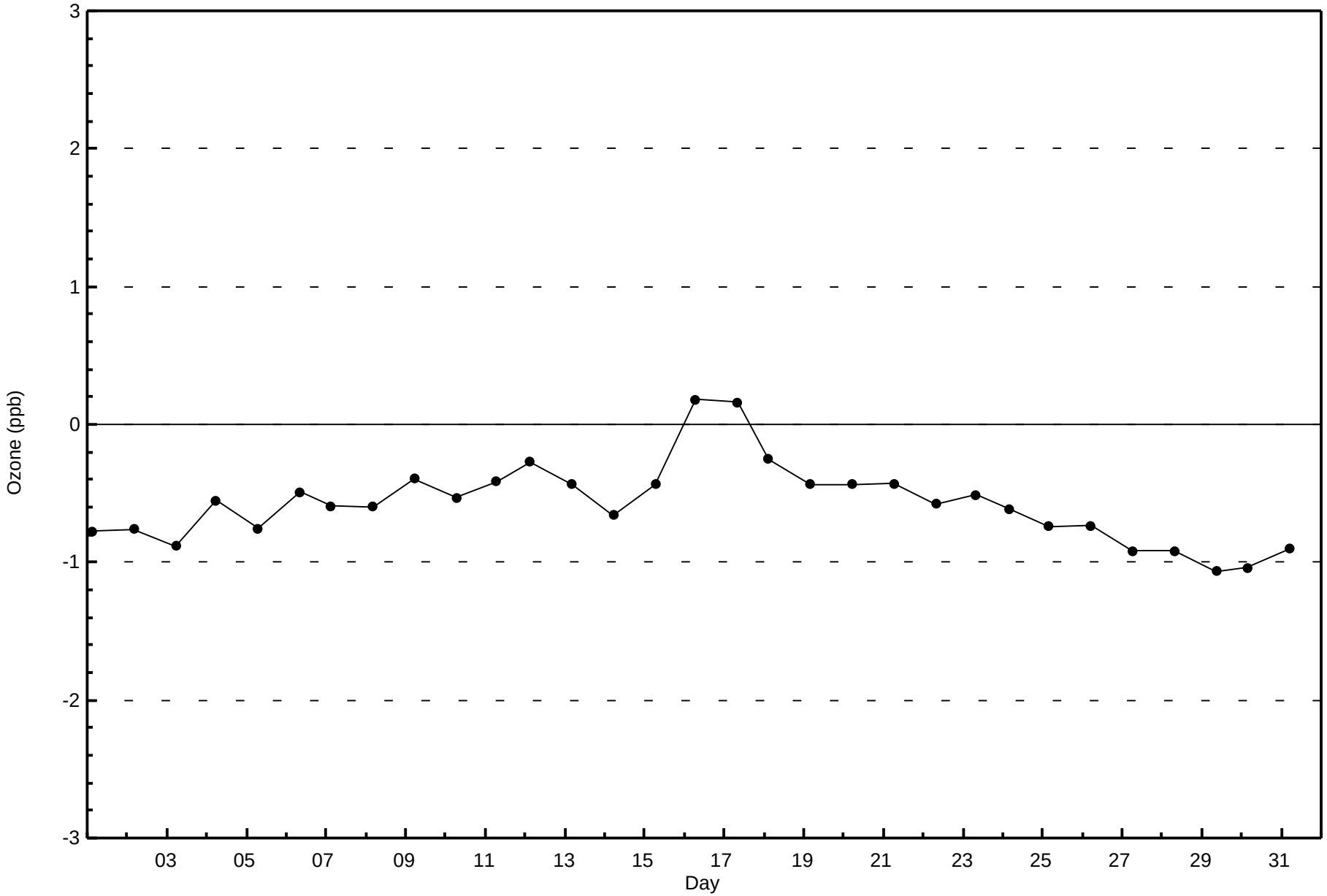
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Patricia McInnes - January 2016

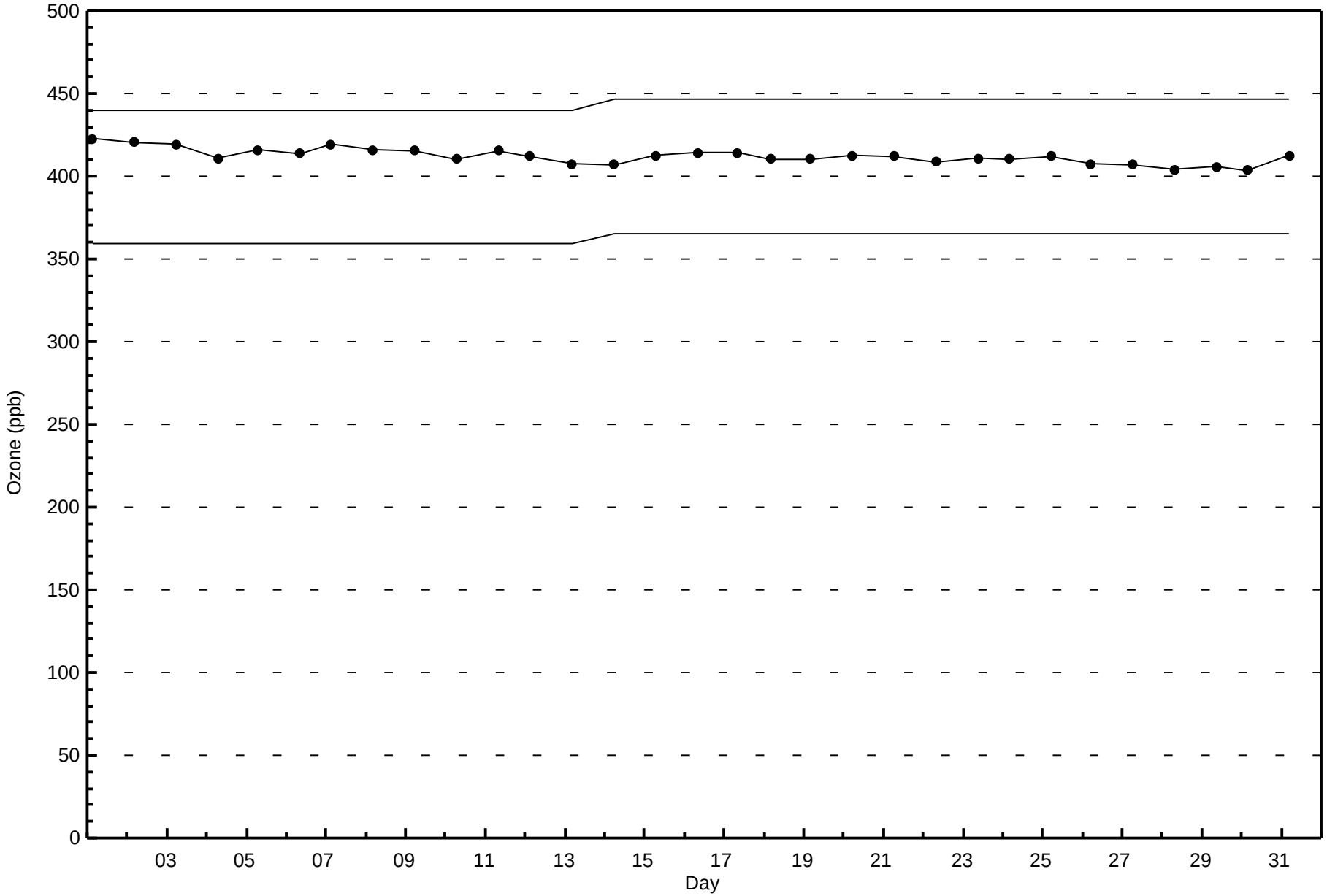


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Patricia McInnes - January 2016

Maximum Value: 74 ppb on Jan 4 15:00

Maximum Daily Average: 25.9 ppb on Jan 6

Minimum Value: 0 ppb on Jan 1 12:00

Minimum Daily Average: 0.1 ppb on Jan 29

Maximum Diurnal Average: 8.7 ppb at hour 15

Minimum Diurnal Average: 1.4 ppb at hour 6

Monthly Average: 5.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 2 $Q_3 = 6$ $P_{90} = 12$ $P_{99} = 47$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	36
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
2-Jan	0	Z	0	0	0	1	1	0	0	1	2	1	1	1	1	1	18	38	20	33	33	9	8	12	7.9	38
3-Jan	6	5	Z	11	3	2	2	12	3	7	4	5	4	5	5	8	16	1	2	11	2	2	0	2	5.1	16
4-Jan	1	1	1	Z	1	4	1	6	3	6	9	11	16	50	74	24	15	6	2	5	1	1	1	0	10.4	74
5-Jan	0	1	0	0	Z	3	2	2	2	3	5	5	6	4	16	10	27	22	19	5	15	39	42	47	12.1	47
6-Jan	50	38	35	34	32	Z	34	41	70	69	56	27	21	17	17	15	23	11	2	1	1	0	0	0	25.9	70
7-Jan	Z	0	0	0	0	0	4	0	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.5	4
8-Jan	0	Z	0	0	0	0	1	1	0	2	4	5	4	3	2	2	2	2	2	1	1	1	1	1	1.5	5
9-Jan	2	4	Z	2	5	1	1	4	9	11	9	9	9	9	11	3	4	5	8	8	7	9	5	7	6.2	11
10-Jan	11	11	3	Z	5	4	4	1	7	8	5	27	22	8	8	10	11	28	4	1	1	0	0	0	7.8	28
11-Jan	0	0	1	0	Z	0	0	1	1	0	0	M	M	M	M	0	0	2	6	2	1	1	0	0	0.9	6
12-Jan	Z	0	0	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	5	5	3	1	3	1	2.3	5
13-Jan	0	Z	0	0	1	7	10	1	C	C	C	C	C	3	3	3	4	68	29	3	3	2	0	0	7.7	68
14-Jan	0	0	Z	0	0	0	1	1	1	1	2	4	2	2	1	1	1	1	1	1	1	0	1	1	1.0	4
15-Jan	1	0	0	Z	0	0	0	0	1	2	6	10	6	9	5	3	2	1	0	0	0	0	1	3	2.2	10
16-Jan	1	0	0	0	Z	0	4	14	11	7	6	16	26	24	29	22	13	11	9	11	8	5	4	4	9.9	29
17-Jan	3	3	13	3	10	Z	7	3	11	7	14	10	9	6	9	7	8	5	9	4	2	2	1	1	6.4	14
18-Jan	Z	1	1	1	1	1	2	2	2	1	2	2	2	2	3	3	2	3	4	1	1	2	1	2	1.7	4
19-Jan	1	Z	2	1	0	1	1	0	1	3	4	10	13	9	7	4	4	3	1	1	1	1	0	0	3.0	13
20-Jan	0	0	Z	0	0	0	0	1	1	0	2	4	8	8	7	8	11	6	9	3	3	2	1	2	3.3	11
21-Jan	1	1	2	Z	4	2	26	18	12	19	5	6	6	6	5	6	4	2	2	2	2	1	1	0	5.8	26
22-Jan	3	1	1	3	Z	2	0	0	3	7	7	8	11	13	11	8	6	12	7	3	1	1	1	1	4.8	13
23-Jan	1	1	0	0	0	Z	1	0	1	6	8	9	13	14	17	13	12	12	11	11	11	12	7	10	7.4	17
24-Jan	Z	4	6	3	2	2	2	2	0	0	0	0	1	1	1	1	2	2	0	0	1	4	2	0	1.6	6
25-Jan	0	Z	0	0	0	2	1	1	1	2	3	3	2	3	6	8	18	9	11	3	5	8	8	11	4.5	18
26-Jan	0	0	Z	1	3	1	2	21	24	66	47	43	33	26	10	18	12	1	1	0	0	0	0	0	13.5	66
27-Jan	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	5	3	1	1	10	11	12	12	16	3.1	16
28-Jan	4	1	1	1	Z	1	2	4	2	7	7	7	7	8	6	16	12	5	1	1	1	1	0	0	4.0	16
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	Z	0	0	0	0	0	0	0	4	0	2	4	6	4	2	1	1	1	1	0	0	0	0	0	1.2	6
31-Jan	0	Z	0	0	0	0	1	0	1	1	1	2	2	3	4	2	1	1	0	0	0	0	0	0	1.0	4
	3.5	3.0	2.6	2.5	2.8	1.4	3.6	4.5	5.8	8.0	7.1	8.1	8.1	8.1	8.7	6.7	7.6	8.4	5.5	4.1	3.7	3.8	3.2	4.0	Diurnal Average	
	50	38	35	34	32	7	34	41	70	69	56	43	33	50	74	24	27	68	29	33	33	39	42	47	Diurnal Maximum	

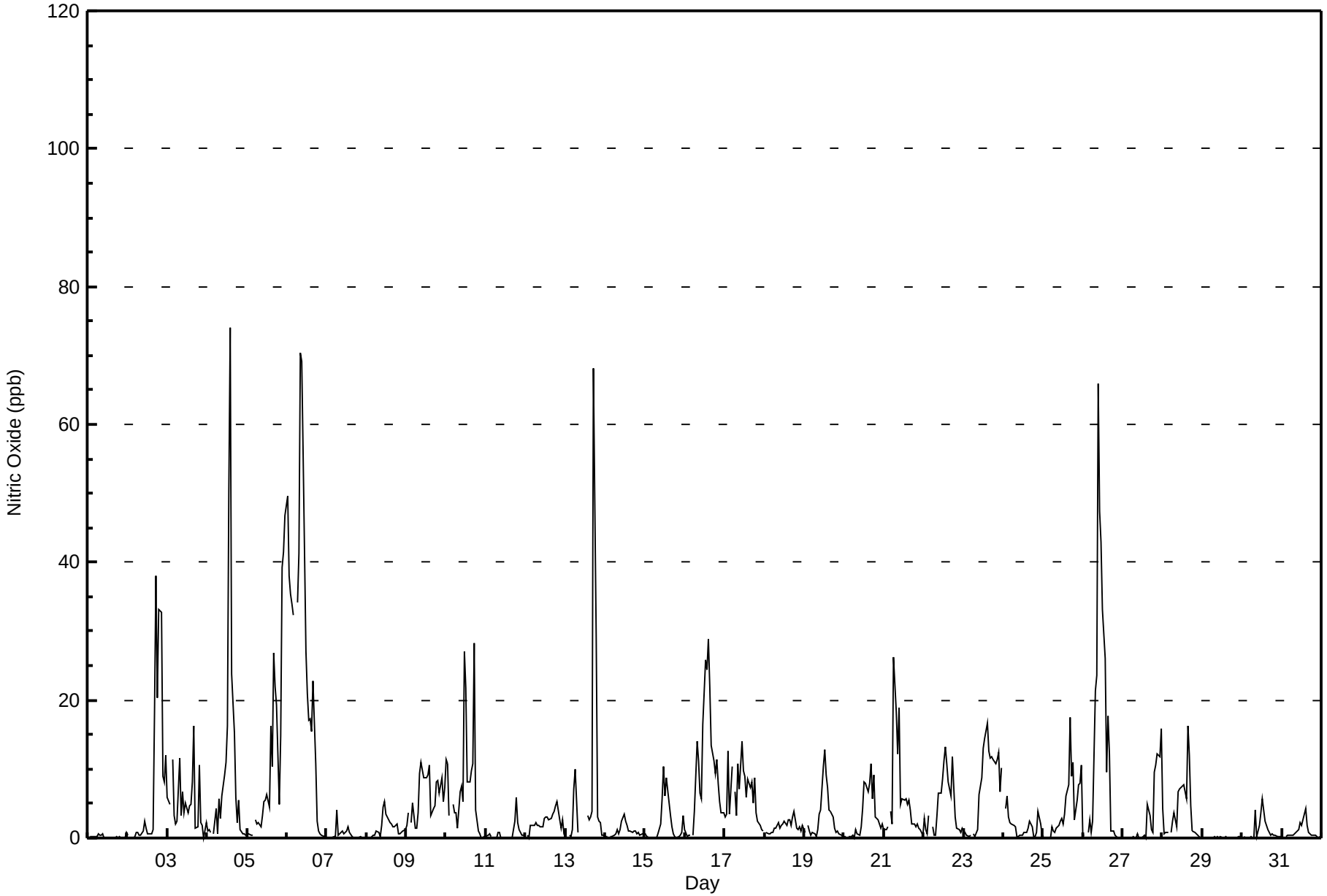
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Patricia McInnes - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	663	94.18	94.18
21 - 40	28	3.98	98.15
11 - 80	13	1.85	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 - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	100	16	7	6	5	22	80	50	51	62	55	48	43	29	18	71	663
21 - 40	4	1	1	4	3	0	3	2	2	2	0	0	0	0	2	4	28
11 - 80	4	2	0	1	0	0	0	3	1	0	0	1	0	0	0	1	13
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	108	19	8	11	8	22	83	55	54	64	55	49	43	29	20	76	704

Total Number of Valid Hours: 704

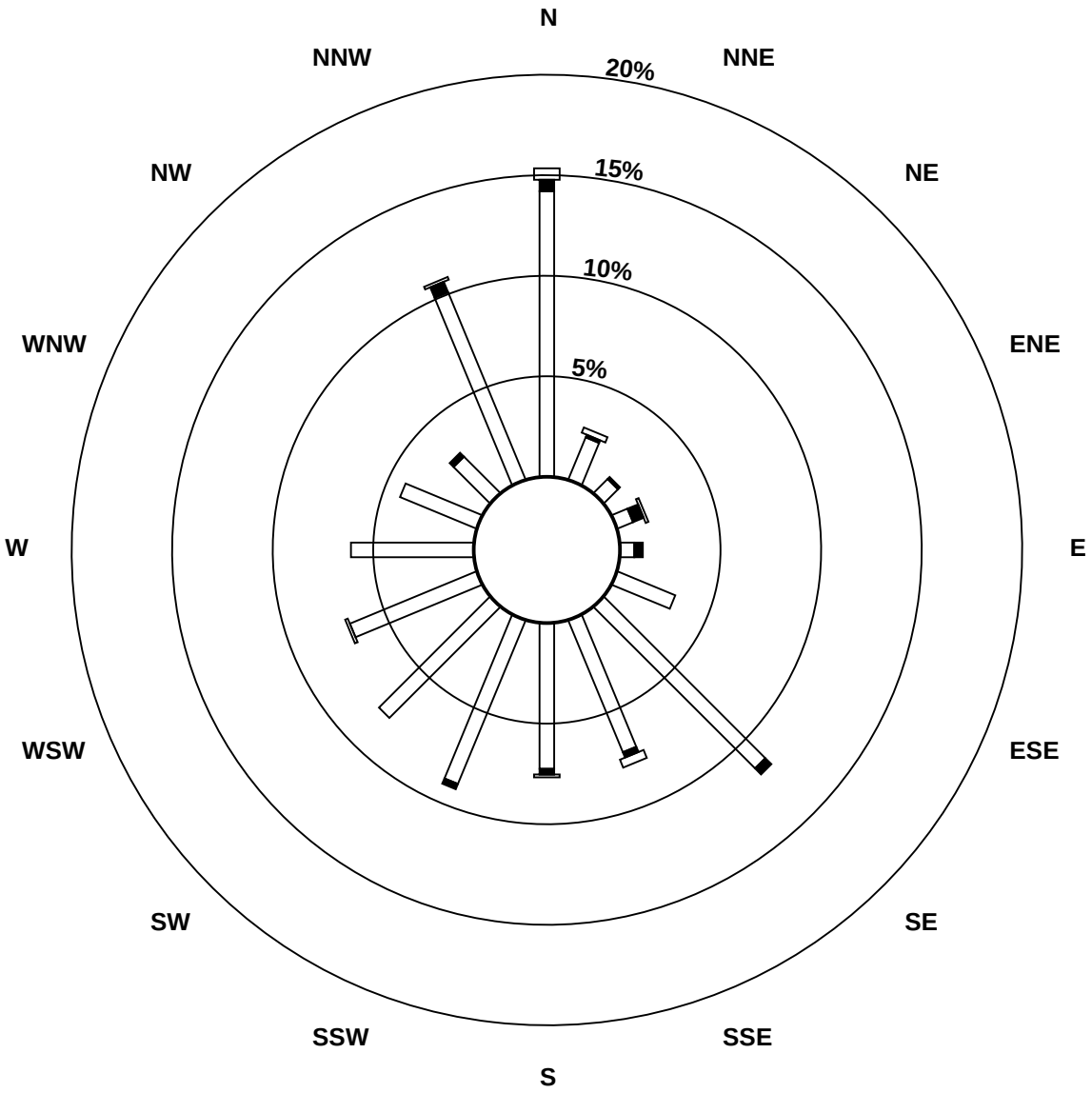
Total Number of Hours: 744

Wood Buffalo Environmental Association

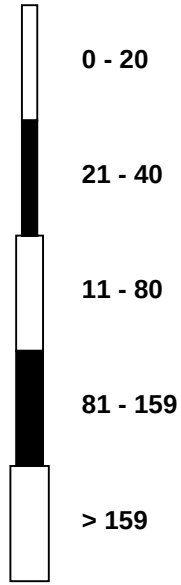
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



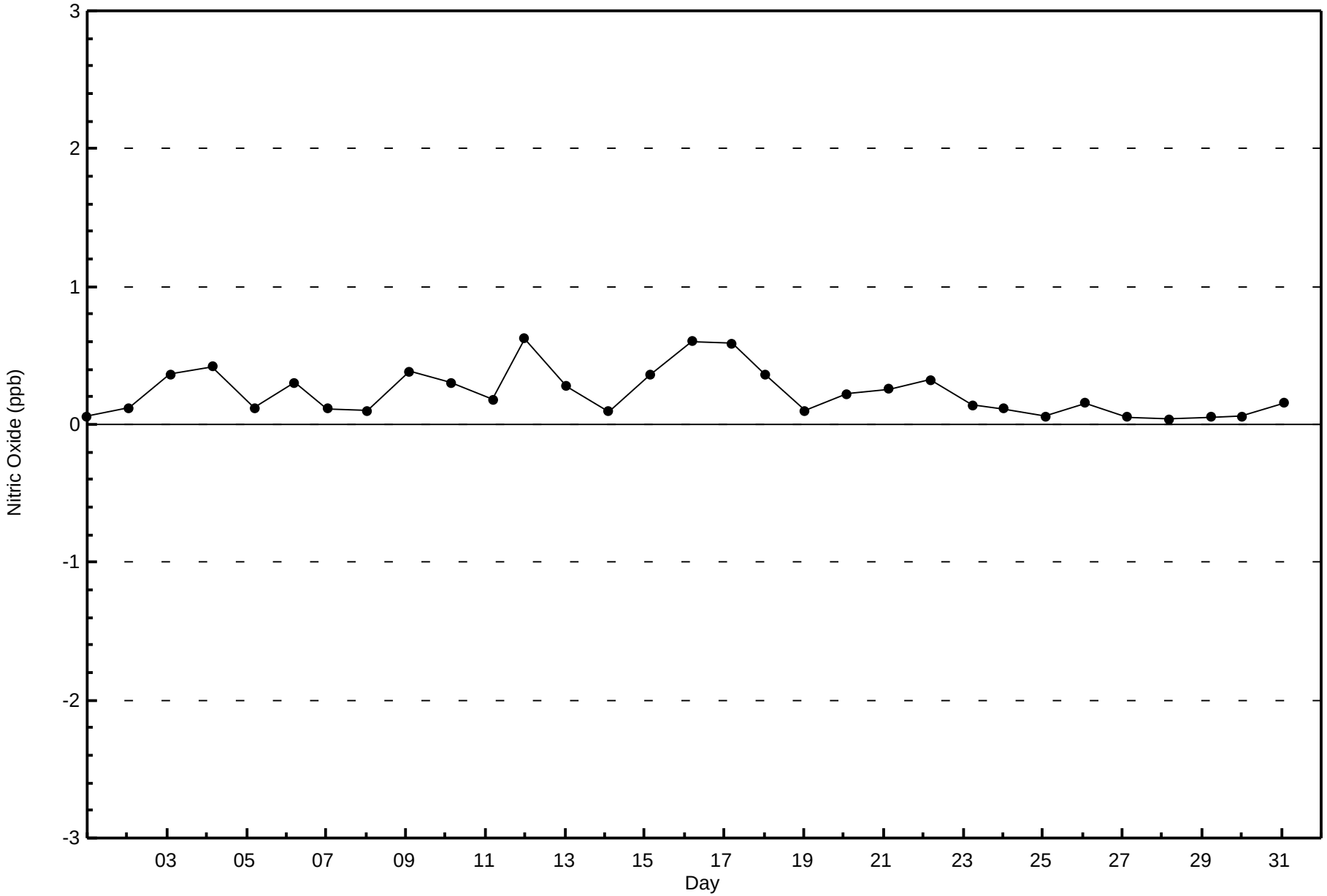
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Patricia McInnes - January 2016

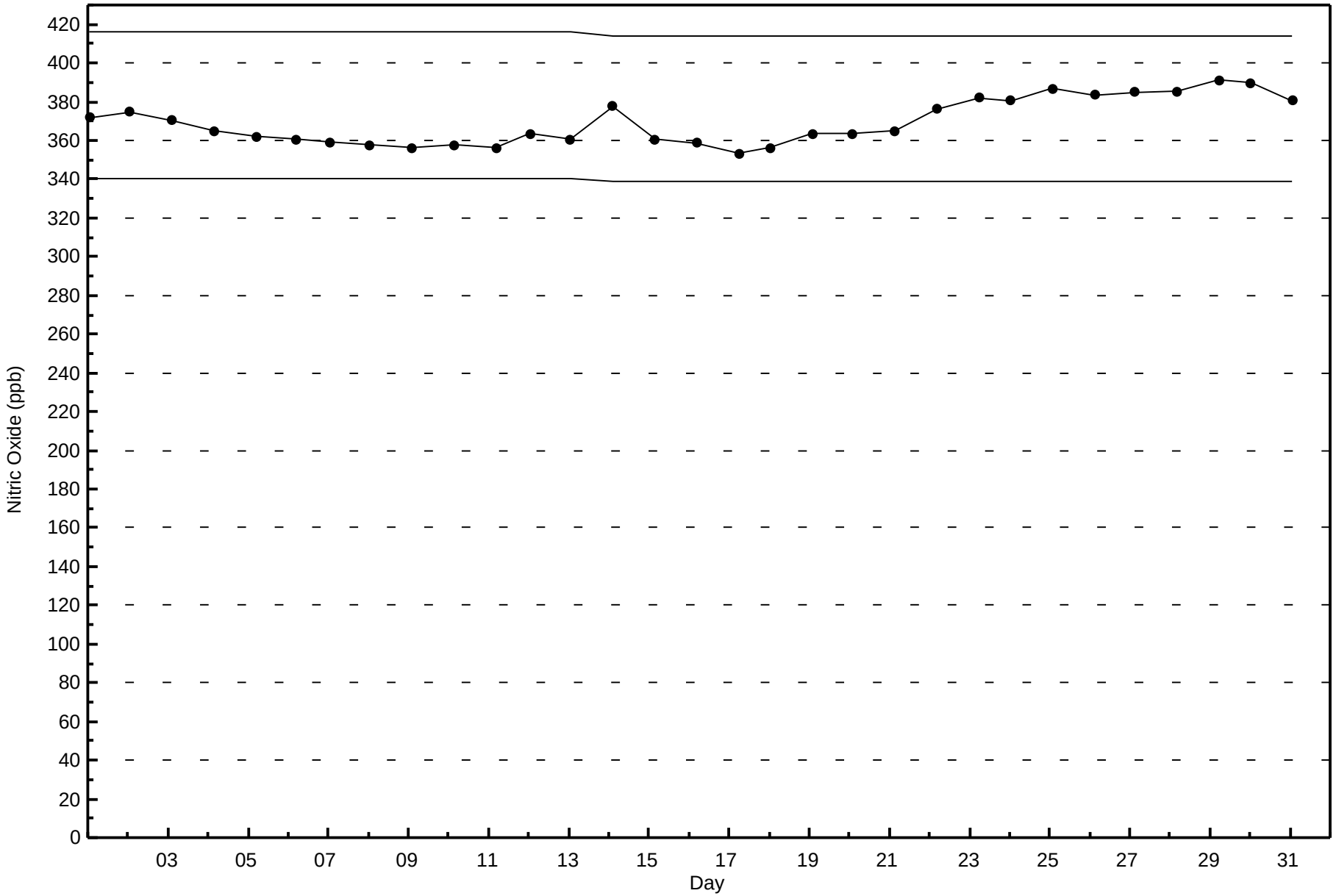


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 41 ppb on Jan 2 20:00

Maximum Daily Average: 21.8 ppb on Jan 6

Minimum Value: 0 ppb on Jan 29 11:00

Minimum Daily Average: 0.4 ppb on Jan 29

Maximum Diurnal Average: 16.1 ppb at hour 17

Minimum Diurnal Average: 7.8 ppb at hour 3

Monthly Average: 10.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 5$ Median = 9 $Q_3 = 16$ $P_{90} = 22$ $P_{99} = 31$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	36
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2	1	2	4	3	4	3	4	3	1	0	0	1	0	0	1	2	1	3	1	1	0	12	2.1	12
2-Jan	10	Z	1	1	2	5	9	3	2	7	7	4	2	2	3	7	28	41	23	41	39	29	23	22	13.5	41
3-Jan	14	17	Z	21	14	12	11	20	9	13	8	8	6	9	12	20	28	11	14	24	16	16	12	17	14.3	28
4-Jan	13	14	11	Z	8	9	6	8	8	12	12	13	15	27	34	25	26	18	9	19	8	5	5	3	13.3	34
5-Jan	5	5	3	3	Z	10	9	8	6	9	11	8	8	7	19	23	32	26	22	18	23	29	30	30	14.9	32
6-Jan	30	23	20	19	19	Z	20	22	31	31	27	21	19	18	23	26	31	28	26	20	15	16	10	9	21.8	31
7-Jan	Z	4	2	2	3	3	10	7	5	5	5	5	6	8	6	5	4	3	2	1	2	1	1	1	3.9	10
8-Jan	1	Z	3	9	9	9	11	11	10	17	16	15	11	9	10	13	17	14	9	4	6	6	7	8	9.7	17
9-Jan	12	16	Z	13	13	9	6	16	24	24	17	13	11	12	16	11	13	18	24	28	25	27	22	22	16.9	28
10-Jan	23	22	17	Z	17	17	14	11	18	16	11	20	18	12	15	19	23	25	22	8	9	7	6	7	15.5	25
11-Jan	8	8	9	5	Z	14	17	10	4	1	0	M	M	M	M	2	1	16	22	12	11	8	7	7	8.4	22
12-Jan	Z	5	1	15	15	12	13	7	7	5	5	7	8	7	7	12	17	18	17	20	16	15	16	10	11.0	20
13-Jan	7	Z	7	6	7	17	20	9	C	C	C	C	C	7	6	8	9	22	12	7	8	7	4	4	9.2	22
14-Jan	8	7	Z	7	6	6	6	9	7	7	12	12	8	7	6	7	7	7	9	8	8	8	12	18	8.3	18
15-Jan	12	4	5	Z	3	4	5	4	13	13	14	15	10	15	12	15	14	14	20	18	17	18	17	18	12.2	20
16-Jan	17	14	13	11	Z	14	14	17	17	11	6	13	15	16	23	27	27	26	22	21	18	18	16	14	16.9	27
17-Jan	12	11	19	12	18	Z	15	9	19	11	14	10	9	8	13	15	19	16	21	15	11	8	6	5	12.9	21
18-Jan	Z	4	4	4	4	4	5	7	8	5	4	6	6	5	6	7	8	12	17	9	9	14	13	17	7.6	17
19-Jan	12	Z	20	17	8	8	4	4	10	13	10	14	14	12	12	12	13	12	11	12	13	11	9	9	11.3	20
20-Jan	8	7	Z	6	7	5	4	7	8	5	7	12	14	13	14	20	29	27	25	18	10	13	12	10	12.2	29
21-Jan	9	12	15	Z	15	10	23	23	17	17	8	8	7	8	8	12	14	12	9	9	9	8	7	12	11.7	23
22-Jan	19	14	6	12	Z	8	5	6	12	18	12	11	13	15	16	17	19	22	21	19	15	14	13	17	14.0	22
23-Jan	17	14	11	8	7	Z	8	8	12	16	13	12	14	14	16	16	19	20	19	19	18	18	17	17	14.5	20
24-Jan	Z	14	15	13	10	9	8	7	3	3	2	2	2	2	3	4	8	6	2	3	4	20	16	10	7.2	20
25-Jan	8	Z	6	4	5	10	5	4	6	6	6	4	3	6	10	14	27	29	23	18	18	16	14	13	11.0	29
26-Jan	2	3	Z	5	9	5	10	25	25	34	29	26	23	20	15	21	16	6	6	3	2	1	1	1	12.5	34
27-Jan	1	1	1	Z	1	0	2	1	0	2	0	0	0	1	0	15	13	9	10	19	18	21	21	19	6.7	21
28-Jan	12	6	3	2	Z	4	11	15	7	13	15	16	19	17	15	25	23	17	8	5	3	3	1	1	10.5	25
29-Jan	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.4	2
30-Jan	Z	1	1	1	1	1	1	1	16	2	5	10	11	10	8	8	8	9	6	7	8	5	4	5	5.6	16
31-Jan	7	Z	10	15	12	8	9	8	8	6	5	6	6	9	9	9	8	9	8	7	7	7	5	5	7.8	15
	10.7	9.0	7.8	8.1	8.3	7.9	9.2	9.3	10.6	10.7	9.4	10.0	9.6	9.8	11.2	13.3	16.1	15.8	14.1	13.3	11.7	11.9	10.6	11.0	Diurnal Average	
	30	23	20	21	19	17	23	25	31	34	29	26	23	27	34	27	32	41	26	41	39	29	30	30	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

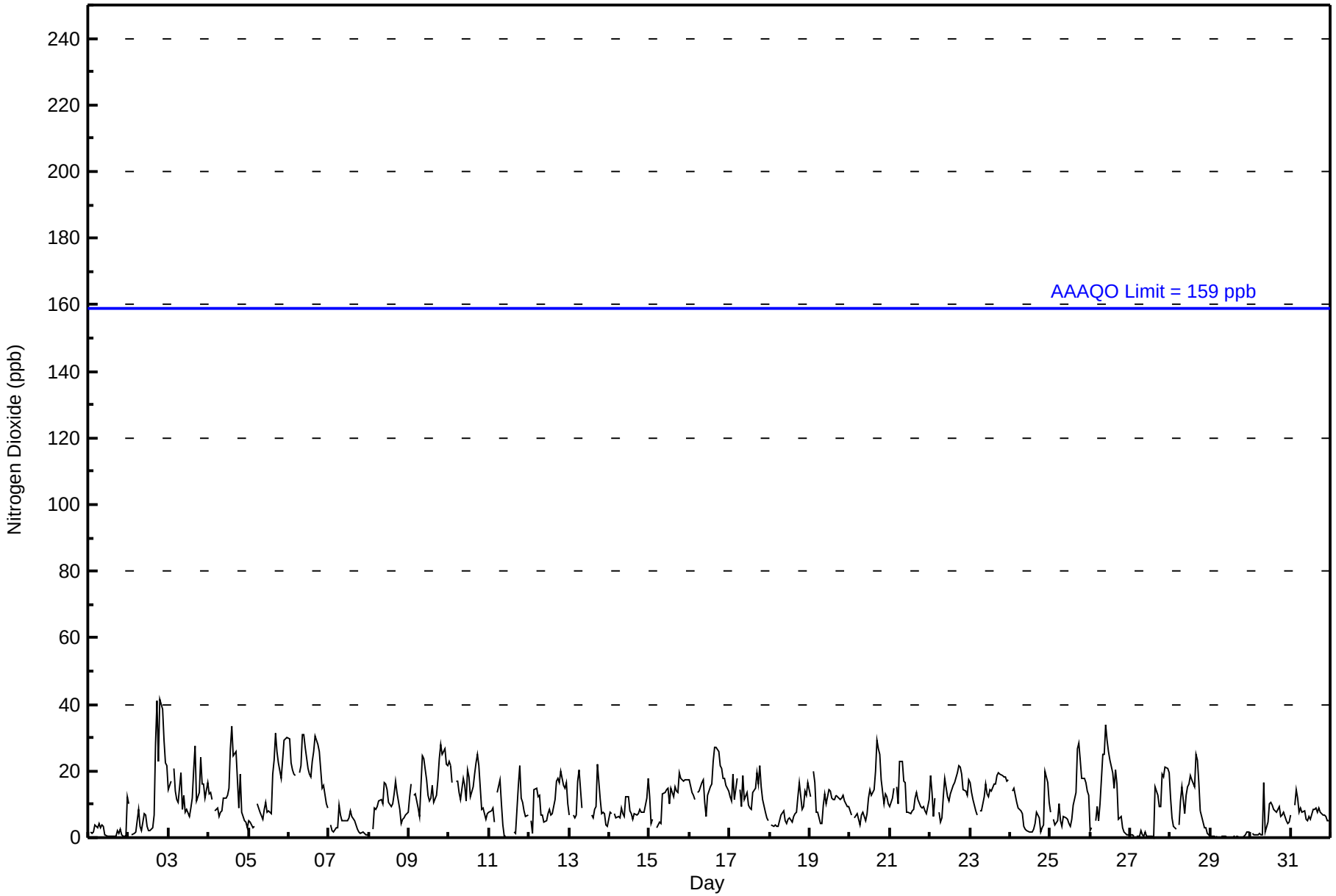
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	626	88.92	88.92
21 - 40	76	10.80	99.72
11 - 80	2	0.28	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 (NO_2) - ppb

Patricia McInnes - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	96	16	7	9	5	20	74	40	43	57	55	47	41	29	18	69	626
21 - 40	12	3	1	2	3	2	8	15	10	7	0	2	2	0	2	7	76
11 - 80	0	0	0	0	0	0	1	0	1	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	108	19	8	11	8	22	83	55	54	64	55	49	43	29	20	76	704

Total Number of Valid Hours: 704

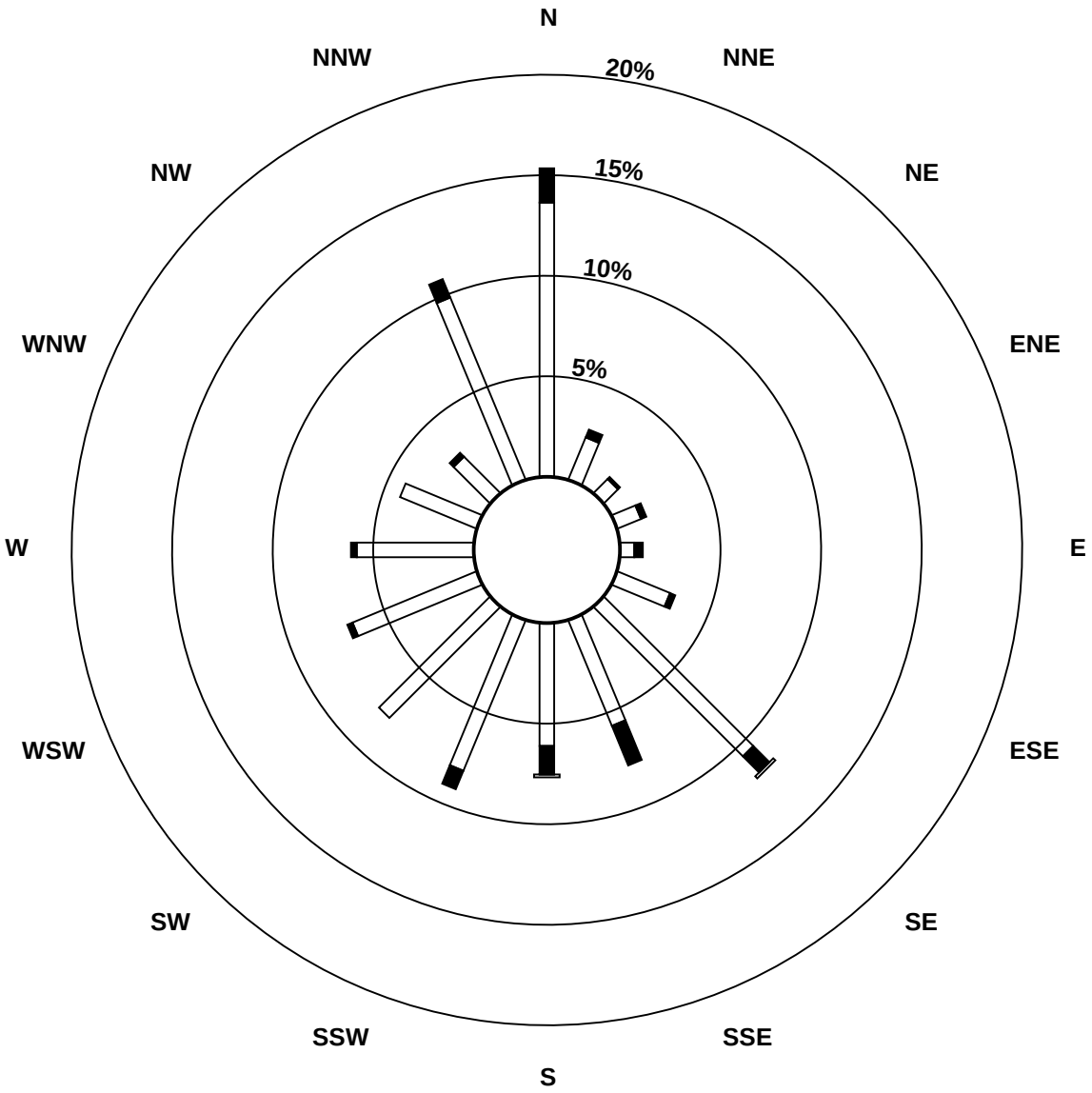
Total Number of Hours: 744

Wood Buffalo Environmental Association

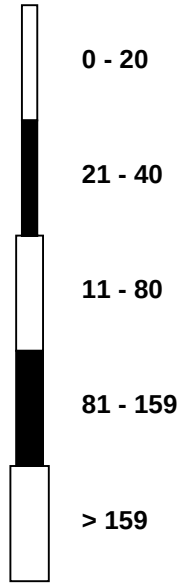
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



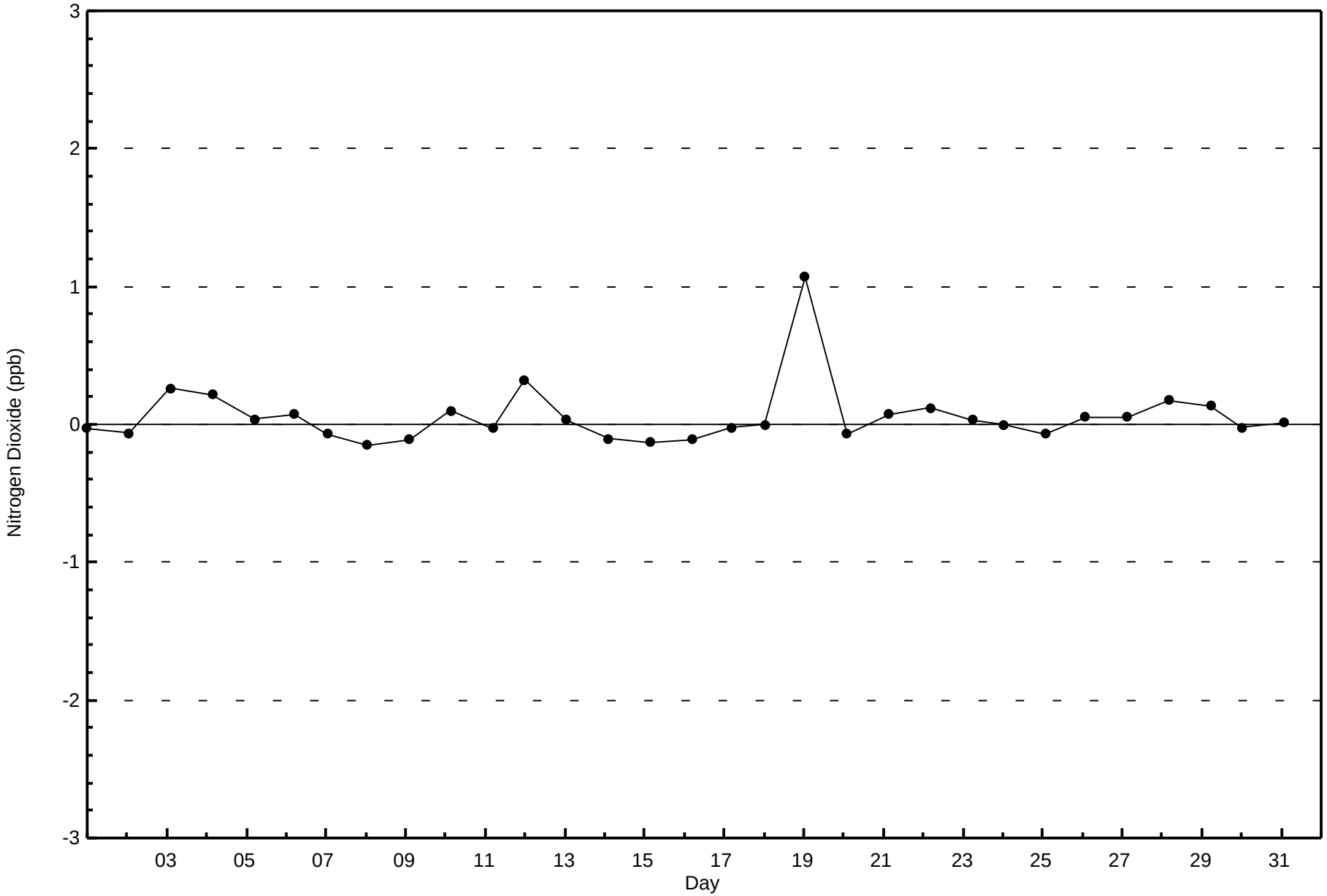
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - January 2016

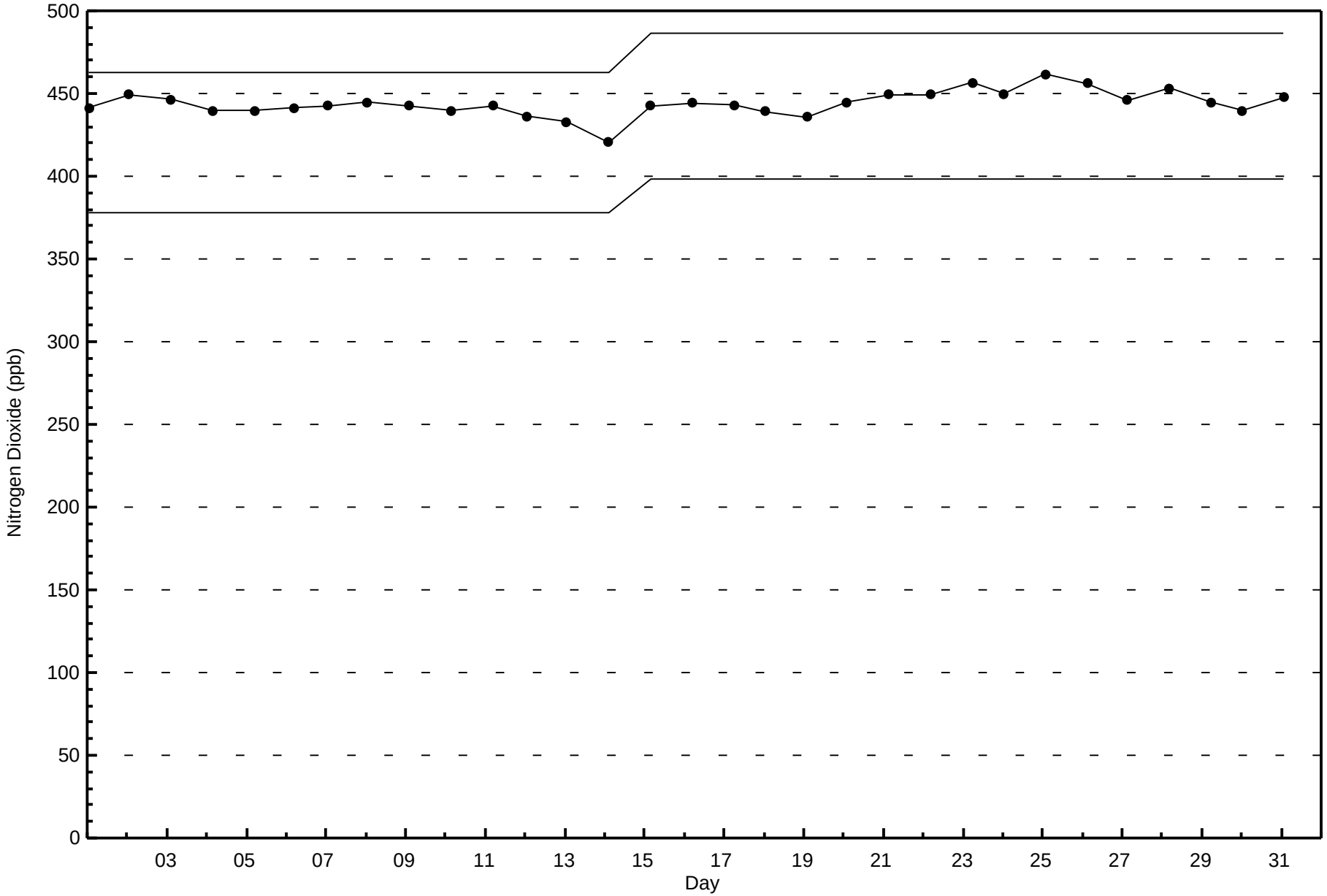


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - January 2016

Maximum Value: 108 ppb on Jan 4 15:00

Maximum Daily Average: 47.7 ppb on Jan 6

Minimum Value: 0 ppb on Jan 29 19:00

Minimum Daily Average: 0.5 ppb on Jan 29

Maximum Diurnal Average: 24.3 ppb at hour 18

Minimum Diurnal Average: 9.3 ppb at hour 6

Monthly Average: 16.2 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 6$ Median = 12 $Q_3 = 21$ $P_{90} = 34$ $P_{99} = 77$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	36
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2	1	2	4	3	5	3	4	4	1	0	0	0	0	0	1	2	1	3	1	0	0	13	2.3	13
2-Jan	11	Z	1	1	2	6	10	4	3	8	9	5	3	3	3	8	46	79	43	75	71	38	31	33	21.4	79
3-Jan	20	22	Z	32	17	13	13	31	12	20	11	13	10	13	17	28	44	13	15	35	18	18	12	19	19.5	44
4-Jan	14	15	12	Z	9	13	7	13	11	18	21	24	31	77	108	48	41	23	11	24	9	6	5	3	23.7	108
5-Jan	5	5	3	4	Z	13	11	10	7	12	16	13	14	12	35	34	58	48	42	22	38	68	71	77	26.9	77
6-Jan	79	61	56	53	51	Z	54	63	101	100	83	48	40	35	40	41	53	39	28	21	16	16	10	9	47.7	101
7-Jan	Z	4	2	2	3	3	14	7	6	6	6	6	7	10	7	5	4	3	2	1	2	1	1	1	4.4	14
8-Jan	1	Z	3	9	9	10	12	12	10	19	21	20	14	12	12	15	18	15	10	5	6	7	8	9	11.2	21
9-Jan	14	20	Z	15	18	10	8	19	34	35	26	21	20	21	26	14	17	22	32	36	31	35	27	29	23.1	36
10-Jan	34	32	20	Z	22	20	17	13	25	23	16	47	40	21	23	29	33	54	26	10	10	7	6	7	23.2	54
11-Jan	8	9	9	5	Z	14	17	11	5	1	0	M	M	M	M	2	1	18	28	14	12	9	7	7	9.2	28
12-Jan	Z	5	1	17	17	14	15	8	8	6	7	10	11	10	10	14	20	22	21	25	18	16	19	11	13.3	25
13-Jan	7	Z	7	6	8	24	30	10	C	C	C	C	C	10	9	11	13	90	41	10	10	9	4	4	16.9	90
14-Jan	8	7	Z	7	6	7	6	10	8	8	14	16	10	9	6	8	8	8	10	8	8	8	12	18	9.3	18
15-Jan	13	5	5	Z	3	4	5	4	14	15	20	25	16	24	18	18	16	14	20	18	17	18	18	21	14.4	25
16-Jan	19	14	13	12	Z	14	18	31	28	17	12	29	41	40	52	49	40	37	31	32	26	23	19	17	26.8	52
17-Jan	15	15	32	15	28	Z	21	13	29	19	28	20	18	14	22	22	27	21	30	19	14	9	7	6	19.3	32
18-Jan	Z	5	4	4	4	4	6	8	10	7	6	8	8	7	9	10	10	15	20	10	10	15	14	18	9.3	20
19-Jan	13	Z	22	18	8	8	5	4	11	16	14	25	27	21	19	16	17	15	13	13	14	12	10	10	14.3	27
20-Jan	8	7	Z	6	7	6	4	8	8	6	9	16	23	21	21	28	40	32	34	21	13	15	14	12	15.6	40
21-Jan	11	13	16	Z	19	12	49	41	29	36	13	13	13	14	13	17	18	13	11	10	11	10	8	12	17.5	49
22-Jan	22	15	7	15	Z	9	5	6	16	25	19	19	24	28	26	25	25	34	28	22	16	15	13	19	18.8	34
23-Jan	18	14	12	8	7	Z	9	8	14	22	21	21	27	28	33	29	30	32	30	29	30	31	24	28	21.9	33
24-Jan	Z	18	21	16	12	11	10	9	4	3	3	2	3	3	3	5	10	8	2	3	4	24	18	11	8.8	24
25-Jan	8	Z	6	4	5	12	6	4	7	8	8	7	5	9	16	21	44	38	34	20	23	24	22	23	15.5	44
26-Jan	3	3	Z	6	12	6	12	46	49	100	77	69	57	46	25	38	28	6	7	3	2	1	1	1	26.0	100
27-Jan	1	1	1	Z	0	0	2	1	0	2	0	0	1	1	0	20	16	11	10	28	29	33	33	35	9.9	35
28-Jan	16	6	4	3	Z	5	13	19	9	20	22	23	26	25	21	41	35	21	9	5	4	3	1	1	14.5	41
29-Jan	1	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.5	2
30-Jan	Z	1	1	1	1	1	1	1	21	2	7	14	16	14	11	9	9	10	7	7	8	5	4	5	6.8	21
31-Jan	7	Z	10	15	12	8	9	8	9	7	6	9	7	12	13	11	9	10	8	7	7	7	5	5	8.8	15
	14.2	12.0	10.4	10.6	11.0	9.3	12.8	13.8	16.4	18.8	16.5	18.1	17.7	17.9	20.0	20.0	23.7	24.3	19.6	17.4	15.4	15.7	13.8	15.1	Diurnal Average	
	79	61	56	53	51	24	54	63	101	100	83	69	57	77	108	49	58	90	43	75	71	68	71	77	Diurnal Maximum	

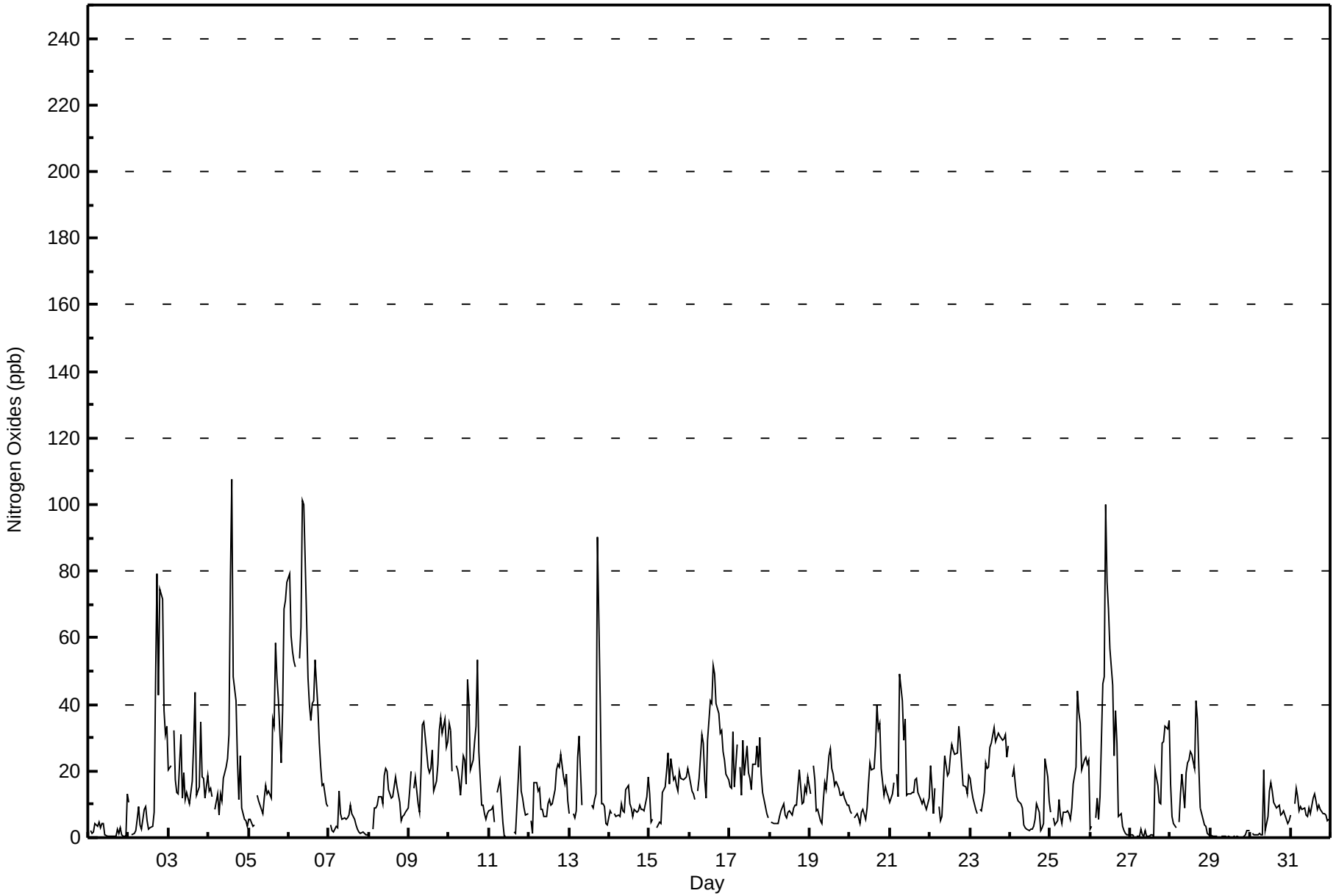
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	516	73.30	73.30
21 - 40	141	20.03	93.32
11 - 80	41	5.82	99.15
81 - 159	6	0.85	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	77	13	6	6	0	17	57	27	33	47	47	45	38	28	16	59	516
21 - 40	25	3	1	1	5	4	23	21	17	12	8	3	5	1	2	10	141
11 - 80	4	3	1	3	3	1	3	7	3	5	0	0	0	0	2	6	41
81 - 159	2	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	6
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	108	19	8	11	8	22	83	55	54	64	55	49	43	29	20	76	704

Total Number of Valid Hours: 704

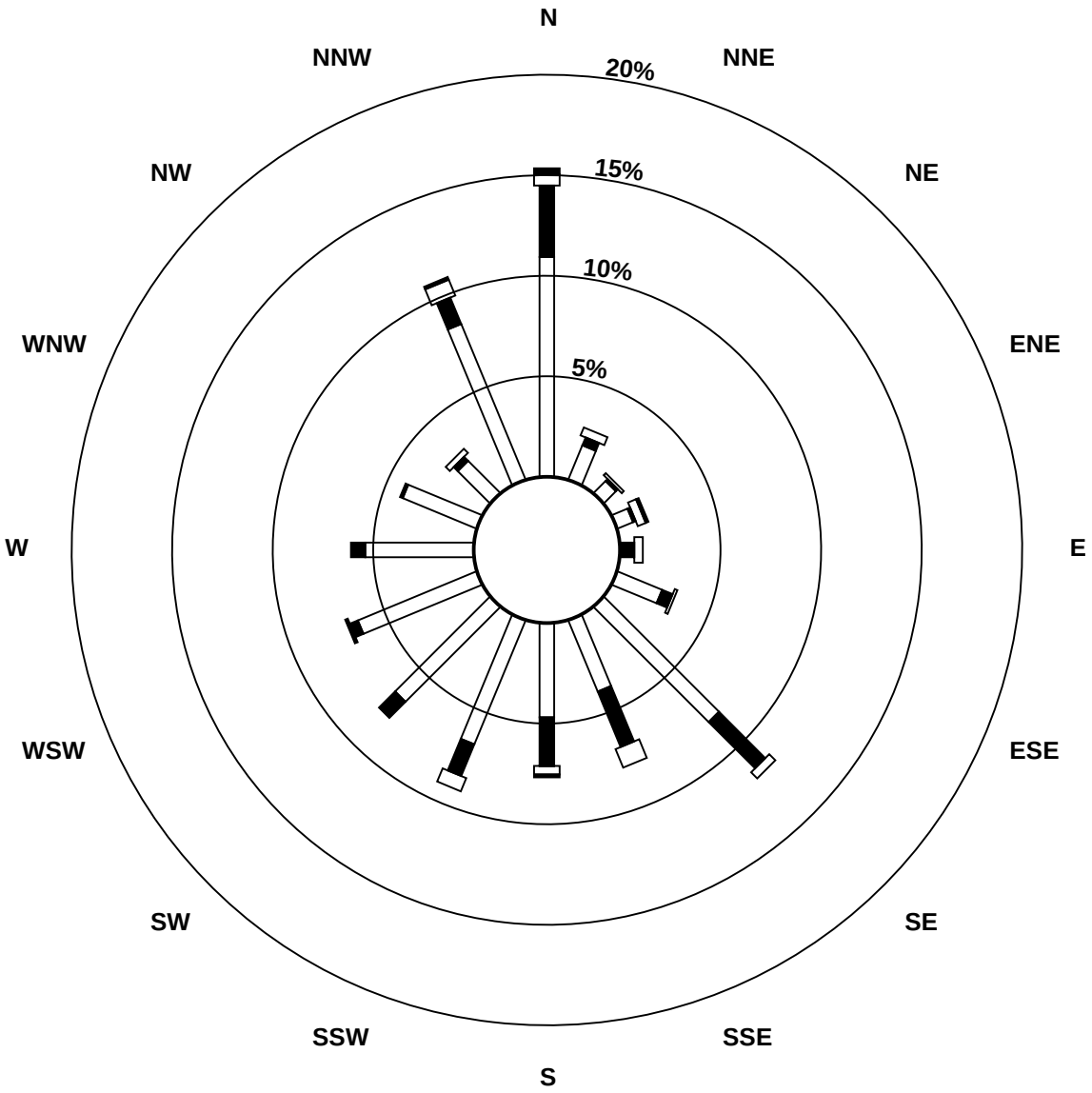
Total Number of Hours: 744

Wood Buffalo Environmental Association

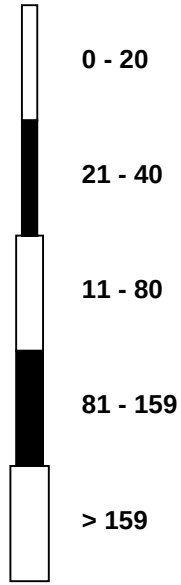
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



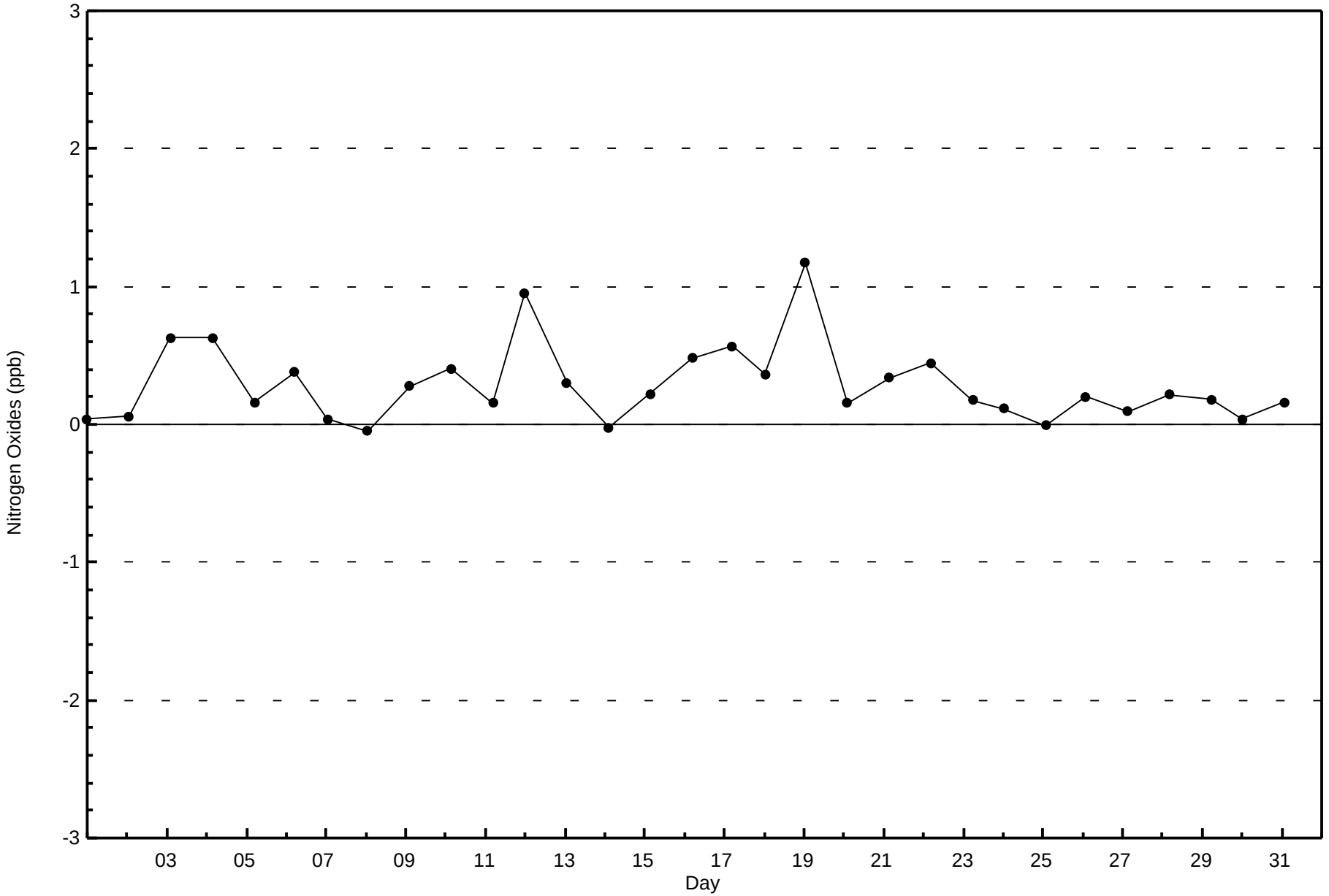
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - January 2016

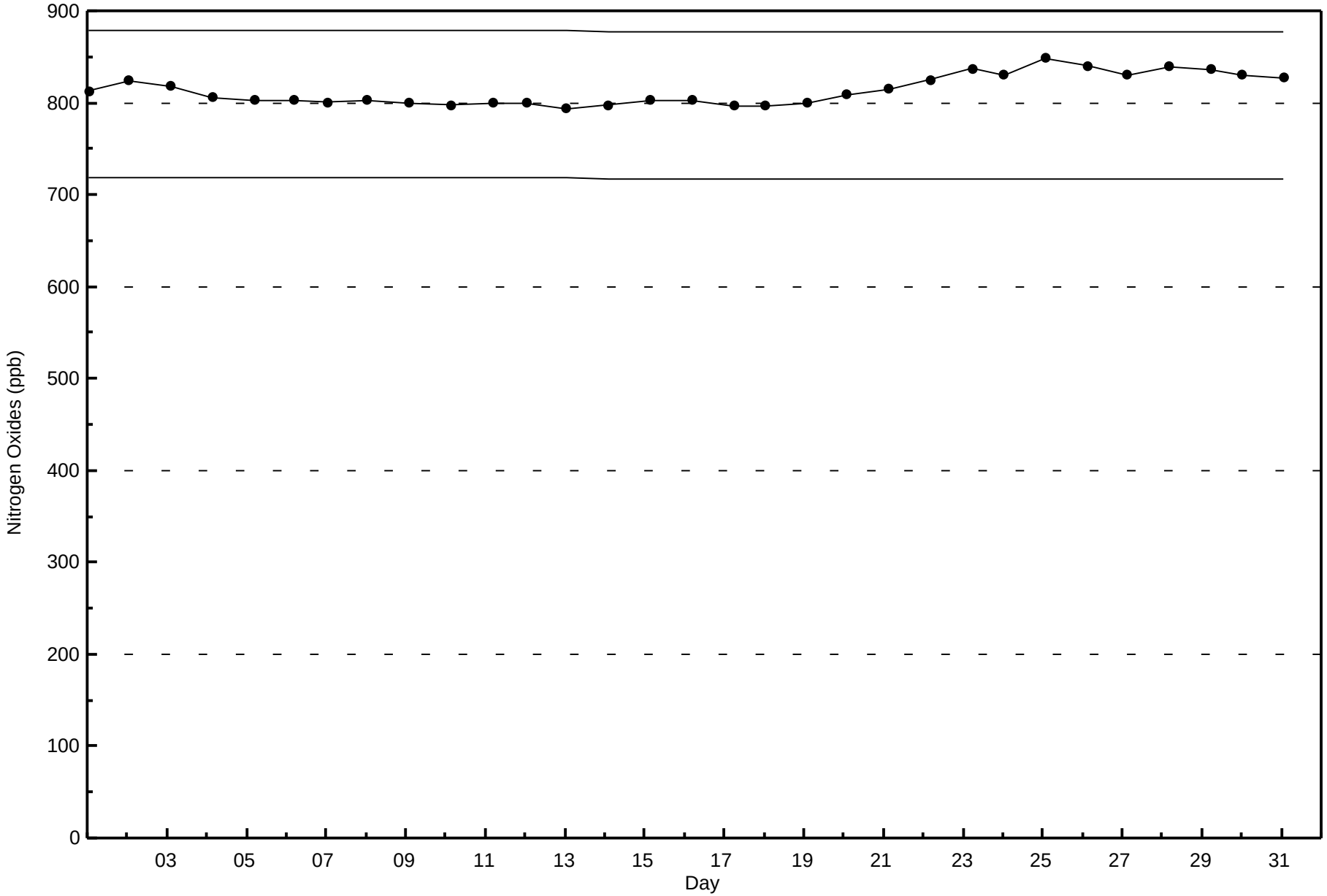


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH_3) - ppb

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 1-hr: 0

Maximum Value: 11 ppb on Jan 4 15:00

Maximum Daily Average: 0.5 ppb on Jan 4

Minimum Value: 0 ppb on Jan 1 01:00

Minimum Daily Average: 0.0 ppb on Jan 1

Maximum Diurnal Average: 0.4 ppb at hour 15

Minimum Diurnal Average: 0.0 ppb at hour 1

Monthly Average: 0.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 0$

Hours in Service:	744
Hours of Data:	668
Hours of Missing Data:	76
Hours of Calibration:	41
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0.5	11
5-Jan	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Jan	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Jan	0	0	0	0	0	0	Z	RE	0	0	0	M	M	M	M	0	0	0	0	0	0	0	0	0	0.0	0
12-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Jan	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Jan	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-Jan	0	0	Z	RE	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	0	0	0	0	0	--	0
19-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Jan	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Jan	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Jan	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Jan	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance RE - Recovery

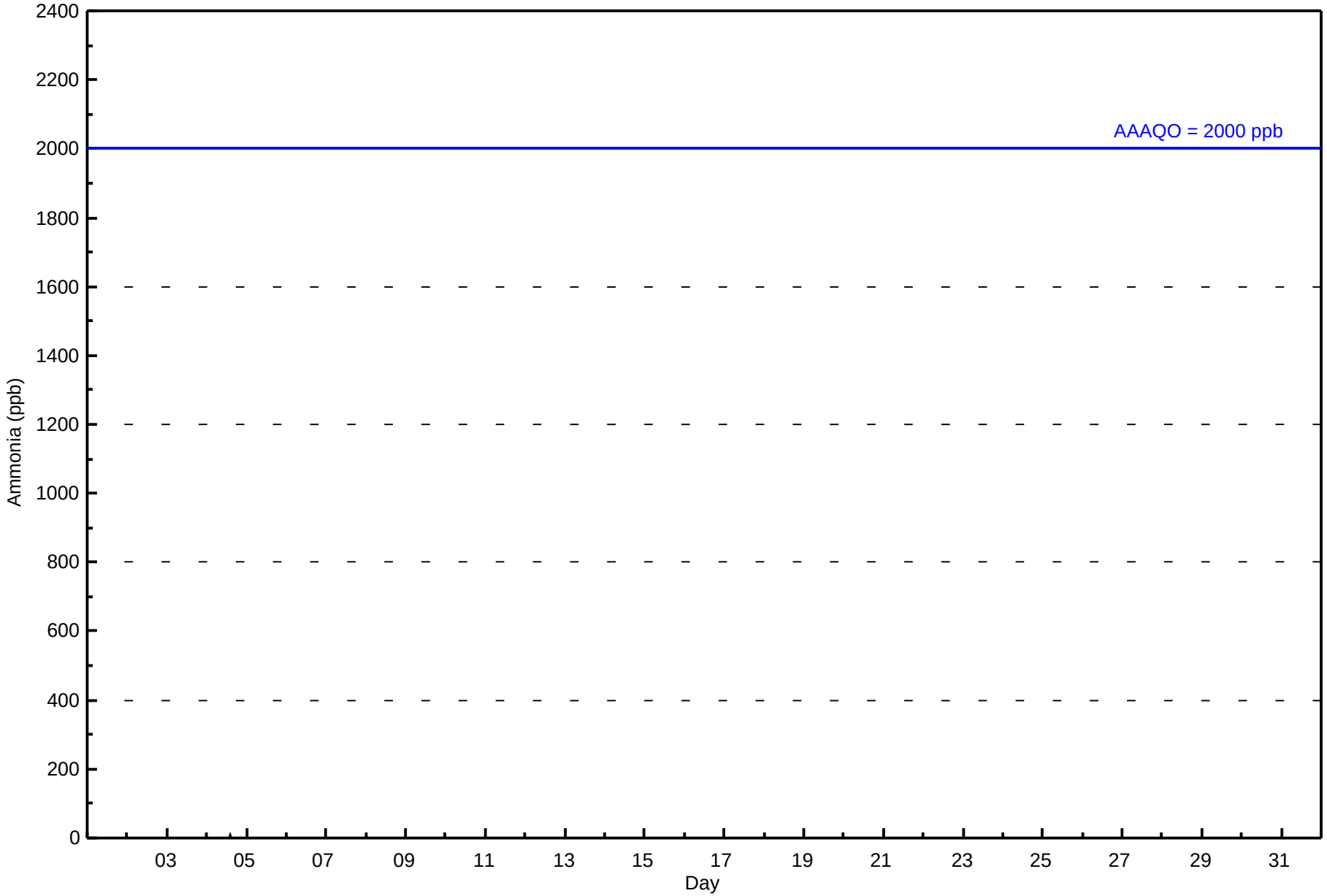
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ammonia (NH_3) - ppb

Patricia McInnes - January 2016



Ammonia (NH_3) - ppb

Patricia McInnes - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	667	99.85	99.85
6 - 10	0	0.00	99.85
11 - 15	1	0.15	100.00
16 - 20	0	0.00	100.00
21 - 25	0	0.00	100.00
> 26	0	0.00	100.00

Total Number of Valid Hours: 668

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ammonia (NH_3) - ppb

Patricia McInnes - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	103	17	8	11	12	19	78	49	54	59	51	43	39	30	21	73	667
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	17	8	11	12	19	78	49	54	59	51	44	39	30	21	73	668

Total Number of Valid Hours: 668

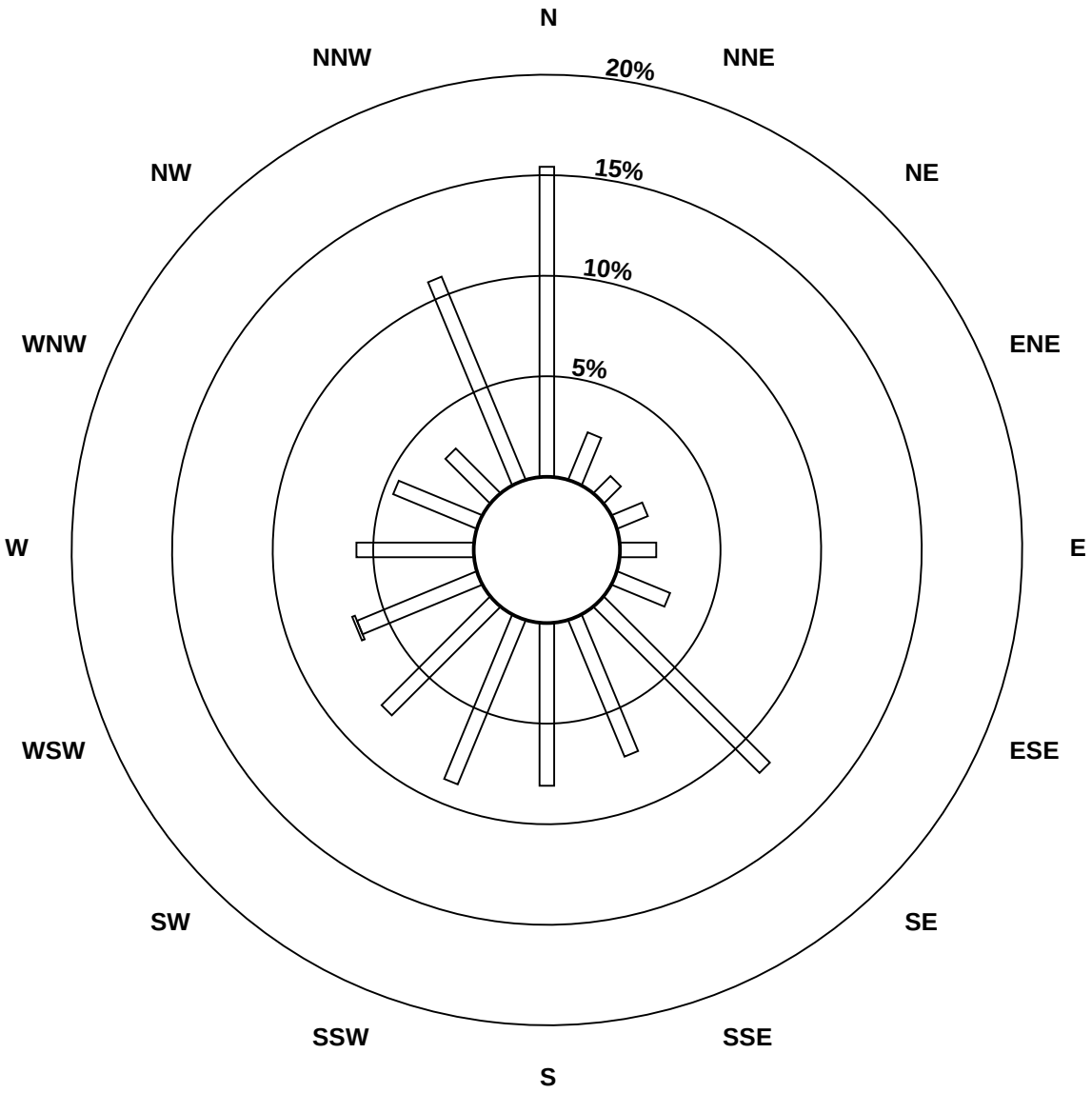
Total Number of Hours: 744

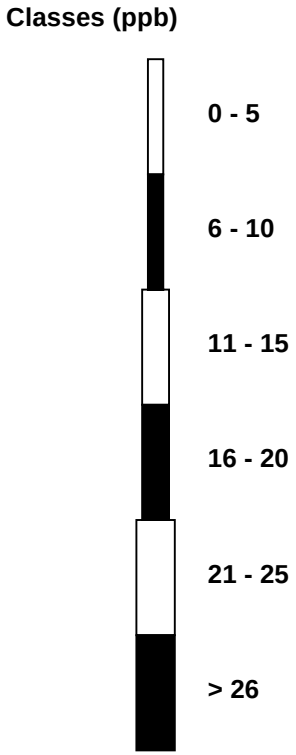
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Ammonia (NH_3) - ppb

Patricia McInnes (AMS 6)





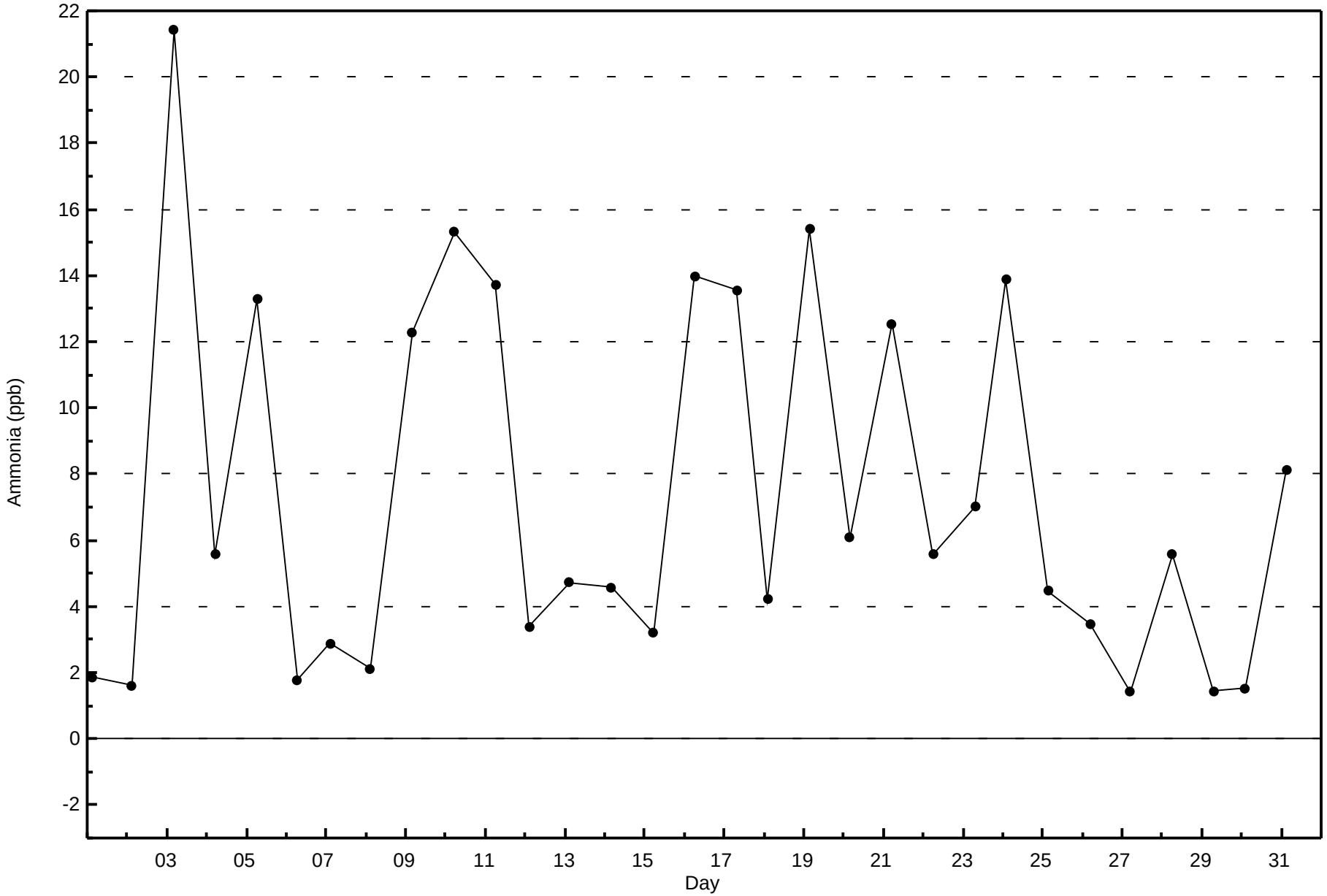
Total Number of Valid Hours: 668

Wood Buffalo Environmental Association

Zero Responses

Ammonia (NH_3) - ppb

Patricia McInnes - January 2016

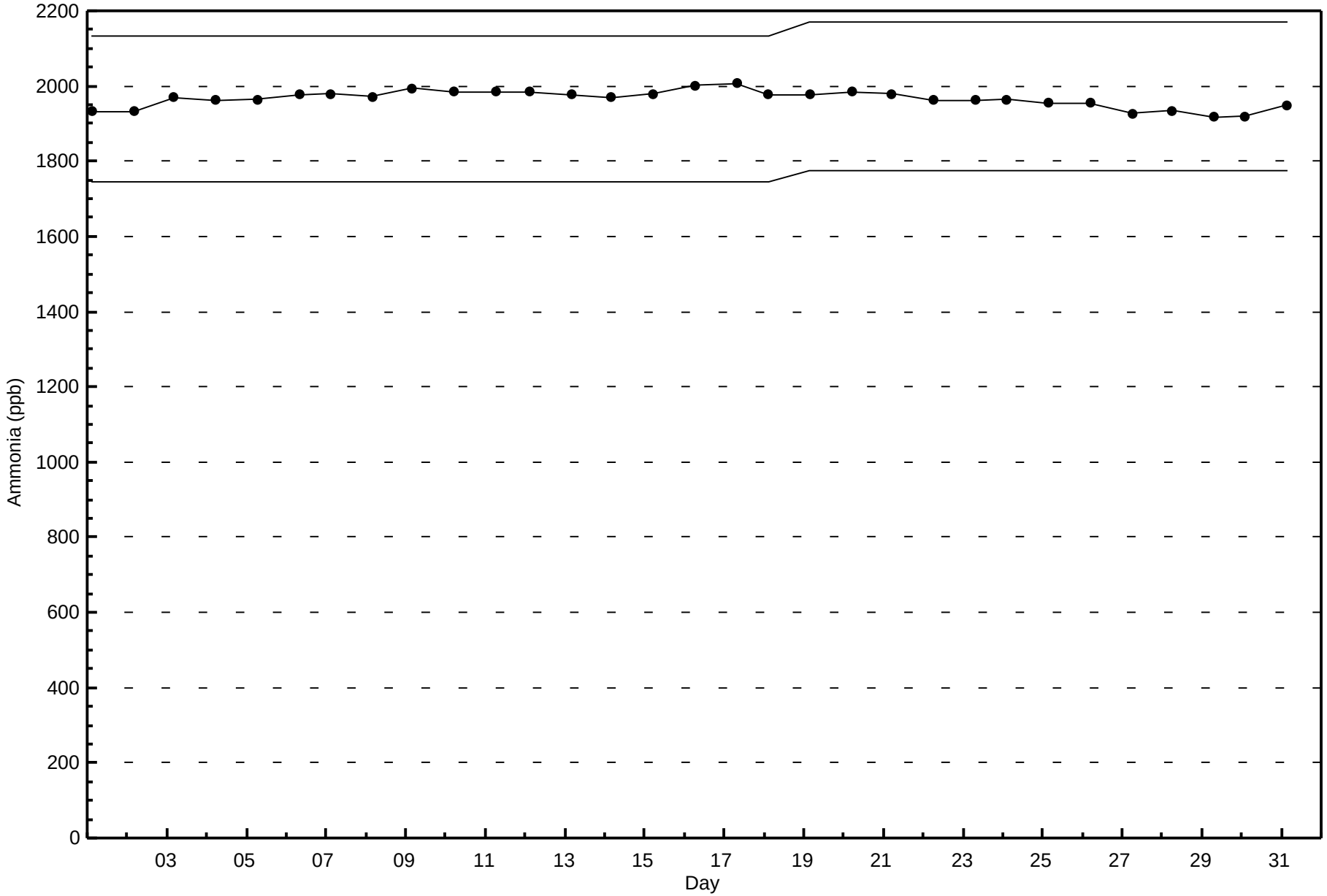


Wood Buffalo Environmental Association

Span Responses

Ammonia (NH_3) - ppb

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 81.1 $\mu g/m^3$ on Jan 2 21:00

Maximum Daily Average: 15.7 $\mu g/m^3$ on Jan 23

Minimum Value: 0.3 $\mu g/m^3$ on Jan 7 08:00

Minimum Daily Average: 0.6 $\mu g/m^3$ on Jan 29

Maximum Diurnal Average: 7.9 $\mu g/m^3$ at hour 21

Minimum Diurnal Average: 3.9 $\mu g/m^3$ at hour 6

Monthly Average: 5.68 $\mu g/m^3$

Percentiles: $P_1 = 0.5$ $P_{10} = 0.9$ $Q_1 = 2.0$ Median = 3.9 $Q_3 = 7.6$ $P_{90} = 12.5$ $P_{99} = 21.1$

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Hours of Calibration:	2
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	1.4	1.8	2.1	3.5	2.3	1.7	1.2	0.9	0.8	0.9	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.4	1.3	1.6	1.8	1.4	1.4	4.7	1.6	4.7
2-Jan	4.3	1.5	1.3	1.4	1.5	1.6	1.2	0.8	0.9	1.1	3.4	3.8	3.3	2.4	2.3	3.1	9.0	21.6	14.4	23.1	81.1	18.9	24.0	16.3	10.1	81.1
3-Jan	10.6	14.1	68.2	6.0	3.2	3.1	2.3	3.6	3.1	3.3	2.8	2.4	3.9	3.2	3.9	8.1	8.9	5.0	12.5	20.4	11.8	10.7	11.3	12.6	9.8	68.2
4-Jan	11.7	11.9	10.7	9.7	8.6	8.5	8.1	6.9	6.7	8.1	7.7	7.7	6.9	9.7	13.3	6.2	5.9	4.9	2.0	2.7	1.7	4.8	5.7	3.7	7.2	13.3
5-Jan	4.3	4.8	1.7	2.1	2.7	3.3	3.3	3.5	3.7	4.9	5.6	4.0	3.3	3.4	6.5	6.9	9.2	10.3	12.2	7.5	9.2	12.3	15.4	13.5	6.4	15.4
6-Jan	14.5	10.6	11.1	10.5	9.9	9.1	9.6	14.2	22.8	19.7	15.8	10.2	8.1	6.3	9.9	13.1	17.1	19.4	7.6	5.6	3.8	3.3	3.0	2.7	10.7	22.8
7-Jan	2.1	2.2	1.0	0.4	0.6	0.3	0.5	0.3	0.3	0.6	1.6	2.1	2.4	3.3	2.4	1.6	1.3	0.9	0.5	0.4	0.4	0.7	0.6	0.6	1.1	3.3
8-Jan	0.7	0.5	0.5	1.5	1.4	1.3	1.7	2.9	4.2	5.9	7.4	7.5	3.9	2.5	2.3	2.8	3.6	3.7	2.7	1.9	3.4	3.2	4.7	12.5	3.5	12.5
9-Jan	11.8	11.5	3.1	3.7	3.7	3.1	4.2	6.8	7.8	7.2	7.3	7.7	6.5	6.9	8.2	7.0	6.0	8.6	13.1	10.6	18.4	13.0	11.7	12.6	8.3	18.4
10-Jan	13.3	12.4	6.8	7.3	6.3	7.8	8.5	12.6	9.3	10.8	13.0	11.2	11.8	11.0	10.4	12.6	16.5	16.7	12.2	5.8	3.9	3.5	3.6	4.2	9.6	16.7
11-Jan	3.7	5.6	5.1	2.4	1.4	2.9	2.9	2.5	1.5	1.1	1.2	1.2	2.0	1.2	1.0	1.1	0.5	2.3	3.6	1.6	2.2	1.8	1.3	3.3	2.2	5.6
12-Jan	6.8	0.6	0.4	1.0	1.1	0.9	1.1	1.1	1.3	1.0	1.1	1.2	2.2	1.3	1.5	1.6	2.7	4.5	4.7	6.9	3.9	3.7	3.9	3.5	2.4	6.9
13-Jan	2.9	3.8	4.0	3.3	3.4	4.4	9.4	5.0	10.2	12.6	12.8	12.0	12.9	12.1	7.8	6.1	5.8	6.7	7.9	7.3	6.3	4.4	3.5	3.8	7.0	12.9
14-Jan	5.1	5.4	6.2	5.7	5.0	4.3	3.5	3.7	2.9	1.5	2.6	2.4	3.4	3.8	3.1	3.3	2.1	1.5	2.6	3.3	3.6	3.1	3.7	6.1	3.7	6.2
15-Jan	6.6	2.1	7.8	7.5	2.6	2.0	2.8	2.6	4.0	4.6	4.2	4.4	2.4	6.6	4.0	4.3	5.6	7.7	3.7	3.5	3.4	3.7	3.4	3.0	4.3	7.8
16-Jan	6.6	4.5	7.3	6.8	23.5	5.3	4.3	5.2	4.5	3.0	1.7	5.9	4.3	5.4	5.8	9.3	9.3	10.0	16.6	14.5	7.2	5.8	5.5	5.5	7.4	23.5
17-Jan	6.6	3.3	8.8	3.4	6.5	3.5	2.3	1.7	5.5	2.3	4.8	4.0	3.2	3.3	5.0	5.2	5.2	4.8	7.9	3.5	2.8	1.8	1.3	0.9	4.1	8.8
18-Jan	2.0	1.4	0.9	0.8	0.9	0.7	0.7	0.9	1.0	0.8	0.8	0.9	0.9	0.9	1.1	1.5	2.0	2.8	5.7	2.8	3.0	3.5	4.1	4.9	1.9	5.7
19-Jan	3.8	3.4	3.6	3.0	2.1	1.9	2.0	2.0	2.2	3.4	3.5	C	C	4.6	5.9	5.1	4.3	4.8	4.8	5.5	5.9	5.9	5.3	5.5	4.0	5.9
20-Jan	4.9	4.0	3.9	3.3	3.1	1.8	1.3	1.6	1.8	1.5	2.1	2.8	2.5	2.5	3.6	4.7	7.2	7.5	7.6	5.5	5.5	7.4	9.2	8.7	4.3	9.2
21-Jan	6.0	6.0	9.2	9.6	7.0	5.1	6.3	7.3	6.3	8.5	12.8	16.1	17.5	14.8	12.0	10.3	8.6	7.0	5.4	4.6	5.2	6.3	5.6	7.5	8.5	17.5
22-Jan	9.5	8.2	10.3	7.3	6.6	10.0	10.7	11.3	12.0	12.6	12.0	11.8	15.1	14.0	13.3	14.3	16.6	17.9	15.3	15.0	11.8	12.5	11.1	8.5	12.0	17.9
23-Jan	8.9	10.8	9.4	9.2	9.2	10.2	11.4	12.2	14.8	16.7	18.4	17.6	18.6	19.4	20.6	21.2	21.7	21.6	20.7	20.9	17.3	17.4	14.3	15.6	15.7	21.7
24-Jan	14.7	12.5	12.9	10.6	9.4	9.5	8.9	6.5	4.0	4.1	4.3	4.0	3.8	3.3	2.9	3.4	4.6	4.8	4.5	4.3	3.9	6.7	9.3	9.3	6.8	14.7
25-Jan	10.5	12.5	10.1	7.5	8.1	8.8	4.8	3.0	4.6	4.8	3.6	2.5	1.7	1.6	2.1	4.1	6.2	5.2	8.4	6.2	8.1	8.0	10.9	7.3	6.3	12.5
26-Jan	1.5	2.0	2.2	2.6	2.1	2.1	1.8	2.3	3.4	5.5	6.0	6.2	4.7	7.6	5.0	8.4	4.0	1.8	1.8	1.9	1.8	1.5	0.9	0.6	3.2	8.4
27-Jan	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.3	6.5	4.6	4.5	9.9	6.9	7.4	18.9	21.9	3.9	21.9
28-Jan	7.3	2.7	2.2	1.8	1.6	1.5	1.8	2.6	1.9	3.5	3.6	3.3	3.0	3.6	3.4	6.6	5.3	3.4	3.6	3.7	2.5	2.5	1.5	1.3	3.1	7.3
29-Jan	1.0	0.8	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.6	1.0
30-Jan	0.7	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.8	0.9	1.0	1.9	3.5	3.8	3.7	2.9	2.4	3.8	3.1	3.1	2.9	2.2	2.1	2.3	2.0	3.8
31-Jan	2.1	2.3	3.1	3.6	3.5	3.6	3.5	4.4	4.7	4.1	4.4	4.8	4.1	5.1	6.2	4.9	5.5	4.4	4.6	4.4	4.9	4.1	3.5	4.0	4.2	6.2
	6.0	5.3	7.0	4.4	4.5	3.9	3.9	4.2	4.8	5.0	5.4	5.4	5.3	5.4	5.5	6.0	6.6	7.1	7.0	6.7	7.9	5.9	6.5	6.7	Diurnal Average	
	14.7	14.1	68.2	10.6	23.5	10.2	11.4	14.2	22.8	19.7	18.4	17.6	18.6	19.4	20.6	21.2	21.7	21.6	20.7	23.1	81.1	18.9	24.0	21.9	Diurnal Maximum	

C - Calibration

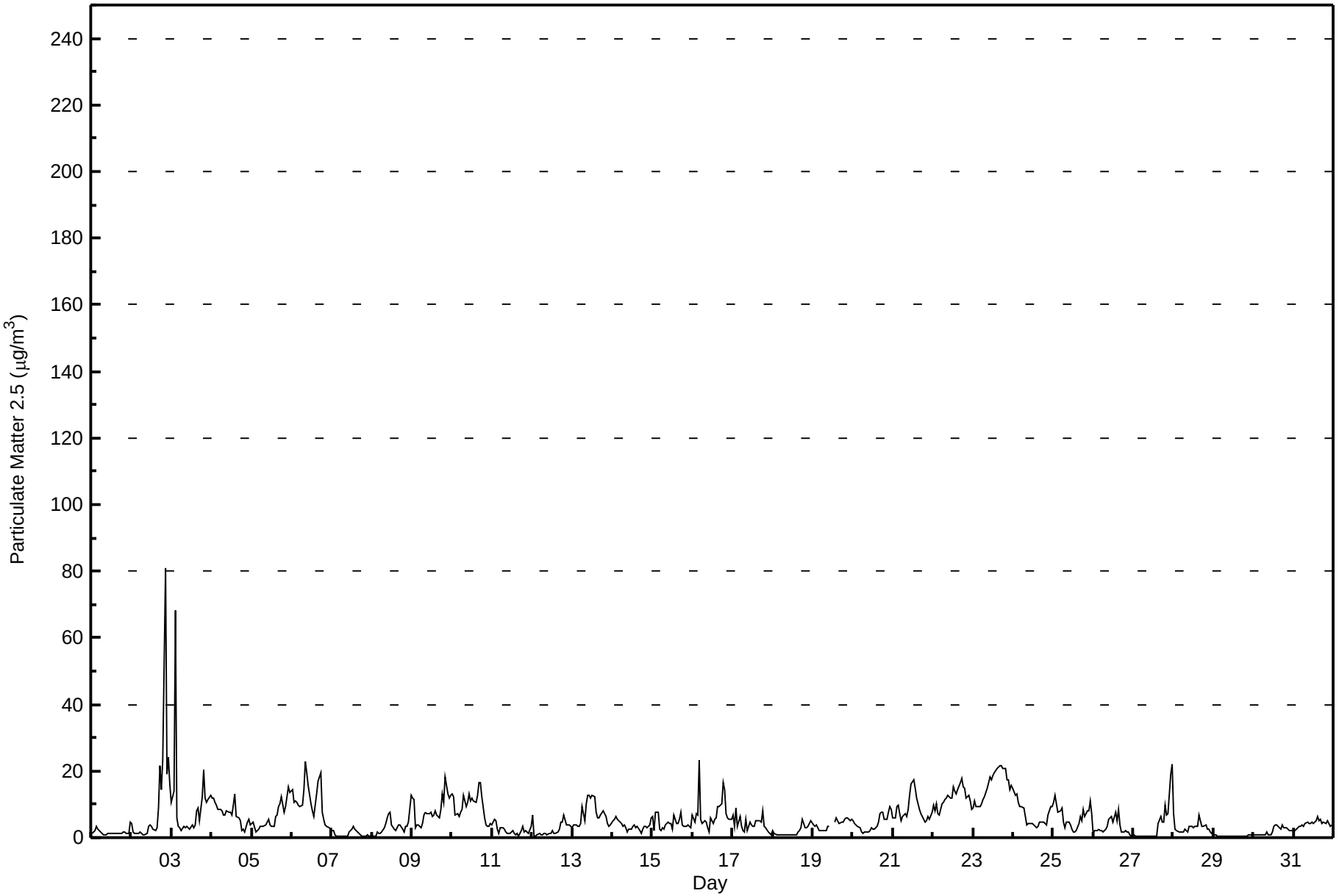
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Patricia McInnes - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	380	51.21	51.21
6 - 15	236	31.81	83.02
16 - 25	36	4.85	87.87
26 - 80	1	0.13	88.01
> 81.0	1	0.13	88.14

Total Number of Valid Hours: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Patricia McInnes - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	58	9	5	2	3	7	44	25	37	42	39	25	16	9	16	43	380
6 - 15	41	8	2	9	9	11	32	28	14	18	12	11	3	5	5	28	236
16 - 25	8	1	1	0	0	0	4	1	5	4	2	2	2	0	1	5	36
26 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Totals	107	18	8	11	12	18	80	55	57	64	53	38	21	14	22	76	654

Total Number of Valid Hours: 742

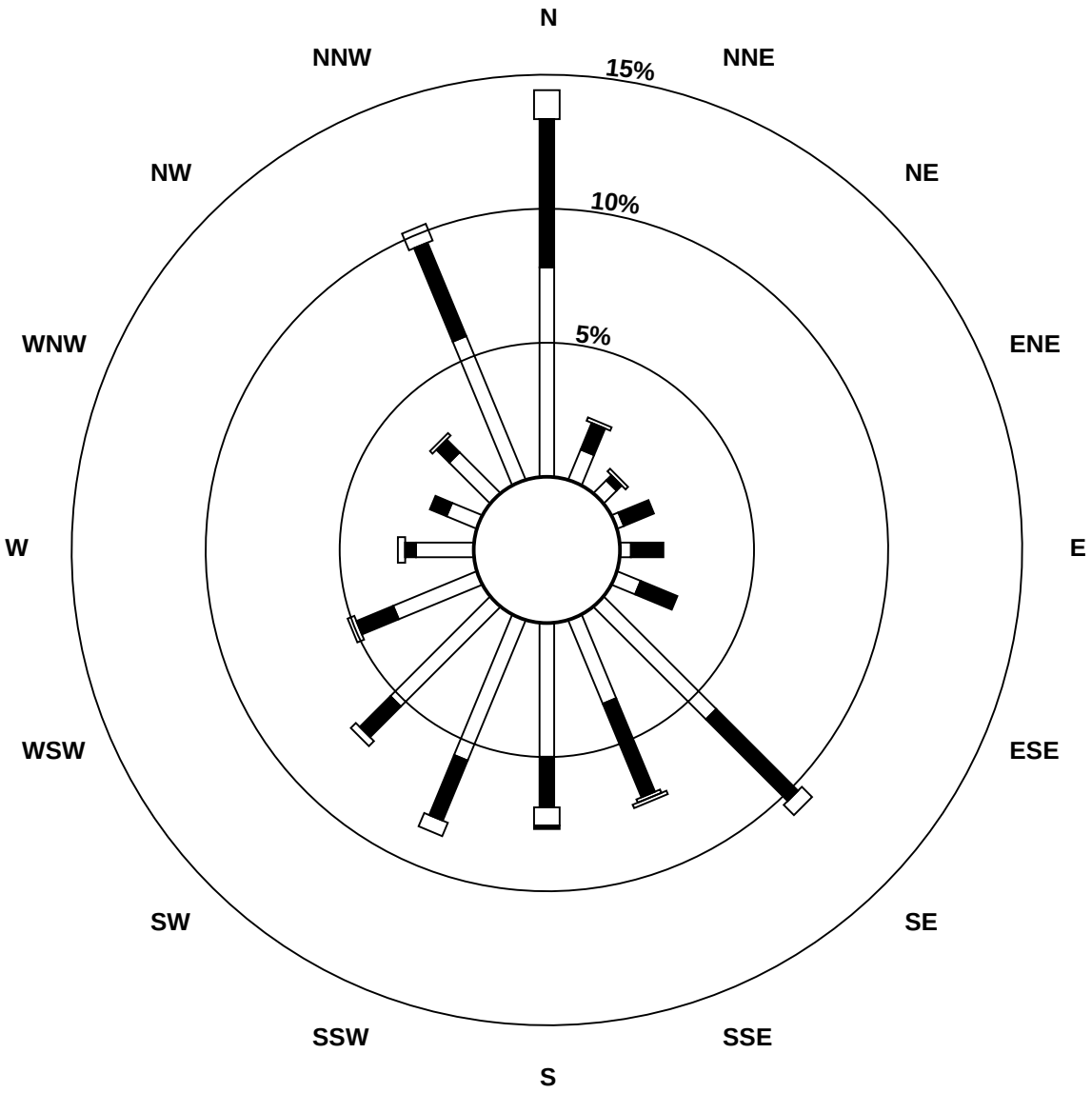
Total Number of Hours: 744

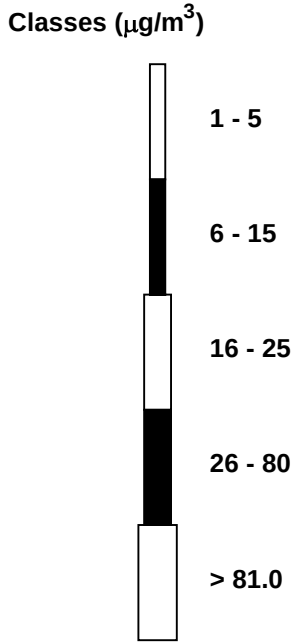
Wood Buffalo Environmental Association

Wind Rose Jan 2016

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

Patricia McInnes (AMS 6)





Total Number of Valid Hours: 742

Maximum Value: 6.3 C on Jan 29 15:00

Maximum Daily Average: 3.3 C on Jan 29

Minimum Value: -34.2 C on Jan 16 07:00

Minimum Daily Average: -30.5 C on Jan 16

Maximum Diurnal Average: -10.0 C at hour 15

Minimum Diurnal Average: -14.2 C at hour 8

Monthly Average: -12.65 C

Percentiles: P_1 = -33.0 P_{10} = -21.7 Q_1 = -18.0 Median = -13.3 Q_3 = -7.7 P_{90} = -1.4 P_{99} = 5.3

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

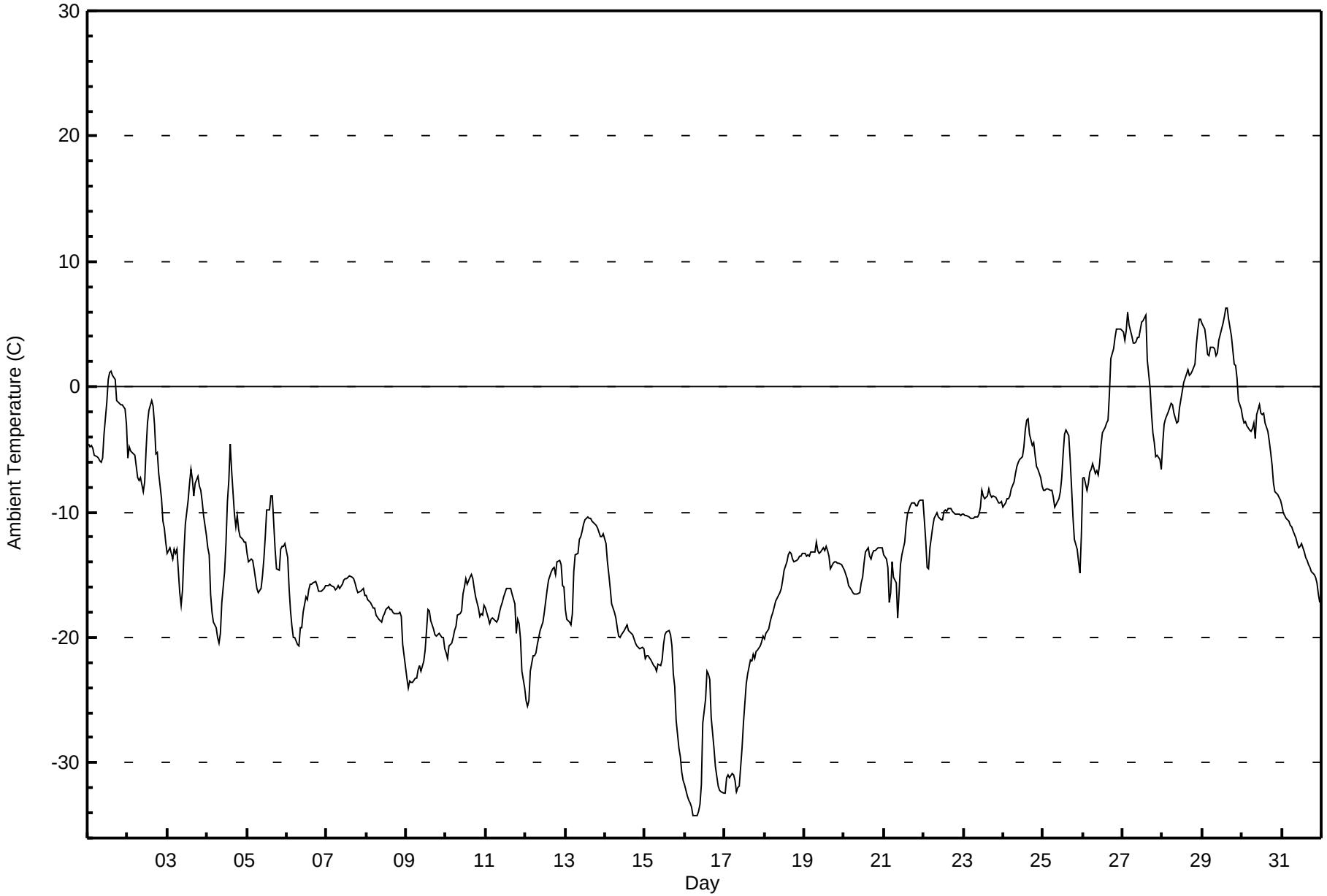
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-4.5	-4.8	-4.7	-4.9	-5.5	-5.6	-5.7	-5.9	-6.1	-5.7	-3.8	-1.2	0.5	1.2	1.2	0.9	0.6	-1.1	-1.2	-1.3	-1.4	-1.4	-1.7	-3.0	-2.7	1.2
2-Jan	-5.7	-4.8	-5.1	-5.4	-5.4	-6.4	-7.2	-7.5	-7.3	-8.3	-7.6	-5.1	-2.9	-1.9	-1.1	-1.6	-3.0	-5.4	-5.2	-6.9	-9.0	-10.7	-11.3	-12.4	-6.1	-1.1
3-Jan	-13.3	-12.8	-13.3	-13.8	-13.0	-13.3	-13.0	-16.4	-17.5	-16.2	-13.2	-10.9	-9.0	-7.7	-6.6	-7.3	-8.7	-7.7	-7.1	-7.9	-8.2	-9.2	-10.2	-11.8	-11.2	-6.6
4-Jan	-12.8	-13.4	-16.5	-17.9	-18.8	-19.2	-20.0	-20.5	-19.7	-17.2	-14.8	-12.4	-9.2	-7.5	-4.6	-6.7	-10.1	-11.2	-10.2	-11.4	-11.9	-12.1	-12.4	-12.4	-13.5	-4.6
5-Jan	-13.3	-14.0	-13.8	-13.9	-14.5	-15.3	-16.1	-16.5	-16.1	-15.1	-13.8	-12.0	-9.8	-9.8	-8.7	-8.7	-10.8	-13.0	-14.5	-14.6	-12.9	-12.7	-12.7	-12.5	-13.1	-8.7
6-Jan	-13.7	-16.0	-17.9	-19.1	-20.1	-20.0	-20.6	-20.7	-19.3	-19.3	-18.0	-16.8	-17.0	-16.1	-15.8	-15.7	-15.6	-15.5	-15.8	-16.3	-16.3	-16.3	-16.1	-15.9	-17.2	-13.7
7-Jan	-15.9	-15.9	-15.8	-15.8	-16.0	-16.2	-16.1	-15.9	-16.1	-15.8	-15.4	-15.3	-15.3	-15.2	-15.1	-15.2	-15.3	-15.7	-16.0	-16.4	-16.3	-16.2	-16.0	-16.6	-15.8	-15.1
8-Jan	-16.7	-17.0	-17.2	-17.5	-17.6	-17.7	-18.2	-18.5	-18.6	-18.8	-18.4	-18.1	-17.8	-17.5	-17.8	-17.7	-18.0	-18.1	-18.1	-18.1	-18.0	-18.4	-20.5	-22.3	-18.2	-16.7
9-Jan	-23.2	-24.0	-23.4	-23.6	-23.6	-23.2	-23.2	-22.6	-22.2	-22.7	-21.9	-21.0	-19.5	-17.8	-17.8	-18.7	-19.3	-19.8	-19.9	-19.8	-19.6	-20.0	-20.0	-20.9	-21.1	-17.8
10-Jan	-21.3	-21.7	-20.7	-20.4	-20.0	-19.5	-19.1	-18.2	-18.2	-17.9	-16.6	-16.0	-15.3	-15.7	-15.2	-15.0	-15.3	-16.1	-16.7	-17.7	-18.4	-18.1	-18.2	-17.5	-17.9	-15.0
11-Jan	-17.7	-18.4	-18.9	-18.6	-18.4	-18.5	-18.7	-18.6	-17.9	-17.6	-17.2	-16.7	-16.1	-16.1	-16.1	-16.1	-16.5	-17.3	-19.6	-18.5	-18.9	-20.1	-22.7	-24.1	-18.3	-16.1
12-Jan	-25.0	-25.5	-25.1	-22.7	-21.4	-21.5	-21.2	-20.6	-20.1	-19.4	-18.8	-18.0	-17.1	-16.3	-15.4	-14.8	-14.6	-14.4	-14.9	-14.0	-13.9	-14.1	-15.8	-15.9	-18.4	-13.9
13-Jan	-17.7	-18.6	-18.8	-19.0	-18.1	-14.8	-13.4	-13.3	-12.1	-11.9	-11.5	-10.9	-10.6	-10.4	-10.4	-10.5	-10.7	-10.8	-11.1	-11.3	-11.6	-11.9	-12.0	-11.8	-13.0	-10.4
14-Jan	-12.6	-14.0	-15.0	-16.1	-17.3	-18.0	-18.5	-19.2	-19.9	-20.0	-19.8	-19.5	-19.2	-19.0	-19.5	-19.6	-19.8	-20.1	-20.5	-20.6	-20.8	-20.9	-20.8	-21.0	-18.8	-12.6
15-Jan	-21.6	-21.5	-21.5	-21.8	-22.0	-22.2	-22.3	-22.7	-22.1	-22.2	-21.8	-20.5	-19.8	-19.6	-19.5	-19.8	-20.7	-23.0	-23.9	-26.6	-28.8	-29.5	-30.7	-31.4	-23.1	-19.5
16-Jan	-31.8	-32.6	-33.0	-33.2	-33.5	-34.2	-34.2	-34.2	-33.8	-33.3	-31.7	-26.9	-24.9	-22.7	-22.9	-23.4	-26.3	-28.8	-30.3	-31.0	-31.8	-32.2	-32.4	-32.4	-30.5	-22.7
17-Jan	-32.4	-31.2	-31.0	-31.2	-30.9	-31.0	-31.5	-32.4	-32.0	-31.9	-28.9	-26.8	-25.2	-23.7	-22.9	-21.8	-21.9	-21.3	-21.7	-21.2	-21.1	-20.7	-20.4	-19.9	-26.4	-19.9
18-Jan	-20.1	-19.7	-19.3	-18.8	-18.3	-18.0	-17.6	-17.1	-16.6	-16.4	-16.1	-15.4	-14.6	-13.9	-13.4	-13.1	-13.3	-13.7	-13.9	-13.8	-13.8	-13.5	-13.5	-13.3	-15.7	-13.1
19-Jan	-13.3	-13.5	-13.4	-13.6	-13.1	-13.1	-13.2	-12.4	-13.0	-13.3	-13.1	-12.9	-13.0	-12.7	-13.1	-13.5	-14.5	-14.1	-14.0	-14.0	-14.0	-14.1	-14.2	-14.4	-13.5	-12.4
20-Jan	-14.6	-14.9	-15.3	-15.8	-16.2	-16.4	-16.6	-16.5	-16.5	-16.5	-15.6	-15.2	-14.1	-13.1	-12.9	-13.6	-13.7	-13.3	-13.1	-13.0	-12.8	-12.8	-12.8	-12.9	-14.5	-12.8
21-Jan	-13.4	-13.8	-14.4	-17.2	-16.5	-14.0	-15.2	-15.7	-18.4	-16.4	-14.2	-13.4	-12.3	-11.1	-10.2	-9.8	-9.5	-9.2	-9.2	-9.5	-9.5	-9.1	-9.0	-9.1	-12.5	-9.0
22-Jan	-10.7	-12.3	-14.4	-14.5	-12.8	-11.2	-10.5	-10.2	-10.0	-10.4	-10.6	-10.6	-10.0	-9.8	-9.9	-9.7	-9.7	-10.0	-10.0	-10.1	-10.1	-10.2	-10.3	-10.2	-10.8	-9.7
23-Jan	-10.2	-10.2	-10.3	-10.4	-10.5	-10.5	-10.5	-10.4	-10.4	-10.1	-9.6	-8.2	-8.7	-8.9	-8.7	-8.1	-8.6	-8.9	-8.7	-8.8	-9.1	-9.3	-9.2	-9.1	-9.5	-8.1
24-Jan	-9.6	-9.2	-9.0	-8.9	-8.7	-8.2	-7.6	-6.9	-6.4	-6.1	-5.7	-5.5	-4.8	-3.4	-2.6	-2.6	-3.8	-4.7	-4.5	-5.5	-6.4	-6.5	-7.2	-7.9	-6.3	-2.6
25-Jan	-8.3	-8.2	-8.1	-8.1	-8.2	-8.3	-8.8	-9.6	-9.3	-8.9	-8.4	-7.3	-5.4	-3.7	-3.5	-3.9	-5.8	-8.1	-10.4	-12.1	-12.9	-13.9	-14.9	-11.9	-8.7	-3.5
26-Jan	-7.2	-7.3	-8.3	-7.7	-6.8	-6.5	-6.2	-7.0	-6.7	-7.0	-6.1	-4.7	-3.7	-3.2	-2.9	-2.7	-0.6	2.3	3.1	4.0	4.6	4.6	4.7	4.6	-2.8	4.7
27-Jan	4.4	3.7	4.5	5.9	5.0	4.0	3.5	3.5	3.6	4.0	4.0	5.2	5.2	5.5	5.8	2.2	-0.1	-2.1	-3.7	-4.5	-5.6	-5.5	-5.8	-6.6	1.5	5.9
28-Jan	-4.6	-3.0	-2.5	-2.0	-1.6	-1.3	-1.4	-2.1	-2.9	-2.7	-1.6	-0.9	-0.3	0.4	1.0	1.4	1.0	1.0	1.2	1.8	3.4	4.5	5.4	5.4	0.0	5.4
29-Jan	5.0	4.6	3.7	2.6	2.4	3.1	3.2	3.1	2.5	2.7	3.7	4.2	5.1	5.7	6.3	6.3	5.4	4.1	2.9	1.8	1.8	0.6	-1.1	-1.7	3.3	6.3
30-Jan	-2.4	-2.9	-2.8	-3.1	-3.5	-3.6	-3.4	-2.9	-4.2	-2.2	-1.4	-2.1	-2.2	-2.1	-2.9	-3.5	-4.4	-5.3	-6.3	-7.7	-8.4	-8.6	-8.9	-9.1	-4.3	-1.4
31-Jan	-9.5	-10.1	-10.5	-10.6	-10.7	-11.0	-11.2	-11.5	-12.1	-12.5	-12.9	-12.7	-12.5	-13.2	-13.7	-13.9	-14.1	-14.4	-14.7	-14.9	-15.2	-15.7	-16.5	-17.2	-13.0	-9.5
	-13.3	-13.6	-13.9	-14.1	-14.1	-13.9	-14.0	-14.2	-14.2	-13.8	-12.9	-11.9	-11.0	-10.3	-10.0	-10.2	-10.9	-11.5	-11.9	-12.3	-12.5	-12.7	-13.1	-13.4	Diurnal Average	
	5.0	4.6	4.5	5.9	5.0	4.0	3.5	3.5	3.6	4.0	4.0	5.2	5.2	5.7	6.3	6.3	5.4	4.1	3.1	4.0	4.6	4.6	5.4	5.4	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Patricia McInnes - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	115	15.46	15.46
-20 - 0	568	76.34	91.80
0 - 10	61	8.20	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Patricia McInnes - January 2016

Maximum Value: 93 % on Jan 28 00:00

Maximum Daily Average: 87.2 % on Jan 24

Minimum Value: 46 % on Jan 27 15:00

Minimum Daily Average: 64.3 % on Jan 1

Maximum Diurnal Average: 80.6 % at hour 1

Minimum Diurnal Average: 71.5 % at hour 15

Monthly Average: 78.2 %

Percentiles: $P_1 = 51$ $P_{10} = 68$ $Q_1 = 74$ Median = 80 $Q_3 = 84$ $P_{90} = 88$ $P_{99} = 92$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

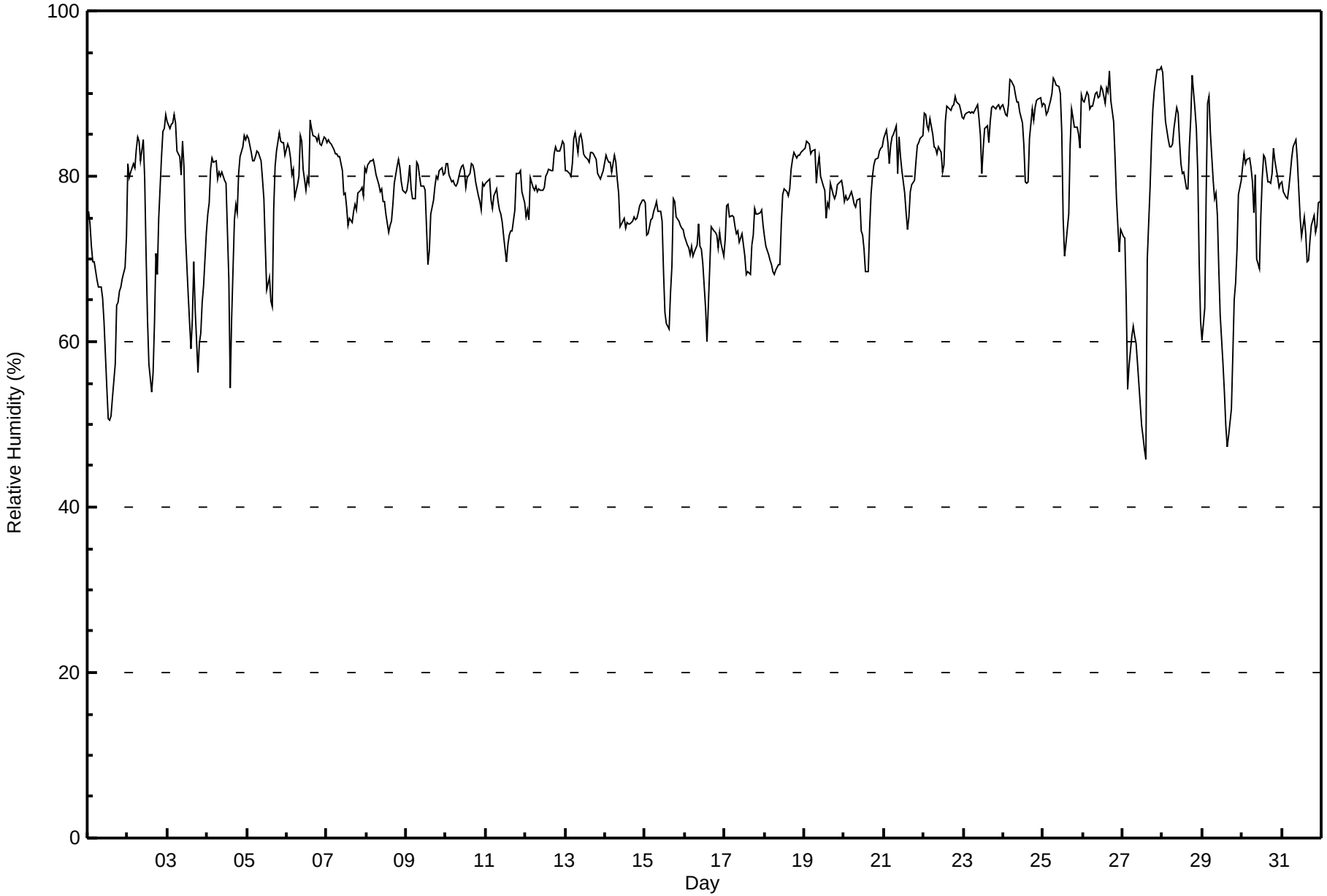
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	76	74	72	70	70	68	67	67	67	65	62	54	51	51	51	53	57	64	65	66	67	68	69	73	64.3	76
2-Jan	82	80	80	81	81	83	85	84	82	84	80	71	63	57	54	56	62	71	68	75	82	86	86	87	75.9	87
3-Jan	87	86	86	87	88	86	83	82	80	84	81	73	66	62	59	63	70	64	56	60	61	65	67	73	73.7	88
4-Jan	75	77	81	82	82	82	80	81	80	81	80	79	73	68	54	63	75	77	76	80	82	84	85	84	77.5	85
5-Jan	85	85	83	82	82	82	83	83	82	80	77	72	66	68	65	64	76	81	83	85	84	84	84	83	79.1	85
6-Jan	84	83	82	80	81	77	79	80	85	84	81	78	80	79	87	86	85	85	84	85	84	84	85	85	82.6	87
7-Jan	84	84	84	84	83	83	83	82	82	81	78	78	76	74	75	74	76	77	76	78	78	79	78	81	79.5	84
8-Jan	81	81	82	82	82	81	80	79	78	79	77	77	75	73	74	75	77	79	81	82	81	79	78	78	78.8	82
9-Jan	78	79	81	79	77	77	82	81	80	79	79	78	74	69	71	75	77	79	80	80	81	81	80	80	78.3	82
10-Jan	81	81	80	79	79	79	79	79	81	81	81	81	79	80	80	82	81	81	79	78	77	76	79	79	79.7	82
11-Jan	79	80	80	77	76	78	78	77	76	75	74	73	70	72	73	73	73	76	80	80	80	81	78	77	76.5	81
12-Jan	75	76	75	80	79	78	79	78	78	78	78	79	80	80	81	81	81	83	84	83	83	84	84	84	80.0	84
13-Jan	81	81	80	80	82	85	85	83	85	85	84	83	82	82	82	83	83	83	82	80	80	80	80	81	82.1	85
14-Jan	83	82	82	82	80	83	82	80	78	74	74	75	74	74	74	74	75	75	75	75	76	76	77	77	77.3	83
15-Jan	77	73	73	75	75	76	76	77	76	76	75	68	64	62	62	66	69	77	77	75	75	74	74	74	72.7	77
16-Jan	73	72	71	71	72	70	71	72	74	72	71	70	64	60	65	69	74	73	73	73	71	73	72	70	70.6	74
17-Jan	72	76	77	75	75	75	74	73	73	72	73	72	70	68	68	68	72	73	76	75	75	76	76	74	73.3	77
18-Jan	73	72	70	70	69	68	68	69	69	69	74	78	79	78	78	78	81	82	83	82	83	83	83	83	75.9	83
19-Jan	83	84	84	84	83	83	83	79	81	82	80	79	78	75	77	76	79	78	77	78	79	79	80	78	80.0	84
20-Jan	77	78	77	77	78	77	77	76	77	77	73	73	71	68	68	74	78	80	81	82	82	83	83	84	77.2	84
21-Jan	85	86	84	82	84	85	85	86	80	85	82	81	78	76	74	75	78	79	79	82	84	84	85	85	81.7	86
22-Jan	88	87	86	86	87	85	84	83	83	84	83	81	81	87	88	88	88	88	89	90	89	89	88	87	86.2	90
23-Jan	87	88	88	88	88	88	88	88	89	87	85	80	83	86	86	84	87	88	88	88	89	89	88	88	86.9	89
24-Jan	89	87	87	89	92	91	91	90	89	89	88	86	84	79	79	79	85	88	87	88	89	89	90	89	87.2	92
25-Jan	89	89	87	88	89	90	92	92	91	91	90	86	75	70	72	75	84	88	87	86	86	85	83	90	85.6	92
26-Jan	89	89	90	90	88	88	88	90	90	90	90	91	90	89	91	90	93	89	87	82	77	74	71	74	86.7	93
27-Jan	73	73	65	54	57	61	62	61	60	57	55	50	48	47	46	70	79	84	88	90	92	93	93	93	68.7	93
28-Jan	93	89	87	84	84	84	84	86	88	88	84	82	80	80	78	78	84	87	92	88	86	81	70	63	83.3	93
29-Jan	60	64	78	89	90	85	79	77	78	75	69	63	57	54	50	47	49	52	58	65	67	71	78	79	68.2	90
30-Jan	81	83	81	82	82	81	79	76	80	70	69	75	80	82	82	79	79	79	80	83	82	80	79	79	79.4	83
31-Jan	79	78	78	77	79	80	82	83	84	82	78	75	73	75	73	70	70	72	74	75	73	74	77	77	76.7	84
	80.6	80.5	80.4	80.1	80.4	80.3	80.2	79.8	79.9	79.2	77.6	75.4	73.1	71.8	71.5	73.2	76.6	78.5	78.9	79.7	79.8	80.0	79.9	80.3	Diurnal Average	
	93	89	90	90	92	91	92	92	91	91	90	91	90	89	91	90	93	89	92	90	92	93	93	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Patricia McInnes - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Patricia McInnes - January 2016

Maximum Speed: 33 km/h on Jan 27 04:00

Maximum Daily Speed Average: 15.6 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 13 00:00

Minimum Daily Speed Average: 0.7 km/h on Jan 8

Maximum Diurnal Speed Average: 2.7 km/h at hour 7

Minimum Diurnal Speed Average: 0.7 km/h at hour 17

Monthly Average Velocity: 1.6 km/h 266.3 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 4$ Median = 7 $Q_3 = 10$ $P_{90} = 15$ $P_{99} = 23$

Hours in Service: 744

Hours of Data: 744

Hours of Missing Data: 0

Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SW14	SW10	SW19	SW12	SSW8	SSW10	SSW9	SW11	SSW9	SSW11	WSW18	W21	W23	W24	W21	WSW21	WSW20	SW15	WSW20	WSW14	WSW10	W13	W9	W4	WSW13.5	W24
2-Jan	SW6	SW12	WSW15	SW13	SW12	SSW8	SSW6	SW9	SW15	SSW7	S6	SSW9	SW12	SW11	SSW9	SW8	SSW4	S4	SSW7	SE5	SSE2	S2	S5	S2	SSW7.3	SW15
3-Jan	SSW4	SSW5	S4	SSE5	SSW7	SSW7	SSW7	S5	S5	SSW5	S7	S9	SSE10	SSE9	SSE10	SSE6	S8	SSW10	SW9	SSW7	SW10	SSW8	WSW9	SW5	SSW6.5	SSW10
4-Jan	SW7	SW5	W1	WNW1	WNW4	WSW2	WSW4	WSW4	SW3	SW4	SSW4	SSW3	SSW3	SSE1	WSW3	SSW5	SSW6	SW8	SW8	SSW5	SW9	SW7	SSW7	SSW9	SW4.4	SSW9
5-Jan	SSW6	SSW7	SW11	SW10	SW9	SSW5	SW6	SSW7	SW7	S5	SSE4	SSE5	ESE4	SSE4	E4	E2	E2	ENE2	NNW3	NNW5	NNW4	NE4	N4	NNE3	SSW2.4	SW11
6-Jan	NNE3	NW3	NW2	N3	NNW1	ESE0	NNW2	N4	N6	NNW7	N5	N5	N7	N7	N8	NNW5	NNW6	N6	N8	NNW7	NNW7	NNW7	NNW7	NNW7	N5.0	N8
7-Jan	NNW7	NNW7	NNW7	NNW7	NNW7	NNW5	NNE5	NW3	WNW2	NNW5	NNW5	NNW5	N5	NW5	NW5	NW5	WNW3	NW4	W4	W5	W3	WNW3	WNW3	W5	NW4.2	NNW7
8-Jan	WNW5	N5	N5	N7	N7	N6	N7	N7	NNW6	NNW6	NNW5	N5	NNW3	NW2	SSW3	SSW1	S4	SSE5	S6	S8	S7	S8	S7	SSE7	NNW0.7	S8
9-Jan	SSE5	S5	S6	ESE6	SE6	S6	S5	SE3	SE4	SE4	SSE6	SE5	SSE6	SE6	SE7	SE7	SE6	SE5	SE5	SE5	SSE5	SE4	S4	S4	SSE4.8	SE7
10-Jan	S4	SSE4	SSE6	SSE5	SE5	SSE6	S6	SSW4	SE4	SSE4	SSW2	ENE4	N3	NNE6	NNE5	N9	NNW14	NNW11	N11	N12	N8	NW6	W3	N4	NNE1.8	NNW14
11-Jan	N5	N9	NNW10	NNW9	NW7	WNW6	W5	WNW6	NW9	WNW8	W8	W10	WNW7	WSW8	WSW11	SW10	WSW9	SSW4	S4	SSW6	S6	SSW6	SSW5	S4	W4.5	WSW11
12-Jan	S3	S4	S2	SSE4	SSE5	SE6	SE5	SE11	SE9	SE10	SE9	SE6	SSE5	SE7	SSE6	SSE5	SE5	S6	SW2	SSE5	SE1	WSW2	SSW4	S0	SSE4.7	SE11
13-Jan	WNW1	NW2	WSW3	N3	W3	E4	E4	NW3	E8	ESE8	E9	E9	E10	ENE11	ENE10	ENE10	ENE11	ENE10	ENE10	ENE9	NE9	ENE9	NE8	NE8	ENE5.9	ENE11
14-Jan	N11	NNW15	N16	NNW17	NNW16	NNW18	NNW16	N18	NNW16	N15	N11	NNW11	NNW11	N13	NNW14	N15	N14	N13	N15	N14	N13	N12	N12	N11	N14.1	N18
15-Jan	NNE9	NNE9	N6	NNW6	NW5	NW5	NW5	NW5	NNW6	NNW7	NNW7	N7	NNE7	N8	NNE8	N8	NNW5	NW6	NW6	NW4	NW3	N2	WNW4	WNW4	NNW5.2	NNE9
16-Jan	WNW2	W2	WSW3	SSW1	WSW2	WSW1	SW2	SSW1	S3	SSW3	SW3	ESE3	E4	ENE2	E4	NE1	NW3	W3	W2	WSW2	SW2	SW4	S3	S3	SW1.0	E4
17-Jan	S3	SSW4	SE3	S5	SSE4	S4	S5	SSW4	SSE3	SW3	SE4	SE5	S5	SSE7	SE4	SE5	SSE5	SE7	SE7	SE11	SE11	SE14	SE14	SE15	SSE5.8	SE15
18-Jan	SE13	SE16	SE16	ESE14	ESE16	ESE17	SE15	SE12	ESE12	SE14	SE11	ESE10	ESE7	ESE7	SE7	ESE6	SE6	SE5	SE5	SE7	SE6	SE5	SE5	SSE4	SE9.8	ESE17
19-Jan	SSE5	SE4	ESE3	S3	SW3	SW4	WSW4	WNW2	NNE6	NNW5	NNW7	NNW6	N6	N7	N7	N8	NNW8	NNW9	NNW8	NNW10	N10	N8	N9	N9	NNW4.4	N10
20-Jan	N9	N10	NNW11	NNW11	NNW10	NNW9	NNW8	NNW7	N8	NNW7	NNW3	NE1	W1	SE3	E3	SSW3	SSE4	SE3	ESE6	SE7	SE6	ESE4	SE5	SE5	NNE2.5	NNW11
21-Jan	SE5	SE5	SSE4	SE4	SE4	SE6	SSE3	SSE5	S3	SE6	SE9	SE9	SE10	ESE9	ESE11	ESE11	ESE14	ESE17	SE20	SE17	SE11	SE9	SE11	S3	SE8.3	SE20
22-Jan	SSE5	SSW4	WNW3	S4	SSW5	SW11	WSW10	WSW5	N3	N2	NNE5	NNW5	N7	N10	NNW10	NNW8	N9	N10	N9	N11	N11	N10	N12	N10	NNW4.5	N12
23-Jan	N10	N9	NNW9	NNW9	NNW8	NNW8	NNW7	NNW6	N6	N5	NNW4	NW2	N3	NNE5	NE4	N1	W1	WSW3	SW3	SSW5	SW4	SSW5	SSW4	SE5	NNW3.1	N10
24-Jan	SSW4	S4	SSE4	S6	S6	SW6	WSW6	W6	W7	WSW8	WSW12	WSW14	SW13	WSW14	SW13	SSW9	S7	SW11	WSW16	WSW10	WSW10	NNW13	NNW12	N11	WSW6.5	WSW16
25-Jan	N8	NW4	NNW5	NNW4	NNE3	SE3	SSW10	SSW9	SSE7	SE9	SSE10	SSE10	S8	SE6	ESE7	ESE7	ESE5	SE3	SSE2	WNW2	SE1	WSW2	S4	SW8	SSE2.9	SSE10
26-Jan	SW10	SW9	S7	SSW8	SSW8	SSW9	SSW9	SSW7	S7	S6	SSE4	SSE4	SE3	SE4	SSE6	SSE5	SW9	SW11	SW10	SW13	WSW19	WSW24	W27	W29	SW8.3	W29
27-Jan	W30	WSW20	WSW22	WNW33	WNW23	W17	WSW10	W12	W13	W15	W17	WNW17	W20	WNW18	WNW12	N7	NNW9	N9	NNW7	N2	N2	N2	SSW2	S1	W11.7	WNW33
28-Jan	SE7	SE7	SE9	SE11	SE12	SE9	SSE7	SSE7	SSW7	S6	SSE6	S4	SSE2	S5	SSE5	SSE2	SSE6	S8	SSW9	SW12	SW13	SW13	WSW18	WSW19	S6.4	WSW19
29-Jan	WSW17	WSW17	WSW18	W18	W15	W18	WNW19	W21	W13	W14	WNW16	WNW23	WNW18	WNW18	WNW19	WNW17	W12	W13	W17	WSW16	W16	WSW14	SW12	SW13	W15.6	WNW23
30-Jan	WSW13	WSW9	WSW14	WSW16	WSW15	WSW13	WSW16	W11	W3	WNW7	NNW4	NE7	NE8	NNE10	NNE14	N13	N12	N14	N17	N18	N16	N12	N11	N10	NW6.0	N18
31-Jan	NNE10	N9	NNE8	NNE8	N10	N11	N11	N12	N13	N14	N14	N9	N14	N15	N13	N15	N12	N11	N11	NNW10	N10	N9	N8	NNW4	N10.9	N15
	WSW2.4	WSW2.2	WSW2.5	W2.5	W2.4	WSW2.5	WSW2.7	WSW2.7	W1.4	WSW1.2	WSW1.4	W1.4	WNW1.4	NW1.2	NW0.9	NNW1.2	NW0.7	W0.9	W1.9	W1.3	W1.6	W1.7	W2.1	W1.8	Diurnal Average	
	W30	WSW20	WSW22	WNW33	WNW23	W18	WNW19	W21	NNW16	W15	WSW18	WNW23	W23	W24	W21	WSW21	WSW20	ESE17	SE20	N18	WSW19	WSW24	W27	W29	Diurnal Maximum	

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 9 km/h on Jan 27 04:00

Minimum Value: 0 km/h on Jan 16 23:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

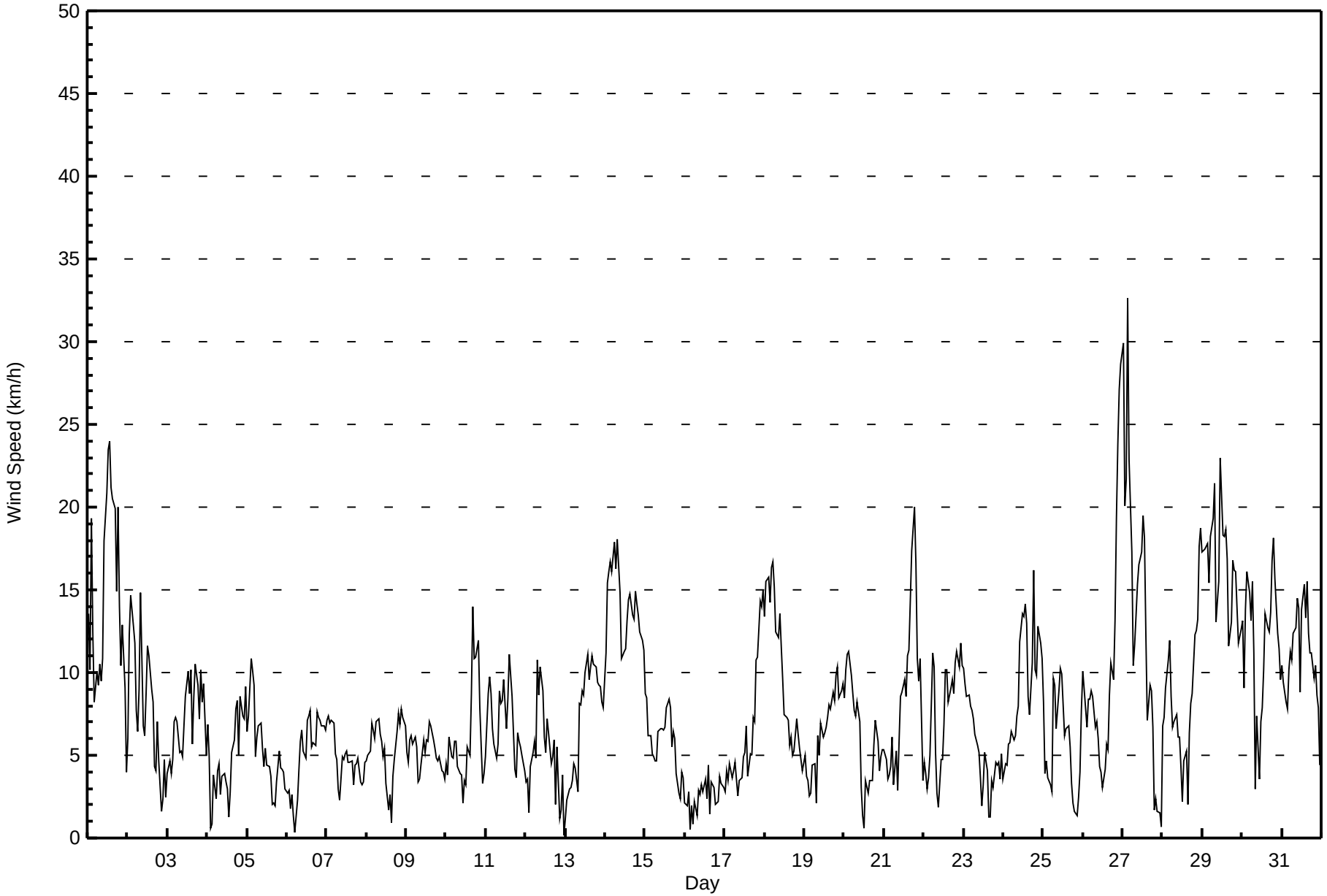
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	2	3	4	5	4	3	3	3	2	3	5	5	5	5	4	4	4	3	3	5	2	2	3	3	5
2-Jan	2	2	2	2	2	2	1	2	4	1	1	3	3	3	2	2	1	2	2	1	1	1	2	1	4
3-Jan	2	1	1	1	1	1	1	1	1	1	2	1	2	2	2	3	3	2	2	2	3	2	3	1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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Patricia McInnes - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	287	38.58	38.58
6 - 11	318	42.74	81.32
12 - 19	120	16.13	97.45
20 - 28	16	2.15	99.60
29 - 38	3	0.40	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Patricia McInnes - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	22	8	3	3	8	6	38	36	36	31	13	14	15	15	18	21	287
6 - 11	60	10	5	8	4	12	37	20	23	35	28	12	6	5	5	48	318
12 - 19	28	1	0	0	0	6	11	0	0	0	17	21	15	9	0	12	120
20 - 28	0	0	0	0	0	0	1	0	0	0	0	6	7	2	0	0	16
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	110	19	8	11	12	24	87	56	59	66	58	53	45	32	23	81	744

Total Number of Valid Hours: 744

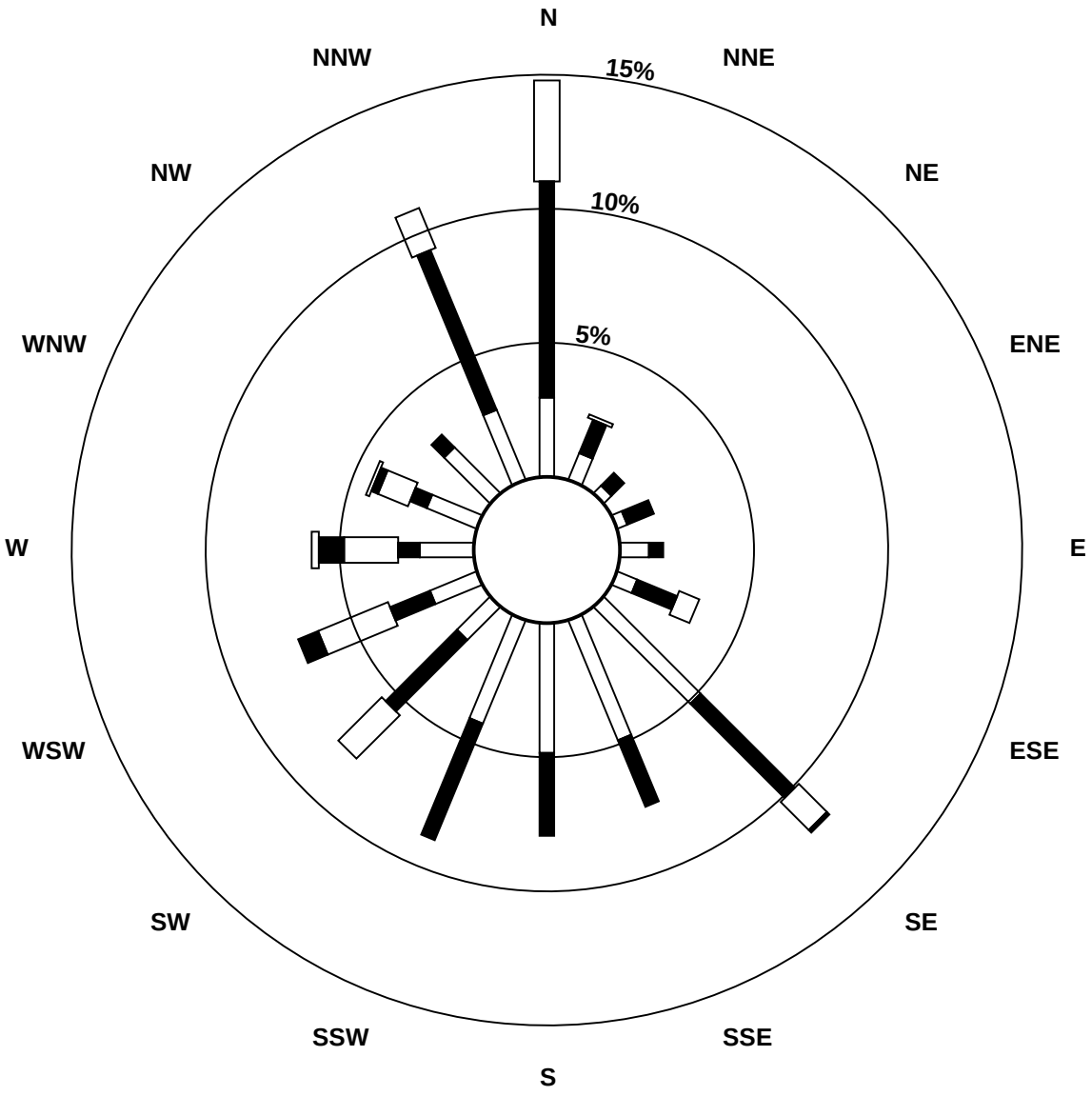
Total Number of Hours: 744

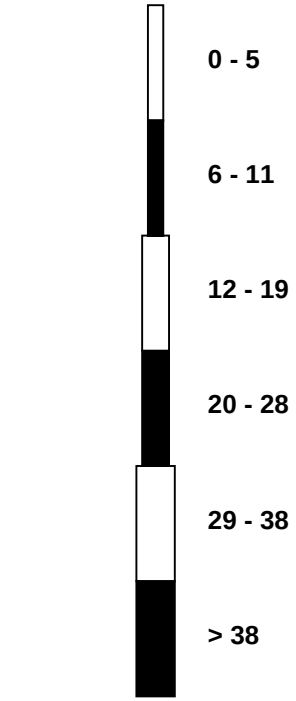
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

Patricia McInnes (AMS 6)





Total Number of Valid Hours: 744

Direction of Maximum Speed: 285 deg on Jan 27 04:00
Direction of Maximum Daily Speed Average: 272.8 deg on Jan 29

Direction of Minimum Speed: 178 deg on Jan 13 00:00

Direction of Minimum Daily Speed Average: 0.7 deg on Jan 8

Monthly Average Direction: 275.1 deg

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	228	229	229	225	199	212	207	218	206	207	248	261	269	268	264	258	252	231	251	244	258	259	271	268	244.6
2-Jan	222	236	240	231	226	209	201	216	227	199	182	206	217	216	206	215	193	185	208	128	147	189	185	188	213.4
3-Jan	203	201	184	163	202	210	197	186	184	201	185	171	159	157	159	150	185	205	222	205	221	211	249	217	193.3
4-Jan	223	221	260	301	291	249	242	254	223	219	196	197	198	163	239	212	199	222	230	204	217	218	212	213	220.5
5-Jan	210	208	224	215	222	209	215	213	216	171	163	163	116	150	90	100	86	67	342	337	333	34	3	20	202.2
6-Jan	19	322	326	350	343	115	338	5	349	348	358	11	7	359	354	344	348	351	350	346	345	341	340	342	350.5
7-Jan	344	342	343	336	341	331	16	325	291	327	339	348	351	308	310	318	293	304	264	272	260	283	287	263	321.0
8-Jan	292	7	8	5	5	6	5	349	337	328	332	350	331	310	195	196	170	155	174	178	176	178	179	167	332.4
9-Jan	148	169	181	111	140	179	189	134	125	143	154	145	151	131	128	126	136	135	128	130	163	143	176	169	146.5
10-Jan	169	152	157	155	140	159	175	205	133	159	194	78	356	31	19	3	345	346	360	5	2	326	270	360	16.1
11-Jan	351	351	340	340	311	294	261	285	310	296	267	269	289	238	244	230	242	198	181	203	185	203	192	187	268.0
12-Jan	169	177	170	148	149	139	145	133	136	135	137	144	147	140	162	165	143	172	227	156	137	237	205	178	150.3
13-Jan	298	323	255	351	272	80	91	319	96	107	90	100	98	77	68	59	68	58	59	63	54	60	39	34	67.1
14-Jan	357	344	349	344	345	345	347	354	347	354	350	346	343	349	348	356	0	1	358	354	356	349	1	11	351.5
15-Jan	12	25	3	335	316	307	315	312	340	337	334	350	14	11	12	8	346	321	319	314	322	360	284	291	343.6
16-Jan	301	268	244	207	252	239	231	193	191	200	229	111	84	70	82	34	307	271	261	248	217	215	170	170	214.0
17-Jan	184	207	145	188	168	177	182	193	155	214	144	129	173	168	142	144	149	143	146	136	137	130	130	128	149.1
18-Jan	127	126	125	122	123	122	126	132	122	125	124	116	104	118	128	123	133	127	134	135	141	133	128	149	125.6
19-Jan	157	139	121	177	227	225	245	297	12	345	332	343	351	358	349	349	331	328	328	339	359	351	350	352	341.6
20-Jan	352	358	345	345	343	334	333	348	360	347	342	38	267	143	99	192	162	141	118	137	131	121	125	133	11.4
21-Jan	139	144	158	134	135	135	154	161	174	141	136	135	125	114	113	116	115	121	126	124	131	131	129	170	129.3
22-Jan	167	206	282	180	202	228	246	256	351	359	16	341	357	356	341	337	354	3	2	359	358	355	353	355	338.1
23-Jan	358	354	343	341	338	339	343	338	358	359	344	315	357	27	39	357	273	258	226	208	222	194	210	142	339.0
24-Jan	201	174	155	177	189	225	241	263	272	251	247	247	236	238	219	201	188	219	244	250	250	344	336	353	242.4
25-Jan	349	308	344	328	17	129	210	199	160	145	149	162	172	145	120	116	109	131	154	284	145	237	169	216	162.2
26-Jan	228	223	190	200	205	212	210	192	176	171	155	147	131	127	158	150	214	227	221	233	242	249	266	267	224.6
27-Jan	262	244	254	285	286	269	253	272	268	273	274	283	274	285	288	2	345	357	330	352	360	5	196	169	278.7
28-Jan	142	140	125	134	139	141	148	167	195	171	161	176	163	181	162	167	153	186	203	228	230	228	242	245	186.1
29-Jan	242	250	258	279	281	281	300	275	273	277	282	290	294	296	291	290	276	267	261	258	270	253	230	229	272.8
30-Jan	242	239	244	244	245	243	254	262	270	283	333	38	35	31	21	7	4	355	360	358	11	8	3	1	324.6
31-Jan	13	11	25	22	1	8	4	3	4	6	3	353	350	10	4	9	3	7	352	347	356	355	351	337	2.9
	252.4	252.0	255.6	270.3	258.8	243.6	247.5	257.3	267.6	257.7	251.8	264.8	291.6	315.5	323.8	341.7	313.4	269.0	272.4	267.0	271.9	271.8	266.7	265.6	
	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

Patricia McInnes - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 100 deg on Jan 12 21:00

Minimum Value: 6 deg on Jan 4 18:00

Percentiles: $P_1 = 8$ $P_{10} = 11$ $Q_1 = 13$ Median = 15 $Q_3 = 22$ $P_{90} = 37$ $P_{99} = 83$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

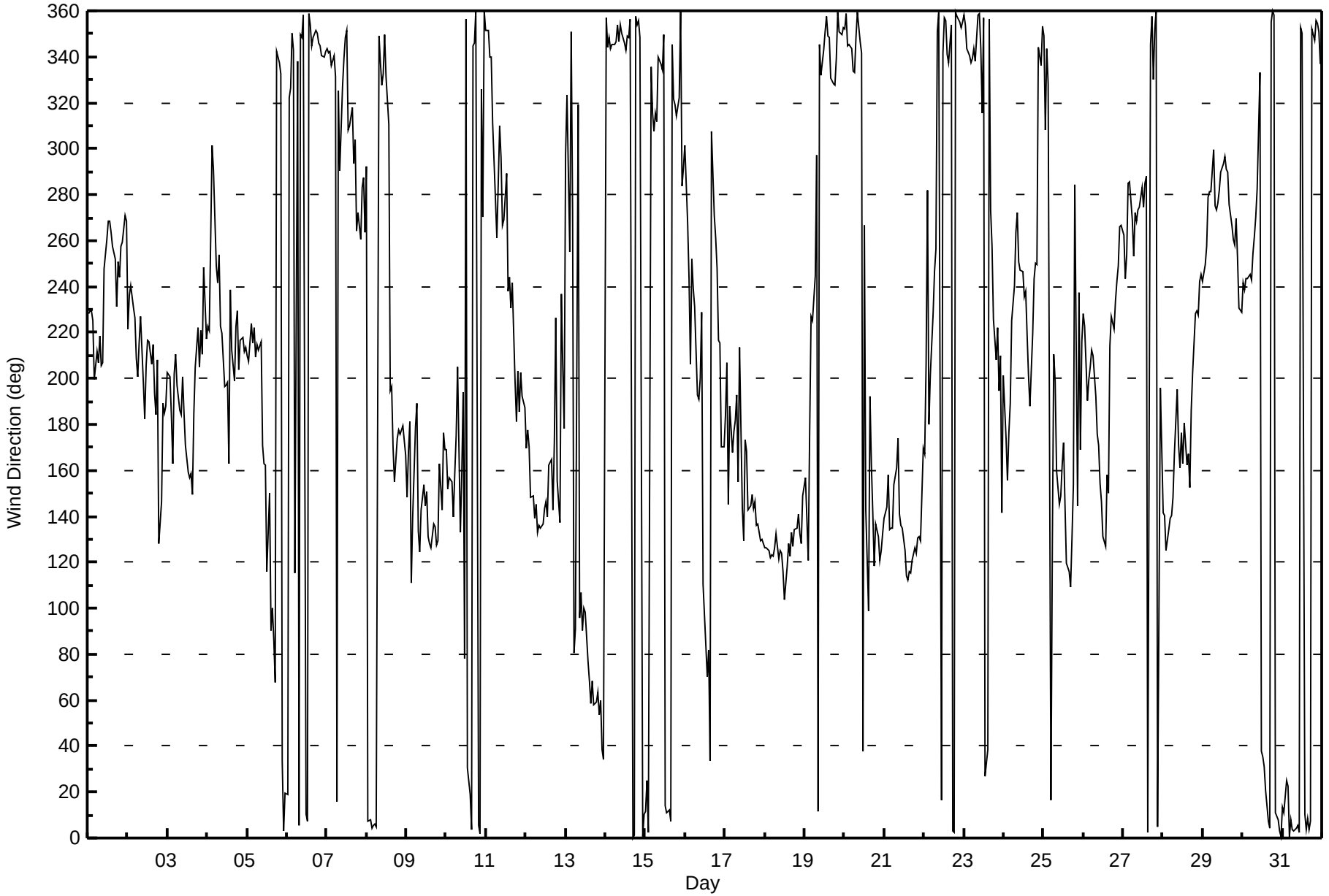
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	10	18	10	17	22	17	16	20	18	16	17	12	12	11	11	10	11	12	9	12	13	9	24	45	45
2-Jan	12	8	9	8	13	14	12	15	9	16	13	17	12	12	15	13	40	28	12	23	48	36	18	42	48
3-Jan	24	13	22	25	7	7	8	9	9	12	12	11	10	10	8	19	12	12	12	26	15	20	14	27	27
4-Jan	16	34	85	83	24	45	8	14	50	20	30	19	25	69	18	18	19	6	12	19	12	15	12	14	85
5-Jan	17	20	13	12	11	31	13	14	16	18	19	18	36	43	21	36	58	38	42	10	26	25	18	25	58
6-Jan	46	13	55	31	77	84	52	13	12	10	15	13	10	13	16	13	14	14	12	13	12	11	11	12	84
7-Jan	13	11	11	11	10	9	28	32	19	11	15	15	16	27	27	24	30	27	27	31	41	36	34	30	41
8-Jan	30	33	15	17	14	14	13	12	10	11	12	15	51	64	59	80	33	27	24	18	15	13	14	10	80
9-Jan	13	11	20	14	25	17	18	35	41	23	15	19	14	15	12	12	14	13	15	20	18	23	15	14	41
10-Jan	16	19	15	26	24	22	13	25	49	23	44	26	50	13	14	20	13	15	12	14	18	16	19	40	50
11-Jan	19	12	10	11	11	15	8	16	11	17	13	12	34	14	11	14	15	19	15	13	15	11	10	22	34
12-Jan	16	17	53	19	18	18	15	15	14	14	17	23	24	18	17	24	23	20	59	28	100	77	49	93	100
13-Jan	63	49	35	21	38	56	19	56	15	16	14	15	15	12	13	13	13	15	13	14	14	14	12	17	63
14-Jan	26	10	11	11	11	12	11	13	12	15	14	12	13	15	13	14	14	15	15	13	13	12	13	11	26
15-Jan	11	16	23	18	14	14	29	27	14	14	11	13	15	19	13	10	8	15	12	24	37	60	16	19	60
16-Jan	43	20	15	93	35	63	67	73	44	56	29	22	24	50	17	61	17	24	28	42	22	14	20	17	93
17-Jan	19	17	14	18	16	14	14	28	23	24	37	22	24	22	35	23	35	37	20	13	12	13	12	13	37
18-Jan	13	14	13	14	14	12	13	13	13	13	14	12	16	16	15	17	14	15	14	15	16	20	19	14	20
19-Jan	12	17	18	34	17	17	13	40	19	24	12	17	15	13	23	11	7	9	13	10	14	14	11	12	40
20-Jan	14	15	11	12	11	14	11	14	13	16	30	60	85	36	41	17	16	47	18	16	19	16	15	14	85
21-Jan	14	14	17	13	13	17	35	30	20	19	16	14	15	15	13	15	14	12	13	13	14	13	17	31	35
22-Jan	33	27	57	30	20	16	12	40	61	68	33	29	23	16	13	14	13	12	14	13	12	13	12	12	68
23-Jan	12	12	9	12	10	13	10	12	16	17	13	13	24	12	20	40	35	9	26	18	15	19	27	21	40
24-Jan	40	21	21	14	12	18	11	29	19	16	13	12	13	11	11	16	12	24	9	10	28	12	12	14	40
25-Jan	11	22	23	33	31	68	17	21	24	15	13	14	16	28	14	10	17	17	25	30	72	24	16	16	72
26-Jan	10	10	18	24	12	17	16	10	15	13	11	18	20	22	19	16	17	10	10	12	11	10	13	12	24
27-Jan	12	11	15	14	13	14	13	25	16	11	12	13	13	12	14	27	14	14	18	72	36	60	75	85	85
28-Jan	20	16	14	15	14	16	32	17	13	17	13	17	51	23	28	79	14	18	12	12	11	12	10	10	79
29-Jan	10	10	15	13	13	13	17	12	13	14	15	13	14	13	12	12	13	12	9	8	9	17	9	9	17
30-Jan	7	12	8	8	8	10	10	42	62	15	66	20	11	12	12	12	14	13	14	14	13	14	15	13	66
31-Jan	11	14	14	15	14	14	12	13	12	12	14	19	13	13	13	12	13	13	15	13	14	17	23	18	23
	63	49	85	93	77	84	67	73	62	68	66	60	85	69	59	80	58	47	59	72	100	77	75	93	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Patricia McInnes - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	January 11, 2016	Last Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:25
Gas Cert Reference	EY0000355	Station temp.	21 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	18/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-678
Analyzer IP address	192.168.1.43		Lamp voltage	764	766
Calculated slope	1.003140	0.993709	Chamber temp	45.0	45.0
Calculated intercept	1.024317	0.974519	Pressure	680.7	700.0
Analyzer Background	5.9	5.9	Flow	0.434	0.444
Analyzer Coefficient	1.101	1.101	Intensity	91	91

Analyzer make	Thermo 43i	Analyzer serial #	1008841397

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.2	----
as found span	5500	86.8	785.9	779.3	1.009
calibrator zero	5500	0.0	0.0	0.1	----
high point	5500	86.8	785.9	790.1	0.995
second point	5500	43.4	393.0	395.0	0.995
third point	5500	21.7	196.5	195.0	1.008
as left zero	5500	0.0	0.0	0.3	----
as left span	5500	86.8	785.9	786.8	0.999
				Average Correction Factor	0.999

Corrected As found	779.5	Previous response	782.4	% change	0.4%

Notes:

Inlet filter changed after as founds.Span adjusted.

Calibration Performed By: Devin Russell

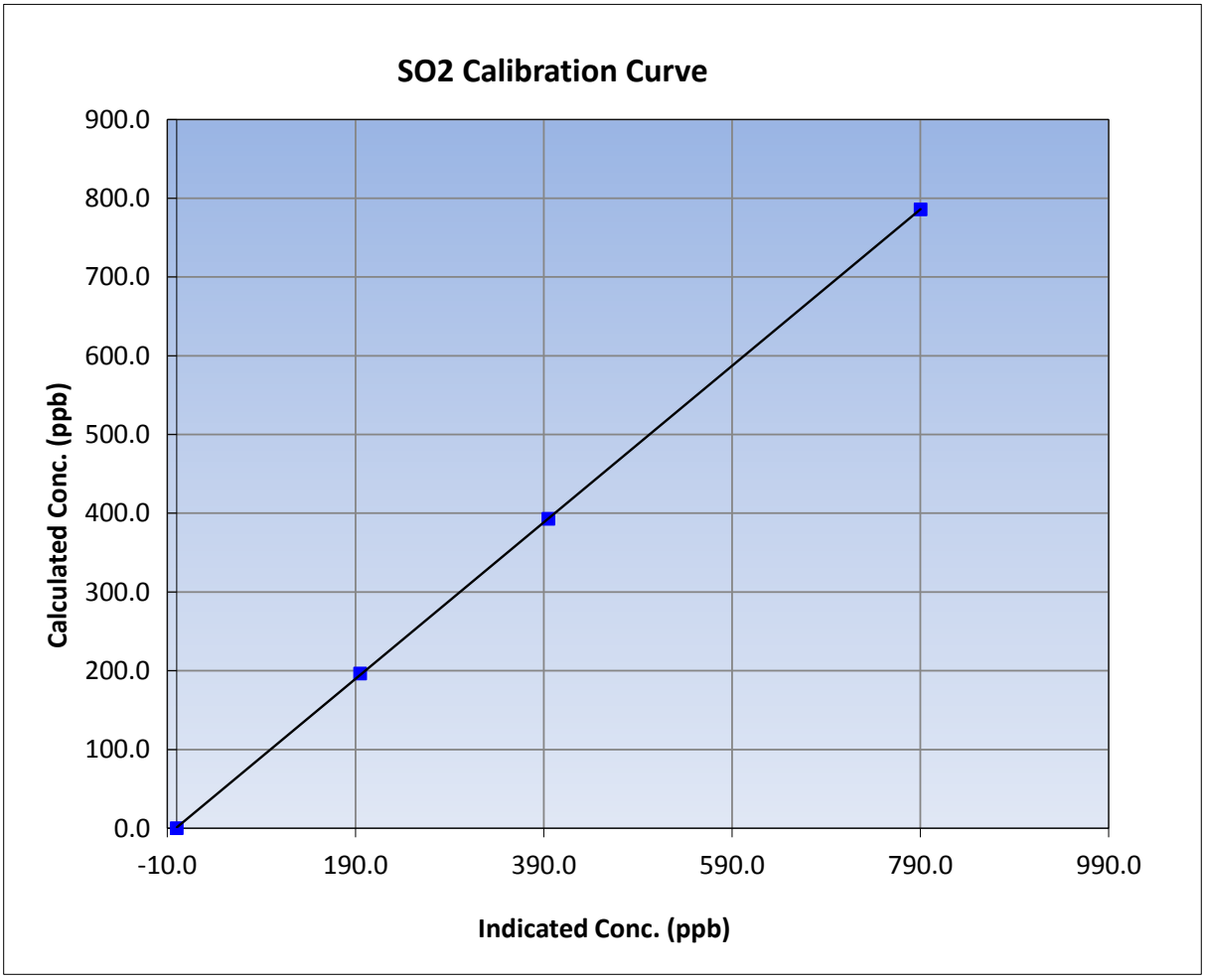
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

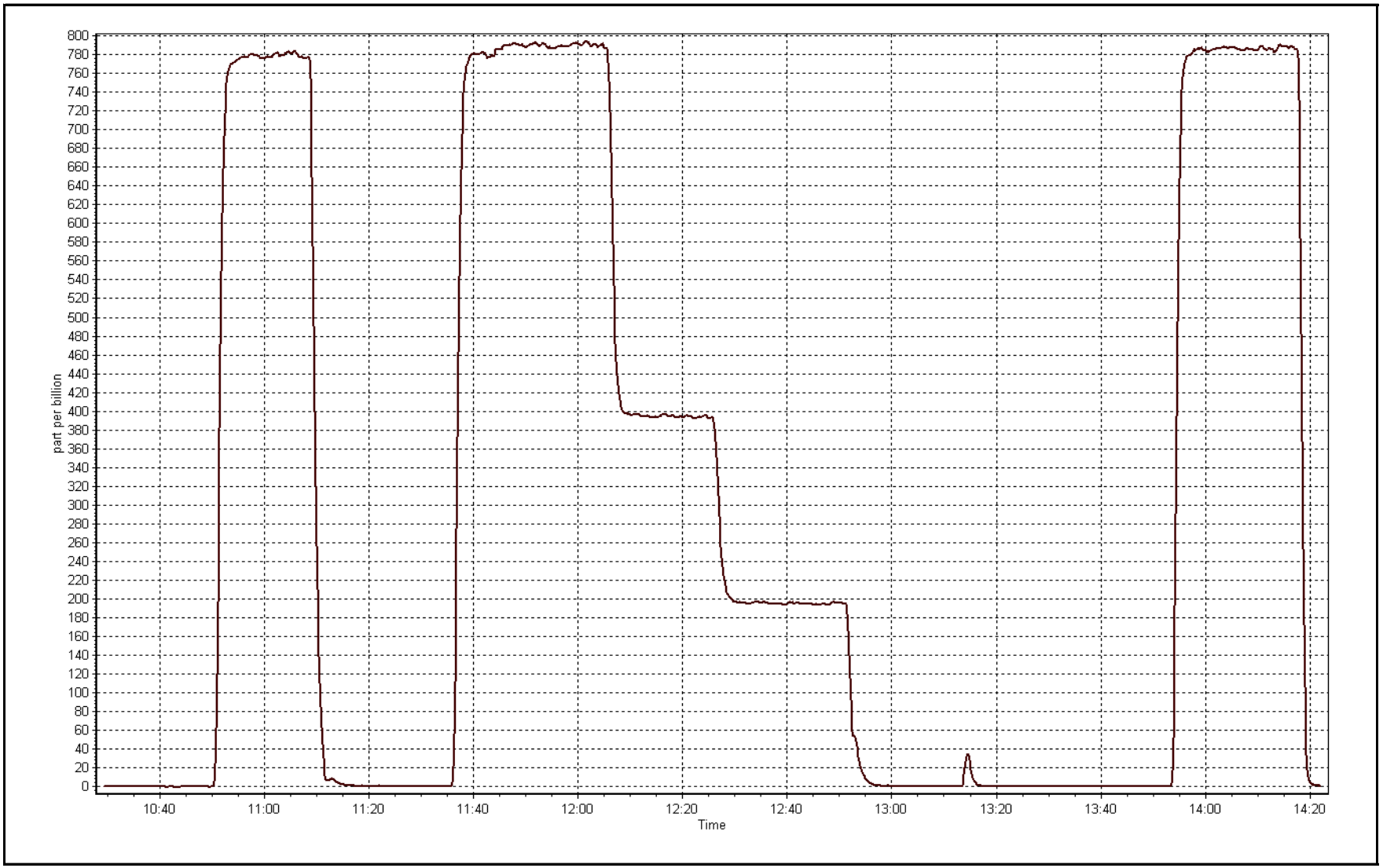
Calibration Date	January 11, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:30	End Time (MST)	14:25
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999986
785.9	790.1	0.9947		
393.0	395.0	0.9950	Slope	0.993709
196.5	195.0	1.0078		
			Intercept	0.974519



SO2 Calibration Plot Date: January 11, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 19, 2016	Last Calibration	December 1, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	12:15
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API 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	1003	1013
Calculated slope	0.997310	0.994658	Chamber temp	45	45
Calculated intercept	-0.227938	-0.272357	Pressure	683.9	680.3
Analyzer Background	2.01	2.01	Flow	0.433	0.430
Analyzer Coefficient	1.105	1.105	Intensity	90	91
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153358
Converter make/model	CDN-101	Converter serial #	520

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	79.5	70.0	68.9	1.015
SO2 scrubber check	5500	21.7	196.5	0.3	----
calibrator zero	6000	0.0	0.0	0.3	----
high point	6000	79.5	70.0	70.5	0.992
second point	6000	39.8	35.0	35.7	0.980
third point	6000	20.5	18.0	18.2	0.990
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	79.5	70.0	71.2	0.983
				Average Correction Factor	0.987

Corrected As found	68.8	Previous response	70.4	% change	2.3%

Notes:

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

Calibration Performed By: Devin Russell

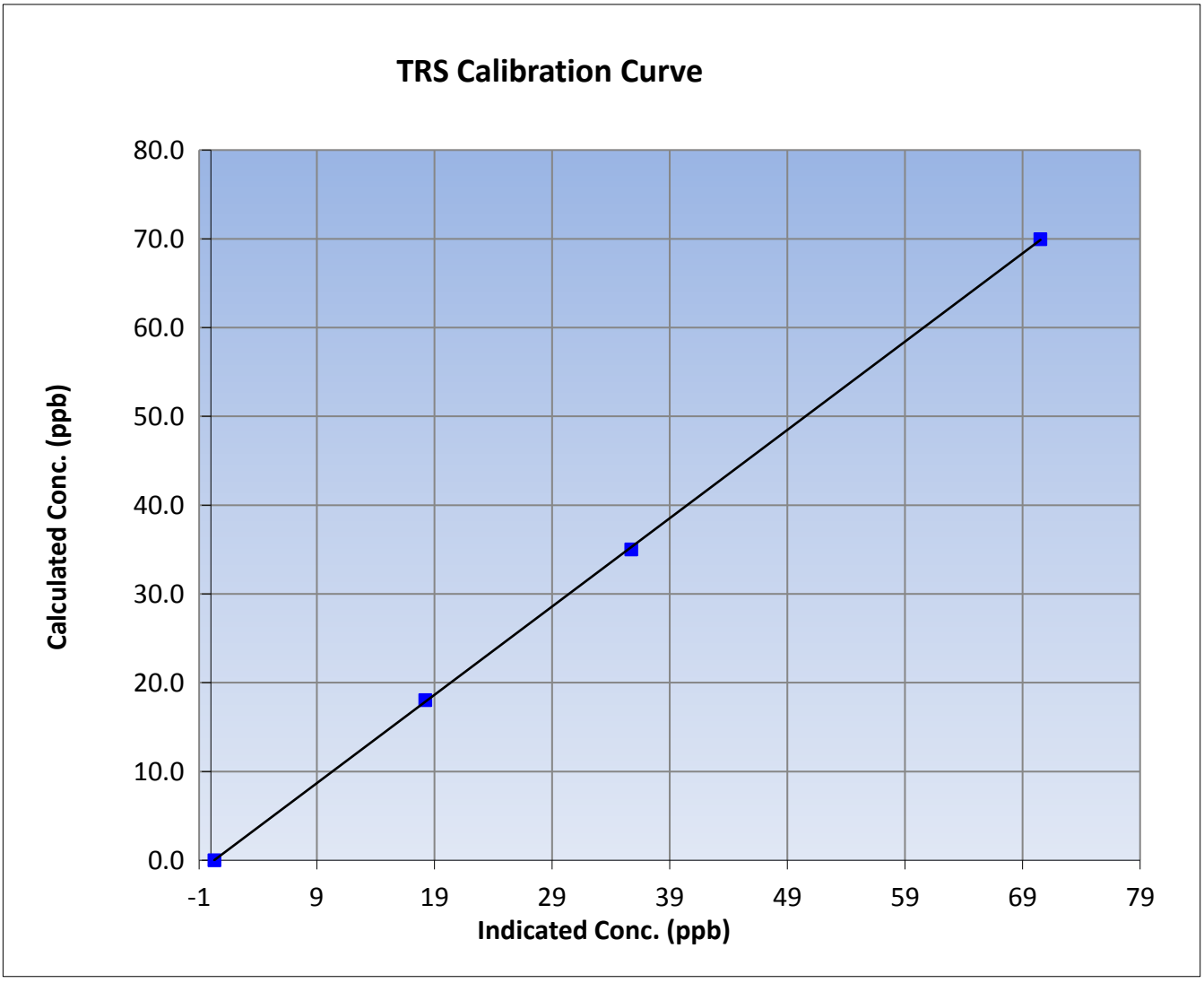
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

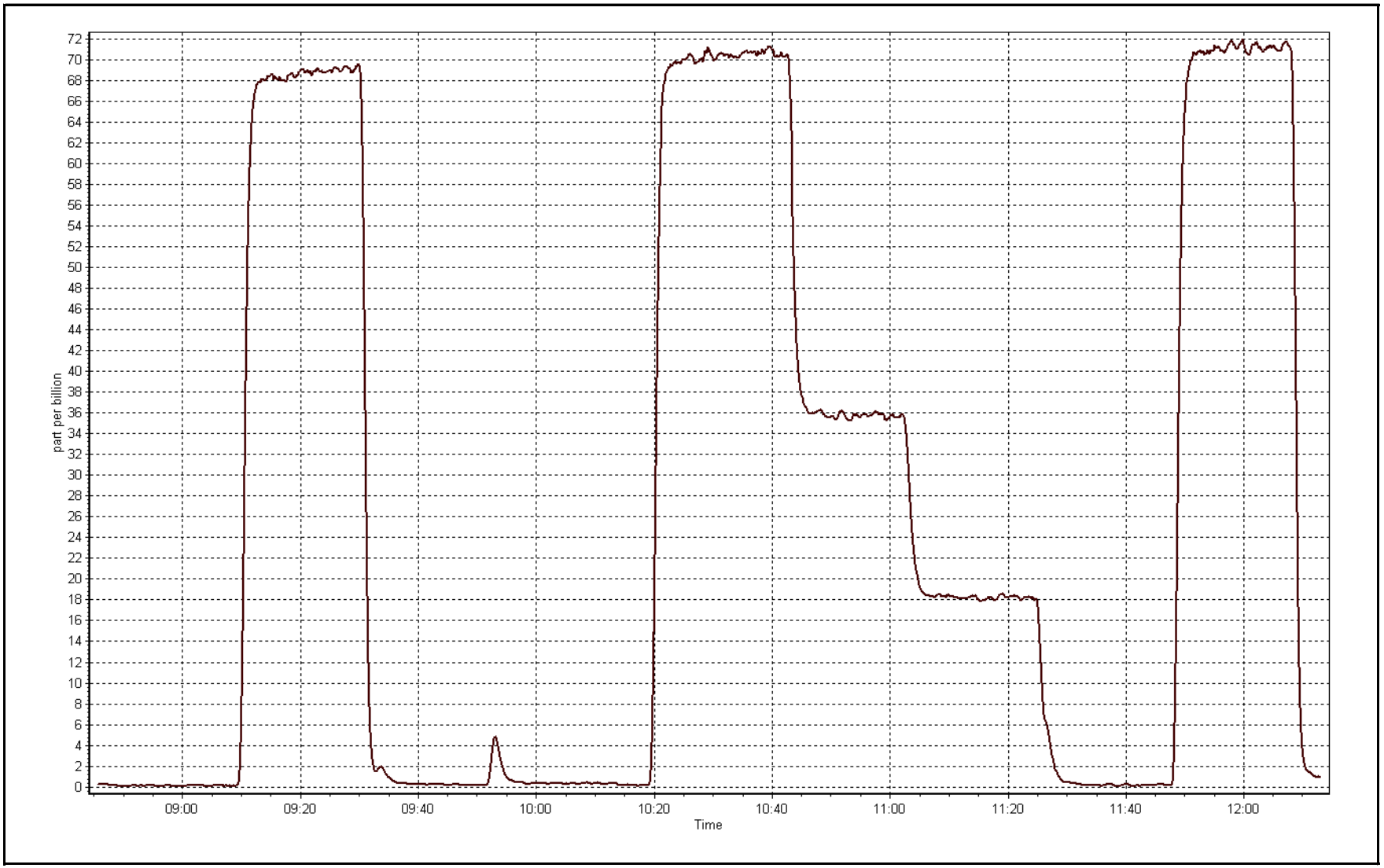
Calibration Date	January 19, 2016	Previous Calibration	December 1, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	12:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999960
70.0	70.5	0.9919		
35.0	35.7	0.9800	Slope	0.994658
18.0	18.2	0.9901		
			Intercept	-0.272357



TRS Calibration Plot Date: January 19, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

Station Information

Calibration Date	January-11-16	Last Calibration	December-07-15
Station Name	Patricia McInnes	Station Number	AMS 6

Reason: Routine

Start Time (MST)	10:30	End Time (MST)	14:25
Gas Cert Reference	EY0000355	Cal Gas Expiry Date	September-18-18
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1068.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	*After*		*Before*	*After*
THC Range (ppm)	0 - 50 ppm		Column Temp	75.3	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	395.4	405.0
THC Calc slope	1.000743	0.998084	Carrier Pressure	34.5	34.5
THC Calc intercept	0.038207	0.038139	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.006820	0.997079	Air Pressure	32.4	32.4
NMHC Calc intercept	0.014164	0.016077			

Analyzer make	Thermo 55i	Analyzer serial #	1331259521

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	86.8	16.85	17.10	0.986
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	16.85	16.86	1.000
second point	5500	43.4	8.43	8.41	1.002
third point	5500	21.7	4.21	4.13	1.020
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	16.85	16.82	1.002
				Average Correction Factor	1.007

Corrected As found	17.10	Previous response	16.80	% change	-1.7%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	86.8	8.68	8.79	0.987
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	8.68	8.69	0.999
second point	5500	43.4	4.34	4.35	0.998
third point	5500	21.7	2.17	2.13	1.019
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	8.68	8.67	1.001
				Average Correction Factor	1.005

Corrected As found	8.79	Previous response	8.61	% change	-2.1%

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	86.8	8.17	8.31	0.984
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	8.17	8.18	0.999
second point	5500	43.4	4.09	4.07	1.004
third point	5500	21.7	2.04	2.01	1.017
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	8.17	8.15	1.003
				Average Correction Factor	1.007

Corrected As found	8.31	Previous response	8.20	% change	-1.4%

Wood Buffalo Environmental Association

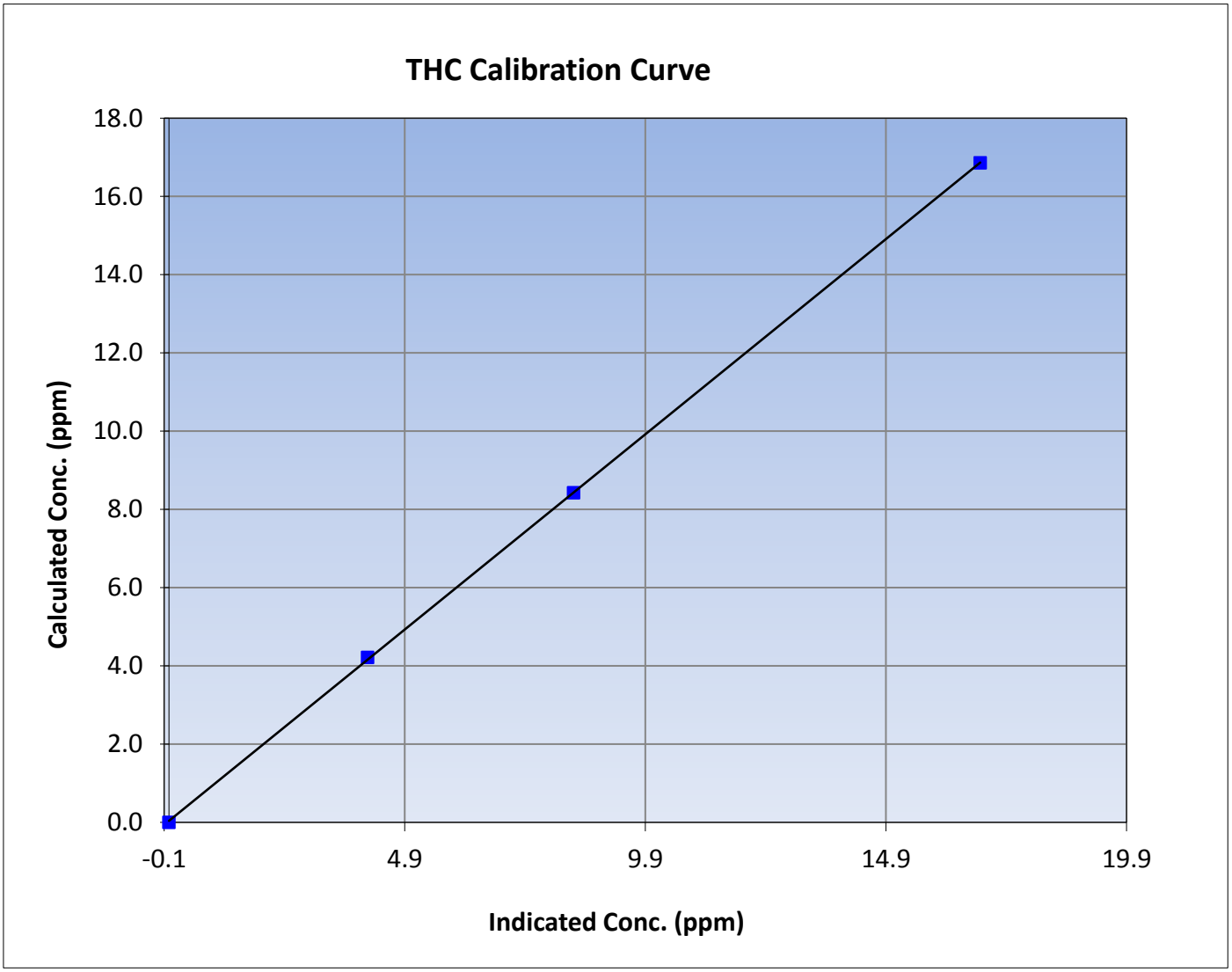
THC Calibration Summary

Station Information

Calibration Date	January 11, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:30	End Time (MST)	14:25
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999971
16.85	16.86	0.9997		
8.43	8.41	1.0021	Slope	0.998084
4.21	4.13	1.0203		
			Intercept	0.038139



Wood Buffalo Environmental Association

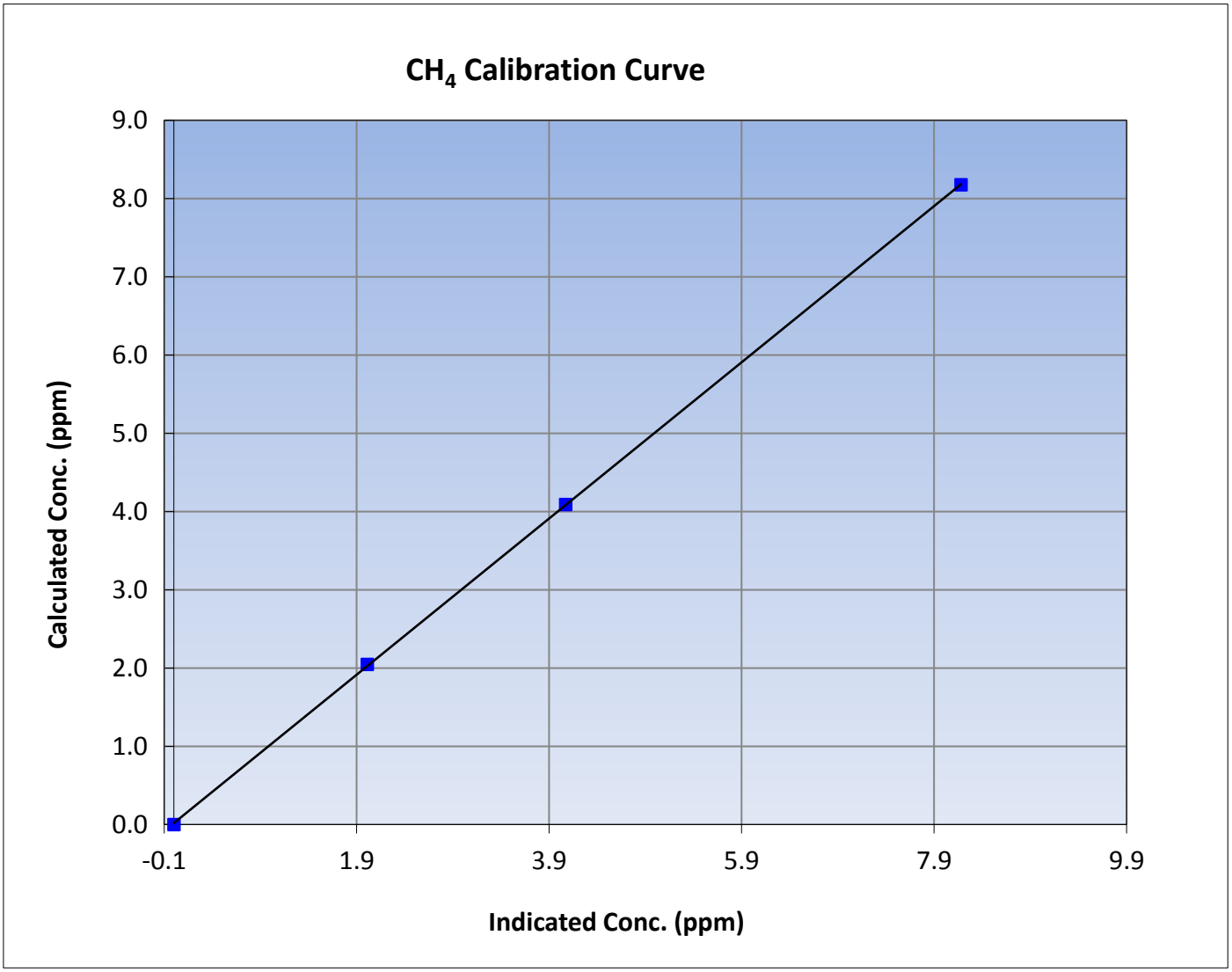
CH_4 Calibration Summary

Station Information

Calibration Date	January 11, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:30	End Time (MST)	14:25
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999978
8.17	8.18	0.9994		
4.09	4.07	1.0043	Slope	0.998179
2.04	2.01	1.0168		
			Intercept	0.018047



Wood Buffalo Environmental Association

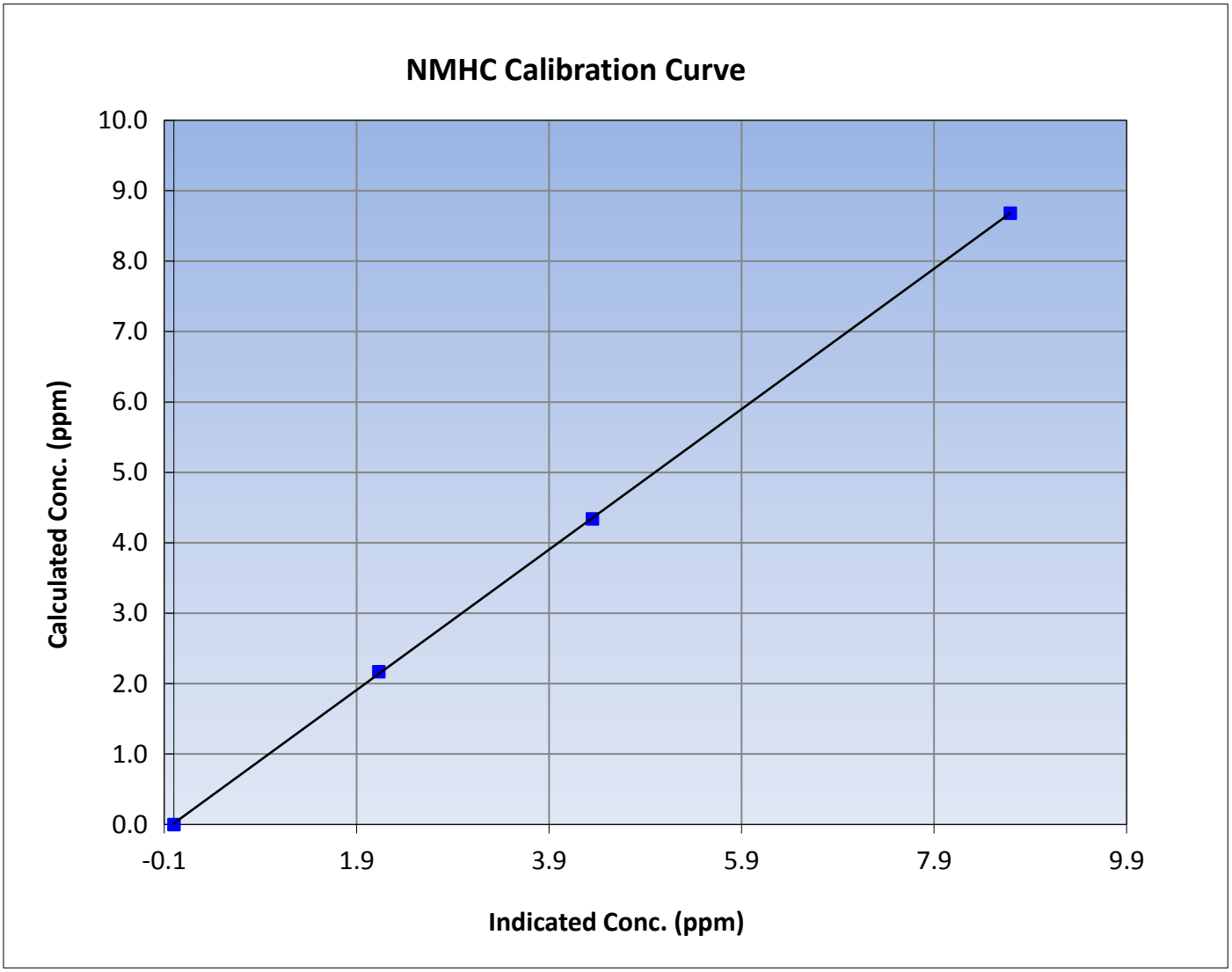
NMHC Calibration Summary

Station Information

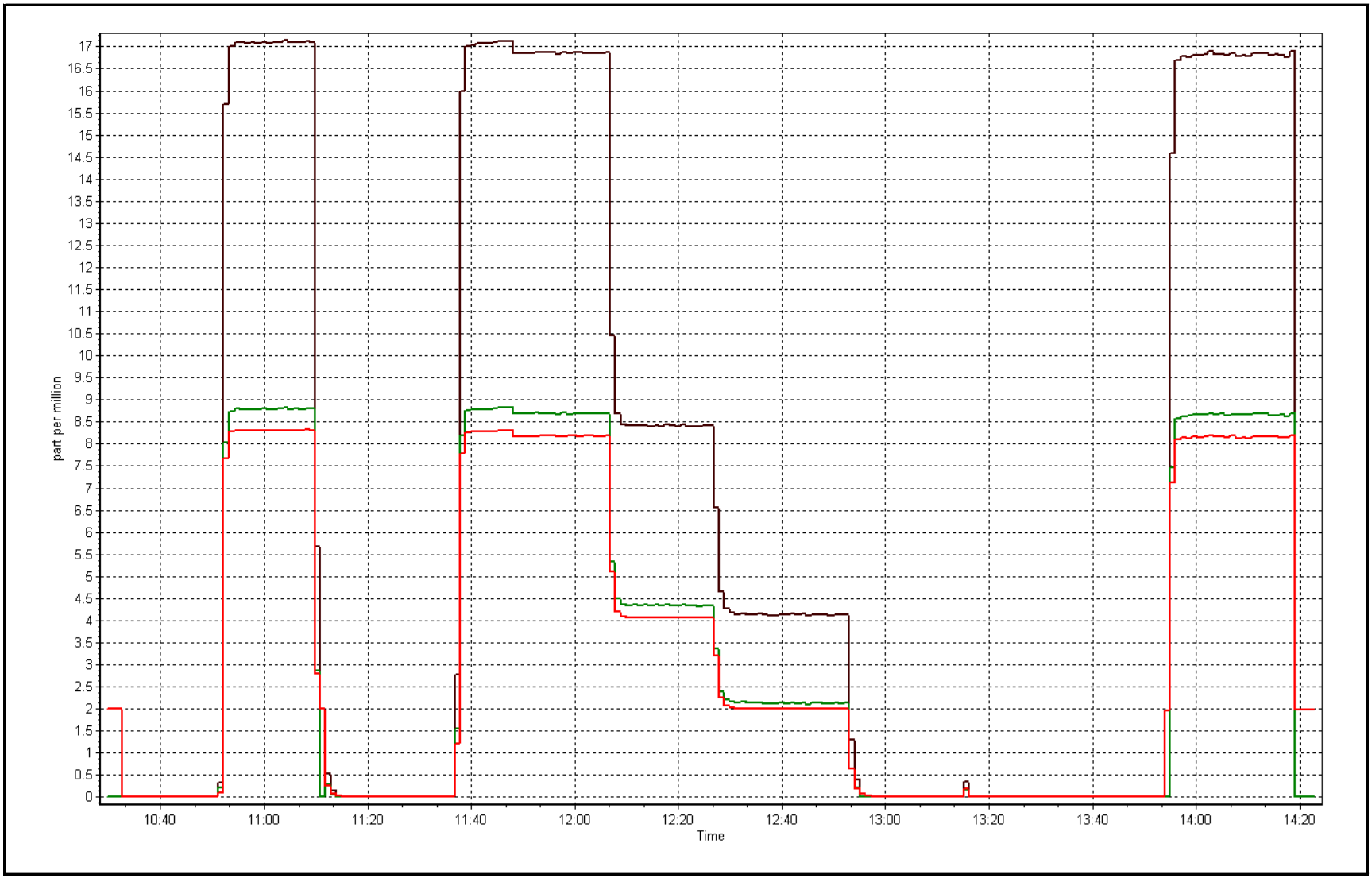
Calibration Date	January 11, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:30	End Time (MST)	14:25
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999967
8.68	8.69	0.9988		
4.34	4.35	0.9977	Slope	0.997079
2.17	2.13	1.0188		
			Intercept	0.016077



THC Calibration Plot Date: January 11, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	January 13, 2016	Previous Calibration	December 8, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	12:15	End Time (MST)	15:25
NO2 GPT Ref date	January-13-16	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	28.5	29.3
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.6
Calculated slope	0.997467	1.002516	Pressure	661.4	664.4
Calculated intercept	-0.550124	-1.855207	Flow cell A	0.702	0.702
Analyzer Background	-1.7	-1.7	Flow cell B	0.725	0.727
Analyzer Coefficient	1.034	1.034	Cell A Intensity	77389	76307
			Cell B Intensity	72542	71533

Analyzer make	Thermo 49i	Analyzer serial #	1300156234

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	0.6	----
as found span	5500	0.78	405.5	407.2	0.996
calibrator zero	5500	0.00	0.0	0.6	----
high point	5500	0.78	405.5	405.7	0.999
second point	5500	0.52	251.0	252.6	0.994
third point	5500	0.26	101.5	104.7	0.970
as left zero	5500	0.00	0.0	0.8	----
as left span	5500	0.78	405.0	398.9	1.015
				Average Correction Factor	0.988

Corrected As found	406.6	Previous response	407.1	% change	0.1%

Notes:

Filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell

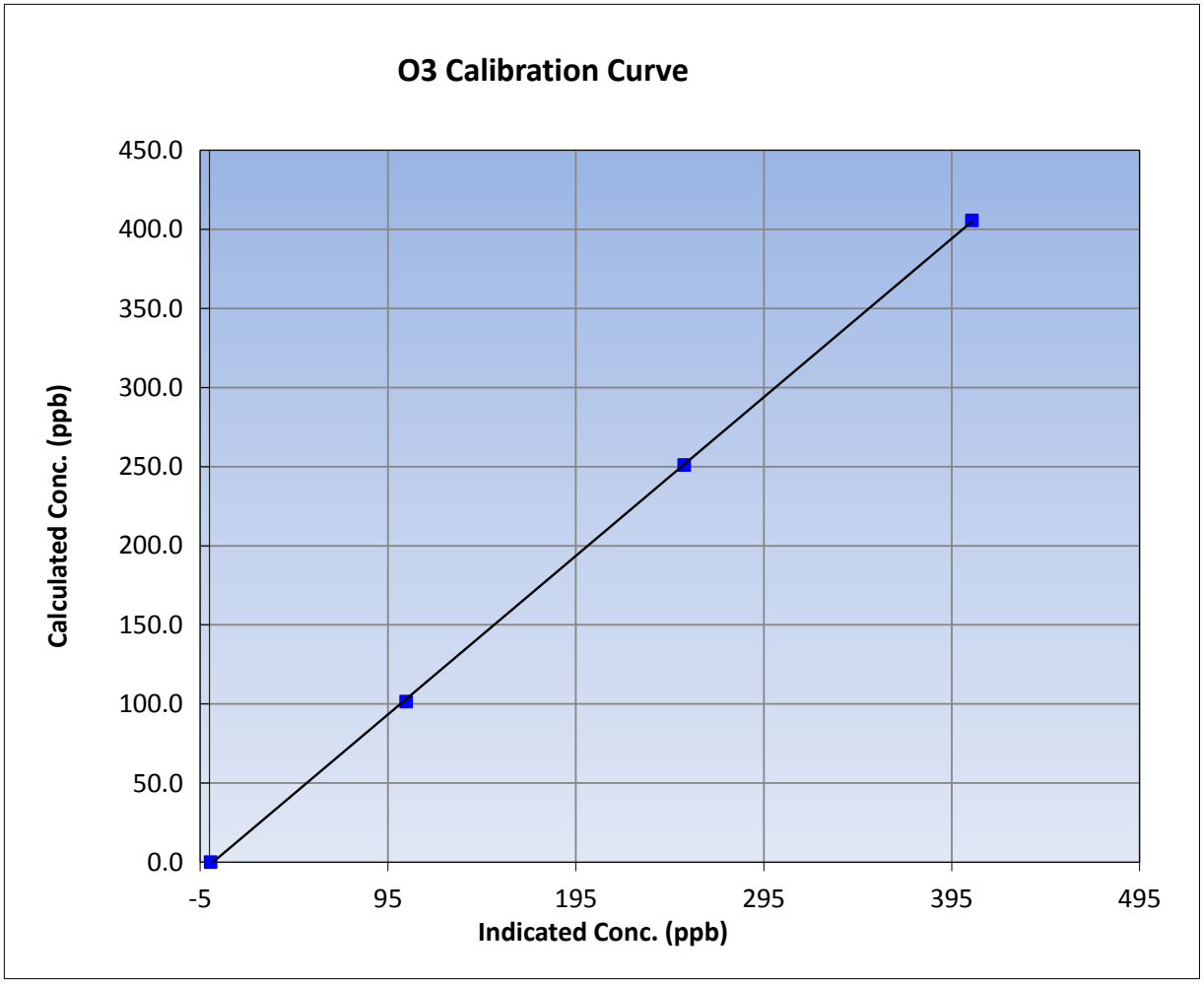
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

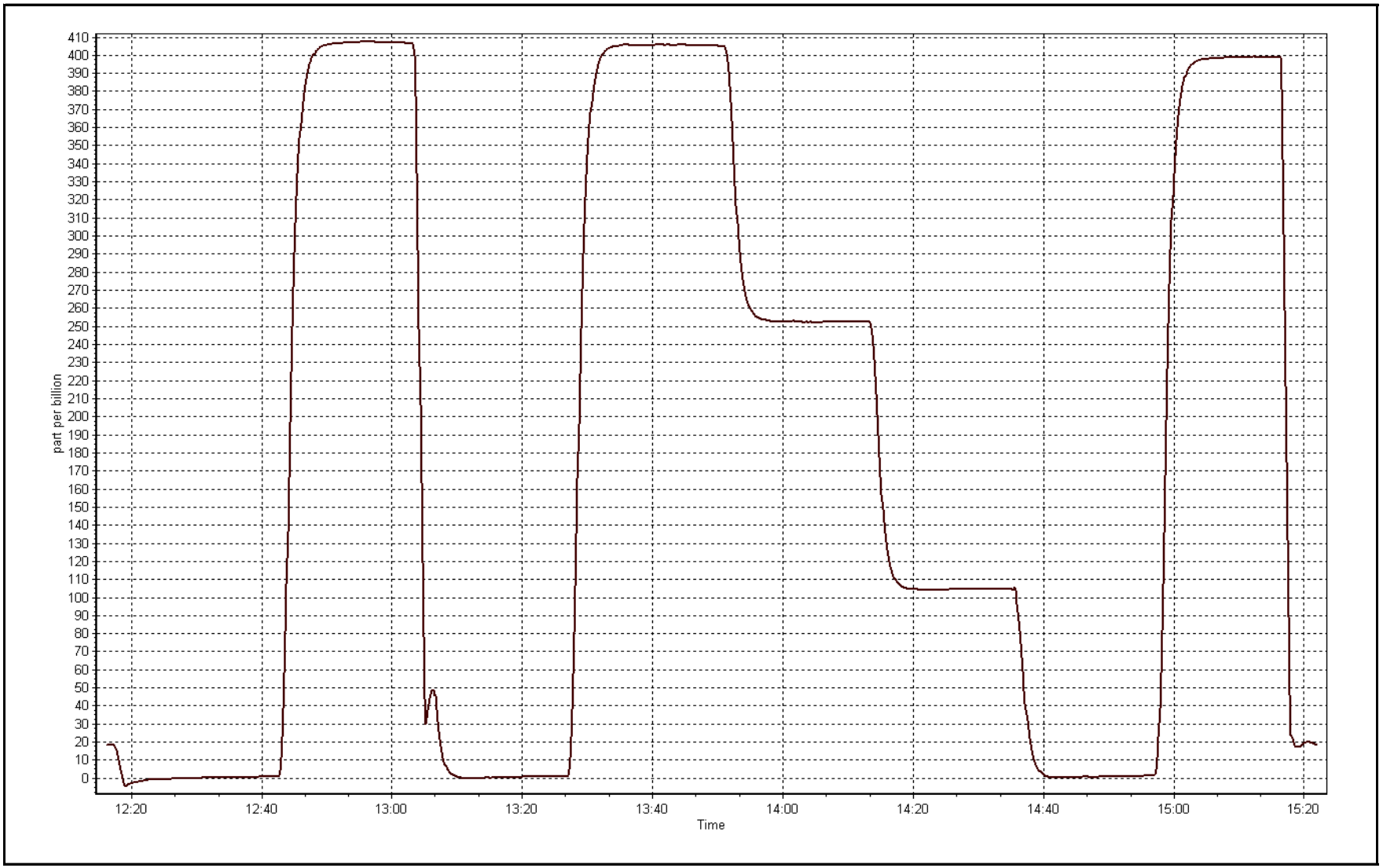
Calibration Date	January-13-16	Previous Calibration	December 8, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:15	End Time (MST)	15:25
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999951
405.5	405.7	0.9995		
251.0	252.6	0.9938	Slope	1.002516
101.5	104.7	0.9698		
			Intercept	-1.855207



O3 Calibration Plot Date: January 13, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 13, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	12:20
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOx Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996602	0.997261	1.000654
	Data Offset	0.475656	0.783165	0.163873
Current Calibration	Data Slope	1.001638	1.003921	0.997310
	Data Offset	0.456218	0.703648	-0.906406

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.036		1.036	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.6		2.600	
NOX bkgrnd	2.9		2.900	
Chamber Temp	50.6	Deg C	50.400	Deg C
Moly Temp	324.7	Deg C	327.400	Deg C
PMT voltage	-760.7	V	-760.700	V
PMT Temp	-3	Deg C	-3.000	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	162.9	mmHg	163.500	mmHg
R Cell Press Nox	162.9	mmHg	163.500	mmHg
NO sample flow	0.862	lpm	0.859	lpm
Nox sample Flow	0.862	lpm	0.859	lpm

Notes:

No maintenance performed. No adjustments made.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 13, 2016 Station Number: AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
as found span	5500	86.8	800.1	800.1	0.0	798.1	796.2	1.9	1.0025	1.0050
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
high point	5500	86.8	800.1	800.1	0.0	798.1	796.2	1.9	1.0025	1.0050
second point	5500	43.4	400.1	400.1	0.0	400.4	398.9	1.4	0.9993	1.0029
third point	5500	21.7	200.0	200.0	0.0	197.5	196.8	0.7	1.0128	1.0164
as left zero	5500	0.0	0.0	0.0	0.0	0.3	0.1	0.2	----	----
as left span	5500	86.8	800.1	392.6	407.5	801.7	398.2	403.5	0.9981	0.9860
								Average Correction Factor	1.0049	1.0081

Corrcted As found NO_X= 797.9 NO= 796.1 Percent Change NO_X= 0.6% NO= 0.7%

Previous Response NO_X= 802.4 NO= 801.6

GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 86.80 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	392.6	405.5	799.7	392.6	407.1	0.9850	1.0000	0.9962	100.4%
2nd NO2 (200)	----	547.2	251.0	800.2	547.2	253.0	0.9844	1.0000	0.9922	100.8%
3rd NO2 (100)	----	696.7	101.5	800.2	696.7	103.5	0.9844	1.0000	0.9803	102.0%
4th NO2 (0)	798.2	----	0.7	798.9	798.2	0.7	0.9860	1.0000	N/A	----
					Average Correction Factor		0.9849	1.0000	0.9896	101.1%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

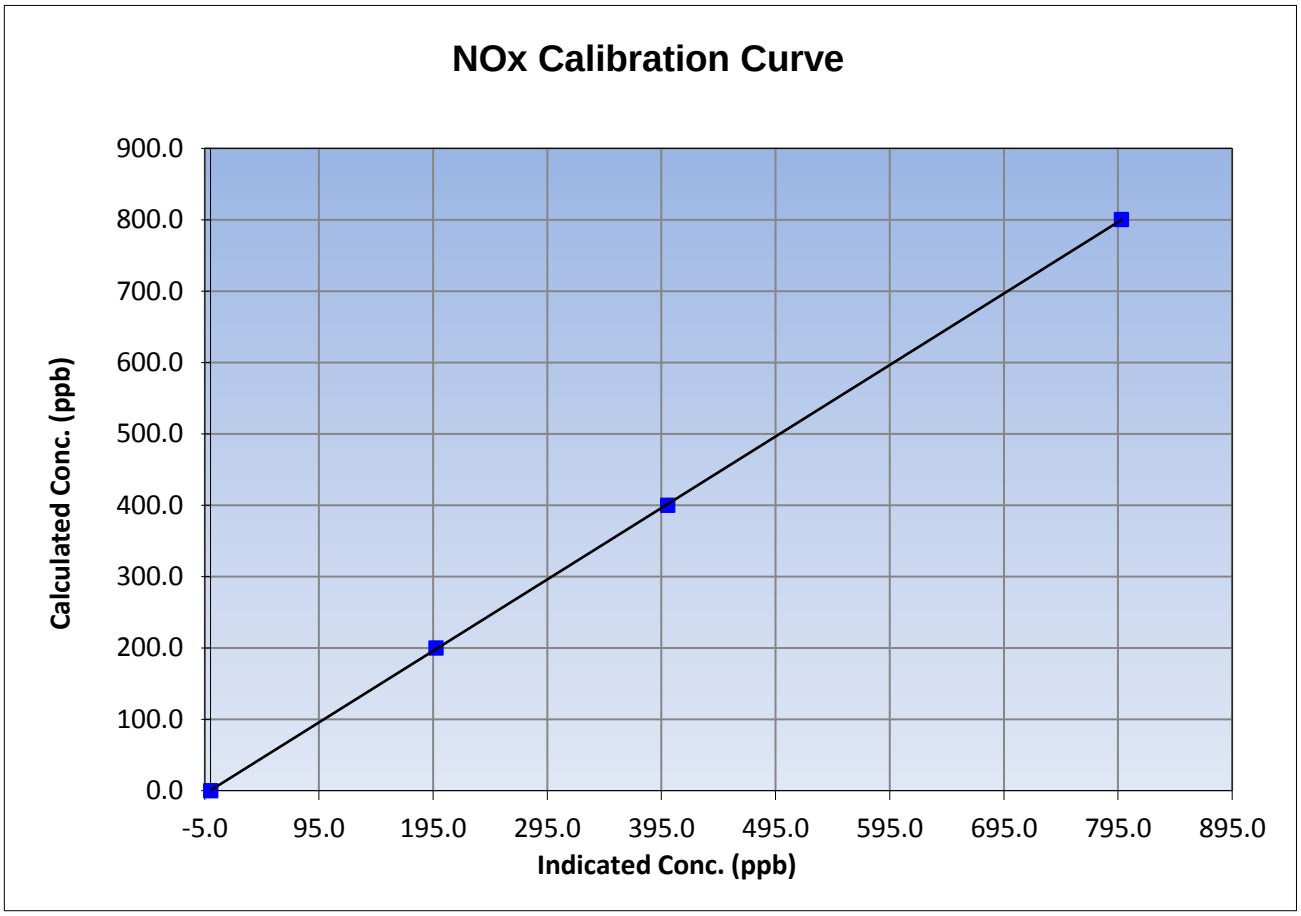
NO_X Calibration Summary

Station Information

Calibration Date	January 13, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:30	End Time (MST)	12:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999984
800.1	798.1	1.0025		
400.1	400.4	0.9993	Slope	1.001638
200.0	197.5	1.0128		
			Intercept	0.456218



Wood Buffalo Environmental Association

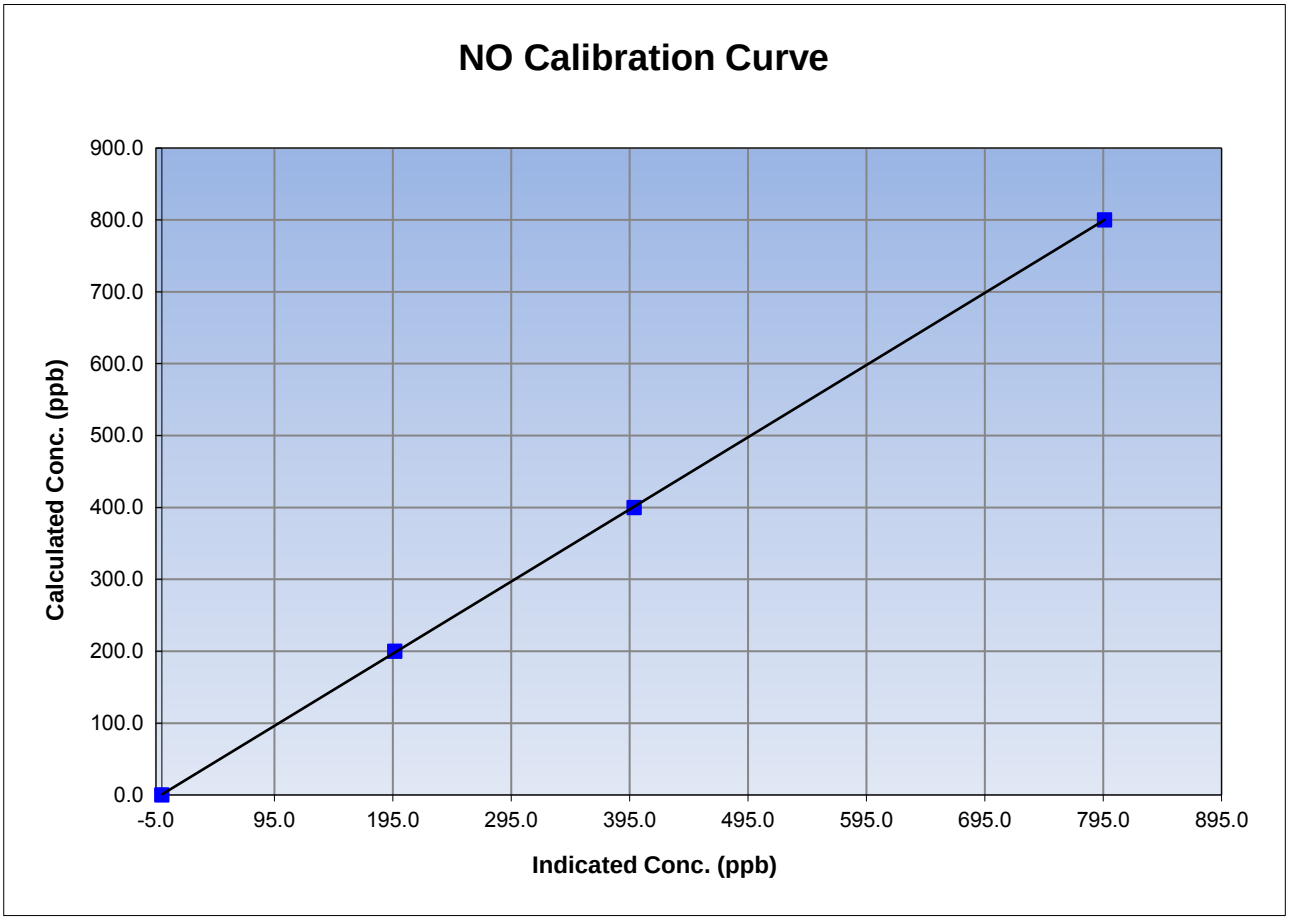
NO Calibration Summary

Station Information

Calibration Date	January 13, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:30	End Time (MST)	12:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999986
800.1	796.2	1.0050		
400.1	398.9	1.0029	Slope	1.003921
200.0	196.8	1.0164		
			Intercept	0.703648



Wood Buffalo Environmental Association

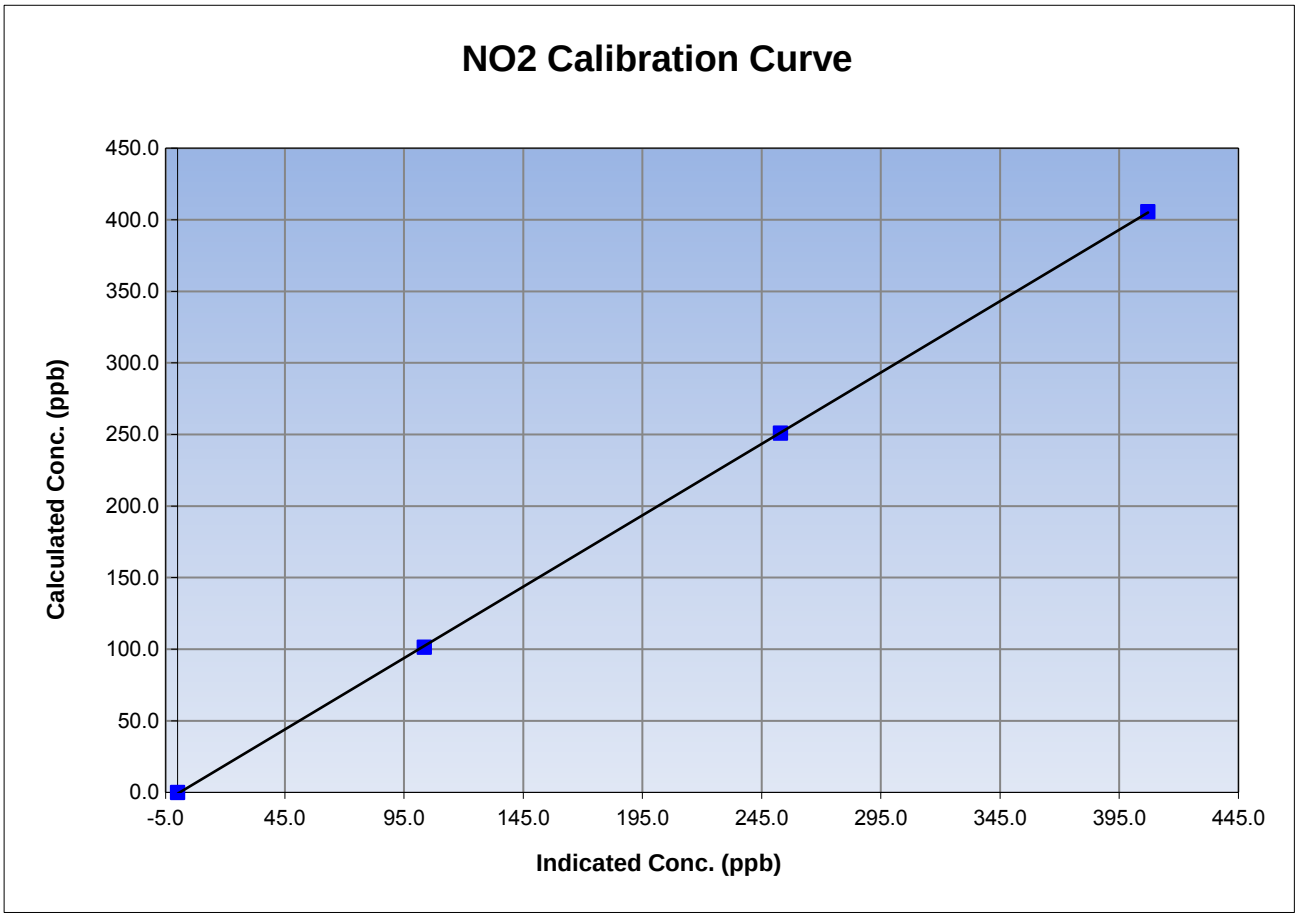
NO_2 Calibration Summary

Station Information

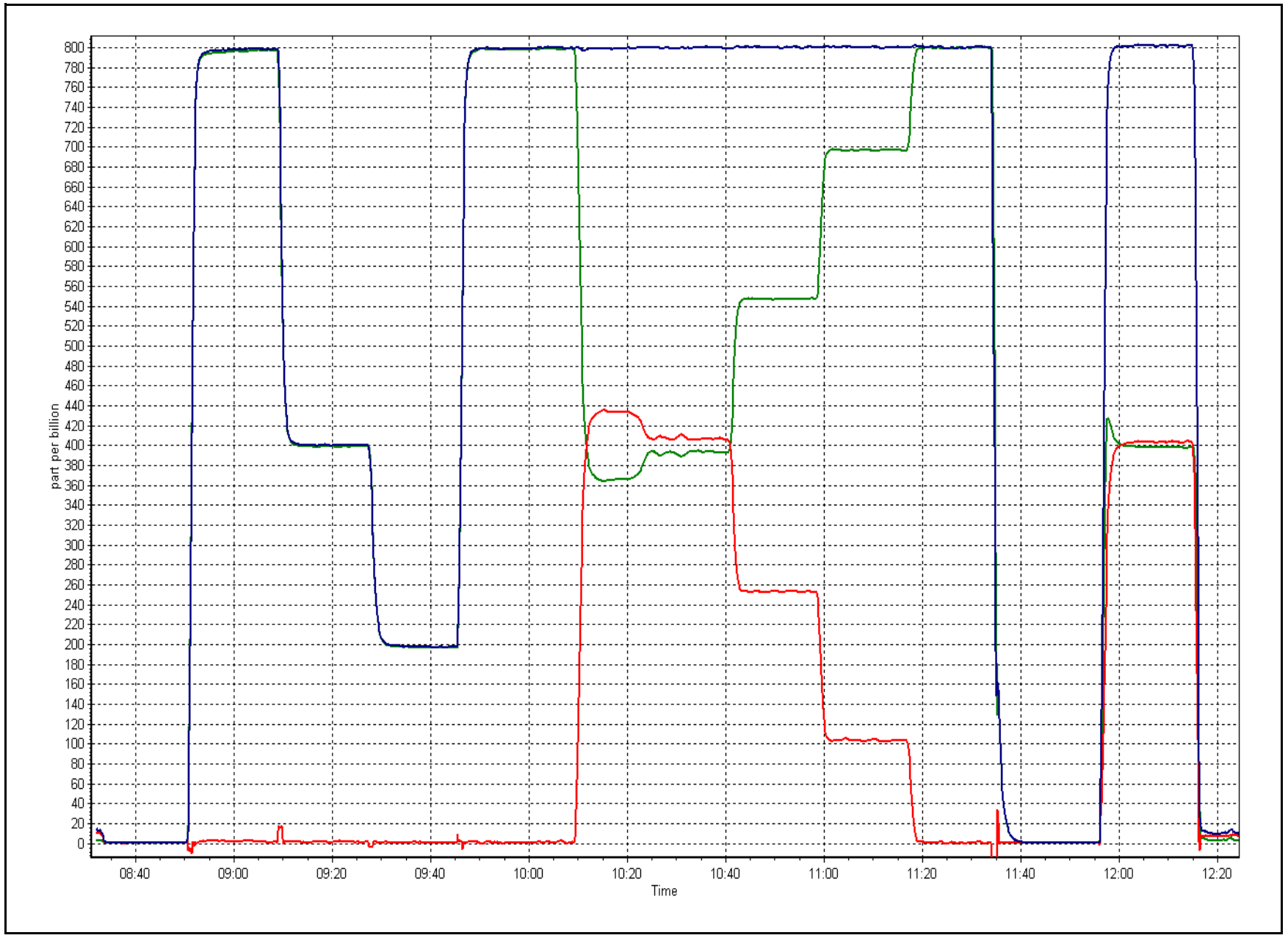
Calibration Date	January 13, 2016	Previous Calibration	December 7, 2015
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:30	End Time (MST)	12:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999982
405.5	407.1	0.9962		
251.0	253.0	0.9922	Slope	0.997310
101.5	103.5	0.9803		
			Intercept	-0.906406



NOX Calibration Plot Date: January 13, 2016



Wood Buffalo Environmental Association
N_t-NO_X-NH_3 Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	January 18, 2016	NOX Previous Cal Date	December 7, 2015
NH3 Calibration Date	January 18, 2016	NH3 Previous Cal Date	December 8, 2015
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	16:15
		Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	14300410
NH3 Cal Gas Conc	75.1 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NOx Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355
NO Cal Gas Conc	50.7 ppm		

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.999531	0.983176	0.996361	0.999734	1.003299
	Data Offset	-3.400261	-4.668922	2.699165	3.660072	0.670149
Cal Stats After	Data Slope	0.996732	0.978884	0.998449	0.999597	1.002198
	Data Offset	-2.403705	-4.272492	0.763099	2.295604	-2.265249
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	215
Converter	API 501 NH#	Converter serial #	217

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOX Conc range	1000	ppb	1000	ppb
NO BKG	-0.2	ppb	-0.2	ppb
NOx BKG	-0.2	ppb	-0.2	ppb
Nt BKG	-0.4		-0.4	
NO coefficient	1.125		1.113	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.142		1.135	
NH3 coefficient	0.974		0.970	
Nt coefficient	1.138		1.130	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.1	Deg C	315.6	Deg C
PMT Temp	7.1	Deg C	7.1	Deg C
O3 flow	84.0	ccm	85.0	ccm
R Cell Press	4.6	mmHg	4.8	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	540.0	ccm	547.0	ccm
Sample Flow 2 Nox	540.0	ccm	547.0	ccm
Sample Flow 3 Nt	540.0	ccm	547.0	ccm

Notes:

Inlet filter changed after as founds. As left NO point drifted from first GPT point. There was no drift in NOX. NOX span adjusted. NH3 adjusted.

Wood Buffalo Environmental Association

$Nt\text{-}NO_x\text{-}NH_3$ Calibration Report

Station Information

Calibration Date: January 18, 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 NH3 conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH3 conc (ppb)	Nt Correction factor	NH3 Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-2.1	-3.1	1.0	----	----
as found NO	5500	86.8	800.1	800.1	----	809.8	809.9	-0.1	0.988	----
calibrator zero	5500	0.0	0.0	0.0	0.0	2.7	0.8	1.9	----	----
high NO point	5500	86.8	800.1	800.1	----	800.5	800.7	-0.2	1.000	----
NO/O3 point	5500	86.8	800.1	800.1	----	801.7	802.0	-0.4	0.998	----
as found NH3	3500	93.2	1999.8	NA	1999.8	2022.1	36.9	1985.4	0.989	1.007
first NH3	3500	93.2	1999.8	NA	1999.8	2044.0	36.7	2007.2	0.978	0.996
second NH3	3500	46.6	999.9	NA	999.9	1034.0	23.9	1009.9	0.967	0.990
third NH3	3500	23.3	500.0	NA	500.0	512.0	10.2	501.8	0.977	0.996
								Average Correction Factor	0.9988	0.9942

NH3 Corrected As Found	NH3 =	1984.4 ppb	Previous Response	NH3 =	2004.1 ppb	NH3 percent change	1.0%
Nt Corrected As Found	Nt =	811.9 ppb	Previous Response	Nt =	818.5 ppb	Nt percent change	0.8%
NOx Corrected As Found	NOx =	813.0 ppb	Previous Response	NOx =	800.4 ppb	NOx percent change	-1.6%

Wood Buffalo Environmental Association

$NO_X(NH_3)$ Calibration Report

Station Information

Calibration Date: January 18, 2016 Station Number: AMS 6

NOX / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-3.1	-3.5	-2.1	----	----
as found span	5500	86.8	800.1	800.1	800.1	809.9	808.4	809.8	0.9880	0.9898
calibrator zero	5500	0.0	0.0	0.0	0.0	0.8	-0.1	2.7	----	----
high point	5500	86.8	800.1	800.1	800.1	800.7	799.2	800.5	0.9993	1.0012
second point	5500	43.4	400.1	400.1	400.1	401.2	397.0	400.9	0.9972	1.0077
third point	5500	21.7	200.0	200.0	200.0	196.7	195.5	196.4	1.0170	1.0234
as left zero	5500	0.0	0.0	0.0	0.0	-3.8	-3.9	-0.6	----	----
as left span	5500	86.8	800.1	365.0	800.1	797.0	389.2	800.6	1.0040	0.9378
								Average Correction Factor	1.0045	1.0108

	Nt	NOX	NO	NO2
Corrected As found	811.9	813.0	811.8	430.8
Previous Response	818.5	800.4	796.7	430.7
Percent Change	0.8%	-1.6%	-1.9%	0.0%

GPT Calibration Data

Total Flow 6000 ccm Source Gas Flow 86.80 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated 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			4.2			----	
1st NO2 (300)	----	365.0	432.8	800.7	365.0	435.0	0.9161	1.0000	0.9949	100.5%
2nd NO2 (200)	----	540.2	257.6	798.8	540.2	258.7	0.9182	1.0000	0.9960	100.4%
3rd NO2 (100)	----	689.7	108.1	797.6	689.7	108.0	0.9196	1.0000	1.0015	99.9%
4th NO2 (0)	797.8	----	4.3	802.0	797.8	4.2	0.9145	1.0000	----	----
					Average Correction Factor		0.9171	1.0000	0.9975	100.3%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

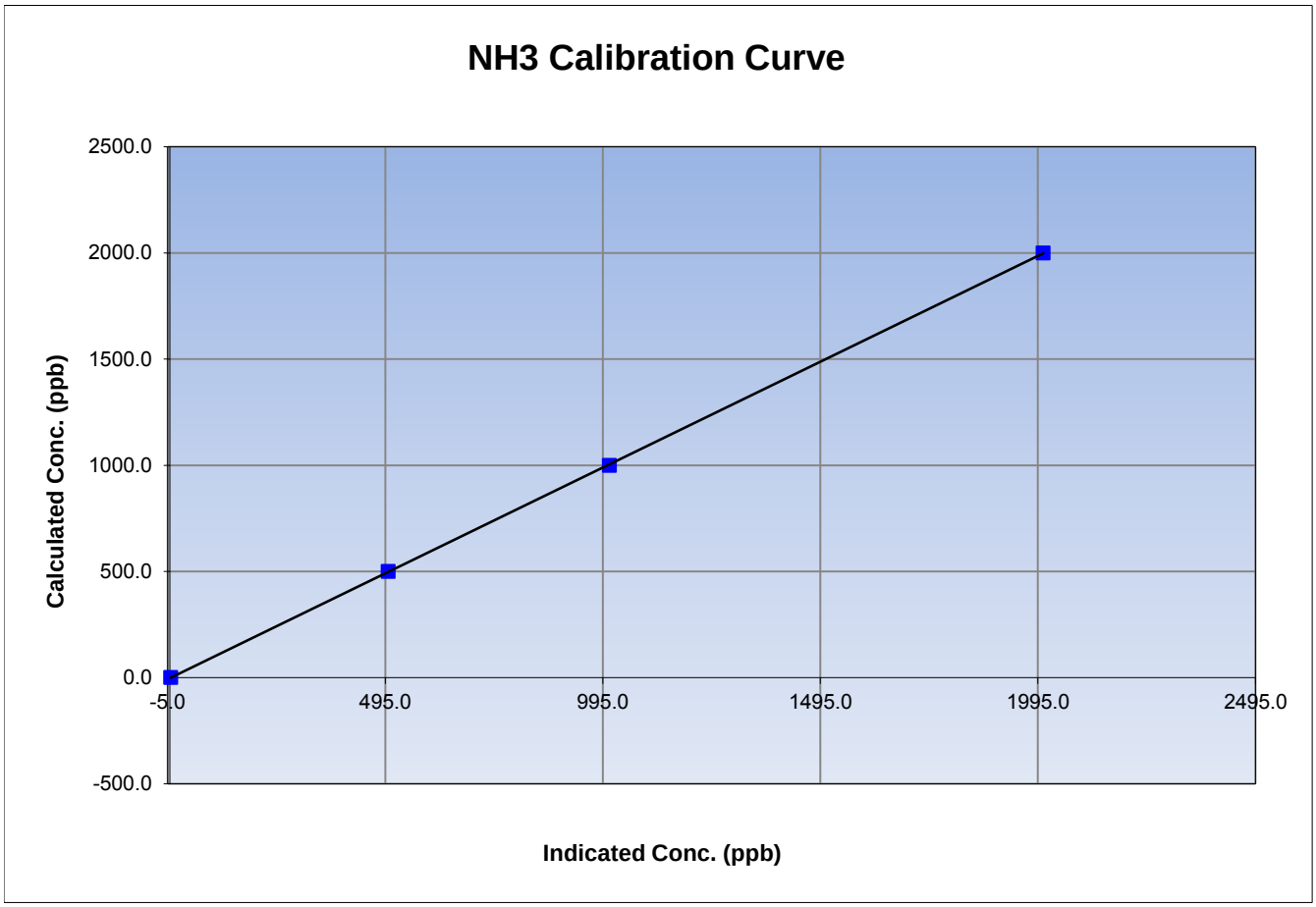
NH3 Calibration Summary

Station Information

Calibration Date	January 18, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	16:15
Analyzer make	API T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.9	----	Correlation Coefficient	0.999988
1999.8	2007.2	0.9963		
999.9	1009.9	0.9901	Slope	0.996732
500.0	501.8	0.9963		
			Intercept	-2.403705



Wood Buffalo Environmental Association

Nt Calibration Summary

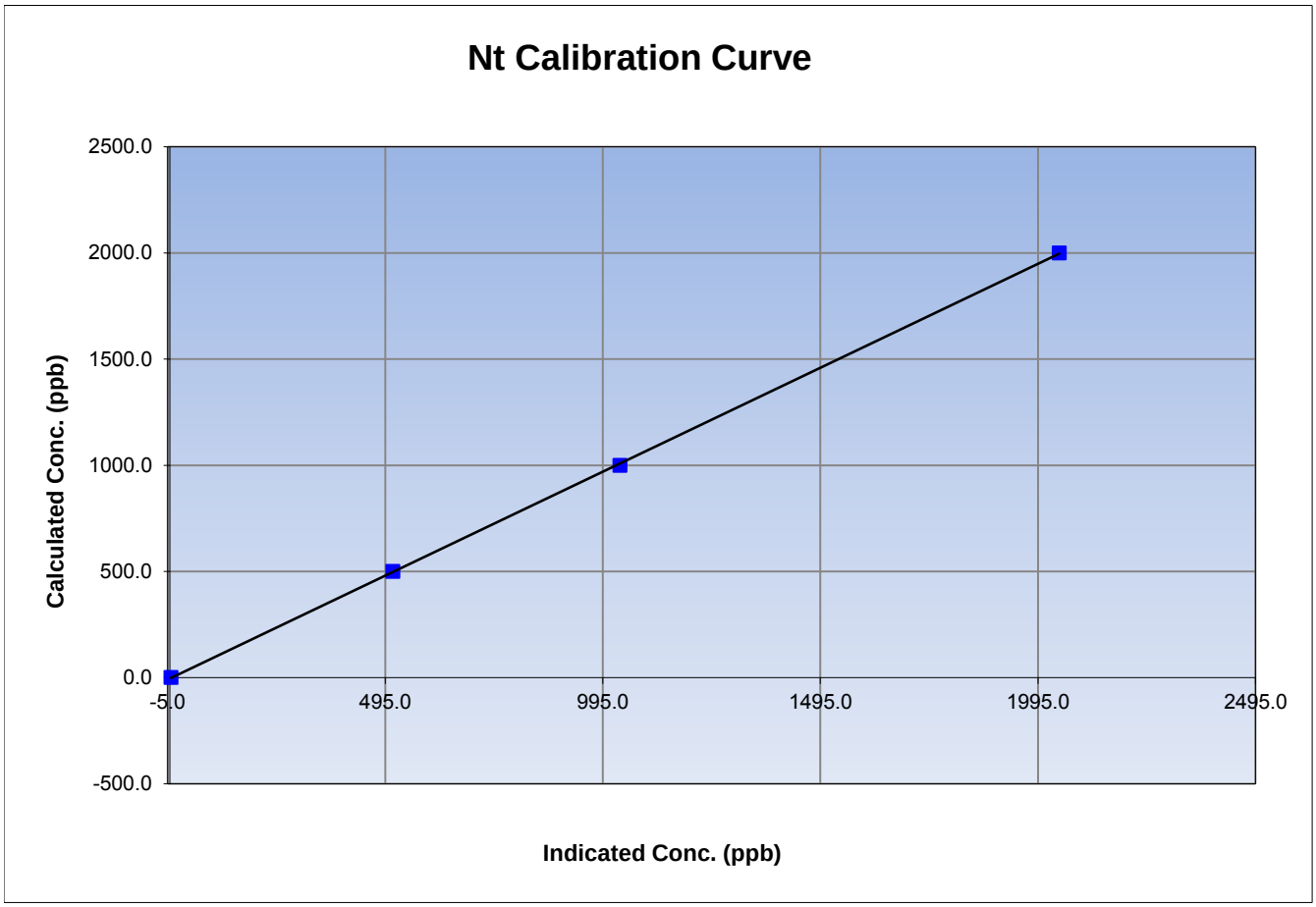
Station Information

Calibration Date	January 18, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	16:15
Analyzer make	API T201	Analyzer serial #	215

Nt (NH_3) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	2.7	----	Correlation Coefficient	0.999960
1999.8	2044.0	0.9784		
999.9	1034.0	0.9670	Slope	0.978884
500.0	512.0	0.9765		
			Intercept	-4.272492

Nt Calibration Curve



Wood Buffalo Environmental Association

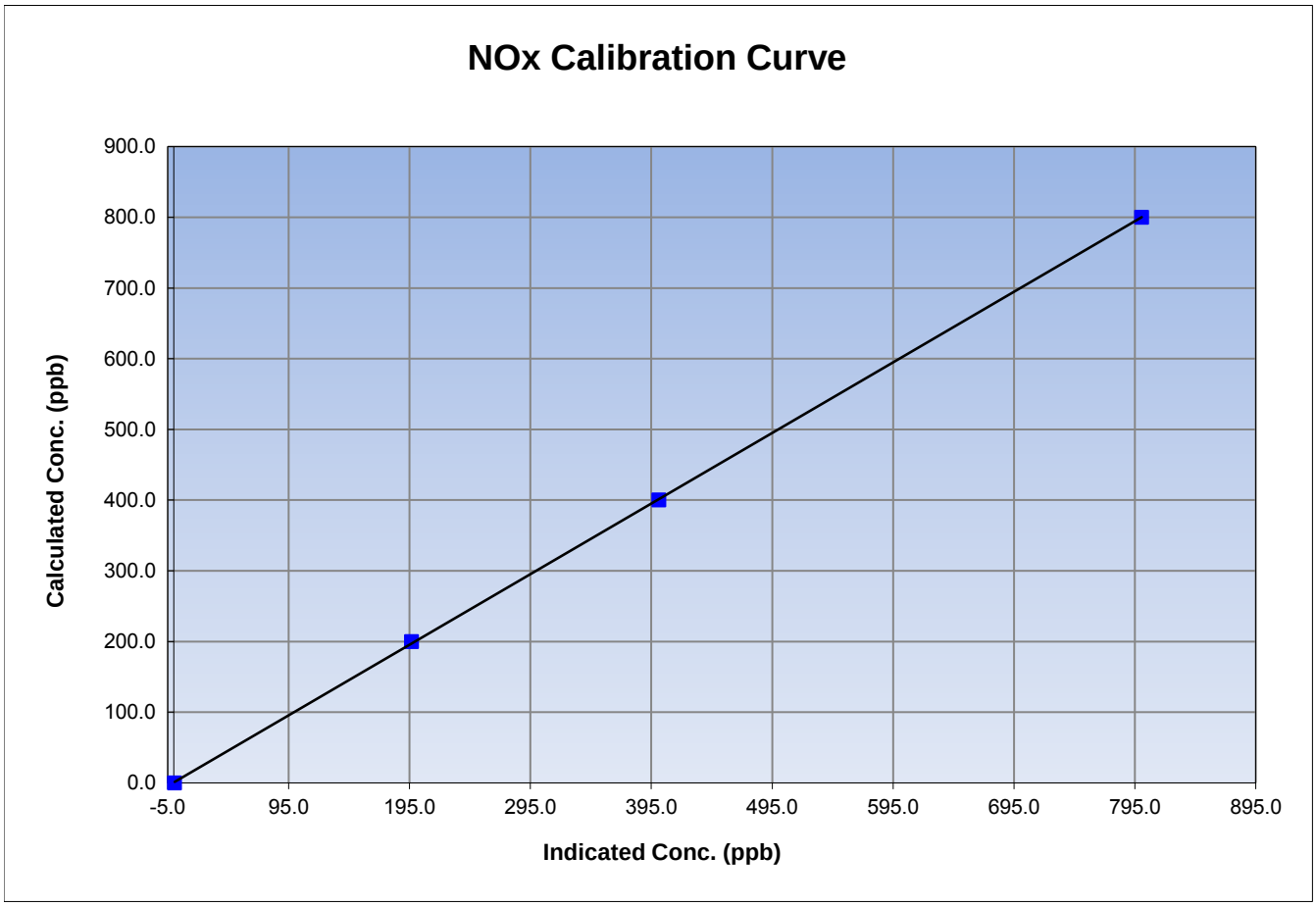
NOx Calibration Summary

Station Information

Calibration Date	January 18, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	16:15
Analyzer make	API T201	Analyzer serial #	215

NO_X Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	----	Correlation Coefficient	0.999965
800.1	800.7	0.9993		
400.1	401.2	0.9972	Slope	0.998449
200.0	196.7	1.0170		
			Intercept	0.763099



Wood Buffalo Environmental Association

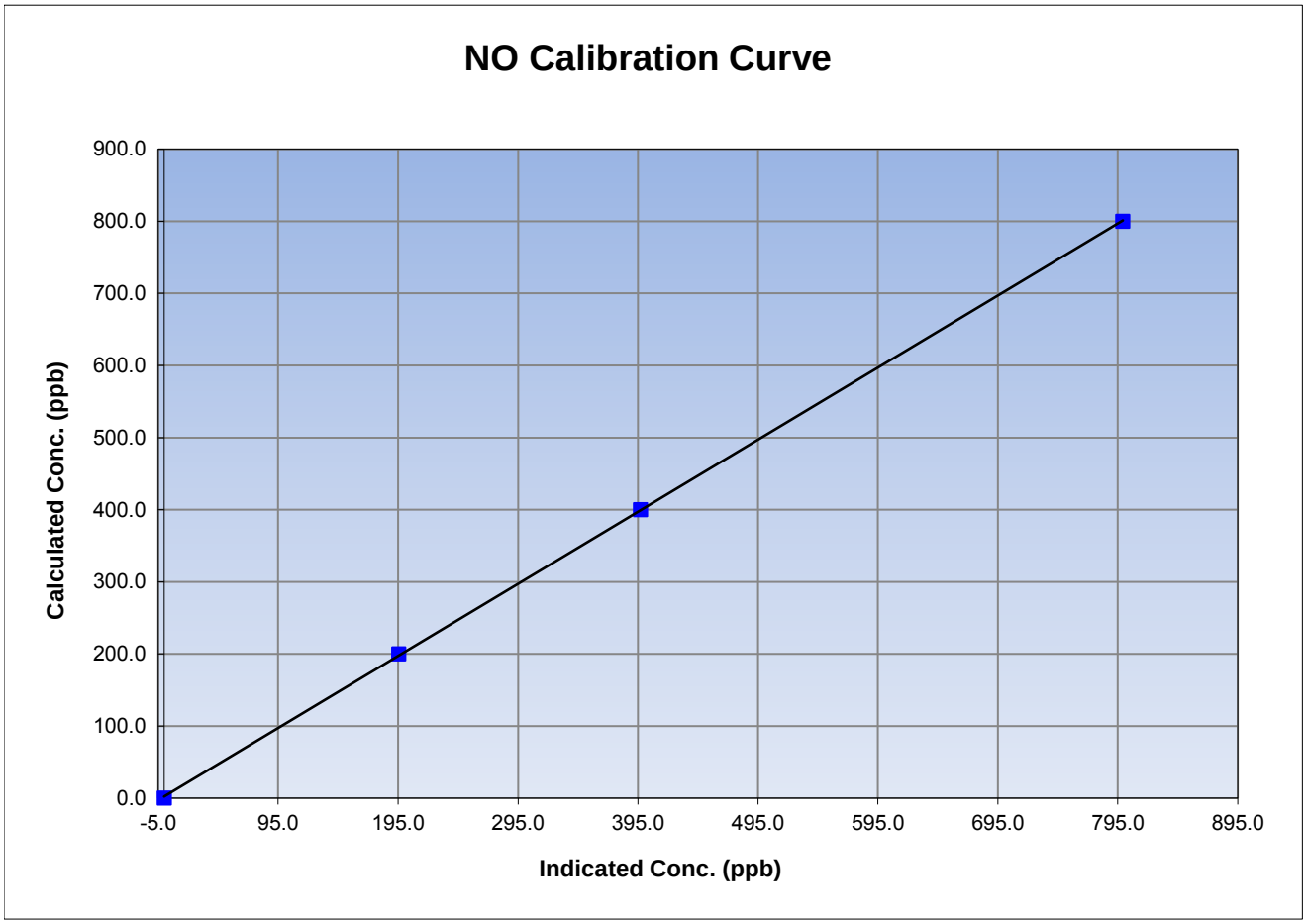
NO Calibration Summary

Station Information

Calibration Date	January 18, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	16:15
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999964
800.1	799.2	1.0012		
400.1	397.0	1.0077	Slope	0.999597
200.0	195.5	1.0234		
			Intercept	2.295604



Wood Buffalo Environmental Association

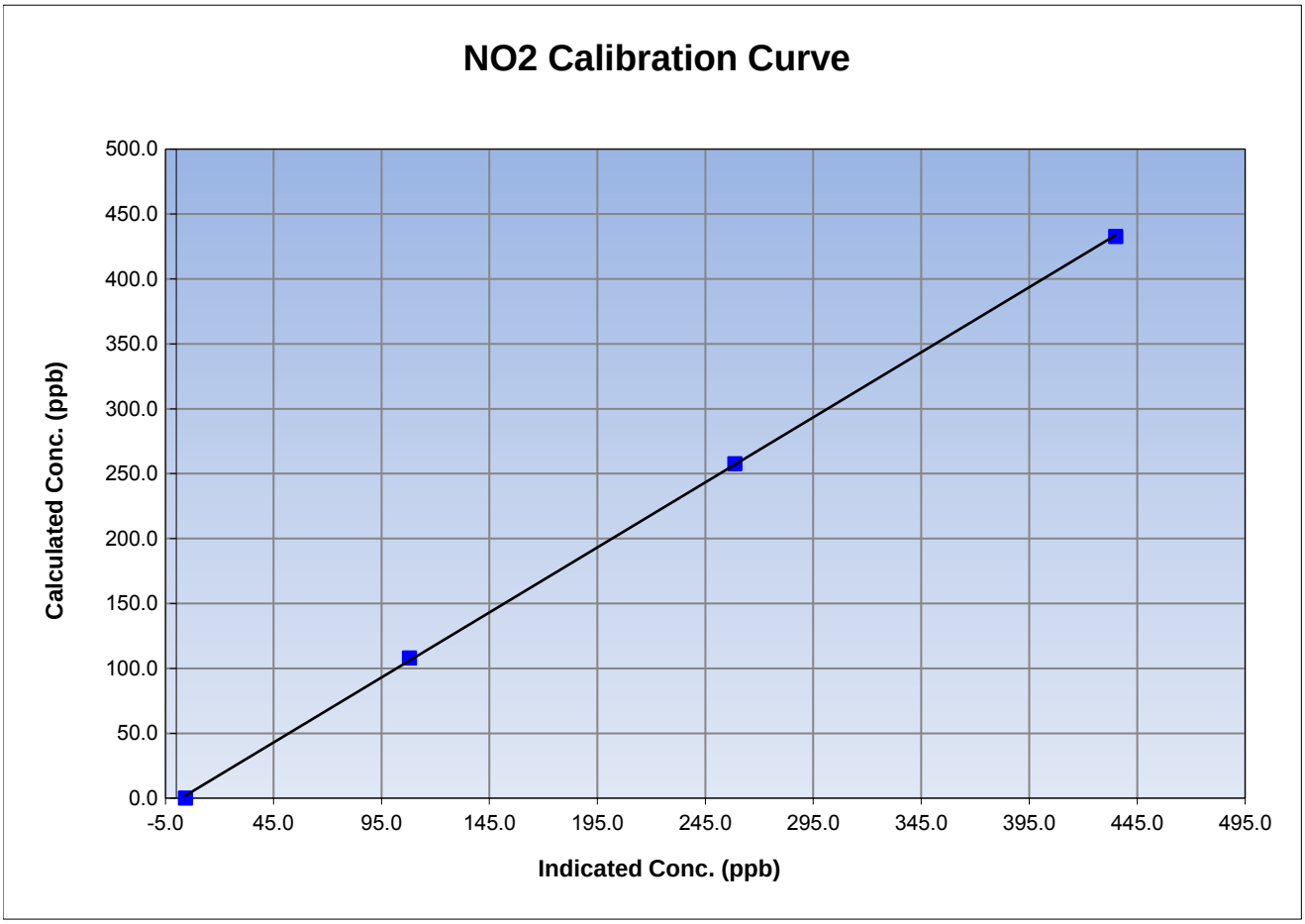
NO_2 Calibration Summary

Station Information

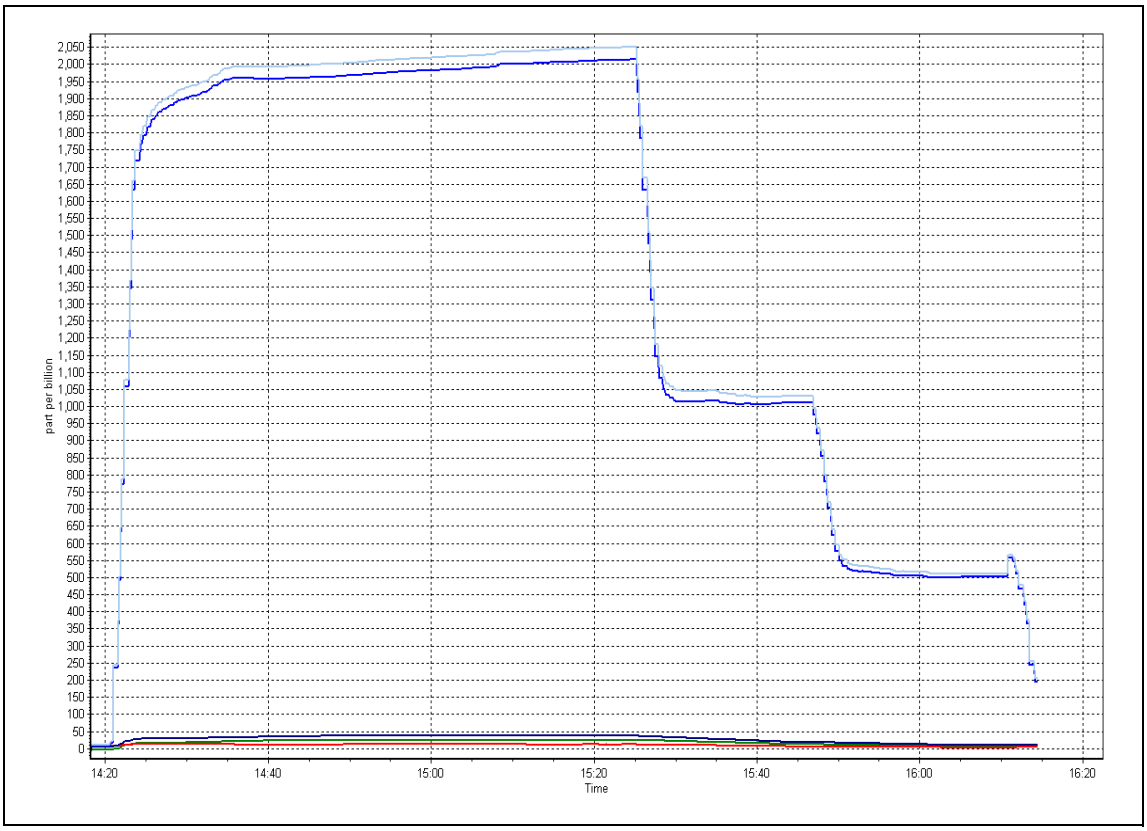
Calibration Date	January 18, 2016	Previous Calibration	December 7, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	16:15
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

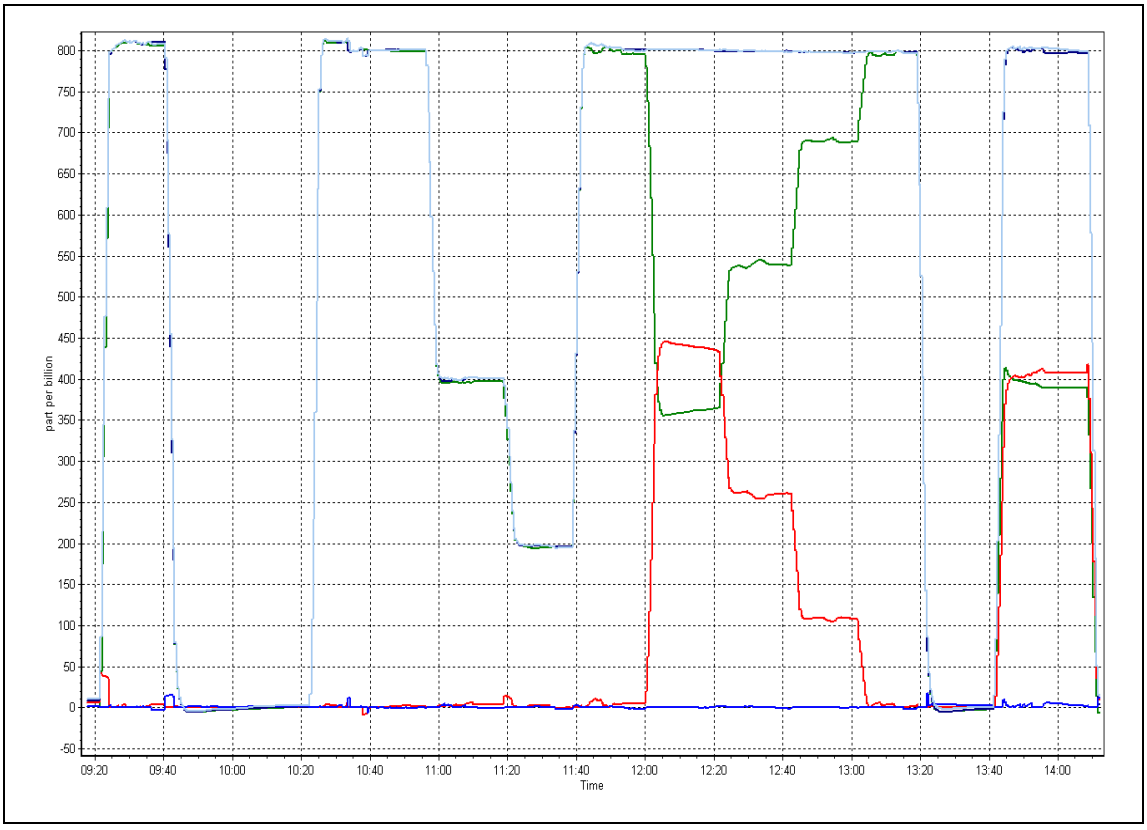
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	4.2	----	Correlation Coefficient	0.999907
432.8	435.0	0.9949		
257.6	258.7	0.9960	Slope	1.002198
108.1	108.0	1.0015		
			Intercept	-2.265249



NH_3 Calibration Plot Date: January 18, 2016



NOX Calibration Plot Date: January 18, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 19, 2016	Previous Calibration:	December 8, 2015
Station Name:	Patricia McInnis	Station Number:	AMS 6
Start Time (MST):	10:45	End Time (MST):	12:00
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	
C_{14} Source SN:	
Confirmation of Time settings:	Yes ☑ No ☐
Paremeters Checked:	T1 ☑ T2 ☐ T3 ☐ T4 ☐ P3 ☑ Main Flow ☑ Beta ☐ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-11.0	-13.3	-2.3	-13.0
T2	16.0	na	na	16.0
T3	20.0	na	na	20.0
T4	8.0	na	na	8.0
RH (%)	14.0	na	na	14.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	973	965.7	-7.4	973

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	204		204
Neph	-0.2		-0.2
C14	-2.7		-2.7
Indicated Concentration (ug/m3)	**-0.1**	**no**	**-0.1**
Offset 1	204.1		204.1
Offset 2	32.5		32.5

Leak Check (Quarterly)

Leak Check Date:	28/9/15	Previous Leak Check Date:	
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	17.10	0.37	
*Flow with adaptor (LPM):	16.73		

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

Mass Foil Calibration (Annualy)

Foil Calibration Date:		Previous Foil Calibration:	May 20, 2015
Zeroed?:			
Foil Mass:		Mass foil set S/N:	
Previous Correction Factor:			
New Correction Factor:			

INSPECTION DATA

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

NOTES:

Cyclone head cleaned. T1 adjusted. Filter tape is good, about 50% left on the roll.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
JANUARY 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	37	38	99.87	15	0	3	0
TRS (ppb) Average	708	35	36	99.87	2	0	1	0
THC (ppm) Average	706	37	38	99.87	3.1	-	2.4	-
NMHC (ppm) Average	706	37	38	99.87	0.414	-	0.154	-
CH4(ppm) Average	706	37	38	99.87	2.7	-	2.3	-
O3 (ppb) Average	709	35	35	100.00	37	0	31	-
NO2 (ppb) Average	706	37	38	99.87	32	0	17	-
NO (ppb) Average	706	37	38	99.87	68	-	22	-
NOX (ppb) Average	706	37	38	99.87	94	-	39	-
PM2.5 (ug/m3) Average	736	1	8	99.06	148.1	-	23.8	0
CO(ppm) Average	709	34	35	99.87	0.7	0	0.3	-
Temperature 2 m (C) Average	744	0	0	100.00	6.7	-	3.7	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.5	-	29.5	-
Relative Humidity (%) Average	744	0	0	100.00	95	-	89	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	30	-	14	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.7	1	-	0	0	0	0	1	1	15
TRS (ppb) Average	708	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	706	2.03	0.2	-	1.8	1.9	1.9	2	2.1	2.2	3.1
NMHC (ppm) Average	706	0.012	0.049	-	0	0	0	0	0	0	0.414
CH4(ppm) Average	706	2.02	0.1	-	1.8	1.9	1.9	2	2.1	2.2	2.7
O3 (ppb) Average	709	13.4	9	-	0	2	6	11	21	28	37
NO2 (ppb) Average	706	11.5	6	-	1	4	7	11	16	19	32
NO (ppb) Average	706	6.4	9	-	0	0	1	3	8	17	68
NOX (ppb) Average	706	17.9	14	-	1	4	9	15	24	33	94
PM2.5 (ug/m3) Average	736	6.44	8.6	-	0	1.7	3	4.9	7.6	11.3	148.1
CO(ppm) Average	709	0.12	0.1	-	0	0.1	0.1	0.1	0.1	0.2	0.7
Temperature 2 m (C) Average	744	-13.43	8.2	-	-33.9	-22.1	-18.4	-14.1	-8.8	-2.1	6.7
Barometric Pressure (inHg) Average	744	28.99	0.3	-	28.1	28.6	28.8	29	29.2	29.3	29.5
Relative Humidity (%) Average	744	79	8	-	48	70	75	80	84	88	95
Wind Speed 10 m (km/h) Average	744	7.1	5	-	0	2	3	6	10	13	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, TRS, THC, NO2, CO	08 Jan 2016 12:00	08 Jan 2016 12:00	1	Maintenance - sample manifold cleaned
PM2.5	29 Jan 2016 04:00	29 Jan 2016 04:00	1	Unstable Operation - negative baseline
PM2.5	29 Jan 2016 14:00	29 Jan 2016 16:00	3	Unstable Operation - negative baseline
PM2.5	29 Jan 2016 18:00	29 Jan 2016 18:00	1	Unstable Operation - negative baseline
PM2.5	29 Jan 2016 20:00	29 Jan 2016 21:00	2	Unstable Operation - negative baseline

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 15 ppb on Jan 6 17:00

Maximum Daily Average: 3.3 ppb on Jan 6

Minimum Value: 0 ppb on Jan 3 02:00

Minimum Daily Average: 0.1 ppb on Jan 12

Maximum Diurnal Average: 1.4 ppb at hour 13

Minimum Diurnal Average: 0.3 ppb at hour 4

Monthly Average: 0.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 9$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	37
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	1	1	0	0	0.4	1
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
6-Jan	0	0	0	0	1	Z	0	1	1	1	1	2	5	2	9	11	15	12	3	2	1	2	3	3	3.3	15
7-Jan	Z	0	0	0	0	0	0	C	C	C	C	C	C	1	4	3	2	3	1	0	0	0	0	0	--	4
8-Jan	0	Z	0	1	1	1	2	2	2	5	6	M	3	3	1	1	1	1	1	2	5	6	2	1	2.2	6
9-Jan	1	1	Z	1	1	1	1	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0.5	1
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	4	4	1	1	0	0	1	3	0.9	4
11-Jan	2	3	1	0	Z	2	1	2	1	1	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0.9	4
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Jan	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Jan	1	Z	0	0	1	7	9	8	5	1	0	0	3	1	1	1	0	0	0	0	0	0	0	0	1.8	9
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0.3	1
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	0.5	1
18-Jan	1	1	0	1	1	Z	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	4	3	1	1	1	1	1	0	0	0	0.8	4
20-Jan	0	Z	0	0	0	0	1	2	2	3	2	1	1	1	1	1	1	0	1	0	0	0	0	0	0.8	3
21-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	1	1	1	1	1	0.8	2
22-Jan	1	1	0	Z	1	0	1	1	0	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0.8	2
23-Jan	1	1	1	1	Z	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
24-Jan	1	1	0	0	0	Z	0	0	1	1	1	1	0	1	1	1	1	1	0	0	0	0	1	0	0.5	1
25-Jan	Z	2	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.6	2
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	6	4	2	2	1	1	1.3	6
28-Jan	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	3	10	3	1	0	0	0	0	0	0	0	0	0.9	10
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	3	15	1	2	1	1	1	1	1	0	0	0	0	1.2	15
	0.4	0.5	0.4	0.3	0.4	0.7	0.7	0.8	0.7	0.7	0.6	0.6	1.4	1.2	1.2	1.2	1.2	1.1	0.7	0.6	0.6	0.6	0.5	0.5	Diurnal Average	
	2	3	1	1	1	7	9	8	5	5	6	3	15	10	9	11	15	12	6	4	5	6	3	3	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

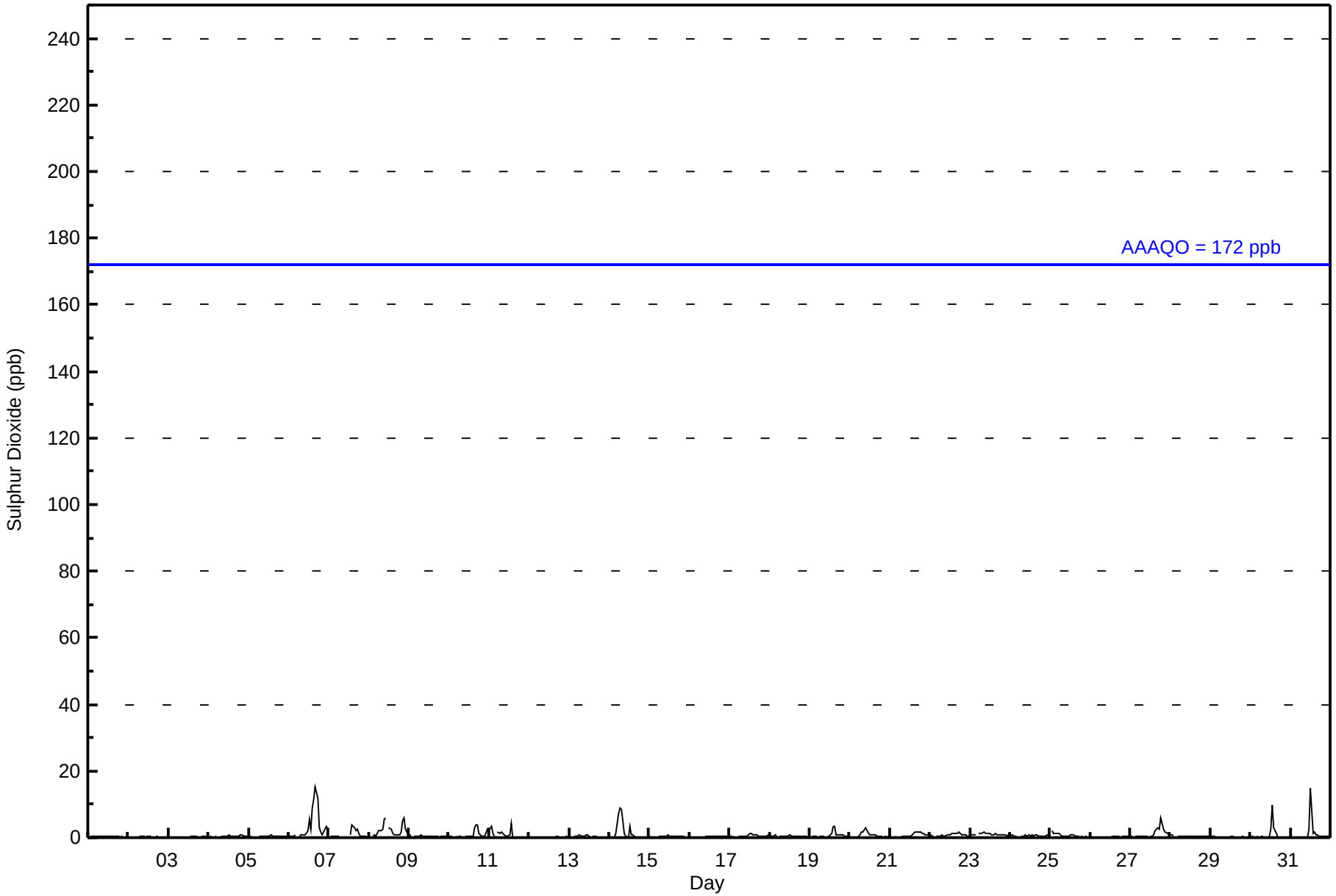
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	99.43	99.43
11 - 20	4	0.57	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 (SO_2) - ppb

Athabasca Valley - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	71	11	4	7	14	16	134	68	24	33	70	53	35	24	21	117	702
11 - 20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	11	4	7	14	16	134	68	24	33	70	53	35	24	21	119	706

Total Number of Valid Hours: 706

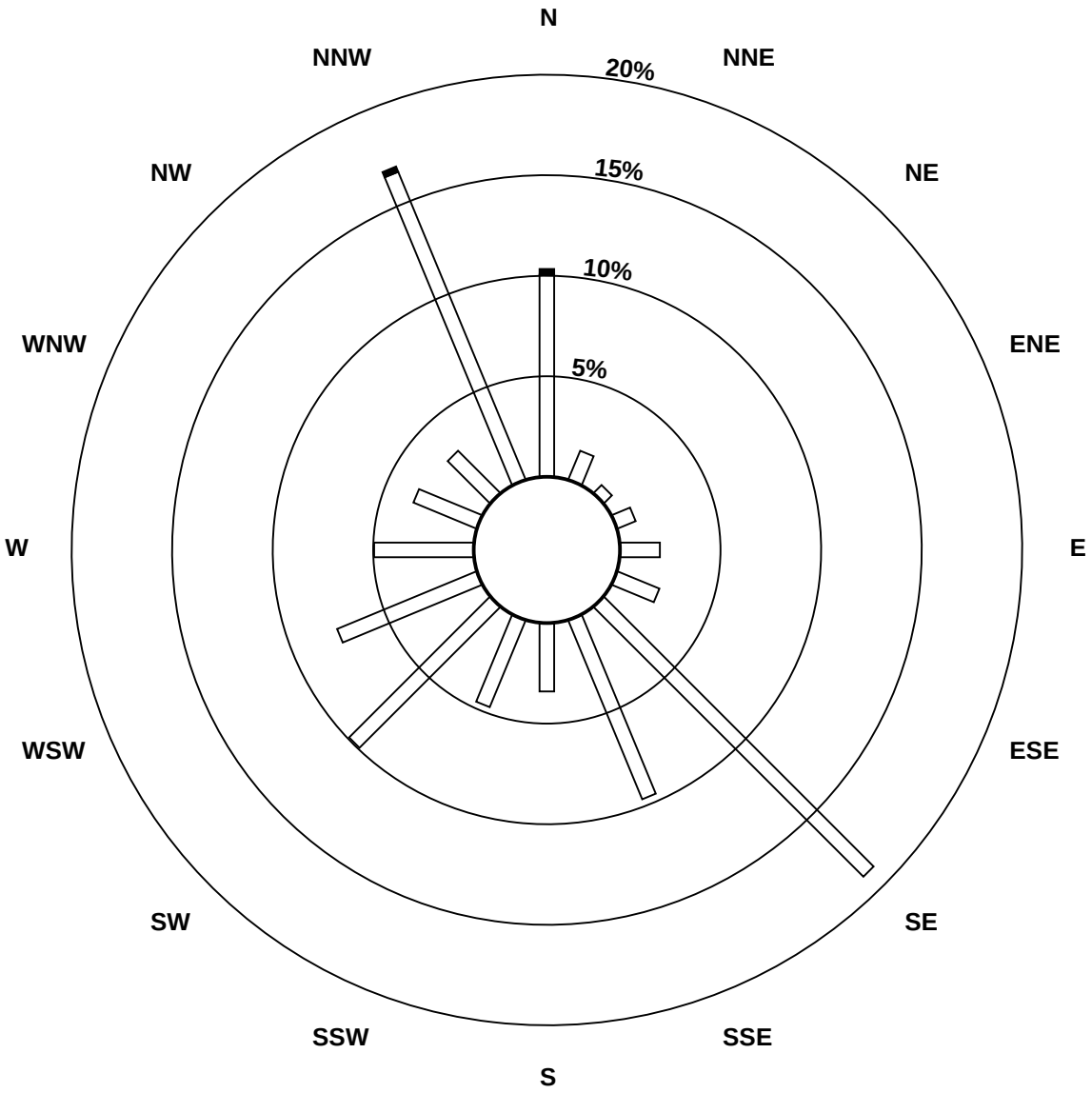
Total Number of Hours: 744

Wood Buffalo Environmental Association

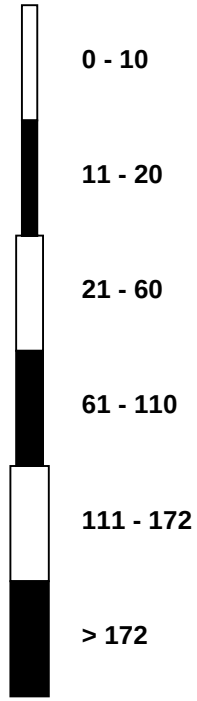
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



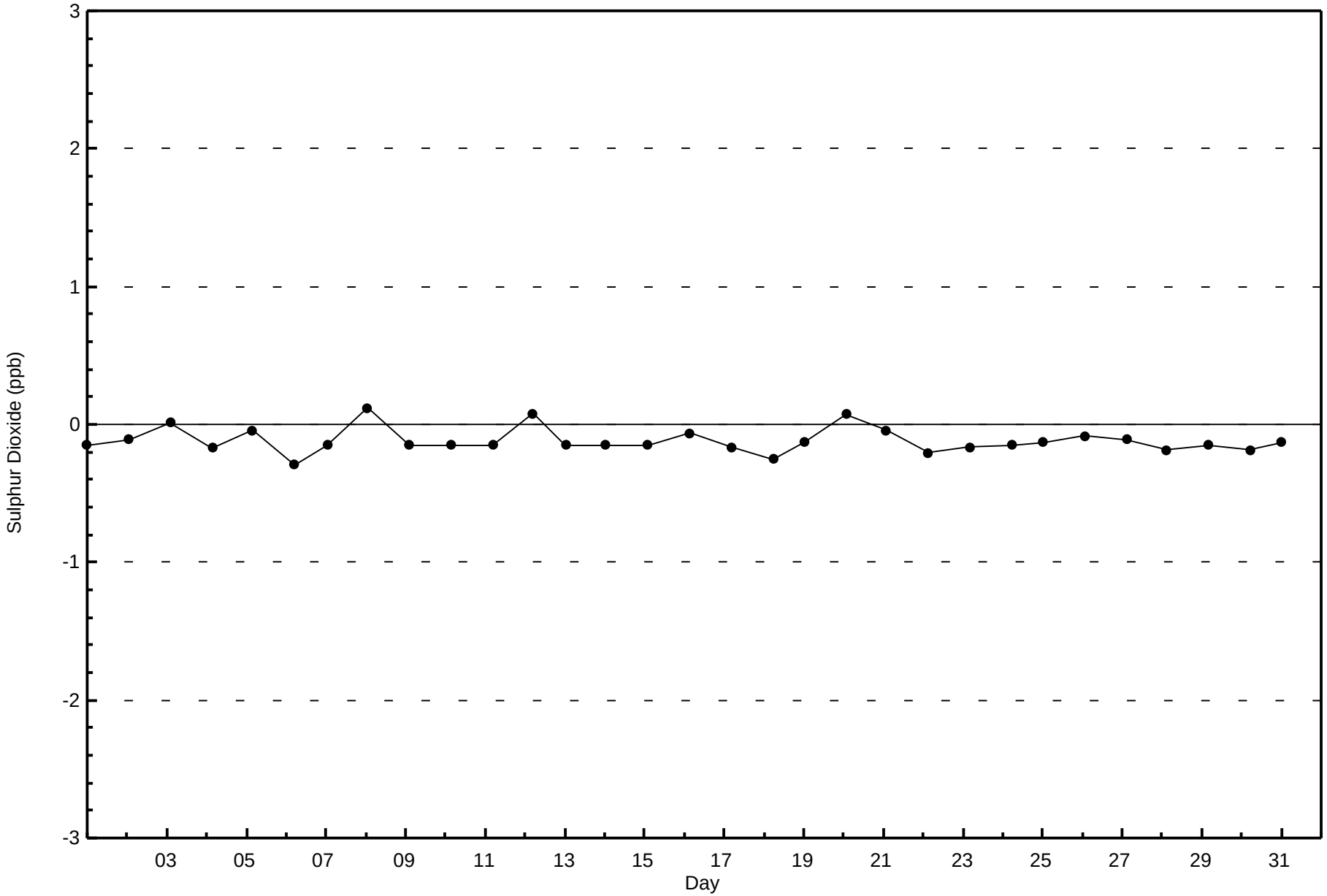
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - January 2016

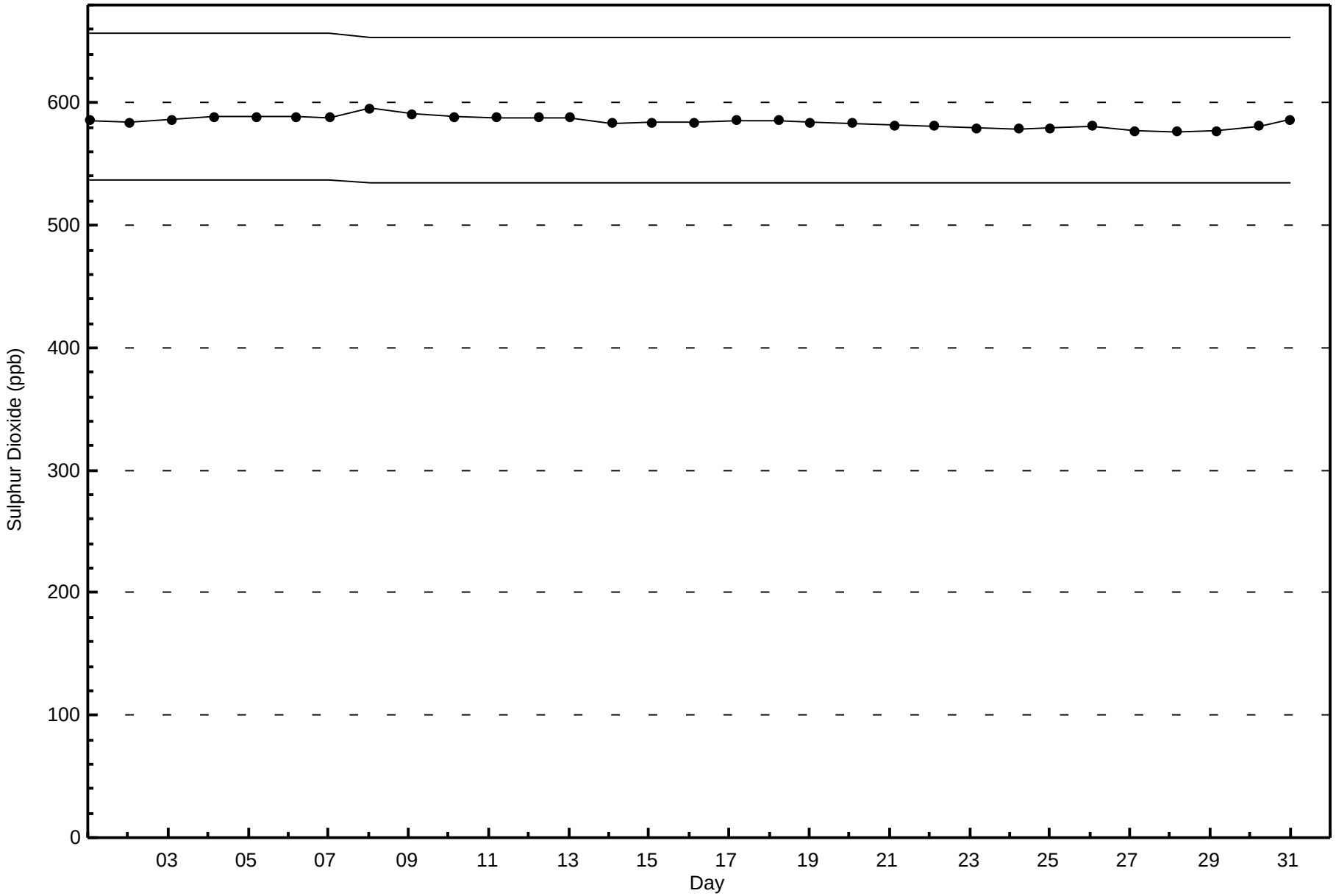


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - January 2016



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Jan 6 15:00 Maximum Daily Average: 0.9 ppb on Jan 6

Minimum Value: 0 ppb on Jan 29 20:00 Minimum Daily Average: 0.2 ppb on Jan 29

Maximum Diurnal Average: 0.5 ppb at hour 13 Minimum Diurnal Average: 0.3 ppb at hour 4

Monthly Average: 0.4 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	35
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0.4	1
5-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Jan	0	0	0	0	1	0	Z	1	1	1	1	1	2	2	2	2	2	1	1	1	0	1	1	1	0.9	2
7-Jan	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	0	Z	0	0	0	1	1	1	0	0	M	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
9-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.5	1
11-Jan	1	1	1	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.4	1
12-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Jan	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
14-Jan	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0.4	1
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0.5	1
20-Jan	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0.5	1
21-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0.5	1
23-Jan	0	1	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
24-Jan	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.4	1
25-Jan	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
28-Jan	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
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average	
	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

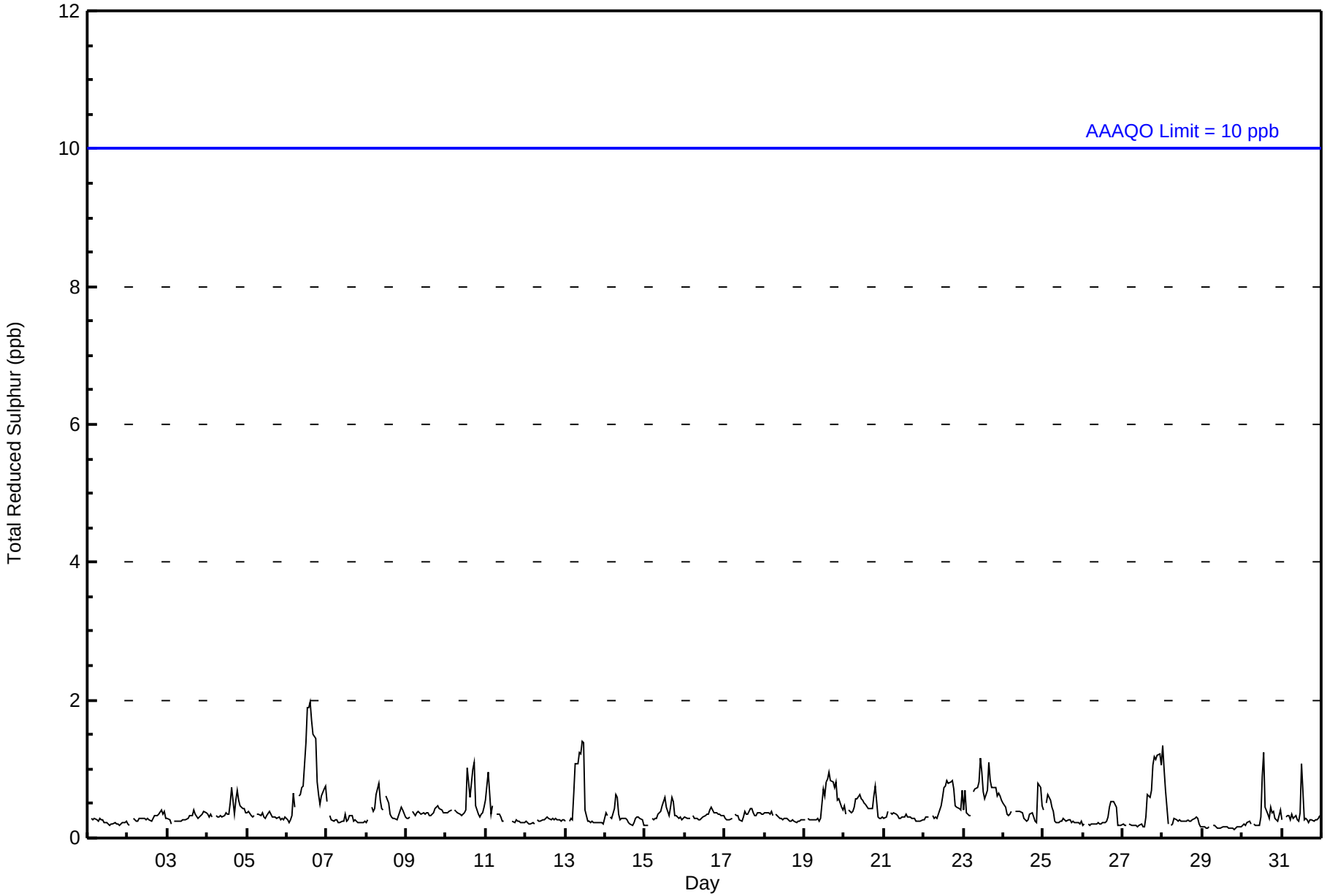
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	75	12	5	7	14	15	136	68	22	35	69	54	34	22	22	118	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	75	12	5	7	14	15	136	68	22	35	69	54	34	22	22	118	708

Total Number of Valid Hours: 708

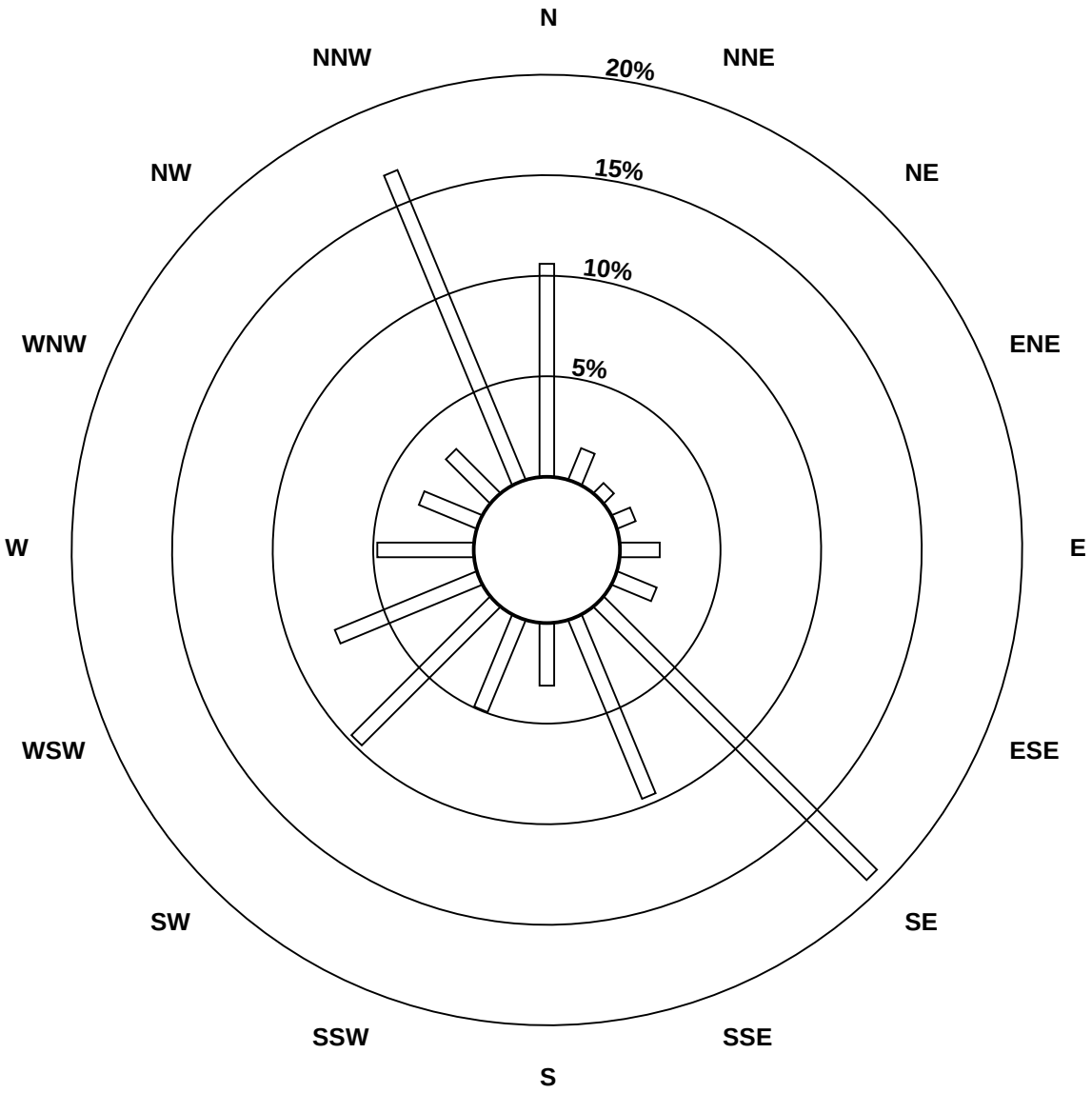
Total Number of Hours: 744

Wood Buffalo Environmental Association

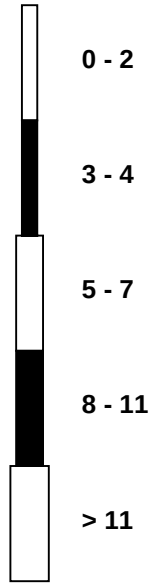
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



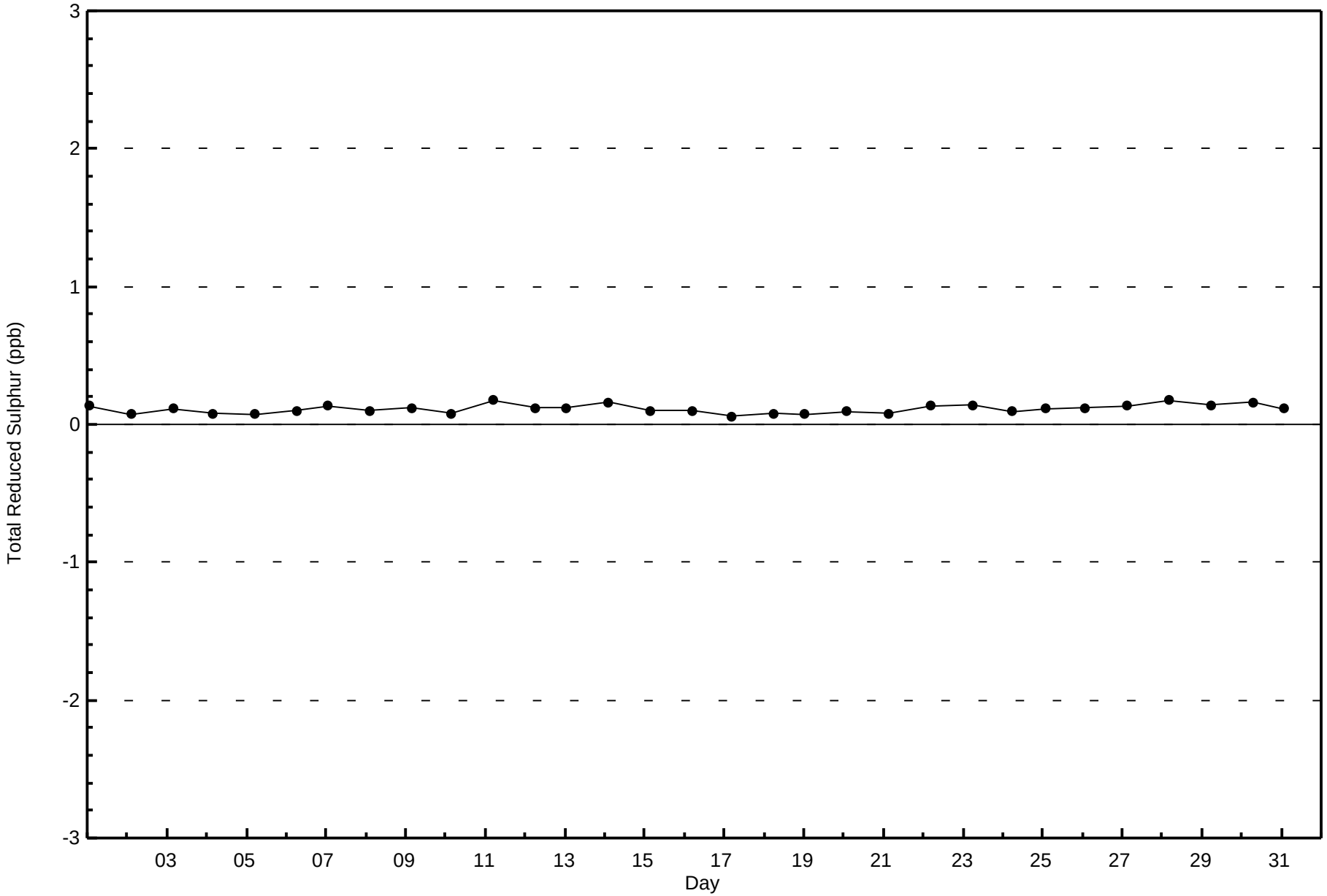
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - January 2016

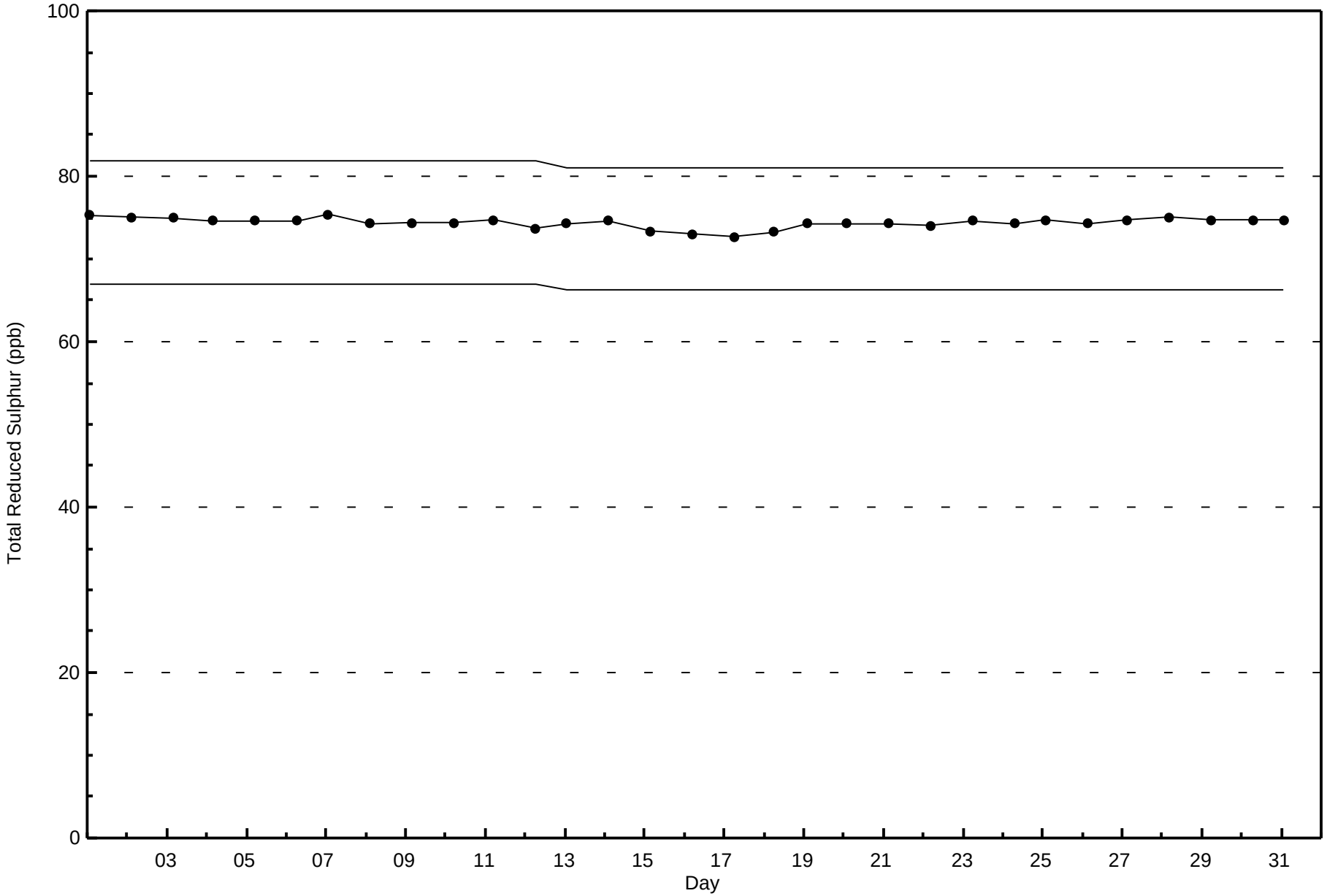


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Athabasca Valley - January 2016

Maximum Value: 3.1 ppm on Jan 6 13:00

Maximum Daily Average: 2.4 ppm on Jan 6

Minimum Value: 1.8 ppm on Jan 29 12:00

Minimum Daily Average: 1.8 ppm on Jan 29

Maximum Diurnal Average: 2.1 ppm at hour 12

Minimum Diurnal Average: 2.0 ppm at hour 6

Monthly Average: 2.03 ppm

Percentiles: P_1 = 1.8 P_{10} = 1.9 Q_1 = 1.9 Median = 2.0 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.7

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	37
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.0	2.1	2.0	2.1	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	1.9	1.9	1.9	1.9	2.0	2.1
2-Jan	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1
3-Jan	2.0	2.0	Z	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.3
4-Jan	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.5	2.6	2.5	2.4	2.3	2.2	2.2	2.6
5-Jan	2.3	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.3
6-Jan	2.1	2.0	2.1	2.1	2.4	Z	2.2	2.5	2.7	2.8	2.8	3.0	3.1	3.0	2.7	2.8	2.7	2.6	2.3	2.2	2.0	2.1	2.1	2.1	2.4	3.1
7-Jan	Z	2.0	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--	2.0
8-Jan	1.9	Z	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	M	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1
9-Jan	2.0	2.0	Z	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2
10-Jan	2.0	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.5	2.4	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5
11-Jan	2.0	2.1	2.0	1.9	Z	2.0	2.0	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1
12-Jan	2.1	2.0	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1
13-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
14-Jan	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	1.9	1.9	1.9	2.0
15-Jan	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
16-Jan	2.0	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
17-Jan	2.0	2.0	2.1	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1
18-Jan	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
19-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2
20-Jan	2.0	Z	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0
21-Jan	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.4
22-Jan	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.5	2.7	2.7	2.5	2.7	2.7	2.6	2.5	2.2	2.1	2.1	2.1	2.4	2.7
23-Jan	2.1	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.2	2.4	2.4	2.5	2.3	2.5
24-Jan	2.4	2.5	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.5
25-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.1	2.1	2.2	2.0	2.2
26-Jan	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.8	1.8	2.0	2.1
27-Jan	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	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.0	1.9	2.1
28-Jan	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.1	2.0	2.2	2.2	2.2	2.0	2.1	2.1	2.2	2.3	2.3	2.1	1.9	2.1	2.3
29-Jan	1.9	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	1.9	1.9	1.8	1.9
30-Jan	1.9	2.0	2.1	2.1	2.4	Z	2.1	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.4
31-Jan	Z	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average	
	2.4	2.5	2.3	2.2	2.4	2.3	2.3	2.5	2.7	2.8	2.8	3.0	3.1	3.0	2.7	2.8	2.7	2.7	2.6	2.6	2.5	2.4	2.4	2.5	Diurnal Maximum	

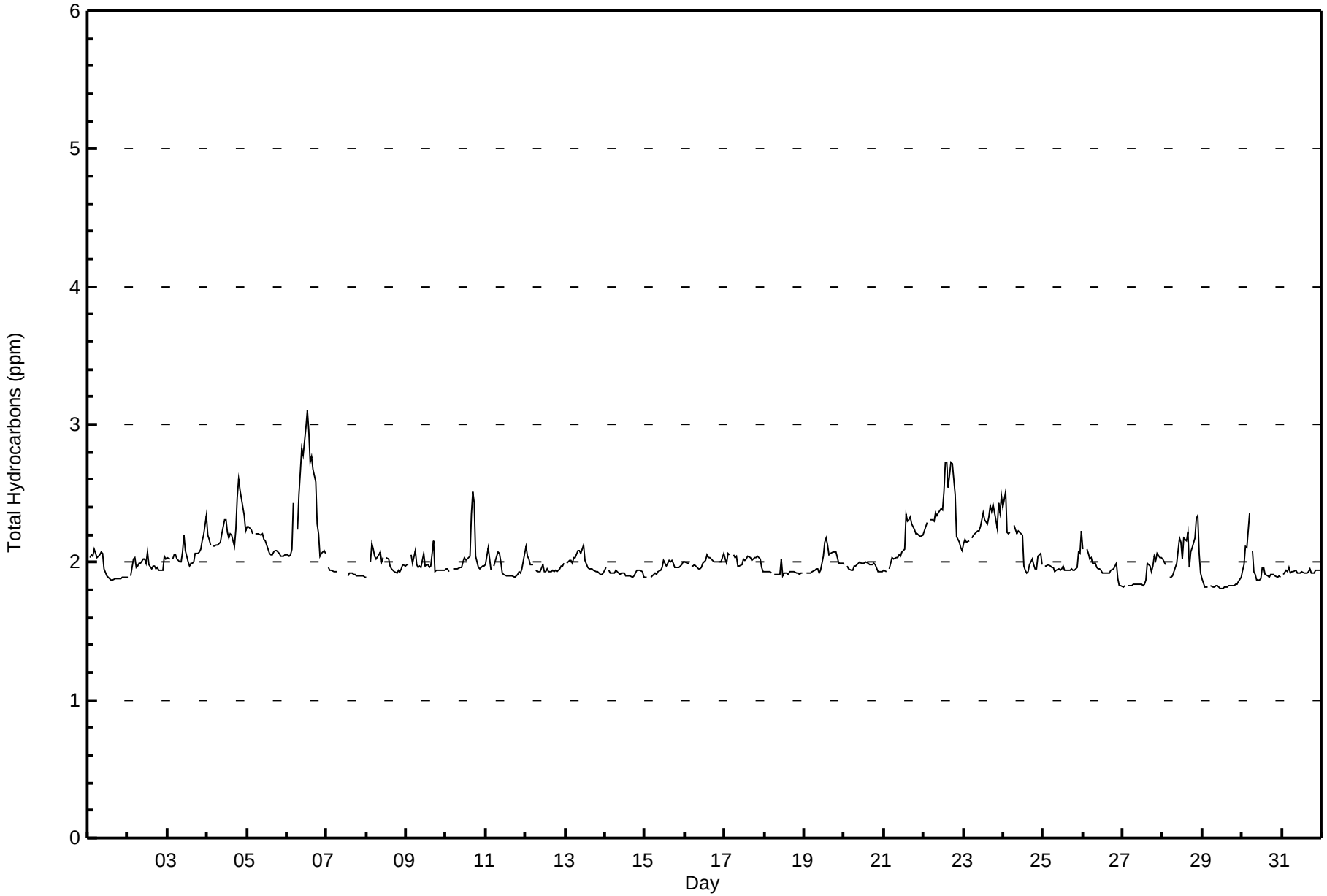
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Athabasca Valley - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	496	70.25	70.26
2.1 - 3.0	209	29.60	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Athabasca Valley - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	51	5	4	6	10	7	107	43	15	15	48	42	29	21	12	81	496
2.1 - 3.0	21	6	0	1	4	9	27	25	9	18	22	11	6	3	9	38	209
3.1 - 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	11	4	7	14	16	134	68	24	33	70	53	35	24	21	119	706

Total Number of Valid Hours: 706

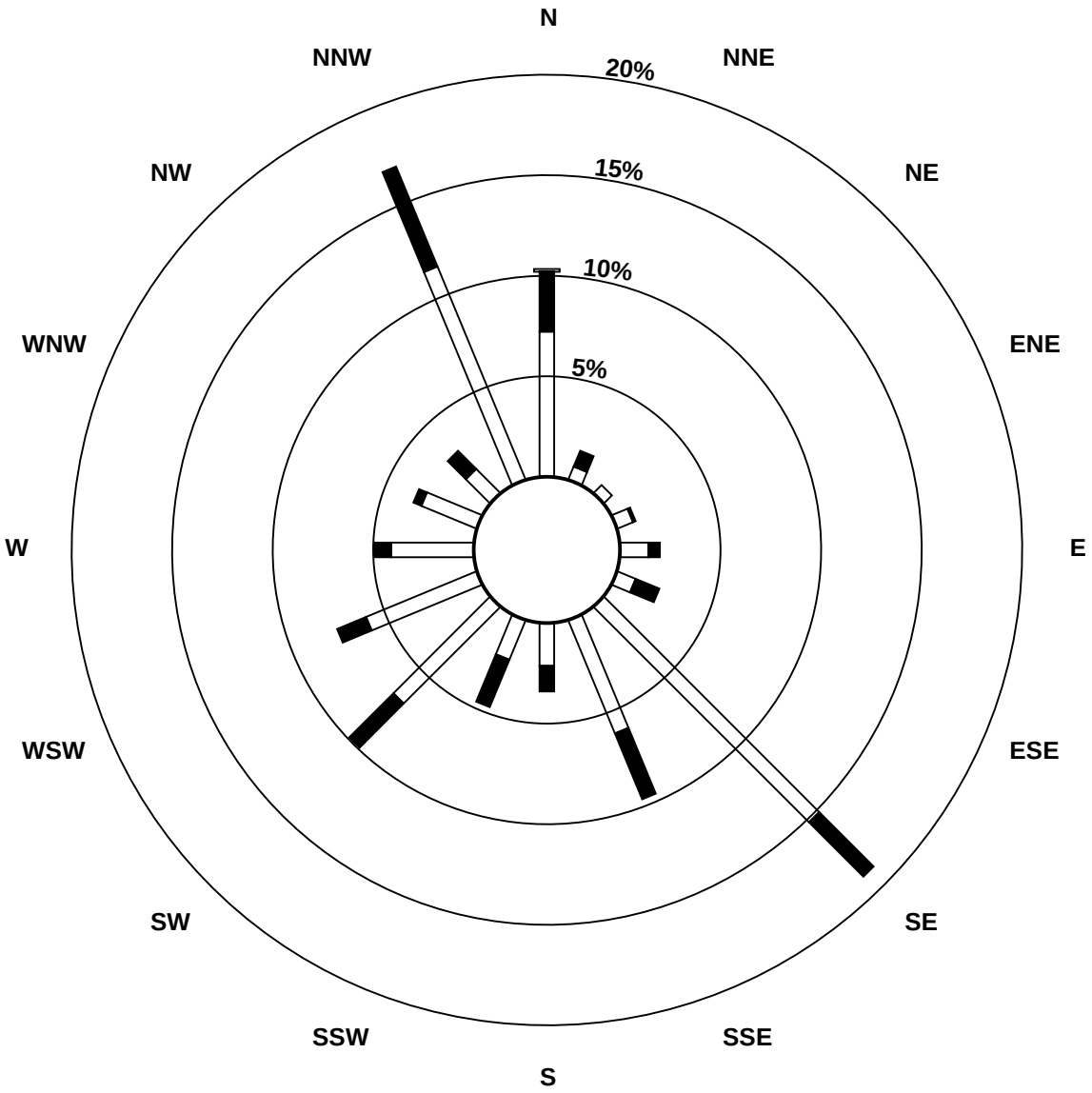
Total Number of Hours: 744

Wood Buffalo Environmental Association

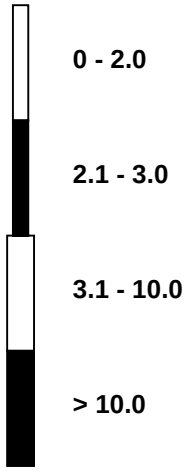
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Athabasca Valley (AMS 7)



Classes (ppm)



0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

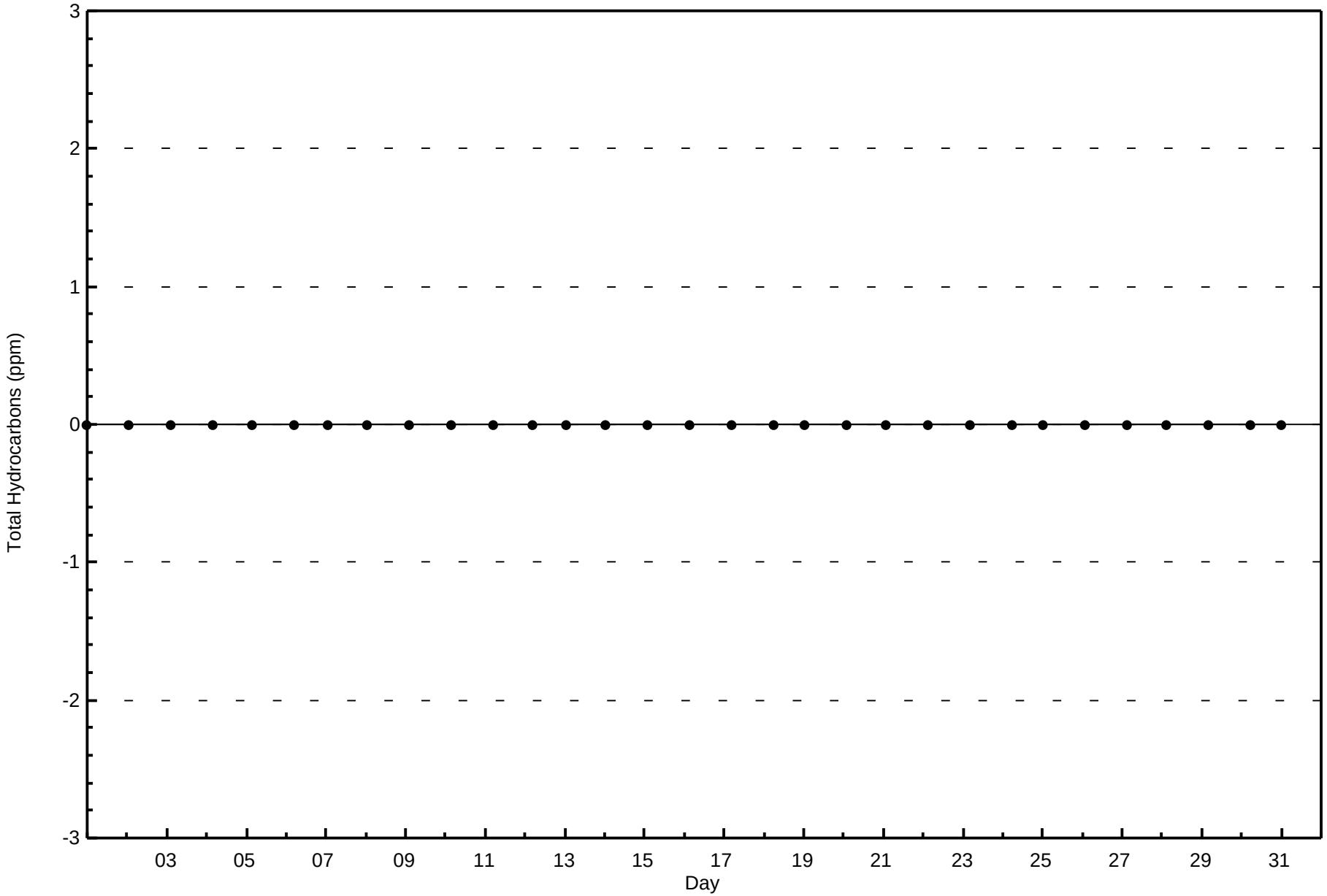
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Athabasca Valley - January 2016

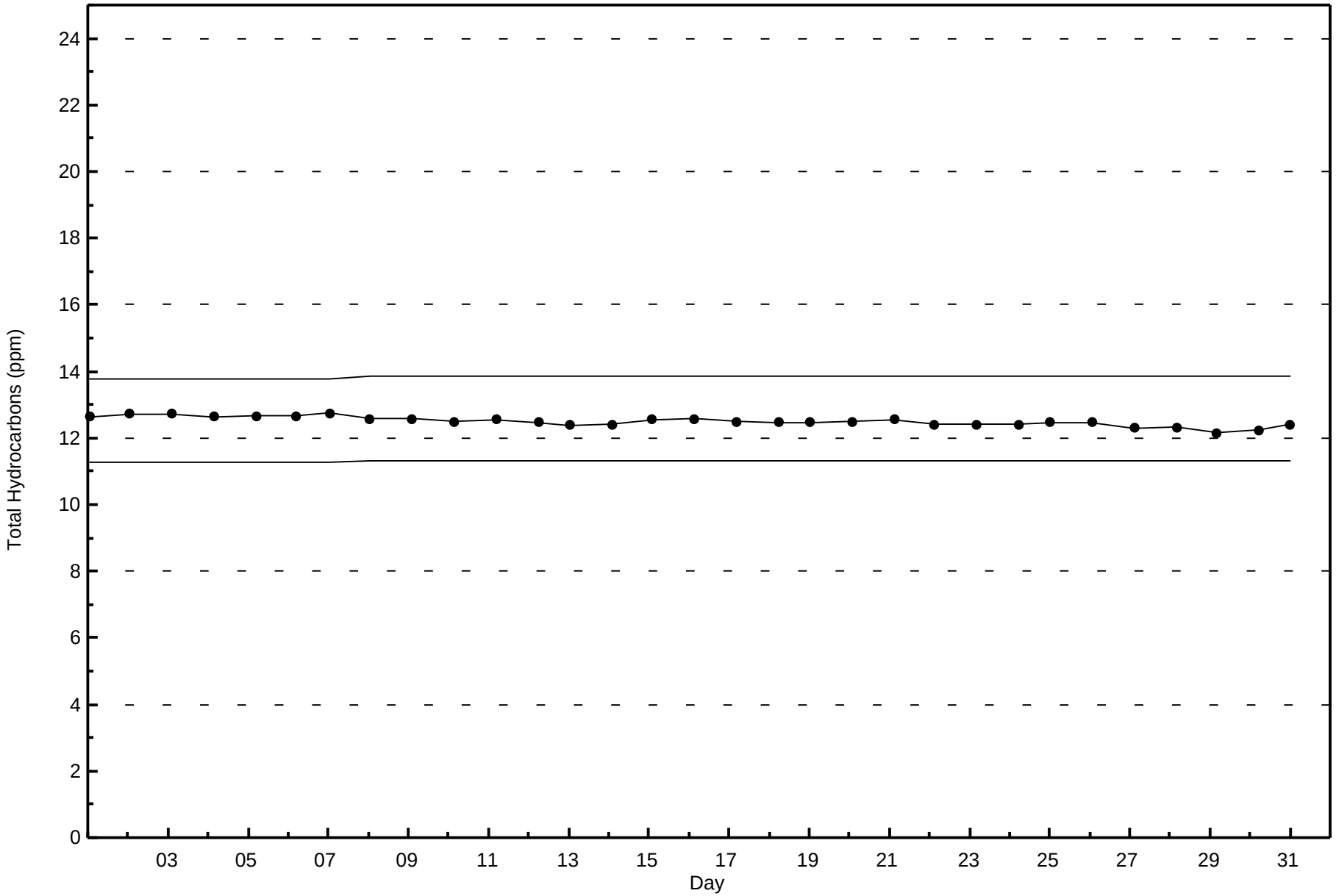


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - January 2016

Maximum Value: 0.414 ppm on Jan 6 13:00

Maximum Daily Average: 0.154 ppm on Jan 6

Minimum Value: 0.000 ppm on Jan 1 02:00

Minimum Daily Average: 0.000 ppm on Jan 29

Maximum Diurnal Average: 0.033 ppm at hour 17

Minimum Diurnal Average: 0.000 ppm at hour 2

Monthly Average: 0.012 ppm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.0 P_{99} = 0.3

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	37
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
2-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.007	0.005	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.102
3-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.006
4-Jan	0.000	0.000	0.000	Z	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.000	0.010	0.000	0.000	0.091	0.262	0.312	0.230	0.146	0.075	0.003	0.049	0.312
5-Jan	0.005	0.000	0.000	0.000	Z	0.000	0.003	0.003	0.000	0.005	0.000	0.000	0.010	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010
6-Jan	0.000	0.000	0.000	0.000	0.150	Z	0.023	0.169	0.236	0.300	0.287	0.369	0.414	0.368	0.263	0.303	0.271	0.232	0.089	0.057	0.000	0.000	0.001	0.000	0.154	0.414
7-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000
8-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.001	0.010
9-Jan	0.000	0.000	Z	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.091	0.000	0.000	0.000	0.000	0.009	0.204	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.204
10-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.197	0.151	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.197
11-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.006	0.000	0.000	0.003	0.000	0.000	0.000	0.006
12-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.052	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.003	0.052
13-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
14-Jan	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
15-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
17-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
18-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.112	0.000	0.000	0.000	0.004	0.000	0.001	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.112
19-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.015	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.020
20-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.004
21-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.112	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.112
22-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.005	0.097	0.201	0.206	0.137	0.222	0.208	0.210	0.190	0.018	0.024	0.002	0.000	0.067	0.222
23-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.001	0.000	0.002	0.000	0.000	0.012	0.067	0.022	0.011	0.066	0.116	0.093	0.143	0.054	0.004	0.156	0.080	0.116	0.041	0.156
24-Jan	0.001	0.000	0.001	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.003	0.006	0.005	0.000	0.000	0.010	0.000	0.000	0.002	0.018
25-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009
26-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.022	0.003	0.000	0.005	0.040	0.018	0.059	0.008	0.011	0.007	0.059
28-Jan	0.010	0.002	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.001	0.010
29-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
31-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.001	0.000	0.000	0.001	0.006	0.000	0.001	0.006	0.008	0.010	0.019	0.015	0.023	0.024	0.017	0.021	0.033	0.026	0.024	0.021	0.009	0.013	0.005	0.004	Diurnal Average	
	0.010	0.002	0.001	0.035	0.150	0.002	0.023	0.169	0.236	0.300	0.287	0.369	0.414	0.368	0.263	0.303	0.271	0.232	0.262	0.312	0.230	0.156	0.080	0.116	Diurnal Maximum	

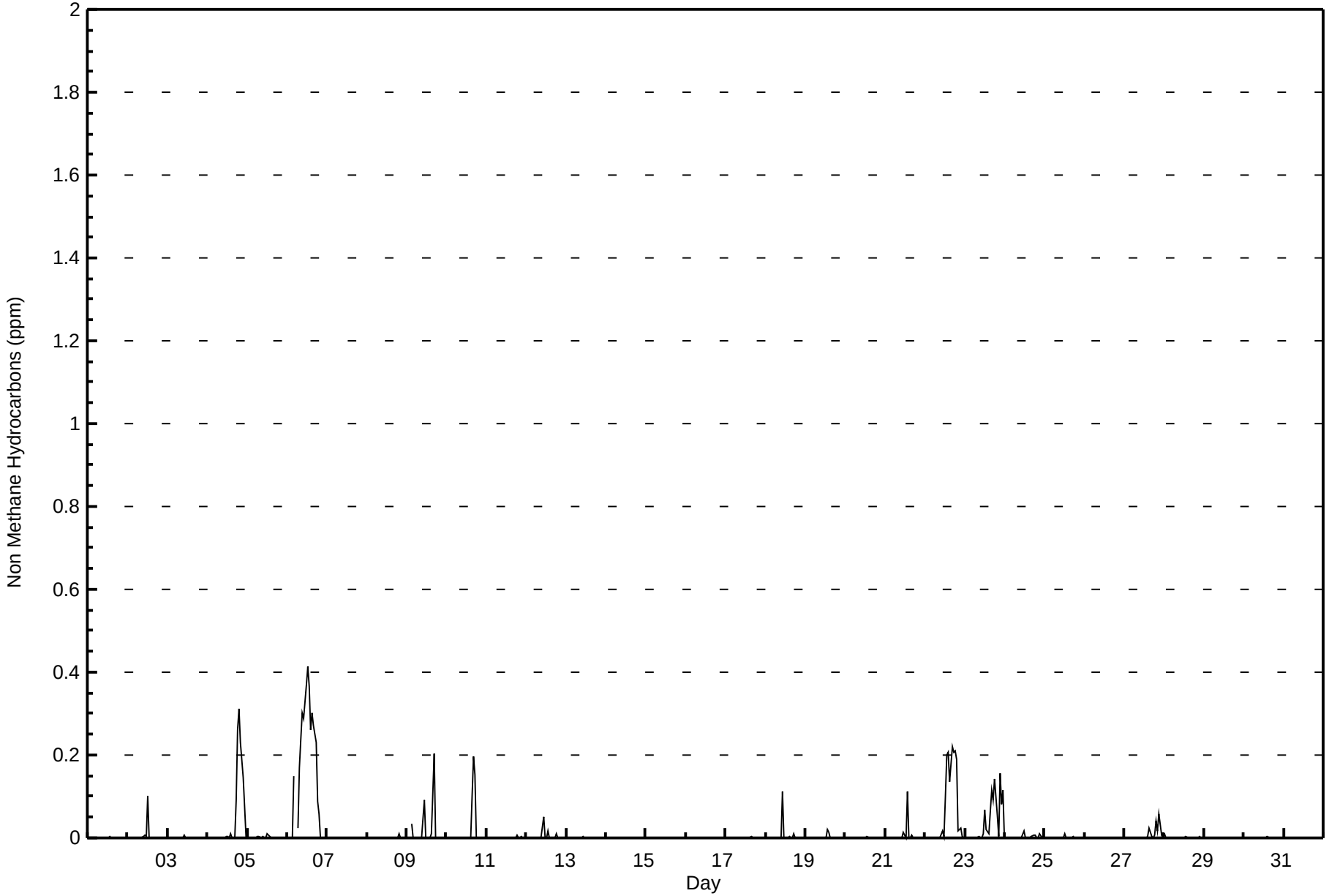
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	627	88.81	88.81
0.006 - 0.05	34	4.82	93.63
0.06 - 0.1	20	2.83	96.46
> 0.1	25	3.54	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	61	7	4	7	13	15	121	59	22	31	67	51	34	23	15	97	627
0.006 - 0.05	2	1	0	0	1	0	9	4	0	1	2	1	1	1	2	9	34
0.06 - 0.1	2	2	0	0	0	0	3	3	2	1	0	0	0	0	2	5	20
> 0.1	8	1	0	0	0	1	1	2	0	0	1	1	0	0	2	8	25
Totals	73	11	4	7	14	16	134	68	24	33	70	53	35	24	21	119	706

Total Number of Valid Hours: 706

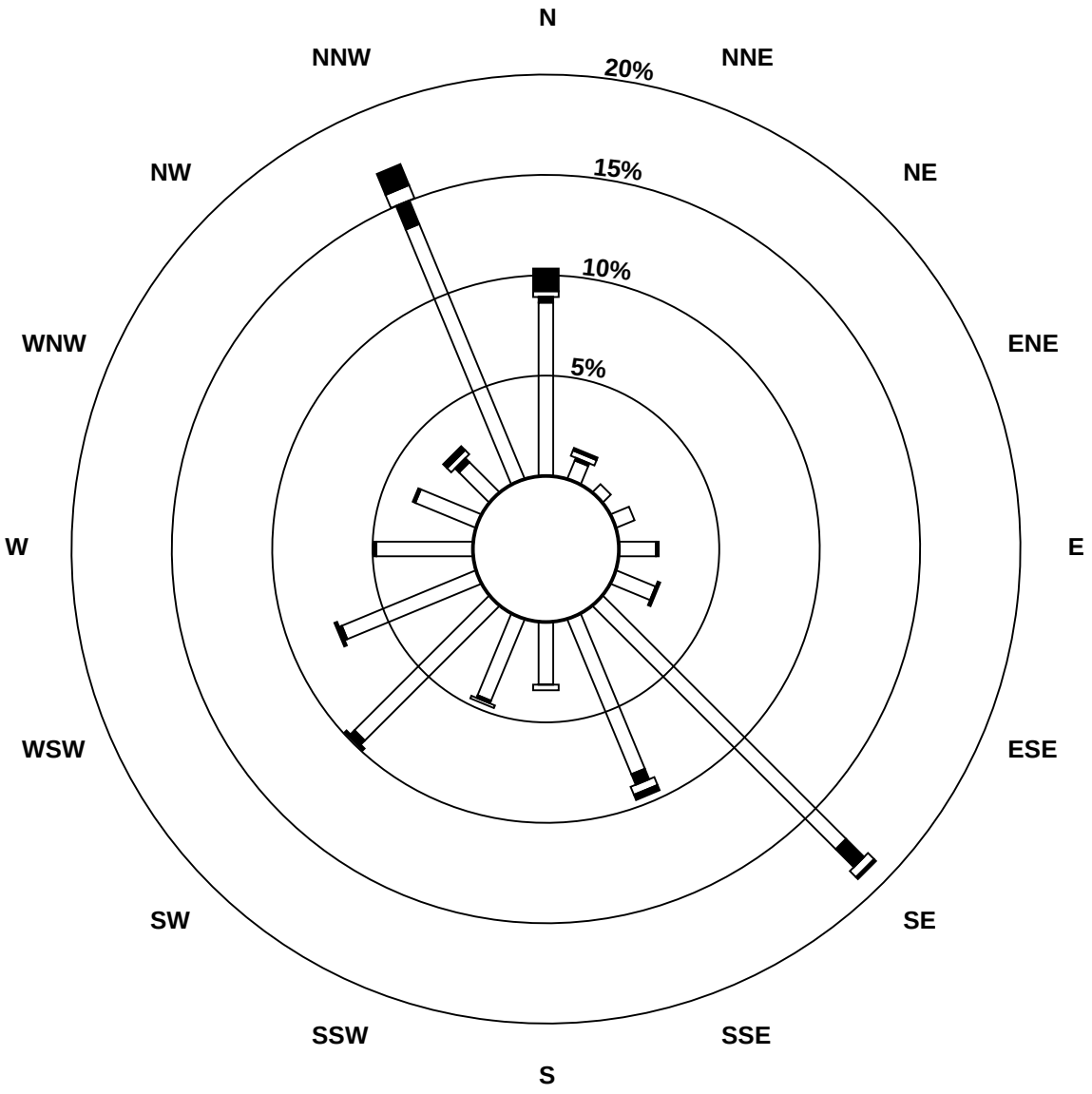
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley (AMS 7)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

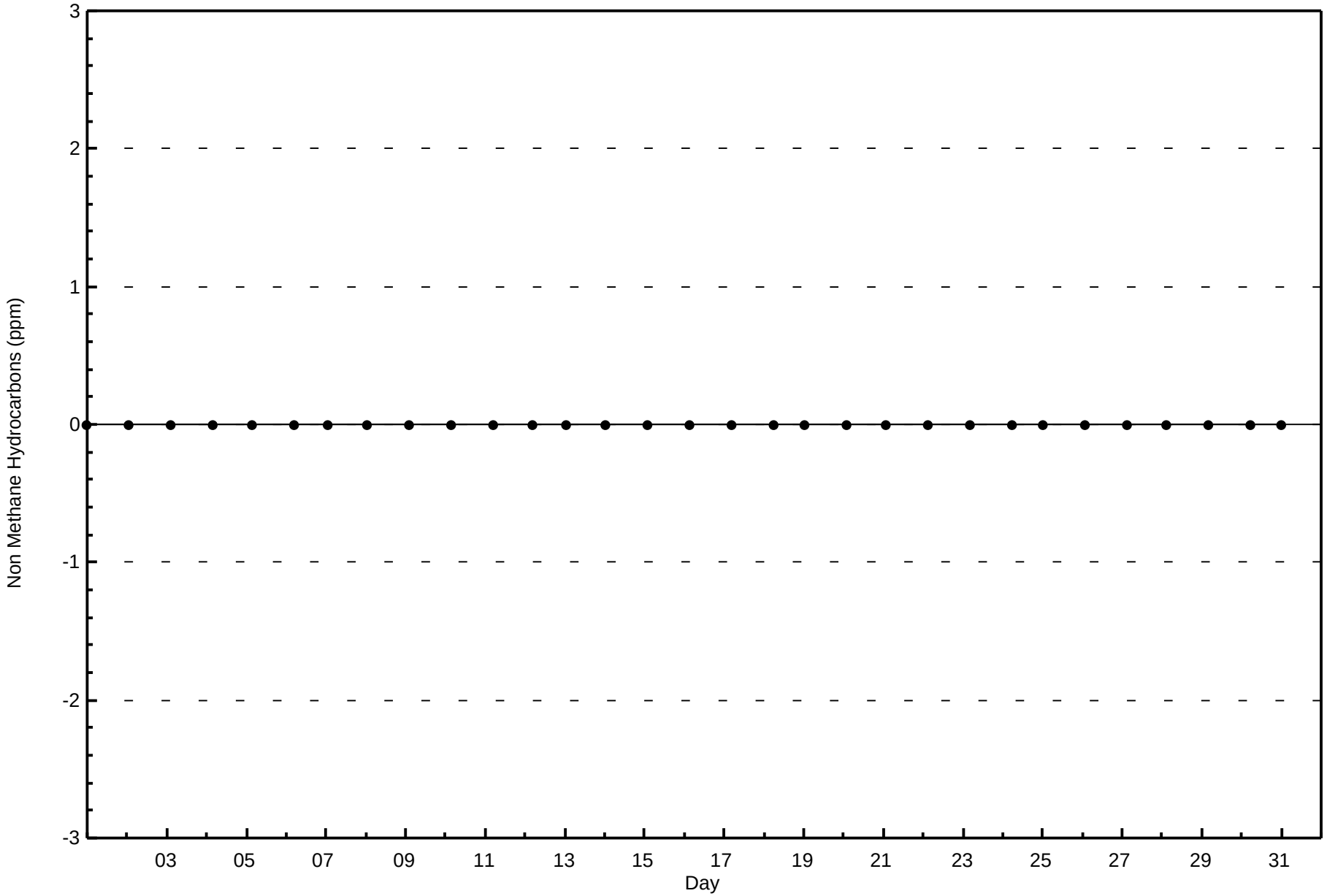
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - January 2016

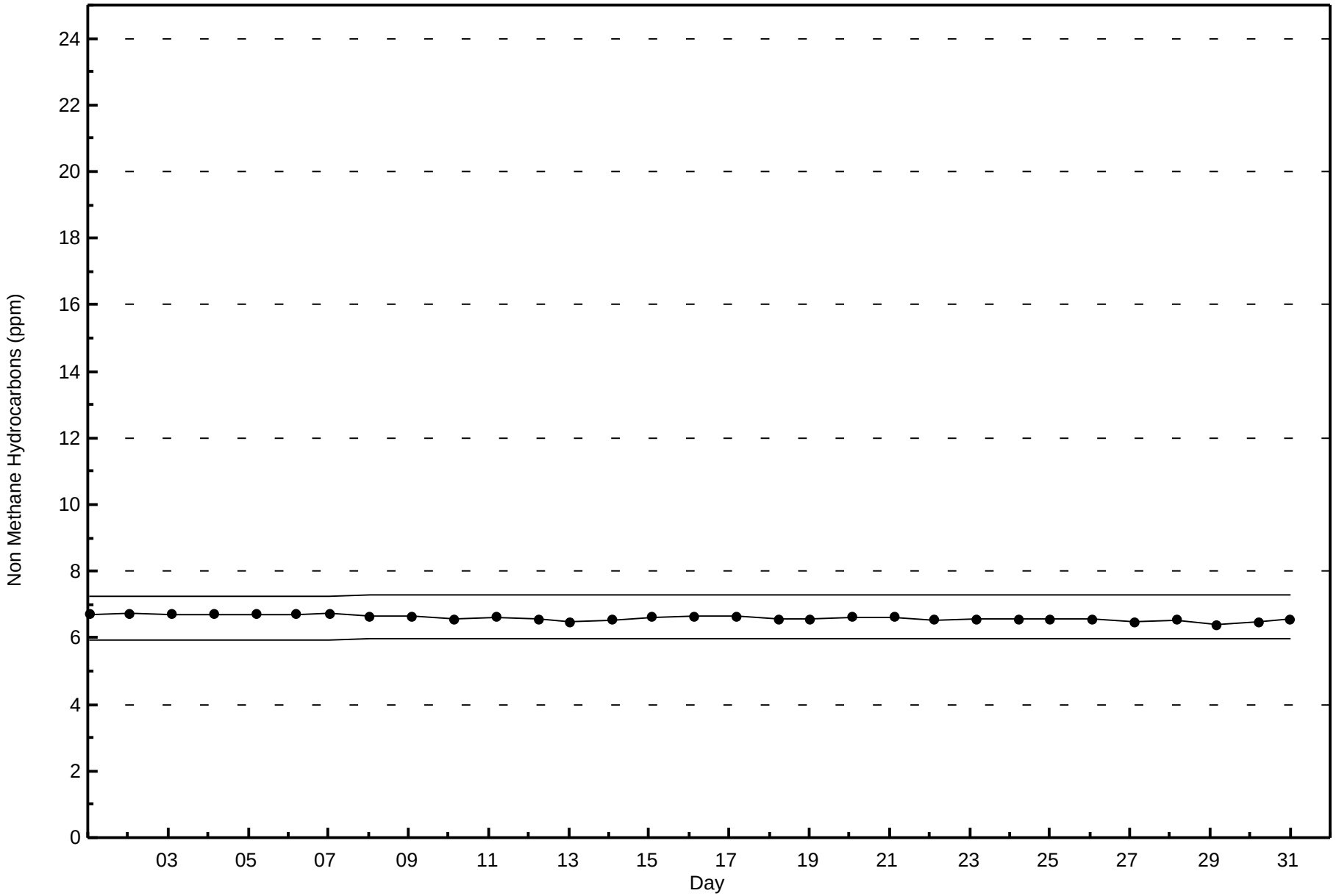


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Athabasca Valley - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.7 ppm on Jan 6 13:00

Maximum Daily Average: 2.3 ppm on Jan 22

Minimum Value: 1.8 ppm on Jan 29 12:00

Minimum Daily Average: 1.8 ppm on Jan 29

Maximum Diurnal Average: 2.0 ppm at hour 12

Minimum Diurnal Average: 2.0 ppm at hour 6

Monthly Average: 2.02 ppm

Percentiles: P_1 = 1.8 P_{10} = 1.9 Q_1 = 1.9 Median = 2.0 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.5

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	37
Percent Operational Time:	99.9

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

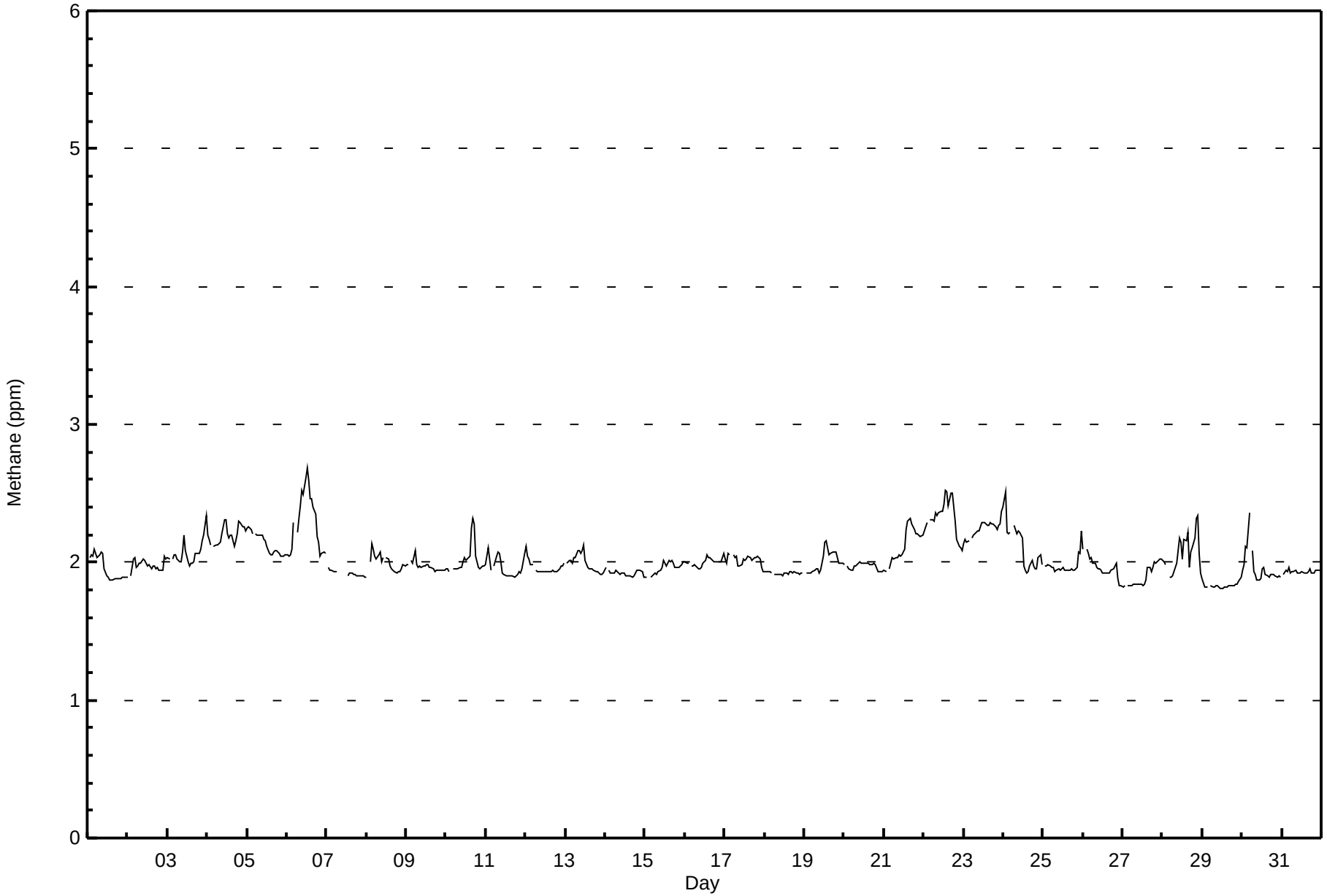
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Methane (CH_4) - ppm

Athabasca Valley - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	500	70.82	70.82
2.1 - 3.0	206	29.18	100.00
3.1 - 10.0	0	0.00	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 (CH_4) - ppm

Athabasca Valley - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	51	5	4	6	10	7	109	44	15	15	48	42	29	21	12	82	500
2.1 - 3.0	22	6	0	1	4	9	25	24	9	18	22	11	6	3	9	37	206
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	73	11	4	7	14	16	134	68	24	33	70	53	35	24	21	119	706

Total Number of Valid Hours: 706

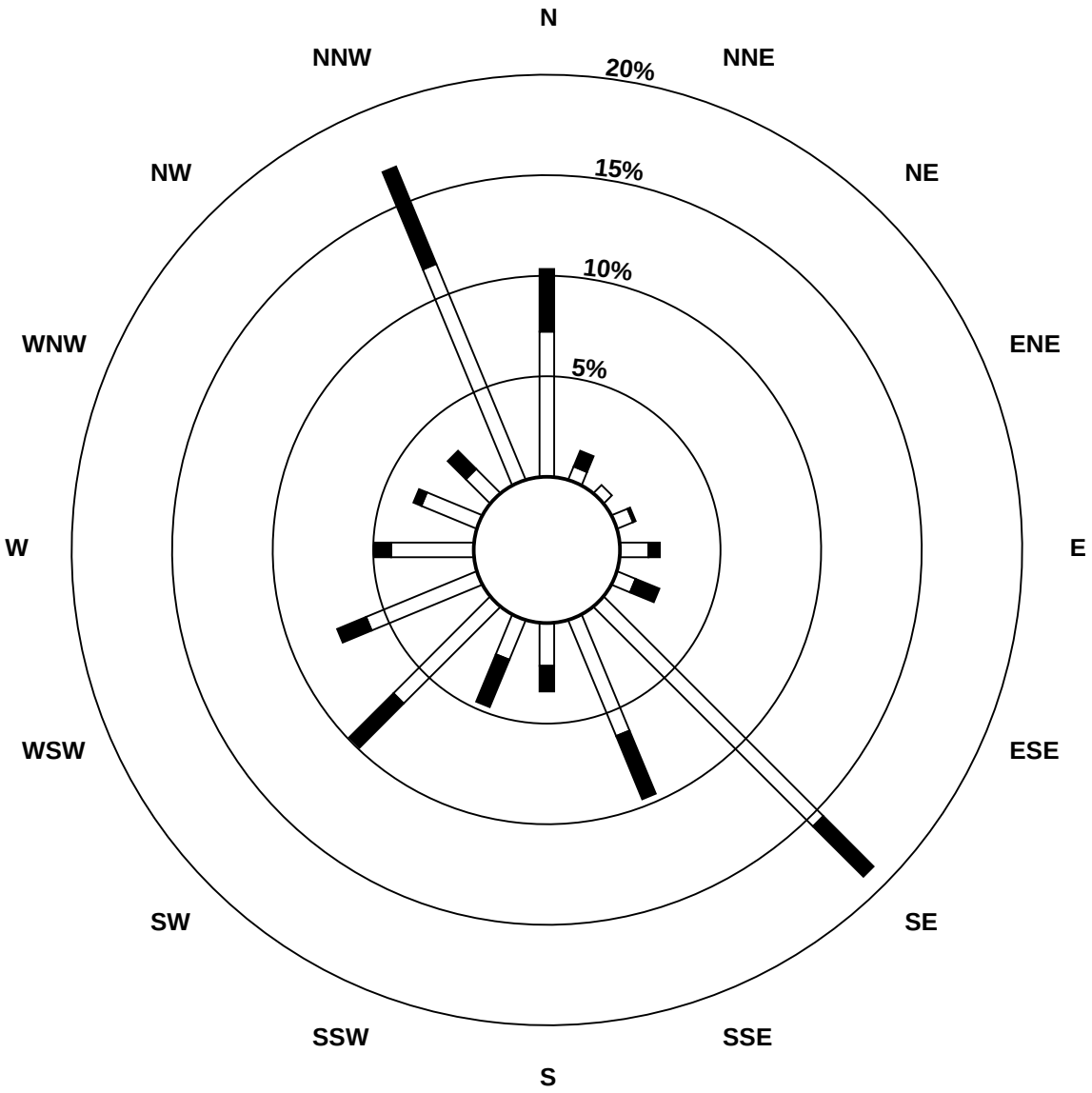
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Methane (CH_4) - ppm

Athabasca Valley (AMS 7)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

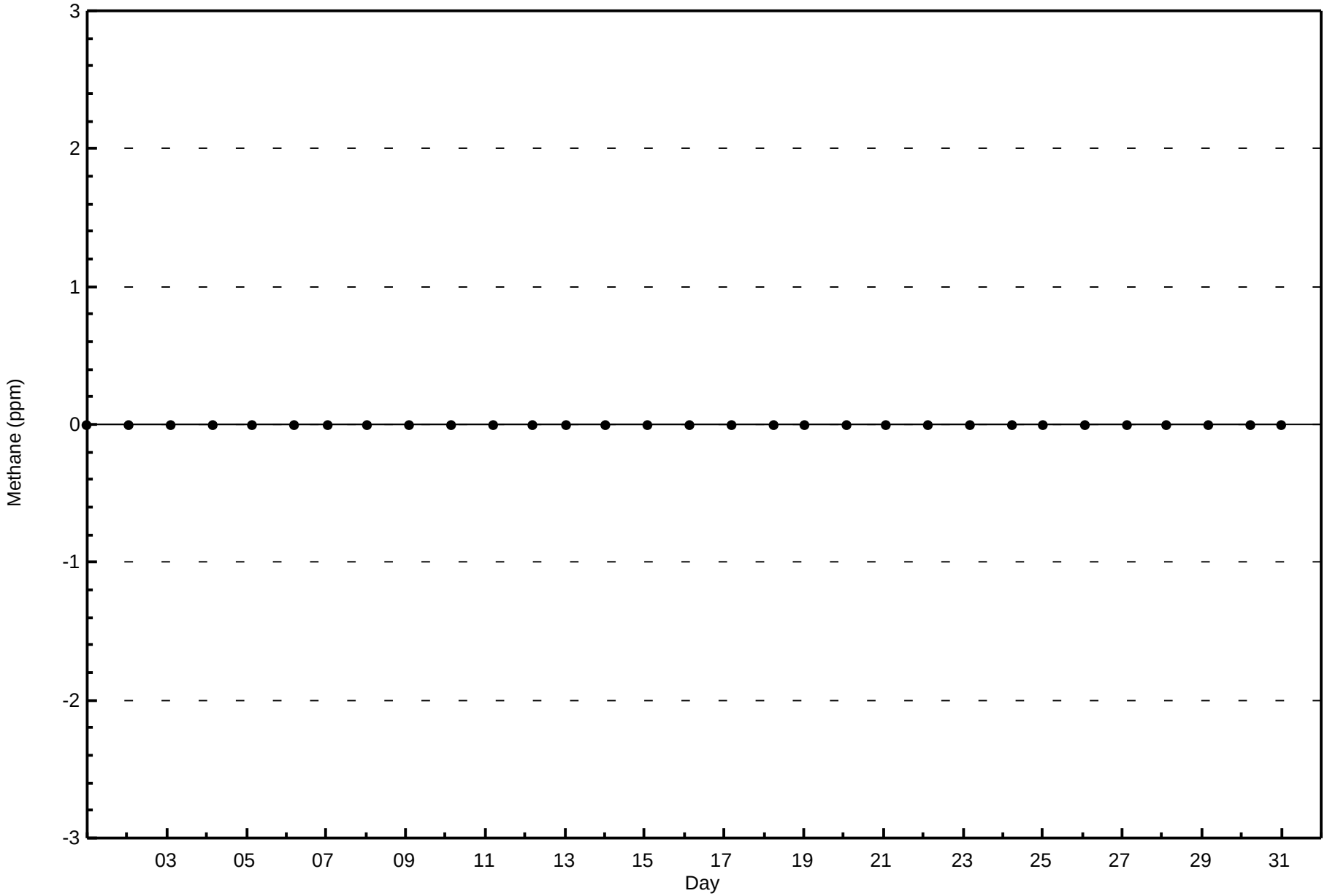
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Athabasca Valley - January 2016

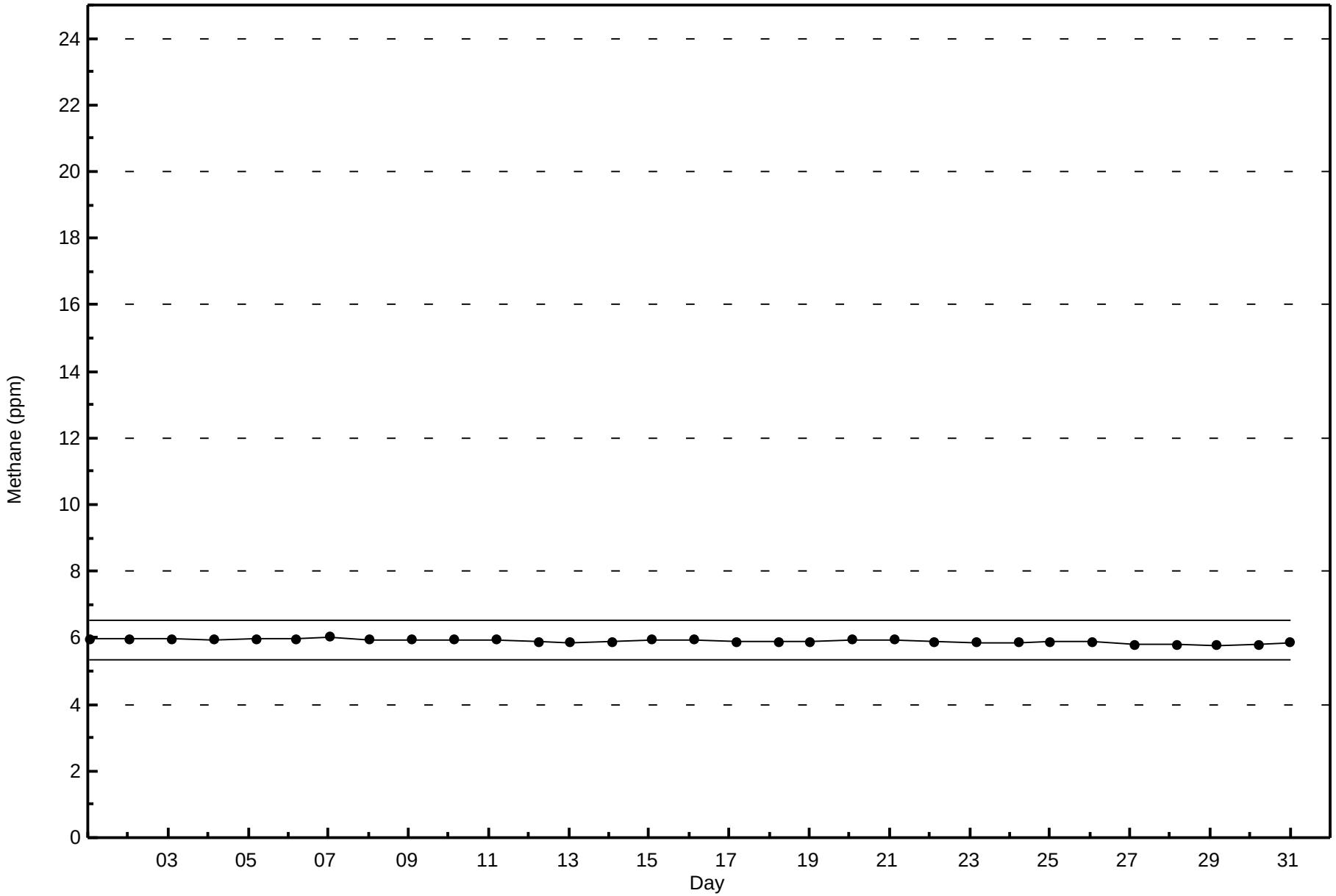


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Athabasca Valley - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 37 ppb on Jan 29 02:00 Maximum Daily Average: 30.8 ppb on Jan 29

Minimum Value: 0 ppb on Jan 23 21:00 Minimum Daily Average: 2.6 ppb on Jan 5

Maximum Diurnal Average: 16.6 ppb at hour 14 Minimum Diurnal Average: 11.0 ppb at hour 18

Monthly Average: 13.4 ppb Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 6$ Median = 11 $Q_3 = 21$ $P_{90} = 28$ $P_{99} = 36$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	4	6	Z	7	3	7	5	1	1	6	21	26	32	37	37	37	36	36	36	36	30	28	28	22	21.0	37
2-Jan	25	28	24	Z	6	7	7	1	1	4	6	10	13	13	16	10	6	7	7	8	8	5	5	6	9.6	28
3-Jan	7	10	11	12	Z	10	9	5	8	9	8	11	10	8	8	5	2	5	8	7	6	4	3	3	7.3	12
4-Jan	4	6	6	6	6	Z	5	2	2	3	4	6	9	10	7	3	4	1	1	1	1	2	1	1	4.0	10
5-Jan	1	1	1	1	1	3	Z	2	1	2	5	7	8	6	6	6	2	2	1	1	1	1	1	1	2.6	8
6-Jan	2	3	1	0	0	0	0	Z	0	1	2	3	3	4	3	2	1	0	4	8	13	13	13	19	4.2	19
7-Jan	21	23	Z	27	25	24	21	28	20	18	18	14	24	27	25	25	27	27	26	29	29	28	29	28	24.5	29
8-Jan	29	28	22	Z	4	11	11	11	14	14	C	C	C	C	17	20	21	20	21	17	17	15	9	11	16.4	29
9-Jan	8	10	9	11	Z	5	7	12	11	13	13	14	15	14	14	12	11	13	14	13	14	14	15	15	12.0	15
10-Jan	13	15	16	15	15	Z	13	12	11	10	8	6	8	6	6	3	1	0	11	18	15	13	15	16	10.7	18
11-Jan	15	11	13	22	22	19	Z	5	6	10	22	25	28	29	26	25	29	19	16	15	13	15	14	15	18.1	29
12-Jan	15	13	14	14	15	15	10	Z	14	15	14	15	13	14	14	13	9	7	9	10	11	8	6	9	12.0	15
13-Jan	8	8	Z	6	5	3	2	11	7	3	5	5	12	19	21	21	22	22	23	24	24	25	23	24	14.1	25
14-Jan	23	22	24	Z	25	24	23	25	26	28	29	31	32	33	31	31	30	28	26	22	23	22	22	29	26.6	33
15-Jan	30	32	32	26	Z	19	17	17	17	16	15	16	17	16	17	13	3	5	10	11	11	8	8	7	15.7	32
16-Jan	6	6	5	6	6	Z	5	5	4	7	9	10	9	9	8	4	1	3	2	1	2	4	4	3	5.3	10
17-Jan	5	7	7	8	8	7	Z	5	7	9	9	10	10	10	10	9	6	5	7	6	4	6	13	20	8.2	20
18-Jan	21	23	23	24	25	25	23	Z	22	21	23	23	22	21	23	19	17	15	15	18	21	23	21	23	21.4	25
19-Jan	23	23	Z	23	21	18	10	9	12	18	16	9	10	11	14	9	2	3	7	7	9	10	11	11	12.3	23
20-Jan	14	19	18	Z	24	22	21	21	20	18	18	16	15	14	14	10	7	4	2	4	18	17	18	20	15.3	24
21-Jan	18	19	19	16	Z	7	6	3	3	5	6	8	8	9	9	8	7	11	12	13	12	13	17	15	10.7	19
22-Jan	10	9	10	9	8	Z	8	5	8	7	6	7	6	5	4	3	1	0	0	0	2	5	4	3	5.2	10
23-Jan	1	1	2	4	5	7	Z	7	7	6	4	5	5	4	4	3	1	0	0	0	0	0	0	1	3.0	7
24-Jan	0	1	5	7	7	6	1	Z	2	2	4	7	21	23	24	18	5	2	7	16	19	4	7	15	8.9	24
25-Jan	16	16	Z	14	17	18	15	20	17	17	18	20	20	20	18	15	11	8	8	9	7	4	6	3	13.8	20
26-Jan	6	8	7	Z	8	8	7	6	8	11	12	12	13	14	14	13	11	7	7	5	5	28	32	34	12.0	34
27-Jan	34	32	32	36	Z	34	31	32	32	32	33	34	36	36	31	10	15	15	8	4	2	1	0	0	22.6	36
28-Jan	0	0	3	17	17	Z	11	7	7	7	7	9	11	8	8	6	6	5	5	3	6	10	25	31	9.2	31
29-Jan	35	37	36	31	27	22	Z	28	25	26	28	32	33	34	33	35	30	32	33	32	31	31	30	27	30.8	37
30-Jan	19	10	9	9	1	5	7	Z	18	24	23	19	18	21	18	18	21	15	18	19	23	27	25	25	17.0	27
31-Jan	23	22	Z	15	12	19	14	19	17	21	23	23	21	24	26	26	23	21	23	23	22	21	20	21	20.8	26
	14.1	14.5	14.0	14.0	12.1	13.1	11.1	11.5	11.3	12.3	13.8	14.4	16.1	16.6	16.4	13.9	11.9	11.0	11.8	12.3	12.9	13.1	13.8	14.8	Diurnal Average	
	35	37	36	36	27	34	31	32	32	32	33	34	36	37	37	37	36	36	36	36	31	31	32	34	Diurnal Maximum	

Z - zerospan C - Calibration

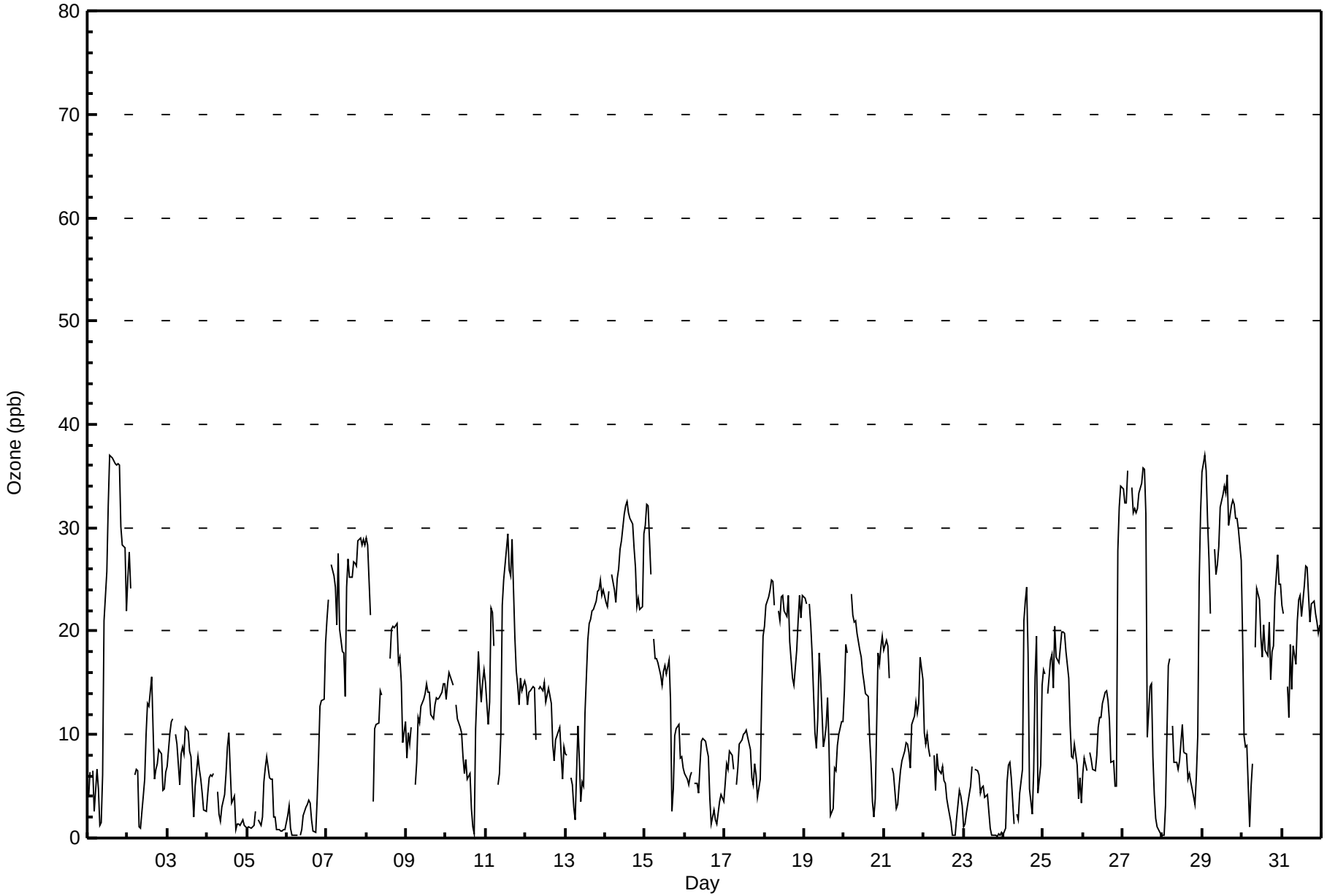
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Athabasca Valley - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	527	74.33	74.33
21 - 50	182	25.67	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Athabasca Valley - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	41	10	2	3	10	14	115	60	24	34	59	31	13	14	18	79	527
21 - 50	32	1	3	4	4	2	18	7	1	0	11	24	23	10	3	39	182
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	11	5	7	14	16	133	67	25	34	70	55	36	24	21	118	709

Total Number of Valid Hours: 709

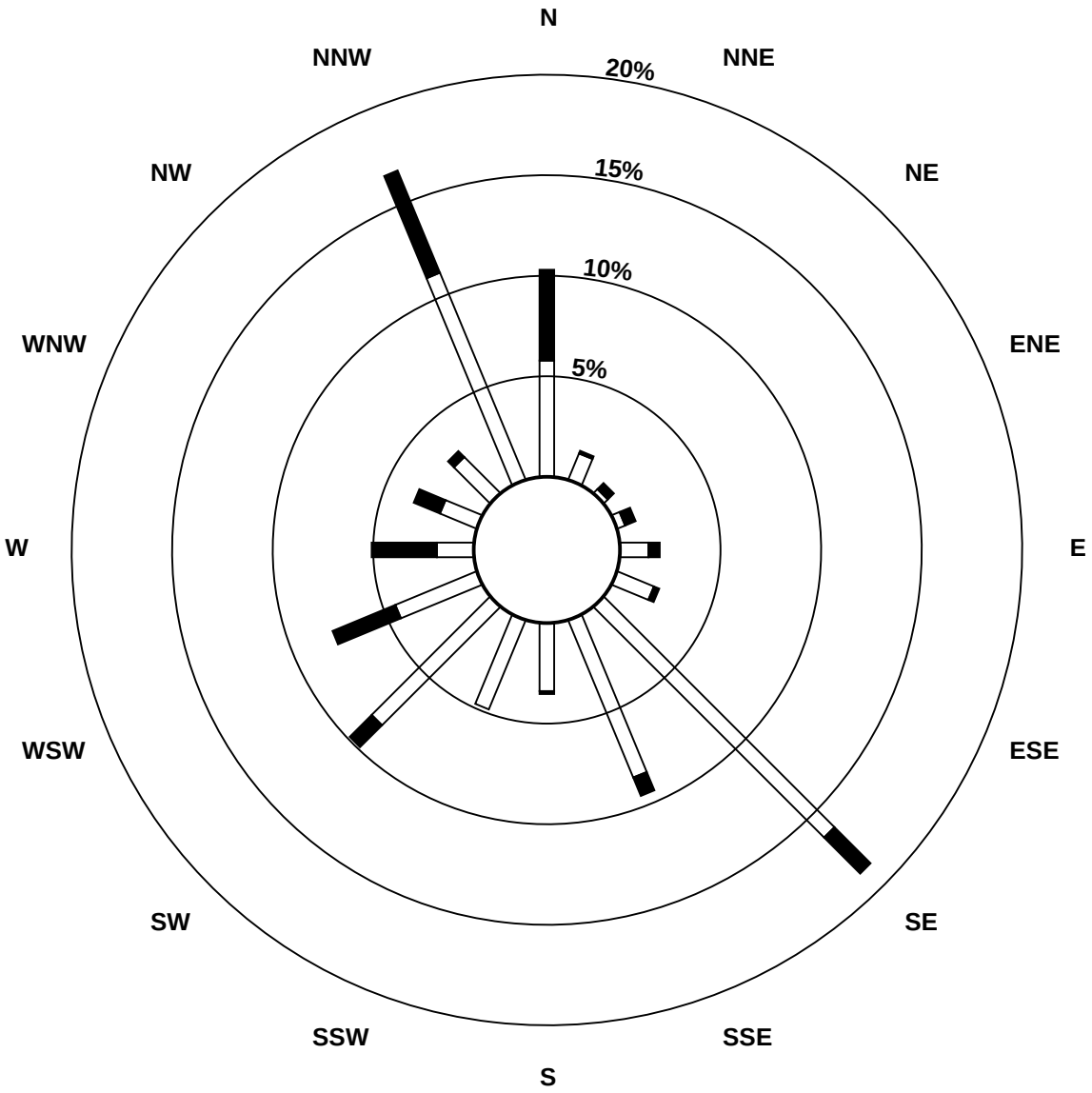
Total Number of Hours: 744

Wood Buffalo Environmental Association

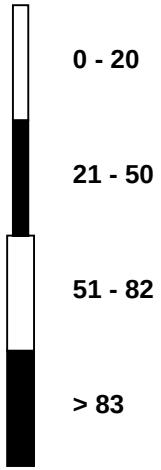
Wind Rose Jan 2016

Ozone (O_3) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



0 - 20

21 - 50

51 - 82

> 83

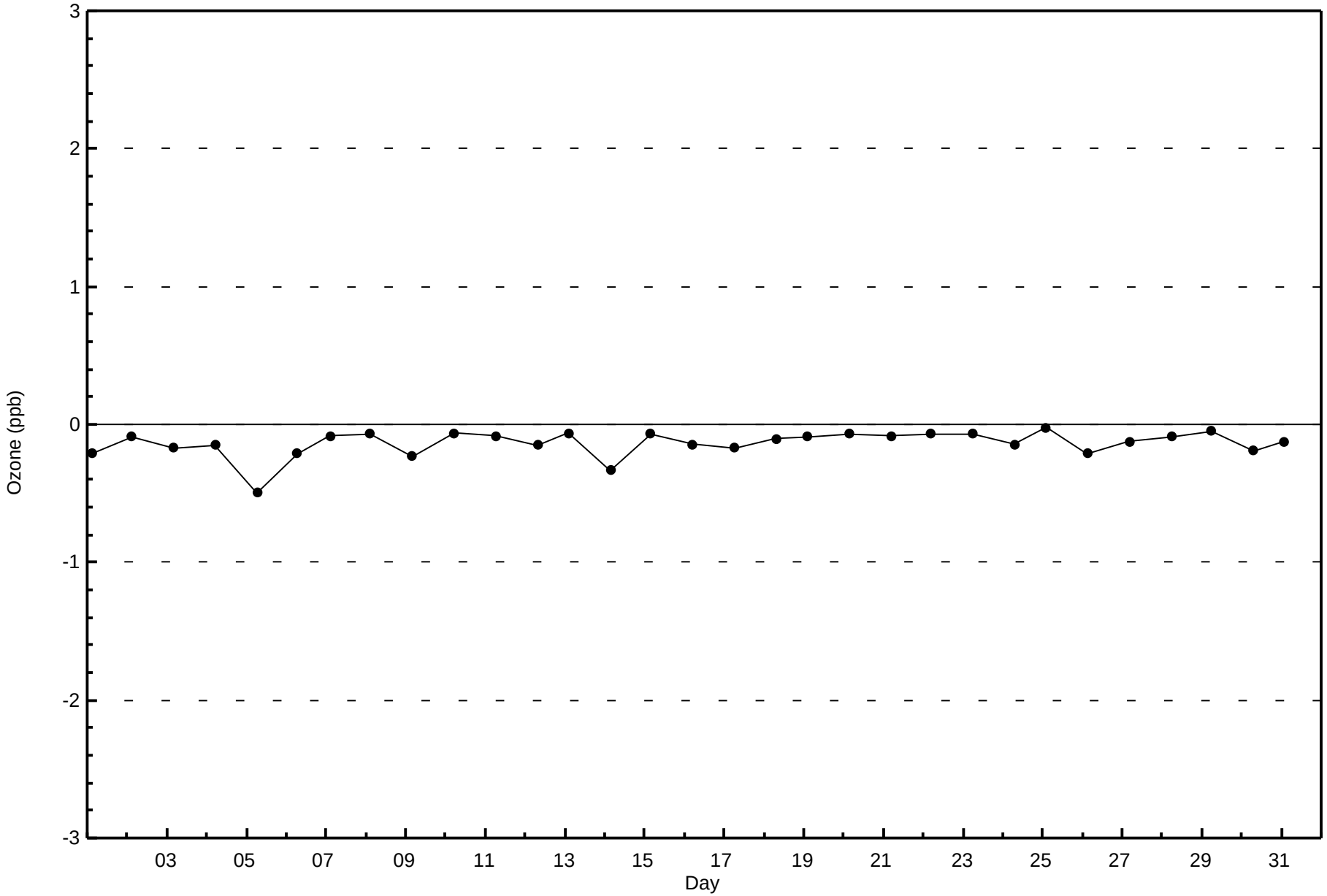
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Athabasca Valley - January 2016

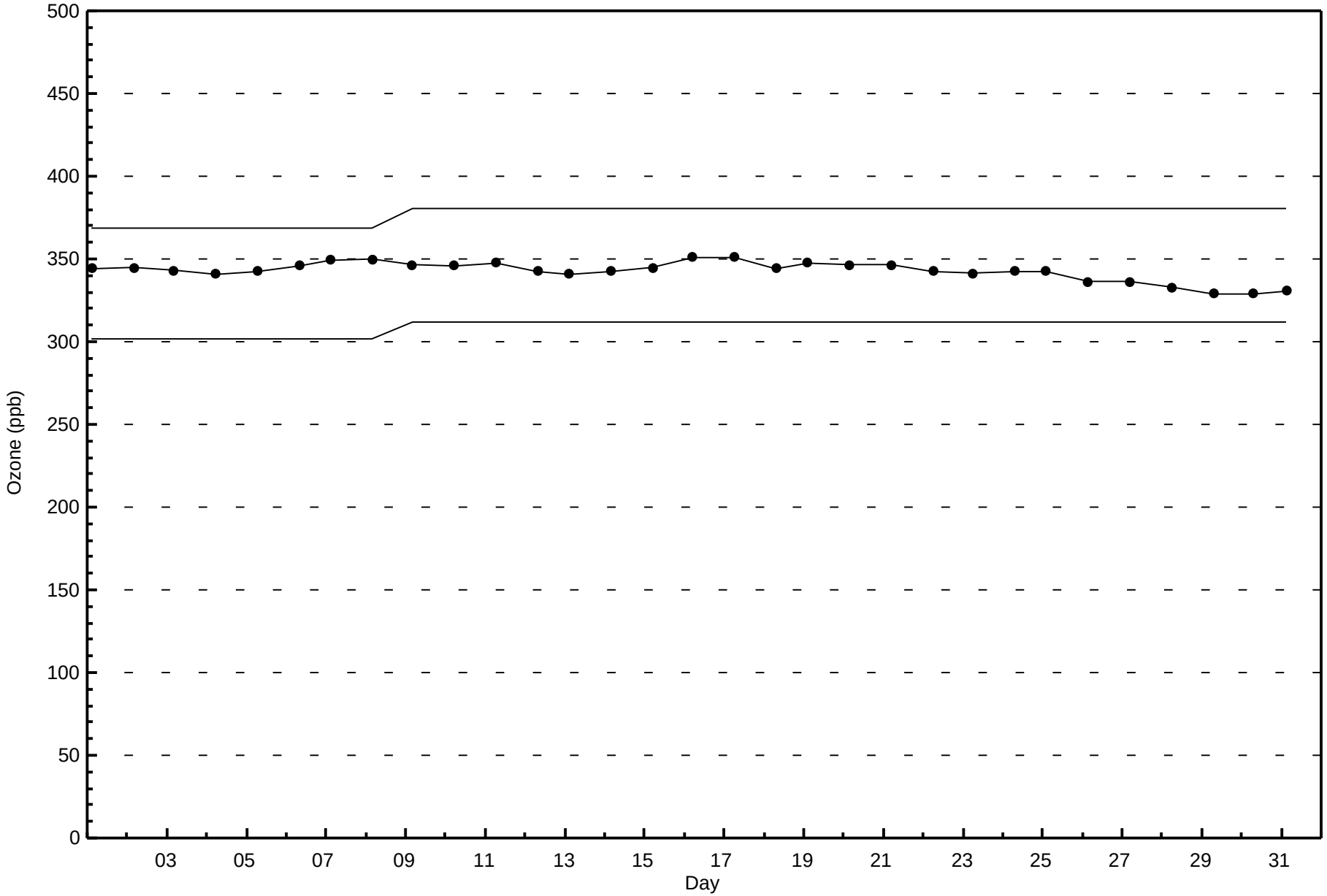


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Athabasca Valley - January 2016

Maximum Value: 68 ppb on Jan 4 20:00

Maximum Daily Average: 22.3 ppb on Jan 6

Minimum Value: 0 ppb on Jan 1 17:00

Minimum Daily Average: 0.1 ppb on Jan 29

Maximum Diurnal Average: 10.7 ppb at hour 12

Minimum Diurnal Average: 1.7 ppb at hour 3

Monthly Average: 6.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 3 $Q_3 = 8$ $P_{90} = 17$ $P_{99} = 43$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	37
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2	3	3	5	6	5	19	16	14	5	3	2	0	0	0	0	0	0	0	2	0	0	0	3.6	19
2-Jan	0	Z	0	2	3	6	4	20	23	23	19	16	13	13	5	7	12	12	8	5	5	7	7	3	9.3	23
3-Jan	2	1	Z	0	1	2	4	7	2	5	9	8	12	19	16	18	33	18	8	8	8	10	10	8	9.0	33
4-Jan	5	2	1	Z	2	2	5	10	11	9	16	19	12	7	13	14	17	37	44	68	47	40	32	21	18.9	68
5-Jan	17	17	12	9	Z	5	6	17	17	36	15	16	20	35	30	19	14	8	8	13	9	11	6	10	15.2	36
6-Jan	3	1	3	9	32	Z	17	32	34	44	44	58	61	52	35	34	33	19	3	0	0	0	0	0	22.3	61
7-Jan	Z	0	0	0	0	0	0	C	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0	--	1
8-Jan	0	Z	0	1	6	2	1	1	0	1	5	M	12	9	4	2	1	2	2	3	3	3	5	4	2.9	12
9-Jan	3	0	Z	3	3	5	5	3	3	4	6	7	8	9	7	7	6	4	4	4	4	3	3	3	4.7	9
10-Jan	3	2	2	Z	2	3	3	3	4	5	8	10	9	15	8	14	9	16	2	0	1	0	1	0	5.2	16
11-Jan	0	0	0	0	Z	0	1	5	3	5	2	1	1	1	1	1	1	7	4	4	4	3	5	2	2.2	7
12-Jan	3	1	0	0	1	Z	3	3	3	4	5	5	6	6	5	5	5	7	7	5	3	2	7	1	3.9	7
13-Jan	Z	0	0	1	1	18	52	26	27	40	43	40	7	1	1	1	1	2	2	1	1	1	0	0	11.6	52
14-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Jan	0	0	Z	0	0	0	0	0	0	2	5	9	11	12	7	8	15	7	3	3	3	2	1	1	3.9	15
16-Jan	1	1	3	Z	1	2	4	4	5	6	8	13	18	23	18	25	30	11	16	11	5	6	5	8	9.8	30
17-Jan	3	2	3	3	Z	5	7	10	3	4	6	11	14	12	11	12	8	6	5	7	8	10	3	2	6.8	14
18-Jan	2	2	2	2	2	Z	2	2	2	4	3	4	5	5	3	3	3	5	4	3	3	2	2	1	2.9	5
19-Jan	Z	1	1	1	1	2	3	4	7	3	5	17	15	14	7	8	16	12	2	0	1	0	0	0	5.2	17
20-Jan	0	Z	0	0	0	0	0	0	0	1	2	4	8	12	9	8	3	3	20	17	2	3	1	1	4.1	20
21-Jan	2	2	Z	1	3	3	5	11	9	8	7	9	9	11	11	9	9	4	4	3	4	2	2	1	5.7	11
22-Jan	2	2	1	Z	3	4	6	15	5	7	14	14	26	23	22	17	9	15	12	11	1	0	0	1	9.0	26
23-Jan	1	1	0	0	Z	0	0	0	0	2	10	11	13	18	14	17	18	9	9	17	15	19	16	29	9.6	29
24-Jan	20	22	3	3	2	Z	8	12	17	26	16	16	4	2	1	9	25	29	12	1	0	4	0	0	10.1	29
25-Jan	Z	0	0	0	0	0	2	1	1	3	4	4	5	5	6	5	5	7	6	6	4	7	3	6	3.6	7
26-Jan	4	Z	2	2	3	4	6	8	5	4	5	5	4	4	4	5	4	7	6	8	6	0	0	0	4.2	8
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	6	1	0	2	3	11	6	10	21	2.7	21
28-Jan	14	11	5	Z	1	1	4	6	7	11	8	4	4	6	6	10	7	6	7	7	12	10	0	0	6.4	14
29-Jan	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
30-Jan	0	2	1	4	8	Z	16	9	2	1	1	2	5	4	3	1	0	0	0	0	0	0	0	0	2.6	16
31-Jan	Z	0	0	0	0	0	0	0	0	1	1	1	3	1	1	1	0	0	0	0	0	0	0	0	0.4	3
	3.4	2.8	1.7	1.7	3.1	2.6	5.4	7.6	7.0	9.1	9.1	10.7	10.2	10.4	8.1	8.5	9.2	8.3	6.4	6.7	5.2	4.9	3.9	4.0	Diurnal Average	
	20	22	12	9	32	18	52	32	34	44	44	58	61	52	35	34	33	37	44	68	47	40	32	29	Diurnal Maximum	

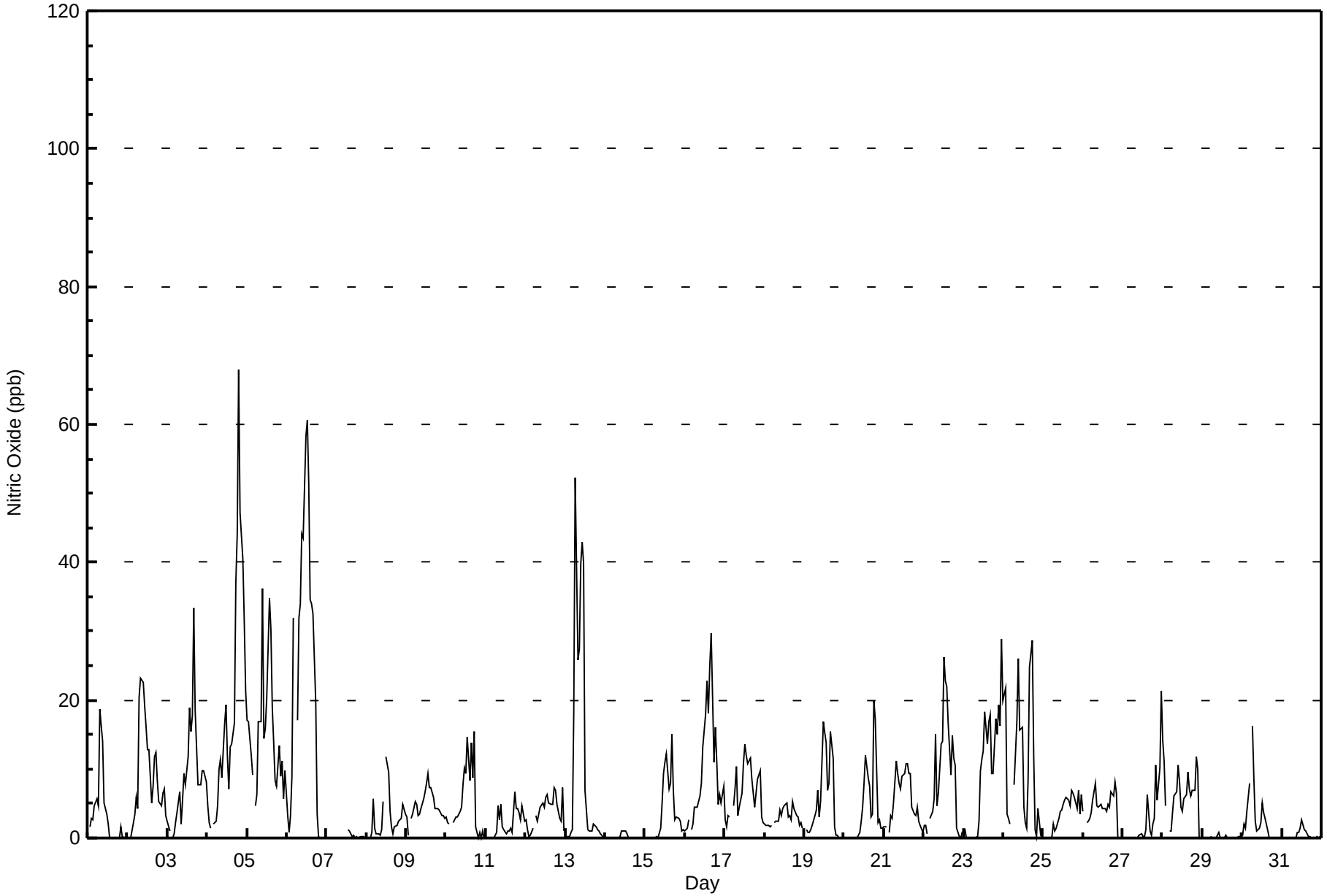
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Athabasca Valley - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	664	94.05	94.05
21 - 40	32	4.53	98.58
11 - 80	10	1.42	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

Nitric Oxide (NO) - ppb

Athabasca Valley - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	67	8	4	6	14	15	129	62	21	30	70	51	35	22	19	111	664
21 - 40	4	2	0	0	0	0	5	4	3	3	0	1	0	2	2	6	32
11 - 80	2	1	0	1	0	1	0	2	0	0	0	1	0	0	0	2	10
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	11	4	7	14	16	134	68	24	33	70	53	35	24	21	119	706

Total Number of Valid Hours: 706

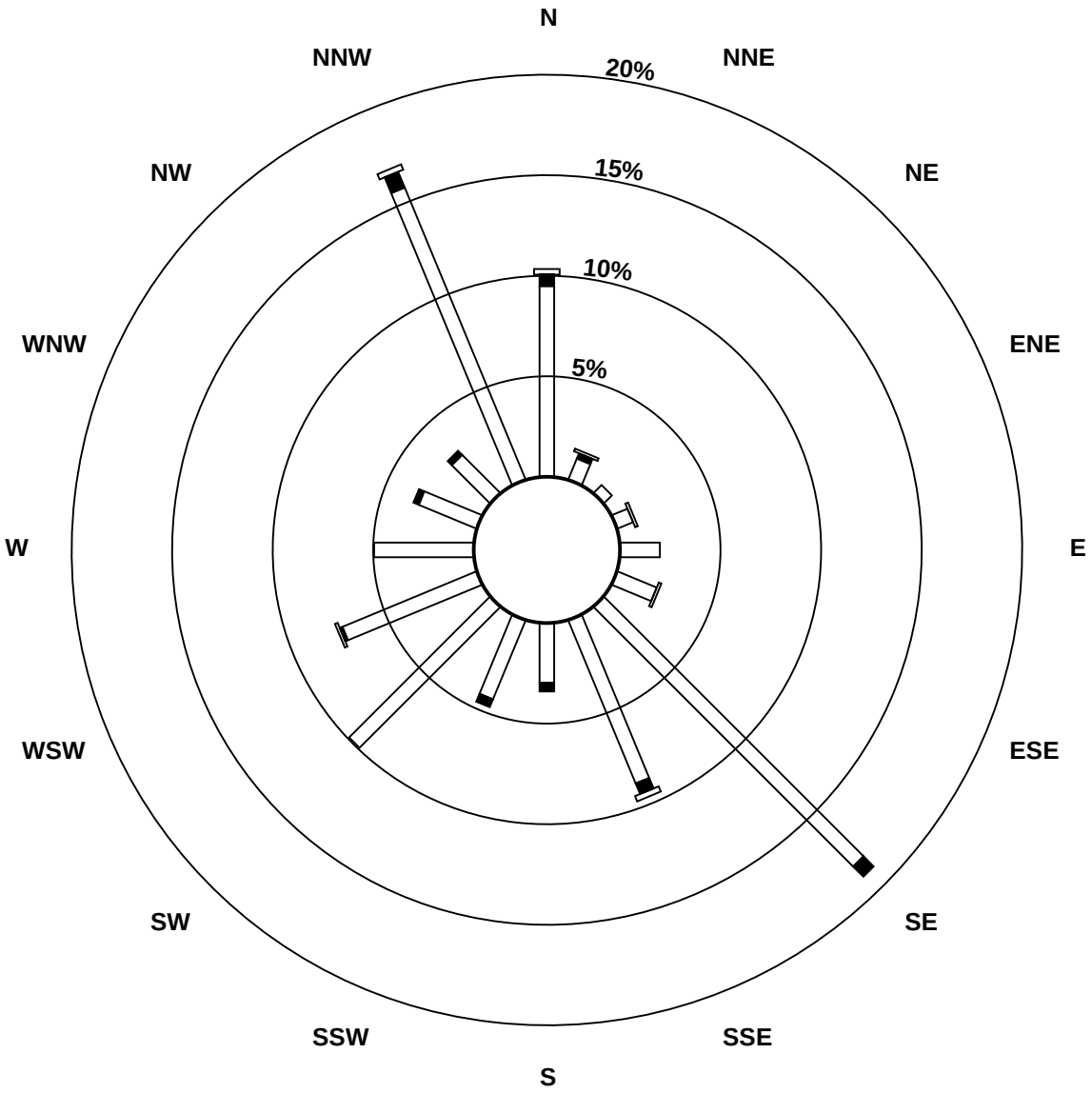
Total Number of Hours: 744

Wood Buffalo Environmental Association

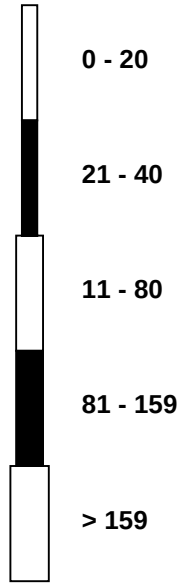
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



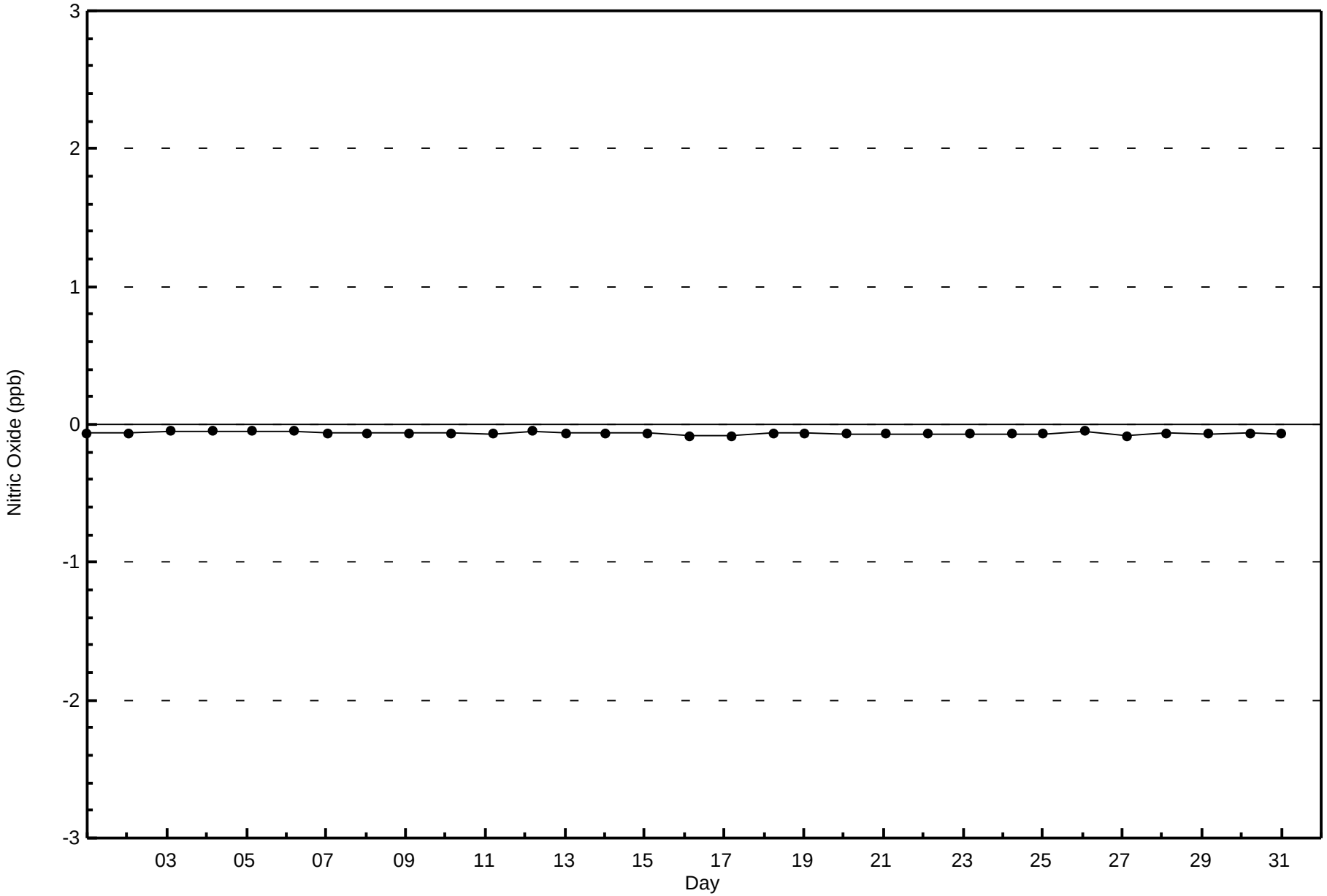
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Athabasca Valley - January 2016

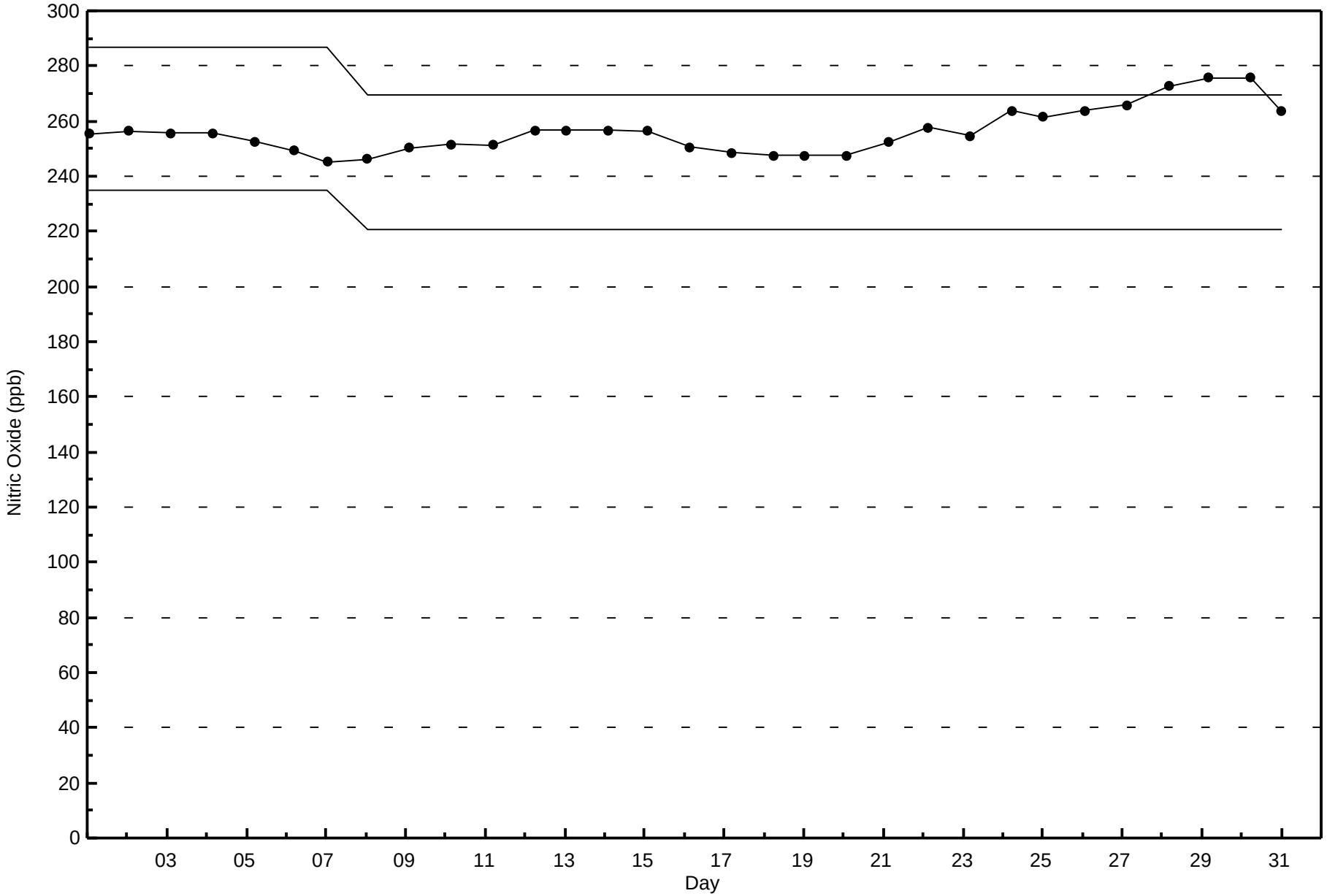


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 32 ppb on Jan 15 17:00

Maximum Daily Average: 17.5 ppb on Jan 2

Minimum Value: 1 ppb on Jan 15 02:00

Minimum Daily Average: 2.4 ppb on Jan 29

Maximum Diurnal Average: 15.3 ppb at hour 18

Minimum Diurnal Average: 9.5 ppb at hour 3

Monthly Average: 11.5 ppb

Percentiles: $P_1 = 1$ $P_{10} = 4$ $Q_1 = 7$ Median = 11 $Q_3 = 16$ $P_{90} = 19$ $P_{99} = 27$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	37
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	23	22	24	26	23	23	30	29	26	15	10	5	2	2	2	1	1	1	1	7	7	5	8	12.8	30
2-Jan	2	Z	3	20	23	23	20	28	28	23	18	18	16	17	11	18	23	20	18	16	14	15	15	11	17.5	28
3-Jan	11	7	Z	3	4	6	7	11	7	8	10	7	10	14	16	19	22	17	11	12	12	13	16	15	11.2	22
4-Jan	12	9	9	Z	6	8	8	11	12	11	13	14	11	9	13	17	16	22	22	26	23	21	20	17	14.2	26
5-Jan	16	17	17	16	Z	13	13	15	16	19	11	10	14	18	17	16	19	18	17	18	17	17	15	16	15.9	19
6-Jan	14	10	12	13	15	Z	12	14	13	15	14	19	24	24	24	26	28	27	22	18	12	12	12	8	16.8	28
7-Jan	Z	6	4	4	5	7	11	C	C	C	C	C	C	8	9	8	7	6	7	4	4	4	3	3	--	11
8-Jan	2	Z	9	28	27	21	20	20	16	15	17	M	19	17	13	11	10	8	7	13	12	14	19	16	15.1	28
9-Jan	18	13	Z	13	12	19	16	11	11	9	9	9	8	10	10	14	13	11	11	10	10	9	8	8	11.4	19
10-Jan	10	7	6	Z	7	7	8	10	10	11	14	15	14	16	14	19	21	23	13	6	9	11	8	6	11.4	23
11-Jan	7	11	9	4	Z	9	19	20	17	16	6	4	3	4	2	4	4	16	17	16	17	13	12	9	10.4	20
12-Jan	9	9	6	5	7	Z	10	11	12	11	11	10	12	12	11	11	16	18	15	14	11	12	14	9	11.1	18
13-Jan	Z	6	7	8	8	14	22	19	19	21	22	23	9	2	2	2	1	2	2	2	1	1	2	1	8.5	23
14-Jan	4	Z	5	5	5	6	9	6	6	6	6	5	4	4	4	4	4	6	8	12	10	11	10	3	6.1	12
15-Jan	3	1	Z	6	8	12	14	12	10	12	12	14	14	17	16	21	32	26	17	16	13	15	13	13	13.7	32
16-Jan	13	12	13	Z	10	10	12	11	11	8	8	9	11	14	14	19	22	17	18	17	16	15	13	15	13.3	22
17-Jan	12	8	9	8	Z	10	10	12	9	6	5	7	9	10	11	14	16	16	13	13	17	16	13	10	10.9	17
18-Jan	10	9	9	8	8	Z	11	13	12	12	10	10	12	13	11	15	17	19	19	15	11	9	10	8	11.7	19
19-Jan	Z	8	8	7	9	12	21	22	18	10	13	20	16	15	12	16	24	22	16	16	14	14	13	13	14.7	24
20-Jan	11	Z	10	7	6	8	8	7	8	10	11	12	13	15	16	19	21	23	27	25	11	11	8	7	12.7	27
21-Jan	8	7	Z	8	10	9	12	14	11	8	6	7	8	12	13	16	18	14	13	12	13	12	8	10	10.7	18
22-Jan	14	11	8	Z	8	10	9	14	9	10	12	11	16	16	18	19	19	20	20	19	18	16	17	17	14.4	20
23-Jan	19	18	17	14	Z	10	10	10	10	11	15	14	14	15	14	17	18	18	18	18	17	17	16	17	15.0	19
24-Jan	16	16	11	9	8	Z	15	16	15	17	12	13	5	4	4	11	26	29	20	9	3	18	11	5	12.7	29
25-Jan	Z	4	3	5	5	5	9	5	9	9	8	7	8	8	10	12	17	18	16	14	12	15	12	14	9.8	18
26-Jan	10	Z	9	7	10	10	12	12	11	8	7	8	7	7	7	8	10	13	12	14	13	3	2	1	8.8	14
27-Jan	1	1	Z	1	1	2	4	4	5	5	3	3	2	2	5	18	11	9	16	18	20	19	19	20	8.2	20
28-Jan	17	17	14	Z	5	5	12	14	13	12	9	7	8	8	9	12	16	15	15	15	15	12	2	1	11.0	17
29-Jan	1	1	1	1	Z	5	2	3	5	3	3	1	2	2	2	2	7	4	3	2	2	1	1	4	2.4	7
30-Jan	9	18	17	18	20	Z	20	13	8	3	4	6	11	9	8	9	7	12	8	7	5	4	6	5	9.8	20
31-Jan	Z	7	10	13	15	8	12	8	10	6	5	5	8	5	4	5	8	9	7	7	8	9	10	9	8.0	15
	9.9	9.8	9.5	9.8	10.2	10.5	12.6	13.1	12.2	11.4	10.3	10.3	10.4	10.5	10.5	13.0	15.1	15.3	13.7	13.0	11.8	11.8	10.7	9.6	Diurnal Average	
	19	23	22	28	27	23	23	30	29	26	22	23	24	24	24	26	32	29	27	26	23	21	20	20	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

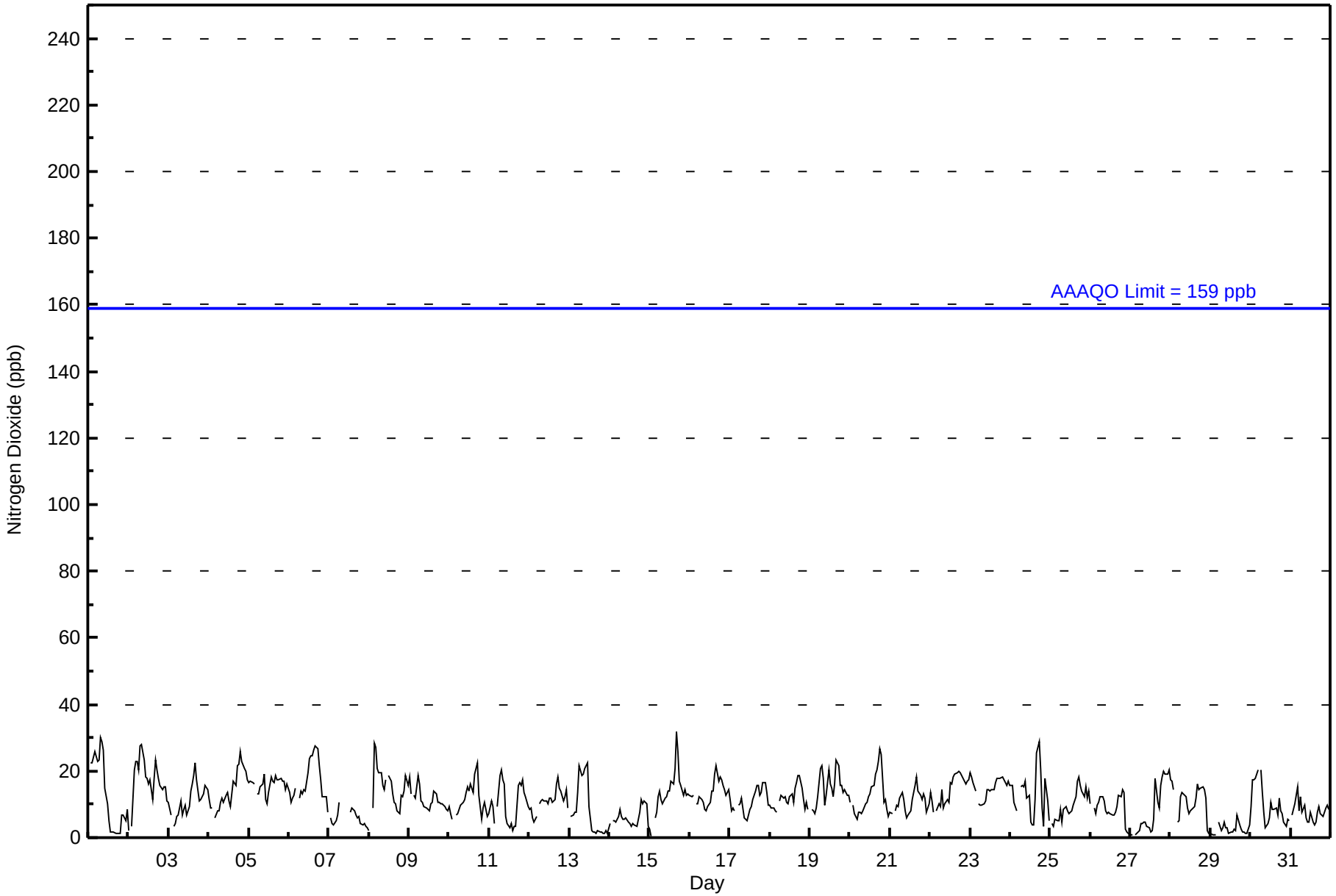
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - January 2016



Nitrogen Dioxide (NO_2) - ppb
Athabasca Valley - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	655	92.78	92.78
21 - 40	51	7.22	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	67	10	4	6	13	13	124	62	20	31	70	52	34	22	20	107	655
21 - 40	6	1	0	1	1	3	10	6	4	2	0	1	1	2	1	12	51
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	11	4	7	14	16	134	68	24	33	70	53	35	24	21	119	706

Total Number of Valid Hours: 706

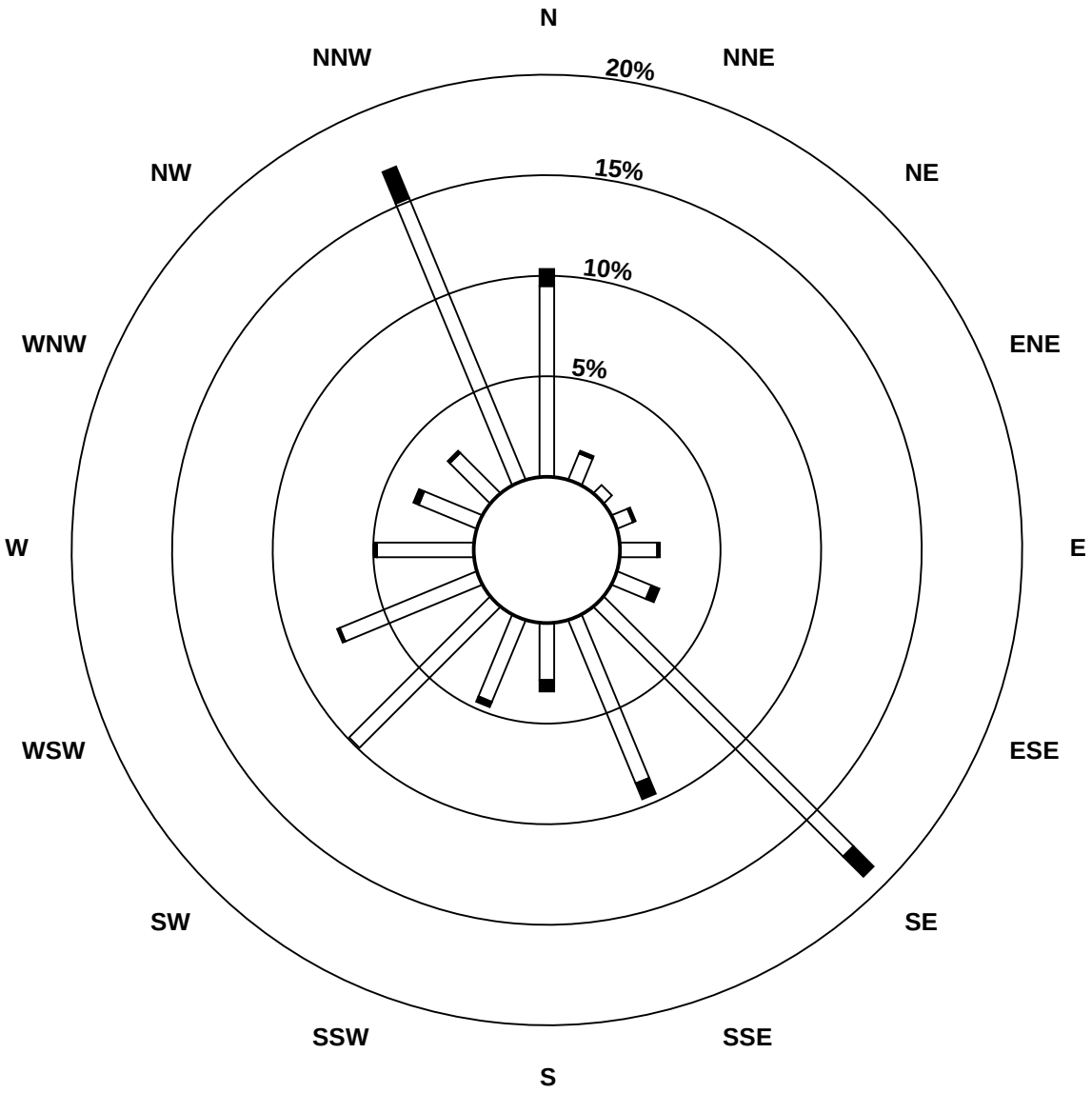
Total Number of Hours: 744

Wood Buffalo Environmental Association

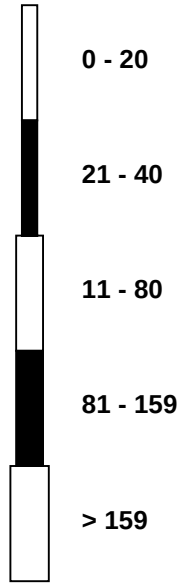
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



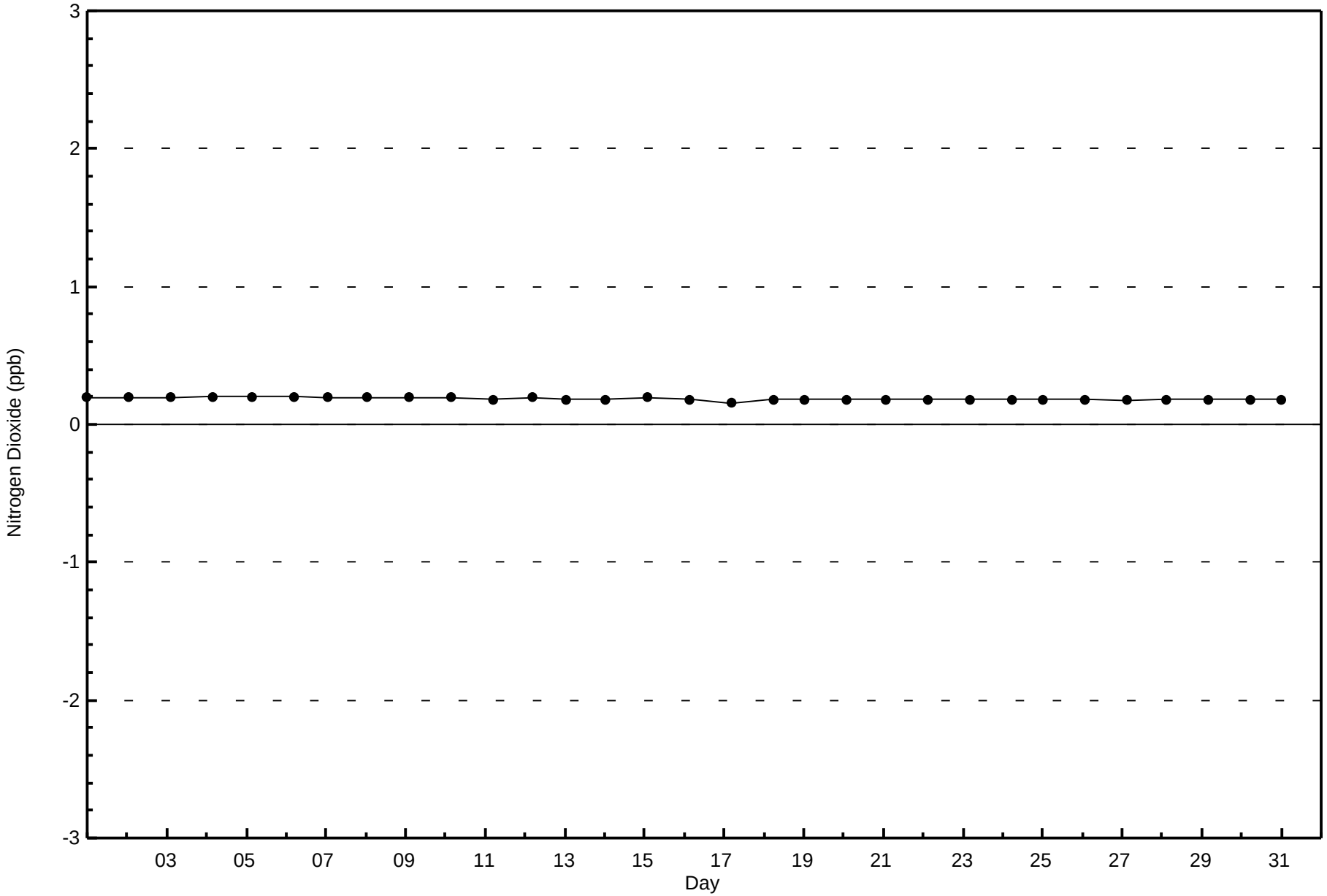
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - January 2016

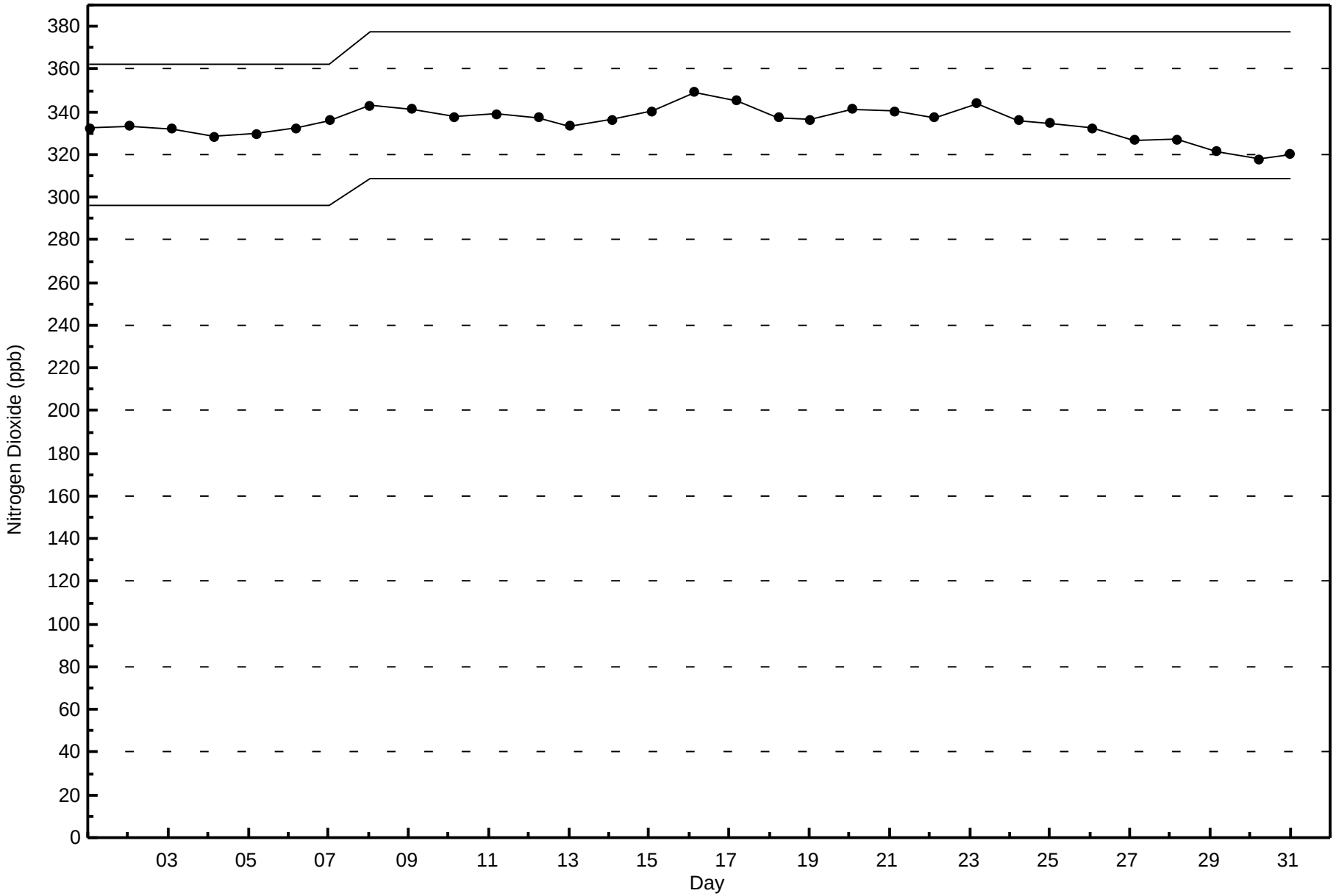


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - January 2016

Maximum Value: 94 ppb on Jan 4 20:00

Maximum Daily Average: 39.1 ppb on Jan 6

Minimum Value: 1 ppb on Jan 15 02:00

Minimum Daily Average: 2.5 ppb on Jan 29

Maximum Diurnal Average: 24.3 ppb at hour 17

Minimum Diurnal Average: 11.2 ppb at hour 3

Monthly Average: 17.9 ppb

Percentiles: $P_1 = 1$ $P_{10} = 4$ $Q_1 = 9$ Median = 15 $Q_3 = 24$ $P_{90} = 33$ $P_{99} = 64$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	37
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	24	25	27	30	29	28	49	45	40	20	14	7	2	2	1	1	1	1	1	8	7	5	9	16.4	49
2-Jan	2	Z	3	23	26	29	25	48	51	46	38	34	29	30	16	25	35	33	26	21	19	22	22	14	26.8	51
3-Jan	13	8	Z	3	5	9	10	18	9	14	19	15	21	33	32	37	56	36	19	19	20	23	25	23	20.2	56
4-Jan	16	11	10	Z	8	10	13	20	23	19	29	33	23	16	26	31	32	58	66	94	70	61	52	39	33.2	94
5-Jan	33	34	29	25	Z	18	19	32	33	55	26	26	34	53	47	35	33	26	25	31	26	28	20	26	31.1	55
6-Jan	17	11	15	22	47	Z	29	46	47	59	57	78	84	76	59	60	60	46	25	18	12	12	12	8	39.1	84
7-Jan	Z	6	4	4	5	7	11	C	C	C	C	C	C	9	10	8	7	6	7	4	4	4	3	3	--	11
8-Jan	2	Z	9	29	33	22	20	20	16	16	23	M	31	26	17	12	11	10	9	15	15	17	24	19	18.0	33
9-Jan	21	13	Z	16	15	24	21	14	14	14	15	15	16	19	18	21	19	15	15	15	14	13	12	11	16.1	24
10-Jan	12	9	8	Z	9	10	11	13	14	16	21	25	23	31	22	33	29	38	15	6	9	11	9	6	16.6	38
11-Jan	7	11	9	4	Z	9	20	25	20	21	8	5	3	5	3	5	4	22	21	20	21	16	17	12	12.6	25
12-Jan	11	10	6	5	8	Z	13	13	15	16	16	15	18	18	16	16	21	26	22	19	14	15	22	10	15.0	26
13-Jan	Z	7	7	8	9	32	74	44	46	61	65	63	16	3	3	3	2	4	3	3	3	2	3	1	20.0	74
14-Jan	4	Z	5	5	5	6	8	6	6	6	7	6	5	4	4	4	4	5	8	11	10	11	10	3	6.2	11
15-Jan	3	1	Z	6	8	12	14	12	10	13	18	23	25	29	23	29	47	33	20	19	16	17	14	14	17.6	47
16-Jan	14	14	15	Z	11	12	17	16	16	15	16	23	29	37	32	44	51	28	34	28	20	21	18	22	23.1	51
17-Jan	14	10	12	11	Z	14	17	22	12	11	12	18	22	22	22	25	24	22	17	20	25	26	17	12	17.7	26
18-Jan	12	11	11	10	10	Z	13	15	14	16	14	15	17	18	13	18	19	24	23	18	14	10	13	10	14.7	24
19-Jan	Z	9	9	8	10	14	24	26	25	13	18	37	31	29	19	24	39	33	17	16	14	15	13	13	19.8	39
20-Jan	11	Z	10	7	6	8	8	7	8	11	13	17	21	27	24	27	24	26	47	42	13	14	10	8	16.9	47
21-Jan	9	9	Z	9	13	12	17	25	21	16	13	16	17	22	24	25	28	18	16	15	18	14	10	11	16.4	28
22-Jan	15	13	8	Z	11	14	15	29	13	17	25	25	43	39	40	36	29	35	31	29	19	16	17	18	23.4	43
23-Jan	21	20	17	14	Z	10	10	10	10	14	24	26	26	33	28	33	36	27	27	35	32	36	32	46	24.6	46
24-Jan	36	38	14	12	10	Z	23	28	32	43	28	29	9	6	5	20	50	57	32	10	3	22	12	5	22.8	57
25-Jan	Z	4	3	5	5	5	11	6	10	12	12	11	13	13	16	18	22	25	22	20	16	22	15	20	13.4	25
26-Jan	14	Z	11	10	13	14	18	20	16	13	12	13	12	11	11	12	14	20	19	22	20	3	2	1	13.0	22
27-Jan	1	1	Z	1	1	2	4	4	5	5	4	3	2	2	7	24	12	9	17	21	31	24	29	42	10.9	42
28-Jan	31	28	19	Z	6	6	16	20	19	23	17	12	12	14	16	21	23	21	22	22	26	22	2	1	17.4	31
29-Jan	1	1	1	1	Z	5	2	3	4	4	3	1	1	1	3	2	7	4	3	2	2	1	2	4	2.5	7
30-Jan	10	20	19	22	28	Z	37	22	10	4	6	8	16	12	11	10	7	12	8	7	5	4	6	5	12.4	37
31-Jan	Z	7	10	13	15	8	12	8	10	7	5	6	10	6	5	5	8	10	7	7	8	9	10	9	8.4	15
	13.3	12.6	11.2	11.5	13.3	13.2	18.1	20.7	19.2	20.5	19.4	21.0	20.6	20.9	18.5	21.5	24.3	23.6	20.1	19.7	17.0	16.7	14.7	13.7	Diurnal Average	
	36	38	29	29	47	32	74	49	51	61	65	78	84	76	59	60	60	58	66	94	70	61	52	46	Diurnal Maximum	

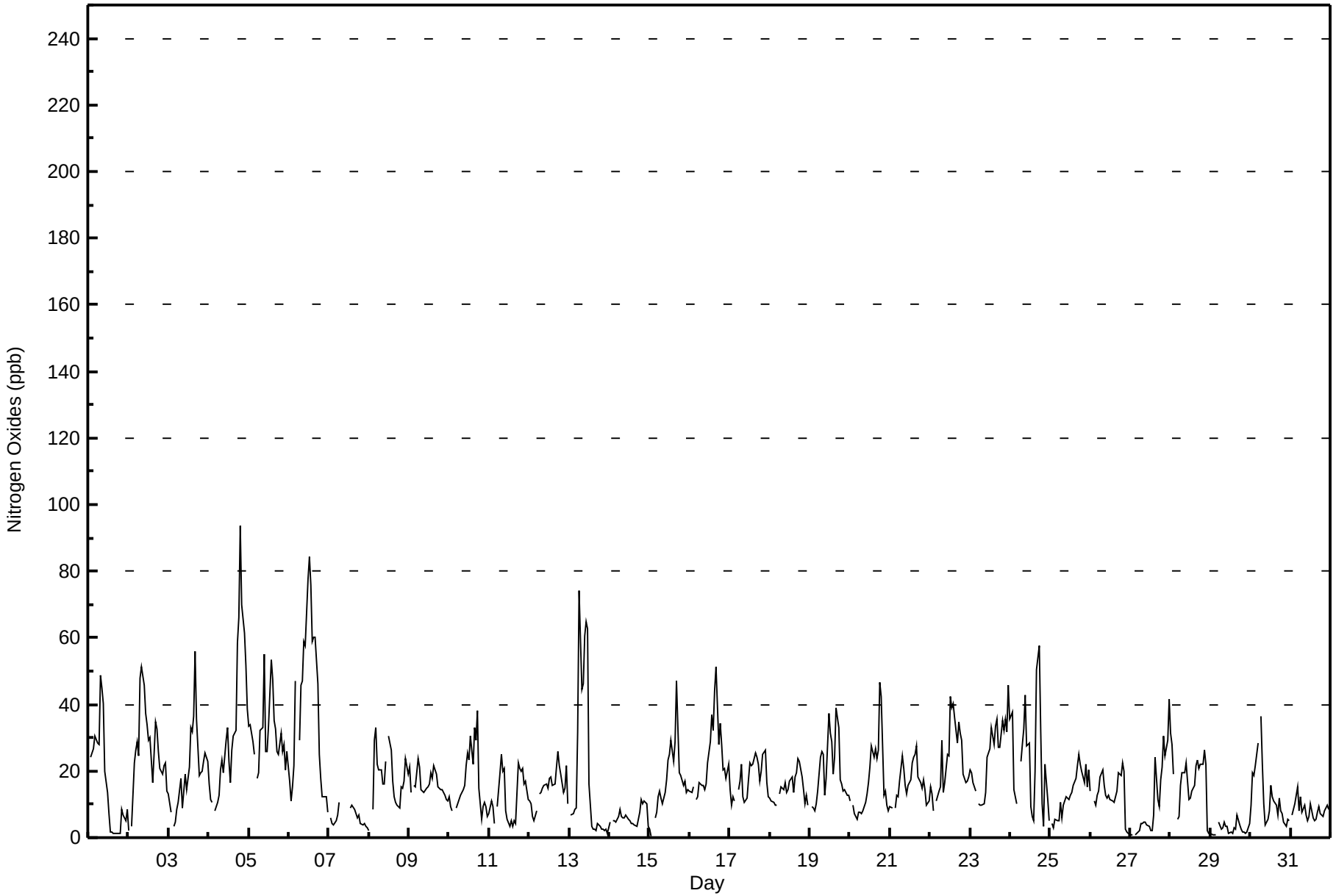
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - January 2016



Nitrogen Oxides (NO_X) - ppb
Athabasca Valley - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	471	66.71	66.71
21 - 40	191	27.05	93.77
11 - 80	42	5.95	99.72
81 - 159	2	0.28	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

Athabasca Valley - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	51	3	3	5	8	5	94	38	12	18	54	42	27	15	8	88	471
21 - 40	16	5	1	1	5	10	35	24	9	11	16	9	8	7	11	23	191
11 - 80	5	3	0	1	1	1	5	5	3	4	0	2	0	2	2	8	42
81 - 159	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	11	4	7	14	16	134	68	24	33	70	53	35	24	21	119	706

Total Number of Valid Hours: 706

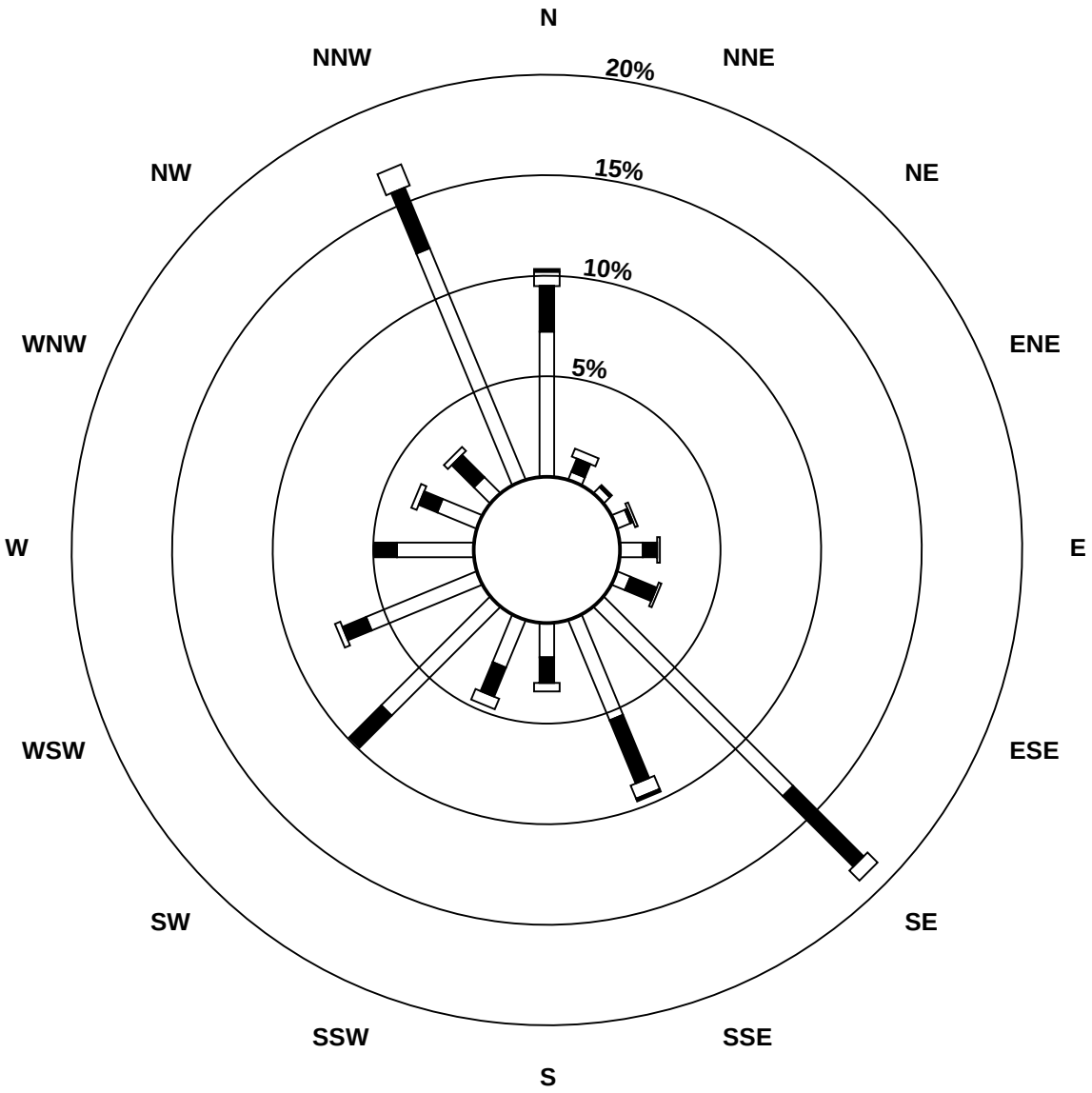
Total Number of Hours: 744

Wood Buffalo Environmental Association

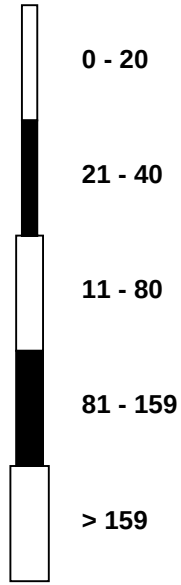
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

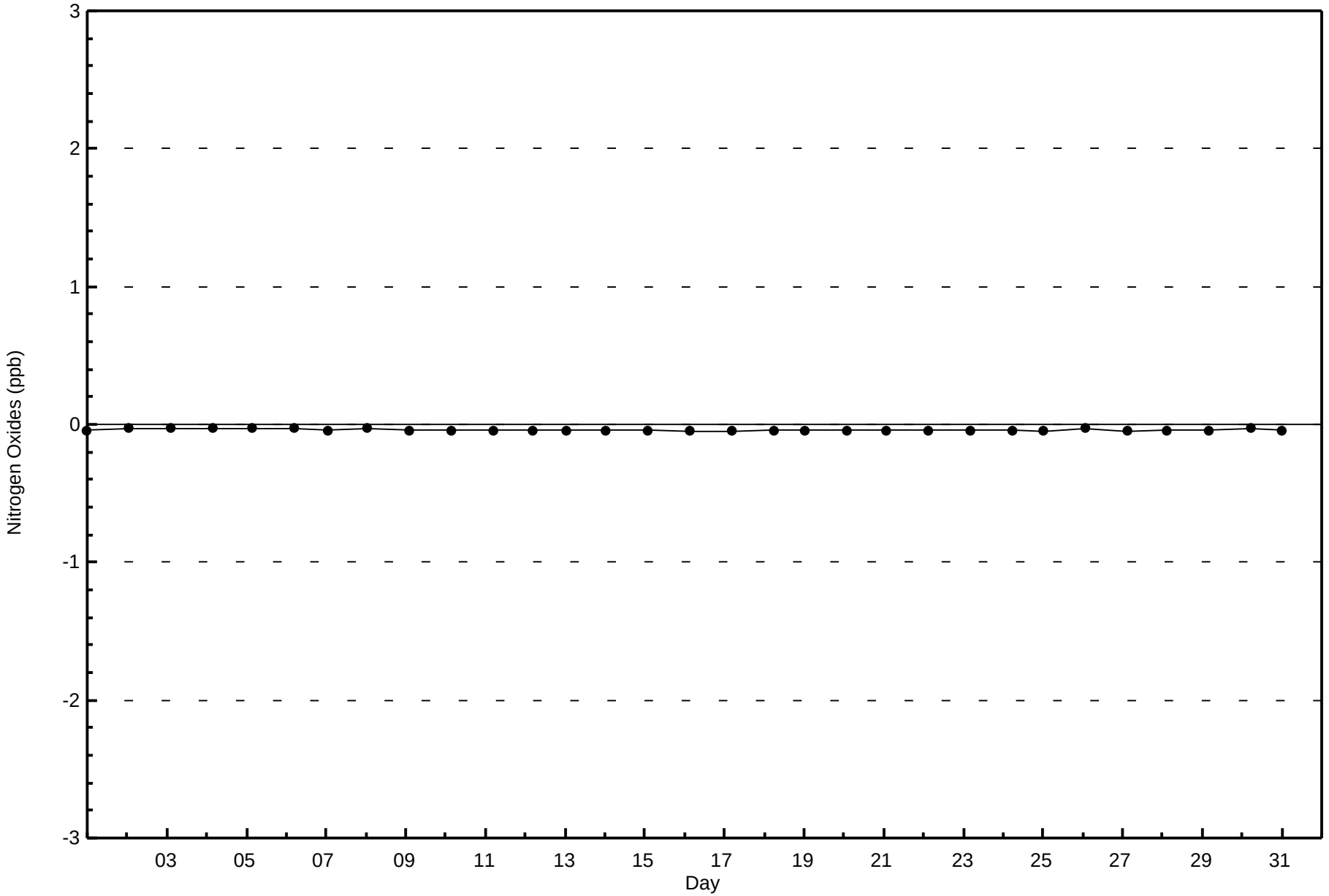
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - January 2016

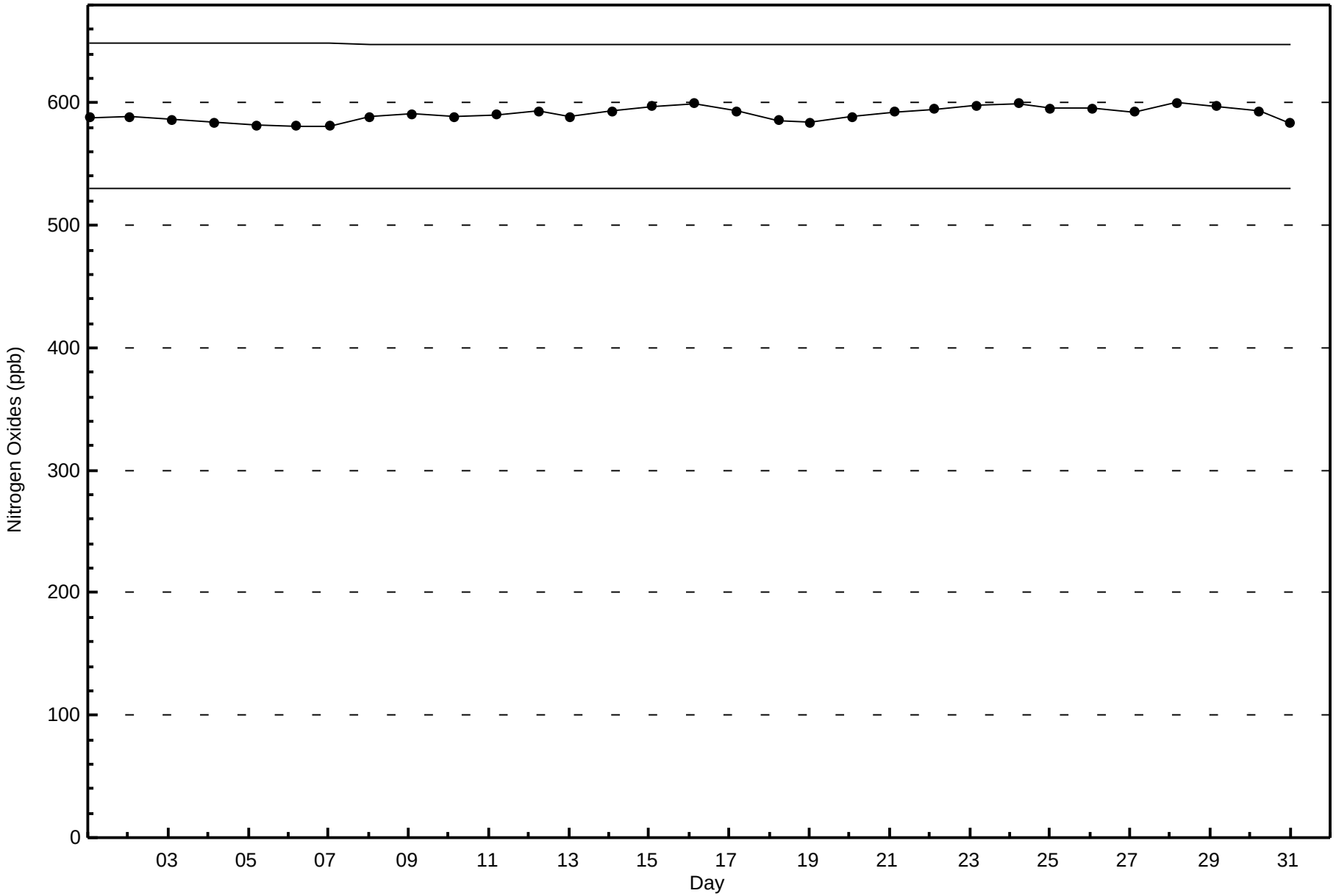


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Athabasca Valley - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 148.1 $\mu g/m^3$ on Jan 13 08:00

Maximum Daily Average: 23.8 $\mu g/m^3$ on Jan 13

Minimum Value: 0.0 $\mu g/m^3$ on Jan 27 05:00

Minimum Daily Average: 2.0 $\mu g/m^3$ on Jan 27

Maximum Diurnal Average: 9.2 $\mu g/m^3$ at hour 8

Minimum Diurnal Average: 4.4 $\mu g/m^3$ at hour 6

Monthly Average: 6.44 $\mu g/m^3$

Percentiles: P_1 = 0.1 P_{10} = 1.7 Q_1 = 3.0 Median = 4.9 Q_3 = 7.6 P_{90} = 11.3 P_{99} = 20.3

Hours in Service:	744
Hours of Data:	736
Hours of Missing Data:	8
Hours of Calibration:	1
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	8.3	8.7	9.1	8.6	12.2	7.9	7.2	6.1	4.9	4.0	2.2	0.9	0.7	0.3	0.2	0.2	0.1	0.3	0.2	0.3	0.6	1.3	1.7	1.4	3.6	12.2
2-Jan	1.1	1.2	1.2	5.5	2.8	1.8	2.8	2.8	2.6	3.4	4.5	5.1	4.5	4.7	3.4	4.5	6.2	7.7	6.0	5.3	4.5	4.7	5.1	3.8	4.0	7.7
3-Jan	4.0	4.1	4.2	4.0	3.8	4.3	4.5	5.4	5.4	5.4	4.9	5.9	7.0	7.4	8.2	9.6	12.0	10.7	7.6	8.0	7.4	7.7	9.1	7.8	6.6	12.0
4-Jan	6.6	6.2	6.8	6.6	6.7	7.1	7.2	7.2	7.4	7.6	8.5	11.4	9.5	8.8	10.2	10.8	7.8	9.4	16.3	18.2	16.4	16.0	16.4	13.1	10.1	18.2
5-Jan	14.2	13.4	10.4	7.8	6.2	5.6	5.4	5.8	5.3	6.7	5.3	5.7	6.7	7.0	6.2	6.0	6.9	7.3	8.4	8.5	6.9	6.0	5.5	5.6	7.2	14.2
6-Jan	4.6	4.2	4.5	4.9	6.4	5.5	5.3	6.0	5.7	7.2	7.2	10.5	15.3	14.8	13.1	13.5	15.8	21.1	10.3	6.3	5.3	4.7	4.8	4.7	8.4	21.1
7-Jan	3.8	3.6	2.5	1.8	1.9	1.8	1.8	1.5	1.7	1.9	1.9	2.4	C	3.3	5.6	4.5	3.6	3.4	2.8	2.3	2.0	2.2	2.1	1.8	2.6	5.6
8-Jan	1.8	1.8	2.8	4.0	4.0	3.8	4.1	5.0	4.5	6.8	8.1	6.4	6.2	6.1	4.7	4.4	4.5	3.6	3.5	5.2	6.3	7.0	8.1	7.2	5.0	8.1
9-Jan	8.5	10.0	7.7	6.2	6.2	5.8	6.2	6.2	6.0	5.7	5.5	5.1	6.3	5.1	4.9	5.6	6.4	6.7	7.7	7.5	6.8	7.0	6.7	7.1	6.5	10.0
10-Jan	5.9	5.4	5.3	5.6	5.6	5.7	6.3	6.7	6.9	7.5	8.5	9.4	9.3	9.8	10.5	14.4	17.1	19.2	10.1	5.6	4.4	4.4	4.5	4.5	8.0	19.2
11-Jan	5.7	9.1	7.1	3.8	2.6	3.1	4.8	5.4	5.3	4.5	3.0	2.7	3.0	3.6	2.5	2.3	1.8	2.1	2.5	2.8	2.9	2.7	4.2	4.7	3.8	9.1
12-Jan	4.1	3.9	3.8	3.2	2.9	1.7	1.9	2.5	2.6	2.7	2.8	3.4	3.7	4.5	3.6	3.5	5.0	5.4	4.3	4.2	4.1	3.7	4.0	3.4	3.5	5.4
13-Jan	3.1	3.1	3.2	3.3	3.1	4.3	25.3	148.1	105.4	54.6	70.7	73.0	17.1	7.9	6.0	4.9	4.9	5.3	5.8	5.8	4.9	3.7	3.4	3.2	23.8	148.1
14-Jan	8.7	20.4	15.8	10.4	9.3	9.3	7.7	5.5	6.5	6.1	5.4	6.3	5.9	8.0	6.8	3.1	2.4	2.4	7.1	10.1	12.5	12.9	9.3	2.2	8.1	20.4
15-Jan	2.4	2.6	2.7	5.3	14.2	8.0	15.0	8.4	9.1	10.6	9.0	11.1	9.3	9.2	7.8	16.0	16.1	10.3	6.5	5.8	5.2	6.2	6.1	4.8	8.4	16.1
16-Jan	5.2	4.6	3.5	2.6	1.9	1.5	1.4	1.1	0.7	0.4	0.6	1.3	2.0	4.5	8.0	10.8	11.1	9.1	9.6	8.9	6.8	5.3	4.1	4.6	4.6	11.1
17-Jan	4.0	3.3	3.1	2.5	2.2	2.2	1.7	1.8	1.2	0.8	0.9	2.0	5.1	8.8	10.8	13.2	12.7	11.0	9.0	8.9	8.7	8.2	7.7	5.1	5.6	13.2
18-Jan	3.9	3.7	3.1	2.9	2.8	2.8	2.8	2.6	2.7	2.8	2.6	2.7	3.2	3.9	4.3	4.5	5.6	5.9	5.1	5.1	3.9	3.3	3.2	2.9	3.6	5.9
19-Jan	4.0	4.0	3.9	2.7	2.4	2.4	2.8	3.6	3.7	2.8	3.3	6.1	8.1	8.8	8.0	8.2	8.0	6.7	9.7	7.9	7.6	7.1	6.8	6.4	5.6	9.7
20-Jan	8.0	8.9	6.7	4.8	4.4	4.0	3.7	3.7	4.3	5.1	4.6	4.2	4.3	4.8	5.3	5.9	6.1	6.1	6.7	6.1	4.9	4.5	5.0	4.2	5.3	8.9
21-Jan	3.8	3.8	4.0	4.8	4.9	4.8	4.8	4.8	4.7	4.2	4.3	5.4	8.4	13.1	12.9	11.9	10.6	8.0	6.5	6.2	6.4	7.0	6.6	6.5	6.6	13.1
22-Jan	7.2	6.8	6.4	6.2	5.9	6.1	7.5	8.2	8.4	8.3	8.6	9.1	13.4	16.4	17.7	18.2	19.4	16.5	15.4	14.7	15.2	13.7	13.5	10.1	11.4	19.4
23-Jan	9.3	12.5	10.6	10.8	10.8	11.3	12.3	13.5	18.1	20.8	20.2	22.6	22.3	22.6	21.5	21.5	21.4	20.7	19.9	21.0	20.7	20.6	19.4	22.4	17.8	22.6
24-Jan	18.6	17.1	9.4	7.6	7.2	7.3	8.2	8.2	8.9	11.0	11.3	9.6	5.1	4.1	3.7	4.6	6.5	8.9	7.2	5.8	5.0	7.4	10.2	8.4	8.4	18.6
25-Jan	7.8	7.6	8.1	9.1	8.4	8.3	6.4	2.9	3.6	4.1	3.9	3.8	2.7	2.4	2.4	2.6	3.5	3.9	4.2	4.0	3.3	3.8	3.0	3.4	4.7	9.1
26-Jan	2.8	3.0	3.0	2.6	2.6	2.7	2.8	2.9	2.9	3.0	3.0	3.2	3.2	3.3	3.2	3.0	2.7	3.9	4.6	4.9	3.7	1.9	1.1	0.1	2.9	4.9
27-Jan	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.5	0.4	0.3	0.3	0.3	0.2	0.7	4.1	3.9	2.8	4.4	5.3	6.0	5.6	5.5	6.1	2.0	6.1
28-Jan	5.4	5.5	4.7	1.6	1.4	1.3	1.8	2.5	2.4	2.5	2.1	2.3	2.0	2.1	2.2	2.6	3.6	3.5	4.3	5.4	5.8	4.9	1.7	0.9	3.0	5.8
29-Jan	0.4	0.4	0.2	UO	0.2	0.3	0.4	0.5	0.6	0.4	0.4	0.2	0.1	UO	UO	UO	0.5	UO	0.2	UO	UO	0.2	0.2	0.5	--	0.6
30-Jan	1.8	3.1	3.6	3.6	5.1	3.6	3.3	2.3	2.3	1.3	1.5	1.7	2.4	2.3	2.3	1.9	1.2	1.7	2.5	3.3	2.6	2.1	2.6	2.4	2.5	5.1
31-Jan	2.3	2.3	2.5	3.0	3.4	3.0	3.3	3.6	4.1	3.3	3.0	3.7	4.0	4.5	5.0	3.9	3.7	3.8	3.6	3.4	3.7	3.5	3.5	3.8	3.5	5.0
	5.4	6.0	5.2	4.9	4.9	4.4	5.5	9.2	8.0	6.6	7.0	7.7	6.4	6.7	6.7	7.3	7.5	7.6	6.8	6.9	6.5	6.1	6.0	5.3	Diurnal Average	
	18.6	20.4	15.8	10.8	14.2	11.3	25.3	148.1	105.4	54.6	70.7	73.0	22.3	22.6	21.5	21.5	21.4	21.1	19.9	21.0	20.7	20.6	19.4	22.4	Diurnal Maximum	

C - Calibration UO - Unstable Operation

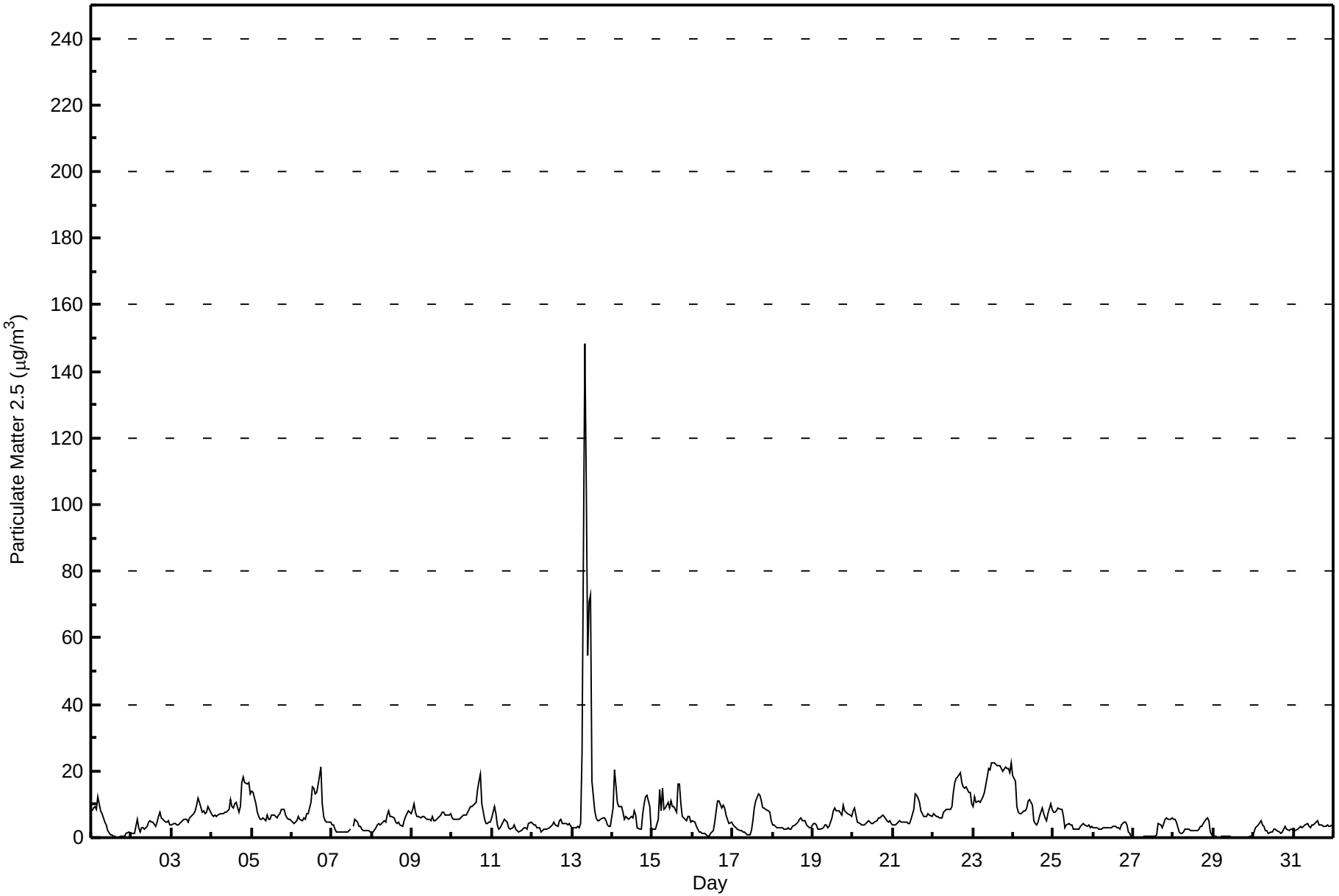
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Athabasca Valley - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	371	50.41	50.41
6 - 15	273	37.09	87.50
16 - 25	38	5.16	92.66
26 - 80	3	0.41	93.07
> 81.0	2	0.27	93.34

Total Number of Valid Hours: 736

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Athabasca Valley - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	32	2	4	4	5	8	72	47	15	23	46	26	10	7	11	59	371
6 - 15	37	5	1	2	9	6	67	19	9	12	17	13	8	8	8	52	273
16 - 25	8	3	0	1	0	2	2	4	1	1	3	0	0	1	2	10	38
26 - 80	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3
> 81.0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Totals	78	12	5	7	14	16	141	70	25	36	66	39	18	16	21	123	687

Total Number of Valid Hours: 736

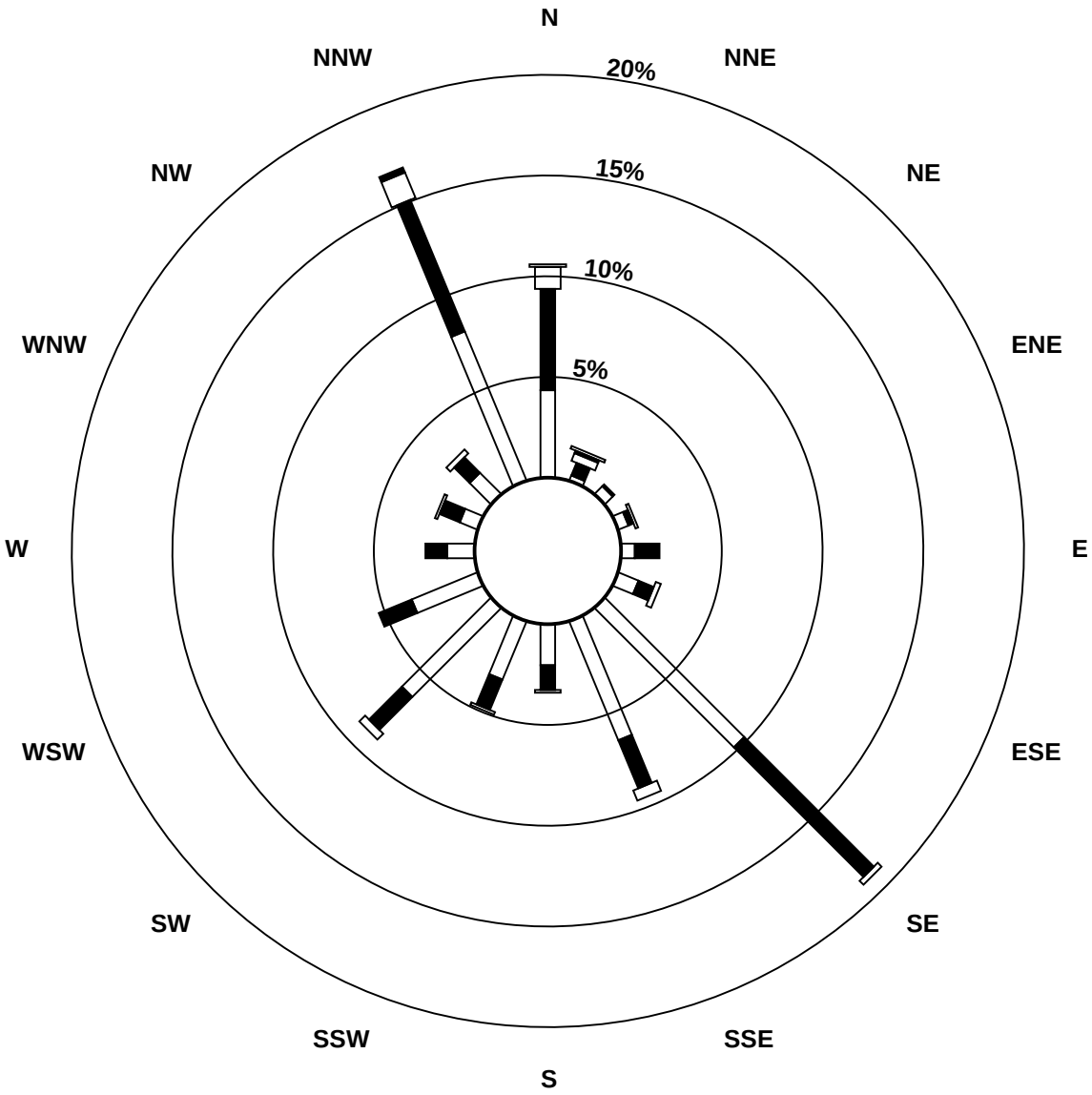
Total Number of Hours: 744

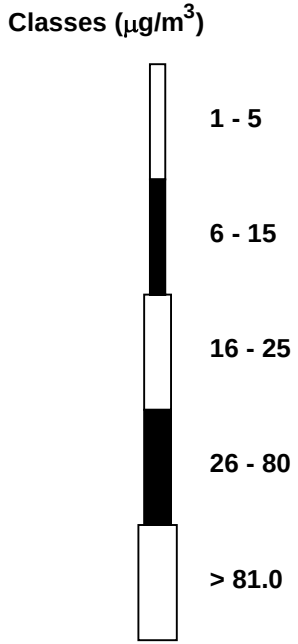
Wood Buffalo Environmental Association

Wind Rose Jan 2016

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

Athabasca Valley (AMS 7)





Total Number of Valid Hours: 736

Wood Buffalo Environmental Association

Summary of Hour Averages

Carbon Monoxide (CO) - ppm

Athabasca Valley - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 0.7 ppm on Jan 13 08:00

Maximum Daily Average: 0.3 ppm on Jan 4

Minimum Value: 0.0 ppm on Jan 15 03:00

Minimum Daily Average: 0.0 ppm on Jan 31

Maximum Diurnal Average: 0.2 ppm at hour 12

Minimum Diurnal Average: 0.1 ppm at hour 4

Monthly Average: 0.12 ppm

Percentiles: $P_1 = 0.0$ $P_{10} = 0.1$ $Q_1 = 0.1$ Median = 0.1 $Q_3 = 0.1$ $P_{90} = 0.2$ $P_{99} = 0.5$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	34
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.3	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
2-Jan	0.1	0.0	0.1	0.2	0.1	Z	0.1	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.3
3-Jan	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
4-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.5	0.5	0.4	0.3	0.3	0.7
5-Jan	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	Z	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
6-Jan	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	Z	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
7-Jan	0.1	0.1	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8-Jan	0.0	0.0	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	M	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2
9-Jan	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
10-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
11-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	C	C	C	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2
12-Jan	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2
13-Jan	0.1	0.1	0.1	0.1	Z	0.1	0.2	0.7	0.7	0.5	0.6	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.7
14-Jan	0.1	0.3	0.2	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.3
15-Jan	0.0	0.0	0.0	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
16-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
17-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2
19-Jan	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	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	0.2
20-Jan	0.1	0.1	0.1	0.0	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
21-Jan	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
22-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
23-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.3	0.2	0.3	0.1	0.3
24-Jan	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	Z	0.2	0.3	0.1	0.1	0.1	0.2	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.4
25-Jan	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.2
26-Jan	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2
27-Jan	0.1	0.1	0.1	0.1	0.0	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2
28-Jan	0.2	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2
29-Jan	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
30-Jan	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2
31-Jan	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average	
	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.7	0.7	0.5	0.6	0.6	0.2	0.3	0.2	0.3	0.4	0.4	0.6	0.7	0.5	0.5	0.4	0.3	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

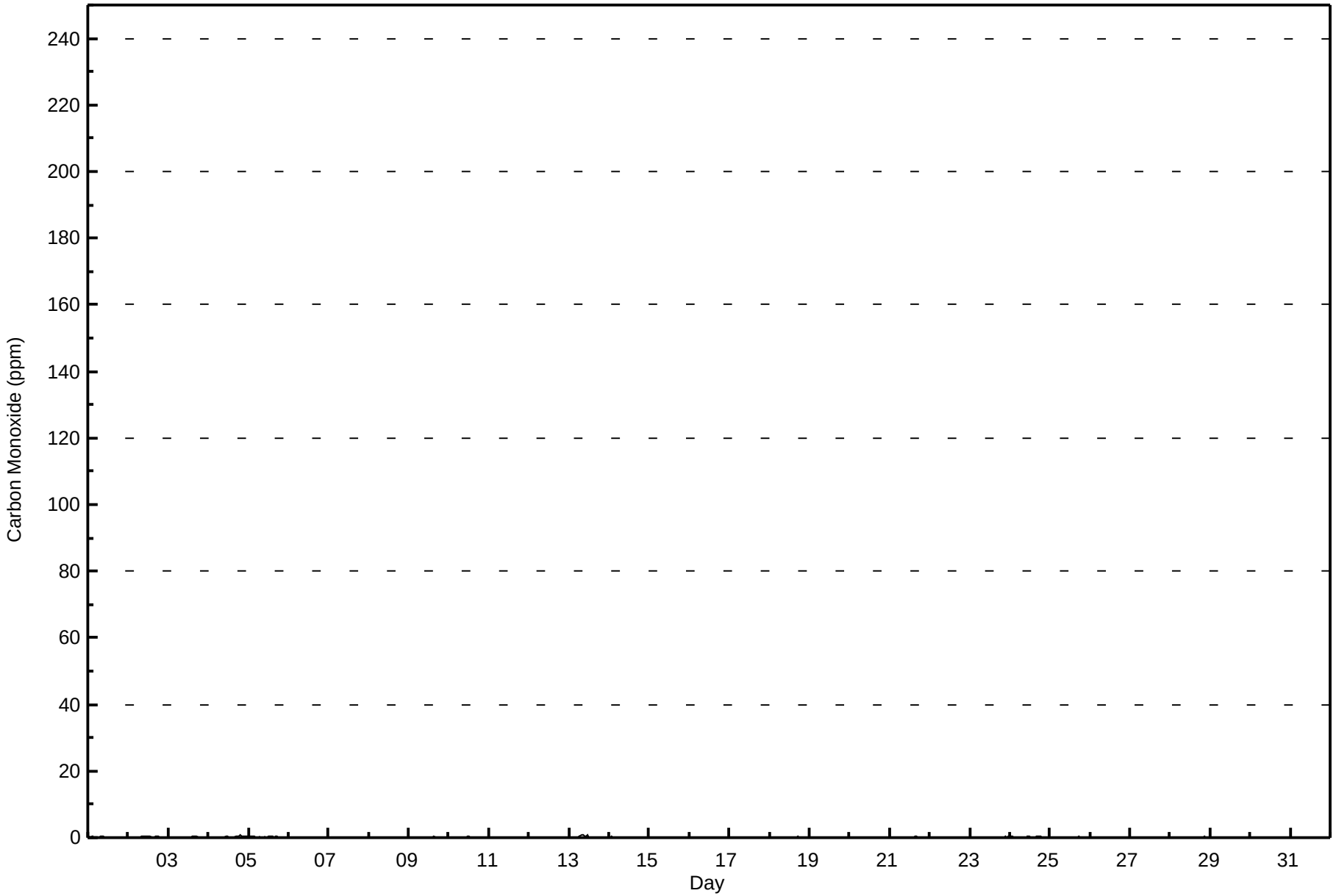
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm

Wood Buffalo Environmental Association

Hourly Averages

Carbon Monoxide (CO) - ppm

Athabasca Valley - January 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	696	98.17	98.17
0.4 - 0.5	7	0.99	99.15
0.6 - 0.7	6	0.85	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Carbon Monoxide (CO) - ppm

Athabasca Valley - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.3	74	8	5	7	14	14	133	66	20	36	67	55	32	25	23	117	696
0.4 - 0.5	0	1	0	0	0	1	3	0	2	0	0	0	0	0	0	0	7
0.6 - 0.7	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	2	6
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	75	10	5	7	14	15	136	68	22	36	67	55	32	25	23	119	709

Total Number of Valid Hours: 709

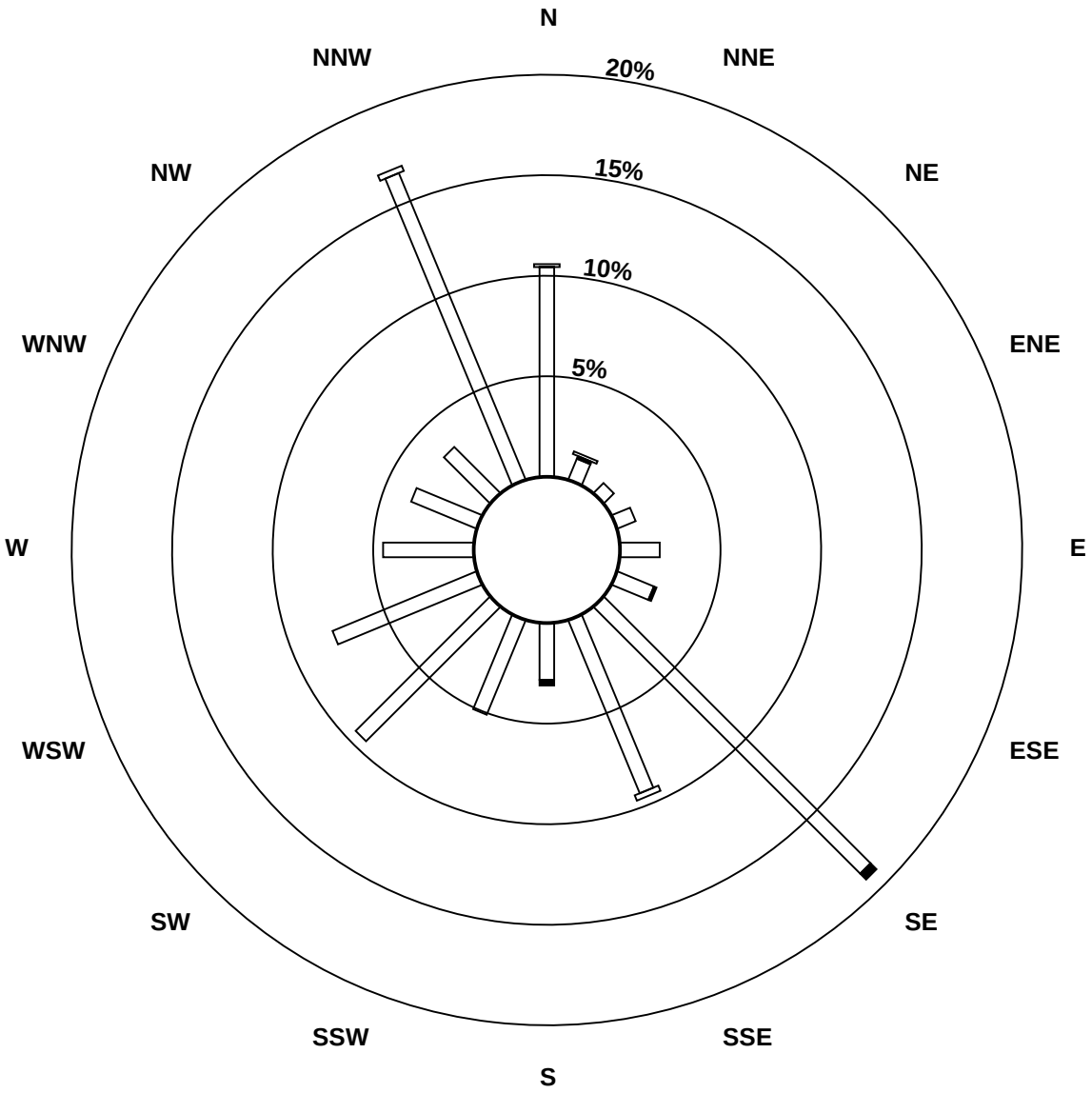
Total Number of Hours: 744

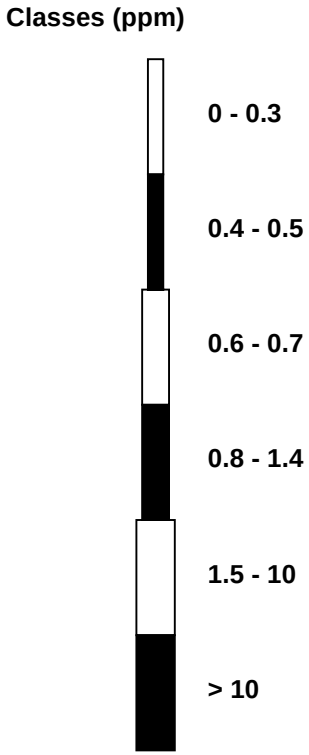
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Carbon Monoxide (CO) - ppm

Athabasca Valley (AMS 7)





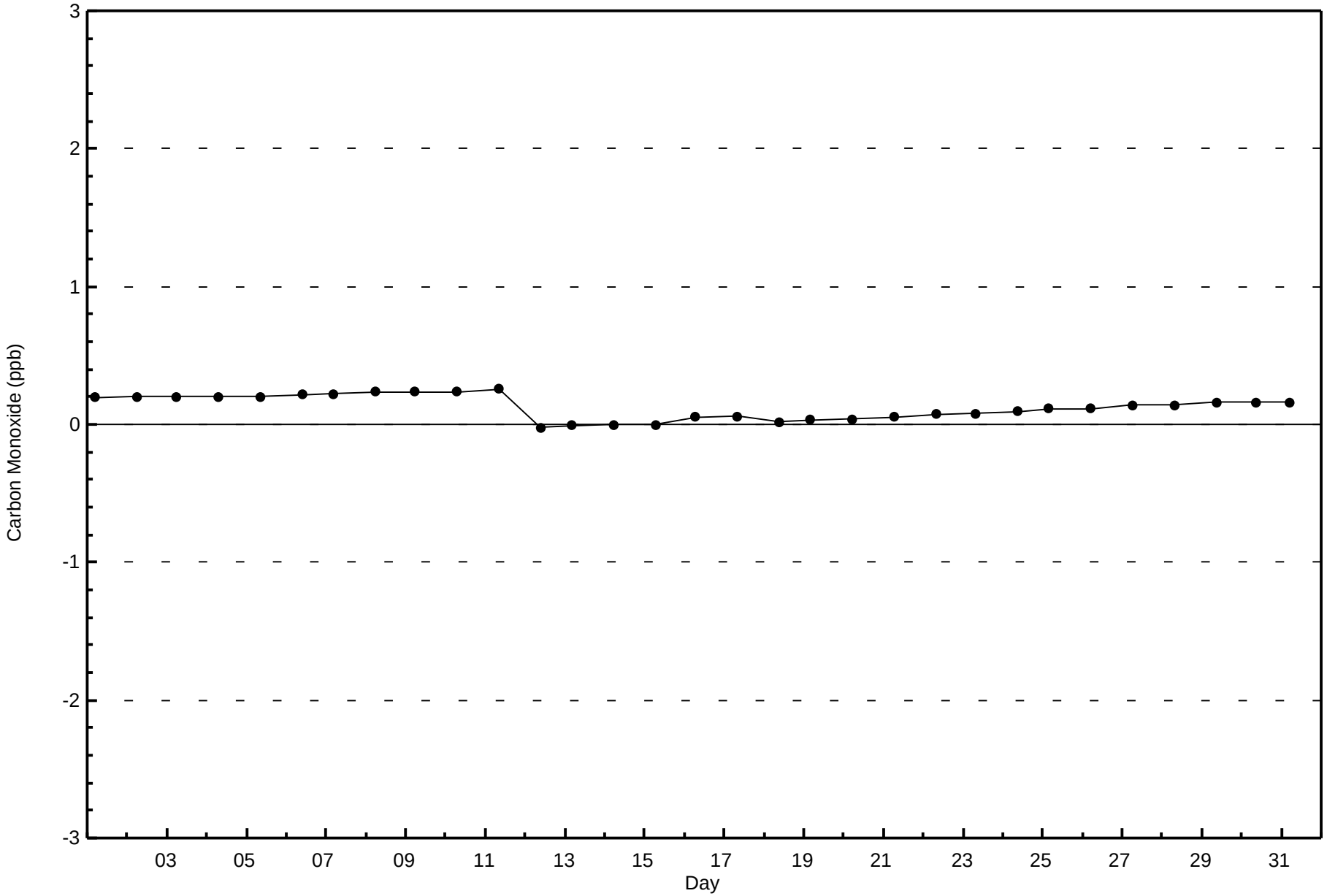
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Carbon Monoxide (CO) - ppb

Athabasca Valley - January 2016

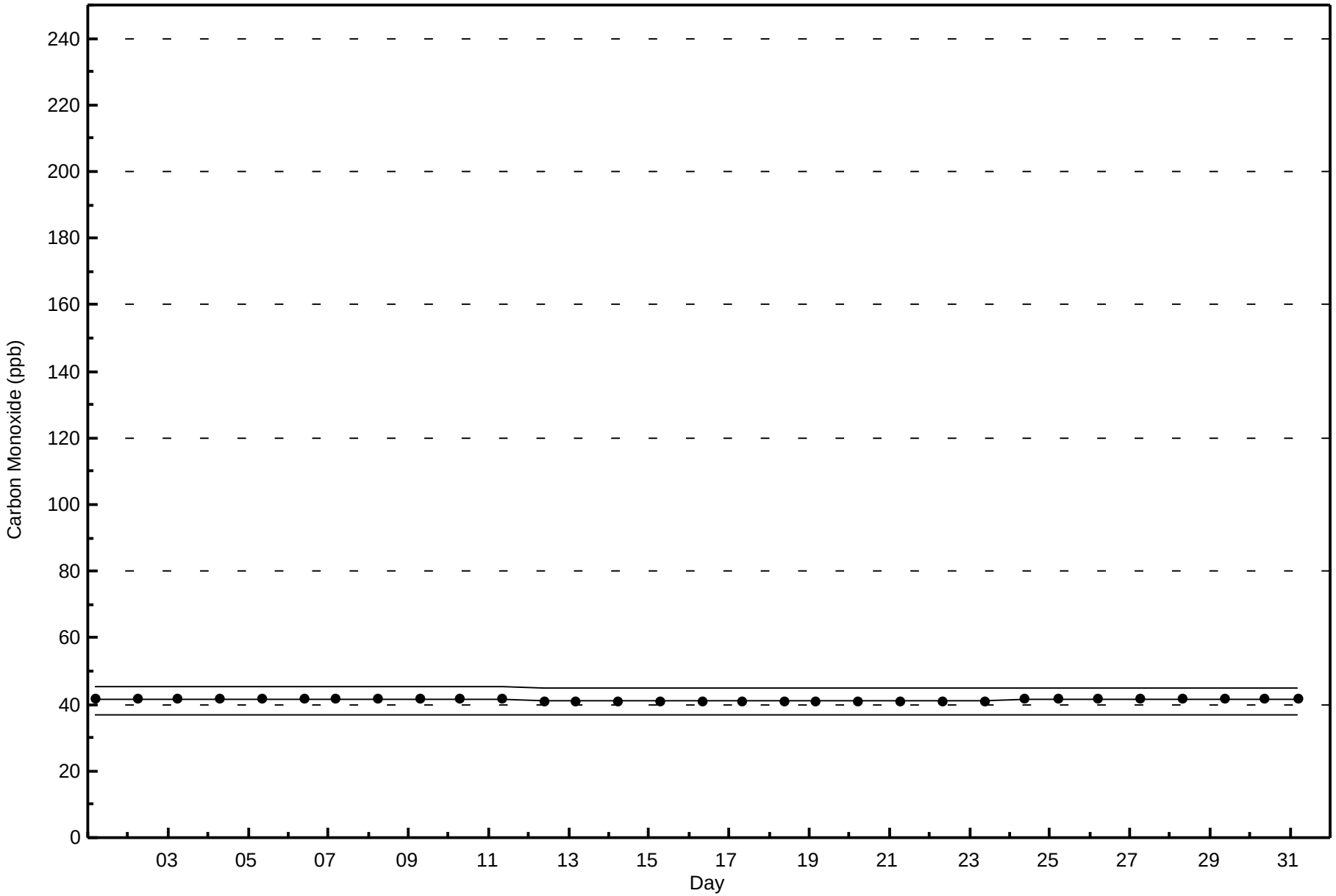


Wood Buffalo Environmental Association

Span Responses

Carbon Monoxide (CO) - ppb

Athabasca Valley - January 2016



Maximum Value: 6.7 C on Jan 29 16:00

Maximum Daily Average: 3.7 C on Jan 29

Minimum Value: -33.9 C on Jan 16 09:00

Minimum Daily Average: -30.9 C on Jan 16

Maximum Diurnal Average: -10.8 C at hour 16

Minimum Diurnal Average: -15.2 C at hour 9

Monthly Average: -13.43 C

Percentiles: P_1 = -32.6 P_{10} = -22.1 Q_1 = -18.4 Median = -14.1 Q_3 = -8.8 P_{90} = -2.1 P_{99} = 5.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

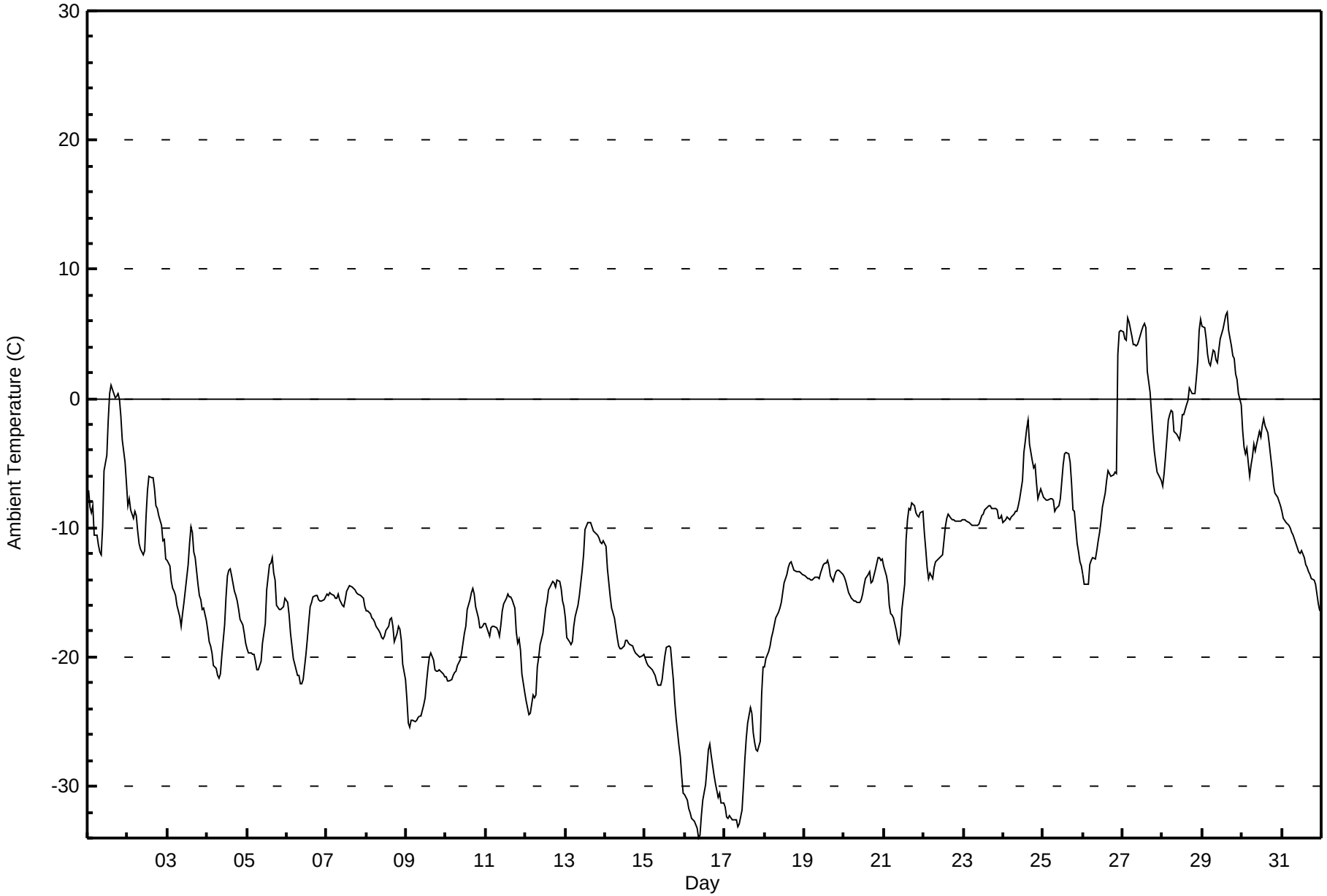
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-7.1	-8.4	-8.9	-8.2	-10.6	-10.6	-11.3	-11.9	-12.1	-9.9	-5.6	-4.4	-1.7	0.4	1.0	0.7	0.1	0.2	0.4	0.0	-1.3	-3.1	-4.9	-6.6	-5.2	1.0
2-Jan	-8.3	-7.7	-8.7	-9.3	-8.7	-9.0	-10.2	-11.2	-11.6	-12.1	-11.8	-9.0	-7.1	-6.0	-6.1	-6.2	-7.0	-8.3	-8.5	-9.1	-9.8	-11.0	-10.9	-12.4	-9.2	-6.0
3-Jan	-12.6	-13.0	-14.1	-14.7	-14.9	-15.2	-16.0	-16.8	-17.6	-16.7	-15.7	-14.8	-12.8	-11.2	-9.9	-10.3	-11.9	-12.4	-14.4	-15.3	-15.6	-16.4	-16.2	-17.2	-14.4	-9.9
4-Jan	-18.0	-18.8	-19.1	-19.7	-20.7	-20.9	-21.4	-21.6	-21.3	-19.9	-17.6	-15.3	-13.7	-13.3	-13.2	-13.8	-15.0	-15.2	-15.6	-16.3	-17.1	-17.5	-18.1	-18.9	-17.6	-13.2
5-Jan	-19.4	-19.6	-19.7	-19.8	-19.8	-20.3	-20.9	-21.0	-20.4	-18.9	-18.2	-17.4	-14.8	-12.9	-12.7	-12.3	-13.5	-14.1	-16.0	-16.3	-16.3	-16.2	-16.0	-15.5	-17.2	-12.3
6-Jan	-15.8	-16.7	-18.1	-19.1	-20.1	-20.5	-21.5	-21.4	-22.1	-22.1	-21.7	-19.8	-18.6	-17.3	-16.1	-15.8	-15.4	-15.2	-15.3	-15.6	-15.7	-15.6	-15.5	-15.3	-17.9	-15.2
7-Jan	-15.2	-15.2	-15.0	-15.1	-15.2	-15.5	-15.4	-15.1	-15.6	-16.0	-16.1	-15.5	-14.9	-14.7	-14.5	-14.5	-14.7	-14.8	-15.0	-15.1	-15.2	-15.3	-15.4	-16.1	-15.2	-14.5
8-Jan	-16.4	-16.4	-16.6	-16.9	-17.1	-17.3	-17.6	-17.9	-18.1	-18.5	-18.6	-18.4	-18.0	-17.6	-17.1	-17.0	-17.6	-18.8	-18.1	-17.6	-17.8	-18.7	-20.5	-21.8	-17.9	-16.4
9-Jan	-23.2	-25.2	-25.4	-24.9	-24.9	-25.0	-24.9	-24.6	-24.6	-24.5	-23.7	-23.2	-21.9	-20.9	-20.0	-19.7	-20.2	-20.9	-21.1	-21.1	-20.9	-21.1	-21.3	-21.6	-22.7	-19.7
10-Jan	-21.5	-21.8	-21.9	-21.7	-21.5	-21.2	-21.1	-20.7	-20.3	-19.7	-19.0	-18.2	-17.6	-16.4	-15.6	-15.0	-14.7	-15.2	-16.1	-17.0	-17.7	-17.7	-17.6	-17.4	-18.6	-14.7
11-Jan	-17.4	-18.0	-18.4	-17.8	-17.6	-17.6	-17.7	-17.9	-18.3	-17.5	-16.4	-15.8	-15.4	-15.1	-15.3	-15.3	-15.5	-16.3	-18.0	-18.9	-18.6	-19.4	-21.3	-22.7	-17.6	-15.1
12-Jan	-23.4	-23.9	-24.5	-24.3	-23.0	-23.2	-23.0	-20.8	-20.0	-19.1	-18.1	-17.1	-16.2	-15.6	-14.8	-14.3	-14.1	-14.2	-14.6	-14.1	-14.2	-14.7	-15.7	-16.1	-18.3	-14.1
13-Jan	-17.0	-18.4	-18.8	-19.0	-18.9	-17.6	-16.9	-16.0	-15.2	-14.3	-13.3	-12.0	-10.1	-9.6	-9.6	-9.6	-9.9	-10.2	-10.4	-10.6	-10.8	-11.1	-11.2	-11.0	-13.4	-9.6
14-Jan	-11.5	-13.2	-14.3	-15.4	-16.2	-17.0	-17.7	-18.5	-19.1	-19.4	-19.3	-19.1	-18.7	-18.7	-18.9	-19.0	-19.1	-19.5	-19.6	-19.8	-19.9	-20.0	-19.9	-19.8	-18.1	-11.5
15-Jan	-20.1	-20.4	-20.7	-20.9	-21.0	-21.2	-21.4	-21.9	-22.2	-22.1	-21.7	-20.8	-19.9	-19.2	-19.2	-19.3	-20.5	-21.7	-23.5	-24.8	-26.9	-27.7	-29.2	-30.6	-22.4	-19.2
16-Jan	-30.7	-31.1	-31.8	-32.0	-32.4	-32.5	-32.7	-33.3	-33.9	-33.8	-32.3	-31.1	-29.9	-28.5	-27.1	-26.7	-27.5	-29.1	-29.7	-30.3	-30.8	-30.5	-31.3	-31.2	-30.9	-26.7
17-Jan	-31.6	-32.3	-32.5	-32.2	-32.6	-32.6	-32.6	-32.6	-33.1	-32.9	-31.8	-30.0	-28.0	-26.3	-25.1	-23.9	-24.4	-25.9	-26.6	-27.2	-27.2	-26.5	-22.8	-20.8	-28.8	-20.8
18-Jan	-20.8	-20.1	-19.5	-19.2	-18.5	-18.0	-17.5	-16.9	-16.6	-16.3	-15.8	-15.1	-14.3	-13.6	-13.0	-12.7	-12.7	-12.9	-13.3	-13.4	-13.4	-13.4	-13.5	-13.6	-15.6	-12.7
19-Jan	-13.7	-13.8	-13.9	-14.0	-14.0	-14.0	-13.9	-13.8	-13.9	-13.9	-13.5	-12.8	-12.7	-12.7	-12.6	-12.9	-13.8	-14.1	-13.7	-13.4	-13.3	-13.3	-13.5	-13.6	-13.5	-12.6
20-Jan	-13.8	-14.2	-14.6	-15.1	-15.4	-15.6	-15.7	-15.7	-15.8	-15.7	-15.5	-15.1	-14.5	-14.0	-13.6	-13.3	-14.2	-14.1	-13.7	-13.3	-12.3	-12.3	-12.5	-12.5	-14.3	-12.3
21-Jan	-13.0	-13.7	-14.4	-15.9	-16.6	-16.7	-16.9	-17.9	-18.6	-18.9	-18.2	-16.3	-14.3	-10.9	-9.3	-8.5	-8.6	-8.1	-8.3	-8.9	-9.1	-9.1	-8.8	-8.7	-12.9	-8.1
22-Jan	-10.4	-11.7	-13.0	-14.0	-13.5	-14.0	-13.1	-12.7	-12.5	-12.4	-12.2	-12.1	-11.0	-9.9	-9.3	-8.9	-9.2	-9.4	-9.4	-9.5	-9.5	-9.5	-9.4	-9.4	-11.1	-8.9
23-Jan	-9.4	-9.4	-9.5	-9.6	-9.8	-9.8	-9.9	-9.8	-9.8	-9.7	-9.4	-9.1	-8.9	-8.6	-8.4	-8.2	-8.3	-8.5	-8.6	-8.5	-8.6	-9.3	-9.2	-9.0	-9.1	-8.2
24-Jan	-9.6	-9.4	-9.2	-9.3	-9.4	-9.2	-8.9	-8.7	-8.7	-8.3	-7.7	-6.4	-4.2	-3.3	-2.3	-1.7	-3.5	-4.9	-5.4	-5.2	-6.6	-7.7	-7.0	-7.3	-6.8	-1.7
25-Jan	-7.6	-7.7	-7.9	-7.9	-7.8	-7.8	-7.8	-8.8	-8.5	-8.3	-7.7	-6.5	-5.1	-4.3	-4.1	-4.2	-5.0	-6.6	-8.6	-8.8	-11.2	-11.9	-12.7	-12.9	-7.9	-4.1
26-Jan	-13.6	-14.4	-14.4	-14.3	-12.9	-12.5	-12.3	-12.4	-11.7	-11.0	-10.3	-9.5	-8.4	-7.3	-6.3	-5.6	-5.8	-6.0	-5.9	-5.7	-5.8	3.4	5.2	5.3	-8.0	5.3
27-Jan	5.2	4.6	4.5	6.2	5.9	4.8	4.1	4.1	4.1	4.2	4.5	5.3	5.6	5.8	5.5	2.2	0.5	-1.2	-2.8	-4.0	-5.0	-5.7	-6.1	-6.4	1.9	6.2
28-Jan	-6.8	-5.7	-4.5	-1.7	-1.2	-0.9	-1.1	-2.6	-2.7	-2.9	-3.2	-2.4	-1.2	-1.2	-0.5	-0.2	0.8	0.6	0.4	0.4	1.6	2.8	5.3	6.1	-0.9	6.1
29-Jan	5.6	5.5	4.6	3.4	2.8	2.5	3.8	3.6	3.0	2.8	3.7	4.7	5.4	6.0	6.5	6.7	5.3	4.1	3.3	3.1	1.9	1.5	0.4	-0.5	3.7	6.7
30-Jan	-2.4	-3.7	-4.2	-3.8	-6.0	-5.2	-4.5	-3.5	-4.0	-3.5	-2.5	-3.0	-2.1	-1.5	-2.1	-2.7	-3.5	-4.5	-5.5	-6.7	-7.3	-7.7	-7.9	-8.3	-4.4	-1.5
31-Jan	-8.7	-9.3	-9.6	-9.7	-9.8	-10.1	-10.3	-10.6	-11.2	-11.5	-11.8	-12.0	-11.7	-12.3	-12.9	-13.1	-13.4	-13.6	-13.9	-14.1	-14.4	-15.1	-15.8	-16.4	-12.1	-8.7
	-13.8	-14.3	-14.7	-14.7	-14.9	-15.0	-15.0	-15.1	-15.2	-14.9	-14.2	-13.3	-12.2	-11.3	-10.9	-10.8	-11.4	-12.0	-12.5	-12.8	-13.2	-13.2	-13.3	-13.6	Diurnal Average	
	5.6	5.5	4.6	6.2	5.9	4.8	4.1	4.1	4.1	4.2	4.5	5.3	5.6	6.0	6.5	6.7	5.3	4.1	3.3	3.1	1.9	3.4	5.3	6.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Athabasca Valley - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	129	17.34	17.34
-20 - 0	558	75.00	92.34
0 - 10	57	7.66	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 29.5 % on Jan 16 07:00

Maximum Daily Average: 29.5 % on Jan 16

Minimum Value: 28.1 % on Jan 29 00:00

Minimum Daily Average: 28.3 % on Jan 29

Maximum Diurnal Average: 29.0 % at hour 11

Minimum Diurnal Average: 29.0 % at hour 15

Monthly Average: 28.99 %

Percentiles: P_1 = 28.2 P_{10} = 28.6 Q_1 = 28.8 Median = 29.0 Q_3 = 29.2 P_{90} = 29.3 P_{99} = 29.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

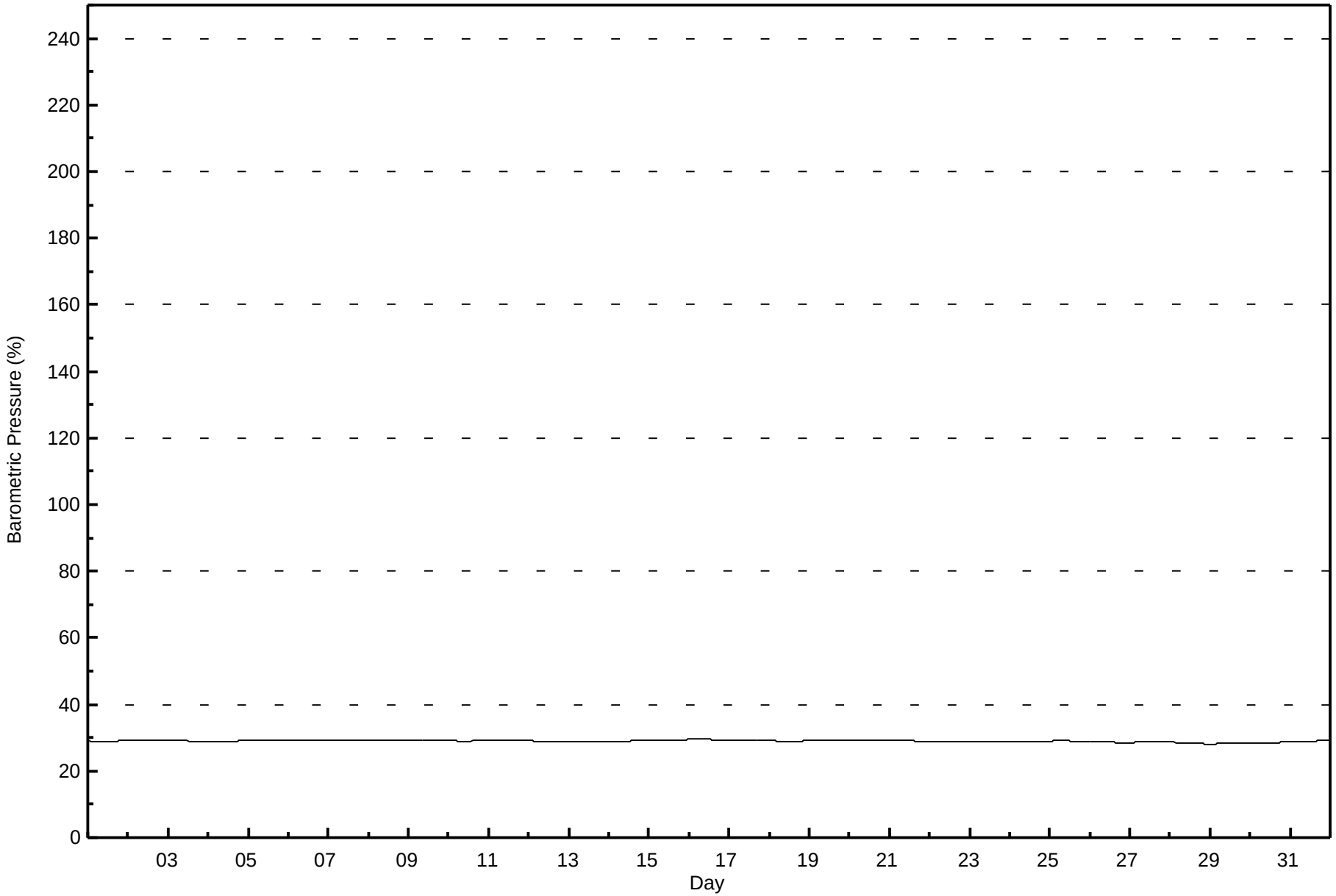
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.0	29.1
2-Jan	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2
3-Jan	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	29.0	29.1
4-Jan	28.9	28.9	28.9	28.9	28.9	28.9	29.0	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	29.1	29.1	29.1	29.0	29.1
5-Jan	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
6-Jan	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	29.3	29.3	29.2	29.3
7-Jan	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.3	29.3	29.3	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.4
8-Jan	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4
9-Jan	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.3
10-Jan	29.1	29.1	29.0	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
11-Jan	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.2	29.3
12-Jan	29.1	29.1	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	28.7	28.7	28.9	29.1
13-Jan	28.7	28.7	28.7	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	28.8	28.8	28.8	28.8	28.7	28.8
14-Jan	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.0	29.2
15-Jan	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.3	29.5
16-Jan	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.5
17-Jan	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	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.3	29.4
18-Jan	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
19-Jan	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	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
20-Jan	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3
21-Jan	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	29.1	29.3
22-Jan	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	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
23-Jan	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9	28.8	28.9	28.9
24-Jan	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	29.0	28.9	29.0
25-Jan	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1
26-Jan	28.9	28.9	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	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.7	28.9
27-Jan	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	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-Jan	28.7	28.7	28.6	28.6	28.6	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.1	28.4	28.7
29-Jan	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3
30-Jan	28.3	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	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.5	28.7
31-Jan	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	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	28.9	29.1
	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	Diurnal Average	
	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Barometric Pressure (BP) - %

Athabasca Valley - January 2016



Maximum Value: 95 inHg on Jan 28 00:00

Maximum Daily Average: 88.8 inHg on Jan 23

Minimum Value: 48 inHg on Jan 27 14:00

Minimum Daily Average: 67.8 inHg on Jan 29

Maximum Diurnal Average: 81.1 inHg at hour 3

Minimum Diurnal Average: 74.0 inHg at hour 15

Monthly Average: 79.0 inHg

Percentiles: P_1 = 54 P_{10} = 70 Q_1 = 75 Median = 80 Q_3 = 84 P_{90} = 88 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

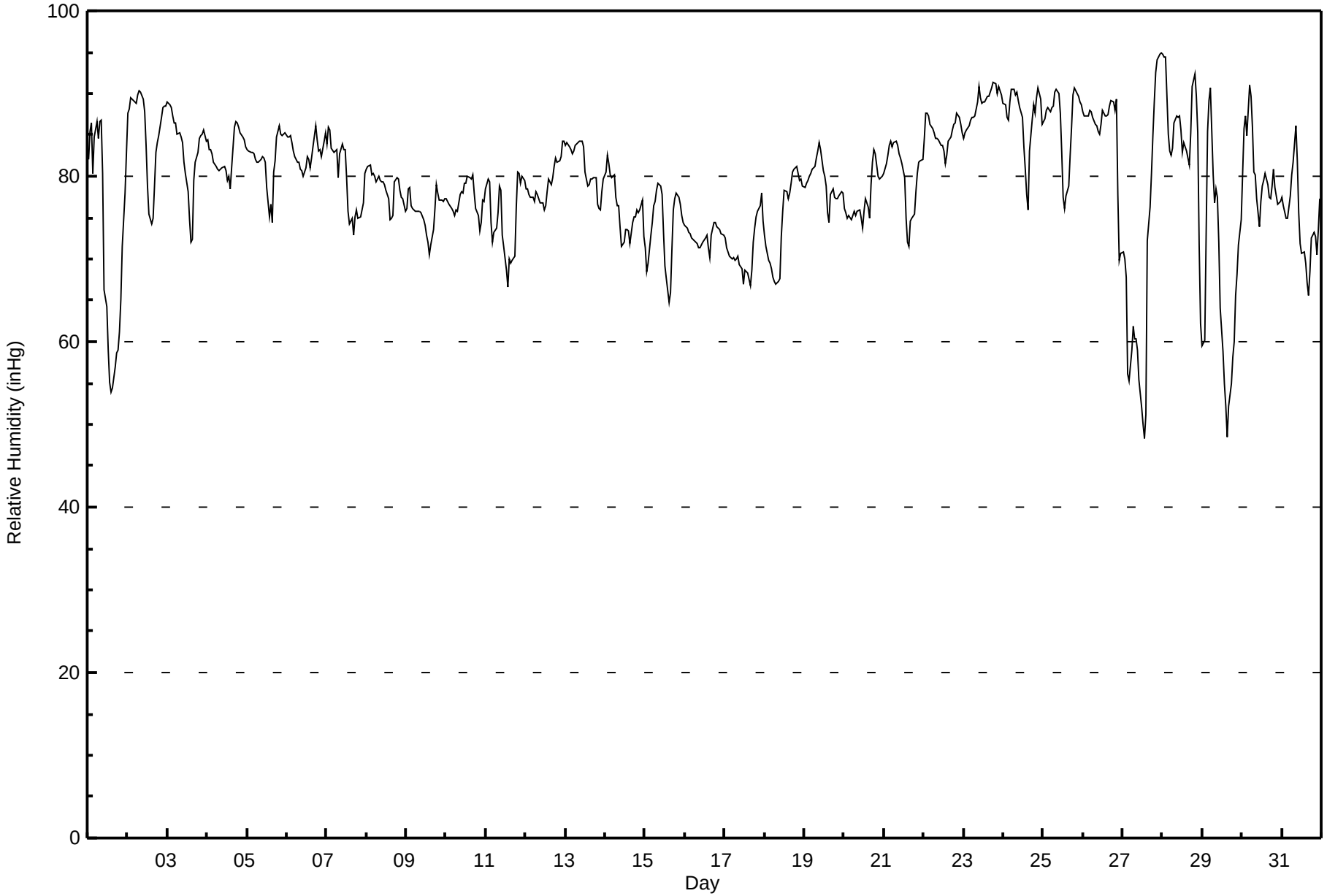
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	82	85	86	80	85	87	85	87	87	80	66	64	59	55	54	54	57	59	59	61	65	71	78	83	72.1	87
2-Jan	88	88	89	89	89	89	90	90	90	89	88	84	79	75	74	75	79	83	84	85	87	88	88	88	85.4	90
3-Jan	89	89	88	87	86	86	85	85	85	84	82	80	78	75	72	72	79	82	83	85	85	85	86	84	83.0	89
4-Jan	84	83	83	83	82	81	81	81	81	81	81	81	79	80	79	81	86	87	87	86	85	85	84	84	82.6	87
5-Jan	83	83	83	83	83	82	82	82	82	82	82	82	79	75	77	74	81	82	85	86	85	85	85	85	82.0	86
6-Jan	85	85	85	84	83	82	82	82	81	81	80	81	82	82	81	82	83	86	84	83	83	82	84	85	82.9	86
7-Jan	84	86	86	83	83	83	83	80	83	84	83	83	80	76	74	75	73	75	76	75	75	76	77	80	79.7	86
8-Jan	81	81	81	80	80	80	79	80	80	79	79	79	78	77	75	75	75	79	80	80	78	78	77	76	78.7	81
9-Jan	76	79	79	76	76	76	76	76	76	76	75	74	73	72	71	72	73	76	79	78	77	77	77	77	75.6	79
10-Jan	77	77	77	76	76	75	76	76	78	78	78	79	79	80	80	80	80	78	76	75	73	74	77	77	77.2	80
11-Jan	78	80	79	74	72	73	74	76	79	78	73	72	69	67	70	70	70	70	76	80	80	79	80	80	75.0	80
12-Jan	78	78	78	77	77	77	78	78	77	77	77	76	76	78	80	79	80	81	82	82	82	82	84	84	79.2	84
13-Jan	84	84	84	83	83	83	84	84	84	84	84	84	81	79	79	80	80	80	80	77	76	76	78	80	81.2	84
14-Jan	81	82	82	80	80	80	78	76	77	74	72	72	74	74	73	72	74	75	75	76	76	76	77	73	76.1	82
15-Jan	71	68	69	73	74	76	77	78	79	79	78	73	69	68	65	66	71	76	77	78	77	77	75	74	73.8	79
16-Jan	74	74	73	73	73	72	72	72	71	71	72	72	72	73	71	70	73	74	74	74	74	74	73	73	72.7	74
17-Jan	73	71	71	70	70	70	70	70	70	69	69	67	69	68	68	67	69	72	74	75	76	77	78	75	71.1	78
18-Jan	73	71	70	70	69	68	67	67	67	68	73	76	78	78	77	78	79	81	81	81	80	79	80	79	74.6	81
19-Jan	79	79	80	80	80	81	81	82	83	84	83	81	80	79	76	74	78	78	77	77	77	78	78	78	79.3	84
20-Jan	76	76	75	75	75	75	76	75	76	76	75	74	76	77	76	75	79	82	83	83	80	80	80	80	77.2	83
21-Jan	80	82	83	84	84	84	84	84	84	83	82	82	80	75	72	72	75	75	75	78	80	82	82	82	80.1	84
22-Jan	85	88	88	87	86	86	85	85	85	84	84	84	83	82	83	84	85	86	86	86	88	87	86	85	85.2	88
23-Jan	85	85	86	86	87	87	87	87	89	91	89	89	89	89	90	90	90	91	91	91	90	91	90	90	88.8	91
24-Jan	89	89	87	87	89	91	90	90	90	89	88	87	84	81	78	76	83	87	89	88	89	91	89	86	86.9	91
25-Jan	87	87	88	88	88	88	89	90	91	90	88	83	78	76	78	79	83	86	90	91	90	90	89	89	86.3	91
26-Jan	88	87	87	87	88	88	87	86	86	86	85	86	88	87	87	88	89	89	89	88	89	78	70	71	85.6	89
27-Jan	71	70	68	56	55	59	62	60	60	59	55	52	50	48	51	72	76	80	85	89	92	94	95	95	69.0	95
28-Jan	95	94	94	85	83	82	83	86	87	87	87	86	83	84	83	82	81	85	91	92	90	85	72	62	85.1	95
29-Jan	60	60	73	85	89	91	80	77	78	78	72	64	59	55	52	48	52	55	58	60	66	68	72	75	67.8	91
30-Jan	80	86	87	85	91	90	86	81	80	77	74	77	79	79	80	79	78	77	79	81	79	77	77	77	80.6	91
31-Jan	77	76	75	75	76	78	80	82	86	82	76	72	71	71	69	67	66	68	72	73	73	70	74	77	74.5	86
	80.4	80.8	81.1	80.1	80.4	80.7	80.3	80.1	80.7	80.0	78.4	77.2	75.9	74.7	74.0	74.4	76.7	78.5	79.9	80.5	80.6	80.4	80.4	80.1	Diurnal Average	
	95	94	94	89	91	91	90	90	91	91	89	89	89	89	90	90	90	91	91	92	92	94	95	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - inHg

Athabasca Valley - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Athabasca Valley - January 2016

Maximum Speed: 30 km/h on Jan 27 00:00

Maximum Daily Speed Average: 14.2 km/h on Jan 14

Minimum Speed Value: 0 km/h on Jan 17 15:00

Minimum Daily Speed Average: 1.0 km/h on Jan 4

Maximum Diurnal Speed Average: 1.5 km/h at hour 23

Minimum Diurnal Speed Average: 0.4 km/h at hour 21

Monthly Average Velocity: 0.7 km/h 269.2 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 6 $Q_3 = 10$ $P_{90} = 13$ $P_{99} = 20$

Hours in Service: 744

Hours of Data: 744

Hours of Missing Data: 0

Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SE6	SE5	SE6	SE6	SE5	SE6	SE7	SE3	SSE3	ESE5	SE4	SE1	SW8	WSW15	WSW15	WSW13	WSW14	WSW19	WSW23	WSW18	SW4	W5	W5	SSE1	SW5.4	WSW23
2-Jan	SW1	WSW3	S1	SE5	SSE5	S4	SSW2	SSW3	SSW2	SSE3	SSE3	SSE7	SSE9	SSE10	SSE14	SSE8	SSE5	SSE4	SE7	SSE6	SSE5	SSE3	SSE5	SSE4	SSE4.6	SSE14
3-Jan	SSE4	S2	SSW1	SW3	SW4	SSW4	SW4	SSW2	SSW3	SSW5	SSW5	SSW6	SSW5	S5	S7	S4	S5	SSW6	SW4	SSW4	SSW2	SSW3	SSE4	S4	SSW3.7	S7
4-Jan	SSE3	S2	SSE1	SSE1	W2	WSW2	SW3	SW2	WSW2	NW1	ESE2	SSE2	ENE1	NW2	NW3	WNW3	WSW3	S1	SSE3	SSE2	ESE2	S3	SE3	SSE3	SSW1.0	WNW3
5-Jan	SE2	SSE3	SSE4	SE5	SE5	ESE4	SE3	SE4	ESE5	SE5	ESE3	ESE3	SE4	SSW3	SSW2	ESE1	E2	E3	N4	NW2	WNW1	W2	WNW2	W1	SE2.0	SE5
6-Jan	WSW3	WSW1	W3	NW2	NW2	WNW2	WNW3	NW1	N2	NNE0	W2	N5	N8	NNW9	NNW12	NNW11	NNW9	N8	N10	N11	NNW10	NNW10	NNW9	NNW9	NNW5.5	NNW12
7-Jan	NNW11	NNW14	NNW9	NNW8	NNW8	NNW6	N5	NE4	NW2	WSW5	WNW2	NW3	NNW5	N4	N5	NNW6	NW6	NNW4	NNW4	W5	SW5	NNW2	NNW3	N6	NNW4.7	NNW14
8-Jan	NNW8	NNW7	NNW9	NNW10	NNW11	NNW12	NNW12	NNW10	NNW10	N9	N8	N9	N7	NNE3	NE3	E2	ESE5	ESE4	ESE5	SE6	SE11	SE12	SE9	SE10	NNE3.5	NNW12
9-Jan	SE6	NNE1	SE7	SE10	SE12	SE10	SE10	SE12	SE9	SE12	SE13	SE11	SE13	SE12	SE13	SE10	SE11	SE13	SE12	SE12	SE11	SE13	SE13	SE11	SE10.7	SE13
10-Jan	SE10	SE10	SE14	SE10	SE12	SE12	SE11	SE10	SE9	SE8	ESE5	E4	NE3	N3	NNE4	NNW9	NNW13	NNW15	NNW14	N11	N7	NNW6	N4	N5	E2.6	NNW15
11-Jan	NNW6	NNW9	NNW7	NNW11	NW10	NW9	WNW6	WSW3	W3	WSW4	WSW8	W9	WNW11	WSW6	SW13	WSW11	WSW11	WSW5	SW3	SSW2	SE1	SSE3	SSW4	SW4	W4.9	SW13
12-Jan	SW5	SW2	SW4	SW4	S3	WSW2	W3	SE9	SE10	SSE10	SSE10	SSE9	SSE6	SSE7	SSE6	SSW6	SE5	SE8	SSE4	SE5	SW2	SW2	SW5	WSW3	SSE4.3	SSE10
13-Jan	SW3	WSW5	WSW2	W3	WSW3	NW2	ENE2	NNE2	N3	NNE3	NNW5	NNW2	ESE6	E10	E8	ENE8	E10	ENE9	ENE7	E7	ENE8	E8	N4	N5	ENE3.0	E10
14-Jan	N9	N17	NNW19	NNW20	N15	N15	NNW19	N15	N13	NNW15	NNW13	NNW14	NNW12	NNW16	N15	NNW16	N14	NNW14	NNW15	NNW14	NNW14	NNW13	N9	N6	NNW14.2	NNW20
15-Jan	NE6	NE7	NNE6	N6	N6	N5	NNW3	NNW3	NNW3	NW4	NNW4	N7	NNW7	NNW8	NNW8	NNW5	WNW3	W3	WSW4	WSW4	WSW3	WSW2	WSW5	WSW3	NNW3.4	NNW8
16-Jan	SW3	SW3	SW3	SSW1	SW5	SW3	SW3	S2	SW3	SW2	WSW1	SW0	W2	WNW3	WNW2	WNW3	WSW4	WSW4	SW1	SW3	SW2	SSW3	SW4	WSW1	SW2.3	SW5
17-Jan	SSW3	SW5	SW6	SW5	SW4	SW5	SW5	SSW3	SW3	SW4	SW5	SSW4	WNW0	WSW1	SW0	S5	S2	SW3	SW3	SW4	SW3	SSW2	SE9	SSE11	SSW3.4	SSE11
18-Jan	SE12	SE12	SSE13	SSE13	SE15	SSE15	SSE12	SE13	SE15	SE14	SE14	SE10	SE6	SE5	SE7	SSE6	SSE6	SE6	SE7	SE7	SSE9	SE11	SE10	SE10	SE10.2	SSE15
19-Jan	SE9	SE9	SE8	SE8	SE8	SE7	SE6	ESE4	E4	E4	ENE3	N4	N7	NNW4	NNW10	NNW9	N5	N6	N6	NNW7	N9	NNW10	NNW9	NNW8	NNE2.4	NNW10
20-Jan	NNW8	N10	NNW13	NNW12	N11	NNW9	N6	N6	N8	N8	N6	NNW4	NW2	NW3	NW3	W3	WNW2	NW2	N2	E2	SE8	SE7	SE9	SE10	N3.5	NNW13
21-Jan	SE10	SE9	SE8	SE5	SSE3	S2	SW1	SW3	WSW3	SW5	WSW4	WSW3	SE1	SSE6	SE8	SE9	SE9	SE13	SSE14	SE17	SSE11	SE8	SE15	SE5	SSE6.3	SE17
22-Jan	SSE3	SW4	SW4	SW2	SSW4	SSW3	SW5	SW4	SW7	WSW4	W3	W3	NNW7	N9	N7	NNW9	NNW9	N8	NNW9	N8	N9	NNW13	NNW12	NNW12	NW4.0	NNW13
23-Jan	NNW11	NNW10	NNW9	N7	N6	N5	NNW7	N4	N5	NNW5	NNW4	NNE3	NNE4	N4	NNW4	N4	NNE2	NW1	NW1	SW3	SW3	SW3	SSW2	SSE6	NNW3.3	NNW11
24-Jan	SSE4	SE7	SSE9	SE8	SE8	SE6	SE5	SE4	SE2	SE3	E3	E3	SW8	SW9	SW10	S5	SE4	SE5	SSE1	WNW3	WSW8	NNW11	NNW11	NNW15	S1.7	NNW15
25-Jan	NNW9	NNW5	N4	WNW3	NNE4	E4	SW7	WSW8	SSE5	SE10	SE11	SE10	SE10	SE12	SE13	SSE10	SE8	SE5	SE5	SE6	S3	SW5	SW5	SSW4	SSE4.0	SE13
26-Jan	SW2	SSW3	S4	SSE4	SE6	SE6	SE8	SSE8	SE10	SE11	SE11	SE12	SE13	SE12	SE13	SE14	SE13	SSE10	SE10	SE7	NNE1	WSW17	W26	W30	SSE6.2	W30
27-Jan	W27	WSW20	WSW17	WNW17	WNW29	W17	W15	W14	W13	W12	W14	W15	W21	WNW14	NW12	NNW10	N8	N10	NNW5	NNW2	NNW2	NNW2	SE1	NNW1	WNW10.9	WNW29
28-Jan	NW2	W2	SSE1	SE12	SSE14	SSE11	SE6	S4	SW5	SSW5	SSW4	S4	SE5	SSW2	S2	SW2	SSE8	SSE6	SSE6	SSE2	SSW5	SW4	WSW12	WSW12	S4.2	SSE14
29-Jan	WSW10	WSW14	WSW19	W20	W5	WNW3	NW12	WNW15	W13	W15	W16	WNW18	WNW17	WNW17	WNW15	WNW18	W11	W12	W11	WSW17	WSW13	WSW18	WSW12	SW5	W12.8	W20
30-Jan	SSE2	SE4	SSE4	S4	ESE4	S6	S4	SSW7	SW7	SW10	SW4	NW5	NNW8	NNW12	N11	NNW11	NNW13	NNW15	NNW18	NNW17	N13	N10	NNW8	NNW11	NNW4.4	NNW18
31-Jan	N10	NNW9	NNW8	NNW8	NNW10	NNW9	NNW11	NNW12	NNW12	N11	N10	NNW10	N11	N12	NNW14	N12	N11	N9	NNW11	NNW9	N8	N6	NNW5	N4	N9.7	NNW14
	W0.9	WNW1.2	WSW0.9	WNW0.8	SW0.5	SSW0.6	W0.8	SSW0.8	SW0.8	SSW1.3	SSW1.0	W0.7	NW1.1	NW1.2	NW0.9	NW1.4	NNW0.5	NW0.5	NW0.9	W0.6	WSW0.4	W1.0	WSW1.5	W1.2	Diurnal Average	
	W27	WSW20	WSW19	W20	WNW29	W17	NNW19	N15	SE15	W15	W16	WNW18	W21	WNW17	WSW15	WNW18	N14	WSW19	WSW23	WSW18	NNW14	WSW18	W26	W30	Diurnal Maximum	

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 8 km/h on Jan 27 04:00

Minimum Value: 0 km/h on Jan 6 07:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

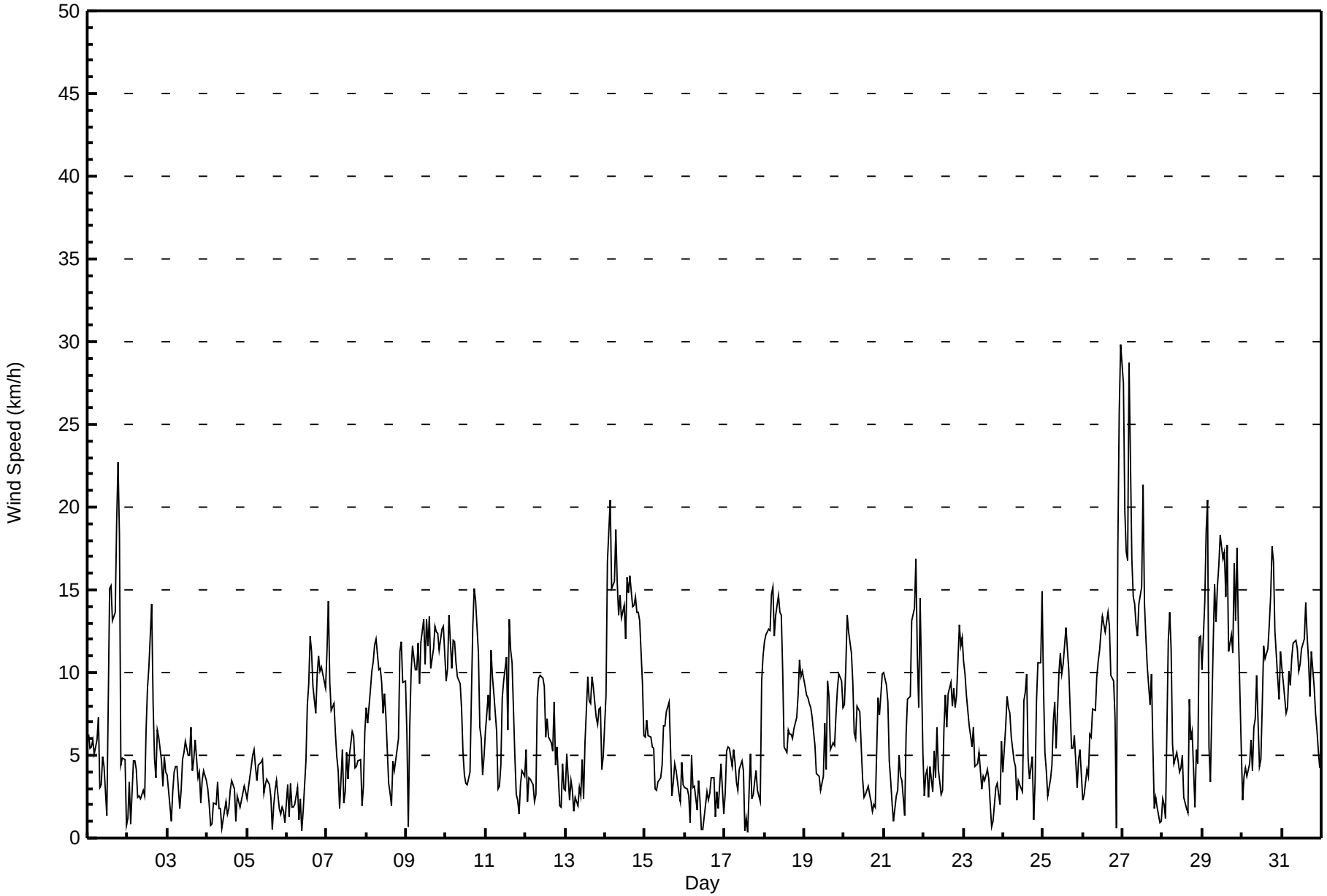
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	2	2	2	2	3	3	2	2	2	2	2	2	4	4	6	4	4	5	4	5	4	2	1	1	6
2-Jan	2	2	2	1	1	1	1	1	1	1	1	2	2	1	2	3	2	2	2	2	2	2	2	2	3
3-Jan	2	2	1	2	1	1	1	1	1	1	1	1	2	1	2	2	2	2	1	1	2	1	2	1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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Athabasca Valley - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	355	47.72	47.72
6 - 11	256	34.41	82.12
12 - 19	124	16.67	98.79
20 - 28	7	0.94	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Athabasca Valley - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	23	11	3	3	9	15	31	35	23	32	64	31	17	15	18	25	355
6 - 11	45	1	2	4	5	1	78	26	2	4	8	8	3	2	3	64	256
12 - 19	10	0	0	0	0	0	33	9	0	0	1	16	11	8	2	34	124
20 - 28	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	1	7
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	78	12	5	7	14	16	142	70	25	36	73	57	36	26	23	124	744

Total Number of Valid Hours: 744

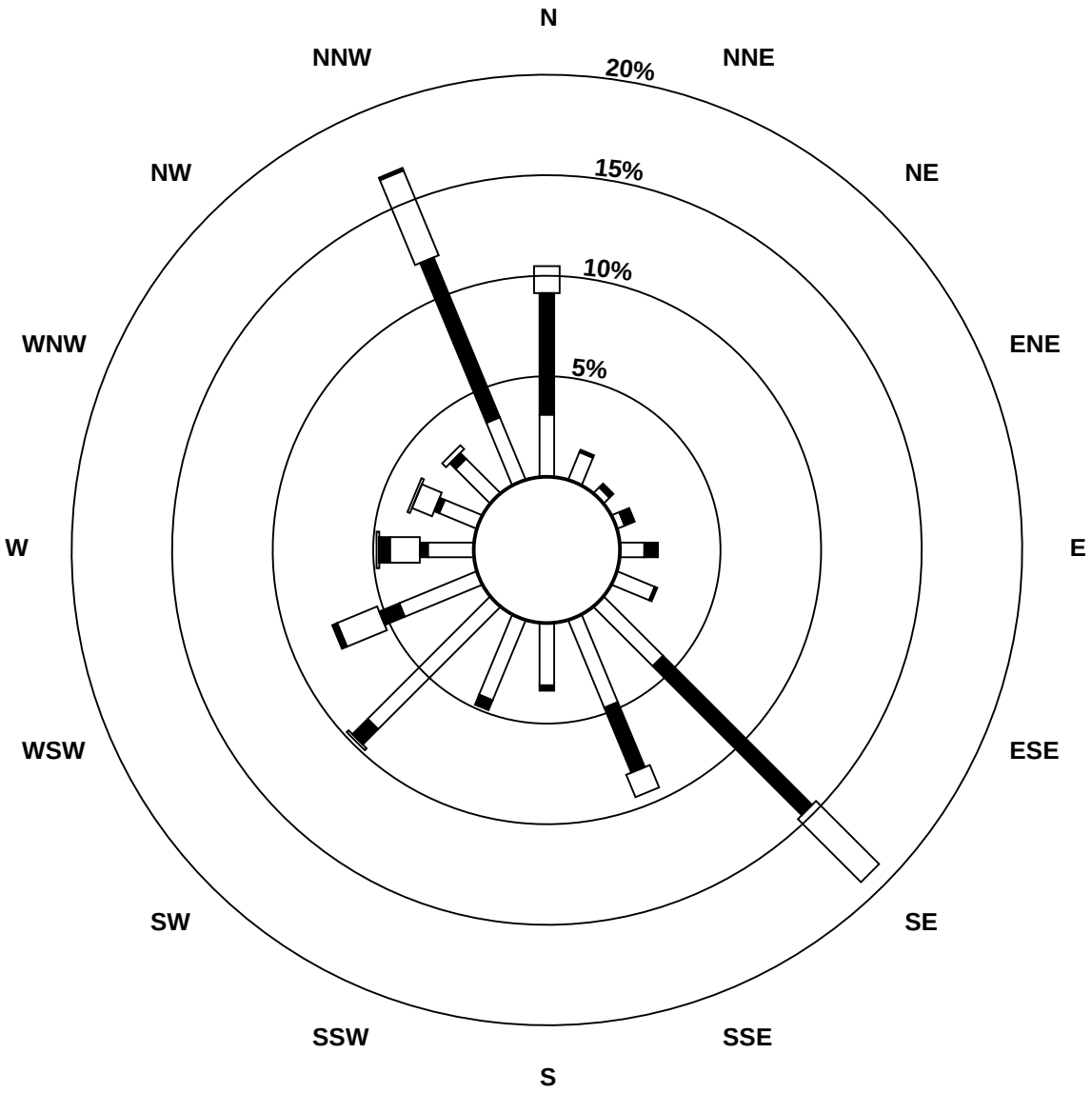
Total Number of Hours: 744

Wood Buffalo Environmental Association

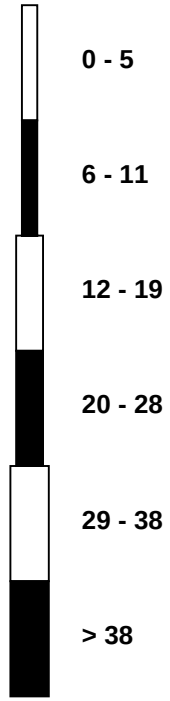
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Athabasca Valley (AMS 7)



Classes (km/h)



Total Number of Valid Hours: 744

Direction of Maximum Speed: 270 deg on Jan 27 00:00
Direction of Maximum Daily Speed Average: 347.7 deg on Jan 14

Direction of Minimum Speed: 214 deg on Jan 17 15:00

Direction of Minimum Daily Speed Average: 1.0 deg on Jan 4

Monthly Average Direction: 290.1 deg

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	146	136	142	142	133	142	138	128	157	114	139	143	234	256	255	244	246	246	250	248	232	260	265	151	223.9
2-Jan	232	240	179	133	162	175	206	206	194	168	162	148	148	149	147	154	154	154	141	147	152	159	165	165	157.8
3-Jan	167	171	210	225	221	213	219	197	206	210	202	207	192	173	169	169	182	208	225	207	201	196	166	181	195.7
4-Jan	158	184	166	150	280	241	231	232	245	325	102	157	63	326	323	288	240	178	167	157	123	175	139	159	196.7
5-Jan	145	151	148	143	141	122	126	133	123	141	111	106	133	192	200	113	91	89	350	311	289	276	282	271	136.5
6-Jan	249	248	270	326	324	283	294	325	7	28	259	356	352	343	346	342	343	350	355	349	348	342	343	333	339.8
7-Jan	337	341	345	345	345	344	359	47	326	237	286	312	348	8	352	343	322	336	329	269	227	333	344	353	336.1
8-Jan	348	338	340	345	341	342	341	341	344	353	354	352	352	14	53	89	115	106	104	137	136	135	144	146	12.5
9-Jan	137	23	134	137	139	132	136	135	137	136	139	137	143	142	140	138	140	133	134	139	139	140	141	140	137.8
10-Jan	142	143	143	137	143	146	141	139	137	133	116	101	40	353	14	344	345	338	347	354	5	344	8	3	84.4
11-Jan	327	343	333	336	317	308	290	251	269	254	255	276	282	251	233	241	251	247	218	197	144	159	197	218	273.9
12-Jan	225	227	225	235	176	255	271	136	144	148	152	151	157	147	147	207	146	145	151	144	222	222	221	245	167.6
13-Jan	235	258	249	266	253	305	70	18	356	26	347	343	110	95	79	75	79	68	75	80	77	90	8	7	64.3
14-Jan	9	350	347	343	351	351	342	351	353	346	344	343	348	343	349	348	349	344	344	343	344	344	359	4	347.7
15-Jan	35	35	15	357	4	351	340	332	331	326	347	352	345	342	348	345	298	261	253	257	245	239	237	237	337.3
16-Jan	225	226	234	212	218	220	224	180	214	229	252	216	278	296	302	293	239	237	223	214	225	203	220	240	232.1
17-Jan	212	222	223	217	221	221	215	206	224	217	233	198	290	247	214	173	182	234	226	230	233	198	141	147	202.7
18-Jan	143	143	148	147	146	147	152	145	140	139	142	144	145	140	136	157	156	139	143	138	148	134	142	139	143.9
19-Jan	136	140	136	133	139	142	134	107	99	83	75	2	6	329	334	345	351	354	3	346	350	338	345	348	33.0
20-Jan	344	349	345	344	349	348	357	1	350	349	352	334	305	311	317	262	293	317	355	79	136	143	142	142	353.8
21-Jan	146	141	141	144	156	181	226	216	240	235	251	249	127	152	140	140	136	143	147	145	152	131	146	137	150.9
22-Jan	152	225	225	221	211	199	222	221	236	258	260	274	344	355	355	344	348	355	346	353	350	344	346	340	326.0
23-Jan	343	338	346	355	351	353	345	356	0	336	341	20	24	3	344	356	24	326	304	230	224	224	208	149	345.4
24-Jan	162	138	149	145	136	141	141	140	124	146	95	87	234	223	217	183	146	138	150	299	258	340	346	343	174.3
25-Jan	336	338	1	300	19	86	225	238	148	144	145	141	133	142	146	147	136	138	143	132	188	214	217	212	153.0
26-Jan	214	192	170	168	135	141	139	148	135	139	144	141	138	133	136	142	145	147	141	141	28	251	267	270	167.2
27-Jan	269	251	244	302	284	268	274	263	268	265	266	275	280	292	317	343	357	351	344	348	334	331	135	335	282.2
28-Jan	325	280	164	142	150	156	143	181	214	209	201	177	142	208	181	231	147	156	160	147	204	236	247	249	182.7
29-Jan	239	257	255	277	267	288	319	287	271	263	271	291	295	299	292	293	274	264	263	248	242	244	240	236	270.9
30-Jan	159	145	157	175	117	175	175	197	215	225	227	312	339	337	2	346	347	343	345	347	355	351	344	336	335.4
31-Jan	349	348	348	347	341	348	340	346	343	357	3	341	353	356	348	355	354	357	340	345	350	1	342	1	349.4
	264.9	284.3	250.2	300.8	228.5	191.7	259.1	207.8	215.6	202.0	208.6	278.4	310.9	306.0	319.6	316.0	335.6	321.8	322.5	265.7	237.6	271.0	241.1	272.6	
	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

Athabasca Valley - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 106 deg on Jan 2 01:00

Minimum Value: 7 deg on Jan 31 07:00

Percentiles: $P_1 = 9$ $P_{10} = 11$ $Q_1 = 14$ Median = 19 $Q_3 = 43$ $P_{90} = 65$ $P_{99} = 92$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

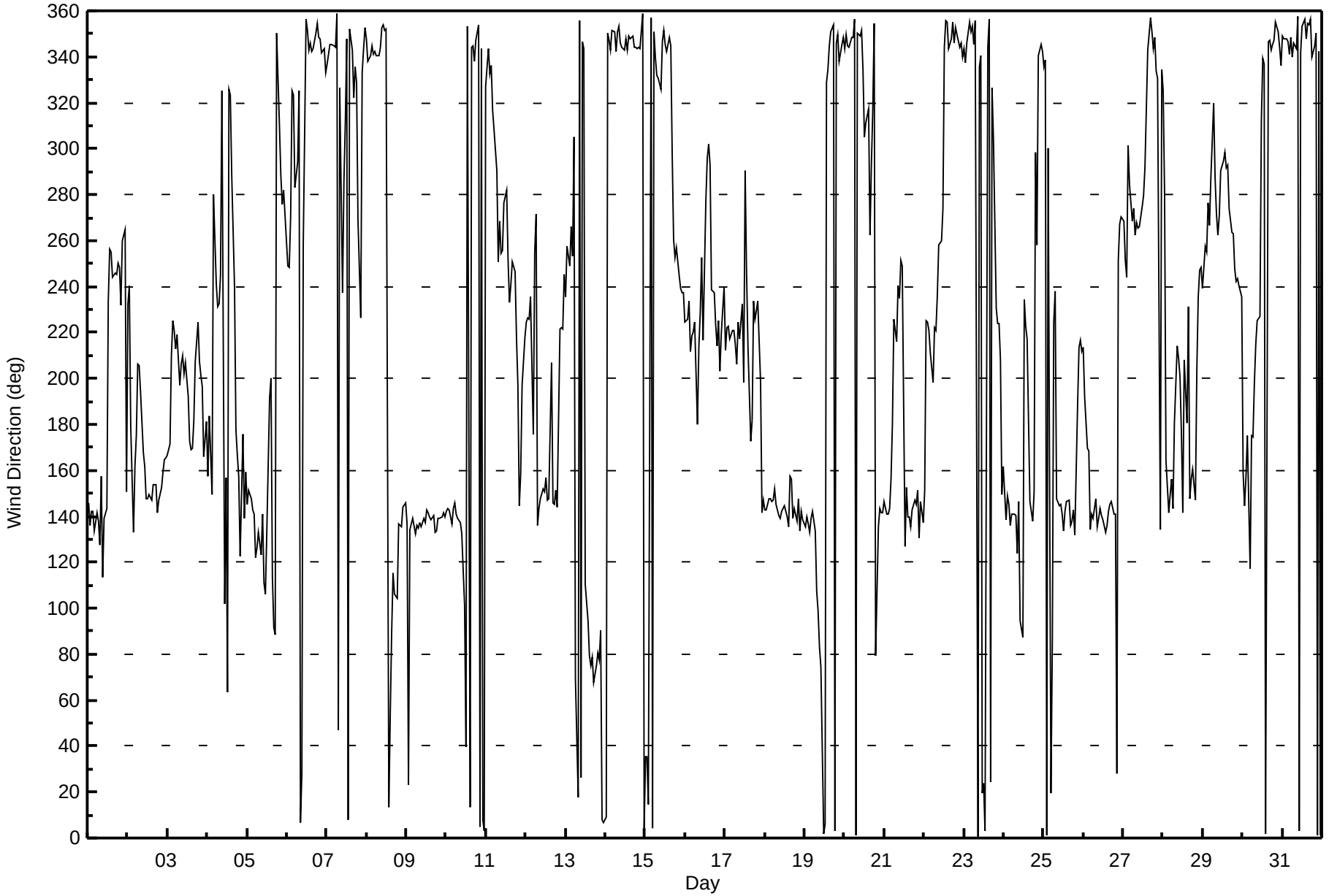
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	18	25	31	28	48	35	19	66	62	49	54	91	53	12	11	12	13	12	10	11	49	51	27	95	95
2-Jan	106	54	85	41	24	27	31	33	41	33	40	23	14	9	9	21	24	46	26	27	43	46	22	22	106
3-Jan	26	73	78	59	22	17	21	36	23	15	14	18	24	30	18	55	27	24	31	30	70	23	43	27	78
4-Jan	45	64	83	75	32	31	19	66	62	84	89	66	81	45	20	13	56	61	46	53	76	45	39	46	89
5-Jan	36	30	20	22	24	26	24	21	27	25	49	37	39	23	42	82	75	58	44	30	52	58	41	69	82
6-Jan	52	57	42	39	54	63	21	49	33	85	28	36	17	13	13	7	12	17	17	14	15	10	11	13	85
7-Jan	12	9	12	13	13	13	20	43	57	22	48	36	14	36	19	16	38	21	33	31	28	61	51	15	61
8-Jan	13	14	14	13	10	10	11	14	21	14	16	14	14	43	62	88	43	55	22	27	10	13	14	14	88
9-Jan	21	82	73	21	13	12	11	13	16	14	13	15	11	12	11	16	13	15	14	14	13	12	13	13	82
10-Jan	16	17	14	14	15	15	14	14	13	14	20	26	36	28	23	13	12	11	15	17	23	16	21	16	36
11-Jan	18	19	15	11	10	10	13	46	32	19	15	19	11	36	11	11	17	33	63	38	79	65	53	48	79
12-Jan	13	68	76	67	57	64	50	20	16	18	17	20	33	21	38	28	30	18	51	44	97	87	40	71	97
13-Jan	40	13	71	22	36	68	44	57	41	40	36	50	55	16	12	13	12	13	17	19	15	13	28	16	71
14-Jan	39	16	15	12	18	16	12	17	16	14	11	12	14	12	15	15	15	10	10	9	10	10	31	29	39
15-Jan	33	17	19	17	16	16	36	58	24	15	24	13	13	11	12	15	34	26	16	52	77	70	18	48	77
16-Jan	64	61	62	92	51	88	77	86	65	84	105	90	52	12	14	18	17	54	89	57	82	59	50	95	105
17-Jan	52	18	36	17	46	37	25	62	81	80	30	73	101	85	93	47	87	83	68	45	24	79	17	15	101
18-Jan	13	13	12	13	12	11	14	13	13	11	11	16	25	20	12	18	17	18	17	16	16	11	12	12	25
19-Jan	12	12	13	11	14	15	16	24	37	17	14	46	14	29	11	11	15	13	14	14	15	8	11	13	46
20-Jan	13	15	10	12	14	13	15	15	14	14	14	14	36	21	14	24	26	51	46	78	15	16	14	13	78
21-Jan	14	16	17	37	47	73	90	80	65	17	51	41	91	27	15	17	23	17	15	12	18	32	14	43	91
22-Jan	63	36	48	70	51	65	22	73	20	24	28	43	22	15	15	15	13	17	12	16	15	9	11	9	73
23-Jan	10	10	12	17	15	17	12	16	17	9	12	20	19	23	9	24	20	34	35	44	19	58	74	38	74
24-Jan	52	15	15	17	13	21	18	24	52	39	47	57	19	17	16	38	36	38	87	54	37	16	12	8	87
25-Jan	12	31	17	35	33	27	29	13	50	15	15	16	12	11	11	15	16	33	39	34	51	17	13	31	51
26-Jan	54	62	27	34	21	24	19	22	14	13	12	13	13	14	15	13	14	16	15	17	104	18	13	11	104
27-Jan	12	12	13	45	15	11	11	9	9	11	12	16	11	13	23	25	22	14	33	48	51	44	80	59	80
28-Jan	52	66	100	16	13	15	44	54	33	27	50	50	55	73	93	83	23	45	33	82	60	60	14	13	100
29-Jan	14	11	13	10	17	70	16	16	10	9	10	14	15	14	13	10	12	10	10	10	11	11	14	52	70
30-Jan	59	35	33	54	20	43	57	49	64	15	54	24	10	10	19	13	12	11	11	15	18	16	12	9	64
31-Jan	14	14	13	13	8	13	7	11	10	18	19	13	16	18	15	18	16	18	11	12	16	16	21	16	21
	106	82	100	92	57	88	90	86	81	85	105	91	101	85	93	88	87	83	89	82	104	87	80	95	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Athabasca Valley - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	January 7, 2015	Last Calibration	December 2, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:25	End Time (MST)	12:08
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	803	802
Calculated slope	1.008011	0.999911	Chamber temp	43.9	43.9
Calculated intercept	1.101819	1.818601	Pressure	689.0	703.6
Analyzer Background	18.4	18.4	Flow	0.474	0.480
Analyzer Coefficient	1.084	1.084	Intensity	43668	43792

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	598.5	1.014
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	60.7	607.0	606.4	1.001
second point	5000	30.4	304.0	300.5	1.012
third point	5000	15.2	152.0	148.9	1.021
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.7	607.0	599.8	1.012
				Average Correction Factor	1.011

Corrected As found	598.6	Previous response	601.1	% change	0.4%

Notes:

filter changed out, no maintenance or adjustments done,

Calibration Performed By: Melissa Lemay

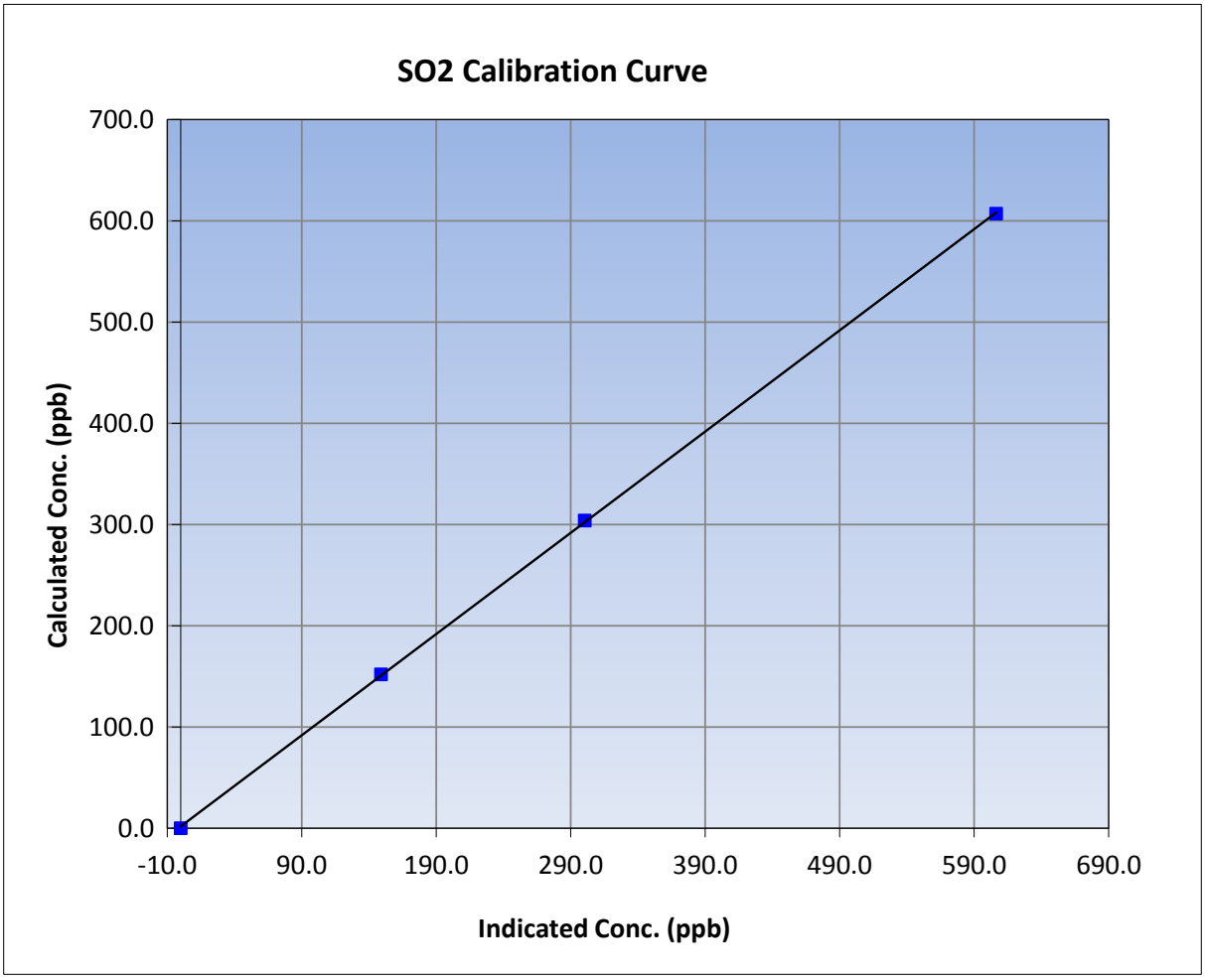
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

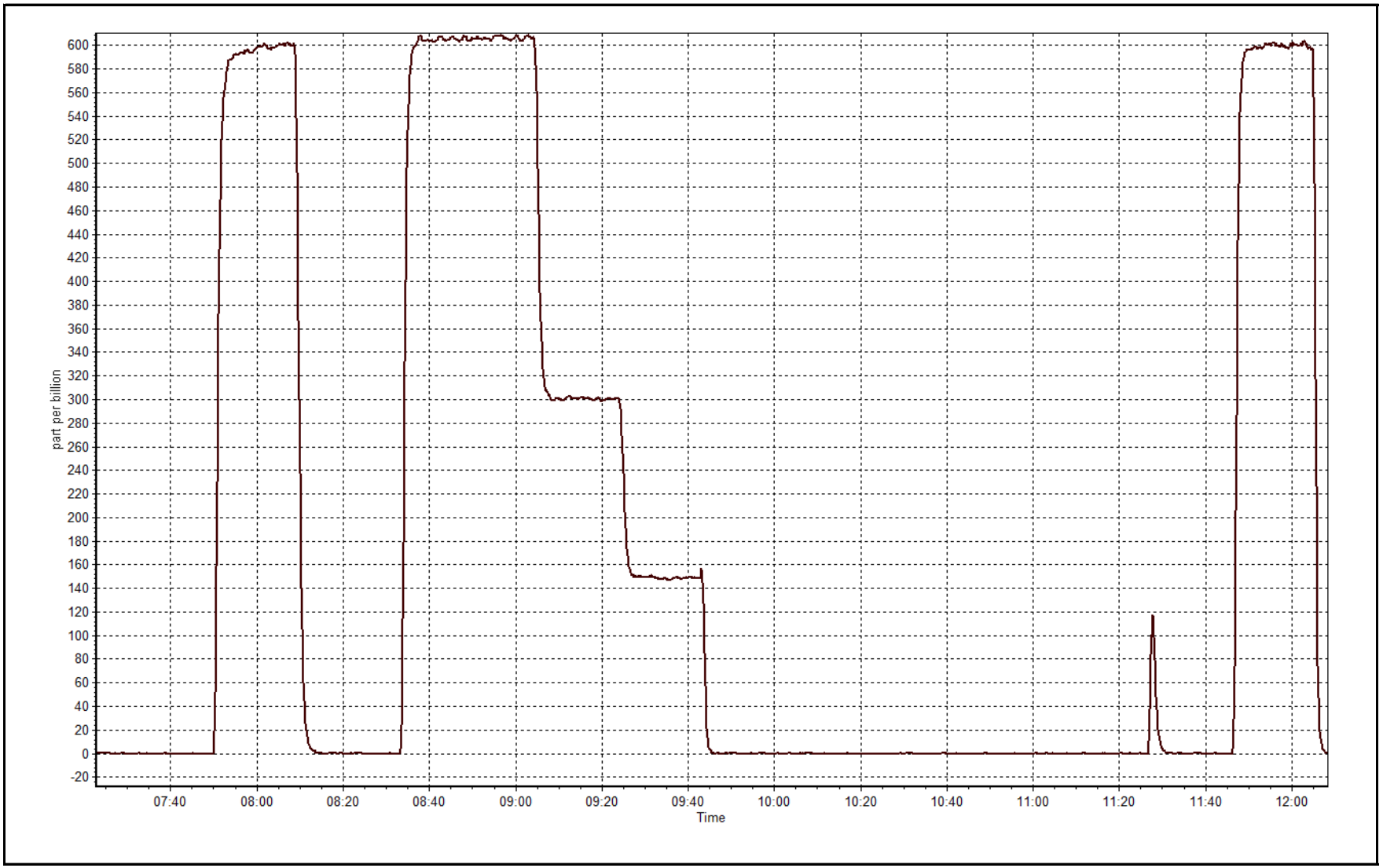
Calibration Date	January 7, 2015	Previous Calibration	December 2, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:25	End Time (MST)	12:08
Analyzer make	Thermo 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999954
607.0	606.4	1.0010		
304.0	300.5	1.0116	Slope	0.999911
152.0	148.9	1.0208		
			Intercept	1.818601



SO2 Calibration Plot Date: January 7, 2015



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 11, 2016	Last Calibration	December 17, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	15:10
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	50.8 ppm	SO2 gas cert/exp	8400311 9/Sep/17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-699
Analyzer IP address	192.168.1.44		Lamp voltage	1102	1109
Calculated slope	0.992369	0.984904	Chamber temp	45	45
Calculated intercept	-0.192492	-0.066844	Pressure	705.9	708.9
Analyzer Background	2.42	2.42	Flow	0.435	0.439
Analyzer Coefficient	1.118	1.118	Intensity	72	72
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-LTE	Analyzer serial #	1507864683
Converter make/model	CDN-101	Converter serial #	503

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	89.6	75.0	75.9	0.988
SO2 scrubber check	5000	15.2	154.4	0.8	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	89.6	75.0	76.3	0.983
second point	6000	50.2	42.0	42.6	0.986
third point	6000	29.9	25.0	25.3	0.989
as left zero	6000	0.0	0.0	0.3	----
as left span	6000	89.6	75.0	75.2	0.997
				Average Correction Factor	0.986

Corrected As found	75.8	Previous response	75.7	% change	-0.1%

Notes:

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

Calibration Performed By: Melissa Lemay

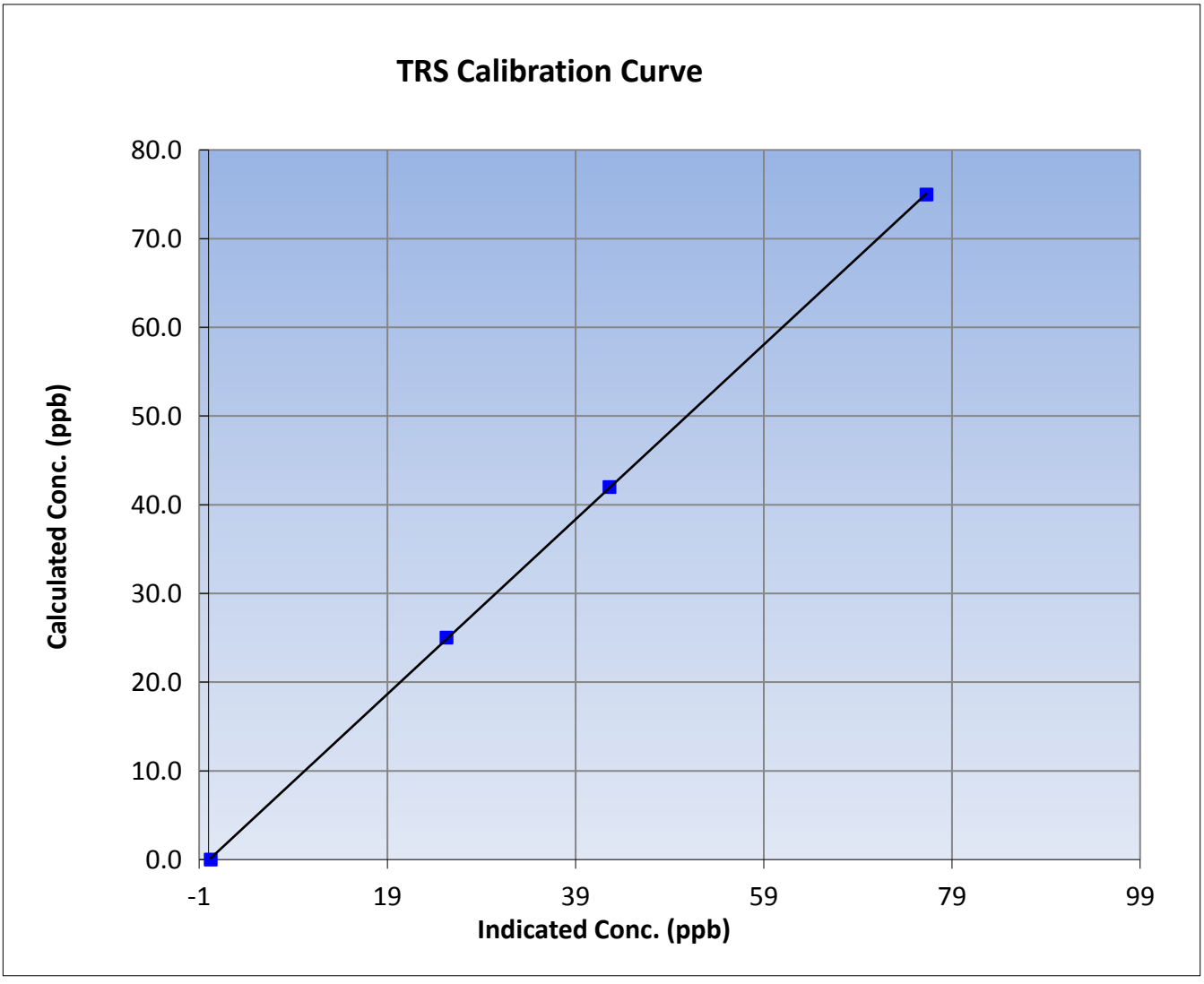
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

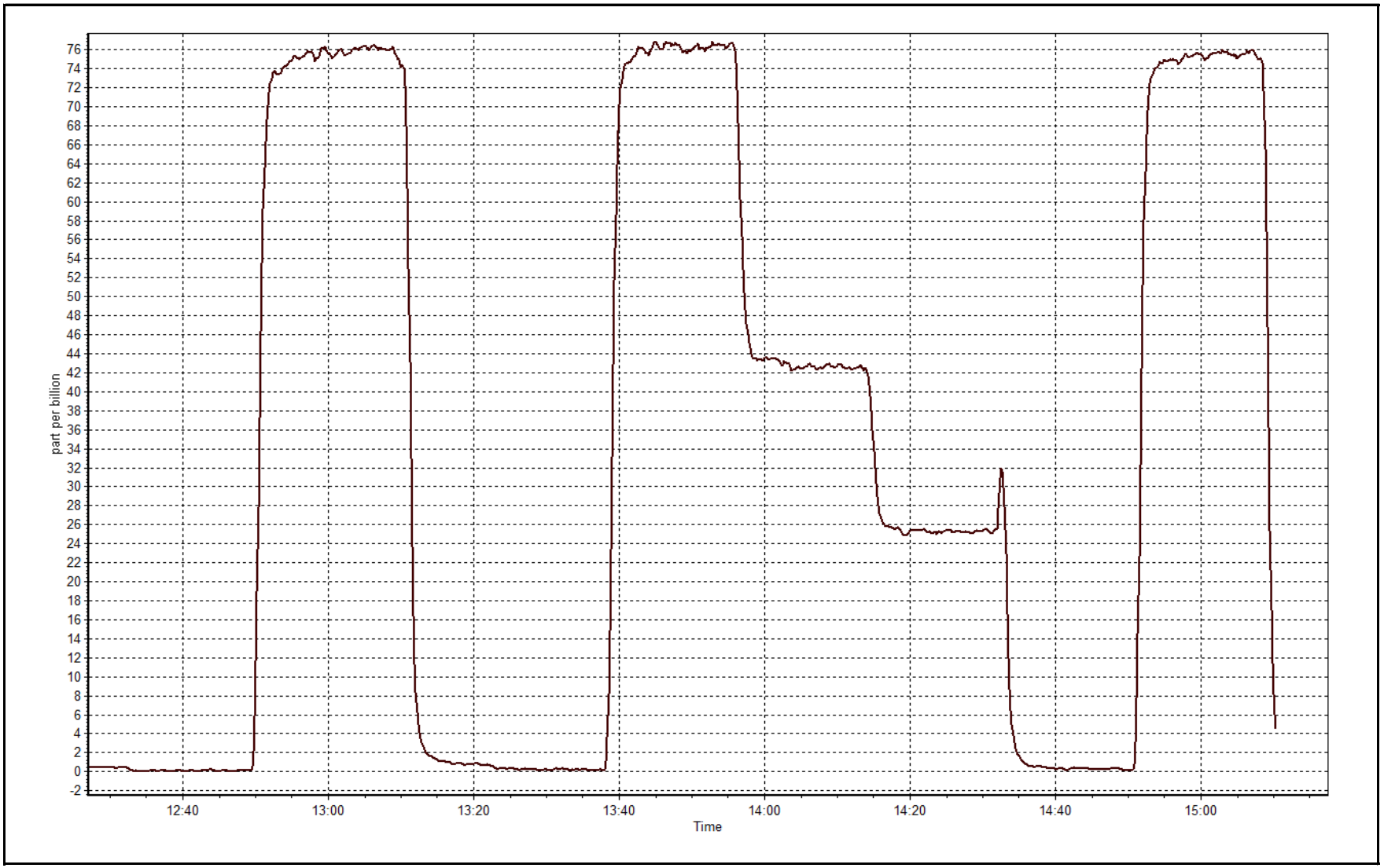
Calibration Date	January 11, 2016	Previous Calibration	December 17, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	12:30	End Time (MST)	15:10
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999974
75.0	76.3	0.9825		
42.0	42.6	0.9859	Slope	0.984904
25.0	25.3	0.9888		
			Intercept	-0.066844



TRS Calibration Plot Date: January 11, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

W B E A

Station Information

Calibration Date	January-07-15	Last Calibration	December-23-15
Station Name	Athabasca Valley	Station Number	AMS 7

Reason: Routine

Start Time (MST)	7:25	End Time (MST)	12:07
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	282.6	286.6
THC Calc slope	1.008435	0.997093	Carrier Pressure	36.8	36.8
THC Calc intercept	0.000000	0.058543	Fuel Pressure	42.1	42.1
NMHC Calc slope	1.011667	0.997157	Air Pressure	32.2	32.2
NMHC Calc intercept	0.000000	0.036481			

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	12.78	0.988
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.64	0.999
second point	5000	30.4	6.32	6.23	1.015
third point	5000	15.2	3.16	3.07	1.030
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	12.63	12.57	1.004
				Average Correction Factor	1.015

Corrected As found	12.78	Previous response	12.52	% change	-2.0%

Notes:

Nitrogen changed out, filter changed out, Span adjusted

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	6.68	6.78	0.985
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.68	1.000
second point	5000	30.4	3.34	3.29	1.016
third point	5000	15.2	1.67	1.61	1.039
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	6.68	6.64	1.006
				Average Correction Factor	1.018

Corrected As found	6.78	Previous response	6.60	% change	-2.7%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	5.95	6.01	0.990
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	5.95	5.96	0.998
second point	5000	30.4	2.98	2.94	1.013
third point	5000	15.2	1.49	1.46	1.020
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	5.95	5.94	1.001
				Average Correction Factor	1.011

Corrected As found	6.01	Previous response	5.92	% change	-1.5%

Wood Buffalo Environmental Association

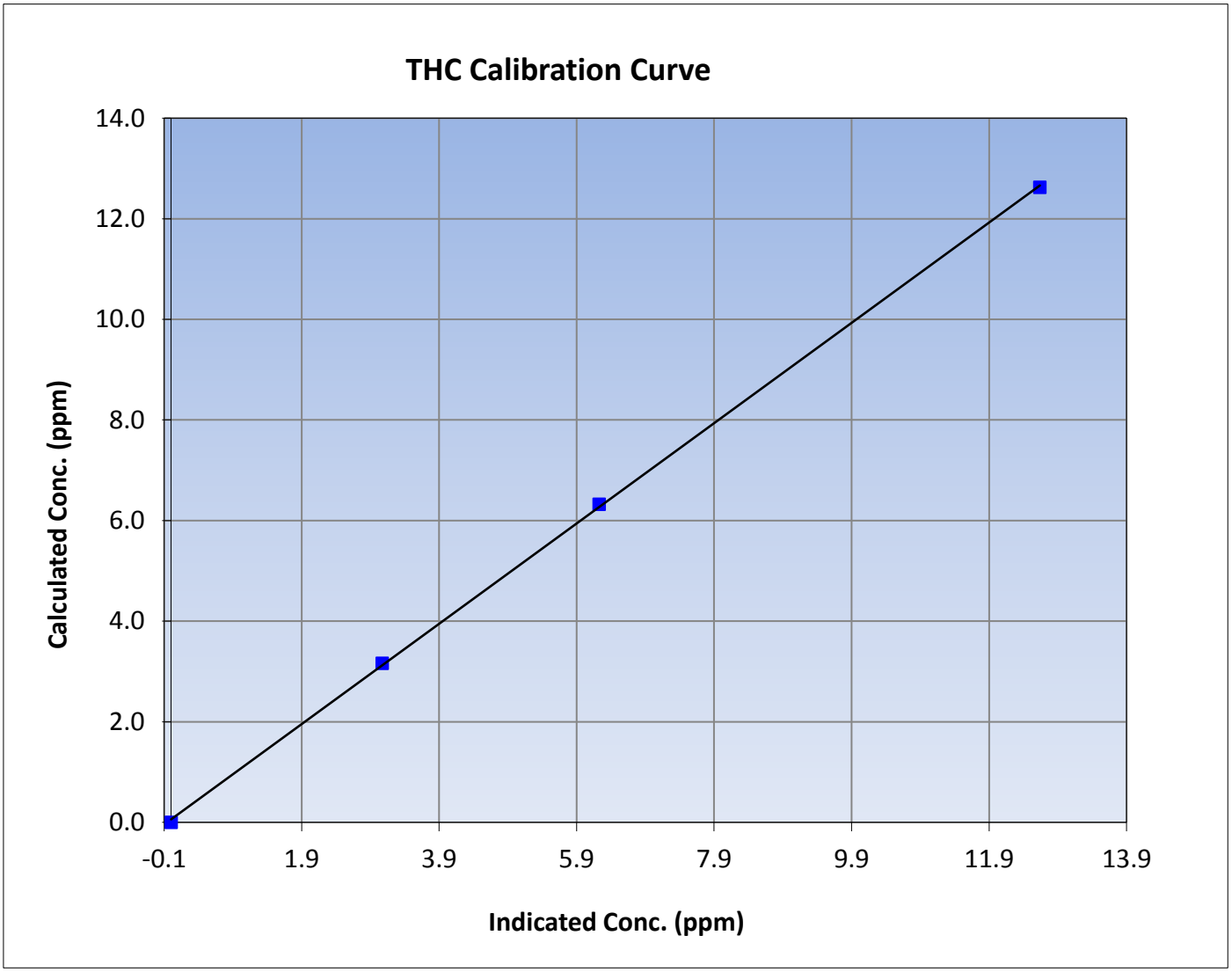
THC Calibration Summary

Station Information

Calibration Date	January 7, 2015	Previous Calibration	December 23, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:25	End Time (MST)	12:07
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	0.999893
12.63	12.64	0.9989		
6.32	6.23	1.0150	Slope	0.997093
3.16	3.07	1.0298		
			Intercept	0.058543



Wood Buffalo Environmental Association

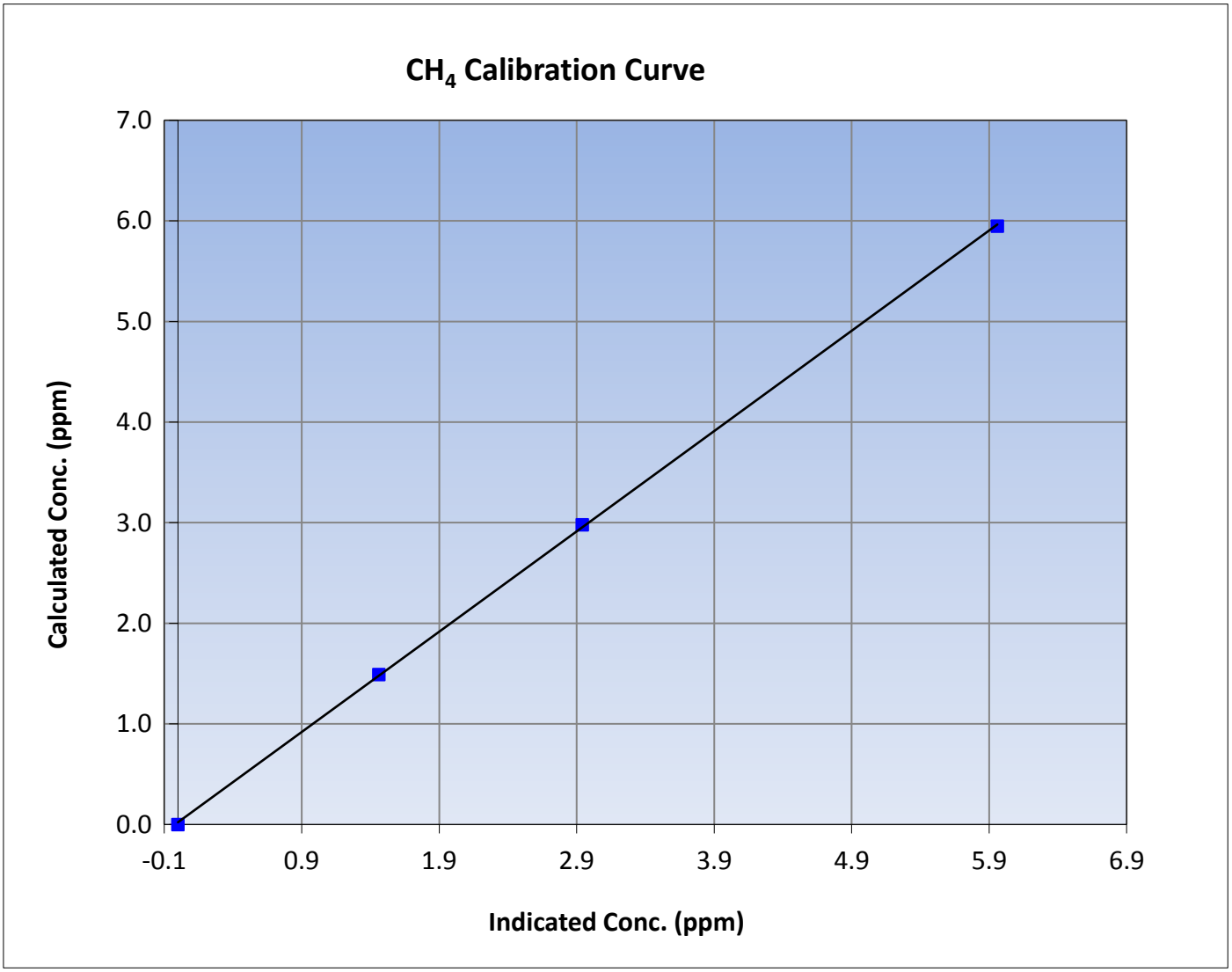
CH_4 Calibration Summary

Station Information

Calibration Date	January 7, 2015	Previous Calibration	December 23, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:25	End Time (MST)	12:07
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	0.999920
5.95	5.96	0.9981		
2.98	2.94	1.0133	Slope	0.997013
1.49	1.46	1.0203		
			Intercept	0.022087



Wood Buffalo Environmental Association

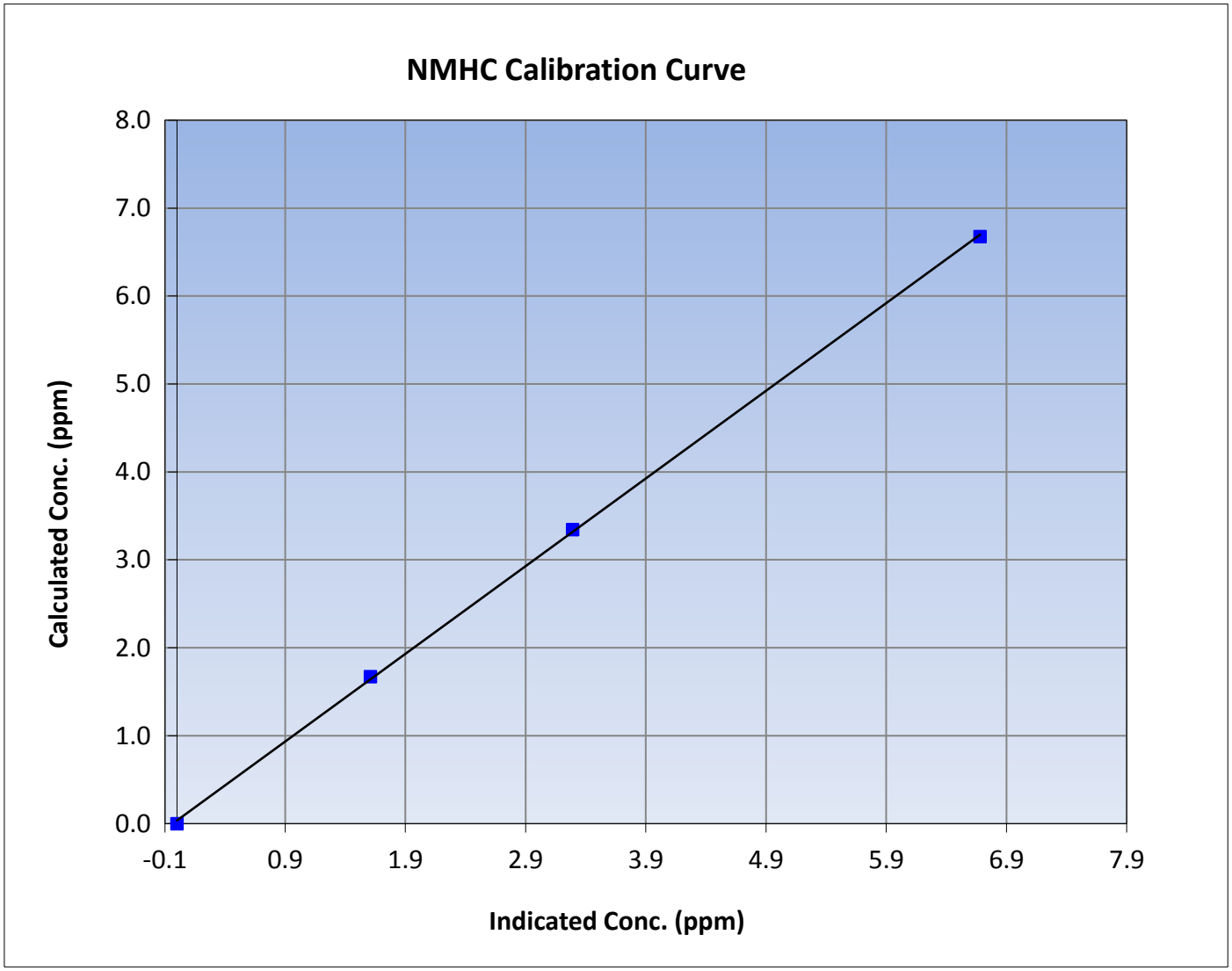
NMHC Calibration Summary

Station Information

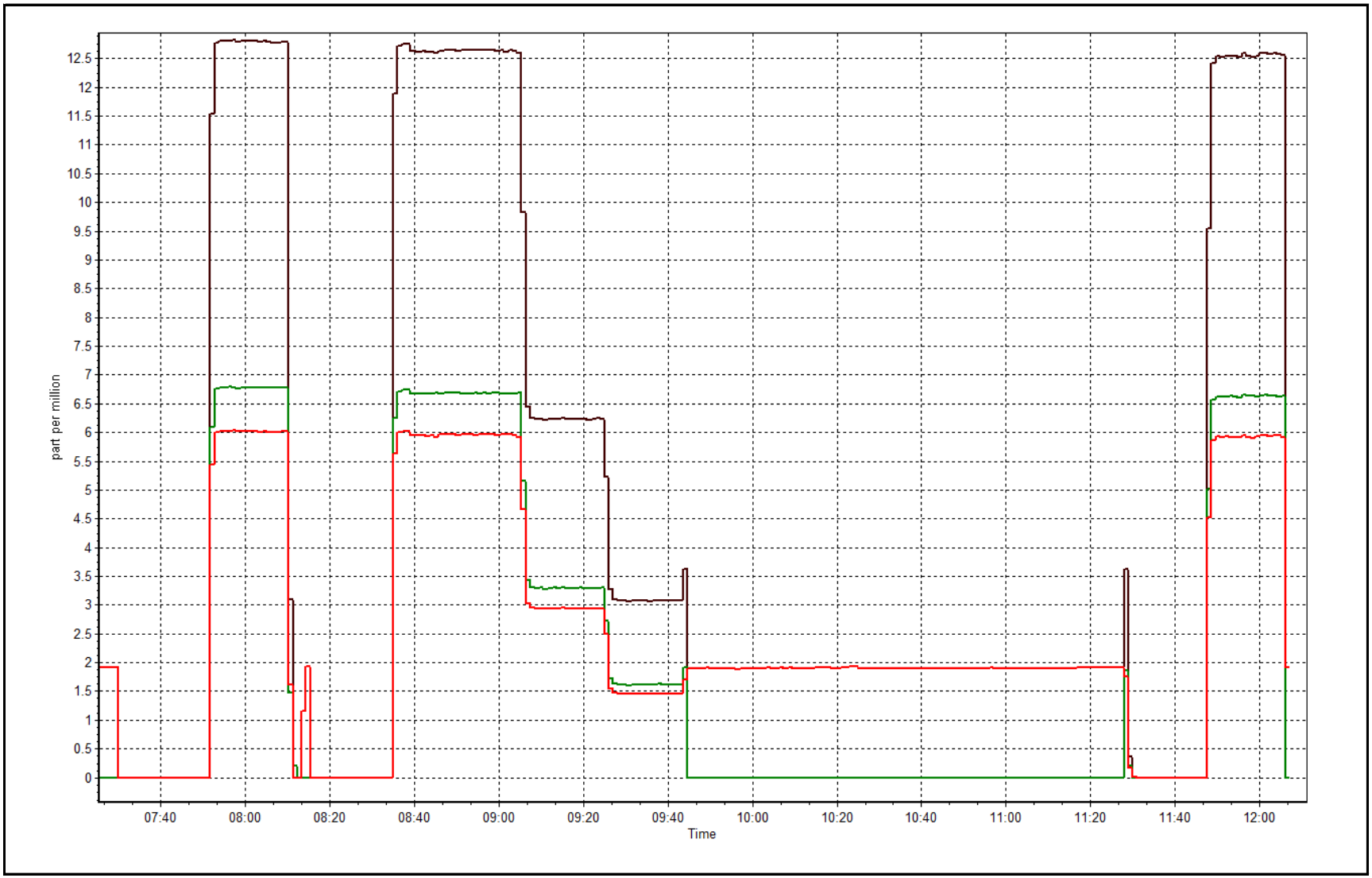
Calibration Date	January 7, 2015	Previous Calibration	December 23, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:25	End Time (MST)	12:07
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999861
6.68	6.68	0.9996		
3.34	3.29	1.0164	Slope	0.997157
1.67	1.61	1.0385		
			Intercept	0.036481



THC Calibration Plot Date: January 7, 2015



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	January 8, 2016	Previous Calibration	December 2, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	13:34
NO2 GPT Ref date	January-07-16	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/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*
Analyzer Range	0 - 500 ppb		Bench temp.	28.2	28.7
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	0.998100	0.993235	Pressure	725.5	762.1
Calculated intercept	0.392220	0.021913	Flow cell A	0.745	0.748
Analyzer Background	0.2	0.2	Flow cell B	0.756	0.757
Analyzer Coefficient	0.958	0.958	Cell A Intensity	88282	85407
			Cell B Intensity	81071	75911

Analyzer make	TEI 49i	Analyzer serial #	1507964700

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.0	----
as found span	5000	1.22	359.3	362.2	0.992
calibrator zero	5000	0.00	0.0	-0.1	----
high point	5000	1.22	359.3	361.6	0.994
second point	5000	0.70	180.2	181.7	0.992
third point	5000	0.43	90.1	90.6	0.994
as left zero	5000	0.00	0.0	-0.2	----
as left span	5000	1.22	359.3	348.7	1.030
				Average Correction Factor	0.993

Corrected As found	362.2	Previous response	359.6	% change	-0.7%

Notes:

Filter changed out, Pump changed out for preventative maintenance, No adjustments done

Calibration Performed By: Melissa Lemay

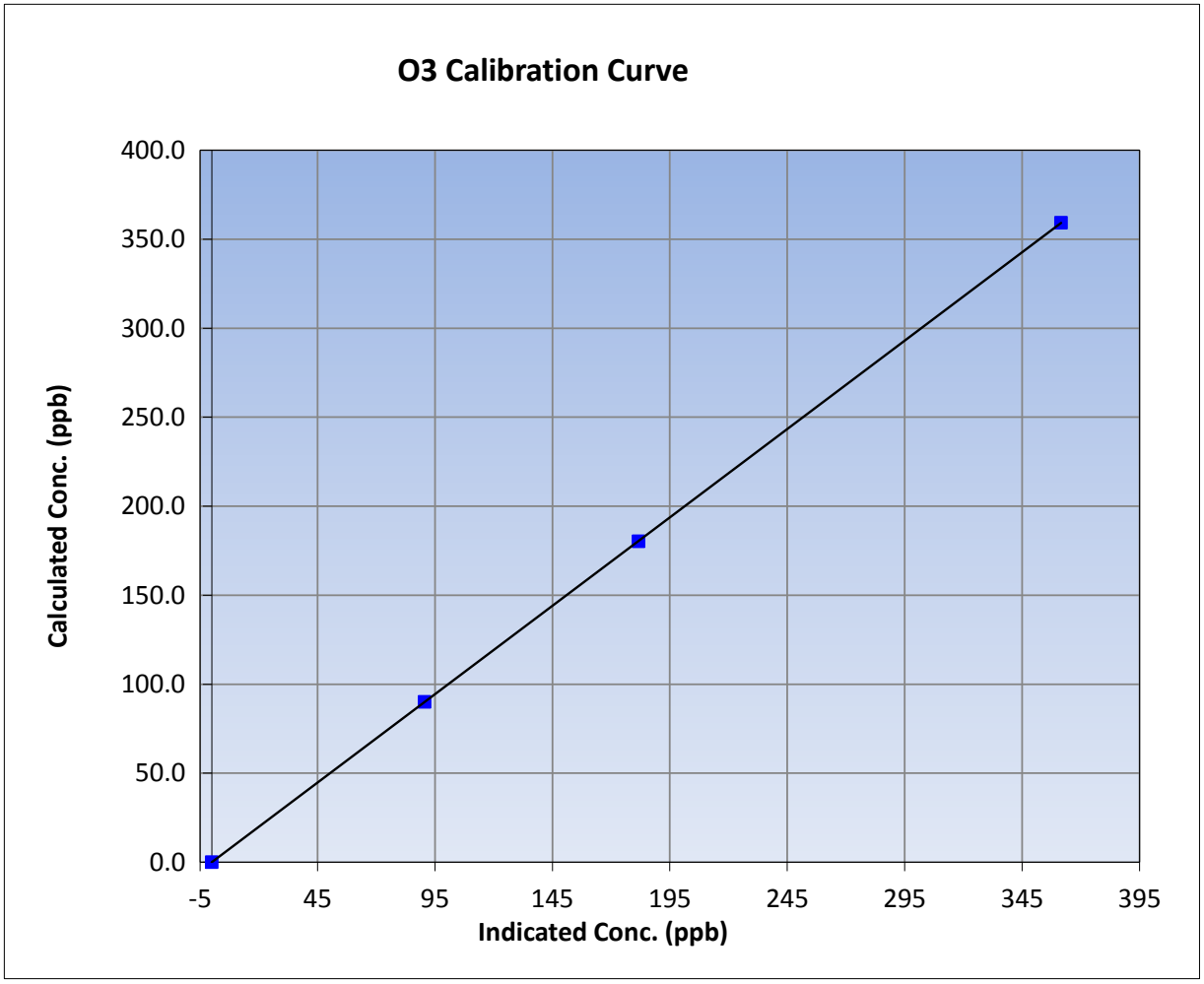
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

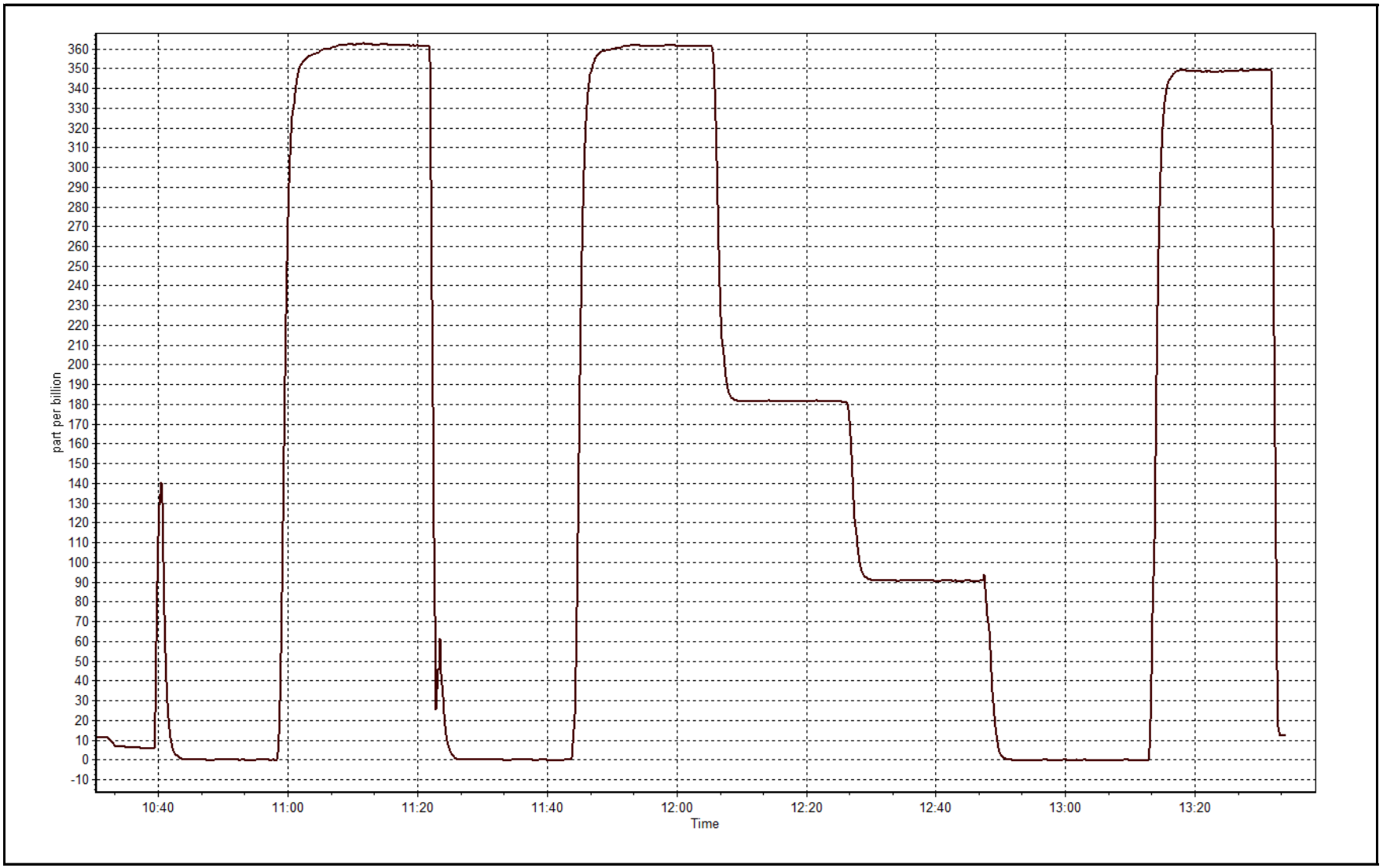
Calibration Date	January-08-16	Previous Calibration	December 2, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:35	End Time (MST)	13:34
Analyzer make	TEI 49i	Analyzer serial #	1507964700

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
359.3	361.6	0.9936		
180.2	181.7	0.9917	Slope	0.993235
90.1	90.6	0.9945		
			Intercept	0.021913



O3 Calibration Plot Date: January 8, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 7, 2015	Previous Calibration	December 2, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:25	End Time (MST)	12:05
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOx Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne API T701	Serial Number	1864

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	5564

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.995512	0.993118	1.007005
	Data Offset	2.045482	1.932206	0.418163
Current Calibration	Data Slope	1.000715	0.998360	1.005612
	Data Offset	2.162494	2.358483	0.152457

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	0.786		0.798	
NOX coefficient	0.996		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.7		2.7	
NOX bkgrnd	2.7		2.8	
Chamber Temp	49.8	Deg C	49.6	Deg C
Moly Temp	323	Deg C	323	Deg C
PMT voltage	-805	V	-805	V
PMT Temp	-3.5	Deg C	-3.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	136.9	mmHg	144.8	mmHg
R Cell Press Nox	136.9	mmHg	144.8	mmHg
NO sample flow	0.908	lpm	0.899	lpm
Nox sample Flow	0.908	lpm	0.899	lpm

Notes:

No maintenance done, filter changed out, Span adjusted

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 7, 2015 Station Number: AMS 7

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	----	----
as found span	5000	60.7	599.7	599.7	0.0	588.5	590.0	-1.2	1.0191	1.0165
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	----	----
high point	5000	60.7	599.7	599.7	0.0	598.3	599.7	-1.2	1.0024	1.0000
second point	5000	30.4	300.4	300.4	0.0	296.5	296.6	0.0	1.0130	1.0127
third point	5000	15.2	150.2	150.2	0.0	146.1	146.3	0.0	1.0279	1.0265
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
as left span	5000	60.7	599.7	237.8	361.9	589.0	247.3	341.5	1.0182	0.9616
								Average Correction Factor	1.0144	1.0131

Corrcted As found NO_X= 588.6 NO= 590.1 Percent Change NO_X= 2.0% NO= 2.0%

Previous Response NO_X= 600.4 NO= 601.9

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO2 (300)	----	237.8	359.3	595.1	237.8	357.2	0.9957	1.0000	1.0059	99.4%
2nd NO2 (200)	----	416.9	180.2	595.8	416.9	179.2	0.9945	1.0000	1.0056	99.4%
3rd NO2 (100)	----	507.0	90.1	595.8	507.0	88.9	0.9945	1.0000	1.0135	98.7%
4th NO2 (0)	597.1	----	-1.3	595.8	597.1	-1.1	0.9945	1.0000	N/A	----
					Average Correction Factor		0.9948	1.0000	1.0083	99.2%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

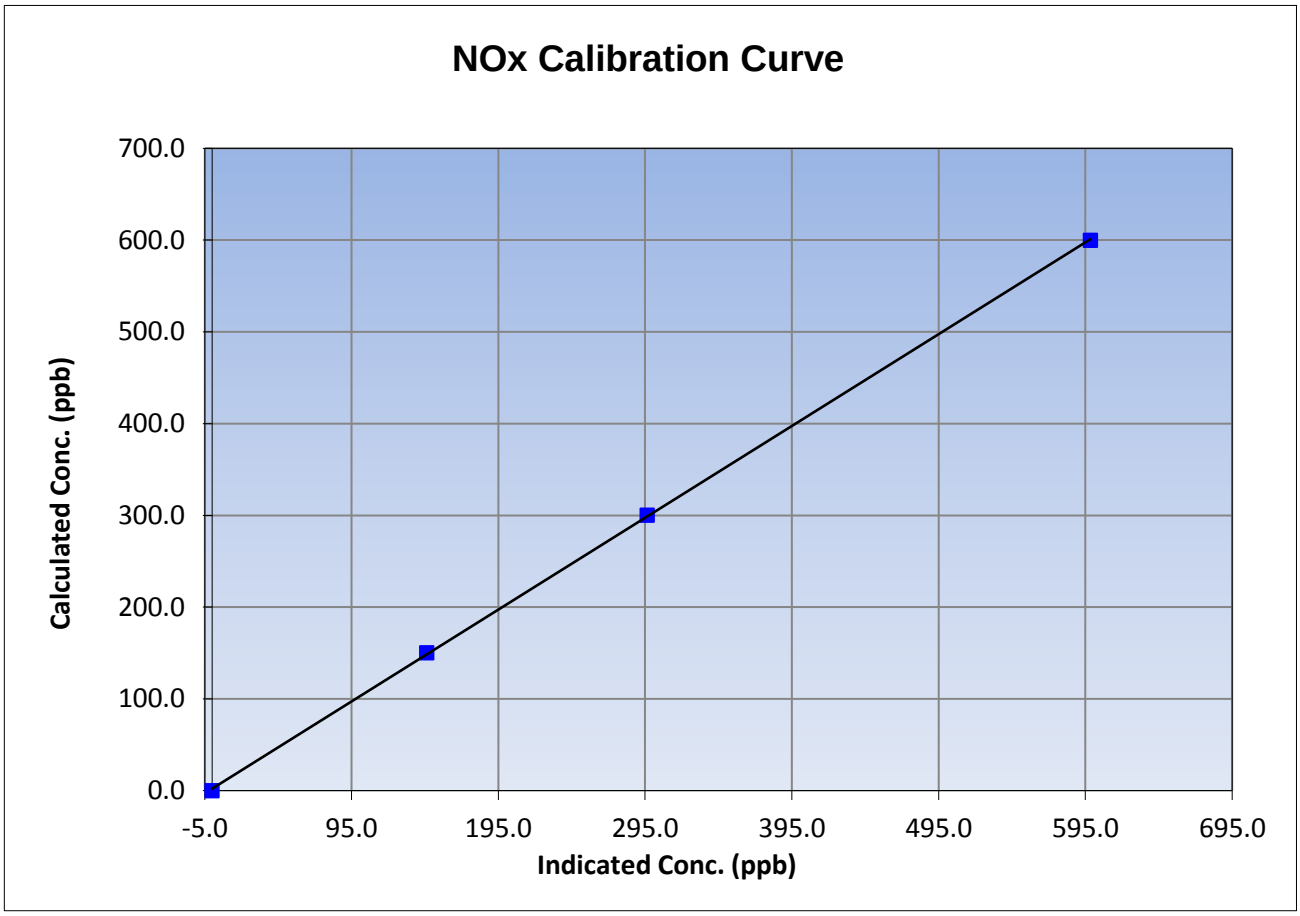
NO_X Calibration Summary

Station Information

Calibration Date	January 7, 2015	Previous Calibration	December 2, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:25	End Time (MST)	12:05
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999943
599.7	598.3	1.0024		
300.4	296.5	1.0130	Slope	1.000715
150.2	146.1	1.0279		
			Intercept	2.162494



Wood Buffalo Environmental Association

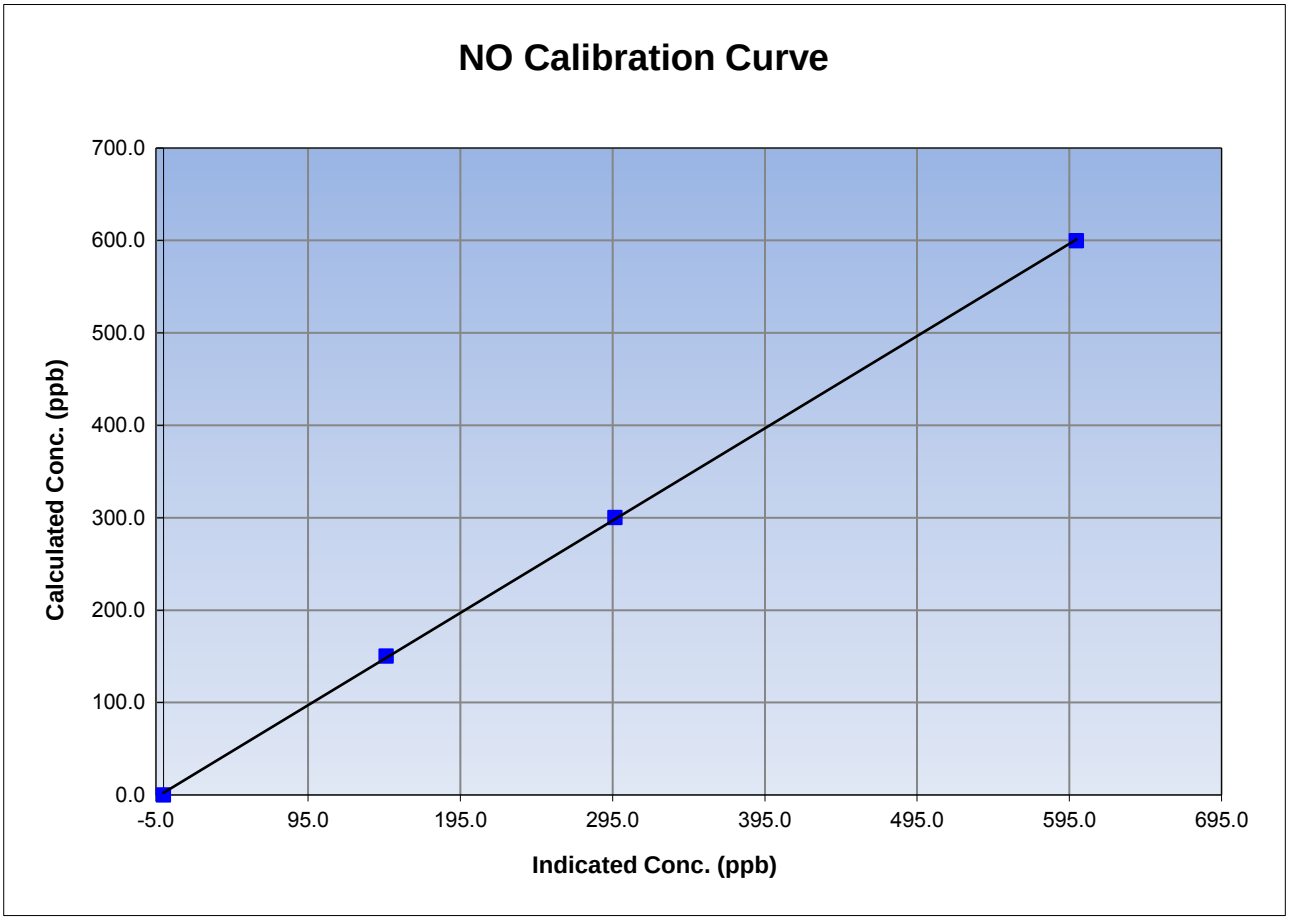
NO Calibration Summary

Station Information

Calibration Date	January 7, 2015	Previous Calibration	December 2, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:25	End Time (MST)	12:05
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	0.999931
599.7	599.7	1.0000		
300.4	296.6	1.0127	Slope	0.998360
150.2	146.3	1.0265		
			Intercept	2.358483



Wood Buffalo Environmental Association

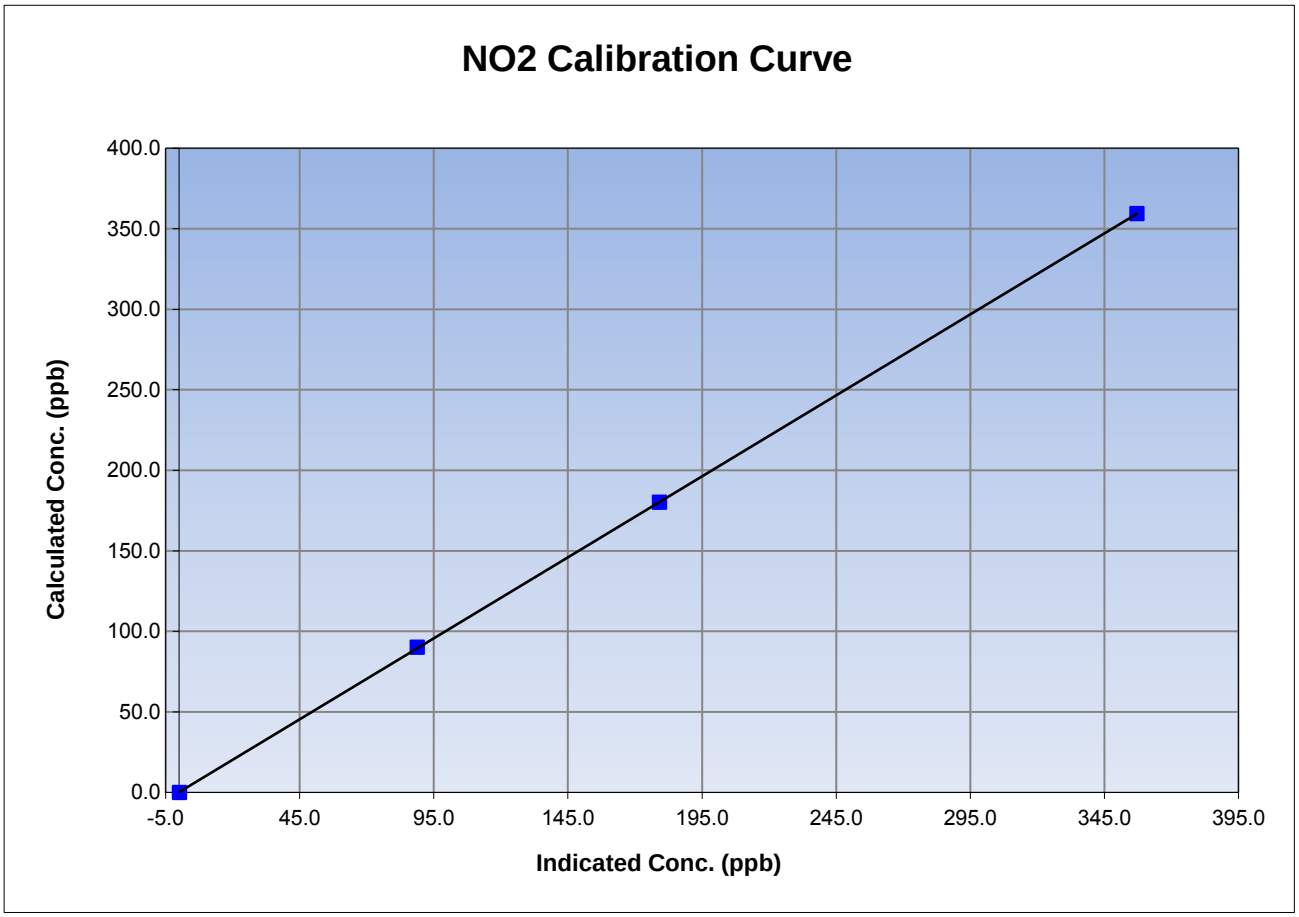
NO_2 Calibration Summary

Station Information

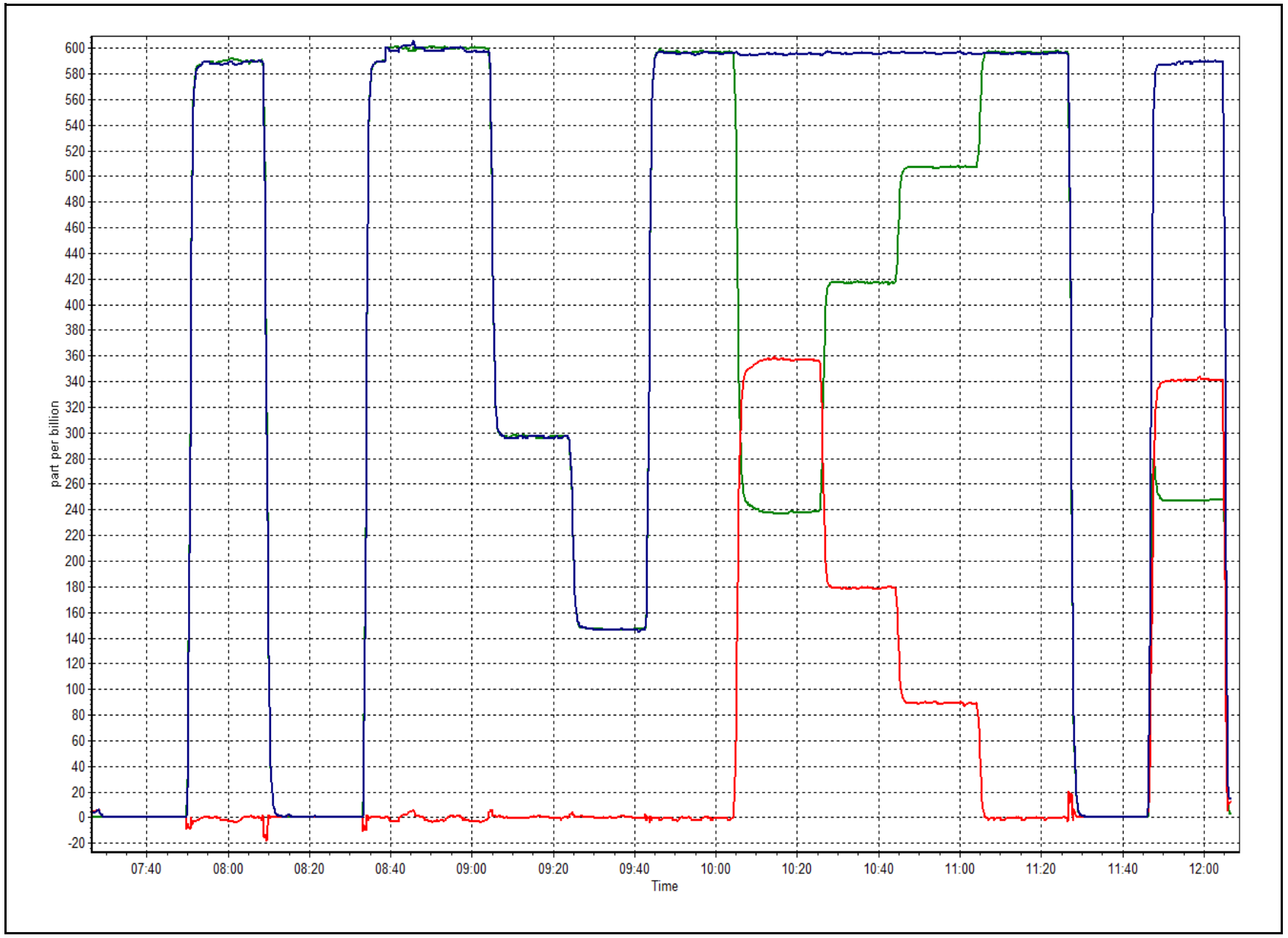
Calibration Date	January 7, 2015	Previous Calibration	December 2, 2015
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:25	End Time (MST)	12:05
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999994
359.3	357.2	1.0059		
180.2	179.2	1.0056	Slope	1.005612
90.1	88.9	1.0135		
			Intercept	0.152457



NOX Calibration Plot Date: January 7, 2015



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 7, 2016	Previous Calibration:	12/01/15
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	12:08	End Time (MST):	13:03
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E515
C_{14} Source SN:	3256
Confirmation of Time settings:	Yes ☑ No ☐

Paremeters Checked: T1 ☑ T2 ☐ T3 ☐ T4 ☐ P3 ☑ Main Flow ☑ Beta ☐ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-13.0	-14.9	-1.9	-15.0
T2	12.0	na	na	12.0
T3	16.0	na	na	16.0
T4	17.0	na	na	17.0
RH (%)	5.0	na	na	5.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	998	994.0	-4.0	998

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	247		247
Neph	0.5		0.5
C14	4.3		4.3
Indicated Concentration (ug/m3)	**0.4**	**No**	**0.4**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date: December 1, 2015 Previous Leak Check Date: September 23, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.90	0.13
*Flow with adaptor (LPM):	16.77	

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

Mass Foil Calibration (Annualy)

Foil Calibration Date: Previous Foil Calibration:

Zeroed?:

Foil Mass: **Mass foil set S/N:**

Previous Correction Factor:

New Correction Factor:

INSPECTION DATA

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

NOTES:

sample head cleaned. T1 adjusted

Calibration Performed By: **Melissa Lemay**

Wood Buffalo Environmental Association
CO Calibration Report

W B E A

Station Information

Calibration Date	January 11, 2016	Last Calibration	December 1, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	12:30
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	48.2
Analyzer IP address	192.168.1.48		Pressure	730.1	738.5
Calculated slope	1.000670	1.006207	Flow	0.485	0.490
Calculated intercept	0.050438	0.014922	Intensity	199588	199488
Analyzer Background	4.150	4.395	S/R ratio	1.175122	1.654941
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	0.3	----
as found span	5000	69.7	41.4	42.0	0.986
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.1	1.007
second point	5000	35.2	20.9	20.8	1.005
third point	5000	15.2	9.0	8.9	1.011
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	40.9	1.012
				Average Correction Factor	1.008

Corrected As found	41.7	Previous response	41.3	% change	-1.0%

Notes:

Zero adjusted, no maintenance done, filter changed out.

Calibration Performed By: Melissa Lemay

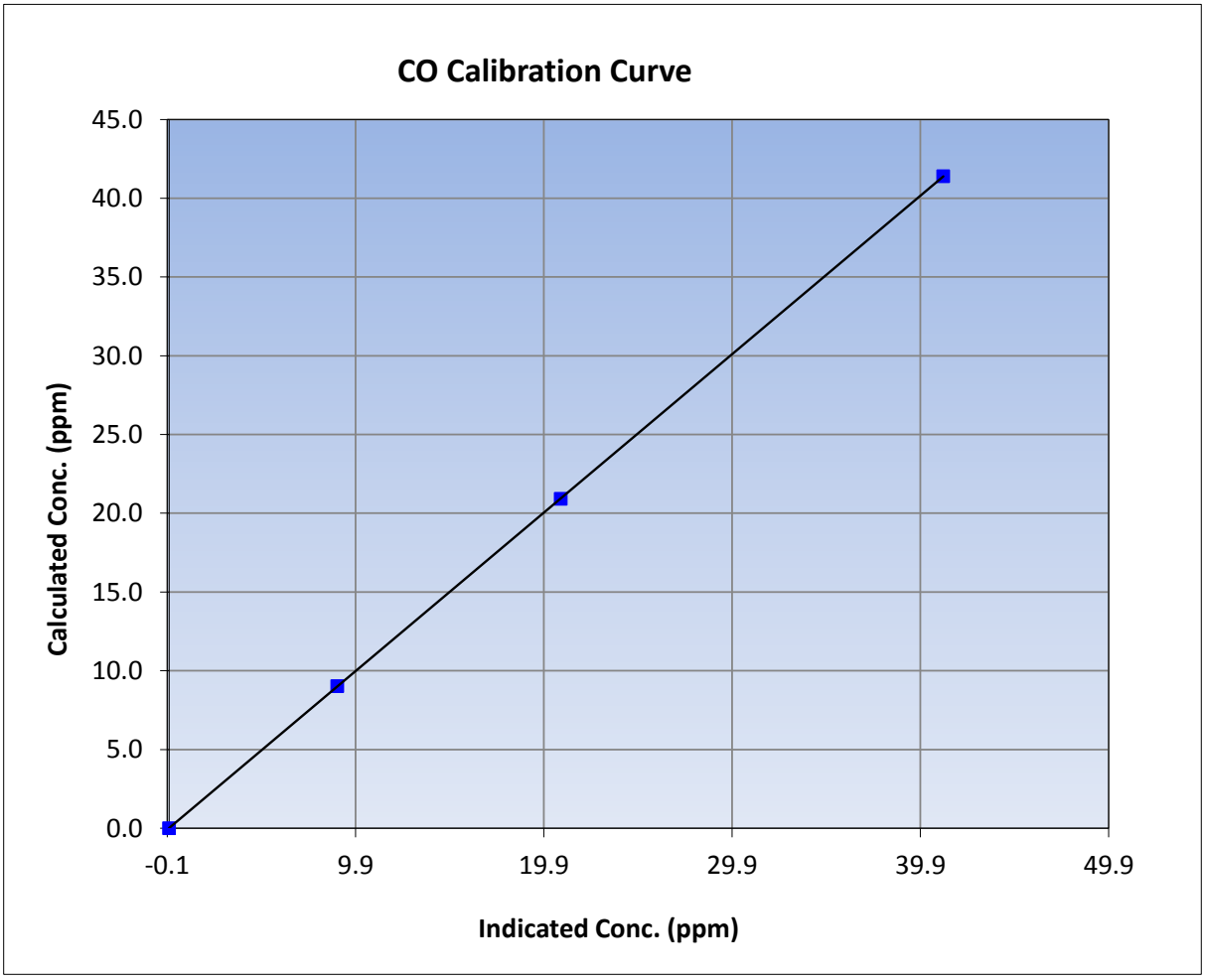
Wood Buffalo Environmental Association
CO Calibration Report

Station Information

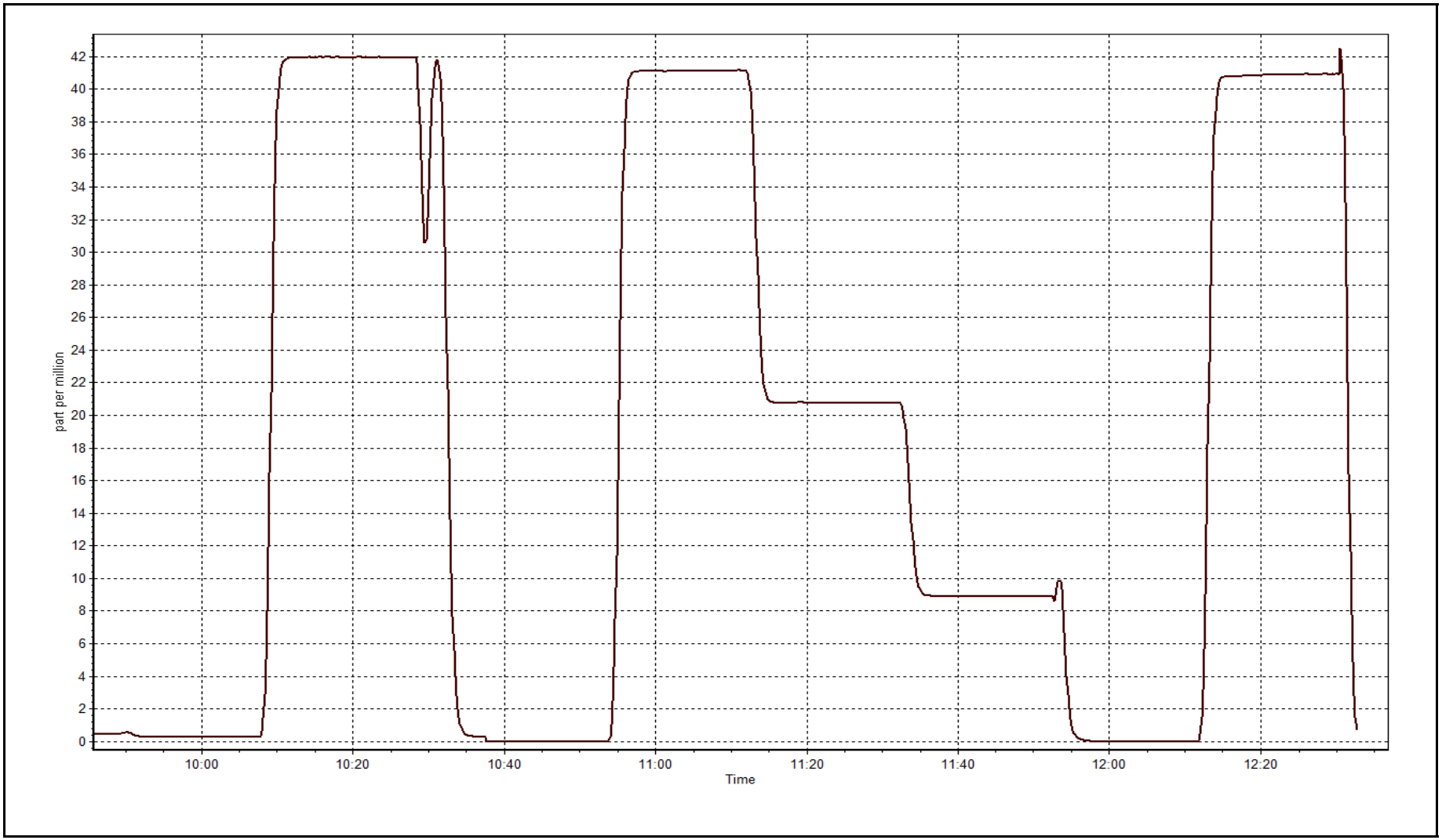
Calibration Date	January 11, 2016	Previous Calibration	December 1, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:45	End Time (MST)	12:30
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

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	41.1	1.0069		
20.9	20.8	1.0052	Slope	1.006207
9.0	8.9	1.0111		
			Intercept	0.014922



CO Calibration Plot Date: January 11, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 8
FORT CHIPEWYAN
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
JANUARY 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	705	36	39	99.60	10	0	4	0
O3(ppb) Average	706	34	38	99.46	40	0	36	-
NO2(ppb) Average	704	37	40	99.60	21	0	8	-
NO(ppb) Average	704	37	40	99.60	8	-	2	-
NOX(ppb) Average	704	37	40	99.60	21	-	10	-
PM2.5(ug/m3) Average	741	2	3	99.87	15.9	-	7.6	0
Wind Speed 10 m (km/h) Average	656	0	88	88.17	30	-	24	-
Wind Direction 10 m (deg) Average	656	0	88	88.17	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	0.1	-	-2.4	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	96	-
Precipitation (mm) Total	744	0	0	100.00	1.8	-	6.9	-
Leaf Wetness (% of range) Average	744	0	0	100.00	87	-	17	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	284	-	49	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	705	0.6	1	-	0	0	0	0	0	2	10
O3(ppb) Average	706	26.5	6	-	2	19	22	27	31	35	40
NO2(ppb) Average	704	2.5	3	-	0	0	1	1	3	6	21
NO(ppb) Average	704	0.3	1	-	0	0	0	0	0	0	8
NOX(ppb) Average	704	2.8	4	-	0	0	1	1	4	6	21
PM2.5(ug/m3) Average	741	3.76	2.3	-	0.5	1.4	2.2	3.3	4.7	6.6	15.9
Wind Speed 10 m (km/h) Average	656	10.5	6	-	0	4	6	9	13	20	30
Wind Direction 10 m (deg) Average	656	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-14.67	7	-	-32.1	-24.4	-19.7	-14.6	-9.3	-5.2	0.1
Relative Humidity (%) Average	744	83.5	7	-	61	75	79	83	88	93	99
Precipitation (mm) Total	744	-	-	9.4	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	3.1	5	-	1	2	2	2	2	10	87
Global Solar Radiation (W/m2) Average	744	20.4	45	-	0	0	0	0	17	73	284

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, O3, NO2	07 Jan 2016 20:00	07 Jan 2016 21:00	2	Maintenance - repairs to sample manifold
SO2, O3, NO2	08 Jan 2016 09:00	08 Jan 2016 09:00	1	Maintenance - adjustment to sample manifold mounts
O3	11 Jan 2016 10:00	11 Jan 2016 10:00	1	Maintenance - remote zero/span check
PM2.5	08 Jan 2016 09:00	08 Jan 2016 09:00	1	Maintenance - zero response check
Wind Speed, Wind Direction	05 Jan 2016 17:00	05 Jan 2016 17:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	05 Jan 2016 19:00	05 Jan 2016 23:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	06 Jan 2016 03:00	06 Jan 2016 03:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	09 Jan 2016 15:00	09 Jan 2016 16:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	10 Jan 2016 09:00	10 Jan 2016 09:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	28 Jan 2016 19:00	01 Feb 2016 00:00	78	Flat line in sensor output signal - Sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 10 ppb on Jan 17 11:00

Maximum Daily Average: 4.3 ppb on Jan 17

Minimum Value: 0 ppb on Jan 6 22:00

Minimum Daily Average: 0.0 ppb on Jan 16

Maximum Diurnal Average: 1.0 ppb at hour 15

Minimum Diurnal Average: 0.3 ppb at hour 3

Monthly Average: 0.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 2$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	36
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1
3-Jan	2	2	Z	3	3	3	2	2	2	2	2	2	1	1	1	2	1	1	0	0	0	0	0	0	1.4	3
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0.0	0
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0.0	0
8-Jan	0	Z	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
9-Jan	1	2	Z	1	1	1	1	1	2	2	2	2	2	2	3	4	3	3	2	2	2	1	1	1	1.9	4
10-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Jan	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	2	4	6	4	2	1	0	0	1	1.2	6
13-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Jan	0	0	0	0	Z	0	2	3	5	7	10	7	8	8	7	6	6	6	5	6	5	4	2	1	4.3	10
18-Jan	1	1	1	1	0	Z	0	0	0	0	0	0	1	1	2	2	3	3	2	2	2	1	1	1	1.1	3
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Jan	0	1	Z	1	1	1	1	2	2	2	2	3	3	4	3	2	1	0	1	1	2	2	2	2	1.6	4
22-Jan	2	1	1	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0.4	3
24-Jan	4	3	3	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
25-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	1	4	9	8	6	6	6	3	2	1	1	1	2.1	9
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	1	1	1	0.6	2
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0.3	1
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	0.5	0.5	0.3	0.3	0.4	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.8	1.0	1.0	0.9	0.9	0.8	0.6	0.5	0.4	0.4	0.4	Diurnal Average	
	4	3	3	3	3	3	2	3	5	7	10	7	8	8	9	8	6	6	6	6	5	4	2	3	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

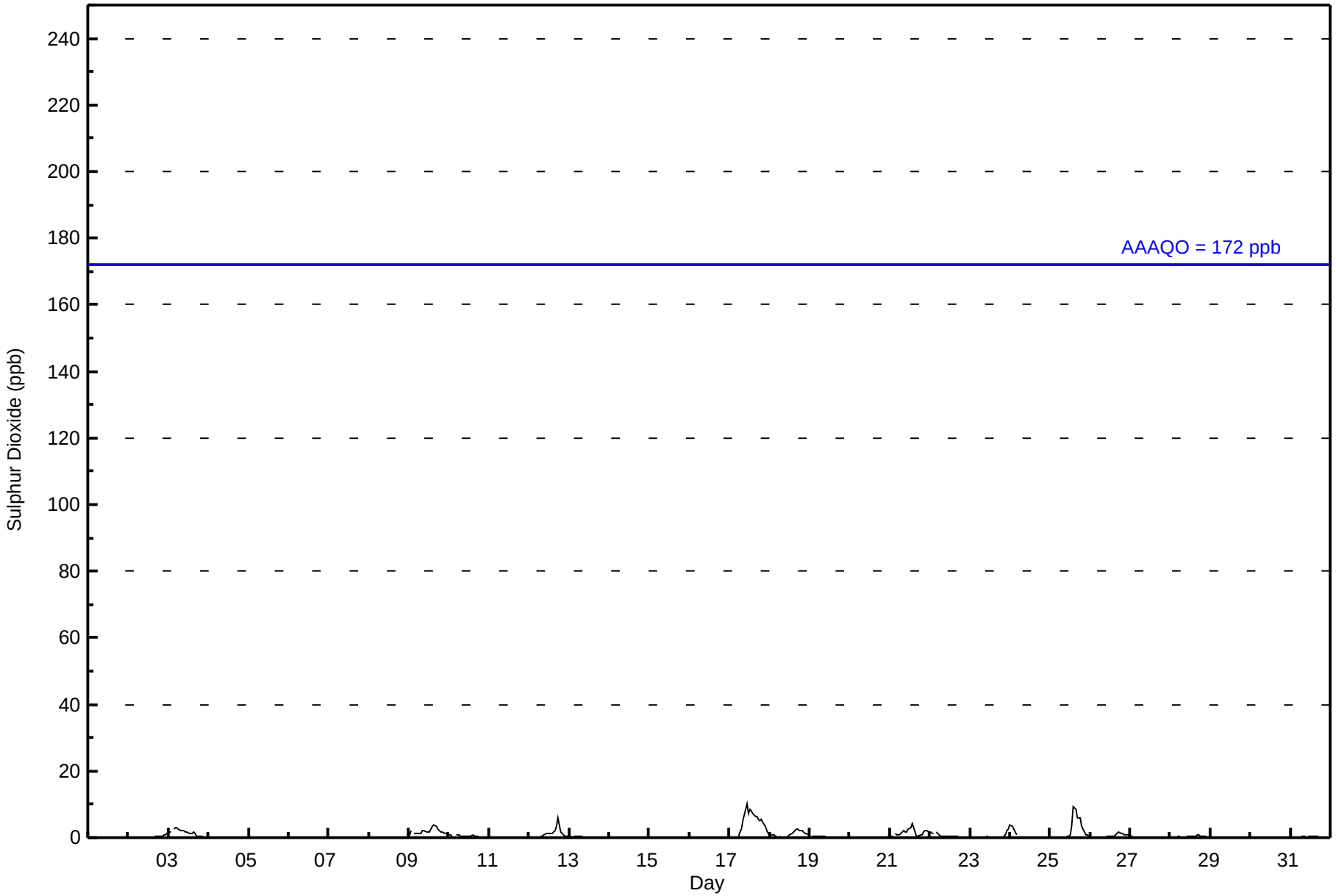
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - January 2016



Sulphur Dioxide (SO_2) - ppb
Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	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: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	13	12	19	63	133	43	24	16	13	7	16	25	64	78	52	42	620
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	12	19	63	133	43	24	16	13	7	16	25	64	78	52	42	620

Total Number of Valid Hours: 620

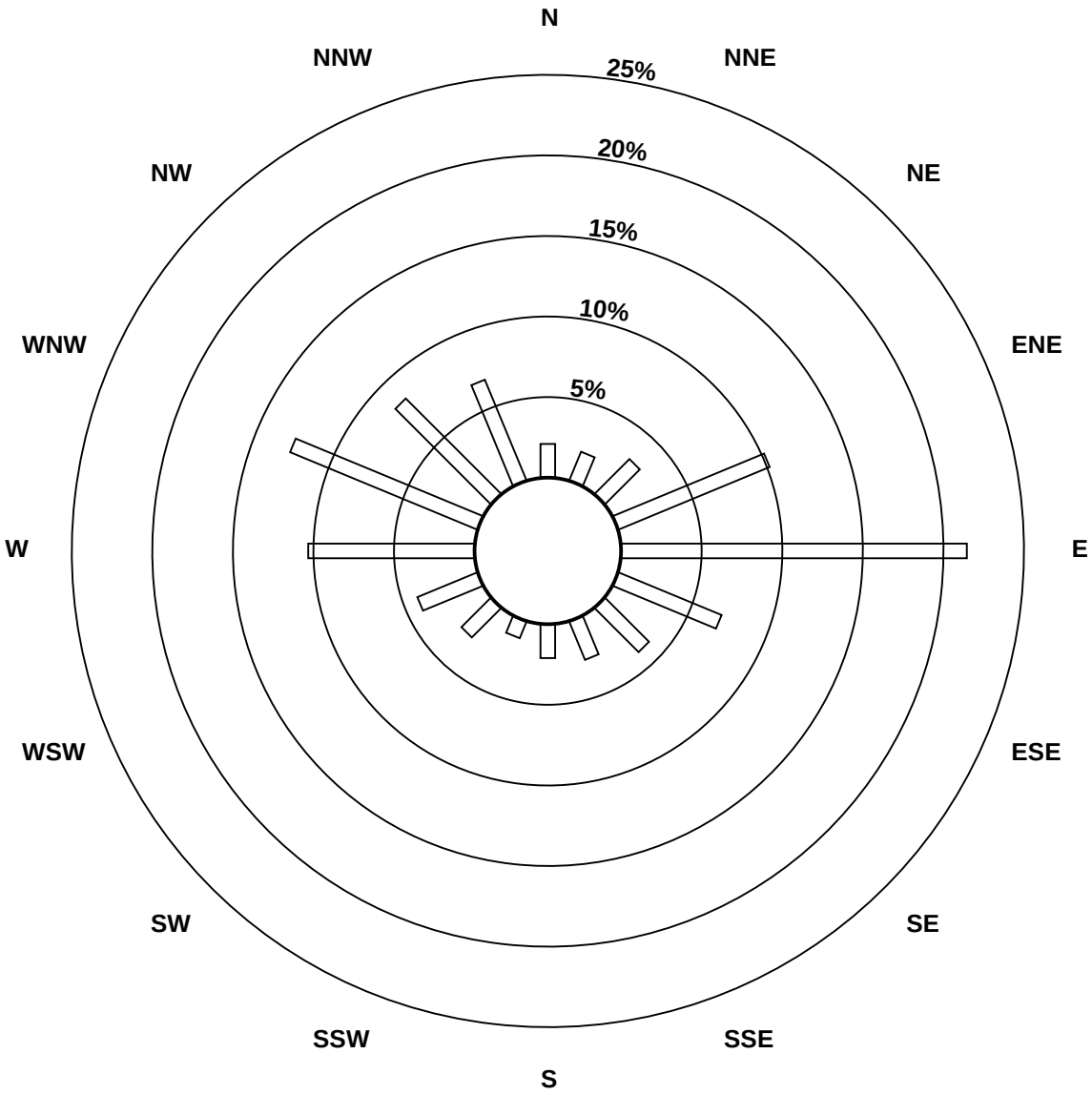
Total Number of Hours: 744

Wood Buffalo Environmental Association

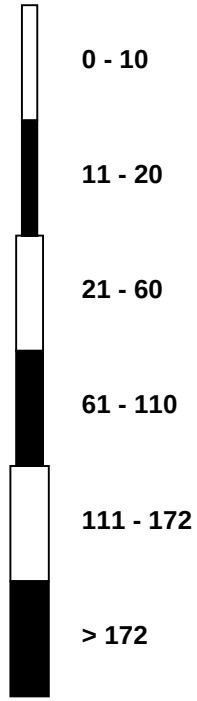
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan (AMS 8)



Classes (ppb)



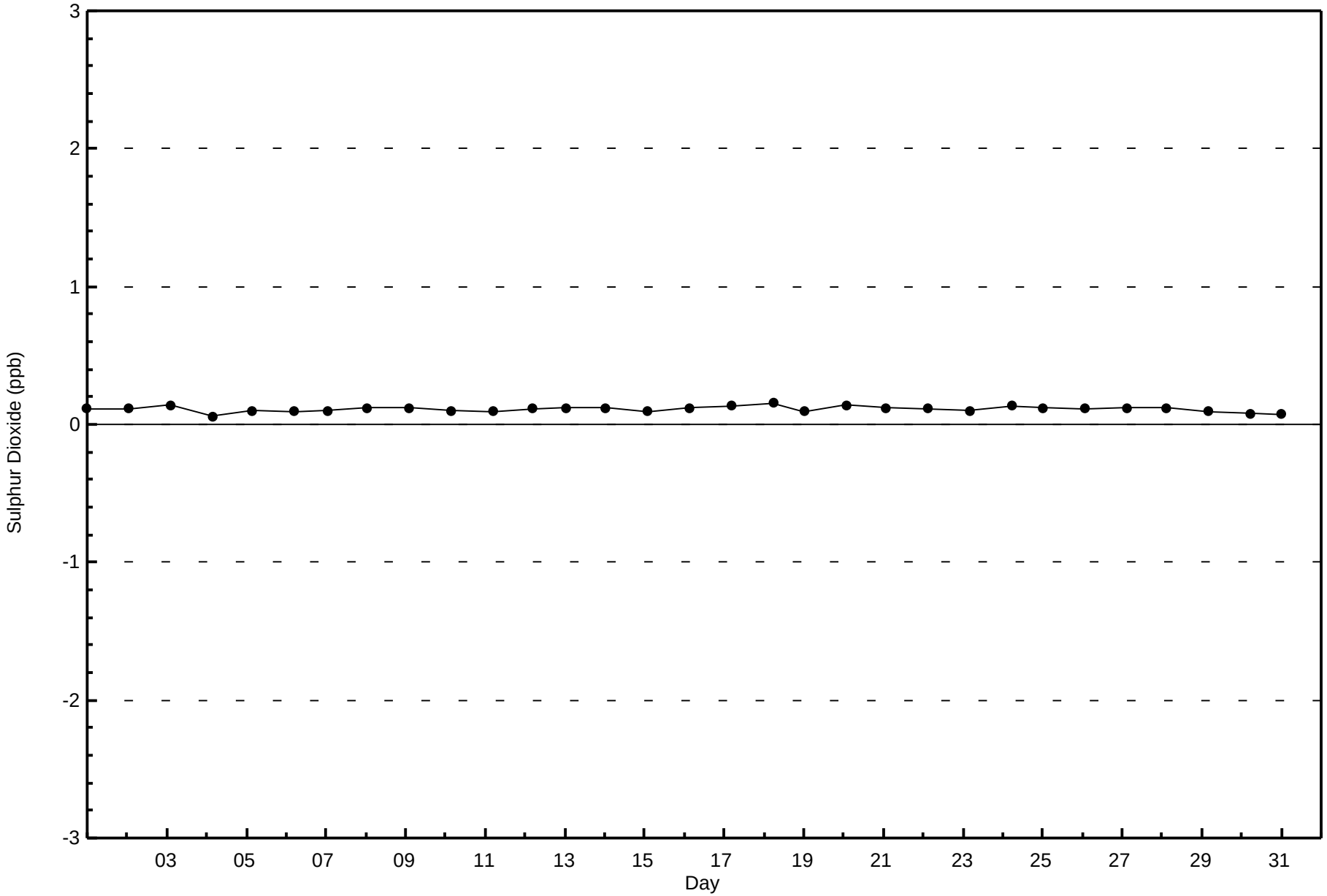
Total Number of Valid Hours: 620

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - January 2016

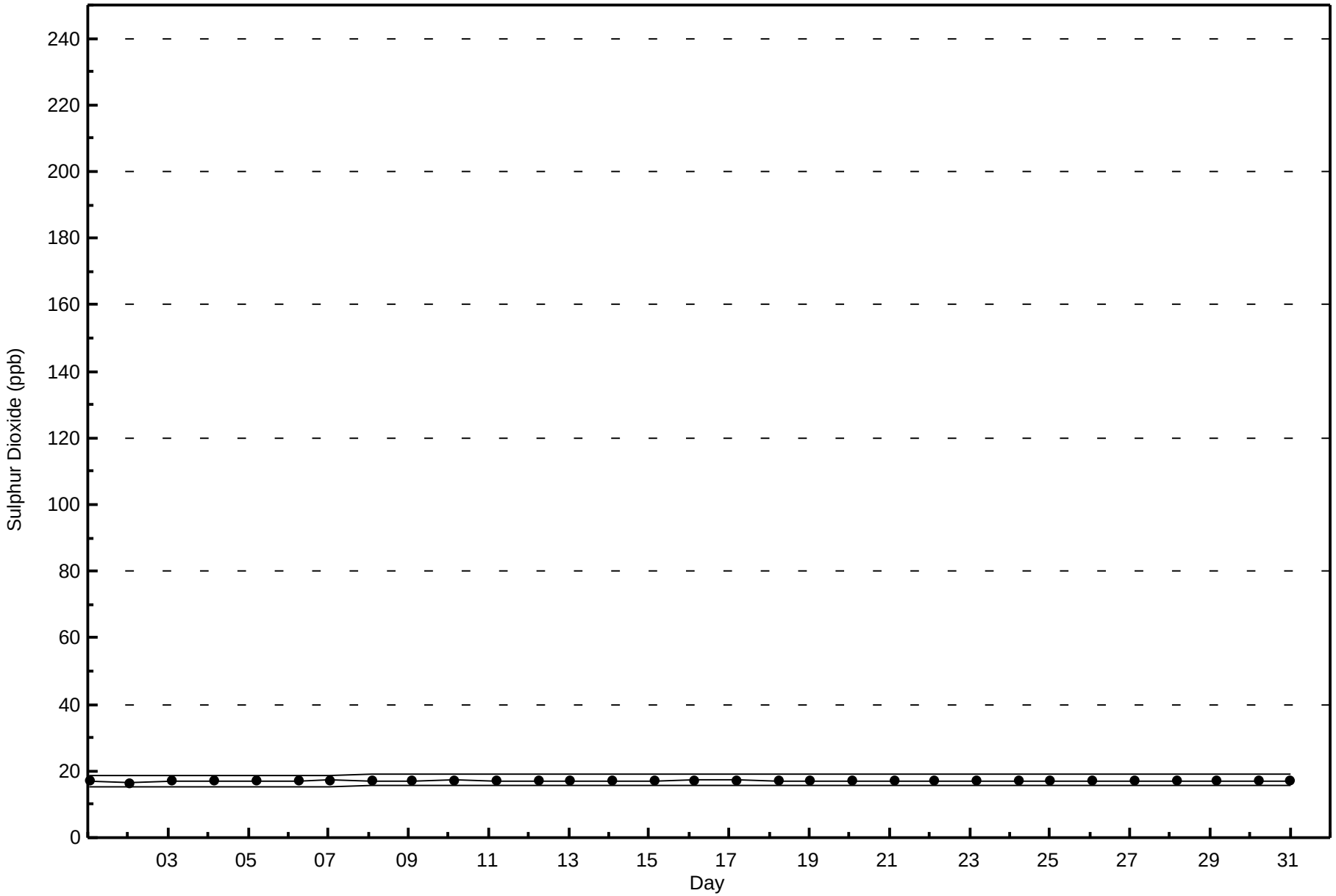


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Fort Chipewyan - January 2016

Maximum Value: 8 ppb on Jan 17 12:00

Maximum Daily Average: 1.6 ppb on Jan 17

Minimum Value: 0 ppb on Jan 8 05:00

Minimum Daily Average: 0.0 ppb on Jan 31

Maximum Diurnal Average: 0.8 ppb at hour 14

Minimum Diurnal Average: 0.1 ppb at hour 1

Monthly Average: 0.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	37
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0.4	1
3-Jan	0	0	Z	0	0	0	0	0	0	0	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0.6	2
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Jan	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	C	C	C	C	C	C	0	0	0	0	--	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0.1	0
8-Jan	0	Z	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
9-Jan	0	0	Z	0	0	0	0	0	0	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0.5	2
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Jan	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Jan	0	0	0	0	Z	0	0	0	0	4	7	8	7	5	3	2	0	0	0	0	0	0	0	0	1.6	8
18-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	2	1	1	0	0	0	0	1	1	0	0	0.3	2
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Jan	0	0	Z	0	0	0	0	0	0	1	1	1	2	2	2	1	0	0	0	0	0	0	0	0	0.4	2
22-Jan	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Jan	Z	0	0	0	0	0	0	0	0	0	1	2	3	5	6	4	1	0	0	0	0	0	0	0	1.0	6
26-Jan	0	Z	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.6	0.7	0.8	0.8	0.7	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average	
	0	0	0	0	0	0	0	1	0	4	7	8	7	5	6	4	1	0	0	1	1	1	0	0	Diurnal Maximum	

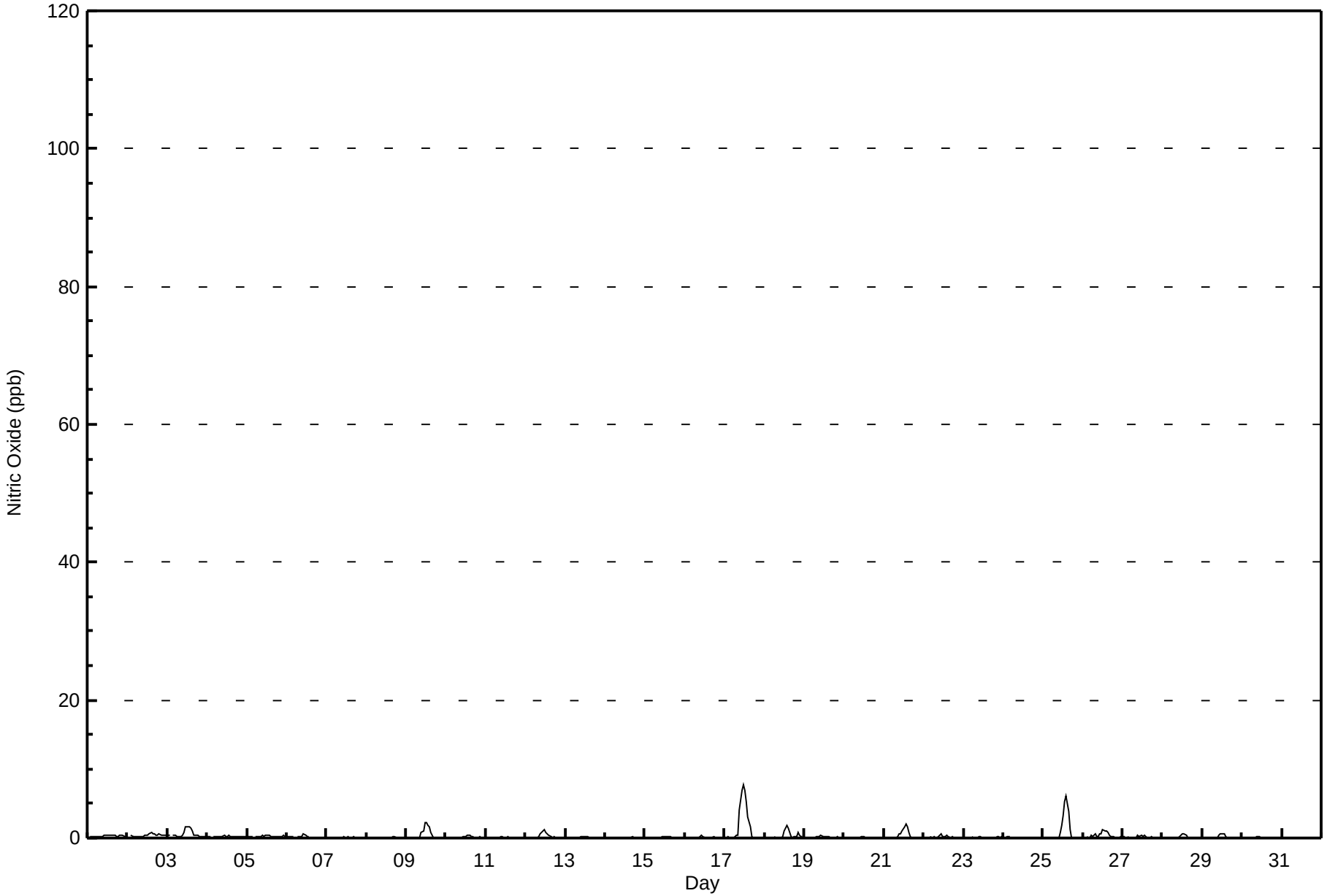
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort Chipewyan - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	100.00	100.00
21 - 40	0	0.00	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: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	13	12	18	63	133	43	24	16	13	7	16	25	64	78	52	42	619
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	13	12	18	63	133	43	24	16	13	7	16	25	64	78	52	42	619

Total Number of Valid Hours: 619

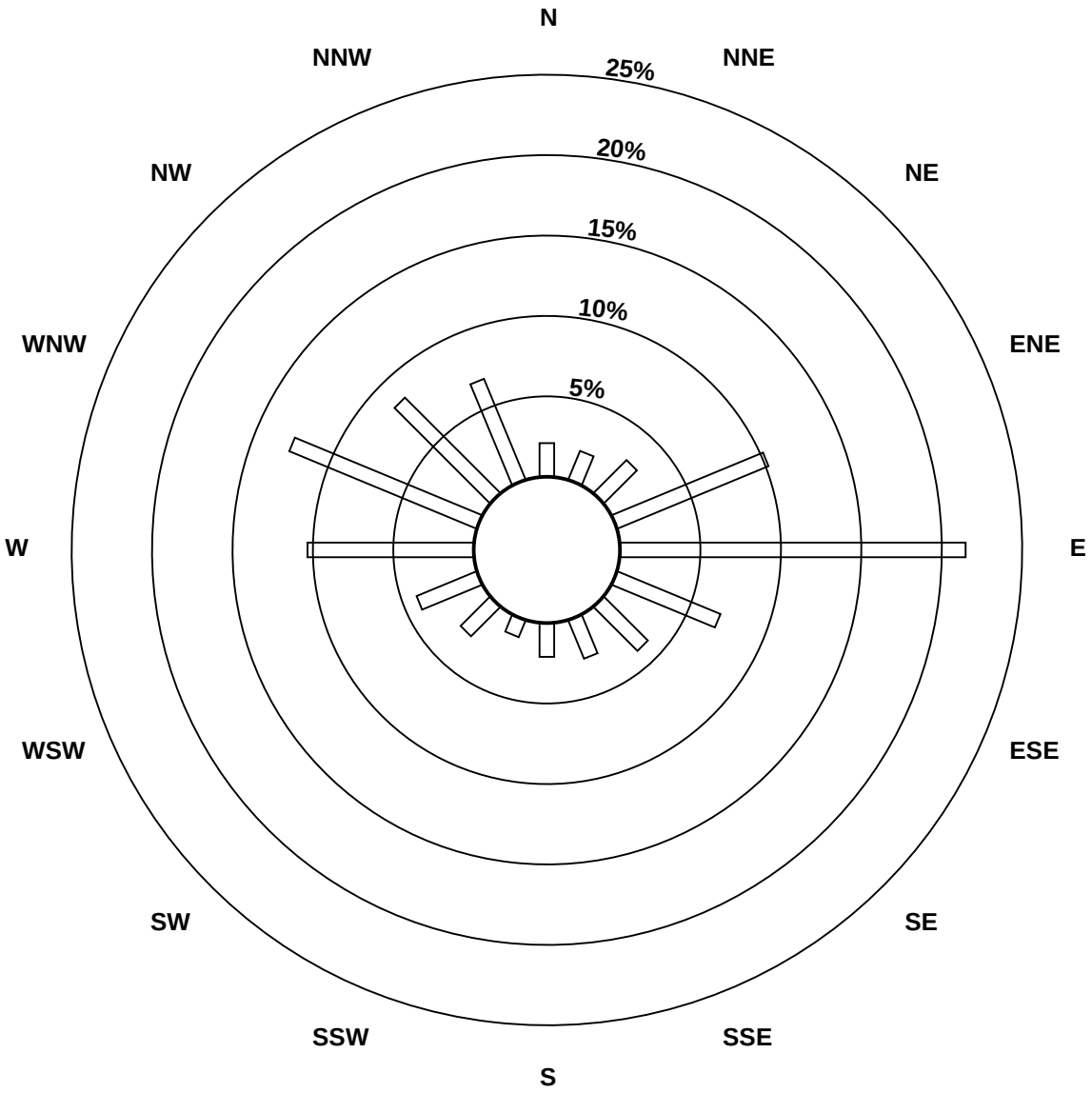
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Fort Chipewyan (AMS 8)



Classes (ppb)

0 - 20

21 - 40

11 - 80

81 - 159

> 159

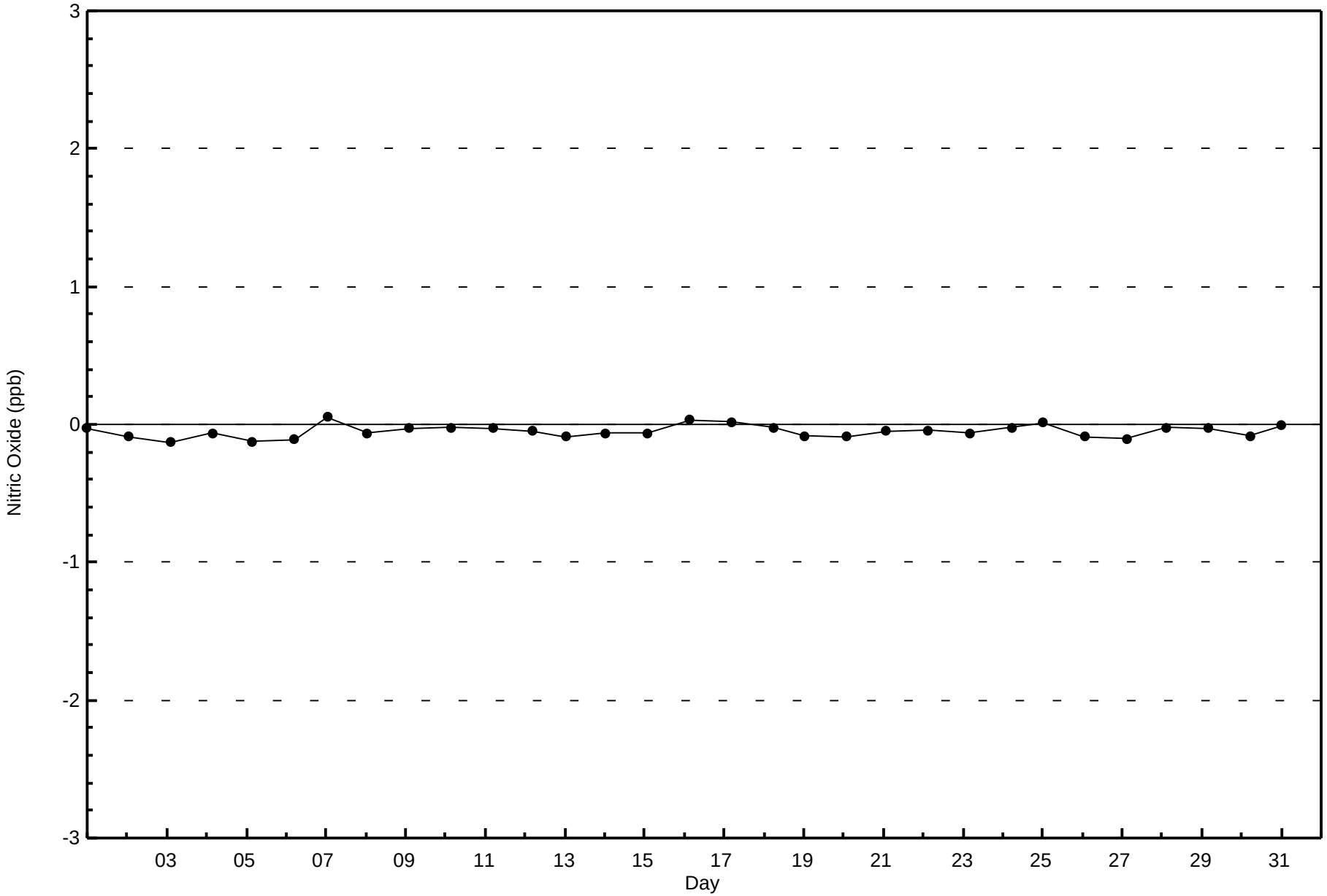
Total Number of Valid Hours: 619

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Fort Chipewyan - January 2016

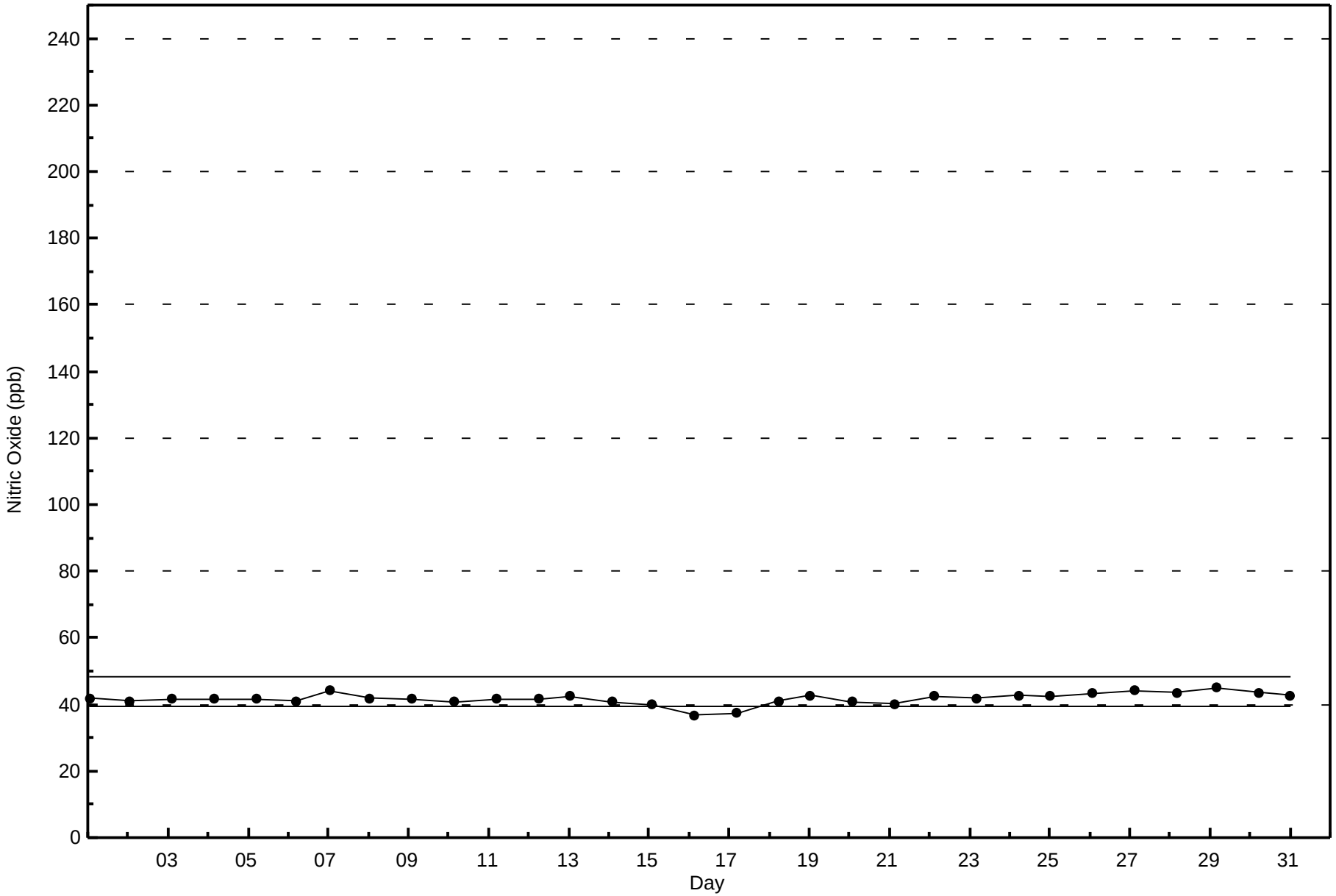


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort Chipewyan - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 21 ppb on Jan 17 09:00

Maximum Daily Average: 8.5 ppb on Jan 17

Minimum Value: 0 ppb on Jan 8 07:00

Minimum Daily Average: 0.2 ppb on Jan 8

Maximum Diurnal Average: 3.5 ppb at hour 17

Minimum Diurnal Average: 2.1 ppb at hour 24

Monthly Average: 2.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 1 $Q_3 = 3$ $P_{90} = 6$ $P_{99} = 14$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	37
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	4	4	3	3	4	4	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	3	3	3.9	5
2-Jan	3	Z	3	3	3	3	3	3	3	3	3	3	4	6	8	10	14	12	12	14	10	10	9	10	6.7	14
3-Jan	10	9	Z	6	6	6	4	4	4	4	7	10	11	11	13	14	13	8	6	4	4	3	3	3	7.0	14
4-Jan	2	3	3	Z	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2.5	3
5-Jan	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	3	5	2	3	5	5	4	6	3	2.8	6
6-Jan	4	4	3	3	2	Z	2	2	3	3	4	3	2	2	C	C	C	C	C	C	1	1	1	0	--	4
7-Jan	Z	1	0	0	0	0	0	0	1	0	1	1	0	1	0	0	1	0	0	M	M	0	0	0	0.4	1
8-Jan	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
9-Jan	2	5	Z	5	5	5	5	8	5	7	3	4	3	3	4	5	5	4	4	3	3	3	4	3	4.3	8
10-Jan	2	2	1	Z	2	1	1	1	2	1	2	1	1	1	2	2	2	2	1	1	1	0	0	0	1.3	2
11-Jan	0	0	0	0	Z	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0.3	1
12-Jan	0	2	4	2	2	Z	1	6	6	6	4	3	3	2	2	3	3	4	3	2	1	1	1	1	2.7	6
13-Jan	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0.6	1
14-Jan	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0.3	2
15-Jan	0	4	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	4
16-Jan	0	2	2	Z	1	2	2	1	2	1	2	1	0	0	0	0	1	2	1	1	1	4	2	1	1.3	4
17-Jan	1	1	6	1	Z	14	18	21	21	16	12	9	8	7	7	9	10	9	7	6	5	4	2	2	8.5	21
18-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	5	8	8	10	11	11	11	10	12	10	9	6	5.2	12
19-Jan	Z	2	1	1	1	2	2	2	2	2	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0.9	2
20-Jan	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Jan	1	1	Z	3	5	5	4	8	12	7	3	3	4	4	5	4	3	2	3	3	5	6	6	5	4.4	12
22-Jan	5	4	5	Z	10	5	4	3	2	2	2	1	1	1	2	2	2	2	1	1	1	1	1	1	2.5	10
23-Jan	1	1	1	1	Z	1	1	1	2	3	2	1	1	1	1	1	1	1	1	1	1	2	3	5	1.4	5
24-Jan	8	12	17	16	14	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3.6	17
25-Jan	Z	1	1	0	0	0	0	0	0	1	2	4	7	9	11	13	14	13	14	13	9	7	5	4	5.6	14
26-Jan	3	Z	3	2	2	8	3	7	2	2	3	3	4	4	4	4	6	5	4	4	3	3	4	4	3.8	8
27-Jan	4	3	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	4
28-Jan	1	0	0	Z	1	1	1	1	1	1	1	2	2	2	2	1	4	3	3	3	3	2	2	3	1.6	4
29-Jan	4	3	2	1	Z	1	1	0	0	0	1	1	1	1	1	0	1	0	1	1	2	1	2	1	1.2	4
30-Jan	1	1	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	0.5	2
	2.3	2.6	2.4	2.1	2.5	2.5	2.2	2.6	2.7	2.4	2.2	2.1	2.3	2.6	2.8	3.1	3.5	3.1	2.8	2.8	2.6	2.4	2.3	2.1	Diurnal Average	
	10	12	17	16	14	14	18	21	21	16	12	10	11	11	13	14	14	13	14	14	12	10	9	10	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

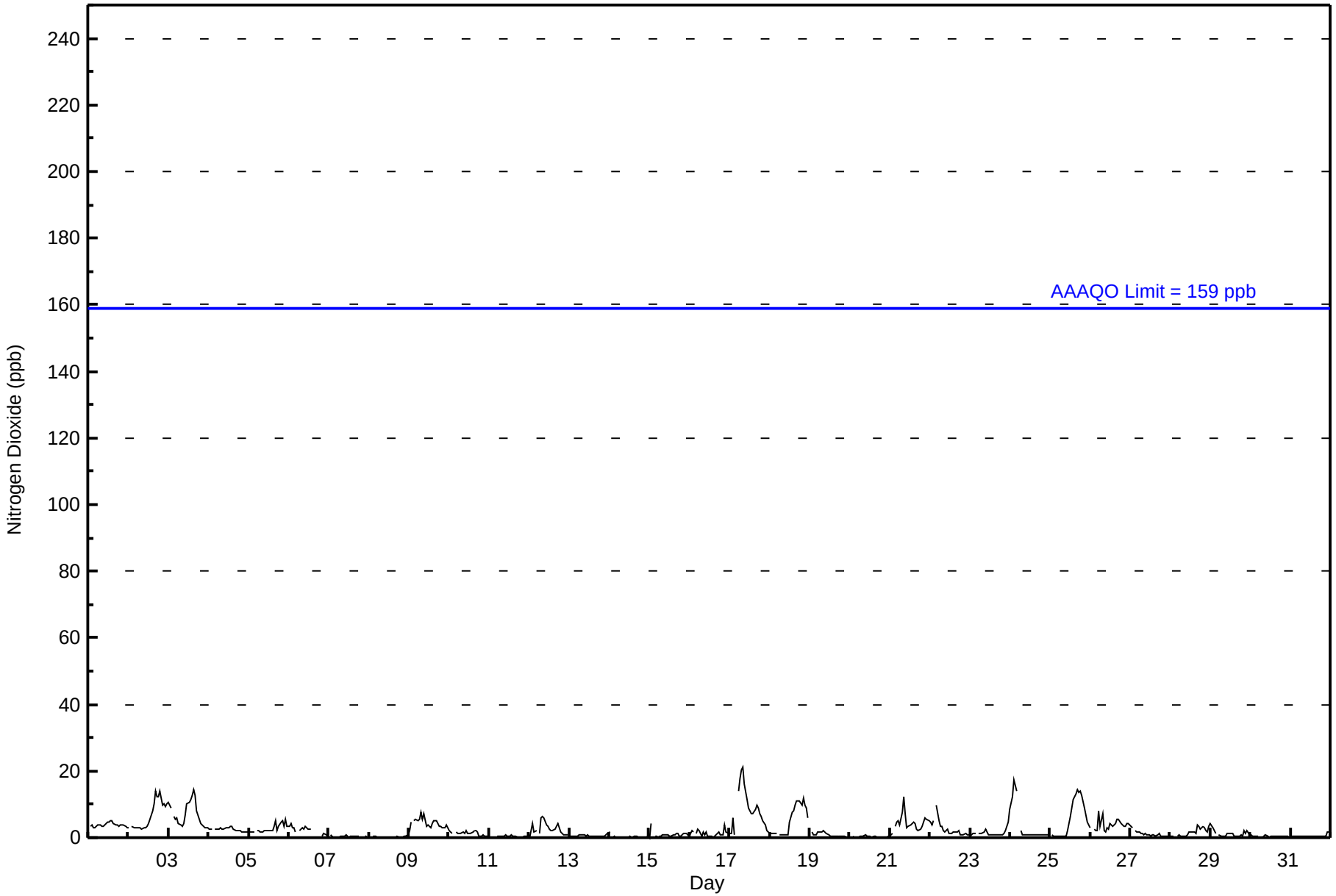
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	99.72	99.72
21 - 40	2	0.28	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: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	13	12	18	63	131	43	24	16	13	7	16	25	64	78	52	42	617
21 - 40	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	12	18	63	133	43	24	16	13	7	16	25	64	78	52	42	619

Total Number of Valid Hours: 619

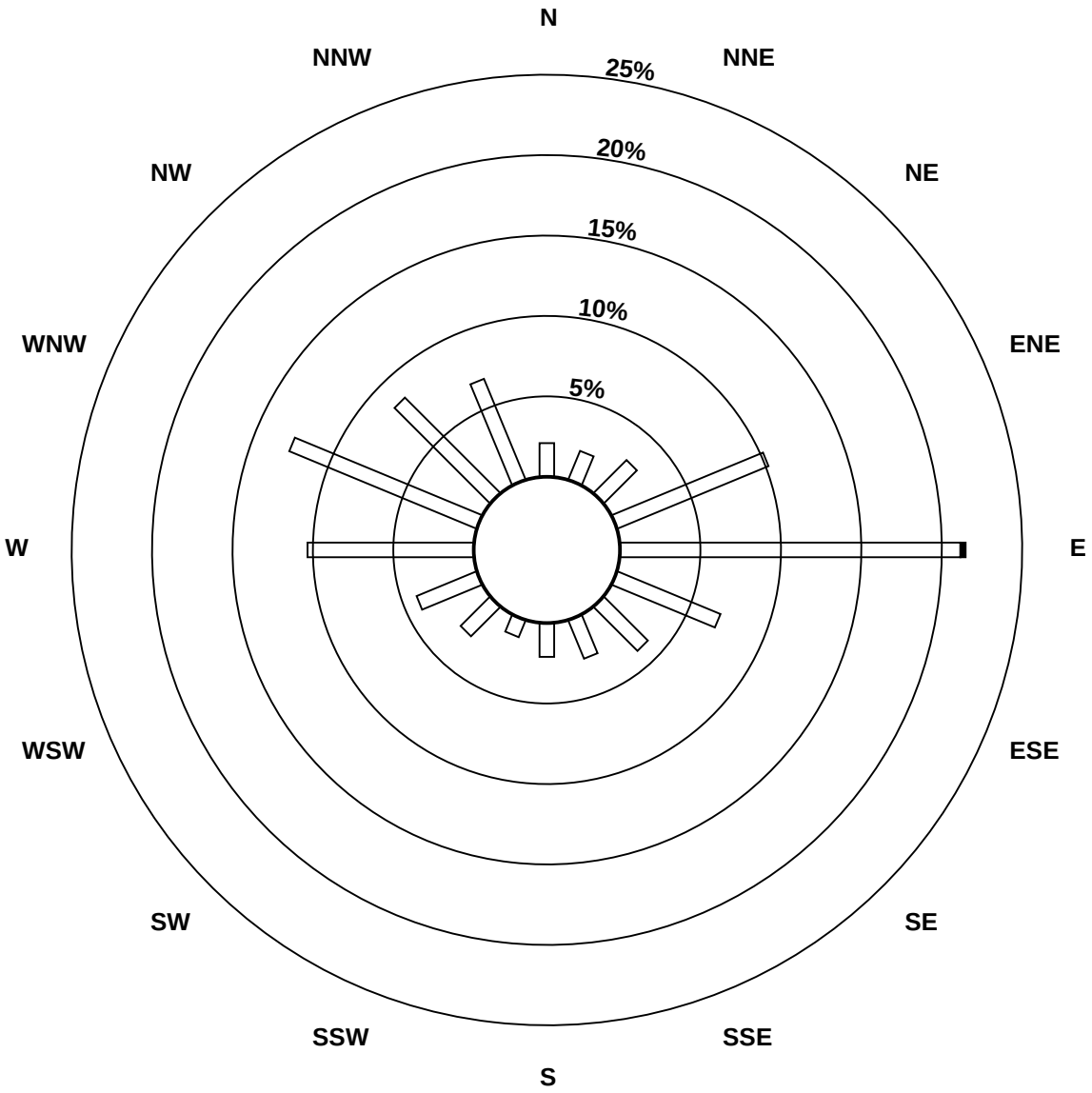
Total Number of Hours: 744

Wood Buffalo Environmental Association

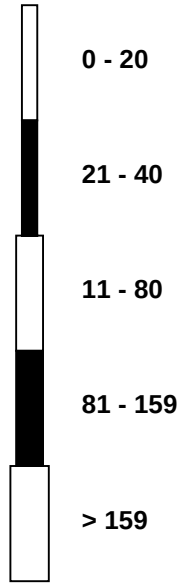
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan (AMS 8)



Classes (ppb)



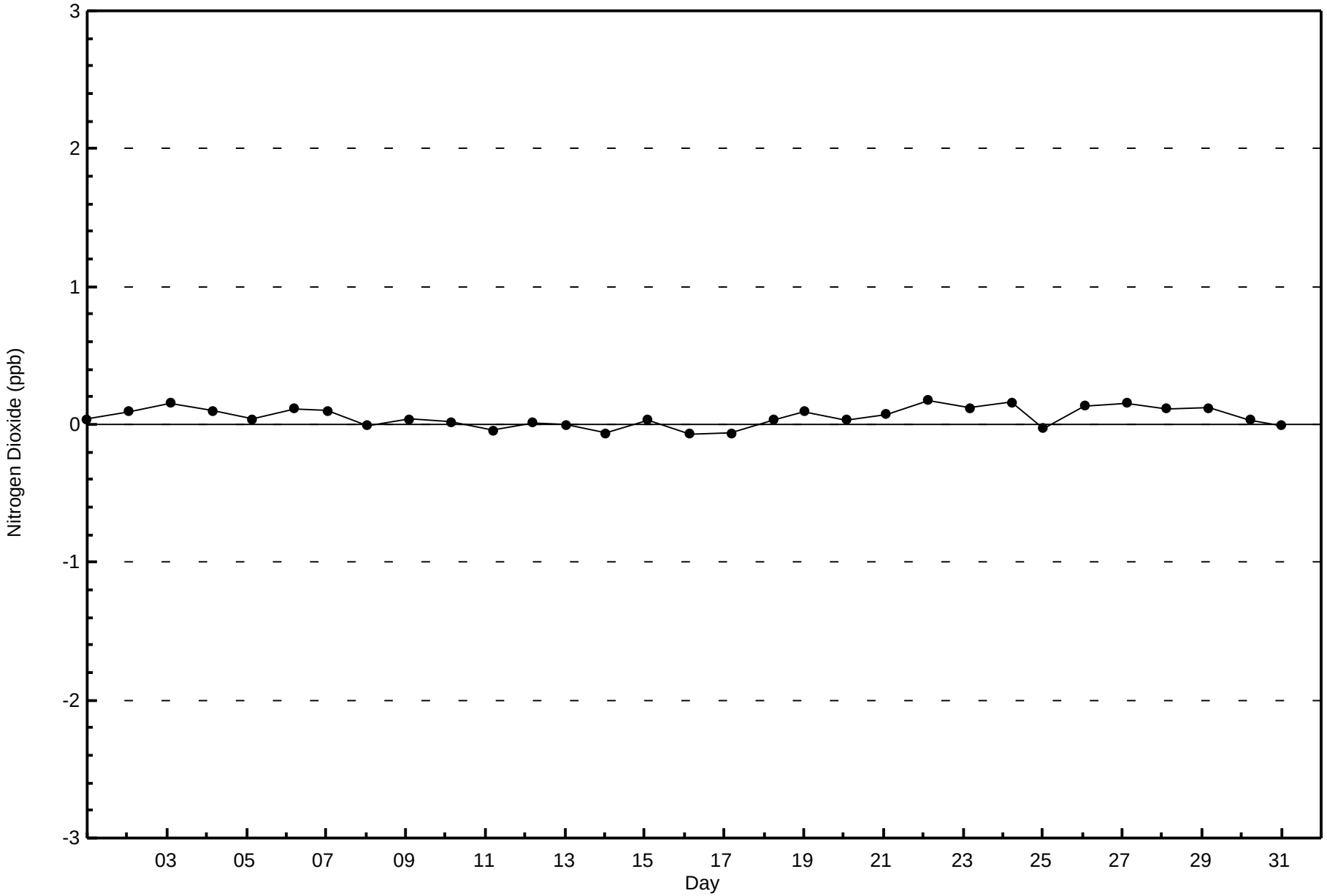
Total Number of Valid Hours: 619

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - January 2016

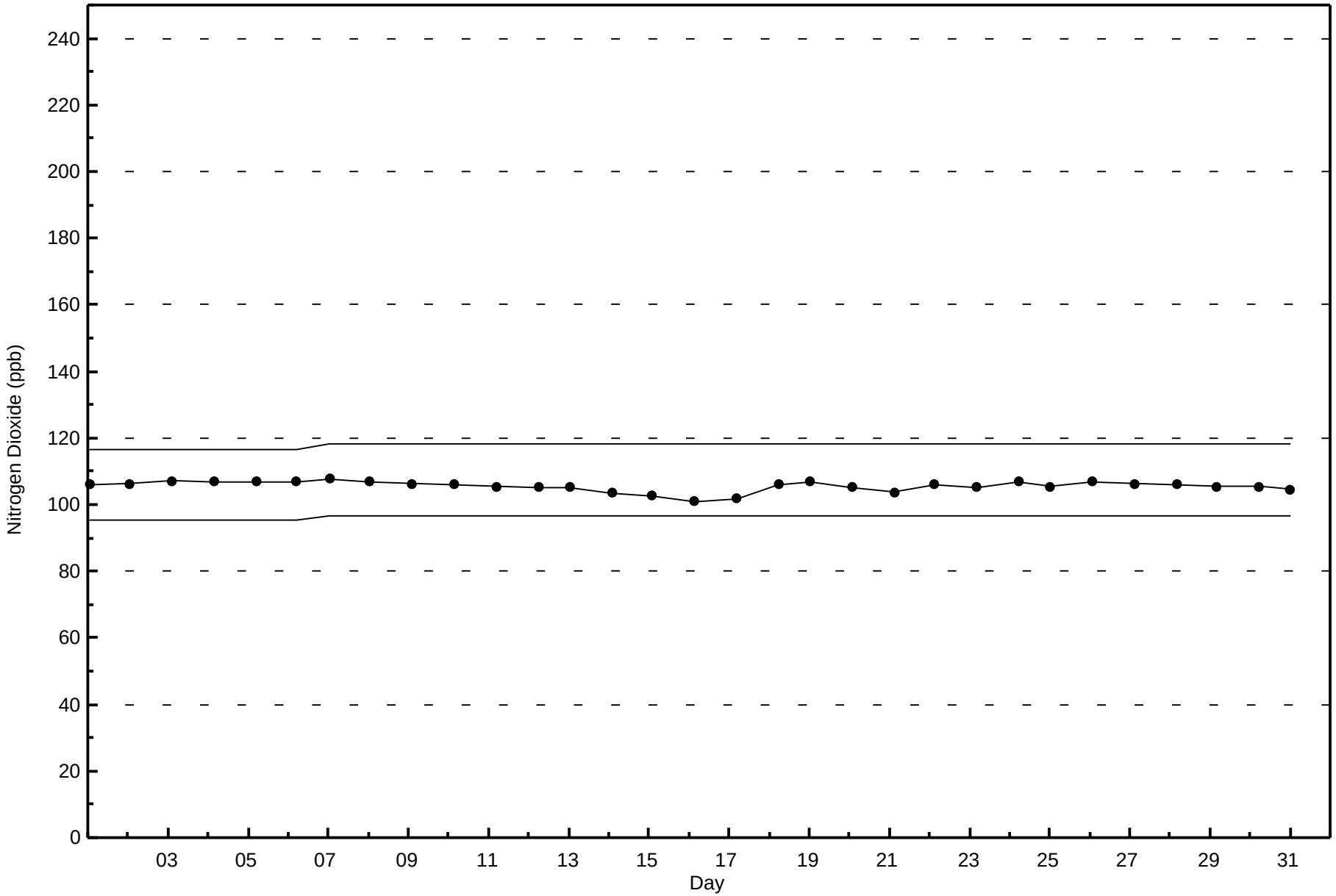


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - January 2016

Maximum Value: 21 ppb on Jan 17 09:00

Maximum Daily Average: 10.1 ppb on Jan 17

Minimum Value: 0 ppb on Jan 8 13:00

Minimum Daily Average: 0.3 ppb on Jan 8

Maximum Diurnal Average: 3.7 ppb at hour 17

Minimum Diurnal Average: 2.2 ppb at hour 24

Monthly Average: 2.8 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 1 $Q_3 = 4$ $P_{90} = 6$ $P_{99} = 18$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	37
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	4	4	3	3	4	4	4	4	4	4	5	5	5	5	5	4	4	4	4	4	4	4	3	4.2	5
2-Jan	3	Z	4	3	3	3	3	3	3	3	3	4	5	6	9	11	15	13	13	14	10	11	10	11	7.1	15
3-Jan	11	9	Z	7	6	6	5	4	4	5	7	12	12	13	14	15	13	8	6	5	4	3	3	3	7.6	15
4-Jan	3	3	3	Z	3	3	3	3	3	3	4	3	3	4	4	3	3	2	2	2	2	2	2	2	2.8	4
5-Jan	2	2	2	2	Z	2	2	2	2	2	3	3	2	3	2	3	5	2	3	5	5	4	6	4	3.0	6
6-Jan	4	4	3	3	2	Z	2	3	3	3	4	3	3	3	C	C	C	C	C	C	1	1	1	0	--	4
7-Jan	Z	1	0	0	0	0	0	0	1	1	1	1	0	1	0	0	1	0	0	M	M	0	0	0	0.4	1
8-Jan	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
9-Jan	2	5	Z	5	5	5	5	8	5	8	4	6	6	5	6	6	5	4	3	3	3	3	4	3	4.8	8
10-Jan	2	2	1	Z	2	1	1	1	2	2	2	2	1	2	2	2	2	2	1	1	1	1	0	0	1.4	2
11-Jan	0	0	0	0	Z	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Jan	0	2	4	2	2	Z	1	6	6	6	5	4	4	3	3	3	3	4	3	2	1	1	1	1	2.9	6
13-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0.7	1
14-Jan	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0.3	2
15-Jan	0	4	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0.9	4
16-Jan	0	2	2	Z	1	2	2	1	2	1	2	1	0	0	0	0	1	2	1	1	1	4	2	1	1.3	4
17-Jan	1	1	6	1	Z	14	18	21	21	20	19	17	15	13	10	10	10	9	7	6	5	4	2	2	10.1	21
18-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	6	9	10	10	11	11	11	10	13	10	9	6	5.6	13
19-Jan	Z	2	1	1	1	2	2	2	2	2	2	1	0	1	1	1	1	1	0	1	1	0	0	0	1.0	2
20-Jan	0	Z	0	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Jan	1	1	Z	3	5	5	4	8	12	8	3	4	5	7	6	5	3	2	2	3	5	6	6	5	4.8	12
22-Jan	5	4	5	Z	10	5	4	4	2	2	3	2	1	2	2	2	2	2	1	1	1	1	1	1	2.7	10
23-Jan	1	1	1	1	Z	2	1	1	2	3	2	1	1	1	1	1	1	1	1	1	1	2	3	5	1.5	5
24-Jan	8	12	18	16	14	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3.6	18
25-Jan	Z	1	1	0	0	0	0	0	0	1	3	6	10	14	18	17	16	14	14	13	9	7	5	4	6.6	18
26-Jan	3	Z	3	2	2	8	3	8	2	2	3	3	5	5	5	5	6	6	5	4	3	3	4	4	4.2	8
27-Jan	4	3	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4
28-Jan	0	0	0	Z	1	1	0	1	0	1	1	2	2	2	2	1	4	3	3	3	3	2	2	3	1.7	4
29-Jan	5	3	2	1	Z	1	0	0	0	2	2	2	2	1	1	1	0	1	1	2	1	2	1	1	1.3	5
30-Jan	1	1	0	1	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	2	0.5	2
	2.4	2.7	2.5	2.2	2.6	2.6	2.3	2.8	2.8	2.7	2.7	2.8	3.1	3.4	3.5	3.6	3.7	3.2	2.8	2.9	2.7	2.4	2.4	2.2	Diurnal Average	
	11	12	18	16	14	14	18	21	21	20	19	17	15	14	18	17	16	14	14	14	13	11	10	11	Diurnal Maximum	

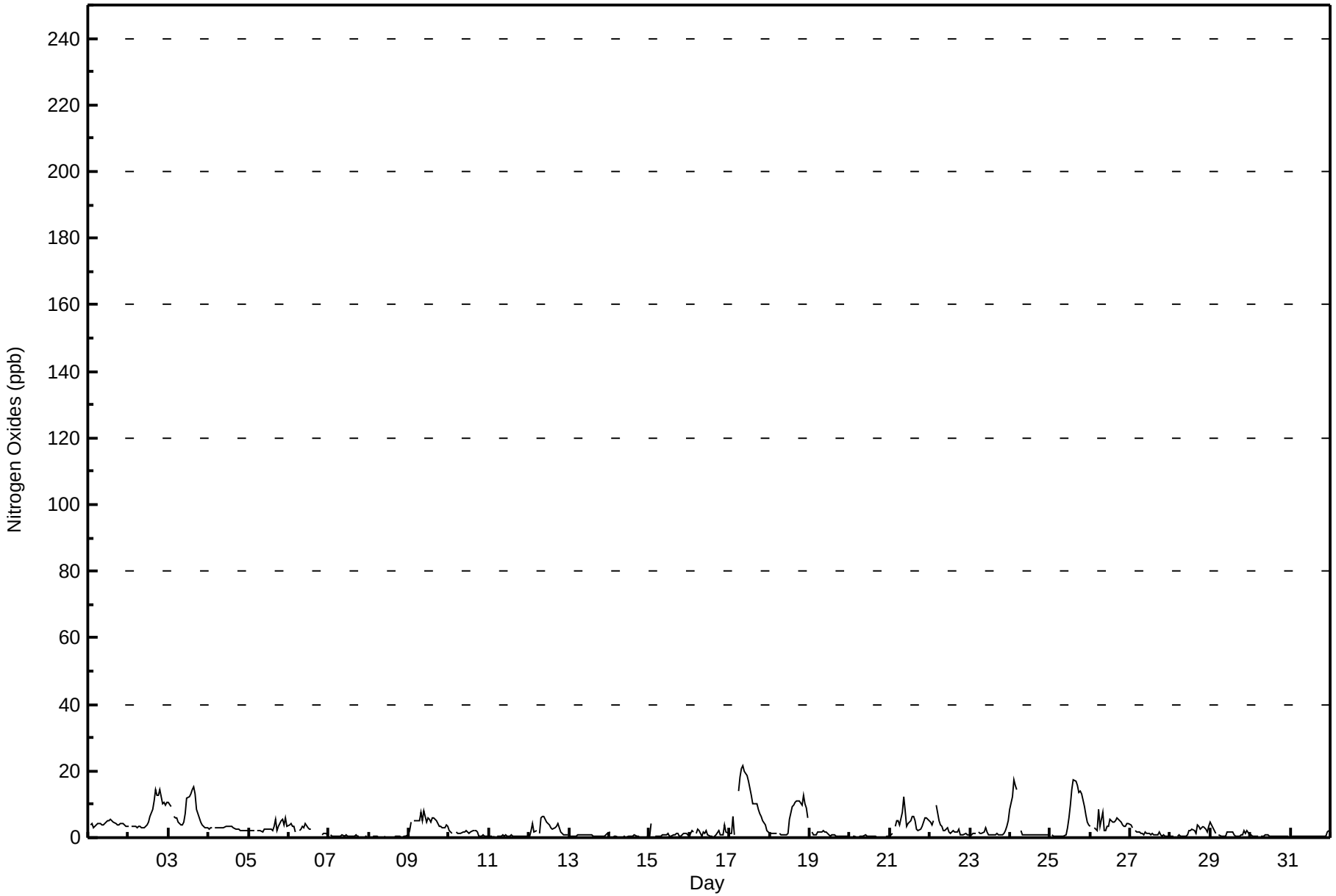
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - January 2016



Nitrogen Oxides (NO_X) - ppb
Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	99.72	99.72
21 - 40	2	0.28	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: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	13	12	18	63	131	43	24	16	13	7	16	25	64	78	52	42	617
21 - 40	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	12	18	63	133	43	24	16	13	7	16	25	64	78	52	42	619

Total Number of Valid Hours: 619

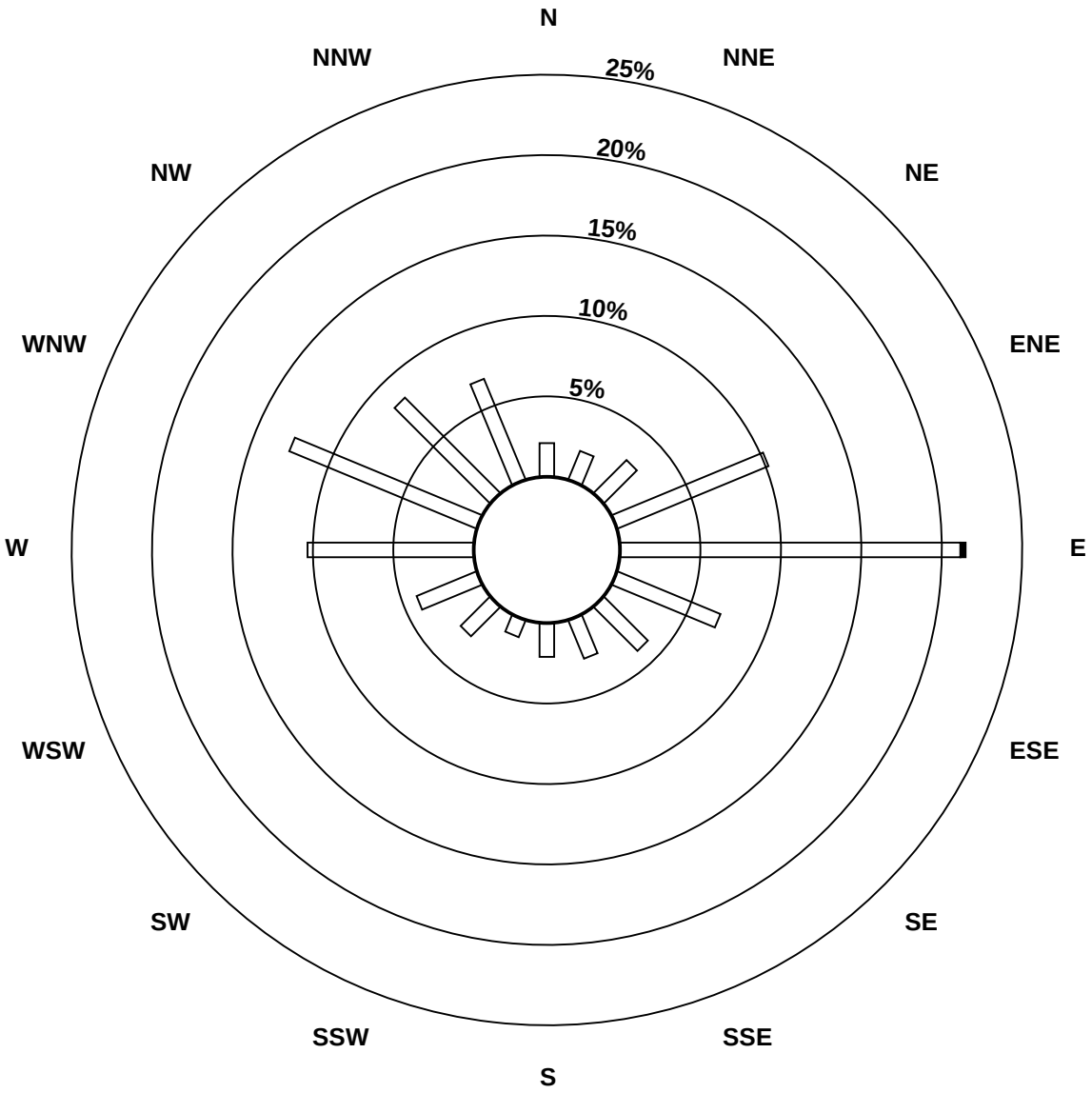
Total Number of Hours: 744

Wood Buffalo Environmental Association

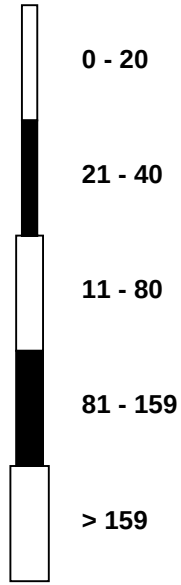
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan (AMS 8)



Classes (ppb)



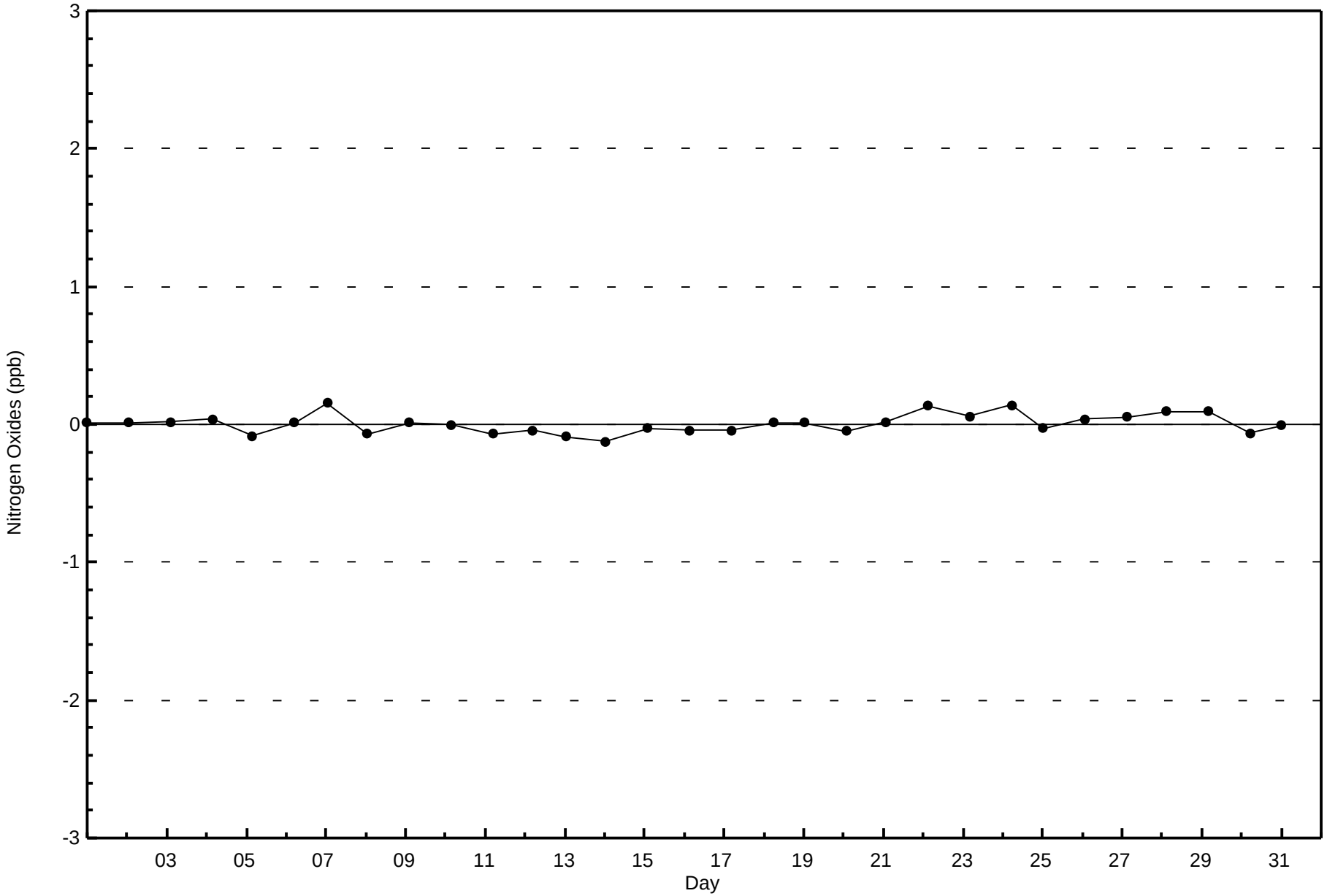
Total Number of Valid Hours: 619

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - January 2016

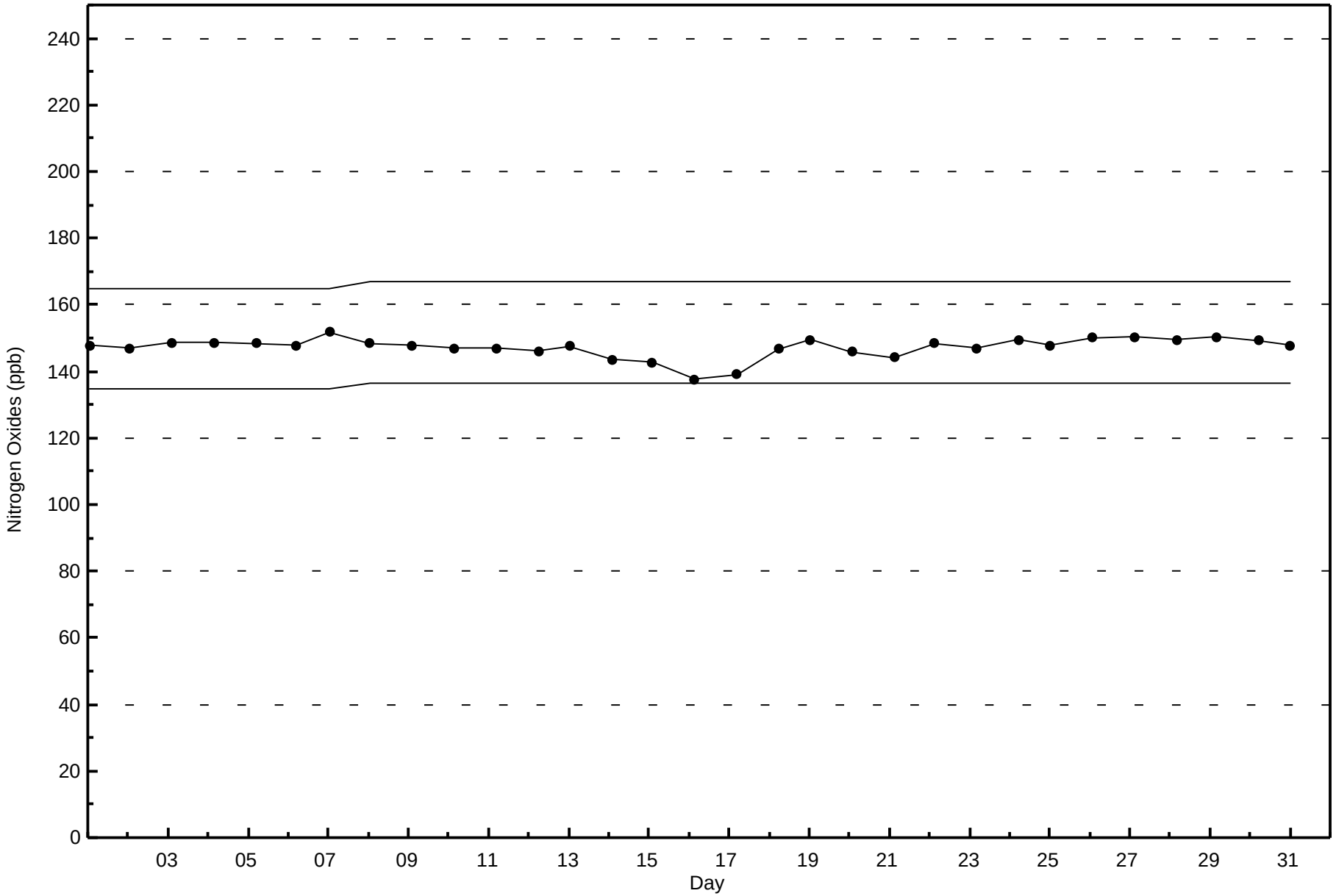


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Fort Chipewyan - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 40 ppb on Jan 18 10:00

Maximum Daily Average: 35.8 ppb on Jan 8

Minimum Value: 2 ppb on Jan 24 03:00

Minimum Daily Average: 17.3 ppb on Jan 24

Maximum Diurnal Average: 27.0 ppb at hour 14

Minimum Diurnal Average: 24.8 ppb at hour 4

Monthly Average: 26.5 ppb

Percentiles: $P_1 = 7$ $P_{10} = 19$ $Q_1 = 22$ Median = 27 $Q_3 = 31$ $P_{90} = 35$ $P_{99} = 38$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	34
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	29	29	27	Z	29	29	29	30	30	30	30	28	27	27	28	29	30	30	30	29	29	28	29	29	29.1	30
2-Jan	29	28	27	28	Z	28	28	27	29	27	26	25	24	22	20	17	13	15	15	12	14	14	15	13	21.5	29
3-Jan	13	14	16	18	20	Z	22	23	24	23	21	16	14	15	15	15	17	22	25	26	27	27	28	29	20.6	29
4-Jan	30	29	28	28	27	27	Z	25	25	25	24	24	25	25	24	26	27	27	27	27	26	25	25	26	26.2	30
5-Jan	26	26	25	25	24	24	22	Z	22	22	24	26	26	26	28	26	24	29	27	25	23	23	21	24	24.7	29
6-Jan	25	25	26	27	28	29	29	28	Z	28	32	32	32	31	29	28	25	24	24	33	33	34	35	36	29.3	36
7-Jan	36	36	37	Z	37	36	36	36	C	C	C	C	34	35	35	36	35	35	34	M	M	35	35	35	--	37
8-Jan	35	35	36	36	Z	36	36	36	M	36	36	36	37	37	36	36	36	36	36	36	35	35	34	33	35.8	37
9-Jan	30	26	26	23	22	Z	21	19	21	19	22	21	22	23	22	21	22	23	23	23	24	24	23	24	22.7	30
10-Jan	24	25	25	25	25	27	Z	26	26	25	24	25	25	24	23	22	22	21	27	29	29	29	29	30	25.6	30
11-Jan	30	30	29	29	29	28	28	29	29	M	31	32	34	35	35	32	31	28	28	28	27	26	24	24	29.4	35
12-Jan	25	23	22	25	23	25	25	20	Z	21	23	24	25	26	27	27	26	25	26	30	31	32	32	31	25.8	32
13-Jan	31	33	34	Z	34	33	32	33	34	35	35	35	35	35	35	35	36	36	36	36	37	37	38	38	34.9	38
14-Jan	37	37	37	36	Z	35	35	36	35	36	36	35	35	35	35	34	34	35	34	34	34	34	34	33	35.0	37
15-Jan	34	28	30	32	32	Z	32	32	31	31	32	32	32	32	32	33	32	32	33	33	32	32	32	32	32.0	34
16-Jan	33	31	31	30	31	29	Z	29	28	27	27	27	28	31	31	30	28	27	28	28	28	25	27	29	28.9	33
17-Jan	29	30	23	22	17	9	6	Z	5	10	15	18	19	20	22	21	21	23	24	26	29	31	35	36	21.4	36
18-Jan	36	36	35	36	37	38	38	39	Z	40	39	38	33	29	29	26	24	23	21	21	18	19	20	22	30.3	40
19-Jan	25	31	34	Z	31	26	25	25	24	24	25	29	32	32	32	31	31	30	30	30	30	32	33	32	29.4	34
20-Jan	31	31	31	30	Z	30	30	30	30	29	30	30	30	30	30	30	30	30	30	31	31	31	31	30	30.3	31
21-Jan	30	28	27	25	22	Z	21	17	11	16	20	18	17	17	17	18	20	22	22	21	19	18	18	19	20.2	30
22-Jan	20	21	18	7	10	14	Z	16	19	20	20	22	23	23	22	23	22	21	22	22	22	21	21	21	19.6	23
23-Jan	21	20	20	22	22	24	26	Z	24	23	26	27	26	26	28	28	28	28	28	29	26	23	19	15	24.3	29
24-Jan	10	6	2	3	4	8	17	20	Z	21	21	21	20	21	23	24	25	24	23	21	21	21	21	23	17.3	25
25-Jan	22	20	17	Z	19	20	22	23	23	25	24	22	20	17	15	14	13	14	13	13	16	18	20	21	18.8	25
26-Jan	22	22	22	22	Z	15	19	16	21	22	21	22	20	21	21	21	19	21	22	24	25	24	21	19	21.0	25
27-Jan	19	21	22	23	23	Z	22	22	23	22	22	22	22	22	23	23	22	22	22	22	22	21	22	22	22.0	23
28-Jan	23	24	25	25	27	28	Z	29	30	29	29	27	27	27	28	27	24	25	26	24	25	26	25	18	26.0	30
29-Jan	14	15	17	21	23	25	30	Z	32	31	29	30	29	28	28	28	28	29	28	27	25	25	24	25	25.6	32
30-Jan	23	21	21	21	21	27	27	27	Z	26	27	28	29	30	30	31	31	31	32	32	31	32	32	32	27.9	32
31-Jan	32	32	33	Z	33	33	33	33	33	33	33	33	33	34	34	34	34	34	34	34	34	34	33	32	33.1	34
	26.6	26.3	26.0	24.8	25.0	26.3	26.7	26.9	25.3	26.1	26.8	26.8	27.0	27.0	26.9	26.6	26.2	26.5	26.9	26.9	26.8	27.0	27.0	26.9	Diurnal Average	
	37	37	37	36	37	38	38	39	35	40	39	38	37	37	36	36	36	36	36	36	37	37	38	38	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

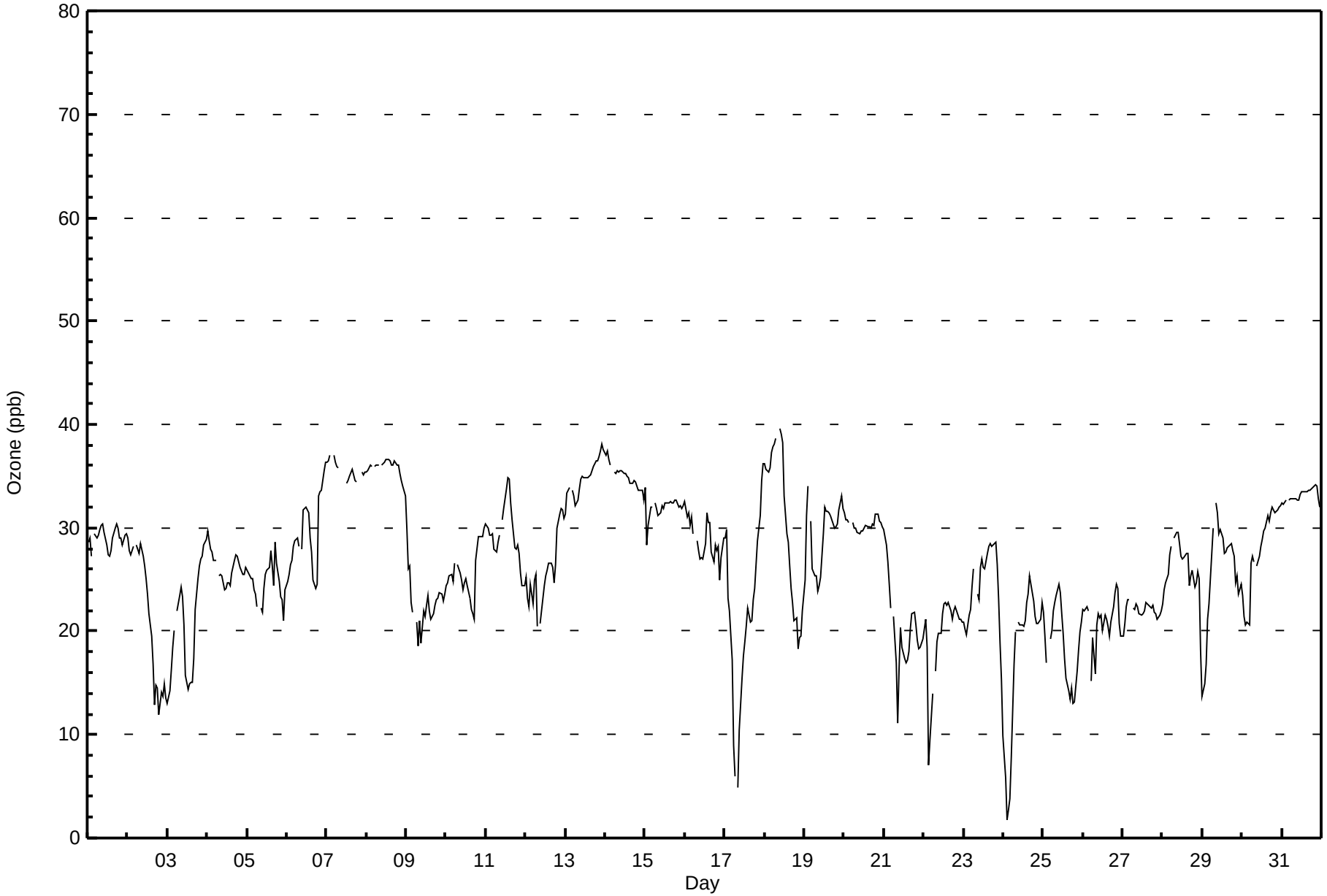
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Fort Chipewyan - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	98	13.88	13.88
21 - 50	608	86.12	100.00
51 - 82	0	0.00	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 (O_3) - ppb

Fort Chipewyan - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	1	0	0	1	30	11	6	4	8	4	6	9	2	9	2	1	94
21 - 50	10	14	22	63	104	31	19	11	5	3	8	17	62	69	49	40	527
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	11	14	22	64	134	42	25	15	13	7	14	26	64	78	51	41	621

Total Number of Valid Hours: 621

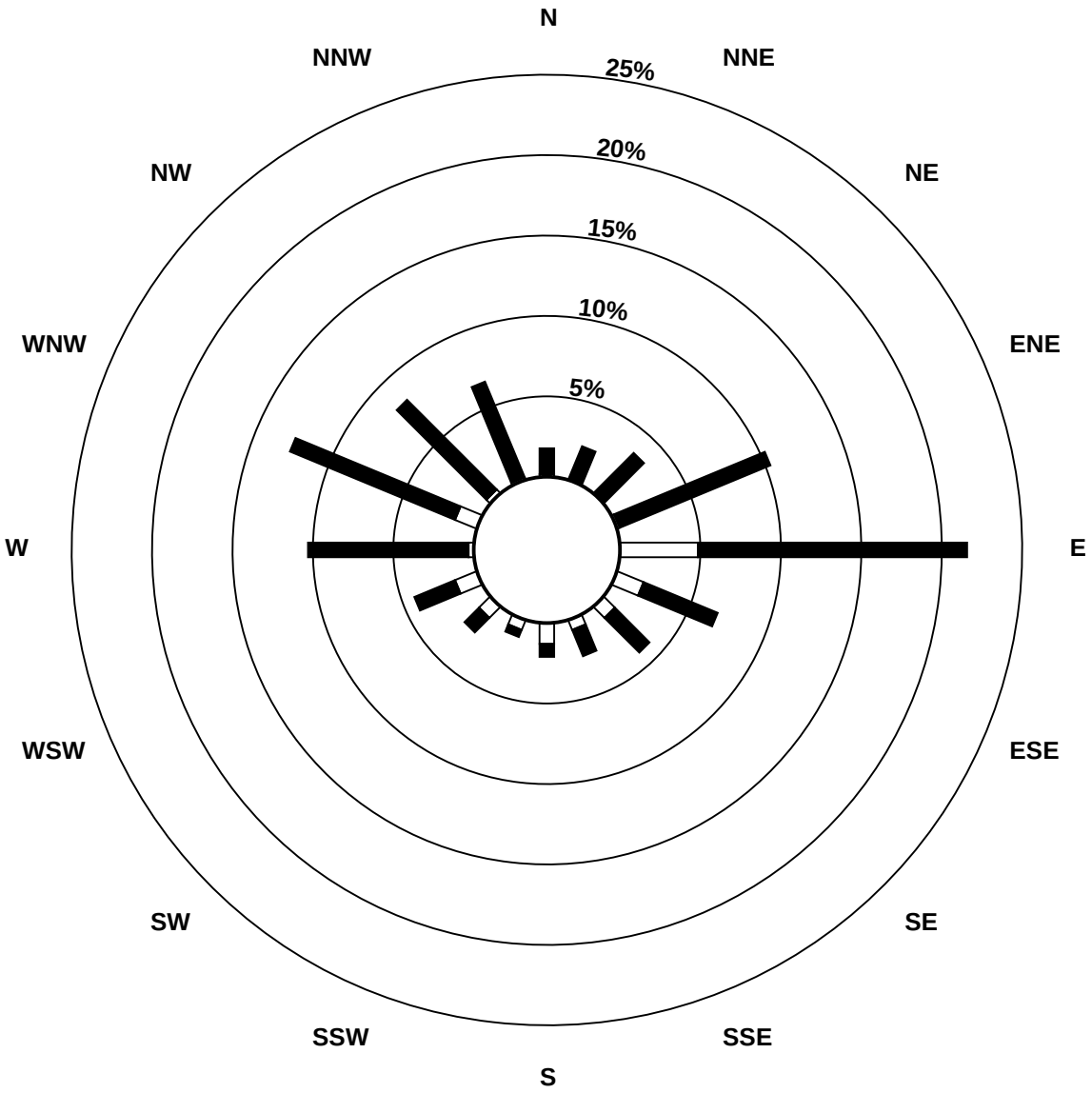
Total Number of Hours: 744

Wood Buffalo Environmental Association

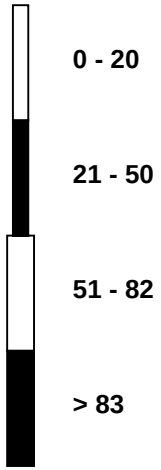
Wind Rose Jan 2016

Ozone (O_3) - ppb

Fort Chipewyan (AMS 8)



Classes (ppb)



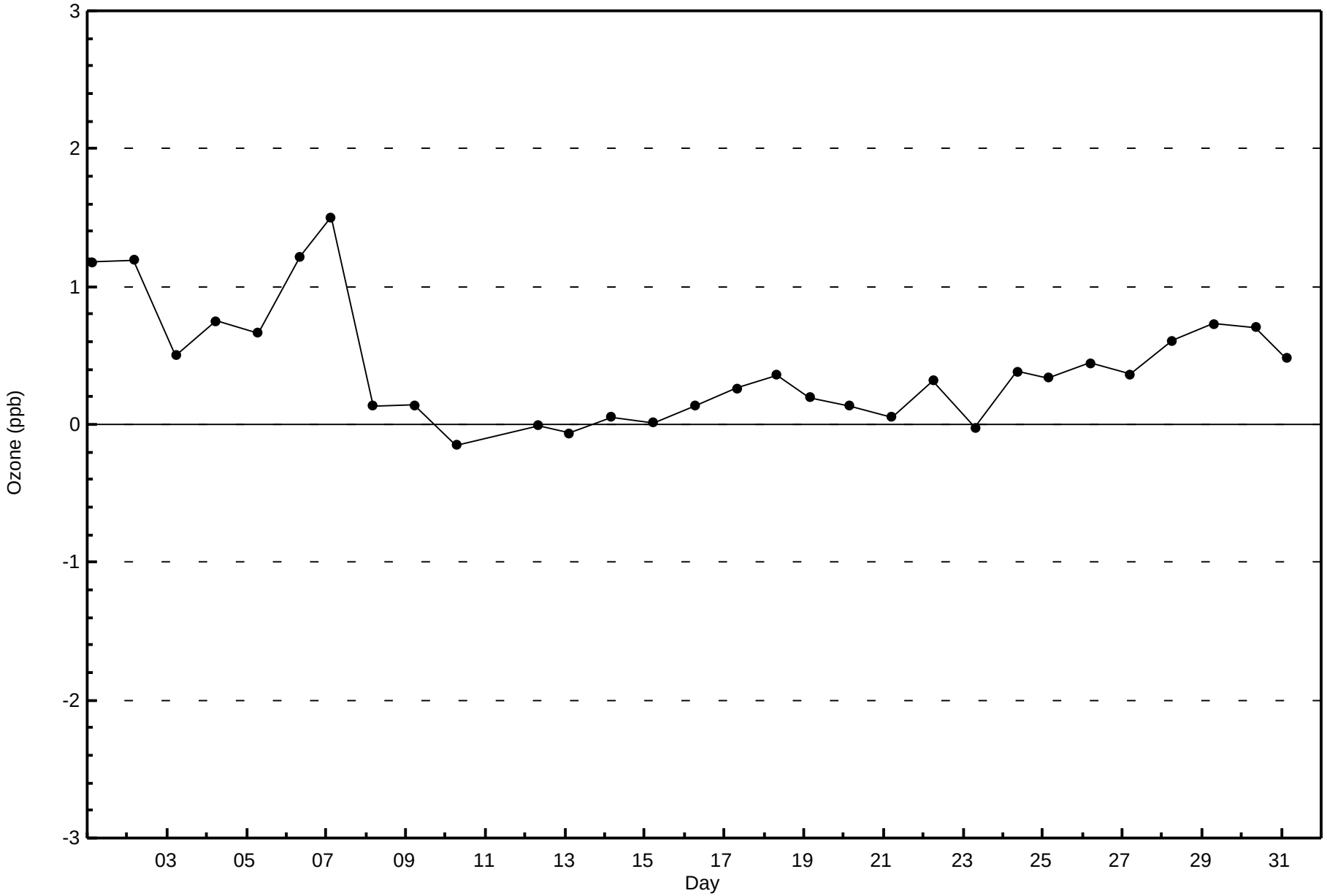
Total Number of Valid Hours: 621

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Fort Chipewyan - January 2016

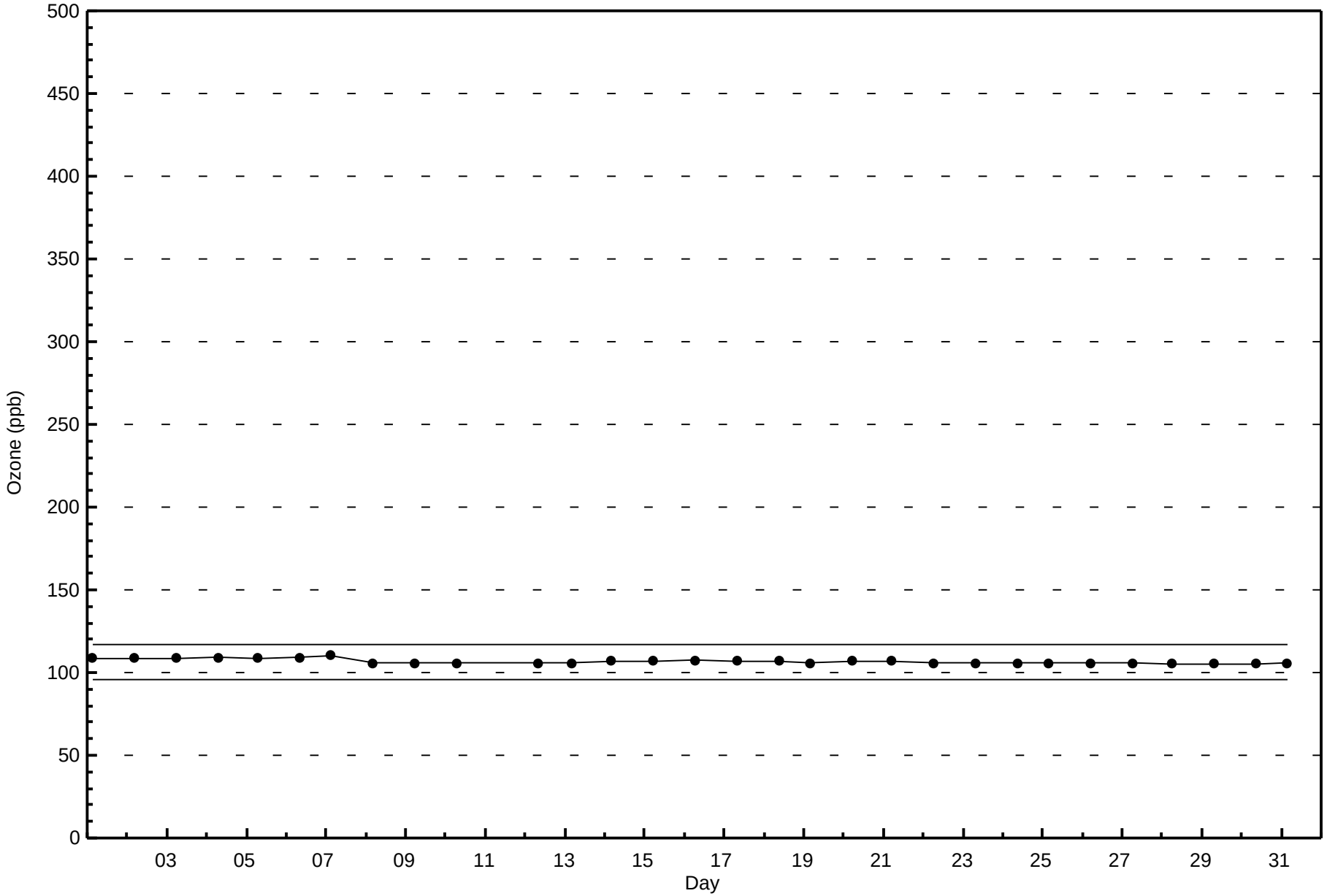


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Fort Chipewyan - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Fort Chipewyan - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 15.9 $\mu g/m^3$ on Jan 22 04:00

Maximum Daily Average: 7.6 $\mu g/m^3$ on Jan 21

Minimum Value: 0.5 $\mu g/m^3$ on Jan 7 21:00

Minimum Daily Average: 0.8 $\mu g/m^3$ on Jan 8

Maximum Diurnal Average: 4.2 $\mu g/m^3$ at hour 11

Minimum Diurnal Average: 3.5 $\mu g/m^3$ at hour 7

Monthly Average: 3.76 $\mu g/m^3$

Percentiles: $P_1 = 0.6$ $P_{10} = 1.4$ $Q_1 = 2.2$ Median = 3.3 $Q_3 = 4.7$ $P_{90} = 6.6$ $P_{99} = 11.2$

Hours in Service:	744
Hours of Data:	741
Hours of Missing Data:	3
Hours of Calibration:	2
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	3.1	3.7	3.8	3.5	3.6	3.4	3.1	2.9	2.8	3.3	3.5	3.4	3.1	2.8	2.8	2.4	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.3	2.9	3.8
2-Jan	2.5	2.3	2.0	1.9	1.9	2.0	2.1	2.4	1.9	1.9	1.9	2.0	2.1	2.1	2.2	2.3	2.7	2.8	3.6	4.0	3.6	3.9	3.8	4.2	2.6	4.2
3-Jan	6.2	7.1	7.2	6.8	6.8	6.8	5.8	5.6	5.5	5.8	6.8	8.1	7.8	8.1	7.5	8.0	8.6	7.9	7.1	9.5	9.7	6.8	6.8	7.1	7.2	9.7
4-Jan	6.2	5.8	7.4	5.9	5.5	5.6	5.5	6.5	5.6	5.6	5.1	4.8	4.4	4.1	3.7	3.6	3.6	3.5	3.4	3.3	3.3	3.3	3.3	3.1	4.7	7.4
5-Jan	3.7	3.1	2.9	2.9	3.0	2.8	2.5	2.6	2.7	2.8	2.8	3.1	3.3	2.6	2.5	3.8	3.3	2.1	2.3	3.7	3.1	2.4	3.3	2.4	2.9	3.8
6-Jan	3.3	3.8	3.0	2.9	2.7	2.7	2.5	2.5	2.8	3.0	13.5	6.5	4.9	5.9	5.0	C	C	2.1	2.3	2.1	2.2	1.8	0.9	1.2	3.5	13.5
7-Jan	1.3	0.9	0.8	0.7	0.8	0.9	1.1	1.2	0.9	0.6	0.7	0.8	0.8	0.8	0.8	0.6	0.8	0.7	0.7	0.7	0.5	0.6	0.7	0.7	0.8	1.3
8-Jan	0.7	0.7	0.6	0.6	0.7	0.6	0.5	0.5	M	0.8	0.7	0.7	0.7	0.7	0.8	0.9	1.0	1.4	1.2	0.8	0.8	0.8	0.8	1.0	0.8	1.4
9-Jan	1.1	1.3	1.3	1.3	1.3	1.3	1.4	3.1	1.9	2.8	1.9	2.7	2.6	2.7	4.0	4.0	3.6	3.4	3.2	3.2	2.8	2.6	3.6	3.3	2.5	4.0
10-Jan	2.5	2.2	2.2	2.8	3.4	2.7	2.7	2.8	3.5	4.0	4.0	4.0	3.8	3.8	3.6	3.6	4.5	5.1	2.4	2.2	2.2	2.2	2.2	2.0	3.1	5.1
11-Jan	2.0	2.4	2.0	2.0	1.8	1.8	1.7	1.7	1.5	1.5	1.3	1.4	2.0	1.7	1.1	1.1	1.3	2.6	1.7	1.6	1.4	2.0	2.0	3.5	1.8	3.5
12-Jan	1.6	4.0	3.7	3.2	2.6	1.2	1.4	3.0	2.8	3.1	3.0	3.1	3.7	2.4	2.3	2.5	3.6	5.7	4.0	2.3	2.2	1.8	1.9	2.2	2.8	5.7
13-Jan	2.0	1.5	1.4	1.5	1.6	1.8	2.1	2.2	2.0	1.7	1.8	1.5	1.5	1.5	1.6	1.6	1.7	2.0	2.4	1.9	1.9	2.2	2.0	1.8	1.8	2.4
14-Jan	1.5	1.3	2.0	4.2	1.8	1.3	1.3	1.6	2.0	2.4	1.9	1.8	1.8	1.8	1.9	2.0	3.3	2.5	2.2	2.1	2.0	2.1	2.3	3.1	2.1	4.2
15-Jan	4.7	4.1	3.8	3.7	3.7	3.9	3.6	3.8	4.1	4.3	3.8	4.1	3.1	3.1	3.5	3.7	3.8	3.2	2.8	3.4	5.4	3.4	3.7	3.6	3.8	5.4
16-Jan	2.7	2.7	2.7	3.1	3.0	3.0	2.3	3.6	6.3	6.5	6.6	2.9	1.5	1.5	1.3	1.4	2.1	1.4	3.3	3.3	5.3	6.0	4.2	6.2	3.5	6.6
17-Jan	4.7	3.2	6.4	1.6	2.0	4.6	8.7	11.5	12.0	11.5	8.2	7.2	6.4	6.1	4.5	4.9	4.4	3.7	3.4	3.1	2.5	2.0	1.6	1.4	5.2	12.0
18-Jan	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.6	1.9	2.2	2.4	2.7	4.1	3.3	6.4	4.3	5.8	6.3	6.5	4.1	2.8	6.5
19-Jan	4.1	3.4	2.8	2.3	2.7	4.1	4.4	3.7	4.1	4.7	3.9	3.2	2.7	2.6	2.0	1.8	1.7	2.5	3.9	2.9	2.0	2.5	1.8	2.0	3.0	4.7
20-Jan	2.3	3.5	3.0	2.9	3.0	2.9	3.0	3.0	4.1	3.7	5.2	4.1	2.8	2.8	2.6	2.7	2.6	2.5	2.5	2.1	2.1	2.2	2.2	2.3	2.9	5.2
21-Jan	2.5	3.2	4.1	5.2	6.0	5.8	4.8	6.6	9.0	6.7	6.1	7.9	11.0	13.3	13.4	11.7	7.6	6.4	7.5	8.9	9.0	8.8	8.4	7.8	7.6	13.4
22-Jan	7.8	7.4	8.4	15.9	13.8	10.4	8.8	7.7	6.0	5.8	6.6	7.3	8.7	7.3	6.5	6.2	6.1	6.2	5.0	5.2	5.2	5.5	5.5	6.4	7.5	15.9
23-Jan	5.8	6.2	6.4	5.7	5.7	5.2	4.7	6.0	5.8	5.3	4.8	4.6	5.2	5.2	4.8	5.0	5.6	5.7	5.6	5.5	7.2	8.1	9.0	8.7	5.9	9.0
24-Jan	9.4	10.7	10.6	10.7	11.0	11.0	9.8	9.8	7.4	6.2	6.3	6.8	6.5	6.6	5.5	6.9	5.6	5.3	4.4	4.7	5.0	5.2	5.6	4.5	7.3	11.0
25-Jan	4.3	4.0	3.9	4.3	4.5	4.7	4.3	4.3	4.4	4.6	5.5	5.1	6.3	9.9	12.8	11.1	9.0	8.4	7.5	7.3	6.0	4.9	4.1	4.1	6.1	12.8
26-Jan	3.9	3.5	3.3	3.1	2.7	3.4	2.8	5.7	2.7	4.9	3.6	2.8	3.5	3.3	3.3	3.6	4.3	3.8	3.5	3.5	3.8	4.5	5.8	4.2	3.7	5.8
27-Jan	4.2	4.4	4.1	4.4	4.5	4.7	4.4	5.3	5.1	5.1	5.2	4.8	4.9	4.5	4.1	3.9	3.9	5.4	3.9	4.2	4.1	4.8	5.0	4.5	4.6	5.4
28-Jan	4.8	4.9	4.6	4.2	3.3	3.1	3.1	3.2	3.2	3.4	3.4	3.0	2.9	2.9	3.0	3.3	3.3	3.3	3.0	3.3	3.3	4.3	3.2	3.1	3.5	4.9
29-Jan	3.6	4.0	4.5	4.6	5.1	4.2	3.6	3.6	3.5	3.2	3.2	2.4	3.1	3.2	3.1	2.7	2.6	2.3	2.6	2.5	2.5	3.8	4.1	2.8	3.4	5.1
30-Jan	2.5	2.5	2.5	2.6	2.7	2.5	2.4	2.5	2.7	2.9	3.0	2.9	3.6	3.5	3.6	3.2	4.8	4.2	3.1	3.1	2.6	3.1	3.6	3.4	3.1	4.8
31-Jan	3.3	3.9	3.8	3.8	3.7	3.3	3.2	3.3	3.1	2.8	3.5	3.3	2.6	2.7	2.3	2.3	2.8	3.7	3.8	4.7	3.5	2.6	4.3	4.7	3.4	4.7
	3.5	3.7	3.8	3.9	3.7	3.7	3.5	4.0	4.0	3.9	4.2	3.8	3.8	3.9	3.8	3.8	3.8	3.7	3.6	3.6	3.7	3.6	3.7	3.6	Diurnal Average	
	9.4	10.7	10.6	15.9	13.8	11.0	9.8	11.5	12.0	11.5	13.5	8.1	11.0	13.3	13.4	11.7	9.0	8.4	7.5	9.5	9.7	8.8	9.0	8.7	Diurnal Maximum	

C - Calibration M - Maintenance

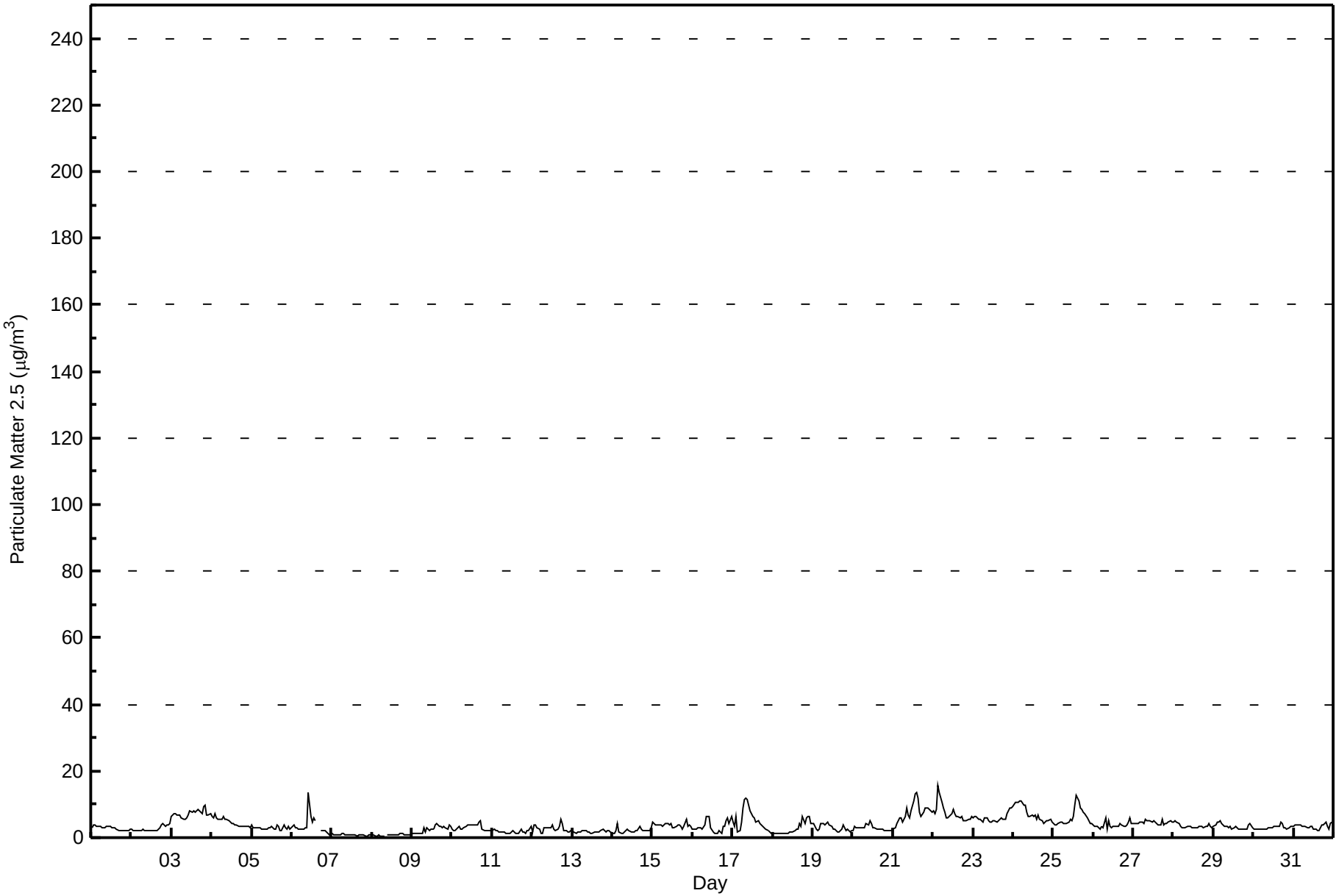
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Fort Chipewyan - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	563	75.98	75.98
6 - 15	136	18.35	94.33
16 - 25	1	0.13	94.47
26 - 80	0	0.00	94.47
> 81.0	0	0.00	94.47

Total Number of Valid Hours: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Fort Chipewyan - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	7	10	19	60	112	23	12	10	6	3	12	16	51	59	38	37	475
6 - 15	3	2	3	3	26	13	8	5	6	4	4	8	12	23	12	4	136
16 - 25	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	10	12	22	63	138	36	20	15	12	7	16	25	63	82	50	41	612

Total Number of Valid Hours: 653

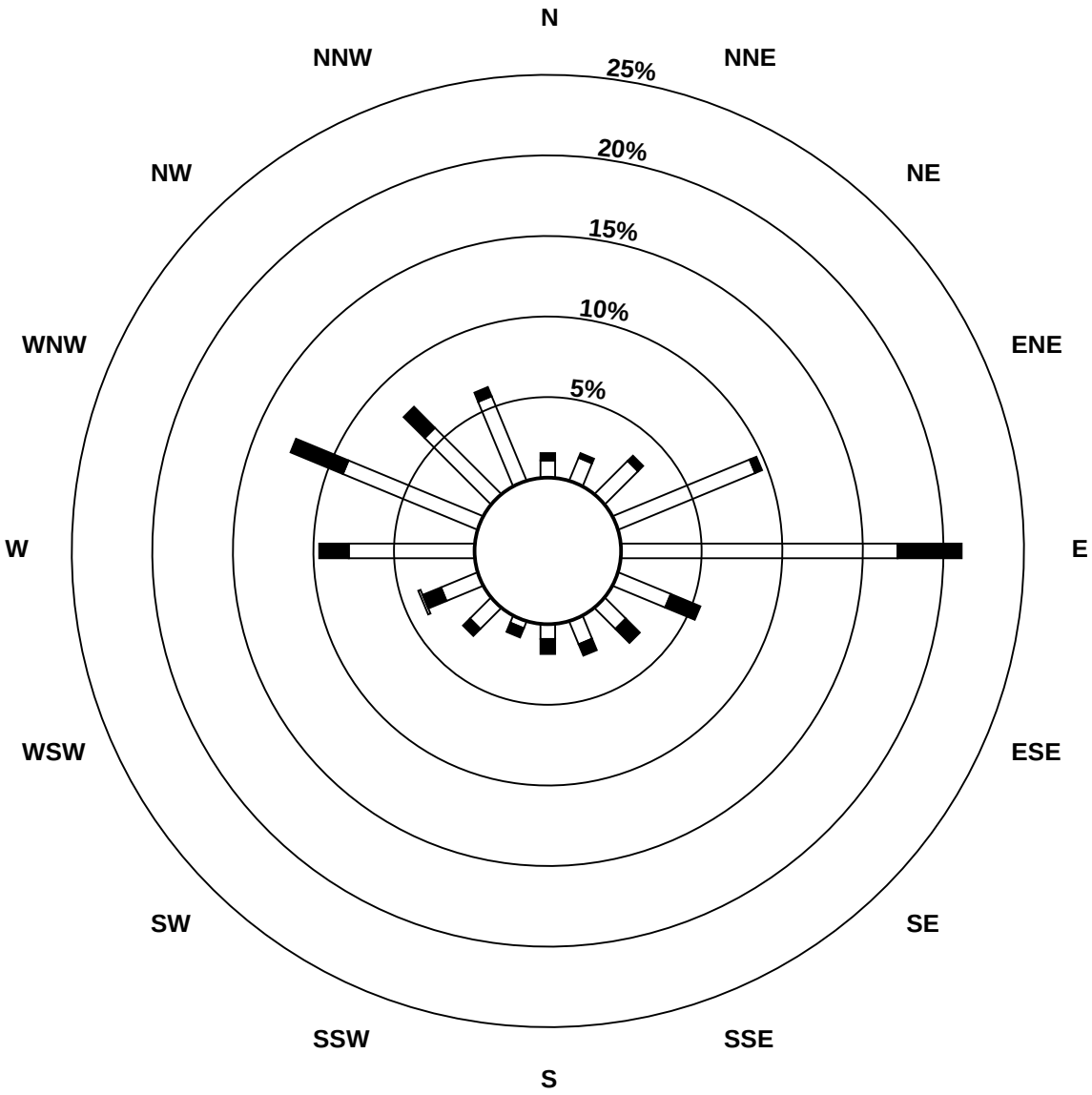
Total Number of Hours: 744

Wood Buffalo Environmental Association

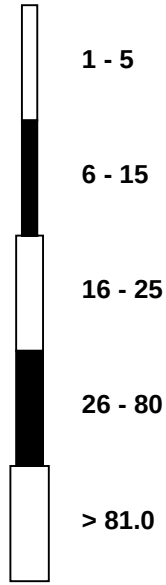
Wind Rose Jan 2016

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

Fort Chipewyan (AMS 8)



Classes ($\mu g/m^3$)



Total Number of Valid Hours: 653

Maximum Value: 0.1 C on Jan 29 04:00

Maximum Daily Average: -2.4 C on Jan 29

Minimum Value: -32.1 C on Jan 16 09:00

Minimum Daily Average: -28.8 C on Jan 16

Maximum Diurnal Average: -13.8 C at hour 16

Minimum Diurnal Average: -15.4 C at hour 7

Monthly Average: -14.67 C

Percentiles: P_1 = -30.2 P_{10} = -24.4 Q_1 = -19.7 Median = -14.6 Q_3 = -9.3 P_{90} = -5.2 P_{99} = -0.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

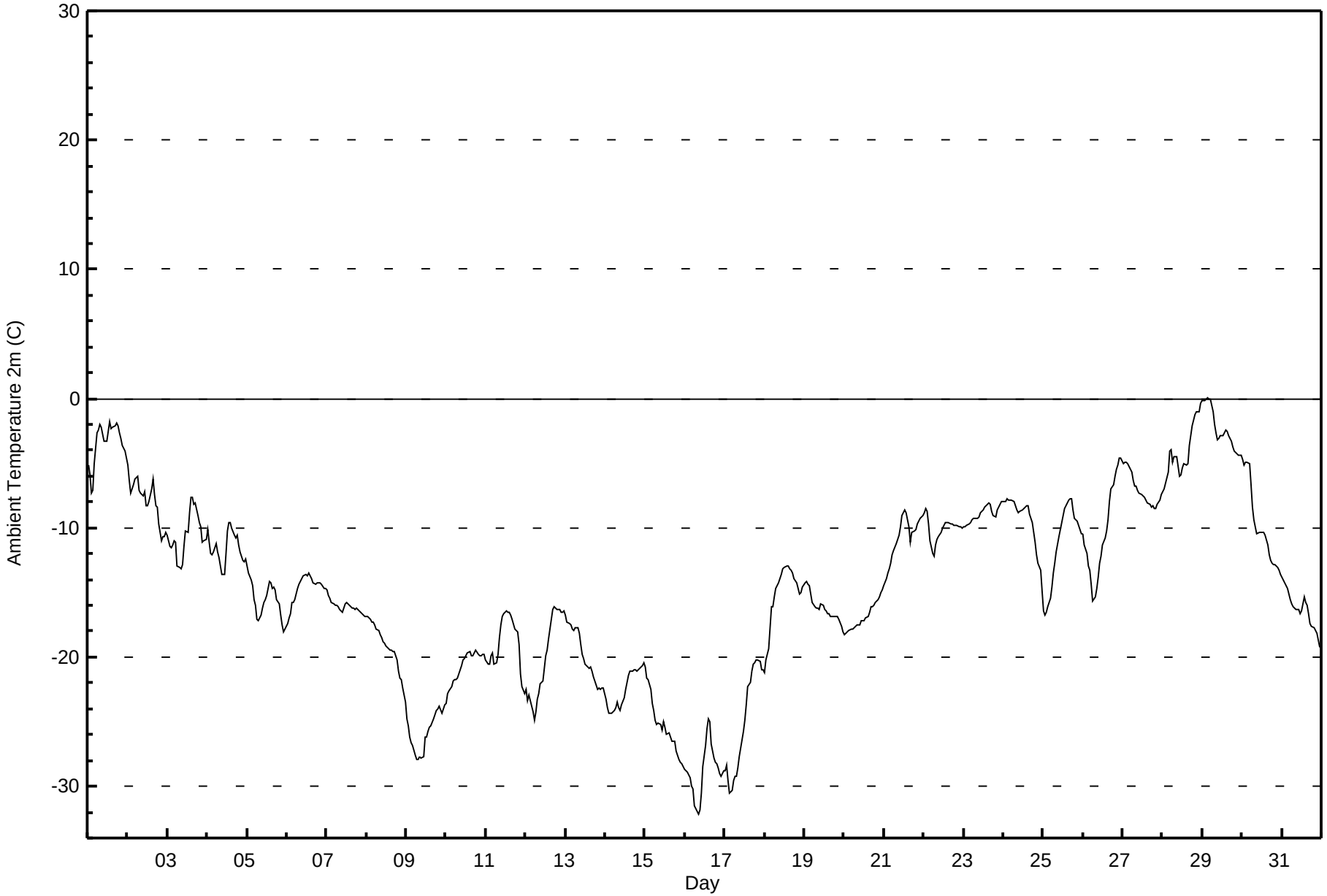
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-5.2	-5.9	-7.3	-7.1	-5.0	-2.6	-2.4	-2.0	-2.3	-2.8	-3.3	-3.3	-2.5	-1.8	-2.3	-2.3	-2.2	-1.8	-2.1	-2.6	-3.1	-3.6	-4.1	-4.6	-3.4	-1.8
2-Jan	-5.1	-6.3	-7.4	-6.7	-6.2	-6.1	-6.0	-7.1	-7.3	-7.5	-7.2	-8.3	-8.3	-7.9	-7.0	-6.2	-7.5	-8.3	-8.4	-9.7	-11.0	-10.6	-10.7	-10.4	-7.8	-5.1
3-Jan	-10.6	-11.5	-11.5	-11.3	-11.0	-11.1	-12.9	-13.0	-13.1	-12.8	-11.4	-10.2	-10.4	-8.8	-7.7	-7.6	-8.1	-8.0	-9.0	-9.5	-10.0	-11.1	-11.0	-10.9	-10.5	-7.6
4-Jan	-10.2	-11.2	-12.0	-12.0	-11.9	-11.3	-11.9	-12.3	-12.9	-13.6	-13.6	-12.0	-10.3	-9.5	-9.6	-10.0	-10.6	-10.8	-10.5	-11.3	-11.8	-12.5	-12.6	-12.5	-11.5	-9.5
5-Jan	-12.9	-13.5	-14.1	-14.5	-15.6	-16.0	-17.0	-17.2	-16.8	-16.2	-15.7	-15.6	-15.2	-14.2	-14.2	-14.7	-14.6	-14.8	-15.6	-15.9	-16.7	-17.5	-18.0	-17.8	-15.6	-12.9
6-Jan	-17.4	-16.9	-16.6	-15.8	-15.8	-15.5	-14.7	-14.4	-14.1	-14.0	-13.7	-13.6	-13.7	-13.5	-13.7	-13.9	-14.2	-14.4	-14.3	-14.3	-14.3	-14.4	-14.6	-14.7	-14.7	-13.5
7-Jan	-14.8	-15.2	-15.5	-15.8	-15.9	-16.0	-16.0	-16.1	-16.4	-16.5	-16.2	-15.9	-15.8	-15.9	-15.9	-16.2	-16.2	-16.3	-16.3	-16.3	-16.6	-16.7	-16.8	-16.9	-16.1	-14.8
8-Jan	-16.8	-16.9	-17.1	-17.3	-17.3	-17.5	-17.8	-17.9	-18.3	-18.5	-18.9	-19.0	-19.2	-19.4	-19.5	-19.4	-19.5	-19.6	-20.2	-21.0	-21.6	-21.8	-22.4	-23.5	-19.2	-16.8
9-Jan	-24.8	-25.3	-26.2	-26.6	-26.9	-27.6	-27.9	-27.9	-27.7	-27.8	-27.7	-26.2	-26.2	-25.8	-25.4	-25.3	-24.8	-24.4	-24.1	-24.0	-23.8	-24.4	-24.0	-23.7	-25.8	-23.7
10-Jan	-23.6	-22.8	-22.6	-22.3	-21.8	-21.8	-21.7	-21.6	-21.0	-20.6	-20.2	-20.2	-19.9	-19.6	-19.6	-19.9	-19.9	-19.7	-19.5	-19.8	-19.8	-19.9	-19.8	-19.8	-20.7	-19.5
11-Jan	-20.2	-20.6	-20.5	-19.9	-19.7	-20.6	-20.5	-19.8	-18.5	-17.5	-16.9	-16.6	-16.5	-16.6	-16.5	-16.7	-17.0	-17.8	-17.9	-18.1	-19.0	-21.3	-22.3	-22.8	-18.9	-16.5
12-Jan	-22.5	-23.4	-22.9	-23.3	-24.2	-24.8	-24.3	-23.2	-22.8	-22.1	-21.9	-20.9	-19.9	-19.4	-18.6	-17.1	-16.3	-16.1	-16.2	-16.3	-16.3	-16.5	-16.5	-16.4	-20.1	-16.1
13-Jan	-16.7	-17.3	-17.5	-17.5	-17.8	-18.0	-17.7	-17.7	-18.2	-19.0	-19.8	-20.1	-20.5	-20.8	-20.9	-20.8	-21.1	-21.5	-22.2	-22.5	-22.4	-22.5	-22.4	-22.4	-19.9	-16.7
14-Jan	-23.2	-23.9	-24.3	-24.4	-24.3	-24.2	-23.9	-23.5	-24.0	-24.1	-23.7	-23.2	-22.6	-22.0	-21.4	-21.1	-21.0	-21.0	-21.0	-21.1	-21.0	-20.8	-20.6	-20.5	-22.5	-20.5
15-Jan	-20.7	-21.7	-21.7	-22.5	-23.6	-24.1	-24.8	-25.2	-25.1	-25.2	-25.6	-25.0	-25.4	-26.0	-25.8	-26.2	-26.5	-26.5	-26.6	-27.3	-27.9	-28.1	-28.3	-28.4	-25.3	-20.7
16-Jan	-28.7	-29.0	-29.1	-29.4	-30.0	-30.2	-31.5	-31.9	-32.1	-31.9	-30.5	-28.5	-26.8	-25.6	-24.8	-25.0	-26.7	-27.8	-28.1	-28.3	-28.6	-29.0	-29.2	-28.8	-28.8	-24.8
17-Jan	-28.8	-28.3	-29.6	-30.5	-30.3	-29.5	-29.2	-29.2	-28.6	-27.7	-26.4	-25.7	-24.9	-23.7	-22.2	-22.0	-21.1	-20.6	-20.4	-20.2	-20.2	-20.4	-21.0	-21.0	-25.1	-20.2
18-Jan	-21.2	-20.2	-19.3	-17.8	-16.1	-16.1	-15.4	-14.6	-14.2	-14.0	-13.6	-13.1	-13.1	-13.0	-13.0	-13.2	-13.3	-13.5	-13.9	-14.2	-14.6	-15.1	-15.0	-14.6	-15.1	-13.0
19-Jan	-14.3	-14.2	-14.3	-14.5	-15.2	-15.8	-16.2	-16.2	-16.2	-16.3	-15.9	-16.0	-16.3	-16.5	-16.7	-16.7	-16.8	-16.9	-16.9	-16.9	-16.9	-17.1	-17.7	-18.0	-16.2	-14.2
20-Jan	-18.2	-18.2	-18.0	-18.0	-17.8	-17.8	-17.7	-17.7	-17.5	-17.5	-17.1	-17.2	-17.1	-17.0	-16.8	-16.5	-16.1	-16.1	-16.0	-15.8	-15.6	-15.4	-15.0	-14.8	-16.9	-14.8
21-Jan	-14.4	-14.0	-13.5	-13.2	-12.7	-12.1	-11.7	-11.2	-10.9	-10.5	-9.9	-9.1	-8.6	-8.9	-9.4	-9.9	-11.1	-10.4	-10.2	-10.1	-9.7	-9.5	-9.2	-9.1	-10.8	-8.6
22-Jan	-8.8	-8.6	-8.7	-9.6	-11.1	-12.0	-12.2	-11.4	-10.9	-10.6	-10.4	-10.1	-9.8	-9.6	-9.5	-9.6	-9.7	-9.8	-9.8	-9.8	-9.8	-9.9	-9.9	-10.0	-10.1	-8.6
23-Jan	-9.9	-9.9	-9.9	-9.7	-9.6	-9.4	-9.3	-9.3	-9.3	-9.1	-8.8	-8.7	-8.6	-8.4	-8.2	-8.1	-8.2	-8.7	-9.0	-9.1	-8.6	-8.4	-8.2	-8.0	-8.9	-8.0
24-Jan	-8.0	-7.9	-7.8	-7.8	-7.9	-7.8	-7.9	-8.3	-8.6	-8.8	-8.8	-8.7	-8.5	-8.4	-8.3	-8.3	-9.0	-9.6	-10.4	-11.1	-12.0	-12.7	-13.3	-14.9	-9.4	-7.8
25-Jan	-16.4	-16.8	-16.6	-16.1	-15.4	-14.6	-13.5	-12.8	-11.8	-10.7	-10.1	-9.6	-9.1	-8.5	-8.3	-7.9	-7.8	-7.7	-8.6	-9.3	-9.5	-9.8	-10.2	-10.5	-11.3	-7.7
26-Jan	-10.4	-11.3	-12.0	-13.0	-13.2	-14.4	-15.6	-15.4	-14.7	-13.8	-12.7	-12.1	-11.4	-10.8	-10.2	-9.3	-8.0	-7.0	-6.6	-6.0	-5.4	-5.1	-4.6	-4.6	-10.3	-4.6
27-Jan	-5.0	-4.9	-4.9	-5.0	-5.3	-5.7	-6.4	-6.8	-6.8	-7.1	-7.3	-7.5	-7.6	-7.7	-7.8	-8.0	-8.2	-8.4	-8.3	-8.5	-8.5	-8.2	-7.9	-7.5	-7.1	-4.9
28-Jan	-7.2	-7.0	-6.6	-5.7	-4.0	-4.0	-5.0	-4.5	-4.5	-5.2	-6.0	-5.9	-5.3	-5.1	-5.1	-5.0	-3.6	-2.9	-2.1	-1.3	-1.0	-1.1	-1.0	-0.3	-4.1	-0.3
29-Jan	-0.1	-0.2	0.0	0.1	0.0	-0.1	-1.1	-2.0	-2.6	-3.2	-3.1	-2.9	-2.8	-2.6	-2.5	-2.6	-2.8	-3.3	-3.7	-4.0	-4.1	-4.3	-4.3	-4.4	-2.4	0.1
30-Jan	-4.7	-5.1	-4.9	-4.9	-5.0	-6.7	-8.4	-9.4	-9.9	-10.4	-10.4	-10.4	-10.4	-10.4	-10.6	-11.3	-12.1	-12.5	-12.8	-12.9	-12.9	-13.0	-13.3	-13.6	-9.8	-4.7
31-Jan	-13.9	-14.0	-14.4	-14.7	-15.1	-15.6	-15.9	-16.1	-16.3	-16.3	-16.3	-16.7	-16.4	-15.3	-15.8	-16.0	-16.6	-17.4	-17.6	-17.7	-17.9	-18.2	-18.8	-19.2	-16.3	-13.9
	-14.7	-14.9	-15.1	-15.1	-15.0	-15.1	-15.4	-15.3	-15.3	-15.2	-14.9	-14.6	-14.3	-14.0	-13.8	-13.8	-13.9	-14.0	-14.1	-14.4	-14.5	-14.8	-14.9	-15.0	Diurnal Average	
	-0.1	-0.2	0.0	0.1	0.0	-0.1	-1.1	-2.0	-2.3	-2.8	-3.1	-2.9	-2.5	-1.8	-2.3	-2.3	-2.2	-1.8	-2.1	-1.3	-1.0	-1.1	-1.0	-0.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Fort Chipewyan - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	173	23.25	23.25
-20 - 0	570	76.61	99.87
0 - 10	1	0.13	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort Chipewyan - January 2016

Maximum Value: 99 % on Jan 29 03:00

Maximum Daily Average: 96.3 % on Jan 29

Minimum Value: 61 % on Jan 1 09:00

Minimum Daily Average: 72.3 % on Jan 1

Maximum Diurnal Average: 84.7 % at hour 2

Minimum Diurnal Average: 81.6 % at hour 14

Monthly Average: 83.5 %

Percentiles: $P_1 = 64$ $P_{10} = 75$ $Q_1 = 79$ Median = 83 $Q_3 = 88$ $P_{90} = 93$ $P_{99} = 99$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

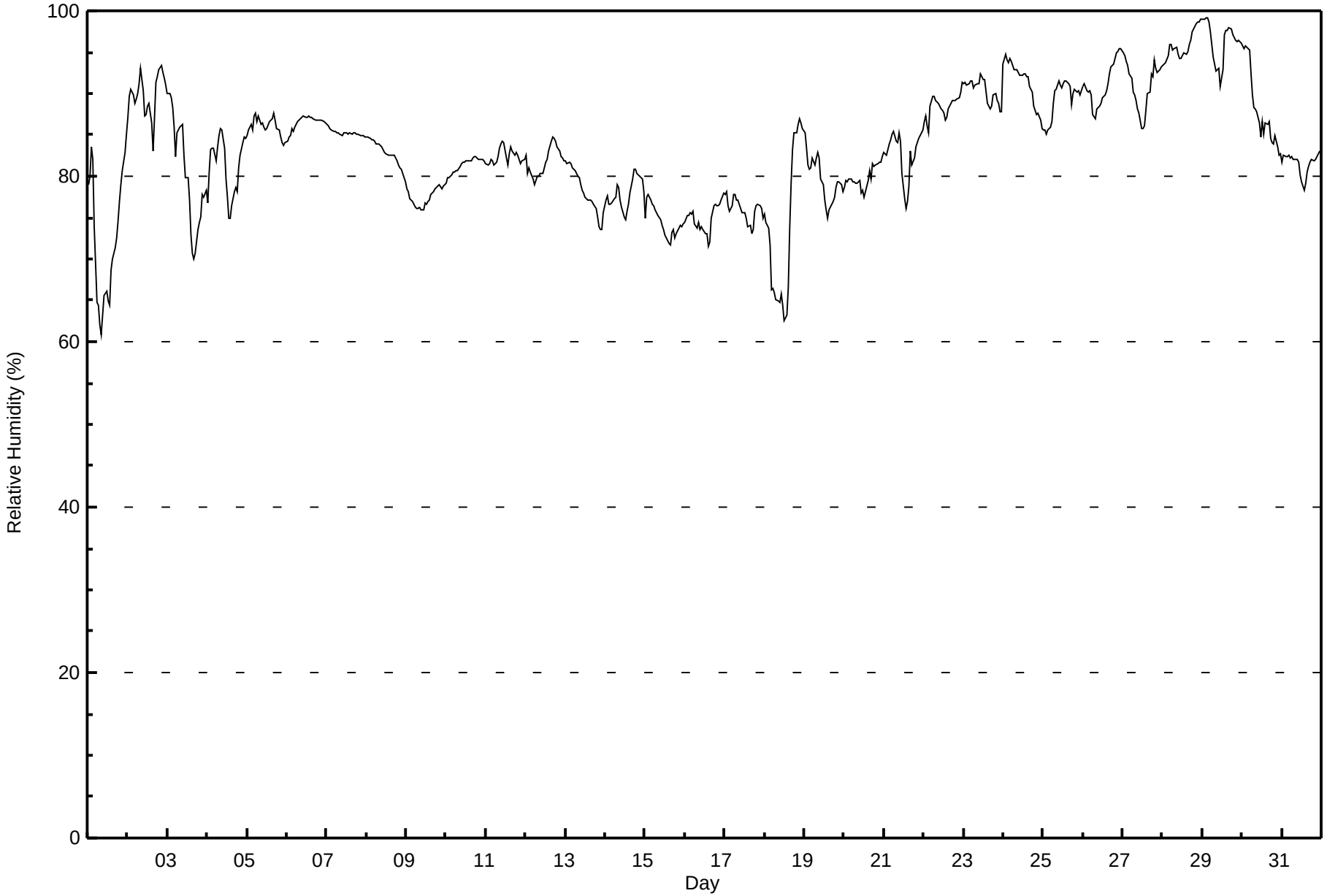
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	79	80	83	82	74	65	64	62	61	63	66	66	65	64	69	70	71	73	75	77	79	81	83	85	72.3	85
2-Jan	87	90	91	90	89	89	90	91	93	90	87	87	88	89	87	83	87	91	92	93	93	93	92	91	89.7	93
3-Jan	90	90	89	88	86	82	85	86	86	86	83	80	80	77	73	71	70	71	74	74	75	78	77	78	80.4	90
4-Jan	77	81	83	83	83	82	84	85	86	86	83	80	77	75	75	76	78	79	78	81	83	84	85	85	81.1	86
5-Jan	85	86	86	86	87	88	87	87	86	86	86	86	86	87	87	87	88	87	86	86	85	84	84	84	86.0	88
6-Jan	84	85	85	86	85	86	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	86	86.5	87
7-Jan	86	86	86	86	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85.3	86
8-Jan	85	85	85	84	84	84	84	84	84	84	83	83	83	83	82	83	83	82	82	81	81	81	80	79	82.9	85
9-Jan	78	78	77	77	77	76	76	76	76	76	76	77	77	77	77	78	78	79	79	79	79	79	79	79	77.5	79
10-Jan	79	80	80	80	81	81	81	81	81	81	82	82	82	82	82	82	82	82	82	82	82	82	82	82	81.3	82
11-Jan	81	81	82	82	82	81	82	82	83	84	84	84	82	81	83	84	83	82	83	83	82	82	82	82	82.4	84
12-Jan	83	80	81	81	80	79	79	80	80	80	80	81	82	82	83	84	85	85	84	84	83	82	82	82	81.7	85
13-Jan	82	82	82	82	81	81	81	80	80	79	78	78	77	77	77	77	77	77	76	75	74	74	74	76	78.1	82
14-Jan	77	78	77	77	77	77	77	79	79	77	76	75	75	76	77	78	80	81	81	80	80	80	80	78	77.9	81
15-Jan	75	78	78	77	77	77	76	76	75	75	74	74	73	73	72	72	73	74	73	73	74	74	74	74	74.5	78
16-Jan	74	75	75	76	75	76	74	74	74	74	74	74	73	73	72	72	75	76	77	76	76	77	77	78	74.9	78
17-Jan	78	78	76	76	76	78	78	77	77	77	76	76	76	75	74	74	73	74	76	76	77	76	76	75	76.0	78
18-Jan	75	74	74	72	66	66	66	65	65	65	66	64	63	63	67	74	79	83	85	85	86	87	86	86	73.5	87
19-Jan	85	83	81	81	81	82	81	82	83	82	80	79	77	76	75	76	76	77	78	79	79	79	79	78	79.6	85
20-Jan	79	79	79	80	80	79	79	79	79	79	78	78	78	78	79	81	80	82	81	81	81	82	82	82	79.8	82
21-Jan	83	83	83	84	84	85	85	84	84	85	84	80	77	76	77	79	83	81	82	84	84	85	85	86	82.7	86
22-Jan	87	87	86	85	88	90	90	89	89	89	88	88	88	87	87	88	89	89	89	89	89	90	90	91	88.4	91
23-Jan	91	91	91	91	92	92	91	91	91	91	92	92	92	92	89	88	88	88	90	90	89	89	88	88	90.3	92
24-Jan	94	95	94	94	94	94	93	93	93	93	92	92	92	92	92	92	91	90	88	88	87	88	87	86	91.4	95
25-Jan	86	86	85	86	86	87	89	90	91	92	91	91	91	91	91	91	91	89	90	90	90	90	90	90	89.3	92
26-Jan	91	91	90	90	90	90	87	87	88	88	88	89	89	90	90	91	92	93	94	94	95	95	95	95	91.1	95
27-Jan	95	95	94	93	92	92	90	90	89	88	88	86	86	86	88	90	90	92	92	94	93	93	93	93	90.9	95
28-Jan	93	93	94	95	96	96	95	95	96	95	94	94	94	95	95	95	96	96	97	98	98	99	99	99	95.8	99
29-Jan	99	99	99	99	99	98	94	93	93	93	93	91	93	97	98	98	98	98	97	97	97	96	97	96	96.3	99
30-Jan	96	95	96	96	95	92	90	88	88	88	86	85	87	85	87	86	87	85	84	84	85	84	83	83	88.0	96
31-Jan	82	83	82	82	82	82	82	82	82	82	82	80	79	78	79	81	81	82	82	82	82	82	83	83	81.6	83
	84.4	84.7	84.7	84.5	84.1	83.6	83.3	83.3	83.4	83.2	82.7	82.0	81.7	81.6	81.7	82.3	83.1	83.5	83.8	84.1	84.2	84.3	84.3	84.4	Diurnal Average	
	99	99	99	99	99	98	95	95	96	95	94	94	94	97	98	98	98	98	97	98	98	99	99	99	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Fort Chipewyan - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	0	0.00	0.00
60 - 80	232	31.18	31.18
80 - 100	512	68.82	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 1.8 mm on Jan 28 18:00

Maximum Daily Total: 6.9 mm on Jan 28

Minimum Value: 0.0 mm on Jan 1 01:00

Minimum Daily Total: 0.0 mm on Jan 1

Maximum Diurnal Total: 1.8 mm at hour 18

Minimum Diurnal Total: 0.0 mm at hour 5

Monthly Total: 9.40 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} = 0.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

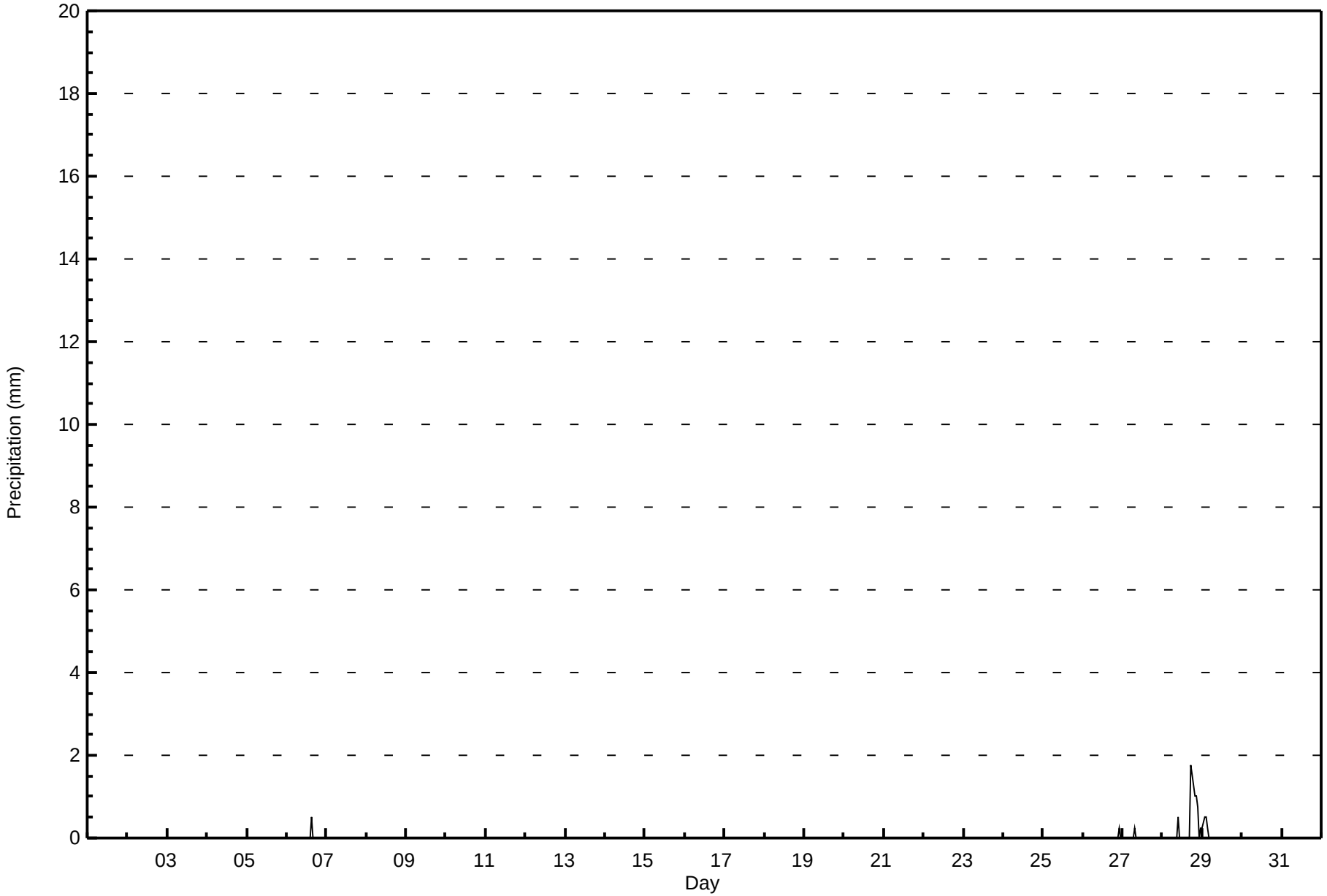
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
7-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
28-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.5	1.0	1.0	0.8	0.0	0.3	6.9	1.8
29-Jan	0.3	0.5	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.5
30-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.3	0.5	0.5	0.3	0.0	0.0	0.0	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.8	1.5	1.0	1.0	0.8	0.3	0.3	Diurnal Average	
	0.3	0.5	0.5	0.3	0.0	0.0	0.0	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.8	1.5	1.0	1.0	0.8	0.3	0.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Fort Chipewyan - January 2016



Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	735	98.79	98.79
0.4 - 0.5	4	0.54	99.33
0.6 - 0.7	0	0.00	99.33
0.8 - 1.4	3	0.40	99.73
1.5 - 10	2	0.27	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 87 % on Jan 29 12:00

Maximum Daily Average: 17.3 % on Jan 29

Minimum Value: 1 % on Jan 1 13:00

Minimum Daily Average: 1.5 % on Jan 1

Maximum Diurnal Average: 5.4 % at hour 12

Minimum Diurnal Average: 2.8 % at hour 2

Monthly Average: 3.1 %

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 2$ Median = 2 $Q_3 = 2$ $P_{90} = 10$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

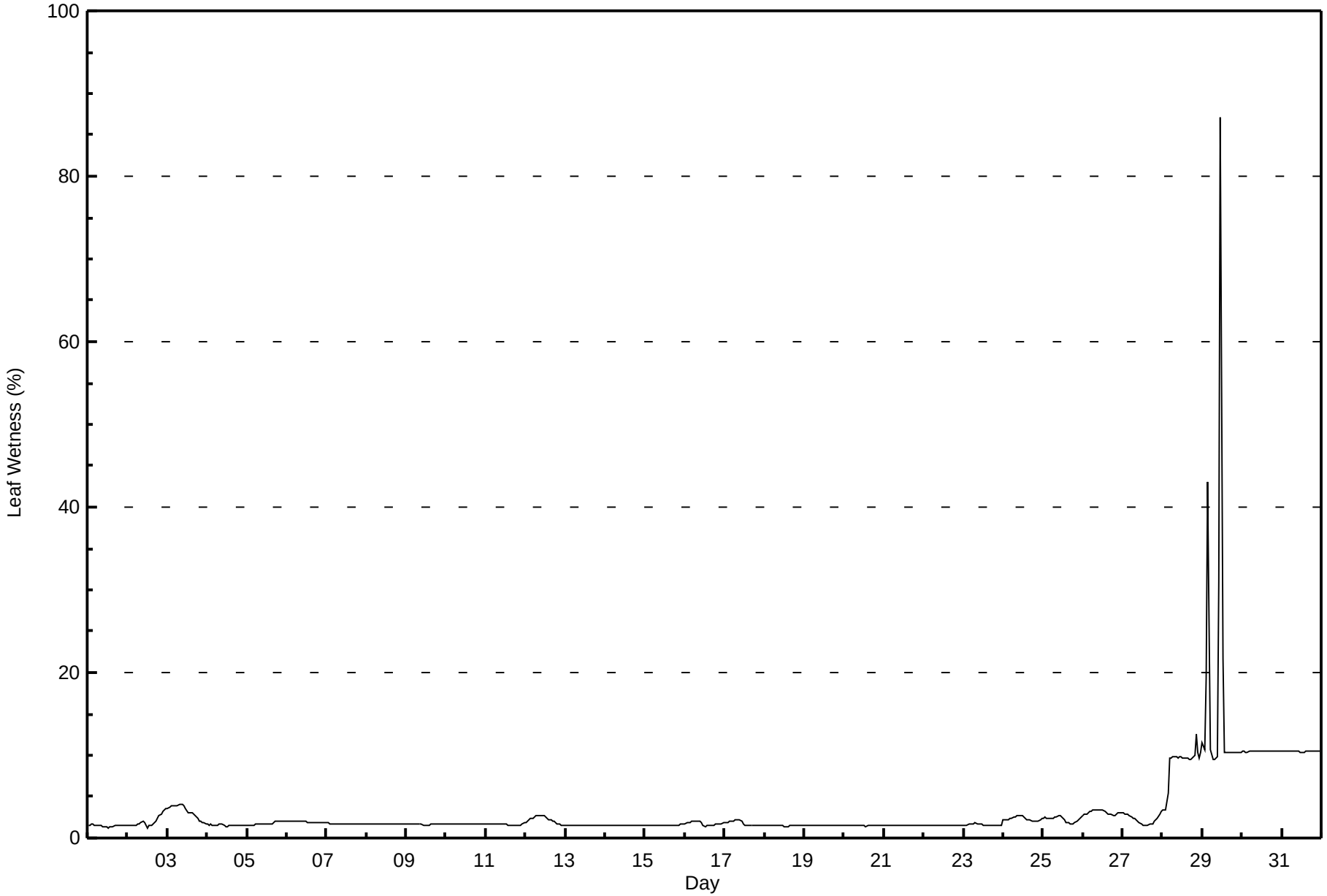
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.5	2
2-Jan	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	3	3	3	3	4	2.0	4
3-Jan	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	3.2	4
4-Jan	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1.6	2
5-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.8	2
6-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
7-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.7	2
8-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.7	2
9-Jan	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	1.7	2
10-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.6	2
11-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.6	2
12-Jan	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2.2	3
13-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.5	2
14-Jan	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	1.5	2
15-Jan	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	1.5	2
16-Jan	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1.8	2
17-Jan	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1.8	2
18-Jan	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1.5	2
19-Jan	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1.5	2
20-Jan	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1.5	2
21-Jan	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	1.5	2
22-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.5	2
23-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.6	2
24-Jan	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2.3	3
25-Jan	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	3	2.3	3
26-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.1	3
27-Jan	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2.2	3
28-Jan	3	3	3	5	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10	10	13	10	10	10	8.9	13
29-Jan	12	11	19	43	27	11	9	10	10	10	31	87	22	10	10	10	10	10	10	10	10	10	10	10	17.3	87
30-Jan	10	10	10	10	10	10	11	11	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10.5	11
31-Jan	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10.4	10
	2.8	2.8	3.1	3.9	3.5	3.0	3.0	3.0	3.0	3.0	3.7	5.4	3.2	2.8	2.8	2.8	2.8	2.8	2.8	2.9	3.0	2.9	2.9	3.0	Diurnal Average	
	12	11	19	43	27	11	11	11	10	10	31	87	22	10	10	10	10	10	10	10	13	10	10	10	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (SW) - %

Fort Chipewyan - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	0	0.00	0.00
0.6 - 0.7	0	0.00	0.00
0.8 - 1.4	21	2.82	2.82
1.5 - 10	605	81.32	84.14
> 10	72	9.68	93.82

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 284 W/m2 on Jan 3 13:00

Maximum Daily Average: 49.2 W/m2 on Jan 17

Minimum Value: 0 W/m2 on Jan 1 01:00

Minimum Daily Average: 7.5 W/m2 on Jan 11

Maximum Diurnal Average: 109.5 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 19

Monthly Average: 20.4 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 17$ $P_{90} = 73$ $P_{99} = 240$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

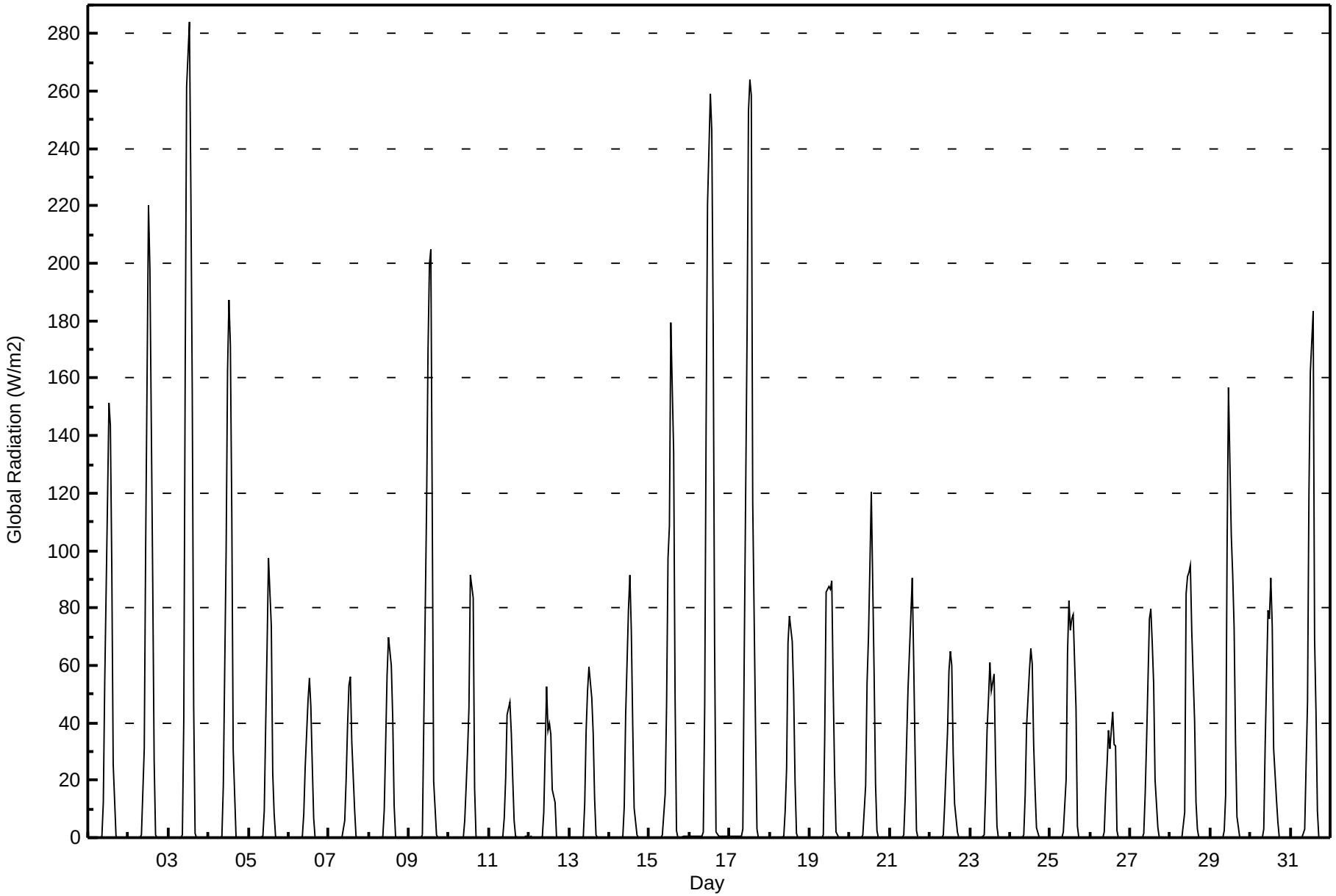
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	0	0	0	0	0	0	0	1	12	54	118	151	143	94	26	0	0	0	0	0	0	0	0	25.0	151
2-Jan	0	0	0	0	0	0	0	0	1	31	102	160	220	198	89	27	1	0	0	0	0	0	0	0	34.5	220
3-Jan	0	0	0	0	0	0	0	0	1	41	163	262	284	226	155	46	2	0	0	0	0	0	0	0	49.2	284
4-Jan	0	0	0	0	0	0	0	0	0	18	100	163	187	171	113	31	1	0	0	0	0	0	0	0	32.7	187
5-Jan	0	0	0	0	0	0	0	0	0	9	39	66	98	74	23	8	0	0	0	0	0	0	0	0	13.2	98
6-Jan	0	0	0	0	0	0	0	0	0	8	25	48	55	46	26	7	0	0	0	0	0	0	0	0	8.9	55
7-Jan	0	0	0	0	0	0	0	0	0	6	20	39	53	56	34	10	0	0	0	0	0	0	0	0	9.1	56
8-Jan	0	0	0	0	0	0	0	0	0	10	33	56	70	60	42	12	1	0	0	0	0	0	0	0	11.8	70
9-Jan	0	0	0	0	0	0	0	0	1	40	116	170	200	205	114	20	1	0	0	0	0	0	0	0	36.1	205
10-Jan	0	0	0	0	0	0	0	0	0	6	18	30	45	91	84	17	0	0	0	0	0	0	0	0	12.2	91
11-Jan	0	0	0	0	0	0	0	0	0	7	21	43	47	36	20	6	0	0	0	0	0	0	0	0	7.5	47
12-Jan	0	0	0	0	0	0	0	0	0	9	53	37	40	36	17	12	1	0	0	0	0	0	0	0	8.5	53
13-Jan	0	0	0	0	0	0	0	0	1	12	37	51	59	49	37	14	1	0	0	0	0	0	0	0	10.8	59
14-Jan	0	0	0	0	0	0	0	0	1	11	43	79	91	72	39	10	1	0	0	0	0	0	0	0	14.5	91
15-Jan	0	0	0	0	0	0	0	0	1	15	47	97	109	179	134	49	2	0	0	0	0	0	1	0	26.5	179
16-Jan	0	0	1	1	0	1	1	0	2	46	144	221	259	246	178	67	2	0	1	0	0	0	0	0	48.8	259
17-Jan	0	0	0	0	0	1	1	0	3	64	176	253	264	259	117	38	3	0	0	0	0	0	0	0	49.2	264
18-Jan	0	0	0	0	0	0	0	0	1	10	24	68	77	68	51	19	1	0	0	0	0	0	0	0	13.3	77
19-Jan	0	0	0	0	0	0	0	0	1	35	85	88	87	90	52	22	2	0	0	0	0	0	0	0	19.3	90
20-Jan	0	0	0	0	0	0	0	0	1	18	54	70	94	120	57	19	3	0	0	0	0	0	0	0	18.2	120
21-Jan	0	0	0	0	0	0	0	0	1	14	33	51	77	90	62	30	3	0	0	0	0	0	0	0	15.1	90
22-Jan	0	0	0	0	0	0	0	0	1	12	37	58	65	60	29	12	2	0	0	0	0	0	0	0	11.5	65
23-Jan	0	0	0	0	0	0	0	0	1	17	37	48	61	51	57	27	4	0	0	0	0	0	0	0	12.6	61
24-Jan	0	0	0	0	0	0	0	0	1	15	39	58	66	60	33	17	4	0	0	0	0	0	0	0	12.1	66
25-Jan	0	0	0	0	0	0	0	0	2	20	64	83	72	76	78	45	4	0	0	0	0	0	0	0	18.5	83
26-Jan	0	0	0	0	0	0	0	0	2	15	26	38	31	44	32	32	2	0	0	0	0	0	0	0	9.2	44
27-Jan	0	0	0	0	0	0	0	0	2	15	34	76	79	68	54	20	3	0	0	0	0	0	0	0	14.7	79
28-Jan	0	0	0	0	0	0	0	0	9	85	91	92	95	72	41	12	3	0	0	0	0	0	0	0	20.8	95
29-Jan	0	0	0	0	0	0	0	0	3	15	99	157	105	92	73	34	8	0	0	0	0	0	0	0	24.4	157
30-Jan	0	0	0	0	0	0	0	0	3	33	79	76	90	74	31	13	6	0	0	0	0	0	0	0	16.9	90
31-Jan	0	0	0	0	0	0	0	0	3	26	47	119	162	183	69	44	9	0	0	0	0	0	0	0	27.6	183
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	21.8	62.6	96.0	109.5	106.4	65.6	24.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	1	1	0	1	1	0	9	85	176	262	284	259	178	67	9	0	1	0	0	0	1	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

Fort Chipewyan - January 2016



Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	570	76.61	76.61
21 - 100	134	18.01	94.62
101 - 300	40	5.38	100.00
301 - 600	0	0.00	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort Chipewyan - January 2016

Maximum Speed: 30 km/h on Jan 13 06:00

Maximum Daily Speed Average: 23.8 km/h on Jan 13

Minimum Speed Value: 0 km/h on Jan 16 22:00

Minimum Daily Speed Average: 1.9 km/h on Jan 3

Maximum Diurnal Speed Average: 3.7 km/h at hour 20

Minimum Diurnal Speed Average: 1.2 km/h at hour 10

Monthly Average Velocity: 2.2 km/h 59.5 deg

Percentiles: $P_1 = 1$ $P_{10} = 4$ $Q_1 = 6$ Median = 9 $Q_3 = 13$ $P_{90} = 20$ $P_{99} = 28$

Hours in Service:	744
Hours of Data:	656
Hours of Missing Data:	88
Percent Operational Time:	88.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	WSW8	SW7	SW7	SW13	WSW18	W24	W26	W27	W29	W28	W25	W24	W20	WSW19	WSW20	W20	W20	W21	W18	W16	W13	W16	W15	WNW14	W18.3	W29
2-Jan	WNW12	W12	W13	W13	W14	WNW16	WNW12	WSW6	SW9	SW15	SW14	ESE4	E6	E5	SSE1	S4	E7	ESE6	ESE4	E9	E9	E10	E8	E10	WSW2.0	WNW16
3-Jan	E10	E12	E17	E17	ESE14	ESE16	E12	E9	ESE10	E9	SE4	WSW6	S4	S7	SSW5	SW11	WSW11	W12	WNW12	W9	W10	W9	WNW13	WNW15	SSE1.9	E17
4-Jan	WNW11	WNW9	WNW10	WNW13	WNW11	NW7	WNW8	NW11	WNW14	WNW15	WNW16	WNW17	W15	W13	W12	W11	W12	W13	W21	W17	W17	WNW15	WNW16	WNW16	WNW13.2	W21
5-Jan	WNW13	WNW12	WNW12	WNW12	WNW10	WNW8	W4	WSW6	WSW7	WNW7	WNW5	WNW3	WNW2	WNW2	NNE1	NE4	AF	ESE4	AF	AF	AF	AF	AF	E1	WNW5.2	WNW13
6-Jan	ENE2	ENE2	AF	E3	E3	ENE6	E6	ENE6	NE3	NE4	NE6	NE8	ENE7	NE5	NE6	NE6	NE7	NE6	NE8	NE8	NE5	NNE3	N3	NNE4	NE4.8	NE8
7-Jan	NNE5	NNE5	NNE6	NNE6	N4	NNW3	N3	NNW2	NW4	N3	WNW3	NW3	NW4	W6	W4	WSW7	WNW4	NW4	WSW4	WSW5	SSW6	WSW3	NNW2	ENE1	NW2.1	WSW7
8-Jan	S4	E3	ENE9	ENE8	E8	E9	ESE10	SE9	SE9	SE11	SE7	SE7	ESE9	ESE8	ESE10	SSE7	SE10	SE11	SSE11	SE9	ESE11	ESE12	ESE10	E9	ESE7.9	ESE12
9-Jan	E10	E7	E6	E5	E4	E5	E4	E5	E3	E5	E7	E5	E7	E6	AF	AF	E10	E9	E9	E9	E9	ENE7	ENE5	ENE5	E6.4	E10
10-Jan	E7	ENE8	ENE7	E6	E4	E8	E8	ENE1	AF	NNW1	ENE2	W4	NW6	WNW6	NW7	WNW7	WNW6	W6	NW9	WNW11	WNW11	WNW10	WNW11	WNW12	NW3.1	WNW12
11-Jan	WNW11	WNW11	W10	WNW11	WNW11	W9	W8	W8	WNW8	WNW9	WNW10	WNW10	WNW10	WNW11	W8	W9	W10	W10	W8	W7	W9	WSW6	W5	WSW4	W8.7	WNW11
12-Jan	SW4	SE2	E5	E6	E7	E9	E9	E9	E11	E12	E13	E14	E12	ENE15	ENE14	ENE15	E20	ENE20	E24	E23	ENE20	ENE23	ENE23	ENE22	E13.4	E24
13-Jan	ENE23	ENE25	ENE28	ENE28	ENE28	ENE30	ENE26	ENE25	ENE26	ENE24	ENE26	ENE26	ENE24	NE23	NE25	NE25	NE22	NE25	NE23	ENE25	ENE21	ENE19	NE18	NNE9	ENE23.8	ENE30
14-Jan	NNE6	NNW6	NNW11	NW9	NW16	NNW14	NW18	NNW12	NNW10	NNW14	NNW10	NNW8	NNW8	NNW8	NNW5	NW7	NW8	NNW9	NNW12	NNW12	NNW11	N12	N9	NNE9	NNW9.8	NW18
15-Jan	NNE15	NNE13	NNE12	ENE19	ENE16	NE8	NE8	ENE11	ENE15	ENE15	ENE13	ENE11	ENE13	ENE13	ENE14	ENE13	ENE16	ENE19	ENE25	ENE22	ENE14	ENE13	ENE11	ENE8	ENE13.7	ENE25
16-Jan	NE9	ENE9	ENE5	ENE7	ESE4	E3	WNW7	NNW6	N4	NNW4	WNW2	WNW4	W6	WNW6	W5	W7	W6	WNW8	NW8	NW4	WNW5	NW0	WSW4	WSW6	NW2.6	NE9
17-Jan	W3	SW3	ESE2	E9	E8	E7	E6	E7	E11	E14	ESE16	ESE16	E19	E19	E24	E23	E26	E28	E22	E22	E26	E23	E23	E24	E15.3	E28
18-Jan	ESE22	ESE22	ESE22	SE17	SSE21	SE20	SSE19	SSE17	SSE16	S19	S13	S13	SSW13	SSW11	SW8	SW6	WSW4	WSW3	WNW4	NW4	NW4	WNW6	WNW5	WNW5	SSE7.9	ESE22
19-Jan	WNW5	NNW6	NNW7	NNW6	NNW8	NW7	NW8	WNW7	WNW7	WNW7	WNW8	NW8	NW8	NW9	NW10	NW10	NW7	NW6	NW6	NW7	NW8	NW9	NNW8	NNW8	NW7.3	NW10
20-Jan	NNW5	NW6	NW8	NW7	N5	NNW4	NW6	NW4	W3	WNW2	SE2	ESE3	E4	E7	E8	E9	SE7	ESE10	ESE12	SE13	ESE9	E10	E11	E11	E3.2	SE13
21-Jan	E12	E13	E12	E11	E10	E11	E13	ESE13	ESE14	E15	ESE16	SE17	SSE16	SE16	SE16	ESE17	E21	E23	E25	E26	E26	E22	E25	E20	E16.5	E26
22-Jan	E14	ESE6	SSE6	WSW10	WSW10	W8	WNW9	WNW9	NW8	WNW10	WNW11	NW9	NW5	NW6	NW5	WNW4	WNW4	NW4	NNW5	N7	N6	NNW4	NNW4	NNW5	NW4.3	E14
23-Jan	N5	NNW3	N3	NNE3	NNE4	E2	E2	ENE2	ENE4	ENE5	E11	E13	E12	ESE10	ESE10	E15	ESE15	SE13	SE10	SE11	SSE11	S7	S7	S7	ESE5.8	ESE15
24-Jan	SSW8	SSW7	SW7	WSW7	WSW8	WSW8	WSW11	W13	W13	W12	W10	W10	WNW11	W8	W8	WNW9	NW9	NW9	NW11	NW11	NW10	NW9	NW9	WNW6	W8.0	W13
25-Jan	WNW8	WNW8	WSW5	SW6	SW4	S5	SE8	SE8	SSE8	SSE11	SSE13	SSE12	SSE11	SE10	ESE11	ESE10	SE9	S13	SW10	SW11	SSW7	S5	SW10	WSW8	S6.1	SSE13
26-Jan	W7	W7	W5	WSW4	WSW3	ENE4	SE2	E3	E7	E11	E10	E11	E10	E12	E12	E13	E13	ENE13	E14	E12	E8	E0	W7	WNW11	E4.7	E14
27-Jan	WNW12	NW12	NW12	NW12	NW12	NNW12	NNW10	NW7	NNW7	NNW8	NNW8	NNW7	NNW7	NNW7	NNW6	N4	NE4	ESE6	SE7	ESE13	ESE13	ESE14	ESE15	ESE17	N3.4	ESE17
28-Jan	E20	E19	E17	E20	ESE23	E20	E24	E23	E24	E16	E11	E11	E11	E11	ESE8	E10	E12	E11	AF	AF	AF	AF	AF	AF	E16.2	E24
29-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
30-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
31-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
	NE2.3	NE2.4	NE2.6	NE2.1	NE1.7	NE2.1	NE1.5	NE1.4	ENE1.5	ENE1.2	E1.3	ENE1.4	ENE1.9	ENE2.0	ENE2.2	ENE2.3	ENE3.4	ENE3.4	ENE3.1	ENE3.7	ENE3.4	ENE3.1	NE2.7	NE2.2	Diurnal Average	
	ENE23	ENE25	ENE28	ENE28	ENE28	ENE30	W26	W27	W29	W28	ENE26	ENE26	ENE24	NE23	NE25	NE25	E26	E28	E25	E26	E26	ENE23	E25	E24	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Fort Chipewyan - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Jan 1 09:00

Minimum Value: 0 km/h on Jan 6 02:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	656
Hours of Missing Data:	88
Hours of Calibration:	0
Percent Operational Time:	88.2

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

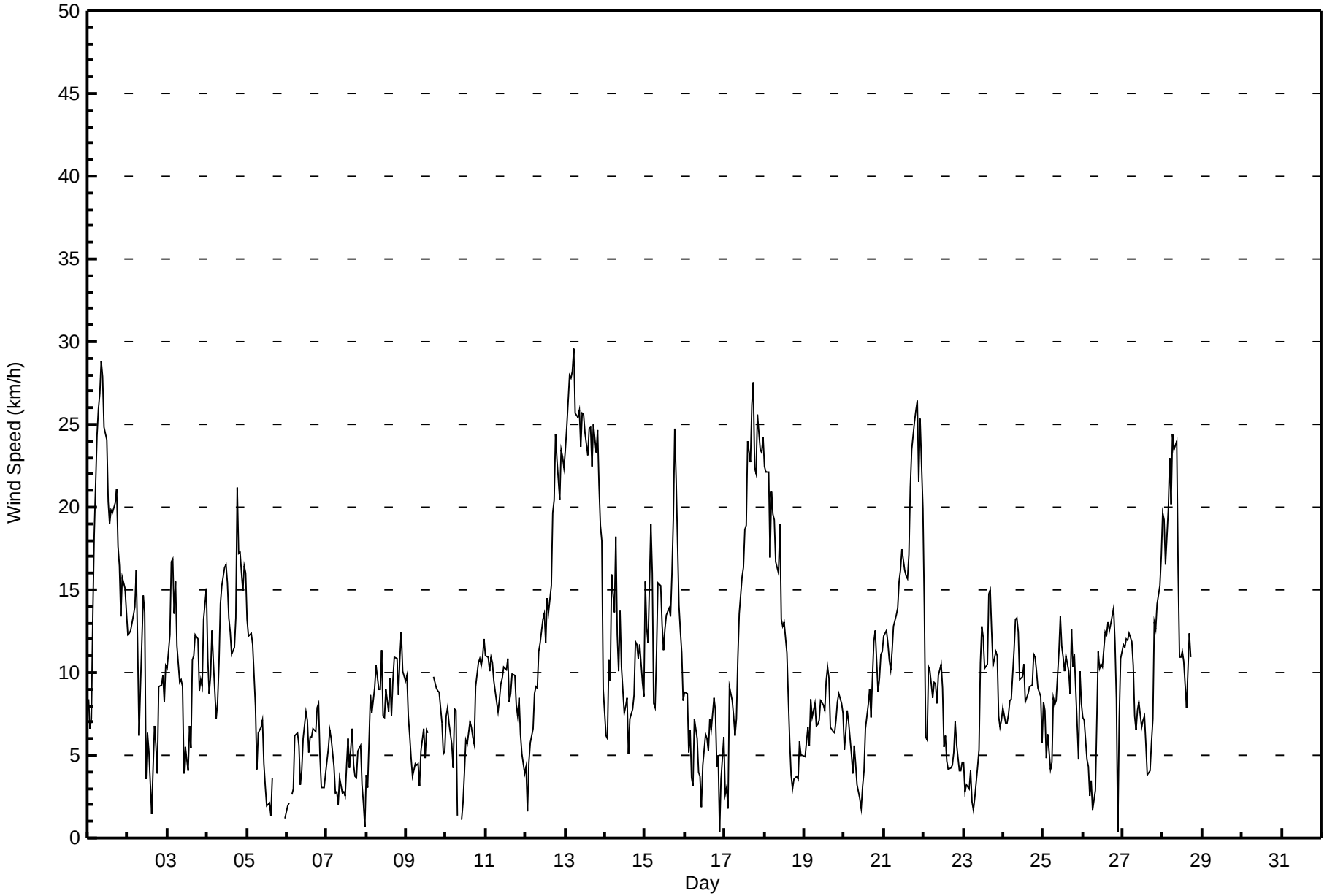
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Fort Chipewyan - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	134	20.43	20.43
6 - 11	304	46.34	66.77
12 - 19	144	21.95	88.72
20 - 28	72	10.98	99.70
29 - 38	2	0.30	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Fort Chipewyan - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	9	7	6	12	21	6	4	1	5	1	3	10	7	17	12	13	134
6 - 11	3	5	11	14	63	17	15	8	4	6	10	16	28	44	36	24	304
12 - 19	1	3	1	18	30	16	6	6	4	1	3	2	18	23	6	6	144
20 - 28	0	0	6	21	27	4	1	1	0	0	0	1	11	0	0	0	72
29 - 38	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	15	24	66	141	43	26	16	13	8	16	29	65	84	54	43	656

Total Number of Valid Hours: 656

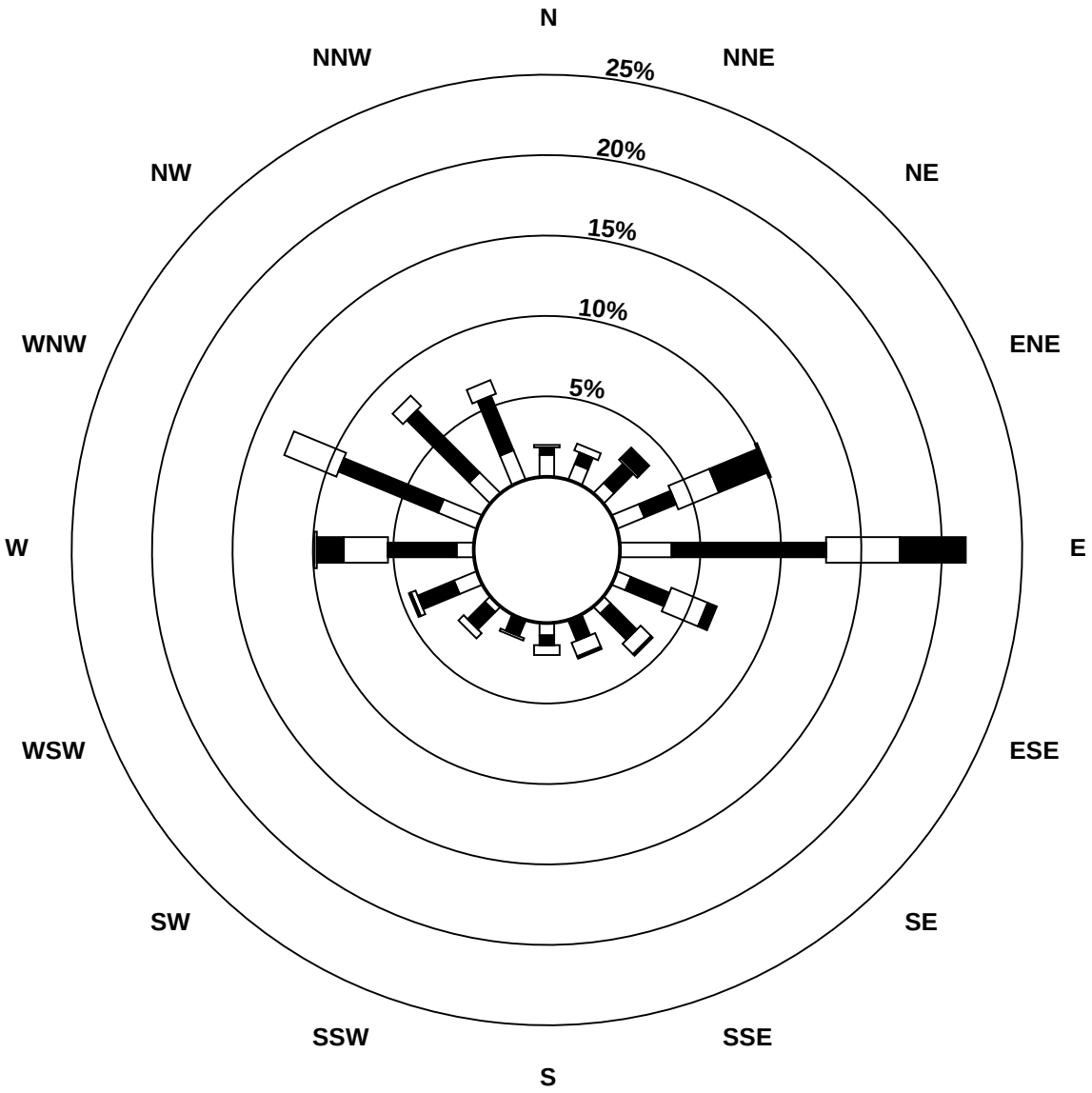
Total Number of Hours: 744

Wood Buffalo Environmental Association

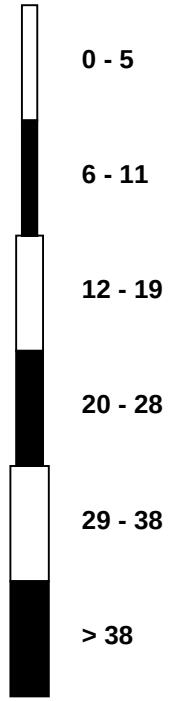
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Fort Chipewyan (AMS 8)



Classes (km/h)



Total Number of Valid Hours: 656

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort Chipewyan - January 2016

Direction of Maximum Speed: 66 deg on Jan 13 06:00
Direction of Maximum Daily Speed Average: 59.1 deg on Jan 13

Direction of Minimum Speed: 324 deg on Jan 16 22:00
Direction of Minimum Daily Speed Average: 1.9 deg on Jan 3

Monthly Average Direction: 301.2 deg

Hours in Service:	744
Hours of Data:	656
Hours of Missing Data:	88
Percent Operational Time:	88.2

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	253	221	214	232	255	262	263	268	268	266	261	260	264	258	258	260	266	274	270	271	275	272	280	286	263.5
2-Jan	287	281	277	275	281	283	283	255	229	226	226	118	82	89	148	182	96	106	106	89	89	88	85	91	248.6
3-Jan	94	88	91	100	103	109	100	100	102	95	133	239	182	189	196	226	241	265	288	275	272	263	290	295	148.3
4-Jan	294	282	283	290	294	324	287	305	295	289	290	289	275	274	274	270	275	274	270	281	281	284	283	284	283.9
5-Jan	289	287	292	291	286	293	272	246	256	284	287	286	296	299	17	39	AF	109	AF	AF	AF	AF	AF	82	286.9
6-Jan	73	64	AF	88	99	78	80	74	47	34	47	56	59	50	54	50	35	39	43	47	46	30	358	23	52.3
7-Jan	31	33	32	21	7	339	7	347	319	11	295	310	324	264	277	252	285	309	246	245	210	239	328	62	314.9
8-Jan	189	83	71	77	81	87	105	129	135	128	126	130	123	118	123	157	146	142	157	144	114	102	102	101	119.0
9-Jan	94	91	92	99	94	94	90	86	89	90	90	91	91	87	AF	AF	86	86	84	82	85	77	68	65	86.6
10-Jan	82	78	73	81	83	87	84	72	AF	331	78	281	307	302	310	303	290	276	306	302	301	294	299	300	325.2
11-Jan	294	286	280	286	291	278	280	279	285	288	288	287	293	293	273	268	269	273	266	266	264	251	259	247	279.1
12-Jan	222	132	83	91	85	89	88	88	84	81	80	79	83	78	77	76	79	78	79	82	77	72	72	65	79.2
13-Jan	63	66	69	69	67	66	63	59	57	57	58	59	58	56	53	54	50	53	55	59	57	59	56	30	59.1
14-Jan	17	346	334	323	324	331	324	337	347	345	340	331	338	340	329	323	319	332	338	335	334	350	358	22	337.6
15-Jan	33	26	26	61	60	47	49	71	70	70	69	61	72	77	72	58	57	62	72	74	67	64	68	58	61.7
16-Jan	53	66	73	71	106	79	292	346	352	335	303	285	277	292	264	270	277	296	306	316	299	324	254	255	315.1
17-Jan	274	233	119	86	82	91	91	89	98	91	106	102	89	83	83	84	86	87	89	87	89	92	100	99	91.0
18-Jan	104	104	104	124	149	145	155	158	161	172	185	190	203	201	224	235	238	249	303	324	306	289	291	284	158.0
19-Jan	293	327	332	335	334	326	313	302	292	292	302	318	324	310	309	307	326	316	311	308	310	319	338	338	315.9
20-Jan	335	315	312	324	355	343	304	315	279	294	135	118	100	101	92	91	135	103	113	127	104	95	97	94	84.8
21-Jan	88	91	101	98	87	95	98	102	110	98	109	128	148	136	125	107	90	97	92	88	88	89	85	87	100.1
22-Jan	91	111	155	251	253	268	287	303	323	288	303	317	320	306	317	288	299	322	337	351	358	344	339	332	307.3
23-Jan	352	339	352	14	33	99	98	69	59	59	95	94	99	105	115	99	106	131	126	128	152	187	170	190	110.1
24-Jan	211	209	224	243	248	245	251	261	269	268	260	278	283	275	270	302	322	317	317	307	318	317	311	295	277.1
25-Jan	282	287	242	228	219	176	141	145	154	165	153	160	153	132	116	110	139	188	223	224	203	188	225	241	178.8
26-Jan	266	272	280	257	255	72	145	87	93	87	87	89	80	82	82	82	80	75	80	81	88	101	278	287	79.2
27-Jan	291	307	311	315	311	334	348	317	330	334	327	337	345	330	342	358	41	119	144	104	108	108	111	113	359.6
28-Jan	94	94	93	91	103	91	86	93	89	94	97	96	98	92	105	91	92	93	AF	AF	AF	AF	AF	AF	93.5
29-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
30-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
31-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
	40.1	42.9	47.4	50.3	40.9	53.4	45.3	54.6	63.2	61.2	82.8	74.9	73.4	74.3	75.6	68.7	69.9	72.6	59.5	64.7	64.4	59.2	47.6	38.4	

Diurnal Average

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 96 deg on Jan 8 00:00

Minimum Value: 4 deg on Jan 2 21:00

Percentiles: P_1 = 4 P_{10} = 6 Q_1 = 8 Median = 13 Q_3 = 19 P_{90} = 30 P_{99} = 72

Hours in Service:	744
Hours of Data:	656
Hours of Missing Data:	88
Hours of Calibration:	0
Percent Operational Time:	88.2

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	20	21	22	16	12	13	14	13	14	13	14	14	13	15	13	14	14	12	12	12	13	13	11	12	22
2-Jan	10	10	13	13	13	11	12	30	10	9	7	59	11	13	64	18	16	18	31	6	4	7	9	6	64
3-Jan	4	5	5	8	6	5	8	7	6	8	46	18	47	24	14	9	13	18	13	18	15	18	10	9	47
4-Jan	11	10	11	14	16	32	22	12	9	9	10	11	12	13	14	15	16	14	13	14	12	14	12	13	32
5-Jan	13	12	13	11	10	12	56	27	16	16	24	24	39	45	32	17	AF	13	AF	AF	AF	AF	AF	36	56
6-Jan	13	12	AF	17	9	9	8	8	25	16	12	12	12	16	14	15	16	15	14	12	18	28	21	22	28
7-Jan	18	15	14	19	27	24	38	53	29	36	38	41	50	26	43	18	29	54	47	34	39	57	73	96	96
8-Jan	38	79	18	30	22	21	22	22	22	15	29	25	18	19	13	26	16	15	13	15	9	4	4	7	79
9-Jan	7	6	7	6	8	5	5	6	7	7	4	5	5	4	AF	AF	6	5	5	6	6	11	8	11	11
10-Jan	7	8	10	13	18	9	7	46	AF	58	72	16	20	19	24	14	15	13	18	17	15	15	16	15	72
11-Jan	14	13	13	14	16	14	15	15	14	13	14	14	15	16	21	15	15	14	15	17	14	18	16	14	21
12-Jan	8	51	8	5	6	6	8	5	5	6	5	6	6	6	7	7	6	6	6	6	6	7	8	8	51
13-Jan	9	9	8	8	8	9	8	8	9	10	9	9	10	10	10	9	10	9	9	9	10	8	9	23	23
14-Jan	24	40	33	25	17	25	17	25	26	22	32	48	39	39	40	23	18	27	17	16	17	18	19	22	48
15-Jan	12	13	15	17	11	15	16	12	7	10	10	7	11	7	6	9	7	8	7	6	8	9	12	14	17
16-Jan	9	5	17	15	28	29	12	20	29	43	76	35	19	28	12	10	10	8	11	39	35	94	59	8	94
17-Jan	55	28	71	5	7	7	12	7	6	6	8	5	6	7	5	6	5	5	5	5	4	5	8	5	71
18-Jan	5	6	7	17	7	7	10	9	11	9	9	12	11	9	13	11	11	24	12	12	7	5	8	11	24
19-Jan	16	23	20	20	19	20	14	17	13	14	20	21	24	20	17	17	22	20	18	18	17	19	24	23	24
20-Jan	23	15	17	21	35	31	24	23	23	29	66	10	11	10	11	9	13	8	6	5	18	8	7	7	66
21-Jan	5	6	7	7	7	6	6	6	8	6	13	6	11	9	8	11	4	5	4	4	4	4	5	6	13
22-Jan	8	15	37	14	12	14	18	14	21	14	13	21	35	20	26	21	18	21	22	18	21	21	21	20	37
23-Jan	21	41	24	33	23	65	39	42	11	8	5	6	4	12	14	5	6	6	8	10	9	13	16	11	65
24-Jan	10	9	12	12	13	12	15	15	14	13	15	16	14	16	15	23	21	18	18	15	18	16	17	18	23
25-Jan	11	11	26	11	22	32	10	13	15	12	12	12	12	13	5	11	29	12	11	9	19	26	9	16	32
26-Jan	9	16	13	17	53	13	64	27	7	5	5	6	7	7	7	8	7	6	6	6	7	85	13	15	85
27-Jan	13	16	17	19	18	26	28	24	29	26	27	31	25	26	25	24	33	30	18	8	6	13	7	7	33
28-Jan	7	5	6	6	7	7	4	9	5	6	5	5	5	4	10	5	5	5	AF	AF	AF	AF	AF	AF	10
29-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
30-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
31-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
	55	79	71	33	53	65	64	53	29	58	76	59	50	45	64	26	33	54	47	39	39	94	73	96	
	Diurnal Maximum																								

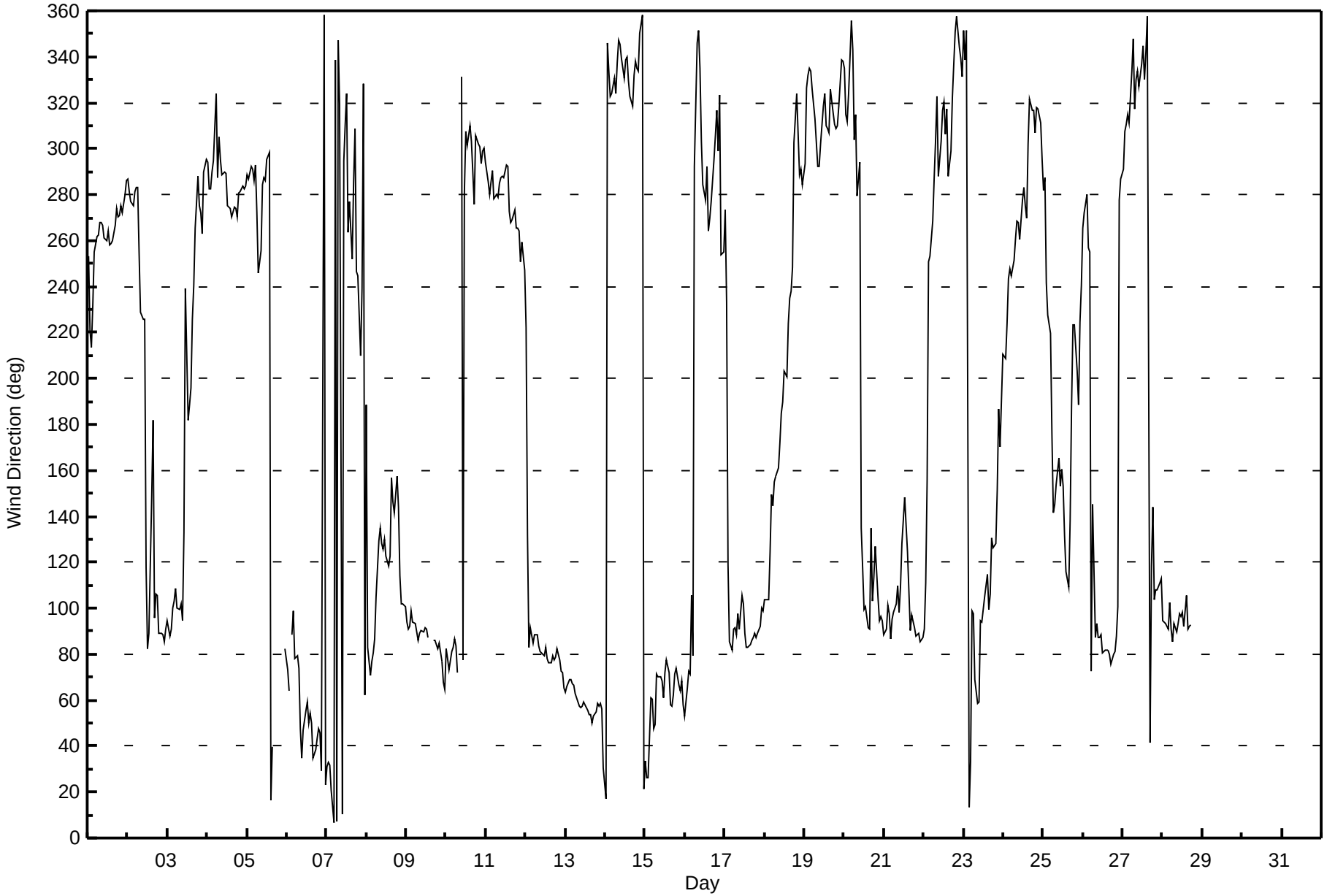
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Fort Chipewyan - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 6, 2016	Last Calibration	December 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	14:20	End Time (MST)	19:00
Gas Cert Reference	LL103809	Station temp.	22 Deg C
Cal Gas Concentration	2.45 ppm	Cal Gas Exp Date	16/09/2015
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-826	-826
Analyzer IP address	192.168.1.43		Lamp voltage	998	1007
Calculated slope	1.009380	1.006348	Chamber temp	45.1	45.0
Calculated intercept	-0.054985	-0.062929	Pressure	693.4	721.2
Analyzer Background	1.15	1.13	Flow	0.423	0.439
Analyzer Coefficient	1.017	1.025	Intensity	92	91

Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	44.6	18.2	17.7	1.031
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.6	18.2	18.2	1.001
second point	6000	23.8	9.7	9.7	1.004
third point	6000	11.9	4.9	4.9	0.999
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	44.6	18.2	17.6	1.032
				Average Correction Factor	1.001

Corrected As found	17.6	Previous response	18.1	% change	3.0%

Notes:

Filter change after As Founds. Span adjusted.

Calibration Performed By: Devin Russell

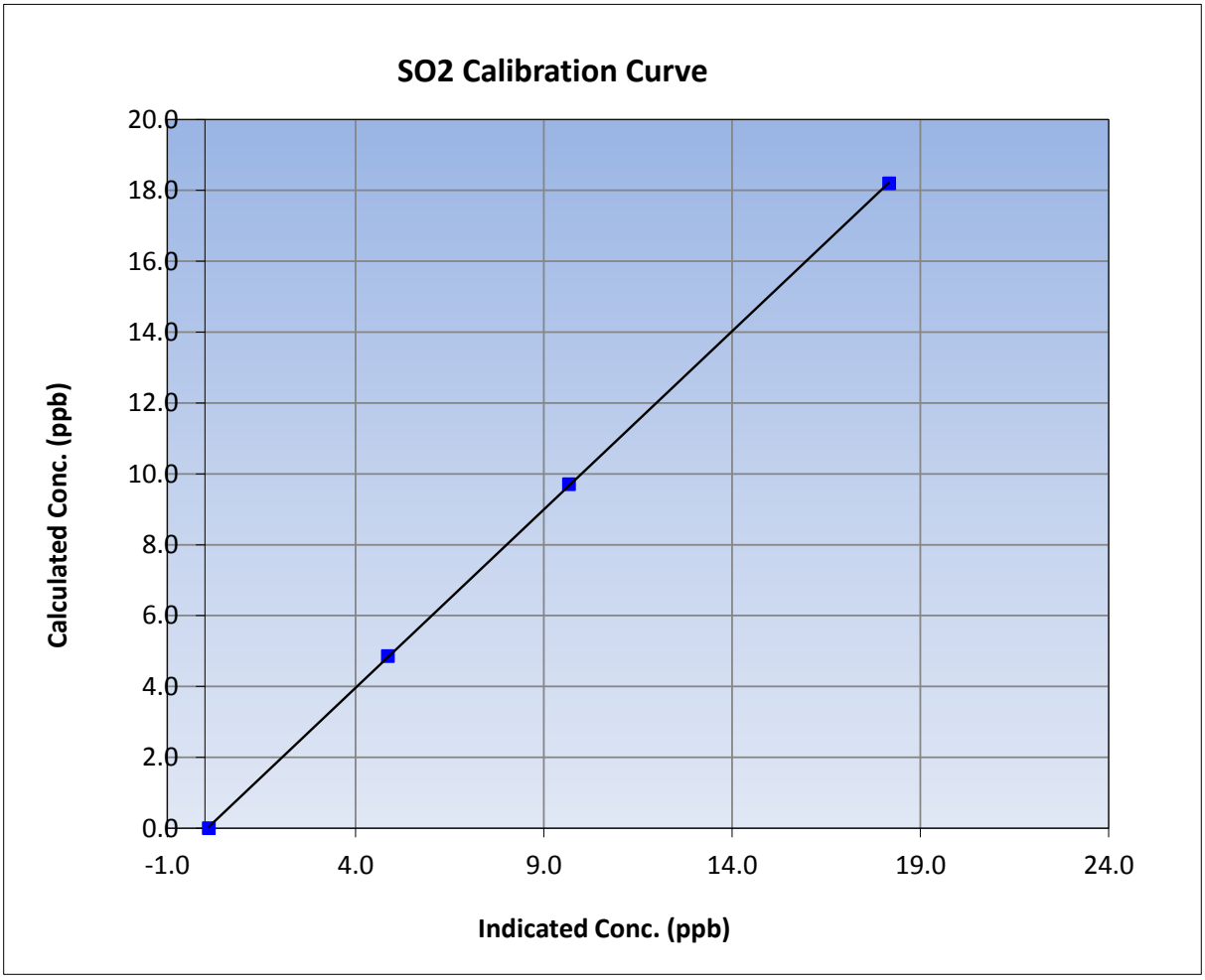
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

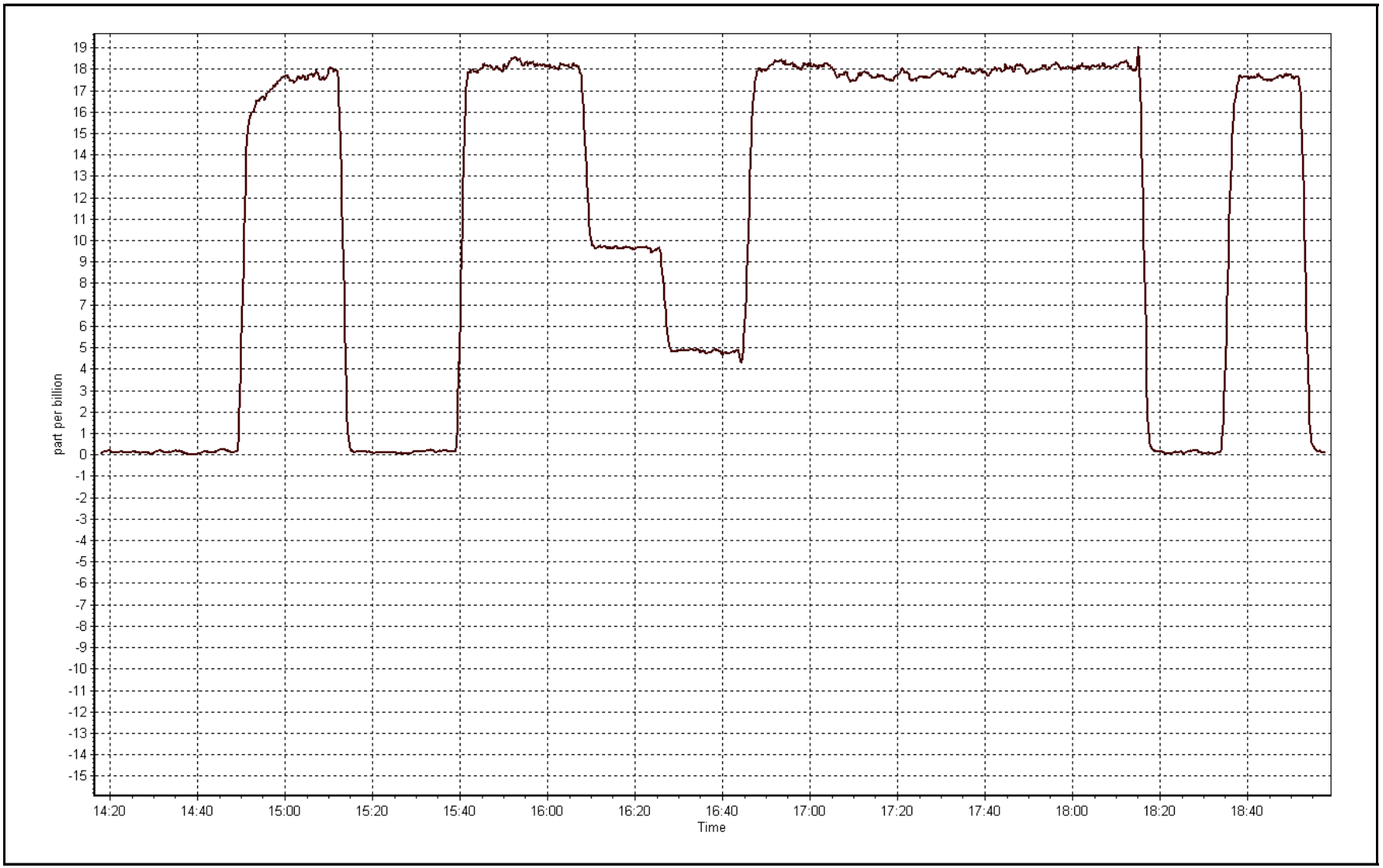
Calibration Date	January 6, 2016	Previous Calibration	December 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	14:20	End Time (MST)	19:00
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999976
18.2	18.2	1.0014		
9.7	9.7	1.0037	Slope	1.006348
4.9	4.9	0.9990		
			Intercept	-0.062929



SO2 Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

W B E A

Station Information

Calibration Date	January 7, 2016	Previous Calibration	December 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Removal		
Start Time (MST)	7:55	End Time (MST)	9:15
NO2 GPT Ref date	October-07-15	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	36.6	
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	
Calculated slope	0.996302	0.976049	Pressure	26.7	
Calculated intercept	0.245047	-1.187123	Flow cell A	771.000	
Analyzer Background	0.7		Flow cell B	771.000	
Analyzer Coefficient	1.108		Cell A Intensity	NA	
			Cell B Intensity	NA	

Analyzer make	Teledyne API T400	Analyzer serial #	1107

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	1.2	----
as found span	6000	237.0 - 830.8	105.3	108.9	0.967
calibrator zero	6000	0.00	0.0	1.2	----
high point	6000	237.0 - 830.8	105.3	108.9	0.967
second point	6000	191.0 - 799.0	84.9	88.4	0.960
third point	6000	114.1 - 736.9	53.7	56.2	0.955
as left zero	6000	0.00	0.0		----
as left span	6000	237.0 - 830.8	105.3		
				Average Correction Factor	0.961

Corrected As found	107.8	Previous response	105.4	% change	-2.1%

Notes:

Removal Calibration due to inconsistent zero.

Calibration Performed By: Devin Russell

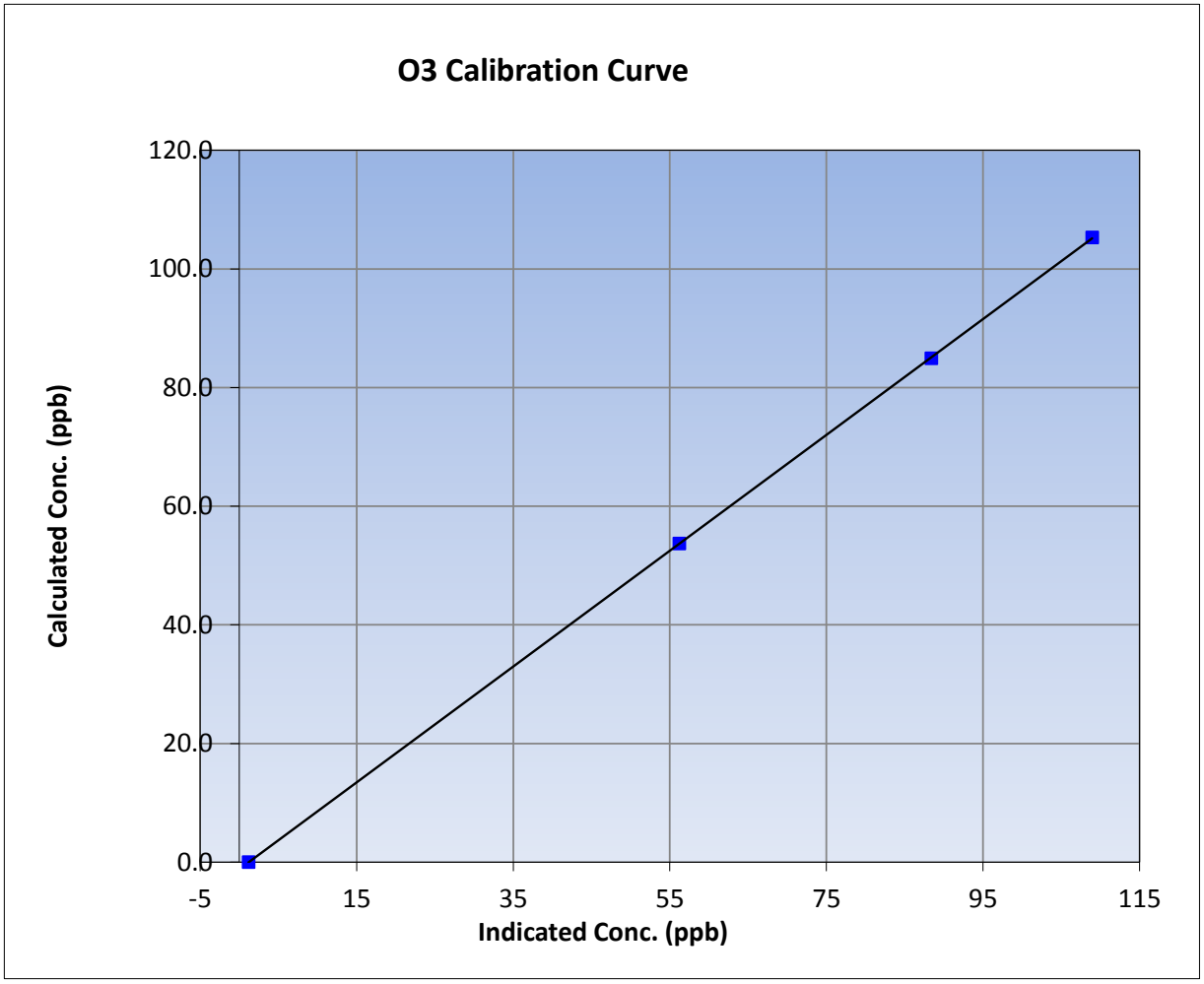
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

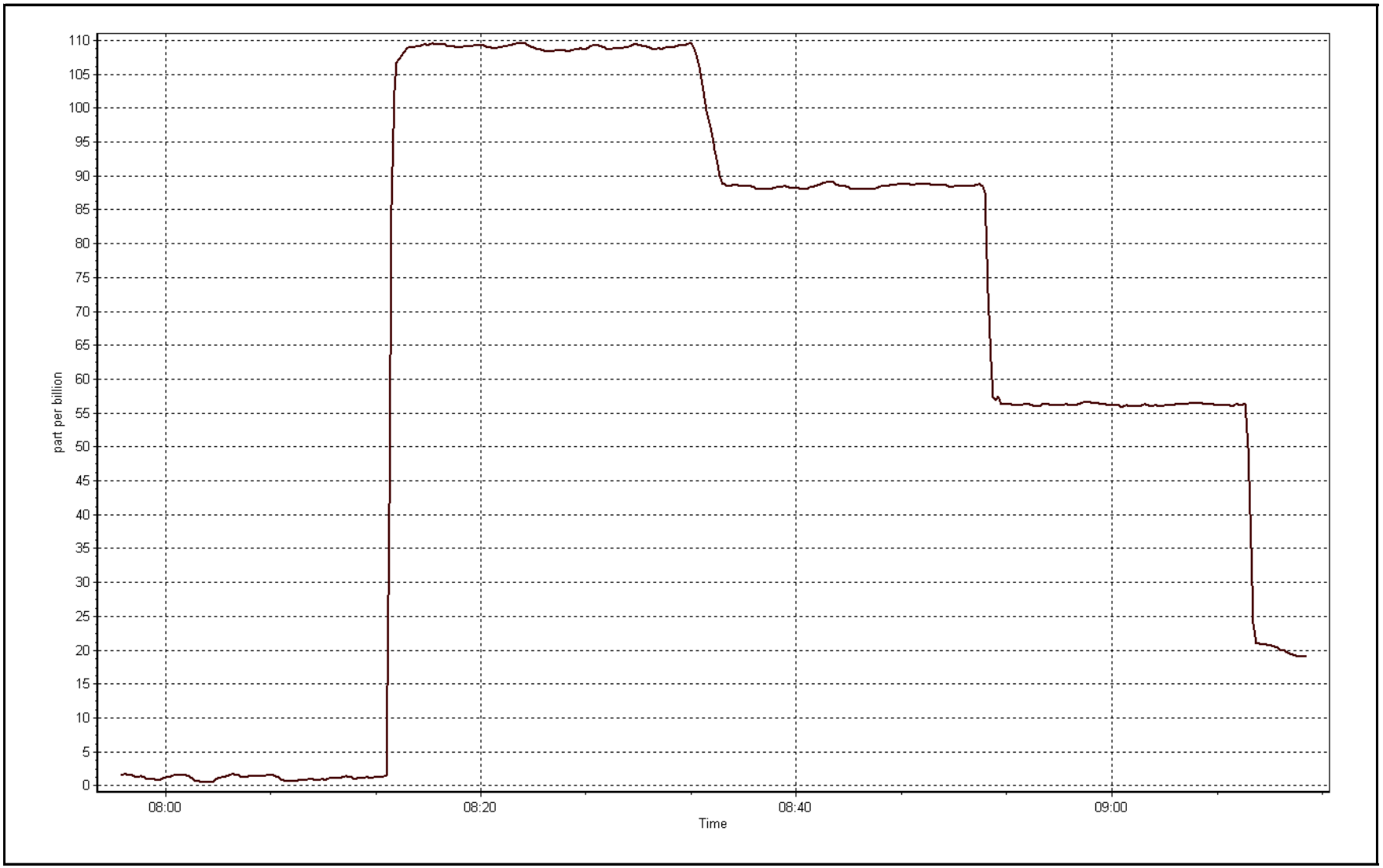
Calibration Date	January-07-16	Previous Calibration	December 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	7:55	End Time (MST)	9:15
Analyzer make	Teledyne API T400	Analyzer serial #	1107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.2	----	Correlation Coefficient	0.999990
105.3	108.9	0.9666		
84.9	88.4	0.9604	Slope	0.976049
53.7	56.2	0.9550		
			Intercept	-1.187123



O3 Calibration Plot Date: January 7, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

W B E A

Station Information

Calibration Date	January 7, 2016	Previous Calibration	
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Install		
Start Time (MST)	9:25	End Time (MST)	11:45
NO2 GPT Ref date	October-07-15	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.	NA	36.0
Analyzer IP address	192.168.1.48		Lamp temp.	NA	58.0
Calculated slope	NA	0.996238	Pressure	NA	27.4
Calculated intercept	NA	0.057550	Flow cell A	NA	753.000
Analyzer Background	NA	-0.4	Flow cell B	NA	753.000
Analyzer Coefficient	NA	1.016	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1020

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	6000	0.00	0.0	-0.2	----
high point	6000	237.0 - 830.8	105.3	105.5	0.998
second point	6000	191.0 - 799.0	84.9	85.3	0.996
third point	6000	114.1 - 736.9	53.7	54.0	0.994
as left zero	6000	0.00	0.0	0.3	----
as left span	6000	237.0 - 830.8	105.3	106.0	0.993
				Average Correction Factor	0.996

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Installation Calibration. Span adjusted.

Calibration Performed By: Devin Russell

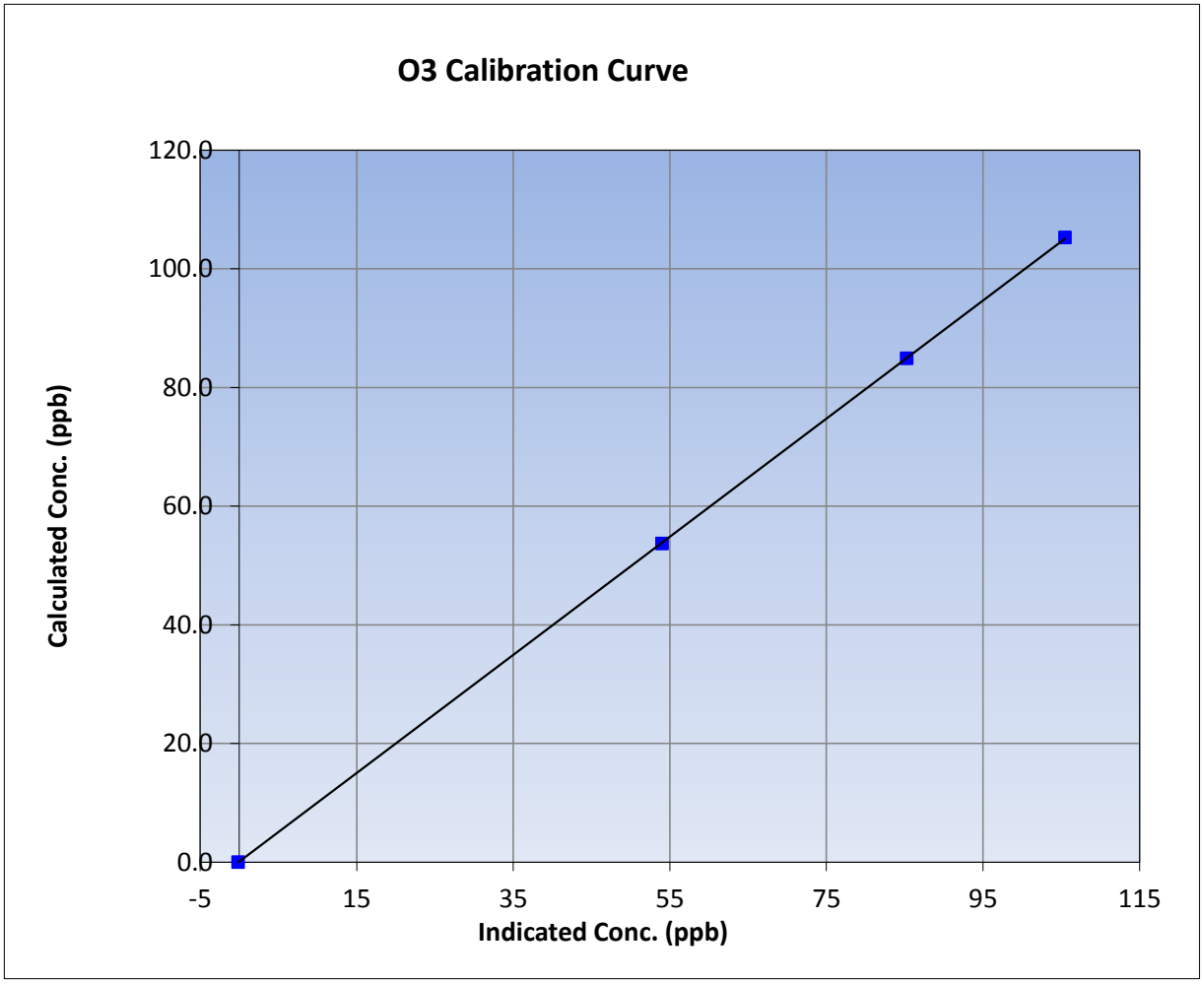
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

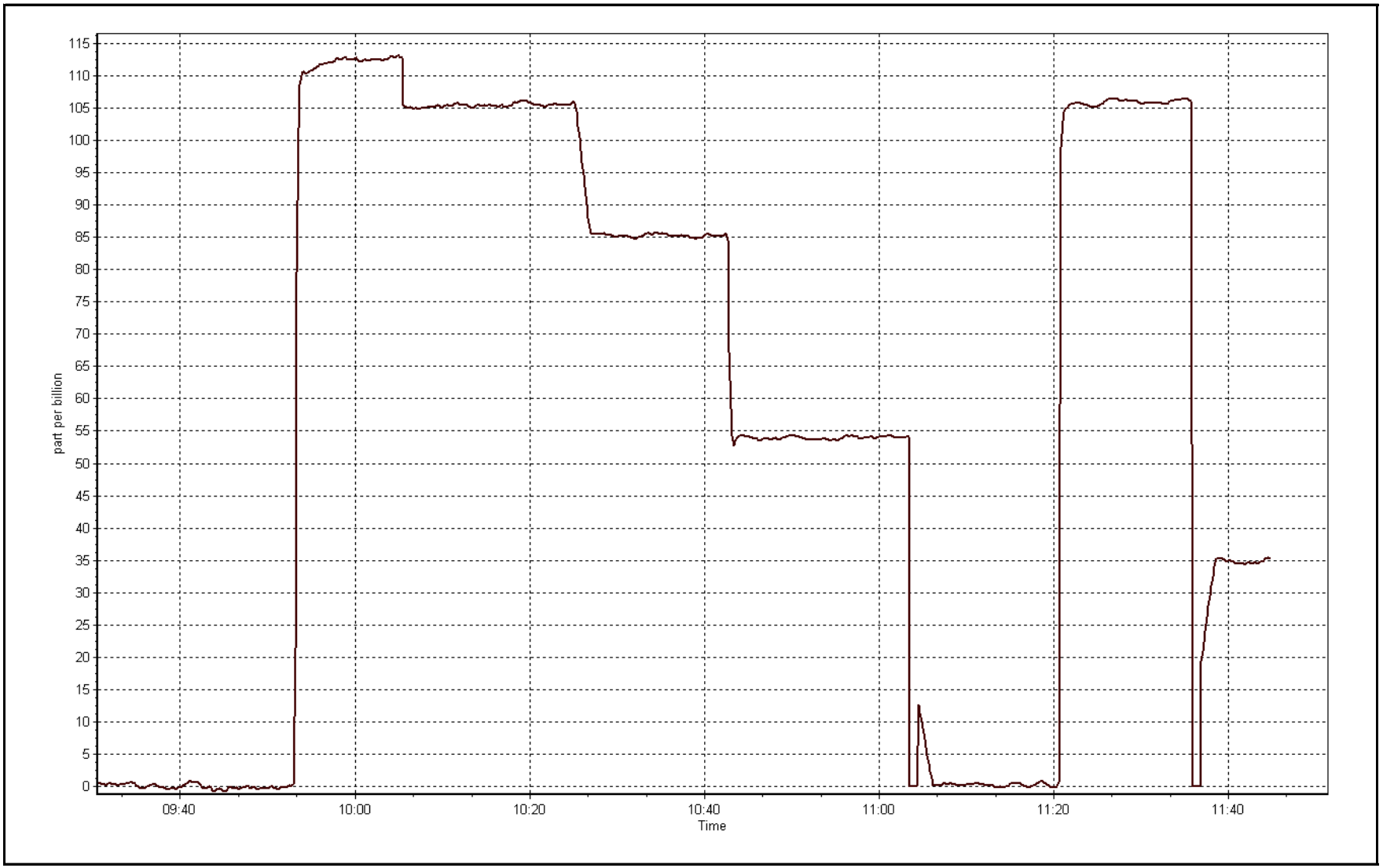
Calibration Date	January-07-16	Previous Calibration	
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:25	End Time (MST)	11:45
Analyzer make	Teledyne API T400	Analyzer serial #	1020

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999990
105.3	105.5	0.9982		
84.9	85.3	0.9959	Slope	0.996238
53.7	54.0	0.9944		
			Intercept	0.057550



O3 Calibration Plot Date: January 7, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 6, 2016	Previous Calibration	December 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	14:20	End Time (MST)	19:00
NO Cal Gas Conc	20.2 ppm	Gas Cert Reference	LL103809
NOx Cal Gas Conc	20.2 ppm	Cal Gas Expiry Date	16/09/2016
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API T701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000181	1.002270	0.995750
	Data Offset	0.393666	0.609162	-0.060364
Current Calibration	Data Slope	1.002069	1.001382	0.997703
	Data Offset	0.244275	0.333042	-0.072050

Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172

Test Point	before		after	
Concentration range	0-200	ppb	0-200	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.147		1.169	
NOX coefficient	1.161		1.180	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.1		0.1	
NOX bkgrnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314	Deg C	316.6	Deg C
HVPS	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	87	ccm	89	ccm
R Cell press NO	3.7	"Hg	3.8	"Hg
R Cell Press Nox	3.7	"Hg	3.8	"Hg
NO sample flow	1074	ccm	1102	ccm
Nox sample Flow	1074	ccm	1102	ccm

Notes:

Filter changed after As Founds. Span adjusted.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 6, 2016 Station Number: AMS 8

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	6000	44.6	150.2	150.2	0.0	147.4	147.1	0.3	1.0185	1.0208
calibrator zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	6000	44.6	150.2	150.2	0.0	149.9	149.9	0.0	1.0018	1.0016
second point	6000	23.8	80.1	80.1	0.0	79.2	79.2	0.0	1.0117	1.0117
third point	6000	11.9	40.1	40.1	0.0	39.7	39.5	0.2	1.0089	1.0137
as left zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	6000	44.6	150.2	44.1	106.0	150.9	44.5	106.4	0.9954	0.9912
								Average Correction Factor	1.0075	1.0090

Corrcted As found NO_X= 147.5 NO= 147.1 Percent Change NO_X= 1.5% NO= 1.4%

Previous Response NO_X= 149.7 NO= 149.2

GPT Calibration Data

Dilution Flow 6000 ccm Source Gas Flow 44.60 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	44.1	105.3	149.7	44.1	105.5	0.9960	1.0000	0.9973	100.3%
2nd NO2 (200)	----	64.5	84.9	149.6	64.5	85.1	0.9966	1.0000	0.9976	100.2%
3rd NO2 (100)	----	95.7	53.7	149.7	95.7	54.0	0.9956	1.0000	0.9935	100.7%
4th NO2 (0)	149.4	----	0.3	149.7	149.4	0.3	0.9956	1.0000	N/A	----
					Average Correction Factor		0.9959	1.0000	0.9961	100.4%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

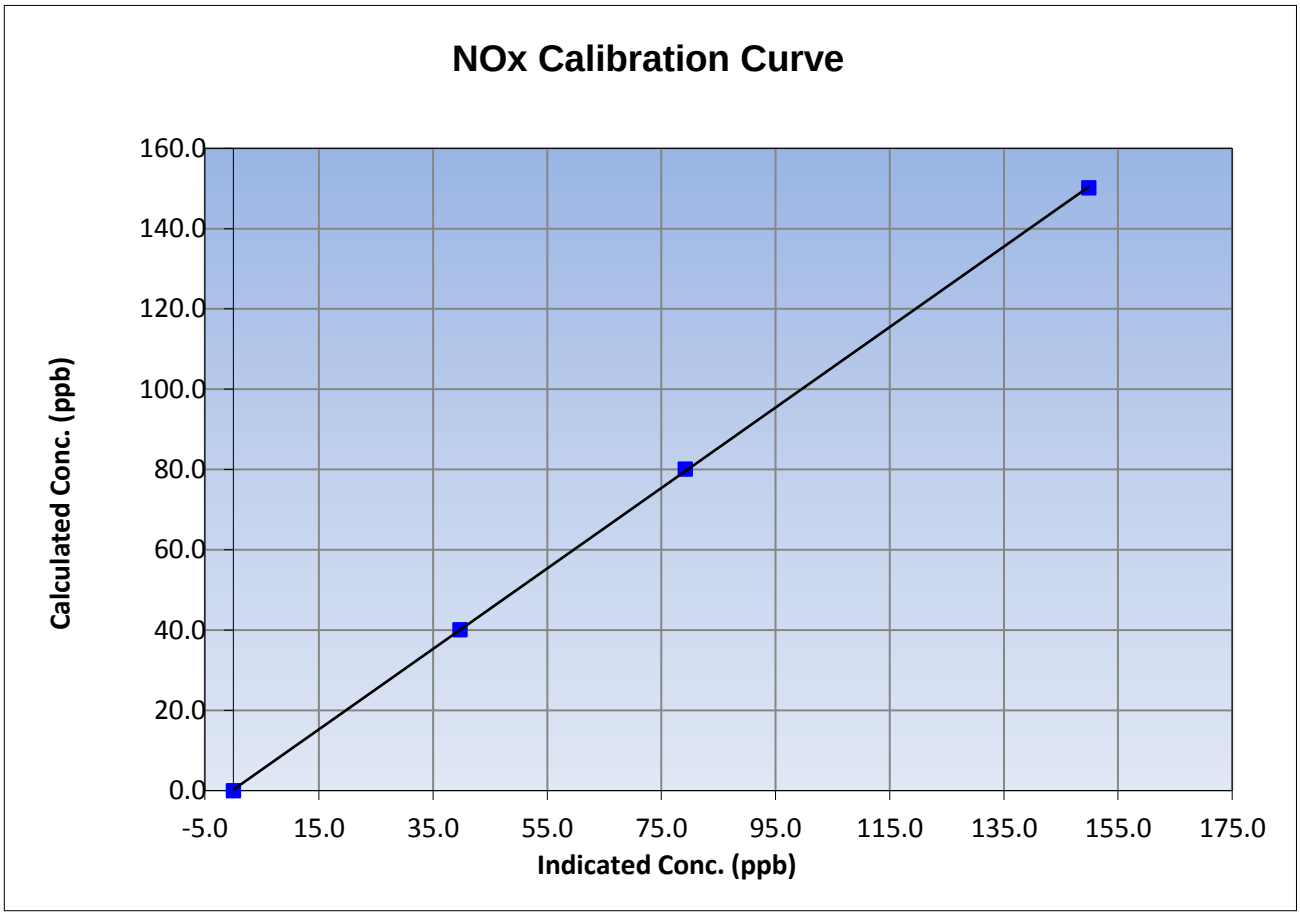
NO_X Calibration Summary

Station Information

Calibration Date	January 6, 2016	Previous Calibration	December 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	14:20	End Time (MST)	19:00
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	0.999966
150.2	149.9	1.0018		
80.1	79.2	1.0117	Slope	1.002069
40.1	39.7	1.0089		
			Intercept	0.244275



Wood Buffalo Environmental Association

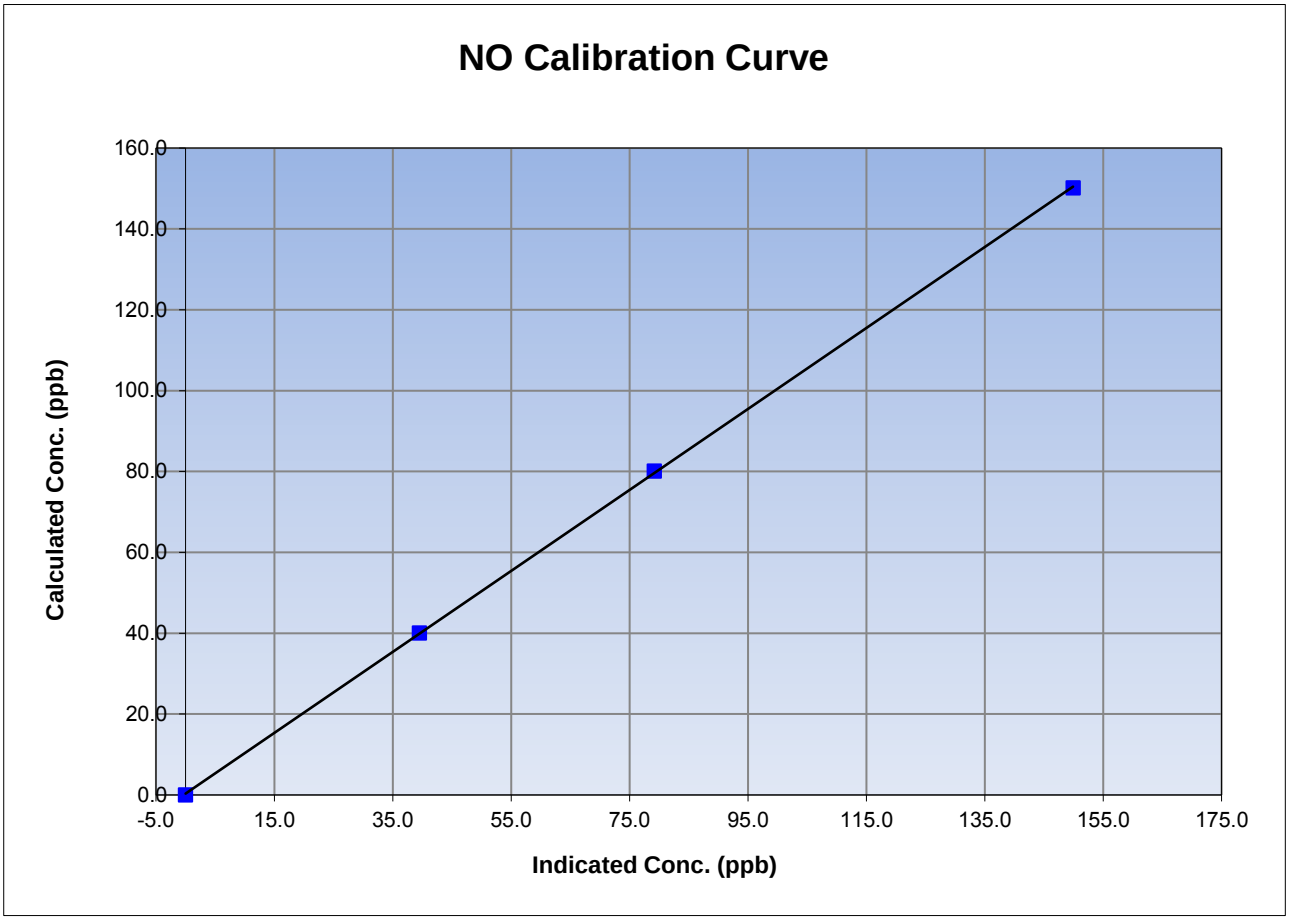
NO Calibration Summary

Station Information

Calibration Date	January 6, 2016	Previous Calibration	December 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	14:20	End Time (MST)	19:00
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999962
150.2	149.9	1.0016		
80.1	79.2	1.0117	Slope	1.001382
40.1	39.5	1.0137		
			Intercept	0.333042



Wood Buffalo Environmental Association

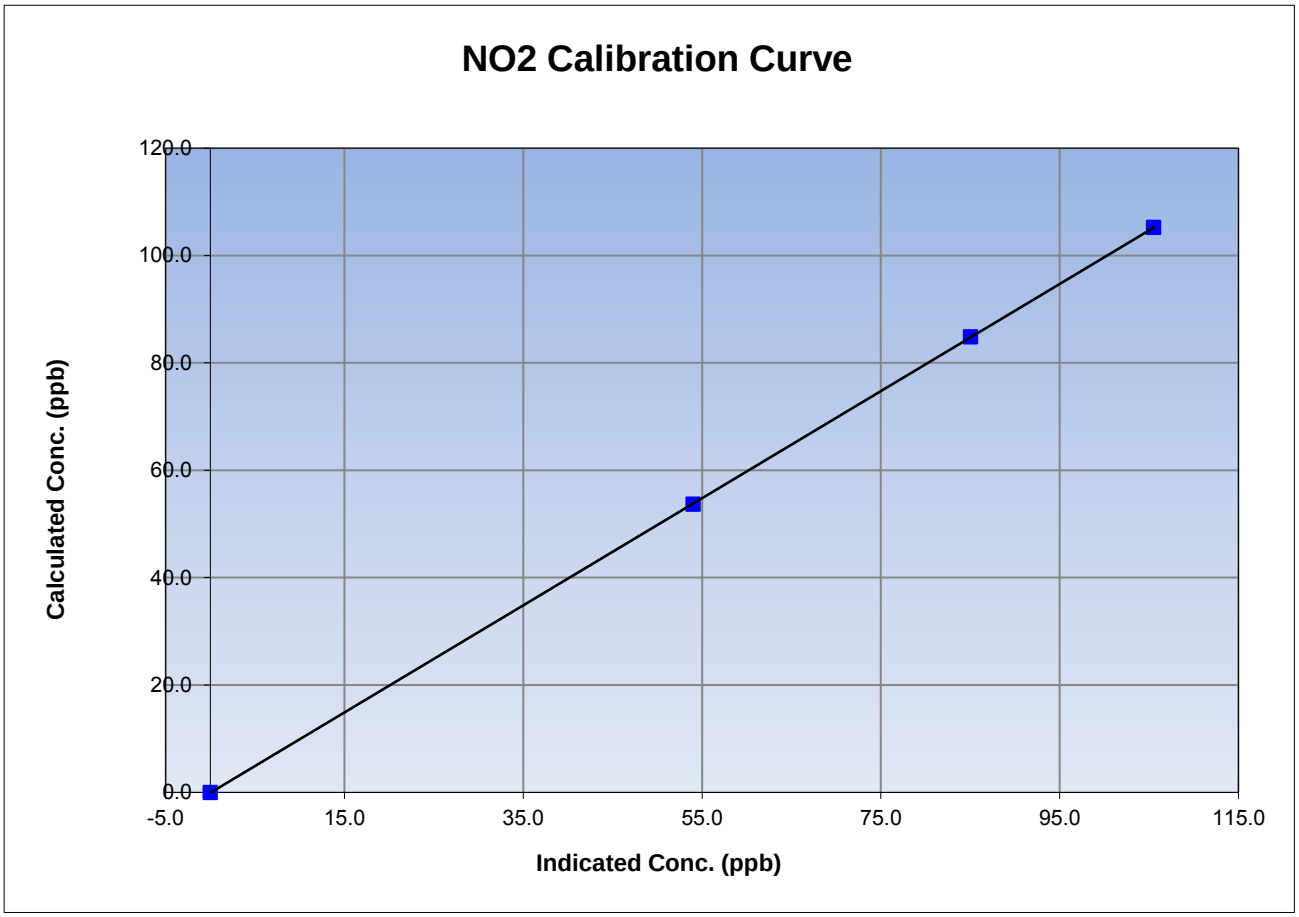
NO_2 Calibration Summary

Station Information

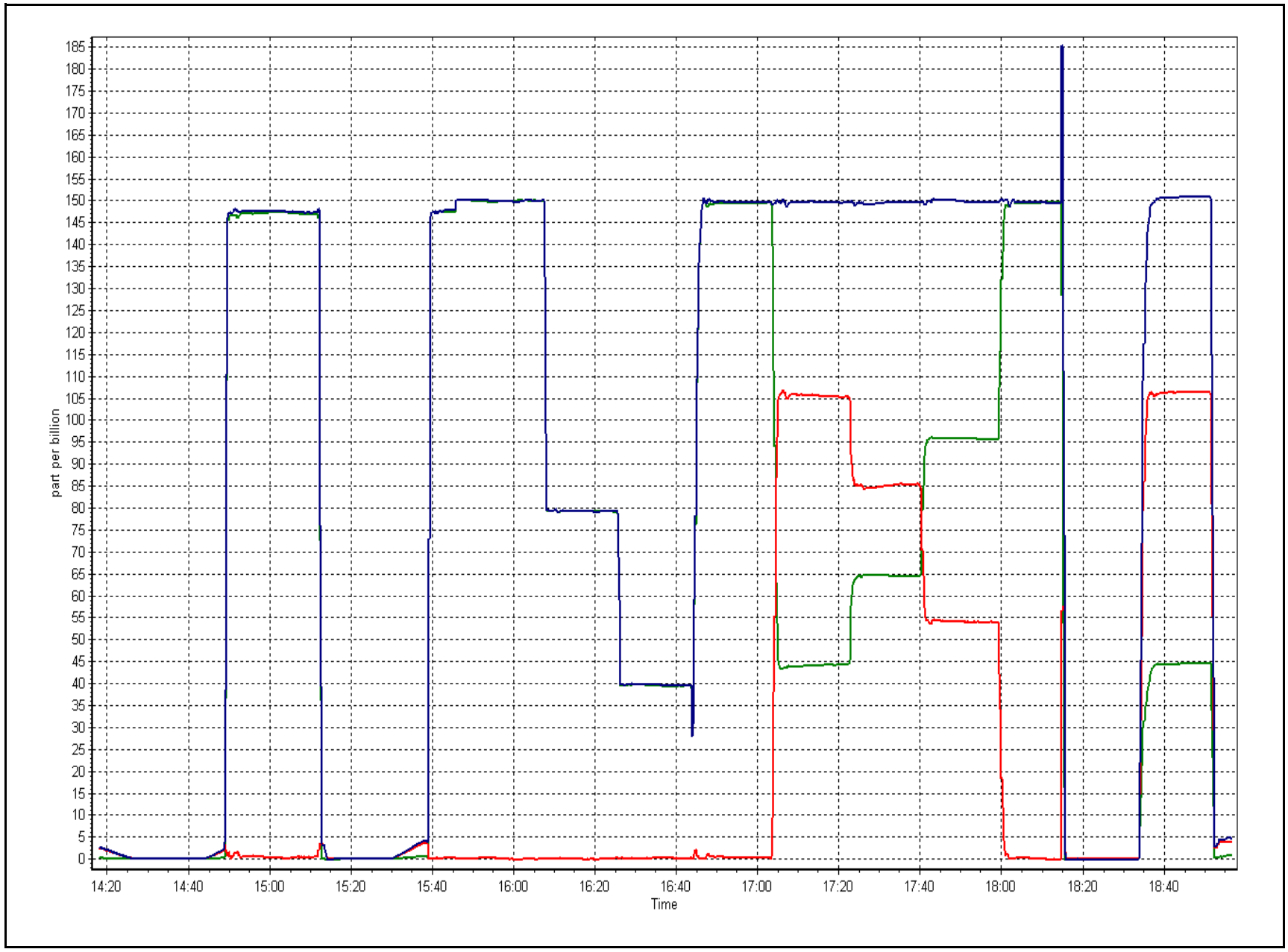
Calibration Date	January 6, 2016	Previous Calibration	December 2, 2015
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	14:20	End Time (MST)	19:00
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999995
105.3	105.5	0.9973		
84.9	85.1	0.9976	Slope	0.997703
53.7	54.0	0.9935		
			Intercept	-0.072050



NOX Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 6, 2016	Previous Calibration:	December 2, 2015
Station Name:	Fort Chipewyan	Station Number:	AMS 8
Start Time (MST):	15:00	End Time (MST):	16:25
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5								
Make/Model:	Thermo / SHARP 5030								
Serial Number	E-2025								
C_{14} Source SN:	7414								
Confirmation of Time settings:	Yes ☑	No ☐							
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☐	Main Flow ☑	Beta ☐	Neph ☑	

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-13.0	-13.5	-0.5	-13.5
T2	16.0	na	na	16.0
T3	17.0	na	na	17.0
T4	18.0	na	na	18.0
RH (%)	15.0	na	na	15.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	996	988.9	-7.1	996

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	995	-5	998	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	190		192
Neph	7.5		-0.1
C14	16.7		21.3
Indicated Concentration (ug/m3)	**1.9**	**yes**	**0**
Offset 1	194		191.2
Offset 2	32		32

Leak Check (Quarterly)

Leak Check Date:	October 7, 2015	Previous Leak Check Date:	August 5, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.72	0.09
*Flow with adaptor (LPM):	16.63	

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

Mass Foil Calibration (Annualy)

Foil Calibration Date:	May 6, 2015	Previous Foil Calibration:	NA
Zeroed?:			
Foil Mass:	1324	Mass foil set S/N:	
Previous Correction Factor:	7081		
New Correction Factor:	7022		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	06/01/2016
Pump	Good / Adjusted	NA
Filter Tape	Good	NA
Mass Foil Cal Set	na	NA
HEPA filter	Good	NA

NOTES:

Cyclone head cleaned. Flow adjusted from 995 lph to 998 lph. Nephalometer zero showing 1.9 ug / m3. Performed FC+Z then checked zero again.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 9
BARGE LANDING
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
JANUARY 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	4	0	2	0
THC(ppm) Average	708	34	36	99.73	4.2	-	3.3	-
Temperature (C) Average	744	0	0	100.00	6.3	-	2.7	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	93	-
Wind Speed 10 m (km/h) Average	735	0	9	98.79	20	-	9	-
Wind Direction 10 m (deg) Average	735	0	9	98.79	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	709	0.6	1	-	0	0	0	0	1	1	4
THC(ppm) Average	708	2.55	0.3	-	2	2.2	2.3	2.5	2.7	3	4.2
Temperature (C) Average	744	-13.2	7.9	-	-34	-22.3	-18.3	-13.6	-8.7	-3.3	6.3
Relative Humidity (%) Average	744	82.3	7	-	51	74	79	82	87	90	98
Wind Speed 10 m (km/h) Average	735	4.4	3	-	0	2	3	4	6	7	20
Wind Direction 10 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	07 Jan 2016 12:00	07 Jan 2016 12:00	1	Unstable Operation - tech activity
THC	24 Jan 2016 08:00	24 Jan 2016 08:00	1	Power spike
WS	05 Jan 2016 23:00	05 Jan 2016 23:00	1	Flat line in sensor output signal -sensor frozen
WS	08 Jan 2016 13:00	08 Jan 2016 13:00	1	Flat line in sensor output signal -sensor frozen
WS	08 Jan 2016 15:00	08 Jan 2016 15:00	1	Flat line in sensor output signal -sensor frozen
WS	15 Jan 2016 02:00	15 Jan 2016 02:00	1	Flat line in sensor output signal -sensor frozen
WS	16 Jan 2016 01:00	16 Jan 2016 02:00	2	Flat line in sensor output signal -sensor frozen
WS	16 Jan 2016 04:00	16 Jan 2016 05:00	2	Flat line in sensor output signal -sensor frozen
WS	16 Jan 2016 10:00	16 Jan 2016 10:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Barge Landing - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 4 ppb on Jan 26 18:00

Maximum Daily Average: 1.5 ppb on Jan 26

Minimum Value: 0 ppb on Jan 27 06:00

Minimum Daily Average: 0.2 ppb on Jan 29

Maximum Diurnal Average: 0.8 ppb at hour 18

Minimum Diurnal Average: 0.6 ppb at hour 22

Monthly Average: 0.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Jan	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	0	2	2	0.9	2
3-Jan	1	1	1	Z	2	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1.4	2
4-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	2	1.1	2
5-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1.1	2
6-Jan	1	1	1	1	1	1	Z	1	0	0	0	1	C	C	C	C	0	0	0	0	0	0	0	0	0.5	1
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Jan	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.4	1
9-Jan	0	0	1	Z	1	1	0	1	1	1	1	1	1	2	2	2	1	1	1	2	2	2	2	1	1.1	2
10-Jan	2	2	2	2	Z	2	2	3	2	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1.0	3
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Jan	0	0	0	1	1	1	Z	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	0.9	2
13-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Jan	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	1	1	1	1	1	2	2	2	1	2	0.8	2
17-Jan	1	1	1	2	2	Z	2	3	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1.4	3
18-Jan	1	1	1	1	1	1	Z	1	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0.6	1
19-Jan	1	Z	1	1	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
20-Jan	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.6	1
21-Jan	1	1	0	Z	1	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	0	1	1.1	2
22-Jan	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0.4	1
24-Jan	1	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
26-Jan	1	1	Z	1	1	2	1	1	2	1	3	3	2	2	2	2	3	4	3	1	1	0	0	0	1.5	4
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Jan	0	0	1	1	Z	1	1	1	1	0	0	0	0	0	1	1	2	2	1	1	0	0	0	0	0.7	2
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0.3	1
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	Diurnal Average	
	2	2	2	2	2	2	2	3	2	2	3	3	2	2	2	2	3	4	3	2	2	2	2	2	Diurnal Maximum	

Z - zerospan C - Calibration

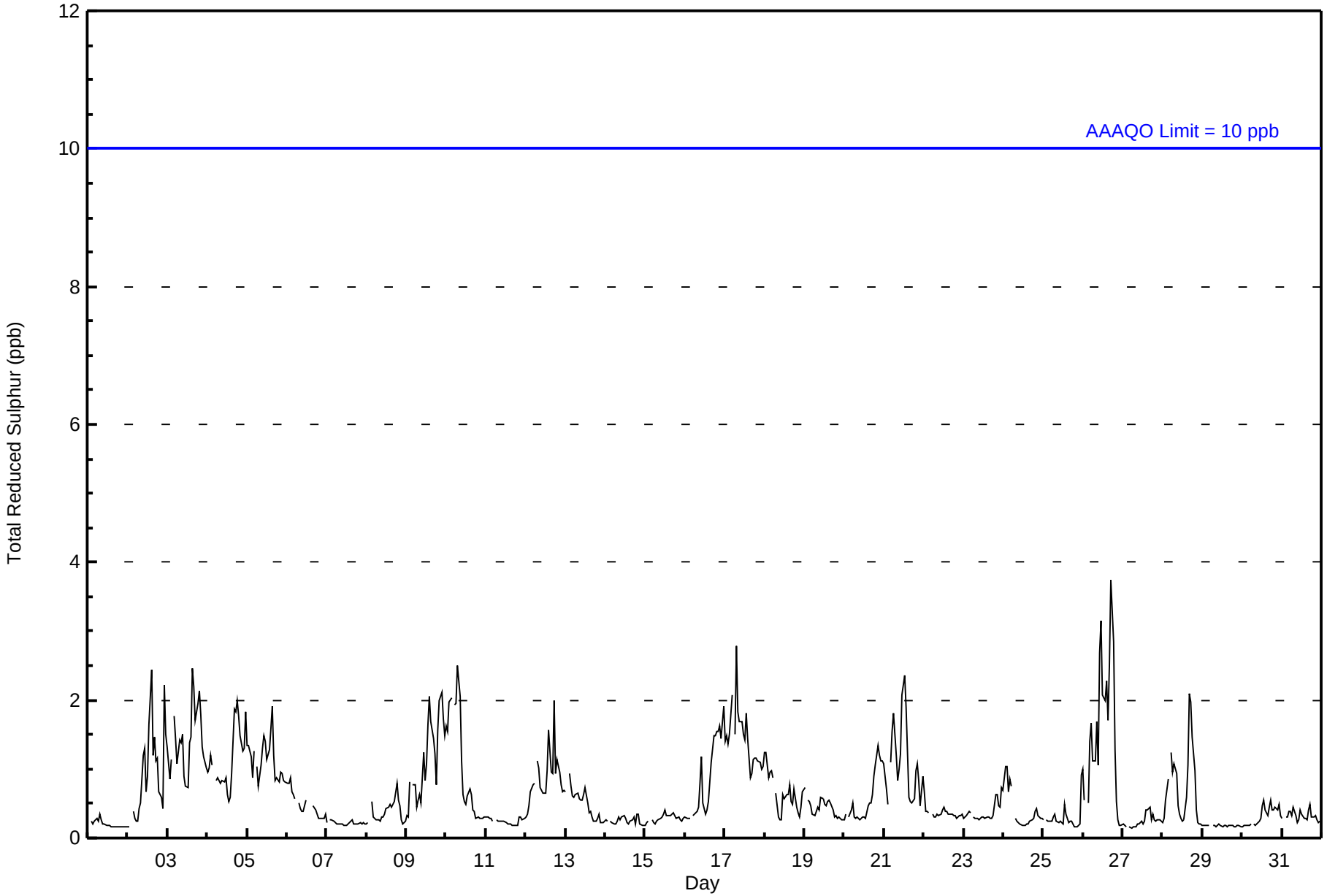
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Barge Landing - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	702	99.01	99.01
3 - 4	7	0.99	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Barge Landing - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	59	70	36	14	2	10	19	66	127	77	49	46	27	7	23	62	694
3 - 4	0	0	0	0	0	0	0	1	1	1	3	0	0	0	1	0	7
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	70	36	14	2	10	19	67	128	78	52	46	27	7	24	62	701

Total Number of Valid Hours: 701

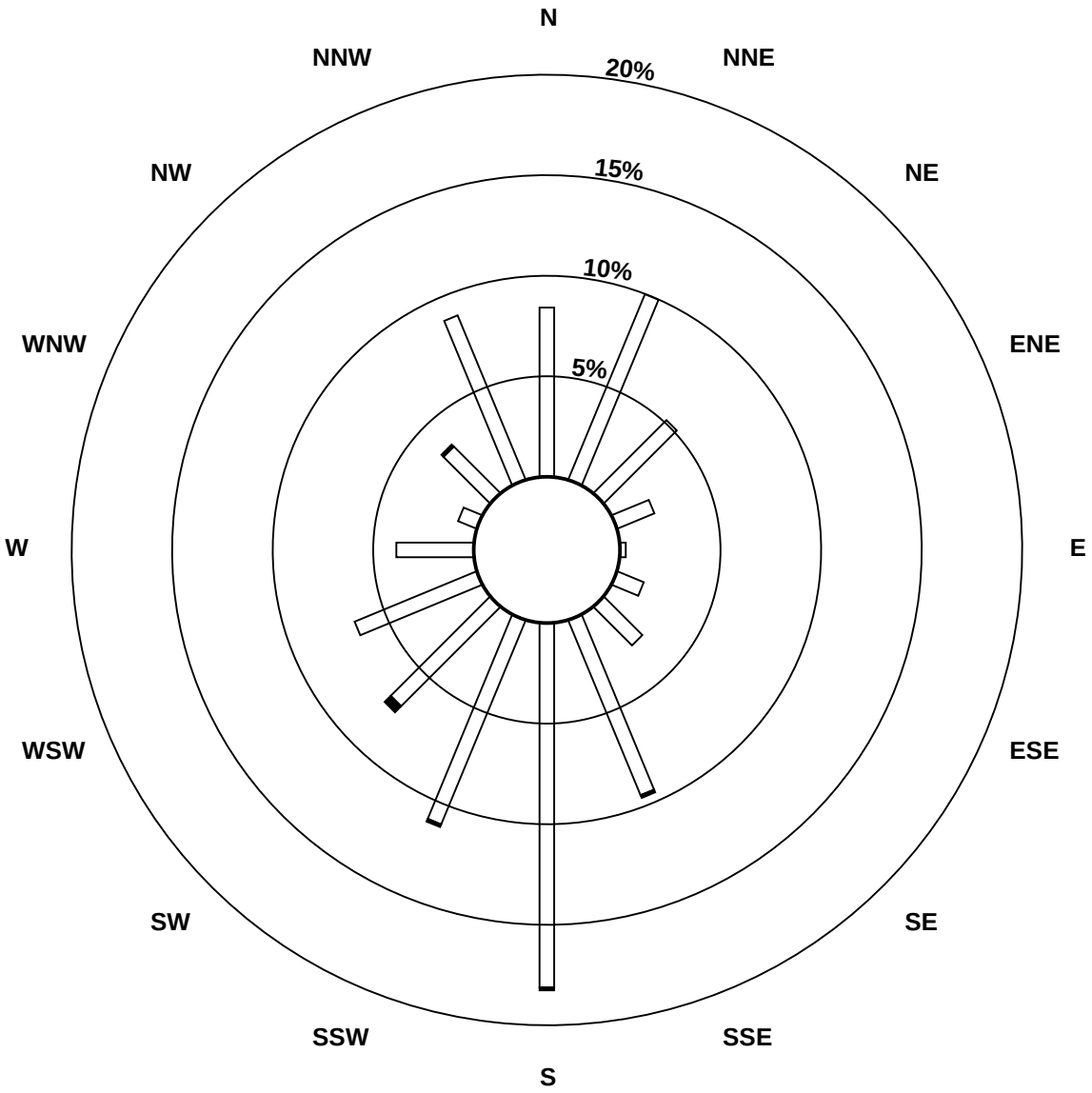
Total Number of Hours: 744

Wood Buffalo Environmental Association

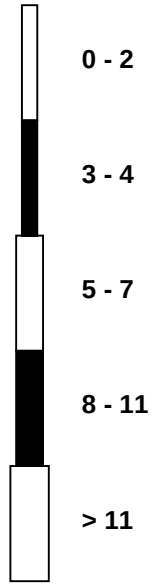
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

Barge Landing (AMS 9)



Classes (ppb)



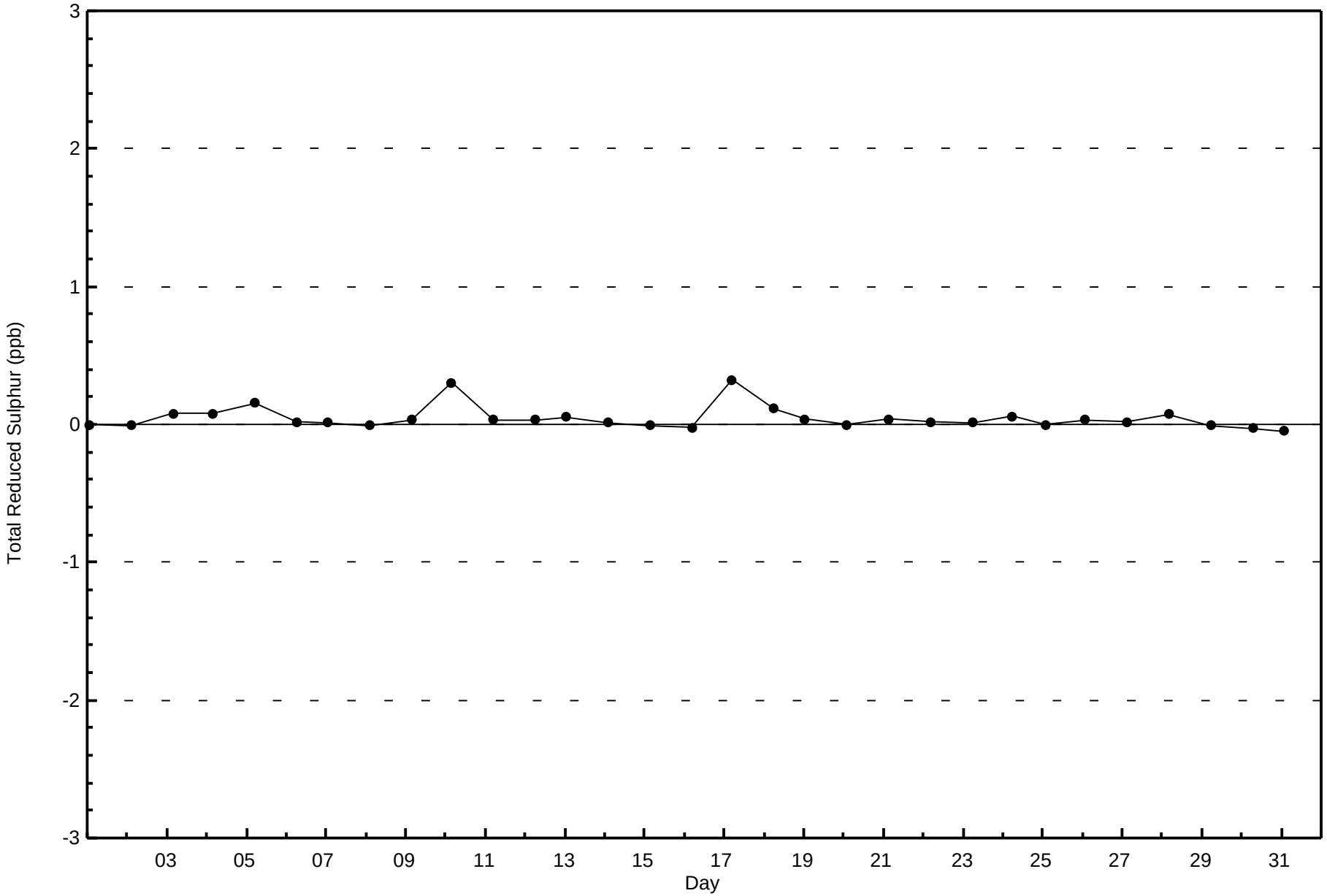
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Barge Landing - January 2016

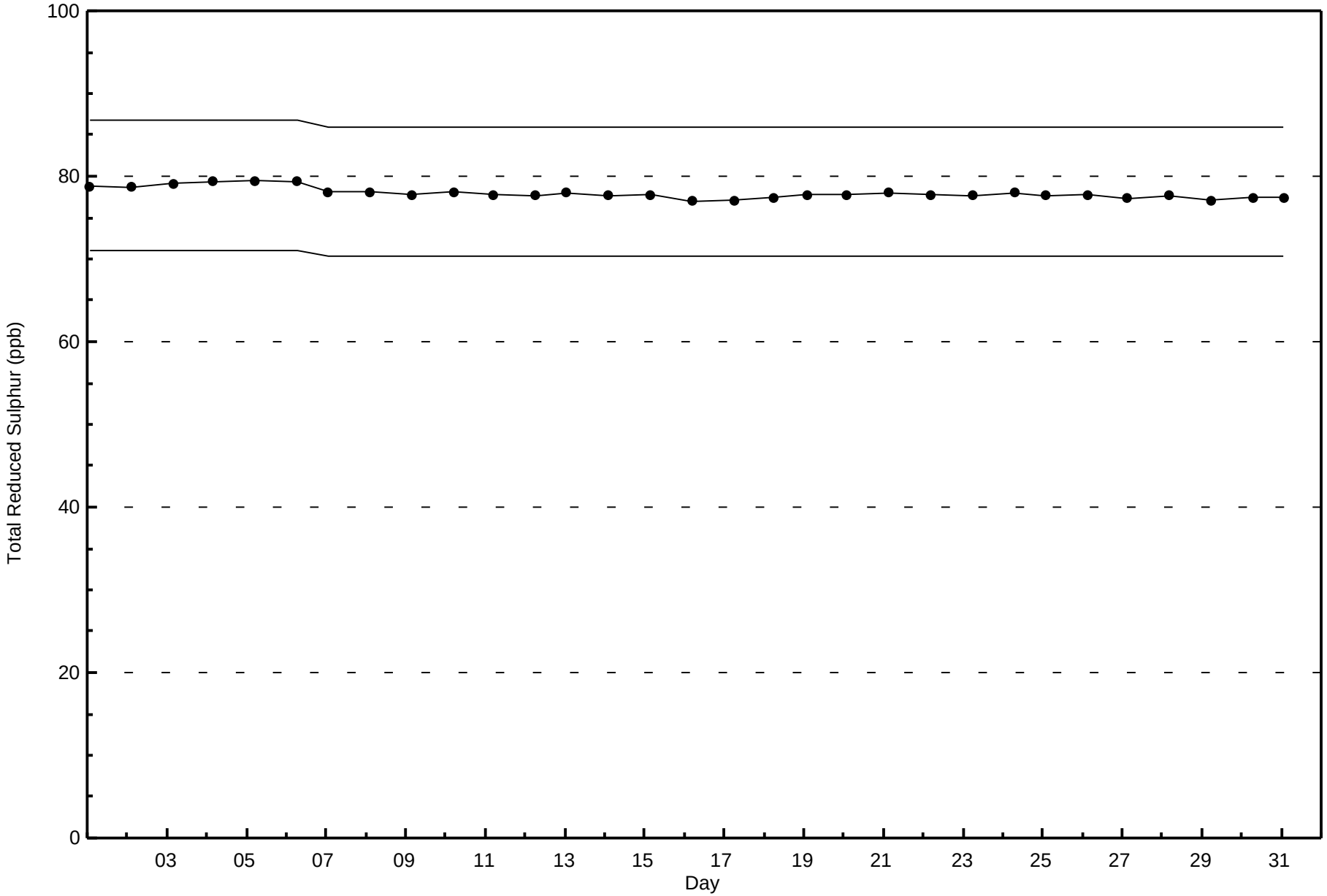


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Barge Landing - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Barge Landing - January 2016

Maximum Value: 4.2 ppm on Jan 4 20:00

Maximum Daily Average: 3.3 ppm on Jan 4

Minimum Value: 2.0 ppm on Jan 29 01:00

Minimum Daily Average: 2.1 ppm on Jan 29

Maximum Diurnal Average: 2.6 ppm at hour 20

Minimum Diurnal Average: 2.5 ppm at hour 7

Monthly Average: 2.55 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.3 Median = 2.5 Q_3 = 2.7 P_{90} = 3.0 P_{99} = 3.6

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	34
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.2	2.4	2.2	2.3	2.5	2.3	2.5	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	2.2	2.5
2-Jan	2.1	Z	2.4	2.9	2.6	2.5	2.5	2.6	2.8	2.8	2.7	2.5	2.5	2.6	2.6	2.5	2.6	2.7	2.7	2.5	2.6	2.9	2.9	2.7	2.6	2.9
3-Jan	2.6	2.6	Z	2.5	2.5	2.6	2.5	2.7	2.5	2.7	3.0	3.0	2.7	2.6	2.7	2.7	2.6	2.6	2.7	2.7	2.7	2.7	2.8	2.8	2.7	3.0
4-Jan	2.9	2.9	3.1	Z	3.0	3.0	3.1	3.0	3.1	3.1	3.1	3.0	2.9	2.8	2.9	3.0	3.6	3.8	4.0	4.2	4.0	3.8	3.4	3.2	3.3	4.2
5-Jan	3.1	3.0	3.0	3.0	Z	3.0	2.9	2.9	3.2	3.0	3.0	2.9	3.0	3.2	3.1	3.1	3.1	3.0	3.3	3.2	3.3	3.2	3.2	3.2	3.1	3.3
6-Jan	3.3	3.4	3.3	3.3	3.2	Z	2.7	2.6	2.5	2.4	C	C	C	2.7	2.5	2.3	2.3	2.4	2.4	2.4	2.3	2.4	2.5	2.2	2.7	3.4
7-Jan	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	UO	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3
8-Jan	2.1	Z	2.2	2.4	2.7	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.3	2.2	2.3	2.4	2.7
9-Jan	2.5	2.4	Z	2.4	2.4	2.5	2.4	2.4	2.7	2.5	2.5	2.5	2.4	2.4	2.5	2.4	2.4	2.6	2.7	2.6	2.6	2.7	2.7	2.8	2.5	2.8
10-Jan	2.8	2.5	2.6	Z	2.8	2.8	2.6	2.6	2.7	2.7	2.7	2.6	2.6	2.9	3.3	2.8	2.7	2.6	2.4	2.4	2.4	2.3	2.4	2.6	2.6	3.3
11-Jan	2.5	2.5	2.4	2.5	Z	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.6	2.6	2.7	2.3	2.7
12-Jan	2.6	2.7	2.8	2.7	2.6	Z	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.7	2.7	2.8	2.6	2.6	2.7	2.5	2.4	2.4	2.6	2.8
13-Jan	Z	2.5	2.6	2.6	2.6	2.6	2.7	2.6	2.6	2.6	2.9	3.3	3.0	2.4	2.3	2.5	2.6	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.6	3.3
14-Jan	2.4	Z	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4
15-Jan	2.2	2.3	Z	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.4	2.6	2.6	2.6	2.7	2.6	2.6	2.8	3.1	2.8	2.7	2.5	2.3	2.3	2.5	3.1
16-Jan	2.6	2.5	2.5	Z	2.5	2.4	2.4	2.4	2.5	2.7	2.8	2.4	2.4	2.6	2.7	3.2	3.2	3.1	3.2	3.1	3.2	3.3	3.4	3.5	2.8	3.5
17-Jan	3.2	3.2	3.2	3.0	Z	2.9	2.6	2.8	2.5	2.5	3.0	3.2	2.8	3.4	3.7	2.9	3.1	3.2	3.3	3.3	3.3	3.3	3.2	3.2	3.1	3.7
18-Jan	2.9	2.7	2.8	2.8	2.8	Z	2.6	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.9
19-Jan	Z	2.4	2.4	2.4	2.4	2.3	2.5	2.6	2.7	2.4	3.0	2.6	2.4	2.4	2.5	3.1	2.7	2.5	2.3	2.4	2.3	2.3	2.2	2.2	2.5	3.1
20-Jan	2.2	Z	2.3	2.3	2.4	2.3	2.3	2.4	2.5	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.6	2.7	2.6	2.6	2.8	2.7	2.6	2.4	2.8
21-Jan	2.6	2.5	Z	2.5	2.4	2.4	2.5	2.7	2.7	2.7	2.7	2.6	2.7	2.7	2.6	2.7	2.7	2.8	2.7	2.9	3.0	2.9	2.6	2.7	2.7	3.0
22-Jan	3.2	2.6	2.8	Z	2.9	2.7	2.6	2.7	2.7	2.7	2.8	3.5	3.4	2.9	2.6	2.5	2.5	2.6	2.5	2.6	2.4	2.5	2.6	2.5	2.7	3.5
23-Jan	2.5	2.6	2.6	2.6	Z	2.7	2.3	2.3	2.3	2.3	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.6	3.2	3.4	3.2	3.1	3.1	2.7	3.4
24-Jan	2.9	3.0	3.0	3.0	3.0	Z	2.5	PF	2.4	2.4	2.3	2.3	2.2	2.3	2.4	2.4	2.6	2.6	2.8	3.2	2.7	2.5	2.4	2.4	2.6	3.2
25-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.6	2.6	2.4	2.3	2.3	2.3	2.5	2.8	2.4	2.8
26-Jan	2.7	Z	2.4	2.4	2.8	2.8	2.7	2.8	2.8	2.8	2.8	3.0	2.7	2.7	2.7	2.6	2.7	2.9	2.7	2.7	2.4	2.1	2.1	2.1	2.6	3.0
27-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	3.1	2.8	2.7	2.8	2.7	2.7	2.6	2.7	2.7	2.4	2.4	2.3	2.4	2.4	3.1
28-Jan	2.4	2.4	2.7	Z	2.7	2.8	2.7	2.9	3.1	2.7	2.5	2.5	2.4	2.6	2.8	2.8	3.3	2.8	2.8	2.8	2.3	2.1	2.1	2.1	2.6	3.3
29-Jan	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
30-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.4	2.6	2.4	2.4	2.6	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.3	2.6
31-Jan	Z	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.3	2.4
	2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	Diurnal Average	
	3.3	3.4	3.3	3.3	3.2	3.0	3.1	3.0	3.2	3.1	3.1	3.5	3.4	3.4	3.7	3.2	3.6	3.8	4.0	4.2	4.0	3.8	3.4	3.5	Diurnal Maximum	

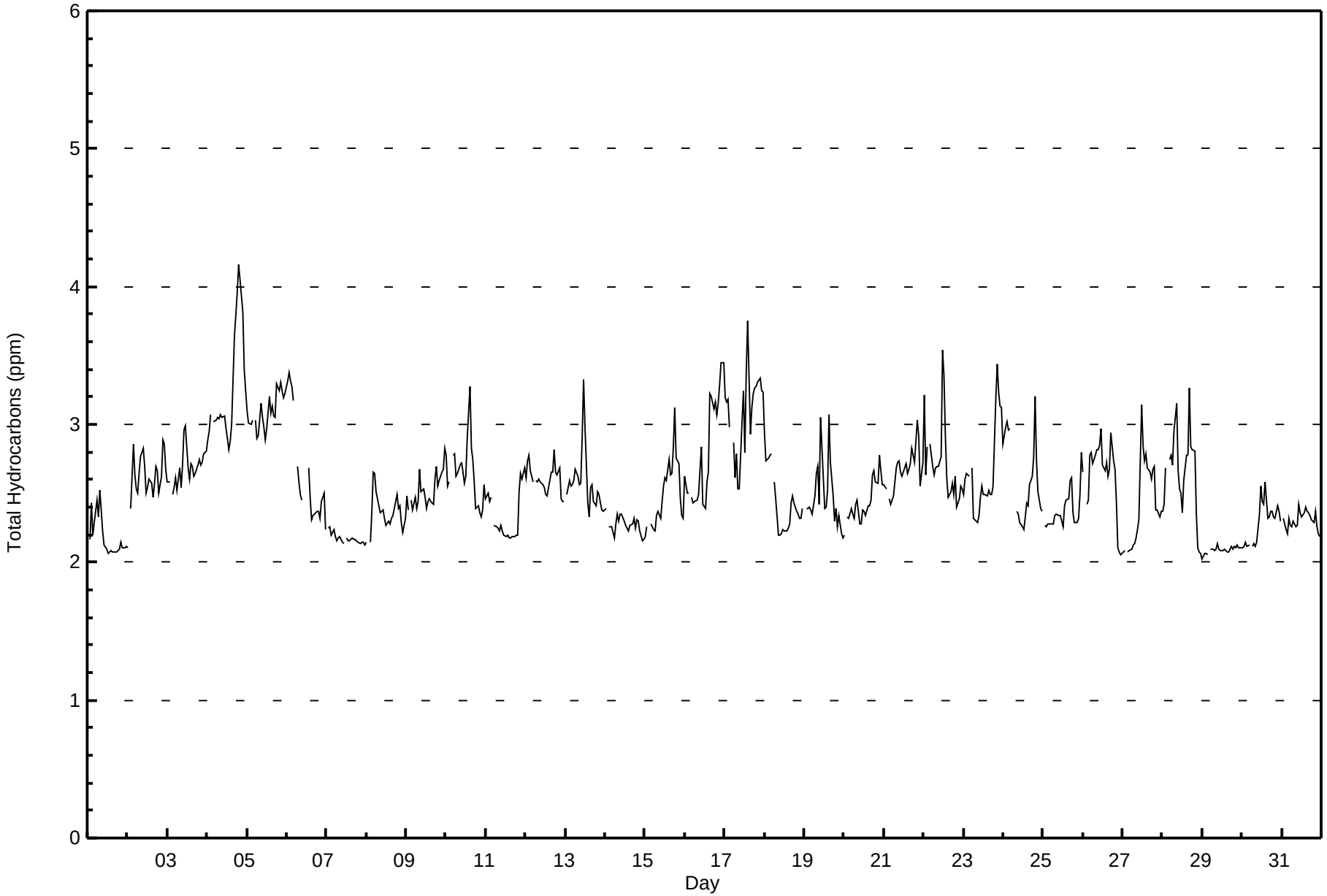
Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Barge Landing - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Barge Landing - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.14	0.14
2.1 - 3.0	638	90.11	90.25
3.1 - 10.0	69	9.75	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

Barge Landing - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
2.1 - 3.0	52	68	35	14	1	8	14	51	114	72	47	43	25	8	21	58	631
3.1 - 10.0	5	2	1	1	1	3	5	14	13	5	3	2	2	1	3	7	68
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	57	70	36	15	2	11	19	65	127	77	50	46	27	9	24	65	700

Total Number of Valid Hours: 700

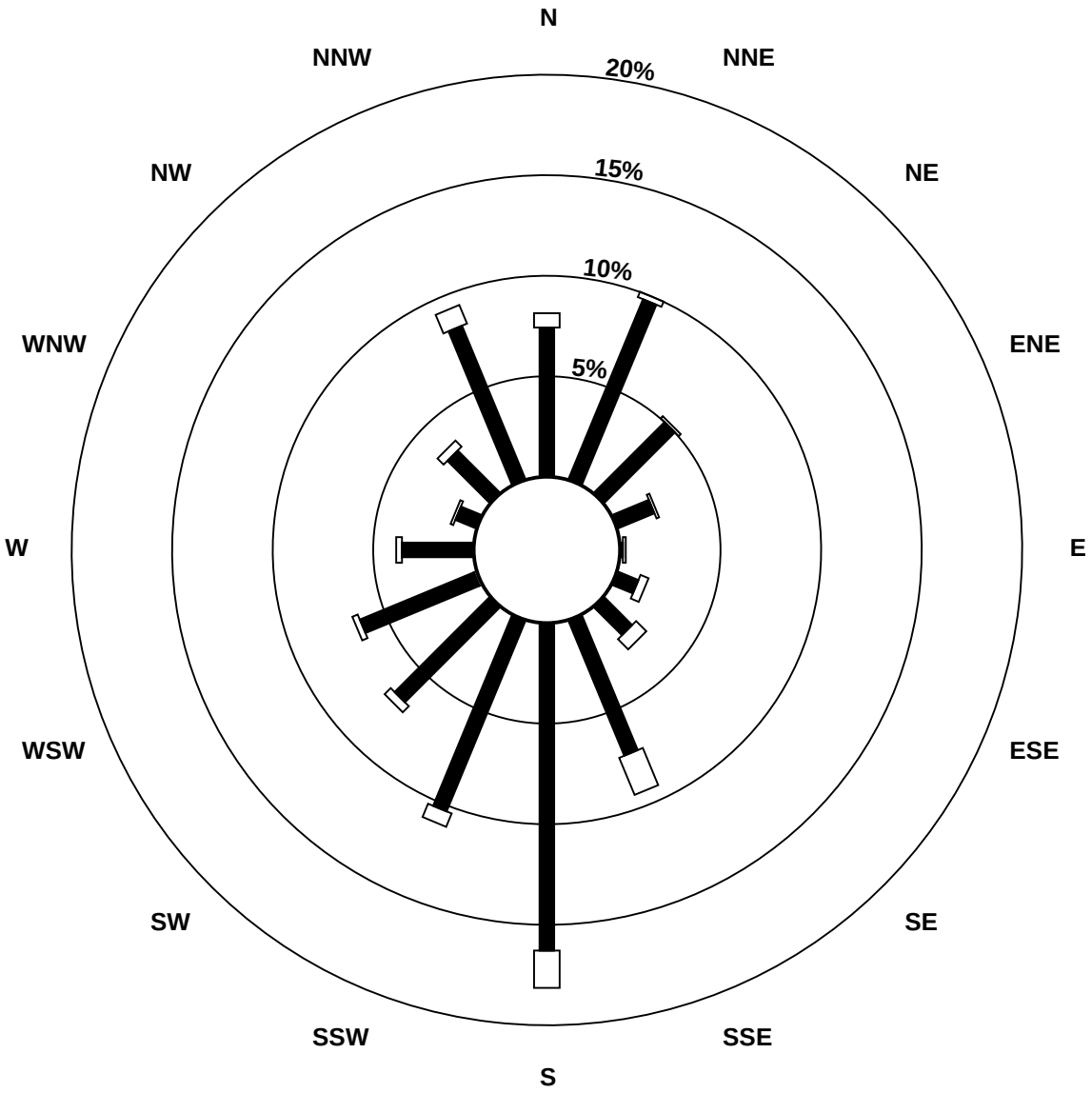
Total Number of Hours: 744

Wood Buffalo Environmental Association

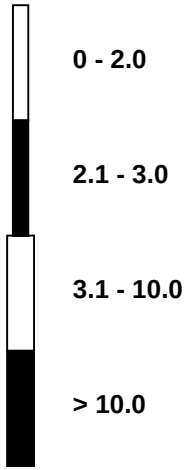
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Barge Landing (AMS 9)



Classes (ppm)



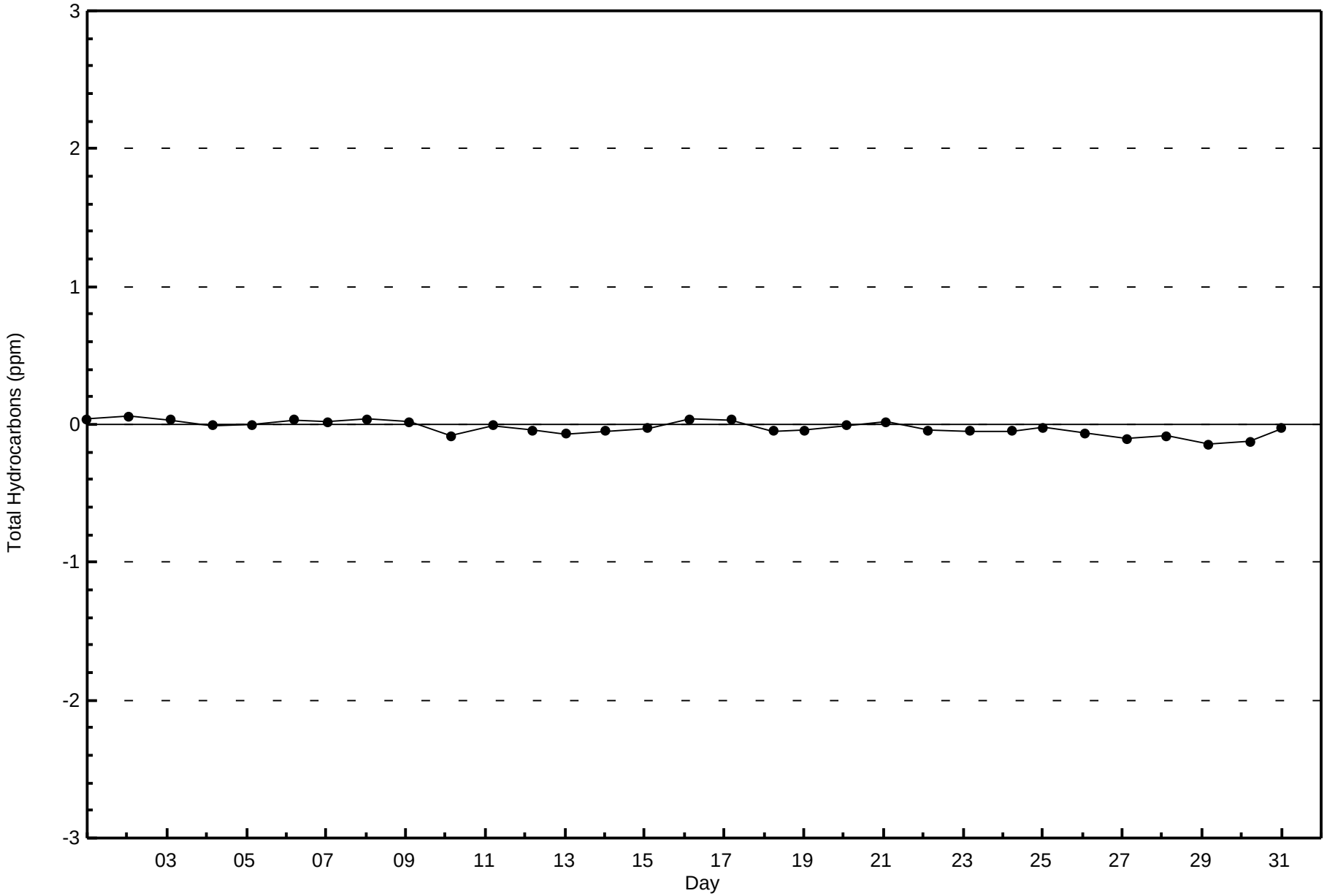
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Barge Landing - January 2016

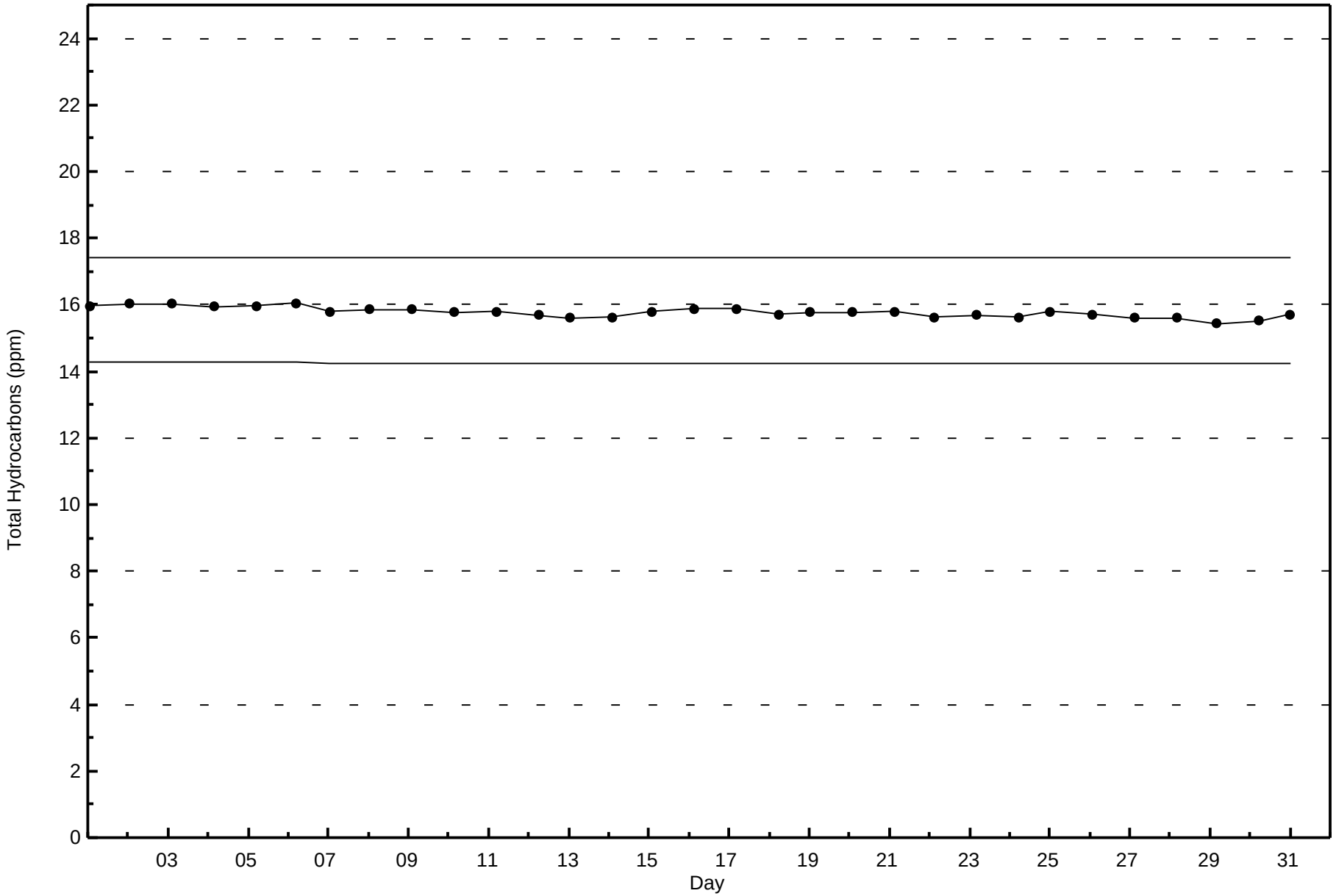


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Barge Landing - January 2016



Maximum Value: 6.3 C on Jan 29 15:00

Maximum Daily Average: 2.7 C on Jan 29

Minimum Value: -34.0 C on Jan 16 07:00

Minimum Daily Average: -30.2 C on Jan 16

Maximum Diurnal Average: -10.8 C at hour 15

Minimum Diurnal Average: -14.5 C at hour 9

Monthly Average: -13.20 C

Percentiles: P_1 = -32.9 P_{10} = -22.3 Q_1 = -18.3 Median = -13.6 Q_3 = -8.7 P_{90} = -3.3 P_{99} = 4.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

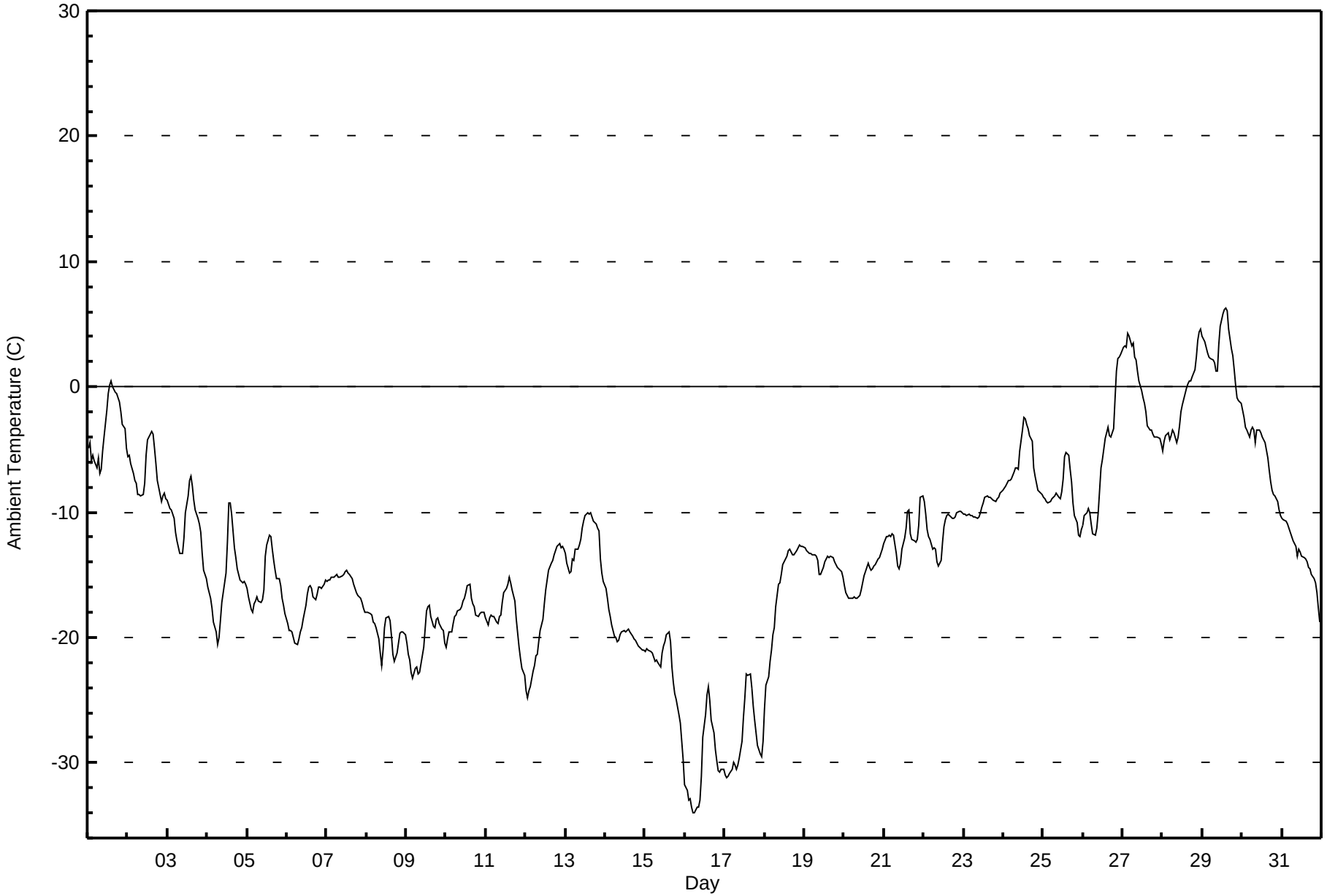
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-4.8	-4.5	-5.9	-5.4	-6.0	-6.5	-5.7	-6.9	-6.6	-5.2	-4.0	-1.8	-0.5	0.2	0.5	0.1	-0.4	-0.5	-0.9	-1.2	-2.0	-3.0	-3.3	-4.9	-3.3	0.5
2-Jan	-5.5	-5.4	-6.2	-7.0	-7.5	-7.7	-8.6	-8.6	-8.7	-8.6	-7.6	-5.4	-4.2	-4.0	-3.6	-3.8	-4.8	-6.2	-7.5	-8.0	-9.1	-8.7	-8.5	-8.9	-6.8	-3.6
3-Jan	-9.1	-9.7	-9.8	-10.2	-10.5	-11.6	-12.2	-13.3	-13.3	-13.3	-12.0	-10.0	-8.7	-7.5	-7.2	-7.9	-9.1	-9.8	-10.4	-10.9	-11.6	-13.3	-14.6	-15.4	-10.9	-7.2
4-Jan	-15.9	-16.4	-16.9	-17.7	-18.7	-19.6	-20.6	-20.0	-18.7	-17.2	-15.7	-14.9	-12.4	-9.2	-9.3	-10.1	-12.8	-13.6	-14.5	-14.9	-15.4	-15.7	-15.5	-15.7	-15.5	-9.2
5-Jan	-16.1	-16.7	-17.7	-17.9	-17.3	-17.1	-16.8	-17.1	-17.2	-17.0	-16.2	-13.5	-12.6	-11.9	-11.9	-12.9	-13.8	-14.6	-15.3	-15.3	-15.8	-16.9	-17.5	-18.1	-15.7	-11.9
6-Jan	-18.9	-19.4	-19.4	-19.6	-20.0	-20.4	-20.6	-20.1	-19.6	-19.2	-18.5	-17.5	-16.5	-16.0	-15.9	-16.1	-16.7	-16.9	-16.5	-15.9	-15.9	-16.1	-15.8	-15.4	-17.8	-15.4
7-Jan	-15.5	-15.4	-15.4	-15.2	-15.2	-15.1	-14.9	-15.2	-15.2	-15.1	-14.9	-14.7	-14.6	-14.9	-14.9	-15.3	-15.8	-16.1	-16.4	-16.7	-16.9	-17.2	-17.6	-18.0	-15.7	-14.6
8-Jan	-18.0	-18.0	-18.1	-18.2	-18.8	-18.9	-19.2	-20.1	-21.3	-22.2	-21.1	-19.2	-18.4	-18.4	-18.7	-19.8	-21.3	-22.0	-21.2	-20.4	-19.7	-19.5	-19.6	-19.8	-19.7	-18.0
9-Jan	-20.5	-21.4	-21.8	-22.8	-23.2	-22.5	-22.4	-22.9	-22.8	-22.1	-20.7	-19.3	-17.9	-17.5	-17.5	-18.3	-19.1	-19.3	-18.6	-18.4	-18.9	-19.3	-19.5	-20.5	-20.3	-17.5
10-Jan	-20.8	-20.1	-19.5	-19.6	-18.9	-18.4	-18.2	-17.9	-17.7	-17.6	-17.1	-16.8	-16.5	-15.8	-15.8	-16.9	-17.3	-17.5	-18.2	-18.3	-18.1	-18.0	-18.0	-18.0	-18.0	-15.8
11-Jan	-18.4	-19.0	-18.4	-18.2	-18.3	-18.3	-18.8	-18.8	-18.3	-18.3	-17.2	-16.4	-16.1	-15.7	-15.1	-15.6	-16.2	-17.1	-18.5	-19.6	-20.8	-21.7	-22.5	-23.0	-18.4	-15.1
12-Jan	-24.3	-24.8	-24.3	-23.9	-22.7	-22.3	-21.5	-21.3	-20.3	-19.4	-18.6	-17.3	-16.2	-15.4	-14.6	-14.1	-13.8	-13.4	-13.1	-12.8	-12.5	-12.8	-12.8	-13.0	-17.7	-12.5
13-Jan	-13.3	-14.1	-14.9	-14.7	-13.8	-13.8	-13.0	-12.9	-12.6	-12.2	-11.3	-10.7	-10.3	-10.0	-10.1	-10.1	-10.4	-10.7	-10.9	-11.2	-11.5	-13.8	-14.8	-15.5	-12.4	-10.0
14-Jan	-16.1	-16.9	-17.8	-18.3	-19.0	-19.9	-20.0	-20.3	-20.3	-19.8	-19.6	-19.4	-19.6	-19.4	-19.3	-19.6	-19.9	-20.1	-20.3	-20.4	-20.6	-20.8	-21.0	-21.0	-19.6	-16.1
15-Jan	-21.1	-20.9	-21.0	-21.1	-21.2	-21.5	-21.9	-21.8	-22.0	-22.4	-21.2	-20.7	-20.3	-19.8	-19.5	-20.4	-22.3	-23.6	-24.5	-24.9	-26.2	-26.8	-28.3	-29.8	-22.6	-19.5
16-Jan	-31.7	-32.2	-33.0	-32.9	-33.5	-34.0	-34.0	-33.6	-33.6	-32.9	-31.0	-27.9	-26.2	-24.6	-23.9	-25.0	-26.6	-27.6	-29.0	-29.9	-30.6	-30.7	-30.5	-30.5	-30.2	-23.9
17-Jan	-31.0	-31.2	-31.1	-30.9	-30.5	-30.0	-30.2	-30.5	-30.2	-29.6	-28.3	-26.3	-24.9	-22.9	-23.0	-22.9	-24.0	-25.5	-26.5	-27.7	-28.6	-29.3	-29.5	-28.3	-28.0	-22.9
18-Jan	-25.7	-23.8	-23.1	-21.9	-21.1	-19.8	-19.2	-17.5	-15.8	-15.6	-14.9	-14.2	-13.9	-13.5	-13.1	-13.0	-13.2	-13.4	-13.4	-13.0	-12.8	-12.7	-12.7	-12.7	-16.3	-12.7
19-Jan	-12.8	-13.0	-13.2	-13.3	-13.3	-13.4	-13.4	-13.5	-13.9	-15.0	-14.9	-14.4	-14.0	-13.7	-13.6	-13.6	-13.5	-13.6	-13.9	-14.2	-14.4	-14.5	-14.8	-15.2	-13.9	-12.8
20-Jan	-15.9	-16.4	-16.7	-16.9	-16.9	-16.9	-16.8	-16.9	-16.9	-16.7	-16.1	-15.7	-15.1	-14.7	-14.1	-14.4	-14.7	-14.5	-14.3	-14.2	-13.8	-13.6	-13.3	-13.0	-15.3	-13.0
21-Jan	-12.5	-12.0	-11.9	-11.8	-11.9	-11.7	-11.8	-13.3	-14.3	-14.6	-14.0	-12.9	-12.0	-11.3	-10.0	-9.8	-11.7	-12.1	-12.3	-12.3	-12.2	-11.0	-8.9	-8.7	-11.9	-8.7
22-Jan	-9.2	-10.2	-11.4	-12.0	-12.1	-13.0	-12.8	-13.0	-14.0	-14.4	-13.8	-12.5	-11.2	-10.6	-10.2	-10.2	-10.4	-10.5	-10.5	-10.4	-10.0	-9.9	-10.0	-10.1	-11.3	-9.2
23-Jan	-10.2	-10.2	-10.3	-10.2	-10.2	-10.3	-10.4	-10.4	-10.5	-10.3	-10.0	-9.6	-9.3	-8.8	-8.7	-8.8	-8.8	-8.9	-9.0	-9.1	-8.9	-8.8	-8.5	-8.4	-9.5	-8.4
24-Jan	-8.3	-7.9	-7.7	-7.5	-7.5	-7.4	-6.8	-6.4	-6.5	-6.6	-5.1	-3.4	-2.5	-2.5	-3.0	-3.3	-3.9	-4.4	-6.4	-7.2	-7.7	-8.2	-8.4	-8.6	-6.1	-2.5
25-Jan	-8.8	-8.9	-9.1	-9.3	-9.2	-8.9	-8.8	-8.7	-8.5	-8.8	-8.9	-8.4	-7.3	-5.6	-5.2	-5.4	-6.5	-7.6	-9.3	-10.3	-10.9	-11.9	-11.9	-11.4	-8.7	-5.2
26-Jan	-11.1	-10.3	-10.0	-9.7	-10.1	-10.9	-11.7	-11.8	-11.2	-10.0	-8.3	-6.5	-5.8	-4.2	-3.7	-3.3	-3.9	-4.0	-3.3	-1.0	1.3	2.3	2.4	2.6	-5.9	2.6
27-Jan	3.2	3.3	3.2	4.3	4.1	3.2	3.5	2.4	2.2	1.2	0.4	-0.3	-0.9	-1.3	-2.0	-3.1	-3.4	-3.5	-3.8	-4.0	-4.0	-4.0	-4.1	-4.5	-0.3	4.3
28-Jan	-5.1	-4.4	-3.8	-3.7	-4.3	-3.9	-3.5	-3.7	-4.4	-4.0	-3.1	-2.0	-1.4	-1.0	-0.1	0.3	0.4	0.5	0.8	1.3	2.4	3.7	4.4	4.6	-1.2	4.6
29-Jan	4.1	3.7	3.2	2.7	2.4	2.3	2.1	1.9	1.3	1.2	3.4	4.8	5.8	6.2	6.3	6.0	4.7	3.1	2.5	1.4	0.1	-0.9	-1.1	-1.4	2.7	6.3
30-Jan	-1.8	-2.5	-3.3	-3.4	-4.0	-3.4	-3.2	-3.5	-4.5	-3.5	-3.4	-3.7	-4.1	-4.2	-4.4	-5.7	-6.7	-7.6	-8.3	-8.6	-8.7	-9.1	-9.8	-10.3	-5.3	-1.8
31-Jan	-10.5	-10.6	-10.7	-11.0	-11.2	-11.6	-11.9	-12.3	-12.7	-13.5	-13.0	-13.2	-13.6	-13.6	-13.7	-14.0	-14.4	-14.5	-14.9	-15.3	-15.7	-16.4	-17.6	-18.8	-13.5	-10.5
	-13.7	-13.8	-14.1	-14.1	-14.2	-14.3	-14.3	-14.5	-14.5	-14.3	-13.5	-12.4	-11.6	-11.0	-10.8	-11.2	-12.0	-12.4	-12.9	-13.0	-13.2	-13.5	-13.7	-13.9	Diurnal Average	
	4.1	3.7	3.2	4.3	4.1	3.2	3.5	2.4	2.2	1.2	3.4	4.8	5.8	6.2	6.3	6.0	4.7	3.1	2.5	1.4	2.4	3.7	4.4	4.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Barge Landing - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	124	16.67	16.67
-20 - 0	572	76.88	93.55
0 - 10	48	6.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 98 % on Jan 28 21:00

Maximum Daily Average: 93.4 % on Jan 28

Minimum Value: 51 % on Jan 29 16:00

Minimum Daily Average: 72.3 % on Jan 1

Maximum Diurnal Average: 84.3 % at hour 5

Minimum Diurnal Average: 77.4 % at hour 15

Monthly Average: 82.3 %

Percentiles: $P_1 = 59$ $P_{10} = 74$ $Q_1 = 79$ Median = 82 $Q_3 = 87$ $P_{90} = 90$ $P_{99} = 96$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

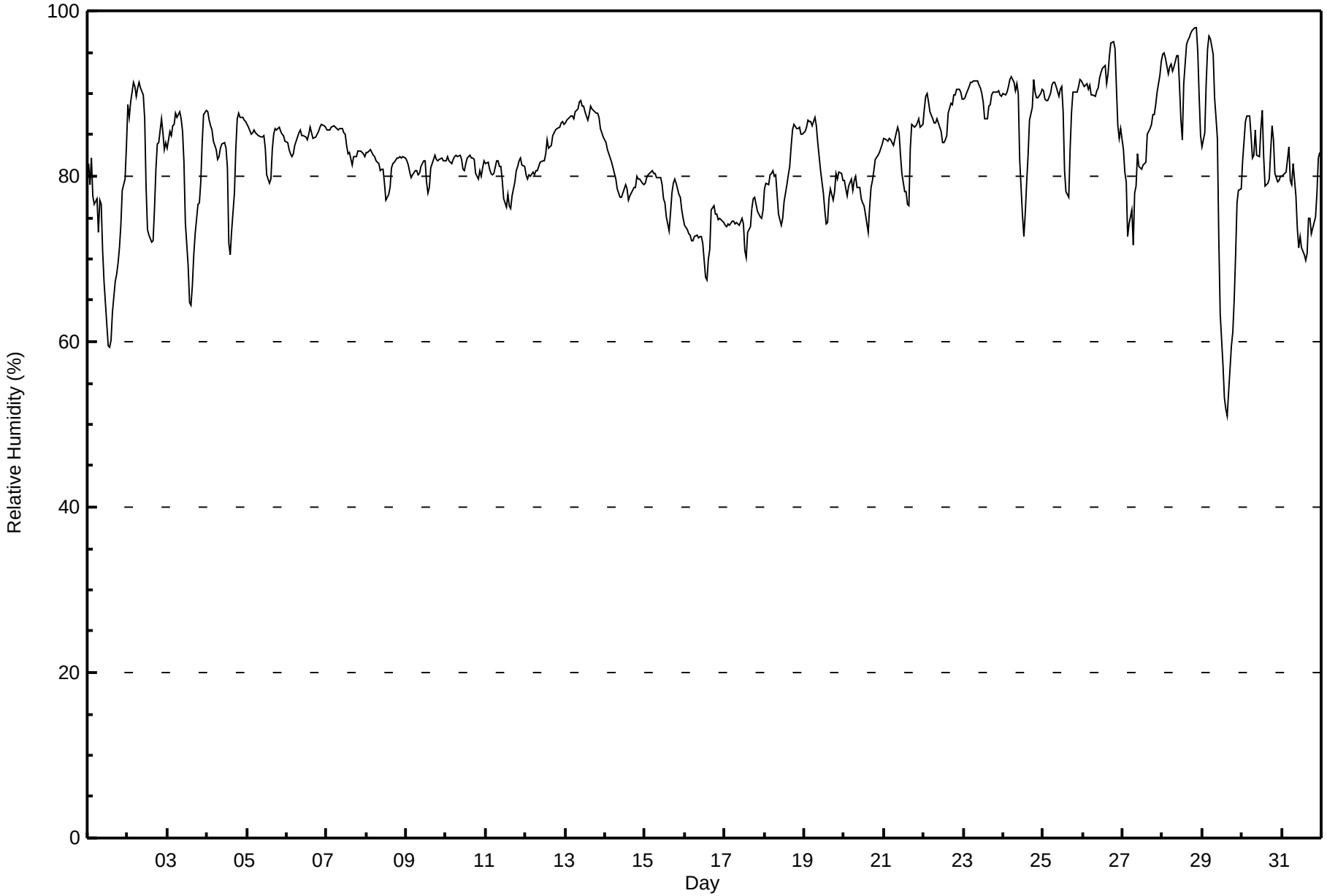
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	81	79	82	78	77	77	73	77	77	71	67	62	59	59	60	64	67	68	69	71	74	78	80	84	72.3	84
2-Jan	89	87	89	91	91	90	91	91	91	90	87	79	74	73	72	72	76	81	84	84	87	85	83	84	84.2	91
3-Jan	83	86	85	86	86	88	87	88	87	85	82	74	69	65	64	67	71	73	77	77	79	84	88	88	79.9	88
4-Jan	88	87	86	86	84	83	82	82	83	84	84	83	81	72	71	73	78	83	87	88	87	87	87	87	83.1	88
5-Jan	86	86	85	85	86	85	85	85	85	85	85	83	80	79	80	83	85	86	86	86	86	85	85	84	84.4	86
6-Jan	84	83	83	82	83	84	85	85	86	85	85	85	84	85	86	85	85	85	85	85	86	86	86	86	84.7	86
7-Jan	86	86	86	86	86	86	86	86	86	86	85	85	84	83	83	81	82	82	82	83	83	83	83	82	84.1	86
8-Jan	83	83	83	83	83	82	82	82	81	81	81	79	77	78	79	81	82	82	82	82	82	82	82	82	81.4	83
9-Jan	82	81	81	80	80	81	81	80	80	81	82	82	79	78	79	81	82	83	82	82	82	82	82	82	81.0	83
10-Jan	82	82	82	81	82	82	83	82	82	82	81	81	81	82	82	82	82	82	80	80	81	80	81	82	81.6	83
11-Jan	82	82	81	80	80	80	82	82	81	81	79	77	76	78	76	76	78	79	81	81	82	82	81	81	80.0	82
12-Jan	80	80	80	80	80	80	81	81	81	82	82	82	83	84	83	84	85	85	86	86	86	86	87	86	82.9	87
13-Jan	86	87	87	87	87	87	88	88	89	89	88	89	88	87	88	88	88	88	88	88	87	86	85	85	87.4	89
14-Jan	84	83	83	82	82	80	80	78	78	77	78	78	79	78	77	78	78	79	79	80	80	80	79	79	79.5	84
15-Jan	79	80	80	81	81	80	80	80	80	80	79	77	77	75	73	76	78	79	80	79	78	78	76	75	78.3	81
16-Jan	74	74	73	73	72	72	73	73	73	73	73	72	68	67	70	71	76	76	75	75	75	75	75	74	73.0	76
17-Jan	74	74	74	74	75	75	74	74	74	74	75	74	71	70	73	74	76	77	77	77	76	75	75	76	74.5	77
18-Jan	78	79	79	80	80	81	80	80	75	75	74	75	77	79	80	81	84	86	86	86	86	86	85	85	80.7	86
19-Jan	85	86	87	87	87	86	87	86	84	82	81	78	76	74	74	77	78	77	78	80	80	81	80	79	81.3	87
20-Jan	80	79	78	79	80	78	79	80	79	79	77	77	77	75	73	76	79	80	81	82	82	83	83	84	79.1	84
21-Jan	85	84	84	85	84	84	84	85	86	85	83	80	78	78	77	76	83	86	86	86	86	87	86	86	83.6	87
22-Jan	88	90	90	89	88	87	86	87	87	86	85	84	84	84	85	88	89	89	90	90	90	91	90	89	87.8	91
23-Jan	89	89	90	91	91	91	91	92	91	91	91	90	89	87	87	88	89	90	90	90	90	90	90	90	90.0	92
24-Jan	90	90	90	91	92	92	91	90	91	90	82	75	73	76	79	83	87	88	92	90	89	90	90	90	87.1	92
25-Jan	90	89	89	89	90	91	91	91	91	90	90	91	88	81	78	78	83	88	90	90	90	91	92	92	88.5	92
26-Jan	91	91	91	91	91	90	90	90	90	91	92	93	93	93	91	92	95	96	96	95	91	86	85	86	91.2	96
27-Jan	83	81	79	73	74	76	72	78	79	83	81	81	81	82	82	85	86	86	87	88	89	90	92	94	82.5	94
28-Jan	95	95	94	92	93	94	93	93	95	95	91	87	84	91	96	97	97	97	98	98	98	95	90	85	93.4	98
29-Jan	84	85	91	95	97	97	95	90	87	84	73	63	57	53	52	51	54	60	61	65	71	77	78	78	74.9	97
30-Jan	82	84	87	87	87	85	82	83	86	83	82	86	88	82	79	79	80	83	86	84	80	79	79	80	83.1	88
31-Jan	80	80	81	82	84	79	79	82	78	74	71	73	71	71	70	71	75	75	73	74	75	78	82	83	76.7	84
	84.0	83.9	84.2	84.1	84.3	84.0	83.6	83.9	83.6	83.0	81.5	79.8	78.3	77.4	77.4	78.7	80.8	82.2	83.0	83.3	83.5	83.8	83.8	83.8	Diurnal Average	
	95	95	94	95	97	97	95	93	95	95	92	93	93	93	96	97	97	97	98	98	98	95	92	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Barge Landing - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - January 2016

Maximum Speed: 20 km/h on Jan 27 01:00

Maximum Daily Speed Average: 8.1 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 23 14:00

Minimum Daily Speed Average: 0.2 km/h on Jan 10

Maximum Diurnal Speed Average: 1.9 km/h at hour 1

Minimum Diurnal Speed Average: 0.1 km/h at hour 19

Monthly Average Velocity: 1.0 km/h 215.5 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 4 $Q_3 = 6$ $P_{90} = 7$ $P_{99} = 15$

Hours in Service: 744

Hours of Data: 735

Hours of Missing Data: 9

Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SW7	SW8	S7	SW8	S8	SSW9	SSW10	S7	S10	SW12	SW10	SW10	WSW8	WSW11	WSW11	WSW14	WSW13	WSW13	SW7	SW7	SW5	WSW7	WSW7	SSE4	SW8.1	WSW14
2-Jan	SSE5	SSW5	S5	SE5	S6	S7	SE6	SSE7	SSE7	SSE7	SSE7	S7	S7	SSE6	S6	S4	S5	SE4	SE5	SSE5	SSE5	S7	SSE7	S7	SSE5.7	S7
3-Jan	S6	S7	S7	S7	S8	S8	S8	SSE7	S8	S8	S8	S9	S9	S8	SSW6	SSW8	SSW6	S5	SE5	S5	SSE5	SSW2	SSE3	S2	S6.3	S9
4-Jan	S3	SSE4	SSE3	S2	N1	N1	S2	NNW1	ESE1	SSE2	W1	SSW1	SSE2	SSE2	SE4	SSE3	SSW3	S3	SSE3	SSE4	SSE5	S5	SSE6	SSE5	SSE2.4	SSE6
5-Jan	SSE4	SSE4	SSW2	S5	SSE5	SSE6	SSE3	SSE4	SSE4	SSE4	SE3	SSW3	SSW4	S4	S1	NW2	NNW3	NNW4	NNW5	NNW6	NW3	WNW2	AF	WSW1	S1.3	NNW6
6-Jan	SE2	N1	NNW3	NNW4	NNW5	NNW6	NNW5	NNW3	NNW2	NNW1	NNW2	NNW1	NW2	NNW2	NNW3	NNW3	N3	N2	N2	NNE3	N4	N4	N4	NNE4	N2.8	NNW6
7-Jan	NNE4	NNE4	NNE4	NE2	NNW3	NNW3	N4	N4	N3	N2	N3	N3	NW3	NW3	NW3	W3	WSW4	WSW5	W4	WNW2	W2	WSW4	SW3	SSW2	NW1.7	WSW5
8-Jan	SSW2	SW2	ESE0	NNW2	N3	NNW2	NNW2	N2	N1	SW1	N0	NNW2	AF	W1	AF	ESE1	ESE2	SSE3	SSW3	SSW3	SSW2	SSW3	SSW3	SSW3	SW0.6	SSW3
9-Jan	SSW4	S5	SSE5	SSE4	S4	S4	S5	S4	S4	S4	S5	S5	S5	S5	S4	S4	S3	S4	S4	S5	SSE4	S4	S4	SSE4	S4.3	S5
10-Jan	SSE5	SSE5	S4	S3	S3	S1	W1	NW2	W0	SSW1	W1	ESE1	NNE2	N3	N4	N5	N4	NNE4	NNE3	NNE1	S2	WSW1	NNW1	N3	N0.2	SSE5
11-Jan	N3	N4	NNW2	NW1	W1	WSW2	SSE1	NW1	NNW2	WSW3	SW3	SW3	SSW3	SW4	WSW4	WSW8	SW5	SW4	SW4	SSW4	SSE4	S4	SSW3	SW4	SW2.2	WSW8
12-Jan	SSE3	S4	S4	S4	SSW2	SSE1	SSW2	WSW2	SW2	SW2	WSW2	WSW4	SSW5	S4	SSW5	S5	S5	SSW3	S4	S4	S3	S4	SSE3	SSW3	S3.1	SSE5
13-Jan	SSE1	ENE2	NNW1	NNW2	NW2	NNW2	NNW3	NNW4	N3	NNW2	N2	NNE3	NNE2	N3	NNW4	NNE4	NNE6	NNE6	NNE7	NNE6	NNE7	N8	N7	N6	N3.5	N8
14-Jan	NNE6	NNE8	NNE8	N7	N6	N7	NNE6	NE6	NE7	NE5	NE6	NE6	NNE6	NNE6	NNE7	NE6	NNE6	NNE6	NNE6	NE5	NNE6	NE3	ENE4	ENE4	NNE5.8	NNE8
15-Jan	NE2	AF	N2	NNW2	NNW1	ENE1	NE2	NNW2	NNW2	N2	NNW1	N3	NNE3	NNE4	NNE4	NNE3	N3	N3	N3	N3	N1	NNW3	NW2	NNW2	N2.1	NNE4
16-Jan	AF	AF	SSE1	AF	AF	SSW2	SE3	SSE2	SE2	AF	WSW2	WSW3	SW3	SSE3	SE2	SW3	SSE3	S2	SE2	SE2	SE3	SSE3	SSE3	SSE2	SSE1.9	SSE3
17-Jan	S2	S3	S3	S3	S4	S4	S4	SSE4	S5	S4	S4	SSE3	WSW5	SW5	SSW4	SE3	W1	E0	SE1	ESE2	SW1	N1	ENE1	ESE1	S2.2	WSW5
18-Jan	SSW4	S5	SSE2	WNW2	NNW2	NNW2	NW1	S3	SSE8	SSE7	SSE5	S7	S6	S5	S5	SW3	WSW3	SSE2	SSW1	WSW2	SSW2	SSW2	S3	S3	S2.9	SSE8
19-Jan	SSE3	SSE1	W0	NNW1	NNW3	NNW3	NNW4	N3	NNE3	NE4	NNE5	NNE6	NNE5	NNE5	NNE5	NNE4	N3	NNE4	NE4	NE4	NE4	NE4	ENE4	ENE5	NNE3.0	NNE6
20-Jan	NE6	NNE6	NNE6	NNE5	NE5	NNE5	N3	N4	N3	NNW3	NW2	NW1	WSW3	S2	S3	S3	WSW2	W1	S2	SSE3	S3	WSW2	SW2	SSW3	N0.9	NNE6
21-Jan	S4	S5	S6	S6	S7	S6	S7	S5	S6	SSE5	SW4	SSW5	SSW6	SSW7	S6	SW2	ESE1	ENE2	NNW3	NNW4	N2	SSE6	S5	SW6	S3.8	S7
22-Jan	SSW5	SSW4	SSW4	SSW5	SSW4	SW4	SW3	W1	N1	NNW3	NW2	NW3	NNW3	NNW5	NNW5	NNW5	NNW4	N6	N5	N4	NE5	NE5	NNE6	NNE5	NNW1.6	N6
23-Jan	NNE5	N4	NNE4	NNE4	N3	NNW3	NNW4	NNW4	NNW3	NNW3	NNW3	NW3	NNW2	ESE0	ESE2	SE2	SW2	SSW3	S3	SSW4	S4	S4	S5	S3	NNW0.7	S5
24-Jan	S4	S4	S6	S7	S7	S4	SW4	SW4	SSW4	SSW6	SW7	SSW6	SW7	SSW6	SSW8	SSW7	SSW7	WSW1	NNW4	N4	NNE6	NE7	NNE6	NNE4	SSW2.7	SSW8
25-Jan	ENE2	ENE2	ENE4	ESE4	SE3	SSE3	SSW4	S4	SSW7	SW6	SSW8	SSW7	S9	S9	SSW9	SW6	S5	SW4	W4	WSW4	SW4	SSW3	S5	SSE5	SSW3.9	S9
26-Jan	S5	S5	S6	S6	S5	SSW2	SSW3	SSW2	SW3	SW3	SW4	SW3	SSW3	SSW3	W3	SSW2	SW5	SSW5	S5	SSW7	SSW9	WSW16	W16	W19	SW4.9	W19
27-Jan	W20	W16	W14	WNW16	NW11	NW6	WNW4	WSW4	SW1	ENE4	ENE5	NE7	NNE7	NE7	NNE8	NNE7	NNE6	NNE5	N4	NNW3	NNW3	N1	WSW1	S1	NW3.7	W20
28-Jan	SSW2	WSW3	SSE5	SSW3	WNW2	W2	S5	SW4	WSW2	WSW4	SW3	SW3	SW5	SSW6	S6	SSE6	S8	S8	S8	S7	SW8	WSW13	WSW14	WSW16	SW4.9	WSW16
29-Jan	WSW12	WSW11	W9	WNW4	SW5	W6	NW5	WNW7	WSW8	W10	W8	NW9	NW8	NW10	NW8	NW7	WNW6	W8	W5	WSW7	SSW1	WSW5	WSW7	SW7	W6.3	WSW12
30-Jan	SSW6	WSW8	SSW3	SW4	SSW2	WSW7	W5	W6	NW3	NNW2	NNW3	NNE6	NNE6	NNE6	NE7	ENE8	NE8	NE8	NE8	NE6	NNE6	NE5	NE5	NE5	NNE2.2	NE8
31-Jan	NNE5	NNE4	ENE4	NE5	NE6	NNE7	NNE6	NNE6	NNE8	NNE9	N6	NE7	NE8	NE7	NNE7	NNE6	NNE6	NNE5	NNE5	NE3	NE5	E3	SE2	S1	NNE5.2	NNE9
	SSW1.9	SSW1.8	S1.3	SSW1.0	SW1.0	SW1.0	SW1.0	SW0.9	SSW1.1	SSW1.4	SW1.2	SW1.0	SW1.2	SW1.1	SW0.9	WSW0.9	WSW0.8	WSW0.5	ENE0.1	S0.5	SSE0.5	SW1.2	SW1.3	SW1.5	Diurnal Average	
	W20	W16	W14	WNW16	NW11	SSW9	SSW10	SSE7	S10	SW12	SW10	SW10	S9	WSW11	WSW11	WSW14	WSW13	WSW13	S8	S7	SSW9	WSW16	W16	W19	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Barge Landing - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Jan 27 04:00

Minimum Value: 0 km/h on Jan 15 20:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 2$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	735
Hours of Missing Data:	9
Hours of Calibration:	0
Percent Operational Time:	98.8

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

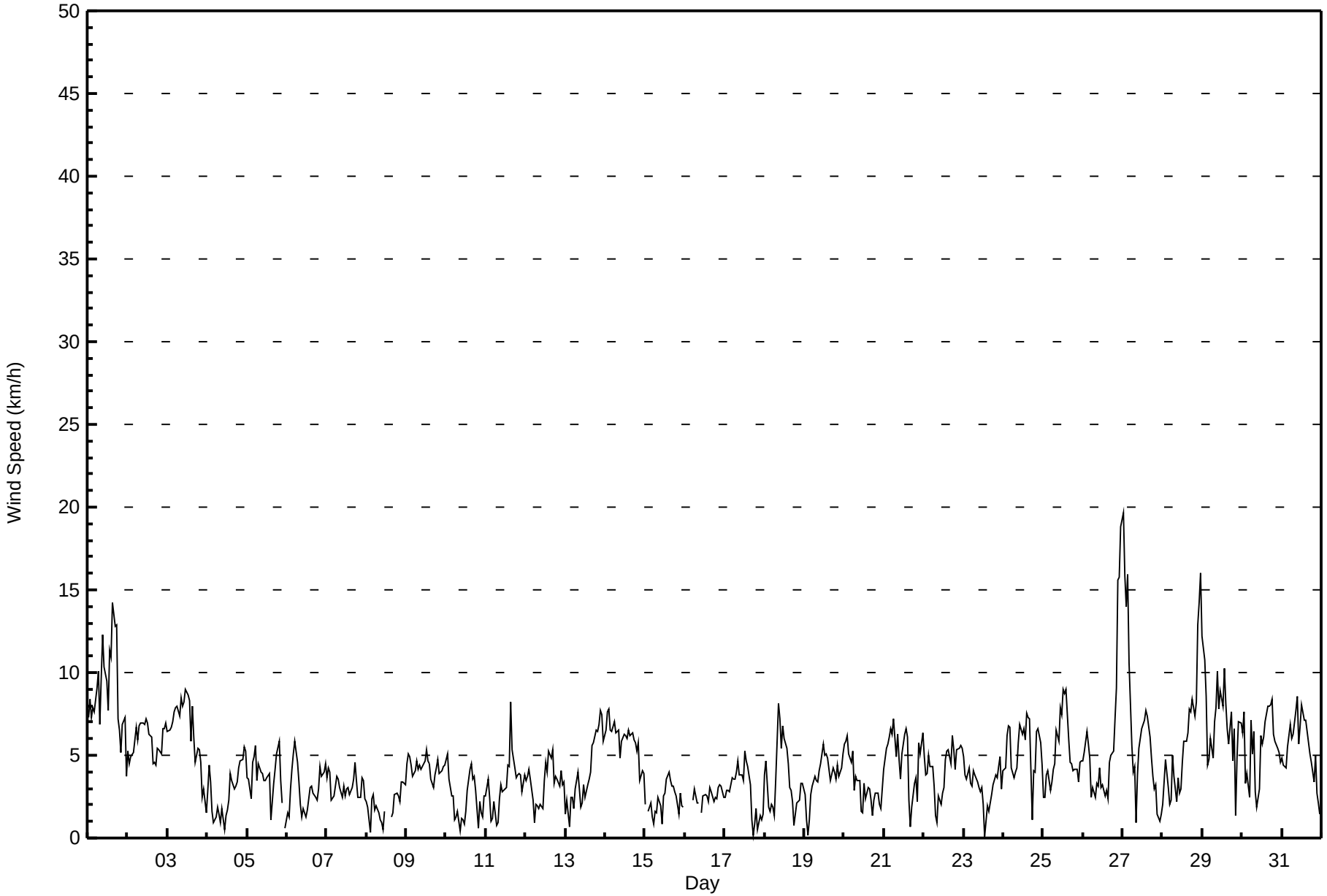
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Barge Landing - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	532	72.38	72.38
6 - 11	188	25.58	97.96
12 - 19	14	1.90	99.86
20 - 28	1	0.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Barge Landing - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	52	36	18	15	2	11	18	56	91	58	39	27	18	6	18	67	532
6 - 11	8	38	18	1	0	0	1	14	43	22	14	12	6	2	7	2	188
12 - 19	0	0	0	0	0	0	0	0	0	0	1	8	4	1	0	0	14
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	74	36	16	2	11	19	70	134	80	54	47	29	9	25	69	735

Total Number of Valid Hours: 735

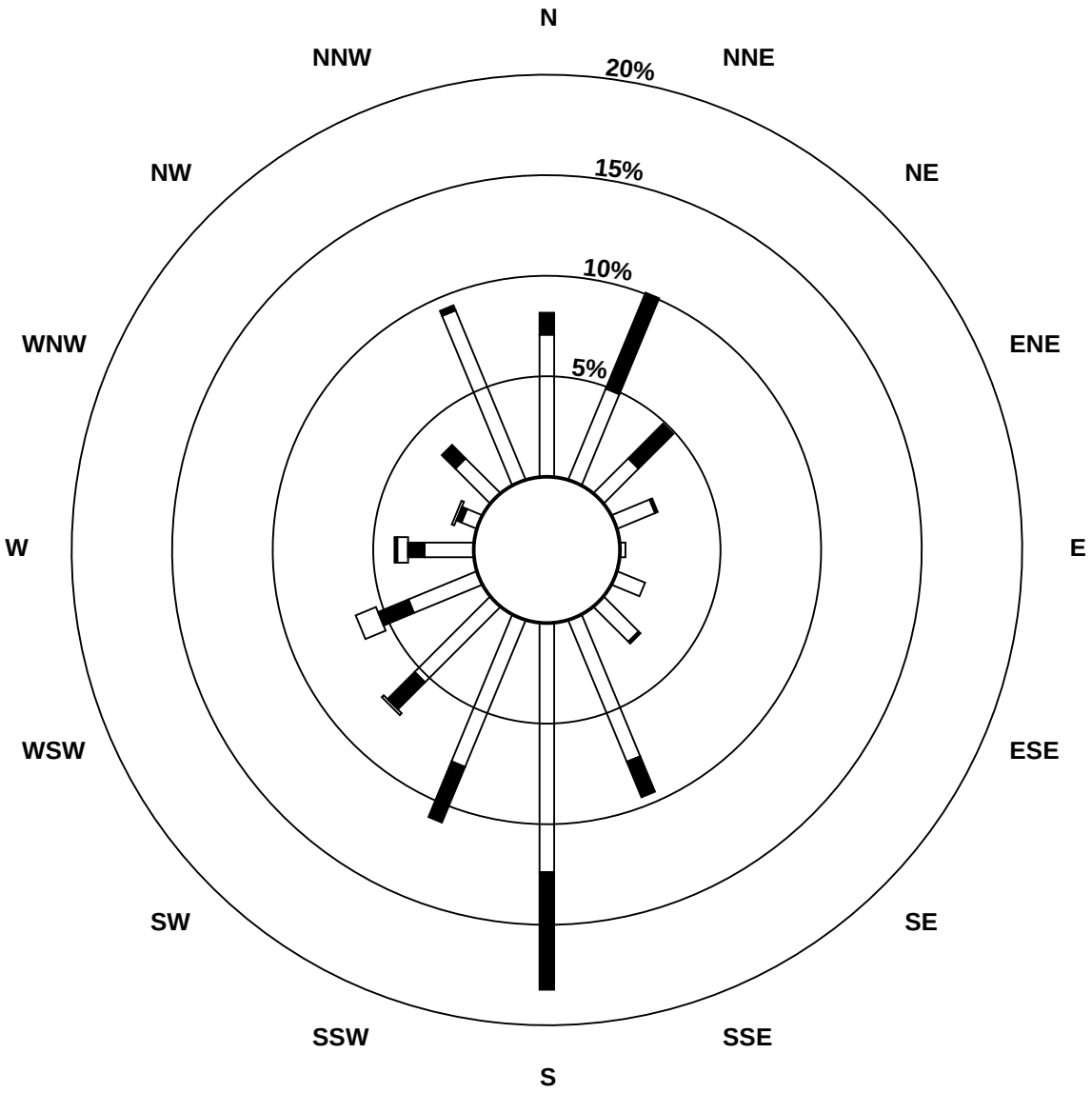
Total Number of Hours: 744

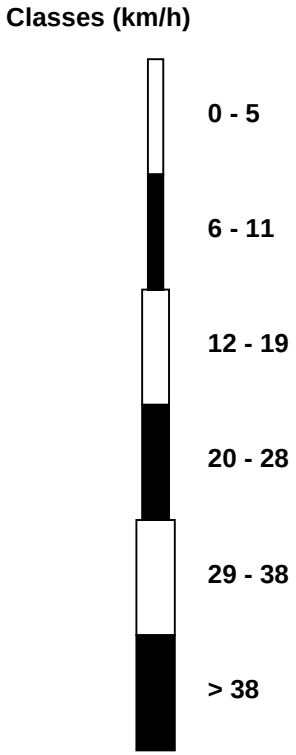
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

Barge Landing (AMS 9)





Total Number of Valid Hours: 735

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Barge Landing - January 2016

Direction of Maximum Speed: 267 deg on Jan 27 01:00
Direction of Maximum Daily Speed Average: 223.4 deg on Jan 1

Direction of Minimum Speed: 115 deg on Jan 23 14:00

Direction of Minimum Daily Speed Average: 0.2 deg on Jan 10

Monthly Average Direction: 240.6 deg

Hours in Service:	744
Hours of Data:	735
Hours of Missing Data:	9
Percent Operational Time:	98.8

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	222	228	180	216	187	194	210	174	186	220	226	234	247	242	239	243	246	248	220	215	231	243	252	160	223.4
2-Jan	163	204	173	145	169	174	145	159	162	168	164	189	181	166	182	182	179	135	124	149	151	173	166	175	166.3
3-Jan	183	183	172	169	182	183	185	164	173	184	180	176	179	191	211	194	202	190	142	171	154	196	161	189	179.9
4-Jan	184	160	155	177	5	357	180	343	122	157	265	194	150	153	146	165	205	173	158	168	157	171	148	150	162.3
5-Jan	153	151	201	169	167	157	168	160	166	165	146	194	196	176	191	314	348	340	336	343	317	294	AF	245	182.3
6-Jan	140	8	335	341	335	338	338	337	340	332	339	344	305	341	343	343	358	354	354	15	3	1	5	22	349.1
7-Jan	16	22	31	52	336	347	7	1	7	359	5	8	312	321	316	271	239	246	270	294	268	237	230	209	322.8
8-Jan	198	231	113	341	351	339	340	356	354	215	4	341	AF	272	AF	104	107	164	193	195	205	207	208	195	221.3
9-Jan	202	190	163	166	175	178	180	180	177	170	177	180	185	183	184	177	189	181	184	176	166	177	172	168	178.3
10-Jan	163	162	180	189	176	191	261	304	265	204	267	119	28	359	354	359	4	28	21	30	186	245	335	3	3.1
11-Jan	1	8	342	305	267	248	156	306	328	240	231	228	213	230	244	247	236	226	214	213	167	177	195	224	234.5
12-Jan	167	184	189	172	213	166	210	250	227	228	239	237	192	175	193	182	169	194	178	178	181	172	147	192	188.3
13-Jan	167	74	340	338	319	346	339	341	355	336	359	29	26	351	338	16	24	19	21	32	29	6	2	2	8.4
14-Jan	15	30	24	11	6	8	13	37	34	40	38	35	33	28	26	34	30	33	30	34	33	56	63	73	29.7
15-Jan	47	AF	350	348	331	58	44	329	346	352	340	349	19	15	21	14	4	353	349	1	354	348	324	337	0.3
16-Jan	AF	AF	155	AF	AF	201	138	167	130	AF	242	250	228	151	137	229	168	185	132	129	140	165	150	167	168.6
17-Jan	184	188	177	187	176	175	184	156	179	191	177	165	243	235	206	145	270	101	126	103	231	357	78	109	183.9
18-Jan	193	180	157	295	345	340	326	175	159	165	168	177	177	184	187	232	253	166	198	237	193	198	170	176	183.9
19-Jan	168	153	269	334	335	332	338	3	33	34	22	18	19	21	29	20	359	28	48	40	55	56	68	58	27.5
20-Jan	48	33	33	29	36	20	359	349	351	338	311	320	257	173	186	190	250	261	188	147	172	246	234	198	8.5
21-Jan	186	190	187	180	180	170	177	177	184	165	217	206	203	194	182	235	104	59	347	347	350	152	184	214	187.0
22-Jan	192	210	199	201	211	214	236	279	10	341	326	322	328	338	332	343	341	358	357	6	48	45	26	16	337.1
23-Jan	12	10	18	16	0	334	341	334	343	334	335	324	333	115	103	141	219	199	180	209	191	177	171	173	333.3
24-Jan	183	181	184	190	177	176	217	224	196	209	217	212	232	205	196	200	194	249	340	8	32	36	16	13	201.5
25-Jan	68	75	75	110	140	159	201	178	207	216	193	201	185	189	210	219	188	236	261	238	229	212	178	160	193.8
26-Jan	180	169	169	177	188	199	201	211	236	227	233	224	204	202	275	194	234	192	184	192	209	252	261	265	221.9
27-Jan	267	268	269	294	308	305	301	237	215	74	57	39	33	40	24	21	20	26	360	328	336	349	244	177	318.9
28-Jan	204	240	153	204	294	264	182	221	249	242	225	229	222	193	176	165	173	178	183	191	234	250	249	248	215.5
29-Jan	250	253	273	291	228	274	318	282	252	260	269	304	315	309	318	313	294	269	280	244	211	255	254	228	274.3
30-Jan	210	238	208	221	205	250	274	263	316	341	340	17	30	33	48	62	38	38	46	45	25	36	42	38	17.7
31-Jan	15	25	64	46	37	33	29	30	23	18	11	39	34	40	30	25	29	26	25	50	34	81	125	191	32.9
	206.7	211.2	185.7	210.7	214.8	227.1	225.7	222.5	194.0	213.3	220.0	230.5	225.0	214.1	225.8	237.7	248.0	257.3	66.9	184.2	160.2	221.9	215.6	214.1	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Barge Landing - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 94 deg on Jan 27 09:00

Minimum Value: 11 deg on Jan 15 18:00

Percentiles: P_1 = 12 P_{10} = 17 Q_1 = 20 Median = 23 Q_3 = 31 P_{90} = 46 P_{99} = 86

Hours in Service:	744
Hours of Data:	735
Hours of Missing Data:	9
Hours of Calibration:	0
Percent Operational Time:	98.8

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	28	20	23	25	25	22	25	25	21	22	25	23	28	18	21	16	22	17	27	36	32	24	13	45	45
2-Jan	28	33	31	20	21	17	14	14	15	19	21	25	25	22	21	23	19	17	15	21	20	18	17	19	33
3-Jan	20	20	20	19	21	19	19	16	17	19	19	25	24	21	23	20	25	49	20	19	20	54	65	64	65
4-Jan	25	16	17	67	67	20	64	40	68	50	74	57	51	54	23	22	27	38	30	19	14	23	13	12	74
5-Jan	40	25	40	18	18	16	21	20	21	23	18	38	37	31	76	32	11	17	15	15	30	33	AF	85	85
6-Jan	53	58	25	12	16	14	15	17	21	21	19	43	28	24	23	20	20	20	24	24	23	21	23	23	58
7-Jan	24	21	22	26	28	23	22	20	24	21	25	25	31	26	27	27	22	21	32	32	33	20	23	30	33
8-Jan	27	37	86	40	19	31	21	19	23	62	41	18	AF	68	AF	30	16	14	17	26	28	24	24	18	86
9-Jan	21	22	24	20	23	22	20	22	21	23	25	27	26	27	27	24	31	22	26	27	20	24	24	17	31
10-Jan	17	22	29	41	41	68	60	48	93	53	55	76	27	24	22	22	19	27	22	50	38	22	27	21	93
11-Jan	19	20	23	32	32	21	70	90	24	19	24	26	29	27	20	19	20	21	20	22	22	16	34	18	90
12-Jan	17	29	23	17	29	79	48	25	43	40	43	24	35	36	30	27	28	40	34	41	42	36	26	28	79
13-Jan	78	26	19	16	31	46	21	18	17	30	27	20	23	29	20	25	19	20	19	19	22	19	21	22	78
14-Jan	20	20	17	22	21	20	20	18	17	21	22	19	20	21	20	19	19	19	20	19	18	26	24	20	26
15-Jan	31	AF	35	18	33	66	43	50	17	22	40	26	23	24	20	17	11	11	23	11	14	14	37	13	66
16-Jan	AF	AF	63	AF	AF	31	17	34	35	AF	49	20	35	41	48	35	14	21	12	16	19	19	29	22	63
17-Jan	29	26	23	19	20	23	21	18	27	36	33	39	24	25	34	30	93	91	83	62	66	32	70	80	93
18-Jan	31	21	44	46	17	21	37	39	20	23	26	29	28	30	28	29	15	29	32	15	30	29	23	24	46
19-Jan	22	77	71	19	15	14	16	22	19	19	15	17	18	18	18	18	19	18	19	18	21	20	25	22	77
20-Jan	21	17	16	18	18	16	31	19	19	19	60	47	36	49	40	31	18	45	31	29	31	40	34	21	60
21-Jan	20	22	21	25	24	24	23	23	22	23	33	32	29	28	30	30	77	37	16	18	30	26	36	25	77
22-Jan	24	38	38	28	26	24	27	75	68	59	35	22	26	20	18	17	16	17	18	24	21	20	17	16	75
23-Jan	18	20	23	17	25	21	18	17	17	18	21	20	25	86	17	46	31	25	23	22	30	26	25	34	86
24-Jan	24	20	22	24	25	23	23	26	16	22	23	24	21	33	30	22	18	72	33	19	18	18	20	20	72
25-Jan	40	34	32	25	33	35	24	26	25	26	27	29	26	29	29	23	27	32	23	11	12	25	30	27	40
26-Jan	17	20	20	20	28	38	30	42	25	29	18	30	43	55	28	46	32	21	32	22	25	16	20	20	55
27-Jan	21	20	20	30	31	33	48	57	94	28	27	21	19	18	19	17	19	16	27	31	31	54	87	56	94
28-Jan	39	40	33	46	55	56	49	42	38	13	43	28	28	30	27	21	22	22	23	21	28	15	16	16	56
29-Jan	16	17	26	40	16	26	19	28	19	12	25	26	22	27	22	24	27	22	34	36	73	20	14	19	73
30-Jan	21	20	51	31	67	22	42	26	26	24	22	17	18	21	23	22	21	18	20	24	20	19	21	22	67
31-Jan	22	19	27	22	18	17	18	16	19	19	26	19	20	20	18	19	21	18	21	27	19	40	20	33	40
	78	77	86	67	67	79	70	90	94	62	74	76	51	86	76	46	93	91	83	62	73	54	87	85	
	Diurnal Maximum																								

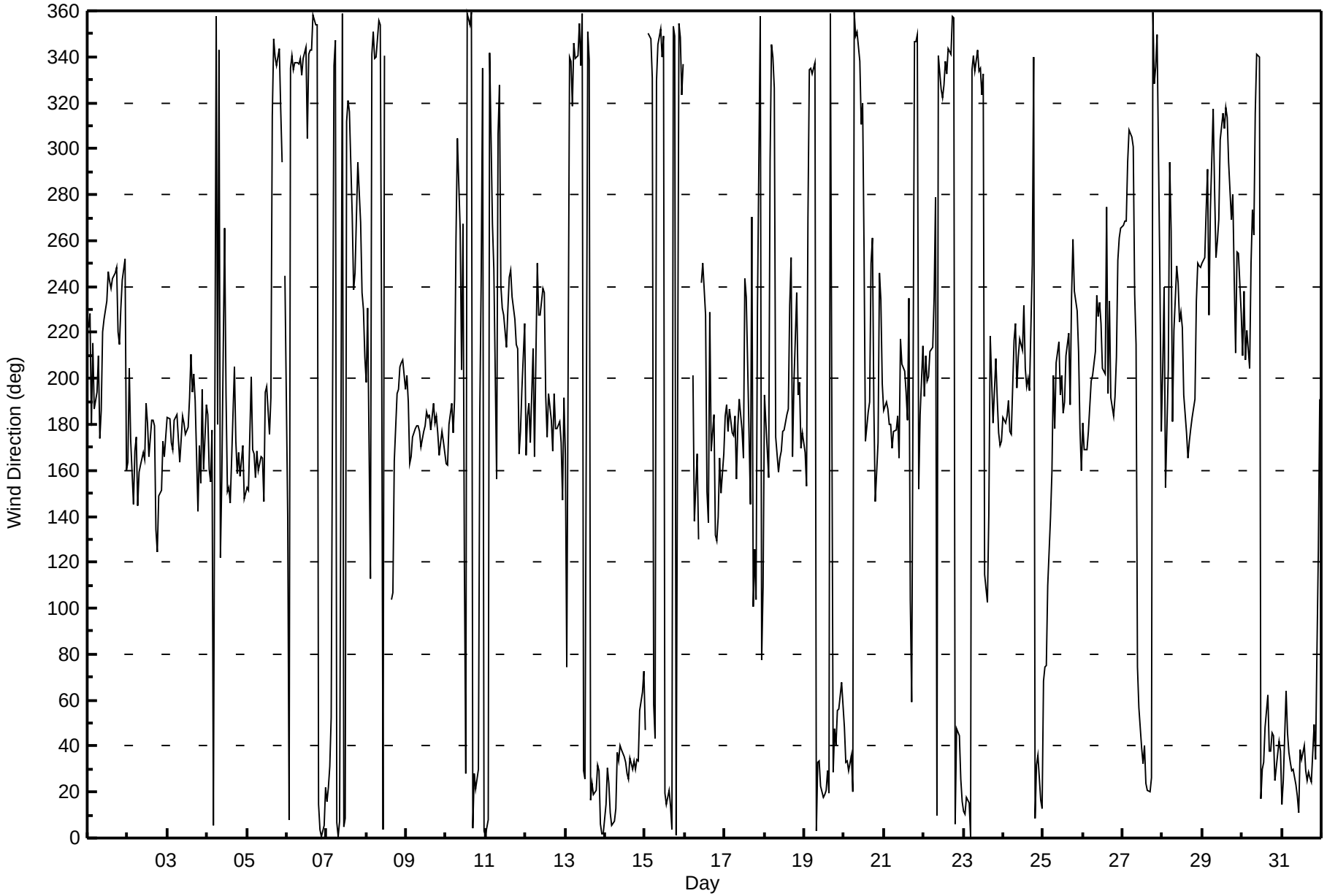
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Barge Landing - January 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 6, 2016	Last Calibration	December 10, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	15:20
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	LL104180 12/Feb/18

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-689	-689
Analyzer IP address	192.168.1.42		Lamp voltage	1014	1018
Calculated slope	0.998618	1.007241	Chamber temp	45	45
Calculated intercept	-0.193370	-0.280609	Pressure	683.9	697.3
Analyzer Background	2.01	1.96	Flow	0.431	0.442
Analyzer Coefficient	1.051	1.039	Intensity	91	90
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153461
Converter make/model	CDN-101	Converter serial #	519

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	83.8	79.9	79.2	1.009
SO2 scrubber check	5000	15.4	147.2	2.9	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	83.8	79.9	79.5	1.006
second point	5000	41.9	40.0	40.2	0.994
third point	5000	21.0	20.0	20.4	0.983
as left zero	6000	0.0	0.0	0.4	----
as left span	5000	83.8	79.9	78.7	1.016
				Average Correction Factor	0.994

Corrected As found	79.2	Previous response	80.2	% change	1.3%

Notes:

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

Calibration Performed By: Evan Magill

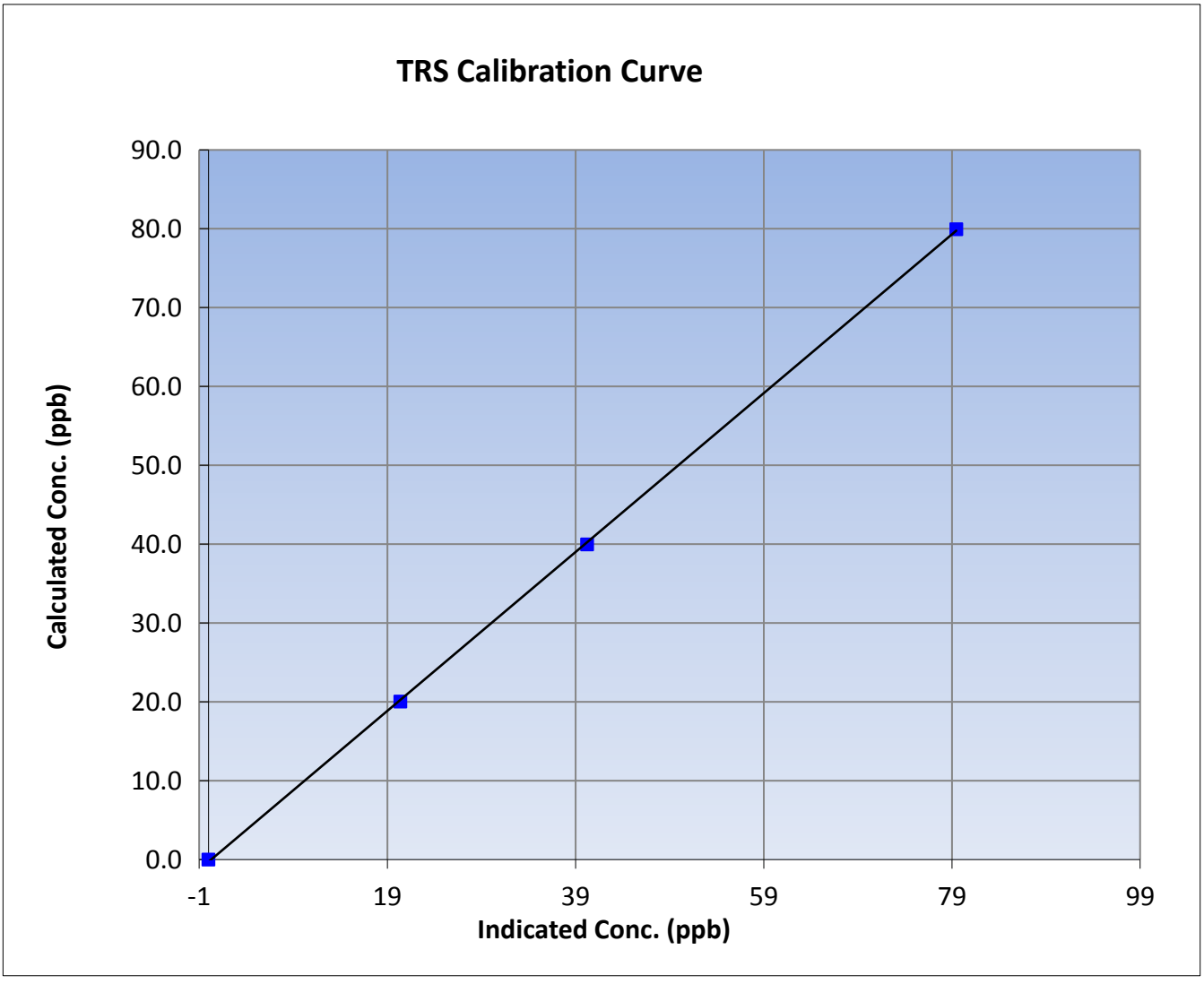
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

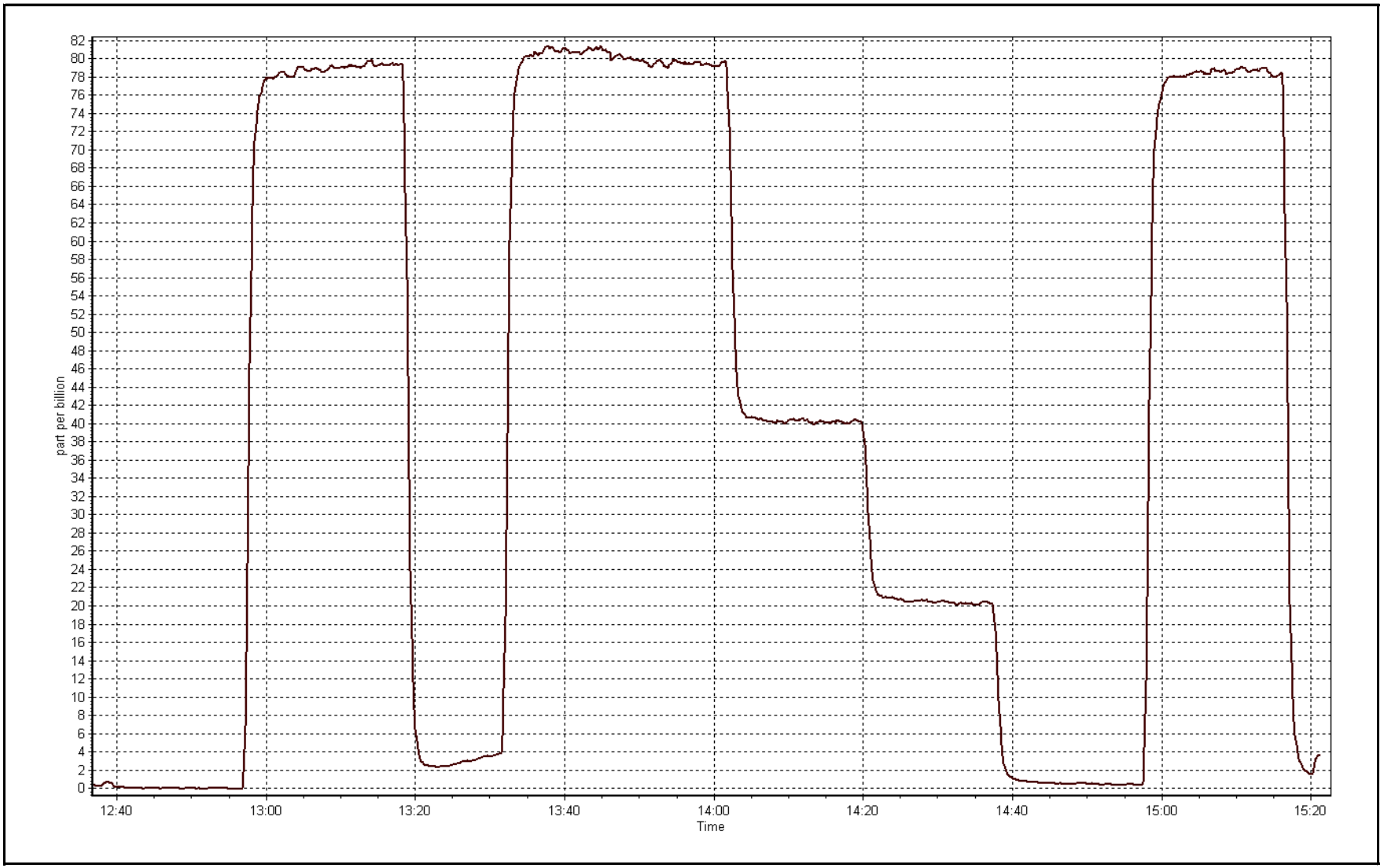
Calibration Date	January 6, 2016	Previous Calibration	December 10, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:40	End Time (MST)	15:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999932
79.9	79.5	1.0061		
40.0	40.2	0.9936	Slope	1.007241
20.0	20.4	0.9830		
			Intercept	-0.280609



TRS Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-06-16	Last Calibration	December-10-15
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:30
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

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	0.997965	0.994647	Fuel Pressure	24.1	24.1
Calculated intercept	0.022735	0.040336	Analyzer Coeff	4.326	4.267
			Analyzer BKG	5.59	5.56
Analyzer make	Thermo 51i-LT		Analyzer serial #	1327059296	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.07	----
as found span	5000	76.7	15.70	16.00	0.981
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	76.7	15.70	15.76	0.996
second point	5000	41.0	8.39	8.36	1.004
third point	5000	15.4	3.15	3.15	1.001
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	76.7	15.70	15.71	0.999
				Average Correction Factor	1.000

Corrected As found	15.93	Previous response	15.71	% change	-1.4%

Notes:

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

Calibration Performed By: Evan Magill

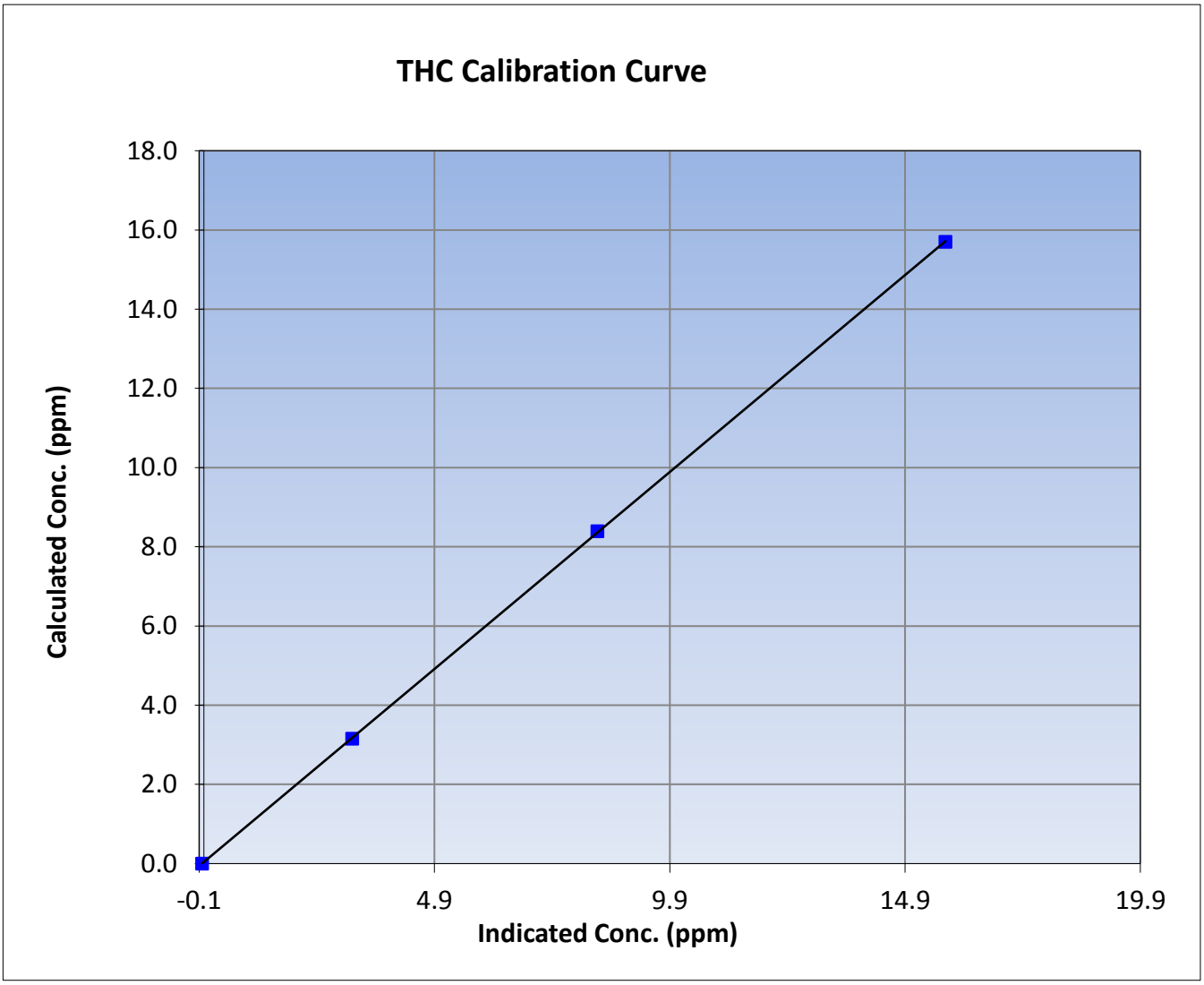
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

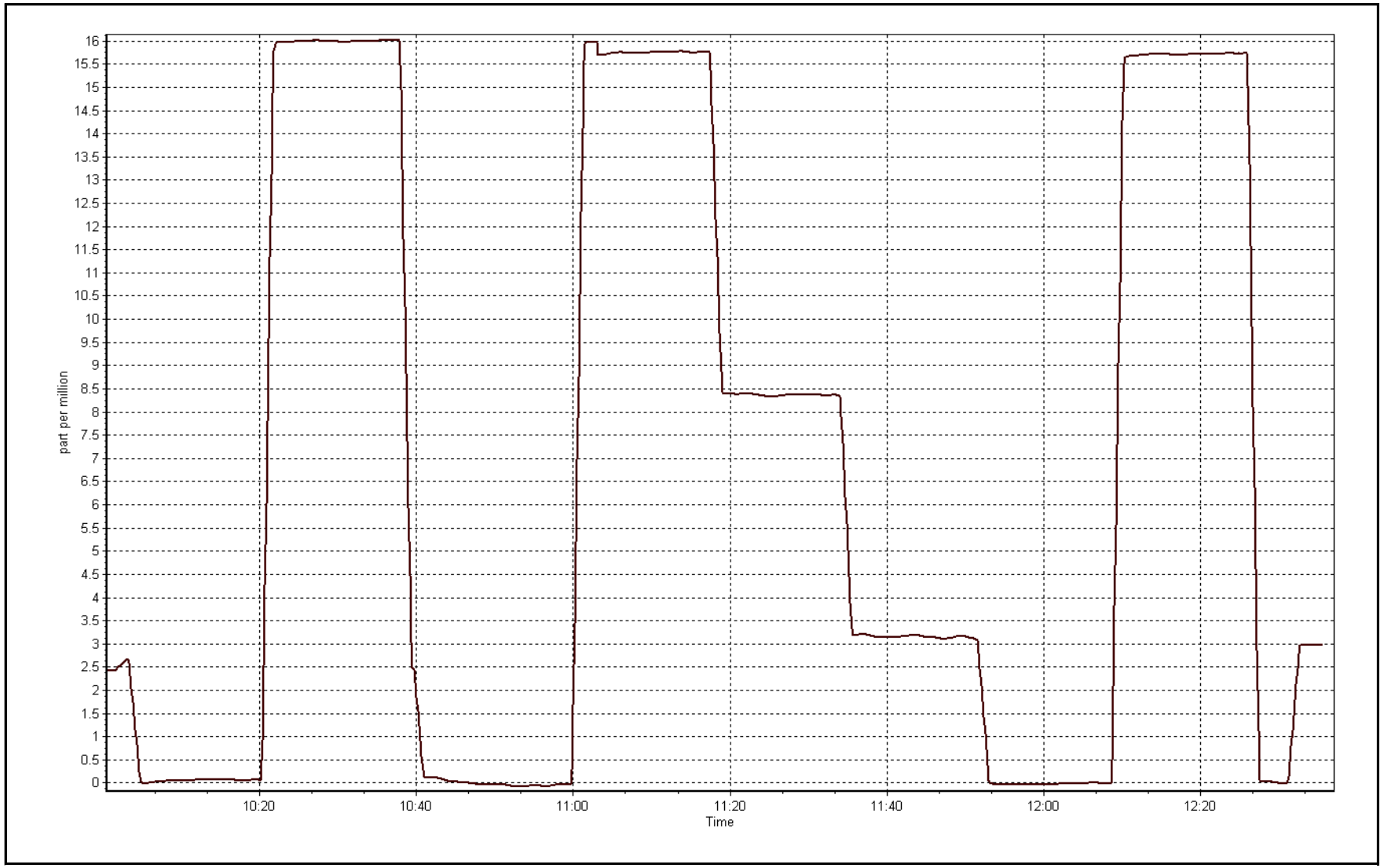
Calibration Date	January 6, 2016	Previous Calibration	December 10, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	10:00	End Time (MST)	12:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	0.999985
15.70	15.76	0.9962		
8.39	8.36	1.0039	Slope	0.994647
3.15	3.15	1.0008		
			Intercept	0.040336



THC Calibration Plot Date: January 6, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 11
LOWER CAMP
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
JANUARY 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	87	0	17	0
H2S (ppb) Average	706	38	38	100.00	11	1	2	0
THC (ppm) Average	703	41	41	100.00	4.7	-	3.1	-
Temperature (C) Average	744	0	0	100.00	6.1	-	3.2	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	90	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	27	-	15	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	2.1	7	-	0	0	0	0	1	4	87
H2S (ppb) Average	706	0.7	1	-	0	0	0	0	1	1	11
THC (ppm) Average	703	2.5	0.4	-	2	2.1	2.2	2.4	2.7	3	4.7
Temperature 2 m (C) Average	744	-13.26	8.1	-	-34.5	-22.2	-18.1	-13.7	-8.3	-2.6	6.1
Relative Humidity (%) Average	744	80.3	7	-	53	72	76	80	85	89	96
Wind Speed 10 m (km/h) Average	743	7.9	5	-	0	2	4	7	11	14	27
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	14 Jan 2016 14:00	14 Jan 2016 15:00	2	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	08 Jan 2016 19:00	08 Jan 2016 19:00	1	Maintenance - tower lowered to access visibility sensor

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Lower Camp - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 87 ppb on Jan 24 13:00

Maximum Daily Average: 17.2 ppb on Jan 24

Minimum Value: 0 ppb on Jan 7 08:00

Minimum Daily Average: 0.1 ppb on Jan 14

Maximum Diurnal Average: 4.1 ppb at hour 13

Minimum Diurnal Average: 0.8 ppb at hour 10

Monthly Average: 2.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 4$ $P_{99} = 37$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	0	1	2	0	4	36	2	1	1	1	1	2	3	1	1	1	1	2	1	3	1	1	2.8	36
2-Jan	2	Z	9	3	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.9	9
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
4-Jan	0	0	0	Z	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0.4	1
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0.4	1
6-Jan	0	1	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0.2	2
8-Jan	0	Z	0	1	1	3	2	1	0	0	0	1	1	1	5	6	9	9	19	8	3	14	2	3	3.9	19
9-Jan	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
10-Jan	0	0	0	Z	1	2	1	2	1	1	1	3	2	1	1	2	2	0	0	0	0	0	0	0	0.9	3
11-Jan	0	0	0	0	Z	0	0	0	0	1	1	2	2	7	1	1	1	37	70	25	16	7	5	6	8.0	70
12-Jan	1	0	0	1	1	Z	0	0	0	1	2	2	3	2	1	2	1	1	0	1	7	13	4	14	2.5	14
13-Jan	Z	3	2	1	1	1	1	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.8	3
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0.1	0
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	2	1	1	1	1	0.7	2
17-Jan	1	0	0	0	Z	0	0	1	1	1	1	1	1	3	5	1	1	1	1	0	1	1	1	1	0.9	5
18-Jan	1	1	0	0	0	Z	0	4	1	0	0	0	0	1	1	0	0	0	0	0	1	3	1	1	0.7	4
19-Jan	Z	1	1	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1
20-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	15	17	6	15	31	8	3	3	3	1	1	0	4.6	31
21-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	1	1	2	6	3	1.0	6
22-Jan	7	1	1	Z	2	3	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	7
23-Jan	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	3	1	0.8	3
24-Jan	1	2	6	1	2	Z	55	4	3	0	48	55	87	38	22	6	11	41	12	1	1	0	0	0	17.2	87
25-Jan	Z	0	0	0	1	1	9	1	3	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1.2	9
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1
27-Jan	1	3	Z	14	17	5	5	0	0	3	2	1	0	0	0	0	0	0	0	8	4	1	12	7	3.7	17
28-Jan	12	9	3	Z	6	7	7	17	4	2	1	1	1	1	1	0	1	1	2	0	1	1	1	2	3.5	17
29-Jan	1	1	1	2	Z	4	0	1	11	6	5	4	2	0	0	2	6	3	2	2	1	1	0	0	2.5	11
30-Jan	4	9	8	6	10	Z	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	10
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
	1.4	1.3	1.3	1.3	1.8	1.2	3.1	2.4	1.1	0.8	2.3	2.6	4.1	2.8	1.9	1.6	2.4	3.6	3.9	2.0	1.6	1.7	1.4	1.4	Diurnal Average	
	12	9	9	14	17	7	55	36	11	6	48	55	87	38	22	15	31	41	70	25	16	14	12	14	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

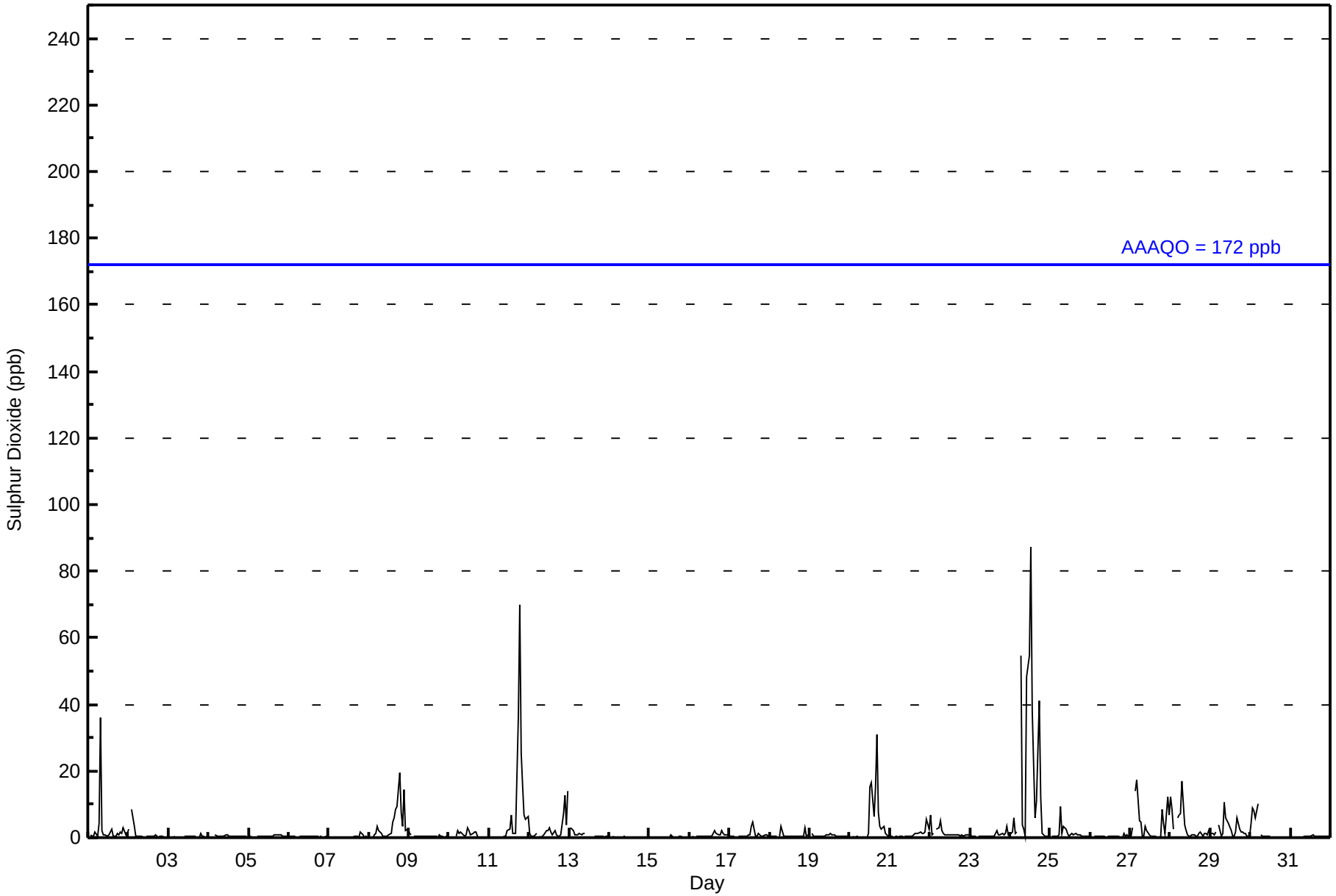
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Lower Camp - January 2016



Sulphur Dioxide (SO_2) - ppb
Lower Camp - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	678	96.03	96.03
11 - 20	16	2.27	98.30
21 - 60	10	1.42	99.72
61 - 110	2	0.28	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Lower Camp - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	48	39	9	5	6	36	224	29	9	2	3	27	40	46	79	76	678
11 - 20	1	0	0	0	2	0	0	3	1	0	0	2	1	2	2	1	15
21 - 60	0	1	0	0	0	0	1	1	2	1	2	2	0	0	0	0	10
61 - 110	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	40	9	5	8	36	225	33	12	3	7	31	41	48	81	77	705

Total Number of Valid Hours: 705

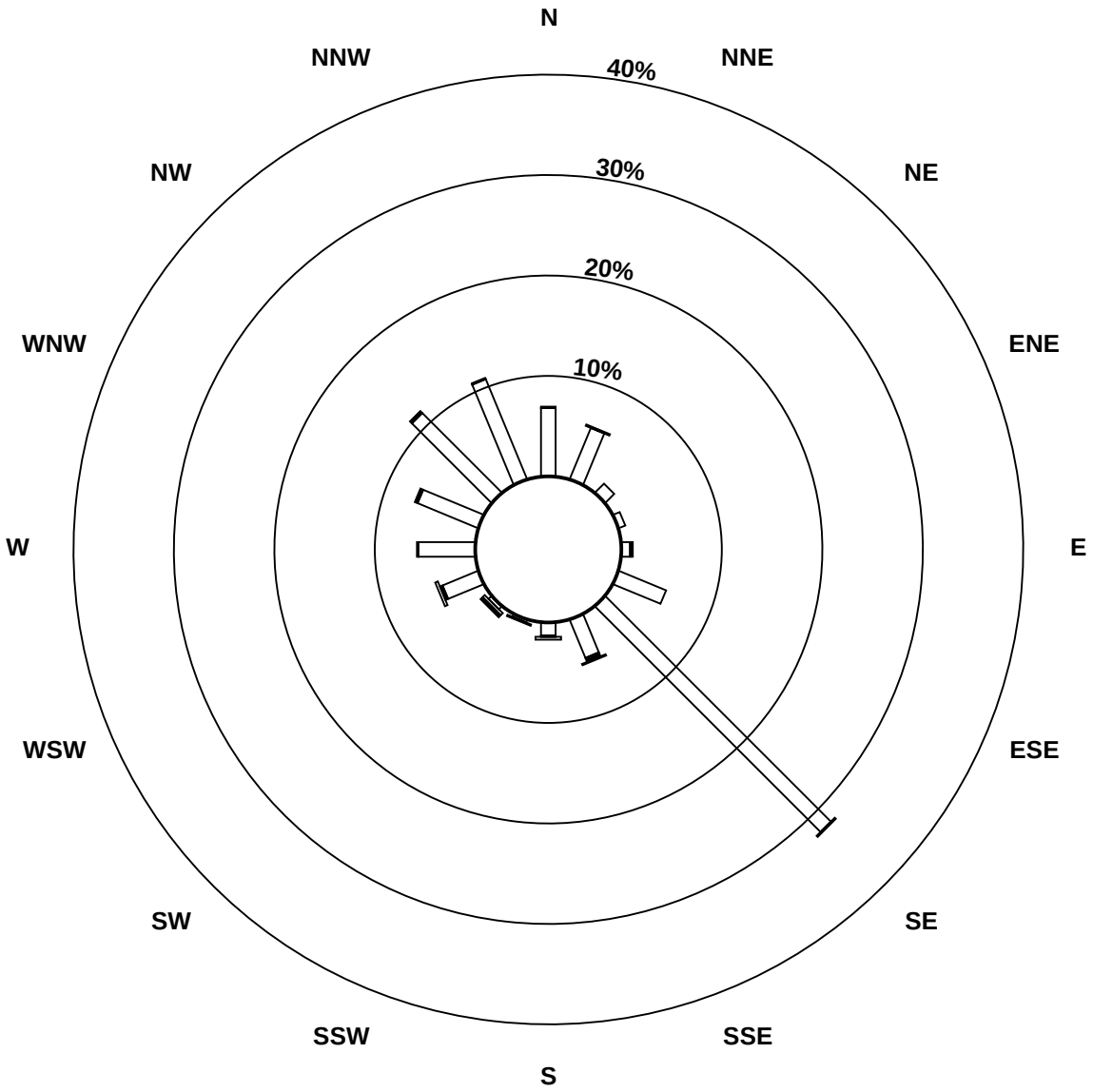
Total Number of Hours: 744

Wood Buffalo Environmental Association

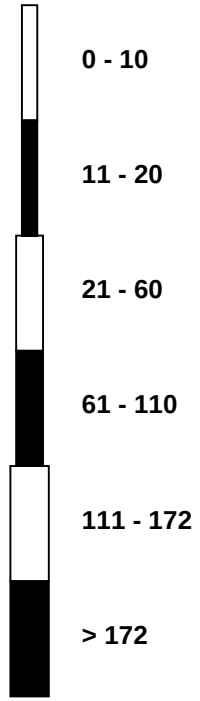
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Lower Camp (AMS 11)



Classes (ppb)



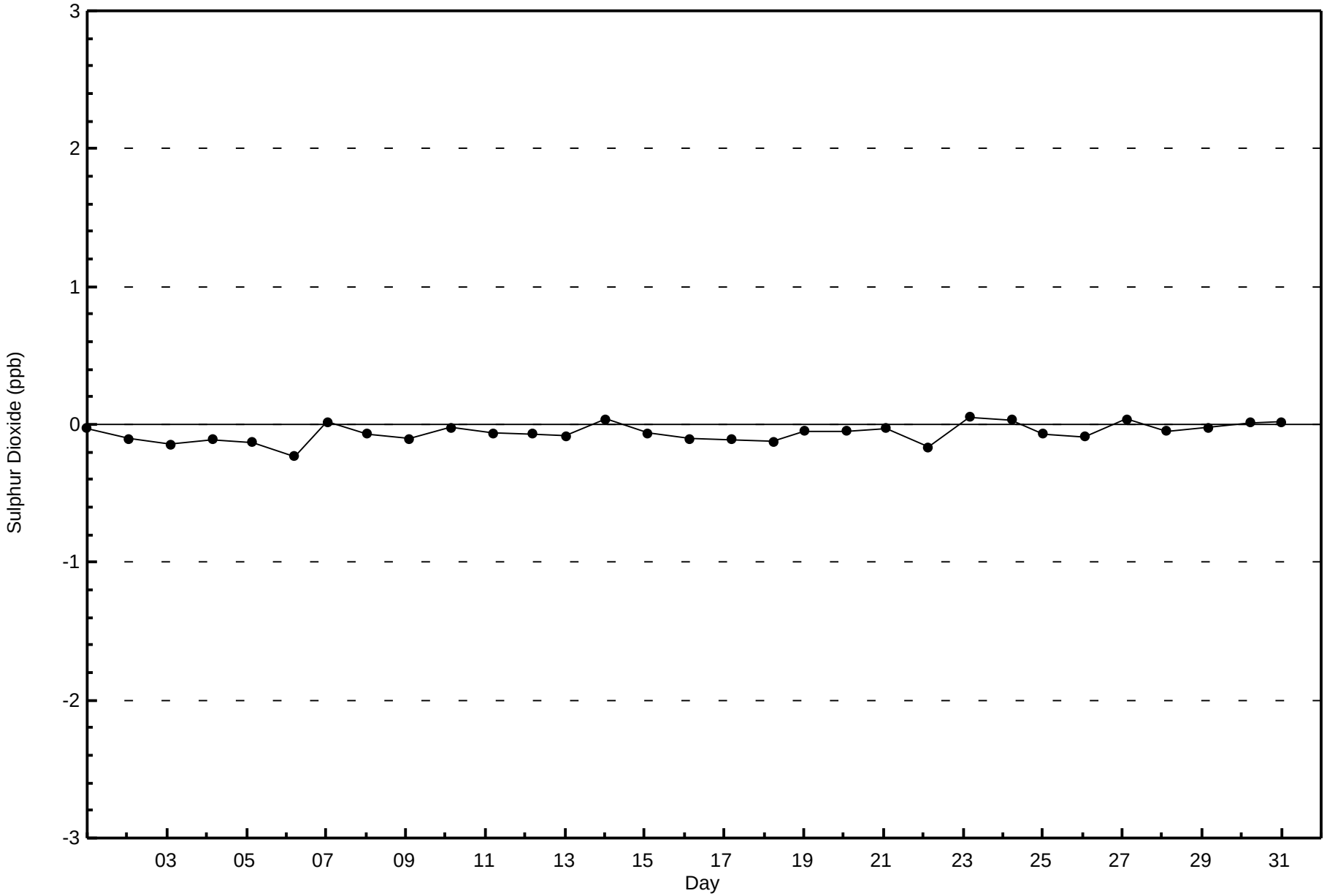
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Lower Camp - January 2016

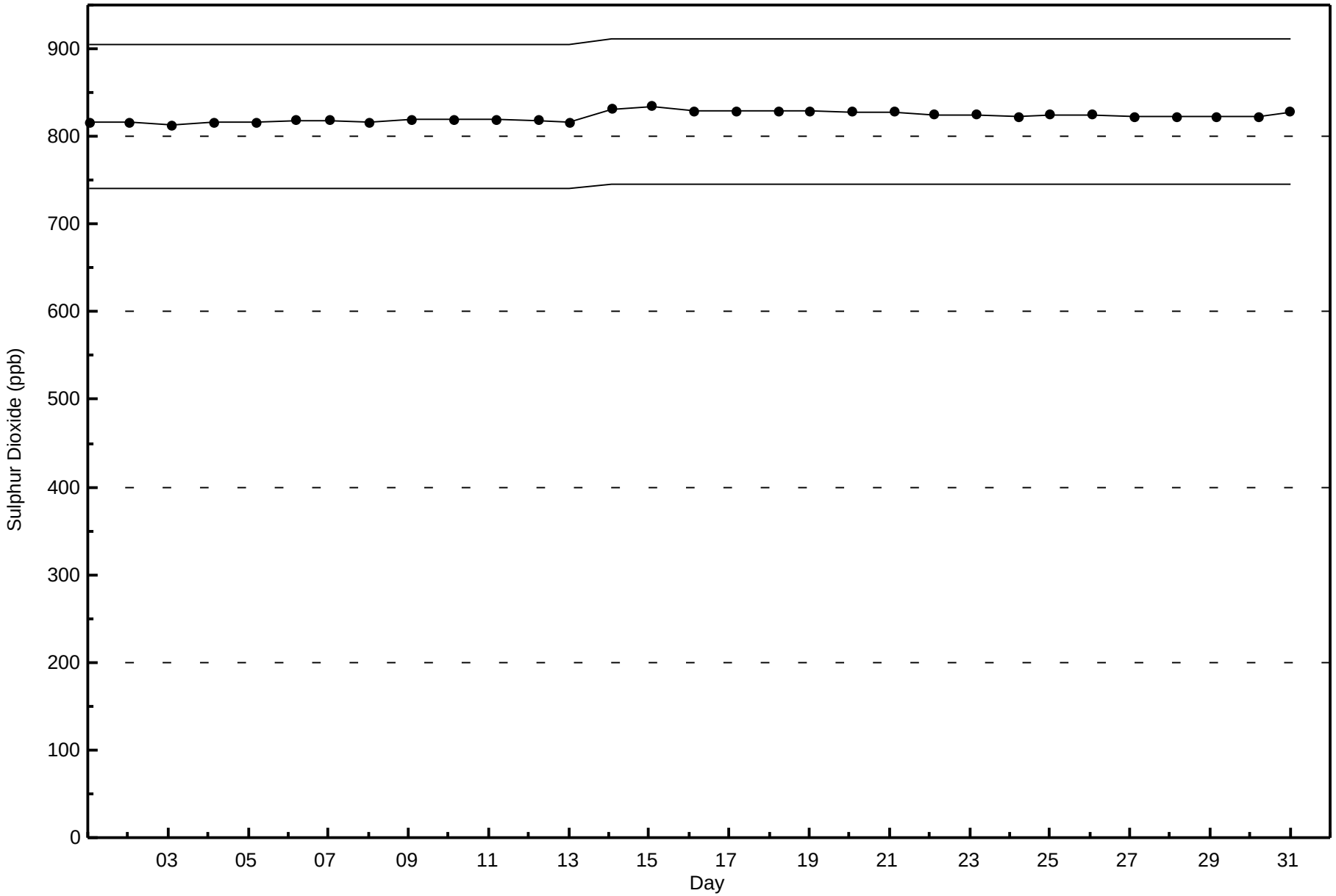


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Lower Camp - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - January 2016

Number of Exceedences (AAAQO): 1-hr: 1 24-hr: 0
Maximum Value: 11 ppb on Jan 24 13:00 Maximum Daily Average: 2.5 ppb on Jan 24

Minimum Value: 0 ppb on Jan 14 08:00 Minimum Daily Average: 0.2 ppb on Jan 7
Maximum Diurnal Average: 1.1 ppb at hour 19 Minimum Diurnal Average: 0.5 ppb at hour 10
Monthly Average: 0.7 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	38
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	1	1	1	1	2	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
2-Jan	0	1	Z	1	0	1	1	1	1	1	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0.6	1
3-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0.4	1
4-Jan	0	0	0	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-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
6-Jan	1	1	1	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	1
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	1	2	2	2	3	1	1	2	0	0	0.8	3
9-Jan	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1
10-Jan	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	1
11-Jan	0	0	0	0	0	Z	0	0	0	1	0	1	0	1	0	0	0	5	9	5	4	3	1	1	1.5	9
12-Jan	1	0	0	1	1	0	Z	1	1	1	1	1	1	0	0	1	1	1	1	1	1	2	1	2	0.8	2
13-Jan	1	Z	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0.7	2
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	--	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0.4	1
16-Jan	0	0	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0.9	2
17-Jan	1	1	1	1	1	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	0.9	2
18-Jan	2	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.5	2
19-Jan	0	Z	1	1	0	1	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
20-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	2	2	1	4	7	3	1	1	1	1	1	1	1.2	7
21-Jan	1	1	0	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0.6	1
22-Jan	1	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.7	2
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
24-Jan	1	1	1	1	1	2	Z	1	1	0	6	7	11	5	4	1	2	5	2	1	1	1	0	0	2.5	11
25-Jan	0	Z	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	1	2	2	1	1	2	1	0.8	2
26-Jan	1	1	Z	1	1	1	0	0	0	0	0	1	0	1	0	0	0	0	1	1	1	1	0	0	0.5	1
27-Jan	0	0	0	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	1	1	3	3	0.6	3
28-Jan	3	2	1	1	Z	3	3	3	3	2	0	0	0	1	1	1	1	2	0	1	1	0	0	0	1.2	3
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
30-Jan	1	1	1	1	2	1	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	0.6	0.6	0.6	0.6	0.5	0.7	0.6	0.7	0.6	0.5	0.7	0.7	0.9	0.7	0.6	0.7	0.9	1.0	1.1	0.9	0.8	0.7	0.7	0.6	Diurnal Average	
	3	2	2	2	2	3	3	4	3	2	6	7	11	5	4	4	7	5	9	5	4	3	3	3	Diurnal Maximum	

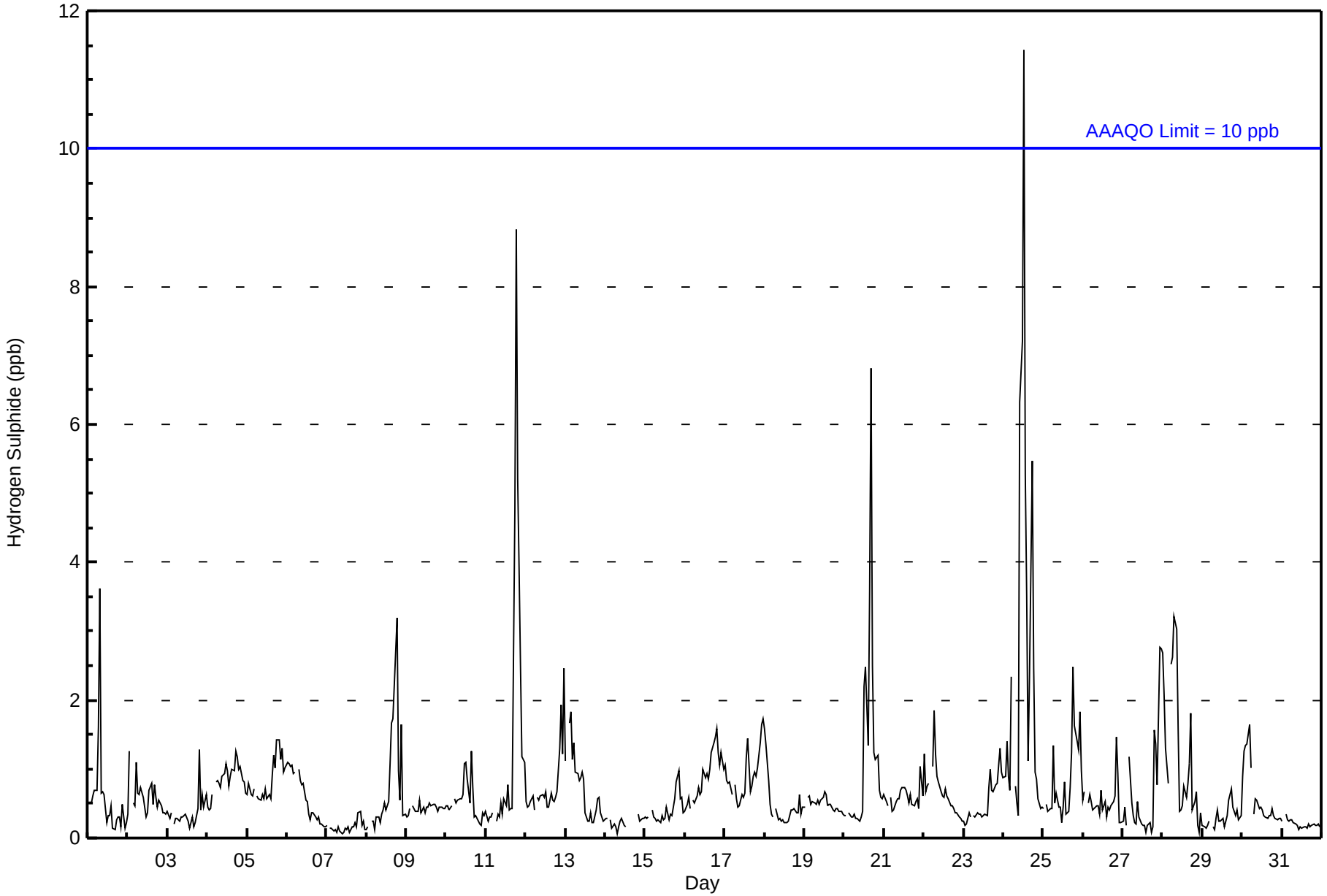
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	683	96.74	96.74
3 - 4	14	1.98	98.73
5 - 7	7	0.99	99.72
8 - 11	1	0.14	99.86
> 11	1	0.14	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	44	38	10	5	8	34	227	33	10	2	3	26	42	44	81	76	683
3 - 4	1	0	0	0	2	0	3	0	0	1	0	2	0	2	2	0	13
5 - 7	0	1	0	0	0	0	0	1	2	0	1	2	0	0	0	0	7
8 - 11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Totals	45	39	10	5	10	34	230	34	12	3	6	30	42	46	83	76	705

Total Number of Valid Hours: 705

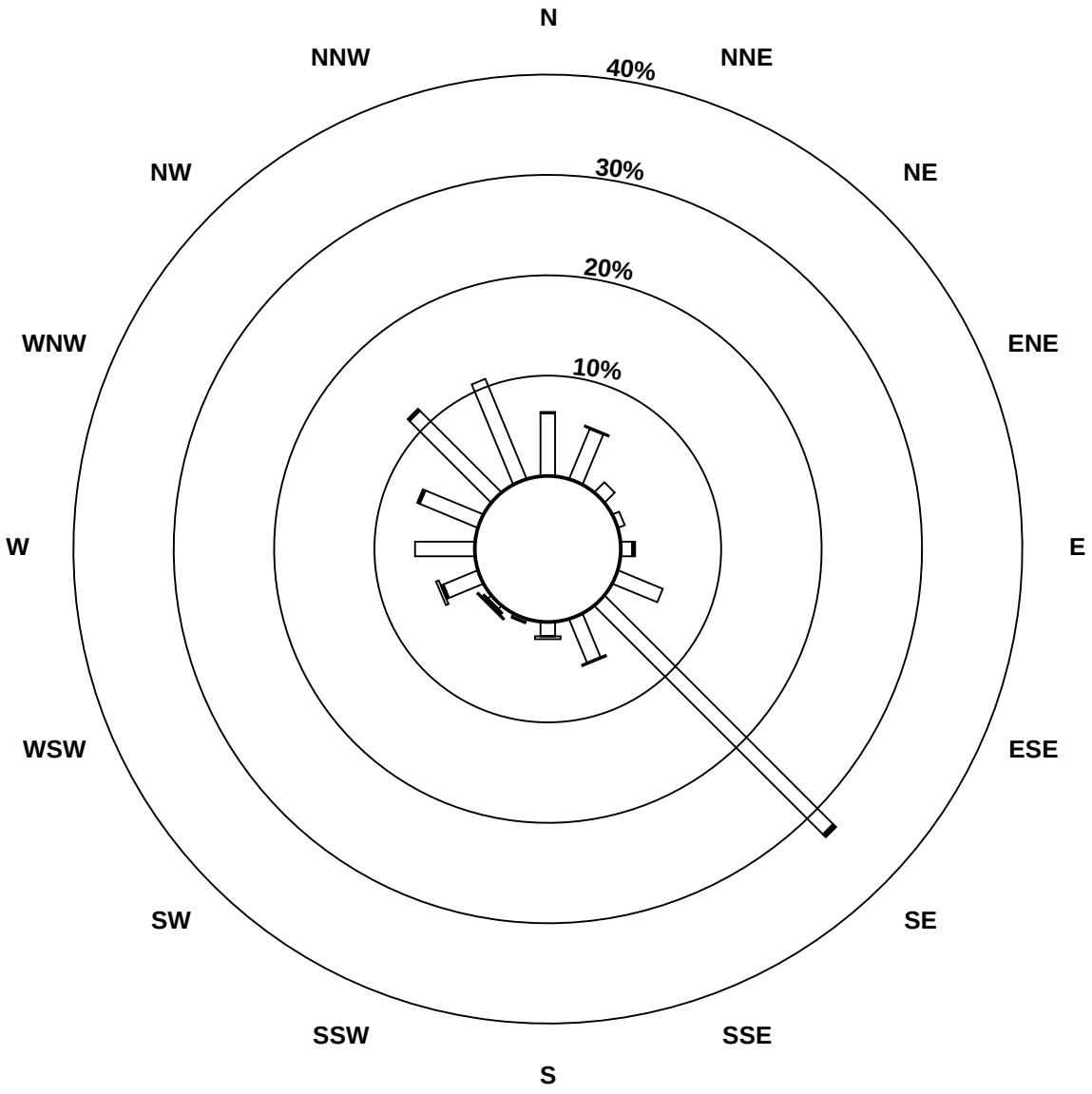
Total Number of Hours: 744

Wood Buffalo Environmental Association

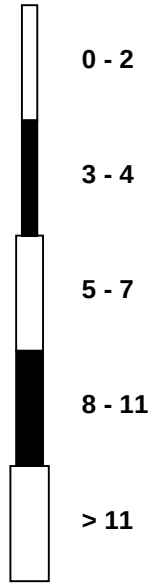
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Lower Camp (AMS 11)



Classes (ppb)



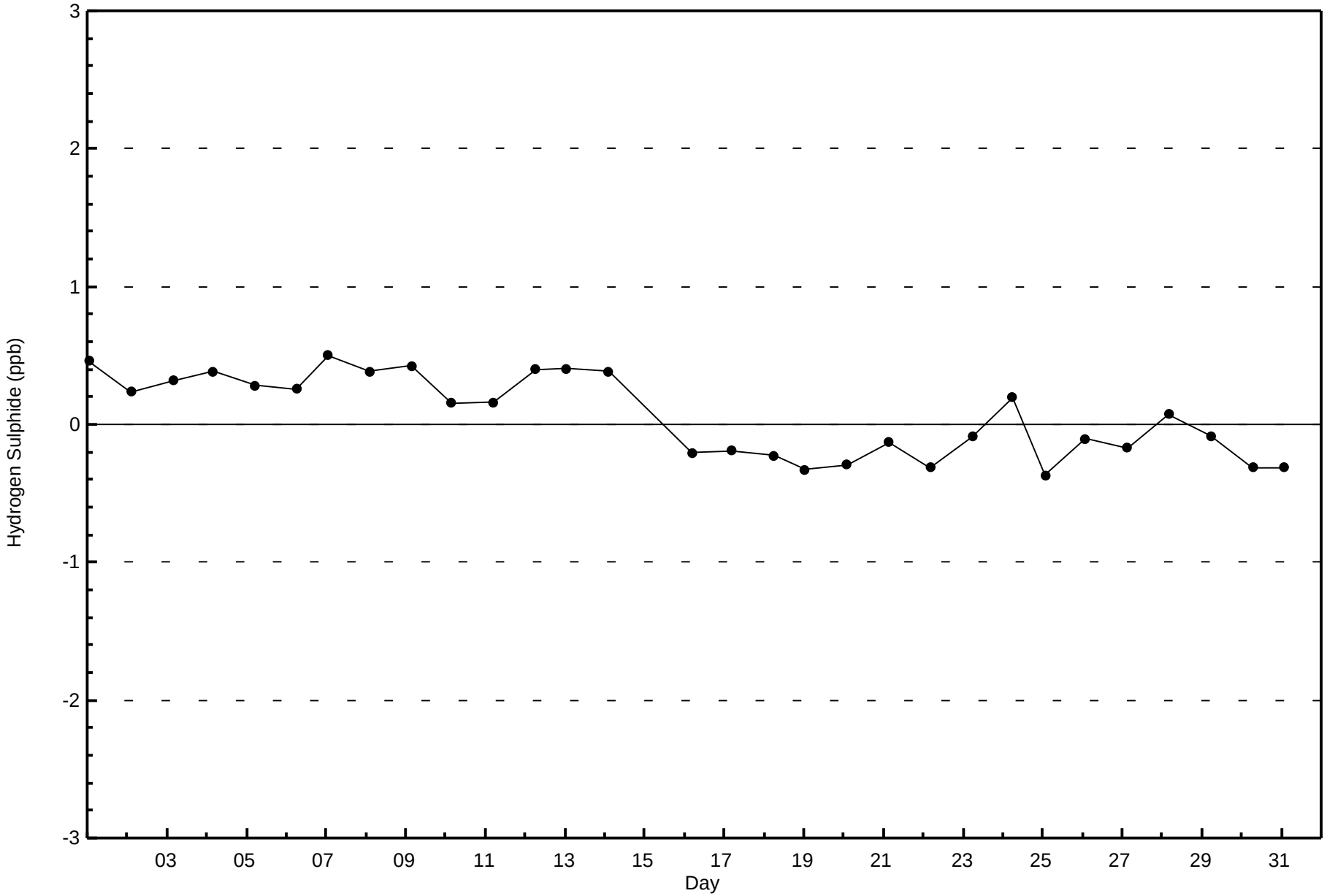
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - January 2016

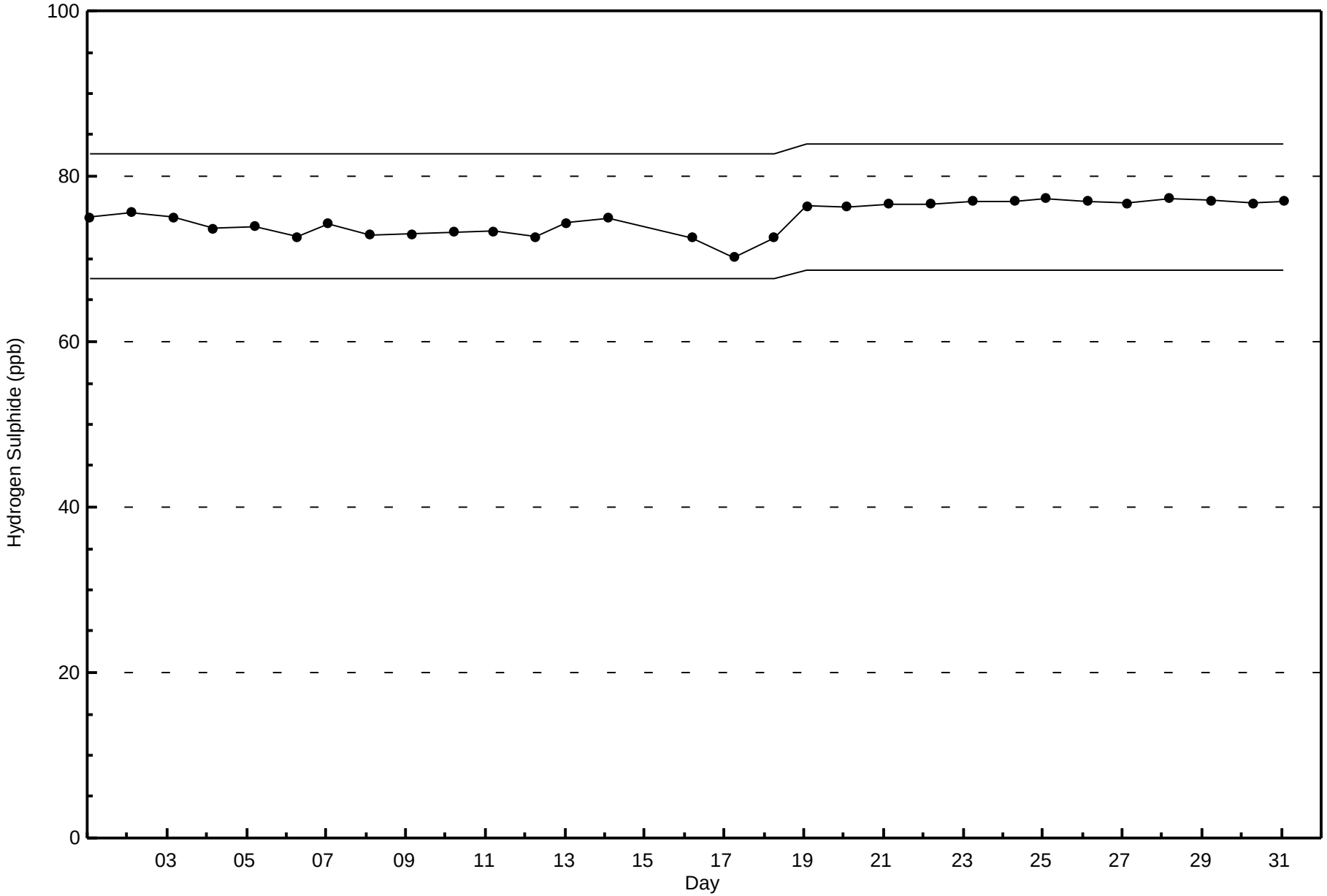


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Lower Camp - January 2016

Maximum Value: 4.7 ppm on Jan 8 18:00

Maximum Daily Average: 3.1 ppm on Jan 4

Minimum Value: 2.0 ppm on Jan 1 17:00

Minimum Daily Average: 2.1 ppm on Jan 7

Maximum Diurnal Average: 2.6 ppm at hour 18

Minimum Diurnal Average: 2.4 ppm at hour 4

Monthly Average: 2.50 ppm

Percentiles: P_1 = 2.0 P_{10} = 2.1 Q_1 = 2.2 Median = 2.4 Q_3 = 2.7 P_{90} = 3.0 P_{99} = 3.4

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	41
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.2	2.2	2.3	2.2	2.2	2.4	2.4	2.3	2.2	2.2	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4
2-Jan	2.2	Z	2.2	2.3	2.5	2.5	2.3	2.4	2.4	2.4	2.2	2.2	2.1	2.4	2.4	2.6	2.6	2.5	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.6
3-Jan	2.4	2.4	Z	2.2	2.3	2.4	2.4	2.4	2.5	2.3	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.3	2.2	2.6	2.6	2.9	2.7	3.0	2.4	3.0
4-Jan	2.7	2.7	2.8	Z	3.0	2.9	3.0	3.0	3.1	3.1	3.0	3.0	3.4	3.1	3.0	3.0	3.4	3.5	3.5	3.4	3.2	3.3	3.4	3.0	3.1	3.5
5-Jan	3.0	3.3	3.0	2.9	Z	3.1	2.7	2.8	2.7	2.9	2.9	3.1	2.7	3.2	2.9	3.0	3.1	3.0	2.9	3.0	3.1	3.1	3.0	2.9	3.0	3.3
6-Jan	3.0	3.1	3.1	3.1	3.1	Z	3.2	3.2	3.2	3.3	3.1	2.8	2.6	2.5	2.4	2.5	2.4	2.4	2.2	2.3	2.2	2.1	2.0	2.1	2.7	3.3
7-Jan	Z	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2
8-Jan	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.6	3.4	4.7	3.8	2.6	2.4	2.4	2.1	2.1	2.5	4.7
9-Jan	2.1	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.1	2.3	2.3	2.3	2.4
10-Jan	2.2	2.3	2.3	Z	2.4	2.5	2.4	2.3	2.6	2.6	2.7	2.8	2.7	2.5	2.5	3.1	2.6	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.4	3.1
11-Jan	2.2	2.2	2.1	2.2	Z	2.2	2.2	2.3	2.4	4.0	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.7	2.6	3.1	2.7	2.5	2.4	2.4	4.0
12-Jan	2.4	2.5	2.5	2.5	2.4	Z	2.7	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.4	2.3	2.5	2.6	2.6	2.9	2.4	2.9
13-Jan	Z	3.2	3.1	2.6	2.7	2.9	2.7	2.7	2.7	2.7	C	C	C	C	C	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.5	3.2
14-Jan	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.0	3.2	C	C	C	C	C	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.2	3.2
15-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.4	2.5	2.5	2.2	2.5
16-Jan	2.5	2.6	2.5	Z	2.6	2.6	2.5	2.6	2.7	2.6	2.6	3.0	3.0	3.4	3.0	3.1	3.4	3.4	3.4	3.4	3.0	3.0	3.0	2.7	2.9	3.4
17-Jan	2.8	2.8	2.7	2.8	Z	2.5	2.6	2.5	2.5	2.6	2.7	2.5	2.7	2.9	2.8	3.0	3.1	3.1	3.1	3.0	3.0	2.9	3.0	2.9	2.8	3.1
18-Jan	3.0	2.9	2.7	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.4	2.3	2.3	2.2	2.4	2.2	2.3	2.3	3.0
19-Jan	Z	2.4	2.5	2.6	2.6	2.6	2.5	2.4	2.5	2.5	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.4	2.6
20-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.6	2.6	2.7	3.0	2.8	2.7	2.6	2.7	2.7	2.6	2.4	2.4	3.0
21-Jan	2.3	2.3	Z	2.4	2.4	2.3	2.4	2.4	2.6	2.6	2.7	2.8	2.8	2.8	2.7	2.7	3.0	2.8	2.6	2.7	2.7	2.6	2.7	2.7	2.6	3.0
22-Jan	3.2	2.8	3.1	Z	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.0	3.1	3.2	3.0	2.8	2.8	2.7	2.6	2.5	2.6	2.5	2.4	2.5	2.9	3.2
23-Jan	2.5	2.5	2.5	2.5	Z	2.5	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.6	2.5	2.6	2.7	3.0	3.0	3.4	3.3	3.0	3.4	3.0	2.7	3.4
24-Jan	3.1	2.9	2.9	2.8	2.8	Z	2.9	2.4	2.4	2.3	2.5	2.6	2.7	2.4	3.0	2.9	2.7	3.6	2.9	3.1	2.7	2.3	2.2	2.2	2.7	3.6
25-Jan	Z	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.7	2.6	2.6	2.6	2.9	2.7	2.5	2.5	2.4	2.9
26-Jan	2.5	Z	2.7	2.7	2.6	2.6	2.6	2.7	2.8	2.6	2.7	2.5	2.7	3.0	2.6	2.6	2.6	2.8	2.6	2.7	3.1	2.6	2.2	2.3	2.6	3.1
27-Jan	2.3	2.2	Z	2.6	2.6	2.2	2.4	2.3	2.3	2.5	2.6	2.3	2.5	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.4	2.6	2.6	2.4	2.6
28-Jan	2.7	3.2	3.4	Z	2.7	2.9	2.9	2.7	2.5	2.3	2.3	2.3	2.5	2.7	2.9	2.6	2.4	2.6	2.6	2.7	2.4	2.1	2.1	2.2	2.6	3.4
29-Jan	2.1	2.3	2.4	2.6	Z	2.6	2.5	2.3	2.3	2.6	2.5	2.5	2.6	2.7	2.7	2.7	2.7	2.9	2.8	2.6	2.2	2.2	2.8	2.9	2.6	2.9
30-Jan	2.4	2.2	2.3	2.3	2.4	Z	2.3	2.3	3.0	2.8	2.3	2.3	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.3	3.0
31-Jan	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.4	2.5	2.6	2.5	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	Diurnal Average	
	3.2	3.3	3.4	3.1	3.2	3.1	3.2	3.2	3.2	4.0	3.1	3.1	3.4	3.4	3.0	3.1	3.4	4.7	3.8	3.4	3.3	3.3	3.4	3.0	Diurnal Maximum	

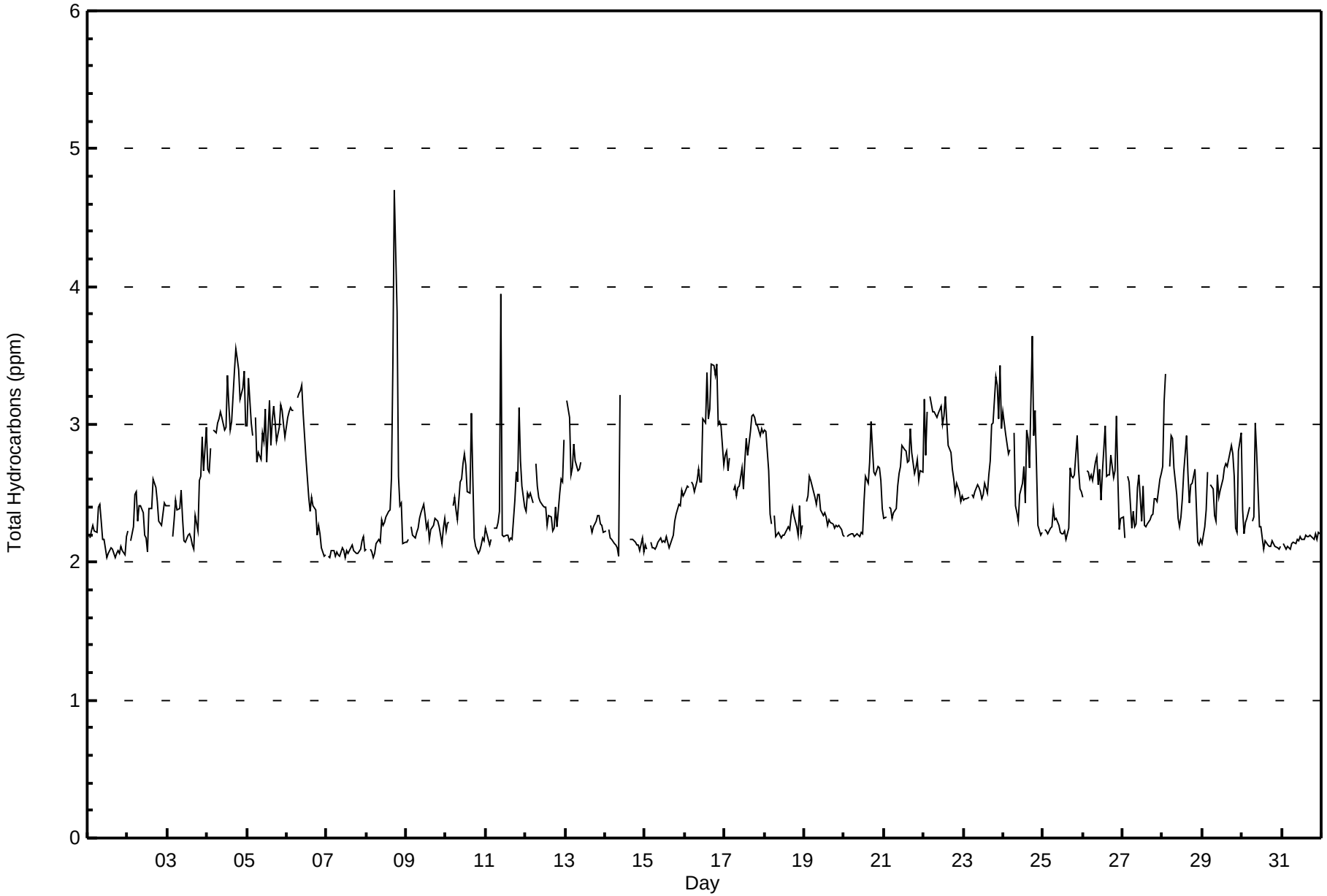
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Lower Camp - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Lower Camp - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	10	1.42	1.42
2.1 - 3.0	629	89.47	90.90
3.1 - 10.0	64	9.10	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Lower Camp - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	3	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	10
2.1 - 3.0	41	38	7	5	7	33	204	27	11	2	7	31	38	33	72	73	629
3.1 - 10.0	2	2	2	0	1	3	21	6	1	1	0	0	1	14	7	2	63
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	40	9	5	8	36	225	33	12	3	7	31	41	48	81	77	702

Total Number of Valid Hours: 702

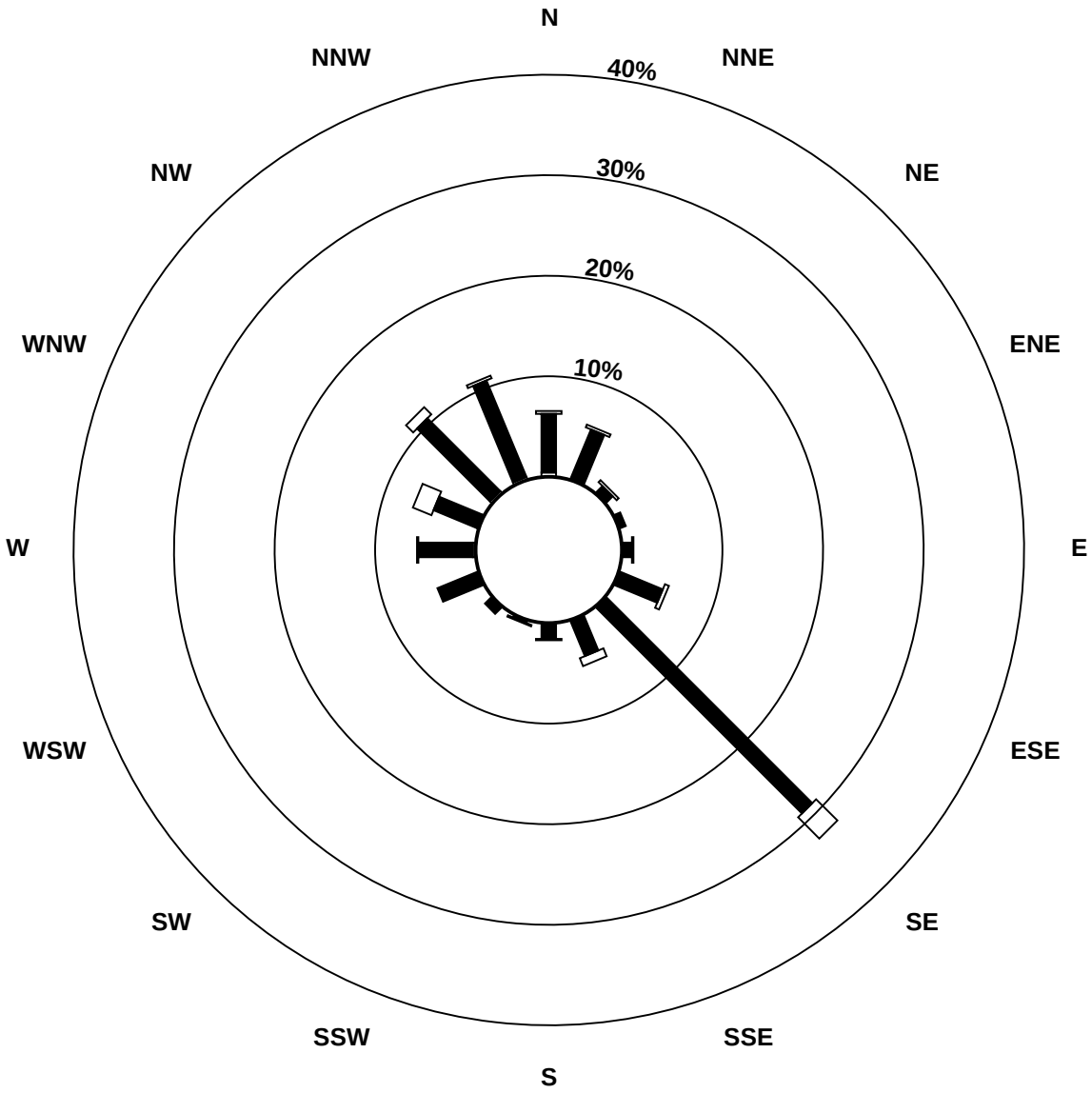
Total Number of Hours: 744

Wood Buffalo Environmental Association

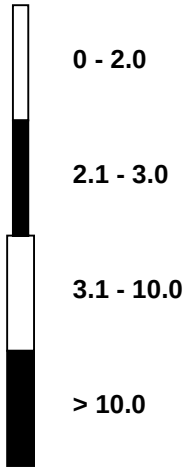
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Lower Camp (AMS 11)



Classes (ppm)



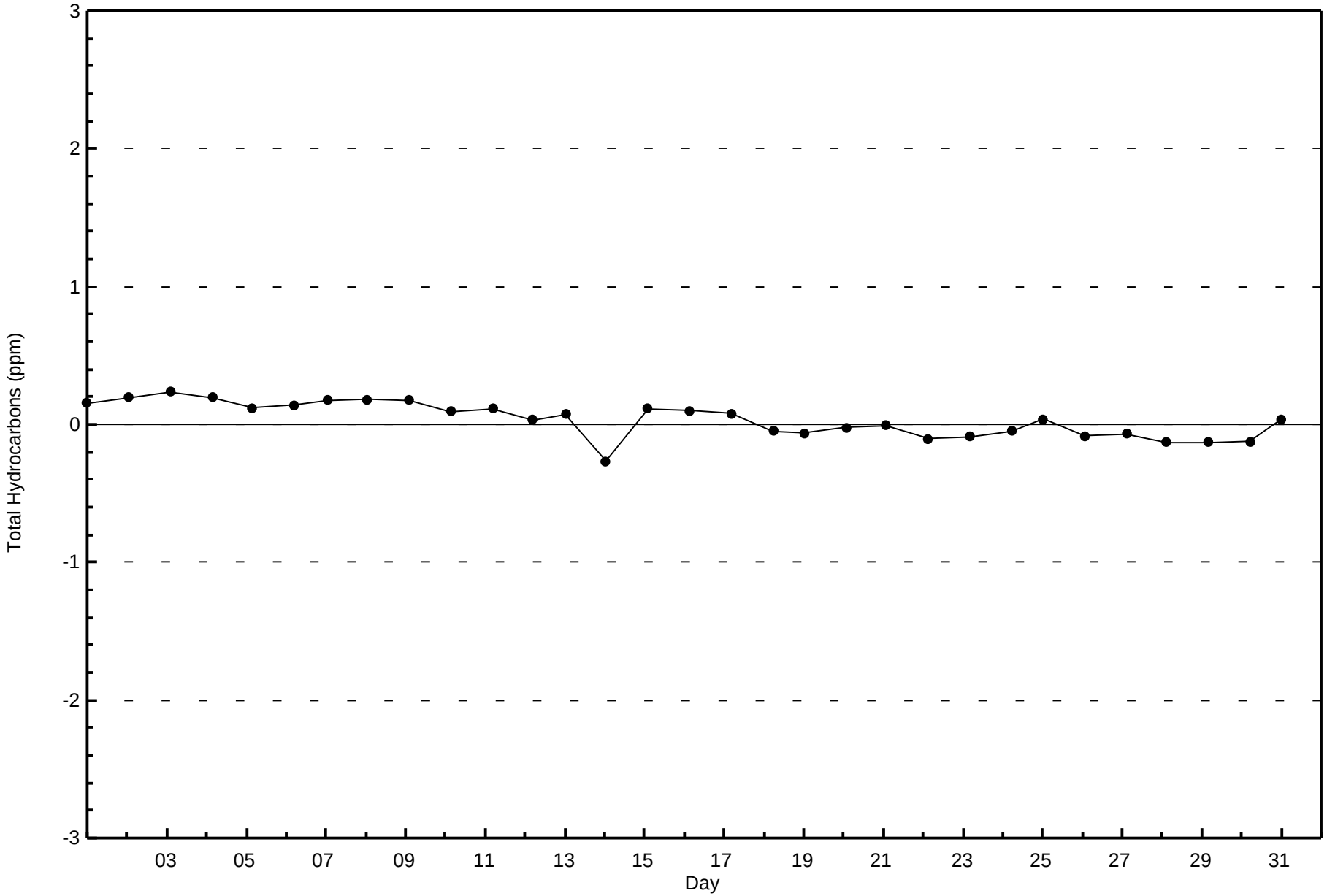
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Lower Camp - January 2016

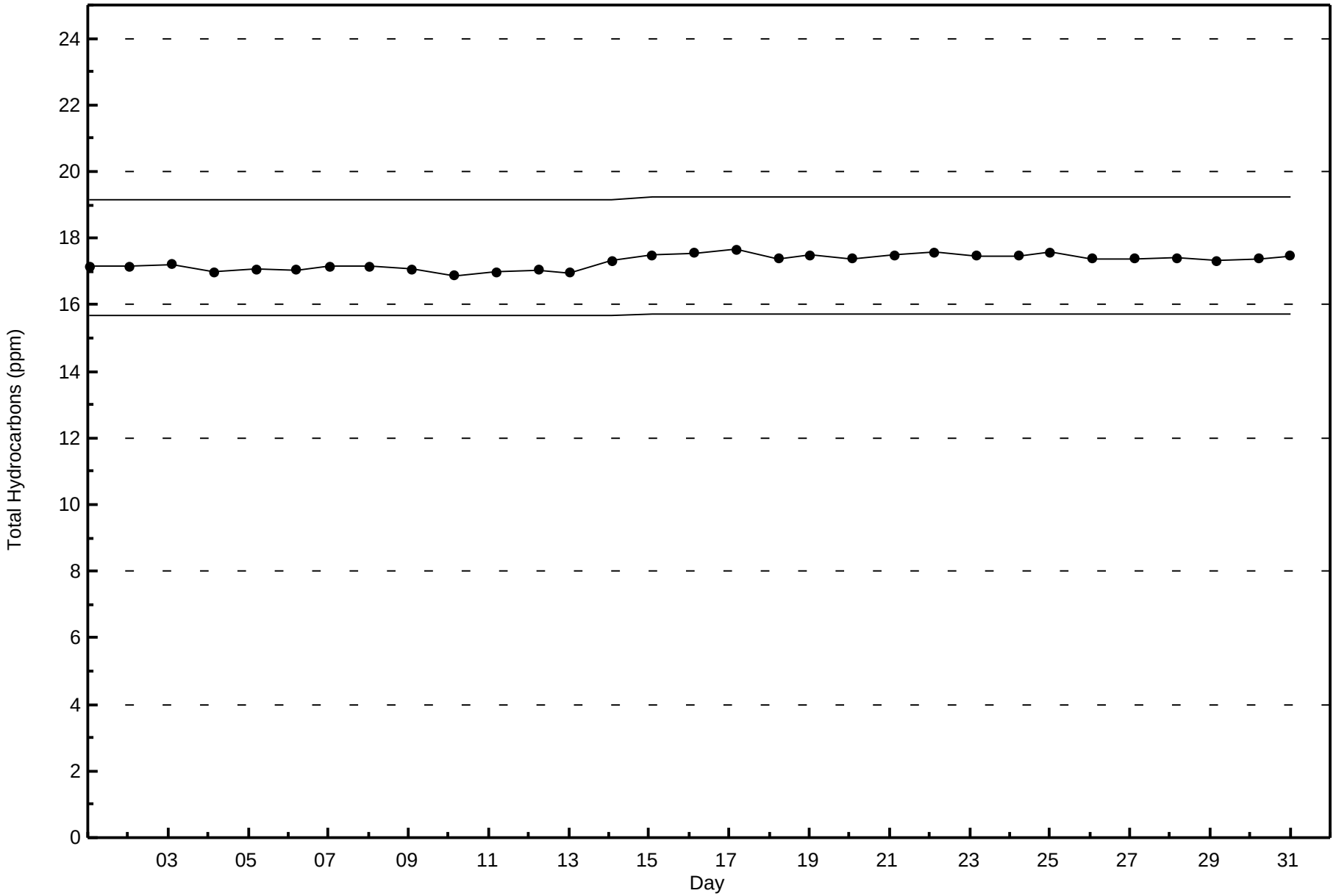


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Lower Camp - January 2016



Maximum Value: 6.1 C on Jan 29 15:00

Maximum Daily Average: 3.2 C on Jan 29

Minimum Value: -34.5 C on Jan 16 06:00

Minimum Daily Average: -30.8 C on Jan 16

Maximum Diurnal Average: -10.9 C at hour 15

Minimum Diurnal Average: -14.6 C at hour 9

Monthly Average: -13.26 C

Percentiles: P_1 = -33.0 P_{10} = -22.2 Q_1 = -18.1 Median = -13.7 Q_3 = -8.3 P_{90} = -2.6 P_{99} = 5.1

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

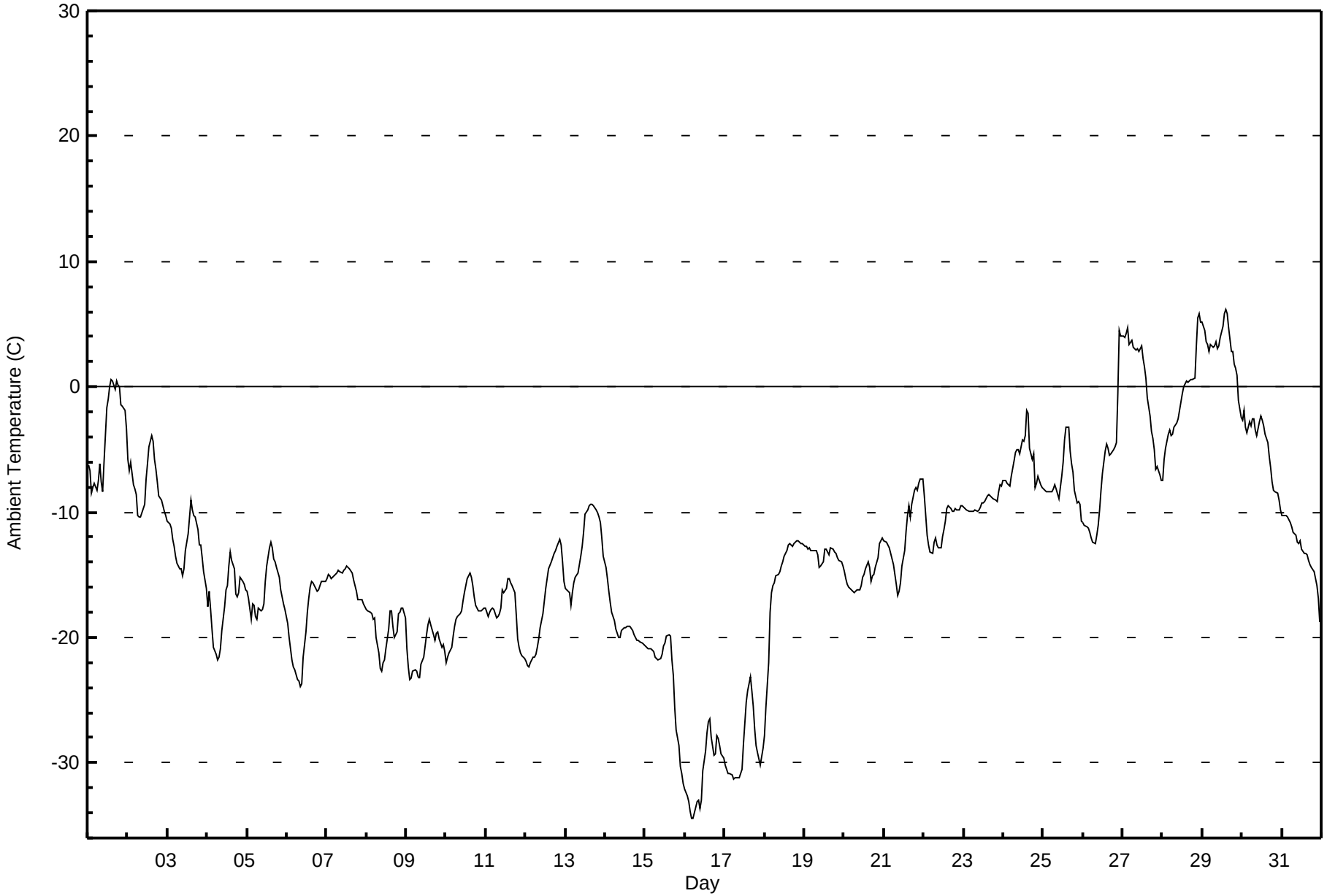
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-6.3	-6.7	-8.5	-8.0	-7.7	-8.3	-7.5	-6.1	-7.6	-8.3	-6.0	-1.7	-1.0	0.0	0.6	0.5	-0.2	0.5	0.1	0.1	-1.4	-1.6	-1.9	-3.3	-3.8	0.6
2-Jan	-5.8	-6.6	-6.1	-7.8	-8.2	-8.6	-10.3	-10.4	-10.4	-9.7	-9.3	-7.4	-6.1	-4.8	-3.9	-4.4	-5.8	-6.6	-7.6	-8.7	-9.0	-9.5	-10.0	-10.3	-7.8	-3.9
3-Jan	-10.7	-11.0	-11.2	-12.2	-12.7	-13.5	-14.1	-14.5	-14.5	-15.0	-14.5	-13.1	-11.7	-10.4	-9.0	-9.8	-10.3	-10.4	-11.4	-12.6	-12.7	-13.7	-14.8	-16.1	-12.5	-9.0
4-Jan	-17.5	-16.3	-17.8	-19.3	-20.8	-21.3	-21.8	-21.6	-20.9	-19.4	-17.6	-16.2	-15.8	-14.3	-13.2	-13.8	-14.5	-16.5	-16.8	-16.5	-15.2	-15.5	-15.8	-16.2	-17.3	-13.2
5-Jan	-16.3	-16.9	-18.6	-17.3	-17.4	-18.3	-18.5	-17.7	-17.9	-17.7	-17.4	-15.5	-14.3	-12.9	-12.4	-12.8	-13.7	-14.0	-14.4	-15.2	-16.2	-16.8	-17.3	-17.8	-16.1	-12.4
6-Jan	-18.8	-20.0	-20.9	-21.8	-22.4	-22.6	-23.3	-23.5	-24.0	-23.7	-21.6	-19.6	-18.0	-16.9	-15.9	-15.6	-15.7	-16.1	-16.3	-16.2	-15.8	-15.5	-15.5	-15.5	-19.0	-15.5
7-Jan	-15.3	-14.9	-15.1	-15.3	-15.1	-15.0	-14.9	-14.7	-14.7	-14.8	-14.7	-14.5	-14.3	-14.4	-14.6	-14.9	-15.5	-15.8	-16.3	-16.9	-16.9	-17.0	-17.3	-17.5	-15.4	-14.3
8-Jan	-17.8	-17.9	-18.0	-18.1	-18.5	-18.4	-20.0	-21.2	-22.5	-22.7	-22.1	-21.8	-20.9	-19.3	-17.9	-17.9	-19.1	-20.0	-19.5	-18.1	-17.9	-17.6	-17.6	-18.4	-19.3	-17.6
9-Jan	-20.9	-22.3	-23.3	-23.2	-22.7	-22.6	-22.7	-23.1	-23.3	-22.1	-21.6	-20.7	-19.8	-19.0	-18.5	-19.0	-19.8	-20.2	-19.6	-19.6	-20.1	-20.8	-20.5	-21.1	-21.1	-18.5
10-Jan	-22.0	-21.6	-21.2	-20.7	-19.9	-19.1	-18.6	-18.3	-18.1	-17.8	-17.1	-16.4	-15.9	-15.3	-14.9	-15.2	-15.8	-16.7	-17.4	-17.9	-17.9	-17.9	-17.8	-17.6	-18.0	-14.9
11-Jan	-17.6	-18.3	-18.0	-17.7	-17.6	-17.8	-18.4	-18.3	-18.2	-17.6	-16.2	-16.5	-16.1	-15.3	-15.4	-15.7	-15.9	-16.5	-18.2	-20.1	-20.7	-21.2	-21.5	-21.7	-17.9	-15.3
12-Jan	-21.9	-22.2	-22.4	-22.1	-21.6	-21.5	-21.3	-20.8	-20.1	-19.3	-18.1	-17.1	-16.0	-15.3	-14.5	-13.9	-13.6	-13.3	-13.1	-12.8	-12.1	-12.7	-13.9	-15.6	-17.3	-12.1
13-Jan	-16.1	-16.3	-16.4	-17.5	-16.4	-15.6	-15.2	-14.9	-14.1	-13.5	-12.8	-11.7	-10.1	-9.8	-9.5	-9.3	-9.4	-9.5	-9.8	-10.1	-10.4	-10.8	-12.1	-13.5	-12.7	-9.3
14-Jan	-14.4	-15.3	-16.4	-17.2	-17.9	-18.6	-19.3	-19.7	-20.0	-20.0	-19.5	-19.2	-19.2	-19.1	-19.1	-19.2	-19.4	-19.8	-20.0	-20.2	-20.3	-20.4	-20.4	-20.5	-19.0	-14.4
15-Jan	-20.7	-20.8	-20.9	-20.9	-21.0	-21.2	-21.6	-21.7	-21.8	-21.7	-21.3	-20.7	-20.4	-19.9	-19.7	-19.9	-21.8	-23.0	-25.6	-27.4	-28.7	-30.2	-30.8	-31.6	-23.1	-19.7
16-Jan	-32.1	-32.7	-33.1	-33.9	-34.4	-34.5	-34.0	-33.1	-33.0	-33.7	-33.0	-30.7	-29.1	-27.6	-26.7	-26.5	-28.0	-29.4	-29.3	-27.8	-28.1	-28.6	-29.3	-29.7	-30.8	-26.5
17-Jan	-30.2	-30.5	-30.8	-30.9	-31.0	-31.3	-31.2	-31.2	-31.2	-31.1	-30.5	-28.6	-26.8	-25.1	-24.2	-23.2	-24.3	-25.5	-27.3	-28.6	-29.2	-30.2	-29.5	-28.9	-28.8	-23.2
18-Jan	-27.8	-25.6	-22.0	-18.0	-16.4	-15.8	-15.6	-15.1	-14.9	-14.7	-14.3	-14.0	-13.5	-13.1	-12.7	-12.5	-12.7	-12.7	-12.5	-12.3	-12.3	-12.3	-12.5	-12.5	-15.2	-12.3
19-Jan	-12.7	-12.8	-12.9	-12.9	-13.1	-13.1	-13.1	-13.1	-13.4	-14.4	-14.3	-13.9	-12.9	-13.0	-13.2	-13.4	-12.9	-12.9	-13.1	-13.3	-13.7	-13.8	-14.0	-14.3	-13.3	-12.7
20-Jan	-14.7	-15.4	-15.7	-16.0	-16.2	-16.3	-16.4	-16.3	-16.2	-16.2	-15.8	-15.2	-15.0	-14.5	-14.0	-14.5	-15.5	-15.1	-15.0	-14.4	-13.7	-12.5	-12.3	-12.1	-15.0	-12.1
21-Jan	-12.3	-12.4	-12.7	-12.9	-13.3	-13.7	-14.2	-15.7	-16.7	-16.3	-15.6	-14.3	-13.1	-11.5	-10.3	-9.4	-10.4	-9.3	-8.2	-8.0	-8.3	-7.7	-7.4	-7.4	-11.7	-7.4
22-Jan	-8.8	-10.2	-11.8	-12.6	-13.1	-13.2	-12.4	-12.0	-12.6	-12.8	-12.9	-11.9	-11.4	-10.7	-9.8	-9.5	-9.7	-10.0	-9.9	-9.8	-9.9	-9.8	-9.5	-9.4	-11.0	-8.8
23-Jan	-9.5	-9.7	-9.8	-9.9	-9.9	-9.9	-9.9	-9.9	-9.9	-9.8	-9.6	-9.2	-9.2	-9.2	-8.7	-8.6	-8.7	-8.8	-9.0	-9.1	-9.1	-8.4	-7.8	-8.0	-9.2	-7.8
24-Jan	-7.5	-7.5	-7.7	-7.8	-8.0	-7.1	-5.9	-5.2	-5.1	-5.0	-5.3	-4.3	-4.3	-3.9	-1.9	-2.1	-5.0	-5.8	-5.3	-8.1	-7.7	-7.2	-7.8	-8.0	-6.0	-1.9
25-Jan	-8.2	-8.3	-8.4	-8.3	-8.4	-8.4	-8.2	-7.8	-8.2	-8.9	-8.1	-7.2	-6.0	-4.3	-3.2	-3.2	-5.1	-6.1	-6.8	-8.2	-9.3	-9.1	-9.4	-10.8	-7.5	-3.2
26-Jan	-10.8	-11.1	-11.2	-11.2	-11.6	-12.0	-12.4	-12.5	-11.8	-11.0	-9.8	-8.2	-6.9	-5.1	-4.6	-4.9	-5.4	-5.4	-5.0	-4.8	-4.4	-0.5	4.5	4.0	-7.2	4.5
27-Jan	4.0	3.9	4.3	4.8	3.3	3.7	3.2	3.0	2.9	3.0	2.8	3.2	2.2	1.6	0.7	-0.8	-2.4	-3.6	-4.1	-5.0	-6.6	-6.4	-7.0	-7.4	0.1	4.8
28-Jan	-7.5	-5.8	-4.9	-3.8	-3.5	-3.9	-3.8	-3.2	-2.9	-2.5	-1.9	-1.2	-0.5	0.0	0.5	0.4	0.4	0.5	0.6	0.7	3.3	5.5	5.8	5.1	-0.9	5.8
29-Jan	5.1	4.5	3.6	3.3	2.9	3.4	3.1	3.2	3.6	3.0	3.3	3.9	4.9	5.9	6.1	5.8	4.7	2.8	2.8	1.8	1.4	0.9	-1.1	-2.5	3.2	6.1
30-Jan	-2.6	-1.8	-3.2	-3.7	-2.7	-3.1	-2.5	-2.5	-3.4	-3.8	-2.8	-2.4	-2.7	-3.1	-3.8	-4.4	-5.5	-6.5	-7.6	-8.3	-8.4	-8.5	-9.0	-9.8	-4.7	-1.8
31-Jan	-10.2	-10.3	-10.3	-10.4	-10.6	-10.9	-11.2	-11.6	-11.9	-12.4	-12.5	-12.3	-13.0	-13.3	-13.3	-13.4	-13.9	-14.2	-14.4	-14.8	-15.3	-15.8	-16.9	-18.7	-13.0	-10.2
	-13.8	-14.0	-14.2	-14.3	-14.4	-14.5	-14.6	-14.5	-14.6	-14.5	-13.9	-12.8	-12.2	-11.4	-10.9	-11.0	-11.8	-12.3	-12.6	-13.0	-13.1	-13.1	-13.2	-13.8	Diurnal Average	
	5.1	4.5	4.3	4.8	3.3	3.7	3.2	3.2	3.6	3.0	3.3	3.9	4.9	5.9	6.1	5.8	4.7	2.8	2.8	1.8	3.3	5.5	5.8	5.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Lower Camp - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	136	18.28	18.28
-20 - 0	553	74.33	92.61
0 - 10	55	7.39	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Lower Camp - January 2016

Maximum Value: 96 % on Jan 28 20:00

Maximum Daily Average: 89.7 % on Jan 28

Minimum Value: 53 % on Jan 29 15:00

Minimum Daily Average: 71.2 % on Jan 29

Maximum Diurnal Average: 82.4 % at hour 5

Minimum Diurnal Average: 75.7 % at hour 15

Monthly Average: 80.3 %

Percentiles: $P_1 = 60$ $P_{10} = 72$ $Q_1 = 76$ Median = 80 $Q_3 = 85$ $P_{90} = 89$ $P_{99} = 93$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

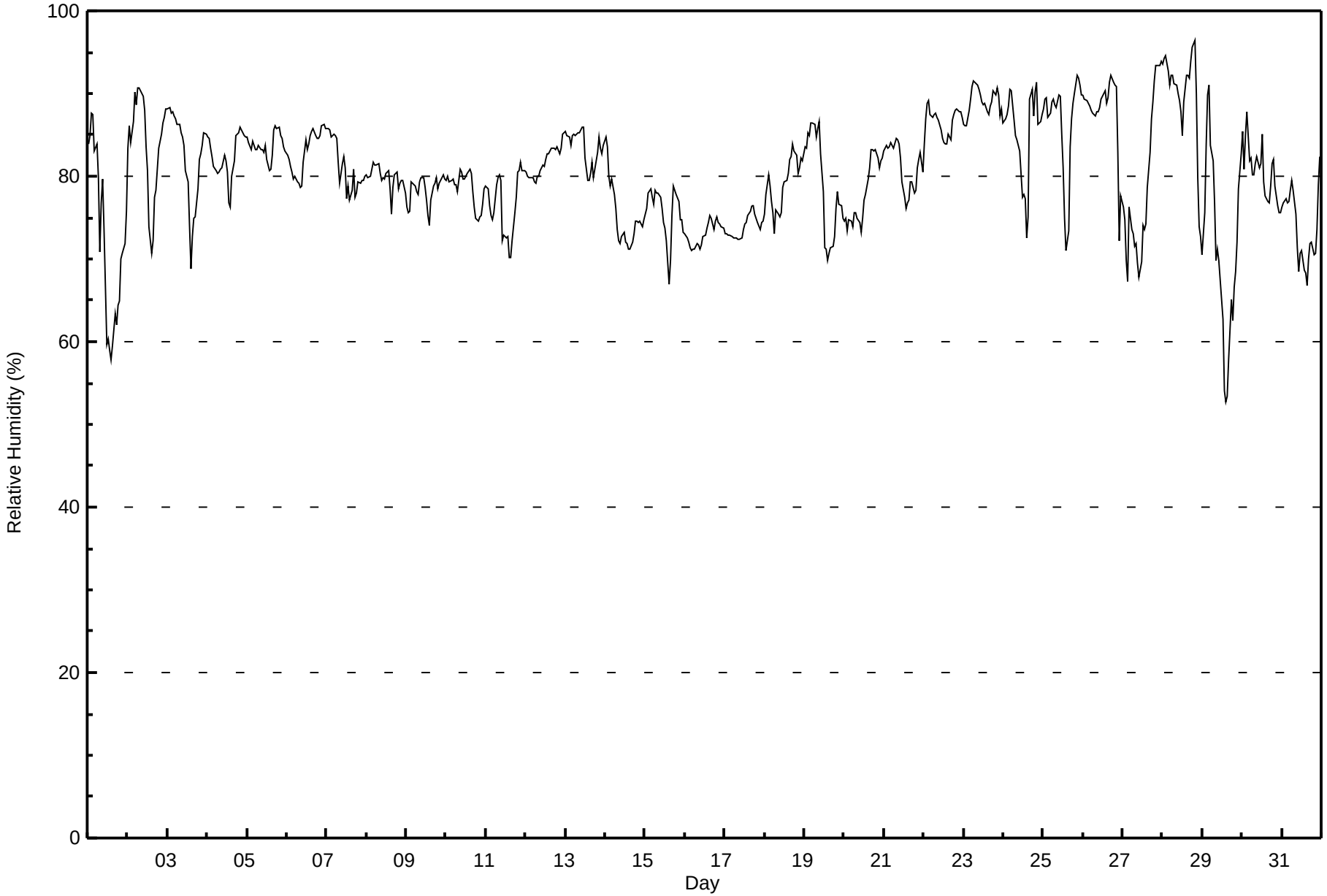
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	84	85	88	88	83	84	80	71	77	80	74	60	60	59	58	60	63	62	64	65	70	71	72	76	72.1	88
2-Jan	83	86	84	87	90	89	91	91	90	90	88	84	81	74	71	72	78	78	81	83	85	87	87	88	84.0	91
3-Jan	88	88	88	88	87	87	86	86	85	85	84	81	79	74	69	73	75	75	78	82	83	84	85	85	82.3	88
4-Jan	85	84	83	82	81	81	80	81	81	81	82	82	80	77	76	80	82	85	85	85	86	85	85	85	82.3	86
5-Jan	85	84	83	84	84	83	83	84	83	83	83	84	82	81	81	83	86	86	86	86	85	85	84	83	83.7	86
6-Jan	83	82	81	80	80	80	79	79	79	79	82	84	83	84	85	86	86	85	85	85	85	86	86	86	82.9	86
7-Jan	86	86	86	85	85	85	85	82	79	81	82	81	77	79	77	78	81	78	78	79	79	79	79	80	81.1	86
8-Jan	80	80	80	81	82	81	81	81	80	79	80	80	80	81	78	75	79	80	81	78	79	80	79	78	79.8	82
9-Jan	76	76	76	79	79	79	78	78	79	80	80	79	77	75	74	77	79	79	80	78	79	80	80	80	78.2	80
10-Jan	79	80	79	80	80	79	79	78	81	80	80	80	80	80	81	80	78	76	75	75	75	75	77	78	78.6	81
11-Jan	79	78	76	75	75	76	79	80	80	79	72	73	73	73	70	70	72	76	77	81	81	82	81	81	76.6	82
12-Jan	80	80	80	80	80	79	79	80	80	81	81	81	82	83	83	83	83	83	83	83	83	83	85	85	81.8	85
13-Jan	85	85	85	84	85	85	85	85	85	86	86	86	82	79	79	80	82	80	82	83	85	83	83	84	83.5	86
14-Jan	85	84	80	79	80	78	76	74	72	72	73	73	72	72	71	71	72	73	75	75	74	75	74	75	75.1	85
15-Jan	75	76	78	79	78	77	78	78	78	77	76	74	74	72	67	70	75	79	78	78	77	75	75	73	75.7	79
16-Jan	73	72	72	71	71	71	71	72	72	71	72	73	73	74	74	75	75	74	75	75	74	74	74	74	73.0	75
17-Jan	73	73	73	73	73	73	73	73	72	72	73	74	74	74	75	76	76	76	75	75	74	74	74	75	73.9	76
18-Jan	75	78	80	79	77	76	73	76	75	75	76	79	79	80	80	82	82	84	83	83	80	81	82	82	79.0	84
19-Jan	84	83	85	85	86	86	86	85	86	87	83	78	71	71	70	71	71	72	73	76	78	77	76	75	79.0	87
20-Jan	75	75	73	75	75	74	76	76	75	74	73	75	77	78	80	81	83	83	83	83	82	81	82	82	77.9	83
21-Jan	83	84	83	84	84	84	83	85	84	84	82	79	77	76	77	77	79	79	78	78	81	82	83	81	81.2	85
22-Jan	84	87	89	89	87	87	88	88	87	87	86	85	84	84	84	85	84	87	87	88	88	88	88	87	86.5	89
23-Jan	86	86	86	88	89	91	92	91	91	91	90	89	89	89	88	87	88	89	90	90	91	90	87	88	89.0	92
24-Jan	86	87	88	88	90	90	87	85	84	84	83	77	78	77	73	75	89	90	87	90	91	86	87	88	85.1	91
25-Jan	88	89	89	87	88	89	89	89	88	90	90	85	81	75	71	73	84	87	89	90	92	92	91	90	86.5	92
26-Jan	90	89	89	89	88	88	88	87	88	88	88	89	90	90	89	90	91	92	91	91	91	83	72	78	87.9	92
27-Jan	76	75	70	67	76	74	73	72	72	69	68	70	74	74	74	79	83	87	89	92	93	93	93	94	78.6	94
28-Jan	94	94	95	93	91	92	92	91	91	90	89	88	85	89	92	92	92	94	96	96	90	80	74	73	89.7	96
29-Jan	70	76	84	90	91	84	82	77	70	71	70	68	63	54	53	53	58	65	63	67	69	72	79	83	71.2	91
30-Jan	85	81	85	88	82	82	80	80	82	82	81	81	85	79	78	77	77	79	82	82	79	76	76	76	80.6	88
31-Jan	76	77	77	77	77	78	79	78	75	71	69	71	71	69	68	67	70	72	72	71	71	73	79	82	73.8	82
	81.7	81.9	82.1	82.3	82.4	81.9	81.7	81.0	80.8	80.6	79.8	78.7	77.9	76.6	75.7	76.7	79.2	80.2	80.7	81.4	81.6	81.0	80.9	81.3	Diurnal Average	
	94	94	95	93	91	92	92	91	91	91	90	89	90	90	92	92	92	94	96	96	93	93	93	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Lower Camp - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Lower Camp - January 2016

Maximum Speed: 27 km/h on Jan 27 00:00

Maximum Daily Speed Average: 12.6 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 12 22:00

Minimum Daily Speed Average: 0.8 km/h on Jan 8

Maximum Diurnal Speed Average: 2.7 km/h at hour 5

Minimum Diurnal Speed Average: 0.5 km/h at hour 15

Monthly Average Velocity: 1.1 km/h 139.4 deg

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 4$ Median = 7 $Q_3 = 11$ $P_{90} = 14$ $P_{99} = 23$

Hours in Service: 744

Hours of Data: 743

Hours of Missing Data: 1

Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SE10	SE10	SE10	SE9	SE10	SE11	SE9	SSW8	SE12	SE14	S8	W23	W24	W19	W24	W20	W15	W23	W26	WSW21	W12	WSW20	WSW20	W4	SW9.4	WSW26
2-Jan	ENE5	E2	WSW0	SSE6	SE10	SE9	SE7	SE9	SE10	SE12	SE13	SE12	SE13	SE11	SE8	SE6	SE3	SE9	SE11	SE9	SE12	SE13	SE13	SE17	SE9.0	SE17
3-Jan	SE15	SE14	SE14	SE14	SE18	SE15	SE13	SE12	SE16	SE17	SE14	ESE13	SE14	SE10	SE9	SE12	SE15	SE12	SE11	SE6	SE10	SE8	SE8	SE2	SE12.2	SE18
4-Jan	SE6	SE7	SE2	NNW1	NNW1	NW1	NW1	NW1	WNW2	NNE1	SE4	SE8	SE8	SE8	SE10	SE9	SE7	SE5	SE7	SE8	SE10	SE11	SE12	SE11	SE5.2	SE12
5-Jan	SE10	SE7	ESE5	SE9	SE7	SE4	SE6	SE9	SE9	SE8	SE9	SE7	SE8	SE5	SE5	SW2	WNW3	WNW4	NW6	NW4	NW3	WNW2	WNW1	NW2	SE3.5	SE10
6-Jan	NW2	WNW3	WNW3	WNW2	NW2	WNW2	WNW2	WNW3	WNW3	NW2	WNW2	WNW4	NW5	NW4	NW4	NNW7	N8	NNW6	NNW6	NW7	NNW7	NNW9	NNW8	NNW7	NW4.3	NNW9
7-Jan	NW5	N9	NNW9	NNW7	NW5	WNW3	WNW4	NNW6	N7	NNW3	NNW3	NW5	NW6	NW8	NW9	WNW7	W10	W11	W12	W9	WSW8	WNW6	N7	N8	NW5.7	W12
8-Jan	N7	N5	N5	NNW5	NW3	W5	WNW2	NW2	NNW2	NW2	WNW3	NW3	N2	NNW2	N1	SSE3	SE2	SSE1	M	S5	S4	S5	S6	SSE8	WNW0.8	SSE8
9-Jan	SSE10	SSE11	SE11	SE11	SE12	SE11	SE13	SE11	ESE4	SE11	SE14	SE14	SE13	SE12	SE13	SE7	SE8	SE12	SE12	SE13	SE13	SE13	SE14	SE13	SE11.5	SE14
10-Jan	SE13	SE15	SE14	SE12	SE13	SE11	SE10	ESE5	SE8	ESE5	ESE2	SE2	NNW4	NW5	NW7	NW9	N13	N12	NNE13	NNE6	NE1	N3	NW4	NNW4	E2.9	SE15
11-Jan	NNW7	NW7	NW9	NW6	NW4	NW5	N1	W1	NW3	NW4	WSW12	WSW14	WSW9	WSW10	WSW14	WSW14	W8	WSW4	SW4	S3	N1	SE3	SE2	ESE2	W4.5	WSW14
12-Jan	SE8	SE9	SE9	SE8	SE7	SE5	SE5	SE6	SE5	SE5	SE5	SE5	SE4	SE6	SE5	SE6	SE9	ESE7	E4	SE5	ESE3	NW0	SW2	SSE2	SE5.2	SE9
13-Jan	ESE2	WNW2	WNW4	SE1	NW1	WNW3	NW3	WNW4	NW3	WNW4	NW3	WNW4	NE3	E9	ENE7	E5	ENE5	ENE6	N3	NNW4	NNW5	N8	NNW11	NNW10	N2.6	NNW11
14-Jan	N16	N17	N16	N13	NNW14	NNW12	N14	N13	N10	N8	N9	N11	N14	N12	N15	N16	N14	NNE13	N12	N12	NNE13	NNE10	NE9	NE5	N12.2	N17
15-Jan	NNE4	NNE3	NW3	NW6	NW7	N4	NW5	NW4	NNW4	WNW5	NNW3	NNW5	NW6	W5	NW5	N8	NW3	NW4	NW3	NW2	NW2	NW2	NW3	WNW2	NW3.6	N8
16-Jan	NNW1	NW2	NW2	NW2	NW2	NNW1	NNW1	NE1	E1	ENE0	SSE1	SSE3	SE4	SE5	SE6	ESE5	NNE1	NE1	SE1	SE3	SE3	SSE6	SE9	SE8	SE1.8	SSE9
17-Jan	SSE5	SE9	SE8	SE9	SE8	SE11	SE9	SE10	SE10	SE8	SSE6	SE11	SE6	ESE2	SE5	SE6	SE3	SSE1	NE1	NW2	W2	NW2	WNW3	NNW2	SE4.9	SE11
18-Jan	SE1	ESE1	ESE5	ESE14	SE18	ESE22	ESE21	SE17	SE15	SE15	SE15	SE11	ESE11	ESE8	ESE7	ESE8	ESE6	E3	E4	SE6	SE8	SSE5	SE7	SE7	SE9.6	ESE22
19-Jan	SE7	ENE2	ESE1	ESE1	NW2	NNW2	NNW2	NNW4	NW5	WNW3	NW6	NNW6	NNW9	NW7	N10	N8	N5	N7	NNW7	NNW6	NNW6	N6	NE6	NNE7	N4.2	N10
20-Jan	N9	N9	NNW9	NNW7	N7	NNW6	NW7	NW6	NNW6	N6	NNW4	WNW1	NW3	NNW2	NW3	WSW4	WSW2	WNW2	WSW1	NNW2	NNW1	ESE2	SE3	SE9	NNW3.0	N9
21-Jan	SE11	SE11	SE12	ESE8	SE10	SE12	SE11	SE10	SE8	SE8	SE9	SE7	SE7	SSE7	ESE13	ESE15	ESE14	ESE18	ESE19	ESE18	SE10	SE18	SE15	S8	SE11.4	ESE19
22-Jan	SSE8	SE4	SE3	SE5	W3	NNE2	SE3	E1	NW2	WNW5	NW4	NW5	NNW5	NNW7	NNW7	NW7	NNW7	NW7	NNW6	NNW6	NW6	NNW5	N7	NNW7	NNW2.9	SSE8
23-Jan	NNW7	NNW6	NNW6	NNW5	NW5	NW6	NW6	NW6	NW4	NW4	NW4	NW4	N6	N5	WNW2	W3	W3	WNW3	NNW0	SSW0	SSE0	SE6	SSE5	SE9	NW2.5	SE9
24-Jan	ESE5	SE9	ESE8	SE10	SE10	SSE3	SW8	WSW12	WSW11	WSW13	SW6	SSE2	SW4	NNE1	SE3	SSE5	SSE4	S2	W8	WNW7	NNW10	N14	N12	NNW8	SW1.4	N14
25-Jan	NW4	NW4	NE2	NNW3	SW1	SE4	S5	SSE6	S8	S8	SSE10	SSE10	SSE10	SSE9	SSE10	SSE7	SE8	SE12	SE12	SE11	SE14	SE14	SE11	SE13	SSE6.9	SE14
26-Jan	SE14	SE11	SE12	SE10	SE11	SE12	SE11	SE11	SE12	SE17	SE15	SE16	SE15	SE14	SE17	SE18	SE16	SE14	SE18	SE19	SE15	WSW9	W27	W27	SSE11.2	W27
27-Jan	W26	W23	W19	WNW14	SSE5	WSW19	W16	W19	W18	WSW20	W16	NNW10	NNW8	NNW10	NNW10	NNW10	NNW9	NW4	WNW4	WSW4	SSE2	S1	WSW0	NW0	W9.1	W26
28-Jan	E0	SE1	SSE2	SE9	ESE7	WNW4	NW1	E3	SE8	SE12	SE15	SE12	SE6	ESE4	SE5	SE13	SE15	SE14	SE13	SE14	WSW7	WSW13	WSW20	W14	SSE5.4	WSW20
29-Jan	WSW17	W17	W18	WNW17	W9	WNW12	NW13	NW13	WNW24	WNW14	W12	W11	W9	WNW15	WNW19	WNW12	W12	WSW11	WSW16	W12	WSW12	W10	WNW8	NNW3	W12.6	WNW24
30-Jan	NE1	NNW1	ESE0	SSE4	SSW6	W7	W11	WNW6	WNW8	W5	NW4	NNW7	N10	NNE13	NNE14	NNE13	NNE13	NNE14	NNE15	NNE11	NNE8	N8	NNE9	NNE9	N5.6	NNE15
31-Jan	NNE4	NNE4	NNE6	NNE9	NNE9	NNE9	NNE10	NNE10	N11	NNE14	NNW11	NNE12	NNE14	N15	NNE15	NNE13	NNE11	NNE9	NNE9	NNE7	NNE7	NNE6	NW1	NNW2	NNE8.9	N15
	SE1.5	SE1.4	ESE1.0	SE1.8	SE2.7	SE1.7	SSE1.4	SSE1.0	S1.2	SSE2.2	SSE2.2	SSE1.4	ESE0.7	NE0.6	ENE0.5	E0.9	ENE1.1	E0.8	ESE0.6	SE1.2	SE1.1	SSE0.7	SSW0.9	SSE0.7		Diurnal Average	
	W26	W23	W19	WNW17	SE18	ESE22	ESE21	W19	WNW24	WSW20	W16	W23	W24	W19	W24	W20	SE16	W23	WSW26	WSW21	SE15	WSW20	W27	W27		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

Lower Camp - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 26 22:00

Minimum Value: 0 km/h on Jan 8 14:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 3$ $P_{99} = 6$

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

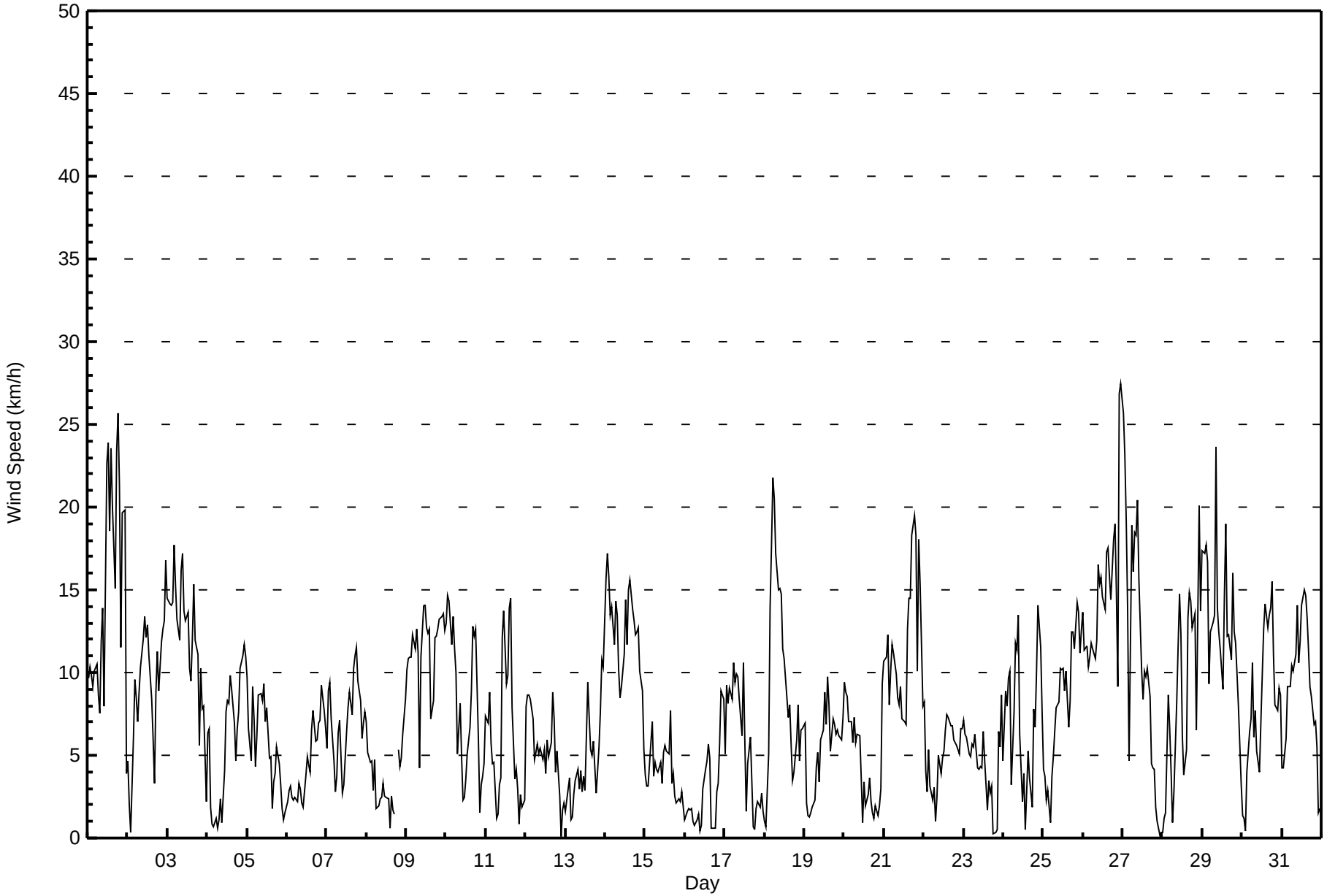
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Lower Camp - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	278	37.42	37.42
6 - 11	287	38.63	76.04
12 - 19	160	21.53	97.58
20 - 28	18	2.42	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

Lower Camp - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	11	8	8	4	9	19	38	18	7	1	5	7	9	36	64	34	278
6 - 11	25	19	2	2	1	9	116	16	5	2	2	7	11	6	22	42	287
12 - 19	18	14	0	0	0	8	83	0	0	0	0	11	15	7	2	2	160
20 - 28	0	0	0	0	0	2	0	0	0	0	0	6	9	1	0	0	18
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	54	41	10	6	10	38	237	34	12	3	7	31	44	50	88	78	743

Total Number of Valid Hours: 743

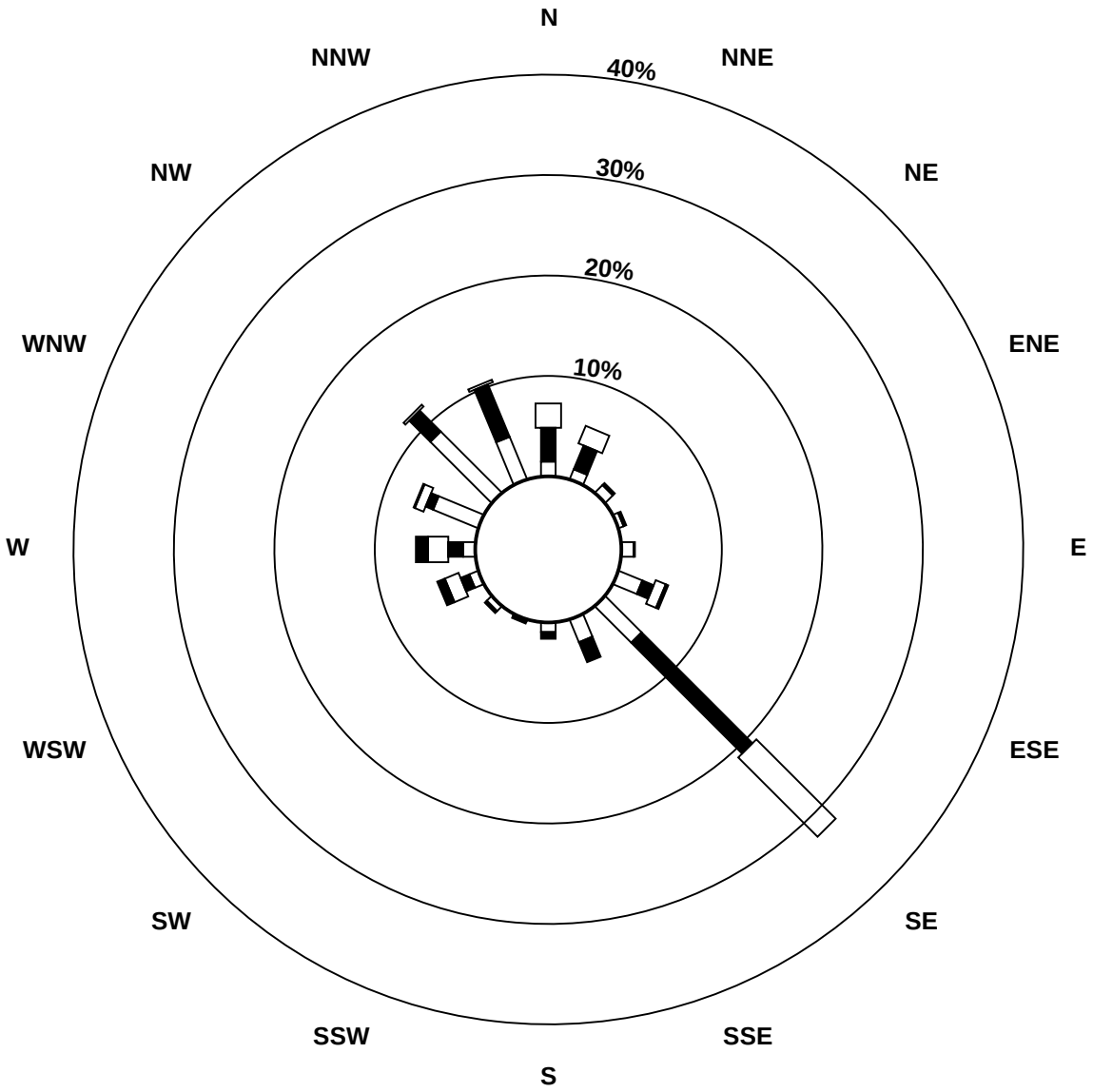
Total Number of Hours: 744

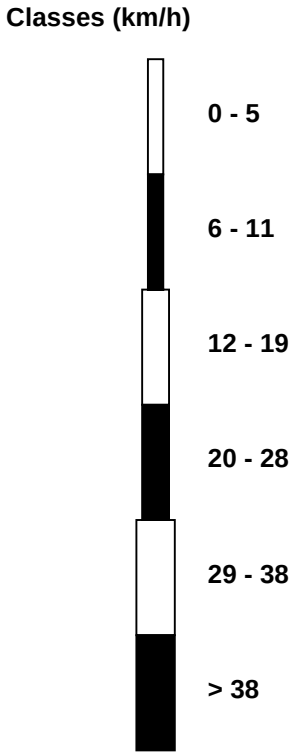
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

Lower Camp (AMS 11)





Total Number of Valid Hours: 743

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Lower Camp - January 2016

Direction of Maximum Speed: 264 deg on Jan 27 00:00
Direction of Maximum Daily Speed Average: 278.6 deg on Jan 29

Direction of Minimum Speed: 312 deg on Jan 12 22:00

Direction of Minimum Daily Speed Average: 0.8 deg on Jan 8

Monthly Average Direction: 306.0 deg

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	144	140	134	139	141	138	146	194	142	138	188	265	261	264	259	268	275	263	259	250	264	252	249	266	235.3
2-Jan	70	88	248	153	143	134	135	135	135	140	137	137	133	137	141	141	125	136	136	132	136	137	135	130	135.0
3-Jan	132	137	132	130	135	135	133	138	138	136	128	121	133	137	141	138	139	139	140	140	142	139	138	134	135.2
4-Jan	131	144	142	327	348	309	319	326	301	17	127	139	143	144	143	138	141	131	128	131	142	145	145	143	139.6
5-Jan	143	134	122	142	140	124	134	145	144	146	143	144	138	140	144	215	294	290	319	325	307	288	301	312	145.0
6-Jan	309	298	298	299	306	296	302	297	293	315	302	300	314	316	321	332	353	327	331	316	332	346	343	342	323.8
7-Jan	320	352	345	333	310	286	303	330	6	344	343	322	311	321	315	291	272	262	269	259	243	301	351	351	308.9
8-Jan	358	9	354	330	310	275	287	312	333	320	298	324	357	329	351	167	135	165	M	191	174	188	183	165	282.1
9-Jan	158	149	141	136	138	137	136	140	120	137	134	133	134	132	137	132	129	134	129	133	138	132	135	138	136.3
10-Jan	135	132	131	135	133	132	130	117	131	119	121	126	334	307	321	325	360	4	14	14	48	352	320	333	89.7
11-Jan	342	320	310	304	317	309	355	275	314	319	257	253	251	239	248	246	264	255	220	187	359	131	134	119	268.3
12-Jan	132	136	133	133	137	144	145	144	144	139	139	136	135	131	128	125	125	122	96	140	119	312	223	161	134.2
13-Jan	116	295	302	126	320	301	307	293	313	294	318	284	49	79	76	79	70	69	5	342	338	353	330	336	356.7
14-Jan	355	6	359	352	348	343	351	358	357	3	1	358	9	4	1	359	6	12	8	5	20	32	34	35	3.1
15-Jan	27	17	310	316	320	2	304	308	328	303	327	345	313	270	326	2	307	315	315	311	310	312	310	297	323.0
16-Jan	348	314	304	311	309	341	341	41	92	65	165	148	133	134	135	116	33	44	125	132	145	151	146	144	134.9
17-Jan	158	142	146	143	143	141	138	137	138	142	147	134	139	121	142	139	143	155	48	317	272	317	291	345	142.1
18-Jan	131	120	123	123	125	123	120	131	128	128	136	136	119	108	107	116	115	98	94	136	131	165	133	139	125.2
19-Jan	136	75	120	105	322	346	328	327	325	294	320	331	341	319	356	8	351	353	339	338	345	2	35	13	349.5
20-Jan	9	351	348	330	359	334	309	319	348	350	336	291	307	331	308	246	243	298	241	328	334	102	132	128	339.1
21-Jan	138	133	130	121	127	129	134	136	135	138	138	145	143	152	118	120	117	117	117	115	135	134	135	172	129.7
22-Jan	161	131	133	129	269	32	124	80	307	286	314	316	340	346	327	339	333	325	331	339	321	332	354	346	334.6
23-Jan	344	339	334	332	317	311	319	316	322	319	309	317	351	355	289	271	277	292	344	202	154	143	149	138	322.7
24-Jan	109	129	117	131	131	162	232	238	237	241	220	152	230	16	133	152	153	173	275	285	336	2	5	345	218.7
25-Jan	316	315	39	345	223	145	180	150	189	172	168	166	160	159	150	162	144	142	140	134	135	140	140	137	150.7
26-Jan	140	139	139	138	139	137	137	136	137	138	138	135	139	136	135	134	135	137	137	137	134	237	262	264	148.2
27-Jan	264	259	275	286	167	258	264	271	262	253	272	342	343	343	340	341	331	313	283	251	147	174	256	326	279.2
28-Jan	83	129	149	134	120	297	307	88	142	144	139	135	131	122	139	135	139	133	139	135	243	256	251	264	156.9
29-Jan	254	261	267	292	273	292	309	305	288	287	270	268	276	297	292	283	277	258	258	265	255	267	299	348	278.6
30-Jan	39	330	115	164	213	273	271	286	287	274	305	345	4	21	12	30	20	13	17	27	31	359	30	21	0.2
31-Jan	17	23	29	18	23	31	28	33	9	16	345	17	18	9	14	20	30	16	15	24	18	30	323	334	17.6
	137.3	131.5	117.9	124.3	131.7	145.5	151.7	167.9	173.9	162.8	168.0	156.0	108.9	55.4	58.3	90.1	74.8	100.1	117.7	142.9	137.3	162.7	204.5	147.3	
	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

Lower Camp - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 102 deg on Jan 28 07:00

Minimum Value: 5 deg on Jan 25 21:00

Percentiles: P_1 = 7 P_{10} = 9 Q_1 = 12 Median = 17 Q_3 = 29 P_{90} = 62 P_{99} = 94

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Hours of Calibration:	0
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	16	8	10	13	19	19	22	33	10	10	63	12	11	13	11	12	17	11	10	12	35	13	9	90	90
2-Jan	42	82	100	40	12	17	13	10	10	11	9	9	9	8	14	19	48	14	7	12	9	9	7	6	100
3-Jan	8	7	10	10	6	7	8	7	8	7	11	11	12	10	11	9	9	11	13	18	12	14	15	78	78
4-Jan	14	19	72	76	82	40	84	73	32	72	20	9	12	12	11	11	19	12	12	13	12	13	13	14	84
5-Jan	12	21	29	14	14	28	16	14	12	15	12	14	6	12	14	58	27	25	15	14	28	30	65	62	65
6-Jan	51	49	38	54	38	33	33	19	29	33	41	22	16	18	21	17	20	18	18	12	20	18	18	18	54
7-Jan	13	20	21	20	22	34	30	18	29	48	24	18	21	20	11	16	10	11	11	14	13	17	19	17	48
8-Jan	22	14	22	16	45	20	61	41	43	33	19	23	21	27	90	28	49	81	M	19	25	26	26	23	90
9-Jan	18	15	20	10	7	8	8	36	66	7	8	9	11	9	10	34	16	8	14	11	8	9	9	8	66
10-Jan	6	8	8	9	9	14	12	20	11	17	33	38	34	14	18	14	16	12	14	17	60	20	25	24	60
11-Jan	16	20	11	16	10	25	18	72	39	37	11	11	13	17	11	11	16	30	18	77	94	66	77	64	94
12-Jan	15	11	11	12	13	20	20	18	19	14	19	17	21	22	13	19	13	38	29	29	74	98	51	53	98
13-Jan	47	55	23	81	29	35	39	14	26	23	27	28	68	13	13	14	35	17	55	37	26	17	15	19	81
14-Jan	16	16	15	18	17	18	17	18	19	17	17	17	14	14	13	16	16	14	16	17	12	9	10	11	19
15-Jan	11	20	23	13	15	71	23	36	28	10	22	22	24	18	18	12	37	17	26	41	32	36	24	66	71
16-Jan	50	34	44	43	33	75	51	78	66	75	83	33	18	13	10	24	79	79	53	42	19	16	15	17	83
17-Jan	19	15	15	11	10	8	10	9	11	11	14	11	18	59	34	14	45	90	95	34	44	43	37	47	95
18-Jan	86	90	30	13	8	8	10	15	15	16	13	13	10	12	19	14	17	19	23	21	23	39	16	15	90
19-Jan	13	46	41	46	49	41	41	15	10	12	14	18	18	21	16	16	36	18	18	16	16	26	14	14	49
20-Jan	15	19	17	19	20	18	9	11	18	17	29	83	31	40	24	14	54	50	64	64	66	55	87	12	87
21-Jan	9	10	8	25	12	9	9	9	8	9	7	13	18	23	16	9	8	7	8	9	28	14	16	30	30
22-Jan	24	82	68	22	69	67	27	78	46	17	31	27	21	19	14	16	14	14	16	17	15	15	16	17	82
23-Jan	17	17	14	17	12	12	12	11	13	9	10	17	16	17	40	13	15	16	92	82	82	11	23	13	92
24-Jan	37	16	39	12	14	63	80	11	10	10	45	59	44	74	51	24	55	68	31	32	16	17	16	19	80
25-Jan	24	27	30	26	60	21	30	19	24	34	27	23	23	26	19	20	14	12	9	9	5	8	15	9	60
26-Jan	9	9	9	10	10	8	10	9	9	7	8	7	9	8	8	8	11	9	8	7	8	76	11	11	76
27-Jan	11	11	12	18	67	13	13	10	10	9	22	23	20	18	16	16	21	33	23	65	76	72	95	92	95
28-Jan	85	98	69	18	80	58	102	72	19	13	8	9	12	25	21	8	9	9	7	8	86	15	12	13	102
29-Jan	14	12	12	10	17	21	12	19	11	16	12	13	22	12	11	16	13	12	13	14	26	29	35	47	47
30-Jan	80	102	87	59	53	58	23	40	29	21	36	18	21	16	16	15	21	13	19	15	22	20	15	17	102
31-Jan	23	21	17	15	25	17	19	15	16	16	17	20	16	16	17	16	12	15	16	15	20	25	52	62	62
	86	102	100	81	82	75	102	78	66	75	83	83	68	74	90	58	79	90	95	82	94	98	95	92	
	Diurnal Maximum																								

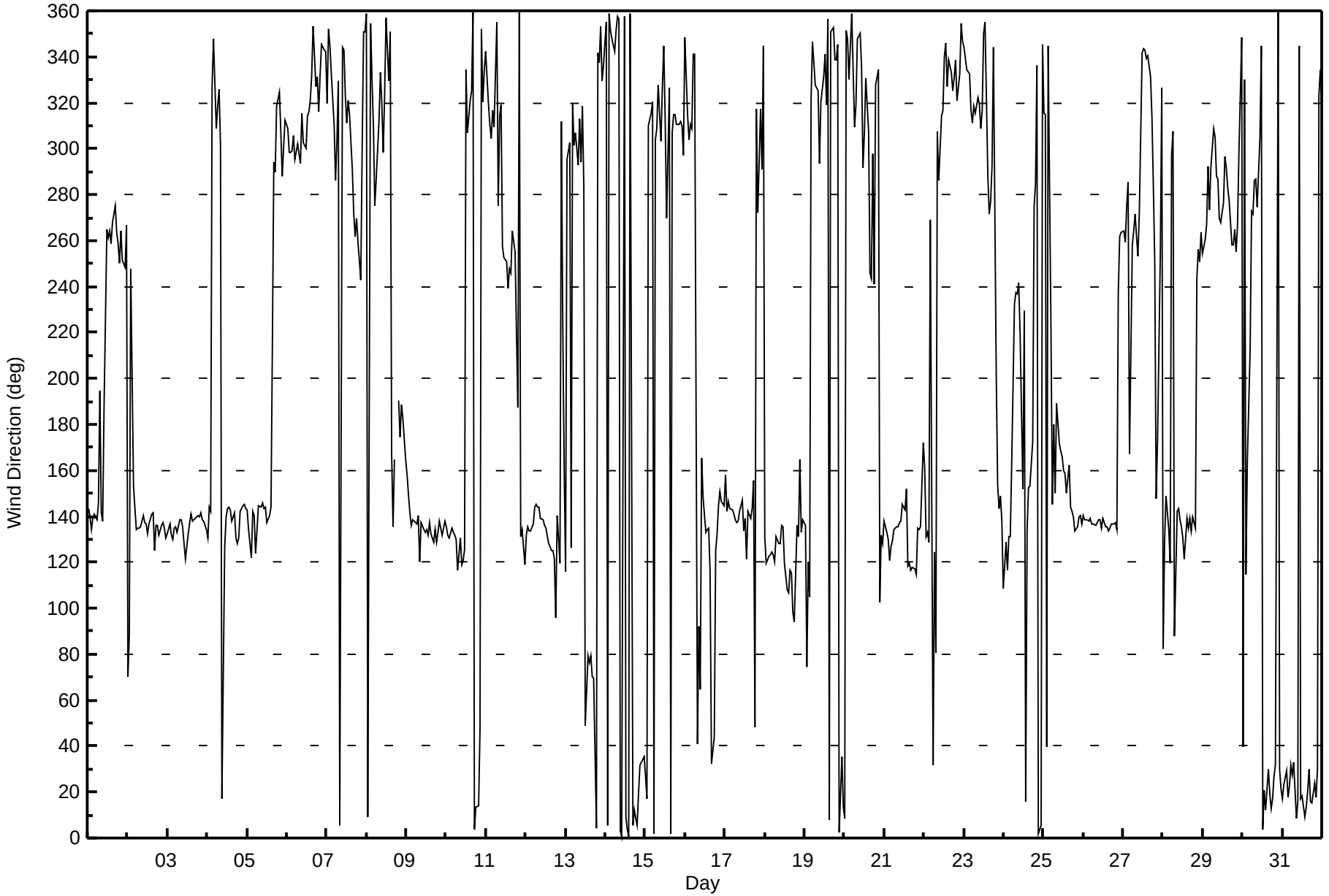
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Lower Camp - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 13, 2016	Last Calibration	December 7, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	14:50
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

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	801	806
Calculated slope	1.008953	0.995555	Chamber temp	44.9	45.0
Calculated intercept	0.976944	1.211378	Pressure	696.9	702.4
Analyzer Background	11.2	11.3	Flow	0.473	0.483
Analyzer Coefficient	1.013	1.025	Intensity	90	91

Analyzer make	TEI 43i	Analyzer serial #	100841398

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	80.9	830.0	820.2	1.012
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	80.9	830.0	833.0	0.996
second point	5000	40.9	419.6	419.8	1.000
third point	5000	20.5	210.3	209.0	1.007
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	80.9	830.0	831.6	0.998
				Average Correction Factor	1.001

Corrected As found	820.3	Previous response	821.7	% change	0.2%

Notes:

Changed inlet filter after as founds. Heavy loading on the filter. Adjusted span.

Calibration Performed By: Evan Magill

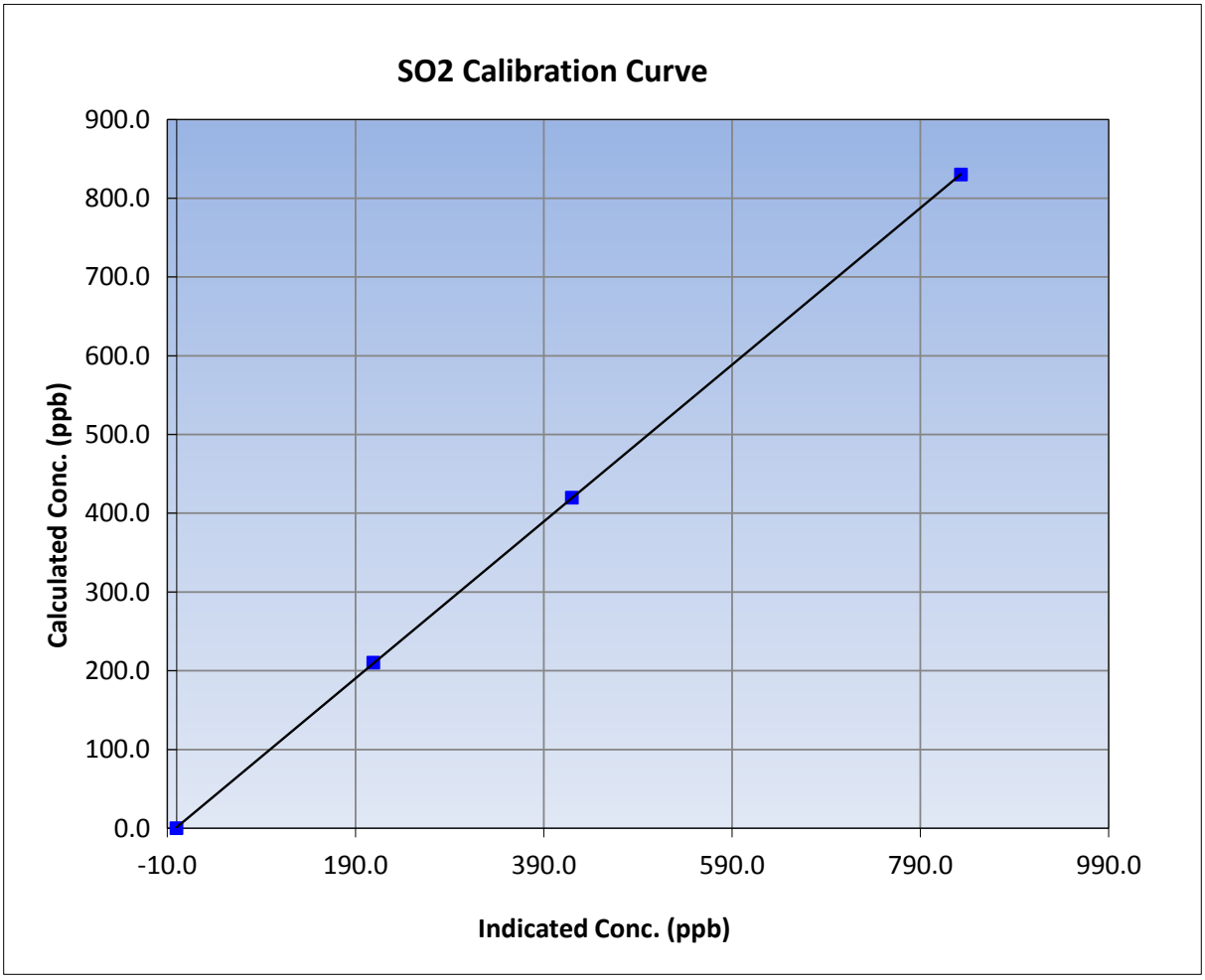
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

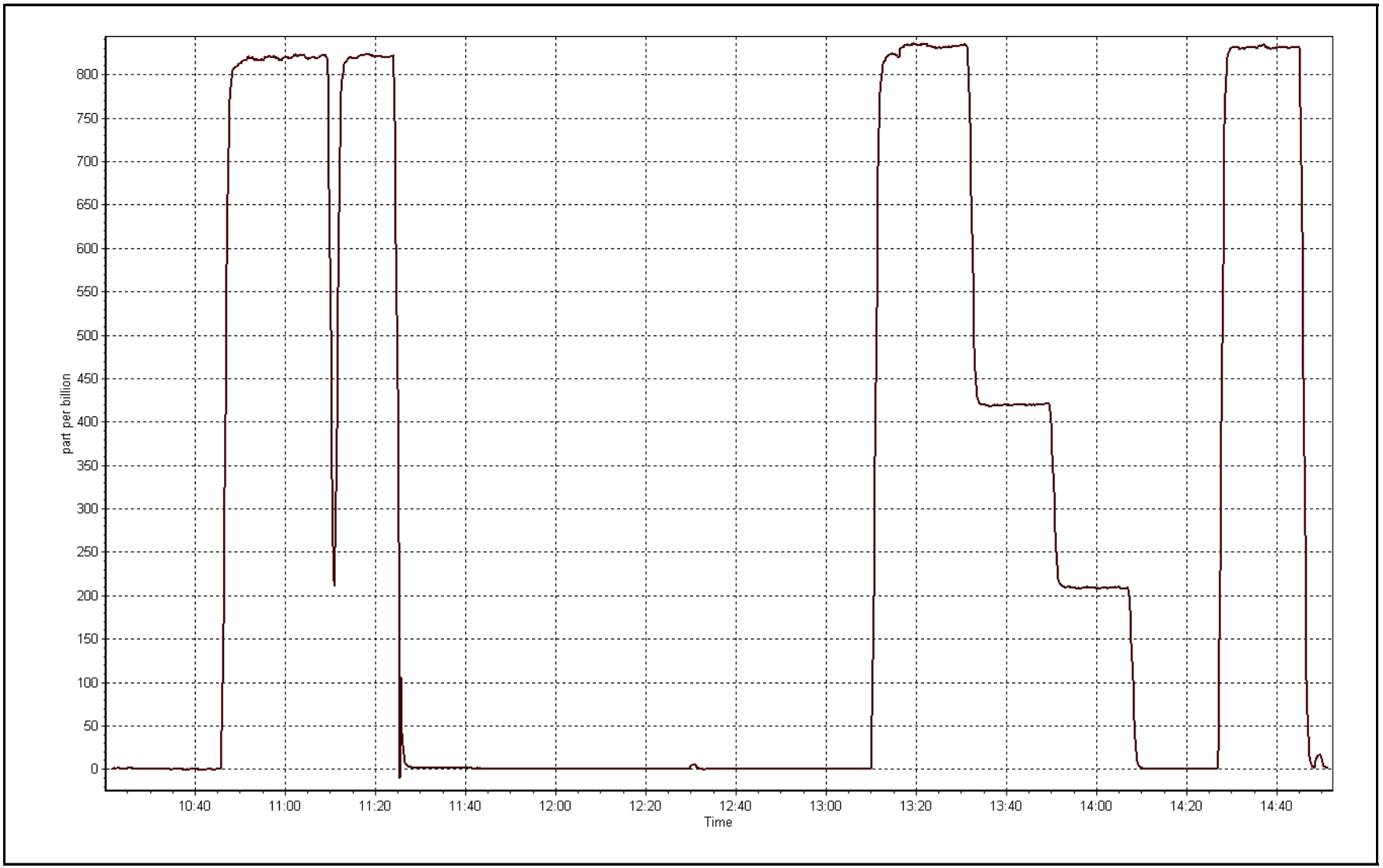
Calibration Date	January 13, 2016	Previous Calibration	December 7, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:25	End Time (MST)	14:50
Analyzer make	TEI 43i	Analyzer serial #	100841398

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999993
830.0	833.0	0.9964		
419.6	419.8	0.9995	Slope	0.995555
210.3	209.0	1.0066		
			Intercept	1.211378



SO2 Calibration Plot Date: January 13, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 14, 2016	Last Calibration	December 8, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	13:25	End Time (MST)	19:10
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-670	-670
Analyzer IP address	192.168.1.42		Lamp voltage	792	814
Calculated slope	0.999813	0.990580	Chamber temp	44.9	45.0
Calculated intercept	-0.238634	-0.036380	Pressure	586.3	595.6
Analyzer Background	9.8	11.6	Flow	1.036	1.049
Analyzer Coefficient	1.221	1.231	Intensity	91	91
			Converter temp.	325	323

Analyzer make/model	Thermo 450i	Analyzer serial #	1410661328
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	72.8	75.0	74.3	1.009
SO2 scrubber check	5000	20.5	210.7	2.4	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	72.8	75.0	75.6	0.992
second point	5000	38.8	40.0	40.6	0.985
third point	5000	19.4	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	72.8	75.0	75.5	0.994
				Average Correction Factor	0.986

Corrected As found	74.0	Previous response	75.2	% change	1.7%

Notes:

Changed inlet filter and scrubber check done after as founds. Replaced the lamp to reduce the noise, lamp voltage noise reduced with new lamp. Adjusted zero and span.

Calibration Performed By: Evan Magill

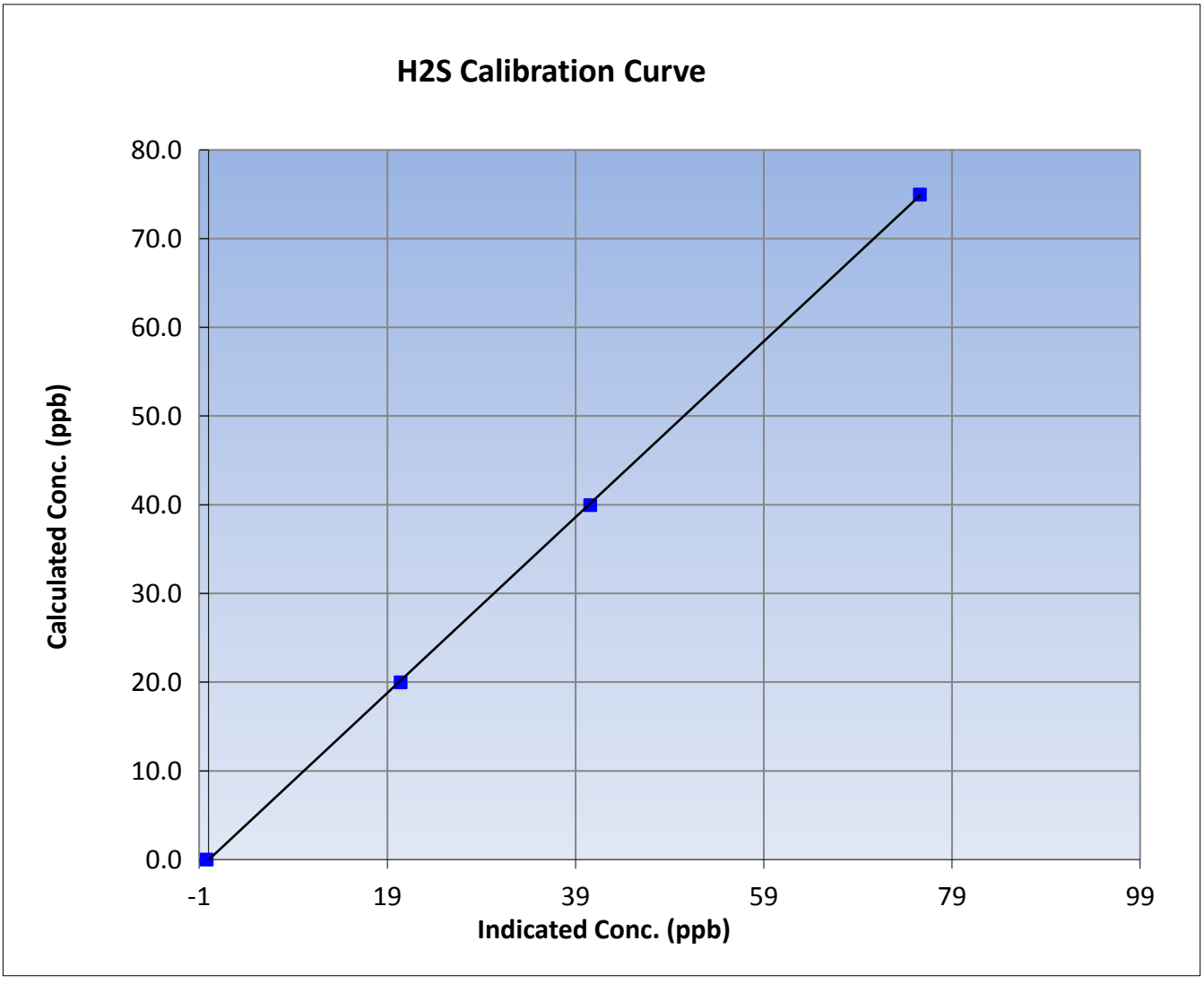
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

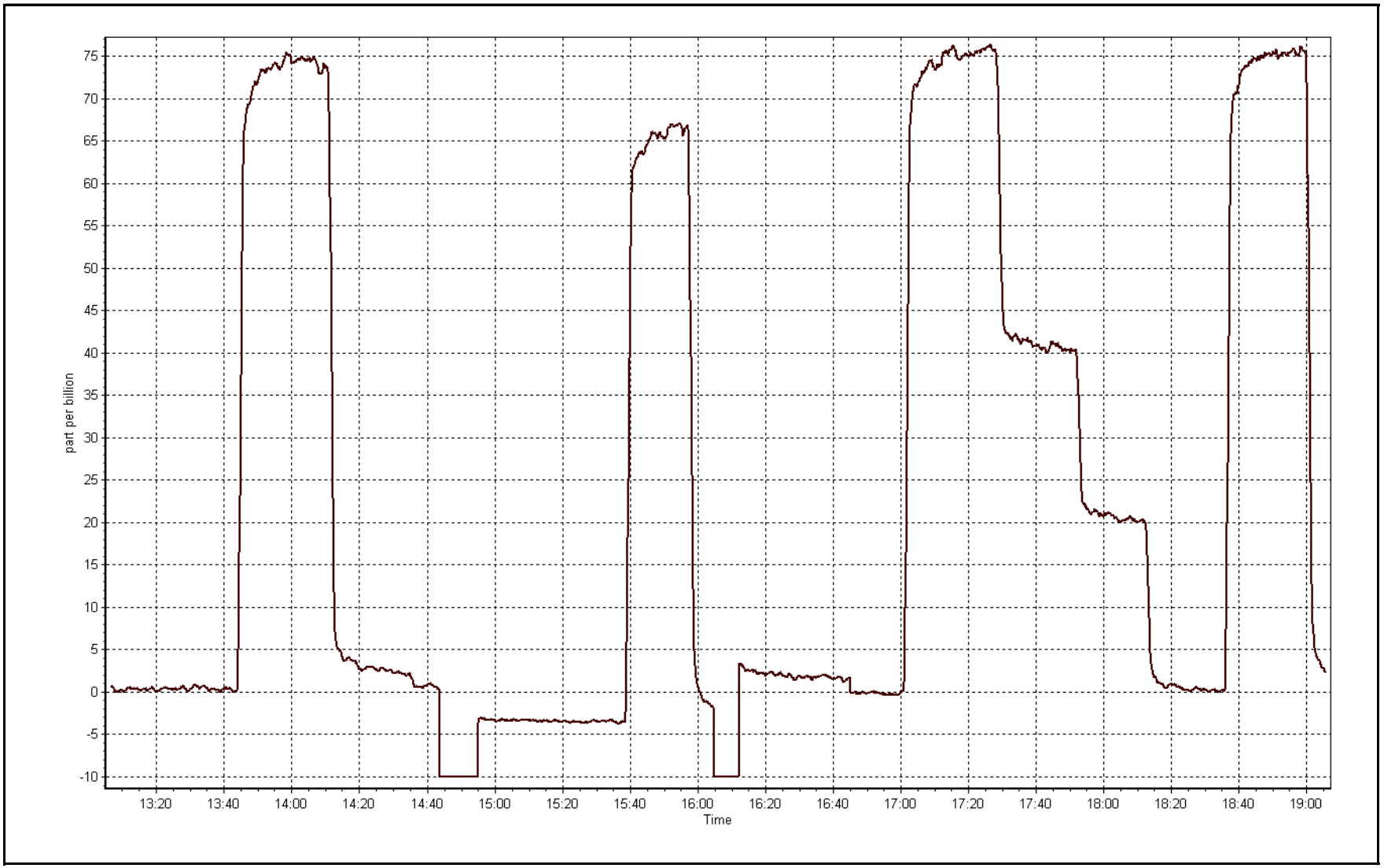
Calibration Date	January 14, 2016	Previous Calibration	December 8, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	13:25	End Time (MST)	19:10
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999953
75.0	75.6	0.9921		
40.0	40.6	0.9851	Slope	0.990580
20.0	20.4	0.9795		
			Intercept	-0.036380



H2S Calibration Plot Date: January 14, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-13-16	Last Calibration	December-07-15
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	14:50
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

	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	37.3	37.3
Calculated slope	0.999566	0.991977	Fuel Pressure	24.0	24.0
Calculated intercept	-0.005084	0.055264	Analyzer Coeff	4.399	4.188
			Analyzer BKG	6.28	6.38

Analyzer make	51i-LT	Analyzer serial #	1410661326

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.01	----
as found span	5000	80.9	17.32	16.72	1.036
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	80.9	17.32	17.46	0.992
second point	5000	40.9	8.76	8.70	1.007
third point	5000	20.5	4.39	4.29	1.023
as left zero	5000	0.0	0.00	-0.09	----
as left span	5000	80.9	17.32	17.34	0.999
				Average Correction Factor	1.007

Corrected As found	16.73	Previous response	17.33	% change	3.6%

Notes:

Changed inlet filter after as founds, heavy loading on filter. Changed Hydrogen cylinder after inlet filter change, no change in span response, flame stayed lit. Large adjustment on zero and span because of new pump.

Calibration Performed By: Evan Magill

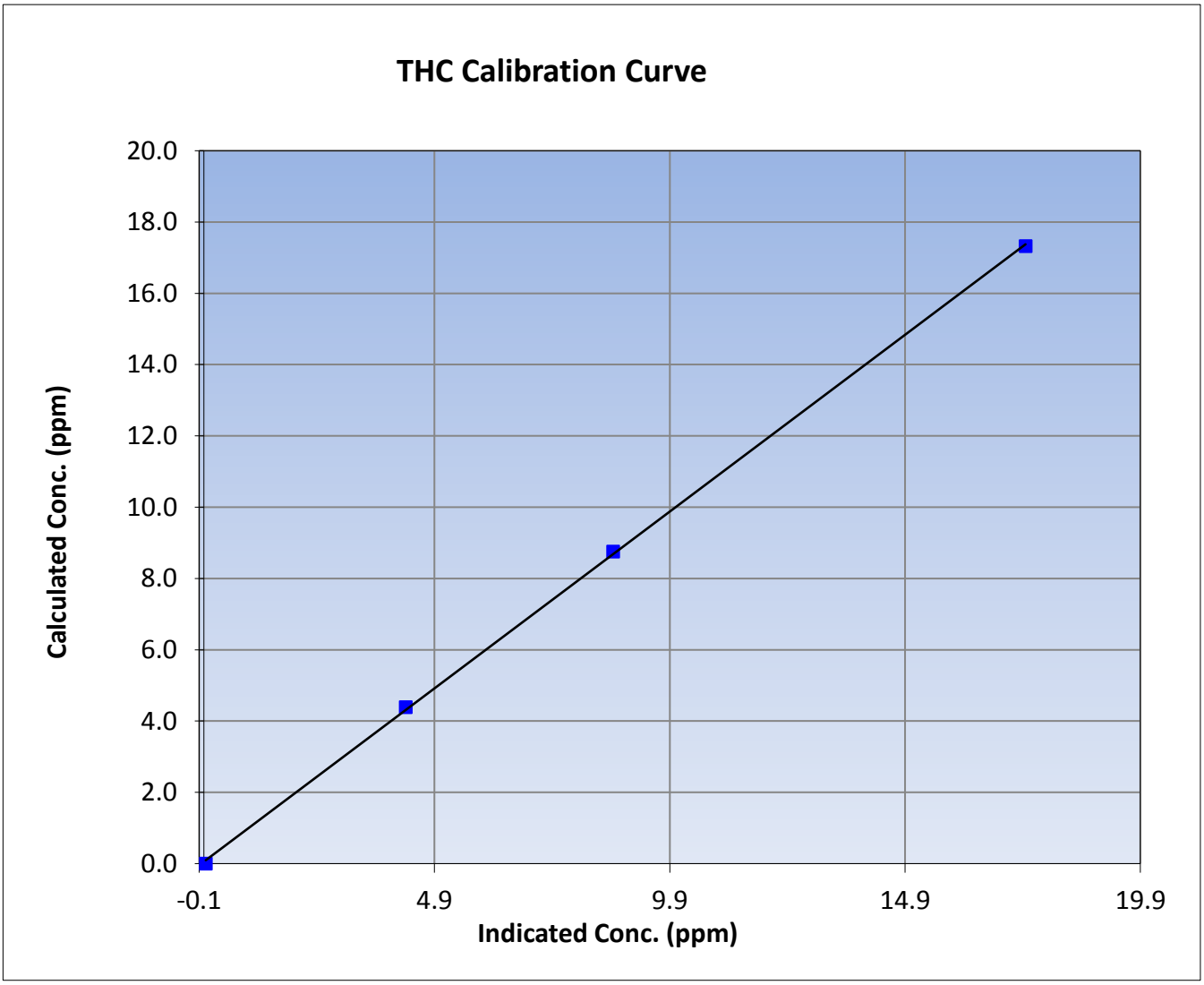
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

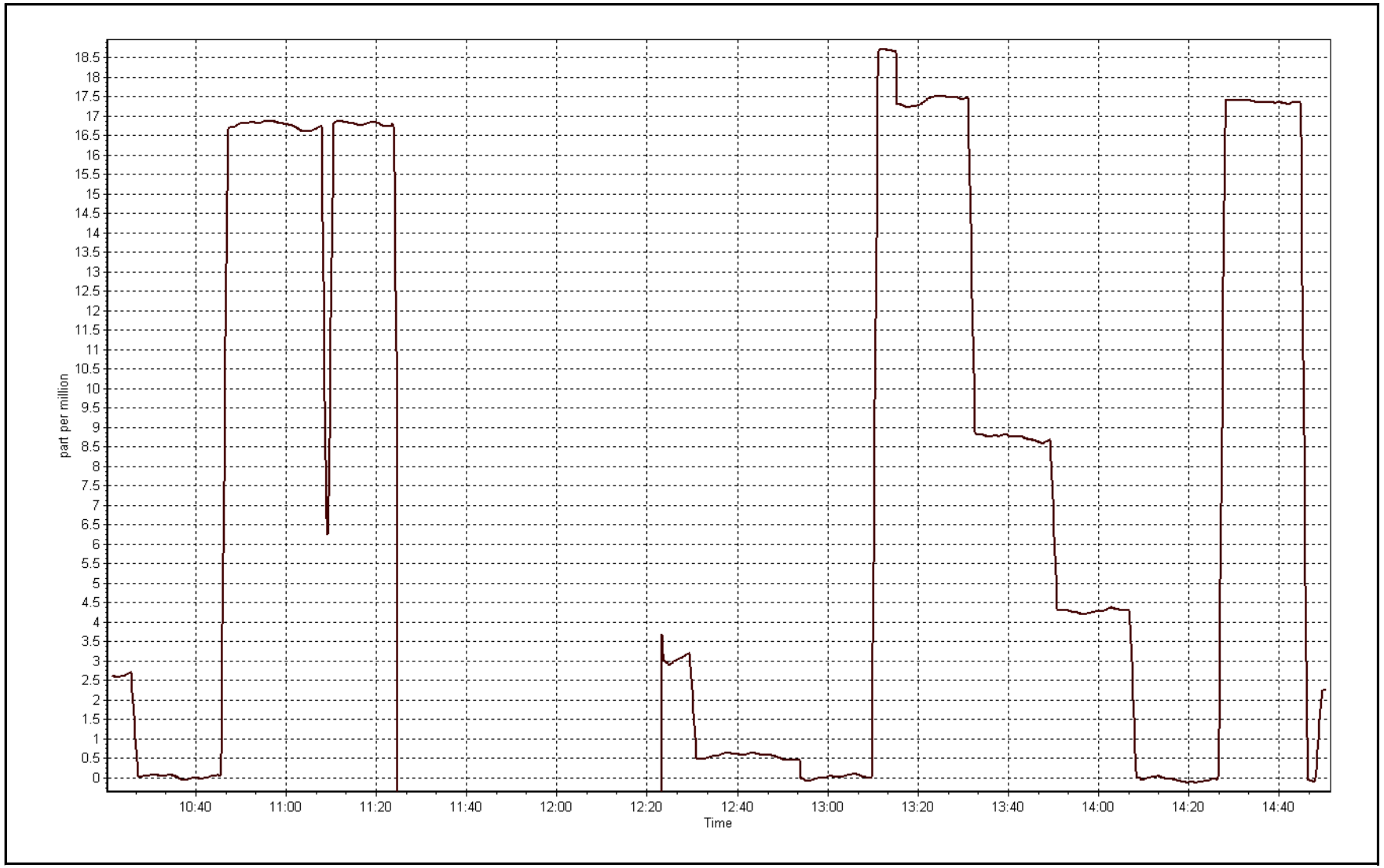
Calibration Date	January 13, 2016	Previous Calibration	December 7, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:25	End Time (MST)	14:50
Analyzer make	51i-LT	Analyzer serial #	1410661326

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999859
17.32	17.46	0.9920		
8.76	8.70	1.0065	Slope	0.991977
4.39	4.29	1.0231		
			Intercept	0.055264



THC Calibration Plot Date: January 13, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-14-16	Last Calibration	January-13-16
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	13:22
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

	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	37.3	37.3
Calculated slope	0.991977	1.001689	Fuel Pressure	24.0	24.0
Calculated intercept	0.055264	-0.011257	Analyzer Coeff	4.188	4.163
			Analyzer BKG	6.38	6.09

Analyzer make	51i-LT	Analyzer serial #	1410661326

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.23	----
as found span	5000	80.9	17.32	17.25	1.004
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	80.9	17.32	17.33	0.999
second point	5000	40.9	8.76	8.69	1.008
third point	5000	20.5	4.39	4.41	0.995
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	80.9	17.32	17.37	0.997
				Average Correction Factor	1.001

Corrected As found	17.48	Previous response	17.41	% change	-0.4%

Notes:

Re-calibrated because zero had dropped to -0.25 since the calibration and pump change yesterday, Jan 13. Adjusted zero and span.

Calibration Performed By: Evan Magill

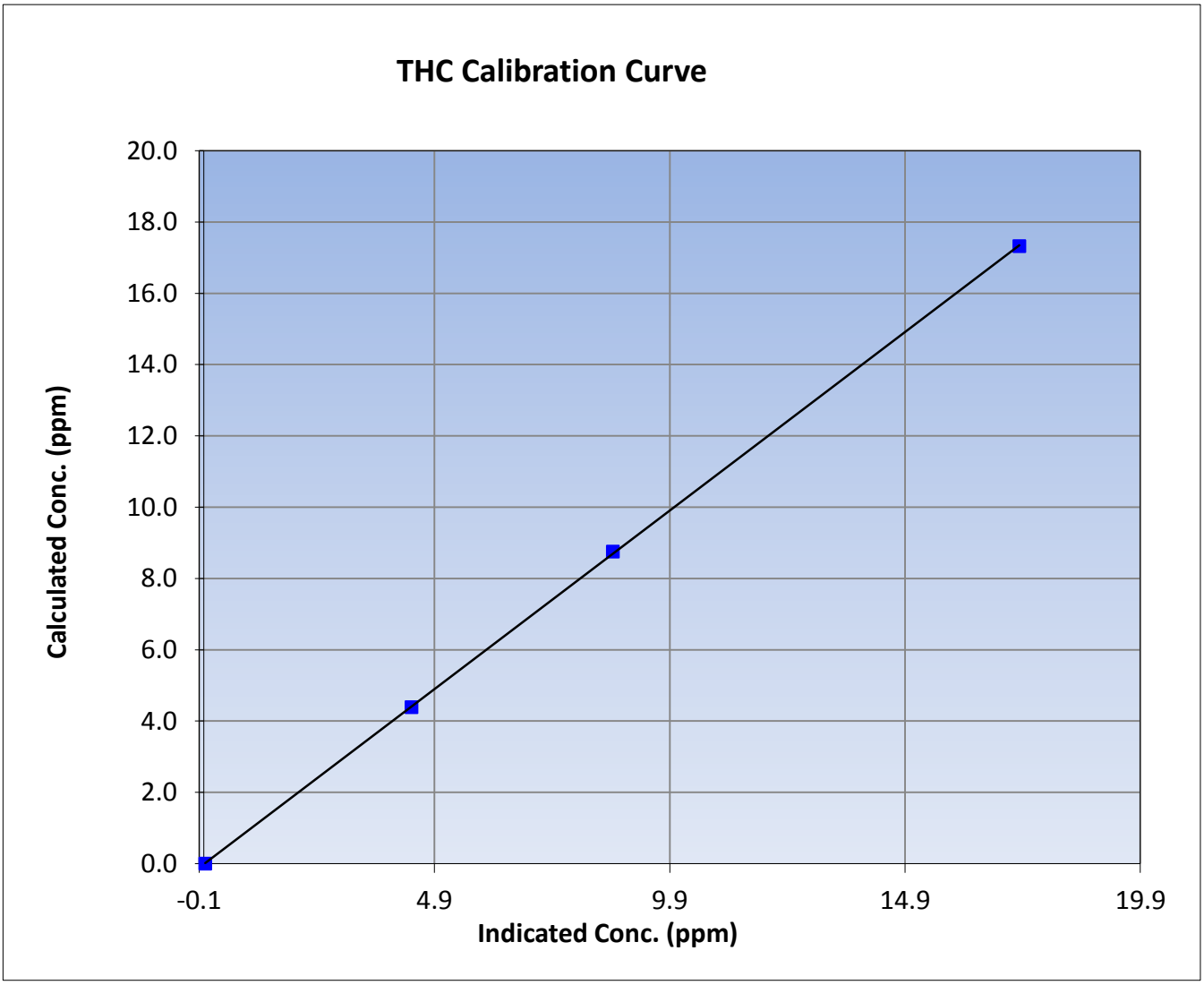
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

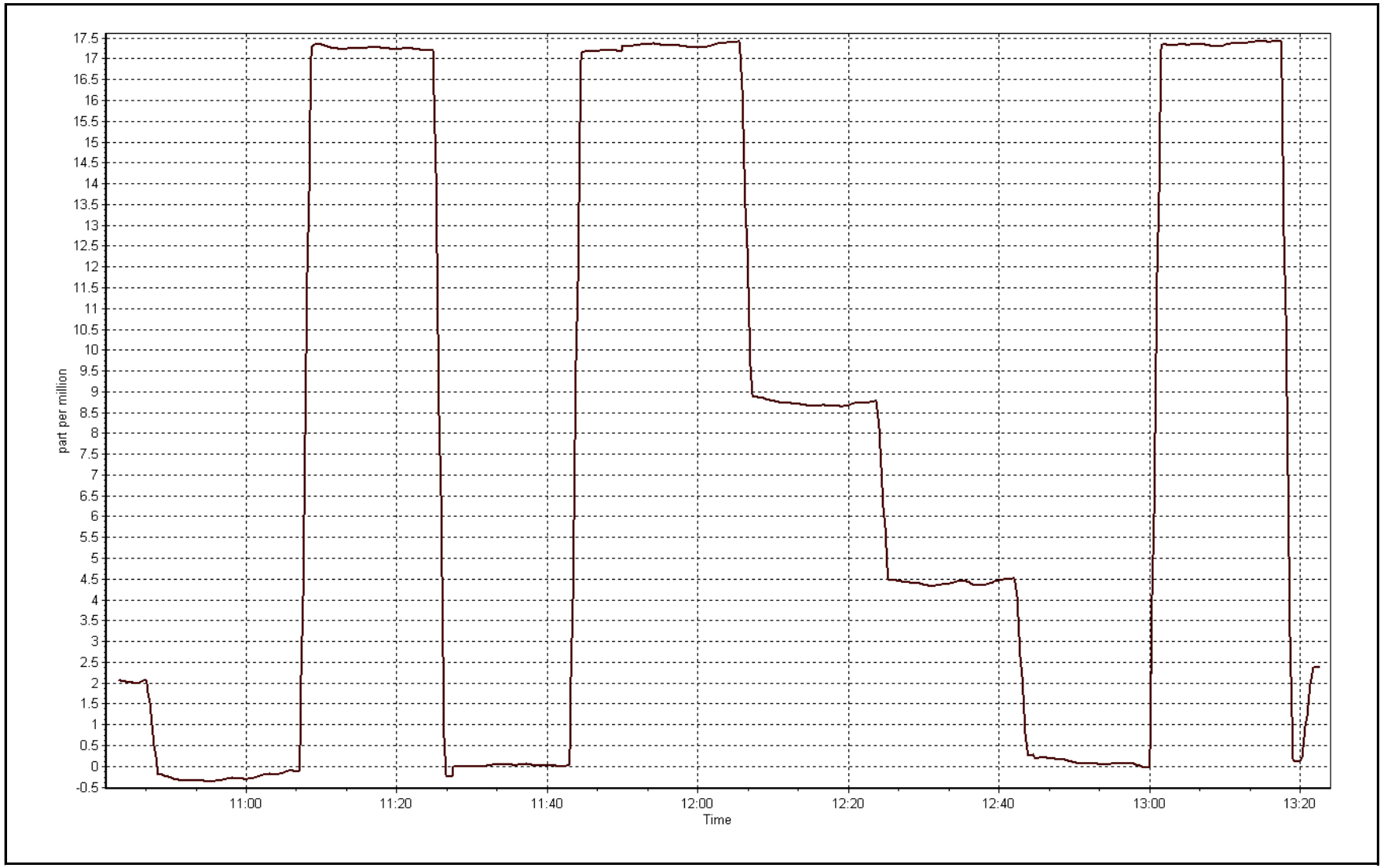
Calibration Date	January 14, 2016	Previous Calibration	January 13, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:45	End Time (MST)	13:22
Analyzer make	51i-LT	Analyzer serial #	1410661326

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999967
17.32	17.33	0.9995		
8.76	8.69	1.0077	Slope	1.001689
4.39	4.41	0.9952		
			Intercept	-0.011257



THC Calibration Plot Date: January 14, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 13
FORT MCKAY SOUTH
JANUARY 2016

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

February 25, 2016

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY SOUTH (AMS 13)
JANUARY 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	5	0	1	0
TRS(ppb) Average	709	35	35	100.00	3	0	1	0
THC(ppm) Average	708	36	36	100.00	4.8	-	3.1	-
O3(ppb) Average	709	35	35	100.00	39	0	32	-
NO2(ppb) Average	708	36	36	100.00	34	0	21	-
NO(ppb) Average	708	36	36	100.00	103	-	42	-
NOX(ppb) Average	708	36	36	100.00	128	-	64	-
PM2.5(ug/m3) Average	743	1	1	100.00	20	-	12.7	0
ET(C) Average	744	0	0	100.00	6.6	-	1.9	-
RH(%) Average	744	0	0	100.00	98	-	93	-
WS(km/h) Average	702	0	42	94.35	15	-	7	-
WD(deg) Average	702	0	42	94.35	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY SOUTH (AMS 13)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	708	0.5	1	-	0	0	0	0	1	1	5
TRS(ppb) Average	709	0.3	0	-	0	0	0	0	0	1	3
THC(ppm) Average	708	2.56	0.4	-	2.1	2.1	2.3	2.5	2.8	3.1	4.8
O3(ppb) Average	709	12	11	-	0	1	2	9	20	29	39
NO2(ppb) Average	708	11.7	7	-	0	1	6	12	17	21	34
NO(ppb) Average	708	9.8	17	-	0	0	0	1	15	33	103
NOX(ppb) Average	708	21.5	22	-	0	1	6	14	32	51	128
PM2.5(ug/m3) Average	743	5.14	3.6	-	0.7	1.5	2.3	4.2	6.8	10.5	20
Temperature 2 m (C) Average	744	-14.41	8.4	-	-36.7	-23.8	-19.4	-14.8	-9.2	-3.2	6.6
Relative Humidity (%) Average	744	82.1	6	-	52	74	79	82	86	90	98
Wind Speed 10 m (km/h) Average	702	3.3	2	-	0	1	2	3	5	7	15
Wind Direction 10 m (deg) Average	702	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	04 Jan 2016 10:00	04 Jan 2016 10:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	08 Jan 2016 12:00	08 Jan 2016 12:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	08 Jan 2016 16:00	08 Jan 2016 17:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	11 Jan 2016 05:00	11 Jan 2016 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	11 Jan 2016 07:00	11 Jan 2016 07:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	12 Jan 2016 05:00	12 Jan 2016 07:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	13 Jan 2016 01:00	13 Jan 2016 01:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	13 Jan 2016 06:00	13 Jan 2016 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	15 Jan 2016 22:00	16 Jan 2016 11:00	14	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 17:00	16 Jan 2016 17:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 21:00	16 Jan 2016 22:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	17 Jan 2016 01:00	17 Jan 2016 01:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	17 Jan 2016 10:00	17 Jan 2016 10:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2016 02:00	18 Jan 2016 04:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2016 18:00	18 Jan 2016 19:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2016 22:00	18 Jan 2016 22:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	19 Jan 2016 01:00	19 Jan 2016 03:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Jan 2016 18:00	20 Jan 2016 19:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	26 Jan 2016 11:00	26 Jan 2016 11:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 5 ppb on Jan 21 15:00

Maximum Daily Average: 1.0 ppb on Jan 8

Minimum Value: 0 ppb on Jan 2 06:00

Minimum Daily Average: 0.0 ppb on Jan 14

Maximum Diurnal Average: 0.9 ppb at hour 15

Minimum Diurnal Average: 0.3 ppb at hour 10

Monthly Average: 0.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

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

Z - zerospan C - Calibration

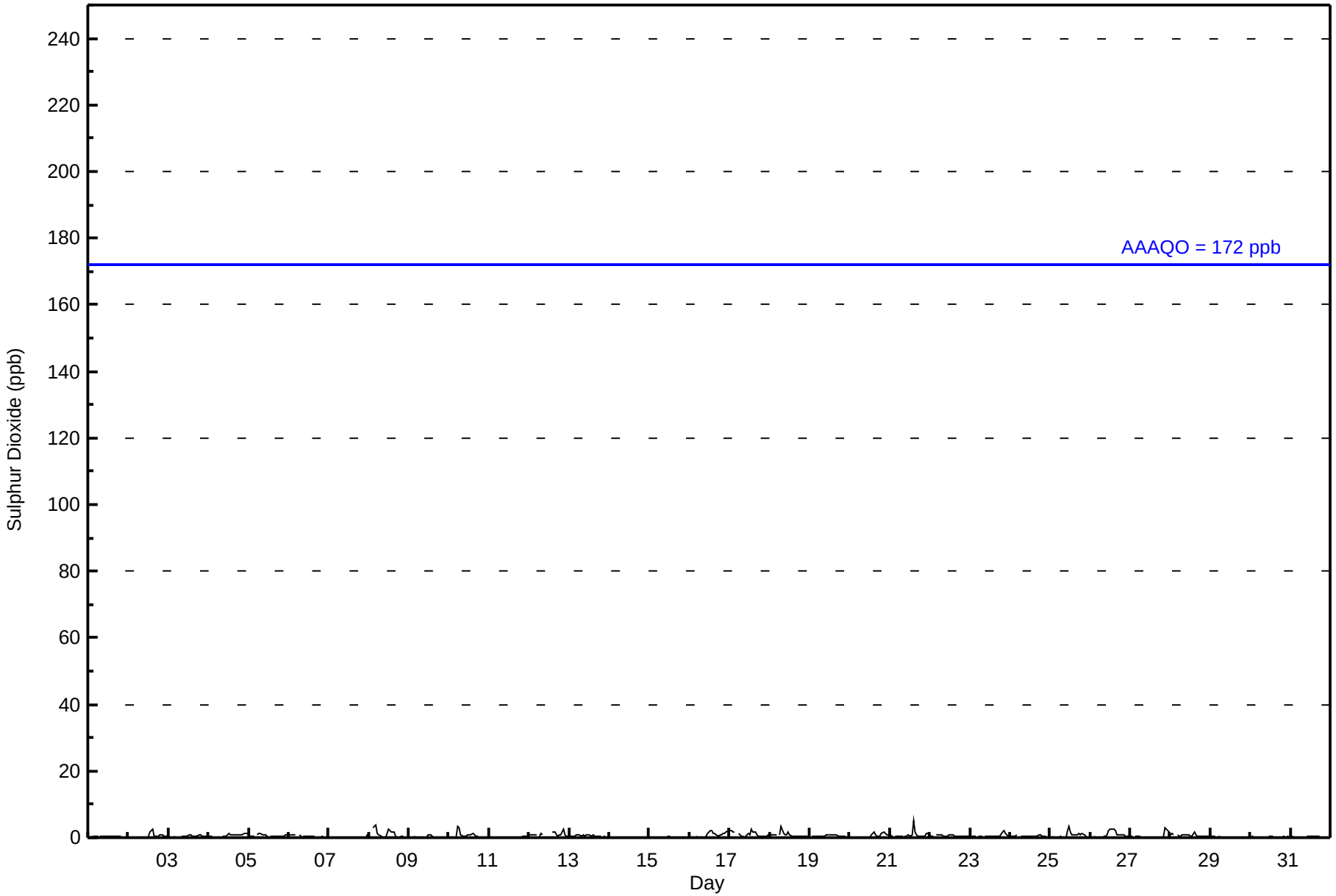
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - January 2016



Sulphur Dioxide (SO_2) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	708	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	89	69	19	5	1	13	14	36	99	90	55	84	23	20	15	39	671
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	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	89	69	19	5	1	13	14	36	99	90	55	84	23	20	15	39	671

Total Number of Valid Hours: 671

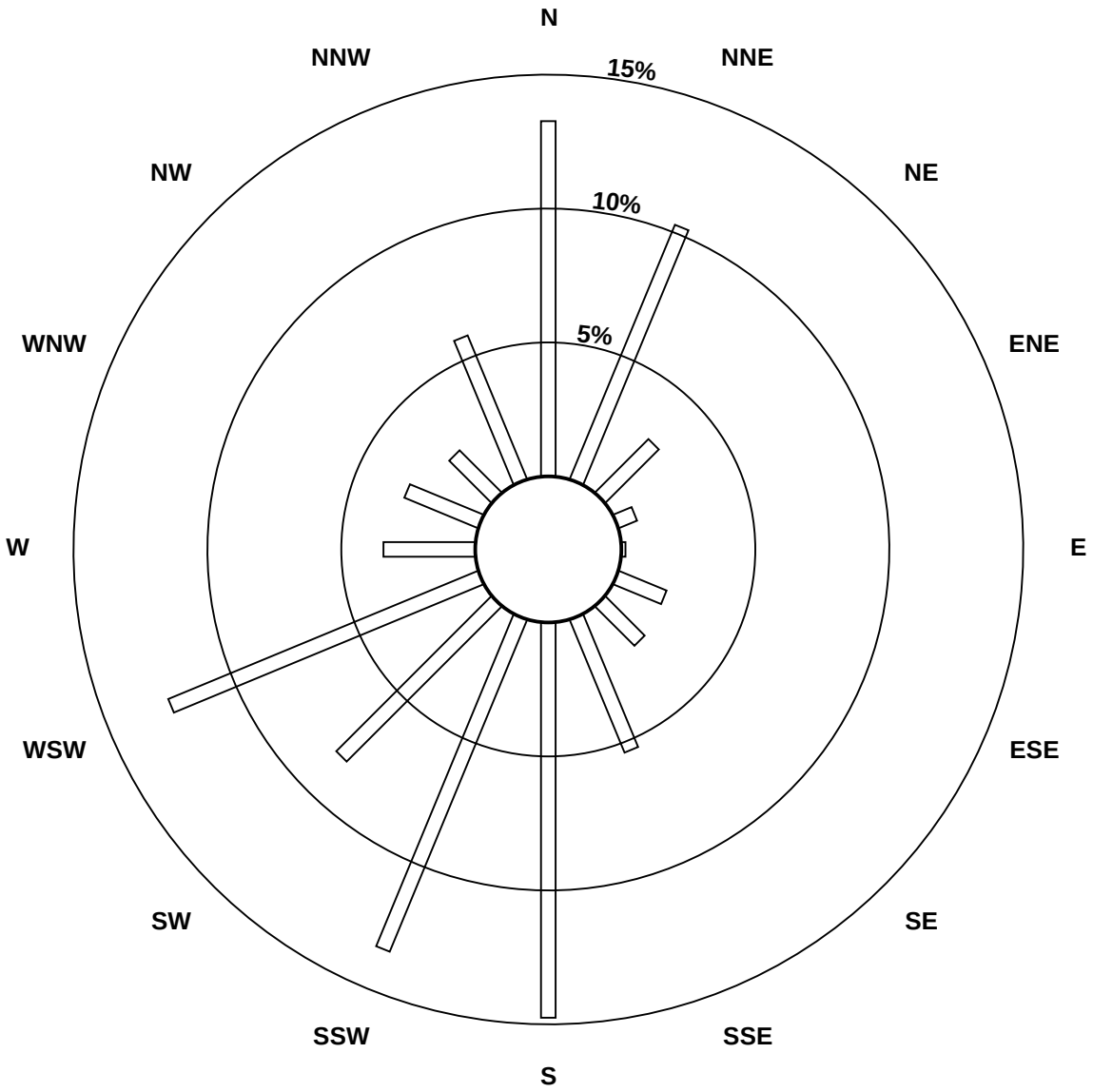
Total Number of Hours: 744

Wood Buffalo Environmental Association

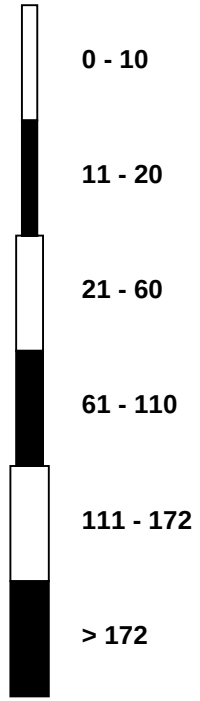
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



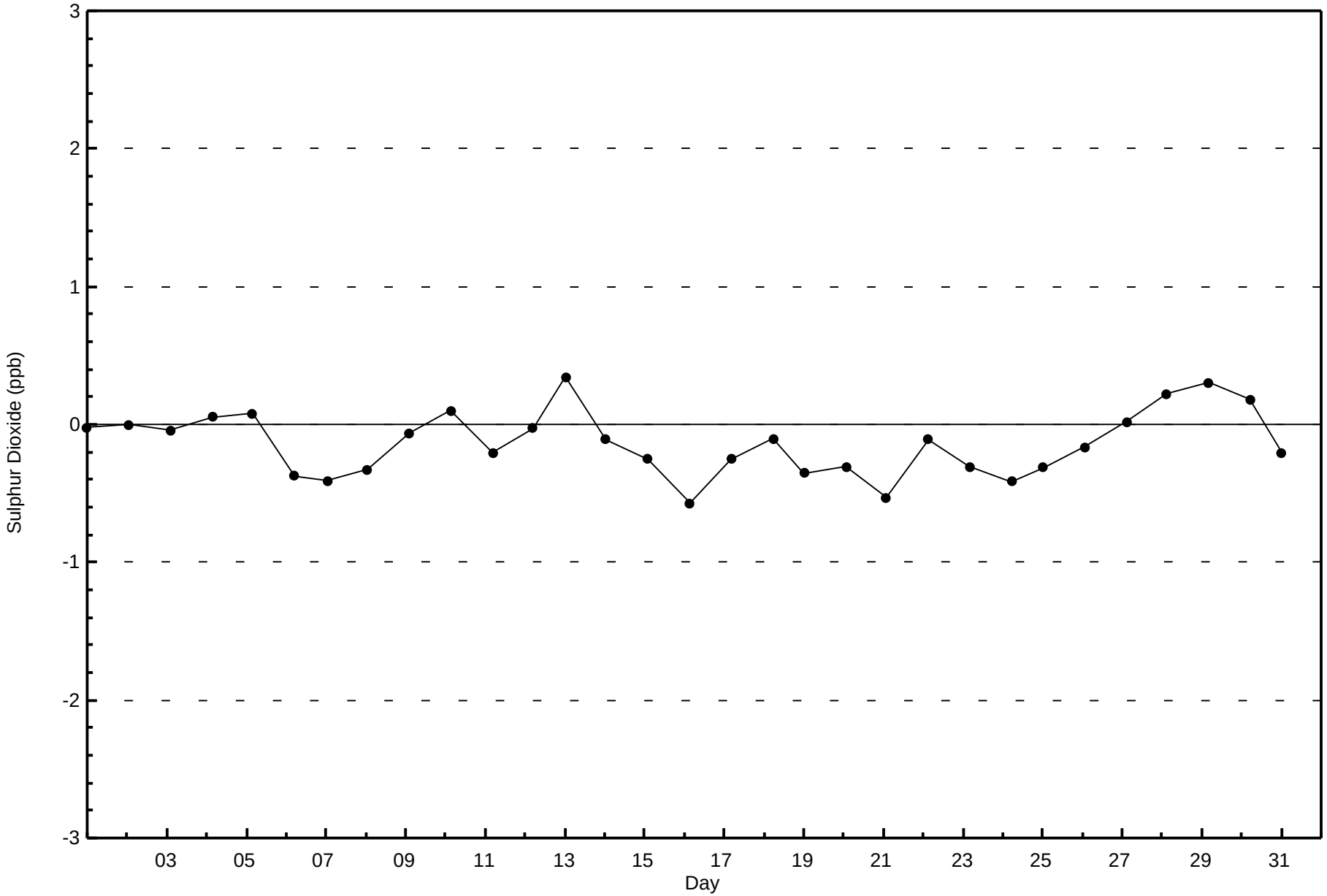
Total Number of Valid Hours: 671

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - January 2016

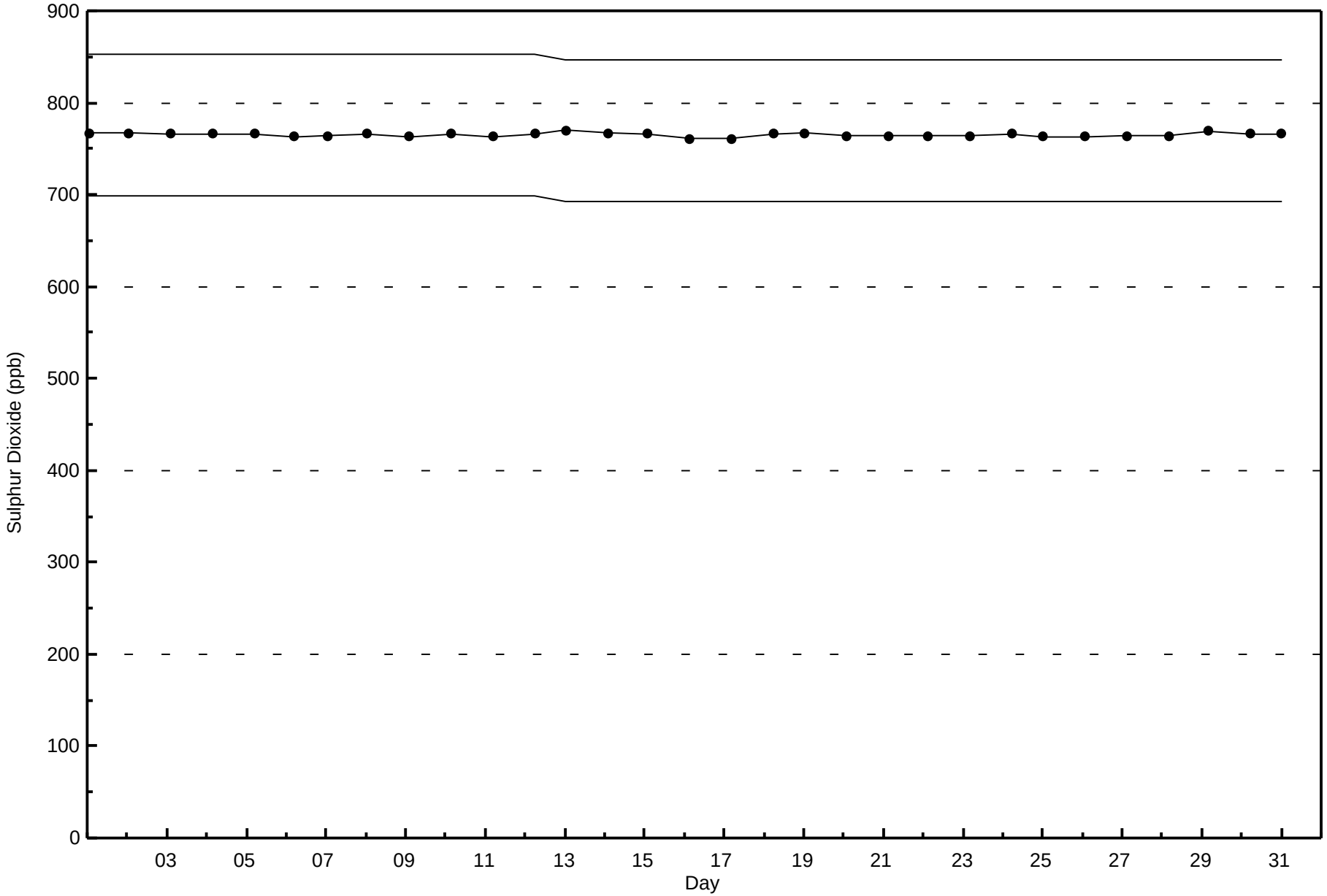


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 3 ppb on Jan 26 16:00

Maximum Daily Average: 1.1 ppb on Jan 26

Minimum Value: 0 ppb on Jan 2 02:00

Minimum Daily Average: 0.1 ppb on Jan 29

Maximum Diurnal Average: 0.5 ppb at hour 15

Minimum Diurnal Average: 0.2 ppb at hour 5

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 in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

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

Z - zerospan C - Calibration

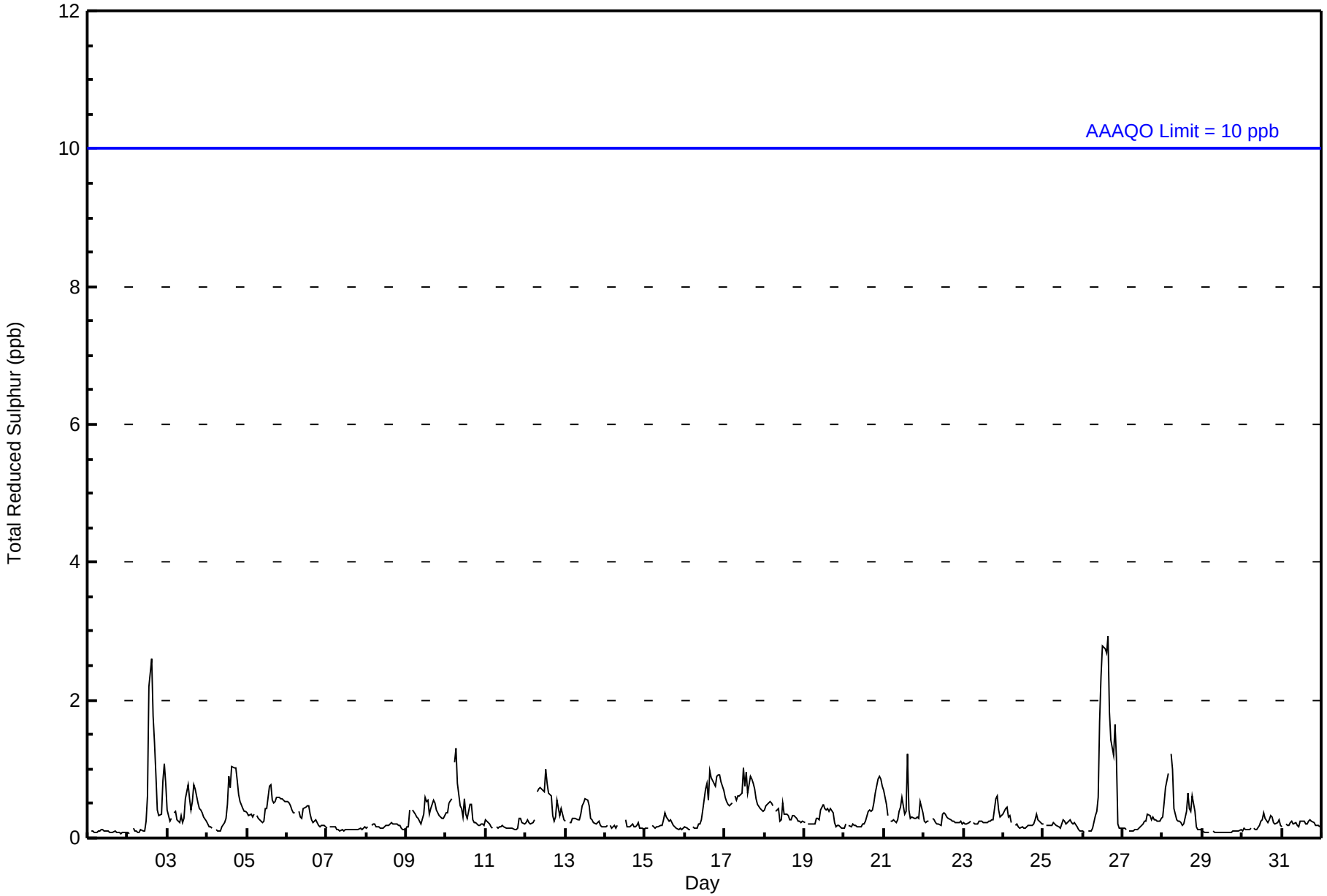
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.29	99.29
3 - 4	5	0.71	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	93	62	21	5	2	14	14	32	98	92	59	82	21	19	14	37	665
3 - 4	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	5
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	62	21	5	2	14	15	34	99	93	59	82	21	19	14	37	670

Total Number of Valid Hours: 670

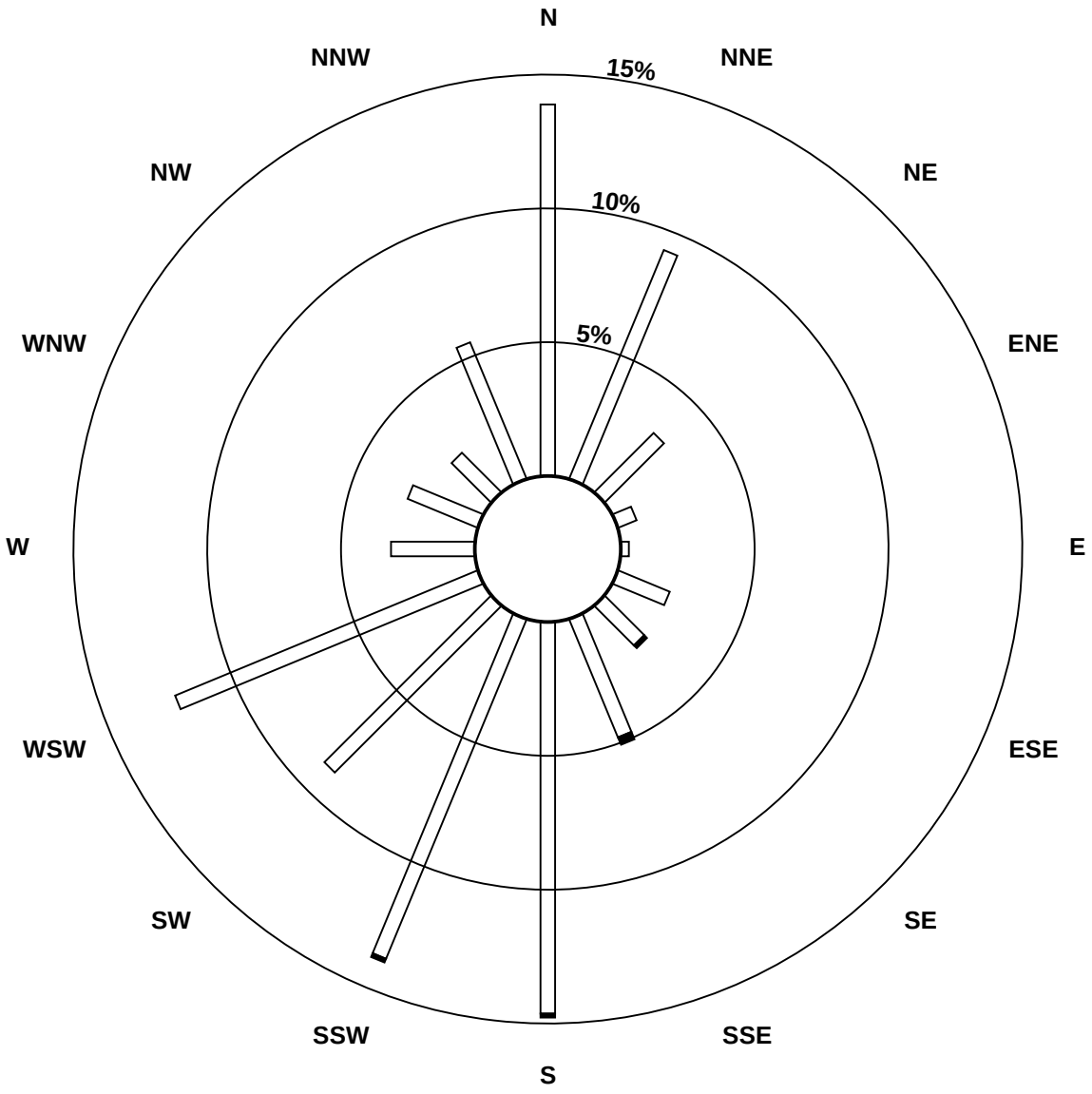
Total Number of Hours: 744

Wood Buffalo Environmental Association

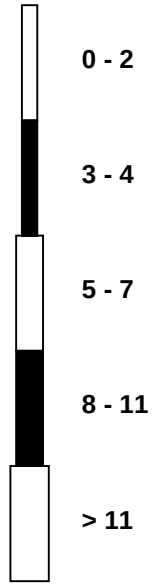
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



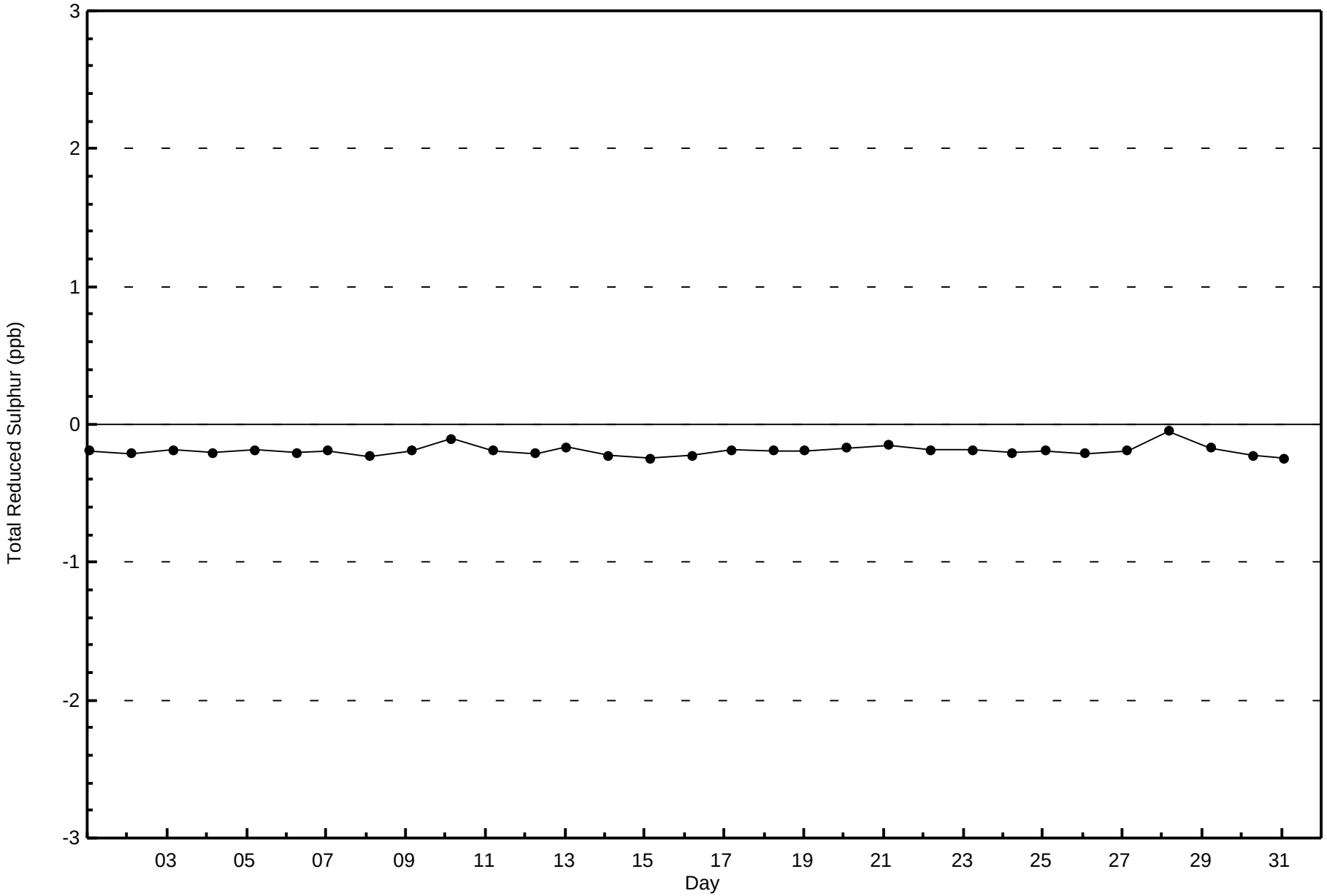
Total Number of Valid Hours: 670

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - January 2016

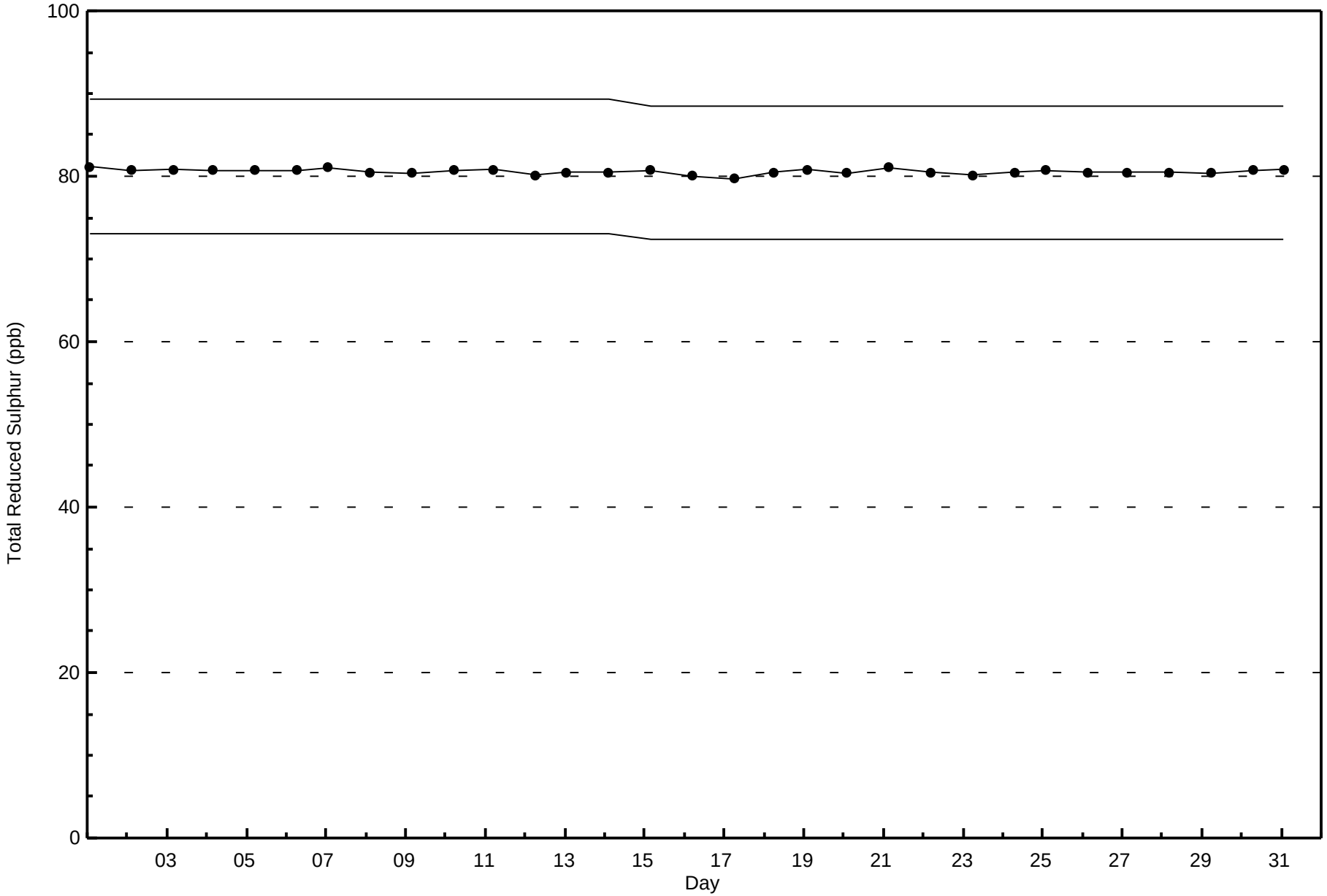


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort McKay South - January 2016

Maximum Value: 4.8 ppm on Jan 3 17:00

Maximum Daily Average: 3.1 ppm on Jan 17

Minimum Value: 2.1 ppm on Jan 29 02:00

Minimum Daily Average: 2.1 ppm on Jan 29

Maximum Diurnal Average: 2.7 ppm at hour 16

Minimum Diurnal Average: 2.5 ppm at hour 11

Monthly Average: 2.56 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.1 Q_1 = 2.3 Median = 2.5 Q_3 = 2.8 P_{90} = 3.1 P_{99} = 4.0

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.1	2.3	2.3	2.3	2.3	2.3	2.2	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
2-Jan	2.1	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.5	2.5	2.5	2.8	2.9	3.0	2.9	3.0	3.5	4.2	3.9	2.7	4.2
3-Jan	3.1	2.7	Z	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.5	3.1	3.4	3.1	2.8	3.4	4.8	4.2	3.8	3.6	3.3	3.1	3.0	3.0	3.1	4.8
4-Jan	2.9	2.8	2.8	Z	2.6	2.5	2.5	2.5	2.4	2.5	2.5	2.6	2.8	3.1	2.8	3.0	3.0	3.1	3.3	3.1	3.2	3.3	3.3	3.2	2.9	3.3
5-Jan	3.0	2.8	2.7	2.8	Z	3.2	3.3	3.3	3.3	3.2	3.2	2.8	2.7	2.8	3.0	2.9	3.0	3.0	3.0	3.0	3.1	3.1	3.2	3.2	3.0	3.3
6-Jan	3.5	3.6	3.6	3.5	3.5	Z	3.3	2.7	2.5	2.5	2.7	2.7	2.9	2.8	2.7	2.4	2.3	2.4	2.5	2.4	2.4	2.3	2.2	2.3	2.8	3.6
7-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2
8-Jan	2.1	Z	2.1	2.2	2.6	2.9	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.3	2.3	2.9
9-Jan	2.5	2.6	Z	2.6	2.5	2.5	2.6	2.7	2.7	2.5	2.5	2.7	2.8	2.8	2.3	2.8	2.9	2.8	2.7	2.6	2.4	2.4	2.4	2.5	2.6	2.9
10-Jan	2.7	2.7	2.8	Z	2.8	2.6	2.7	2.7	2.7	2.8	2.5	2.6	2.5	2.7	2.9	2.7	2.4	2.5	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.9
11-Jan	2.6	2.5	2.4	2.3	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.7	2.7	2.6	2.5	2.3	2.7
12-Jan	2.6	2.7	2.6	2.6	2.7	Z	2.7	2.6	2.6	C	C	C	C	C	2.5	2.7	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.7
13-Jan	Z	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.7	2.9	3.0	2.8	2.6	2.4	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.6	3.0
14-Jan	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4
15-Jan	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.5	2.5	2.5	2.6	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.7
16-Jan	2.4	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.7	3.0	3.2	3.1	3.2	3.2	3.2	3.5	4.1	4.2	4.1	3.9	3.8	3.0	4.2
17-Jan	3.7	3.7	3.6	3.4	Z	3.3	3.2	3.1	2.9	2.8	3.0	2.9	3.0	3.8	2.8	3.4	3.1	3.0	2.9	2.9	2.9	2.9	2.9	2.9	3.1	3.8
18-Jan	2.9	2.9	2.8	2.8	2.7	Z	2.6	2.3	2.3	2.2	2.3	2.4	2.5	2.5	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.5	2.9
19-Jan	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.6	2.4	2.5	2.5	2.4	2.5	2.5	2.7	2.9	2.7	2.4	2.3	2.3	2.2	2.3	2.2	2.4	2.9
20-Jan	2.2	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.8	2.6	2.6	2.7	2.8	3.1	3.0	2.9	2.8	2.7	2.6	3.1
21-Jan	2.7	2.6	Z	2.4	2.3	2.3	2.4	2.4	2.6	2.9	2.7	2.8	2.6	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	3.0	2.7	3.0
22-Jan	2.9	2.9	2.9	Z	3.1	3.1	3.0	3.0	2.9	2.9	2.8	3.2	3.3	3.0	2.8	2.6	2.5	2.6	2.5	2.5	2.6	2.5	2.5	2.5	2.8	3.3
23-Jan	2.4	2.4	2.5	2.6	Z	2.6	2.4	2.4	2.4	2.4	2.5	2.6	2.5	2.4	2.5	2.5	2.5	2.5	2.6	3.4	3.6	3.3	3.0	2.9	2.6	3.6
24-Jan	2.9	2.9	2.9	2.7	2.8	Z	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.3	2.5	2.9	2.8	2.7	2.7	2.6	2.7	2.4	2.4	2.4	2.6	2.9
25-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.6	2.4	2.6	3.0	2.7	2.6	2.7	2.6	2.4	2.4	2.3	2.4	3.0
26-Jan	2.3	Z	2.3	2.3	2.2	2.2	2.3	2.4	2.5	2.6	2.8	2.8	3.0	2.9	3.1	3.0	3.1	3.3	3.4	3.2	3.1	2.1	2.1	2.1	2.7	3.4
27-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	2.8	2.6	2.5	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.8
28-Jan	2.4	2.8	2.7	Z	2.9	2.9	2.9	3.0	3.3	3.3	2.7	2.6	2.4	2.5	4.0	4.2	2.9	2.6	3.5	2.8	2.3	2.1	2.1	2.1	2.8	4.2
29-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
30-Jan	2.1	2.3	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.4
31-Jan	Z	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4
	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.5	Diurnal Average	
	3.7	3.7	3.6	3.5	3.5	3.3	3.3	3.3	3.3	3.3	3.2	3.2	3.4	3.8	4.0	4.2	4.8	4.2	3.8	4.1	4.2	4.1	4.2	3.9	Diurnal Maximum	

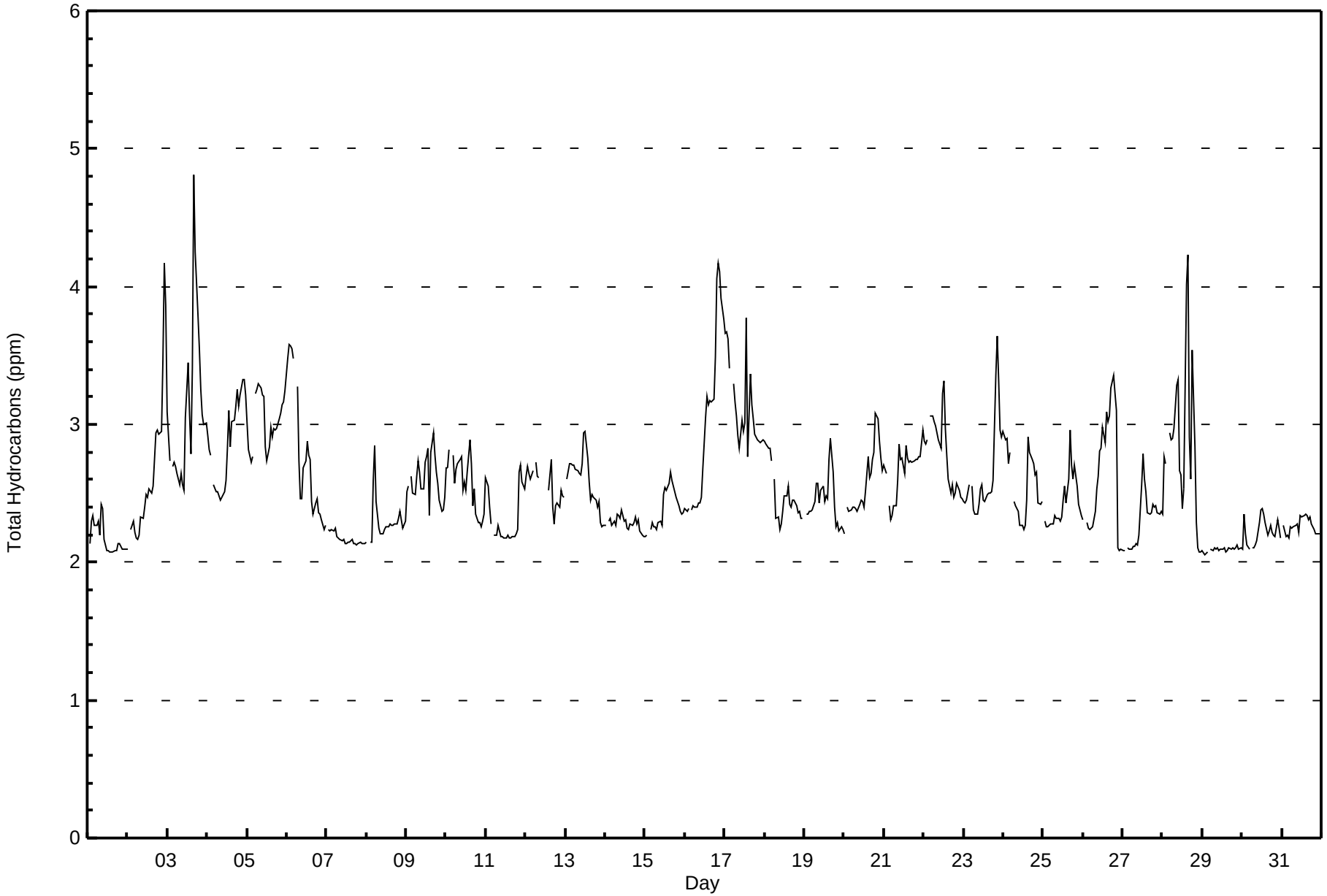
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Fort McKay South - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	630	88.98	88.98
3.1 - 10.0	78	11.02	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

Fort McKay South - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	89	69	19	5	1	11	13	32	87	61	47	74	20	20	13	36	597
3.1 - 10.0	0	0	0	0	0	2	1	4	12	29	8	10	3	0	2	3	74
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	69	19	5	1	13	14	36	99	90	55	84	23	20	15	39	671

Total Number of Valid Hours: 671

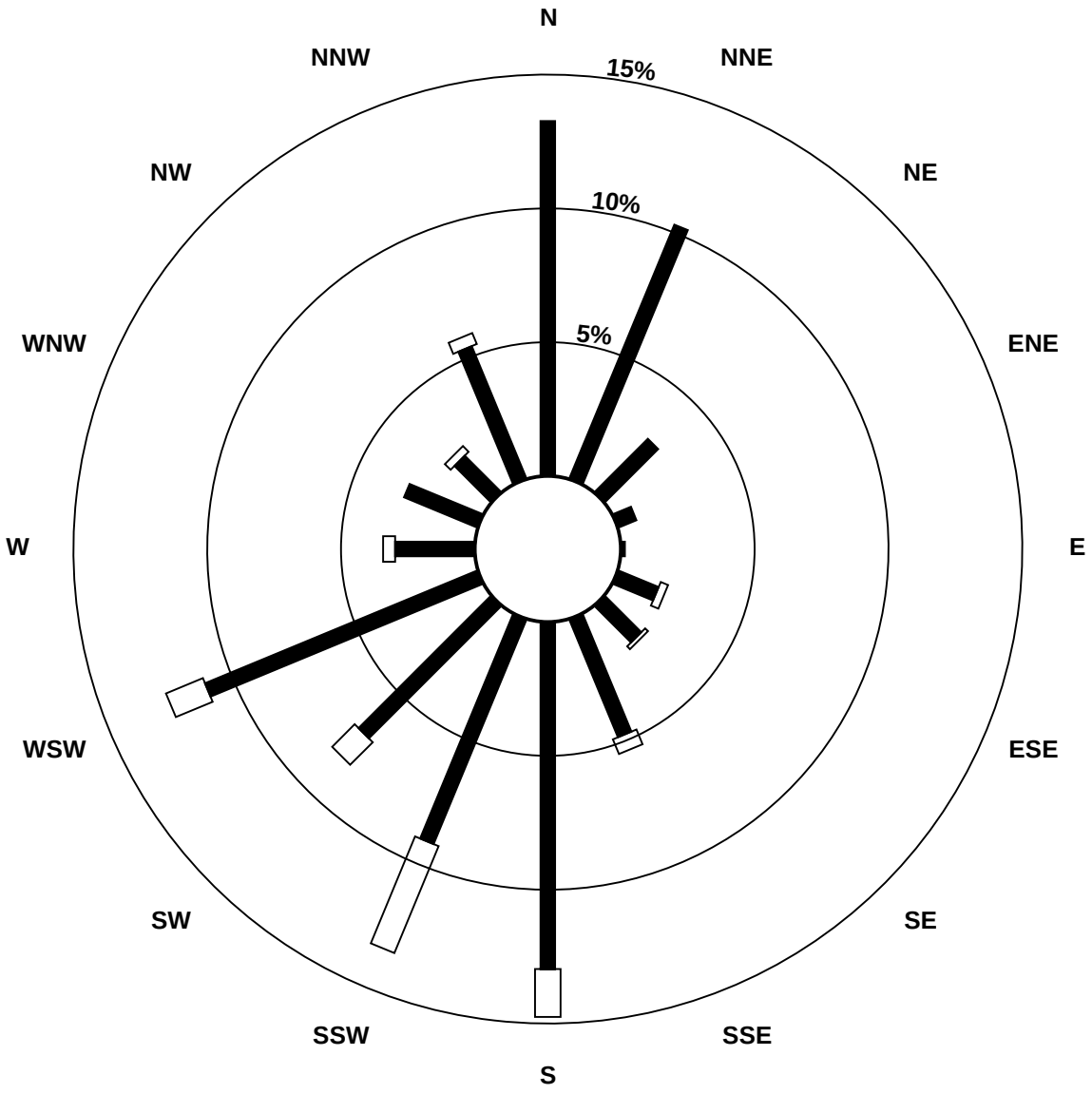
Total Number of Hours: 744

Wood Buffalo Environmental Association

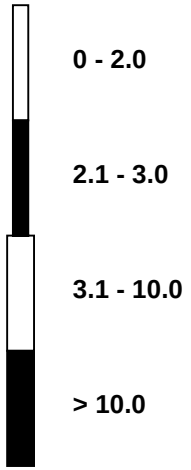
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Fort McKay South (AMS 13)



Classes (ppm)



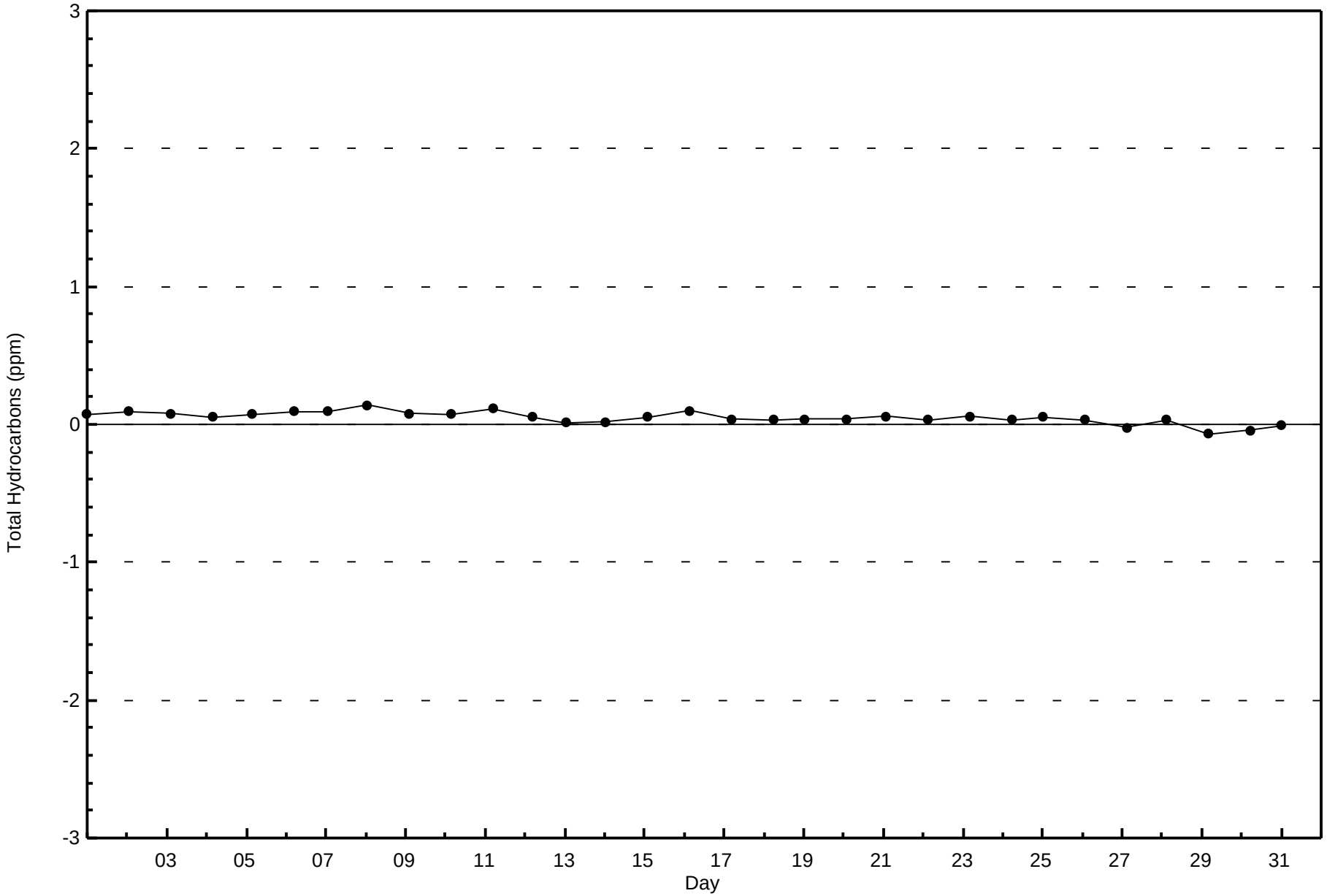
Total Number of Valid Hours: 671

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay South - January 2016

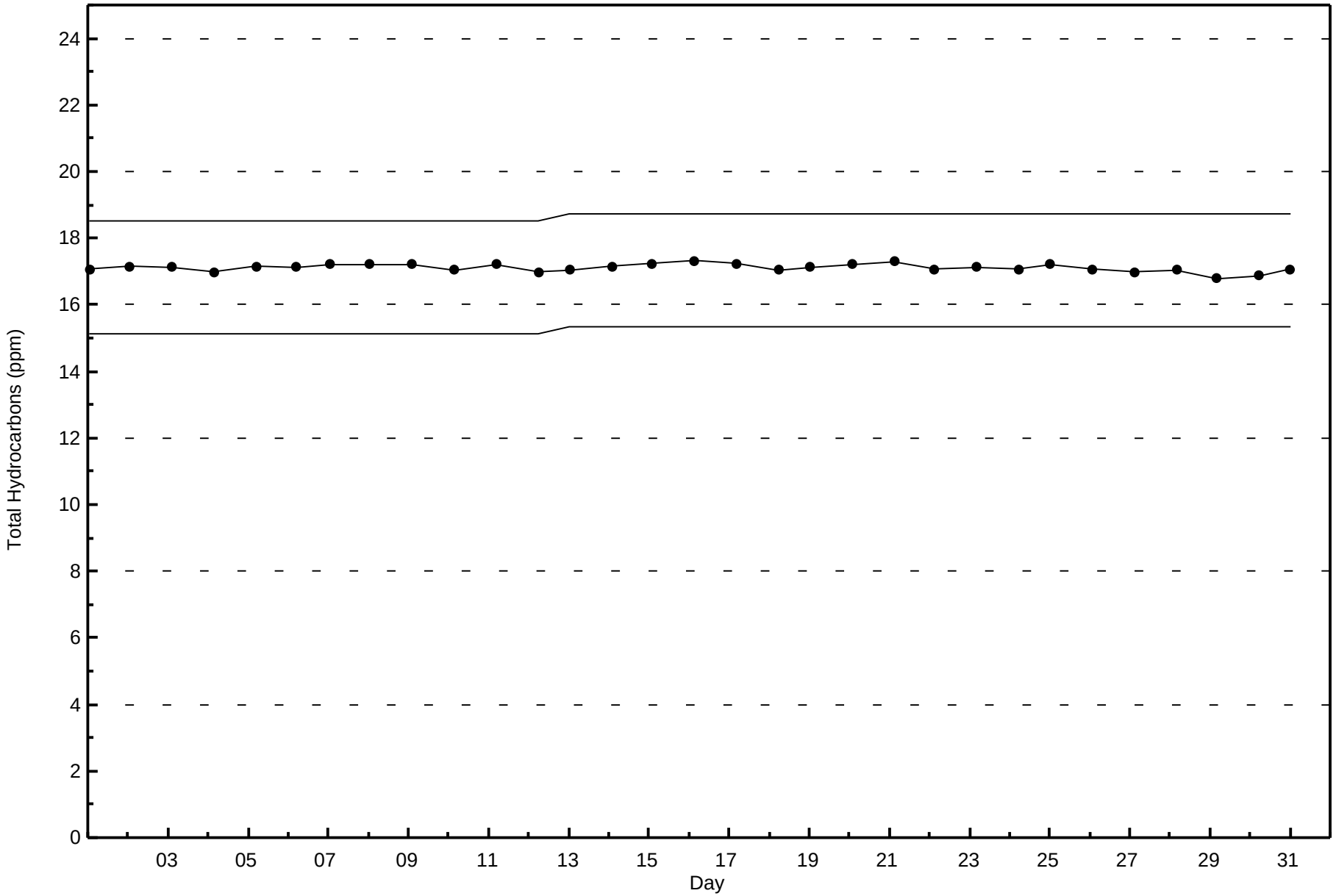


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Fort McKay South - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 39 ppb on Jan 1 14:00

Maximum Daily Average: 32.0 ppb on Jan 7

Minimum Value: 0 ppb on Jan 17 06:00

Minimum Daily Average: 1.4 ppb on Jan 5

Maximum Diurnal Average: 16.4 ppb at hour 14

Minimum Diurnal Average: 9.3 ppb at hour 18

Monthly Average: 12.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 9 $Q_3 = 20$ $P_{90} = 29$ $P_{99} = 37$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	10	11	6	Z	9	10	11	19	15	11	27	37	39	39	38	38	39	35	28	15	16	33	34	23	23.6	39
2-Jan	15	12	6	10	Z	16	11	11	8	7	9	13	18	18	14	7	4	2	1	1	1	1	1	3	8.2	18
3-Jan	4	2	2	3	3	Z	1	2	1	3	12	11	16	16	13	7	3	1	1	1	1	1	1	1	4.4	16
4-Jan	1	1	1	1	3	4	Z	3	3	2	3	3	3	3	2	1	0	1	0	0	1	1	0	0	1.6	4
5-Jan	1	0	0	0	0	1	0	Z	0	1	1	4	7	6	4	1	0	1	1	1	0	0	0	1	1.4	7
6-Jan	1	0	0	0	0	1	1	4	Z	9	6	6	6	6	5	11	17	11	16	18	24	26	27	25	9.6	27
7-Jan	29	28	30	Z	25	25	27	29	34	32	34	34	35	35	34	34	34	35	34	34	34	33	33	31	32.0	35
8-Jan	32	29	26	24	Z	1	13	18	17	15	14	18	15	16	12	10	7	5	6	9	15	16	17	10	15.1	32
9-Jan	4	5	9	14	12	Z	9	7	6	8	11	14	17	16	15	11	7	4	4	4	6	7	7	6	8.8	17
10-Jan	4	3	4	5	5	6	Z	4	1	2	7	7	8	8	4	5	11	8	16	16	17	19	15	12	8.2	19
11-Jan	3	5	12	18	19	21	17	Z	26	27	27	29	29	26	30	29	28	25	18	10	1	1	1	1	17.5	30
12-Jan	1	1	1	1	1	1	1	1	Z	2	4	7	7	11	13	10	10	11	10	6	10	5	4	4	5.1	13
13-Jan	4	2	1	Z	1	1	1	1	1	1	C	C	C	C	5	9	9	12	14	19	18	24	26	25	9.0	26
14-Jan	24	24	25	28	Z	29	29	26	30	28	25	31	29	30	30	30	29	27	26	24	23	31	32	32	27.9	32
15-Jan	32	30	27	21	18	Z	16	16	13	10	15	12	13	18	16	8	3	2	4	6	6	5	6	6	13.1	32
16-Jan	6	6	6	6	7	7	Z	5	4	6	7	5	5	5	5	3	0	0	0	0	0	0	0	0	3.6	7
17-Jan	0	0	0	0	0	0	0	Z	0	2	3	5	10	7	4	3	1	0	0	0	0	0	1	0	1.7	10
18-Jan	1	0	0	1	0	0	4	14	Z	23	21	29	31	32	29	28	26	18	11	10	10	8	11	12	14.0	32
19-Jan	7	5	5	Z	8	14	12	6	7	13	13	10	14	15	14	7	1	1	15	23	22	24	25	27	12.6	27
20-Jan	29	24	17	18	Z	15	15	19	22	21	19	19	19	14	12	9	4	2	1	1	1	1	1	0	12.3	29
21-Jan	1	1	2	11	15	Z	12	7	5	4	6	9	11	10	7	4	1	1	0	0	0	1	9	12	5.6	15
22-Jan	1	1	1	0	1	0	Z	0	0	1	2	3	3	4	4	5	6	5	8	7	5	9	11	12	4.0	12
23-Jan	12	13	11	5	1	3	10	Z	9	9	5	5	7	8	6	5	2	1	1	1	1	1	1	1	5.1	13
24-Jan	1	1	1	1	1	5	11	13	Z	9	19	22	23	22	12	5	1	1	0	2	3	12	10	13	8.1	23
25-Jan	11	17	18	Z	13	11	14	18	20	15	20	19	19	17	11	5	1	0	0	1	0	1	1	4	10.3	20
26-Jan	5	6	7	8	Z	7	5	3	1	2	3	4	4	5	6	5	1	1	1	1	4	30	31	32	7.4	32
27-Jan	34	32	31	34	37	Z	25	29	31	31	22	21	21	21	21	18	19	16	15	15	15	14	13	12	22.9	37
28-Jan	9	3	2	5	2	2	Z	1	1	1	3	3	5	3	2	3	4	3	7	7	14	21	22	27	6.6	27
29-Jan	31	31	28	25	14	21	25	Z	20	14	30	35	35	37	38	34	20	18	26	20	31	29	27	26	26.7	38
30-Jan	24	9	16	25	29	27	27	26	Z	22	17	16	16	20	22	25	23	24	25	26	28	21	25	30	22.8	30
31-Jan	28	19	26	Z	28	22	23	23	20	24	28	22	23	24	22	21	21	18	20	26	30	26	19	15	23.1	30
	11.7	10.4	10.3	10.6	9.8	9.6	12.3	11.7	11.4	11.4	13.7	15.1	16.2	16.4	14.5	12.6	10.8	9.3	10.1	9.8	10.9	13.0	13.3	13.0	Diurnal Average	
	34	32	31	34	37	29	29	29	34	32	34	37	39	39	38	38	39	35	34	34	34	33	34	32	Diurnal Maximum	

Z - zerospan C - Calibration

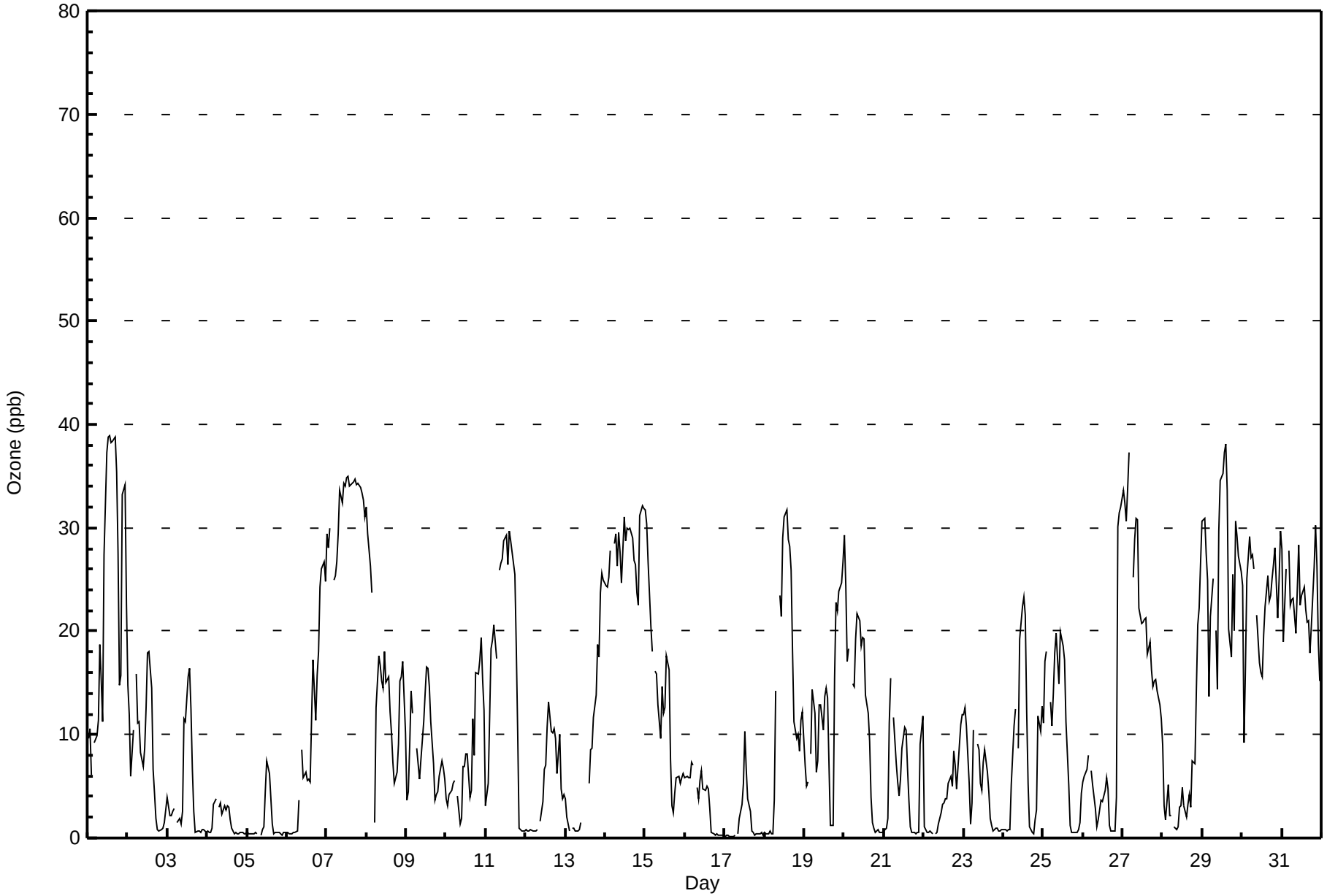
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Ozone (O_3) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	534	75.32	75.32
21 - 50	175	24.68	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	64	31	6	2	2	13	13	32	96	84	46	42	13	6	11	32	493
21 - 50	27	35	14	3	0	1	1	1	5	7	12	40	11	11	1	6	175
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	66	20	5	2	14	14	33	101	91	58	82	24	17	12	38	668

Total Number of Valid Hours: 668

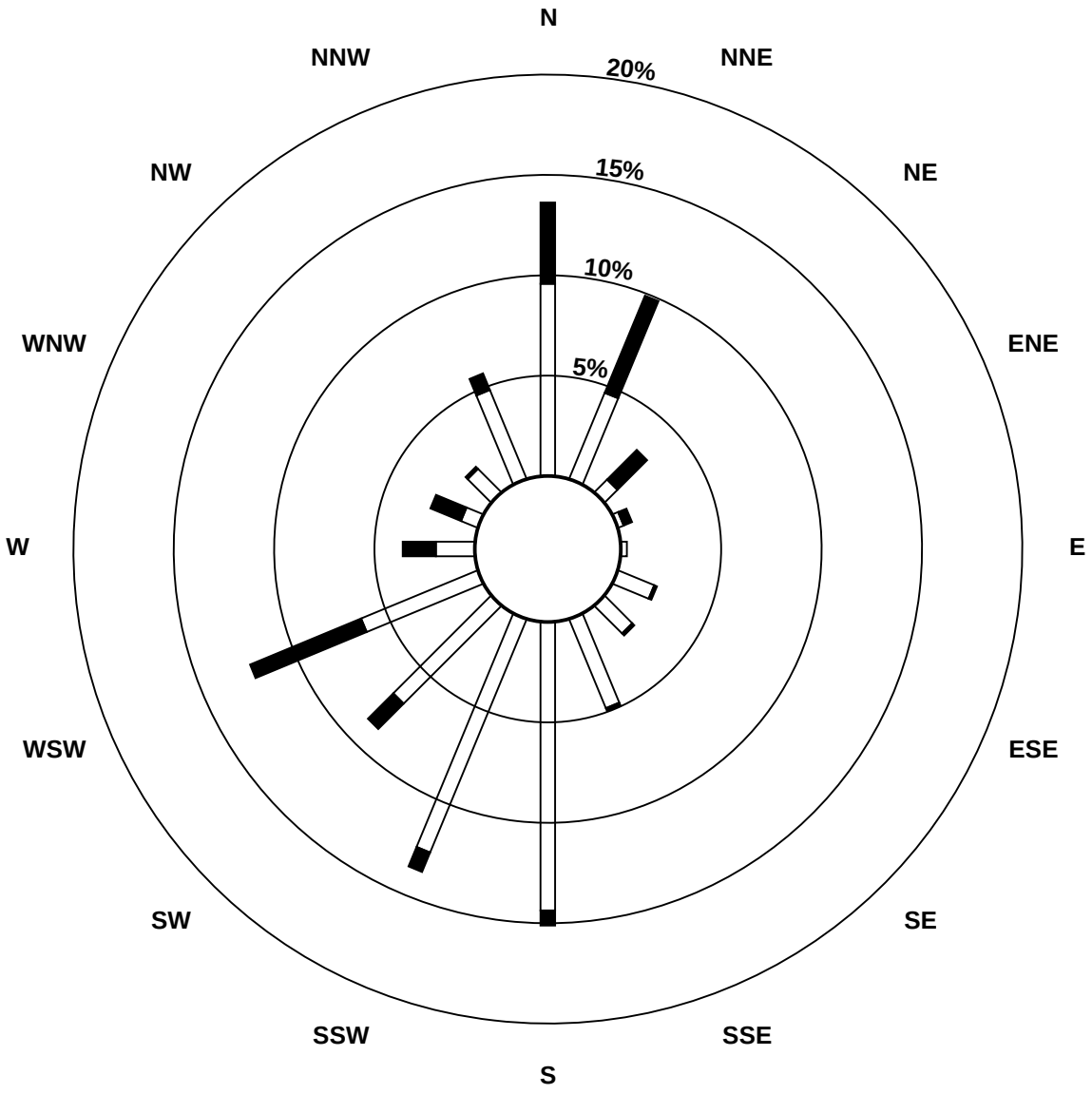
Total Number of Hours: 744

Wood Buffalo Environmental Association

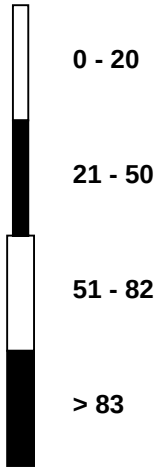
Wind Rose Jan 2016

Ozone (O_3) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



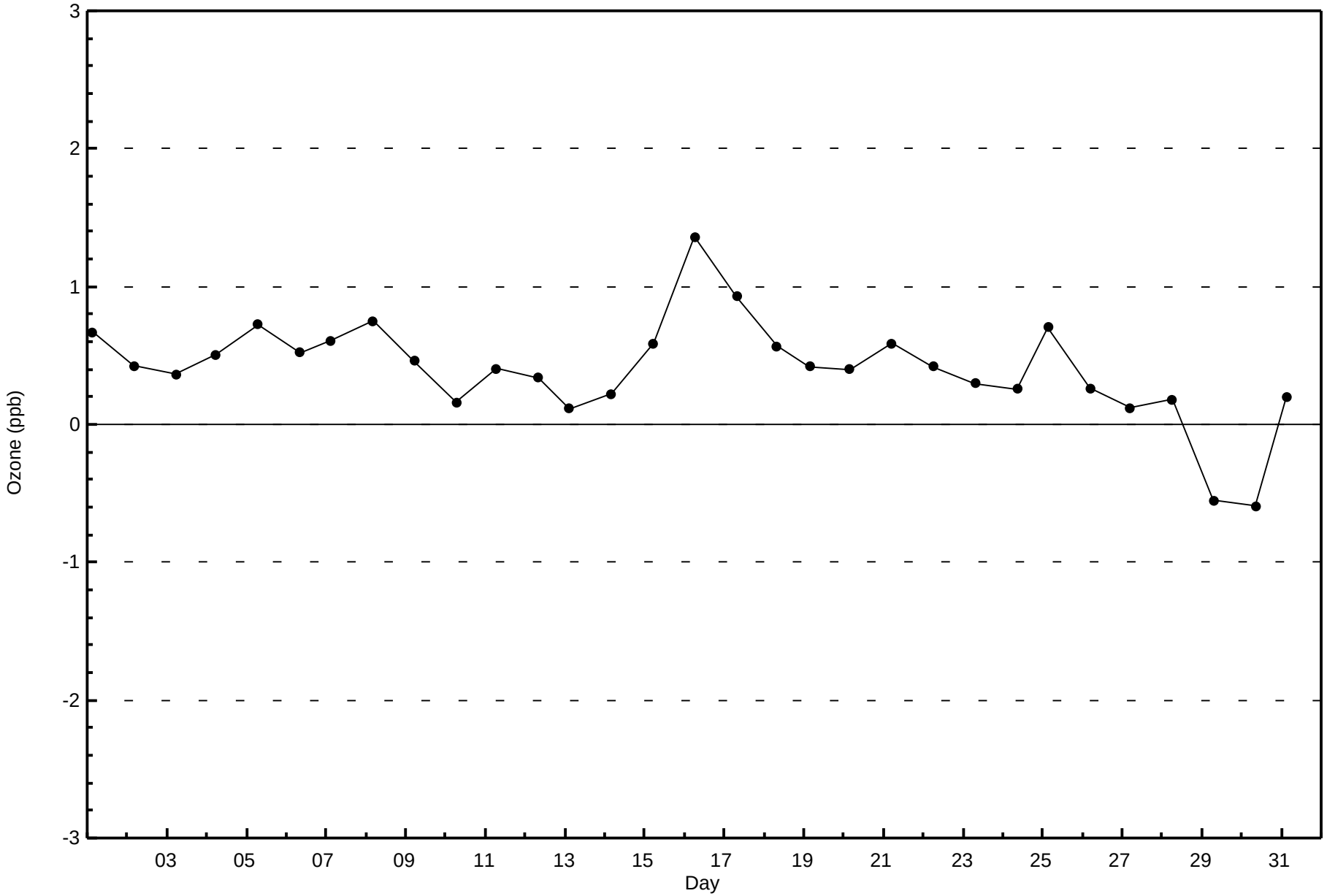
Total Number of Valid Hours: 668

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Fort McKay South - January 2016

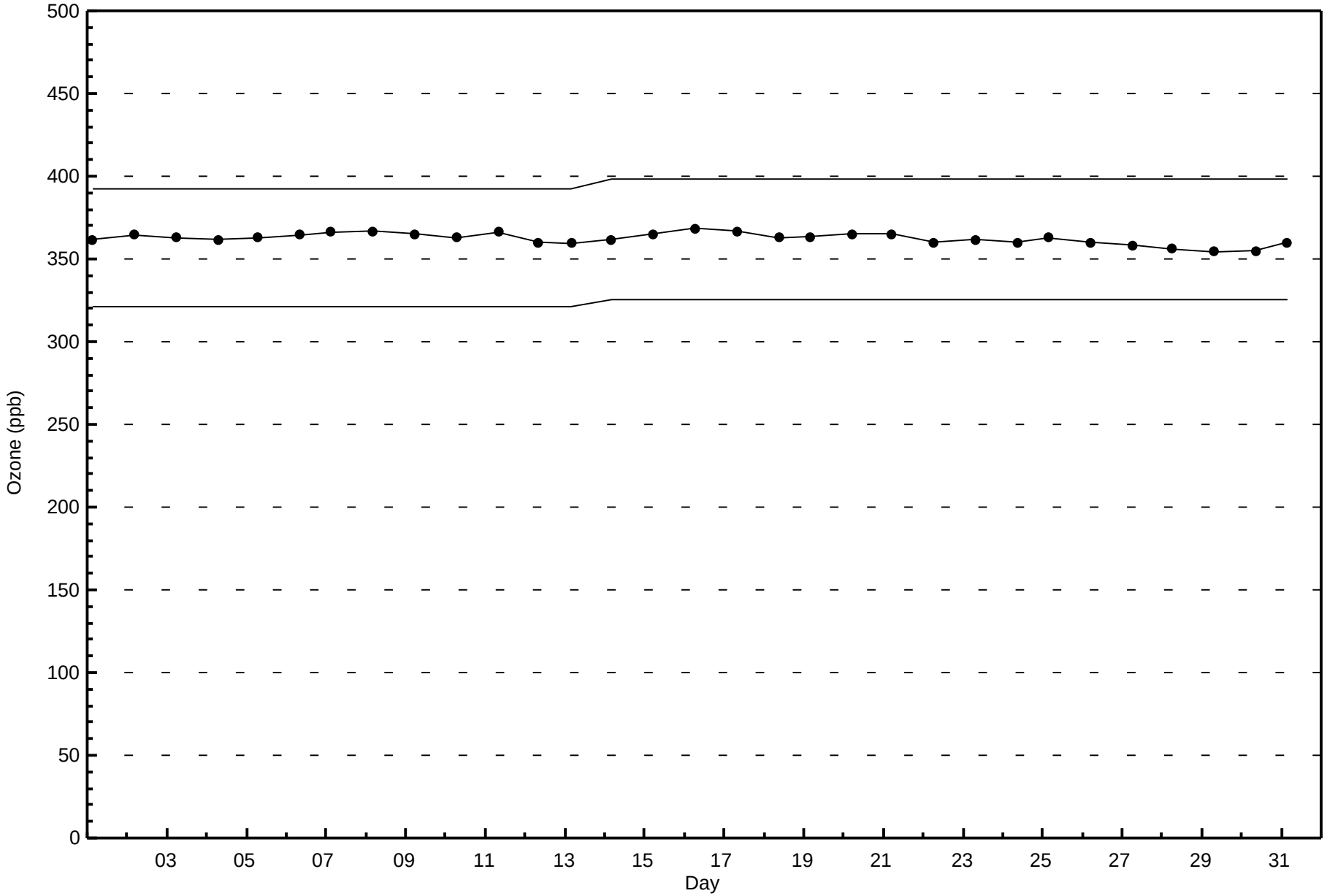


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Fort McKay South - January 2016

Maximum Value: 103 ppb on Jan 17 01:00

Maximum Daily Average: 42.1 ppb on Jan 17

Minimum Value: 0 ppb on Jan 7 18:00

Minimum Daily Average: 0.0 ppb on Jan 29

Maximum Diurnal Average: 13.7 ppb at hour 21

Minimum Diurnal Average: 6.2 ppb at hour 8

Monthly Average: 9.8 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 15$ $P_{90} = 33$ $P_{99} = 75$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
2-Jan	0	Z	1	1	0	0	0	0	0	1	3	6	4	3	3	2	0	4	23	31	35	17	5	2	6.2	35
3-Jan	0	1	Z	4	1	1	2	3	6	9	3	6	5	3	2	1	2	17	25	32	22	16	18	18	8.7	32
4-Jan	14	10	11	Z	1	0	0	1	0	12	14	32	48	44	36	45	36	37	38	36	44	63	74	64	28.7	74
5-Jan	46	25	16	22	Z	56	65	67	58	51	51	27	15	21	17	21	22	21	21	24	28	31	33	35	33.7	67
6-Jan	41	45	43	42	38	Z	33	9	0	2	12	16	21	18	13	4	0	0	0	0	0	0	0	0	14.7	45
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Jan	0	Z	0	0	2	3	1	0	0	0	0	1	3	4	4	2	0	0	0	1	0	0	0	0	1.0	4
9-Jan	3	2	Z	0	0	0	0	0	0	1	4	7	7	6	5	2	1	0	0	0	0	0	0	0	1.8	7
10-Jan	0	1	0	Z	0	0	1	2	12	15	5	6	6	7	23	11	1	1	0	0	0	0	0	0	3.9	23
11-Jan	4	1	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	27	28	21	24	4.7	28
12-Jan	39	54	44	33	32	Z	25	13	16	C	C	C	C	C	4	3	1	0	0	1	0	0	0	0	14.7	54
13-Jan	Z	1	10	17	24	22	22	20	18	17	20	27	24	12	11	2	1	0	0	0	0	0	0	0	10.9	27
14-Jan	0	Z	0	0	0	0	0	0	0	0	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	2
15-Jan	0	0	Z	0	0	0	0	0	0	3	4	12	17	11	8	8	3	1	0	0	0	0	0	0	3.0	17
16-Jan	0	0	0	Z	0	0	0	0	0	2	8	49	70	60	41	32	31	28	27	38	52	67	86	100	30.2	100
17-Jan	103	99	88	79	Z	62	38	25	16	15	45	35	18	34	41	39	33	29	25	23	24	28	31	35	42.1	103
18-Jan	37	37	32	32	21	Z	17	2	0	1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	8.0	37
19-Jan	Z	0	0	0	0	0	0	0	1	1	18	23	17	16	19	13	17	5	1	0	0	0	0	0	5.7	23
20-Jan	0	Z	0	0	0	0	0	0	0	0	2	3	3	11	11	7	3	2	4	27	32	25	18	13	7.0	32
21-Jan	17	11	Z	0	0	0	0	0	0	5	13	8	6	5	11	15	13	12	12	13	11	9	3	1	7.2	17
22-Jan	8	7	16	Z	40	42	37	33	26	21	17	29	31	20	13	5	1	0	0	0	0	0	0	0	15.1	42
23-Jan	0	0	0	0	Z	1	0	0	0	1	5	8	4	4	5	6	6	4	16	78	96	55	30	16	14.7	96
24-Jan	14	7	9	7	22	Z	0	0	0	1	1	0	1	4	10	16	20	24	29	10	2	0	0	0	7.7	29
25-Jan	Z	0	0	0	0	0	0	0	0	1	1	1	4	6	16	27	42	52	47	61	35	13	4	0	13.5	61
26-Jan	0	Z	0	0	0	0	0	0	3	7	12	21	21	25	18	13	12	14	20	23	17	0	0	0	9.0	25
27-Jan	0	0	Z	0	0	0	0	0	0	0	1	3	3	3	2	2	0	0	0	0	0	0	0	0	0.6	3
28-Jan	0	4	3	Z	0	0	1	17	37	44	21	18	6	13	66	26	3	1	0	0	0	0	0	0	11.3	66
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	0	7	0	0	0	Z	0	0	0	0	2	3	4	2	1	0	0	0	0	0	0	0	0	0	0.9	7
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	0	0	0	0	0	0	0	0	0.4	2
	13.1	12.0	10.6	9.2	7.0	7.3	7.8	6.2	6.4	7.1	8.9	11.5	11.4	11.2	12.4	9.9	8.0	8.2	9.3	12.9	13.7	11.4	10.5	10.0	Diurnal Average	
	103	99	88	79	40	62	65	67	58	51	51	49	70	60	66	45	42	52	47	78	96	67	86	100	Diurnal Maximum	

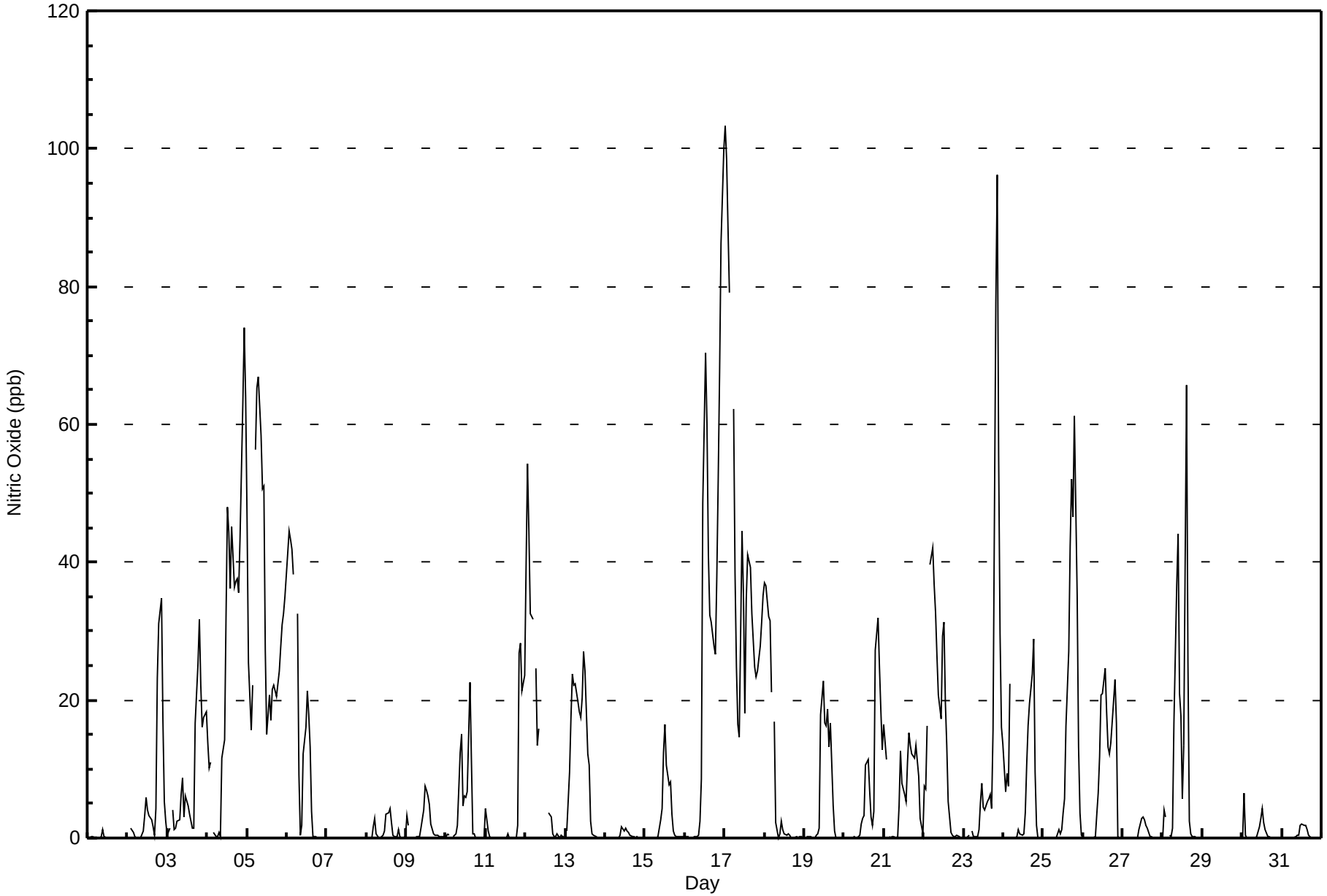
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort McKay South - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	574	81.07	81.07
21 - 40	89	12.57	93.64
11 - 80	39	5.51	99.15
81 - 159	6	0.85	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 - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	84	68	19	5	1	4	11	30	84	65	33	65	18	16	11	33	547
21 - 40	5	1	0	0	0	4	3	3	9	10	14	16	4	4	3	6	82
11 - 80	0	0	0	0	0	5	0	2	6	14	5	3	1	0	1	0	37
81 - 159	0	0	0	0	0	0	0	1	0	1	3	0	0	0	0	0	5
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	69	19	5	1	13	14	36	99	90	55	84	23	20	15	39	671

Total Number of Valid Hours: 671

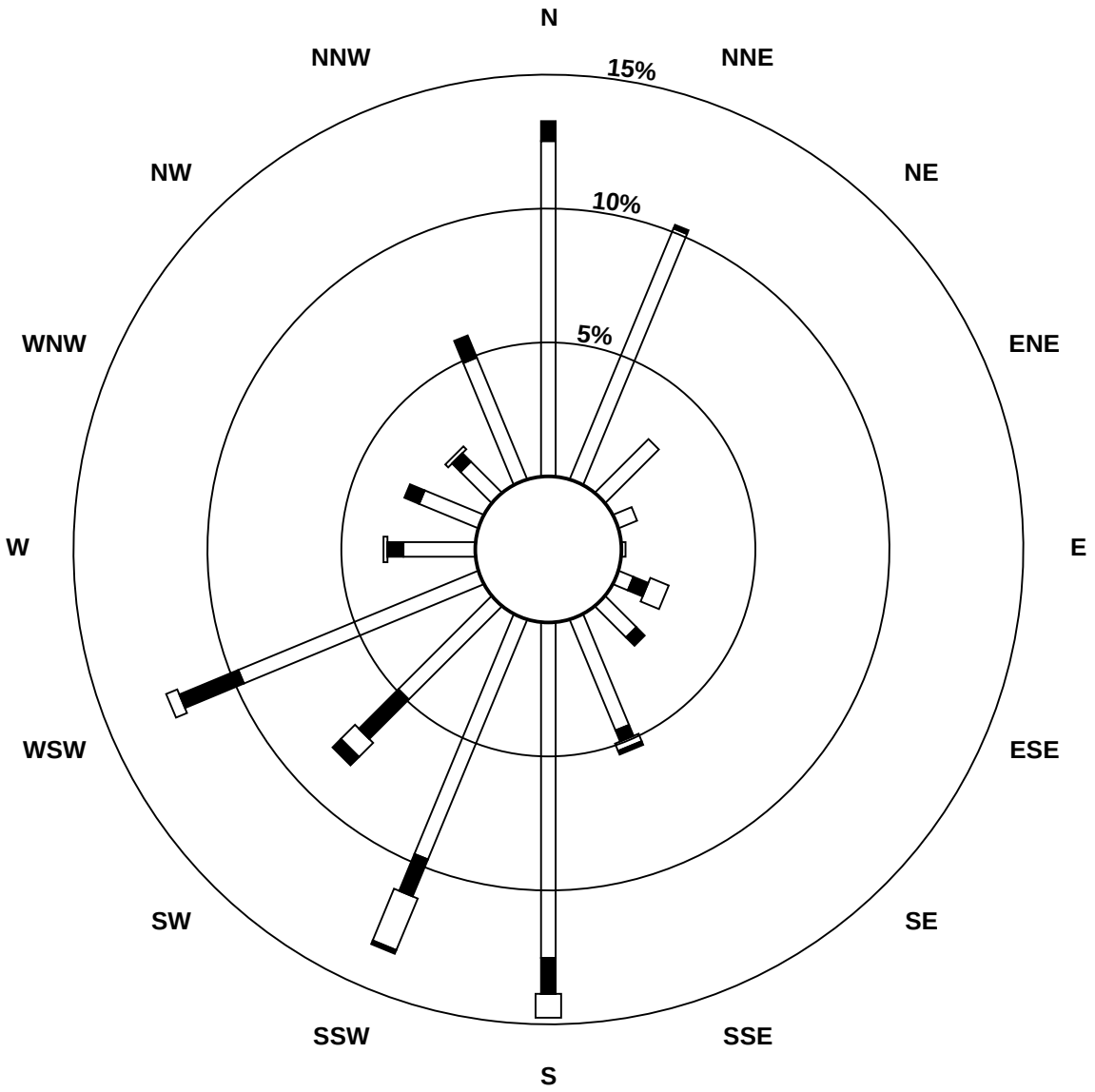
Total Number of Hours: 744

Wood Buffalo Environmental Association

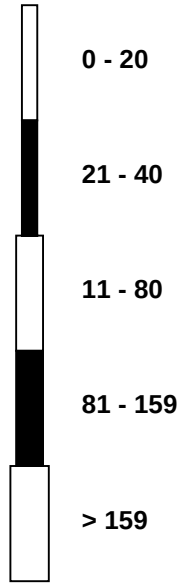
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



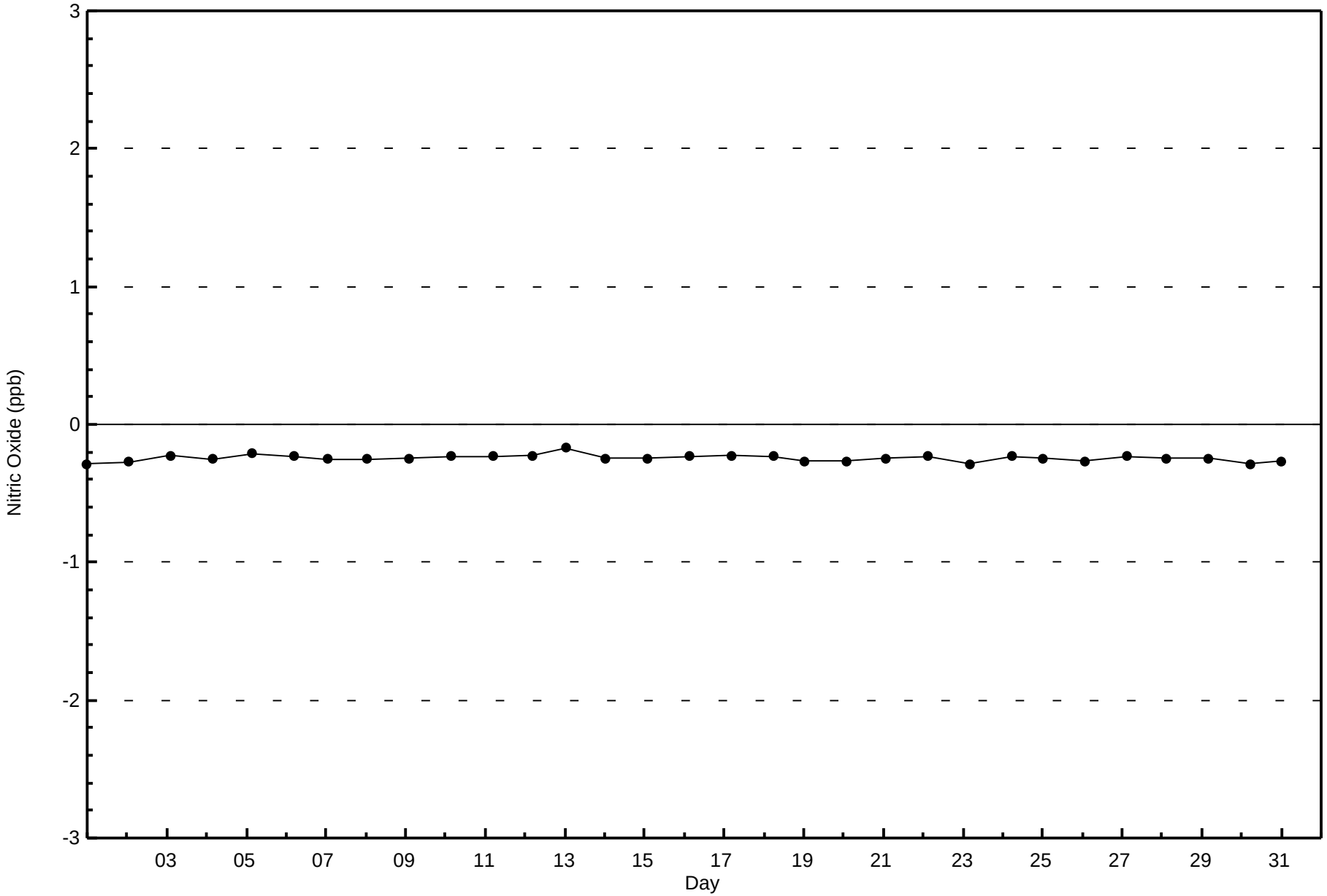
Total Number of Valid Hours: 671

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Fort McKay South - January 2016

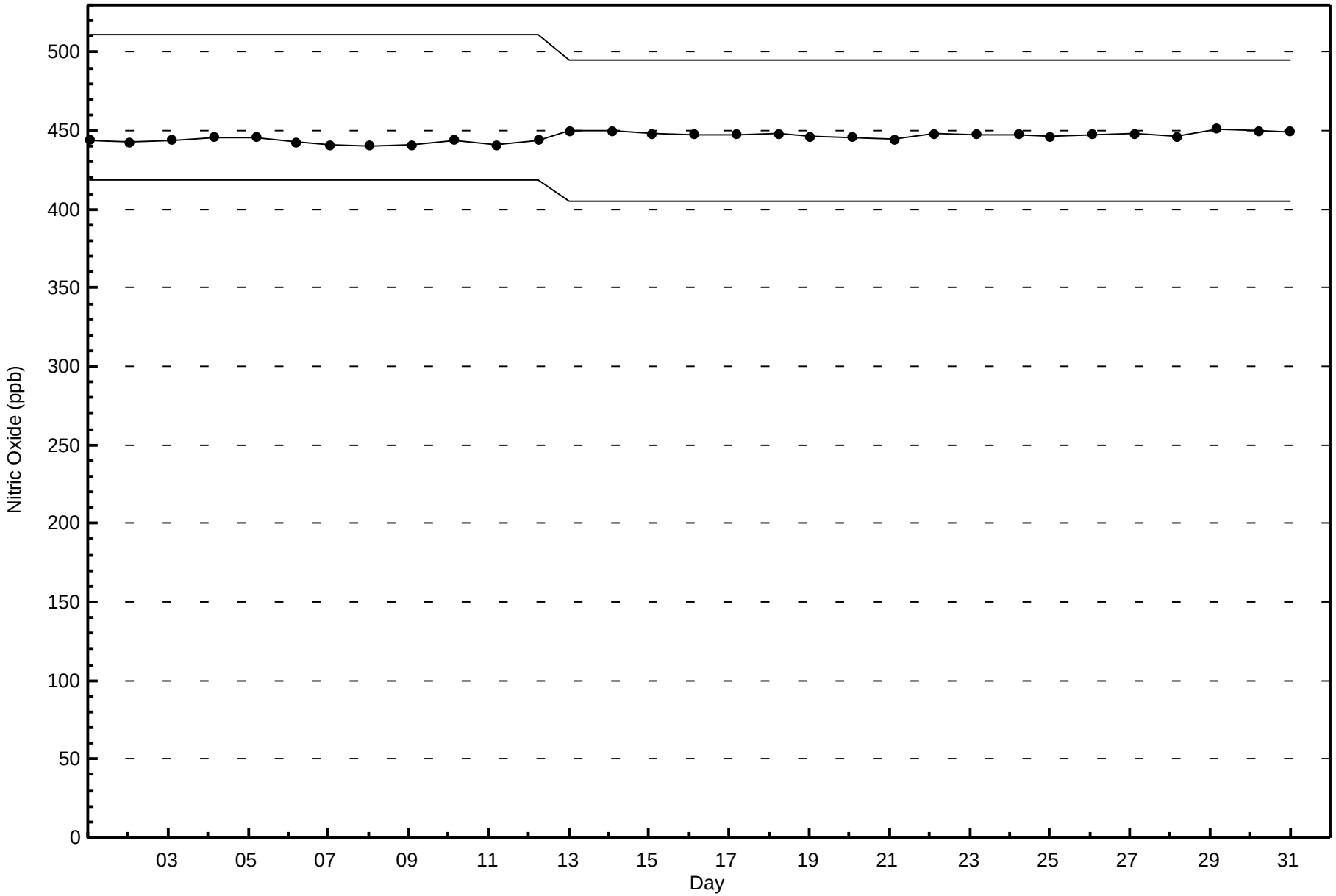


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 34 ppb on Jan 20 21:00

Maximum Daily Average: 21.5 ppb on Jan 17

Minimum Value: 0 ppb on Jan 29 19:00

Minimum Daily Average: 0.4 ppb on Jan 29

Maximum Diurnal Average: 14.5 ppb at hour 16

Minimum Diurnal Average: 9.6 ppb at hour 7

Monthly Average: 11.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 6$ Median = 12 $Q_3 = 17$ $P_{90} = 21$ $P_{99} = 28$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2	8	9	6	7	7	5	13	18	3	1	0	1	1	1	1	1	6	5	4	1	1	0	4.3	18
2-Jan	0	Z	11	16	16	11	6	4	8	8	10	16	13	12	12	10	11	14	17	17	15	17	17	12	11.8	17
3-Jan	9	12	Z	16	13	12	14	17	19	15	10	14	12	11	10	10	14	18	18	18	18	17	17	16	14.3	19
4-Jan	15	13	14	Z	7	6	6	5	5	11	12	14	18	19	13	16	15	16	17	18	17	18	18	18	13.4	19
5-Jan	18	18	17	16	Z	17	16	16	15	14	13	17	17	21	19	16	15	14	14	16	16	16	15	15	16.2	21
6-Jan	16	16	15	14	15	Z	15	16	16	17	22	21	24	24	24	17	12	17	12	11	8	6	5	8	15.2	24
7-Jan	Z	5	4	5	4	6	6	4	2	2	1	1	1	1	2	1	1	1	0	0	0	0	1	3	2.2	6
8-Jan	1	Z	6	7	22	29	15	6	3	2	2	4	9	10	13	15	14	13	13	18	16	12	7	11	10.8	29
9-Jan	24	23	Z	10	8	7	10	14	13	11	15	18	15	15	15	15	15	17	17	14	13	13	13	13	14.3	24
10-Jan	13	15	13	Z	12	16	19	16	21	20	14	14	13	14	20	19	13	17	11	10	8	5	8	11	13.9	21
11-Jan	22	18	14	7	Z	3	3	4	3	1	1	1	1	3	1	1	1	1	1	8	26	24	21	20	8.0	26
12-Jan	20	21	19	17	17	Z	17	22	24	C	C	C	C	C	14	17	16	15	15	19	14	17	13	10	16.9	24
13-Jan	Z	10	14	14	14	13	13	12	11	14	20	22	21	19	19	16	17	15	13	9	11	6	5	6	13.6	22
14-Jan	7	Z	8	5	6	6	6	10	8	9	14	8	10	7	7	7	8	10	9	12	13	4	2	2	7.7	14
15-Jan	2	3	Z	6	8	7	8	10	14	19	17	22	23	19	20	26	26	24	19	16	15	14	12	10	14.7	26
16-Jan	8	7	9	Z	6	5	6	8	11	9	9	21	28	28	27	26	25	23	21	21	21	21	22	24	16.7	28
17-Jan	25	24	22	21	Z	19	18	17	18	16	21	23	17	27	28	30	26	24	22	20	20	19	18	19	21.5	30
18-Jan	20	19	19	20	23	Z	25	21	8	12	14	8	5	5	7	8	8	9	14	21	20	20	17	13	14.6	25
19-Jan	Z	13	12	11	8	6	10	18	18	10	15	19	14	12	18	20	25	24	11	4	5	3	2	2	12.1	25
20-Jan	2	Z	15	13	10	15	15	10	8	10	13	12	12	20	22	22	22	23	26	33	34	31	29	25	18.3	34
21-Jan	23	18	Z	8	7	7	9	12	11	11	13	13	12	11	16	19	18	15	15	14	14	13	12	15	13.2	23
22-Jan	25	20	20	Z	17	16	15	13	12	10	9	16	20	18	16	14	11	13	11	11	13	10	9	9	14.2	25
23-Jan	9	8	9	14	Z	17	9	10	10	11	15	16	12	11	14	15	17	17	18	24	24	21	18	16	14.6	24
24-Jan	14	13	14	14	15	Z	5	4	6	6	3	2	2	6	17	23	19	17	16	19	16	9	11	8	11.2	23
25-Jan	Z	4	3	3	5	5	5	7	7	12	6	6	9	12	20	27	28	23	19	17	13	9	8	7	11.1	28
26-Jan	6	Z	3	2	3	3	4	6	10	9	12	19	21	22	21	18	11	10	10	15	13	2	1	1	9.6	22
27-Jan	1	1	Z	1	1	1	1	0	0	0	4	7	8	7	6	9	8	10	11	10	9	10	10	10	5.5	11
28-Jan	12	18	17	Z	12	10	10	19	14	8	15	16	14	18	24	17	14	12	10	13	5	1	1	1	12.2	24
29-Jan	1	1	1	1	Z	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1
30-Jan	0	15	6	2	0	Z	0	1	1	2	8	11	12	8	6	2	6	6	3	3	2	10	7	1	4.9	15
31-Jan	Z	10	3	1	1	6	6	6	9	7	3	10	10	9	11	12	12	14	11	5	2	3	3	2	6.8	14
	11.7	12.5	11.3	9.7	9.8	9.6	9.6	10.1	10.2	9.8	10.5	12.4	12.4	13.0	14.2	14.5	13.8	13.9	12.9	13.6	13.0	11.3	10.4	9.9	Diurnal Average	
	25	24	22	21	23	29	25	22	24	20	22	23	28	28	28	30	28	24	26	33	34	31	29	25	Diurnal Maximum	

Z - zerospan C - Calibration

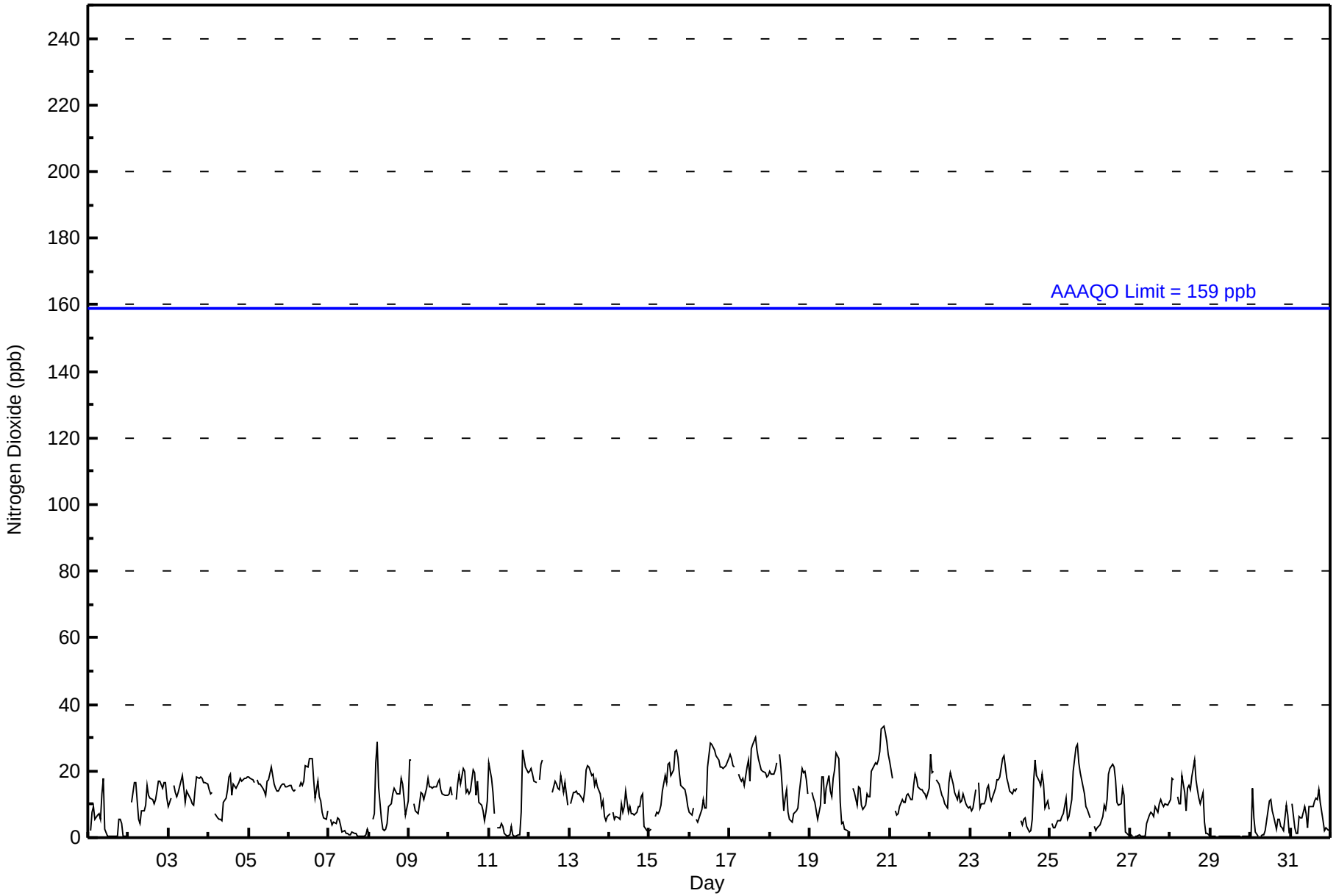
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	629	88.84	88.84
21 - 40	79	11.16	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	79	64	19	5	1	8	7	28	92	81	46	78	21	19	13	37	598
21 - 40	10	5	0	0	0	5	7	8	7	9	9	6	2	1	2	2	73
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	89	69	19	5	1	13	14	36	99	90	55	84	23	20	15	39	671

Total Number of Valid Hours: 671

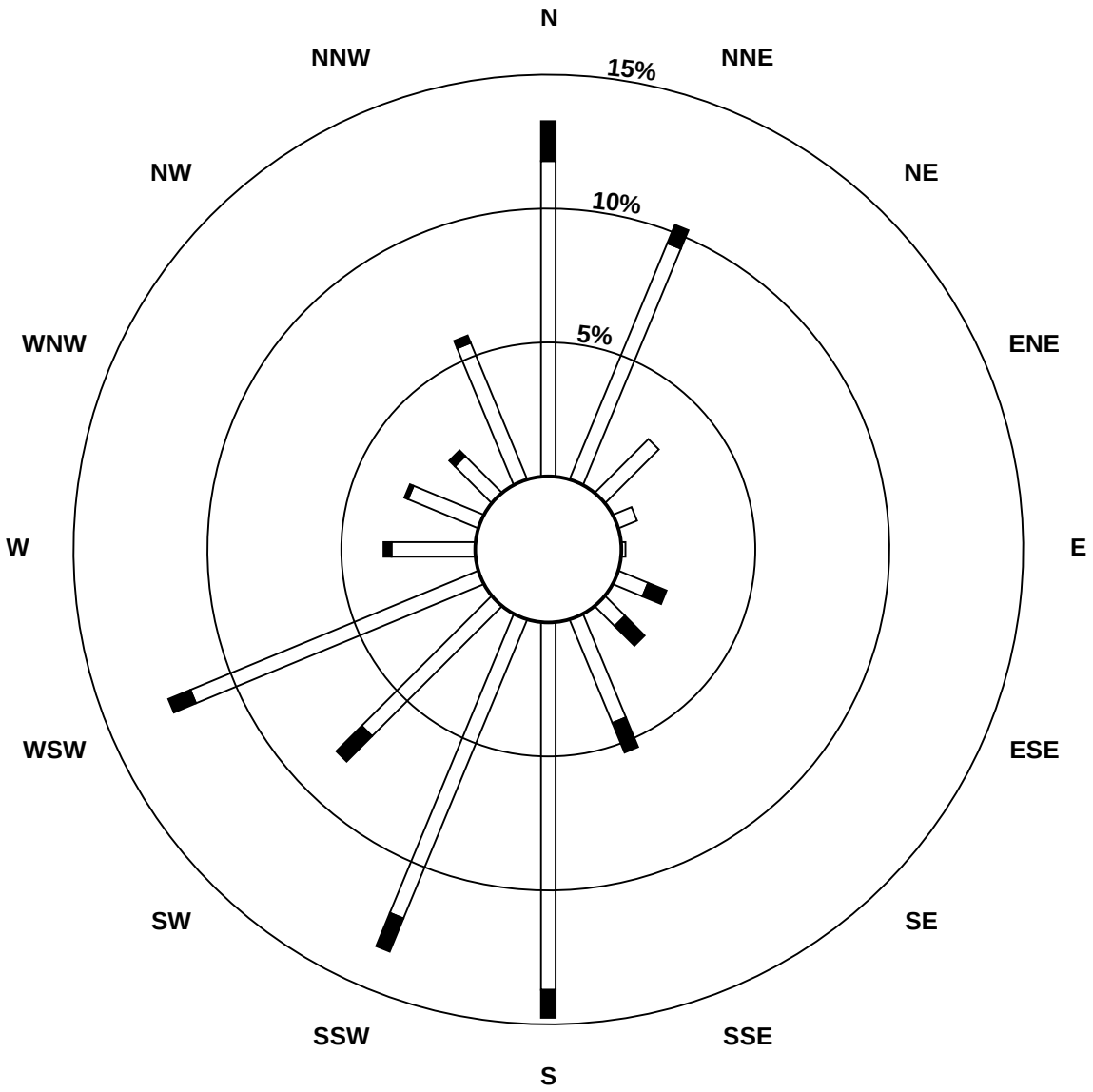
Total Number of Hours: 744

Wood Buffalo Environmental Association

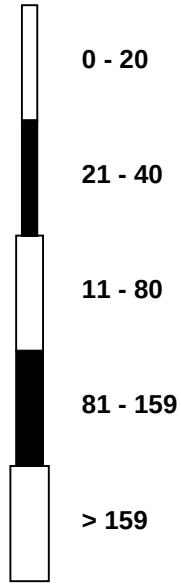
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



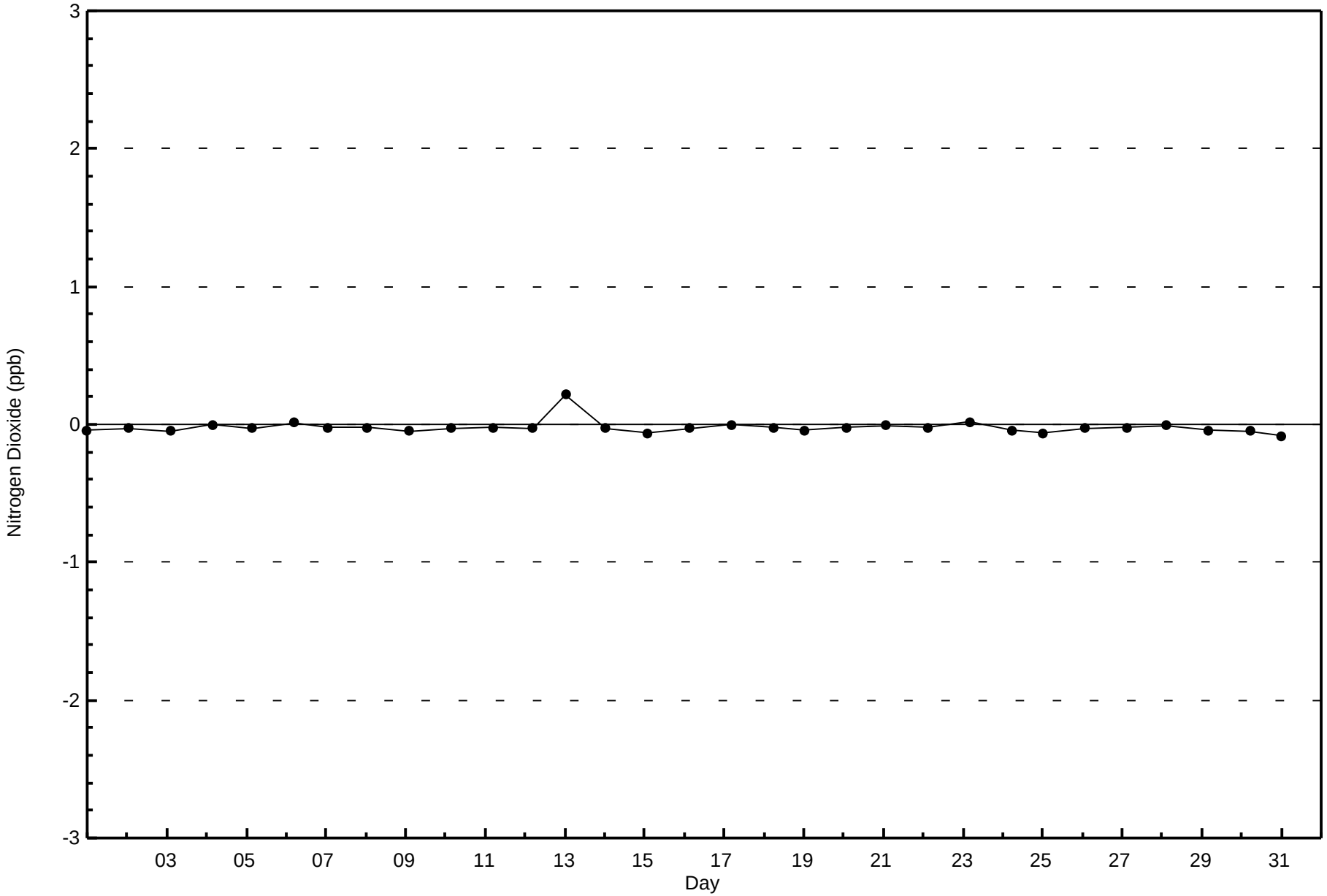
Total Number of Valid Hours: 671

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - January 2016

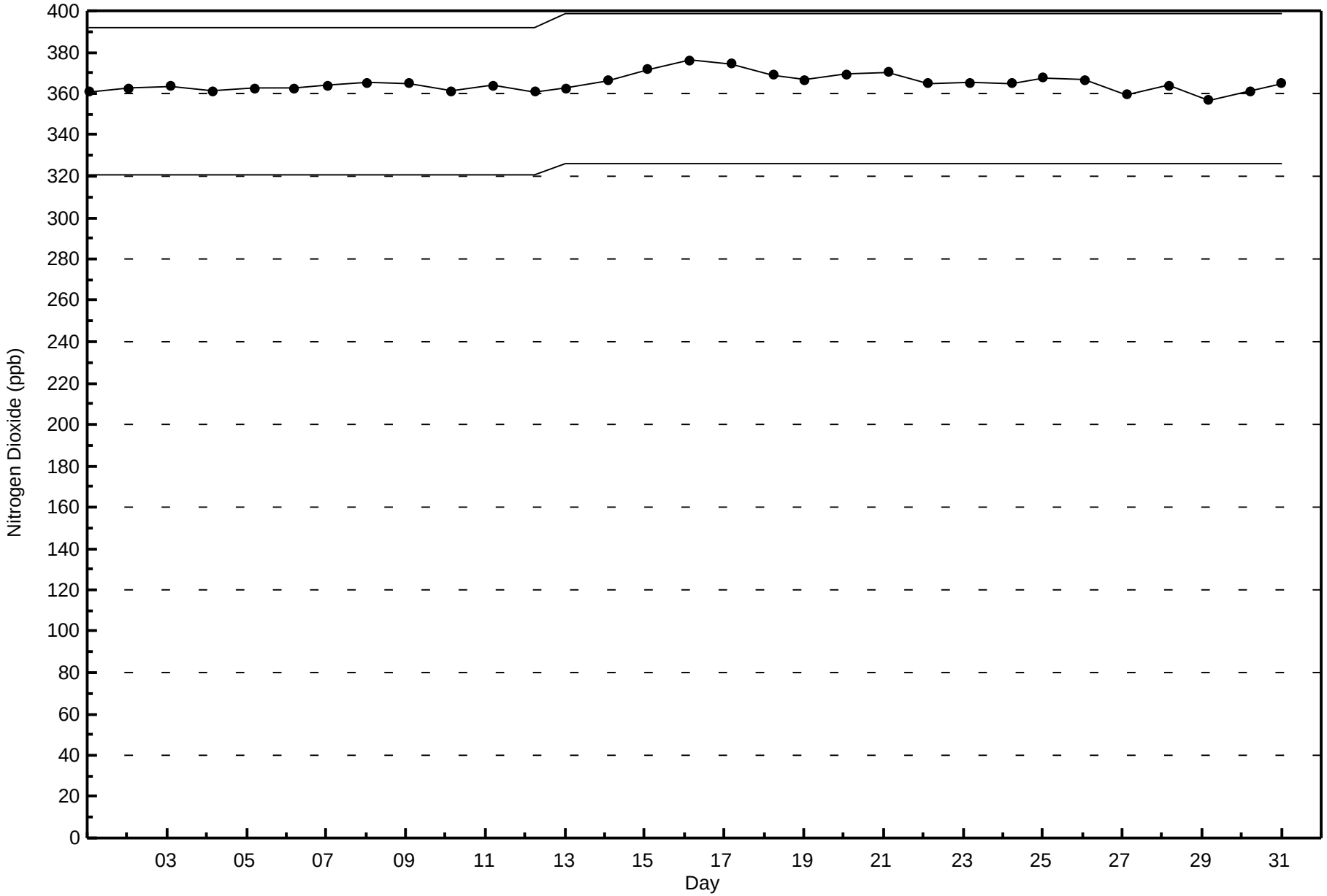


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - January 2016

Maximum Value: 128 ppb on Jan 17 01:00

Maximum Daily Average: 63.6 ppb on Jan 17

Minimum Value: 0 ppb on Jan 29 19:00

Minimum Daily Average: 0.4 ppb on Jan 29

Maximum Diurnal Average: 26.8 ppb at hour 21

Minimum Diurnal Average: 16.3 ppb at hour 8

Monthly Average: 21.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 6$ Median = 14 $Q_3 = 32$ $P_{90} = 51$ $P_{99} = 98$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2	8	9	6	7	7	5	13	19	3	1	1	0	0	1	0	0	6	6	4	1	0	0	4.4	19
2-Jan	0	Z	12	17	17	11	6	4	8	9	13	21	17	15	14	12	12	18	40	48	50	34	22	14	18.0	50
3-Jan	10	13	Z	20	15	14	16	20	25	24	13	20	17	15	13	11	16	35	43	50	40	33	34	34	23.0	50
4-Jan	28	23	25	Z	8	6	6	6	5	22	26	46	66	63	49	61	51	53	54	53	60	80	92	82	42.1	92
5-Jan	65	43	33	39	Z	73	81	83	73	64	64	44	32	42	36	38	37	35	35	40	44	47	48	50	49.8	83
6-Jan	57	60	58	56	53	Z	48	26	16	19	34	37	45	42	37	21	12	17	12	11	8	6	5	8	29.9	60
7-Jan	Z	5	4	4	4	6	6	4	2	2	2	2	1	1	2	1	1	1	0	0	0	0	1	2	2.2	6
8-Jan	1	Z	6	7	24	31	16	6	3	2	3	5	13	14	17	17	14	13	13	19	16	12	7	11	11.8	31
9-Jan	27	25	Z	10	8	7	10	14	13	13	19	25	22	21	20	17	16	17	18	15	14	13	13	13	16.1	27
10-Jan	13	16	13	Z	12	16	20	18	33	35	18	20	19	21	43	31	13	17	11	10	8	5	8	11	17.8	43
11-Jan	27	19	14	7	Z	3	3	4	3	1	1	0	1	4	1	0	1	1	1	10	53	52	42	43	12.7	53
12-Jan	59	75	64	49	49	Z	42	36	39	C	C	C	C	C	17	20	16	15	15	19	14	17	13	10	31.6	75
13-Jan	Z	11	23	31	38	35	36	31	29	31	41	49	45	31	30	18	18	15	13	9	11	6	5	6	24.5	49
14-Jan	7	Z	8	5	6	6	6	10	8	10	16	9	11	8	8	7	8	10	9	12	13	4	2	2	8.0	16
15-Jan	2	3	Z	6	8	7	8	10	14	22	21	35	39	29	28	34	30	25	20	16	15	15	12	10	17.7	39
16-Jan	8	7	9	Z	6	5	6	9	12	11	18	70	99	88	68	59	56	51	48	59	73	89	108	124	46.9	124
17-Jan	128	122	110	100	Z	81	56	42	34	30	66	59	35	61	69	70	59	53	47	44	44	47	50	54	63.6	128
18-Jan	57	56	51	52	44	Z	42	23	8	13	17	9	6	5	8	8	8	9	14	21	20	20	18	13	22.6	57
19-Jan	Z	14	12	11	8	6	10	19	19	12	33	41	31	29	37	34	42	29	12	4	5	3	2	2	17.9	42
20-Jan	2	Z	15	13	10	15	15	10	8	10	15	15	15	31	33	29	25	25	30	60	66	56	47	38	25.4	66
21-Jan	39	29	Z	8	7	7	10	12	11	15	25	21	18	16	27	34	31	28	26	28	25	22	15	15	20.4	39
22-Jan	32	27	36	Z	57	58	52	46	38	31	26	46	51	37	29	19	12	14	11	11	14	10	10	9	29.4	58
23-Jan	9	8	9	15	Z	17	9	11	10	12	20	24	17	15	19	21	24	21	34	102	121	77	48	32	29.3	121
24-Jan	28	20	24	21	37	Z	5	4	6	7	4	2	3	9	28	39	38	41	45	29	18	9	11	8	18.9	45
25-Jan	Z	4	3	3	5	5	5	7	7	13	6	8	12	17	36	54	70	75	66	79	48	23	12	8	24.6	79
26-Jan	6	Z	3	2	3	3	4	7	13	15	23	40	42	47	39	31	23	24	30	38	29	2	1	1	18.5	47
27-Jan	1	1	Z	1	1	1	1	0	0	0	6	10	11	10	8	11	8	10	11	10	9	10	10	11	6.1	11
28-Jan	12	22	20	Z	13	11	12	35	50	52	36	33	20	32	89	43	17	13	11	14	5	1	1	1	23.5	89
29-Jan	1	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0.4	1
30-Jan	0	22	6	2	0	Z	0	1	1	2	10	14	16	10	8	3	6	6	3	3	2	10	7	1	5.8	22
31-Jan	Z	10	3	1	1	6	6	6	9	8	3	11	12	11	13	13	12	14	11	5	2	3	3	2	7.2	14
	24.8	24.5	21.9	18.9	16.8	16.9	17.5	16.3	16.6	16.9	19.4	23.9	23.9	24.1	26.7	24.4	21.8	22.1	22.2	26.6	26.8	22.8	20.9	19.9	Diurnal Average	
	128	122	110	100	57	81	81	83	73	64	66	70	99	88	89	70	70	75	66	102	121	89	108	124	Diurnal Maximum	

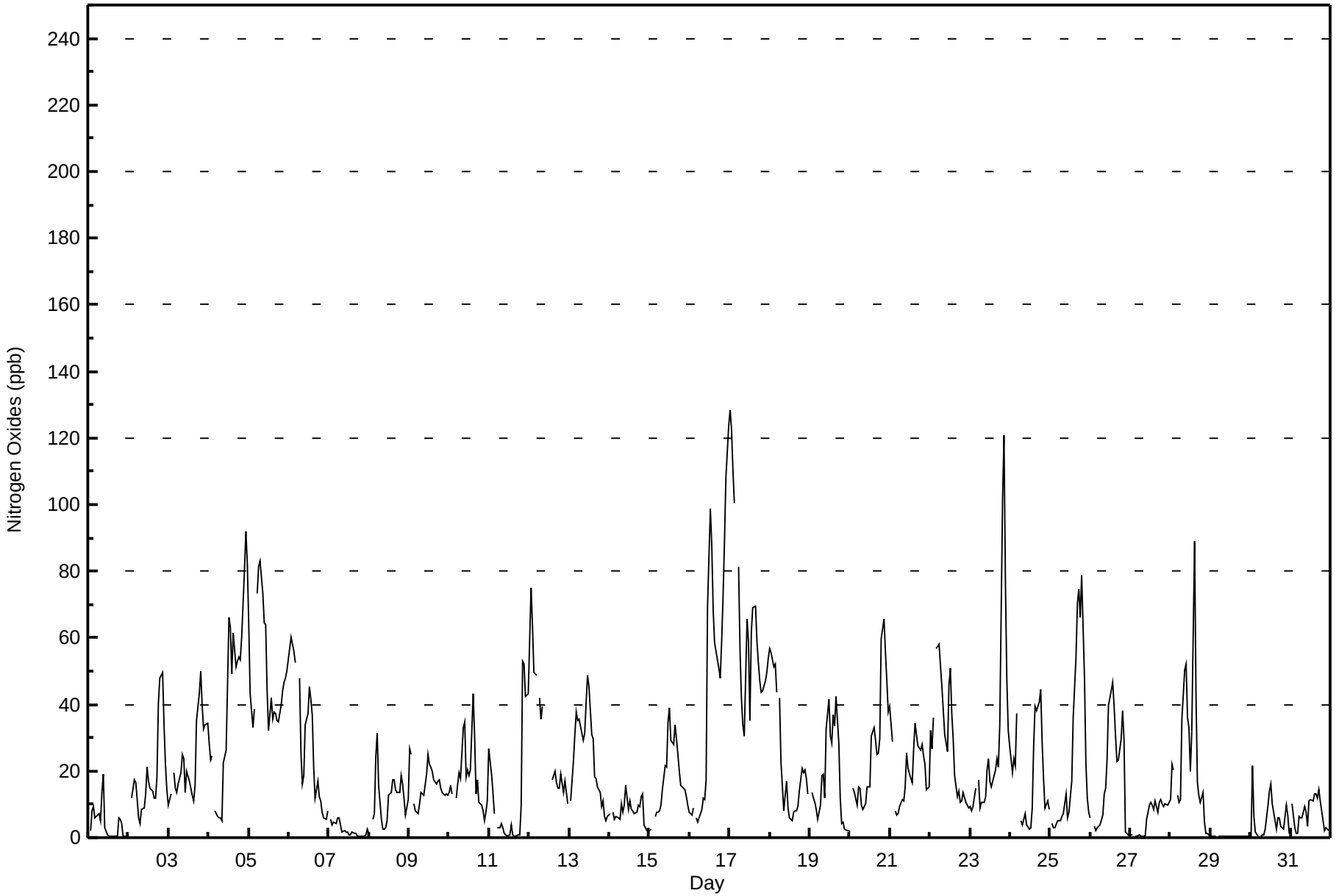
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - January 2016



Nitrogen Oxides (NO_X) - ppb
Fort McKay South - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	454	64.12	64.12
21 - 40	132	18.64	82.77
11 - 80	105	14.83	97.60
81 - 159	15	2.12	99.72
> 159	0	0.00	99.72

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 - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	62	57	19	5	1	3	6	20	68	46	24	56	16	15	7	27	432
21 - 40	21	9	0	0	0	1	3	10	19	21	9	12	2	4	6	9	126
11 - 80	6	3	0	0	0	7	5	5	10	16	19	16	5	1	2	3	98
81 - 159	0	0	0	0	0	2	0	1	2	5	3	0	0	0	0	0	13
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	69	19	5	1	13	14	36	99	88	55	84	23	20	15	39	669

Total Number of Valid Hours: 671

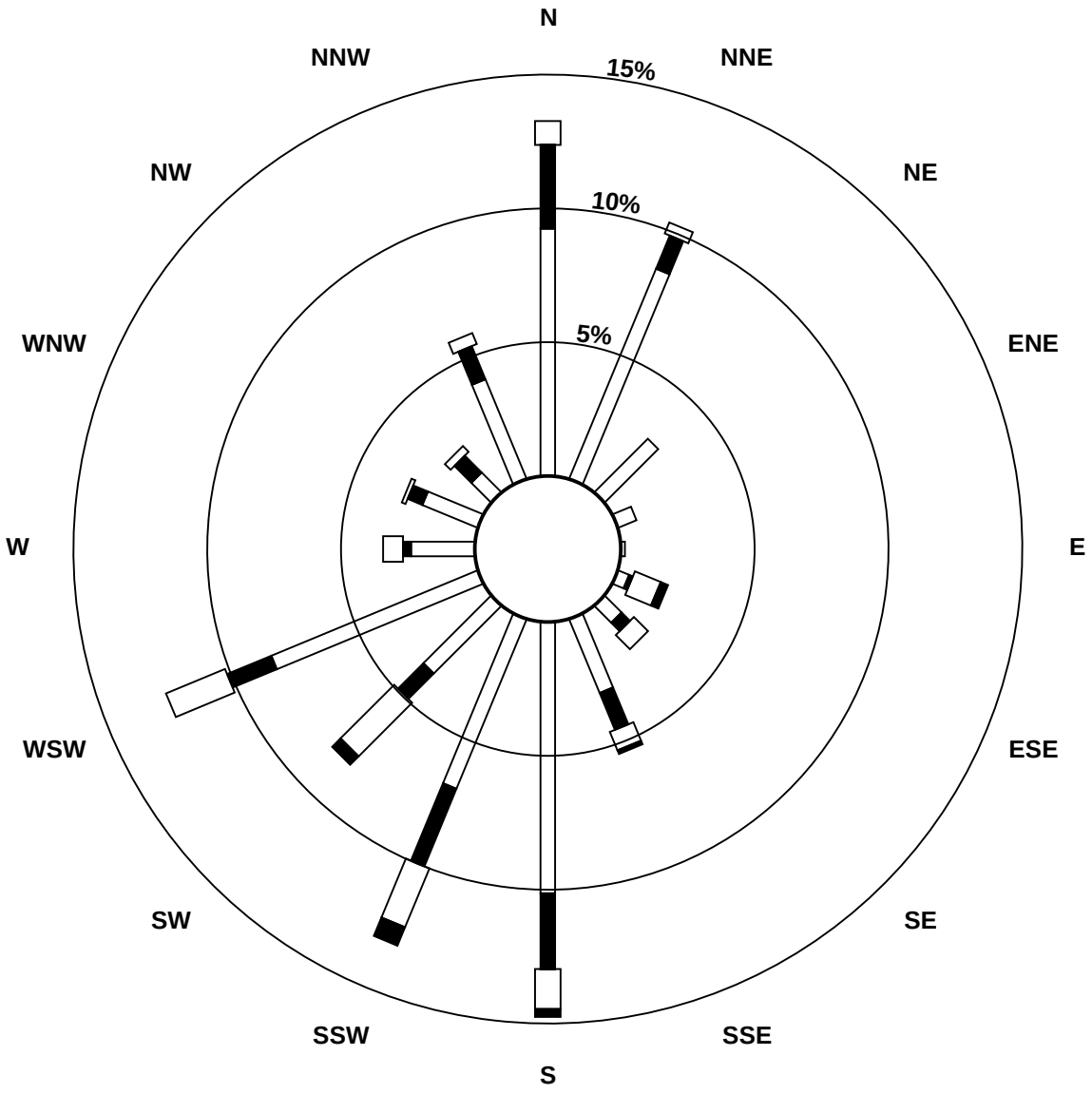
Total Number of Hours: 744

Wood Buffalo Environmental Association

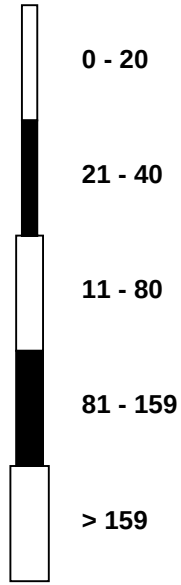
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



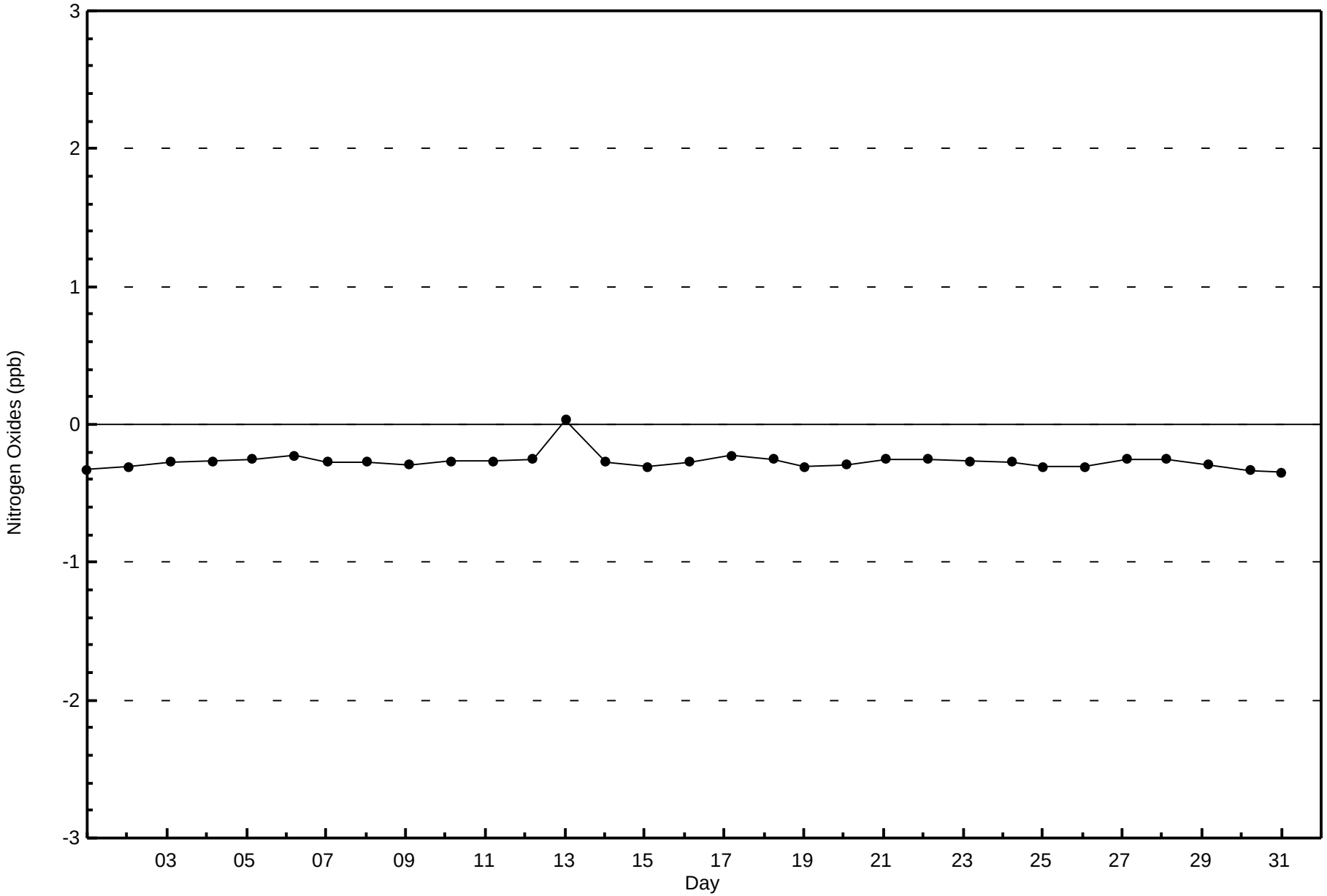
Total Number of Valid Hours: 671

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - January 2016

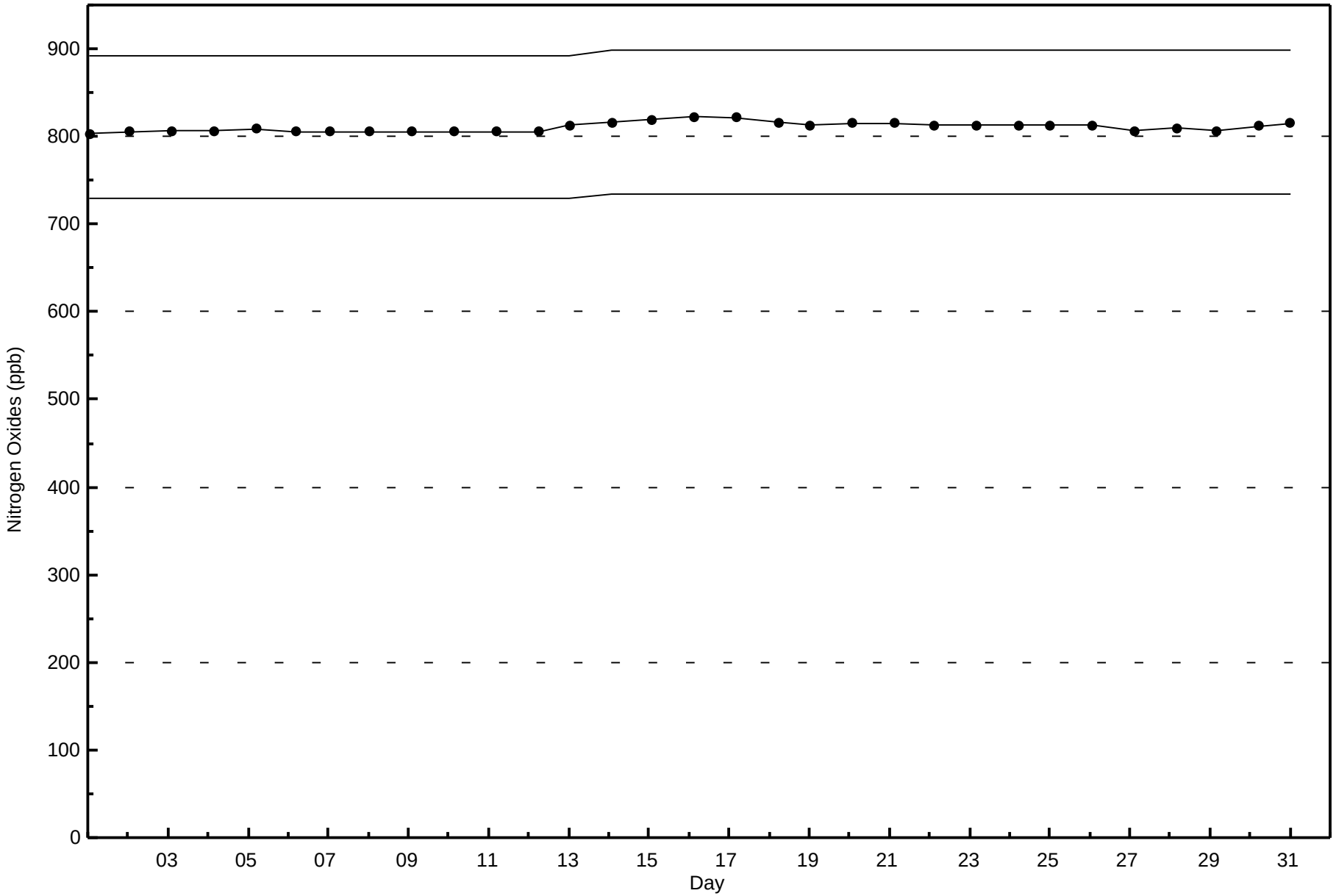


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Fort McKay South - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 20.0 $\mu g/m^3$ on Jan 28 02:00

Maximum Daily Average: 12.7 $\mu g/m^3$ on Jan 23

Minimum Value: 0.7 $\mu g/m^3$ on Jan 7 22:00

Minimum Daily Average: 1.1 $\mu g/m^3$ on Jan 7

Maximum Diurnal Average: 6.4 $\mu g/m^3$ at hour 16

Minimum Diurnal Average: 4.3 $\mu g/m^3$ at hour 9

Monthly Average: 5.14 $\mu g/m^3$

Percentiles: $P_1 = 0.9$ $P_{10} = 1.5$ $Q_1 = 2.3$ Median = 4.2 $Q_3 = 6.8$ $P_{90} = 10.5$ $P_{99} = 16.1$

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Hours of Calibration:	1
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	3.1	3.7	3.8	3.4	2.8	2.3	2.3	1.9	2.0	2.0	1.8	2.0	1.8	1.2	1.2	1.3	1.5	1.4	2.0	2.0	2.0	2.2	2.1	1.8	2.1	3.8
2-Jan	1.6	2.5	3.3	3.8	3.9	3.9	2.9	3.2	3.7	3.4	3.5	3.5	4.8	6.9	8.8	9.0	10.4	9.4	7.5	7.8	8.4	12.4	12.1	8.0	6.0	12.4
3-Jan	5.4	5.5	7.5	7.7	7.6	7.3	7.6	7.4	7.1	6.6	5.6	6.1	6.3	7.7	6.0	8.6	11.8	9.5	8.0	7.4	7.0	6.2	6.0	5.3	7.1	11.8
4-Jan	4.5	4.1	4.3	4.3	3.5	3.4	3.4	3.1	3.0	3.6	4.1	4.8	9.1	10.2	12.5	14.0	14.9	16.1	9.8	7.2	5.8	5.2	4.9	5.3	6.7	16.1
5-Jan	4.5	4.4	4.9	4.6	5.3	5.3	5.2	4.6	4.4	4.0	4.0	6.1	6.1	8.0	7.8	7.3	7.1	7.0	8.1	8.1	7.4	6.9	6.0	5.5	5.9	8.1
6-Jan	5.7	5.7	5.4	5.4	4.8	4.6	4.7	5.3	5.8	6.6	6.6	7.5	7.8	7.2	5.3	3.6	2.2	2.4	2.2	1.5	1.1	1.0	1.0	0.9	4.3	7.8
7-Jan	1.0	1.5	1.0	0.9	0.9	1.1	1.1	1.2	1.3	1.4	1.5	1.5	1.3	1.2	1.4	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.8	1.0	1.1	1.5
8-Jan	0.9	1.2	1.9	3.8	5.5	3.9	3.7	3.1	2.8	3.3	3.9	4.4	4.5	4.4	6.2	7.1	6.3	5.4	4.2	2.9	2.1	1.3	0.9	1.1	3.5	7.1
9-Jan	2.6	3.5	4.6	5.4	4.5	4.5	4.4	4.7	4.2	3.8	5.9	9.3	13.6	12.8	9.3	11.0	11.1	10.0	8.6	6.5	5.7	6.5	7.7	7.9	7.0	13.6
10-Jan	9.0	9.5	10.5	9.3	10.0	12.5	13.3	13.2	13.6	13.5	11.0	12.0	9.8	9.8	12.9	11.7	6.7	5.6	4.2	3.8	3.8	3.6	3.5	3.6	9.0	13.6
11-Jan	3.4	3.0	2.7	2.2	1.9	1.7	1.6	1.6	1.4	1.5	1.5	1.3	0.8	0.9	0.8	0.8	1.0	1.2	1.1	1.2	2.1	1.7	1.3	1.8	1.6	3.4
12-Jan	2.1	2.4	2.2	2.0	2.3	2.5	2.5	3.0	3.0	3.9	4.3	3.9	5.0	4.3	4.1	4.3	3.2	2.8	3.9	6.8	4.8	6.4	5.2	4.2	3.7	6.8
13-Jan	4.4	4.5	4.3	4.8	5.0	5.0	5.0	4.5	4.5	8.3	14.6	13.4	11.2	9.0	9.3	8.2	7.3	6.8	6.1	5.6	4.9	3.1	3.1	3.4	6.5	14.6
14-Jan	3.3	3.5	3.4	3.2	2.9	2.0	1.7	1.7	1.5	1.5	1.5	C	2.9	2.4	2.0	2.1	2.6	3.0	3.0	3.3	3.8	3.8	3.3	2.8	2.7	3.8
15-Jan	2.6	2.0	2.0	2.4	2.7	3.0	2.9	2.9	3.0	2.8	3.2	4.0	4.2	3.3	2.5	2.9	3.0	3.2	3.0	2.5	2.3	2.1	1.7	2.0	2.8	4.2
16-Jan	1.2	1.0	1.3	1.4	1.4	1.3	1.5	2.0	3.3	3.7	5.9	10.0	13.2	11.7	10.8	11.0	10.1	12.5	14.5	15.3	11.3	8.4	6.6	6.8	6.9	15.3
17-Jan	5.9	4.8	4.5	5.1	5.4	4.8	4.7	4.1	4.1	3.9	9.3	8.6	8.4	12.5	6.5	8.8	6.6	6.1	5.3	4.5	4.0	3.8	3.2	3.0	5.7	12.5
18-Jan	3.3	3.0	2.7	2.7	3.1	3.4	3.1	2.4	1.3	1.1	1.2	1.3	1.1	1.2	1.5	1.5	1.6	1.6	1.7	2.1	2.5	2.7	2.5	2.5	2.1	3.4
19-Jan	3.9	4.4	4.9	5.3	4.7	3.9	4.0	5.5	5.1	4.3	4.7	4.4	3.9	3.5	3.6	4.1	5.7	5.3	6.1	5.8	4.4	3.2	3.4	3.4	4.5	6.1
20-Jan	3.1	2.2	1.9	1.8	1.9	2.0	1.8	1.7	2.0	1.9	1.9	1.8	1.9	3.8	5.8	4.7	6.4	6.3	7.4	10.0	10.7	8.4	7.5	6.1	4.3	10.7
21-Jan	6.4	5.7	5.0	5.8	5.7	6.1	6.3	5.9	6.4	6.9	6.9	8.5	10.5	15.2	19.1	16.3	13.2	11.5	10.6	9.6	9.0	8.2	6.7	12.1	9.0	19.1
22-Jan	6.0	5.9	6.4	5.9	7.0	7.2	7.1	6.4	6.2	6.3	6.5	10.3	11.2	11.2	11.2	11.7	11.5	10.3	9.6	9.8	9.7	7.9	6.2	6.5	8.3	11.7
23-Jan	7.2	7.3	8.5	11.2	13.7	14.2	15.7	16.2	16.0	17.9	18.1	17.8	14.3	13.0	12.1	12.6	12.6	9.0	9.3	10.9	12.1	12.0	10.8	11.8	12.7	18.1
24-Jan	10.7	10.2	10.9	10.0	10.5	8.7	6.2	5.0	5.0	4.3	4.1	4.5	4.4	3.7	4.1	4.5	5.2	6.0	5.0	8.0	9.5	10.5	9.6	10.0	7.1	10.9
25-Jan	7.7	4.8	4.3	4.7	4.9	4.8	5.8	6.6	4.2	3.3	4.0	5.4	4.8	4.2	3.1	3.0	4.1	4.2	4.3	4.3	3.3	2.8	3.0	2.7	4.3	7.7
26-Jan	2.7	2.9	2.2	2.3	2.1	2.0	1.9	2.7	3.2	3.5	6.3	5.8	7.9	8.4	8.7	8.3	7.5	8.6	8.3	8.6	6.4	3.2	2.5	1.9	4.9	8.7
27-Jan	1.7	1.8	1.9	1.9	1.8	2.1	2.3	1.9	1.7	1.4	1.9	2.1	3.2	4.6	4.3	5.2	5.6	5.8	5.3	4.9	6.5	13.6	13.6	14.7	4.6	14.7
28-Jan	13.0	20.0	13.6	9.2	9.9	10.1	8.0	4.8	4.6	4.6	5.4	4.6	4.3	5.0	7.2	6.0	4.6	4.2	4.4	4.8	4.6	3.5	2.8	2.2	6.7	20.0
29-Jan	2.0	2.4	2.4	2.2	1.9	1.9	2.2	2.2	1.9	2.0	1.8	1.4	1.3	1.1	1.0	1.0	1.3	2.1	2.6	1.9	1.9	1.9	1.9	2.1	1.8	2.6
30-Jan	2.0	2.4	2.2	2.3	2.2	2.2	2.2	2.0	2.1	2.1	2.2	3.1	3.3	2.8	2.6	2.3	2.3	2.6	3.0	3.9	4.1	3.8	2.6	2.2	2.6	4.1
31-Jan	2.3	2.2	1.8	2.4	2.8	2.8	3.2	4.2	3.8	4.1	4.8	5.4	4.6	4.6	4.3	3.9	3.7	3.5	2.9	2.9	2.4	2.2	2.2	2.1	3.3	5.4
	4.3	4.5	4.4	4.4	4.6	4.5	4.5	4.4	4.3	4.4	5.1	5.8	6.1	6.3	6.3	6.4	6.2	5.9	5.6	5.6	5.3	5.1	4.7	4.7	Diurnal Average	
	13.0	20.0	13.6	11.2	13.7	14.2	15.7	16.2	16.0	17.9	18.1	17.8	14.3	15.2	19.1	16.3	14.9	16.1	14.5	15.3	12.1	13.6	13.6	14.7	Diurnal Maximum	

C - Calibration

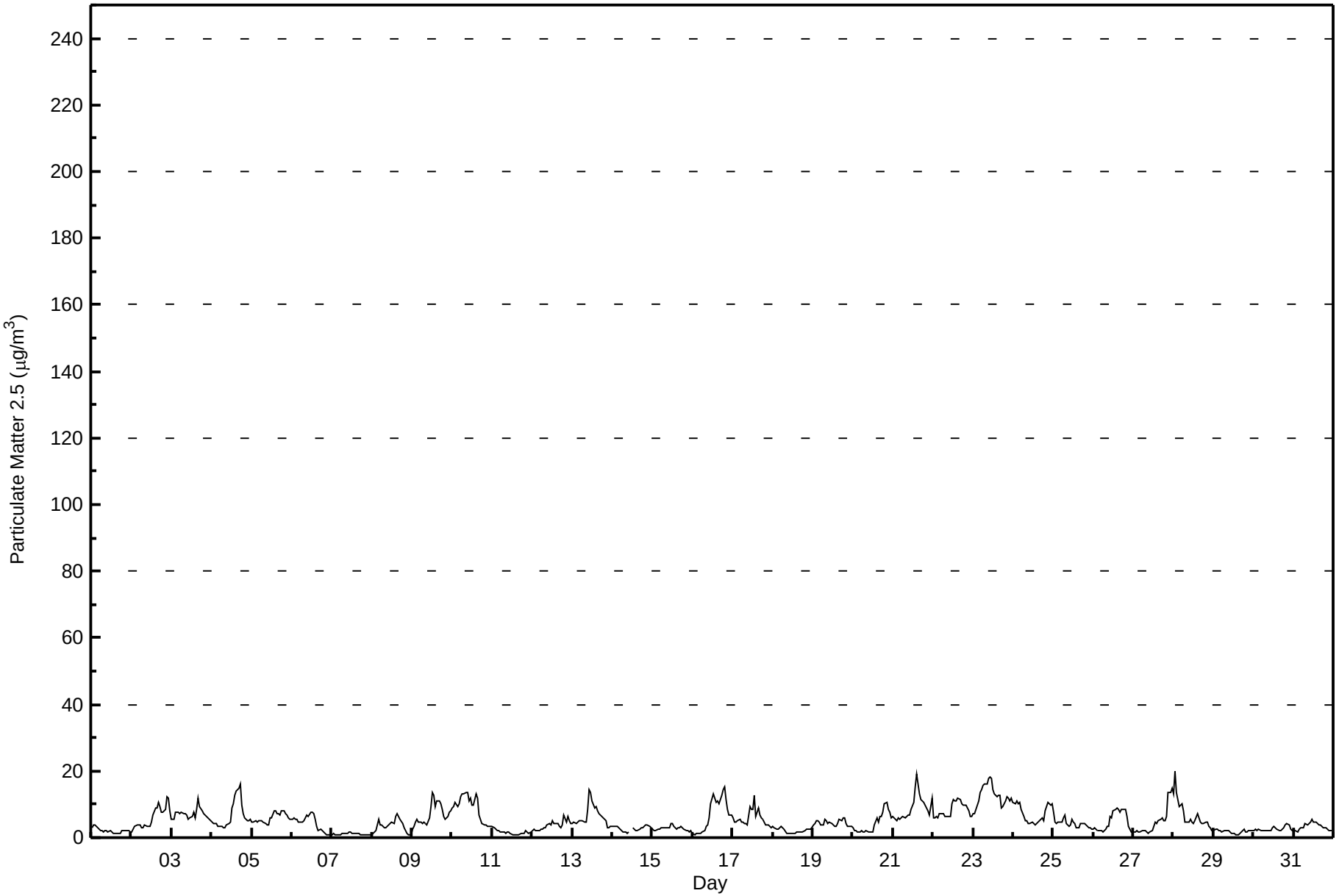
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

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

Fort McKay South - January 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	464	62.45	62.45
6 - 15	249	33.51	95.96
16 - 25	10	1.35	97.31
26 - 80	0	0.00	97.31
> 81.0	0	0.00	97.31

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Fort McKay South - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	51	56	18	5	1	5	8	12	48	59	37	66	18	14	11	23	432
6 - 15	37	12	3	0	1	9	8	22	56	35	15	13	6	3	4	15	239
16 - 25	4	0	0	0	0	0	0	2	0	1	1	0	0	0	0	2	10
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	68	21	5	2	14	16	36	104	95	53	79	24	17	15	40	681

Total Number of Valid Hours: 701

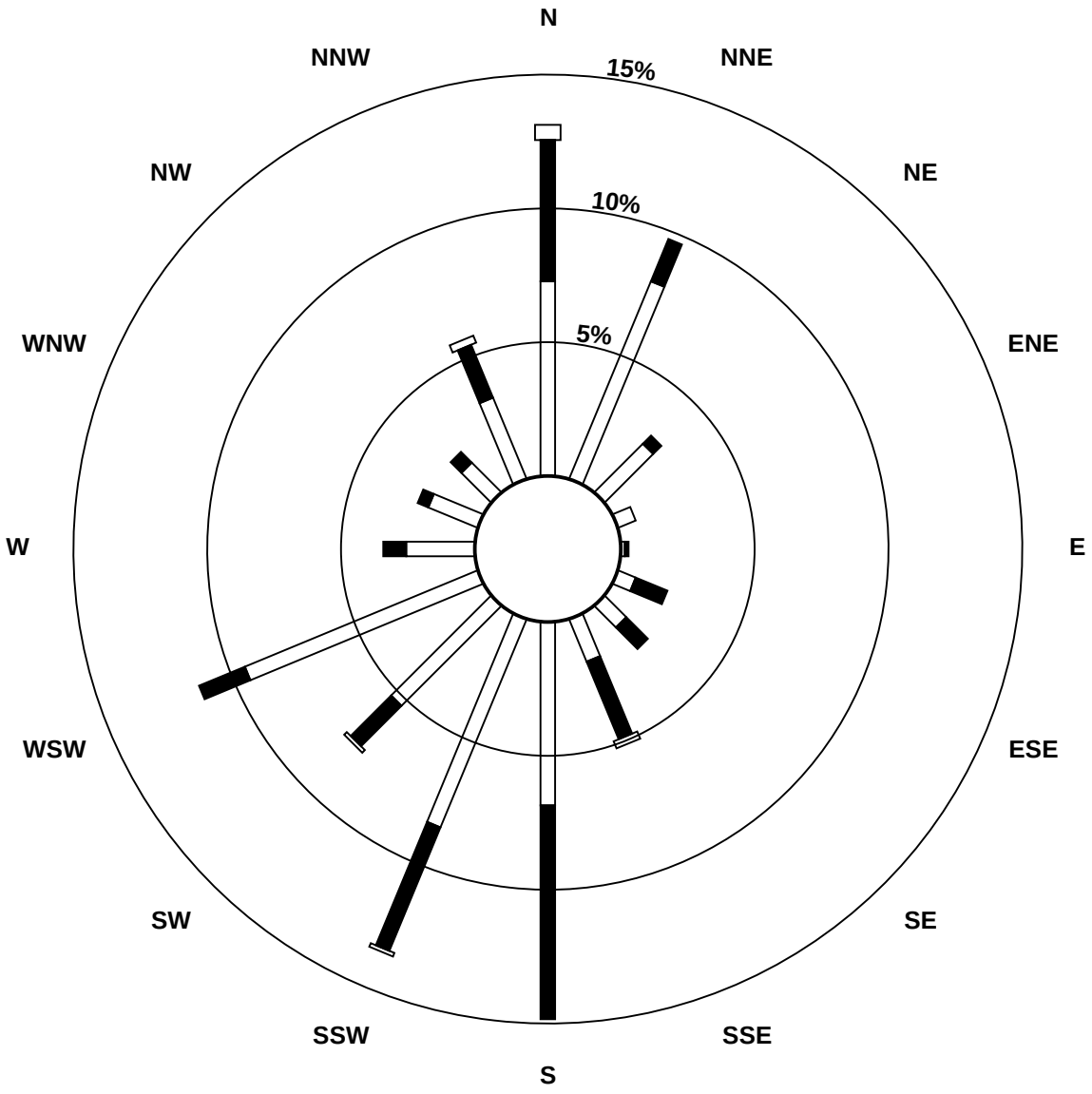
Total Number of Hours: 744

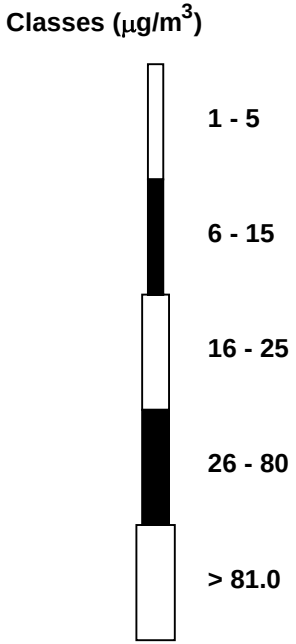
Wood Buffalo Environmental Association

Wind Rose Jan 2016

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

Fort McKay South (AMS 13)





Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Fort McKay South - January 2016

Maximum Value: 6.6 C on Jan 29 15:00

Maximum Daily Average: 1.9 C on Jan 29

Minimum Value: -36.7 C on Jan 16 09:00

Minimum Daily Average: -32.8 C on Jan 16

Maximum Diurnal Average: -10.9 C at hour 15

Minimum Diurnal Average: -15.9 C at hour 3

Monthly Average: -14.41 C

Percentiles: P_1 = -34.8 P_{10} = -23.8 Q_1 = -19.4 Median = -14.8 Q_3 = -9.2 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

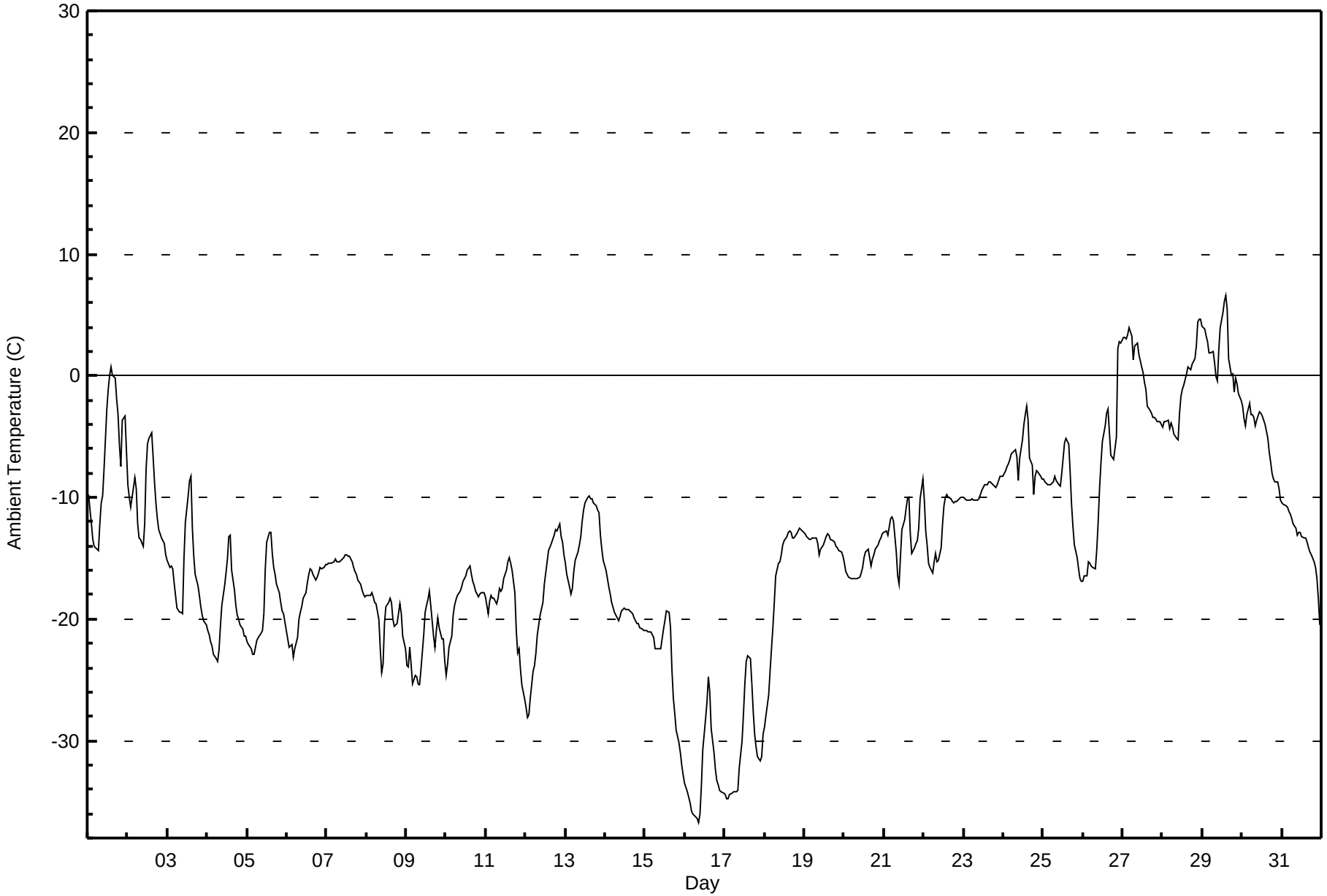
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-9.7	-11.1	-12.2	-13.5	-14.0	-14.2	-14.4	-12.2	-10.5	-9.9	-7.7	-2.8	-1.1	0.0	0.7	0.0	-0.2	-1.9	-3.2	-5.8	-7.5	-3.6	-3.3	-6.2	-6.8	0.7
2-Jan	-8.9	-9.9	-10.7	-9.2	-8.3	-9.3	-12.2	-13.3	-13.5	-14.0	-12.1	-7.6	-5.6	-5.1	-4.7	-6.6	-8.7	-10.5	-11.7	-12.6	-13.3	-13.5	-13.7	-14.7	-10.4	-4.7
3-Jan	-15.1	-15.7	-15.7	-15.9	-17.1	-18.0	-19.1	-19.5	-19.4	-19.6	-15.0	-12.1	-9.8	-8.6	-8.3	-12.5	-14.8	-16.3	-17.3	-18.1	-18.9	-19.7	-20.1	-20.5	-16.1	-8.3
4-Jan	-20.9	-21.3	-21.8	-22.2	-22.9	-23.2	-23.4	-22.6	-20.5	-18.9	-17.2	-16.2	-15.1	-13.2	-13.2	-15.9	-17.6	-18.9	-19.7	-20.0	-20.5	-20.9	-21.4	-21.4	-19.5	-13.2
5-Jan	-21.9	-22.1	-22.5	-22.9	-22.9	-22.4	-21.8	-21.5	-21.2	-20.9	-19.5	-15.9	-13.7	-12.8	-12.9	-14.6	-15.8	-16.3	-17.1	-17.9	-18.7	-19.3	-19.6	-20.3	-18.9	-12.8
6-Jan	-21.6	-22.4	-22.2	-22.1	-23.1	-22.5	-21.6	-20.1	-19.4	-18.9	-18.3	-17.8	-17.0	-16.3	-15.9	-16.0	-16.4	-16.8	-16.6	-16.2	-15.8	-15.9	-15.8	-15.5	-18.5	-15.5
7-Jan	-15.5	-15.4	-15.4	-15.4	-15.3	-15.1	-15.2	-15.3	-15.2	-15.0	-14.9	-14.7	-14.7	-14.8	-14.8	-15.3	-15.7	-16.1	-16.4	-16.8	-17.1	-17.6	-18.0	-18.2	-15.8	-14.7
8-Jan	-18.1	-18.0	-18.0	-17.9	-18.2	-18.6	-18.8	-20.0	-22.4	-24.4	-23.7	-20.3	-19.0	-18.7	-18.3	-18.6	-20.0	-20.6	-20.4	-19.5	-18.7	-19.5	-21.5	-22.4	-19.8	-17.9
9-Jan	-23.8	-23.9	-22.3	-23.7	-25.4	-24.6	-24.7	-25.3	-25.4	-24.2	-21.3	-19.4	-18.8	-18.4	-17.7	-18.8	-21.4	-22.3	-21.0	-19.9	-20.7	-21.7	-21.7	-23.5	-22.1	-17.7
10-Jan	-24.7	-23.8	-22.3	-21.4	-19.7	-18.8	-18.4	-18.0	-17.7	-17.4	-16.9	-16.7	-16.5	-16.0	-15.6	-16.3	-16.9	-17.3	-17.8	-18.1	-17.9	-17.8	-17.9	-17.8	-18.4	-15.6
11-Jan	-18.2	-19.6	-18.5	-18.1	-18.3	-18.3	-18.8	-18.3	-17.5	-17.8	-17.4	-16.6	-16.0	-15.3	-14.9	-15.4	-16.0	-17.8	-20.9	-22.8	-22.4	-24.1	-25.4	-26.5	-19.0	-14.9
12-Jan	-27.2	-28.0	-27.9	-26.5	-24.3	-23.8	-22.8	-21.3	-20.5	-19.7	-18.6	-17.1	-16.2	-15.4	-14.3	-13.7	-13.4	-13.1	-12.7	-12.7	-12.2	-13.2	-13.7	-14.7	-18.5	-12.2
13-Jan	-15.4	-16.4	-17.3	-17.9	-17.4	-16.0	-15.2	-14.5	-14.0	-13.2	-11.9	-11.0	-10.4	-10.0	-9.9	-10.1	-10.1	-10.4	-10.7	-11.0	-11.3	-13.1	-14.3	-15.2	-13.2	-9.9
14-Jan	-15.9	-16.6	-17.4	-18.0	-18.7	-19.4	-19.7	-19.9	-20.1	-19.8	-19.3	-19.1	-19.2	-19.2	-19.2	-19.4	-19.6	-19.9	-20.1	-20.3	-20.4	-20.7	-20.9	-20.9	-19.3	-15.9
15-Jan	-21.0	-21.0	-21.0	-21.1	-21.3	-21.5	-22.5	-22.4	-22.4	-22.4	-21.7	-20.8	-20.1	-19.4	-19.4	-20.8	-24.1	-26.5	-27.8	-29.1	-30.2	-30.9	-32.1	-32.9	-23.8	-19.4
16-Jan	-33.5	-34.2	-34.7	-35.2	-35.8	-36.0	-36.1	-36.4	-36.7	-36.1	-33.7	-30.8	-28.2	-26.8	-24.8	-26.0	-29.0	-31.0	-32.4	-33.2	-33.7	-34.1	-34.2	-34.3	-32.8	-24.8
17-Jan	-34.4	-34.8	-34.8	-34.4	-34.3	-34.2	-34.2	-34.1	-34.1	-32.3	-30.1	-27.9	-25.3	-23.5	-23.0	-23.3	-25.3	-27.7	-29.5	-30.5	-31.3	-31.7	-31.3	-29.4	-30.5	-23.0
18-Jan	-28.9	-28.0	-26.3	-24.3	-22.4	-20.7	-18.6	-16.4	-15.4	-15.3	-14.7	-13.9	-13.6	-13.2	-12.9	-12.8	-12.9	-13.3	-13.3	-13.0	-12.7	-12.6	-12.7	-12.7	-16.7	-12.6
19-Jan	-12.9	-13.2	-13.4	-13.5	-13.4	-13.3	-13.3	-13.4	-13.8	-14.8	-14.3	-13.9	-13.6	-13.2	-13.0	-13.1	-13.5	-13.6	-13.7	-14.0	-14.2	-14.3	-14.5	-14.9	-13.7	-12.9
20-Jan	-15.5	-16.1	-16.4	-16.6	-16.7	-16.7	-16.7	-16.7	-16.7	-16.6	-16.2	-15.7	-15.0	-14.5	-14.3	-15.0	-15.6	-15.1	-14.7	-14.3	-13.9	-13.5	-13.3	-13.0	-15.4	-13.0
21-Jan	-12.8	-12.7	-13.1	-12.4	-11.7	-11.6	-12.0	-14.5	-16.4	-17.2	-14.9	-12.7	-11.9	-10.9	-10.1	-10.0	-13.0	-14.6	-14.1	-13.8	-13.6	-12.5	-10.1	-8.5	-12.7	-8.5
22-Jan	-10.3	-12.7	-14.0	-15.5	-15.7	-16.2	-15.3	-14.7	-15.3	-15.2	-14.2	-12.2	-10.7	-10.0	-9.7	-10.0	-10.2	-10.3	-10.4	-10.4	-10.3	-10.1	-10.0	-10.0	-12.2	-9.7
23-Jan	-10.0	-10.1	-10.2	-10.2	-10.2	-10.1	-10.2	-10.2	-10.2	-10.1	-9.8	-9.4	-9.2	-9.0	-9.0	-8.8	-8.8	-8.9	-9.0	-9.1	-9.0	-8.6	-8.2	-8.3	-9.4	-8.2
24-Jan	-8.2	-7.8	-7.5	-7.2	-6.9	-6.4	-6.2	-6.1	-6.7	-8.6	-6.8	-5.3	-4.0	-3.2	-2.5	-3.7	-6.8	-7.4	-9.8	-8.2	-7.8	-7.9	-8.3	-8.4	-6.7	-2.5
25-Jan	-8.5	-8.7	-8.8	-8.9	-8.9	-8.9	-8.7	-8.3	-8.6	-9.0	-9.0	-8.1	-6.8	-5.5	-5.2	-5.6	-8.0	-10.6	-12.4	-13.9	-15.0	-15.9	-16.7	-16.9	-9.9	-5.2
26-Jan	-17.0	-16.5	-16.4	-15.3	-15.4	-15.6	-15.8	-15.9	-14.2	-12.0	-9.2	-7.2	-5.4	-4.2	-3.0	-2.7	-4.7	-6.6	-6.9	-5.9	-5.0	2.3	2.7	2.7	-8.6	2.7
27-Jan	3.2	3.1	3.0	3.4	3.9	3.2	1.3	2.4	2.6	2.6	1.7	0.7	0.3	-0.5	-1.1	-2.5	-2.9	-3.1	-3.4	-3.5	-3.6	-3.8	-3.8	-4.0	0.0	3.9
28-Jan	-4.2	-3.8	-3.7	-3.6	-4.4	-3.9	-4.2	-4.8	-5.2	-5.2	-3.1	-1.7	-1.1	-0.7	0.2	0.8	0.6	0.5	1.0	1.5	2.4	4.4	4.7	4.6	-1.2	4.7
29-Jan	4.1	3.8	3.2	2.8	1.9	1.9	2.0	1.1	-0.1	-0.4	2.1	4.0	5.2	6.1	6.6	5.5	1.4	0.0	0.2	-1.4	-0.2	-0.7	-1.5	-2.0	1.9	6.6
30-Jan	-2.5	-3.6	-4.1	-3.2	-2.2	-3.2	-3.2	-3.4	-4.1	-3.6	-2.9	-3.1	-3.4	-3.6	-4.0	-5.1	-6.3	-7.1	-8.1	-8.5	-8.7	-8.8	-9.3	-10.2	-5.1	-2.2
31-Jan	-10.5	-10.5	-10.6	-10.8	-11.2	-11.4	-11.7	-12.2	-12.5	-13.2	-12.9	-12.9	-13.2	-13.3	-13.4	-13.7	-14.1	-14.5	-14.8	-15.3	-15.7	-16.6	-18.3	-20.5	-13.5	-10.5
	-15.5	-15.8	-15.9	-15.8	-15.8	-15.8	-15.9	-15.7	-15.7	-15.6	-14.3	-12.8	-11.9	-11.3	-10.9	-11.6	-12.9	-13.8	-14.3	-14.7	-14.8	-14.7	-15.0	-15.4	Diurnal Average	
	4.1	3.8	3.2	3.4	3.9	3.2	2.0	2.4	2.6	2.6	2.1	4.0	5.2	6.1	6.6	5.5	1.4	0.5	1.0	1.5	2.4	4.4	4.7	4.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Fort McKay South - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	166	22.31	22.31
-20 - 0	534	71.77	94.09
0 - 10	44	5.91	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort McKay South - January 2016

Maximum Value: 98 % on Jan 28 20:00

Maximum Daily Average: 92.9 % on Jan 28

Minimum Value: 52 % on Jan 29 15:00

Minimum Daily Average: 70.3 % on Jan 16

Maximum Diurnal Average: 83.6 % at hour 20

Minimum Diurnal Average: 77.5 % at hour 15

Monthly Average: 82.1 %

Percentiles: $P_1 = 66$ $P_{10} = 74$ $Q_1 = 79$ Median = 82 $Q_3 = 86$ $P_{90} = 90$ $P_{99} = 96$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

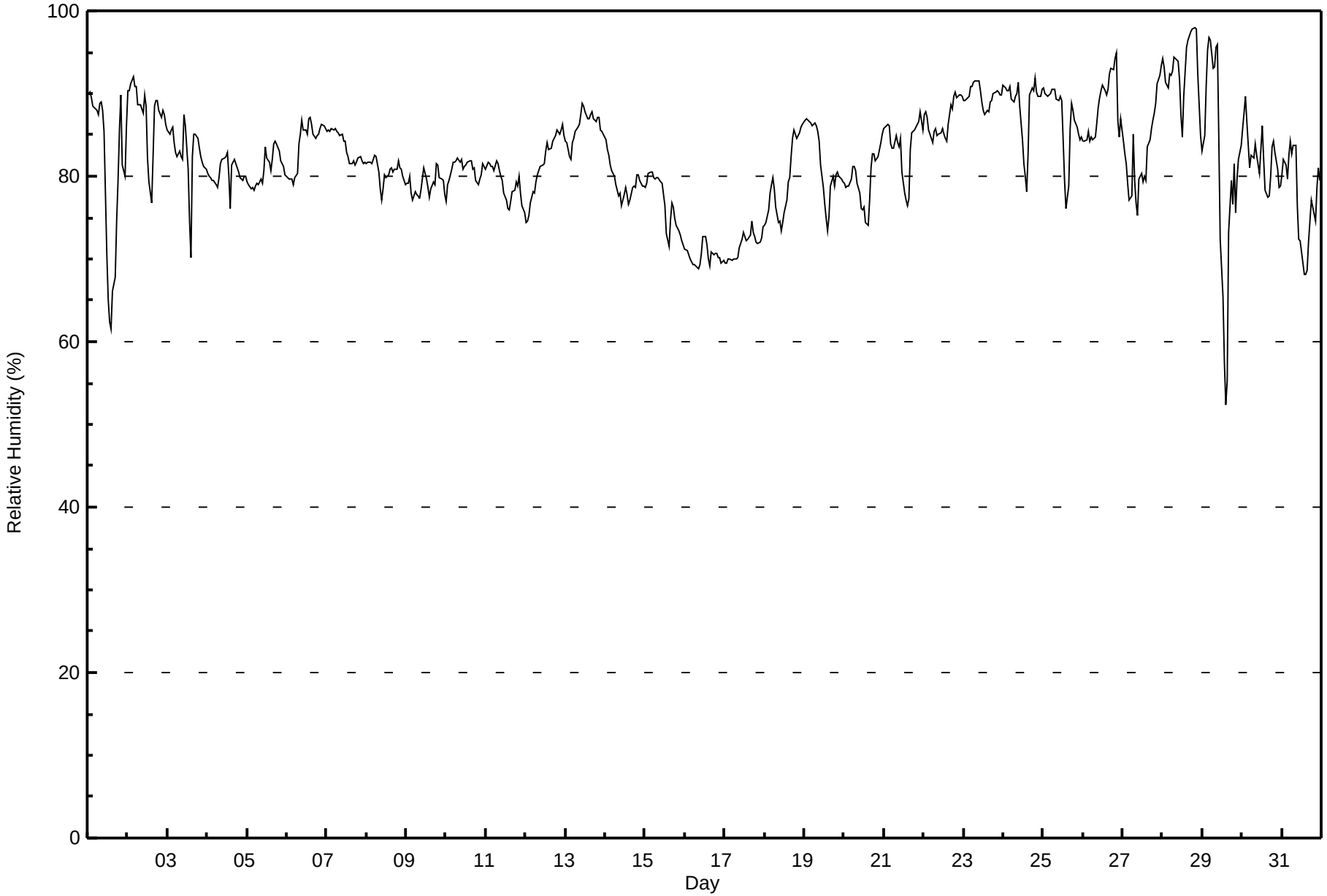
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	90	90	89	88	88	88	87	89	89	88	85	70	65	62	61	66	68	75	80	86	90	81	80	86	80.9	90
2-Jan	90	90	91	92	91	91	89	89	89	88	90	89	82	79	77	83	88	89	89	88	87	88	87	86	87.6	92
3-Jan	86	85	86	86	84	83	82	83	82	82	88	86	81	75	70	82	85	85	85	83	82	82	81	81	82.7	88
4-Jan	80	80	80	79	80	79	79	80	82	82	82	82	83	80	76	81	82	81	81	81	80	79	80	80	80.4	83
5-Jan	79	79	79	79	78	79	79	79	80	79	81	84	82	82	81	82	84	84	84	83	82	82	81	80	80.8	84
6-Jan	80	80	80	80	79	80	80	84	85	87	86	86	85	87	87	86	85	85	85	85	86	86	86	86	83.9	87
7-Jan	85	86	86	86	86	86	85	85	85	85	84	84	83	82	82	81	82	81	82	82	82	82	82	82	83.6	86
8-Jan	82	82	82	81	82	83	82	81	78	77	78	80	80	80	81	81	81	81	81	82	81	81	80	79	80.6	83
9-Jan	79	79	80	78	77	78	78	78	77	78	81	80	80	79	77	79	79	79	82	81	80	80	80	78	79.0	82
10-Jan	77	79	79	81	82	82	82	82	82	82	81	81	81	82	82	82	81	81	80	79	80	80	81	81	80.8	82
11-Jan	81	82	82	81	81	81	82	81	81	80	79	78	77	76	76	77	78	78	79	79	80	78	76	76	79.1	82
12-Jan	74	75	75	77	78	78	79	80	81	81	81	82	83	84	83	83	84	85	85	86	85	86	86	85	81.5	86
13-Jan	84	84	82	82	84	85	85	86	86	87	89	88	88	87	87	88	88	87	87	87	87	86	85	85	86.0	89
14-Jan	84	83	83	81	81	80	79	78	78	78	76	78	79	78	77	77	79	79	79	80	80	80	79	79	79.3	84
15-Jan	79	79	80	81	80	80	80	80	80	79	79	78	76	73	72	75	77	76	75	74	73	73	72	72	76.8	81
16-Jan	71	71	71	70	70	69	69	69	69	69	71	73	73	72	70	69	71	71	71	71	70	70	70	70	70.3	73
17-Jan	70	69	70	70	70	70	70	70	70	71	72	73	73	72	72	73	75	73	73	72	72	72	73	74	71.6	75
18-Jan	74	74	76	78	79	80	79	76	74	75	73	74	76	77	79	80	82	85	86	85	85	85	86	86	79.3	86
19-Jan	87	87	87	87	87	86	86	86	85	84	81	79	77	75	73	75	79	80	79	80	80	80	80	79	81.6	87
20-Jan	79	79	79	79	80	81	81	81	79	78	76	76	76	74	74	77	81	83	83	82	82	83	84	85	79.7	85
21-Jan	86	86	86	86	84	83	83	85	84	84	85	81	78	77	76	77	83	85	86	86	86	87	88	86	83.7	88
22-Jan	87	88	87	86	85	84	85	86	85	85	85	86	85	84	84	86	89	88	90	90	90	90	90	90	86.9	90
23-Jan	89	89	89	90	91	91	91	91	91	92	90	89	88	87	88	88	89	89	90	90	90	90	90	90	89.7	92
24-Jan	91	91	90	90	91	89	89	90	90	91	89	84	81	80	78	83	90	91	90	92	90	90	90	91	88.4	92
25-Jan	91	90	90	90	90	90	91	91	89	89	90	89	84	79	76	79	86	89	88	87	86	85	84	85	87.0	91
26-Jan	84	84	84	85	84	85	84	85	86	88	89	90	91	90	90	91	92	93	93	94	95	87	85	87	88.3	95
27-Jan	84	83	81	79	77	78	85	79	77	75	80	80	79	80	79	84	84	86	87	88	89	91	92	93	83.0	93
28-Jan	94	93	91	91	92	92	93	94	94	94	92	87	85	90	96	96	97	97	98	98	98	92	89	85	92.9	98
29-Jan	83	85	91	95	97	96	93	93	96	96	85	72	65	57	52	55	73	80	77	81	76	80	82	84	81.0	97
30-Jan	86	88	90	87	81	83	82	82	84	83	80	83	86	82	78	77	78	80	84	84	83	81	79	79	82.4	90
31-Jan	80	82	81	80	83	84	83	84	84	76	72	72	71	68	68	69	72	75	77	75	75	79	81	80	77.1	84
	82.8	82.9	83.1	83.0	82.9	83.0	83.1	83.1	83.0	82.7	82.3	81.2	79.8	78.5	77.5	79.4	82.0	82.9	83.2	83.6	83.3	82.7	82.5	82.5	Diurnal Average	
	94	93	91	95	97	96	93	94	96	96	92	90	91	90	96	96	97	97	98	98	98	92	92	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Fort McKay South - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort McKay South - January 2016

Maximum Speed: 15 km/h on Jan 27 00:00

Maximum Daily Speed Average: 6.3 km/h on Jan 14

Minimum Speed Value: 0 km/h on Jan 18 00:00

Minimum Daily Speed Average: 0.6 km/h on Jan 17

Maximum Diurnal Speed Average: 1.4 km/h at hour 1

Minimum Diurnal Speed Average: 0.2 km/h at hour 14

Monthly Average Velocity: 0.7 km/h 271.5 deg

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 3 $Q_3 = 5$ $P_{90} = 7$ $P_{99} = 12$

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Percent Operational Time:	94.4

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	S3	S3	S3	WSW2	S4	S3	SSW3	SSW7	S6	S5	SSW5	WSW10	WSW12	WSW9	SW8	SW8	WSW12	SSW5	S5	S3	WSW7	WSW9	WSW6	SSW4	SW5.3	WSW12
2-Jan	SW4	SSW2	S3	S3	SSE4	S4	SSE2	S3	S3	S2	S3	S5	SE3	SE3	S4	S3	SSW2	SSW2	WSW2	SW3	S3	S5	S2	SSW2	S2.7	S5
3-Jan	SSW2	SW3	SSW3	S3	S2	SSE2	SSE2	S3	S2	S3	S4	S4	S6	S6	S4	SSW3	SW3	SSW2	W1	SW2	WSW3	WSW2	WSW2	WSW2	SSW2.6	S6
4-Jan	SW2	SW1	WSW2	SW1	W1	SW1	SSW1	NNW1	S0	AF	NNE0	ESE1	ESE1	ESE1	ESE2	SSW3	SSW2	SW1	SSW2	SSW2	SSW2	S2	SSW2	SSW2	SSW1.0	SSW3
5-Jan	SW1	SW1	SW2	SSW2	SSW1	SSW2	SSW1	SSW1	SSW1	SSW2	SSW1	S2	SSE3	ESE2	SE1	WNW1	NNW2	NNW2	NW2	NW1	SSW1	WSW1	WSW1	SW2	SSW0.7	SSE3
6-Jan	WSW1	W1	WSW1	NW0	NW0	N2	NNW2	NNW3	NNW2	NNW1	N2	N2	N3	NNE3	N4	N4	NNW4	N3	NNW2	N3	N5	N6	N5	N4	N2.5	N6
7-Jan	N4	N4	N4	NNE1	WNW1	NNW2	N2	NNW3	NNW3	NNW2	N3	NW2	WNW3	W3	W3	WSW3	WSW3	WSW4	WSW3	WSW4	WSW4	SW4	WSW5	WSW4	WNW2.1	WSW5
8-Jan	SW2	SW2	WSW3	WSW2	NNE1	NNE2	NNW1	W0	WSW1	WSW1	WNW0	AF	ENE1	NE1	NE1	AF	AF	SSW0	SSW1	SSW3	SW3	SSW2	SSW3	SSW2	SW0.9	SW3
9-Jan	SSW4	S3	S3	SSE2	SSW2	SSW2	S2	S2	S2	S2	SSE2	SSE3	S4	S3	S3	S1	SW2	SSW2	SSW2	SSW2	SSW1	S3	SSW2	SSW1	S2.2	S4
10-Jan	S2	S2	S1	SW1	S1	SSE1	WNW0	NNW1	W0	S0	NE0	E2	NNE3	N4	N4	N5	N5	N4	NNE4	ENE1	SSE2	SSE0	N1	NNE2	NNE1.0	N5
11-Jan	N3	N3	NNW2	W0	AF	WSW2	AF	NW2	WNW3	WSW5	WSW5	WSW5	SW3	SW4	SW5	WSW5	SW4	SW3	SSW2	SW4	SW5	SW1	SW1	SW1	WSW2.4	WSW5
12-Jan	WSW2	WSW2	SW1	WSW1	AF	AF	AF	NW0	SE0	NE1	E0	SE1	SE2	ESE2	SSE3	SE2	SSE3	S2	SSE1	SSE2	S3	S1	WSW0	SSW2	S1.2	SSE3
13-Jan	AF	NW1	WSW2	WSW1	WSW2	AF	WNW1	NNW1	N1	N2	NNE3	N3	N4	N4	NNE4	N4	N5	N6	N6	N7	NNE6	N9	N8	N7	N3.5	N9
14-Jan	N7	N8	NNE7	N8	N8	N7	N6	NNE6	NNE4	NNE2	NNE6	NNE6	NNE8	NNE8	NNE9	NNE8	NNE9	NNE7	N6	N7	NNE6	NNE4	NNE4	NNE3	NNE6.3	NNE9
15-Jan	NNE3	NNE2	N1	NNW0	NNW0	NW1	NNW1	NW1	N2	N2	N2	N3	NNE4	N5	N5	N3	NNW2	NW2	W1	WSW1	WSW1	AF	AF	AF	N1.8	N5
16-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	ESE0	ESE1	ESE2	SSE2	SSW2	AF	WSW0	WSW0	WSW0	AF	AF	SW0	SW0	----	ESE2
17-Jan	AF	SW0	SSW0	SSW1	S0	SSW0	SSW1	S0	SW1	AF	SSE1	SE2	SW2	SSW2	S1	SE1	W1	SW1	WSW1	WSW1	WSW1	WSW0	WSW0	ESE0	SSW0.6	SSW2
18-Jan	W0	AF	AF	AF	N1	N1	SE3	SSE3	S4	SE3	ESE2	S5	S5	S5	S3	SSE2	SSW1	AF	AF	WNW0	S0	AF	SSE1	S0	SSE1.8	S5
19-Jan	AF	AF	AF	WNW0	NW1	NNW1	NW1	N3	N3	N4	NNE5	N7	N6	N5	N6	NNE5	N2	NNW2	NNE3	NNE3	NNE4	NE3	NE3	NE4	NNE3.2	NNE7
20-Jan	NE5	NNE6	NNE6	NNE5	NNE4	N3	NNW2	NNW2	N3	N3	NNE1	E1	SSW2	S2	ESE3	SSE1	WSW1	AF	AF	SSE1	S1	SSE0	SE0	SE0	NNE1.5	NNE6
21-Jan	SSW1	S1	SSW2	SSE3	S5	SSE4	S4	S2	S2	S2	SSE3	S4	S5	S6	SSE5	SSE2	WSW1	NW1	NNW1	NNE1	W1	SSW2	S5	SSW6	S2.5	S6
22-Jan	SSW4	SW3	SW3	S2	SSW1	SSW1	SW1	W0	WNW1	NNW2	NNW1	NNW2	NNW3	N4	NW4	NNW4	N3	N5	N6	N5	N3	N3	N4	NNE5	NNW1.6	N6
23-Jan	N5	N4	N3	N3	N3	NNW3	NNW3	NNW3	N3	N3	N2	N2	NNW2	NE1	ESE2	SSE1	S1	SSW2	S1	S2	SSE2	S2	S2	SSE0	N1.0	N5
24-Jan	SSW2	S2	S4	SSW5	S5	SW6	WSW6	SW4	SSW4	S4	SSW5	SSW6	SSW5	SSW6	SSW7	S4	S2	SW1	WNW2	N5	N5	NNE7	N5	N3	SSW2.2	NNE7
25-Jan	NNW1	NNE2	NE2	SE1	SSW0	S2	S3	S5	SW7	SSW5	S7	S6	SSW7	SSW7	SW8	SW5	SSW3	SW2	SW2	S2	SW2	SSW2	S2	SSW1	SSW2.9	SW8
26-Jan	WSW2	SSW2	S2	SSW1	SSW2	SW1	WSW2	SW2	SSW1	SSW1	AF	S1	SSE2	SE1	SSW2	SSE2	SSW2	SSW2	SSW3	S4	SSW5	WSW12	WSW13	WSW15	SW3.0	WSW15
27-Jan	WSW15	WSW10	W8	W13	W11	NW4	WSW4	W5	WSW8	W5	NNE5	N7	N9	NNE9	N9	NNE9	NNE8	NNE6	N4	NNW3	NNW3	NNE2	SSE1	SSE2	NW3.9	WSW15
28-Jan	S2	SSW2	SE3	S3	N2	SSW1	S3	SW5	WSW2	SW3	SSW3	WSW3	SW3	SSW4	S4	S3	S4	S3	S5	S5	SW6	SW9	SW9	WSW10	SSW3.4	WSW10
29-Jan	WSW9	WSW8	W7	W4	SSW3	WNW4	WNW5	WSW4	WSW6	W2	W6	WNW6	WNW7	WNW8	WNW9	WNW5	W5	WSW5	WSW8	WSW5	WSW6	WSW6	WSW6	WSW7	W5.4	WSW9
30-Jan	WSW7	SSW5	WSW5	WSW8	WSW10	WSW9	W7	W6	WNW3	NNW2	N3	NNE6	NNE7	NNE7	NE6	NE8	NNE8	NE8	NE9	NE5	NE3	NNE4	NE4	NE4	NNW2.2	WSW10
31-Jan	NE3	NNE3	NE3	NE5	NE4	NNE4	NNE5	NNE5	N7	NNE8	N7	NNE8	NNE8	NNE7	NNE7	N7	N6	N6	NNE3	ENE3	ENE3	ENE1	WSW1	WSW2	NNE4.5	NNE8
	WSW1.4	W0.9	WSW0.9	WSW1.0	WSW0.9	W0.9	WSW0.8	WSW1.1	WSW0.9	W0.6	NW0.3	WNW0.3	NW0.4	NNW0.2	WNW0.4	NW0.5	NW0.9	NNW0.8	NW0.7	WNW0.4	W0.8	W1.1	WSW1.1	WSW1.3	Diurnal Average	
	WSW15	WSW10	W8	W13	WNW11	WSW9	W7	SSW7	WSW8	NNE8	N7	WSW10	WSW12	WSW9	WNW9	NNE9	WSW12	NE8	NE9	N7	WSW7	WSW12	WSW13	WSW15	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Fort McKay South - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Jan 27 04:00

Minimum Value: 0 km/h on Jan 15 18:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 2$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	0
Percent Operational Time:	94.4

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

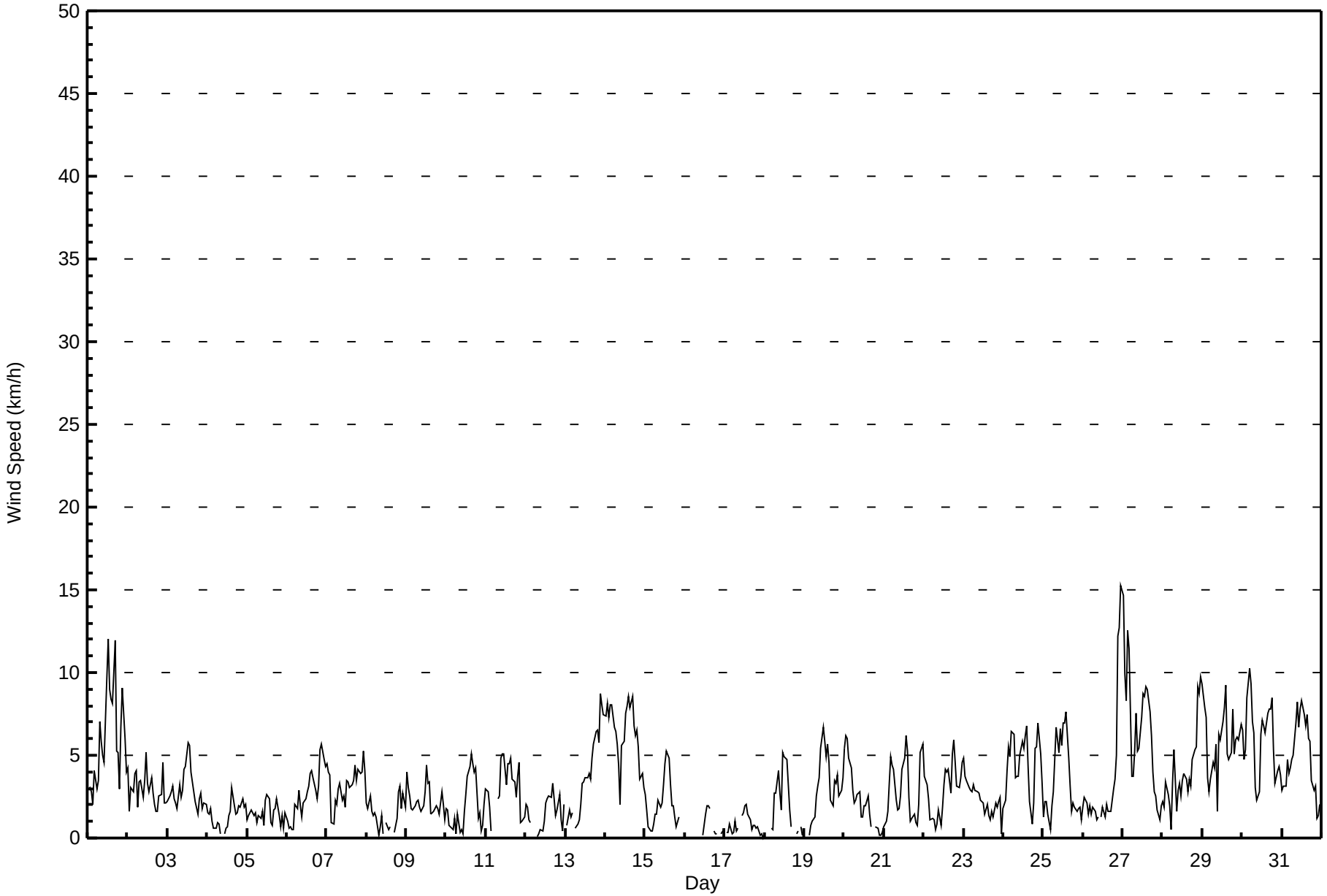
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Fort McKay South - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	584	83.19	83.19
6 - 11	111	15.81	99.00
12 - 19	7	1.00	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: 702

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Fort McKay South - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	70	40	17	5	2	14	16	36	98	89	51	58	18	15	15	40	584
6 - 11	25	30	4	0	0	0	0	0	6	7	8	21	5	5	0	0	111
12 - 19	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	7
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	95	70	21	5	2	14	16	36	104	96	59	85	24	20	15	40	702

Total Number of Valid Hours: 702

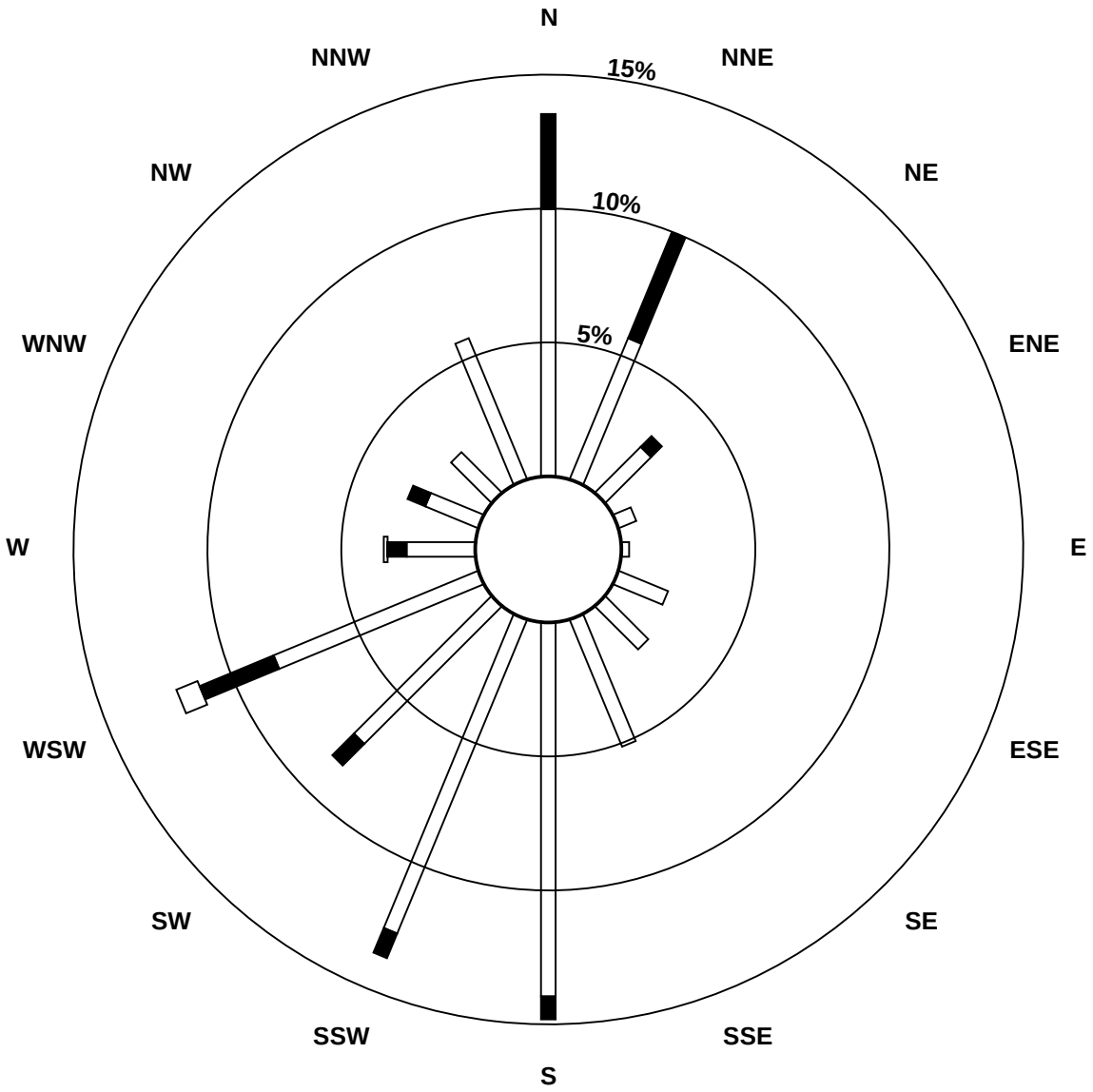
Total Number of Hours: 744

Wood Buffalo Environmental Association

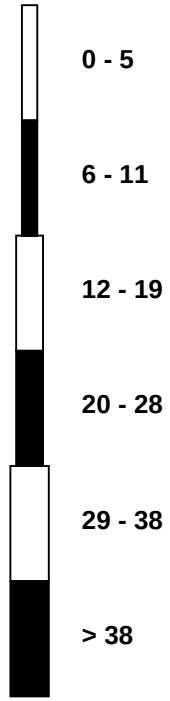
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Fort McKay South (AMS 13)



Classes (km/h)



Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay South - January 2016

Direction of Maximum Speed: 255 deg on Jan 27 00:00
Direction of Maximum Daily Speed Average: 13.8 deg on Jan 14

Direction of Minimum Speed: 120 deg on Jan 18 00:00

Direction of Minimum Daily Speed Average: 0.6 deg on Jan 17

Monthly Average Direction: 236.6 deg

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Percent Operational Time:	94.4

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	187	186	186	237	185	191	204	198	180	189	202	246	254	243	234	228	244	198	188	179	242	247	246	208	222.3
2-Jan	229	196	177	179	166	170	165	188	188	178	175	178	141	139	182	182	212	206	242	224	188	183	188	200	184.0
3-Jan	203	216	192	183	189	168	154	175	178	177	174	169	171	184	191	197	218	211	268	226	246	241	237	240	194.1
4-Jan	232	218	252	219	272	232	202	334	185	AF	30	103	112	115	111	194	199	226	213	203	207	190	199	195	201.0
5-Jan	214	218	217	205	206	196	206	211	201	198	206	171	153	121	138	286	345	345	323	325	198	242	241	229	210.9
6-Jan	251	274	240	308	312	349	348	331	337	333	0	6	9	21	11	356	346	354	345	351	7	7	4	1	355.5
7-Jan	5	358	5	19	302	332	0	343	341	335	2	324	293	277	278	253	257	245	247	258	243	227	237	245	290.1
8-Jan	234	220	240	239	31	13	339	278	241	239	289	AF	77	54	43	AF	AF	208	210	202	221	202	211	198	224.9
9-Jan	194	189	172	162	203	195	184	191	186	188	167	156	172	172	175	186	215	203	198	195	194	189	195	209	184.9
10-Jan	187	186	187	224	185	157	284	334	261	171	53	100	20	3	355	359	5	5	29	60	168	147	354	13	13.4
11-Jan	3	351	337	267	AF	244	AF	308	295	250	254	252	227	215	233	252	220	223	203	223	232	214	216	228	246.8
12-Jan	237	242	216	237	AF	AF	AF	307	137	44	82	131	134	121	163	146	167	181	154	165	183	184	248	205	173.5
13-Jan	AF	308	243	237	244	AF	298	347	1	8	12	6	8	4	15	0	9	8	9	10	12	8	5	4	3.9
14-Jan	4	8	13	9	3	359	6	20	21	32	19	19	20	13	14	20	20	17	10	9	16	33	24	16	13.8
15-Jan	17	23	352	340	331	316	340	326	350	353	3	2	21	9	3	2	337	310	260	245	255	AF	AF	AF	354.1
16-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	108	104	110	153	194	AF	240	239	245	AF	AF	224	232	--
17-Jan	AF	215	207	200	191	197	206	190	225	AF	162	145	215	208	180	131	260	233	247	239	243	251	248	120	200.3
18-Jan	279	AF	AF	AF	360	351	135	158	170	145	121	173	175	175	171	158	196	AF	AF	285	183	AF	156	175	164.5
19-Jan	AF	AF	AF	302	315	330	316	353	11	9	12	11	7	6	9	14	350	346	29	23	23	34	43	39	12.0
20-Jan	39	21	16	14	18	6	344	343	356	5	21	101	204	179	107	155	242	AF	AF	155	175	154	140	143	23.4
21-Jan	199	189	199	167	169	160	172	186	174	189	168	170	174	176	168	164	241	305	339	15	265	197	183	211	180.3
22-Jan	193	217	217	190	212	209	232	271	289	337	335	333	339	3	326	341	353	5	5	4	3	3	9	16	342.5
23-Jan	8	10	2	353	350	331	347	341	1	3	349	349	347	45	103	154	181	195	175	190	154	177	174	159	1.6
24-Jan	195	178	186	194	191	225	240	225	200	191	201	204	194	202	197	191	191	232	288	354	7	19	10	358	212.7
25-Jan	347	29	42	130	201	171	185	189	218	195	189	191	194	192	217	215	197	226	223	183	214	202	190	203	198.2
26-Jan	238	204	183	207	202	232	237	230	194	198	AF	176	159	136	198	152	201	209	192	180	198	243	253	255	224.9
27-Jan	254	254	264	274	281	309	244	279	258	277	22	7	3	13	6	15	12	20	11	341	331	13	156	166	313.5
28-Jan	175	206	144	172	5	203	178	228	239	235	211	240	222	208	176	179	180	180	183	189	222	235	234	237	210.5
29-Jan	243	250	265	276	213	289	299	248	241	263	269	299	296	292	292	288	263	256	243	239	248	258	255	244	264.2
30-Jan	241	208	246	253	256	254	261	269	294	347	3	13	14	30	42	48	32	37	36	39	48	27	38	49	346.0
31-Jan	38	24	49	40	49	19	26	26	8	14	9	23	22	25	12	5	11	10	21	62	62	65	240	240	21.5
	256.2	260.1	251.4	249.2	253.7	261.7	256.8	258.4	256.5	265.8	306.6	299.2	306.5	331.2	299.9	325.7	308.9	326.9	323.1	297.0	262.0	261.5	257.7	256.8	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Fort McKay South - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 96 deg on Jan 28 06:00

Minimum Value: 6 deg on Jan 17 21:00

Percentiles: P_1 = 11 P_{10} = 17 Q_1 = 23 Median = 27 Q_3 = 37 P_{90} = 55 P_{99} = 88

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	0
Percent Operational Time:	94.4

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	21	20	22	38	25	49	31	15	13	20	49	25	23	28	29	51	18	33	35	49	12	14	31	28	51
2-Jan	31	59	27	54	22	25	82	16	13	24	16	19	33	33	28	26	18	58	63	20	31	11	23	24	82
3-Jan	18	24	15	15	20	20	21	20	13	22	18	24	24	20	16	22	20	34	46	30	13	35	19	17	46
4-Jan	44	30	24	46	51	42	70	43	73	AF	80	37	52	50	33	13	21	24	31	18	21	16	29	22	80
5-Jan	63	25	27	24	29	26	45	24	63	25	76	34	33	32	56	52	21	17	21	57	77	40	60	28	77
6-Jan	65	45	59	50	50	17	19	26	29	43	32	37	30	25	22	28	24	28	26	24	26	23	24	23	65
7-Jan	27	23	24	48	46	34	25	24	28	39	35	46	33	33	27	21	24	20	24	24	24	23	20	19	48
8-Jan	23	32	20	14	31	33	46	68	57	46	75	AF	20	29	17	AF	AF	74	26	21	24	16	12	16	75
9-Jan	14	14	21	30	17	16	14	14	12	18	27	25	27	31	26	54	22	14	18	19	20	15	14	24	54
10-Jan	18	15	73	77	35	45	91	30	68	80	89	41	27	31	26	24	24	24	26	30	28	72	51	18	91
11-Jan	26	19	27	41	AF	14	AF	33	37	15	18	23	32	27	28	24	21	14	14	12	13	74	39	27	74
12-Jan	8	10	33	42	AF	AF	AF	70	88	38	67	53	32	34	30	30	25	37	39	60	42	36	85	16	88
13-Jan	AF	39	12	62	14	AF	34	17	23	15	22	22	24	23	20	23	23	24	22	23	24	24	22	23	62
14-Jan	24	24	24	23	25	25	25	24	33	44	25	29	24	25	23	25	24	23	25	23	26	25	23	25	44
15-Jan	23	28	37	22	15	77	42	29	21	31	28	26	24	26	23	19	12	11	24	13	11	AF	AF	AF	77
16-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	63	18	37	35	50	AF	46	55	33	AF	AF	53	37	63
17-Jan	AF	23	43	11	48	9	13	12	16	AF	29	30	30	32	49	40	55	55	42	8	6	54	65	88	88
18-Jan	73	AF	AF	AF	19	90	46	42	31	32	39	31	29	29	28	38	65	AF	AF	43	54	AF	76	81	90
19-Jan	AF	AF	AF	33	15	22	23	27	24	19	20	25	26	28	25	28	28	25	22	25	25	29	28	34	34
20-Jan	28	24	22	24	24	27	30	25	28	29	67	40	52	50	40	50	44	AF	AF	42	51	92	91	77	92
21-Jan	64	17	13	29	24	28	27	25	43	27	34	31	31	28	32	32	45	36	69	77	66	22	26	23	77
22-Jan	16	19	30	38	63	47	32	61	53	26	68	38	39	27	34	32	31	25	26	23	24	26	25	23	68
23-Jan	22	24	24	28	27	29	28	31	27	24	28	32	34	51	25	23	37	21	17	15	31	23	21	86	86
24-Jan	26	19	18	21	23	22	16	22	15	14	24	26	28	24	21	15	11	77	36	21	21	24	22	30	77
25-Jan	37	30	32	52	83	30	23	24	22	30	28	25	26	29	24	22	22	40	25	19	26	27	59	84	84
26-Jan	27	21	29	37	20	45	18	22	53	59	AF	69	33	51	43	35	38	54	16	17	25	24	27	25	69
27-Jan	26	31	29	30	36	90	48	35	21	41	28	24	25	23	22	21	25	24	30	41	46	66	61	48	90
28-Jan	30	55	35	54	52	96	40	17	89	19	25	29	28	26	28	25	23	20	21	18	29	23	21	23	96
29-Jan	23	25	29	38	29	45	45	35	19	71	38	42	37	39	34	37	23	15	17	38	25	24	15	13	71
30-Jan	14	23	33	20	19	20	33	41	52	47	24	21	25	29	33	32	28	30	29	30	40	30	29	32	52
31-Jan	29	28	32	32	33	28	27	26	24	25	25	26	26	29	27	25	25	23	30	34	35	28	50	7	50
	73	59	73	77	83	96	91	70	89	80	89	69	52	51	56	54	65	77	69	77	77	92	91	88	
	Diurnal Maximum																								

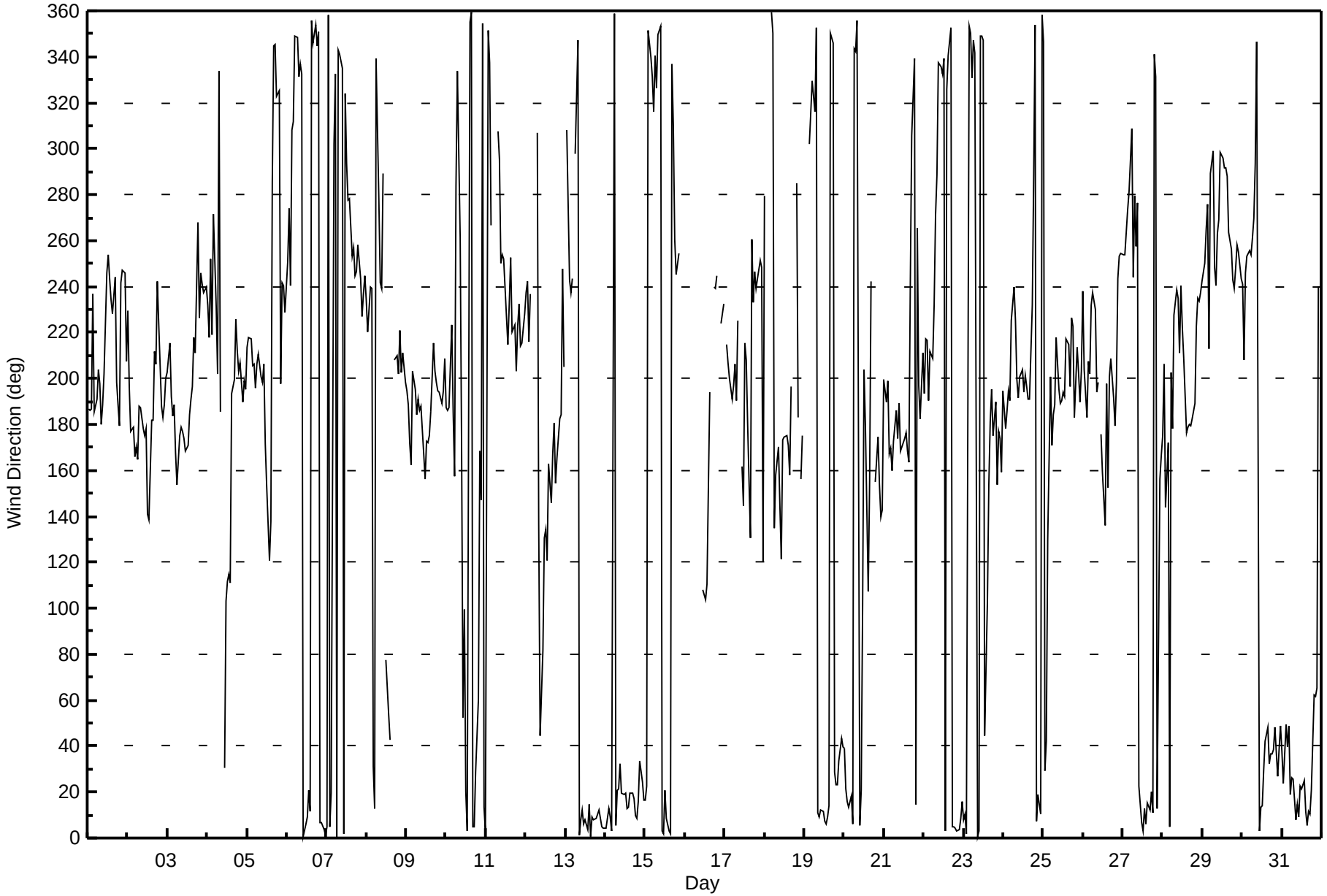
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Fort McKay South - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 12, 2016	Last Calibration	December 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:32
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

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Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		HVPS voltage	547	547
Analyzer IP address	192.168.1.44		Lamp voltage	1684	1644
Calculated slope	1.001947	1.001898	Box temp	30.7	30.7
Calculated intercept	0.929137	2.095355	Pressure	25.7	26.0
Analyzer Background	42.1	42.1	Flow	667	680
Analyzer Coefficient	0.953	0.953	Lamp Ratio	57	56

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	0.0	----
as found span	5000	78.9	785.8	778.7	1.009
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	78.9	785.8	783.7	1.003
second point	5000	39.4	392.4	387.5	1.013
third point	5000	19.7	196.2	192.1	1.021
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	78.9	785.8	776.9	1.012
				Average Correction Factor	1.012

Corrected As found	778.7	Previous response	783.4	% change	0.6%

Notes:

No adjustments and maintenance done, filter changed out

Calibration Performed By: Melissa Lemay

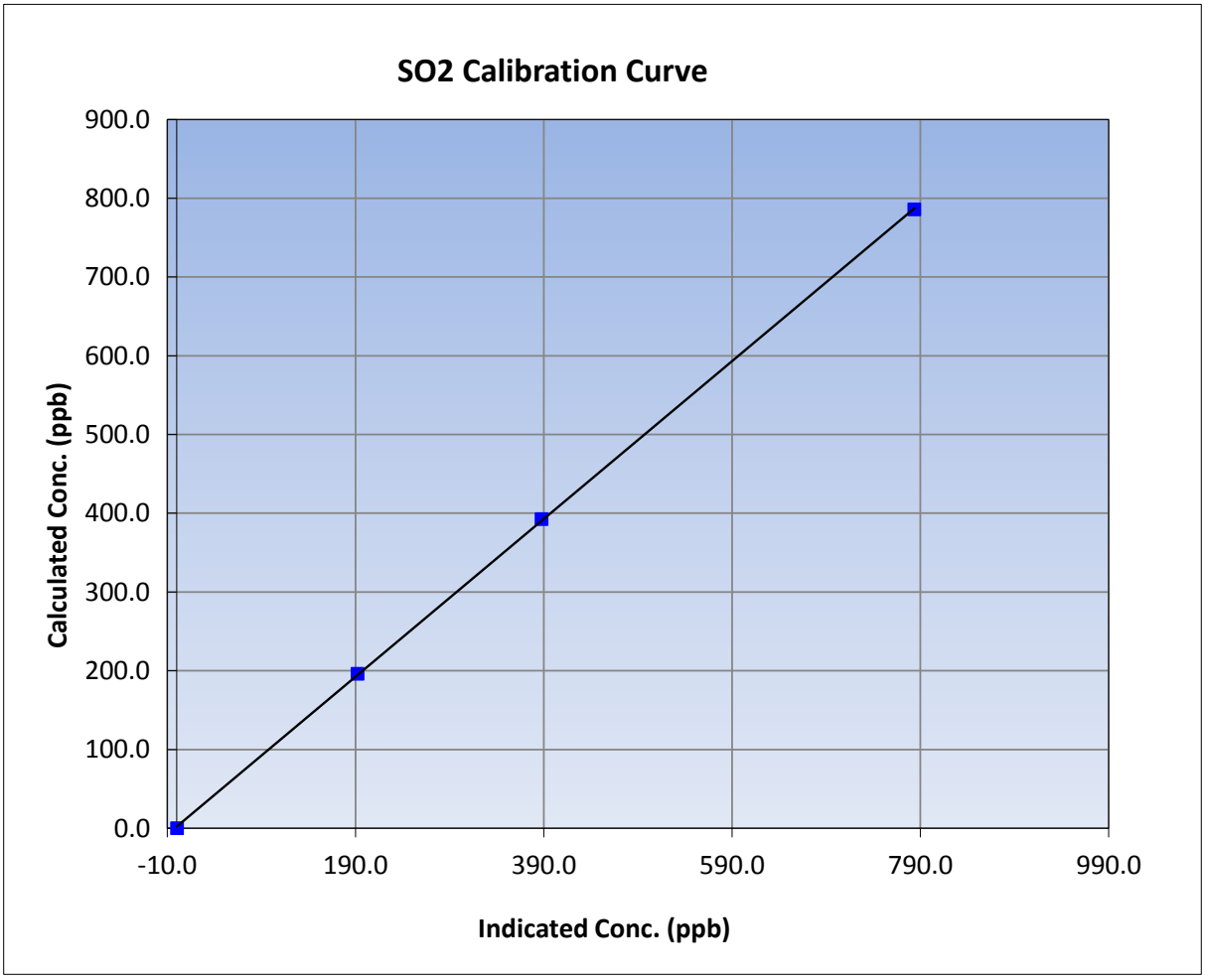
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

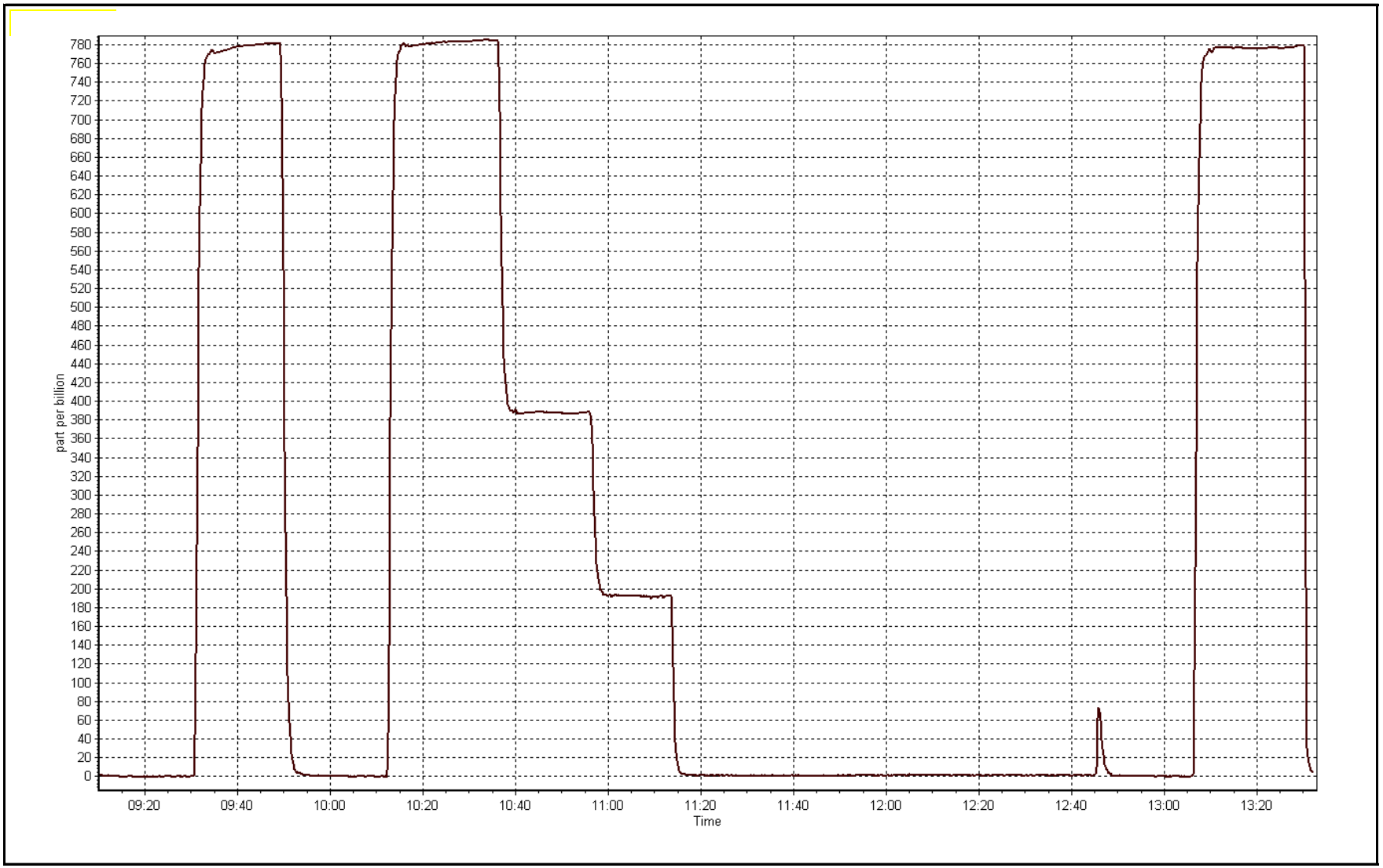
Calibration Date	January 12, 2016	Previous Calibration	December 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	13:32
Analyzer make	API T100	Analyzer serial #	599

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999957
785.8	783.7	1.0027		
392.4	387.5	1.0127	Slope	1.001898
196.2	192.1	1.0214		
			Intercept	2.095355



SO2 Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 14, 2016	Last Calibration	December 8, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:35	End Time (MST)	11:11
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	30/05/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	S980455A 26/Sep/17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-727
Analyzer IP address	192.168.1.44		Lamp voltage	1003	1007
Calculated slope	0.983265	0.989627	Chamber temp	45	45
Calculated intercept	0.482703	0.548938	Pressure	681.1	690.2
Analyzer Background	2.13	2.13	Flow	0.445	0.450
Analyzer Coefficient	1.038	1.038	Intensity	90	90
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153359
Converter make/model	CDN-101	Converter serial #	456

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	78.9	80.0	80.4	0.995
SO2 scrubber check	5000	17.6	179.9	0.1	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	78.9	80.0	80.4	0.995
second point	5000	39.4	40.0	39.8	1.004
third point	5000	19.7	20.0	19.2	1.040
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	78.9	80.0	80.7	0.991
				Average Correction Factor	1.013

Corrected As found	80.6	Previous response	80.9	% change	0.3%

Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay

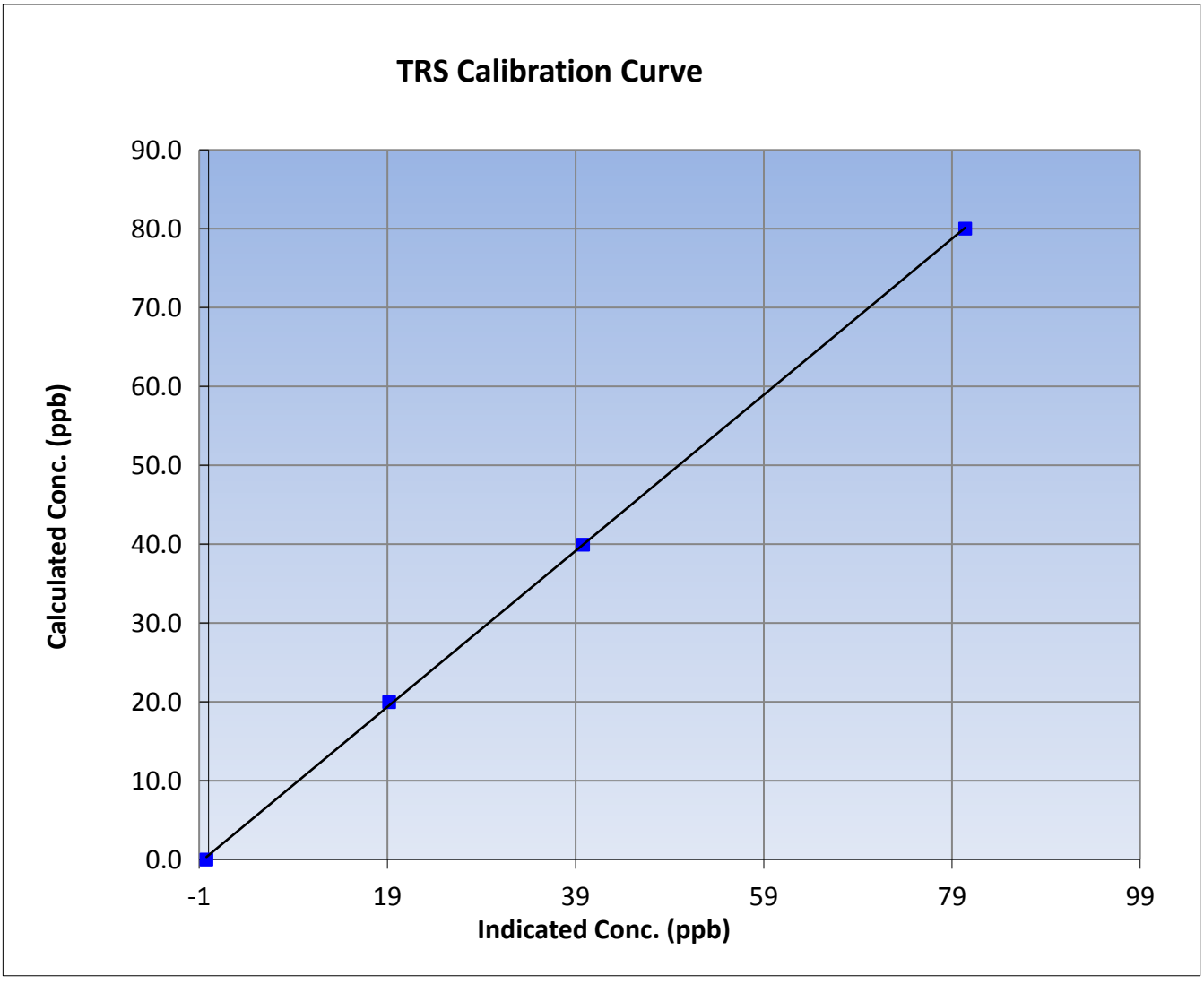
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

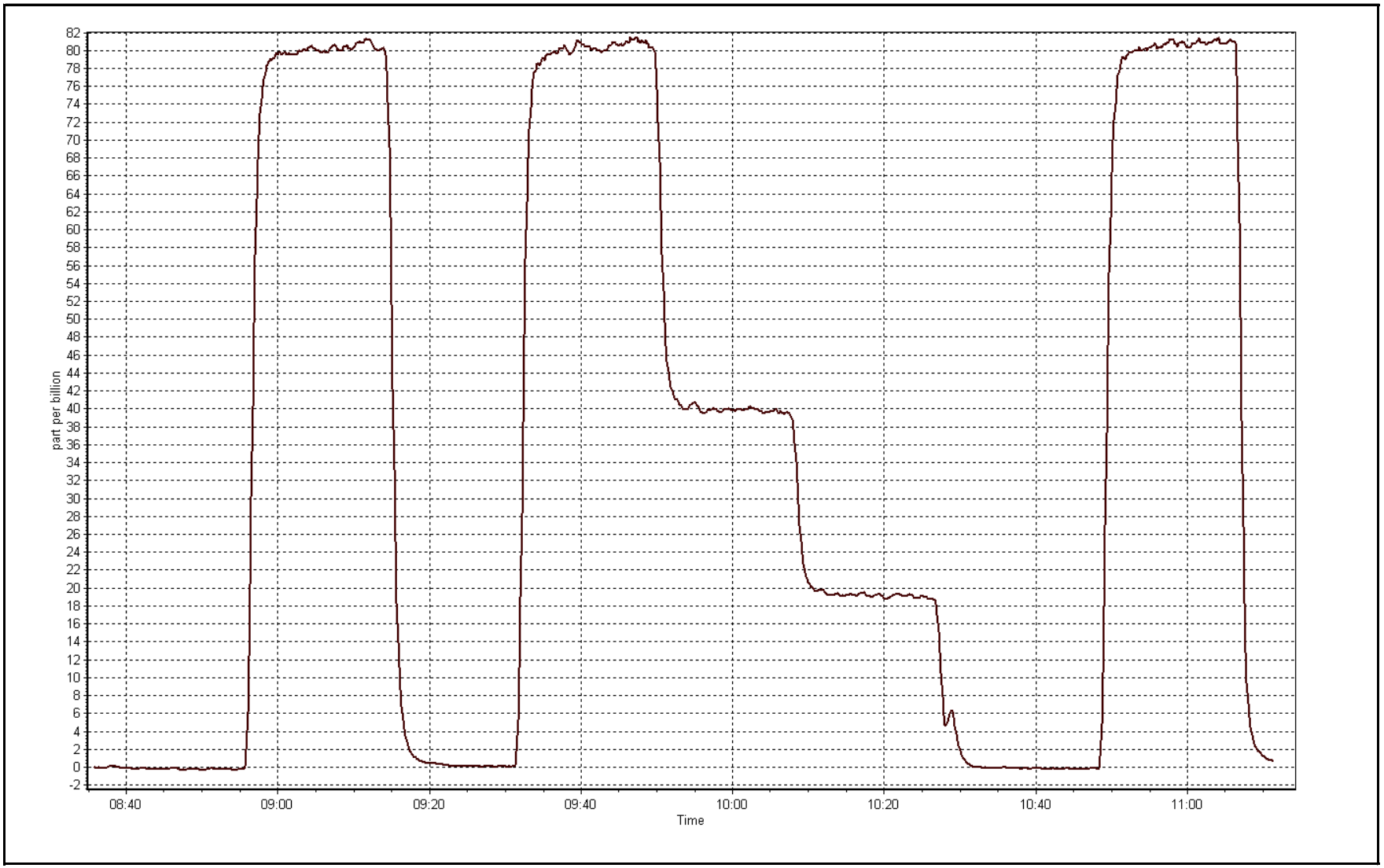
Calibration Date	January 14, 2016	Previous Calibration	December 8, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:35	End Time (MST)	11:11
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999913
80.0	80.4	0.9951		
40.0	39.8	1.0038	Slope	0.989627
20.0	19.2	1.0404		
			Intercept	0.548938



TRS Calibration Plot Date: January 14, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-12-16	Last Calibration	December-07-15
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:30
Gas Cert Reference	LL110515	Cal Gas Expiry Date	08/09/2018
CH4 Cal Gas Conc.	517 ppm	CH4 Equiv Conc.	1067.0 ppm
C3H8 Cal Gas Conc.	200 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.2	34.2
Calculated slope	1.014120	0.998432	Fuel Pressure	23.1	23.1
Calculated intercept	0.073312	0.043792	Analyzer Coeff	3.085	3.104
			Analyzer BKG	1.260	1.300

Analyzer make	51i-LT	Analyzer serial #	1505164380

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.08	----
as found span	5000	78.9	16.84	16.73	1.006
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	78.9	16.84	16.84	1.000
second point	5000	39.4	8.41	8.34	1.008
third point	5000	19.7	4.20	4.16	1.011
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	78.9	16.84	16.94	0.994
				Average Correction Factor	1.006

Corrected As found	16.65	Previous response	16.53	% change	-0.7%

Notes:

hydrogen changed out, filter changed out, zero adjusted

Calibration Performed By: Melissa Lemay

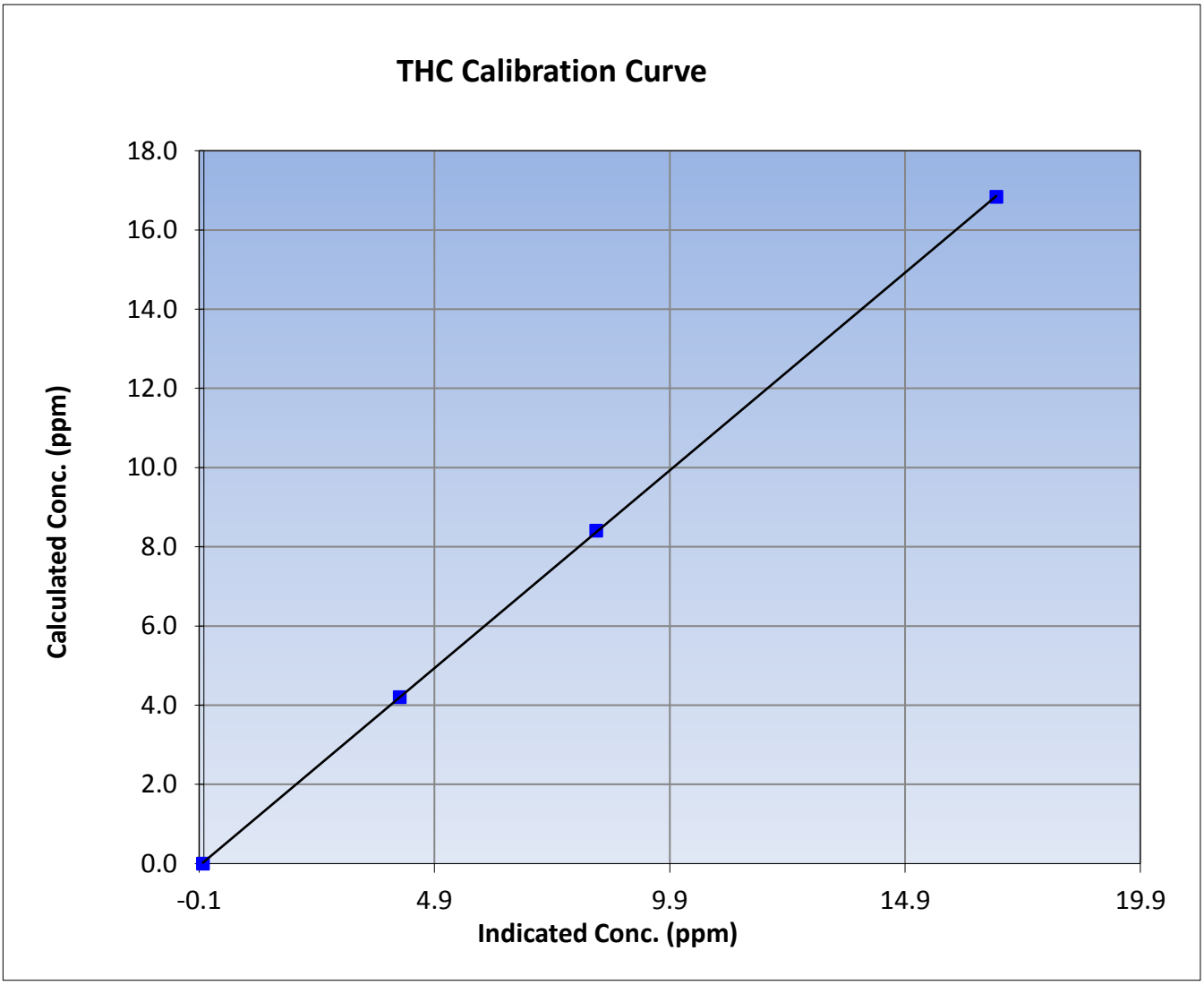
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

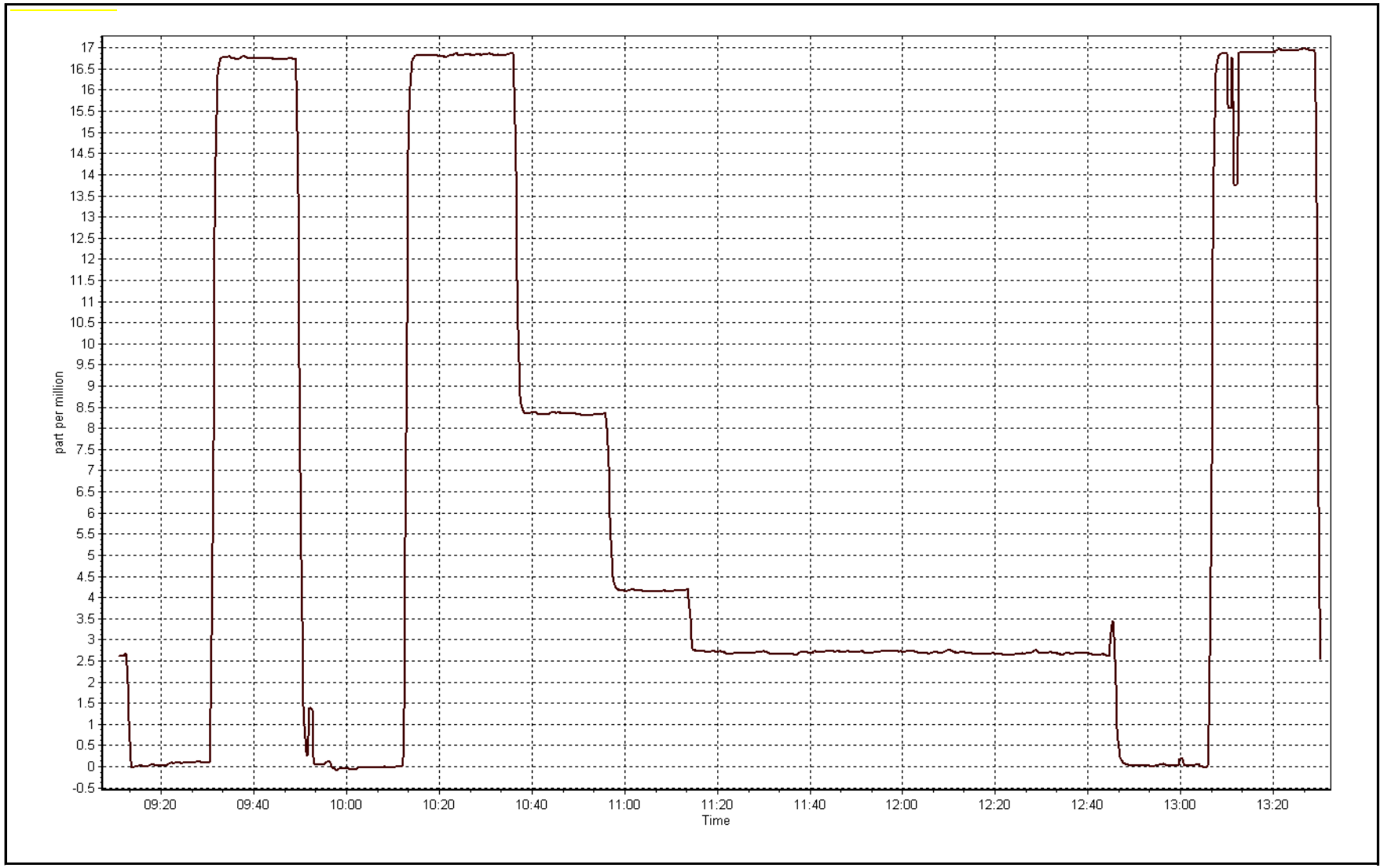
Calibration Date	January 12, 2016	Previous Calibration	December 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	13:30
Analyzer make	51i-LT	Analyzer serial #	1505164380

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	----	Correlation Coefficient	0.999984
16.84	16.84	0.9998		
8.41	8.34	1.0081	Slope	0.998432
4.20	4.16	1.0106		
			Intercept	0.043792



THC Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

W B E A

Station Information

Calibration Date	January 13, 2016	Previous Calibration	December 8, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	13:45
NO2 GPT Ref date	January-12-16	Transfer Standard	Sabio 4010
		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.	24.3	24.8
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.000634	1.012761	Pressure	26.2	26.4
Calculated intercept	-0.150923	-0.508394	Flow	744.0	744.0
Analyzer Background	0.2	0.2	Intensity	2650.7	2625.5
Analyzer Coefficient	1.009	1.009			

Analyzer make	API T400	Analyzer serial #	825

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.1	----
as found span	5000	0.89	353.8	350.9	1.008
calibrator zero	5000	0.00	0.0	0.5	----
high point	5000	0.89	353.8	349.7	1.012
second point	5000	0.47	210.3	208.5	1.009
third point	5000	0.36	111.1	110.0	1.010
as left zero	5000	0.00	0.0	0.7	----
as left span	5000	0.89	353.8	359.2	0.985
				Average Correction Factor	1.010

Corrected As found	350.8	Previous response	353.7	% change	0.8%

Notes:

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

Calibration Performed By: Melissa Lemay

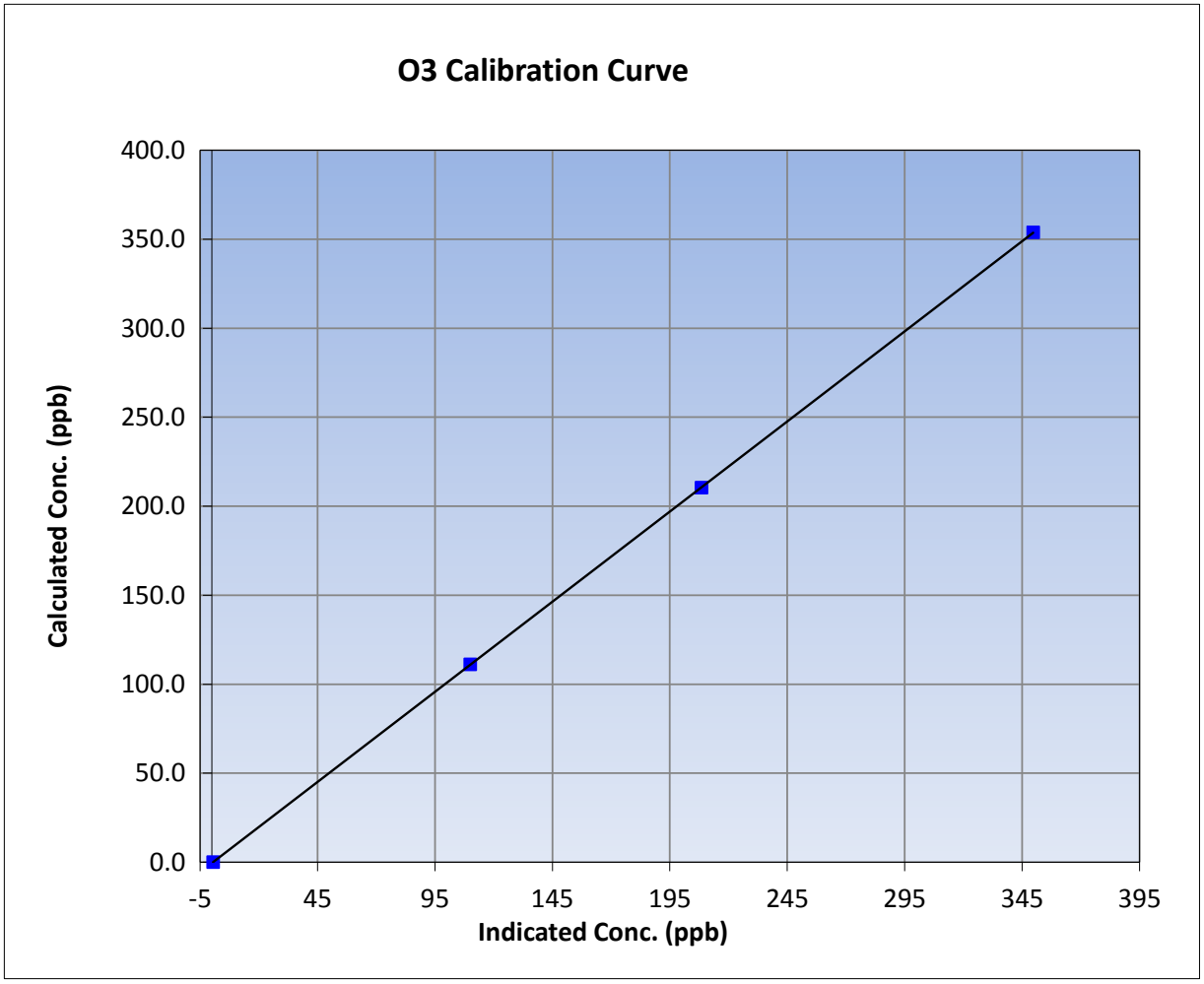
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

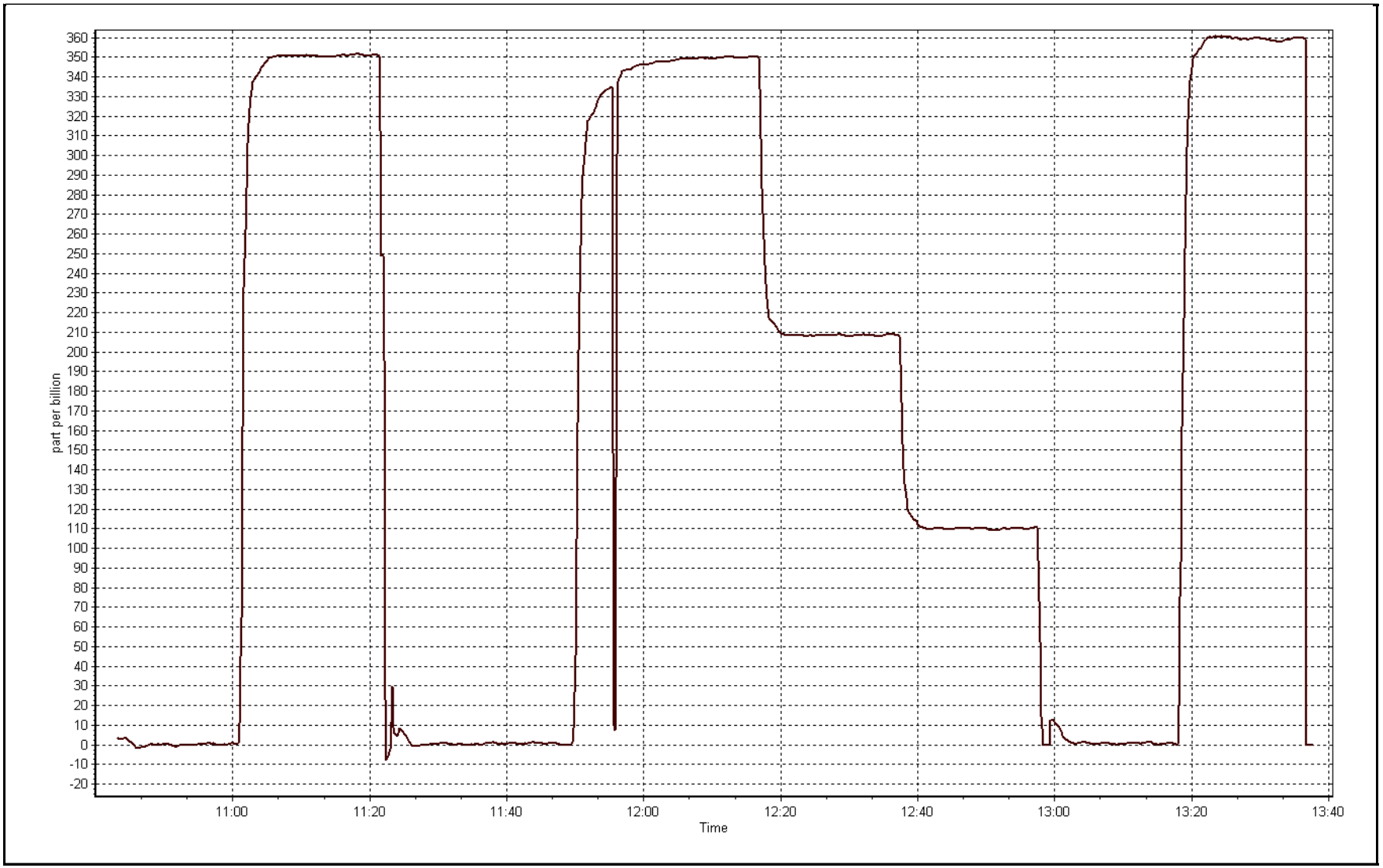
Calibration Date	January-13-16	Previous Calibration	December 8, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:35	End Time (MST)	13:45
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999997
353.8	349.7	1.0117		
210.3	208.5	1.0086	Slope	1.012761
111.1	110.0	1.0100		
			Intercept	-0.508394



O3 Calibration Plot Date: January 13, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 12, 2016	Previous Calibration	December 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:31
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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996339	0.997450	0.982833
	Data Offset	2.067773	1.505407	-0.286151
Current Calibration	Data Slope	0.998418	0.998704	1.000380
	Data Offset	1.948488	1.964085	0.304547

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.837		0.848	
NOX coefficient	0.998		1.003	
NO2 coefficient	0.998		0.998	
NO bkgrnd	7.4		7.5	
NOX bkgrnd	7.5		7.7	
Chamber Temp	50.2	Deg C	50.2	Deg C
Moly Temp	325.8	Deg C	323.9	Deg C
PMT voltage	-846.6	V	-846.2	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	177	mmHg	182.7	mmHg
R Cell Press Nox	177	mmHg	182.7	mmHg
NO sample flow	0.878	lpm	0.871	lpm
Nox sample Flow	0.876	lpm	0.871	lpm

Notes:

Filter changed out, no maintenance done, span adjusted

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 12, 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	-0.3	0.0	----	----
as found span	5000	78.9	803.2	800.0	3.2	789.3	789.5	-0.3	1.0176	1.0134
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	78.9	803.2	800.0	3.2	803.8	800.4	3.4	0.9993	0.9996
second point	5000	39.4	401.1	399.5	1.6	397.7	396.0	1.6	1.0085	1.0089
third point	5000	19.7	200.5	199.8	0.8	197.9	197.0	0.8	1.0134	1.0140
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	5000	78.9	803.2	444.5	358.7	808.8	447.0	362.0	0.9931	0.9944
								Average Correction Factor	1.0071	1.0075

Corrcted As found NO_X= 789.5 NO= 789.8 Percent Change NO_X= 1.8% NO= 1.4%

Previous Response NO_X= 804.1 NO= 800.6

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	801.5	798.3	0.0	1.0021	1.0022	----	----
1st NO2 (300)	444.5	357.0	801.1	444.5	356.6	1.0026	----	1.0010	99.9%
2nd NO2 (200)	588.0	213.5	801.2	588.0	213.2	1.0025	----	1.0012	99.9%
3rd NO2 (100)	687.2	114.3	800.6	687.2	113.4	1.0033	----	1.0075	99.3%
2nd NO ref point		3.2	800.2	797.1	3.1	1.0038	1.0037	----	----
				Average Correction Factor		1.0030		1.0032	99.7%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

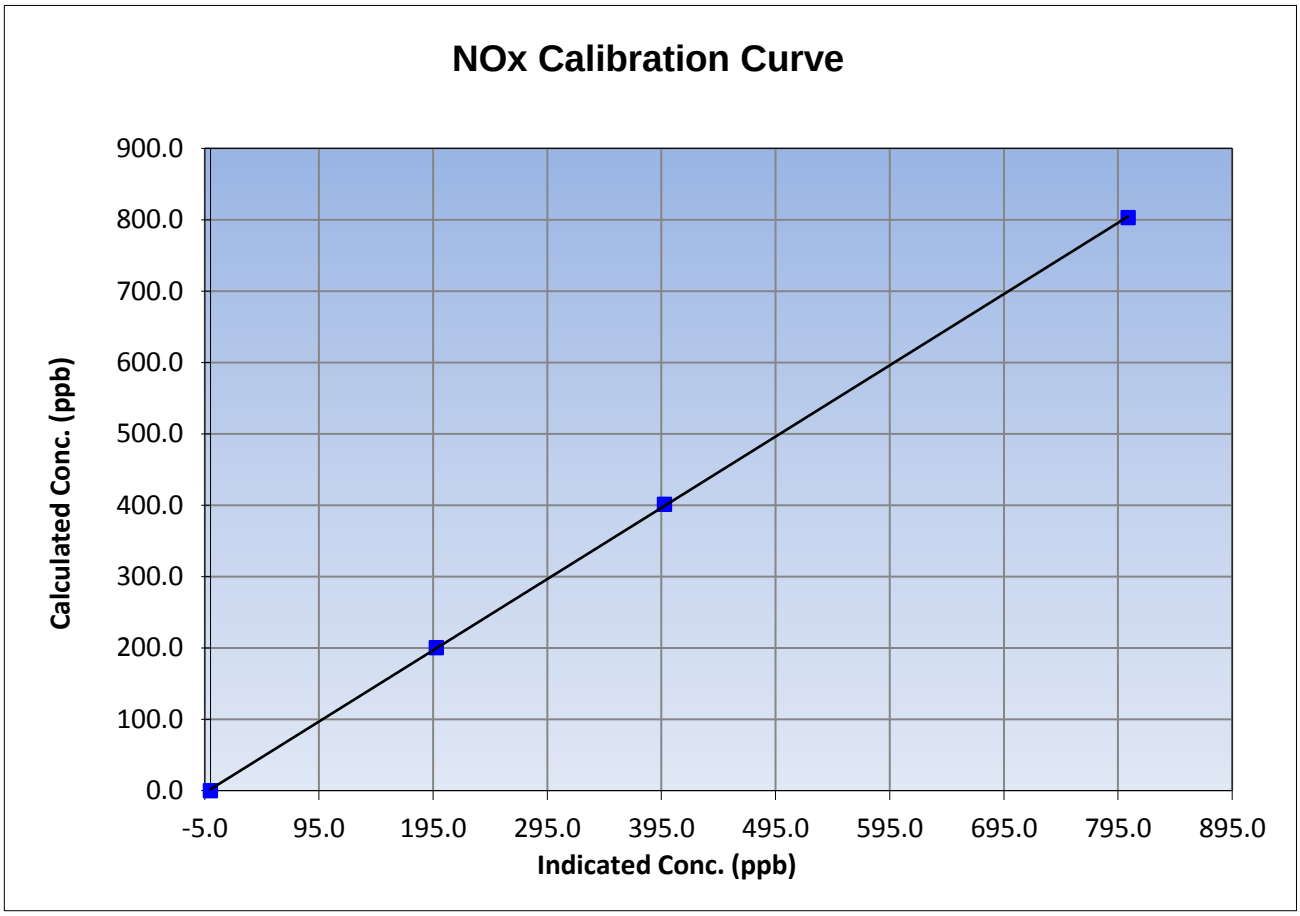
NO_X Calibration Summary

Station Information

Calibration Date	January 12, 2016	Previous Calibration	December 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	13:31
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999971
803.2	803.8	0.9993		
401.1	397.7	1.0085	Slope	0.998418
200.5	197.9	1.0134		
			Intercept	1.948488



Wood Buffalo Environmental Association

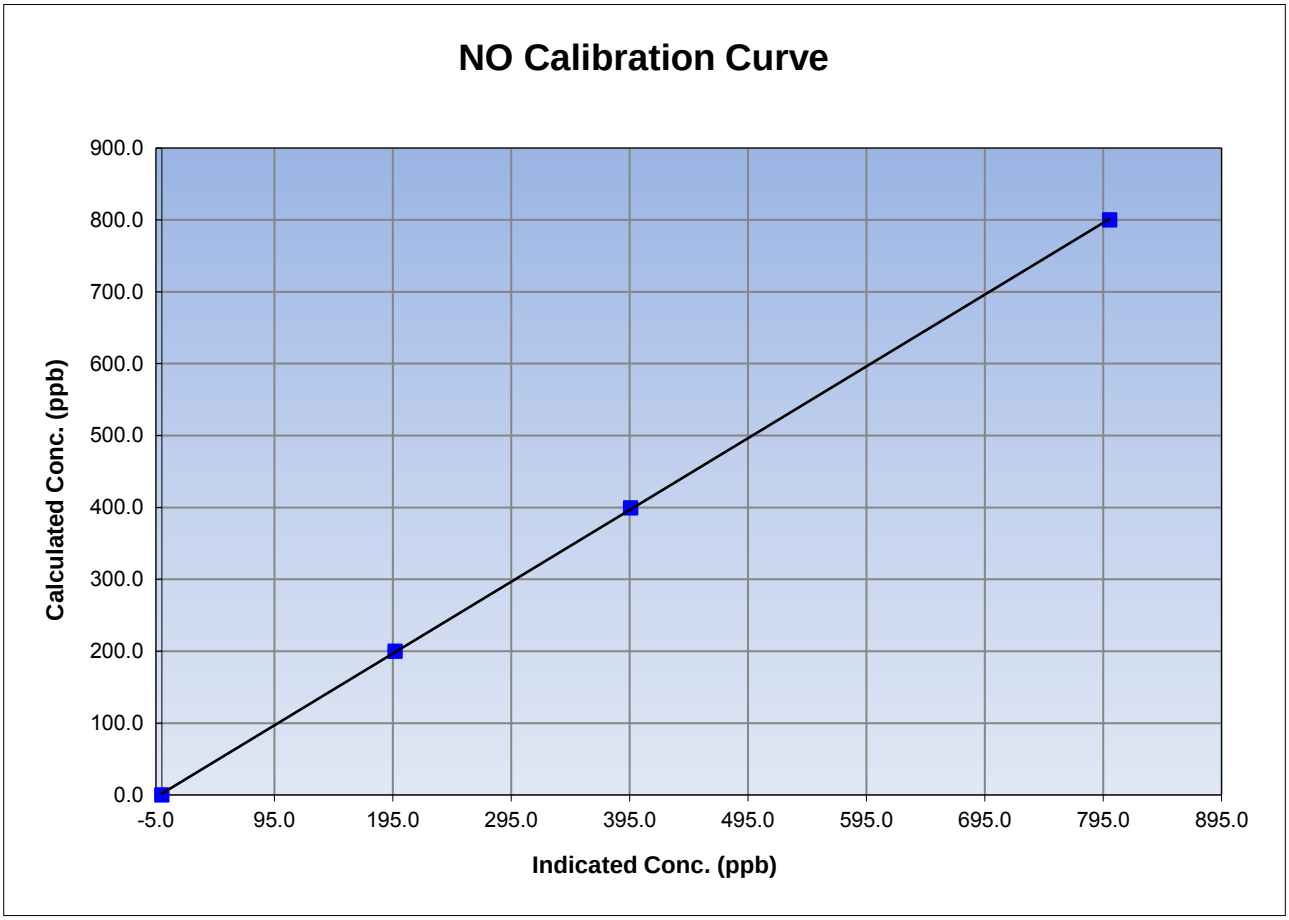
NO Calibration Summary

Station Information

Calibration Date	January 12, 2016	Previous Calibration	December 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	13:31
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999970
800.0	800.4	0.9996		
399.5	396.0	1.0089	Slope	0.998704
199.8	197.0	1.0140		
			Intercept	1.964085



Wood Buffalo Environmental Association

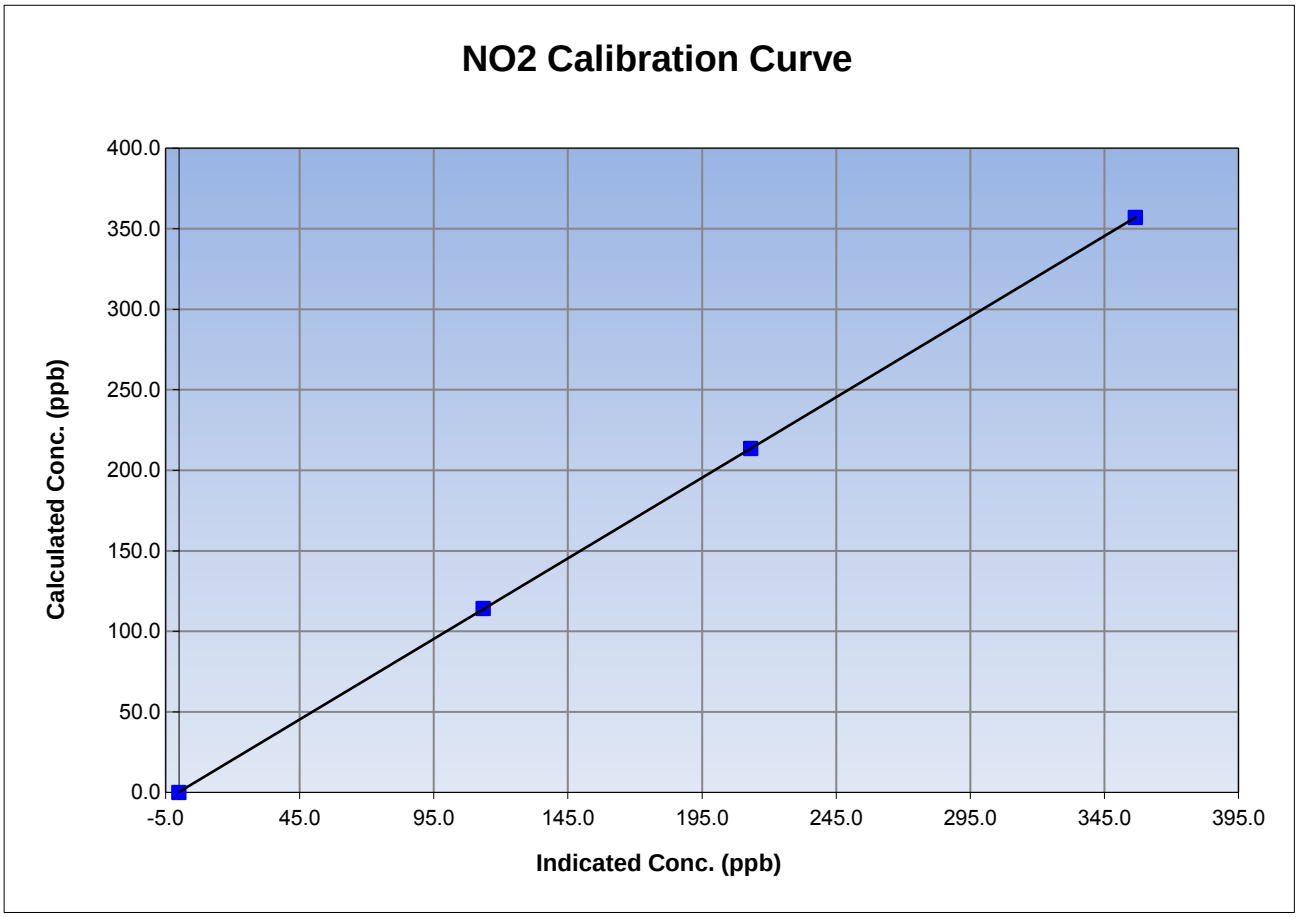
NO_2 Calibration Summary

Station Information

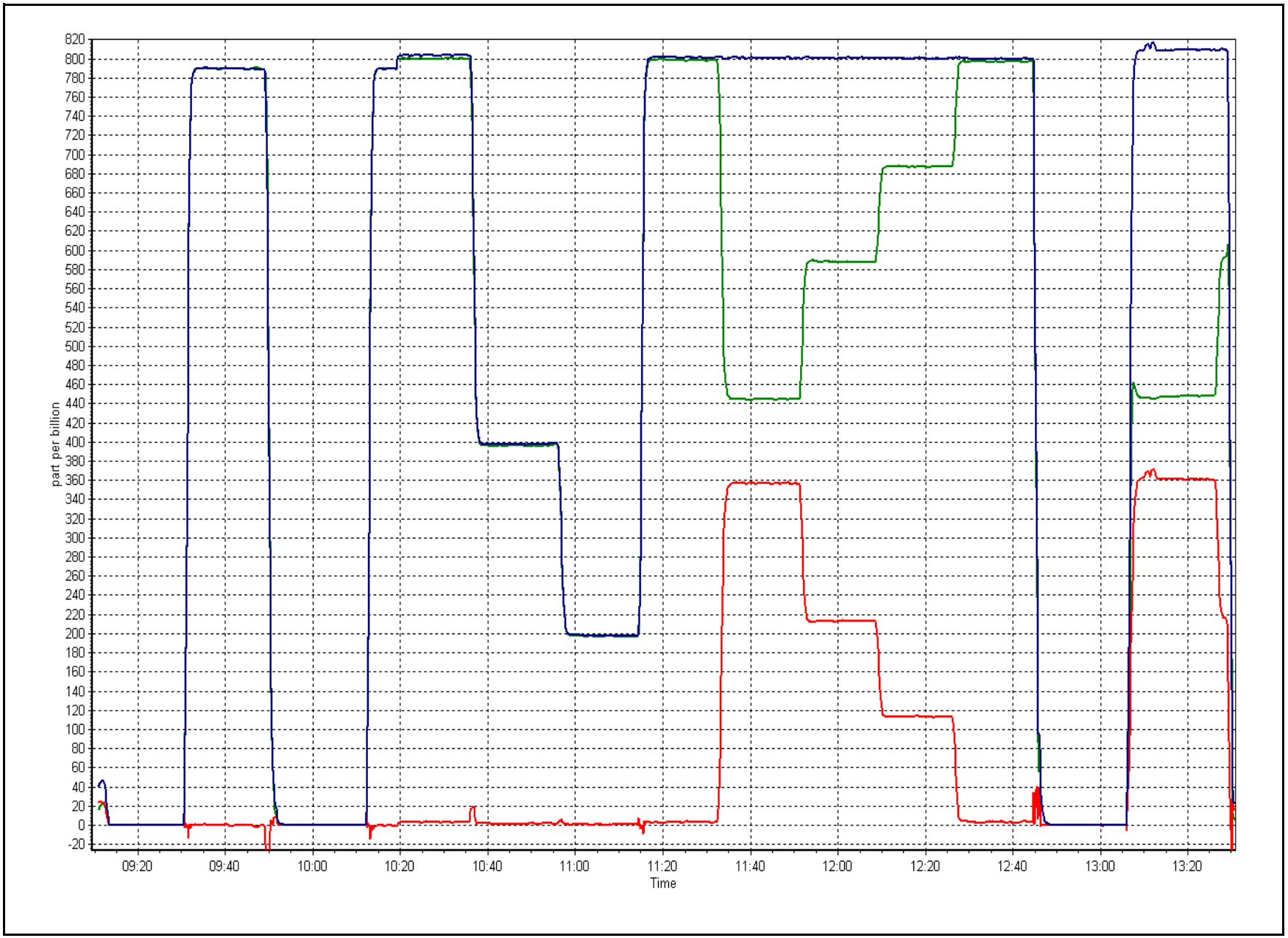
Calibration Date	January 12, 2016	Previous Calibration	December 7, 2015
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	13:31
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999995
357.0	356.6	1.0010		
213.5	213.2	1.0012	Slope	1.000380
114.3	113.4	1.0075		
			Intercept	0.304547



NOX Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 14, 2016	Previous Calibration:	December 8, 2015
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	11:06	End Time (MST):	11:50
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5										
Make/Model:	Thermo / SHARP 5030										
Serial Number	E-803										
C_{14} Source SN:	4066										
Confirmation of Time settings:	Yes ☑	No ☐									
Paremeters Checked:	☑ T1	☐ T2	☐ T3	☐ T4	☑ P3	☑ Main Flow	☐ Beta	☑ Neph			

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-19.0	-19.3	-0.3	-19.0
T2	17.0	na	na	17.0
T3	19.0	na	na	19.0
T4	15.0	na	na	15.0
RH (%)	13.0	na	na	13.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	980	980.0	0.0	980

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	389		389
Neph	1.3		1.3
C14	12.6		12.6
Indicated Concentration (ug/m3)	**0.5**	**No**	**0.5**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	December 8, 2015	Previous Leak Check Date:	September 28, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	17.40	0.08
*Flow with adaptor (LPM):	17.32	

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

Mass Foil Calibration (Annualy)

Foil Calibration Date:	July 14, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337	Mass foil set S/N:	
Previous Correction Factor:	6970		
New Correction Factor:	7080		

INSPECTION DATA

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

NOTES:

No adjustments done, sample head cleaned

Calibration Performed By: **Melissa Lemay**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 14
ANZAC
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
JANUARY 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	659	36	85	93.41	16	0	3	0
TRS(ppb) Average	681	34	63	96.10	2	0	1	0
THC(ppm) Average	676	42	68	96.51	3.1	-	2.3	-
NMHC(ppm) Average	676	42	68	96.51	0.231	-	0.066	-
CH4(ppm) Average	676	42	68	96.51	2.9	-	2.3	-
NO2(ppb) Average	704	36	40	99.46	25	0	10	-
NO(ppb) Average	704	36	40	99.46	13	-	2	-
NOX(ppb) Average	704	36	40	99.46	31	-	12	-
O3(ppb) Average	708	33	36	99.60	44	0	42	-
PM2.5(ug/m3) Average	731	3	13	98.66	44.3	-	18.7	0
AT 2m(C) Average	744	0	0	100.00	6	-	2.1	-
RH(%) Average	744	0	0	100.00	97	-	90	-
Leaf Wetness (% of range) Average	744	0	0	100.00	74	-	10	-
WS(km/h) Average	722	0	22	97.04	21	-	14	-
WD(deg) Average	722	0	22	97.04	-	-	-	-
PC(mm) Total	743	0	1	99.87	1.5	-	2.5	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	659	0.9	2	-	0	0	0	0	1	2	16
TRS(ppb) Average	681	0.4	0	-	0	0	0	0	0	1	2
THC(ppm) Average	676	2.02	0.1	-	1.9	1.9	1.9	2	2.1	2.2	3.1
NMHC (ppm) Average	676	0.005	0.021	-	0	0	0	0	0	0	0.231
CH4(ppm) Average	676	2.01	0.1	-	1.9	1.9	1.9	2	2.1	2.2	2.9
NO2(ppb) Average	704	4.7	4	-	0	1	2	4	7	9	25
NO(ppb) Average	704	0.7	1	-	0	0	0	0	1	2	13
NOX(ppb) Average	704	5.4	5	-	0	1	2	4	7	11	31
O3(ppb) Average	708	25.1	9	-	4	13	18	25	32	37	44
PM2.5(ug/m3) Average	731	4.86	5.6	-	0.1	0.9	1.6	2.6	5.9	11.5	44.3
Temperature 2 m (C) Average	744	-12.2	8.6	-	-32.9	-22.4	-17.6	-13.1	-6.7	0.3	6
Relative Humidity (%) Average	744	79.8	9	-	36	68	75	82	86	90	97
Leaf Wetness (% of range) Average	744	2	4	-	0	0	1	2	2	3	74
Wind Speed 20 m (km/h) Average	722	6.3	4	-	0	2	3	5	8	12	21
Wind Direction 20 m (deg) Average	722	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	743	-	-	4.83	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2	23 Jan 2016 10:00	23 Jan 2016 10:00	1	Station power spike
SO2, TRS, THC, NO2, O3	23 Jan 2016 15:00	23 Jan 2016 17:00	3	Station power failure
SO2	03 Jan 2016 04:00	04 Jan 2016 03:00	24	Unstable operation - excessive baseline drift
SO2	04 Jan 2016 06:00	04 Jan 2016 09:00	4	Unstable operation - excessive baseline drift
SO2	09 Jan 2016 04:00	09 Jan 2016 12:00	9	Unstable operation - excessive baseline drift
SO2	21 Jan 2016 04:00	21 Jan 2016 06:00	3	Unstable operation - excessive baseline drift
SO2	23 Jan 2016 18:00	23 Jan 2016 22:00	5	Unstable operation - excessive baseline drift
TRS	07 Jan 2016 09:00	08 Jan 2016 09:00	25	Analyzer Failure - pump failure
TRS	08 Jan 2016 10:00	08 Jan 2016 10:00	1	Maintenance - verify QA response
CH4, NMHC, THC	03 Jan 2016 19:00	04 Jan 2016 16:00	22	Unstable operation - excessive baseline drift
PM2.5	07 Jan 2016 08:00	07 Jan 2016 09:00	2	Unstable operation - excessive baseline drift
PM2.5	23 Jan 2016 15:00	23 Jan 2016 16:00	2	Station power failure
PM2.5	25 Jan 2016 18:00	25 Jan 2016 18:00	1	Maintenance - analyzer restart and zero check
PM2.5	27 Jan 2016 10:00	27 Jan 2016 10:00	1	Unstable operation - excessive baseline drift
PM2.5	27 Jan 2016 17:00	27 Jan 2016 17:00	1	Maintenance - zero check and adjustment
PM2.5	29 Jan 2016 00:00	29 Jan 2016 01:00	2	Unstable operation - excessive baseline drift
PM2.5	29 Jan 2016 16:00	29 Jan 2016 16:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	03 Jan 2016 18:00	03 Jan 2016 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	09 Jan 2016 07:00	09 Jan 2016 07:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	09 Jan 2016 12:00	09 Jan 2016 12:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	09 Jan 2016 18:00	09 Jan 2016 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Jan 2016 05:00	10 Jan 2016 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	15 Jan 2016 16:00	15 Jan 2016 17:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 00:00	16 Jan 2016 00:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 03:00	16 Jan 2016 04:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 10:00	16 Jan 2016 10:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 18:00	16 Jan 2016 21:00	4	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 23:00	17 Jan 2016 00:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2016 22:00	18 Jan 2016 23:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Jan 2016 06:00	22 Jan 2016 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2016 23:00	24 Jan 2016 00:00	2	Flat line in sensor output signal -sensor frozen
Precipitation Collector	15 Jan 2016 09:00	15 Jan 2016 09:00	1	Maintenance - cleaning and function check

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Anzac - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 16 ppb on Jan 8 14:00 Maximum Daily Average: 3.1 ppb on Jan 8

Minimum Value: 0 ppb on Jan 9 13:00 Minimum Daily Average: 0.2 ppb on Jan 2

Maximum Diurnal Average: 1.6 ppb at hour 14 Minimum Diurnal Average: 0.4 ppb at hour 5

Monthly Average: 0.9 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 10$

Hours in Service:	744
Hours of Data:	659
Hours of Missing Data:	85
Hours of Calibration:	36
Percent Operational Time:	93.4

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jan	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0
4-Jan	UO	UO	UO	Z	1	UO	UO	UO	UO	6	5	9	7	6	5	5	5	6	6	4	3	2	2	1	--	9
5-Jan	1	1	1	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	0.4	1
7-Jan	Z	1	2	1	0	0	0	0	0	0	0	0	0	1	3	1	1	2	3	3	3	1	1	0	1.1	3
8-Jan	0	Z	0	0	0	0	0	0	5	2	3	4	13	16	8	7	5	3	1	1	0	0	0	0	3.1	16
9-Jan	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	1	2	0	0	0	0	0	0	0	0	0	--	2
10-Jan	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	12	8	14	6	7	6	3	2.8	14
11-Jan	1	1	2	1	Z	0	3	2	1	0	1	1	2	3	0	0	0	0	0	0	0	0	0	0	0.8	3
12-Jan	0	0	0	0	0	Z	0	0	0	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0.4	1
13-Jan	Z	0	0	0	1	1	3	7	5	5	10	13	3	1	2	1	0	0	0	0	0	0	0	0	2.4	13
14-Jan	0	Z	0	0	0	0	0	3	3	5	2	2	1	0	0	1	0	0	0	0	0	0	0	0	0.9	5
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	2	4	5	2	2	1	1	0	0	0	1.0	5
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	1	1	1	0.5	1
18-Jan	1	1	1	0	0	Z	2	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	3	9	10	3	2	1	1	1	1	1	1.5	10
20-Jan	1	Z	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
21-Jan	0	0	Z	UO	UO	UO	0	0	0	0	0	1	1	2	2	2	2	1	2	1	1	1	1	1	0.9	2
22-Jan	0	0	0	Z	0	0	0	1	1	1	1	2	4	5	2	1	1	1	1	1	1	1	1	1	1.2	5
23-Jan	1	1	0	0	Z	0	0	0	0	PF	0	0	0	0	PF	PF	PF	UO	UO	UO	UO	UO	0	0	--	1
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2	2
25-Jan	Z	5	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	5
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Jan	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0.6	1
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	5	5	1	0	0	0	0	0.7	5
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	1	1	1	1	1	1	0	0	0.6	3
	0.4	0.6	0.6	0.4	0.4	0.4	0.5	0.7	0.8	1.0	1.1	1.4	1.3	1.6	1.4	1.4	1.3	1.4	1.2	1.1	0.7	0.6	0.6	0.5	Diurnal Average	
	1	5	3	2	1	1	3	7	5	6	10	13	13	16	8	9	10	12	8	14	6	7	6	3	Diurnal Maximum	

Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure

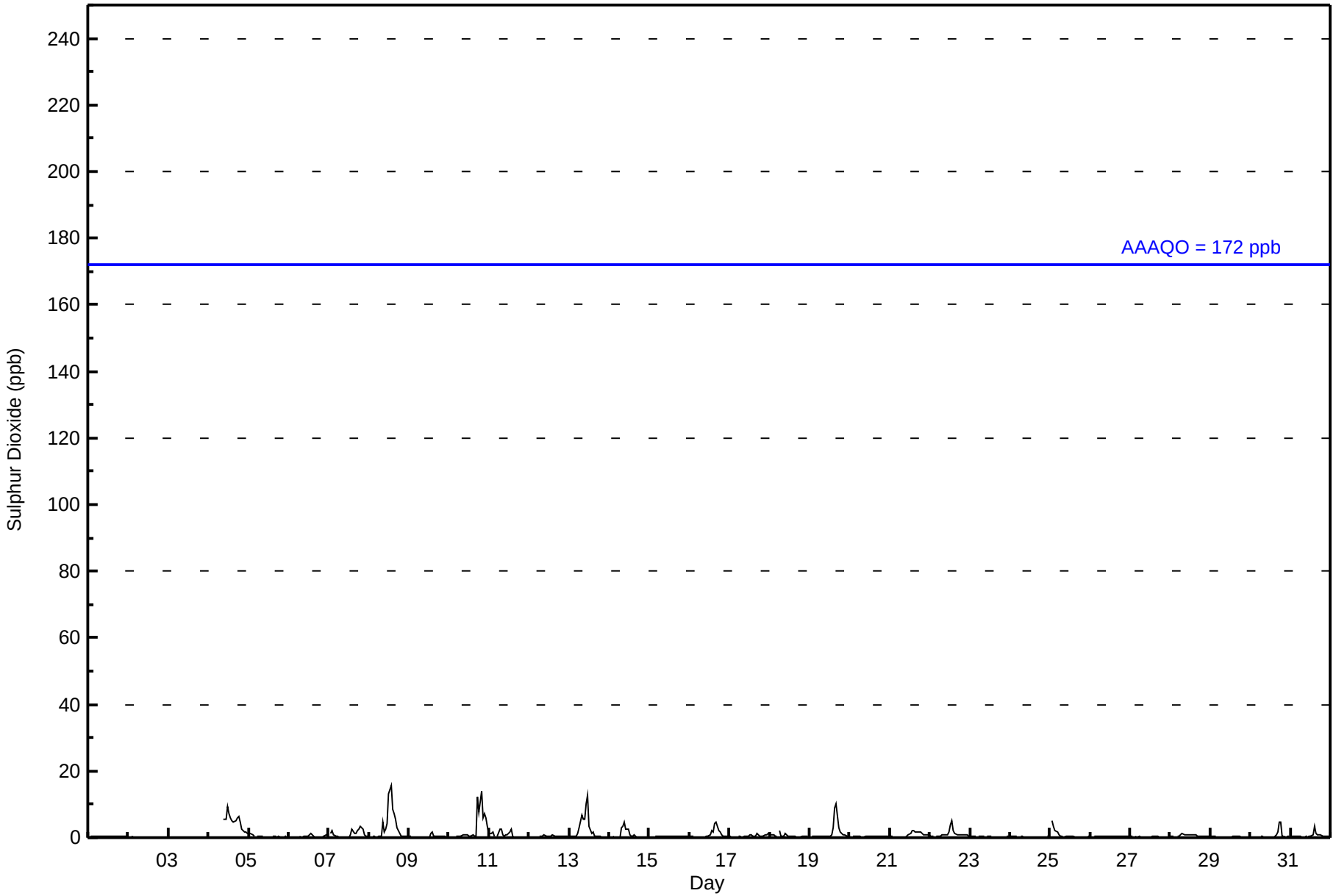
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	654	99.24	99.24
11 - 20	5	0.76	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	34	23	13	4	17	29	90	57	37	18	14	12	41	118	67	62	636
11 - 20	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	2	5
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	23	13	5	17	30	91	57	37	18	14	12	41	118	67	64	641

Total Number of Valid Hours: 641

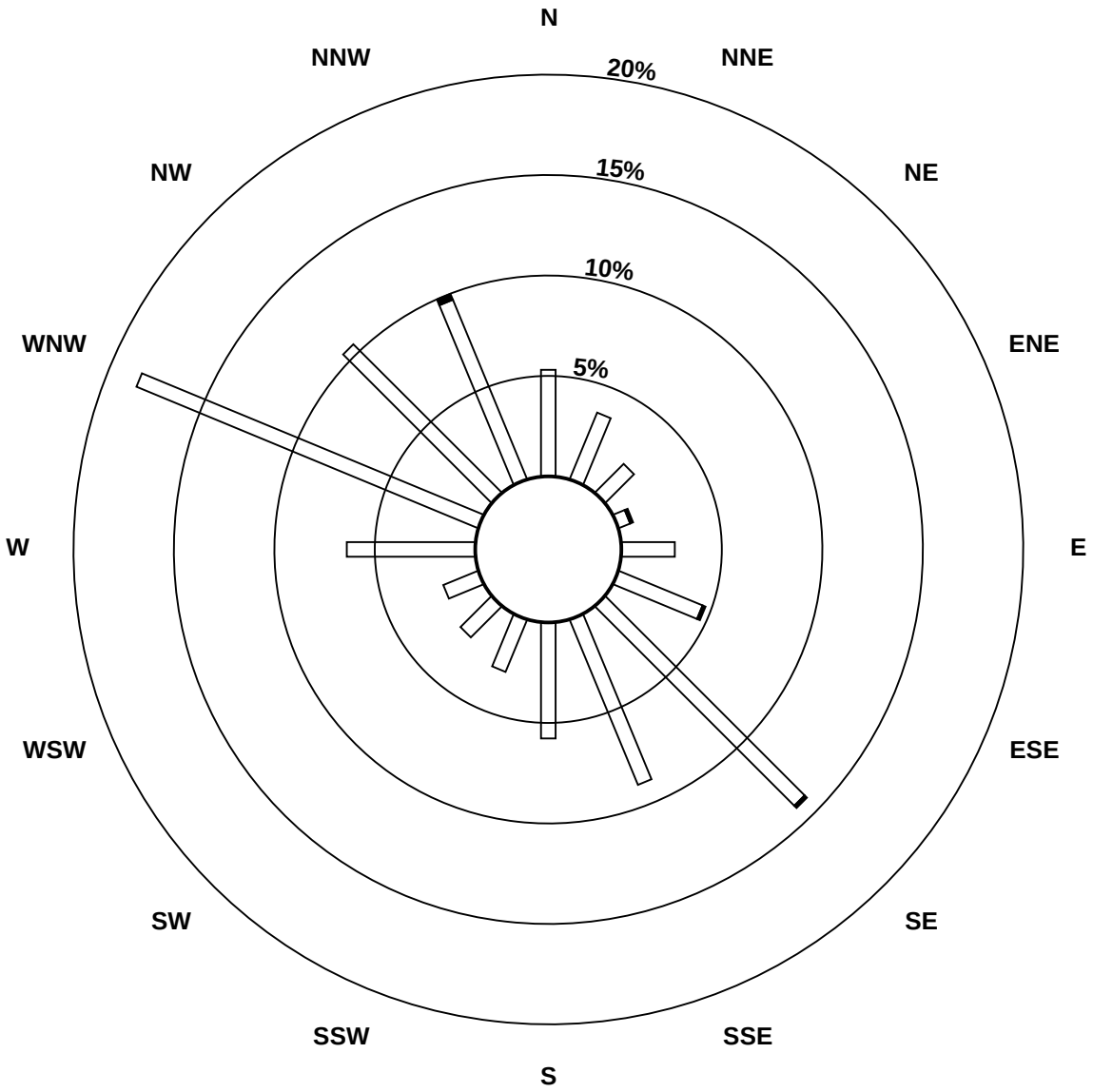
Total Number of Hours: 744

Wood Buffalo Environmental Association

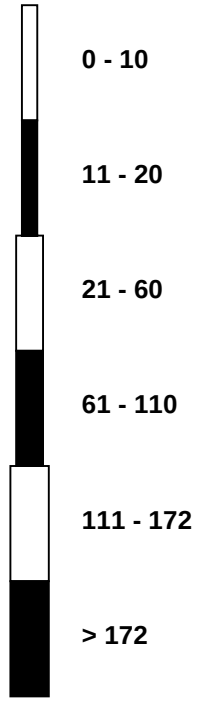
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Anzac (AMS 14)



Classes (ppb)



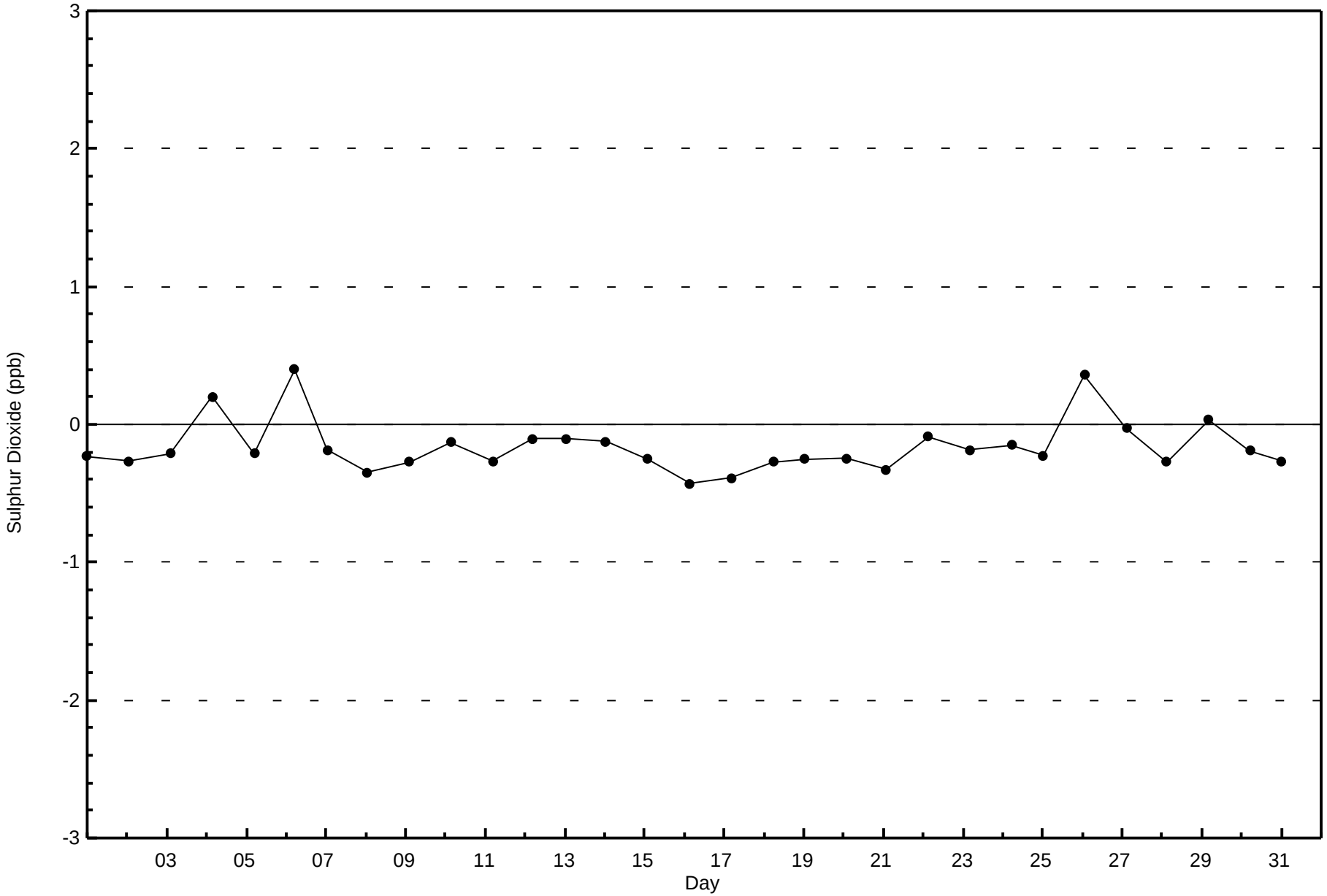
Total Number of Valid Hours: 641

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Anzac - January 2016

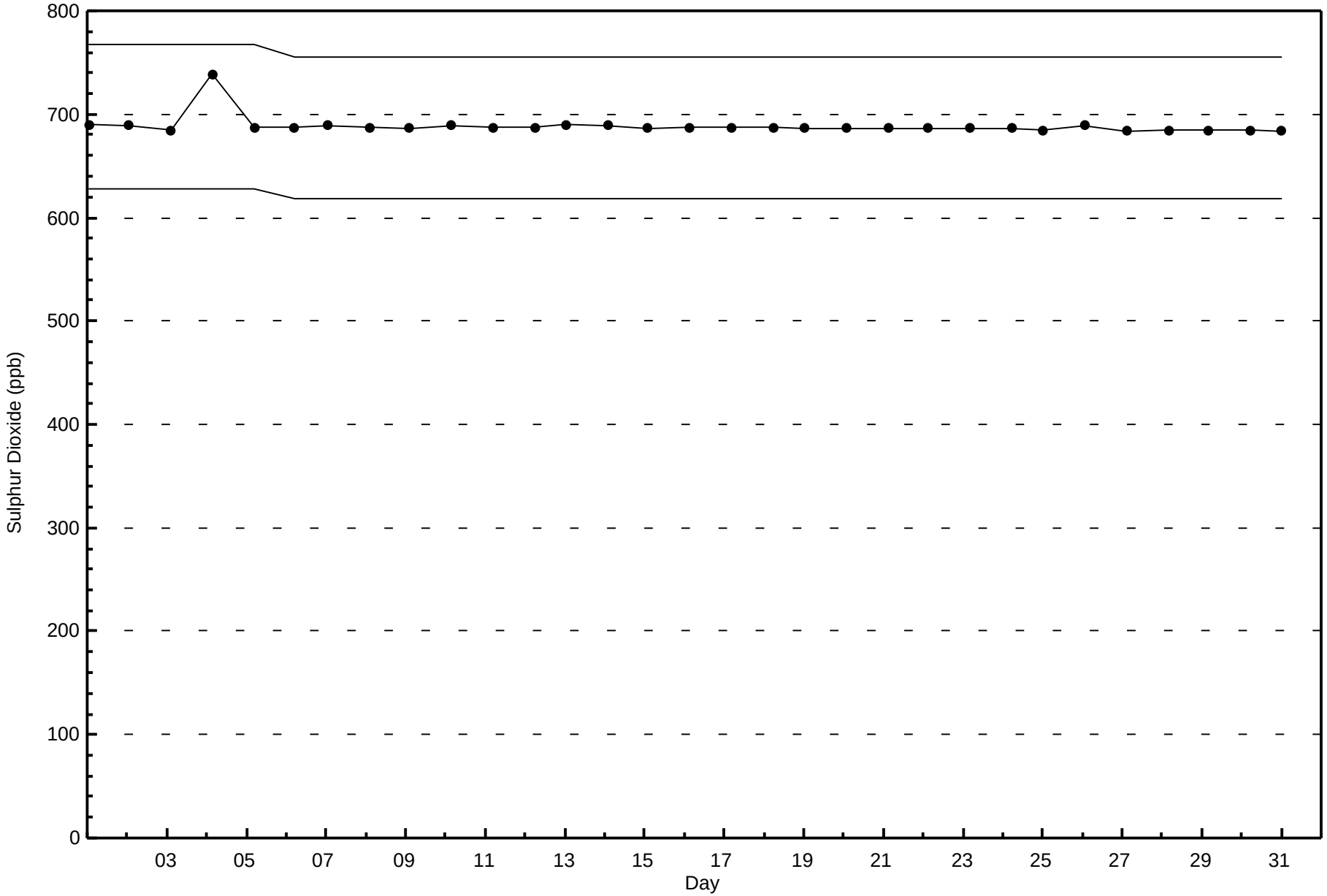


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Anzac - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Jan 5 18:00

Maximum Daily Average: 0.7 ppb on Jan 5

Minimum Value: 0 ppb on Jan 25 20:00

Minimum Daily Average: 0.2 ppb on Jan 29

Maximum Diurnal Average: 0.5 ppb at hour 17

Minimum Diurnal Average: 0.3 ppb at hour 5

Monthly Average: 0.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	681
Hours of Missing Data:	63
Hours of Calibration:	34
Percent Operational Time:	96.1

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

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

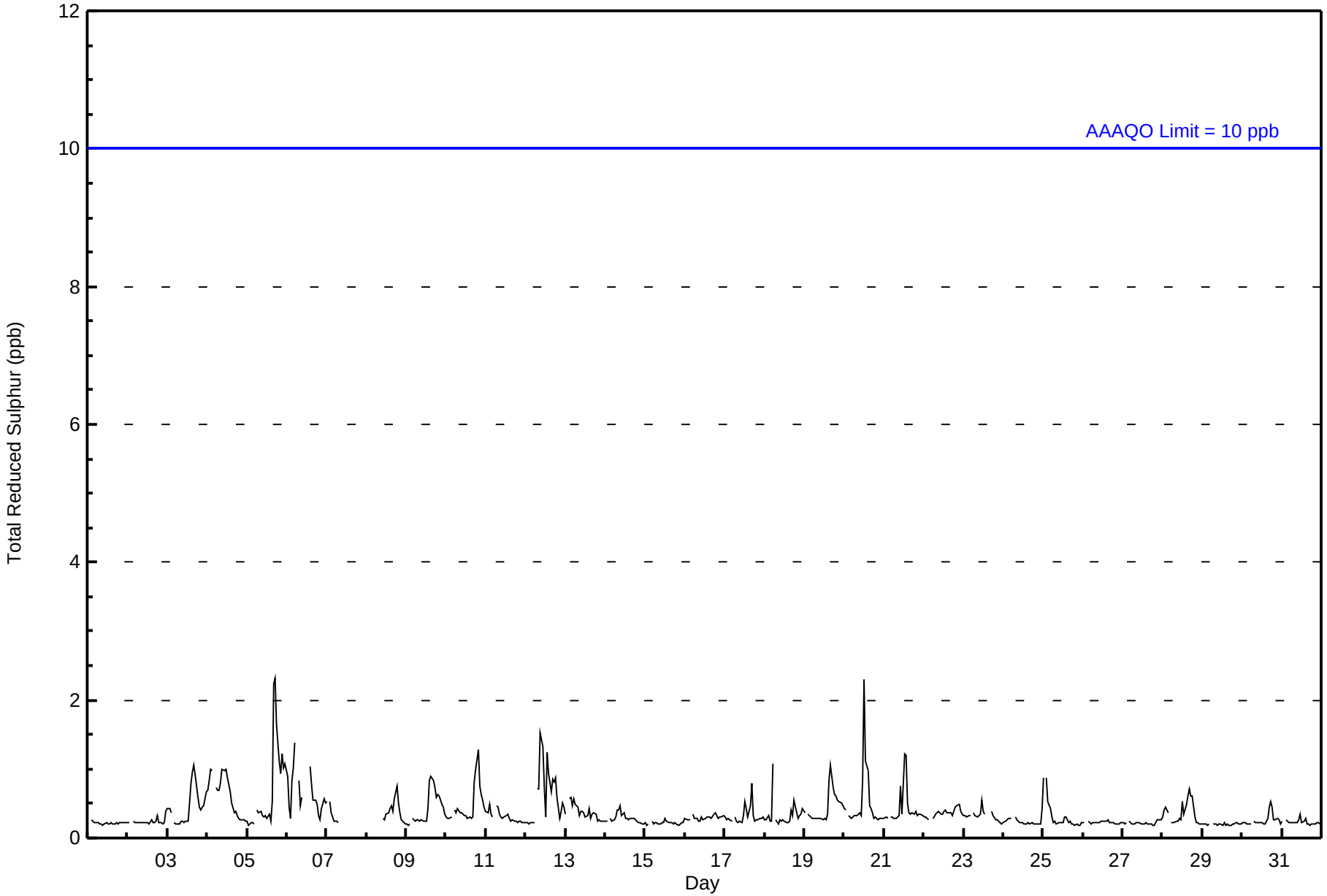
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	681	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: 681

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	32	22	10	8	16	29	91	60	56	22	16	11	41	122	63	61	660
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	32	22	10	8	16	29	91	60	56	22	16	11	41	122	63	61	660

Total Number of Valid Hours: 660

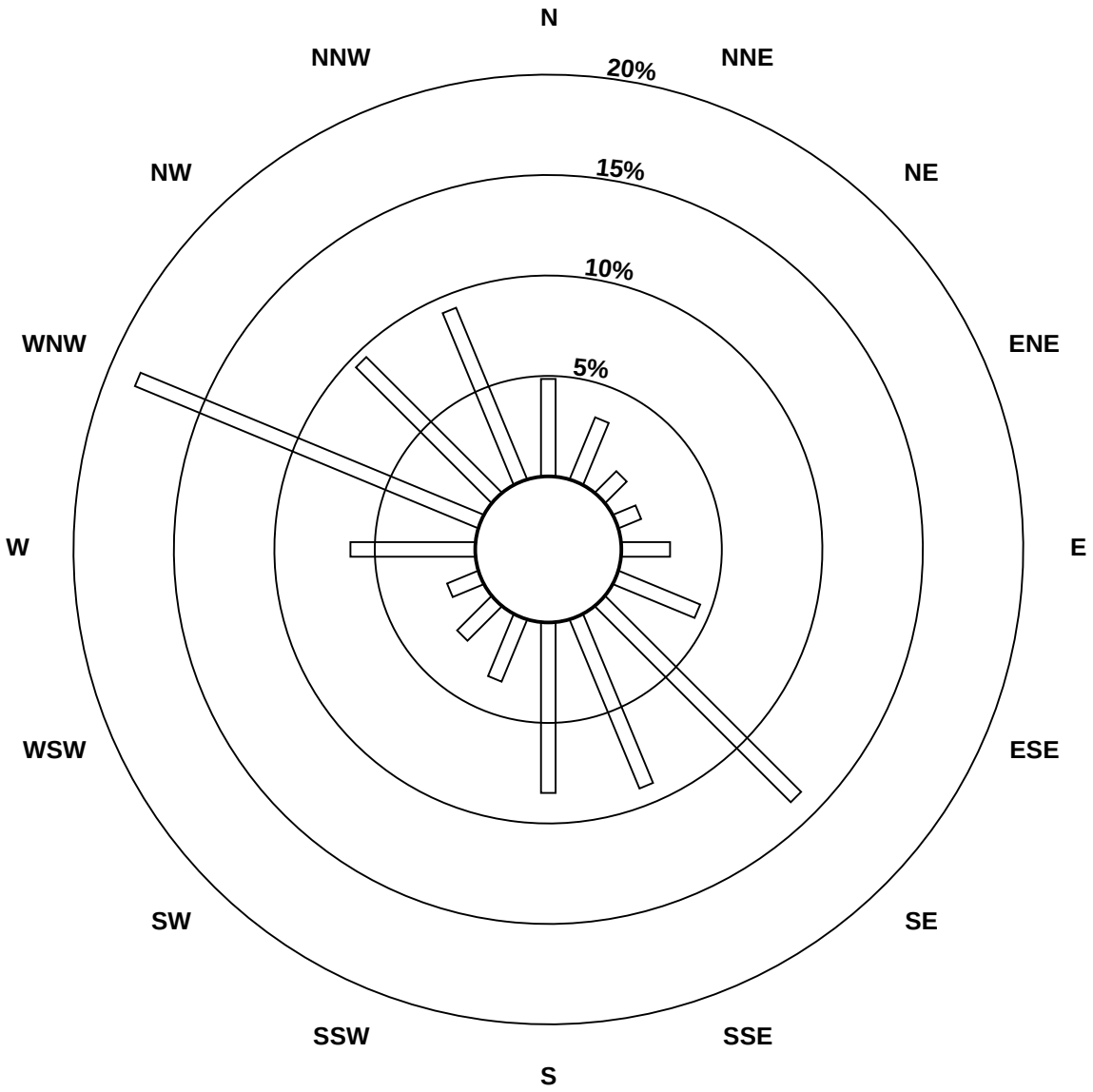
Total Number of Hours: 744

Wood Buffalo Environmental Association

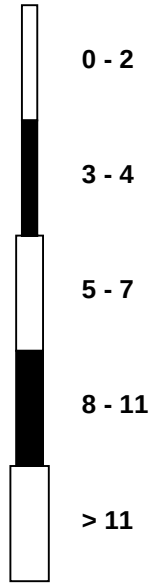
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

Anzac (AMS 14)



Classes (ppb)



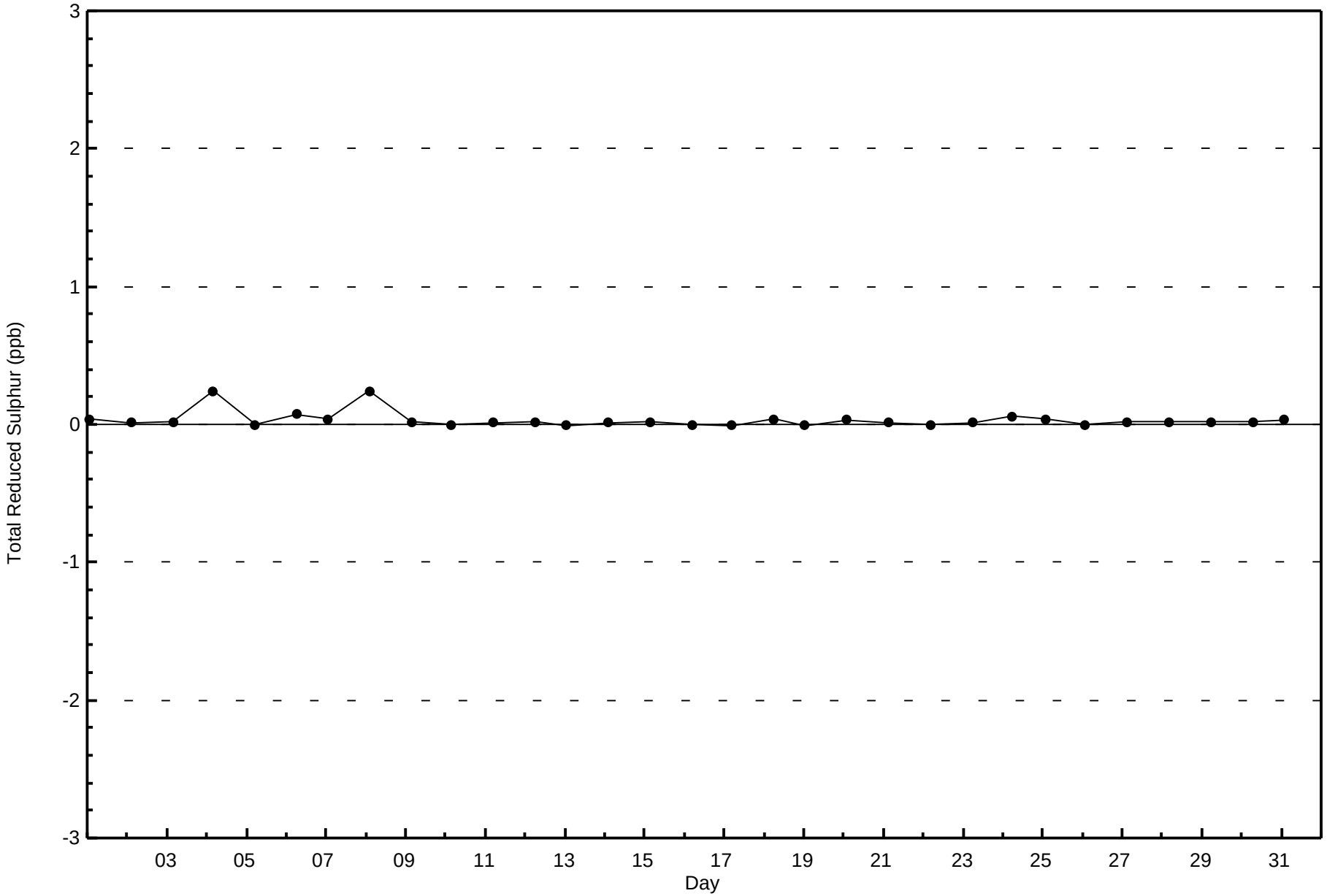
Total Number of Valid Hours: 660

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Anzac - January 2016

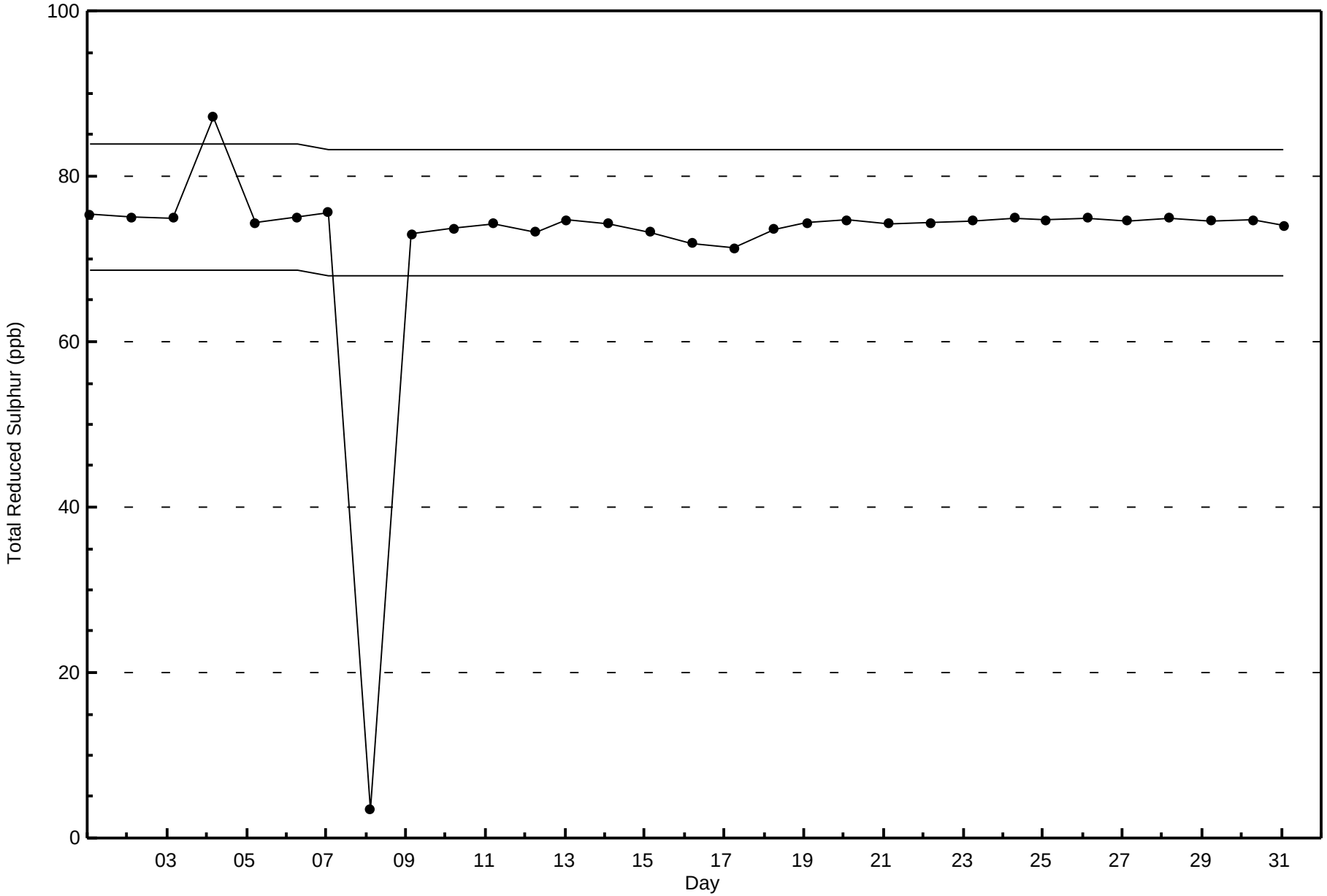


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Anzac - January 2016

Maximum Value: 3.1 ppm on Jan 5 17:00

Maximum Daily Average: 2.3 ppm on Jan 5

Minimum Value: 1.9 ppm on Jan 29 02:00

Minimum Daily Average: 1.9 ppm on Jan 29

Maximum Diurnal Average: 2.1 ppm at hour 18

Minimum Diurnal Average: 2.0 ppm at hour 4

Monthly Average: 2.02 ppm

Percentiles: P_1 = 1.9 P_{10} = 1.9 Q_1 = 1.9 Median = 2.0 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.5

Hours in Service:	744
Hours of Data:	676
Hours of Missing Data:	68
Hours of Calibration:	42
Percent Operational Time:	96.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
2-Jan	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
3-Jan	2.1	2.2	Z	2.1	2.0	2.0	2.1	2.1	2.3	2.1	2.0	2.0	1.9	2.1	2.1	2.2	2.4	2.4	UO	UO	UO	UO	UO	UO	--	2.4
4-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.1	--	2.1
5-Jan	2.1	2.0	1.9	1.9	Z	2.0	2.1	2.2	2.1	C	C	C	C	C	1.9	2.1	3.1	3.1	2.8	2.5	2.4	2.5	2.5	2.6	2.3	3.1
6-Jan	2.6	2.2	2.1	2.2	2.3	Z	2.4	2.3	2.1	2.1	2.0	2.0	2.1	2.0	2.2	2.2	2.3	2.2	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.6
7-Jan	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
8-Jan	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
9-Jan	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.1	2.1	2.3
10-Jan	2.0	2.0	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.0	2.0	2.0	2.0	2.1	2.2
11-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.1
12-Jan	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
13-Jan	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1
14-Jan	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
15-Jan	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
16-Jan	1.9	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	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
17-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
18-Jan	2.0	2.0	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	2.0	2.1	2.0	2.2	2.0	2.0	2.0	2.1	2.2	2.0	2.2
19-Jan	Z	2.1	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	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.2	2.3
20-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
21-Jan	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.4
22-Jan	2.1	2.1	2.1	Z	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.2	2.4
23-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	PF	2.1	2.3	2.2	2.2	PF	PF	PF	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.3
24-Jan	2.2	2.1	2.1	2.2	2.2	Z	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2
25-Jan	Z	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	C	1.9	2.0	2.0	1.9	1.9	1.9	--	2.1
26-Jan	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
27-Jan	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0
28-Jan	2.0	2.1	2.2	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.0	1.9	1.9	1.9	1.9	2.1	2.4
29-Jan	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
30-Jan	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0
31-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average	
	2.6	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.3	2.4	3.1	3.1	2.8	2.5	2.4	2.5	2.5	2.6	Diurnal Maximum	

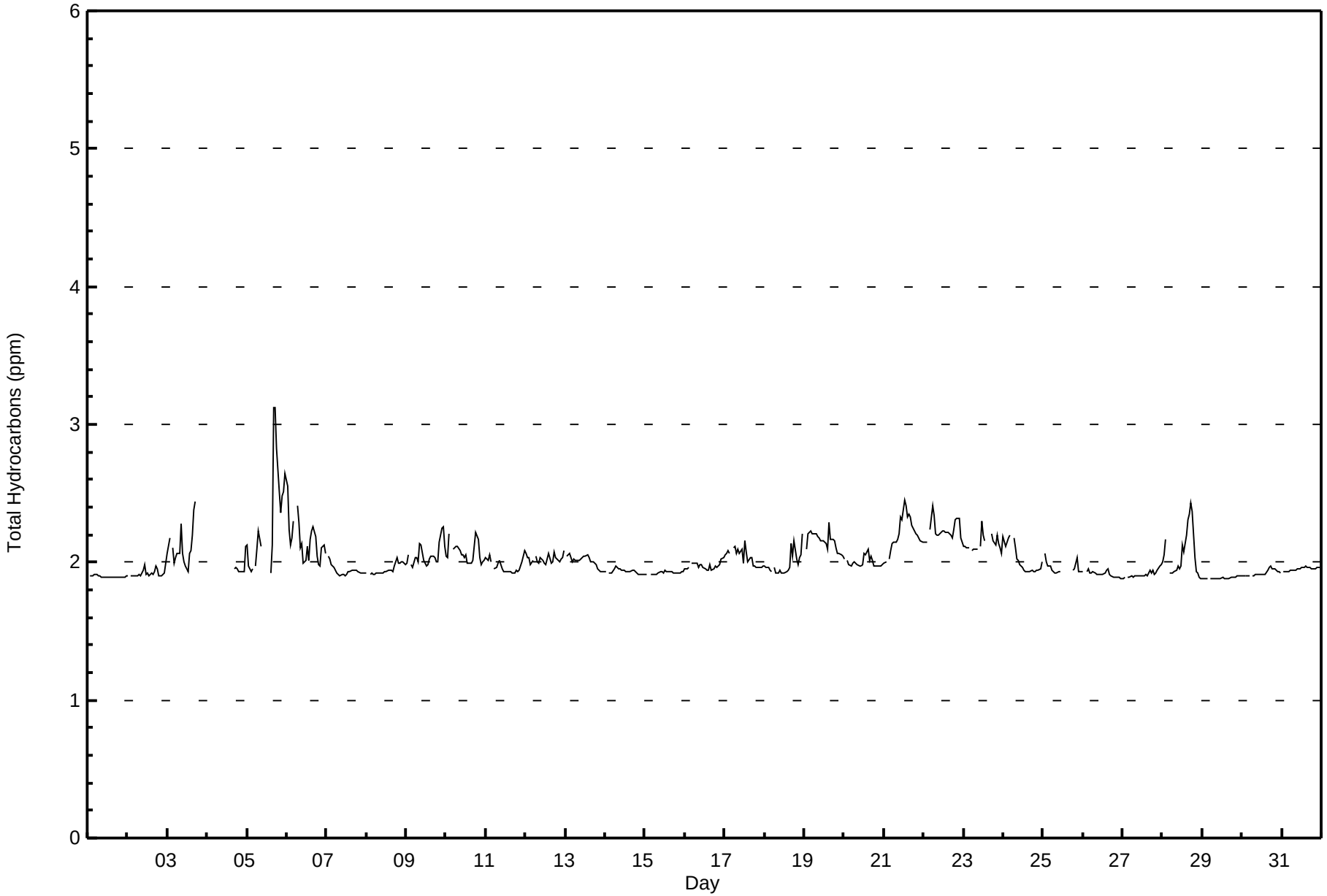
Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Anzac - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Anzac - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	489	72.34	72.34
2.1 - 3.0	185	27.37	99.70
3.1 - 10.0	2	0.30	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Anzac - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	25	10	13	5	14	14	60	44	17	14	9	8	37	101	51	52	474
2.1 - 3.0	9	13	0	0	4	17	32	15	33	6	5	4	4	10	15	12	179
3.1 - 10.0	0	0	0	0	0	1	1	0	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	34	23	13	5	18	32	93	59	50	20	14	12	41	111	66	64	655

Total Number of Valid Hours: 655

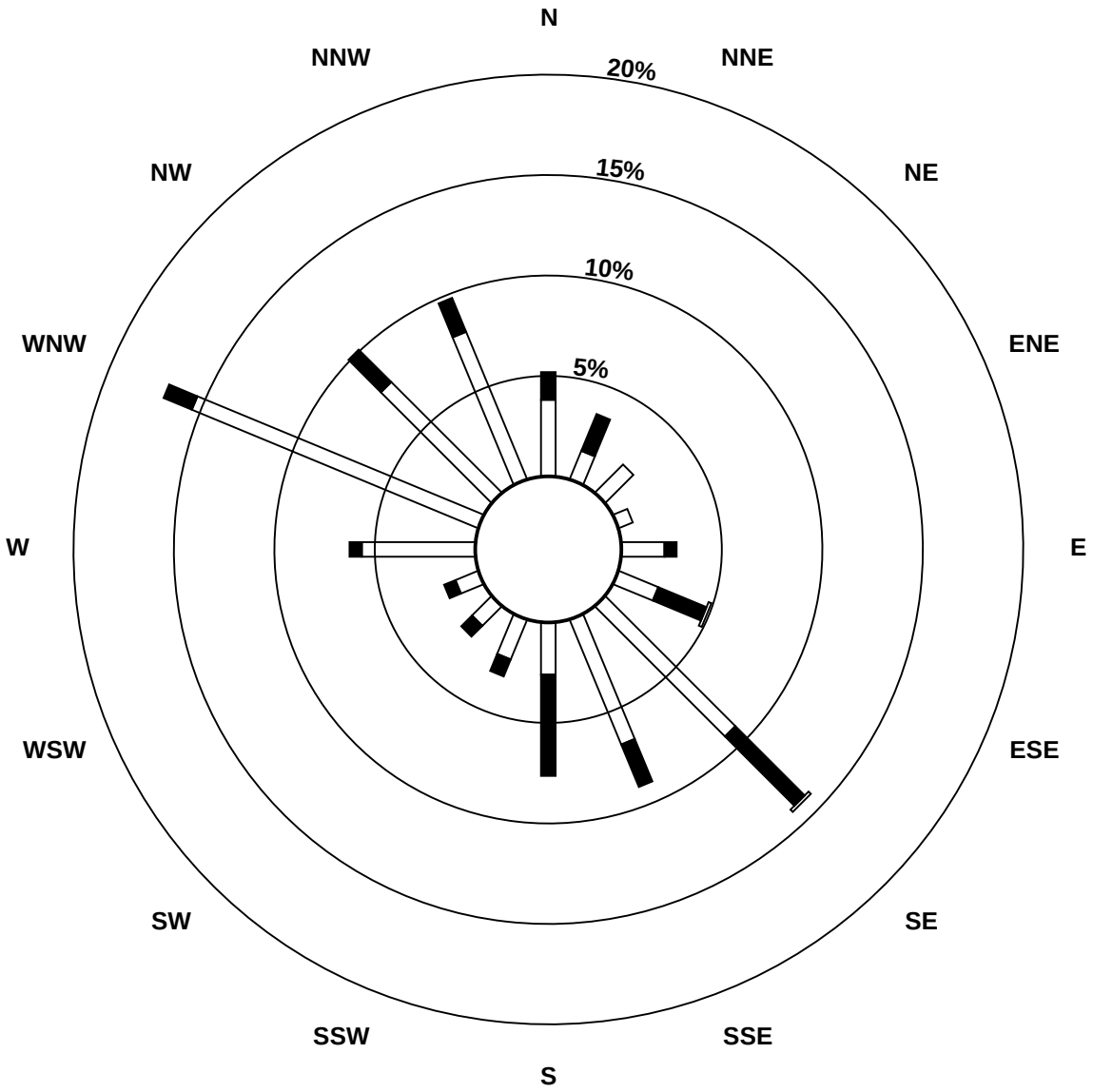
Total Number of Hours: 744

Wood Buffalo Environmental Association

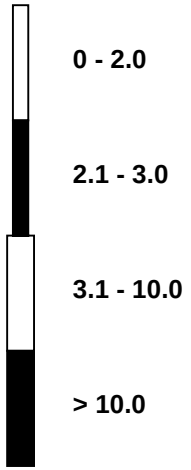
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Anzac (AMS 14)



Classes (ppm)



0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

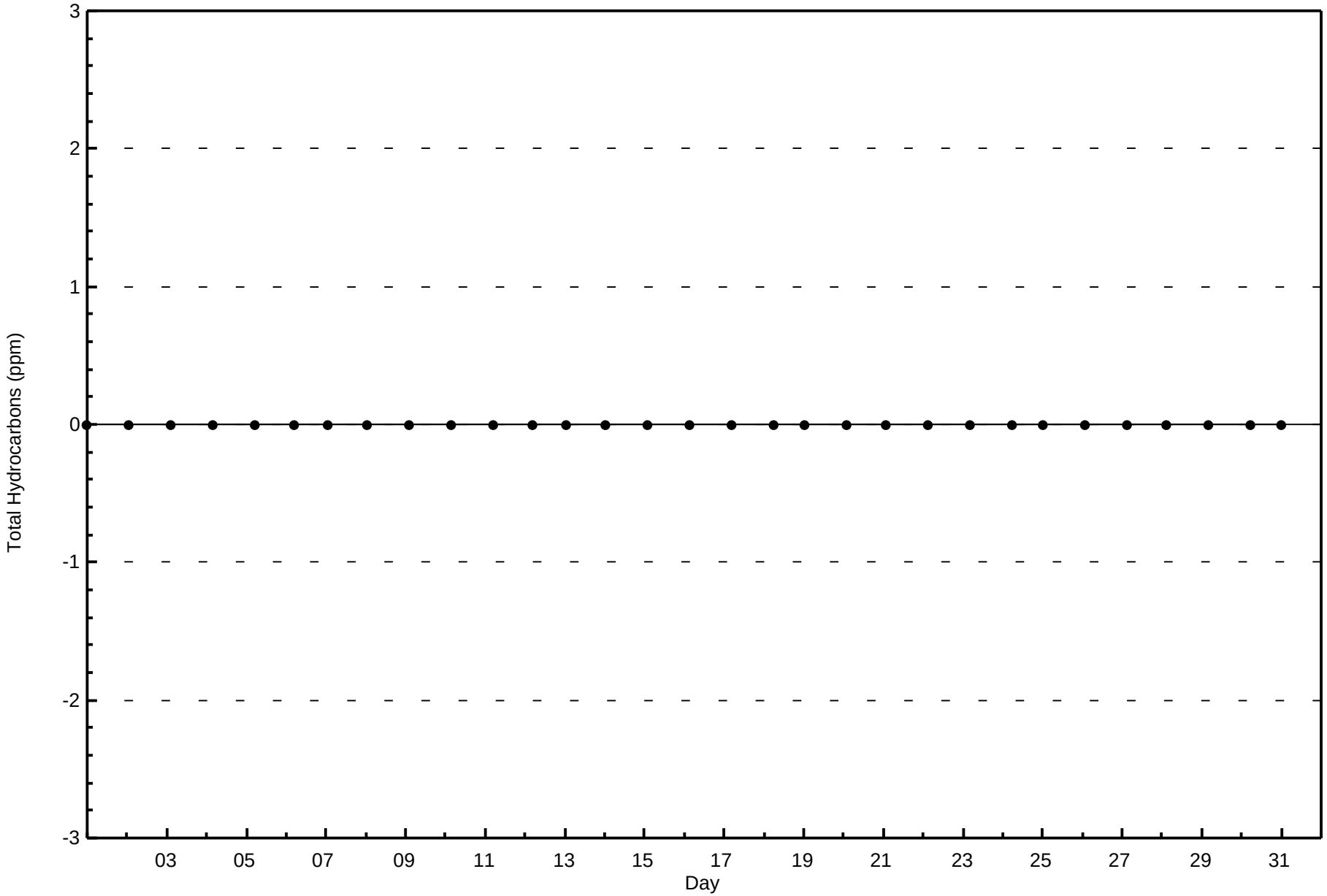
Total Number of Valid Hours: 655

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Anzac - January 2016

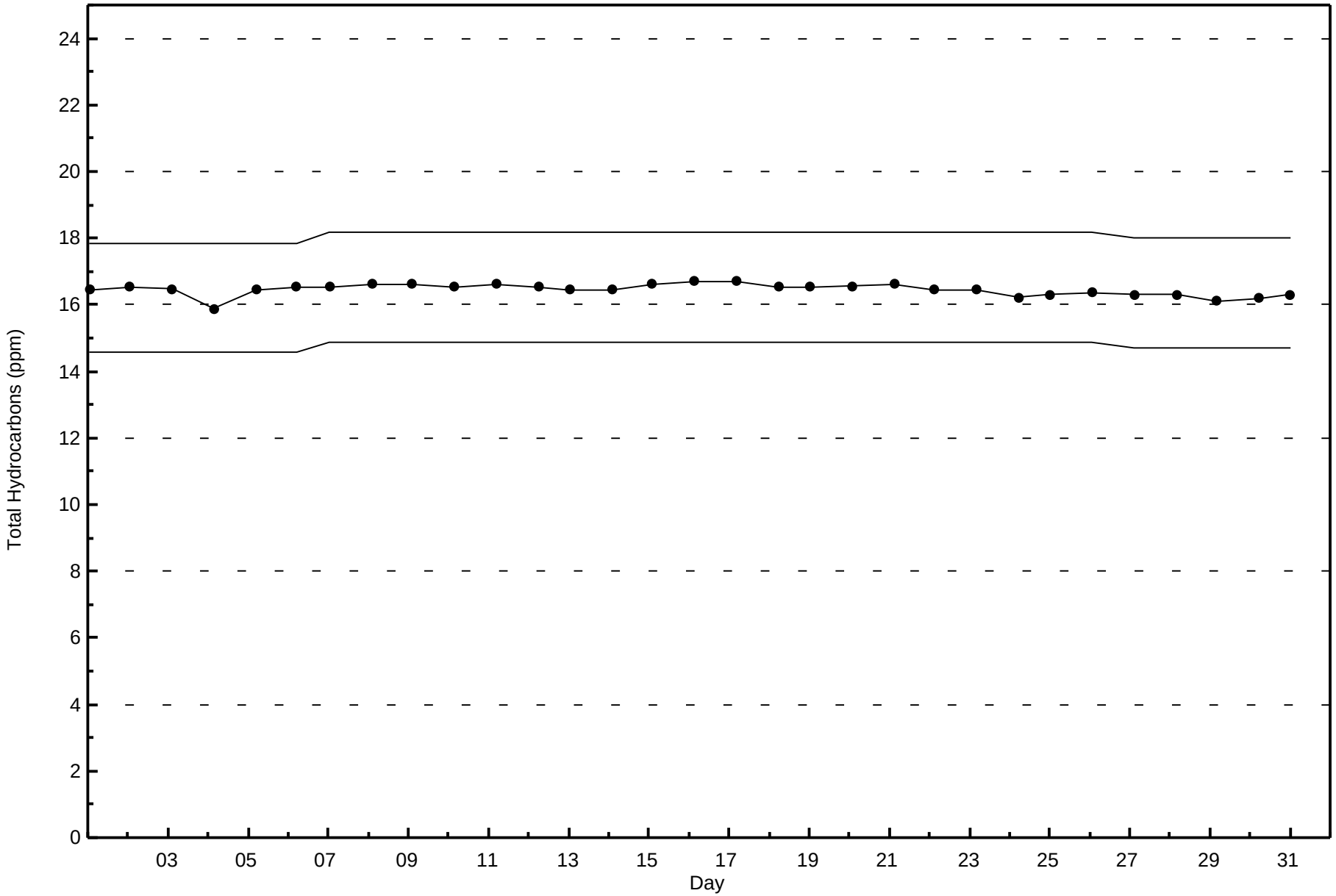


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - January 2016

Maximum Value: 0.231 ppm on Jan 5 19:00

Maximum Daily Average: 0.066 ppm on Jan 5

Minimum Value: 0.000 ppm on Jan 1 02:00

Minimum Daily Average: 0.000 ppm on Jan 7

Maximum Diurnal Average: 0.015 ppm at hour 18

Minimum Diurnal Average: 0.000 ppm at hour 6

Monthly Average: 0.005 ppm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.0 P_{99} = 0.1

Hours in Service:	744
Hours of Data:	676
Hours of Missing Data:	68
Hours of Calibration:	42
Percent Operational Time:	96.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.013
3-Jan	0.000	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.071	0.058	0.074	UO	UO	UO	UO	UO	UO	--	0.074
4-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000
5-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.003	0.000	C	C	C	C	C	0.000	0.020	0.180	0.190	0.231	0.135	0.092	0.118	0.106	0.118	0.066	0.231
6-Jan	0.073	0.002	0.000	0.008	0.020	Z	0.024	0.007	0.000	0.001	0.000	0.000	0.020	0.003	0.000	0.003	0.001	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.073
7-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.012	0.000	0.010	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.012
10-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.002	0.001	0.000	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.002	0.035
11-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12-Jan	0.000	0.000	0.000	0.000	0.006	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027	0.000	0.004	0.035	0.014	0.001	0.000	0.000	0.000	0.000	0.004	0.035
13-Jan	Z	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
14-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.028	0.000	0.004	0.015	0.000	0.000	0.000	0.000	0.000	0.002	0.028
17-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
18-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.004	0.002	0.000	0.000	0.000	0.009	0.001	0.009
19-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.085	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.004	0.085
20-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.025
22-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.001	0.001	0.005	0.001	0.001	0.011	0.006	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.011
23-Jan	0.000	0.000	0.000	0.001	Z	0.000	0.000	0.000	0.000	PF	0.000	0.011	0.005	0.002	PF	PF	PF	0.009	0.000	0.000	0.089	0.015	0.000	0.000	0.007	0.089
24-Jan	0.019	0.000	0.000	0.000	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.004	0.003	0.000	0.000	0.000	0.002	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.019
25-Jan	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	C	0.000	0.000	0.093	0.000	0.000	0.000	--	0.093
26-Jan	0.000	Z	0.001	0.000	0.000	0.000	0.002	0.000	0.001	0.002	0.003	0.007	0.008	0.010	0.011	0.026	0.010	0.006	0.003	0.001	0.001	0.002	0.000	0.000	0.004	0.026
27-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.003	0.002	0.002	0.000	0.000	0.000	0.001	0.002	0.001	0.010
28-Jan	0.001	0.007	0.034	Z	0.001	0.001	0.000	0.001	0.005	0.024	0.004	0.008	0.056	0.027	0.078	0.101	0.116	0.114	0.119	0.039	0.014	0.005	0.001	0.000	0.033	0.119
29-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
30-Jan	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
31-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
	0.004	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.001	0.000	0.002	0.006	0.002	0.005	0.012	0.013	0.015	0.013	0.006	0.010	0.005	0.004	0.004	Diurnal Average	
	0.073	0.007	0.034	0.008	0.020	0.001	0.024	0.007	0.005	0.024	0.004	0.012	0.056	0.027	0.078	0.101	0.180	0.190	0.231	0.135	0.093	0.118	0.106	0.118	Diurnal Maximum	

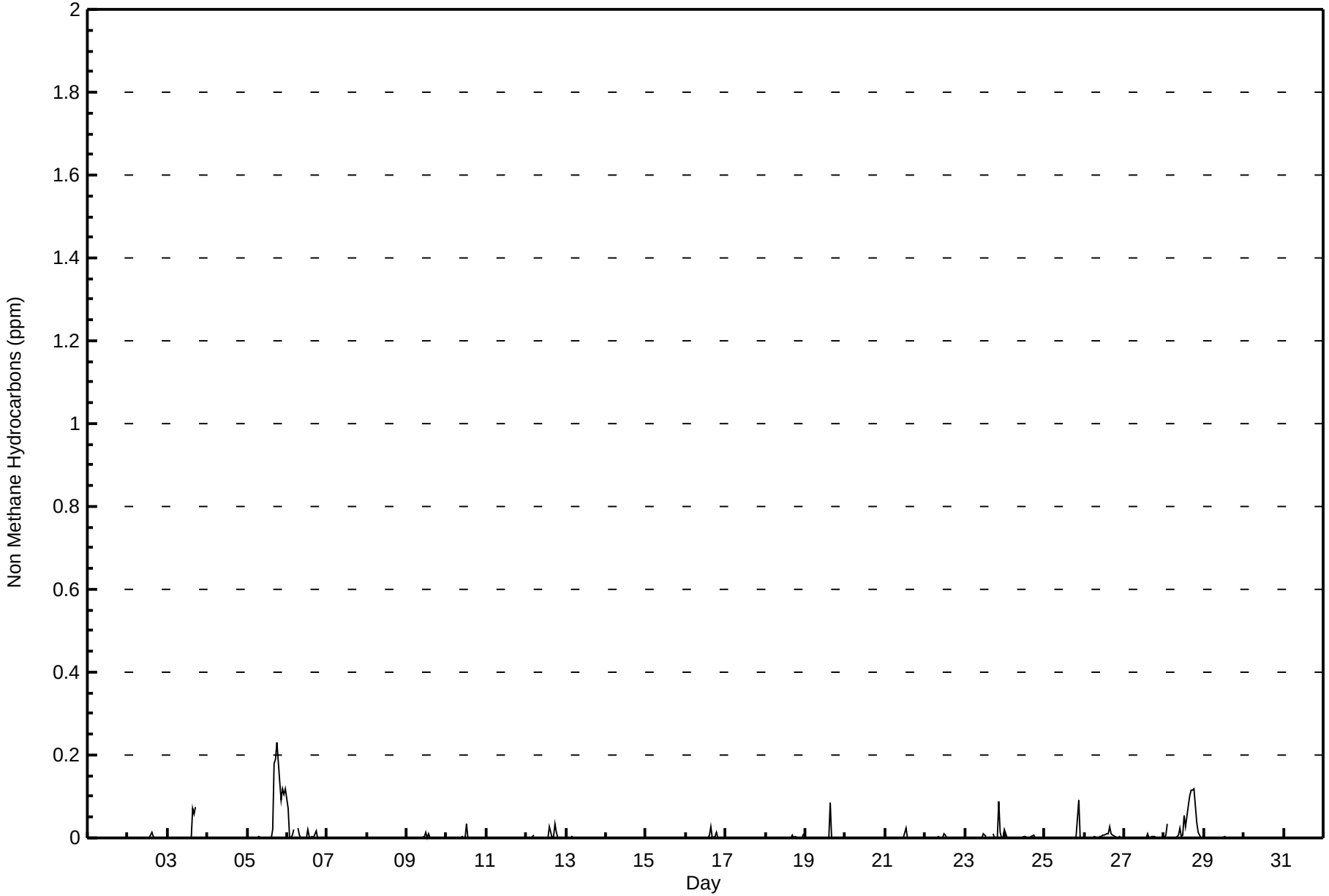
Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	613	90.68	90.68
0.006 - 0.05	42	6.21	96.89
0.06 - 0.1	18	2.66	99.56
> 0.1	3	0.44	100.00

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	32	23	13	5	15	21	79	52	42	19	11	12	34	110	63	64	595
0.006 - 0.05	1	0	0	0	2	6	8	6	5	0	1	0	7	1	3	0	40
0.06 - 0.1	1	0	0	0	1	3	5	1	3	1	2	0	0	0	0	0	17
> 0.1	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
Totals	34	23	13	5	18	32	93	59	50	20	14	12	41	111	66	64	655

Total Number of Valid Hours: 655

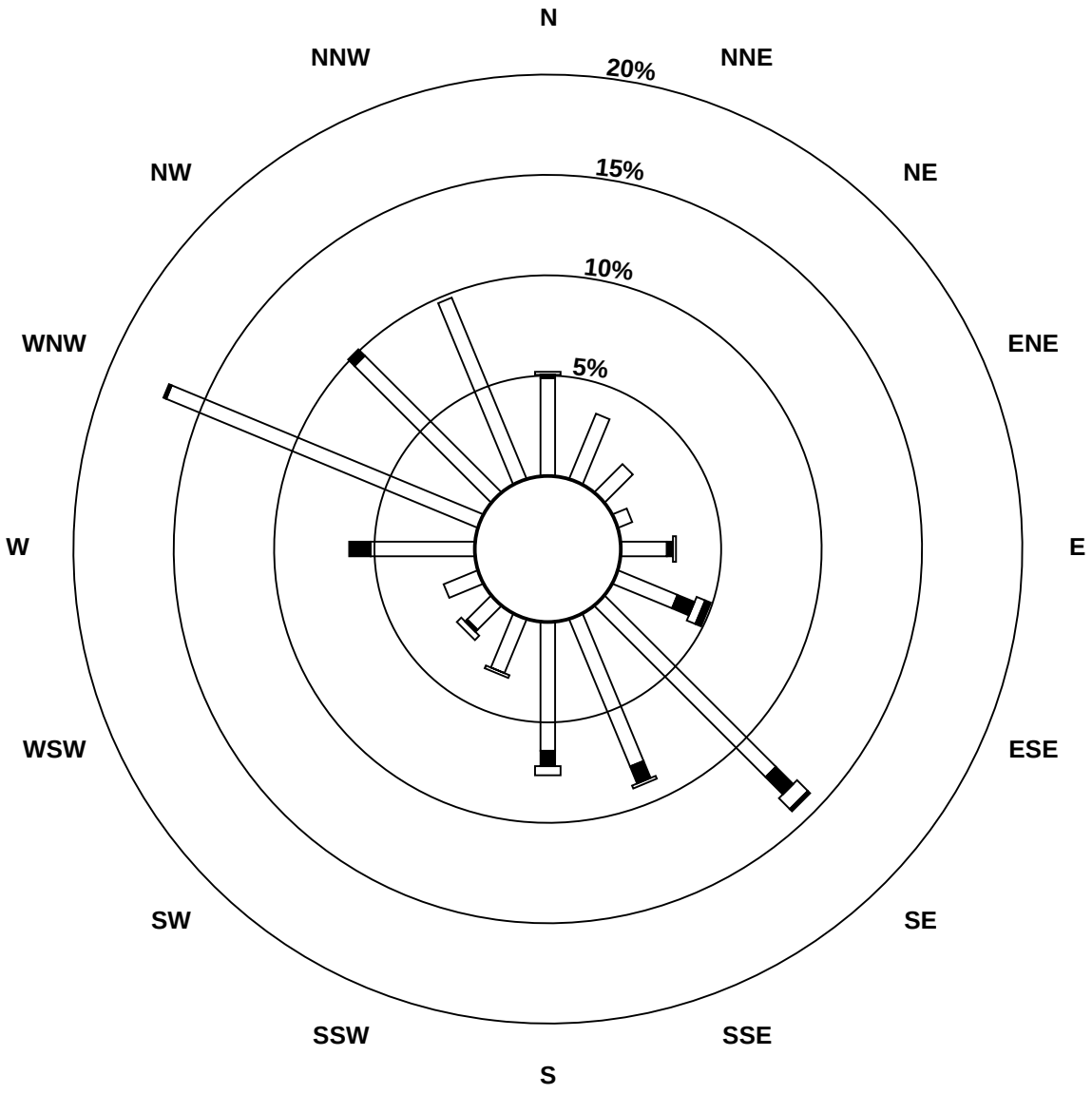
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Non Methane Hydrocarbons (NMHC) - ppm

Anzac (AMS 14)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

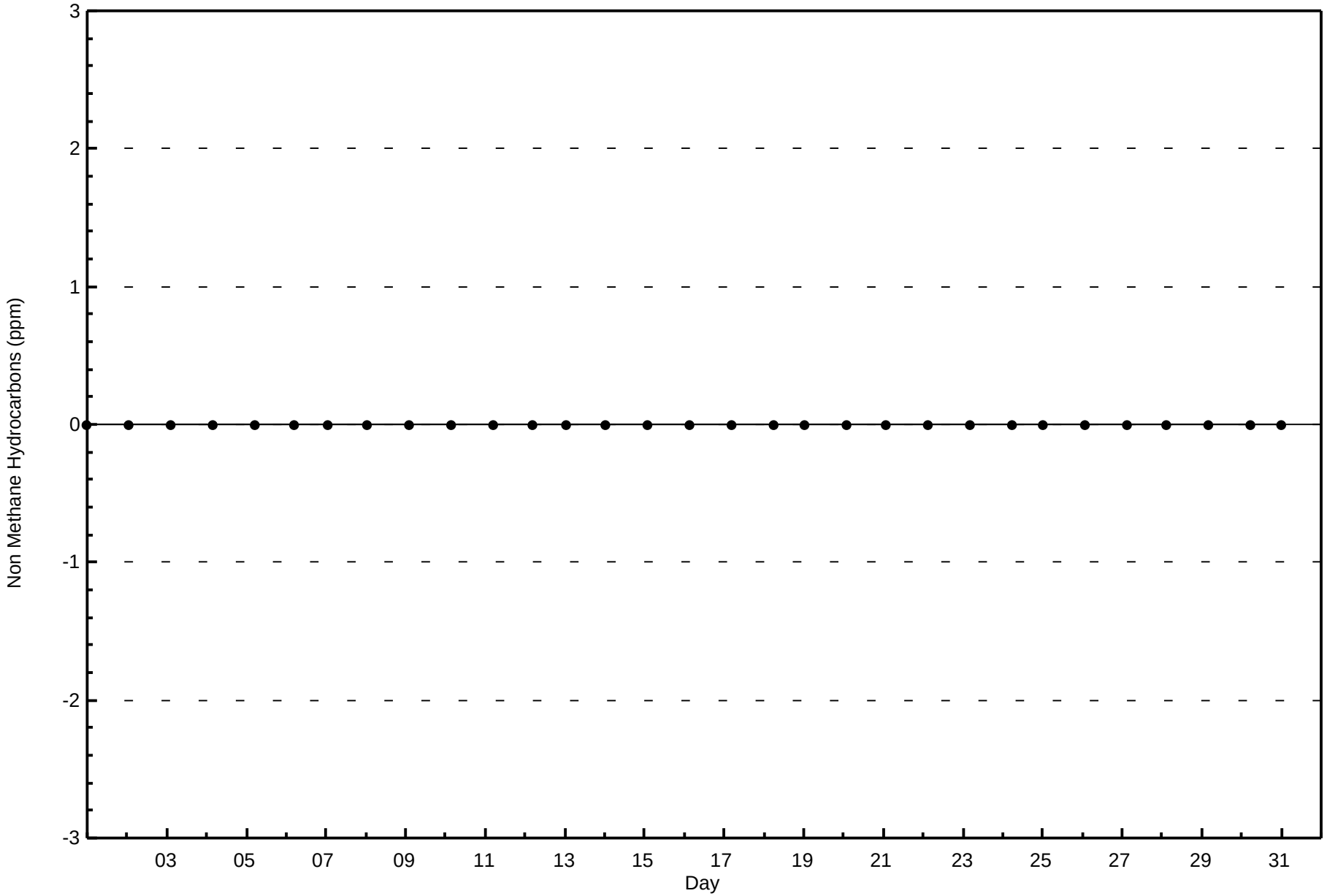
Total Number of Valid Hours: 655

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - January 2016

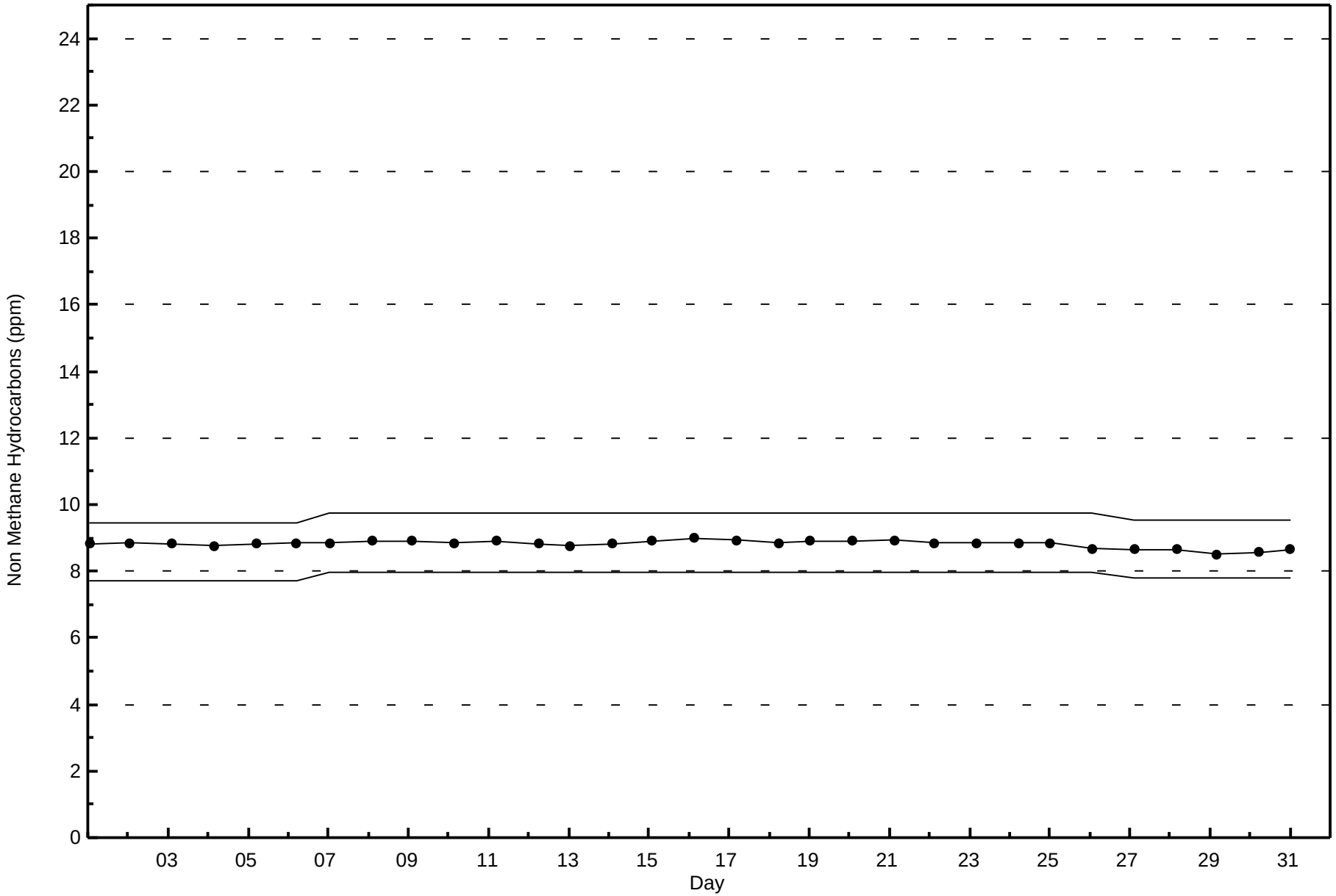


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Anzac - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.9 ppm on Jan 5 17:00

Maximum Daily Average: 2.3 ppm on Jan 5

Minimum Value: 1.9 ppm on Jan 29 02:00

Minimum Daily Average: 1.9 ppm on Jan 29

Maximum Diurnal Average: 2.1 ppm at hour 18

Minimum Diurnal Average: 2.0 ppm at hour 12

Monthly Average: 2.01 ppm

Percentiles: P_1 = 1.9 P_{10} = 1.9 Q_1 = 1.9 Median = 2.0 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.4

Hours in Service:	744
Hours of Data:	676
Hours of Missing Data:	68
Hours of Calibration:	42
Percent Operational Time:	96.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
2-Jan	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
3-Jan	2.1	2.2	Z	2.1	2.0	2.0	2.1	2.1	2.3	2.1	2.0	2.0	1.9	2.1	2.1	2.1	2.3	2.4	UO	UO	UO	UO	UO	UO	--	2.4
4-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.1	--	2.1
5-Jan	2.1	2.0	1.9	1.9	Z	2.0	2.1	2.2	2.1	C	C	C	C	C	1.9	2.1	2.9	2.9	2.6	2.4	2.3	2.4	2.4	2.5	2.3	2.9
6-Jan	2.5	2.2	2.1	2.2	2.3	Z	2.4	2.3	2.1	2.1	2.0	2.0	2.1	2.0	2.2	2.2	2.3	2.2	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.5
7-Jan	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
8-Jan	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
9-Jan	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.1	2.1	2.3
10-Jan	2.0	2.0	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.0	2.0	2.0	2.0	2.1	2.2
11-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.1
12-Jan	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
13-Jan	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1
14-Jan	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
15-Jan	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
16-Jan	1.9	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	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
17-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
18-Jan	2.0	2.0	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	2.0	2.1	2.0	2.2	2.0	2.0	2.0	2.1	2.2	2.0	2.2
19-Jan	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.2
20-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
21-Jan	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.4
22-Jan	2.1	2.1	2.1	Z	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.2	2.4
23-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	PF	2.1	2.3	2.2	2.2	PF	PF	PF	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3
24-Jan	2.2	2.1	2.1	2.2	2.2	Z	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2
25-Jan	Z	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	C	1.9	2.0	1.9	1.9	1.9	1.9	--	2.1
26-Jan	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
27-Jan	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0
28-Jan	2.0	2.1	2.1	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.0	1.9	1.9	1.9	1.9	2.0	2.3
29-Jan	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
30-Jan	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0
31-Jan	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average	
	2.5	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.3	2.4	2.9	2.9	2.6	2.4	2.3	2.4	2.4	2.5	Diurnal Maximum	

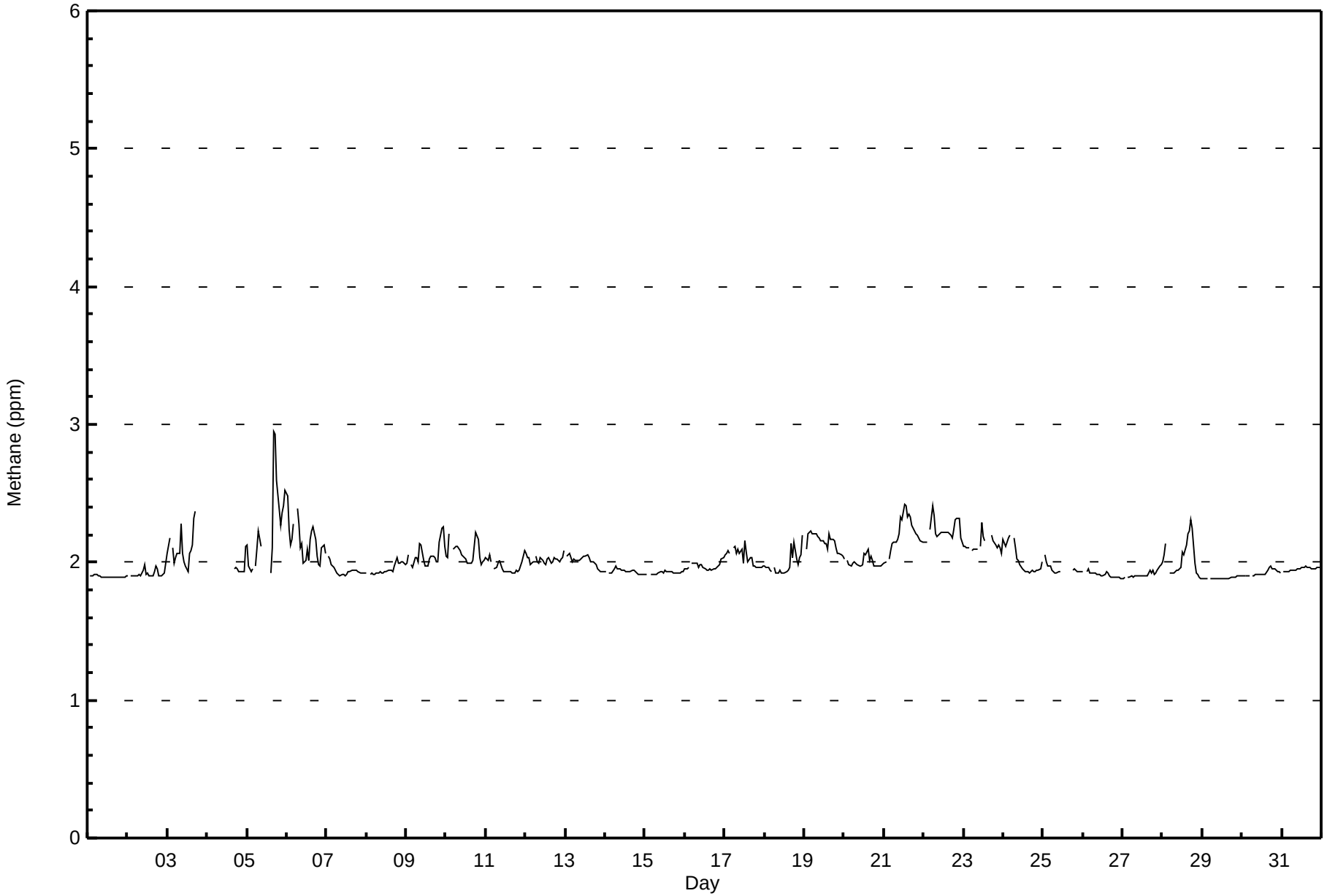
Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Anzac - January 2016



Methane (CH_4) - ppm

Anzac - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	492	72.78	72.78
2.1 - 3.0	184	27.22	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Methane (CH_4) - ppm

Anzac - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	25	10	13	5	14	15	61	44	17	14	9	8	37	101	52	52	477
2.1 - 3.0	9	13	0	0	4	17	32	15	33	6	5	4	4	10	14	12	178
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	34	23	13	5	18	32	93	59	50	20	14	12	41	111	66	64	655

Total Number of Valid Hours: 655

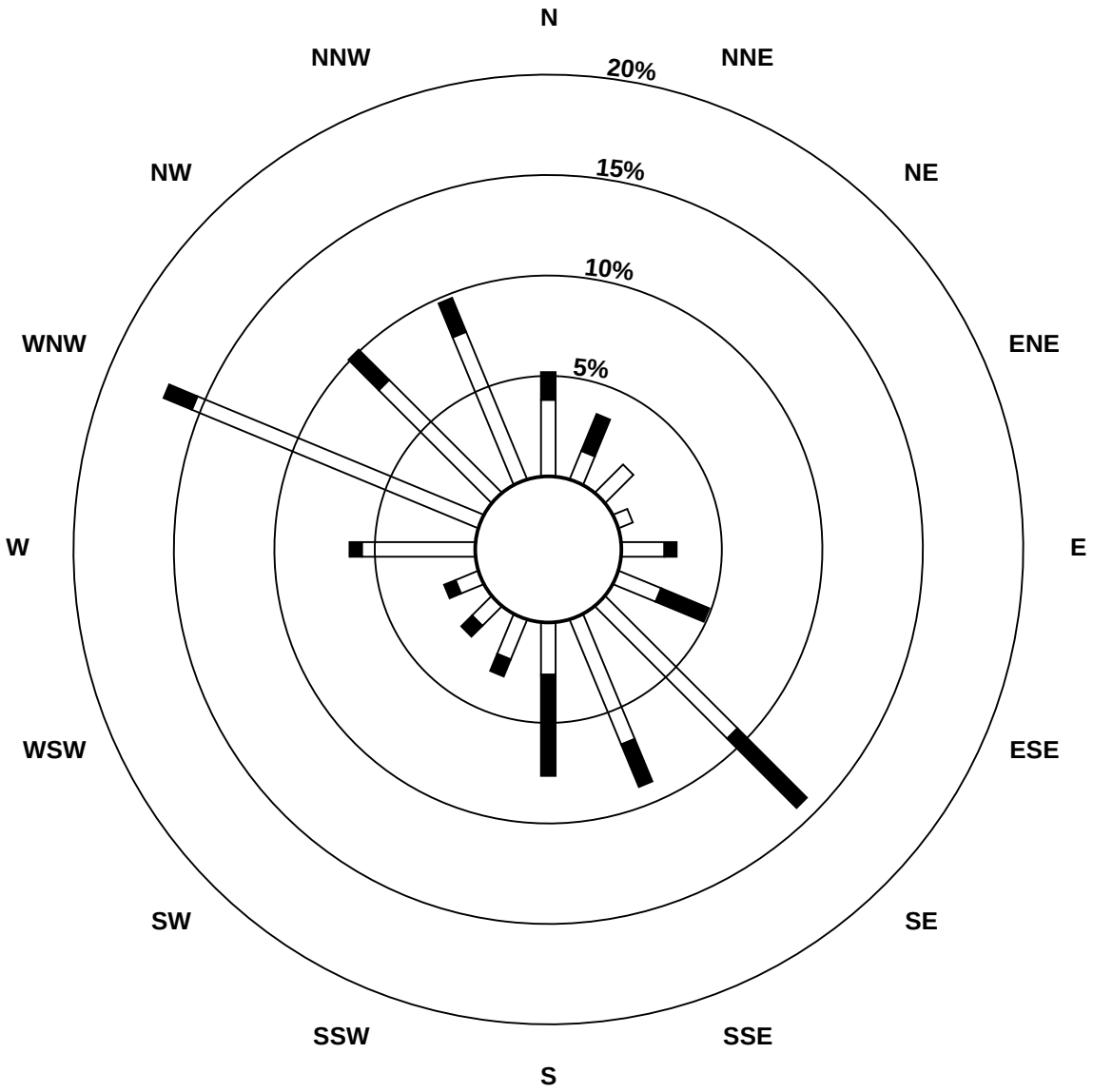
Total Number of Hours: 744

Wood Buffalo Environmental Association

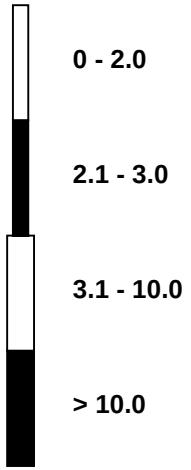
Wind Rose Jan 2016

Methane (CH_4) - ppm

Anzac (AMS 14)



Classes (ppm)



0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

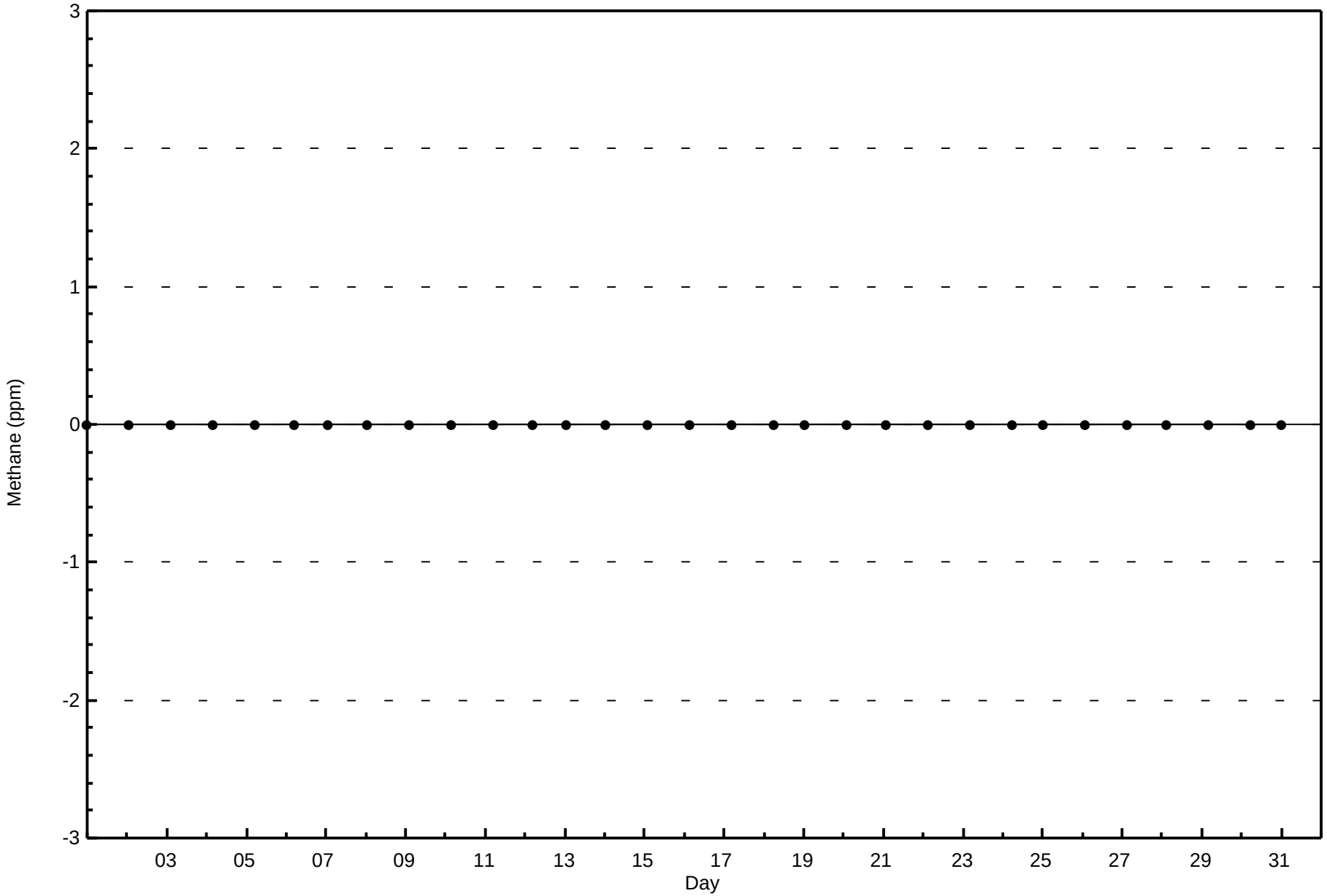
Total Number of Valid Hours: 655

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Anzac - January 2016

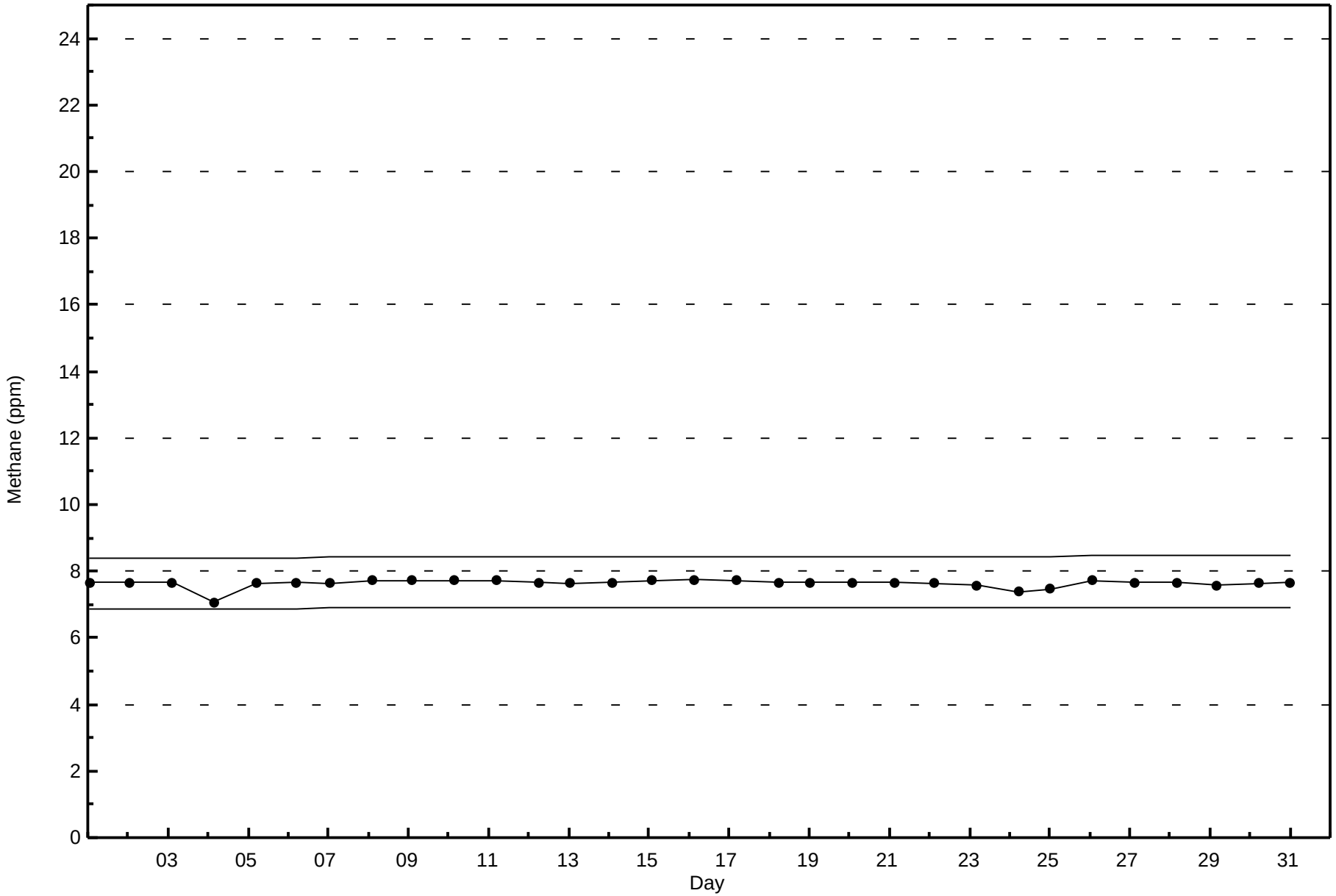


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Anzac - January 2016

Maximum Value: 13 ppb on Jan 9 21:00

Maximum Daily Average: 1.9 ppb on Jan 10

Minimum Value: 0 ppb on Jan 3 22:00

Minimum Daily Average: 0.1 ppb on Jan 18

Maximum Diurnal Average: 1.8 ppb at hour 12

Minimum Diurnal Average: 0.1 ppb at hour 4

Monthly Average: 0.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 8$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	36
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1
2-Jan	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	3	0	0.4	3
3-Jan	0	2	Z	0	0	0	0	1	0	0	1	7	1	1	1	1	1	0	0	3	0	0	0	0	0.9	7
4-Jan	0	0	0	Z	2	1	1	2	1	2	2	2	2	2	1	1	2	3	0	0	0	0	0	0	1.1	3
5-Jan	0	0	0	0	Z	0	1	1	1	C	C	C	C	C	0	0	0	0	2	0	0	0	2	0	0.5	2
6-Jan	0	0	0	0	0	Z	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	6	4	0	0.7	6
7-Jan	Z	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1
8-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0.4	2
9-Jan	0	0	Z	0	0	2	0	0	1	2	2	2	2	2	2	2	0	0	1	9	13	0	0	0	1.8	13
10-Jan	0	0	0	Z	0	1	0	0	0	1	6	8	2	0	0	1	0	6	9	8	0	0	0	0	1.9	9
11-Jan	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0.3	1
12-Jan	0	0	0	0	1	Z	0	1	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	2
13-Jan	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
15-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	12	2	1	0	0	0	0	0	0	0	0	0	0.8	12
16-Jan	0	0	0	Z	0	0	0	0	1	2	8	4	2	3	2	1	0	0	0	1	0	0	0	0	1.1	8
17-Jan	0	0	0	0	Z	0	0	0	1	2	4	4	4	3	1	1	0	0	0	0	0	0	0	0	1.0	4
18-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Jan	Z	1	2	0	0	0	0	0	0	0	0	0	1	1	1	5	8	3	1	0	0	1	0	0	1.1	8
20-Jan	0	Z	0	0	0	0	0	0	0	1	2	3	3	2	2	1	0	1	0	0	0	0	0	0	0.7	3
21-Jan	0	0	Z	0	0	0	0	0	0	1	3	3	4	5	3	1	0	0	0	0	0	0	0	0	1.0	5
22-Jan	0	0	0	Z	1	0	0	0	0	0	1	3	4	3	1	1	0	0	0	0	4	7	0	0	1.2	7
23-Jan	0	0	0	0	Z	0	0	0	0	PF	1	1	1	1	PF	PF	PF	0	0	0	0	1	1	0	0.4	1
24-Jan	1	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0.4	1
25-Jan	Z	0	0	0	0	0	0	0	0	4	7	4	5	10	8	1	1	0	0	0	0	0	0	0	1.8	10
26-Jan	1	Z	0	0	0	0	0	0	0	0	0	1	1	6	6	2	0	0	0	0	0	0	0	0	0.8	6
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0.2	1
28-Jan	0	0	0	Z	0	0	0	0	2	1	7	4	2	2	1	1	1	0	0	0	0	0	0	0	0.9	7
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0.2	1
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0.2	1
	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.8	1.7	1.8	1.8	1.8	1.3	0.8	0.6	0.6	0.5	0.8	0.7	0.6	0.4	0.1	Diurnal Average	
	1	2	2	0	2	2	1	2	2	4	8	8	12	10	8	5	8	6	9	9	13	7	4	0	Diurnal Maximum	

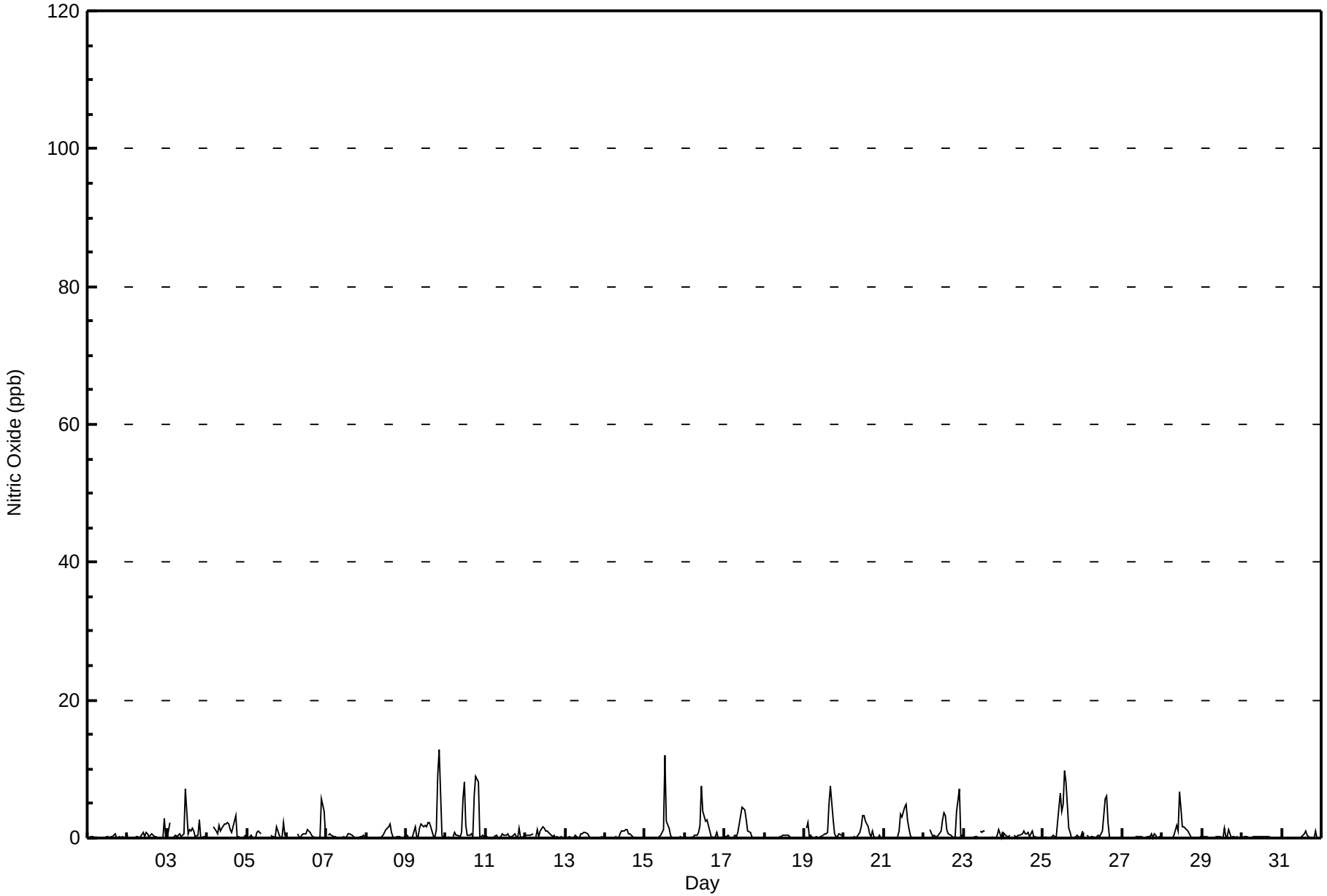
Z - zerospan C - Calibration PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Anzac - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	100.00	100.00
21 - 40	0	0.00	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: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	36	24	13	6	18	32	94	63	53	21	16	13	41	122	67	64	683
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	24	13	6	18	32	94	63	53	21	16	13	41	122	67	64	683

Total Number of Valid Hours: 683

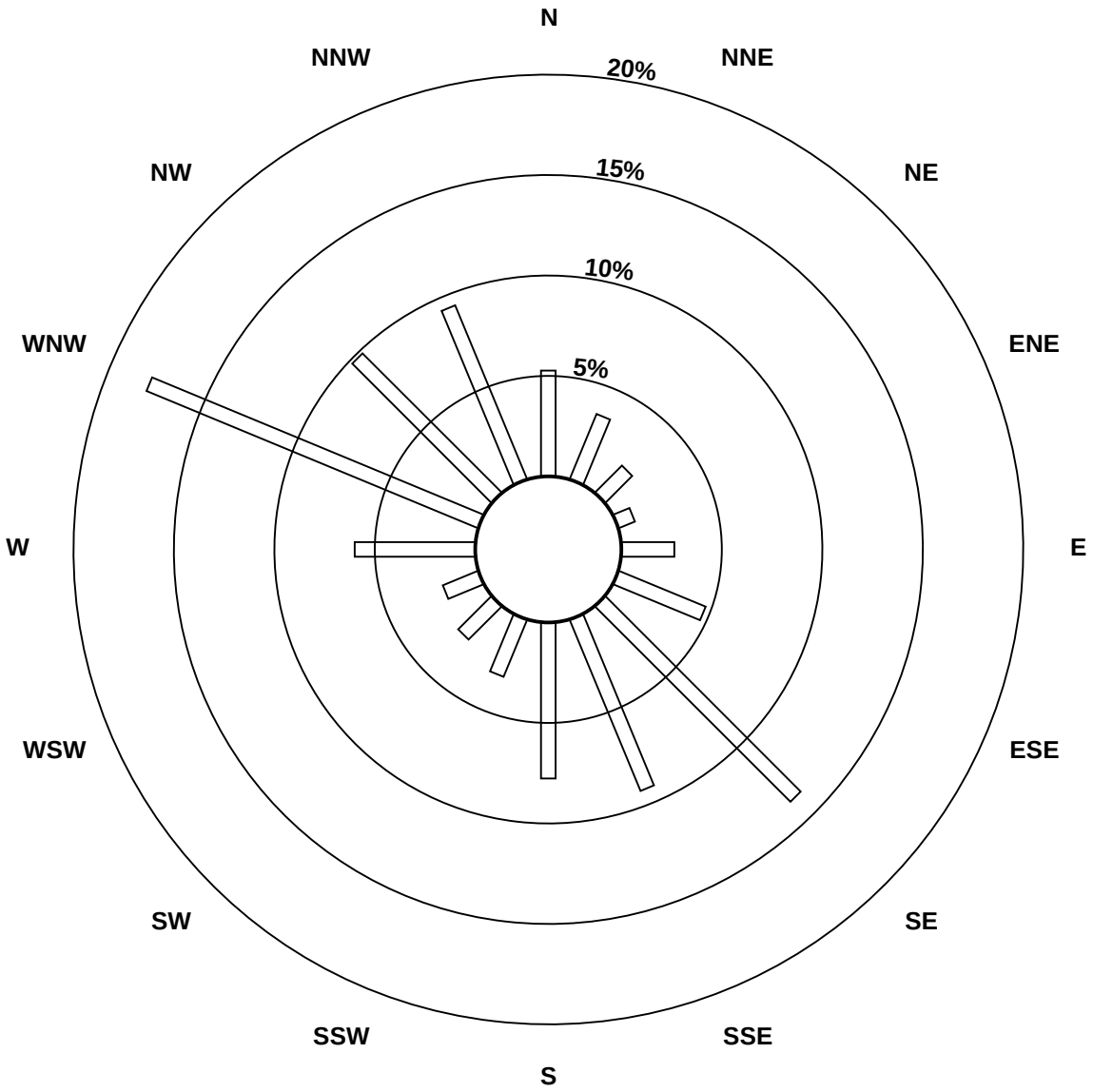
Total Number of Hours: 744

Wood Buffalo Environmental Association

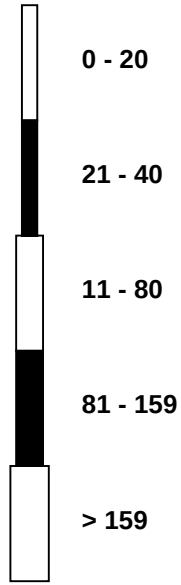
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Anzac (AMS 14)



Classes (ppb)



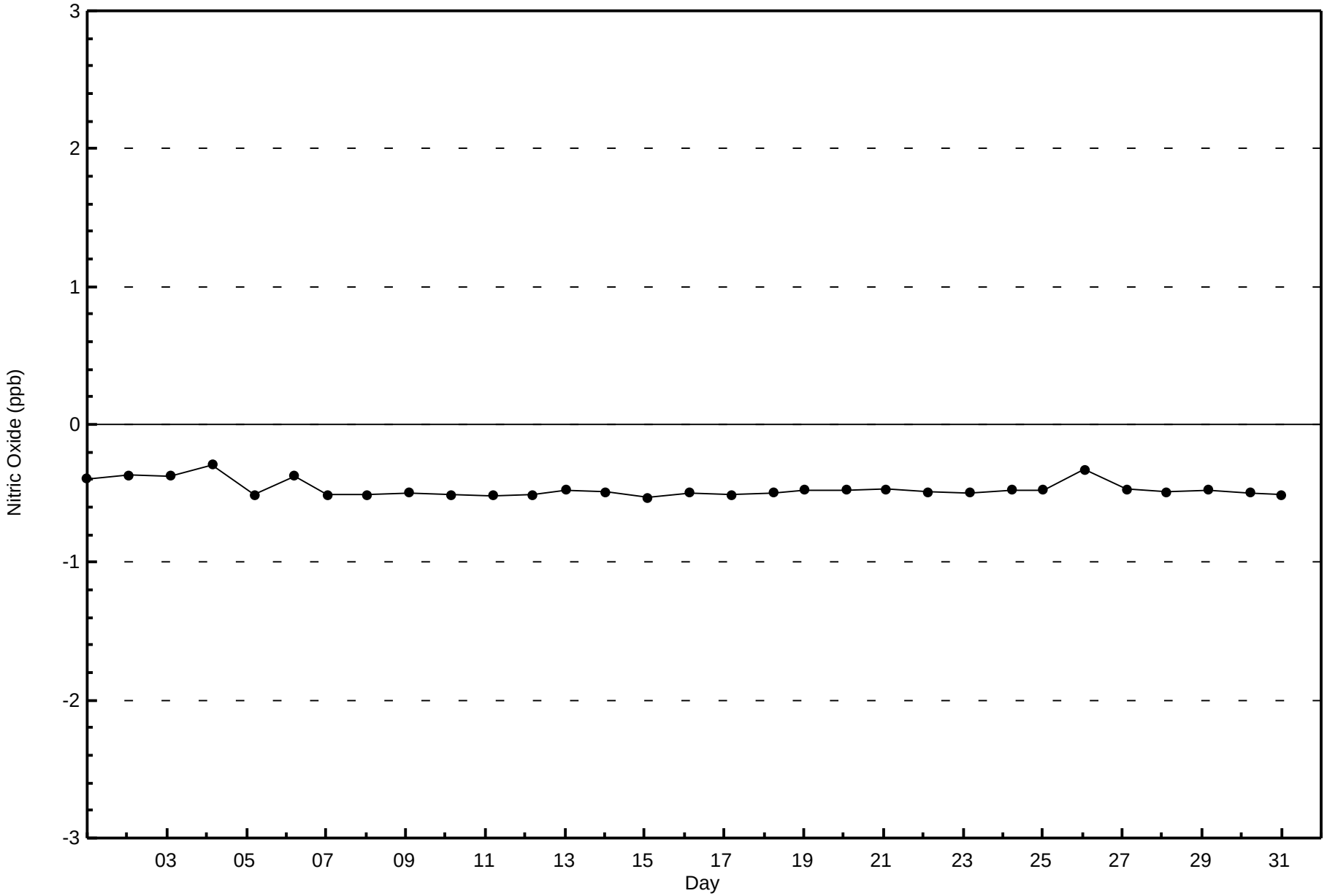
Total Number of Valid Hours: 683

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Anzac - January 2016

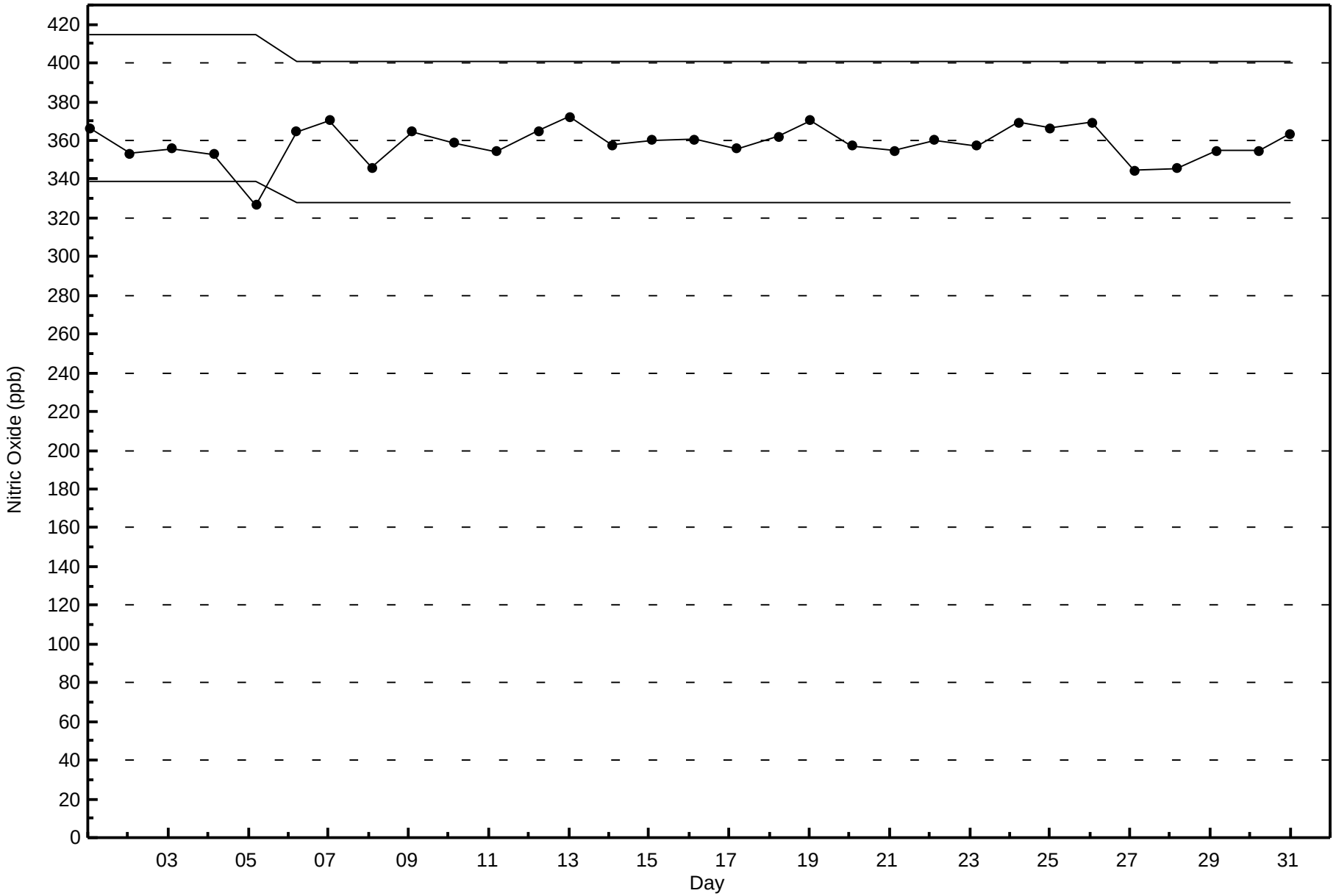


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Anzac - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 25 ppb on Jan 6 23:00

Maximum Daily Average: 9.5 ppb on Jan 10

Minimum Value: 0 ppb on Jan 15 04:00

Minimum Daily Average: 0.8 ppb on Jan 29

Maximum Diurnal Average: 6.4 ppb at hour 18

Minimum Diurnal Average: 3.2 ppb at hour 4

Monthly Average: 4.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 4 $Q_3 = 7$ $P_{90} = 9$ $P_{99} = 20$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	36
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
2-Jan	2	Z	1	1	1	1	1	1	1	4	1	3	3	1	3	3	2	3	3	2	1	1	3	1	1.8	4
3-Jan	2	8	Z	3	2	3	3	3	3	4	4	9	3	5	6	12	15	13	10	11	7	5	6	6	6.2	15
4-Jan	6	7	8	Z	11	9	9	10	9	11	11	12	11	9	8	9	12	14	8	5	3	2	4	3	8.4	14
5-Jan	3	2	3	3	Z	1	5	7	8	C	C	C	C	C	3	2	5	6	14	10	4	4	6	5	5.1	14
6-Jan	5	4	3	3	3	Z	5	3	2	3	2	2	3	3	4	4	4	5	6	4	7	23	25	18	6.0	25
7-Jan	Z	13	10	8	8	5	3	0	1	1	1	1	2	5	7	6	6	6	6	6	4	2	2	2	4.5	13
8-Jan	1	Z	1	1	1	1	1	1	4	4	3	4	6	6	9	9	9	7	7	4	5	6	6	4	4.3	9
9-Jan	4	4	Z	4	5	12	13	7	7	8	4	3	3	5	8	9	9	12	12	16	18	10	8	6	8.0	18
10-Jan	6	5	6	Z	10	12	11	10	11	8	8	8	5	3	3	3	4	20	22	23	14	10	11	9	9.5	23
11-Jan	8	6	10	9	Z	6	6	7	6	3	2	2	2	4	1	1	1	3	2	2	7	8	4	3	4.4	10
12-Jan	3	3	3	3	3	Z	6	7	7	9	8	6	5	6	5	6	5	5	6	5	5	5	6	5	5.1	9
13-Jan	Z	7	6	3	3	6	5	5	4	6	4	4	3	3	2	1	1	1	1	1	1	1	1	1	2.9	7
14-Jan	0	Z	0	0	0	5	10	8	7	7	7	7	5	6	6	7	9	8	6	4	3	3	0	0	4.8	10
15-Jan	0	0	Z	0	0	1	1	1	2	5	4	4	12	6	5	3	3	3	3	3	2	1	0	1	2.7	12
16-Jan	1	2	3	Z	4	6	6	8	6	6	10	7	5	5	5	7	9	8	10	11	9	8	9	7	6.5	11
17-Jan	7	6	9	8	Z	7	8	8	8	8	8	7	7	6	4	5	8	6	7	6	7	7	6	6	6.8	9
18-Jan	5	4	5	3	2	Z	6	2	2	3	2	2	1	2	3	2	1	1	1	1	2	2	3	3	2.4	6
19-Jan	Z	6	6	3	4	3	3	3	3	2	2	2	2	3	5	18	23	22	20	17	18	21	18	14	9.4	23
20-Jan	10	Z	10	6	4	10	14	13	11	9	8	9	9	7	6	4	4	6	3	3	3	3	3	3	6.8	14
21-Jan	5	4	Z	4	4	3	4	5	5	6	8	7	8	9	8	9	9	8	8	7	5	5	5	4	6.0	9
22-Jan	3	4	3	Z	9	6	8	6	7	6	6	6	7	7	6	6	7	6	11	17	19	20	8	6	8.0	20
23-Jan	5	5	4	4	Z	4	4	5	5	PF	4	4	4	4	PF	PF	PF	3	3	2	3	4	4	2	3.8	5
24-Jan	4	3	3	5	6	Z	7	6	4	3	3	2	2	2	2	4	3	5	3	2	2	2	2	6	3.4	7
25-Jan	Z	11	7	5	5	3	2	2	1	6	7	5	5	10	9	4	5	4	2	2	3	2	1	5	4.6	11
26-Jan	4	Z	3	3	1	2	3	1	5	5	2	4	3	9	8	6	2	1	1	1	1	1	1	1	2.9	9
27-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	0	1	1	1	3	2	2	4	5	5	4	3	1.6	5
28-Jan	2	3	5	Z	2	2	3	4	8	5	9	10	9	8	8	10	9	9	9	4	2	1	1	1	5.3	10
29-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	0	1	1	1	2	1	1	1	1	1	1	1	0.8	2
30-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	3	7	10	7	5	4	1	0	0	2.2	10
31-Jan	Z	1	2	1	1	1	1	1	1	1	0	0	1	3	6	3	4	2	0	1	2	1	1	1	1.4	6
	3.5	4.2	4.4	3.2	3.5	4.1	4.8	4.4	4.5	4.7	4.4	4.3	4.3	4.6	4.6	5.3	6.0	6.4	6.3	5.8	5.3	5.3	4.7	4.1	Diurnal Average	
	10	13	10	9	11	12	14	13	11	11	11	12	12	10	9	18	23	22	22	23	19	23	25	18	Diurnal Maximum	

Z - zerospan C - Calibration PF - Power Failure

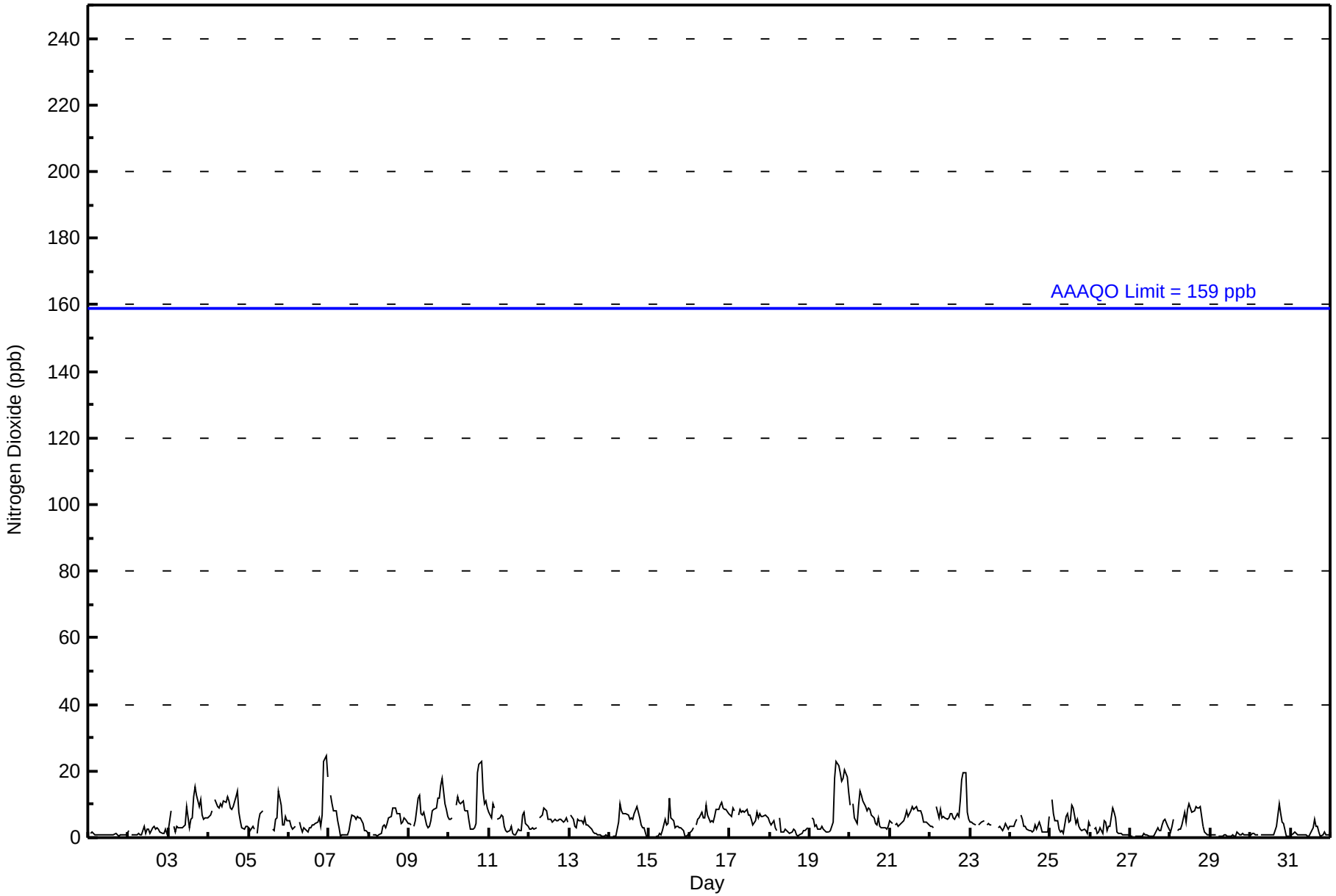
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	697	99.01	99.01
21 - 40	7	0.99	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	34	24	13	6	18	32	94	63	53	21	16	13	41	122	66	60	676
21 - 40	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	24	13	6	18	32	94	63	53	21	16	13	41	122	67	64	683

Total Number of Valid Hours: 683

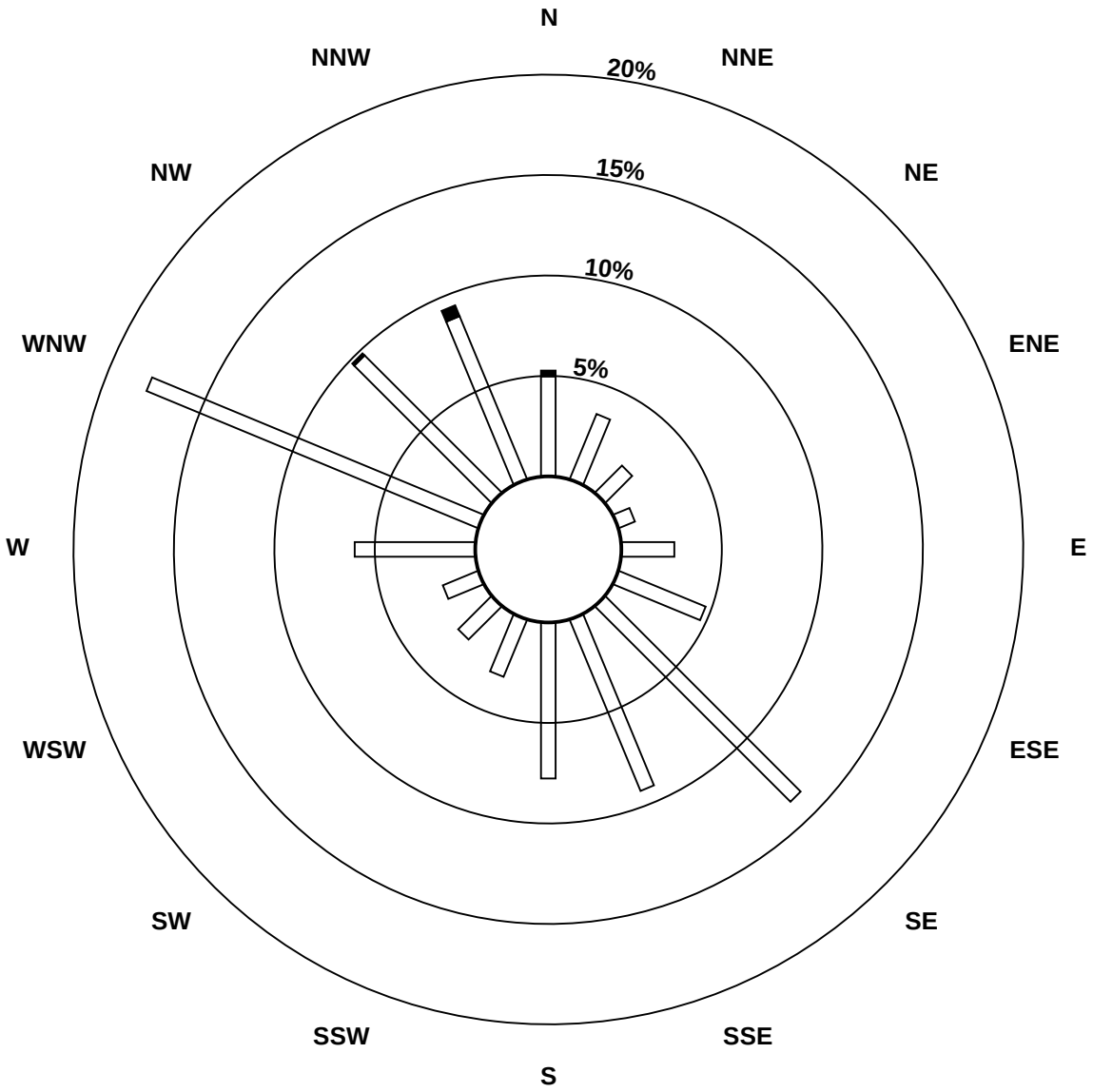
Total Number of Hours: 744

Wood Buffalo Environmental Association

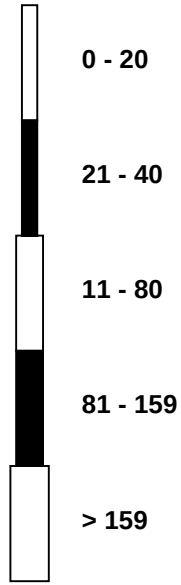
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Anzac (AMS 14)



Classes (ppb)



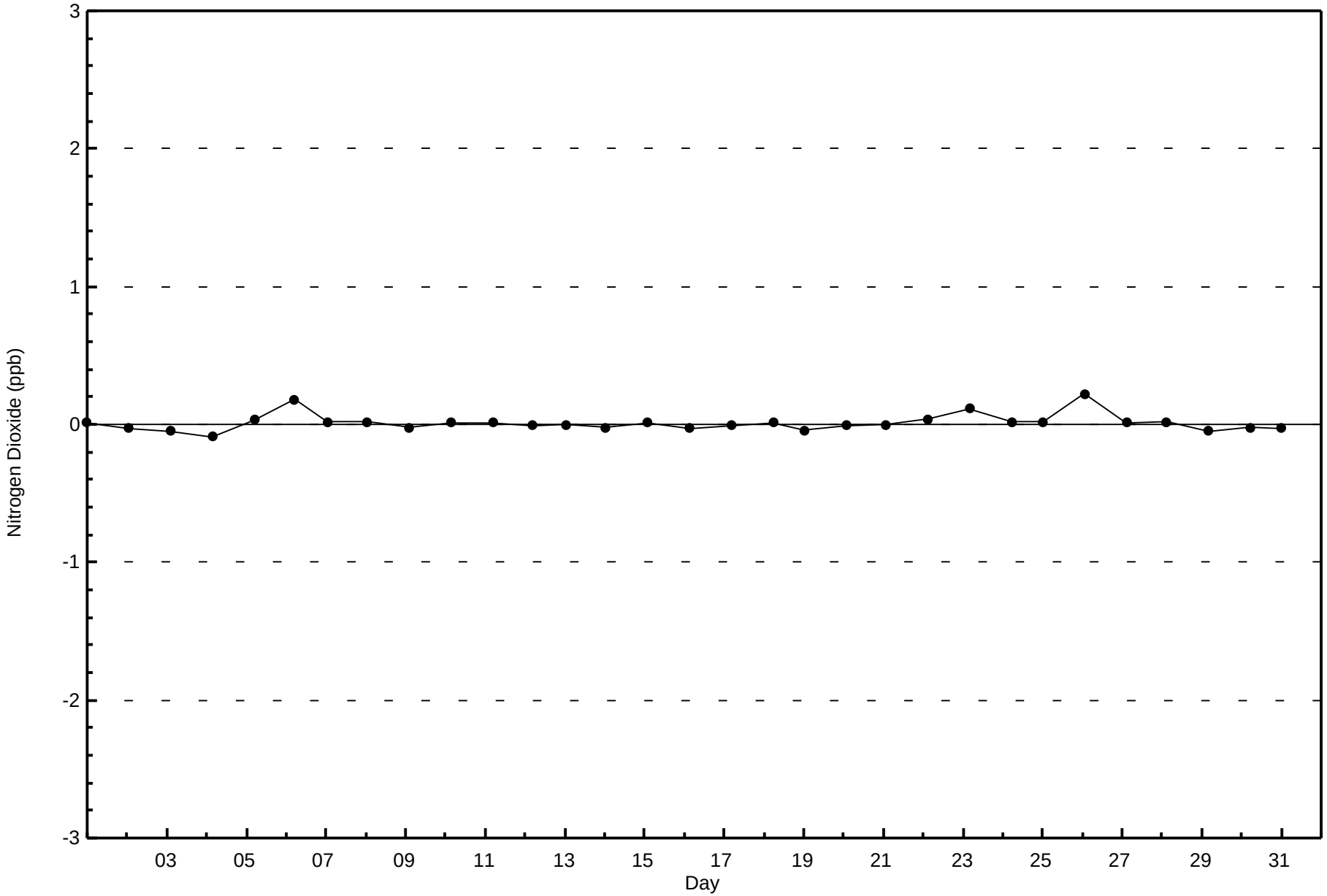
Total Number of Valid Hours: 683

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Anzac - January 2016

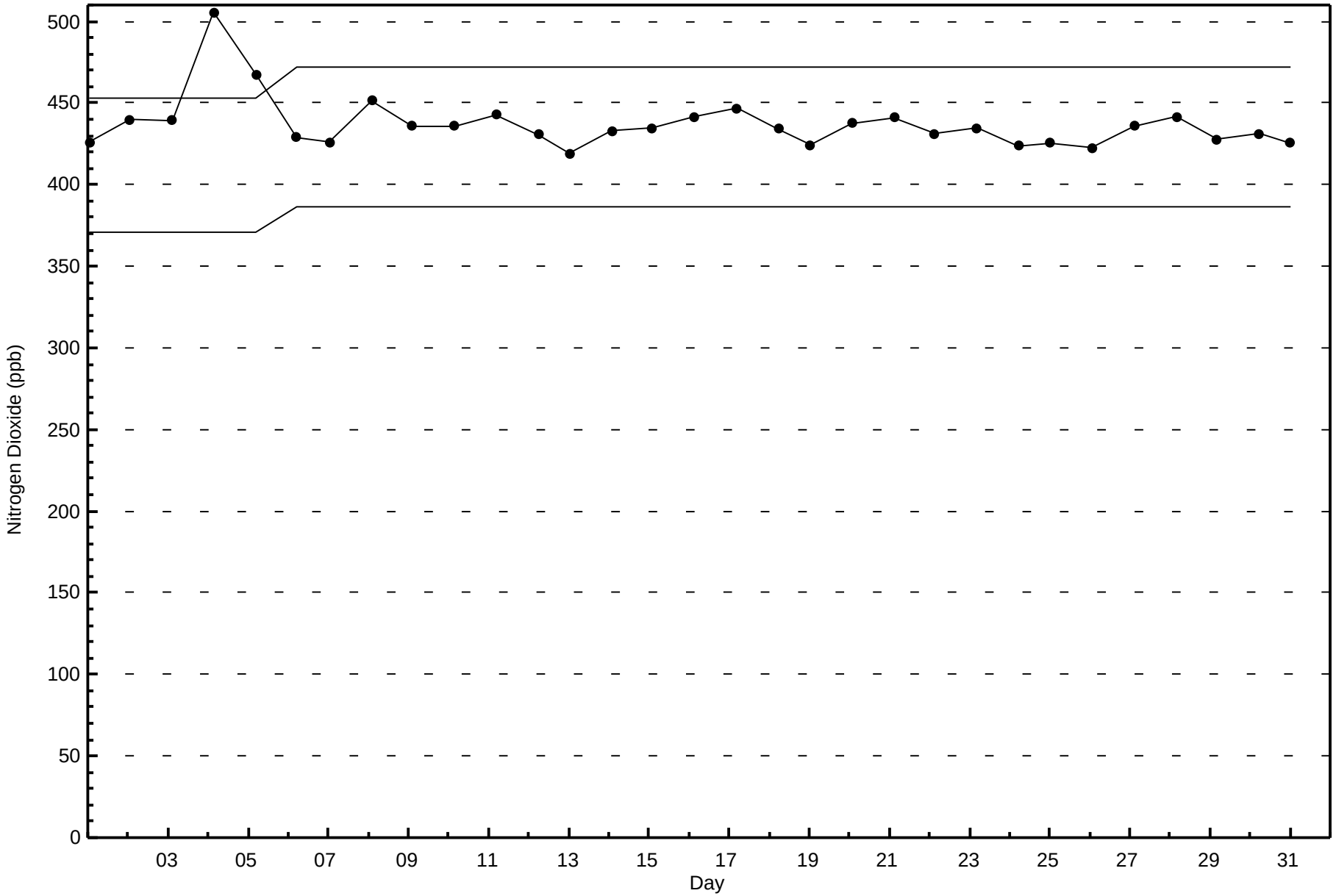


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Anzac - January 2016

Maximum Value: 31 ppb on Jan 10 20:00

Maximum Daily Average: 11.5 ppb on Jan 10

Minimum Value: 0 ppb on Jan 15 02:00

Minimum Daily Average: 1.0 ppb on Jan 29

Maximum Diurnal Average: 6.9 ppb at hour 18

Minimum Diurnal Average: 3.3 ppb at hour 4

Monthly Average: 5.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 4 $Q_3 = 7$ $P_{90} = 11$ $P_{99} = 26$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	36
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1.0	2
2-Jan	2	Z	1	1	1	1	1	1	1	4	2	3	3	1	4	4	3	3	3	2	2	2	6	1	2.2	6
3-Jan	2	10	Z	3	2	3	3	3	3	4	4	16	4	7	7	14	16	13	10	14	7	5	6	6	7.1	16
4-Jan	6	7	8	Z	13	10	10	12	10	12	13	14	13	11	10	10	15	17	8	5	3	2	4	4	9.4	17
5-Jan	3	2	4	3	Z	1	6	8	9	C	C	C	C	C	3	2	5	6	16	10	4	4	9	5	5.6	16
6-Jan	5	4	3	3	3	Z	5	3	2	4	3	2	4	4	5	5	4	5	6	3	7	29	28	19	6.7	29
7-Jan	Z	13	11	8	8	5	3	0	1	1	1	1	2	5	7	7	6	6	6	6	4	2	2	2	4.7	13
8-Jan	1	Z	1	1	1	1	1	1	4	4	3	5	7	8	11	10	9	7	7	5	5	6	5	4	4.6	11
9-Jan	5	4	Z	4	5	13	13	7	8	10	5	5	5	7	10	10	9	12	13	25	31	11	9	7	9.9	31
10-Jan	6	5	6	Z	10	13	11	11	11	9	14	16	7	3	3	3	4	26	31	31	14	10	11	9	11.5	31
11-Jan	8	6	10	9	Z	6	6	7	6	4	3	2	2	4	1	1	1	3	2	2	8	8	4	4	4.7	10
12-Jan	3	3	3	3	4	Z	6	8	7	10	9	7	6	6	5	6	5	5	6	6	5	5	6	5	5.6	10
13-Jan	Z	7	6	4	3	6	5	5	4	7	5	5	4	3	2	1	1	1	1	1	1	0	1	0	3.1	7
14-Jan	0	Z	0	0	0	5	10	8	7	8	8	8	7	7	6	8	9	8	6	4	3	3	0	0	5.1	10
15-Jan	0	0	Z	0	0	1	1	1	2	6	5	6	24	9	6	3	3	3	3	3	2	1	0	1	3.5	24
16-Jan	2	2	3	Z	4	6	6	8	7	8	17	11	7	8	7	8	9	8	10	11	9	8	9	8	7.6	17
17-Jan	7	6	9	8	Z	7	9	8	9	10	13	11	11	8	5	6	8	6	7	6	7	7	6	6	7.8	13
18-Jan	5	4	5	3	2	Z	6	2	2	3	2	2	2	2	3	2	1	1	1	1	2	2	3	3	2.5	6
19-Jan	Z	7	8	4	4	3	3	3	3	2	2	2	3	4	6	23	30	25	20	17	18	21	19	14	10.4	30
20-Jan	10	Z	10	6	4	10	14	13	11	10	10	12	12	9	7	5	4	7	3	3	3	3	3	3	7.5	14
21-Jan	5	4	Z	4	4	3	4	5	5	7	11	10	12	14	11	10	10	8	8	7	5	5	5	4	7.0	14
22-Jan	3	4	3	Z	11	6	9	6	7	6	6	9	11	10	7	6	8	7	11	18	23	27	8	6	9.2	27
23-Jan	5	4	4	4	Z	4	4	5	5	PF	5	5	5	5	PF	PF	PF	3	3	2	3	6	4	2	4.2	6
24-Jan	4	4	4	5	6	Z	7	6	4	4	3	3	3	2	3	5	3	6	3	2	2	2	2	6	3.8	7
25-Jan	Z	11	7	5	5	3	2	2	1	11	14	8	10	19	17	6	6	4	2	2	3	2	1	5	6.5	19
26-Jan	5	Z	3	3	1	2	3	1	6	5	2	4	4	15	14	8	2	1	1	1	1	1	1	1	3.7	15
27-Jan	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	3	3	2	4	6	6	4	3	1.8	6
28-Jan	2	3	5	Z	2	2	3	4	9	6	15	14	11	9	9	11	10	9	9	4	2	1	1	1	6.2	15
29-Jan	1	1	1	1	Z	1	0	1	1	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	1.0	3
30-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	4	7	10	7	5	4	0	0	0	2.3	10
31-Jan	Z	1	2	1	1	1	1	1	1	1	0	0	1	4	7	3	4	2	0	1	2	1	1	1	1.6	7
	3.7	4.5	4.6	3.3	3.8	4.3	5.0	4.6	4.8	5.4	6.0	6.1	6.1	6.4	5.9	6.1	6.6	6.9	6.7	6.5	6.0	5.9	5.1	4.2	Diurnal Average	
	10	13	11	9	13	13	14	13	11	12	17	16	24	19	17	23	30	26	31	31	31	29	28	19	Diurnal Maximum	

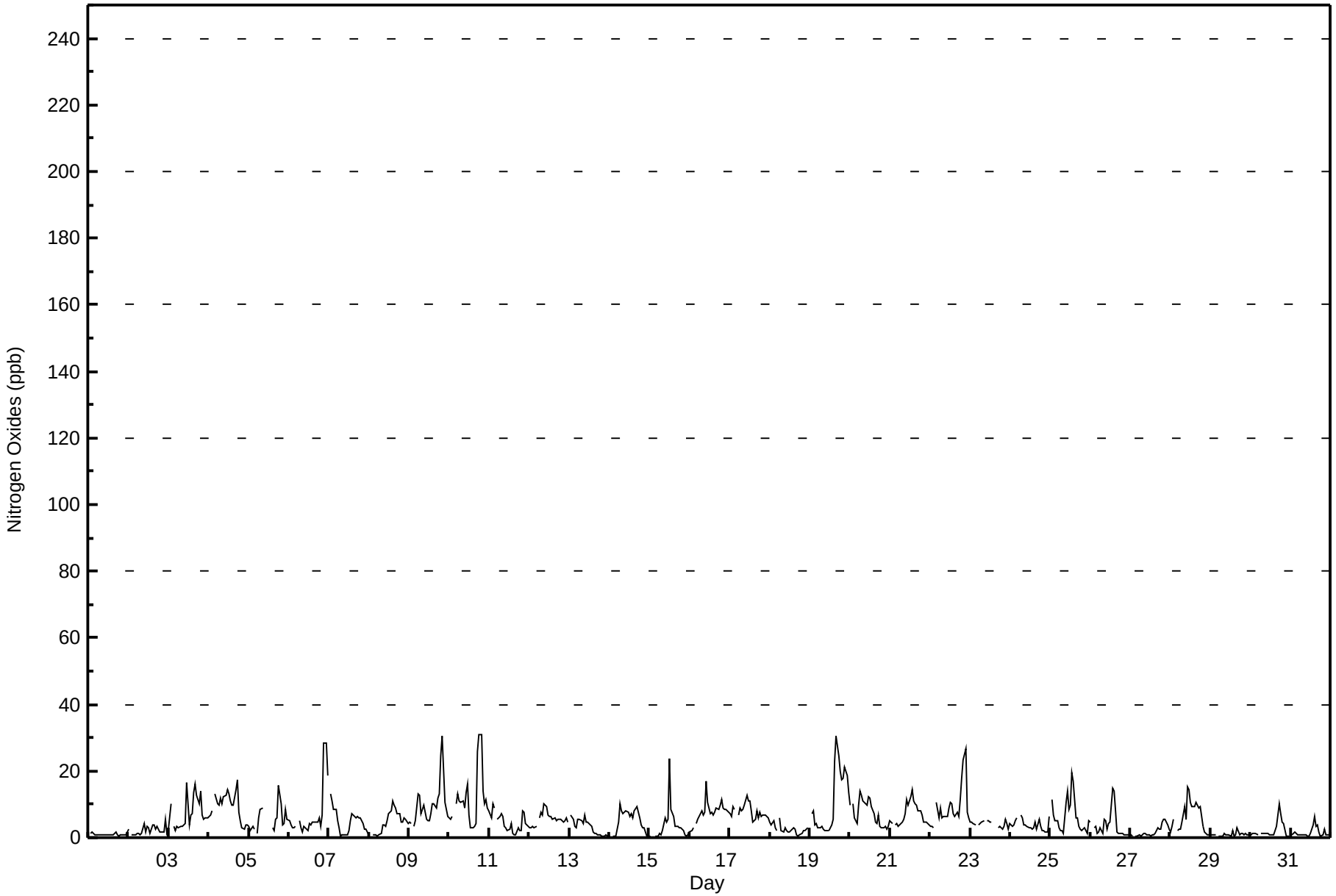
Z - zerospan C - Calibration PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Anzac - January 2016



Nitrogen Oxides (NO_X) - ppb
Anzac - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	690	98.01	98.01
21 - 40	14	1.99	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	33	22	13	6	18	32	94	63	53	19	16	12	41	122	66	59	669
21 - 40	3	2	0	0	0	0	0	0	0	2	0	1	0	0	1	5	14
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	24	13	6	18	32	94	63	53	21	16	13	41	122	67	64	683

Total Number of Valid Hours: 683

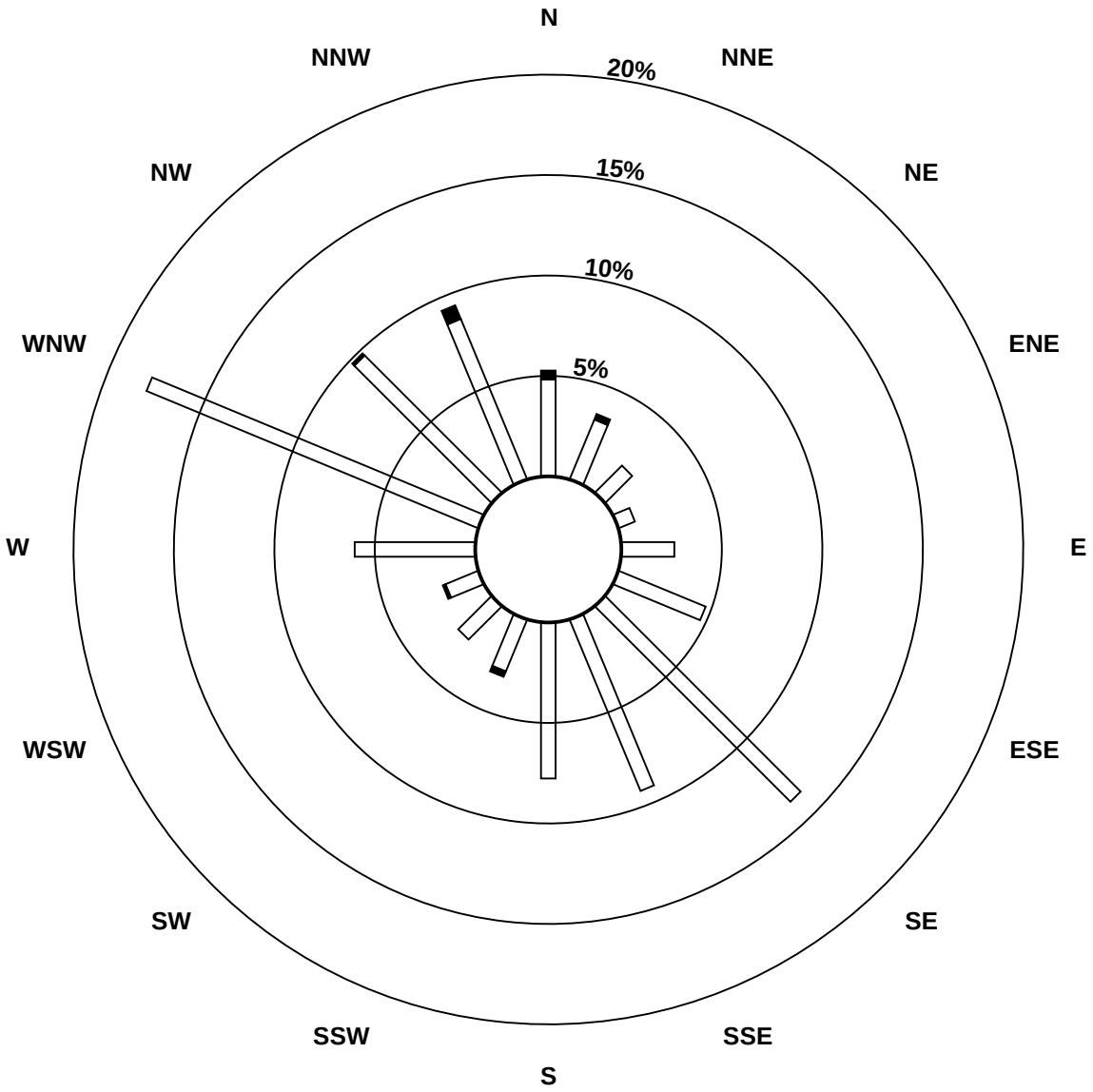
Total Number of Hours: 744

Wood Buffalo Environmental Association

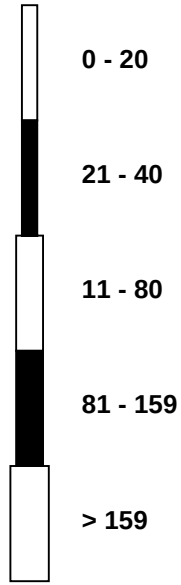
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Anzac (AMS 14)



Classes (ppb)



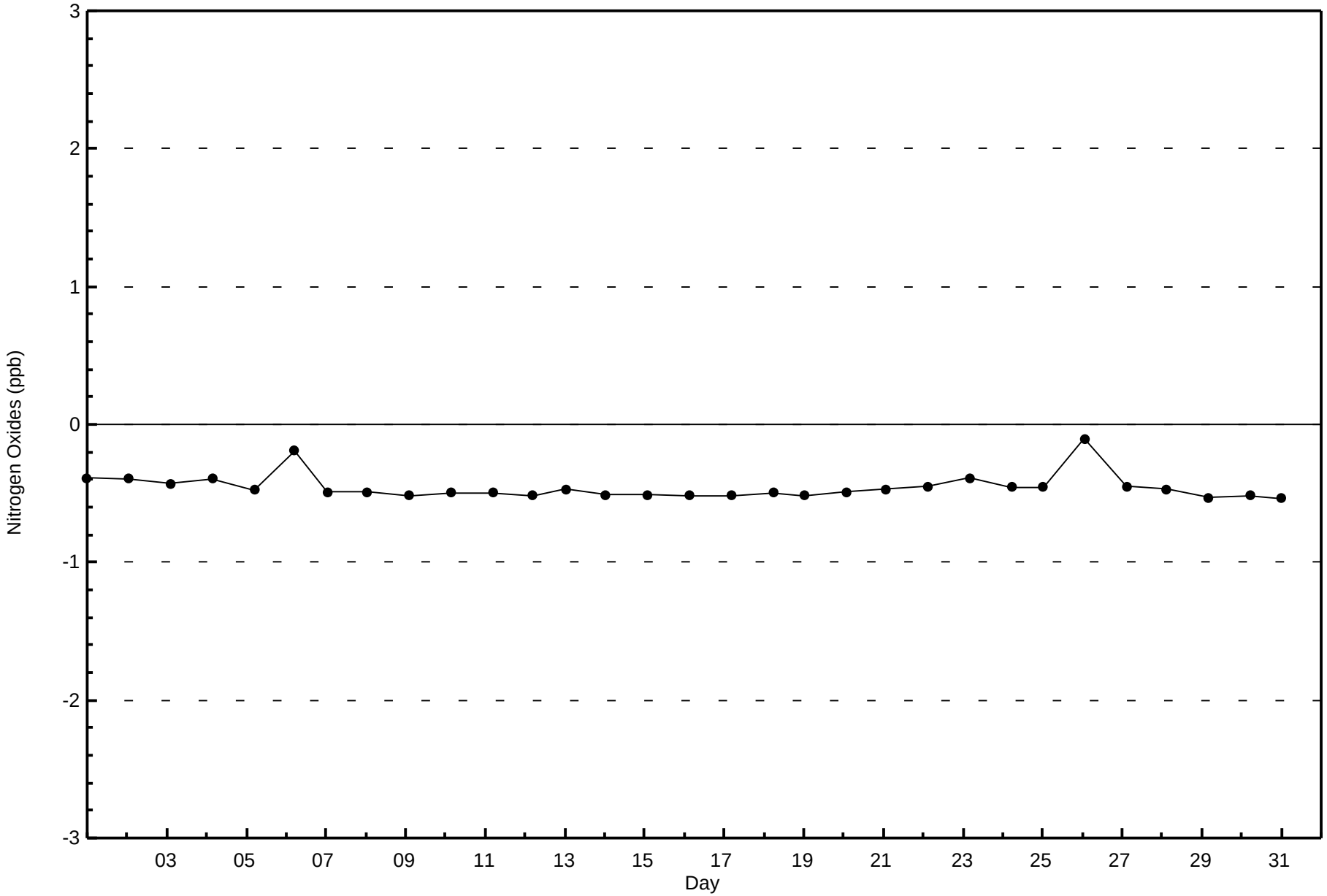
Total Number of Valid Hours: 683

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Anzac - January 2016

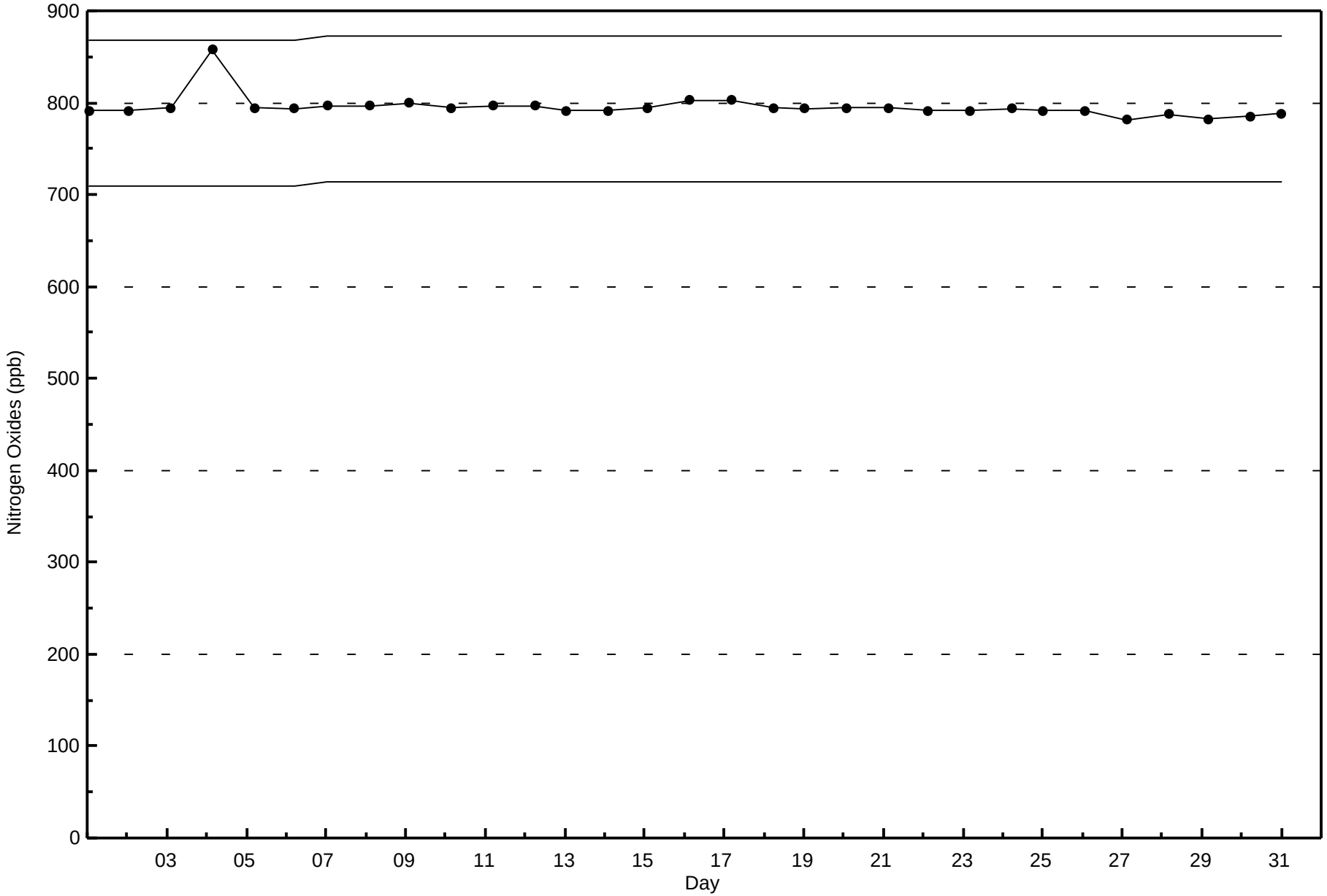


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Anzac - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 44 ppb on Jan 29 01:00

Maximum Daily Average: 42.1 ppb on Jan 1

Minimum Value: 4 ppb on Jan 10 19:00

Minimum Daily Average: 14.3 ppb on Jan 10

Maximum Diurnal Average: 28.2 ppb at hour 15

Minimum Diurnal Average: 23.2 ppb at hour 19

Monthly Average: 25.1 ppb

Percentiles: $P_1 = 6$ $P_{10} = 13$ $Q_1 = 18$ Median = 25 $Q_3 = 32$ $P_{90} = 37$ $P_{99} = 43$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	33
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	40	40	40	Z	42	42	43	43	43	43	44	44	43	43	43	43	42	43	43	42	42	41	41	40	42.1	44
2-Jan	39	40	40	39	Z	39	39	39	39	35	32	30	33	34	31	32	29	31	31	26	27	25	23	24	32.8	40
3-Jan	20	14	11	17	20	Z	21	19	23	32	33	28	38	33	24	17	13	17	21	17	22	22	21	20	21.9	38
4-Jan	18	17	17	18	16	17	Z	20	20	19	24	25	27	29	30	29	27	26	29	33	34	34	33	29	24.9	34
5-Jan	23	22	32	32	26	20	17	Z	15	19	23	23	25	32	32	27	17	13	9	12	16	14	10	11	20.5	32
6-Jan	12	13	14	14	15	16	19	18	C	C	C	26	26	26	25	25	21	17	18	22	21	7	4	9	17.5	26
7-Jan	11	14	18	Z	23	27	30	35	36	36	36	36	34	32	31	31	31	30	29	29	32	34	34	34	29.7	36
8-Jan	35	34	35	35	35	35	34	Z	32	31	32	30	28	28	26	26	26	23	19	21	17	16	18	16	27.4	35
9-Jan	16	17	16	18	15	Z	7	14	14	15	20	22	26	25	25	20	15	10	10	8	7	10	10	11	15.3	26
10-Jan	11	12	11	11	11	9	Z	11	10	16	18	18	21	25	25	24	20	6	4	4	13	17	15	17	14.3	25
11-Jan	17	19	15	19	26	26	25	21	Z	25	30	32	32	32	34	35	35	34	32	29	26	23	24	24	26.7	35
12-Jan	25	24	24	26	25	23	20	20	Z	17	18	20	20	20	21	20	20	20	18	18	19	18	15	18	20.4	26
13-Jan	14	13	15	Z	20	17	19	19	20	18	20	21	21	22	24	25	26	26	27	28	29	30	30	30	22.3	30
14-Jan	30	30	29	29	Z	25	20	24	25	26	27	29	32	32	33	31	28	29	29	31	31	31	35	36	29.2	36
15-Jan	36	36	36	36	35	Z	33	32	29	26	28	29	24	27	28	29	26	24	21	19	21	26	25	23	28.2	36
16-Jan	21	19	17	17	15	13	Z	13	17	13	13	24	27	27	28	23	18	15	14	13	12	12	13	13	17.3	28
17-Jan	14	11	10	12	15	15	15	Z	16	20	19	23	23	25	26	27	26	29	26	28	29	28	29	30	21.6	30
18-Jan	32	34	33	35	36	34	32	36	Z	34	35	35	36	36	35	34	34	34	33	32	30	29	28	28	33.2	36
19-Jan	26	24	26	Z	26	26	25	24	24	25	25	25	25	24	25	13	7	5	7	8	8	5	7	11	18.3	26
20-Jan	15	15	15	20	Z	17	13	15	17	19	21	21	22	24	23	24	22	24	25	25	24	24	23	22	20.4	25
21-Jan	19	19	19	16	17	Z	18	18	17	17	15	17	16	17	18	18	18	21	20	22	26	26	26	28	19.5	28
22-Jan	24	20	19	14	10	11	Z	19	19	20	20	20	19	19	20	20	18	18	13	6	4	4	15	16	16.0	24
23-Jan	17	18	18	18	17	17	16	Z	16	16	15	15	16	17	PF	PF	PF	17	19	20	17	14	13	13	16.5	20
24-Jan	13	18	15	13	12	10	10	15	Z	23	25	28	29	30	31	30	25	20	31	31	30	30	28	21	22.5	31
25-Jan	15	12	18	Z	22	27	29	29	29	26	25	27	26	24	24	25	22	25	24	21	21	18	21	29	23.4	29
26-Jan	32	34	33	26	Z	29	32	32	31	34	37	36	21	22	17	26	35	37	38	38	38	38	38	39	32.3	39
27-Jan	40	39	39	40	40	Z	40	40	39	39	40	40	41	42	42	40	38	31	24	21	18	19	20	18	34.4	42
28-Jan	26	29	26	30	32	32	Z	31	28	31	28	26	25	26	25	23	18	15	13	29	32	34	40	44	28.0	44
29-Jan	44	43	42	39	35	33	33	Z	34	33	33	36	38	38	38	39	38	38	39	38	39	38	38	37	37.6	44
30-Jan	37	36	36	36	35	36	37	37	Z	34	34	34	35	34	34	29	25	20	22	24	25	31	33	35	32.1	37
31-Jan	34	33	31	Z	32	32	32	30	29	29	29	30	29	28	26	29	30	32	34	33	32	33	32	31	30.8	34
	24.4	24.1	24.1	24.4	24.2	24.2	25.4	25.1	24.9	25.7	26.7	27.4	27.7	28.1	28.2	27.1	25.0	23.5	23.2	23.5	24.0	23.5	23.9	24.4	Diurnal Average	
	44	43	42	40	42	42	43	43	43	43	44	44	43	43	43	43	42	43	43	42	42	41	41	44	Diurnal Maximum	

Z - zerospan C - Calibration PF - Power Failure

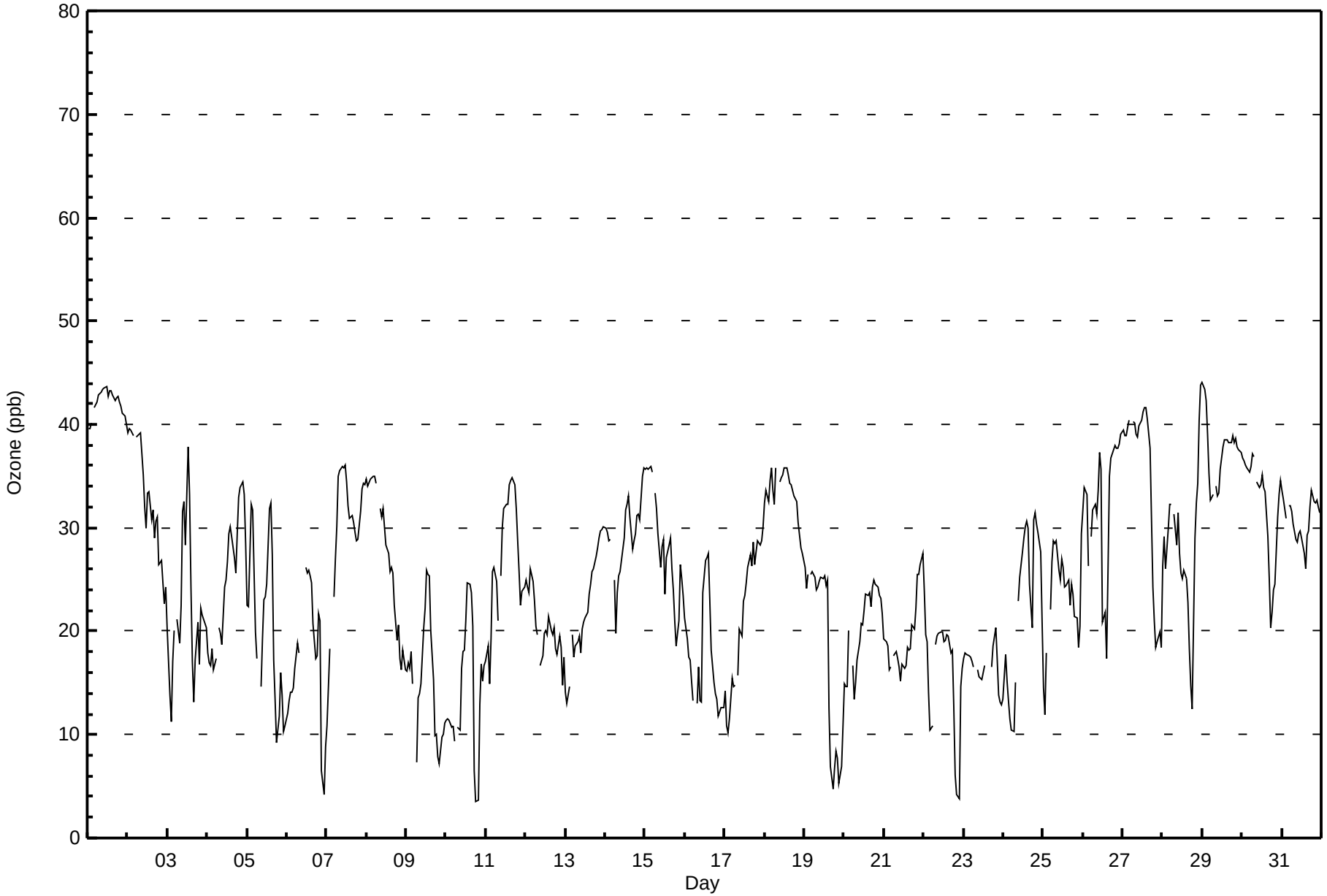
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Anzac - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	249	35.17	35.17
21 - 50	459	64.83	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Anzac - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	13	14	1	2	4	11	43	24	37	8	9	4	3	12	27	21	233
21 - 50	23	11	12	6	14	18	51	38	18	13	8	9	40	108	38	46	453
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	25	13	8	18	29	94	62	55	21	17	13	43	120	65	67	686

Total Number of Valid Hours: 686

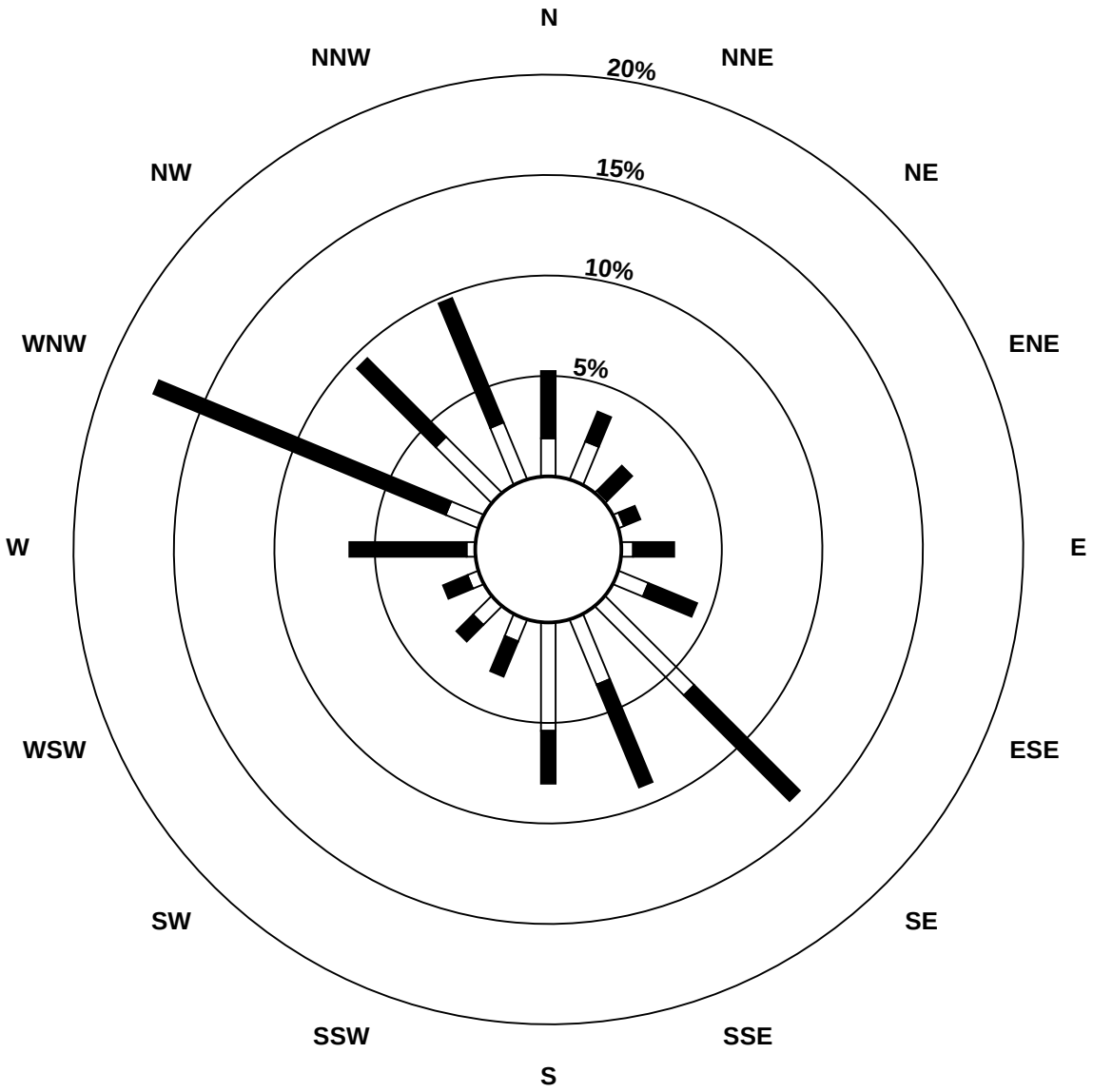
Total Number of Hours: 744

Wood Buffalo Environmental Association

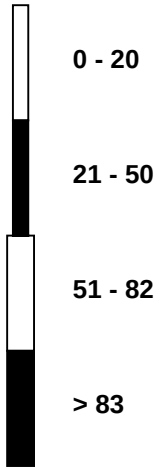
Wind Rose Jan 2016

Ozone (O_3) - ppb

Anzac (AMS 14)



Classes (ppb)



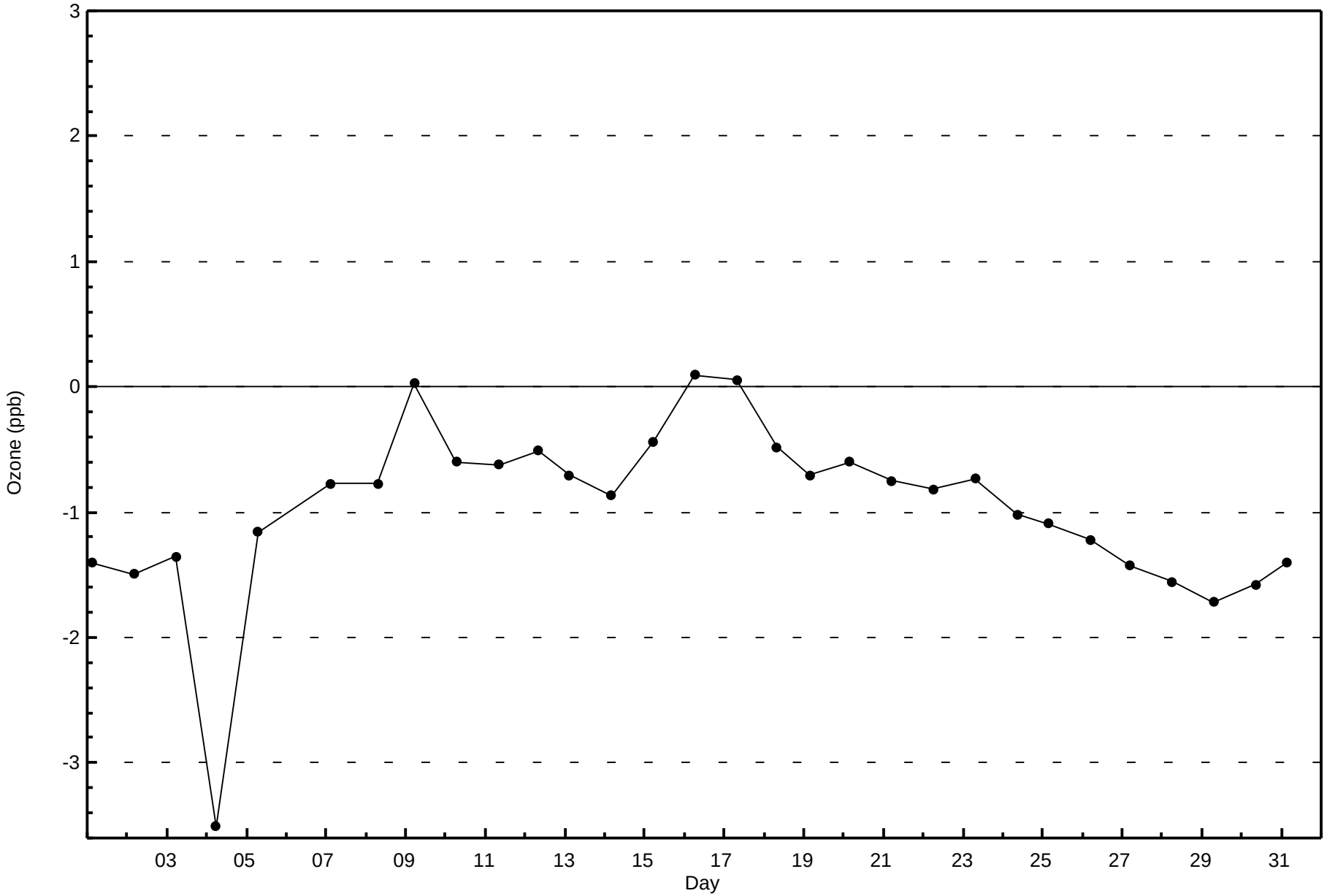
Total Number of Valid Hours: 686

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Anzac - January 2016

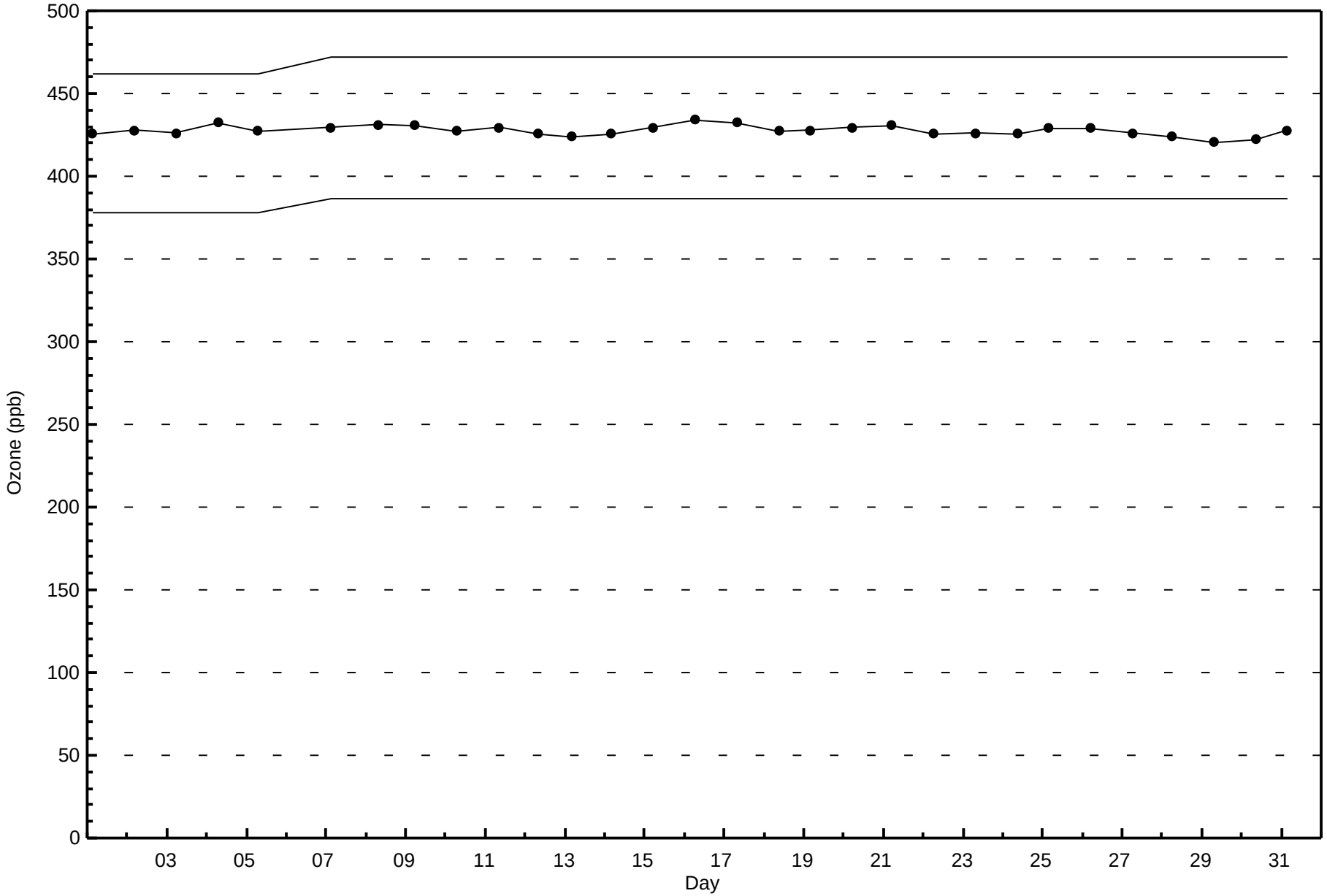


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Anzac - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 44.3 $\mu g/m^3$ on Jan 3 18:00

Maximum Daily Average: 18.7 $\mu g/m^3$ on Jan 10

Minimum Value: 0.1 $\mu g/m^3$ on Jan 7 10:00

Minimum Daily Average: 0.7 $\mu g/m^3$ on Jan 27

Maximum Diurnal Average: 6.4 $\mu g/m^3$ at hour 18

Minimum Diurnal Average: 4.1 $\mu g/m^3$ at hour 1

Monthly Average: 4.86 $\mu g/m^3$

Percentiles: $P_1 = 0.2$ $P_{10} = 0.9$ $Q_1 = 1.6$ Median = 2.6 $Q_3 = 5.9$ $P_{90} = 11.5$ $P_{99} = 30.0$

Hours in Service:	744
Hours of Data:	731
Hours of Missing Data:	13
Hours of Calibration:	3
Percent Operational Time:	98.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	2.9	3.3	3.9	3.8	2.8	2.2	2.0	1.8	1.8	1.6	1.7	1.6	1.3	1.2	1.1	1.2	1.4	1.7	2.0	2.0	1.6	1.5	1.4	1.5	2.0	3.9
2-Jan	1.7	1.4	1.4	1.5	1.5	1.6	1.7	1.9	2.1	2.2	2.3	1.9	1.5	1.9	1.7	2.9	2.3	2.5	2.5	4.7	8.3	15.7	12.6	6.1	3.5	15.7
3-Jan	5.0	5.3	4.3	2.4	1.9	2.2	2.0	2.6	2.4	3.0	2.1	1.7	1.4	1.8	4.0	8.8	22.1	44.3	19.3	9.6	20.4	26.5	15.9	11.6	9.2	44.3
4-Jan	4.9	2.4	2.0	1.3	2.8	2.4	3.2	2.5	2.1	2.0	1.9	1.2	1.2	0.9	1.0	0.9	1.0	1.3	1.5	0.9	1.3	1.1	1.1	0.9	1.7	4.9
5-Jan	0.8	0.8	0.6	0.5	0.5	0.6	0.8	1.4	0.8	0.9	0.9	0.7	0.6	0.9	0.9	1.6	2.3	2.7	2.4	1.7	1.4	1.4	1.6	1.5	1.2	2.7
6-Jan	1.3	1.2	1.3	1.4	1.4	1.5	1.5	1.3	1.4	C	C	C	2.2	2.1	6.0	2.9	2.1	2.3	5.1	5.6	3.1	7.1	9.3	7.0	3.2	9.3
7-Jan	6.1	6.5	5.1	3.7	3.2	2.4	1.7	UO	UO	0.1	0.6	0.3	0.6	1.3	3.3	4.3	4.4	4.2	4.8	5.5	4.5	2.9	2.0	1.7	3.1	6.5
8-Jan	1.2	1.0	1.0	1.0	0.9	1.1	1.2	1.4	1.8	1.7	1.9	2.7	4.4	5.5	7.2	6.2	4.4	5.6	5.1	2.6	2.4	2.3	2.3	2.3	2.8	7.2
9-Jan	3.3	7.3	10.6	23.8	21.4	19.3	16.9	9.7	7.0	4.8	2.1	2.3	3.8	5.2	16.4	7.2	5.8	3.6	2.9	5.2	3.9	4.6	4.3	5.5	8.2	23.8
10-Jan	12.1	13.8	14.0	17.3	17.4	18.8	18.2	17.7	22.7	31.2	30.6	25.3	19.8	15.8	14.6	15.1	16.1	28.7	29.0	25.5	13.0	11.0	11.8	10.5	18.7	31.2
11-Jan	11.7	11.4	9.9	4.9	1.9	1.5	2.7	6.4	5.4	3.5	2.3	2.1	2.4	3.6	2.3	1.6	1.1	1.4	1.1	3.8	2.5	2.4	2.3	2.3	3.8	11.7
12-Jan	2.3	2.3	2.3	2.5	2.7	2.5	2.9	3.3	3.0	8.6	6.6	3.3	6.9	5.4	15.6	5.1	5.0	3.7	11.5	13.2	11.6	14.1	11.1	9.2	6.4	15.6
13-Jan	8.4	13.6	8.6	5.1	4.7	6.0	4.6	6.2	6.6	7.1	9.1	8.7	8.5	9.5	8.7	6.7	6.1	6.4	6.1	6.1	4.5	3.1	3.0	3.7	6.7	13.6
14-Jan	3.5	3.3	2.9	4.0	6.6	7.0	9.1	10.3	6.1	4.9	3.7	3.1	2.1	2.2	2.0	2.6	1.9	1.7	2.7	2.4	2.2	2.6	3.2	2.2	3.8	10.3
15-Jan	1.9	1.6	1.8	1.8	2.1	2.6	1.9	1.8	1.8	2.2	2.2	2.1	5.6	4.7	3.6	3.4	2.8	2.3	2.0	1.7	1.7	1.7	1.6	1.5	2.3	5.6
16-Jan	1.9	1.6	1.6	1.6	1.6	2.4	3.6	3.7	2.7	2.6	2.9	3.2	2.4	2.2	2.5	4.3	7.4	7.4	8.4	8.8	5.9	4.0	3.3	2.6	3.7	8.8
17-Jan	2.5	2.3	2.3	2.0	1.6	1.5	1.3	1.1	1.7	1.3	1.8	1.8	1.2	1.1	1.1	1.2	1.1	0.9	0.9	1.2	1.2	1.1	1.2	1.2	1.4	2.5
18-Jan	1.1	1.0	0.7	0.6	0.6	1.2	2.5	0.6	0.6	0.7	0.6	0.6	0.6	1.1	2.4	1.8	1.6	1.4	1.3	1.1	1.8	1.6	1.6	1.4	1.2	2.5
19-Jan	1.7	2.4	5.3	7.9	11.4	9.9	9.5	8.7	9.0	7.9	4.6	6.1	5.1	4.7	5.2	12.5	7.4	4.6	5.9	6.4	4.0	5.2	5.1	5.2	6.5	12.5
20-Jan	4.8	3.9	4.4	4.8	5.1	5.9	5.1	5.4	3.6	3.0	3.4	5.5	11.2	8.8	7.2	5.4	4.9	5.0	4.1	3.9	4.2	4.1	4.1	3.9	5.1	11.2
21-Jan	4.5	5.3	6.1	6.1	7.6	8.1	9.0	11.4	16.0	16.9	17.7	14.5	12.1	10.4	9.2	8.4	6.9	6.3	4.9	4.7	5.1	5.2	5.2	5.0	8.6	17.7
22-Jan	4.2	3.9	4.7	4.4	4.3	4.5	7.4	16.0	16.6	15.6	13.5	13.1	12.0	11.0	9.3	9.1	9.0	9.3	10.9	11.7	11.5	11.6	11.3	11.6	9.8	16.6
23-Jan	12.5	12.1	11.3	11.3	11.9	12.1	13.5	15.5	16.3	34.3	35.1	36.6	35.9	28.5	PF	PF	24.3	24.1	14.1	10.6	10.0	9.5	8.3	8.3	18.0	36.6
24-Jan	6.4	7.9	8.1	8.4	8.4	8.7	9.0	6.2	3.7	4.6	4.7	4.4	5.5	3.2	3.1	3.5	3.4	4.1	3.7	3.5	3.8	3.9	4.3	7.1	5.4	9.0
25-Jan	9.5	9.9	8.4	8.1	7.7	4.6	3.4	3.5	2.8	2.8	2.7	2.1	2.3	2.5	2.4	2.1	1.8	M	1.0	1.0	1.2	2.0	1.9	2.0	3.7	9.9
26-Jan	1.8	1.6	1.5	1.4	1.3	1.1	0.9	0.8	0.8	1.1	1.2	2.2	0.7	1.7	0.9	1.6	1.5	0.5	0.4	0.5	0.5	0.4	0.6	0.5	1.1	2.2
27-Jan	0.1	0.2	0.5	0.3	0.2	0.2	0.1	0.1	0.5	UO	0.1	0.1	0.2	0.2	0.3	0.3	M	1.0	1.1	1.3	1.9	2.5	2.3	2.0	0.7	2.5
28-Jan	1.3	1.2	1.2	1.2	1.2	1.3	1.5	1.5	1.7	1.7	2.2	2.3	2.4	2.1	2.2	2.4	2.2	2.6	5.1	6.2	2.5	1.8	0.8	UO	2.1	6.2
29-Jan	UO	0.3	1.0	1.1	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.3	1.0	0.3	0.2	UO	0.4	1.5	1.4	2.3	2.4	1.9	1.8	2.9	1.2	2.9
30-Jan	2.7	1.8	1.9	1.9	1.6	1.6	1.9	1.8	1.7	1.8	1.8	1.8	1.5	1.7	1.8	2.1	3.0	8.2	6.2	2.0	1.9	1.9	1.8	1.5	2.3	8.2
31-Jan	1.8	1.6	1.8	1.7	1.8	2.7	3.7	2.6	2.7	2.5	2.7	3.0	3.6	3.6	5.1	4.7	4.8	3.4	2.4	2.4	2.5	2.5	2.4	2.4	2.9	5.1
	4.1	4.3	4.2	4.4	4.5	4.5	4.6	4.9	4.9	5.9	5.5	5.2	5.2	4.7	4.7	4.5	5.3	6.4	5.5	5.1	4.6	5.1	4.5	4.2	Diurnal Average	
	12.5	13.8	14.0	23.8	21.4	19.3	18.2	17.7	22.7	34.3	35.1	36.6	35.9	28.5	16.4	15.1	24.3	44.3	29.0	25.5	20.4	26.5	15.9	11.6	Diurnal Maximum	

C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure

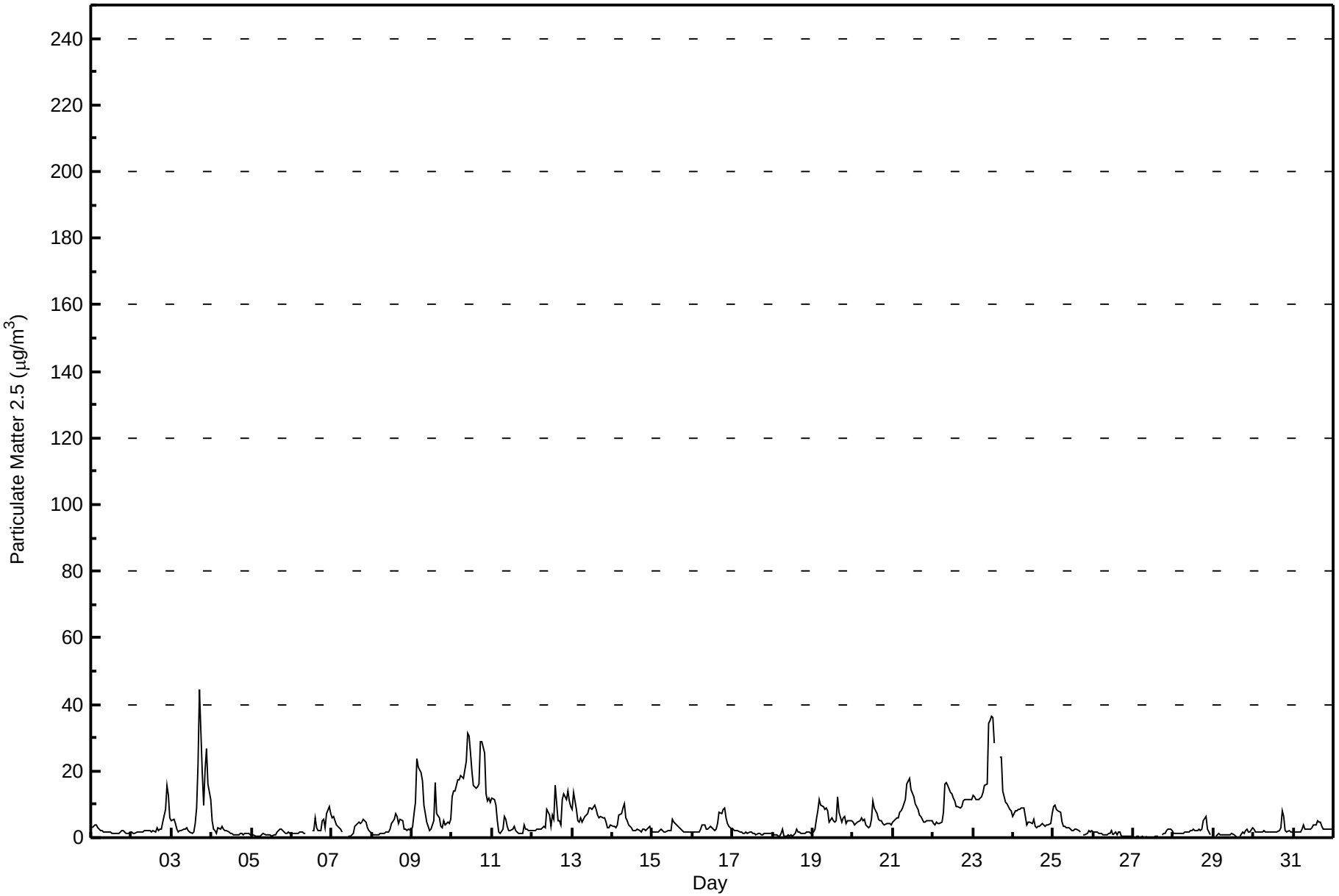
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Anzac - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	460	62.93	62.93
6 - 15	150	20.52	83.45
16 - 25	31	4.24	87.69
26 - 80	11	1.50	89.19
> 81.0	0	0.00	89.19

Total Number of Valid Hours: 731

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Anzac - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	23	9	14	5	13	21	51	40	39	19	14	9	26	87	34	43	447
6 - 15	11	12	0	0	4	8	28	18	14	0	2	1	2	6	21	17	144
16 - 25	0	2	0	1	0	2	6	3	1	2	1	2	0	1	5	3	29
26 - 80	1	0	0	1	0	1	0	1	2	0	0	0	0	2	0	2	10
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	23	14	7	17	32	85	62	56	21	17	12	28	96	60	65	630

Total Number of Valid Hours: 709

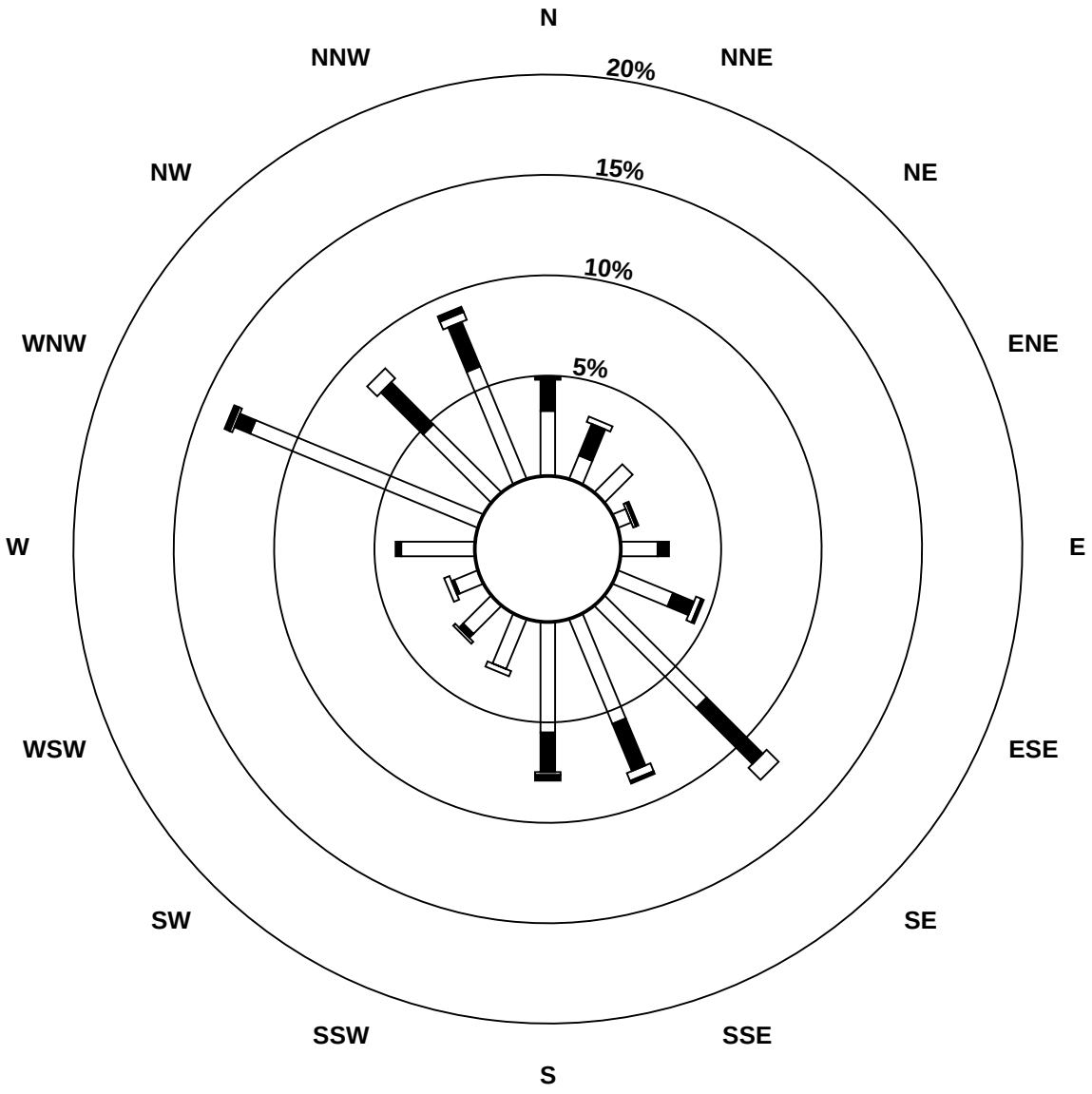
Total Number of Hours: 744

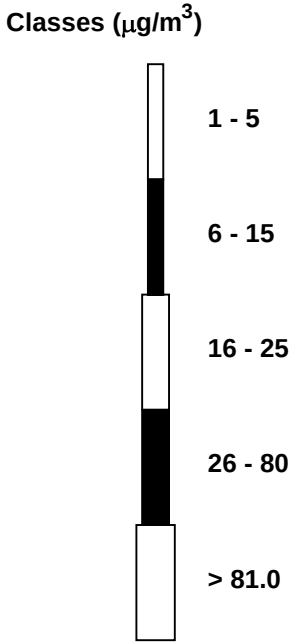
Wood Buffalo Environmental Association

Wind Rose Jan 2016

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

Anzac (AMS 14)





Total Number of Valid Hours: 709

Maximum Value: 6.0 C on Jan 28 21:00

Maximum Daily Average: 2.1 C on Jan 29

Minimum Value: -32.9 C on Jan 16 06:00

Minimum Daily Average: -28.7 C on Jan 16

Maximum Diurnal Average: -9.0 C at hour 15

Minimum Diurnal Average: -13.6 C at hour 6

Monthly Average: -12.20 C

Percentiles: P_1 = -31.4 P_{10} = -22.4 Q_1 = -17.6 Median = -13.1 Q_3 = -6.7 P_{90} = 0.3 P_{99} = 5.2

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

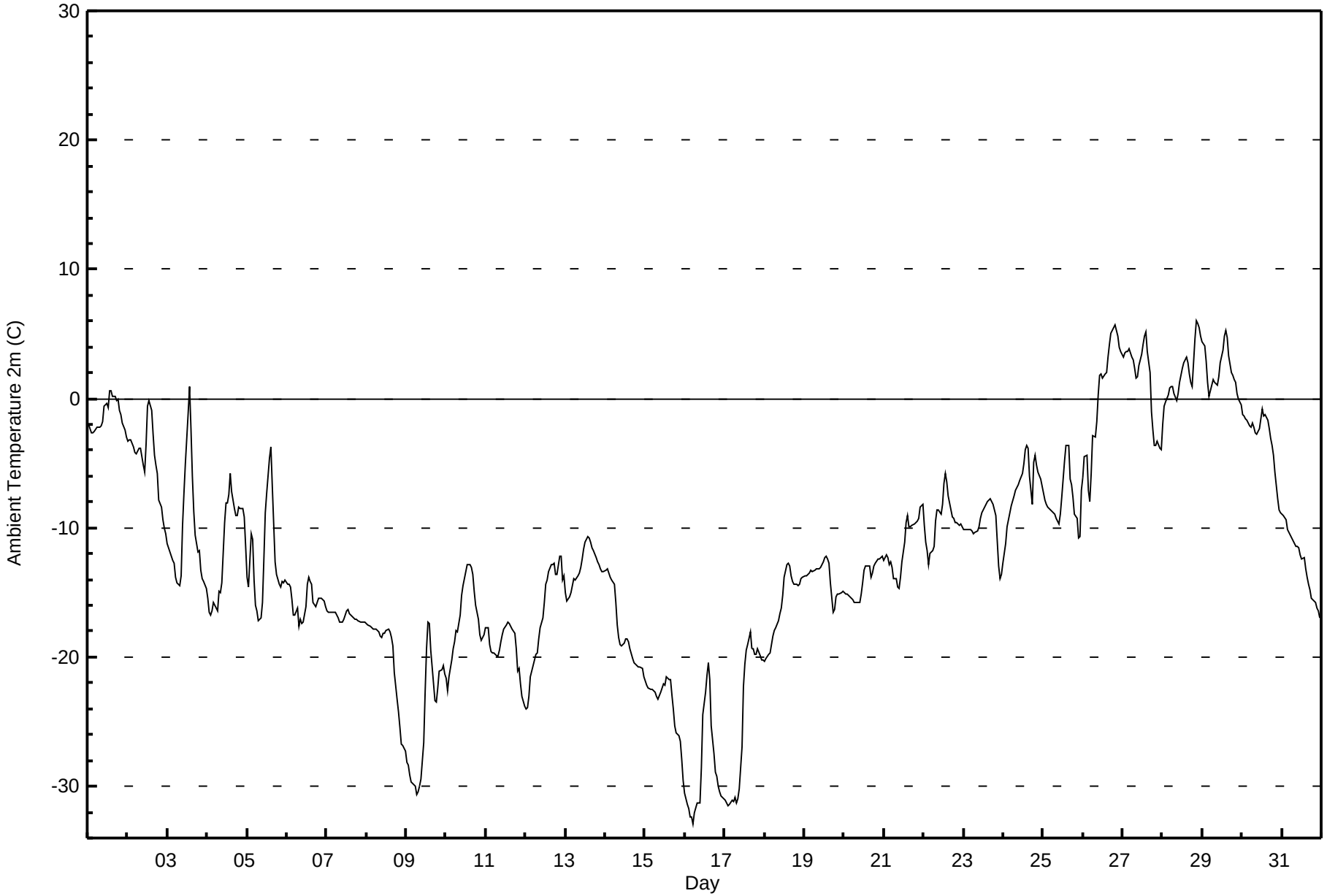
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.0	-2.3	-2.6	-2.6	-2.6	-2.2	-2.2	-2.2	-2.1	-1.8	-0.6	-0.4	-0.7	0.5	0.6	0.2	0.1	-0.1	0.0	-0.9	-1.2	-1.9	-2.4	-3.0	-1.4	0.6
2-Jan	-3.3	-3.2	-3.2	-3.8	-4.2	-4.3	-4.0	-3.9	-3.8	-5.2	-5.7	-3.5	-0.6	-0.1	-1.0	-2.8	-4.4	-5.1	-5.8	-7.9	-8.4	-9.4	-10.0	-10.5	-4.7	-0.1
3-Jan	-11.2	-11.8	-12.2	-12.6	-12.8	-13.8	-14.2	-14.5	-13.7	-9.8	-7.3	-5.1	-1.1	0.9	-2.3	-6.1	-8.7	-10.6	-11.9	-11.8	-13.3	-13.9	-14.2	-14.7	-10.3	0.9
4-Jan	-15.5	-16.5	-16.7	-16.4	-15.8	-16.2	-16.4	-14.9	-15.1	-14.3	-9.6	-8.1	-8.1	-7.4	-5.8	-7.2	-8.6	-9.1	-9.0	-8.4	-8.6	-8.5	-9.1	-11.4	-11.5	-5.8
5-Jan	-13.9	-14.6	-10.4	-10.9	-14.0	-16.0	-16.4	-17.2	-17.0	-15.8	-12.4	-8.8	-7.3	-4.6	-3.8	-6.8	-9.7	-12.6	-13.6	-14.3	-14.6	-14.2	-14.3	-14.0	-12.4	-3.8
6-Jan	-14.3	-14.3	-14.6	-15.5	-16.7	-16.8	-16.3	-17.6	-17.0	-17.4	-17.3	-16.1	-14.4	-13.8	-14.2	-14.3	-15.8	-16.2	-15.8	-15.5	-15.4	-15.5	-15.7	-16.1	-15.7	-13.8
7-Jan	-16.5	-16.6	-16.6	-16.5	-16.5	-16.6	-16.8	-17.0	-17.3	-17.3	-17.1	-16.7	-16.4	-16.3	-16.7	-16.8	-17.0	-17.1	-17.1	-17.2	-17.3	-17.3	-17.3	-17.3	-16.9	-16.3
8-Jan	-17.4	-17.5	-17.7	-17.7	-17.9	-17.8	-17.9	-18.1	-18.4	-18.5	-18.2	-18.2	-18.0	-17.8	-18.1	-18.5	-19.1	-21.2	-23.3	-24.2	-25.4	-26.7	-26.8	-27.3	-20.1	-17.4
9-Jan	-28.1	-28.4	-29.1	-29.6	-29.8	-30.0	-30.7	-30.4	-29.9	-29.4	-26.7	-22.8	-19.4	-17.2	-17.4	-19.5	-22.1	-23.3	-23.5	-22.4	-21.1	-21.0	-20.7	-21.3	-24.7	-17.2
10-Jan	-21.6	-22.6	-21.5	-20.3	-19.4	-18.8	-18.0	-18.1	-16.8	-15.2	-14.4	-13.9	-13.4	-12.9	-12.8	-13.0	-13.7	-14.9	-16.0	-17.0	-18.3	-18.8	-18.4	-18.3	-17.0	-12.8
11-Jan	-17.8	-17.7	-19.0	-19.5	-19.6	-19.6	-19.9	-19.9	-19.4	-18.8	-18.2	-17.9	-17.5	-17.3	-17.4	-17.6	-17.9	-18.1	-19.3	-21.1	-20.9	-22.1	-23.1	-23.8	-19.3	-17.3
12-Jan	-24.0	-23.9	-23.1	-21.6	-20.6	-20.2	-19.8	-19.6	-18.6	-17.8	-17.0	-15.8	-14.3	-14.0	-13.4	-12.9	-12.8	-12.8	-13.6	-13.6	-12.2	-12.2	-14.1	-13.7	-16.7	-12.2
13-Jan	-15.0	-15.7	-15.3	-15.0	-14.4	-13.9	-14.0	-13.8	-13.5	-13.1	-12.4	-11.6	-11.1	-10.7	-10.8	-11.1	-11.6	-11.8	-12.3	-12.6	-12.8	-13.2	-13.4	-13.4	-13.0	-10.7
14-Jan	-13.3	-13.2	-13.5	-13.8	-14.0	-14.4	-15.8	-17.5	-18.5	-19.0	-19.1	-18.9	-18.6	-18.6	-18.8	-19.4	-20.1	-20.4	-20.5	-20.6	-20.8	-20.8	-20.9	-21.5	-18.0	-13.2
15-Jan	-21.9	-22.2	-22.4	-22.5	-22.5	-22.6	-22.7	-23.0	-23.2	-22.8	-22.4	-22.1	-22.2	-21.5	-21.7	-21.7	-23.0	-24.1	-25.3	-25.8	-26.0	-26.5	-27.9	-29.6	-23.6	-21.5
16-Jan	-30.5	-31.4	-31.7	-32.4	-32.4	-32.9	-32.1	-31.3	-31.3	-31.3	-28.5	-24.4	-22.7	-21.4	-20.4	-21.8	-25.3	-27.5	-28.9	-29.2	-30.0	-30.4	-30.7	-30.9	-28.7	-20.4
17-Jan	-31.0	-31.3	-31.5	-31.4	-31.1	-31.1	-30.9	-31.3	-31.0	-30.2	-26.9	-22.2	-20.5	-19.5	-19.0	-18.1	-19.3	-19.3	-19.8	-19.8	-19.4	-19.8	-20.2	-20.2	-24.8	-18.1
18-Jan	-20.4	-20.1	-19.8	-19.7	-19.0	-18.4	-18.0	-17.7	-17.1	-16.6	-16.2	-15.2	-13.9	-12.9	-12.8	-13.0	-13.7	-14.2	-14.4	-14.3	-14.5	-14.3	-13.9	-13.8	-16.0	-12.8
19-Jan	-13.7	-13.7	-13.6	-13.5	-13.3	-13.4	-13.3	-13.2	-13.2	-13.2	-13.1	-12.6	-12.4	-12.3	-12.4	-12.8	-14.3	-16.5	-16.3	-15.4	-15.2	-15.1	-15.0	-14.9	-13.8	-12.3
20-Jan	-15.0	-15.1	-15.1	-15.3	-15.5	-15.6	-15.7	-15.8	-15.8	-15.7	-15.1	-14.3	-13.3	-13.0	-13.0	-13.0	-13.8	-13.5	-12.9	-12.7	-12.5	-12.4	-12.3	-12.2	-14.1	-12.2
21-Jan	-12.5	-12.1	-12.3	-12.8	-12.6	-13.1	-14.0	-13.9	-14.6	-14.7	-13.9	-12.6	-11.1	-9.6	-9.0	-9.9	-9.9	-9.9	-9.7	-9.6	-9.5	-9.3	-8.4	-8.2	-11.4	-8.2
22-Jan	-9.8	-11.2	-11.8	-12.8	-12.0	-11.7	-11.4	-9.5	-8.6	-8.7	-9.0	-8.2	-6.6	-5.8	-6.4	-7.6	-8.6	-9.2	-9.3	-9.6	-9.6	-9.8	-9.7	-9.9	-9.4	-5.8
23-Jan	-10.1	-10.1	-10.1	-10.1	-10.2	-10.3	-10.4	-10.3	-10.2	-9.9	-9.2	-8.9	-8.6	-8.3	-7.9	-7.8	-7.7	-7.9	-8.2	-9.0	-11.0	-13.0	-13.9	-13.6	-9.9	-7.7
24-Jan	-12.8	-11.2	-9.9	-9.4	-8.9	-8.3	-7.5	-7.1	-6.9	-6.7	-6.3	-5.8	-5.1	-4.0	-3.6	-3.9	-6.0	-8.2	-5.0	-4.4	-5.1	-5.7	-6.2	-6.8	-6.9	-3.6
25-Jan	-7.4	-7.8	-8.1	-8.4	-8.6	-8.7	-8.9	-9.0	-9.3	-9.7	-9.0	-7.7	-6.2	-4.8	-3.6	-3.7	-6.2	-6.7	-7.7	-9.0	-9.3	-10.7	-10.7	-7.1	-7.8	-3.6
26-Jan	-6.1	-4.5	-4.4	-7.1	-7.9	-5.8	-2.8	-3.0	-1.8	0.2	1.8	1.9	1.6	1.9	2.0	3.2	4.2	5.0	5.5	5.7	5.2	4.8	4.0	3.6	0.3	5.7
27-Jan	3.3	3.5	3.6	3.7	3.9	3.2	3.0	2.4	1.6	1.7	2.6	3.4	4.2	4.9	5.2	3.6	2.0	-1.1	-2.4	-3.7	-3.6	-3.4	-3.8	-3.9	1.4	5.2
28-Jan	-2.0	-0.5	-0.3	0.2	0.8	0.9	0.9	0.4	-0.1	0.3	1.3	1.8	2.4	2.8	3.2	2.8	2.0	1.3	0.9	4.6	6.0	5.8	5.5	4.8	1.9	6.0
29-Jan	4.4	4.1	2.8	1.2	0.2	0.6	1.4	1.3	1.1	1.1	1.7	2.8	3.8	4.8	5.3	4.7	3.3	2.0	1.8	1.5	1.2	0.3	0.0	-0.5	2.1	5.3
30-Jan	-1.2	-1.3	-1.5	-1.7	-2.1	-2.2	-1.8	-2.2	-2.6	-2.8	-2.3	-1.6	-0.8	-1.4	-1.3	-1.6	-2.3	-3.1	-3.6	-4.4	-5.7	-7.8	-8.6	-8.9	-3.0	-0.8
31-Jan	-9.0	-9.0	-9.4	-10.1	-10.3	-10.6	-10.8	-11.0	-11.4	-11.4	-11.6	-12.1	-12.4	-12.3	-13.1	-13.9	-14.4	-14.8	-15.4	-15.7	-15.8	-16.2	-16.5	-16.9	-12.7	-9.0
	-13.2	-13.3	-13.3	-13.5	-13.5	-13.6	-13.5	-13.5	-13.4	-13.0	-12.0	-10.8	-9.8	-9.1	-9.0	-9.7	-10.8	-11.6	-12.0	-12.2	-12.4	-12.9	-13.2	-13.4	Diurnal Average	
	4.4	4.1	3.6	3.7	3.9	3.2	3.0	2.4	1.6	1.7	2.6	3.4	4.2	4.9	5.3	4.7	4.2	5.0	5.5	5.7	6.0	5.8	5.5	4.8	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Anzac - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	115	15.46	15.46
-20 - 0	550	73.92	89.38
0 - 10	79	10.62	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Anzac - January 2016

Maximum Value: 97 % on Jan 29 06:00

Maximum Daily Average: 90.4 % on Jan 23

Minimum Value: 36 % on Jan 3 14:00

Minimum Daily Average: 56.2 % on Jan 1

Maximum Diurnal Average: 82.0 % at hour 5

Minimum Diurnal Average: 73.7 % at hour 14

Monthly Average: 79.8 %

Percentiles: $P_1 = 50$ $P_{10} = 68$ $Q_1 = 75$ Median = 82 $Q_3 = 86$ $P_{90} = 90$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

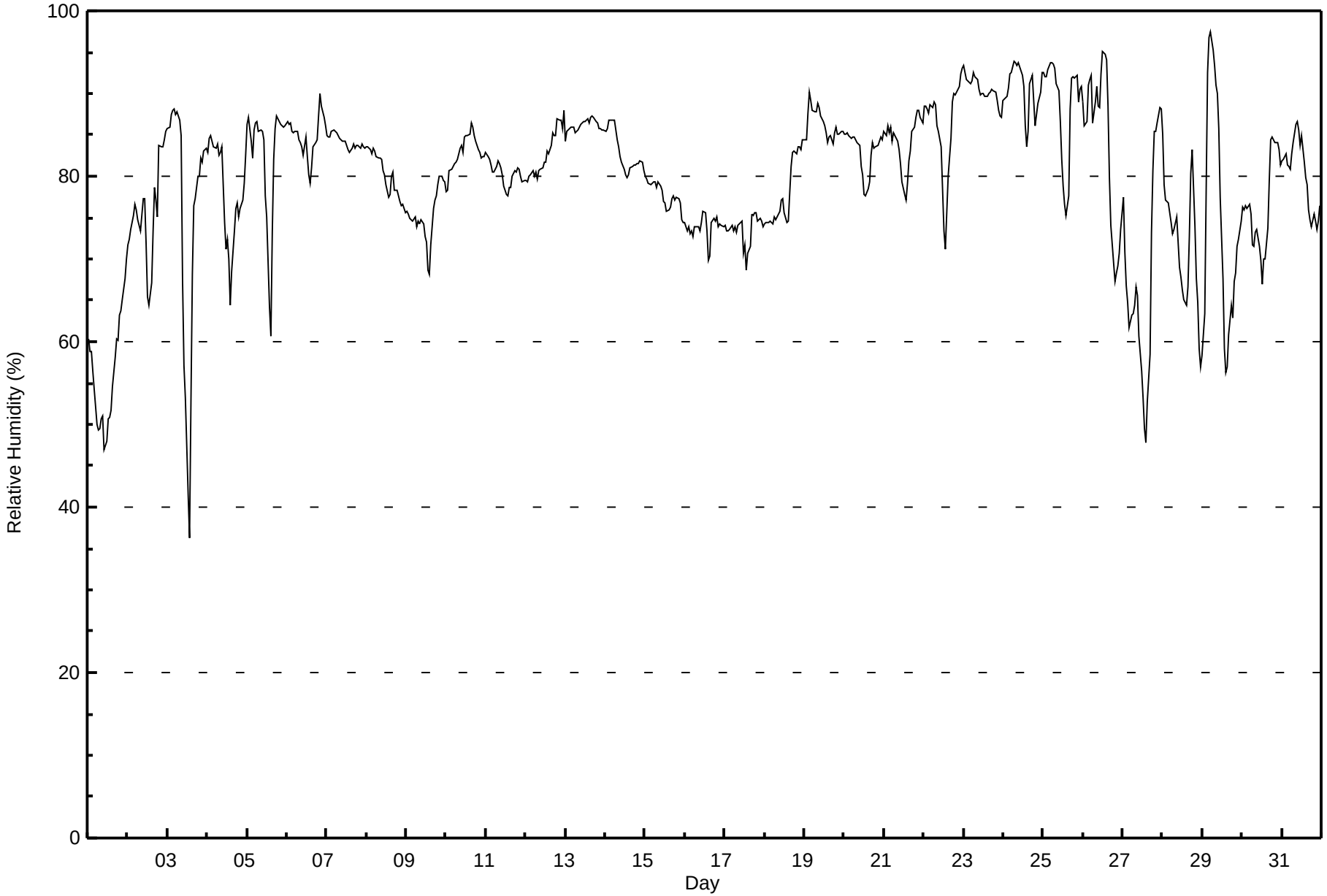
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	60	59	59	56	54	50	49	49	51	51	47	48	51	51	52	55	58	60	60	63	64	65	68	70	56.2	70
2-Jan	72	72	74	75	77	76	75	74	73	77	77	72	65	64	67	73	79	77	75	84	83	84	84	85	75.7	85
3-Jan	86	86	87	88	88	87	88	87	85	68	57	53	42	36	53	68	77	77	80	80	82	82	83	83	75.1	88
4-Jan	83	85	85	84	84	83	84	83	83	84	74	71	72	70	64	68	73	76	77	75	76	77	79	82	78.1	85
5-Jan	86	87	84	82	86	86	87	85	86	85	84	78	75	64	61	73	82	86	87	87	86	86	86	86	82.3	87
6-Jan	87	86	86	85	85	86	85	84	84	83	83	85	82	80	79	81	84	84	84	87	90	88	87	86	84.7	90
7-Jan	85	85	85	85	86	85	85	85	85	84	84	84	84	83	83	83	84	83	84	84	83	84	84	83	84.2	86
8-Jan	84	83	83	83	83	83	82	82	82	82	81	80	79	78	78	80	81	78	78	78	77	77	77	76	80.2	84
9-Jan	76	75	75	75	75	75	74	75	74	75	74	73	72	69	68	72	76	77	78	79	80	80	79	79	75.2	80
10-Jan	78	78	81	81	81	81	82	82	83	84	83	85	85	85	85	86	86	85	84	83	83	82	82	82	82.9	86
11-Jan	83	82	82	81	81	81	81	82	82	81	80	79	78	78	79	79	80	81	80	81	81	80	79	79	80.4	83
12-Jan	80	79	80	80	81	80	81	80	81	81	81	82	82	83	83	84	85	85	85	87	87	87	86	88	82.7	88
13-Jan	84	85	86	86	86	86	85	86	86	86	86	87	87	87	86	87	87	87	87	87	86	86	86	86	86.1	87
14-Jan	85	86	87	87	87	87	86	84	83	82	82	81	80	80	80	81	81	81	81	82	82	82	82	81	82.9	87
15-Jan	80	80	79	79	79	79	79	79	79	79	78	77	77	76	76	76	77	78	77	77	77	77	75	74	77.7	80
16-Jan	74	73	74	73	73	73	74	74	74	73	74	76	76	73	70	70	74	75	75	75	74	74	74	74	73.8	76
17-Jan	74	73	73	74	74	73	74	73	74	74	75	71	72	69	71	71	75	75	76	76	75	75	75	74	73.5	76
18-Jan	74	74	74	75	74	74	75	75	75	76	77	77	76	74	75	78	81	83	83	83	84	84	83	84	77.9	84
19-Jan	84	84	88	90	89	88	88	88	89	88	87	87	86	85	84	85	85	84	85	86	85	85	85	85	86.3	90
20-Jan	85	85	85	85	85	85	85	84	84	84	81	80	78	78	79	79	82	84	83	84	84	84	85	84	83.0	85
21-Jan	85	85	86	85	86	84	85	85	84	83	82	79	78	77	79	82	83	85	86	87	88	88	87	86	84.0	88
22-Jan	89	88	88	88	89	88	89	89	86	85	83	79	73	71	76	80	85	89	90	90	90	91	92	93	85.9	93
23-Jan	93	93	92	91	91	92	93	92	92	90	90	90	90	90	90	90	90	90	90	90	89	88	87	87	90.4	93
24-Jan	89	90	90	91	92	93	94	94	93	94	93	92	91	86	84	85	91	92	89	86	87	89	90	93	90.3	94
25-Jan	93	92	92	93	94	94	94	93	91	90	87	82	79	77	75	78	88	92	92	92	92	89	90	91	88.7	94
26-Jan	89	86	87	91	92	92	87	89	91	89	88	92	95	95	94	88	80	74	70	67	68	69	71	74	84.0	95
27-Jan	77	71	67	65	62	63	63	64	67	66	61	56	53	50	48	53	59	73	81	85	85	87	88	88	68.0	88
28-Jan	85	79	77	77	76	74	73	74	75	72	69	68	66	65	64	67	73	80	83	74	68	65	59	57	71.6	85
29-Jan	58	63	78	93	97	97	95	93	91	90	86	78	68	59	56	57	61	64	63	67	68	72	72	75	75.1	97
30-Jan	76	76	76	76	77	75	72	72	73	74	71	70	67	70	70	74	79	84	85	84	84	84	83	81	76.4	85
31-Jan	82	82	83	81	81	81	83	84	86	87	86	84	85	82	80	79	76	75	74	76	75	74	75	77	80.2	87
	81.2	80.8	81.4	81.8	82.0	81.7	81.5	81.2	81.4	80.6	78.8	77.2	75.5	73.7	73.8	76.2	79.1	80.5	80.7	81.1	81.1	81.0	81.1	81.5	Diurnal Average	
	93	93	92	93	97	97	95	94	93	94	93	92	95	95	94	90	91	92	92	92	92	91	92	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Anzac - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	1	0.13	0.13
40 - 60	32	4.30	4.44
60 - 80	283	38.04	42.47
80 - 100	428	57.53	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 74 % on Jan 29 06:00

Maximum Daily Average: 9.7 % on Jan 29

Minimum Value: 0 % on Jan 3 14:00

Minimum Daily Average: 0.3 % on Jan 1

Maximum Diurnal Average: 4.0 % at hour 6

Minimum Diurnal Average: 1.5 % at hour 20

Monthly Average: 2.0 %

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 2 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 12$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

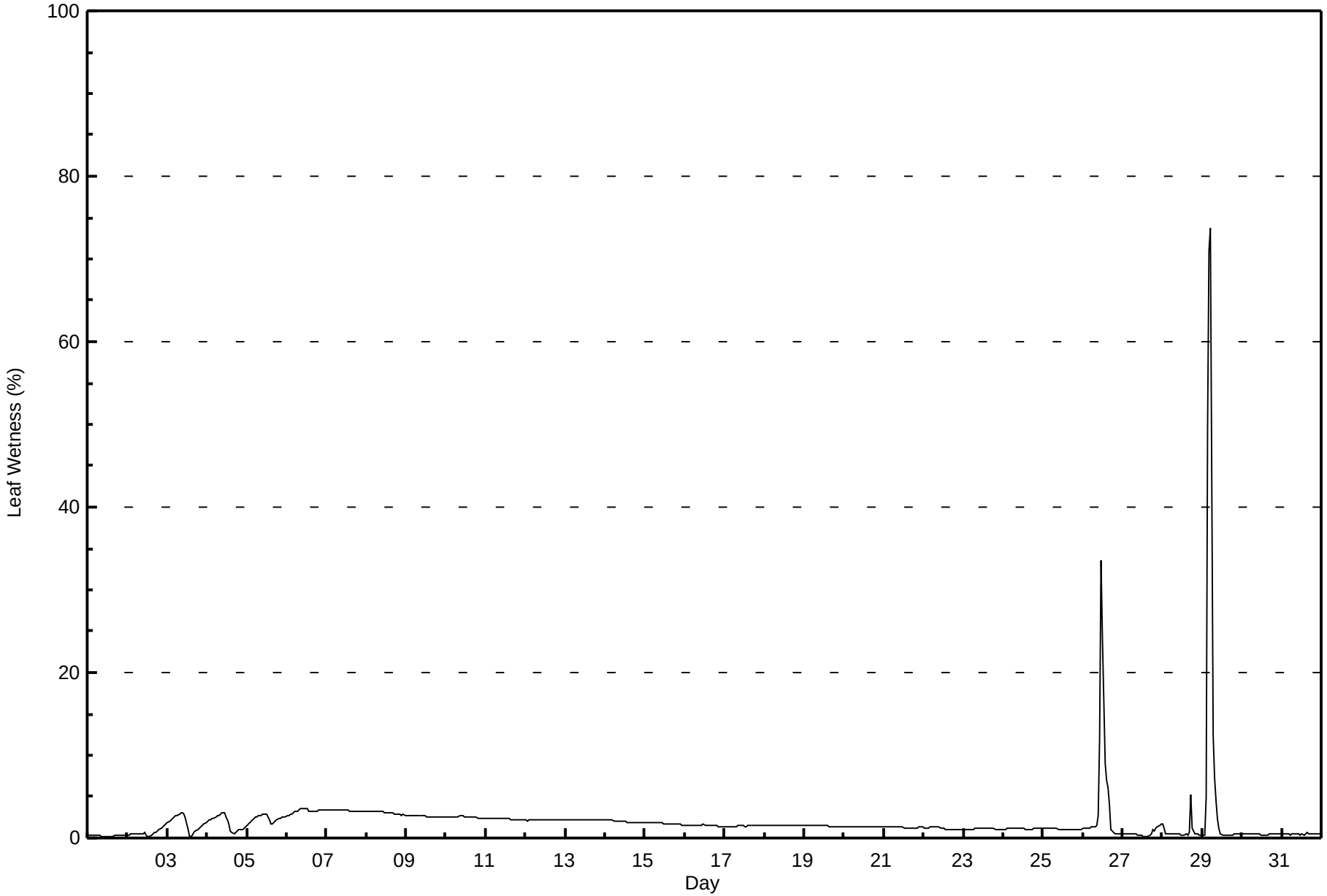
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	2	0.7	2
3-Jan	2	2	2	2	3	3	3	3	3	3	3	2	1	0	0	0	1	1	1	1	1	2	2	2	1.8	3
4-Jan	2	2	2	2	2	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1.8	3
5-Jan	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	3	3	2.3	3
6-Jan	3	3	3	3	3	3	3	3	3	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3.3	4
7-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.4	3
8-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.1	3
9-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	2	3	3	3	3	3	3	2.6	3
10-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2.5	3
11-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.3	2
12-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	2
13-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	2
14-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
15-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.7	2
16-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1.5	2
17-Jan	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	2	2	2	2	2	2	2	2	1.5	2
18-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	1.6	2
19-Jan	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.5	2
20-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	1
21-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	1
22-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1
23-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1
24-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1
25-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1
26-Jan	1	1	1	1	1	1	1	1	1	3	12	34	24	9	7	6	4	1	1	1	1	1	1	1	4.8	34
27-Jan	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	0.6	2
28-Jan	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	5	1	1	1	0	0	0	0.8	5
29-Jan	0	0	5	49	71	74	12	7	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	9.7	74
30-Jan	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.5	1
31-Jan	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0.5	1
	1.6	1.6	1.8	3.2	3.9	4.0	2.1	1.9	1.9	1.8	2.1	2.7	2.3	1.7	1.6	1.6	1.5	1.6	1.5	1.5	1.5	1.5	1.6	1.6	Diurnal Average	
	3	3	5	49	71	74	12	7	5	4	12	34	24	9	7	6	4	5	3	3	3	3	3	3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (SW) - %

Anzac - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	36	4.84	4.84
0.4 - 0.5	94	12.63	17.47
0.6 - 0.7	25	3.36	20.83
0.8 - 1.4	201	27.02	47.85
1.5 - 10	366	49.19	97.04
> 10	7	0.94	97.98

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Anzac - January 2016

Maximum Speed: 21 km/h on Jan 26 20:00

Maximum Daily Speed Average: 14.2 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 16 01:00

Minimum Daily Speed Average: 0.9 km/h on Jan 23

Maximum Diurnal Speed Average: 2.8 km/h at hour 7

Minimum Diurnal Speed Average: 1.1 km/h at hour 17

Monthly Average Velocity: 1.8 km/h 282.5 deg

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 3$ Median = 5 $Q_3 = 8$ $P_{90} = 12$ $P_{99} = 20$

Hours in Service:	744
Hours of Data:	722
Hours of Missing Data:	22
Percent Operational Time:	97.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	WNW8	WNW11	WNW15	W16	W15	W16	W16	W14	WNW16	WNW16	W15	W16	W12	WNW12	WNW16	WNW17	WNW18	WNW15	WNW17	WNW15	WNW15	WNW13	WNW12	WNW10	WNW14.2	WNW18
2-Jan	WNW9	W12	W12	WNW10	WNW9	WNW9	WNW10	WNW11	WNW9	W5	SSW5	SW3	SSW3	SSW3	S1	SSW4	SW6	SW6	SSW5	SE3	SSE4	SE4	S4	SSE4	WSW4.2	W12
3-Jan	SSW5	S5	S4	S4	S7	S4	S5	S4	S9	S10	S8	SSW8	SSW8	S7	ESE1	E4	S2	AF	WSW0	SW3	ENE1	N3	NNE3	S2	S3.9	S10
4-Jan	S3	SW2	N1	NNW4	NW5	WNW3	WNW6	WNW7	WNW6	WNW6	WNW8	WNW7	WNW8	WNW8	WNW7	WNW8	WNW8	WNW8	WNW9	WNW10	WNW9	WNW8	WNW7	WNW5	WNW6.0	WNW10
5-Jan	WNW6	NW7	WNW8	W5	ENE3	NNE4	WSW4	WSW5	W5	WNW4	W3	WSW4	NW2	W2	NW1	E3	SE3	ESE4	ESE4	SE2	ESE1	SE3	SE4	SE6	W1.1	WNW8
6-Jan	SE5	ESE5	ESE4	SE5	SE5	SE6	SSE6	ESE5	ESE5	ESE5	SE5	SSE5	ESE6	ESE6	SE4	SSE1	SSW3	W0	NNW1	NNW3	NNW2	NNW2	NW4	NW4	SE2.5	ESE6
7-Jan	NW4	NW5	NW5	NW4	NNW5	NNW5	NNW5	NNW4	N4	N3	NNW3	NNW3	NNW4	NW4	NNW4	NW4	NNW3	NNW4	NW3	NW2	WNW1	W2	SW4	WSW2	NW3.2	NW5
8-Jan	SW0	N1	E1	ESE2	NE2	E2	NE1	NE1	NE2	NE2	ENE2	NE3	ENE3	ESE2	SSE2	SSE2	SSE2	ESE4	SSE4	SSE4	SSW2	S1	SSE4	S4	ESE1.3	ESE4
9-Jan	S3	S3	S2	SE1	SSE2	SSW2	AF	SE1	SSE2	S1	S2	AF	SSE1	ESE1	SE2	SE3	SE4	AF	SSE2	SSW0	SSW2	S2	S2	SSE1	SSE1.7	SE4
10-Jan	S1	SSE2	S2	SSW1	AF	WSW1	SSE1	SW0	NW2	WNW7	WNW12	WNW11	NW9	NNW11	NNW11	NNW9	NNW10	NNW10	NNW10	NNW11	NNW10	NNW7	NW6	NW8	NW5.6	WNW12
11-Jan	NW8	NNW11	NNW11	NNW12	NNW10	NNW9	NW8	NW7	NW7	NW8	NW8	NW7	NW6	WNW5	WNW7	WNW6	WNW6	W5	SSW3	S4	S5	S6	SSE6	S6	NW4.8	NNW12
12-Jan	S6	S6	SSE6	S7	SSE6	SSE6	SE6	SE6	SE5	SE5	SE6	SSE4	ESE3	E4	SE4	ESE2	E3	ESE3	SE3	SSE7	SSE6	SE5	SSE4	S7	SSE4.6	S7
13-Jan	SSE5	SE6	SE6	ESE8	SE8	SE9	SE8	SE7	SE7	SE6	SE7	SE8	SSE6	SE6	ESE7	ESE6	E6	ESE6	E6	E7	E5	E6	E5	ENE4	ESE6.0	SE9
14-Jan	ENE3	NE3	NNE4	NNE3	N3	N4	NW5	NW7	NW6	NW6	NW5	NW6	NW6	NNW6	NW7	NNW6	NNW7	NNW6	NNW6	NNW5	NNW4	N4	NE6	NE6	NNW4.5	NW7
15-Jan	NE5	NNE4	NNE3	N1	NW2	NW1	NNW2	N1	N2	NNW2	N2	NNE2	WSW0	W1	W2	AF	AF	NE0	NE1	ENE2	E3	E5	SE3	AF	NNE1.3	E5
16-Jan	S0	E1	AF	AF	WSW2	NW3	WNW4	NW4	WNW2	AF	WNW1	NW2	WNW3	WNW3	WNW2	N2	N1	AF	AF	AF	AF	SW2	AF	AF	----	WNW4
17-Jan	S1	WSW1	SW1	SSW1	S1	SE2	S3	S2	SSW2	SSW2	S3	SE4	ESE5	SE6	SE5	SE8	SE9	SSE11	SE11	SE11	SE13	SE11	SE12	SE11	SE5.3	SE13
18-Jan	SE11	SE11	SE14	SE12	SE12	SE11	SE10	SE9	SE9	SE8	SE9	SE9	SE10	SSE8	SSE8	ESE5	E6	E5	E4	SE2	SE1	AF	AF	S2	SE7.7	SE14
19-Jan	SW1	W2	W3	WNW3	WNW4	NW4	WNW4	NW4	NNW3	NNW3	NNW3	NW2	NW3	NNW3	N4	N4	N3	N3	NNW3	NW3	NNW3	NW2	NW2	NW3	NW2.7	WNW4
20-Jan	NNW3	NNW3	NNW4	NNW4	NNW4	NW4	NW3	NNW2	N2	N1	NE1	SE3	SE4	ESE5	ESE5	ESE5	SE6	SSE8	SSE9	SSE8	SSE8	SSE7	SSE7	SE5	SE2.0	SSE9
21-Jan	SE6	SSE5	S4	SSE5	SSE6	SSE7	SSE8	SE9	SSE11	SE11	SE9	SE8	SE9	SE10	SE13	SE14	SE14	SE16	SE16	SE15	SE11	SE7	SE9	SSE7	SE9.5	SE16
22-Jan	S5	S5	S5	NE1	SSE1	AF	WNW4	NW8	NW6	NW7	NW5	SW2	NW3	N5	N5	N6	NNE6	NNE5	NNE3	N2	NNE3	NNE3	NNE4	NNE4	NNW2.3	NW8
23-Jan	NNE4	NNE4	NNE3	NNE3	NNW3	N4	NNE2	WNW1	NNE1	ENE1	ESE3	SSE3	S2	S1	ESE2	E3	ESE2	ESE2	SE3	SSE4	S4	S3	AF	AF	E0.9	NNE4
24-Jan	S5	S5	SSE4	S5	S3	W3	NW5	WNW8	WNW8	WNW8	WNW8	WNW8	WNW7	WNW7	WNW7	WSW6	SW2	WNW5	WNW10	WNW11	WNW11	NW11	NW12	NNW11	WNW5.5	NW12
25-Jan	NW7	NW6	NW5	NNW5	NW5	WNW5	WNW4	SW2	SSE4	SE7	SSE8	SSE8	SSE7	SE8	SSE8	SSE6	S7	SSW7	SSW7	SSW7	SSW5	SW4	W6	W5	SSW2.7	SSE8
26-Jan	WSW7	WNW8	WNW7	W2	NW3	WNW4	W7	W6	WNW5	W7	WSW9	W7	SSE2	SE4	S3	W9	W14	W19	W20	W21	W20	W20	WNW21	WNW18	W9.3	W21
27-Jan	WNW19	WNW18	WNW20	WNW18	WNW20	WNW15	WNW16	WNW14	WNW15	WNW14	WNW15	WNW14	WNW15	NW14	NW11	WNW7	W5	WSW3	SW2	SSE1	SE1	SE4	SSE5	SE4	WNW9.9	WNW20
28-Jan	SE7	SE6	SE7	SE9	SSE10	SE10	SSE11	SSE10	SSE9	SSE9	SSE8	SSE6	ESE5	ESE5	SE2	ESE1	SW1	S3	SW3	W16	W20	W18	W19	W19	SSW4.2	W20
29-Jan	W20	W19	WNW17	WNW15	WNW12	WNW13	NW16	NW16	WNW16	WNW15	WNW15	WNW15	NW16	NW13	NW11	NW13	WNW10	NW9	WNW10	WNW12	WNW12	WNW12	WNW13	WNW12	WNW13.6	W20
30-Jan	WNW9	WNW11	WNW11	WNW12	WNW10	WNW10	WNW12	WNW10	WNW10	WNW10	WNW12	WNW11	WNW10	NW8	NW9	NNW7	N6	N7	NNW7	NNW9	NNW10	N10	N8	NNW7	NW8.4	WNW12
31-Jan	NNW6	N5	N5	NE5	NNE5	NNE6	NNE5	NNE4	N6	N6	N8	N8	NW6	NNW10	NNW11	NNW10	NNW8	NNW9	N9	NNW7	NNW9	NNW9	N7	N5	N6.7	NNW11
	W2.1	W2.3	WNW2.3	WNW1.8	WNW1.7	WNW1.9	W2.8	WNW2.7	WNW2.3	W2.2	W2.2	W2.1	WNW1.6	NW1.1	NW1.3	NW1.3	WNW1.1	WNW1.2	W1.4	W2.0	WNW2.0	WNW1.7	W1.9	W1.9	Diurnal Average	
	W20	W19	WNW20	WNW18	WNW20	W16	NW16	NW16	WNW16	WNW16	W15	W16	NW16	NW14	WNW16	WNW17	WNW18	W19	W20	W21	W20	W20	WNW21	W19	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Anzac - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 26 20:00

Minimum Value: 1 km/h on Jan 20 08:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 1 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 7

Hours in Service:	744
Hours of Data:	722
Hours of Missing Data:	22
Hours of Calibration:	0
Percent Operational Time:	97.0

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

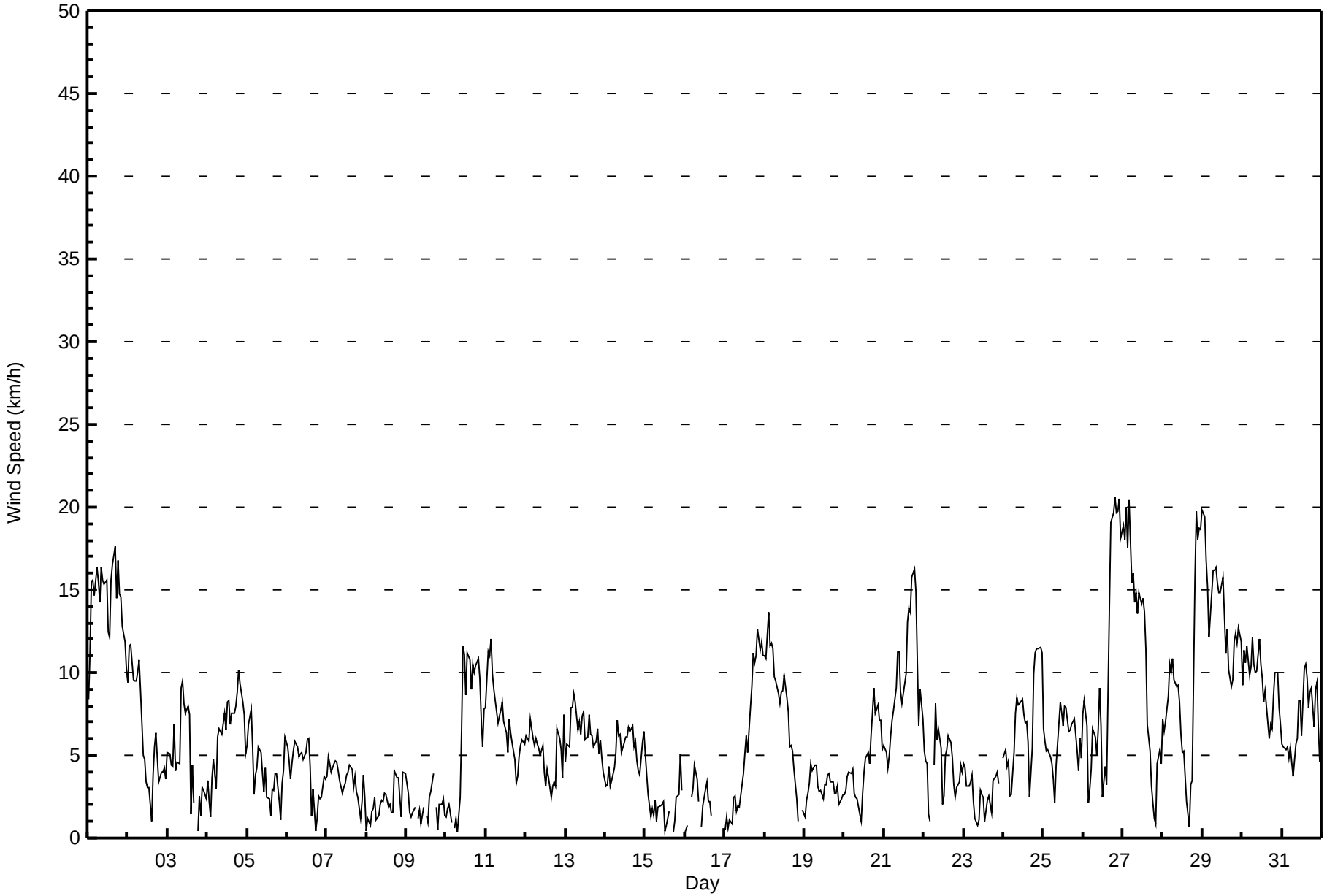
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Anzac - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	373	51.66	51.66
6 - 11	262	36.29	87.95
12 - 19	78	10.80	98.75
20 - 28	9	1.25	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 722

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Anzac - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	26	23	13	8	14	28	35	31	45	17	15	11	16	23	33	35	373
6 - 11	11	2	2	0	5	6	51	34	12	5	2	3	6	60	30	33	262
12 - 19	0	0	0	0	0	0	11	0	0	0	0	0	16	43	7	1	78
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	6	3	0	0	9
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	37	25	15	8	19	34	97	65	57	22	17	14	44	129	70	69	722

Total Number of Valid Hours: 722

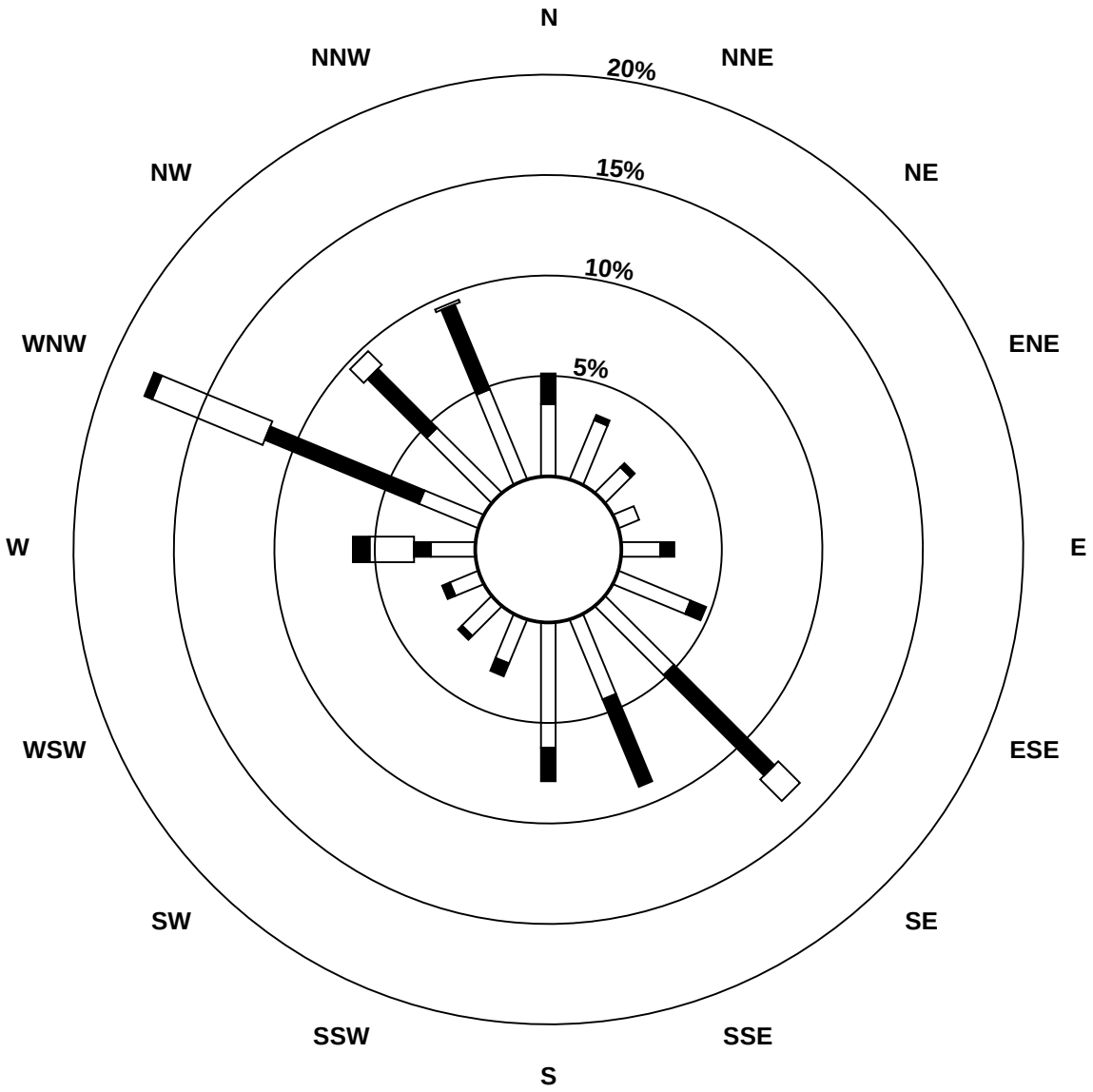
Total Number of Hours: 744

Wood Buffalo Environmental Association

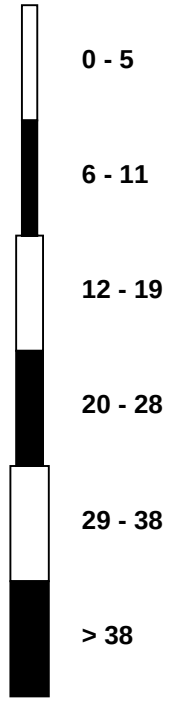
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Anzac (AMS 14)



Classes (km/h)



Total Number of Valid Hours: 722

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Anzac - January 2016

Direction of Maximum Speed: 275 deg on Jan 26 20:00
Direction of Maximum Daily Speed Average: 285.2 deg on Jan 1

Direction of Minimum Speed: 190 deg on Jan 16 01:00

Direction of Minimum Daily Speed Average: 0.9 deg on Jan 23

Monthly Average Direction: 291.8 deg

Hours in Service:	744
Hours of Data:	722
Hours of Missing Data:	22
Percent Operational Time:	97.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	293	289	282	281	279	268	277	278	285	288	276	271	280	282	292	285	290	292	294	295	294	297	294	293	285.2
2-Jan	283	281	280	289	293	292	291	291	286	261	199	219	195	192	176	213	225	218	211	138	153	124	181	149	258.6
3-Jan	193	185	187	172	175	190	185	180	172	174	180	193	203	174	112	93	184	AF	237	217	61	7	32	177	177.9
4-Jan	190	217	5	335	304	292	291	287	291	290	298	297	300	298	294	300	298	300	303	300	296	290	288	282	294.7
5-Jan	300	307	295	273	66	15	257	258	277	288	275	244	325	279	326	87	136	112	114	146	109	127	142	145	268.9
6-Jan	142	122	121	137	124	132	159	108	122	117	129	147	110	111	136	166	196	267	333	334	345	333	326	306	126.5
7-Jan	313	315	313	321	328	334	340	348	11	350	327	345	335	323	339	325	329	339	325	304	285	273	233	257	324.3
8-Jan	236	354	83	122	55	82	52	48	49	35	59	47	76	102	150	167	154	120	154	160	195	190	164	184	119.3
9-Jan	186	183	176	127	167	198	AF	131	162	181	178	AF	163	108	128	126	135	AF	166	198	197	174	180	165	163.0
10-Jan	183	149	175	195	AF	238	160	222	305	293	287	299	309	328	328	327	341	341	340	341	347	333	320	315	321.9
11-Jan	319	332	340	343	335	328	310	318	321	316	312	306	317	297	295	296	293	269	211	173	174	174	166	172	309.0
12-Jan	173	176	168	169	166	152	144	141	135	140	134	150	116	86	136	106	90	123	125	157	149	139	148	175	147.3
13-Jan	147	124	133	106	133	124	128	140	133	134	128	127	147	133	121	117	99	102	91	79	90	86	81	74	117.5
14-Jan	69	39	24	15	3	351	317	325	321	309	317	317	324	337	325	331	336	335	331	335	342	357	41	43	342.4
15-Jan	39	30	23	1	324	324	330	351	351	327	350	32	250	272	276	AF	AF	56	47	72	86	95	133	AF	28.7
16-Jan	190	83	AF	AF	255	306	303	308	302	AF	296	304	295	297	291	352	9	AF	AF	AF	AF	222	AF	AF	--
17-Jan	191	245	219	213	174	138	181	187	192	192	177	132	113	133	144	135	128	147	140	139	136	133	136	130	140.6
18-Jan	132	133	130	136	131	127	128	143	132	136	141	133	136	147	150	105	87	84	99	129	137	AF	AF	183	130.9
19-Jan	215	261	280	297	302	305	293	307	330	345	348	326	304	348	359	358	350	350	335	312	345	319	315	324	321.8
20-Jan	335	346	341	339	338	324	323	340	350	353	54	140	131	107	104	123	133	152	157	155	150	159	158	144	132.8
21-Jan	145	152	180	148	150	158	155	146	150	142	132	133	130	129	131	143	142	143	140	139	136	135	135	154	141.8
22-Jan	187	179	171	46	154	AF	290	308	316	324	320	221	319	3	3	360	24	27	16	359	27	22	29	29	348.4
23-Jan	25	33	28	12	334	350	26	300	17	73	122	151	175	171	110	99	111	109	139	166	171	188	AF	AF	87.7
24-Jan	176	178	164	173	180	269	308	301	294	295	290	290	290	290	290	246	215	287	283	292	300	305	324	327	287.8
25-Jan	317	307	321	332	322	301	284	232	152	145	149	163	150	139	149	157	178	193	199	208	210	216	269	263	200.0
26-Jan	258	284	283	263	320	285	264	280	283	263	256	262	164	137	182	259	278	278	270	275	277	273	283	291	273.4
27-Jan	289	286	283	291	299	296	296	296	300	298	299	298	302	305	305	301	278	256	230	156	128	134	159	145	292.4
28-Jan	142	134	135	139	151	145	156	159	168	165	156	147	106	113	144	107	222	176	219	278	279	273	269	269	198.1
29-Jan	272	276	284	288	298	300	304	309	303	302	296	301	305	306	313	308	302	304	299	295	293	289	296	292	296.4
30-Jan	298	298	295	293	301	293	287	287	293	294	297	298	303	311	313	339	0	358	346	345	347	1	353	348	312.9
31-Jan	343	2	11	39	33	23	27	15	11	359	3	2	323	337	347	338	338	344	351	344	338	347	351	350	353.9
	262.0	278.4	281.4	289.5	290.6	289.7	279.0	284.6	284.6	279.0	271.4	269.7	284.2	307.7	311.9	308.8	298.2	285.8	269.8	274.3	284.3	284.7	278.7	272.7	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Anzac - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 96 deg on Jan 10 08:00

Minimum Value: 6 deg on Jan 16 05:00

Percentiles: P_1 = 11 P_{10} = 16 Q_1 = 19 Median = 23 Q_3 = 28 P_{90} = 43 P_{99} = 84

Hours in Service:	744
Hours of Data:	722
Hours of Missing Data:	22
Hours of Calibration:	0
Percent Operational Time:	97.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	26	32	27	25	26	26	33	32	27	25	26	26	28	30	26	26	27	28	30	30	26	23	24	25	33
2-Jan	24	20	20	22	19	21	22	20	19	32	15	27	16	52	80	12	12	19	35	35	28	31	23	19	80
3-Jan	19	13	14	15	10	14	12	12	9	11	13	20	19	15	64	32	58	AF	93	79	61	51	40	92	93
4-Jan	51	21	86	19	25	22	20	21	22	20	24	23	22	23	19	22	22	22	20	20	20	20	19	19	86
5-Jan	13	14	19	18	41	34	30	22	21	32	45	16	34	38	34	37	28	28	28	43	55	21	16	16	55
6-Jan	19	28	37	30	21	25	22	26	20	20	27	23	28	27	25	69	12	60	15	27	21	24	18	23	69
7-Jan	22	22	24	22	20	19	19	22	26	29	25	24	23	23	21	21	21	20	24	32	49	45	33	36	49
8-Jan	91	30	69	54	44	37	61	38	38	24	32	30	31	45	44	63	72	15	19	19	19	66	14	21	91
9-Jan	14	51	52	41	25	46	AF	39	24	56	16	AF	59	40	28	24	10	AF	24	82	27	51	31	50	82
10-Jan	80	48	60	71	AF	73	65	96	35	31	25	23	24	17	17	18	16	17	16	16	16	20	22	20	96
11-Jan	20	16	16	17	17	17	20	19	17	20	23	24	25	32	24	26	26	34	21	16	19	12	12	11	34
12-Jan	13	14	18	15	16	20	22	21	21	22	23	27	25	27	41	31	50	23	38	23	32	28	39	14	50
13-Jan	28	21	24	18	21	18	19	22	17	18	18	19	24	20	19	22	23	23	26	22	26	22	22	22	28
14-Jan	22	25	22	23	19	18	22	19	19	20	23	20	19	16	18	18	18	16	17	16	17	23	23	21	25
15-Jan	23	23	27	25	16	22	17	26	17	17	18	24	64	62	25	AF	AF	31	30	10	28	16	16	AF	64
16-Jan	93	40	AF	AF	6	21	16	16	28	AF	32	41	26	24	36	24	13	AF	AF	AF	AF	9	AF	AF	93
17-Jan	83	33	66	55	57	18	22	61	16	26	28	16	25	18	32	16	18	20	21	18	18	21	20	21	83
18-Jan	20	21	20	27	22	20	23	18	18	20	22	22	20	23	20	31	27	19	23	34	59	AF	AF	23	59
19-Jan	48	26	32	27	27	25	26	22	23	24	24	30	27	26	21	17	12	13	14	18	22	18	20	18	48
20-Jan	16	16	18	16	17	16	18	21	22	19	50	43	25	23	23	17	13	15	14	15	16	17	18	17	50
21-Jan	18	18	18	18	15	17	21	16	14	17	19	21	19	21	17	19	20	18	21	22	22	17	15	38	38
22-Jan	21	20	17	62	68	AF	32	20	23	18	27	78	61	29	19	17	22	25	29	32	22	22	21	23	78
23-Jan	21	24	24	23	16	19	35	27	34	26	19	19	27	62	18	18	16	51	18	17	16	15	AF	AF	62
24-Jan	26	18	16	16	43	55	23	26	30	26	28	29	29	28	26	30	31	20	23	27	25	23	19	16	55
25-Jan	20	22	22	21	23	36	38	53	23	21	22	23	25	18	18	21	15	17	15	12	15	25	21	32	53
26-Jan	23	29	23	50	50	41	24	24	26	26	27	24	46	23	30	29	29	30	29	30	29	28	28	27	50
27-Jan	28	27	27	28	23	25	25	26	23	24	24	26	22	22	23	22	21	28	83	59	88	30	20	21	88
28-Jan	19	17	17	18	15	16	16	17	18	17	15	20	24	30	69	79	84	23	29	26	28	29	28	26	84
29-Jan	28	28	29	28	25	25	23	22	23	23	24	25	24	23	25	23	21	23	24	25	26	25	26	24	29
30-Jan	25	22	24	24	23	27	25	25	24	24	23	23	28	21	22	18	17	17	19	18	19	20	18	17	28
31-Jan	20	16	30	21	22	21	25	27	21	20	20	20	30	19	18	18	18	19	19	17	17	16	16	17	30
	93	51	86	71	68	73	65	96	38	56	50	78	64	62	80	79	84	60	93	82	88	66	40	92	
	Diurnal Maximum																								

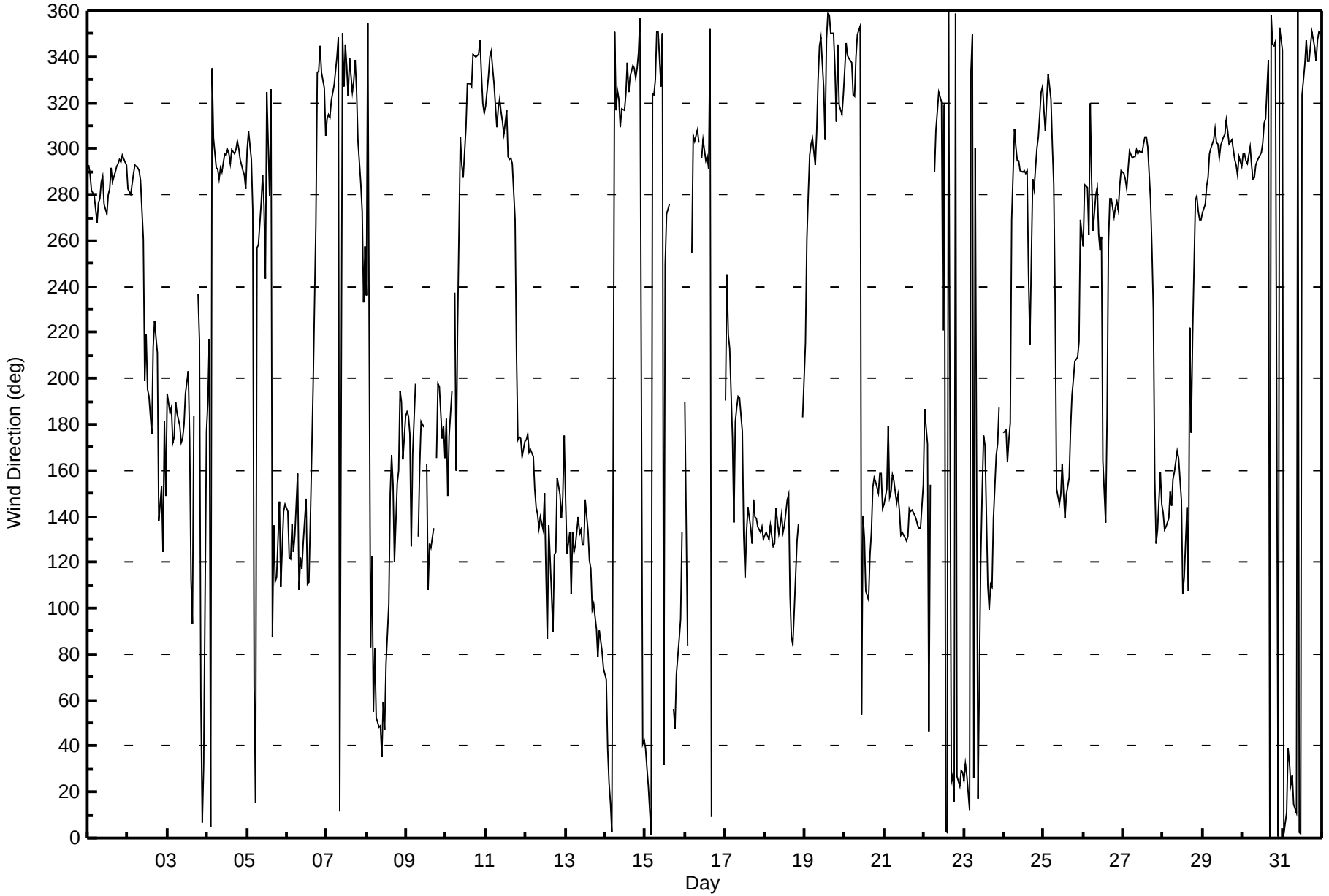
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Anzac - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

Anzac - January 2016

Maximum Value: 1.5 mm on Jan 29 05:00

Maximum Daily Total: 2.5 mm on Jan 29

Minimum Value: 0.0 mm on Jan 1 01:00

Minimum Daily Total: 0.0 mm on Jan 1

Maximum Diurnal Total: 1.5 mm at hour 5

Minimum Diurnal Total: 0.0 mm at hour 1

Monthly Total: 4.83 mm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.0 P_{99} = 0.3

Hours 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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Jan	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	0.0	0.0
16-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.3	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.5
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Jan	0.0	0.0	0.0	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5
30-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	0.3	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0.0	0.0	0.0	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.3	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Maximum	

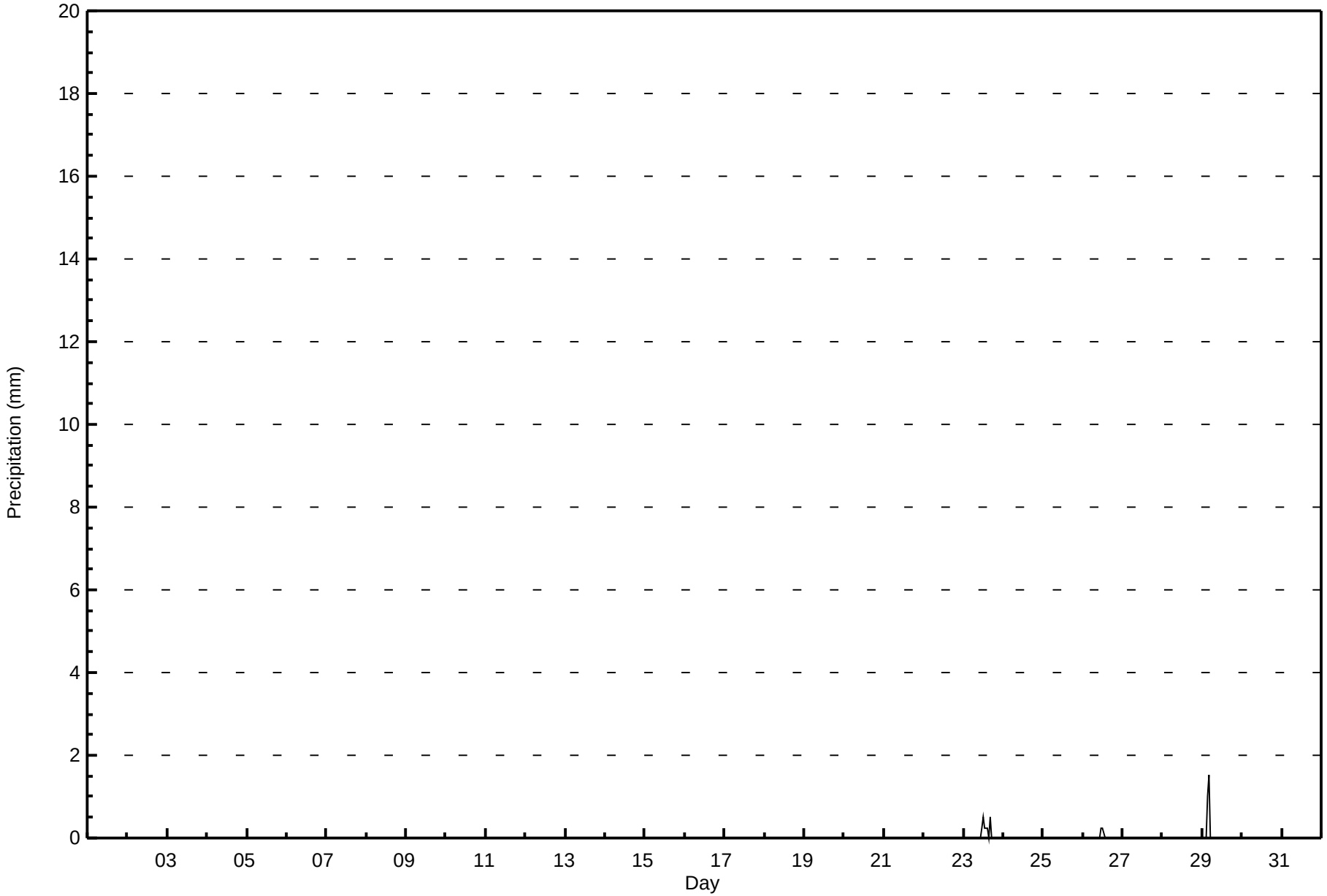
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Anzac - January 2016



14-93

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 5, 2016	Last Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:37
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	2639	2607
Calculated slope	0.997143	1.002282	Chamber temp	50.0	50.0
Calculated intercept	1.857119	1.795576	Pressure	25.0	25.1
Analyzer Background	19.4	19.4	Flow	651	652
Analyzer Coefficient	1.021	1.021	Intensity	65	64

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	-0.4	----
as found span	5000	74.9	707.1	703.3	1.005
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.9	707.1	705.0	1.003
second point	5000	37.5	354.0	349.1	1.014
third point	5000	18.7	176.5	173.5	1.017
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.9	707.1	692.0	1.022
				Average Correction Factor	1.011

Corrected As found	703.7	Previous response	707.2	% change	0.5%

Notes:

No adjustments done, Filter changed Pump changed out for Preventative maintenance

Calibration Performed By: Melissa Lemay

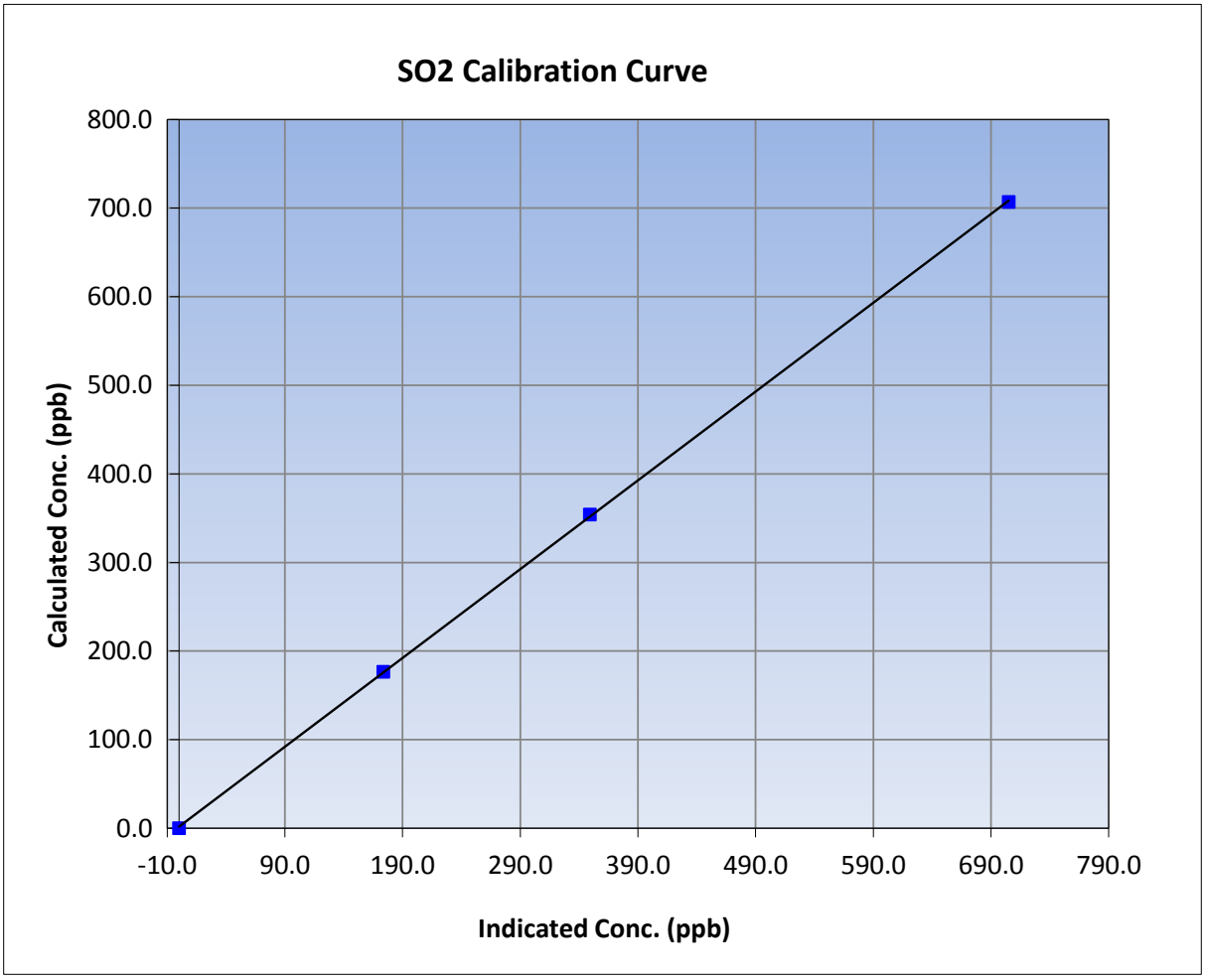
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

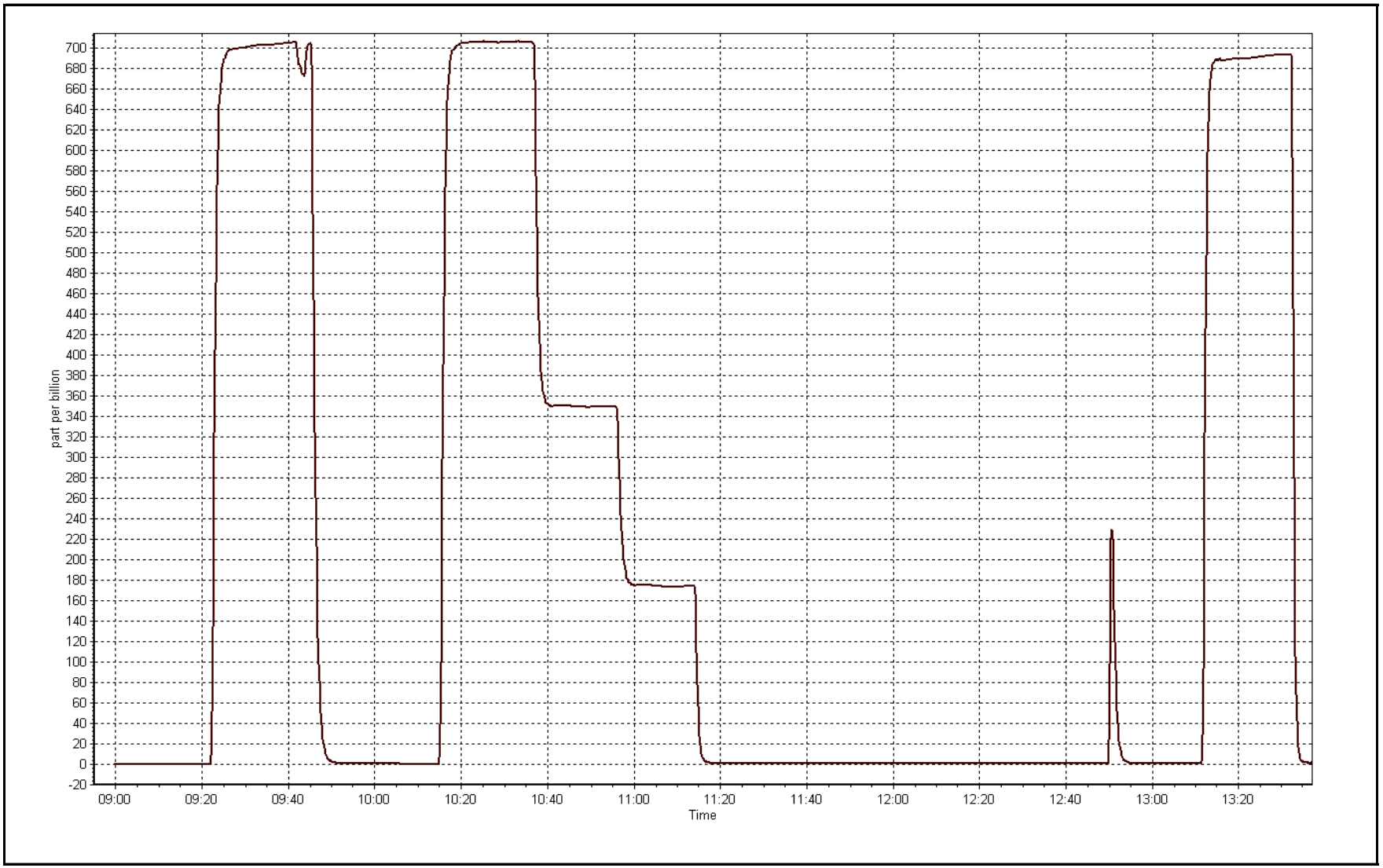
Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	13:37
Analyzer make	API T100	Analyzer serial #	723

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999960
707.1	705.0	1.0029		
354.0	349.1	1.0140	Slope	1.002282
176.5	173.5	1.0175		
			Intercept	1.795576



SO2 Calibration Plot Date: January 5, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 6, 2016	Last Calibration	December 4, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	13:35MST
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	996	997
Calculated slope	0.995268	1.004493	Chamber temp	45	45
Calculated intercept	-0.005219	-0.220240	Pressure	646.8	660.0
Analyzer Background	1.17	1.17	Flow	0.376	0.407
Analyzer Coefficient	1.168	1.168	Intensity	98	98
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1300156232
Converter make/model	CDN-101	Converter serial #	510

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	74.3	75.0	74.8	1.003
SO2 scrubber check	5000	18.7	176.5	0.4	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	74.3	75.0	74.9	1.002
second point	5000	39.6	40.0	40.1	0.997
third point	5000	19.8	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.3	75.0	74.8	1.003
				Average Correction Factor	0.998

Corrected As found	74.6	Previous response	75.4	% change	1.1%

Notes:

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

Calibration Performed By: Melissa Lemay

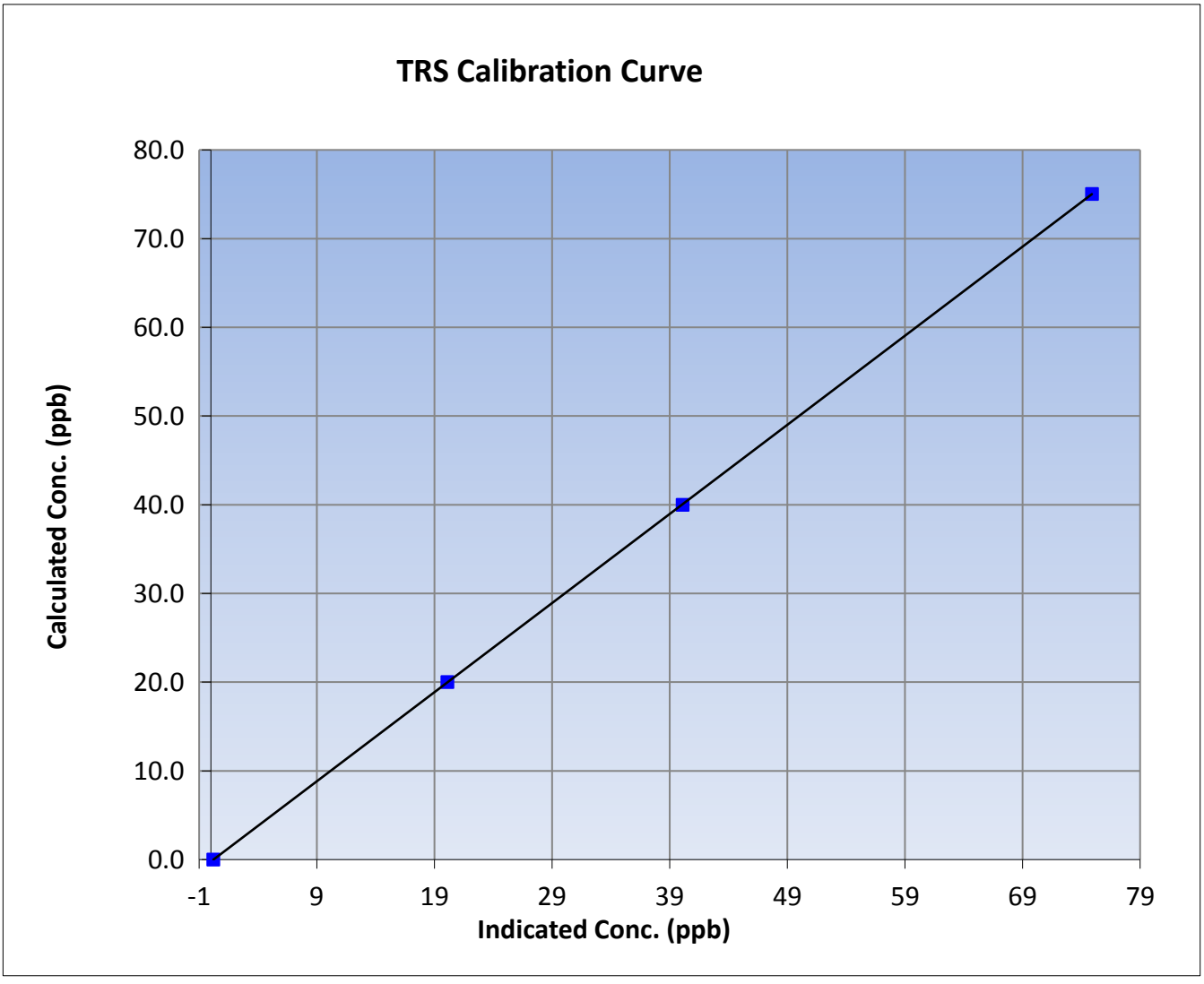
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

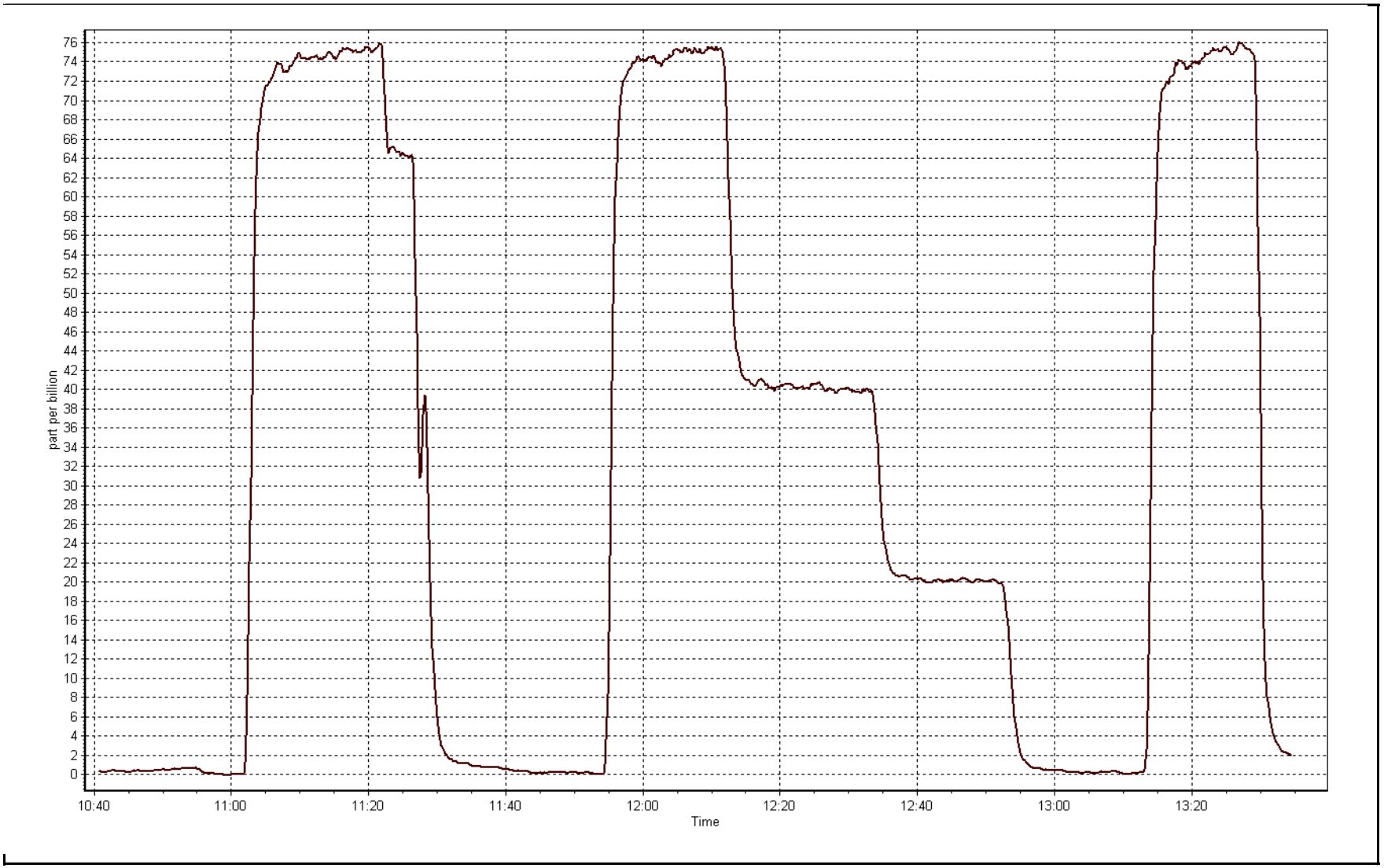
Calibration Date	January 6, 2016	Previous Calibration	December 4, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:45	End Time (MST)	
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999998
75.0	74.9	1.0019		
40.0	40.1	0.9974	Slope	1.004493
20.0	20.1	0.9949		
			Intercept	-0.220240



TRS Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

W B E A

Station Information

Calibration Date	January-05-16	Last Calibration	December-03-15
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:35
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	75.1	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	403.1
THC Calc slope	0.997700	0.990697	Carrier Pressure	31.8	31.8
THC Calc intercept	0.068546	0.053925	Fuel Pressure	41.4	41.4
NMHC Calc slope	0.999306	0.982409	Air Pressure	32.6	32.5
NMHC Calc intercept	0.026161	0.023722			

Analyzer make	Thermo 55i	Analyzer serial #	1218153355

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	74.9	16.36	16.52	0.990
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.50	0.992
second point	5000	37.5	8.19	8.15	1.005
third point	5000	18.7	4.09	4.04	1.011
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.50	0.992
				Average Correction Factor	1.003

Corrected As found	16.52	Previous response	16.33	% change	-1.1%

Notes:

No adjustments done, filter change out, Hydrogen and Nitrogen changed out

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	8.69	8.85	0.982
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.84	0.983
second point	5000	37.5	4.35	4.38	0.994
third point	5000	18.7	2.17	2.17	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.82	0.986
				Average Correction Factor	0.992

Corrected As found	8.85	Previous response	8.67	% change	-2.0%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	7.66	1.001
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.66	1.001
second point	5000	37.5	3.84	3.77	1.019
third point	5000	18.7	1.91	1.87	1.024
as left zero	5000	0.0	0.00	3.00	----
as left span	5000	74.9	7.67	7.68	0.999
				Average Correction Factor	1.015

Corrected As found	7.66	Previous response	7.66	% change	0.0%

Wood Buffalo Environmental Association

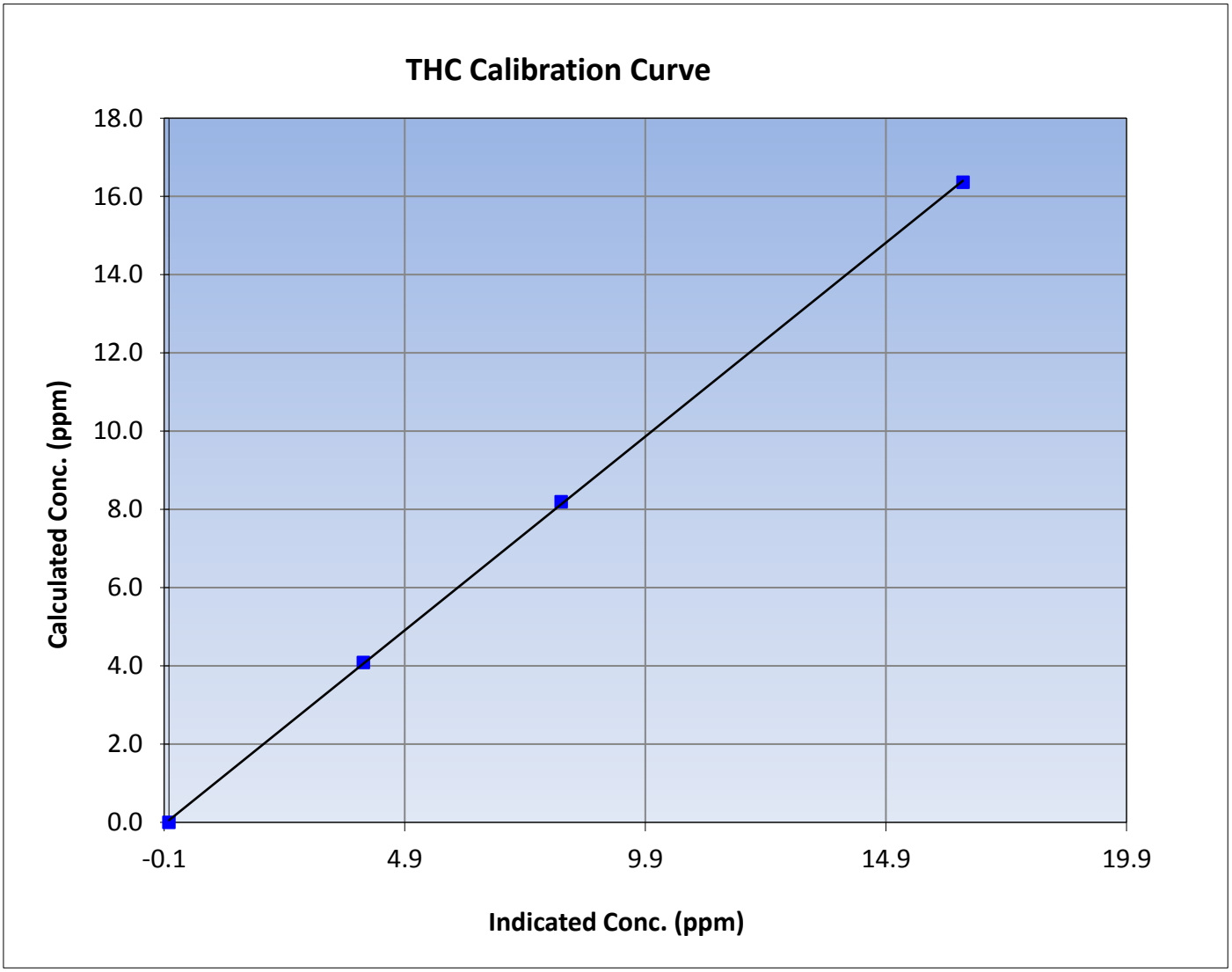
THC Calibration Summary

Station Information

Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999937
16.36	16.50	0.9916		
8.19	8.15	1.0051	Slope	0.990697
4.09	4.04	1.0111		
			Intercept	0.053925



Wood Buffalo Environmental Association

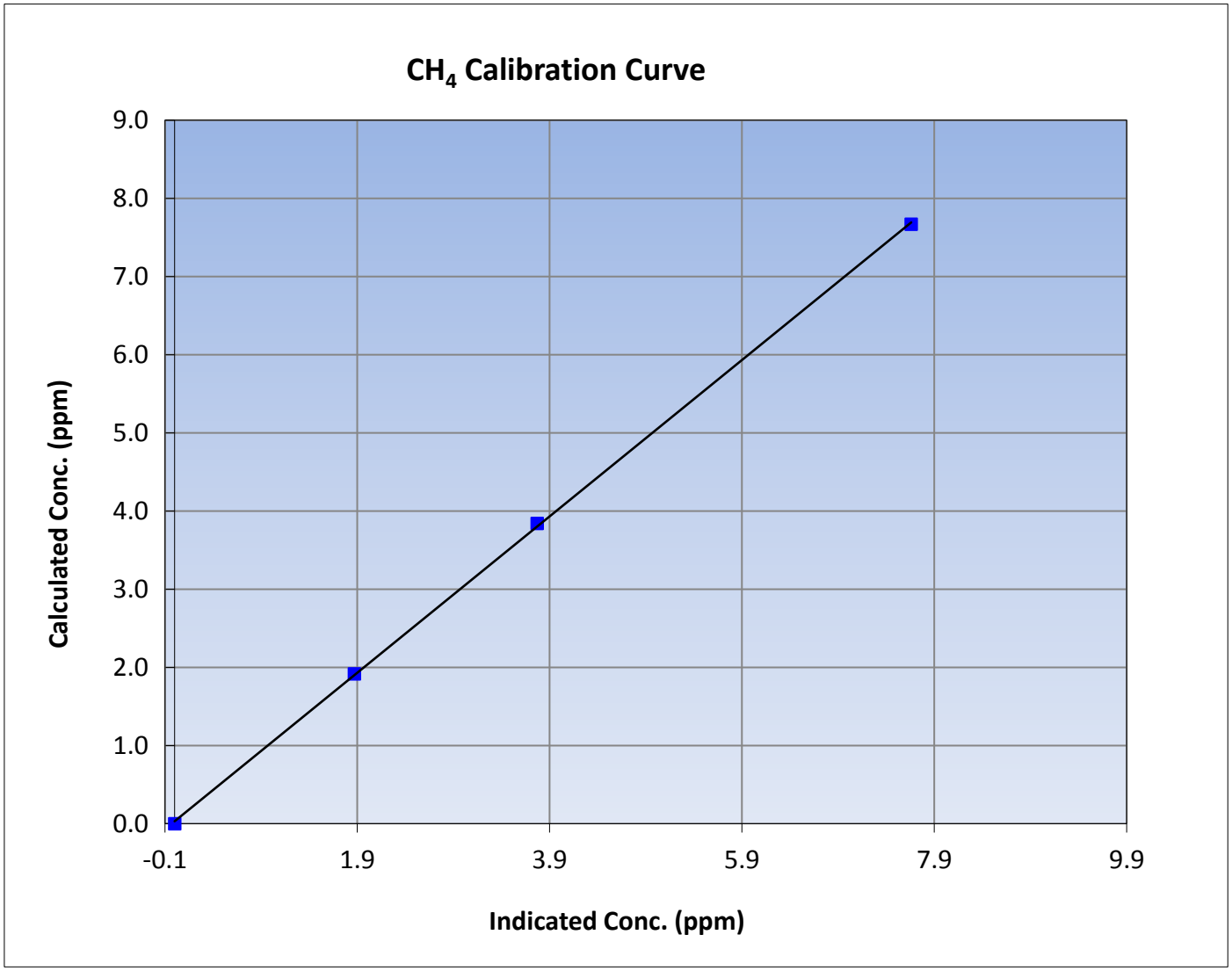
CH_4 Calibration Summary

Station Information

Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999903
7.67	7.66	1.0013		
3.84	3.77	1.0186	Slope	1.000254
1.91	1.87	1.0240		
			Intercept	0.030317



Wood Buffalo Environmental Association

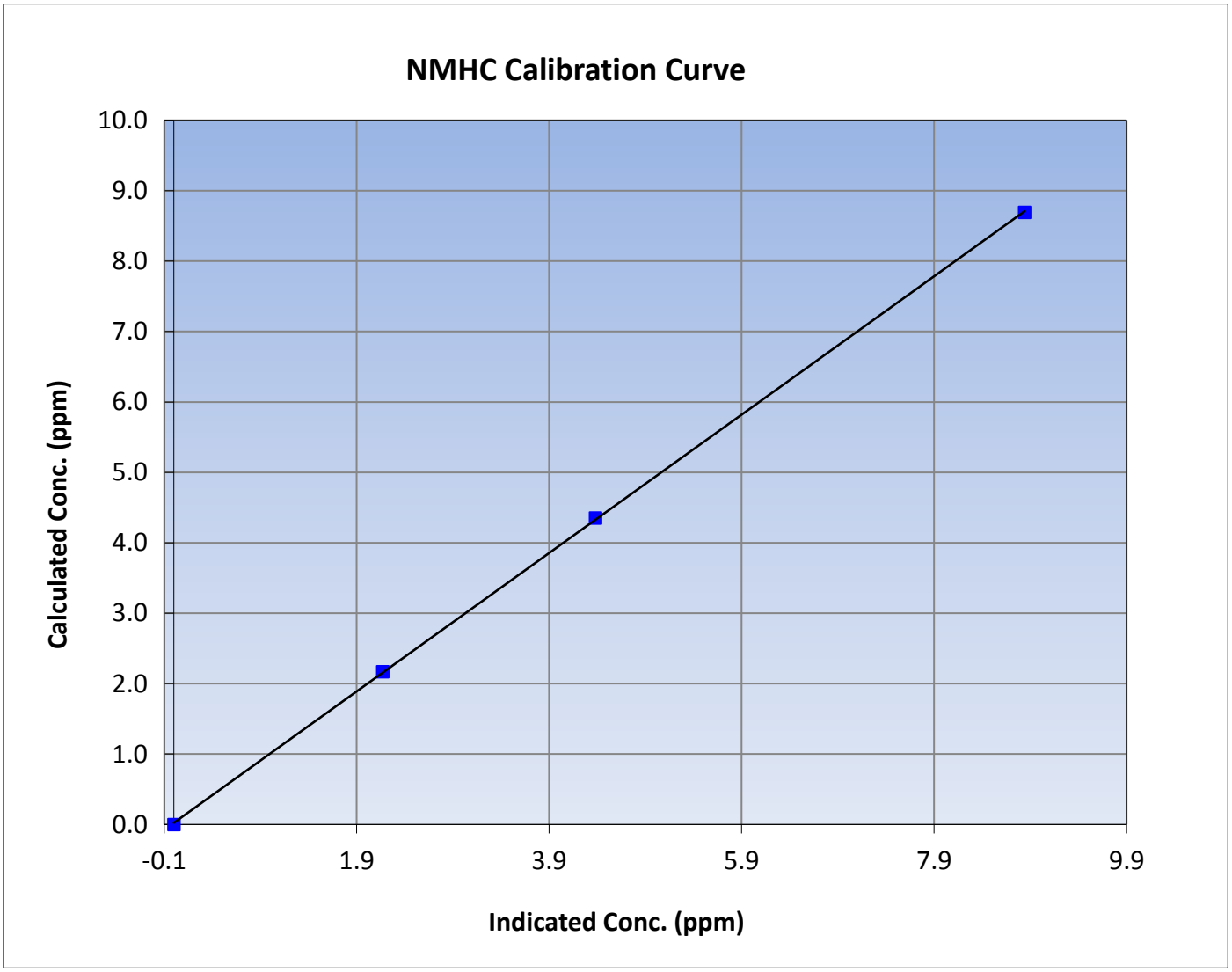
NMHC Calibration Summary

Station Information

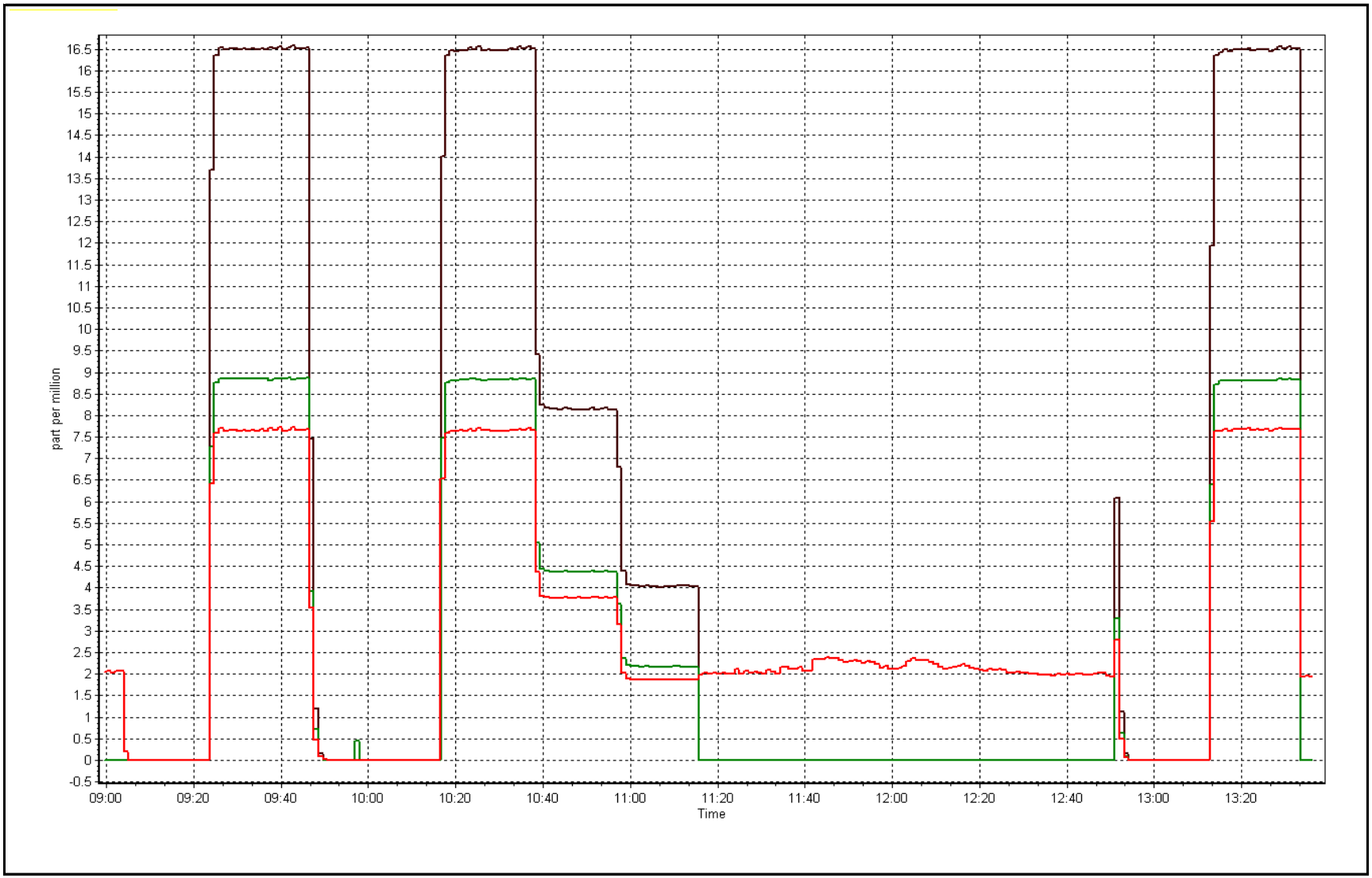
Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999960
8.69	8.84	0.9833		
4.35	4.38	0.9936	Slope	0.982409
2.17	2.17	1.0001		
			Intercept	0.023722



THC Calibration Plot Date: January 5, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

W B E A

Station Information

Calibration Date	January-25-16	Last Calibration	January-05-16
Station Name	Anzac	Station Number	AMS 14

Reason: Routine

Start Time (MST)	11:15	End Time (MST)	17:25
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	75.1	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	403.1
THC Calc slope	0.997700	0.998669	Carrier Pressure	31.8	31.8
THC Calc intercept	0.068546	0.034197	Fuel Pressure	41.4	41.4
NMHC Calc slope	0.999306	1.001966	Air Pressure	32.6	32.5
NMHC Calc intercept	0.026161	0.006087			

Analyzer make	Thermo 55i	Analyzer serial #	1218153355

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	74.9	16.36	16.45	0.995
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.38	0.999
second point	5000	37.5	8.19	8.11	1.010
third point	5000	18.7	4.09	4.05	1.009
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.41	0.997
				Average Correction Factor	1.006

Corrected As found	16.45	Previous response	16.33	% change	-0.7%

Notes:

Instrument exhibiting negative spiking on methane channel. Troubleshooting investigation did not reveal the issue to be related to pump or actuator. Diagnostics did not reveal an obvious issue. Methane window start time adjusted from 8.0 sec to 8.2sec. Issue appears to be resolved at this time.

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	74.9	8.69	8.88	0.979
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.68	1.001
second point	5000	37.5	4.35	4.31	1.010
third point	5000	18.7	2.17	2.17	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.69	1.000
				Average Correction Factor	1.004

Corrected As found	8.88	Previous response	8.67	% change	-2.3%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	7.57	1.013
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.70	0.996
second point	5000	37.5	3.84	3.80	1.011
third point	5000	18.7	1.91	1.88	1.019
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	7.67	7.72	0.993
				Average Correction Factor	1.008

Corrected As found	7.57	Previous response	7.66	% change	1.2%

Wood Buffalo Environmental Association

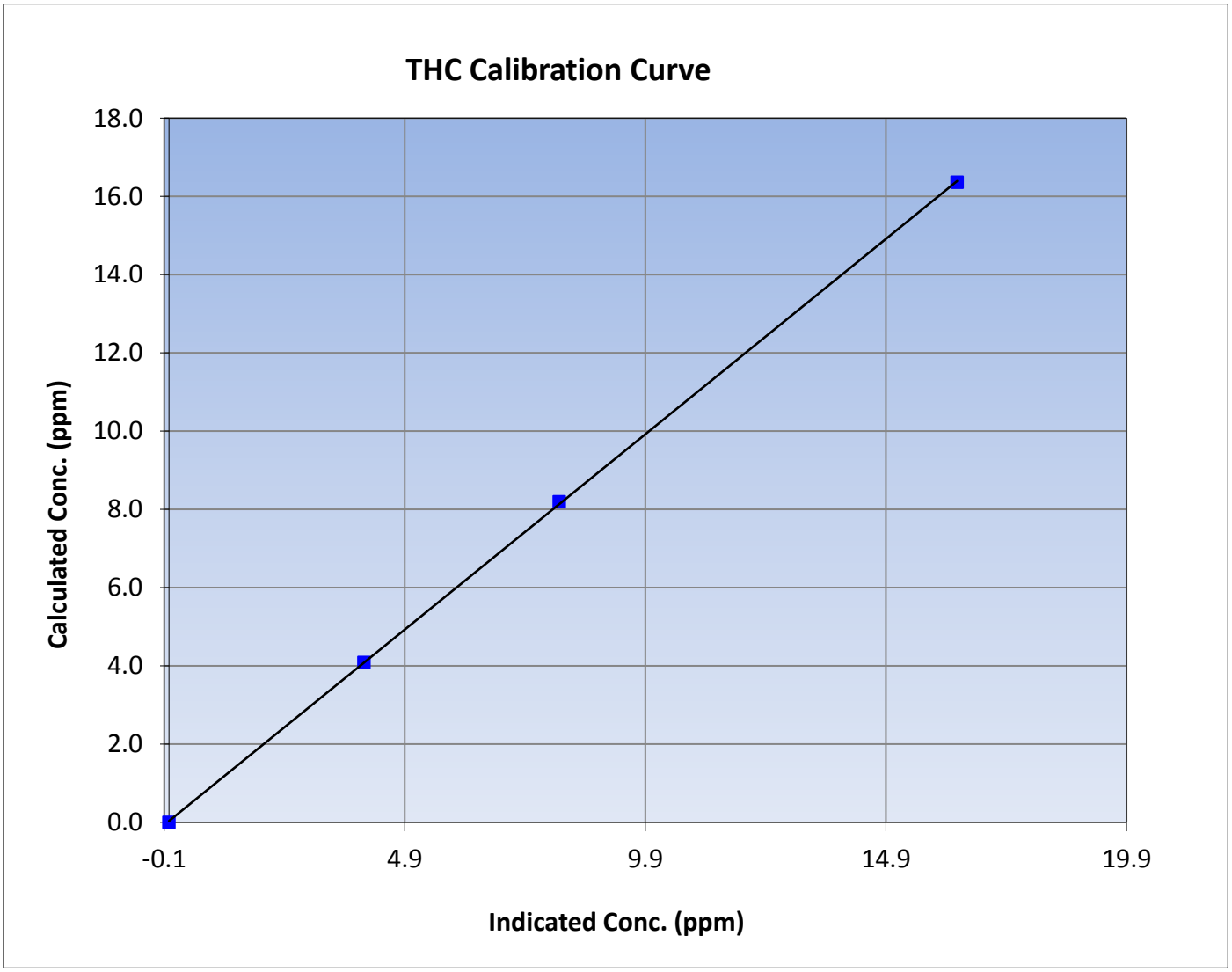
THC Calibration Summary

Station Information

Calibration Date	January 25, 2016	Previous Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	11:15	End Time (MST)	17:25
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999962
16.36	16.38	0.9989		
8.19	8.11	1.0101	Slope	0.998669
4.09	4.05	1.0086		
			Intercept	0.034197



Wood Buffalo Environmental Association

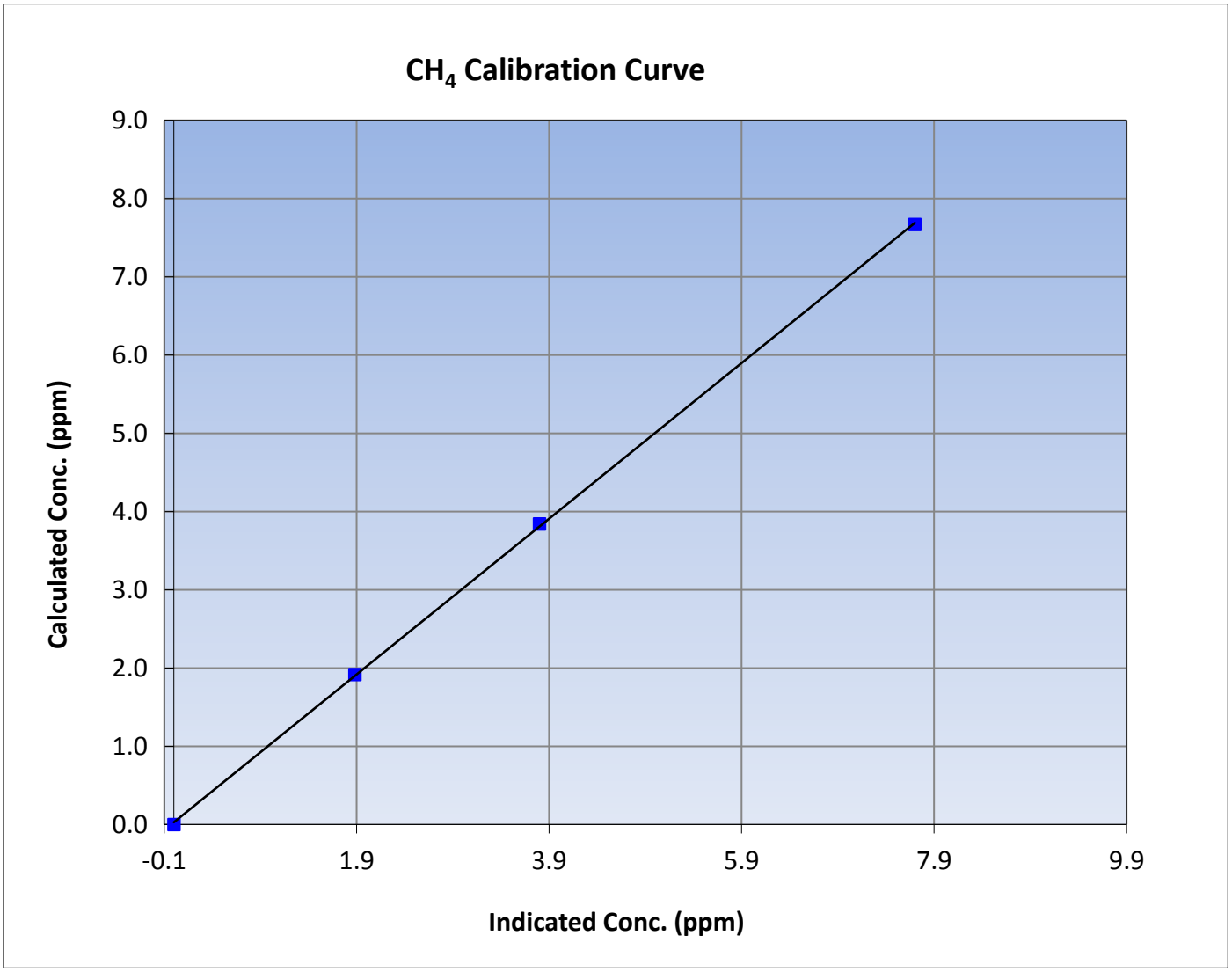
CH_4 Calibration Summary

Station Information

Calibration Date	January 25, 2016	Previous Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	11:15	End Time (MST)	17:25
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999925
7.67	7.70	0.9961		
3.84	3.80	1.0105	Slope	0.994937
1.91	1.88	1.0186		
			Intercept	0.028096



Wood Buffalo Environmental Association

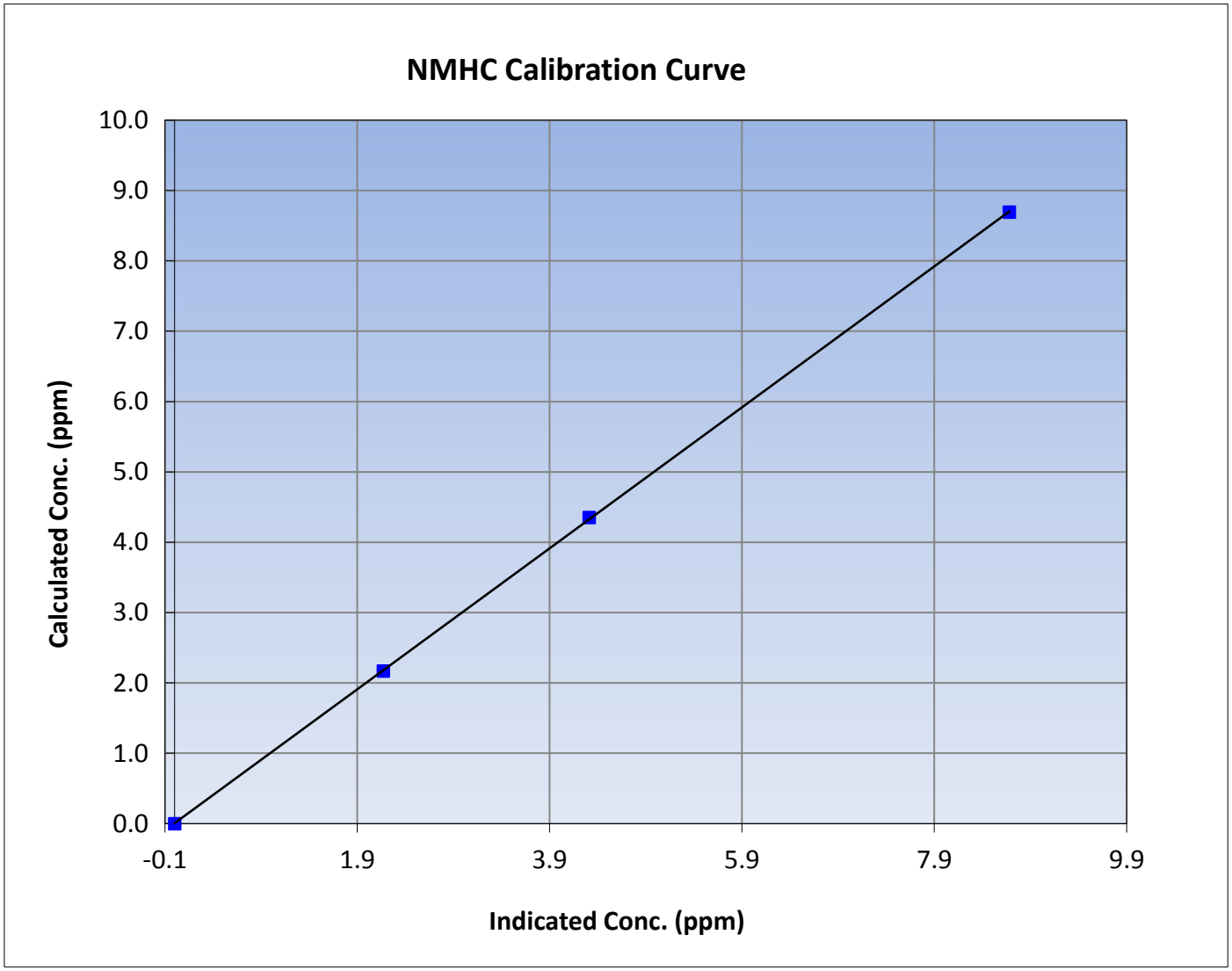
NMHC Calibration Summary

Station Information

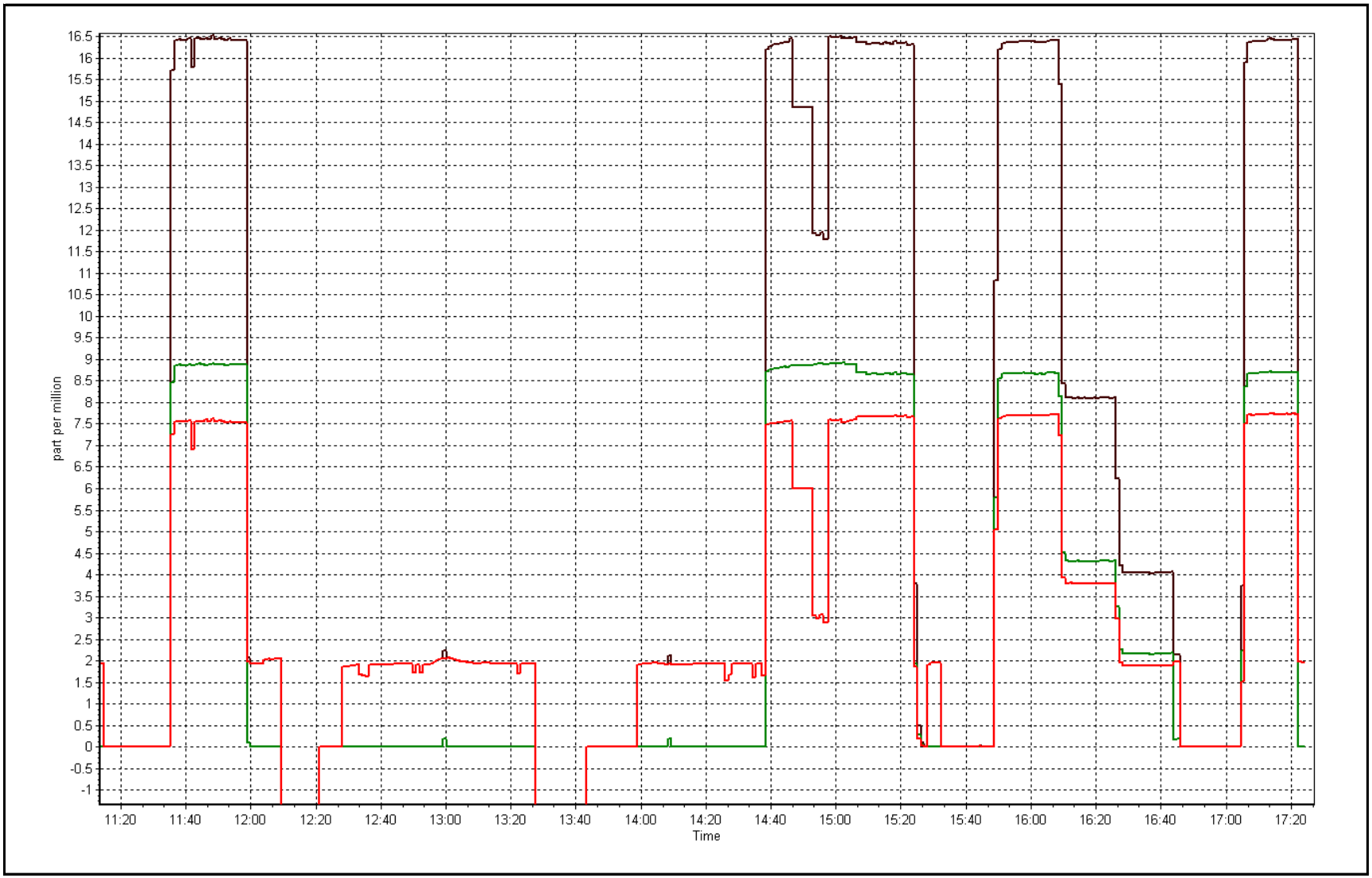
Calibration Date	January 25, 2016	Previous Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	11:15	End Time (MST)	17:25
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999976
8.69	8.68	1.0014		
4.35	4.31	1.0097	Slope	1.001966
2.17	2.17	1.0001		
			Intercept	0.006087



THC Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	January 6, 2016	Previous Calibration	December 4, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	10:45
NO2 GPT Ref date	January-05-16	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.	26.5	26.4
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.9
Calculated slope	0.992371	0.987491	Pressure	638.5	684.1
Calculated intercept	-0.580702	-0.818368	Flow cell A	0.694	0.723
Analyzer Background	-2.0	-2.0	Flow cell B	0.695	0.728
Analyzer Coefficient	0.980	0.980	Cell A Intensity	119373	116772
			Cell B Intensity	122741	121117

Analyzer make	Thermo 49i	Analyzer serial #	1426262596

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.9	----
as found span	5000	1.19	436.4	442.8	0.986
calibrator zero	5000	0.00	0.0	0.9	----
high point	5000	1.19	436.4	442.8	0.986
second point	5000	0.85	298.3	302.9	0.985
third point	5000	0.51	156.2	158.9	0.983
as left zero	5000	0.00	0.0	2.0	----
as left span	5000	1.19	436.4	430.4	1.014
				Average Correction Factor	0.984

Corrected As found	441.9	Previous response	440.3	% change	-0.4%

Notes:

no adjustments or maintenance done, filter changed out, delayed calibration due to nightly zero and span

Calibration Performed By: Melissa Lemay

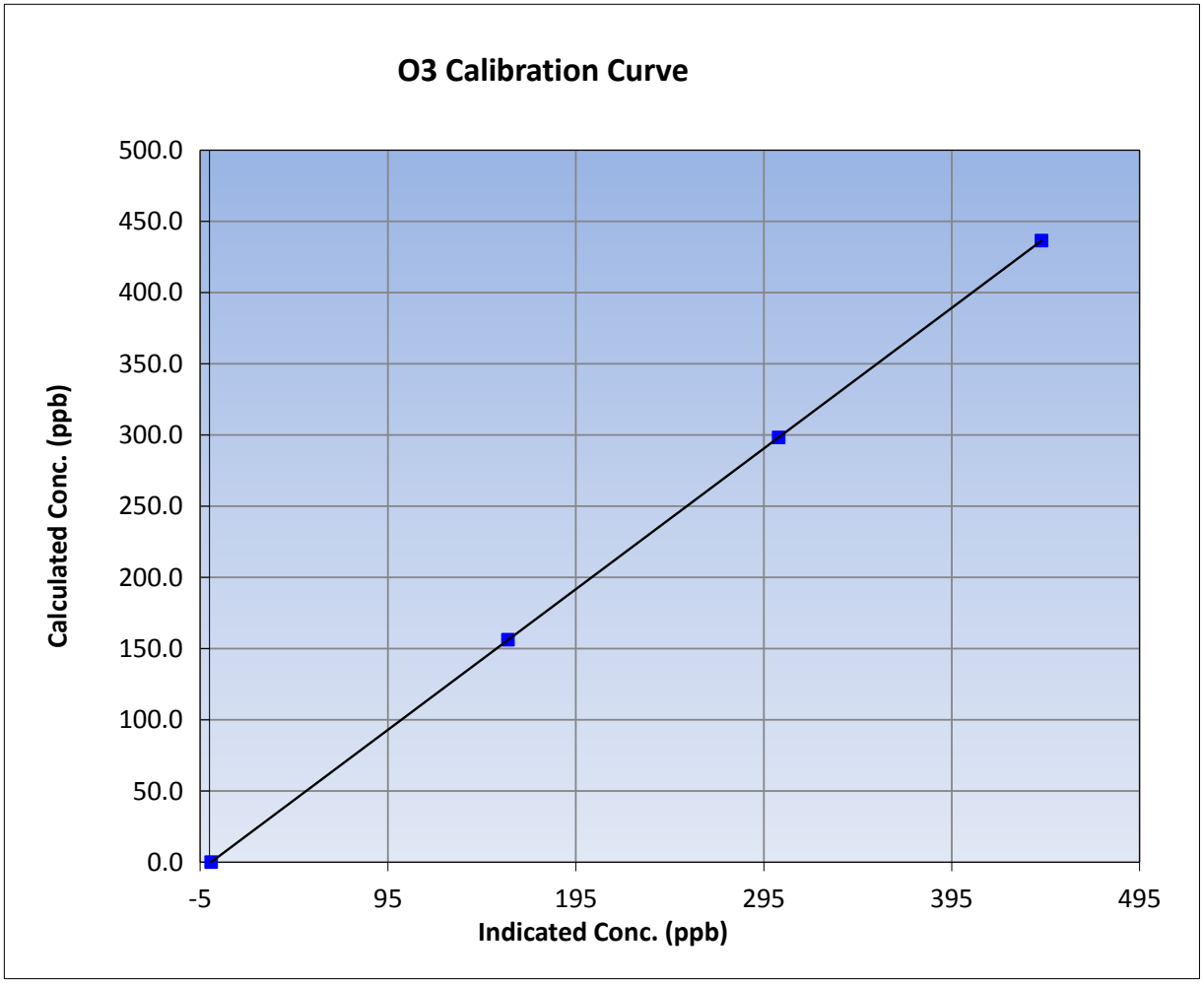
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

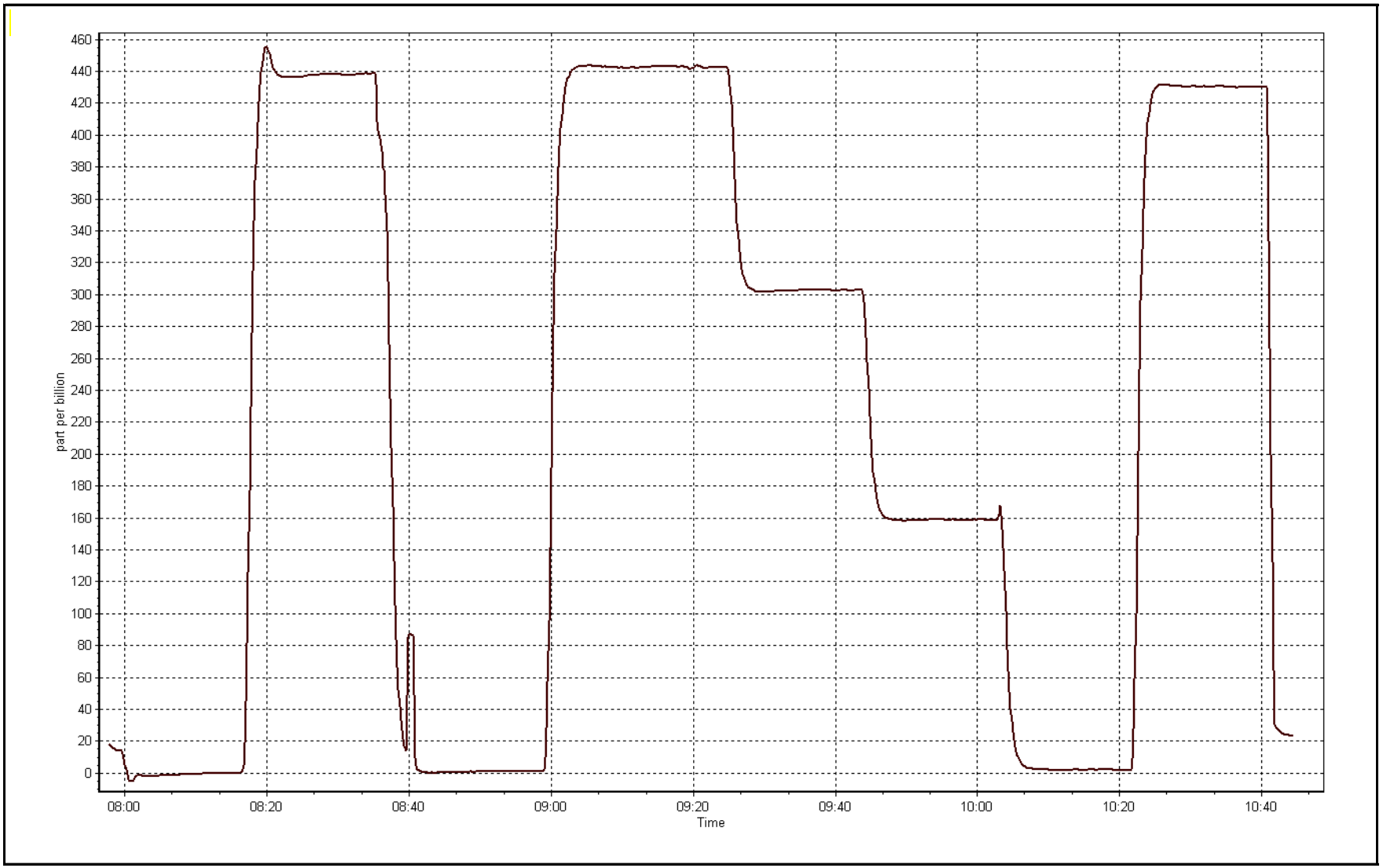
Calibration Date	January-06-16	Previous Calibration	December 4, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:00	End Time (MST)	10:45
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	----	Correlation Coefficient	1.000000
436.4	442.8	0.9855		
298.3	302.9	0.9848	Slope	0.987491
156.2	158.9	0.9830		
			Intercept	-0.818368



O3 Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:35
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOx Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne API T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.006227	1.005729	1.000755
	Data Offset	2.071061	2.122784	-0.114684
Current Calibration	Data Slope	0.996585	0.996594	1.002849
	Data Offset	2.503043	2.624465	0.262950

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.966		0.966	
NOX coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.7		3.7	
NOX bkgrnd	3.8		3.8	
Chamber Temp	49.8	Deg C	49.9	Deg C
Moly Temp	322.9	Deg C	326.3	Deg C
PMT voltage	-802.2	V	-802.5	V
PMT Temp	-2.7	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	136	mmHg	130	mmHg
R Cell Press Nox	136	mmHg	129.3	mmHg
NO sample flow	0.82	lpm	0.826	lpm
Nox sample Flow	0.823	lpm	0.829	lpm

Notes:

Filter changed out, no maintenance or adjustments done

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 5, 2016 Station Number: AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.5	0.0	----	----
as found span	5000	74.9	799.9	799.9	0.0	800.7	800.4	0.3	0.9990	0.9994
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.4	0.0	----	----
high point	5000	74.9	799.9	799.9	0.0	801.5	801.5	-0.1	0.9980	0.9980
second point	5000	37.5	400.5	400.5	0.0	397.4	397.0	0.4	1.0078	1.0088
third point	5000	18.7	199.7	199.7	0.0	196.4	196.3	0.1	1.0169	1.0174
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.4	0.2	----	----
as left span	5000	74.9	799.9	360.5	439.4	793.4	372.2	421.1	1.0082	0.9686
								Average Correction Factor	1.0076	1.0081

Corrcted As found NO_X= 801.2 NO= 800.9 Percent Change NO_X= -1.0% NO= -1.0%

Previous Response NO_X= 792.9 NO= 793.3

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 74.90 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	360.5	436.4	795.6	360.5	435.1	0.9906	1.0000	1.0030	99.7%
2nd NO2 (200)	----	498.6	298.3	795.7	498.6	297.1	0.9905	1.0000	1.0040	99.6%
3rd NO2 (100)	----	640.7	156.2	795.8	640.7	155.1	0.9904	1.0000	1.0071	99.3%
4th NO2 (0)	796.9	----	-0.2	796.7	796.9	-0.3	0.9892	1.0000	N/A	----
					Average Correction Factor		0.9902	1.0000	1.0047	99.5%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

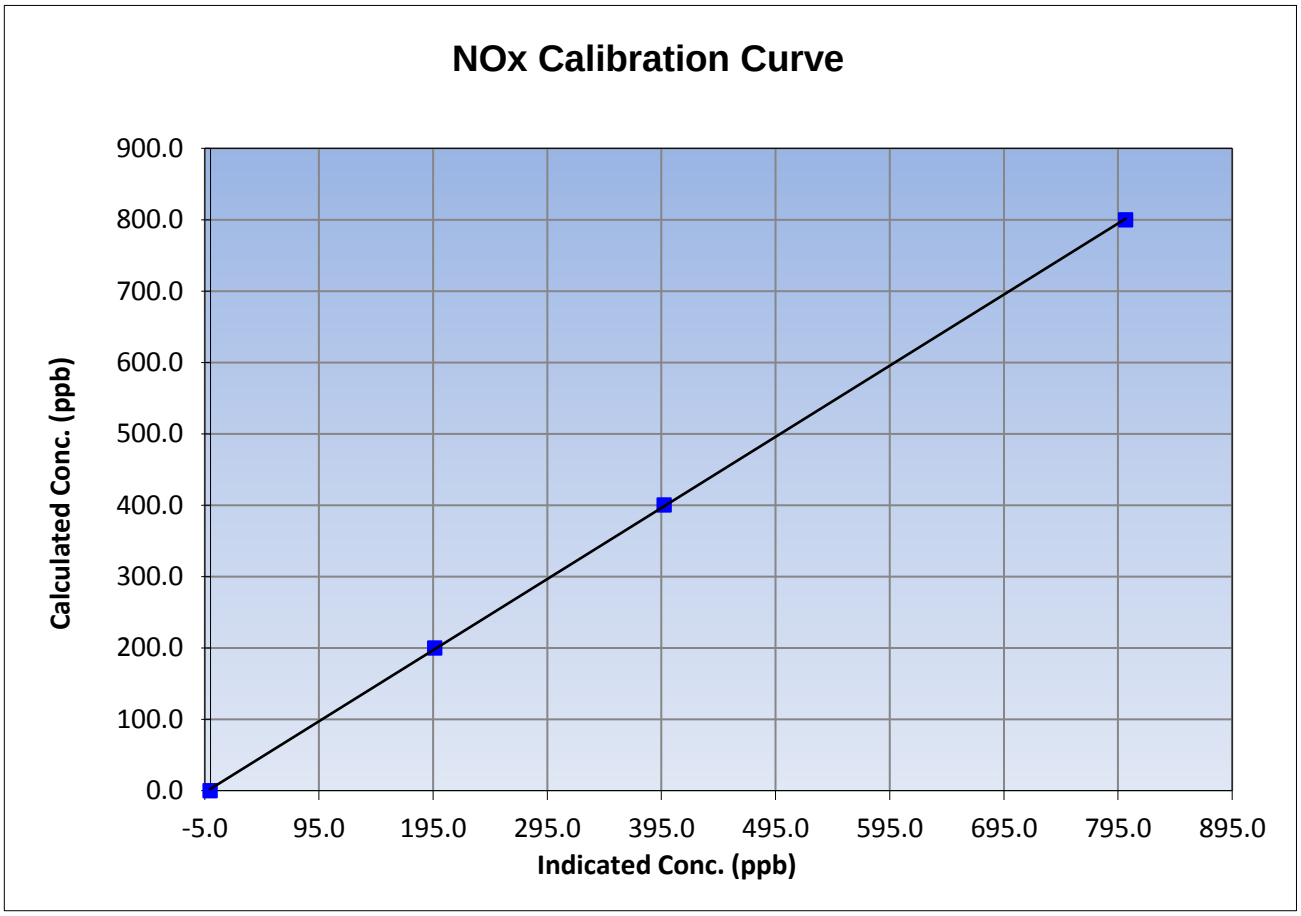
NO_X Calibration Summary

Station Information

Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999965
799.9	801.5	0.9980		
400.5	397.4	1.0078	Slope	0.996585
199.7	196.4	1.0169		
			Intercept	2.503043



Wood Buffalo Environmental Association

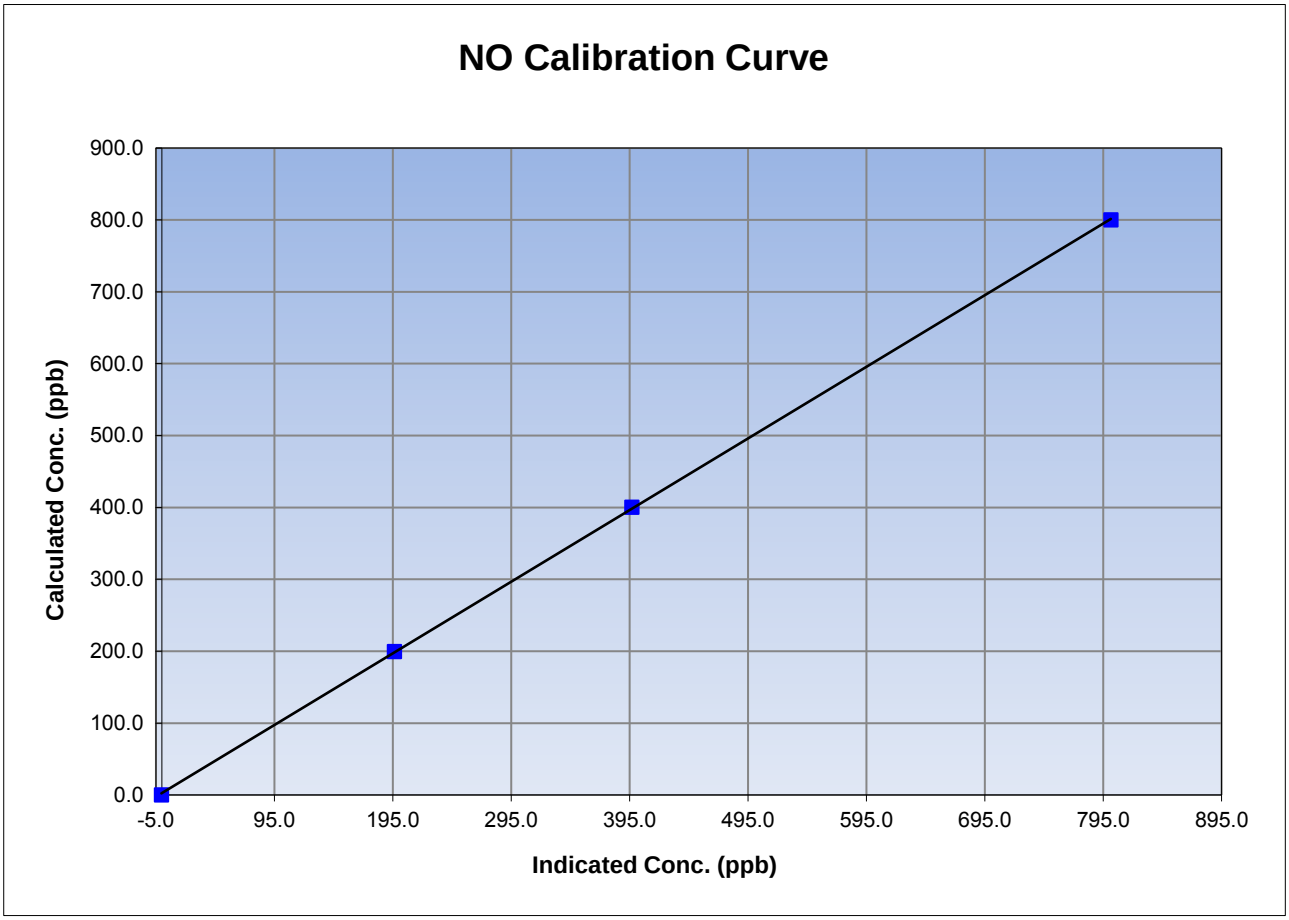
NO Calibration Summary

Station Information

Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999959
799.9	801.5	0.9980		
400.5	397.0	1.0088	Slope	0.996594
199.7	196.3	1.0174		
			Intercept	2.624465



Wood Buffalo Environmental Association

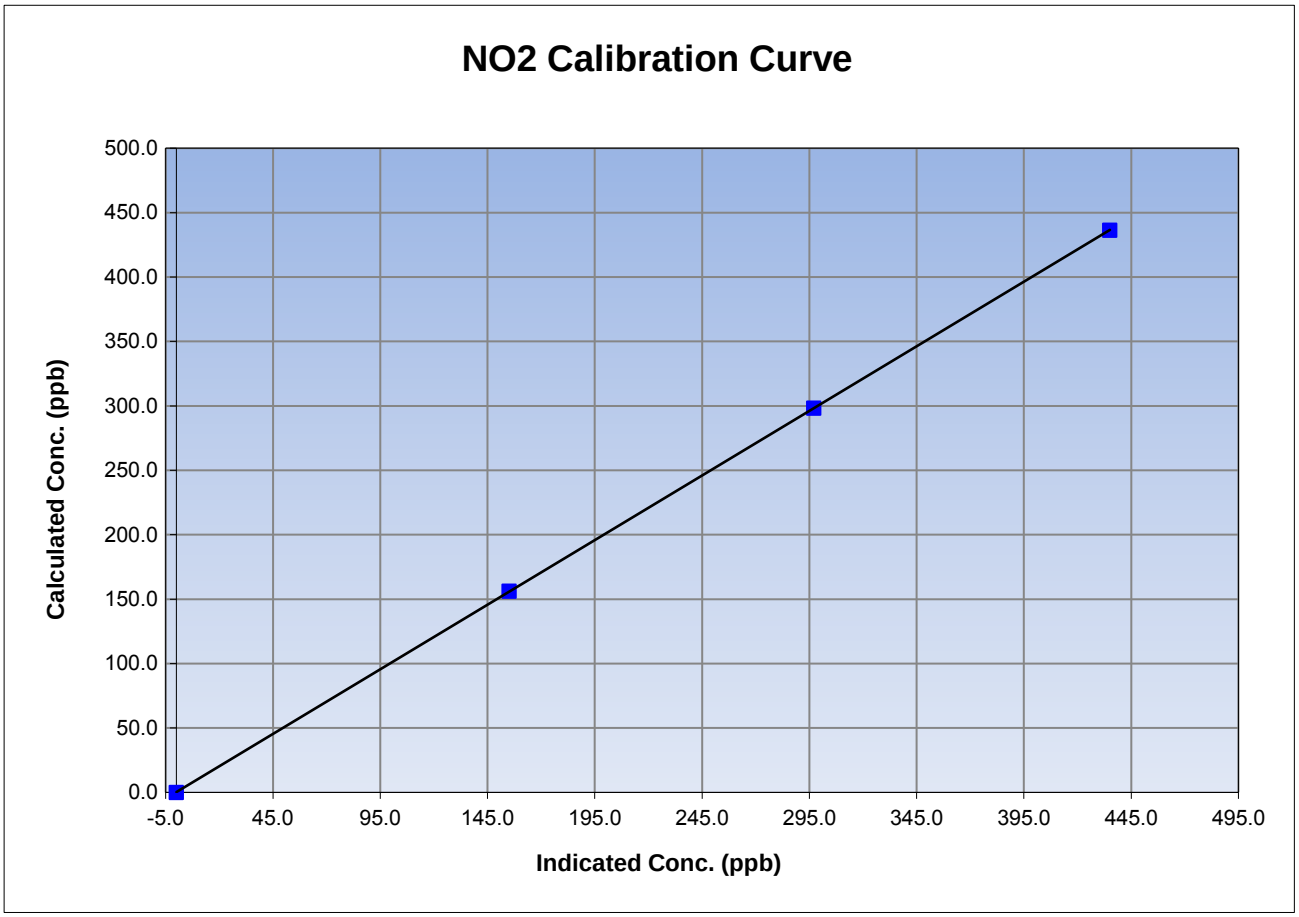
NO_2 Calibration Summary

Station Information

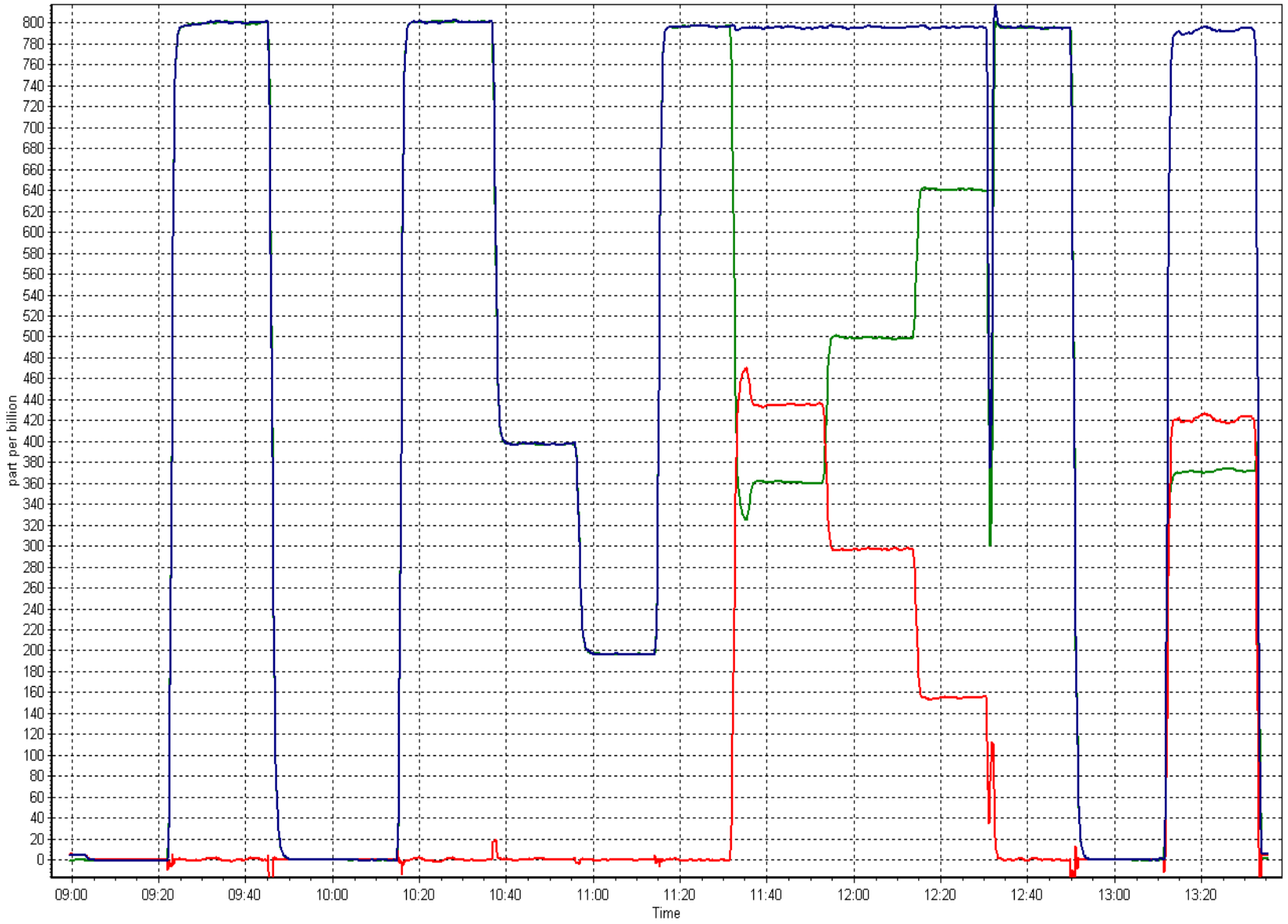
Calibration Date	January 5, 2016	Previous Calibration	December 3, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999997
436.4	435.1	1.0030		
298.3	297.1	1.0040	Slope	1.002849
156.2	155.1	1.0071		
			Intercept	0.262950



NOX Calibration Plot Date: January 5, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 6, 2016	Previous Calibration:	December 3, 2015
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:51	End Time (MST):	11:10
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5										
Make/Model:	Thermo / SHARP 5030										
Serial Number	E1093										
C_{14} Source SN:	4933										
Confirmation of Time settings:	Yes ☑	No ☐									
Paremeters Checked:	☑ T1	☐ T	☐ T	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑			

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-17.0	-15.1	1.9	-15.0
T2	20.0	na	na	20.0
T3	21.0	na	na	21.0
T4	15.0	na	na	15.0
RH (%)	6.0	na	na	6.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	958	952.0	-6.0	958

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	193		193
Neph	1.8		0.2
C14	8.7		15
Indicated Concentration (ug/m3)	**1.3**	**Yes**	**0.2**
Offset 1	194		192.6
Offset 2	31.8		31.8

Leak Check (Quarterly)

Leak Check Date:	November 16, 2015	Previous Leak Check Date:	August 18, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	17.18	0.03
*Flow with adaptor (LPM):	17.15	

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

Mass Foil Calibration (Annualy)

Foil Calibration Date:	June 17, 2015	Previous Foil Calibration:	
Zeroed?:			
Foil Mass:	1278	Mass foil set S/N:	2520
Previous Correction Factor:	7020		
New Correction Factor:	6936		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	06/10/2015
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

T1 and Nepholometer adjusted. Cyclone head cleaned.

Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 15
CNRL HORIZON
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
JANUARY 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	702	34	42	98.92	19	0	6	0
TRS (ppb) Average	680	33	64	95.83	1	0	1	0
THC (ppm) Average	702	34	42	98.92	5.5	-	3.1	-
NO2 (ppb) Average	701	36	43	99.06	30	0	19	-
NO (ppb) Average	701	36	43	99.06	72	-	16	-
NOX (ppb) Average	701	36	43	99.06	98	-	34	-
PM2.5 (ug/m3) Average	735	2	9	99.06	59.7	-	18	0
Temperature 2 m (C) Average	744	0	0	100.00	5.5	-	2.7	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	19	-	12	-
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	1.5	-	5.1	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	94	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	245	-	45	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	702	0.7	2	-	0	0	0	0	1	1	19
TRS (ppb) Average	680	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	702	2.3	0.4	-	1.9	2	2.1	2.2	2.4	2.6	5.5
NO2 (ppb) Average	701	9	9	-	0	1	2	5	16	23	30
NO (ppb) Average	701	3.2	8	-	0	0	0	0	2	9	72
NOX (ppb) Average	701	12.1	15	-	0	1	2	6	19	32	98
PM2.5 (ug/m3) Average	735	4.72	5.3	-	0.5	1	1.6	3	6.2	10	59.7
Temperature 2 m (C) Average	744	-13.43	8	-	-34.9	-22.3	-18.8	-14	-8.6	-2.7	5.5
Wind Speed 10 m (km/h) Average	740	6.3	3	-	0	2	4	6	8	11	19
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	8.38	-	-	-	-	-	-	-
Relative Humidity (%) Average	744	81.3	7	-	54	73	78	81	86	90	98
Global Solar Radiation (W/m2) Average	744	20	42	-	0	0	0	0	18	73	245

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	26 Jan 2016 10:00	26 Jan 2016 16:00	7	Station power failure
SO2, THC	26 Jan 2016 17:00	26 Jan 2016 17:00	1	Unstable Operation - stabilization after power restored
TRS	26 Jan 2016 17:00	27 Jan 2016 12:00	20	Analyzer failure - TRS converter failure
TRS	27 Jan 2016 13:00	27 Jan 2016 16:00	4	Maintenance - replace TRS converter and re-calibration
Wind Speed, Wind Direction	07 Jan 2016 04:00	07 Jan 2016 04:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Jan 2016 23:00	10 Jan 2016 23:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	15 Jan 2016 03:00	15 Jan 2016 03:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Jan 2016 17:00	22 Jan 2016 17:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 19 ppb on Jan 8 14:00 Maximum Daily Average: 5.6 ppb on Jan 8

Minimum Value: 0 ppb on Jan 2 08:00 Minimum Daily Average: 0.0 ppb on Jan 30

Maximum Diurnal Average: 1.5 ppb at hour 13 Minimum Diurnal Average: 0.4 ppb at hour 2

Monthly Average: 0.7 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 9$

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	34
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0.2	1
6-Jan	0	0	1	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Jan	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0.2	1
8-Jan	1	Z	0	0	0	1	1	1	1	4	7	12	18	19	14	14	14	10	6	3	1	1	0	0	5.6	19
9-Jan	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Jan	0	0	0	Z	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0.2	0
12-Jan	Z	0	0	0	0	0	0	0	0	1	3	3	7	5	1	1	2	2	0	1	2	2	1	0	1.4	7
13-Jan	0	Z	0	1	1	2	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.6	2
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.2	2
16-Jan	0	0	3	1	Z	0	0	0	0	0	0	1	1	2	1	1	1	0	0	0	0	1	1	0	0.6	3
17-Jan	1	1	1	1	1	Z	1	1	0	0	0	0	0	0	1	1	4	2	1	0	0	0	0	0	0.7	4
18-Jan	Z	1	1	1	2	6	8	6	4	5	7	7	10	9	6	5	3	1	1	1	0	0	0	0	3.6	10
19-Jan	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	1
20-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	4	3	2	2	1	1	0.8	4
21-Jan	1	1	1	Z	1	0	1	0	0	0	0	0	0	1	3	5	3	3	5	3	2	3	3	2	1.7	5
22-Jan	1	1	1	1	Z	0	0	0	0	1	1	1	1	1	2	4	4	1	1	1	1	1	1	1	1.2	4
23-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
24-Jan	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Jan	0	0	Z	0	0	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	UO	0	0	0	0	0	0	0	--	0
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.3	3
28-Jan	4	2	3	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	0.5	0.4	0.5	0.4	0.4	0.5	0.6	0.5	0.4	0.6	0.8	1.0	1.5	1.5	1.2	1.2	1.1	0.8	0.7	0.5	0.5	0.5	0.4	0.4	Diurnal Average	
	4	2	3	2	2	6	8	6	4	5	7	12	18	19	14	14	14	10	6	3	2	3	3	3	Diurnal Maximum	

Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure

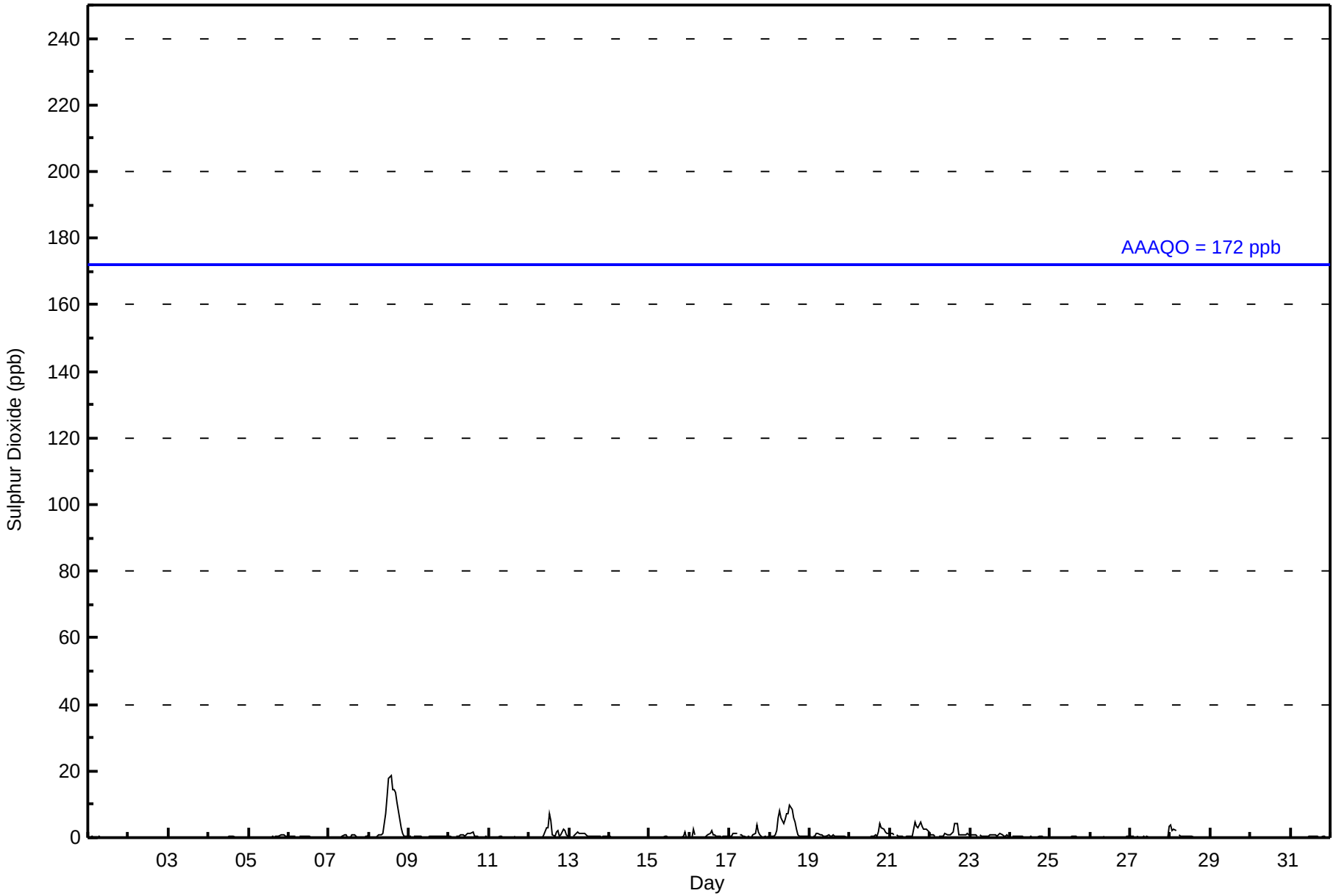
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	696	99.15	99.15
11 - 20	6	0.85	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: 702

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	48	104	46	5	3	6	8	40	167	120	57	21	16	14	17	20	692
11 - 20	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	6
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	104	46	5	3	6	8	40	167	123	57	21	19	14	17	20	698

Total Number of Valid Hours: 698

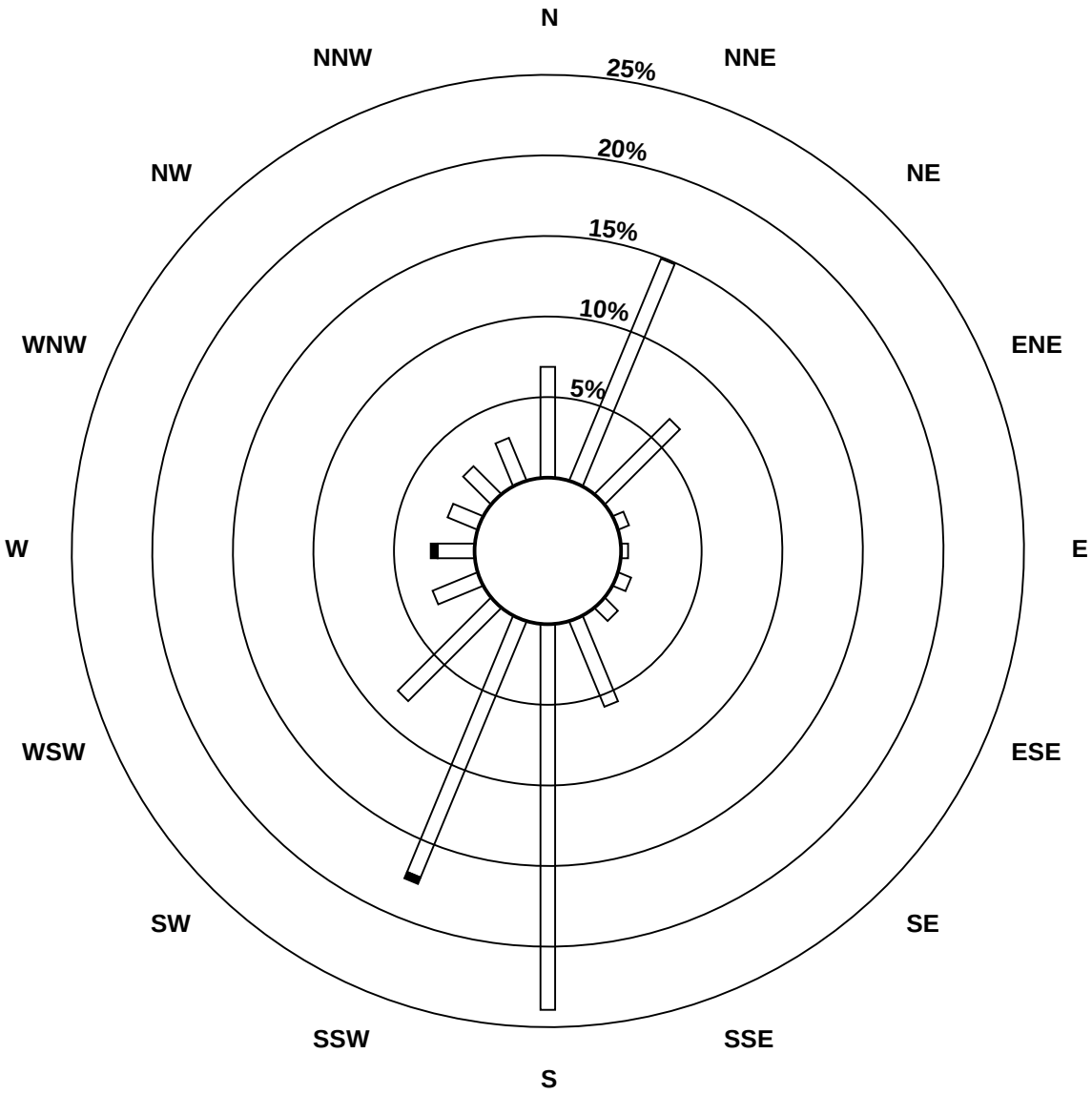
Total Number of Hours: 744

Wood Buffalo Environmental Association

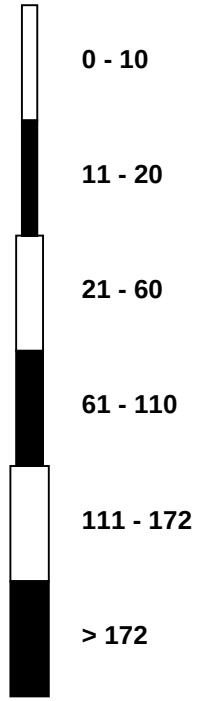
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



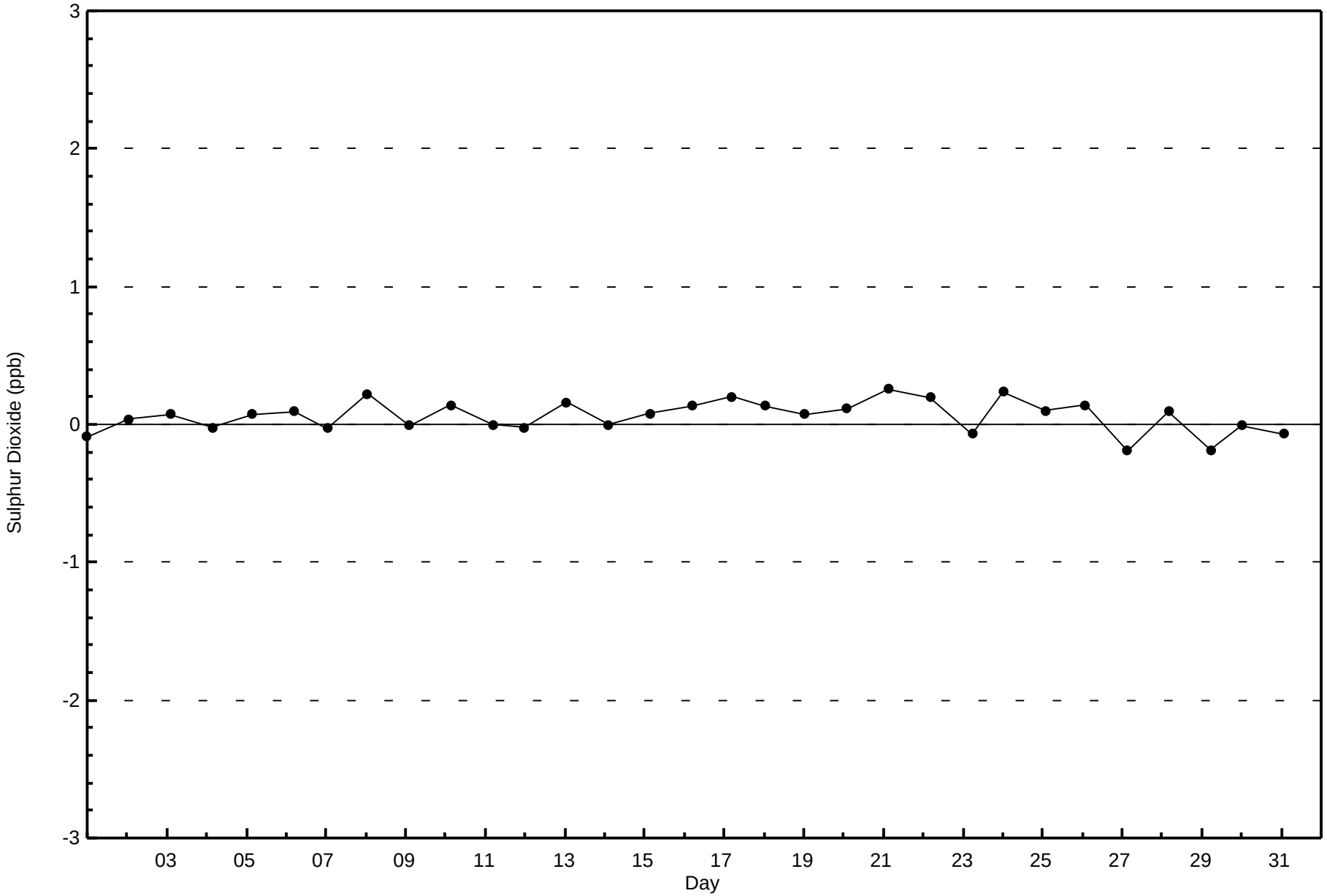
Total Number of Valid Hours: 698

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - January 2016

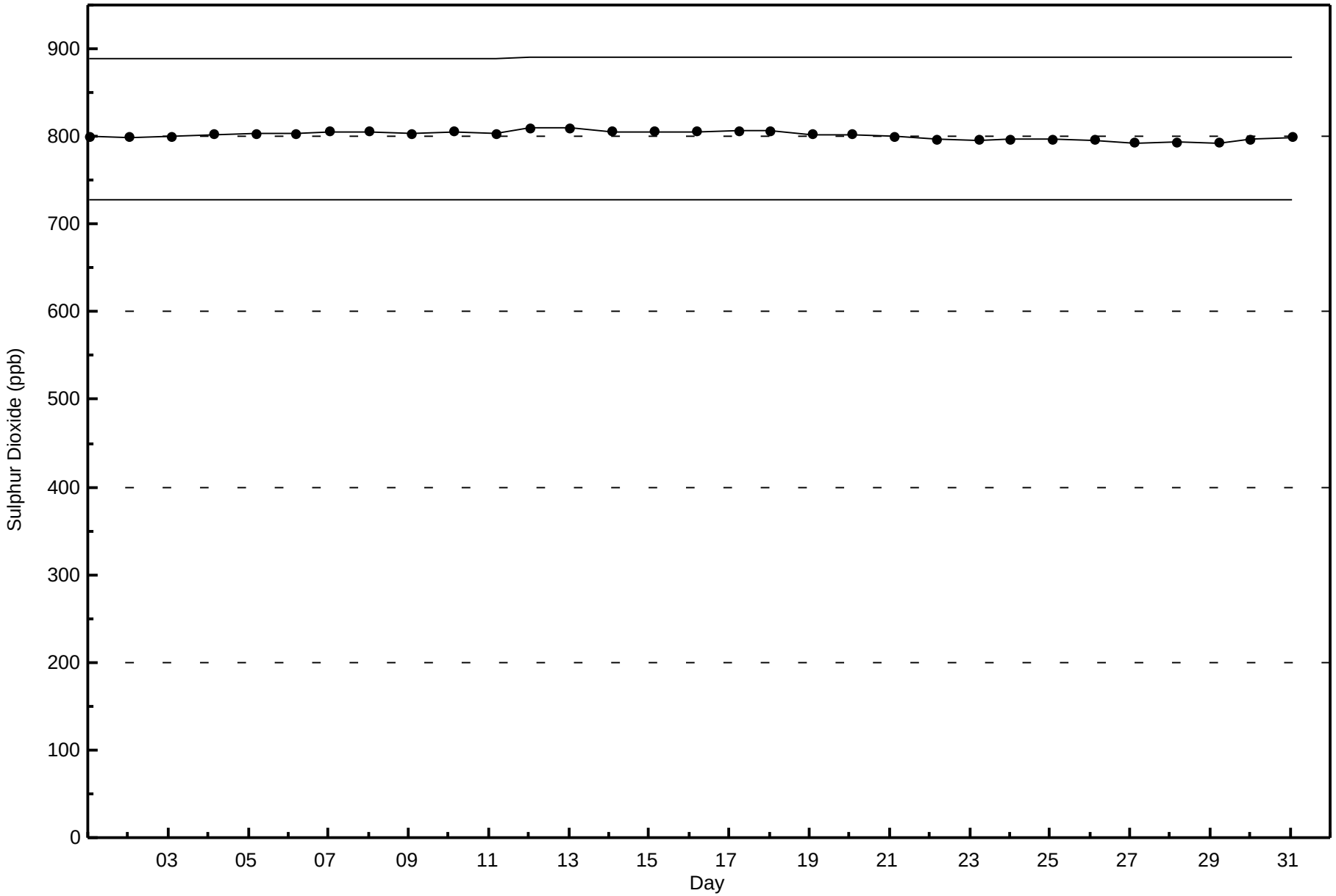


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 1 ppb on Jan 5 19:00 Maximum Daily Average: 0.5 ppb on Jan 21

Minimum Value: 0 ppb on Jan 4 10:00 Minimum Daily Average: 0.2 ppb on Jan 1
Maximum Diurnal Average: 0.3 ppb at hour 19 Minimum Diurnal Average: 0.3 ppb at hour 9
Monthly Average: 0.3 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	680
Hours of Missing Data:	64
Hours of Calibration:	33
Percent Operational Time:	95.8

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

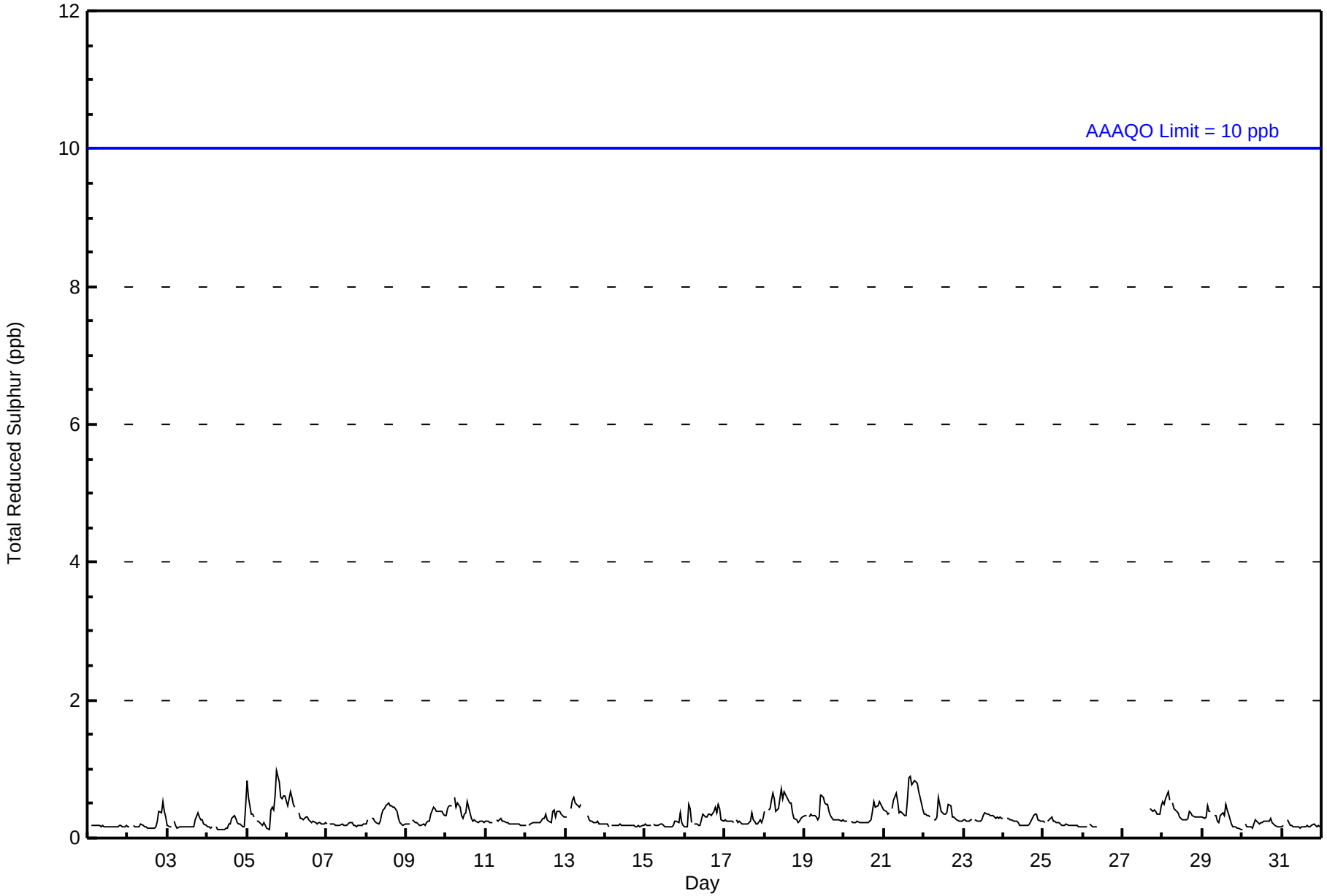
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	680	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: 680

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	46	99	42	6	3	6	9	38	164	124	54	20	19	11	16	19	676
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	99	42	6	3	6	9	38	164	124	54	20	19	11	16	19	676

Total Number of Valid Hours: 676

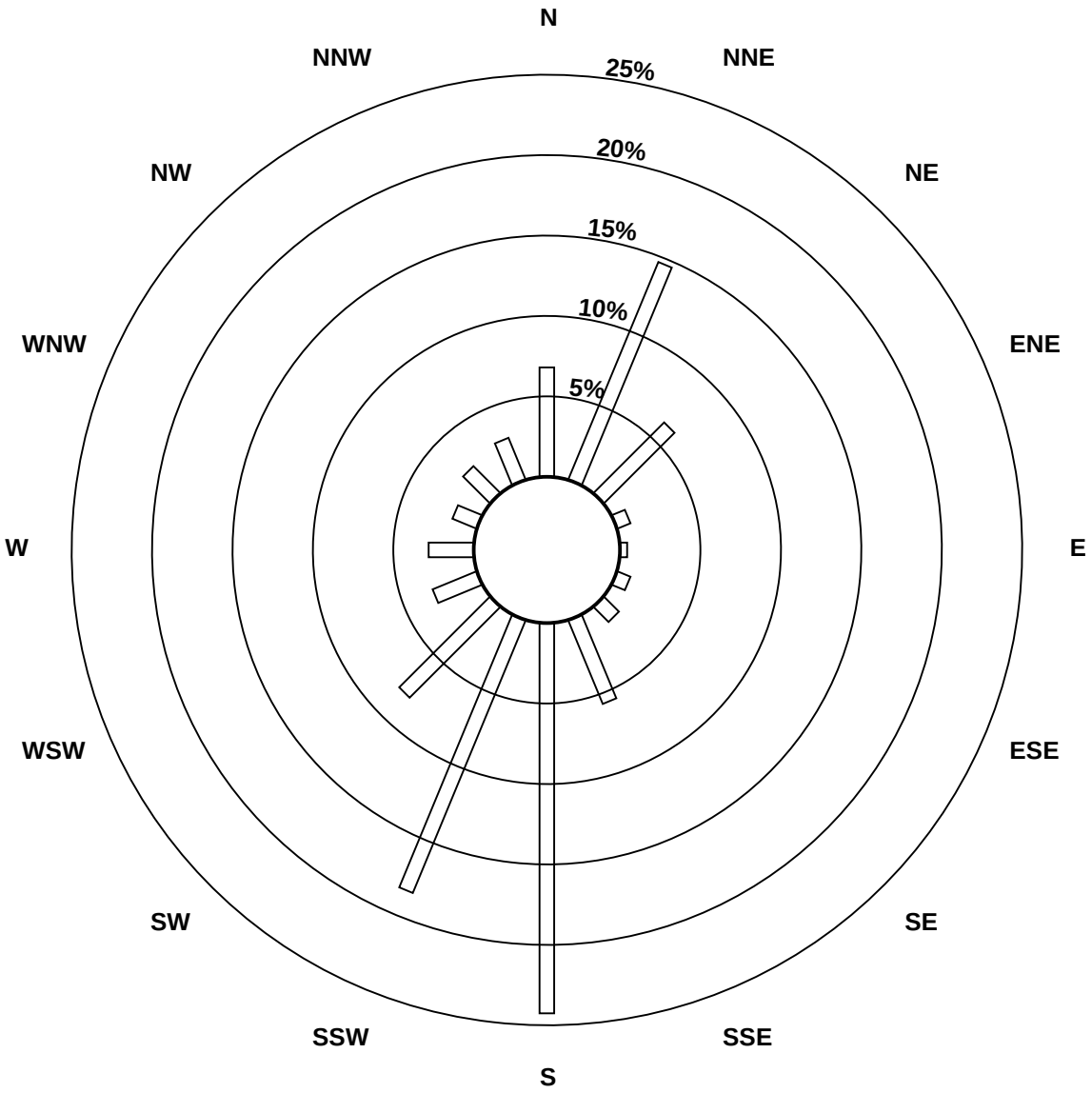
Total Number of Hours: 744

Wood Buffalo Environmental Association

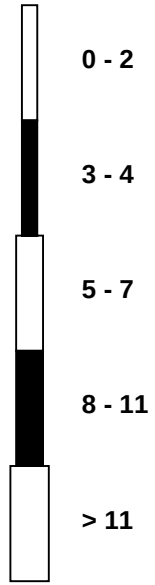
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



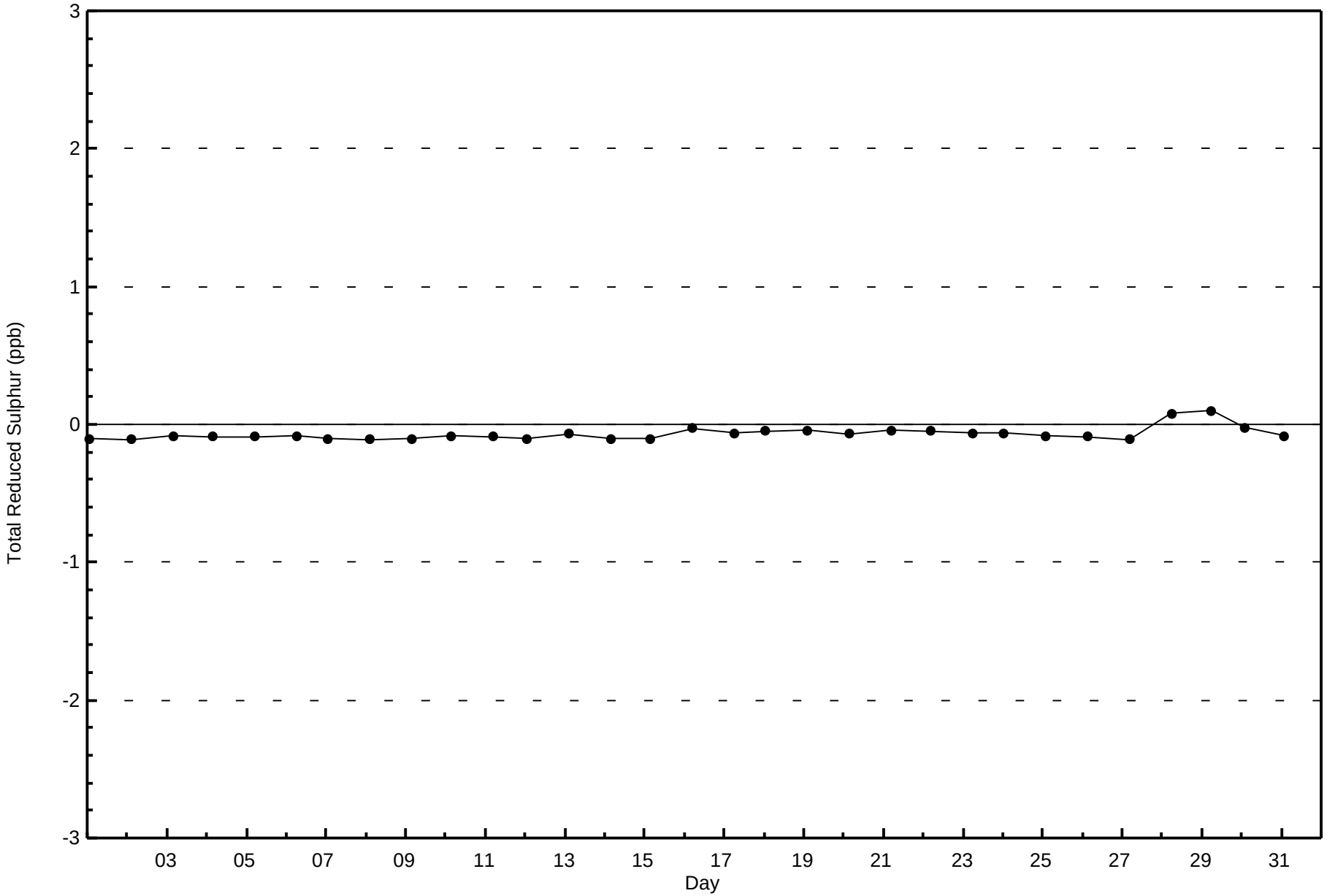
Total Number of Valid Hours: 676

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - January 2016

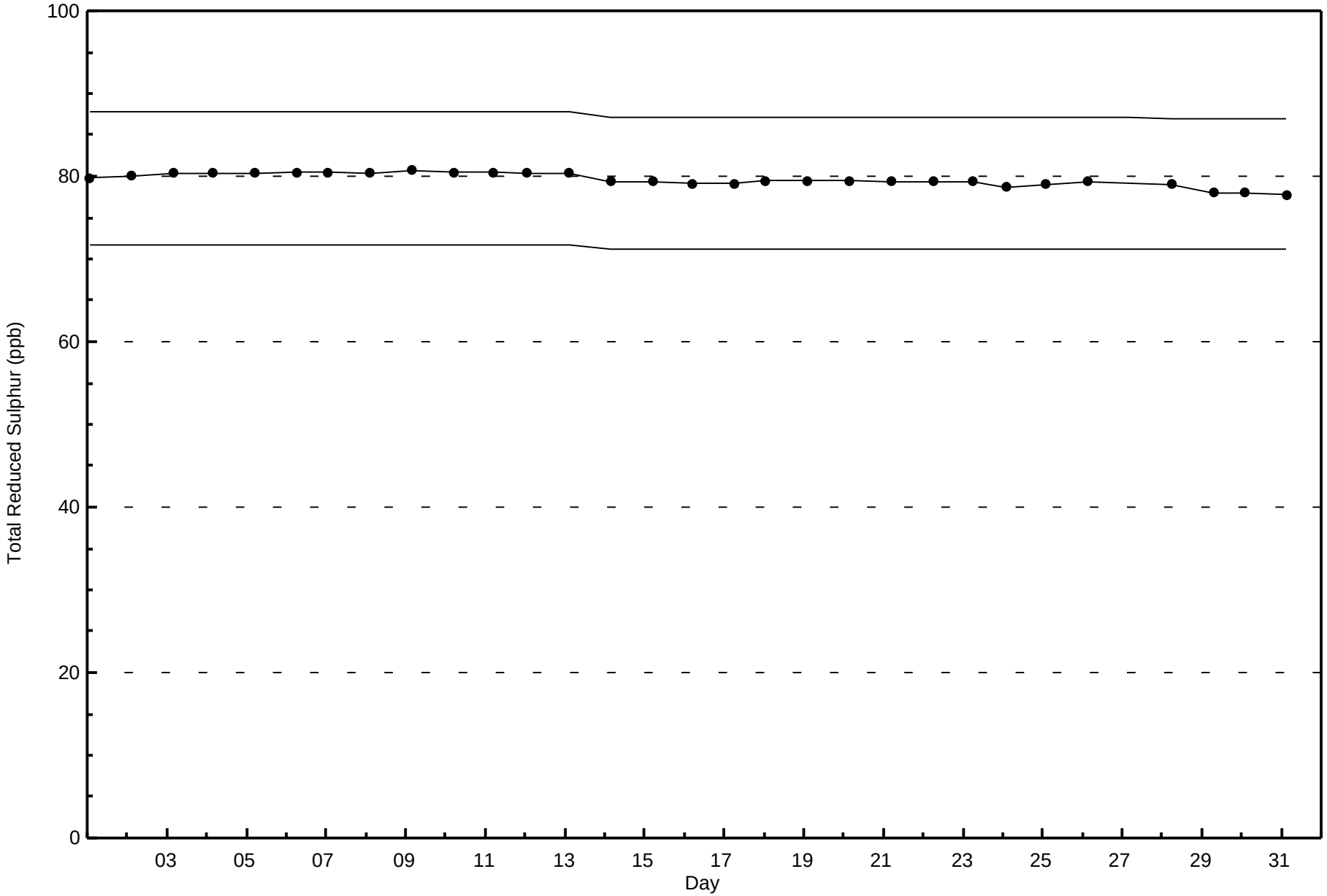


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

CNRL Horizon - January 2016

Maximum Value: 5.5 ppm on Jan 21 19:00

Maximum Daily Average: 3.1 ppm on Jan 21

Minimum Value: 1.9 ppm on Jan 26 22:00

Minimum Daily Average: 2.0 ppm on Jan 31

Maximum Diurnal Average: 2.4 ppm at hour 20

Minimum Diurnal Average: 2.2 ppm at hour 11

Monthly Average: 2.30 ppm

Percentiles: P_1 = 1.9 P_{10} = 2.0 Q_1 = 2.1 Median = 2.2 Q_3 = 2.4 P_{90} = 2.6 P_{99} = 3.8

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	34
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.3	2.5	2.1	2.3	2.5	2.1	2.5
2-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.6	2.9	2.7	2.6	2.2	2.9
3-Jan	2.1	2.1	Z	2.4	2.5	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.4	2.6	2.5	2.5	2.5	2.4	2.3	2.3	2.6
4-Jan	2.2	2.2	2.2	Z	2.5	2.4	2.7	2.4	2.3	2.2	2.3	2.1	2.2	2.2	2.2	2.4	2.4	2.4	2.3	2.4	2.4	2.3	2.2	2.5	2.3	2.7
5-Jan	2.8	2.5	2.4	2.5	Z	2.4	2.3	2.4	2.4	2.4	2.5	2.4	2.2	2.3	2.6	2.7	2.7	2.9	3.4	3.6	3.8	4.2	3.5	3.2	2.8	4.2
6-Jan	3.9	3.7	3.1	3.0	2.7	Z	2.6	2.4	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.4	3.9
7-Jan	Z	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	2.4	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.4
8-Jan	2.1	Z	3.8	3.3	3.4	2.4	2.2	2.2	2.3	2.4	2.3	2.6	2.6	2.4	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.4	3.8
9-Jan	2.1	2.1	Z	2.1	2.3	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.5	2.7	2.6	2.6	2.7	2.6	2.6	2.6	2.6	2.4	2.7
10-Jan	2.6	2.7	2.9	Z	2.8	2.8	2.7	4.1	3.7	2.6	2.4	2.6	2.8	2.9	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	4.1
11-Jan	2.2	2.2	2.2	2.2	Z	2.2	2.4	2.4	2.5	2.4	2.2	2.2	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
12-Jan	Z	2.1	2.1	2.1	2.3	2.4	2.3	2.3	2.4	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.6
13-Jan	2.5	Z	2.5	3.1	3.0	2.6	2.5	2.6	2.7	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.3	3.1
14-Jan	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
15-Jan	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.6	2.4	2.3	2.2	2.2	2.2	2.6
16-Jan	2.4	2.3	2.2	2.2	Z	2.5	2.3	2.1	2.2	2.3	2.2	2.3	3.1	2.7	2.8	2.5	2.4	2.5	2.5	2.5	2.8	2.6	2.4	2.3	2.4	3.1
17-Jan	2.3	2.2	2.1	2.2	2.1	Z	2.3	2.2	2.3	2.5	2.1	2.1	2.2	2.2	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5
18-Jan	Z	2.5	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.3	2.3	2.4	2.6	2.6	2.6	2.6	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6
19-Jan	2.3	Z	2.2	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.4
20-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.4	2.3	2.3	2.4	2.5	2.5	2.4	2.2	2.5
21-Jan	2.4	2.3	2.3	Z	2.3	2.4	2.6	2.7	2.7	2.5	2.5	2.5	2.5	2.5	2.9	3.4	3.3	3.8	5.5	5.3	4.8	3.7	2.9	2.6	3.1	5.5
22-Jan	2.6	2.6	2.6	2.6	Z	2.6	2.6	2.6	2.7	2.9	2.9	2.6	2.4	2.5	2.9	2.9	2.9	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.6	2.9
23-Jan	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.6	3.0	3.3	3.1	3.0	2.6	2.5	2.6	2.5	2.5	2.4	2.4	2.5	3.3
24-Jan	Z	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.8	2.5	2.2	2.1	2.1	2.2	2.1	2.3	2.8
25-Jan	2.2	Z	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.3
26-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	PF	PF	PF	PF	PF	PF	PF	UO	2.0	2.1	2.0	1.9	1.9	1.9	1.9	--	2.1
27-Jan	1.9	1.9	1.9	Z	2.1	2.5	2.5	2.8	2.7	2.0	2.0	2.0	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	2.8
28-Jan	2.2	2.2	2.2	2.3	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.3	2.1	2.0	2.0	2.0	1.9	2.0	2.1	2.4
29-Jan	1.9	1.9	2.1	3.1	2.5	Z	2.3	2.1	2.2	2.1	2.0	2.6	2.7	2.9	3.4	2.9	2.8	2.1	2.0	2.0	2.0	2.0	2.0	1.9	2.3	3.4
30-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	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	2.3
31-Jan	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	2.0	2.0	2.0	2.0	2.0	2.1
	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	Diurnal Average	
	3.9	3.7	3.8	3.3	3.4	2.8	2.7	4.1	3.7	2.9	2.9	2.6	3.1	3.0	3.4	3.4	3.3	3.8	5.5	5.3	4.8	4.2	3.5	3.2	Diurnal Maximum	

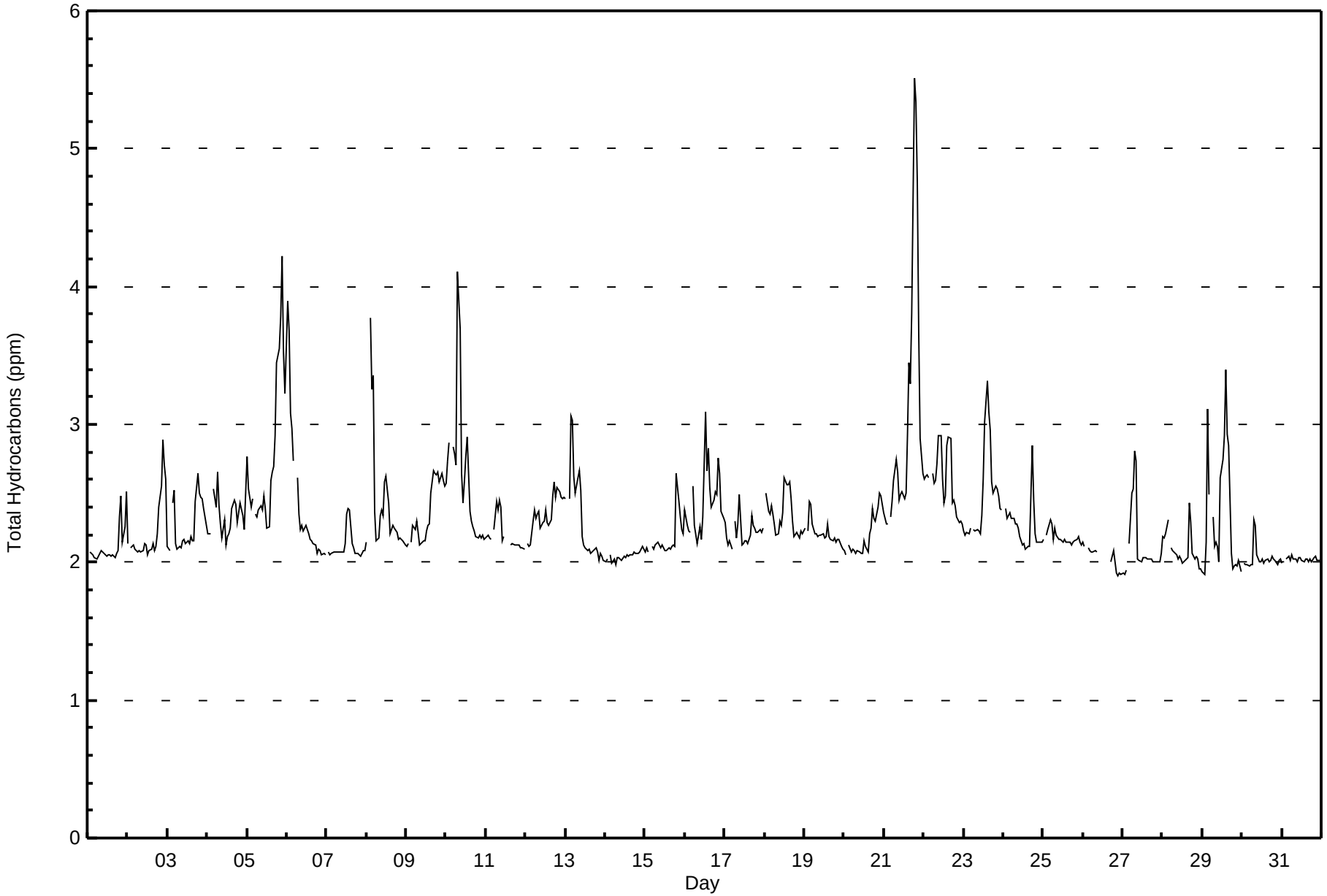
Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

CNRL Horizon - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	111	15.81	15.81
2.1 - 3.0	564	80.34	96.15
3.1 - 10.0	27	3.85	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

CNRL Horizon - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	4	30	27	0	0	0	0	3	11	10	18	7	1	0	0	0	111
2.1 - 3.0	42	73	19	5	3	6	8	37	151	109	39	13	15	11	13	16	560
3.1 - 10.0	2	1	0	0	0	0	0	0	5	4	0	1	3	3	4	4	27
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	104	46	5	3	6	8	40	167	123	57	21	19	14	17	20	698

Total Number of Valid Hours: 698

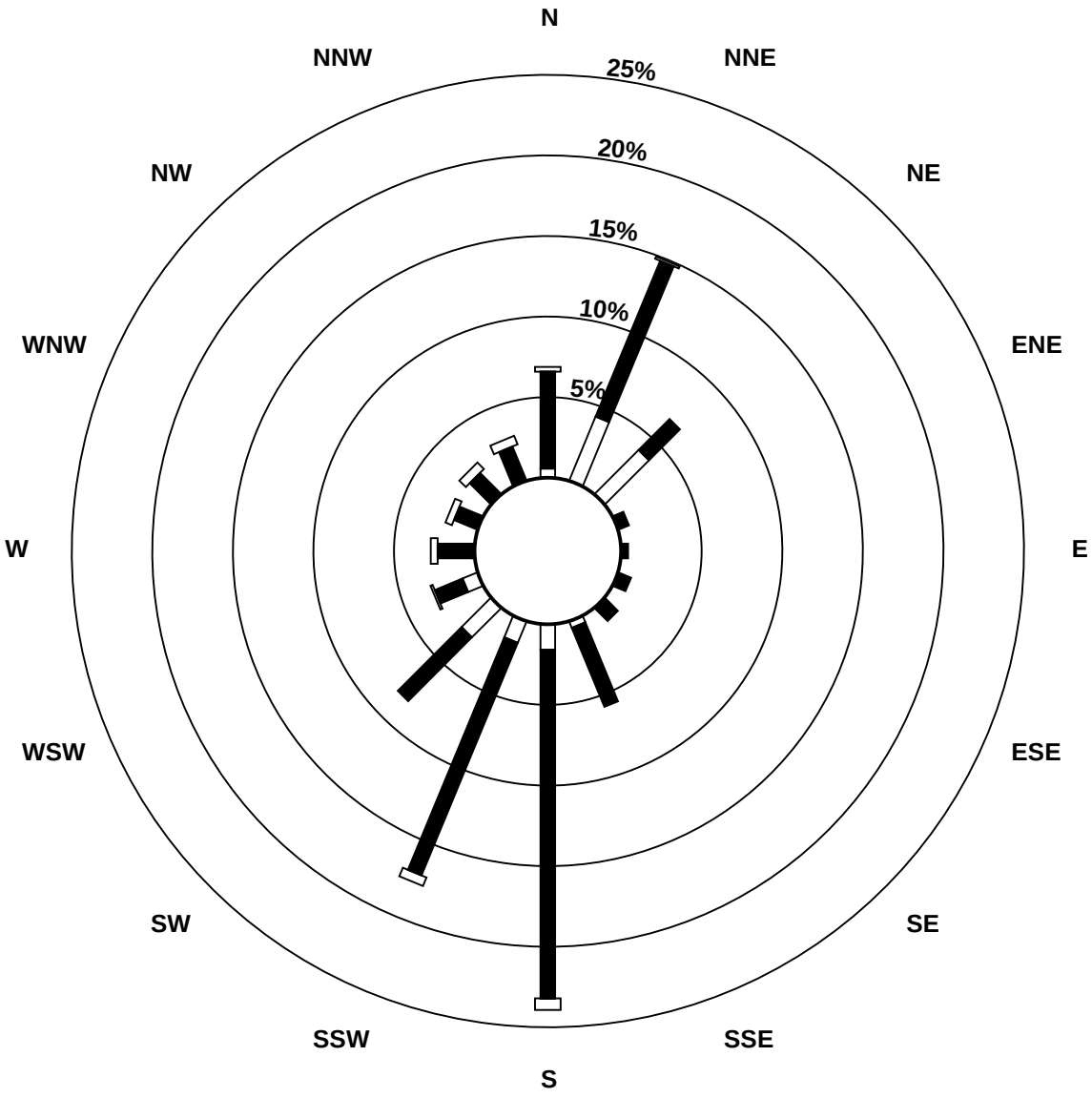
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

CNRL Horizon (AMS 15)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

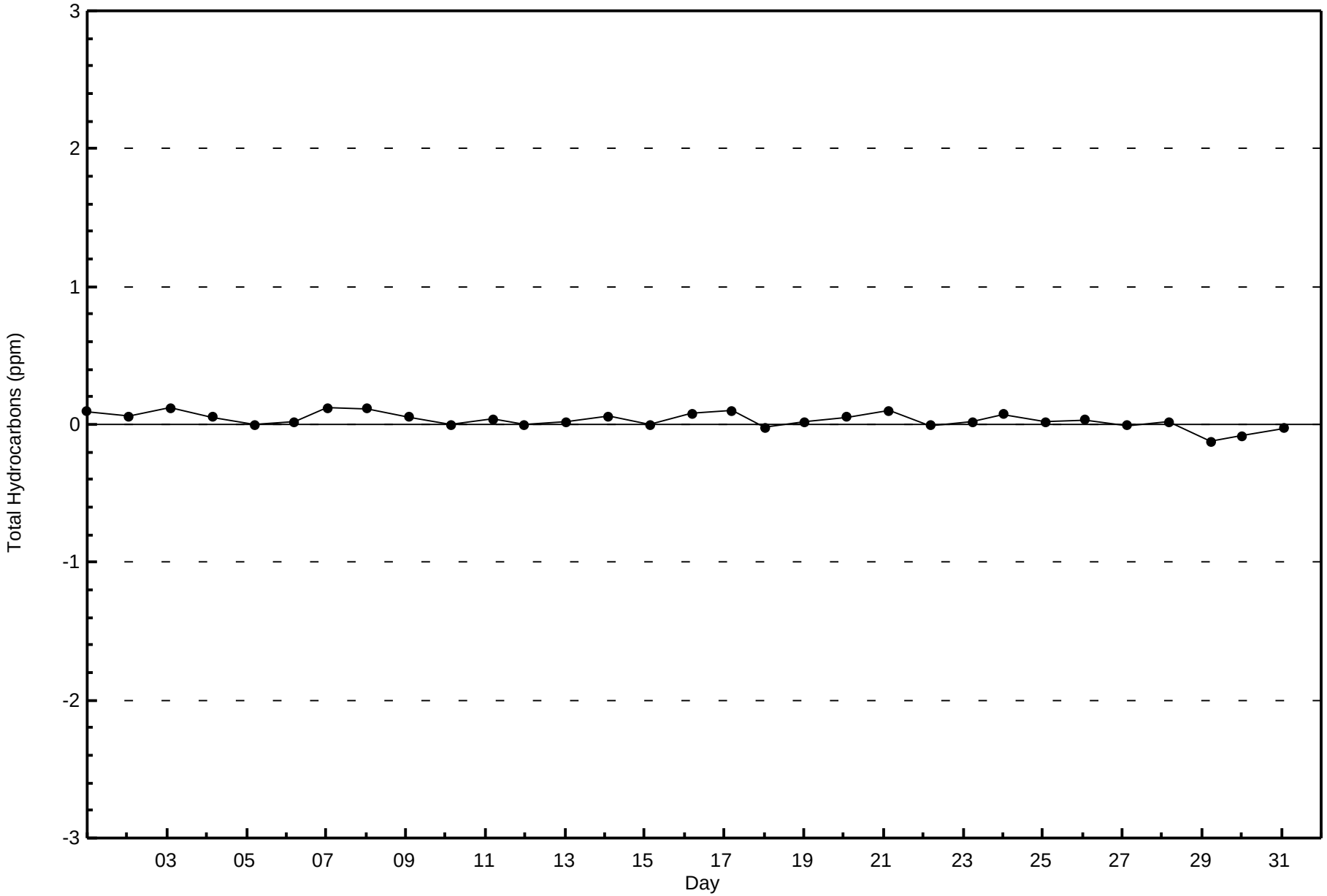
Total Number of Valid Hours: 698

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

CNRL Horizon - January 2016

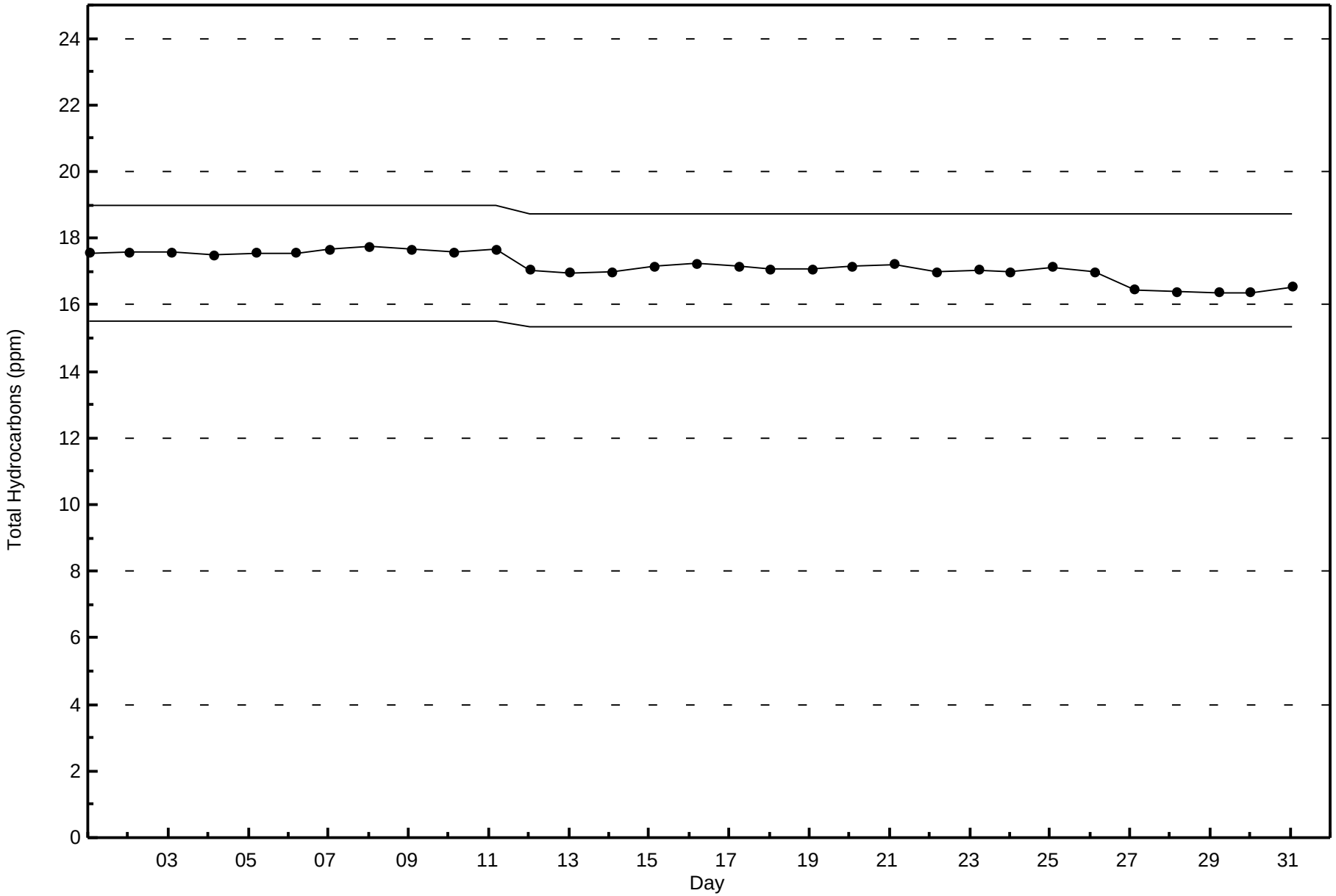


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

CNRL Horizon - January 2016

Maximum Value: 72 ppb on Jan 21 19:00

Maximum Daily Average: 15.6 ppb on Jan 21

Minimum Value: 0 ppb on Jan 6 18:00

Minimum Daily Average: 0.1 ppb on Jan 14

Maximum Diurnal Average: 5.4 ppb at hour 19

Minimum Diurnal Average: 1.3 ppb at hour 7

Monthly Average: 3.2 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 2$ $P_{90} = 9$ $P_{99} = 40$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	36
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0	1	5	5	0.7	5
3-Jan	0	0	Z	6	6	0	0	0	0	0	0	0	0	0	1	0	0	1	4	1	0	0	0	0	0.9	6
4-Jan	0	0	0	Z	2	1	7	2	0	0	3	2	0	1	2	3	2	1	0	1	1	0	0	7	1.5	7
5-Jan	19	8	0	1	Z	0	0	1	1	2	13	6	1	1	11	10	20	24	38	32	29	45	27	24	13.5	45
6-Jan	51	42	25	16	4	Z	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	6.2	51
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0.2	2
8-Jan	0	Z	17	10	12	3	0	0	2	5	18	29	23	19	3	2	1	0	0	0	0	0	0	0	6.2	29
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	3	3	4	9	8	11	19	15	10	10	9	9	4.8	19
10-Jan	10	11	7	Z	10	5	5	40	29	6	3	6	13	23	3	2	0	0	0	0	0	0	0	0	7.6	40
11-Jan	0	0	0	0	Z	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
12-Jan	Z	0	0	0	3	5	1	3	6	1	C	C	C	C	C	5	4	7	14	13	7	5	5	7	4.8	14
13-Jan	9	Z	8	27	21	12	9	17	9	8	3	5	2	2	1	1	1	0	0	0	0	0	0	0	5.8	27
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
15-Jan	0	0	0	Z	0	0	0	0	1	3	1	3	1	1	1	1	1	5	2	0	1	1	2	0	1.1	5
16-Jan	3	5	8	6	Z	11	2	0	0	2	2	6	27	14	18	10	7	11	16	17	35	29	9	4	10.5	35
17-Jan	2	0	0	0	0	Z	2	1	2	18	2	1	1	2	1	1	2	0	0	0	0	0	0	0	1.6	18
18-Jan	Z	3	1	0	0	0	0	0	0	1	2	3	3	3	2	1	0	0	0	0	0	0	0	0	0.9	3
19-Jan	0	Z	0	1	1	0	0	0	0	4	3	1	1	2	2	1	0	0	0	0	0	0	0	0	0.7	4
20-Jan	0	0	Z	0	0	0	0	0	0	0	1	2	2	1	1	2	1	0	0	0	3	7	7	5	1.4	7
21-Jan	2	0	0	Z	1	7	6	0	2	4	8	9	8	8	11	8	4	26	72	70	61	41	10	1	15.6	72
22-Jan	0	0	0	0	Z	0	0	1	10	25	21	10	5	6	7	15	14	1	2	3	0	0	0	0	5.3	25
23-Jan	0	0	0	1	3	Z	2	1	1	0	1	2	2	9	23	16	11	1	0	1	0	0	0	0	3.2	23
24-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	2	0	0	0	0	0	1.2	23
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
26-Jan	0	0	Z	0	0	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	5	0	0	0	0	0	0	0	--	5
27-Jan	0	0	0	Z	0	0	0	2	3	2	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0.6	3
28-Jan	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	4	0	0	0	0	0	0	0	0.4	4
29-Jan	0	0	0	4	0	Z	0	0	1	1	1	9	7	7	14	9	6	0	0	0	0	0	0	0	2.5	14
30-Jan	Z	0	0	0	0	0	0	1	1	2	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0.4	2
31-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
	3.8	2.8	2.6	2.8	2.5	1.6	1.3	2.2	2.2	2.9	3.0	3.4	3.6	3.7	3.8	3.2	3.0	3.6	5.4	5.0	4.8	4.5	2.5	2.1	Diurnal Average	
	51	42	25	27	21	12	9	40	29	25	21	29	27	23	23	16	20	26	72	70	61	45	27	24	Diurnal Maximum	

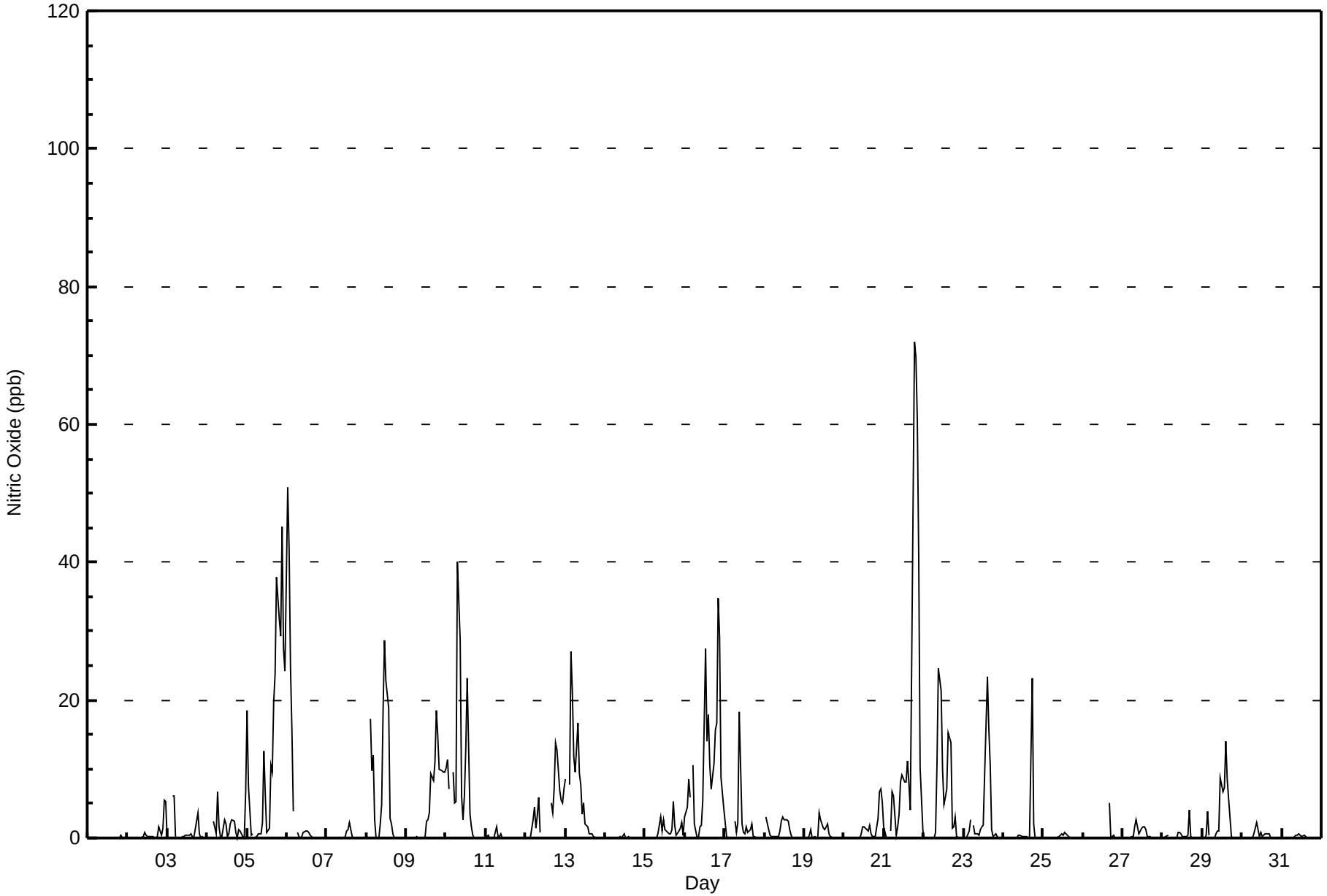
Z - zerospan C - Calibration PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

CNRL Horizon - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	672	95.86	95.86
21 - 40	22	3.14	99.00
11 - 80	7	1.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

CNRL Horizon - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	41	103	46	5	3	6	8	40	158	121	58	21	16	13	14	15	668
21 - 40	6	0	0	0	0	0	0	0	5	1	0	0	3	1	3	3	22
11 - 80	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0	2	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	48	104	46	5	3	6	8	40	163	125	58	21	19	14	17	20	697

Total Number of Valid Hours: 697

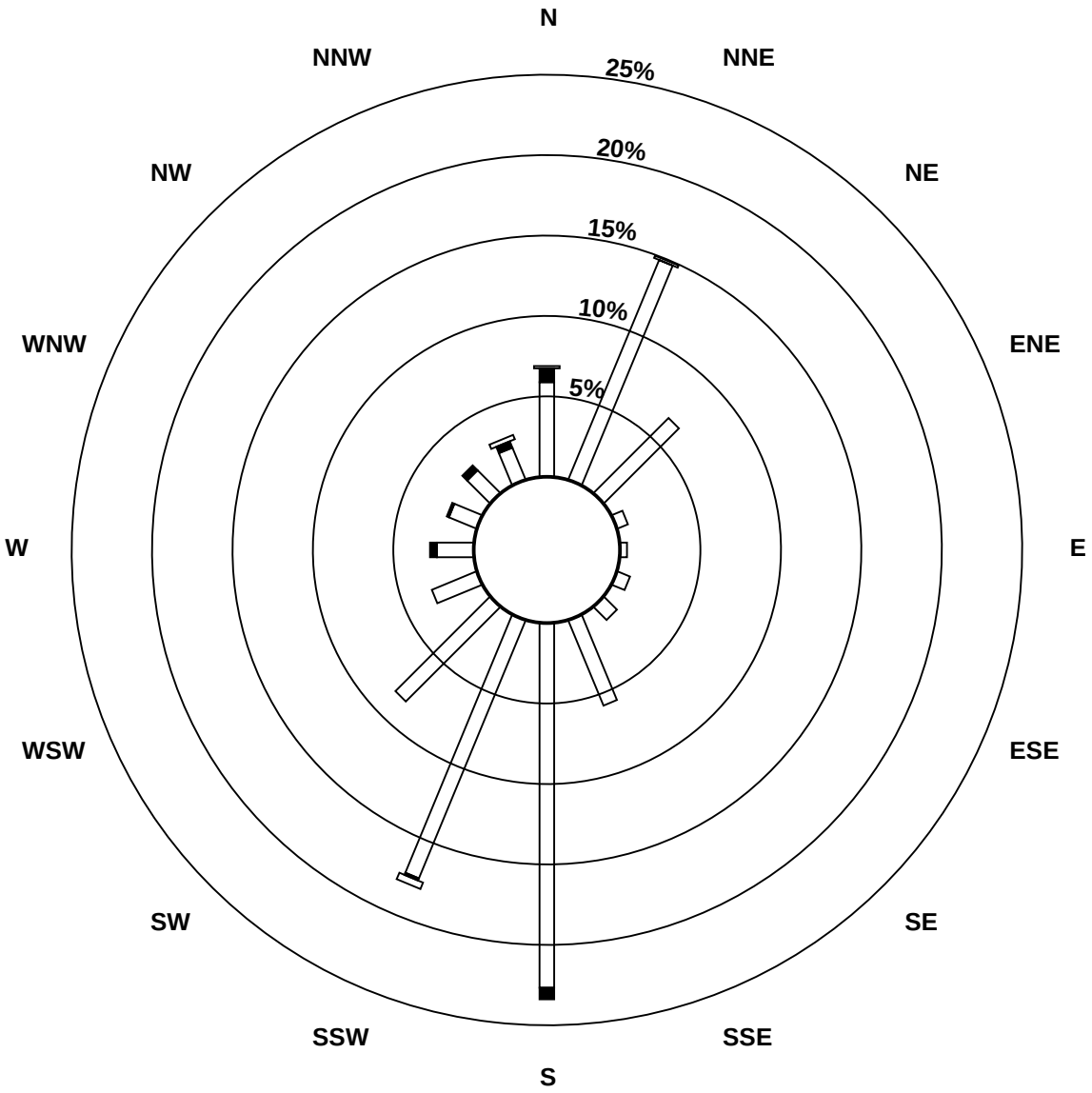
Total Number of Hours: 744

Wood Buffalo Environmental Association

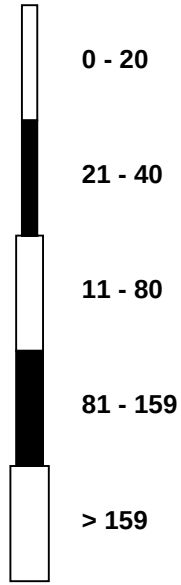
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

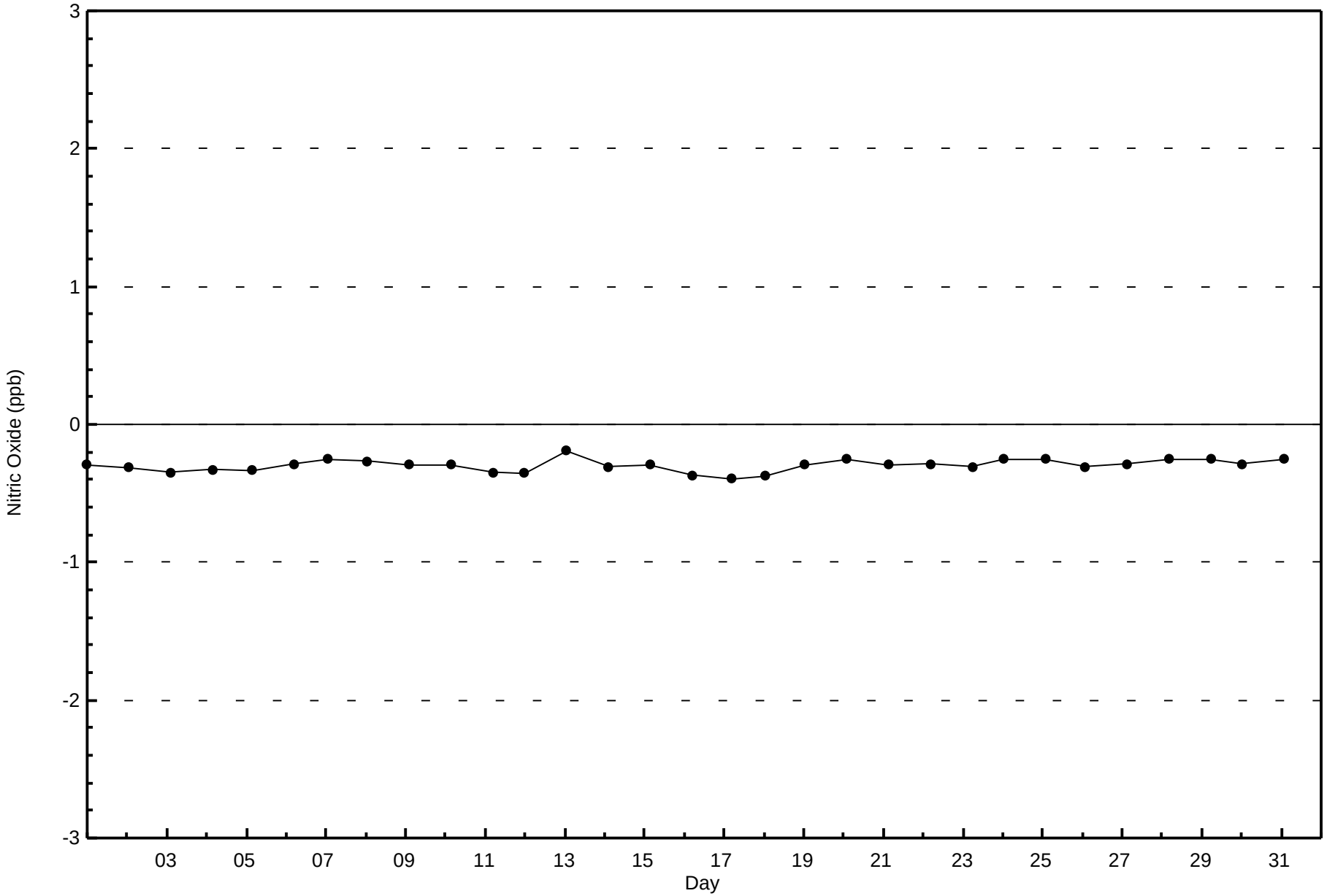
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

CNRL Horizon - January 2016

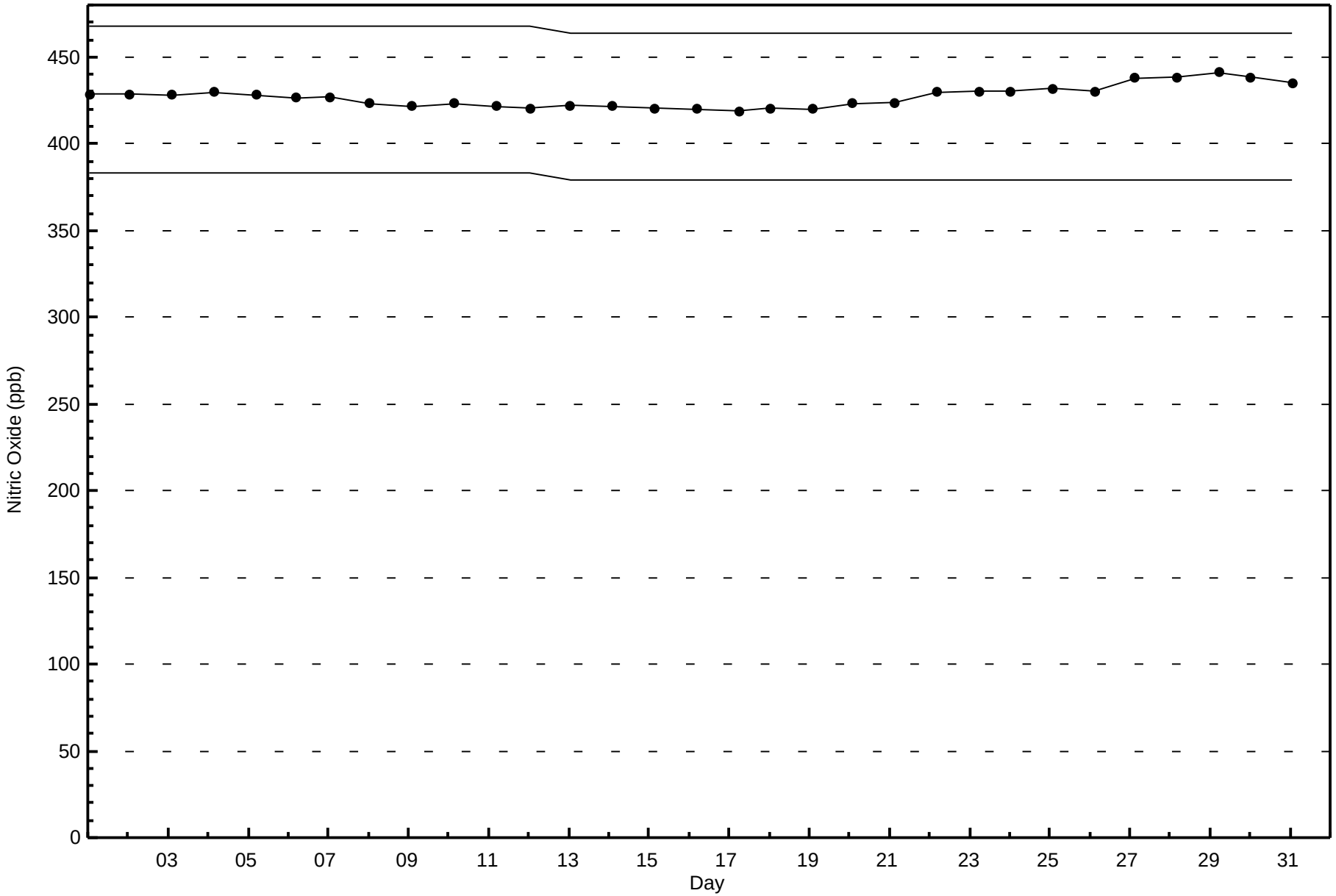


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 30 ppb on Jan 2 23:00 Maximum Daily Average: 19.0 ppb on Jan 12

Minimum Value: 0 ppb on Jan 7 20:00
Maximum Diurnal Average: 12.1 ppb at hour 18
Monthly Average: 9.0 ppb

Minimum Daily Average: 1.0 ppb on Jan 14
Minimum Diurnal Average: 5.6 ppb at hour 13
Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 5 $Q_3 = 16$ $P_{90} = 23$ $P_{99} = 29$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	36
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	6	11	3	7	12	2.2	12
2-Jan	1	Z	0	0	0	0	0	1	2	2	4	2	0	1	1	2	2	2	11	27	24	28	30	29	7.4	30
3-Jan	4	2	Z	20	23	3	1	1	1	2	2	2	2	2	4	2	3	21	28	24	22	22	15	7	9.1	28
4-Jan	3	2	2	Z	12	12	14	11	7	3	5	2	1	2	9	15	22	23	13	15	19	12	5	20	9.9	23
5-Jan	26	21	16	17	Z	10	12	16	18	15	16	9	2	3	15	19	23	25	27	27	29	29	27	26	18.7	29
6-Jan	25	24	20	20	22	Z	17	11	6	5	5	4	4	3	3	2	2	2	2	2	1	1	1	1	7.9	25
7-Jan	Z	0	1	1	1	0	1	1	1	1	2	3	8	9	16	4	2	1	0	0	0	0	1	1	2.3	16
8-Jan	3	Z	30	21	22	18	6	7	15	21	23	26	24	21	12	15	20	20	15	8	4	2	2	1	14.6	30
9-Jan	1	1	Z	2	12	9	16	9	1	1	1	1	6	7	11	22	26	26	26	26	26	25	25	23	13.1	26
10-Jan	23	24	23	Z	23	21	21	25	24	17	10	13	15	19	8	8	7	5	2	2	3	3	3	5	13.1	25
11-Jan	2	8	6	5	Z	3	8	5	5	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	9
12-Jan	Z	0	1	5	22	25	22	24	23	13	C	C	C	C	C	17	23	25	26	25	24	23	23	22	19.0	26
13-Jan	22	Z	21	23	23	23	23	25	22	19	11	11	6	5	4	5	5	2	1	1	1	1	1	1	11.0	25
14-Jan	1	0	Z	0	0	0	1	1	3	4	1	3	0	0	1	0	0	0	1	0	0	1	1	2	1.0	4
15-Jan	2	1	1	Z	2	2	4	9	12	16	5	7	3	3	2	4	12	29	22	20	20	18	23	19	10.2	29
16-Jan	21	27	29	26	Z	20	13	3	7	7	5	8	18	14	17	18	22	26	25	23	26	26	22	20	18.3	29
17-Jan	15	7	6	6	6	Z	17	9	15	20	5	2	2	4	3	6	19	19	16	8	7	12	9	9	9.7	20
18-Jan	Z	26	24	22	20	21	20	17	15	14	14	13	13	12	13	13	13	13	10	9	11	9	6	4	14.4	26
19-Jan	2	Z	2	14	15	6	6	6	6	11	6	3	2	3	5	4	4	2	5	7	5	8	3	6	5.7	15
20-Jan	1	1	Z	0	0	1	1	0	2	2	5	7	6	5	4	11	14	23	24	23	29	29	28	27	10.5	29
21-Jan	23	15	15	Z	19	23	21	18	18	12	12	12	10	12	14	17	19	23	26	24	24	23	22	18	18.2	26
22-Jan	14	13	13	13	Z	10	9	9	16	18	17	11	7	9	10	17	18	9	11	11	6	4	3	3	10.9	18
23-Jan	3	2	2	4	6	Z	10	7	5	3	6	6	6	12	19	18	18	17	15	16	14	11	7	11	9.5	19
24-Jan	Z	9	6	5	5	5	4	3	3	3	2	1	1	1	1	1	3	26	14	3	1	1	1	1	4.3	26
25-Jan	1	Z	7	8	11	7	4	8	3	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	3.4	11
26-Jan	2	2	Z	1	2	1	1	2	1	PF	PF	PF	PF	PF	PF	PF	15	9	12	8	1	1	1	1	--	15
27-Jan	1	1	1	Z	3	17	12	25	22	12	3	3	3	4	4	2	2	3	5	5	4	3	4	10	6.4	25
28-Jan	14	12	14	19	Z	8	7	6	4	4	3	3	2	3	2	3	18	14	3	2	2	2	1	1	6.4	19
29-Jan	1	1	11	28	19	Z	7	9	18	10	5	18	14	16	25	23	30	8	0	0	1	0	0	0	10.6	30
30-Jan	Z	0	0	0	0	0	0	12	17	13	2	3	1	2	2	3	4	1	1	1	0	1	1	3	3.0	17
31-Jan	1	Z	1	1	1	0	1	2	3	3	3	2	1	2	1	1	1	1	1	3	1	1	2	4	1.6	4
	8.4	8.0	9.7	10.0	10.4	9.1	9.0	9.0	9.5	8.8	6.0	6.1	5.6	6.0	7.2	8.4	11.3	12.1	11.1	10.6	10.3	9.6	8.9	9.2	Diurnal Average	
	26	27	30	28	23	25	23	25	24	21	23	26	24	21	25	23	30	29	28	27	29	29	30	29	Diurnal Maximum	

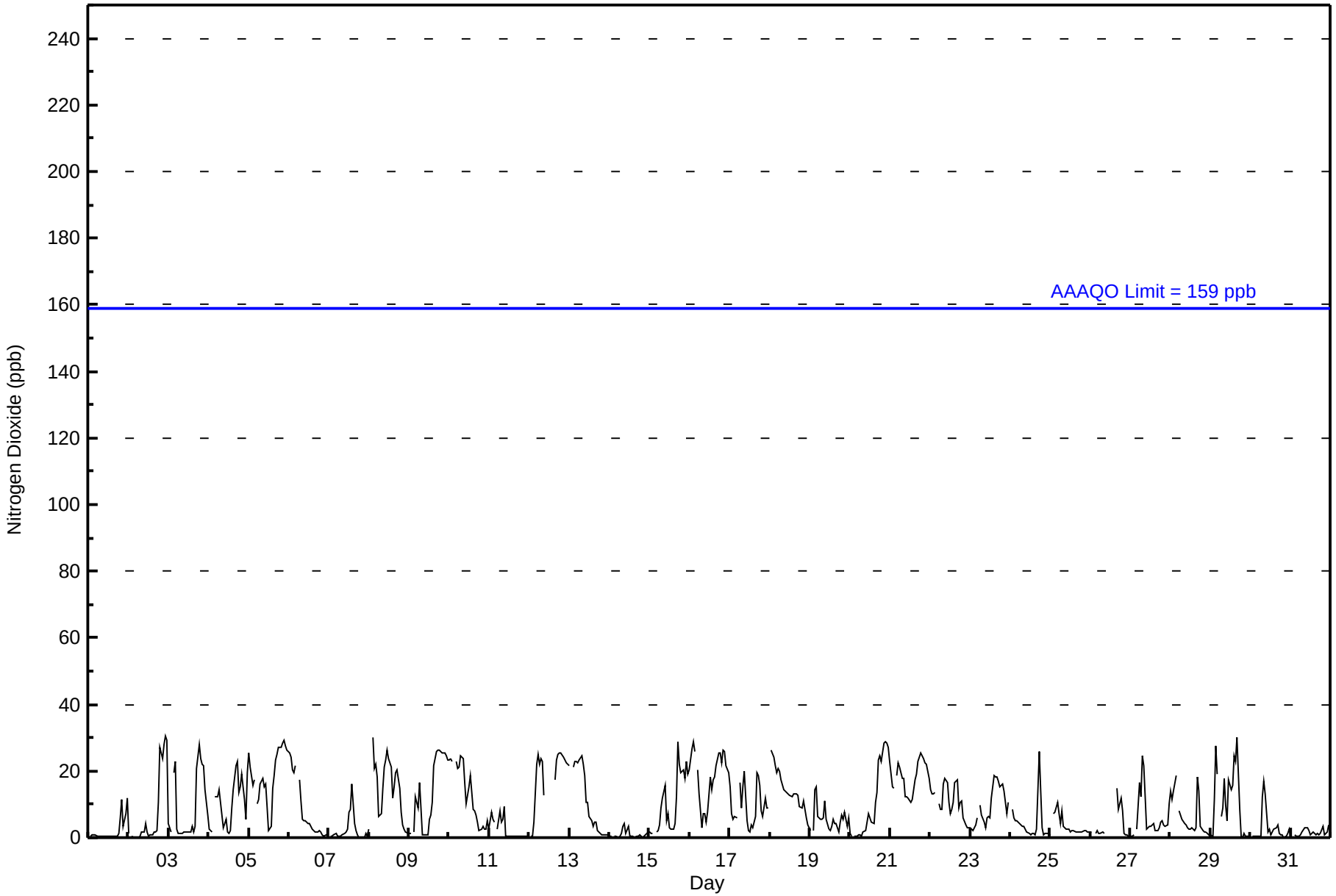
Z - zerospan C - Calibration PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	588	83.88	83.88
21 - 40	113	16.12	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: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	39	101	46	5	2	6	5	29	127	111	53	17	11	9	12	11	584
21 - 40	9	3	0	0	1	0	3	11	36	14	5	4	8	5	5	9	113
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	104	46	5	3	6	8	40	163	125	58	21	19	14	17	20	697

Total Number of Valid Hours: 697

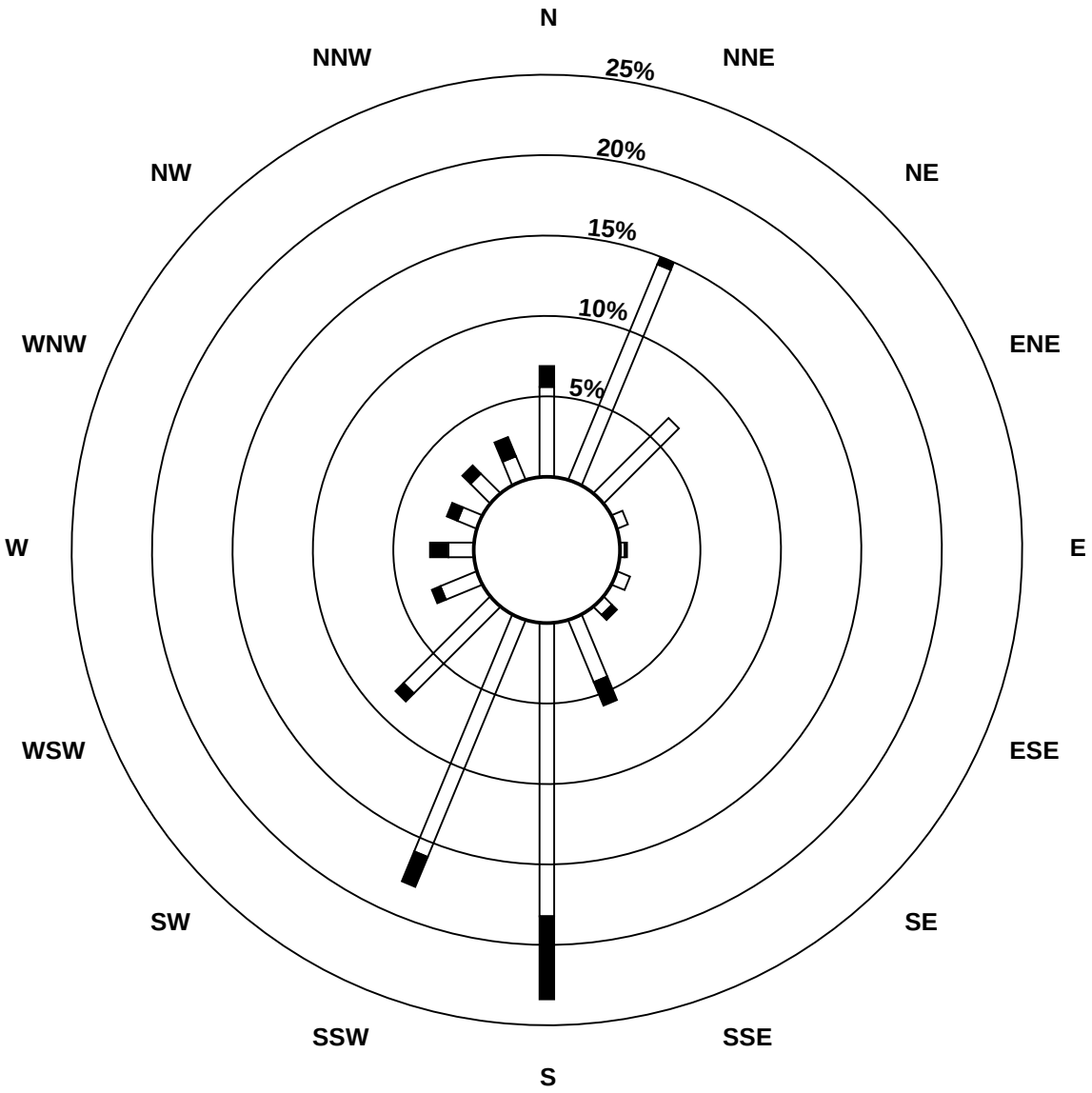
Total Number of Hours: 744

Wood Buffalo Environmental Association

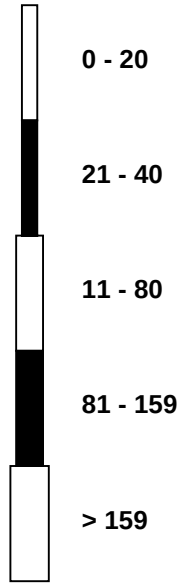
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



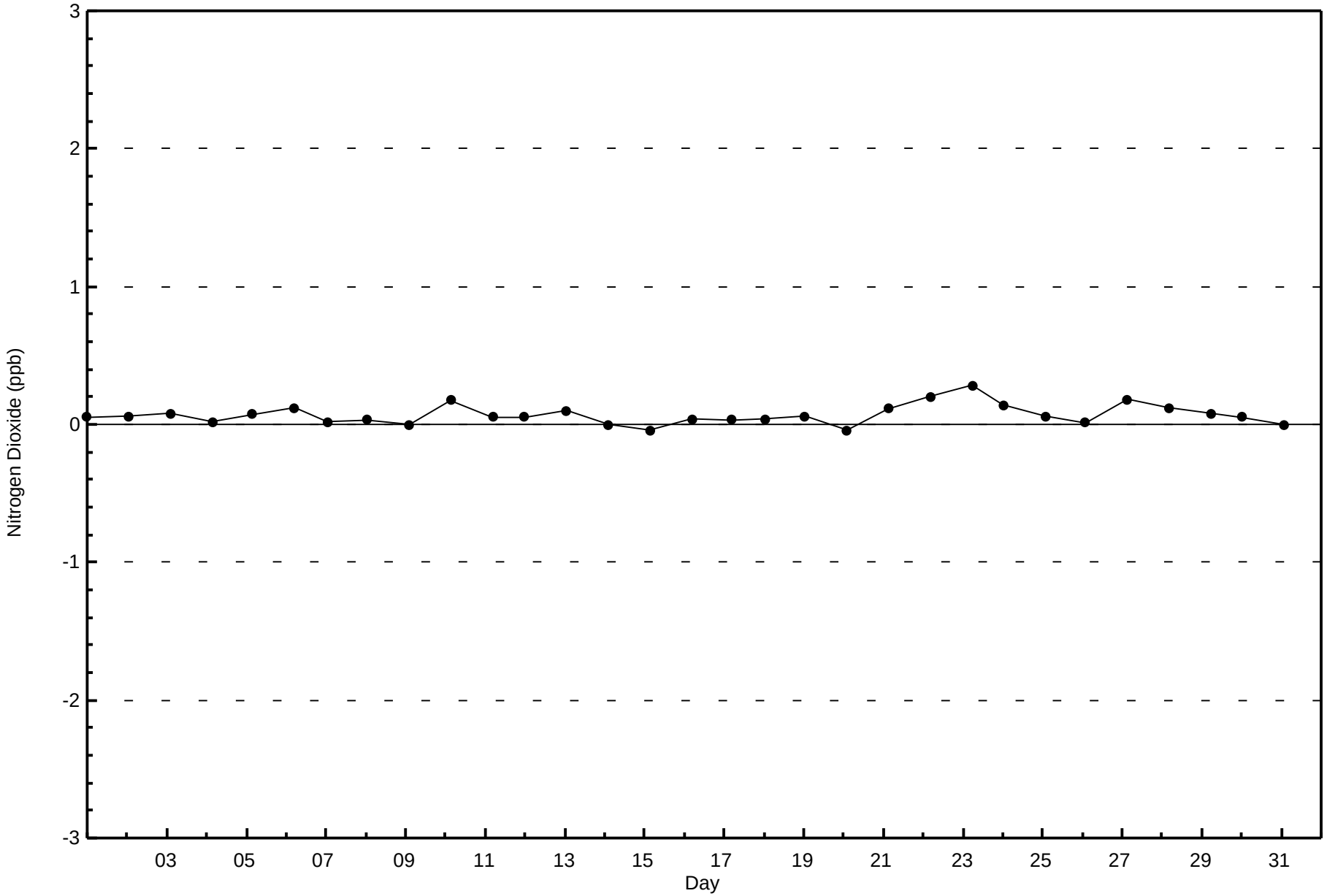
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - January 2016

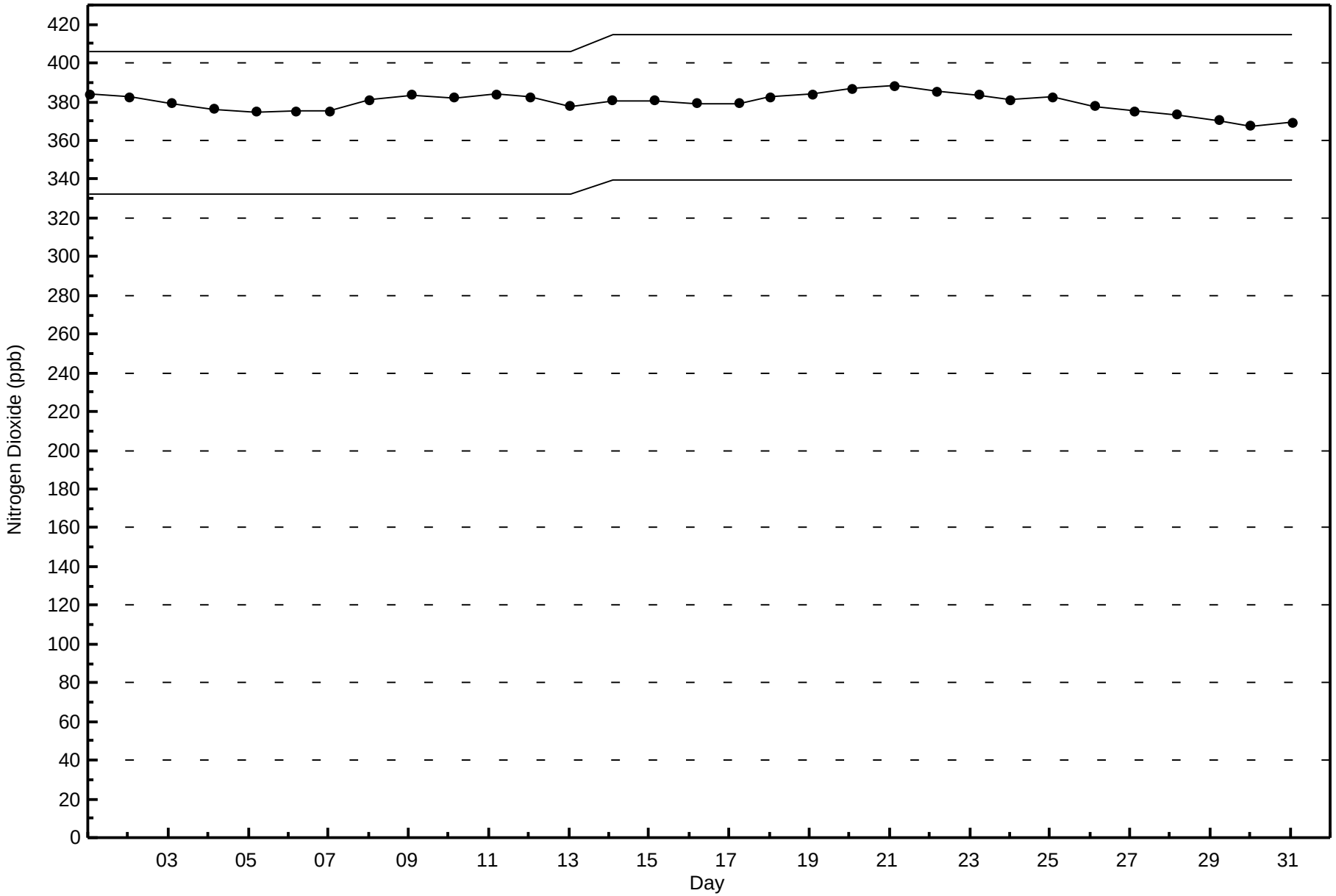


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - January 2016

Maximum Value: 98 ppb on Jan 21 19:00

Maximum Daily Average: 33.7 ppb on Jan 21

Minimum Value: 0 ppb on Jan 7 21:00

Minimum Daily Average: 1.1 ppb on Jan 14

Maximum Diurnal Average: 16.6 ppb at hour 19

Minimum Diurnal Average: 9.0 ppb at hour 11

Monthly Average: 12.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 6 $Q_3 = 19$ $P_{90} = 32$ $P_{99} = 64$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	36
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	6	12	3	7	12	2.2	12
2-Jan	1	Z	0	0	0	0	0	1	2	2	5	2	0	1	1	2	2	2	11	29	24	29	36	35	8.1	36
3-Jan	4	2	Z	26	29	3	1	1	1	2	2	2	2	2	4	2	3	22	31	24	22	22	15	7	10.0	31
4-Jan	3	2	2	Z	15	13	21	12	7	3	8	4	1	3	11	17	24	24	14	16	20	12	5	26	11.4	26
5-Jan	44	29	16	18	Z	10	12	17	18	17	29	16	3	5	26	28	43	49	65	59	58	74	55	51	32.2	74
6-Jan	76	66	45	35	25	Z	18	11	5	5	6	5	5	4	3	2	2	2	2	2	1	1	1	1	14.1	76
7-Jan	Z	0	1	1	1	0	1	1	1	1	2	3	9	10	18	4	2	1	0	0	0	0	1	1	2.5	18
8-Jan	3	Z	47	31	34	21	6	7	17	26	42	55	46	40	15	17	20	20	15	8	4	2	2	1	20.8	55
9-Jan	1	1	Z	1	12	9	17	9	1	1	1	1	8	9	15	31	34	37	45	41	36	35	34	33	17.9	45
10-Jan	33	35	30	Z	32	26	26	65	52	23	13	19	28	42	12	10	7	5	2	3	3	3	3	5	20.7	65
11-Jan	2	8	6	5	Z	3	10	5	6	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5	10
12-Jan	Z	0	1	4	25	30	24	27	29	13	C	C	C	C	C	22	27	32	39	38	31	29	28	29	23.8	39
13-Jan	30	Z	29	50	44	34	33	41	31	27	14	16	8	7	4	5	5	2	1	1	1	1	1	1	16.8	50
14-Jan	0	0	Z	0	0	0	1	1	4	5	1	4	0	0	1	0	0	0	1	0	0	0	1	2	1.1	5
15-Jan	2	1	1	Z	2	2	4	9	13	19	6	10	4	4	3	5	14	34	24	20	21	19	25	19	11.3	34
16-Jan	24	31	37	31	Z	31	15	3	7	9	7	13	45	28	35	29	29	36	41	39	61	55	30	24	28.8	61
17-Jan	18	7	5	6	6	Z	19	10	17	39	7	3	3	5	4	8	22	19	16	8	7	12	9	9	11.2	39
18-Jan	Z	29	25	22	20	21	20	17	15	15	16	16	15	15	16	14	14	13	10	9	11	9	6	4	15.3	29
19-Jan	2	Z	2	15	17	6	6	6	6	15	8	4	4	5	7	5	4	2	5	7	5	8	3	6	6.4	17
20-Jan	1	1	Z	0	0	1	1	0	2	2	5	9	8	6	5	12	14	23	25	23	31	36	36	32	11.9	36
21-Jan	24	15	15	Z	20	29	27	18	19	16	20	21	19	20	25	25	23	48	98	94	84	63	32	19	33.7	98
22-Jan	14	13	13	13	Z	10	9	9	27	43	38	21	12	14	18	32	31	10	12	14	6	4	3	3	16.1	43
23-Jan	3	2	2	5	9	Z	12	7	5	3	7	8	8	21	42	34	29	18	16	17	14	11	7	11	12.7	42
24-Jan	Z	9	6	5	5	4	4	3	3	3	2	1	1	1	1	1	2	49	16	3	1	1	1	1	5.4	49
25-Jan	1	Z	7	8	11	7	4	8	3	3	3	3	2	3	3	2	2	2	2	2	2	2	2	2	3.6	11
26-Jan	2	2	Z	1	2	1	1	2	2	PF	PF	PF	PF	PF	PF	PF	20	8	12	8	1	1	1	1	--	20
27-Jan	1	1	1	Z	3	17	13	26	24	14	3	5	5	5	6	2	2	3	5	5	4	3	4	10	7.0	26
28-Jan	14	11	14	19	Z	8	7	6	4	4	4	3	3	3	3	3	22	14	3	2	2	2	1	1	6.7	22
29-Jan	1	1	12	31	19	Z	6	9	18	11	6	26	21	23	39	31	36	9	0	0	1	0	0	0	13.1	39
30-Jan	Z	0	0	0	0	0	0	13	19	16	2	3	1	2	3	3	4	1	1	1	0	1	1	3	3.3	19
31-Jan	1	Z	1	1	0	0	1	2	3	3	4	3	1	2	2	1	1	1	1	3	1	1	2	4	1.7	4
	12.2	10.8	12.3	12.8	12.8	10.7	10.3	11.2	11.7	11.6	9.0	9.6	9.1	9.7	11.0	11.7	14.2	15.7	16.6	15.5	15.0	14.2	11.4	11.3	Diurnal Average	
	76	66	47	50	44	34	33	65	52	43	42	55	46	42	42	34	43	49	98	94	84	74	55	51	Diurnal Maximum	

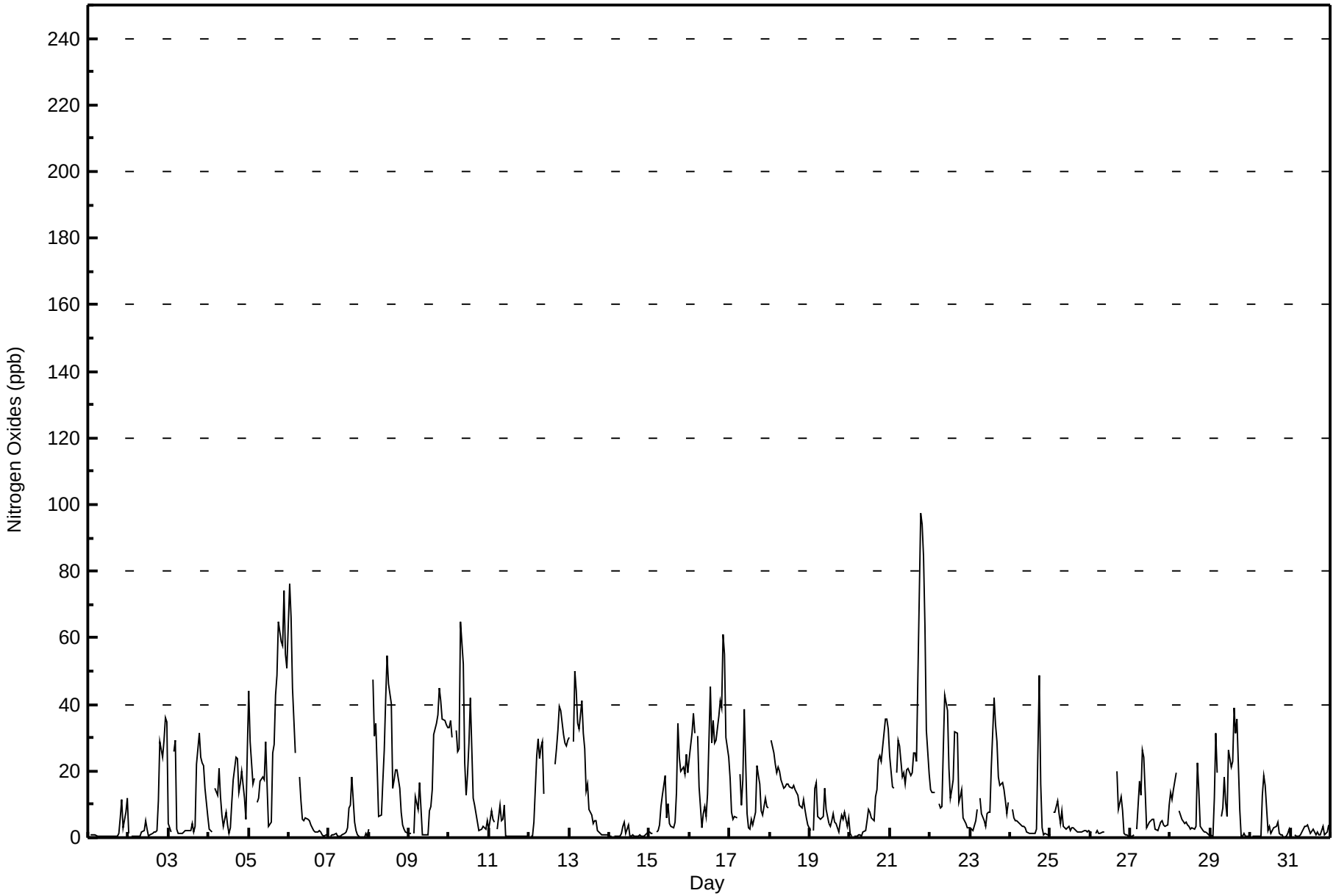
Z - zerospan C - Calibration PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - January 2016



Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	547	78.03	78.03
21 - 40	118	16.83	94.86
11 - 80	33	4.71	99.57
81 - 159	3	0.43	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	34	98	45	5	2	4	2	28	116	108	51	15	11	6	11	8	544
21 - 40	7	5	1	0	1	2	5	11	40	13	7	6	4	6	3	6	117
11 - 80	7	0	0	0	0	0	1	1	7	3	0	0	4	2	3	5	33
81 - 159	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	104	46	5	3	6	8	40	163	125	58	21	19	14	17	20	697

Total Number of Valid Hours: 697

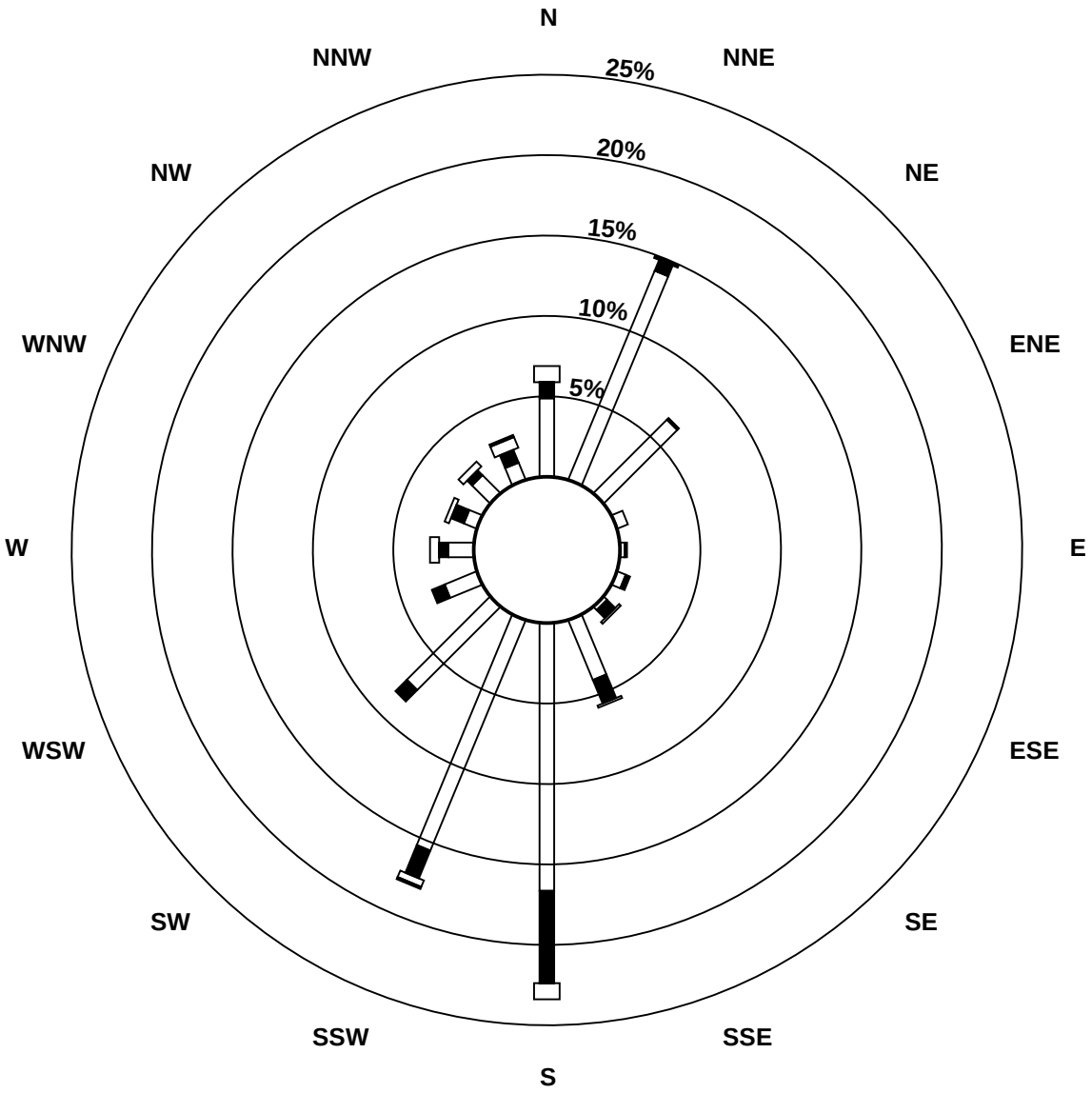
Total Number of Hours: 744

Wood Buffalo Environmental Association

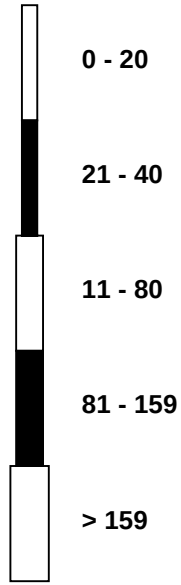
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



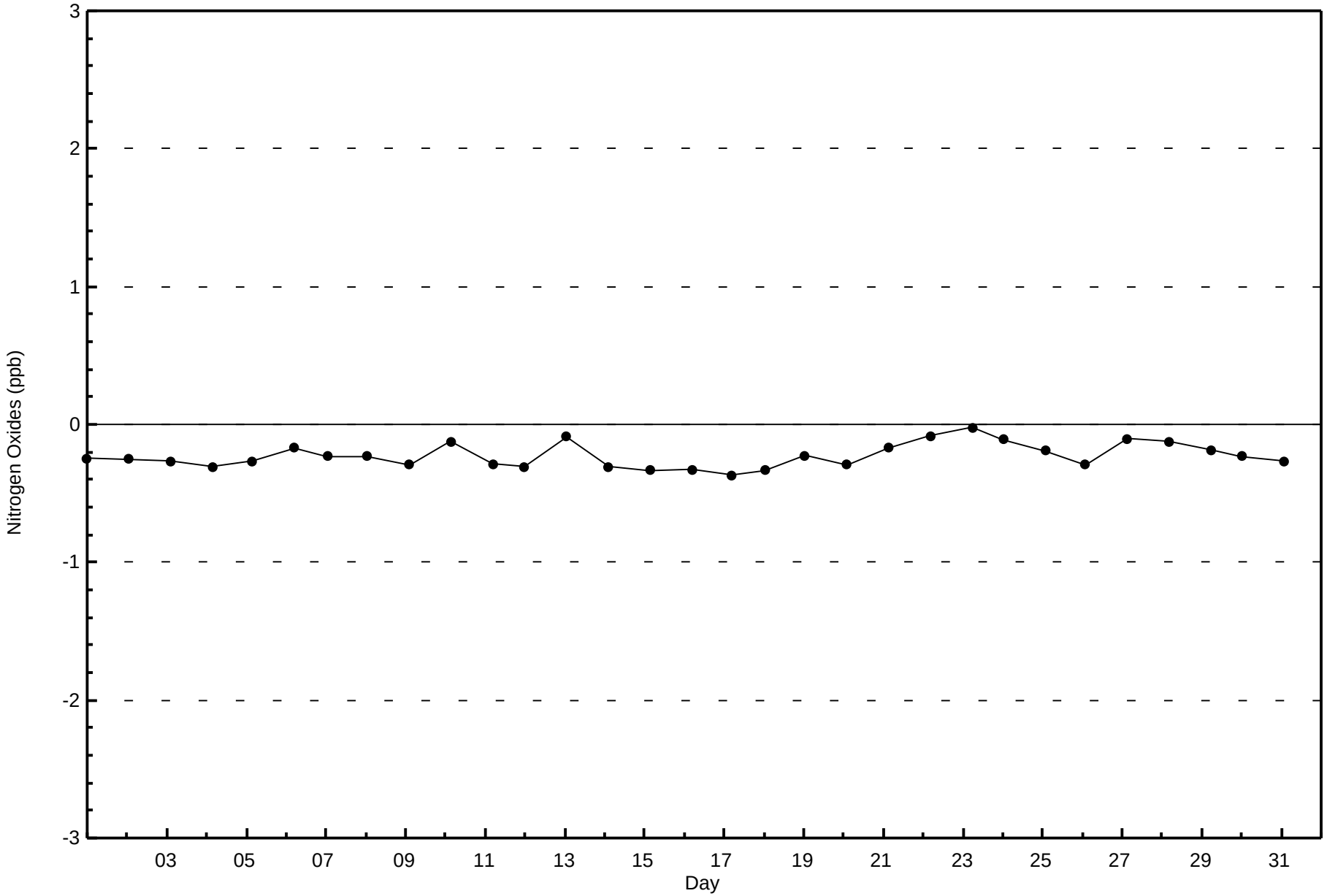
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - January 2016

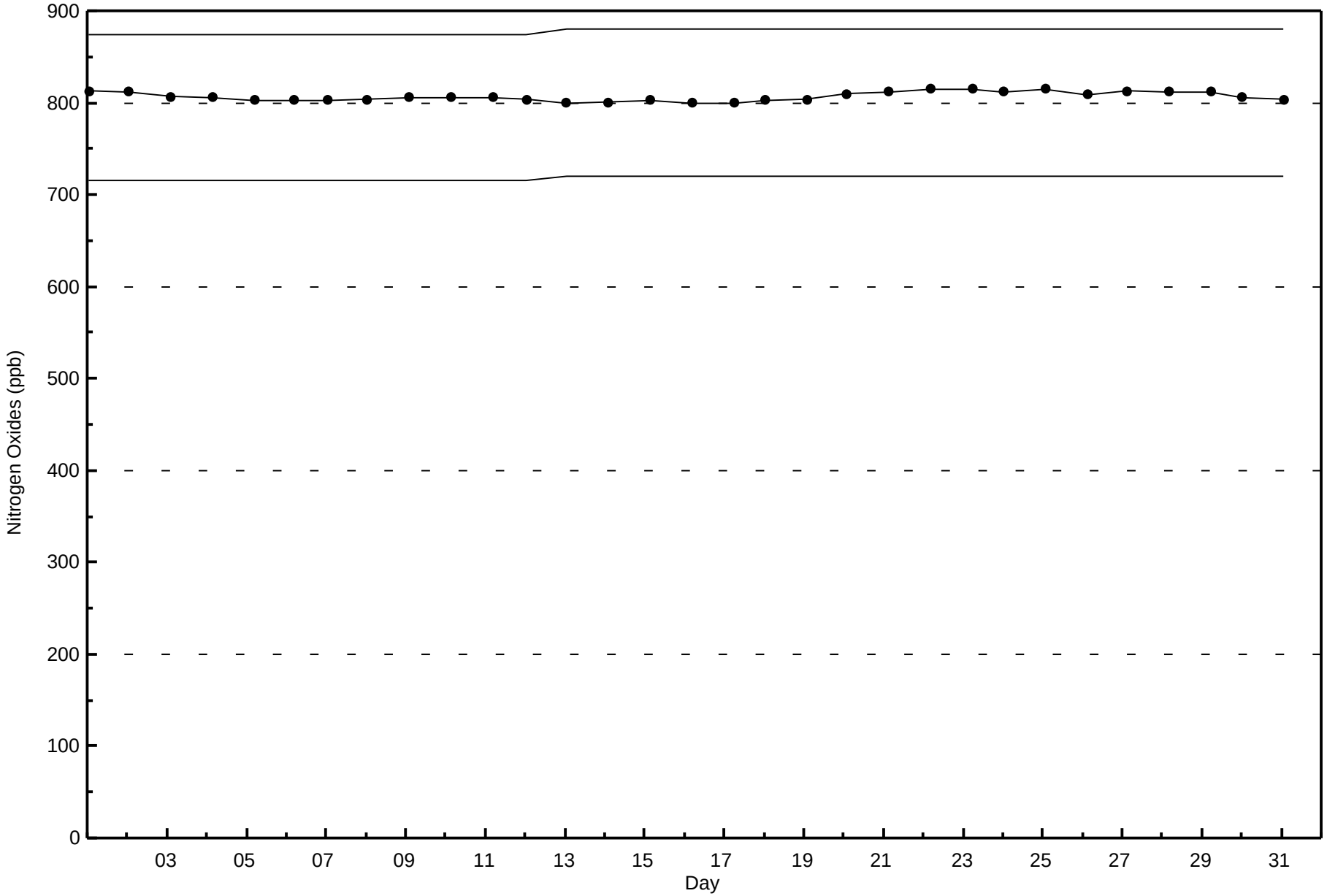


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

CNRL Horizon - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 59.7 $\mu g/m^3$ on Jan 21 16:00

Maximum Daily Average: 18.0 $\mu g/m^3$ on Jan 21

Minimum Value: 0.5 $\mu g/m^3$ on Jan 12 02:00

Minimum Daily Average: 1.0 $\mu g/m^3$ on Jan 7

Maximum Diurnal Average: 6.0 $\mu g/m^3$ at hour 16

Minimum Diurnal Average: 4.0 $\mu g/m^3$ at hour 23

Monthly Average: 4.72 $\mu g/m^3$

Percentiles: P_1 = 0.6 P_{10} = 1.0 Q_1 = 1.6 Median = 3.0 Q_3 = 6.2 P_{90} = 10.0 P_{99} = 27.9

Hours in Service:	744
Hours of Data:	735
Hours of Missing Data:	9
Hours of Calibration:	2
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	1.4	1.6	2.4	2.8	2.9	2.8	2.5	2.2	2.2	2.2	1.8	1.6	1.5	1.5	1.4	1.4	1.3	1.2	1.2	2.3	2.1	1.0	1.1	1.3	1.8	2.9
2-Jan	1.0	0.9	0.9	0.9	1.0	1.0	1.1	1.3	1.5	1.6	2.2	1.5	1.6	1.6	1.7	2.1	3.0	3.6	4.6	6.6	8.7	9.5	7.3	6.8	3.0	9.5
3-Jan	4.7	4.1	4.0	5.9	7.6	6.2	6.5	6.2	7.7	9.5	8.4	7.4	6.6	5.7	5.5	5.4	5.4	6.7	7.4	7.9	7.2	6.8	6.0	3.1	6.3	9.5
4-Jan	4.1	4.3	4.1	3.8	3.8	2.7	4.4	2.1	1.4	1.2	1.6	1.3	1.8	3.8	3.1	6.3	8.0	6.9	4.7	4.5	4.0	2.7	1.8	8.4	3.8	8.4
5-Jan	13.1	7.3	4.0	5.0	3.7	2.6	2.7	3.4	3.5	3.3	4.2	3.1	1.3	1.8	6.1	7.5	8.2	10.8	13.6	10.2	9.0	9.3	8.5	8.1	6.3	13.6
6-Jan	8.9	10.2	9.7	7.2	9.8	10.2	8.6	6.0	4.6	4.5	3.6	3.4	3.1	2.8	2.2	1.5	1.7	1.3	1.1	1.2	1.1	0.6	0.7	0.8	4.4	10.2
7-Jan	0.7	0.7	0.6	0.6	0.7	0.8	1.0	1.1	1.2	1.2	1.1	1.1	1.1	1.3	1.8	1.6	1.2	0.8	0.8	0.8	0.8	0.7	0.8	0.7	1.0	1.8
8-Jan	1.2	2.8	3.5	3.4	3.9	3.1	2.8	3.2	5.1	6.5	9.1	14.3	19.5	17.2	12.6	12.9	8.6	6.1	3.8	2.3	1.7	1.5	1.3	1.5	6.2	19.5
9-Jan	2.0	2.7	3.0	3.0	4.2	3.9	4.5	4.0	3.9	4.1	7.9	6.5	5.9	5.5	5.5	9.9	13.0	12.7	12.0	11.4	10.2	10.0	12.5	12.3	7.1	13.0
10-Jan	12.8	15.1	15.2	15.3	15.3	14.9	14.0	14.9	13.5	9.8	8.1	8.4	10.7	13.1	6.0	4.4	4.5	4.8	3.4	3.1	3.0	3.0	2.9	3.1	9.1	15.3
11-Jan	2.5	2.9	2.6	2.3	2.1	2.1	1.5	1.6	1.6	1.6	1.2	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	1.3	2.9
12-Jan	0.7	0.5	0.5	0.8	1.5	1.6	2.0	2.2	2.7	2.3	3.0	3.3	4.6	3.2	2.9	3.1	4.4	4.5	3.8	4.2	4.7	4.4	4.2	4.8	2.9	4.8
13-Jan	5.2	5.1	6.7	8.6	8.7	9.0	13.3	16.9	16.6	15.3	C	C	11.7	11.6	10.6	7.9	7.6	9.4	7.7	6.0	3.9	3.6	3.5	4.0	8.8	16.9
14-Jan	4.3	3.9	3.3	2.4	1.4	0.9	0.7	0.7	0.7	0.8	0.7	0.8	0.7	1.0	0.8	0.8	1.0	1.2	1.2	1.3	1.6	1.6	1.6	1.6	1.5	4.3
15-Jan	1.5	1.3	1.4	1.3	1.3	1.4	1.6	2.7	2.8	5.0	2.2	2.0	1.7	1.7	1.8	1.8	3.6	4.9	4.5	3.8	3.7	4.0	4.7	3.9	2.7	5.0
16-Jan	3.5	32.4	33.6	14.4	2.6	2.1	1.1	0.7	1.5	1.4	2.6	3.1	5.6	3.2	3.3	2.9	3.6	5.1	5.5	5.4	7.7	6.1	2.9	2.9	6.4	33.6
17-Jan	2.7	1.7	2.1	2.5	2.5	2.6	3.3	2.9	3.3	4.6	2.9	2.7	1.9	1.4	1.5	2.1	3.8	3.0	2.8	2.2	2.3	3.2	2.2	2.1	2.6	4.6
18-Jan	2.7	3.1	3.0	3.0	3.5	3.6	3.2	2.6	2.9	3.5	5.6	4.9	7.3	4.5	4.3	3.2	2.4	1.8	1.7	1.7	1.5	1.5	1.5	1.5	3.1	7.3
19-Jan	1.5	1.5	1.7	2.8	5.1	4.2	3.8	3.7	3.6	4.5	3.6	2.8	2.1	2.2	2.7	3.3	3.7	5.1	5.4	4.4	3.9	3.3	3.6	3.4	3.4	5.4
20-Jan	1.5	1.1	1.0	1.0	1.0	1.2	1.1	1.2	1.3	1.4	1.3	1.2	1.2	1.4	1.6	1.9	2.2	5.8	5.5	4.3	5.5	6.7	5.9	5.9	2.6	6.7
21-Jan	5.3	4.8	4.7	4.9	5.9	7.5	9.0	9.4	9.7	8.9	9.3	9.3	9.7	11.7	39.4	59.7	46.8	43.5	29.9	27.9	27.7	24.0	14.5	7.7	18.0	59.7
22-Jan	6.9	7.2	7.8	7.8	7.6	7.8	7.7	7.6	9.7	13.4	9.5	8.9	8.0	8.2	10.8	13.8	12.7	8.7	8.5	8.5	7.1	5.7	4.6	5.7	8.5	13.8
23-Jan	6.9	7.6	7.9	9.1	9.5	10.9	11.0	11.4	11.0	10.6	12.3	12.9	11.7	11.3	10.1	9.0	8.8	7.5	7.4	6.8	6.5	6.4	7.2	7.9	9.2	12.9
24-Jan	8.4	8.4	7.8	7.7	7.8	6.9	5.6	5.2	5.4	4.8	3.4	3.0	2.6	2.6	2.5	2.5	2.7	6.0	8.2	11.0	13.9	11.4	10.5	7.0	6.5	13.9
25-Jan	7.0	6.9	7.0	6.2	6.2	6.4	7.3	8.8	6.3	4.8	3.2	2.5	3.2	2.6	2.0	2.1	2.6	2.9	2.9	2.8	2.7	2.4	1.9	1.7	4.3	8.8
26-Jan	1.9	1.7	1.6	1.5	1.4	1.4	1.4	1.4	1.5	PF	PF	PF	PF	PF	PF	PF	2.7	2.7	2.4	2.1	1.0	0.8	0.8	0.7	--	2.7
27-Jan	0.7	0.7	0.7	0.8	0.8	1.3	1.1	1.5	1.7	2.3	1.6	1.8	2.2	2.3	2.6	3.4	3.2	2.9	2.9	3.7	4.1	3.9	4.1	10.8	2.5	10.8
28-Jan	16.0	10.3	12.0	17.6	10.5	5.9	5.2	4.9	4.8	4.6	3.8	2.8	2.3	2.2	2.1	2.1	3.0	2.7	2.5	1.8	2.2	1.9	1.1	0.8	5.1	17.6
29-Jan	0.7	0.6	0.9	1.4	1.3	1.3	1.2	1.1	1.6	1.2	0.9	1.4	1.1	1.2	1.7	1.3	2.1	1.4	1.0	1.1	1.1	1.0	1.1	1.0	1.2	2.1
30-Jan	1.1	1.1	1.1	1.1	1.2	1.2	1.2	2.0	2.9	2.4	1.6	1.9	1.9	1.8	2.1	2.3	2.7	2.9	3.1	2.9	2.2	1.9	1.8	1.8	1.9	3.1
31-Jan	1.8	1.8	1.9	2.2	2.7	3.7	3.5	3.6	4.0	4.1	3.8	3.9	3.5	2.8	2.4	2.4	2.4	2.1	2.4	2.2	2.1	2.1	2.3	2.5	2.8	4.1
	4.3	5.0	5.1	4.8	4.4	4.2	4.3	4.4	4.5	4.7	4.2	4.1	4.6	4.4	5.1	6.0	5.7	5.8	5.2	5.0	5.0	4.6	4.0	4.0	Diurnal Average	
	16.0	32.4	33.6	17.6	15.3	14.9	14.0	16.9	16.6	15.3	12.3	14.3	19.5	17.2	39.4	59.7	46.8	43.5	29.9	27.9	27.7	24.0	14.5	12.3	Diurnal Maximum	

C - Calibration PF - Power Failure

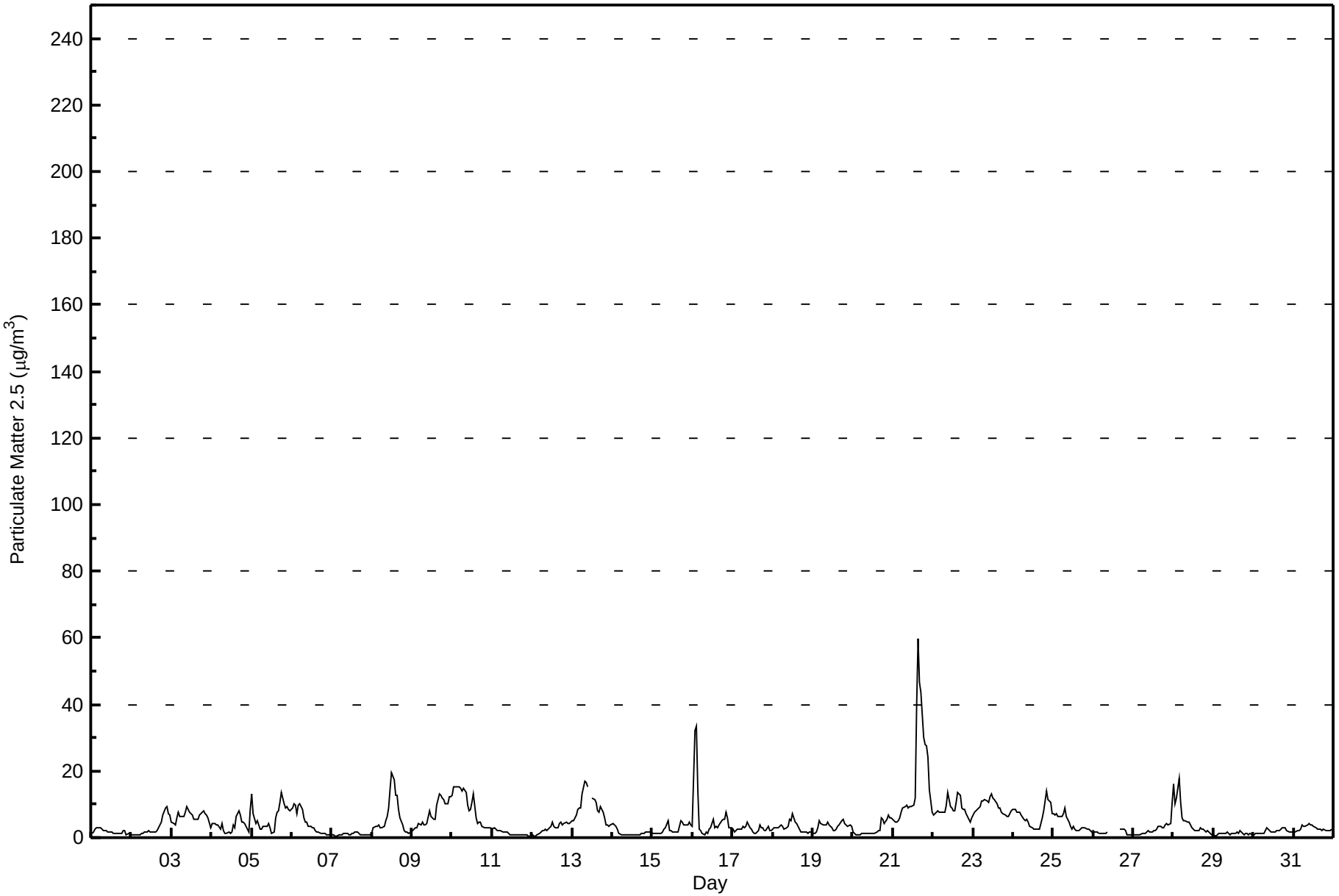
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

CNRL Horizon - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	458	62.31	62.31
6 - 15	194	26.39	88.71
16 - 25	7	0.95	89.66
26 - 80	9	1.22	90.88
> 81.0	0	0.00	90.88

Total Number of Valid Hours: 735

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

CNRL Horizon - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	19	62	45	5	1	3	5	30	107	77	44	14	11	14	10	9	456
6 - 15	25	25	1	2	2	3	4	9	63	29	6	3	4	1	7	9	193
16 - 25	1	1	0	0	0	0	0	0	0	2	1	0	2	0	0	0	7
26 - 80	0	2	0	0	0	0	0	0	1	2	0	1	0	1	0	2	9
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	45	90	46	7	3	6	9	39	171	110	51	18	17	16	17	20	665

Total Number of Valid Hours: 731

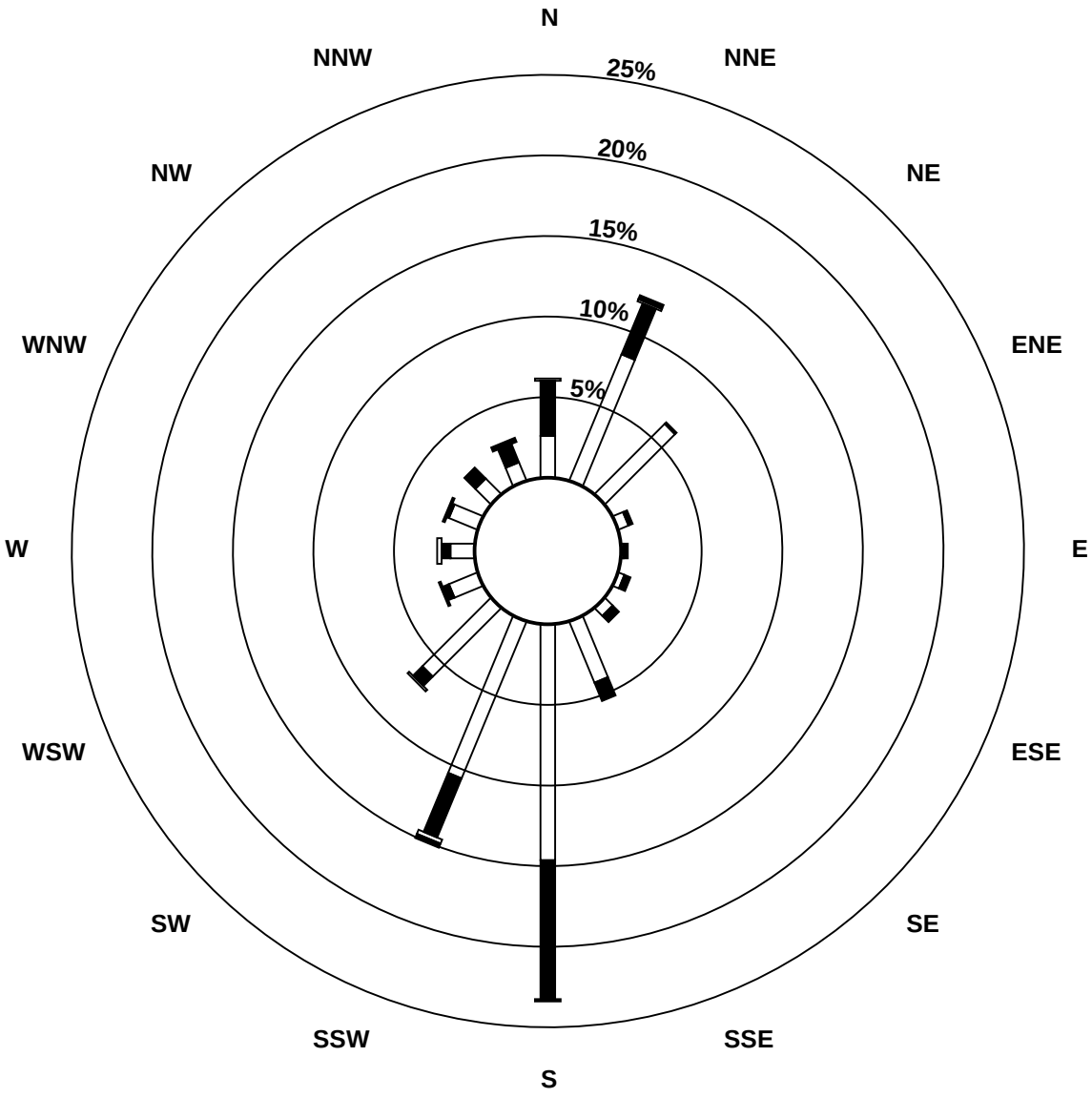
Total Number of Hours: 744

Wood Buffalo Environmental Association

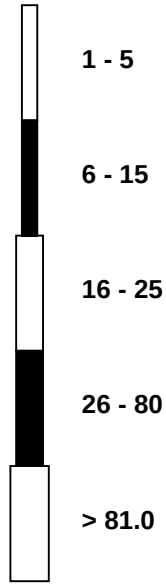
Wind Rose Jan 2016

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

CNRL Horizon (AMS 15)



Classes ($\mu g/m^3$)



Total Number of Valid Hours: 731

Maximum Value: 5.5 C on Jan 29 15:00

Maximum Daily Average: 2.7 C on Jan 29

Minimum Value: -34.9 C on Jan 16 05:00

Minimum Daily Average: -31.0 C on Jan 16

Maximum Diurnal Average: -11.0 C at hour 15

Minimum Diurnal Average: -14.6 C at hour 9

Monthly Average: -13.43 C

Percentiles: P_1 = -32.4 P_{10} = -22.3 Q_1 = -18.8 Median = -14.0 Q_3 = -8.6 P_{90} = -2.7 P_{99} = 4.2

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

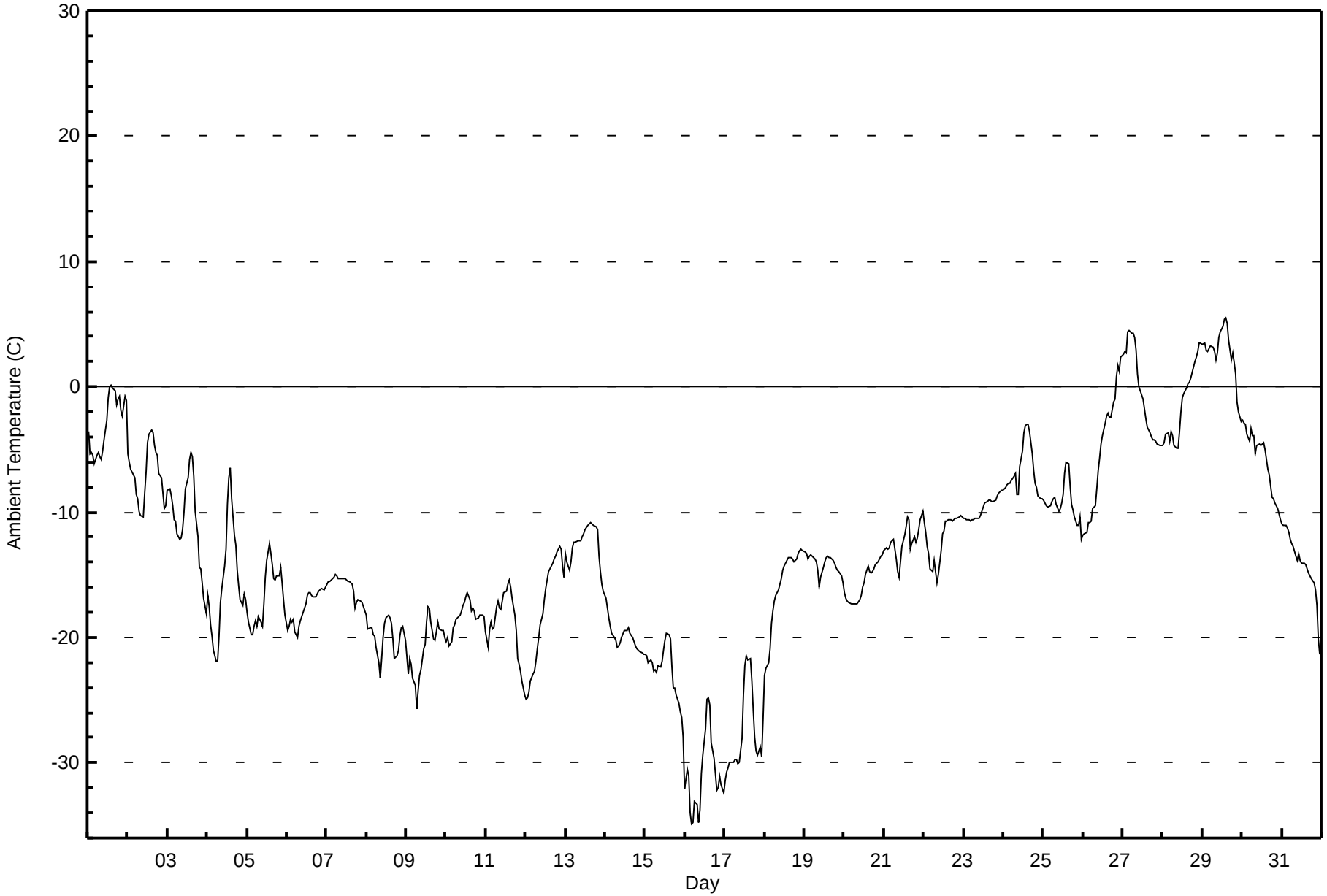
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-3.6	-5.3	-5.2	-5.4	-6.2	-5.5	-5.2	-5.5	-5.8	-5.2	-4.2	-2.6	-0.8	0.0	0.1	-0.1	-0.3	-1.4	-1.0	-0.8	-1.8	-2.3	-0.7	-1.1	-2.9	0.1
2-Jan	-5.4	-6.1	-6.6	-7.0	-7.2	-8.6	-8.9	-10.0	-10.3	-10.4	-8.4	-6.8	-4.4	-3.7	-3.4	-3.7	-4.6	-5.3	-5.5	-6.9	-7.2	-8.5	-9.8	-9.5	-7.0	-3.4
3-Jan	-8.2	-8.1	-8.7	-9.5	-10.6	-10.7	-11.7	-12.1	-12.1	-11.4	-10.0	-8.1	-7.3	-5.8	-5.2	-5.6	-7.2	-10.0	-11.9	-14.5	-14.5	-15.6	-16.9	-18.2	-10.6	-5.2
4-Jan	-16.6	-17.5	-19.0	-19.9	-21.0	-21.9	-21.9	-19.9	-17.2	-16.1	-14.4	-13.0	-9.4	-7.2	-6.5	-8.9	-11.9	-12.7	-14.6	-15.9	-17.0	-17.5	-16.6	-16.9	-15.6	-6.5
5-Jan	-17.9	-18.7	-19.8	-19.8	-19.1	-18.7	-19.1	-18.3	-18.8	-19.1	-17.3	-15.2	-13.8	-12.6	-13.3	-14.2	-15.3	-15.4	-15.1	-15.1	-14.4	-15.6	-17.0	-18.2	-16.7	-12.6
6-Jan	-19.5	-19.1	-18.5	-18.7	-18.5	-19.6	-20.0	-19.1	-18.6	-18.4	-18.0	-17.3	-16.7	-16.4	-16.4	-16.6	-16.8	-16.7	-16.5	-16.3	-16.2	-16.1	-16.2	-16.0	-17.6	-16.0
7-Jan	-15.7	-15.6	-15.6	-15.5	-15.2	-15.0	-15.1	-15.3	-15.3	-15.3	-15.3	-15.3	-15.5	-15.5	-15.6	-15.7	-16.3	-17.7	-17.2	-17.0	-17.1	-17.2	-17.6	-17.9	-16.0	-15.0
8-Jan	-18.2	-19.3	-19.3	-19.2	-19.7	-19.9	-20.8	-22.0	-23.3	-21.7	-20.0	-18.9	-18.4	-18.2	-18.5	-18.8	-20.1	-21.7	-21.5	-21.0	-19.9	-19.2	-19.2	-20.3	-20.0	-18.2
9-Jan	-21.6	-22.9	-21.7	-22.1	-23.2	-23.8	-25.7	-24.3	-23.0	-22.6	-20.9	-20.6	-18.8	-17.5	-17.7	-18.8	-20.1	-20.3	-19.5	-18.8	-19.3	-19.5	-19.4	-20.0	-20.9	-17.5
10-Jan	-20.4	-20.1	-20.7	-20.4	-19.2	-18.9	-18.6	-18.5	-18.2	-17.9	-17.5	-17.2	-16.8	-16.4	-17.0	-17.9	-17.7	-17.8	-18.5	-18.5	-18.2	-18.2	-18.2	-18.3	-18.4	-16.4
11-Jan	-19.6	-20.8	-19.4	-18.8	-19.4	-19.3	-17.5	-17.1	-17.6	-17.8	-17.1	-16.4	-16.3	-15.8	-15.4	-16.0	-16.9	-18.2	-19.5	-21.6	-22.2	-22.7	-23.5	-24.6	-18.9	-15.4
12-Jan	-25.0	-24.9	-24.4	-23.5	-22.9	-22.7	-21.9	-20.9	-20.0	-19.0	-18.1	-17.0	-16.1	-15.4	-14.8	-14.3	-14.0	-13.7	-13.6	-13.1	-12.8	-12.9	-14.3	-15.1	-17.9	-12.8
13-Jan	-13.3	-13.9	-14.6	-14.0	-12.8	-12.4	-12.4	-12.3	-12.3	-12.3	-12.0	-11.7	-11.4	-11.0	-10.9	-10.9	-11.0	-11.1	-11.2	-11.4	-13.5	-14.8	-15.7	-16.3	-12.6	-10.9
14-Jan	-16.9	-17.6	-18.5	-19.1	-19.7	-20.0	-20.2	-20.8	-20.7	-20.4	-20.0	-19.4	-19.5	-19.5	-19.3	-19.6	-20.0	-20.3	-20.7	-20.9	-21.0	-21.1	-21.2	-21.3	-19.9	-16.9
15-Jan	-21.4	-21.4	-22.0	-21.8	-22.0	-22.6	-22.6	-22.8	-22.2	-22.4	-21.9	-21.0	-20.3	-19.6	-19.8	-20.1	-22.3	-24.0	-24.0	-24.6	-25.3	-26.0	-26.4	-28.0	-22.7	-19.6
16-Jan	-32.1	-30.5	-31.0	-34.0	-34.9	-34.7	-33.0	-33.3	-34.8	-33.8	-30.8	-29.4	-27.3	-24.9	-24.8	-25.4	-28.4	-29.6	-30.9	-32.2	-32.0	-31.1	-31.8	-32.4	-31.0	-24.8
17-Jan	-31.4	-30.7	-30.4	-30.0	-29.9	-29.9	-29.7	-29.7	-30.0	-30.0	-28.0	-24.6	-22.2	-21.5	-21.8	-21.7	-23.5	-25.8	-27.9	-29.0	-29.3	-28.8	-29.5	-26.5	-27.6	-21.5
18-Jan	-23.0	-22.5	-22.0	-20.9	-18.9	-17.9	-17.1	-16.6	-16.2	-15.7	-15.3	-14.7	-14.3	-13.9	-13.6	-13.6	-13.7	-13.8	-14.0	-13.7	-13.3	-13.0	-13.0	-13.0	-16.0	-13.0
19-Jan	-13.1	-13.3	-13.7	-13.5	-13.4	-13.5	-13.7	-14.0	-14.6	-15.9	-15.2	-14.5	-14.0	-13.7	-13.5	-13.6	-13.7	-13.8	-14.1	-14.4	-14.6	-14.8	-15.1	-15.6	-14.1	-13.1
20-Jan	-16.5	-16.9	-17.1	-17.2	-17.3	-17.3	-17.3	-17.3	-17.3	-17.0	-16.7	-16.0	-15.7	-15.0	-14.3	-14.8	-14.9	-14.7	-14.5	-14.2	-14.0	-13.7	-13.5	-13.4	-15.7	-13.4
21-Jan	-13.1	-12.8	-13.0	-12.9	-12.4	-12.2	-12.1	-13.7	-14.8	-15.2	-14.0	-12.8	-11.8	-11.2	-10.4	-10.6	-13.0	-12.5	-12.0	-12.3	-12.1	-11.4	-10.6	-10.0	-12.4	-10.0
22-Jan	-10.8	-11.6	-12.7	-13.3	-14.5	-14.7	-13.9	-14.8	-15.6	-15.0	-13.1	-11.8	-11.5	-10.8	-10.7	-10.7	-10.6	-10.7	-10.6	-10.5	-10.5	-10.4	-10.3	-10.4	-12.1	-10.3
23-Jan	-10.5	-10.5	-10.6	-10.7	-10.7	-10.6	-10.6	-10.5	-10.5	-10.5	-10.2	-10.0	-9.6	-9.2	-9.1	-9.0	-9.0	-9.2	-9.1	-9.1	-8.7	-8.5	-8.3	-8.3	-9.7	-8.3
24-Jan	-8.3	-8.1	-7.8	-7.7	-7.7	-7.5	-7.1	-6.9	-8.6	-8.6	-6.3	-5.1	-3.6	-3.1	-3.0	-3.0	-3.6	-5.3	-6.7	-7.7	-8.1	-8.7	-8.9	-9.0	-6.7	-3.0
25-Jan	-9.0	-9.2	-9.5	-9.6	-9.4	-9.2	-8.9	-8.8	-9.3	-9.9	-9.7	-9.2	-8.6	-7.0	-6.1	-6.1	-7.9	-9.4	-9.9	-10.4	-11.1	-11.0	-10.4	-12.1	-9.2	-6.1
26-Jan	-11.8	-11.7	-11.7	-10.9	-10.9	-10.7	-9.7	-9.4	-8.1	-6.7	-5.6	-4.6	-3.9	-2.8	-2.4	-2.1	-2.5	-2.4	-1.3	-0.9	0.8	1.7	1.3	2.4	-5.2	2.4
27-Jan	2.6	2.8	2.7	4.4	4.4	4.2	4.2	4.0	3.0	1.0	0.0	-0.6	-1.0	-1.8	-2.5	-3.3	-3.6	-4.0	-4.2	-4.2	-4.4	-4.6	-4.7	-4.7	-0.4	4.4
28-Jan	-4.7	-4.5	-3.8	-3.7	-4.3	-3.5	-3.9	-4.6	-4.9	-4.9	-3.5	-2.0	-0.9	-0.6	-0.1	0.2	0.4	0.7	1.2	2.0	2.4	2.8	3.5	3.5	-1.4	3.5
29-Jan	3.3	3.4	3.0	2.8	3.0	3.3	3.2	2.8	2.2	2.7	4.0	4.3	4.9	5.4	5.5	5.0	3.7	2.2	2.8	1.9	1.0	-1.2	-2.0	-2.7	2.7	5.5
30-Jan	-2.7	-2.9	-3.0	-3.7	-4.3	-3.3	-3.9	-3.9	-5.3	-4.7	-4.6	-4.7	-4.5	-4.4	-5.0	-6.5	-7.1	-8.0	-8.8	-8.9	-9.2	-9.7	-10.2	-10.6	-5.8	-2.7
31-Jan	-10.9	-11.1	-11.1	-11.3	-11.6	-12.1	-12.5	-12.7	-13.5	-13.8	-13.2	-13.9	-14.1	-14.1	-14.2	-14.5	-14.8	-15.1	-15.3	-15.6	-16.2	-17.4	-20.1	-21.4	-14.2	-10.9
	-14.0	-14.2	-14.4	-14.4	-14.5	-14.5	-14.4	-14.5	-14.6	-14.4	-13.5	-12.6	-11.7	-11.1	-11.0	-11.3	-12.1	-12.8	-13.1	-13.4	-13.5	-13.8	-14.1	-14.4	Diurnal Average	
	3.3	3.4	3.0	4.4	4.4	4.2	4.2	4.0	3.0	2.7	4.0	4.3	4.9	5.4	5.5	5.0	3.7	2.2	2.8	2.0	2.4	2.8	3.5	3.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

CNRL Horizon - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	135	18.15	18.15
-20 - 0	563	75.67	93.82
0 - 10	46	6.18	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 1.5 mm on Jan 28 14:00

Maximum Daily Total: 5.1 mm on Jan 28

Minimum Value: 0.0 mm on Jan 1 01:00

Minimum Daily Total: 0.0 mm on Jan 1

Maximum Diurnal Total: 1.5 mm at hour 14

Minimum Diurnal Total: 0.0 mm at hour 4

Monthly Total: 8.38 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} = 0.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

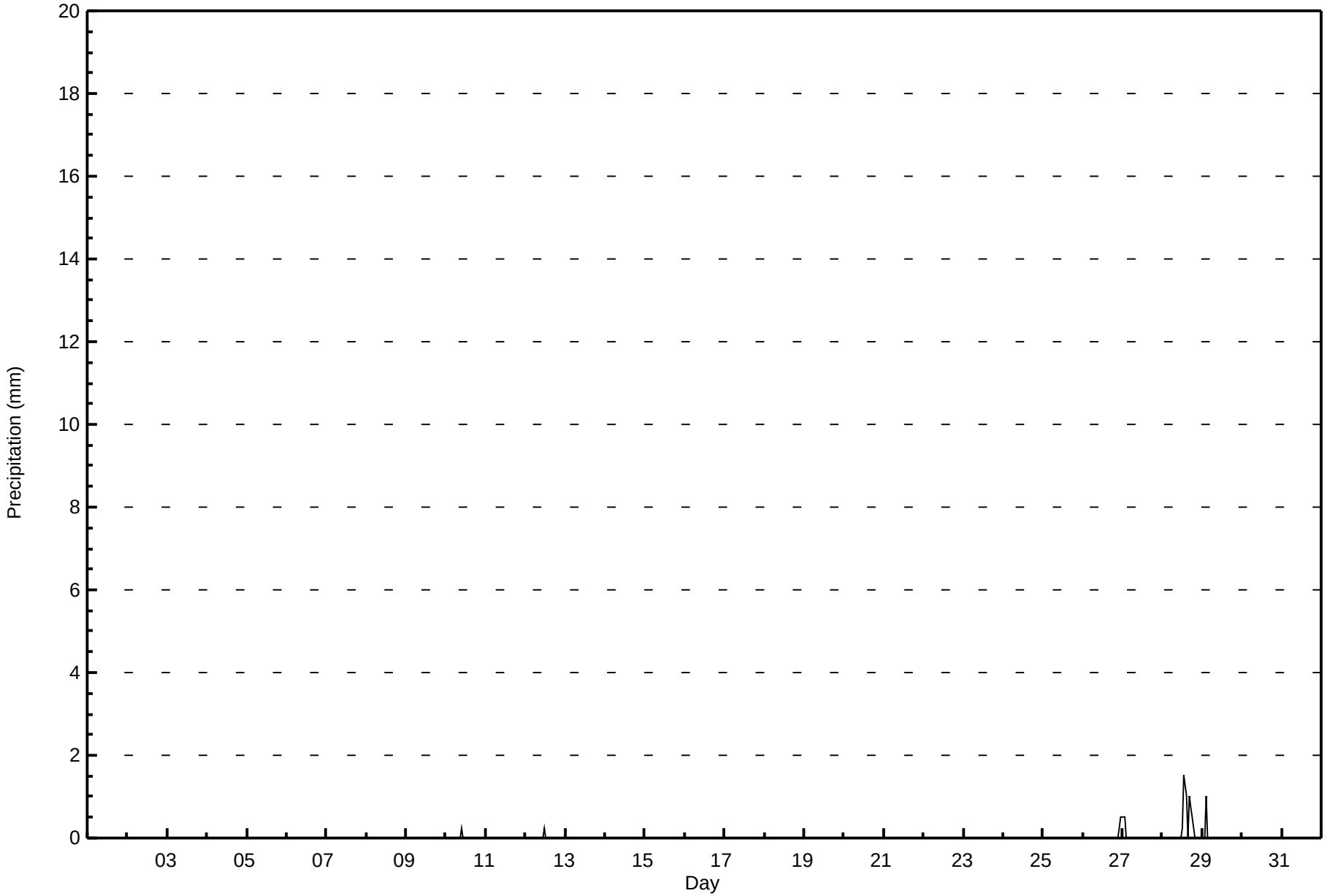
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jan	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	0.3	0.3
11-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
13-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.8	0.5
27-Jan	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5
28-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.5	1.0	0.0	1.0	0.8	0.5	0.0	0.0	0.0	0.0	0.0	5.1	1.5
29-Jan	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
30-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.5	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3	1.5	1.0	0.0	1.0	0.8	0.5	0.0	0.0	0.0	0.3	0.5	Diurnal Average	
	0.5	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3	1.5	1.0	0.0	1.0	0.8	0.5	0.0	0.0	0.0	0.3	0.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

CNRL Horizon - January 2016



Maximum Value: 98 % on Jan 28 19:00

Maximum Daily Average: 93.7 % on Jan 28

Minimum Value: 54 % on Jan 3 14:00

Minimum Daily Average: 70.8 % on Jan 1

Maximum Diurnal Average: 83.2 % at hour 22

Minimum Diurnal Average: 76.5 % at hour 14

Monthly Average: 81.3 %

Percentiles: P_1 = 58 P_{10} = 73 Q_1 = 78 Median = 81 Q_3 = 86 P_{90} = 90 P_{99} = 96

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

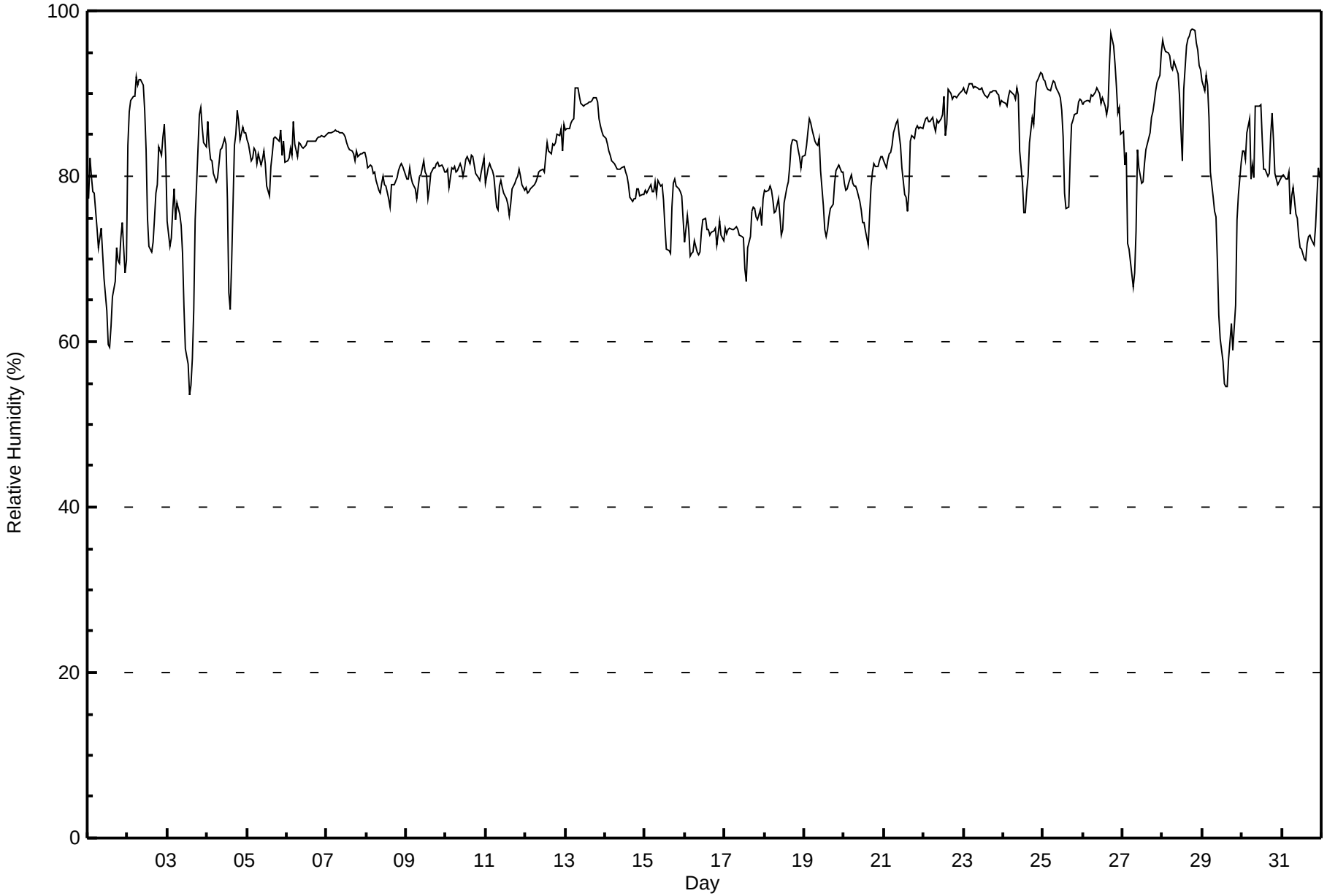
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	77	82	80	78	78	74	71	72	74	71	68	64	60	59	62	65	67	71	70	70	73	74	68	70	70.8	82
2-Jan	84	88	89	90	90	92	91	92	92	91	88	83	75	72	71	72	75	78	79	84	83	85	86	82	83.7	92
3-Jan	75	72	73	76	79	75	77	75	74	71	64	59	57	54	55	58	64	75	83	88	88	86	84	84	72.6	88
4-Jan	87	84	82	82	80	79	80	82	83	83	85	84	77	66	64	69	84	85	88	87	84	86	85	85	81.3	88
5-Jan	84	84	82	82	83	83	82	83	81	82	83	82	79	78	81	83	85	85	85	84	86	83	84	82	82.6	86
6-Jan	82	82	83	82	87	84	82	84	84	84	83	84	84	84	84	84	84	84	85	85	85	85	85	85	84.0	87
7-Jan	85	85	85	85	86	86	85	85	85	85	85	85	84	84	83	83	83	82	83	82	83	83	83	83	84.1	86
8-Jan	82	81	81	81	80	80	80	78	78	79	80	79	79	77	76	79	79	79	80	81	81	82	81	80	79.8	82
9-Jan	80	80	81	80	79	78	77	79	80	80	82	80	80	77	79	80	81	81	82	82	81	81	81	81	80.1	82
10-Jan	80	81	79	81	81	81	81	81	82	81	80	81	82	82	82	82	82	81	80	80	80	80	81	82	81.0	82
11-Jan	79	81	82	81	81	80	76	76	79	79	79	78	77	77	75	77	78	79	80	80	81	80	79	78	78.8	82
12-Jan	79	78	78	78	79	79	79	80	81	81	81	81	82	84	83	83	84	84	84	85	85	86	83	86	81.7	86
13-Jan	86	86	86	86	87	87	91	91	90	89	89	89	89	89	89	89	89	90	89	89	87	86	85	85	87.9	91
14-Jan	85	84	83	82	82	81	81	81	81	81	81	81	81	80	79	77	77	77	77	78	78	78	78	78	80.1	85
15-Jan	78	78	78	79	78	78	79	78	80	79	79	77	74	71	71	71	76	79	80	79	78	78	78	75	77.1	80
16-Jan	72	75	74	70	71	71	72	71	70	71	73	75	75	74	74	73	73	73	74	72	73	75	73	72	72.7	75
17-Jan	74	73	74	74	73	74	74	74	74	73	73	72	69	67	71	73	76	76	76	75	75	76	74	77	73.6	77
18-Jan	78	78	78	79	78	77	76	76	77	75	73	73	77	79	79	81	84	84	84	84	83	82	81	82	79.2	84
19-Jan	83	84	85	87	86	86	84	84	84	85	81	76	74	73	74	75	76	77	79	81	81	81	80	81	80.6	87
20-Jan	79	78	78	79	80	79	79	79	78	77	76	74	74	73	72	75	79	81	81	81	81	82	82	82	78.4	82
21-Jan	82	81	82	83	83	84	85	86	87	85	84	81	78	78	76	78	84	85	85	86	86	86	86	86	83.1	87
22-Jan	87	87	87	87	87	87	86	86	87	86	87	87	90	85	86	91	90	89	90	90	89	90	90	90	87.9	91
23-Jan	91	90	90	91	91	91	91	91	91	90	91	91	90	90	90	90	90	90	90	90	90	90	89	89	90.2	91
24-Jan	89	89	88	90	90	90	90	89	91	90	83	79	76	76	78	80	84	87	86	89	91	92	93	92	86.8	93
25-Jan	92	92	91	90	90	91	91	91	91	90	89	88	85	78	76	76	82	86	87	87	88	89	89	89	87.5	92
26-Jan	89	89	89	89	89	90	90	90	91	90	90	89	90	88	88	89	93	97	96	94	91	88	88	85	90.0	97
27-Jan	85	81	83	72	71	68	67	68	73	83	81	79	79	82	83	84	85	87	88	89	90	91	92	95	81.6	95
28-Jan	96	96	95	95	95	93	93	94	93	92	90	86	82	90	96	97	97	98	98	98	96	95	93	93	93.7	98
29-Jan	92	90	92	91	87	81	77	76	75	70	63	60	58	55	55	55	58	62	59	62	64	75	78	82	71.5	92
30-Jan	83	83	82	85	87	80	81	80	88	89	88	89	84	81	81	80	80	85	88	84	80	79	79	80	83.2	89
31-Jan	80	80	80	80	80	75	78	79	75	75	73	71	71	70	70	72	73	73	72	72	74	78	81	80	75.5	81
	83.0	82.9	82.9	82.8	82.8	81.7	81.5	81.6	82.2	81.8	80.7	79.3	77.7	76.5	76.8	78.1	80.4	82.0	82.5	82.8	82.8	83.2	82.9	82.9	Diurnal Average	
	96	96	95	95	95	93	93	94	93	92	91	91	90	90	96	97	97	98	98	98	96	95	93	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

CNRL Horizon - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	13	1.75	1.75
60 - 80	277	37.23	38.98
80 - 100	454	61.02	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

CNRL Horizon - January 2016

Maximum Value: 245 W/m2 on Jan 17 13:00

Maximum Daily Average: 45.1 W/m2 on Jan 29

Minimum Value: 0 W/m2 on Jan 1 01:00

Minimum Daily Average: 4.4 W/m2 on Jan 10

Maximum Diurnal Average: 111.0 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 1

Monthly Average: 20.0 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 18$ $P_{90} = 73$ $P_{99} = 200$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

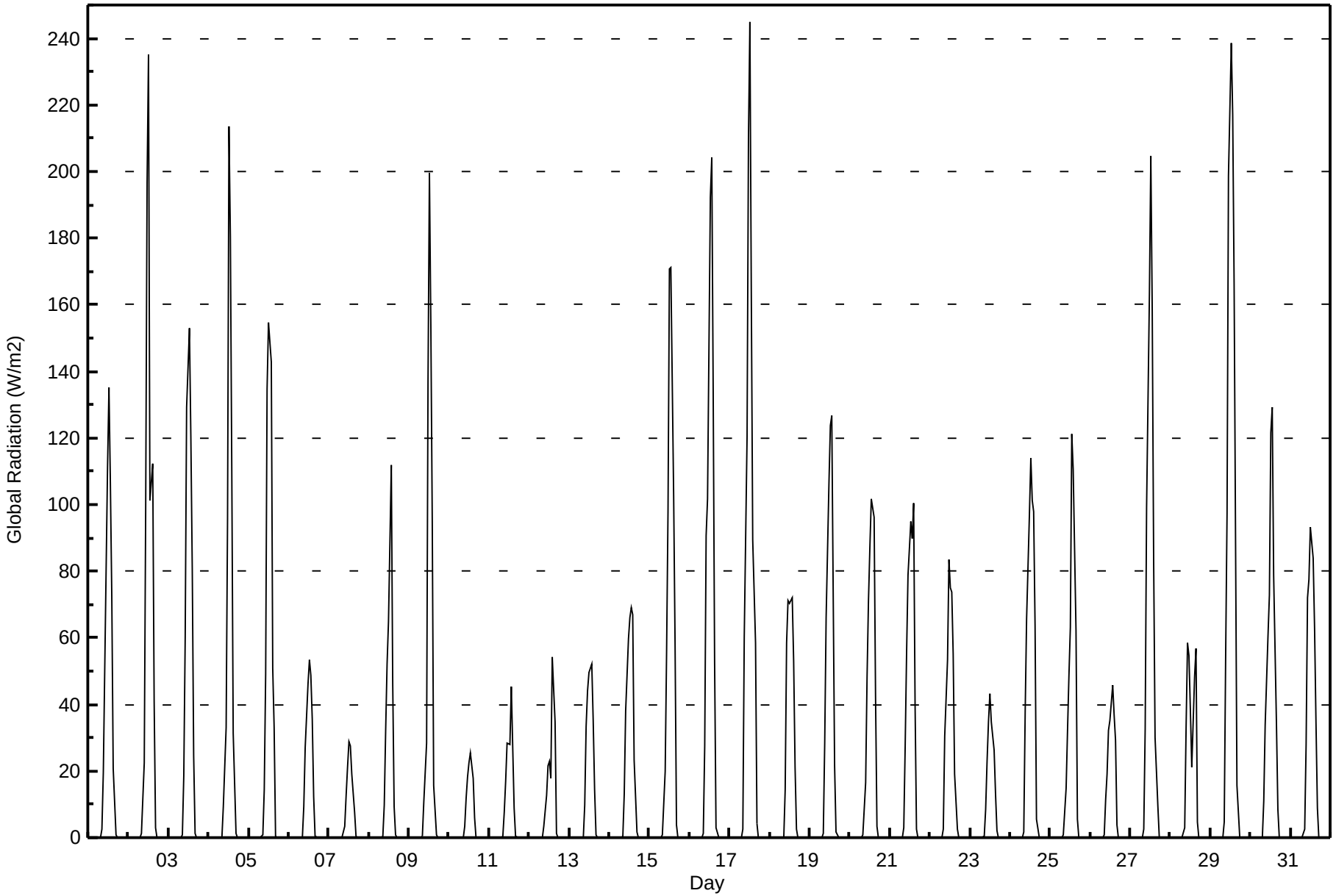
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	0	0	0	0	0	0	0	2	19	51	111	135	107	73	21	1	0	0	0	0	0	0	0	21.6	135
2-Jan	0	0	0	0	0	0	0	0	1	22	98	197	235	101	112	41	3	0	0	0	0	0	0	0	33.8	235
3-Jan	0	0	0	0	0	0	0	0	1	19	60	129	153	121	81	25	1	0	0	0	0	0	0	0	24.5	153
4-Jan	0	0	0	0	0	0	0	0	0	9	33	96	214	180	110	31	1	0	0	0	0	0	0	0	28.1	214
5-Jan	0	0	0	0	0	0	0	0	1	15	49	135	155	143	51	33	0	0	0	0	0	0	0	0	24.2	155
6-Jan	0	0	0	0	0	0	0	0	0	9	27	46	54	49	36	12	1	0	0	0	0	0	0	0	9.7	54
7-Jan	0	0	0	0	0	0	0	0	0	3	13	21	29	27	19	8	0	0	0	0	0	0	0	0	5.0	29
8-Jan	0	0	0	0	0	0	0	0	0	10	32	52	65	112	46	9	1	0	0	0	0	0	0	0	13.6	112
9-Jan	0	0	0	0	0	0	0	0	0	11	28	137	200	154	95	16	1	0	0	0	0	0	0	0	26.8	200
10-Jan	0	0	0	0	0	0	0	0	0	3	12	18	23	26	18	6	0	0	0	0	0	0	0	0	4.4	26
11-Jan	0	0	0	0	0	0	0	0	0	8	17	29	28	45	27	9	0	0	0	0	0	0	0	0	6.8	45
12-Jan	0	0	0	0	0	0	0	0	0	3	13	22	23	18	54	35	1	0	0	0	0	0	0	0	7.0	54
13-Jan	0	0	0	0	0	0	0	0	0	10	33	44	50	52	35	14	1	0	0	0	0	0	0	0	10.0	52
14-Jan	0	0	0	0	0	0	0	0	1	13	38	60	66	69	67	24	2	0	0	0	0	0	0	0	14.1	69
15-Jan	0	0	0	0	0	0	0	0	1	20	56	98	171	171	103	58	4	0	0	0	0	0	0	0	28.4	171
16-Jan	0	0	0	0	0	0	0	0	1	27	91	102	193	204	134	53	3	0	0	0	0	0	0	0	33.6	204
17-Jan	0	0	0	0	0	0	0	0	3	60	120	210	245	163	90	58	4	0	0	0	0	0	0	0	39.7	245
18-Jan	0	0	0	0	0	0	0	0	0	14	58	71	70	72	53	21	3	0	0	0	0	0	0	0	15.1	72
19-Jan	0	0	0	0	0	0	0	0	1	28	66	106	124	127	74	22	2	0	0	0	0	0	0	0	22.9	127
20-Jan	0	0	0	0	0	0	0	0	1	17	48	71	87	102	96	43	3	0	0	0	0	0	0	0	19.5	102
21-Jan	0	0	0	0	0	0	0	0	3	28	56	79	95	90	100	40	3	0	0	0	0	0	0	0	20.5	100
22-Jan	0	0	0	0	0	0	0	0	2	30	53	84	75	74	55	19	3	0	0	0	0	0	0	0	16.5	84
23-Jan	0	0	0	0	0	0	0	0	0	8	23	35	43	35	26	13	2	0	0	0	0	0	0	0	7.7	43
24-Jan	0	0	0	0	0	0	0	0	2	38	66	97	114	101	98	64	6	0	0	0	0	0	0	0	24.4	114
25-Jan	0	0	0	0	0	0	0	0	1	15	32	49	63	121	110	62	6	0	0	0	0	0	0	0	19.1	121
26-Jan	0	0	0	0	0	0	0	0	1	11	19	32	35	46	37	29	4	0	0	0	0	0	0	0	8.9	46
27-Jan	0	0	0	0	0	0	0	0	2	33	99	163	205	158	83	30	9	0	0	0	0	0	0	0	32.6	205
28-Jan	0	0	0	0	0	0	0	0	3	33	59	55	38	21	49	57	5	0	0	0	0	0	0	0	13.3	59
29-Jan	0	0	0	0	0	0	0	0	5	54	98	199	238	217	166	91	16	0	0	0	0	0	0	0	45.1	238
30-Jan	0	0	0	0	0	0	0	0	11	34	61	73	122	129	79	34	9	0	0	0	0	0	0	0	23.0	129
31-Jan	0	0	0	0	0	0	0	0	3	28	72	77	93	84	63	34	9	0	0	0	0	0	0	0	19.3	93
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	20.4	51.0	87.0	111.0	100.6	72.3	32.6	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	0	11	60	120	210	245	217	166	91	16	0	0	0	0	0	0	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

CNRL Horizon - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

CNRL Horizon - January 2016

Maximum Speed: 19 km/h on Jan 1 11:00

Maximum Daily Speed Average: 11.6 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 20 13:00

Minimum Daily Speed Average: 0.4 km/h on Jan 23

Maximum Diurnal Speed Average: 3.4 km/h at hour 1

Minimum Diurnal Speed Average: 0.9 km/h at hour 18

Monthly Average Velocity: 2.0 km/h 196.9 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 4$ Median = 6 $Q_3 = 8$ $P_{90} = 11$ $P_{99} = 16$

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	SW14	S11	SSW13	SSW12	S15	S15	SSW13	SSW16	SSW16	SW18	SW19	WSW19	SW16	SSW14	S12	SW12	SW13	S9	SSW7	WNW6	SW6	SW8	W10	WSW7	SSW11.6	SW19
2-Jan	SSW7	SSW8	SSW8	SSW10	SSW9	S8	S6	SSE7	SE6	SSE6	SSE6	SSE7	S9	S9	S11	S11	SSW11	S9	SSE9	SSE8	S10	S8	S7	S10	S7.9	S11
3-Jan	SSW13	S15	S14	S13	S13	S16	S16	S17	S16	S17	S19	S19	S16	S16	S15	S14	S8	SE6	SE4	SW3	SSE1	SSW2	SSW4	SSW3	S11.4	S19
4-Jan	SSW6	S4	SSW4	SSW3	S2	SW4	SW3	N1	S3	SW4	SSW5	SSW5	S5	S6	SSE5	ESE4	S5	SSW4	S5	S6	S5	SSW6	SSE6	ESE3	S3.9	SSW6
5-Jan	SE4	S5	S4	S6	S5	S5	SSE4	SSE4	SSE3	SSE2	SE3	S3	S4	SSE1	NE3	NNW2	NNW5	N5	NNW5	NW5	NW6	NNW1	NNW3	S1	S1.0	S6
6-Jan	SSW3	N4	N4	N4	N6	N4	N3	NNW3	NNE2	N1	N2	N2	N1	NE2	NNE2	N3	NNE3	NNE3	NNE3	NNE3	N4	N5	NNE3	NNE3	N2.8	N6
7-Jan	NNE2	NNE3	NNE1	AF	N2	NNE3	N3	N3	N4	NNW3	NW2	WNW3	W3	W3	W3	SW2	SW3	SSW3	SW2	W2	SW2	SSW3	S3	S2	WNW1.1	N4
8-Jan	SSW2	WNW4	WNW3	NW2	W2	WSW3	SW2	WSW2	WSW3	WSW3	W4	W3	W3	W1	SSW2	SSW2	SSW3	SSW3	SSW3	SSW3	SSW3	SSW4	SSW4	SSW4	SW2.3	SSW4
9-Jan	SSW4	SSW5	S5	S5	SSE5	S5	S4	S7	S7	S6	SSW6	SSW5	S5	S4	S4	SSE4	S4	SSW4	S4	S4	SSE4	S5	S6	S6	S4.8	S7
10-Jan	S6	SSE4	S1	S1	SSE2	E1	WSW2	W2	S1	SSW2	S1	SE1	NNE3	N5	N5	NNE4	NNE3	NNE2	NE2	ESE2	S3	SSE0	AF	NE3	E0.5	S6
11-Jan	NE2	NW2	SSW2	SSW2	S3	SW3	NW8	NW7	WSW4	SW5	SW5	SW6	SSW5	SSW5	SW6	SSW7	SSW7	SSW8	SW7	SSW6	SSW8	SSW8	SSW7	SSW7	SW4.2	NW8
12-Jan	SSW8	SSW8	S9	SSW8	SSW7	S7	S6	S5	SSW5	SSW5	SSW5	S6	S8	S7	S7	SSE7	S6	S5	SSE5	SSE2	S4	S3	S2	SW4	S5.7	S9
13-Jan	SW2	ENE3	NNW3	NW4	N4	N4	N4	N5	NNE4	NNE5	NNE6	N6	NNE6	NNE7	NNE8	NNE8	N10	NNE10	NNE10	NNE10	NNE13	NNE11	N10	N11	NNE6.5	NNE13
14-Jan	NNE11	NNE12	NNE10	NNE10	NNE11	NNE8	NNE7	NNE7	NNE5	NNE4	NNE5	N6	NNE10	NNE8	NNE9	NNE11	NNE10	NNE10	NNE10	NNE8	NNE8	NNE7	NE6	NE5	NNE8.2	NNE12
15-Jan	NNE5	NE2	AF	NNE3	N2	E1	NNW3	NW3	N4	NNE4	NNE3	N4	NNE5	NNE4	NE5	NNE6	NNE5	N4	NNW4	NNW5	NNW5	NNW5	NNW5	NNW3	N3.7	NNE6
16-Jan	S2	NNW4	NNE3	WSW3	SSW2	SW6	SSW4	S4	ESE3	SSW4	SW2	SSE4	S4	SE4	ESE5	SE4	SSE3	SSW2	SSE4	S5	SSW5	S5	S5	S6	S2.8	S6
17-Jan	S7	SSW8	S8	S9	S10	S10	S10	S11	S8	S8	S9	S8	S7	S7	S7	SSE5	SSW5	SSW4	SSW5	SW4	SW5	WSW5	WSW4	SW6	S6.8	S11
18-Jan	SW8	SSW7	SSW4	WSW3	WSW2	SW4	S7	S6	SW3	SSW2	S5	S7	S9	SSW7	SSW6	S5	SSE6	S6	S5	S5	S5	S5	S4	SSW4	SSW5.0	S9
19-Jan	SSW4	SSW1	NNE1	N5	N5	NNE7	NNE6	NE5	NNE5	N5	NNE6	NNE6	N4	NW4	NNE4	NE6	NNE5	NNE6	ENE3	ENE4	ENE3	ENE4	NE6	NE7	NNE4.0	NE7
20-Jan	NE9	NNE8	NNE8	NNE6	NE6	NNE5	NNE3	NE4	NE2	NNE2	SSE3	SSW3	S0	SSE3	S5	SSE4	SSE3	S6	S5	SSE4	S5	SSW5	SSW5	S6	ESE1.3	NE9
21-Jan	S6	SSW6	SSW6	S6	S6	S5	S6	S6	SSW7	S6	S6	S7	S7	S8	S8	SSW5	WSW4	WNW6	NNW3	NNE1	SSW3	SSW5	SW5	SW6	SSW4.8	S8
22-Jan	S8	SSW8	S10	SSW8	S5	SSW6	SSW5	WNW3	N4	NNW5	N4	NNE6	N5	NNW3	NW6	NW4	AF	NNE6	N6	N5	NNE6	NNE6	NNE8	NNE7	NNW1.2	S10
23-Jan	N7	NNE7	NNE7	NNE7	NNE6	N5	N6	N5	NNE5	NNE3	N3	NW3	NW2	S3	S3	S4	S4	S6	S6	SSW5	SSW5	SSW6	S7	S7	NNE0.4	NNE7
24-Jan	S9	S10	SSW10	S8	S6	S5	SSW6	SW7	S7	SSW9	SSW10	SSW10	SSW9	SSW10	S10	SSE7	NW1	N7	N10	NNE9	NNE11	NNE9	NNE9	NNE5	SSW2.9	NNE11
25-Jan	E1	ENE4	ENE4	ESE4	SSE4	SSE5	SSW8	SSW9	SW8	SW6	SSW7	SSW8	S10	S11	S10	SSW7	SW6	SSW7	SSW9	SSW11	SSW12	SSW11	SSW8	S5	SSW6.3	SSW12
26-Jan	SSW6	S6	SE5	S6	SSE6	S6	S10	S9	S8	S11	S11	SSE7	S10	S7	S5	S6	SSW8	S9	S15	SSW14	SSW11	SW13	SW11	WSW17	S8.4	WSW17
27-Jan	SW13	S10	SSE7	WSW5	W10	WNW15	WNW16	WNW11	NW2	NNE7	NNE8	NE8	NE10	NE11	NE10	NNE10	NNE7	NE6	NE4	SSW1	SW2	SW2	SW4	SSW5	NNW2.2	WNW16
28-Jan	SW5	SW6	S4	SSW4	W4	SW7	SSW8	SW6	SSW7	S9	S11	S11	S11	S13	S9	SSE10	S13	S13	S12	SSW13	SSW13	SW12	SW12	SW13	SSW8.9	SW13
29-Jan	SW12	WSW10	W8	W7	W8	WNW12	WNW11	W8	W8	WSW6	WSW10	WNW10	WNW13	WNW10	WNW9	WNW8	W6	SW8	SW9	WSW9	W7	SW8	SSW9	SSW10	W8.1	WNW13
30-Jan	SW12	SW12	WSW9	SW10	SW10	WSW8	SW10	NW5	NNW5	NE3	NE8	NE10	NE9	NE9	NE10	NE11	NNE10	NE12	NE10	NE8	NE9	NE7	NE6	NE6	NNE2.9	SW12
31-Jan	NE8	NE6	NE7	NE9	NE9	NNE10	NE8	NNE9	NNE11	NNE6	NE6	NNE12	NNE12	NE9	NE10	NNE9	NNE8	NNE8	NE8	NE6	NE7	NE3	SSE1	SSW2	NE7.4	NNE12
	SSW3.4	SSW2.7	SSW2.5	SSW2.3	SSW2.0	SSW2.4	SW2.8	SW2.2	SSW1.8	SSW2.4	SSW2.6	SSW2.1	S2.2	S2.3	SSE2.1	SSE1.5	S1.4	SSE0.9	S1.2	SSW1.3	SSW1.5	SSW2.0	SSW2.0	SSW2.4	Diurnal Average	
	SW14	S15	S14	S13	S15	S16	S16	S17	SSW16	SW18	SW19	S19	S16	S16	S15	S14	S13	S13	S15	SSW14	SSW13	SW13	SW12	WSW17	Diurnal Maximum	

AF - Analyzer Failure

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Jan 27 06:00

Minimum Value: 0 km/h on Jan 8 09:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

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

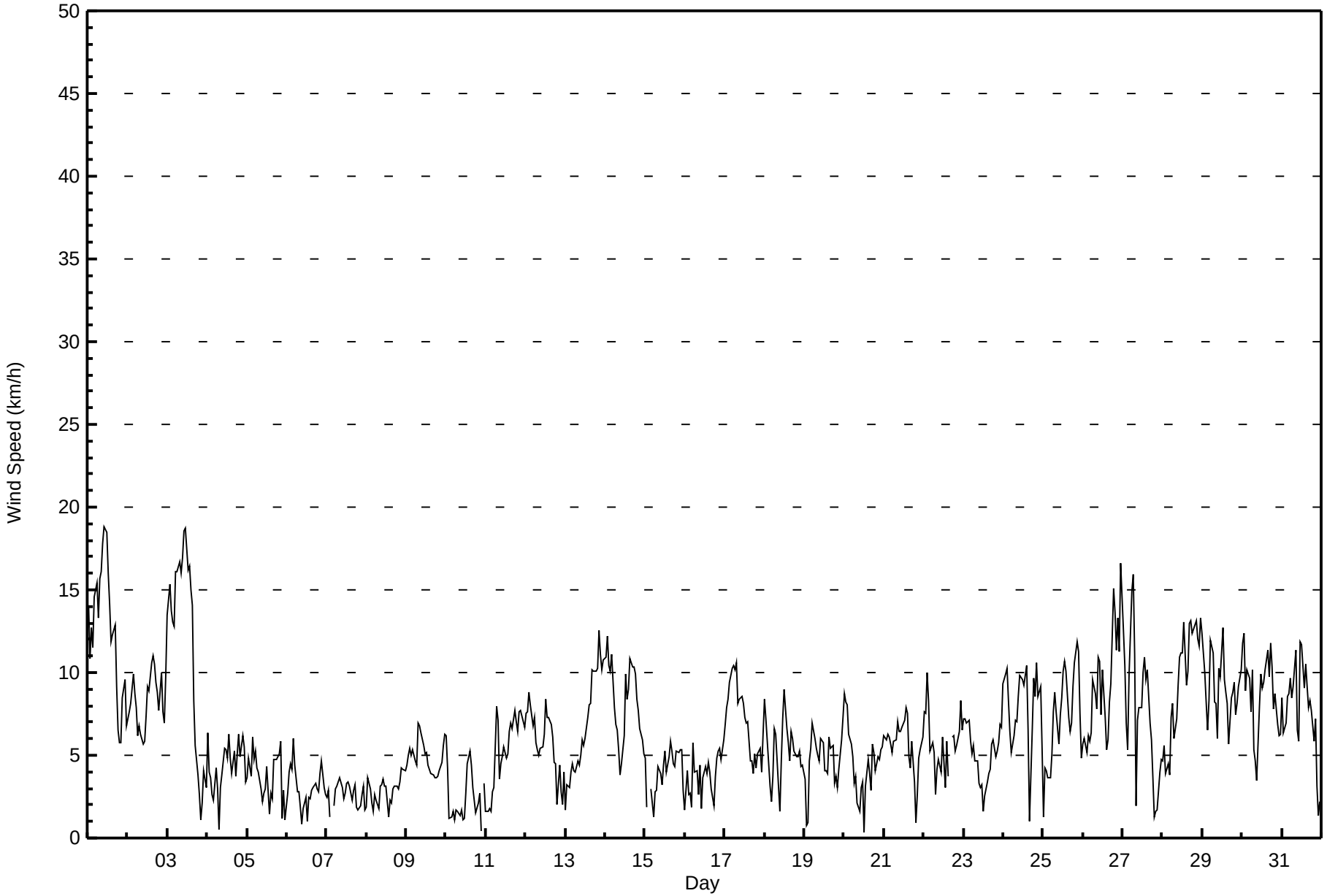
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

CNRL Horizon - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	353	47.70	47.70
6 - 11	328	44.32	92.03
12 - 19	59	7.97	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: 740

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

CNRL Horizon - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	39	40	14	7	3	6	7	27	63	62	24	13	11	4	13	20	353
6 - 11	11	63	33	0	0	0	2	14	96	58	23	7	9	8	4	0	328
12 - 19	0	5	0	0	0	0	0	0	23	11	14	2	0	4	0	0	59
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	50	108	47	7	3	6	9	41	182	131	61	22	20	16	17	20	740

Total Number of Valid Hours: 740

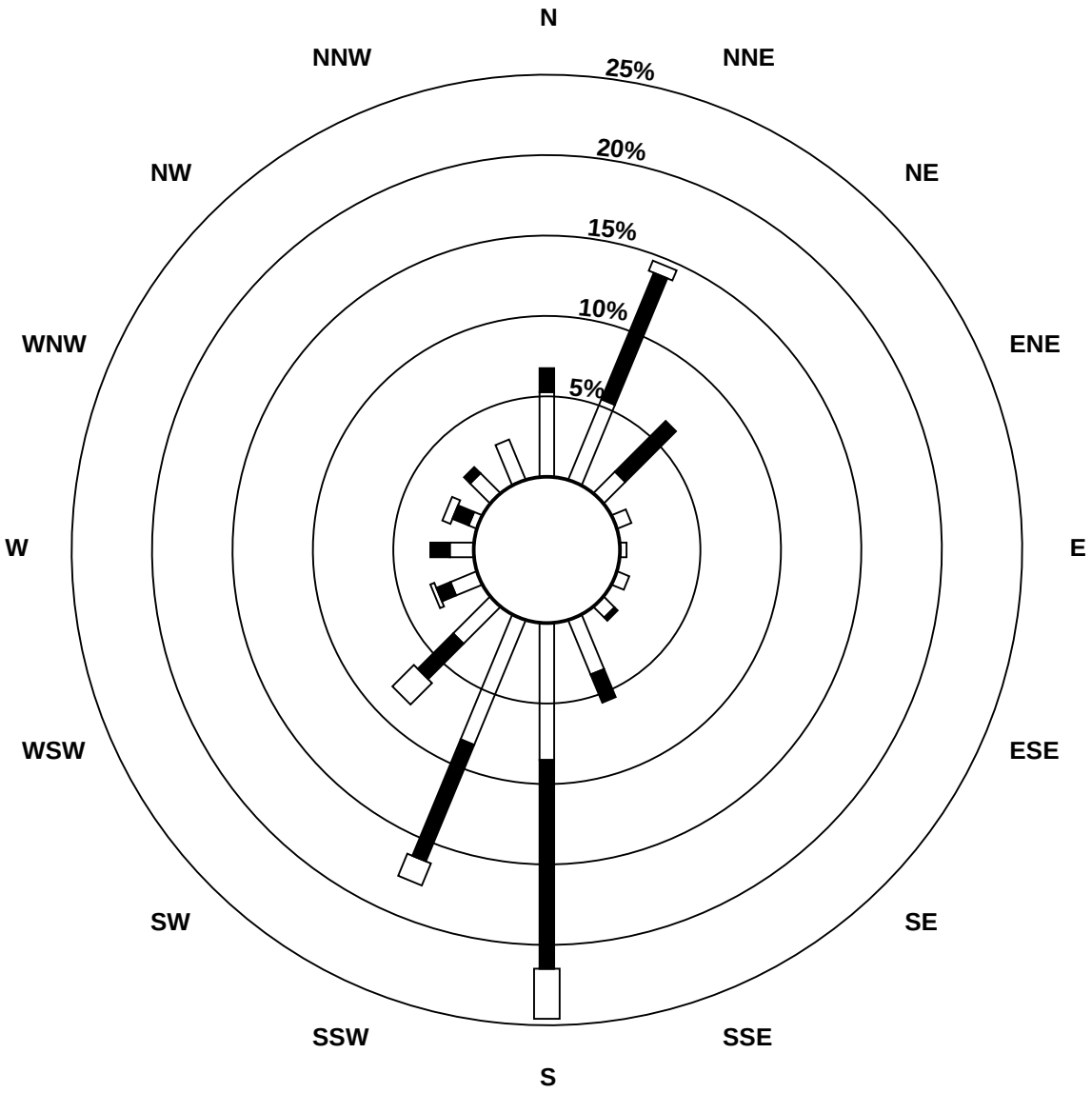
Total Number of Hours: 744

Wood Buffalo Environmental Association

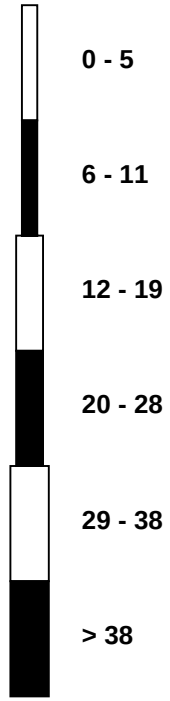
Wind Rose Jan 2016

Wind Speed (WS) - km/h

CNRL Horizon (AMS 15)



Classes (km/h)



Total Number of Valid Hours: 740

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

CNRL Horizon - January 2016

Direction of Maximum Speed: 229 deg on Jan 1 11:00
Direction of Maximum Daily Speed Average: 213.3 deg on Jan 1

Direction of Minimum Speed: 185 deg on Jan 20 13:00
Direction of Minimum Daily Speed Average: 0.4 deg on Jan 23

Monthly Average Direction: 211.0 deg

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	216	187	208	203	187	189	198	202	193	217	229	242	232	210	184	223	222	191	203	288	219	235	263	237	213.3
2-Jan	207	201	194	202	199	179	182	164	145	158	152	164	181	170	177	181	195	170	154	158	179	182	185	187	179.0
3-Jan	193	184	180	169	179	182	185	189	185	182	184	183	181	178	180	182	170	128	138	218	156	208	201	203	181.4
4-Jan	194	186	194	207	191	226	227	355	174	218	199	209	188	179	151	122	191	200	174	187	186	201	162	119	187.2
5-Jan	137	185	178	184	176	178	168	157	166	164	132	183	185	163	52	332	346	358	341	304	304	347	346	189	189.3
6-Jan	199	4	351	356	356	9	1	345	15	9	5	6	1	36	14	11	24	29	30	16	7	11	14	13	8.1
7-Jan	16	18	20	AF	8	18	359	7	349	346	325	292	274	276	260	230	223	212	223	263	222	204	186	169	296.0
8-Jan	213	300	292	322	260	237	228	246	254	256	262	269	266	281	192	194	202	210	211	208	204	193	199	192	232.7
9-Jan	196	192	189	174	166	178	175	183	183	185	195	195	181	176	174	164	182	195	178	176	163	170	178	175	180.5
10-Jan	171	168	185	173	156	99	258	279	185	197	177	134	21	10	6	19	15	23	44	123	180	153	AF	42	82.4
11-Jan	35	323	201	192	181	216	318	312	251	233	223	216	206	206	215	211	201	209	222	203	197	195	200	195	217.3
12-Jan	198	200	189	196	192	188	188	190	198	195	196	187	179	173	180	167	169	177	165	160	188	186	184	229	186.8
13-Jan	222	62	335	317	1	350	4	4	25	29	22	11	19	14	15	13	10	16	26	18	14	12	9	10	12.6
14-Jan	20	19	19	26	25	28	33	30	17	24	32	8	33	27	22	28	30	24	19	23	28	32	44	35	25.5
15-Jan	27	45	AF	27	351	80	343	324	4	27	24	1	15	17	37	32	14	355	347	328	343	345	344	346	5.0
16-Jan	186	343	20	245	201	219	205	191	123	208	220	163	184	141	116	138	158	194	162	187	195	191	184	179	181.6
17-Jan	189	194	187	186	185	183	187	185	171	183	185	180	174	184	187	153	196	207	213	223	233	244	243	215	191.2
18-Jan	216	210	209	239	240	218	186	182	218	205	182	185	185	193	192	180	166	169	173	189	178	176	177	196	191.3
19-Jan	200	207	33	2	10	19	19	36	30	5	17	20	3	323	19	44	19	27	62	58	64	60	37	52	26.9
20-Jan	34	27	29	30	42	23	28	38	36	15	147	209	185	165	179	151	149	170	189	165	173	200	198	181	107.2
21-Jan	182	192	192	188	190	179	180	188	192	182	187	190	178	178	170	200	241	301	328	20	195	203	227	215	194.6
22-Jan	187	199	189	201	183	195	210	300	8	336	10	15	6	337	307	318	AF	25	2	9	16	18	31	21	344.1
23-Jan	10	13	19	16	13	4	9	356	16	12	352	320	308	169	171	182	183	179	184	200	198	192	188	176	18.9
24-Jan	179	186	194	182	181	191	213	216	188	202	213	213	213	195	170	163	322	352	10	18	26	23	16	23	192.7
25-Jan	83	74	65	111	165	166	194	195	222	219	210	203	189	182	188	213	224	201	201	196	192	207	200	184	193.8
26-Jan	199	175	145	173	164	187	187	176	181	177	186	163	181	172	174	172	199	182	186	192	204	225	221	243	190.6
27-Jan	226	172	156	254	281	291	287	297	325	32	15	35	48	36	37	33	24	43	35	207	234	214	231	209	333.4
28-Jan	216	217	188	203	270	214	193	232	209	190	184	176	177	186	177	166	177	185	188	210	213	215	215	220	197.4
29-Jan	229	241	264	276	270	291	282	267	261	239	251	283	290	295	294	285	260	231	235	251	264	219	204	213	259.0
30-Jan	223	232	239	236	217	247	235	311	343	49	44	36	35	35	36	35	29	34	36	35	41	35	49	55	14.9
31-Jan	38	43	44	34	35	27	40	28	22	23	42	32	32	35	34	33	31	31	37	53	41	47	161	211	34.8
	201.1	194.9	192.0	201.6	199.4	211.5	217.6	218.2	195.9	197.8	198.7	202.2	190.6	178.2	163.3	155.7	189.3	164.5	171.2	206.7	201.4	209.6	207.8	202.8	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

CNRL Horizon - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 99 deg on Jan 20 13:00

Minimum Value: 8 deg on Jan 4 20:00

Percentiles: P_1 = 10 P_{10} = 13 Q_1 = 15 Median = 18 Q_3 = 23 P_{90} = 38 P_{99} = 81

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	24	16	19	22	16	19	19	17	15	18	18	18	20	23	25	23	20	38	54	47	45	20	25	30	54
2-Jan	16	12	11	13	15	14	23	13	16	15	15	19	14	13	13	11	15	15	18	10	10	11	10	11	23
3-Jan	14	12	13	11	12	12	11	13	14	13	13	13	13	12	13	13	19	36	33	35	73	64	29	60	73
4-Jan	11	18	26	58	93	27	32	82	15	20	18	13	20	14	20	19	16	17	16	8	24	21	29	50	93
5-Jan	50	30	38	14	17	16	24	30	16	38	38	52	22	72	39	58	16	13	17	10	9	72	20	85	85
6-Jan	38	19	14	15	17	15	13	17	21	28	24	23	29	22	23	20	19	22	19	20	21	19	20	21	38
7-Jan	22	23	20	AF	22	23	23	21	25	27	29	25	20	19	23	16	18	13	27	18	31	23	21	31	31
8-Jan	47	18	25	27	42	26	25	29	10	14	20	18	19	43	17	19	14	13	21	16	18	18	17	15	47
9-Jan	13	15	17	12	12	13	8	13	15	14	20	18	15	16	13	14	10	13	15	16	12	11	14	10	20
10-Jan	10	13	71	32	28	59	49	68	31	25	44	70	28	22	20	14	29	38	28	36	22	78	AF	18	78
11-Jan	73	42	39	50	19	19	17	21	25	38	19	19	21	23	21	19	14	14	13	19	11	11	10	12	73
12-Jan	13	13	14	15	16	12	14	16	16	20	19	17	16	16	16	17	18	24	34	68	27	34	67	14	68
13-Jan	52	20	38	11	21	20	17	18	17	19	19	16	19	17	18	18	18	18	19	19	19	17	19	19	52
14-Jan	18	20	21	19	19	18	18	17	22	28	30	21	18	19	19	18	18	19	18	17	17	17	14	16	30
15-Jan	17	41	AF	15	34	68	59	22	11	22	22	25	18	25	19	16	10	21	29	17	11	21	11	69	69
16-Jan	64	17	54	50	77	9	31	24	43	11	42	24	23	28	26	17	20	26	19	25	13	11	25	14	77
17-Jan	12	13	12	12	11	11	12	12	12	15	13	15	16	17	18	21	28	35	15	17	20	11	38	27	38
18-Jan	14	14	20	20	34	27	18	18	24	38	19	18	16	20	18	28	15	14	11	13	14	16	15	21	38
19-Jan	15	72	50	16	19	17	18	15	14	12	15	25	31	22	36	19	18	15	27	15	18	16	16	16	72
20-Jan	17	18	18	18	14	18	18	15	19	28	32	28	99	59	25	21	21	13	19	18	16	18	14	16	99
21-Jan	15	14	12	12	13	14	14	8	9	10	14	17	17	17	21	17	24	12	35	64	53	16	23	26	64
22-Jan	15	19	15	21	23	13	17	62	13	19	19	22	33	44	16	24	AF	23	19	17	17	16	18	19	62
23-Jan	17	16	18	17	18	17	17	18	17	22	21	18	25	66	17	16	14	12	13	17	21	17	17	18	66
24-Jan	14	15	14	15	15	14	18	19	10	15	17	20	21	21	13	20	90	27	16	18	19	20	16	20	90
25-Jan	55	16	20	34	21	20	20	19	21	24	21	22	17	17	17	23	20	15	13	15	16	22	17	21	55
26-Jan	15	15	21	12	15	12	13	10	12	12	15	20	14	15	19	15	14	13	12	13	20	19	20	18	21
27-Jan	24	23	53	77	29	19	16	14	85	19	18	23	18	17	17	19	21	19	20	85	73	61	25	24	85
28-Jan	24	31	47	44	35	18	17	18	19	15	14	13	17	16	18	12	15	13	15	18	19	18	17	18	47
29-Jan	18	19	20	18	20	18	20	26	25	41	26	20	19	16	18	18	19	16	18	15	16	19	14	12	41
30-Jan	12	16	15	15	18	27	14	45	25	25	16	16	20	18	18	18	17	17	18	17	14	19	21	16	45
31-Jan	15	17	14	16	17	19	15	18	18	29	37	16	18	19	15	17	18	17	15	19	17	46	74	77	77
	73	72	71	77	93	68	59	82	85	41	44	70	99	72	39	58	90	38	54	85	73	78	74	85	
	Diurnal Maximum																								

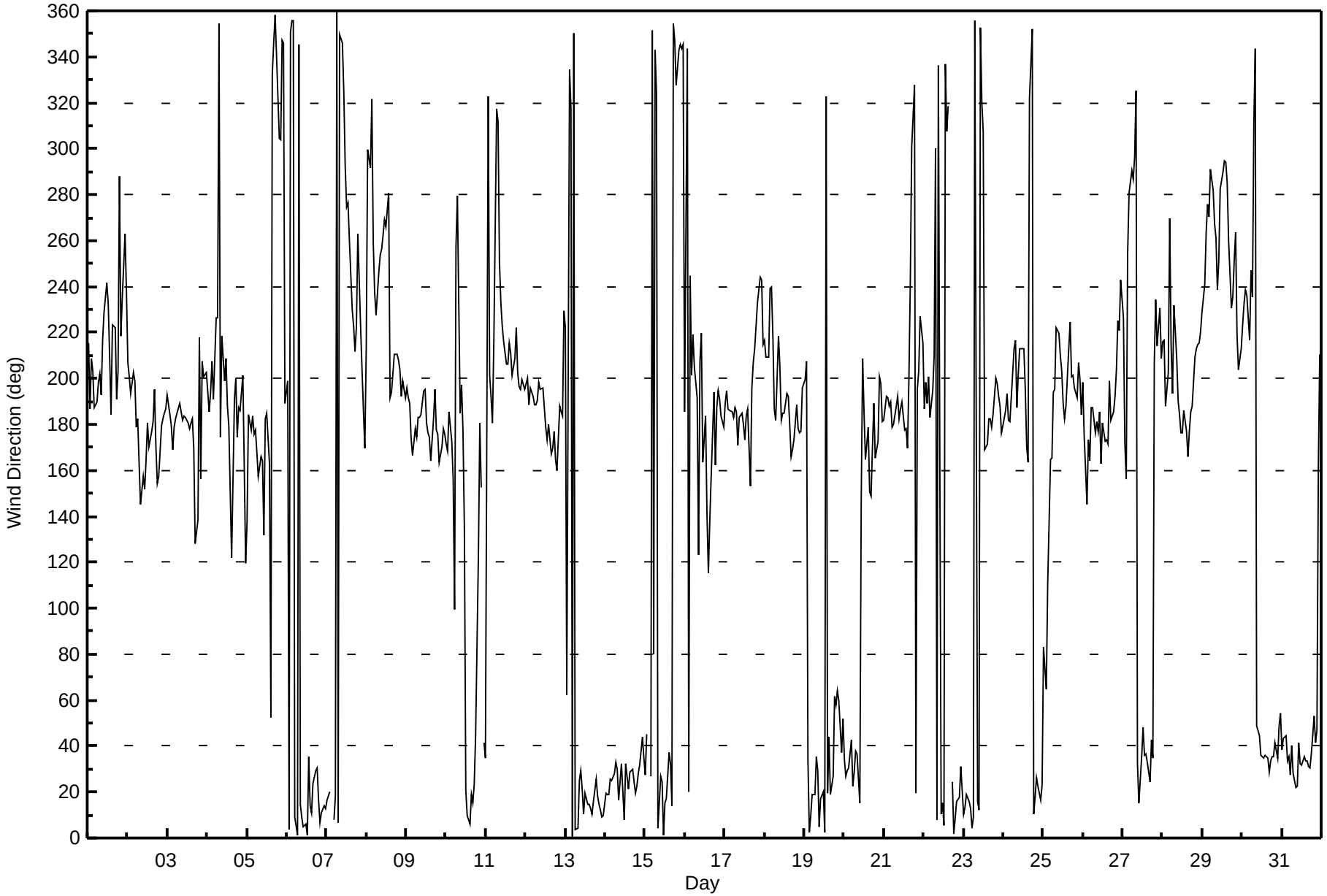
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

CNRL Horizon - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	January 11, 2016	Last Calibration	December 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	11:52	End Time (MST)	14:55
Gas Cert Reference	S0002486	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	849	855
Calculated slope	0.997227	0.999001	Chamber temp	45.0	45.0
Calculated intercept	0.383294	0.432818	Pressure	706.3	710.6
Analyzer Background	18.0	18.1	Flow	0.431	0.431
Analyzer Coefficient	0.978	0.978	Intensity	91	90

Analyzer make	Thermo 43i	Analyzer serial #	710321322

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	81.5	815.0	811.4	1.004
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	81.5	815.0	815.9	0.999
second point	5000	40.6	406.0	405.3	1.002
third point	5000	20.2	202.0	201.0	1.005
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	81.5	815.0	815.2	1.000
				Average Correction Factor	1.002

Corrected As found	811.4	Previous response	816.9	% change	0.7%

Notes:

Inlet filter replaced after 3rd point. SO2 pump changed after as founds for preventative maintenance. No adjustments.

Calibration Performed By: Asad Hidayat

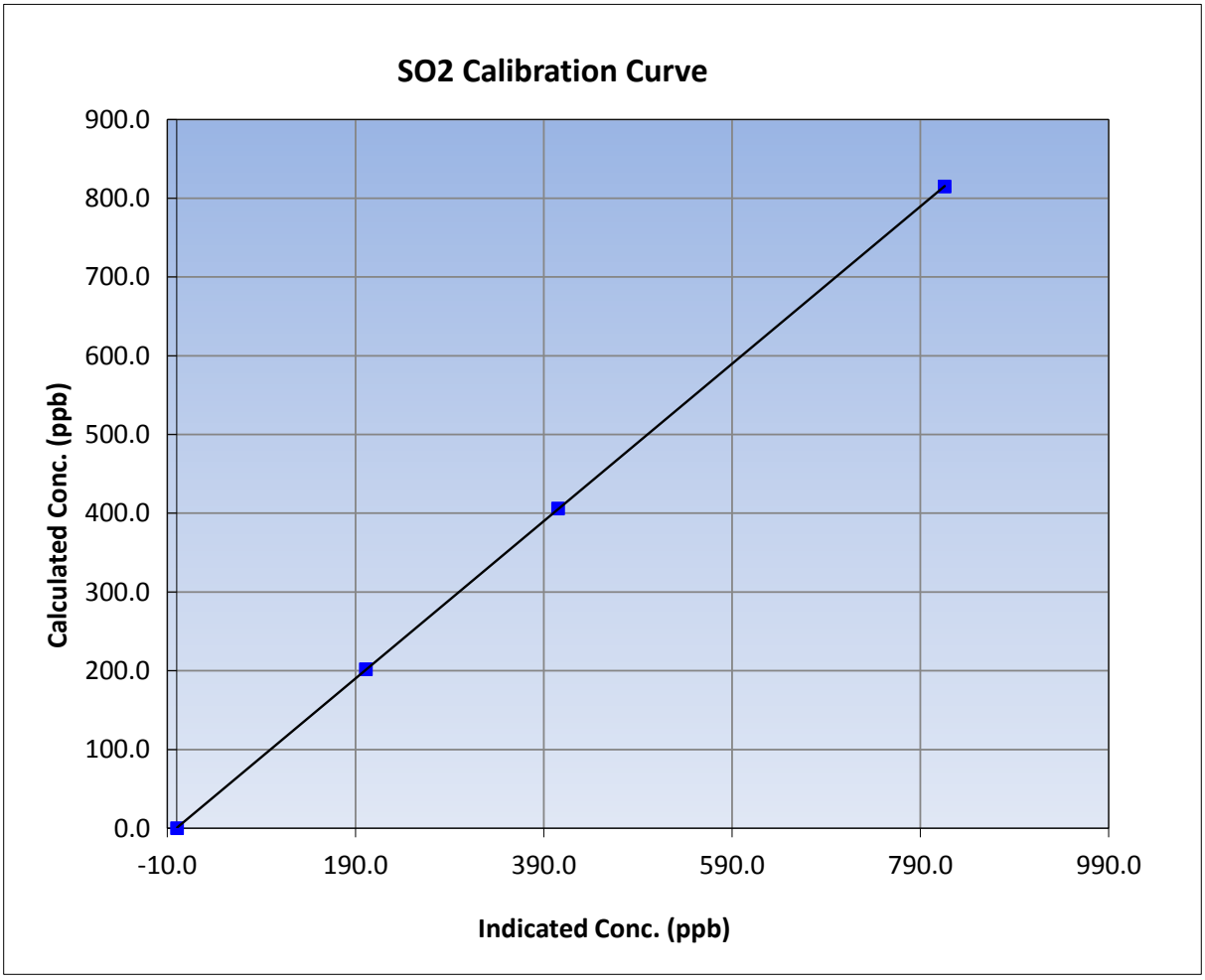
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

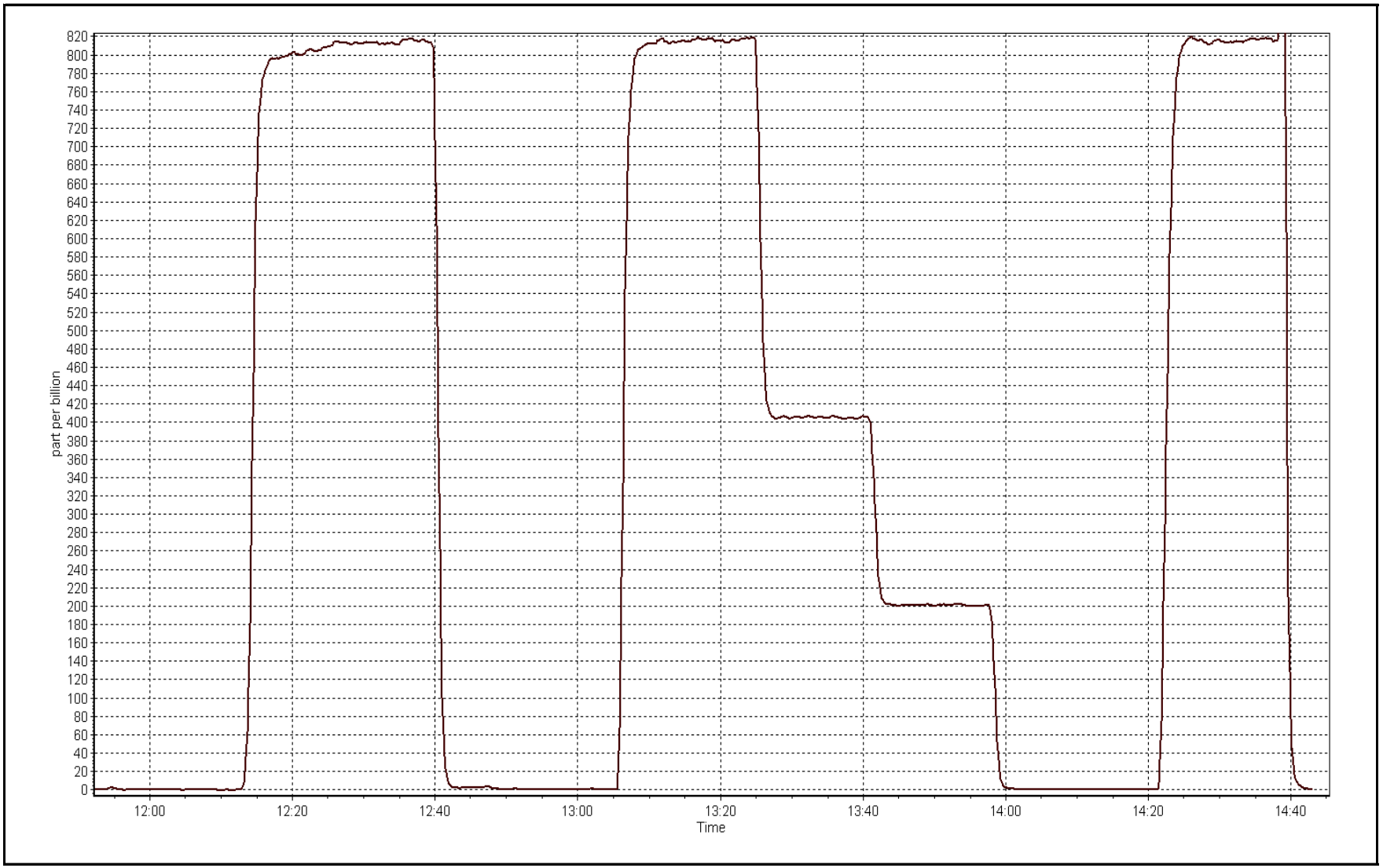
Calibration Date	January 11, 2016	Previous Calibration	December 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	11:52	End Time (MST)	14:55
Analyzer make	Thermo 43i	Analyzer serial #	710321322

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999994
815.0	815.9	0.9989		
406.0	405.3	1.0017	Slope	0.999001
202.0	201.0	1.0049		
			Intercept	0.432818



SO2 Calibration Plot Date: January 11, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 13, 2016	Last Calibration	December 9, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:02	End Time (MST)	12:42
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-694	-694
Analyzer IP address	192.168.1.44		Lamp voltage	980	988
Calculated slope	0.990354	0.991560	Chamber temp	45	45
Calculated intercept	0.115331	0.097866	Pressure	690.8	699.0
Analyzer Background	1.33	1.3	Flow	0.433	0.438
Analyzer Coefficient	0.976	0.961	Intensity	91	91
			Converter temp.	809	809

Analyzer make/model	Thermo 43i TLE	Analyzer serial #	1150840012
Converter make/model	CDN-101	Converter serial #	363

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	41.5	79.7	80.7	0.987
SO2 scrubber check	5000	19.8	198.0	0.4	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	41.5	79.7	80.3	0.993
second point	5000	20.7	39.7	40.0	0.993
third point	5000	10.3	19.8	19.8	1.000
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	41.5	79.7	80.3	0.992
				Average Correction Factor	0.995

Corrected As found	80.8	Previous response	80.3	% change	-0.5%

Notes:

Scrubber check and inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat

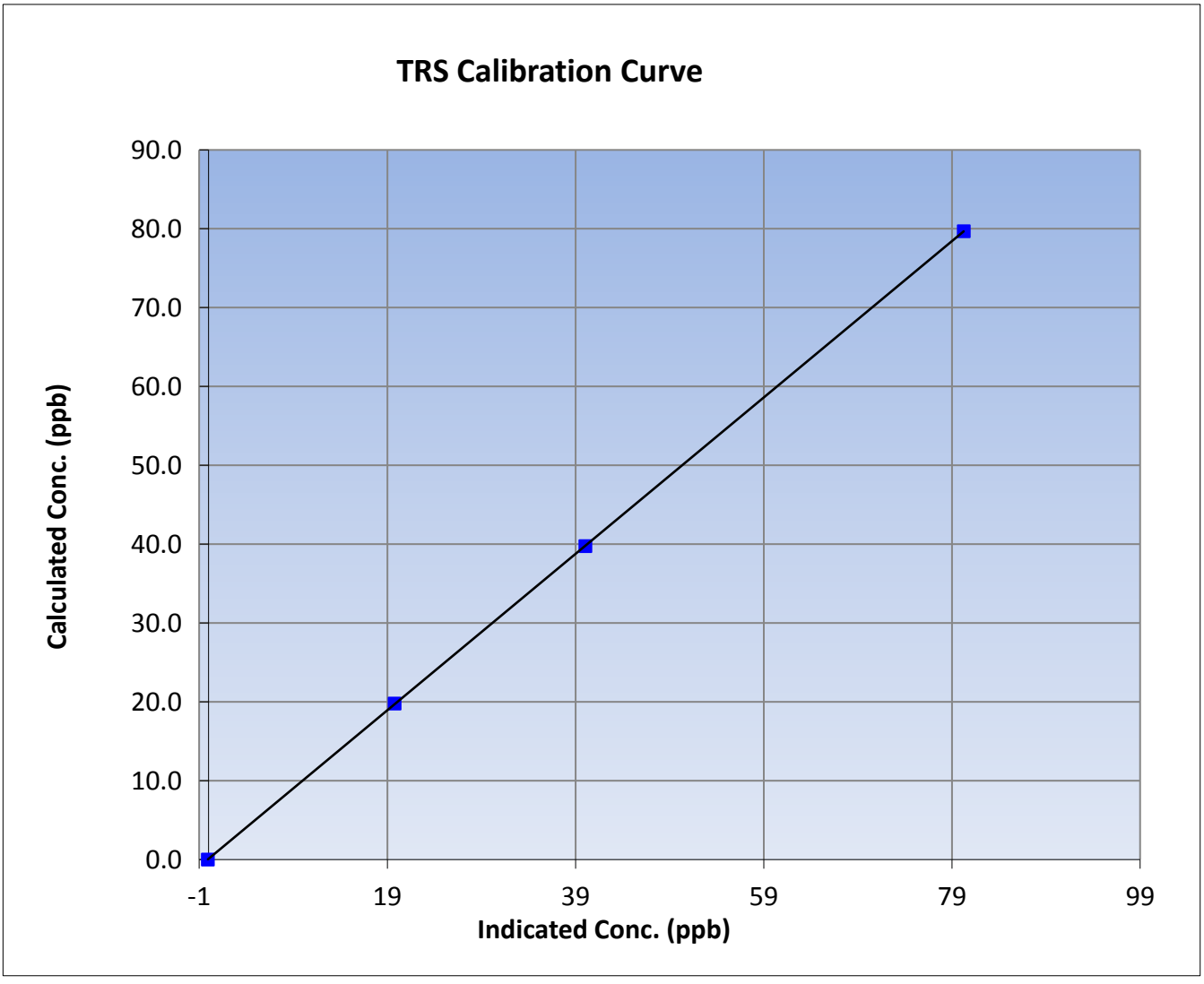
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

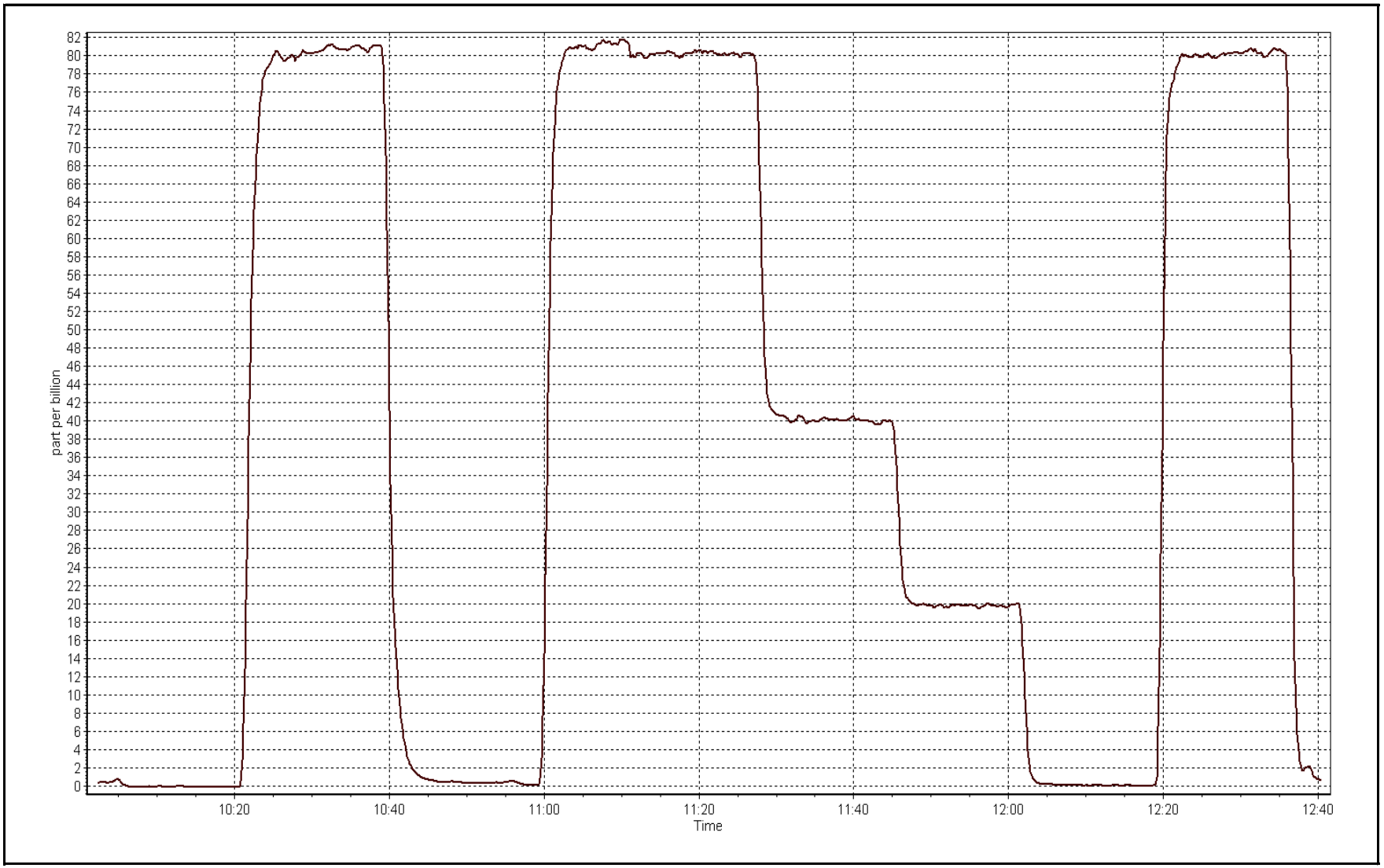
Calibration Date	January 13, 2016	Previous Calibration	December 9, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:02	End Time (MST)	12:42
Analyzer make	Thermo 43i TLE	Analyzer serial #	1150840012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999997
79.7	80.3	0.9929		
39.7	40.0	0.9926	Slope	0.991560
19.8	19.8	1.0003		
			Intercept	0.097866



TRS Calibration Plot Date: January 13, 2016



Wood Buffalo Environmental Association
Repair TRS Calibration Report

Station Information

Calibration Date	January 27, 2016	Last Calibration	January 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Other:	TRS Converter replaced	
Start Time (MST)	11:55	End Time (MST)	14:25
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-694	-694
Analyzer IP address	192.168.1.44		Lamp voltage	988	995
Calculated slope	0.991560	0.998575	Chamber temp	45	45
Calculated intercept	0.097866	-0.139361	Pressure	699.0	681.7
Analyzer Background	1.3	1.44	Flow	0.438	0.428
Analyzer Coefficient	0.961	1.049	Intensity	91	90
			Converter temp.	809	800

Analyzer make/model	Thermo 43i TLE	Analyzer serial #	1150840012
Converter make/model	CDN-101	Converter serial #	461

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	19.8	198.0	1.4	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	41.4	79.5	79.8	0.996
second point	5000	20.6	39.6	39.7	0.996
third point	5000	10.2	19.6	19.7	0.994
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	41.4	79.5	80.2	0.991
				Average Correction Factor	0.995

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

TRS converter failed yesterday, completely dead on arrival. Replaced with new one prior to calibration. Scrubber check done after 3rd point.

Calibration Performed By: Evan Magill

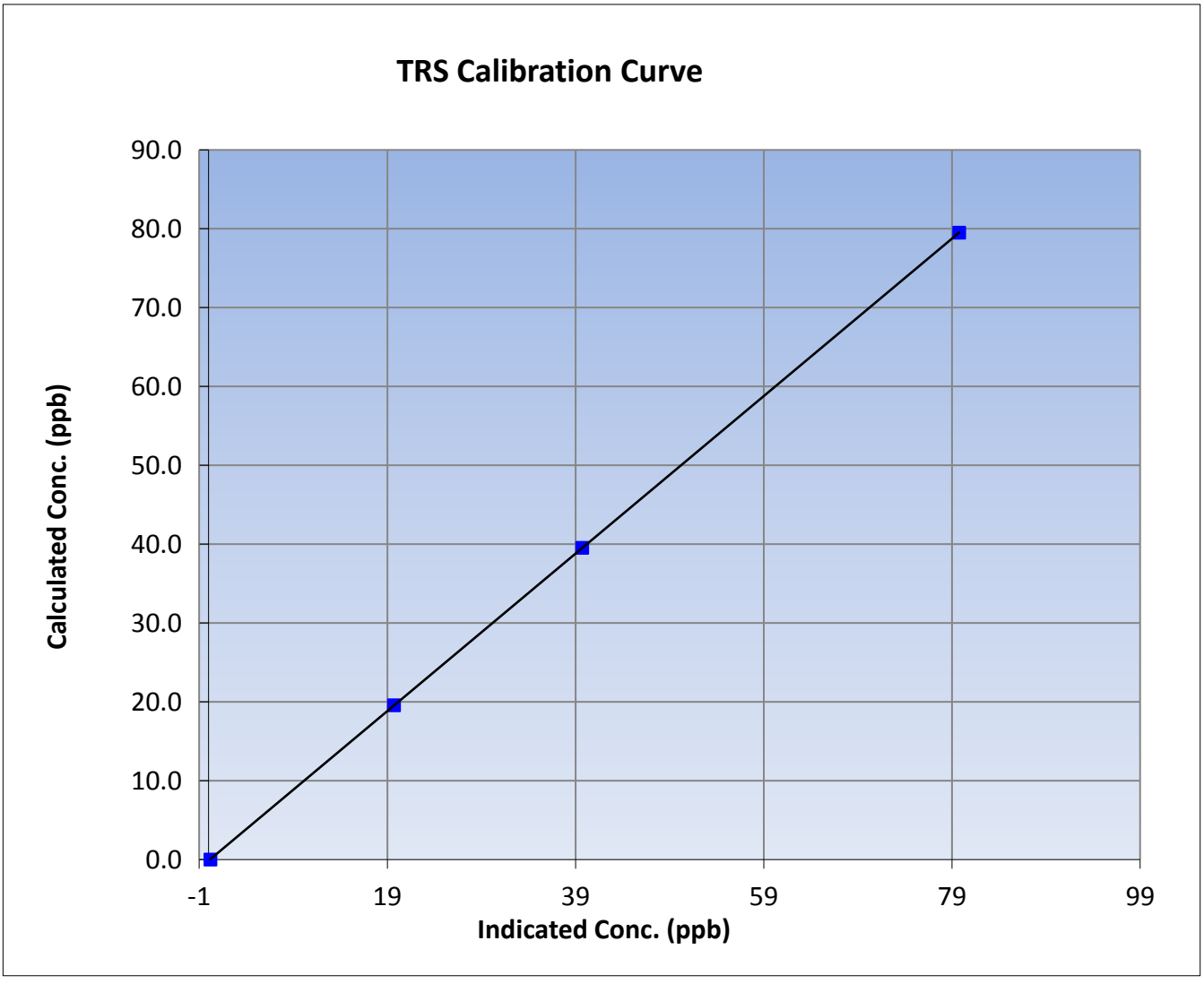
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

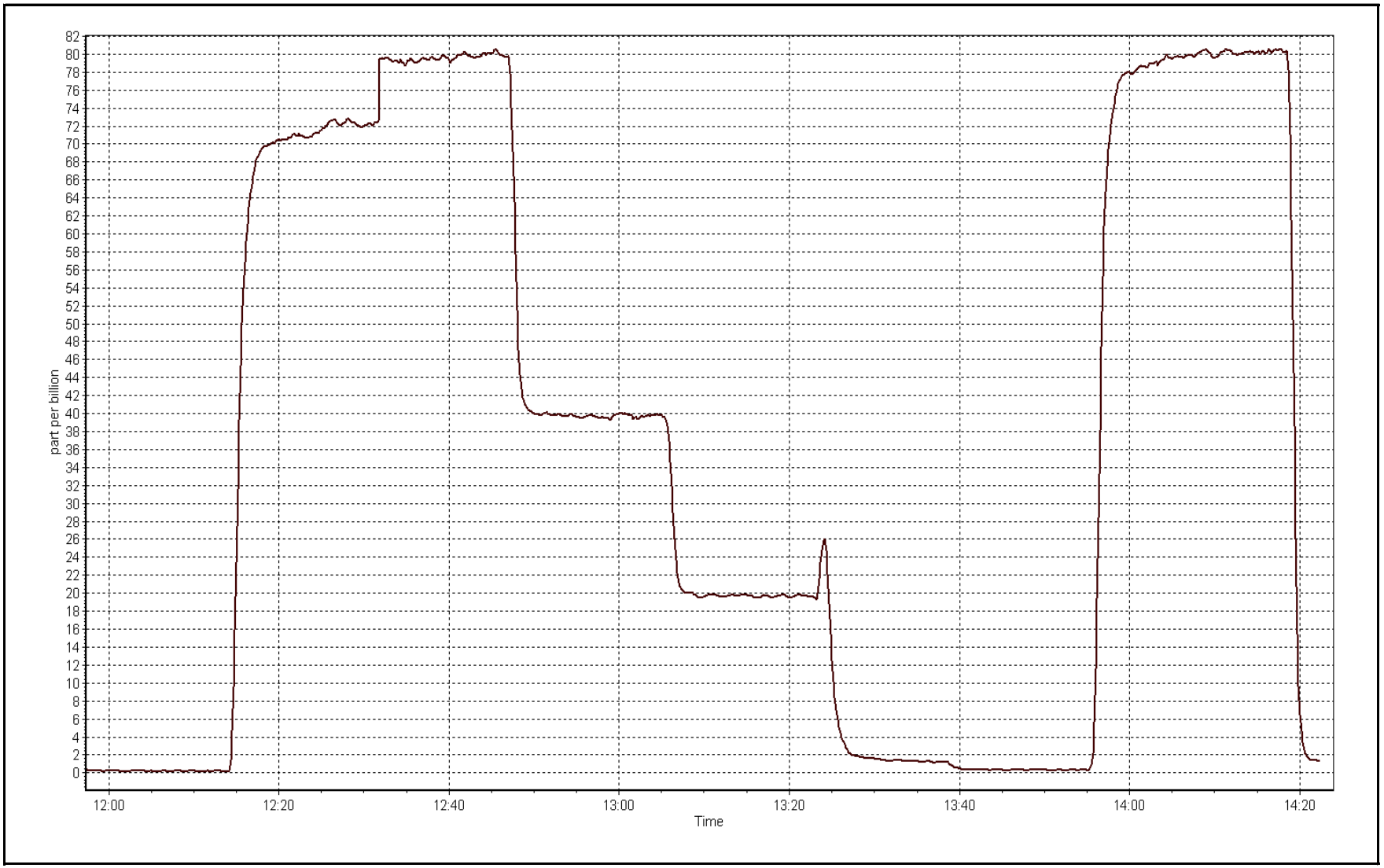
Calibration Date	January 27, 2016	Previous Calibration	January 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	11:55	End Time (MST)	14:25
Analyzer make	Thermo 43i TLE	Analyzer serial #	1150840012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999998
79.5	79.8	0.9965		
39.6	39.7	0.9960	Slope	0.998575
19.6	19.7	0.9936		
			Intercept	-0.139361



TRS Calibration Plot Date: January 27, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-11-16	Last Calibration	December-21-15
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	11:52	End Time (MST)	14:45
Gas Cert Reference	S0002486	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1046.8 ppm
C3H8 Cal Gas Conc.	197 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.7	8.7
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	38.0
Calculated slope	1.001857	1.002419	Fuel Pressure	26.3	26.3
Calculated intercept	0.001323	-0.032922	Analyzer Coeff	3.1	3.0
			Analyzer BKG	1.840	1.790

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.06	----
as found span	5000	81.5	17.06	17.52	0.974
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	81.5	17.06	17.06	1.000
second point	5000	40.6	8.50	8.49	1.001
third point	5000	20.2	4.23	4.27	0.990
as left zero	5000	0.0	0.00	0.09	----
as left span	5000	81.5	17.06	17.09	0.998
				Average Correction Factor	0.997

Corrected As found	17.46	Previous response	17.03	% change	-2.5%

Notes:

Hydrogen cylinder changed after as founds. Adjusted span. Sample inlet filter replaced after 3rd point.

Calibration Performed By: Asad Hidayat

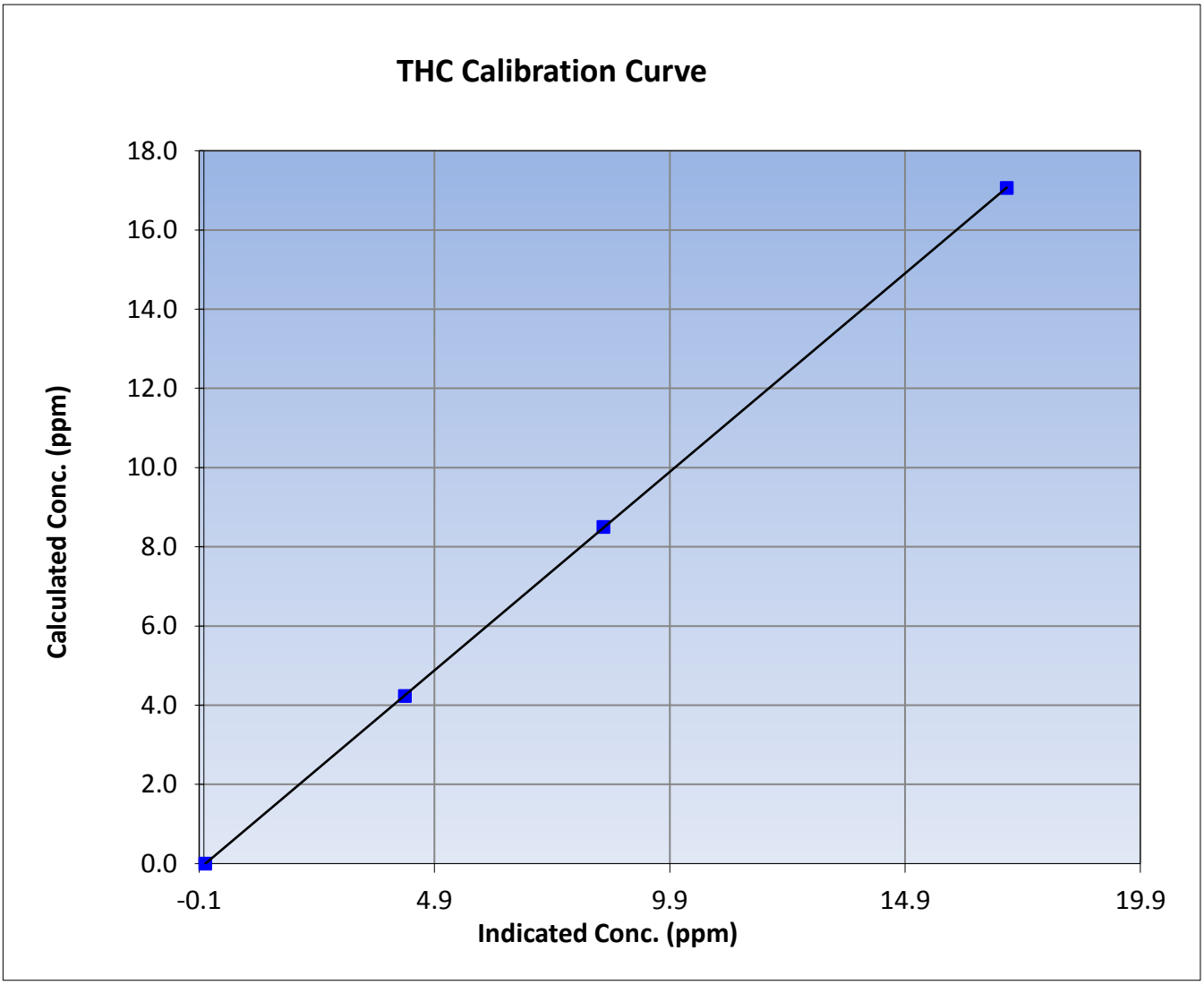
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

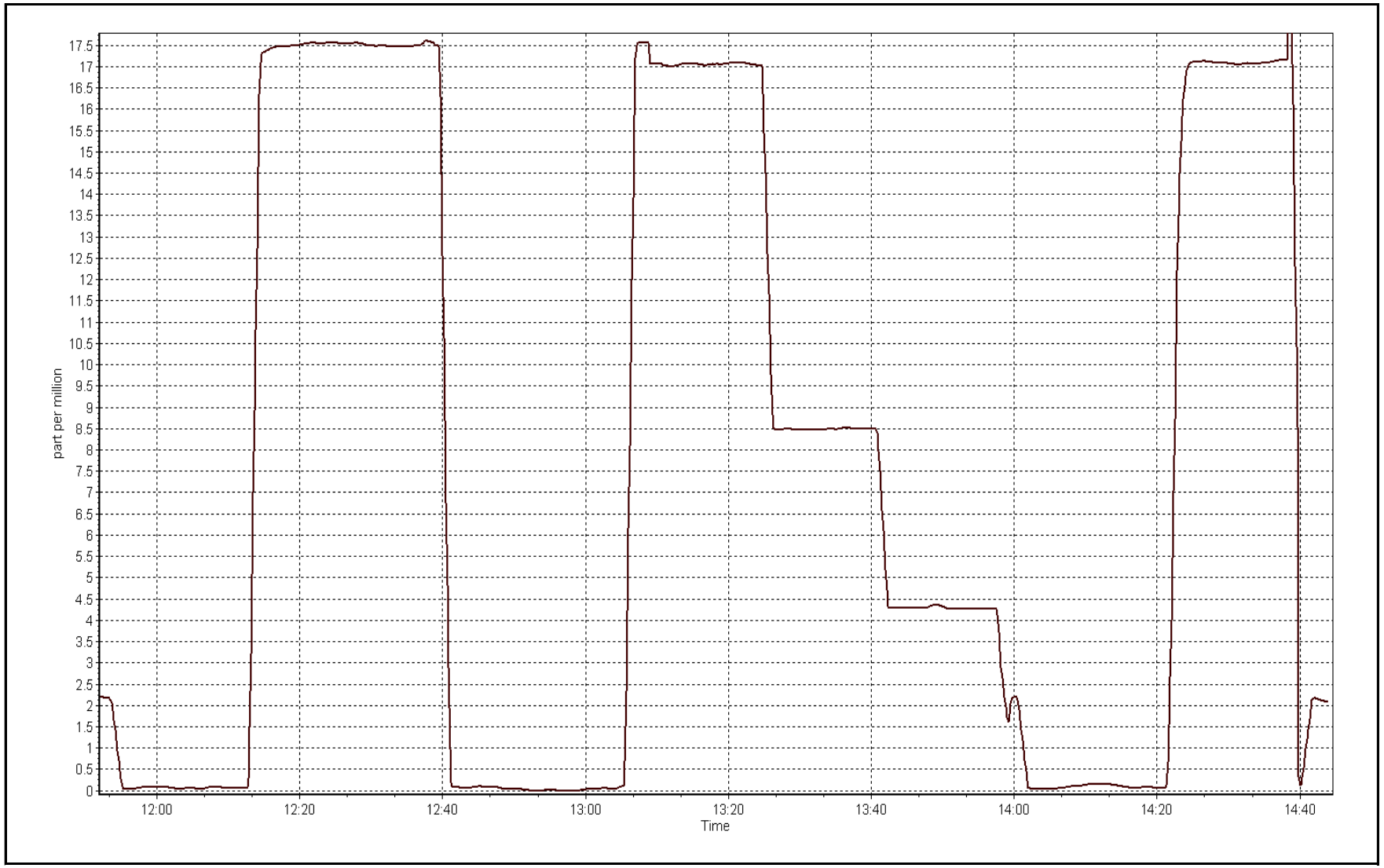
Calibration Date	January 11, 2016	Previous Calibration	December 21, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	11:52	End Time (MST)	14:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999995
17.06	17.06	1.0001		
8.50	8.49	1.0011	Slope	1.002419
4.23	4.27	0.9904		
			Intercept	-0.032922



THC Calibration Plot Date: January 11, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 12, 2016	Previous Calibration	December 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:34	End Time (MST)	14:13
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002486
NOx Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	26/09/2017
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000700	1.000140	0.998935
	Data Offset	0.197738	0.427515	0.077236
Current Calibration	Data Slope	0.996965	0.996190	0.997427
	Data Offset	0.461226	0.651581	-0.080548

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	710321429

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.013		1.009	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.8		9.7	
NOX bkgrnd	9.8		9.8	
Chamber Temp	50.1	Deg C	49.7	Deg C
Moly Temp	325.3	Deg C	325.3	Deg C
PMT voltage	-753	V	-752.6	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	158.7	mmHg	158.4	mmHg
R Cell Press Nox	159	mmHg	158.7	mmHg
NO sample flow	0.68	lpm	0.68	lpm
Nox sample Flow	0.681	lpm	0.681	lpm

Notes:

Replaced sample inlet filter after as founds. Slightly adjusted span.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 12, 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	-0.2	0.1	----	----
as found span	5000	81.5	797.1	797.1	0.0	807.1	805.6	1.5	0.9876	0.9894
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
high point	5000	81.5	797.1	797.1	0.0	799.1	799.6	-0.5	0.9975	0.9969
second point	5000	40.6	397.1	397.1	0.0	398.2	398.1	0.0	0.9973	0.9973
third point	5000	20.2	197.6	197.6	0.0	197.0	196.9	0.0	1.0031	1.0033
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	81.5	797.1	423.3	373.7	798.8	423.0	375.8	0.9978	1.0008
								Average Correction Factor	0.9993	0.9992

Corrcted As found NO_X= 807.2 NO= 805.8 Percent Change NO_X= -1.3% NO= -1.2%

Previous Response NO_X= 796.3 NO= 796.5

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	799.4	798.0	0.1	0.9971	0.9989	----	----
1st NO2 (300)	423.3	374.6	799.0	423.3	375.7	0.9976	----	0.9972	100.3%
2nd NO2 (200)	545.1	252.9	798.7	545.1	253.7	0.9980	----	0.9970	100.3%
3rd NO2 (100)	667.0	131.0	798.3	667.0	131.3	0.9984	----	0.9973	100.3%
2nd NO ref point		0.0	797.7	796.5	1.2	0.9993	1.0008	----	----
				Average Correction Factor		0.9983		0.9972	100.3%

Calibration Performed By: Asad Hidayat

Wood Buffalo Environmental Association

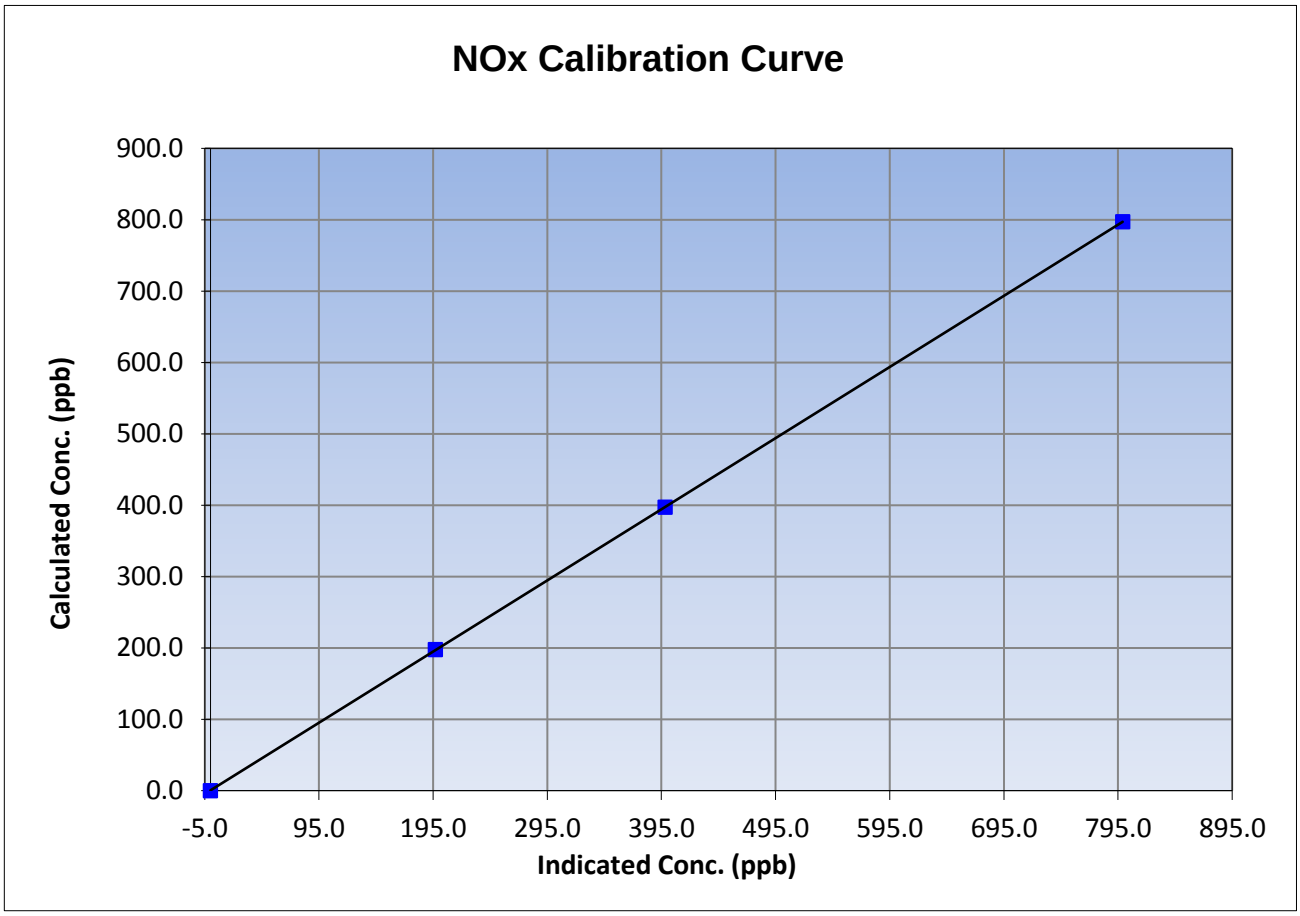
NO_X Calibration Summary

Station Information

Calibration Date	January 12, 2016	Previous Calibration	December 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:34	End Time (MST)	14:13
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	0.999998
797.1	799.1	0.9975		
397.1	398.2	0.9973	Slope	0.996965
197.6	197.0	1.0031		
			Intercept	0.461226



Wood Buffalo Environmental Association

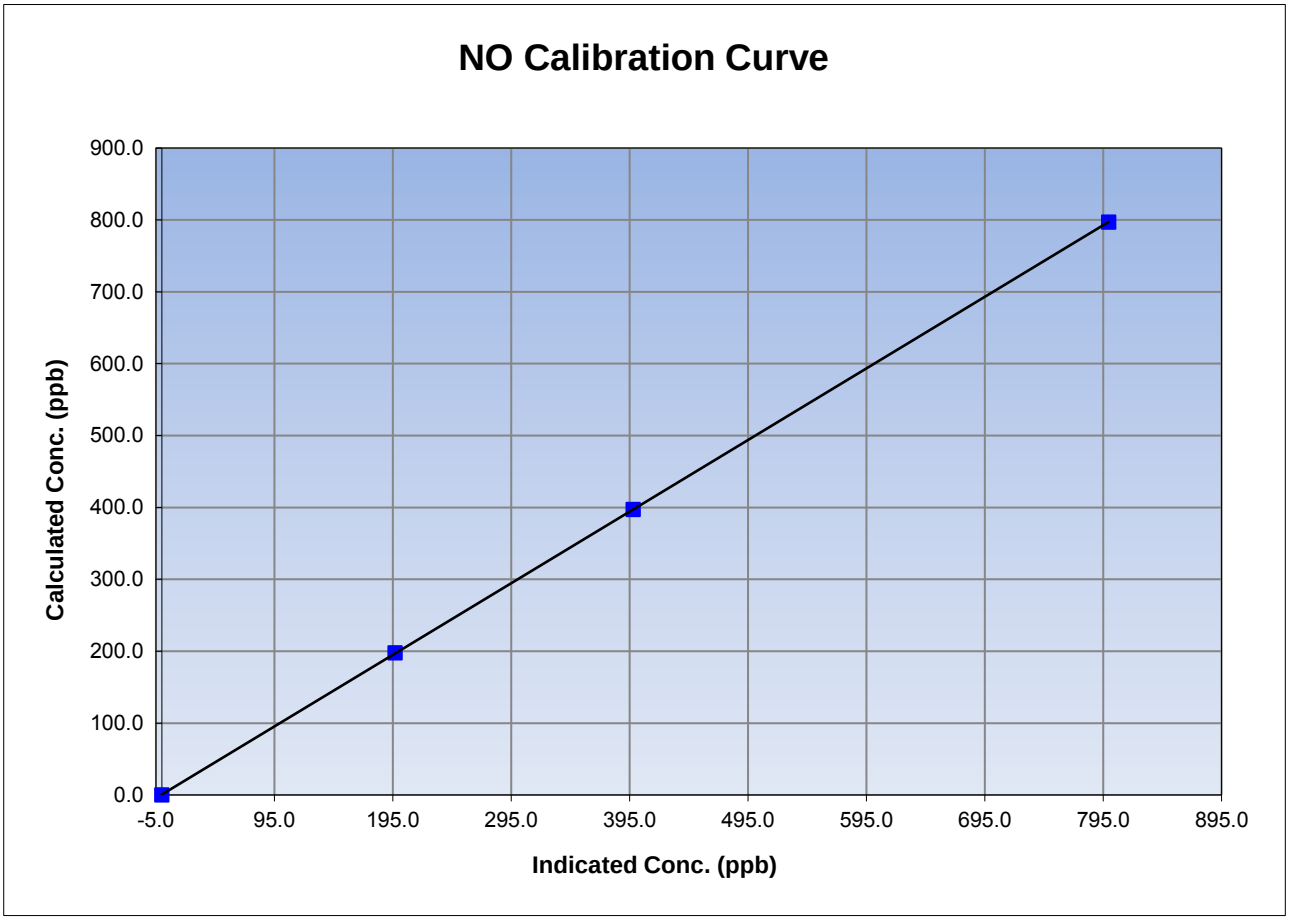
NO Calibration Summary

Station Information

Calibration Date	January 12, 2016	Previous Calibration	December 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:34	End Time (MST)	14:13
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999998
797.1	799.6	0.9969		
397.1	398.1	0.9973	Slope	0.996190
197.6	196.9	1.0033		
			Intercept	0.651581



Wood Buffalo Environmental Association

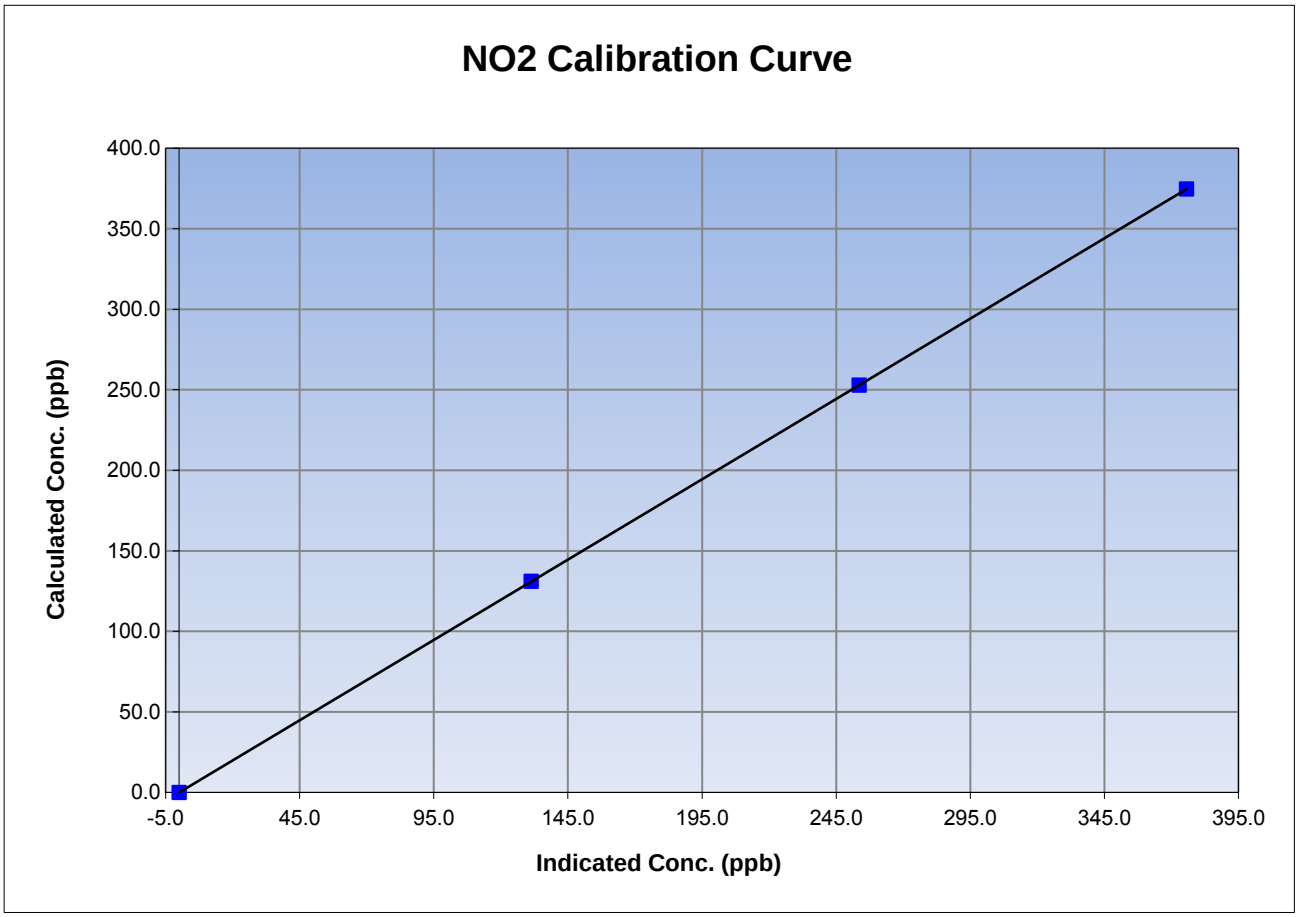
NO_2 Calibration Summary

Station Information

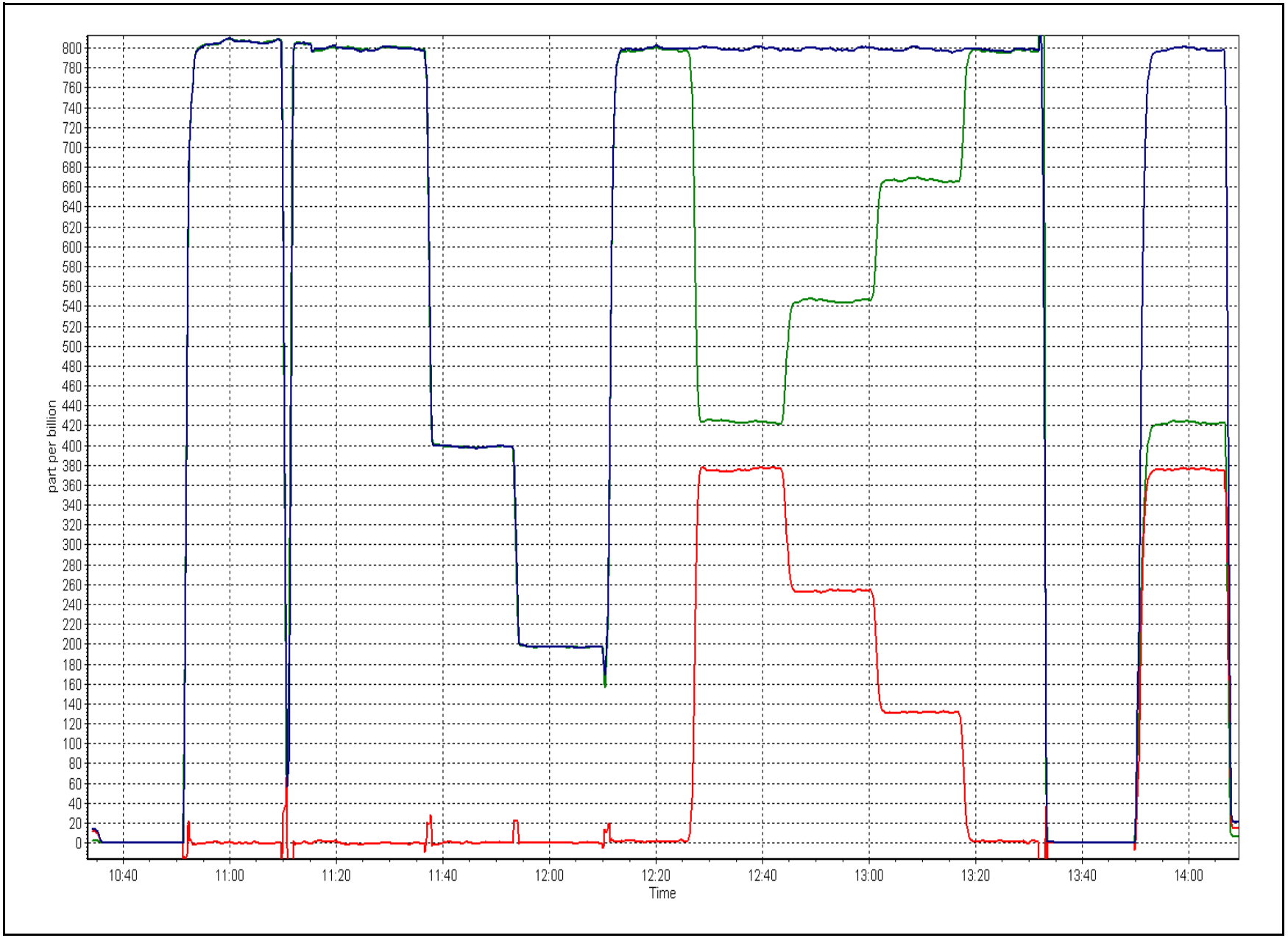
Calibration Date	January 12, 2016	Previous Calibration	December 11, 2015
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:34	End Time (MST)	14:13
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	1.000000
374.6	375.7	0.9972		
252.9	253.7	0.9970	Slope	0.997427
131.0	131.3	0.9973		
			Intercept	-0.080548



NOX Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 13, 2016	Previous Calibration:	December 11, 2015
Station Name:	CNRL Horizon	Station Number:	AMS 15
Start Time (MST):	10:22	End Time (MST):	11:45
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E-2020
C_{14} Source SN:	7409
Confirmation of Time settings:	Yes ☑ No ☐
Paremeters Checked:	☑ T1 ☑ T2 ☑ T3 ☑ T4 ☑ P3 ☑ Main Flow ☑ Beta ☑ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-11.0	-11.4	-0.4	-11.0
T2	17.0	na	na	17.0
T3	19.0	na	na	19.0
T4	13.0	na	na	13.0
RH (%)	16.0	na	na	16.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	966	967.0	1.0	966

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
998	997	-1	997	998

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	165		165
Neph	0.6		0.6
C14	55.7		55.7
Indicated Concentration (ug/m3)	**0.3**	**No**	**0.3**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	January 13, 2016	Previous Leak Check Date:	August 26, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.61	0.06
*Flow with adaptor (LPM):	16.55	

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

Mass Foil Calibration (Annualy)

Foil Calibration Date:	June 22, 2015	Previous Foil Calibration:	NA
Zeroed?:	Yes		
Foil Mass:	1507	Mass foil set S/N:	2022
Previous Correction Factor:	7091		
New Correction Factor:	7029		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	13/01/2016
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	Good	NA
HEPA filter	Good	09/06/2014

NOTES:

No adjustments. Cleaned cyclone head. Leak check done; passed.

Calibration Performed By: **Asad Hidayat**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 16
SHELL MUSKEG RIVER
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
JANUARY 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	32	0	15	0
THC (ppm) Average	705	37	39	99.73	5.8	-	3.7	-
NO2 (ppb) Average	707	37	37	100.00	42	0	27	-
NO (ppb) Average	707	37	37	100.00	150	-	61	-
NOX (ppb) Average	707	37	37	100.00	187	-	88	-
PM2.5 (ug/m3) Average	742	2	2	100.00	150.7	-	34.6	1
Temperature 2 m (C) Average	744	0	0	100.00	5.8	-	2	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	95	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.4	-	29.3	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	29	-	17	-
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 - SHELL MUSKEG RIVER (AMS 16)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.9	4	-	0	0	0	1	2	4	32
THC (ppm) Average	705	2.63	0.5	-	2	2.2	2.3	2.5	2.8	3.2	5.8
NO2 (ppb) Average	707	13.7	9	-	0	2	6	13	21	26	42
NO (ppb) Average	707	11.4	20	-	0	0	0	4	12	34	150
NOX (ppb) Average	707	25.1	26	-	0	2	8	17	34	57	187
PM2.5 (ug/m3) Average	742	9.23	13.1	-	0.1	1.4	2.7	5.9	11.6	18.2	150.7
Temperature 2 m (C) Average	744	-13.74	7.9	-	-33.9	-23	-18.7	-13.7	-9.1	-3.7	5.8
Relative Humidity (%) Average	744	83.5	7	-	54	75	79	84	88	92	98
Barometric Pressure (inHg) Average	744	28.88	0.3	-	28	28.5	28.7	28.9	29.1	29.2	29.4
Wind Speed 10 m (km/h) Average	742	8.1	5	-	1	3	5	7	11	16	29
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	04 Jan 2016 13:00	04 Jan 2016 14:00	2	Maintenance - Station operator on site
Wind Speed, Wind Direction	10 Jan 2016 13:00	10 Jan 2016 13:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Jan 2016 17:00	20 Jan 2016 17:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 32 ppb on Jan 3 15:00

Maximum Daily Average: 14.9 ppb on Jan 3

Minimum Value: 0 ppb on Jan 29 22:00

Minimum Daily Average: 0.1 ppb on Jan 29

Maximum Diurnal Average: 3.5 ppb at hour 15

Minimum Diurnal Average: 1.0 ppb at hour 3

Monthly Average: 1.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 2$ $P_{90} = 4$ $P_{99} = 19$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
2-Jan	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	3	2	1	1	1	1	1	1	2	1.0	3
3-Jan	10	6	Z	14	11	16	14	11	11	10	22	20	29	31	32	22	17	20	15	14	8	5	3	2	14.9	32
4-Jan	2	1	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1.1	2
5-Jan	1	1	1	1	Z	1	2	1	2	2	2	2	2	4	4	2	2	2	2	1	1	1	1	1	1.6	4
6-Jan	1	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	3	6	2	2	0.9	6
8-Jan	2	Z	1	2	1	1	2	2	2	1	1	2	10	9	9	5	4	2	1	1	1	1	1	1	2.7	10
9-Jan	1	3	Z	3	2	1	2	3	2	1	1	2	3	9	11	8	2	2	3	10	14	15	11	15	5.3	15
10-Jan	11	7	2	Z	11	11	10	10	10	6	4	2	2	3	4	1	1	1	1	0	0	0	0	0	4.3	11
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Jan	Z	1	1	0	1	1	1	6	3	5	4	5	4	6	10	10	13	4	3	2	3	5	4	3	4.2	13
13-Jan	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.9	3
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Jan	0	0	0	0	Z	1	1	1	1	3	4	4	1	1	1	1	1	1	1	1	1	2	3	5	1.4	5
17-Jan	6	3	5	3	3	Z	12	4	4	3	3	1	14	14	16	3	2	2	1	1	1	1	1	1	4.6	16
18-Jan	Z	1	1	1	1	1	1	1	0	1	1	1	5	4	2	2	1	1	1	0	1	1	1	1	1.2	5
19-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0.8	1
20-Jan	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	2	1	1	1	2	0.9	2
21-Jan	1	1	1	Z	1	1	2	1	1	1	1	1	4	3	1	1	1	1	1	1	1	1	1	1	1.3	4
22-Jan	3	2	2	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	3
23-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0.9	2
24-Jan	Z	2	2	3	3	3	2	1	1	1	1	0	1	0	0	0	0	0	1	1	0	0	0	0	1.0	3
25-Jan	0	Z	0	0	0	0	5	8	5	2	13	C	C	C	C	C	C	1	1	1	1	1	1	1	--	13
26-Jan	2	1	Z	1	1	2	3	3	2	2	3	3	3	3	3	3	4	5	2	1	1	0	0	0	2.1	5
27-Jan	0	0	0	Z	1	1	2	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.5	2
28-Jan	1	1	1	2	Z	2	1	1	1	3	3	3	1	1	1	1	2	2	1	1	0	0	0	0	1.3	3
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Jan	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
	1.9	1.4	1.0	1.5	1.6	1.8	2.1	2.0	1.7	1.6	2.3	1.8	3.0	3.3	3.5	2.4	2.0	1.7	1.4	1.5	1.4	1.5	1.3	1.5	Diurnal Average	
	11	7	5	14	11	16	14	11	11	10	22	20	29	31	32	22	17	20	15	14	14	15	11	15	Diurnal Maximum	

Z - zerospan C - Calibration

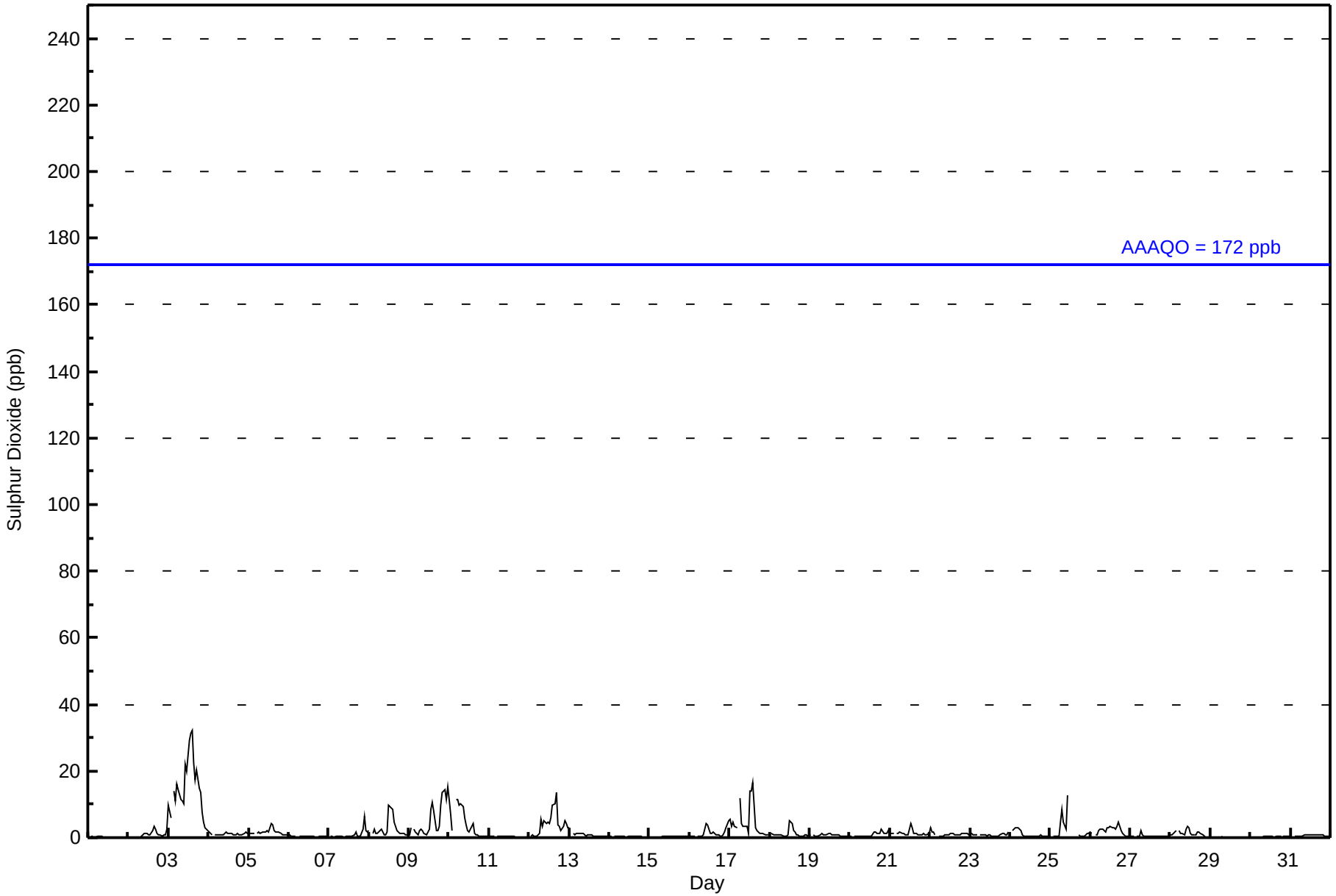
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	677	95.76	95.76
11 - 20	25	3.54	99.29
21 - 60	5	0.71	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 (SO_2) - ppb

Shell Muskeg River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	9	40	103	43	12	4	8	22	137	140	66	39	21	16	11	4	675
11 - 20	0	0	0	0	0	0	0	1	7	14	2	1	0	0	0	0	25
21 - 60	0	0	0	0	0	0	0	0	0	5	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	9	40	103	43	12	4	8	23	144	159	68	40	21	16	11	4	705

Total Number of Valid Hours: 705

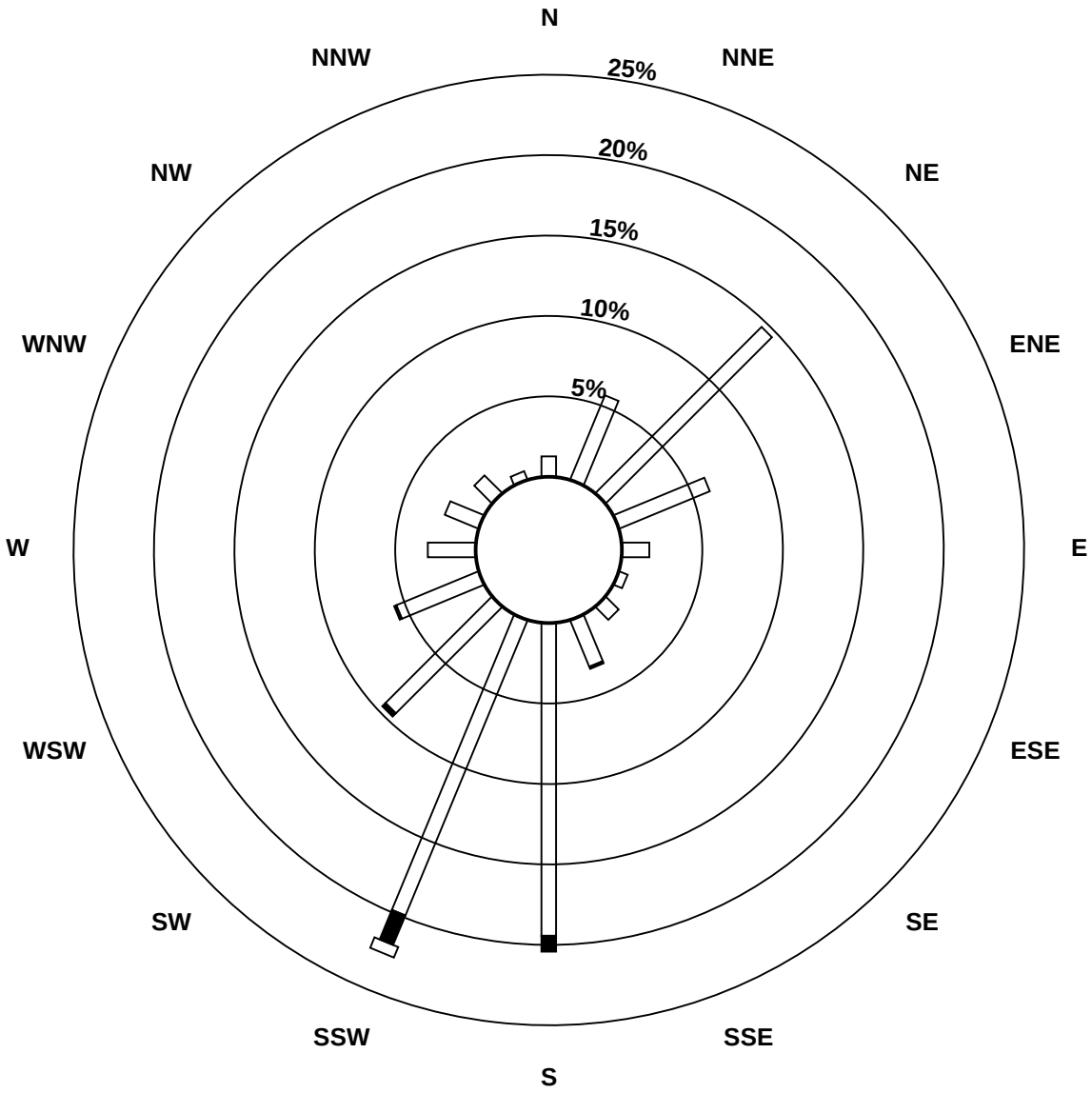
Total Number of Hours: 744

Wood Buffalo Environmental Association

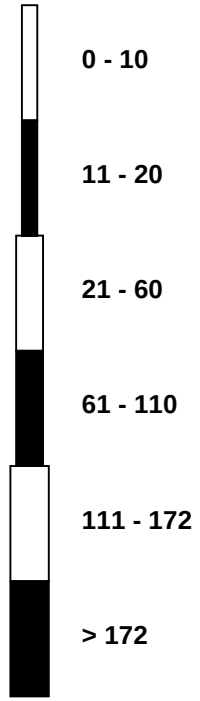
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)



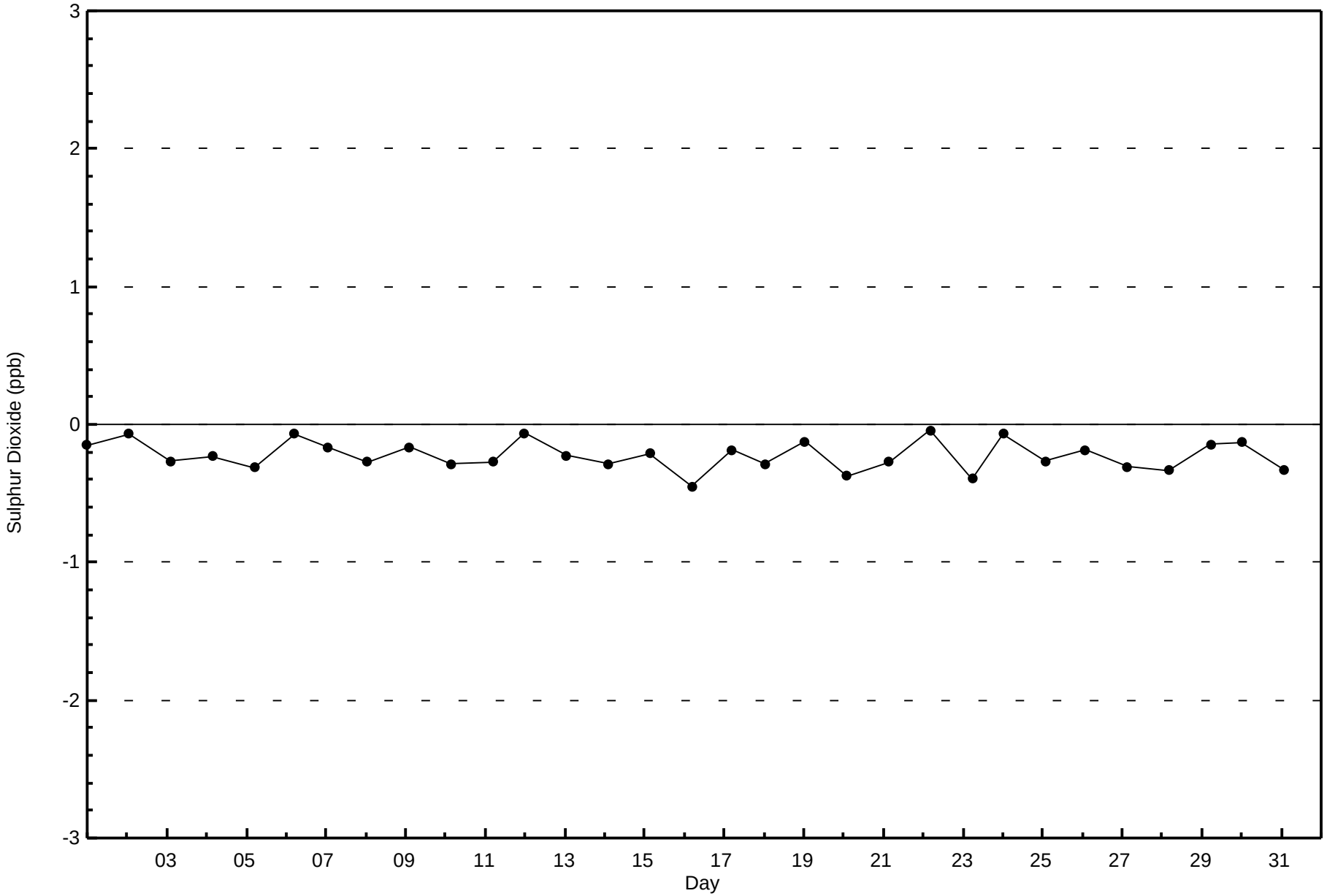
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - January 2016

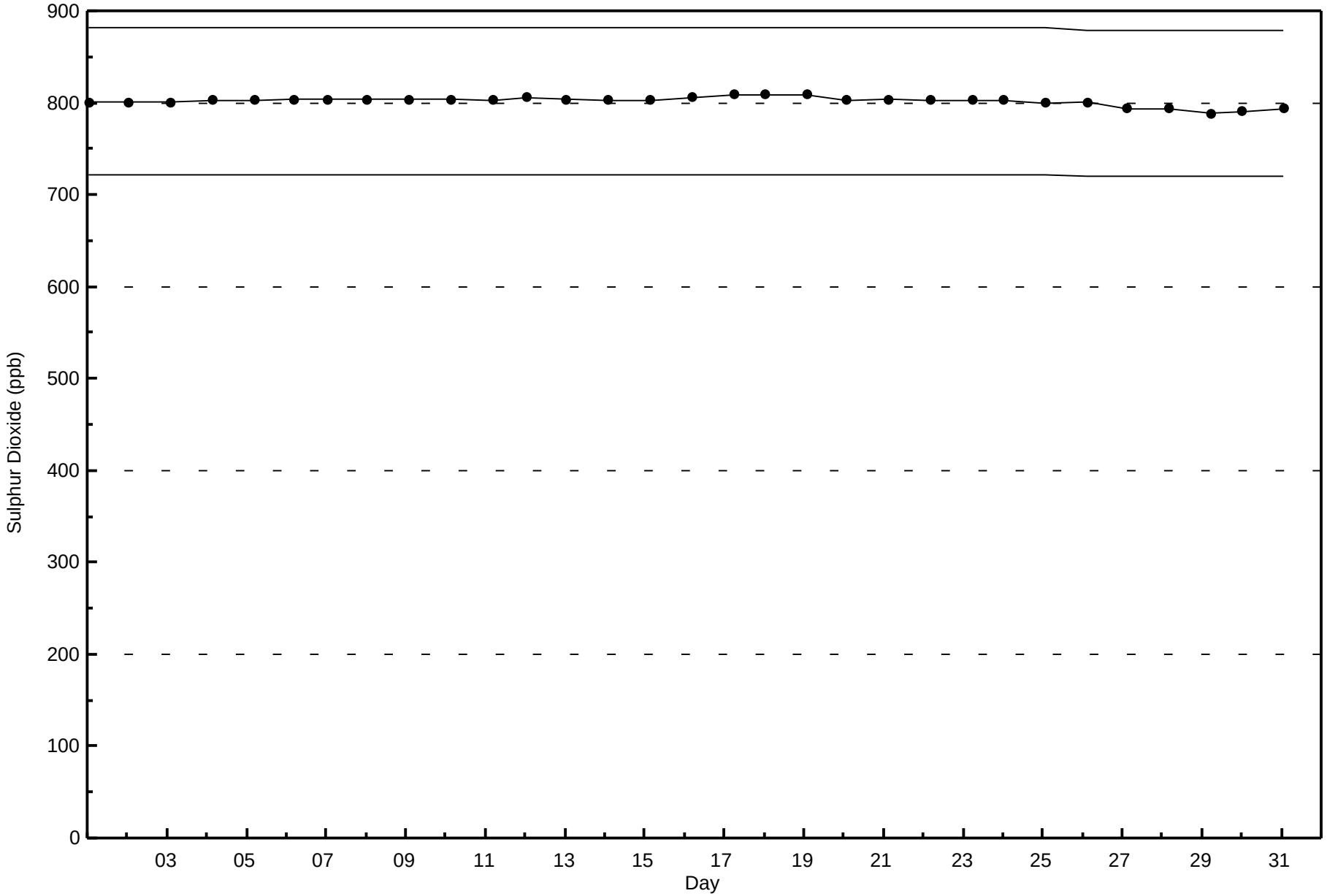


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - January 2016

Maximum Value: 5.8 ppm on Jan 5 19:00

Maximum Daily Average: 3.7 ppm on Jan 5

Minimum Value: 2.0 ppm on Jan 27 01:00

Minimum Daily Average: 2.3 ppm on Jan 14

Maximum Diurnal Average: 2.7 ppm at hour 19

Minimum Diurnal Average: 2.6 ppm at hour 14

Monthly Average: 2.63 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.3 Median = 2.5 Q_3 = 2.8 P_{90} = 3.2 P_{99} = 4.3

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	37
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.3	2.4	2.3	2.2	2.3	2.3	2.3	2.5	2.5	2.2	2.3	2.2	2.4	2.7	2.2	2.1	2.4	2.7	2.1	3.1	3.2	2.9	2.4	2.4	3.2
2-Jan	2.1	Z	2.2	2.5	2.7	2.7	2.5	2.5	2.4	2.4	2.5	2.4	2.4	2.5	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.6	2.4	2.7
3-Jan	2.5	2.4	Z	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.7	2.9	3.0	2.5	3.0
4-Jan	2.9	3.1	3.1	Z	3.6	3.7	3.6	3.5	3.3	3.2	3.3	3.3	UO	UO	2.7	2.7	2.7	3.1	3.3	3.3	3.4	3.6	3.8	3.8	3.3	3.8
5-Jan	3.6	3.3	3.4	3.5	Z	3.1	2.9	2.9	2.9	2.9	2.9	2.8	2.8	2.9	3.2	3.3	3.5	5.7	5.8	5.3	4.5	4.4	4.3	4.1	3.7	5.8
6-Jan	4.1	4.3	4.4	3.8	3.9	Z	3.7	3.5	3.1	3.0	3.0	2.6	2.5	3.0	2.9	2.7	2.5	2.7	2.6	2.4	2.8	3.0	2.9	2.7	3.1	4.4
7-Jan	Z	2.8	2.3	2.2	2.7	2.6	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.3	2.8
8-Jan	2.1	Z	2.1	2.7	2.8	2.8	3.0	2.7	2.8	3.1	3.0	3.0	2.6	2.8	2.7	3.1	2.9	3.3	2.9	2.8	2.7	2.6	2.4	2.4	2.8	3.3
9-Jan	2.3	2.4	Z	2.4	2.3	2.4	2.4	2.5	2.5	2.5	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.7	2.7	2.7	2.7	2.5	2.6	2.5	2.7
10-Jan	2.5	2.5	2.6	Z	2.7	2.6	2.6	2.7	2.9	3.0	3.0	2.9	2.9	3.6	3.2	2.7	2.5	2.4	2.5	2.4	2.2	2.3	2.4	2.5	2.7	3.6
11-Jan	2.7	2.6	2.7	2.7	Z	2.6	2.4	2.6	2.4	2.3	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.5	2.4	2.5	2.4	2.7
12-Jan	Z	2.5	2.5	2.6	2.7	2.7	2.7	2.8	2.8	2.8	2.7	2.7	2.6	2.5	2.4	2.5	2.4	2.5	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.8
13-Jan	2.5	Z	2.7	2.8	3.0	3.1	3.3	3.8	3.9	2.8	2.5	2.4	2.3	2.3	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.7	2.6	2.4	2.7	3.9
14-Jan	2.3	2.4	Z	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.4
15-Jan	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.4	2.4	2.5	2.4	2.3	2.4	2.5	2.5	2.5	2.4	2.4	2.5	2.6	2.3	2.6
16-Jan	2.7	2.7	2.8	2.7	Z	2.4	2.4	2.4	2.5	2.7	2.8	2.9	2.9	2.8	2.7	2.9	2.9	3.2	3.1	3.1	3.2	3.1	3.2	3.6	2.8	3.6
17-Jan	3.5	3.4	3.3	3.2	2.9	Z	2.8	2.6	2.5	2.5	3.0	3.7	2.9	3.2	3.1	3.7	3.4	3.4	3.5	3.4	3.4	3.4	3.4	3.3	3.2	3.7
18-Jan	Z	2.9	2.9	2.9	3.1	2.9	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	3.1
19-Jan	2.3	Z	2.3	2.4	2.5	2.6	2.6	2.5	2.5	2.6	2.6	2.5	2.4	2.5	2.7	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.4	2.7
20-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.5	2.6	2.3	2.2	2.2	2.3	2.3	2.5	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.7	2.7	2.4	2.7
21-Jan	2.6	2.5	2.4	Z	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.7	2.7	2.6	2.6	2.6	2.6	2.9	3.4	4.3	3.9	2.8	2.6	2.8	4.3
22-Jan	2.8	2.9	3.0	3.0	Z	3.1	2.9	3.2	3.6	4.3	3.5	3.3	3.0	2.6	3.1	3.3	3.1	3.1	2.9	2.7	2.6	2.6	2.6	2.6	3.0	4.3
23-Jan	2.6	2.6	2.6	2.6	2.5	Z	2.7	2.8	2.7	2.5	2.4	2.8	2.8	2.5	2.7	2.7	2.6	2.5	2.6	2.7	3.0	3.3	3.2	3.2	2.7	3.3
24-Jan	Z	2.9	3.0	3.1	3.0	2.9	2.8	2.7	2.4	2.4	2.4	2.3	2.2	2.3	2.4	2.4	2.6	2.6	3.6	2.6	2.5	2.5	2.5	2.3	2.6	3.6
25-Jan	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.4	2.3	C	C	C	C	C	C	2.5	3.1	3.4	3.0	2.5	2.6	2.7	--	3.4
26-Jan	2.6	2.6	Z	2.6	2.6	2.5	2.5	2.4	2.5	2.6	2.7	2.6	2.6	2.5	2.5	2.5	3.2	3.2	2.7	2.4	2.4	2.4	2.2	2.1	2.6	3.2
27-Jan	2.0	2.0	2.1	Z	2.3	2.4	2.3	2.5	2.3	2.4	2.5	2.4	2.3	2.4	2.4	2.5	2.5	2.4	2.5	2.7	2.7	2.4	2.4	2.5	2.4	2.7
28-Jan	2.7	2.5	2.7	2.6	Z	3.2	2.9	2.6	2.5	2.6	2.9	2.9	3.6	2.6	2.7	2.6	2.3	2.2	2.3	2.4	2.5	2.6	2.7	2.5	2.7	3.6
29-Jan	2.5	2.5	2.1	2.2	2.5	Z	2.2	2.3	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.2	2.2	2.6	2.7	2.7	2.4	2.2	2.3	2.7
30-Jan	Z	2.5	2.7	2.5	2.4	2.3	2.3	2.3	2.9	2.5	2.5	2.3	3.3	2.5	2.2	2.2	2.2	2.3	2.3	2.2	2.4	2.3	2.2	2.2	2.4	3.3
31-Jan	2.3	Z	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.5	2.5	2.4	2.3	2.5	2.8	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.8
	2.6	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.6	Diurnal Average	
	4.1	4.3	4.4	3.8	3.9	3.7	3.7	3.8	3.9	4.3	3.5	3.7	3.6	3.6	3.2	3.7	3.5	5.7	5.8	5.3	4.5	4.4	4.3	4.1	Diurnal Maximum	

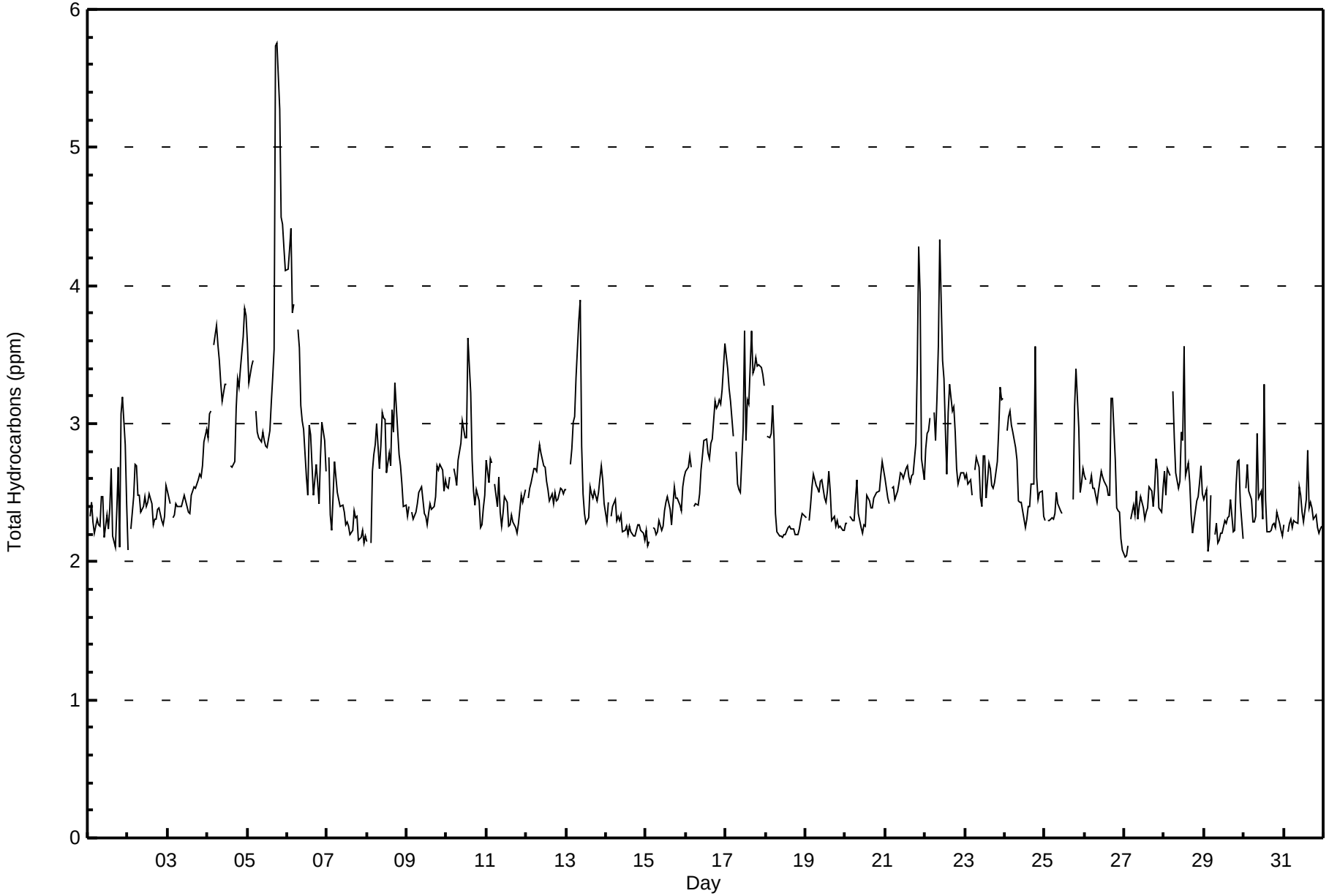
Z - zerospan C - Calibration UO - Unstable Operation

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.28	0.28
2.1 - 3.0	603	85.53	85.82
3.1 - 10.0	100	14.18	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

Shell Muskeg River - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
2.1 - 3.0	4	38	99	40	9	2	6	18	121	132	56	32	19	15	7	3	601
3.1 - 10.0	5	2	4	3	3	2	2	4	22	27	12	6	2	1	4	1	100
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	9	40	103	43	12	4	8	22	143	159	68	40	21	16	11	4	703

Total Number of Valid Hours: 703

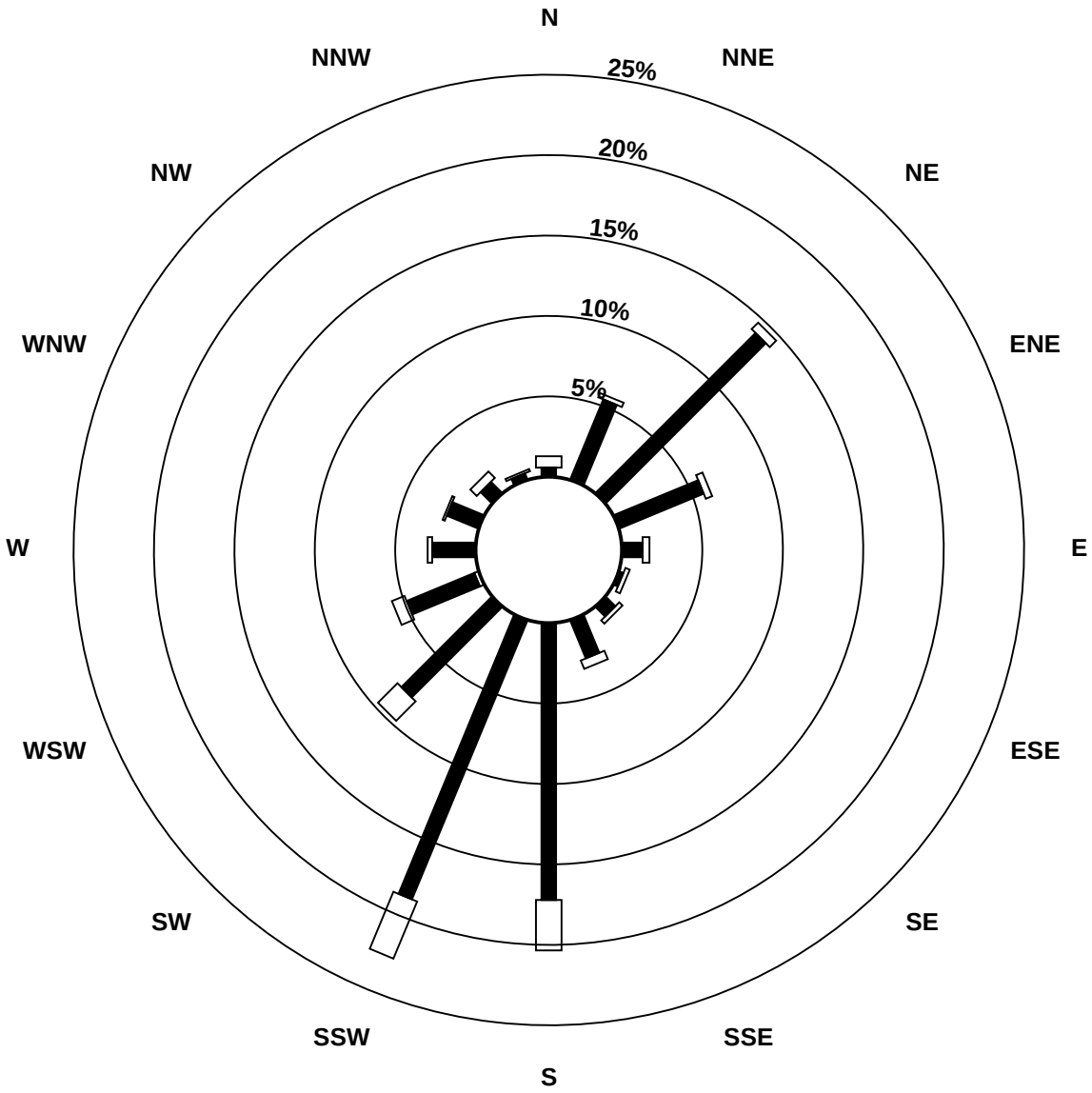
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Shell Muskeg River (AMS 16)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

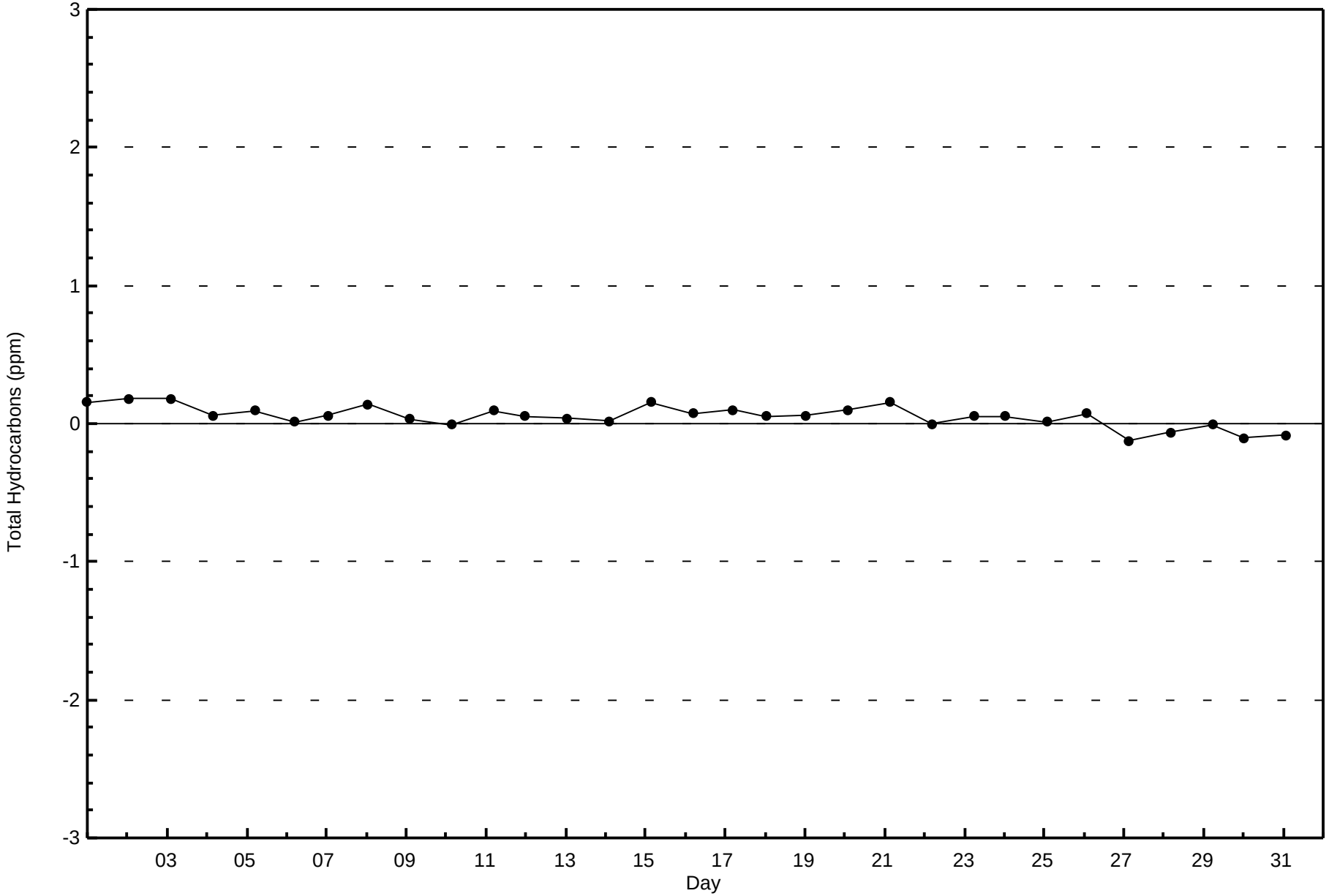
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - January 2016

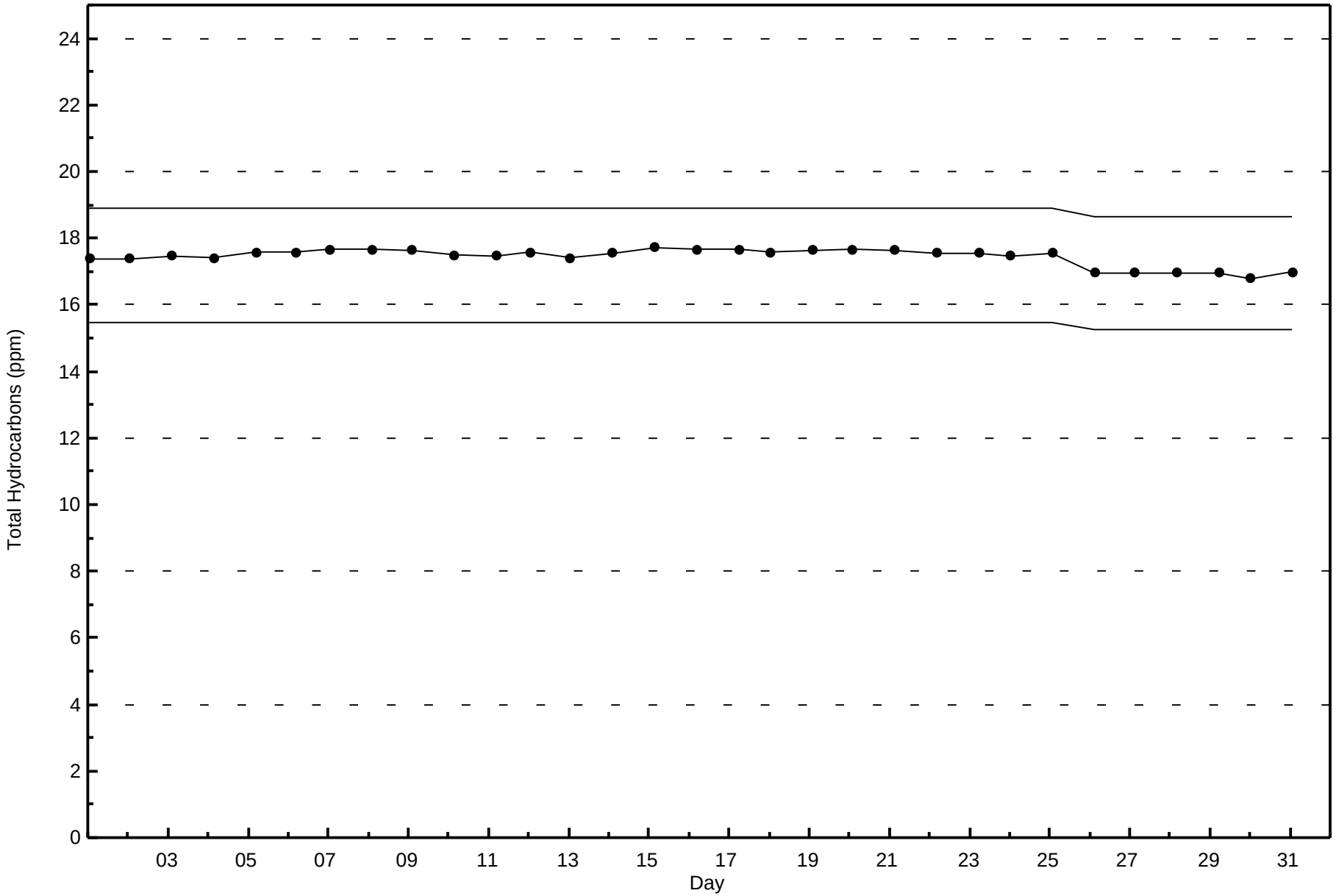


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Shell Muskeg River - January 2016

Maximum Value: 150 ppb on Jan 5 19:00

Maximum Daily Average: 60.7 ppb on Jan 5

Minimum Value: 0 ppb on Jan 1 05:00

Minimum Daily Average: 0.1 ppb on Jan 1

Maximum Diurnal Average: 14.3 ppb at hour 19

Minimum Diurnal Average: 7.8 ppb at hour 16

Monthly Average: 11.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 4 $Q_3 = 12$ $P_{90} = 34$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
2-Jan	0	Z	0	0	0	0	0	0	0	3	8	4	2	1	2	2	0	2	4	2	1	0	0	11	2.0	11
3-Jan	4	0	Z	0	0	0	0	0	0	5	9	8	10	10	12	8	1	1	1	1	1	6	5	7	4.0	12
4-Jan	3	4	9	Z	26	28	32	25	29	36	41	46	40	31	23	16	17	34	44	36	54	63	93	97	36.0	97
5-Jan	73	76	67	58	Z	53	34	45	36	40	38	28	20	10	9	9	32	145	150	138	102	85	75	70	60.7	150
6-Jan	70	76	71	53	59	Z	59	48	27	26	23	3	2	27	18	7	2	3	8	3	5	5	6	6	26.5	76
7-Jan	Z	4	2	0	5	4	4	5	5	2	4	2	3	2	2	1	1	0	0	0	0	0	0	0	2.0	5
8-Jan	0	Z	0	7	15	22	14	26	23	42	26	32	20	7	7	3	2	6	3	3	2	0	0	0	11.4	42
9-Jan	0	0	Z	0	0	0	0	0	0	1	1	1	2	4	5	3	0	0	1	3	7	9	3	3	1.9	9
10-Jan	3	2	16	Z	11	8	3	1	1	3	7	8	11	67	35	10	8	10	5	2	0	0	0	4	9.4	67
11-Jan	3	8	5	12	Z	7	0	0	4	1	1	1	0	1	0	0	0	0	0	0	2	8	3	0	2.5	12
12-Jan	Z	0	2	4	20	18	17	8	0	3	6	9	9	10	10	8	13	16	10	8	12	12	5	3	8.8	20
13-Jan	1	Z	14	8	21	33	45	88	76	11	6	5	2	2	4	3	5	7	9	5	6	6	4	5	15.8	88
14-Jan	5	8	Z	5	8	5	6	0	1	3	1	4	10	8	5	7	8	7	6	2	0	0	0	0	4.4	10
15-Jan	0	0	0	Z	3	5	0	0	2	1	2	2	4	6	3	0	1	5	2	12	1	1	5	8	2.6	12
16-Jan	13	21	21	14	Z	9	5	5	19	25	26	38	21	27	26	35	42	23	36	31	39	36	66	118	30.2	118
17-Jan	109	95	85	66	44	Z	39	17	11	15	21	14	16	22	26	21	22	39	49	39	49	45	41	39	40.1	109
18-Jan	Z	24	37	30	21	14	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	5.8	37
19-Jan	0	Z	0	1	1	5	1	1	1	2	6	5	5	13	16	4	0	0	0	0	0	0	0	0	2.8	16
20-Jan	1	4	Z	3	4	5	3	10	2	0	1	1	2	4	6	5	2	0	0	0	6	15	35	18	5.5	35
21-Jan	9	4	0	Z	15	15	3	14	13	18	22	19	28	23	10	1	0	7	23	45	79	56	5	0	17.8	79
22-Jan	0	0	0	8	Z	12	3	1	18	50	26	19	10	3	34	37	28	28	11	2	0	2	3	5	13.2	50
23-Jan	6	2	4	4	0	Z	2	5	3	1	1	20	27	13	11	7	6	6	6	13	41	33	20	9	10.5	41
24-Jan	Z	6	12	7	5	5	3	0	0	3	7	7	5	5	3	1	0	0	43	12	4	4	5	1	5.9	43
25-Jan	0	Z	0	0	0	0	0	0	0	1	1	C	C	C	C	C	C	10	6	5	1	2	8	13	--	13
26-Jan	15	12	Z	1	2	9	12	13	17	28	32	29	25	26	28	20	22	12	13	1	0	0	0	0	13.8	32
27-Jan	0	0	0	Z	0	0	1	2	0	0	2	2	1	2	9	9	8	5	3	16	11	2	3	0	3.3	16
28-Jan	0	0	0	1	Z	5	6	0	1	7	9	11	5	13	5	2	4	1	0	0	0	0	0	0	3.1	13
29-Jan	0	0	0	1	1	Z	0	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0.4	2
30-Jan	Z	0	0	0	0	0	0	0	26	2	4	9	5	3	1	2	3	3	5	0	6	5	3	1	3.4	26
31-Jan	5	Z	0	3	5	1	4	6	10	6	10	8	8	7	8	6	5	4	3	8	0	0	0	0	4.7	10
	12.9	13.8	13.3	10.9	10.3	9.8	9.6	10.4	10.5	10.8	11.0	11.3	10.0	11.7	10.7	7.8	7.9	12.2	14.3	12.5	13.9	12.8	12.5	13.5	Diurnal Average	
	109	95	85	66	59	53	59	88	76	50	41	46	40	67	35	37	42	145	150	138	102	85	93	118	Diurnal Maximum	

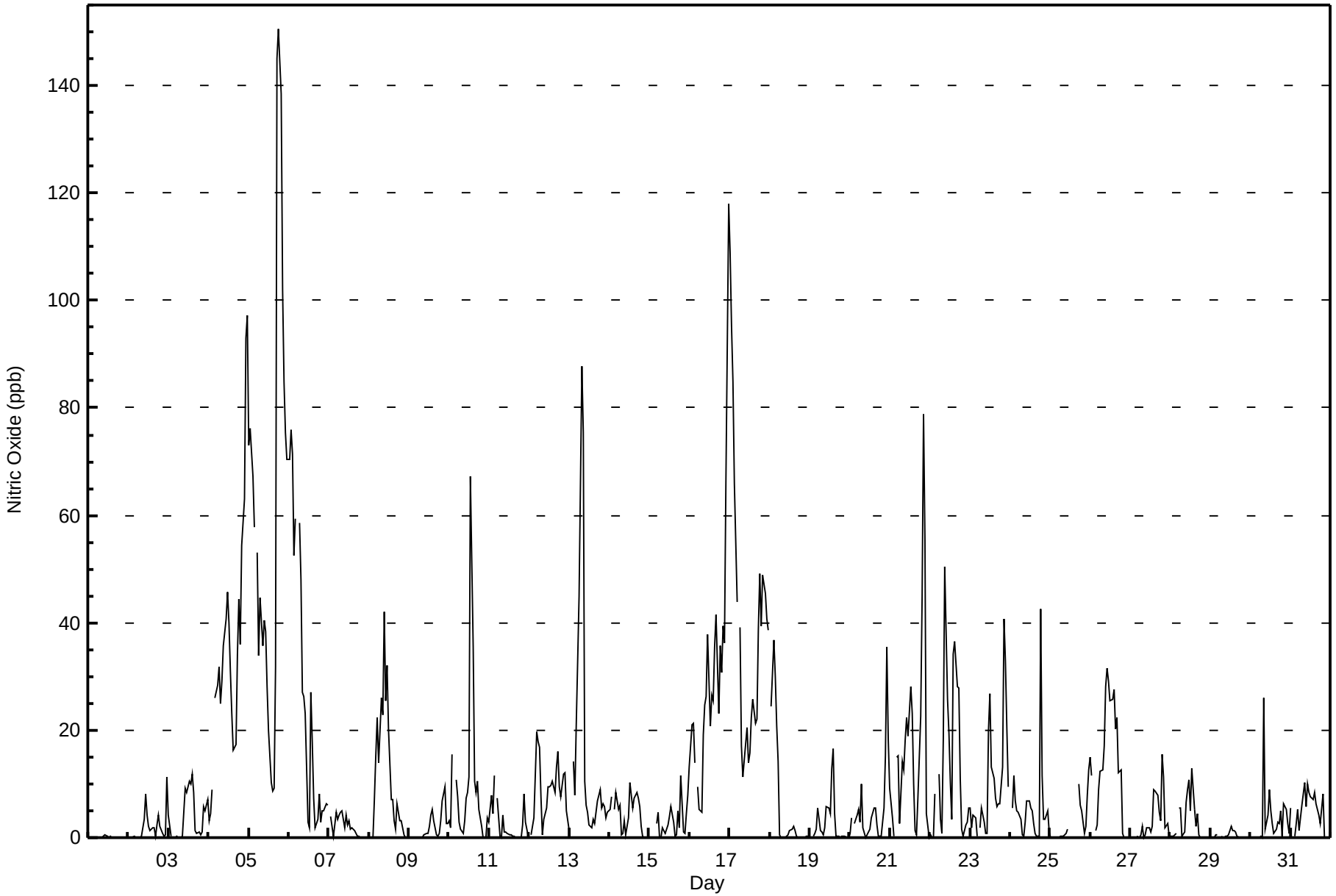
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Shell Muskeg River - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	581	82.18	82.18
21 - 40	76	10.75	92.93
11 - 80	38	5.37	98.30
81 - 159	12	1.70	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Shell Muskeg River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	4	38	101	40	9	2	3	15	117	123	52	37	17	13	5	3	579
21 - 40	2	1	1	2	1	0	4	5	12	24	13	2	2	3	3	1	76
11 - 80	2	1	1	1	2	2	1	3	11	9	3	0	1	0	1	0	38
81 - 159	1	0	0	0	0	0	0	0	4	3	0	1	1	0	2	0	12
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	9	40	103	43	12	4	8	23	144	159	68	40	21	16	11	4	705

Total Number of Valid Hours: 705

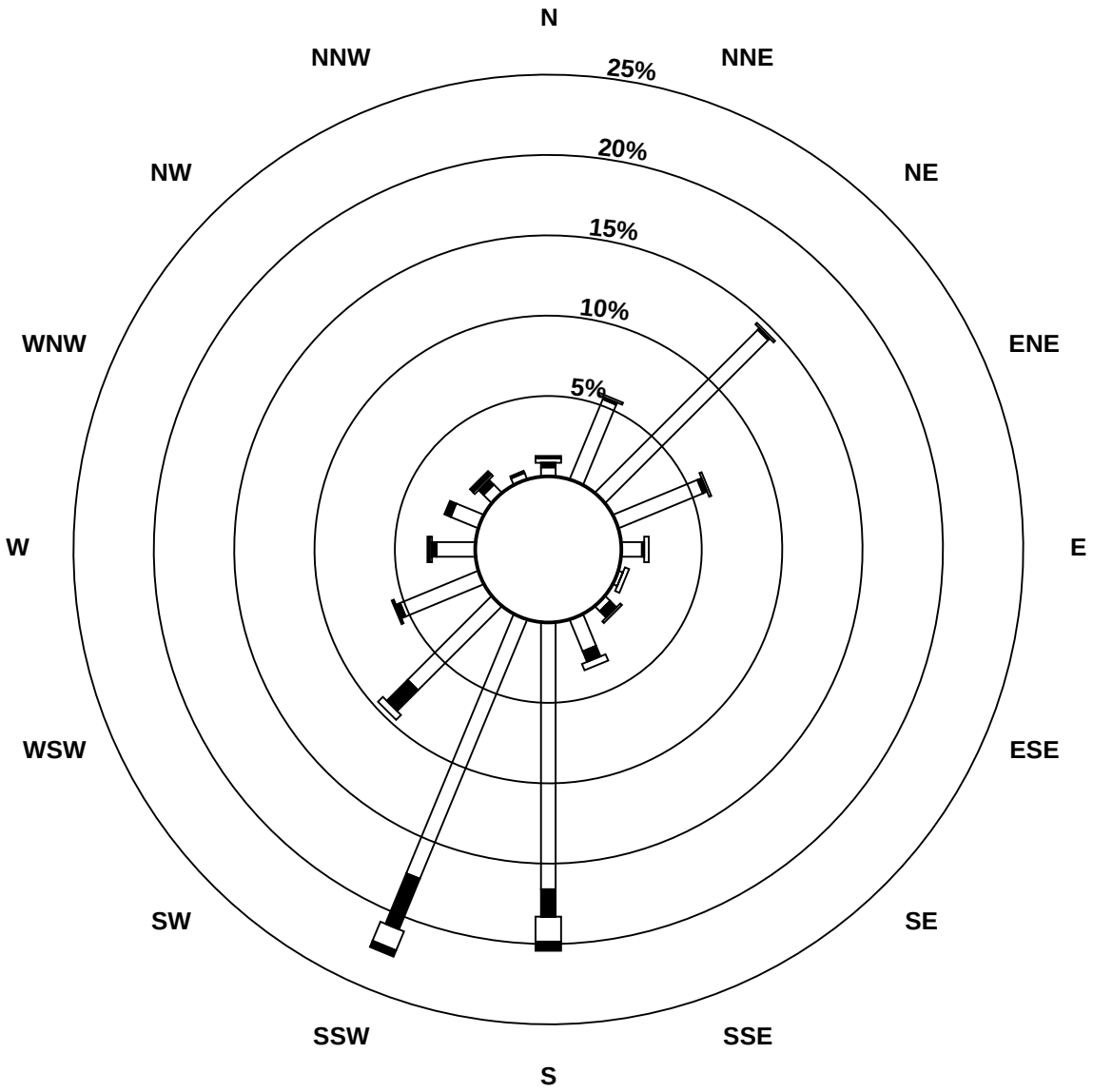
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)

0 - 20

21 - 40

11 - 80

81 - 159

> 159

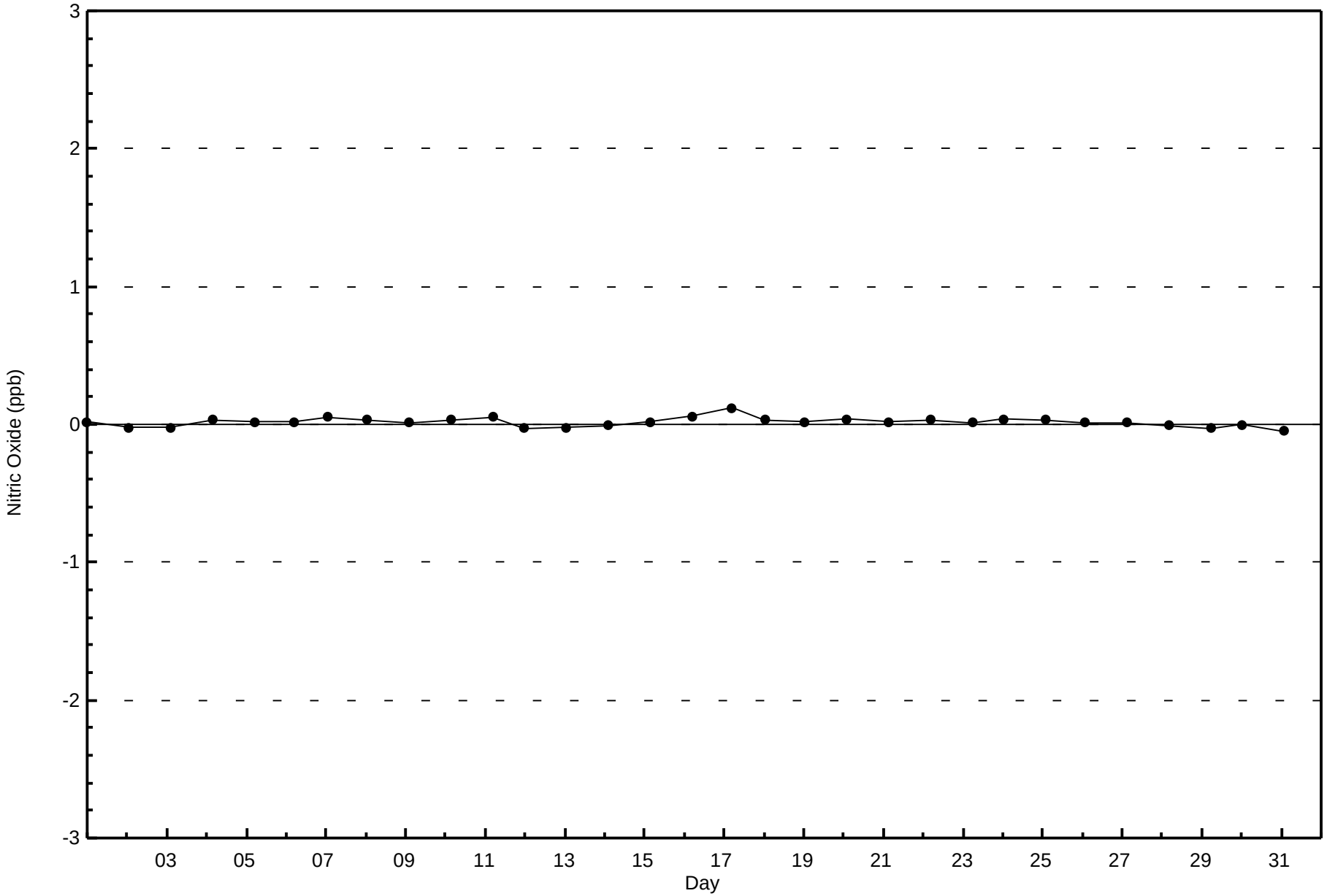
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Shell Muskeg River - January 2016

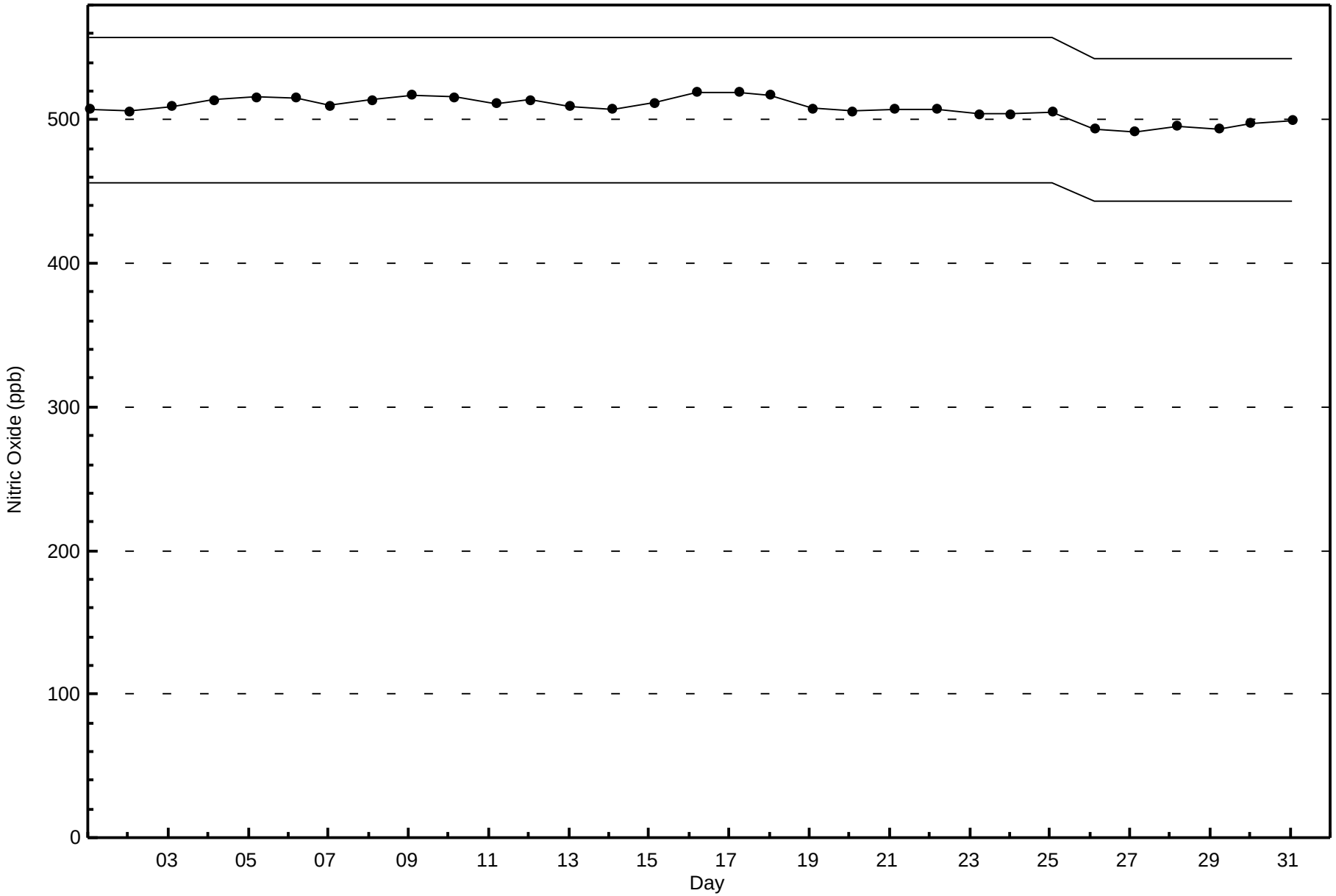


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 42 ppb on Jan 17 00:00

Maximum Daily Average: 27.0 ppb on Jan 5

Minimum Value: 0 ppb on Jan 29 10:00

Minimum Daily Average: 2.9 ppb on Jan 29

Maximum Diurnal Average: 15.9 ppb at hour 6

Minimum Diurnal Average: 10.3 ppb at hour 13

Monthly Average: 13.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 6$ Median = 13 $Q_3 = 21$ $P_{90} = 26$ $P_{99} = 36$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	4	8	5	4	4	4	6	7	5	6	2	0	1	1	1	1	1	1	3	3	1	1	2	2.9	8
2-Jan	3	Z	15	18	11	7	8	10	12	22	21	13	8	7	11	18	21	28	29	28	22	18	22	31	16.6	31
3-Jan	27	20	Z	15	14	16	16	15	16	20	18	15	17	17	20	25	25	27	27	23	23	27	24	24	20.5	27
4-Jan	22	20	20	Z	22	21	21	18	19	21	20	20	20	21	22	22	24	29	28	27	32	30	36	36	23.9	36
5-Jan	33	35	31	27	Z	29	26	29	26	25	22	19	17	16	18	23	29	38	37	36	32	26	24	23	27.0	38
6-Jan	22	21	19	20	19	Z	20	19	21	22	22	9	8	23	20	14	8	12	11	5	11	10	10	10	15.5	23
7-Jan	Z	7	4	1	10	6	7	10	9	11	10	11	10	7	7	12	13	4	2	2	2	6	3	2	6.7	13
8-Jan	3	Z	2	15	30	31	30	31	26	26	23	25	20	13	16	16	19	22	19	20	19	15	10	9	19.0	31
9-Jan	4	7	Z	9	6	7	5	5	6	7	4	3	5	10	15	16	16	21	25	26	28	27	25	24	13.1	28
10-Jan	23	21	23	Z	22	21	21	19	18	15	14	14	14	26	22	14	11	9	7	6	2	3	7	9	14.7	26
11-Jan	8	11	10	28	Z	25	7	8	17	7	5	3	1	2	0	1	1	2	6	9	21	26	17	11	9.7	28
12-Jan	Z	19	21	23	27	26	26	24	19	20	18	16	16	18	19	21	26	27	26	25	25	24	23	22	22.2	27
13-Jan	18	Z	22	22	21	21	23	30	28	17	13	10	6	5	10	6	9	9	9	7	8	8	6	6	13.7	30
14-Jan	7	9	Z	9	10	7	8	7	7	8	2	5	10	8	6	7	8	8	7	4	3	1	1	1	6.2	10
15-Jan	4	3	2	Z	15	13	7	7	16	10	8	6	8	9	5	2	4	13	12	29	16	11	20	20	10.3	29
16-Jan	19	22	22	20	Z	22	21	20	24	23	22	24	17	19	23	30	32	28	28	25	30	22	31	42	24.6	42
17-Jan	40	35	33	31	27	Z	26	24	23	20	19	15	14	18	23	26	29	30	29	29	27	25	22	24	25.6	40
18-Jan	Z	26	28	26	25	25	9	2	1	0	0	2	7	8	11	13	9	6	3	2	9	21	21	23	12.0	28
19-Jan	16	Z	13	22	21	26	14	7	6	6	8	5	4	8	13	8	4	3	1	4	3	4	1	1	8.6	26
20-Jan	3	6	Z	6	6	7	8	18	6	1	3	3	4	8	13	17	21	20	21	23	25	28	30	28	13.2	30
21-Jan	26	24	19	Z	23	23	19	21	21	18	17	14	17	17	12	6	7	16	24	21	23	22	9	11	17.7	26
22-Jan	14	9	9	21	Z	21	17	13	17	21	18	15	10	7	18	20	18	19	13	8	5	5	5	9	13.4	21
23-Jan	8	7	7	9	5	Z	7	12	11	7	5	15	18	15	14	15	17	18	18	19	21	20	19	16	13.1	21
24-Jan	Z	15	15	14	14	13	13	9	7	8	10	9	7	8	6	4	5	12	25	10	3	5	5	3	9.5	25
25-Jan	1	Z	1	2	5	5	7	12	8	7	7	C	C	C	C	C	C	26	19	22	18	18	22	24	--	26
26-Jan	26	25	Z	18	21	24	26	26	26	25	24	22	21	21	20	19	22	23	20	12	9	3	2	1	18.8	26
27-Jan	0	1	0	Z	6	6	8	17	2	3	4	2	1	2	6	8	8	6	7	23	24	21	21	14	8.2	24
28-Jan	11	10	13	14	Z	16	15	11	11	15	15	18	14	20	15	10	20	18	14	9	7	2	1	0	12.1	20
29-Jan	0	1	0	9	11	Z	2	3	0	0	0	1	4	3	4	5	8	2	1	1	1	6	3	3	2.9	11
30-Jan	Z	1	1	3	3	5	10	4	21	7	8	7	6	3	1	2	3	3	4	1	7	6	3	1	4.8	21
31-Jan	6	Z	1	3	5	2	3	5	10	12	10	7	7	7	9	7	7	5	3	8	0	1	3	3	5.2	12
	13.8	14.3	13.0	14.9	14.7	15.9	13.9	14.2	14.1	13.2	12.0	10.9	10.3	11.5	12.7	12.9	14.1	15.6	15.4	15.0	14.8	14.2	13.7	14.0	Diurnal Average	
	40	35	33	31	30	31	30	31	28	26	24	25	21	26	23	30	32	38	37	36	32	30	36	42	Diurnal Maximum	

Z - zerospan C - Calibration

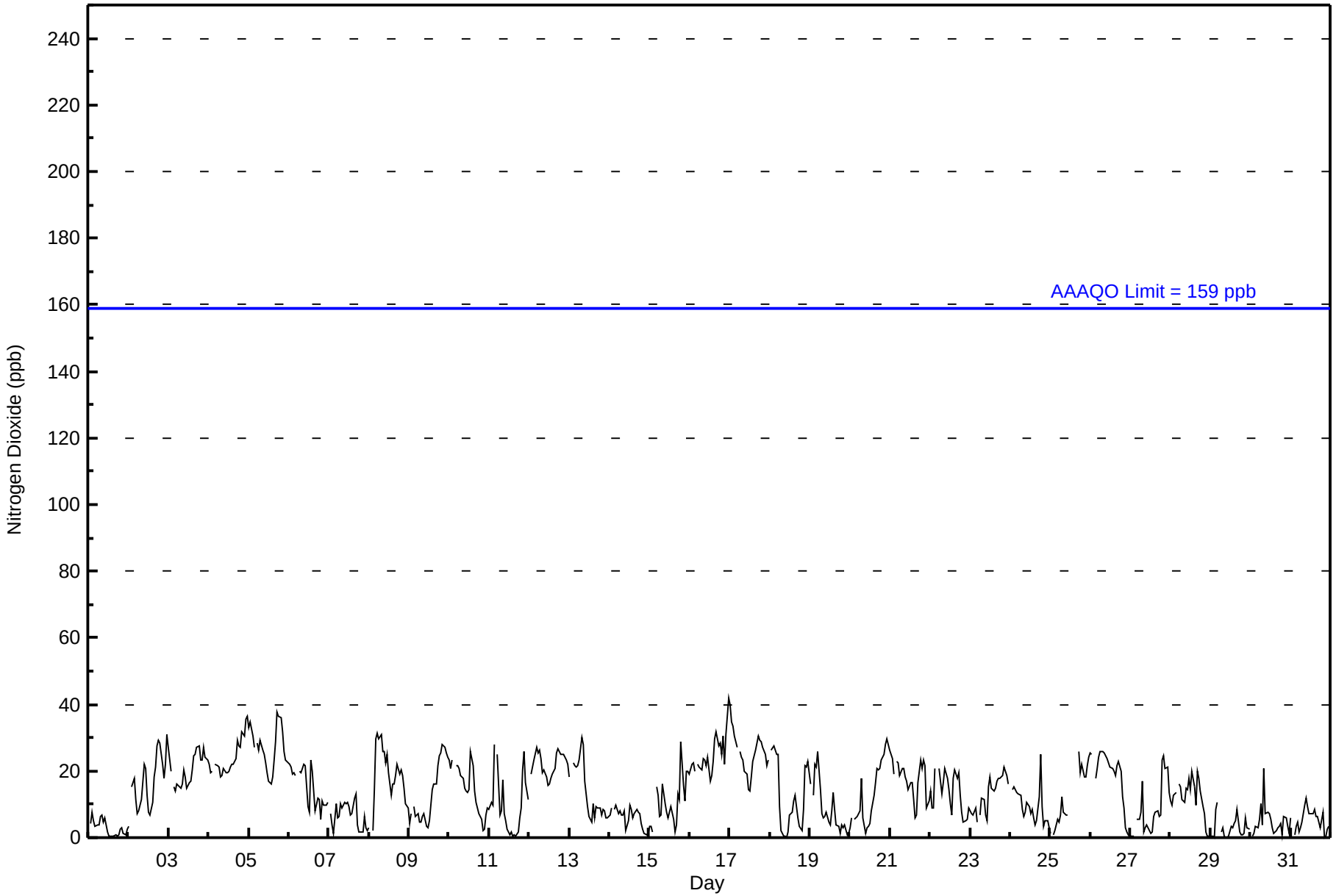
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - January 2016



Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	504	71.29	71.29
21 - 40	202	28.57	99.86
11 - 80	1	0.14	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 (NO_2) - ppb

Shell Muskeg River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	5	38	98	41	9	4	3	11	89	79	55	35	18	11	3	4	503
21 - 40	4	2	5	2	3	0	5	12	54	80	13	5	3	5	8	0	201
11 - 80	0	0	0	0	0	0	0	0	1	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	9	40	103	43	12	4	8	23	144	159	68	40	21	16	11	4	705

Total Number of Valid Hours: 705

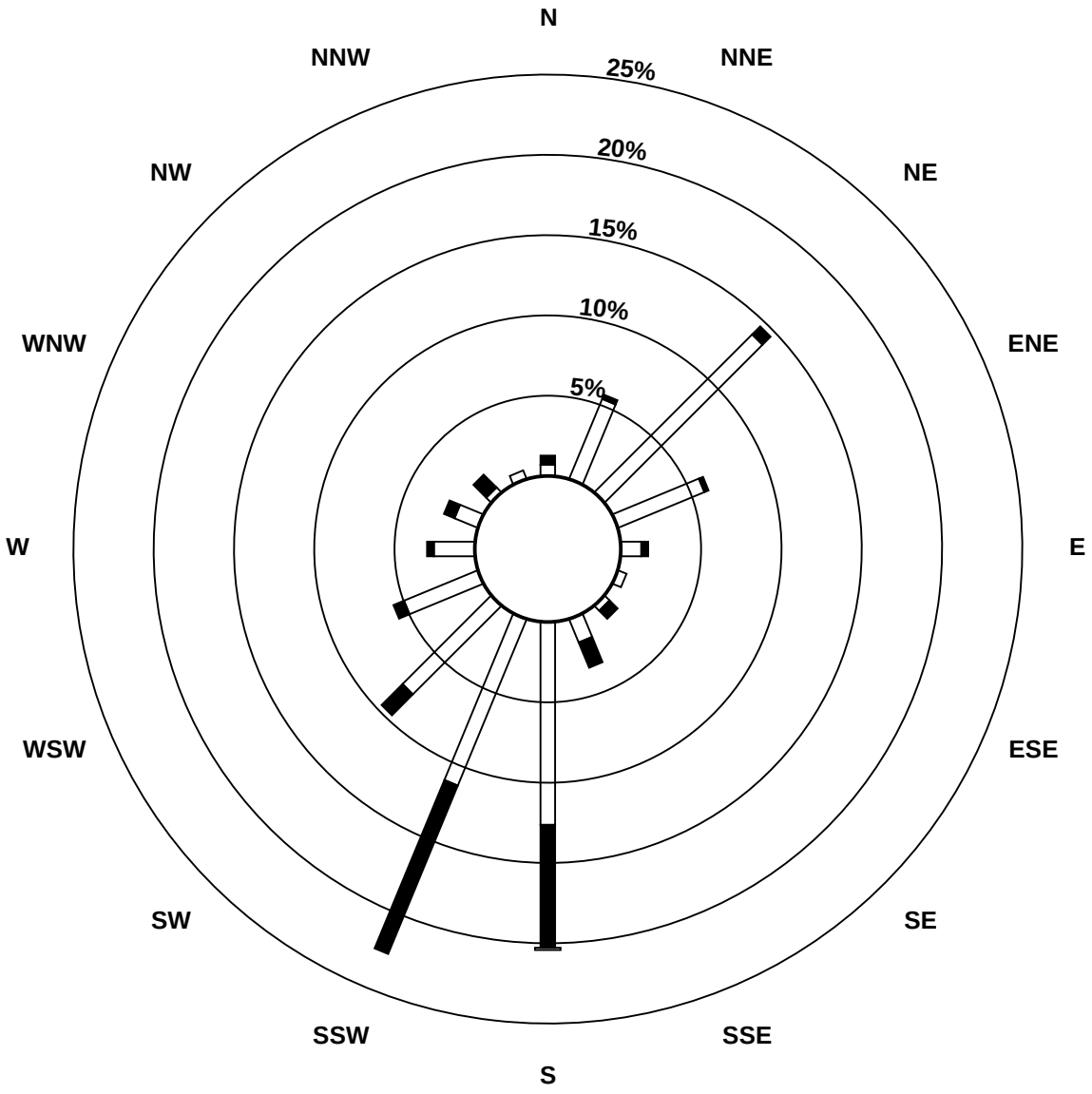
Total Number of Hours: 744

Wood Buffalo Environmental Association

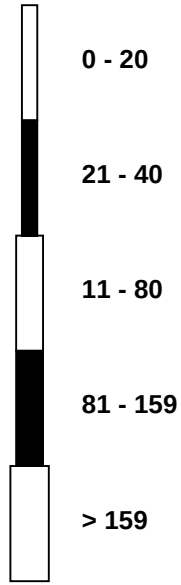
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)



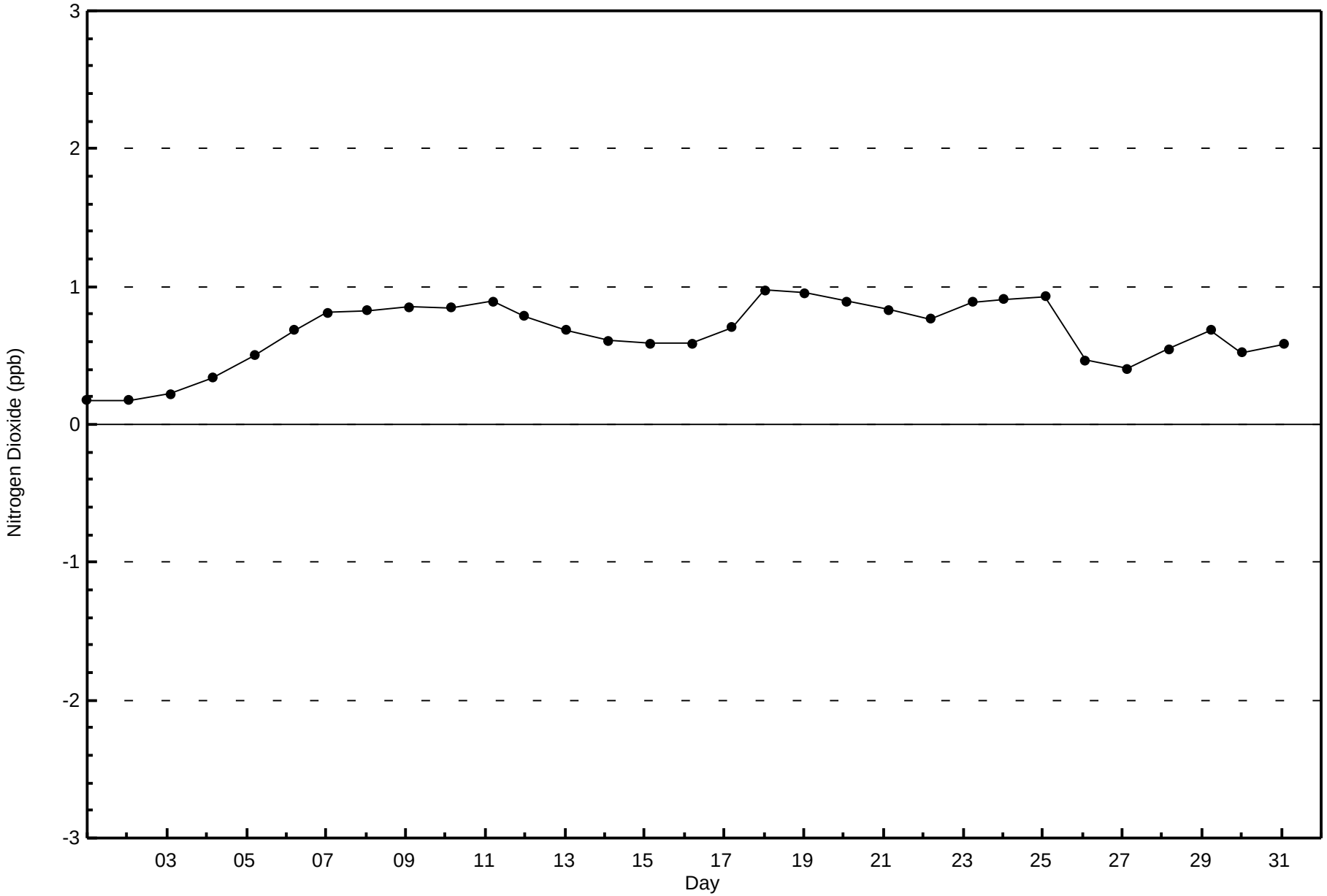
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - January 2016

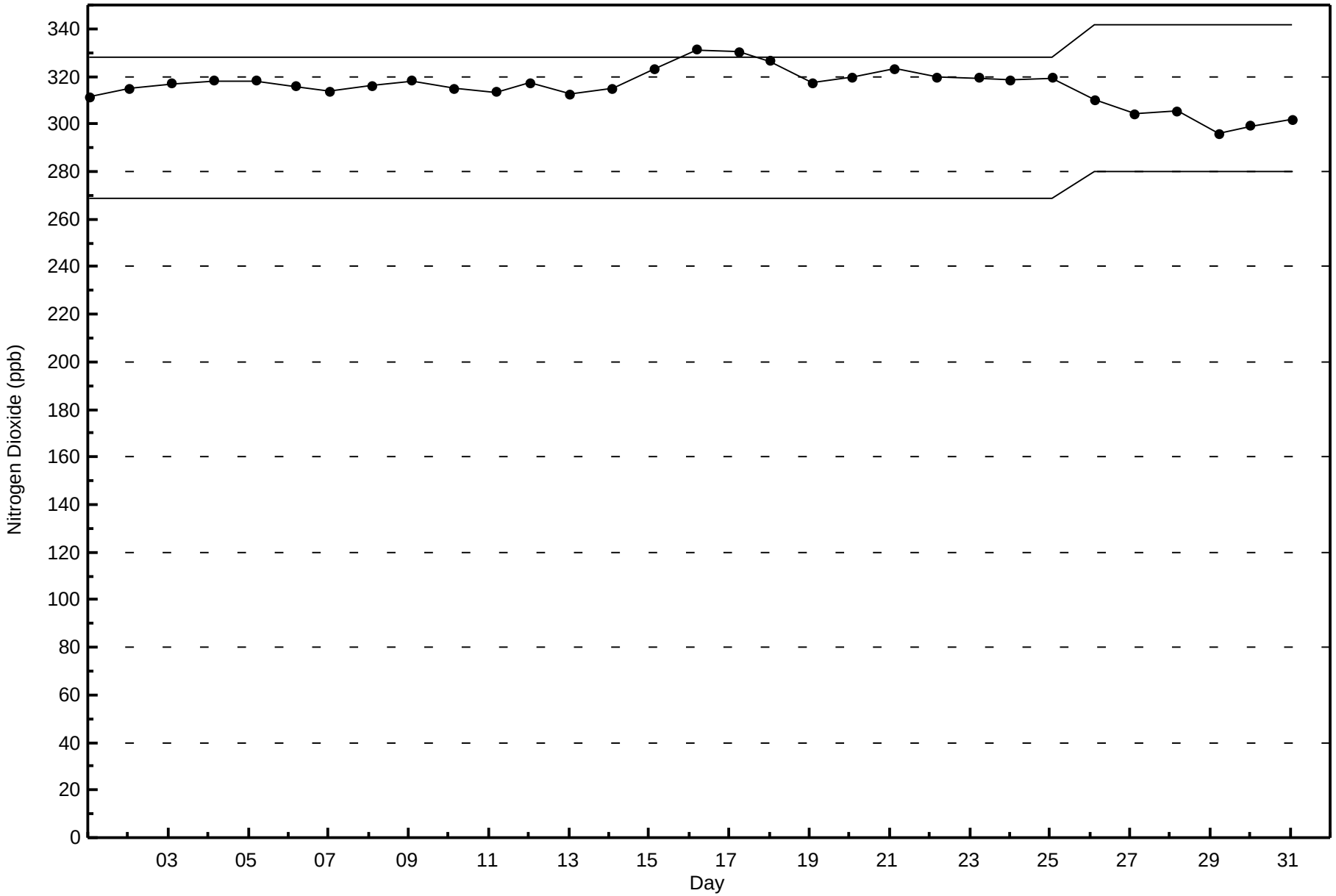


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - January 2016

Maximum Value: 187 ppb on Jan 5 19:00

Maximum Daily Average: 87.6 ppb on Jan 5

Minimum Value: 0 ppb on Jan 31 21:00

Minimum Daily Average: 3.0 ppb on Jan 1

Maximum Diurnal Average: 29.6 ppb at hour 19

Minimum Diurnal Average: 20.3 ppb at hour 13

Monthly Average: 25.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 8$ Median = 17 $Q_3 = 34$ $P_{90} = 57$ $P_{99} = 134$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	4	8	5	4	4	4	6	7	5	7	2	1	1	1	1	1	1	1	3	3	1	1	2	3.0	8
2-Jan	3	Z	15	18	12	7	8	10	12	25	29	17	10	8	13	20	21	30	33	30	23	18	23	42	18.6	42
3-Jan	32	20	Z	15	14	16	16	15	16	25	28	23	27	27	32	33	26	28	29	24	24	33	29	30	24.5	33
4-Jan	25	24	29	Z	48	50	53	43	48	56	60	65	60	52	45	38	41	64	72	63	86	94	129	134	60.0	134
5-Jan	106	111	98	85	Z	81	60	74	62	65	61	47	37	26	27	33	61	183	187	174	134	111	99	93	87.6	187
6-Jan	92	97	91	72	78	Z	78	67	48	49	45	12	9	50	38	21	10	15	20	8	16	15	16	17	42.0	97
7-Jan	Z	11	6	2	15	10	11	15	14	12	14	13	13	9	9	13	14	4	2	2	2	6	3	2	8.7	15
8-Jan	3	Z	2	22	45	54	43	57	49	68	48	57	40	20	23	19	20	28	22	23	20	15	10	9	30.4	68
9-Jan	4	7	Z	10	6	7	5	5	6	8	4	4	7	14	20	19	17	22	25	29	35	37	28	27	15.0	37
10-Jan	26	23	39	Z	32	29	24	20	18	18	21	22	26	93	57	24	19	19	13	8	2	3	7	13	24.2	93
11-Jan	11	18	14	40	Z	33	7	8	21	8	6	3	1	2	0	1	1	2	6	9	23	34	19	12	12.2	40
12-Jan	Z	19	23	27	47	43	43	31	20	24	24	25	25	27	29	29	39	42	35	33	37	36	28	25	31.0	47
13-Jan	20	Z	36	30	42	54	68	118	103	28	19	14	9	7	14	9	14	16	18	12	15	14	9	11	29.5	118
14-Jan	12	16	Z	14	18	13	14	7	8	11	3	9	20	16	11	15	17	15	13	6	3	1	1	1	10.6	20
15-Jan	4	3	2	Z	18	18	7	7	18	11	9	9	12	15	8	2	5	18	13	41	17	12	25	28	13.0	41
16-Jan	32	43	44	34	Z	31	26	25	43	48	48	62	38	45	49	65	73	51	64	56	70	58	97	160	54.8	160
17-Jan	149	130	118	96	71	Z	65	41	35	34	40	28	30	41	49	48	50	69	79	68	76	70	62	62	65.7	149
18-Jan	Z	51	65	56	46	39	10	2	1	0	0	2	8	9	13	14	10	6	3	2	9	22	21	23	17.9	65
19-Jan	16	Z	13	23	22	31	15	8	6	8	13	10	8	21	30	13	4	3	2	4	3	4	1	1	11.4	31
20-Jan	4	10	Z	8	11	12	11	28	8	1	3	4	6	12	18	22	23	21	21	24	30	43	65	47	18.8	65
21-Jan	35	27	19	Z	38	38	21	35	33	36	39	33	45	40	22	7	7	24	46	66	102	77	14	11	35.5	102
22-Jan	15	9	9	29	Z	32	20	14	35	71	43	34	20	10	52	57	46	47	24	9	5	8	8	14	26.6	71
23-Jan	14	9	11	12	5	Z	9	17	14	8	6	35	45	28	25	22	23	24	24	32	62	53	39	26	23.6	62
24-Jan	Z	20	27	21	19	18	16	9	7	11	17	16	13	13	9	5	5	13	68	21	7	8	10	4	15.4	68
25-Jan	1	Z	1	2	5	5	7	13	8	8	8	C	C	C	C	C	C	36	26	27	19	20	30	37	--	37
26-Jan	40	36	Z	19	23	33	38	38	43	53	55	51	46	46	48	39	44	35	33	13	9	3	2	1	32.6	55
27-Jan	0	1	0	Z	6	6	8	19	2	4	6	4	2	4	15	16	16	11	10	39	36	22	24	14	11.5	39
28-Jan	11	10	13	14	Z	21	21	12	12	21	23	29	19	33	21	12	24	18	14	9	7	2	1	0	15.1	33
29-Jan	0	1	0	9	11	Z	2	3	0	0	0	1	6	4	5	6	9	2	1	1	1	6	3	3	3.3	11
30-Jan	Z	1	1	3	3	5	11	4	47	9	12	16	11	6	2	4	6	6	9	1	13	11	6	2	8.2	47
31-Jan	12	Z	1	6	10	3	7	11	20	18	20	15	15	14	17	13	12	9	6	16	0	1	3	3	10.0	20
	26.7	28.1	26.4	25.9	24.9	25.7	23.5	24.6	24.6	24.0	23.0	22.2	20.3	23.1	23.3	20.7	21.9	27.7	29.6	27.5	28.6	27.0	26.2	27.5	Diurnal Average	
	149	130	118	96	78	81	78	118	103	71	61	65	60	93	57	65	73	183	187	174	134	111	129	160	Diurnal Maximum	

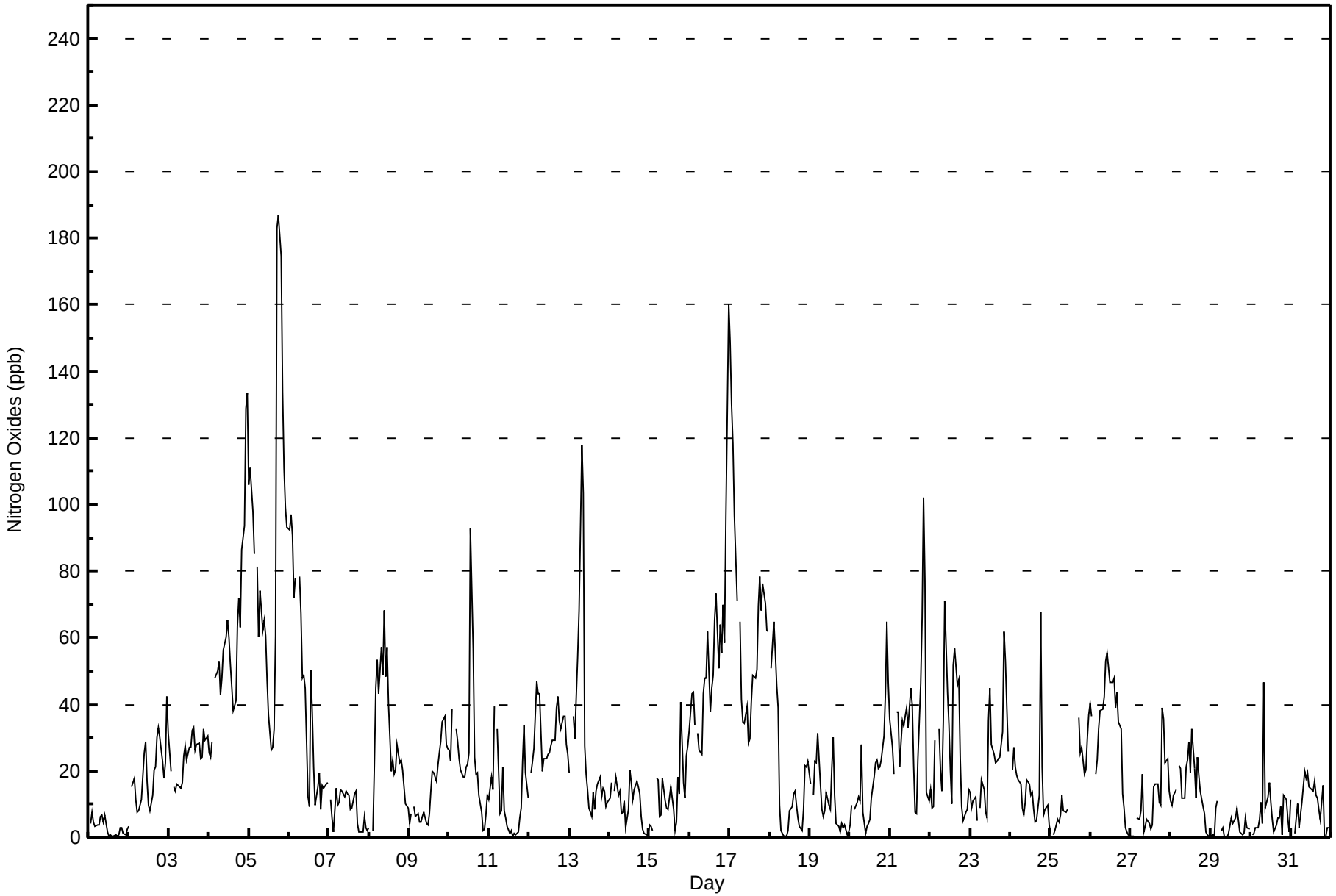
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	403	57.00	57.00
21 - 40	168	23.76	80.76
11 - 80	107	15.13	95.90
81 - 159	24	3.39	99.29
> 159	4	0.57	99.86

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	3	34	91	40	8	1	1	9	74	50	33	31	14	10	1	3	403
21 - 40	1	4	9	0	1	1	1	6	41	67	21	6	3	2	3	0	166
11 - 80	2	2	3	3	1	2	6	6	21	32	14	2	3	4	5	1	107
81 - 159	3	0	0	0	2	0	0	2	7	9	0	1	0	0	0	0	24
> 159	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	4
Totals	9	40	103	43	12	4	8	23	144	158	68	40	21	16	11	4	704

Total Number of Valid Hours: 705

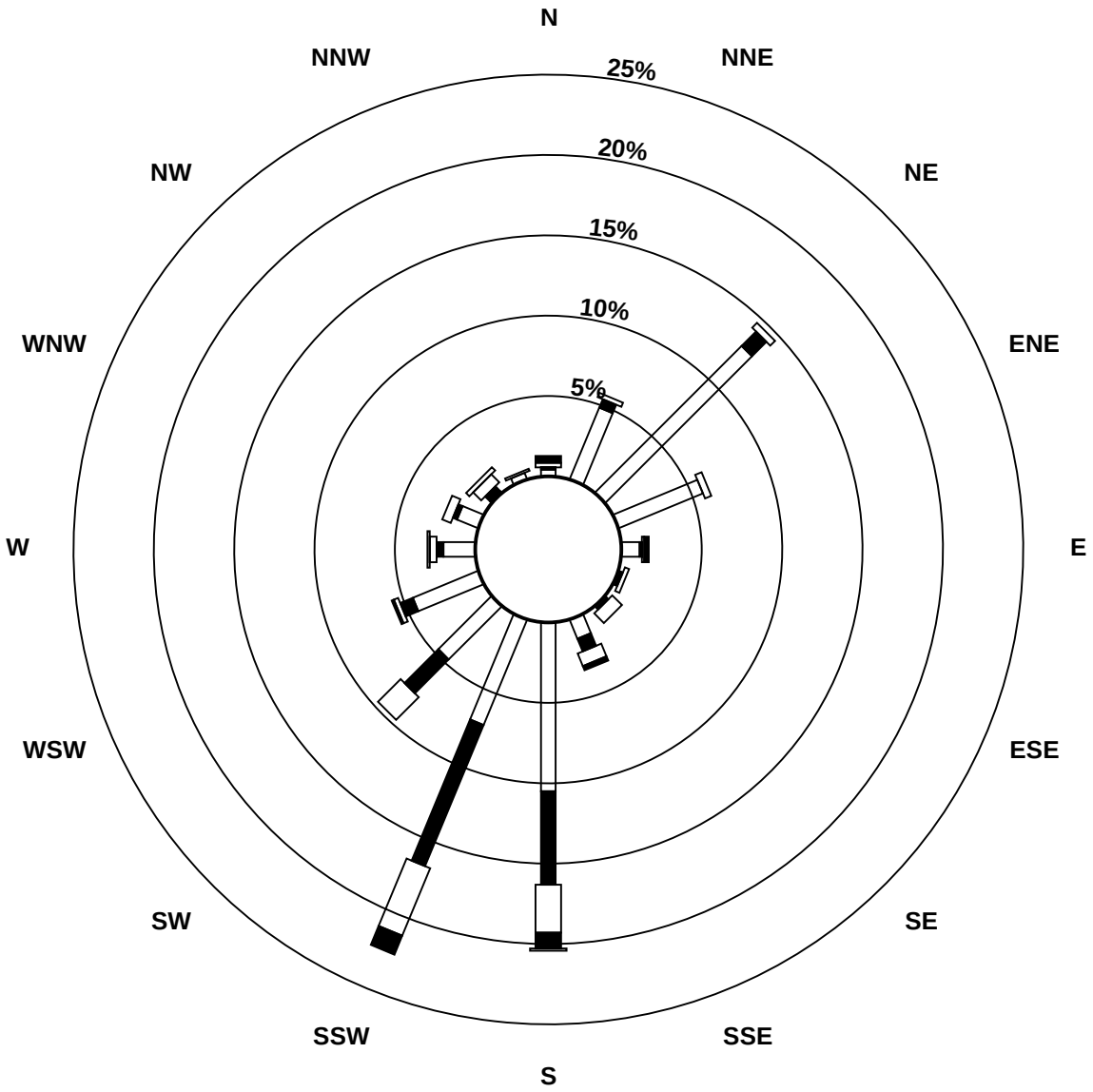
Total Number of Hours: 744

Wood Buffalo Environmental Association

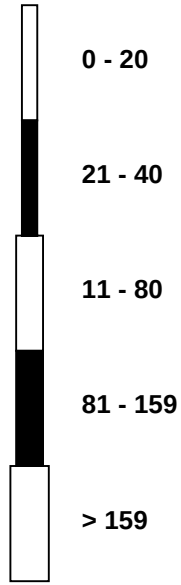
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

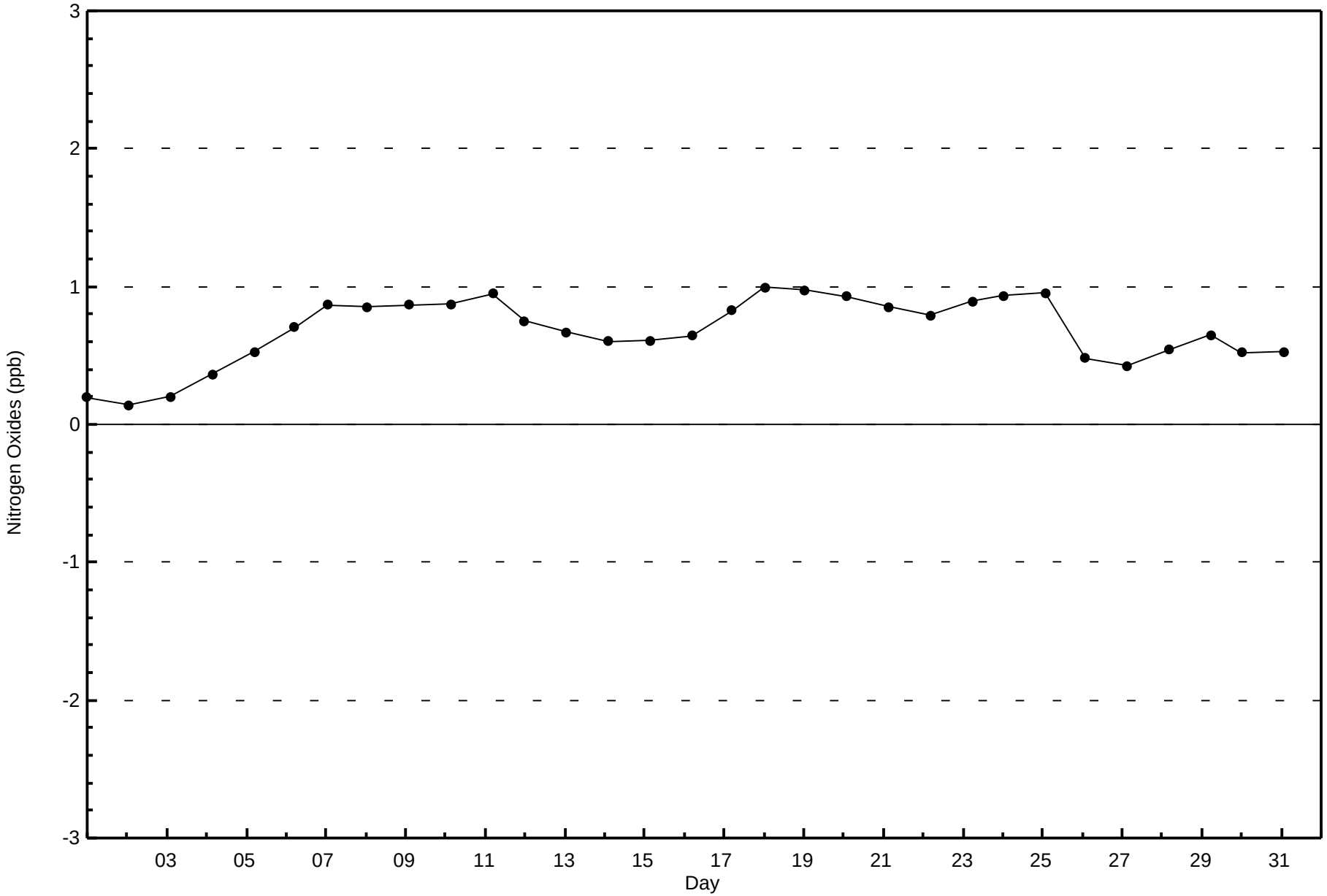
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - January 2016

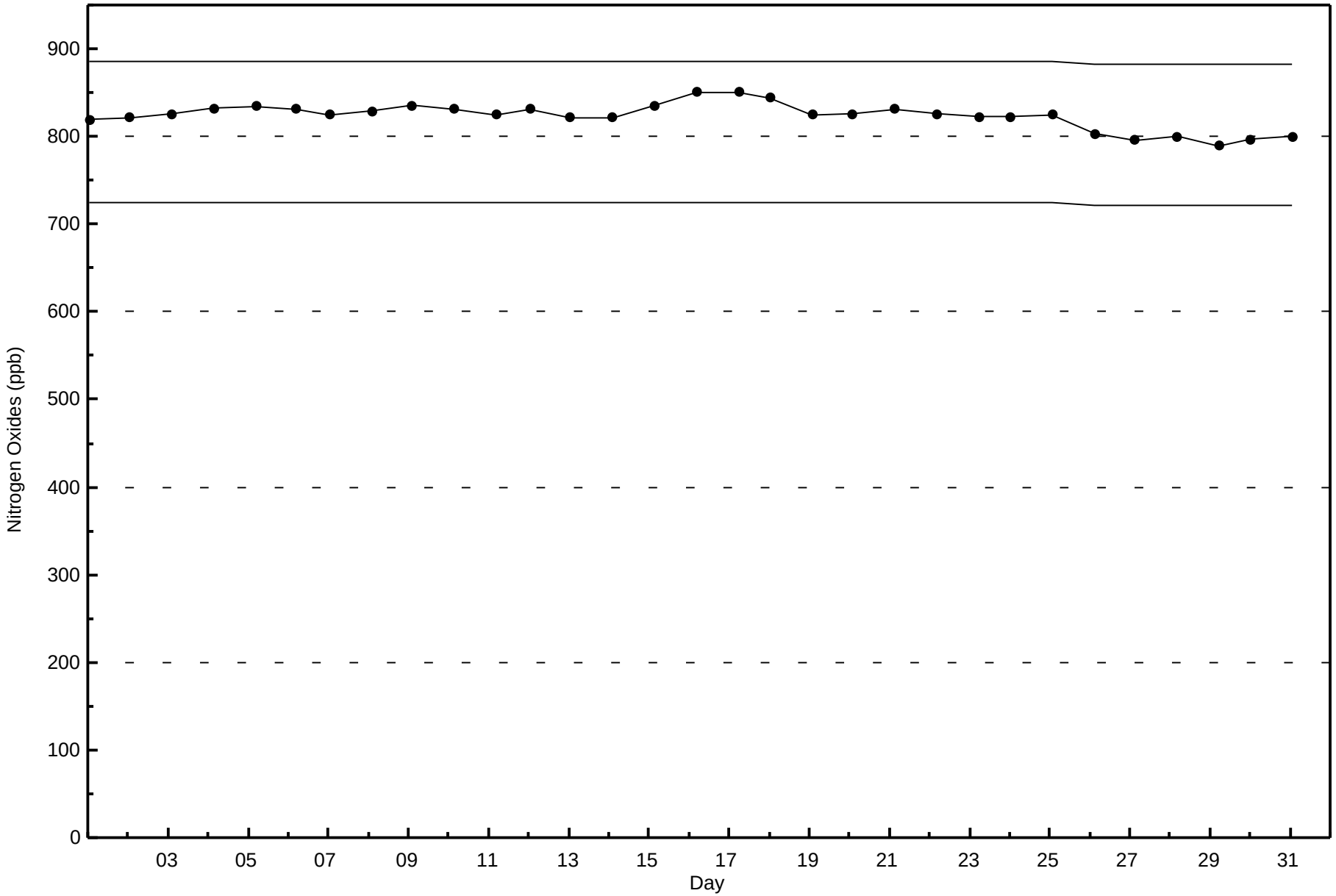


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Shell Muskeg River - January 2016

Number of Exceedences (AAAQO): 24-hr: 1

Maximum Value: 150.7 $\mu g/m^3$ on Jan 17 00:00

Maximum Daily Average: 34.6 $\mu g/m^3$ on Jan 16

Minimum Value: 0.1 $\mu g/m^3$ on Jan 29 18:00

Minimum Daily Average: 0.6 $\mu g/m^3$ on Jan 29

Maximum Diurnal Average: 15.0 $\mu g/m^3$ at hour 24

Minimum Diurnal Average: 6.7 $\mu g/m^3$ at hour 13

Monthly Average: 9.23 $\mu g/m^3$

Percentiles: P_1 = 0.3 P_{10} = 1.4 Q_1 = 2.7 Median = 5.9 Q_3 = 11.6 P_{90} = 18.2 P_{99} = 72.6

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Hours of Calibration:	2
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	2.7	2.4	2.7	2.5	2.9	3.7	7.2	7.2	3.2	2.4	1.6	1.4	1.0	0.8	0.8	0.9	1.1	1.3	1.1	1.4	1.7	1.5	1.4	1.7	2.3	7.2
2-Jan	2.1	2.2	2.9	3.5	4.2	4.1	3.7	4.3	5.8	5.6	4.0	3.6	3.2	3.5	4.0	5.0	7.0	8.8	8.6	8.1	6.1	5.1	5.7	9.3	5.0	9.3
3-Jan	12.6	11.0	13.0	11.2	9.7	6.7	6.8	7.3	6.9	6.3	6.6	10.2	9.1	13.9	9.6	11.4	11.0	11.3	12.0	12.2	12.5	14.2	12.7	13.4	10.5	14.2
4-Jan	13.6	12.4	14.1	15.5	14.5	14.7	14.7	13.9	12.5	16.6	20.5	18.4	16.2	16.9	16.7	9.1	9.4	18.8	20.2	15.2	19.1	19.8	19.0	15.9	15.7	20.5
5-Jan	10.6	7.6	6.7	7.0	5.5	5.2	4.5	5.2	4.7	5.1	5.8	7.0	10.7	27.1	33.2	29.9	27.3	28.6	27.0	24.3	18.3	18.7	16.1	14.3	14.6	33.2
6-Jan	17.3	14.2	10.2	8.2	8.4	9.7	7.9	6.4	6.7	8.6	11.3	6.9	6.1	6.0	7.6	5.3	3.4	3.7	1.9	1.4	2.2	2.5	2.0	1.4	6.6	17.3
7-Jan	2.1	1.2	3.0	4.0	3.1	2.5	1.8	1.9	2.0	2.2	2.3	2.1	7.8	17.8	20.4	18.2	8.1	4.4	5.9	3.2	4.9	5.6	1.6	1.2	5.3	20.4
8-Jan	1.7	2.8	1.0	2.3	5.0	4.2	11.0	10.4	13.8	12.3	4.7	4.9	10.6	9.8	11.2	11.4	16.5	12.6	19.5	19.5	11.4	8.1	5.9	3.7	8.9	19.5
9-Jan	3.9	5.8	13.7	4.8	4.2	4.8	7.8	10.5	10.2	9.2	5.0	9.5	11.4	23.0	30.1	28.4	16.2	28.2	92.9	73.7	90.0	80.9	29.3	70.4	27.7	92.9
10-Jan	34.3	21.4	17.7	20.4	35.0	21.4	16.7	19.0	23.0	19.9	18.3	21.2	18.3	20.4	18.3	8.9	5.5	3.6	3.6	3.5	3.0	3.1	3.2	3.2	15.1	35.0
11-Jan	3.1	2.1	2.0	1.7	1.7	1.3	1.2	1.2	1.9	1.9	1.5	1.3	1.1	1.1	1.2	1.0	1.0	1.2	2.4	11.7	9.9	6.0	5.9	5.0	2.8	11.7
12-Jan	5.9	6.9	17.5	7.8	7.1	6.8	7.3	8.8	6.0	6.6	5.7	5.9	5.7	6.0	5.6	6.2	4.8	5.5	9.0	10.9	10.5	10.5	10.8	11.4	7.9	17.5
13-Jan	13.5	13.9	10.6	5.7	7.7	12.1	12.4	12.6	17.3	13.9	14.0	10.8	9.2	8.3	7.8	7.2	7.6	7.2	6.6	5.6	5.4	3.4	3.9	4.6	9.2	17.3
14-Jan	5.3	10.7	11.6	10.2	9.7	10.8	11.1	17.3	20.7	4.7	3.0	1.9	1.9	2.2	1.9	1.6	2.1	2.3	2.9	3.8	4.3	3.2	2.9	2.5	6.2	20.7
15-Jan	2.9	2.7	2.2	2.3	2.7	2.7	2.2	2.3	2.4	2.2	2.1	2.1	1.9	2.6	2.6	3.1	2.1	3.3	2.6	2.9	2.9	3.1	3.2	60.5	5.0	60.5
16-Jan	49.3	32.0	21.2	19.5	21.0	17.5	13.4	9.3	8.9	11.7	15.6	17.6	10.8	10.3	8.4	10.7	12.1	25.2	25.2	22.1	65.0	117.1	136.7	150.7	34.6	150.7
17-Jan	103.4	66.6	31.4	32.9	32.1	36.2	18.2	18.6	12.9	11.5	21.7	32.8	10.1	19.1	23.0	32.3	23.7	14.7	15.3	14.1	12.7	12.3	11.6	11.5	25.8	103.4
18-Jan	10.5	9.3	8.9	7.6	5.9	4.4	1.7	1.3	3.6	0.7	0.9	1.0	2.0	2.2	2.3	2.8	2.5	2.6	3.1	3.6	3.5	4.0	3.6	3.8	3.8	10.5
19-Jan	3.5	3.6	3.9	4.4	3.9	3.5	3.3	3.3	2.8	3.0	3.4	2.8	2.5	2.2	2.6	3.5	5.2	5.4	4.4	3.9	3.8	4.2	3.6	2.6	3.6	5.4
20-Jan	1.5	1.6	1.2	1.4	1.4	1.2	2.1	2.7	1.5	1.2	1.3	1.5	1.5	1.7	2.2	2.2	2.5	3.1	4.1	5.7	6.9	6.9	7.5	8.2	3.0	8.2
21-Jan	7.0	6.2	6.8	7.3	14.4	13.8	18.5	9.5	7.9	7.4	8.5	9.5	9.7	13.2	14.5	11.9	10.8	12.0	11.8	14.7	15.4	11.7	6.0	5.5	10.6	18.5
22-Jan	6.5	7.1	8.7	10.0	11.3	11.6	10.5	10.4	11.3	12.2	11.8	12.1	11.7	12.0	12.0	11.9	10.5	10.8	13.2	8.1	5.9	7.3	7.6	8.0	10.1	13.2
23-Jan	7.8	8.9	11.5	14.1	13.5	14.8	15.4	16.1	16.4	16.4	16.6	18.2	19.0	15.0	15.2	14.1	11.8	13.3	12.0	10.6	11.1	12.9	14.1	14.8	13.9	19.0
24-Jan	13.1	12.9	13.2	13.4	13.1	12.9	11.7	7.0	5.3	5.0	4.4	3.7	3.6	3.4	3.4	3.6	4.8	5.4	7.8	8.8	10.1	8.3	7.7	4.8	7.8	13.4
25-Jan	4.2	4.6	4.5	4.1	4.8	4.8	9.3	13.2	9.4	7.3	4.4	4.7	4.7	3.7	C	C	9.1	7.2	9.4	10.1	10.6	11.1	12.0	19.0	7.8	19.0
26-Jan	16.5	14.0	13.0	11.6	12.1	11.1	9.0	7.2	6.7	7.0	7.1	6.4	7.3	9.3	8.3	7.1	9.2	10.7	9.9	7.3	5.0	2.3	1.5	1.2	8.4	16.5
27-Jan	1.0	0.9	0.9	0.7	0.8	1.0	1.1	1.6	2.1	2.1	2.1	2.5	2.4	2.3	2.5	3.2	3.3	3.7	3.6	4.4	4.2	4.7	7.1	10.0	2.8	10.0
28-Jan	10.8	12.3	13.3	7.4	7.1	7.3	7.1	4.6	3.5	4.1	4.3	3.9	3.8	4.5	5.6	5.8	4.3	3.7	4.5	5.8	4.9	3.0	1.5	1.0	5.6	13.3
29-Jan	0.9	0.9	0.9	1.1	1.3	1.1	1.0	0.9	0.6	0.5	0.5	0.4	0.3	0.3	0.2	0.1	0.3	0.1	0.1	0.2	0.2	0.4	0.5	0.6	0.6	1.3
30-Jan	0.7	0.7	0.8	0.9	1.0	1.2	1.4	1.1	2.8	1.6	1.9	1.8	1.6	1.2	1.0	1.1	1.5	2.1	2.5	1.9	2.2	1.6	1.7	2.0	1.5	2.8
31-Jan	2.1	2.3	2.4	3.1	4.0	4.3	4.8	4.4	4.6	5.6	4.1	4.3	3.8	3.3	3.3	3.4	2.9	2.7	2.6	2.8	2.2	2.5	2.5	2.8	3.4	5.6
	11.9	9.7	8.8	8.0	8.7	8.3	7.9	7.7	7.7	6.9	6.9	7.4	6.7	8.5	9.2	8.7	7.7	8.5	11.1	10.4	11.8	12.8	11.3	15.0	Diurnal Average	
	103.4	66.6	31.4	32.9	35.0	36.2	18.5	19.0	23.0	19.9	21.7	32.8	19.0	27.1	33.2	32.3	27.3	28.6	92.9	73.7	90.0	117.1	136.7	150.7	Diurnal Maximum	

C - Calibration

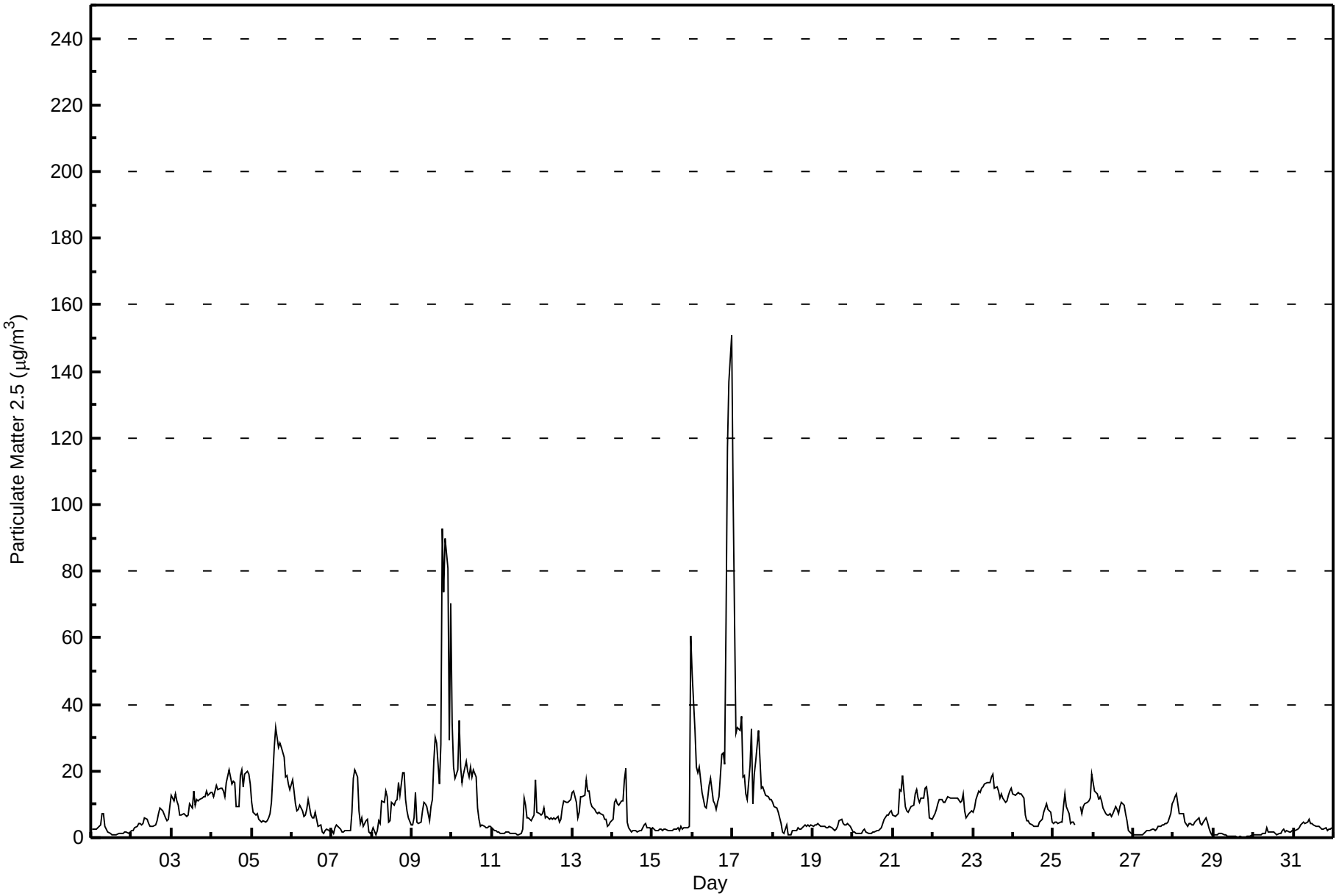
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Shell Muskeg River - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	310	41.78	41.78
6 - 15	295	39.76	81.54
16 - 25	66	8.89	90.43
26 - 80	25	3.37	93.80
> 81.0	7	0.94	94.74

Total Number of Valid Hours: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Shell Muskeg River - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	4	28	77	31	7	2	1	7	55	35	27	17	6	4	5	3	309
6 - 15	4	12	25	11	4	2	5	7	70	102	31	9	5	2	5	1	295
16 - 25	2	1	2	3	1	0	1	7	16	17	7	2	2	4	0	0	65
26 - 80	0	0	0	1	0	0	2	1	11	6	1	0	0	1	2	0	25
> 81.0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	7
Totals	10	41	104	46	12	4	9	22	154	165	66	28	13	11	12	4	701

Total Number of Valid Hours: 740

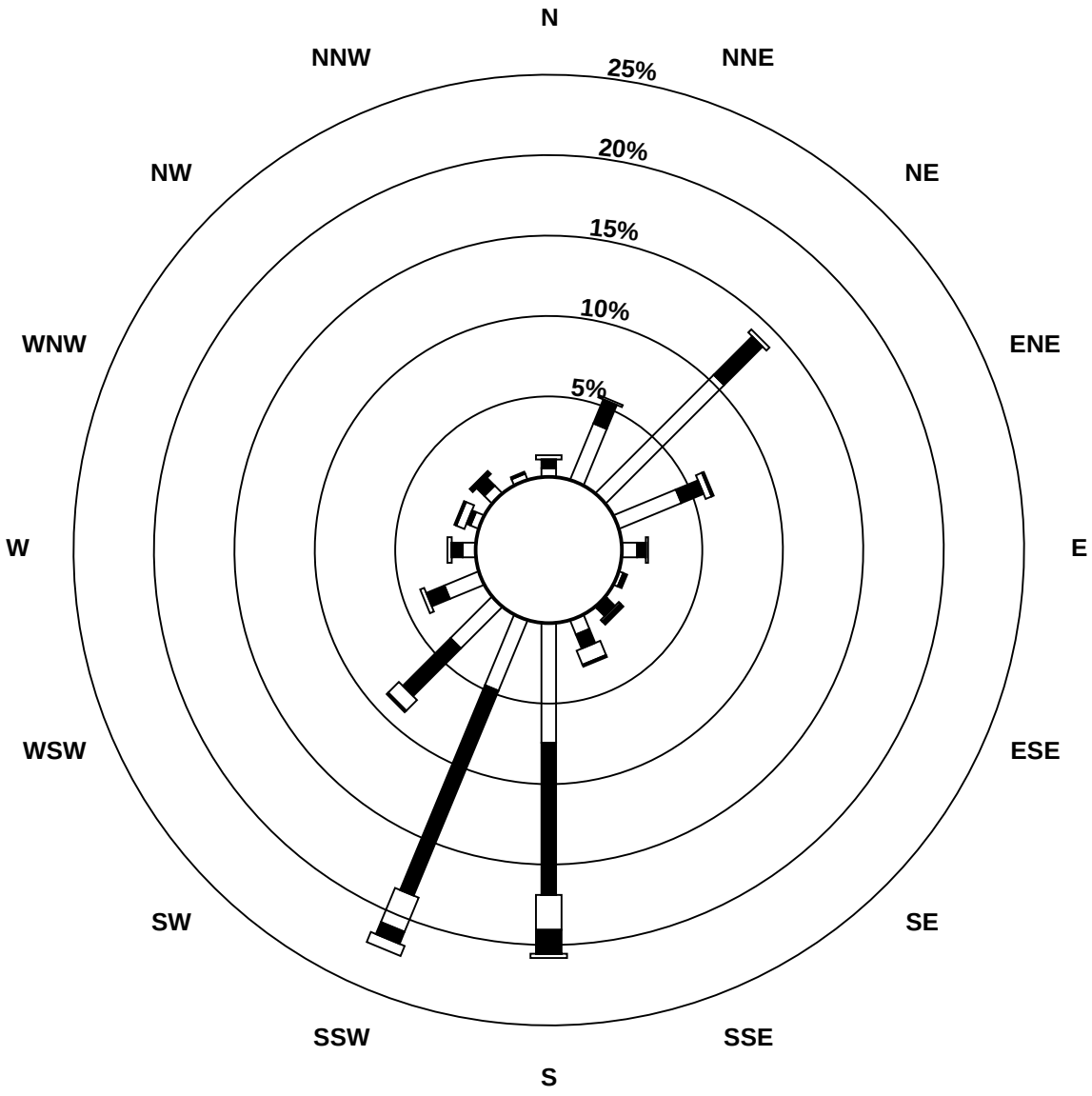
Total Number of Hours: 744

Wood Buffalo Environmental Association

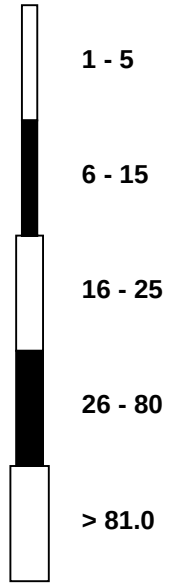
Wind Rose Jan 2016

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

Shell Muskeg River (AMS 16)



Classes ($\mu g/m^3$)



Total Number of Valid Hours: 740

Maximum Value: 98 % on Jan 28 20:00

Maximum Daily Average: 94.6 % on Jan 28

Minimum Value: 54 % on Jan 29 15:00

Minimum Daily Average: 74.2 % on Jan 16

Maximum Diurnal Average: 85.0 % at hour 1

Minimum Diurnal Average: 79.0 % at hour 14

Monthly Average: 83.5 %

Percentiles: P_1 = 65 P_{10} = 75 Q_1 = 79 Median = 84 Q_3 = 88 P_{90} = 92 P_{99} = 97

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

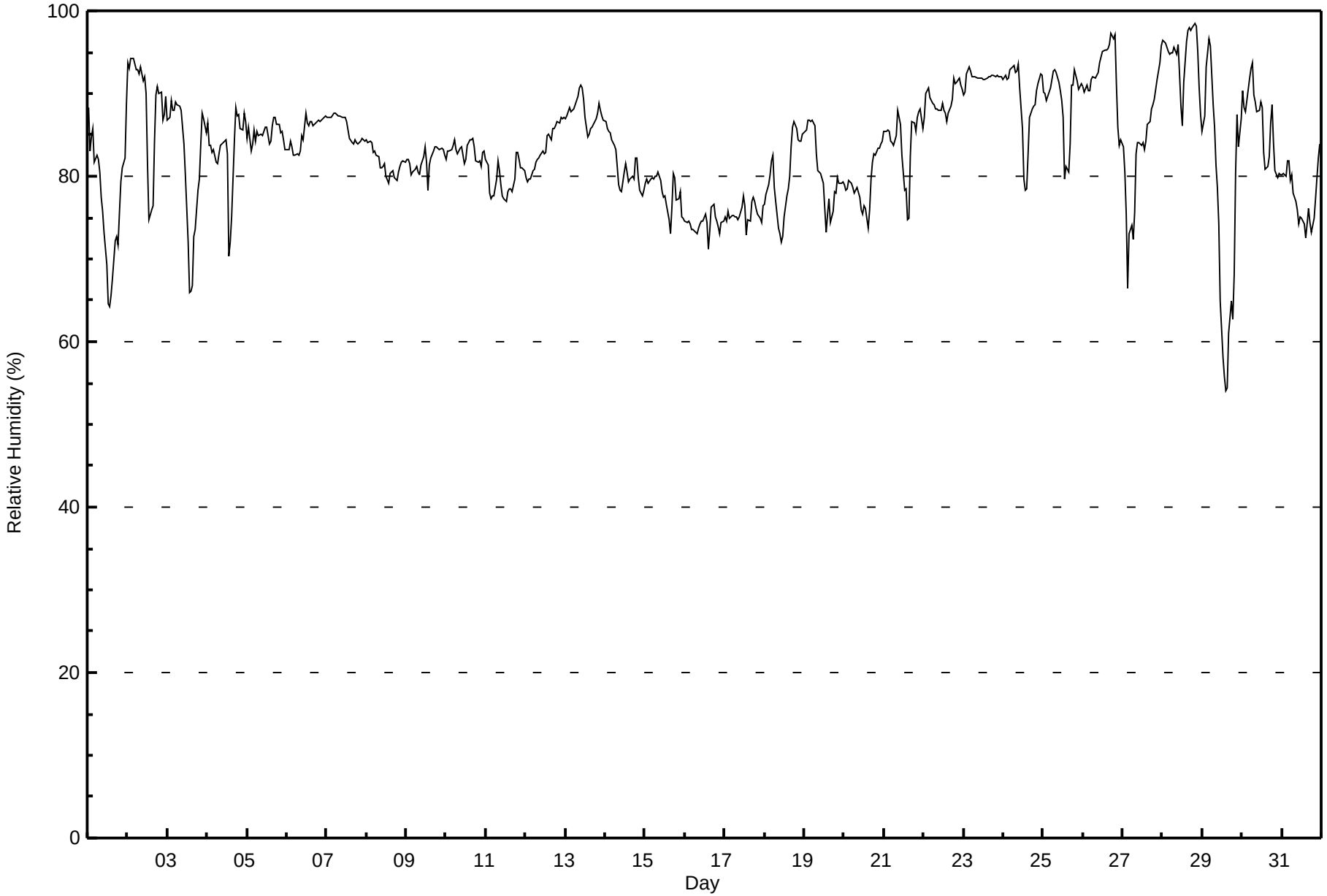
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	88	83	85	86	82	83	82	80	77	76	73	69	65	64	66	68	72	73	72	76	79	81	82	89	77.1	89
2-Jan	94	93	94	94	94	93	93	92	93	91	92	90	82	75	76	77	84	90	91	90	90	87	88	90	88.8	94
3-Jan	87	87	89	88	88	89	89	88	88	86	84	80	72	66	66	67	73	74	78	80	84	88	87	85	81.7	89
4-Jan	86	84	84	83	83	82	81	83	84	84	84	84	83	70	72	75	84	88	87	88	86	86	88	87	83.1	88
5-Jan	85	86	83	84	86	84	85	85	85	85	85	86	86	84	84	86	87	87	86	86	85	85	84	83	85.2	87
6-Jan	83	83	84	84	83	83	83	82	83	85	84	88	86	86	87	87	86	86	87	87	87	87	87	87	85.2	88
7-Jan	87	87	87	87	88	88	87	87	87	87	87	87	87	86	85	84	84	84	84	84	84	85	84	84	85.9	88
8-Jan	84	84	84	84	83	83	83	82	81	81	81	82	80	79	80	80	81	80	79	80	81	82	82	82	81.6	84
9-Jan	82	82	81	80	80	81	81	80	80	81	82	84	82	78	81	82	83	84	84	83	83	83	83	83	81.9	84
10-Jan	82	83	83	83	84	84	83	83	83	84	83	82	82	84	84	84	85	84	82	82	82	81	83	83	83.0	85
11-Jan	82	81	78	77	78	78	80	82	81	79	78	77	77	78	78	78	78	80	83	83	82	81	81	81	79.6	83
12-Jan	80	79	80	80	81	81	82	82	82	83	83	83	83	85	85	84	86	86	86	87	87	87	87	87	83.5	87
13-Jan	87	87	88	88	88	88	89	90	91	91	91	89	87	85	85	86	86	86	87	88	89	88	87	87	87.8	91
14-Jan	87	86	86	85	84	84	83	81	79	78	78	81	82	81	79	80	80	80	82	82	80	78	78	78	81.3	87
15-Jan	79	80	79	80	80	80	80	80	80	79	78	77	78	77	75	73	76	80	80	77	77	78	75	75	78.1	80
16-Jan	75	74	75	74	74	74	73	73	74	74	75	74	75	74	71	73	76	77	75	75	74	73	74	75	74.2	77
17-Jan	75	75	76	75	75	75	75	75	75	75	76	78	76	73	75	75	77	77	77	76	75	75	74	76	75.5	78
18-Jan	77	78	79	80	82	83	79	77	74	73	72	73	75	78	79	80	84	86	87	86	84	84	84	85	79.9	87
19-Jan	86	86	87	87	87	87	86	83	81	80	80	79	76	73	75	77	74	76	78	78	80	79	79	79	80.5	87
20-Jan	79	78	78	79	79	79	78	78	79	78	76	75	76	76	74	76	80	82	83	83	83	83	84	84	79.2	84
21-Jan	85	85	86	85	84	84	84	85	88	87	86	83	78	78	75	75	82	87	87	85	87	88	88	86	84.1	88
22-Jan	87	90	90	91	89	89	89	88	88	88	88	89	88	88	87	88	88	89	92	91	91	92	91	90	89.2	92
23-Jan	90	90	92	93	93	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	91.9	93
24-Jan	92	92	92	92	93	93	93	93	93	94	91	86	80	78	79	83	87	88	89	89	90	91	92	92	89.2	94
25-Jan	90	90	89	90	91	92	93	93	93	91	90	89	87	80	81	81	84	91	91	93	92	91	91	91	89.3	93
26-Jan	91	90	91	90	90	92	92	92	92	92	94	94	95	95	95	95	96	97	97	97	91	86	84	84	92.3	97
27-Jan	84	81	75	66	73	74	72	76	83	84	84	84	84	83	84	86	87	88	89	89	90	92	94	96	83.2	96
28-Jan	96	96	96	95	95	95	95	96	95	96	92	89	86	91	96	98	98	98	98	98	98	95	91	87	94.6	98
29-Jan	85	87	93	95	97	96	89	86	81	79	74	65	58	56	54	54	61	65	63	68	80	87	84	87	76.9	97
30-Jan	90	88	88	89	92	93	94	90	89	88	88	89	88	83	81	81	82	87	89	84	81	80	80	80	86.4	94
31-Jan	80	80	80	82	82	80	80	78	77	76	74	75	75	74	72	74	76	74	73	75	77	80	82	84	77.6	84
	85.0	84.7	84.9	84.7	85.0	85.0	84.7	84.3	84.1	83.8	83.1	82.3	80.7	79.0	79.1	80.0	82.2	83.7	84.0	84.2	84.6	84.7	84.5	84.8	Diurnal Average	
	96	96	96	95	97	96	95	96	95	96	94	94	95	95	96	98	98	98	98	98	98	95	94	96	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Shell Muskeg River - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	4	0.54	0.54
60 - 80	211	28.36	28.90
80 - 100	529	71.10	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 5.8 C on Jan 29 15:00

Maximum Daily Average: 2.0 C on Jan 29

Minimum Value: -33.9 C on Jan 16 08:00

Minimum Daily Average: -30.6 C on Jan 16

Maximum Diurnal Average: -11.1 C at hour 15

Minimum Diurnal Average: -14.8 C at hour 6

Monthly Average: -13.74 C

Percentiles: P_1 = -32.5 P_{10} = -23.0 Q_1 = -18.7 Median = -13.7 Q_3 = -9.1 P_{90} = -3.7 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

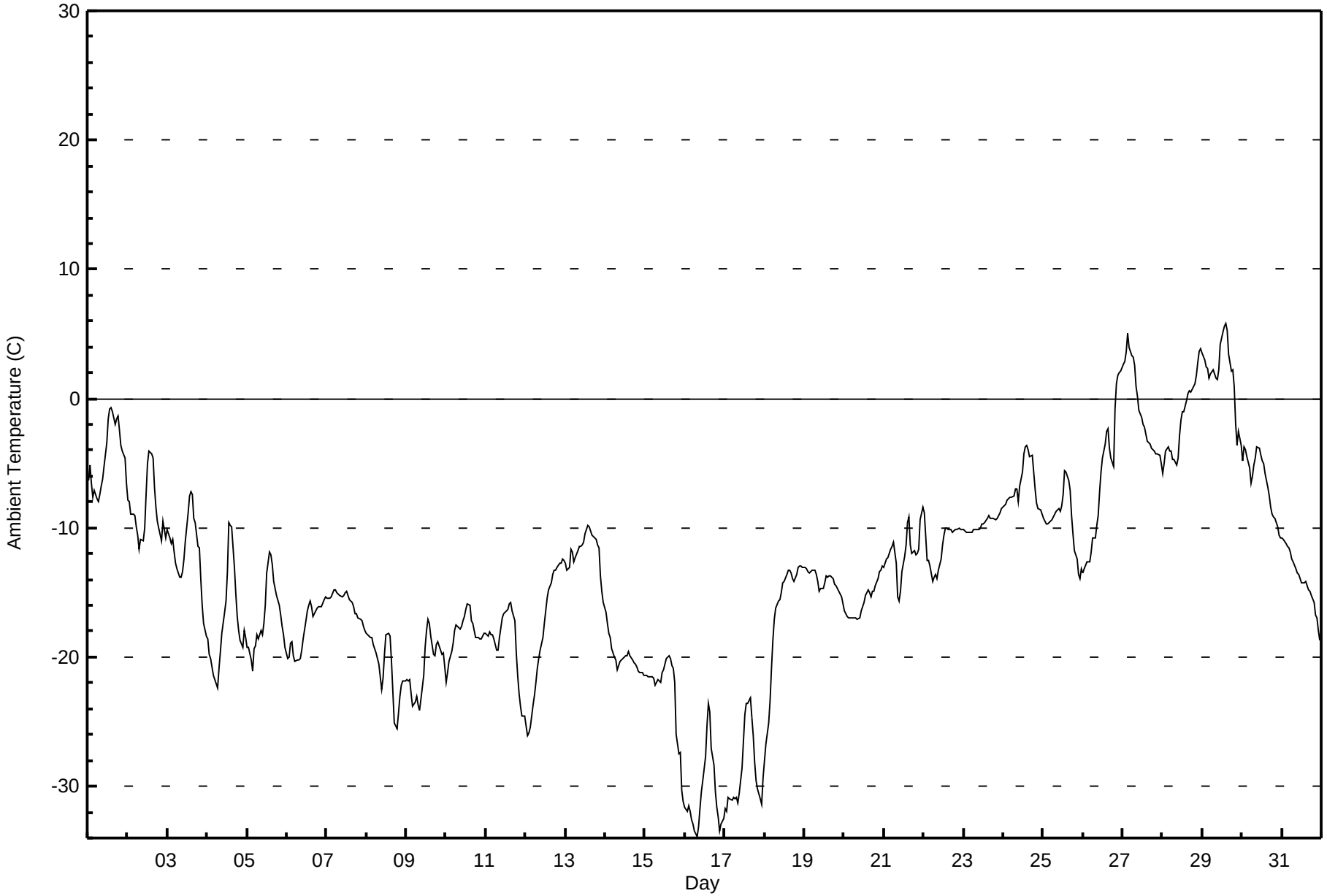
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-6.3	-5.2	-6.5	-7.6	-7.1	-7.8	-8.0	-7.4	-6.7	-6.3	-5.3	-3.5	-1.6	-0.8	-0.7	-1.1	-2.0	-1.6	-1.3	-2.4	-3.6	-4.0	-4.6	-6.6	-4.5	-0.7
2-Jan	-7.8	-7.9	-8.9	-9.0	-9.1	-10.0	-10.6	-11.6	-10.9	-11.0	-10.0	-7.4	-5.0	-4.0	-4.3	-4.6	-6.9	-8.4	-9.5	-10.1	-11.0	-9.5	-10.1	-10.8	-8.7	-4.0
3-Jan	-10.2	-10.8	-11.2	-10.9	-11.9	-12.7	-13.2	-13.8	-13.9	-13.4	-12.4	-11.0	-8.8	-7.5	-7.2	-7.4	-9.3	-9.6	-11.4	-11.5	-13.9	-16.0	-17.4	-18.4	-11.8	-7.2
4-Jan	-18.6	-19.7	-20.1	-20.8	-21.4	-22.0	-22.4	-20.9	-19.6	-18.2	-16.5	-15.6	-13.3	-9.6	-9.8	-9.9	-13.1	-15.1	-16.9	-17.9	-18.7	-19.2	-18.0	-18.5	-17.3	-9.6
5-Jan	-19.2	-19.2	-20.2	-21.1	-19.4	-19.1	-18.3	-18.7	-17.9	-18.2	-17.4	-16.0	-13.6	-11.9	-12.1	-12.9	-14.1	-14.7	-15.2	-16.0	-16.8	-17.6	-18.3	-19.3	-17.0	-11.9
6-Jan	-20.1	-20.0	-19.0	-18.8	-19.9	-20.3	-20.2	-20.2	-20.1	-19.5	-18.6	-17.2	-16.5	-15.9	-15.7	-16.1	-16.9	-16.4	-16.2	-16.1	-16.1	-16.1	-15.5	-15.3	-17.8	-15.3
7-Jan	-15.4	-15.5	-15.5	-15.4	-14.8	-14.8	-15.0	-15.2	-15.3	-15.4	-15.2	-15.0	-14.9	-15.3	-15.5	-15.8	-16.1	-16.7	-16.6	-17.0	-17.1	-17.2	-17.6	-18.0	-15.8	-14.8
8-Jan	-18.2	-18.3	-18.5	-18.4	-19.0	-19.3	-19.7	-20.5	-21.5	-22.5	-21.6	-19.8	-18.2	-18.2	-18.4	-20.4	-22.7	-25.1	-25.6	-24.4	-23.1	-22.2	-21.9	-21.8	-20.8	-18.2
9-Jan	-21.8	-21.8	-21.7	-22.8	-23.8	-23.5	-23.0	-23.7	-24.2	-23.2	-21.4	-19.3	-18.0	-17.1	-17.4	-18.4	-19.8	-19.9	-19.0	-18.8	-19.2	-19.8	-19.7	-20.8	-20.7	-17.1
10-Jan	-21.9	-21.2	-20.3	-19.6	-19.0	-18.0	-17.5	-17.6	-17.9	-17.6	-17.2	-16.9	-16.3	-15.9	-15.9	-17.2	-17.4	-17.9	-18.5	-18.4	-18.6	-18.6	-18.4	-18.1	-18.2	-15.9
11-Jan	-18.2	-18.3	-18.0	-18.2	-18.3	-18.6	-19.4	-19.4	-18.4	-17.7	-17.0	-16.6	-16.4	-16.4	-15.9	-15.8	-16.4	-17.2	-19.7	-21.5	-22.8	-23.8	-24.6	-24.5	-18.9	-15.8
12-Jan	-25.3	-26.1	-25.9	-25.4	-23.7	-22.9	-22.0	-20.9	-20.1	-19.5	-18.5	-17.5	-16.4	-15.5	-14.8	-14.2	-13.7	-13.2	-13.3	-13.0	-12.8	-12.7	-12.5	-12.5	-18.0	-12.5
13-Jan	-12.8	-13.3	-13.1	-11.6	-11.8	-12.7	-12.3	-11.8	-11.5	-11.4	-11.3	-11.1	-10.4	-9.8	-9.9	-10.2	-10.6	-10.7	-10.9	-11.3	-11.6	-13.7	-14.9	-15.7	-11.9	-9.8
14-Jan	-16.5	-17.4	-18.1	-18.5	-19.3	-20.0	-20.3	-20.9	-20.7	-20.4	-20.2	-20.0	-19.9	-19.9	-19.6	-19.9	-20.2	-20.5	-20.5	-20.8	-21.1	-21.2	-21.2	-21.4	-19.9	-16.5
15-Jan	-21.4	-21.4	-21.6	-21.5	-21.5	-21.6	-22.2	-22.0	-21.7	-21.9	-21.2	-20.9	-20.5	-20.1	-19.9	-20.2	-20.6	-20.9	-22.0	-26.0	-27.4	-27.3	-30.4	-31.2	-22.7	-19.9
16-Jan	-31.6	-31.9	-31.5	-32.0	-32.6	-32.9	-33.5	-33.9	-33.2	-31.7	-30.4	-29.6	-27.7	-25.3	-23.6	-24.3	-27.0	-28.4	-30.4	-31.6	-32.4	-33.5	-32.9	-32.5	-30.6	-23.6
17-Jan	-31.7	-31.9	-30.9	-30.9	-31.1	-30.9	-30.9	-30.9	-31.3	-30.5	-28.6	-26.5	-24.5	-23.6	-23.5	-23.2	-24.6	-26.1	-28.1	-29.5	-30.2	-31.0	-31.4	-29.4	-28.8	-23.2
18-Jan	-28.0	-26.7	-25.1	-23.4	-20.8	-18.7	-17.1	-16.2	-15.7	-15.6	-15.0	-14.3	-14.1	-13.6	-13.3	-13.2	-13.5	-14.0	-14.1	-13.6	-13.1	-13.0	-13.0	-13.0	-16.6	-13.0
19-Jan	-13.1	-13.2	-13.4	-13.5	-13.4	-13.3	-13.3	-13.6	-14.2	-14.9	-14.7	-14.7	-14.3	-13.7	-13.8	-13.7	-13.7	-14.0	-14.4	-14.5	-14.7	-14.9	-15.4	-15.9	-14.1	-13.1
20-Jan	-16.5	-16.7	-16.9	-17.0	-17.0	-17.0	-16.9	-16.9	-17.0	-17.0	-16.5	-16.1	-15.7	-15.2	-14.8	-15.1	-15.4	-14.9	-14.9	-14.5	-13.9	-13.4	-13.2	-12.9	-15.6	-12.9
21-Jan	-13.1	-12.4	-12.3	-12.0	-11.6	-11.4	-11.1	-12.8	-15.4	-15.7	-14.9	-13.4	-12.1	-11.3	-9.5	-9.1	-11.3	-12.0	-11.8	-12.1	-12.0	-11.6	-9.4	-8.4	-12.0	-8.4
22-Jan	-8.9	-10.6	-12.6	-12.6	-13.0	-14.1	-13.8	-13.6	-14.0	-13.3	-12.4	-11.3	-10.5	-10.0	-10.0	-10.1	-10.1	-10.3	-10.2	-10.1	-10.1	-10.1	-10.1	-10.1	-11.3	-8.9
23-Jan	-10.2	-10.2	-10.3	-10.3	-10.3	-10.3	-10.2	-10.1	-10.1	-10.1	-10.0	-9.7	-9.7	-9.6	-9.3	-9.1	-9.2	-9.3	-9.3	-9.4	-9.3	-9.1	-8.8	-8.5	-9.7	-8.5
24-Jan	-8.4	-8.1	-7.9	-7.7	-7.7	-7.7	-7.6	-7.0	-7.0	-8.0	-6.8	-5.7	-4.3	-3.7	-3.6	-3.9	-4.5	-4.4	-5.6	-7.0	-8.0	-8.5	-8.7	-9.0	-6.7	-3.6
25-Jan	-9.3	-9.5	-9.7	-9.7	-9.5	-9.4	-9.2	-9.0	-8.7	-8.5	-8.8	-8.3	-7.4	-5.6	-5.7	-6.3	-7.1	-9.0	-10.4	-11.8	-12.4	-13.6	-14.0	-13.1	-9.4	-5.6
26-Jan	-13.5	-13.2	-12.6	-12.6	-12.6	-11.9	-10.8	-10.8	-9.8	-9.0	-7.2	-5.7	-4.6	-3.5	-2.6	-2.3	-3.9	-4.6	-5.3	-0.8	1.2	1.8	2.0	2.1	-6.3	2.1
27-Jan	2.7	2.8	3.6	5.0	3.9	3.3	3.2	2.5	0.9	0.2	-0.9	-1.4	-2.0	-2.2	-2.7	-3.3	-3.5	-3.9	-3.9	-4.1	-4.2	-4.3	-4.4	-5.1	-0.7	5.0
28-Jan	-5.8	-5.1	-4.1	-3.7	-4.0	-4.1	-4.7	-4.7	-5.1	-4.6	-2.8	-1.7	-1.0	-1.0	-0.2	0.4	0.6	0.5	0.7	1.1	1.8	2.7	3.6	3.8	-1.6	3.8
29-Jan	3.6	3.0	2.5	2.3	1.6	1.9	2.3	1.9	1.6	1.5	2.2	4.2	5.1	5.5	5.8	5.2	3.4	2.1	2.3	0.9	-1.9	-3.7	-2.5	-3.6	2.0	5.8
30-Jan	-4.8	-3.7	-3.9	-4.5	-5.4	-6.5	-6.0	-5.1	-4.6	-3.7	-3.8	-4.4	-4.8	-5.0	-5.8	-6.9	-7.5	-8.4	-8.9	-9.2	-9.2	-9.9	-10.5	-10.8	-6.4	-3.7
31-Jan	-10.8	-10.9	-11.2	-11.4	-11.5	-11.9	-12.4	-12.6	-13.2	-13.5	-13.6	-14.0	-14.3	-14.3	-14.2	-14.5	-14.7	-14.9	-15.3	-15.8	-16.7	-17.0	-17.9	-18.7	-14.0	-10.8
	-14.6	-14.7	-14.7	-14.6	-14.7	-14.8	-14.7	-14.7	-14.7	-14.5	-13.8	-12.9	-12.0	-11.3	-11.1	-11.4	-12.3	-12.9	-13.4	-13.8	-14.2	-14.4	-14.6	-14.8	Diurnal Average	
	3.6	3.0	3.6	5.0	3.9	3.3	3.2	2.5	1.6	1.5	2.2	4.2	5.1	5.5	5.8	5.2	3.4	2.1	2.3	1.1	1.8	2.7	3.6	3.8	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Shell Muskeg River - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	146	19.62	19.62
-20 - 0	555	74.60	94.22
0 - 10	43	5.78	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Barometric Pressure (BP) - inHg

Shell Muskeg River - January 2016

Maximum Value: 29.4 inHg on Jan 16 07:00

Maximum Daily Average: 29.3 inHg on Jan 16

Minimum Value: 28.0 inHg on Jan 29 00:00

Minimum Daily Average: 28.2 inHg on Jan 29

Maximum Diurnal Average: 28.9 inHg at hour 11

Minimum Diurnal Average: 28.9 inHg at hour 22

Monthly Average: 28.88 inHg

Percentiles: P_1 = 28.1 P_{10} = 28.5 Q_1 = 28.7 Median = 28.9 Q_3 = 29.1 P_{90} = 29.2 P_{99} = 29.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

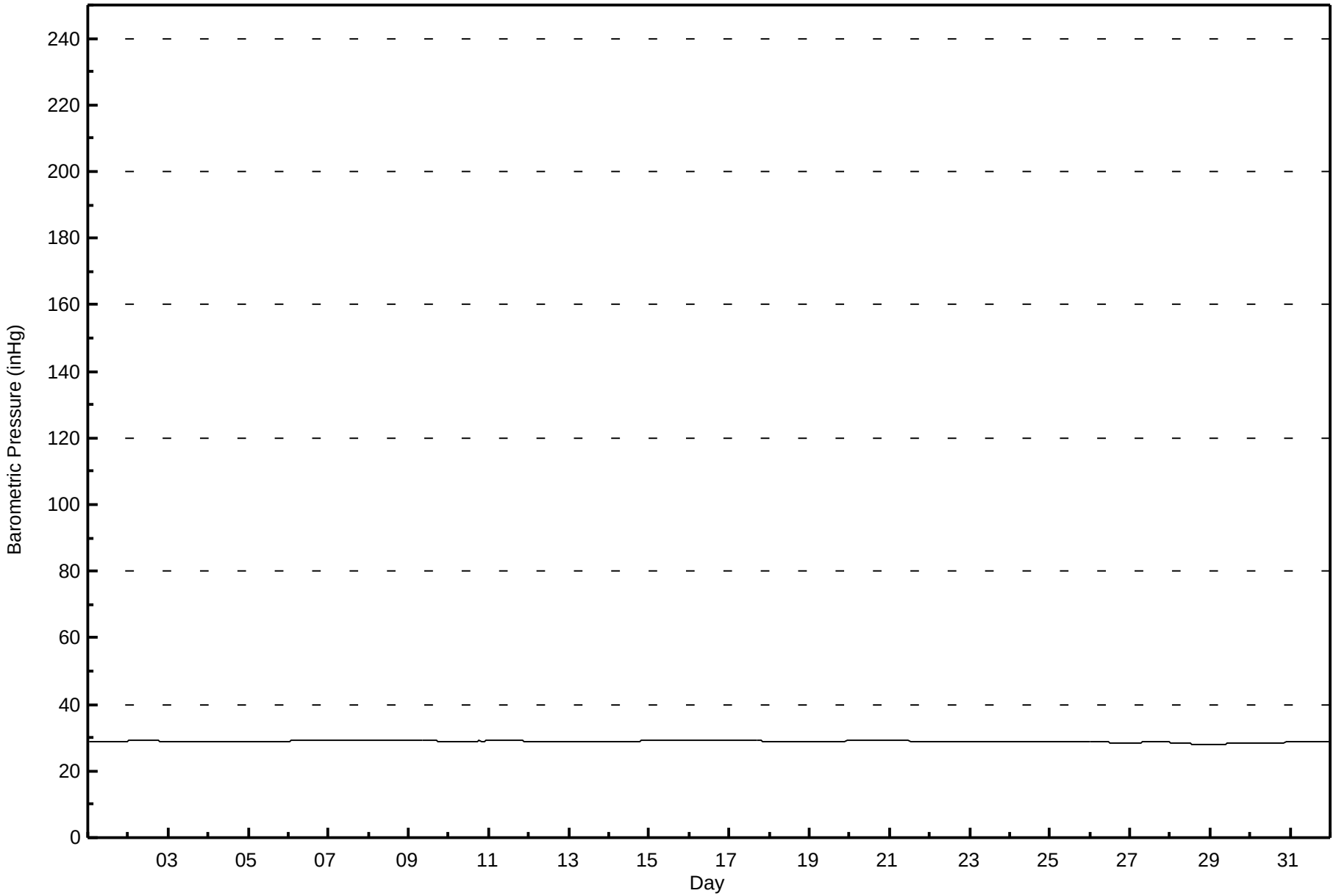
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	28.9	29.0
2-Jan	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1
3-Jan	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	28.9	29.0
4-Jan	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
5-Jan	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	29.0	29.0
6-Jan	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	29.2	29.2	29.2	29.2	29.1	29.2
7-Jan	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.3
8-Jan	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.3	29.3
9-Jan	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.2
10-Jan	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	29.1	29.0	29.1
11-Jan	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.1	29.2
12-Jan	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.8	29.0
13-Jan	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.6	28.7
14-Jan	28.7	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	28.9	29.1
15-Jan	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3
16-Jan	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	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4
17-Jan	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.1	29.3
18-Jan	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
19-Jan	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	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
20-Jan	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2
21-Jan	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	28.8	28.8	28.8	28.8	28.7	28.7	29.0	29.1
22-Jan	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.8
23-Jan	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.8	28.8
24-Jan	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	28.8	28.8	28.8	28.9	28.9	28.9	28.8	28.9
25-Jan	28.9	28.9	28.9	28.9	29.0	28.9	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	28.7	28.7	28.9	29.0
26-Jan	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	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.6	28.7
27-Jan	28.4	28.4	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.8
28-Jan	28.6	28.6	28.5	28.5	28.5	28.4	28.4	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.1	28.1	28.0	28.0	28.0	28.0	28.2	28.6
29-Jan	28.0	28.0	28.0	28.1	28.1	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2
30-Jan	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.7	28.4	28.7
31-Jan	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	Diurnal Average	
	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	29.3	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 - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Shell Muskeg River - January 2016

Maximum Speed: 29 km/h on Jan 27 04:00

Maximum Daily Speed Average: 16.9 km/h on Jan 14

Minimum Speed Value: 1 km/h on Jan 21 20:00

Minimum Daily Speed Average: 1.3 km/h on Jan 10

Maximum Diurnal Speed Average: 2.4 km/h at hour 1

Minimum Diurnal Speed Average: 0.3 km/h at hour 15

Monthly Average Velocity: 1.2 km/h 175.6 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 5$ Median = 7 $Q_3 = 11$ $P_{90} = 16$ $P_{99} = 23$

Hours in Service: 744

Hours of Data: 742

Hours of Missing Data: 2

Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	SW16	SW19	SW14	SSW14	SSW11	S13	S10	SSW12	SSW16	SSW15	S14	SSW12	WSW14	WSW17	SW20	SSW11	SW12	WSW20	SW21	SSW9	SW12	WSW16	WSW13	SW9	SW13.4	SW21
2-Jan	SSW9	S6	S7	S9	S8	S8	SSE6	S8	S8	S9	S8	S8	S10	S8	S7	S7	S7	S6	SSE7	SSW7	SSW8	SSW9	S7	SSW8	S7.7	S10
3-Jan	SSW10	SSW8	SSW10	SSW9	SSW11	SSW11	SSW9	SSW10	SSW12	SSW12	SSW14	SSW17	SSW12	SSW10	SSW9	SSW9	SSW6	S7	SSW7	SSW8	SSW5	S5	SSW5	SSW6	SSW9.1	SSW17
4-Jan	SSW8	SSW7	SSW6	SSW5	SSW5	S3	S3	SW1	S3	SSW4	SW4	S3	S3	SSE3	SSE3	SSW5	SSW6	SSW6	SSE5	SSW6	SSW6	SSW8	S7	S6	SSW4.7	SSW8
5-Jan	SSE5	S5	SSW6	SSW7	SSW6	SSW6	SSW4	S5	SSW6	SSW5	S4	SSW3	SSW4	SSW5	SW2	WNW2	ENE2	NW4	NW4	W2	WSW1	SSW4	SSW4	S4	SSW3.1	SSW7
6-Jan	SSW3	E2	E5	ESE3	W2	SE1	ESE1	SE2	E2	SSE1	SW1	NE5	E2	WNW1	NNE4	NE6	NE7	NNE5	NNE9	NE9	NNE7	NNE6	NNE7	NNE6	NE3.0	NE9
7-Jan	N6	NNE6	NE7	ENE5	NNE5	NNE7	NNE7	NNE7	NNE7	NNW5	NNE6	NNW3	NW4	WNW5	WNW6	WNW6	WSW5	WSW6	WSW8	W6	WSW5	SW4	SW4	SW4	NNW2.3	WSW8
8-Jan	SSE4	S3	SSE2	SSW1	NW4	WNW4	WNW3	NW3	W3	S3	SSW3	SSW1	SW2	SW3	SSW2	SSW2	S3	SSW3	SSW4	SSW4	S4	S4	S4	S4	SSW2.1	SSW4
9-Jan	S5	SSW6	S5	S6	S5	S5	S5	S5	S5	S5	S6	S5	S6	S6	S6	S5	SSW5	SSW6	SSW5	SSW5	SSW5	SSW6	S7	SSW5	S5.4	S7
10-Jan	S5	S5	S5	SSW5	S3	SSE3	SW3	WSW4	SW3	S1	SW4	S2	AF	N3	NNE10	NNE11	NE12	NE17	NNE10	NE4	S3	WSW4	SSE2	NNE8	NE1.3	NE17
11-Jan	N9	NNE12	N13	N7	NW4	W7	W5	SW2	NW8	W7	W7	WSW8	SW8	SW10	SW9	WSW9	SW10	SSW8	SSW7	SW8	SSW5	SSW5	S7	SSW5	WSW3.9	N13
12-Jan	S7	S7	SSW6	SSW6	S6	S6	SSW5	SSW4	SSW5	SW5	SSW3	SW6	SSW5	SSW5	SW6	SSW6	S5	SSW5	SSW5	SSW3	SSW6	S5	S3	SW5	SSW5.2	S7
13-Jan	S3	ENE3	NE6	NE5	SSE1	SSW4	NW2	N4	N2	NE9	ENE8	ENE8	ENE6	ENE8	NE13	NE16	NE18	NE17	NE19	NE18	NE17	NNE16	NNE16	NNE19	NE8.8	NNE19
14-Jan	NNE24	NNE23	NNE19	NNE16	NNE19	NNE14	NNE17	ENE16	ENE15	NE14	NE18	NE20	NE18	NE17	NE17	NE20	NNE21	NNE21	NE18	NE17	NE17	ENE13	ENE14	ENE9	NE16.9	NNE24
15-Jan	ENE9	E6	E4	S2	WSW3	E6	ENE5	ENE4	ENE3	ENE5	E3	ENE7	NE7	NE8	ENE11	ENE13	ENE12	NE11	NE9	NE4	ENE8	ENE6	ESE1	SSE3	ENE5.6	ENE13
16-Jan	SE3	SE3	SE4	SW4	S4	S5	S5	S5	SE4	SSW4	SSW4	SSW3	SW5	SW4	SE4	SSW3	SSW5	SSW4	S4	S4	S5	SSW7	S6	S7	S4.0	SSW7
17-Jan	SSW7	SSW7	S7	S6	S8	S7	S8	SSW7	SSW7	SSW7	SSW6	SSW6	WSW7	SW8	SW8	S5	SSE1	WSW3	S4	SE4	SSW1	SW1	SW2	SSW5	SSW5.2	SW8
18-Jan	SSW8	SSW5	SW6	SW5	WSW4	SSW5	S7	S7	S12	S11	S10	S11	S10	S8	S8	S6	SSW4	S4	SSW4	SSW4	S5	S6	S5	S5	S6.3	S12
19-Jan	S5	S4	S3	WSW3	S2	E6	NE8	NE12	NE13	NE12	NE15	NE13	ENE11	NE6	NE7	NE12	NE13	ENE12	ENE10	NE14	ENE9	ENE12	ENE11	NE15	ENE8.3	NE15
20-Jan	NE17	NE14	NE15	NE14	NE14	NE14	NNE8	NE7	ENE7	ESE3	SE3	SW3	WSW4	WSW4	WSW3	WSW3	AF	SW2	S4	S4	S5	SW5	SSW5	SSW6	NE2.9	NE17
21-Jan	SSW6	SSW7	SSW7	S8	S10	S8	SSE8	S6	SSW8	SSW7	SW7	SW7	SW8	SW8	S6	S5	S5	W1	NW2	NE1	SSE2	S8	S10	SSW9	SSW5.8	S10
22-Jan	SSW9	SSW7	SSW7	SSW8	SSW7	SSW7	SSW6	WSW5	NE2	NE8	ENE9	NE12	ENE10	ENE10	NW7	NNW8	N6	N9	NNE12	NE15	NE14	NE15	NE14	NE14	NE3.9	NE15
23-Jan	NE13	NE14	NE13	NE12	NE11	ENE4	ENE6	NE4	NE5	ENE4	E1	W4	WNW6	WSW3	SW3	S3	SSW3	SSW4	S5	SSW6	S6	S6	S6	S5	ENE2.1	NE14
24-Jan	S7	S6	SSW9	SSW8	S8	S6	S6	SW7	SSW7	S7	SSW10	SSW10	SSW10	SSW11	S11	S10	S7	SW5	NNE12	NNE19	NE22	NE16	NNE15	NE13	SSE2.4	NE22
25-Jan	ENE6	ENE7	ENE7	SSE3	S4	SSE6	S6	S8	S9	SSW8	SSW11	SSW11	S12	S13	SSW11	SW12	SSW8	SW9	WSW9	SW8	SSW7	SSW9	S6	S5	SSW6.4	S13
26-Jan	SSE7	SSE6	S6	S6	S6	SSW7	SSW7	SSW6	SSW6	SSW5	SW6	SSW2	SSW3	S3	W2	SSW4	SW6	SSW7	S5	SW16	SW18	SW21	WSW25	WSW26	SW7.4	WSW26
27-Jan	WSW27	WSW21	W23	WNW29	WNW16	W16	WNW12	NNW5	ENE7	ENE9	NE15	NE16	NE18	NE19	NE17	NE16	NE14	NE12	NE8	NW5	WNW6	NW1	WSW4	SW3	NNW5.3	WNW29
28-Jan	SSW4	SW6	SSE5	SSW3	W6	SW5	S7	SW9	SSW7	SW9	SW11	SW11	SW9	SSW10	S6	S9	S10	S10	S11	SSW10	SW17	SW20	SW23	WSW24	SW9.4	WSW24
29-Jan	WSW21	WSW17	W12	WNW10	WSW8	W11	WNW12	W11	W11	W16	WSW9	WSW7	W11	WNW13	WNW13	WNW14	W12	W17	W15	WSW10	WSW6	S5	SSE4	SSW7	W10.2	WSW21
30-Jan	S7	SW13	WSW14	SW12	SSW7	S4	SW5	SW3	NE7	NE7	NNE8	NE14	NE12	NE15	NE18	NE17	NE19	NE21	NE20	NE16	NNE14	NE15	NE10	NE11	NE6.6	NE21
31-Jan	NE12	NE11	ENE11	NE16	NE17	NE17	NE18	NE18	NNE19	N13	NNE16	NE18	NE18	NE14	NNE13	NE15	NE14	NE14	NE14	NE13	E5	E6	SSE3	S2	NE12.5	NNE19
	SSW2.4	SSW1.9	S1.5	SSW1.7	SSW1.8	S2.2	S1.5	S1.5	SSE1.6	S1.8	SSE1.8	SSE1.4	S1.0	S1.2	S0.3	E0.9	E1.4	NNE0.7	ENE1.0	E1.0	SSE1.2	S1.8	S2.0	SSW1.9	Diurnal Average	
	WSW27	NNE23	W23	WNW29	NNE19	NE17	NE18	NE18	NNE19	W16	NE18	NE20	NE18	NE19	SW20	NE20	NNE21	NE21	SW21	NNE19	NE22	SW21	WSW25	WSW26	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Shell Muskeg River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 27 04:00

Minimum Value: 0 km/h on Jan 8 16:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 3$ $P_{99} = 6$

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

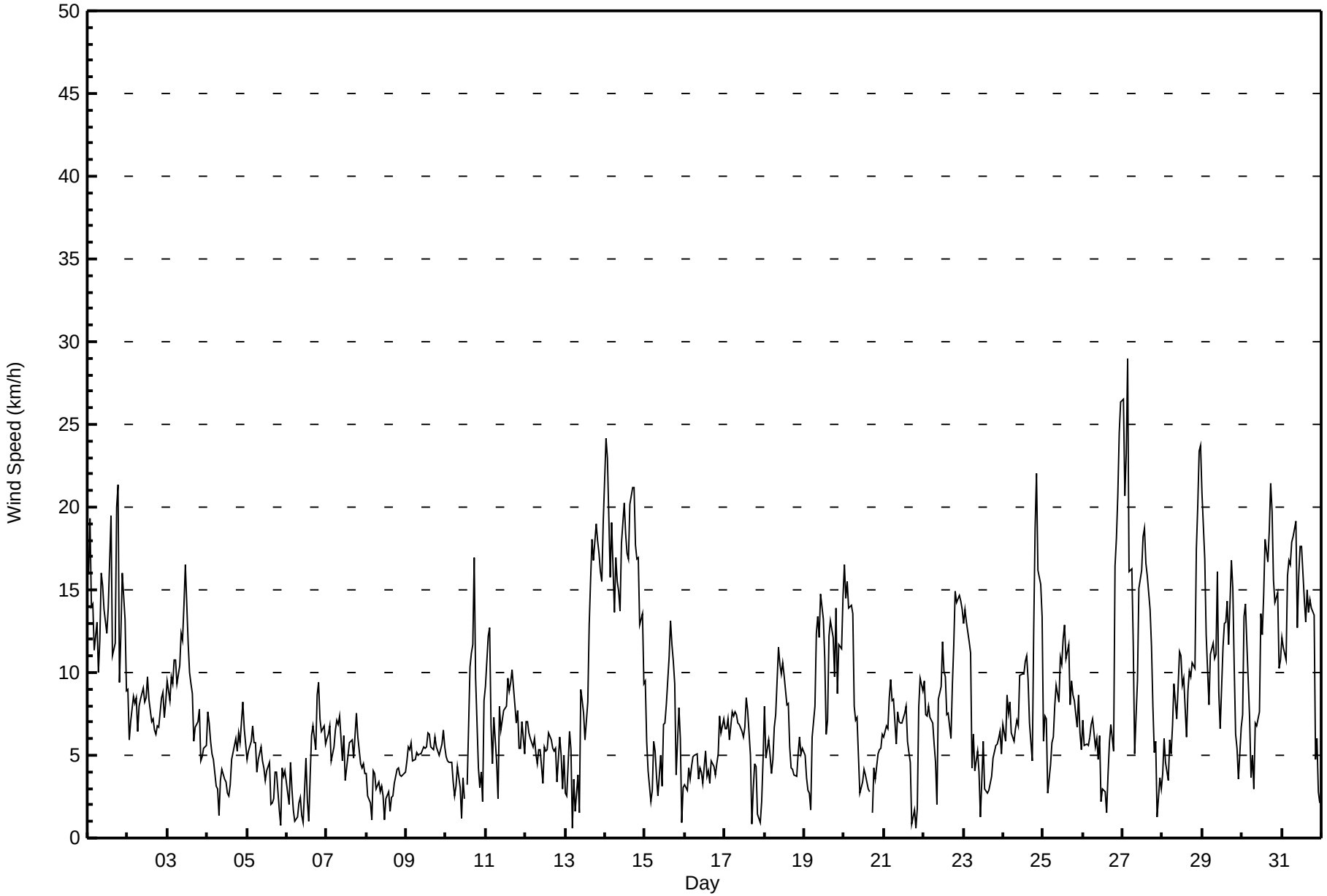
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Shell Muskeg River - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	266	35.85	35.85
6 - 11	308	41.51	77.36
12 - 19	145	19.54	96.90
20 - 28	22	2.96	99.87
29 - 38	1	0.13	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

Shell Muskeg River - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	3	3	8	9	8	4	9	17	71	64	29	16	7	5	10	3	266
6 - 11	5	17	19	28	4	0	0	6	82	94	25	11	9	5	2	1	308
12 - 19	2	17	73	9	0	0	0	0	5	10	11	6	6	6	0	0	145
20 - 28	0	4	5	0	0	0	0	0	0	0	5	7	1	0	0	0	22
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	10	41	105	46	12	4	9	23	158	168	70	40	23	17	12	4	742

Total Number of Valid Hours: 742

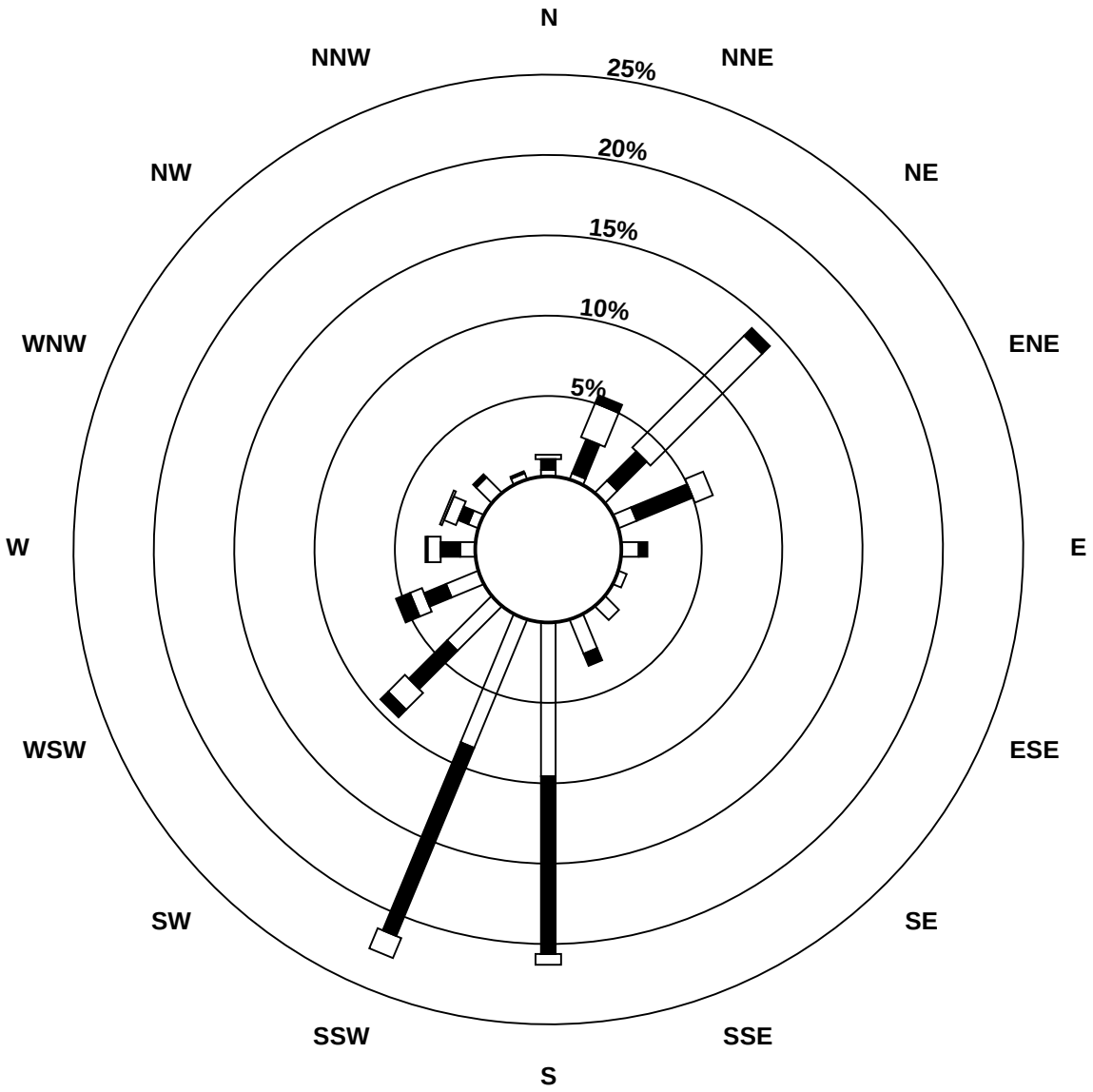
Total Number of Hours: 744

Wood Buffalo Environmental Association

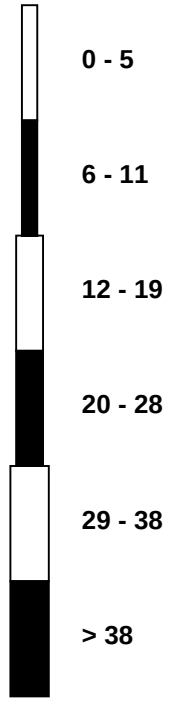
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Shell Muskeg River (AMS 16)



Classes (km/h)



Total Number of Valid Hours: 742

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Shell Muskeg River - January 2016

Direction of Maximum Speed: 289 deg on Jan 27 04:00
Direction of Maximum Daily Speed Average: 39.6 deg on Jan 14

Direction of Minimum Speed: 51 deg on Jan 21 20:00

Direction of Minimum Daily Speed Average: 1.3 deg on Jan 10

Monthly Average Direction: 209.3 deg

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	219	221	216	209	200	189	183	197	210	196	188	208	240	239	234	197	215	249	234	212	232	243	246	214	218.7
2-Jan	201	191	188	178	174	171	164	173	173	169	174	185	188	186	182	188	185	169	162	192	194	194	189	194	182.1
3-Jan	204	200	194	193	206	209	208	195	205	207	208	210	201	205	211	198	199	182	192	203	197	181	193	200	201.7
4-Jan	209	204	208	201	192	190	189	225	190	203	220	178	170	167	165	205	200	197	166	196	195	203	189	179	194.7
5-Jan	150	172	197	203	196	192	194	188	198	196	183	203	211	206	234	297	61	318	316	276	241	213	198	179	200.9
6-Jan	192	80	81	103	265	138	104	130	98	157	226	53	94	295	16	35	55	17	32	40	25	16	24	15	43.2
7-Jan	11	32	50	73	28	31	33	25	29	343	23	338	313	285	289	284	258	250	247	268	251	225	216	214	333.5
8-Jan	167	178	157	206	304	295	294	310	281	189	199	208	228	223	203	204	188	193	200	199	178	183	189	174	209.5
9-Jan	188	192	173	178	189	186	187	188	189	184	184	179	173	185	187	181	194	197	202	200	203	195	188	193	188.0
10-Jan	186	185	191	200	173	165	228	255	222	187	228	185	AF	3	22	24	37	38	27	39	181	239	159	15	39.0
11-Jan	6	18	6	353	323	275	265	218	308	280	263	245	226	221	223	238	225	212	209	217	201	198	180	195	251.9
12-Jan	183	191	193	195	186	187	196	201	203	219	195	225	208	208	217	195	177	206	211	202	196	182	182	224	199.2
13-Jan	182	74	54	53	154	206	305	350	358	56	59	62	73	67	55	51	41	39	40	46	38	19	17	23	41.8
14-Jan	28	27	26	26	24	18	31	57	57	54	52	49	37	38	37	40	32	28	37	47	56	61	58	72	39.6
15-Jan	69	82	83	174	247	91	74	70	71	69	83	58	54	53	63	57	57	46	50	47	72	68	115	160	65.7
16-Jan	140	138	124	217	179	188	179	179	144	201	210	198	231	228	137	209	204	201	178	175	171	193	178	190	184.7
17-Jan	195	192	189	181	186	186	189	192	199	210	204	211	239	233	215	175	161	244	184	140	199	222	221	204	199.3
18-Jan	208	210	218	228	245	206	180	181	176	181	179	182	180	181	181	190	195	178	198	197	187	185	172	171	188.7
19-Jan	179	184	171	245	188	80	56	54	56	55	54	55	57	38	38	52	52	57	65	48	66	57	67	52	58.5
20-Jan	51	39	44	42	43	44	31	39	68	121	142	222	247	251	256	240	AF	225	179	171	188	217	209	207	55.5
21-Jan	196	201	201	187	183	176	168	183	206	198	214	221	223	223	181	177	184	272	326	51	162	169	175	201	193.3
22-Jan	201	206	194	205	206	210	197	246	54	56	63	51	62	63	324	328	7	358	17	53	55	52	54	42	49.4
23-Jan	45	55	54	52	55	63	60	40	47	60	86	279	300	252	233	173	203	208	186	203	191	190	184	184	77.0
24-Jan	191	179	193	195	182	175	190	220	209	189	202	198	211	202	191	189	186	233	18	31	47	39	26	50	161.9
25-Jan	67	75	68	153	186	161	191	189	187	199	192	198	185	182	205	223	205	220	240	227	212	213	187	186	193.8
26-Jan	167	161	170	169	176	195	204	198	200	206	221	202	212	173	270	196	233	198	173	217	221	235	251	254	216.8
27-Jan	256	255	274	289	292	280	295	341	68	61	51	50	50	49	42	44	42	51	50	309	300	318	244	226	340.9
28-Jan	207	225	166	200	261	216	189	219	201	219	227	222	216	197	175	177	182	188	183	200	227	234	235	239	214.4
29-Jan	239	244	270	302	251	270	288	273	265	271	252	252	281	299	294	283	275	268	272	253	245	175	155	199	265.5
30-Jan	185	230	242	229	192	170	228	224	37	45	20	35	35	50	51	51	50	49	45	55	25	40	52	56	46.7
31-Jan	38	42	65	47	42	52	44	37	29	11	26	44	40	35	30	40	37	42	48	39	90	94	161	184	41.6
	193.2	194.3	183.3	209.6	200.9	187.8	183.6	183.5	165.0	176.1	165.8	152.5	189.3	190.8	170.1	93.9	79.2	27.2	58.5	96.2	153.8	184.7	189.3	194.7	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Shell Muskeg River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 94 deg on Jan 13 05:00

Minimum Value: 6 deg on Jan 15 16:00

Percentiles: $P_1 = 7$ $P_{10} = 10$ $Q_1 = 14$ Median = 17 $Q_3 = 24$ $P_{90} = 42$ $P_{99} = 74$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	15	11	12	13	20	15	24	19	18	20	21	23	18	10	12	18	27	24	9	28	11	6	13	25	28
2-Jan	12	20	18	9	9	11	18	15	14	12	15	19	17	16	14	12	20	16	22	17	10	14	13	14	22
3-Jan	13	15	14	14	14	12	14	15	12	14	15	13	17	14	13	19	21	30	29	15	13	14	19	15	30
4-Jan	12	10	11	25	17	27	26	69	22	18	44	23	16	15	34	12	13	13	7	12	10	14	16	22	69
5-Jan	23	17	16	14	15	13	14	11	13	18	18	18	25	27	51	41	38	45	28	58	76	13	13	20	76
6-Jan	28	42	27	25	73	82	56	53	31	75	73	25	30	78	39	20	24	32	17	14	17	20	23	29	82
7-Jan	24	23	17	16	27	29	25	30	22	28	29	33	24	22	12	11	14	10	11	12	16	26	19	18	33
8-Jan	16	48	25	68	15	17	30	18	35	11	20	61	24	20	32	8	22	11	14	16	18	14	15	14	68
9-Jan	15	18	19	17	18	18	18	17	17	17	21	20	19	20	17	16	17	16	18	20	16	16	17	16	21
10-Jan	16	16	16	26	19	35	29	20	18	56	18	46	AF	41	26	19	19	13	22	58	28	18	42	49	58
11-Jan	21	20	19	28	49	10	42	49	17	16	11	13	11	11	15	15	12	16	14	10	14	14	12	19	49
12-Jan	8	11	13	16	17	15	19	21	20	17	27	16	22	22	20	21	19	24	20	57	27	29	28	13	57
13-Jan	41	62	15	28	94	28	82	51	74	14	10	14	11	12	7	8	12	12	12	9	19	16	19	14	94
14-Jan	7	11	13	16	15	23	14	8	9	12	9	8	13	15	18	13	12	10	15	13	6	11	9	10	23
15-Jan	12	29	62	46	75	24	26	65	46	23	33	16	11	18	10	6	8	13	70	41	16	18	88	35	88
16-Jan	31	36	35	27	25	18	19	20	34	20	22	35	16	26	28	28	21	26	23	15	14	14	11	10	36
17-Jan	12	12	12	14	12	13	14	14	15	15	23	24	19	11	27	21	74	61	28	19	58	67	67	45	74
18-Jan	16	17	10	18	11	25	17	16	17	16	15	18	17	20	18	20	17	16	13	16	18	15	16	15	25
19-Jan	16	13	15	64	57	44	29	11	9	9	7	6	7	41	34	11	8	14	19	10	24	16	17	10	64
20-Jan	6	18	14	15	14	14	26	42	26	54	37	36	25	24	26	27	AF	50	17	15	16	26	19	17	54
21-Jan	14	17	14	15	15	14	15	13	14	15	15	21	23	18	27	17	12	76	90	88	65	14	17	18	90
22-Jan	17	21	33	33	15	14	16	41	56	20	17	11	13	11	56	31	32	25	18	8	9	9	9	14	56
23-Jan	14	7	8	10	11	34	21	33	19	26	55	40	12	23	18	25	18	19	15	16	16	19	19	20	55
24-Jan	17	15	17	17	18	15	24	22	17	16	18	21	20	21	18	17	26	20	23	13	9	18	16	15	26
25-Jan	59	20	14	27	28	15	22	20	19	21	21	21	18	20	20	11	15	20	10	7	12	13	24	24	59
26-Jan	24	16	15	16	14	17	14	15	20	17	14	46	44	34	59	20	26	18	33	12	11	9	8	10	59
27-Jan	11	10	21	14	20	12	13	56	15	21	7	6	6	7	13	9	14	12	13	31	24	67	56	36	67
28-Jan	28	27	29	54	22	36	43	14	16	9	8	9	22	20	32	15	16	18	16	19	14	7	7	9	54
29-Jan	7	8	13	22	28	20	14	12	14	11	20	48	16	15	14	12	11	9	11	10	20	30	66	31	66
30-Jan	16	13	7	12	24	53	47	68	46	51	29	19	23	15	7	8	9	8	13	10	22	15	24	20	68
31-Jan	22	23	16	16	14	10	13	14	14	20	20	12	15	19	23	18	18	19	15	19	38	31	56	63	63
	59	62	62	68	94	82	82	69	74	75	73	61	44	78	59	41	74	76	90	88	76	67	88	63	
	Diurnal Maximum																								

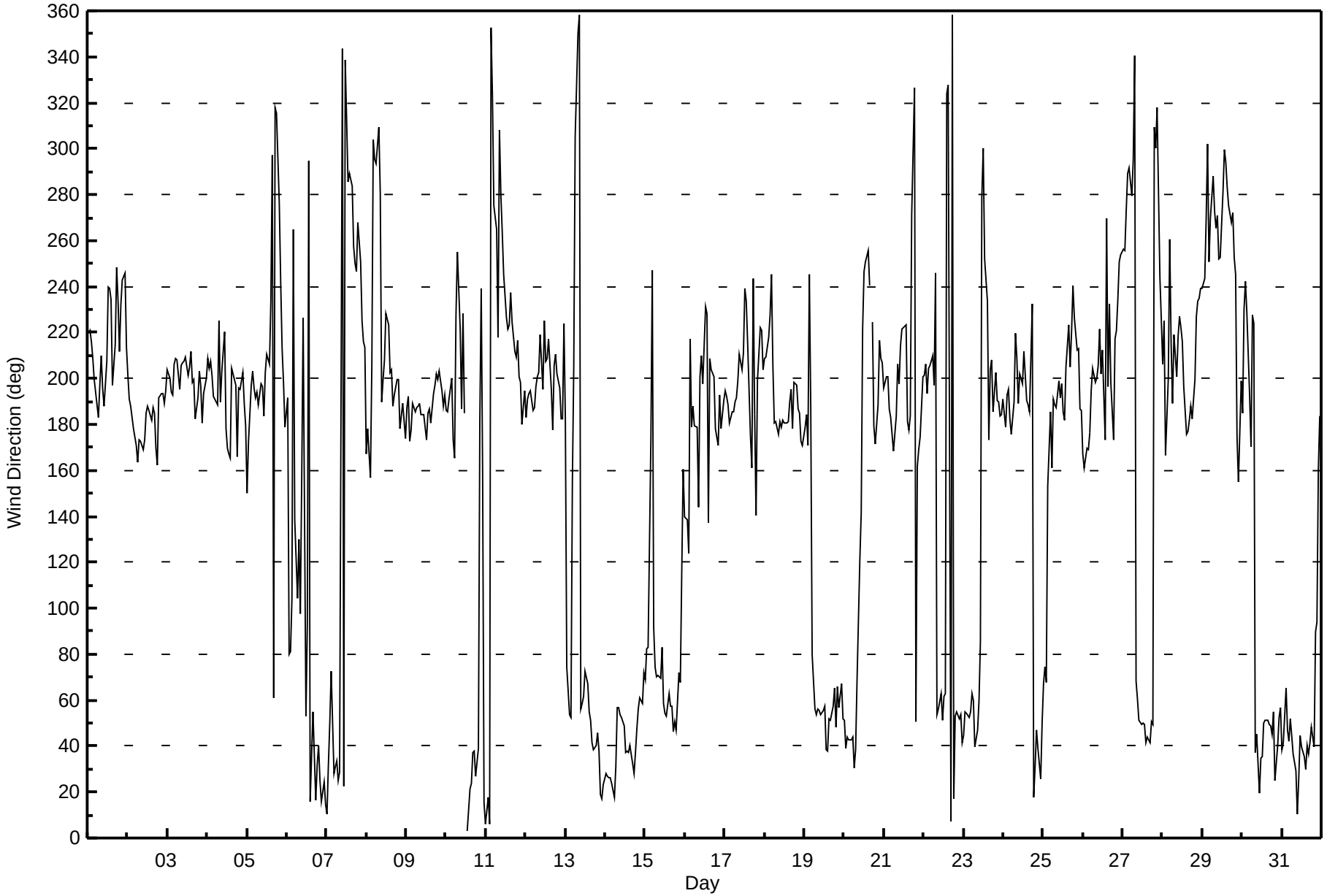
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Shell Muskeg River - January 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 25, 2016	Last Calibration	December 9, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	16:05
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	773	778
Calculated slope	1.004322	1.001020	Chamber temp	45.0	45.2
Calculated intercept	1.326667	1.140698	Pressure	692.7	705.7
Analyzer Background	8.8	8.7	Flow	0.433	0.448
Analyzer Coefficient	1.215	1.215	Intensity	91	91

Analyzer make	Thermo 43i	Analyzer serial #	1118148498

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	83.6	807.6	806.2	1.002
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	83.6	807.6	806.2	1.002
second point	5000	42.0	405.7	403.2	1.006
third point	5000	21.1	203.8	202.0	1.009
as left zero	6000	0.0	0.0	0.1	----
as left span	5000	83.6	807.6	799.5	1.010
				Average Correction Factor	1.006

Corrected As found	806.5	Previous response	802.8	% change	-0.5%

Notes:

Changed inlet filter after as founds. Replaced pump after as founds for preventative maintenance. Gave the new pump 20 minutes to warm up before continuing with calibration. No adjustments.

Calibration Performed By: Evan Magill

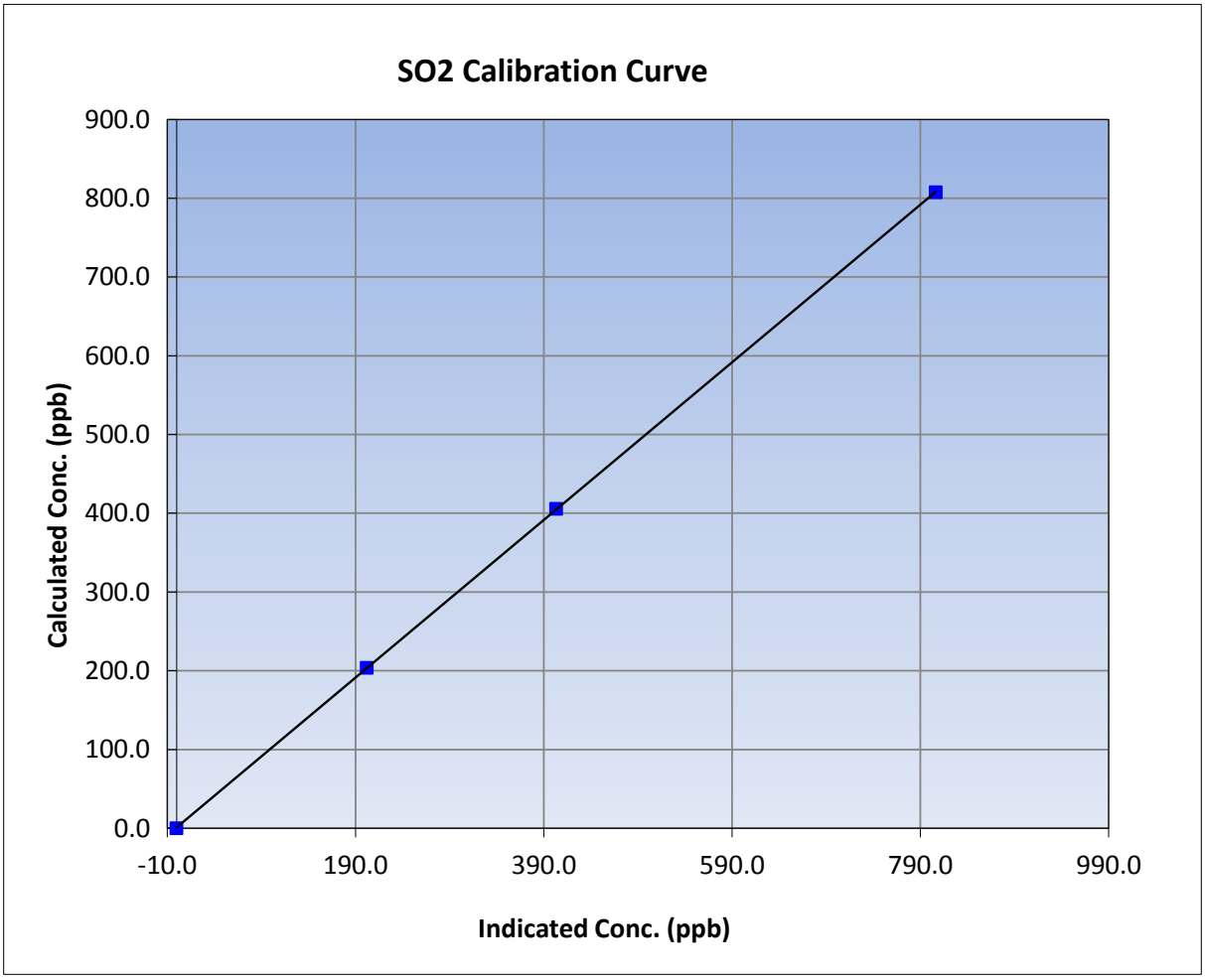
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

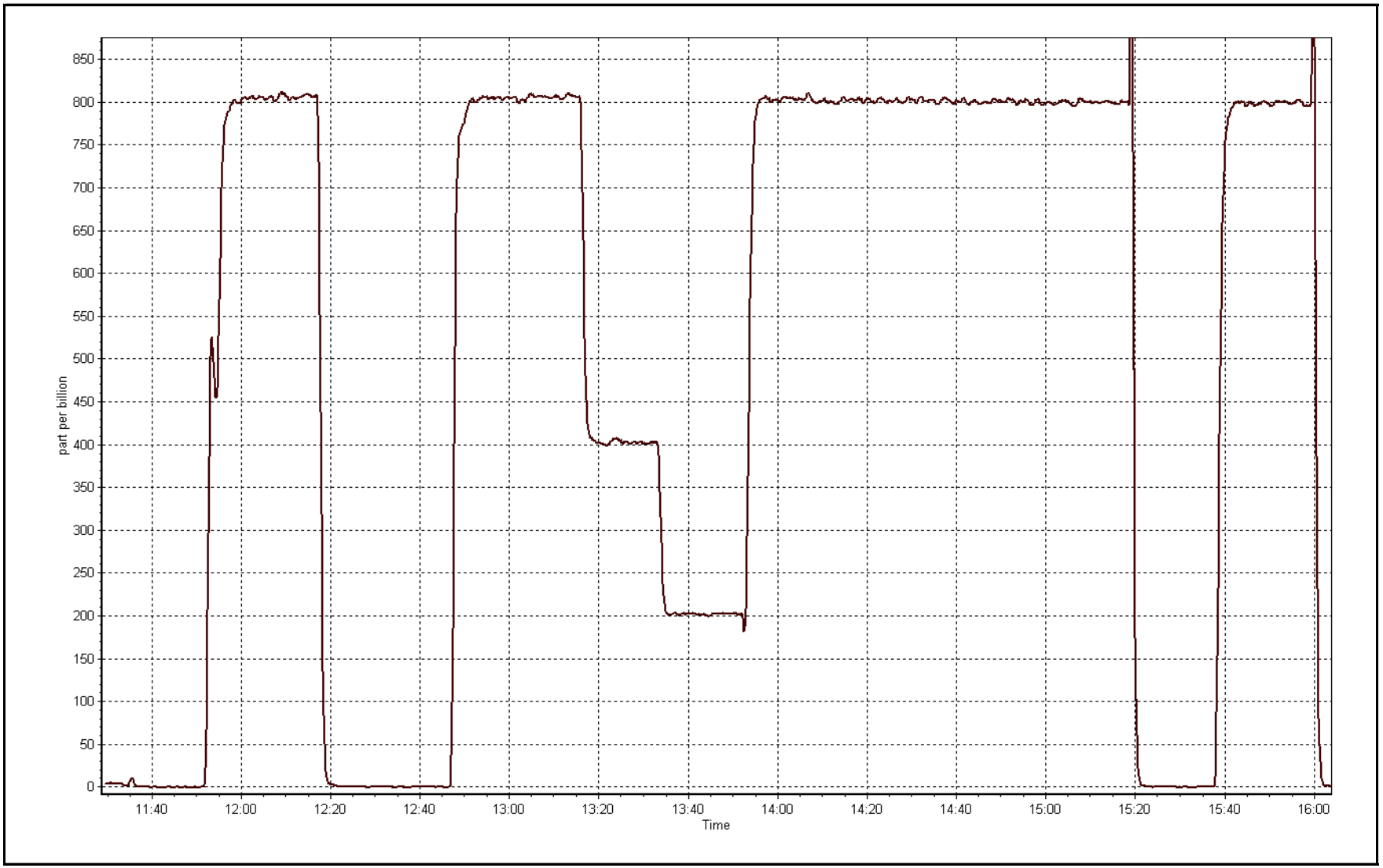
Calibration Date	January 25, 2016	Previous Calibration	December 9, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	11:30	End Time (MST)	16:05
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999993
807.6	806.2	1.0017		
405.7	403.2	1.0063	Slope	1.001020
203.8	202.0	1.0092		
			Intercept	1.140698



SO2 Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-25-16	Last Calibration	December-09-15
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	16:05
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.6
Calculated slope	0.999699	1.006309	Fuel Pressure	24.2	24.2
Calculated intercept	-0.015049	-0.051933	Analyzer Coeff	4.695	4.574
			Analyzer BKG	2.30	2.24

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.03	----
as found span	5000	83.6	17.02	17.31	0.983
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	83.6	17.02	16.95	1.004
second point	5000	42.0	8.55	8.56	0.999
third point	5000	21.1	4.29	4.34	0.990
as left zero	6000	0.0	0.00	0.01	----
as left span	5000	83.6	17.02	17.00	1.001
				Average Correction Factor	0.997

Corrected As found	17.28	Previous response	17.04	% change	-1.4%

Notes:

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By: Evan Magill

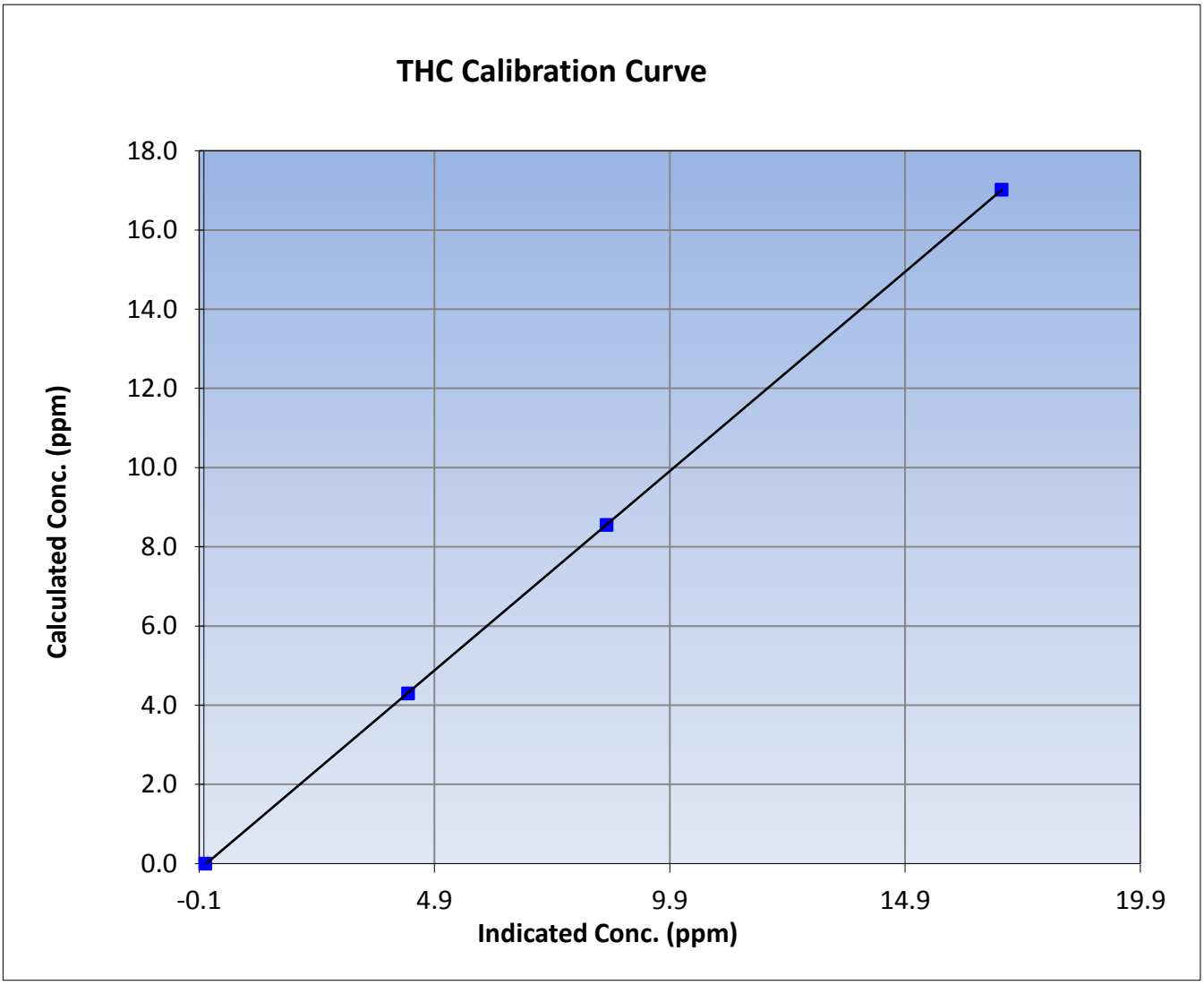
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

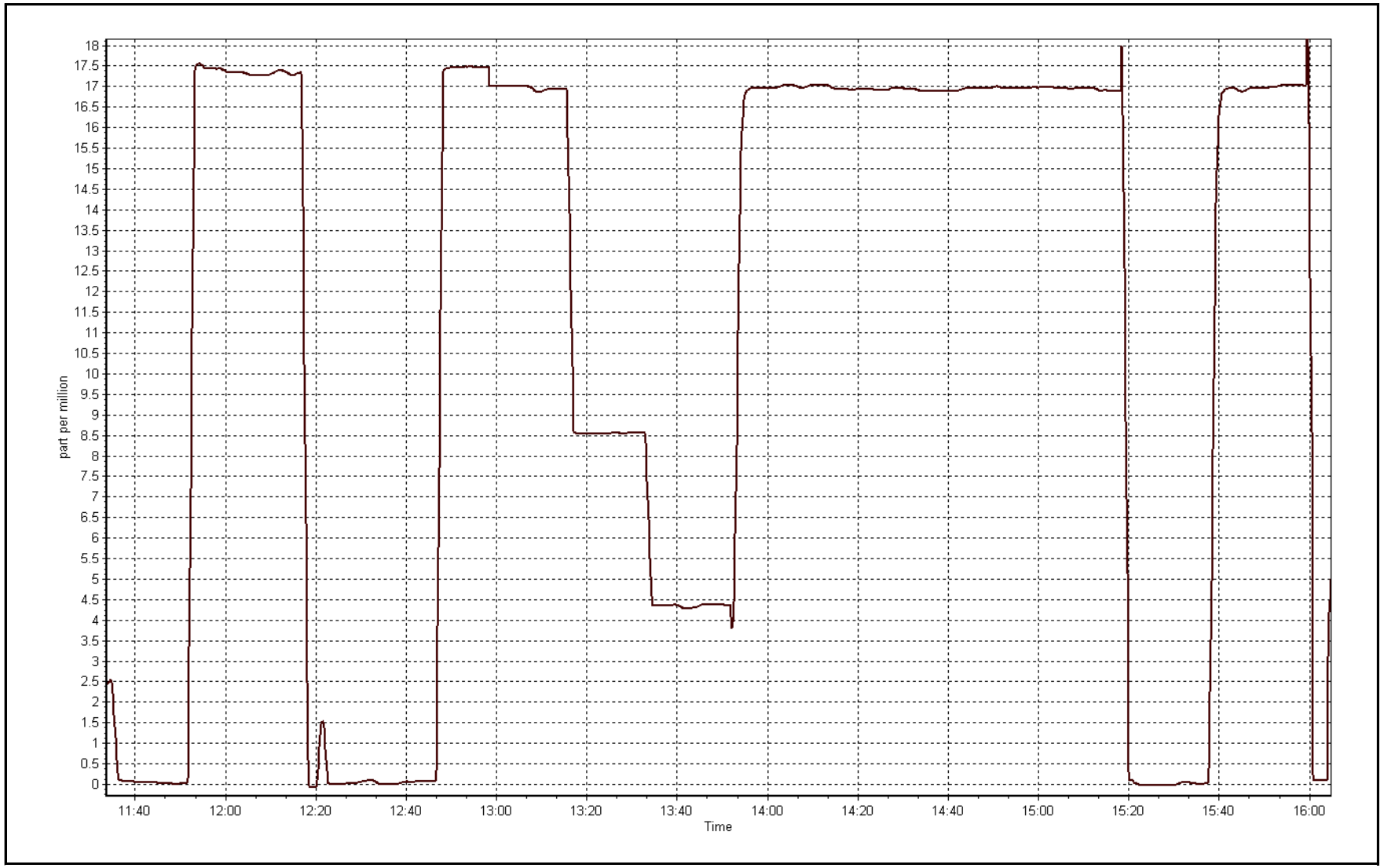
Calibration Date	January 25, 2016	Previous Calibration	December 9, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	11:30	End Time (MST)	16:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999992
17.02	16.95	1.0039		
8.55	8.56	0.9987	Slope	1.006309
4.29	4.34	0.9896		
			Intercept	-0.051933



THC Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 25, 2016	Previous Calibration	December 9, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	16:05
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	API T700	Serial Number	493
Zero air Generator	Teledyne API T701	Serial Number	2155

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000502	0.999888	0.998154
	Data Offset	0.321145	0.809263	0.678750
Current Calibration	Data Slope	1.000617	1.000095	0.993246
	Data Offset	0.493340	1.349049	0.175134

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.800		0.826	
NOX coefficient	0.997		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.8		9.1	
NOX bkgrnd	9.1		9.4	
Chamber Temp	50	Deg C	50.4	Deg C
Moly Temp	323.2	Deg C	322.6	Deg C
PMT voltage	-774	V	-774	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	169.2	mmHg	178.9	mmHg
R Cell Press Nox	168.9	mmHg	178.6	mmHg
NO sample flow	0.853	lpm	0.829	lpm
Nox sample Flow	0.855	lpm	0.831	lpm

Notes:

Changed inlet filter after as founds. Pump was un-plugged after the as founds for a few mintues to install a plastic pump board. The pump was using a wooden pump board before. Sample flow decreased by a small amount after pump was plugged back in, resulting in the span to drop slightly. Adjusted the span and continued with calibration.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 25, 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	0.2	0.1	0.2	----	----
as found span	5000	83.6	802.6	802.6	0.0	820.5	817.9	2.6	0.9781	0.9812
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.2	----	----
high point	5000	83.6	802.6	802.6	0.0	801.8	801.8	0.0	1.0010	1.0010
second point	5000	42.0	403.2	403.2	0.0	402.5	401.3	1.2	1.0017	1.0047
third point	5000	21.1	202.6	202.6	0.0	201.0	199.7	1.3	1.0079	1.0145
as left zero	6000	0.0	0.0	0.0	0.0	1.0	0.1	0.9	----	----
as left span	5000	83.6	802.6	494.7	307.9	792.1	489.6	302.5	1.0132	1.0105
								Average Correction Factor	1.0035	1.0067

Corrcted As found NO_X= 820.3 NO= 817.9 Percent Change NO_X= -2.3% NO= -2.0%

Previous Response NO_X= 801.8 NO= 801.8

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)	----	494.7	296.1	793.0	494.7	298.3	0.9954	1.0000	0.9927	100.7%
2nd NO2 (200)	----	587.8	203.0	791.7	587.8	203.9	0.9970	1.0000	0.9958	100.4%
3rd NO2 (100)	----	686.3	104.6	791.0	686.3	104.8	0.9979	1.0000	0.9981	100.2%
4th NO2 (0)	790.9	----	1.8	792.7	790.9	1.8	0.9958	1.0000	N/A	----
					Average Correction Factor		0.9965	1.0000	0.9955	100.5%

Calibration Performed By: Evan Magill

Wood Buffalo Environmental Association

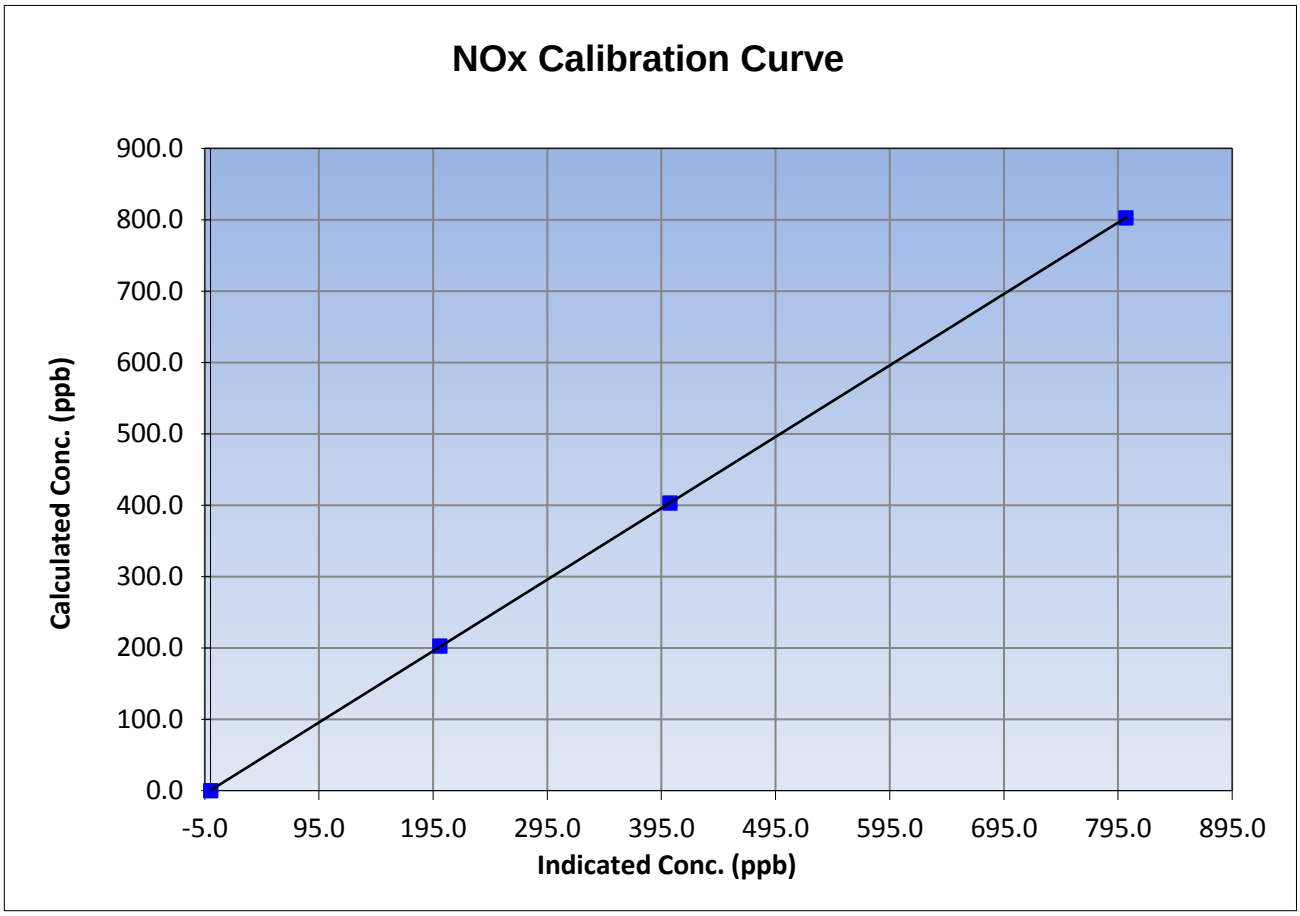
NO_X Calibration Summary

Station Information

Calibration Date	January 25, 2016	Previous Calibration	December 9, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	11:30	End Time (MST)	16:05
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
802.6	801.8	1.0010		
403.2	402.5	1.0017	Slope	1.000617
202.6	201.0	1.0079		
			Intercept	0.493340



Wood Buffalo Environmental Association

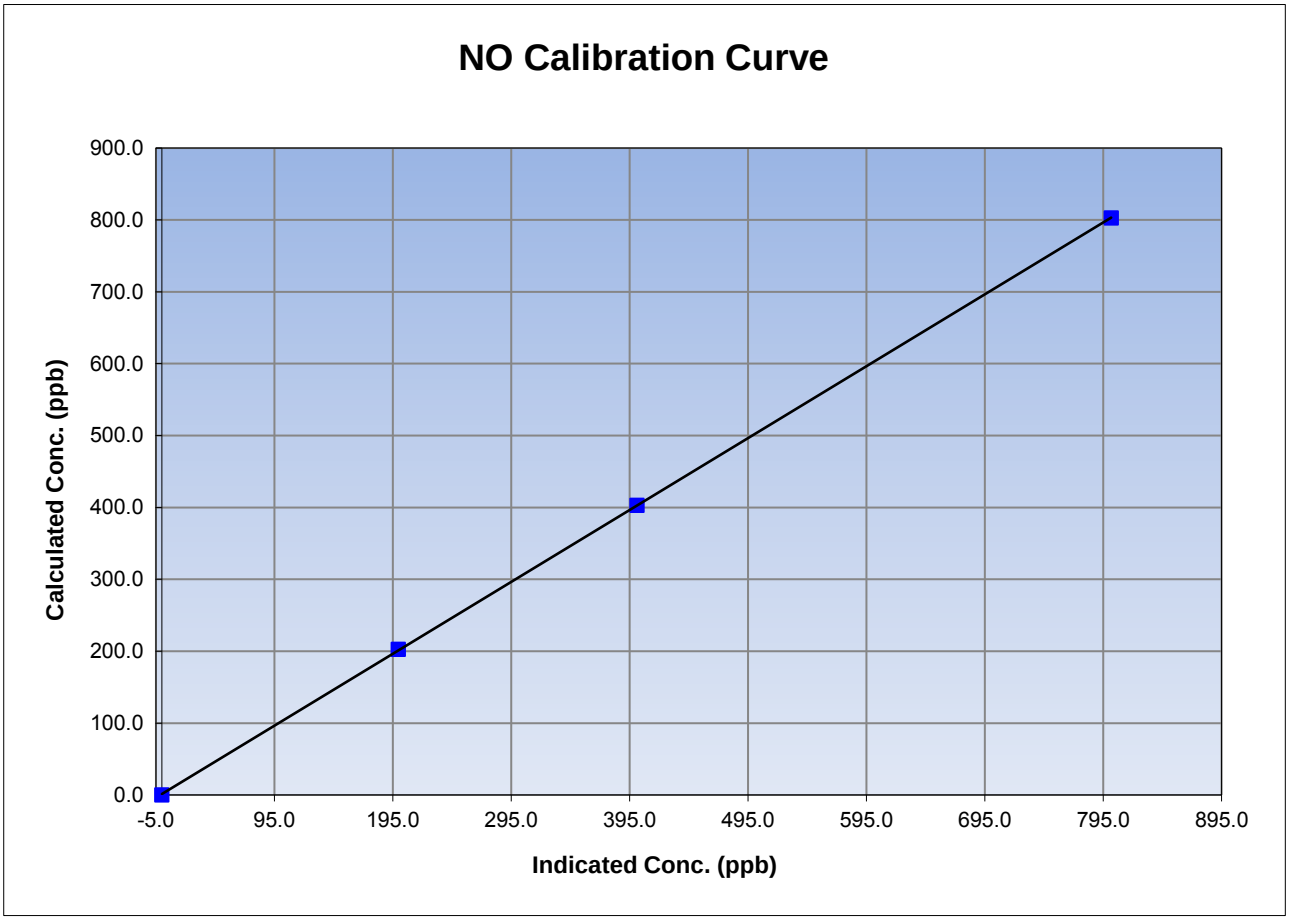
NO Calibration Summary

Station Information

Calibration Date	January 25, 2016	Previous Calibration	December 9, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	11:30	End Time (MST)	16:05
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	0.999986
802.6	801.8	1.0010		
403.2	401.3	1.0047	Slope	1.000095
202.6	199.7	1.0145		
			Intercept	1.349049



Wood Buffalo Environmental Association

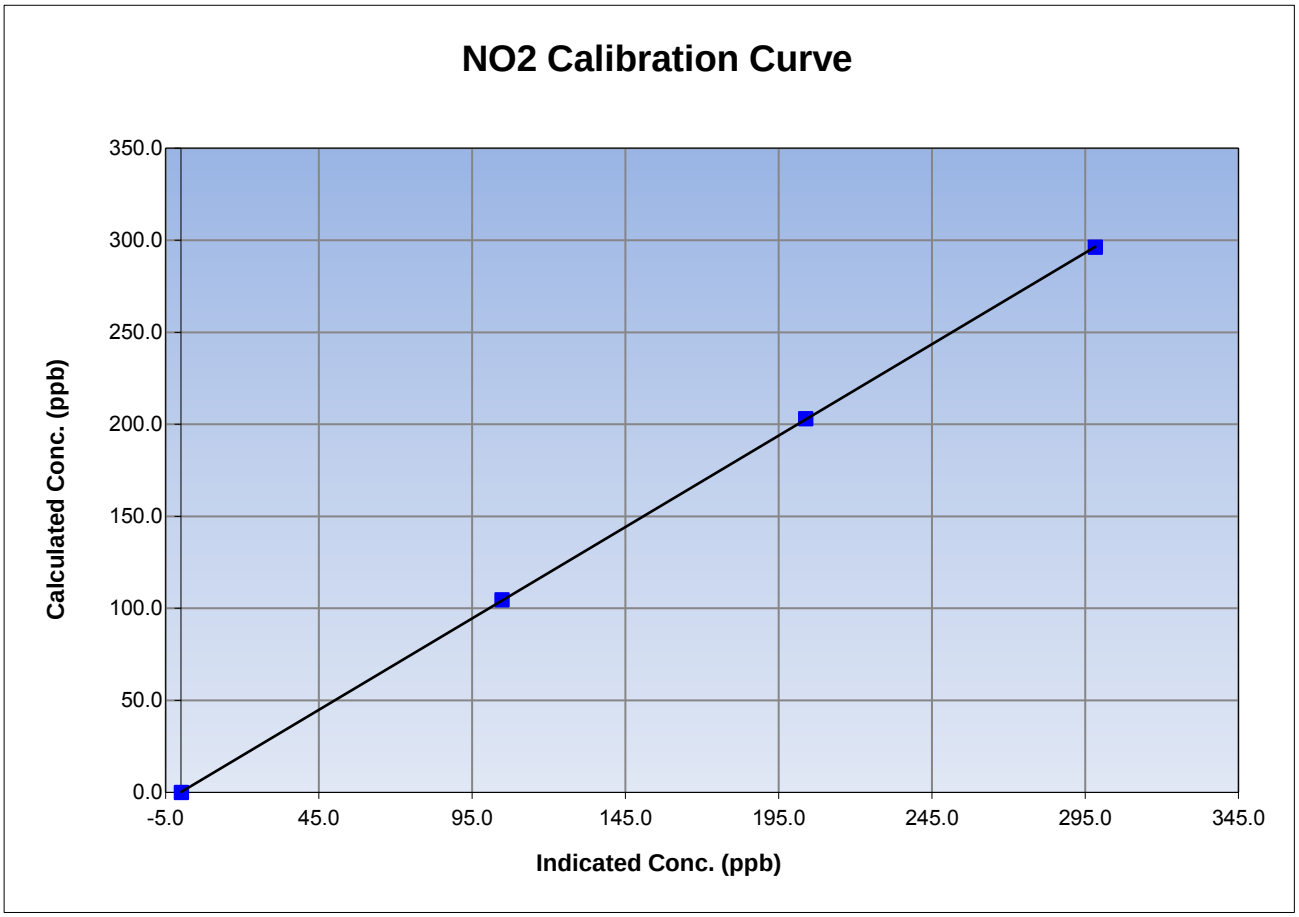
NO_2 Calibration Summary

Station Information

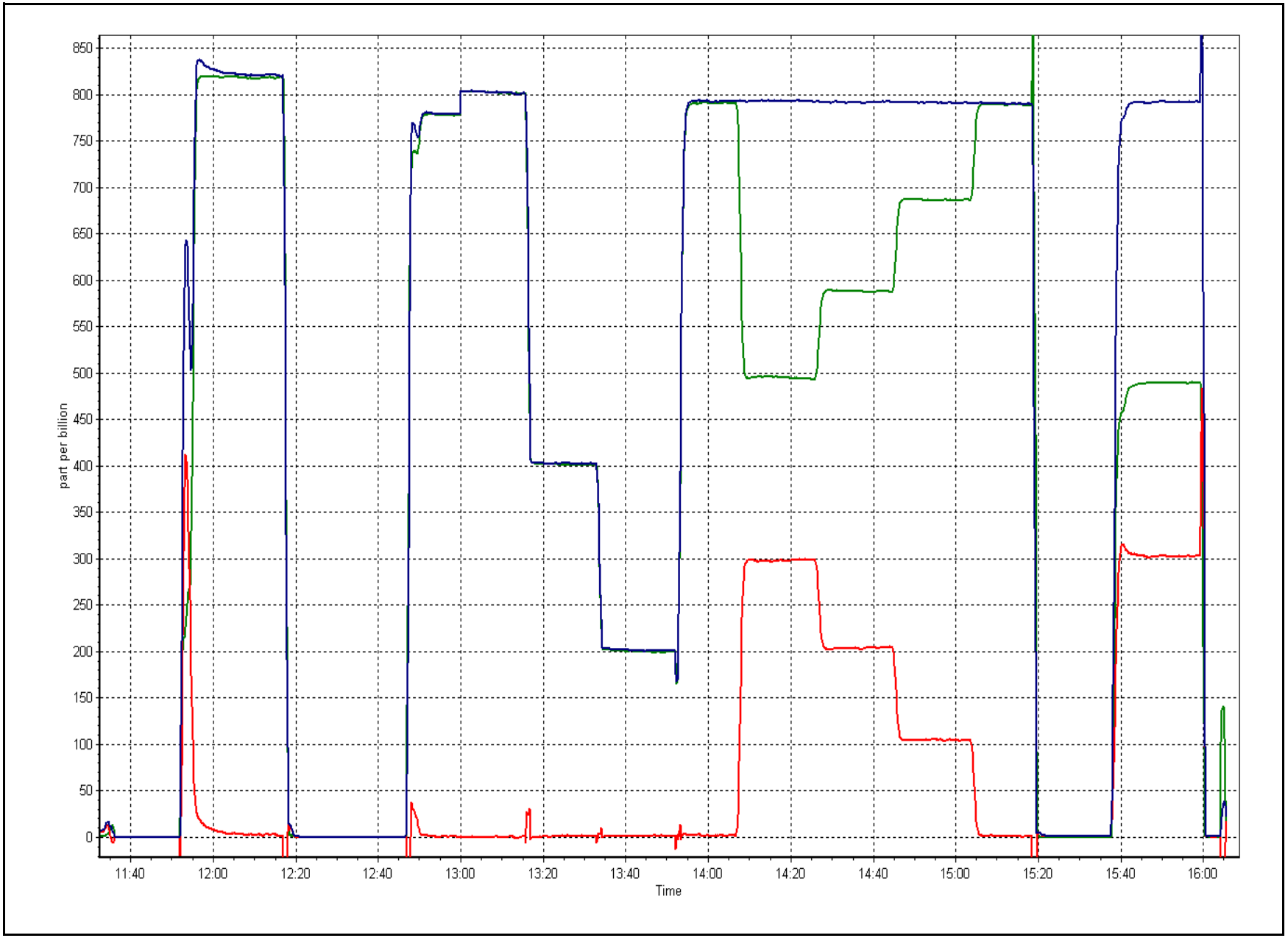
Calibration Date	January 25, 2016	Previous Calibration	December 9, 2015
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	11:30	End Time (MST)	16:05
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999991
296.1	298.3	0.9927		
203.0	203.9	0.9958	Slope	0.993246
104.6	104.8	0.9981		
			Intercept	0.175134



NOX Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 25, 2016	Previous Calibration:	December 9, 2015
Station Name:	Shell Muskeg River	Station Number:	AMS 16
Start Time (MST):	14:00	End Time (MST):	16:02
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1102

SHARP INFORMATION

Particulate Fraction:	PM2.5										
Make/Model:	Thermo / SHARP 5030										
Serial Number	E-798										
C_{14} Source SN:	4142										
Confirmation of Time settings:	Yes ☑	No ☐									
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑			

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-2.8	-4.5	-1.7	-4.7
T2		na	na	
T3		na	na	
T4		na	na	
RH (%)		na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	977	978.0	1.0	977

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1001	1003	2	1003	1001

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	545		545
Neph	0.9		0.9
C14	23		23
Indicated Concentration (ug/m3)	**0.2**	**no**	**0.2**
Offset 1	na		na
Offset 2	na		na

Leak Check (Quarterly)

Leak Check Date:	January 25, 2016	Previous Leak Check Date:	October 29, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.70	0.09
*Flow with adaptor (LPM):	16.61	

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

Mass Foil Calibration (Annualy)

Foil Calibration Date:	May 25, 2015	Previous Foil Calibration:	na
Zeroed?:	yes		
Foil Mass:	1337	Mass foil set S/N:	2518
Previous Correction Factor:	7029		
New Correction Factor:	7067		

INSPECTION DATA

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

NOTES:

Adjusted temperature (T1) and conducted a leak check. Replaced PM head with a clean one.

Calibration Performed By: **Evan Magill**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 17
WAPASU
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
JANUARY 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	53	0	6	0
H2S (ppb) Average	709	35	35	100.00	1	0	1	0
THC (ppm) Average	708	36	36	100.00	3.7	-	2.5	-
O3 (ppb) Average	709	35	35	100.00	41	0	36	-
NO2 (ppb) Average	707	37	37	100.00	30	0	10	-
NO (ppb) Average	707	37	37	100.00	26	-	2	-
NOX (ppb) Average	707	37	37	100.00	56	-	11	-
PM2.5 (ug/m3) Average	739	2	5	99.60	18.4	-	10.2	0
Temperature 2 m (C) Average	744	0	0	100.00	3.4	-	0.6	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	94	-
Precipitation (mm) Total	744	0	0	100.00	1.3	-	5	-
Wind Speed 10 m (km/h) Average	737	0	7	99.06	20	-	12	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.5	3	-	0	0	0	1	1	4	53
H2S (ppb) Average	709	0.3	0	-	0	0	0	0	0	1	1
THC (ppm) Average	708	2.26	0.1	-	2.1	2.2	2.2	2.2	2.3	2.4	3.7
O3 (ppb) Average	709	24.1	8	-	1	14	19	24	30	35	41
NO2 (ppb) Average	707	4.9	5	-	0	0	1	3	7	11	30
NO (ppb) Average	707	0.7	2	-	0	0	0	0	1	1	26
NOX (ppb) Average	707	5.6	6	-	0	1	2	4	8	12	56
PM2.5 (ug/m3) Average	739	4.06	3.6	-	0.1	1	1.5	2.8	5.1	10	18.4
Temperature 2 m (C) Average	744	-13.13	7.8	-	-34.6	-22.5	-18.3	-13.5	-7.8	-2.1	3.4
Relative Humidity (%) Average	744	83.1	9	-	36	72	80	84	90	93	99
Precipitation (mm) Total	744	-	-	17.59	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	737	5.8	4	-	0	2	3	5	8	10	20
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	30 Jan 2016 02:00	30 Jan 2016 02:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	30 Jan 2016 15:00	30 Jan 2016 16:00	2	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	07 Jan 2016 20:00	07 Jan 2016 20:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	08 Jan 2016 05:00	08 Jan 2016 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	15 Jan 2016 18:00	15 Jan 2016 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 11:00	16 Jan 2016 11:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	19 Jan 2016 05:00	19 Jan 2016 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2016 16:00	23 Jan 2016 16:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	29 Jan 2016 10:00	29 Jan 2016 10:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Wapasu - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 53 ppb on Jan 17 03:00 Maximum Daily Average: 6.4 ppb on Jan 17

Minimum Value: 0 ppb on Jan 30 19:00 Minimum Daily Average: 0.2 ppb on Jan 14

Maximum Diurnal Average: 3.3 ppb at hour 3 Minimum Diurnal Average: 0.8 ppb at hour 19

Monthly Average: 1.5 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 4$ $P_{99} = 12$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	5	7	10	6	6	5	6	8	11	9	4	2	1	1	1	1	1	1	0	1	1	1	0	3.7	11
2-Jan	0	Z	0	1	2	4	7	6	6	6	3	6	13	11	9	6	1	1	3	2	1	1	1	1	4.0	13
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	3	5	5	5	4	2	1.7	5
4-Jan	1	1	0	Z	1	1	3	2	1	1	1	0	0	0	0	0	0	0	0	1	4	9	4	4	1.6	9
5-Jan	3	2	1	1	Z	5	14	10	3	2	6	11	8	6	14	4	1	1	1	1	1	1	1	1	4.1	14
6-Jan	1	1	1	1	1	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0.5	6
8-Jan	12	Z	7	4	4	3	3	2	2	1	1	1	1	2	2	1	1	0	1	1	1	2	6	5	2.7	12
9-Jan	2	1	Z	1	1	1	1	0	1	3	4	3	3	3	3	2	1	1	1	1	1	1	3	2	1.6	4
10-Jan	1	1	1	Z	1	1	1	1	1	1	1	2	5	5	3	1	1	1	0	1	0	0	1	0	1.3	5
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	3	3	2	1	1	0.8	3
12-Jan	0	0	0	0	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
13-Jan	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Jan	0	0	0	Z	0	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0.5	2
17-Jan	6	26	53	24	Z	10	4	2	2	1	1	2	5	2	3	2	1	1	1	1	1	1	1	1	6.4	53
18-Jan	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
19-Jan	Z	1	0	1	1	0	0	1	2	1	1	2	2	1	1	1	1	1	1	0	0	0	0	0	0.8	2
20-Jan	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Jan	0	1	Z	0	0	0	0	0	1	0	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1.0	2
22-Jan	1	1	1	Z	3	4	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	4
23-Jan	1	1	1	1	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-Jan	0	1	1	6	4	Z	4	2	1	1	1	4	6	6	5	10	7	4	2	1	0	0	0	0	3.0	10
25-Jan	Z	0	0	0	0	1	0	1	4	5	5	2	1	C	C	C	C	C	0	0	1	1	2	5	1.7	5
26-Jan	7	Z	7	7	7	5	8	6	6	4	3	5	5	3	4	2	1	2	3	3	2	1	1	0	4.0	8
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0.3	1
28-Jan	0	0	0	Z	0	0	0	1	1	1	1	1	2	4	8	8	6	4	1	2	4	1	0	0	2.0	8
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Jan	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0.4	1
	1.6	1.7	3.3	2.4	1.4	1.8	1.9	1.5	1.4	1.5	1.4	1.7	2.0	1.8	2.1	1.6	1.1	0.9	0.8	0.9	1.0	1.0	1.1	1.1	Diurnal Average	
	12	26	53	24	7	10	14	10	8	11	9	11	13	11	14	10	7	4	3	5	5	9	6	6	Diurnal Maximum	

Z - zerospan C - Calibration

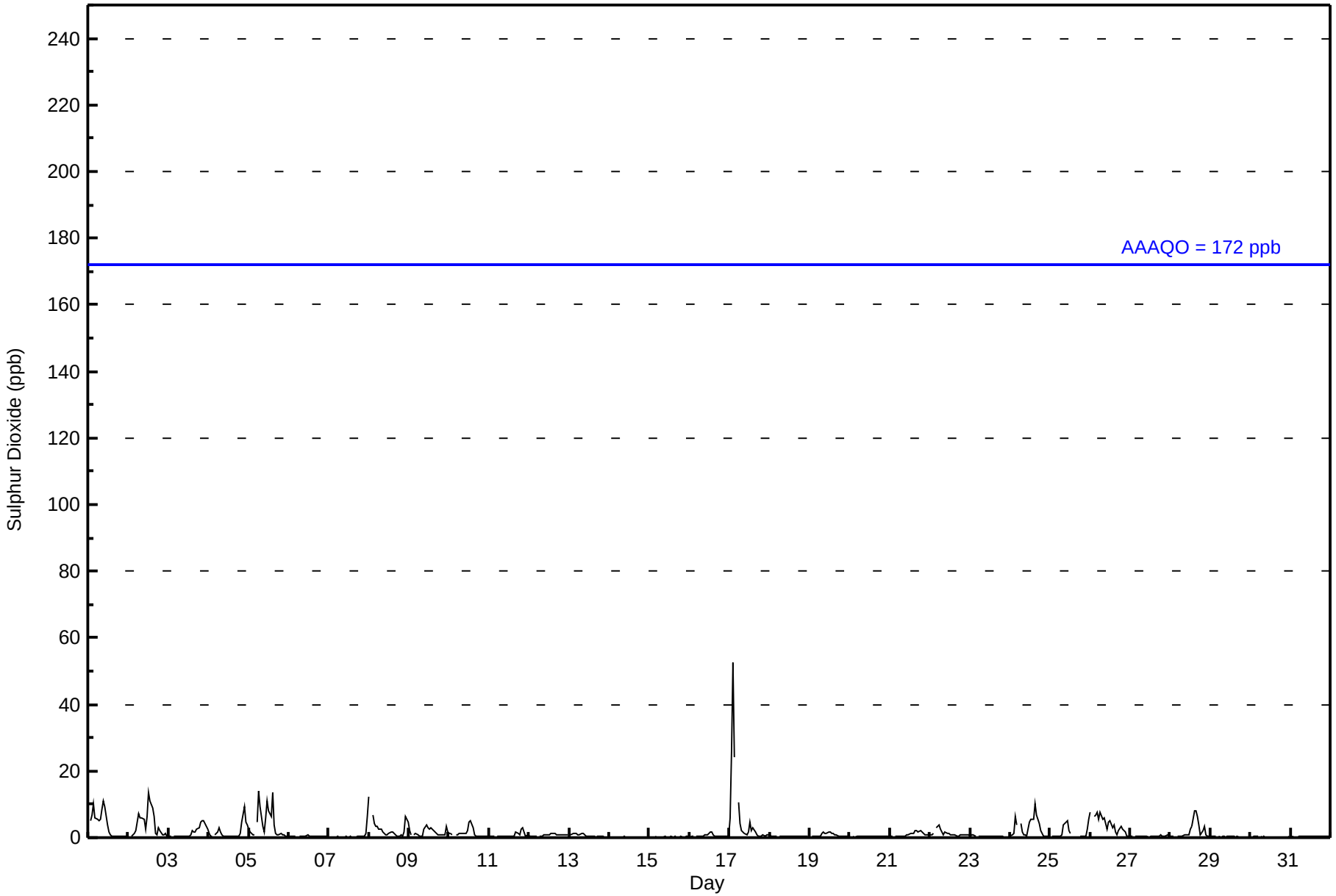
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	698	98.59	98.59
11 - 20	7	0.99	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 (SO_2) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	82	46	24	15	22	31	93	140	78	17	38	16	22	16	13	38	691
11 - 20	0	0	0	0	0	0	2	1	3	0	1	0	0	0	0	0	7
21 - 60	0	0	0	0	0	0	1	2	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	82	46	24	15	22	31	96	143	81	17	39	16	22	16	13	38	701

Total Number of Valid Hours: 701

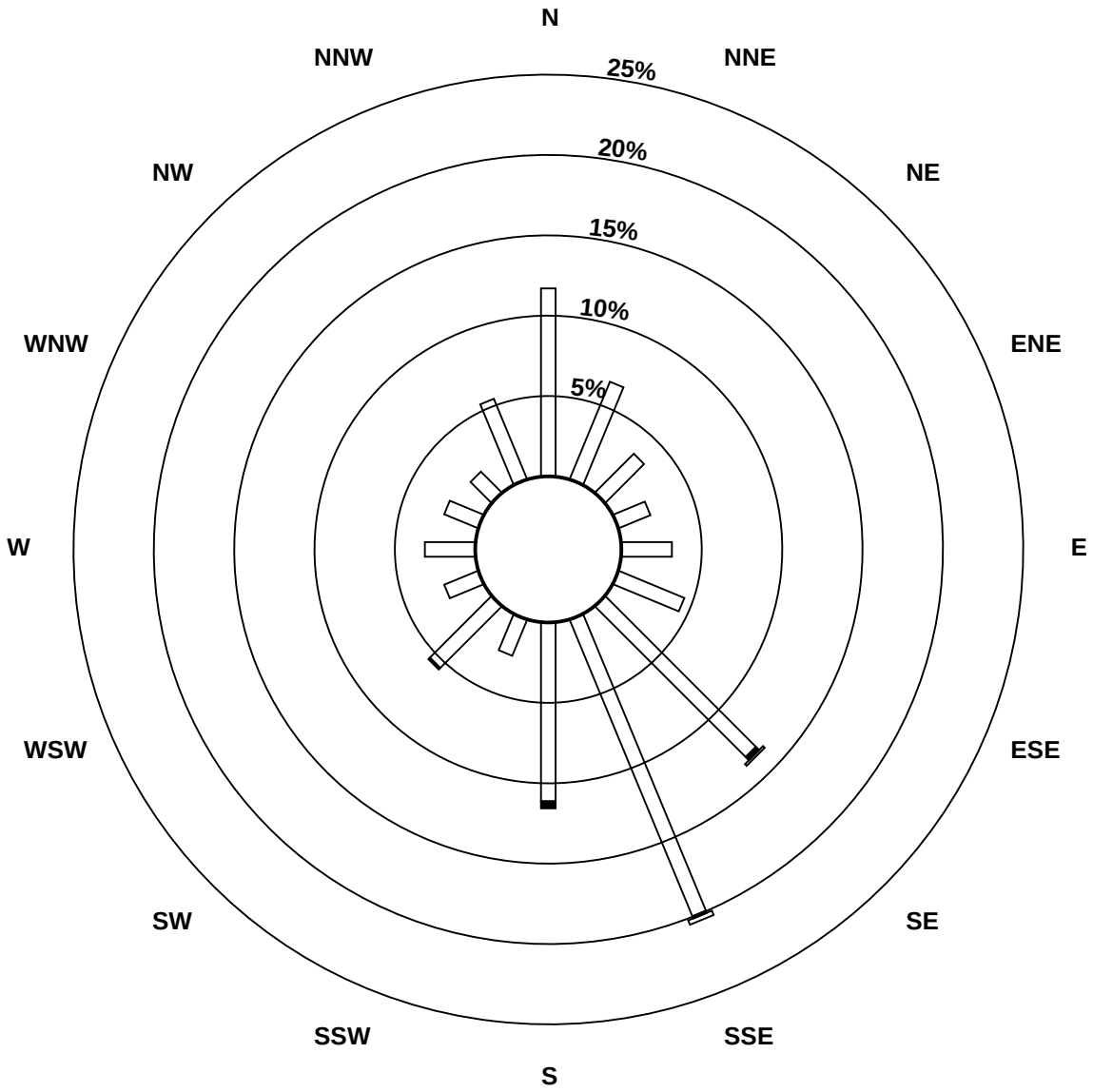
Total Number of Hours: 744

Wood Buffalo Environmental Association

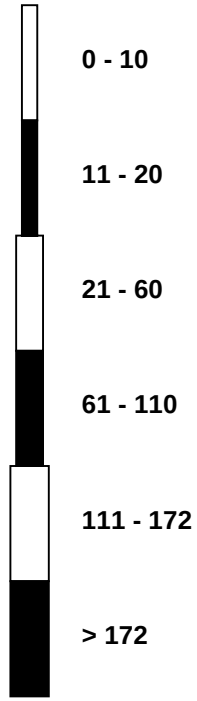
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Wapasu (AMS 17)



Classes (ppb)



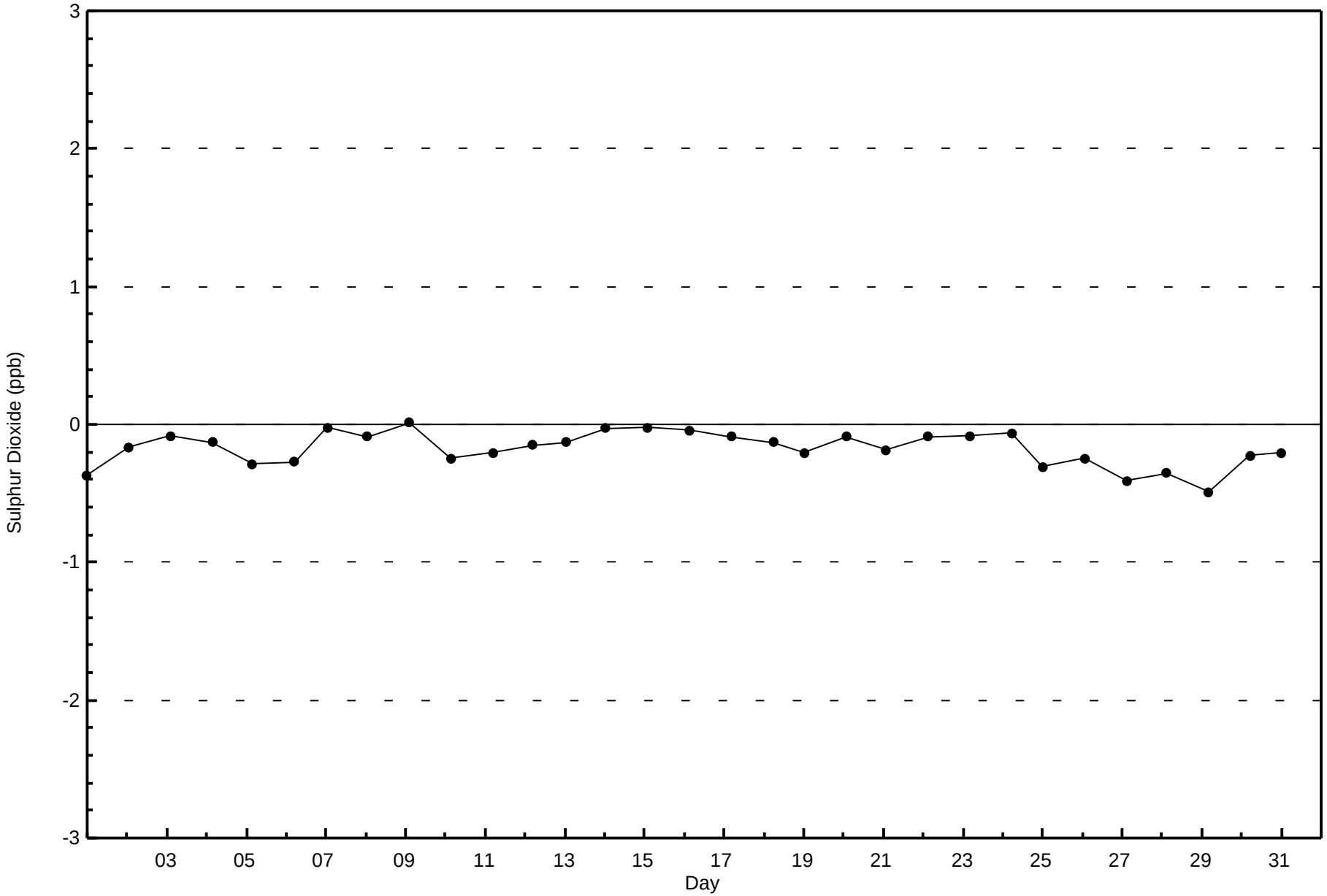
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Wapasu - January 2016

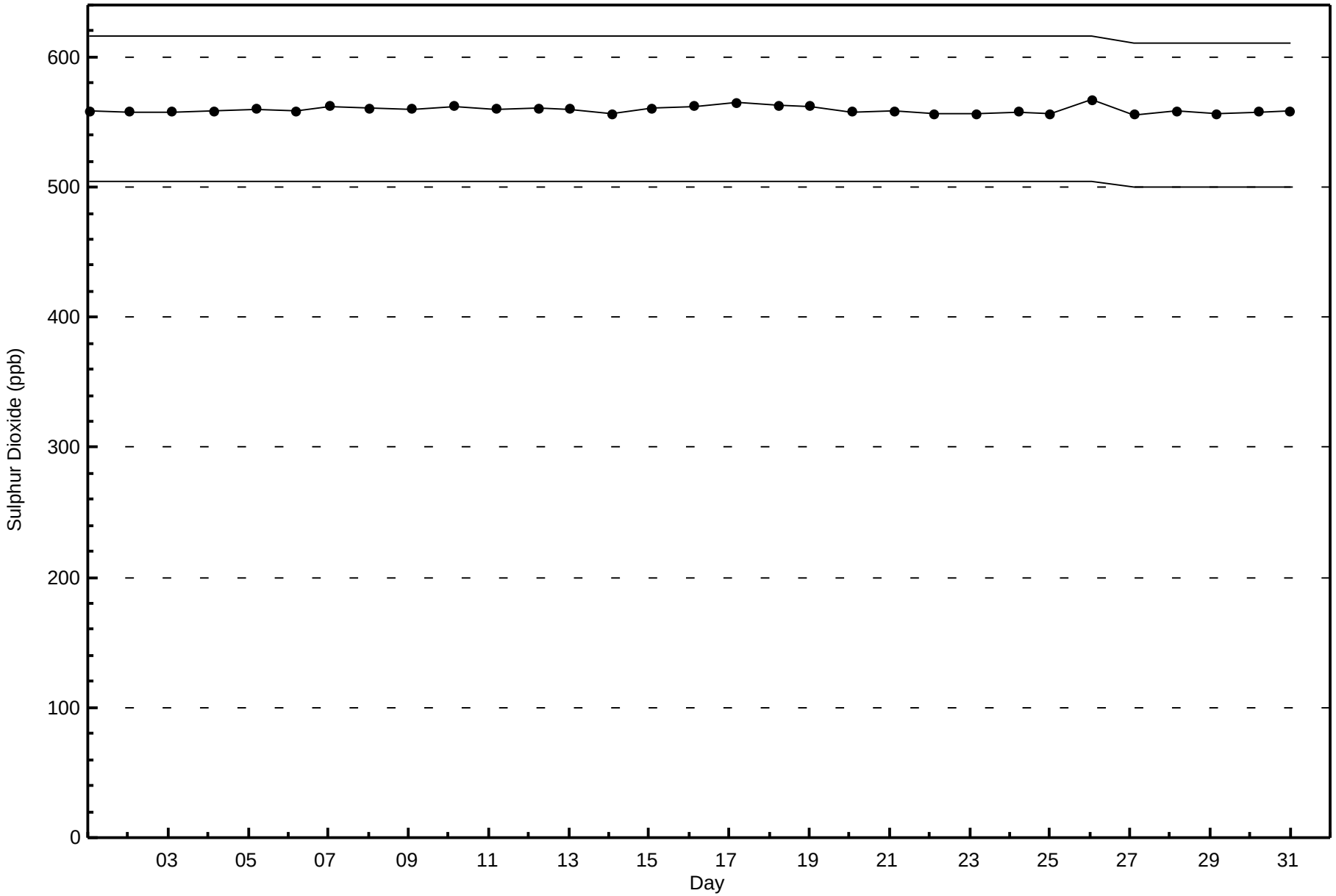


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Wapasu - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Jan 17 03:00 Maximum Daily Average: 0.6 ppb on Jan 5

Minimum Value: 0 ppb on Jan 3 01:00 Minimum Daily Average: 0.2 ppb on Jan 15

Maximum Diurnal Average: 0.4 ppb at hour 4 Minimum Diurnal Average: 0.3 ppb at hour 18

Monthly Average: 0.3 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

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

Z - zerospan C - Calibration

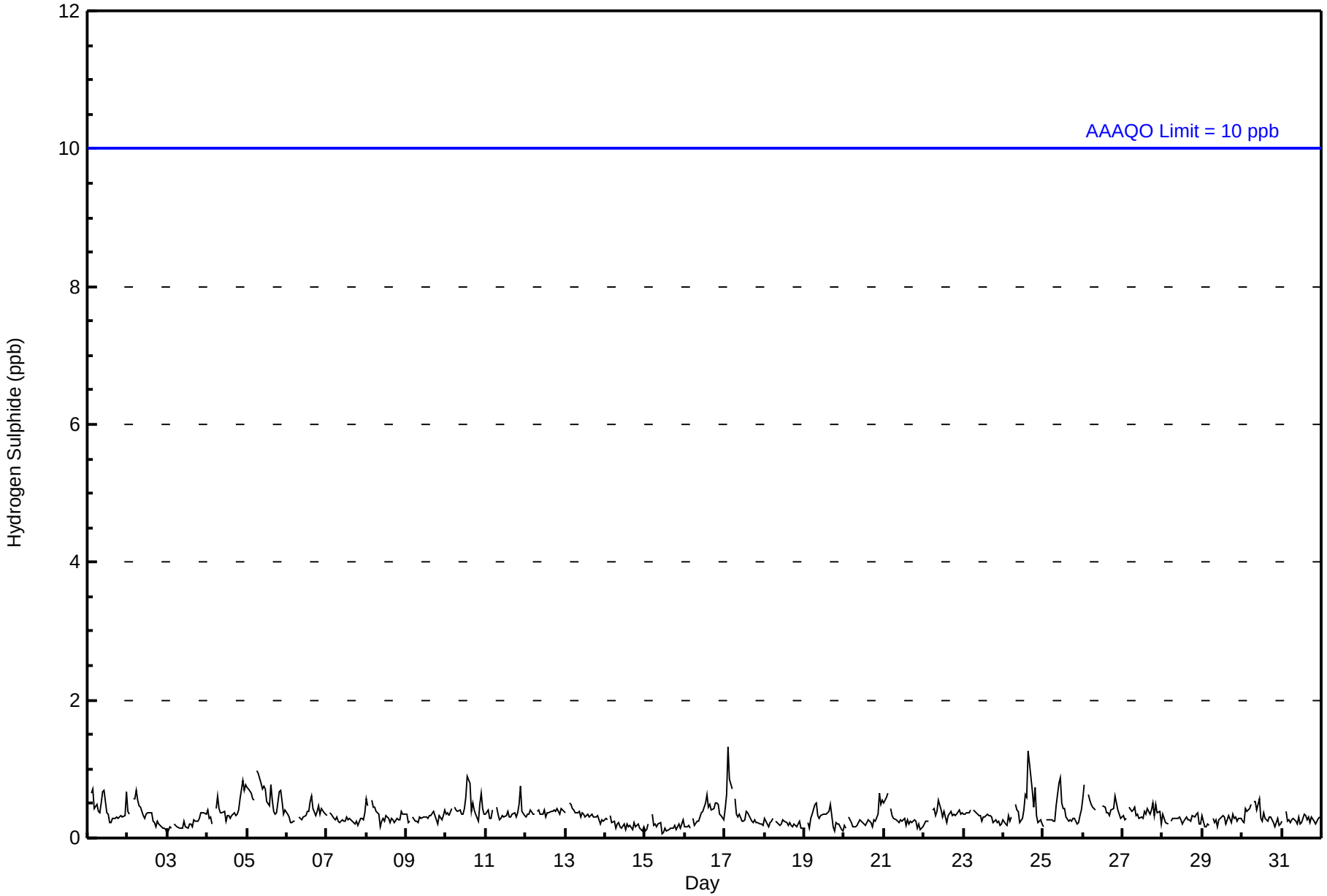
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Wapasu - January 2016



Hydrogen Sulphide (H_2S) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	709	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	82	46	24	15	22	30	93	146	84	16	40	16	21	16	13	38	702
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	82	46	24	15	22	30	93	146	84	16	40	16	21	16	13	38	702

Total Number of Valid Hours: 702

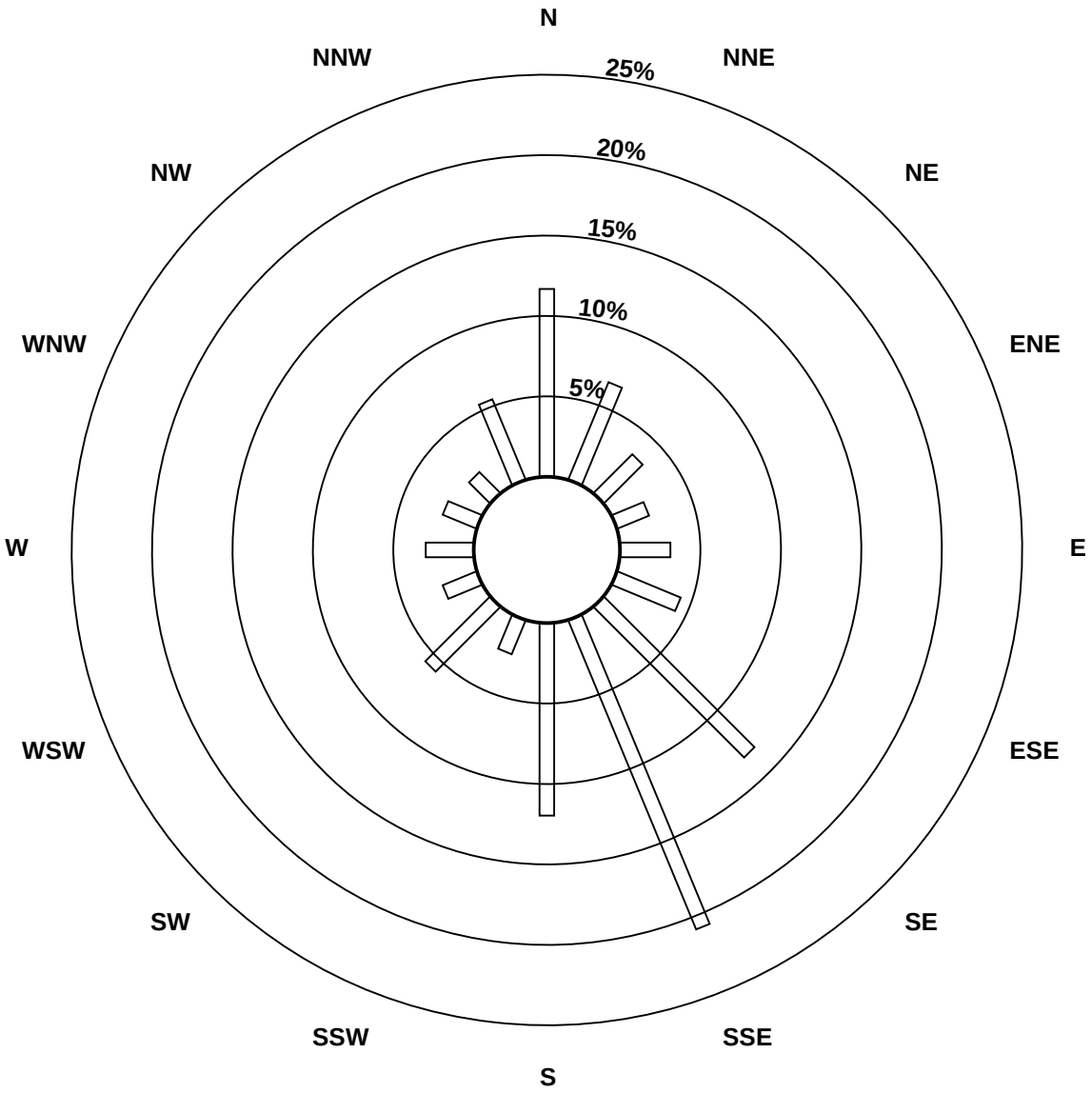
Total Number of Hours: 744

Wood Buffalo Environmental Association

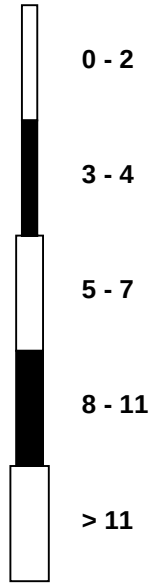
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Wapasu (AMS 17)



Classes (ppb)



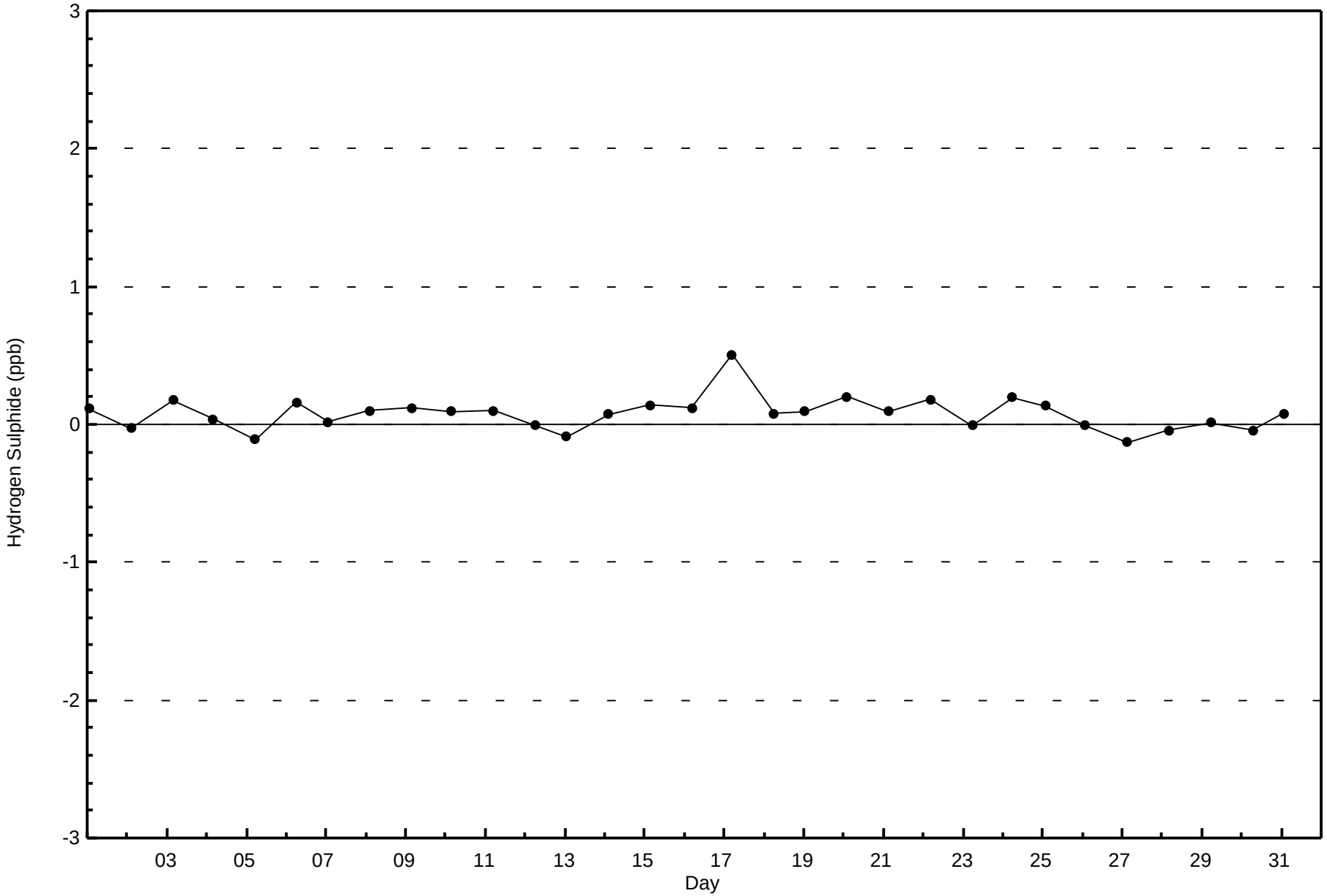
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Wapasu - January 2016

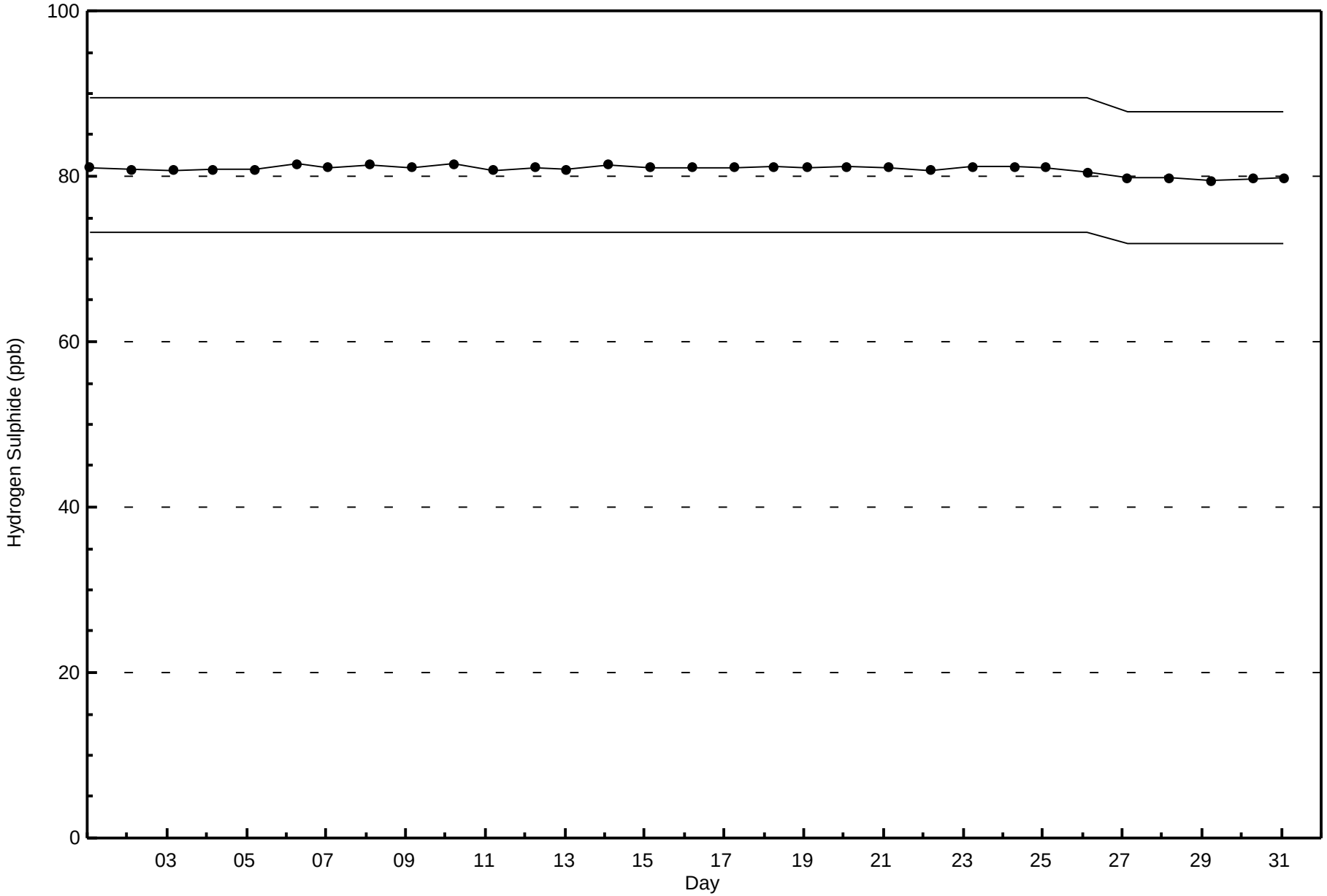


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Wapasu - January 2016

Maximum Value: 3.7 ppm on Jan 2 00:00

Maximum Daily Average: 2.5 ppm on Jan 22

Minimum Value: 2.1 ppm on Jan 1 15:00

Minimum Daily Average: 2.2 ppm on Jan 14

Maximum Diurnal Average: 2.3 ppm at hour 24

Minimum Diurnal Average: 2.2 ppm at hour 12

Monthly Average: 2.26 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.2 Median = 2.2 Q_3 = 2.3 P_{90} = 2.4 P_{99} = 2.6

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	2.2	2.3	2.5	2.2	2.2	2.2	2.2	2.3	2.2	2.5	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.7	2.3	3.7
2-Jan	2.6	Z	2.3	2.3	2.3	2.3	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	2.2	2.2	2.2	2.2	2.6
3-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.2	2.4
4-Jan	2.3	2.3	2.3	Z	2.3	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	2.2	2.3	2.3	2.3	2.3	2.3	2.4
5-Jan	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.4
6-Jan	2.3	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.4	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4
7-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.3
8-Jan	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3
9-Jan	2.2	2.3	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.3
10-Jan	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.5	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.6
11-Jan	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3
12-Jan	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
13-Jan	Z	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
14-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2
15-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
16-Jan	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.5	2.4	2.5	2.5	2.6	2.5	2.5	2.4	2.3	2.3	2.3	2.6
17-Jan	2.3	2.4	2.4	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
18-Jan	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
19-Jan	Z	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4
20-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
21-Jan	2.2	2.2	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.6	2.6	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.4	2.6
22-Jan	2.5	2.5	2.5	Z	2.6	2.6	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.5	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.7
23-Jan	2.4	2.4	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5
24-Jan	2.4	2.5	2.5	2.5	2.5	Z	2.5	2.6	2.6	2.5	2.4	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.5	2.3	2.3	2.3	2.3	2.4	2.6
25-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
26-Jan	2.2	Z	2.3	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	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3
27-Jan	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.6	2.3	2.2	2.2	2.2	2.6
28-Jan	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3
29-Jan	2.3	2.2	2.1	2.3	Z	2.2	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.5	2.3	2.3	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.5
30-Jan	2.2	2.2	2.4	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
31-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	Diurnal Average	
	2.6	2.5	2.5	2.5	2.6	2.6	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.6	2.5	2.6	2.6	2.5	2.6	2.5	2.6	2.5	2.4	3.7	Diurnal Maximum	

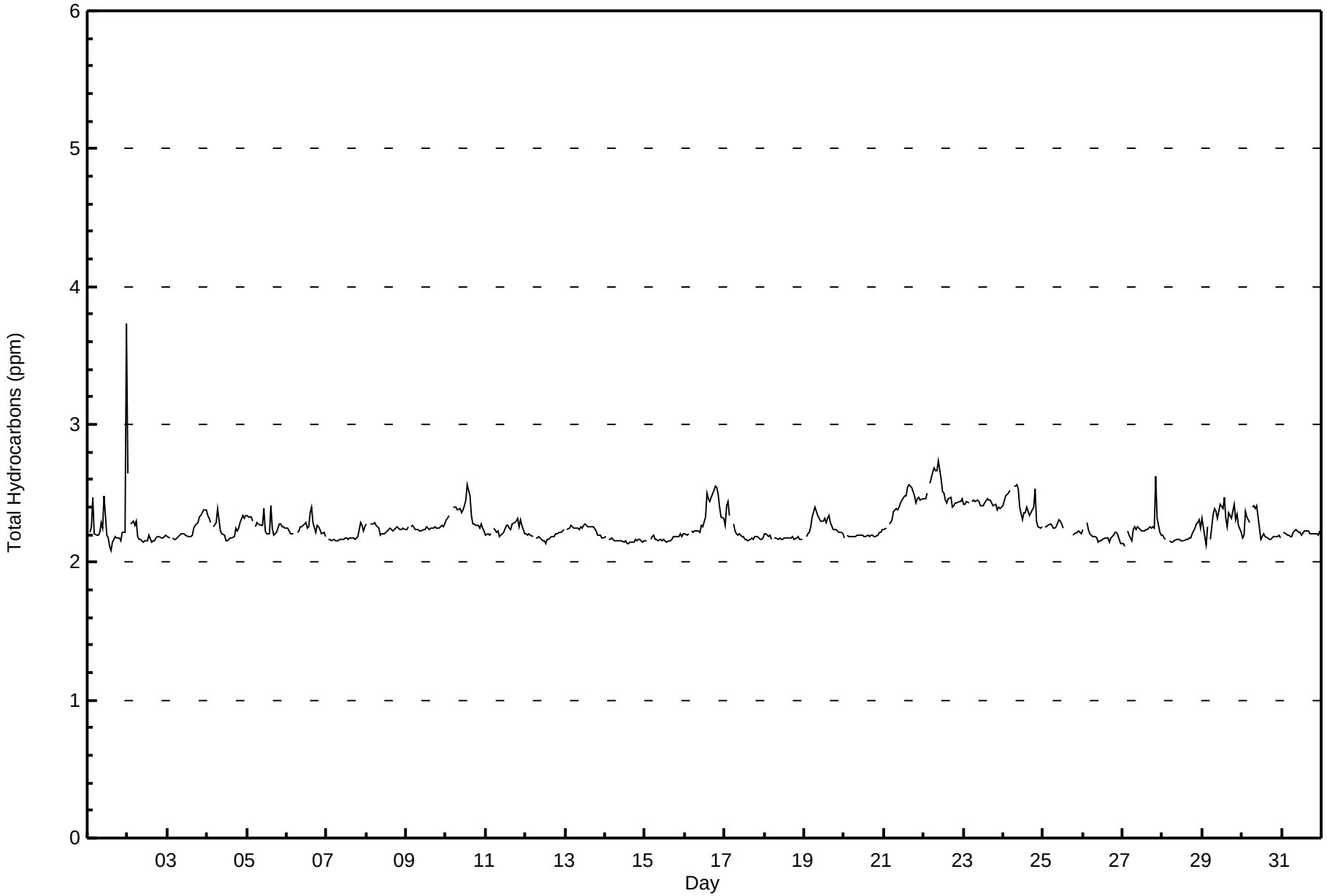
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Wapasu - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Wapasu - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	707	99.86	99.86
3.1 - 10.0	1	0.14	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 - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	82	46	24	15	22	31	96	142	81	17	39	16	22	16	13	38	700
3.1 - 10.0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	46	24	15	22	31	96	143	81	17	39	16	22	16	13	38	701

Total Number of Valid Hours: 701

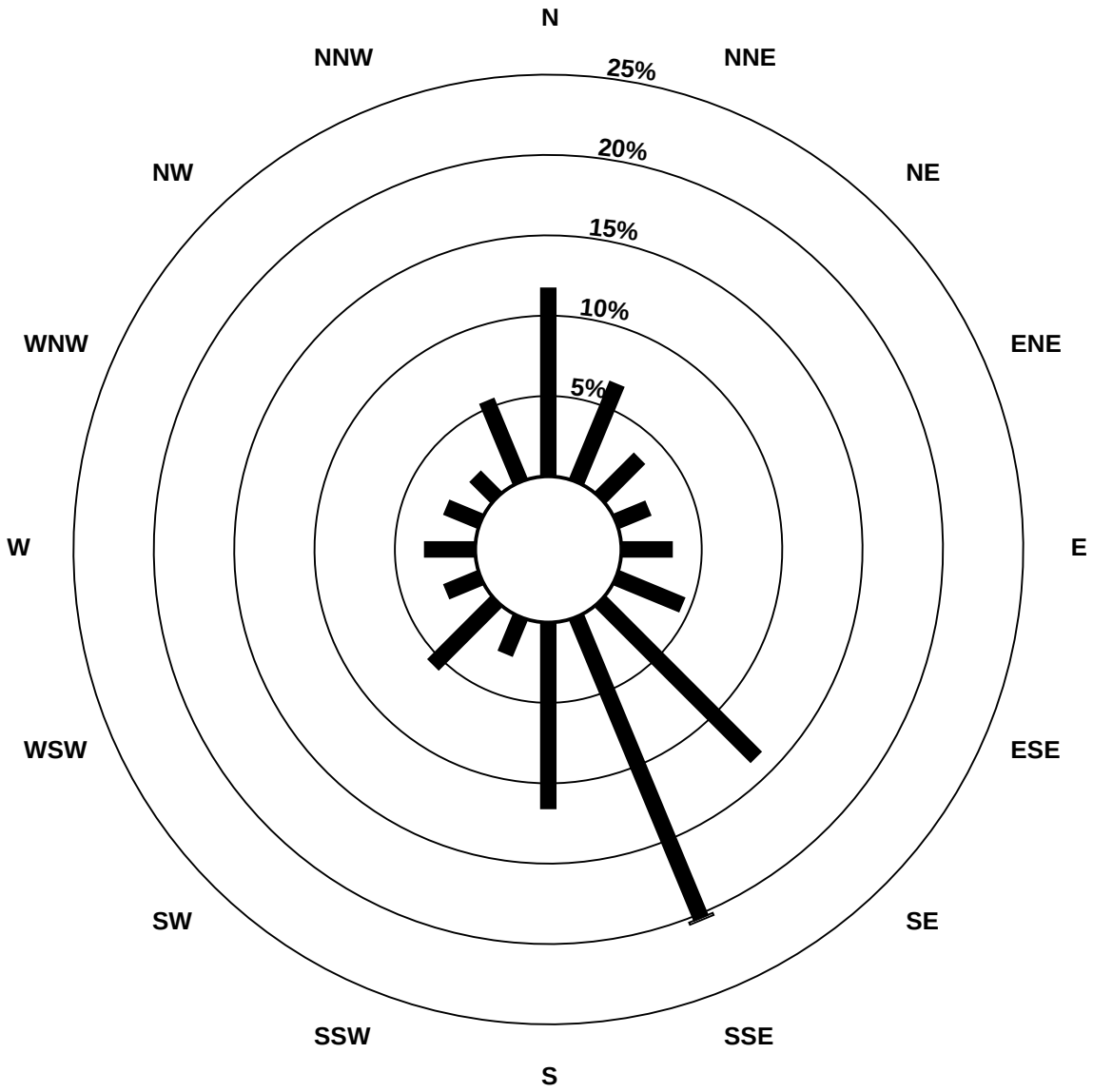
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Wapasu (AMS 17)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

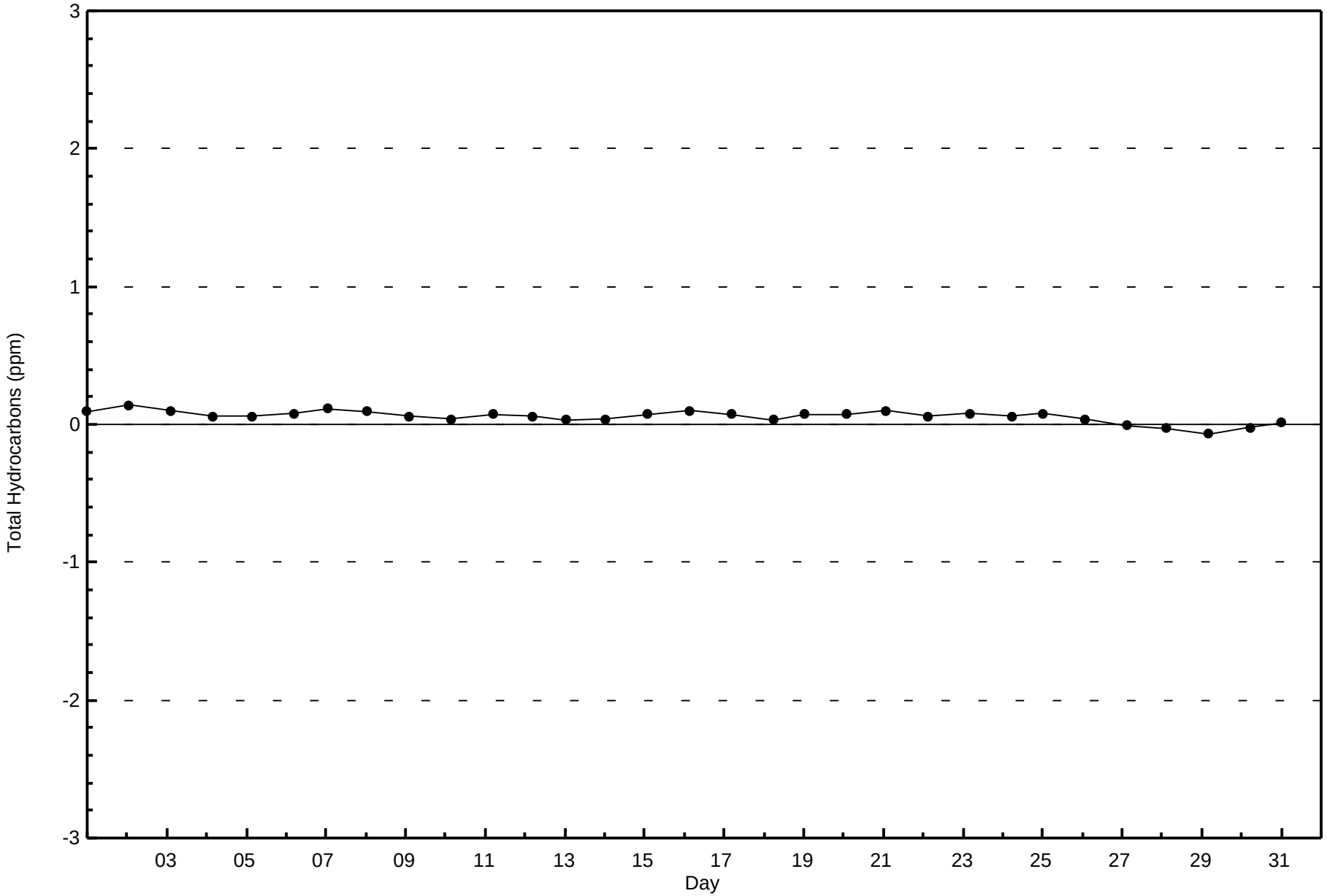
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Wapasu - January 2016

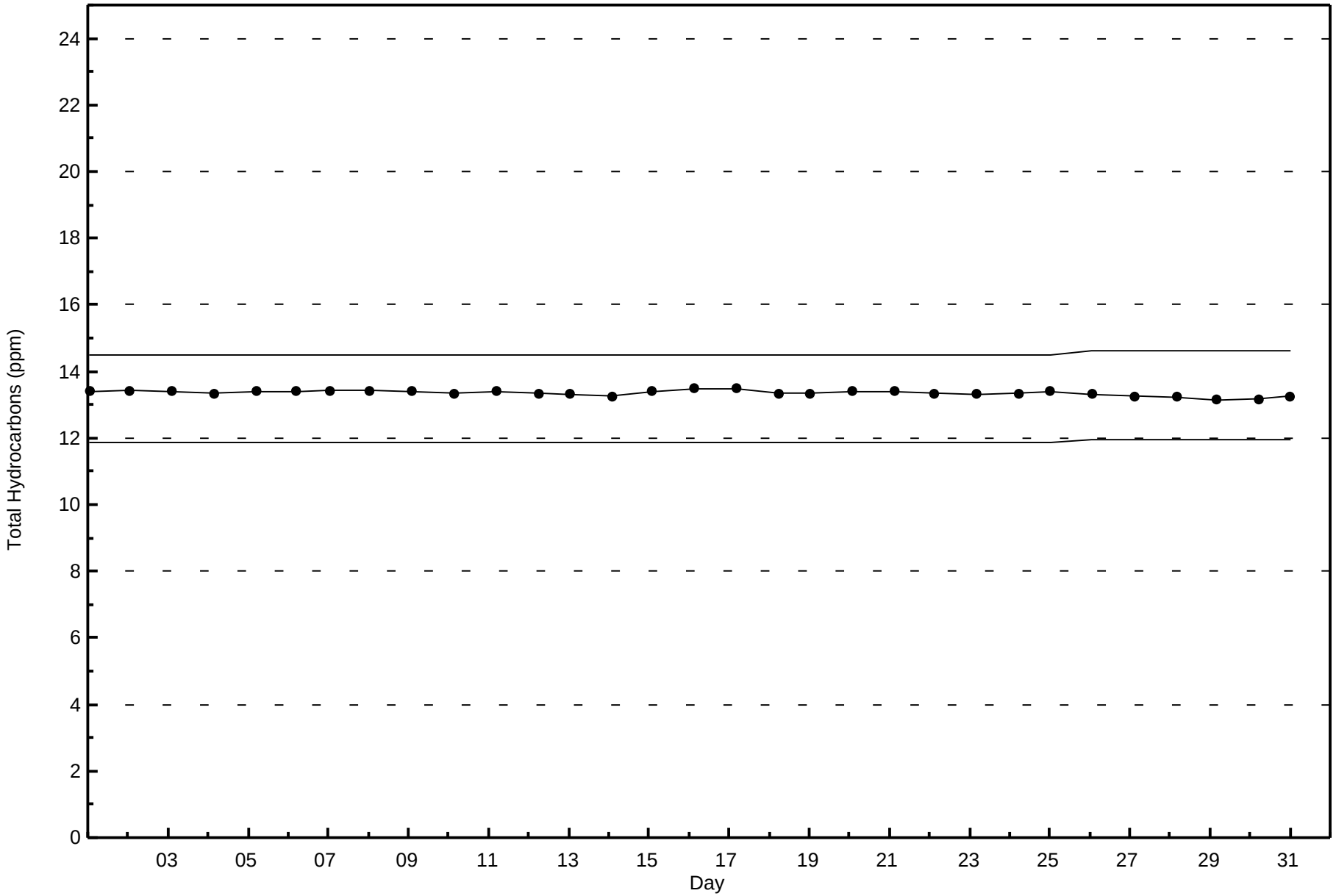


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Wapasu - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 41 ppb on Jan 18 07:00

Maximum Daily Average: 35.7 ppb on Jan 18

Minimum Value: 1 ppb on Jan 16 20:00

Minimum Daily Average: 14.0 ppb on Jan 16

Maximum Diurnal Average: 27.0 ppb at hour 13

Minimum Diurnal Average: 21.0 ppb at hour 6

Monthly Average: 24.1 ppb

Percentiles: $P_1 = 5$ $P_{10} = 14$ $Q_1 = 19$ Median = 24 $Q_3 = 30$ $P_{90} = 35$ $P_{99} = 39$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	21	22	22	Z	24	25	27	26	22	24	23	33	36	38	39	36	35	35	35	33	34	31	31	26	29.5	39
2-Jan	24	21	21	19	Z	15	17	21	22	25	29	28	26	24	25	27	29	30	27	31	32	32	33	33	25.8	33
3-Jan	32	34	35	36	37	Z	36	34	34	35	36	37	37	38	35	34	31	29	27	22	20	22	17	14	30.9	38
4-Jan	13	17	18	20	18	19	Z	25	31	32	33	36	37	38	37	36	30	22	21	18	10	7	11	12	23.5	38
5-Jan	14	14	13	14	16	15	11	Z	10	11	14	17	22	24	12	13	13	13	18	23	22	18	15	16	15.6	24
6-Jan	14	17	17	17	19	18	17	15	Z	16	17	17	21	21	10	5	16	24	19	18	24	27	27	31	18.5	31
7-Jan	32	35	35	Z	36	37	36	38	39	38	38	37	37	36	35	35	35	34	36	33	27	29	30	24	34.4	39
8-Jan	19	20	21	20	Z	18	17	24	30	27	30	31	28	27	29	27	29	23	19	23	27	28	26	27	24.8	31
9-Jan	27	27	26	26	24	Z	27	27	26	26	26	26	26	24	24	22	21	25	25	26	24	22	18	18	24.5	27
10-Jan	15	18	17	14	13	13	Z	15	14	14	12	10	9	7	10	20	20	24	22	23	24	20	22	25	16.6	25
11-Jan	27	27	29	29	27	23	29	Z	33	33	34	32	28	28	29	29	27	24	23	21	21	17	18	25	26.7	34
12-Jan	26	25	28	24	26	29	29	29	Z	29	30	30	31	30	27	24	24	24	23	21	22	22	21	23	26.0	31
13-Jan	22	20	19	Z	19	21	20	22	23	23	24	25	25	25	25	25	25	23	24	26	27	28	28	28	23.8	28
14-Jan	27	30	31	30	Z	32	33	34	36	37	37	37	37	36	36	35	35	35	34	34	34	34	33	33	33.9	37
15-Jan	32	31	30	30	26	Z	26	27	28	28	33	35	34	32	31	31	29	25	21	20	20	24	26	24	27.9	35
16-Jan	22	19	17	18	17	16	Z	15	13	15	17	26	23	18	18	15	8	4	1	1	5	9	12	12	14.0	26
17-Jan	13	6	2	3	4	12	22	Z	27	27	32	36	37	38	35	33	36	36	36	34	35	35	36	36	26.6	38
18-Jan	36	37	38	39	40	41	41	40	Z	38	37	36	36	36	35	35	34	34	32	32	31	32	31	32	35.7	41
19-Jan	31	29	28	Z	21	20	19	17	21	22	22	22	21	22	21	17	21	26	27	27	28	29	30	33	24.1	33
20-Jan	33	32	32	31	Z	30	30	30	29	28	28	30	30	29	28	30	28	29	27	28	28	26	25	24	28.9	33
21-Jan	23	23	22	21	20	Z	17	18	19	19	20	20	19	19	19	19	19	21	24	28	28	28	28	27	21.8	28
22-Jan	27	26	18	18	11	7	Z	6	6	9	12	13	14	17	18	15	15	19	19	18	18	18	17	17	15.5	27
23-Jan	17	16	16	16	15	14	14	Z	15	20	22	22	21	12	12	11	9	20	20	20	21	22	19	18	17.1	22
24-Jan	16	11	12	8	6	5	5	6	Z	13	20	22	18	18	17	13	10	11	12	7	19	23	25	25	14.0	25
25-Jan	25	24	24	Z	23	22	24	23	19	14	16	22	25	27	27	28	C	C	C	C	27	26	24	21	23.2	28
26-Jan	17	16	16	16	Z	19	19	21	20	22	26	24	23	24	22	22	20	16	19	21	24	26	29	29	21.3	29
27-Jan	30	31	33	31	29	Z	27	23	24	24	26	26	25	25	25	25	24	22	21	21	13	12	23	25	24.6	33
28-Jan	27	29	28	29	30	30	Z	29	28	27	28	30	29	26	20	17	21	21	22	21	18	19	19	22	24.8	30
29-Jan	25	27	27	23	25	25	20	Z	18	23	23	23	25	26	30	32	24	22	22	18	21	15	14	16	22.8	32
30-Jan	14	16	15	13	12	11	8	6	Z	9	21	25	25	25	27	28	29	28	30	31	29	31	30	30	21.5	31
31-Jan	30	29	28	Z	29	29	29	29	26	29	30	31	32	30	30	30	31	32	31	32	32	32	30	24	29.8	32
	23.6	23.5	23.2	21.8	21.9	21.0	23.1	23.0	23.6	23.8	25.6	27.0	27.0	26.5	25.5	24.9	24.3	24.4	23.9	23.8	24.0	24.0	24.1	24.1	Diurnal Average	
	36	37	38	39	40	41	41	40	39	38	38	37	37	38	39	36	36	36	36	34	35	35	36	36	Diurnal Maximum	

Z - zerospan C - Calibration

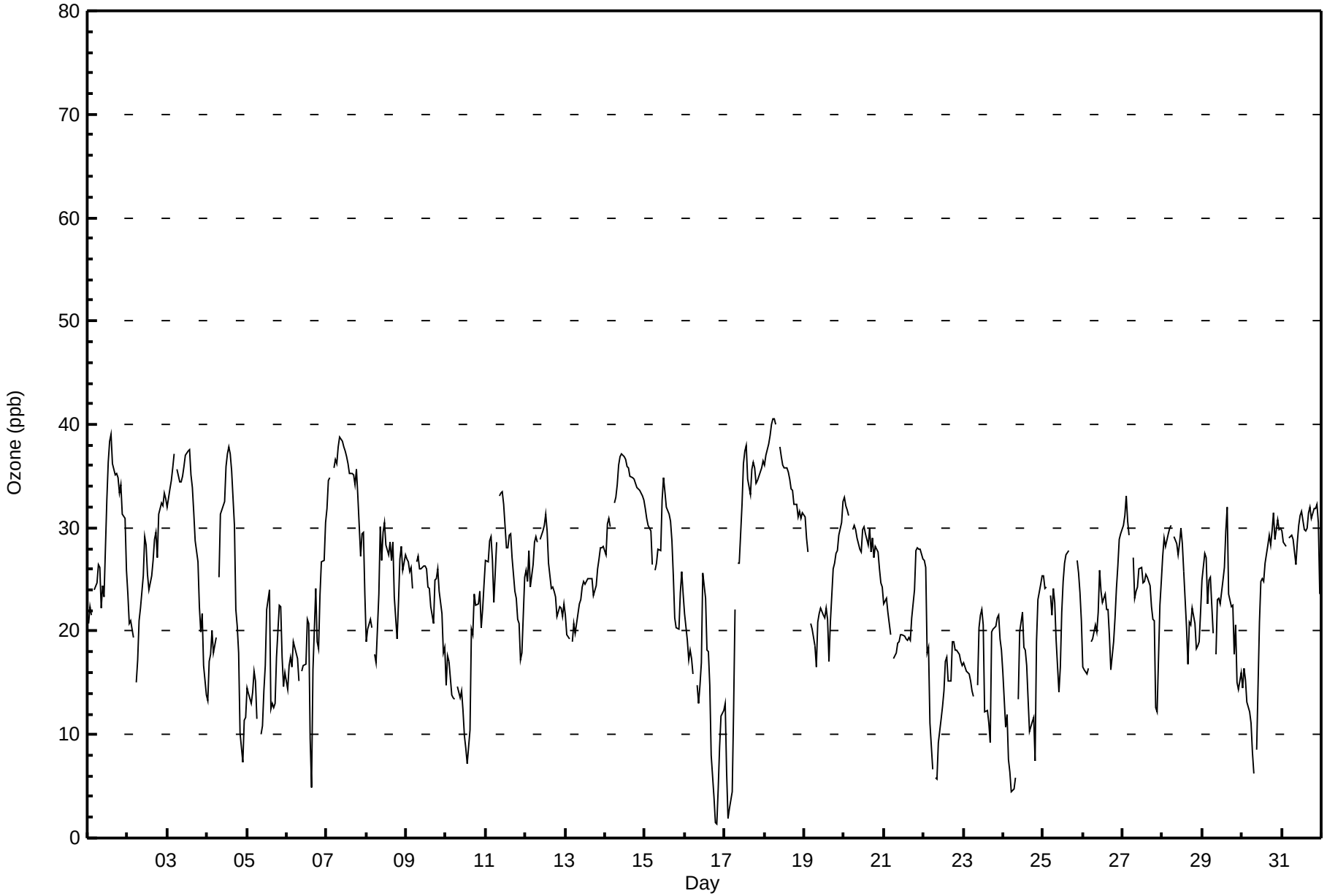
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Wapasu - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	220	31.03	31.03
21 - 50	489	68.97	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	7	13	10	5	12	18	41	39	22	10	12	5	6	5	2	11	218
21 - 50	78	31	13	9	11	12	52	104	66	6	27	12	15	11	10	28	485
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	44	23	14	23	30	93	143	88	16	39	17	21	16	12	39	703

Total Number of Valid Hours: 703

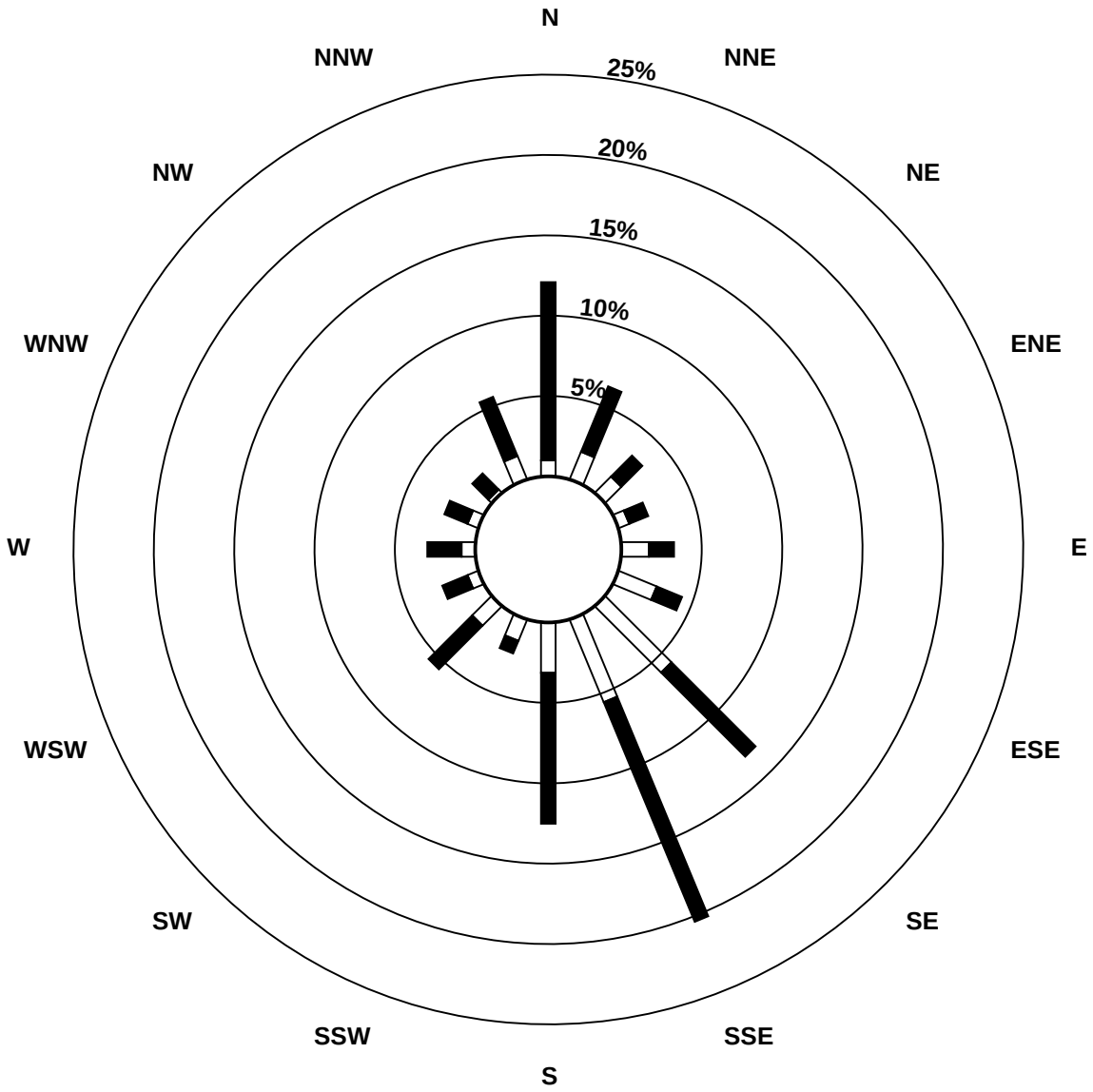
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Ozone (O_3) - ppb

Wapasu (AMS 17)



Classes (ppb)

0 - 20

21 - 50

51 - 82

> 83

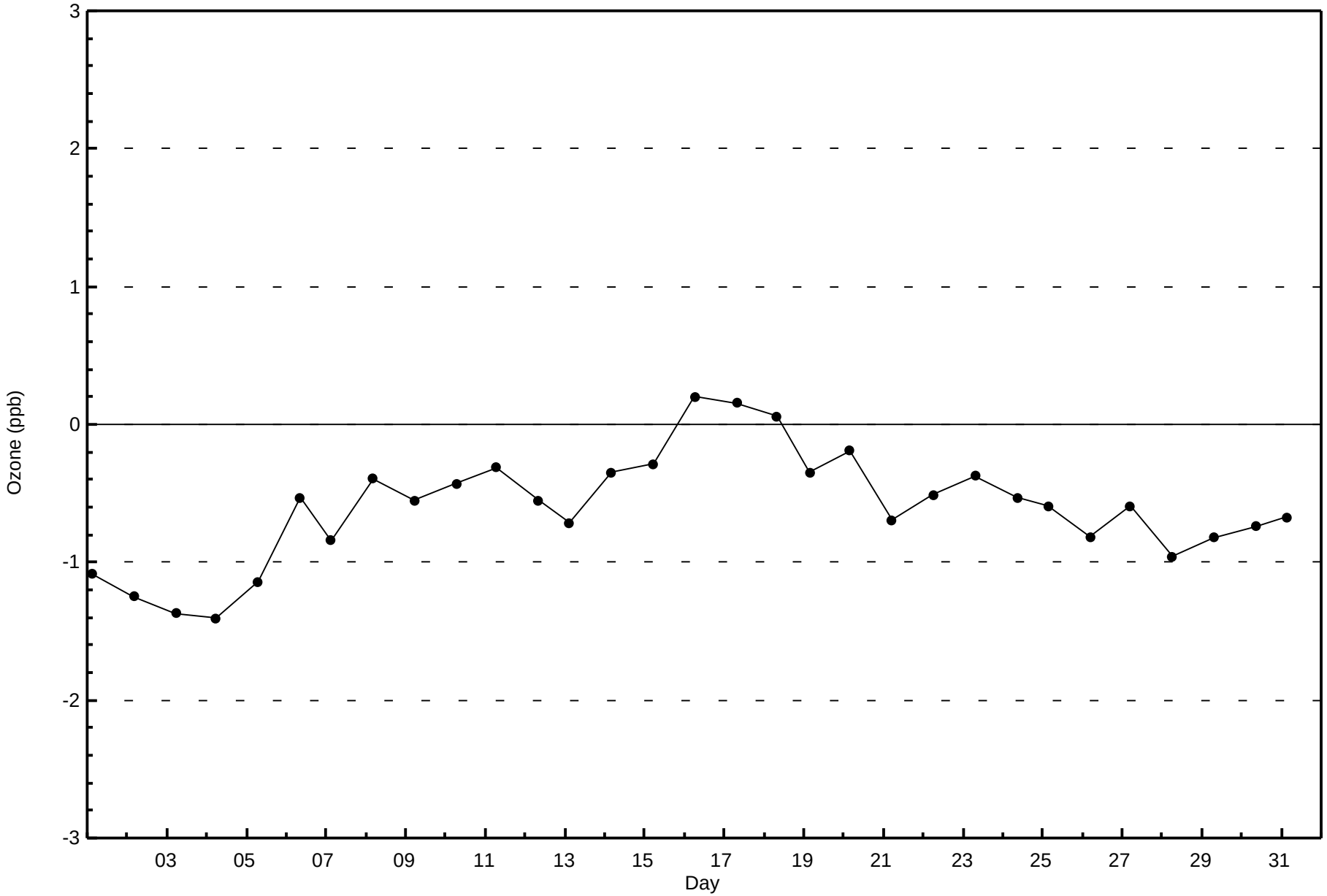
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Wapasu - January 2016

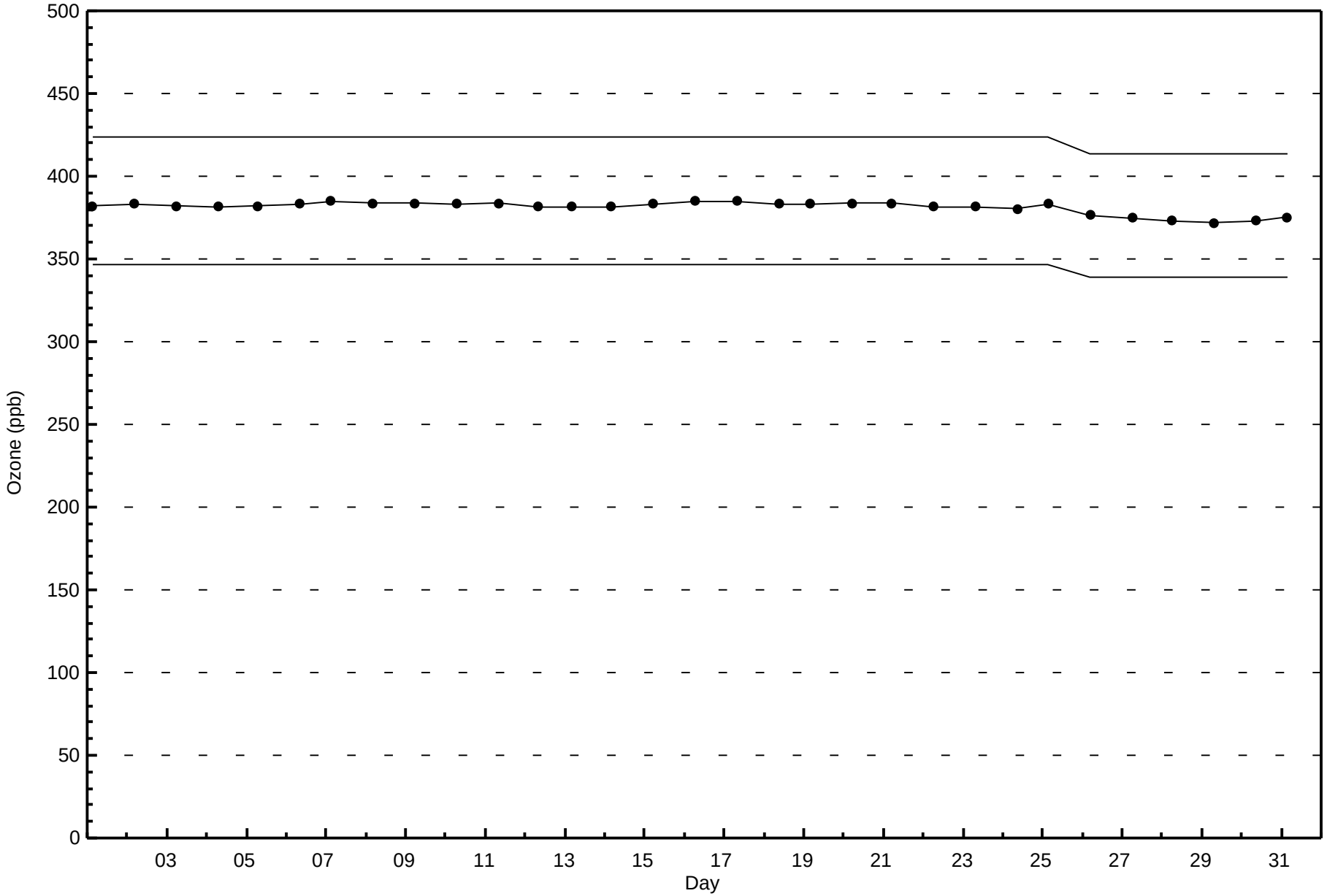


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Wapasu - January 2016

Maximum Value: 26 ppb on Jan 17 03:00

Maximum Daily Average: 1.9 ppb on Jan 10

Minimum Value: 0 ppb on Jan 1 02:00

Minimum Daily Average: 0.1 ppb on Jan 15

Maximum Diurnal Average: 2.0 ppb at hour 15

Minimum Diurnal Average: 0.2 ppb at hour 1

Monthly Average: 0.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 9$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	2	0	0	0	0	0	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	3
2-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	3	3	2	1	0	0	0	0	0	0	0	0	0.7	3
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
4-Jan	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
5-Jan	0	0	0	0	Z	0	0	0	0	1	3	5	3	2	8	3	0	0	0	1	0	0	0	0	1.3	8
6-Jan	1	0	0	0	0	Z	0	0	0	1	2	3	2	3	9	11	1	0	0	0	0	0	0	0	1.6	11
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0.5	2
9-Jan	0	0	Z	0	0	0	0	0	0	1	1	2	2	3	2	1	0	0	0	0	0	0	0	0	0.6	3
10-Jan	0	0	0	Z	0	0	0	0	0	1	2	4	7	16	11	1	0	0	0	0	0	0	0	0	1.9	16
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Jan	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Jan	0	0	0	Z	0	0	0	0	0	1	3	2	5	9	7	4	2	1	1	1	0	0	0	0	1.6	9
17-Jan	0	3	26	9	Z	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1.8	26
18-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0.5	2
20-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0.3	1
21-Jan	0	0	Z	0	0	1	0	0	1	1	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0.7	2
22-Jan	0	0	1	Z	1	2	1	1	1	2	3	2	2	1	1	1	1	0	1	0	1	0	1	0	1.0	3
23-Jan	0	1	1	1	Z	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
24-Jan	0	1	0	0	0	Z	2	1	0	1	1	1	3	4	5	5	2	1	0	2	0	0	0	0	1.2	5
25-Jan	Z	0	0	0	0	0	0	0	0	2	4	2	C	C	C	C	C	C	0	0	0	0	0	0	--	4
26-Jan	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0.3	1
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Jan	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0.4	1
29-Jan	0	0	0	0	Z	0	1	0	0	1	3	5	4	4	2	1	1	0	0	0	0	0	0	0	1.1	5
30-Jan	0	0	1	1	0	Z	0	0	1	2	2	1	1	1	1	1	0	0	0	0	0	0	1	0	0.6	2
31-Jan	Z	0	0	1	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
	0.2	0.4	1.2	0.7	0.2	0.3	0.3	0.2	0.3	0.6	1.1	1.2	1.5	1.9	2.0	1.2	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	Diurnal Average	
	1	3	26	9	1	2	2	1	1	2	4	5	7	16	11	11	2	1	1	2	1	1	1	1	Diurnal Maximum	

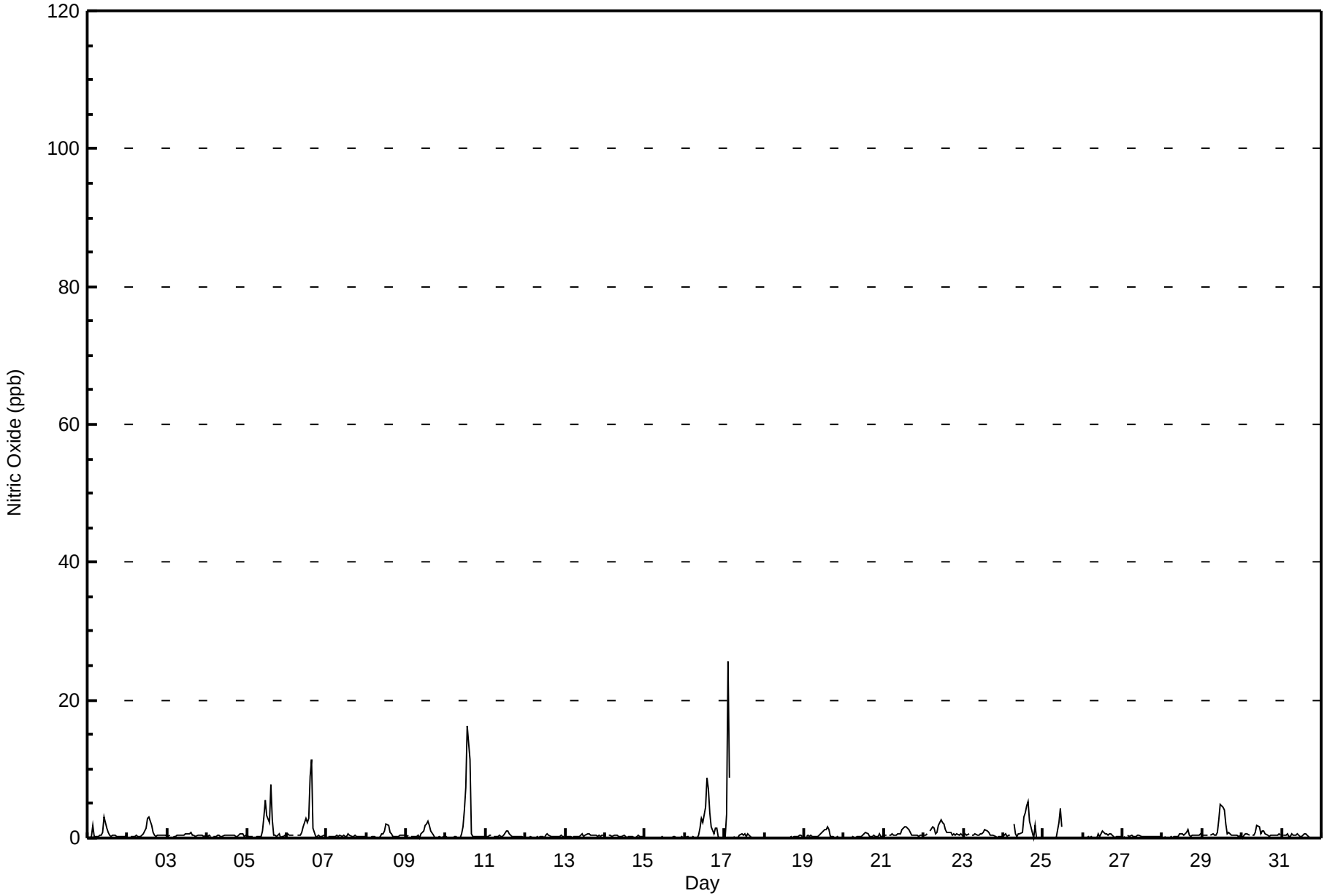
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Wapasu - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.86	99.86
21 - 40	1	0.14	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

Nitric Oxide (NO) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	82	46	24	15	22	31	96	142	80	17	39	16	22	16	13	38	699
21 - 40	0	0	0	0	0	0	0	1	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	82	46	24	15	22	31	96	143	80	17	39	16	22	16	13	38	700

Total Number of Valid Hours: 700

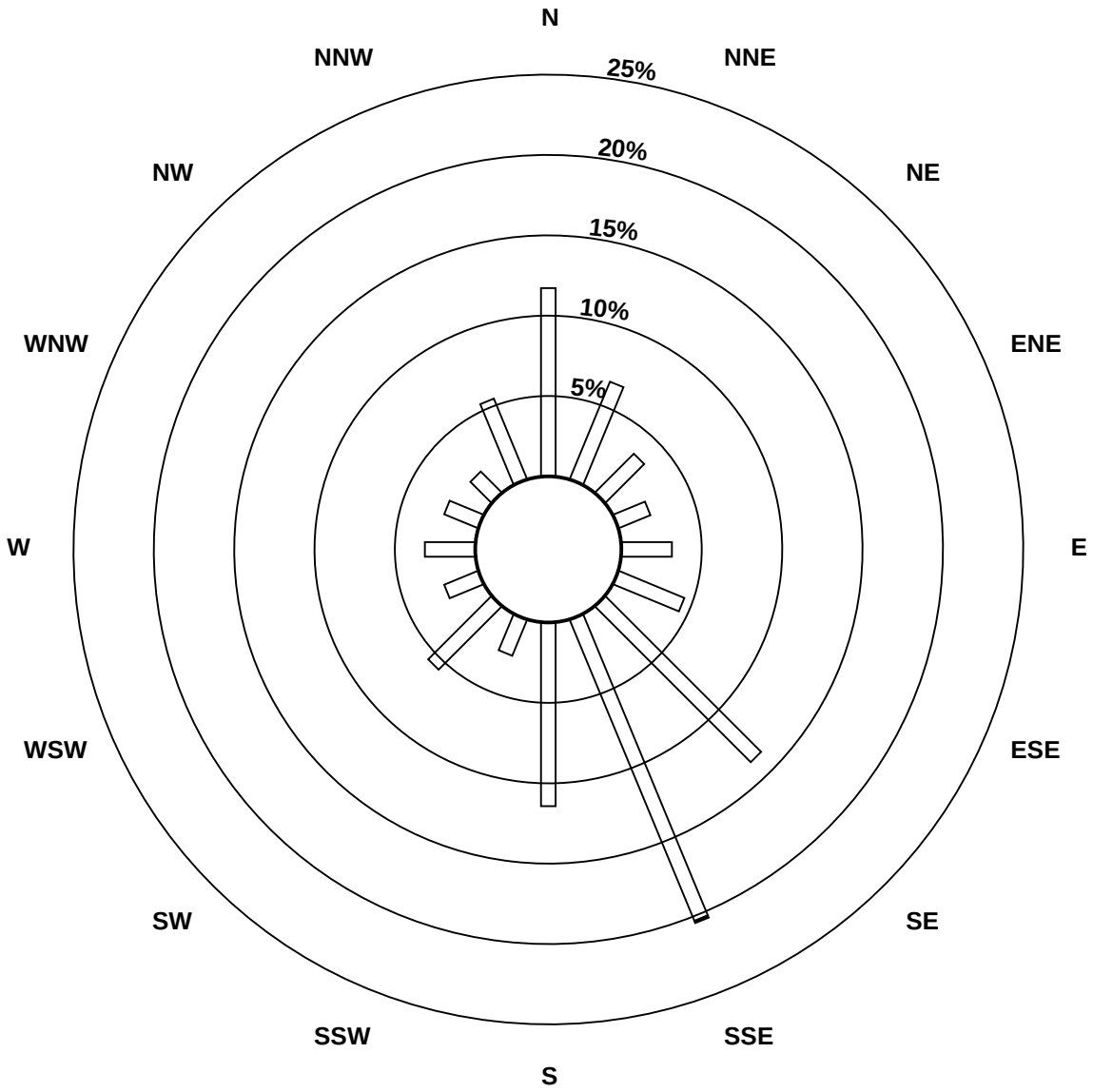
Total Number of Hours: 744

Wood Buffalo Environmental Association

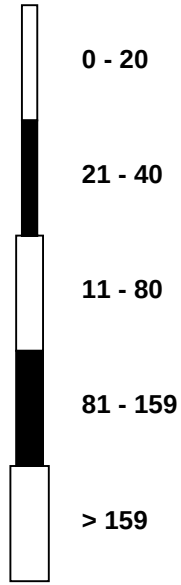
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Wapasu (AMS 17)



Classes (ppb)



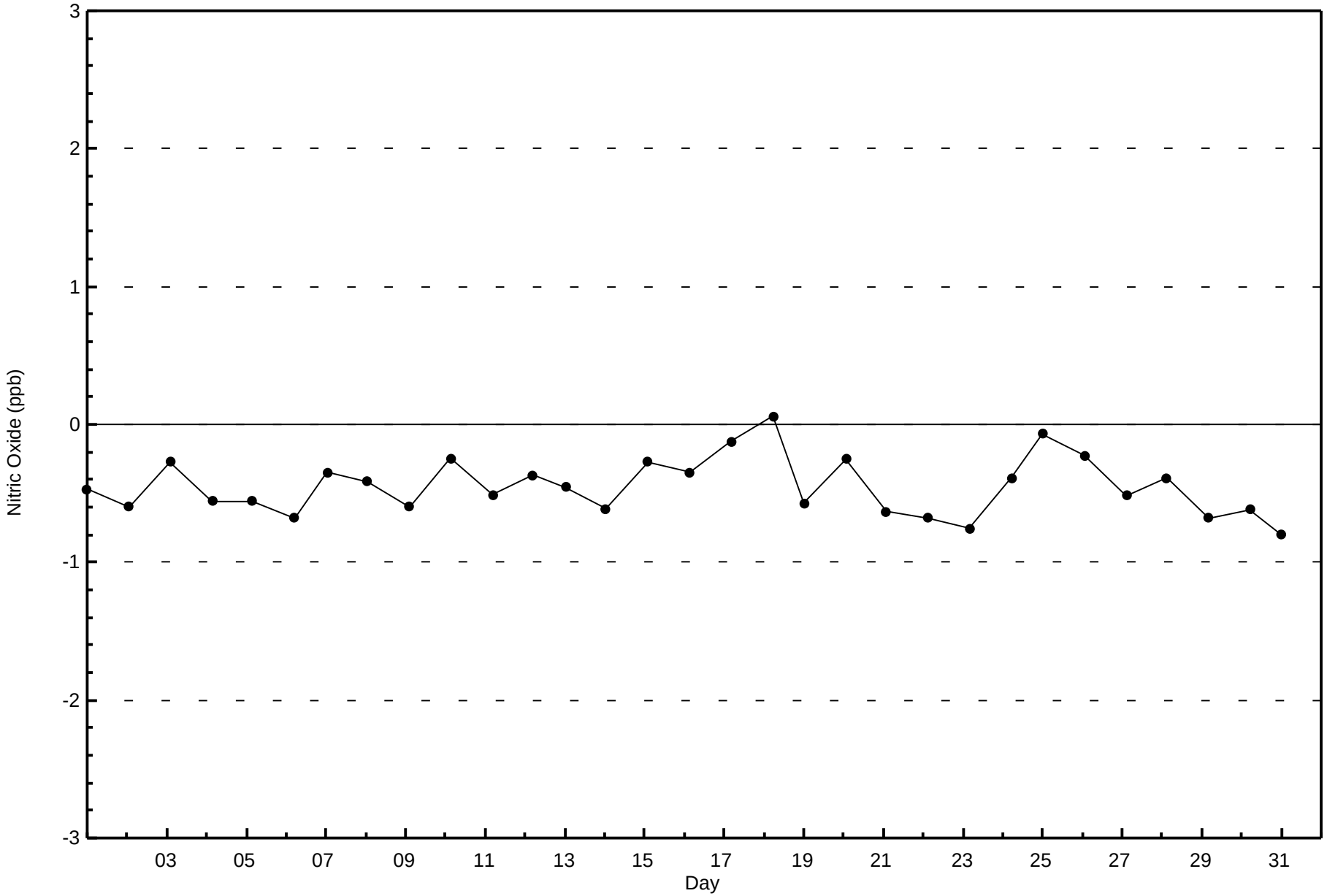
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Wapasu - January 2016

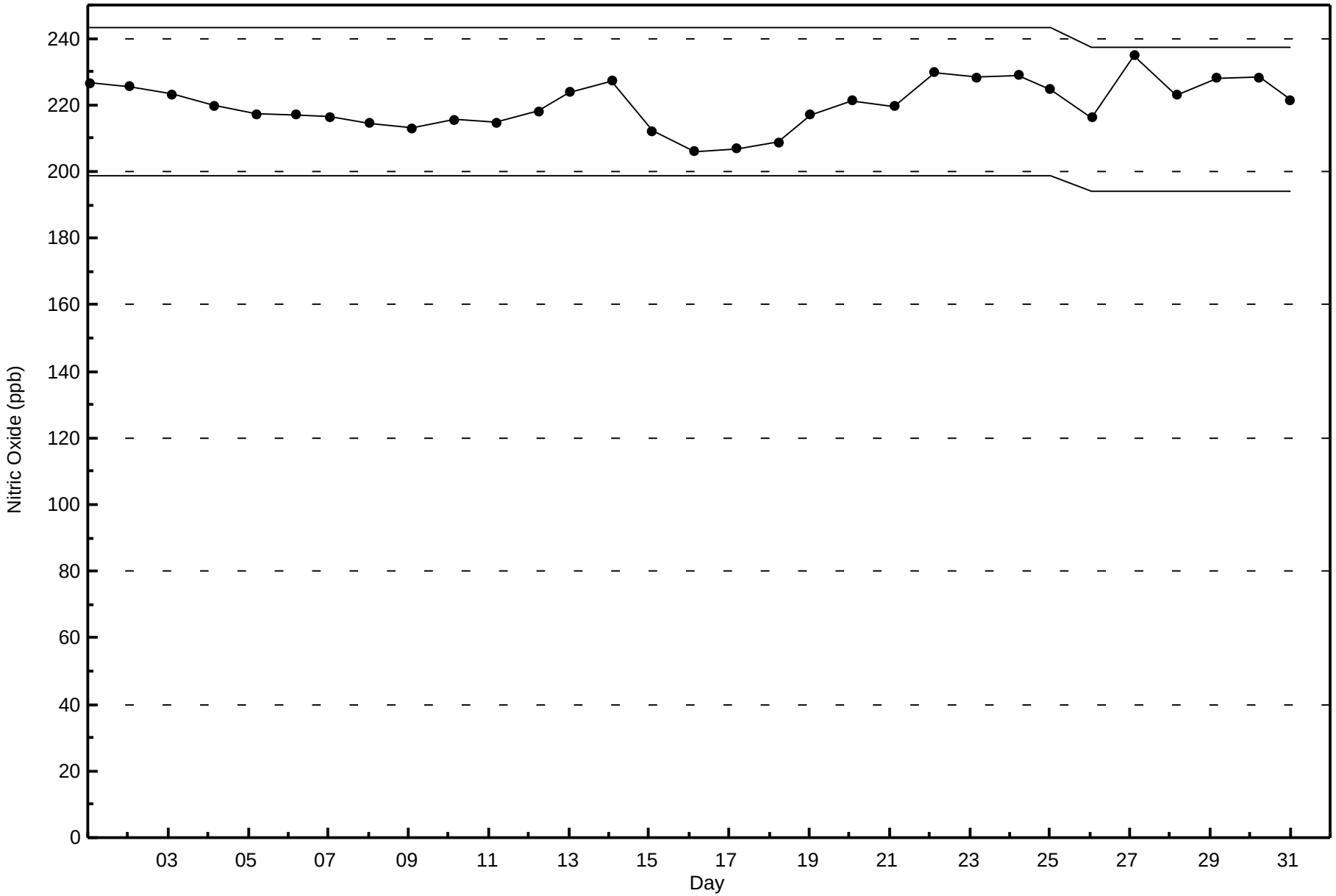


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Wapasu - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 30 ppb on Jan 17 03:00

Maximum Daily Average: 9.9 ppb on Jan 5

Minimum Value: 0 ppb on Jan 7 03:00

Minimum Daily Average: 0.6 ppb on Jan 14

Maximum Diurnal Average: 5.8 ppb at hour 7

Minimum Diurnal Average: 3.8 ppb at hour 24

Monthly Average: 4.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 3 $Q_3 = 7$ $P_{90} = 11$ $P_{99} = 22$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	9	11	22	10	10	9	9	14	14	16	7	4	2	1	3	4	4	3	3	3	4	4	4	7.4	22
2-Jan	6	Z	8	10	12	16	16	11	10	7	5	5	9	11	10	8	5	4	7	3	3	4	3	3	7.6	16
3-Jan	4	3	Z	2	1	1	2	2	2	2	2	2	2	3	5	4	5	8	9	12	14	11	12	11	5.1	14
4-Jan	9	6	4	Z	3	5	10	8	4	3	3	1	1	1	1	1	1	1	2	6	13	24	16	15	5.9	24
5-Jan	12	9	8	6	Z	8	17	17	14	10	11	14	8	8	21	16	8	7	6	7	6	5	4	4	9.9	21
6-Jan	3	2	2	1	2	Z	2	4	5	4	5	9	8	9	17	25	12	1	7	12	6	3	3	1	6.2	25
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	1	2	7	5	4	9	1.8	9
8-Jan	13	Z	10	9	8	8	7	5	4	8	6	5	7	7	5	6	4	7	11	8	4	3	5	3	6.7	13
9-Jan	4	3	Z	3	4	3	3	3	3	4	4	5	6	7	7	7	9	4	4	4	5	6	9	8	4.9	9
10-Jan	11	7	6	Z	9	9	10	9	9	8	9	12	14	16	14	5	6	3	3	3	3	6	3	3	7.7	16
11-Jan	2	3	2	2	Z	9	3	2	1	1	1	2	6	6	3	3	4	4	4	6	7	13	14	6	4.5	14
12-Jan	5	6	2	5	3	Z	1	1	1	1	1	1	1	2	3	5	3	3	3	5	3	3	3	2	2.6	6
13-Jan	Z	4	4	4	4	2	3	2	2	2	2	2	2	2	2	1	2	3	3	2	1	1	1	0	2.1	4
14-Jan	3	Z	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
15-Jan	1	0	Z	1	4	2	2	1	1	1	0	1	0	1	0	1	0	0	0	1	1	1	1	1	0.9	4
16-Jan	1	2	2	Z	2	3	5	7	8	7	6	5	8	12	14	15	19	19	21	23	18	13	10	7	9.9	23
17-Jan	13	22	30	26	Z	14	6	6	4	6	4	3	3	3	5	5	2	1	2	2	2	2	2	2	7.1	30
18-Jan	2	1	1	1	1	Z	1	1	1	1	1	1	2	2	1	1	2	2	2	2	3	2	2	2	1.5	3
19-Jan	Z	3	3	5	9	8	9	11	6	4	3	3	3	3	5	10	7	2	1	1	1	1	1	1	4.2	11
20-Jan	1	Z	0	0	1	0	0	0	1	1	1	2	2	3	3	2	3	2	4	3	2	3	4	4	1.8	4
21-Jan	4	3	Z	4	4	4	5	4	3	2	2	3	4	5	5	7	7	6	5	3	3	2	2	2	3.9	7
22-Jan	2	2	11	Z	15	20	20	18	16	13	9	6	6	5	4	6	8	5	4	4	3	3	4	3	8.0	20
23-Jan	3	3	3	3	Z	4	4	3	3	2	2	2	2	4	4	4	7	2	2	2	2	1	3	4	2.9	7
24-Jan	4	8	5	9	10	Z	13	12	10	8	4	4	9	10	12	17	20	18	15	16	2	1	1	1	9.0	20
25-Jan	Z	1	2	2	3	5	3	3	7	12	11	6	C	C	C	C	C	C	3	2	3	3	5	8	--	12
26-Jan	13	Z	13	12	12	10	10	8	9	7	4	7	7	5	5	4	5	9	8	8	6	5	3	2	7.3	13
27-Jan	1	1	Z	2	5	3	3	6	3	3	1	1	2	1	0	1	1	2	3	2	5	5	2	1	2.2	6
28-Jan	1	1	1	Z	1	1	1	1	1	3	3	3	4	5	7	9	5	5	3	6	8	5	3	2	3.4	9
29-Jan	2	2	1	5	Z	2	8	8	10	6	7	10	9	9	6	3	11	12	10	13	6	7	9	9	7.1	13
30-Jan	5	4	9	9	9	Z	10	10	9	8	8	2	3	4	1	0	0	0	0	1	3	0	1	0	4.1	10
31-Jan	Z	1	1	0	0	0	0	1	4	3	2	1	1	2	3	2	1	0	0	0	0	0	0	0	1.0	4
	4.9	4.1	5.4	5.6	5.0	5.7	5.8	5.5	5.2	4.8	4.3	4.0	4.3	4.9	5.6	5.8	5.4	4.5	4.7	5.0	4.6	4.6	4.3	3.8	Diurnal Average	
	13	22	30	26	15	20	20	18	16	14	16	14	14	16	21	25	20	19	21	23	18	24	16	15	Diurnal Maximum	

Z - zerospan C - Calibration

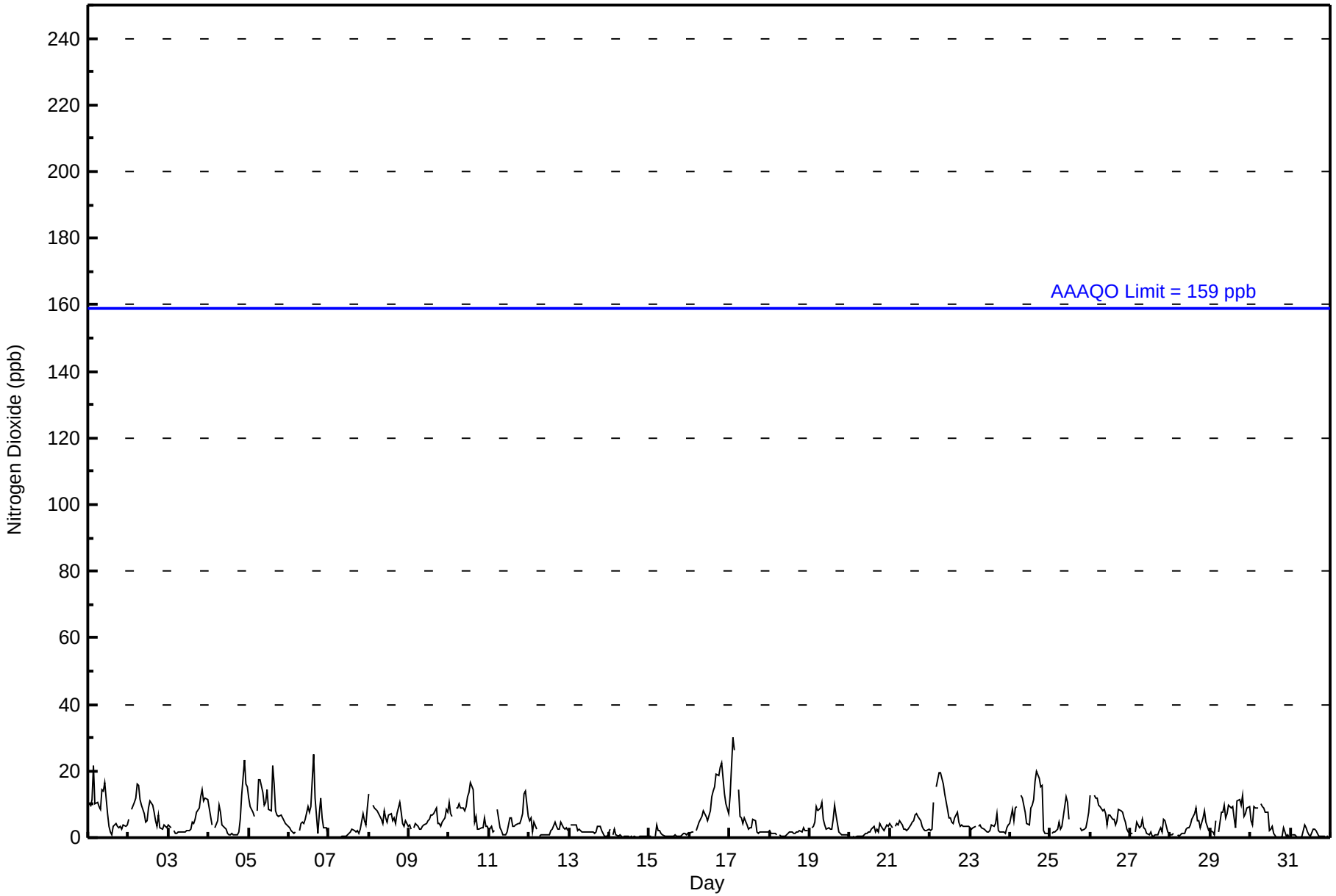
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	98.73	98.73
21 - 40	9	1.27	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 Dioxide (NO_2) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	81	46	24	15	22	30	93	140	80	16	39	16	22	16	13	38	691
21 - 40	1	0	0	0	0	1	3	3	0	1	0	0	0	0	0	0	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	46	24	15	22	31	96	143	80	17	39	16	22	16	13	38	700

Total Number of Valid Hours: 700

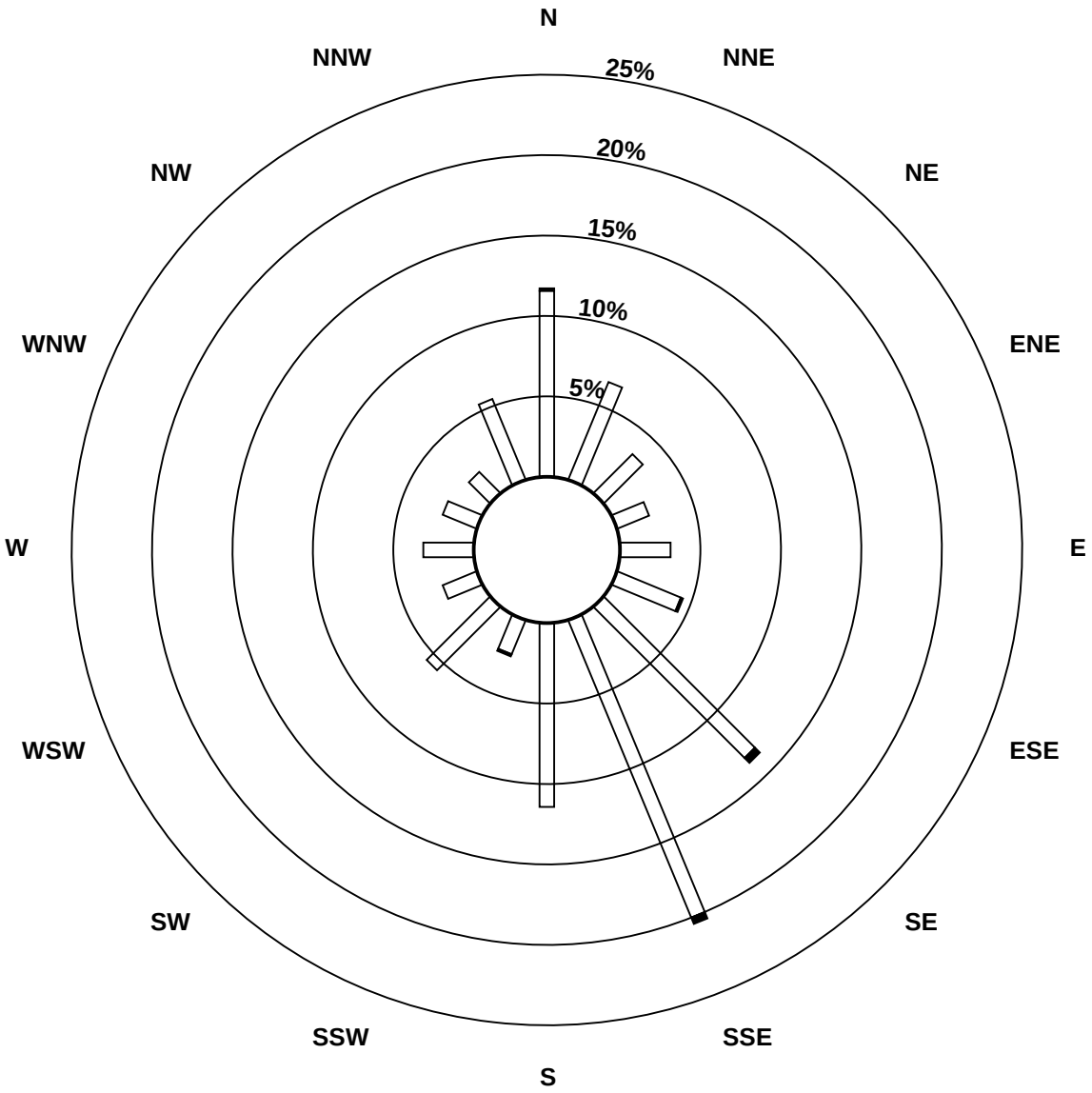
Total Number of Hours: 744

Wood Buffalo Environmental Association

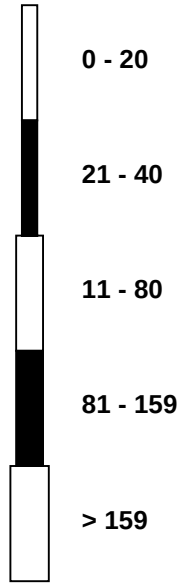
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Wapasu (AMS 17)



Classes (ppb)



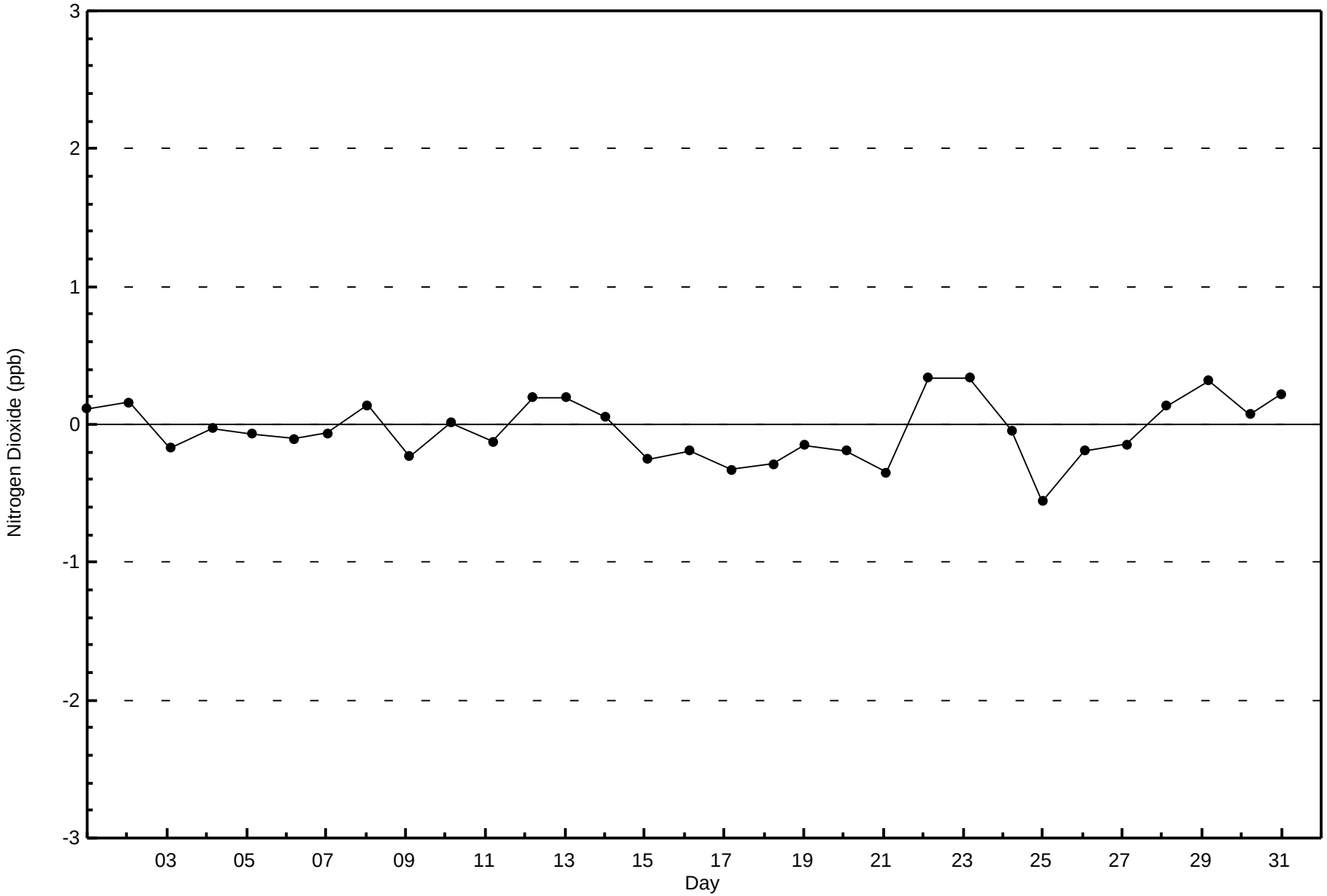
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Wapasu - January 2016

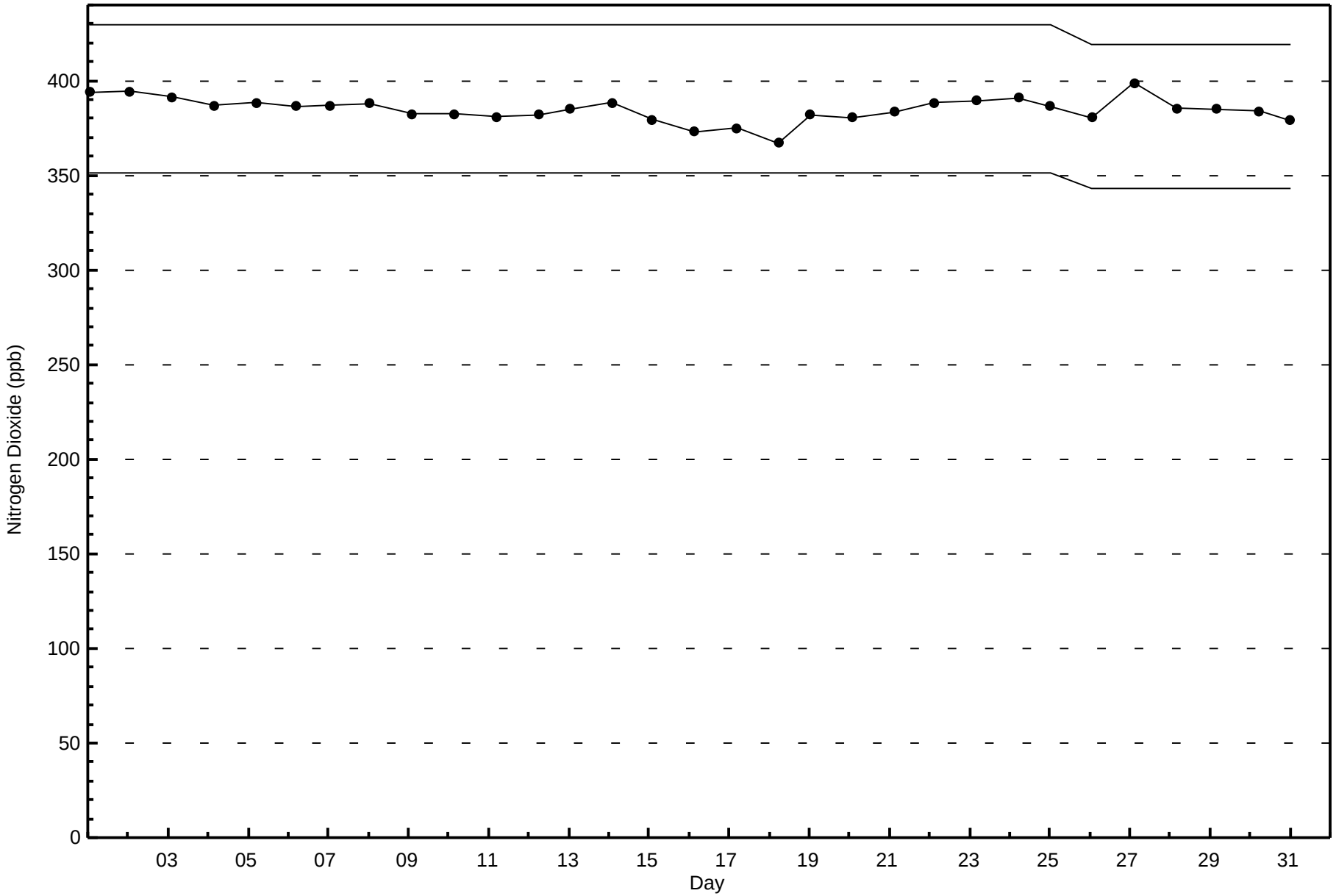


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Wapasu - January 2016

Maximum Value: 56 ppb on Jan 17 03:00

Maximum Daily Average: 11.4 ppb on Jan 16

Minimum Value: 0 ppb on Jan 7 03:00

Minimum Daily Average: 0.8 ppb on Jan 14

Maximum Diurnal Average: 7.6 ppb at hour 15

Minimum Diurnal Average: 4.1 ppb at hour 24

Monthly Average: 5.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 4 $Q_3 = 8$ $P_{90} = 12$ $P_{99} = 25$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	9	12	23	10	11	10	9	15	15	19	8	4	2	1	4	5	4	3	4	3	4	4	4	7.9	23
2-Jan	6	Z	9	11	12	17	16	12	10	8	6	6	12	14	12	8	5	4	7	3	3	4	4	4	8.3	17
3-Jan	4	4	Z	2	1	2	2	2	2	2	2	3	3	3	5	5	6	8	9	13	15	11	12	12	5.5	15
4-Jan	9	6	4	Z	3	5	10	8	4	3	3	1	1	1	1	1	1	1	2	6	13	24	16	16	6.2	24
5-Jan	12	10	8	7	Z	8	17	17	14	11	14	20	12	10	29	19	8	7	7	7	6	6	4	4	11.2	29
6-Jan	4	3	2	2	2	Z	3	5	5	5	7	12	10	12	26	36	13	2	7	12	6	3	3	1	7.9	36
7-Jan	Z	0	0	0	0	0	1	0	1	0	1	1	2	2	3	3	2	2	1	3	8	5	4	9	2.1	9
8-Jan	13	Z	10	9	9	8	7	5	4	9	7	6	9	9	6	6	4	7	11	8	5	4	5	4	7.2	13
9-Jan	4	3	Z	3	5	4	3	3	3	5	5	7	8	9	9	8	9	4	4	4	5	6	9	8	5.5	9
10-Jan	11	7	6	Z	9	9	10	9	9	9	11	16	21	33	26	5	7	3	3	3	3	6	4	3	9.6	33
11-Jan	3	4	2	3	Z	9	3	2	1	1	1	2	7	7	4	4	4	5	5	6	7	13	14	6	4.9	14
12-Jan	5	6	2	5	3	Z	1	1	1	1	1	1	1	3	3	5	3	3	3	5	3	3	3	2	2.7	6
13-Jan	Z	4	4	4	4	2	3	2	2	2	2	2	2	2	2	2	2	4	4	2	2	1	1	1	2.4	4
14-Jan	3	Z	1	3	1	1	1	1	0	1	1	1	1	0	0	1	0	0	0	0	1	1	1	0	0.8	3
15-Jan	0	0	Z	1	4	2	2	1	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	1.0	4
16-Jan	1	2	2	Z	2	3	5	7	8	9	9	7	13	21	21	19	21	19	22	24	18	13	10	7	11.4	24
17-Jan	13	25	56	35	Z	15	6	6	4	6	5	3	4	3	6	5	1	1	2	2	2	2	2	2	8.9	56
18-Jan	2	1	1	1	1	Z	1	1	1	1	1	1	2	2	1	1	2	2	2	2	3	3	3	2	1.6	3
19-Jan	Z	3	4	5	10	8	9	11	6	4	3	4	4	4	7	11	7	2	1	1	1	1	1	1	4.7	11
20-Jan	0	Z	0	0	0	1	0	0	1	1	1	2	2	4	4	2	3	2	4	3	2	3	4	4	2.0	4
21-Jan	5	3	Z	4	5	4	5	4	3	3	3	4	6	6	7	8	8	7	6	4	3	2	3	3	4.6	8
22-Jan	2	3	11	Z	16	21	21	19	17	15	11	8	8	6	5	7	8	5	4	4	4	4	4	4	9.0	21
23-Jan	3	3	4	4	Z	4	4	4	3	2	2	2	3	5	4	5	7	3	2	2	2	2	3	4	3.4	7
24-Jan	5	9	5	9	10	Z	15	12	10	8	5	5	12	14	16	22	22	19	15	18	2	1	1	1	10.3	22
25-Jan	Z	1	2	2	3	5	3	3	6	14	15	7	C	C	C	C	C	C	3	2	3	3	5	8	--	15
26-Jan	13	Z	13	12	12	10	10	8	9	8	4	7	8	6	6	4	6	9	8	8	6	5	3	2	7.6	13
27-Jan	1	1	Z	2	5	3	3	6	3	3	1	1	2	1	1	1	1	2	3	2	6	5	2	1	2.5	6
28-Jan	1	1	2	Z	1	1	1	1	1	3	4	3	5	6	8	10	6	5	3	6	8	5	4	3	3.8	10
29-Jan	2	2	1	5	Z	2	8	8	10	7	10	15	13	13	8	4	12	12	10	13	7	8	9	10	8.2	15
30-Jan	5	4	10	10	9	Z	10	10	9	9	9	3	4	5	2	1	0	1	1	1	4	1	1	1	4.7	10
31-Jan	Z	1	1	1	0	0	1	1	4	3	2	1	1	3	3	3	1	0	0	0	0	0	0	0	1.3	4
	5.1	4.5	6.6	6.2	5.2	6.0	6.1	5.7	5.5	5.5	5.3	5.2	5.9	6.9	7.6	7.0	5.9	4.8	5.0	5.4	4.9	4.9	4.5	4.1	Diurnal Average	
	13	25	56	35	16	21	21	19	17	15	19	20	21	33	29	36	22	19	22	24	18	24	16	16	Diurnal Maximum	

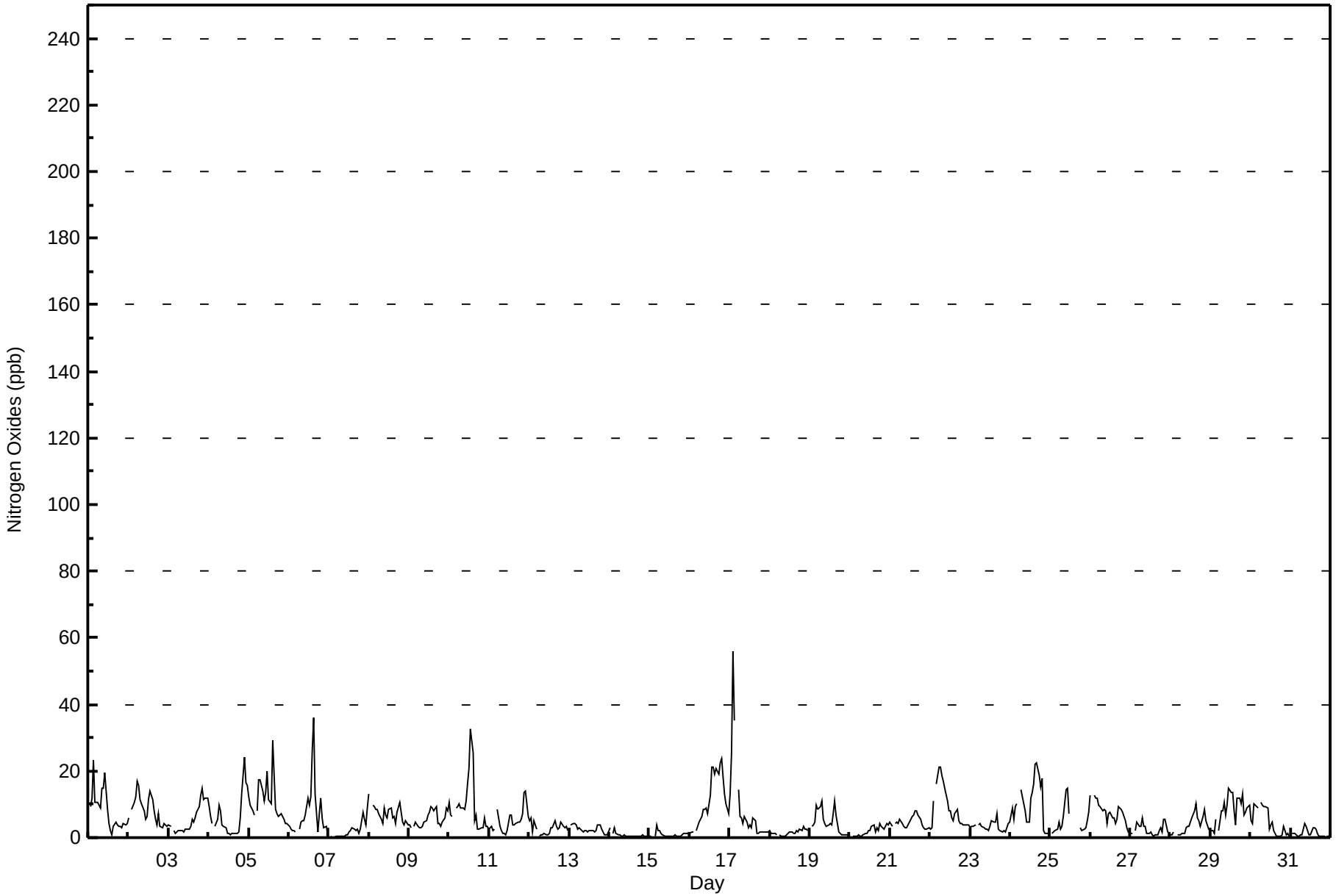
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Wapasu - January 2016



Nitrogen Oxides (NO_X) - ppb

Wapasu - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	687	97.17	97.17
21 - 40	19	2.69	99.86
11 - 80	1	0.14	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

Wapasu - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	80	46	24	15	22	30	93	139	78	14	39	15	21	16	13	35	680
21 - 40	2	0	0	0	0	1	3	3	2	3	0	1	1	0	0	3	19
11 - 80	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	46	24	15	22	31	96	143	80	17	39	16	22	16	13	38	700

Total Number of Valid Hours: 700

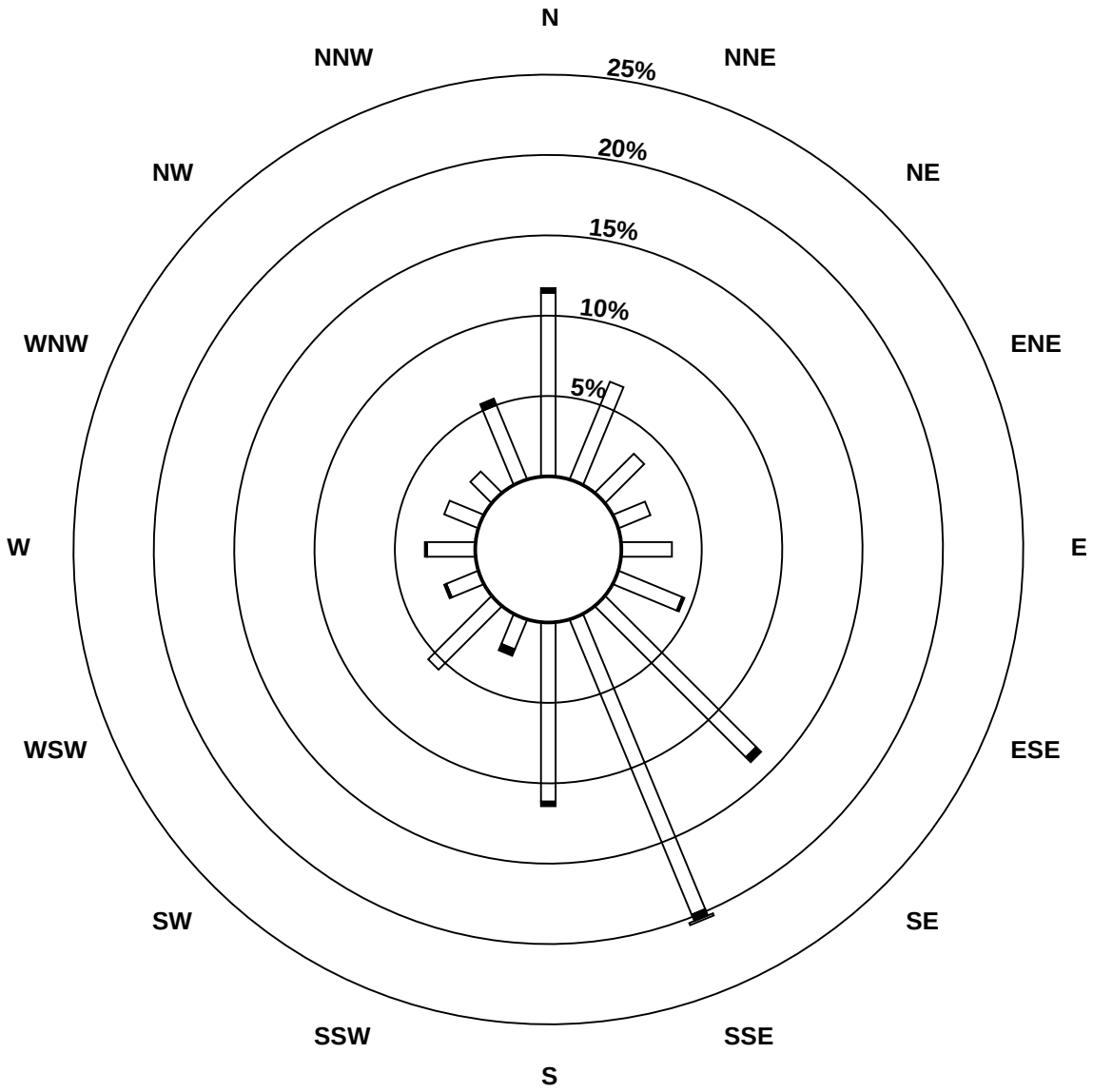
Total Number of Hours: 744

Wood Buffalo Environmental Association

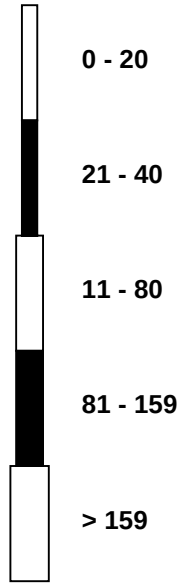
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Wapasu (AMS 17)



Classes (ppb)



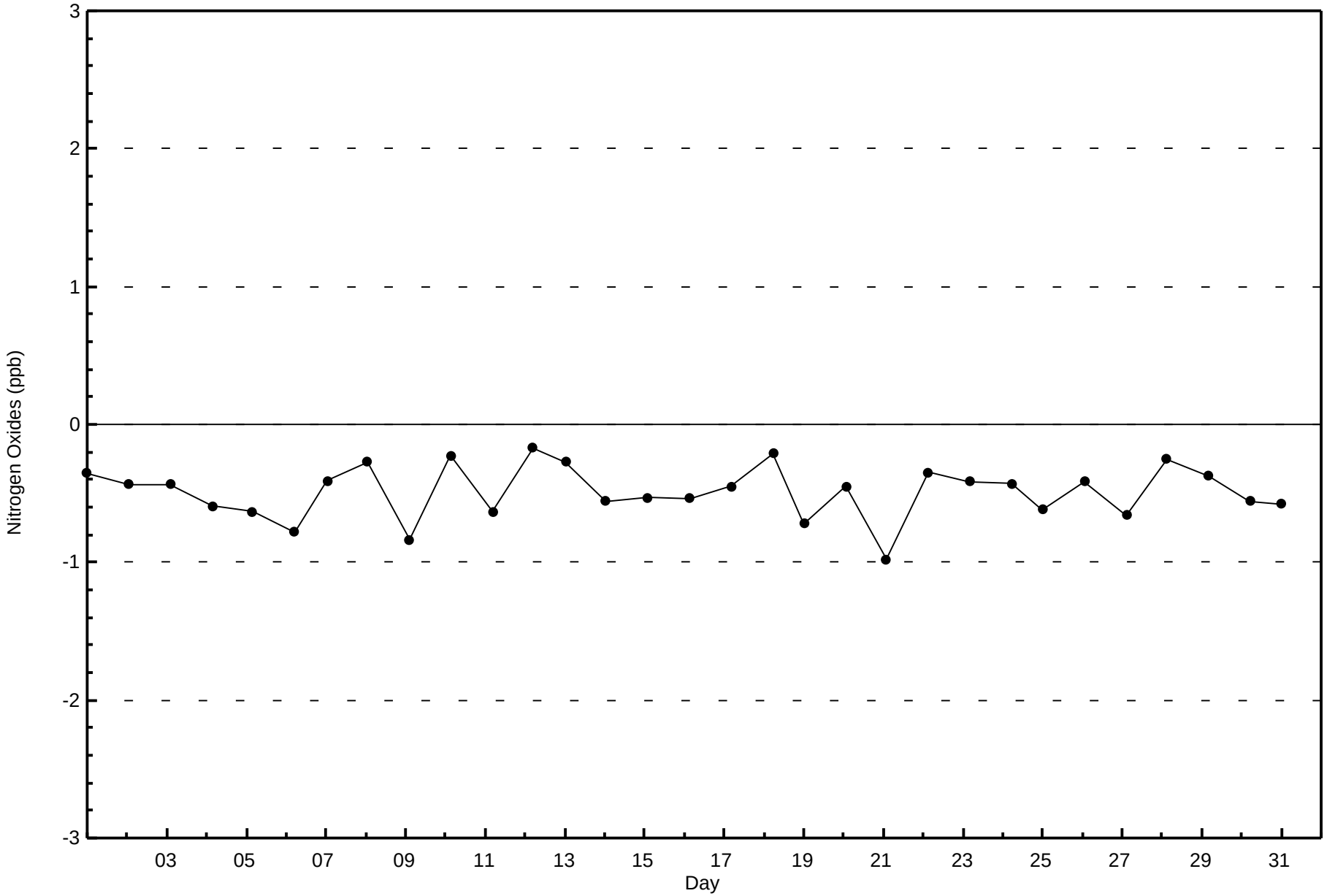
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Wapasu - January 2016

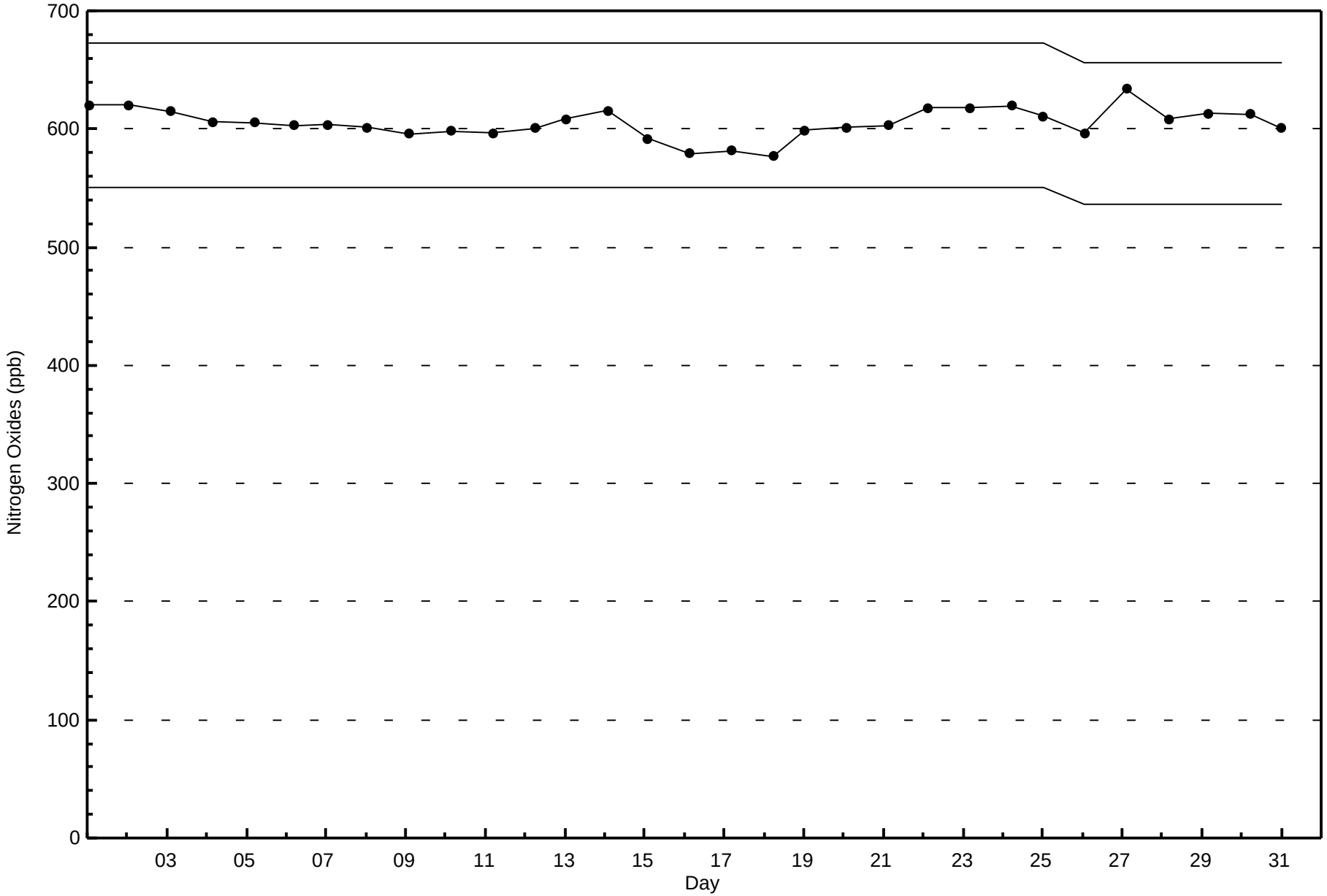


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Wapasu - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 18.4 $\mu g/m^3$ on Jan 22 06:00

Maximum Daily Average: 10.2 $\mu g/m^3$ on Jan 23

Minimum Value: 0.1 $\mu g/m^3$ on Jan 30 17:00

Minimum Daily Average: 0.8 $\mu g/m^3$ on Jan 29

Maximum Diurnal Average: 5.0 $\mu g/m^3$ at hour 15

Minimum Diurnal Average: 3.3 $\mu g/m^3$ at hour 24

Monthly Average: 4.06 $\mu g/m^3$

Percentiles: $P_1 = 0.2$ $P_{10} = 1.0$ $Q_1 = 1.5$ Median = 2.8 $Q_3 = 5.1$ $P_{90} = 10.0$ $P_{99} = 15.5$

Hours in Service:	744
Hours of Data:	739
Hours of Missing Data:	5
Hours of Calibration:	2
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	2.6	2.9	4.2	5.7	4.3	3.3	3.4	3.1	5.7	3.2	4.7	3.7	4.0	1.6	1.2	3.3	1.1	2.4	1.3	1.4	1.9	4.3	3.3	2.2	3.1	5.7
2-Jan	2.0	1.9	2.6	4.0	3.6	3.7	2.1	3.7	5.1	3.1	2.4	2.3	4.8	4.3	2.9	3.3	4.0	4.5	4.6	4.3	3.3	3.7	4.6	8.8	3.7	8.8
3-Jan	9.4	7.1	3.6	6.0	4.3	3.8	7.6	10.2	7.8	4.5	3.5	2.4	1.8	1.7	2.1	2.7	4.3	7.5	10.5	12.0	13.7	14.7	13.5	12.0	6.9	14.7
4-Jan	9.6	6.4	4.9	4.4	5.2	6.1	7.3	5.3	3.7	3.7	3.6	2.2	1.6	2.2	1.7	1.0	1.1	1.1	1.3	1.9	3.9	3.6	1.9	1.7	3.6	9.6
5-Jan	2.3	1.3	1.5	1.5	1.1	1.4	2.1	2.5	3.4	3.2	4.3	4.7	4.4	4.6	11.8	7.2	4.3	3.0	3.1	4.1	2.6	2.3	1.9	1.8	3.4	11.8
6-Jan	1.7	1.8	1.5	1.6	1.8	3.7	3.8	2.9	2.6	1.8	2.4	3.1	4.8	6.1	12.2	11.6	6.1	4.3	4.7	3.3	3.7	3.8	3.3	2.3	4.0	12.2
7-Jan	2.0	1.3	1.2	1.0	1.1	1.3	1.5	1.1	1.0	0.9	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.3	1.8	1.8	3.3	5.4	1.5	5.4
8-Jan	6.4	7.9	7.0	6.1	5.9	5.3	4.8	4.2	3.2	3.1	2.7	2.4	2.7	3.0	3.0	3.3	2.5	2.1	2.3	2.3	2.1	2.4	3.9	3.5	3.8	7.9
9-Jan	3.5	3.5	3.6	3.9	4.3	4.2	4.2	3.8	4.1	5.0	6.5	6.5	10.7	16.9	15.7	17.7	16.1	12.8	10.7	7.6	11.4	14.5	15.9	13.4	9.0	17.7
10-Jan	11.4	11.0	11.4	11.9	12.6	13.3	14.3	13.2	12.7	11.7	12.4	13.0	13.1	13.9	12.4	7.9	4.8	3.5	3.0	3.2	2.9	3.0	2.8	2.3	9.2	14.3
11-Jan	1.8	1.7	1.4	1.3	1.5	1.6	1.2	1.1	1.0	0.9	0.8	0.8	1.0	1.2	1.2	1.2	2.3	2.3	2.1	3.8	3.8	2.5	2.1	1.8	1.7	3.8
12-Jan	1.5	1.3	1.3	1.4	1.5	1.4	1.4	1.6	1.8	1.8	1.8	2.3	5.9	6.6	2.7	2.9	2.9	3.5	3.1	3.2	3.5	3.8	3.8	3.5	2.7	6.6
13-Jan	6.1	7.4	9.1	10.0	12.0	13.0	13.7	12.8	10.8	10.4	7.5	6.1	5.2	5.1	5.8	7.0	7.5	6.7	4.6	3.3	2.8	3.5	3.2	3.2	7.4	13.7
14-Jan	2.2	1.5	1.8	1.6	1.5	1.6	1.0	0.8	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.3	2.2
15-Jan	2.0	2.2	2.0	1.9	2.4	1.9	1.8	1.8	1.8	1.8	2.0	2.2	2.6	2.8	2.7	2.3	1.9	1.7	1.7	1.7	1.6	2.2	1.7	1.5	2.0	2.8
16-Jan	1.6	1.9	1.9	1.8	1.7	1.8	2.0	2.1	2.1	2.3	2.5	3.1	4.2	7.5	6.1	4.6	5.5	5.0	4.8	4.3	3.2	2.4	1.9	1.9	3.2	7.5
17-Jan	5.6	12.6	14.2	10.8	9.8	8.4	5.4	3.9	3.2	2.9	2.2	1.3	0.9	0.8	1.0	1.5	1.5	1.5	1.4	1.4	1.2	1.1	1.1	1.0	3.9	14.2
18-Jan	1.0	1.0	0.9	0.8	0.8	0.9	0.8	0.8	0.9	1.0	1.2	1.6	1.7	1.7	1.7	1.6	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.7
19-Jan	1.3	2.1	2.0	2.1	2.6	2.8	3.0	4.4	4.5	4.3	3.7	3.0	2.5	2.5	3.3	4.7	4.5	3.6	3.9	3.8	3.6	3.6	2.9	2.1	3.2	4.7
20-Jan	1.9	1.8	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.5	1.8	1.5	1.7	1.8	2.0	2.1	1.8	1.9	2.1	2.9	4.0	4.1	3.6	2.0	4.1
21-Jan	4.2	4.6	5.0	5.1	5.2	5.6	7.0	7.2	8.0	7.3	8.3	10.5	13.0	11.3	10.3	8.2	6.6	5.2	4.4	3.9	3.8	4.0	4.0	4.0	6.5	13.0
22-Jan	4.2	4.8	7.1	8.1	10.0	18.4	17.8	14.8	12.5	15.2	10.7	11.1	10.5	8.6	8.2	9.8	8.5	6.8	6.0	6.2	5.8	5.9	6.3	6.0	9.3	18.4
23-Jan	7.4	9.3	11.0	12.1	12.5	13.6	13.8	12.4	11.1	9.0	10.1	9.6	8.8	13.2	15.3	14.2	13.4	7.5	7.7	8.0	6.6	6.0	5.9	6.2	10.2	15.3
24-Jan	6.7	8.7	9.5	10.6	12.1	12.5	12.7	9.5	7.4	6.1	4.6	5.8	9.1	7.4	8.1	5.9	5.8	6.3	6.0	9.1	9.4	6.3	3.4	2.4	7.7	12.7
25-Jan	2.5	2.8	3.0	2.9	3.0	3.1	3.2	3.3	4.5	5.9	6.4	5.0	4.3	3.5	2.6	1.7	1.6	1.3	1.4	1.3	1.2	1.2	1.4	2.2	2.9	6.4
26-Jan	2.8	3.4	4.5	4.9	3.9	3.0	5.2	4.9	C	C	1.3	2.4	2.1	1.4	1.6	1.0	0.8	1.8	3.9	4.7	5.0	2.9	0.5	0.2	2.8	5.2
27-Jan	0.2	0.2	0.2	0.1	0.3	0.2	1.1	1.8	1.7	1.8	1.5	1.6	1.9	2.1	1.9	2.1	2.1	2.8	4.1	1.8	2.1	2.3	2.4	1.8	1.6	4.1
28-Jan	1.2	1.0	0.9	0.6	0.5	0.5	0.6	0.7	0.8	1.3	1.5	1.7	1.9	3.7	8.0	12.5	3.1	2.1	2.4	7.3	9.2	5.1	3.0	0.9	2.9	12.5
29-Jan	0.4	0.4	0.3	0.6	0.2	0.4	1.0	1.5	1.6	0.9	1.1	1.3	0.9	0.9	0.5	0.2	0.6	0.6	0.7	0.9	0.6	1.0	1.0	0.7	0.8	1.6
30-Jan	0.4	UO	0.4	0.4	0.9	1.2	1.6	1.6	1.7	1.1	1.8	1.7	1.2	1.1	UO	UO	0.1	0.5	0.5	0.4	0.5	0.7	0.8	1.1	0.9	1.8
31-Jan	1.2	1.8	1.8	2.1	2.9	4.2	4.3	4.0	5.9	5.6	4.7	3.8	3.1	3.0	2.7	2.7	2.6	2.1	2.1	2.0	2.0	1.8	1.5	1.4	2.9	5.9
	3.5	3.9	3.9	4.1	4.2	4.6	4.9	4.6	4.4	4.1	3.9	3.8	4.3	4.6	5.0	4.9	3.9	3.5	3.5	3.7	3.8	3.8	3.5	3.3	Diurnal Average	
	11.4	12.6	14.2	12.1	12.6	18.4	17.8	14.8	12.7	15.2	12.4	13.0	13.1	16.9	15.7	17.7	16.1	12.8	10.7	12.0	13.7	14.7	15.9	13.4	Diurnal Maximum	

C - Calibration UO - Unstable Operation

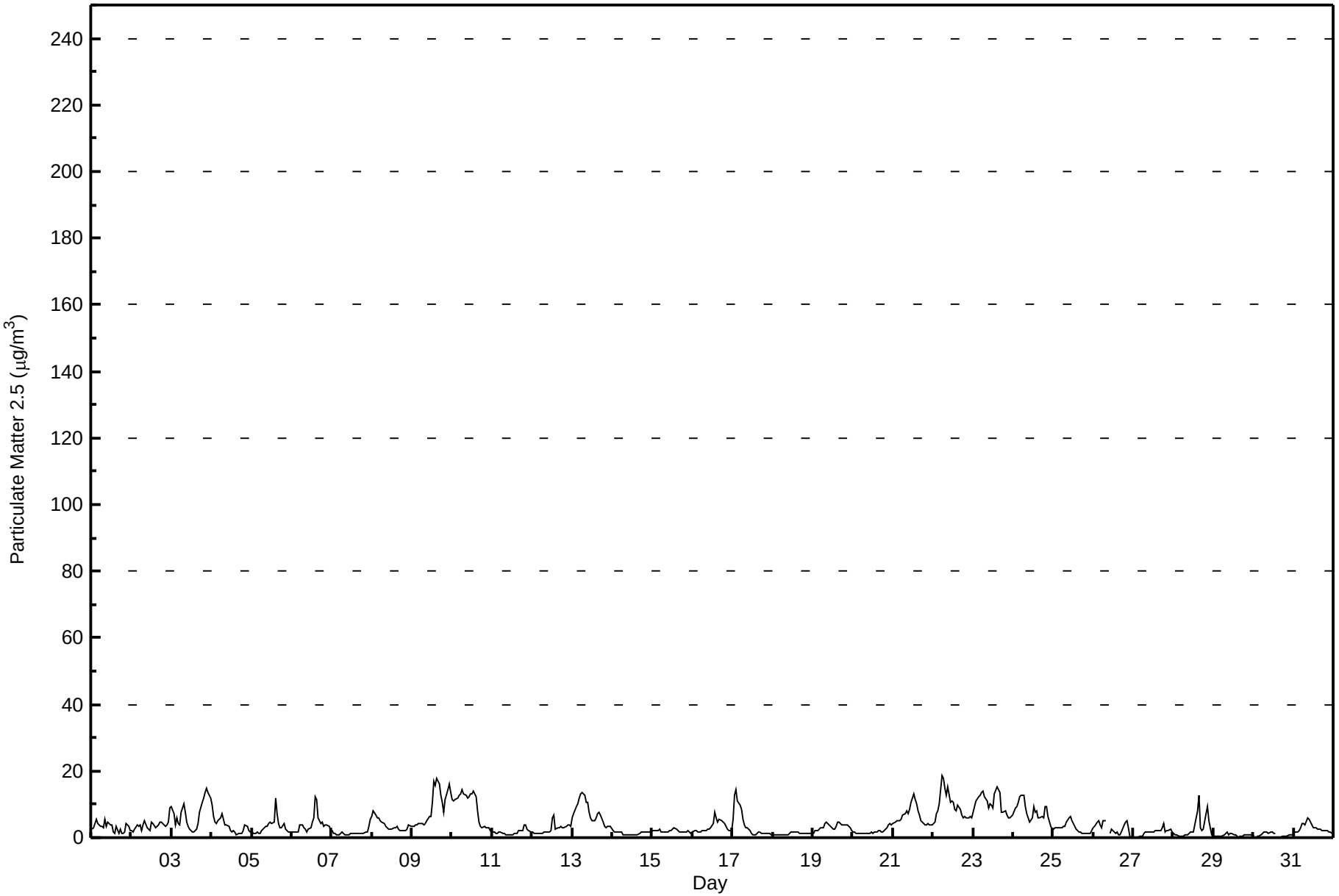
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Wapasu - January 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	487	65.90	65.90
6 - 15	168	22.73	88.63
16 - 25	7	0.95	89.58
26 - 80	0	0.00	89.58
> 81.0	0	0.00	89.58

Total Number of Valid Hours: 739

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Wapasu - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	60	34	15	13	17	23	64	100	61	6	25	8	10	7	11	29	483
6 - 15	6	12	10	3	6	8	22	39	20	10	9	3	4	4	0	10	166
16 - 25	0	0	0	0	0	0	0	5	2	0	0	0	0	0	0	0	7
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	46	25	16	23	31	86	144	83	16	34	11	14	11	11	39	656

Total Number of Valid Hours: 732

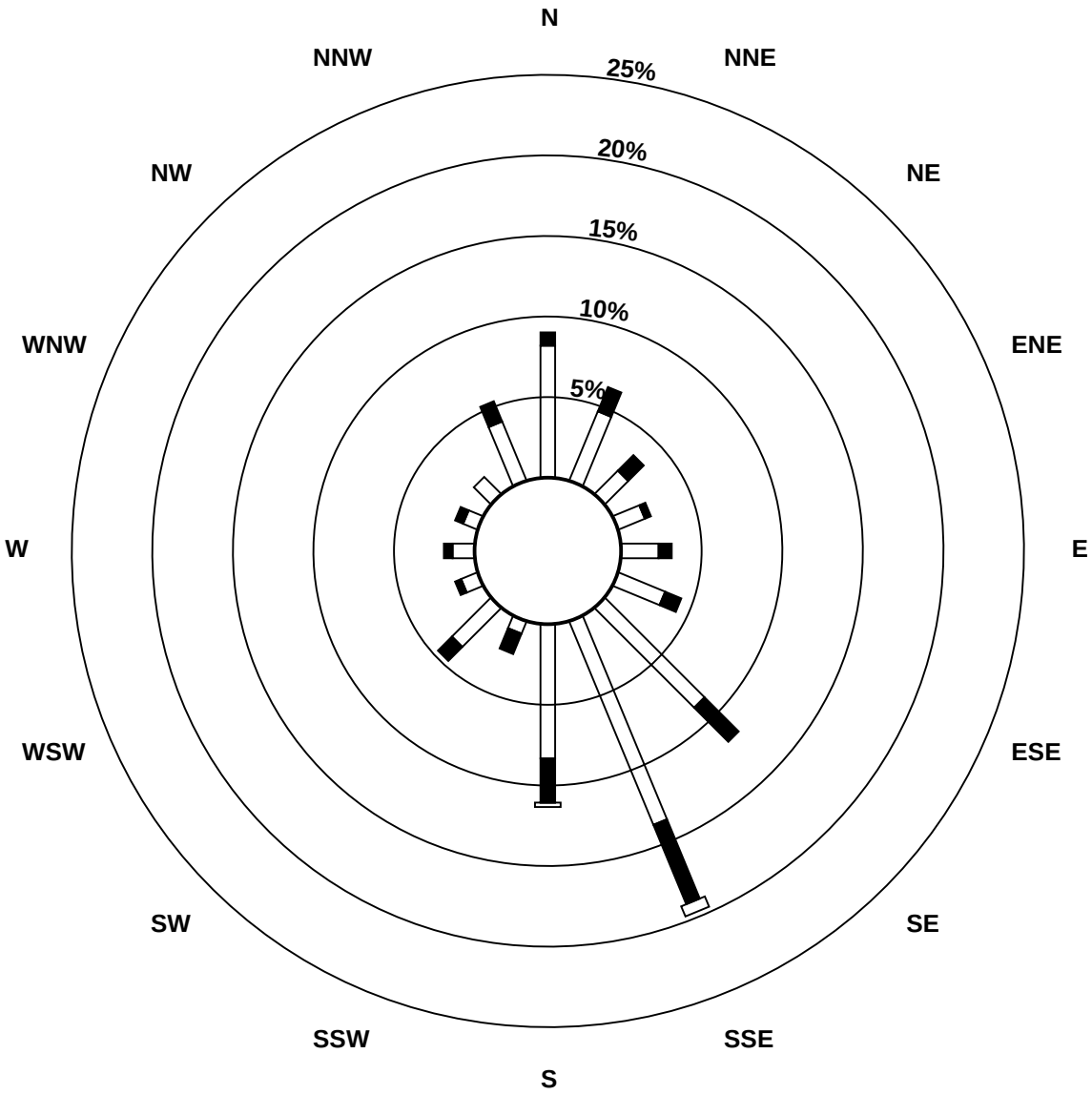
Total Number of Hours: 744

Wood Buffalo Environmental Association

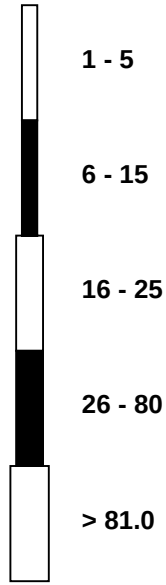
Wind Rose Jan 2016

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

Wapasu (AMS 17)



Classes ($\mu g/m^3$)



1 - 5

6 - 15

16 - 25

26 - 80

> 81.0

Total Number of Valid Hours: 732

Maximum Value: 3.4 C on Jan 29 15:00

Maximum Daily Average: 0.6 C on Jan 28

Minimum Value: -34.6 C on Jan 16 04:00

Minimum Daily Average: -30.1 C on Jan 16

Maximum Diurnal Average: -10.6 C at hour 14

Minimum Diurnal Average: -14.2 C at hour 5

Monthly Average: -13.13 C

Percentiles: P_1 = -34.2 P_{10} = -22.5 Q_1 = -18.3 Median = -13.5 Q_3 = -7.8 P_{90} = -2.1 P_{99} = 2.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

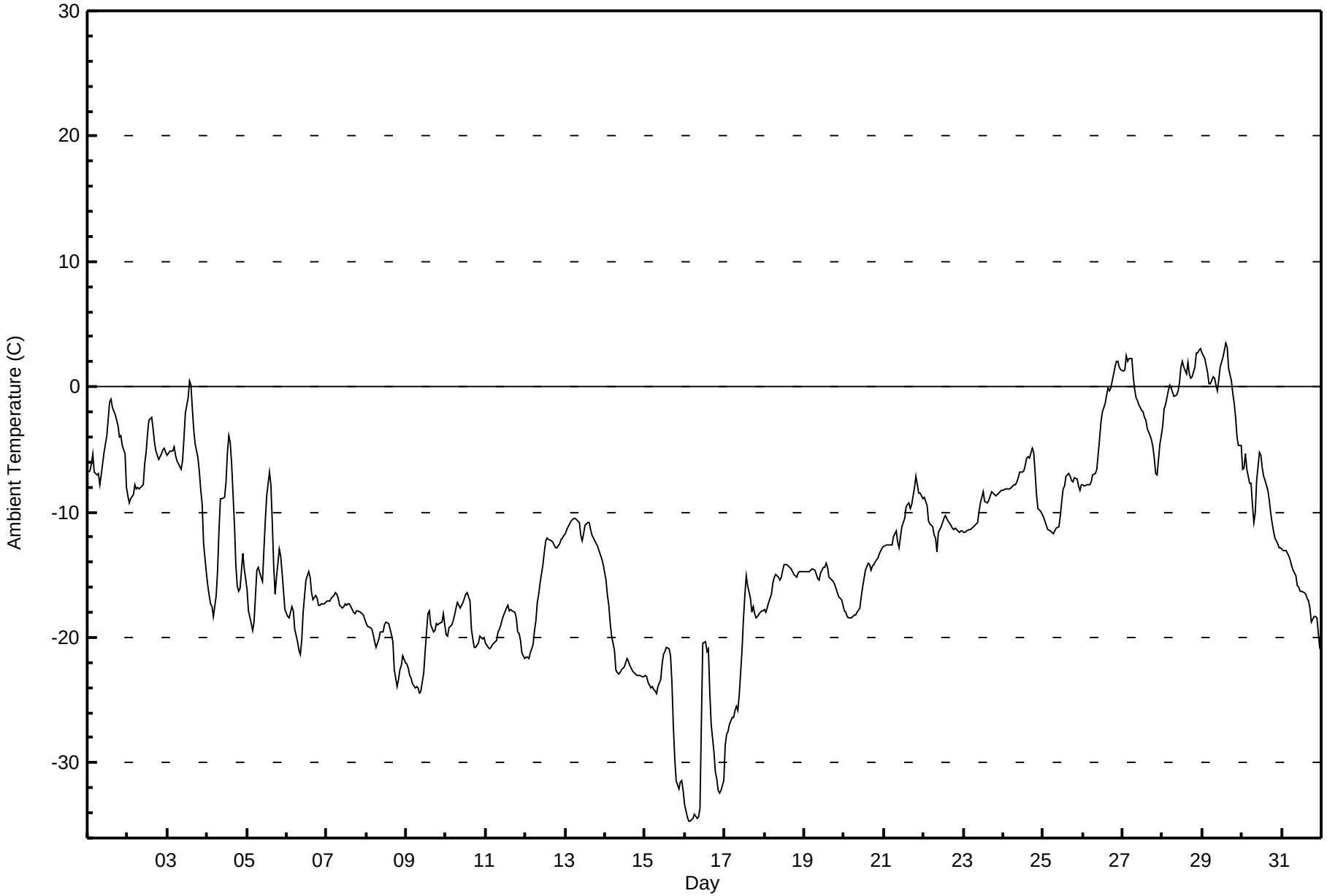
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-6.8	-6.7	-6.2	-5.4	-6.8	-7.1	-6.9	-7.8	-7.0	-6.1	-5.3	-3.9	-2.5	-1.2	-1.0	-1.7	-2.2	-2.6	-3.1	-4.0	-3.9	-4.6	-5.3	-8.0	-4.8	-1.0
2-Jan	-8.7	-9.2	-9.0	-8.5	-7.8	-8.1	-8.1	-8.1	-8.0	-7.8	-6.1	-5.2	-3.8	-2.7	-2.5	-3.4	-4.4	-5.2	-5.5	-5.8	-5.3	-5.0	-4.9	-5.2	-6.2	-2.5
3-Jan	-5.5	-5.2	-5.1	-5.1	-4.8	-5.4	-5.9	-6.3	-6.5	-5.9	-4.2	-2.1	-0.8	0.5	0.1	-1.8	-3.5	-4.6	-5.7	-6.8	-8.2	-9.4	-12.5	-14.9	-5.4	0.5
4-Jan	-15.9	-16.6	-17.3	-17.6	-18.3	-16.7	-14.6	-11.4	-8.9	-8.9	-8.8	-7.5	-5.2	-3.9	-4.4	-6.1	-10.9	-14.2	-15.9	-16.3	-16.1	-13.3	-14.5	-15.4	-12.5	-3.9
5-Jan	-16.2	-17.9	-18.9	-19.5	-18.7	-16.7	-14.6	-14.4	-15.2	-15.5	-13.0	-10.7	-8.7	-6.8	-7.8	-10.8	-14.3	-16.5	-15.2	-13.0	-13.6	-14.8	-16.3	-17.8	-14.5	-6.8
6-Jan	-18.3	-18.4	-18.0	-17.5	-17.9	-19.3	-20.3	-21.0	-21.3	-20.2	-17.9	-15.5	-15.1	-14.7	-15.2	-16.5	-17.0	-16.6	-16.9	-17.4	-17.4	-17.3	-17.4	-17.2	-17.7	-14.7
7-Jan	-17.1	-17.0	-17.1	-16.9	-16.6	-16.5	-16.5	-16.9	-17.4	-17.6	-17.5	-17.4	-17.4	-17.3	-17.3	-17.8	-18.0	-18.1	-17.9	-17.9	-17.9	-18.1	-18.2	-18.6	-17.5	-16.5
8-Jan	-18.9	-19.1	-19.2	-19.3	-19.8	-20.3	-20.8	-20.1	-19.6	-19.6	-19.5	-19.0	-18.8	-18.9	-19.3	-19.8	-20.4	-22.6	-23.9	-23.3	-22.6	-22.2	-21.5	-22.1	-20.4	-18.8
9-Jan	-22.1	-22.5	-23.0	-23.3	-23.7	-24.0	-23.9	-24.1	-24.4	-24.2	-22.8	-21.1	-19.6	-18.1	-17.9	-19.0	-19.6	-19.4	-18.8	-19.0	-18.9	-18.8	-18.2	-19.0	-21.1	-17.9
10-Jan	-19.8	-19.9	-19.3	-19.0	-18.6	-18.3	-17.6	-17.2	-17.7	-17.4	-17.2	-16.9	-16.6	-16.4	-17.1	-19.3	-20.1	-20.7	-20.8	-20.5	-19.9	-20.0	-20.1	-20.0	-18.8	-16.4
11-Jan	-20.5	-20.8	-20.9	-20.8	-20.6	-20.5	-20.3	-19.5	-19.4	-19.1	-18.5	-18.2	-17.6	-17.5	-17.8	-17.8	-17.9	-18.0	-18.4	-19.6	-19.6	-20.2	-21.2	-21.7	-19.4	-17.5
12-Jan	-21.6	-21.6	-21.6	-21.2	-20.6	-19.5	-18.7	-17.3	-16.5	-15.6	-14.1	-13.1	-12.2	-12.1	-12.2	-12.3	-12.4	-12.6	-12.9	-12.9	-12.5	-12.2	-12.0	-11.8	-15.4	-11.8
13-Jan	-11.7	-11.4	-10.9	-10.7	-10.7	-10.5	-10.5	-10.7	-10.9	-11.8	-12.3	-11.7	-11.0	-10.8	-10.8	-11.4	-11.9	-12.1	-12.5	-12.8	-13.1	-13.4	-13.7	-14.2	-11.7	-10.5
14-Jan	-15.4	-16.6	-17.4	-18.9	-19.9	-21.0	-22.6	-22.8	-22.9	-22.8	-22.6	-22.3	-22.0	-21.7	-21.9	-22.3	-22.6	-22.8	-22.9	-23.0	-23.0	-23.1	-23.1	-23.1	-21.5	-15.4
15-Jan	-23.1	-23.2	-23.6	-24.1	-23.9	-24.1	-24.3	-24.5	-23.9	-23.3	-22.1	-21.3	-21.1	-20.8	-20.9	-21.4	-23.6	-27.1	-29.6	-31.4	-32.1	-31.5	-31.4	-32.2	-25.2	-20.8
16-Jan	-33.3	-34.3	-34.6	-34.6	-34.6	-34.5	-34.1	-34.4	-34.3	-33.6	-26.9	-20.4	-20.3	-21.2	-20.9	-24.3	-26.9	-29.2	-30.7	-31.3	-32.2	-32.4	-32.2	-31.4	-30.1	-20.3
17-Jan	-28.6	-27.7	-27.5	-26.9	-26.4	-26.4	-25.8	-25.4	-25.8	-24.6	-21.0	-18.6	-16.7	-15.1	-15.9	-16.9	-18.0	-17.5	-18.1	-18.4	-18.3	-18.0	-17.9	-17.8	-21.4	-15.1
18-Jan	-17.8	-18.0	-17.2	-16.9	-16.5	-15.6	-15.2	-14.9	-15.1	-15.5	-15.2	-14.6	-14.2	-14.2	-14.3	-14.4	-14.6	-14.8	-15.0	-15.2	-14.9	-14.8	-14.8	-14.7	-15.4	-14.2
19-Jan	-14.8	-14.8	-14.8	-14.8	-14.7	-14.5	-14.6	-14.9	-15.3	-15.4	-14.8	-14.4	-14.4	-14.1	-14.4	-15.2	-15.3	-15.5	-15.8	-16.1	-16.4	-16.7	-17.0	-17.4	-15.3	-14.1
20-Jan	-17.9	-18.0	-18.3	-18.5	-18.4	-18.3	-18.2	-18.2	-18.0	-17.6	-16.8	-16.0	-15.3	-14.6	-14.1	-14.2	-14.6	-14.3	-14.2	-14.0	-13.6	-13.3	-13.0	-12.9	-15.9	-12.9
21-Jan	-12.7	-12.6	-12.6	-12.6	-12.7	-12.6	-12.0	-11.5	-12.4	-12.9	-11.9	-11.2	-10.5	-9.6	-9.4	-9.2	-9.7	-9.4	-8.1	-7.1	-7.9	-8.4	-8.5	-8.9	-10.6	-7.1
22-Jan	-8.8	-9.1	-9.5	-10.7	-11.0	-11.2	-11.8	-12.1	-13.1	-11.6	-11.1	-10.8	-10.5	-10.3	-10.5	-10.7	-11.1	-11.3	-11.4	-11.3	-11.4	-11.6	-11.5	-11.5	-11.0	-8.8
23-Jan	-11.6	-11.6	-11.5	-11.4	-11.3	-11.2	-11.2	-11.0	-10.8	-10.0	-9.3	-8.8	-8.4	-9.1	-9.3	-9.0	-8.7	-8.4	-8.4	-8.7	-8.6	-8.5	-8.4	-8.3	-9.7	-8.3
24-Jan	-8.3	-8.2	-8.2	-8.2	-8.2	-8.1	-7.9	-7.8	-7.6	-7.3	-6.8	-6.8	-6.7	-6.3	-5.6	-5.6	-5.7	-4.9	-5.2	-6.8	-8.5	-9.7	-10.0	-10.2	-7.4	-4.9
25-Jan	-10.4	-10.7	-11.1	-11.4	-11.5	-11.6	-11.7	-11.5	-11.3	-11.1	-10.3	-9.1	-8.1	-7.9	-7.2	-7.0	-7.2	-7.5	-7.5	-7.3	-7.3	-7.9	-8.2	-7.8	-9.3	-7.0
26-Jan	-7.8	-7.9	-7.8	-7.8	-7.8	-7.6	-7.0	-6.9	-6.5	-5.3	-4.1	-2.8	-2.0	-1.3	-0.6	-0.1	-0.3	-0.1	1.0	1.6	2.1	2.1	1.6	1.3	-3.1	2.1
27-Jan	1.2	1.4	2.5	2.1	2.3	2.2	0.8	-0.2	-0.9	-1.1	-1.5	-1.8	-2.0	-2.4	-2.6	-3.3	-3.9	-4.2	-4.8	-5.7	-6.9	-7.0	-4.6	-3.9	-1.8	2.5
28-Jan	-3.1	-1.8	-1.4	-0.4	0.1	0.0	-0.5	-0.8	-0.7	-0.3	0.4	1.6	2.0	1.6	1.0	1.9	1.0	0.7	0.8	1.6	2.7	2.7	3.0	3.0	0.6	3.0
29-Jan	2.7	2.2	1.7	1.1	0.2	0.3	0.8	0.7	0.1	-0.3	0.6	1.5	2.4	2.9	3.4	3.1	1.5	0.4	-0.5	-1.4	-2.4	-4.0	-4.7	-4.7	0.3	3.4
30-Jan	-6.5	-6.5	-5.3	-6.6	-7.8	-7.7	-9.4	-10.8	-10.0	-7.4	-5.2	-5.4	-6.5	-7.1	-7.5	-8.3	-9.1	-10.0	-10.8	-11.5	-12.1	-12.5	-12.8	-12.9	-8.7	-5.2
31-Jan	-13.0	-13.1	-13.1	-13.2	-13.5	-13.8	-14.2	-14.6	-15.1	-15.9	-16.0	-16.3	-16.3	-16.4	-16.6	-16.9	-17.1	-17.7	-18.7	-18.3	-18.3	-18.4	-19.7	-20.9	-16.1	-13.0
	-13.9	-14.1	-14.1	-14.1	-14.2	-14.1	-14.1	-14.1	-14.1	-13.7	-12.6	-11.6	-11.0	-10.6	-10.7	-11.3	-12.2	-12.8	-13.1	-13.3	-13.5	-13.6	-13.8	-14.2	Diurnal Average	
	2.7	2.2	2.5	2.1	2.3	2.2	0.8	0.7	0.1	-0.3	0.6	1.6	2.4	2.9	3.4	3.1	1.5	0.7	1.0	1.6	2.7	2.7	3.0	3.0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Wapasu - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	128	17.20	17.20
-20 - 0	569	76.48	93.68
0 - 10	47	6.32	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 99 % on Jan 29 07:00

Maximum Daily Average: 93.6 % on Jan 26

Minimum Value: 36 % on Jan 3 14:00

Minimum Daily Average: 55.7 % on Jan 3

Maximum Diurnal Average: 84.8 % at hour 1

Minimum Diurnal Average: 79.1 % at hour 14

Monthly Average: 83.1 %

Percentiles: $P_1 = 50$ $P_{10} = 72$ $Q_1 = 80$ Median = 84 $Q_3 = 90$ $P_{90} = 93$ $P_{99} = 97$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

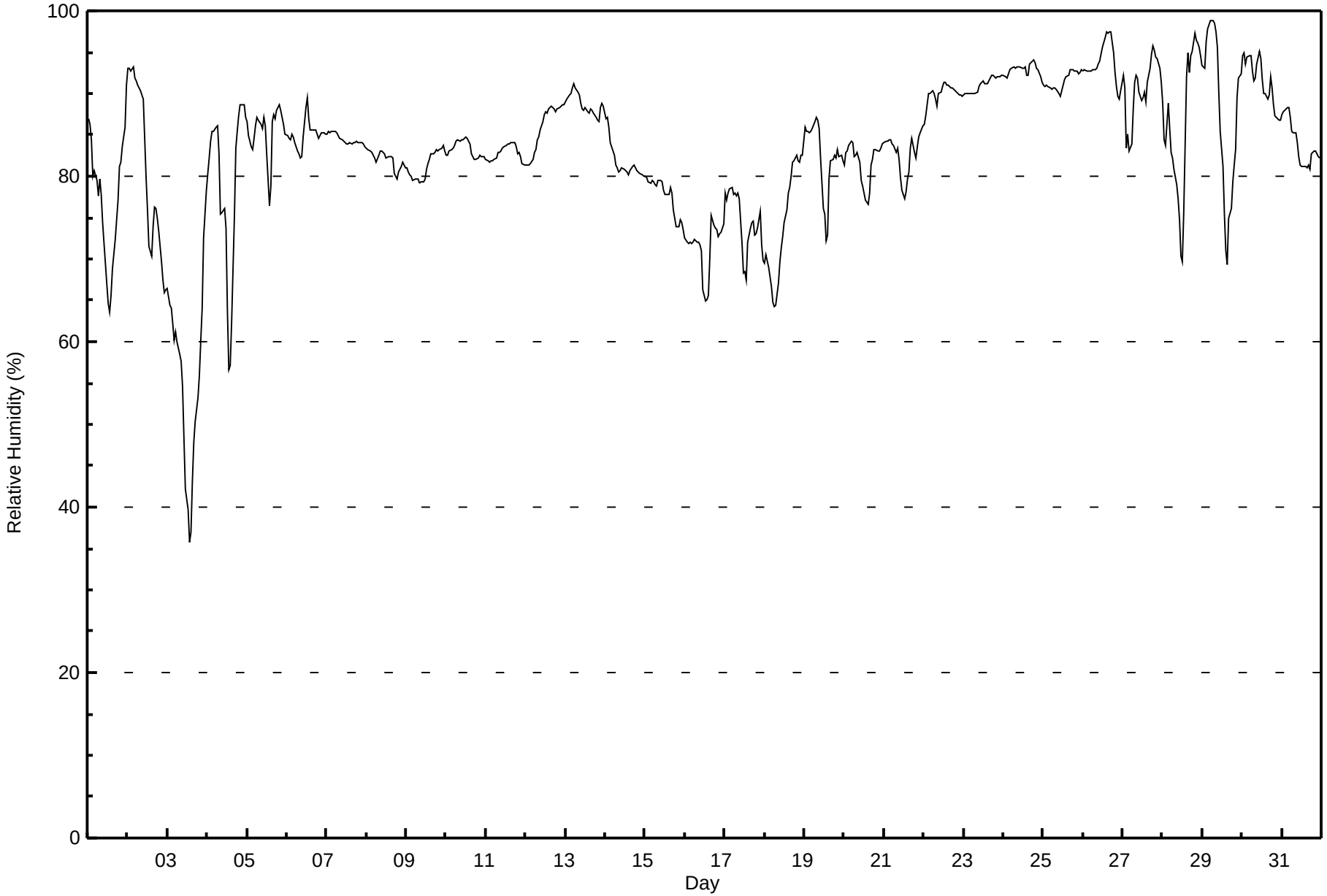
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	87	86	84	80	81	79	78	80	78	74	72	67	65	63	66	69	72	75	77	81	82	84	86	91	77.4	91
2-Jan	93	93	93	93	92	91	91	91	90	89	85	80	76	72	70	74	76	76	75	73	70	67	66	66	81.0	93
3-Jan	66	64	64	62	60	61	60	59	58	55	48	42	40	36	37	43	48	50	53	56	60	64	73	78	55.7	78
4-Jan	80	82	84	86	85	86	86	83	75	76	76	74	64	57	57	62	75	83	85	87	89	89	89	87	79.1	89
5-Jan	87	85	84	83	85	86	87	87	86	86	87	86	83	76	79	87	88	87	88	89	88	87	86	85	85.4	89
6-Jan	85	85	84	85	85	84	83	83	82	82	85	88	89	87	86	86	86	86	85	85	85	85	85	85	85.0	89
7-Jan	85	85	85	85	85	85	85	85	85	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84.5	85
8-Jan	83	83	83	83	83	82	82	83	83	83	83	83	82	82	82	82	82	80	80	80	81	81	82	81	82.1	83
9-Jan	81	81	80	80	80	80	80	80	79	79	79	80	81	82	82	83	83	83	83	83	83	83	84	83	81.3	84
10-Jan	83	83	83	83	83	84	84	84	84	84	84	85	85	84	84	83	82	82	82	82	83	82	82	82	83.3	85
11-Jan	82	82	82	82	82	82	82	83	83	83	83	84	84	84	84	84	84	84	84	83	83	82	82	81	82.8	84
12-Jan	81	81	81	82	82	83	83	84	85	86	87	87	88	88	88	88	88	88	88	88	88	89	89	89	85.9	89
13-Jan	89	89	90	90	91	91	91	90	90	89	88	88	88	88	88	88	88	88	87	87	87	88	89	88	88.7	91
14-Jan	87	87	86	84	83	83	81	81	81	81	81	81	81	80	80	81	81	81	81	81	80	80	80	80	81.8	87
15-Jan	80	80	79	79	79	79	79	79	79	80	79	78	78	78	78	79	78	76	75	74	74	75	74	74	77.6	80
16-Jan	73	72	72	72	72	72	72	72	72	72	71	66	65	65	66	70	75	74	74	73	73	73	73	74	71.4	75
17-Jan	78	77	78	78	79	78	78	78	78	77	72	68	69	67	72	74	74	75	73	73	74	76	72	70	74.5	79
18-Jan	70	71	69	68	67	65	64	64	67	70	71	73	74	76	78	79	80	82	82	83	82	82	83	82	74.1	83
19-Jan	86	85	85	85	85	86	87	87	87	86	82	76	75	72	73	80	82	82	83	82	83	82	82	82	82.4	87
20-Jan	81	83	83	84	84	84	82	83	83	82	79	79	78	77	77	78	81	82	83	83	83	83	83	84	81.7	84
21-Jan	84	84	84	84	84	84	84	83	83	82	80	78	77	78	80	81	83	85	83	82	84	85	85	86	82.7	86
22-Jan	86	87	89	90	90	90	90	89	89	90	90	91	91	91	91	91	91	91	91	90	90	90	90	90	89.9	91
23-Jan	90	90	90	90	90	90	90	90	90	91	91	91	92	91	91	91	92	92	92	92	92	92	92	92	91.0	92
24-Jan	92	92	92	92	93	93	93	93	93	93	93	93	93	93	92	92	94	94	94	94	93	93	92	91	92.9	94
25-Jan	91	91	91	91	91	91	91	91	91	90	90	90	91	92	92	92	93	93	93	93	93	92	93	93	91.5	93
26-Jan	93	93	93	93	93	93	93	93	93	94	94	95	96	97	98	97	97	97	95	93	91	90	89	90	93.6	98
27-Jan	92	91	83	85	83	84	88	91	92	92	90	89	89	90	89	91	93	95	96	95	94	94	93	91	90.5	96
28-Jan	89	84	84	89	86	83	82	81	79	77	75	70	70	76	92	95	93	95	95	97	96	96	96	94	86.4	97
29-Jan	93	93	96	98	98	99	99	99	97	96	90	85	81	75	71	69	75	76	79	81	83	89	92	92	87.9	99
30-Jan	95	95	93	94	95	95	93	92	92	94	95	94	92	90	90	89	90	92	91	89	87	87	87	87	91.5	95
31-Jan	87	88	88	88	88	87	85	85	85	84	82	81	81	81	81	81	81	81	83	83	83	83	82	82	83.9	88
	84.8	84.6	84.3	84.5	84.3	84.2	84.0	83.9	83.5	83.2	82.2	80.9	80.0	79.1	79.9	81.4	82.9	83.5	83.6	83.8	83.8	84.1	84.3	84.4	Diurnal Average	
	95	95	96	98	98	99	99	99	97	96	95	95	96	97	98	97	97	97	96	97	96	96	96	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Wapasu - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	3	0.40	0.40
40 - 60	12	1.61	2.02
60 - 80	174	23.39	25.40
80 - 100	555	74.60	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 1.3 mm on Jan 28 15:00

Maximum Daily Total: 5.0 mm on Jan 28

Minimum Value: 0.0 mm on Jan 1 01:00

Minimum Daily Total: 0.0 mm on Jan 1

Maximum Diurnal Total: 2.2 mm at hour 15

Minimum Diurnal Total: 0.0 mm at hour 1

Monthly Total: 17.59 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 in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

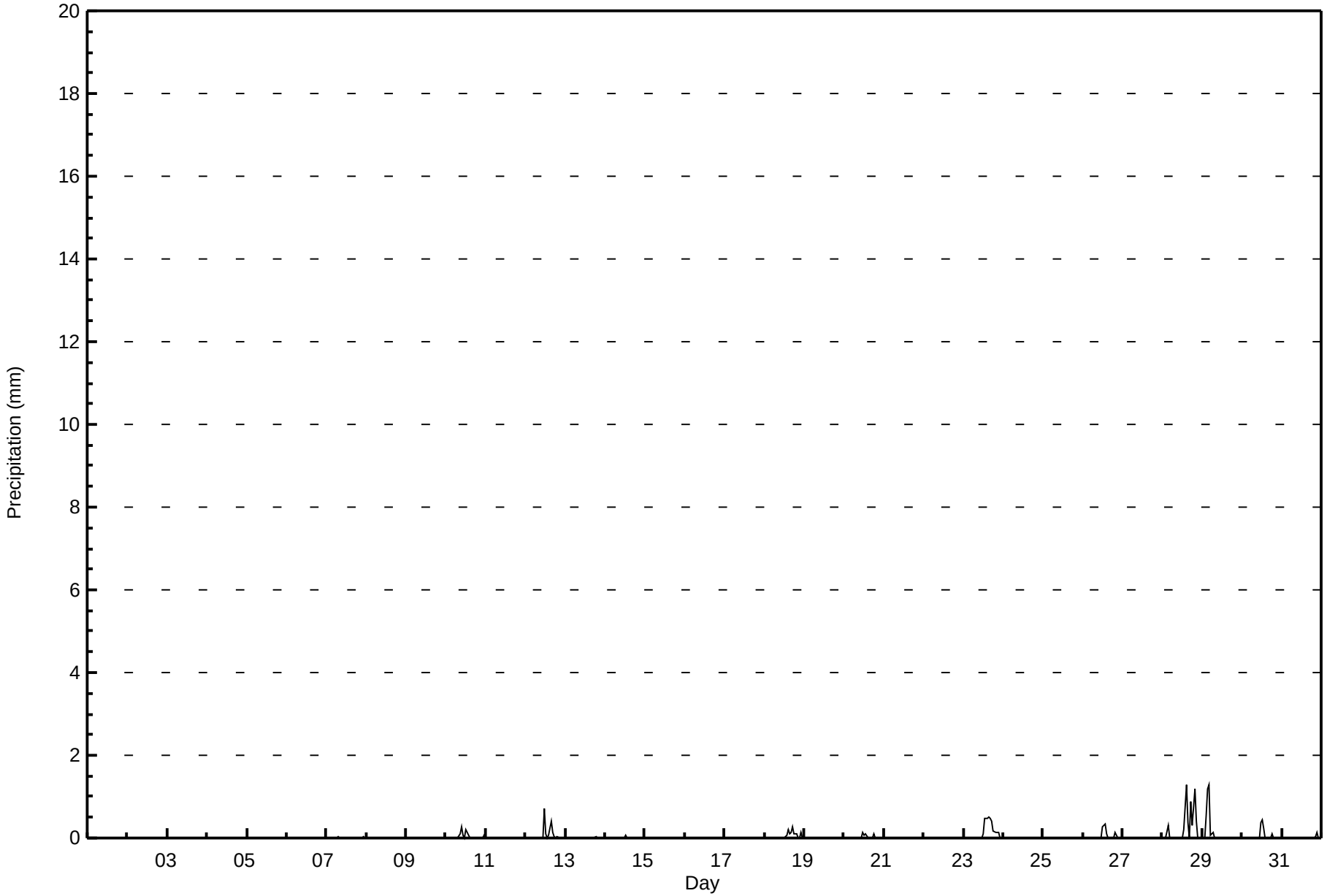
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.3
11-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.1	0.4	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	1.5	0.7
13-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1
14-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
15-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.3	0.1	0.1	0.0	0.0	0.1	0.0	1.1	0.3
19-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.1
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.5	0.5	0.5	0.4	0.2	0.1	0.2	0.1	0.0	0.0	3.1	0.5
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.9	0.3
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Jan	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	0.2	1.3	0.4	0.0	0.9	0.3	1.2	0.4	0.0	0.0	0.0	5.0	1.3
29-Jan	0.0	0.0	0.5	1.2	1.3	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	3.2	1.3
30-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.1	0.4
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.1
	0.0	0.0	0.5	1.5	1.3	0.1	0.1	0.1	0.1	0.3	0.1	1.2	1.3	1.6	2.2	1.4	0.8	1.6	0.8	1.6	0.7	0.3	0.2	0.1	Diurnal Average	
	0.0	0.0	0.5	1.2	1.3	0.1	0.1	0.1	0.1	0.3	0.1	0.7	0.4	0.5	1.3	0.5	0.5	0.9	0.3	1.2	0.4	0.1	0.1	0.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Wapasu - January 2016

Maximum Speed: 20 km/h on Jan 18 04:00

Maximum Daily Speed Average: 11.4 km/h on Jan 18

Minimum Speed Value: 0 km/h on Jan 7 19:00

Minimum Daily Speed Average: 0.8 km/h on Jan 6

Maximum Diurnal Speed Average: 3.0 km/h at hour 1

Minimum Diurnal Speed Average: 1.2 km/h at hour 15

Monthly Average Velocity: 2.2 km/h 157.2 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 5 $Q_3 = 8$ $P_{90} = 10$ $P_{99} = 18$

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	S8	S9	S9	SSW11	S10	S10	S11	S9	S11	S10	SSW10	SW9	SW13	WSW14	SW14	SW11	SW11	SW8	SW7	SW5	SW7	SW6	SW6	SSE4	SSW8.5	WSW14
2-Jan	SE6	SSE6	SSE5	SE6	SE7	SSE7	SSE7	SE8	SE7	SE8	SSE8	SSE8	S8	S8	S6	SSE7	SSE8	SSE8	SSE7	SE7	SSE8	SSE8	SSE8	SSE9	SSE7.1	SSE9
3-Jan	SSE10	SSE9	SSE10	SSE10	SSE10	SSE10	SSE11	S10	SSE11	SSE11	S11	S11	S11	S10	S9	S10	S10	S8	SSE7	SSE7	SE6	SE7	SE5	E4	SSE8.9	S11
4-Jan	E4	E4	E4	ENE4	ENE4	NNE5	NE5	NNE7	NNE9	NNE8	NNE7	NNE8	NE8	NNE7	NNE6	NNE3	SE4	SE5	SE5	SE5	SE7	SE7	SE6	SE7	ENE3.6	NNE9
5-Jan	ESE5	ESE5	ESE5	SE4	SE6	SE6	SE7	ESE4	SE4	ESE4	SSE4	SE5	SE3	S1	SSE2	ENE4	ESE2	E4	E5	E4	E4	E3	ESE3	ENE3	ESE3.6	SE7
6-Jan	ESE4	E3	E4	ESE4	ENE4	E3	ESE3	SE3	SE3	SSE1	SW2	WNW2	WNW2	WNW2	NNW2	N2	NNE1	NNW2	NW2	NW2	NNW2	N2	N2	N2	ENE0.8	ESE4
7-Jan	N2	N3	NNE3	NNE3	NNE2	N3	N3	N3	N3	N3	N2	NNE2	N2	WNW3	NNW3	W2	WSW1	WNW1	NE0	AF	WSW2	WSW2	SW2	WSW2	NNW1.5	NNE3
8-Jan	SW1	SW1	WNW1	WNW1	AF	NE0	NNE1	NE1	N2	ENE0	NE2	W1	W2	WSW2	SSE2	SW2	S2	SSE2	SSE3	SSE3	SSE3	S4	S4	S3	S1.0	S4
9-Jan	S4	S5	S4	S4	S4	S4	S4	S4	SSE4	SSE4	SSE4	S4	S4	S4	SSE3	SSE3	SSE4	SSE4	SSE3	SSE3	S3	SSE3	SSE3	SSE3	SSE3.8	S5
10-Jan	SSE3	SSE4	SSE3	S3	SSE3	SSE3	SSE2	WSW3	SSW2	WNW2	NNW1	W1	N2	NNW3	NNW4	NNW4	NNW4	N5	N4	NNW4	NNW4	NNW5	NW5	NNW5	NNW1.2	NNW5
11-Jan	NNW6	NNW7	NNW7	NNW6	NNW5	NW5	NW5	NW6	NW5	NW5	NW4	WNW4	WNW4	W3	SW4	SW3	SW4	SW3	SW3	SSW3	SSW3	S3	SSE3	SSE3	WNW2.7	NNW7
12-Jan	SSE4	SSE4	SSE4	SSE4	SE4	SSE4	SE4	SE4	SE4	SE4	SE3	SE3	SSE3	SSE4	SSE3	S3	SSE3	SE4	SSE4	SSE4	SSE3	SE3	SE3	SSE3	SSE3.5	SSE4
13-Jan	SSE3	E2	ESE3	SE0	SE3	SE2	ESE2	SE2	ESE3	ESE5	ESE4	ESE4	E3	ESE4	ESE3	ESE4	E3	ENE3	ENE4	ENE3	ENE4	NE4	NNE3	NNE4	E2.6	ESE5
14-Jan	N4	N4	N4	N4	N4	N4	N4	N4	N4	N4	N4	N5	N5	N4	N5	NNE4	NNE4	NNE4	NNE4	NNE3	NNE3	NNE3	NNE2	NE1	N3.7	N5
15-Jan	NNE1	NNW1	NW3	N1	NE2	ENE2	ENE1	E1	E2	ENE1	ENE2	NE3	NE4	NNE3	NNE3	NE3	E2	AF	ESE2	ESE2	ESE3	ESE3	ESE2	E2	ENE1.6	NE4
16-Jan	ESE2	ESE2	ESE3	SE3	SE3	SE3	SE3	SE3	SE3	ESE2	AF	WNW1	W3	W3	WSW1	WSW1	SSW2	SE3	SE3	ESE2	SE3	SE3	SE4	SE4	SE1.8	SE4
17-Jan	SE3	SE3	SSE3	SSE3	SSE4	SE4	SE4	S4	SSE4	SSE4	SSE4	S4	SSE4	SSE4	S3	SSE5	SE10	SE11	SE13	SE15	SE16	SE17	SE18	SSE16	SE7.2	SE18
18-Jan	SSE18	SE18	SE19	SE20	SE19	SE18	SE18	SE15	SE15	SE14	SSE13	SSE12	SSE9	SSE9	SSE8	SSE7	SSE6	SSE5	SSE5	SE6	SSE6	SSE6	SSE5	SSE5	SE11.4	SE20
19-Jan	S4	S4	SSE3	SSE3	AF	W1	WNW4	NNW5	N5	NNE5	N5	N6	N5	NW6	NNW7	N6	N5	NNE5	NNE5	N5	N6	NNW7	N6	N6	N3.4	NNW7
20-Jan	N7	N5	N6	N6	NNE4	NNE4	NNW3	N3	NNE3	NNE2	NE0	S4	S5	S5	SSW4	S4	SSE5	SSE6	SSE7	SSE8	SSE9	SSE9	SSE9	SSE8	SE1.9	SSE9
21-Jan	SSE8	SSE7	SSE8	SSE9	SSE8	SSE8	SSE9	SSE9	SSE9	SE10	SE10	SE10	SE10	SE7	SE11	SE12	SE16	SE16	SE15	SE17	SE16	SE16	SSE15	SSE9	SE10.9	SE17
22-Jan	S10	S8	SSW8	S7	S4	S4	SSE3	SE4	NNE3	NNE6	NE8	NNE7	NE5	NNE5	N5	NNW5	NNW4	N5	NNE6	NE5	NE6	NE5	NE4	NNE3	ENE1.8	S10
23-Jan	NNE4	NNE4	NNE3	NNE4	NE3	NE3	NE3	ENE2	E3	SE4	SE5	SE5	SSW2	W4	WSW3	AF	SSE2	SSE4	SSE4	S4	S5	S6	S7	S7	SE1.7	S7
24-Jan	S6	S5	S6	S6	SSE6	S5	SSW5	SW6	SW6	SW6	SW7	SW8	SW9	SSW8	SSW8	S6	SSW5	SW6	W5	NNW8	N9	N8	N7	N5	SW3.3	N9
25-Jan	N4	NNW5	NNW4	NW2	SE1	SSE4	S6	S7	S8	SSE7	SSE8	S8	S8	SSE9	S9	S8	SSE9	SSE9	SSE8	SSE8	S7	SSE6	S6	S6	S5.4	SSE9
26-Jan	S6	S6	SSE6	SSE6	SSE6	SSE6	SSE6	SSE6	SSE6	SSE7	S7	S6	S6	S6	SSE6	S6	S7	SSW9	SW13	SW14	SW15	SW17	SW15	WSW12	SSW7.1	SW17
27-Jan	SW14	WSW11	WSW14	W9	WNW7	WNW7	NW7	NNW7	NNW5	NNW5	N6	NNW6	N5	NNE5	NE7	NE8	ENE7	E7	E7	SE3	SSW2	SE4	SE8	SE10	NW1.2	SW14
28-Jan	SE10	SSE13	SSE11	SE12	SE14	SE12	SE12	SE13	SSE12	SSE13	SSE12	S10	S9	SSE9	SSE6	SSE5	SSE9	SSE10	S11	SSW11	SW14	SW14	SW13	SW14	SSE9.5	SW14
29-Jan	SW13	SW12	WSW9	WNW11	WNW5	WSW6	WNW8	W6	W6	AF	W7	W7	W8	W8	W8	W7	W8	W6	W5	WSW5	SW3	SSW4	SSE5	S4	WSW6.2	SW13
30-Jan	S3	S4	S5	SSE4	SE5	SSE4	SE4	SSE3	NE2	N3	N6	NNW8	N9	NNW10	N8	N8	N8	N9	N10	N9	N7	N8	N7	N6	N3.5	N10
31-Jan	N5	N6	N5	N6	N7	N9	N8	N7	NNW9	NNW7	N8	N9	NNW8	NW10	NNW11	NNW9	N8	N7	N4	N5	N5	N6	N3	E2	N6.6	NNW11
	SSE3.0	SSE2.7	SSE2.5	SSE2.4	SE3.0	SSE2.7	SSE2.4	SSE2.1	SE2.0	SE2.2	SSE1.8	SSE1.5	S1.3	SSW1.5	SSW1.2	SSE1.3	SSE2.2	SSE2.5	SSE2.5	SSE2.5	SSE2.4	SSE2.5	SSE2.8	SSE2.7		Diurnal Average
	SSE18	SE18	SE19	SE20	SE19	SE18	SE18	SE15	SE15	SE14	SSE13	SSE12	SW13	WSW14	SW14	SE12	SE16	SE16	SE15	SE17	SE16	SW17	SE18	SSE16		Diurnal Maximum

AF - Analyzer Failure

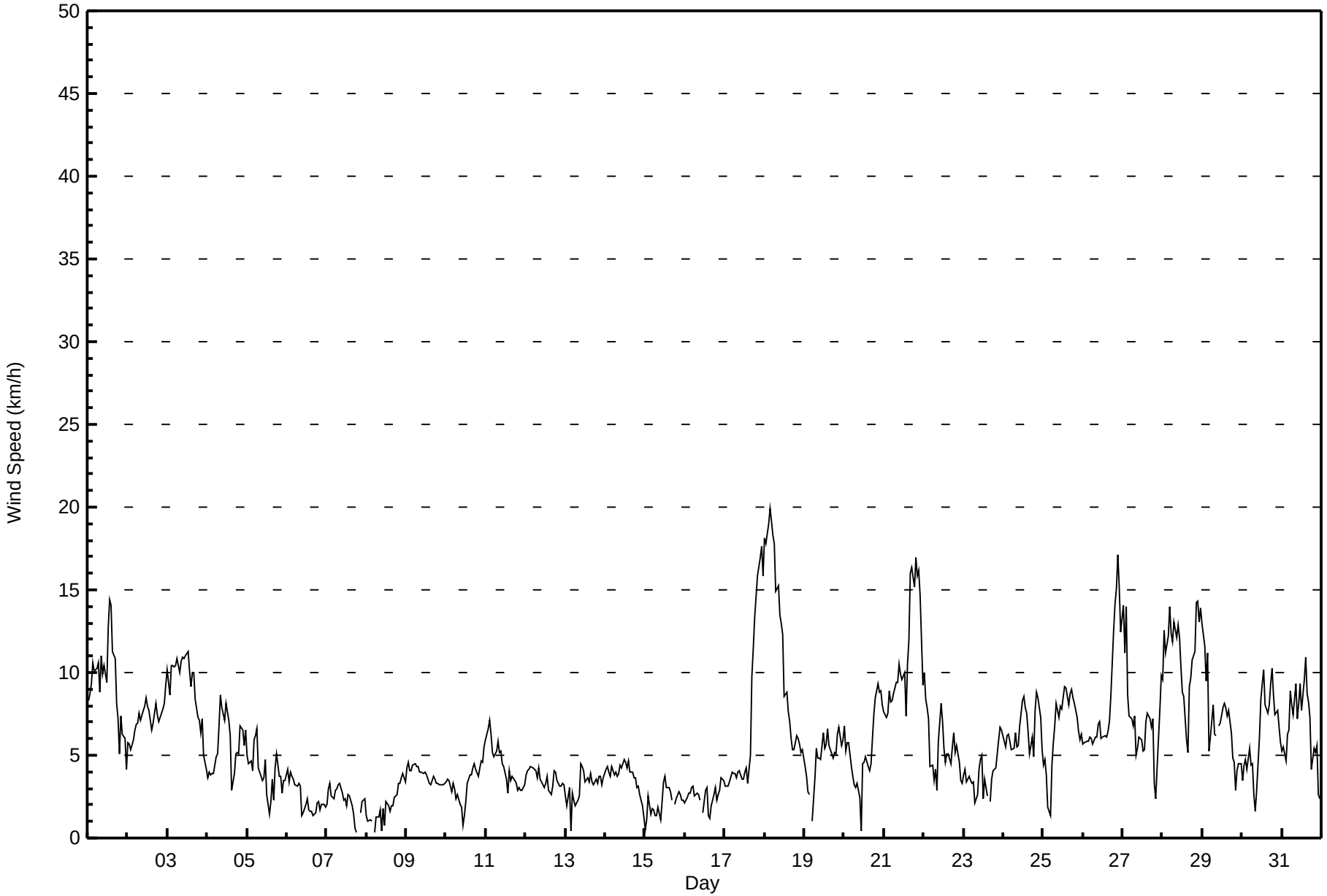
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Wapasu - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	421	57.12	57.12
6 - 11	264	35.82	92.94
12 - 19	51	6.92	99.86
20 - 28	1	0.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 737

Total Number of Hours: 744

Wood Buffalo Environmental Association | **Wind Speed (WS) - km/h**

Frequency Distribution | **Wapasu - January 2016**

Wind Speed	Wind Direction																
Ranges (km/h)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	52	36	20	15	21	31	47	71	39	10	11	11	11	13	10	23	421
6 - 11	35	10	5	1	2	0	27	73	51	7	15	3	11	4	4	16	264
12 - 19	0	0	0	0	0	0	25	9	0	0	14	3	0	0	0	0	51
20 - 28	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	87	46	25	16	23	31	100	153	90	17	40	17	22	17	14	39	737

Total Number of Valid Hours: 737

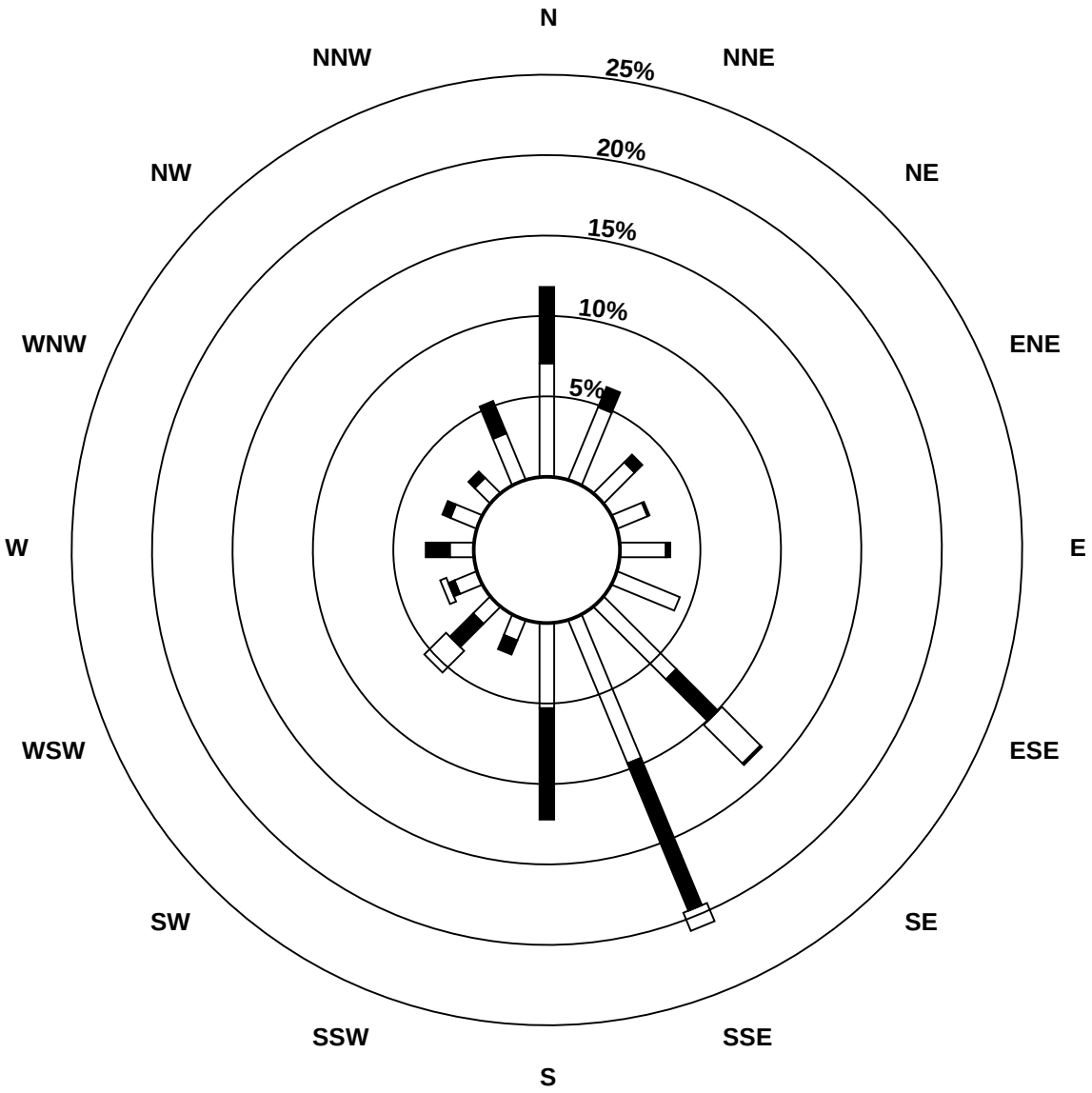
Total Number of Hours: 744

Wood Buffalo Environmental Association

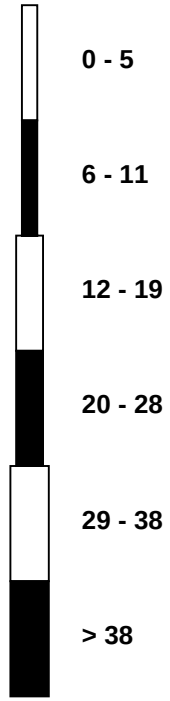
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Wapasu (AMS 17)



Classes (km/h)



Total Number of Valid Hours: 737

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Wapasu - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Jan 17 19:00

Minimum Value: 0 km/h on Jan 15 23:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Hours of Calibration:	0
Percent Operational Time:	99.1

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Wapasu - January 2016

Direction of Maximum Speed: 136 deg on Jan 18 04:00
Direction of Maximum Daily Speed Average: 145.7 deg on Jan 18

Direction of Minimum Speed: 54 deg on Jan 7 19:00

Direction of Minimum Daily Speed Average: 0.8 deg on Jan 6

Monthly Average Direction: 189.3 deg

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	173	174	179	196	172	178	179	179	184	188	203	220	235	240	236	232	228	230	224	216	226	224	215	164	205.8
2-Jan	145	150	149	146	143	147	151	146	143	144	154	162	184	181	170	163	152	155	148	144	149	151	149	151	153.4
3-Jan	153	157	153	161	164	162	167	172	167	166	169	171	170	176	177	171	170	172	166	154	140	139	127	92	162.6
4-Jan	101	81	79	58	72	16	39	26	20	26	23	30	40	27	26	32	142	142	140	126	140	140	145	139	67.1
5-Jan	119	119	120	126	145	139	141	123	125	111	154	129	124	178	159	75	116	87	82	89	79	99	122	77	118.1
6-Jan	123	94	84	103	70	97	116	136	132	155	235	285	286	297	338	5	28	348	318	319	348	359	359	353	65.2
7-Jan	10	5	33	32	12	358	354	1	5	7	9	18	352	299	328	269	248	288	54	AF	254	253	234	240	344.5
8-Jan	226	216	303	286	AF	45	29	38	9	78	50	264	276	241	167	218	183	156	154	163	162	175	177	174	180.9
9-Jan	179	176	171	169	174	170	177	169	168	167	164	174	171	172	168	158	154	164	160	164	171	161	164	160	168.3
10-Jan	153	152	148	171	152	150	155	247	203	293	332	271	359	332	337	337	347	349	351	339	336	327	325	335	328.4
11-Jan	335	335	332	331	332	320	316	324	313	315	305	289	293	269	236	229	223	217	220	212	196	172	167	163	293.7
12-Jan	158	154	151	156	146	147	136	134	137	144	143	140	158	166	168	188	154	144	160	152	165	145	144	158	151.2
13-Jan	160	88	108	142	126	143	117	140	116	108	123	109	86	107	120	104	88	72	74	77	58	53	33	24	95.7
14-Jan	354	0	5	350	1	355	5	11	6	357	2	0	1	6	352	19	18	15	19	24	25	29	28	39	6.9
15-Jan	12	328	315	2	36	61	67	87	95	78	73	36	40	30	29	49	84	AF	117	106	104	122	111	100	63.8
16-Jan	107	109	119	135	139	138	146	125	129	105	AF	288	274	262	243	243	213	137	135	121	125	130	136	138	141.4
17-Jan	146	146	147	152	149	144	146	169	160	155	153	174	151	161	187	157	132	131	143	142	140	139	140	152	145.7
18-Jan	147	138	134	136	137	140	138	143	144	146	148	151	159	156	161	152	155	161	160	146	156	162	155	168	145.7
19-Jan	170	170	156	164	AF	265	296	334	358	30	8	3	9	325	335	358	10	24	24	3	2	348	357	7	359.3
20-Jan	2	357	4	5	15	14	344	6	26	27	42	173	182	186	199	180	148	154	158	148	149	155	152	163	137.7
21-Jan	162	165	166	159	159	158	158	157	153	144	138	146	142	141	128	129	132	138	138	141	143	146	148	166	146.2
22-Jan	170	178	192	177	187	185	156	138	25	23	34	29	40	22	5	343	343	4	26	36	56	54	54	25	59.8
23-Jan	21	30	28	30	42	47	53	64	99	124	141	144	194	273	247	AF	152	166	164	171	178	179	184	178	139.9
24-Jan	186	184	174	174	167	181	208	224	227	222	225	217	216	208	195	191	198	222	279	338	2	356	357	5	217.9
25-Jan	5	343	344	320	138	164	176	185	171	163	154	170	178	163	175	174	166	163	159	162	175	165	175	178	169.0
26-Jan	178	174	159	163	155	157	159	161	165	159	174	177	176	176	167	170	178	198	223	226	227	233	235	238	195.8
27-Jan	230	239	254	260	284	291	324	337	347	344	355	335	3	17	40	42	64	87	98	140	193	124	143	135	316.9
28-Jan	144	147	157	140	137	143	139	146	149	153	161	171	170	167	148	158	151	160	169	196	225	230	232	231	168.0
29-Jan	229	231	254	290	282	251	285	272	267	AF	272	261	273	274	264	263	260	268	269	257	219	201	158	177	256.6
30-Jan	173	177	190	159	145	166	144	149	53	360	353	340	350	343	354	4	357	358	360	353	351	350	359	5	358.8
31-Jan	350	354	5	359	359	5	357	349	338	348	355	357	341	324	329	344	357	350	10	10	9	1	356	98	352.1
	164.2	160.3	159.6	156.7	143.0	150.1	149.6	152.4	144.9	134.8	147.2	167.6	186.7	212.1	198.0	163.4	150.8	150.4	148.8	152.1	159.0	162.5	161.0	160.0	
	Diurnal Average																								

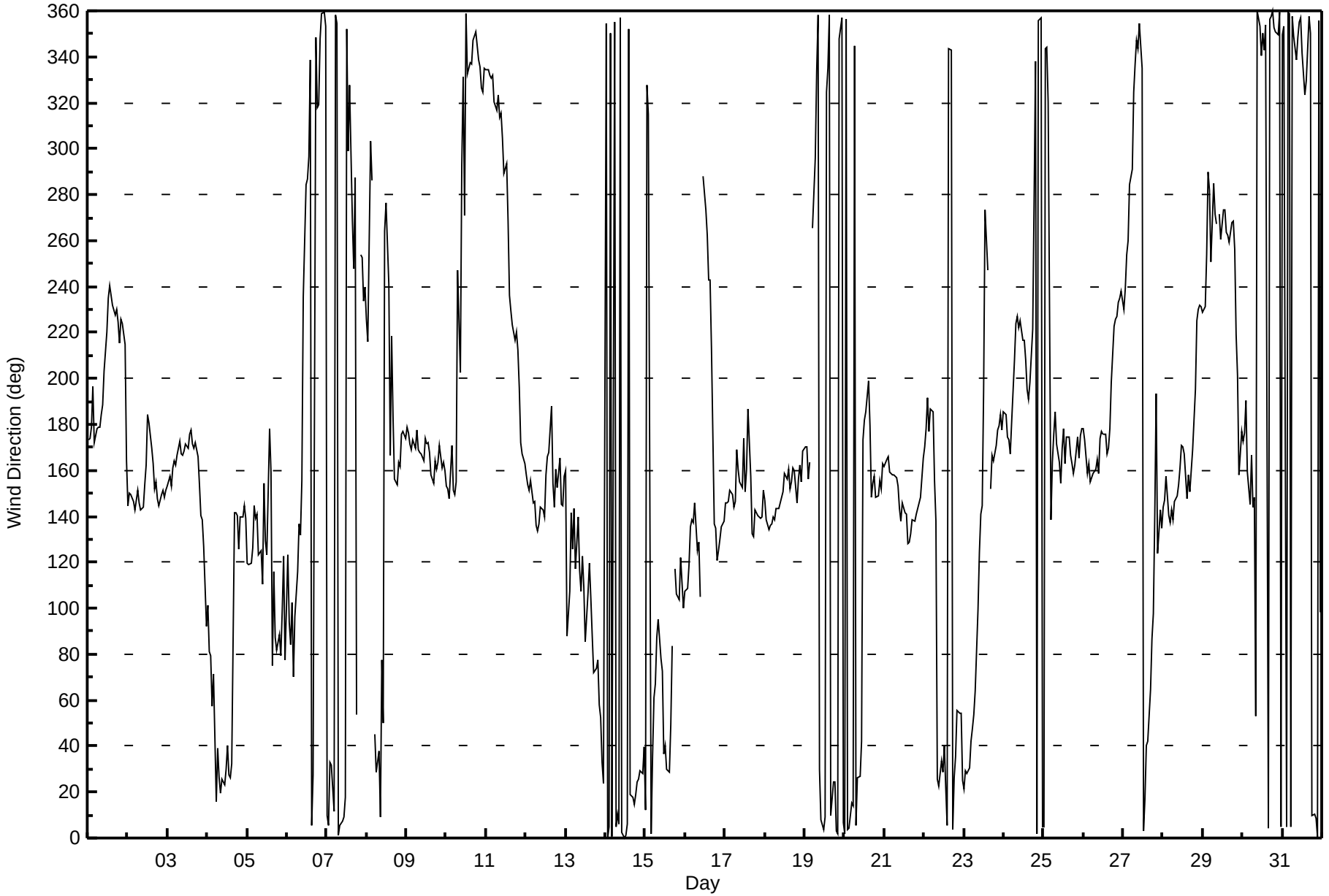
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Wapasu - January 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Wapasu - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 99 deg on Jan 20 11:00

Minimum Value: 5 deg on Jan 16 23:00

Percentiles: P_1 = 8 P_{10} = 19 Q_1 = 23 Median = 28 Q_3 = 34 P_{90} = 39 P_{99} = 71

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Hours of Calibration:	0
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	28	31	32	40	28	30	31	31	30	31	35	30	23	22	22	21	23	24	25	30	21	23	23	30	40
2-Jan	13	8	9	10	13	14	17	16	14	15	21	26	34	31	28	20	17	20	17	13	15	23	22	25	34
3-Jan	23	27	24	26	25	28	30	30	30	32	30	29	29	33	28	30	31	25	23	13	16	8	21	24	33
4-Jan	20	31	29	32	18	31	17	23	27	27	30	27	26	32	32	56	16	10	9	8	8	7	10	7	56
5-Jan	20	27	23	28	8	7	9	21	22	28	39	19	47	57	51	12	73	26	15	31	24	49	19	36	73
6-Jan	24	22	11	36	27	30	27	24	21	59	37	33	30	27	36	39	28	36	27	21	38	33	36	34	59
7-Jan	37	35	32	36	41	40	38	35	37	34	37	41	60	38	38	35	48	53	27	AF	45	34	28	26	60
8-Jan	46	68	58	62	AF	53	33	30	41	85	43	71	30	36	38	35	29	18	15	23	28	32	34	32	85
9-Jan	35	34	30	31	32	30	31	31	29	27	28	31	31	30	29	22	23	28	26	27	30	26	26	23	35
10-Jan	20	22	23	34	23	32	25	38	39	49	76	71	50	33	36	33	41	37	36	35	32	28	24	30	76
11-Jan	31	30	28	26	27	23	24	27	22	20	24	25	31	39	23	26	28	28	29	30	36	31	24	24	39
12-Jan	22	24	22	23	20	22	20	18	20	21	19	23	26	32	33	37	23	21	27	33	28	31	23	30	37
13-Jan	26	34	25	79	25	27	27	29	31	22	21	24	27	23	26	24	24	25	25	24	25	25	34	34	79
14-Jan	37	39	43	37	37	41	37	38	40	40	39	36	39	41	39	39	35	37	36	36	31	32	35	34	43
15-Jan	38	47	18	40	37	27	24	29	12	15	26	33	28	37	33	24	26	AF	16	21	13	17	20	27	47
16-Jan	29	20	19	16	12	14	15	19	19	23	AF	55	31	31	59	44	37	16	11	15	14	14	5	8	59
17-Jan	9	8	8	14	12	12	16	25	20	22	26	33	29	33	35	31	18	18	31	21	20	19	19	24	35
18-Jan	22	19	18	18	20	20	19	22	21	24	22	24	32	30	30	26	28	30	28	23	24	28	23	29	32
19-Jan	27	27	24	20	AF	52	23	29	34	31	36	37	43	39	33	32	37	32	33	35	33	33	37	35	52
20-Jan	34	35	37	31	36	47	34	37	33	50	99	37	39	40	36	28	19	24	25	23	24	26	23	26	99
21-Jan	27	30	28	25	30	28	27	27	26	21	20	23	22	23	20	19	17	20	22	23	22	24	24	31	31
22-Jan	32	30	31	33	32	26	25	23	44	30	32	34	36	40	38	32	37	37	32	33	27	29	28	32	44
23-Jan	38	28	29	29	33	19	20	16	24	18	21	23	53	26	22	AF	23	30	26	36	36	33	34	31	53
24-Jan	31	35	33	32	29	34	35	27	25	25	26	32	31	34	34	32	36	30	34	33	34	32	34	38	38
25-Jan	37	32	42	69	72	29	34	33	29	28	29	33	34	30	32	35	30	28	26	26	31	28	31	29	72
26-Jan	29	28	23	23	22	26	23	22	24	24	29	32	31	32	27	30	30	35	28	23	24	21	22	23	35
27-Jan	22	24	25	29	27	25	28	30	33	38	35	33	40	43	29	26	29	22	21	59	59	35	21	18	59
28-Jan	19	22	26	21	19	20	21	24	26	26	28	28	30	28	20	30	23	28	30	36	28	22	24	23	36
29-Jan	23	23	25	25	32	22	25	26	27	AF	23	25	25	23	24	24	22	25	28	24	51	26	15	34	51
30-Jan	38	24	30	44	13	25	12	43	54	37	40	30	34	32	38	38	36	36	36	38	40	36	38	36	54
31-Jan	39	34	37	33	35	32	33	33	31	37	32	35	34	24	25	33	34	36	34	35	37	38	23	41	41
	46	68	58	79	72	53	38	43	54	85	99	71	60	57	59	56	73	53	36	59	59	49	38	41	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 25, 2016	Last Calibration	December 3, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	12:55	End Time (MST)	17:20
Gas Cert Reference	SA130010A	Station temp.	Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-702
Analyzer IP address	192.168.1.43		Lamp voltage	874	884
Calculated slope	1.014716	0.999479	Chamber temp	44.9	45.0
Calculated intercept	1.887104	1.720405	Pressure	682.3	700.0
Analyzer Background	8.9	8.7	Flow	0.447	0.458
Analyzer Coefficient	0.840	0.840	Intensity	82	82

Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	60.4	577.4	574.2	1.006
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	60.4	577.4	577.1	1.001
second point	5000	30.2	288.7	285.5	1.011
third point	5000	15.2	145.3	142.3	1.021
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	60.4	577.4	577.3	1.000
				Average Correction Factor	1.011

Corrected As found	574.4	Previous response	567.2	% change	-1.3%

Notes:

Inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell

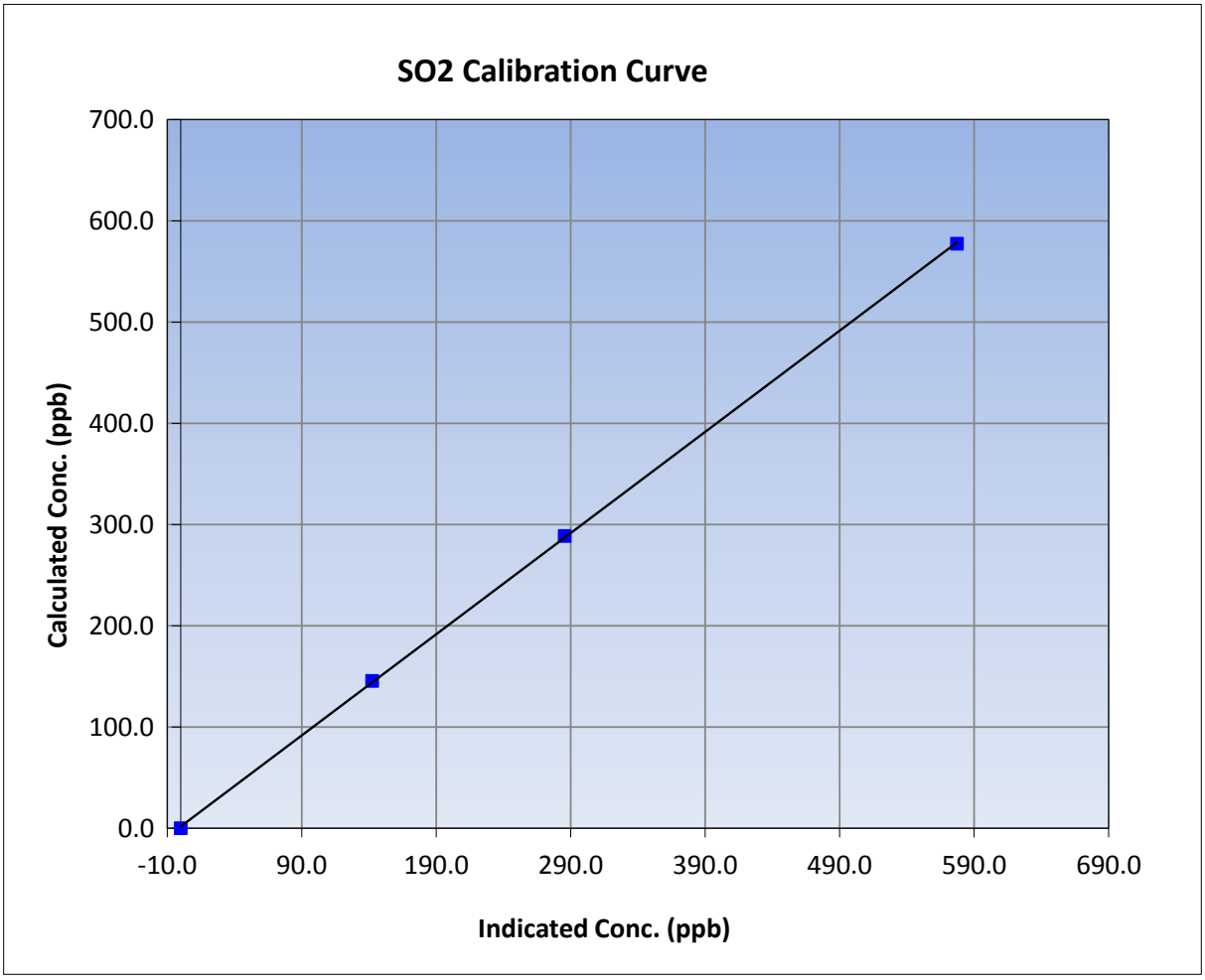
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

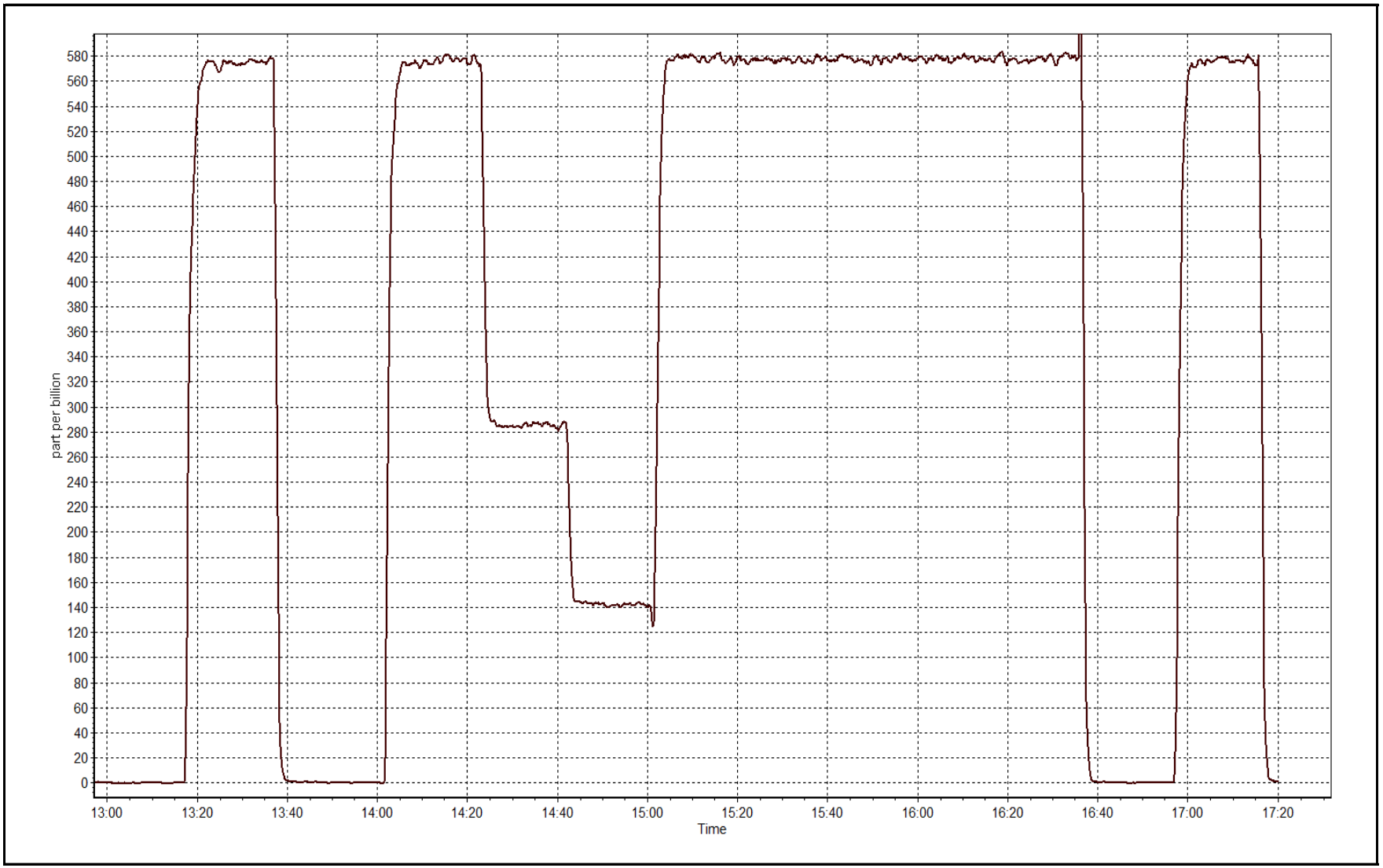
Calibration Date	January 25, 2016	Previous Calibration	December 3, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	12:55	End Time (MST)	17:20
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999950
577.4	577.1	1.0005		
288.7	285.5	1.0111	Slope	0.999479
145.3	142.3	1.0211		
			Intercept	1.720405



SO2 Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 26, 2016	Last Calibration	December 4, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:35	End Time (MST)	11:50
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12-Dec-16

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.45		Lamp voltage	800	800
Calculated slope	0.989468	0.996789	Chamber temp	45	45
Calculated intercept	0.049407	-0.162105	Pressure	538.7	551.3
Analyzer Background	14.6	14.4	Flow	0.949	0.979
Analyzer Coefficient	1.244	1.229	Intensity	113	113
			Converter temp.	342	342

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
Converter make/model		Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	78.4	80.0	81.3	0.984
SO2 scrubber check	5000	20.9	199.8	1.9	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	78.4	80.0	80.4	0.995
second point	5000	39.3	40.1	40.4	0.993
third point	5000	19.7	20.1	20.3	0.990
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	78.5	80.1	81.3	0.985
				Average Correction Factor	0.993

Corrected As found	81.4	Previous response	80.8	% change	-0.7%

Notes:

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

Calibration Performed By: Devin Russell

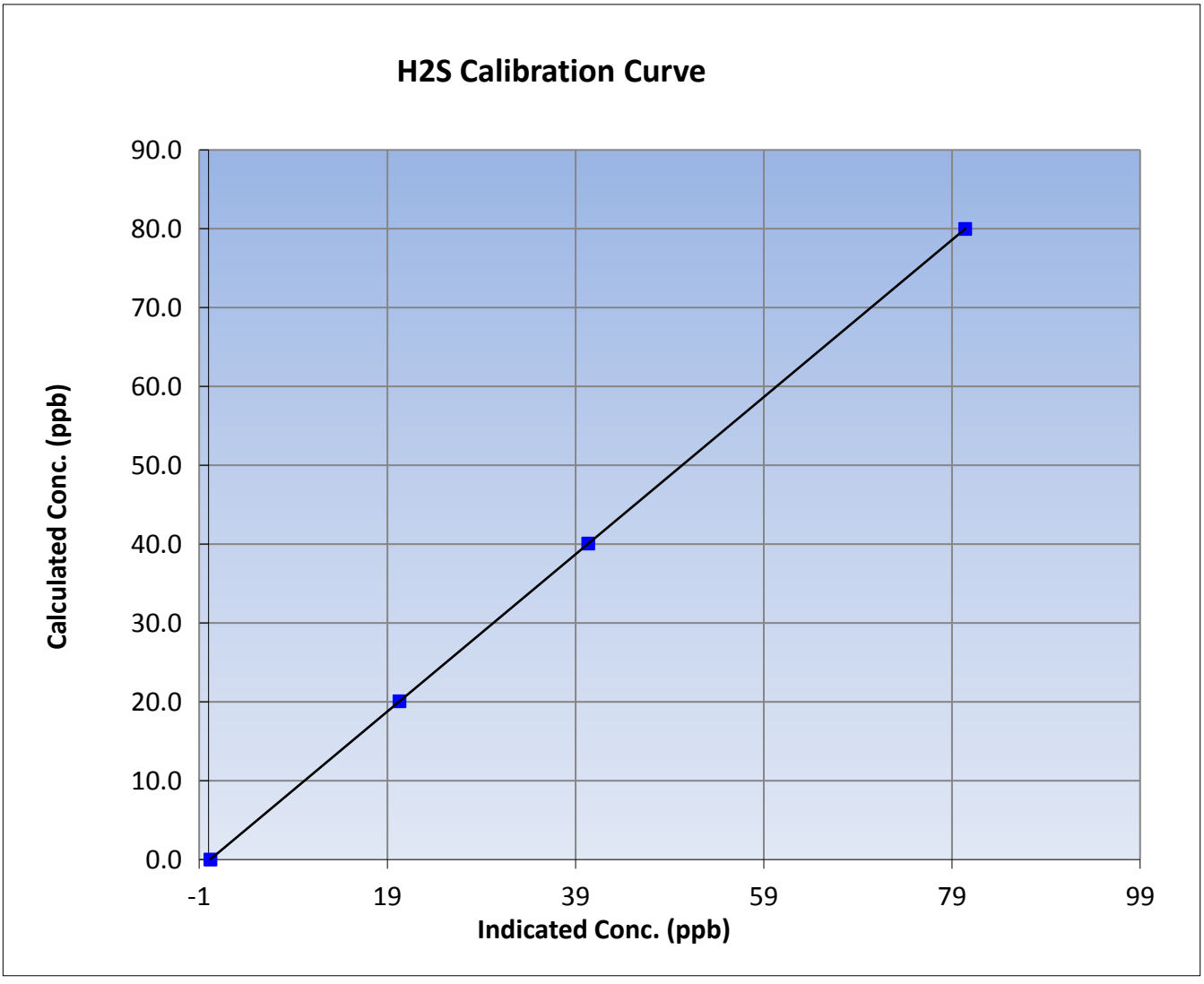
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

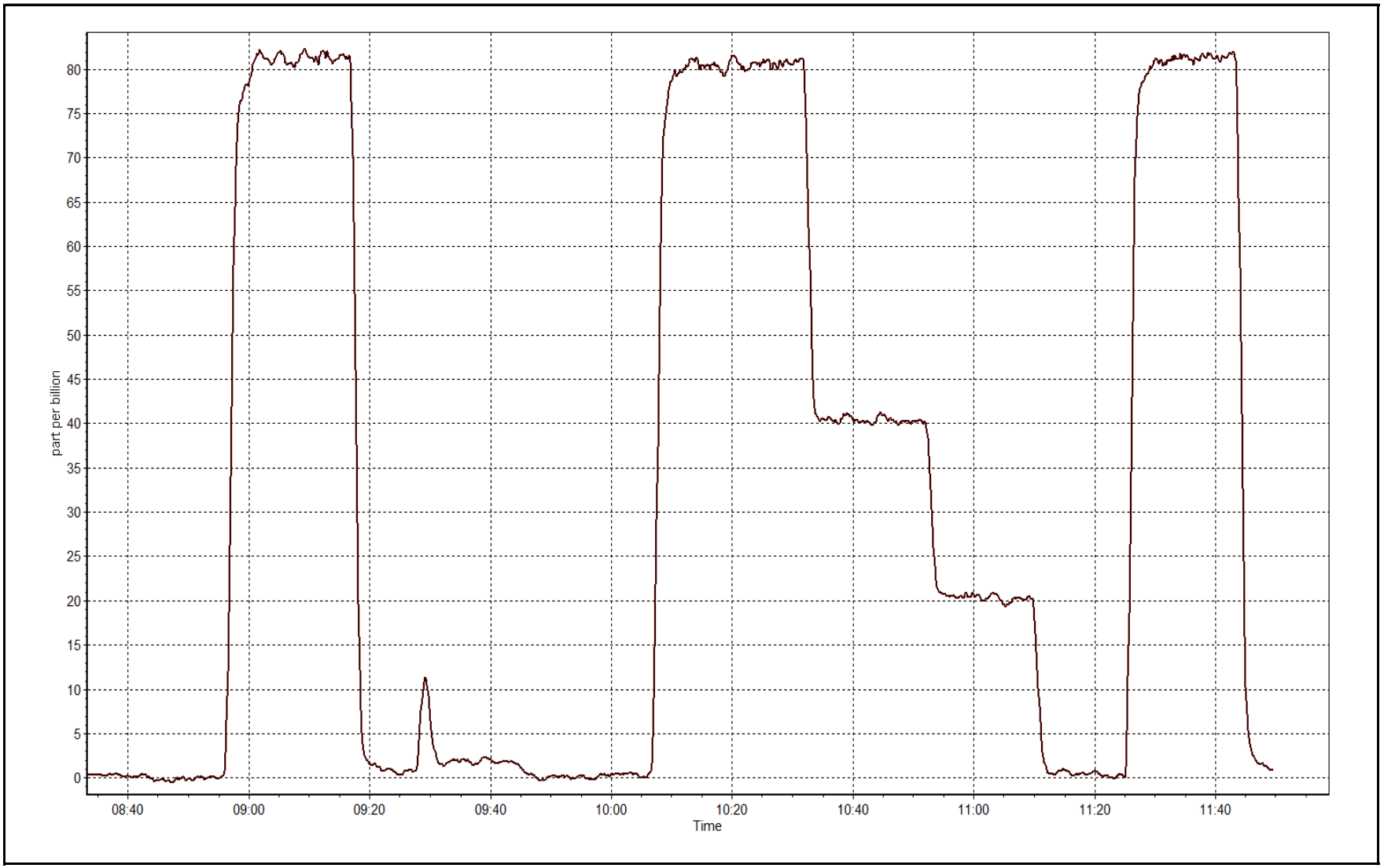
Calibration Date	January 26, 2016	Previous Calibration	December 4, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:35	End Time (MST)	11:50
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999999
80.0	80.4	0.9945		
40.1	40.4	0.9935	Slope	0.996789
20.1	20.3	0.9903		
			Intercept	-0.162105



H2S Calibration Plot Date: January 26, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January 25, 2016	Last Calibration	December 3, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	12:55	End Time (MST)	17:20
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

	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	37.4	41.0
Calculated slope	1.002997	1.000825	Fuel Pressure	24.8	24.8
Calculated intercept	-0.009289	-0.009266	Analyzer Coeff	4.3	4.3
			Analyzer BKG	2.680	2.720

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.05	----
as found span	5000	60.4	13.19	13.29	0.993
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	60.4	13.19	13.20	1.000
second point	5000	30.2	6.60	6.59	1.001
third point	5000	15.2	3.32	3.32	1.000
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	60.4	13.19	13.28	0.994
				Average Correction Factor	1.000

Corrected As found	13.24	Previous response	13.16	% change	-0.6%

Notes:

Inlet filter changed after as founds. Zero and span adjusted.

Calibration Performed By: Devin Russell

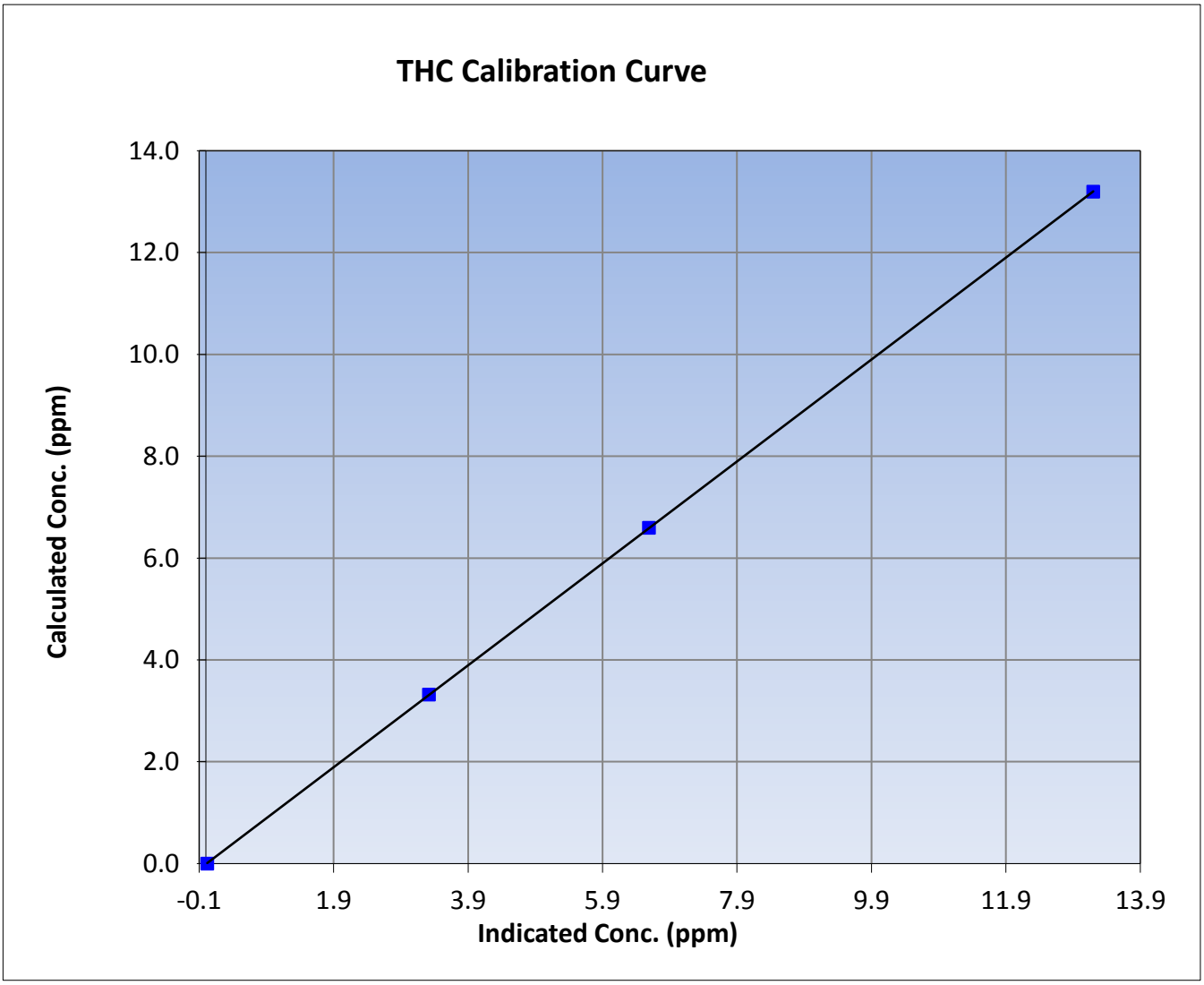
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

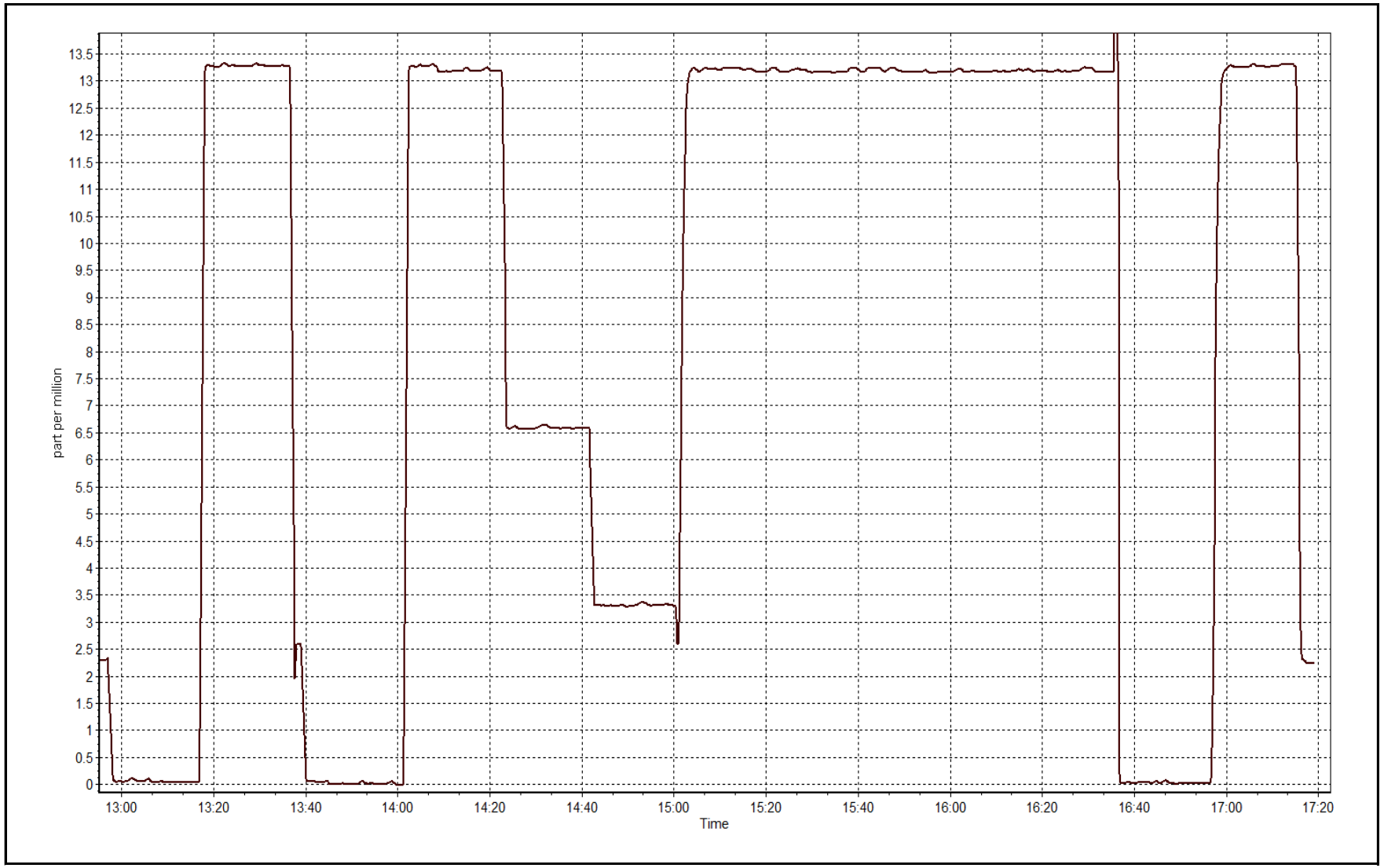
Calibration Date	January 25, 2016	Previous Calibration	December 3, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	12:55	End Time (MST)	17:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999996
13.19	13.20	0.9996		
6.60	6.59	1.0011	Slope	1.000825
3.32	3.32	1.0001		
			Intercept	-0.009266



THC Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	January 25, 2016	Previous Calibration	December 4, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	16:35	End Time (MST)	19:40
NO2 GPT Ref date	January 25, 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.	28.8	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	1.000089	1.000427	Pressure	25.5	25.8
Calculated intercept	-1.067405	-0.344141	Flow cell A	700	738
Analyzer Background	6.6	6.5	Flow cell B	691	723
Analyzer Coefficient	0.991	0.979	O3 measure	4560.6	4527.3
			O3 reference	4561.5	4544.3

Analyzer make	Teledyne API T400	Analyzer serial #	824

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.3	----
as found span	5000	713.6/1082.0	377.6	383.9	0.984
calibrator zero	5000	0.00	0.0	0.4	----
high point	5000	713.6/1082.0	377.6	377.9	0.999
second point	5000	496.5/973.6	255.4	255.4	1.000
third point	5000	260.3/849.3	130.8	131.2	0.997
as left zero	5000	0.00	0.0	0.1	----
as left span	5000	713.6/1082.0	377.6	376.1	1.004
				Average Correction Factor	0.999

Corrected As found	384.1	Previous response	378.6	% change	-1.4%

Notes:

Inlet filter changed after as founds. Span was adjusted.

Calibration Performed By: Devin Russell

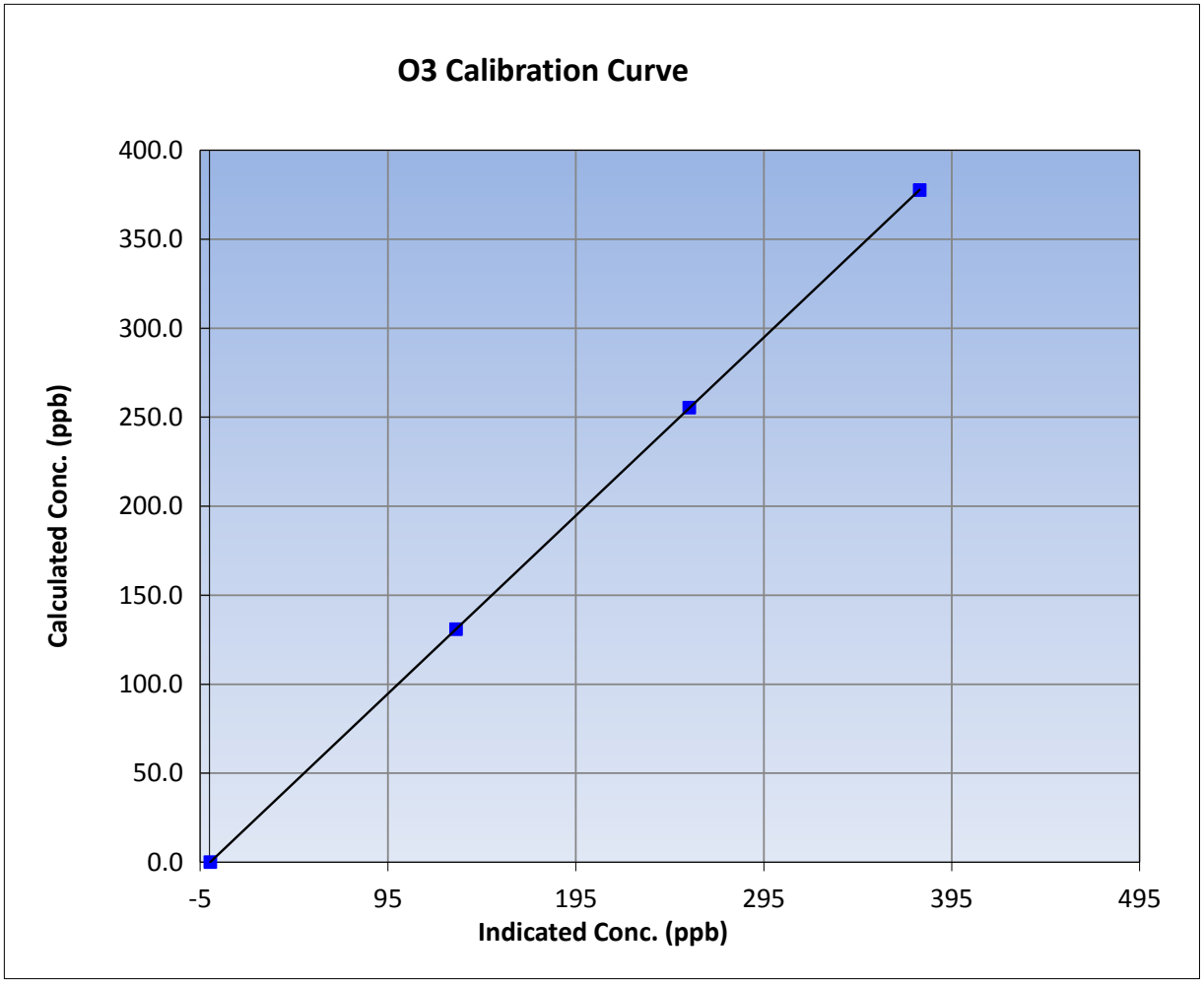
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

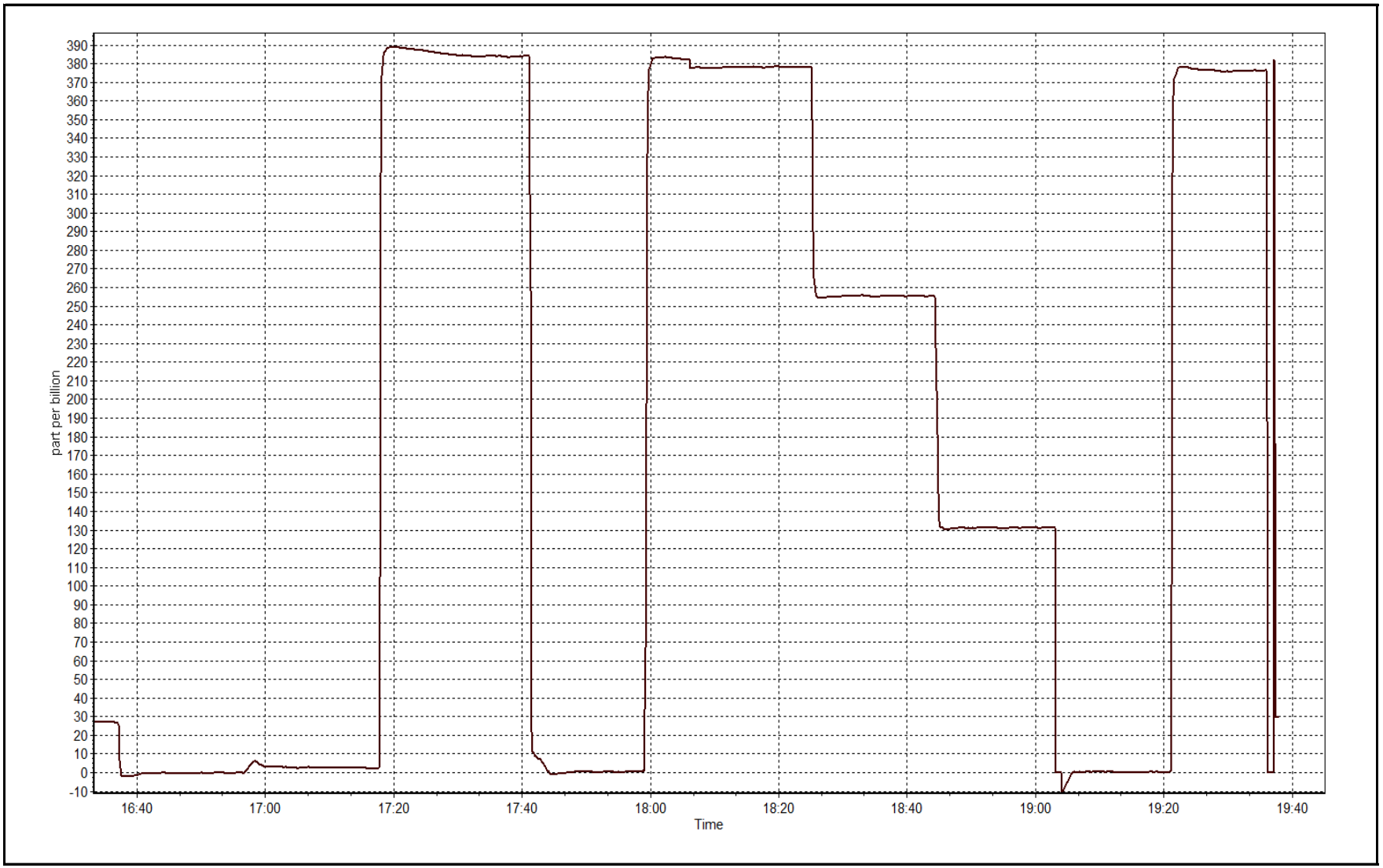
Calibration Date	January-25-16	Previous Calibration	December 4, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	16:35	End Time (MST)	19:40
Analyzer make	Teledyne API T400	Analyzer serial #	824

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999999
377.6	377.9	0.9991		
255.4	255.4	1.0001	Slope	1.000427
130.8	131.2	0.9971		
			Intercept	-0.344141



O3 Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 25, 2016	Previous Calibration	December 3, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	17:20
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	12/2016
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.991446	0.990261	1.000038
	Data Offset	1.647250	1.303297	0.005021
Current Calibration	Data Slope	1.000198	0.996879	1.006152
	Data Offset	2.834079	2.779881	0.422816

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	0.964		0.964	
NOX coefficient	0.960		0.960	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.6		0.6	
NOX bkgrnd	1.1		1.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	314.8	Deg C	316.2	Deg C
PMT voltage	781	V	781	V
PMT Temp	7	Deg C	7	Deg C
O3 flow	72	ccm	72	ccm
R Cell press NO	4.9	mmHg	5.1	mmHg
R Cell Press Nox	4.9	mmHg	5.1	mmHg
NO sample flow	0.442	lpm	0.45	lpm
Nox sample Flow	0.446	lpm	0.446	lpm

Notes:

Inlet filter changed after as founds. No adjustments made.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 25, 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	-0.6	-0.5	-0.1	----	----
as found span	5000	60.4	600.4	600.4	0.0	601.9	598.9	2.9	0.9976	1.0024
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.7	0.0	----	----
high point	5000	60.4	600.4	600.4	0.0	598.4	600.4	-2.1	1.0033	0.9999
second point	5000	30.2	300.2	300.2	0.0	296.3	297.5	-1.1	1.0130	1.0091
third point	5000	15.2	151.1	151.1	0.0	146.1	146.6	-0.5	1.0345	1.0309
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.3	----	----
as left span	5000	60.4	600.4	220.5	379.9	595.6	218.9	376.6	1.0080	1.0069
								Average Correction Factor	1.0169	1.0133

Corrcted As found NO_X= 602.4 NO= 599.4 Percent Change NO_X= 0.2% NO= 0.9%

Previous Response NO_X= 603.9 NO= 605.0

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	220.5	377.6	595.5	220.5	375.0	0.9961	1.0000	1.0067	99.3%
2nd NO2 (200)	----	342.7	255.4	596.0	342.7	253.4	0.9953	1.0000	1.0078	99.2%
3rd NO2 (100)	----	467.3	130.8	596.2	467.3	128.9	0.9950	1.0000	1.0141	98.6%
4th NO2 (0)	598.0	----	-0.5	597.5	598.0	-0.5	0.9928	1.0000	N/A	----
					Average Correction Factor		0.9948	1.0000	1.0095	99.1%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

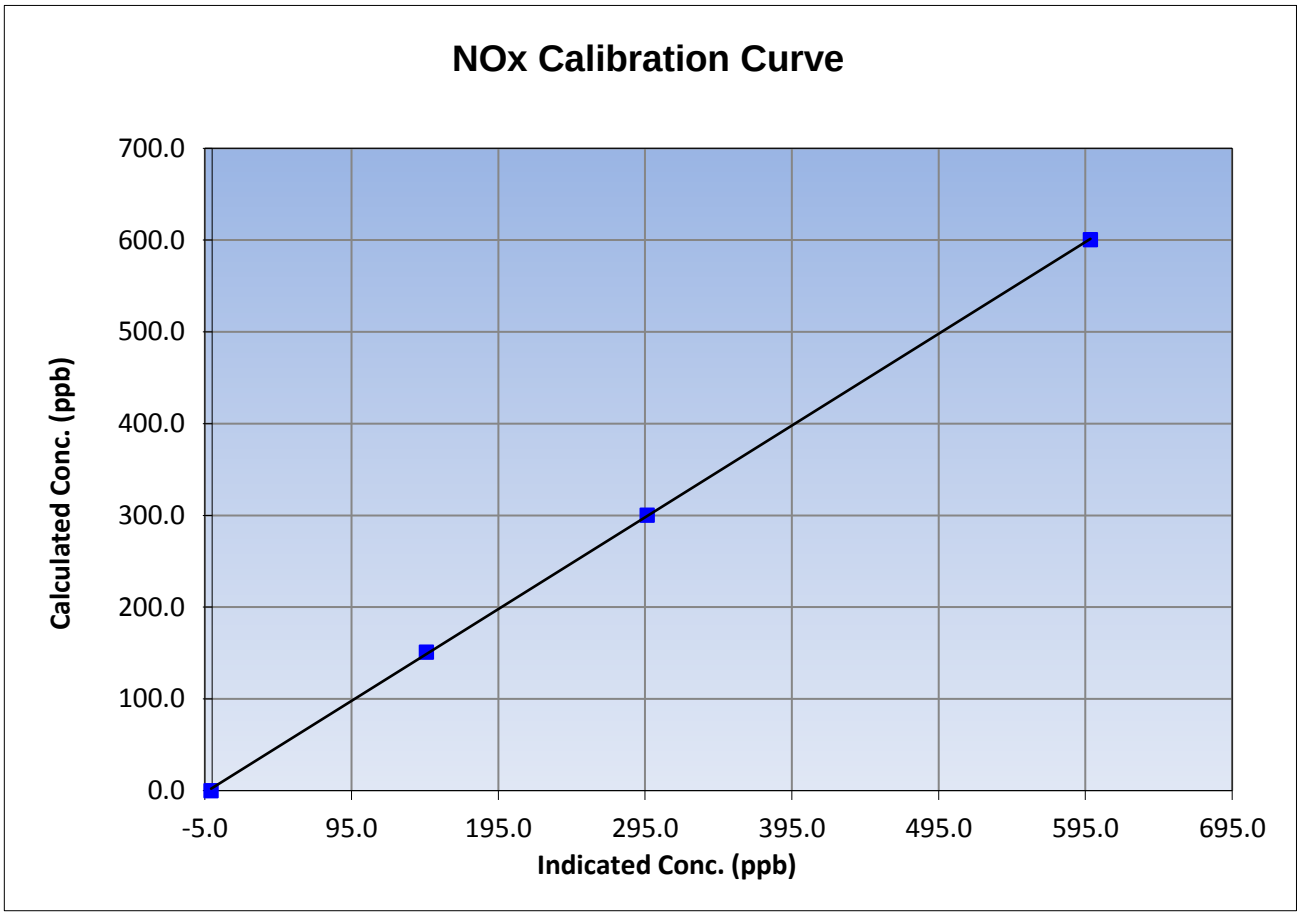
NO_X Calibration Summary

Station Information

Calibration Date	January 25, 2016	Previous Calibration	December 3, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	12:00	End Time (MST)	17:20
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	-0.7	----	Correlation Coefficient	0.999943
600.4	598.4	1.0033		
300.2	296.3	1.0130	Slope	1.000198
151.1	146.1	1.0345		
			Intercept	2.834079



Wood Buffalo Environmental Association

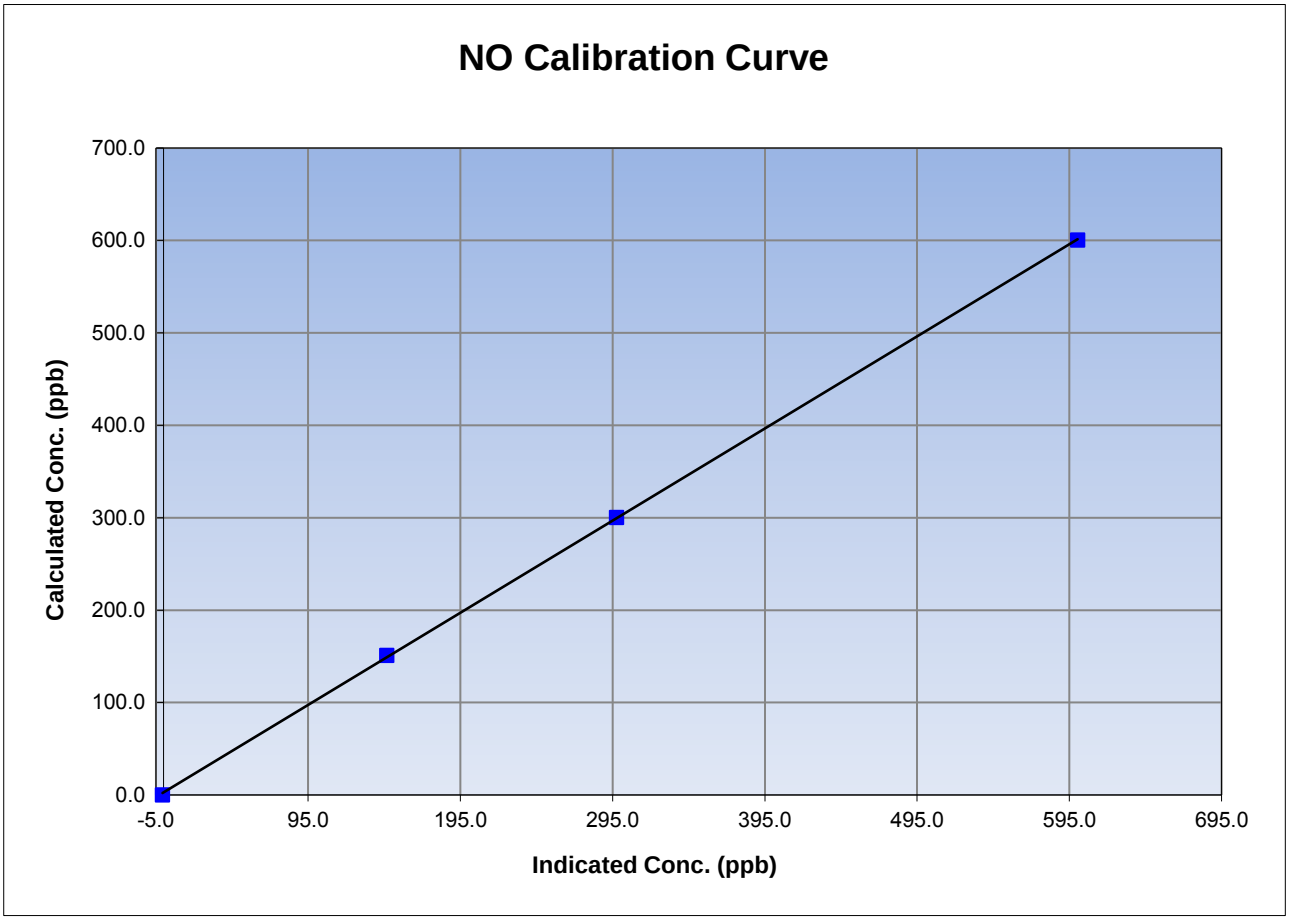
NO Calibration Summary

Station Information

Calibration Date	January 25, 2016	Previous Calibration	December 3, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	12:00	End Time (MST)	17:20
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	-0.7	N/A	Correlation Coefficient	0.999944
600.4	600.4	0.9999		
300.2	297.5	1.0091	Slope	0.996879
151.1	146.6	1.0309		
			Intercept	2.779881



Wood Buffalo Environmental Association

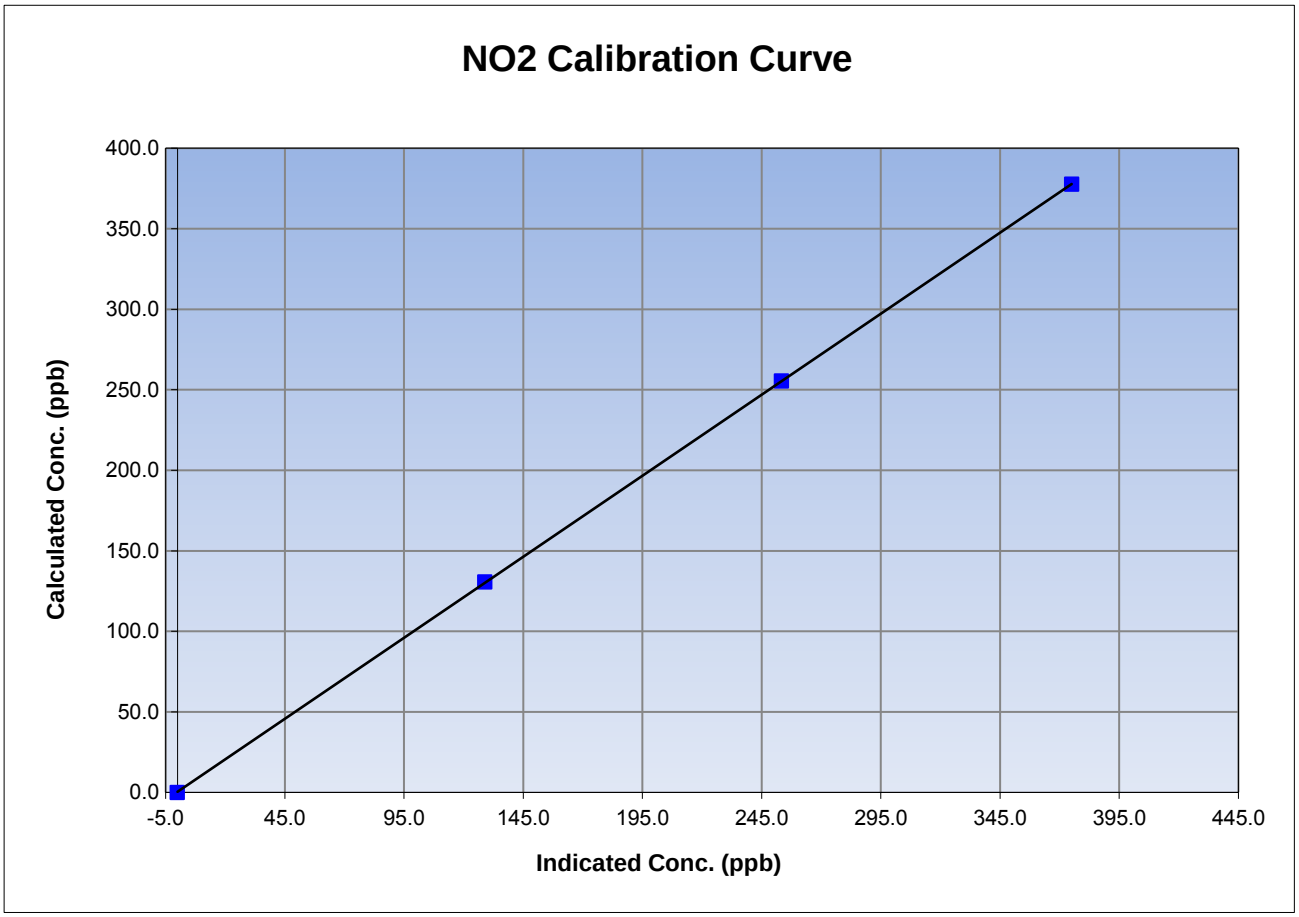
NO_2 Calibration Summary

Station Information

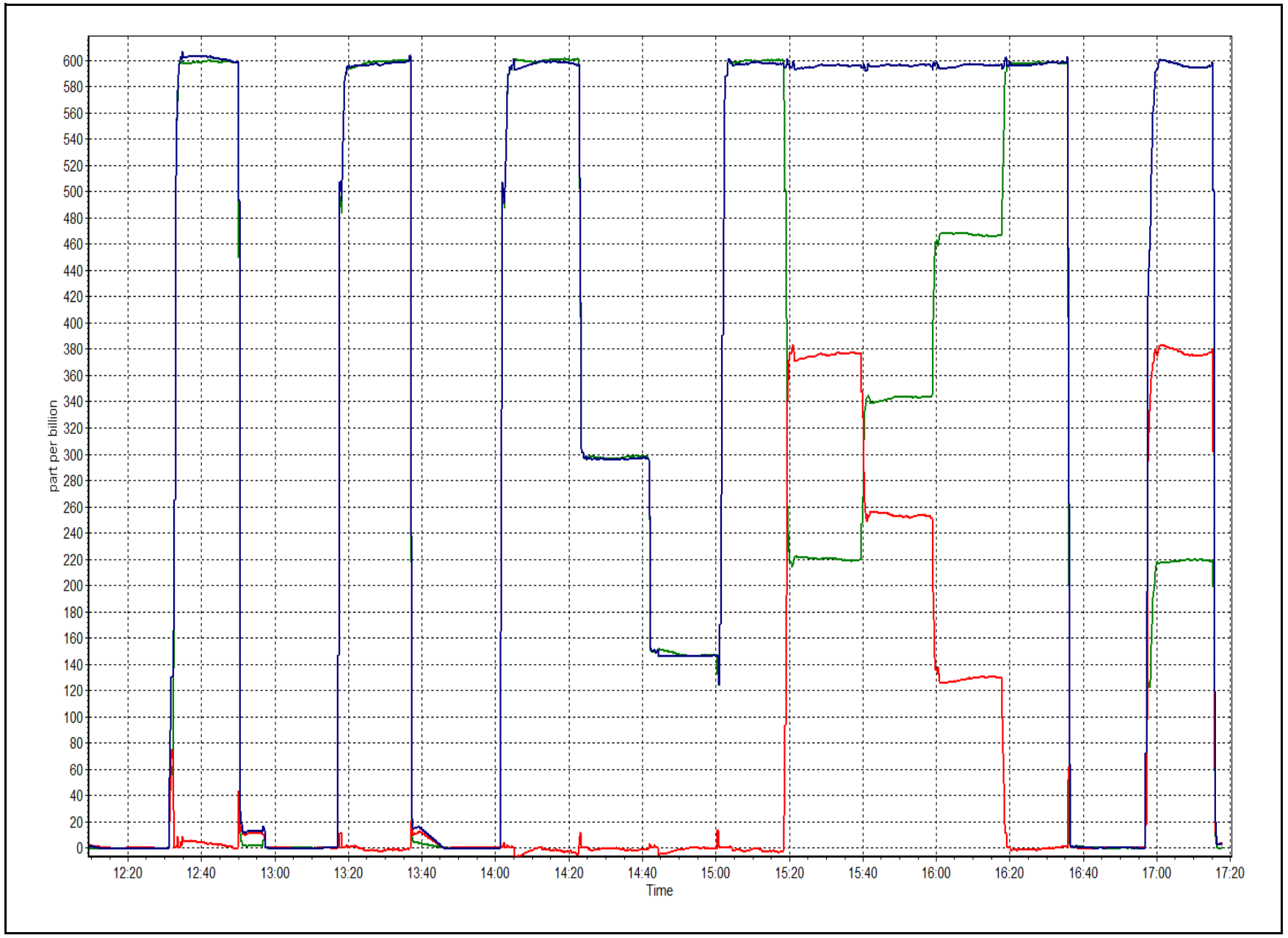
Calibration Date	January 25, 2016	Previous Calibration	December 3, 2015
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	12:00	End Time (MST)	17:20
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999993
377.6	375.0	1.0067		
255.4	253.4	1.0078	Slope	1.006152
130.8	128.9	1.0141		
			Intercept	0.422816



NOX Calibration Plot Date: January 25, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 26, 2016	Previous Calibration:	December 4, 2015
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	8:35	End Time (MST):	9:50
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION

Particulate Fraction:	PM2.5												
Make/Model:	Thermo / SHARP 5030												
Serial Number	E-1107												
C_{14} Source SN:	2518												
Confirmation of Time settings:	Yes ☑		No ☐										
Paremeters Checked:	T1	☑	T2	☐	T3	☐	T4	☐	P3	☑	Main Flow	☑	Beta ☐	Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-6.0	-6.8	-0.8	-6.0
T2	16.0	na	na	
T3	19.0	na	na	
T4	17.0	na	na	
RH (%)	16.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	944	942.1	-2.0	944

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	199		199
Neph	0.7		0
C14	6.8		7.3
Indicated Concentration (ug/m3)	**0.4**	**yes**	**0**
Offset 1			199.8
Offset 2			32

Leak Check (Quarterly)

Leak Check Date: | Previous Leak Check Date: June 10, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):		0.00
*Flow with adaptor (LPM):		

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

Mass Foil Calibration (Annualy)

Foil Calibration Date: | Previous Foil Calibration:

Zeroed?:

Foil Mass: | **Mass foil set S/N:**

Previous Correction Factor:

New Correction Factor:

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	26/01/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head cleaned. Nephalometer zeroed. Filter tape has about 25% of the roll left.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 18
CONKLIN LOOKOUT
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
JANUARY 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	5	0	2	0
TRS(ppb) Average	707	34	37	99.60	1	0	1	0
THC(ppm) Average	709	35	35	100.00	2.6	-	2.4	-
NMHC(ppm) Average	709	35	35	100.00	0.103	-	0.082	-
CH4(ppm) Average	709	35	35	100.00	2.5	-	2.3	-
O3 (ppb) Average	708	33	36	99.60	48	0	44	-
NO2 (ppb) Average	707	35	37	99.73	19	0	7	-
NO (ppb) Average	707	35	37	99.73	3	-	1	-
NOX (ppb) Average	707	35	37	99.73	19	-	7	-
PM2.5 (ug/m3) Average	742	2	2	100.00	23.2	-	9.3	0
Wind Speed 10 m (km/h) Average	737	0	7	99.06	23	-	17	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	4.9	-	2.2	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	91.0	-
Precipitation (mm) Total	744	0	0	100.00	0.7	-	6.3	-
Leaf Wetness (% of range) Average	741	0	3	99.60	74	-	14.0	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	342	-	66.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.6	1	-	0	0	0	0	1	1	5
TRS (ppb) Average	707	0.4	0	-	0	0	0	0	0	0	1
THC (ppm) Average	709	2.07	0.1	-	1.9	1.9	2	2	2.1	2.3	2.6
NMHC(ppm) Average	709	0.013	0.023	-	0	0	0	0	0	0	0.103
CH4(ppm) Average	709	2.06	0.1	-	1.9	1.9	2	2	2.1	2.2	2.5
O3 (ppb) Average	708	32.1	7	-	12	22	27	33	37	42	48
NO2 (ppb) Average	707	2.8	2	-	0	1	1	2	4	6	19
NO (ppb) Average	707	0.2	0	-	0	0	0	0	0	0	3
NOX (ppb) Average	707	2.9	3	-	0	1	1	2	4	7	19
PM2.5 (ug/m3) Average	742	4.17	3.7	-	0.3	1	1.4	2.8	6	9.6	23.2
Wind Speed 10 m (km/h) Average	737	7.5	5	-	0	2	4	6	11	16	23
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-10.64	7.8	-	-28.4	-20.8	-16	-10.7	-4.9	0	4.9
Relative Humidity (%) Average	744	78.1	12	-	32	59	73	82	87	89	96
Precipitation (mm) Total	744	-	-	16.13	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	741	3.2	5	-	1	2	2	3	3	5	74
Global Solar Radiation (W/m2) Average	744	22.5	51	-	0	0	0	0	17	82	342

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS, O3	15 Jan 2016 11:00	15 Jan 2016 13:00	3	Maintenance - manifold cleaning
NO2, NO, NOX	20 Jan 2016 09:00	20 Jan 2016 10:00	2	Maintenance - confirmed calibration points for Ozone
Wind Speed, Wind Direction	08 Jan 2016 18:00	08 Jan 2016 18:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 00:00	16 Jan 2016 01:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 05:00	16 Jan 2016 05:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 15:00	16 Jan 2016 16:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 18:00	16 Jan 2016 18:00	1	Flat line in sensor output signal - Sensor frozen
Surface Leaf Wetness	29 Jan 2016 05:00	29 Jan 2016 07:00	3	Unstable operation - exceed upper range

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 5 ppb on Jan 16 13:00

Maximum Daily Average: 1.7 ppb on Jan 7

Minimum Value: 0 ppb on Jan 17 07:00

Minimum Daily Average: 0.1 ppb on Jan 24

Maximum Diurnal Average: 0.7 ppb at hour 13

Minimum Diurnal Average: 0.5 ppb at hour 3

Monthly Average: 0.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	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
3-Jan	1	1	Z	2	1	1	1	3	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	4
4-Jan	1	1	1	Z	1	1	1	1	2	2	2	1	1	1	1	1	1	1	2	2	4	2	1	1	1.4	4
5-Jan	1	2	2	2	Z	2	1	2	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1.0	2
6-Jan	2	1	1	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
7-Jan	Z	0	0	0	1	1	2	2	2	2	1	1	2	2	4	4	3	1	1	1	2	2	2	1	1.7	4
8-Jan	0	Z	0	0	0	0	0	0	1	0	1	0	1	1	1	1	1	1	1	2	2	1	1	1	0.8	2
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
10-Jan	1	1	2	Z	2	2	2	2	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0.9	2
11-Jan	1	1	1	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Jan	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Jan	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Jan	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1
15-Jan	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Jan	0	0	0	0	Z	0	0	0	0	0	1	3	5	3	2	1	1	0	0	0	0	0	0	0	0.8	5
17-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1
18-Jan	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
20-Jan	2	3	Z	3	2	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1.0	3
21-Jan	0	0	0	Z	0	0	0	0	1	1	3	4	3	2	2	2	2	2	1	1	1	1	1	1	1.3	4
22-Jan	1	1	1	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	2	1	1	1	1	0.9	2
23-Jan	1	1	1	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Jan	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	0	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.7	1
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Jan	0	Z	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	2	4	0.7	4
	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	Diurnal Average	
	2	3	2	3	2	2	2	3	4	3	3	4	5	3	4	4	3	2	2	2	4	2	2	4	Diurnal Maximum	

Z - zerospan C - Calibration

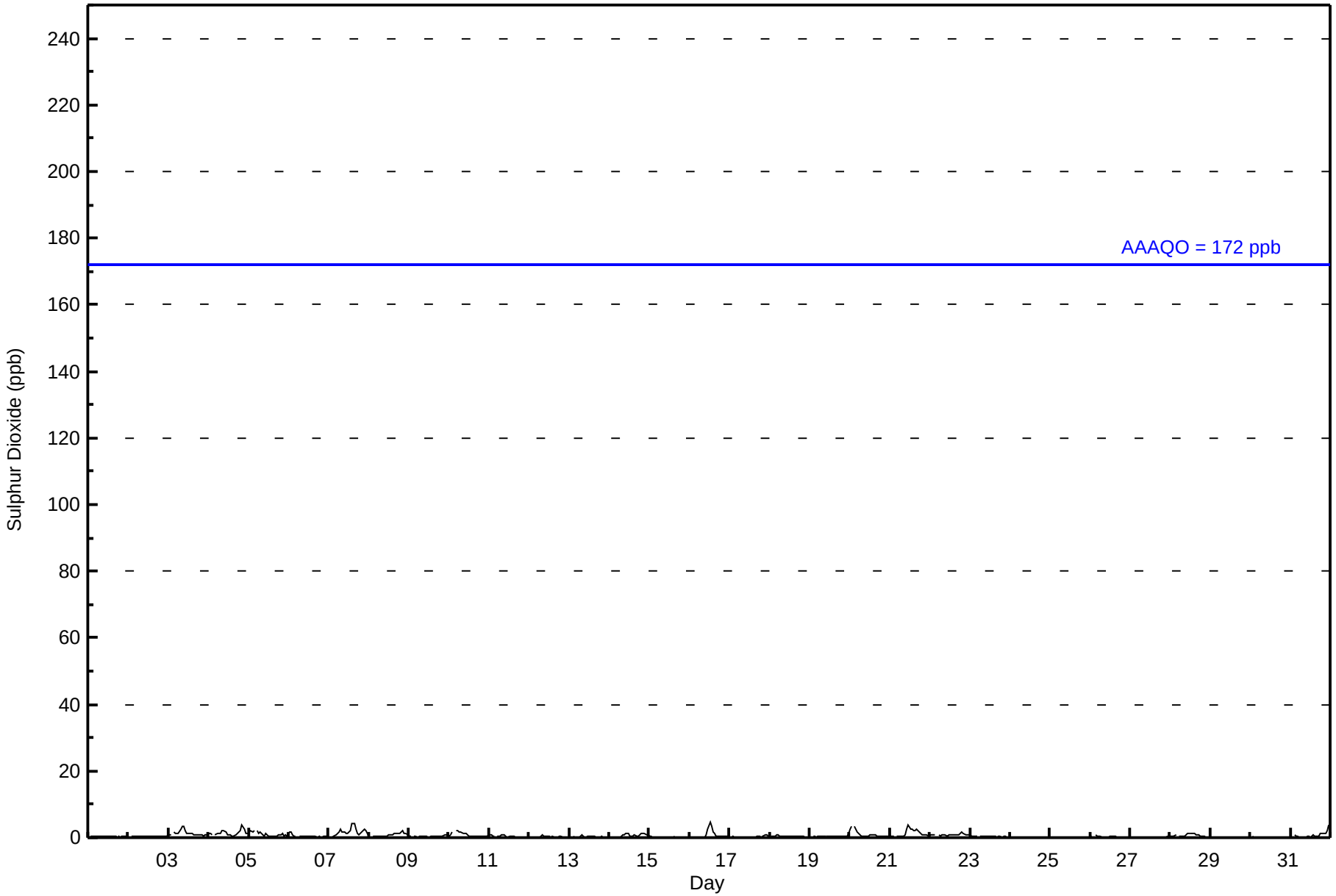
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - January 2016



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Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	709	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	24	51	55	20	17	5	11	26	26	100	118	32	62	85	35	36	703
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	51	55	20	17	5	11	26	26	100	118	32	62	85	35	36	703

Total Number of Valid Hours: 703

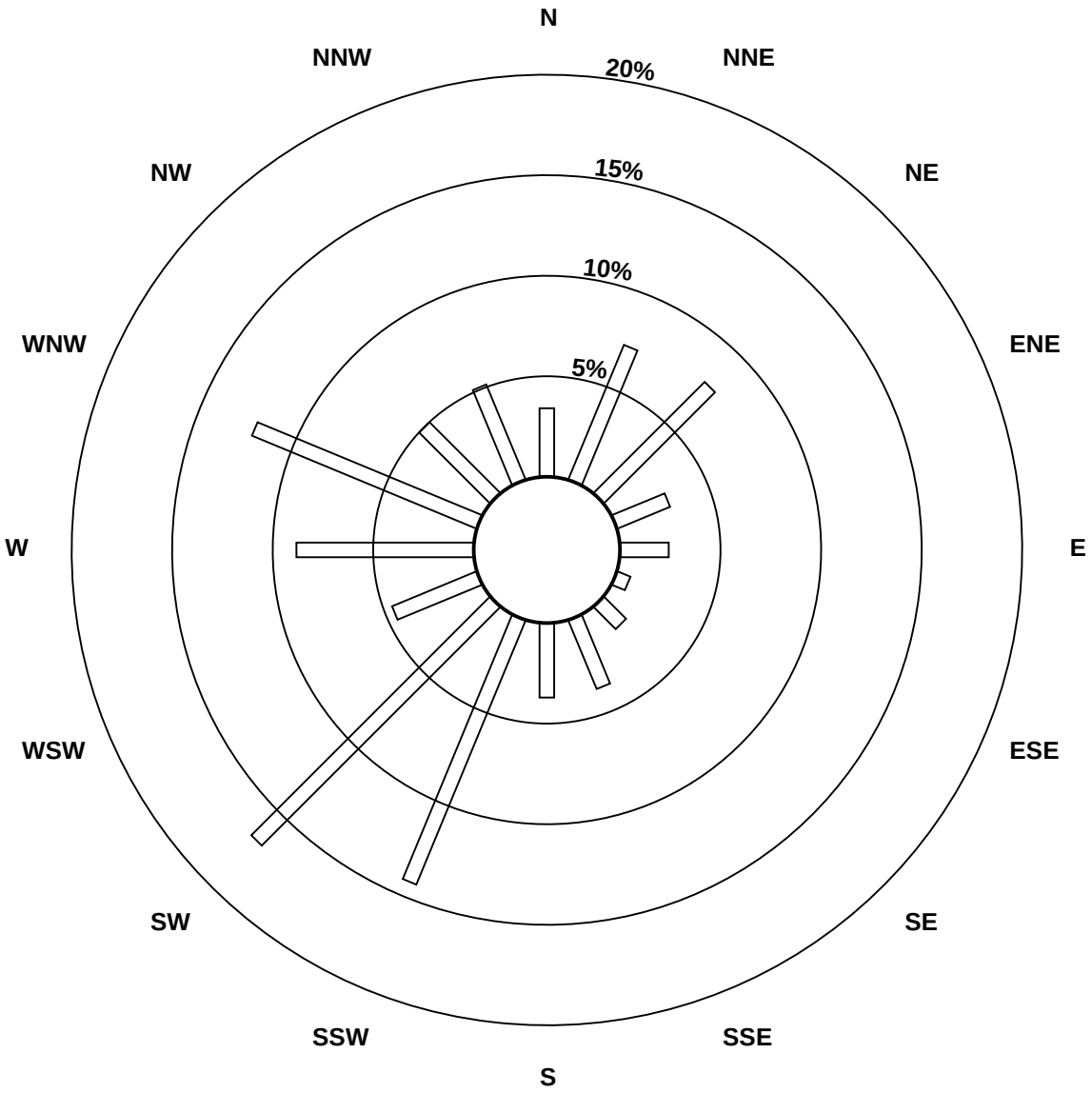
Total Number of Hours: 744

Wood Buffalo Environmental Association

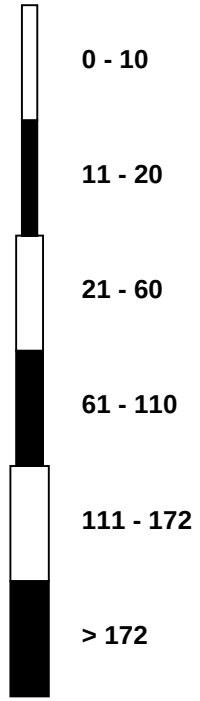
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



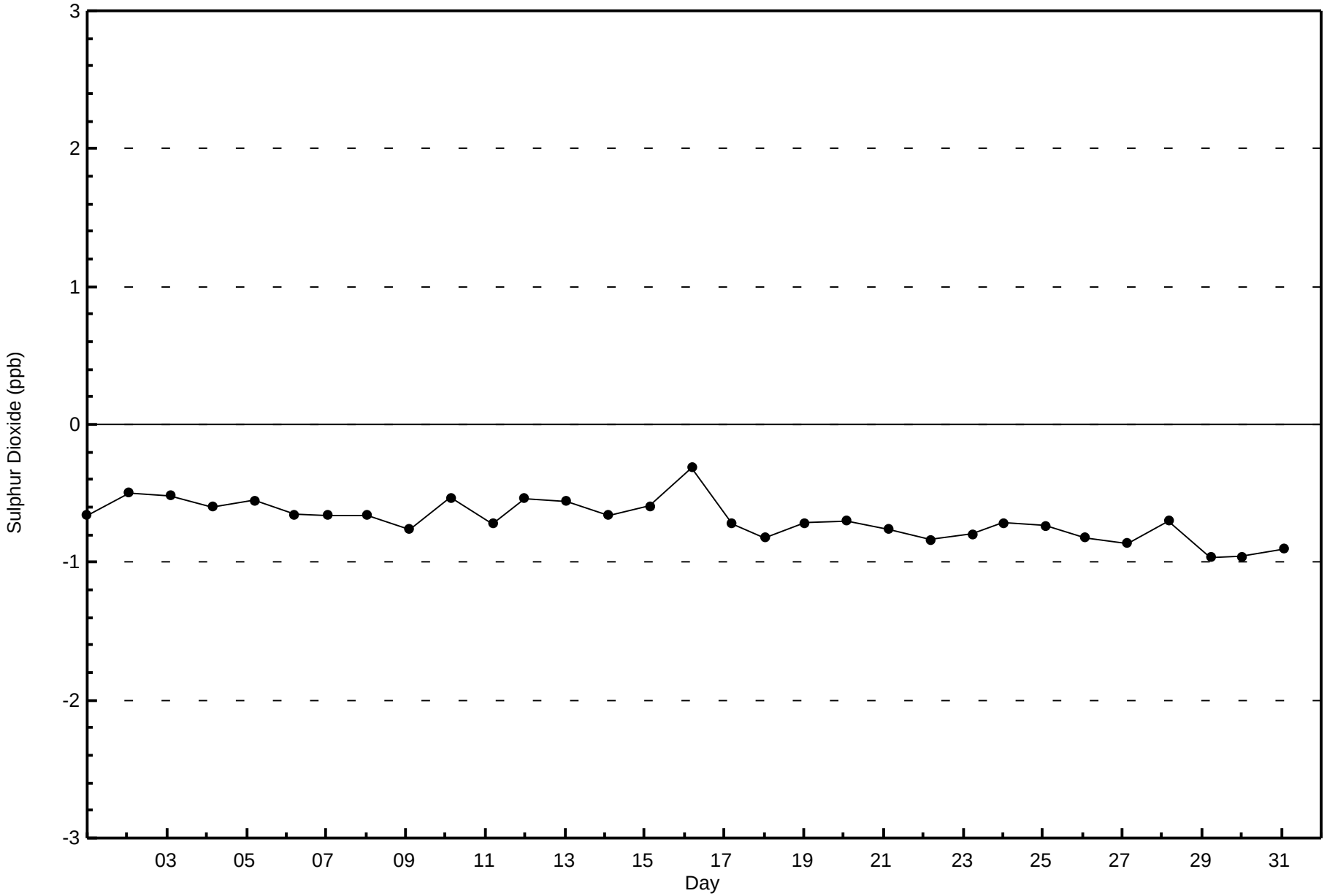
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - January 2016

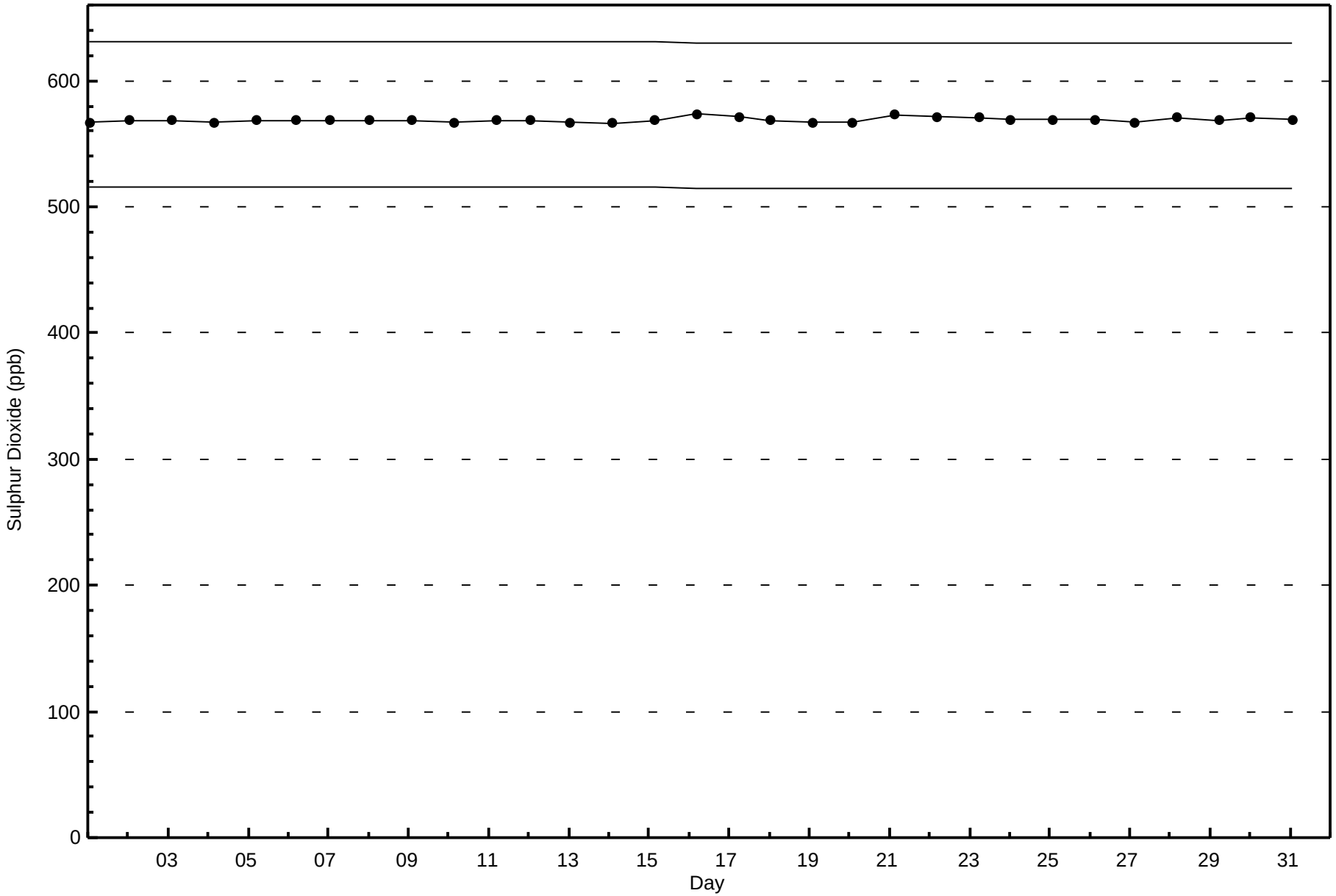


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Jan 20 03:00

Maximum Daily Average: 0.5 ppb on Jan 20

Minimum Value: 0 ppb on Jan 17 12:00

Minimum Daily Average: 0.3 ppb on Jan 1

Maximum Diurnal Average: 0.4 ppb at hour 3

Minimum Diurnal Average: 0.3 ppb at hour 24

Monthly Average: 0.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	34
Percent Operational Time:	99.6

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

Z - zerospan C - Calibration M - Maintenance

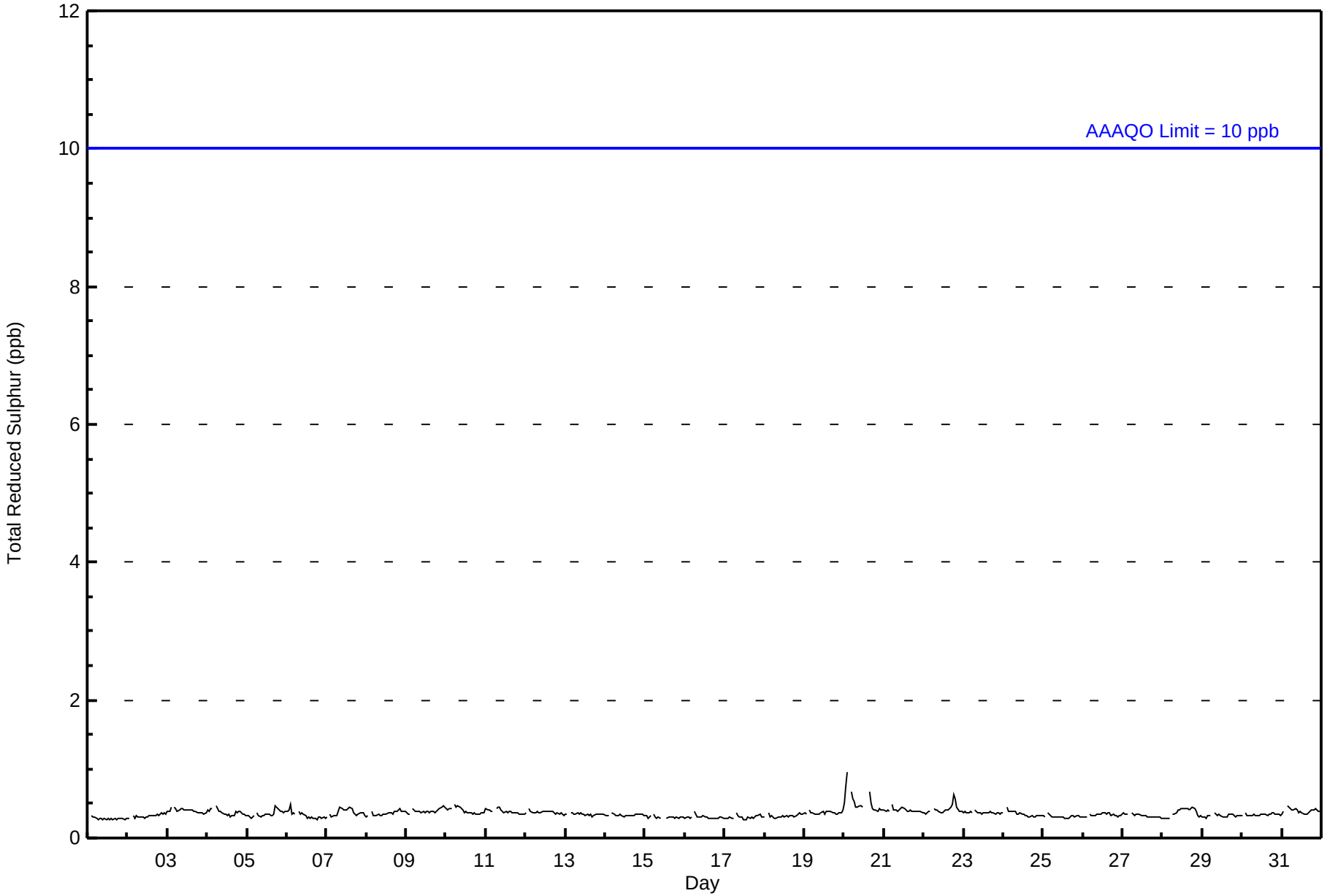
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	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: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	25	51	55	19	17	5	11	26	25	101	117	30	61	86	34	37	700
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	25	51	55	19	17	5	11	26	25	101	117	30	61	86	34	37	700

Total Number of Valid Hours: 700

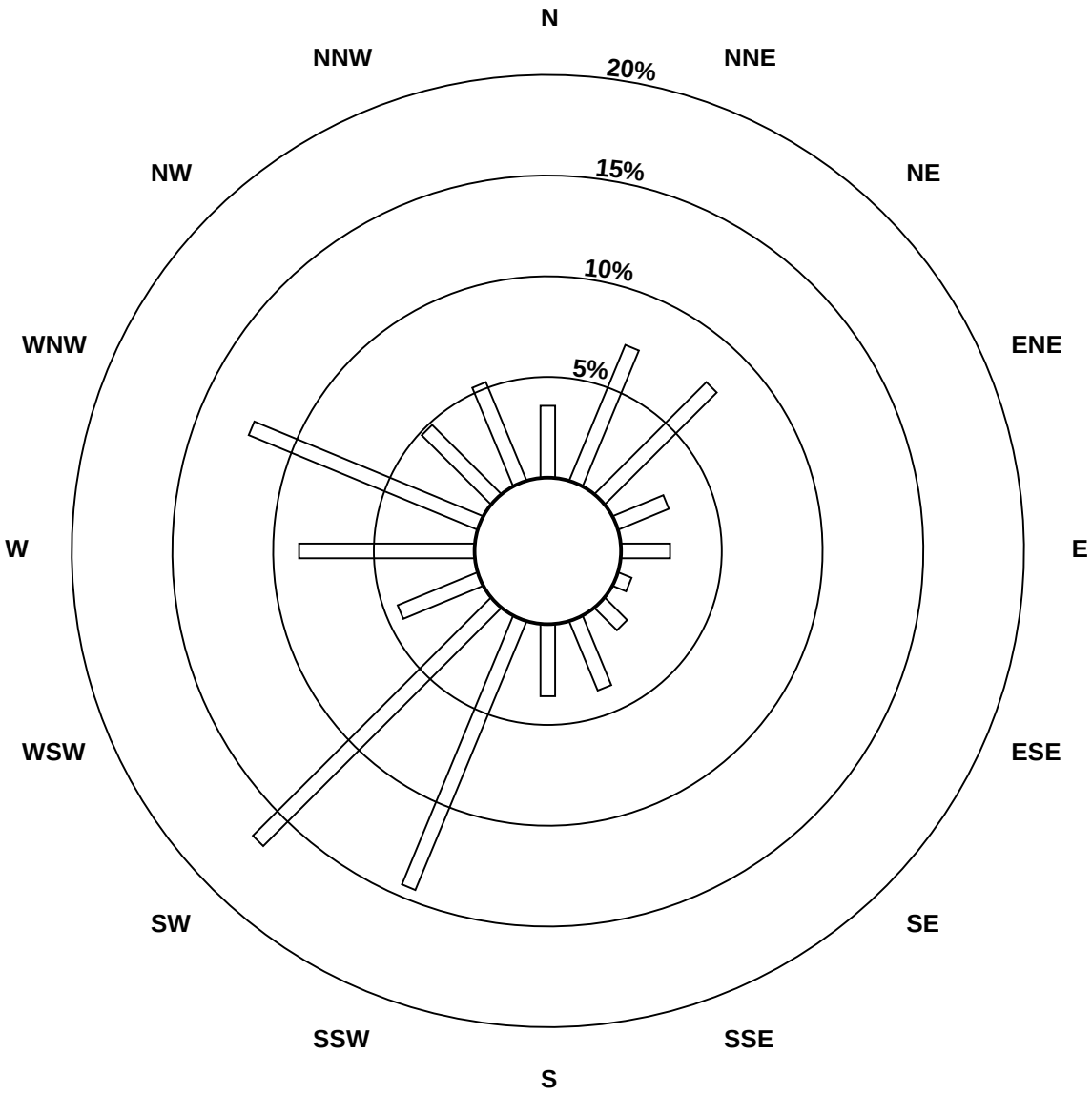
Total Number of Hours: 744

Wood Buffalo Environmental Association

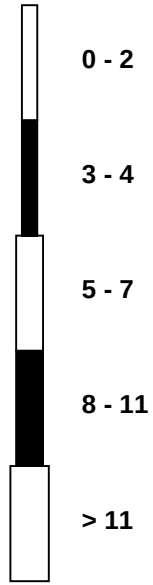
Wind Rose Jan 2016

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



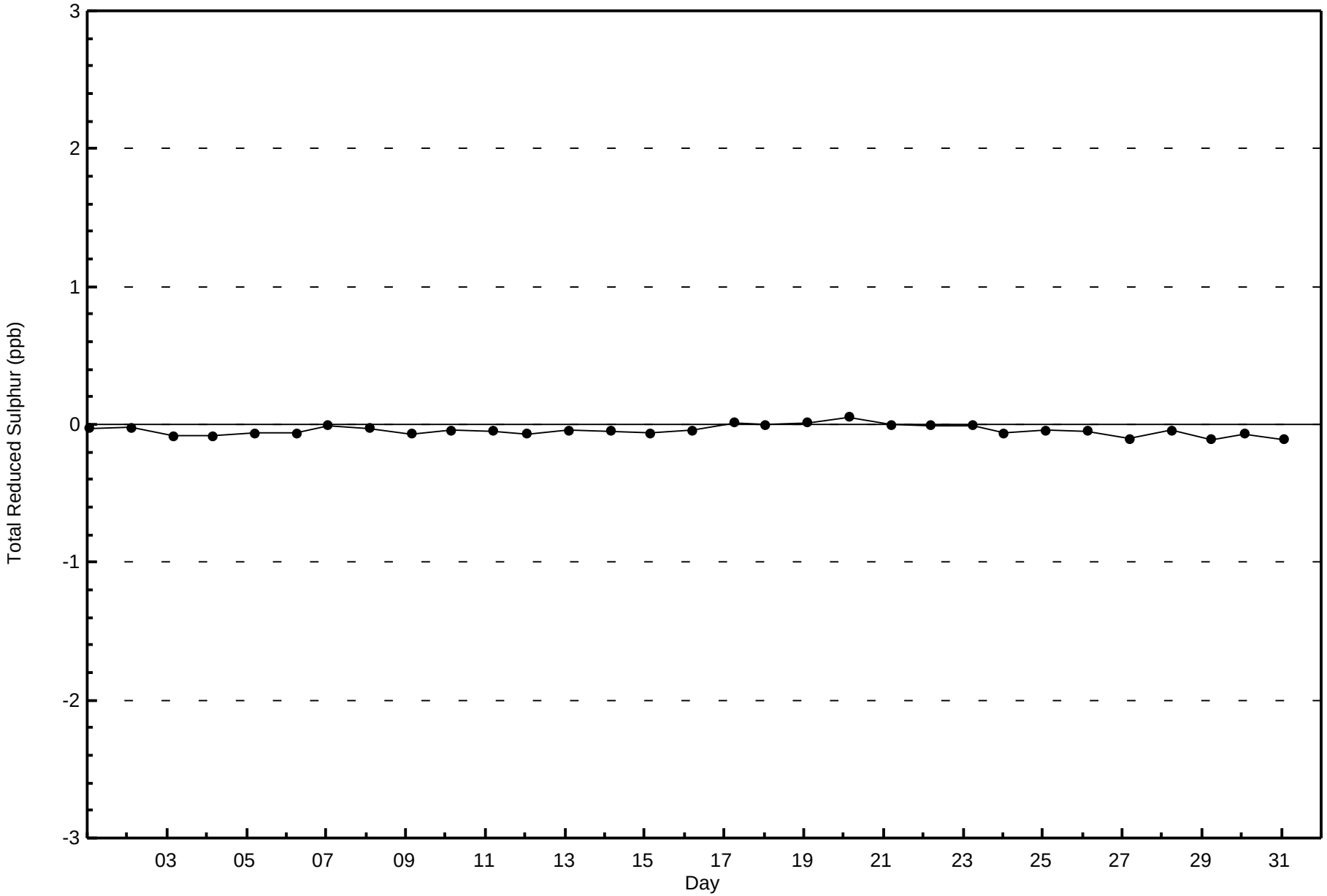
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - January 2016

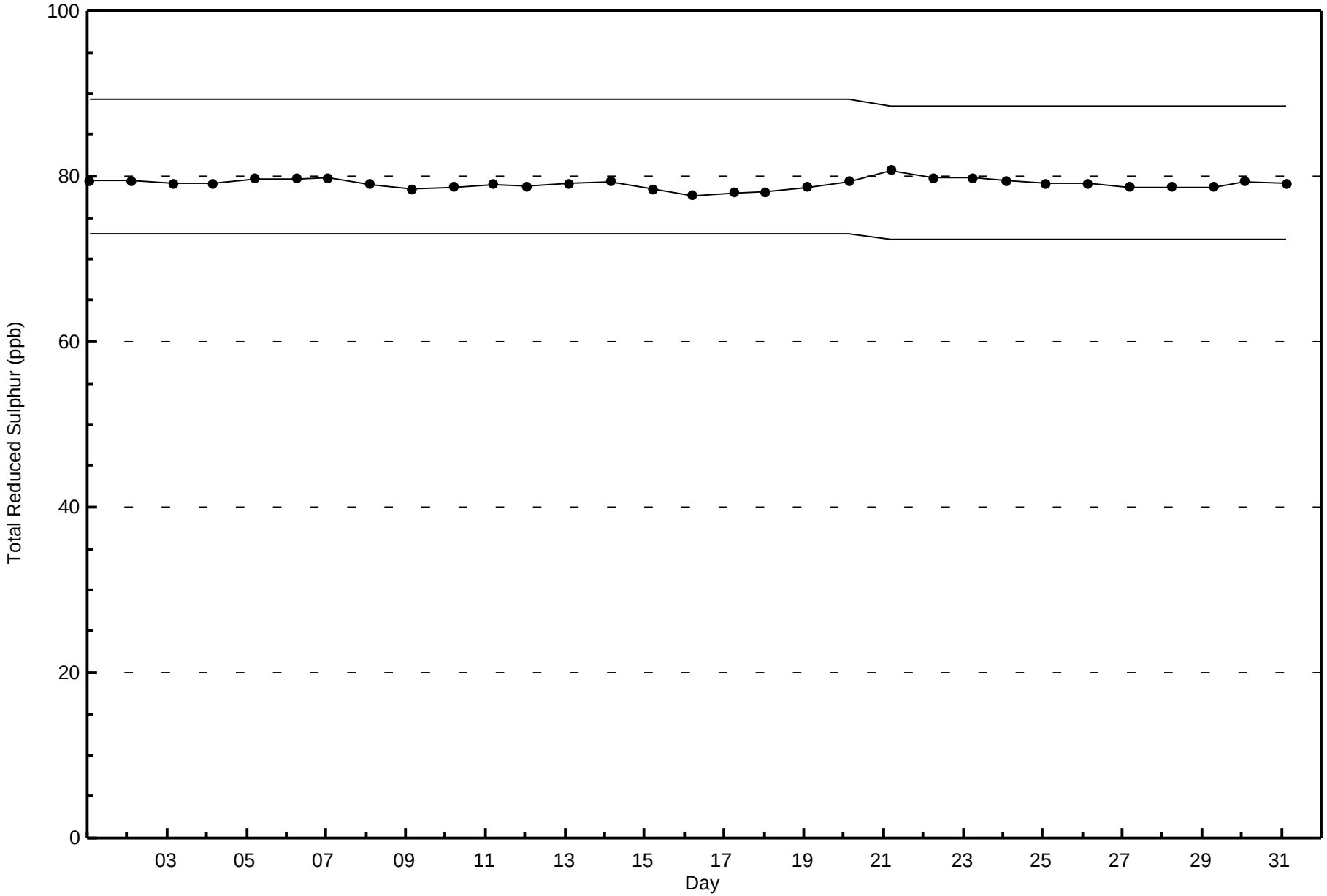


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Conklin Lookout - January 2016

Maximum Value: 2.6 ppm on Jan 21 11:00

Maximum Daily Average: 2.4 ppm on Jan 22

Minimum Value: 1.9 ppm on Jan 17 14:00

Minimum Daily Average: 1.9 ppm on Jan 16

Maximum Diurnal Average: 2.1 ppm at hour 5

Minimum Diurnal Average: 2.1 ppm at hour 16

Monthly Average: 2.07 ppm

Percentiles: P_1 = 1.9 P_{10} = 1.9 Q_1 = 2.0 Median = 2.0 Q_3 = 2.1 P_{90} = 2.3 P_{99} = 2.5

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

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

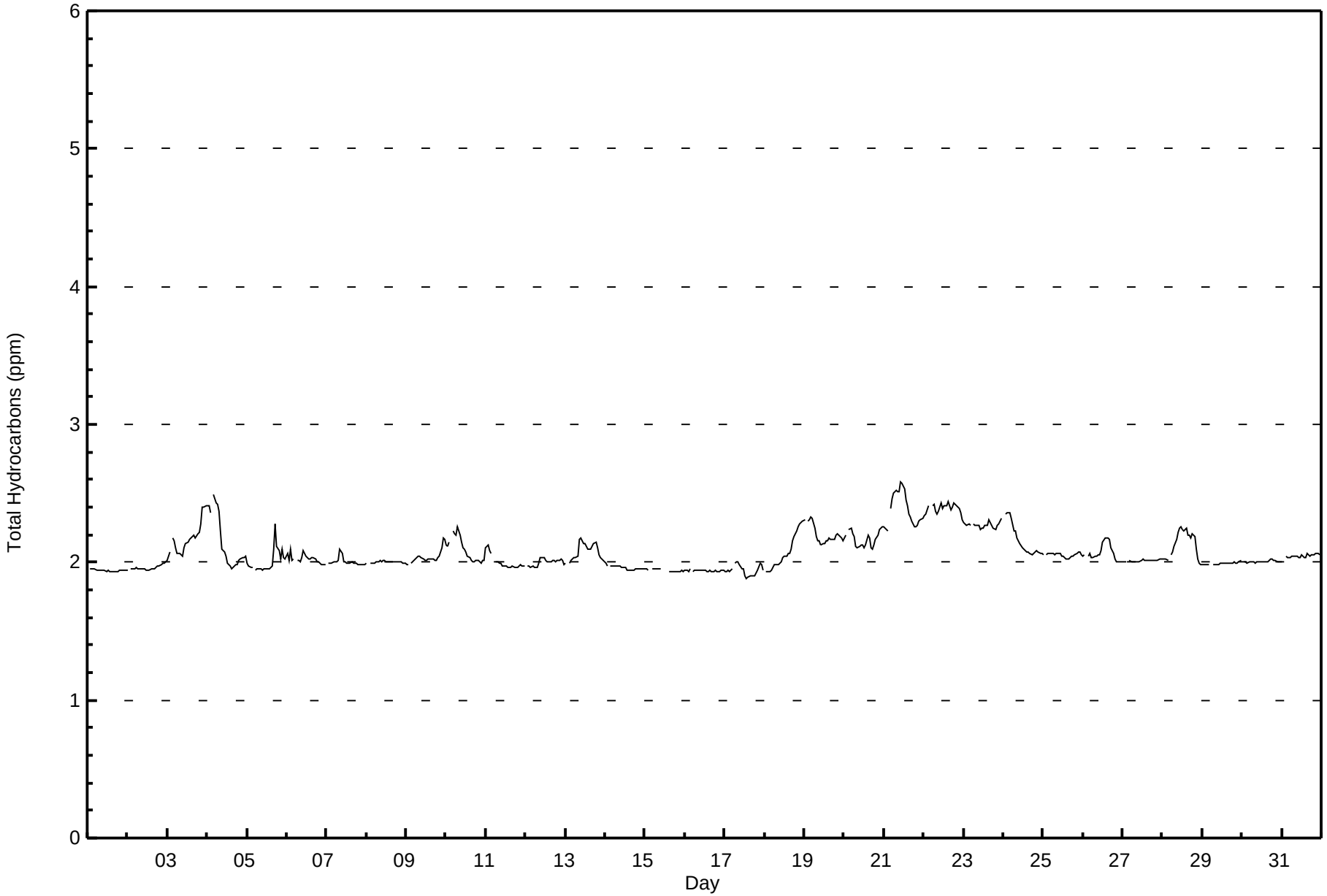
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Conklin Lookout - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	439	61.92	61.92
2.1 - 3.0	270	38.08	100.00
3.1 - 10.0	0	0.00	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

Conklin Lookout - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	18	38	25	9	9	4	5	18	11	50	62	19	46	68	27	24	433
2.1 - 3.0	6	13	30	11	8	1	6	8	15	50	56	13	16	17	8	12	270
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	24	51	55	20	17	5	11	26	26	100	118	32	62	85	35	36	703

Total Number of Valid Hours: 703

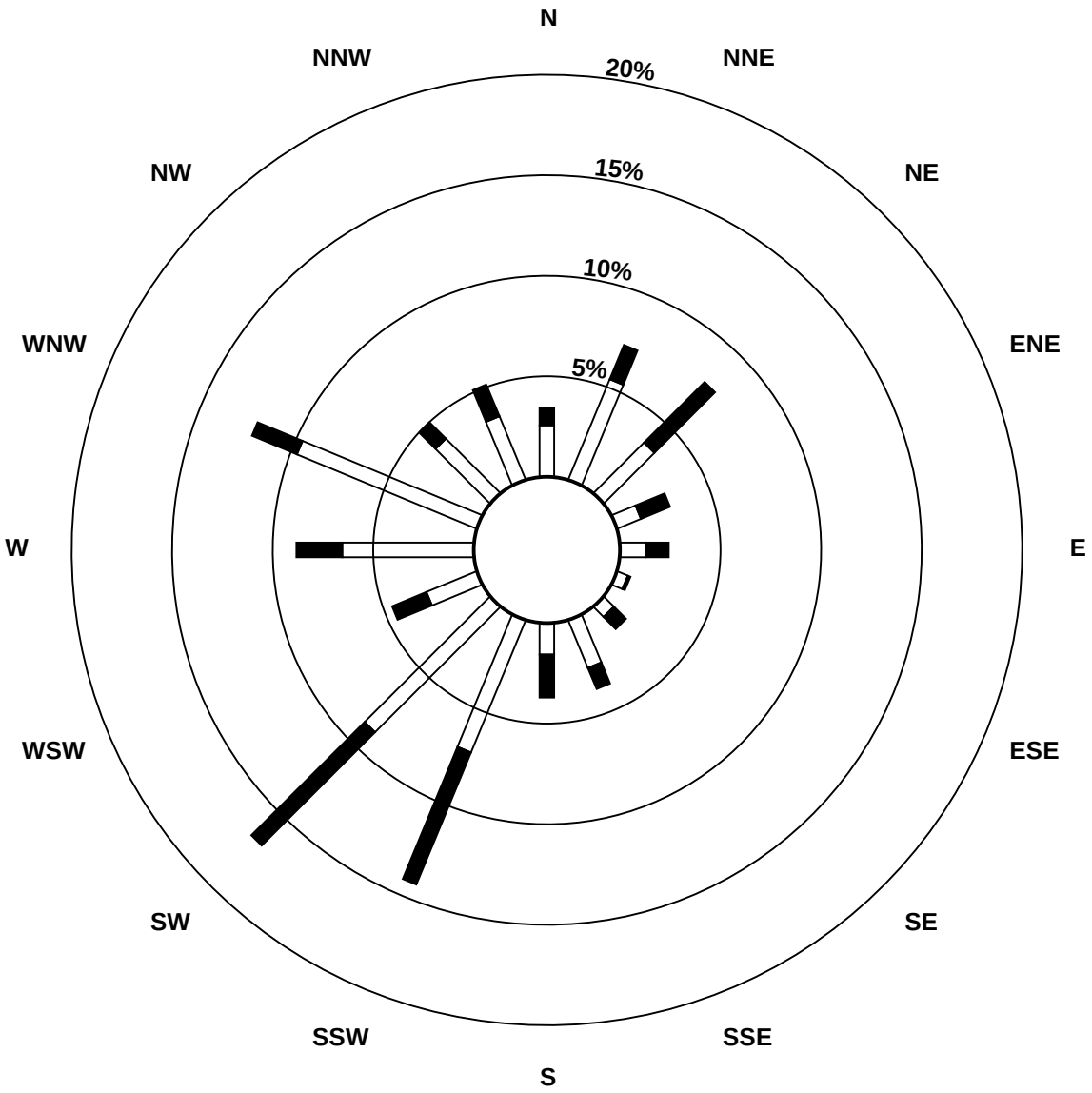
Total Number of Hours: 744

Wood Buffalo Environmental Association

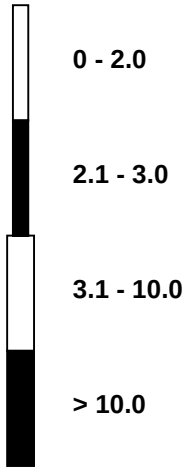
Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Conklin Lookout (AMS 18)



Classes (ppm)



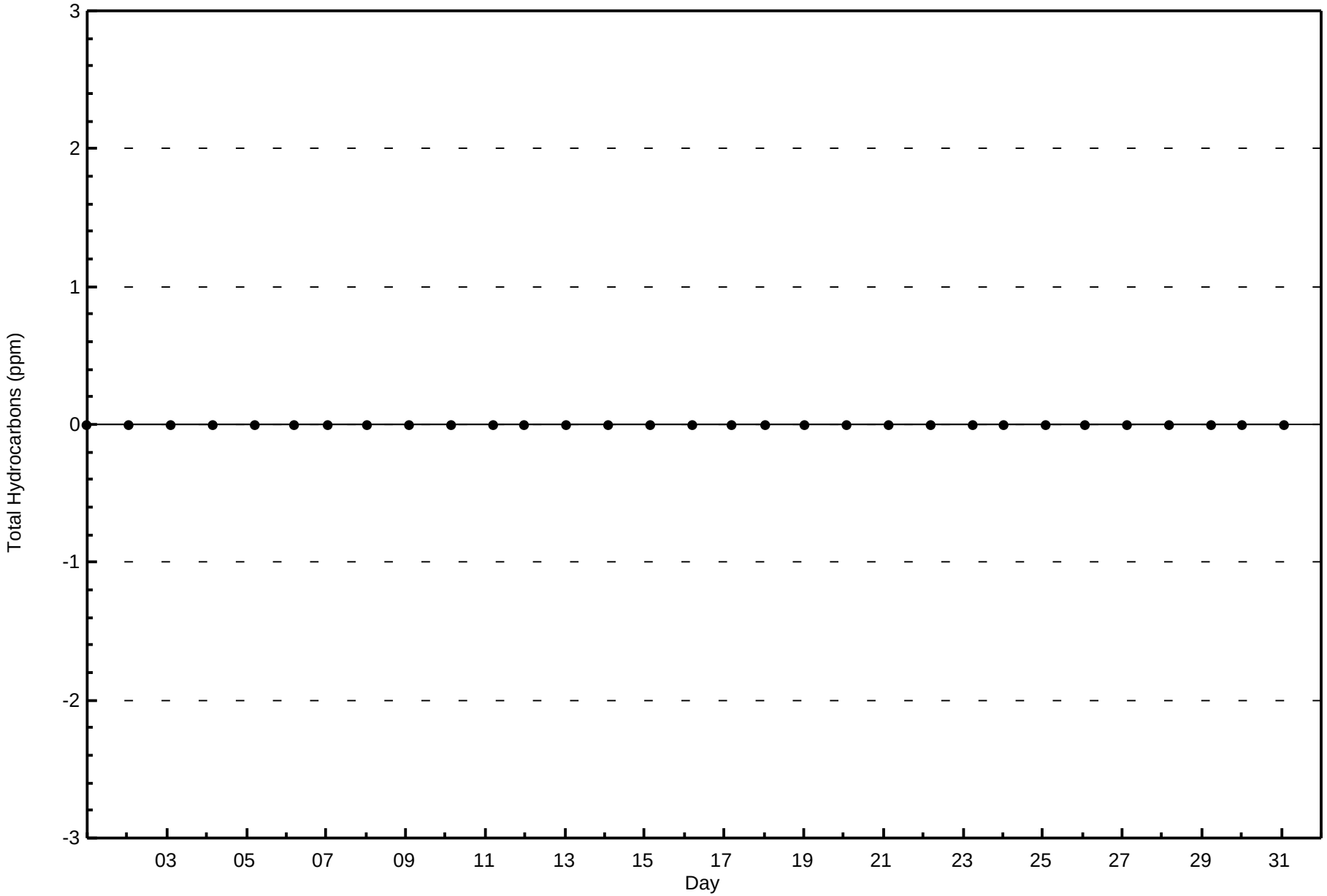
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Conklin Lookout - January 2016

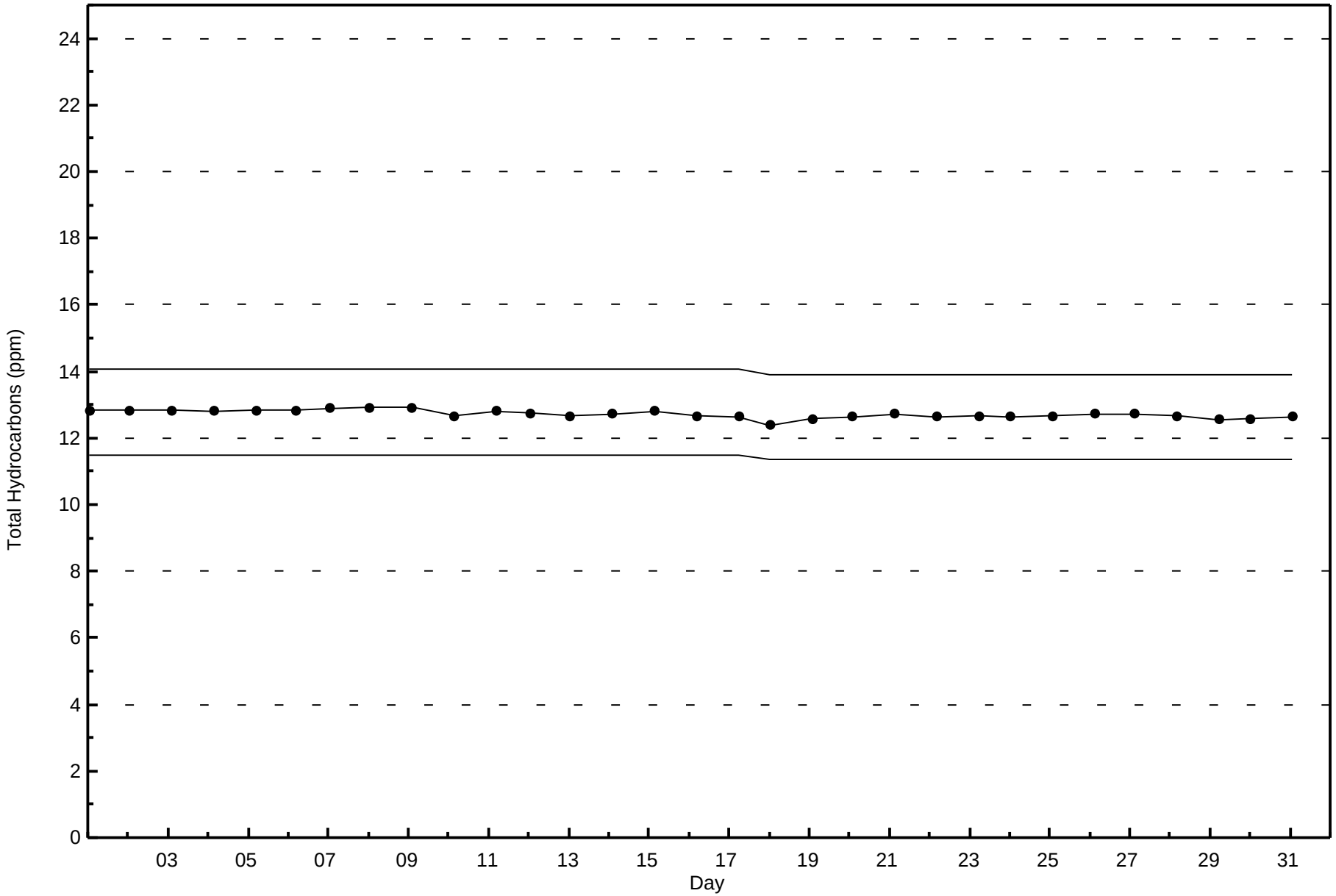


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - January 2016

Maximum Value: 0.103 ppm on Jan 10 08:00

Maximum Daily Average: 0.082 ppm on Jan 22

Minimum Value: 0.000 ppm on Jan 1 02:00

Minimum Daily Average: 0.000 ppm on Jan 1

Maximum Diurnal Average: 0.018 ppm at hour 6

Minimum Diurnal Average: 0.009 ppm at hour 21

Monthly Average: 0.013 ppm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.0 P_{99} = 0.1

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3-Jan	0.002	0.026	Z	0.084	0.076	0.055	0.038	0.033	0.021	0.009	0.028	0.033	0.036	0.047	0.051	0.051	0.041	0.029	0.036	0.031	0.037	0.041	0.038	0.043	0.038	0.084
4-Jan	0.051	0.040	0.038	Z	0.051	0.058	0.062	0.056	0.050	0.031	0.024	0.017	0.000	0.000	0.000	0.001	0.020	0.013	0.006	0.012	0.018	0.024	0.028	0.035	0.028	0.062
5-Jan	0.009	0.008	0.010	0.011	Z	0.000	0.007	0.004	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.102	0.072	0.059	0.029	0.046	0.010	0.008	0.018	0.102
6-Jan	0.009	0.015	0.079	0.001	0.009	Z	0.003	0.005	0.000	0.017	0.020	0.005	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.079
7-Jan	Z	0.000	0.002	0.002	0.005	0.006	0.001	0.000	0.037	0.027	0.002	0.000	0.000	0.000	0.001	0.008	0.000	0.002	0.001	0.001	0.000	0.001	0.000	0.000	0.004	0.037
8-Jan	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.002
9-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.046	0.046	0.005	0.046
10-Jan	0.039	0.039	0.058	Z	0.088	0.086	0.081	0.103	0.085	0.070	0.055	0.053	0.047	0.034	0.032	0.021	0.014	0.014	0.014	0.020	0.009	0.006	0.012	0.011	0.043	0.103
11-Jan	0.049	0.067	0.046	0.033	Z	0.007	0.003	0.003	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.067
12-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.002	0.002	0.002	0.000	0.002
13-Jan	0.000	Z	0.001	0.004	0.003	0.007	0.004	0.018	0.053	0.043	0.041	0.029	0.036	0.017	0.019	0.005	0.004	0.005	0.006	0.003	0.000	0.000	0.000	0.000	0.013	0.053
14-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.002	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.002
16-Jan	0.007	0.007	0.005	0.018	Z	0.000	0.005	0.000	0.001	0.005	0.003	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.018
17-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.002	0.002	0.005	0.004	0.001	0.005
19-Jan	0.008	Z	0.008	0.011	0.012	0.012	0.010	0.008	0.009	0.006	0.003	0.011	0.009	0.018	0.020	0.026	0.016	0.009	0.009	0.005	0.004	0.006	0.010	0.005	0.010	0.026
20-Jan	0.033	0.050	Z	0.056	0.055	0.047	0.038	0.006	0.005	0.013	0.018	0.017	0.008	0.017	0.053	0.036	0.002	0.000	0.000	0.002	0.003	0.007	0.005	0.007	0.021	0.056
21-Jan	0.006	0.004	0.002	Z	0.034	0.048	0.043	0.038	0.030	0.034	0.050	0.052	0.057	0.048	0.044	0.033	0.030	0.023	0.014	0.024	0.039	0.053	0.060	0.066	0.036	0.066
22-Jan	0.070	0.074	0.078	0.085	Z	0.085	0.091	0.084	0.095	0.086	0.089	0.094	0.087	0.089	0.088	0.090	0.085	0.086	0.088	0.080	0.075	0.073	0.063	0.045	0.082	0.095
23-Jan	0.038	0.037	0.035	0.036	0.035	Z	0.035	0.034	0.032	0.033	0.026	0.024	0.029	0.037	0.045	0.048	0.042	0.046	0.028	0.026	0.048	0.047	0.045	0.053	0.037	0.053
24-Jan	Z	0.063	0.069	0.071	0.071	0.066	0.053	0.052	0.037	0.034	0.033	0.020	0.010	0.005	0.003	0.001	0.001	0.000	0.001	0.002	0.004	0.001	0.001	0.001	0.026	0.071
25-Jan	0.000	Z	0.001	0.005	0.004	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005
26-Jan	0.000	0.000	Z	0.001	0.001	0.000	0.000	0.000	0.001	0.002	0.002	0.014	0.053	0.067	0.062	0.063	0.058	0.030	0.010	0.000	0.000	0.000	0.000	0.000	0.016	0.067
27-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.007	0.018	0.023	0.022	0.023	0.013	0.010	0.007	0.009	0.022	0.022	0.003	0.000	0.000	0.000	0.008	0.023
29-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
31-Jan	0.000	Z	0.001	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.004
	0.013	0.017	0.017	0.016	0.017	0.018	0.015	0.014	0.015	0.014	0.014	0.013	0.013	0.013	0.014	0.013	0.011	0.012	0.010	0.009	0.009	0.011	0.011	0.011	Diurnal Average	
	0.070	0.074	0.079	0.085	0.088	0.086	0.091	0.103	0.095	0.086	0.089	0.094	0.087	0.089	0.088	0.090	0.085	0.102	0.088	0.080	0.075	0.073	0.063	0.066	Diurnal Maximum	

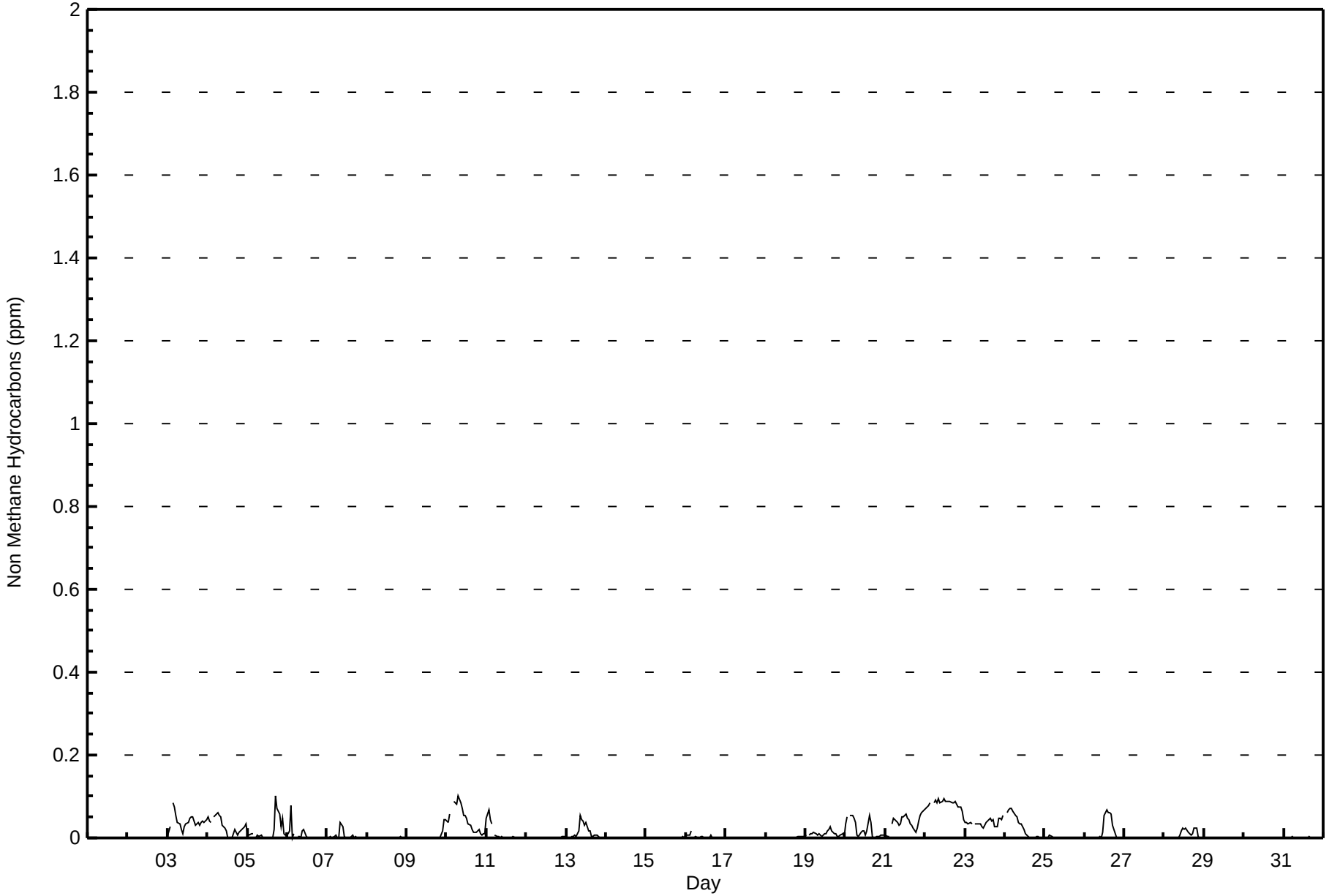
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	467	65.87	65.87
0.006 - 0.05	190	26.80	92.67
0.06 - 0.1	52	7.33	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	21	43	26	11	8	3	3	18	13	64	79	24	53	65	18	14	463
0.006 - 0.05	2	7	20	9	8	2	6	6	11	27	28	5	6	17	15	19	188
0.06 - 0.1	1	1	9	0	1	0	2	2	2	9	11	3	3	3	2	3	52
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	51	55	20	17	5	11	26	26	100	118	32	62	85	35	36	703

Total Number of Valid Hours: 703

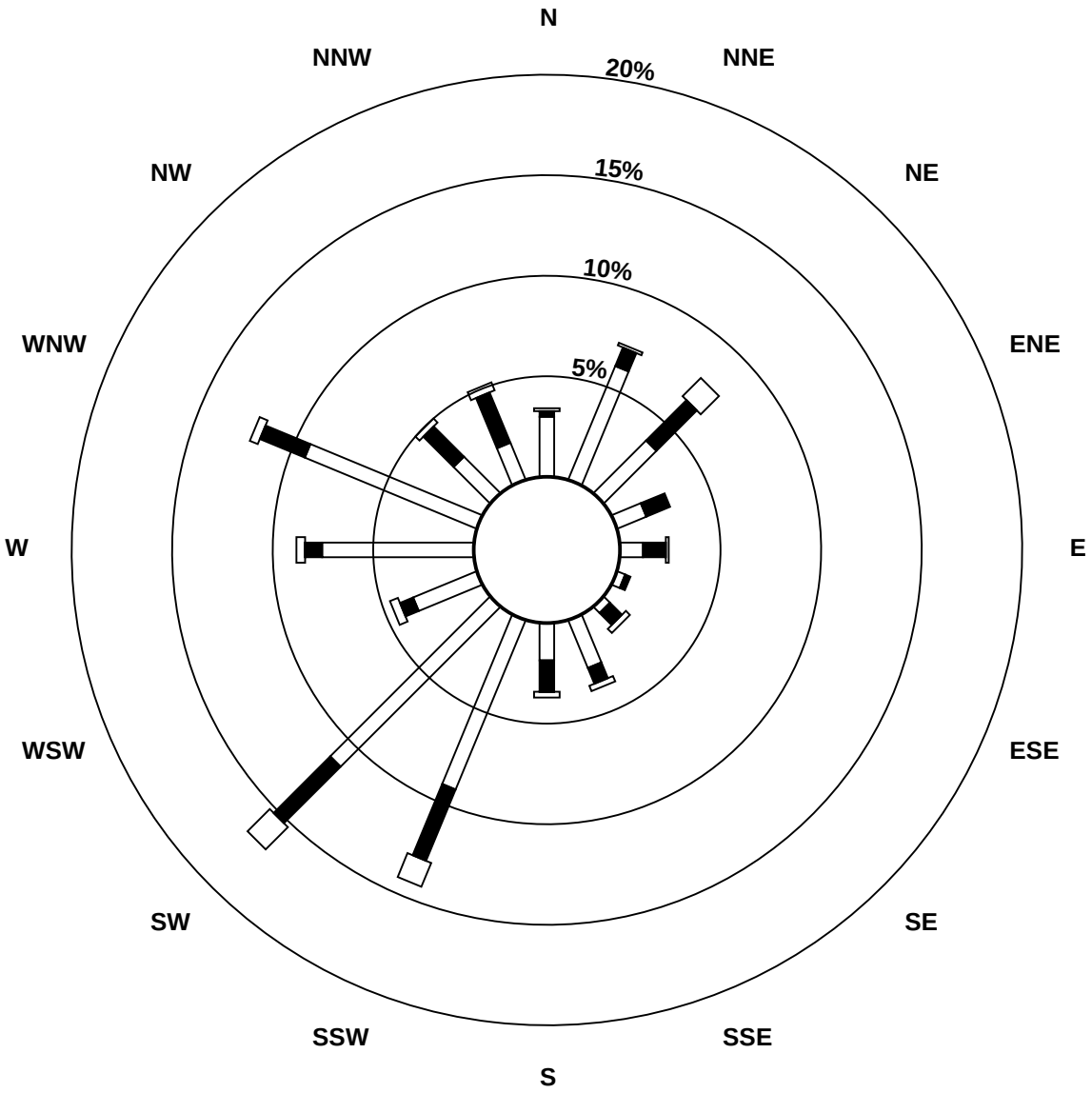
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout (AMS 18)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

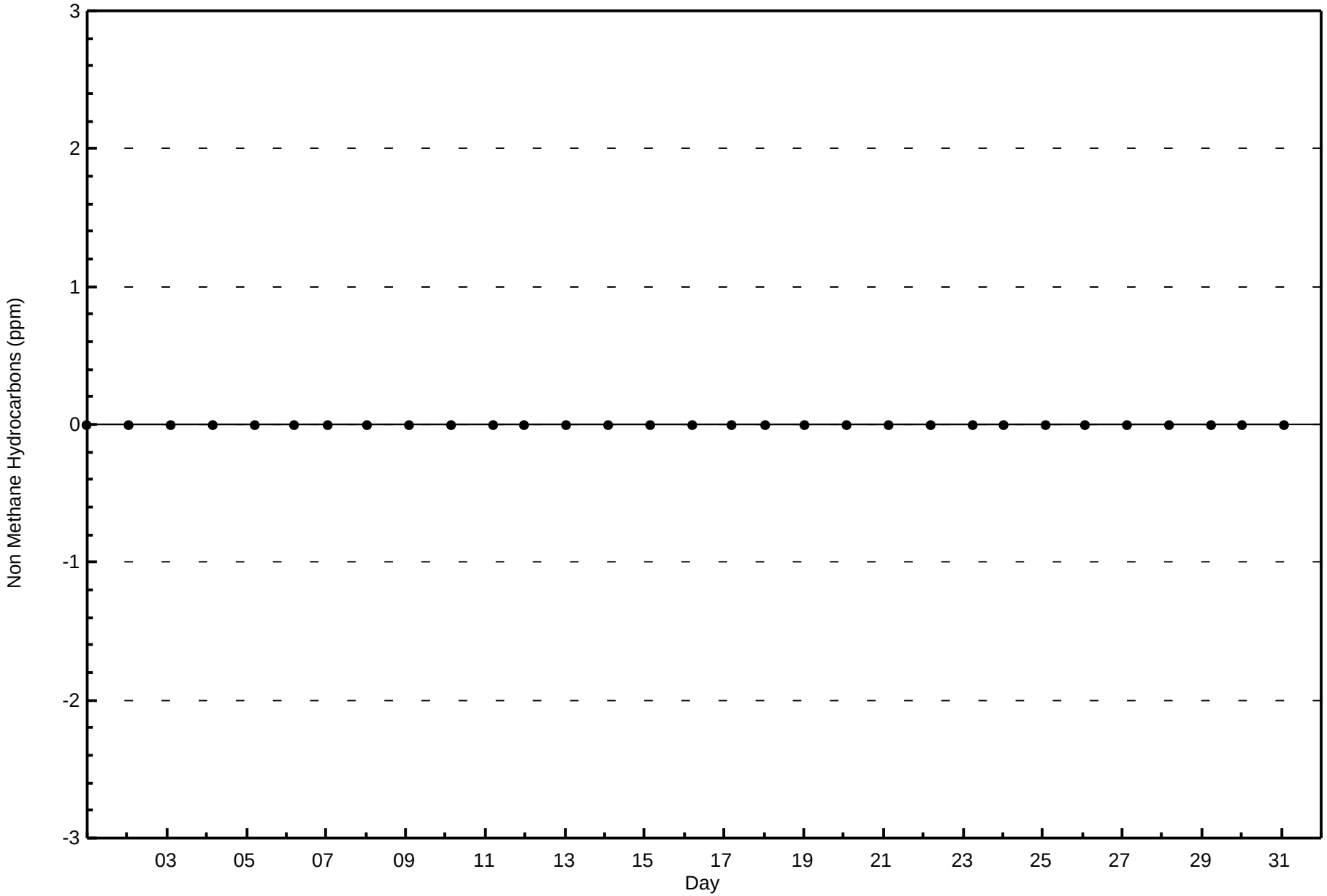
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - January 2016

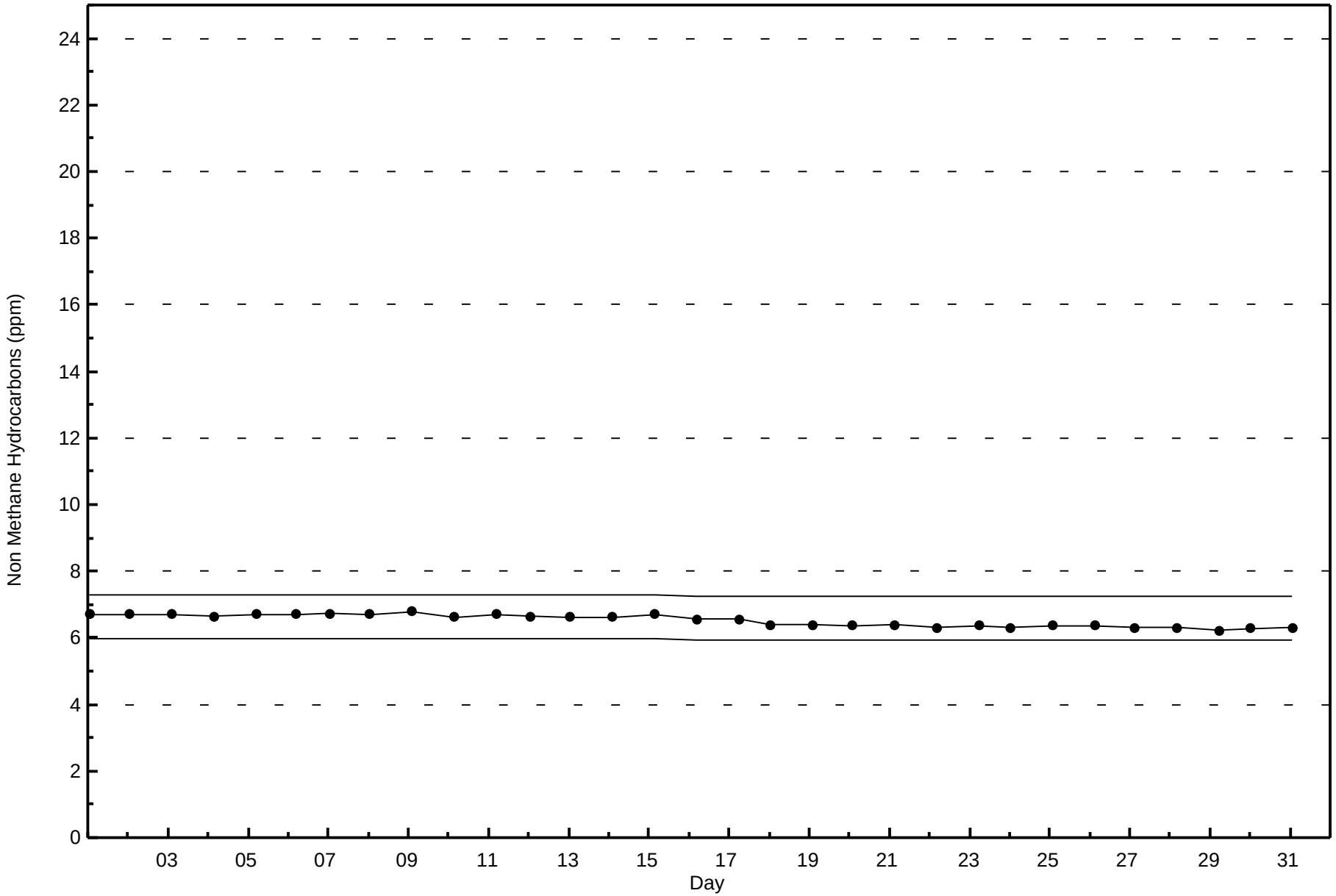


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.5 ppm on Jan 21 11:00

Maximum Daily Average: 2.3 ppm on Jan 21

Minimum Value: 1.9 ppm on Jan 17 14:00

Minimum Daily Average: 1.9 ppm on Jan 16

Maximum Diurnal Average: 2.1 ppm at hour 5

Minimum Diurnal Average: 2.0 ppm at hour 4

Monthly Average: 2.06 ppm

Percentiles: P_1 = 1.9 P_{10} = 1.9 Q_1 = 2.0 Median = 2.0 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.4

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

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

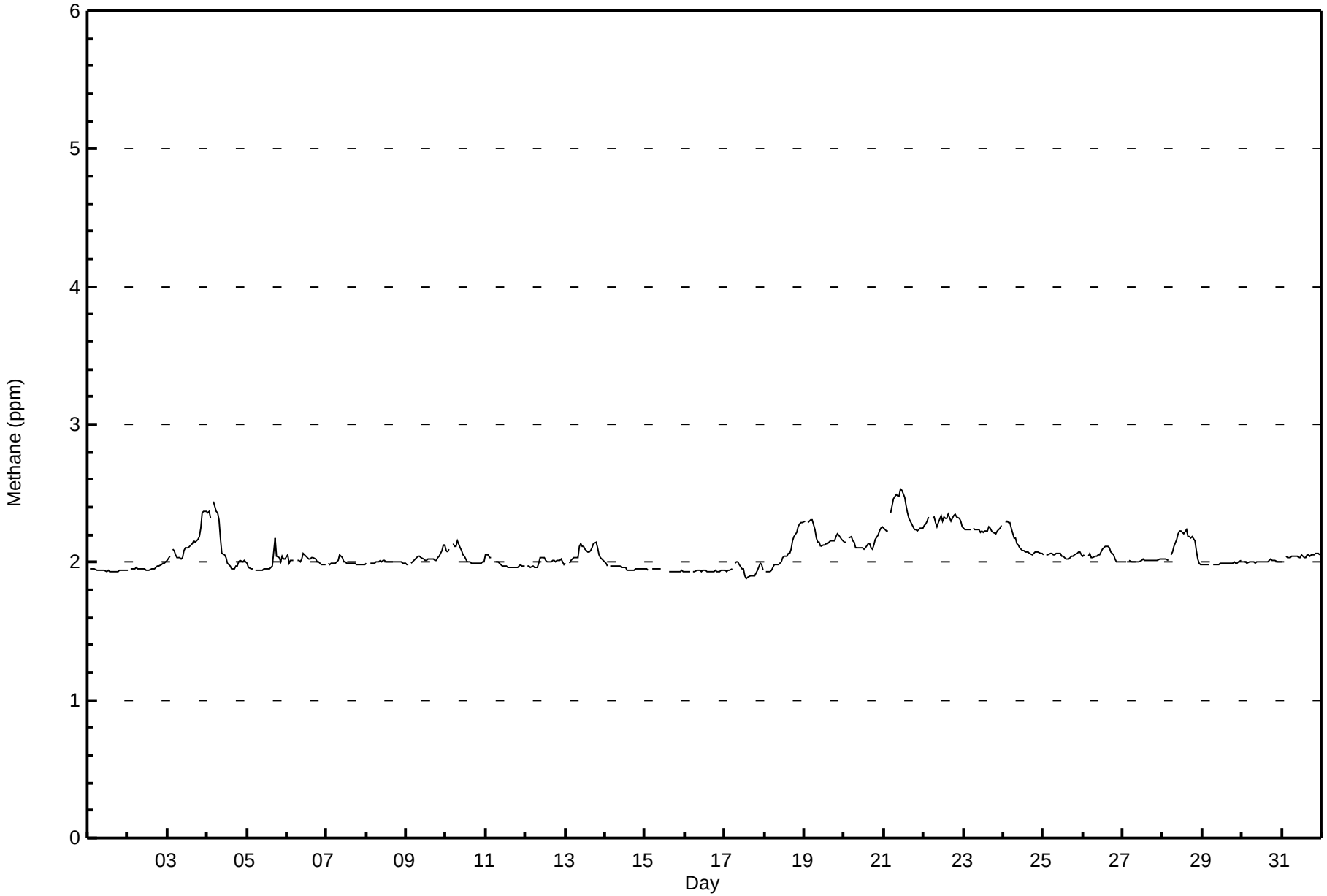
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Methane (CH_4) - ppm

Conklin Lookout - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	451	63.61	63.61
2.1 - 3.0	258	36.39	100.00
3.1 - 10.0	0	0.00	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

Methane (CH_4) - ppm

Conklin Lookout - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	18	38	26	9	9	4	7	19	11	50	65	19	46	69	28	27	445
2.1 - 3.0	6	13	29	11	8	1	4	7	15	50	53	13	16	16	7	9	258
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	24	51	55	20	17	5	11	26	26	100	118	32	62	85	35	36	703

Total Number of Valid Hours: 703

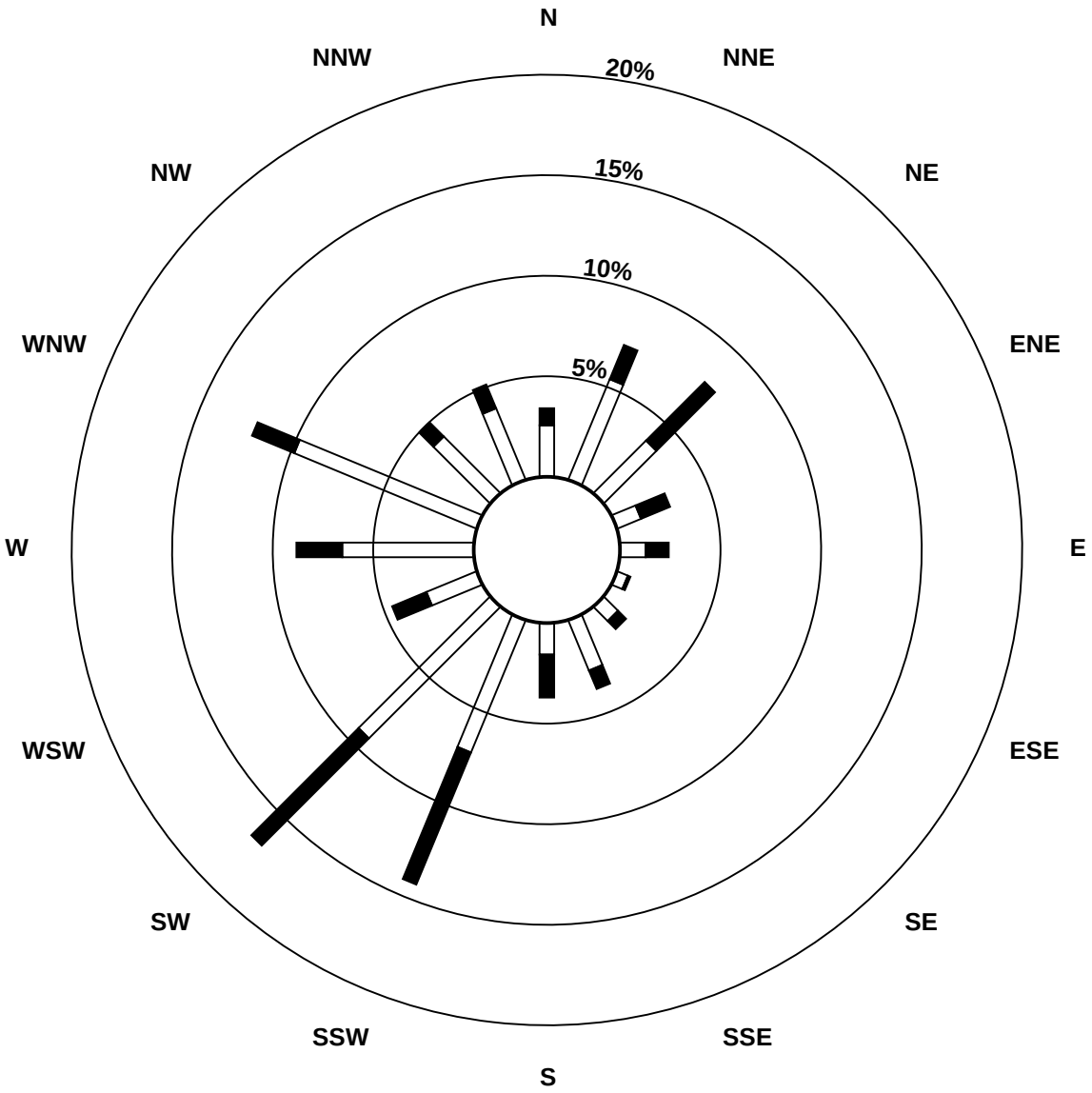
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Methane (CH_4) - ppm

Conklin Lookout (AMS 18)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

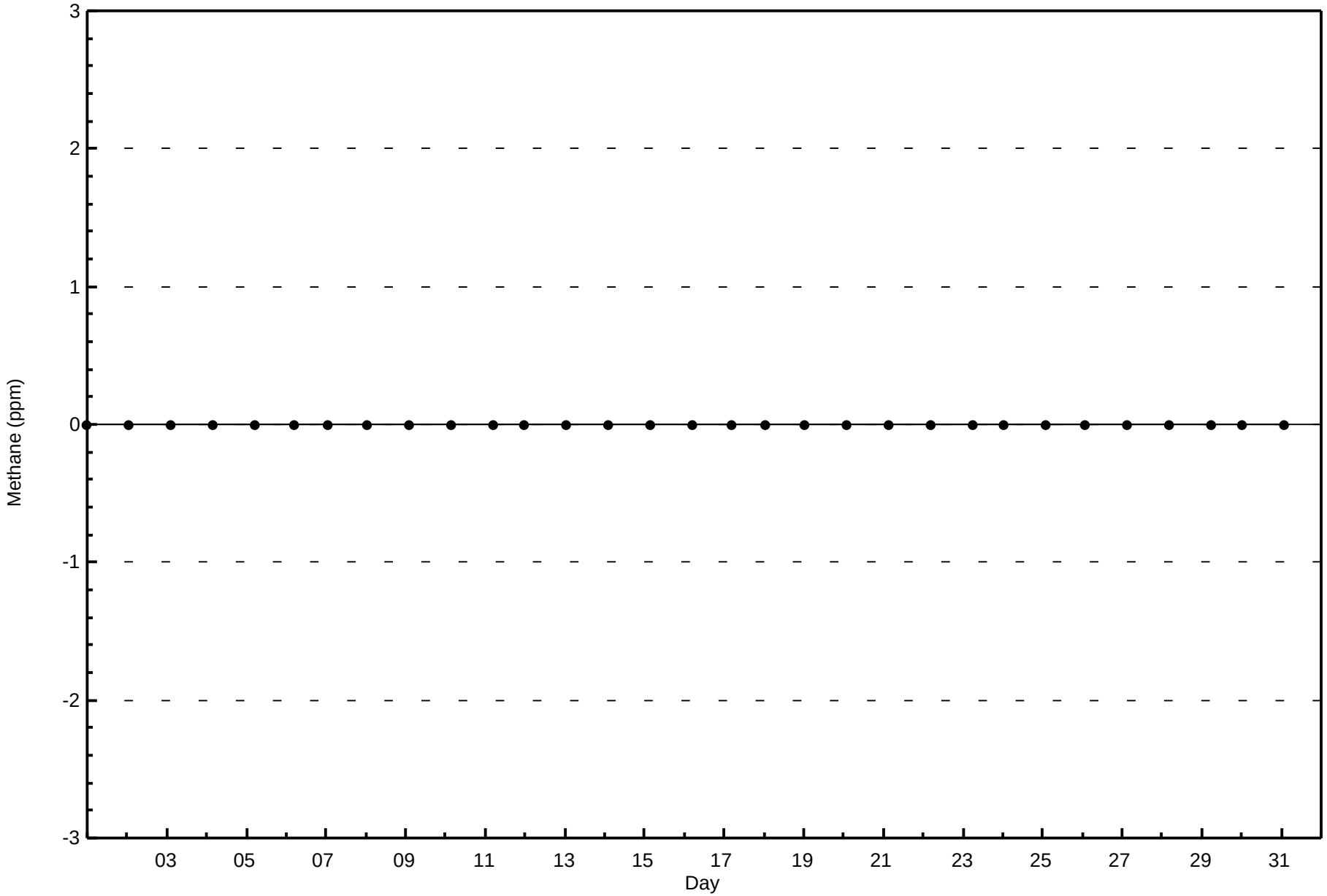
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Conklin Lookout - January 2016

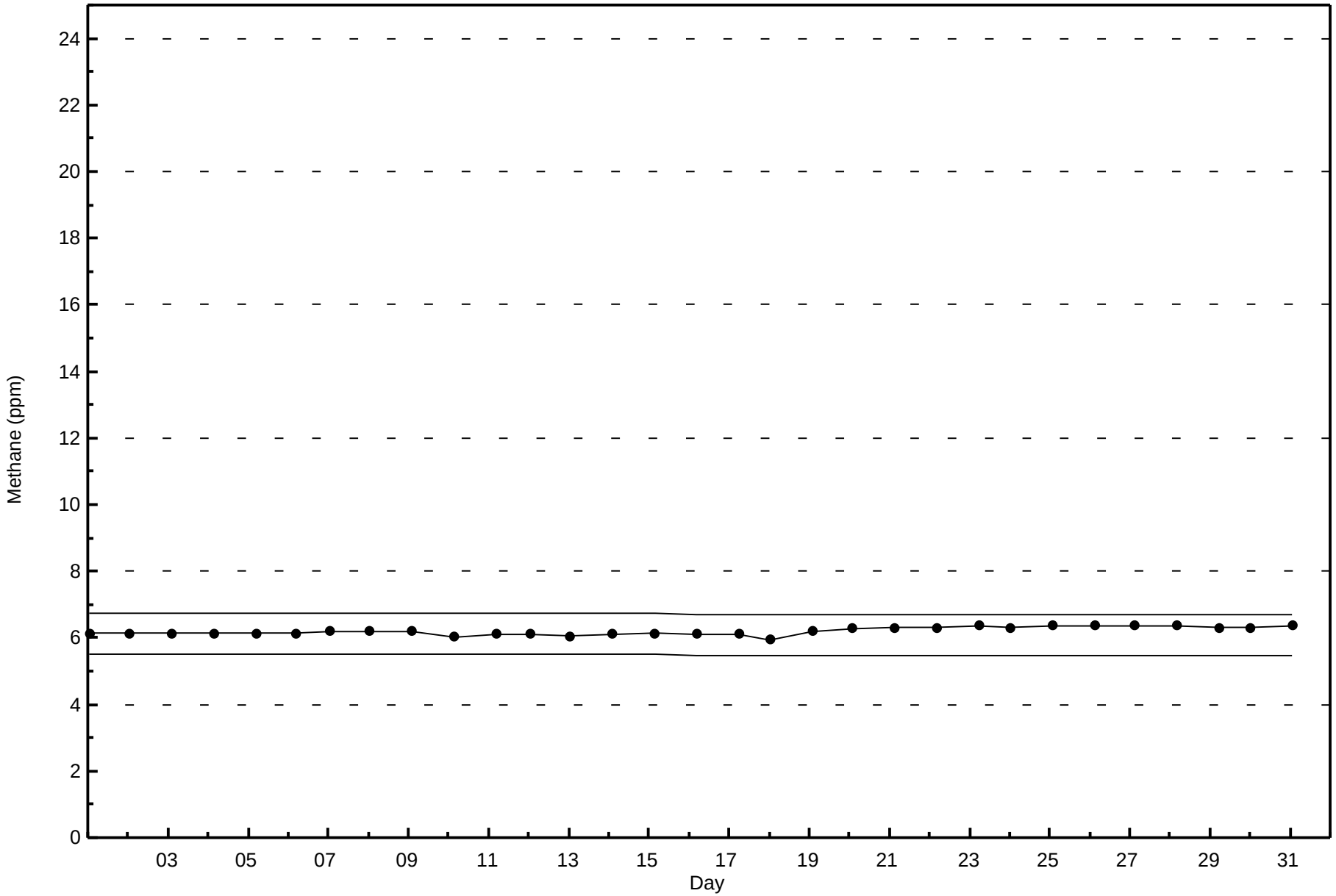


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Conklin Lookout - January 2016

Maximum Value: 3 ppb on Jan 13 13:00

Maximum Daily Average: 0.7 ppb on Jan 13

Minimum Value: 0 ppb on Jan 29 23:00

Minimum Daily Average: 0.0 ppb on Jan 29

Maximum Diurnal Average: 0.6 ppb at hour 13

Minimum Diurnal Average: 0.0 ppb at hour 21

Monthly Average: 0.2 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 2$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	35
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.3	2
4-Jan	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1
6-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
8-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Jan	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Jan	0	Z	0	0	0	0	0	0	0	2	3	3	3	2	1	1	0	0	0	0	0	0	0	0	0.7	3
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1
17-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Jan	0	0	Z	0	0	0	0	0	M	M	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
21-Jan	0	0	0	Z	0	0	0	0	0	1	2	3	2	2	2	1	0	0	0	0	0	0	0	0	0.5	3
22-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	2	2	2	1	0	0	0	0	0	0	0	0	0.4	2
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.2	1
24-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.6	0.6	0.6	0.5	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	0	0	2	3	3	3	2	2	1	0	0	0	0	0	0	0	0	Diurnal Maximum	

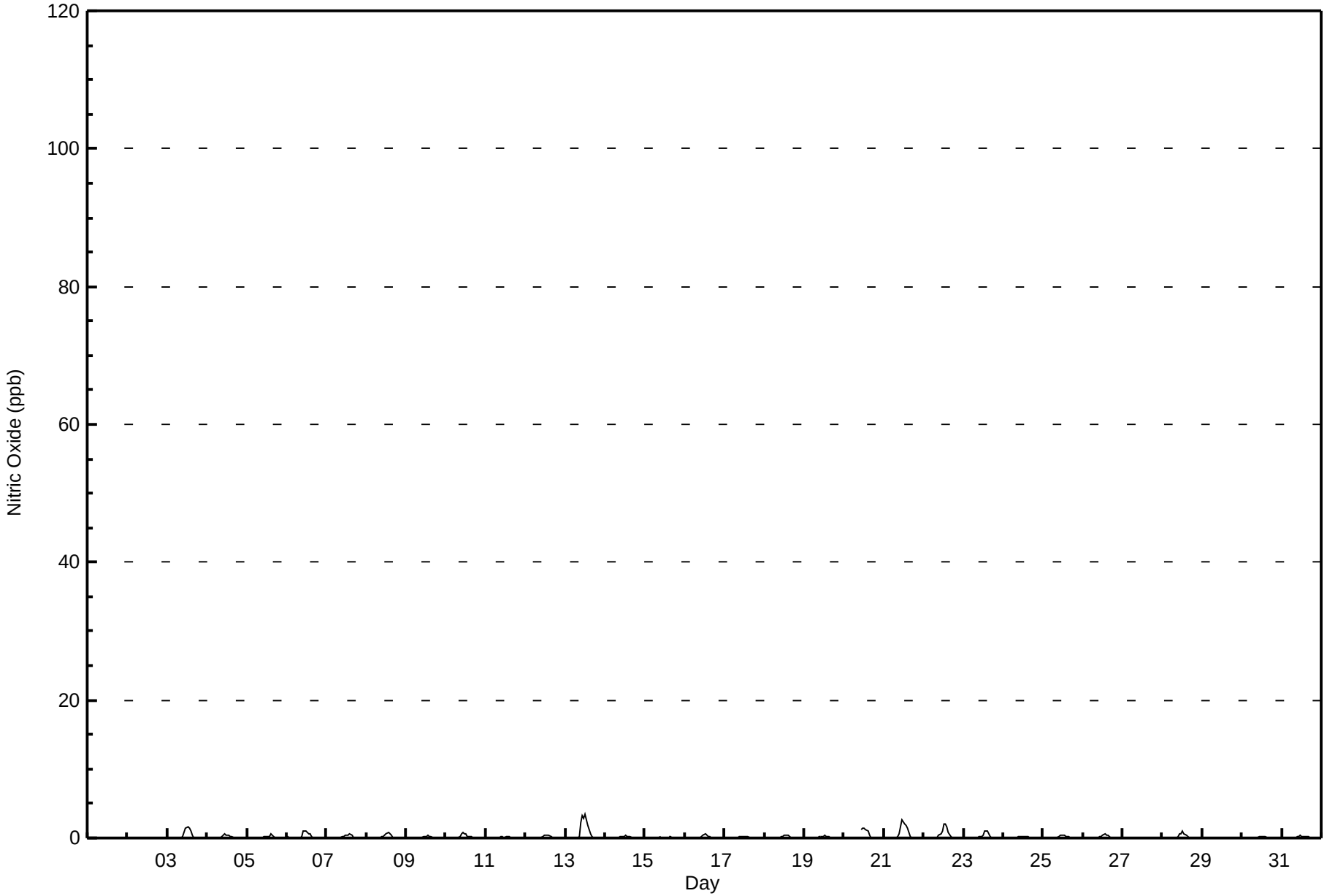
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Conklin Lookout - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	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

Nitric Oxide (NO) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	24	51	55	20	15	5	11	26	26	100	118	32	62	85	35	36	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	24	51	55	20	15	5	11	26	26	100	118	32	62	85	35	36	701

Total Number of Valid Hours: 701

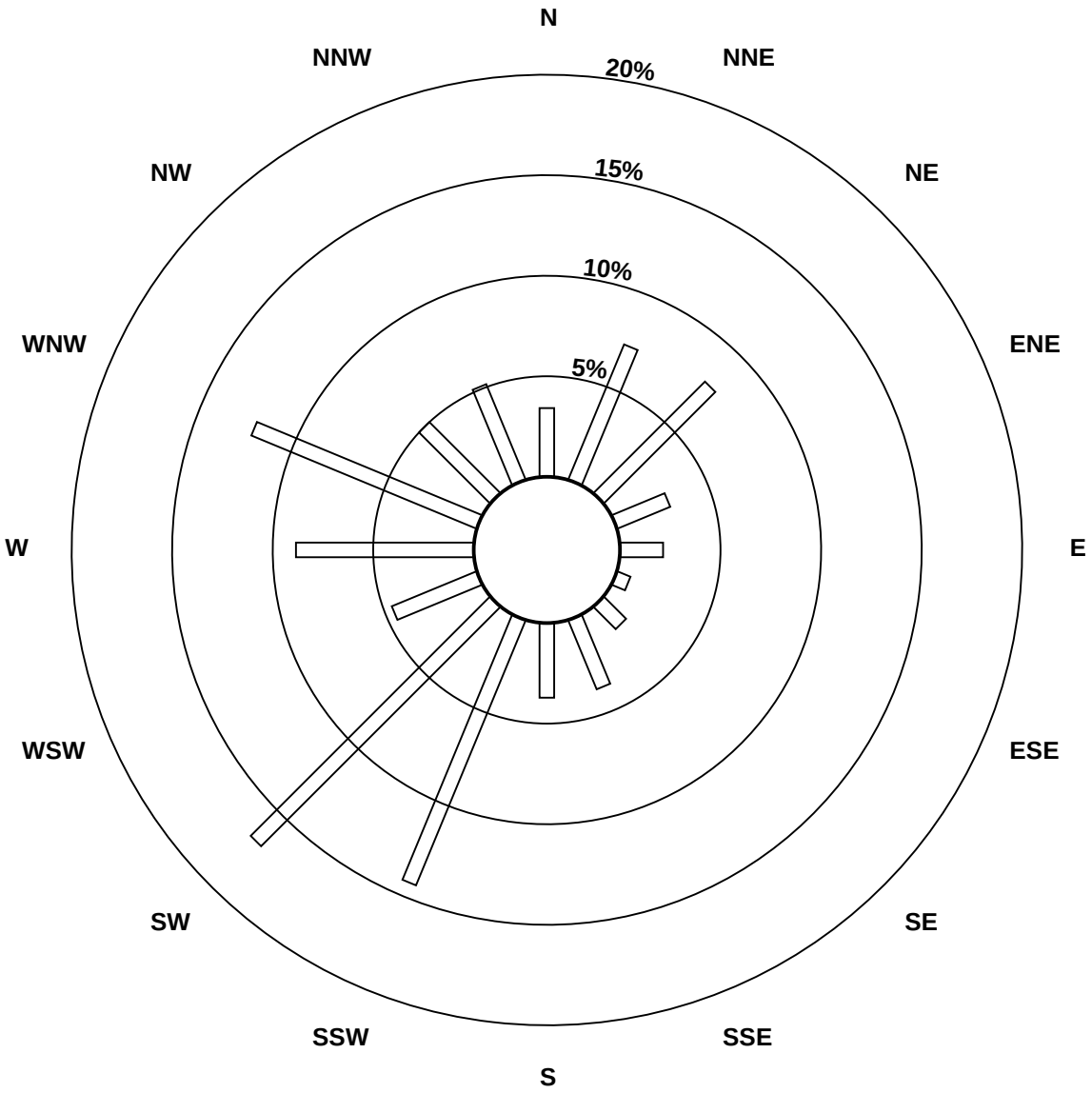
Total Number of Hours: 744

Wood Buffalo Environmental Association

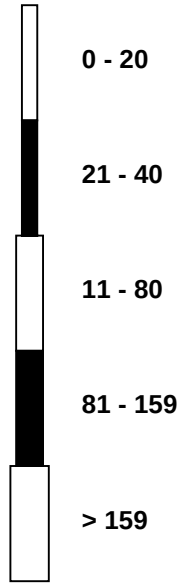
Wind Rose Jan 2016

Nitric Oxide (NO) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



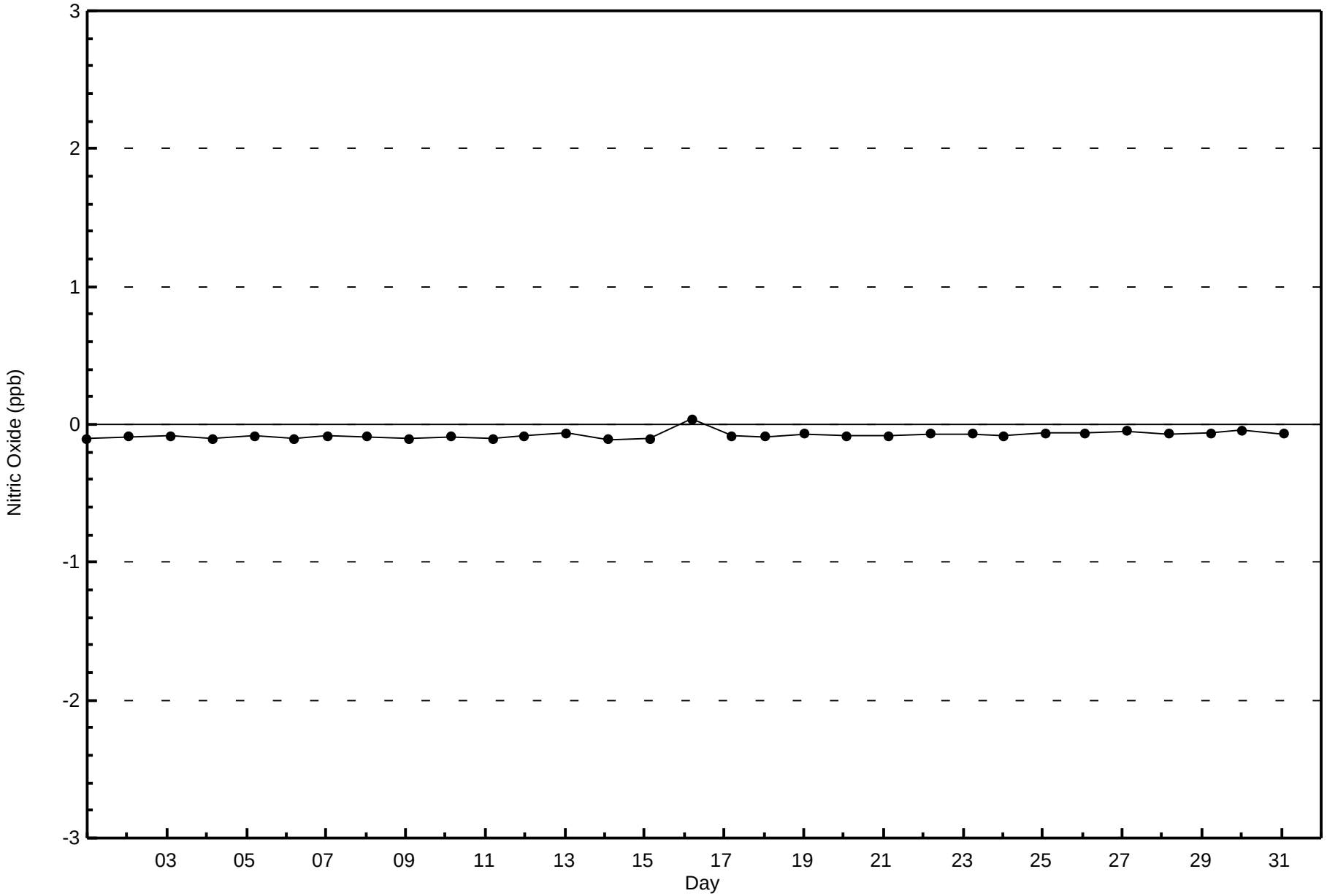
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Conklin Lookout - January 2016

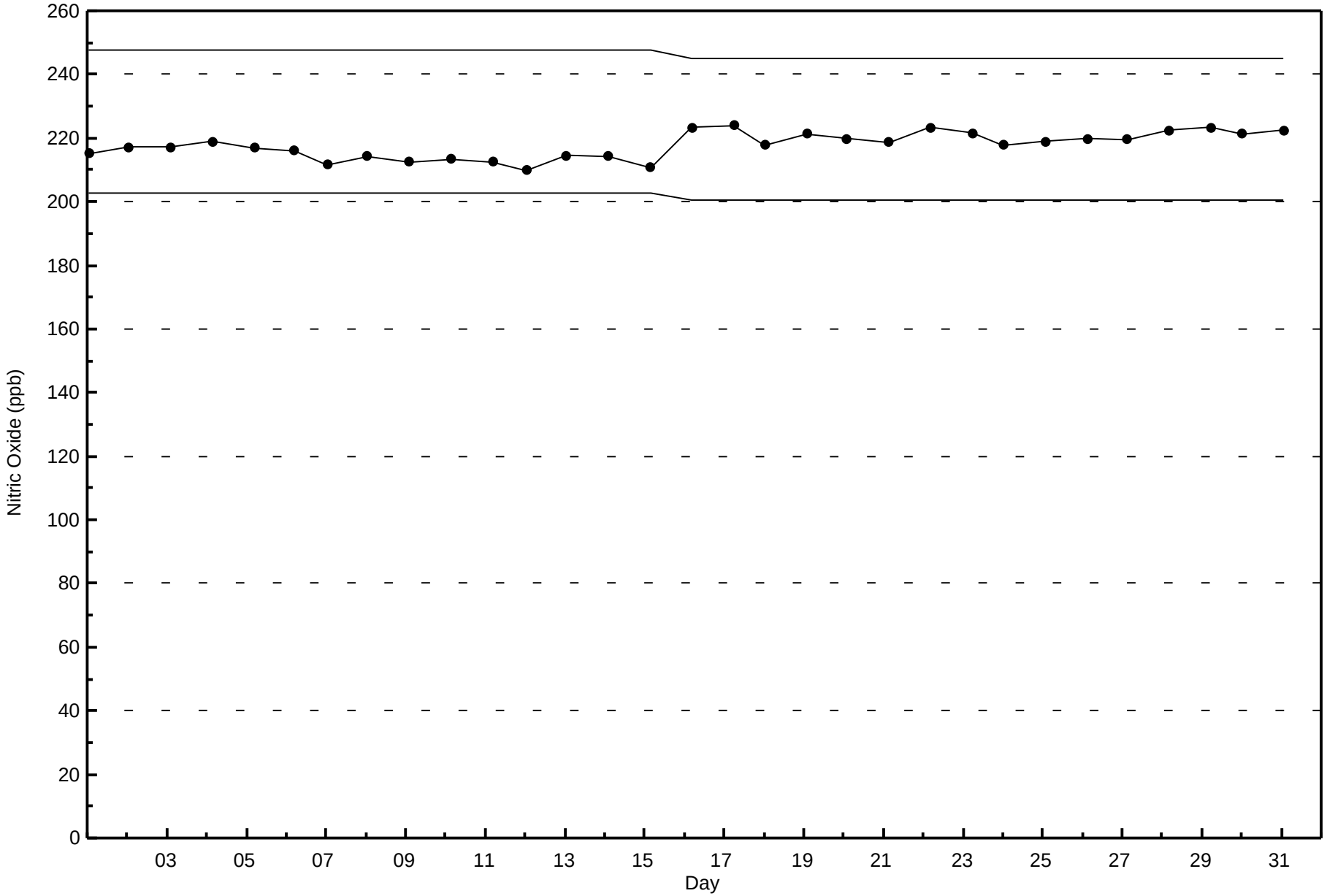


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 19 ppb on Jan 5 18:00 Maximum Daily Average: 6.8 ppb on Jan 3

Minimum Value: 0 ppb on Jan 30 22:00 Minimum Daily Average: 0.5 ppb on Jan 29

Maximum Diurnal Average: 3.4 ppb at hour 5 Minimum Diurnal Average: 2.4 ppb at hour 3

Monthly Average: 2.8 ppb Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 4$ $P_{90} = 6$ $P_{99} = 12$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	35
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
2-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.2	2
3-Jan	3	5	Z	9	8	6	5	6	6	6	7	7	7	7	8	8	8	8	8	8	8	8	7	7	6.8	9
4-Jan	7	7	6	Z	7	6	6	6	6	5	4	3	2	2	2	2	3	3	3	4	6	4	4	4	4.4	7
5-Jan	3	3	2	1	Z	1	1	1	1	1	1	1	1	2	3	5	9	19	11	9	6	11	9	7	4.5	19
6-Jan	9	6	5	2	4	Z	5	5	3	3	6	4	4	4	4	4	3	2	2	2	2	1	1	1	3.5	9
7-Jan	Z	1	2	2	5	4	4	4	7	5	3	3	2	3	6	6	5	4	4	4	3	3	3	2	3.6	7
8-Jan	1	Z	1	1	2	2	2	2	2	2	2	2	2	2	3	4	4	5	5	5	5	4	3	2	2.6	5
9-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2	4	6	8	8	2.2	8
10-Jan	8	8	10	Z	13	12	12	12	10	8	6	4	3	3	2	2	2	2	2	1	1	1	1	2	5.5	13
11-Jan	5	5	3	2	Z	1	1	3	3	2	1	0	1	1	1	1	0	0	0	0	0	1	1	1	1.4	5
12-Jan	Z	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	4	3	4	4	3	3	3	3	2.3	4
13-Jan	3	Z	3	4	4	4	4	7	12	13	9	7	7	5	5	6	5	5	5	4	2	2	1	1	5.1	13
14-Jan	1	1	Z	1	1	1	1	2	1	2	2	2	2	1	2	3	3	3	4	4	4	4	4	2	2.2	4
15-Jan	2	1	0	Z	0	1	1	2	3	1	C	C	C	C	2	1	1	1	1	1	1	1	0	1	1.1	3
16-Jan	1	1	2	1	Z	1	0	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.0	4
17-Jan	1	1	1	1	1	Z	2	2	2	1	1	1	1	1	1	1	1	3	2	2	2	3	3	2	1.4	3
18-Jan	Z	2	2	2	3	3	2	2	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	2.1	3
19-Jan	3	Z	3	3	3	3	3	2	2	2	2	2	2	2	2	3	3	2	2	3	3	3	3	3	2.5	3
20-Jan	6	7	Z	13	13	11	9	5	M	M	5	5	5	5	6	5	2	2	2	2	3	3	3	3	5.4	13
21-Jan	3	3	3	Z	9	9	6	6	6	5	6	7	6	5	6	7	7	6	4	3	3	3	3	3	5.1	9
22-Jan	3	3	3	4	Z	4	4	6	7	6	4	5	7	7	8	8	9	9	8	7	6	5	4	4	5.6	9
23-Jan	3	3	3	3	3	Z	3	3	3	4	2	2	2	3	4	5	5	6	3	2	3	3	3	3	3.2	6
24-Jan	Z	4	4	4	4	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2.0	4
25-Jan	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1.4	2
26-Jan	2	2	Z	2	2	1	1	2	1	2	2	2	3	3	4	3	4	3	2	1	1	1	1	1	1.9	4
27-Jan	1	1	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0.7	2
28-Jan	1	1	1	1	Z	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	3	2	1	1	2.8	4
29-Jan	0	0	0	1	1	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1
30-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.7	1
31-Jan	1	Z	3	2	2	1	2	2	1	1	1	2	1	2	1	2	2	2	2	3	3	3	3	4	2.0	4
	2.7	2.7	2.4	2.5	3.4	3.0	2.7	2.9	3.1	2.7	2.6	2.5	2.4	2.5	2.8	3.0	3.0	3.3	3.0	2.8	2.7	2.8	2.7	2.5	Diurnal Average	
	9	8	10	13	13	12	12	12	12	13	9	7	7	7	8	8	9	19	11	9	8	11	9	8	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

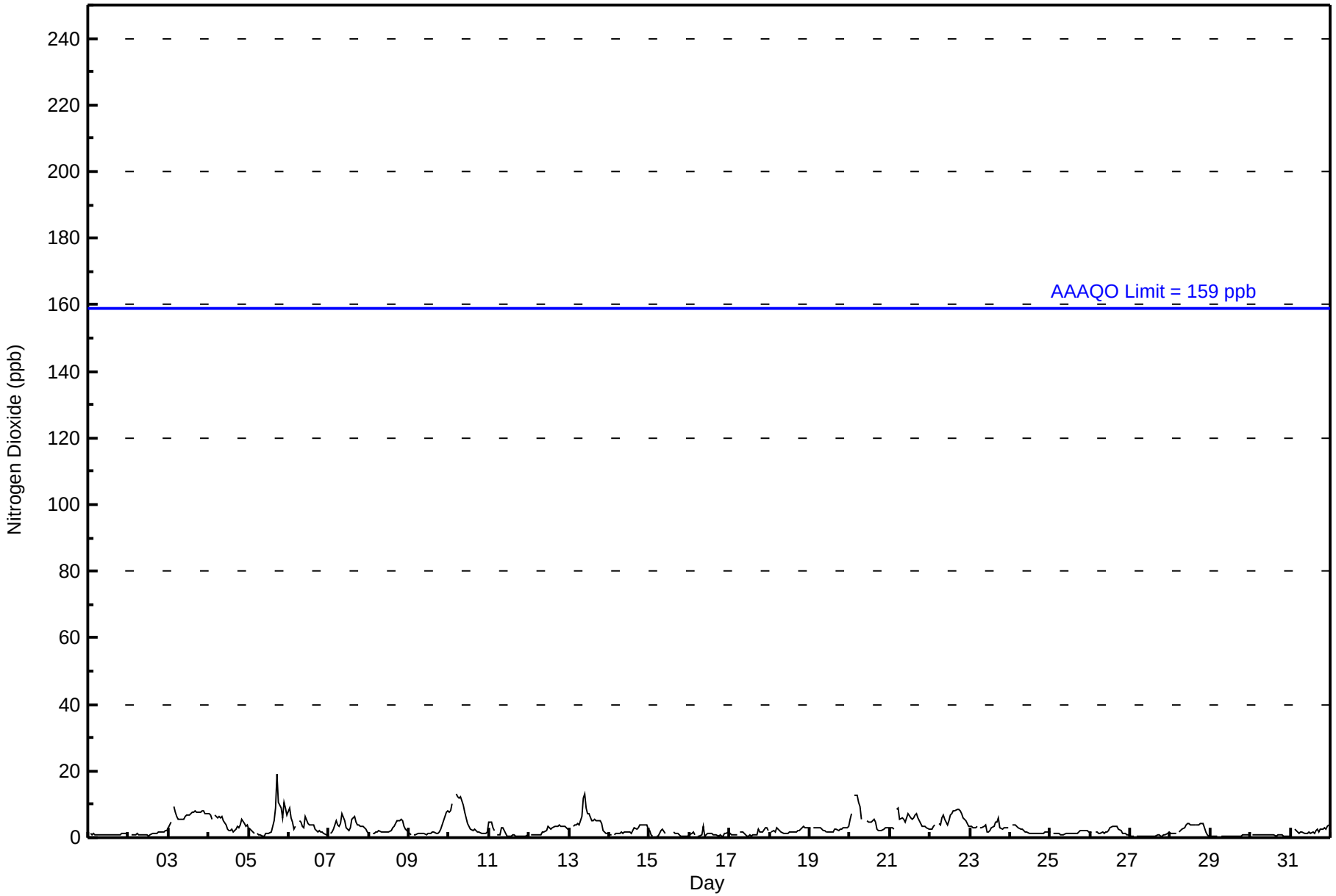
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	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 Dioxide (NO_2) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	24	51	55	20	15	5	11	26	26	100	118	32	62	85	35	36	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	24	51	55	20	15	5	11	26	26	100	118	32	62	85	35	36	701

Total Number of Valid Hours: 701

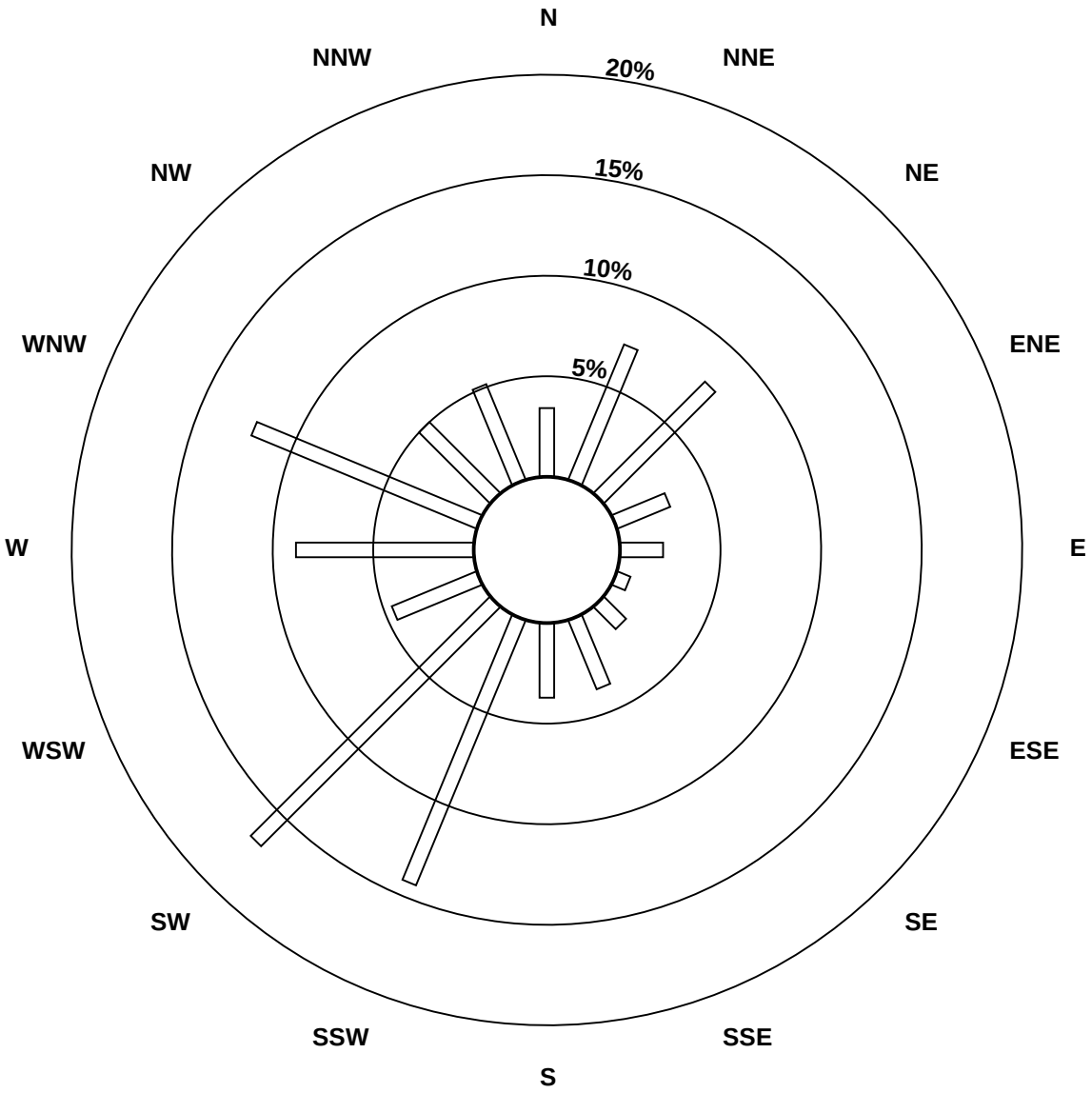
Total Number of Hours: 744

Wood Buffalo Environmental Association

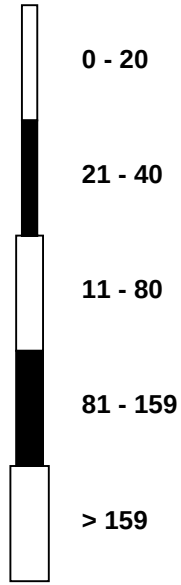
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



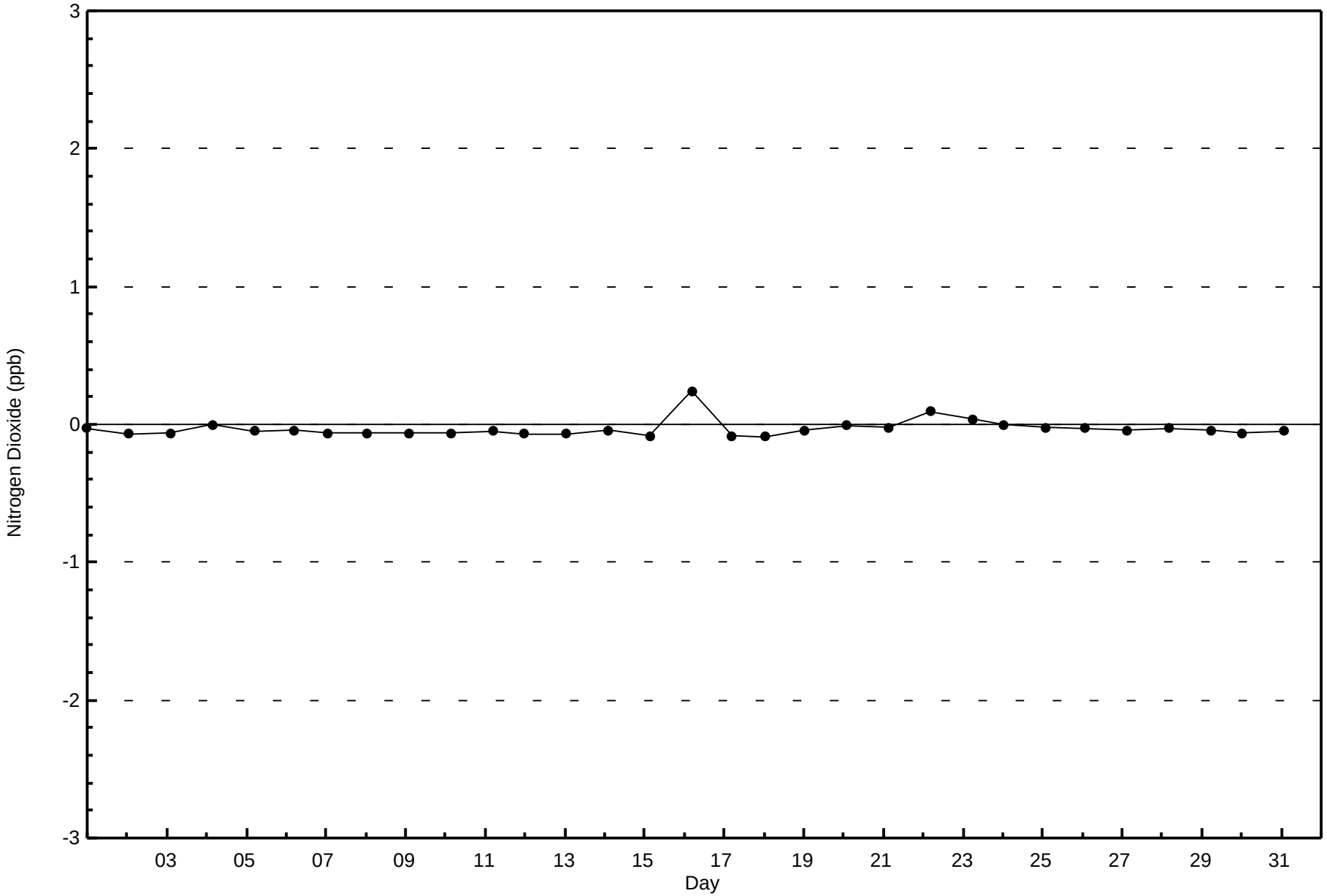
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - January 2016

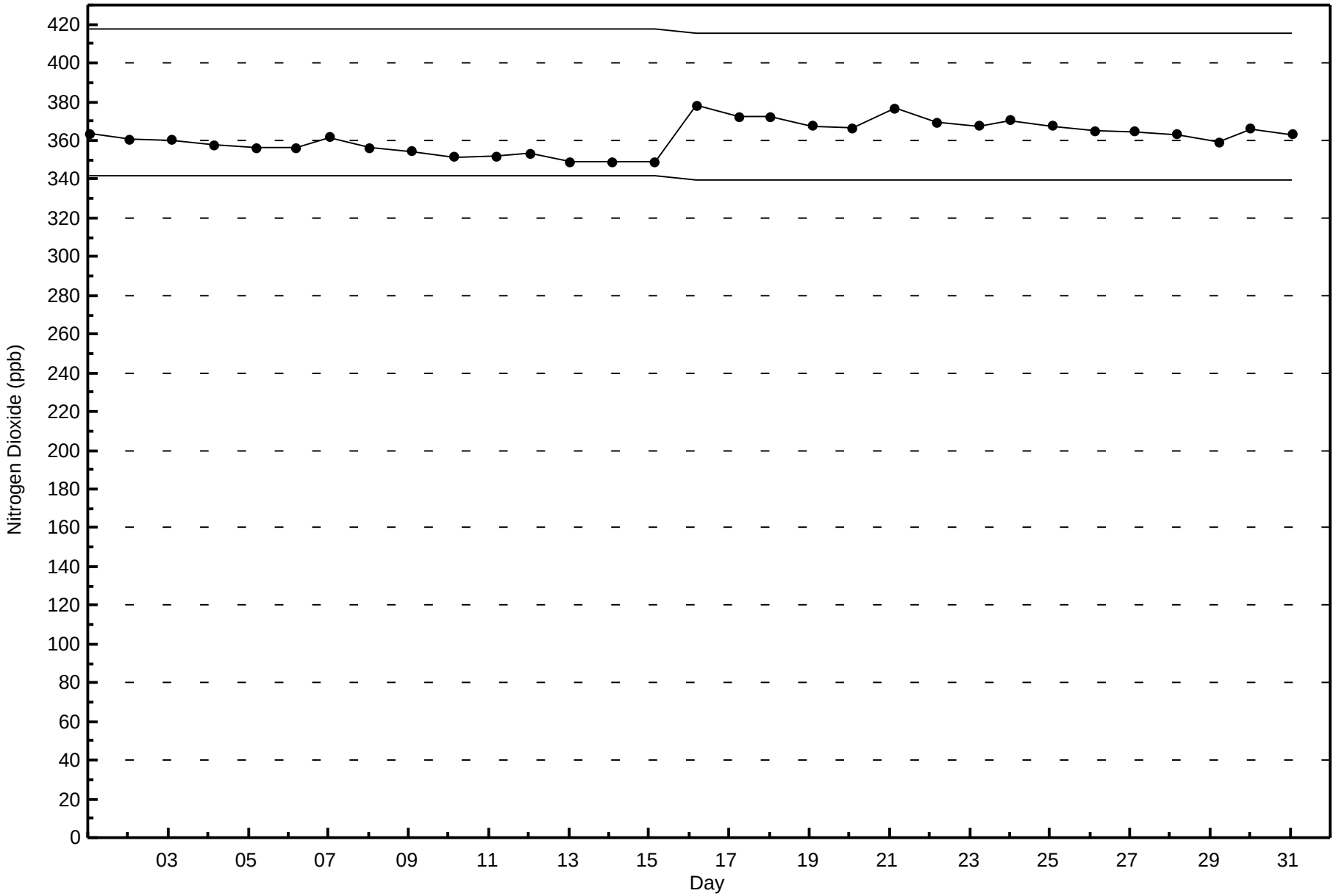


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - January 2016

Maximum Value: 19 ppb on Jan 5 18:00

Maximum Daily Average: 7.1 ppb on Jan 3

Minimum Value: 0 ppb on Jan 30 22:00

Minimum Daily Average: 0.5 ppb on Jan 29

Maximum Diurnal Average: 3.4 ppb at hour 5

Minimum Diurnal Average: 2.4 ppb at hour 3

Monthly Average: 2.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 4$ $P_{90} = 7$ $P_{99} = 12$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	35
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
2-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.2	2
3-Jan	3	5	Z	9	8	6	5	6	5	6	7	8	8	9	9	8	8	8	8	8	8	8	7	7	7.1	9
4-Jan	7	7	6	Z	7	6	6	6	6	5	4	3	3	3	3	2	2	3	3	4	6	4	4	4	4.5	7
5-Jan	3	3	2	1	Z	1	1	1	1	1	1	1	2	2	4	5	9	19	11	9	6	11	9	7	4.7	19
6-Jan	9	6	5	2	3	Z	5	5	4	3	7	5	5	5	4	4	3	2	2	2	2	1	1	1	3.7	9
7-Jan	Z	1	2	2	5	4	4	4	7	5	3	3	3	4	6	7	5	4	4	4	3	3	3	2	3.7	7
8-Jan	1	Z	1	1	2	2	2	2	2	2	2	2	2	3	3	4	4	5	5	5	5	4	3	2	2.8	5
9-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	4	6	8	8	2.3	8
10-Jan	8	8	10	Z	13	12	12	12	10	8	7	5	4	3	2	3	2	2	2	2	1	1	1	2	5.7	13
11-Jan	5	5	3	2	Z	1	1	3	3	2	2	0	1	1	1	1	0	0	0	0	0	1	1	1	1.5	5
12-Jan	Z	1	1	1	1	1	1	1	2	2	2	4	3	3	3	4	4	3	4	4	3	3	3	3	2.4	4
13-Jan	3	Z	3	4	4	4	4	7	12	16	12	10	11	7	6	6	5	5	5	4	2	1	1	1	5.8	16
14-Jan	1	1	Z	1	1	1	1	2	2	2	2	2	2	1	2	3	3	3	4	4	4	4	4	3	2.3	4
15-Jan	2	1	0	Z	0	0	1	2	3	1	C	C	C	C	2	1	1	1	1	0	1	1	1	1	1.1	3
16-Jan	1	1	2	1	Z	1	0	1	4	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	1.1	4
17-Jan	1	1	1	1	1	Z	2	1	2	1	1	1	1	1	1	1	1	3	2	1	2	3	3	2	1.4	3
18-Jan	Z	2	2	2	3	3	2	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	2.2	3
19-Jan	3	Z	3	3	3	3	3	2	2	2	2	2	2	2	2	3	3	2	2	3	3	3	3	3	2.6	3
20-Jan	6	7	Z	13	13	11	9	5	M	M	6	6	6	6	7	5	3	2	2	2	2	3	3	3	5.8	13
21-Jan	3	3	3	Z	9	9	6	6	6	5	8	10	8	7	8	8	7	6	4	3	3	3	3	3	5.6	10
22-Jan	3	3	3	4	Z	4	4	6	7	6	4	6	9	9	10	9	9	8	8	7	6	5	4	4	6.0	10
23-Jan	3	3	3	3	3	Z	3	3	3	4	2	2	3	4	5	5	5	6	3	2	3	3	3	3	3.4	6
24-Jan	Z	4	4	4	4	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2.1	4
25-Jan	1	Z	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	2	2	2	2	1.5	2
26-Jan	2	2	Z	1	2	1	1	1	1	2	2	2	3	4	4	4	4	3	2	1	1	1	1	1	2.0	4
27-Jan	1	1	0	Z	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0.7	2
28-Jan	1	1	1	1	Z	2	2	3	3	4	5	5	5	5	4	4	4	4	4	4	3	1	1	0	3.0	5
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
30-Jan	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
31-Jan	0	Z	3	2	2	1	1	2	1	1	1	2	1	2	2	2	3	2	2	2	3	3	3	4	2.0	4
	2.7	2.7	2.4	2.5	3.4	3.0	2.8	2.9	3.2	2.9	3.1	3.1	3.1	3.0	3.2	3.2	3.1	3.3	3.0	2.8	2.7	2.8	2.7	2.5	Diurnal Average	
	9	8	10	13	13	12	12	12	12	16	12	10	11	9	10	9	9	19	11	9	8	11	9	8	Diurnal Maximum	

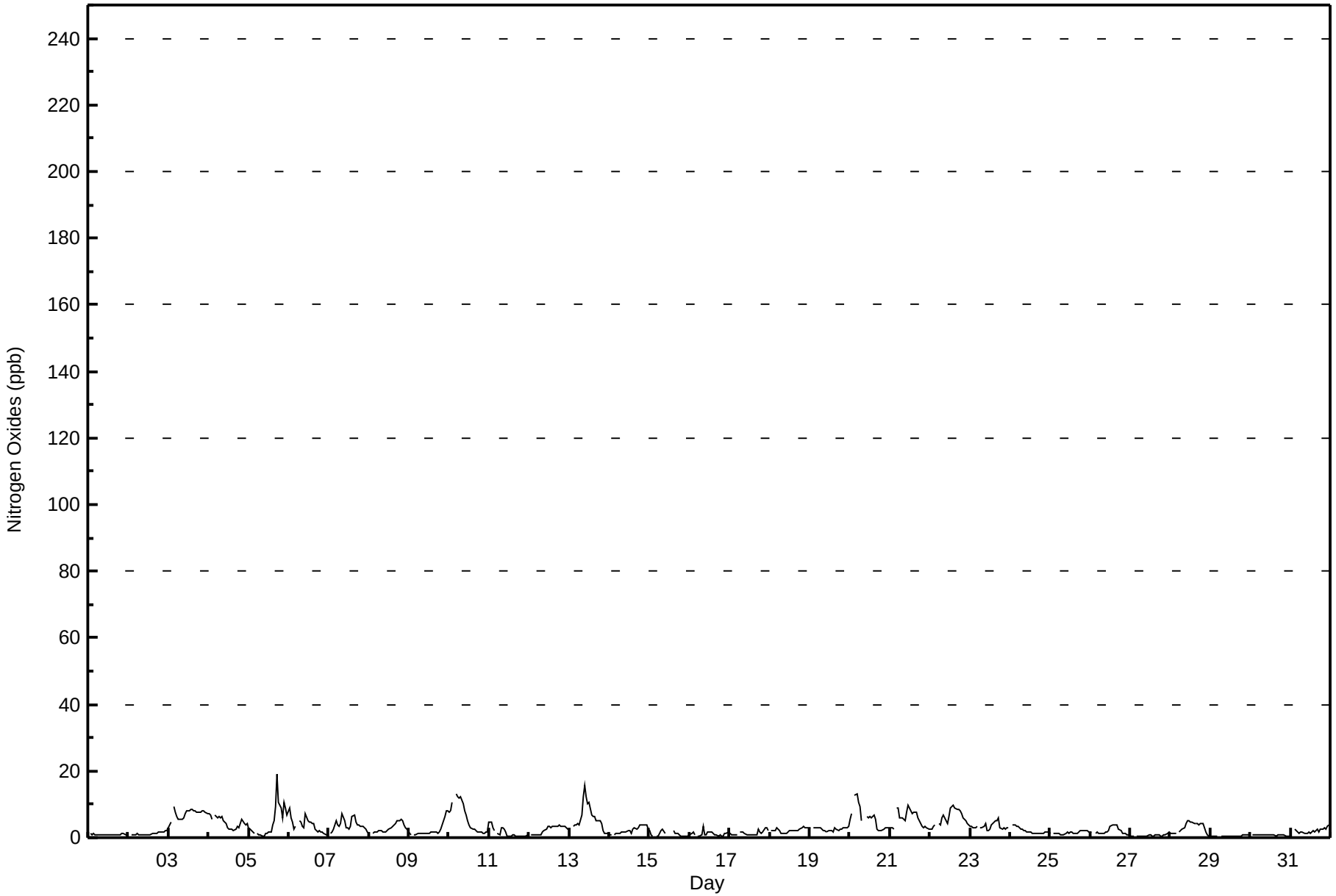
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	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

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	24	51	55	20	15	5	11	26	26	100	118	32	62	85	35	36	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	24	51	55	20	15	5	11	26	26	100	118	32	62	85	35	36	701

Total Number of Valid Hours: 701

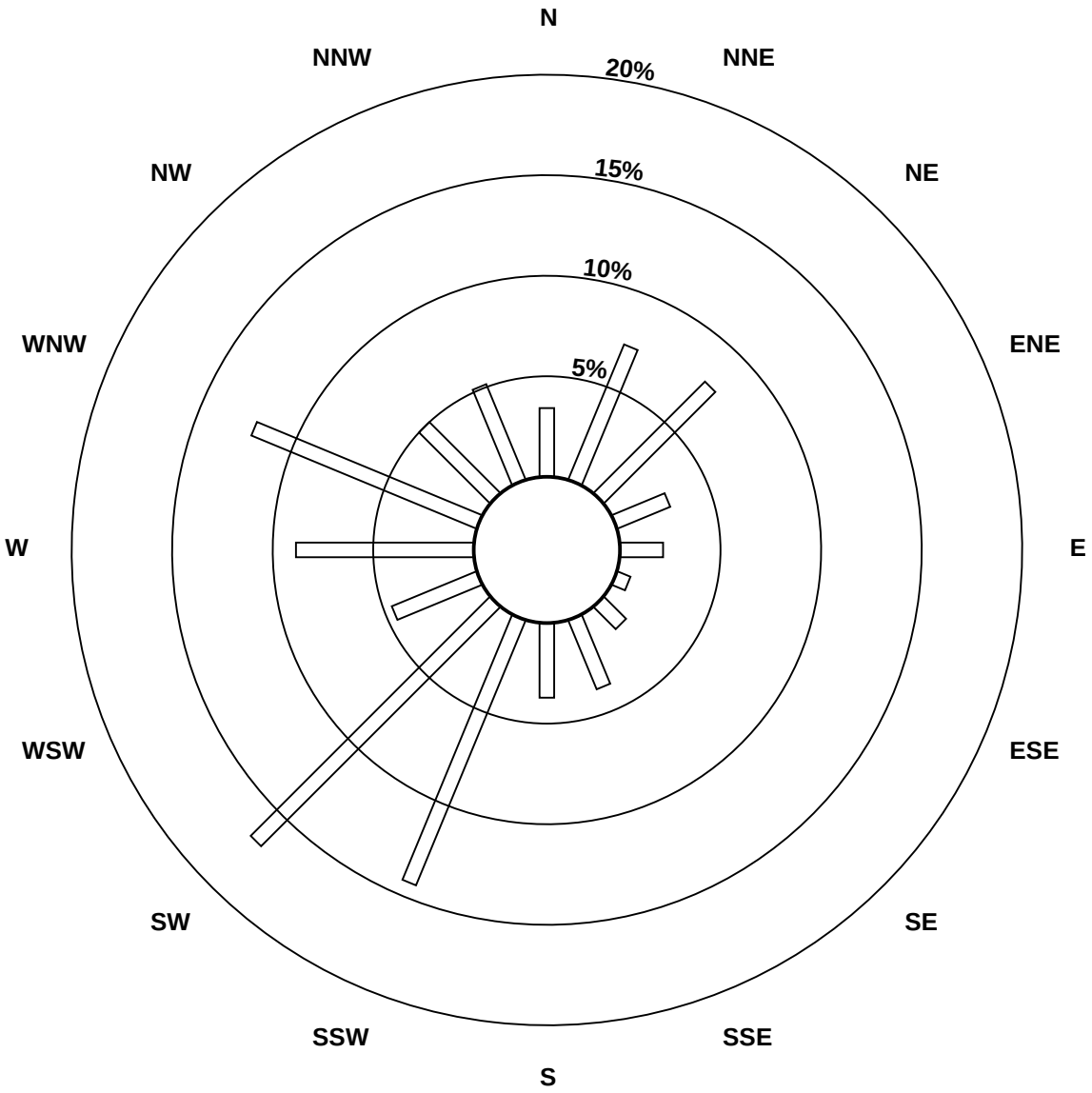
Total Number of Hours: 744

Wood Buffalo Environmental Association

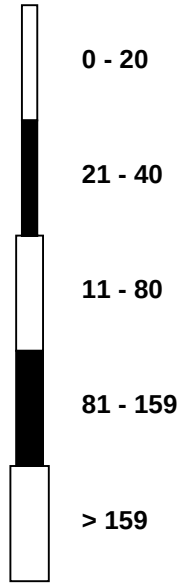
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

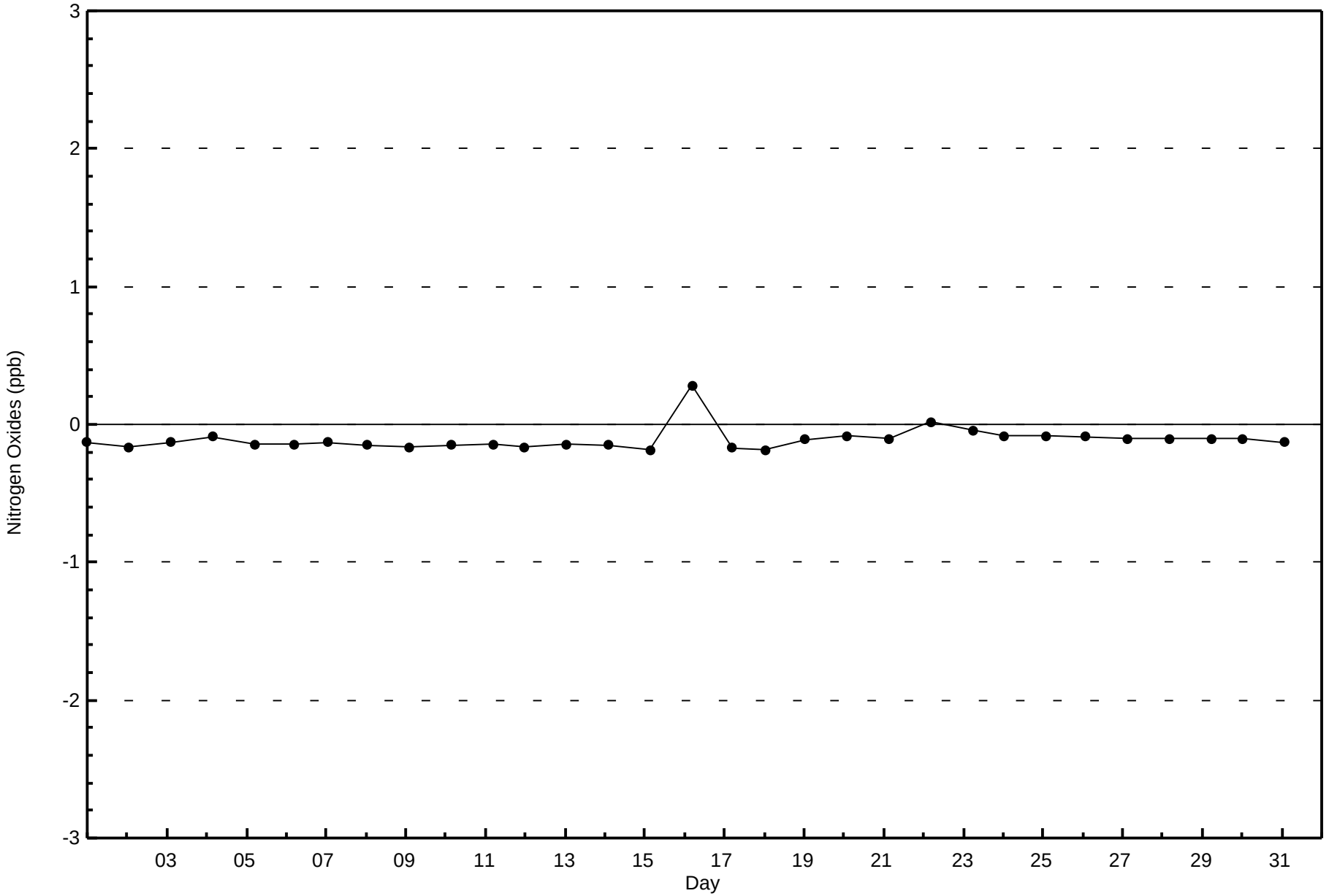
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - January 2016

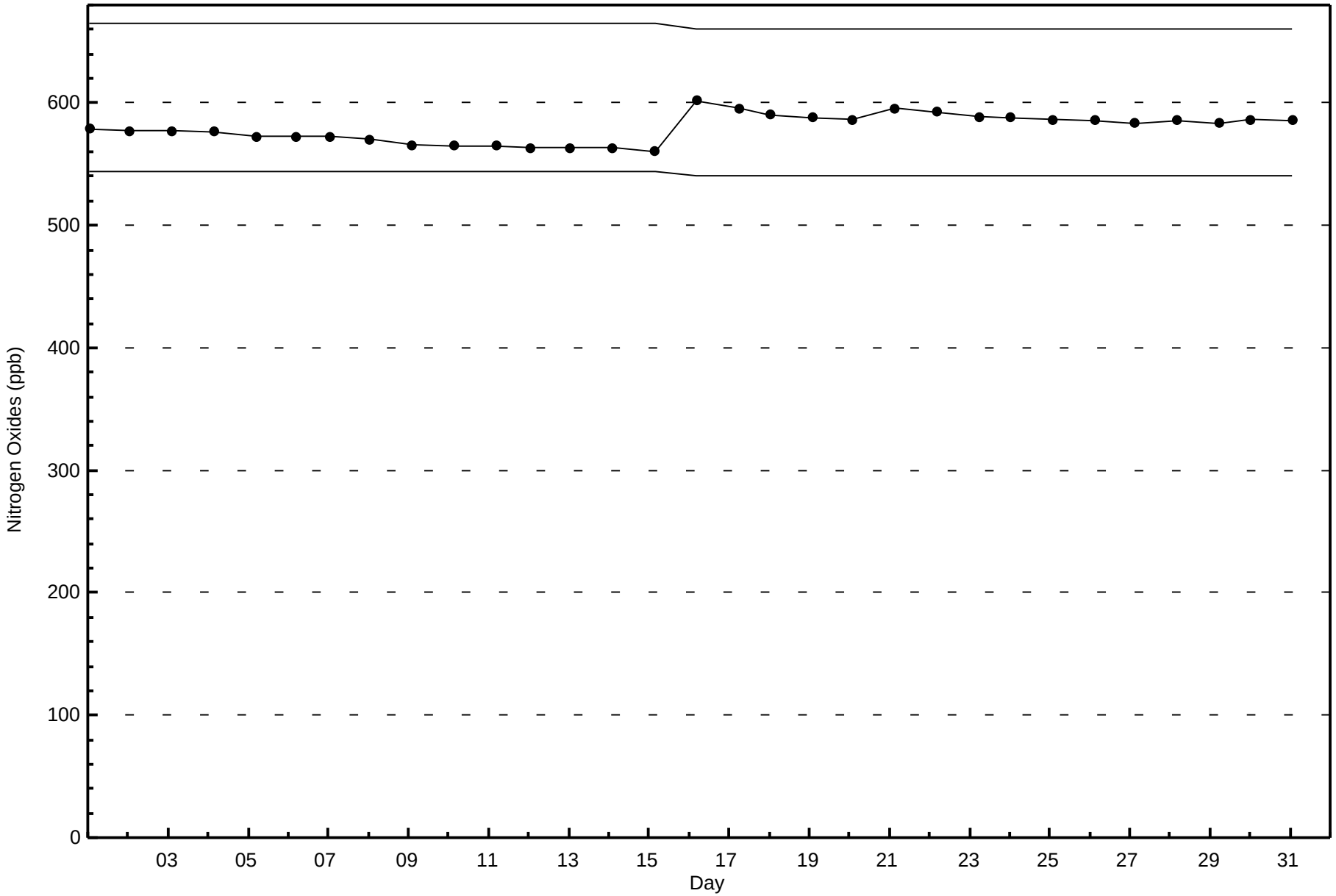


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 48 ppb on Jan 29 00:00

Maximum Daily Average: 43.9 ppb on Jan 1

Minimum Value: 12 ppb on Jan 13 09:00

Minimum Daily Average: 20.5 ppb on Jan 13

Maximum Diurnal Average: 33.5 ppb at hour 14

Minimum Diurnal Average: 30.9 ppb at hour 5

Monthly Average: 32.1 ppb

Percentiles: $P_1 = 14$ $P_{10} = 22$ $Q_1 = 27$ Median = 33 $Q_3 = 37$ $P_{90} = 42$ $P_{99} = 46$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	33
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	42	43	43	Z	44	44	44	44	44	44	45	45	45	45	45	45	44	45	45	44	43	43	43	42	43.9	45
2-Jan	42	42	41	40	Z	40	41	41	42	42	42	43	44	45	41	42	39	40	40	41	40	39	38	38	41.0	45
3-Jan	36	33	29	28	30	Z	35	36	37	37	34	34	34	35	35	33	33	34	32	32	30	29	29	30	32.9	37
4-Jan	29	29	32	28	28	30	Z	26	28	31	32	34	37	38	38	40	39	36	37	33	31	33	33	33	32.9	40
5-Jan	36	38	41	41	41	42	43	Z	43	43	42	41	41	40	35	33	23	16	26	28	33	25	27	28	34.9	43
6-Jan	27	30	32	33	31	21	28	29	Z	28	21	23	22	22	22	20	21	23	25	27	29	30	33	33	26.5	33
7-Jan	33	31	30	Z	26	26	26	24	21	27	31	32	33	32	30	29	32	32	32	32	32	32	33	33	30.0	33
8-Jan	34	33	33	32	Z	32	32	32	31	31	32	31	31	31	30	29	28	26	26	26	26	27	28	30	30.0	34
9-Jan	30	32	33	34	34	Z	33	32	33	34	35	35	35	34	33	33	33	33	32	31	28	23	20	19	31.2	35
10-Jan	19	18	15	12	13	15	Z	13	17	19	22	25	28	30	32	32	32	31	30	30	30	32	30	28	24.1	32
11-Jan	22	22	24	24	25	28	27	Z	27	30	33	33	33	33	33	34	33	33	33	31	31	30	30	30	29.4	34
12-Jan	29	30	30	Z	31	31	31	30	30	28	28	27	28	28	28	27	27	26	27	26	25	25	27	32	28.4	32
13-Jan	30	27	30	28	Z	27	26	23	12	13	15	16	15	17	17	15	16	16	17	19	22	23	24	25	20.5	30
14-Jan	27	28	29	29	29	Z	30	29	31	32	33	32	33	38	37	37	37	37	34	34	33	33	32	33	32.4	38
15-Jan	33	35	36	36	36	36	Z	34	33	34	M	M	M	36	36	37	37	36	37	37	37	36	34	33	35.4	37
16-Jan	32	32	31	31	31	33	33	Z	30	33	33	32	33	33	34	33	33	34	33	34	34	34	33	32	32.7	34
17-Jan	33	33	33	33	34	34	33	33	Z	35	38	35	35	38	38	38	38	36	37	38	37	36	36	38	35.6	38
18-Jan	39	39	38	Z	38	37	36	38	37	37	37	37	36	36	36	35	35	34	33	32	31	30	30	29	35.2	39
19-Jan	28	27	27	26	Z	26	25	26	27	26	27	27	26	26	26	25	25	25	25	24	24	24	23	23	25.5	28
20-Jan	21	19	17	14	14	Z	17	22	21	20	C	C	24	25	22	23	27	28	27	24	23	22	21	22	21.8	28
21-Jan	23	24	25	24	18	17	Z	20	22	23	22	22	25	27	28	29	29	31	34	34	34	34	34	34	26.5	34
22-Jan	33	32	31	30	29	29	27	Z	26	24	25	26	25	25	25	24	22	22	21	20	21	22	23	25	25.5	33
23-Jan	25	25	24	24	23	23	23	22	Z	21	25	26	26	25	24	23	23	21	24	25	23	23	20	18	23.3	26
24-Jan	18	18	17	Z	18	19	25	24	27	28	30	32	33	34	34	35	35	35	34	31	31	32	32	33	28.5	35
25-Jan	33	33	33	32	Z	33	33	32	31	31	32	34	35	36	38	38	37	35	35	35	35	34	34	36	34.2	38
26-Jan	36	35	35	37	35	Z	39	38	39	36	36	34	34	33	33	33	33	35	38	41	42	41	42	43	36.9	43
27-Jan	43	44	44	44	45	45	Z	45	45	45	45	45	46	46	46	45	43	43	43	43	41	39	39	39	43.5	46
28-Jan	39	40	39	39	38	40	38	Z	34	33	33	33	34	35	34	36	36	36	34	33	35	42	48	48	37.2	48
29-Jan	48	47	47	45	42	41	41	41	Z	41	41	42	42	43	43	44	43	43	43	42	41	40	41	41	42.7	48
30-Jan	41	41	41	Z	40	40	39	40	40	41	40	41	41	42	43	43	41	40	40	40	41	44	43	43	41.1	44
31-Jan	43	36	33	34	Z	35	30	28	31	31	32	31	33	33	32	30	29	31	29	29	28	30	30	30	31.6	43
	32.4	32.1	32.0	31.2	30.9	31.7	32.1	30.9	31.0	31.6	32.5	32.7	32.9	33.5	33.2	32.9	32.3	32.1	32.3	32.0	32.0	31.8	32.0	32.3	Diurnal Average	
	48	47	47	45	45	45	44	45	45	45	45	45	46	46	46	45	44	45	45	44	43	44	48	48	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

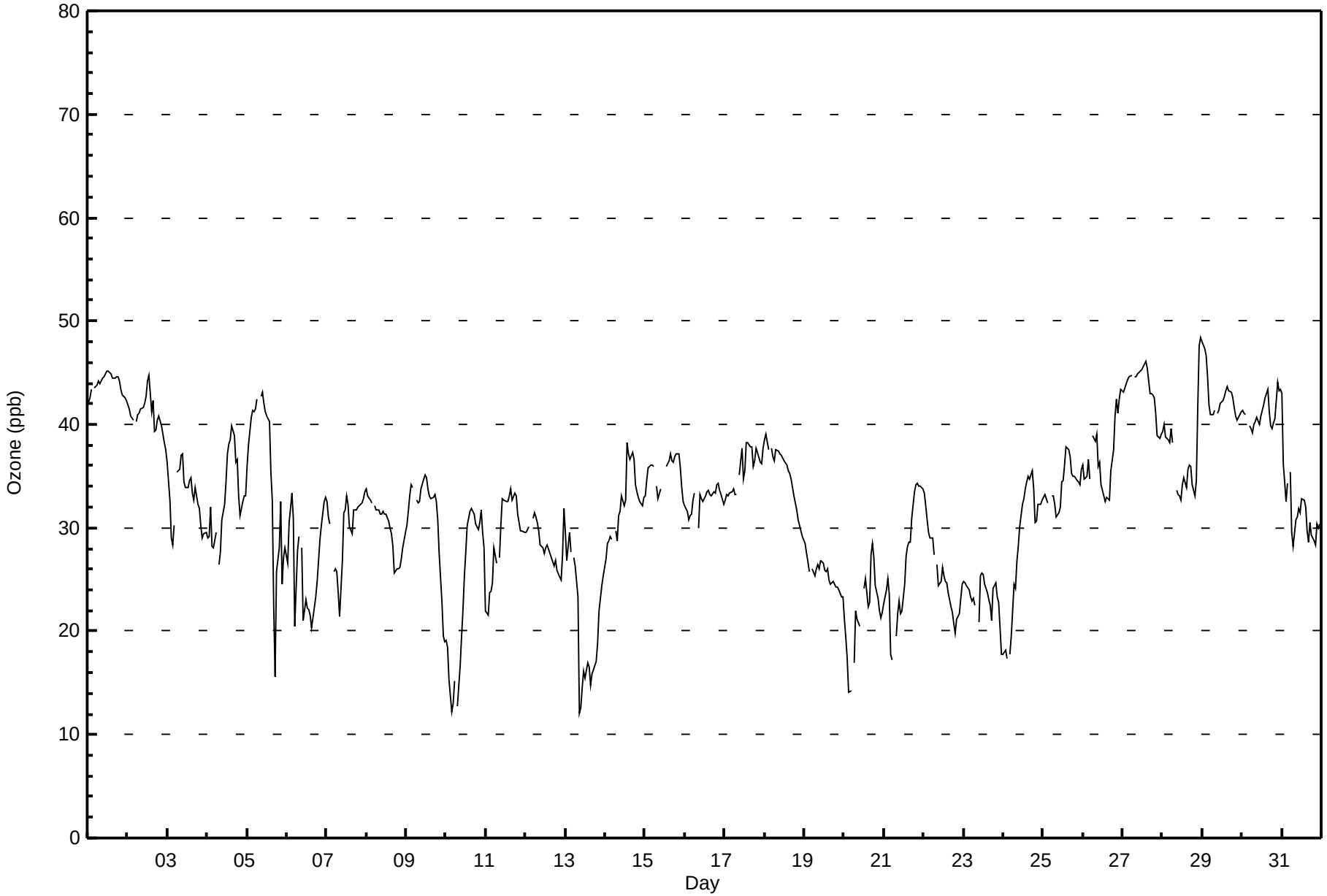
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Ozone (O_3) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	42	5.93	5.93
21 - 50	666	94.07	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Conklin Lookout - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	1	6	9	2	2	0	0	1	1	10	6	1	2	1	0	0	42
21 - 50	21	45	48	18	13	5	10	24	25	91	115	29	59	85	34	37	659
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	51	57	20	15	5	10	25	26	101	121	30	61	86	34	37	701

Total Number of Valid Hours: 701

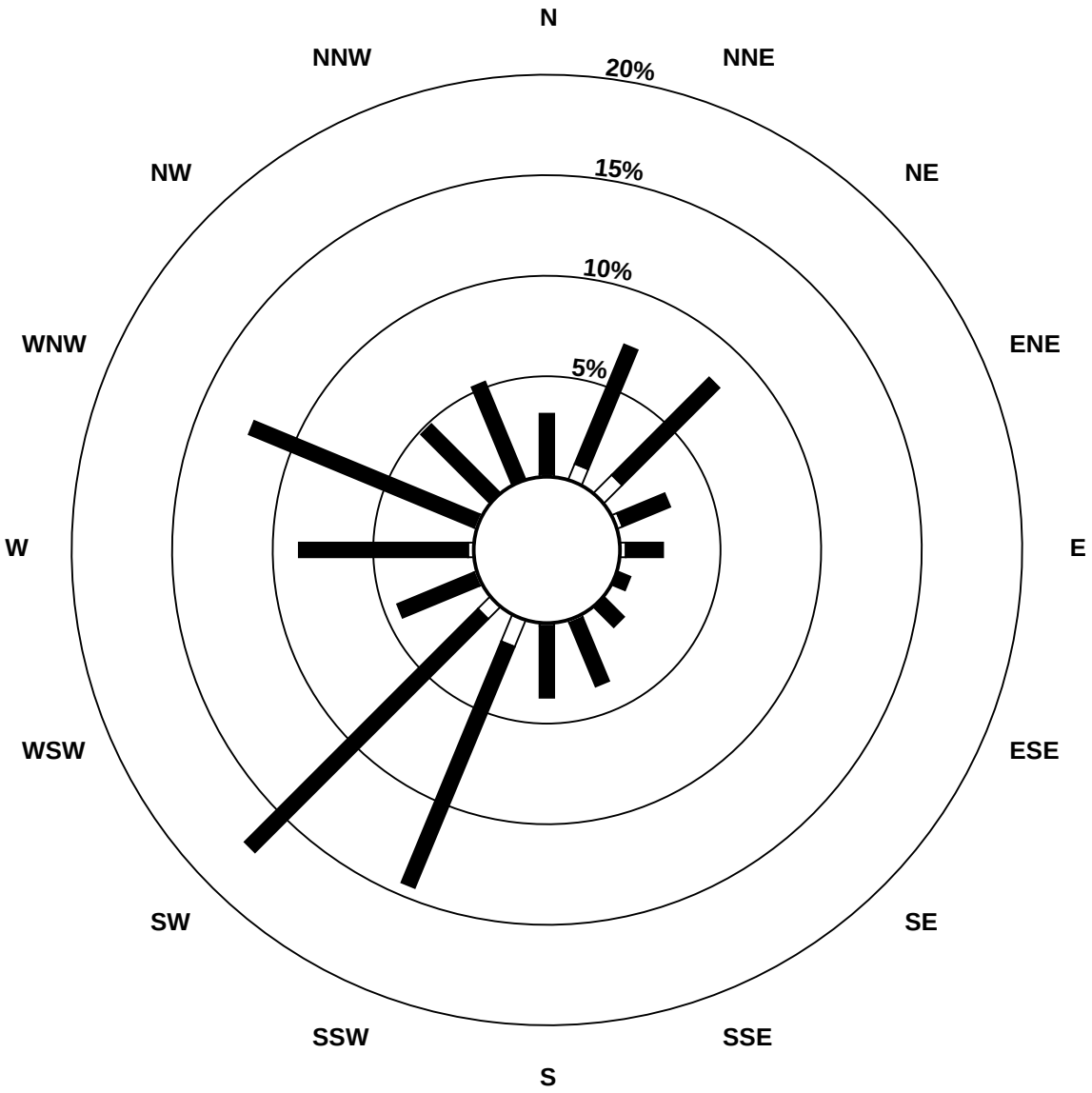
Total Number of Hours: 744

Wood Buffalo Environmental Association

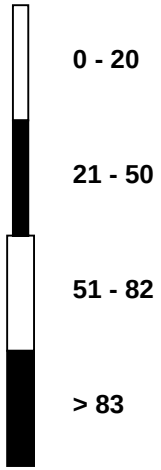
Wind Rose Jan 2016

Ozone (O_3) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



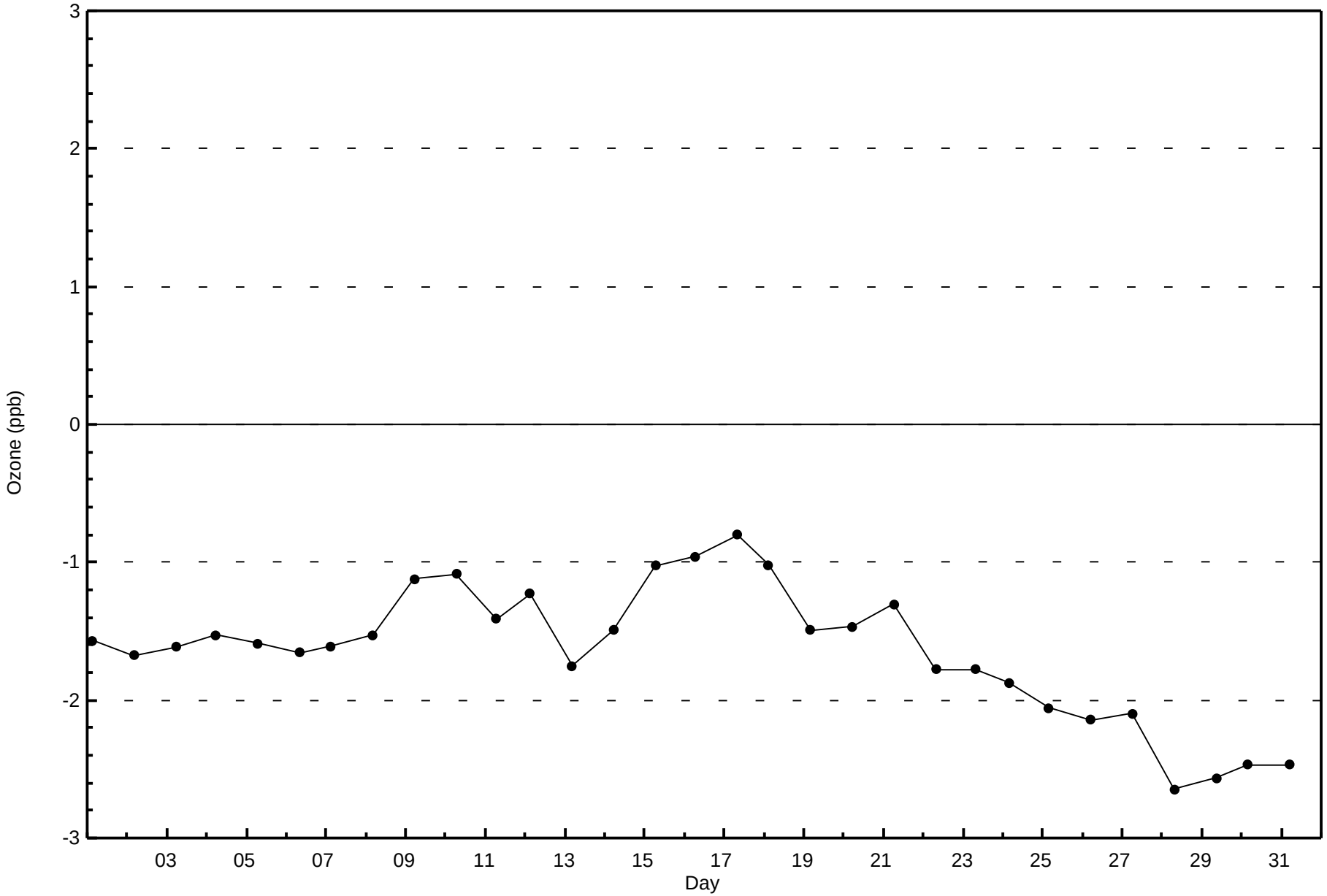
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Conklin Lookout - January 2016

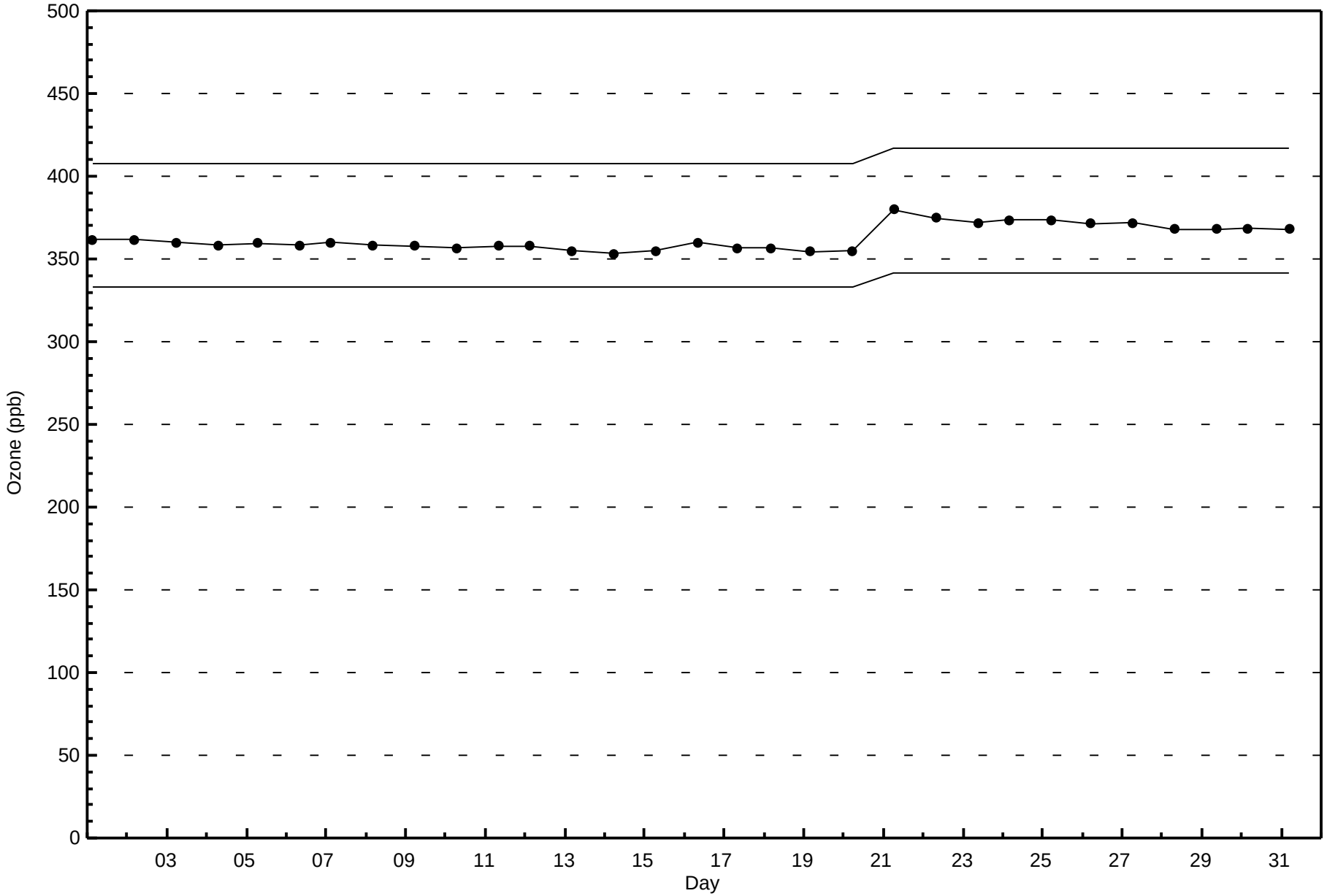


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 23.2 $\mu g/m^3$ on Jan 21 05:00

Maximum Daily Average: 9.3 $\mu g/m^3$ on Jan 10

Minimum Value: 0.3 $\mu g/m^3$ on Jan 18 02:00

Minimum Daily Average: 0.8 $\mu g/m^3$ on Jan 17

Maximum Diurnal Average: 5.6 $\mu g/m^3$ at hour 5

Minimum Diurnal Average: 3.4 $\mu g/m^3$ at hour 19

Monthly Average: 4.17 $\mu g/m^3$

Percentiles: P_1 = 0.4 P_{10} = 1.0 Q_1 = 1.4 Median = 2.8 Q_3 = 6.0 P_{90} = 9.6 P_{99} = 15.3

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Hours of Calibration:	2
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	1.2	1.4	1.0	0.9	0.9	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.3	1.7	2.3	2.3	2.6	1.1	2.6
2-Jan	2.8	3.6	4.6	5.8	7.3	8.1	5.9	4.5	3.1	2.8	2.2	1.7	1.4	1.2	1.7	1.8	2.2	2.6	2.5	4.0	4.6	4.9	5.4	5.8	3.8	8.1
3-Jan	7.6	11.9	13.4	12.2	10.0	7.3	5.4	5.3	5.3	5.6	6.4	6.2	5.7	4.9	4.5	4.9	5.4	5.0	5.1	4.8	4.8	4.2	4.2	4.5	6.5	13.4
4-Jan	4.5	4.4	5.1	5.3	6.1	7.0	7.0	6.7	6.5	5.1	4.3	2.8	1.6	1.2	1.1	0.9	1.0	1.3	1.2	1.8	2.6	2.7	1.7	1.7	3.5	7.0
5-Jan	3.0	2.8	1.8	1.8	2.2	1.8	1.4	1.7	1.3	1.1	1.2	1.1	1.1	1.1	1.6	2.2	5.1	5.8	3.5	2.3	1.5	12.0	14.4	5.9	3.2	14.4
6-Jan	6.1	3.1	1.6	1.2	1.6	2.2	1.5	1.8	1.8	1.5	2.8	1.9	1.6	1.4	1.4	1.5	1.7	1.8	1.7	1.8	2.4	2.0	1.5	1.4	2.0	6.1
7-Jan	1.8	2.3	2.8	2.7	2.7	2.7	2.8	3.6	4.1	2.5	1.8	2.1	2.0	2.0	2.8	3.0	1.6	1.3	1.2	1.2	1.5	1.8	2.0	2.7	2.3	4.1
8-Jan	3.8	4.6	4.5	4.4	3.9	3.5	3.3	3.0	3.0	3.3	3.6	3.5	3.1	2.2	2.2	2.6	3.2	3.1	2.8	3.0	2.8	2.0	1.6	1.4	3.1	4.6
9-Jan	1.3	1.1	2.8	5.6	7.0	7.6	6.9	6.3	6.9	7.4	7.9	8.0	7.5	8.5	9.1	8.9	7.3	5.0	5.7	9.9	18.8	17.9	14.1	13.5	8.1	18.8
10-Jan	13.3	14.0	16.0	16.5	14.8	13.9	13.4	13.2	12.5	12.2	10.9	8.2	6.8	5.3	4.3	3.7	4.3	4.7	5.1	5.5	5.7	5.4	6.1	7.0	9.3	16.5
11-Jan	9.1	8.1	7.3	7.0	6.5	4.6	4.1	4.3	3.4	2.6	1.6	1.4	1.3	0.8	0.7	1.0	1.1	1.1	1.0	1.0	1.2	1.2	1.2	1.2	3.0	9.1
12-Jan	1.5	1.5	1.5	1.6	1.2	1.1	2.9	4.2	3.7	3.5	8.4	13.4	11.7	10.0	9.7	10.2	10.7	10.8	8.8	8.4	8.6	8.5	7.3	4.3	6.4	13.4
13-Jan	6.2	10.5	8.5	10.0	10.7	10.6	9.3	11.8	12.3	13.6	11.3	9.7	11.3	10.5	6.7	5.4	5.4	5.7	5.9	6.3	5.4	4.6	4.1	3.6	8.3	13.6
14-Jan	3.1	2.6	2.2	2.1	2.4	2.6	3.4	4.6	3.2	3.0	3.1	2.8	2.4	1.3	1.3	1.0	0.4	0.3	1.0	1.1	1.4	2.1	2.2	2.5	2.2	4.6
15-Jan	2.5	2.3	2.2	1.2	0.9	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.2	1.6	1.7	1.4	1.3	1.3	1.1	1.0	0.9	1.2	1.8	1.9	1.3	2.5
16-Jan	1.9	1.8	1.9	1.9	1.9	1.7	1.6	1.3	1.1	1.0	1.5	2.5	2.1	1.1	1.1	1.1	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	1.3	2.5
17-Jan	1.0	0.9	0.8	0.8	0.8	0.8	1.1	1.2	1.0	2.1	0.9	0.9	0.6	0.3	0.4	0.4	0.4	0.6	0.7	0.6	0.6	0.6	0.5	0.4	0.8	2.1
18-Jan	0.3	0.3	0.3	0.4	0.5	0.9	1.0	0.6	0.7	0.9	0.5	0.5	0.5	0.5	0.5	0.5	0.7	1.0	1.0	1.2	1.5	1.6	2.2	2.6	0.8	2.6
19-Jan	2.7	3.7	10.7	11.4	15.0	13.1	9.7	8.1	7.2	7.6	4.8	4.8	5.1	6.0	5.8	6.4	6.9	6.7	6.4	7.5	7.0	7.6	7.4	5.9	7.4	15.0
20-Jan	6.6	7.8	8.5	10.3	7.6	7.0	5.3	3.1	2.9	2.7	5.9	C	C	5.0	6.7	7.0	4.8	3.9	3.5	5.1	5.9	6.2	6.6	7.5	5.9	10.3
21-Jan	7.6	7.2	8.8	13.1	23.2	20.1	12.9	11.4	9.2	7.6	8.0	7.0	6.2	7.0	7.5	6.8	6.5	5.8	5.1	4.9	4.8	5.0	4.5	4.1	8.5	23.2
22-Jan	3.8	3.9	4.5	4.6	5.4	7.5	6.6	12.9	13.6	11.6	7.0	10.7	9.9	10.6	11.4	12.8	13.4	13.7	12.5	10.9	10.0	9.2	6.8	5.2	9.1	13.7
23-Jan	6.0	7.6	8.4	8.4	8.4	8.8	9.6	9.9	10.3	10.0	6.8	6.9	7.2	7.3	7.1	7.4	7.7	7.7	7.4	7.3	7.8	7.3	7.1	7.0	7.9	10.3
24-Jan	10.9	18.8	18.9	15.6	15.2	14.5	9.8	9.4	6.1	5.7	5.8	5.1	4.7	4.0	3.7	3.3	3.4	3.3	3.1	2.9	2.8	2.3	2.0	1.7	7.2	18.9
25-Jan	2.0	2.0	2.1	2.8	2.6	2.6	2.4	2.2	2.6	1.9	1.4	1.0	1.0	1.2	1.3	2.0	3.1	3.9	3.3	3.0	3.0	2.8	2.8	2.7	2.3	3.9
26-Jan	3.8	5.5	5.2	4.3	4.9	3.2	3.2	3.7	3.9	4.5	4.4	5.4	6.5	7.3	7.8	7.3	6.8	5.4	4.6	2.8	2.0	2.3	1.7	1.6	4.5	7.8
27-Jan	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.6	1.6	1.4	1.3	1.3	1.3	1.3	1.2	1.3	1.4	1.4	1.4	1.6	1.5	1.5	1.7	2.0	1.6	2.0
28-Jan	1.9	1.8	1.8	1.8	1.8	1.8	2.0	2.4	2.9	3.4	3.6	3.4	3.1	2.9	2.3	2.4	2.3	2.3	2.9	3.8	2.7	1.8	1.2	1.1	2.4	3.8
29-Jan	1.1	1.2	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.5
30-Jan	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.2	1.2	1.2	1.2	1.1	1.2	1.1	1.2	2.2	2.3	2.4	2.2	2.1	1.7	1.7	1.7	1.5	2.4
31-Jan	1.7	2.5	3.2	2.9	2.5	2.5	2.8	2.8	2.5	2.7	3.0	2.9	2.8	2.7	3.9	3.2	2.1	2.0	2.3	2.6	3.7	3.9	4.0	3.6	2.9	4.0
	3.9	4.6	5.0	5.2	5.6	5.3	4.6	4.7	4.4	4.2	4.0	4.0	3.8	3.6	3.6	3.7	3.7	3.6	3.4	3.6	3.9	4.1	3.9	3.5	Diurnal Average	
	13.3	18.8	18.9	16.5	23.2	20.1	13.4	13.2	13.6	13.6	11.3	13.4	11.7	10.6	11.4	12.8	13.4	13.7	12.5	10.9	18.8	17.9	14.4	13.5	Diurnal Maximum	

C - Calibration

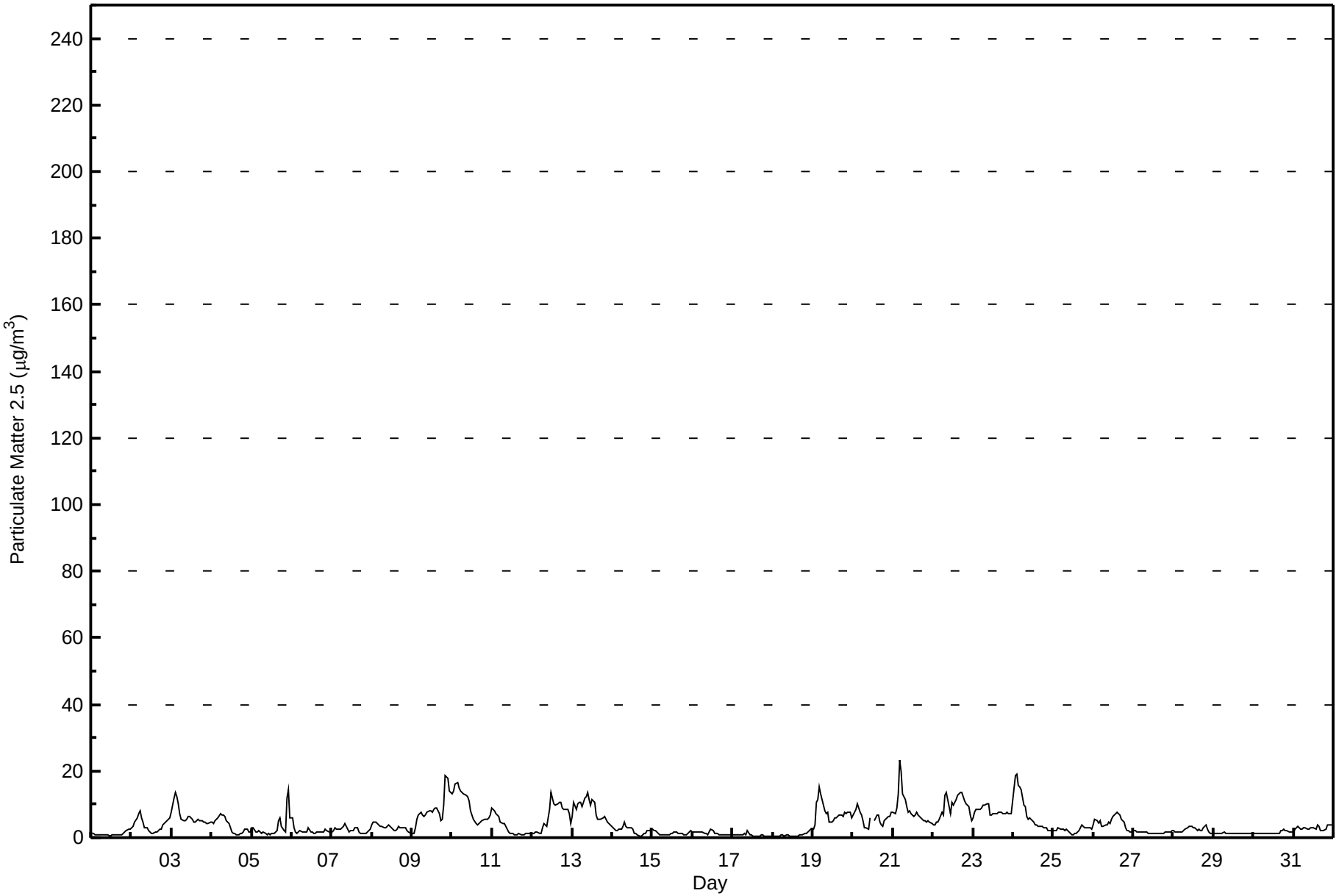
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

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

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

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

Conklin Lookout - January 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	456	61.46	61.46
6 - 15	197	26.55	88.01
16 - 25	9	1.21	89.22
26 - 80	0	0.00	89.22
> 81.0	0	0.00	89.22

Total Number of Valid Hours: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

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

Conklin Lookout - January 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	22	42	22	9	10	4	8	5	11	58	63	26	45	68	31	26	450
6 - 15	1	10	29	11	7	1	3	6	10	28	48	5	9	14	3	12	197
16 - 25	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	9
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	23	52	51	20	17	5	11	11	21	94	112	31	54	82	34	38	656

Total Number of Valid Hours: 735

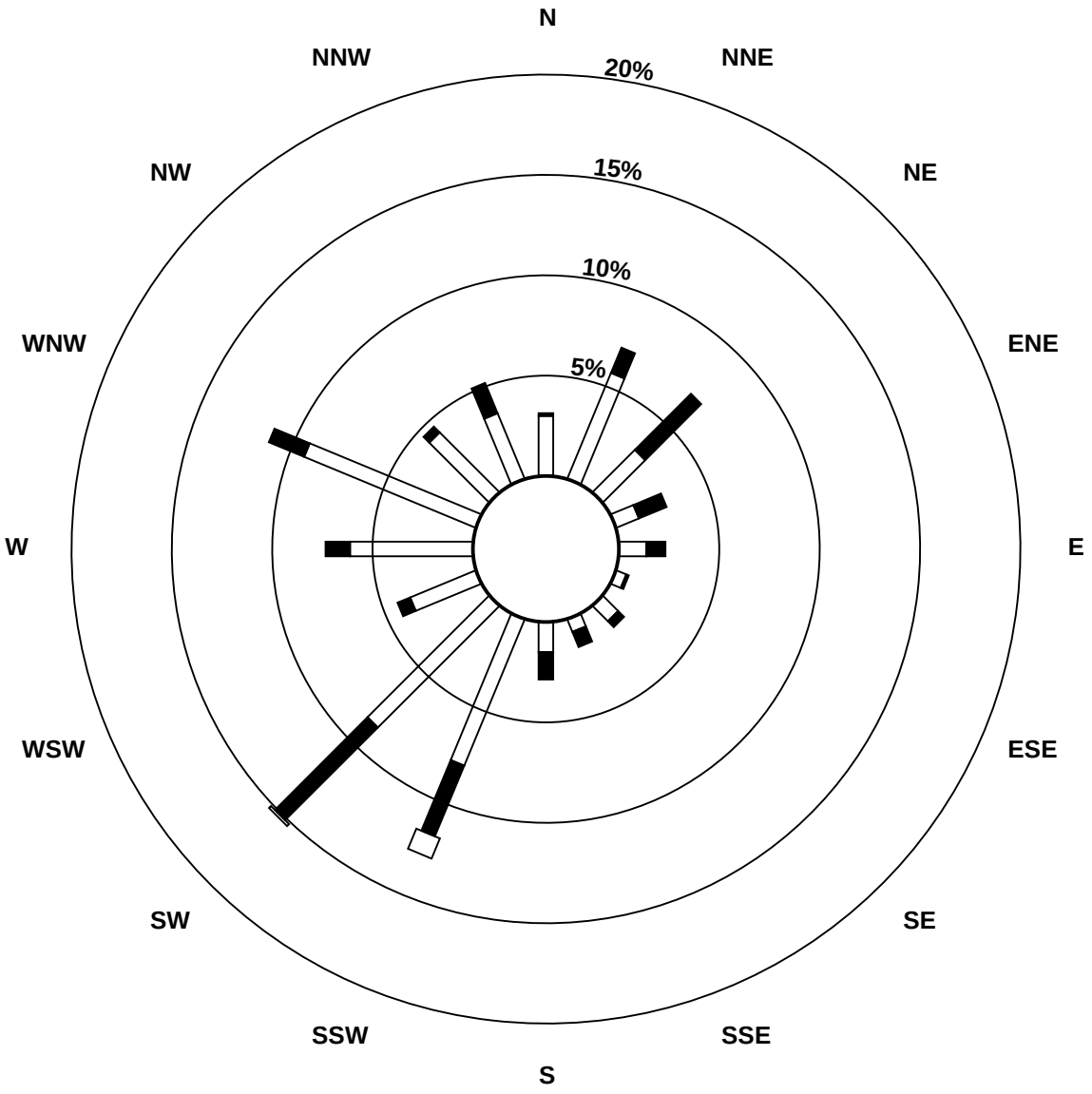
Total Number of Hours: 744

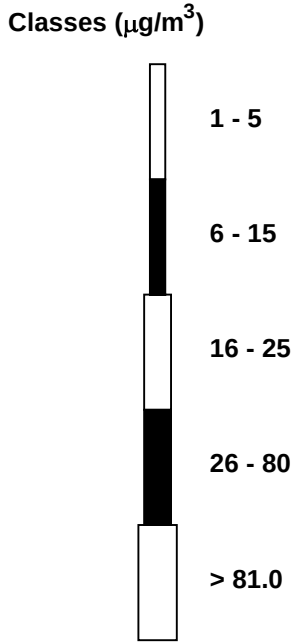
Wood Buffalo Environmental Association

Wind Rose Jan 2016

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

Conklin Lookout (AMS 18)





Total Number of Valid Hours: 735

Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C

Conklin Lookout - January 2016

Maximum Value: 4.9 C on Jan 26 21:00

Maximum Daily Average: 2.2 C on Jan 27

Minimum Value: -28.4 C on Jan 16 09:00

Minimum Daily Average: -24.6 C on Jan 16

Maximum Diurnal Average: -8.2 C at hour 15

Minimum Diurnal Average: -11.6 C at hour 24

Monthly Average: -10.64 C

Percentiles: P_1 = -25.8 P_{10} = -20.8 Q_1 = -16.0 Median = -10.7 Q_3 = -4.9 P_{90} = 0.0 P_{99} = 4.2

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

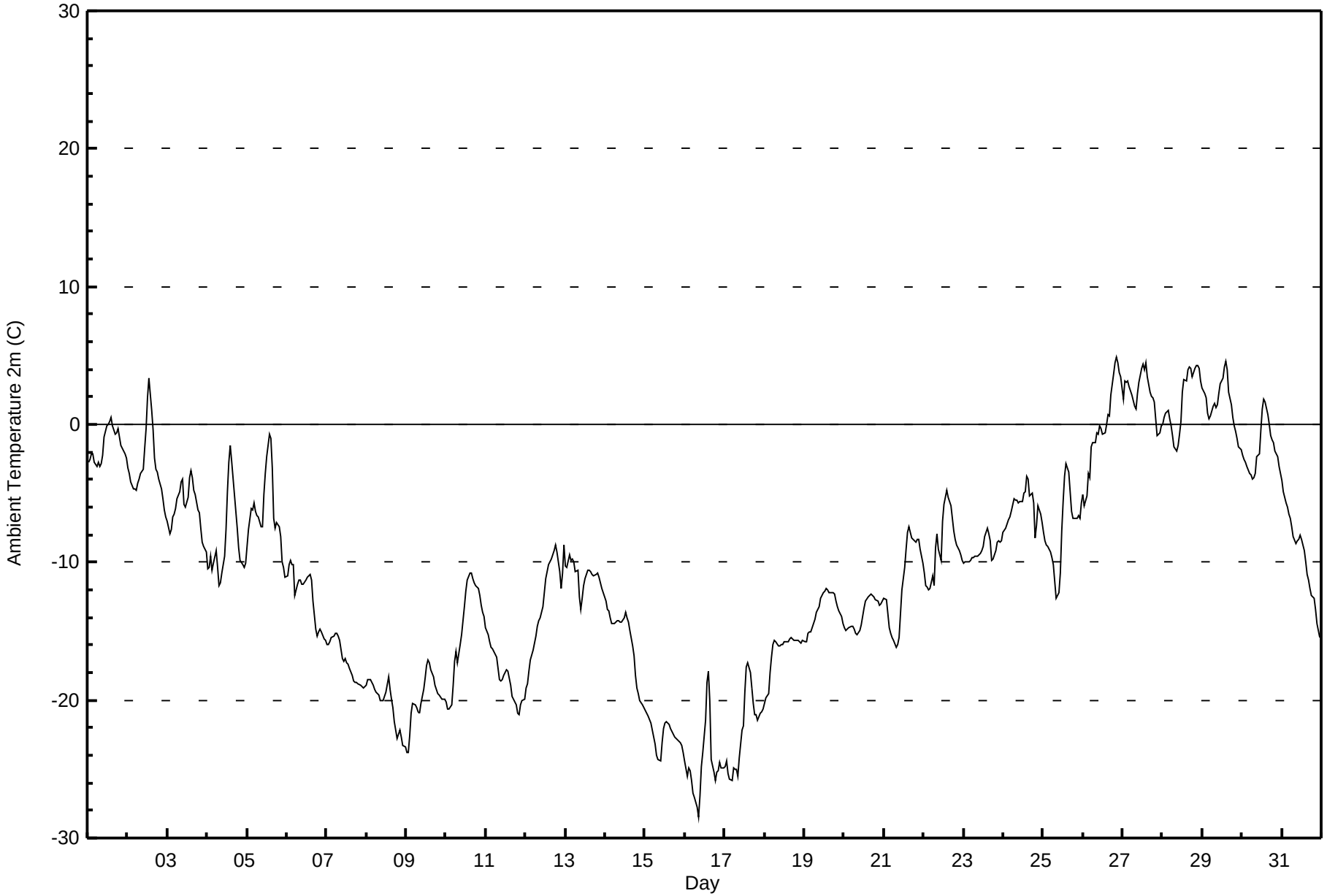
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.7	-2.6	-2.2	-2.1	-2.8	-3.0	-2.8	-3.0	-2.9	-2.2	-0.9	-0.1	0.0	0.2	0.5	-0.1	-0.7	-0.6	-0.4	-0.9	-1.6	-1.8	-2.1	-2.4	-1.5	0.5
2-Jan	-3.1	-3.5	-4.2	-4.6	-4.7	-4.7	-4.3	-4.0	-3.5	-3.3	-1.8	-0.4	1.9	3.4	1.0	-0.4	-2.5	-3.3	-3.4	-4.0	-4.7	-5.4	-6.2	-6.7	-3.0	3.4
3-Jan	-7.0	-7.9	-7.6	-6.7	-6.6	-6.1	-5.4	-4.9	-4.1	-3.9	-5.8	-6.0	-5.3	-3.9	-3.3	-3.9	-4.8	-5.1	-6.2	-6.4	-7.5	-8.6	-8.9	-9.3	-6.0	-3.3
4-Jan	-10.5	-10.3	-9.6	-10.6	-10.1	-9.2	-10.4	-11.7	-11.5	-10.8	-9.5	-7.6	-4.9	-2.8	-1.5	-2.6	-5.1	-6.3	-7.5	-9.0	-9.8	-10.2	-10.4	-10.1	-8.4	-1.5
5-Jan	-8.8	-7.6	-6.1	-6.2	-5.7	-6.3	-6.6	-6.7	-7.4	-7.5	-5.1	-3.6	-2.3	-0.7	-1.0	-3.1	-6.8	-7.5	-7.1	-7.4	-8.2	-10.0	-10.4	-11.1	-6.4	-0.7
6-Jan	-11.0	-10.2	-9.9	-10.2	-10.1	-12.4	-11.6	-11.3	-11.2	-11.6	-11.6	-11.3	-11.1	-11.0	-10.9	-11.3	-12.8	-14.9	-15.3	-15.0	-14.8	-15.1	-15.5	-15.7	-12.3	-9.9
7-Jan	-16.0	-16.0	-15.7	-15.4	-15.4	-15.1	-15.2	-15.4	-15.7	-16.9	-17.2	-17.0	-17.3	-17.4	-17.7	-18.2	-18.6	-18.7	-18.7	-18.8	-18.9	-19.0	-19.1	-19.1	-17.2	-15.1
8-Jan	-18.9	-18.6	-18.5	-18.7	-18.9	-19.2	-19.4	-19.6	-20.0	-20.1	-20.1	-19.7	-19.4	-18.3	-19.2	-20.0	-20.6	-21.6	-22.8	-22.5	-22.2	-22.7	-23.3	-23.4	-20.3	-18.3
9-Jan	-23.7	-23.8	-22.6	-21.0	-20.2	-20.3	-20.5	-20.8	-20.9	-20.3	-19.3	-18.4	-17.5	-17.1	-17.3	-17.8	-18.3	-18.9	-19.2	-19.5	-19.7	-20.0	-19.9	-19.9	-19.9	-17.1
10-Jan	-20.2	-20.6	-20.7	-20.3	-18.9	-17.1	-16.5	-17.3	-15.9	-15.2	-14.3	-13.2	-12.1	-11.3	-10.8	-10.8	-11.2	-11.5	-11.7	-11.9	-12.4	-13.2	-13.7	-14.0	-14.8	-10.8
11-Jan	-14.7	-15.3	-15.7	-16.2	-16.2	-16.4	-16.9	-17.7	-18.5	-18.6	-18.5	-18.2	-17.8	-17.9	-18.4	-18.9	-19.7	-20.1	-20.3	-20.9	-21.0	-20.3	-20.0	-19.9	-18.3	-14.7
12-Jan	-19.1	-18.8	-17.9	-17.1	-16.4	-15.9	-15.3	-14.7	-14.3	-14.0	-13.2	-12.2	-11.2	-10.7	-10.2	-9.7	-9.5	-9.2	-8.7	-9.3	-10.7	-11.9	-10.7	-8.7	-12.9	-8.7
13-Jan	-10.3	-10.4	-9.4	-9.8	-9.8	-9.9	-10.7	-10.6	-12.5	-13.4	-12.6	-11.7	-11.2	-10.6	-10.6	-10.7	-10.9	-11.0	-10.9	-10.8	-11.0	-11.5	-11.9	-12.2	-11.0	-9.4
14-Jan	-12.8	-13.4	-13.5	-14.1	-14.4	-14.4	-14.3	-14.2	-14.3	-14.3	-14.3	-14.0	-13.6	-14.1	-14.3	-15.0	-16.1	-16.8	-18.2	-19.1	-19.5	-20.0	-20.3	-20.5	-15.7	-12.8
15-Jan	-20.7	-20.9	-21.2	-21.7	-22.2	-22.7	-23.2	-24.0	-24.3	-24.4	-23.1	-22.0	-21.7	-21.6	-21.8	-22.0	-22.3	-22.5	-22.7	-22.8	-23.0	-23.1	-23.3	-23.8	-22.5	-20.7
16-Jan	-24.4	-25.5	-24.9	-25.1	-25.8	-26.7	-27.0	-27.7	-28.4	-27.0	-24.8	-23.8	-21.5	-18.7	-17.9	-20.1	-24.3	-25.2	-25.8	-25.2	-25.1	-24.5	-24.9	-24.9	-24.6	-17.9
17-Jan	-24.9	-24.4	-25.3	-25.8	-25.8	-24.9	-25.1	-25.0	-25.5	-24.2	-22.2	-21.9	-19.4	-17.6	-17.2	-18.0	-19.1	-20.2	-21.1	-21.1	-21.5	-20.9	-20.8	-20.6	-22.2	-17.2
18-Jan	-20.2	-19.8	-19.6	-18.0	-16.9	-16.0	-15.7	-15.8	-16.1	-16.1	-16.0	-15.9	-15.8	-15.8	-15.7	-15.6	-15.4	-15.5	-15.7	-15.7	-15.7	-15.7	-15.9	-15.7	-16.4	-15.4
19-Jan	-15.8	-15.7	-15.1	-15.1	-15.0	-14.7	-14.1	-13.6	-13.4	-13.2	-12.6	-12.2	-12.1	-11.9	-12.0	-12.2	-12.2	-12.2	-12.4	-12.8	-13.2	-13.6	-13.9	-14.4	-13.5	-11.9
20-Jan	-14.7	-14.9	-14.8	-14.8	-14.7	-14.7	-14.8	-15.1	-15.2	-14.9	-14.5	-13.9	-13.3	-12.9	-12.5	-12.4	-12.3	-12.4	-12.6	-12.7	-12.8	-13.2	-13.1	-12.8	-13.7	-12.3
21-Jan	-12.6	-12.7	-13.7	-14.7	-15.2	-15.5	-15.7	-16.2	-16.0	-15.4	-13.8	-12.0	-10.4	-9.1	-7.8	-7.4	-7.9	-8.3	-8.4	-8.5	-8.4	-8.3	-9.1	-10.1	-11.5	-7.4
22-Jan	-10.8	-11.7	-11.7	-12.0	-11.9	-11.0	-11.7	-9.0	-7.9	-9.0	-9.9	-7.0	-5.8	-5.3	-4.8	-5.3	-5.8	-6.8	-7.8	-8.3	-8.8	-9.1	-9.5	-9.9	-8.8	-4.8
23-Jan	-10.1	-10.0	-10.0	-9.9	-9.8	-9.7	-9.7	-9.6	-9.6	-9.4	-9.4	-9.1	-8.8	-8.1	-7.5	-7.9	-8.4	-9.8	-9.8	-9.2	-8.6	-8.5	-8.5	-8.4	-9.2	-7.5
24-Jan	-7.8	-7.5	-7.3	-6.9	-6.7	-6.3	-5.4	-5.5	-5.5	-5.6	-5.6	-5.6	-5.0	-4.9	-3.8	-4.0	-5.2	-5.0	-5.7	-8.2	-7.3	-5.9	-6.5	-7.1	-6.0	-3.8
25-Jan	-7.8	-8.4	-8.8	-8.8	-9.3	-9.6	-10.2	-11.4	-12.6	-12.2	-10.8	-7.7	-5.5	-3.7	-2.9	-3.5	-4.9	-6.3	-6.8	-6.9	-6.8	-6.6	-6.8	-5.7	-7.7	-2.9
26-Jan	-5.1	-5.9	-5.2	-3.6	-3.9	-1.6	-1.3	-1.3	-0.6	-0.7	-0.1	-0.3	-0.7	-0.6	0.0	0.7	0.6	2.1	3.6	4.5	4.9	4.4	3.8	3.5	-0.1	4.9
27-Jan	1.9	3.1	3.0	3.1	2.7	2.2	1.8	1.4	1.1	2.2	3.0	4.1	4.4	3.9	4.5	3.4	2.4	2.0	2.0	1.6	0.5	-0.8	-0.6	-0.1	2.2	4.5
28-Jan	0.0	0.5	0.9	1.0	0.4	-0.1	-0.8	-1.6	-1.9	-1.5	-0.7	0.2	2.3	3.2	3.2	4.0	4.1	4.1	3.5	4.1	4.2	4.3	4.1	3.2	1.7	4.3
29-Jan	2.6	2.3	1.9	0.8	0.4	0.6	1.3	1.5	1.2	1.4	2.3	2.9	3.4	4.2	4.6	4.0	2.4	1.4	0.5	-0.1	-0.5	-1.0	-1.6	-1.8	1.4	4.6
30-Jan	-2.2	-2.6	-2.8	-3.1	-3.6	-3.6	-4.0	-3.8	-3.5	-2.3	-2.2	-0.4	1.1	1.8	1.7	0.7	0.0	-0.8	-1.1	-1.3	-1.9	-2.4	-3.1	-3.6	-1.8	1.8
31-Jan	-4.1	-4.9	-5.7	-6.0	-6.5	-6.8	-7.4	-8.1	-8.6	-8.5	-8.3	-8.0	-8.3	-9.1	-10.0	-10.9	-11.3	-11.9	-12.4	-12.6	-13.4	-14.4	-15.0	-15.5	-9.5	-4.1
	-11.5	-11.6	-11.4	-11.4	-11.4	-11.3	-11.4	-11.5	-11.6	-11.4	-10.7	-9.9	-9.0	-8.3	-8.2	-8.7	-9.6	-10.1	-10.4	-10.7	-10.9	-11.2	-11.5	-11.6	Diurnal Average	
	2.6	3.1	3.0	3.1	2.7	2.2	1.8	1.5	1.2	2.2	3.0	4.1	4.4	4.2	4.6	4.0	4.1	4.1	3.6	4.5	4.9	4.4	4.1	3.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Conklin Lookout - January 2016



Ambient Temperature 2m (AT 2m) - C
Conklin Lookout - January 2016

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	100	13.44	13.44
-20 - 0	568	76.34	89.79
0 - 10	76	10.22	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 96 % on Jan 26 10:00

Maximum Daily Average: 91.2 % on Jan 24

Minimum Value: 32 % on Jan 3 10:00

Minimum Daily Average: 48.2 % on Jan 3

Maximum Diurnal Average: 79.8 % at hour 24

Minimum Diurnal Average: 73.3 % at hour 15

Monthly Average: 78.1 %

Percentiles: $P_1 = 43$ $P_{10} = 59$ $Q_1 = 73$ Median = 82 $Q_3 = 87$ $P_{90} = 89$ $P_{99} = 95$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

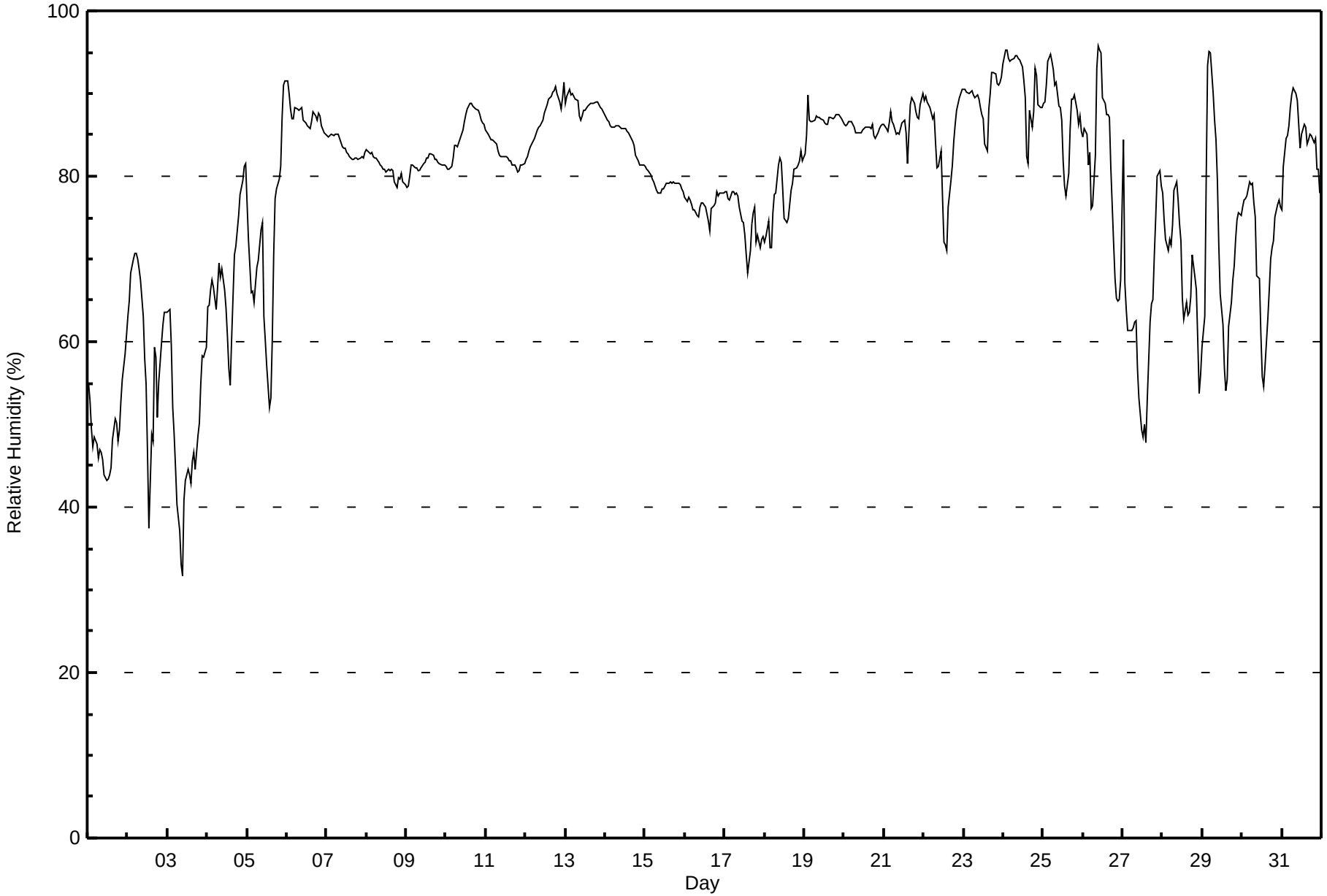
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	55	53	49	47	49	48	46	47	47	46	44	43	43	44	45	48	51	50	48	49	53	55	59	61	49.1	61
2-Jan	63	65	68	70	71	71	70	69	67	63	58	55	47	38	49	48	59	58	51	55	60	62	64	64	60.1	71
3-Jan	64	64	59	52	49	45	40	37	33	32	41	43	45	44	43	46	47	45	49	50	55	58	58	59	48.2	64
4-Jan	64	64	66	67	67	64	67	69	68	69	66	64	61	57	55	60	71	71	73	75	78	79	81	82	68.3	82
5-Jan	77	72	66	66	65	67	69	70	73	74	63	60	57	52	53	60	70	77	78	80	81	87	91	92	70.9	92
6-Jan	91	90	88	87	87	88	88	88	88	88	87	87	86	86	86	87	88	87	87	88	87	86	85	85	87.3	91
7-Jan	85	85	85	85	85	85	85	85	85	83	83	83	83	83	82	82	82	82	82	82	82	82	82	83	83.5	85
8-Jan	83	83	83	83	82	82	82	82	81	81	81	81	81	81	81	81	81	79	79	80	80	80	79	79	81.0	83
9-Jan	79	79	80	81	81	81	81	81	81	81	81	82	82	82	83	83	83	82	82	82	82	81	81	81	81.3	83
10-Jan	81	81	81	81	82	84	84	84	85	85	86	87	87	88	89	89	88	88	88	88	87	87	86	86	85.5	89
11-Jan	86	85	85	84	84	84	84	83	83	82	82	82	82	82	82	82	81	81	81	81	81	81	81	82	82.6	86
12-Jan	82	82	83	84	84	85	85	86	86	86	87	88	88	89	89	90	90	90	91	90	89	88	89	91	87.2	91
13-Jan	89	90	90	90	90	90	89	89	87	87	87	88	88	89	89	89	89	89	89	89	89	88	88	88	88.7	90
14-Jan	87	87	87	86	86	86	86	86	86	86	86	86	86	85	85	85	84	84	83	82	82	81	81	81	84.8	87
15-Jan	81	81	81	80	80	79	79	78	78	78	78	79	79	79	79	79	79	79	79	79	79	79	79	78	79.1	81
16-Jan	77	77	77	77	77	76	76	75	75	76	77	77	76	75	75	73	76	76	77	78	78	78	78	78	76.5	78
17-Jan	78	78	77	77	78	78	78	78	78	76	74	74	73	70	68	71	74	76	76	72	73	71	72	73	74.8	78
18-Jan	72	73	75	71	71	76	78	78	81	82	82	78	75	74	75	77	78	79	81	81	81	82	83	82	77.7	83
19-Jan	83	85	90	87	87	87	87	87	87	87	87	87	86	86	86	87	87	87	87	87	87	87	87	87	86.8	90
20-Jan	86	86	86	87	87	86	86	85	85	85	85	86	86	86	86	86	86	86	85	85	85	86	86	86	85.8	87
21-Jan	86	86	85	86	88	87	86	85	85	85	86	86	87	85	82	85	89	89	89	88	87	87	89	90	86.6	90
22-Jan	89	90	89	89	88	87	88	84	81	81	83	77	72	72	71	76	80	81	84	86	88	90	90	91	83.6	91
23-Jan	90	91	90	90	90	90	90	90	90	89	88	87	87	84	83	88	90	92	93	92	91	91	91	92	89.6	93
24-Jan	94	95	95	94	94	94	94	95	95	94	94	93	92	89	82	82	88	86	88	93	92	89	88	88	91.2	95
25-Jan	89	89	91	94	95	94	93	91	91	88	88	87	82	79	78	80	86	89	89	90	88	86	87	86	87.9	95
26-Jan	85	86	85	81	83	76	76	82	93	96	95	95	89	89	87	87	87	81	72	68	65	65	65	68	81.6	96
27-Jan	84	67	64	61	61	61	62	62	63	57	53	49	48	50	48	53	62	64	65	70	75	80	81	79	63.4	84
28-Jan	78	75	72	71	72	72	74	78	79	77	74	72	65	63	65	63	64	65	70	68	66	60	54	56	69.0	79
29-Jan	59	63	79	93	95	95	90	87	84	79	72	66	62	57	54	55	62	65	67	69	72	75	76	75	73.0	95
30-Jan	76	77	77	78	79	79	79	77	75	68	68	61	56	55	57	63	66	70	71	72	75	77	77	76	71.2	79
31-Jan	76	81	85	85	86	88	90	91	90	89	86	83	85	86	86	84	84	85	85	84	85	81	81	78	84.8	91
	79.7	79.3	79.7	79.6	79.8	79.5	79.4	79.3	79.4	78.5	77.5	76.3	74.7	73.5	73.3	74.8	77.5	78.0	78.0	78.5	79.2	79.4	79.7	79.8	Diurnal Average	
	94	95	95	94	95	95	94	95	95	96	95	95	92	89	89	90	90	92	93	93	92	91	91	92	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Conklin Lookout - January 2016



Maximum Value: 0.7 mm on Jan 23 12:00

Maximum Daily Total: 6.3 mm on Jan 23

Minimum Value: 0.0 mm on Jan 1 01:00

Minimum Daily Total: 0.0 mm on Jan 1

Maximum Diurnal Total: 1.6 mm at hour 10

Minimum Diurnal Total: 0.1 mm at hour 23

Monthly Total: 16.13 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} = 0.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

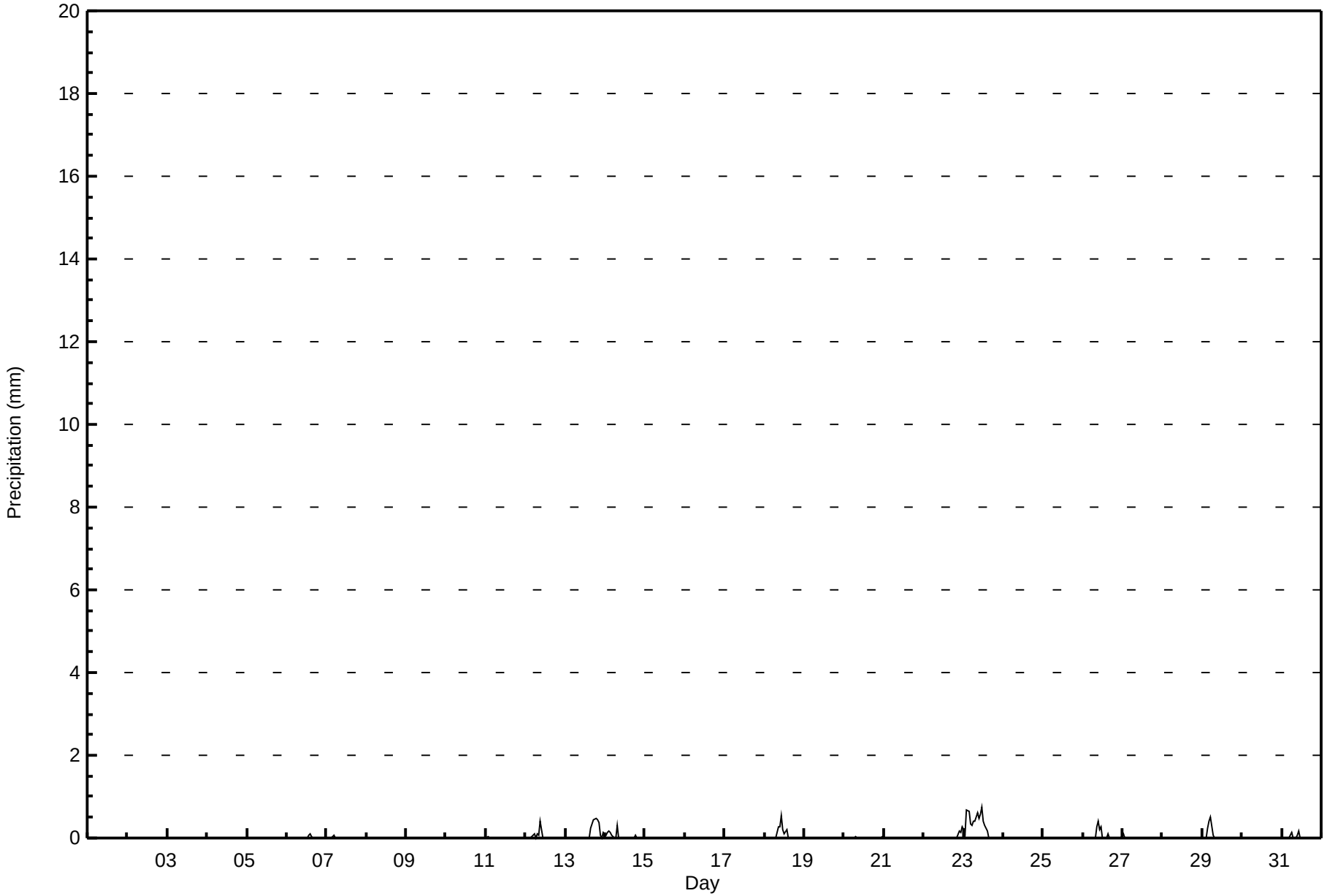
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
7-Jan	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jan	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
12-Jan	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4
13-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.4	0.4	0.1	0.0	0.2	2.5	0.5
14-Jan	0.1	0.1	0.2	0.2	0.1	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	0.1	0.0	0.0	0.0	0.0	0.0	1.0	0.3
15-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.6	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.6
19-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.6	0.3
23-Jan	0.2	0.1	0.7	0.7	0.3	0.3	0.4	0.4	0.6	0.5	0.6	0.7	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.7
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.2	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.4
27-Jan	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
28-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Jan	0.0	0.0	0.0	0.3	0.4	0.5	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	1.2	0.5
30-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jan	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	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	0.4	0.2
	0.4	0.2	0.8	1.1	1.0	1.0	0.6	0.8	1.2	1.6	1.5	1.2	0.5	0.6	0.3	0.4	0.3	0.4	0.5	0.4	0.4	0.2	0.1	0.5	Diurnal Average	
	0.2	0.1	0.7	0.7	0.4	0.5	0.4	0.4	0.6	0.5	0.6	0.7	0.4	0.3	0.2	0.2	0.3	0.4	0.5	0.4	0.4	0.2	0.1	0.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Conklin Lookout - January 2016



Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	726	97.58	97.58
0.4 - 0.5	12	1.61	99.19
0.6 - 0.7	6	0.81	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (LW) - %

Conklin Lookout - January 2016

Maximum Value: 74 % on Jan 29 04:00

Maximum Daily Average: 13.8 % on Jan 26

Minimum Value: 1 % on Jan 5 15:00

Minimum Daily Average: 1.5 % on Jan 3

Maximum Diurnal Average: 5.1 % at hour 4

Minimum Diurnal Average: 2.6 % at hour 20

Monthly Average: 3.2 %

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 2$ Median = 3 $Q_3 = 3$ $P_{90} = 5$ $P_{99} = 17$

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1.6	2
2-Jan	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	1.6	2
3-Jan	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1.5	2
4-Jan	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	1.8	2
5-Jan	3	3	2	2	2	2	2	2	2	3	3	2	2	1	1	1	2	3	3	3	4	4	4	5	2.6	5
6-Jan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.7	5
7-Jan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.6	5
8-Jan	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.4	5
9-Jan	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.0	4
10-Jan	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3.6	4
11-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.4	3
12-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.1	3
13-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0	3
14-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.9	3
15-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.9	3
16-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3	3	2.7	3
17-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2.5	3
18-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
19-Jan	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2.3	3
20-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
21-Jan	2	2	2	3	3	3	4	4	4	4	4	4	3	3	2	2	2	2	2	2	2	2	2	2	2.7	4
22-Jan	3	3	3	4	4	4	4	4	4	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2.7	4
23-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2.2	3
24-Jan	3	3	3	4	4	4	4	4	4	4	4	4	3	3	2	2	2	2	2	3	3	4	4	4	3.3	4
25-Jan	4	4	5	5	5	5	5	5	5	5	5	5	5	4	2	2	2	2	2	2	2	2	2	2	3.7	5
26-Jan	2	2	2	2	2	2	2	6	16	17	44	43	14	14	21	71	13	38	7	2	2	2	2	6	13.8	71
27-Jan	27	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2.7	27
28-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	11	9	2	2	2	2	2	2	2	2.4	11
29-Jan	2	2	15	74	UO	UO	UO	8	5	3	2	2	2	1	1	1	2	2	2	2	2	2	2	2	6.2	74
30-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	1.7	2
31-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
	3.5	2.7	3.2	5.1	2.8	2.9	2.9	3.2	3.4	3.4	4.2	4.1	3.0	2.8	2.9	4.8	3.0	3.7	2.7	2.6	2.6	2.6	2.6	2.8	Diurnal Average	
	27	5	15	74	5	5	5	8	16	17	44	43	14	14	21	71	13	38	7	5	5	5	5	6	Diurnal Maximum	

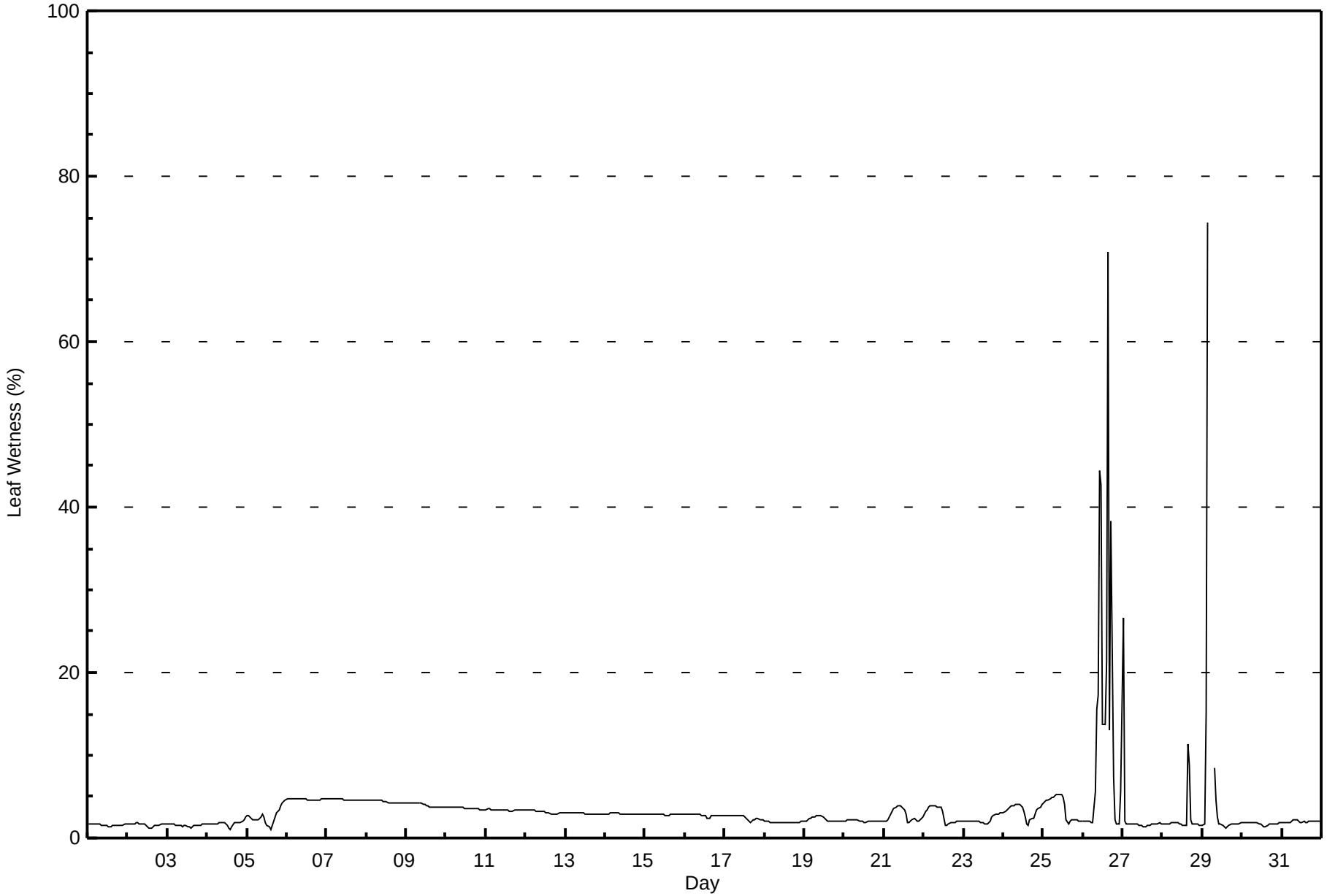
UO - Unstable Operation

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (LW) - %

Conklin Lookout - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	0	0.00	0.00
0.6 - 0.7	0	0.00	0.00
0.8 - 1.4	26	3.51	3.51
1.5 - 10	693	93.52	97.03
> 10	14	1.89	98.92

Total Number of Valid Hours: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Conklin Lookout - January 2016

Maximum Value: 342 W/m2 on Jan 30 13:00

Maximum Daily Average: 65.5 W/m2 on Jan 29

Minimum Value: 0 W/m2 on Jan 2 18:00

Minimum Daily Average: 6.5 W/m2 on Jan 23

Maximum Diurnal Average: 118.6 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 20

Monthly Average: 22.5 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 17$ $P_{90} = 82$ $P_{99} = 252$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

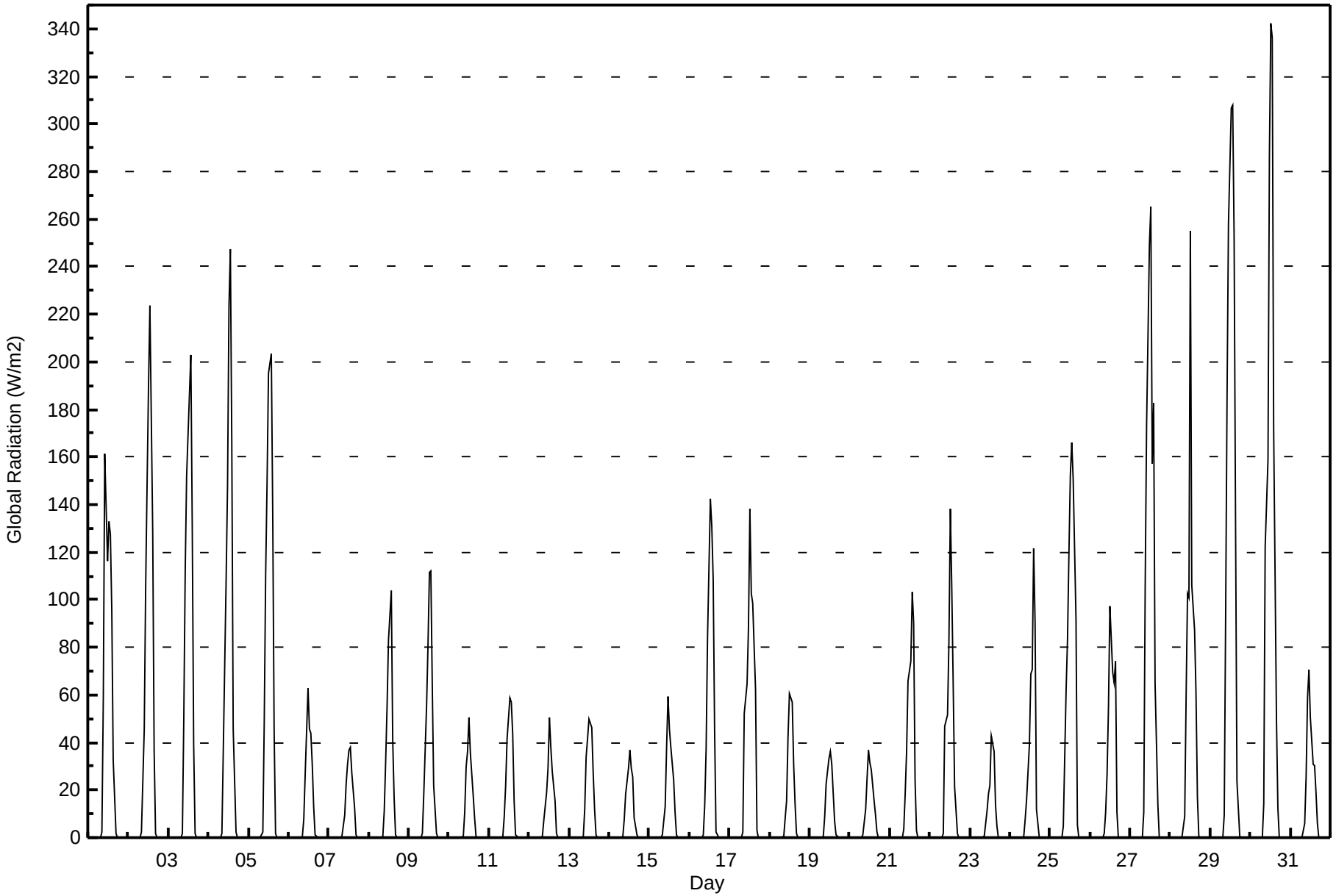
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	0	0	0	0	0	0	0	2	59	161	116	133	127	95	33	2	0	0	0	0	0	0	0	30.4	161
2-Jan	0	0	0	0	0	0	0	0	2	46	106	148	189	224	128	37	2	0	0	0	0	0	0	0	36.7	224
3-Jan	0	0	0	0	0	0	0	0	2	50	112	152	186	203	131	39	2	0	0	0	0	0	0	0	36.5	203
4-Jan	0	0	0	0	0	0	0	0	2	37	109	148	223	248	166	46	3	0	0	0	0	0	0	0	40.9	248
5-Jan	0	0	0	0	0	0	0	0	2	49	111	150	195	203	136	45	2	0	0	0	0	0	0	0	37.3	203
6-Jan	0	0	0	0	0	0	0	0	0	8	27	63	46	44	31	13	1	0	0	0	0	0	0	0	9.7	63
7-Jan	0	0	0	0	0	0	0	0	0	9	23	31	37	38	27	12	1	0	0	0	0	0	0	0	7.4	38
8-Jan	0	0	0	0	0	0	0	0	1	11	32	55	83	104	41	16	1	0	0	0	0	0	0	0	14.4	104
9-Jan	0	0	0	0	0	0	0	0	1	19	56	81	112	112	65	22	2	0	0	0	0	0	0	0	19.5	112
10-Jan	0	0	0	0	0	0	0	0	1	11	30	36	50	36	18	9	1	0	0	0	0	0	0	0	7.9	50
11-Jan	0	0	0	0	0	0	0	0	1	9	22	41	59	57	43	15	1	0	0	0	0	0	0	0	10.4	59
12-Jan	0	0	0	0	0	0	0	0	1	7	19	29	50	38	28	15	2	0	0	0	0	0	0	0	7.9	50
13-Jan	0	0	0	0	0	0	0	0	1	12	34	41	50	46	28	12	1	0	0	0	0	0	0	0	9.3	50
14-Jan	0	0	0	0	0	0	0	0	0	8	18	29	37	29	25	8	1	0	0	0	0	0	0	0	6.5	37
15-Jan	0	0	0	0	0	0	0	0	1	13	38	59	45	38	24	11	1	0	0	0	0	0	0	0	9.6	59
16-Jan	0	0	0	0	0	0	0	0	1	14	37	84	142	131	108	46	3	0	0	0	0	0	0	0	23.6	142
17-Jan	0	0	0	0	0	0	0	0	2	52	65	88	138	102	99	62	3	0	0	0	0	0	0	0	25.5	138
18-Jan	0	0	0	0	0	0	0	0	1	8	16	42	61	57	31	14	2	0	0	0	0	0	0	0	9.6	61
19-Jan	0	0	0	0	0	0	0	0	1	9	23	33	36	31	19	7	1	0	0	0	0	0	0	0	6.7	36
20-Jan	0	0	0	0	0	0	0	0	1	12	25	37	32	29	16	9	2	0	0	0	0	0	0	0	6.7	37
21-Jan	0	0	0	0	0	0	0	0	4	19	36	66	74	103	90	24	3	0	0	0	0	0	0	0	17.5	103
22-Jan	0	0	0	0	0	0	0	0	2	47	52	83	139	105	65	22	2	0	0	0	0	0	0	0	21.4	139
23-Jan	0	0	0	0	0	0	0	0	1	6	12	18	22	43	36	14	5	0	0	0	0	0	0	0	6.5	43
24-Jan	0	0	0	0	0	0	0	0	1	7	16	39	69	70	122	91	12	0	0	0	0	0	0	0	17.8	122
25-Jan	0	0	0	0	0	0	0	0	5	62	84	120	152	166	151	92	5	0	0	0	0	0	0	0	34.9	166
26-Jan	0	0	0	0	0	0	0	0	2	11	27	55	97	70	65	74	11	0	0	0	0	0	0	0	17.1	97
27-Jan	0	0	0	0	0	0	0	0	11	105	173	249	265	157	183	65	13	0	0	0	0	0	0	0	50.9	265
28-Jan	0	0	0	0	0	0	0	0	9	59	103	101	255	106	87	61	17	0	0	0	0	0	0	0	33.3	255
29-Jan	0	0	0	0	0	0	0	0	9	93	186	258	307	308	252	135	24	1	0	0	0	0	0	0	65.5	308
30-Jan	0	0	0	0	0	0	0	0	14	122	159	287	342	336	173	50	12	0	0	0	0	0	0	0	62.3	342
31-Jan	0	0	0	0	0	0	0	0	6	26	59	71	51	31	30	19	6	0	0	0	0	0	0	0	12.4	71
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	32.2	63.4	90.7	118.6	109.4	81.0	36.0	4.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	0	14	122	186	287	342	336	252	135	24	1	0	0	0	0	0	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

Conklin Lookout - January 2016



Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	567	76.21	76.21
21 - 100	115	15.46	91.67
101 - 300	58	7.80	99.46
301 - 600	4	0.54	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Conklin Lookout - January 2016

Maximum Speed: 23 km/h on Jan 29 07:00

Maximum Daily Speed Average: 16.7 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 8 04:00

Minimum Daily Speed Average: 0.5 km/h on Jan 8

Maximum Diurnal Speed Average: 4.8 km/h at hour 4

Minimum Diurnal Speed Average: 2.8 km/h at hour 16

Monthly Average Velocity: 4.0 km/h 253.2 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 4$ Median = 6 $Q_3 = 11$ $P_{90} = 16$ $P_{99} = 22$

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	W19	W17	W21	W21	W18	W16	W17	W19	W22	WNW20	WNW17	WNW17	WNW16	WNW16	W12	W13	WNW12	WNW15	WNW17	WNW14	WNW15	WNW18	WNW17	WNW14	WNW16.7	W22
2-Jan	WNW13	WNW13	WNW10	WNW11	WNW10	W13	W11	W12	W11	W10	WSW11	WSW12	W11	WSW8	SW10	SW10	SSW12	SW13	SW13	SW15	SW16	SW16	SW15	SW15	WSW10.2	SW16
3-Jan	SW17	SW16	SW16	SW16	SW16	SW17	SW16	SW17	SW17	SW18	SSW21	SSW21	SSW20	SSW16	SSW14	SW14	SW16	SW13	SSW17	SW17	SSW17	SSW16	SW10	WSW5	SW15.8	SSW21
4-Jan	W2	SW5	SW4	SW4	SW7	NW5	NW5	NNW6	NNW5	NNW5	NNW7	NNW6	N6	N7	N6	N4	NW5	NW8	WNW9	NW11	NW9	NW8	NW8	NW7	NW4.9	NW11
5-Jan	WNW8	WNW7	WNW6	WNW6	WNW5	WNW5	WNW5	WNW5	NW3	WSW4	SW7	SW6	NW3	W3	SSE1	SE1	SE4	SSE4	SE4	SE5	SE3	NE4	E4	NE3	W1.6	WNW8
6-Jan	ENE5	SE5	SSE6	SSE6	ESE3	NE4	NE5	ENE6	E5	E5	NNE4	NNE5	NNE4	N4	N4	N5	NNE8	NNE8	NNE6	NNE5	NNE4	NNE3	NNE3	NNE3	NE3.3	NNE8
7-Jan	NNE3	NNE2	N1	N1	N1	N1	NNE2	NNE2	NNW2	NNW2	NW2	NNW2	NNW2	NNW2	NW2	NW1	NW2	NW1	NNW1	WNW1	W2	W2	W2	W2	NNW1.5	NNE3
8-Jan	WNW2	NW1	NNE1	W0	NE1	N1	E1	ENE1	E1	ENE1	ENE1	ENE1	ESE1	S0	E1	SSE1	SE1	AF	SE1	SW2	SSW1	SSW4	SSW4	SSW4	S0.5	SSW4
9-Jan	SSW4	SSW5	SSW5	SW10	SW8	SW5	SW6	SW6	SW7	SW6	SW6	SW6	SW5	SW5	SW5	SW5	SW4	SW3	SW4	SSW5	SW6	SSW7	SSW6	SW7	SW5.6	SW10
10-Jan	SW7	SW5	SSW7	SSW7	SW3	W4	WSW3	WSW3	W4	WNW5	W5	WNW5	NW5	NW6	NW5	NNW4	NNW3	NNW3	NNW2	NNW2	NNW2	NNW3	NNW2	NNW3	W2.8	SW7
11-Jan	NNW3	NNW4	NNW4	NNW4	NNW3	NW4	NNW3	N4	N3	NNW3	NNW3	NW4	NNW3	NW3	NW3	NW2	W2	WSW3	SW3	SSW3	SSW5	SW6	SW7	SSW6	WNW2.0	SW7
12-Jan	SSW6	SSW6	SSW6	SSW6	SSW6	SSW6	SSW6	S5	SSW6	SSW6	SSW7	SW6	SW6	SSW6	SSW5	SSW4	SSW5	SW6	SW7	SW6	SW5	SW4	SW5	WSW4	SSW5.4	SSW7
13-Jan	SSW2	SSW7	SW5	SSW5	SSW4	S3	S2	ENE1	NNE2	NE2	NE2	NE2	ENE3	ENE3	NE3	NE4	NNE3	NNE4	NNE4	NNE4	NNE4	NNE4	NNE5	NE5	NE1.2	SSW7
14-Jan	NE5	NNE4	N3	NNE4	NNE4	NNE4	NNE4	NNE4	NNE5	NNE5	NNE5	NNE5	NNE4	NNE6	NNE5	NE4	NE5	NNE5	NE6	NE6	NE5	NE6	NNE5	NE5	NNE4.6	NE6
15-Jan	NE5	NE5	NE5	NE4	NE4	NE4	NNE4	NNE3	NNE2	N2	NNE2	NNE2	NNE2	NNE1	NE2	NE2	ENE2	NE3	NE2	NE3	NE4	ENE3	NE2	AF	NE2.8	NE5
16-Jan	AF	N0	NNE1	NNW1	AF	W2	NW2	NNW1	WNW2	WNW2	W2	WSW2	SW2	WNW1	AF	AF	WSW1	AF	SW1	SW2	SW2	SW2	SW3	SW3	WSW1.2	SW3
17-Jan	SW3	SW3	SW3	SSW3	SSW3	SW5	SW5	SW4	SSW4	SSW4	SSW4	S4	S4	SSW6	SSW7	SSE6	SSE7	SSE7	SSE6	S7	SSE7	SSE8	S8	S9	S4.9	S9
18-Jan	SSE8	SSE4	SSE4	SSE6	SSE7	SSE8	SSE7	SSE8	S7	SSE6	S6	SSW7	SSW7	SSW6	SSW5	SSW4	SW4	SW4	SSW4	SW5	SW5	SW5	SW6	SW4	S5.3	SSE8
19-Jan	SW4	SW4	WSW3	SW3	SW5	SW6	W4	WNW5	WNW4	WNW4	WNW3	NW3	NW2	WNW1	NE2	NE3	NE3	NE4	NE5	NE5	NE5	ENE4	NE5	NE5	NNW0.9	SW6
20-Jan	ENE4	E3	NNE2	NE3	NE3	NNE3	NE3	ENE3	E2	E2	SE2	SSE2	SSW2	S2	SSW4	SSW3	SSW4	SSW4	SSW5	SSW5	SSW6	SSW7	SSW9	SSW10	S1.8	SSW10
21-Jan	SSW10	S9	SSW9	SSW8	SSW9	SSW8	S8	S8	S9	S6	S6	S7	S7	SSE7	SSE10	SSE10	SSE10	SSE11	S11	S14	S14	SSW12	SSW10	S8	S8.8	S14
22-Jan	SSW9	SSW9	SW10	SSW12	SW10	WSW7	SW5	WNW9	WNW7	W3	SW4	NNW6	N4	NNE4	E4	NE6	NE8	NE8	NE9	NE11	NE11	NE9	NE10	NE9	N1.1	SSW12
23-Jan	NE9	NE6	NE6	NE6	NNE5	NE4	ENE4	ENE4	E4	E4	E5	ESE4	E4	ENE3	SE2	NNE4	NNE3	NE3	SE2	SW3	W3	W3	SW5	SSW7	ENE2.2	NE9
24-Jan	SSW8	SSW8	SSW8	SSW9	SSW8	SW6	WSW8	WNW10	WNW8	WNW8	WNW8	WNW8	WNW8	W8	W8	W7	WSW8	WSW11	WSW11	SW13	WSW11	W12	W13	W14	WSW7.9	W14
25-Jan	WNW14	WNW13	NW10	NW9	NW8	WNW5	W3	SW2	SSW6	SSW6	SSW9	SW11	SSW11	SSW10	SSW10	SSW11	SW13	SW13	SW15	SW15	SW14	SW13	SW11	SW10	SW8.2	SW15
26-Jan	WSW11	SW11	SW11	SW12	SW10	WSW13	SW14	SW12	SW11	SW10	SW12	SW13	SSW16	SW16	SW16	SW15	SW14	WSW18	W22	WSW19	W20	W23	W21	WNW23	WSW14.0	WNW23
27-Jan	WNW19	WNW21	WNW20	WNW23	WNW20	WNW17	WNW18	WNW15	WNW14	WNW16	WNW16	WNW15	WNW14	WNW13	W12	W11	WSW12	WSW12	WSW11	WSW11	SW10	SSW9	SSW12	SSW14	W13.3	WNW23
28-Jan	SSW12	SSW14	SSW13	S9	S8	S7	S8	SSW12	SSW15	SSW15	SSW14	SSW10	SSW12	SSW13	SW14	SW14	SW13	SW12	SW13	WSW15	WSW17	W21	WSW18	WSW18	SW11.8	W21
29-Jan	WSW17	WSW17	W18	W18	WNW20	WNW21	WNW23	WNW23	WNW21	WNW20	WNW18	WNW18	WNW16	WNW15	WNW15	WNW14	W12	W13	W13	W13	W15	W16	WNW14	WNW14	WNW16.5	WNW23
30-Jan	WNW14	WNW14	W14	W13	W13	W13	W14	W16	W16	WNW13	WNW9	WNW8	WNW9	WNW10	NW8	NW8	WNW9	WNW10	WNW11	WNW12	NW10	NW10	NNW6	NW9	WNW10.8	W16
31-Jan	NW8	NNW5	NNW5	NNW5	N4	N2	E2	E3	ESE4	E4	E5	ENE4	NE7	NNE8	NNE8	NNE8	NNE6	NNW5	NNW5	N6	N6	N5	N5	N4	NNE4.1	NW8
	WSW4.6	WSW4.7	WSW4.7	WSW4.8	WSW4.5	WSW4.3	W4.2	W4.1	WSW4.1	W3.7	WSW3.9	WSW3.9	WSW3.4	WSW3.3	WSW3.1	WSW2.8	WSW3.1	WSW3.8	WSW4.1	WSW4.3	WSW4.1	WSW4.6	WSW4.1	WSW4.4	Diurnal Average	
	WNW19	WNW21	W21	WNW23	WNW20	WNW21	WNW23	WNW23	W22	WNW20	SSW21	SSW21	SSW20	WNW16	SW16	SW15	SW16	WSW18	W22	WSW19	W20	W23	W21	WNW23	Diurnal Maximum	

AF - Analyzer Failure

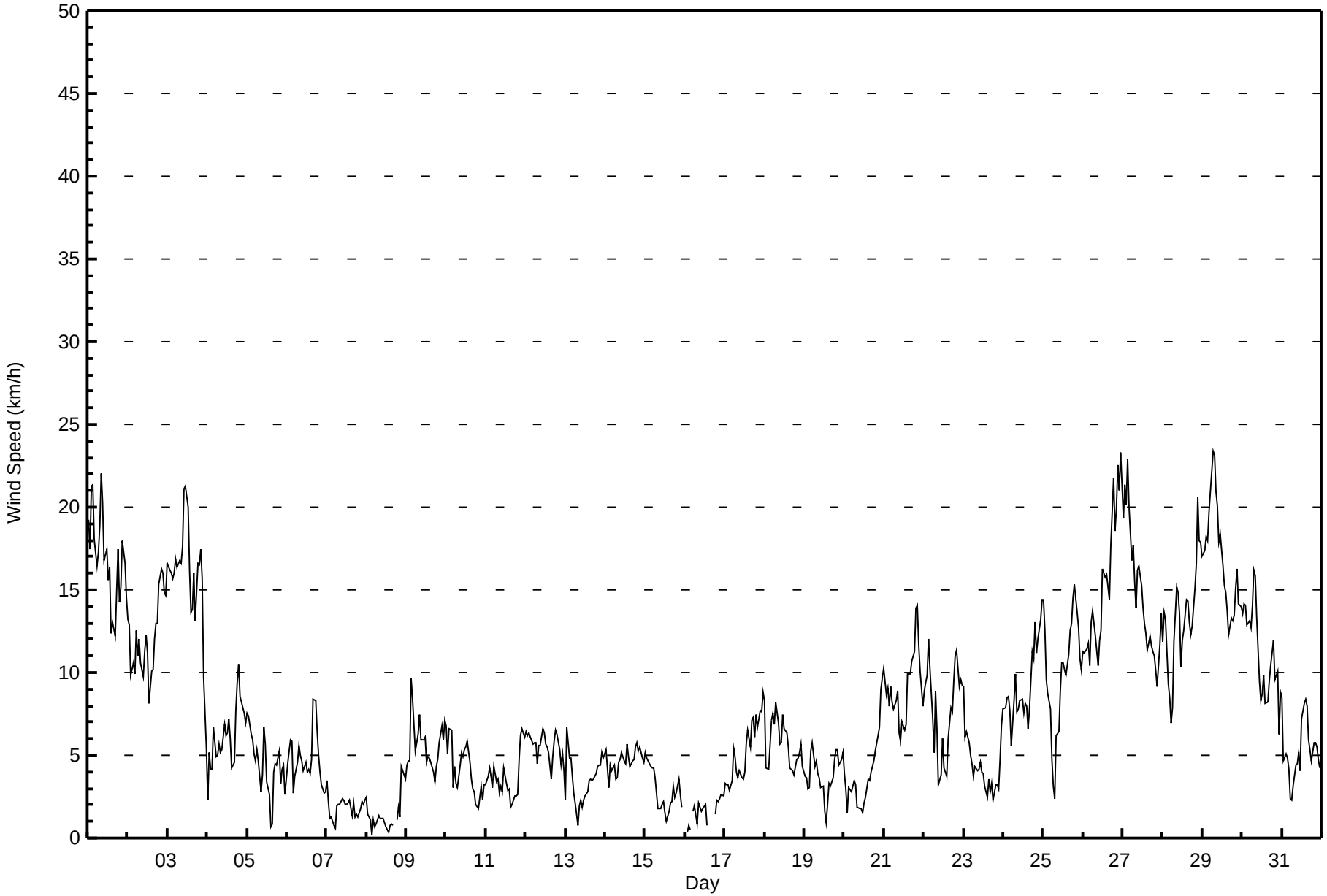
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Conklin Lookout - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	351	47.63	47.63
6 - 11	220	29.85	77.48
12 - 19	143	19.40	96.88
20 - 28	23	3.12	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 737

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Conklin Lookout - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	20	49	41	19	17	5	11	6	7	32	46	9	18	18	20	33	351
6 - 11	5	8	17	1	0	0	0	21	18	50	37	11	8	23	16	5	220
12 - 19	0	0	0	0	0	0	0	0	2	21	41	12	29	38	0	0	143
20 - 28	0	0	0	0	0	0	0	0	0	3	0	0	8	12	0	0	23
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	25	57	58	20	17	5	11	27	27	106	124	32	63	91	36	38	737

Total Number of Valid Hours: 737

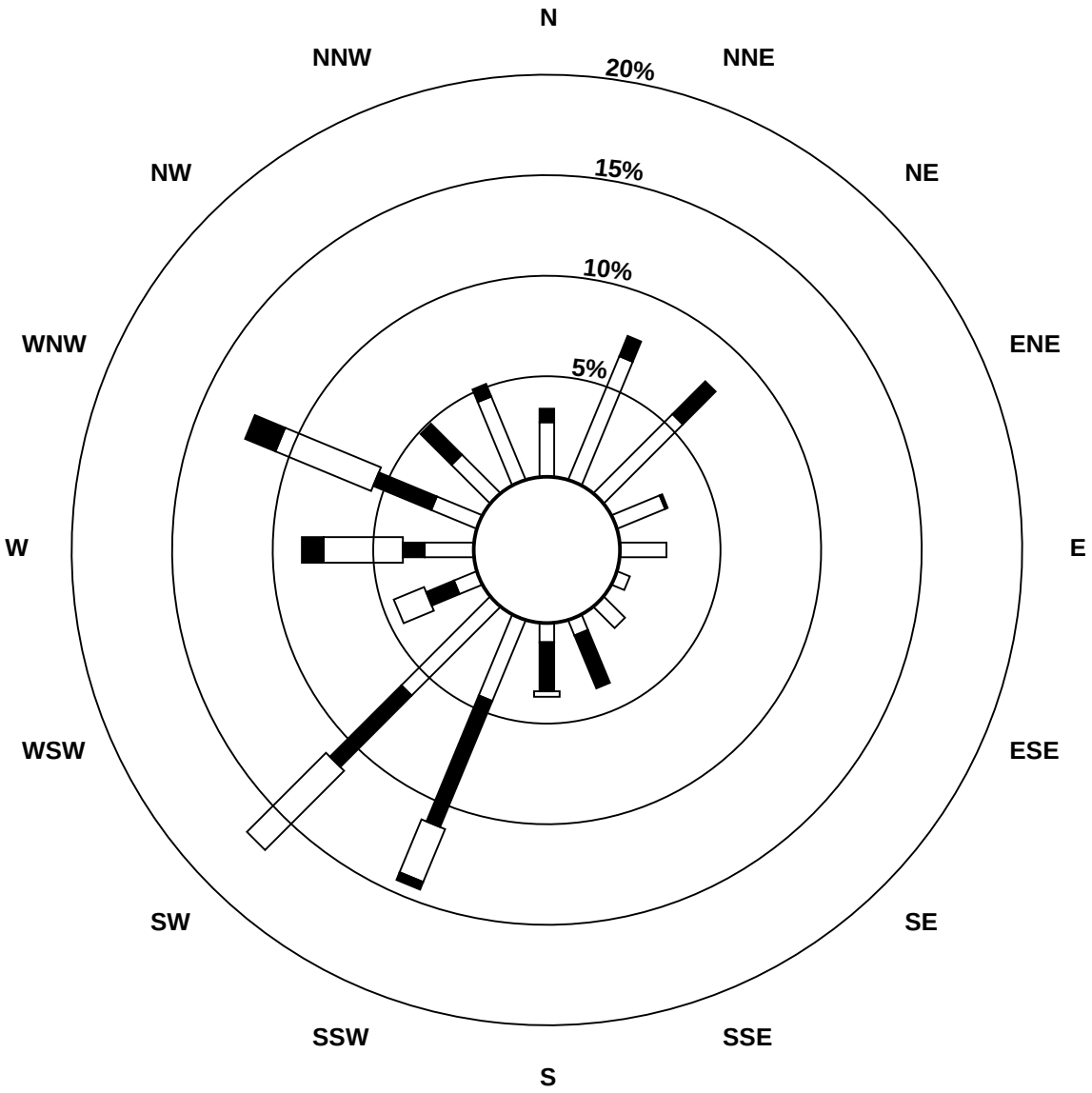
Total Number of Hours: 744

Wood Buffalo Environmental Association

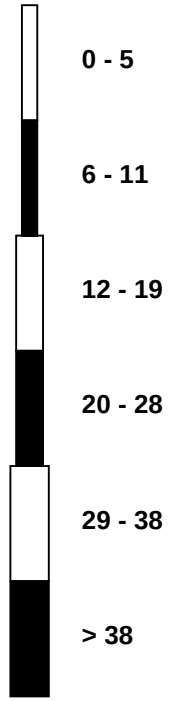
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Conklin Lookout (AMS 18)



Classes (km/h)



Total Number of Valid Hours: 737

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 27 00:00

Minimum Value: 0 km/h on Jan 17 00:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Hours of Calibration:	0
Percent Operational Time:	99.1

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Conklin Lookout - January 2016

Direction of Maximum Speed: 295 deg on Jan 29 07:00
Direction of Maximum Daily Speed Average: 281.5 deg on Jan 1

Direction of Minimum Speed: 280 deg on Jan 8 04:00

Direction of Minimum Daily Speed Average: 0.5 deg on Jan 8

Monthly Average Direction: 260.2 deg

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	281	272	280	277	281	261	268	271	276	285	282	284	283	282	276	276	287	290	283	292	289	290	300	302	281.5
2-Jan	303	299	300	292	286	276	277	279	277	269	249	249	274	251	220	214	213	214	217	219	217	217	216	216	248.7
3-Jan	215	215	217	218	217	218	220	217	216	214	213	210	208	209	213	219	223	219	213	214	211	208	215	252	215.2
4-Jan	272	214	224	230	222	312	323	332	341	337	332	334	351	3	3	356	307	306	300	310	312	309	309	306	313.5
5-Jan	291	288	295	300	299	298	290	292	313	240	229	236	309	266	168	131	136	153	126	131	128	42	101	46	271.8
6-Jan	70	137	156	162	122	54	46	57	92	93	22	27	19	9	1	7	23	26	19	19	32	20	19	20	45.9
7-Jan	31	25	359	359	350	5	24	22	342	334	308	333	339	328	309	308	311	321	345	303	281	275	279	271	331.3
8-Jan	284	313	16	280	40	10	101	61	100	65	75	73	105	189	84	156	128	AF	137	214	196	205	200	202	176.1
9-Jan	203	210	209	223	228	222	220	218	215	221	224	218	222	219	221	223	224	221	229	211	217	213	212	216	218.4
10-Jan	219	215	210	213	217	268	256	240	266	285	277	297	306	306	317	331	338	338	338	348	342	330	335	338	279.0
11-Jan	343	334	332	336	346	321	336	351	352	341	334	324	327	319	304	310	278	250	230	197	204	216	214	208	295.9
12-Jan	207	207	205	204	204	194	194	185	192	196	212	222	224	211	209	205	210	217	230	224	221	217	229	256	211.1
13-Jan	197	212	224	212	209	173	171	73	20	41	35	54	67	59	54	38	22	14	17	24	26	27	32	35	42.0
14-Jan	37	31	10	17	32	20	17	12	17	26	33	23	24	28	31	41	39	33	48	51	47	36	33	49	31.7
15-Jan	43	41	46	39	52	45	31	27	17	9	25	15	26	23	40	56	62	54	52	48	48	69	36	AF	41.5
16-Jan	AF	353	24	344	AF	280	309	342	300	298	278	241	228	299	AF	AF	237	AF	217	220	224	223	220	223	253.1
17-Jan	219	220	214	212	209	217	217	214	207	207	197	185	186	192	192	163	160	164	167	175	166	167	169	175	185.7
18-Jan	164	161	149	163	161	167	168	168	173	161	174	198	195	195	192	195	220	216	213	222	225	219	215	223	186.0
19-Jan	224	226	253	221	221	230	265	290	299	293	301	311	317	302	53	40	36	36	41	56	55	71	50	56	337.2
20-Jan	62	83	31	56	47	31	36	66	94	94	137	151	193	180	206	194	210	209	213	201	201	205	208	207	181.5
21-Jan	203	191	202	198	196	196	188	189	190	174	171	174	170	165	160	156	153	158	172	177	177	199	192	190	181.0
22-Jan	210	200	216	212	221	237	236	286	296	262	236	328	3	14	82	37	41	51	37	40	46	48	47	42	358.9
23-Jan	43	36	35	37	24	55	76	77	88	81	95	112	88	72	124	15	20	56	129	219	262	273	215	212	64.0
24-Jan	206	210	206	207	212	220	253	283	299	298	298	292	288	279	277	268	250	257	238	226	242	263	274	279	256.5
25-Jan	283	295	311	312	316	286	267	228	201	200	207	220	212	212	211	213	218	218	218	221	222	225	223	234	234.5
26-Jan	237	235	235	234	228	242	236	231	233	227	226	215	211	214	219	224	230	243	265	258	264	274	276	286	243.3
27-Jan	285	286	287	286	286	291	288	287	289	294	290	289	288	283	280	264	255	256	249	239	215	204	211	210	273.6
28-Jan	199	205	199	189	187	181	188	193	202	207	207	193	197	211	216	218	228	234	234	247	256	270	257	258	220.4
29-Jan	256	248	262	271	283	294	295	293	290	294	294	297	295	296	289	288	278	272	273	273	274	280	289	289	283.1
30-Jan	285	283	280	274	269	269	267	276	276	283	298	299	296	298	306	315	293	287	289	300	315	320	330	315	289.2
31-Jan	319	339	343	347	353	352	94	87	104	89	90	66	52	30	23	24	14	343	345	351	359	349	355	0	14.6
	256.1	249.1	253.1	251.3	251.6	257.6	259.1	262.8	257.8	259.9	253.6	257.4	257.9	258.0	245.9	247.8	245.3	249.0	248.2	243.3	245.0	254.1	251.5	258.4	
	Diurnal Average																								

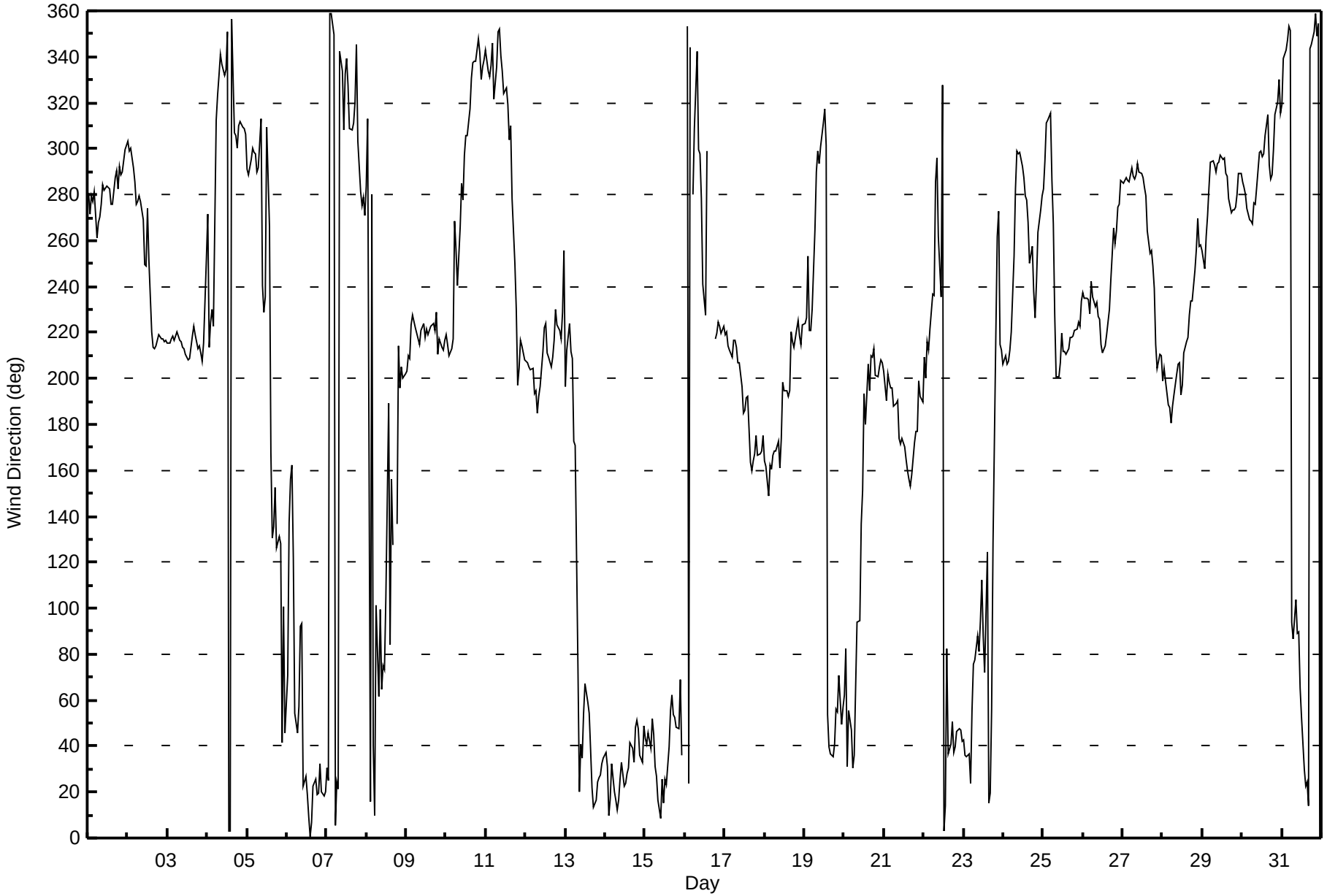
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Conklin Lookout - January 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Conklin Lookout - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 93 deg on Jan 5 15:00

Minimum Value: 10 deg on Jan 4 09:00

Percentiles: P_1 = 12 P_{10} = 16 Q_1 = 18 Median = 21 Q_3 = 25 P_{90} = 38 P_{99} = 72

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Hours of Calibration:	0
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	19	23	19	21	19	22	21	20	19	19	18	20	20	19	22	21	22	20	21	21	20	19	20	20	23
2-Jan	20	21	20	18	16	19	19	17	19	20	21	21	21	29	24	18	17	15	15	15	15	15	14	14	29
3-Jan	14	15	16	16	15	16	16	17	16	17	17	17	18	21	22	19	18	19	17	17	17	16	21	37	37
4-Jan	61	27	48	47	25	29	18	15	10	12	15	19	21	21	20	19	16	16	17	15	14	13	13	12	61
5-Jan	14	12	17	12	12	14	19	15	20	44	13	20	40	52	93	77	12	12	13	17	50	40	30	44	93
6-Jan	26	18	18	15	56	45	29	23	30	23	29	24	22	19	18	19	15	16	18	18	20	26	29	26	56
7-Jan	22	25	38	40	31	29	22	26	48	41	34	41	52	48	42	49	35	44	42	33	34	31	40	39	52
8-Jan	33	53	48	82	61	72	56	48	34	32	69	75	68	81	62	65	59	AF	12	14	21	22	20	21	82
9-Jan	18	22	21	21	23	21	22	21	22	26	24	22	23	22	21	23	21	23	26	21	19	18	20	19	26
10-Jan	19	21	18	18	26	33	39	30	30	27	28	26	26	26	28	39	38	43	44	42	43	35	37	37	44
11-Jan	41	39	33	35	40	27	38	35	35	39	40	29	35	35	25	38	25	20	20	22	14	17	17	18	41
12-Jan	17	18	18	19	19	19	19	23	20	21	22	22	26	21	23	24	18	16	19	18	16	22	14	39	39
13-Jan	57	15	12	14	14	32	18	57	25	27	32	30	29	23	20	18	19	18	17	18	18	19	17	19	57
14-Jan	19	19	20	18	17	20	23	23	21	23	21	23	23	22	21	21	19	20	19	15	19	19	20	20	23
15-Jan	21	20	19	20	19	20	19	19	23	23	28	32	46	64	50	40	29	29	30	26	21	23	28	AF	64
16-Jan	AF	66	34	37	AF	20	21	21	23	15	20	29	34	63	AF	AF	16	AF	48	15	14	12	11	11	66
17-Jan	13	14	11	42	13	16	19	17	17	18	20	24	25	20	23	29	19	17	17	19	17	19	20	19	42
18-Jan	19	20	17	17	17	20	22	22	22	21	25	22	26	24	24	29	23	24	20	18	18	20	17	19	29
19-Jan	20	24	30	28	17	19	30	26	27	24	31	33	73	89	63	33	26	23	19	20	23	21	19	19	89
20-Jan	24	28	42	17	18	20	18	22	22	20	35	70	60	35	24	24	20	21	21	21	22	20	18	17	70
21-Jan	17	21	19	20	19	21	20	18	19	19	21	22	23	23	19	16	15	17	19	20	22	23	21	25	25
22-Jan	23	20	20	17	20	23	35	16	16	53	38	23	37	29	51	20	21	19	16	16	15	16	16	17	53
23-Jan	16	19	17	19	20	21	20	17	18	19	21	27	25	34	65	20	23	13	31	20	33	31	22	14	65
24-Jan	16	19	17	18	18	27	28	23	24	23	23	23	23	22	22	23	23	21	20	17	19	23	19	18	28
25-Jan	19	20	19	18	19	31	36	42	13	15	16	17	19	19	19	17	17	17	18	17	17	16	16	18	42
26-Jan	17	16	16	17	18	18	17	17	17	21	21	17	18	17	19	17	17	22	23	24	23	23	23	22	24
27-Jan	23	21	23	21	22	23	23	24	25	23	22	22	22	21	24	24	23	21	19	18	18	17	16	18	25
28-Jan	16	17	17	21	15	16	19	17	16	17	17	19	21	21	19	17	22	20	19	23	24	22	24	23	24
29-Jan	24	24	23	25	22	22	23	22	25	23	25	24	23	24	24	24	23	21	21	22	19	19	20	19	25
30-Jan	18	18	18	21	20	22	21	18	20	20	21	24	24	25	24	22	22	20	20	22	23	23	23	23	25
31-Jan	23	23	26	27	24	34	32	26	19	35	24	33	17	22	21	20	26	31	32	30	26	27	25	27	35
	61	66	48	82	61	72	56	57	48	53	69	75	73	89	93	77	59	44	48	42	50	40	40	44	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 15, 2016	Last Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	9:48	End Time (MST)	14:00
Gas Cert Reference	EY0000368	Station temp.	22 Deg C
Cal Gas Concentration	49 ppm	Cal Gas Exp Date	10/06/2016
Calibrator Make/Model	API T700	Serial Number	1222
ZAG Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-601	-602
Analyzer IP address	192.168.1.43		Lamp voltage	895	901
Calculated slope	0.999232	0.992736	Chamber temp	45.2	45.0
Calculated intercept	1.267096	1.561202	Pressure	640.9	658.4
Analyzer Background	23.0	23.0	Flow	0.419	0.428
Analyzer Coefficient	0.918	0.918	Intensity	86	86

Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.6	----
as found span	5000	58.6	574.3	577.8	0.994
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	58.6	574.3	577.6	0.994
second point	5000	29.3	287.1	286.8	1.001
third point	5000	14.6	143.1	141.5	1.011
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	58.6	574.3	578.5	0.993
				Average Correction Factor	1.002

Corrected As found	578.4	Previous response	573.5	% change	-0.9%

Notes:

No maintenance or adjustments done, filter changed out

Calibration Performed By: Melissa Lemay

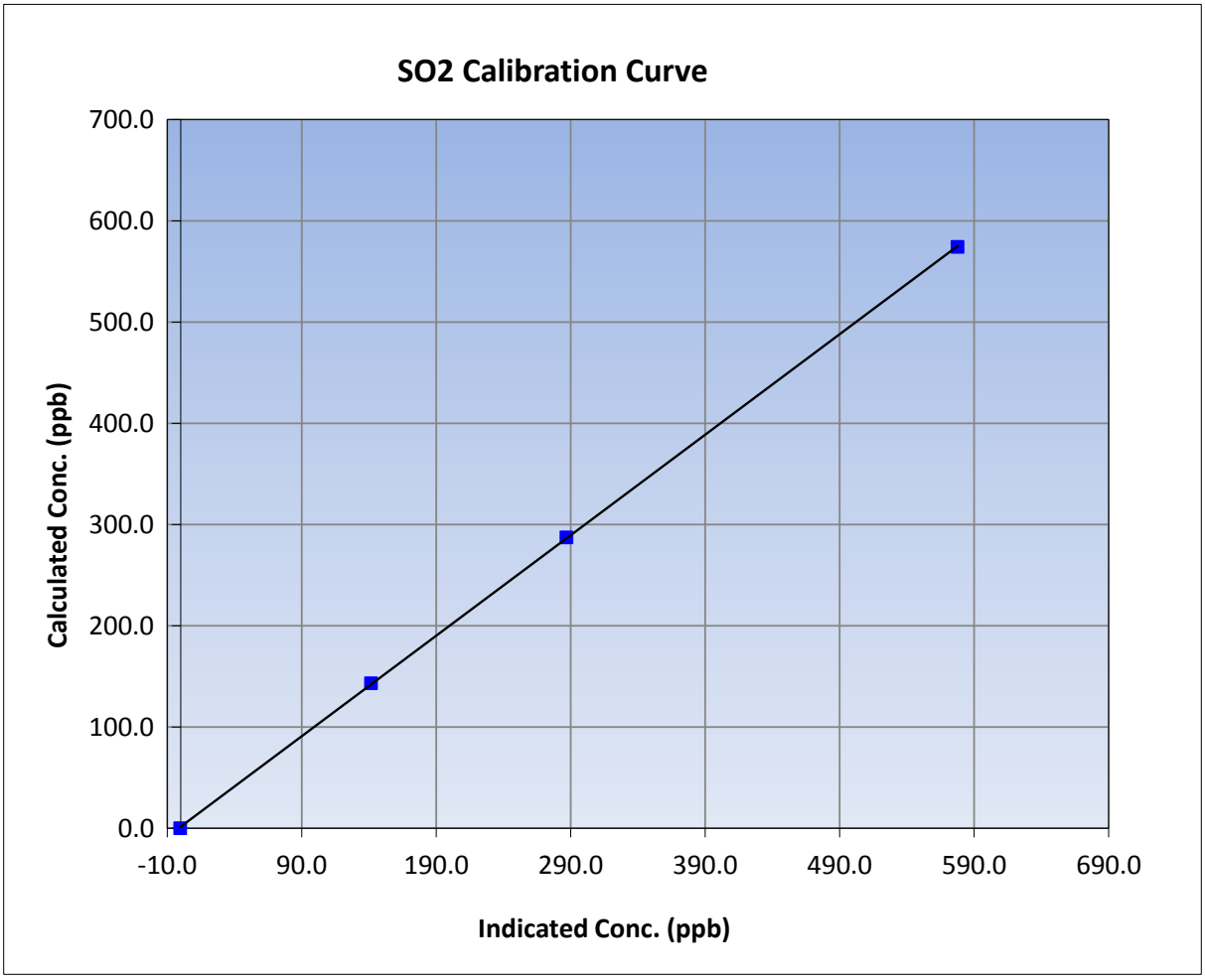
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

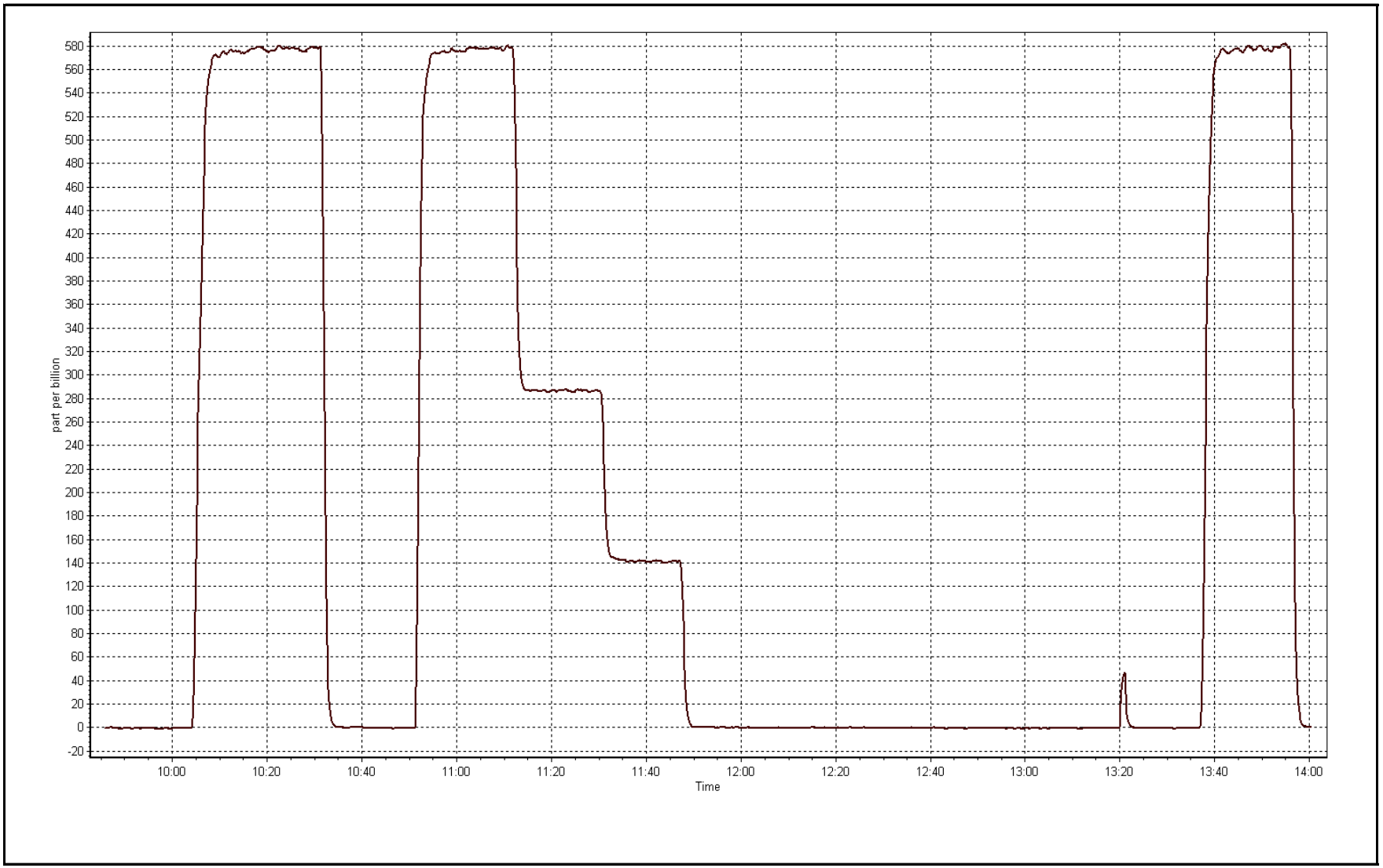
Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:48	End Time (MST)	14:00
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999979
574.3	577.6	0.9943		
287.1	286.8	1.0012	Slope	0.992736
143.1	141.5	1.0112		
			Intercept	1.561202



SO2 Calibration Plot Date: January 15, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	January 20, 2016	Last Calibration	December 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:08
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	06/10/2014
Calibrator Make/Model	API 700	Serial Number	1222
Dil air Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000368 10/Jun/15

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-699
Analyzer IP address	192.168.1.42		Lamp voltage	1014	1025
Calculated slope	0.988803	1.011644	Chamber temp	45	45
Calculated intercept	0.158694	-0.082451	Pressure	627.5	639.6
Analyzer Background	2.99	2.99	Flow	0.405	0.411
Analyzer Coefficient	1.121	1.121	Intensity	91	92
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1336160090
Converter make/model	CDN-101	Converter serial #	522

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	82.0	80.0	79.1	1.012
SO2 scrubber check	5000	19.5	191.1	1.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.0	80.0	79.1	1.012
second point	5000	41.0	40.0	39.8	1.005
third point	5000	20.5	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	82.0	80.0	80.3	0.997
				Average Correction Factor	1.008

Corrected As found	79.1	Previous response	80.8	% change	2.1%

Notes:

no maintenance or adjustments donedone, filter changed out

Calibration Performed By: Melissa Lemay

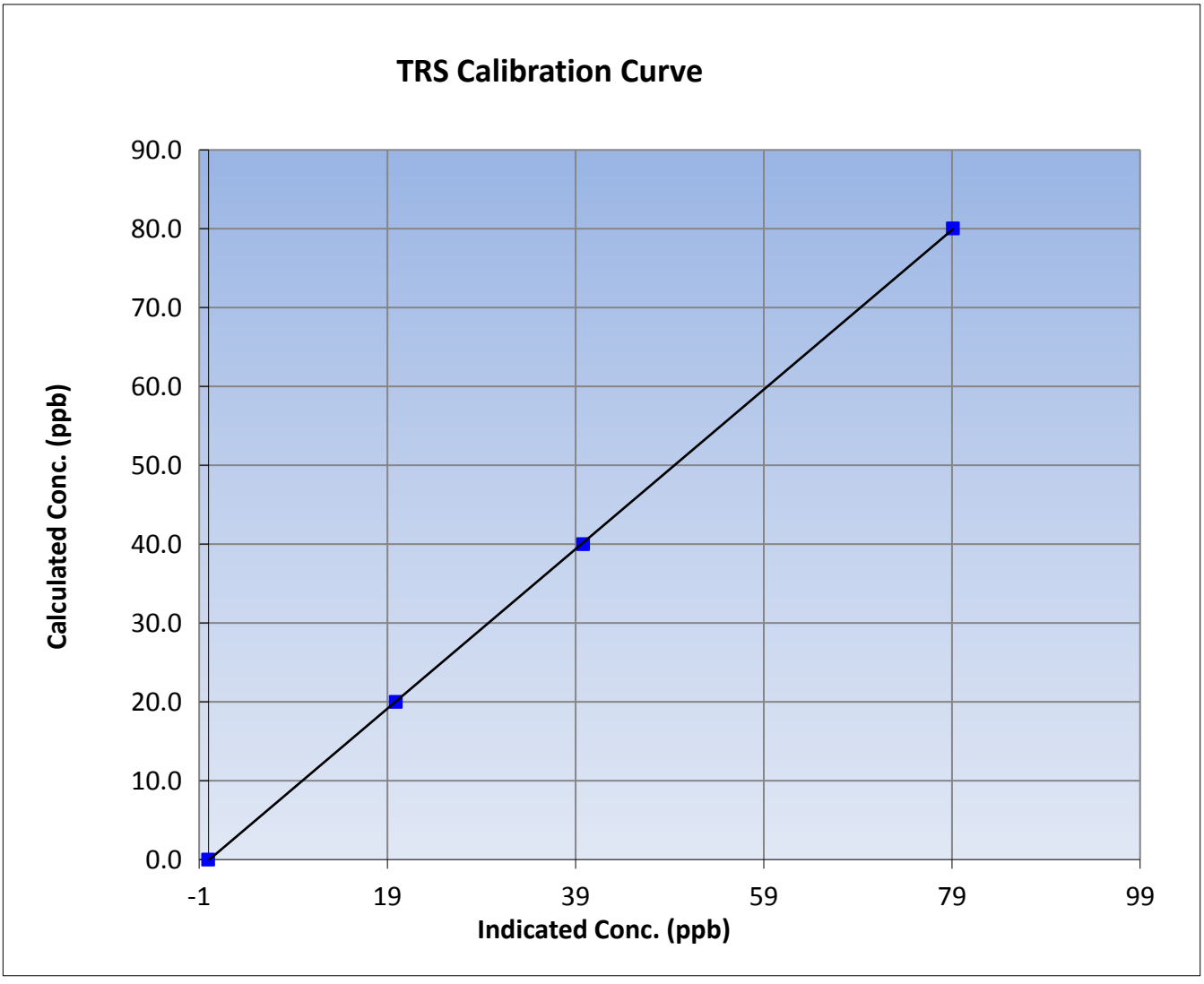
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

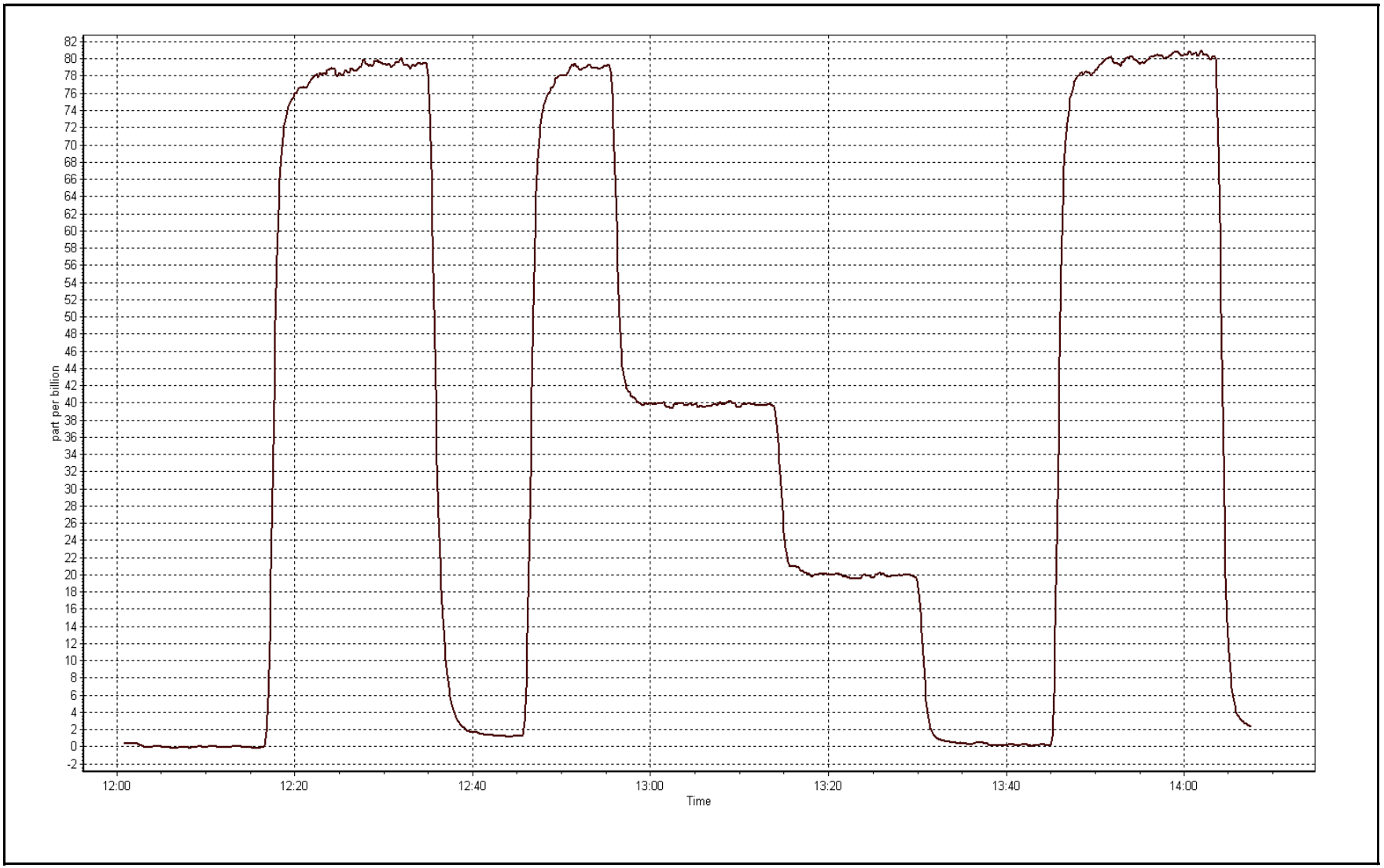
Calibration Date	January 20, 2016	Previous Calibration	December 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	12:00	End Time (MST)	14:08
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1336160090

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999986
80.0	79.1	1.0118		
40.0	39.8	1.0054	Slope	1.011644
20.0	19.9	1.0054		
			Intercept	-0.082451



TRS Calibration Plot Date: January 20, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

Station Information

Calibration Date	January 15, 2016	Last Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18

Reason: Routine

Start Time (MST)	9:48	End Time (MST)	14:00
Gas Cert Reference	EY0000368	Cal Gas Expiry Date	June 10, 2016
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1076.3 ppm
C3H8 Cal Gas Conc.	203.0 ppm	Station temp.	22 Deg C
Calibrator Model	API T700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9035

Analyzer Information

	Before	*After*		*Before*	*After*
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.004095	0.999347	Carrier Pressure	31.7	31.7
THC Calc intercept	0.015849	0.031863	Fuel Pressure	42.2	42.2
NMHC Calc slope	1.003586	1.000255	Air Pressure	32.4	32.4
NMHC Calc intercept	0.005828	0.007804			

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	12.73	0.991
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	12.61	12.61	1.000
second point	5000	29.3	6.31	6.25	1.009
third point	5000	14.6	3.14	3.09	1.017
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	1.009

Corrected As found	12.73	Previous response	12.55	% change	-1.4%

Notes:

Nitrogen changed out,span adjusted, filter changed out

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.6	6.54	6.65	0.984
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	3.25	1.007
third point	5000	14.6	1.63	1.62	1.006
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.54	6.56	0.997
				Average Correction Factor	1.004

Corrected As found	6.65	Previous response	6.51	% change	-2.1%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.6	6.07	6.08	0.999
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.07	6.07	1.000
second point	5000	29.3	3.04	2.99	1.015
third point	5000	14.6	1.51	1.48	1.022
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.07	6.05	1.003
				Average Correction Factor	1.012

Corrected As found	6.08	Previous response	6.03	% change	-0.8%

Wood Buffalo Environmental Association

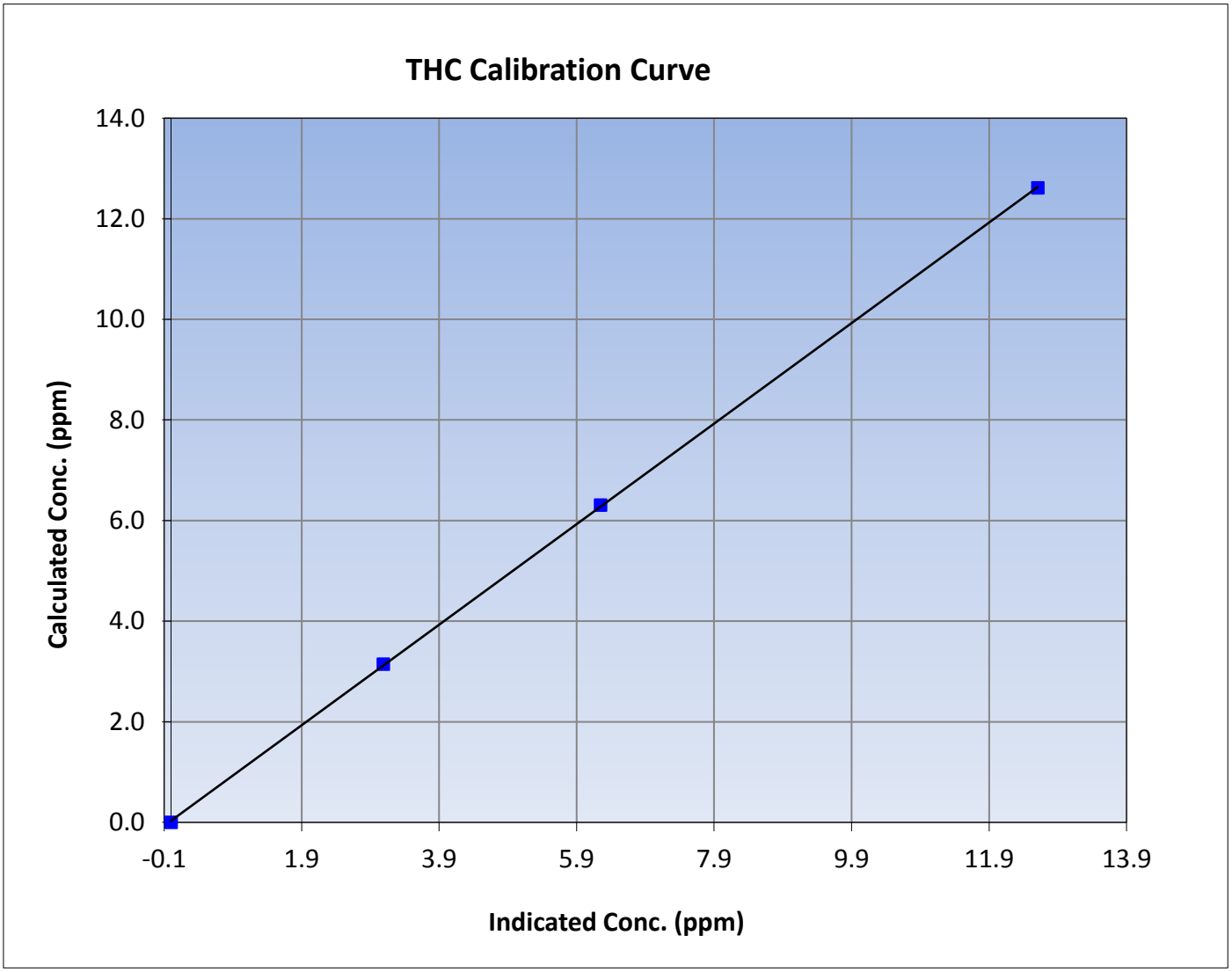
THC Calibration Summary

Station Information

Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:48	End Time (MST)	14:00
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	0.999968
12.61	12.61	1.0003		
6.31	6.25	1.0091	Slope	0.999347
3.14	3.09	1.0170		
			Intercept	0.031863



Wood Buffalo Environmental Association

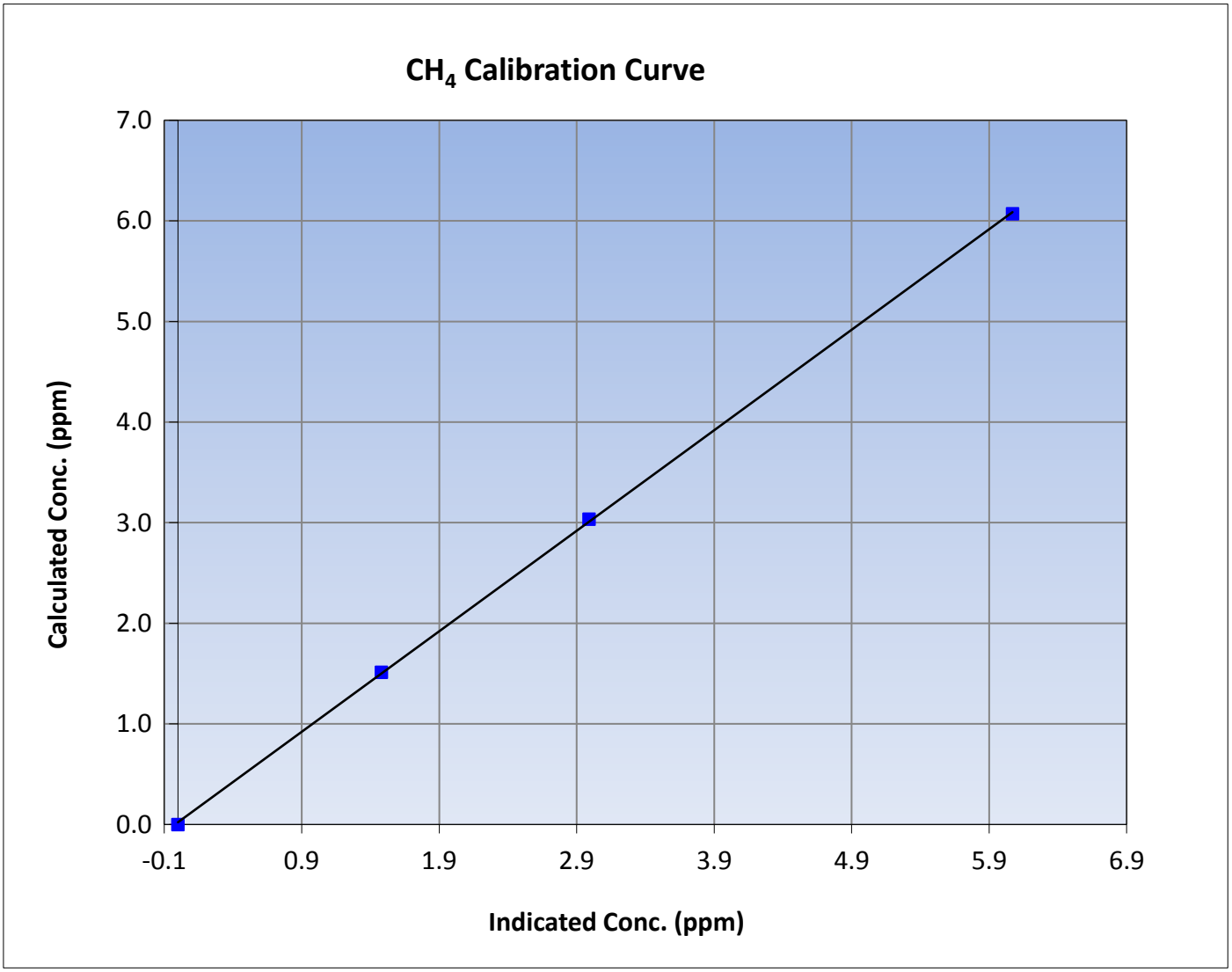
CH_4 Calibration Summary

Station Information

Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:48	End Time (MST)	14:00
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	0.999923
6.07	6.07	1.0002		
3.04	2.99	1.0152	Slope	0.999101
1.51	1.48	1.0220		
			Intercept	0.022119



Wood Buffalo Environmental Association

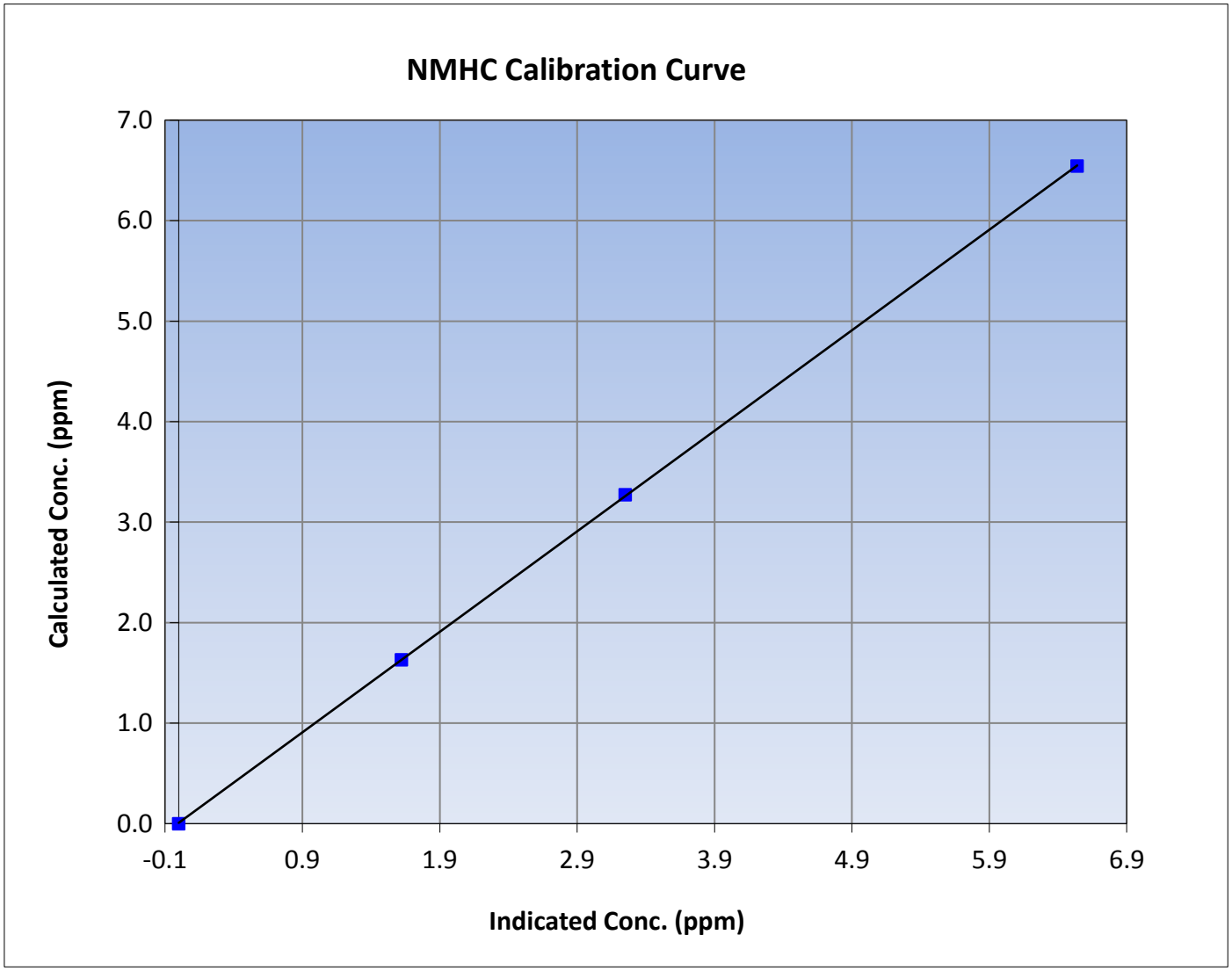
NMHC Calibration Summary

Station Information

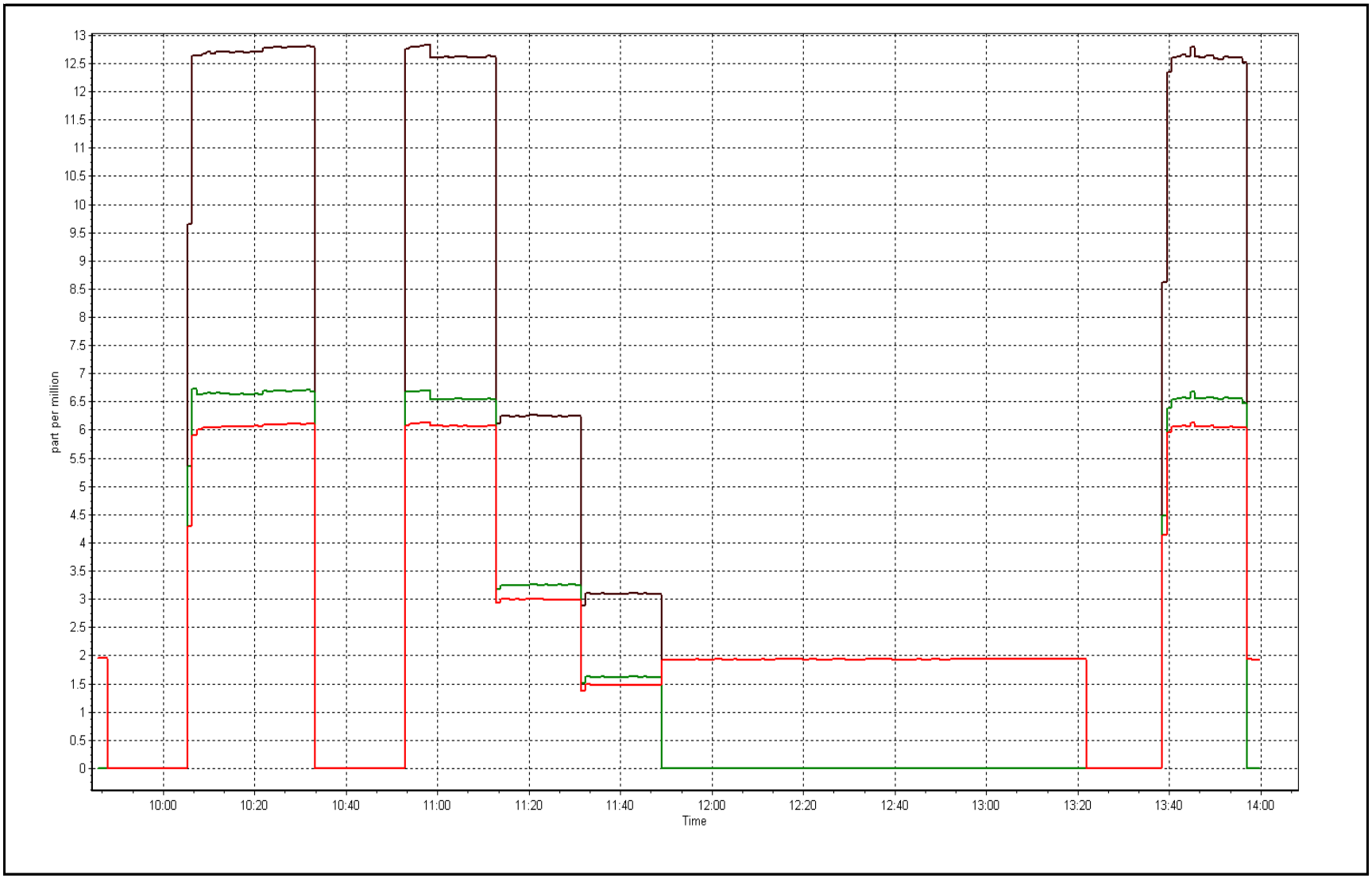
Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:48	End Time (MST)	14:00
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999988
6.54	6.54	1.0004		
3.27	3.25	1.0066	Slope	1.000255
1.63	1.62	1.0062		
			Intercept	0.007804



THC Calibration Plot Date: January 15, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

W B E A

Station Information

Calibration Date	January 20, 2016	Previous Calibration	December 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	9:46	End Time (MST)	12:05
NO2 GPT Ref date	January-15-16	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9305

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	27.4	27.9
Analyzer IP address	192.168.1.48		Lamp temp.	53.3	53.3
Calculated slope	1.013920	0.994101	Pressure	602.0	614.0
Calculated intercept	-0.223946	0.260127	Flow cell A	0.685	0.693
Analyzer Background	-1.6	-1.7	Flow cell B	0.684	0.691
Analyzer Coefficient	1.043	1.092	Cell A Intensity	80015	75894
			Cell B Intensity	74678	71582

Analyzer make	Thermo 49i	Analyzer serial #	1501663733

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.0	0.2	----
as found span	5000	757	376.3	360.0	1.045
calibrator zero	5000	0	0.0	0.2	----
high point	5000	757	376.3	378.4	0.994
second point	5000	520	256.1	257.6	0.994
third point	5000	270	133.8	133.5	1.002
as left zero	5000	0	0.0	0.8	----
as left span	5000	757	376.3	383.2	0.982
				Average Correction Factor	0.997

Corrected As found	359.8	Previous response	371.4	% change	3.2%

Notes:

GPT checked and verified O3 setpoints. Span adjusted, filter changed out, No maintenance done

Calibration Performed By: Melissa Lemay

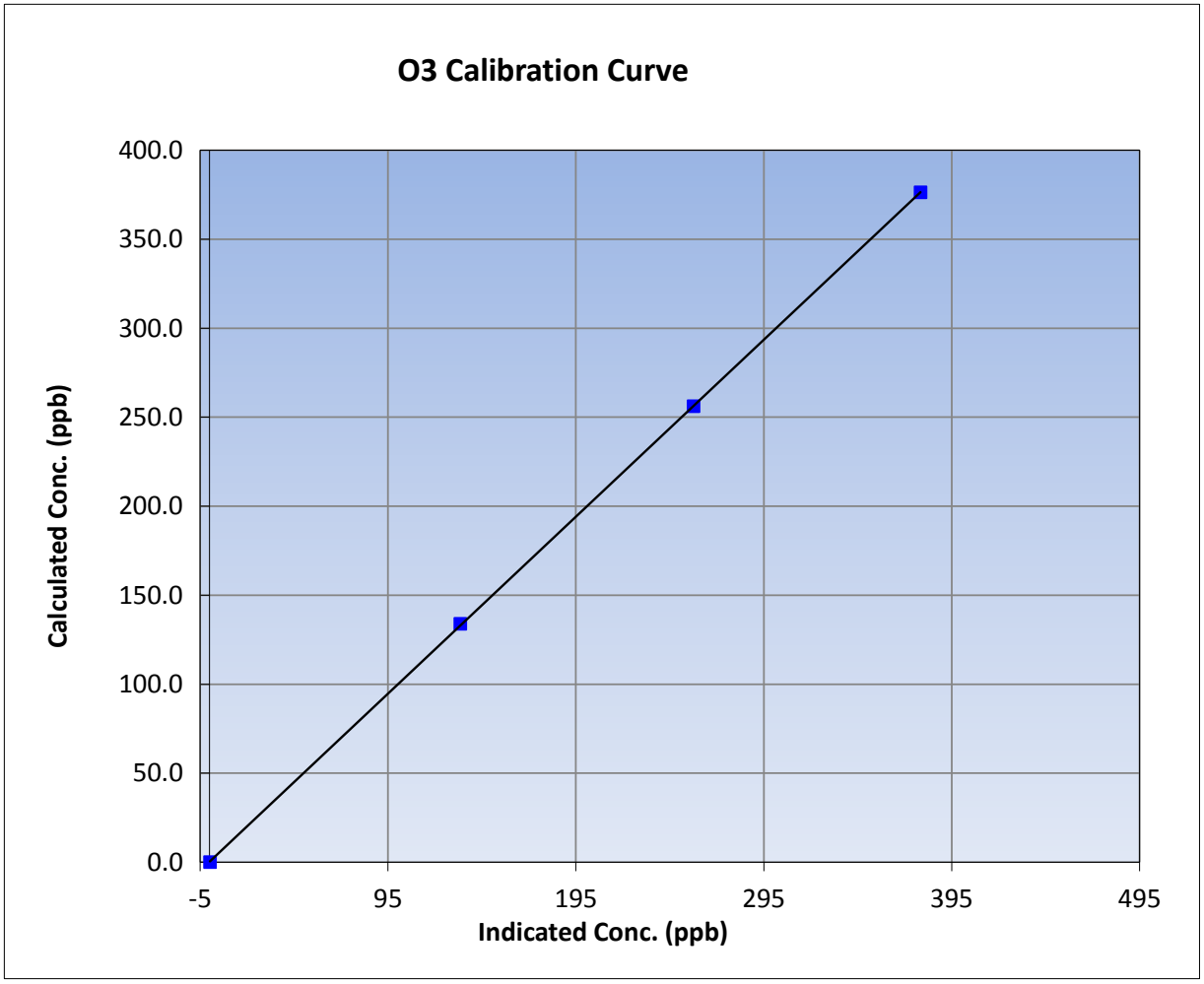
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

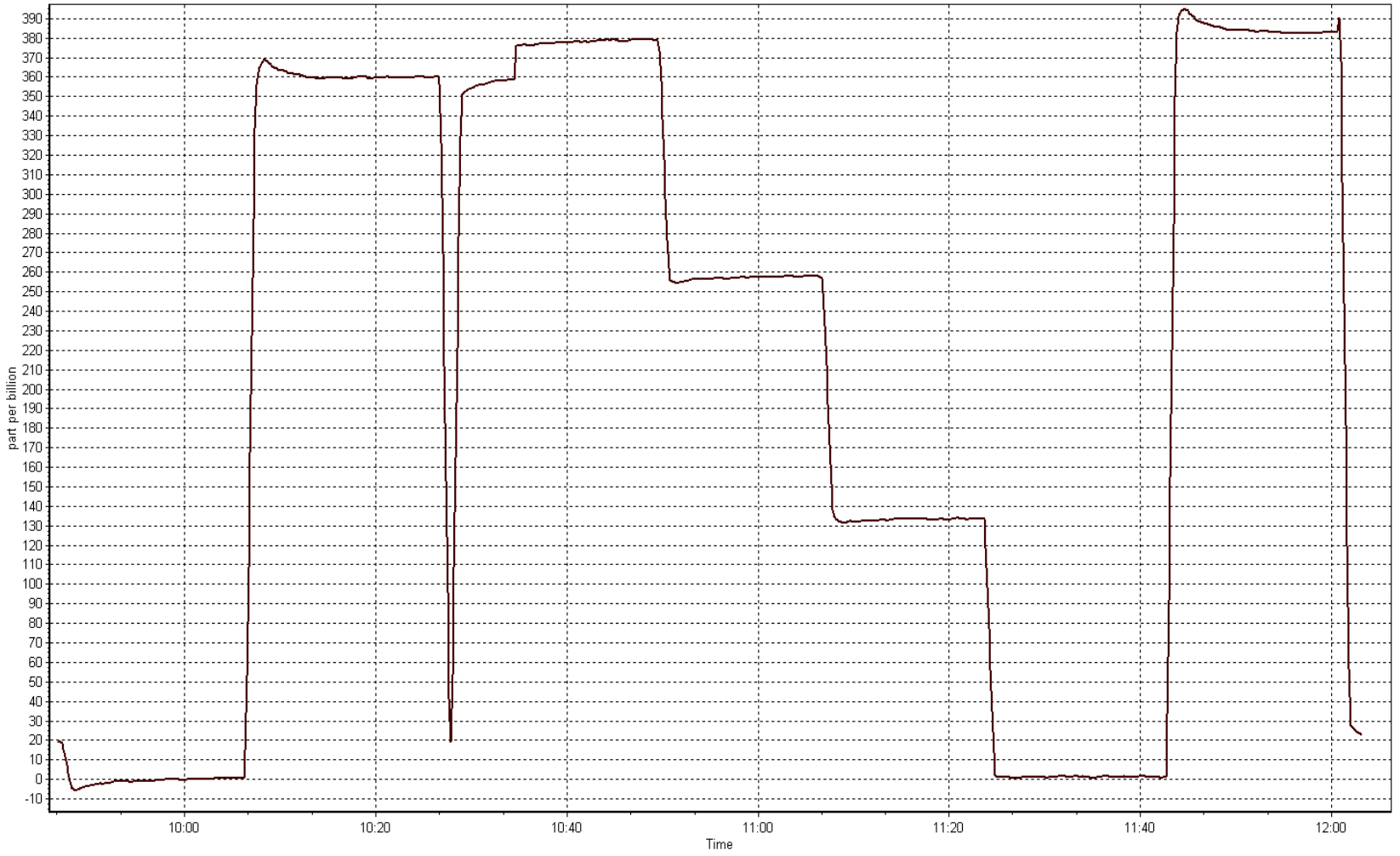
Calibration Date	January-20-16	Previous Calibration	December 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:46	End Time (MST)	12:05
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999988
376.3	378.4	0.9945		
256.1	257.6	0.9942	Slope	0.994101
133.8	133.5	1.0022		
			Intercept	0.260127



O3 Calibration Plot Date: January 20, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	9:48	End Time (MST)	13:59
NO Cal Gas Conc	51.2 ppm	Gas Cert Reference	EY0000368
NOx Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	10/06/2016
Calibrator	API T700	Serial Number	1222
Zero air Generator	Teledyne API T701	Serial Number	5610

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9035

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.991728	0.991390	0.995291
	Data Offset	-0.184872	0.350866	-0.231056
Current Calibration	Data Slope	0.998149	0.996916	1.004753
	Data Offset	0.435719	0.903901	0.099397

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.810		0.771	
NOX coefficient	0.997		0.997	
NO2 coefficient	0.999		0.999	
NO bkgrnd	1.7		1.6	
NOX bkgrnd	1.8		1.7	
Chamber Temp	50.4	Deg C	50.2	Deg C
Moly Temp	324.5	Deg C	326	Deg C
PMT voltage	-842.5	V	-842.2	V
PMT Temp	-2.9	Deg C	-3.2	Deg C
O3 flow	OK	ccm	Ok	ccm
R Cell press NO	170	mmHg	154.7	mmHg
R Cell Press Nox	170	mmHg	155	mmHg
NO sample flow	0.856	lpm	0.974	lpm
Nox sample Flow	0.856	lpm	0.974	lpm

Notes:

during as found span flow changed from 0.856-0.868, the span went up, pump changed out, filter changed out, span adjusted

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 15, 2016 Station Number: AMS 18

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as found span	5000	58.6	600.1	600.1	0.0	558.2	557.7	0.5	1.0750	1.0760
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	5000	58.6	600.1	600.1	0.0	601.2	601.7	-0.5	0.9981	0.9973
second point	5000	29.3	300.0	300.0	0.0	299.2	298.9	0.5	1.0028	1.0038
third point	5000	14.6	149.5	149.5	0.0	149.4	148.6	0.8	1.0007	1.0061
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
as left span	5000	58.6	600.1	228.0	372.1	602.3	221.4	381.6	0.9963	1.0298
								Average Correction Factor	1.0005	1.0024

Corrcted As found NO_X= 558.4 NO= 557.8 Percent Change NO_X= 8.4% NO= 8.4%

Previous Response NO_X= 605.3 NO= 604.9

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	603.7	604.3	0.0	0.9940	0.9930	----	----
1st NO2 (300)	228.0	376.3	603.7	228.0	374.0	0.9940	----	1.0061	99.4%
2nd NO2 (200)	348.2	256.1	603.9	348.2	255.7	0.9936	----	1.0016	99.8%
3rd NO2 (100)	470.5	133.8	603.1	470.5	132.5	0.9950	----	1.0098	99.0%
2nd NO ref point		0.0	601.8	602.3	-0.6	0.9971	0.9963	----	----
				Average Correction Factor		0.9949		1.0058	99.4%

Calibration Performed By: _____

Wood Buffalo Environmental Association

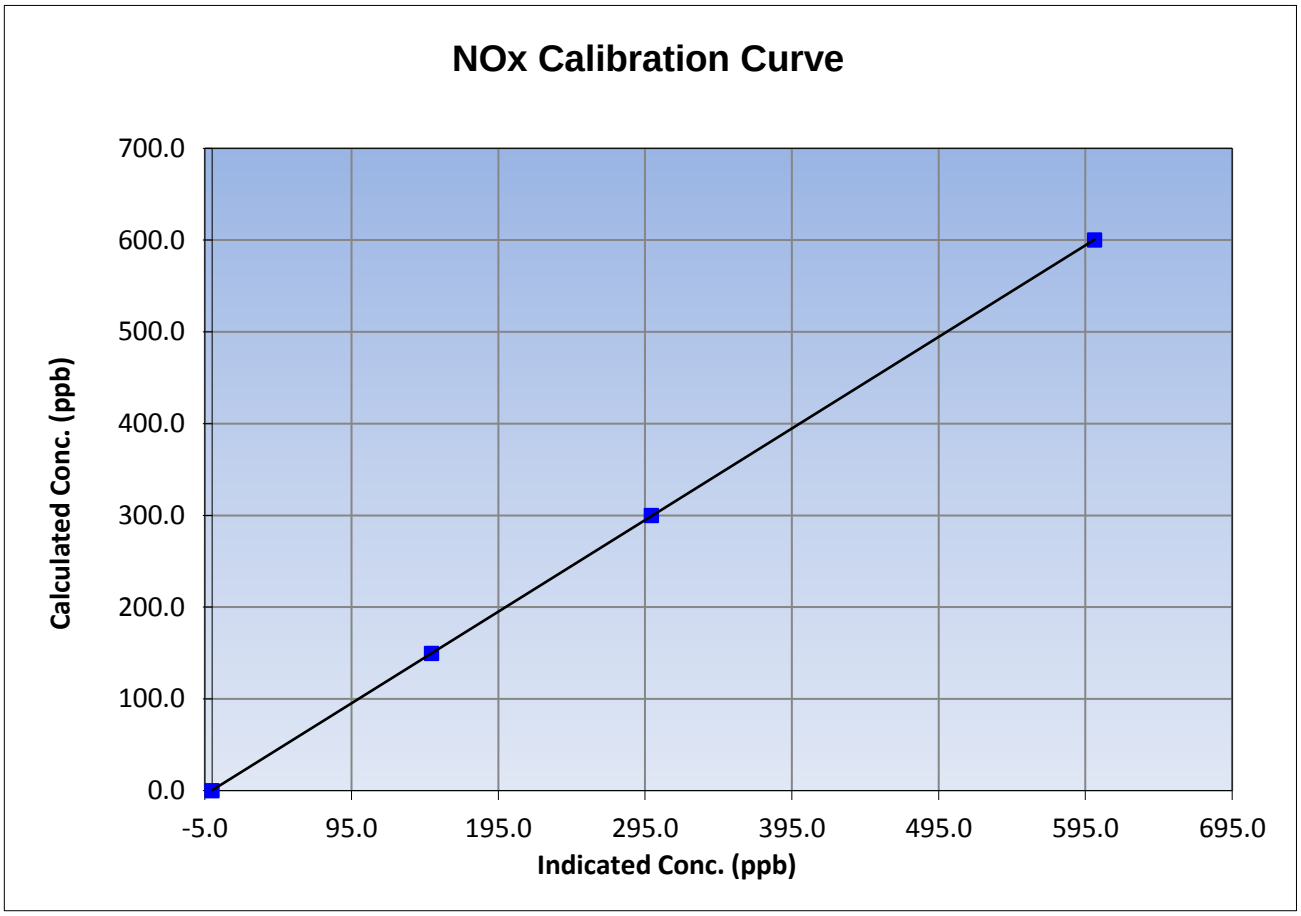
NO_X Calibration Summary

Station Information

Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:48	End Time (MST)	13:59
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999993
600.1	601.2	0.9981		
300.0	299.2	1.0028	Slope	0.998149
149.5	149.4	1.0007		
			Intercept	0.435719



Wood Buffalo Environmental Association

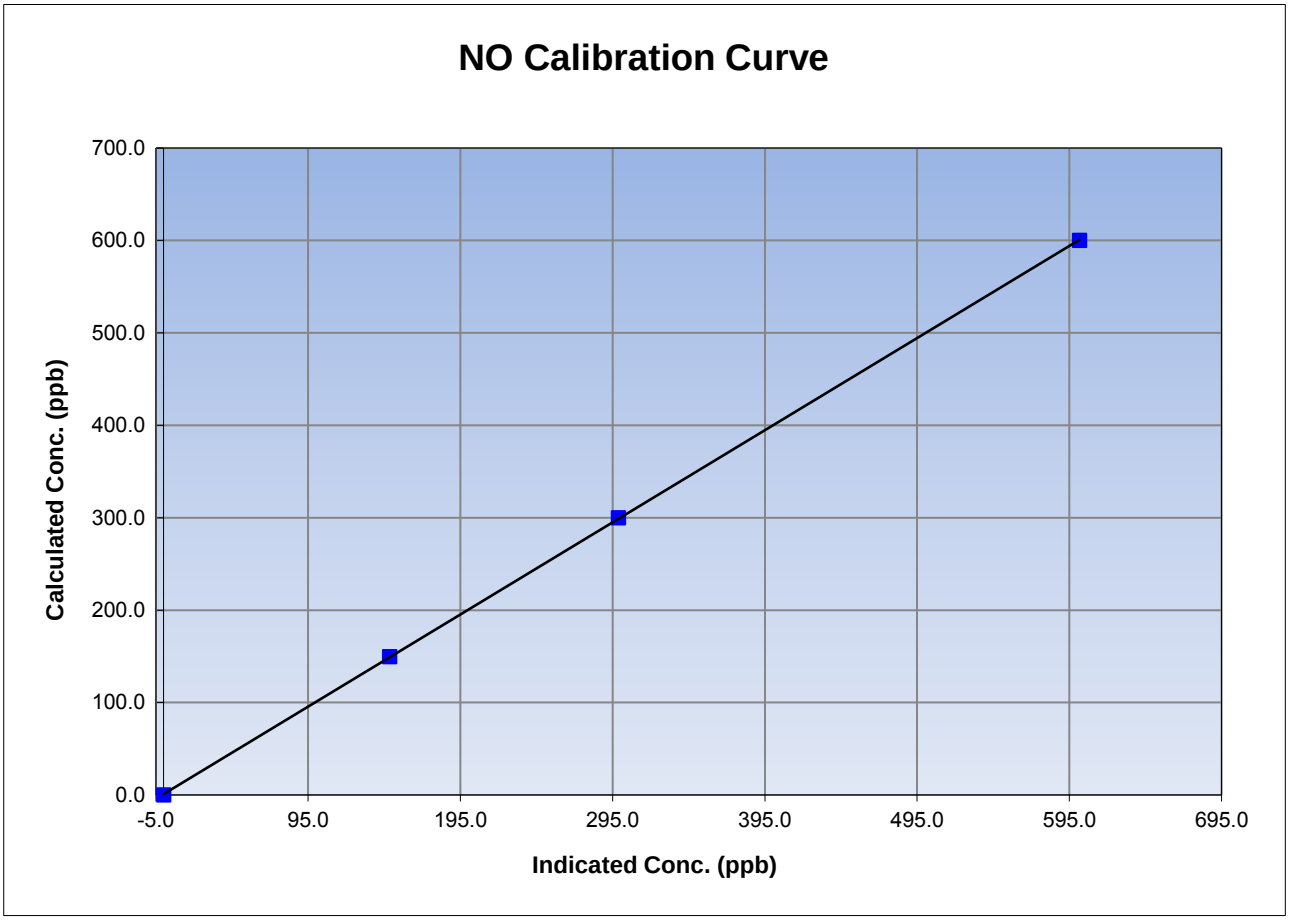
NO Calibration Summary

Station Information

Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:48	End Time (MST)	13:59
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999986
600.1	601.7	0.9973		
300.0	298.9	1.0038	Slope	0.996916
149.5	148.6	1.0061		
			Intercept	0.903901



Wood Buffalo Environmental Association

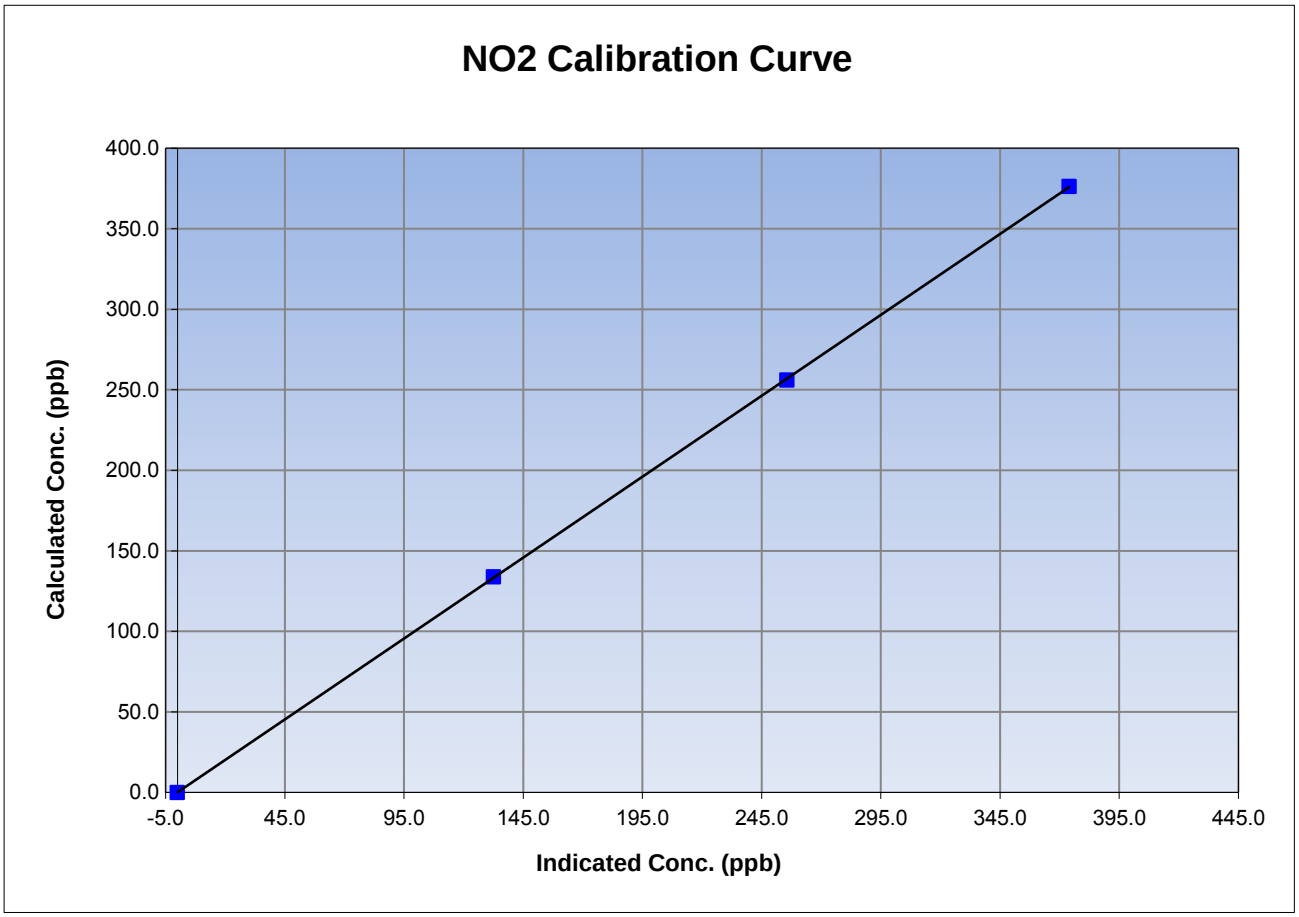
NO_2 Calibration Summary

Station Information

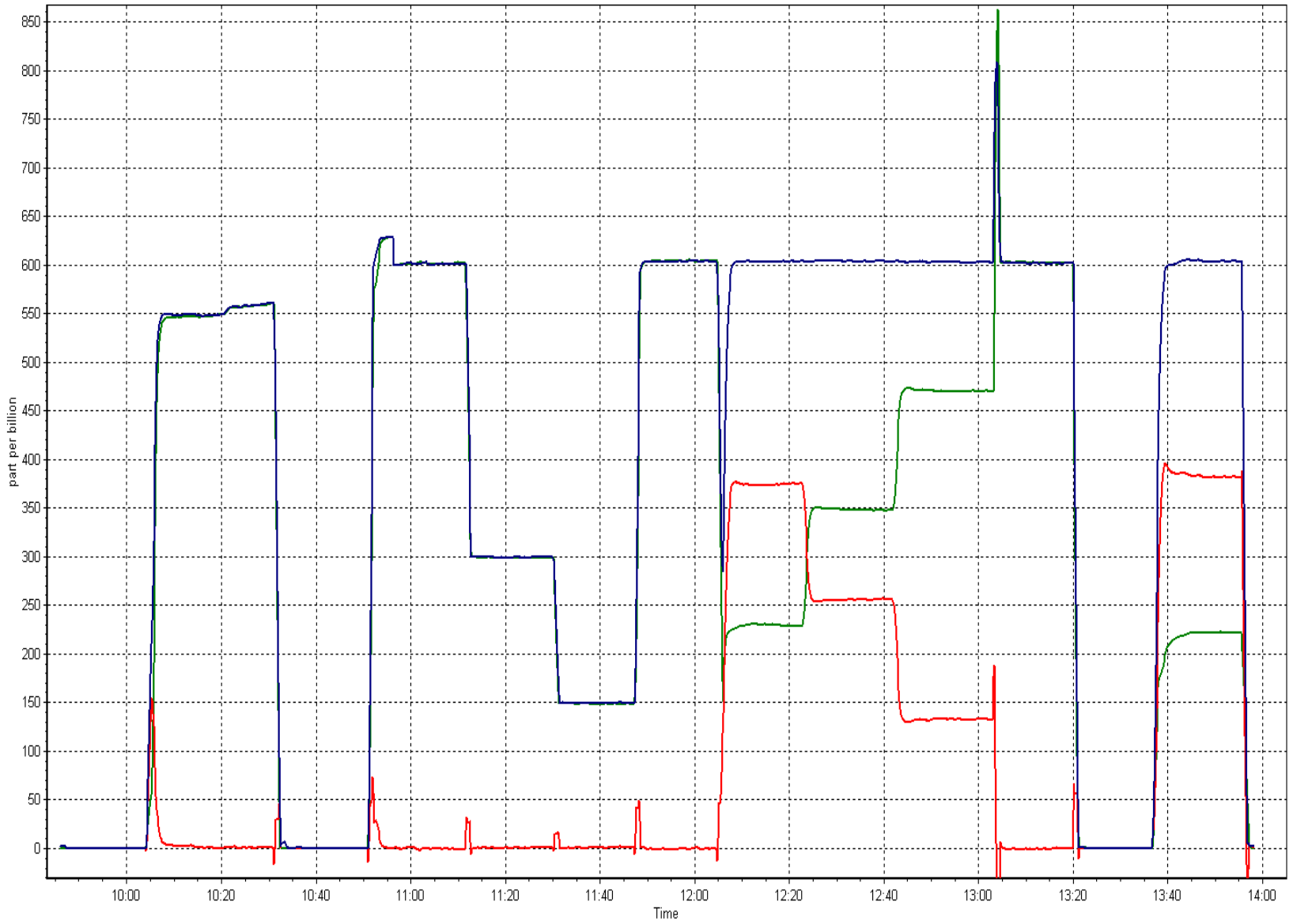
Calibration Date	January 15, 2016	Previous Calibration	December 9, 2015
Station Number	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:48	End Time (MST)	13:59
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999983
376.3	374.0	1.0061		
256.1	255.7	1.0016	Slope	1.004753
133.8	132.5	1.0098		
			Intercept	0.099397



NOX Calibration Plot Date: January 15, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	January 20, 2016	Previous Calibration:	December 10, 2015
Station Name:	Conklin Lookout	Station Number:	AMS 18
Start Time (MST):	11:24	End Time (MST):	12:06
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5										
Make/Model:	Thermo / SHARP 5030										
Serial Number	E-781										
C_{14} Source SN:											
Confirmation of Time settings:	Yes ☑	No ☐									
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑			

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-12.0	-14.0	-2.0	-14.0
T2	17.0	na	na	17.0
T3	26.0	na	na	26.0
T4	14.0	na	na	14.0
RH (%)	9.0	na	na	9.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	942	941.0	-1.0	942

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
997	1000	3	1000	997

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	287		287
Neph	-0.1		-0.1
C14	13.8		13.8
Indicated Concentration (ug/m3)	**-0.1**	**No**	**-0.1**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	November 29, 2015	Previous Leak Check Date:	September 29, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.63	0.03
*Flow with adaptor (LPM):	16.60	

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

Mass Foil Calibration (Annualy)

Foil Calibration Date:	June 30, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337	Mass foil set S/N:	12111
Previous Correction Factor:	6983		
New Correction Factor:	7050		

INSPECTION DATA

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

NOTES:

T1 adjusted, sample head cleaned

Calibration Performed By: **Melissa Lemay**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 19
SUNCOR FIREBAG
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
JANUARY 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	82	0	9	0
H2S (ppb) Average	707	35	37	99.73	2	0	1	0
THC (ppm) Average	708	36	36	100.00	2.7	-	2.5	-
NO2 (ppb) Average	674	35	70	95.30	35	0	15	-
NO (ppb) Average	674	35	70	95.30	34	-	4	-
NOX (ppb) Average	674	35	70	95.30	68	-	19	-
Temperature 2 m (C) Average	744	0	0	100.00	2.6	-	0	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	95	-
Wind Speed 10 m (km/h) Average	723	0	21	97.18	29	-	19	-
Wind Direction 10 m (deg) Average	723	0	21	97.18	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.7	4	-	0	0	0	0	1	4	82
H2S (ppb) Average	707	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	708	2.17	0.1	-	1.9	2	2	2.2	2.2	2.4	2.7
NO2 (ppb) Average	674	5.5	5	-	0	0	2	4	7	12	35
NO (ppb) Average	674	1.1	2	-	0	0	0	0	1	3	34
NOX (ppb) Average	674	6.6	7	-	0	0	2	5	9	14	68
Temperature 2 m (C) Average	744	-13.09	7.5	-	-32.6	-22.9	-18.6	-13.4	-7.4	-2.6	2.6
Relative Humidity (%) Average	744	83.1	9	-	39	74	79	84	89	93	99
Wind Speed 10 m (km/h) Average	723	9.2	6	-	0	3	4	8	13	18	29
Wind Direction 10 m (deg) Average	723	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, NO2	12 Jan 2016 12:00	12 Jan 2016 13:00	2	Maintenance - manifold cleaning
NO2, NO, NOX	13 Jan 2016 03:00	14 Jan 2016 11:00	33	Unstable operation - low shelter temp
Wind Speed, Wind Direction	05 Jan 2016 14:00	05 Jan 2016 14:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	05 Jan 2016 16:00	05 Jan 2016 16:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	08 Jan 2016 02:00	08 Jan 2016 02:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	08 Jan 2016 11:00	08 Jan 2016 11:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	08 Jan 2016 14:00	08 Jan 2016 19:00	6	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	10 Jan 2016 11:00	10 Jan 2016 11:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	12 Jan 2016 07:00	12 Jan 2016 12:00	6	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	12 Jan 2016 13:00	12 Jan 2016 13:00	1	Maintenance - frost removal
Wind Speed, Wind Direction	13 Jan 2016 05:00	13 Jan 2016 05:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 20:00	16 Jan 2016 21:00	2	Flat line in sensor output signal - sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Firebag - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 82 ppb on Jan 17 03:00 Maximum Daily Average: 8.8 ppb on Jan 17

Minimum Value: 0 ppb on Jan 14 11:00 Minimum Daily Average: 0.1 ppb on Jan 14

Maximum Diurnal Average: 4.0 ppb at hour 3 Minimum Diurnal Average: 0.9 ppb at hour 19

Monthly Average: 1.7 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 4$ $P_{99} = 17$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	5	7	6	7	6	4	7	10	7	6	6	2	1	0	0	0	0	0	1	1	1	1	0	3.4	10
2-Jan	0	Z	1	2	3	5	8	11	9	14	7	6	14	10	8	6	1	0	1	1	0	0	1	1	4.8	14
3-Jan	0	0	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	3	4	7	5	3	1.6	7
4-Jan	2	1	1	Z	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	11	23	12	7	7	3.2	23
5-Jan	6	6	3	1	Z	8	18	17	4	2	2	3	10	7	3	2	1	1	1	1	1	1	0	0	4.3	18
6-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1
8-Jan	1	Z	1	1	2	2	2	1	0	0	0	1	1	1	1	0	0	1	1	1	0	1	6	5	1.3	6
9-Jan	2	1	Z	1	2	2	0	0	0	1	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1.4	3
10-Jan	1	1	1	Z	1	1	1	1	1	1	1	3	6	4	2	1	0	0	0	0	0	0	0	0	1.2	6
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4	6	2	0	0	0.8	6
12-Jan	Z	0	0	0	0	0	1	1	1	1	2	C	C	C	C	C	1	1	1	1	1	1	1	1	0.7	2
13-Jan	1	Z	2	1	1	0	1	1	1	0	0	0	1	7	0	0	3	2	1	1	0	0	0	0	1.0	7
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Jan	0	0	0	0	Z	2	1	0	1	1	0	0	0	0	0	1	1	1	1	0	0	1	2	1	0.6	2
17-Jan	1	30	82	42	22	Z	4	1	1	1	1	6	3	1	1	1	1	0	0	0	1	1	1	1	8.8	82
18-Jan	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Jan	0	Z	0	0	0	0	1	1	2	2	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0.7	2
20-Jan	0	0	Z	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
21-Jan	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1.0	2
22-Jan	1	1	1	2	Z	4	5	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	5
23-Jan	1	1	1	1	1	Z	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
24-Jan	Z	1	1	4	3	3	5	3	1	1	0	3	6	9	10	13	6	2	3	2	0	0	0	0	3.3	13
25-Jan	0	Z	0	0	0	0	0	0	0	1	4	4	2	1	0	0	0	0	0	0	0	0	1	2	0.8	4
26-Jan	5	9	Z	11	11	9	11	8	10	4	1	3	5	2	2	1	0	2	5	4	3	2	0	0	4.8	11
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
28-Jan	0	0	0	0	Z	0	0	0	1	1	1	1	1	3	13	16	16	7	2	1	5	1	1	0	3.0	16
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	Z	0	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
31-Jan	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
	0.9	2.4	4.0	2.9	2.3	1.8	2.2	2.0	1.6	1.5	1.2	1.6	2.0	1.8	1.7	1.7	1.3	0.9	0.9	1.2	1.6	1.1	1.0	0.9	Diurnal Average	
	6	30	82	42	22	9	18	17	10	14	7	6	14	10	13	16	16	7	5	11	23	12	7	7	Diurnal Maximum	

Z - zerospan C - Calibration

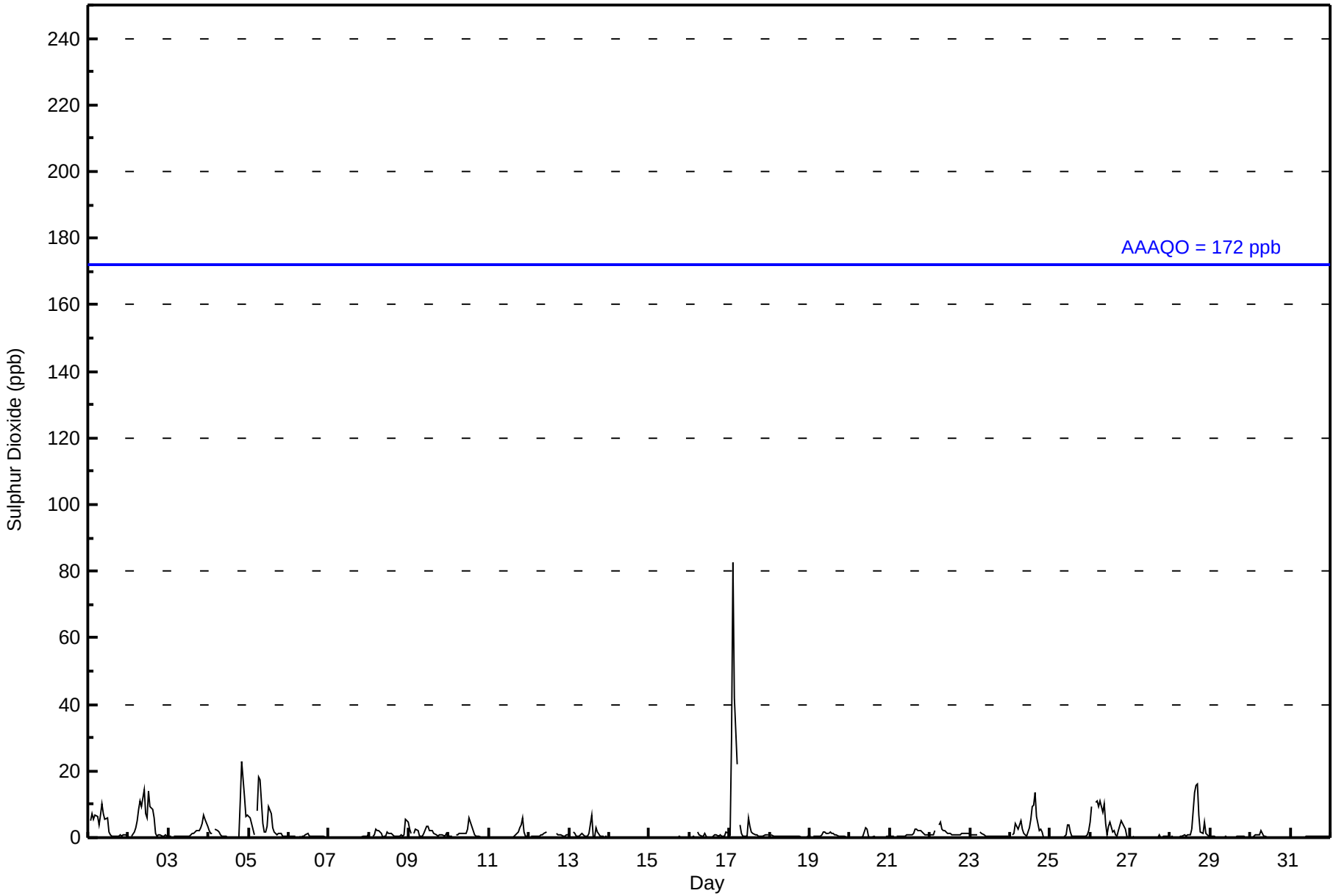
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	689	97.32	97.32
11 - 20	14	1.98	99.29
21 - 60	4	0.56	99.86
61 - 110	1	0.14	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 (SO_2) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	77	67	32	19	5	15	22	43	77	94	61	53	32	20	17	37	671
11 - 20	0	0	0	0	0	0	0	0	0	3	7	2	1	1	0	0	14
21 - 60	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	4
61 - 110	0	0	0	0	0	0	0	0	0	0	1	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	77	67	32	19	5	15	22	43	77	98	71	56	33	21	17	37	690

Total Number of Valid Hours: 690

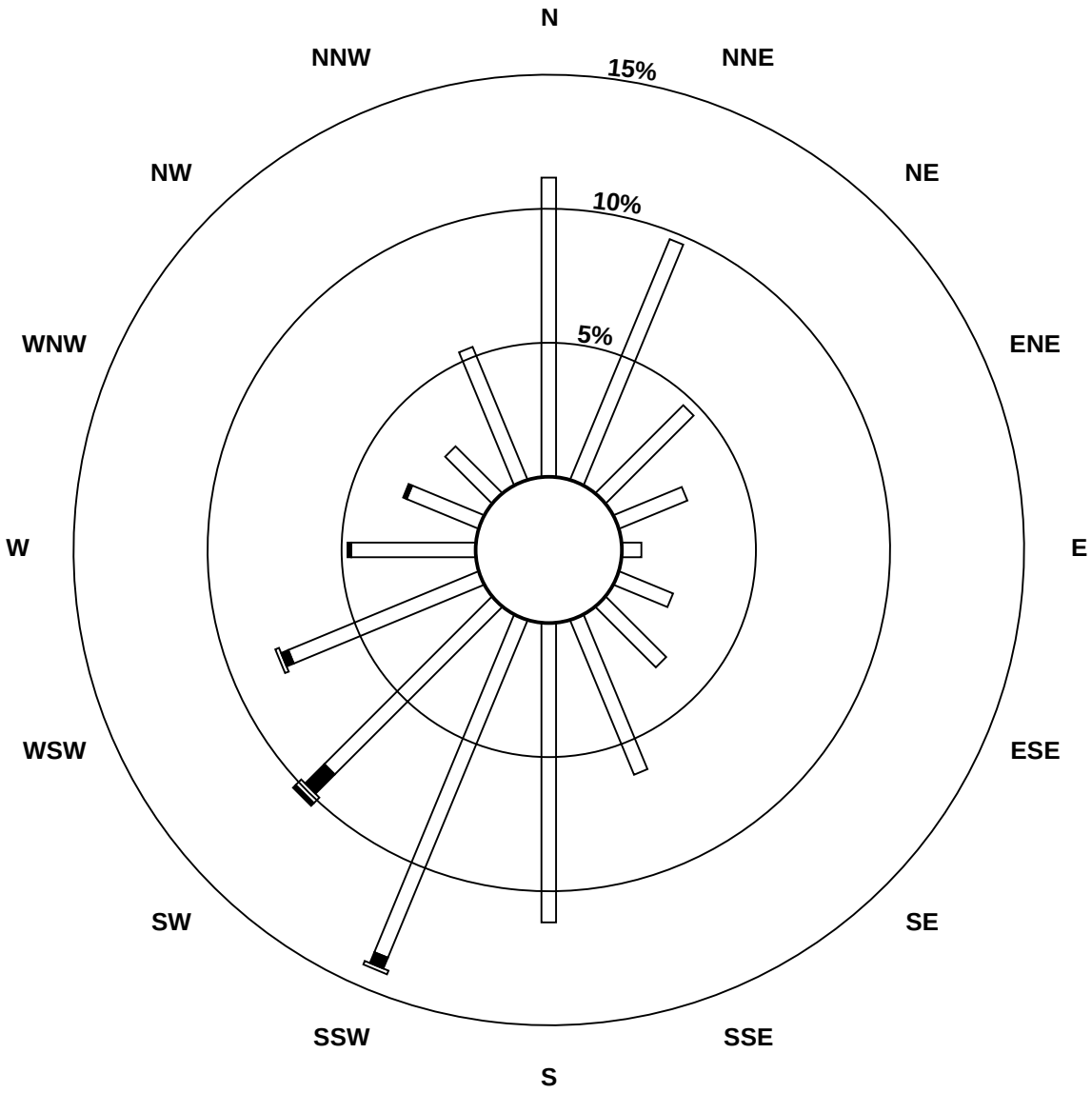
Total Number of Hours: 744

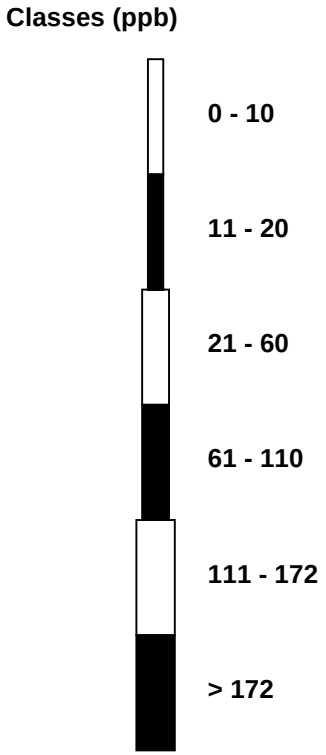
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Firebag (AMS 19)





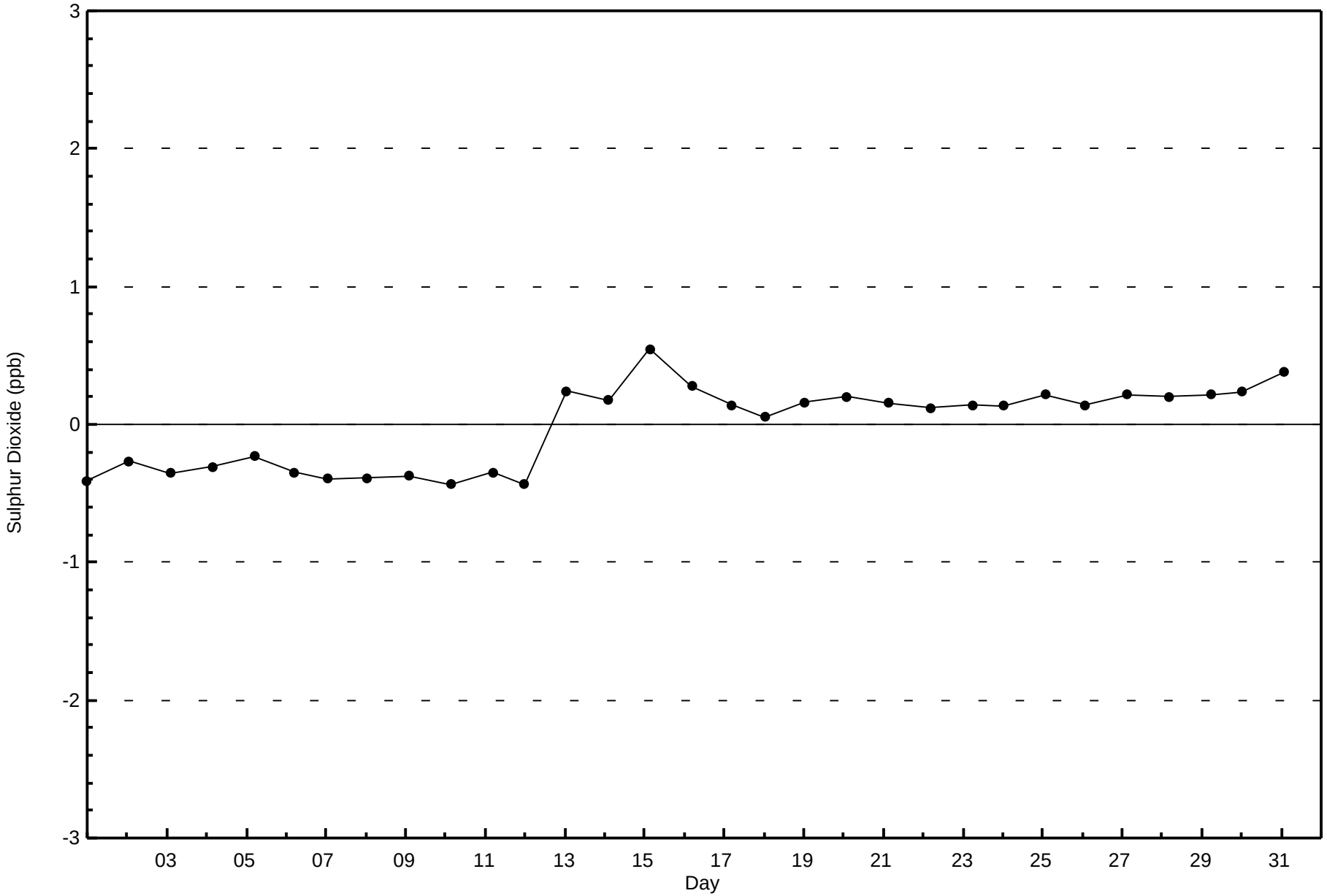
Total Number of Valid Hours: 690

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Firebag - January 2016

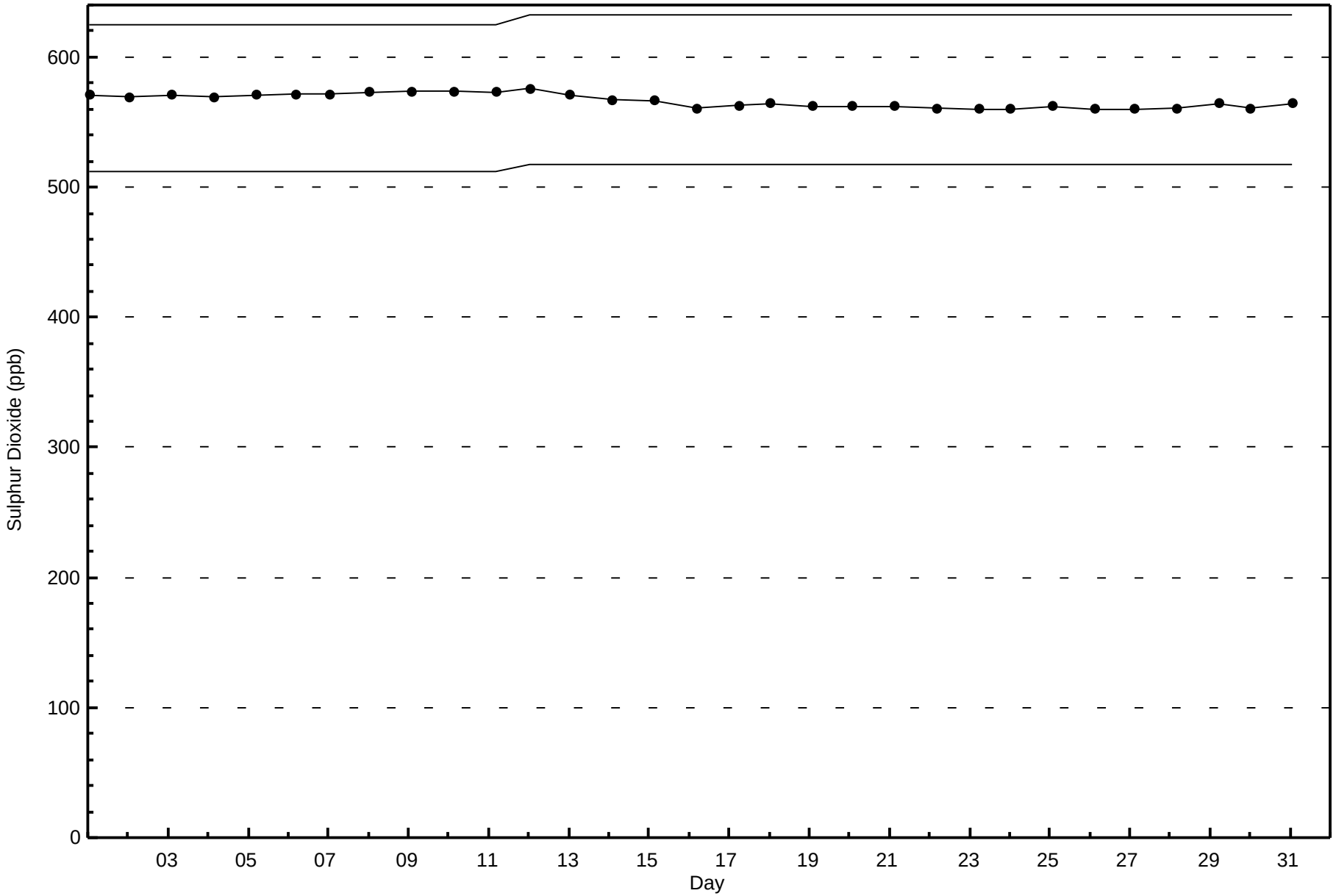


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Firebag - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Jan 17 03:00 Maximum Daily Average: 0.5 ppb on Jan 24

Minimum Value: 0 ppb on Jan 27 01:00 Minimum Daily Average: 0.1 ppb on Jan 27

Maximum Diurnal Average: 0.3 ppb at hour 3 Minimum Diurnal Average: 0.2 ppb at hour 1

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 in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	35
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
5-Jan	0	1	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
6-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Jan	0	Z	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
14-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
16-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
17-Jan	0	0	2	2	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
18-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Jan	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	1	0	0	0	0	0.5	2
25-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Jan	0	1	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.2	1
27-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	0	1	2	2	1	1	1	1	0	0	1	1	0	1	1	2	1	1	1	1	1	1	1	0	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

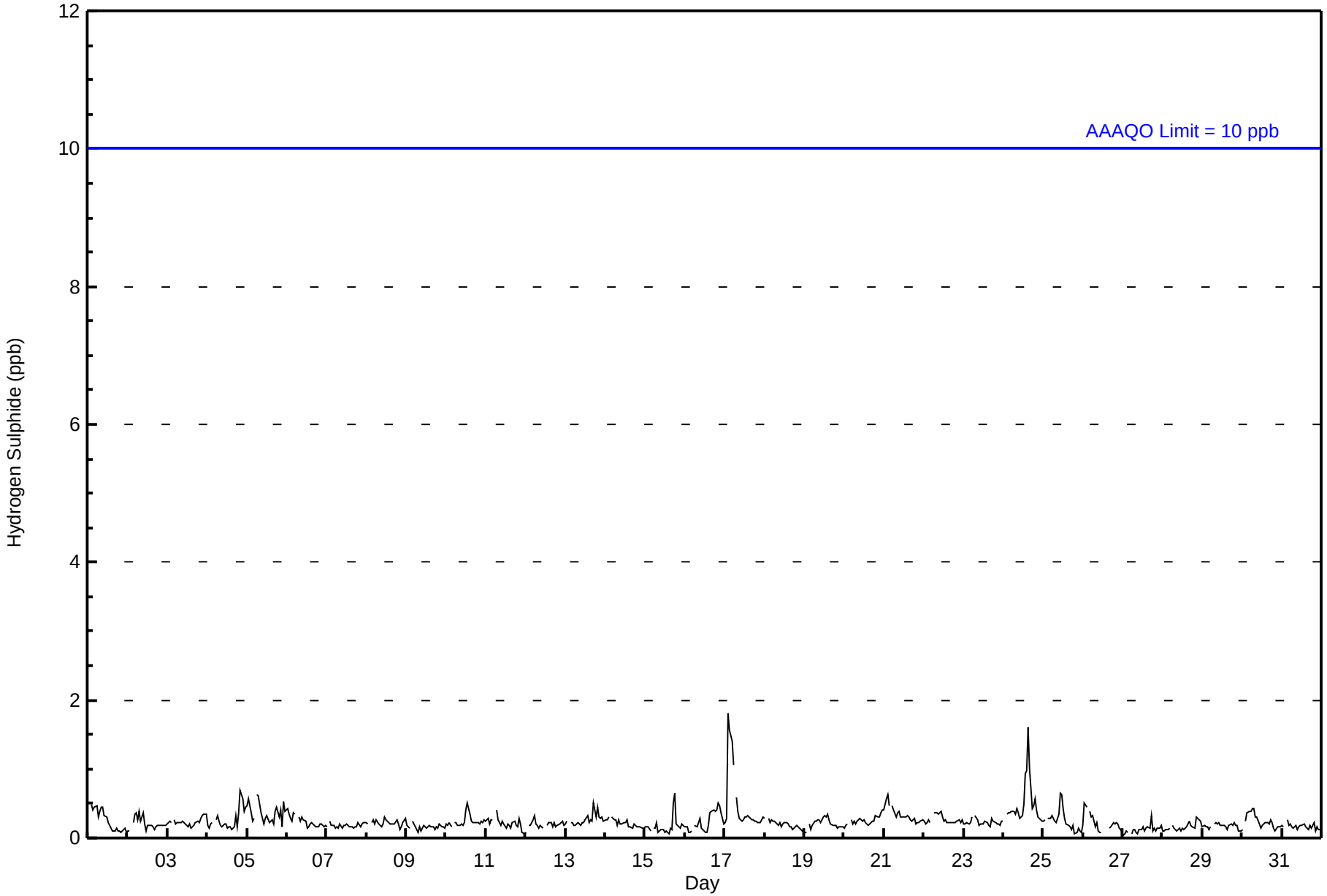
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	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: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	76	68	30	19	5	16	21	42	79	96	70	55	35	21	17	38	688
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	76	68	30	19	5	16	21	42	79	96	70	55	35	21	17	38	688

Total Number of Valid Hours: 688

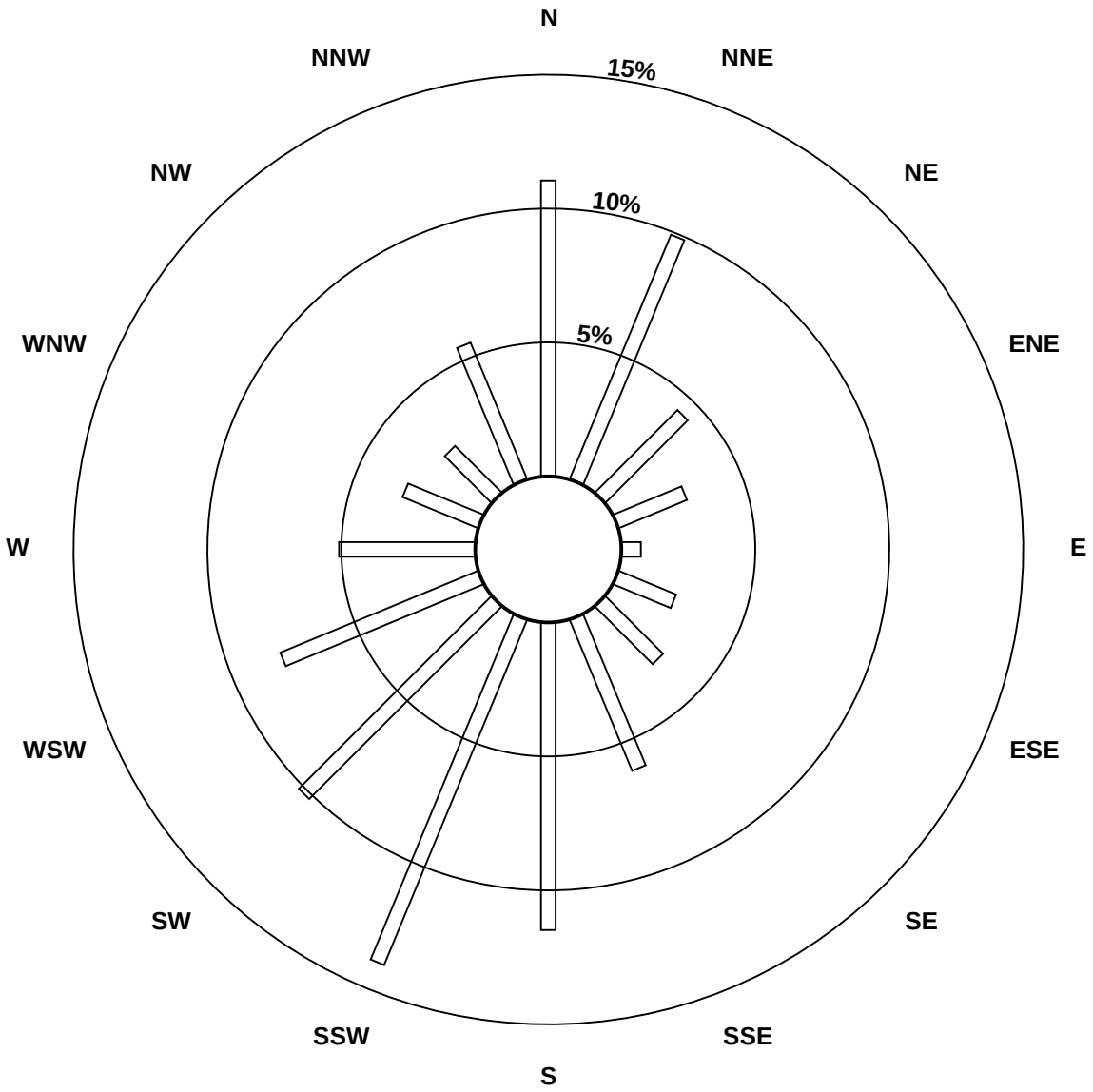
Total Number of Hours: 744

Wood Buffalo Environmental Association

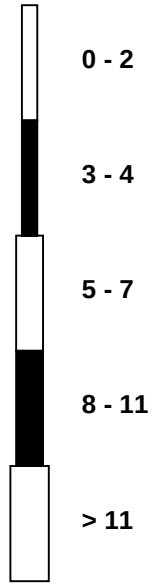
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Firebag (AMS 19)



Classes (ppb)



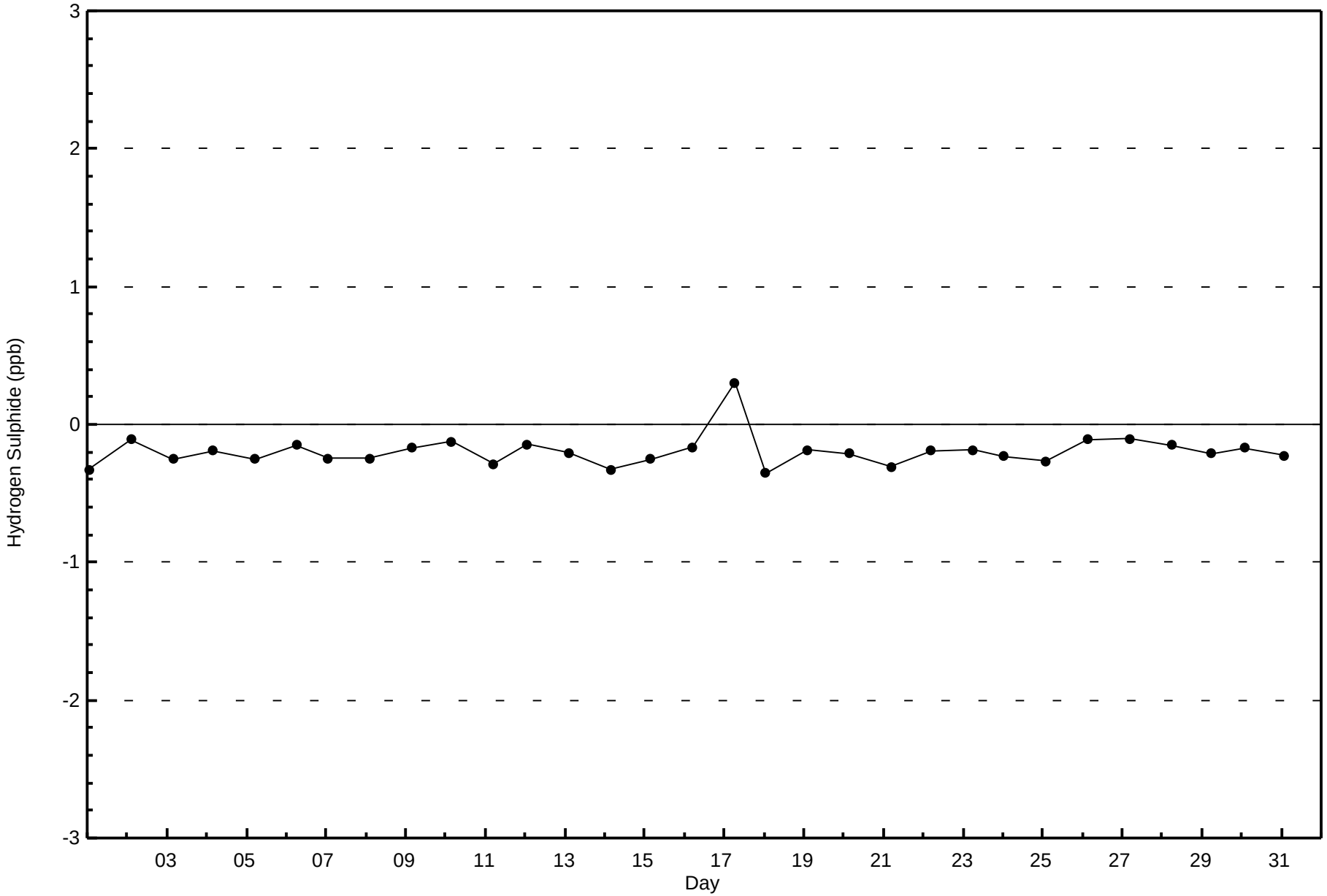
Total Number of Valid Hours: 688

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Firebag - January 2016

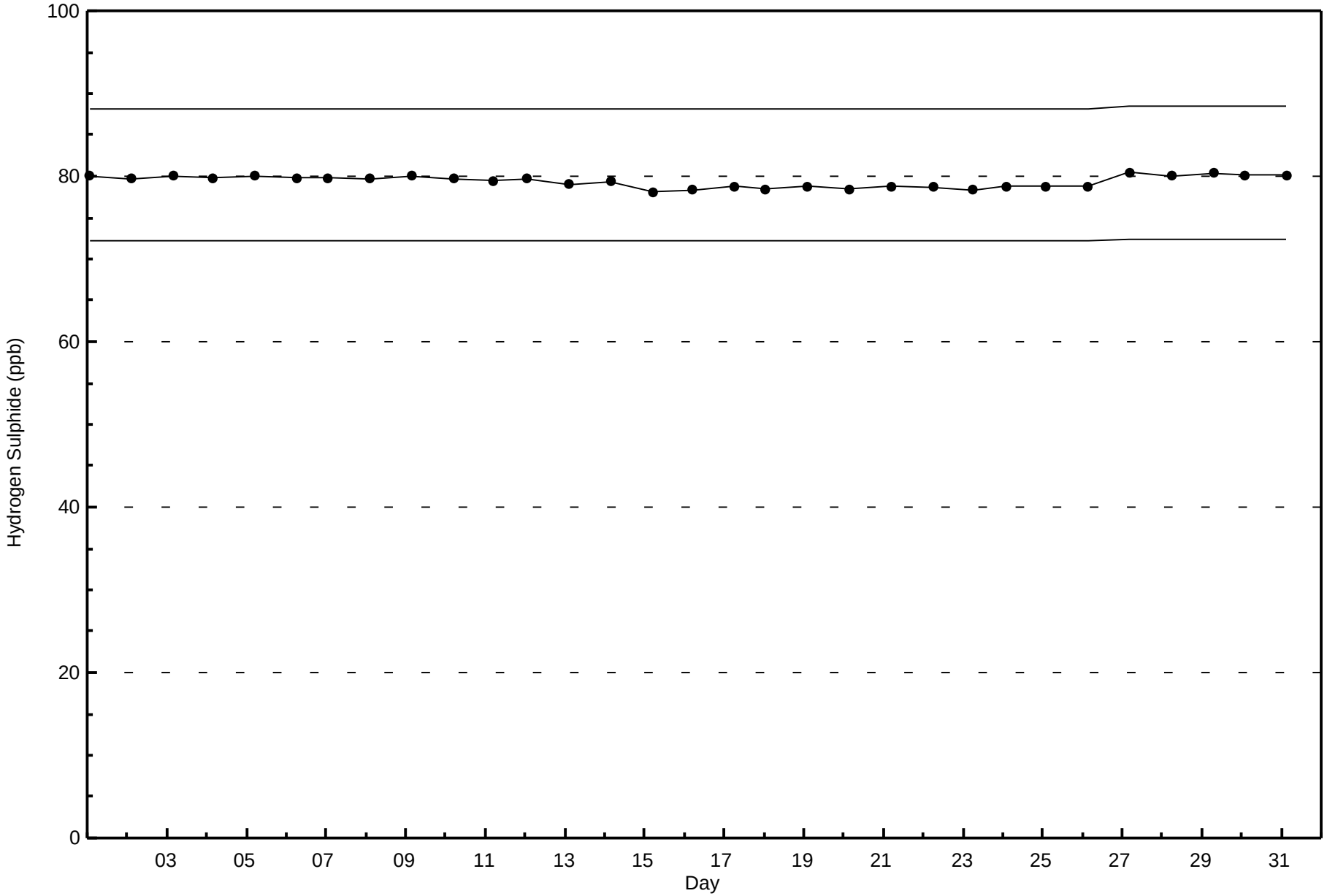


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Firebag - January 2016

Maximum Value: 2.7 ppm on Jan 22 09:00

Maximum Daily Average: 2.5 ppm on Jan 22

Minimum Value: 1.9 ppm on Jan 7 10:00

Minimum Daily Average: 2.0 ppm on Jan 7

Maximum Diurnal Average: 2.2 ppm at hour 20

Minimum Diurnal Average: 2.2 ppm at hour 12

Monthly Average: 2.17 ppm

Percentiles: P_1 = 1.9 P_{10} = 2.0 Q_1 = 2.0 Median = 2.2 Q_3 = 2.2 P_{90} = 2.4 P_{99} = 2.6

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

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

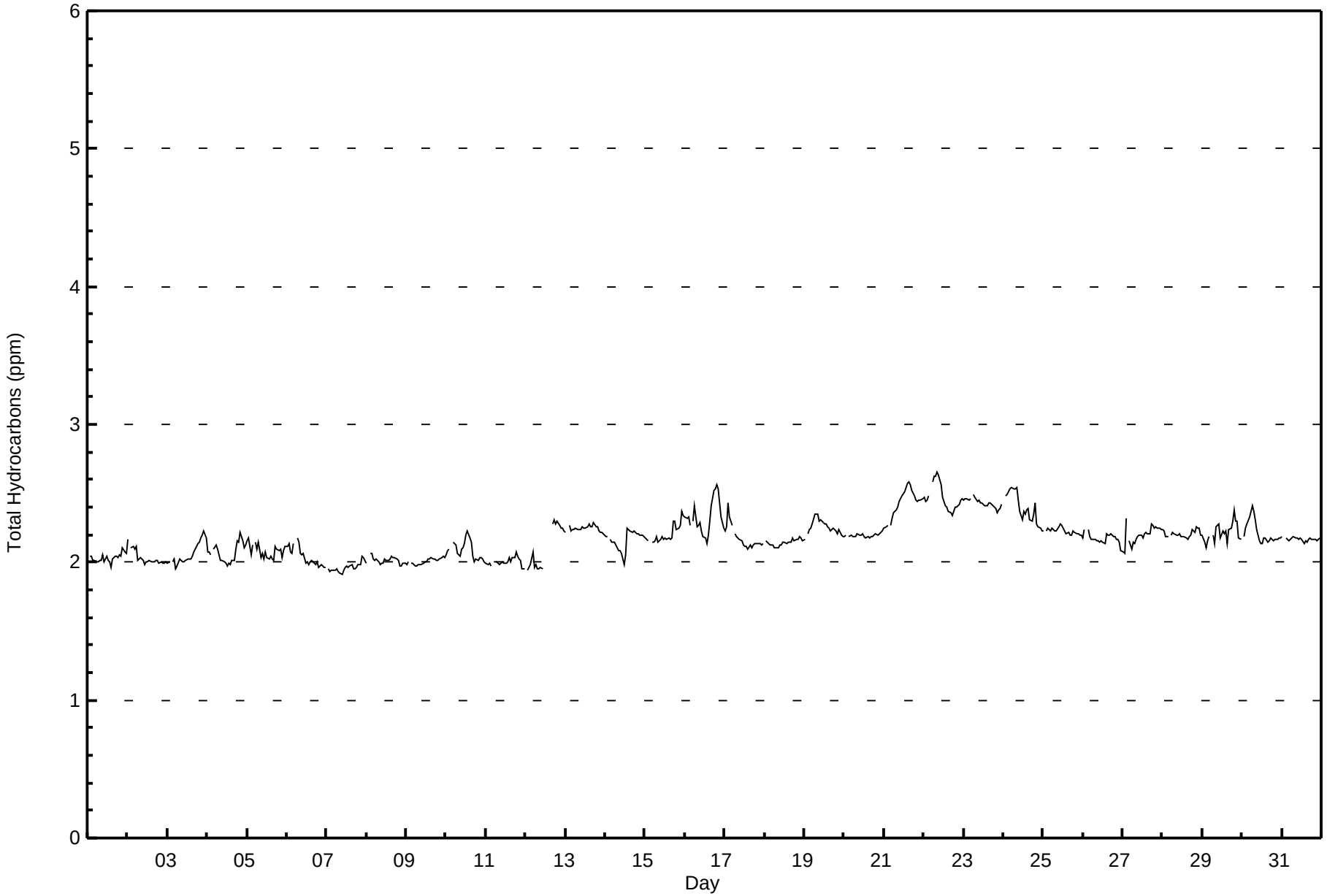
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Firebag - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Firebag - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	189	26.69	26.69
2.1 - 3.0	519	73.31	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Firebag - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	15	21	4	4	0	0	1	0	6	49	23	11	10	2	9	20	175
2.1 - 3.0	62	46	28	15	5	15	21	43	71	49	48	45	23	19	8	17	515
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	77	67	32	19	5	15	22	43	77	98	71	56	33	21	17	37	690

Total Number of Valid Hours: 690

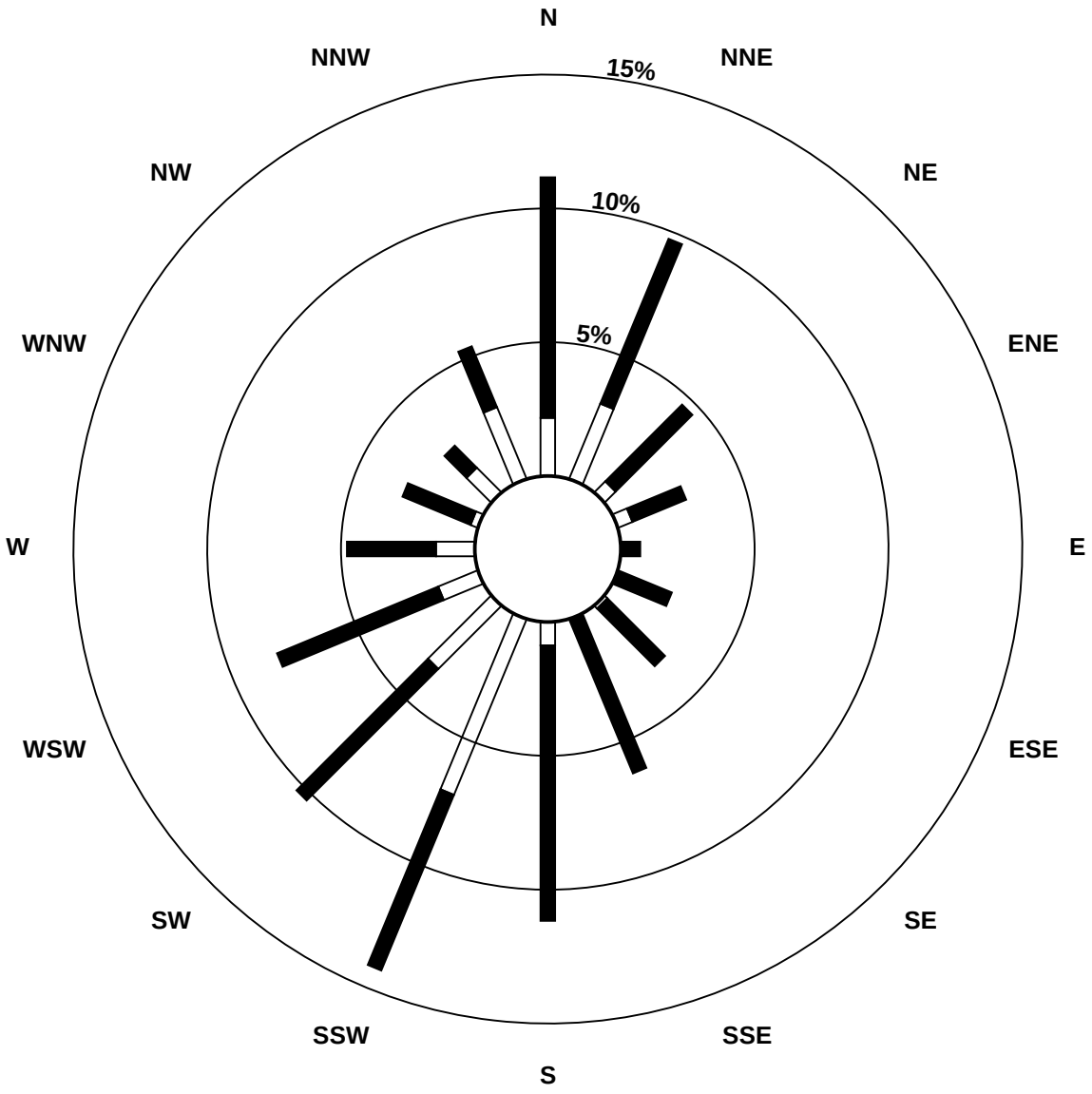
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Firebag (AMS 19)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

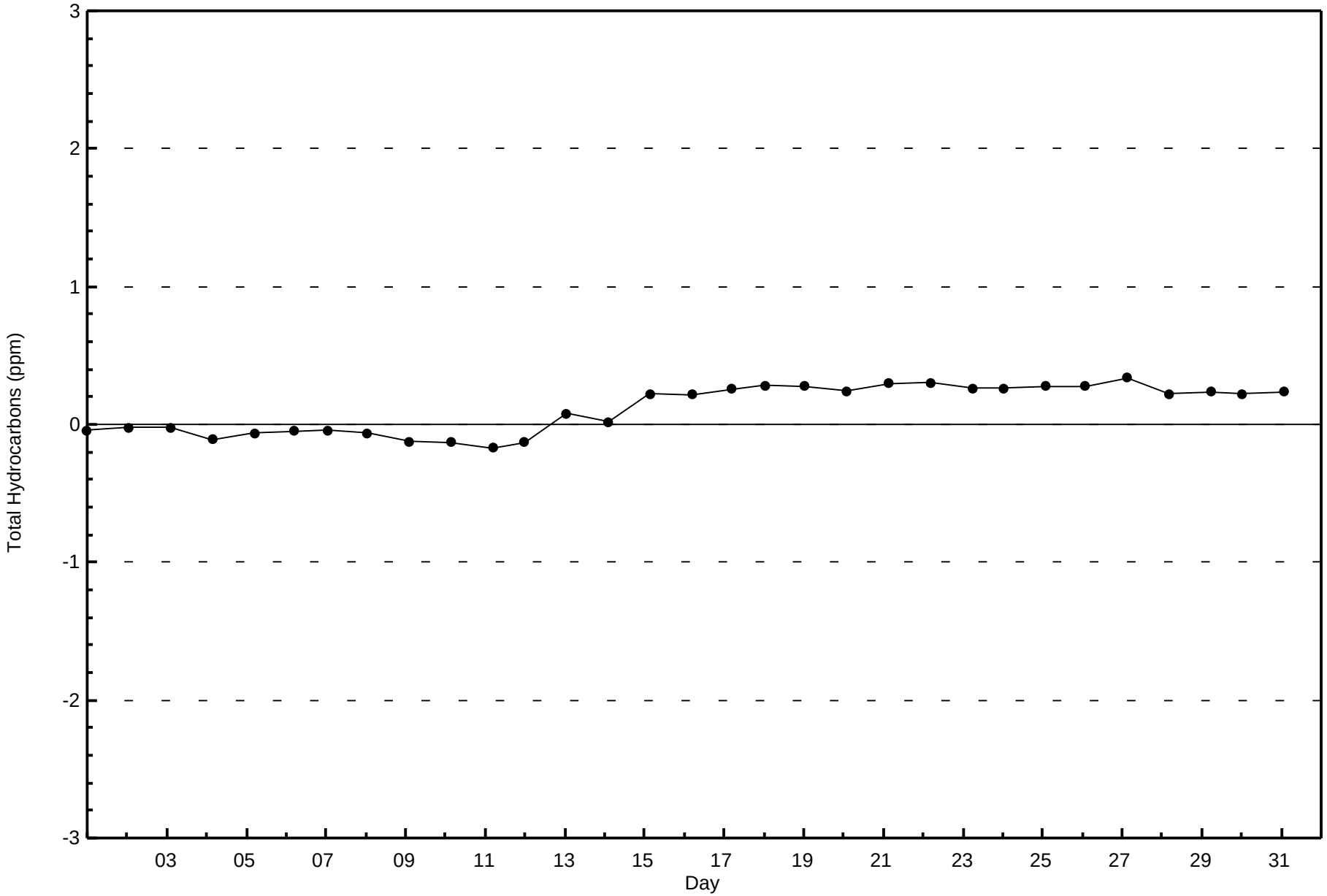
Total Number of Valid Hours: 690

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Firebag - January 2016

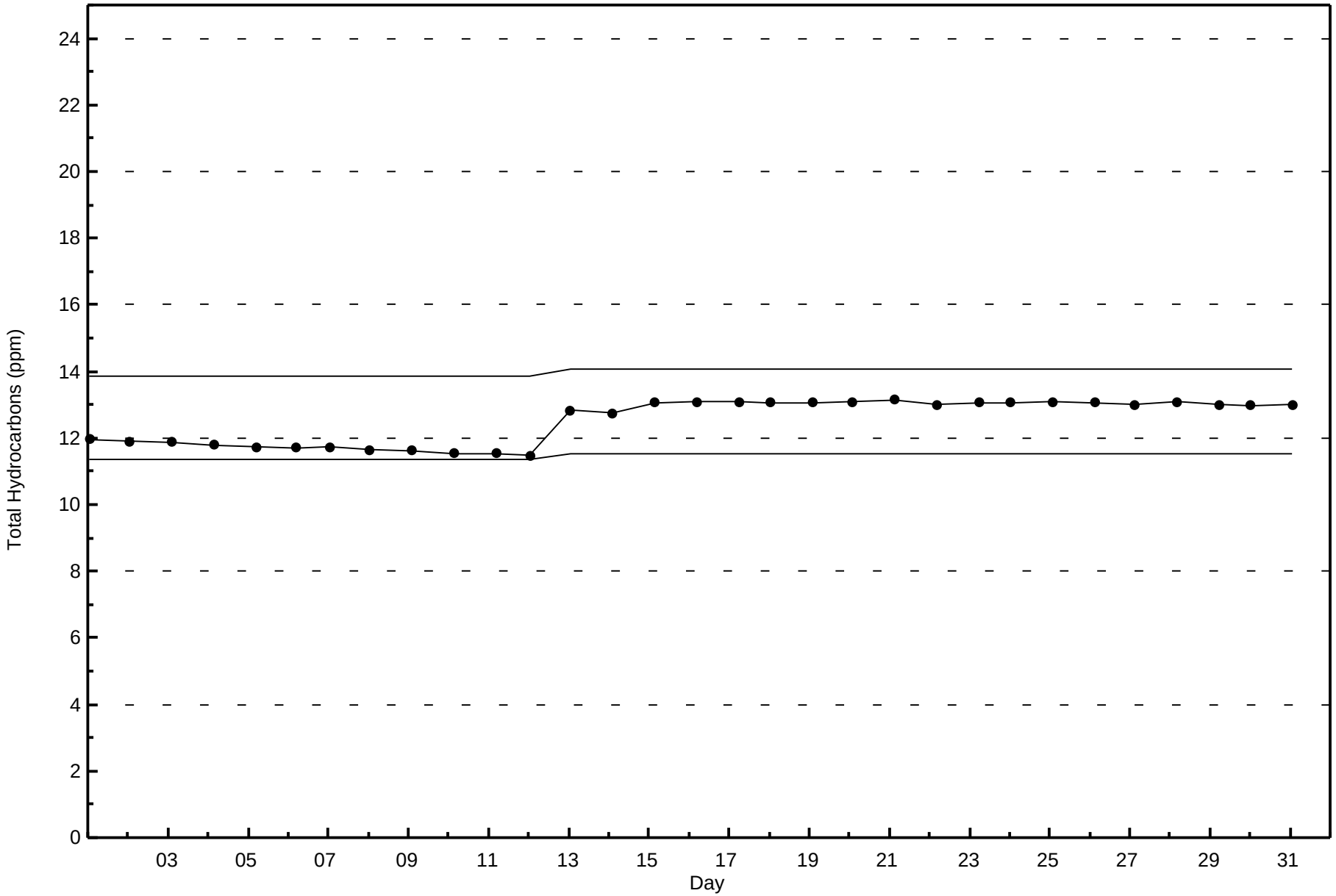


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Firebag - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Firebag - January 2016

Maximum Value: 34 ppb on Jan 17 03:00

Maximum Daily Average: 4.5 ppb on Jan 17

Minimum Value: 0 ppb on Jan 6 19:00

Minimum Daily Average: 0.0 ppb on Jan 31

Maximum Diurnal Average: 1.9 ppb at hour 3

Minimum Diurnal Average: 0.5 ppb at hour 1

Monthly Average: 1.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 3$ $P_{99} = 10$

Hours in Service:	744
Hours of Data:	674
Hours of Missing Data:	70
Hours of Calibration:	35
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.2	2
2-Jan	0	Z	0	0	0	0	0	0	0	2	2	2	2	2	1	0	0	1	0	0	0	0	0	0	0.6	2
3-Jan	0	1	Z	2	2	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	2	2	3	0.7	3
4-Jan	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0.7	10
5-Jan	0	3	1	0	Z	0	0	0	0	0	1	2	3	2	1	1	2	12	3	3	1	1	4	0	1.7	12
6-Jan	2	2	1	0	4	Z	4	3	3	6	7	2	1	1	1	1	0	0	0	0	0	0	0	0	1.6	7
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Jan	0	Z	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	2	6	1	0	0	1	3	1.0	6
9-Jan	1	0	Z	2	1	0	0	0	1	1	3	2	2	3	3	2	2	1	0	0	0	0	0	0	1.1	3
10-Jan	1	2	2	Z	0	2	3	0	0	1	1	2	5	7	3	1	0	0	0	0	0	0	0	0	1.3	7
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.1	1
12-Jan	Z	0	3	3	7	10	3	3	3	4	3	M	M	1	1	0	0	1	1	1	0	1	1	1	2.3	10
13-Jan	1	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1
14-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
15-Jan	0	0	0	Z	0	0	0	1	0	1	0	0	0	1	2	1	1	1	1	1	0	1	2	1	0.7	2
16-Jan	1	1	0	0	Z	0	0	1	1	7	2	0	0	0	2	3	2	2	3	6	20	17	7	2	3.4	20
17-Jan	1	6	34	17	6	Z	7	2	1	1	1	3	3	5	5	2	2	2	2	1	1	1	1	2	4.5	34
18-Jan	Z	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0.8	2
19-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.3	2
20-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	1	2	3	2	2	1	0.8	3
21-Jan	1	0	4	Z	4	7	7	1	9	7	2	6	5	5	4	4	3	1	1	1	2	2	2	0	3.4	9
22-Jan	0	0	0	0	Z	0	0	0	1	2	4	3	2	1	1	1	0	0	0	0	1	1	1	1	0.8	4
23-Jan	0	0	0	0	0	Z	0	1	1	1	2	3	1	1	1	1	1	5	2	3	0	0	0	0	0.9	5
24-Jan	Z	0	0	0	1	0	0	0	0	1	1	1	4	5	6	4	1	0	0	0	0	0	0	0	1.0	6
25-Jan	0	Z	0	0	0	2	1	0	0	2	4	4	2	1	1	1	0	0	1	0	0	0	0	0	0.9	4
26-Jan	0	0	Z	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	2	0.5	2
28-Jan	2	0	1	0	Z	4	3	1	0	1	2	1	0	0	1	2	0	0	0	0	0	0	0	0	0.9	4
29-Jan	0	0	0	0	0	Z	0	0	0	1	2	2	3	2	2	1	0	0	0	0	0	0	0	0	0.6	3
30-Jan	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
	0.5	0.7	1.9	1.1	1.1	1.1	1.1	0.5	0.8	1.4	1.4	1.5	1.5	1.5	1.4	1.0	0.6	1.3	0.8	0.7	1.0	1.1	0.8	0.6	Diurnal Average	
	2	6	34	17	7	10	7	3	9	7	7	6	5	7	6	4	3	12	6	6	20	17	7	3	Diurnal Maximum	

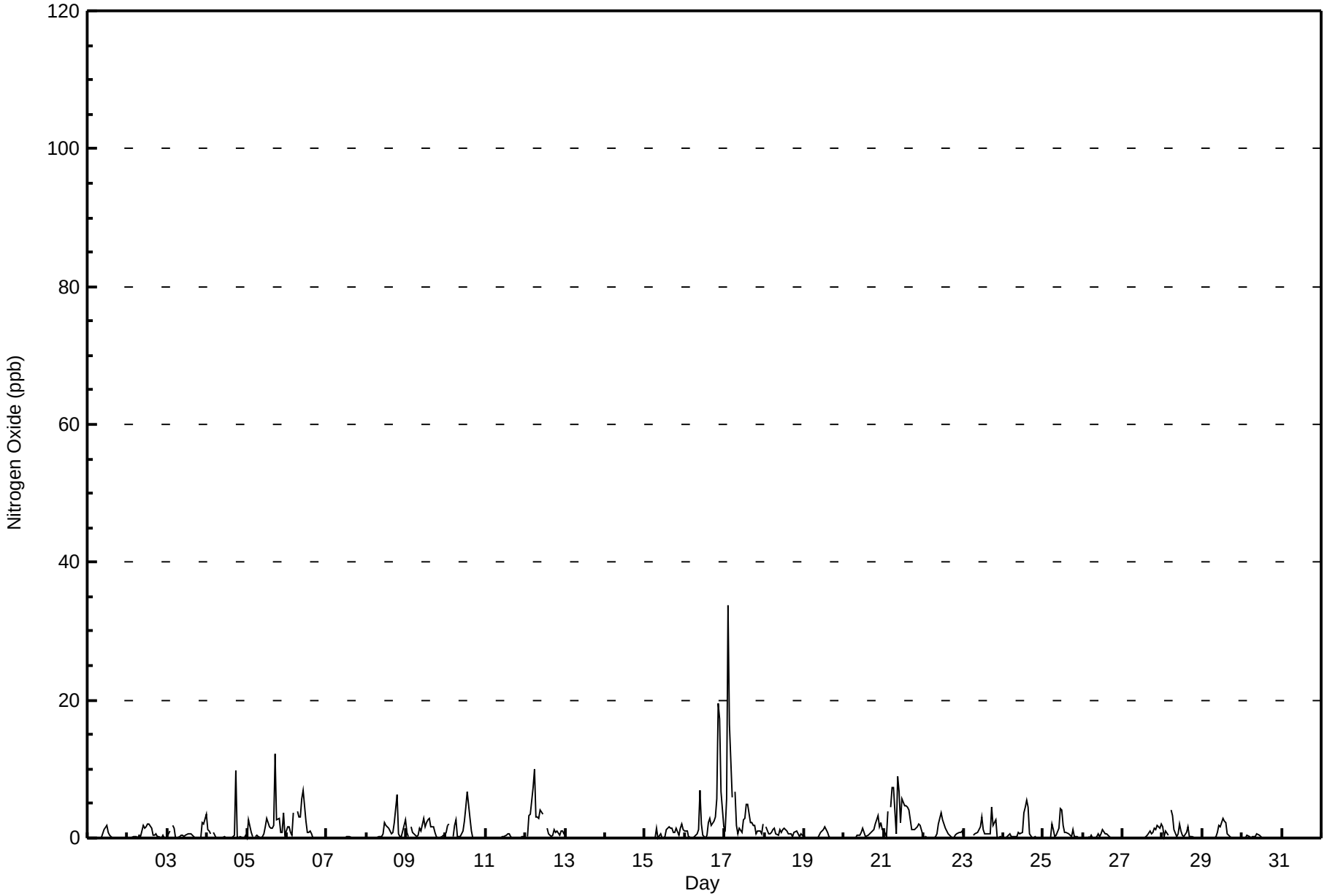
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	673	99.85	99.85
21 - 40	1	0.15	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: 674

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	71	58	31	16	2	7	16	43	77	100	71	56	33	21	17	37	656
21 - 40	0	0	0	0	0	0	0	0	0	0	1	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	71	58	31	16	2	7	16	43	77	100	72	56	33	21	17	37	657

Total Number of Valid Hours: 657

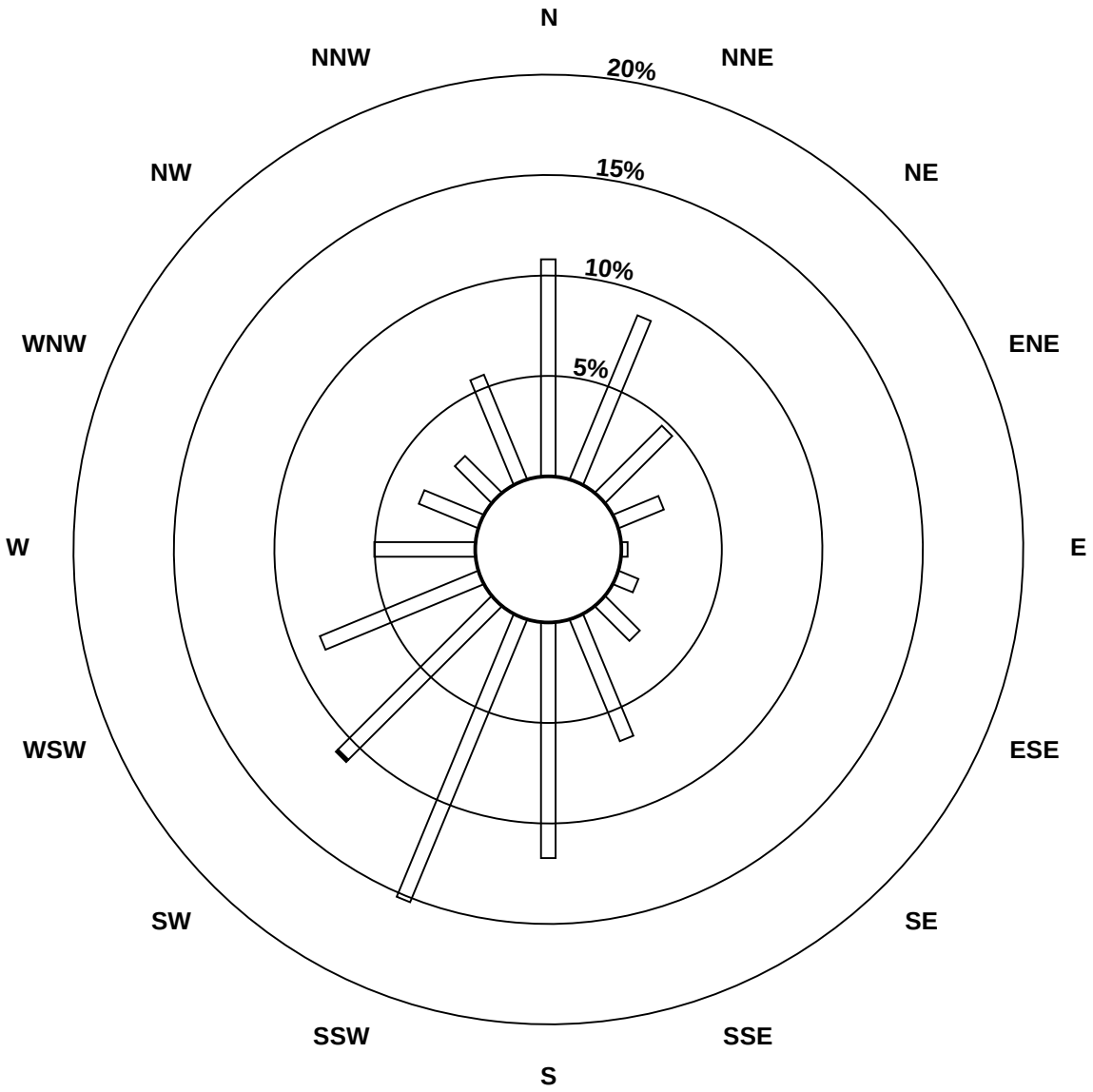
Total Number of Hours: 744

Wood Buffalo Environmental Association

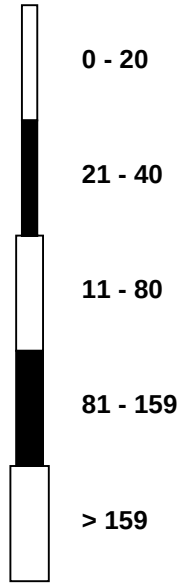
Wind Rose Jan 2016

Nitrogen Oxide (NO) - ppb

Firebag (AMS 19)



Classes (ppb)



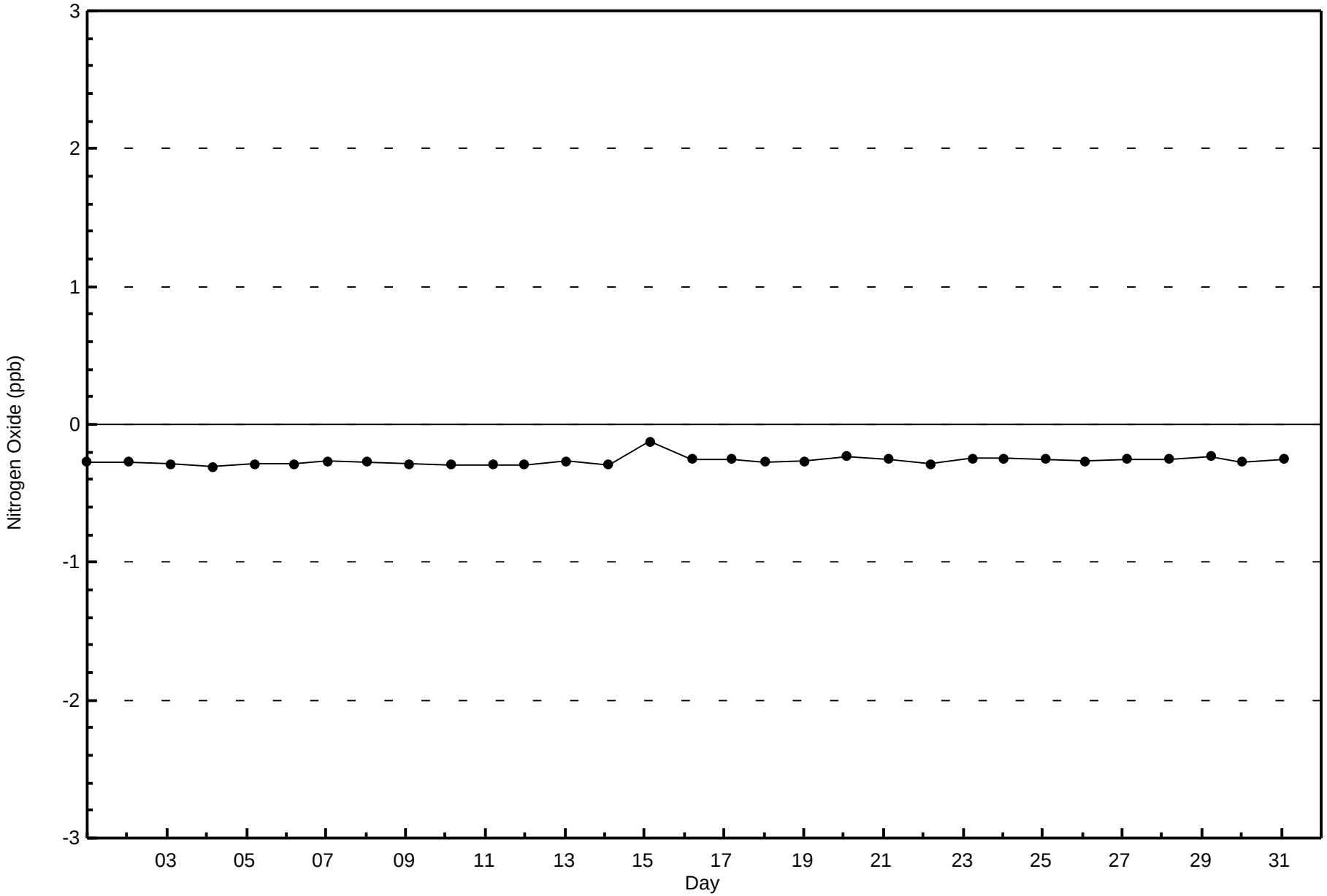
Total Number of Valid Hours: 657

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Firebag - January 2016

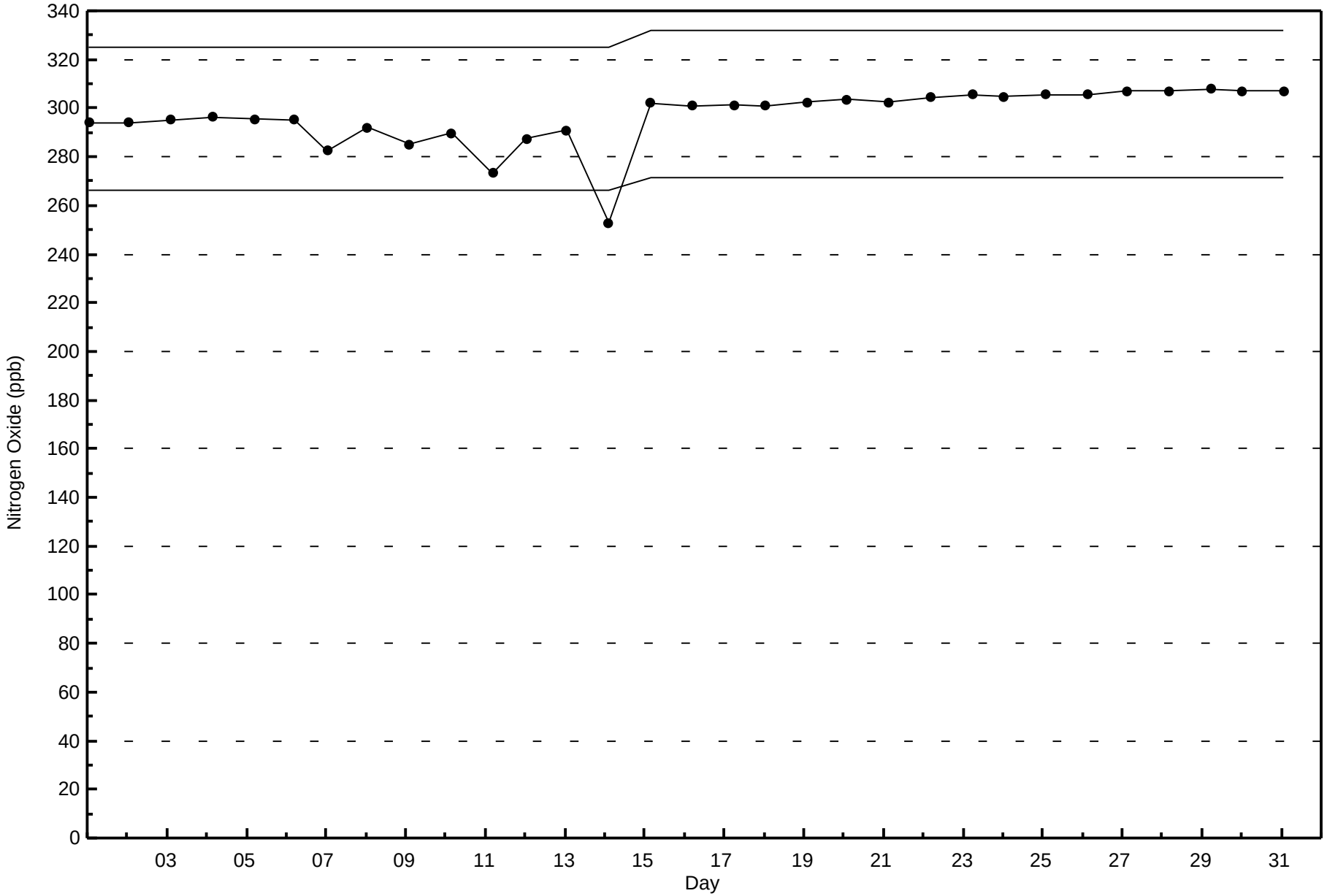


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Firebag - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 35 ppb on Jan 16 22:00

Maximum Daily Average: 15.4 ppb on Jan 16

Minimum Value: 0 ppb on Jan 7 04:00

Minimum Daily Average: 0.2 ppb on Jan 31

Maximum Diurnal Average: 7.5 ppb at hour 7

Minimum Diurnal Average: 3.6 ppb at hour 13

Monthly Average: 5.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 2$ Median = 4 $Q_3 = 7$ $P_{90} = 12$ $P_{99} = 28$

Hours in Service:	744
Hours of Data:	674
Hours of Missing Data:	70
Hours of Calibration:	35
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	6	9	8	9	8	6	6	12	12	8	7	3	2	1	3	3	3	4	3	2	4	4	2	5.3	12
2-Jan	5	Z	5	8	8	12	9	11	11	14	7	4	6	7	7	4	4	3	3	4	2	4	2	3	6.2	14
3-Jan	2	6	Z	8	8	2	2	2	3	2	2	2	2	3	4	4	5	7	7	9	10	19	21	14	6.2	21
4-Jan	10	7	6	Z	6	5	6	5	3	2	1	1	1	1	1	1	4	29	7	12	24	18	10	15	7.4	29
5-Jan	10	24	13	10	Z	10	18	16	5	4	5	6	8	6	8	11	13	27	17	17	9	9	17	12	12.0	27
6-Jan	16	20	18	12	18	Z	22	19	13	20	16	7	3	3	4	6	5	2	1	1	1	1	1	0	9.0	22
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	3	3	3	2	4	6	5	4	1.6	6
8-Jan	6	Z	6	7	6	5	5	3	2	2	3	7	5	4	4	6	12	9	15	4	2	2	5	7	5.3	15
9-Jan	4	3	Z	5	4	4	2	3	6	4	6	4	4	6	7	7	8	6	5	4	4	4	6	5	4.8	8
10-Jan	6	9	9	Z	7	10	11	7	6	7	6	8	9	10	7	5	1	1	1	1	1	1	1	1	5.4	11
11-Jan	0	0	0	0	Z	0	3	1	1	1	2	1	2	3	4	3	3	3	5	4	7	12	4	2	2.7	12
12-Jan	Z	1	8	11	15	18	8	7	7	9	8	M	M	4	3	4	5	5	4	5	4	5	5	4	6.6	18
13-Jan	6	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	6
14-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
15-Jan	0	0	0	Z	0	0	0	4	0	1	0	0	0	2	2	2	4	4	8	13	8	9	15	9	3.6	15
16-Jan	17	18	6	10	Z	10	9	17	19	17	5	1	0	1	6	11	19	28	27	27	31	35	28	13	15.4	35
17-Jan	10	16	34	30	22	Z	16	8	8	6	3	6	6	9	12	8	7	6	6	3	3	3	3	6	10.0	34
18-Jan	Z	5	3	3	3	4	4	2	2	4	3	3	3	3	2	3	4	2	4	7	4	2	4	3	3.2	7
19-Jan	2	Z	2	2	3	6	10	11	7	4	3	2	3	2	2	2	2	1	1	1	1	1	0	0	3.0	11
20-Jan	0	0	Z	0	0	0	0	0	1	2	3	4	2	1	1	3	4	4	5	7	8	6	7	5	2.8	8
21-Jan	5	3	10	Z	10	14	12	4	13	9	4	7	6	8	8	10	10	8	7	5	6	6	6	4	7.6	14
22-Jan	3	4	4	7	Z	15	17	19	17	11	9	6	5	5	5	4	4	4	4	5	5	5	5	6	7.3	19
23-Jan	5	5	5	5	5	Z	6	6	6	6	5	6	4	3	3	4	5	10	6	7	2	1	1	2	4.5	10
24-Jan	Z	4	5	8	9	9	10	10	9	6	3	3	7	9	11	13	9	9	12	12	1	1	1	1	7.0	13
25-Jan	1	Z	1	1	2	6	4	2	3	5	8	7	3	2	3	3	3	3	5	2	2	2	2	4	3.1	8
26-Jan	6	11	Z	11	9	9	9	8	8	5	2	4	5	3	3	3	2	4	7	7	6	5	3	2	5.7	11
27-Jan	1	1	2	Z	3	1	2	1	1	1	1	1	1	1	1	1	2	3	3	5	4	5	4	4	2.0	5
28-Jan	4	1	4	2	Z	8	9	5	2	3	5	4	3	4	7	11	5	5	4	3	7	5	4	3	4.6	11
29-Jan	2	2	2	3	3	Z	6	3	8	7	6	4	6	6	6	4	9	10	10	12	8	9	2	1	5.5	12
30-Jan	Z	2	3	8	9	10	14	12	8	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3.4	14
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	5.1	6.2	6.2	6.5	6.6	6.5	7.5	6.6	6.2	5.8	4.3	3.7	3.6	3.7	4.2	4.7	5.2	6.5	6.0	6.1	5.5	6.0	5.5	4.4	Diurnal Average	
	17	24	34	30	22	18	22	19	19	20	16	8	9	10	12	13	19	29	27	27	31	35	28	15	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation

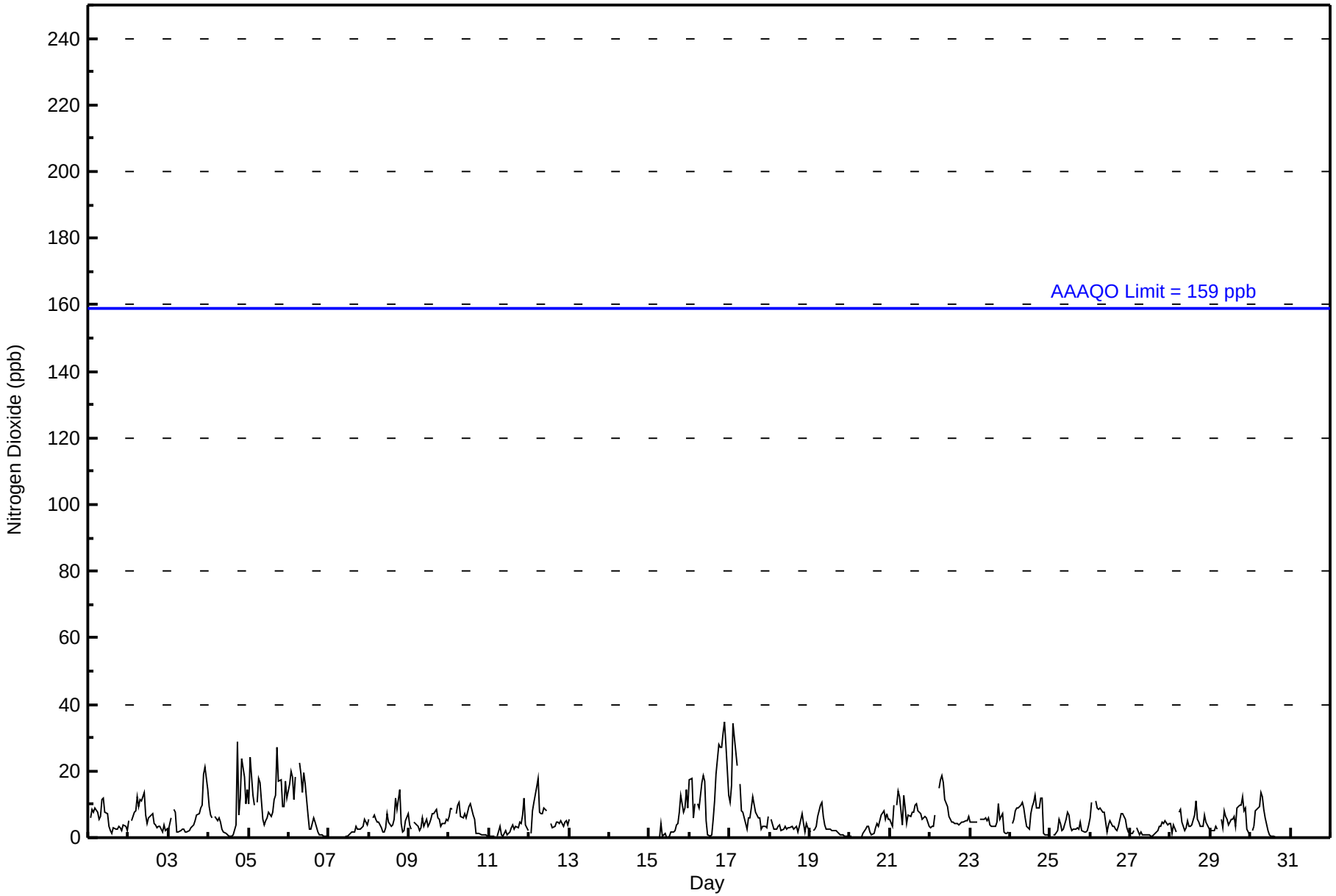
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	97.77	97.77
21 - 40	15	2.23	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: 674

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	71	58	31	16	2	6	14	43	77	99	68	52	32	21	17	37	644
21 - 40	0	0	0	0	0	1	2	0	0	1	4	4	1	0	0	0	13
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	71	58	31	16	2	7	16	43	77	100	72	56	33	21	17	37	657

Total Number of Valid Hours: 657

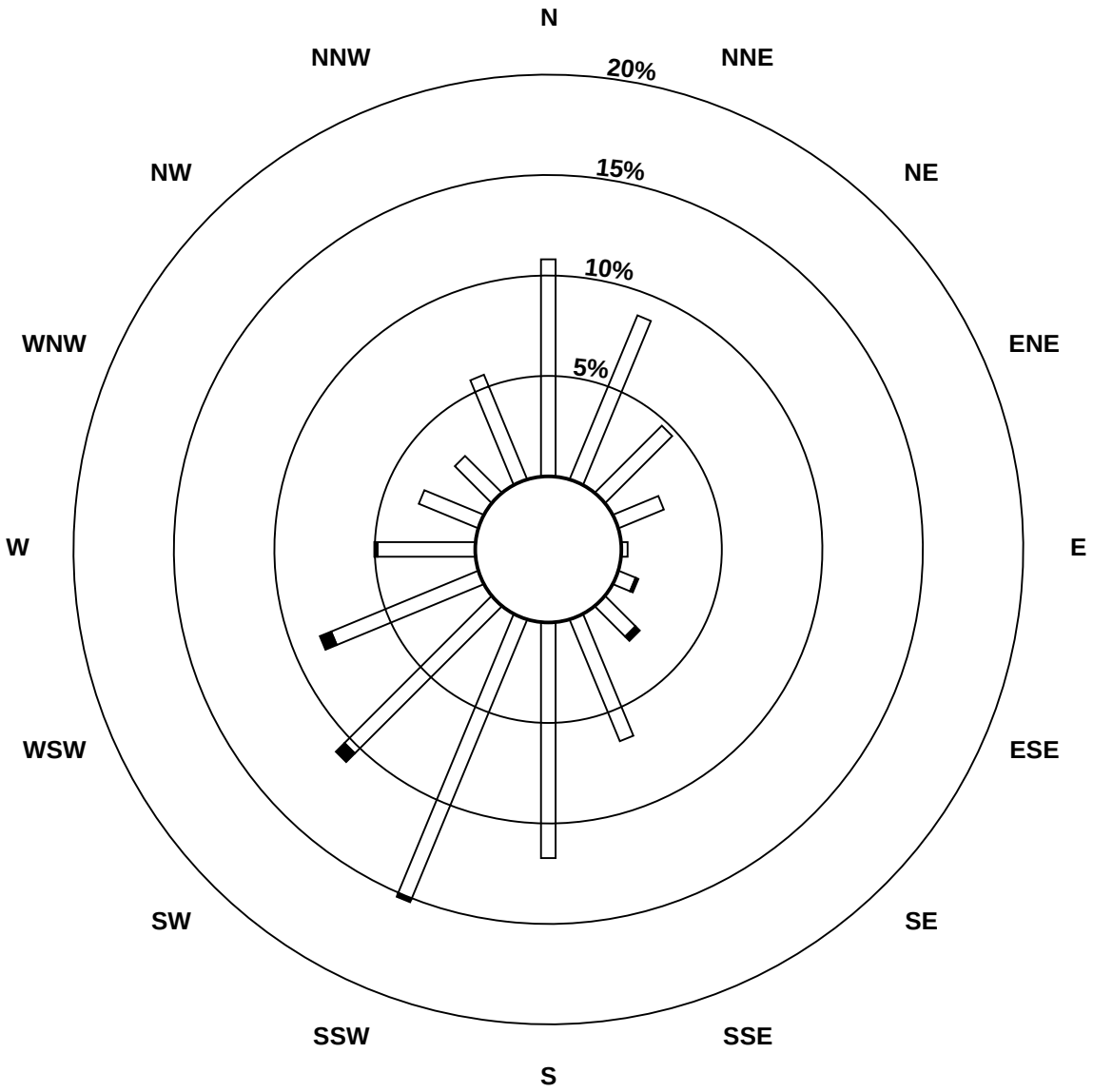
Total Number of Hours: 744

Wood Buffalo Environmental Association

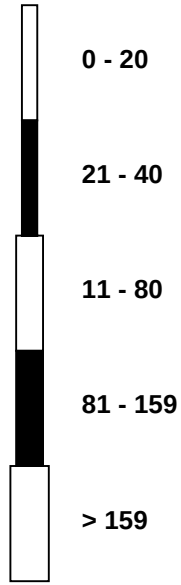
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Firebag (AMS 19)



Classes (ppb)



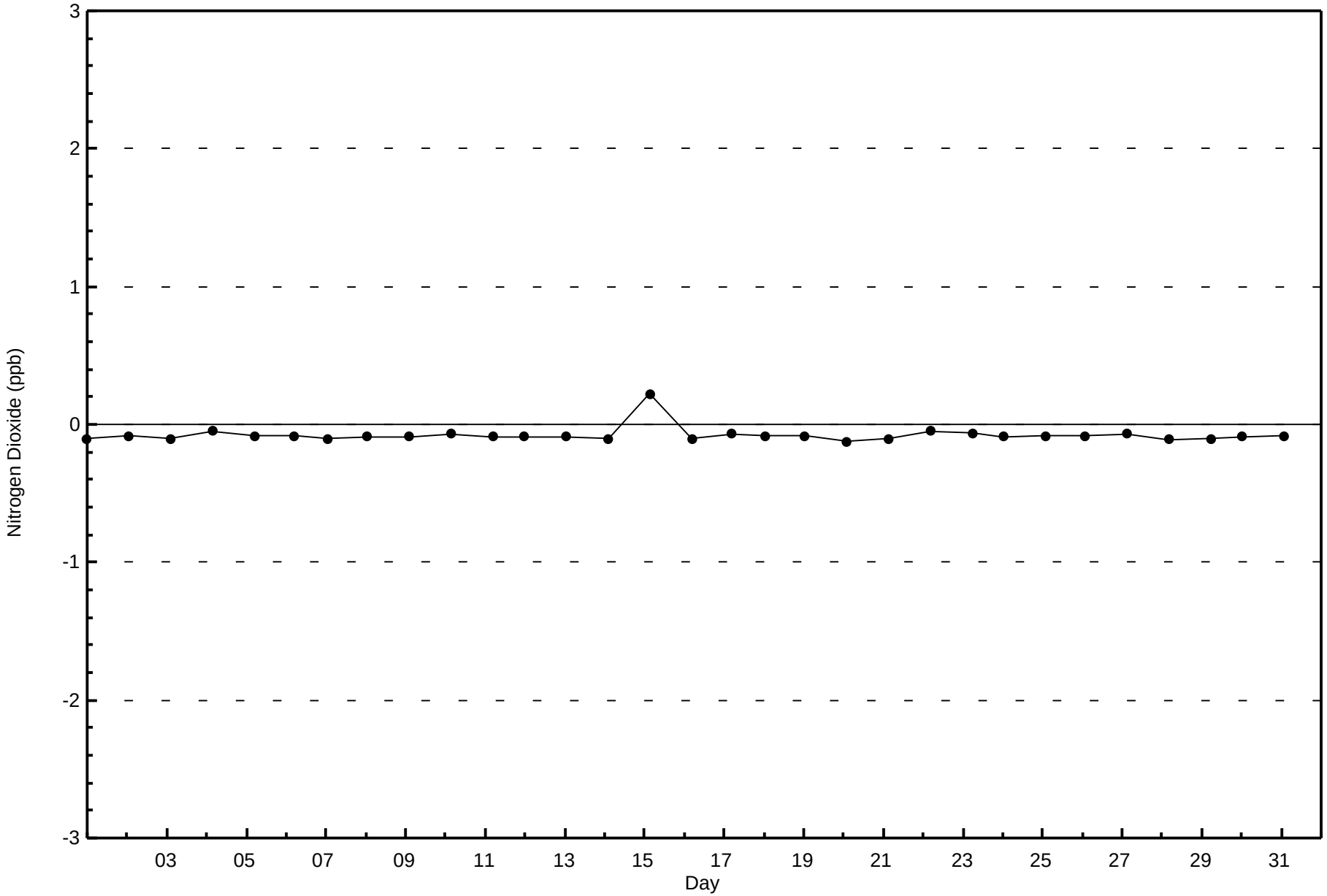
Total Number of Valid Hours: 657

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Firebag - January 2016

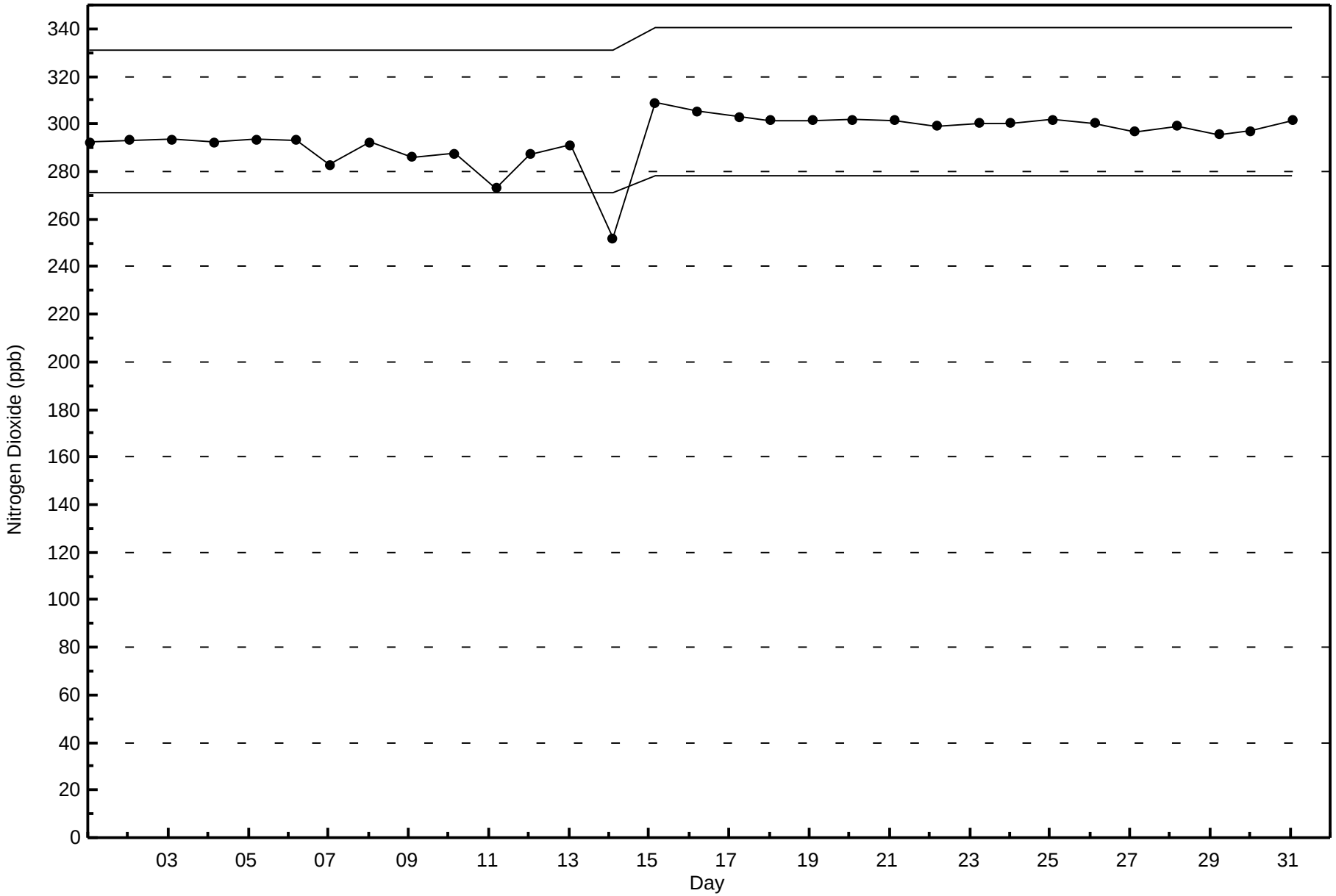


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Firebag - January 2016

Maximum Value: 68 ppb on Jan 17 03:00

Maximum Daily Average: 18.8 ppb on Jan 16

Minimum Value: 0 ppb on Jan 7 09:00

Minimum Daily Average: 0.2 ppb on Jan 31

Maximum Diurnal Average: 8.6 ppb at hour 7

Minimum Diurnal Average: 5.0 ppb at hour 24

Monthly Average: 6.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 2$ Median = 5 $Q_3 = 9$ $P_{90} = 14$ $P_{99} = 34$

Hours in Service:	744
Hours of Data:	674
Hours of Missing Data:	70
Hours of Calibration:	35
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	6	8	8	9	8	6	6	12	12	9	9	4	2	2	3	2	3	4	3	2	4	3	2	5.5	12
2-Jan	5	Z	5	8	8	13	9	12	11	16	8	6	8	8	8	5	4	3	4	4	2	4	2	3	6.8	16
3-Jan	2	7	Z	10	9	1	2	2	3	3	2	2	3	4	4	4	5	7	7	9	10	21	23	18	6.9	23
4-Jan	11	7	7	Z	7	5	6	5	3	2	1	1	1	1	1	1	4	38	7	12	24	18	10	15	8.1	38
5-Jan	10	27	14	10	Z	10	18	16	5	4	6	7	10	8	9	13	15	39	20	20	10	10	21	12	13.7	39
6-Jan	18	22	19	12	22	Z	26	22	16	25	23	9	3	3	5	6	5	2	1	1	1	1	0	0	10.6	26
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	3	3	3	2	4	6	5	4	1.6	6
8-Jan	5	Z	6	7	6	5	5	3	2	2	4	9	7	5	5	6	13	11	21	5	2	2	6	10	6.3	21
9-Jan	4	3	Z	6	5	4	2	3	7	5	8	5	6	8	10	9	10	7	6	4	4	4	6	5	5.8	10
10-Jan	7	11	11	Z	8	12	13	7	6	8	7	10	14	17	10	6	1	1	1	1	1	1	1	1	6.6	17
11-Jan	0	0	0	0	Z	0	3	1	1	1	2	1	2	4	4	3	4	3	5	4	7	12	4	3	2.8	12
12-Jan	Z	1	11	14	22	28	11	10	10	13	11	M	M	5	4	4	5	6	5	6	4	5	6	4	8.9	28
13-Jan	7	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	7
14-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
15-Jan	0	0	0	Z	0	0	0	6	0	2	0	0	1	3	3	4	5	5	9	14	8	10	16	10	4.3	16
16-Jan	18	19	6	10	Z	10	9	17	20	24	7	1	0	1	8	14	21	30	30	33	51	52	35	15	18.8	52
17-Jan	11	21	68	47	27	Z	23	10	8	7	4	8	9	14	17	10	9	8	8	3	4	4	4	8	14.5	68
18-Jan	Z	7	3	3	3	5	5	3	3	5	3	4	5	4	3	4	4	2	4	8	5	2	5	3	4.1	8
19-Jan	2	Z	2	2	3	6	10	11	7	4	3	4	4	4	3	2	2	1	1	1	1	1	0	0	3.3	11
20-Jan	0	0	Z	0	0	0	0	0	2	3	4	5	3	1	2	3	5	5	6	9	11	7	9	7	3.7	11
21-Jan	7	3	14	Z	14	21	20	5	22	16	6	13	11	12	12	14	13	9	8	7	8	8	8	4	11.0	22
22-Jan	3	4	4	7	Z	15	18	19	17	13	13	9	7	6	6	5	4	4	4	5	5	6	6	7	8.1	19
23-Jan	5	5	5	5	5	Z	6	6	6	7	7	9	5	4	4	4	5	14	7	10	2	1	1	2	5.5	14
24-Jan	Z	4	6	9	10	9	10	11	9	7	4	3	11	14	16	17	10	9	12	12	1	1	1	1	8.0	17
25-Jan	1	Z	1	1	2	8	6	2	3	7	12	11	5	3	4	3	3	3	6	3	2	2	2	4	4.0	12
26-Jan	6	11	Z	11	9	9	9	8	8	5	2	5	6	4	4	3	2	4	7	7	6	5	3	2	5.9	11
27-Jan	1	1	2	Z	3	1	2	1	1	1	1	1	1	1	1	1	3	4	4	6	5	7	5	6	2.5	7
28-Jan	6	2	5	2	Z	12	12	6	2	4	7	5	4	4	7	13	6	5	4	3	7	5	4	3	5.4	13
29-Jan	2	2	2	3	3	Z	6	3	8	7	7	5	9	8	9	4	9	10	10	12	8	9	2	1	6.1	12
30-Jan	Z	2	3	8	9	10	14	12	9	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3.5	14
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	5.6	6.9	8.1	7.7	7.8	7.6	8.6	7.1	7.0	7.2	5.7	5.2	5.0	5.2	5.6	5.6	5.8	7.9	6.8	6.8	6.5	7.0	6.3	5.0	Diurnal Average	
	18	27	68	47	27	28	26	22	22	25	23	13	14	17	17	17	21	39	30	33	51	52	35	18	Diurnal Maximum	

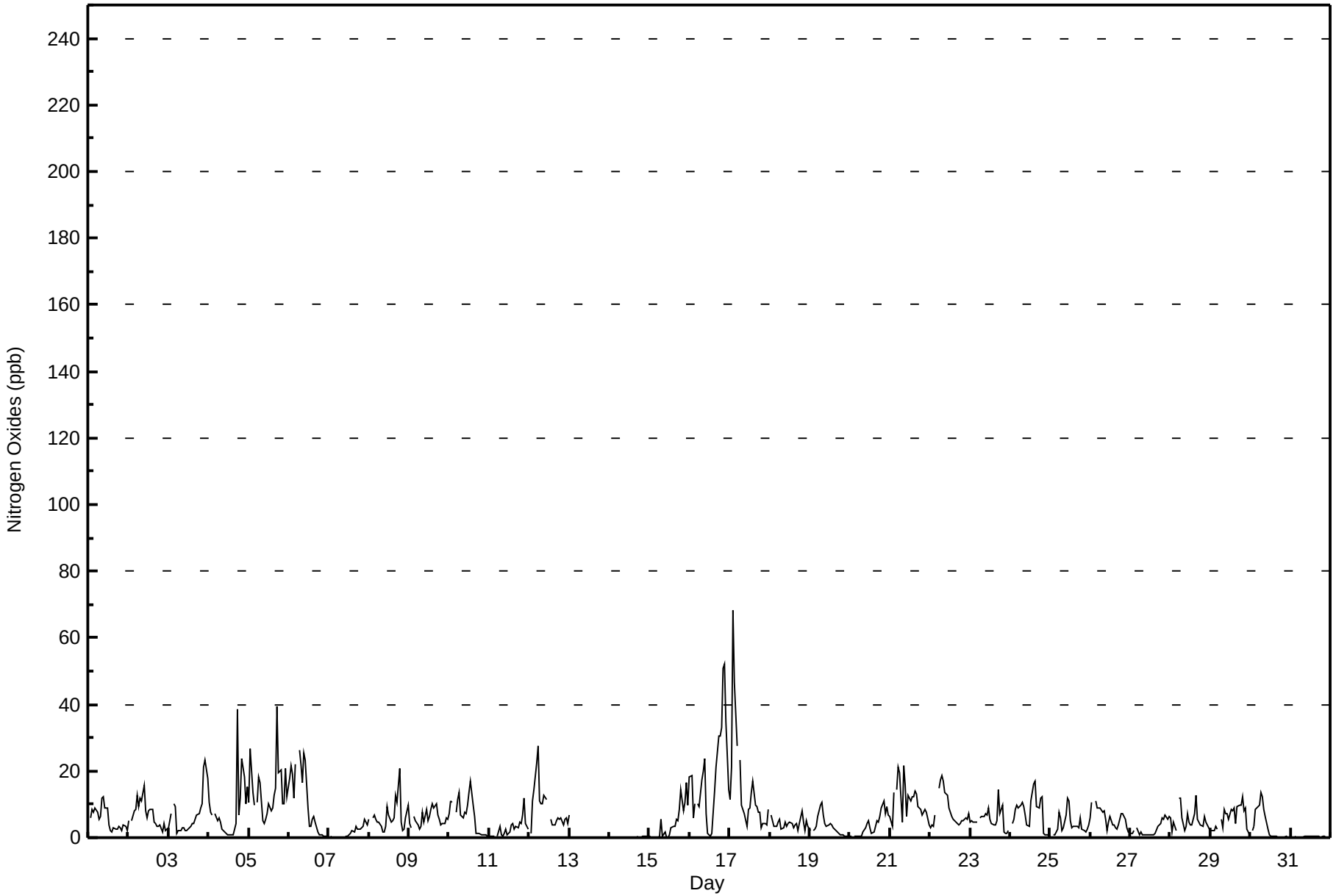
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Firebag - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	643	95.40	95.40
21 - 40	27	4.01	99.41
11 - 80	4	0.59	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Firebag - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	71	57	31	16	2	6	12	41	73	97	67	51	30	21	17	37	629
21 - 40	0	1	0	0	0	1	4	2	4	3	2	5	3	0	0	0	25
11 - 80	0	0	0	0	0	0	0	0	0	0	3	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	71	58	31	16	2	7	16	43	77	100	72	56	33	21	17	37	657

Total Number of Valid Hours: 657

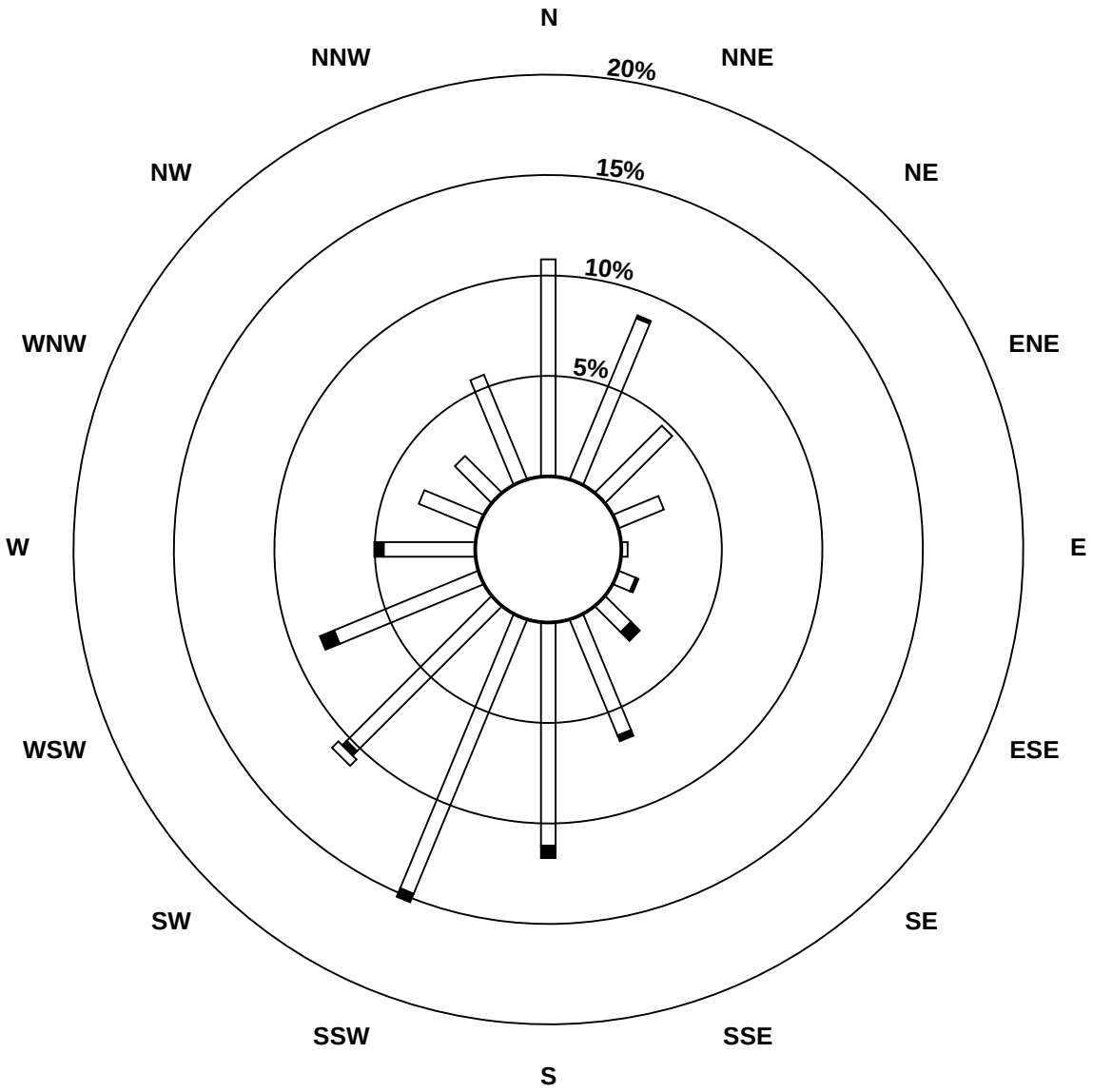
Total Number of Hours: 744

Wood Buffalo Environmental Association

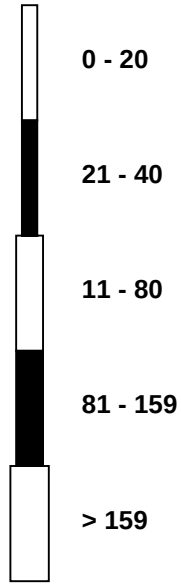
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Firebag (AMS 19)



Classes (ppb)



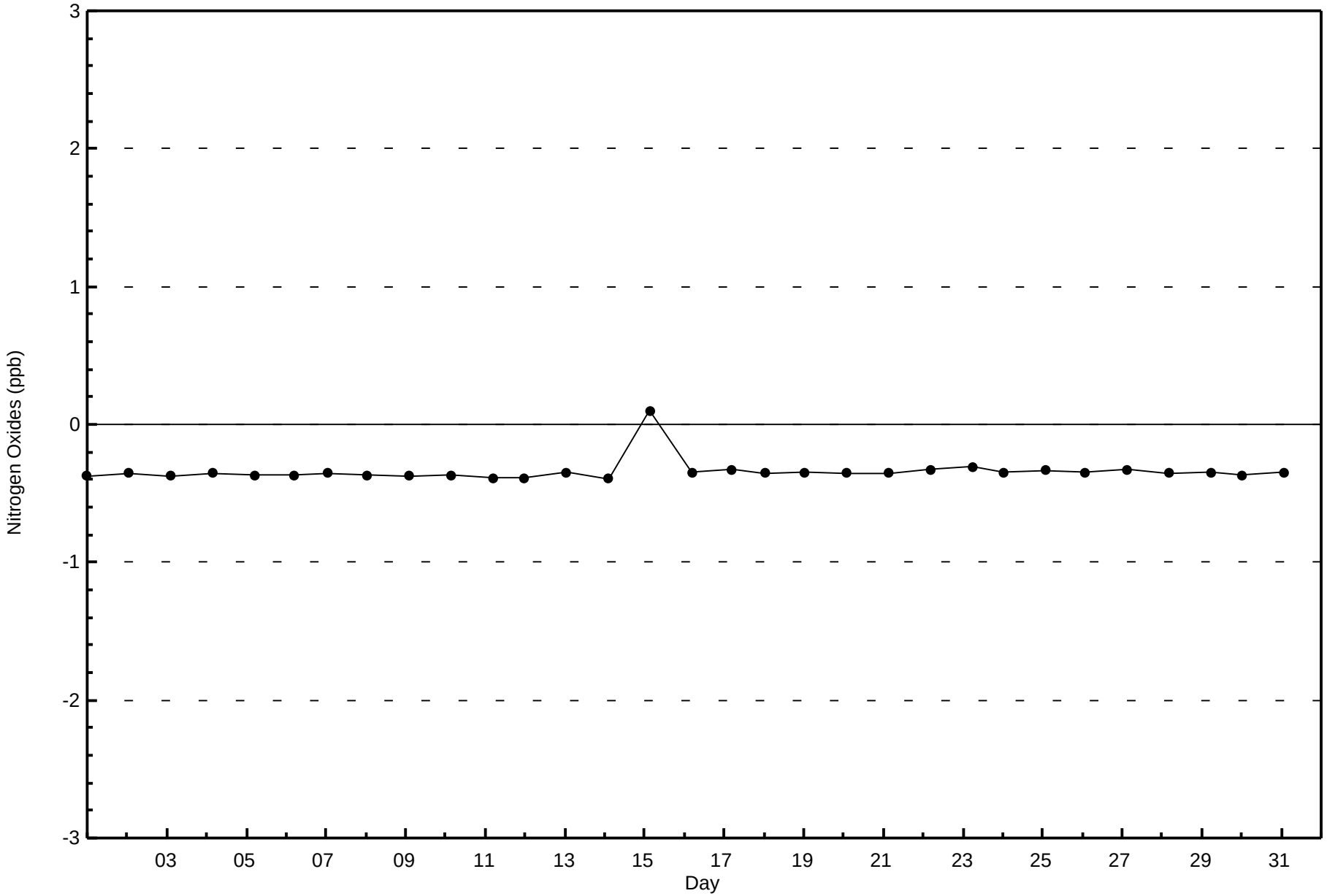
Total Number of Valid Hours: 657

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Firebag - January 2016

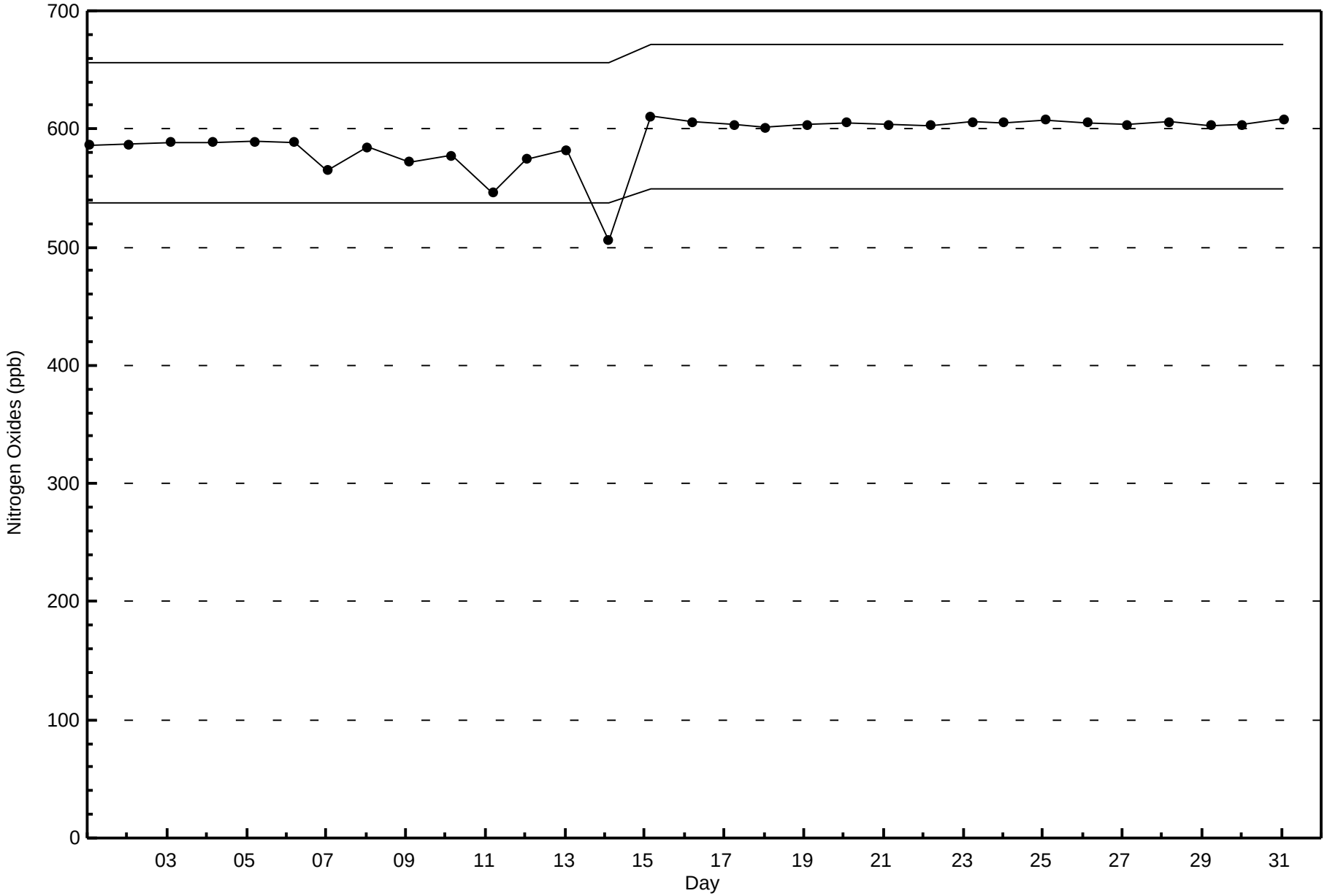


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Firebag - January 2016



Maximum Value: 2.6 C on Jan 28 23:00

Maximum Daily Average: 0.0 C on Jan 29

Minimum Value: -32.6 C on Jan 16 10:00

Minimum Daily Average: -27.5 C on Jan 16

Maximum Diurnal Average: -11.3 C at hour 14

Minimum Diurnal Average: -13.9 C at hour 24

Monthly Average: -13.09 C

Percentiles: P_1 = -30.7 P_{10} = -22.9 Q_1 = -18.6 Median = -13.4 Q_3 = -7.4 P_{90} = -2.6 P_{99} = 2.1

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

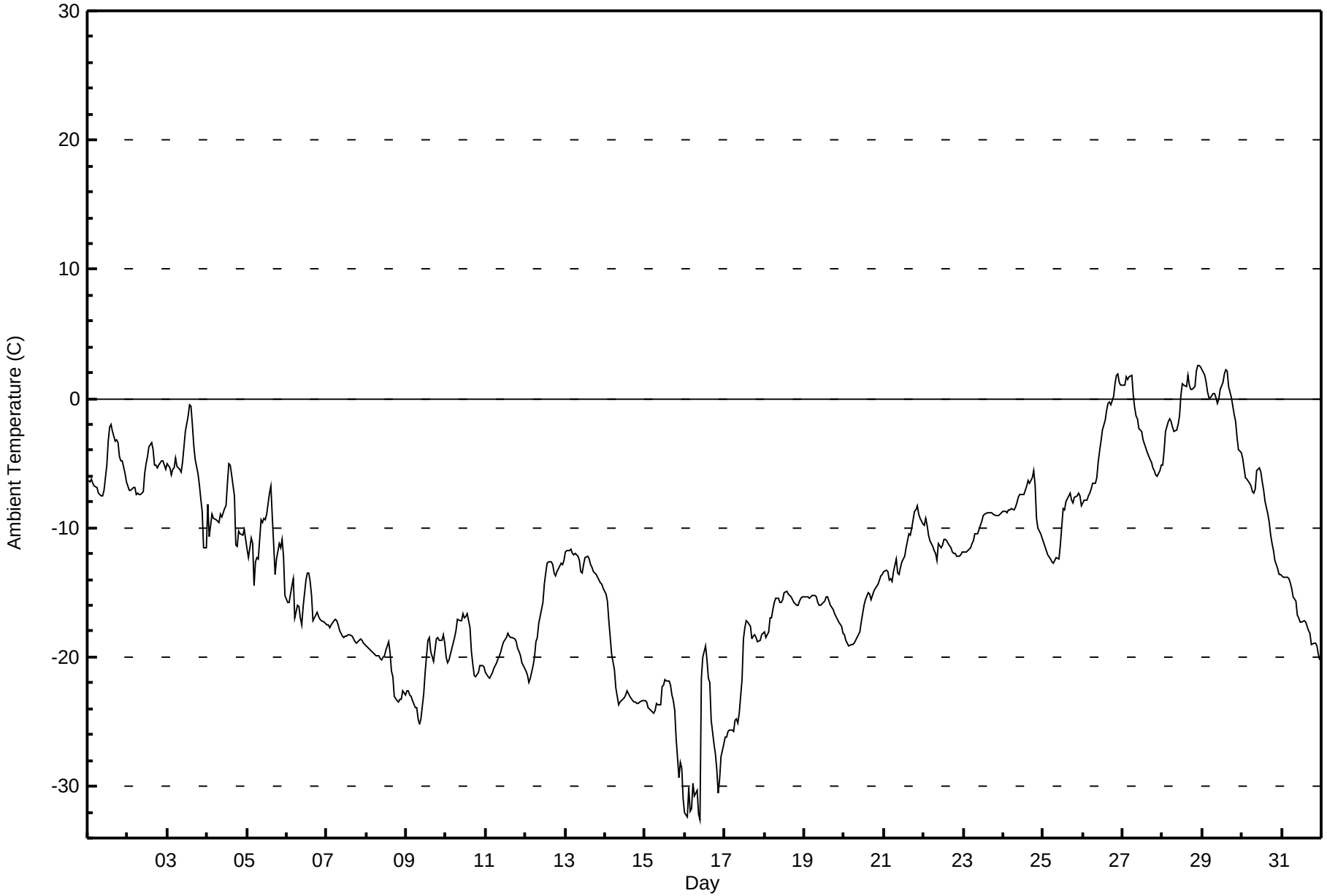
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-6.3	-6.5	-6.2	-6.6	-6.7	-6.9	-7.3	-7.4	-7.6	-7.6	-7.1	-5.1	-3.3	-2.3	-2.0	-2.6	-3.3	-3.2	-3.4	-4.4	-4.8	-4.9	-5.8	-6.5	-5.3	-2.0
2-Jan	-6.8	-7.1	-7.1	-6.9	-6.9	-7.4	-7.4	-7.4	-7.4	-7.2	-5.8	-5.1	-4.5	-3.8	-3.4	-4.0	-5.1	-5.2	-5.4	-5.1	-4.8	-4.8	-5.2	-5.5	-5.8	-3.4
3-Jan	-5.1	-5.3	-5.9	-5.5	-5.3	-4.6	-5.2	-5.5	-5.7	-4.9	-3.7	-2.6	-1.3	-0.5	-0.6	-2.0	-3.6	-4.7	-5.8	-6.7	-7.7	-8.7	-11.5	-11.5	-5.2	-0.5
4-Jan	-8.1	-10.7	-9.8	-9.0	-9.2	-9.4	-9.5	-9.5	-8.9	-9.2	-8.5	-8.3	-6.5	-5.0	-5.2	-5.9	-7.5	-11.3	-11.4	-10.2	-10.5	-10.5	-10.1	-10.8	-9.0	-5.0
5-Jan	-11.7	-12.3	-10.8	-11.2	-14.5	-12.6	-12.3	-12.4	-9.3	-9.6	-9.3	-9.4	-9.0	-7.3	-6.8	-9.1	-11.4	-13.6	-12.4	-11.2	-11.6	-10.9	-12.2	-15.2	-11.1	-6.8
6-Jan	-15.8	-15.8	-15.1	-14.5	-13.9	-17.0	-16.0	-16.1	-17.0	-17.5	-16.1	-14.1	-13.5	-13.5	-14.1	-15.2	-17.1	-16.7	-16.5	-16.8	-17.0	-17.2	-17.3	-17.4	-15.9	-13.5
7-Jan	-17.5	-17.6	-17.7	-17.5	-17.2	-17.1	-17.2	-17.5	-18.0	-18.4	-18.4	-18.4	-18.4	-18.3	-18.3	-18.4	-18.6	-18.8	-18.9	-18.8	-18.6	-18.7	-19.0	-19.1	-18.2	-17.1
8-Jan	-19.1	-19.2	-19.5	-19.6	-19.7	-19.8	-19.9	-19.9	-20.2	-20.3	-20.0	-19.9	-19.5	-18.8	-19.7	-21.1	-21.6	-23.1	-23.4	-23.5	-23.2	-23.3	-22.6	-22.9	-20.8	-18.8
9-Jan	-22.7	-22.6	-23.0	-23.0	-23.4	-23.9	-23.9	-24.8	-25.2	-24.8	-22.8	-21.2	-19.9	-18.7	-18.4	-19.6	-20.3	-19.5	-18.6	-18.5	-18.7	-18.7	-18.3	-19.0	-21.2	-18.3
10-Jan	-20.0	-20.4	-20.2	-19.4	-18.9	-18.5	-17.9	-17.1	-17.2	-17.2	-16.6	-17.0	-16.9	-16.6	-17.7	-19.6	-20.6	-21.4	-21.6	-21.2	-20.6	-20.6	-20.7	-20.8	-19.1	-16.6
11-Jan	-21.2	-21.5	-21.6	-21.4	-21.2	-20.9	-20.5	-20.1	-19.9	-19.6	-19.2	-18.8	-18.4	-18.1	-18.4	-18.5	-18.5	-18.6	-18.9	-19.4	-19.6	-19.9	-20.4	-20.8	-19.8	-18.1
12-Jan	-21.1	-21.5	-21.9	-21.6	-20.7	-20.0	-18.8	-18.5	-17.4	-16.8	-15.8	-14.4	-13.5	-12.7	-12.6	-12.6	-12.8	-13.5	-13.7	-13.4	-12.9	-12.7	-12.9	-12.6	-16.0	-12.6
13-Jan	-11.8	-11.7	-11.7	-11.7	-11.9	-12.0	-12.0	-12.2	-12.6	-13.4	-13.5	-12.9	-12.3	-12.2	-12.4	-12.8	-13.0	-13.3	-13.6	-13.9	-14.1	-14.3	-14.4	-14.7	-12.9	-11.7
14-Jan	-15.1	-15.6	-17.2	-18.5	-19.8	-20.9	-22.4	-23.0	-23.7	-23.5	-23.4	-23.2	-22.9	-22.6	-22.8	-23.0	-23.3	-23.5	-23.5	-23.6	-23.6	-23.4	-23.4	-23.4	-21.9	-15.1
15-Jan	-23.4	-23.5	-23.9	-24.1	-24.2	-24.4	-24.1	-23.5	-23.7	-23.7	-22.3	-22.2	-21.8	-21.8	-21.8	-22.2	-23.0	-23.3	-24.1	-26.3	-29.3	-28.1	-28.6	-31.0	-24.4	-21.8
16-Jan	-32.1	-32.4	-30.1	-32.0	-31.7	-29.8	-30.7	-30.3	-32.2	-32.6	-21.6	-20.0	-19.1	-20.2	-21.7	-21.9	-24.9	-26.7	-27.5	-28.7	-30.5	-29.5	-27.7	-26.7	-27.5	-19.1
17-Jan	-26.2	-26.2	-25.7	-25.6	-25.7	-25.7	-24.9	-24.8	-25.1	-24.4	-21.7	-18.6	-17.7	-17.2	-17.3	-17.6	-18.6	-18.4	-18.2	-18.5	-18.8	-18.7	-18.2	-18.2	-21.3	-17.2
18-Jan	-18.1	-18.5	-18.0	-17.0	-17.0	-16.3	-15.8	-15.4	-15.5	-15.8	-15.8	-15.6	-15.0	-14.9	-15.1	-15.2	-15.4	-15.6	-15.8	-16.0	-16.0	-15.7	-15.5	-15.4	-16.0	-14.9
19-Jan	-15.3	-15.3	-15.4	-15.4	-15.4	-15.3	-15.2	-15.3	-15.7	-16.0	-16.0	-15.7	-15.6	-15.3	-15.3	-15.7	-16.0	-16.3	-16.7	-16.9	-17.1	-17.3	-17.7	-18.2	-16.0	-15.2
20-Jan	-18.3	-18.7	-19.0	-19.1	-19.1	-19.0	-18.9	-18.7	-18.5	-18.0	-17.3	-16.7	-16.0	-15.6	-15.0	-15.1	-15.5	-15.2	-15.0	-14.7	-14.4	-14.0	-13.8	-13.6	-16.6	-13.6
21-Jan	-13.3	-13.2	-13.4	-14.0	-14.0	-14.1	-13.4	-12.4	-13.5	-13.6	-13.1	-12.6	-12.2	-11.5	-11.0	-10.5	-10.5	-10.1	-8.8	-8.6	-8.3	-8.9	-9.3	-9.7	-11.7	-8.3
22-Jan	-9.8	-9.3	-9.9	-10.6	-11.0	-11.4	-11.7	-11.9	-12.6	-11.2	-11.5	-11.3	-10.9	-10.9	-11.0	-11.2	-11.5	-11.8	-12.0	-12.0	-12.1	-12.2	-12.1	-11.9	-11.3	-9.3
23-Jan	-11.9	-11.9	-11.8	-11.7	-11.5	-11.2	-11.0	-10.5	-10.4	-10.2	-9.8	-9.5	-9.0	-8.9	-8.9	-8.9	-8.8	-8.9	-8.9	-9.1	-9.0	-9.0	-9.0	-8.9	-10.0	-8.8
24-Jan	-8.7	-8.8	-8.8	-8.6	-8.6	-8.6	-8.6	-8.4	-8.0	-7.7	-7.4	-7.4	-7.4	-7.1	-6.7	-6.4	-6.6	-6.1	-5.6	-6.7	-9.3	-10.1	-10.4	-10.7	-8.0	-5.6
25-Jan	-11.1	-11.4	-11.8	-12.1	-12.4	-12.7	-12.8	-12.5	-12.3	-12.4	-11.3	-9.9	-8.6	-8.6	-8.0	-7.5	-7.3	-7.8	-8.1	-7.6	-7.5	-7.3	-7.6	-8.2	-9.9	-7.3
26-Jan	-8.1	-7.9	-7.8	-7.5	-7.3	-7.0	-6.5	-6.5	-6.1	-5.0	-4.0	-3.3	-2.4	-1.6	-0.9	-0.3	-0.3	-0.5	0.1	1.1	1.8	1.9	1.3	1.1	-3.2	1.9
27-Jan	1.0	1.0	1.7	1.5	1.7	1.8	0.3	-0.7	-1.4	-1.6	-2.3	-2.5	-3.2	-3.5	-3.9	-4.2	-4.7	-4.9	-5.4	-5.6	-6.0	-6.1	-5.6	-5.1	-2.4	1.8
28-Jan	-5.1	-4.0	-2.6	-1.7	-1.6	-1.7	-2.3	-2.5	-2.4	-2.0	-1.3	0.3	1.1	1.1	0.9	1.8	1.0	0.7	0.7	0.9	2.2	2.5	2.6	2.5	-0.4	2.6
29-Jan	2.2	1.7	1.2	0.5	0.1	0.0	0.3	0.4	0.0	-0.4	0.0	0.7	1.3	1.9	2.2	2.1	0.9	0.1	-0.6	-1.3	-1.8	-3.0	-4.0	-4.2	0.0	2.2
30-Jan	-4.7	-5.3	-6.2	-6.2	-6.6	-6.7	-7.2	-7.3	-7.0	-5.5	-5.4	-5.7	-6.4	-7.1	-7.9	-8.9	-9.6	-10.6	-11.2	-11.8	-12.5	-13.2	-13.6	-13.6	-8.3	-4.7
31-Jan	-13.7	-13.8	-13.8	-13.8	-14.0	-14.3	-14.6	-15.3	-15.7	-16.8	-17.0	-17.3	-17.3	-17.2	-17.3	-17.6	-17.9	-18.2	-19.0	-18.9	-18.9	-19.1	-19.8	-20.3	-16.7	-13.7
	-13.5	-13.7	-13.6	-13.7	-13.8	-13.8	-13.8	-13.8	-13.9	-13.8	-12.8	-12.2	-11.6	-11.3	-11.3	-11.7	-12.4	-12.9	-13.0	-13.1	-13.4	-13.4	-13.6	-13.9	Diurnal Average	
	2.2	1.7	1.7	1.5	1.7	1.8	0.3	0.4	0.0	-0.4	0.0	0.7	1.3	1.9	2.2	2.1	1.0	0.7	0.7	1.1	2.2	2.5	2.6	2.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Firebag - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	126	16.94	16.94
-20 - 0	576	77.42	94.35
0 - 10	42	5.65	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Firebag - January 2016

Maximum Value: 99 % on Jan 29 07:00

Maximum Daily Average: 94.5 % on Jan 26

Minimum Value: 39 % on Jan 3 14:00

Minimum Daily Average: 54.6 % on Jan 3

Maximum Diurnal Average: 84.1 % at hour 2

Minimum Diurnal Average: 81.3 % at hour 14

Monthly Average: 83.1 %

Percentiles: $P_1 = 50$ $P_{10} = 74$ $Q_1 = 79$ Median = 84 $Q_3 = 89$ $P_{90} = 93$ $P_{99} = 99$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

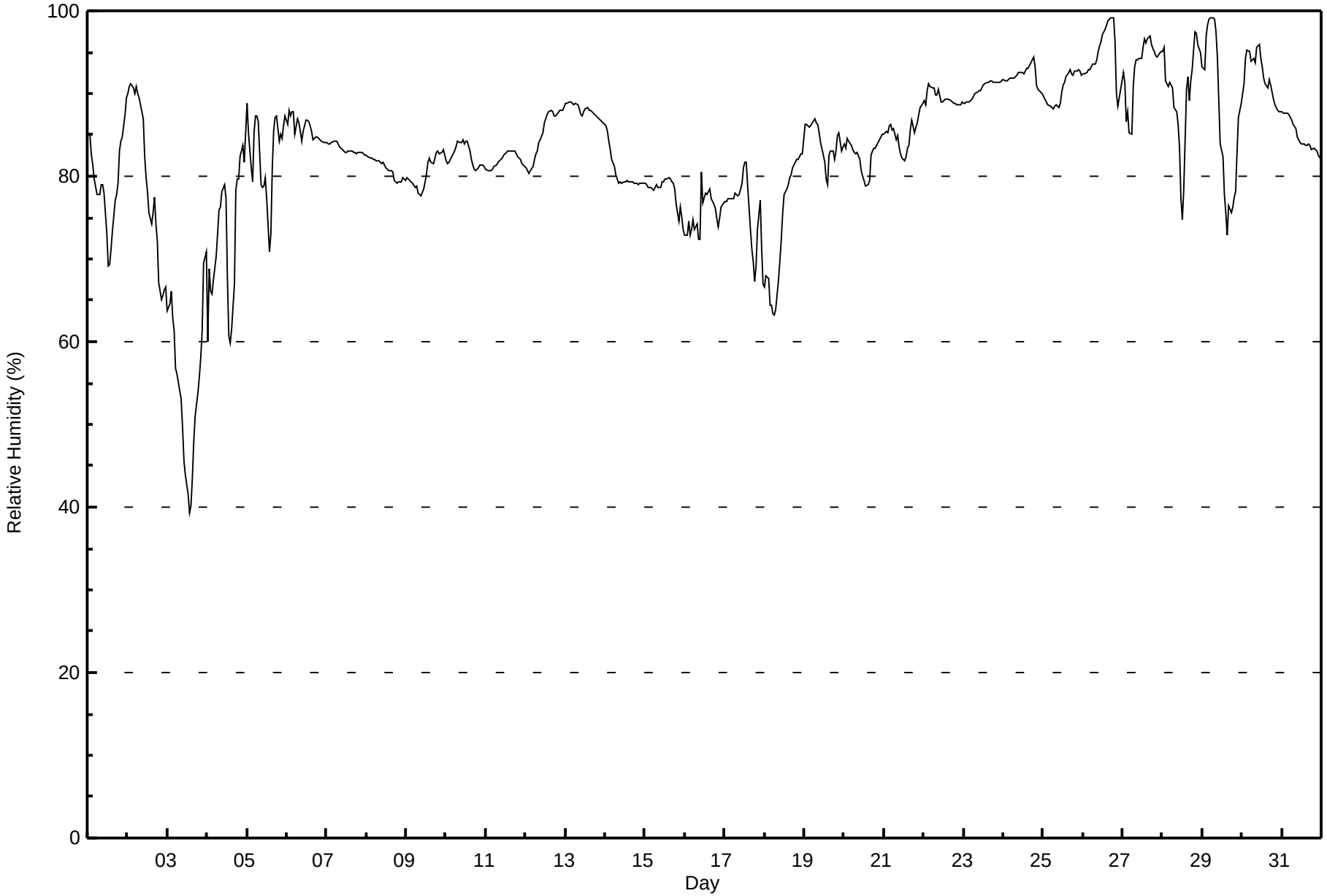
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	85	85	83	81	80	78	78	78	79	79	78	73	69	69	71	73	77	78	79	83	84	85	87	89	79.3	89
2-Jan	90	91	91	91	90	91	90	89	89	87	82	80	78	76	74	76	77	74	72	67	65	66	66	67	80.0	91
3-Jan	64	65	66	63	61	57	56	54	53	50	46	44	41	39	40	43	48	51	54	56	58	61	70	71	54.6	71
4-Jan	60	69	66	66	67	70	73	76	76	78	79	77	68	61	60	61	67	78	80	80	82	84	82	85	72.7	85
5-Jan	89	85	81	79	85	87	87	87	79	79	79	80	77	71	73	81	86	87	87	84	85	85	86	87	82.8	89
6-Jan	86	88	87	88	88	85	87	86	85	84	85	87	87	87	86	85	84	85	85	85	84	84	84	84	85.7	88
7-Jan	84	84	84	84	84	84	84	84	84	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83.3	84
8-Jan	83	82	82	82	82	82	82	82	82	82	82	81	81	81	81	81	81	79	79	79	79	79	80	79	81.0	83
9-Jan	80	80	79	79	79	79	79	78	78	78	78	79	80	82	82	82	81	82	83	83	83	83	83	83	80.5	83
10-Jan	82	82	82	82	83	83	84	84	84	84	84	84	84	84	83	82	81	81	81	81	81	81	81	81	82.5	84
11-Jan	81	81	81	81	81	81	81	82	82	82	82	83	83	83	83	83	83	83	83	82	82	82	82	81	81.9	83
12-Jan	81	81	80	81	81	82	83	83	84	84	85	86	87	87	88	88	88	87	87	88	88	88	88	88	85.1	88
13-Jan	89	89	89	89	89	89	89	89	88	87	87	88	88	88	88	88	88	88	87	87	87	87	87	86	87.9	89
14-Jan	86	86	84	83	82	81	80	80	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	80.4	86
15-Jan	79	79	79	79	78	78	79	79	79	79	79	79	80	80	80	80	79	79	78	77	75	76	75	74	78.2	80
16-Jan	73	73	75	73	73	75	73	74	72	72	80	77	78	78	78	79	77	77	76	75	74	75	76	77	75.4	80
17-Jan	77	77	77	77	77	77	78	78	78	78	79	81	82	82	79	74	71	70	67	69	74	77	71	67	75.7	82
18-Jan	67	68	68	64	64	63	63	64	68	70	72	76	78	79	79	80	80	81	81	82	82	82	83	83	74.0	83
19-Jan	86	86	86	86	86	87	87	87	86	85	84	83	82	80	79	83	83	83	82	83	85	85	83	84	84.2	87
20-Jan	84	83	85	84	84	83	83	83	83	82	81	80	79	79	79	80	83	83	83	83	84	84	85	85	82.6	85
21-Jan	85	85	85	86	86	86	86	84	85	84	83	82	82	82	83	84	86	87	85	86	86	87	88	89	85.1	89
22-Jan	89	89	90	91	91	91	91	90	90	90	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89.5	91
23-Jan	89	89	89	89	89	89	90	90	90	90	90	91	91	91	91	91	91	92	91	91	91	91	91	92	90.5	92
24-Jan	92	92	92	92	92	92	92	92	92	92	93	92	92	93	93	93	93	94	94	93	91	91	90	90	92.1	94
25-Jan	90	89	89	89	89	88	88	88	89	88	89	90	91	91	92	93	93	92	92	93	93	93	93	92	90.6	93
26-Jan	92	92	92	93	93	93	94	94	94	95	96	96	97	98	98	99	99	99	99	96	90	88	89	91	94.5	99
27-Jan	93	91	87	88	85	85	91	93	94	94	94	94	96	97	96	97	97	96	95	95	95	94	95	95	93.2	97
28-Jan	95	96	92	91	91	91	91	88	88	86	83	77	75	78	91	92	89	91	93	98	97	96	96	95	90.0	98
29-Jan	93	93	97	98	99	99	99	99	97	94	89	84	82	78	76	73	76	76	76	78	78	83	87	89	87.2	99
30-Jan	90	91	94	95	95	94	94	94	94	96	96	94	93	92	91	91	92	91	90	89	89	88	88	88	92.0	96
31-Jan	88	88	88	88	87	87	87	86	86	85	84	84	84	84	84	84	84	84	83	83	83	83	82	82	84.9	88
	83.9	84.1	83.8	83.6	83.7	83.5	83.8	83.7	83.4	83.1	83.0	82.4	81.8	81.3	81.6	82.1	82.8	83.2	83.1	83.1	83.1	83.6	83.8	84.0	Diurnal Average	
	95	96	97	98	99	99	99	99	97	96	96	96	97	98	98	99	99	99	99	98	97	96	96	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Firebag - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	1	0.13	0.13
40 - 60	16	2.15	2.28
60 - 80	200	26.88	29.17
80 - 100	527	70.83	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Firebag - January 2016

Maximum Speed: 29 km/h on Jan 26 22:00

Maximum Daily Speed Average: 18.1 km/h on Jan 1

Minimum Speed Value: 0 km/h on Jan 8 12:00

Minimum Daily Speed Average: 0.9 km/h on Jan 6

Maximum Diurnal Speed Average: 4.4 km/h at hour 1

Minimum Diurnal Speed Average: 1.1 km/h at hour 11

Monthly Average Velocity: 2.7 km/h 219.2 deg

Percentiles: P_1 = 1 P_{10} = 3 Q_1 = 4 Median = 8 Q_3 = 13 P_{90} = 18 P_{99} = 26

Hours in Service: 744

Hours of Data: 723

Hours of Missing Data: 21

Percent Operational Time: 97.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	SW17	SW18	SW20	SW20	SW23	SW23	SW25	SW24	SW24	SW20	SW16	WSW22	W22	W23	W24	W20	W19	W18	W17	W13	W13	W13	WSW9	WSW10	WSW18.1	SW25
2-Jan	WSW10	WSW7	SW6	SW8	SW8	SW10	SW13	SW11	SW12	SSW11	SSW10	SSW12	SW16	SW13	SW11	SW10	SSW10	SSW14	SSW11	SSW10	SSW13	SSW13	SSW13	SSW15	SW10.9	SW16
3-Jan	SSW15	S14	S16	S15	S16	SSW20	SSW20	SSW21	SSW22	SSW22	SW23	SW22	SSW22	SSW17	SW18	SSW20	SSW21	SW18	SW17	SW11	SW7	SSW5	SE4	NE7	SSW15.3	SSW23
4-Jan	ENE6	NE7	NE6	NNE10	NE8	NNE14	NNE15	NNE16	NNE18	NNE14	NNE14	NNE15	NNE16	NNE14	NNE13	NNE9	N5	W5	W8	W8	WSW8	WSW7	WSW7	SW6	N7.1	NNE18
5-Jan	W5	WSW3	NNW4	WNW5	NW7	WSW6	WSW5	WNW6	NW8	NNW6	NW4	WSW4	WSW1	AF	WSW4	AF	ENE5	ESE4	SE6	SE5	ESE5	SE6	SSE4	SW0	W1.3	NW8
6-Jan	WSW2	W2	ENE3	ESE3	SE3	ESE3	SE4	SE3	SE3	SSE2	WSW2	NNW2	NNW1	NW1	N1	NNE2	NE2	NE2	NNE3	NNE3	N3	NNE3	NNE3	NNE2	NE0.9	SE4
7-Jan	NNE3	NNE4	NE5	NE4	NNE4	NNE4	NNE4	N4	N4	NW3	N3	N3	N3	NNW3	NNW3	NW1	NW2	WNW2	NNW2	N2	NNW2	W2	WSW2	WNW1	N2.5	NE5
8-Jan	N1	AF	NE3	NE3	NNE3	NNE3	NNE2	ENE2	ENE2	ENE1	AF	WSW0	W1	AF	AF	AF	AF	AF	AF	SSW2	SSW4	SSW4	SSW5	SSW4	----	SSW5
9-Jan	SSW5	SSW6	SSW5	SSW5	SSW5	SSW5	SSW4	SSW4	SSW4	SSW4	SSW3	SW3	SW3	SW3	SSW2	SSW2	SSW2	SSW2	SSW2	SW2	SW1	SW1	SSW1	SSW2	SSW3.2	SSW6
10-Jan	SSW1	S1	S1	SW1	SSW2	S1	S1	WSW1	SW1	WSW0	AF	WNW1	N2	NNE2	N2	NNW3	NNW3	N3	N3	NNW3	NNW3	NNW3	NNW3	NNW3	NNW1.2	NNW3
11-Jan	NNW7	N8	N8	N8	NNW7	NNW6	NNW6	NNW7	NNW7	NNW7	NNW6	NW5	NW4	NW4	W4	WSW4	WSW4	WSW5	WSW4	WSW4	SW4	SW4	SSW4	SSW4	NW3.8	N8
12-Jan	SSW4	SSW4	S4	S3	S3	S3	AF	AF	AF	AF	AF	AF	M	SSW11	SSW9	SW8	S7	SSE11	S11	S9	SSW8	SSE9	S8	S10	----	SSE11
13-Jan	SSW8	SE6	SE9	SE8	AF	SE7	SE10	SE10	SE10	ESE13	ESE13	ESE11	ESE12	ESE13	ESE11	ESE10	ESE11	E9	E10	E10	E9	ENE8	ENE7	NE7	ESE8.7	ESE13
14-Jan	NNE8	NNE11	NNE8	N6	NNE8	N6	NNE7	NNE10	N11	N10	N11	N11	NNE10	NNE9	N9	NNE8	NNE9	NNE7	NNE8	NNE7	NE5	NE8	NE7	NE6	NNE8.1	NNE11
15-Jan	NNE6	N7	NNE6	N8	NNE6	NNE5	NE7	NW5	NE3	ENE6	NE5	NE6	NE6	ENE7	ENE7	ENE7	E6	E9	ESE5	SSE3	SE3	SE5	SSE3	S1	NE3.9	E9
16-Jan	NW2	NNW5	NW3	W1	WSW4	WSW4	WSW3	WSW3	NNW2	NNE3	NE4	NNE4	NNE3	NNW4	WNW4	WNW2	W4	WSW4	WSW4	AF	AF	SW3	SW4	SW5	WNW1.9	NNW5
17-Jan	SW4	SW5	SW5	SW5	SSW6	S5	SSW6	SSW7	SW7	SSW7	SSW6	SSW8	S10	S13	S14	S14	SSE16	SSE17	S23	SSE27	SSE21	SSE22	SSE26	SSE26	S11.8	SSE27
18-Jan	S27	SSE27	SSE27	SSE27	SSE26	SSE24	SSE23	SSE24	S20	S21	S20	S21	S18	S15	S16	S12	S12	S12	S11	S9	S10	S11	S9	SSW9	S17.7	SSE27
19-Jan	SSW8	SW7	SW5	SW5	W4	W4	WNW7	NW7	N9	NNE9	N7	NNE10	N9	N7	N9	N11	NNE12	NNE10	NNE12	N10	N13	N11	N12	N11	N6.2	N13
20-Jan	N12	NNE9	N10	N9	NNE8	NNE9	NNE4	NNE4	ENE5	ESE6	SE3	S8	S10	S10	SSW8	SSW7	S10	S12	S12	S12	S15	S15	S15	S14	SSE3.9	S15
21-Jan	S14	S14	S12	S14	S14	S12	S14	S17	S15	SSE16	SSE16	SSE16	SSE16	SSE14	SSE16	SSE19	SSE20	SSE25	SSE23	SSE21	SSE20	S26	S24	S18	SSE17.0	S26
22-Jan	SSW18	SSW16	SW15	SW16	WSW10	WSW9	WSW6	SW2	NNE5	NNE13	NE12	NNE10	NNE7	NNE5	NNE6	N6	N5	NNE7	NE8	NE7	NE7	ENE6	ENE5	ENE6	NNE1.0	SSW18
23-Jan	NE5	NE3	NE3	NE2	NE3	ENE3	ENE3	SE4	SE3	SE4	SSE4	S4	S4	S5	S5	S5	S5	S5	S6	S6	SSW7	SSW8	SSW9	SSW9	S3.0	SSW9
24-Jan	SSW8	SW7	SSW8	SW9	SSW8	SW7	SW6	WSW6	W6	W6	W7	WSW9	WSW9	WSW9	SW8	SW7	SW6	WSW6	WNW6	N6	NNE8	N7	N7	N7	WSW4.6	WSW9
25-Jan	N5	N4	N4	N1	S1	S3	SSW3	SSW3	SSW4	S4	S4	S4	SSW5	SSW6	SSW7	SSW7	SSW7	SSW7	S6	SSW6	SSW6	SW6	SW6	SW5	SSW3.4	SSW7
26-Jan	SW6	SW5	SW4	SW5	SW5	SSW5	SW5	SW5	SSW5	SSW5	SSW6	SW6	SSW6	SW6	SSW6	SSW7	SW7	SW8	WSW14	WSW26	WSW27	WSW29	W24	W22	WSW9.6	WSW29
27-Jan	WSW25	W24	W25	W18	WNW15	NW18	NNW12	NNW14	NNW12	N8	NNE9	N8	NNE9	NNE7	NE9	NE10	ENE10	ESE9	ESE10	SE9	SSE7	SSE8	SSE8	SSE10	NW3.6	WSW25
28-Jan	SSE10	SSE15	S15	SSE18	SSE18	SSE17	SE17	SSE18	SSE17	S18	S15	SSW16	SSW17	SSW16	SW7	SSW7	SSW16	SSW17	SSW20	SW20	WSW24	WSW24	WSW23	WSW23	SSW13.8	WSW24
29-Jan	WSW24	WSW22	W19	NW18	NW11	WNW12	NW16	WNW17	WNW16	WNW16	WNW16	WNW16	WNW14	WNW14	WNW13	W13	W14	WNW15	WNW12	W11	WNW8	WSW9	WSW11	WSW14	WNW13.9	WSW24
30-Jan	W10	WSW7	WSW8	SW9	SW9	WSW12	WSW10	W9	NNW7	N11	N13	N12	NNW12	NNW13	N15	N15	N15	N17	N17	N14	N14	N14	N11	N10	NNW8.0	N17
31-Jan	N11	NNW10	N10	N9	N10	N9	N10	N9	N12	N11	N11	N12	N12	NNW11	NNW14	N12	N13	N12	N11	N11	N11	N9	NNW6	NNW4	N10.3	NNW14
	SW4.4	SW3.8	SW2.9	SW2.8	SW2.6	SW2.8	SW2.5	SW2.8	WSW1.7	SW1.2	SW1.1	WSW1.9	WSW2.0	SW2.6	SW2.2	SW2.0	SSW2.3	SSW2.9	SSW3.2	SSW3.3	SW3.2	SSW3.8	SSW3.8	SW3.8	Diurnal Average	
	S27	SSE27	SSE27	SSE27	SSE26	SSE24	SW25	SW24	SW24	SSW22	SSW23	SSW22	W22	W23	W24	W20	SSW21	SSE25	S23	SSE27	WSW27	WSW29	SSE26	SSE26	Diurnal Maximum	

M - Maintenance AF - Analyzer Failure

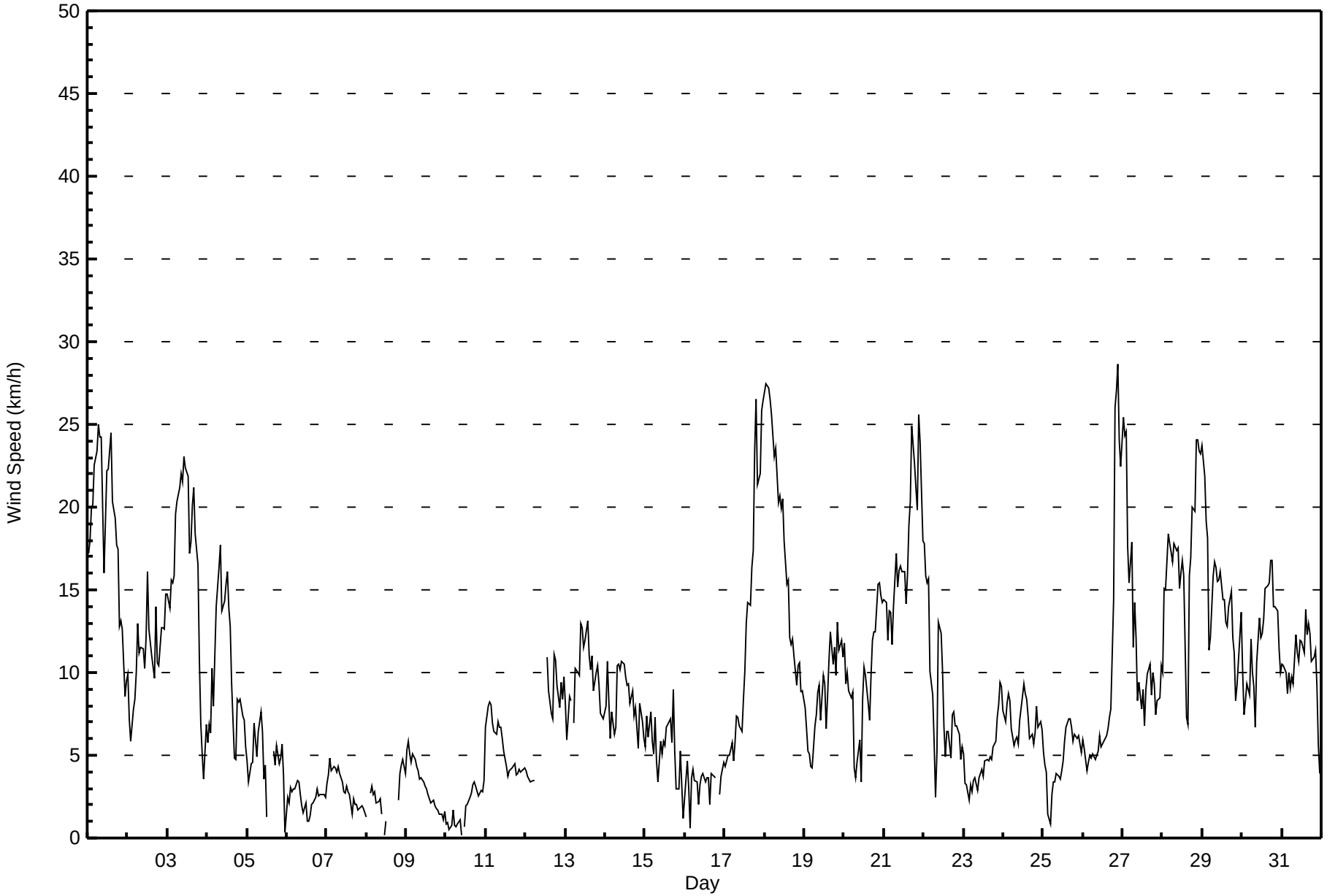
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Firebag - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	241	33.33	33.33
6 - 11	271	37.48	70.82
12 - 19	147	20.33	91.15
20 - 28	63	8.71	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 723

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Firebag - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	19	23	15	9	0	5	12	5	22	37	26	23	10	6	11	18	241
6 - 11	43	34	16	11	5	7	10	7	18	39	30	21	8	4	4	14	271
12 - 19	18	13	1	0	0	4	1	15	33	16	11	4	9	12	3	7	147
20 - 28	0	0	0	0	0	0	0	17	8	11	9	10	8	0	0	0	63
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	70	32	20	5	16	23	44	81	103	76	59	35	22	18	39	723

Total Number of Valid Hours: 723

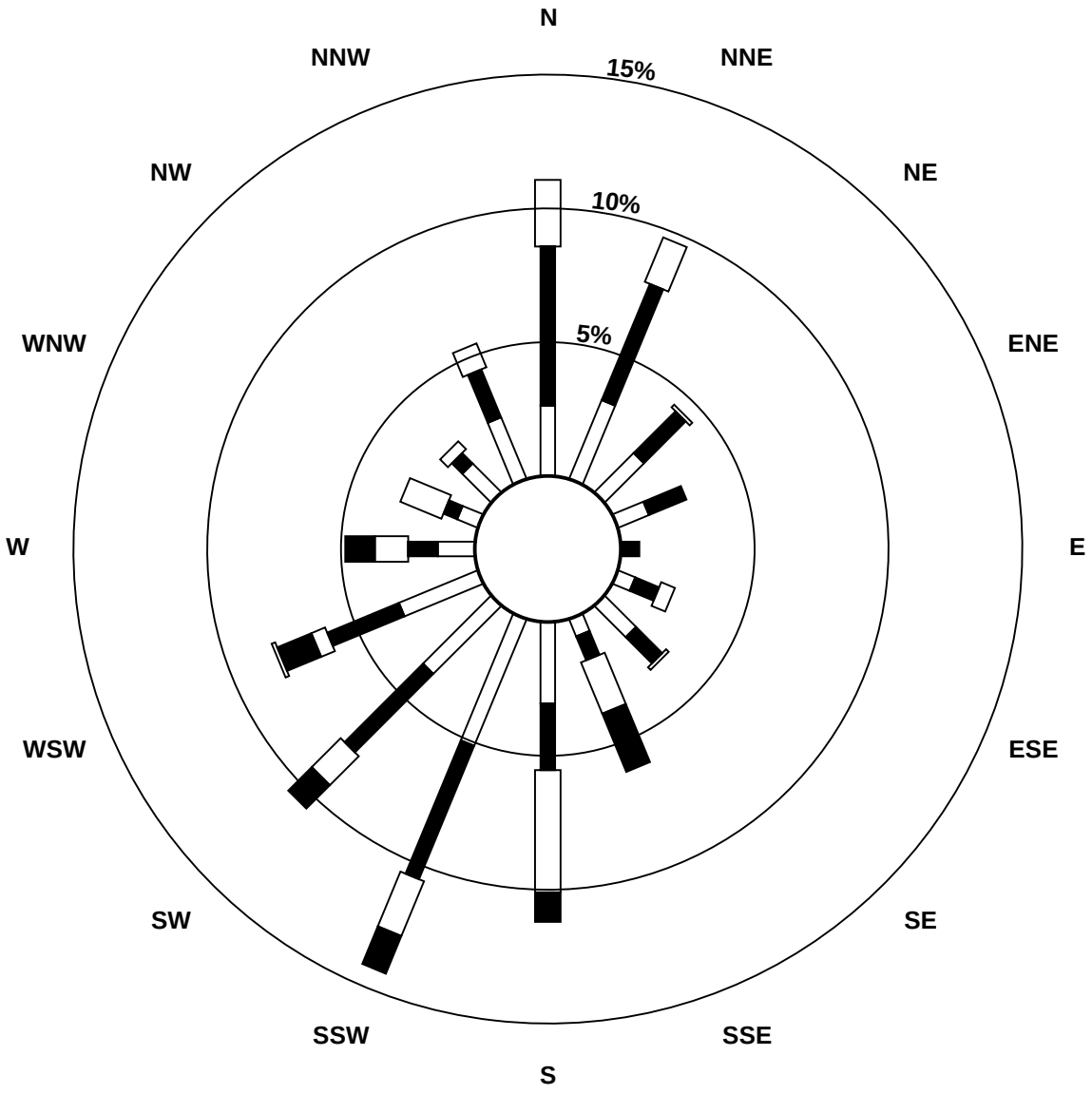
Total Number of Hours: 744

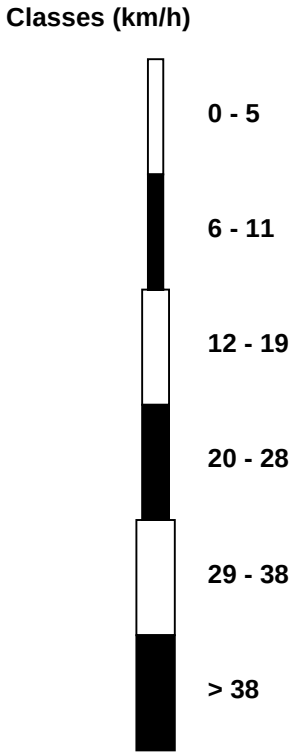
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

Firebag (AMS 19)





Total Number of Valid Hours: 723

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Jan 26 19:00

Minimum Value: 0 km/h on Jan 6 17:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	723
Hours of Missing Data:	21
Hours of Calibration:	0
Percent Operational Time:	97.2

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

M - Maintenance AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Firebag - January 2016

Direction of Maximum Speed: 254 deg on Jan 26 22:00
Direction of Maximum Daily Speed Average: 245.4 deg on Jan 1

Direction of Minimum Speed: 240 deg on Jan 8 12:00

Direction of Minimum Daily Speed Average: 0.9 deg on Jan 6

Monthly Average Direction: 241.0 deg

Hours in Service:	744
Hours of Data:	723
Hours of Missing Data:	21
Percent Operational Time:	97.2

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	223	224	229	235	229	231	228	236	232	226	225	250	269	269	265	261	259	267	272	262	260	266	245	245	245.4
2-Jan	245	238	226	222	218	217	217	217	214	207	208	204	228	227	219	214	209	210	209	205	200	204	200	200	213.9
3-Jan	202	187	173	183	188	197	198	212	207	208	214	214	211	209	214	213	213	219	222	226	231	194	130	56	205.4
4-Jan	64	52	44	30	46	16	18	17	17	15	14	17	21	16	15	18	354	273	267	259	245	246	241	235	8.4
5-Jan	267	243	328	296	319	257	237	291	324	329	313	245	257	AF	243	AF	63	117	126	132	116	135	157	231	273.7
6-Jan	237	274	65	112	131	114	136	142	139	160	258	329	331	313	357	25	43	38	12	23	7	13	15	20	54.8
7-Jan	24	26	35	37	23	17	14	8	4	324	349	10	2	347	343	318	308	297	329	10	348	277	254	291	358.9
8-Jan	350	AF	39	44	24	22	29	62	60	62	AF	240	267	AF	AF	AF	AF	AF	AF	210	212	207	199	192	--
9-Jan	208	210	201	200	201	203	209	208	206	213	207	220	220	216	209	205	198	211	211	215	221	214	210	206	208.1
10-Jan	199	189	175	214	202	185	185	240	236	245	AF	299	11	14	6	345	345	354	350	347	345	345	344	346	340.8
11-Jan	346	351	352	349	345	341	334	342	342	344	333	313	321	309	268	253	245	247	251	248	234	224	212	210	314.4
12-Jan	207	197	188	186	179	179	AF	AF	AF	AF	AF	AF	M	192	195	223	186	168	185	184	204	167	170	183	--
13-Jan	201	138	124	128	AF	138	127	139	131	119	120	123	114	116	120	123	116	93	95	98	79	78	66	55	115.0
14-Jan	14	25	24	11	19	11	13	15	11	3	9	9	15	12	6	20	21	16	22	25	35	51	50	45	18.8
15-Jan	24	8	26	3	12	26	44	313	42	61	48	43	52	68	63	69	87	95	118	168	136	142	156	174	55.8
16-Jan	315	344	308	276	254	248	256	252	347	26	40	15	15	327	300	296	269	253	243	AF	AF	235	225	225	288.9
17-Jan	225	226	226	216	209	191	192	213	217	205	196	200	173	174	171	182	159	152	171	161	159	163	163	168	175.2
18-Jan	174	164	161	162	159	160	165	161	169	171	174	172	175	174	180	187	185	188	187	175	182	188	182	194	171.2
19-Jan	213	218	224	231	259	279	296	321	5	28	11	12	358	352	356	8	19	19	12	9	4	1	357	6	354.6
20-Jan	6	12	6	7	21	27	18	20	71	116	144	181	191	191	197	194	169	178	181	176	177	180	178	182	166.2
21-Jan	183	191	185	174	176	175	179	184	174	166	161	168	160	166	153	148	151	156	155	153	166	174	171	187	167.8
22-Jan	192	204	222	223	239	245	251	232	12	26	34	30	28	30	17	360	5	15	42	55	55	63	58	72	12.0
23-Jan	41	48	39	43	51	67	76	125	133	142	152	171	183	190	187	188	186	176	183	177	196	200	205	208	170.0
24-Jan	212	222	213	216	209	219	224	250	262	260	261	244	244	239	229	232	233	249	285	357	16	6	6	9	248.7
25-Jan	6	358	0	2	188	185	194	207	198	185	175	189	198	192	194	200	202	193	187	201	209	216	214	223	202.2
26-Jan	227	224	216	217	215	209	219	217	211	209	212	219	211	218	211	212	217	225	249	251	250	254	259	263	238.7
27-Jan	258	264	274	280	298	312	336	340	338	355	12	5	29	26	47	48	68	112	122	139	153	150	158	153	314.6
28-Jan	156	166	179	159	149	151	144	159	167	175	177	195	209	212	221	213	199	199	207	217	244	255	252	253	196.9
29-Jan	253	255	279	306	306	283	307	300	286	291	295	299	295	294	286	281	275	284	285	277	290	258	250	245	282.5
30-Jan	259	246	240	215	220	239	257	264	331	349	355	350	348	341	360	2	11	7	3	359	352	356	2	356	336.3
31-Jan	354	347	354	358	1	2	358	3	354	350	0	2	359	348	348	349	349	0	359	2	10	358	347	336	355.8
	227.3	224.2	226.6	218.8	218.1	221.4	219.7	235.0	239.2	213.8	221.0	236.3	240.7	232.5	235.4	227.4	199.0	196.4	206.3	202.8	216.1	211.8	206.8	214.1	
	Diurnal Average																								

M - Maintenance AF - Analyzer Failure

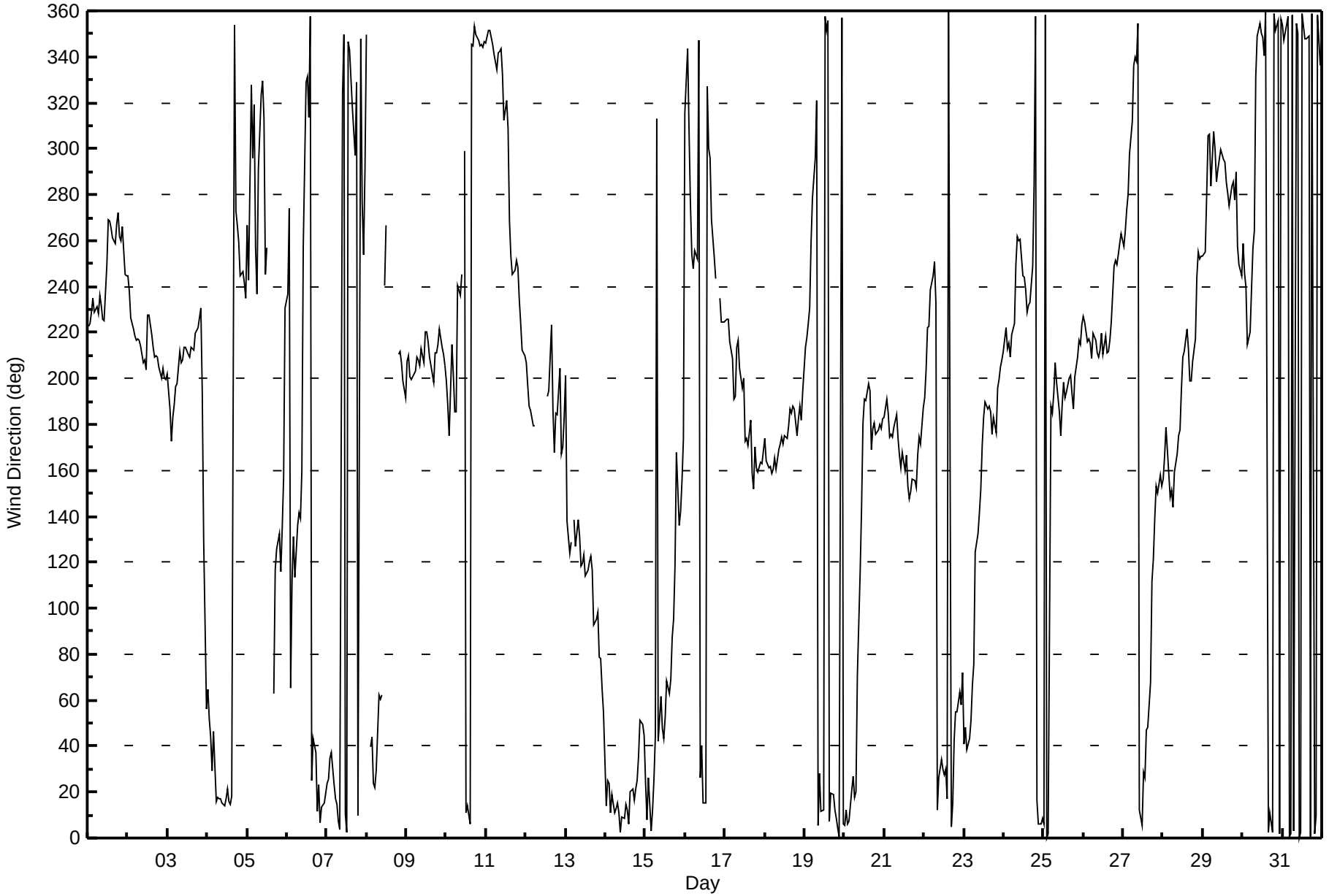
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Firebag - January 2016



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 93 deg on Jan 8 12:00

Minimum Value: 3 deg on Jan 16 23:00

Percentiles: P_1 = 5 P_{10} = 8 Q_1 = 9 Median = 11 Q_3 = 14 P_{90} = 22 P_{99} = 60

Hours in Service:	744
Hours of Data:	723
Hours of Missing Data:	21
Hours of Calibration:	0
Percent Operational Time:	97.2

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	8	8	10	9	9	10	9	9	8	8	9	8	11	9	9	9	8	8	9	11	8	9	10	16	16
2-Jan	9	13	9	9	9	8	6	9	11	7	9	6	9	9	8	8	6	6	7	5	5	4	5	5	13
3-Jan	6	7	6	6	9	5	6	7	7	6	6	7	7	8	7	7	6	10	9	7	13	18	41	18	41
4-Jan	15	16	23	6	11	9	6	8	7	8	9	8	9	9	9	8	28	9	4	16	7	10	8	9	28
5-Jan	14	35	32	20	16	22	10	24	9	15	39	25	50	AF	15	AF	25	22	27	28	19	13	17	89	89
6-Jan	21	33	48	50	35	22	15	23	23	60	45	22	24	29	16	13	11	19	14	13	13	11	12	12	60
7-Jan	13	15	14	13	15	15	17	18	23	15	31	20	20	21	22	47	28	28	24	29	26	32	31	23	47
8-Jan	23	AF	12	17	19	14	21	16	10	22	AF	93	25	AF	AF	AF	AF	AF	AF	60	10	10	8	8	93
9-Jan	10	10	8	8	8	8	9	10	7	9	9	11	11	10	10	12	9	9	9	9	10	9	10	9	12
10-Jan	9	6	12	16	13	17	13	29	17	47	AF	22	15	18	15	13	13	14	13	14	11	11	11	12	47
11-Jan	13	13	13	13	13	12	13	13	12	11	13	14	19	19	17	9	9	10	11	10	11	9	8	8	19
12-Jan	8	7	7	11	12	9	AF	AF	AF	AF	AF	AF	M	19	12	19	15	11	12	20	14	19	20	16	20
13-Jan	17	20	15	16	AF	12	13	14	16	11	13	12	11	13	15	13	12	12	12	11	15	17	16	16	20
14-Jan	28	16	11	10	12	12	11	9	12	14	13	12	12	15	13	12	11	11	10	11	11	11	10	14	28
15-Jan	17	10	25	13	13	14	18	35	27	11	11	11	19	13	13	13	15	9	36	39	12	12	46	59	59
16-Jan	27	19	17	76	45	21	32	9	69	36	11	23	29	32	22	37	28	10	4	AF	AF	24	3	6	76
17-Jan	6	7	7	11	12	13	7	11	8	8	10	10	12	8	8	12	12	14	9	8	8	8	8	8	14
18-Jan	9	9	8	8	9	9	9	10	10	9	8	8	9	9	9	10	9	7	6	8	10	7	10	11	11
19-Jan	9	10	10	10	25	19	12	19	12	12	13	15	14	15	20	15	13	12	12	12	11	12	11	12	25
20-Jan	12	14	12	11	12	12	24	24	29	15	50	9	7	6	9	10	6	10	9	11	9	10	8	9	50
21-Jan	7	7	9	7	9	9	10	8	8	8	9	9	10	9	9	10	10	9	11	12	11	8	9	8	12
22-Jan	7	10	10	9	13	13	22	32	16	10	11	11	19	17	19	15	21	14	14	13	13	13	13	20	32
23-Jan	12	17	14	17	11	20	25	17	15	13	13	10	14	7	10	7	8	8	8	10	7	7	8	10	25
24-Jan	16	12	8	9	8	9	11	13	11	11	12	11	10	11	9	8	12	13	14	25	12	13	14	13	25
25-Jan	14	14	18	47	90	11	9	9	9	8	11	10	9	10	10	8	8	7	7	8	8	8	10	9	90
26-Jan	7	9	12	10	9	10	8	8	8	8	9	11	11	10	9	10	10	13	9	8	8	9	10	11	13
27-Jan	10	10	11	15	13	12	14	12	11	12	13	14	16	16	13	16	16	15	13	16	17	15	16	12	17
28-Jan	11	8	10	9	11	9	10	8	8	7	7	12	7	7	12	9	11	8	9	11	11	9	9	9	12
29-Jan	9	10	15	13	13	11	16	12	11	11	11	11	12	13	12	10	8	10	10	8	10	14	7	5	16
30-Jan	7	12	11	8	9	8	8	14	20	12	12	12	12	12	15	13	14	12	14	14	12	13	14	12	20
31-Jan	12	11	13	11	13	14	14	12	12	12	13	14	12	14	15	13	11	12	12	13	13	11	21	19	21
	28	35	48	76	90	22	32	35	69	60	50	93	50	32	22	47	28	28	36	60	26	32	46	89	
	Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 12, 2016	Last Calibration	December 11, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Other:	Pump removal	
Start Time (MST)	10:50	End Time (MST)	13:20
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	797	804
Calculated slope	1.002388	0.981271	Chamber temp	45.0	45.2
Calculated intercept	-1.221674	-0.399822	Pressure	680.1	685.9
Analyzer Background	8.0	8.0	Flow	0.441	0.153
Analyzer Coefficient	0.950	0.950	Intensity	90	90

Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	58.3	574.8	586.0	0.981
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	58.3	574.8	586.0	0.981
second point	5000	29.3	288.9	294.7	0.980
third point	5000	14.7	144.9	149.3	0.971
as left zero					
as left span					
				Average Correction Factor	0.977

Corrected As found	586.4	Previous response	574.7	% change	-2.0%

Notes:

Completed as founds and 3 points to check linearity. Pump changed after third point.

Calibration Performed By: Devin Russell

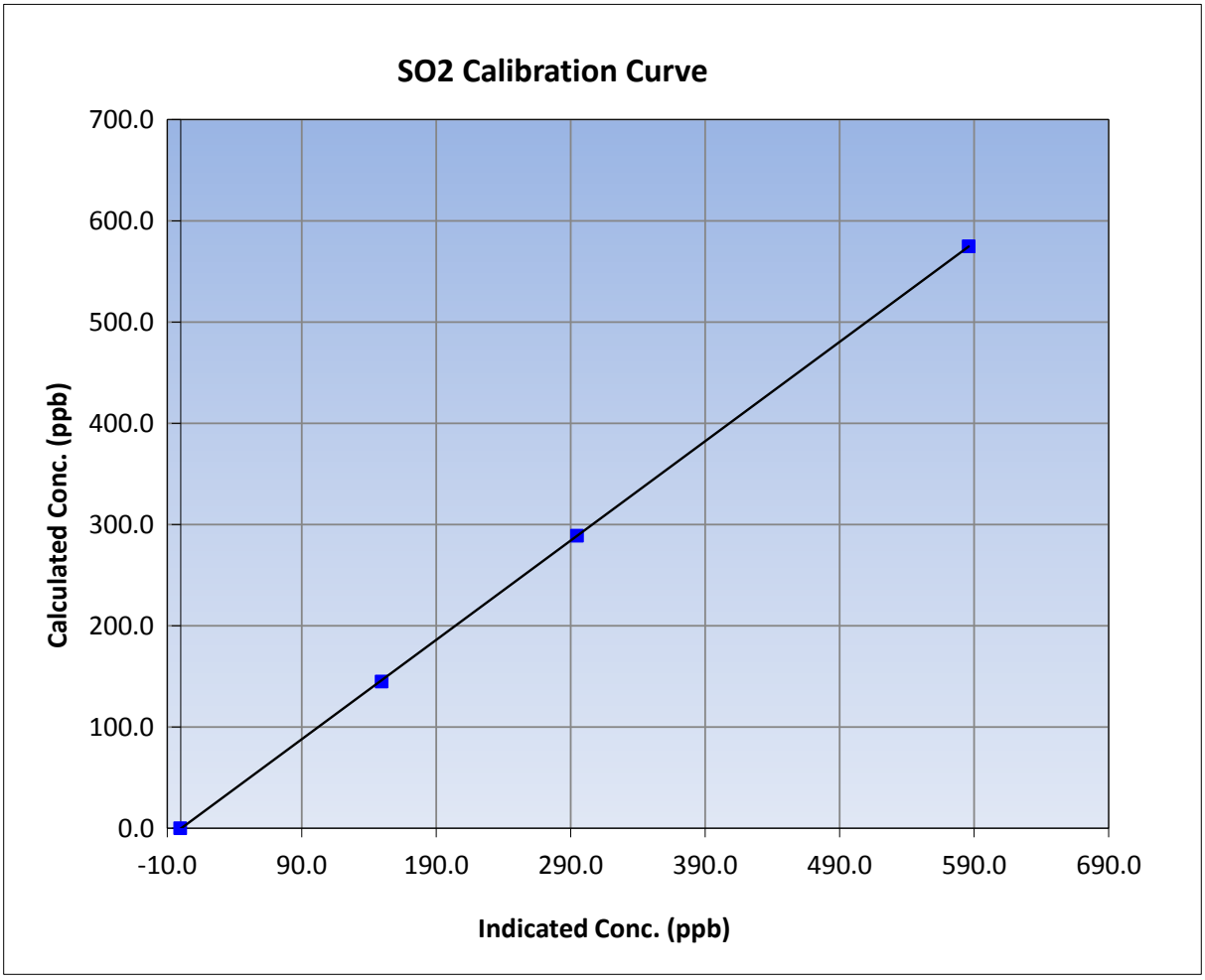
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

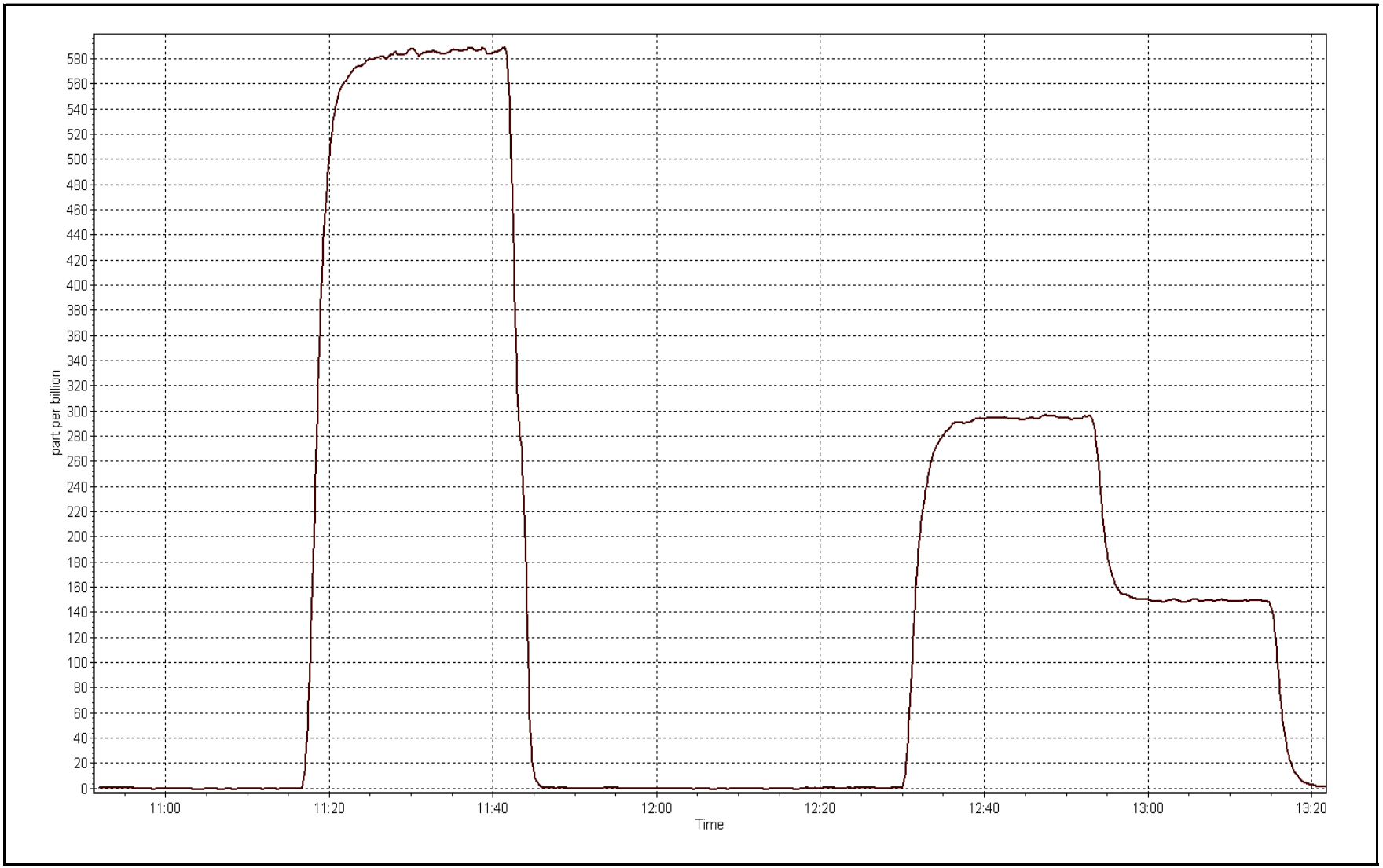
Calibration Date	January 12, 2016	Previous Calibration	December 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:50	End Time (MST)	13:20
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999989
574.8	586.0	0.9810		
288.9	294.7	0.9803	Slope	0.981271
144.9	149.3	0.9708		
			Intercept	-0.399822



SO2 Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 12, 2016	Last Calibration	January 12, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	13:30	End Time (MST)	15:37
Gas Cert Reference	SA130123A	Station temp.	Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-605	-606
Analyzer IP address	192.168.1.43		Lamp voltage	804	804
Calculated slope	0.981271	0.994510	Chamber temp	45.2	45.0
Calculated intercept	-0.399822	-1.022875	Pressure	685.9	678.6
Analyzer Background	8.0	8.0	Flow	0.153	0.442
Analyzer Coefficient	0.950	0.950	Intensity	90	90

Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	58.3	574.8	577.3	0.996
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	58.3	574.8	578.6	0.994
second point	5000	29.3	288.9	292.2	0.989
third point	5000	14.7	144.9	147.3	0.984
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	58.3	574.8	576.5	0.997
				Average Correction Factor	0.989

Corrected As found	577.0	Previous response	586.2	% change	1.6%

Notes:

Pump replaced previous to calibration. No adjustments made.

Calibration Performed By: Devin Russell

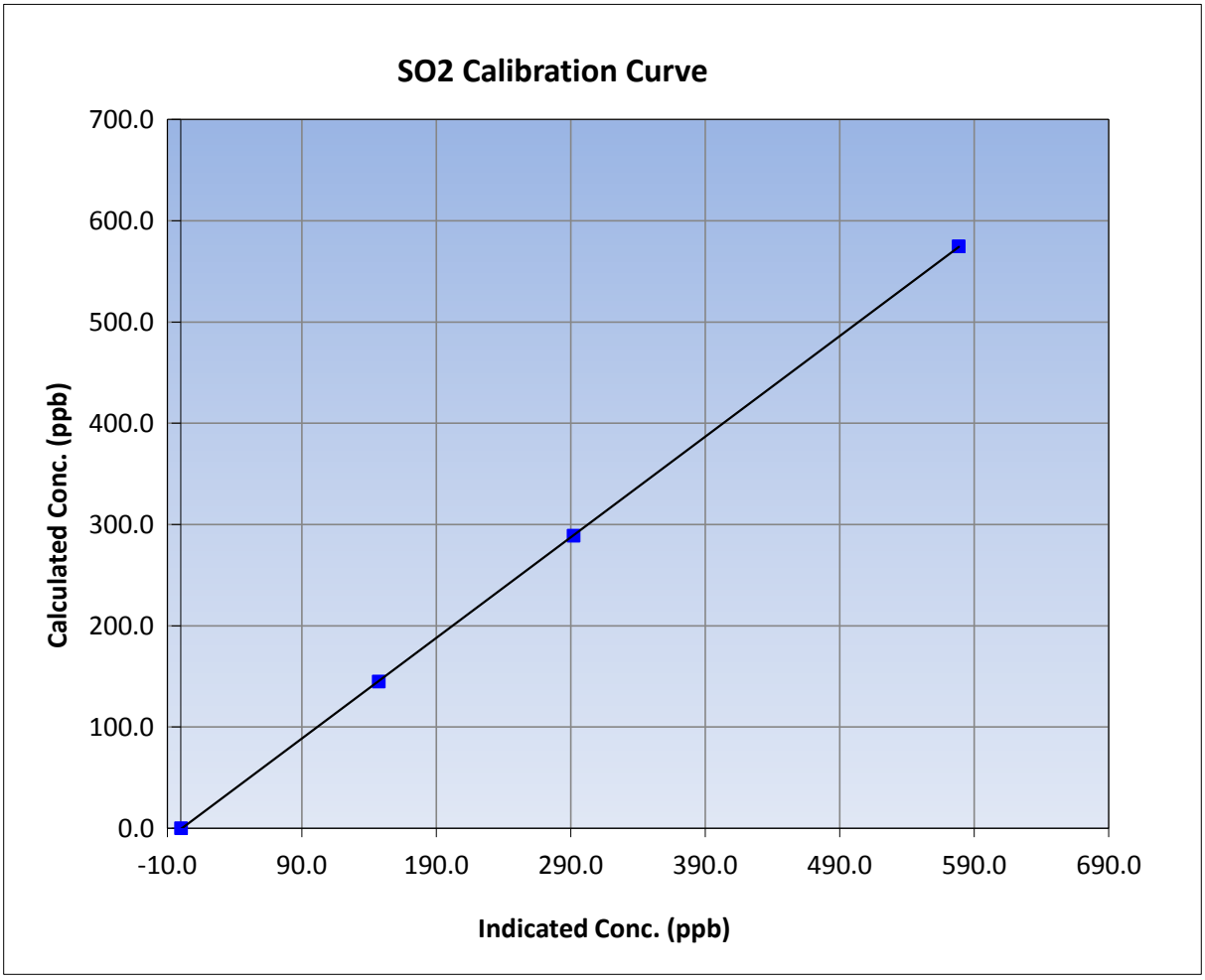
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

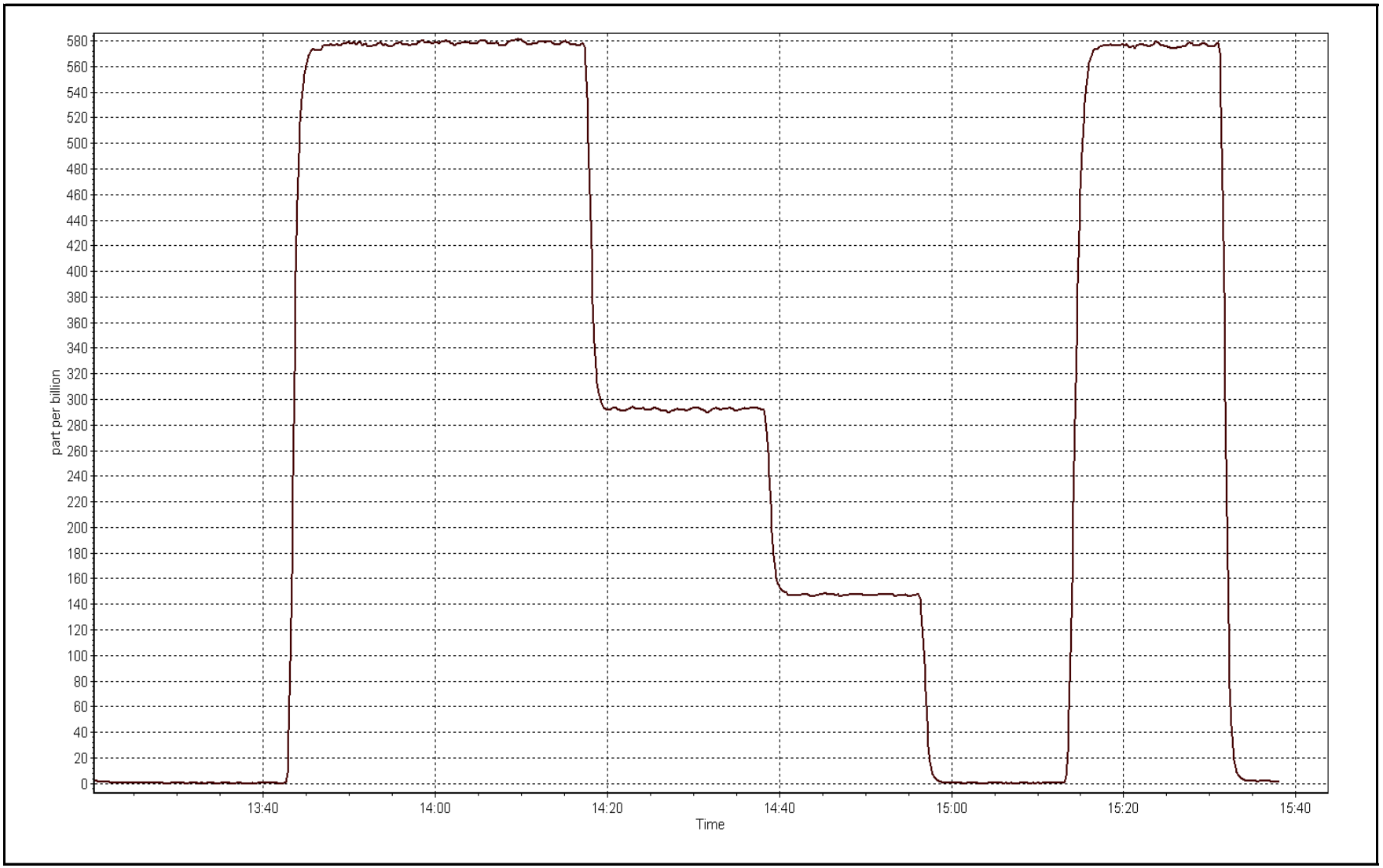
Calibration Date	January 12, 2016	Previous Calibration	January 12, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	13:30	End Time (MST)	15:37
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999992
574.8	578.6	0.9935		
288.9	292.2	0.9888	Slope	0.994510
144.9	147.3	0.9839		
			Intercept	-1.022875



SO2 Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 26, 2016	Last Calibration	December 9, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	12:25	End Time (MST)	15:05
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	933
Calculated slope	0.998275	0.998896	Chamber temp	45	45
Calculated intercept	-0.303998	-0.007297	Pressure	529.8	527.4
Analyzer Background	12.9	13	Flow	0.945	0.934
Analyzer Coefficient	1.131	1.146	Intensity	85	85
			Converter temp.	335	336

Analyzer make/model	Thermo 450i	Analyzer serial #	815129098
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	83.4	80.9	79.6	1.016
SO2 scrubber check	5000	15.2	149.9	1.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.4	80.9	80.9	1.000
second point	5000	41.8	40.5	40.8	0.994
third point	5000	21.0	20.4	20.5	0.996
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	83.4	80.9	80.6	1.003
				Average Correction Factor	0.997

Corrected As found	79.8	Previous response	81.3	% change	2.0%

Notes:

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

Calibration Performed By: Devin Russell

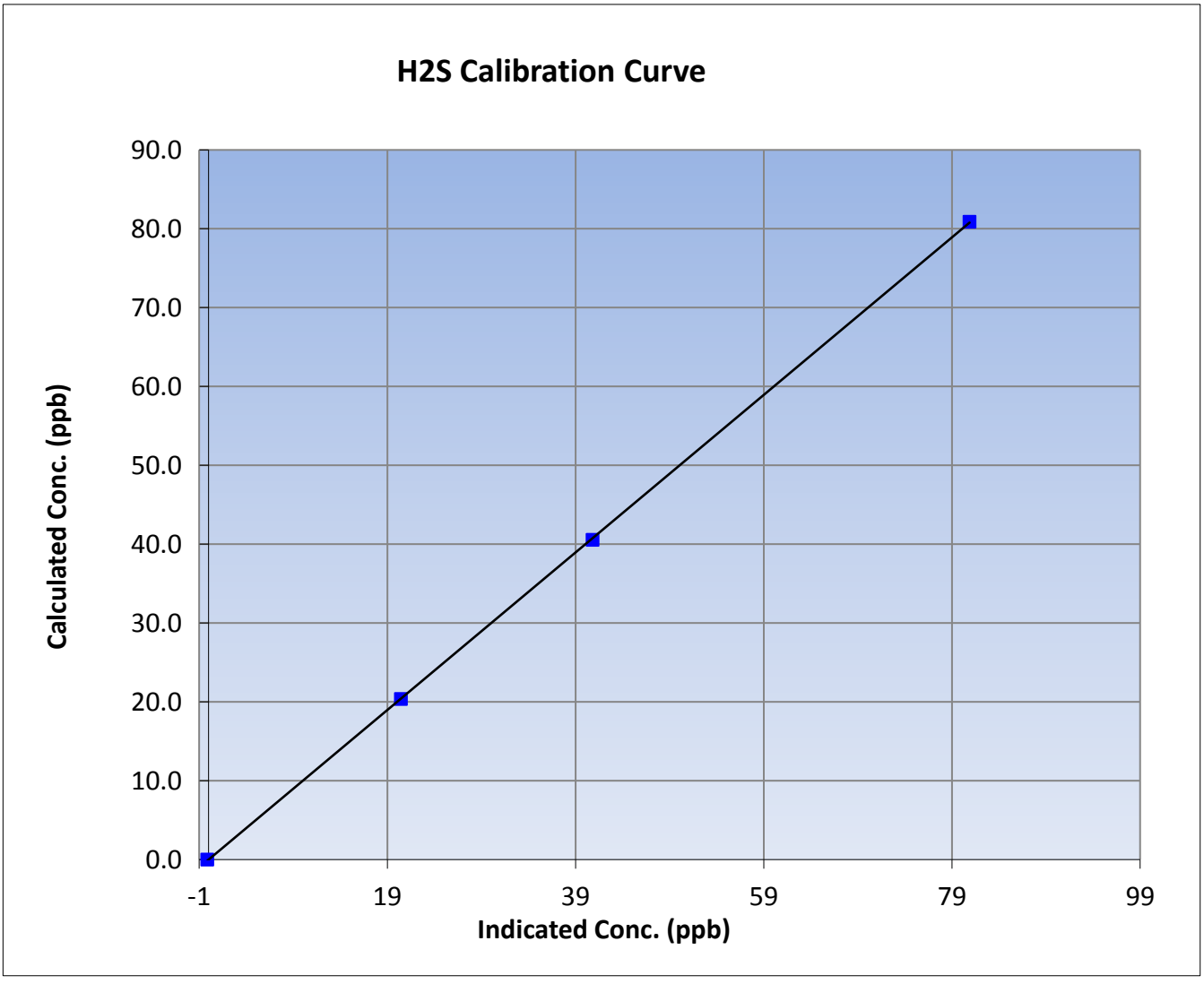
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

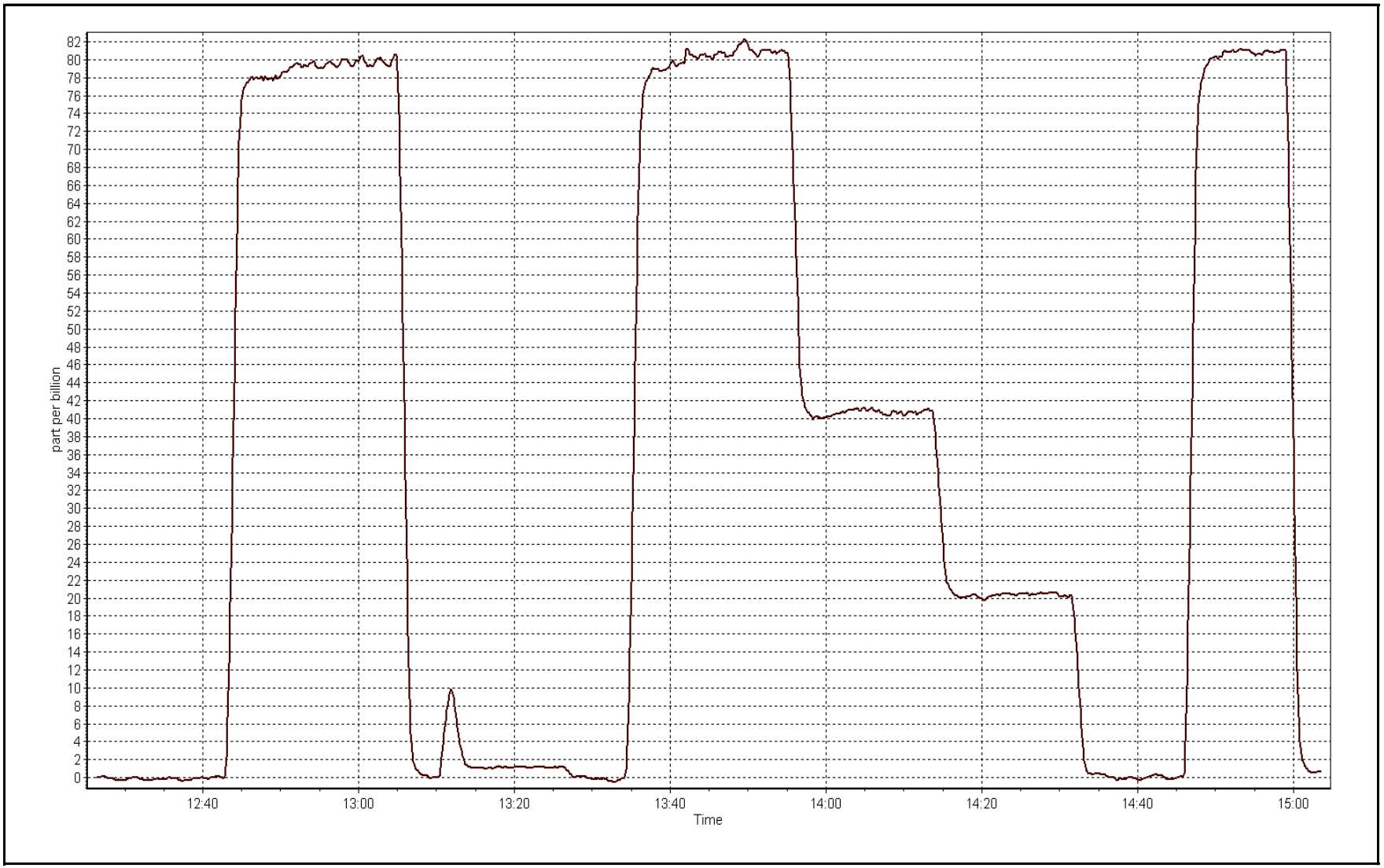
Calibration Date	January 26, 2016	Previous Calibration	December 9, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	12:25	End Time (MST)	15:05
Analyzer make	Thermo 450i	Analyzer serial #	815129098

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999979
80.9	80.9	1.0002		
40.5	40.8	0.9938	Slope	0.998896
20.4	20.5	0.9961		
			Intercept	-0.007297



H2S Calibration Plot Date: January 26, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January 12, 2016	Last Calibration	December 11, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	15:50
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.001316	1.001968	Fuel Pressure	23.0	23.0
Calculated intercept	0.009527	-0.074261	Analyzer Coeff	3.6	3.5
			Analyzer BKG	4.940	4.660

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.19	----
as found span	5000	58.3	12.74	11.39	1.118
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	58.3	12.74	12.76	0.998
second point	5000	29.3	6.40	6.49	0.986
third point	5000	14.7	3.21	3.32	0.967
as left zero	5000	0.0	0.00	0.11	----
as left span	5000	58.3	12.74	12.83	0.993
				Average Correction Factor	0.984

Corrected As found	11.58	Previous response	12.71	% change	9.8%

Notes:

Inlet filter changed after as founds. Pump changed after as founds. Zero and span adjusted.

Calibration Performed By: Devin Russell

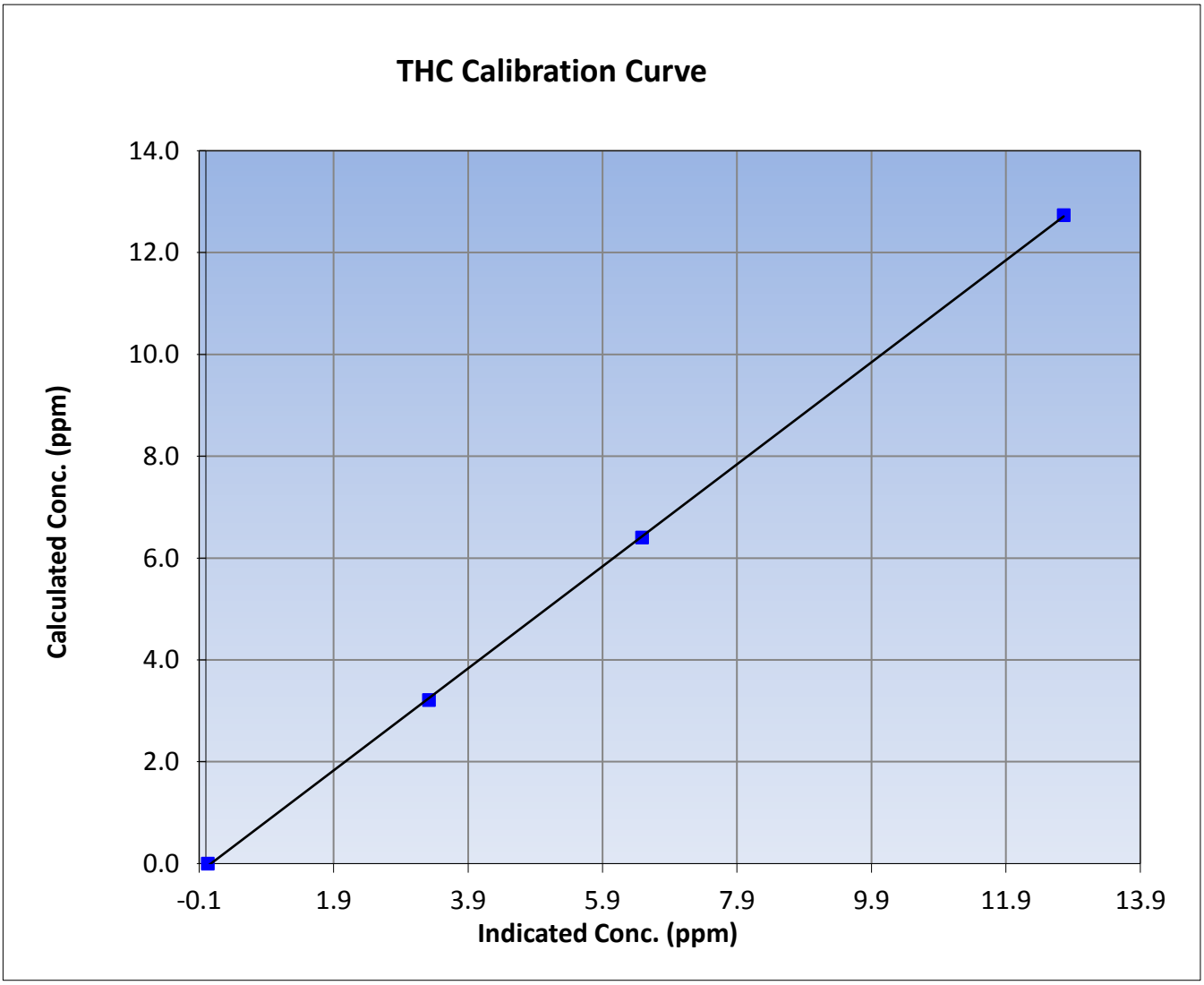
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

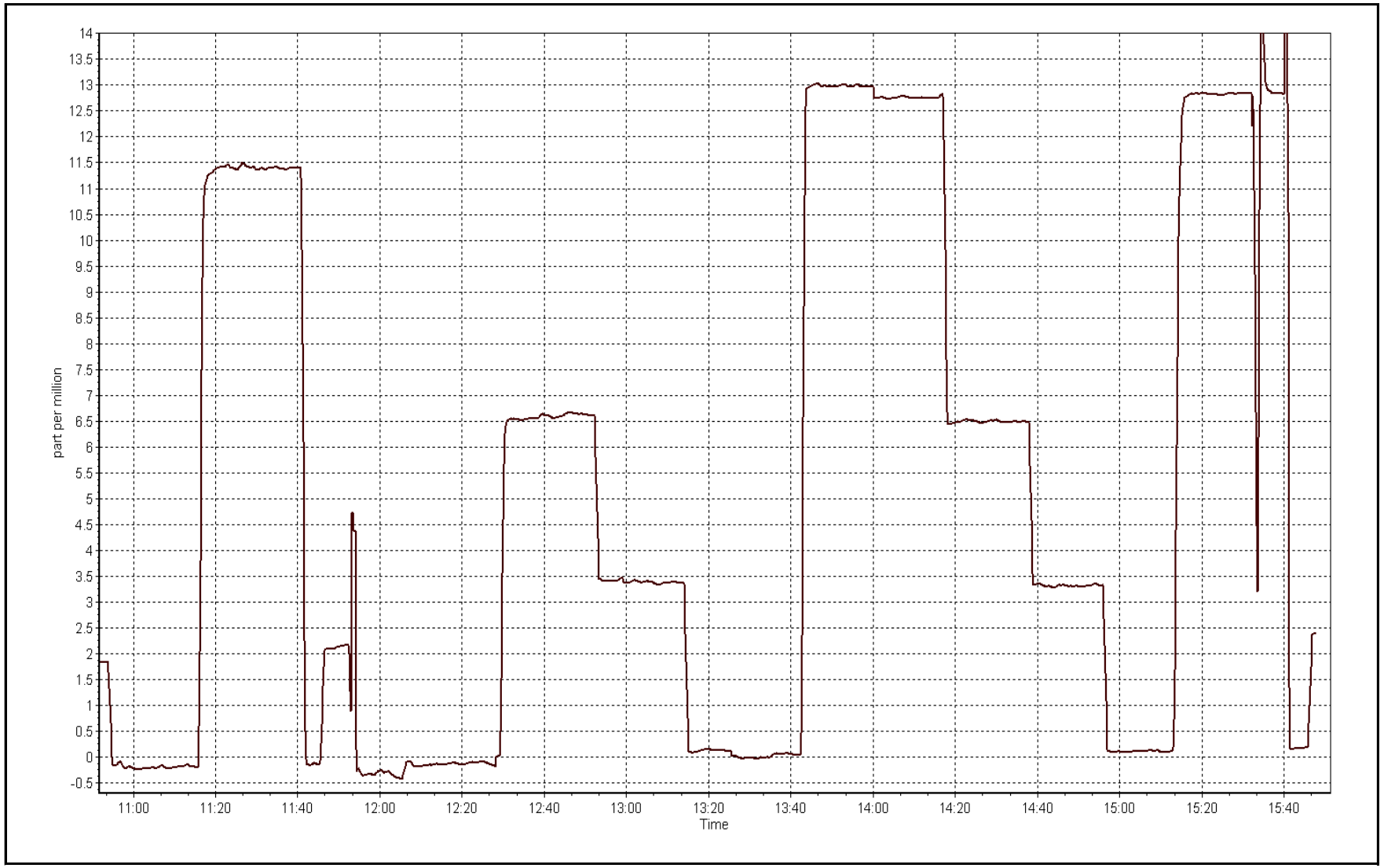
Calibration Date	January 12, 2016	Previous Calibration	December 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:50	End Time (MST)	15:50
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999943
12.74	12.76	0.9981		
6.40	6.49	0.9862	Slope	1.001968
3.21	3.32	0.9672		
			Intercept	-0.074261



THC Calibration Plot Date: January 12, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 14, 2016	Previous Calibration	December 11, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	15:50
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOx Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9037

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998066	0.997447	1.000659
	Data Offset	-0.678169	-0.387246	-0.211362
Current Calibration	Data Slope	1.000913	0.999663	0.997766
	Data Offset	-1.569337	-1.238367	-1.034755

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.897		0.926	
NOX coefficient	0.998		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.0		4.2	
NOX bkgrnd	4.1		4.3	
Chamber Temp	50.4	Deg C	50.8	Deg C
Moly Temp	326	Deg C	322.9	Deg C
PMT voltage	-780.3	V	-780.3	V
PMT Temp	-2.8	Deg C	-2.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	163.3	mmHg	166.7	mmHg
R Cell Press Nox	163.3	mmHg	166.7	mmHg
NO sample flow	0.61	lpm	0.618	lpm
Nox sample Flow	0.610	lpm	0.618	lpm

Notes:

Pump was not functioning properly due to low temperature inside the pump cabinet. Pump moved to lower shelf in cabinet, away from cold air. Cabinet doors opened to warm up to room temperature. Span adjusted.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 14, 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	-0.4	-0.3	-0.1	----	----
as found span	5000	58.3	600.5	600.5	0.0	519.3	519.0	0.2	1.1564	1.1569
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
high point	5000	58.3	600.5	600.5	0.0	600.6	601.2	-0.7	0.9999	0.9988
second point	5000	29.3	301.8	301.8	0.0	304.0	303.8	0.2	0.9928	0.9934
third point	5000	14.7	151.4	151.4	0.0	154.7	154.2	0.6	0.9785	0.9820
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	----	----
as left span	5000	58.3	600.5	306.9	293.6	613.9	304.3	309.6	0.9782	1.0086
								Average Correction Factor	0.9904	0.9914

Corrcted As found NO_X= 519.7 NO= 519.3 Percent Change NO_X= 15.9% NO= 16.0%

Previous Response NO_X= 602.3 NO= 602.4

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 58.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	306.9	302.2	609.9	306.9	302.9	0.9733	1.0000	0.9979	100.2%
2nd NO2 (200)	----	406.2	203.0	611.6	406.2	205.4	0.9706	1.0000	0.9882	101.2%
3rd NO2 (100)	----	506.1	103.1	611.9	506.1	105.6	0.9700	1.0000	0.9760	102.5%
4th NO2 (0)	609.2	----	0.8	610.0	609.2	0.8	0.9731	1.0000	N/A	----
					Average Correction Factor		0.9717	1.0000	0.9874	101.3%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

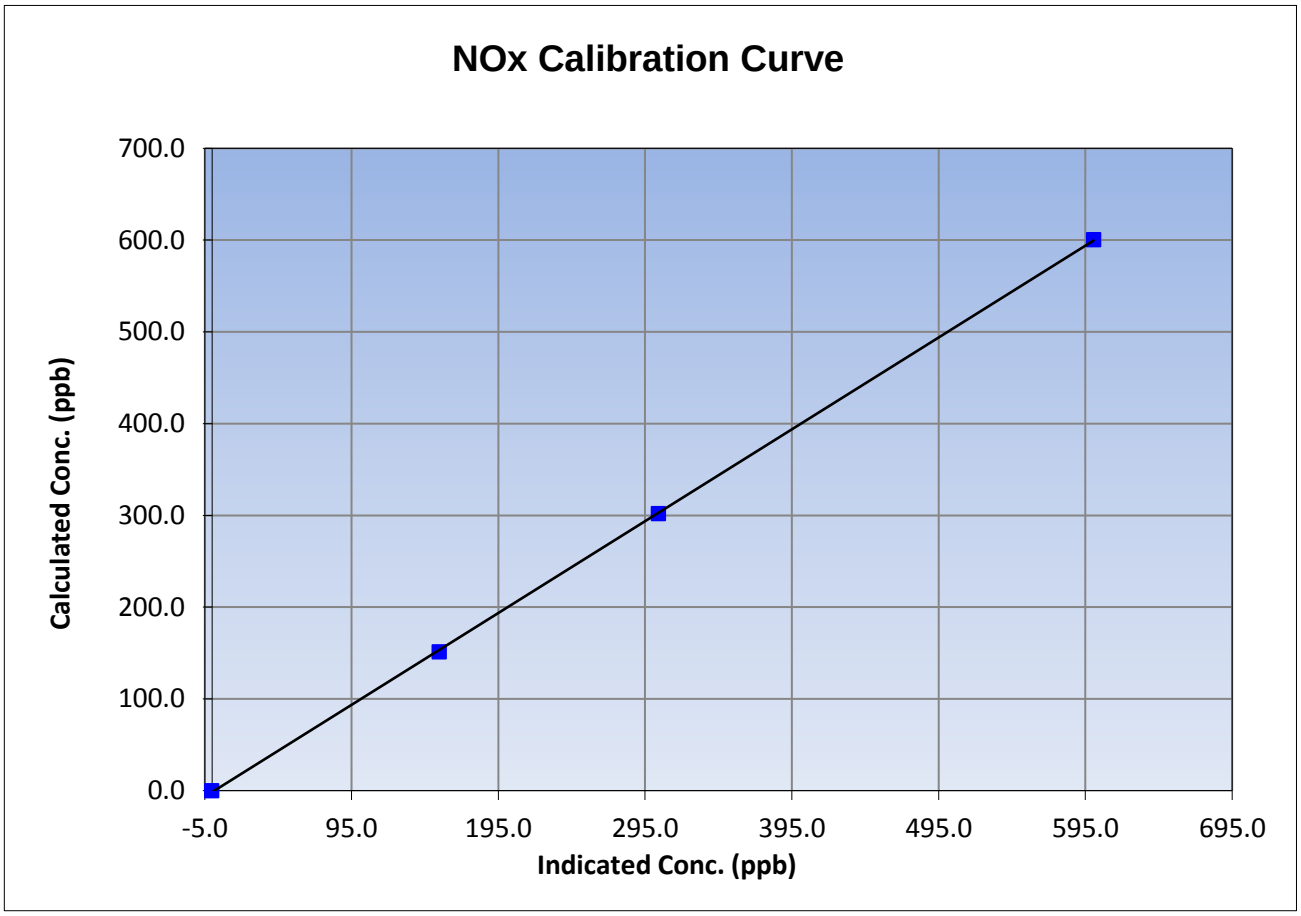
NO_X Calibration Summary

Station Information

Calibration Date	January 14, 2016	Previous Calibration	December 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:35	End Time (MST)	15:50
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	----	Correlation Coefficient	0.999955
600.5	600.6	0.9999		
301.8	304.0	0.9928	Slope	1.000913
151.4	154.7	0.9785		
			Intercept	-1.569337



Wood Buffalo Environmental Association

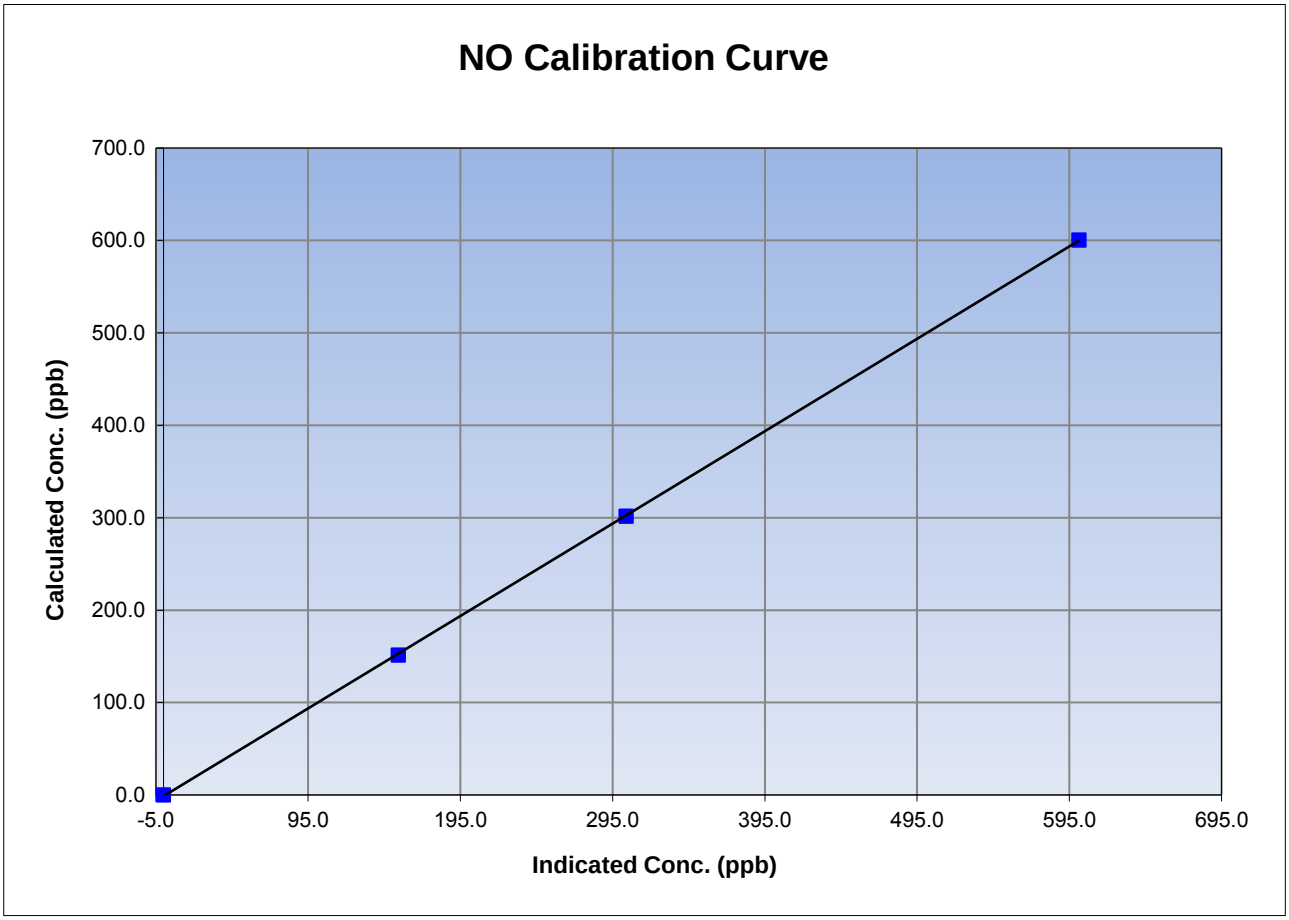
NO Calibration Summary

Station Information

Calibration Date	January 14, 2016	Previous Calibration	December 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:35	End Time (MST)	15:50
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	-0.2	N/A	Correlation Coefficient	0.999973
600.5	601.2	0.9988		
301.8	303.8	0.9934	Slope	0.999663
151.4	154.2	0.9820		
			Intercept	-1.238367



Wood Buffalo Environmental Association

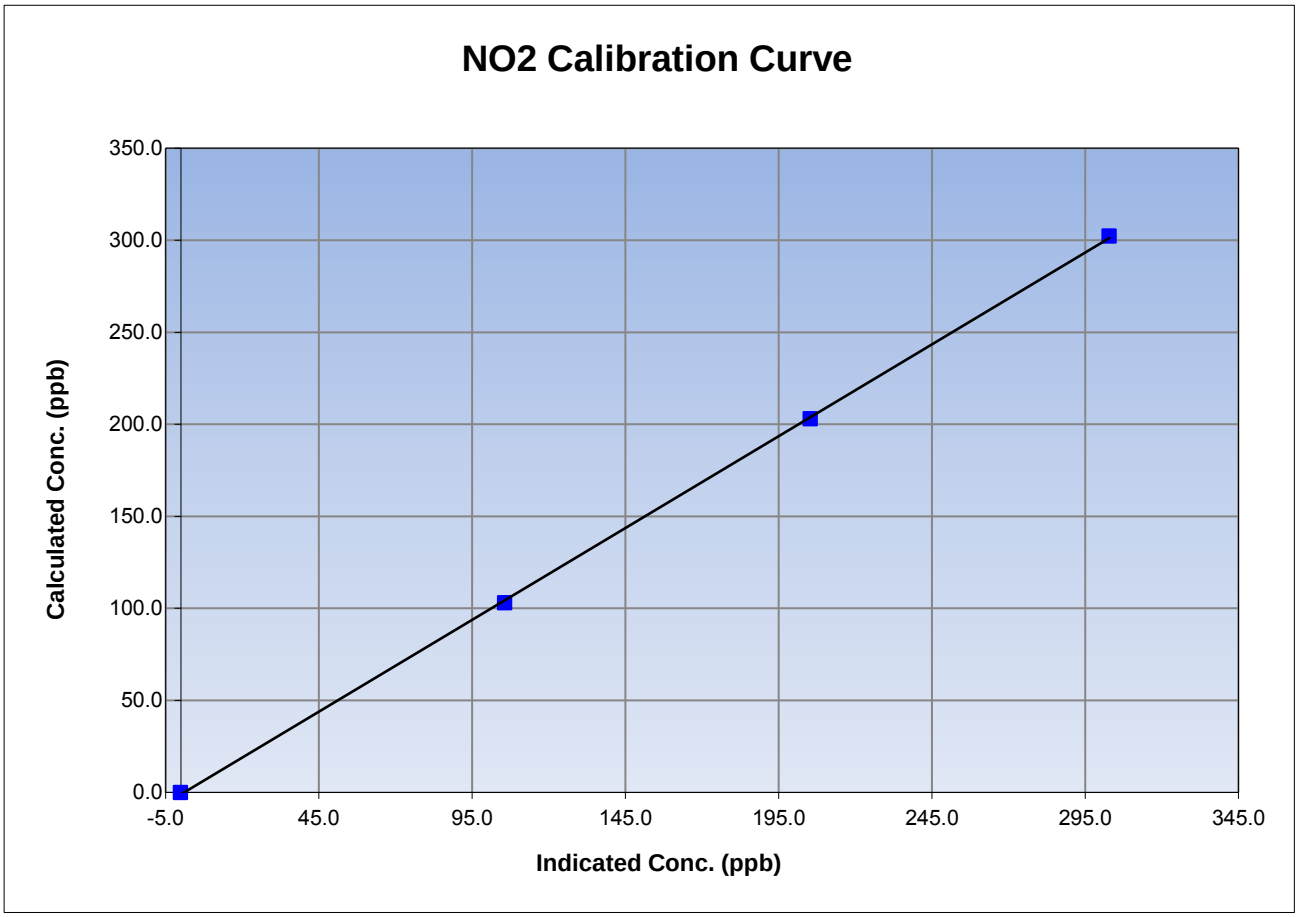
NO_2 Calibration Summary

Station Information

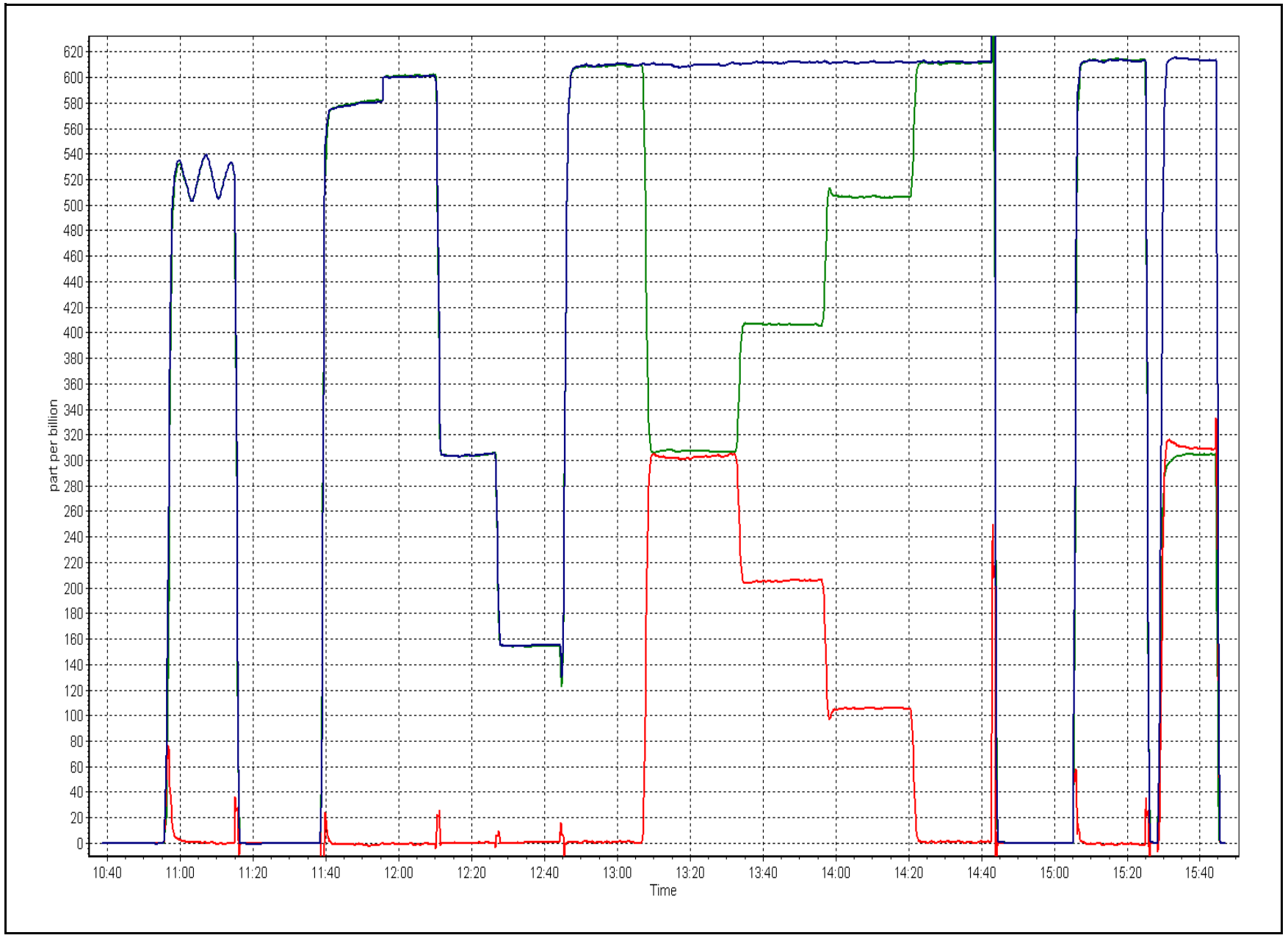
Calibration Date	January 14, 2016	Previous Calibration	December 11, 2015
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	10:35	End Time (MST)	15:50
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999904
302.2	302.9	0.9979		
203.0	205.4	0.9882	Slope	0.997766
103.1	105.6	0.9760		
			Intercept	-1.034755



NOX Calibration Plot Date: January 14, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 20
BRION MACKAY RIVER
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
JANUARY 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	582	29	29	100.00	44	0	3	0
H2S (ppb) Average	531	32	33	99.82	4	0	1	0
THC (ppm) Average	579	32	32	100.00	3	-	2.8	-
NO2 (ppb) Average	581	29	30	99.84	46	0	25	-
NO (ppb) Average	581	29	30	99.84	185	-	42	-
NOX (ppb) Average	581	29	30	99.84	209	-	67	-
Temperature 2 m (C) Average	419	0	0	100.00	5.6	-	2	-
Relative Humidity (%) Average	419	0	0	100.00	96	-	91	-
Wind Speed 10 m (km/h) Average	604	0	6	99.02	15	-	10	-
Wind Direction 10 m (deg) Average	604	0	6	99.02	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	582	1	3	-	0	0	0	0	1	2	44
H2S (ppb) Average	531	0.4	0	-	0	0	0	0	0	1	4
THC (ppm) Average	579	2.31	0.2	-	2	2.1	2.2	2.3	2.4	2.6	3
NO2 (ppb) Average	581	6.7	7	-	0	1	2	4	9	17	46
NO (ppb) Average	581	3.9	15	-	0	0	0	0	1	5	185
NOX (ppb) Average	581	10.6	20	-	0	1	2	5	10	22	209
Temperature 2 m (C) Average	419	-11.66	9.9	-	-36	-26.6	-15.7	-11.5	-4.6	2.1	5.6
Relative Humidity (%) Average	419	80.7	10	-	45	68	75	83	88	91	96
Wind Speed 10 m (km/h) Average	604	4.8	3	-	0	2	3	5	6	8	15
Wind Direction 10 m (deg) Average	604	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Jan 2016 01:00	06 Jan 2016 13:00	133	Not in Service
H2S	01 Jan 2016 01:00	08 Jan 2016 12:00	180	Not in Service
H2S	11 Jan 2016 13:00	11 Jan 2016 13:00	1	DAS collection error - data not recorded
THC	01 Jan 2016 01:00	06 Jan 2016 13:00	133	Not in Service
NO2, NO, NOX	01 Jan 2016 01:00	06 Jan 2016 13:00	133	Not in Service
NO2, NO, NOX	11 Jan 2016 13:00	11 Jan 2016 13:00	1	DAS collection error - data not recorded
Temperature/ Relative Humidity	01 Jan 2016 01:00	14 Jan 2016 13:00	325	Not in Service
Wind Speed, Wind Direction	01 Jan 2016 01:00	06 Jan 2016 14:00	134	Not in Service
Wind Speed, Wind Direction	08 Jan 2016 22:00	08 Jan 2016 22:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	15 Jan 2016 02:00	15 Jan 2016 02:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	15 Jan 2016 18:00	15 Jan 2016 18:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 16:00	16 Jan 2016 16:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	23 Jan 2016 17:00	23 Jan 2016 18:00	2	Flat line in sensor output signal - sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 44 ppb on Jan 6 19:00 Maximum Daily Average: 3.3 ppb on Jan 22

Minimum Value: 0 ppb on Jan 9 07:00 Minimum Daily Average: 0.0 ppb on Jan 29
Maximum Diurnal Average: 2.3 ppb at hour 19 Minimum Diurnal Average: 0.4 ppb at hour 6
Monthly Average: 1.0 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 12$

Hours in Service: 611
Hours of Data: 582
Hours of Missing Data: 29
Hours of Calibration: 29
Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	32	44	11	16	2	0	0	--	44
7-Jan	Z	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	1	0	1	2	1	0	0	0	0.4	2
8-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0.3	1
9-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	2	1	0	0.7	3
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	1	1	2	2	0.7	2
14-Jan	3	Z	1	4	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0.8	5
15-Jan	2	1	Z	0	0	0	0	0	0	0	0	0	2	1	1	1	0	1	0	0	0	0	0	0	0.6	2
16-Jan	0	0	1	Z	1	1	1	1	1	1	0	1	1	2	1	1	0	0	0	0	1	1	0	0	0.7	2
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Jan	0	0	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	6	8	8	8	2	1	1	1	1	1	1.7	8
20-Jan	1	Z	2	0	0	0	2	9	9	8	6	5	6	5	2	2	2	2	2	1	1	0	0	0	2.9	9
21-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	3	3	3	2	1	1	1	1	1	1	1	1	1.0	3
22-Jan	1	1	1	Z	0	0	0	0	0	1	0	1	4	6	9	11	14	8	3	4	6	2	2	1	3.3	14
23-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0.7	1
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
25-Jan	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1
28-Jan	1	0	0	Z	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	12	4	6	12	1.7	12
31-Jan	Z	8	9	9	3	3	3	2	4	3	2	0	0	0	0	1	1	0	0	0	0	0	1	1	2.2	9
	0.6	0.7	0.9	0.8	0.5	0.4	0.4	0.7	0.8	0.7	0.7	0.6	0.9	0.9	1.1	1.2	1.3	2.2	2.3	1.1	1.7	0.7	0.7	1.0	Diurnal Average	
	3	8	9	9	3	3	3	9	9	8	6	5	6	6	9	11	14	32	44	11	16	4	6	12	Diurnal Maximum	

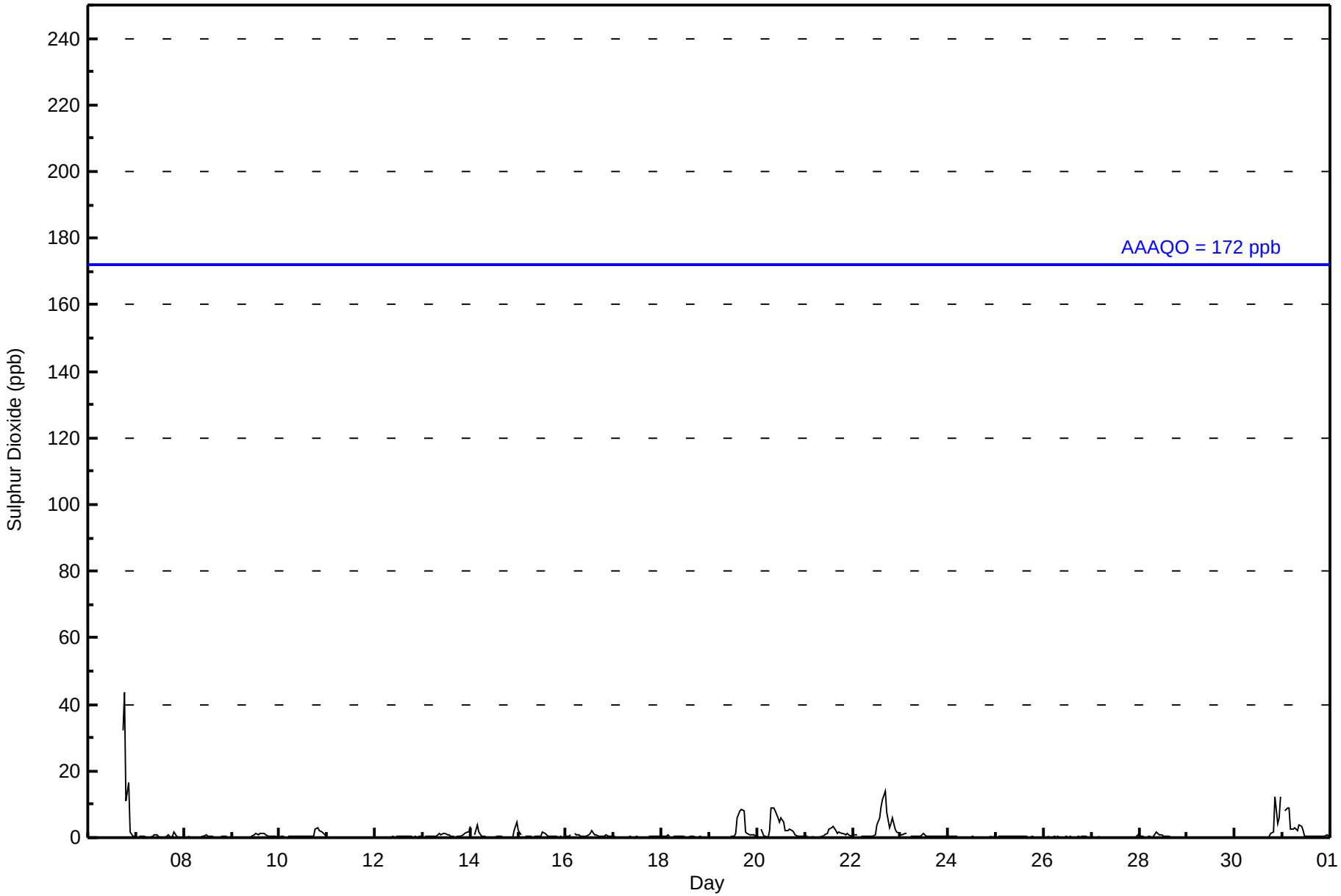
Z - zerospan C - Calibration NS - Not in Service
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - January 2016



Sulphur Dioxide (SO_2) - ppb
Brion MacKay River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	574	98.63	98.63
11 - 20	6	1.03	99.66
21 - 60	2	0.34	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: 582

Total Number of Hours: 624

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	22	59	47	19	10	13	60	68	65	36	30	44	36	36	14	9	568
11 - 20	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	6
21 - 60	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	61	50	20	10	13	60	68	65	36	30	44	36	36	14	9	576

Total Number of Valid Hours: 576

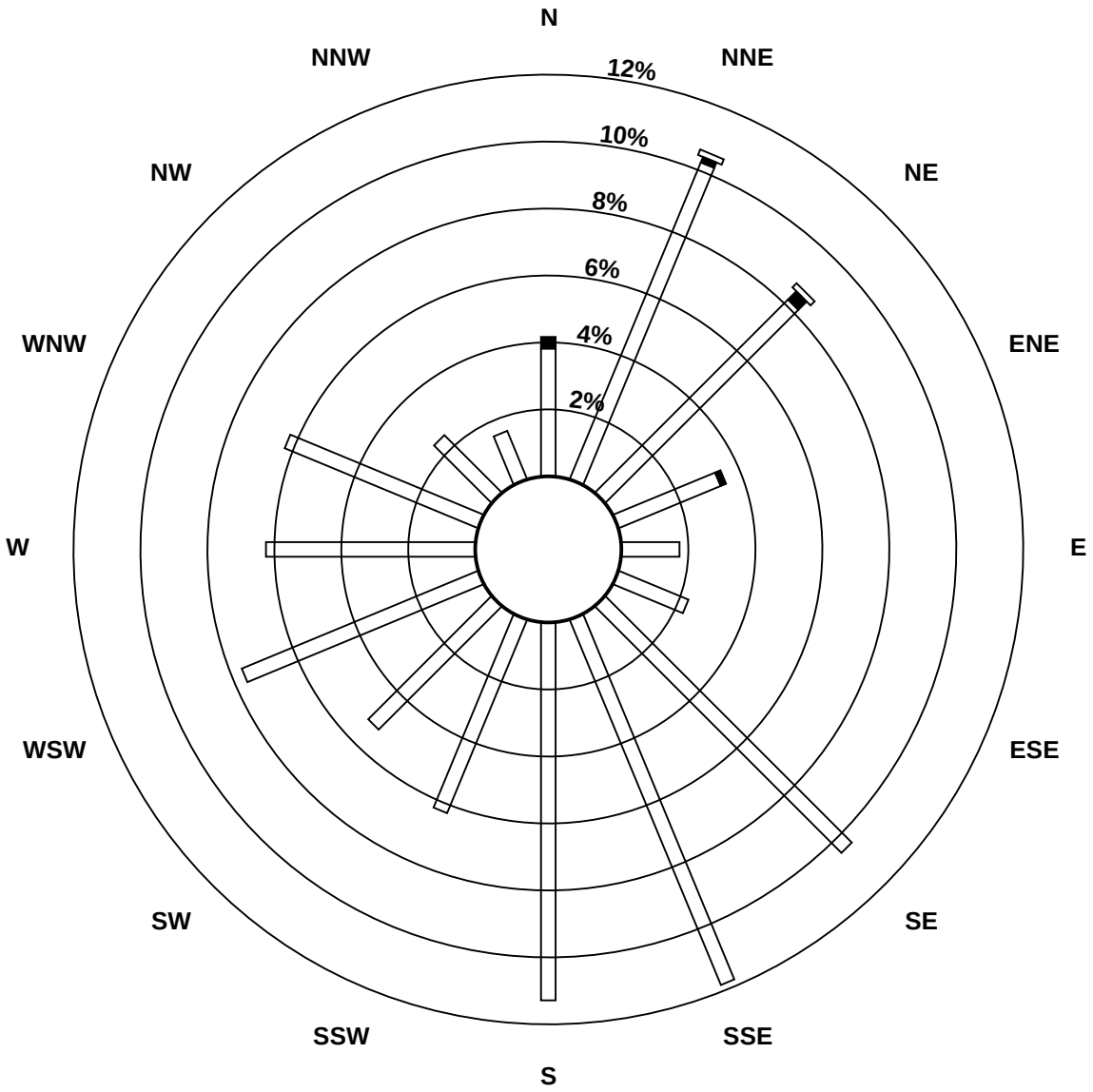
Total Number of Hours: 624

Wood Buffalo Environmental Association

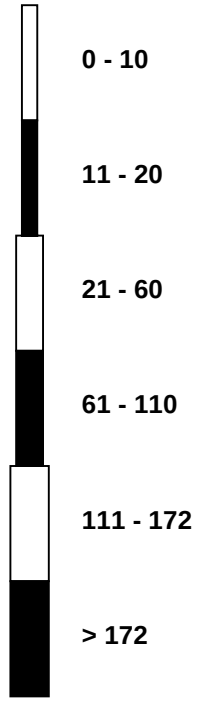
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



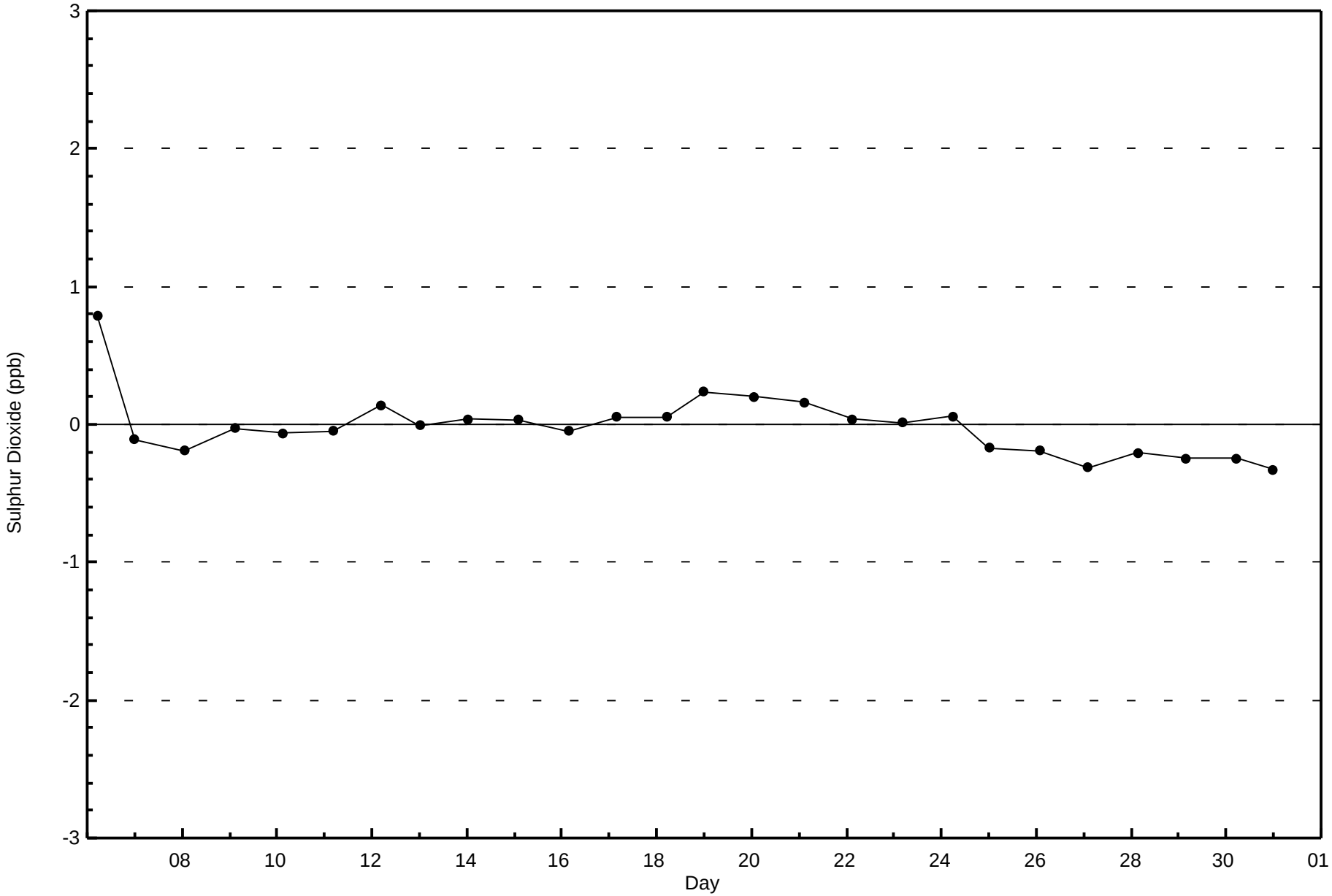
Total Number of Valid Hours: 576

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - January 2016

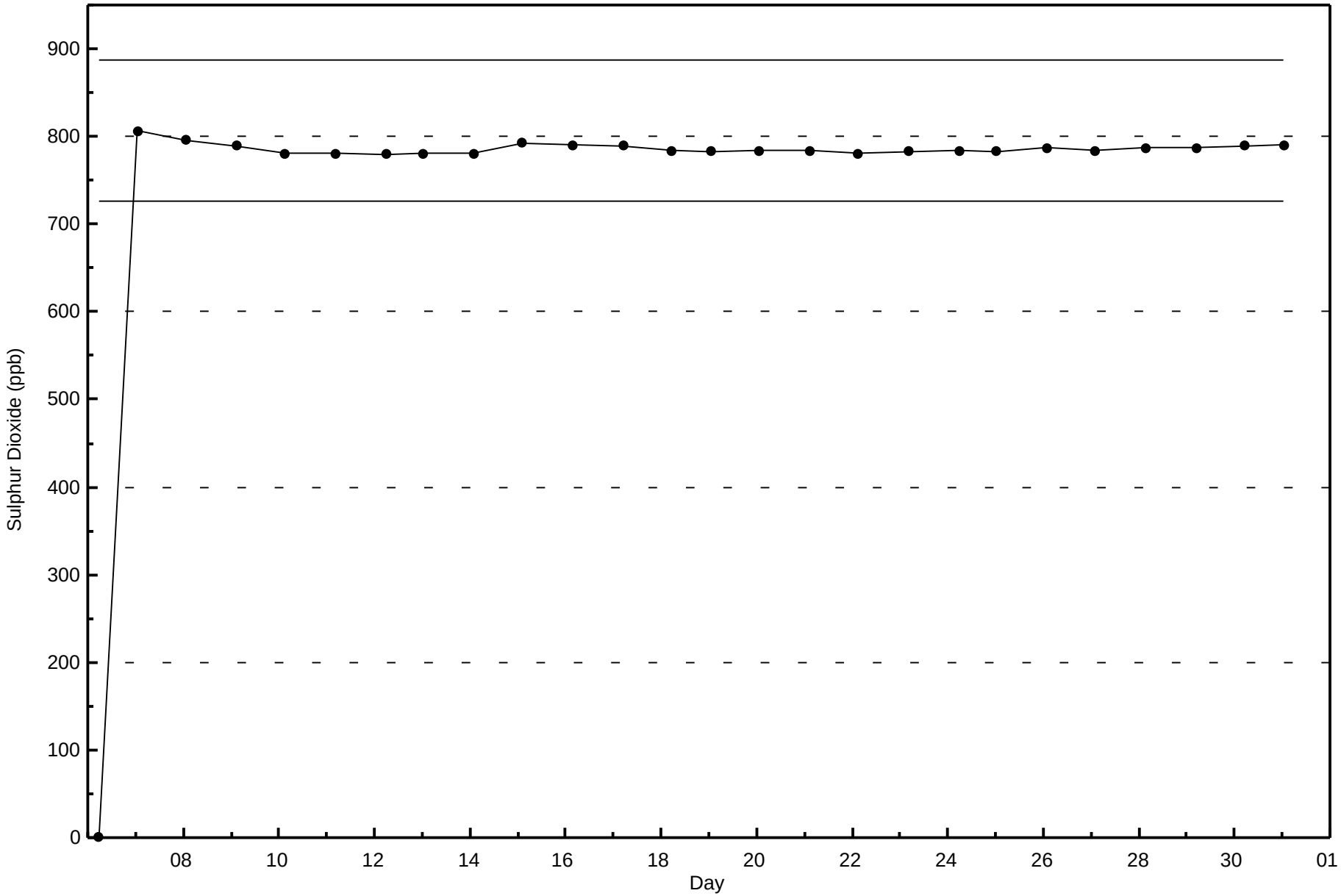


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 4 ppb on Jan 16 04:00 Maximum Daily Average: 1.4 ppb on Jan 16

Minimum Value: 0 ppb on Jan 11 16:00 Minimum Daily Average: 0.2 ppb on Jan 25

Maximum Diurnal Average: 0.5 ppb at hour 4 Minimum Diurnal Average: 0.3 ppb at hour 12

Monthly Average: 0.4 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 2$

Hours in Service:	564
Hours of Data:	531
Hours of Missing Data:	33
Hours of Calibration:	32
Percent Operational Time:	99.8

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

Z - zerospan C - Calibration DF - DAS Failure NS - Not in Service

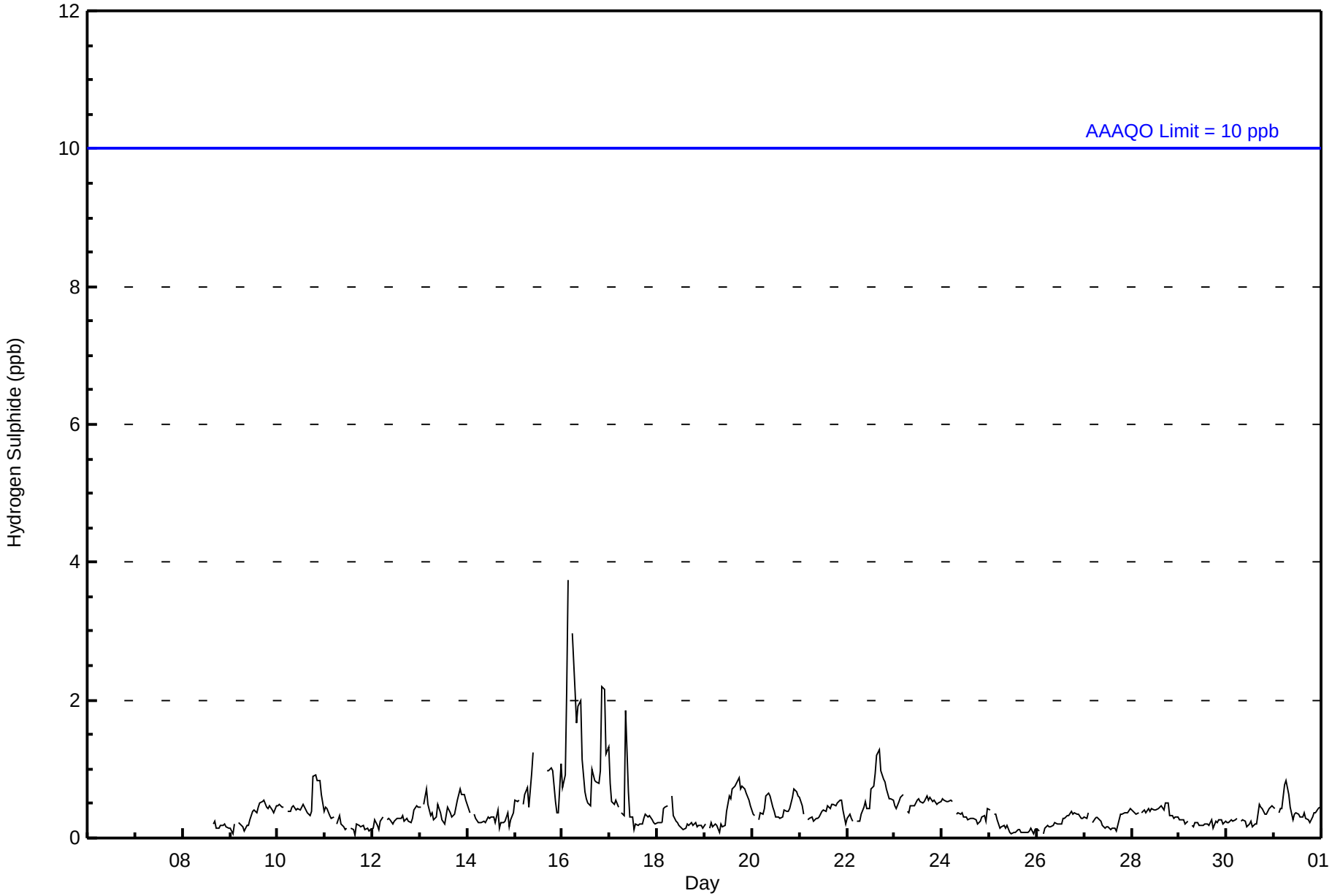
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	529	99.62	99.62
3 - 4	2	0.38	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: 531

Total Number of Hours: 624

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	15	47	47	16	10	12	58	65	64	36	27	39	35	32	10	10	523
3 - 4	0	0	0	0	0	0	1	1	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	15	47	47	16	10	12	59	66	64	36	27	39	35	32	10	10	525

Total Number of Valid Hours: 525

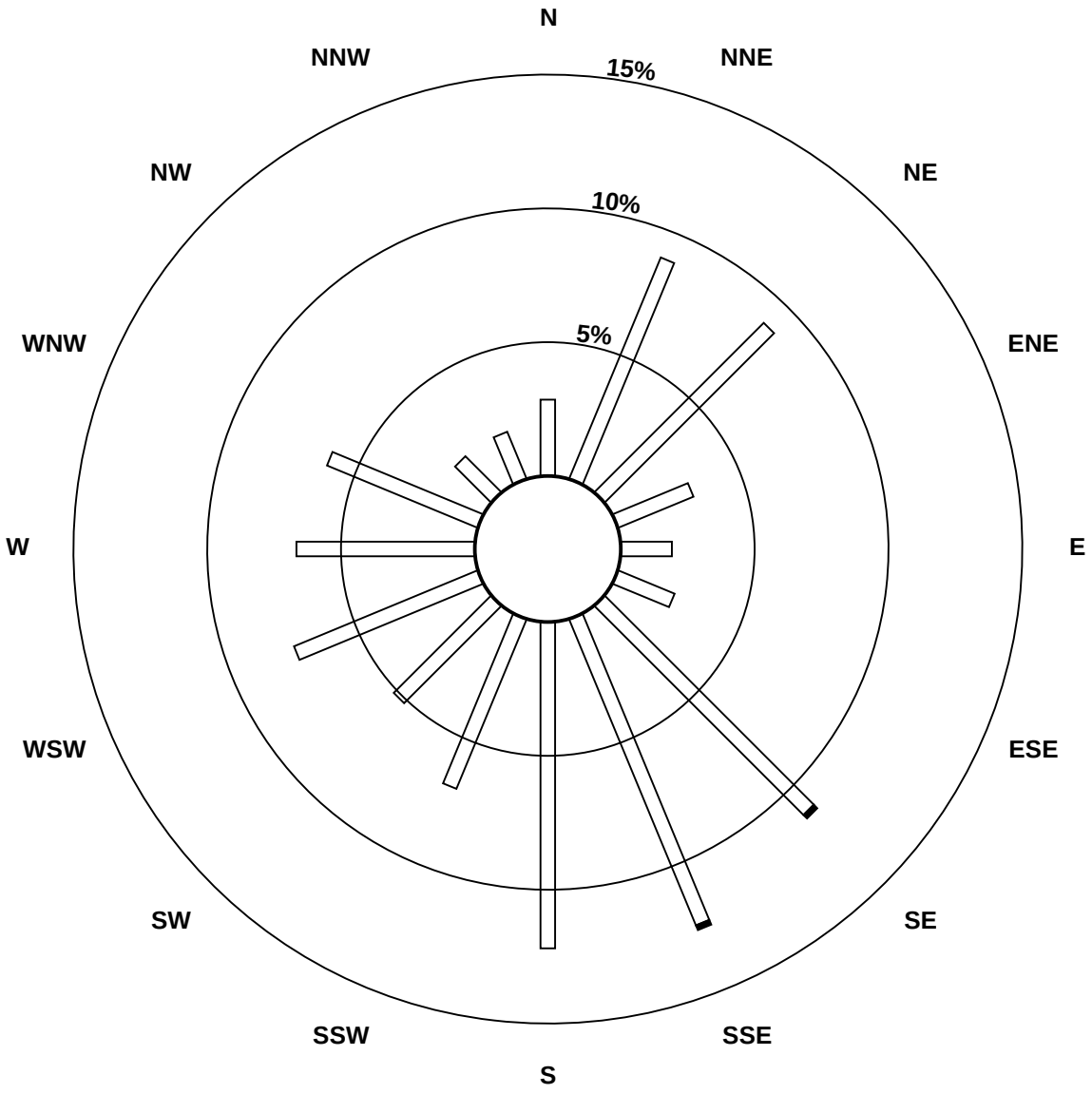
Total Number of Hours: 624

Wood Buffalo Environmental Association

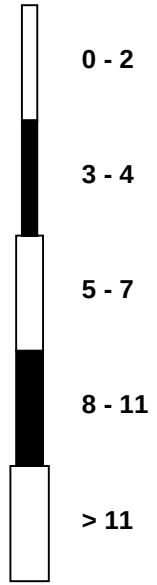
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



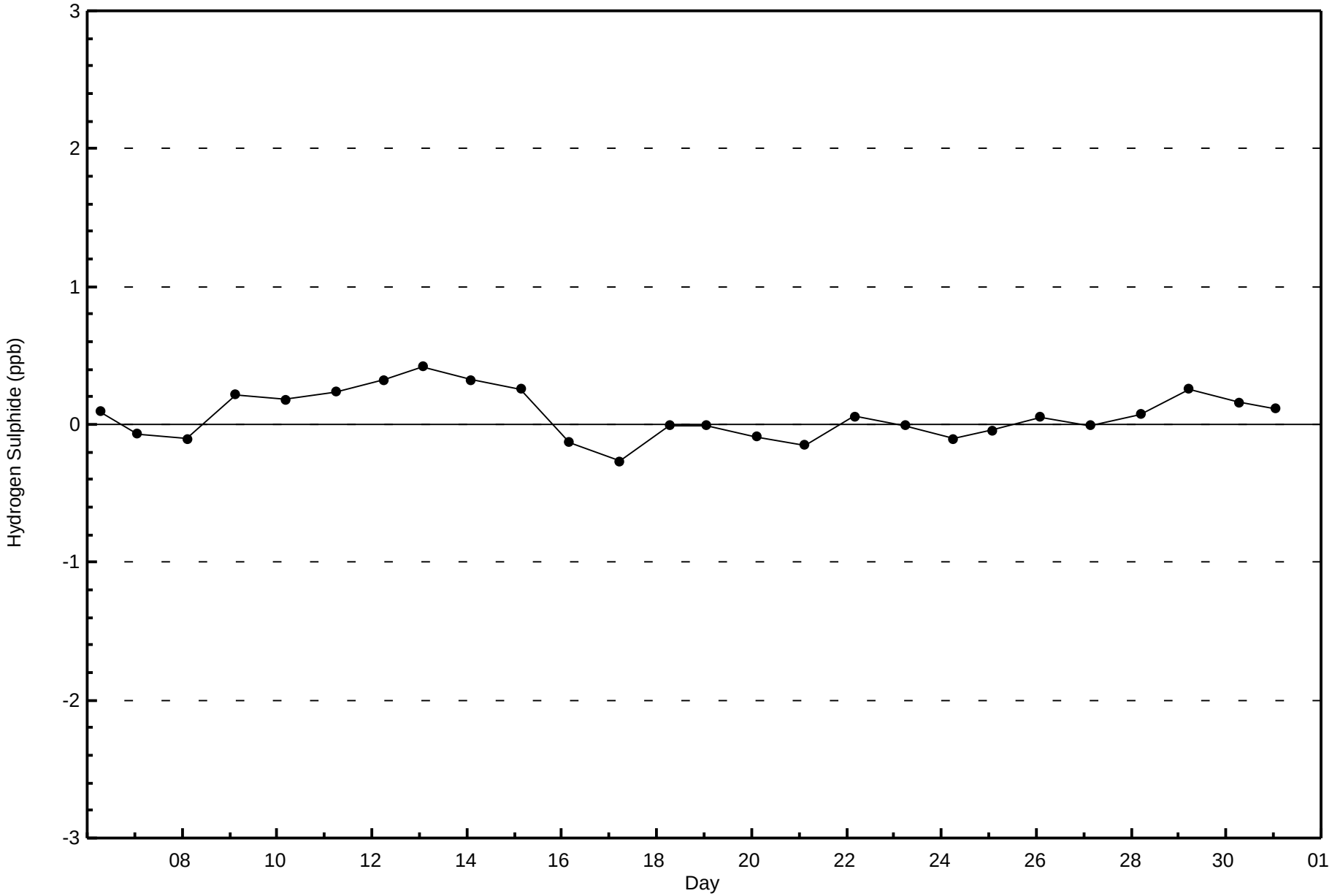
Total Number of Valid Hours: 525

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - January 2016

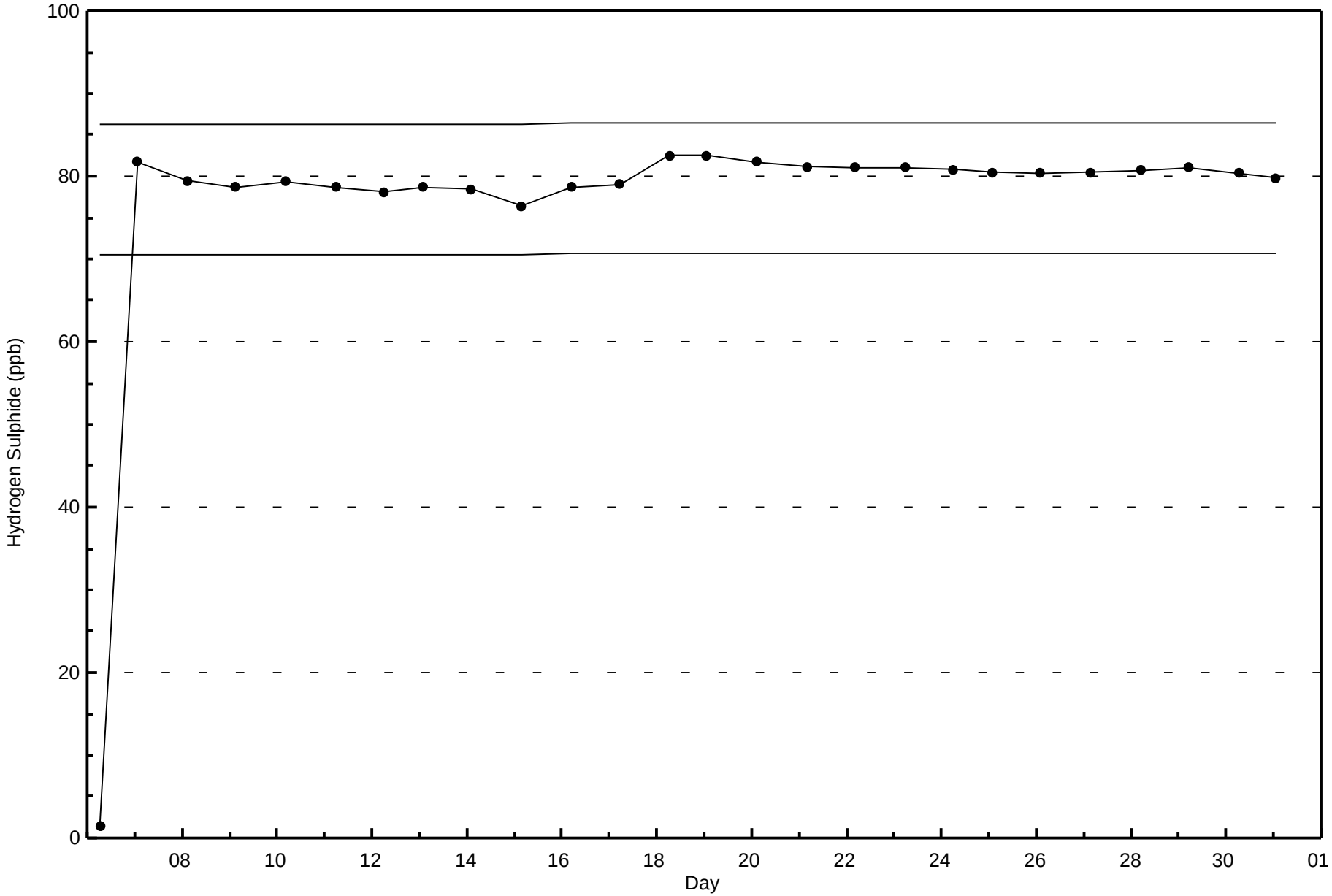


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Brion MacKay River - January 2016

Maximum Value: 3.0 ppm on Jan 22 17:00

Maximum Daily Average: 2.8 ppm on Jan 22

Minimum Value: 2.0 ppm on Jan 29 00:00

Minimum Daily Average: 2.1 ppm on Jan 29

Maximum Diurnal Average: 2.4 ppm at hour 19

Minimum Diurnal Average: 2.3 ppm at hour 8

Monthly Average: 2.31 ppm

Percentiles: P_1 = 2.0 P_{10} = 2.1 Q_1 = 2.2 Median = 2.3 Q_3 = 2.4 P_{90} = 2.6 P_{99} = 2.9

Hours in Service:	611
Hours of Data:	579
Hours of Missing Data:	32
Hours of Calibration:	32
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	2.8	2.8	2.7	2.3	2.2	2.2	2.2	--	2.8
7-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2
8-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
9-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3
10-Jan	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.8	2.8	2.6	2.6	2.5	2.3	2.4	2.8
11-Jan	2.3	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
12-Jan	2.2	2.2	2.2	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.3
13-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.5	2.5	2.4	2.3	2.3	2.5
14-Jan	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	C	C	C	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.3
15-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4
16-Jan	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5
17-Jan	2.3	2.3	2.3	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.3
18-Jan	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.6	2.6	2.6	2.6	2.4	2.6
19-Jan	Z	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.7	2.8	2.8	2.8	2.9	2.8	2.8	2.8	2.6	2.6	2.7	2.7	2.6	2.6	2.9
20-Jan	2.5	Z	2.5	2.5	2.5	2.4	2.4	2.6	2.6	2.6	2.5	2.5	2.4	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.6
21-Jan	2.4	2.4	Z	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.8	2.8	2.8	2.8	2.7	2.8	2.8	2.8	2.7	2.7	2.7	2.6	2.6	2.6	2.8
22-Jan	2.6	2.6	2.6	Z	2.7	2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8	3.0	3.0	3.0	3.0	2.9	2.8	2.7	2.7	2.7	2.8	3.0
23-Jan	2.6	2.6	2.7	2.7	Z	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7
24-Jan	2.6	2.6	2.6	2.6	2.6	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.6
25-Jan	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
26-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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
27-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.2	2.4
28-Jan	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.3
29-Jan	2.0	2.0	2.0	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
30-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.5	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.5
31-Jan	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	Diurnal Average	
	2.6	2.6	2.7	2.7	2.7	2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8	3.0	3.0	3.0	3.0	2.9	2.8	2.7	2.7	2.7	Diurnal Maximum	

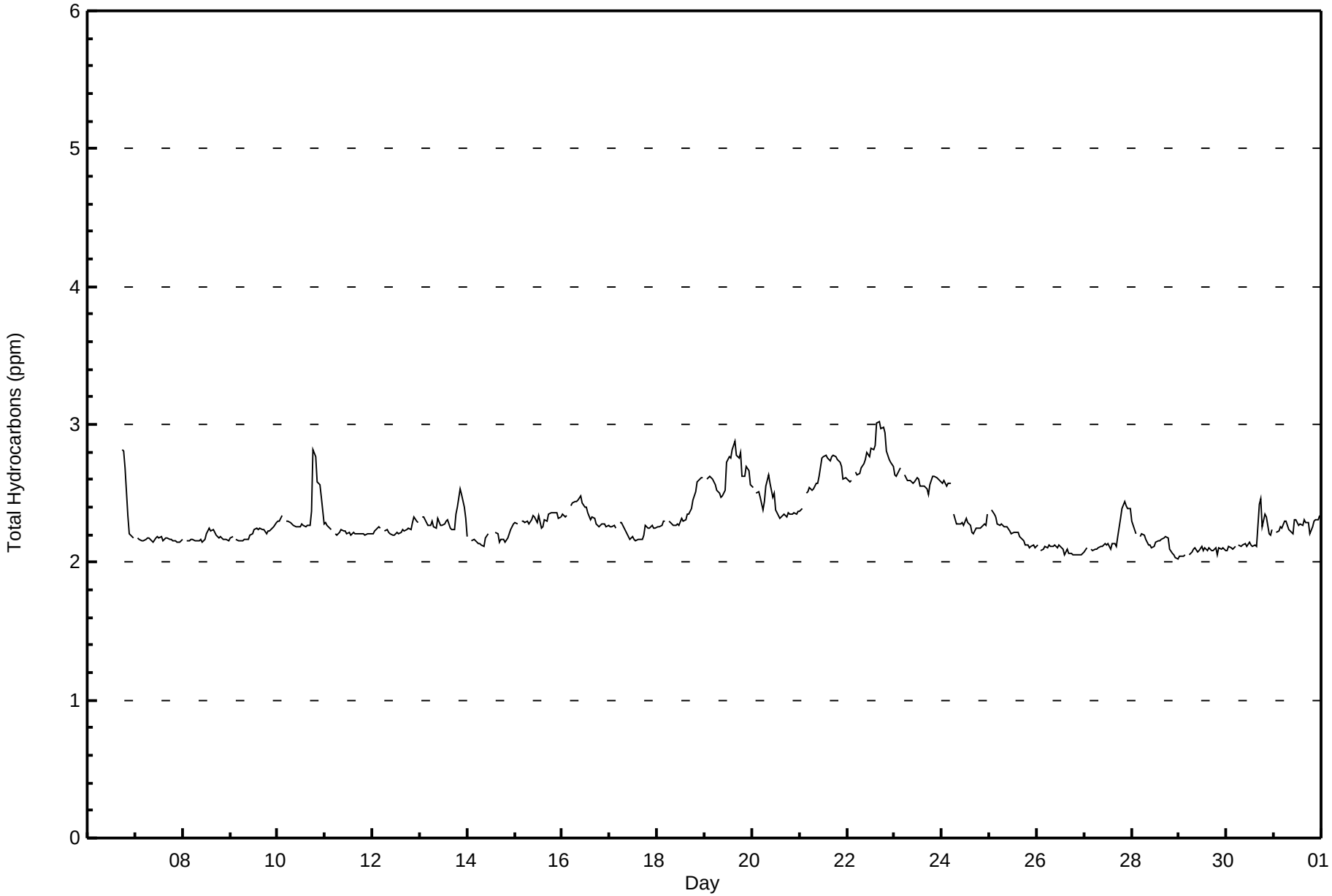
Z - zerospan C - Calibration NS - Not in Service

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Brion MacKay River - January 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	6	1.04	1.04
2.1 - 3.0	573	98.96	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 579

Total Number of Hours: 624

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Brion MacKay River - January 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	4	1	1	0	0	6
2.1 - 3.0	23	59	50	20	10	13	60	68	65	36	30	40	35	35	14	9	567
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	23	59	50	20	10	13	60	68	65	36	30	44	36	36	14	9	573

Total Number of Valid Hours: 573

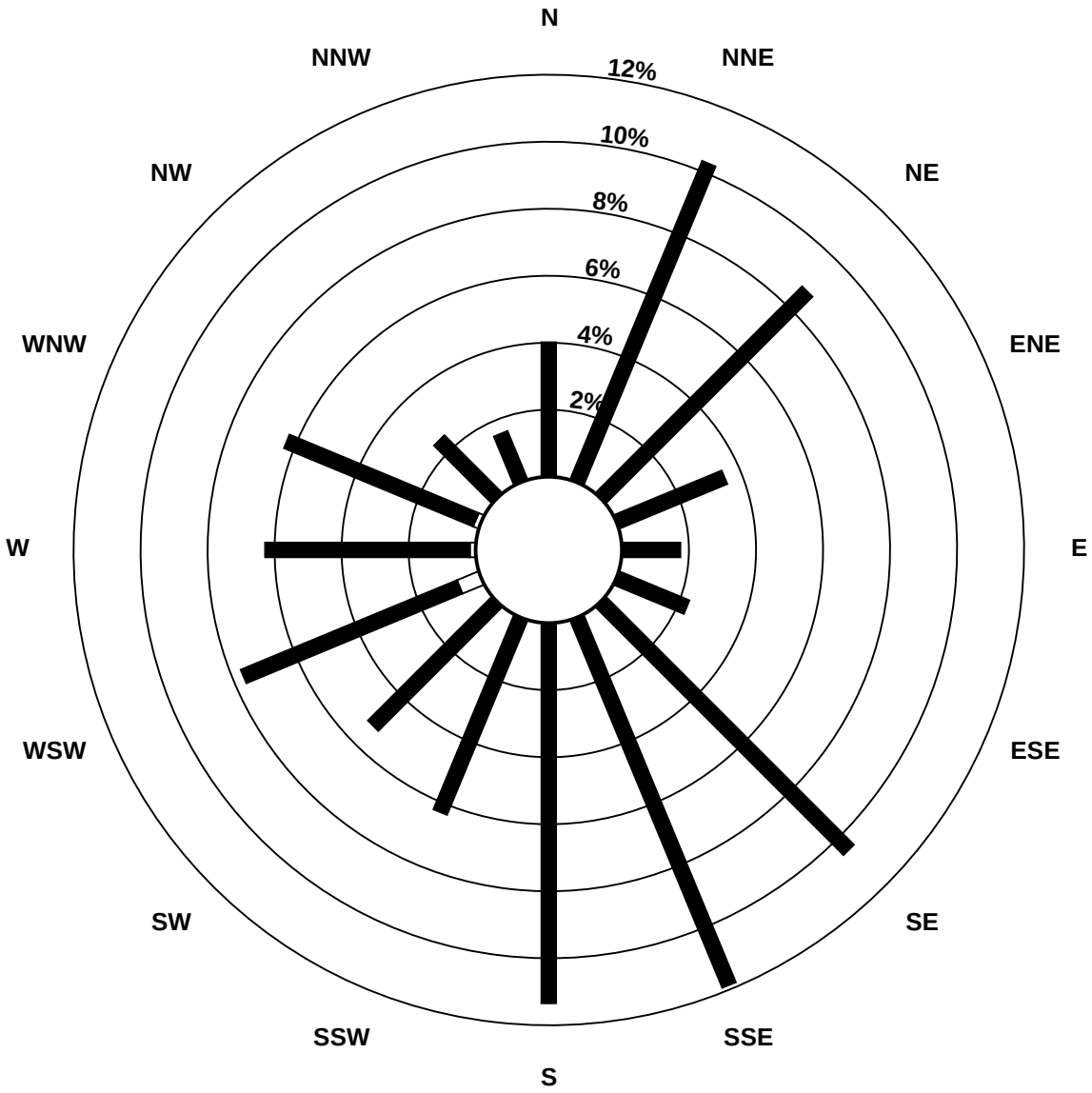
Total Number of Hours: 624

Wood Buffalo Environmental Association

Wind Rose Jan 2016

Total Hydrocarbons (THC) - ppm

Brion MacKay River (AMS 20)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

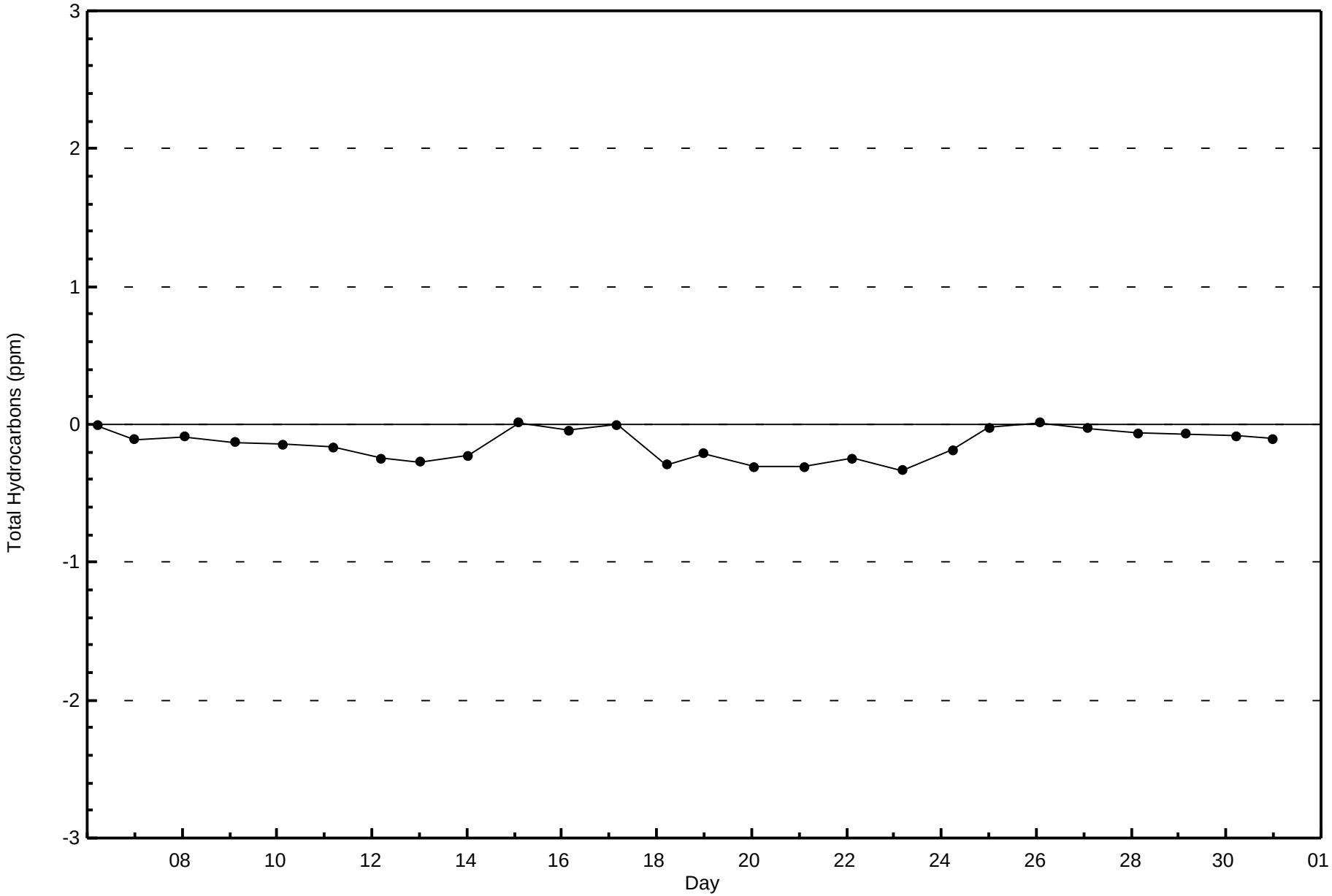
Total Number of Valid Hours: 573

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Brion MacKay River - January 2016

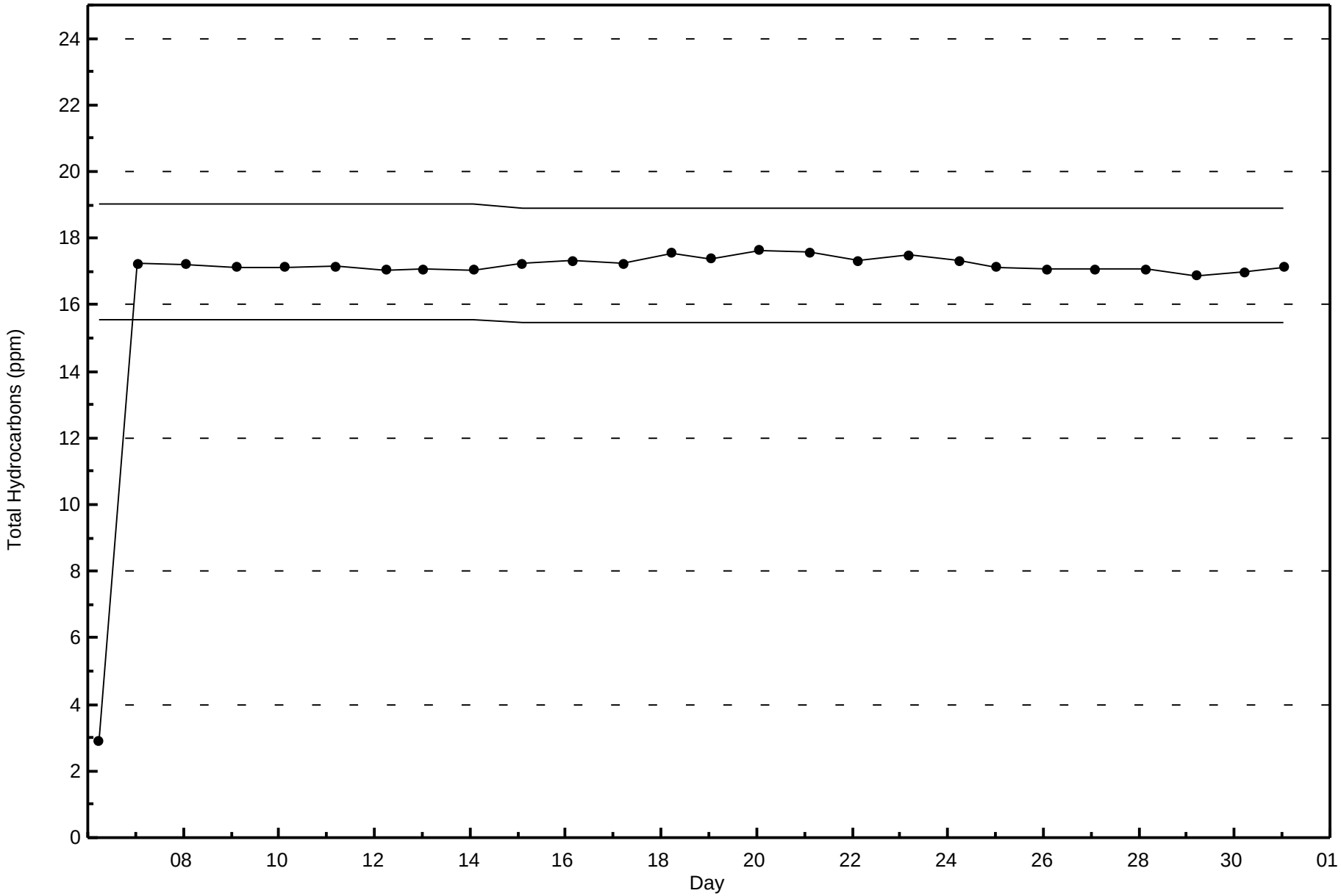


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Brion MacKay River - January 2016

Maximum Value: 185 ppb on Jan 7 20:00

Maximum Daily Average: 42.4 ppb on Jan 16

Minimum Value: 0 ppb on Jan 7 06:00

Minimum Daily Average: 0.0 ppb on Jan 29

Maximum Diurnal Average: 9.6 ppb at hour 20

Minimum Diurnal Average: 1.0 ppb at hour 4

Monthly Average: 3.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 5$ $P_{99} = 75$

Hours in Service:	611
Hours of Data:	581
Hours of Missing Data:	30
Hours of Calibration:	29
Percent Operational Time:	99.8

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	34	43	14	1	1	1	1	--	43
7-Jan	Z	0	0	0	0	0	0	5	0	0	0	1	1	1	1	17	103	7	57	185	65	0	0	0	19.3	185
8-Jan	0	Z	0	0	0	1	3	0	2	2	2	0	1	3	1	0	1	0	0	0	0	0	0	0	0.7	3
9-Jan	0	0	Z	0	0	0	0	0	0	0	1	2	3	2	2	1	1	0	0	0	0	0	0	5	0.7	5
10-Jan	0	0	0	Z	1	0	0	1	0	0	1	1	1	3	2	1	0	0	5	5	4	4	1	1	1.4	5
11-Jan	1	2	1	0	Z	1	1	1	0	0	0	0	DF	0	0	1	3	1	1	0	0	0	0	0	0.5	3
12-Jan	0	3	1	0	1	Z	10	0	0	1	1	0	0	0	0	1	0	0	1	2	0	3	3	0	1.2	10
13-Jan	Z	0	1	10	3	0	1	0	0	5	2	1	1	1	2	1	1	2	1	0	0	0	0	0	1.4	10
14-Jan	1	Z	0	0	0	0	0	1	0	0	2	1	2	1	1	3	1	1	0	0	7	0	1	0	1.0	7
15-Jan	5	1	Z	1	3	10	13	3	23	30	28	6	5	3	6	6	14	15	19	18	2	1	1	31	10.5	31
16-Jan	13	21	73	Z	149	107	75	50	63	59	35	17	11	7	5	25	15	16	11	19	75	67	28	34	42.4	149
17-Jan	13	2	1	5	Z	0	0	2	56	15	2	5	0	0	0	0	0	0	0	0	0	0	0	0	4.5	56
18-Jan	0	0	0	0	0	Z	0	2	2	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.3	2
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	3	6	5	5	3	2	4	0	0	0	0	0	0	1.3	6
20-Jan	0	Z	0	0	0	0	0	0	0	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0.4	2
21-Jan	0	0	Z	0	0	0	0	0	0	1	1	3	4	4	3	2	1	0	0	0	1	0	0	0	0.9	4
22-Jan	0	0	0	Z	0	0	0	0	3	4	4	4	6	7	8	12	20	11	4	5	3	0	0	0	4.0	20
23-Jan	2	0	3	2	Z	1	2	0	2	1	2	3	3	2	2	2	2	0	0	0	1	0	0	0	1.3	3
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3	0.3	3
25-Jan	Z	1	3	3	1	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	0	0	Z	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1
31-Jan	Z	0	0	0	0	0	0	0	0	0	1	2	3	1	1	1	0	0	0	0	0	0	0	0	0.4	3
	1.7	1.4	3.9	1.0	7.6	5.8	4.2	2.6	6.3	4.9	3.4	2.1	2.1	1.8	1.7	3.1	6.6	3.5	5.5	9.6	6.2	3.0	1.4	2.9	Diurnal Average	
	13	21	73	10	149	107	75	50	63	59	35	17	11	7	8	25	103	34	57	185	75	67	28	34	Diurnal Maximum	

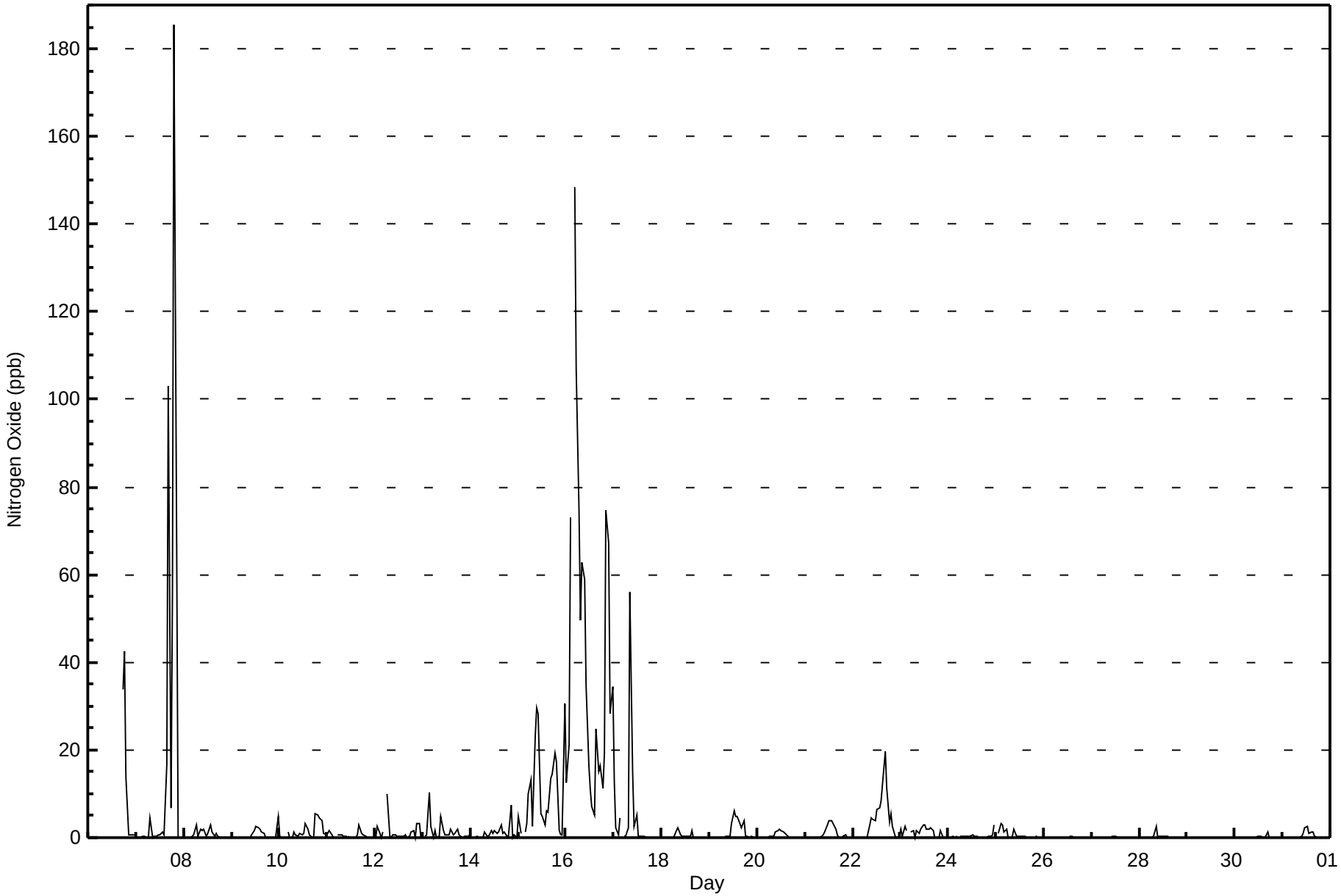
Z - zerospan C - Calibration DF - DAS Failure NS - Not in Service

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	556	95.70	95.70
21 - 40	10	1.72	97.42
11 - 80	11	1.89	99.31
81 - 159	3	0.52	99.83
> 159	1	0.17	100.00

Total Number of Valid Hours: 581

Total Number of Hours: 624

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	23	60	49	20	10	12	53	60	65	36	30	41	34	35	14	9	551
21 - 40	1	0	1	0	0	1	2	3	0	0	0	0	1	0	0	0	9
11 - 80	0	1	0	0	0	0	4	4	0	0	0	1	0	1	0	0	11
81 - 159	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Totals	24	61	50	20	10	13	60	68	65	36	30	43	36	36	14	9	575

Total Number of Valid Hours: 575

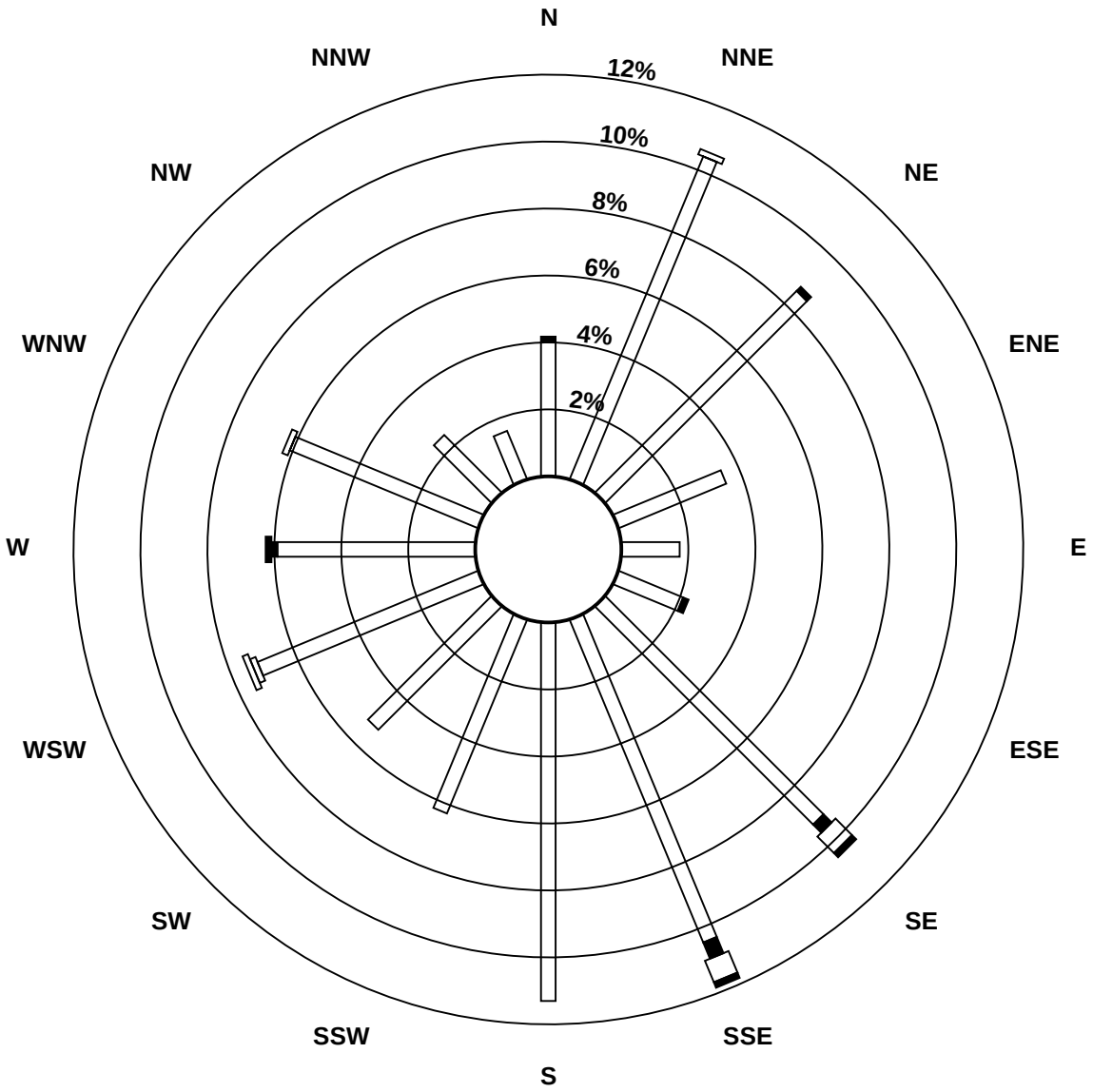
Total Number of Hours: 624

Wood Buffalo Environmental Association

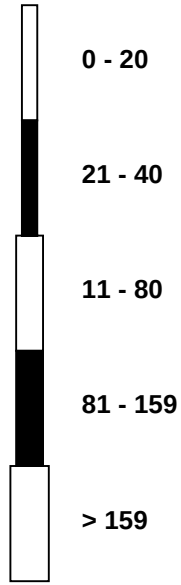
Wind Rose Jan 2016

Nitrogen Oxide (NO) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



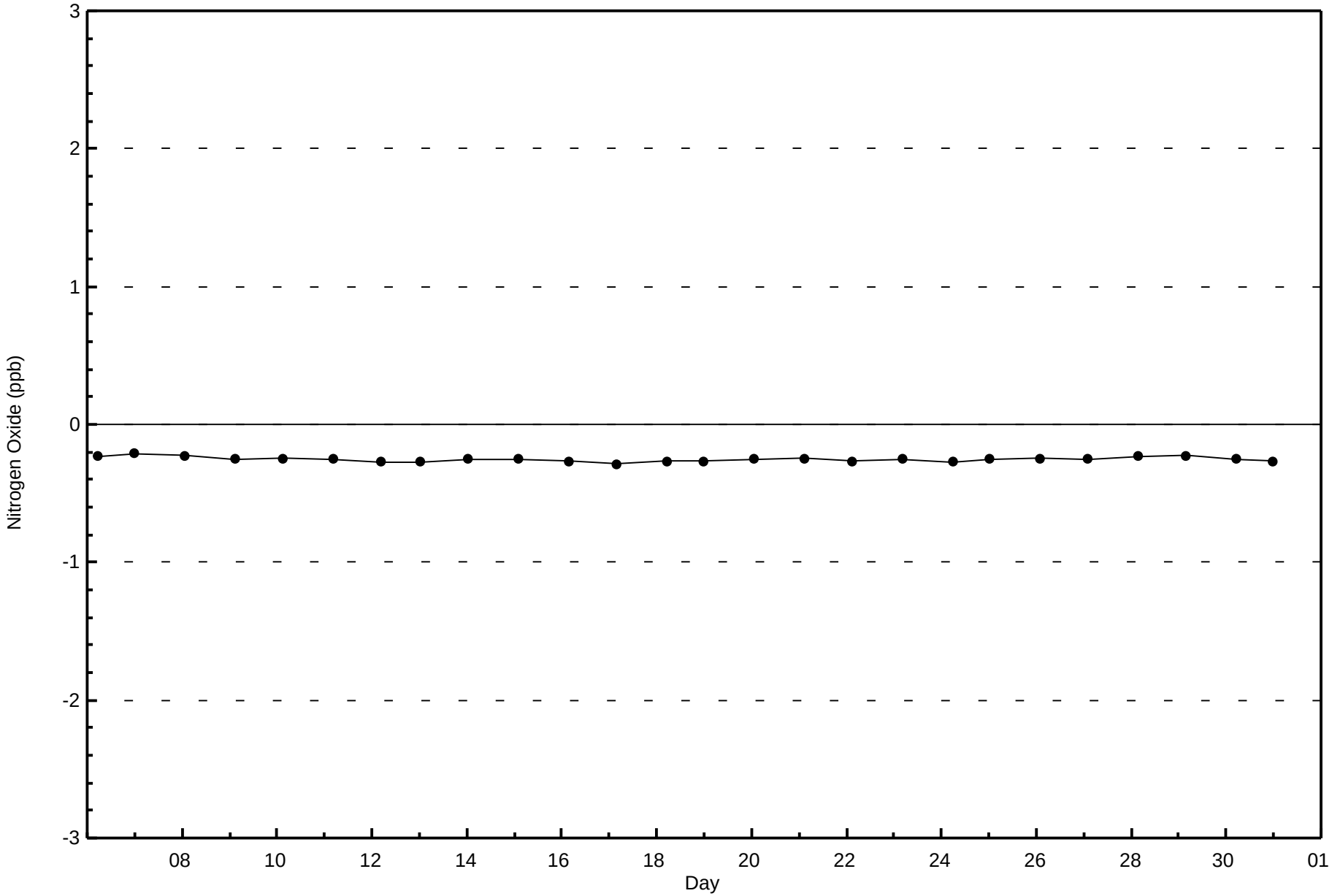
Total Number of Valid Hours: 575

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Brion MacKay River - January 2016

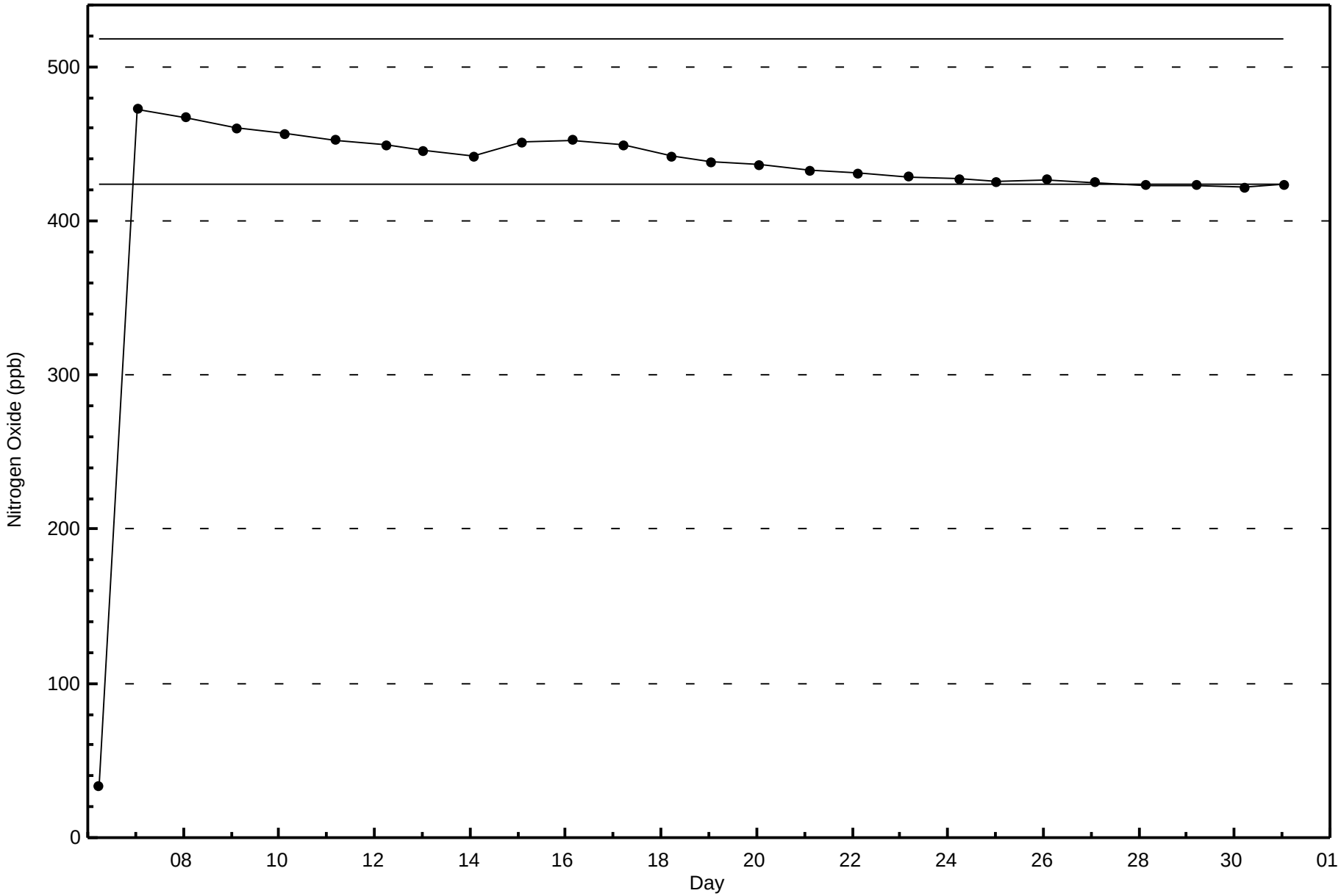


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 46 ppb on Jan 16 05:00 Maximum Daily Average: 24.8 ppb on Jan 16

Minimum Value: 0 ppb on Jan 12 03:00 Minimum Daily Average: 0.7 ppb on Jan 29
Maximum Diurnal Average: 9.8 ppb at hour 21 Minimum Diurnal Average: 4.0 ppb at hour 14
Monthly Average: 6.7 ppb Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 4 $Q_3 = 9$ $P_{90} = 17$ $P_{99} = 32$

Hours in Service:	611
Hours of Data:	581
Hours of Missing Data:	30
Hours of Calibration:	29
Percent Operational Time:	99.8

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	30	32	29	22	6	5	3	--	32
7-Jan	Z	2	3	3	3	3	5	8	2	2	2	4	3	4	3	8	26	13	13	24	14	1	1	1	6.2	26
8-Jan	1	Z	4	4	2	1	3	2	3	3	3	2	2	2	3	3	4	2	1	1	2	3	2	2	2.4	4
9-Jan	2	1	Z	1	1	1	1	1	1	1	3	5	6	6	7	10	13	8	6	5	5	5	5	6	4.3	13
10-Jan	6	6	6	Z	6	6	6	8	7	4	5	4	4	5	5	5	2	6	24	24	20	18	14	6	8.4	24
11-Jan	6	9	4	4	Z	5	3	9	2	3	1	1	DF	1	1	1	1	3	4	3	1	1	0	0	2.8	9
12-Jan	0	2	0	1	3	Z	6	2	1	2	2	2	2	2	3	3	2	2	2	1	4	8	6	6	2.7	8
13-Jan	Z	7	8	12	7	3	8	3	5	12	3	3	3	3	5	3	2	5	10	11	18	14	11	9	7.2	18
14-Jan	7	Z	4	8	5	2	2	4	2	6	8	7	5	5	8	11	5	4	5	5	6	7	9	11	5.9	11
15-Jan	15	21	Z	20	21	20	22	20	25	32	25	11	10	6	8	13	24	27	28	25	20	15	15	23	19.4	32
16-Jan	21	25	35	Z	46	37	32	29	31	35	18	13	12	10	10	18	20	21	22	23	31	30	26	25	24.8	46
17-Jan	21	15	14	11	Z	11	10	7	4	10	3	2	1	1	1	2	2	4	7	6	5	4	3	3	6.3	21
18-Jan	3	3	3	3	3	Z	3	4	4	2	2	2	1	1	2	3	3	3	4	4	3	3	3	2	2.8	4
19-Jan	Z	2	3	3	3	7	4	3	3	3	2	9	13	11	14	15	19	22	14	18	19	21	18	10	10.2	22
20-Jan	7	Z	6	9	8	8	12	18	17	14	10	7	5	4	3	4	4	4	4	5	8	8	7	7	7.7	18
21-Jan	7	5	Z	3	3	4	4	4	5	4	5	7	7	8	8	9	11	11	10	11	11	9	6	5	6.8	11
22-Jan	5	5	5	Z	7	6	7	9	13	12	7	6	8	10	14	19	22	21	20	20	19	15	15	15	12.2	22
23-Jan	10	9	12	14	Z	12	10	8	7	7	7	8	8	6	7	9	12	11	10	9	9	7	6	6	8.8	14
24-Jan	6	6	6	8	9	Z	4	5	4	2	2	2	2	2	2	2	2	2	2	2	6	5	7	9	4.0	9
25-Jan	Z	6	6	7	4	5	2	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.2	7
26-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	2	1	1.2	2
27-Jan	1	2	Z	2	1	1	3	3	2	1	1	2	1	1	1	2	0	5	11	9	10	7	5	7	3.4	11
28-Jan	5	4	3	Z	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	2.7	5
29-Jan	1	1	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0.7	1
30-Jan	1	1	1	1	1	Z	5	1	1	1	1	2	1	1	1	1	15	9	5	6	5	6	6	10	3.5	15
31-Jan	Z	6	7	7	3	5	6	4	5	4	8	8	8	5	7	8	10	10	6	8	12	12	12	13	7.5	13
	6.3	6.7	6.3	5.6	6.6	6.7	6.4	6.3	6.0	6.7	4.9	4.4	4.5	4.0	4.6	6.1	8.2	8.9	9.4	9.8	9.8	8.0	7.1	7.0	Diurnal Average	
	21	25	35	20	46	37	32	29	31	35	25	13	13	11	14	19	26	30	32	29	31	30	26	25	Diurnal Maximum	

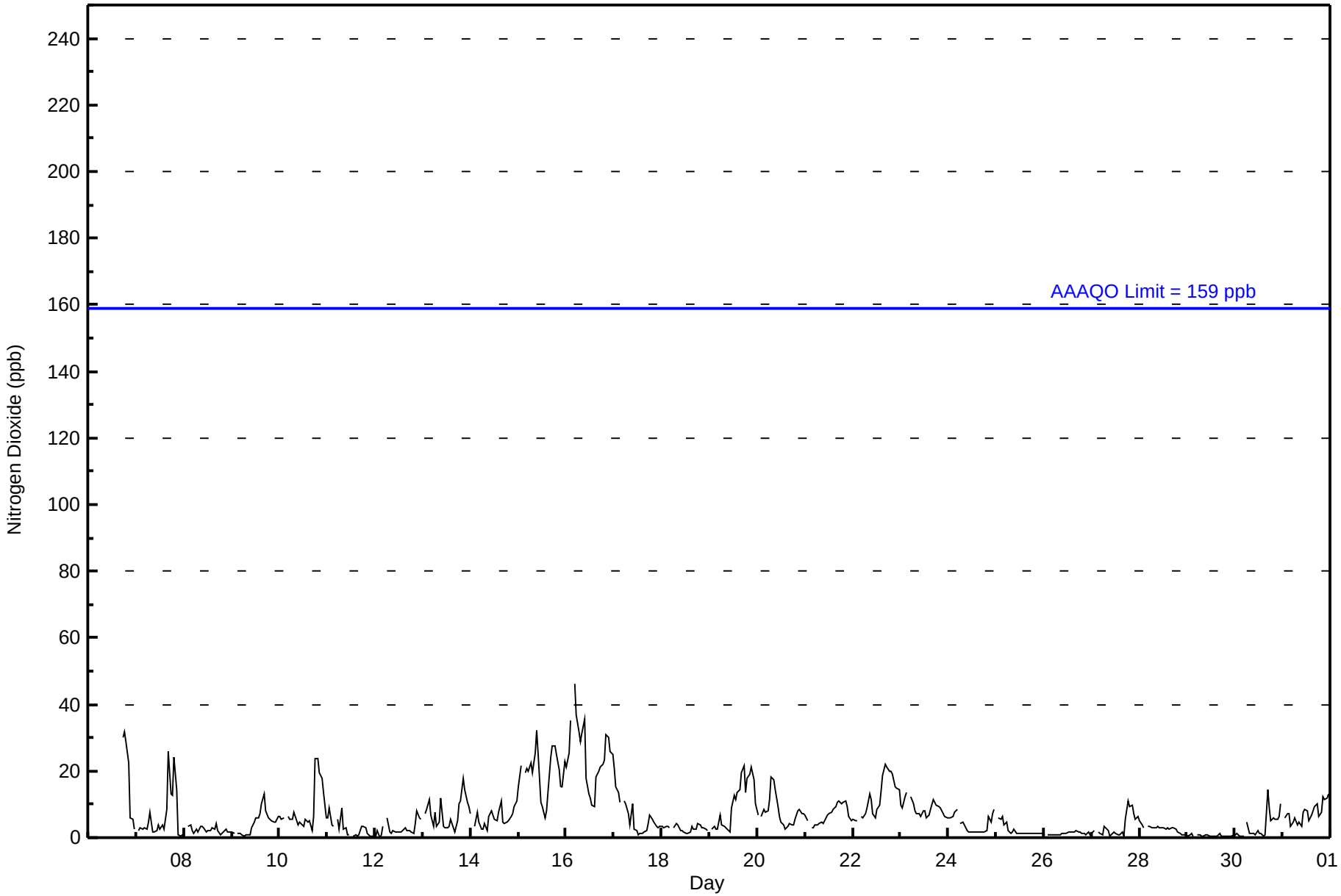
Z - zerospan C - Calibration DF - DAS Failure NS - Not in Service
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	541	93.12	93.12
21 - 40	39	6.71	99.83
11 - 80	1	0.17	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 581

Total Number of Hours: 624

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	19	59	45	20	9	10	50	59	64	36	30	42	35	36	14	9	537
21 - 40	5	2	5	0	1	3	9	9	1	0	0	1	1	0	0	0	37
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	24	61	50	20	10	13	60	68	65	36	30	43	36	36	14	9	575

Total Number of Valid Hours: 575

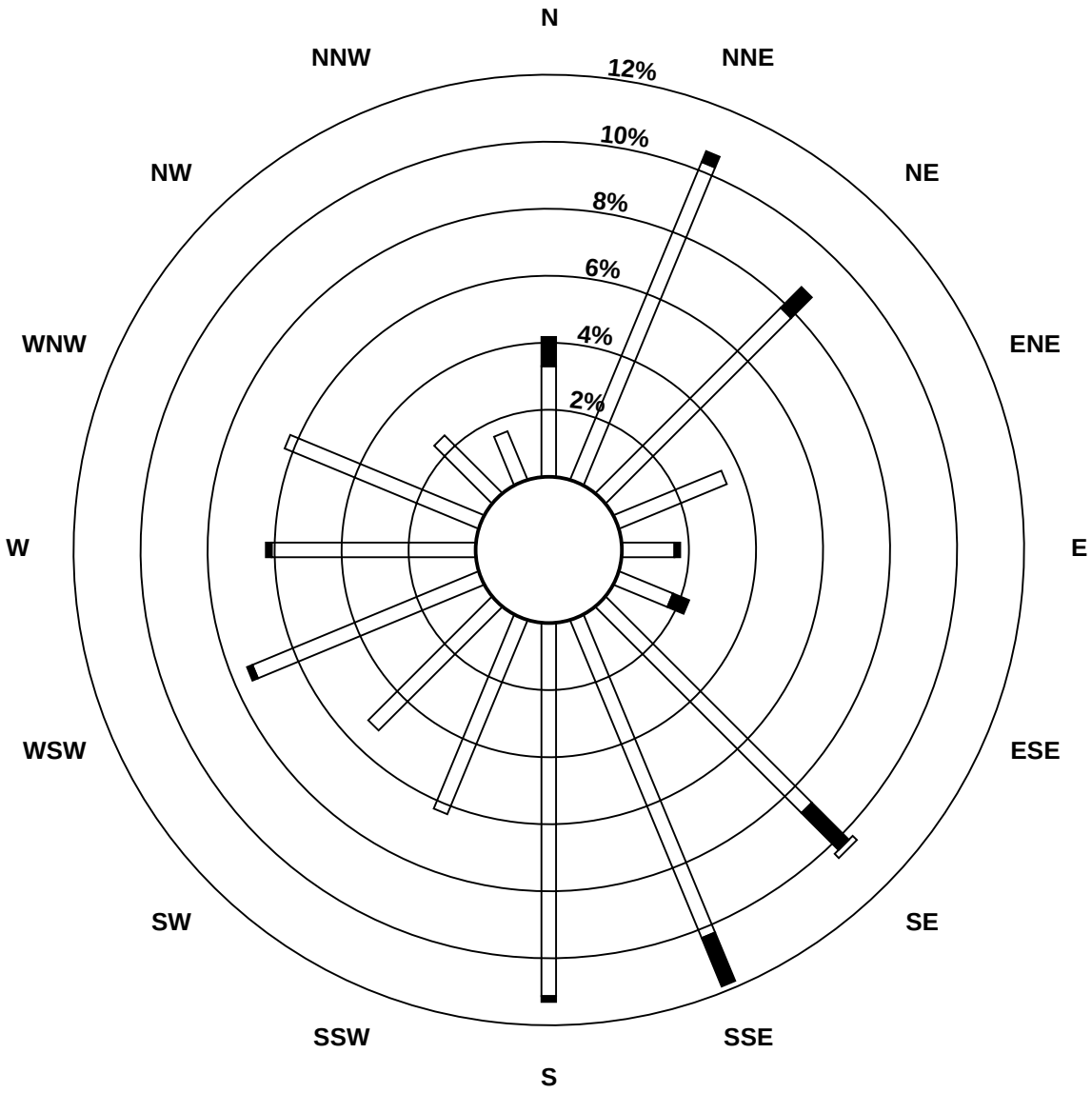
Total Number of Hours: 624

Wood Buffalo Environmental Association

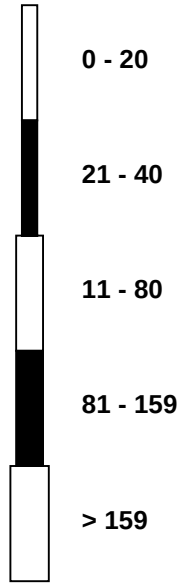
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



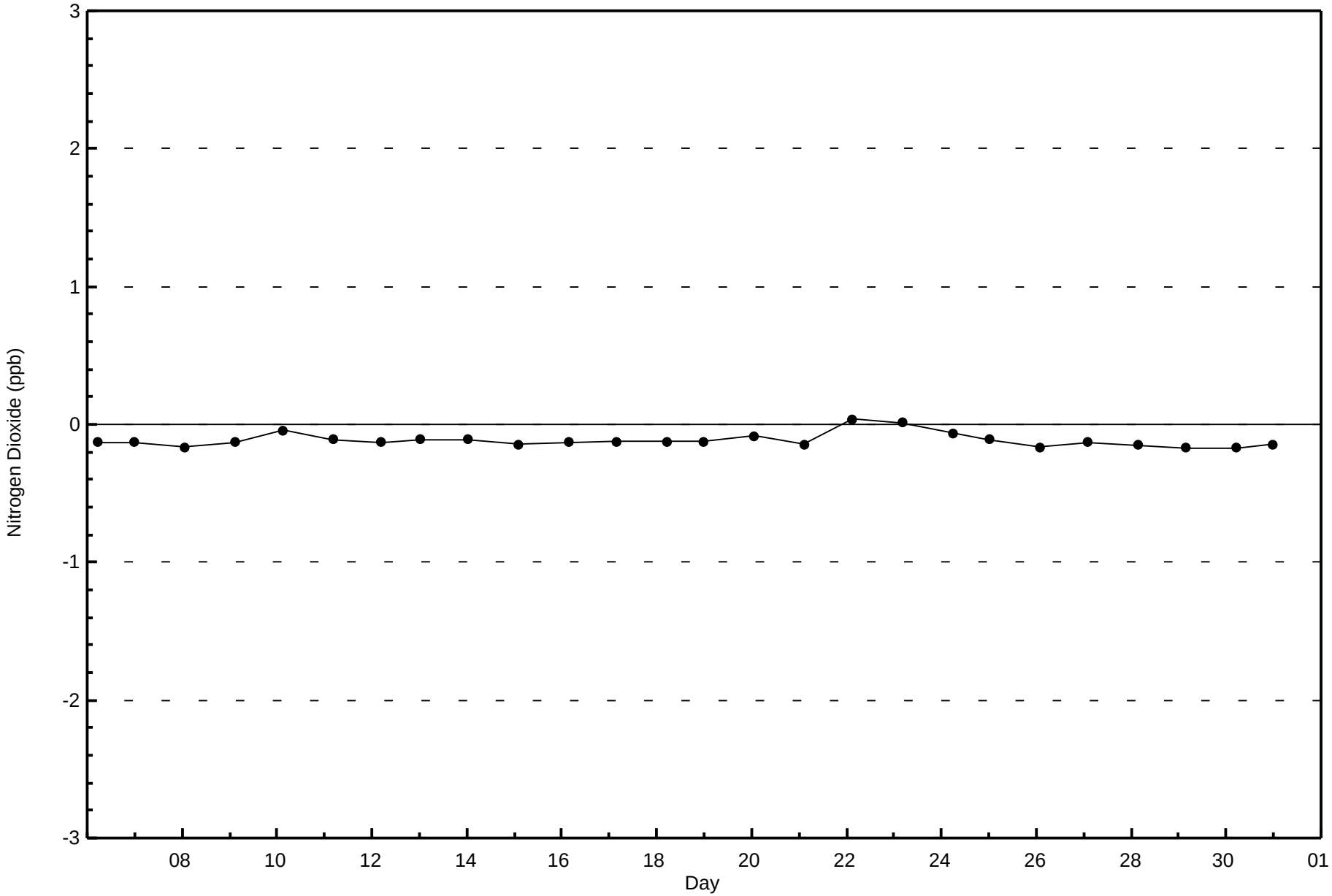
Total Number of Valid Hours: 575

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - January 2016

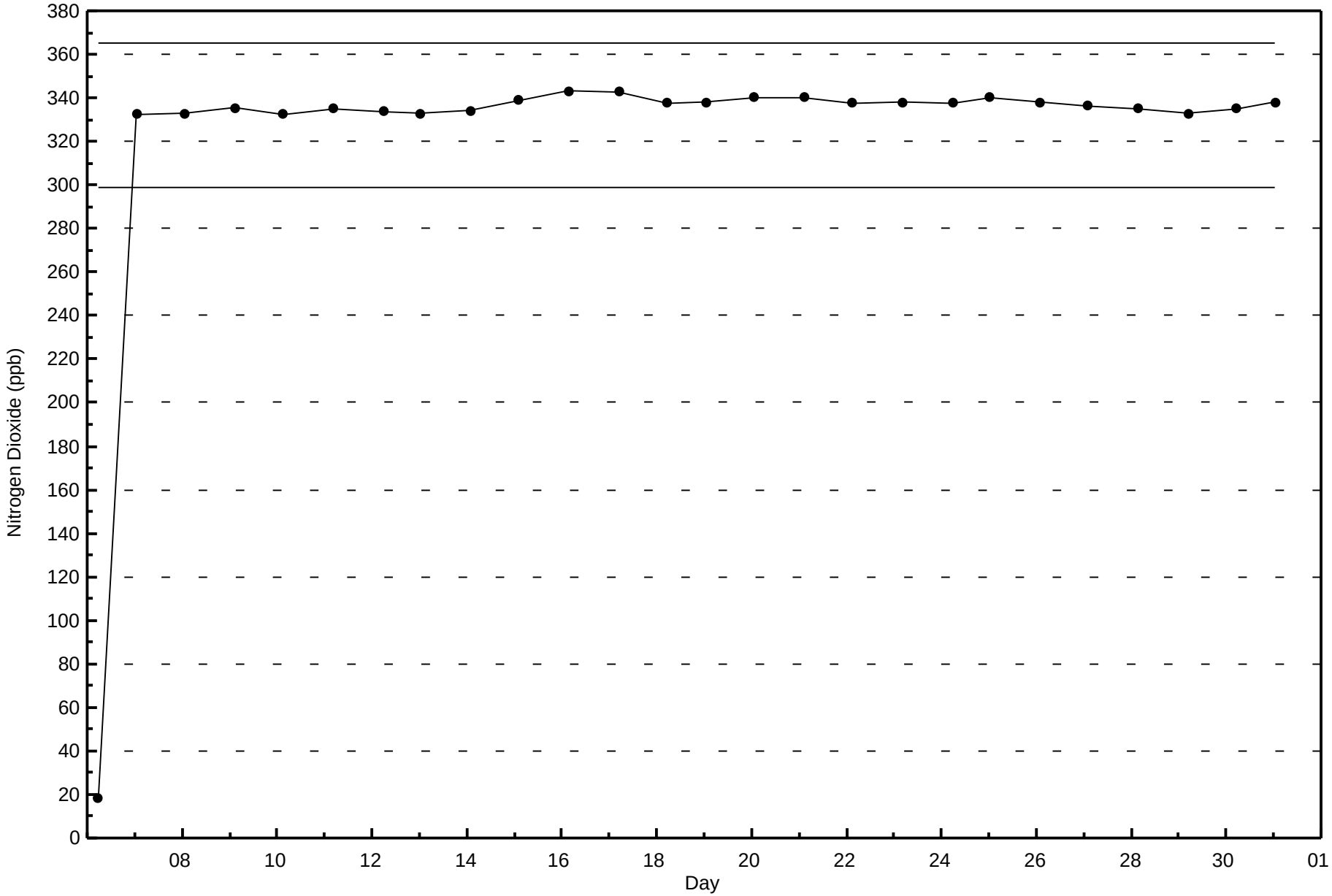


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - January 2016

Maximum Value: 209 ppb on Jan 7 20:00

Maximum Daily Average: 67.2 ppb on Jan 16

Minimum Value: 0 ppb on Jan 12 00:00

Minimum Daily Average: 0.7 ppb on Jan 29

Maximum Diurnal Average: 19.4 ppb at hour 20

Minimum Diurnal Average: 5.7 ppb at hour 14

Monthly Average: 10.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 5 $Q_3 = 10$ $P_{90} = 22$ $P_{99} = 106$

Hours in Service:	611
Hours of Data:	581
Hours of Missing Data:	30
Hours of Calibration:	29
Percent Operational Time:	99.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	64	74	43	23	6	6	3	--	74
7-Jan	Z	2	3	3	3	3	5	12	2	2	2	4	3	5	3	25	129	20	70	209	80	1	1	1	25.5	209
8-Jan	1	Z	4	4	2	2	6	2	5	5	5	2	3	5	4	3	5	3	1	1	2	3	2	2	3.1	6
9-Jan	2	1	Z	1	1	1	1	1	1	1	3	6	9	8	9	12	14	8	6	5	5	5	5	11	5.0	14
10-Jan	7	6	6	Z	7	6	6	9	7	4	6	4	5	8	6	6	2	7	29	29	24	22	15	7	9.8	29
11-Jan	7	11	4	3	Z	6	3	10	3	3	1	1	DF	1	1	1	4	4	4	3	1	1	0	0	3.3	11
12-Jan	0	5	1	1	5	Z	16	2	1	3	2	2	2	2	3	4	2	2	3	3	4	11	9	6	3.9	16
13-Jan	Z	7	9	22	9	3	9	4	5	17	5	4	4	4	7	4	2	7	11	11	18	15	11	9	8.5	22
14-Jan	8	Z	4	8	5	3	3	5	2	7	9	8	7	6	9	14	6	5	5	6	14	7	10	11	7.0	14
15-Jan	20	22	Z	21	24	30	35	22	48	62	54	16	14	9	14	19	38	42	47	43	22	16	16	53	29.9	62
16-Jan	34	47	108	Z	195	144	106	79	94	94	52	30	23	17	14	43	35	38	33	42	106	97	54	59	67.2	195
17-Jan	34	18	14	15	Z	11	10	10	60	25	5	7	1	1	2	2	2	4	7	6	5	4	3	3	10.8	60
18-Jan	3	3	3	3	3	Z	3	6	6	3	2	2	2	2	2	5	3	3	4	4	3	3	3	2	3.1	6
19-Jan	Z	2	3	2	3	7	4	3	3	3	2	12	19	16	18	18	22	26	14	18	19	21	18	10	11.5	26
20-Jan	7	Z	6	9	8	8	12	19	18	15	11	8	6	5	4	4	4	4	4	5	8	8	7	7	8.2	19
21-Jan	7	5	Z	3	3	4	4	4	5	5	6	10	11	11	12	11	12	11	10	11	11	9	6	5	7.7	12
22-Jan	5	5	5	Z	7	6	8	9	16	16	12	10	15	17	23	31	41	32	24	25	22	16	15	15	16.2	41
23-Jan	12	9	15	15	Z	13	12	8	9	8	8	11	11	8	9	11	13	11	10	9	10	7	6	6	10.1	15
24-Jan	6	6	6	8	9	Z	5	5	4	2	2	2	2	2	2	2	2	2	2	2	6	5	8	12	4.4	12
25-Jan	Z	7	9	9	5	7	2	1	2	4	2	2	2	2	1	1	1	1	1	1	2	1	1	1	2.9	9
26-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	2	1	1.3	2
27-Jan	1	2	Z	2	1	1	3	3	2	1	2	2	2	1	1	2	0	5	11	9	10	7	5	6	3.5	11
28-Jan	5	4	3	Z	3	3	3	3	6	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	2.9	6
29-Jan	0	1	1	1	Z	1	1	1	0	1	1	0	1	1	1	1	1	1	1	0	0	0	1	1	0.7	1
30-Jan	1	1	1	1	0	Z	5	1	1	2	1	3	2	1	1	1	16	9	5	6	5	6	6	10	3.7	16
31-Jan	Z	6	7	7	3	5	6	4	5	4	9	11	11	6	8	9	10	10	6	8	12	12	12	13	7.9	13
	8.1	8.1	10.2	6.6	14.2	12.5	10.7	8.9	12.3	11.6	8.3	6.4	6.5	5.7	6.3	9.3	14.8	12.4	14.9	19.4	15.9	10.9	8.5	9.8	Diurnal Average	
	34	47	108	22	195	144	106	79	94	94	54	30	23	17	23	43	129	64	74	209	106	97	54	59	Diurnal Maximum	

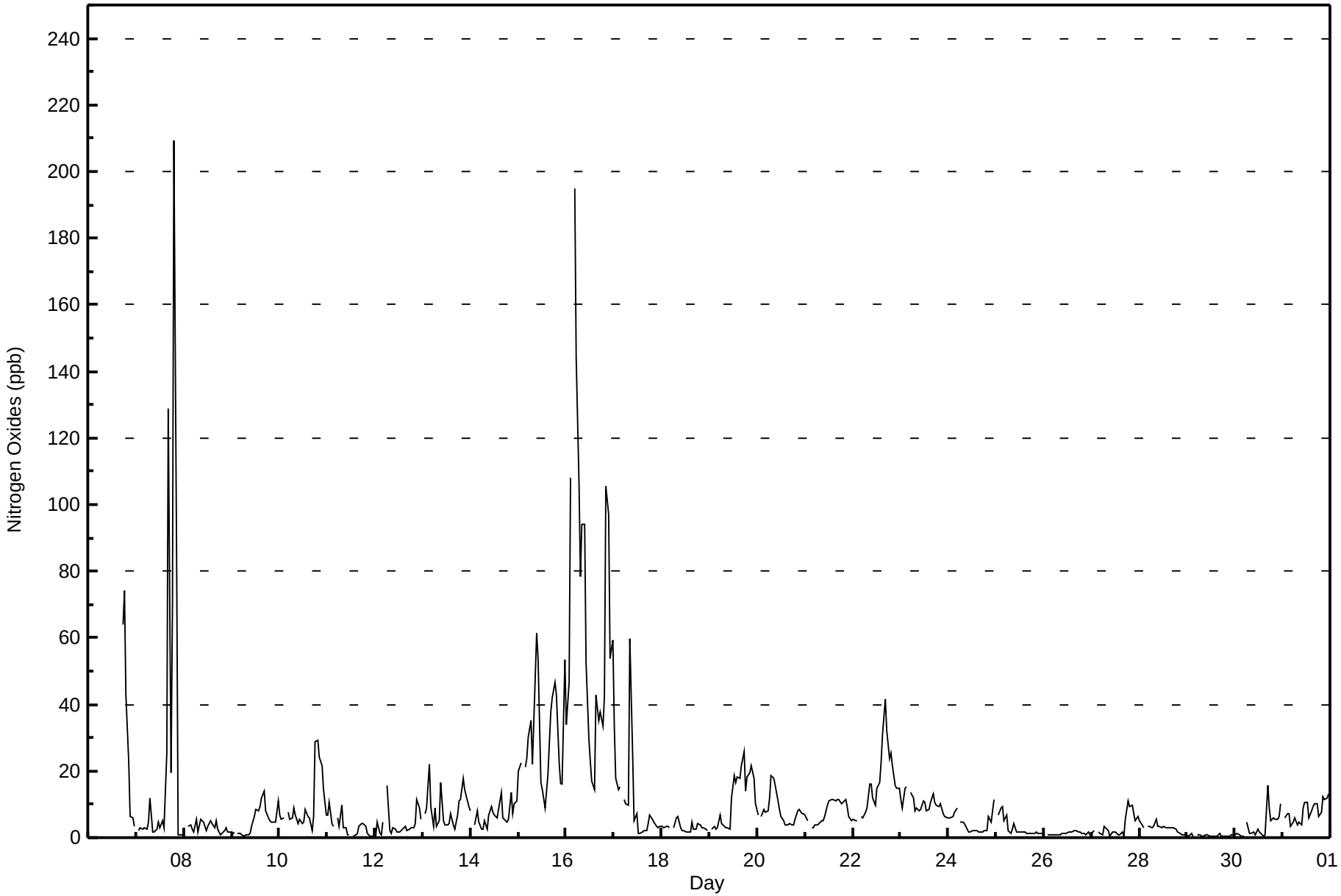
Z - zerospan C - Calibration DF - DAS Failure NS - Not in Service

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	518	89.16	89.16
21 - 40	32	5.51	94.66
11 - 80	21	3.61	98.28
81 - 159	8	1.38	99.66
> 159	2	0.34	100.00

Total Number of Valid Hours: 581

Total Number of Hours: 624

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	19	56	41	20	9	9	47	56	63	36	30	41	33	33	14	8	515
21 - 40	3	3	8	0	0	2	5	4	2	0	0	0	1	2	0	1	31
11 - 80	2	2	1	0	1	2	3	5	0	0	0	1	1	1	0	0	19
81 - 159	0	0	0	0	0	0	4	3	0	0	0	0	1	0	0	0	8
> 159	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2
Totals	24	61	50	20	10	13	60	68	65	36	30	43	36	36	14	9	575

Total Number of Valid Hours: 575

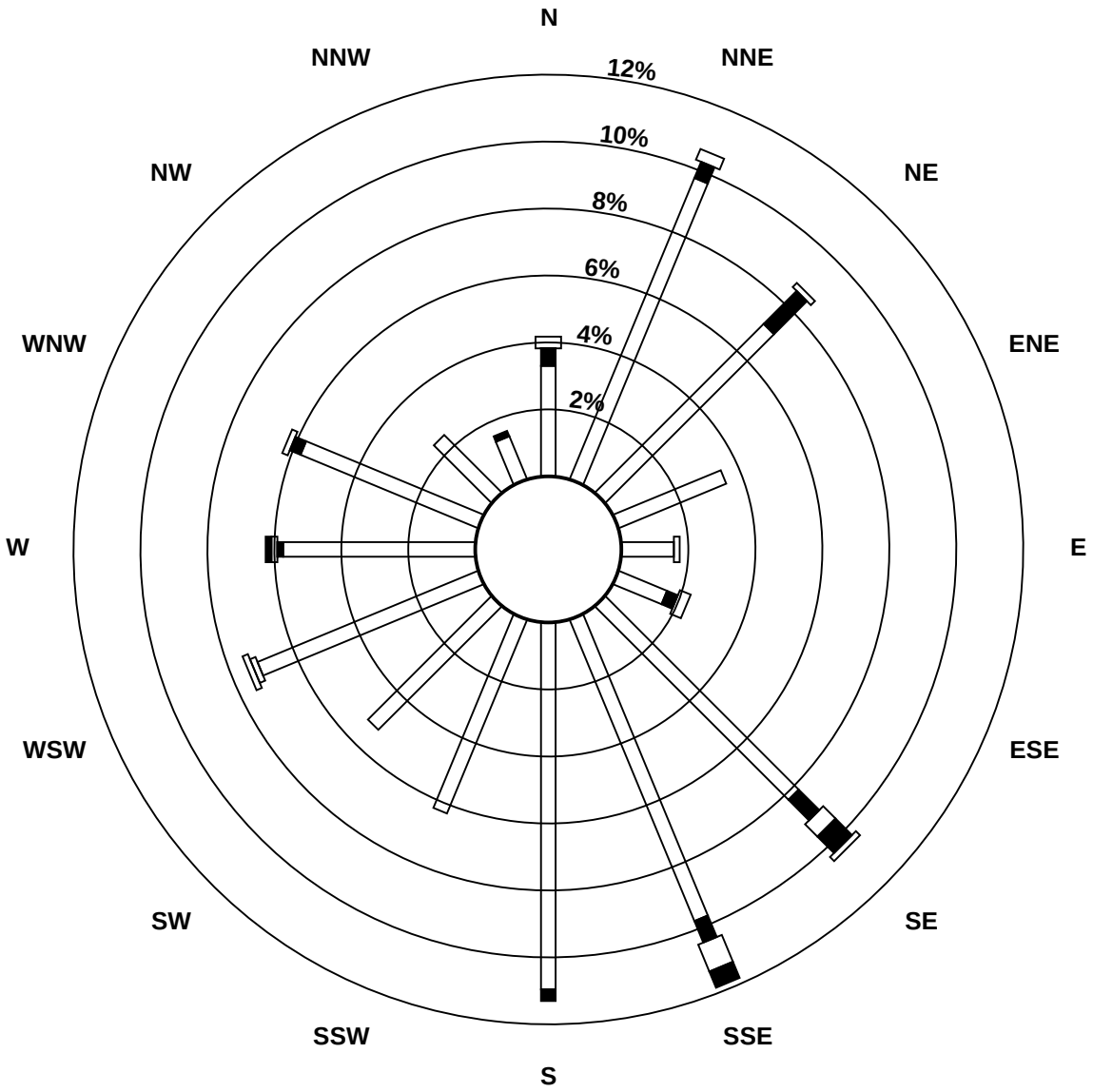
Total Number of Hours: 624

Wood Buffalo Environmental Association

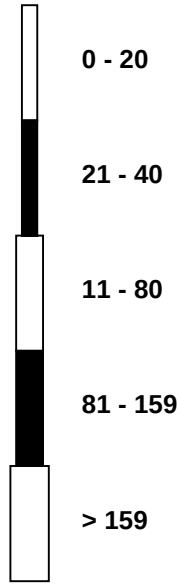
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



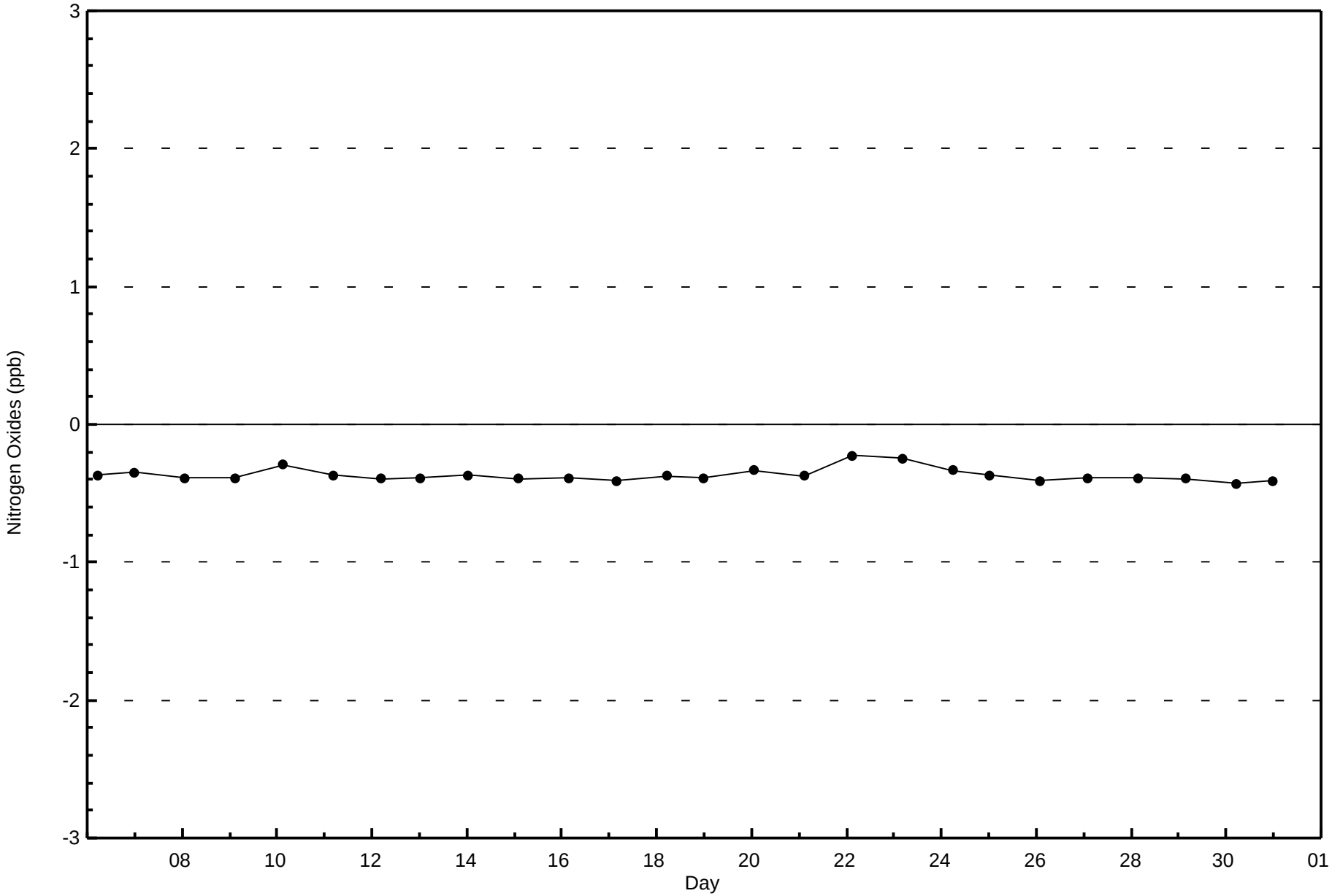
Total Number of Valid Hours: 575

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - January 2016

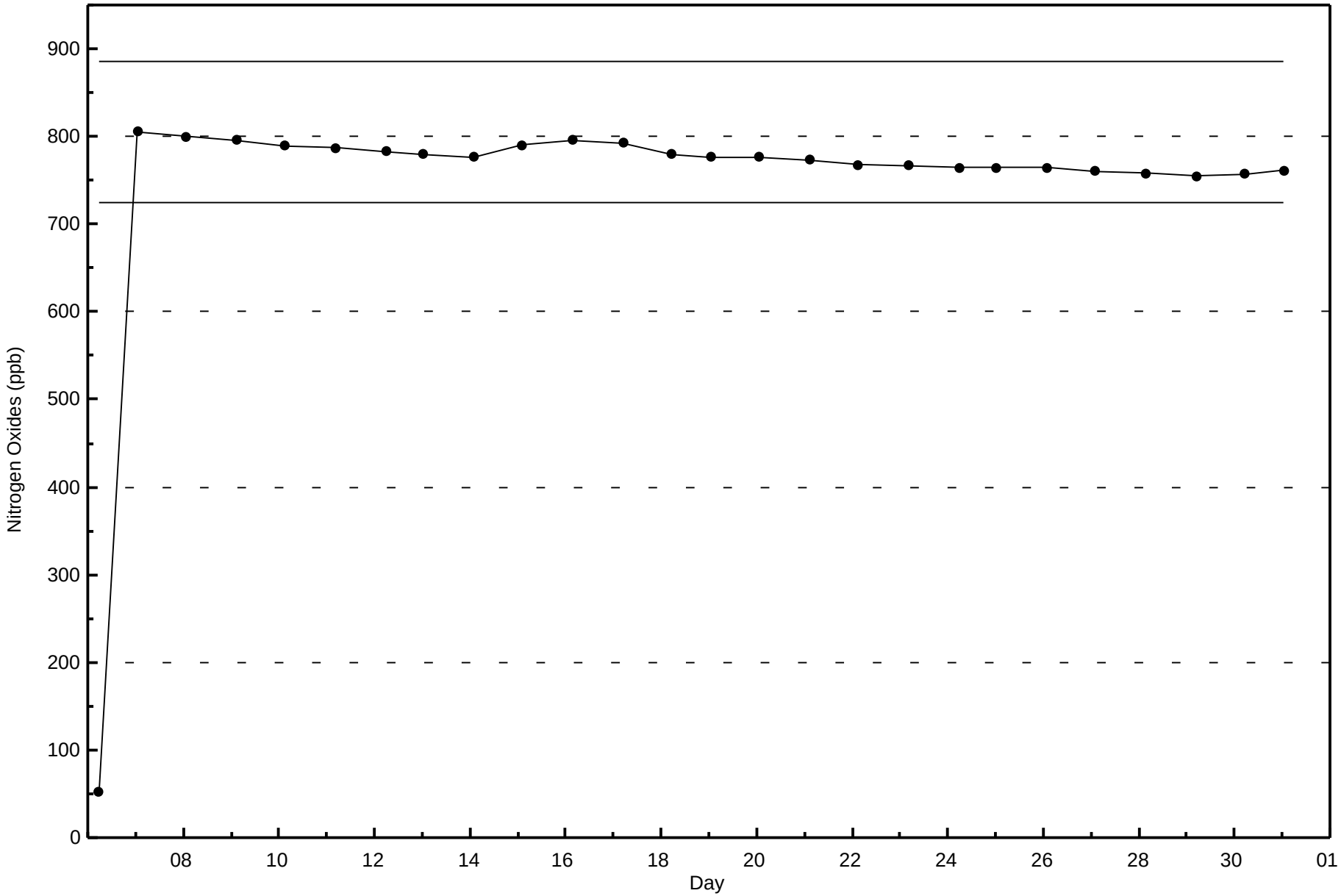


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Brion MacKay River - January 2016

Maximum Value: 5.6 C on Jan 29 15:00

Maximum Daily Average: 2.0 C on Jan 29

Minimum Value: -36.0 C on Jan 16 09:00

Minimum Daily Average: -31.2 C on Jan 16

Maximum Diurnal Average: -8.6 C at hour 15

Minimum Diurnal Average: -13.3 C at hour 7

Monthly Average: -11.66 C

Percentiles: P_1 = -35.6 P_{10} = -26.6 Q_1 = -15.7 Median = -11.5 Q_3 = -4.6 P_{90} = 2.1 P_{99} = 4.8

Hours in Service:	419
Hours of Data:	419
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
7-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
8-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
9-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
10-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
11-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
12-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
13-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
14-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-18.4	-18.7	-19.5	-20.1	-20.6	-21.1	-21.4	-21.5	-21.7	-21.8	-22.3	--	-18.4
15-Jan	-23.7	-25.5	-26.3	-26.9	-26.6	-26.5	-28.1	-28.6	-28.0	-26.3	-24.2	-22.8	-21.4	-20.9	-21.3	-22.7	-25.7	-27.6	-29.2	-30.5	-30.7	-31.5	-32.0	-32.6	-26.7	-20.9
16-Jan	-33.4	-34.3	-34.8	-34.9	-35.2	-35.9	-35.8	-35.8	-36.0	-35.5	-32.1	-27.7	-23.0	-20.7	-20.7	-24.0	-27.1	-29.1	-30.8	-31.6	-32.3	-32.9	-33.0	-33.5	-31.2	-20.7
17-Jan	-33.8	-34.0	-33.7	-33.9	-33.6	-33.6	-33.7	-33.2	-32.0	-30.7	-26.3	-21.9	-19.5	-19.2	-18.6	-18.2	-20.1	-21.4	-21.9	-21.4	-20.9	-20.6	-19.7	-19.6	-25.9	-18.2
18-Jan	-20.0	-19.3	-18.5	-17.9	-17.5	-17.1	-17.1	-17.2	-17.0	-16.4	-15.6	-15.0	-14.1	-13.5	-13.1	-13.2	-13.6	-14.2	-14.5	-14.1	-14.0	-14.0	-14.0	-14.0	-15.6	-13.1
19-Jan	-14.1	-14.1	-14.0	-13.9	-13.8	-13.6	-13.5	-13.5	-13.5	-13.9	-13.8	-13.5	-13.3	-13.1	-13.3	-13.8	-14.6	-15.3	-15.3	-15.4	-15.5	-15.4	-15.2	-15.2	-14.2	-13.1
20-Jan	-15.3	-15.6	-15.9	-16.3	-16.7	-17.0	-17.2	-17.1	-17.1	-16.8	-16.2	-15.5	-14.9	-13.7	-13.3	-13.3	-13.6	-13.5	-13.4	-13.5	-13.5	-13.4	-13.4	-13.3	-15.0	-13.3
21-Jan	-13.4	-13.9	-12.8	-12.0	-12.0	-13.4	-15.4	-15.5	-15.6	-15.4	-14.1	-12.3	-10.9	-9.3	-9.2	-10.3	-11.5	-10.9	-10.5	-10.9	-12.5	-10.8	-9.7	-11.4	-12.2	-9.2
22-Jan	-10.9	-11.0	-11.6	-13.8	-13.0	-12.8	-11.8	-11.6	-11.6	-11.8	-11.8	-11.3	-9.9	-9.6	-10.4	-10.7	-10.9	-11.1	-11.2	-11.5	-11.6	-11.7	-11.5	-11.5	-11.4	-9.6
23-Jan	-11.4	-11.4	-11.4	-11.5	-11.5	-11.5	-11.6	-11.5	-11.3	-11.1	-10.7	-10.4	-10.3	-9.7	-9.7	-9.6	-9.5	-9.5	-9.6	-9.7	-9.6	-9.3	-9.0	-9.3	-10.4	-9.0
24-Jan	-9.1	-8.6	-8.3	-7.8	-7.4	-7.1	-7.3	-7.1	-7.1	-7.3	-7.1	-6.3	-4.7	-3.3	-2.7	-3.0	-4.1	-4.7	-5.0	-5.9	-6.9	-7.7	-9.3	-9.9	-6.6	-2.7
25-Jan	-9.9	-10.2	-10.7	-10.5	-11.1	-11.8	-12.3	-12.5	-13.4	-13.2	-11.2	-9.5	-7.9	-6.5	-5.0	-4.6	-6.5	-6.6	-6.6	-7.2	-7.6	-7.7	-8.1	-8.8	-9.1	-4.6
26-Jan	-10.2	-10.4	-10.9	-10.5	-9.7	-8.6	-7.6	-5.8	-5.0	-3.6	-2.4	-0.8	0.5	1.3	1.8	2.1	2.4	2.9	3.3	3.5	3.4	3.1	3.3	2.8	-2.3	3.5
27-Jan	2.3	2.6	3.8	3.8	3.2	3.1	2.7	2.1	2.4	1.8	2.5	3.3	4.2	5.0	4.2	2.8	1.7	-1.2	-3.9	-4.5	-4.5	-4.5	-4.4	-3.8	1.0	5.0
28-Jan	-3.2	-2.2	-1.5	-0.7	-0.3	-1.6	-3.0	-2.9	-0.5	-0.2	0.5	1.2	1.6	2.5	3.4	2.5	1.4	1.2	1.9	3.8	4.4	4.6	4.4	4.1	0.9	4.6
29-Jan	4.0	3.3	2.3	1.5	1.7	2.0	1.9	1.9	1.5	1.9	2.2	3.6	4.5	5.4	5.6	5.3	3.9	2.1	1.1	0.2	-0.7	-1.8	-2.7	-2.9	2.0	5.6
30-Jan	-3.0	-3.3	-3.9	-4.1	-4.1	-4.7	-5.4	-5.5	-5.9	-4.9	-3.5	-2.8	-2.1	-1.7	-1.5	-0.8	-1.8	-3.9	-5.5	-7.3	-8.4	-9.0	-9.2	-9.3	-4.7	-0.8
31-Jan	-9.2	-9.2	-9.0	-9.0	-9.6	-11.0	-11.6	-12.1	-12.4	-12.7	-13.2	-12.9	-12.2	-12.2	-13.1	-14.1	-14.6	-14.8	-15.0	-15.1	-15.4	-15.6	-15.9	-16.1	-12.8	-9.0
	-12.6	-12.8	-12.8	-12.9	-12.8	-13.0	-13.3	-13.3	-13.1	-12.7	-11.6	-10.3	-9.0	-8.8	-8.6	-9.2	-10.2	-11.0	-11.5	-11.8	-12.1	-12.2	-12.3	-12.6	Diurnal Average	
	4.0	3.3	3.8	3.8	3.2	3.1	2.7	2.1	2.4	1.9	2.5	3.6	4.5	5.4	5.6	5.3	3.9	2.9	3.3	3.8	4.4	4.6	4.4	4.1	Diurnal Maximum	

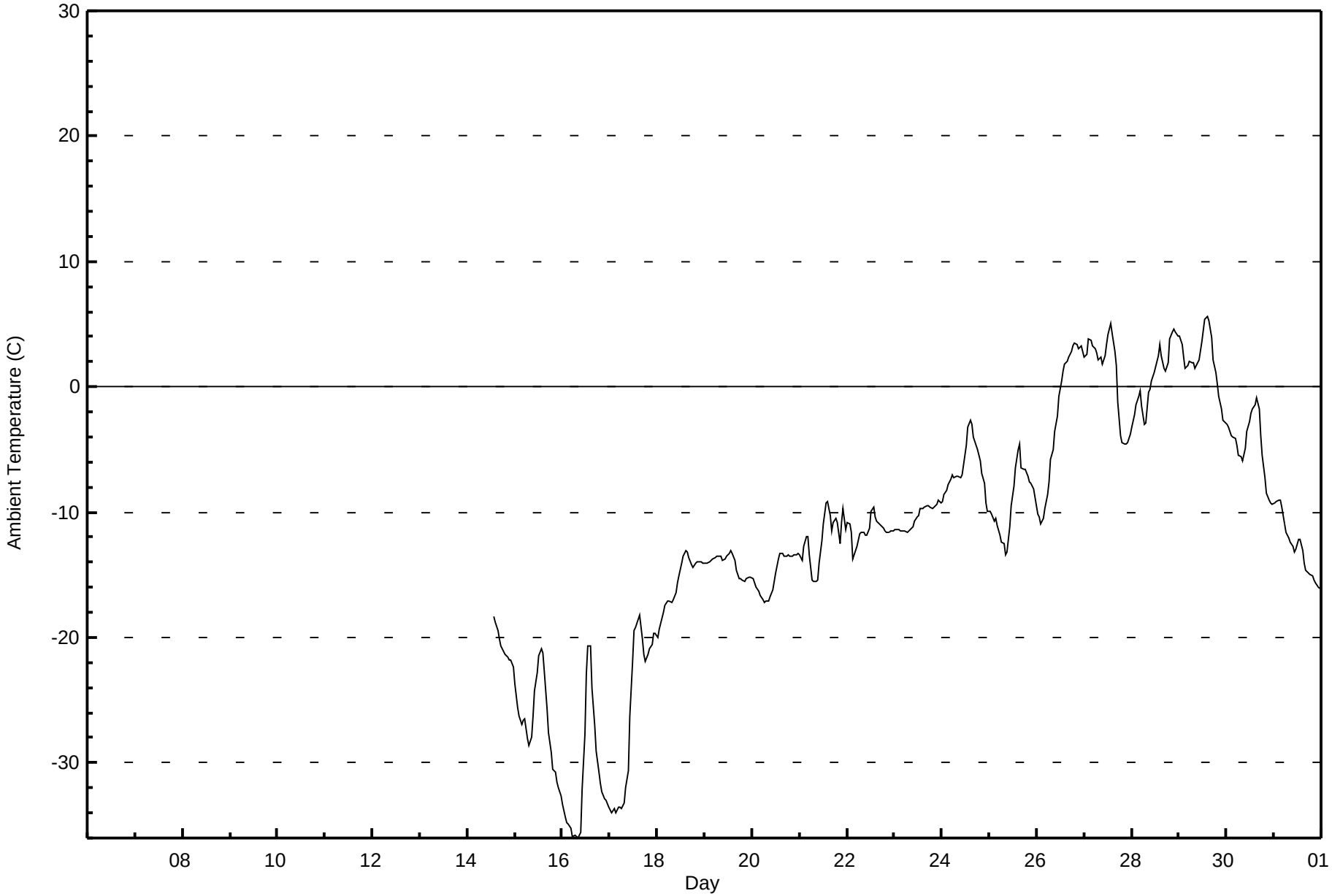
NS - Not in Service

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Brion MacKay River - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	74	17.66	17.66
-20 - 0	282	67.30	84.96
0 - 10	63	15.04	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 419

Total Number of Hours: 624

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Brion MacKay River - January 2016

Maximum Value: 96 % on Jan 26 12:00

Maximum Daily Average: 91.1 % on Jan 24

Minimum Value: 45 % on Jan 27 14:00

Minimum Daily Average: 65.4 % on Jan 27

Maximum Diurnal Average: 82.8 % at hour 21

Minimum Diurnal Average: 74.9 % at hour 15

Monthly Average: 80.7 %

Percentiles: P_1 = 48 P_{10} = 68 Q_1 = 75 Median = 83 Q_3 = 88 P_{90} = 91 P_{99} = 95

Hours in Service:	419
Hours of Data:	419
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
7-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
8-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
9-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
10-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
11-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
12-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
13-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
14-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	79	78	78	79	79	78	79	80	79	79	78	--	80
15-Jan	77	76	75	75	75	75	73	74	74	75	76	76	74	70	72	74	74	74	73	72	72	72	71	70	73.8	77
16-Jan	69	69	69	69	69	68	68	68	68	68	65	63	66	63	63	72	72	70	70	69	69	69	68	68	68.0	72
17-Jan	68	69	68	69	68	67	68	70	71	71	67	68	67	70	71	73	77	76	76	75	74	74	73	73	70.9	77
18-Jan	73	73	74	74	74	75	77	78	78	78	80	79	77	75	75	78	81	83	82	81	81	82	83	84	78.2	84
19-Jan	84	84	84	85	86	86	86	88	86	85	83	82	81	80	81	82	84	84	84	82	83	82	82	80	83.5	88
20-Jan	81	83	83	83	83	83	82	82	82	80	79	77	76	74	75	78	82	82	83	83	84	84	85	85	81.2	85
21-Jan	85	85	86	86	85	85	85	85	84	84	83	80	77	75	78	82	85	86	87	87	88	88	88	89	84.4	89
22-Jan	88	89	88	86	88	87	88	87	87	86	83	83	82	82	88	90	90	90	90	91	91	91	90	90	87.7	91
23-Jan	90	90	89	89	89	89	89	89	89	89	89	89	89	89	89	90	90	90	90	90	90	90	90	90	89.5	90
24-Jan	90	91	92	93	93	93	93	93	93	92	92	92	90	85	83	86	91	92	91	92	92	92	92	93	91.1	93
25-Jan	91	91	90	90	90	89	88	88	87	87	87	88	89	89	86	86	91	92	92	92	92	92	92	92	89.6	92
26-Jan	90	91	89	90	91	92	92	93	94	94	95	96	95	94	93	93	92	90	88	85	83	80	78	84	90.2	96
27-Jan	82	76	64	60	61	62	62	63	60	60	56	52	48	45	47	53	56	67	78	81	82	84	85	86	65.4	86
28-Jan	85	84	83	82	78	81	86	85	73	72	70	68	70	69	64	77	89	93	92	89	84	75	68	66	78.5	93
29-Jan	68	78	88	95	95	90	85	83	83	78	74	64	59	54	49	47	51	60	67	73	77	81	85	85	73.7	95
30-Jan	84	84	86	86	85	85	86	86	87	83	79	76	74	74	74	73	77	83	84	85	87	88	89	88	82.6	89
31-Jan	88	88	88	89	88	88	89	89	88	85	86	85	82	83	81	81	80	81	82	81	82	82	82	83	84.7	89
	82.2	82.4	82.2	82.5	82.2	82.0	82.3	82.4	81.5	80.4	78.9	77.6	76.2	75.0	74.9	77.5	80.0	81.8	82.6	82.6	82.8	82.5	82.2	82.5	Diurnal Average	
	91	91	92	95	95	93	93	93	94	94	95	96	95	94	93	93	92	93	92	92	92	92	92	93	Diurnal Maximum	

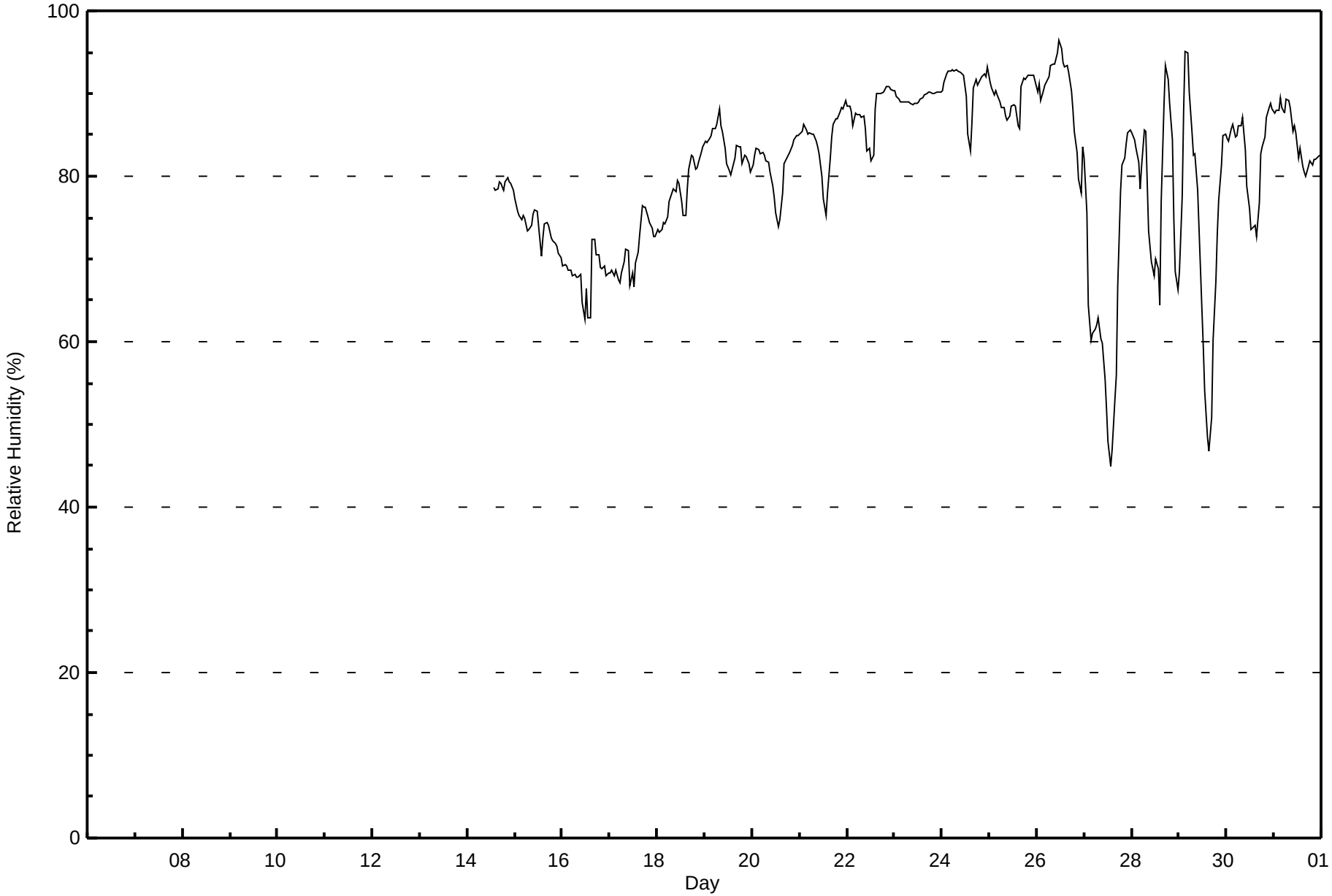
NS - Not in Service

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Brion MacKay River - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	13	3.10	3.10
60 - 80	149	35.56	38.66
80 - 100	257	61.34	100.00

Total Number of Valid Hours: 419

Total Number of Hours: 624

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Brion MacKay River - January 2016

Maximum Speed: 15 km/h on Jan 27 03:00

Maximum Daily Speed Average: 9.5 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 16 11:00

Minimum Daily Speed Average: 0.8 km/h on Jan 15

Maximum Diurnal Speed Average: 1.2 km/h at hour 15

Minimum Diurnal Speed Average: 0.2 km/h at hour 17

Monthly Average Velocity: 0.7 km/h 225.8 deg

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 3$ Median = 5 $Q_3 = 6$ $P_{90} = 8$ $P_{99} = 12$

Hours in Service:	610
Hours of Data:	604
Hours of Missing Data:	6
Percent Operational Time:	99.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	N6	N6	NNE5	NE2	NNE3	N5	N6	N6	NNE6	N6	----	N6
7-Jan	N5	NNE6	NNE4	NNE4	NNE5	NNE4	NNE4	NNE4	N4	N3	NNE2	NW3	NW2	WNW3	WNW2	W2	W3	NW3	WNW3	WSW3	WSW3	SW2	SW2	WSW2	NNW1.9	NNE6
8-Jan	WSW1	E1	SE1	NNE1	NNE2	ENE1	ENE1	SE1	ENE1	ESE1	E2	S1	SE2	SSE2	SSE2	S2	SSE2	SSE2	S3	S2	S0	AF	SSE1	SSE1	SE0.9	S3
9-Jan	SSE2	S2	SW2	WSW2	SSW2	SSW2	SSW2	SW2	SW2	SSW2	SSW2	SW2	SW2	SW2	SW5	SSW4	S4	S6	S6	S6	S6	S6	S5	S2	SSW3.1	S6
10-Jan	SSW5	S4	S5	SW4	SW3	S3	SW4	W5	W4	WSW4	W4	W3	WNW5	WNW7	NW8	NNW9	NNW10	N7	N5	N4	NNE2	NNW1	WNW3	NW6	WNW2.8	NNW10
11-Jan	NW7	NW7	NW9	NNW6	NNW5	NW7	WNW7	NW6	WNW5	WSW4	WSW5	WSW5	WSW5	WSW5	SW5	SSW5	S3	SSW3	SSE3	SSE3	S4	S5	S5	SSE5	W2.7	NW9
12-Jan	SSE4	SSE5	SSE5	SSE5	SE4	SE4	SE3	SE4	SE5	SE4	SSE3	S2	S3	SSW4	W3	S2	S2	S3	SSE2	SSE4	E2	E1	SSE4	SSE6	SSE3.2	SSE6
13-Jan	SE4	N1	ESE1	ESE4	ESE3	ENE1	NNE4	NE2	E3	NE2	ENE6	E5	ENE6	NE7	NE8	ENE7	NE7	NE7	NE7	NE7	NE5	NNE6	NE7	NNE8	NE4.4	NE8
14-Jan	NNE7	NNE8	NNE8	NNE9	N8	N8	N8	N8	NNE9	NNE8	NNE5	NNE6	N7	NNE6	NE5	NNE6	NNE7	NNE8	NNE8	NNE7	NNE7	NNE6	NE6	NE6	NNE7.0	NNE9
15-Jan	NNE3	AF	SE1	SE1	ESE0	SSE1	S0	SSE0	SE1	ESE0	N1	N3	NNE4	NE4	NE3	NNE2	NE1	AF	ESE1	E1	SE1	SSE1	SSE1	SE1	NE0.8	NNE4
16-Jan	SE1	SSE1	SE2	SE2	SE2	SSE0	SE1	SSE1	SE1	SSE0	W0	WNW2	WNW2	WSW2	W2	AF	SE1	SSE2	SSE2	SE1	SSE2	SE2	SSE2	SE2	SSE0.9	SSE2
17-Jan	SE2	SE2	SSE3	SSE2	SE2	SE2	SSE4	SSE4	SSE4	S4	SSE4	SE6	S5	S4	SE4	SE5	SE4	SE6	SE7	SE7	SE7	SE6	SE7	SE9	SE4.5	SE9
18-Jan	SE9	SE9	SE8	SE6	SE6	SE5	SE6	SE7	SE6	SSE5	SE5	SE5	S3	SSW3	SSW4	SW4	WSW4	SW2	WSW3	WSW3	SW4	SW3	SSW3	SSW3	SSE3.8	SE9
19-Jan	SSW3	SW3	WSW2	WSW2	W3	W3	W2	NNW2	N1	N2	NNE3	NNE5	NNE3	NNE5	N5	NNE4	NNE4	NE5	NE3	NE5	NNE4	NE4	NE2	ENE2	NNE1.9	NE5
20-Jan	NE3	NE5	NE5	NE4	NE4	NE5	ENE4	E3	ENE4	ENE4	ESE4	SE5	SSE4	SE5	SSE4	SE4	SSE3	S2	SE3	SE4	SE5	SSE5	SSE4	SSE5	ESE2.7	NE5
21-Jan	SSE4	SSE4	S5	S6	S5	SSE3	SE3	SSE4	SE5	SE6	SSE6	SSE6	SSE7	SE6	ESE7	ESE6	ESE8	ESE8	SE8	SE5	SSE3	SSE6	S3	SSW4	SSE4.9	SE8
22-Jan	SSW6	SSW6	SW4	W1	SW3	SSW4	W3	WSW3	NW3	NNW2	ENE1	NNE3	NE4	NE6	NNE7	NE5	NNE6	NE5	NE6	NE6	NE7	NE6	NE6	NNE6	NNE2.0	NE7
23-Jan	NNE7	NE6	NE5	NNE5	NNE4	NNE5	N4	N4	NNE3	NE2	NE1	NNW1	N3	NNE1	NW2	NNW2	AF	AF	SSW2	SSW3	S3	S4	SSE4	S5	NNE1.4	NNE7
24-Jan	S4	SSW4	SSW3	SW4	W3	WNW6	WNW6	WNW5	W6	W6	WSW7	WSW6	WSW5	SW6	SW6	SW7	SW5	SW5	WSW6	W5	W5	WNW7	NW4	N3	WSW4.4	WNW7
25-Jan	SE1	SSW3	SSW2	SE3	SSE4	SSE5	S4	SSE4	SSE4	SSE4	S6	S5	S4	S6	SSW6	SSW5	S4	S6	S7	S6	S6	SSW6	SSW5	SSW5	S4.5	S7
26-Jan	S4	SSW5	S5	S4	SSE5	S5	S5	S6	S5	S6	S5	S6	S6	SSW9	SW9	SW8	SW9	WSW10	SW11	SW12	WSW12	WSW13	W15	W12	SW6.6	W15
27-Jan	W11	W12	W15	W15	WNW14	WNW12	W10	W10	W11	W10	W11	W10	WNW9	WNW10	WNW8	WSW4	WSW4	NNE2	NE2	E2	ENE2	SSE4	SE4	SSE6	W6.8	W15
28-Jan	SSE7	SSE5	SE3	SSE7	SSE7	SE4	SSE4	S6	S10	S10	S9	S8	S3	SW3	SSW3	S5	SSW7	SSW9	SSW9	WSW12	WSW10	WSW12	WSW11	WSW10	SSW5.9	WSW12
29-Jan	WSW11	W11	WNW12	WNW11	W11	WNW12	WNW12	WNW12	WNW11	WNW13	WNW11	WNW13	WNW11	WNW11	WNW14	WNW12	WNW8	WSW7	WSW7	WSW8	WSW7	WSW6	SW5	SW6	W9.5	WNW14
30-Jan	W7	W7	WSW6	WSW6	WSW6	WSW5	W4	WSW6	WSW6	W7	W5	W5	WNW6	WNW6	WNW6	WNW6	NNW6	NNE6	NNE7	NE8	NE6	ENE5	E4	ENE4	WNW2.8	NE8
31-Jan	E3	ENE3	ESE2	E3	ENE5	ENE6	ENE6	ENE6	NE6	NE7	NNE8	NNE4	NW5	NNE5	NE7	NNE7	NNE5	NNE4	NNE3	NE3	NNE3	NE3	NE3	NE2	NE4.1	NNE8
	S1.2	SW1.0	SW0.9	SW0.7	SW0.5	W0.6	W0.8	WSW0.8	SW0.8	SW1.1	SW1.0	WSW1.2	W1.2	W1.2	WNW1.2	WNW0.7	NW0.2	SSE0.6	SSE0.8	S0.6	S0.6	SSW1.0	S0.9	S1.0	Diurnal Average	
	W11	W12	W15	W15	WNW14	WNW12	WNW12	WNW12	W11	WNW13	WNW11	WNW13	WNW11	WNW11	WNW14	WNW12	NNW10	WSW10	SW11	WSW12	WSW12	WSW13	W15	W12	Diurnal Maximum	

AF - Analyzer Failure NS - Not in Service

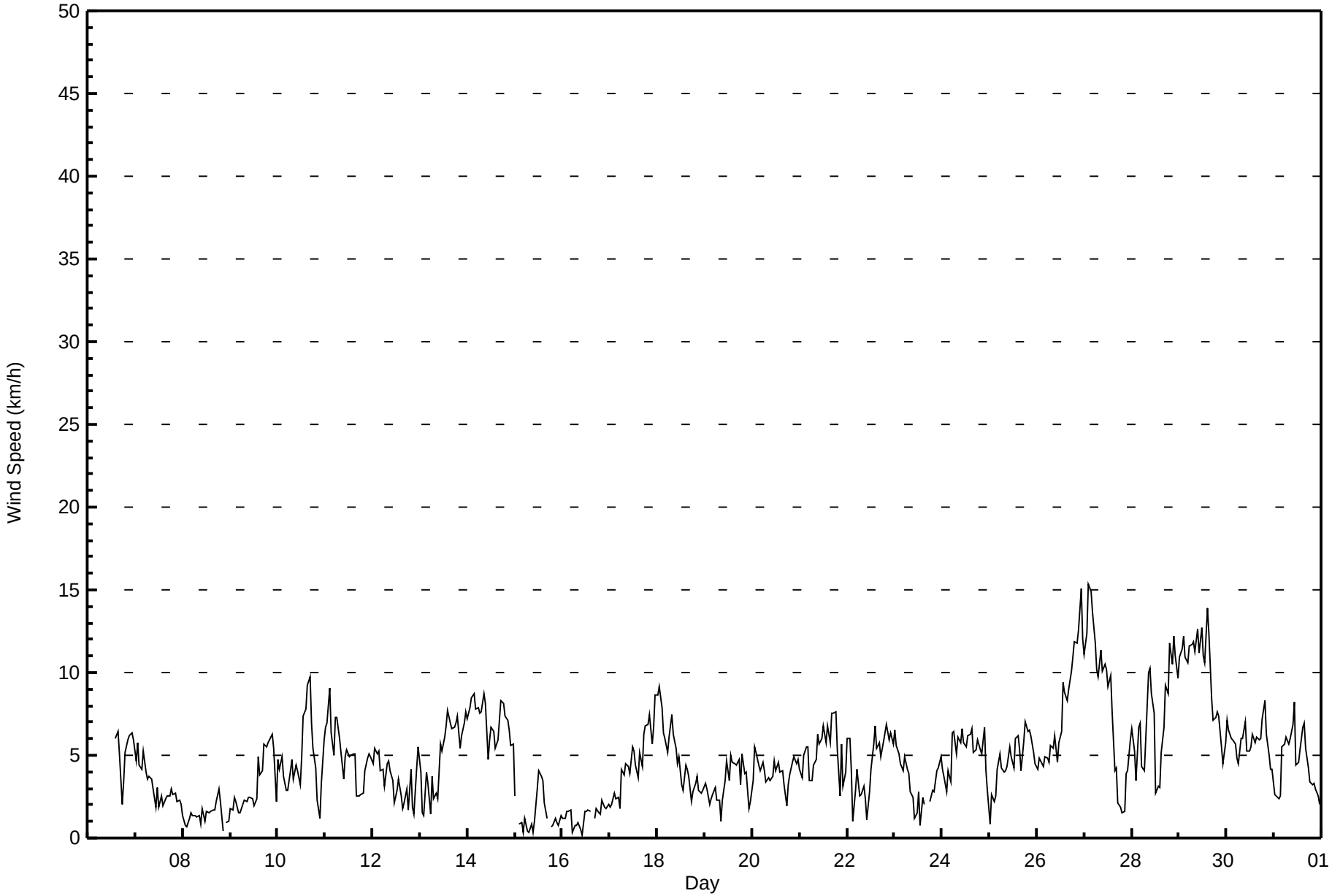
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Brion MacKay River - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	389	64.40	64.40
6 - 11	195	32.28	96.69
12 - 19	20	3.31	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: 604

Total Number of Hours: 624

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Brion MacKay River - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	16	37	30	14	12	9	48	60	45	29	25	22	20	9	7	6	389
6 - 11	11	27	21	6	0	4	19	9	21	9	7	18	14	18	7	4	195
12 - 19	0	0	0	0	0	0	0	0	0	0	0	5	5	10	0	0	20
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	27	64	51	20	12	13	67	69	66	38	32	45	39	37	14	10	604

Total Number of Valid Hours: 604

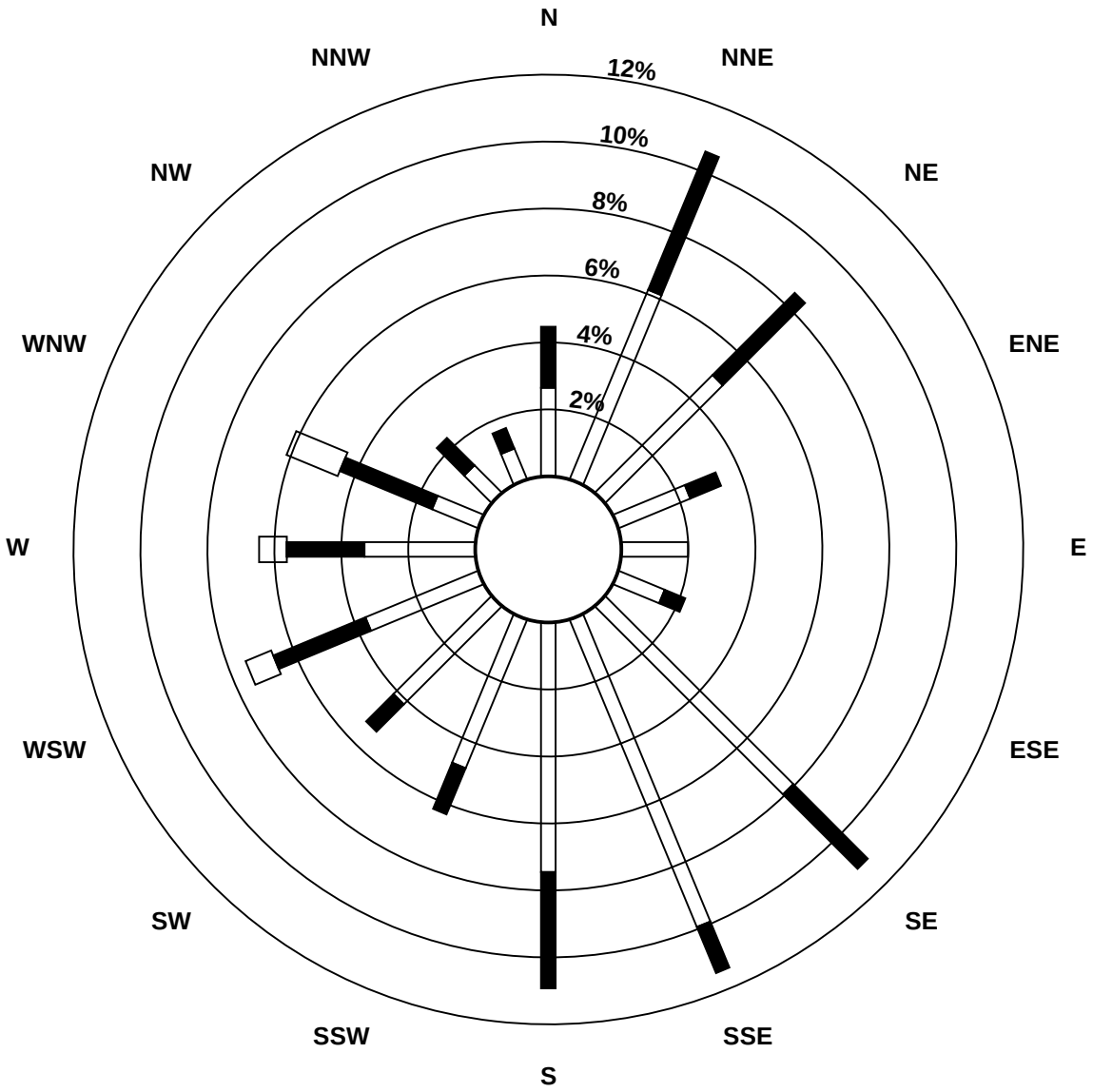
Total Number of Hours: 624

Wood Buffalo Environmental Association

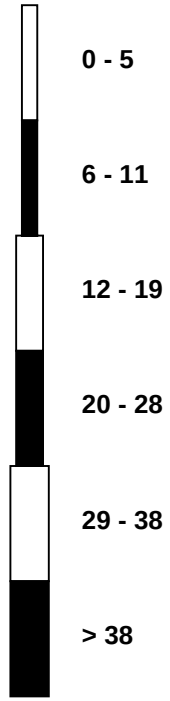
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Brion MacKay River (AMS 20)



Classes (km/h)



Total Number of Valid Hours: 604

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Brion MacKay River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Jan 27 04:00

Minimum Value: 0 km/h on Jan 16 21:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	610
Hours of Data:	604
Hours of Missing Data:	6
Hours of Calibration:	0
Percent Operational Time:	99.0

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

AF - Analyzer Failure NS - Not in Service

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Brion MacKay River - January 2016

Direction of Maximum Speed: 272 deg on Jan 27 03:00
Direction of Maximum Daily Speed Average: 275.7 deg on Jan 29

Direction of Minimum Speed: 267 deg on Jan 16 11:00

Direction of Minimum Daily Speed Average: 0.8 deg on Jan 15

Monthly Average Direction: 221.7 deg

Hours in Service:	610
Hours of Data:	604
Hours of Missing Data:	6
Percent Operational Time:	99.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	357	6	20	34	23	6	10	9	15	7	--
7-Jan	9	14	15	14	16	32	20	23	5	351	25	316	317	283	294	262	269	311	282	242	244	218	217	247	339.7
8-Jan	252	92	138	20	20	73	64	129	71	121	98	191	124	149	162	181	151	168	171	190	170	AF	156	159	141.0
9-Jan	157	183	220	239	198	209	193	219	214	201	194	220	231	235	219	196	187	183	188	191	185	181	185	169	196.5
10-Jan	193	178	186	214	231	186	231	272	268	254	269	263	291	302	309	327	338	354	360	5	31	348	301	308	293.5
11-Jan	322	317	325	334	339	317	301	313	291	254	255	253	256	247	224	213	180	204	159	149	171	186	189	153	270.5
12-Jan	155	155	152	148	140	146	138	138	138	139	160	190	185	211	261	187	181	173	147	167	94	86	151	152	155.7
13-Jan	135	5	117	119	117	74	28	37	91	51	68	94	71	56	51	59	48	46	45	45	38	31	35	29	56.1
14-Jan	33	20	18	29	11	9	2	10	27	26	28	27	8	15	35	27	29	32	27	30	26	32	35	36	23.3
15-Jan	21	AF	142	136	115	153	176	163	133	119	352	2	15	44	36	32	55	AF	123	85	142	163	151	144	55.7
16-Jan	132	150	144	142	144	149	130	167	134	155	267	292	302	250	281	AF	144	147	152	139	148	142	148	146	157.3
17-Jan	143	146	155	148	145	134	151	157	151	171	155	136	170	170	144	126	129	133	140	138	141	138	142	140	144.8
18-Jan	138	135	130	130	127	130	136	134	138	148	143	136	184	193	198	225	244	217	238	244	225	219	209	196	158.6
19-Jan	204	221	242	242	262	263	269	345	5	353	21	19	17	26	9	18	29	45	51	39	31	45	42	71	14.9
20-Jan	54	43	41	35	37	47	68	83	69	76	113	144	149	139	160	137	164	188	139	135	141	151	157	153	108.9
21-Jan	156	160	179	170	174	150	143	157	145	145	153	160	158	132	121	117	116	121	138	126	147	147	177	207	146.8
22-Jan	194	204	218	271	224	210	263	247	315	333	77	27	37	37	24	35	25	45	56	48	44	41	37	29	32.3
23-Jan	31	44	38	28	17	12	10	358	33	54	44	340	349	21	326	340	AF	AF	193	197	175	185	162	182	31.2
24-Jan	190	200	202	222	259	285	286	284	270	260	242	246	239	234	227	224	214	226	249	264	266	285	326	5	251.0
25-Jan	135	195	194	145	161	163	173	157	157	150	176	188	183	185	200	196	173	182	187	184	183	194	195	196	180.4
26-Jan	182	193	178	174	162	171	169	186	184	191	189	185	190	205	214	224	235	244	235	236	239	248	271	261	219.4
27-Jan	264	274	272	273	282	286	275	273	272	269	271	273	282	288	285	258	258	13	44	94	74	149	140	153	272.4
28-Jan	150	152	125	149	149	143	160	177	187	190	187	187	178	219	208	184	195	195	212	244	247	245	239	238	199.0
29-Jan	255	265	282	284	277	282	283	282	286	284	283	287	287	284	297	298	282	252	245	251	254	251	218	226	275.7
30-Jan	261	264	258	239	240	253	260	256	257	265	265	279	288	299	298	300	346	24	27	38	46	76	79	69	294.6
31-Jan	93	77	117	96	57	76	59	65	47	37	27	24	325	17	37	31	28	31	17	50	32	36	40	43	42.1
	191.0	214.5	232.3	215.3	230.1	265.1	271.0	249.1	232.5	229.4	217.8	237.1	262.4	265.0	286.8	286.1	308.1	148.0	166.4	174.4	183.1	191.8	190.7	176.9	
	Diurnal Average																								

AF - Analyzer Failure NS - Not in Service

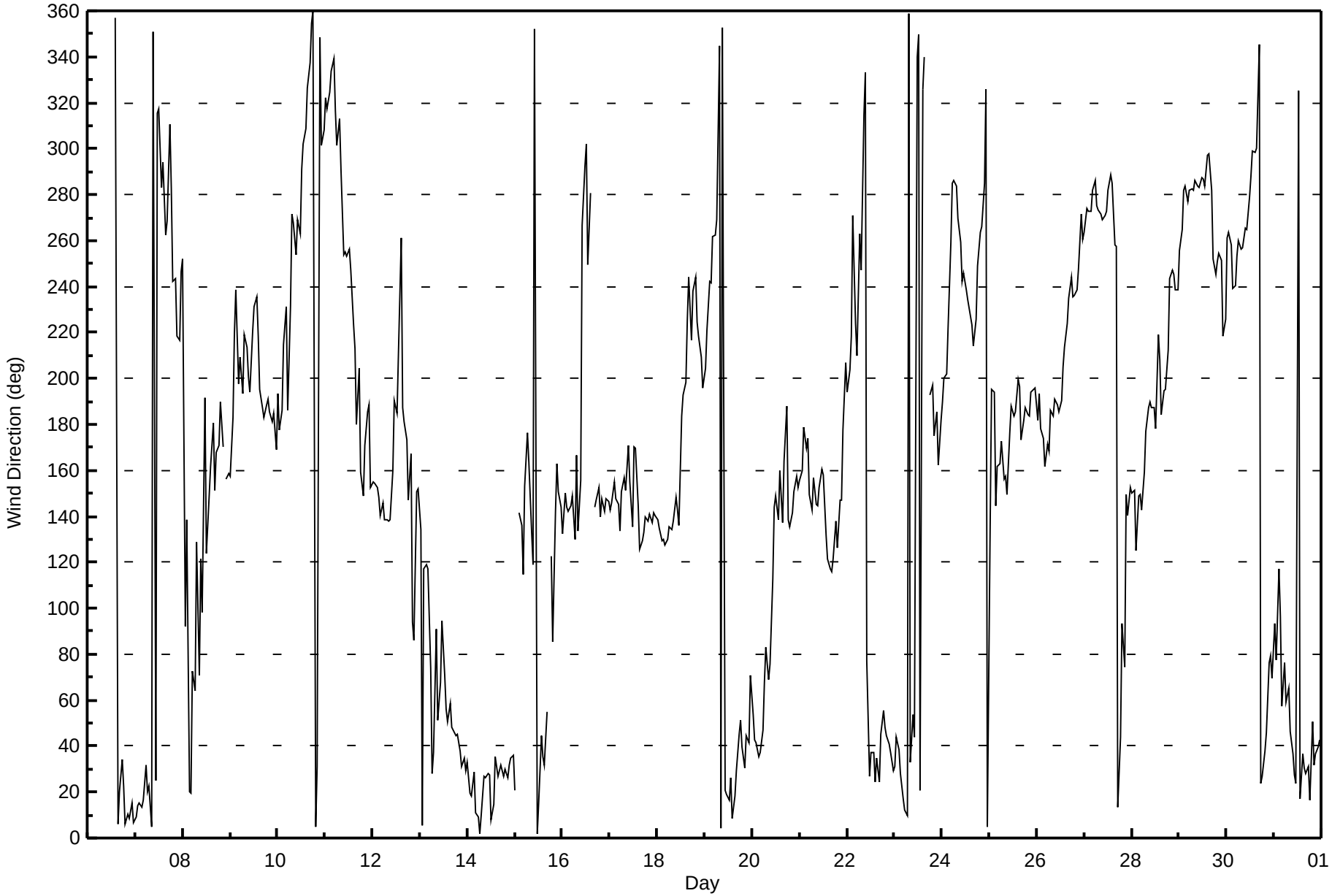
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Brion MacKay River - January 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Brion MacKay River - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 93 deg on Jan 16 11:00

Minimum Value: 8 deg on Jan 17 07:00

Percentiles: P_1 = 11 P_{10} = 18 Q_1 = 23 Median = 27 Q_3 = 38 P_{90} = 47 P_{99} = 74

Hours in Service:	610
Hours of Data:	604
Hours of Missing Data:	6
Hours of Calibration:	0
Percent Operational Time:	99.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
6-Jan	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	25	23	24	25	27	22	26	24	25	26	27
7-Jan	26	26	25	27	27	30	29	31	28	37	48	29	58	56	58	49	45	30	36	43	48	44	43	47	58
8-Jan	73	72	52	51	44	55	53	62	44	71	43	65	52	52	45	35	62	32	32	28	76	AF	23	47	76
9-Jan	17	29	29	35	22	29	25	32	33	30	25	31	36	43	31	26	18	23	25	22	19	20	21	34	43
10-Jan	24	25	24	36	49	32	41	39	46	40	45	48	32	24	23	20	23	37	26	24	27	43	23	20	49
11-Jan	18	20	19	20	26	21	23	21	26	47	46	40	44	51	32	29	23	24	17	15	15	13	14	11	51
12-Jan	11	10	13	16	18	16	18	22	21	26	30	68	38	38	43	47	81	37	79	37	74	68	17	13	81
13-Jan	17	39	71	16	36	88	15	45	45	59	27	37	32	24	25	26	27	26	26	27	25	22	23	25	88
14-Jan	24	27	24	26	25	24	26	25	24	22	27	29	26	26	28	28	26	25	24	22	25	25	27	22	29
15-Jan	22	AF	43	18	69	69	90	68	43	61	47	30	28	29	23	15	22	AF	56	74	25	51	22	20	90
16-Jan	10	26	19	16	17	56	22	45	24	40	93	37	53	48	75	AF	21	20	27	18	11	20	20	16	93
17-Jan	17	22	14	17	11	18	8	10	14	22	20	24	25	38	38	24	21	19	22	19	22	23	22	20	38
18-Jan	18	20	22	21	23	24	19	21	20	25	26	23	44	62	37	37	37	25	32	40	31	34	27	21	62
19-Jan	24	38	40	35	47	39	38	40	32	18	30	25	53	28	27	23	21	26	24	22	27	23	42	27	53
20-Jan	29	25	24	24	25	23	29	35	31	33	31	30	30	28	28	21	25	51	22	22	25	19	20	17	51
21-Jan	19	14	24	24	27	29	26	25	21	22	23	27	25	26	23	18	21	22	24	19	25	29	39	21	39
22-Jan	22	29	27	69	28	29	55	57	31	62	58	23	25	25	24	31	21	25	26	27	24	25	25	25	69
23-Jan	25	25	26	23	26	22	25	24	22	17	41	35	24	41	13	33	AF	AF	24	25	28	22	25	22	41
24-Jan	24	29	36	29	45	36	32	38	42	44	40	44	45	33	33	33	30	31	42	40	36	25	29	25	45
25-Jan	69	24	39	31	24	25	23	19	18	21	23	28	30	26	28	24	18	18	19	18	16	19	19	18	69
26-Jan	18	17	14	14	15	15	17	18	16	19	23	18	24	25	28	30	33	41	35	36	39	42	40	46	46
27-Jan	40	43	39	41	36	35	38	39	41	44	44	41	41	35	33	41	38	42	36	33	74	30	22	20	74
28-Jan	18	33	41	23	22	24	20	16	21	23	22	22	31	63	55	25	30	23	27	37	42	39	38	39	63
29-Jan	44	42	35	35	38	32	34	36	32	33	36	35	35	38	29	27	33	38	42	43	42	42	35	33	44
30-Jan	37	43	39	31	39	39	33	42	42	42	47	40	36	26	28	28	23	26	25	25	30	31	29	27	47
31-Jan	33	31	42	32	28	28	28	29	28	26	24	45	36	33	26	22	25	23	25	24	24	24	26	35	45
	73	72	71	69	69	88	90	68	46	71	93	68	58	63	75	49	81	51	79	74	76	68	43	47	
	Diurnal Maximum																								

AF - Analyzer Failure NS - Not in Service

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	January 6, 2016	Last Calibration	
Station Name	Brion	Station Number	AMS 20
Reason:	Install		
Start Time (MST)	11:45	End Time (MST)	15:40
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

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-633	-633
Analyzer IP address	192.168.1.43		Lamp voltage	835	835
Calculated slope		0.990759	Chamber temp	45.1	45.0
Calculated intercept		1.463077	Pressure	670.6	672.1
Analyzer Background		12.4	Flow	0.488	0.490
Analyzer Coefficient		0.977	Intensity	88	89

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					
as found span					
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	79.8	809.2	816.0	0.992
second point	5000	40.0	405.6	406.9	0.997
third point	5000	20.1	203.8	203.2	1.003
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	79.8	809.2	812.1	0.996
				Average Correction Factor	0.997

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Adjusted zero. Inlet filter replaced during high point.

Calibration Performed By: Asad Hidayat

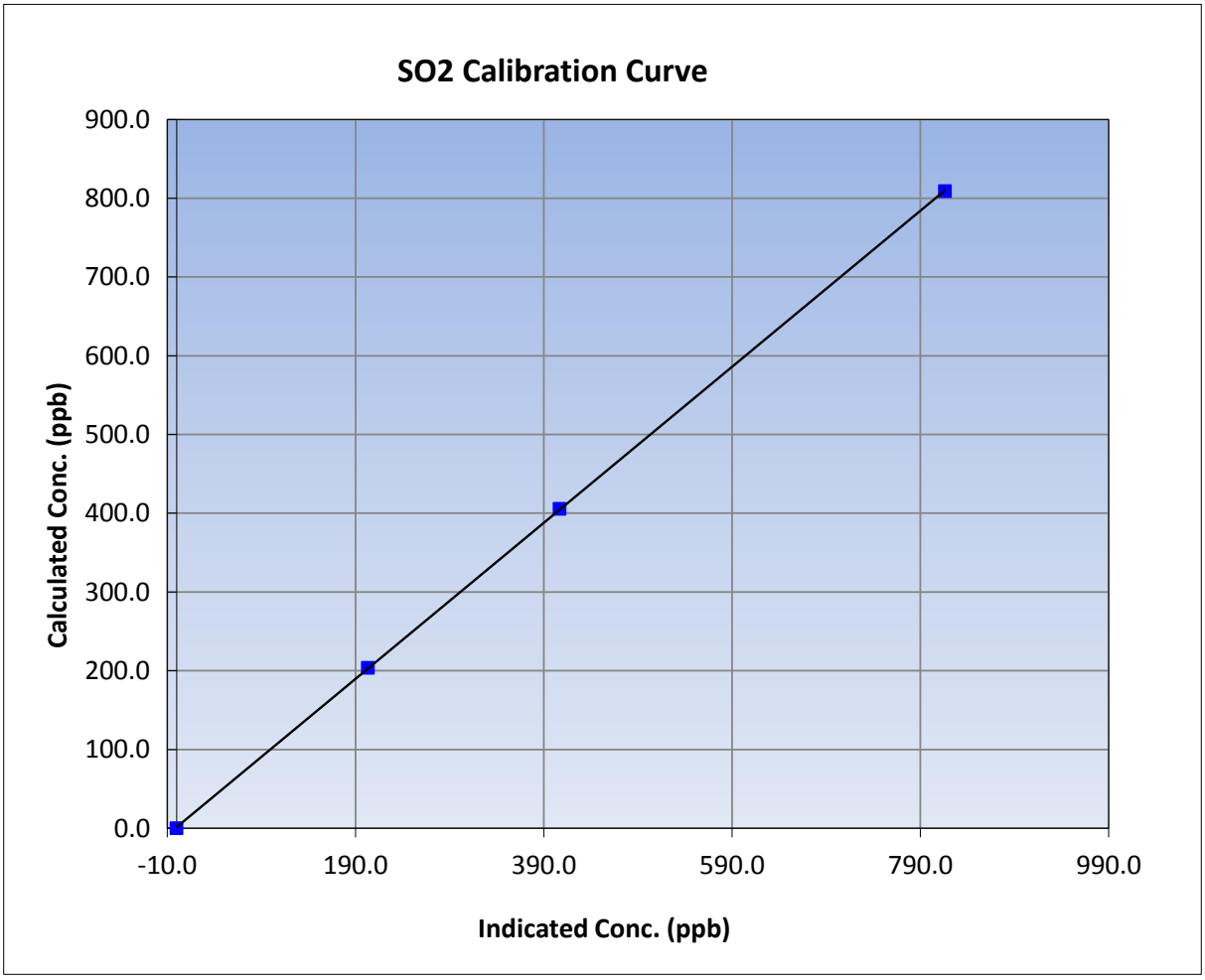
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

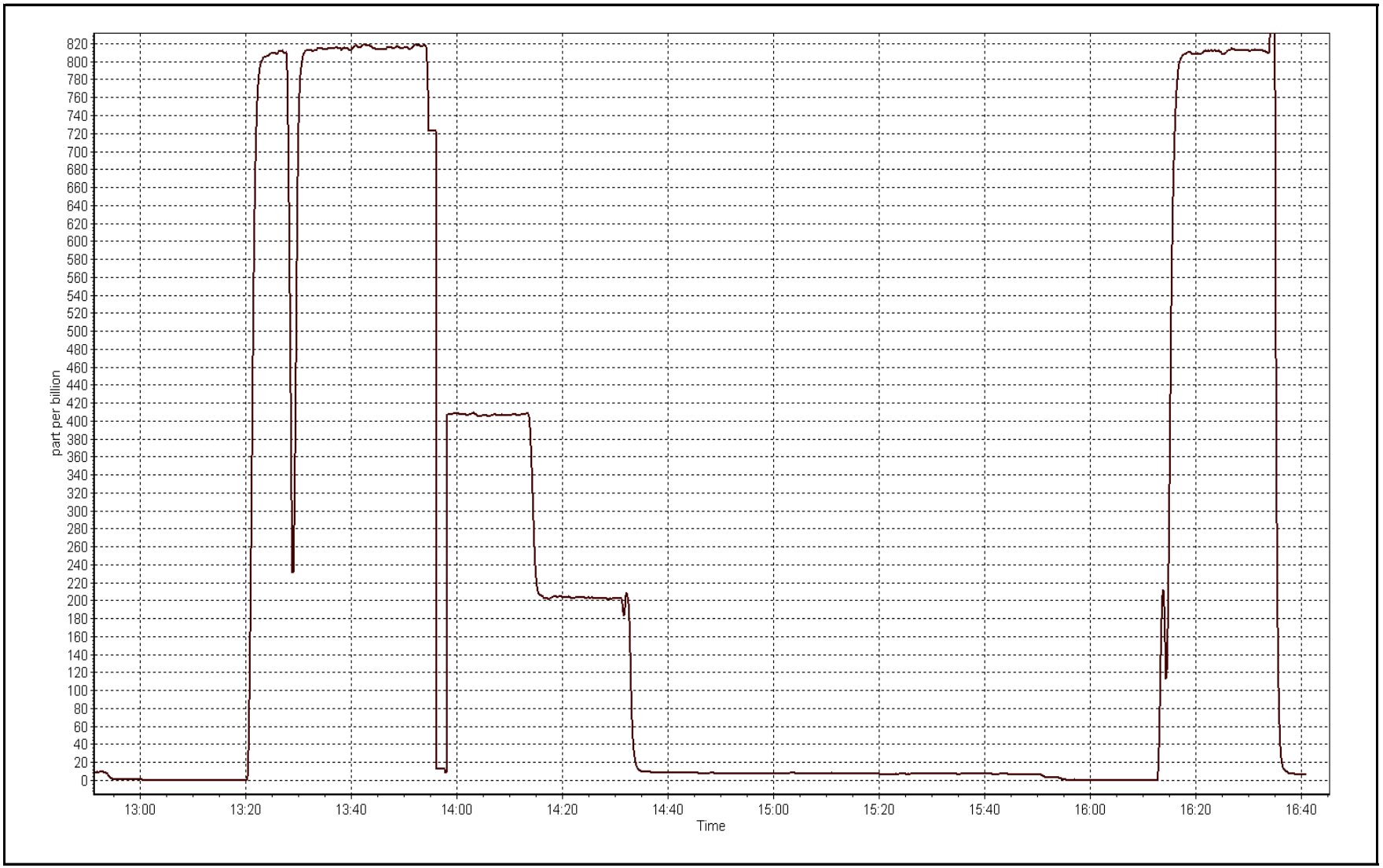
Calibration Date	January 6, 2016	Previous Calibration	
Station Name	Brion	Station Number	AMS 20
Start Time (MST)	11:45	End Time (MST)	15:40
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999987
809.2	816.0	0.9916		
405.6	406.9	0.9969	Slope	0.990759
203.8	203.2	1.0033		
			Intercept	1.463077



SO2 Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 8, 2016	Last Calibration	
Station Name	Brion	Station Number	AMS 20
Reason:	Install		
Start Time (MST)	11:55	End Time (MST)	14:45
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	1120
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
Analyzer IP address	192.168.1.75		Lamp voltage		3555
Calculated slope		1.003661	Chamber temp		50
Calculated intercept		-0.074963	Pressure		23.6
Analyzer Background		24.6	Flow		0.629
Analyzer Coefficient		1.026	Intensity		88
			Converter temp.		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					
as found span					
SO2 scrubber check	5000	19.8	200.8	3.5	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	75.5	80.8	80.6	1.003
second point	5000	37.9	40.6	40.5	1.001
third point	5000	19.0	20.3	20.3	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	75.5	80.8	79.1	1.021
				Average Correction Factor	1.002

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Scrubber check done before calibrator zero. Adjusted both zero and span.

Calibration Performed By: Asad Hidayat

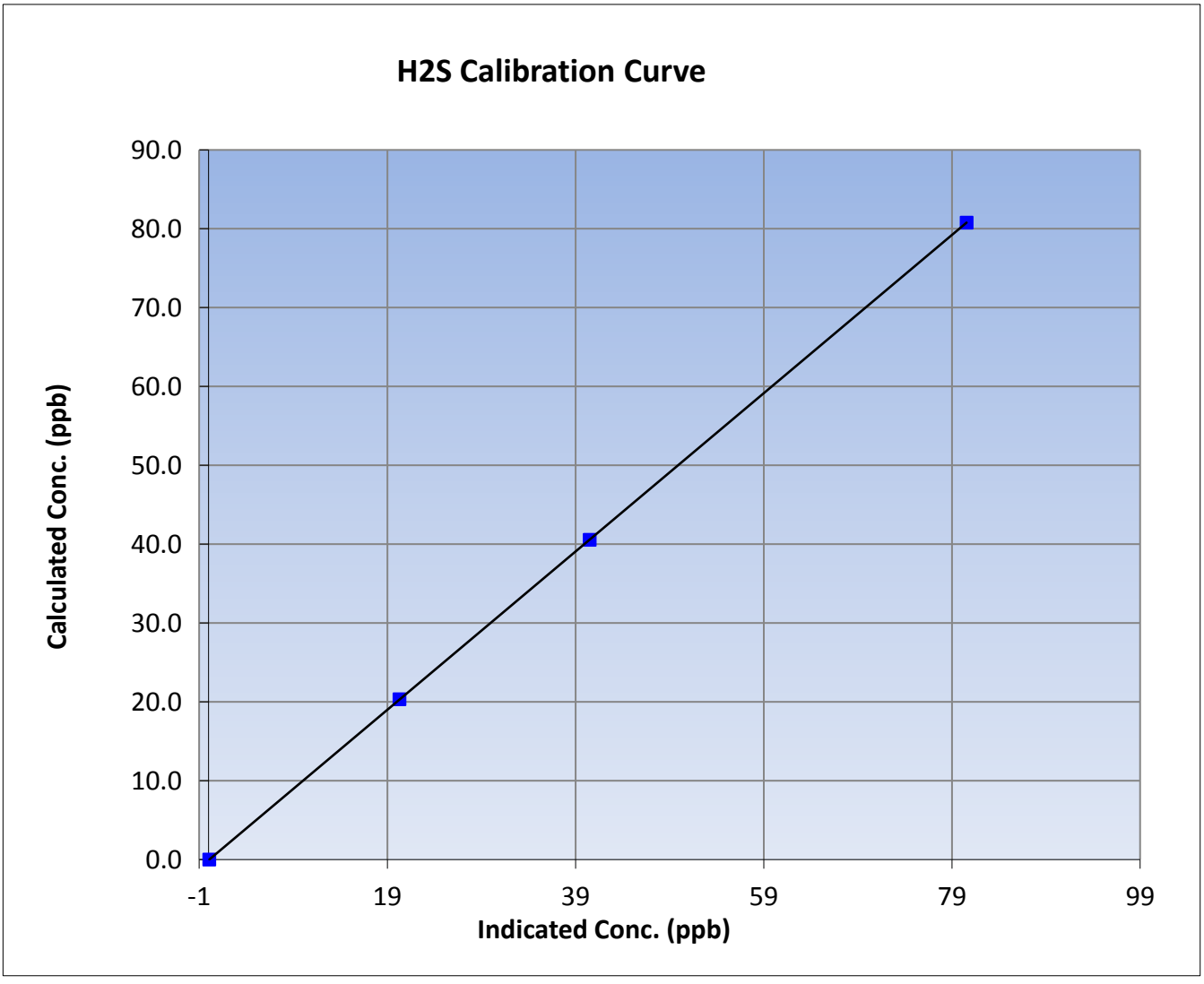
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

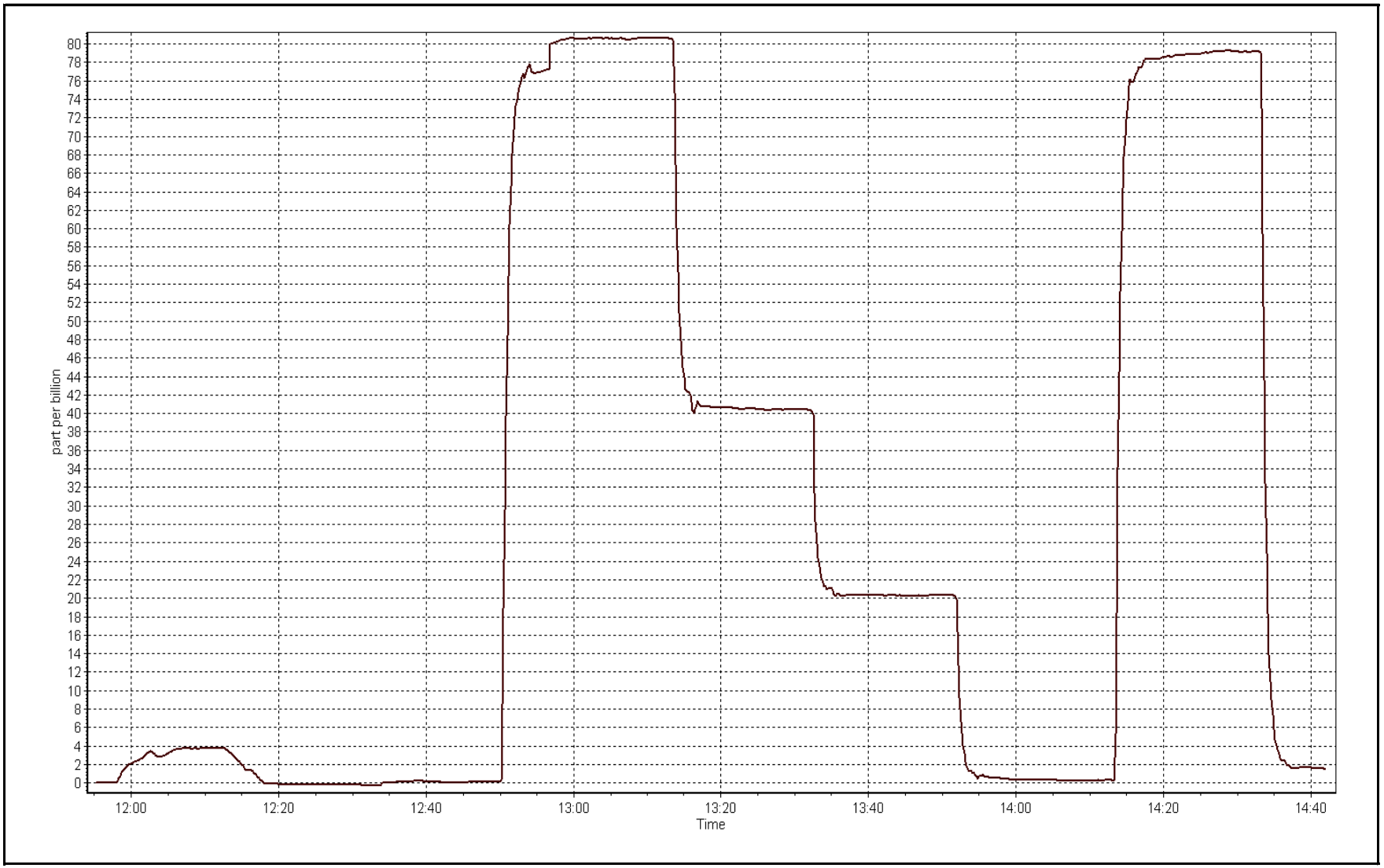
Calibration Date	January 8, 2016	Previous Calibration	
Station Name	Brion	Station Number	AMS 20
Start Time (MST)	11:55	End Time (MST)	14:45
Analyzer make	API T101	Analyzer serial #	196

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999999
80.8	80.6	1.0028		
40.6	40.5	1.0011	Slope	1.003661
20.3	20.3	1.0020		
			Intercept	-0.074963



H2S Calibration Plot Date: January 8, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 15, 2016	Last Calibration	January 8, 2016
Station Name	Brion	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	10:24	End Time (MST)	15:55
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	1120
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	3555	3518
Calculated slope	1.003661	0.994493	Chamber temp	50	50
Calculated intercept	-0.074963	-0.166548	Pressure	23.6	23.5
Analyzer Background	24.6	25.2	Flow	0.629	0.627
Analyzer Coefficient	1.026	1.022	Intensity	88	87
			Converter temp.	317	316

Analyzer make/model	API T101	Analyzer serial #	196
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	75.6	80.9	76.6	1.056
SO2 scrubber check	5000	19.8	200.8	4.4	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	75.6	80.9	81.3	0.994
second point	5000	37.9	40.6	41.2	0.984
third point	5000	19.0	20.3	20.7	0.982
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	75.6	80.9	81.5	0.993
				Average Correction Factor	0.987

Corrected As found	76.5	Previous response	80.7	% change	5.5%

Notes:

Re-calibrating instrument to adjust baseline. Adjusted both zero and span. Purged calibrator from 11:30-12:10 MST.

Calibration Performed By: Asad Hidayat

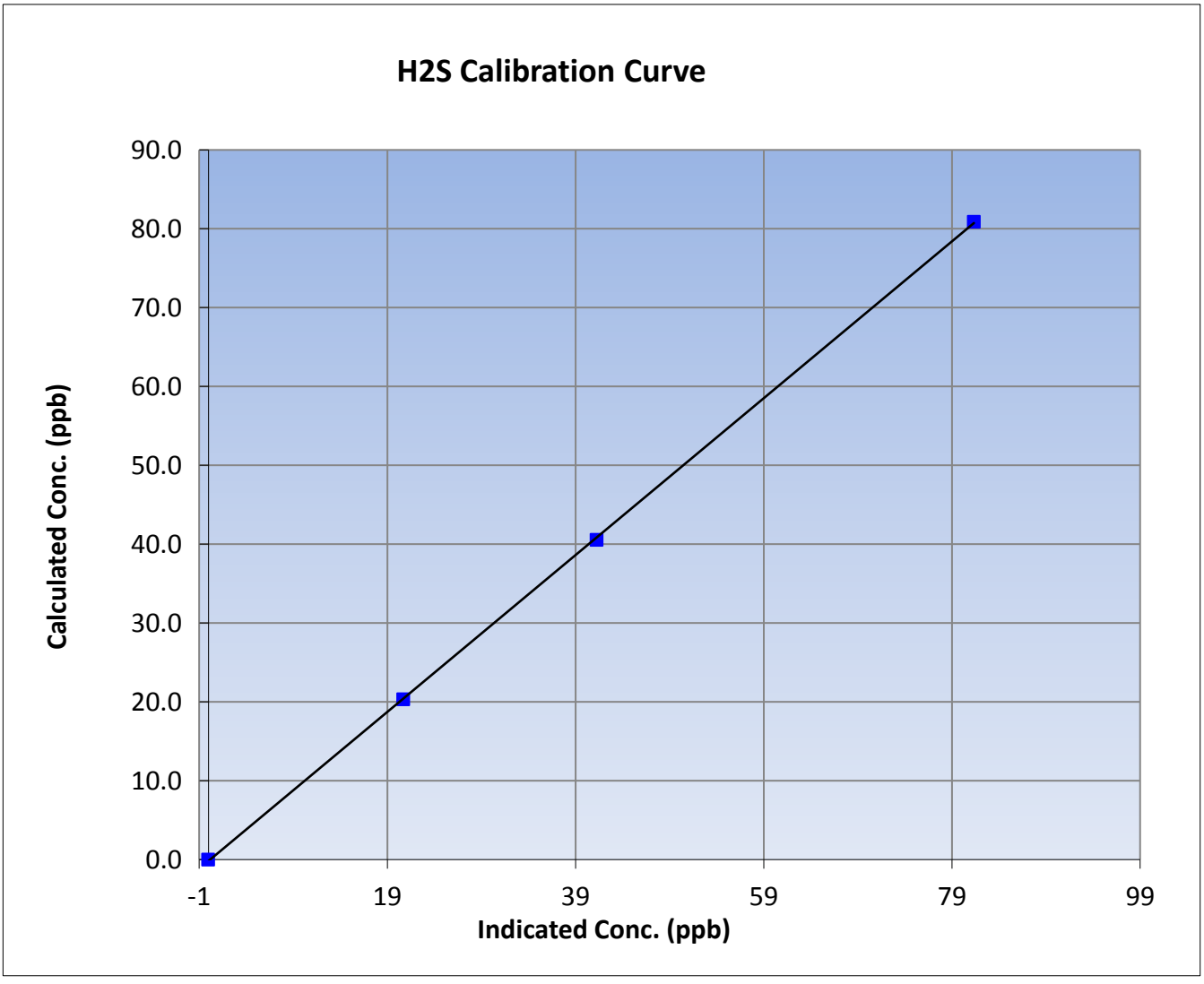
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

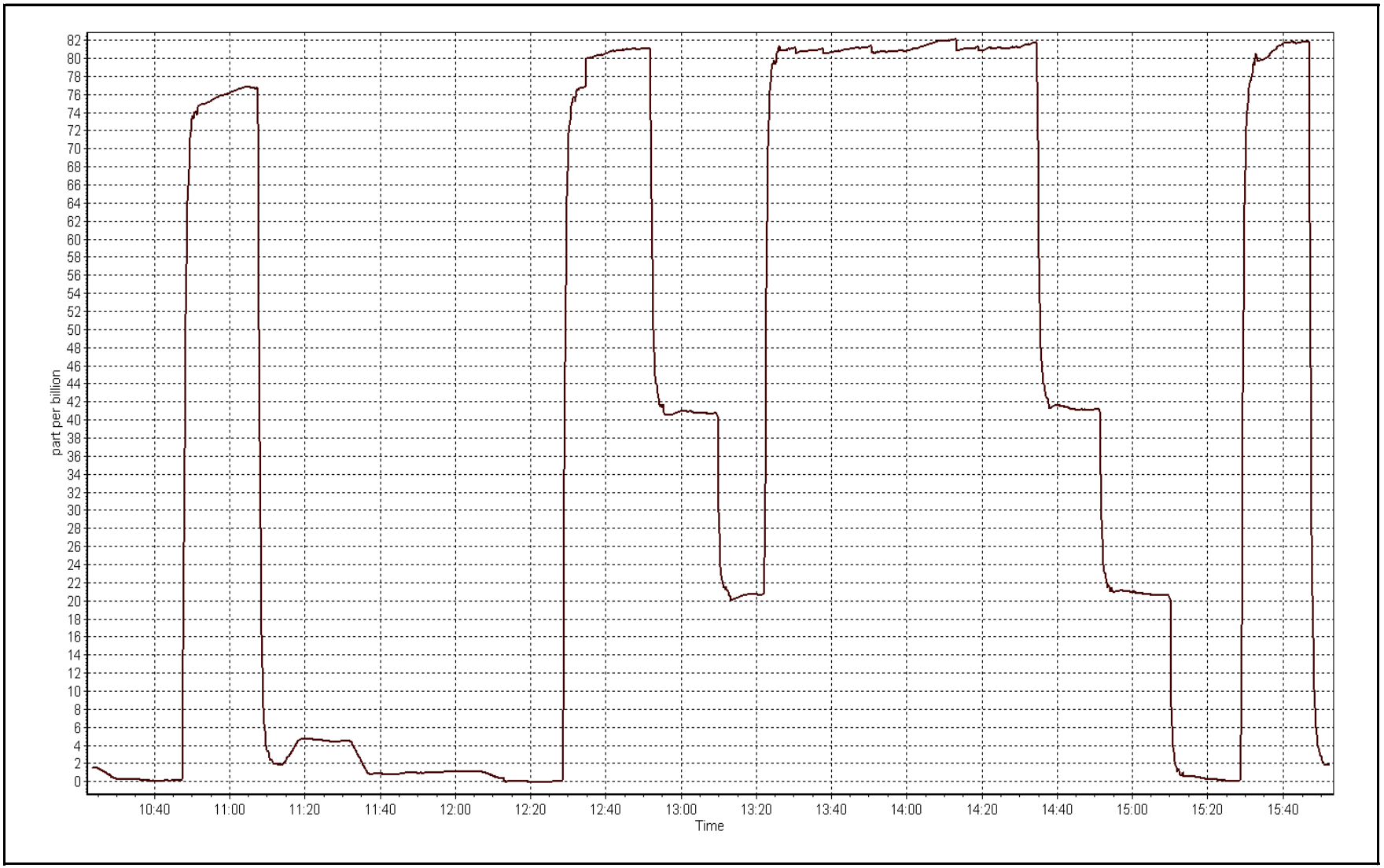
Calibration Date	January 15, 2016	Previous Calibration	January 8, 2016
Station Name	Brion	Station Number	AMS 20
Start Time (MST)	10:24	End Time (MST)	15:55
Analyzer make	API T101	Analyzer serial #	196

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999956
80.9	81.3	0.9945		
40.6	41.2	0.9836	Slope	0.994493
20.3	20.7	0.9821		
			Intercept	-0.166548



H2S Calibration Plot Date: January 15, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-06-16	Last Calibration	
Station Name	Brion	Station Number	AMS 20
Reason:	Install		
Start Time (MST)	11:45	End Time (MST)	15:40
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
Analyzer IP address	192.168.1.51		Air or Bypass Press		34.3
Calculated slope		0.996733	Fuel Pressure		23.9
Calculated intercept		0.049068	Analyzer Coeff		4.3
			Analyzer BKG		2.230
Analyzer make	51i-LT		Analyzer serial #	1501663727	

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					
as found span					
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	79.8	17.12	17.13	0.999
second point	5000	40.0	8.58	8.56	1.002
third point	5000	20.1	4.31	4.25	1.014
as left zero	5000	0.0	0.00	-0.08	----
as left span	5000	79.9	17.14	17.21	0.996
				Average Correction Factor	1.005

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Adjusted zero and span slightly. Inlet filter replaced during high point.

Calibration Performed By: Asad Hidayat

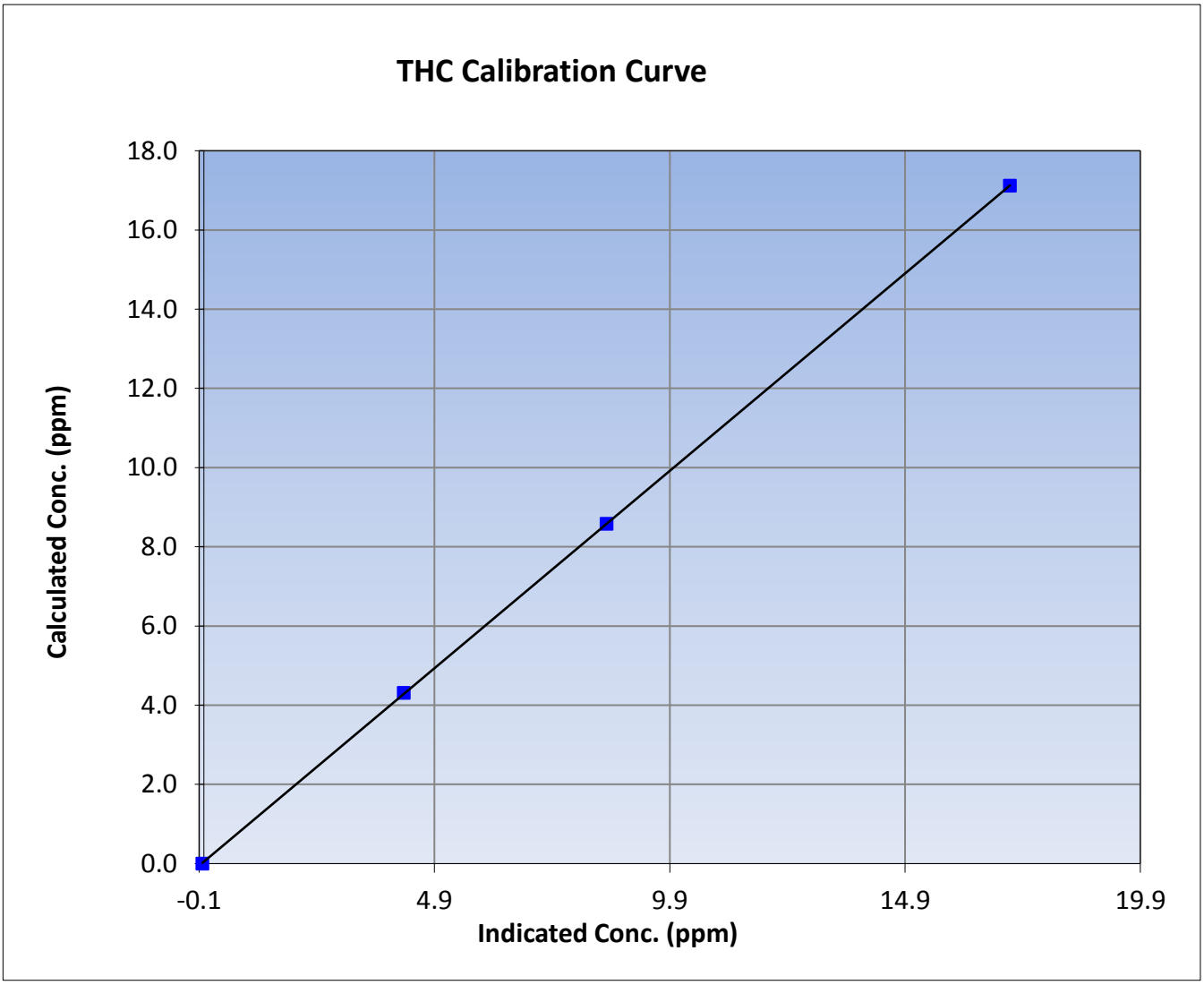
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

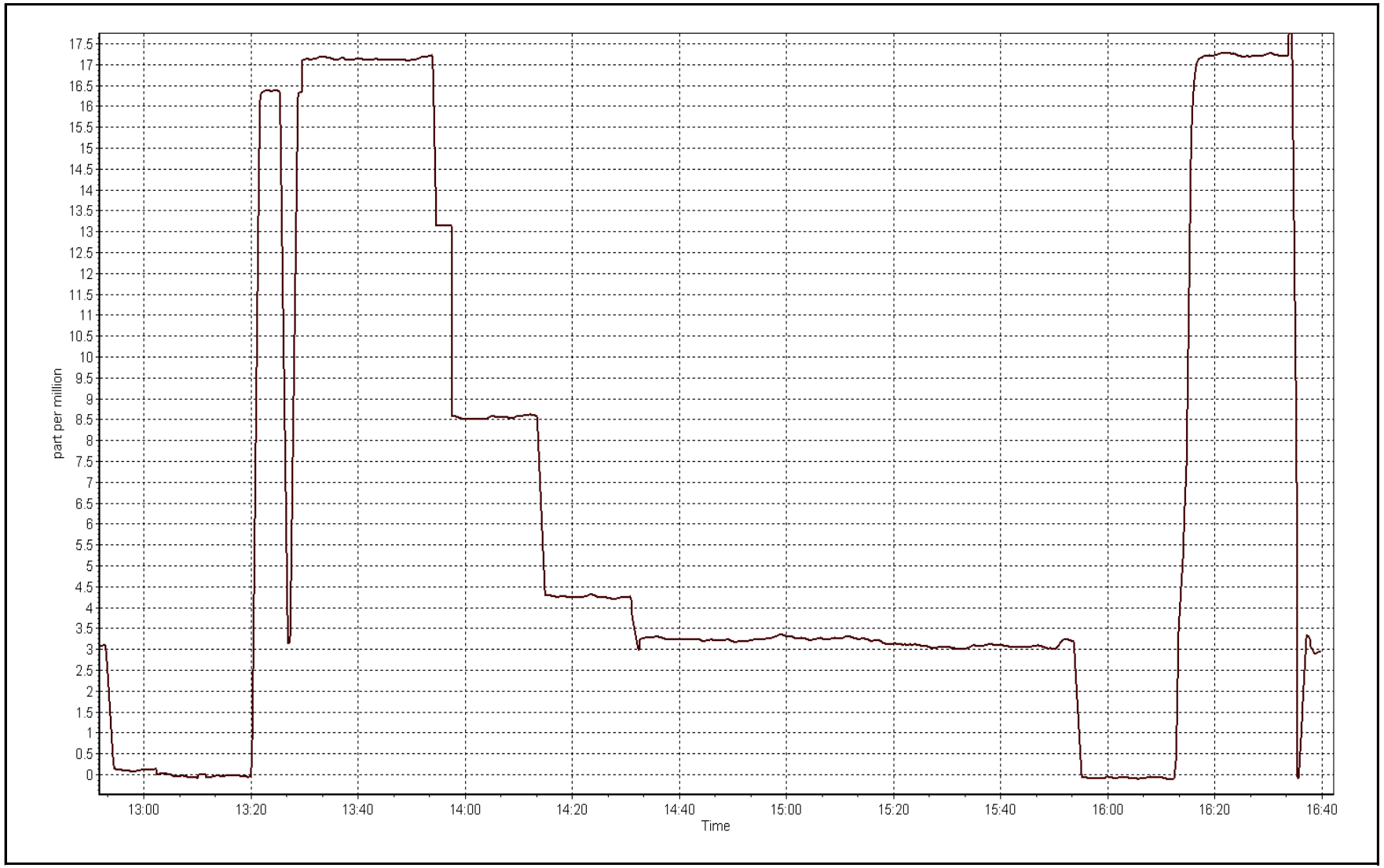
Calibration Date	January 6, 2016	Previous Calibration	
Station Name	Brion	Station Number	AMS 20
Start Time (MST)	11:45	End Time (MST)	15:40
Analyzer make	51i-LT	Analyzer serial #	1501663727

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999993
17.12	17.13	0.9992		
8.58	8.56	1.0023	Slope	0.996733
4.31	4.25	1.0145		
			Intercept	0.049068



THC Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	January-14-16	Last Calibration	January-06-16
Station Name	Brion	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	13:53
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	0.996733	0.999582	Fuel Pressure	23.9	23.9
Calculated intercept	0.049068	-0.014718	Analyzer Coeff	4.3	4.3
			Analyzer BKG	2.230	1.960
Analyzer make	51i-LT		Analyzer serial #	1501663727	

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	79.8	17.12	17.04	1.005
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	79.8	17.12	17.14	0.999
second point	5000	40.0	8.58	8.62	0.995
third point	5000	20.1	4.31	4.28	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	79.9	17.14	17.15	0.999
				Average Correction Factor	1.000

Corrected As found	17.25	Previous response	17.12	% change	-0.7%

Notes:

Recalibrating the instrument since daily zero have been a bit negative. Adjusted zero and span.

Calibration Performed By: Asad Hidayat

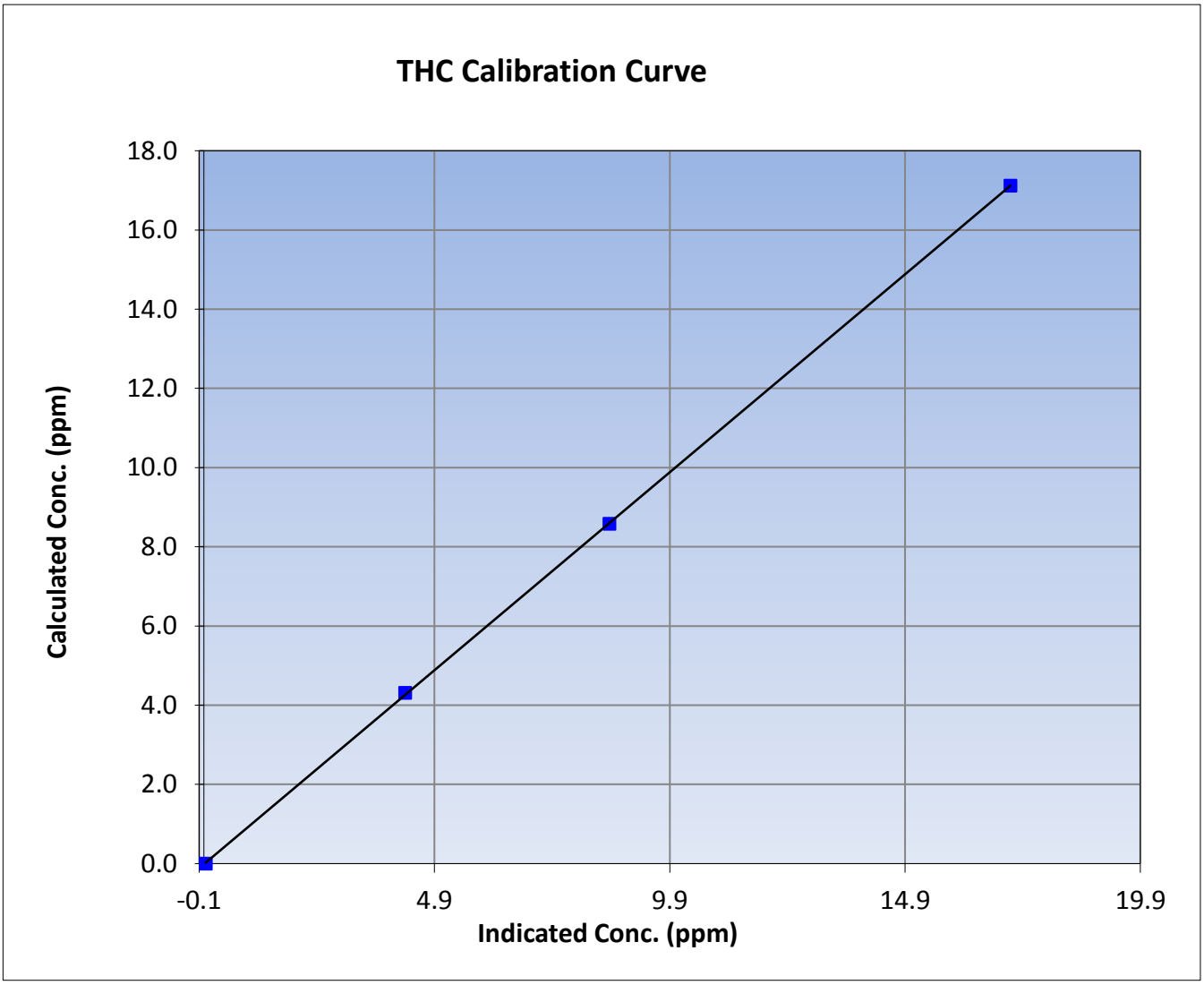
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

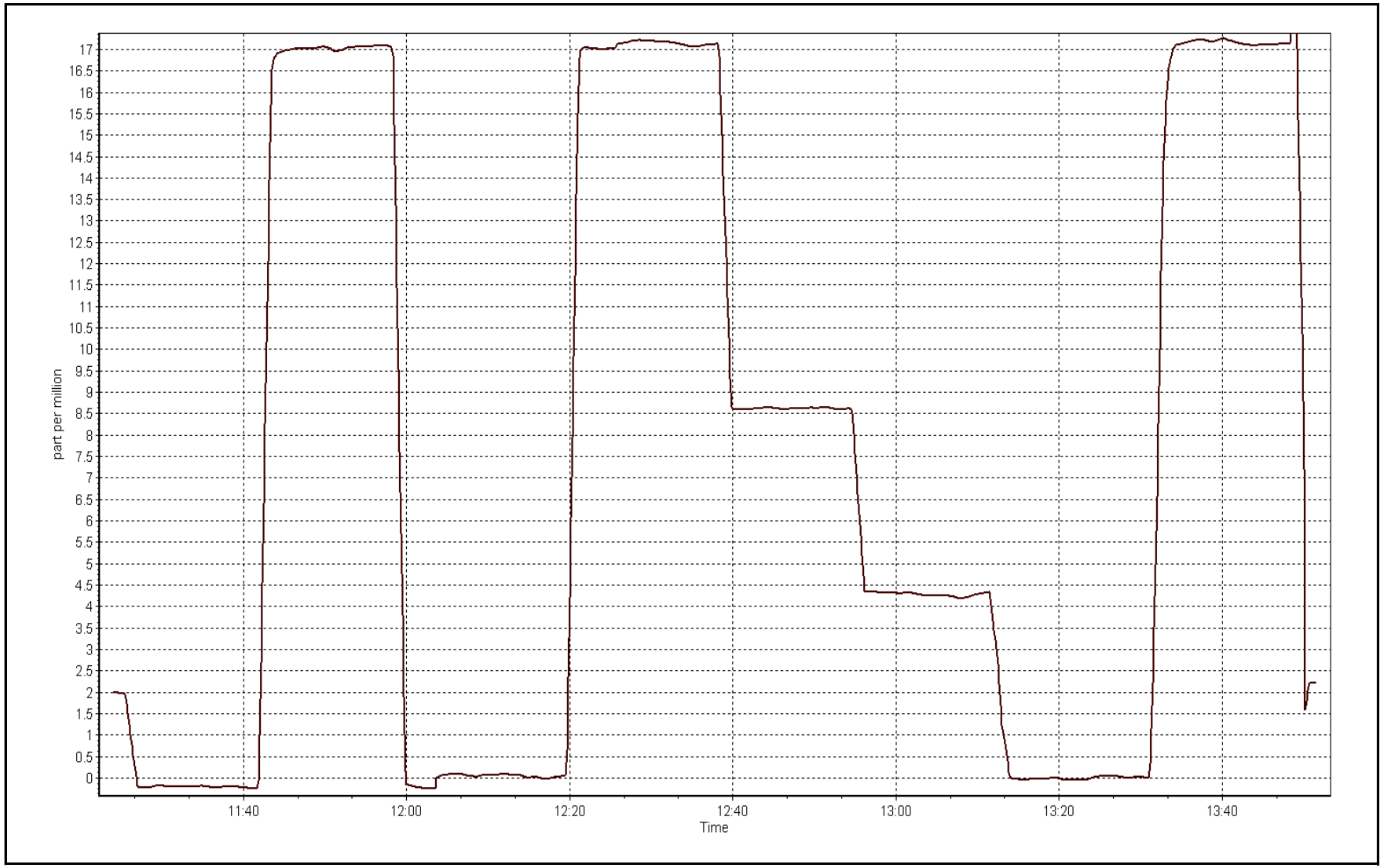
Calibration Date	January 14, 2016	Previous Calibration	January 6, 2016
Station Name	Brion	Station Number	AMS 20
Start Time (MST)	11:25	End Time (MST)	13:53
Analyzer make	51i-LT	Analyzer serial #	1501663727

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999979
17.12	17.14	0.9987		
8.58	8.62	0.9954	Slope	0.999582
4.31	4.28	1.0073		
			Intercept	-0.014718



THC Calibration Plot Date: January 14, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 6, 2016	Previous Calibration	
Station Name	Mackay River	Station Number	AMS 20
Reason:	Install		
Start Time (MST)	11:45	End Time (MST)	15:40
NO Cal Gas Conc	50.1 ppm	Gas Cert Reference	EY0000372
NOx Cal Gas Conc	50.4 ppm	Cal Gas Expiry Date	June 10, 2016
Calibrator	Sabio 4010	Serial Number	1220
Zero air Generator	Teledyne API T701	Serial Number	4766

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9627

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope			
	Data Offset			
Current Calibration	Data Slope	1.001929	1.001122	0.970000
	Data Offset	0.938524	0.977850	-3.382551

Analyzer Information

Analyzer make/model		Analyzer serial #	

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	January 1, 1900		1.037	
NOX coefficient	0.998		1.003	
NO2 coefficient	0.995		0.995	
NO bkgrnd	3.2		3.1	
NOX bkgrnd	3.4		3.3	
Chamber Temp	50.5	Deg C	50.4	Deg C
Moly Temp	326.3	Deg C	325	Deg C
PMT voltage	-767	V	-767	V
PMT Temp	-3	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	176.2	mmHg	171.1	mmHg
R Cell Press Nox	175.6	mmHg	170.8	mmHg
NO sample flow	0.833	lpm	0.801	lpm
Nox sample Flow	0.831	lpm	0.800	lpm

Notes:

Adjusted span. Inlet filter replaced during high point.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 6, 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										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	79.8	804.4	799.6	4.8	802.3	798.2	4.1	1.0026	1.0018
second point	5000	40.0	403.2	400.8	2.4	401.0	398.8	2.2	1.0054	1.0050
third point	5000	20.1	202.6	201.4	1.2	200.6	199.5	1.1	1.0100	1.0095
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	----	----
as left span	5000	79.9	805.4	477.6	327.8	806.6	476.7	329.9	0.9985	1.0019
								Average Correction Factor	1.0060	1.0054

Corrcted 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 79.80 ccm NOX ref calc conc = 804.4 ppb NO ref calc conc = 799.6 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		4.8	803.4	797.3	0.0	1.0012	1.0029	----	----
1st NO2 (300)	477.6	324.5	804.1	477.6	326.5	1.0004	----	0.9938	100.6%
2nd NO2 (200)	581.1	221.0	806.3	581.1	225.2	0.9976	----	0.9813	101.9%
3rd NO2 (100)	686.9	115.2	805.2	686.9	118.3	0.9990	----	0.9735	102.7%
2nd NO ref point		4.8	803.4	797.3	6.2	1.0012	1.0029	----	----
				Average Correction Factor		0.9995		0.9829	101.7%

Calibration Performed By: Asad Hidayat

Wood Buffalo Environmental Association

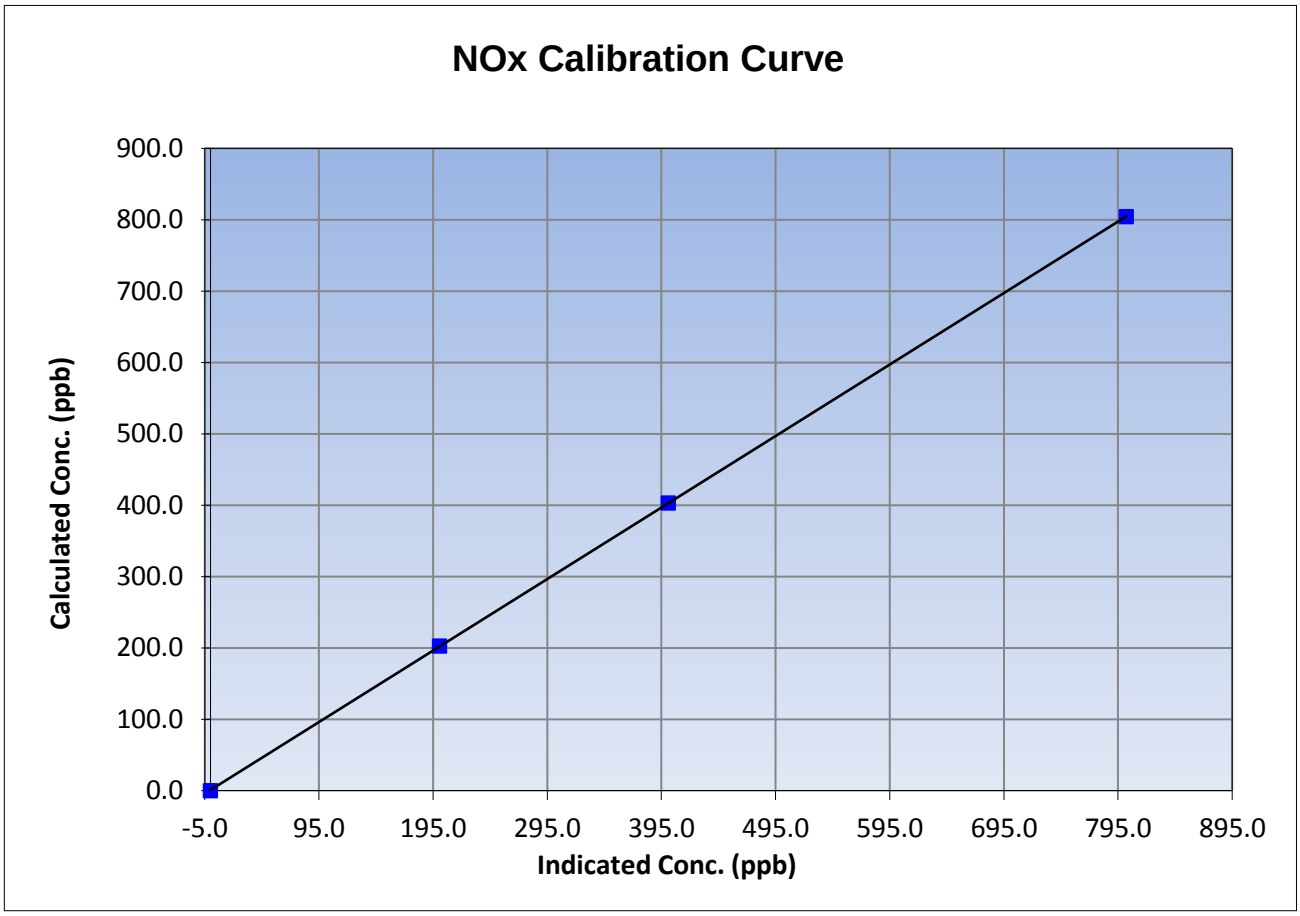
NO_X Calibration Summary

Station Information

Calibration Date	January 6, 2016	Previous Calibration	
Station Name	Mackay River	Station Number	AMS 20
Start Time (MST)	11:45	End Time (MST)	15:40
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999996
804.4	802.3	1.0026		
403.2	401.0	1.0054	Slope	1.001929
202.6	200.6	1.0100		
			Intercept	0.938524



Wood Buffalo Environmental Association

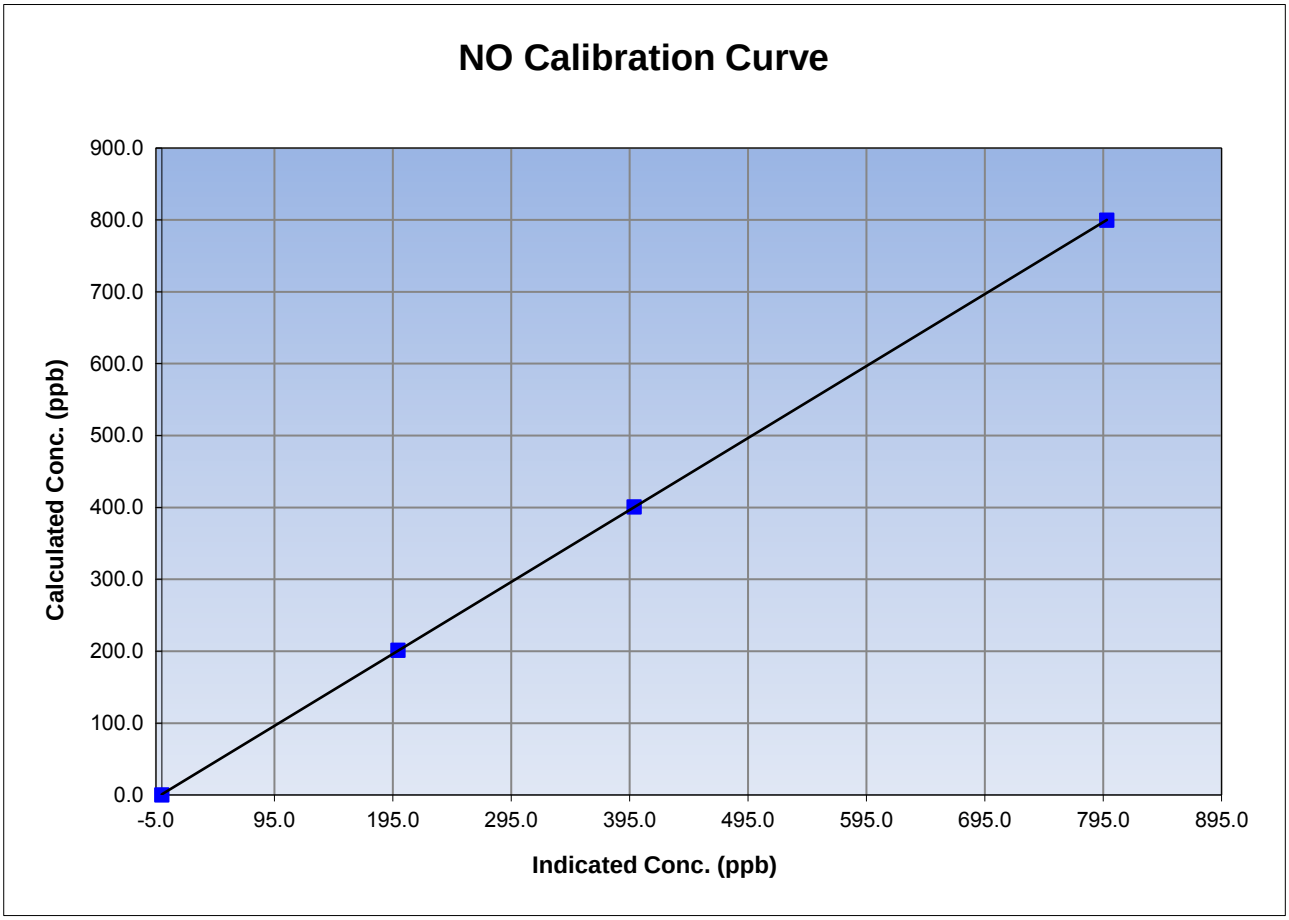
NO Calibration Summary

Station Information

Calibration Date	January 6, 2016	Previous Calibration	
Station Name	Mackay River	Station Number	AMS 20
Start Time (MST)	11:45	End Time (MST)	15:40
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999995
799.6	798.2	1.0018		
400.8	398.8	1.0050	Slope	1.001122
201.4	199.5	1.0095		
			Intercept	0.977850



Wood Buffalo Environmental Association

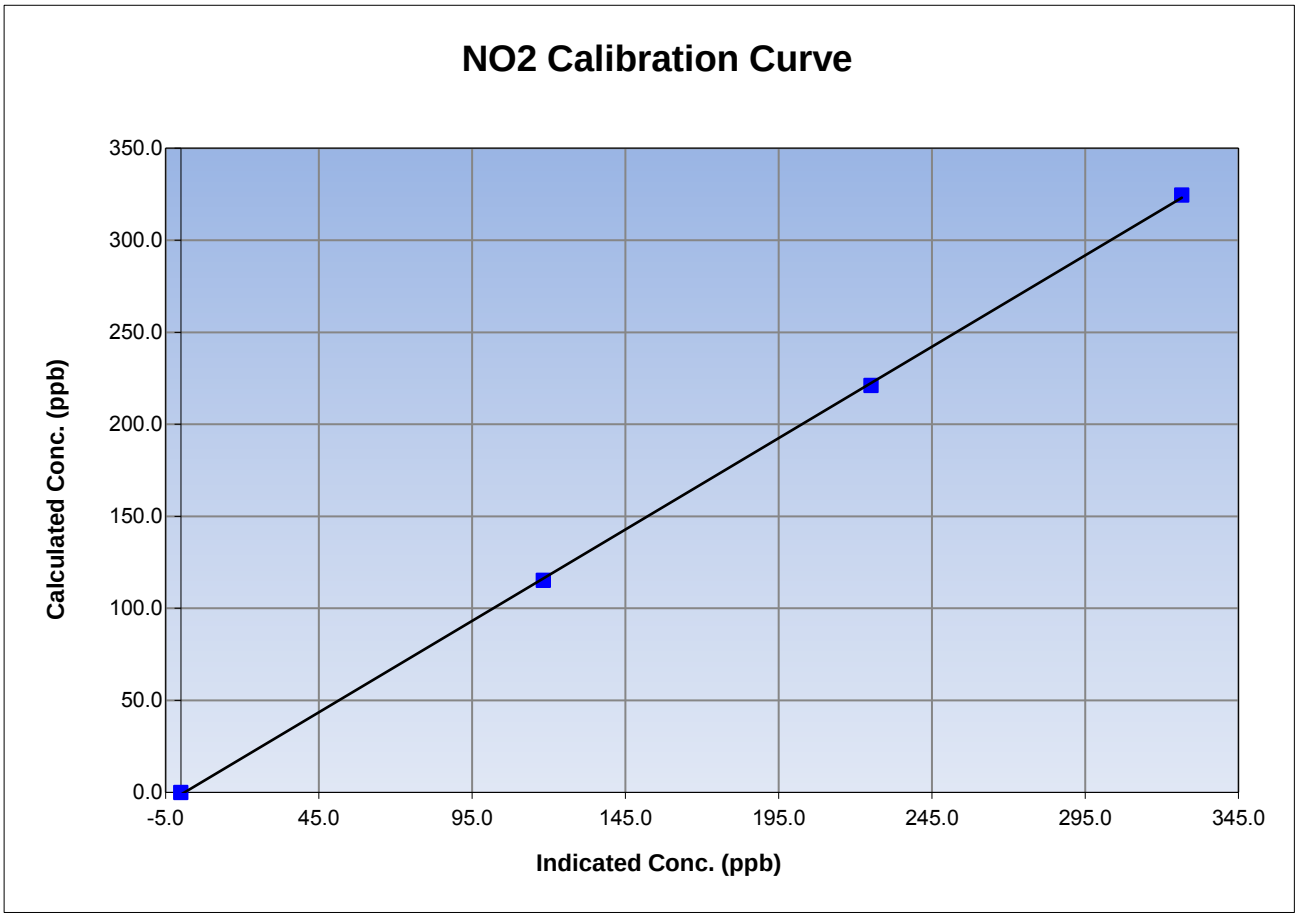
NO_2 Calibration Summary

Station Information

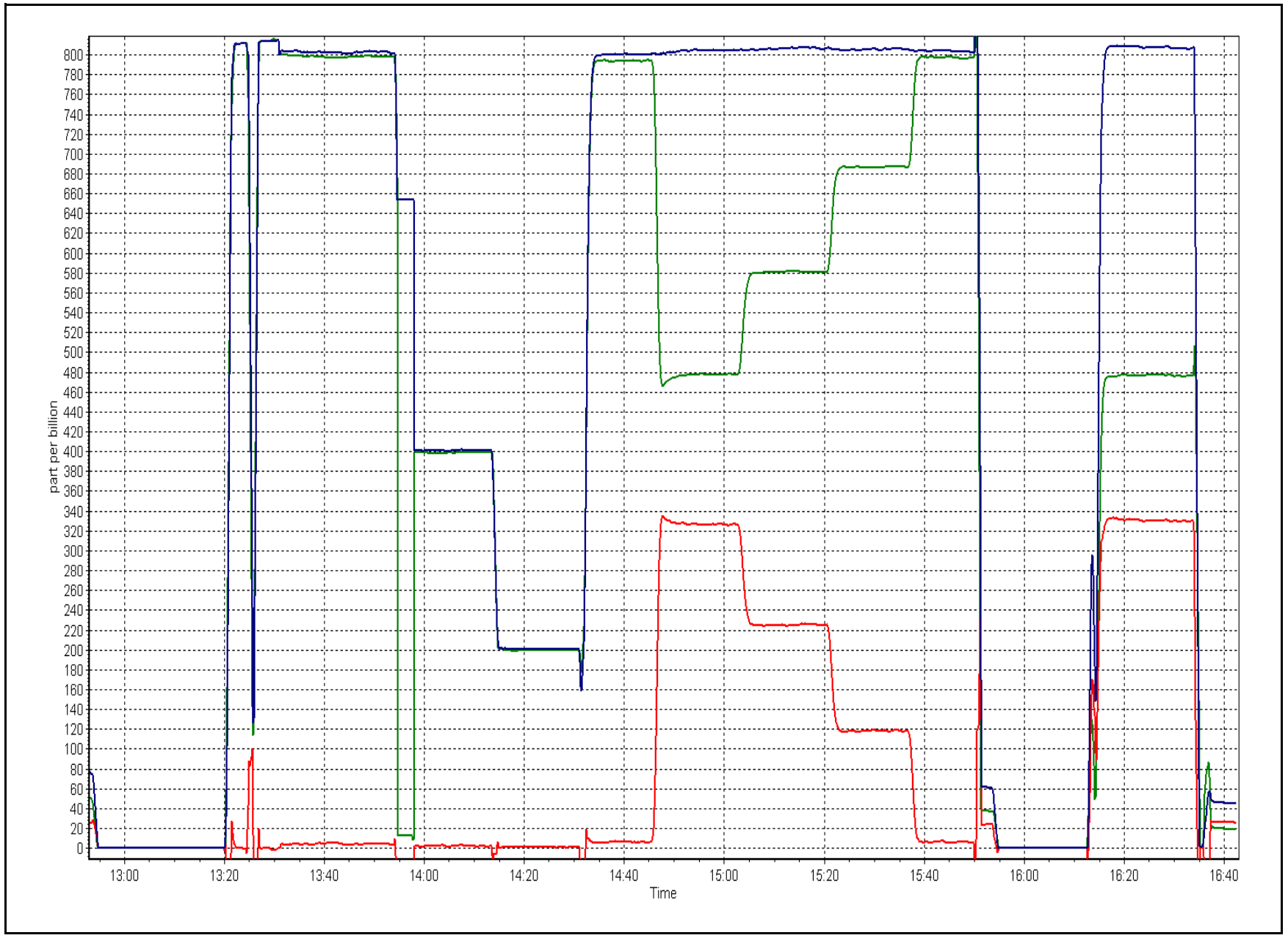
Calibration Date	January 6, 2016	Previous Calibration	
Station Number	Mackay River	Station Number	AMS 20
Start Time (MST)	11:45	End Time (MST)	15:40
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999881
324.5	326.5	0.9938		
221.0	225.2	0.9813	Slope	0.992979
115.2	118.3	0.9735		
			Intercept	-1.150495



NOX Calibration Plot Date: January 6, 2016



Wood Buffalo Environmental Association

WS/WD Calibration Report

W B E A

Station Information

Calibration Date	January-05-16	Previous Calibration	
Station Name	Mackay River	Station Number	AMS 20
Reason:	Routine / Installation / Removal		
Start Time (MST)	11:00	End Time (MST)	11:45
Barometric Press	n/a	Station Temp	21 Deg C
WS Calibrator	MetOne 053	Serial Number	K13090

WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	A3111
DACS make	Campbel Scientific CR3000	DACS serial No.	9627
DACS voltage range	5000	DACS channel #	P2
	Before		After
Calculated slope	NA	Calculated slope	0.999907
Calculated intercept	NA	Calculated intercept	0.008013

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.1	1.0025
400	39.4	39.4	0.9989
600	58.6	58.6	1.0001
900	87.4	87.3	1.0001
1000	96.9	97.0	0.9997
Average Correction Factor			1.0002

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	N9937
DACS make	Campbel Scientific CR3000	DACS serial No.	9627
DACS voltage range	5000	DACS channel #	SE 24
	Before		After
Calculated slope	N/A	Calculated slope	1.013406
Calculated intercept	N/A	Calculated intercept	0.514986

As Found Declination (west of North) _____ As Left Declination (west of North) _____

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	0.4	n/a
90	87.9	1.0235
180	176.2	1.0216
270	265.1	1.0184
358	353.9	1.0116
Average Correction Factor		1.0188

Notes:

WS sensor cleaned and bearings replaced. Changing bearings helped, but still a little friction. Calibration passed.

Serial number on WS sensor faded, A3111 is written on the sensor body in marker.

Calibration Performed By: Devin Russell

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 500
CENOVUS
CHRISTINA LAKE
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
JANUARY 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	16	0	2	0
H2S (ppb) Average	709	35	35	100	1	0	0	0
NO2 (ppb) Average	673	36	71	95.3	36	0	16	-
NO (ppb) Average	673	36	71	95.3	69	-	14	-
NOX (ppb) Average	673	36	71	95.3	97	-	30	-
Temperature 2 m (C) Average	744	0	0	100	5.7	-	2.8	-
Relative Humidity (%) Average	744	0	0	100	93	-	89	-
Wind Speed 10 m (km/h) Average	744	0	0	100	30	-	19	-
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)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.6	1	-	0	0	0	0	1	1	16
H2S (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	673	6.6	5	-	0	2	3	5	9	15	36
NO (ppb) Average	673	3	6	-	0	0	0	1	2	7	69
NOX (ppb) Average	673	9.6	11	-	0	2	3	6	11	21	97
Temperature 2 m (C) Average	744	-11.05	8.2	-	-32.7	-21.1	-16.7	-11.8	-5.1	1	5.7
Relative Humidity (%) Average	744	77.1	10	-	36	61	73	80	84	87	93
Wind Speed 10 m (km/h) Average	744	7.9	5	-	0	2	4	7	10	14	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	16 Jan 2016 07:00	17 Jan 2016 16:00	34	Unstable Operation - low shelter temp
NO2, NO, NOX	17 Jan 2016 17:00	17 Jan 2016 17:00	1	Maintenance - zero and span check to confirm operation

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 16 ppb on Jan 1 23:00 Maximum Daily Average: 1.7 ppb on Jan 1

Minimum Value: 0 ppb on Jan 5 04:00 Minimum Daily Average: 0.1 ppb on Jan 6

Maximum Diurnal Average: 1.1 ppb at hour 14 Minimum Diurnal Average: 0.3 ppb at hour 4

Monthly Average: 0.6 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	38
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	16	15	1.7	16
2-Jan	10	4	1	Z	0	0	0	0	0	1	1	1	1	0	0	1	1	0	1	0	1	1	1	0	1.1	10
3-Jan	1	0	0	0	Z	0	0	0	0	0	2	2	2	1	1	1	1	0	1	1	0	0	0	0	0.6	2
4-Jan	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0.6	1
5-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0.2	1
6-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Jan	0	0	Z	0	0	1	1	2	1	1	1	1	1	1	1	2	3	1	0	0	0	1	1	2	0.9	3
8-Jan	2	1	1	Z	1	1	2	2	2	1	1	1	2	2	1	1	1	0	0	0	0	1	1	1	1.2	2
9-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
10-Jan	1	0	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1
11-Jan	Z	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
12-Jan	0	Z	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Jan	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	1	1	0	0	0.6	2
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Jan	0	0	0	0	0	Z	0	0	0	0	0	2	3	2	2	2	1	1	0	0	0	0	0	0	0.6	3
17-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.2	1
18-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0.2	1
19-Jan	0	0	Z	0	0	0	0	0	0	2	2	0	C	C	C	C	C	C	C	1	1	1	1	2	--	2
20-Jan	2	4	4	Z	1	1	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.8	4
21-Jan	0	0	1	1	Z	0	0	1	0	1	2	3	3	3	2	2	2	1	1	1	1	1	1	1	1.2	3
22-Jan	1	1	1	0	0	Z	0	0	0	0	1	0	1	1	1	1	0	1	1	1	1	1	1	1	0.6	1
23-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Jan	0	Z	1	1	1	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
25-Jan	0	0	Z	1	0	0	0	0	0	0	1	1	1	1	0	1	2	0	1	1	1	1	1	1	0.7	2
26-Jan	1	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Jan	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
28-Jan	0	0	1	2	1	Z	1	1	1	2	1	2	2	3	3	1	1	1	1	0	0	0	0	0	1.1	3
29-Jan	Z	0	0	0	0	0	1	1	1	1	4	4	4	5	4	1	0	0	0	0	0	0	0	0	1.2	5
30-Jan	0	Z	0	0	0	0	0	0	0	0	1	4	1	2	3	1	1	1	1	3	2	2	1	1	1.0	4
31-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	1	4	1	0	0	1	1	2	3	2	2	1	1.0	4
	0.8	0.5	0.4	0.3	0.3	0.3	0.4	0.5	0.4	0.5	0.7	1.0	0.9	1.1	0.9	0.7	0.6	0.5	0.4	0.5	0.6	0.5	0.9	0.9	Diurnal Average	
	10	4	4	2	1	1	2	2	2	2	4	4	4	5	4	2	3	2	2	3	3	2	16	15	Diurnal Maximum	

Z - zerospan C - Calibration

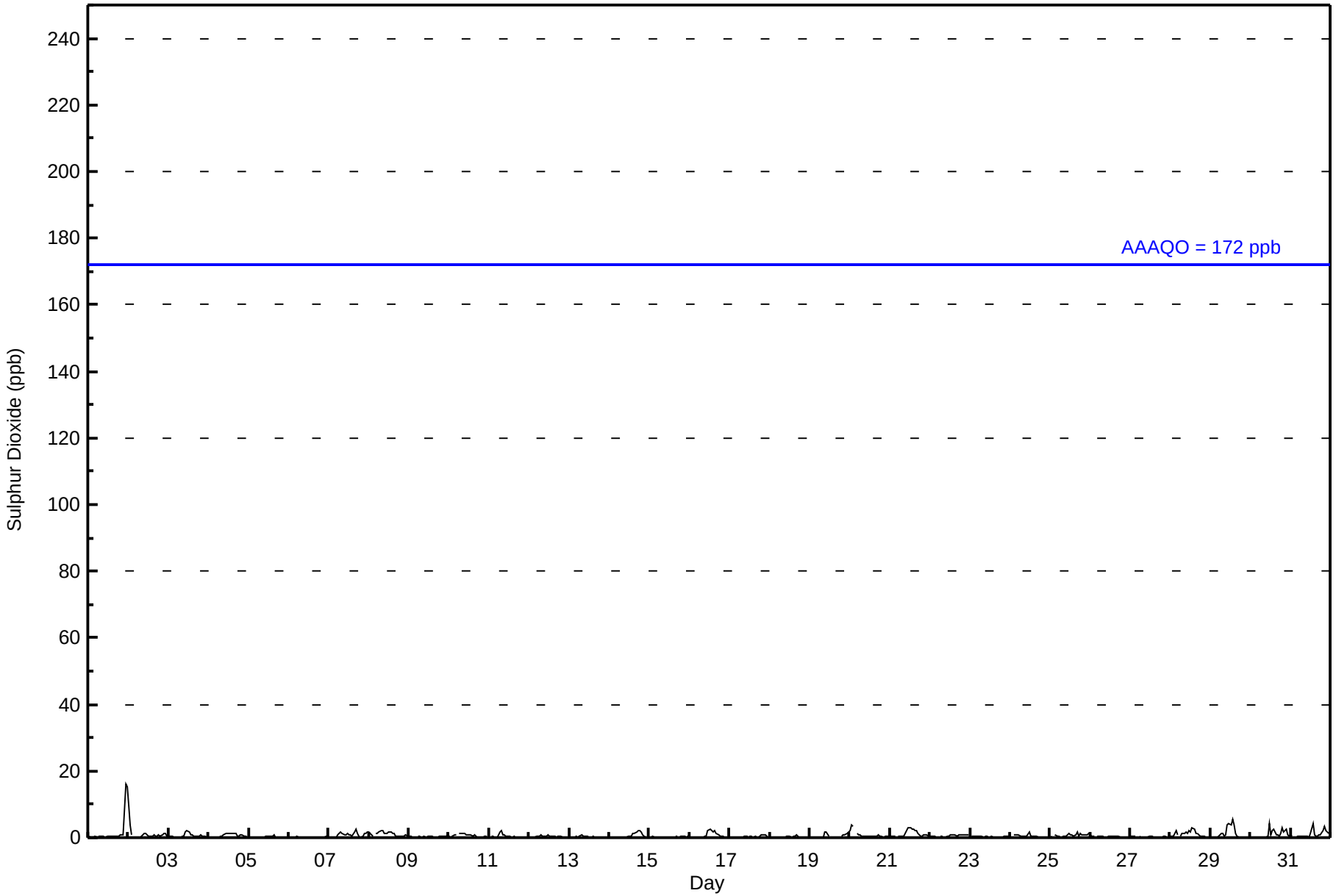
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - January 2016



Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	704	99.72	99.72
11 - 20	2	0.28	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	53	64	38	19	15	10	41	64	84	71	56	71	43	11	34	30	704
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	53	64	38	19	15	10	41	64	84	71	56	71	43	13	34	30	706

Total Number of Valid Hours: 706

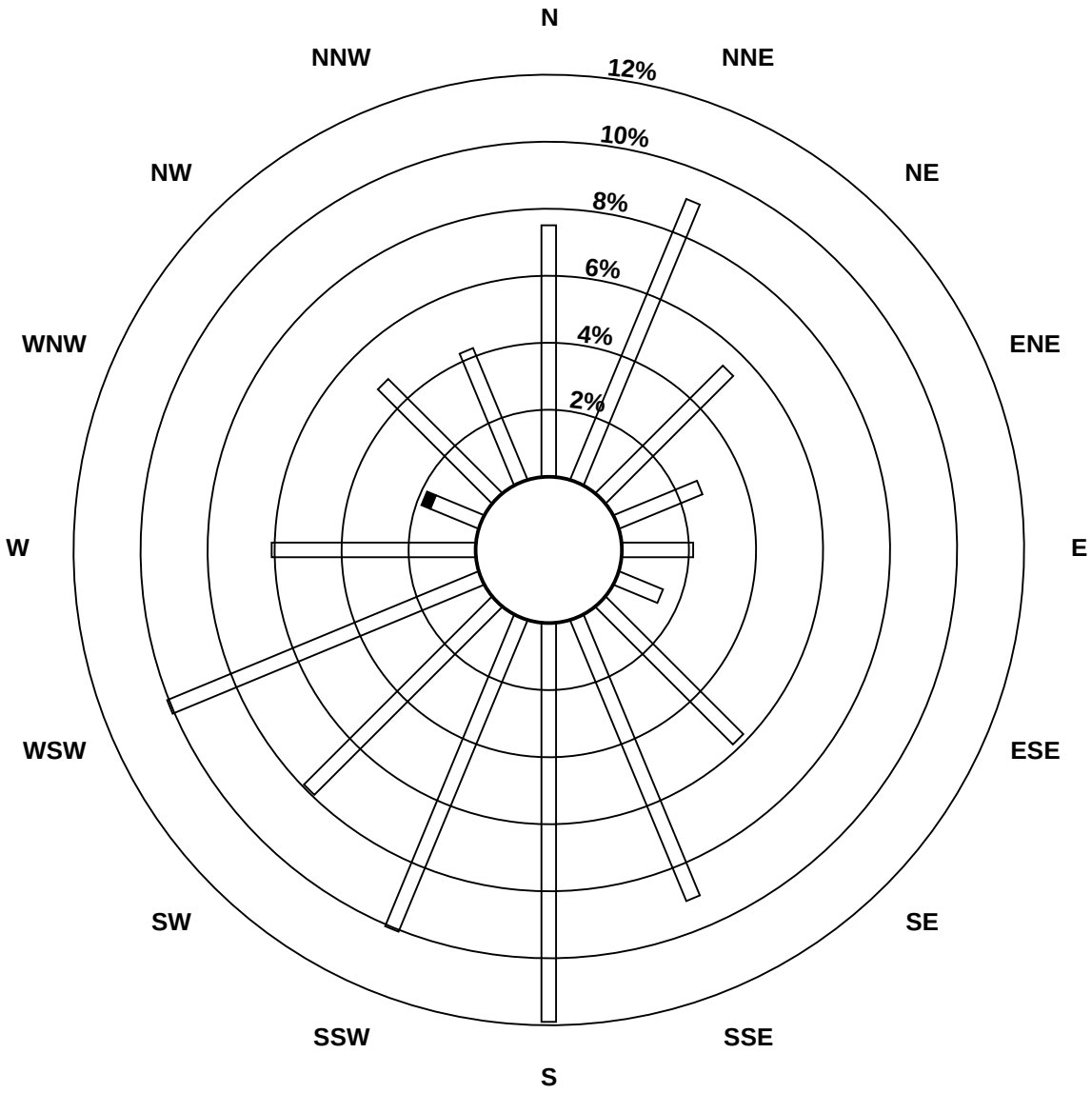
Total Number of Hours: 744

Wood Buffalo Environmental Association

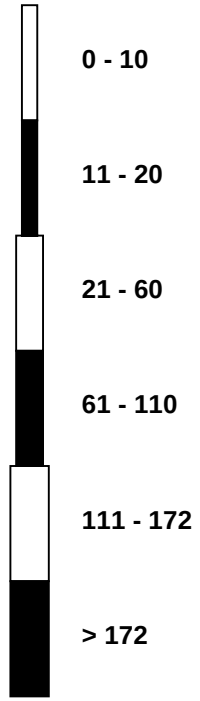
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



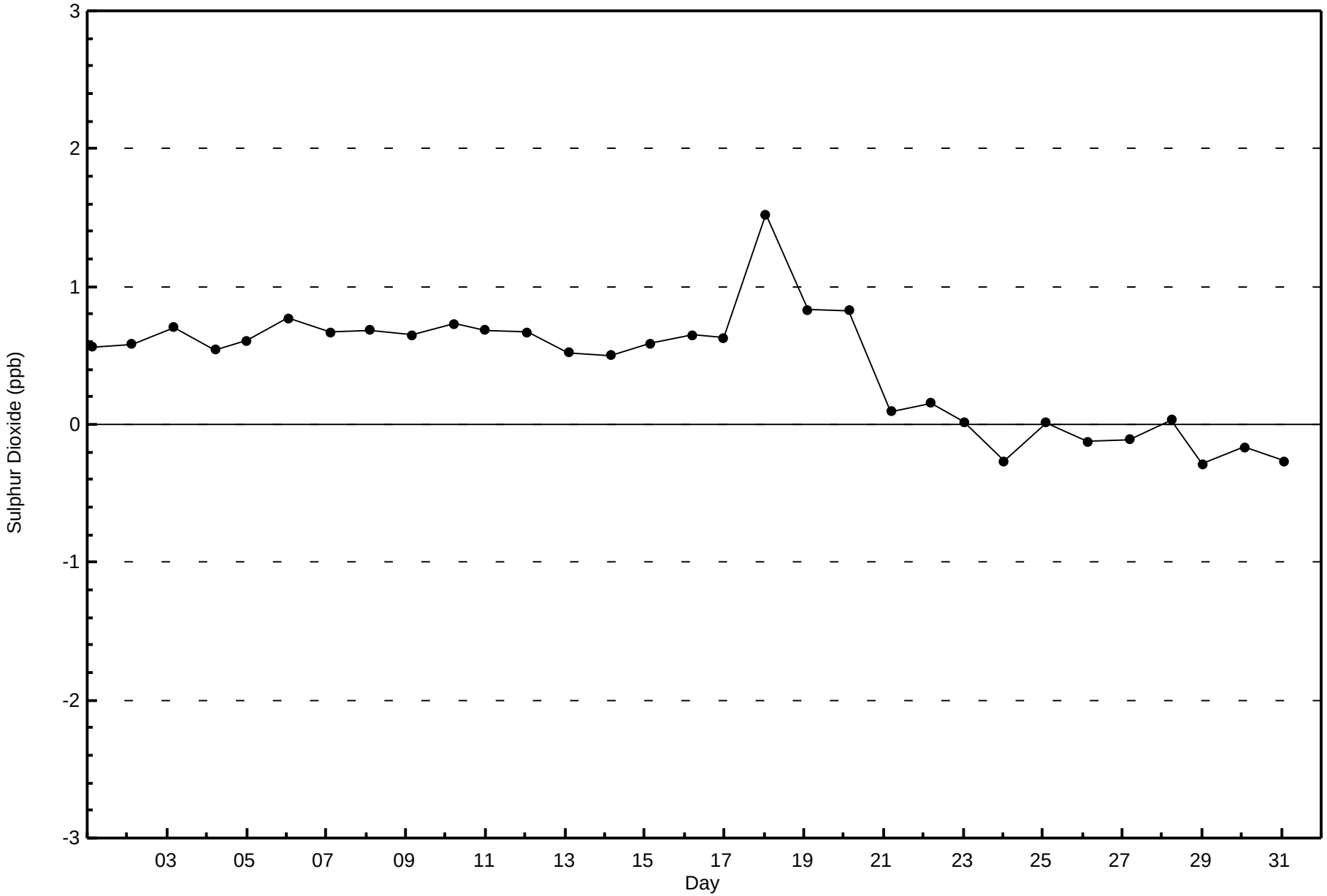
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - January 2016



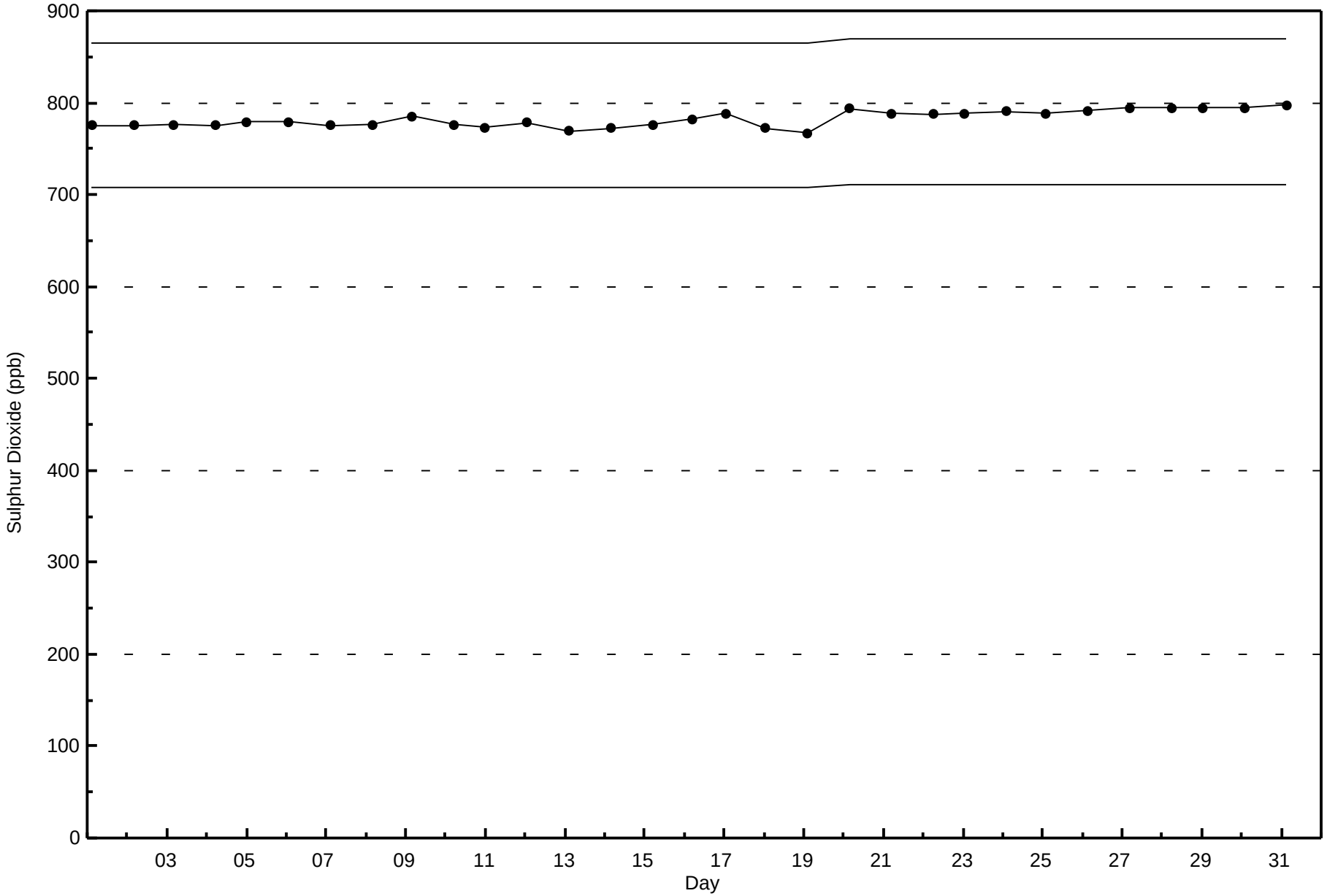
500-11

Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Jan 4 09:00

Maximum Daily Average: 0.3 ppb on Jan 5

Minimum Value: 0 ppb on Jan 2 06:00

Minimum Daily Average: 0.0 ppb on Jan 15

Maximum Diurnal Average: 0.2 ppb at hour 12

Minimum Diurnal Average: 0.2 ppb at hour 7

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 in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

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

Z - zerospan C - Calibration

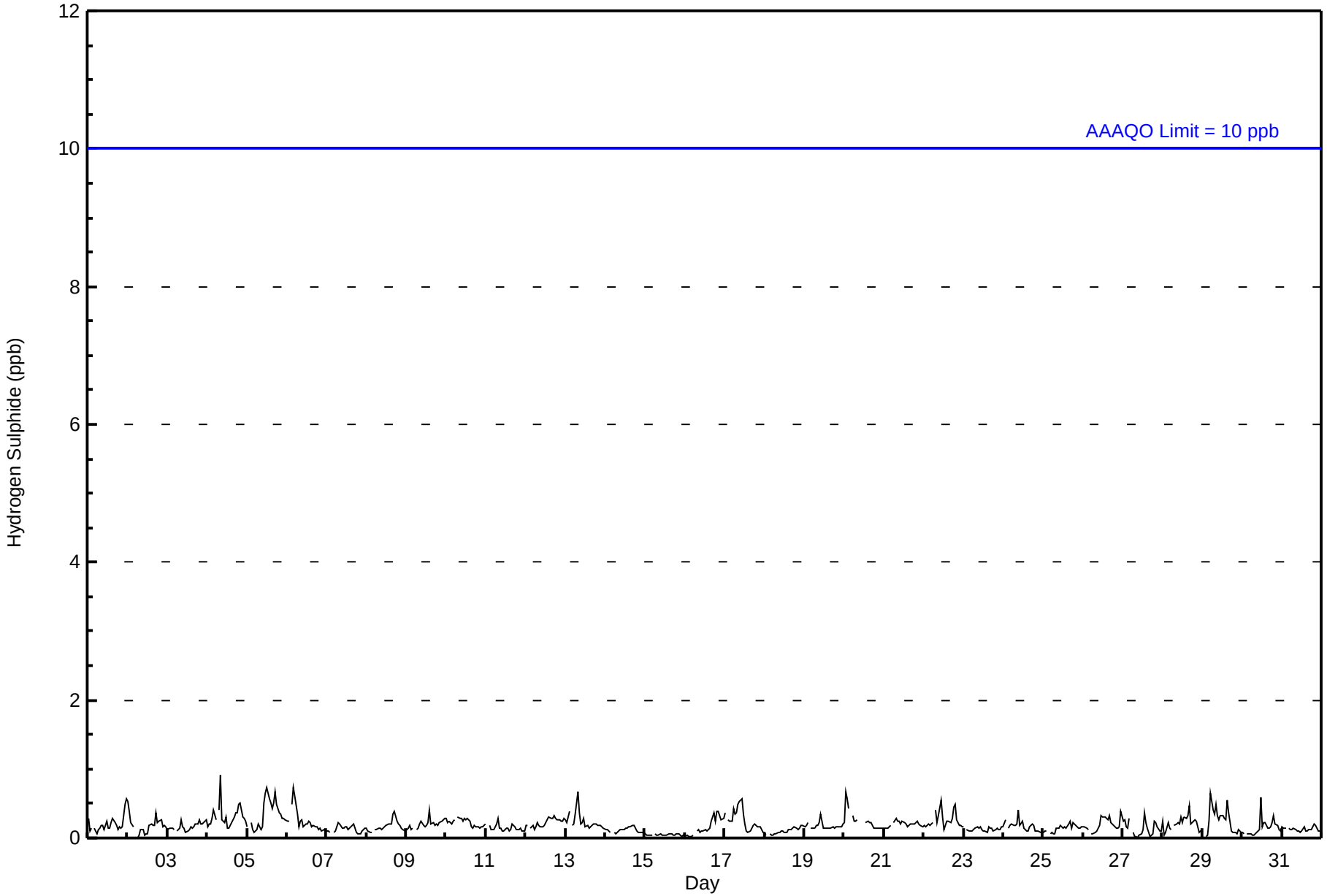
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	709	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	55	69	35	17	15	12	41	61	82	75	54	72	43	13	33	32	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	55	69	35	17	15	12	41	61	82	75	54	72	43	13	33	32	709

Total Number of Valid Hours: 709

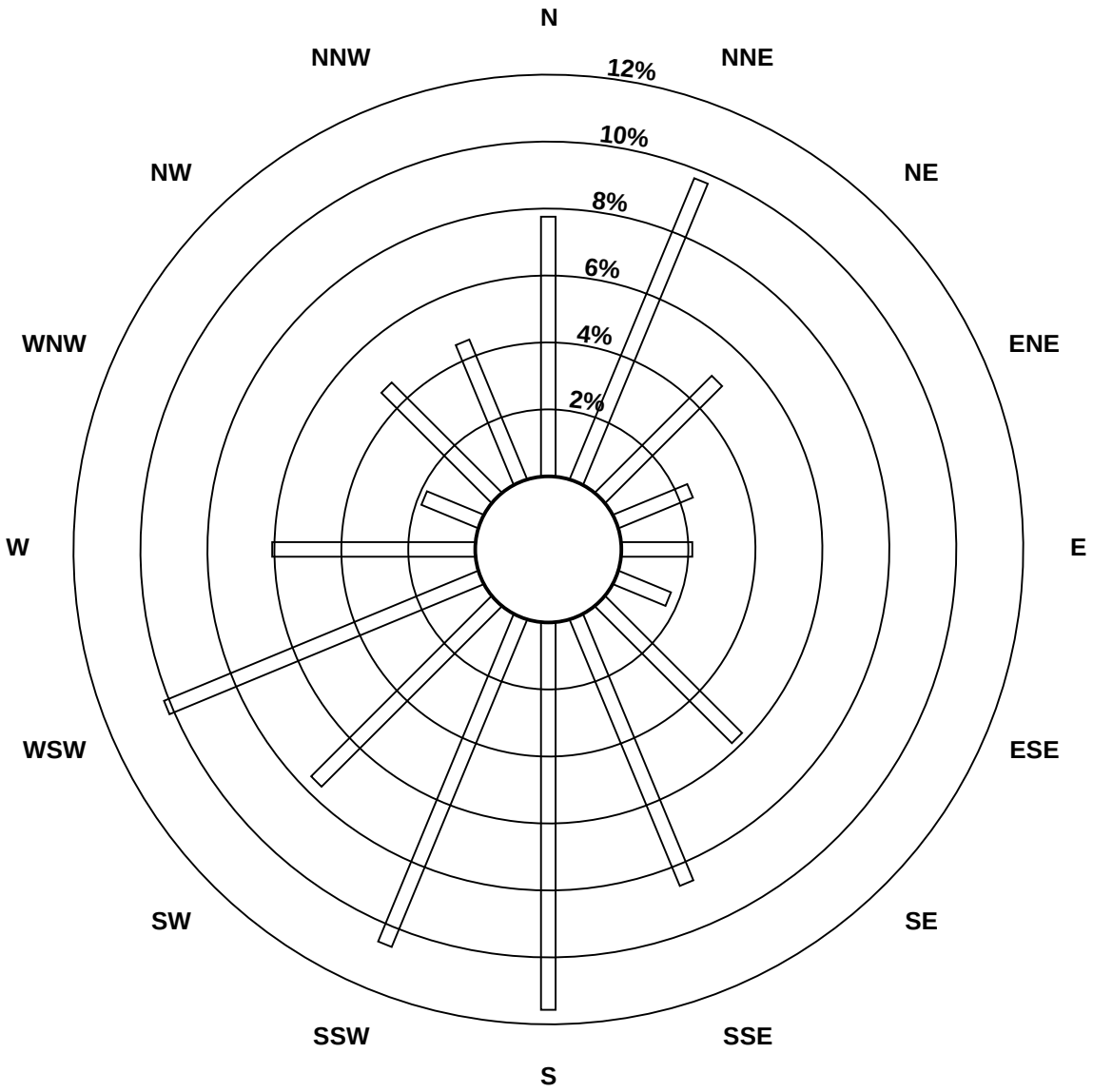
Total Number of Hours: 744

Wood Buffalo Environmental Association

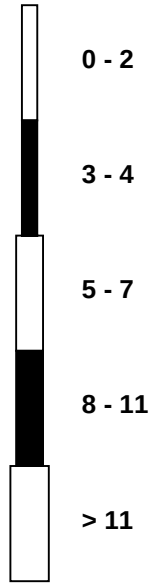
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



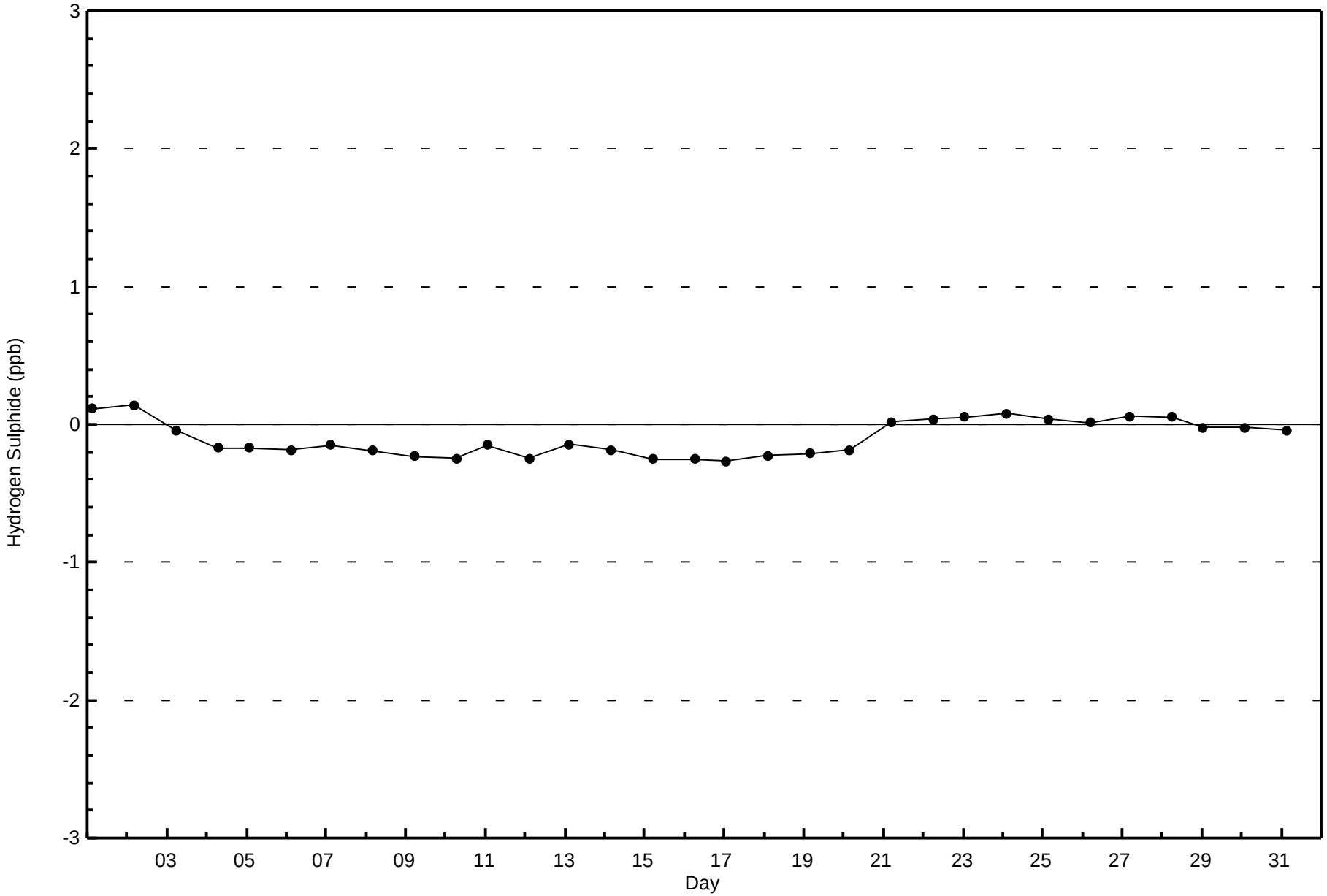
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - January 2016

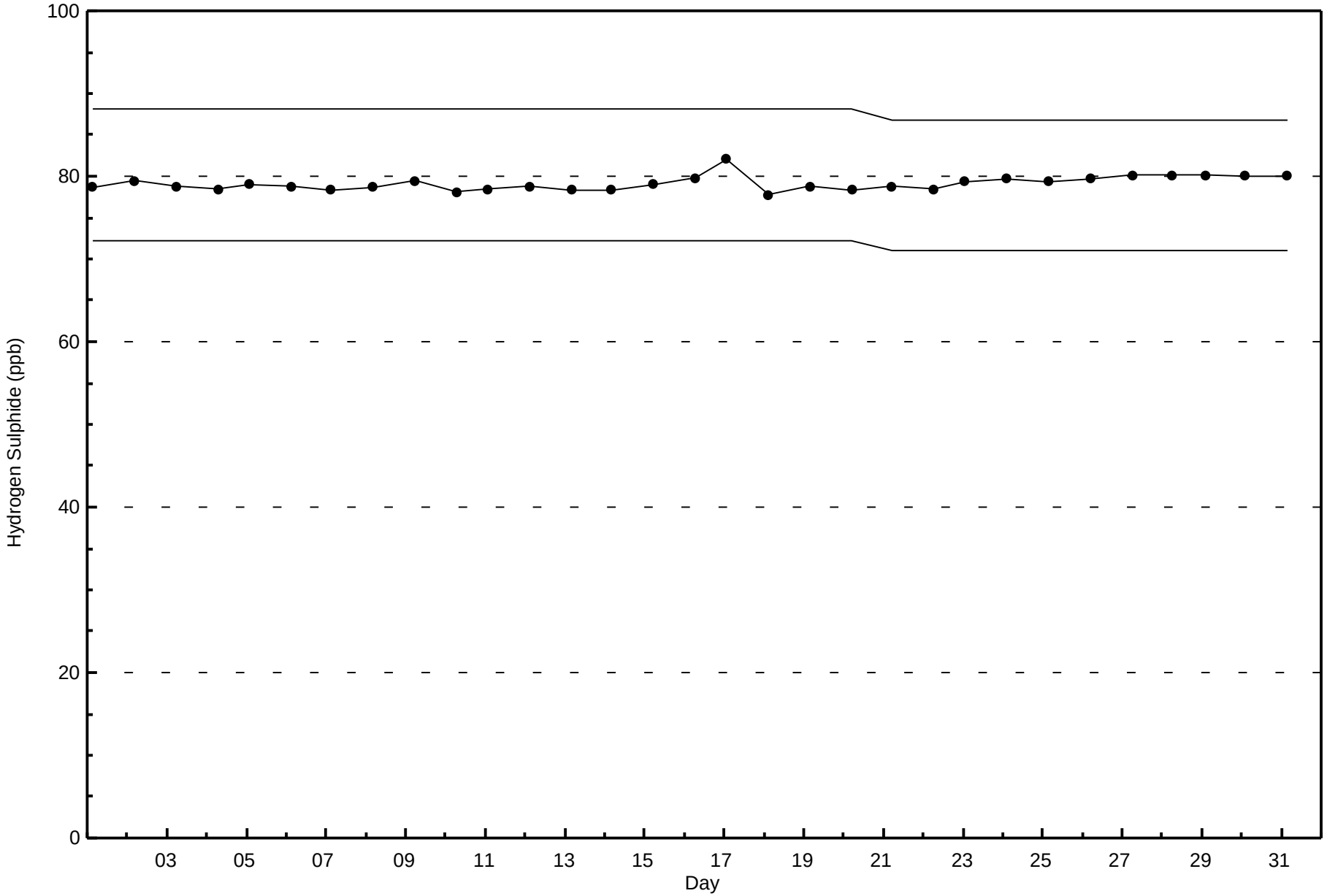


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - January 2016

Maximum Value: 69 ppb on Jan 13 08:00

Maximum Daily Average: 13.8 ppb on Jan 5

Minimum Value: 0 ppb on Jan 8 02:00

Minimum Daily Average: 0.4 ppb on Jan 11

Maximum Diurnal Average: 6.0 ppb at hour 8

Minimum Diurnal Average: 1.0 ppb at hour 22

Monthly Average: 3.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 2$ $P_{90} = 7$ $P_{99} = 34$

Hours in Service:	744
Hours of Data:	673
Hours of Missing Data:	71
Hours of Calibration:	36
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	15	0	Z	1	13	8	13	18	20	15	10	14	10	8	12	19	16	8	3	4	4	5	15	16	10.7	20
2-Jan	9	5	3	Z	0	1	1	2	1	1	1	5	1	6	0	0	0	0	0	0	0	1	1	1	1.8	9
3-Jan	1	0	1	0	Z	3	2	7	19	8	7	3	3	2	2	2	2	3	1	7	1	1	4	1	3.4	19
4-Jan	2	0	1	1	3	Z	3	1	2	4	2	2	2	2	1	1	2	4	2	6	2	3	2	2	2.1	6
5-Jan	Z	2	2	1	1	2	5	14	4	4	39	44	43	23	15	7	13	31	20	11	12	6	10	9	13.8	44
6-Jan	10	Z	11	18	44	42	16	2	6	8	3	4	1	1	1	1	1	1	1	1	1	0	0	1	7.6	44
7-Jan	1	1	Z	1	1	1	0	1	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.7	2
8-Jan	0	0	0	Z	1	0	0	1	1	1	2	3	3	4	5	3	15	24	7	4	2	1	2	2	3.5	24
9-Jan	2	4	10	2	Z	2	2	2	5	12	6	2	2	2	2	2	2	1	1	1	1	0	1	0	2.8	12
10-Jan	3	1	1	0	1	Z	3	3	2	3	4	2	2	2	1	1	0	0	0	0	0	0	0	0	1.2	4
11-Jan	Z	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	1	2	1	1	1	0.4	2
12-Jan	4	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	7	1.3	7
13-Jan	3	5	Z	7	4	11	25	69	35	17	18	22	5	9	2	3	2	3	2	0	1	1	0	0	10.6	69
14-Jan	0	1	1	Z	1	1	0	1	3	4	4	3	4	4	2	2	2	2	1	1	1	1	1	0	1.7	4
15-Jan	1	1	1	1	Z	1	1	1	1	2	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0.7	2
16-Jan	0	0	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0
17-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	4	2	2	1	2	1	0	--	4
18-Jan	0	Z	0	0	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
19-Jan	1	1	Z	1	1	1	1	1	2	4	4	2	C	C	C	C	C	C	1	1	0	0	0	0	--	4
20-Jan	1	0	0	Z	1	0	1	2	3	3	4	4	5	5	4	4	2	1	1	1	0	1	1	0	1.9	5
21-Jan	0	0	0	2	Z	2	6	12	12	4	4	5	5	4	3	2	1	1	1	1	1	0	0	0	2.9	12
22-Jan	1	1	1	1	2	Z	12	25	8	12	25	15	3	4	6	5	1	2	1	0	1	0	1	0	5.5	25
23-Jan	Z	1	0	1	0	1	1	2	2	3	4	3	1	3	2	6	2	3	1	1	1	1	1	1	1.8	6
24-Jan	1	Z	1	1	1	1	1	0	1	2	1	4	1	1	1	1	2	3	2	0	0	0	0	0	1.0	4
25-Jan	0	0	Z	1	0	0	0	0	0	2	3	3	3	3	2	3	4	1	1	0	0	0	1	0	1.3	4
26-Jan	0	1	0	Z	0	0	0	1	1	1	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0.6	2
27-Jan	2	1	0	1	Z	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2
28-Jan	0	0	0	0	0	Z	2	1	1	2	2	5	3	2	1	1	1	0	0	1	0	0	0	0	1.0	5
29-Jan	Z	0	1	0	0	2	5	3	2	2	8	10	8	12	8	3	1	0	0	0	0	0	0	0	3.0	12
30-Jan	0	Z	0	1	0	0	0	1	0	1	2	5	2	3	4	1	0	0	2	2	1	2	1	1	1.4	5
31-Jan	0	0	Z	0	0	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	2
	2.2	1.0	1.4	1.7	3.1	3.3	3.6	6.0	4.7	4.1	5.5	5.8	4.2	3.9	3.0	2.5	2.6	3.3	1.7	1.6	1.2	1.0	1.5	1.6	Diurnal Average	
	15	5	11	18	44	42	25	69	35	17	39	44	43	23	15	19	16	31	20	11	12	6	15	16	Diurnal Maximum	

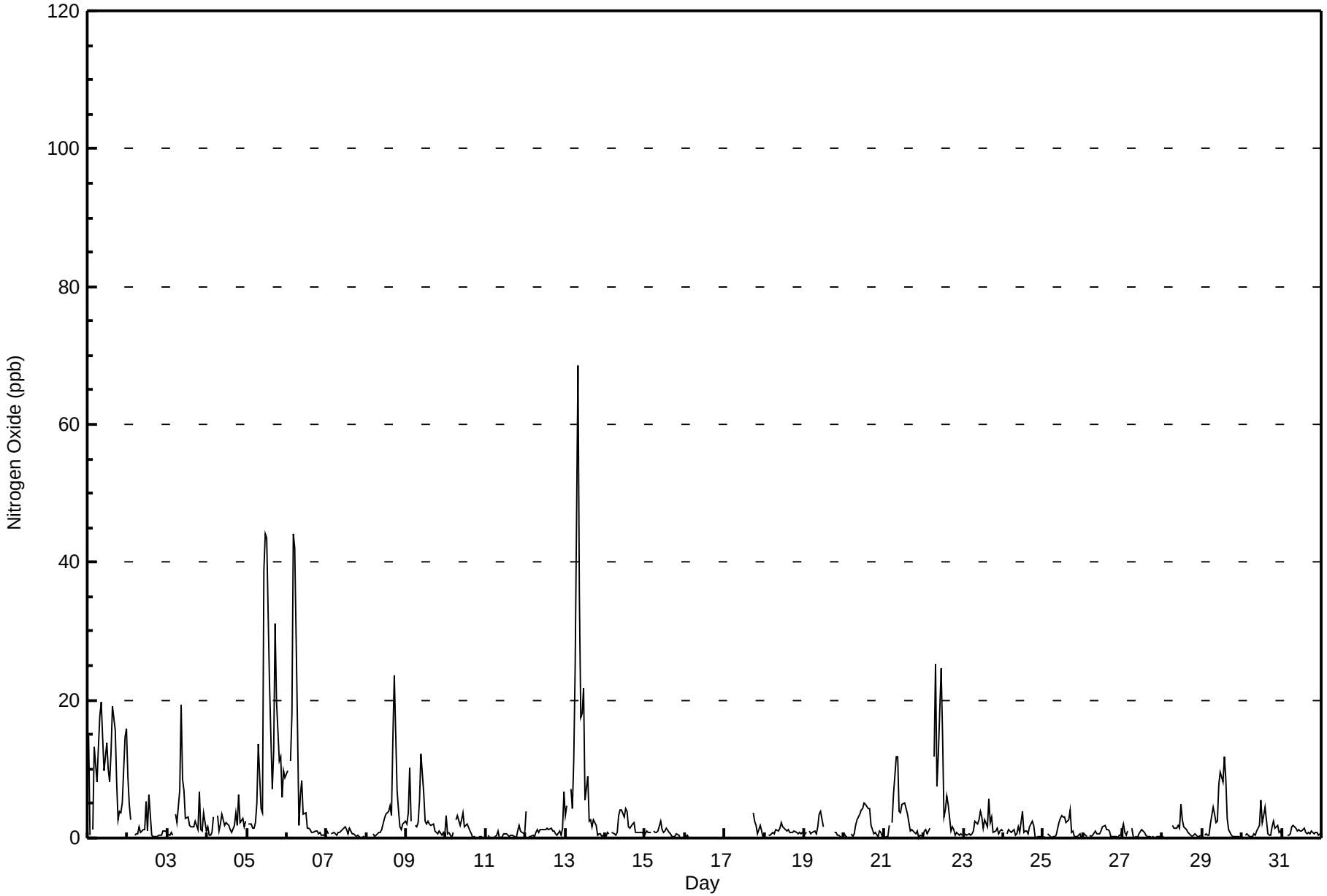
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - January 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	97.92	97.92
21 - 40	9	1.34	99.26
11 - 80	5	0.74	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	51	64	31	14	15	9	37	58	73	67	56	68	42	13	33	28	659
21 - 40	1	0	2	1	0	0	0	0	3	1	0	0	0	0	0	1	9
11 - 80	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	1	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	64	36	16	15	9	37	58	76	68	56	68	42	13	33	30	673

Total Number of Valid Hours: 673

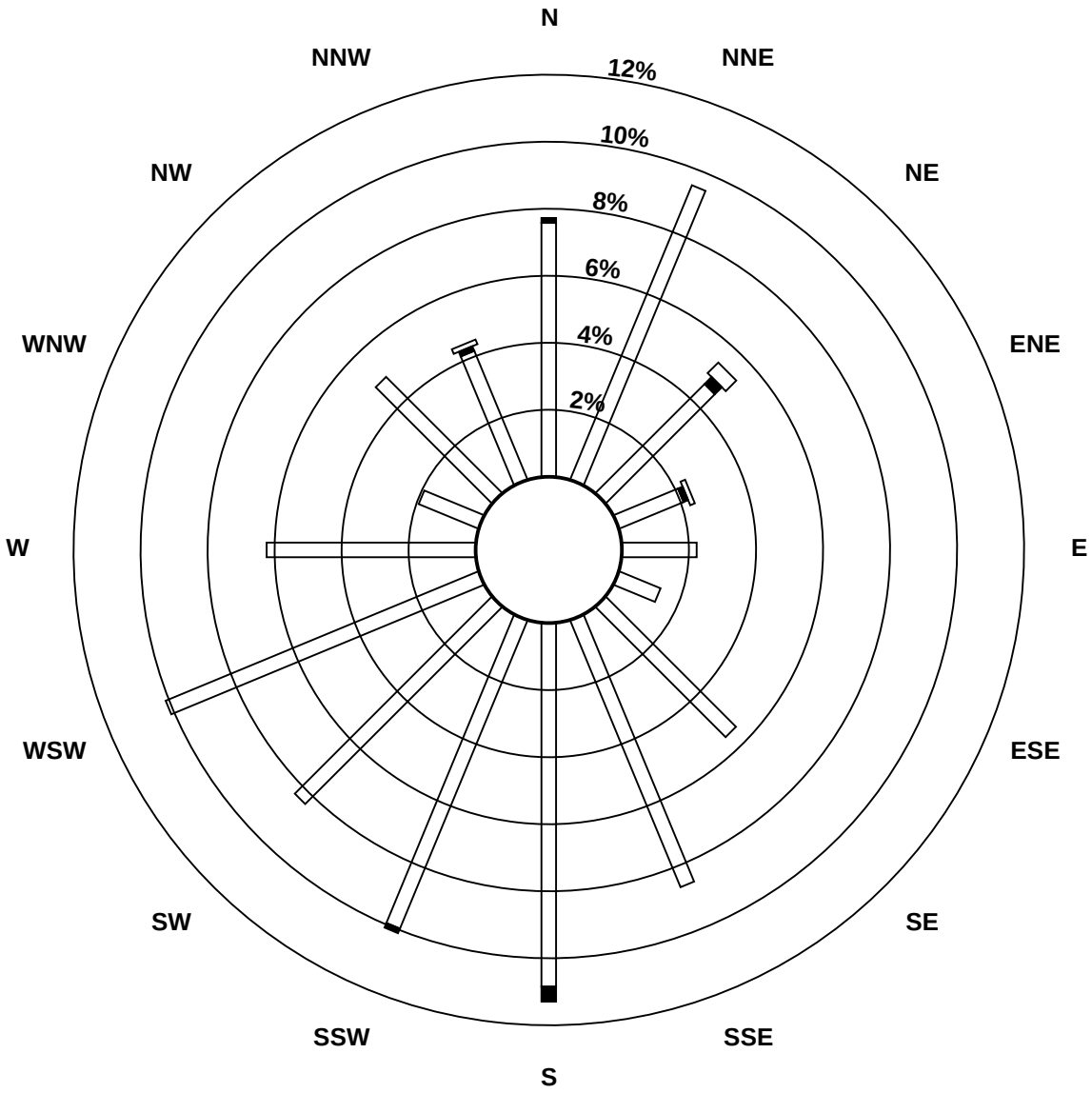
Total Number of Hours: 744

Wood Buffalo Environmental Association

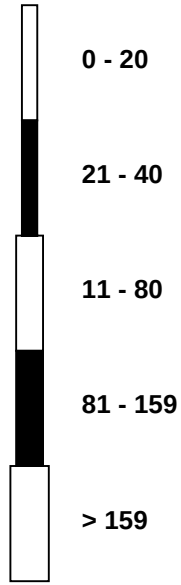
Wind Rose Jan 2016

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



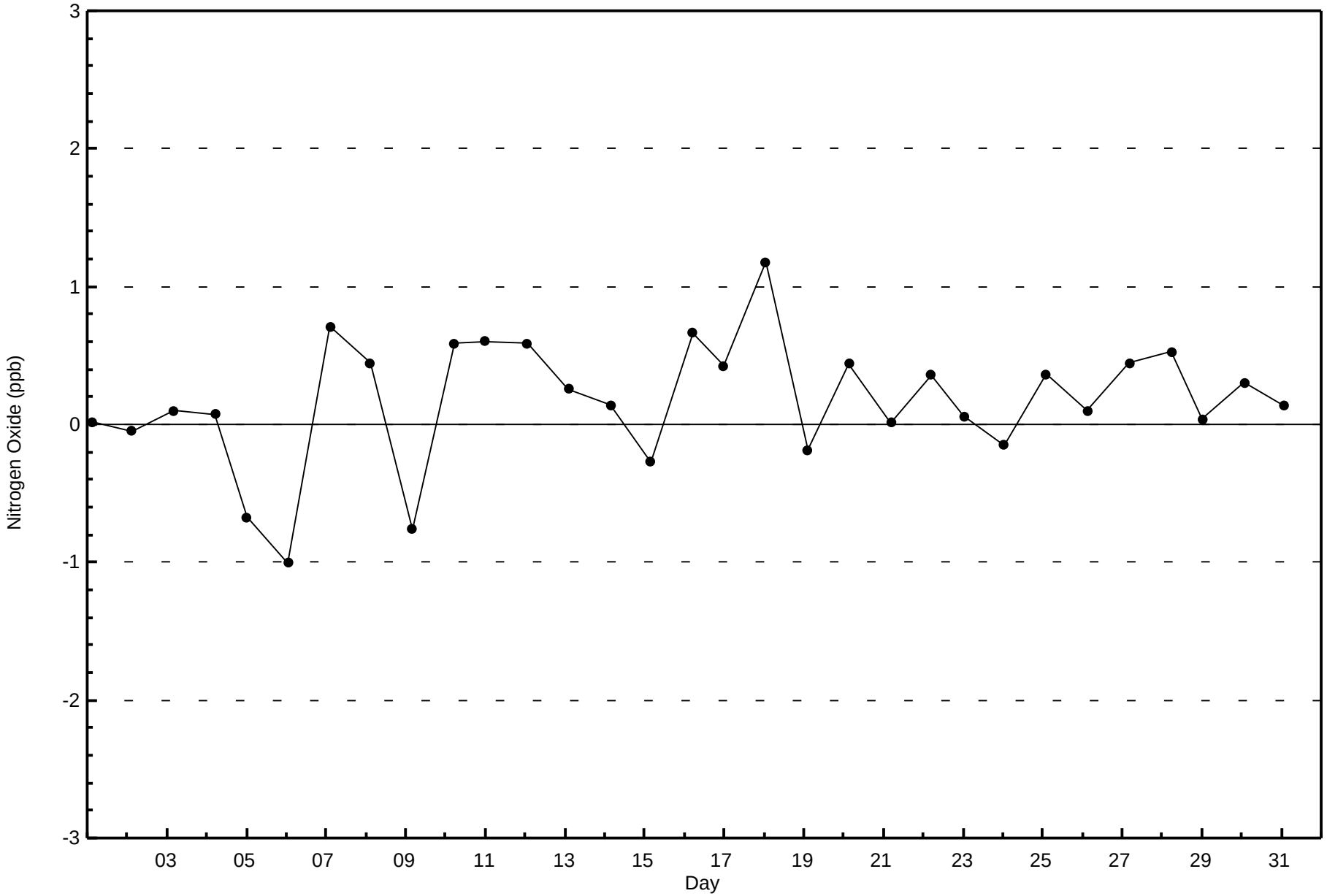
Total Number of Valid Hours: 673

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - January 2016



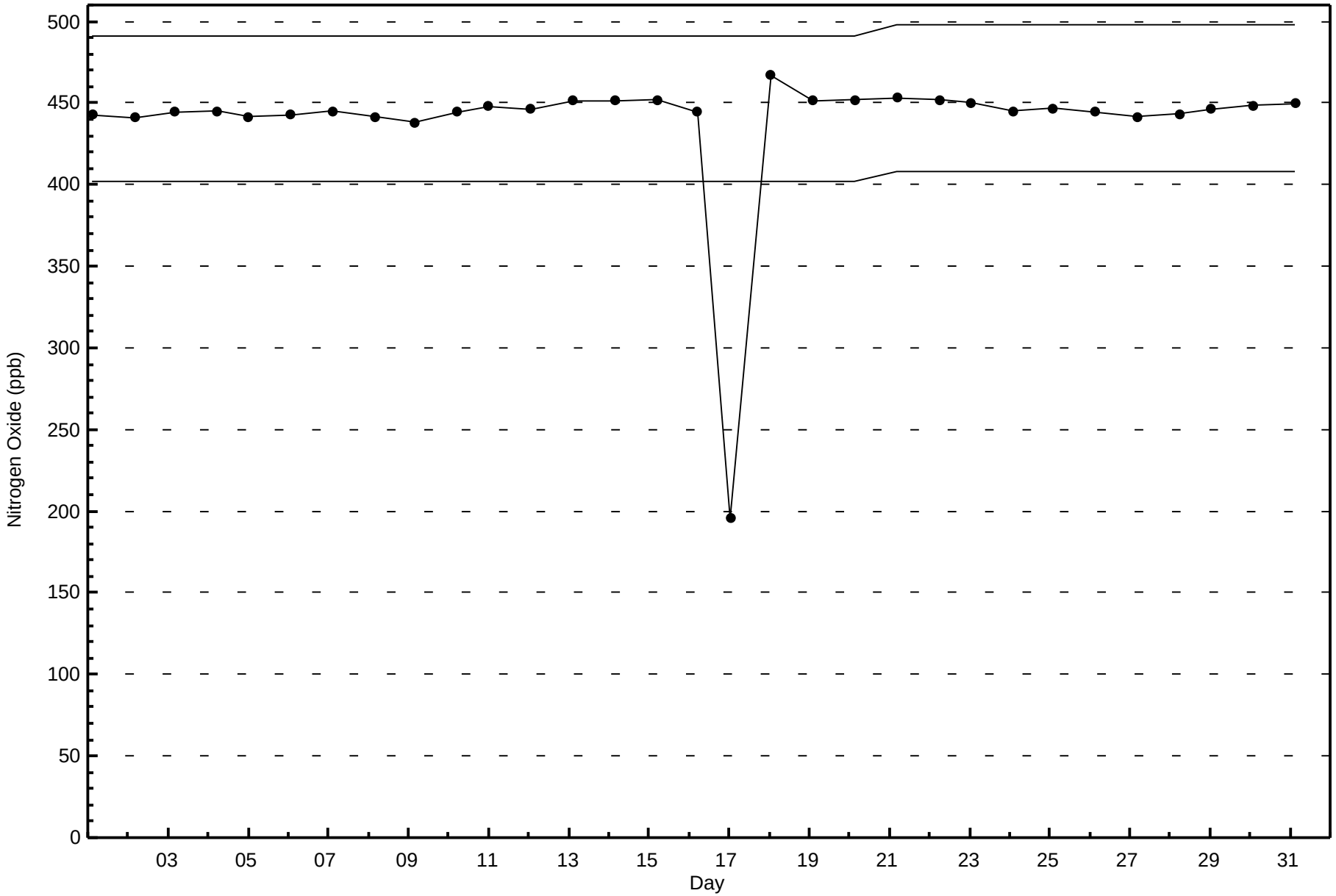
500-25

Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 36 ppb on Jan 5 18:00

Maximum Daily Average: 16.1 ppb on Jan 5

Minimum Value: 0 ppb on Jan 29 03:00

Minimum Daily Average: 2.2 ppb on Jan 27

Maximum Diurnal Average: 9.5 ppb at hour 9

Minimum Diurnal Average: 4.9 ppb at hour 2

Monthly Average: 6.6 ppb

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 5 $Q_3 = 9$ $P_{90} = 15$ $P_{99} = 25$

Hours in Service:	744
Hours of Data:	673
Hours of Missing Data:	71
Hours of Calibration:	36
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	18	2	Z	3	16	14	19	18	20	16	12	15	12	10	16	22	21	12	5	9	8	10	22	22	13.9	22
2-Jan	18	11	6	Z	3	4	4	5	5	6	3	6	3	6	2	2	3	2	3	4	4	5	5	12	5.2	18
3-Jan	8	7	9	10	Z	10	12	15	22	15	12	9	8	6	7	8	10	14	10	17	9	9	14	18	11.2	22
4-Jan	12	9	8	12	15	Z	15	8	10	10	6	5	4	4	4	4	11	16	11	17	12	11	8	8	9.5	17
5-Jan	Z	6	6	3	4	7	10	12	9	9	17	25	30	21	23	21	29	36	25	22	15	15	15	12	16.1	36
6-Jan	12	Z	14	16	21	23	19	14	19	19	8	6	3	2	1	1	1	1	0	1	1	1	2	2	8.1	23
7-Jan	1	0	Z	1	1	2	6	7	6	5	4	4	4	2	4	4	5	4	2	2	3	3	4	4	3.4	7
8-Jan	3	3	2	Z	3	3	5	7	7	5	5	6	6	7	8	9	22	26	20	15	10	4	5	6	8.2	26
9-Jan	7	12	14	8	Z	4	4	6	12	17	11	4	3	4	5	6	10	8	11	4	5	6	8	8	7.7	17
10-Jan	10	12	10	9	13	Z	18	19	15	13	11	7	6	6	4	3	2	2	1	1	2	1	1	3	7.3	19
11-Jan	Z	4	5	2	1	1	5	8	3	2	2	2	2	2	1	2	3	6	5	6	6	9	4	4	3.7	9
12-Jan	15	Z	3	3	7	3	6	8	7	4	5	5	5	5	6	8	9	7	8	8	10	6	9	15	7.0	15
13-Jan	17	9	Z	13	13	18	17	28	22	16	15	16	8	12	7	9	7	9	7	3	3	4	2	2	11.1	28
14-Jan	1	2	1	Z	1	2	1	2	6	8	7	5	5	6	5	6	10	9	6	5	5	5	5	4	4.6	10
15-Jan	3	2	2	3	Z	3	2	3	2	7	3	2	2	2	3	3	5	3	2	4	4	4	2	3	3.0	7
16-Jan	1	7	2	1	1	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	7
17-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	16	22	17	13	12	7	4	--	22
18-Jan	6	Z	5	3	3	2	3	6	7	6	5	5	3	2	4	4	5	6	5	6	4	5	5	6	4.5	7
19-Jan	6	5	Z	6	5	6	8	6	8	8	7	3	C	C	C	C	C	C	2	4	4	3	3	4	--	8
20-Jan	5	9	10	Z	9	10	9	9	11	10	9	8	9	9	10	12	12	10	5	3	2	2	3	3	7.8	12
21-Jan	3	2	3	6	Z	13	15	19	17	10	8	8	8	8	7	8	10	7	5	5	6	5	3	4	7.8	19
22-Jan	5	4	10	10	10	Z	17	24	17	15	21	14	6	8	11	14	9	9	7	6	6	5	4	4	10.3	24
23-Jan	Z	3	4	3	2	3	5	10	11	9	11	5	2	3	3	12	7	11	3	4	10	4	7	5	6.0	12
24-Jan	3	Z	4	3	4	4	6	3	3	3	2	5	1	1	1	2	8	13	14	3	2	2	2	2	3.9	14
25-Jan	2	3	Z	3	2	2	2	3	3	4	5	4	5	5	4	6	10	3	5	3	3	3	3	4	3.6	10
26-Jan	3	3	3	Z	2	3	4	5	6	6	5	6	4	6	5	6	8	6	3	2	1	1	1	1	3.8	8
27-Jan	4	2	2	2	Z	4	1	2	2	2	1	3	2	3	1	1	1	2	5	5	2	3	1	3	2.2	5
28-Jan	1	1	2	10	9	Z	13	13	13	10	6	11	5	6	6	5	6	5	6	5	4	2	1	0	5.9	13
29-Jan	Z	0	0	0	1	3	7	5	4	4	9	10	9	12	8	5	2	1	1	1	1	1	1	1	3.7	12
30-Jan	2	Z	3	2	4	2	2	2	2	3	3	7	3	4	6	2	2	2	4	7	3	4	1	1	2.9	7
31-Jan	4	2	Z	0	1	2	3	5	7	2	2	2	2	3	1	1	3	2	2	5	6	5	3	2	2.8	7
	6.4	4.9	5.2	5.3	5.9	5.8	8.2	9.4	9.5	8.3	7.3	7.1	5.6	6.0	5.9	6.6	8.2	8.5	6.8	6.4	5.4	5.0	5.0	5.5	Diurnal Average	
	18	12	14	16	21	23	19	28	22	19	21	25	30	21	23	22	29	36	25	22	15	15	22	22	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation

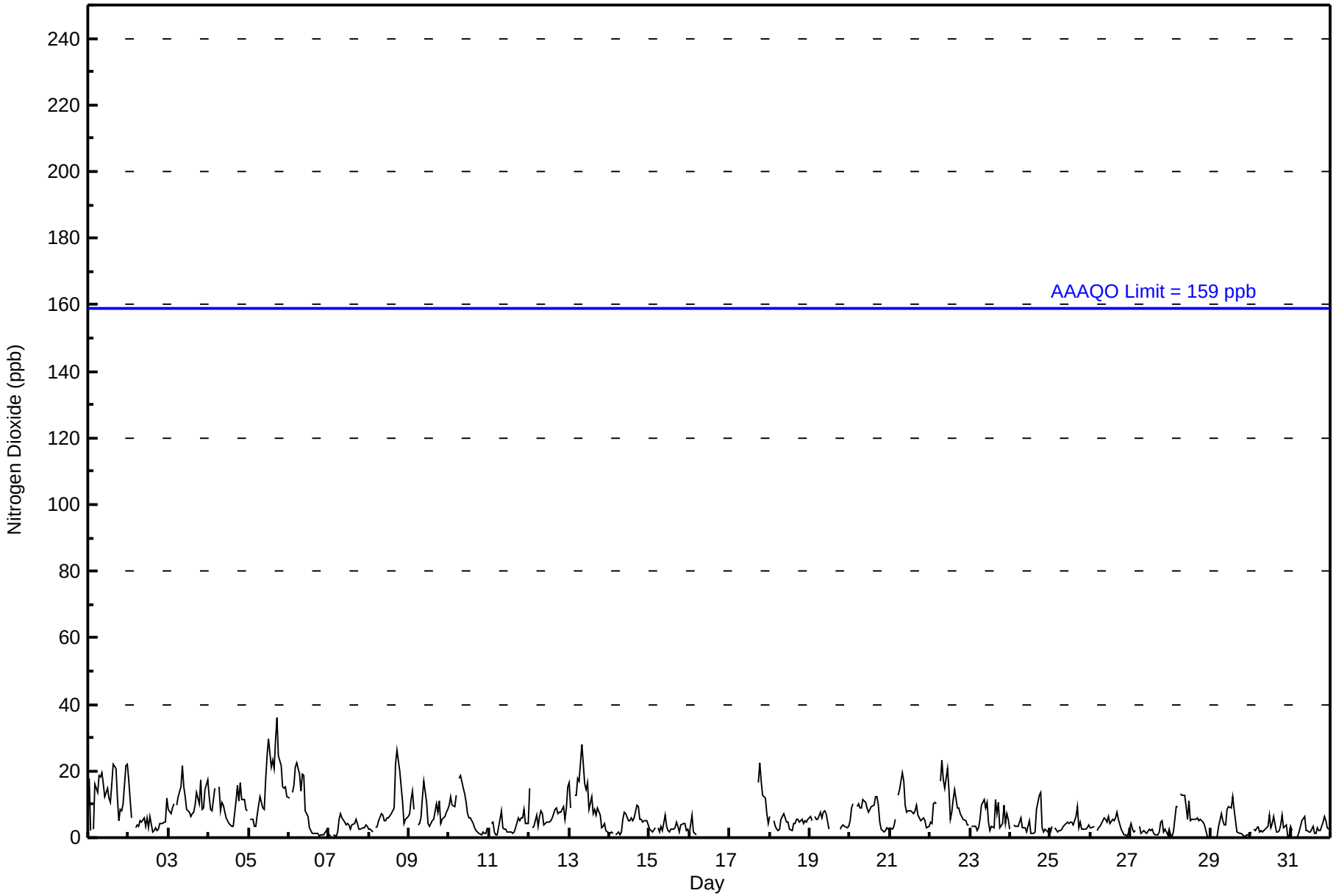
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - January 2016



Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	650	96.58	96.58
21 - 40	23	3.42	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: 673

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	51	64	30	14	14	9	36	55	74	66	56	66	42	11	33	29	650
21 - 40	1	0	6	2	1	0	1	3	2	2	0	2	0	2	0	1	23
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	52	64	36	16	15	9	37	58	76	68	56	68	42	13	33	30	673

Total Number of Valid Hours: 673

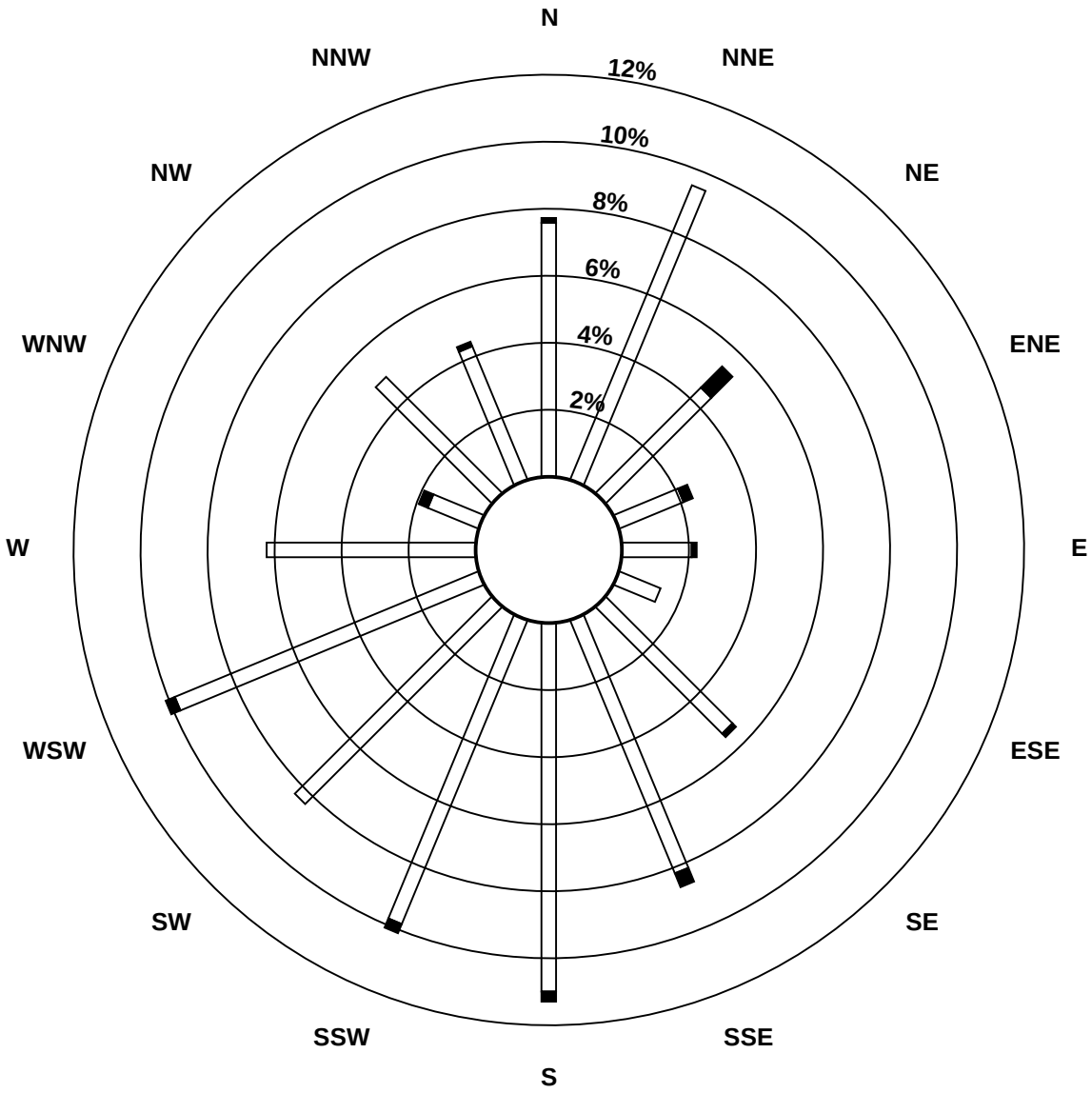
Total Number of Hours: 744

Wood Buffalo Environmental Association

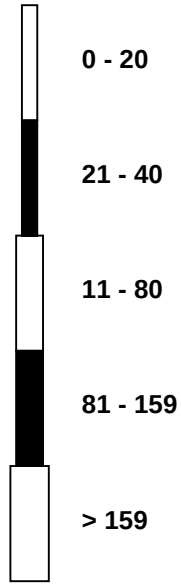
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



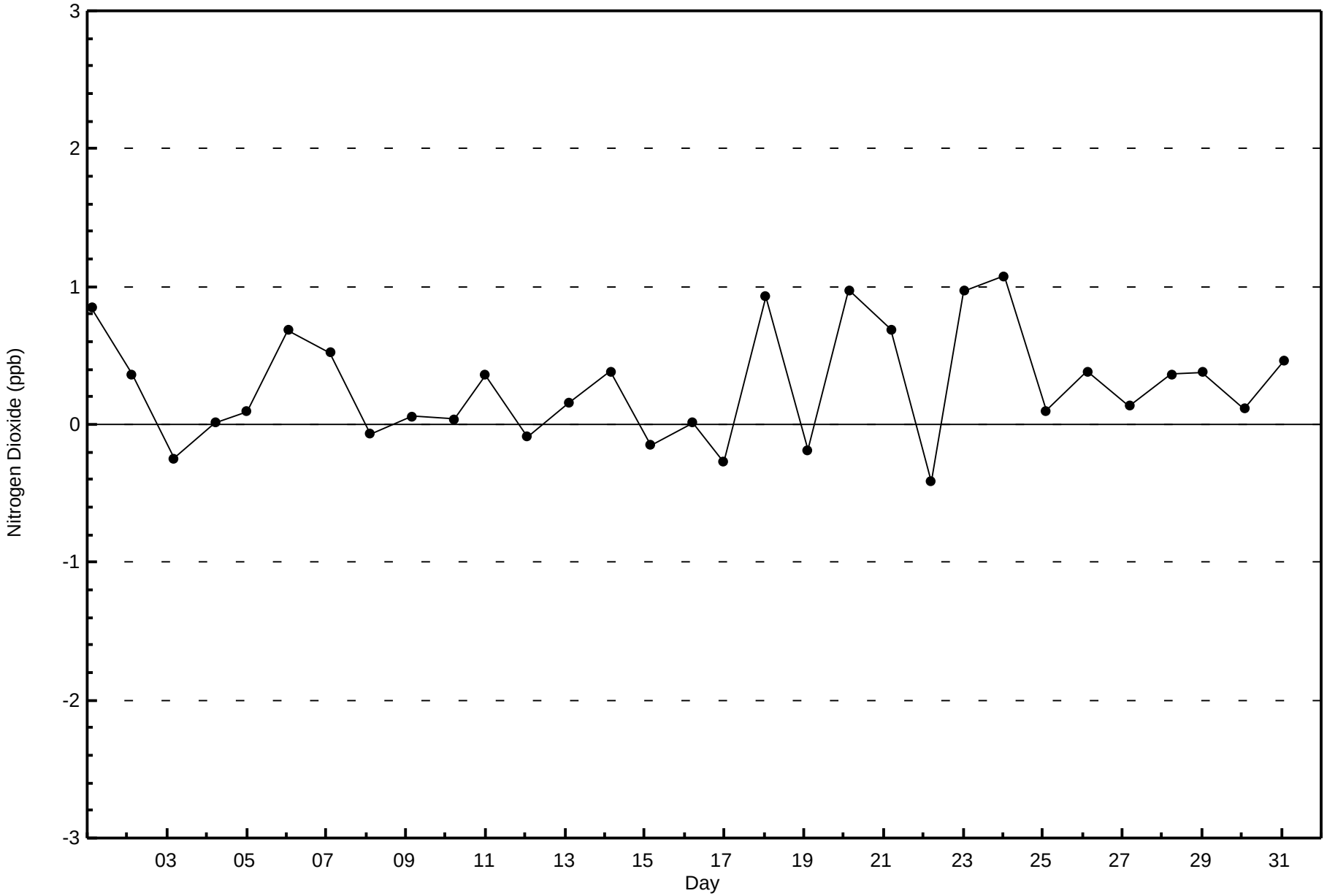
Total Number of Valid Hours: 673

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - January 2016

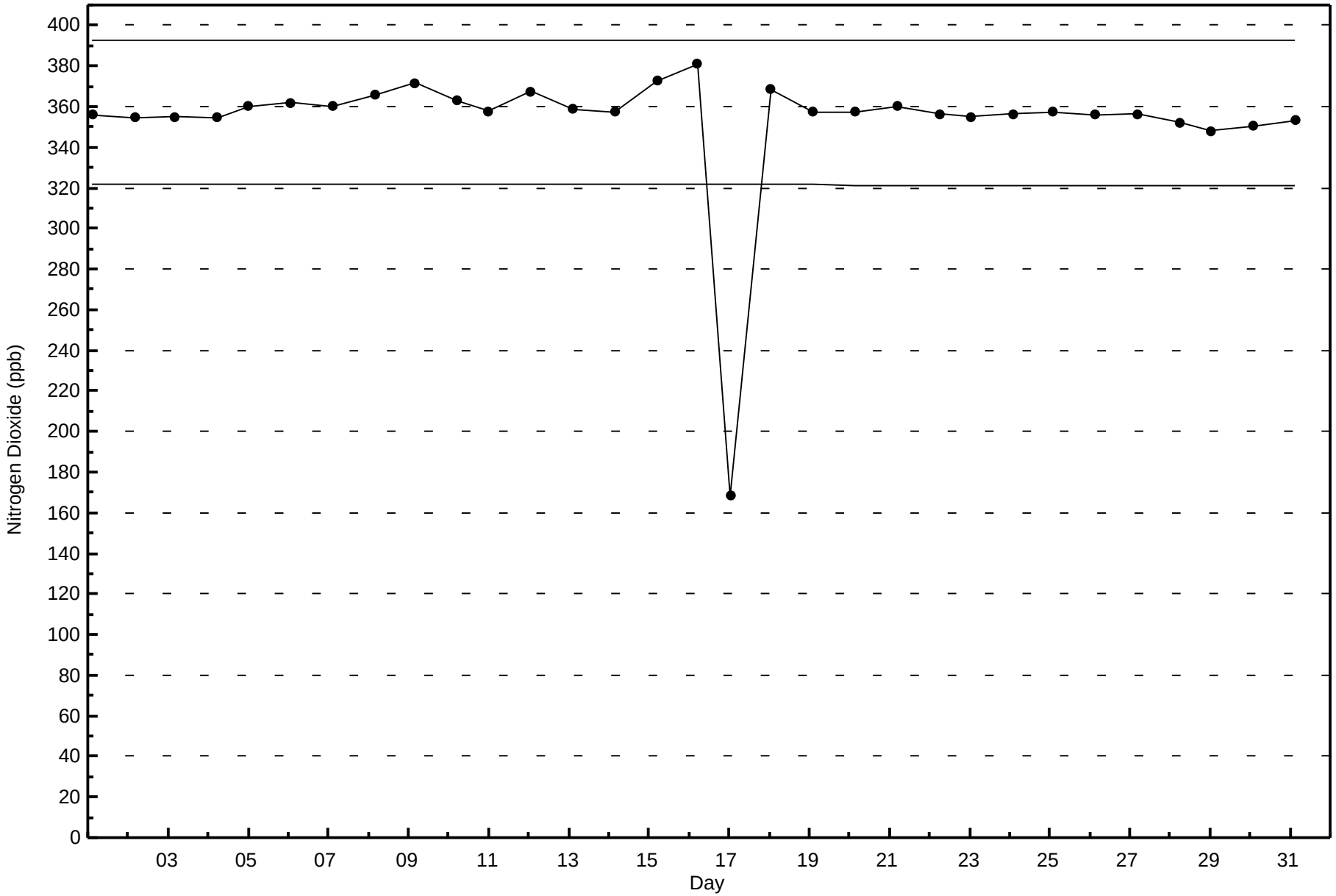


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - January 2016

Maximum Value: 97 ppb on Jan 13 08:00

Maximum Daily Average: 29.9 ppb on Jan 5

Minimum Value: 0 ppb on Jan 31 04:00

Minimum Daily Average: 2.7 ppb on Jan 27

Maximum Diurnal Average: 15.3 ppb at hour 8

Minimum Diurnal Average: 5.9 ppb at hour 2

Monthly Average: 9.6 ppb

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 6 $Q_3 = 11$ $P_{90} = 21$ $P_{99} = 55$

Hours in Service:	744
Hours of Data:	673
Hours of Missing Data:	71
Hours of Calibration:	36
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	32	3	Z	4	29	22	32	36	39	31	22	29	22	18	28	41	36	20	8	12	11	15	36	38	24.6	41
2-Jan	27	16	9	Z	3	4	4	7	5	7	5	11	4	13	2	3	3	3	3	5	5	5	6	13	7.0	27
3-Jan	9	8	10	11	Z	13	14	22	41	24	19	11	11	8	9	9	11	16	11	24	10	10	18	19	14.7	41
4-Jan	14	9	9	12	18	Z	18	9	12	13	8	7	6	6	5	4	13	19	13	23	14	14	10	10	11.6	23
5-Jan	Z	8	8	5	5	9	15	26	13	12	56	69	73	44	38	28	42	67	45	33	27	21	25	21	29.9	73
6-Jan	22	Z	25	34	65	65	35	16	25	27	12	10	4	4	3	2	2	2	1	1	1	1	3	3	15.7	65
7-Jan	2	1	Z	1	1	2	6	8	7	6	5	6	5	3	5	5	6	5	3	3	3	3	4	4	4.0	8
8-Jan	3	3	2	Z	4	3	5	8	8	6	7	9	9	11	13	12	36	50	27	19	12	6	7	9	11.7	50
9-Jan	9	15	24	11	Z	6	6	8	17	29	17	7	5	7	7	7	12	9	12	5	6	6	8	9	10.6	29
10-Jan	13	13	10	9	13	Z	21	22	16	16	14	9	8	8	5	4	2	2	1	1	2	2	1	3	8.5	22
11-Jan	Z	5	5	2	1	1	6	9	3	3	2	2	3	2	1	2	3	6	5	7	8	10	5	5	4.1	10
12-Jan	19	Z	3	4	7	3	7	9	8	5	6	6	6	7	7	10	10	8	8	8	10	6	10	22	8.3	22
13-Jan	20	14	Z	20	17	29	42	97	57	33	33	38	14	21	10	11	8	11	8	4	4	5	3	2	21.8	97
14-Jan	1	3	2	Z	2	2	1	3	9	12	11	8	10	10	7	7	12	11	6	6	5	6	6	4	6.3	12
15-Jan	3	3	3	4	Z	4	2	4	3	9	4	3	3	4	3	4	5	4	2	4	5	4	2	3	3.7	9
16-Jan	1	7	2	1	1	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	7
17-Jan	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	20	25	19	13	14	8	4	--	25
18-Jan	6	Z	6	4	3	3	3	7	8	7	7	6	4	3	6	5	6	6	6	7	5	6	5	6	5.5	8
19-Jan	7	6	Z	7	6	6	9	7	9	11	11	4	C	C	C	C	C	C	3	4	5	4	3	3	--	11
20-Jan	6	9	10	Z	10	11	10	11	14	14	13	12	14	14	14	16	14	11	5	3	2	3	4	3	9.7	16
21-Jan	3	3	3	7	Z	15	21	31	29	14	11	13	13	12	11	10	11	8	6	6	7	5	3	4	10.7	31
22-Jan	6	5	11	11	12	Z	29	49	25	27	46	29	9	12	18	19	10	10	9	7	6	6	5	4	15.8	49
23-Jan	Z	4	4	4	3	4	6	12	13	11	14	8	4	6	4	17	10	14	4	5	11	5	8	7	7.8	17
24-Jan	4	Z	5	5	5	4	7	3	4	5	3	9	2	2	2	2	10	15	15	3	2	3	2	2	5.0	15
25-Jan	2	4	Z	4	2	2	2	3	4	6	8	8	8	8	6	9	14	4	6	3	3	3	4	4	4.9	14
26-Jan	3	3	4	Z	3	3	4	6	7	6	5	7	6	7	6	7	8	6	3	2	1	1	1	2	4.5	8
27-Jan	6	3	2	3	Z	5	2	2	2	2	2	4	3	3	1	1	1	2	5	5	2	3	1	2	2.7	6
28-Jan	1	1	2	10	9	Z	15	14	14	11	7	16	8	7	7	6	7	6	6	5	4	2	1	1	7.0	16
29-Jan	Z	1	1	1	1	6	12	8	6	6	16	19	17	24	17	8	3	2	2	1	1	1	1	1	6.6	24
30-Jan	2	Z	3	3	4	2	2	2	3	3	5	12	5	7	11	2	2	3	5	9	4	6	1	2	4.3	12
31-Jan	4	2	Z	0	1	2	5	7	8	3	3	3	2	5	2	2	4	3	3	5	7	6	4	3	3.7	8
	8.6	5.9	6.6	7.0	9.0	9.1	11.8	15.3	14.2	12.5	12.9	12.9	9.9	9.8	8.8	9.1	10.8	11.8	8.5	8.0	6.6	6.0	6.5	7.1	Diurnal Average	
	32	16	25	34	65	65	42	97	57	33	56	69	73	44	38	41	42	67	45	33	27	21	36	38	Diurnal Maximum	

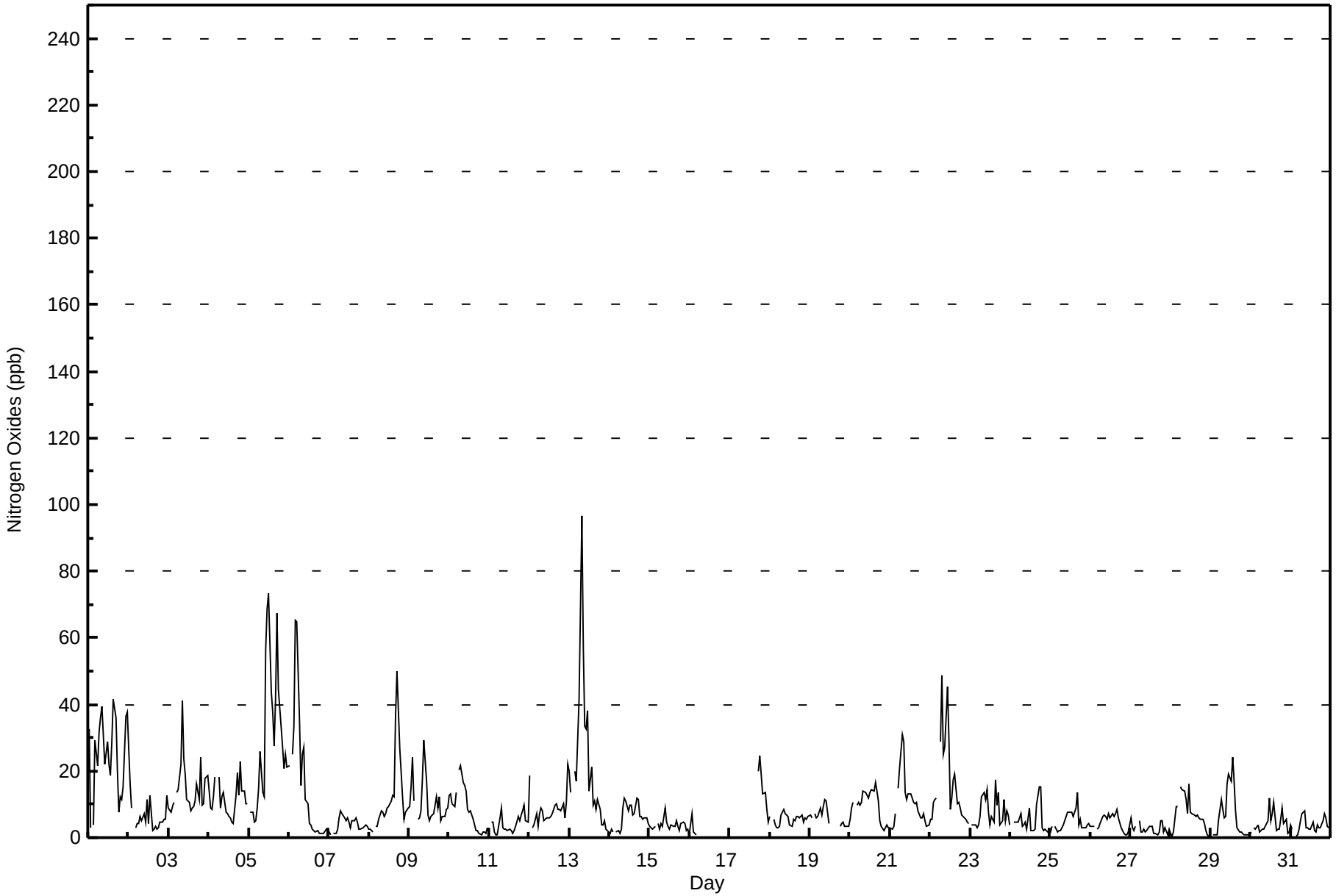
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - January 2016



Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	602	89.45	89.45
21 - 40	54	8.02	97.47
11 - 80	16	2.38	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	50	63	29	12	13	6	31	48	69	63	55	55	41	9	32	26	602
21 - 40	1	1	2	2	1	3	6	9	4	3	1	12	1	4	1	3	54
11 - 80	1	0	5	1	1	0	0	1	3	2	0	1	0	0	0	1	16
81 - 159	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	64	36	16	15	9	37	58	76	68	56	68	42	13	33	30	673

Total Number of Valid Hours: 673

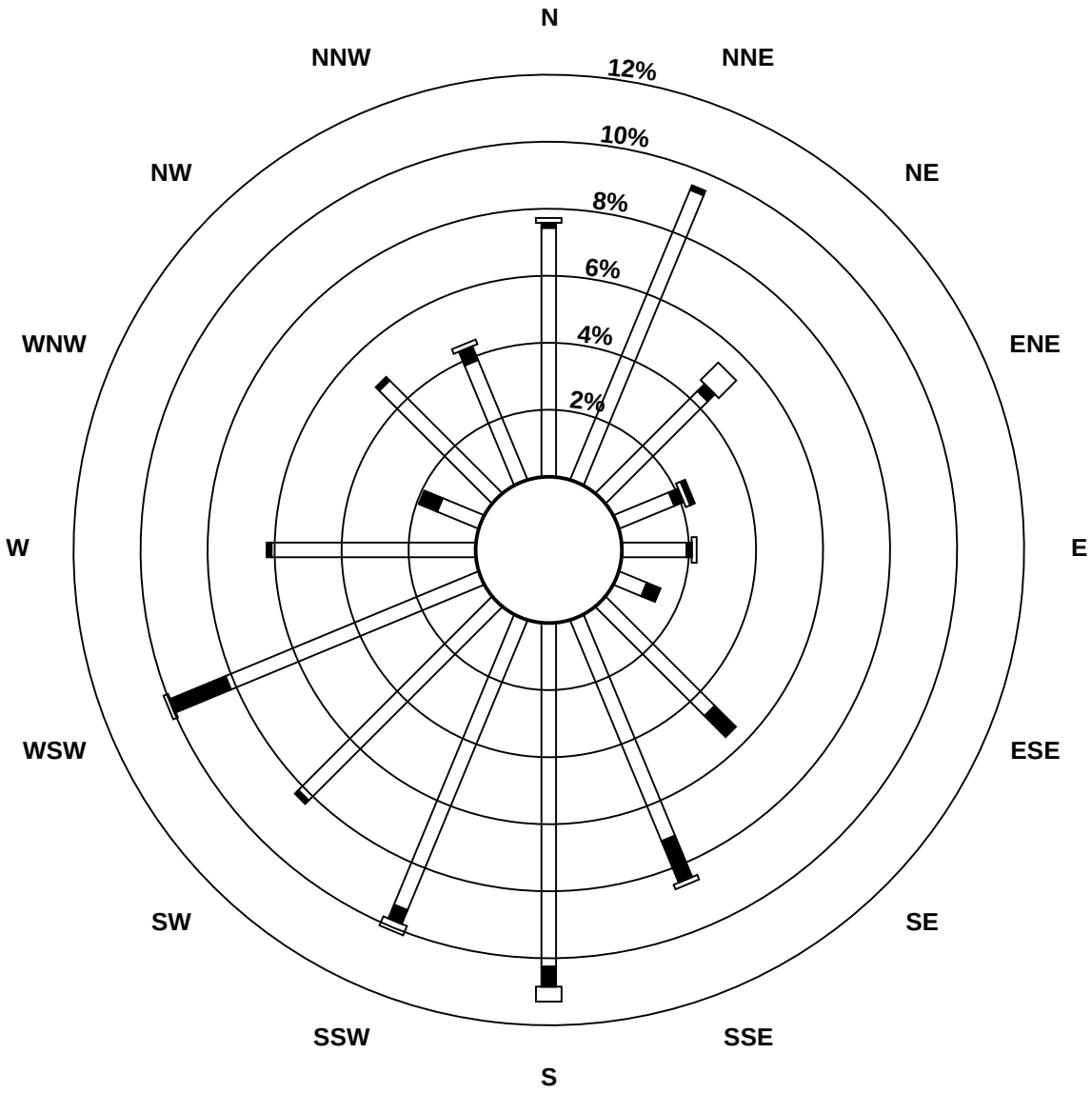
Total Number of Hours: 744

Wood Buffalo Environmental Association

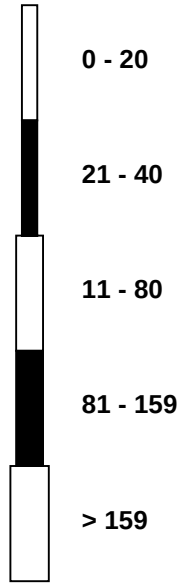
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



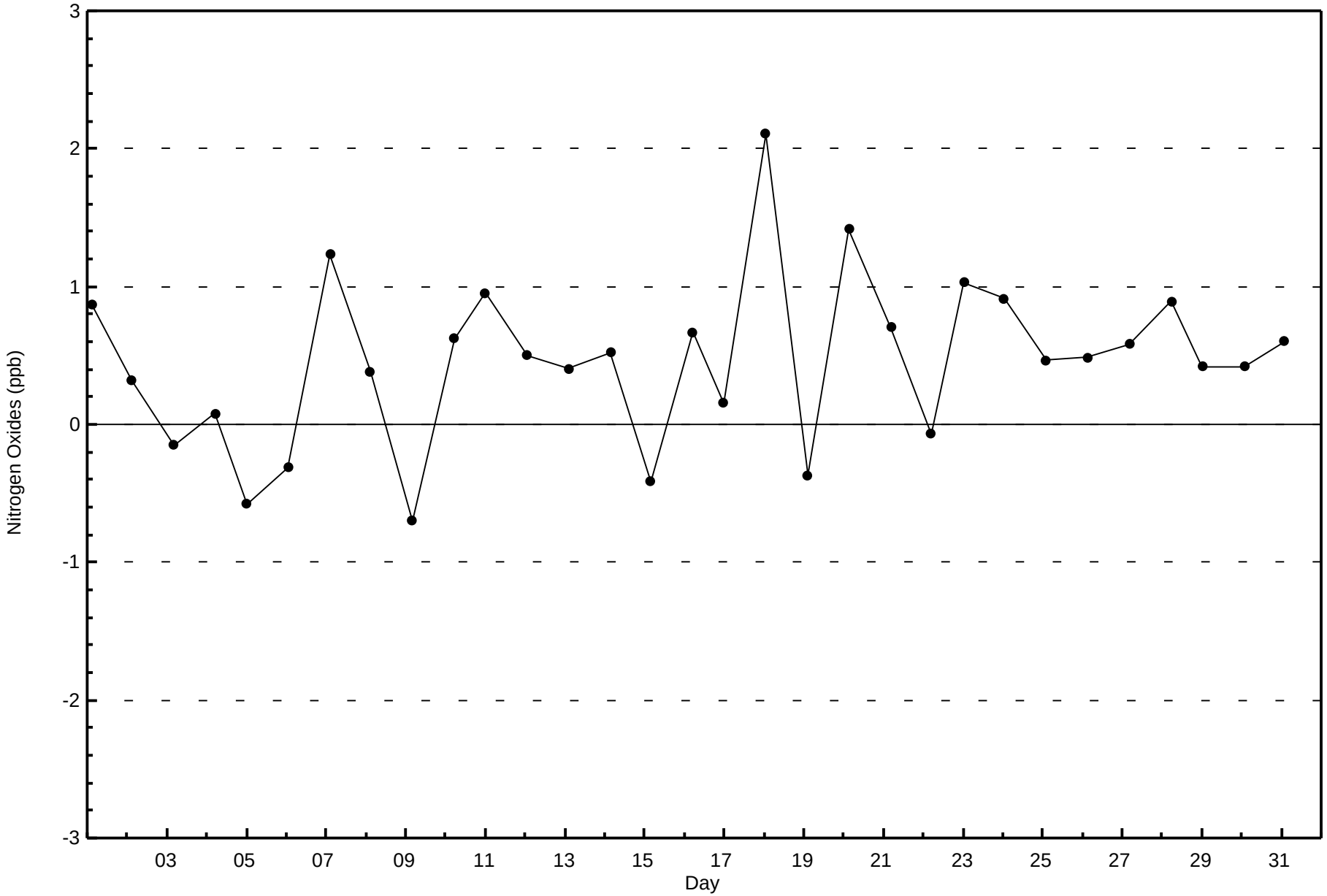
Total Number of Valid Hours: 673

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - January 2016

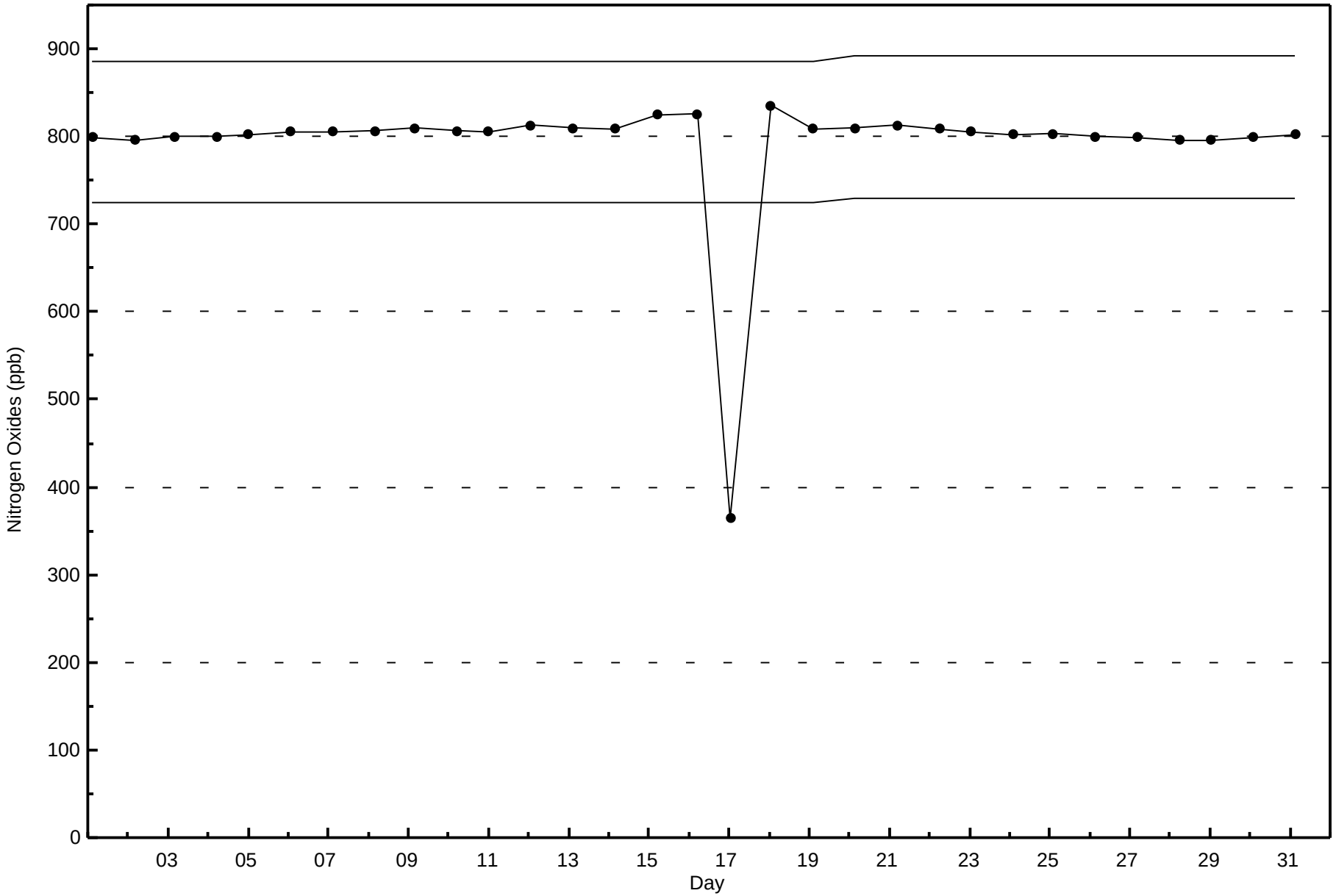


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - January 2016



Maximum Value: 5.7 C on Jan 28 15:00

Maximum Daily Average: 2.8 C on Jan 27

Minimum Value: -32.7 C on Jan 17 08:00

Minimum Daily Average: -25.6 C on Jan 16

Maximum Diurnal Average: -7.6 C at hour 15

Minimum Diurnal Average: -12.9 C at hour 9

Monthly Average: -11.05 C

Percentiles: P_1 = -31.7 P_{10} = -21.1 Q_1 = -16.7 Median = -11.8 Q_3 = -5.1 P_{90} = 1.0 P_{99} = 5.0

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

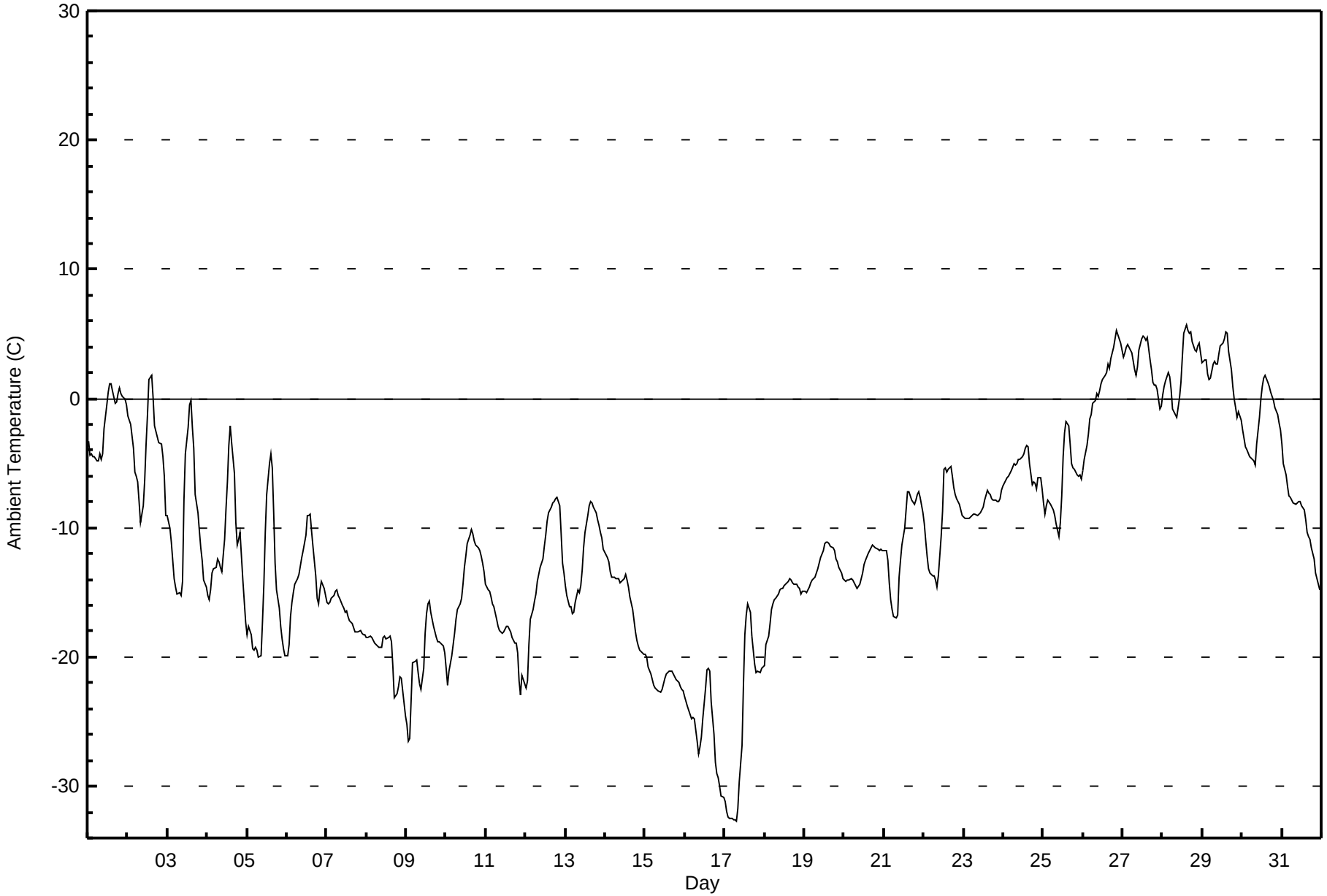
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-3.3	-4.3	-4.3	-4.5	-4.5	-4.8	-4.8	-4.3	-4.7	-4.3	-2.3	-0.4	0.5	1.1	1.2	0.6	-0.4	-0.3	0.4	0.9	0.4	0.2	0.0	-0.5	-1.8	1.2
2-Jan	-1.3	-1.7	-2.0	-3.8	-5.6	-6.0	-6.5	-8.0	-9.6	-8.3	-6.3	-3.5	-1.3	1.5	1.8	0.0	-2.1	-2.5	-3.0	-3.4	-3.5	-4.5	-6.0	-9.0	-4.0	1.8
3-Jan	-9.0	-10.1	-11.1	-12.5	-14.0	-14.6	-15.1	-15.1	-15.3	-14.1	-7.9	-4.3	-2.2	-0.5	-0.1	-2.2	-3.8	-7.4	-8.8	-10.3	-11.5	-12.5	-14.0	-14.6	-9.6	-0.1
4-Jan	-15.2	-15.5	-14.8	-13.4	-13.2	-13.0	-12.4	-12.6	-13.0	-13.4	-10.9	-8.6	-6.5	-3.6	-2.1	-3.4	-5.8	-9.6	-11.3	-10.9	-10.3	-14.0	-15.7	-17.3	-11.1	-2.1
5-Jan	-18.3	-17.7	-18.3	-19.3	-19.5	-19.2	-19.5	-20.0	-19.9	-17.3	-14.4	-10.4	-7.5	-5.0	-4.2	-5.4	-8.9	-12.8	-14.8	-16.2	-17.6	-18.6	-19.3	-19.9	-15.2	-4.2
6-Jan	-19.9	-19.0	-16.9	-15.8	-15.1	-14.4	-14.0	-13.6	-12.9	-12.3	-11.8	-10.6	-9.1	-9.0	-9.0	-10.3	-11.5	-13.7	-15.5	-15.9	-14.8	-14.1	-14.6	-15.2	-13.7	-9.0
7-Jan	-15.8	-15.9	-15.7	-15.5	-15.2	-14.9	-14.9	-15.2	-15.5	-16.0	-16.2	-16.5	-16.4	-16.9	-17.1	-17.4	-17.7	-18.0	-18.1	-18.1	-18.0	-18.1	-18.2	-18.3	-16.7	-14.9
8-Jan	-18.5	-18.5	-18.4	-18.5	-18.7	-18.9	-19.0	-19.2	-19.2	-19.2	-18.5	-18.3	-18.6	-18.5	-18.4	-18.8	-20.8	-23.2	-22.8	-22.3	-21.5	-21.6	-22.6	-24.5	-19.9	-18.3
9-Jan	-25.2	-26.5	-26.3	-23.4	-20.5	-20.4	-20.3	-21.2	-22.0	-22.5	-20.9	-18.2	-16.7	-15.9	-15.7	-16.6	-17.6	-18.1	-18.5	-18.8	-18.9	-19.0	-19.2	-19.7	-20.1	-15.7
10-Jan	-20.9	-22.2	-21.1	-19.9	-19.0	-18.1	-17.0	-16.3	-15.9	-15.4	-14.4	-13.1	-12.1	-11.2	-10.5	-10.2	-10.5	-11.0	-11.4	-11.5	-11.8	-12.2	-12.7	-13.4	-14.7	-10.2
11-Jan	-14.4	-14.8	-15.0	-15.4	-15.8	-16.1	-17.1	-17.6	-18.0	-18.1	-18.2	-18.0	-17.6	-17.7	-17.8	-18.0	-18.5	-18.9	-19.0	-19.7	-21.8	-22.9	-21.4	-22.1	-18.1	-14.4
12-Jan	-22.4	-21.9	-19.1	-17.1	-16.3	-15.7	-15.1	-14.2	-13.6	-13.0	-12.4	-11.5	-10.6	-9.5	-8.8	-8.3	-8.1	-7.9	-7.8	-7.6	-8.3	-10.5	-12.7	-13.5	-12.7	-7.6
13-Jan	-14.5	-15.3	-16.1	-16.1	-16.6	-16.5	-15.8	-14.8	-15.0	-14.5	-13.3	-11.6	-10.4	-9.1	-8.3	-8.0	-8.1	-8.4	-8.8	-9.3	-9.8	-10.4	-10.8	-11.6	-12.2	-8.0
14-Jan	-12.1	-12.3	-12.6	-13.4	-13.8	-13.8	-13.9	-14.0	-14.0	-14.2	-14.2	-13.9	-13.6	-14.0	-14.6	-15.4	-16.3	-17.1	-18.1	-18.7	-19.1	-19.5	-19.6	-19.8	-15.3	-12.1
15-Jan	-19.8	-20.1	-20.7	-21.3	-21.8	-22.2	-22.4	-22.5	-22.6	-22.7	-22.5	-22.1	-21.6	-21.3	-21.1	-21.1	-21.1	-21.3	-21.5	-21.8	-22.0	-22.3	-22.5	-22.7	-21.7	-19.8
16-Jan	-23.1	-23.8	-24.1	-24.5	-24.7	-24.7	-24.8	-26.5	-27.5	-27.0	-26.2	-24.7	-22.4	-21.0	-20.8	-21.1	-23.5	-26.0	-28.1	-29.0	-29.3	-30.0	-30.7	-30.9	-25.6	-20.8
17-Jan	-31.1	-31.9	-32.3	-32.5	-32.4	-32.6	-32.6	-32.7	-31.7	-29.7	-26.9	-22.2	-18.3	-16.7	-15.9	-16.6	-18.4	-19.4	-20.5	-21.2	-21.1	-21.2	-20.9	-20.8	-25.0	-15.9
18-Jan	-20.7	-19.1	-18.4	-17.4	-16.4	-15.9	-15.6	-15.4	-15.2	-14.8	-14.7	-14.7	-14.5	-14.2	-14.2	-14.0	-14.1	-14.3	-14.4	-14.4	-14.5	-14.7	-15.1	-15.0	-15.5	-14.0
19-Jan	-14.9	-15.0	-14.8	-14.6	-14.2	-14.1	-13.9	-13.5	-13.2	-12.7	-12.3	-11.8	-11.3	-11.1	-11.1	-11.3	-11.4	-11.5	-11.8	-12.4	-12.7	-13.1	-13.5	-14.0	-12.9	-11.1
20-Jan	-14.1	-14.1	-14.1	-14.0	-13.9	-14.0	-14.2	-14.5	-14.7	-14.4	-13.9	-13.5	-12.9	-12.5	-12.0	-11.8	-11.5	-11.3	-11.4	-11.5	-11.6	-11.8	-11.7	-11.7	-13.0	-11.3
21-Jan	-11.7	-11.8	-12.5	-14.3	-15.5	-16.3	-16.9	-17.0	-16.7	-13.8	-12.6	-11.3	-10.0	-8.7	-7.2	-7.2	-7.5	-7.8	-8.2	-7.9	-7.5	-7.2	-7.7	-8.9	-11.1	-7.2
22-Jan	-9.7	-11.0	-12.1	-13.2	-13.5	-13.8	-13.7	-14.0	-14.6	-13.7	-10.7	-8.8	-5.4	-5.3	-5.6	-5.4	-5.3	-6.0	-6.9	-7.4	-7.7	-8.2	-8.6	-9.1	-9.6	-5.3
23-Jan	-9.2	-9.3	-9.3	-9.3	-9.1	-9.1	-9.0	-9.0	-9.0	-9.0	-8.8	-8.6	-8.4	-7.8	-7.2	-7.3	-7.5	-7.7	-7.8	-7.9	-8.0	-7.9	-7.7	-7.1	-8.4	-7.1
24-Jan	-6.7	-6.4	-6.1	-6.0	-5.8	-5.6	-5.0	-5.2	-5.0	-4.7	-4.7	-4.5	-4.2	-3.8	-3.6	-3.7	-5.0	-6.6	-6.5	-6.5	-7.0	-6.1	-6.1	-7.0	-5.5	-3.6
25-Jan	-8.1	-9.0	-8.2	-7.9	-8.1	-8.4	-8.6	-9.1	-9.7	-10.7	-9.6	-7.6	-4.5	-2.6	-1.8	-2.1	-3.5	-5.0	-5.4	-5.5	-5.9	-6.1	-5.9	-6.2	-6.6	-1.8
26-Jan	-5.6	-4.7	-3.6	-2.7	-1.6	-1.2	-0.4	-0.1	0.4	0.2	0.6	1.1	1.5	1.7	2.0	2.7	2.4	3.1	4.0	4.7	5.2	4.9	4.6	4.3	1.0	5.2
27-Jan	3.2	3.5	4.0	4.1	3.9	3.6	2.9	2.3	1.9	2.5	3.7	4.6	4.9	4.7	4.5	4.7	3.0	2.2	1.3	1.1	1.0	0.7	-0.8	-0.6	2.8	4.9
28-Jan	0.3	0.9	1.4	2.0	1.7	0.7	-0.8	-1.0	-1.4	-0.7	0.1	1.2	3.2	5.0	5.7	5.3	5.0	5.1	4.4	3.8	3.7	4.1	4.3	3.5	2.4	5.7
29-Jan	2.8	3.0	3.0	1.9	1.5	1.6	2.7	2.9	2.6	2.6	3.4	4.0	4.3	4.7	5.1	5.1	3.6	2.2	1.0	0.0	-0.7	-1.5	-1.0	-1.6	2.2	5.1
30-Jan	-2.4	-3.1	-3.7	-4.0	-4.5	-4.6	-4.8	-4.9	-5.2	-3.6	-1.4	-0.1	1.0	1.5	1.8	1.2	0.9	0.5	0.1	-0.2	-0.7	-1.2	-1.9	-2.5	-1.7	1.8
31-Jan	-3.5	-5.0	-5.9	-6.8	-7.5	-7.7	-7.8	-8.1	-8.2	-8.1	-8.0	-8.0	-8.3	-8.6	-9.4	-10.3	-10.7	-10.9	-11.6	-12.4	-13.5	-14.0	-14.4	-14.8	-9.3	-3.5
	-12.4	-12.7	-12.6	-12.6	-12.6	-12.6	-12.6	-12.7	-12.9	-12.4	-11.2	-9.9	-8.7	-7.9	-7.6	-7.9	-8.9	-9.8	-10.3	-10.7	-10.9	-11.4	-11.8	-12.4	Diurnal Average	
	3.2	3.5	4.0	4.1	3.9	3.6	2.9	2.9	2.6	2.6	3.7	4.6	4.9	5.0	5.7	5.3	5.0	5.1	4.4	4.7	5.2	4.9	4.6	4.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Cenovus - Christina Lake - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	95	12.77	12.77
-20 - 0	554	74.46	87.23
0 - 10	95	12.77	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Cenovus - Christina Lake - January 2016

Maximum Value: 93 % on Jan 25 06:00

Maximum Daily Average: 89.2 % on Jan 24

Minimum Value: 36 % on Jan 3 15:00

Minimum Daily Average: 53.3 % on Jan 1

Maximum Diurnal Average: 80.4 % at hour 9

Minimum Diurnal Average: 70.6 % at hour 15

Monthly Average: 77.1 %

Percentiles: $P_1 = 45$ $P_{10} = 61$ $Q_1 = 73$ Median = 80 $Q_3 = 84$ $P_{90} = 87$ $P_{99} = 92$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

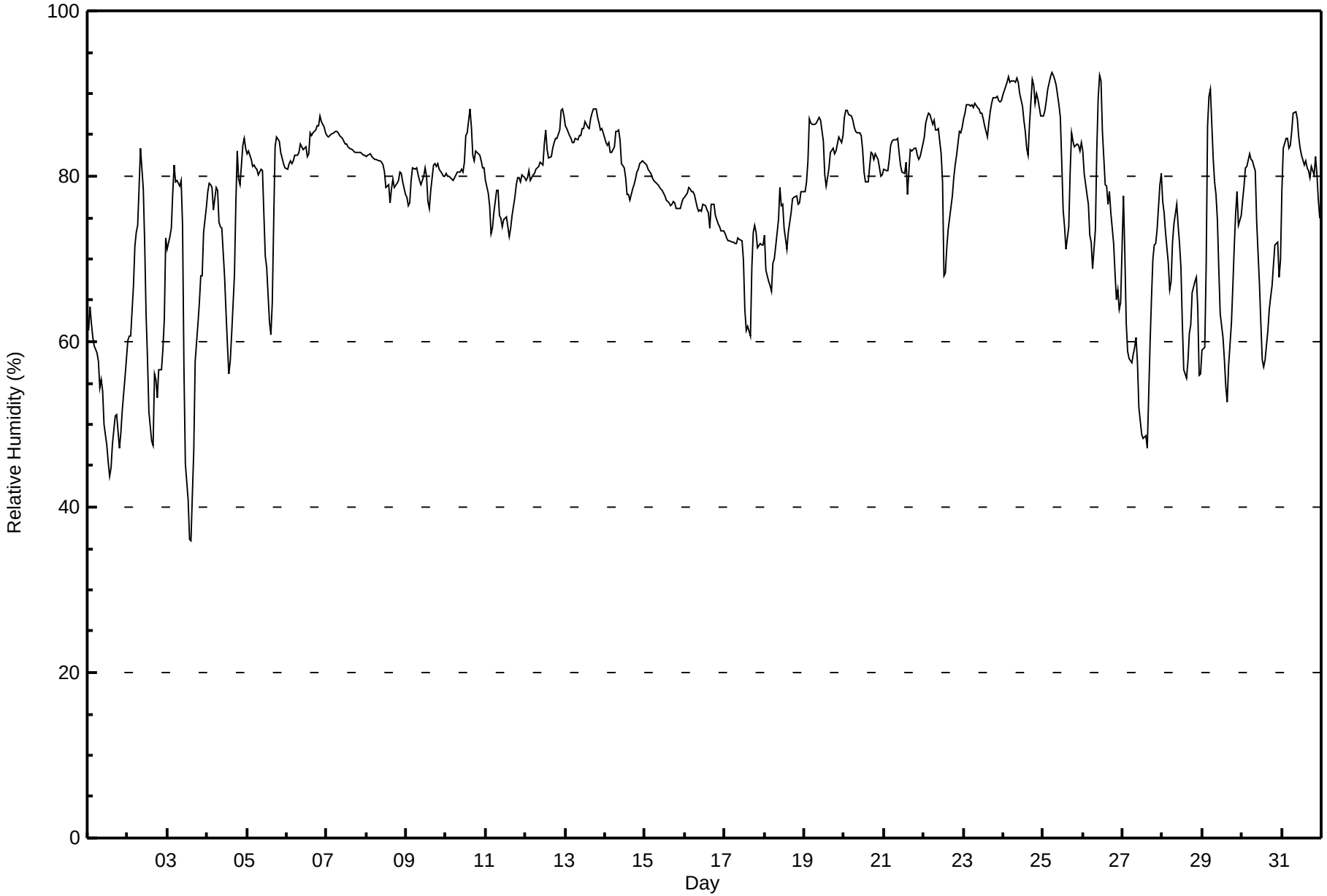
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	61	64	62	60	59	59	58	54	55	54	50	47	45	44	45	48	51	51	49	47	49	52	56	58	53.3	64
2-Jan	60	61	61	67	71	73	74	79	83	79	72	63	58	52	48	48	56	55	53	57	57	59	63	73	63.3	83
3-Jan	71	73	74	78	81	79	79	79	80	74	57	45	41	36	36	42	47	58	62	65	68	68	73	76	64.2	81
4-Jan	78	79	79	79	76	79	78	74	74	74	68	64	60	56	58	61	68	77	83	80	79	84	85	83	73.9	85
5-Jan	83	83	82	81	81	81	81	80	81	81	75	70	69	62	61	65	75	84	85	84	83	82	82	81	78.0	85
6-Jan	81	81	82	82	82	83	82	83	84	84	83	83	82	83	85	85	85	86	86	86	87	87	86	85	83.9	87
7-Jan	85	85	85	85	85	85	85	85	85	85	84	84	84	84	83	83	83	83	83	83	83	83	83	83	84.0	85
8-Jan	82	83	83	82	82	82	82	82	82	82	81	81	79	79	77	79	80	79	79	80	80	80	79	78	80.5	83
9-Jan	77	76	77	79	81	81	81	80	80	79	80	81	80	77	76	78	81	82	81	81	81	80	80	80	79.6	82
10-Jan	80	80	80	80	79	80	80	81	80	81	81	82	85	85	88	86	82	82	83	83	83	82	81	81	81.8	88
11-Jan	79	78	76	73	74	76	78	78	75	75	74	75	75	74	73	74	75	77	79	80	80	79	80	80	76.6	80
12-Jan	80	80	81	79	80	80	81	81	81	82	81	84	86	83	82	82	83	84	85	85	86	88	88	87	82.9	88
13-Jan	86	86	85	85	84	84	85	84	85	85	86	86	87	86	86	87	88	88	88	87	86	86	86	85	85.8	88
14-Jan	84	84	84	83	83	83	85	85	86	84	82	81	80	78	78	77	78	79	80	81	81	82	82	82	81.7	86
15-Jan	82	81	81	80	80	80	79	79	79	79	78	78	78	77	77	77	77	77	77	76	76	76	77	77	78.2	82
16-Jan	77	78	79	78	78	78	78	76	76	76	76	77	76	76	76	74	77	77	75	75	74	74	73	73	76.1	79
17-Jan	73	73	72	72	72	72	72	72	72	72	72	70	64	61	62	61	69	73	74	73	71	72	72	72	70.4	74
18-Jan	73	69	67	67	66	69	70	72	75	79	76	77	74	71	73	74	76	77	77	78	77	77	78	78	73.7	79
19-Jan	78	79	82	87	86	86	86	86	87	87	87	84	80	79	80	81	83	83	83	83	84	85	84	85	83.6	87
20-Jan	87	88	88	87	87	87	86	85	85	85	85	83	81	79	79	81	83	83	82	83	82	81	80	80	83.7	88
21-Jan	81	81	81	82	84	84	84	84	85	83	81	80	80	82	78	81	83	83	83	83	83	82	82	84	82.3	85
22-Jan	85	86	87	88	88	86	87	86	86	86	83	79	68	68	71	74	76	78	80	81	82	85	85	86	81.7	88
23-Jan	87	88	89	89	88	89	88	89	88	88	88	88	87	86	85	86	88	89	90	90	90	89	89	89	88.1	90
24-Jan	90	91	91	92	91	92	92	91	92	91	90	89	87	85	83	83	86	92	91	89	90	89	87	87	89.2	92
25-Jan	87	88	89	90	92	93	92	92	91	89	87	82	76	74	71	74	81	85	84	84	84	84	83	84	84.8	93
26-Jan	83	80	78	77	73	72	69	74	83	90	92	92	85	79	79	77	78	76	72	68	65	66	64	65	76.5	92
27-Jan	78	71	62	59	58	57	58	59	60	57	52	49	48	48	49	47	60	65	70	72	72	73	79	80	61.9	80
28-Jan	77	76	73	69	66	67	72	74	77	74	72	69	62	57	56	58	61	62	66	67	68	64	56	56	66.6	77
29-Jan	59	59	69	86	90	90	82	79	78	75	69	63	60	58	55	53	57	62	67	71	75	78	74	75	70.2	90
30-Jan	77	79	81	81	83	82	82	81	81	75	67	62	58	57	58	61	64	66	67	69	72	72	68	70	71.3	83
31-Jan	78	83	85	85	83	84	85	88	88	87	85	83	82	81	82	81	81	80	81	80	82	80	77	75	82.4	88
	78.7	78.8	78.8	79.4	79.6	79.8	79.8	79.8	80.4	79.6	77.2	75.2	72.8	70.9	70.6	71.4	74.5	76.5	77.3	77.4	77.7	78.0	77.8	78.3	Diurnal Average	
	90	91	91	92	92	93	92	92	92	91	92	92	87	86	88	87	88	92	91	90	90	89	89	89	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Cenovus - Christina Lake - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	2	0.27	0.27
40 - 60	66	8.87	9.14
60 - 80	303	40.73	49.87
80 - 100	373	50.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association — **Wind Speed (WS) - km/h**

Summary of Hour Averages — **Cenovus - Christina Lake - January 2016**

Maximum Speed: 30 km/h on Jan 29 08:00

Maximum Daily Speed Average: 18.6 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 6 08:00

Minimum Daily Speed Average: 0.7 km/h on Jan 16

Maximum Diurnal Speed Average: 3.2 km/h at hour 14

Minimum Diurnal Speed Average: 1.7 km/h at hour 4

Monthly Average Velocity: 2.3 km/h 255.3 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 4$ Median = 7 $Q_3 = 10$ $P_{90} = 14$ $P_{99} = 24$

Hours in Service: 744

Hours of Data: 744

Hours of Missing Data: 0

Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	WSW12	SW9	SW10	SW10	WSW14	WSW9	WSW12	WSW13	WSW12	WSW14	WSW13	WSW13	WSW14	W16	WSW12	WSW13	WSW12	W17	W21	W22	W21	W19	WNW19	WNW20	WSW13.7	W22
2-Jan	WNW14	W13	W17	WSW11	SW9	SW9	SW6	S4	S6	S6	SSE6	SSE5	SE5	SSW6	SW8	SSW7	SSW6	SSW9	SSW6	SSW6	SSW4	S4	SSW5	SE5	SW5.6	W17
3-Jan	SE6	SE7	SE5	E2	SE3	SSE3	S3	SE3	E3	SSE2	S5	S8	SSE6	S8	SSW6	S7	SSE5	SSE4	S6	S3	S4	S2	NNW1	SSW1	SSE3.7	S8
4-Jan	SE1	SSE3	SSE5	SE1	NW1	ESE1	ENE2	NW8	NW8	NNW5	NW8	NW7	NW6	N5	NNE10	NNE10	S1	S3	WSW3	W2	WSW4	SSW3	SSW3	S3	NW1.8	NNE10
5-Jan	SSW4	SSW3	SSW4	SSW3	S3	SSW4	SSW3	S3	SSW5	SSW2	ENE1	NE2	NE5	NE4	ENE3	NE6	SSE3	S2	SSW2	SSE2	SSW1	S3	SSE2	SSW2	SSE1.5	NE6
6-Jan	SSE2	S3	ENE2	E1	NE3	NNW1	NNW3	SE0	SSE2	NNE1	N5	NNE5	NNE6	N7	N8	N11	N11	N10	N8	N5	NNW4	N5	N5	N4	N3.9	N11
7-Jan	NE3	N2	NNW2	NNW2	NW2	NNW2	N3	NNE5	NNE5	N4	N4	NNE4	N4	NNW5	N4	NW3	NW4	NW4	NNW4	NW3	N2	WSW2	WSW3	WSW3	NNW2.7	NNW5
8-Jan	WSW4	W2	N2	N3	N3	NNE4	NNE4	NE4	NE3	NE4	NE2	E2	ESE3	E3	E4	E2	SSE2	S3	SSE3	S4	S3	S4	SSE2	S3	E0.9	WSW4
9-Jan	S3	SSE3	SSE3	SSE3	SSW3	S3	SSW4	S4	S3	SE3	SE3	SSW6	SSW7	SW7	SW7	SSW7	SSW5	SW7	SW6	SSW6	SW6	SW6	S4	S4	SSW4.3	SSW7
10-Jan	SSE4	SSE6	S5	SE3	S3	SSW4	S5	SW6	WSW8	WSW8	WSW9	WSW9	W11	W12	NW12	NW12	NW14	NW12	NNW10	NNW10	NNW11	NW14	NW15	NNW15	WNW5.7	NNW15
11-Jan	NNW17	NW13	NW15	NW16	NNW16	NNW14	N11	N10	NNW14	NW14	NW15	NNW12	NW10	NNW12	NNW8	WNW5	WSW6	SW6	SW6	S4	SSE5	SSE4	S4	ESE4	NW7.3	NNW17
12-Jan	E4	SE3	S5	SSE6	SSE5	SSE7	SSE6	SSE7	S8	S7	S8	SSW8	SSW7	SSW7	SW7	SW6	SW8	SSW7	SW6	SW5	SSW3	SSE4	SSE4	ESE3	S5.1	S8
13-Jan	SSE2	S3	E1	SE2	SSE2	E2	S1	ENE2	N1	NNW1	NW2	NNW0	NNW2	NE4	NNE5	NE8	NE8	NE8	NE9	NE11	NE9	NE10	NNE9	NNE11	NE3.8	NNE11
14-Jan	NNE12	NNE10	N8	N11	N9	NNE10	N8	N10	N9	NNE12	NNE14	N11	N11	N13	N14	NNE12	NNE13	NNE14	NNE15	NNE14	NNE14	NNE12	NNE12	NNE11	NNE11.5	NNE15
15-Jan	NNE10	NNE11	NE11	NNE11	NNE11	NNE10	N9	N7	N8	NNE10	NE5	N7	NNE7	NNE6	NNE8	NNE6	NNE8	N9	N8	NE8	NE9	NNE7	N6	NNW6	NNE8.0	NE11
16-Jan	NNW6	N7	N7	NNW6	NNW4	WSW4	WSW2	N4	NW1	WSW3	W5	WSW4	NNE4	NE4	ENE2	ENE2	SE2	S4	S3	SSE3	SSW3	SSE2	SSW3	SSE2	NW0.7	N7
17-Jan	SSW4	S3	S3	S2	S1	SE2	S3	SSE3	SSW3	ESE2	ENE4	NE2	SE6	S8	SSE9	SSE12	SE7	SE6	SE7	ESE5	SE8	ESE7	SE7	SE6	SE4.3	SSE12
18-Jan	ESE5	SSE11	SE10	SE10	SE11	SE12	SSE12	SE9	SE7	SSE8	SSE14	S11	S10	S8	S6	SSW5	S6	SSW7	SSW6	SW5	SW7	SW8	SSW6	SW7	SSE7.3	SSE14
19-Jan	SSW7	S5	S5	SSE5	SW7	SW9	SW7	WSW5	W4	NW7	WNW6	NNW6	NNW4	N2	NNE4	N6	NNE6	NNE7	NNE9	NNE9	NE9	NNE9	NE8	NE8	NNW1.8	NNE9
20-Jan	ENE6	N6	N6	NNE6	NNE5	NNE7	NNE7	NE6	ENE4	NE5	NE3	SE2	E2	SE3	E2	ENE3	SSE2	SSW5	S5	S6	S6	S6	S7	S6	E1.5	NNE7
21-Jan	S7	S10	S9	SSE7	SE6	SE5	ESE5	SE3	SE4	SSE9	SSE15	SSE13	SSE13	SSE11	SE10	SE12	SE10	SSE14	SSE11	SSE14	SSE14	S13	S10	S10	SSE9.4	SSE15
22-Jan	S5	SSE6	SE4	SE5	SSE4	SE2	SSE4	SSW3	SE3	SSW4	NE1	N4	NNW2	SE1	SE1	E2	NNE9	NNE10	NNE10	NNE10	NNE11	NNE10	NNE12	NNE12	NE2.7	NNE12
23-Jan	NNE9	NNE9	NNE8	NNE7	N5	NNE5	NE5	NE6	ENE6	NE6	ENE5	E6	E5	E4	ENE4	NE4	N5	NNE4	NNW2	SW2	SW3	S1	SSW4	S5	NE3.3	NNE9
24-Jan	S7	SSW9	SSW8	SSW7	SSW9	SSW8	SW6	WSW9	WSW10	W12	WSW12	W10	WSW9	WSW10	WSW10	SW8	SW5	SSW5	SW6	WSW8	WSW9	WSW10	WSW11	WSW10	SW7.9	WSW12
25-Jan	WSW10	W4	NW11	NW11	NW9	WNW5	W4	SW6	SSW6	S7	S7	SSW6	SSW7	SSW9	SW10	SSW10	SSW11	SSW11	SSW10	SSW9	S8	S8	S7	S8	SW5.8	NW11
26-Jan	SSW10	SW10	SW10	SSW9	SW11	SW12	SW14	SW12	SW14	SW13	SW13	SW11	SSW13	SSW14	SSW12	SW11	SW12	SW16	WSW18	WSW22	WSW17	WSW21	W24	W24	SW13.6	W24
27-Jan	W26	W21	W21	W25	W23	W23	W18	WSW13	WSW15	WSW14	WSW16	W18	W19	W17	WSW13	WSW13	WSW10	WSW9	SW7	SSW7	SSW9	SSW9	S5	S10	WSW13.9	W26
28-Jan	S12	S8	S7	SSE10	SSE10	ESE5	SSE6	SSE6	SSE8	SSE10	S10	SSE10	S10	SSW8	SSW7	SSW6	SW5	WSW9	SW11	SW15	WSW16	WSW15	SW16	WSW17	SSW8.0	WSW17
29-Jan	SW15	SW18	WSW22	WSW20	W20	W24	W28	W30	W24	W22	W24	WNW26	WNW27	WNW25	W20	W22	W17	WSW13	WSW11	WSW10	WSW11	WSW11	WSW14	WSW12	W18.6	W30
30-Jan	SW9	SW11	SW9	SW8	WSW9	WSW10	WSW10	WSW9	WSW11	WSW11	W11	WNW15	W13	W14	WNW13	NW11	NW10	W9	W11	WNW13	NW19	NW20	NW19	NW15	W10.4	NW20
31-Jan	N10	NNE9	NNE10	NE11	NE8	ENE6	E5	ENE5	E4	NE7	ENE8	ENE8	NE10	NNE12	NNE14	NNE13	N9	N11	NNW11	N10	NNE10	NNE9	NNE9	N8	NNE8.2	NNE14
	WSW2.2	SW2.3	WSW2.3	WSW1.7	WSW2.1	WSW2.2	WSW2.3	WSW2.1	WSW2.6	WSW2.4	WSW2.5	W2.8	WSW2.8	W3.2	W2.2	W1.9	W1.7	WSW2.4	WSW2.5	WSW2.4	WSW2.3	W2.7	W2.8	W2.2	Diurnal Average	
	W26	W21	WSW22	W25	W23	W24	W28	W30	W24	W22	W24	WNW26	WNW27	WNW25	W20	W22	W17	W17	W21	WSW22	W21	WSW21	W24	W24	Diurnal Maximum	

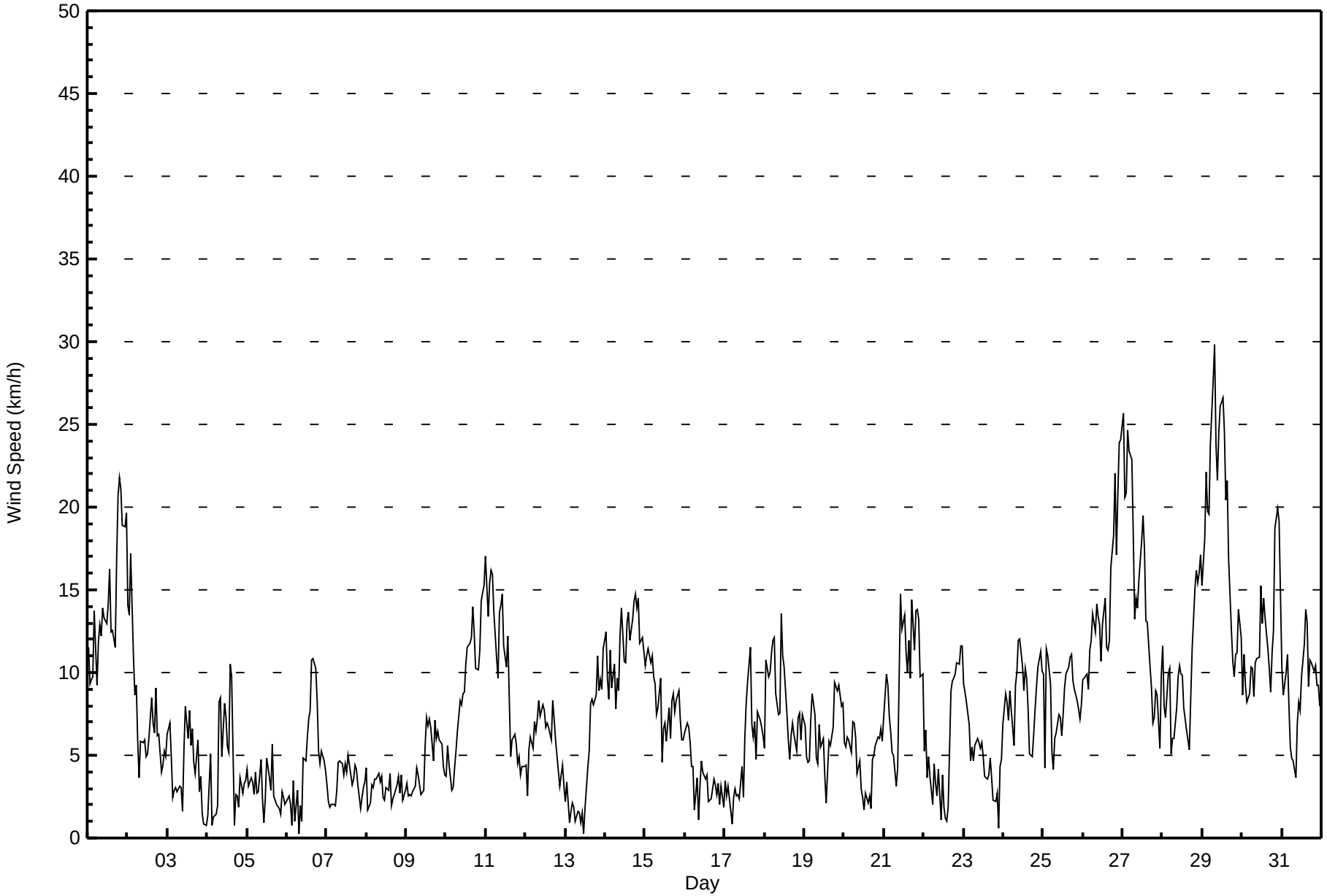
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Cenovus - Christina Lake - January 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	281	37.77	37.77
6 - 11	322	43.28	81.05
12 - 19	112	15.05	96.10
20 - 28	28	3.76	99.87
29 - 38	1	0.13	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 - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	22	13	18	13	15	11	26	34	48	31	6	11	6	2	8	17	281
6 - 11	33	43	20	6	1	1	17	22	36	43	41	32	4	2	12	9	322
12 - 19	2	16	0	0	0	0	2	9	2	3	12	26	14	5	14	7	112
20 - 28	0	0	0	0	0	0	0	0	0	0	0	4	19	4	1	0	28
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	57	72	38	19	16	12	45	65	86	77	59	73	44	13	35	33	744

Total Number of Valid Hours: 744

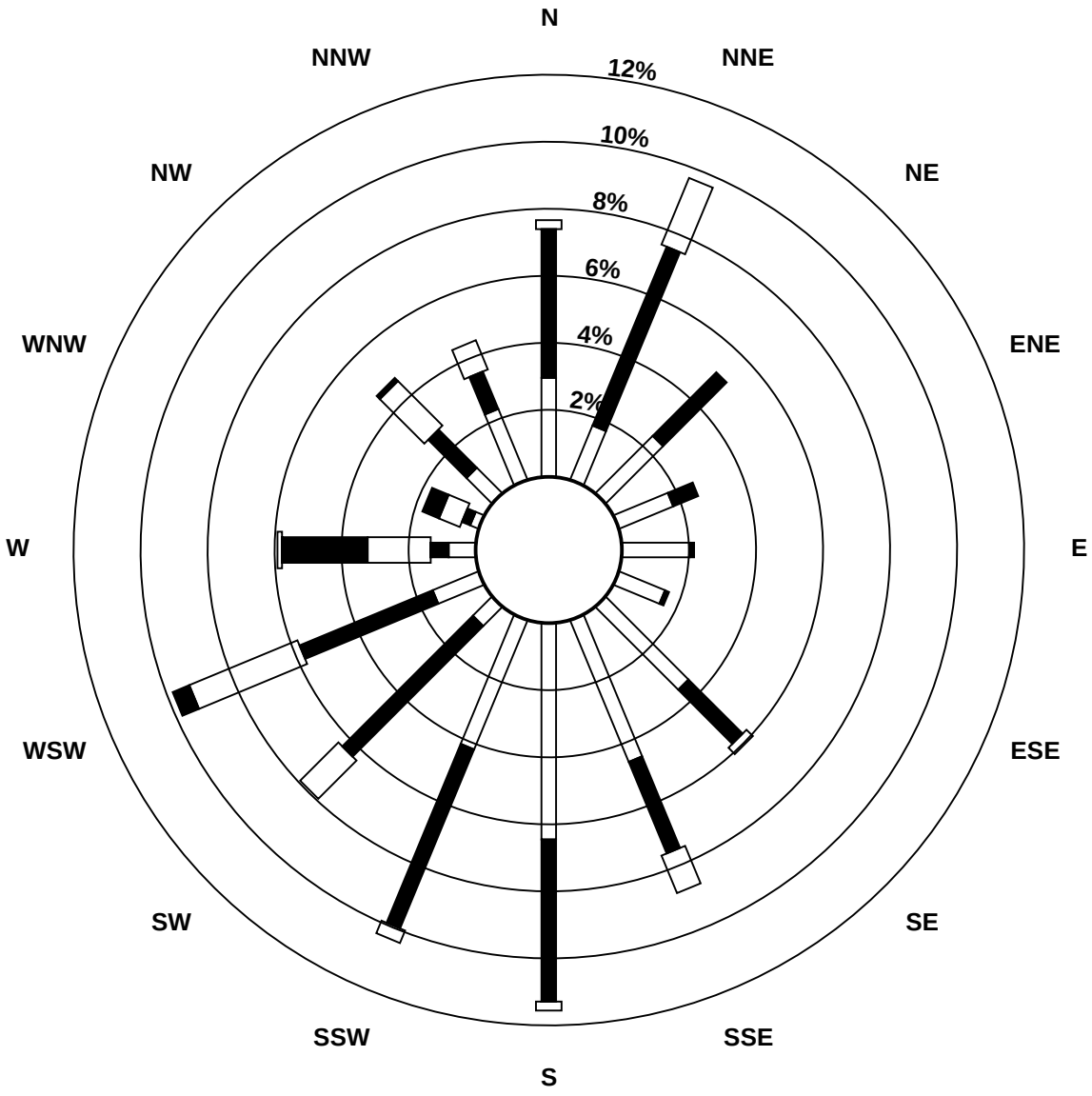
Total Number of Hours: 744

Wood Buffalo Environmental Association

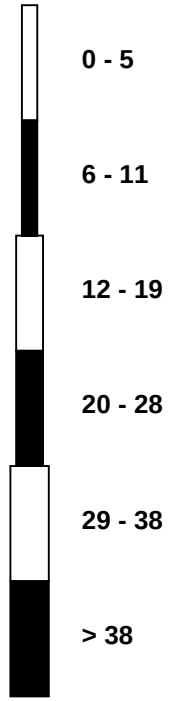
Wind Rose Jan 2016

Wind Speed (WS) - km/h

Cenovus - Christina Lake (AMS500)



Classes (km/h)



Total Number of Valid Hours: 744

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 km/h on Jan 27 01:00

Minimum Value: 0 km/h on Jan 7 05:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 6$

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

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Cenovus - Christina Lake - January 2016

Direction of Maximum Speed: 274 deg on Jan 29 08:00
Direction of Maximum Daily Speed Average: 265.2 deg on Jan 29

Direction of Minimum Speed: 128 deg on Jan 6 08:00

Direction of Minimum Daily Speed Average: 0.7 deg on Jan 16

Monthly Average Direction: 234.1 deg

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	244	229	233	226	246	241	240	250	251	250	248	250	252	259	251	251	248	260	265	269	268	266	296	295	257.3
2-Jan	290	277	271	239	223	224	219	186	187	184	167	150	130	203	219	204	195	212	195	211	202	169	200	128	218.6
3-Jan	145	142	129	101	133	161	174	132	99	148	191	187	158	191	193	170	168	156	186	190	190	173	329	200	165.3
4-Jan	139	167	165	129	319	108	63	319	308	332	317	319	314	357	16	21	172	178	251	264	257	212	211	175	321.1
5-Jan	196	193	192	197	183	202	213	172	192	211	60	48	44	40	74	41	154	181	194	163	197	181	153	204	168.6
6-Jan	166	188	66	99	35	332	340	128	160	21	10	23	16	350	9	6	4	358	4	11	337	360	9	2	6.7
7-Jan	38	1	329	328	323	328	356	16	17	1	9	25	354	342	4	305	320	323	336	322	351	257	258	241	343.0
8-Jan	247	272	353	358	7	22	12	45	38	38	54	93	110	81	82	99	159	173	160	177	185	190	168	174	90.4
9-Jan	184	159	159	167	212	184	193	188	188	135	143	208	209	223	222	210	207	234	221	213	217	215	180	175	202.3
10-Jan	149	149	184	132	176	210	187	221	242	237	238	244	267	270	320	317	321	324	330	331	329	319	319	333	293.0
11-Jan	333	324	317	322	331	336	10	6	333	326	325	329	315	334	332	295	238	233	234	177	151	163	173	104	324.3
12-Jan	87	142	172	151	154	150	167	160	169	173	177	203	206	209	215	227	217	210	221	219	197	167	157	114	182.8
13-Jan	147	173	89	129	164	101	182	69	9	343	307	336	340	51	15	47	47	42	43	44	45	40	18	16	41.1
14-Jan	19	21	1	5	8	17	4	6	6	16	22	5	354	2	7	12	20	24	21	17	20	15	20	14	13.2
15-Jan	15	26	38	26	23	20	9	5	10	29	38	6	15	29	13	27	17	10	8	39	35	19	2	340	19.3
16-Jan	348	9	3	344	341	240	246	349	315	251	261	241	24	37	62	73	138	181	174	165	195	152	194	161	324.3
17-Jan	209	179	171	171	179	140	183	149	208	115	72	46	144	176	164	165	135	132	126	122	133	121	137	138	146.1
18-Jan	120	149	143	144	143	138	148	125	135	161	165	181	183	186	170	207	190	195	192	215	221	218	198	217	168.2
19-Jan	211	188	185	163	217	223	236	241	263	304	284	329	333	2	24	354	15	14	24	26	39	24	35	52	344.4
20-Jan	63	8	2	22	13	17	17	38	66	50	45	140	89	140	91	68	151	193	179	169	171	183	187	182	81.4
21-Jan	180	188	186	158	133	143	114	124	124	158	160	168	163	157	146	139	138	148	150	161	163	180	179	173	158.8
22-Jan	184	157	125	137	154	143	168	206	144	196	56	10	334	143	142	85	17	22	23	19	25	19	17	32	45.1
23-Jan	33	24	21	27	7	31	54	47	64	56	72	95	100	83	72	48	359	28	340	228	228	172	195	184	47.2
24-Jan	185	211	202	193	200	202	217	249	237	262	257	281	248	241	238	233	216	205	223	244	245	250	250	248	234.8
25-Jan	239	264	325	316	322	288	268	229	201	172	176	197	194	211	216	204	200	196	199	193	190	191	188	185	216.1
26-Jan	197	214	214	213	222	230	227	229	230	227	227	217	206	213	211	220	220	227	252	242	248	252	259	266	232.3
27-Jan	273	265	264	265	267	268	261	252	249	246	257	262	266	263	253	255	239	238	226	208	204	197	174	187	253.6
28-Jan	190	175	176	159	153	112	148	155	162	167	172	162	180	195	202	212	220	237	229	232	239	243	236	240	200.4
29-Jan	236	234	246	251	261	271	279	274	271	270	281	284	283	286	279	271	260	255	249	243	246	245	250	244	265.2
30-Jan	233	235	223	229	246	247	248	248	246	252	263	292	269	279	289	311	311	279	269	301	314	312	312	317	278.3
31-Jan	8	24	22	35	50	70	92	69	80	38	61	68	42	17	15	18	6	349	347	10	26	17	13	10	25.4
	248.9	229.8	250.0	250.1	254.3	248.4	244.1	257.0	245.5	249.9	246.3	259.2	253.4	262.6	277.7	277.0	262.9	251.0	257.3	253.0	255.9	259.1	267.5	267.7	
	Diurnal Average																								

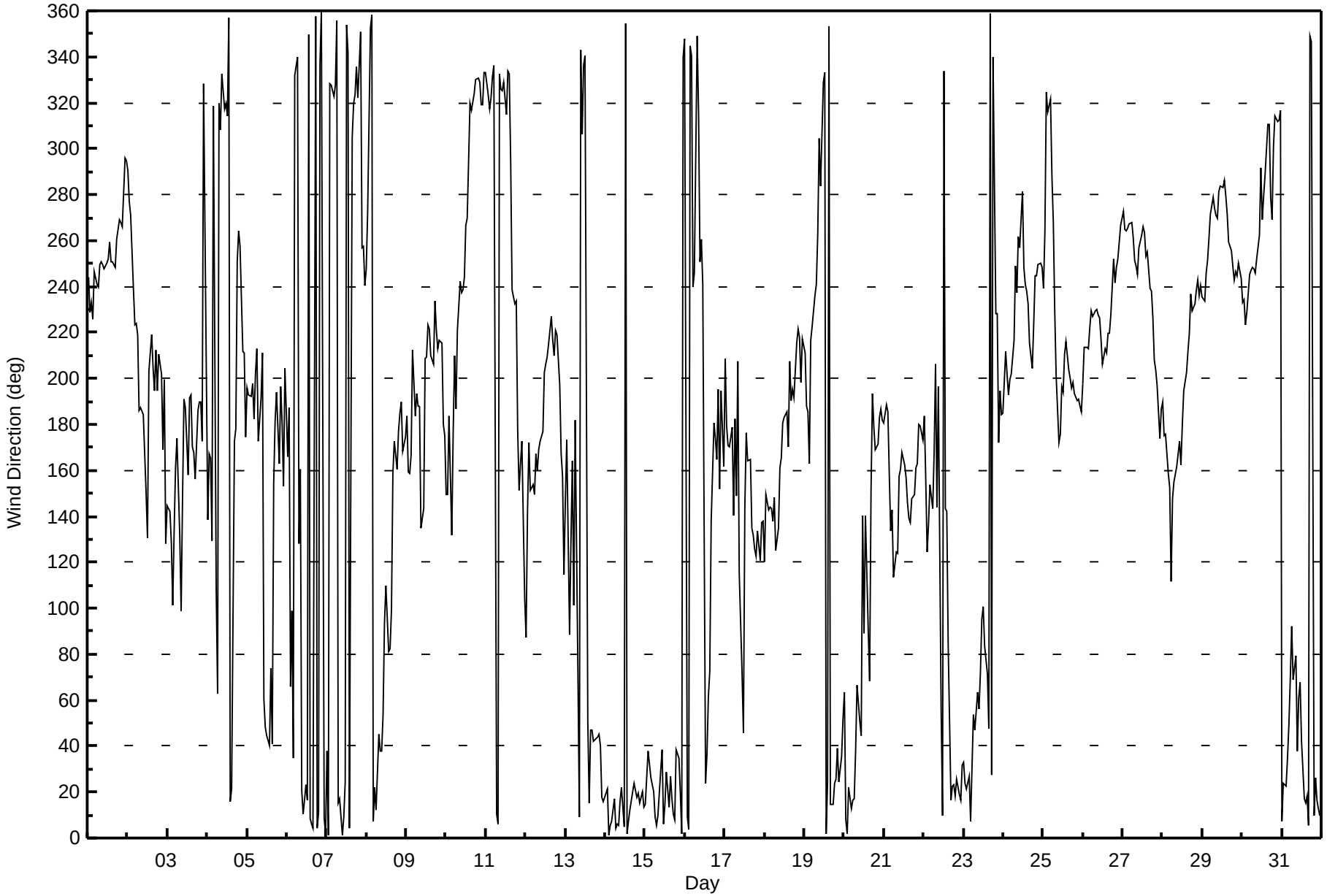
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Cenovus - Christina Lake - January 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Cenovus - Christina Lake - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 97 deg on Jan 13 12:00

Minimum Value: 8 deg on Jan 13 20:00

Percentiles: P_1 = 10 P_{10} = 12 Q_1 = 14 Median = 17 Q_3 = 24 P_{90} = 45 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	17	14	15	16	16	22	17	18	18	16	16	17	17	15	15	15	15	15	14	14	15	15	16	14	22
2-Jan	20	19	15	17	21	18	24	29	11	10	18	15	29	24	17	23	14	15	28	21	45	35	16	25	45
3-Jan	14	18	12	33	30	19	14	30	31	69	16	19	17	24	26	15	25	27	12	30	33	76	92	72	92
4-Jan	66	73	13	90	76	75	57	12	43	25	10	11	17	36	15	12	89	49	58	92	55	37	24	22	92
5-Jan	15	16	18	12	35	16	25	36	17	49	85	21	19	23	28	15	45	21	31	61	68	18	47	52	85
6-Jan	29	34	52	74	19	63	31	85	54	86	16	18	20	16	12	12	12	14	13	14	18	23	24	21	86
7-Jan	12	30	16	15	11	15	22	17	14	26	29	18	29	23	21	43	38	27	21	30	68	50	35	29	68
8-Jan	24	70	52	24	24	14	24	22	28	32	40	49	26	22	15	49	26	19	17	18	20	21	17	20	70
9-Jan	13	20	19	36	28	14	16	14	14	22	15	22	18	21	22	19	20	19	16	24	17	19	17	26	36
10-Jan	34	19	32	23	32	30	16	23	17	20	18	19	21	20	18	13	12	11	11	12	13	14	12	12	34
11-Jan	13	11	11	13	13	13	22	17	11	13	13	14	26	16	22	46	50	19	19	18	17	22	22	21	50
12-Jan	12	37	25	15	18	17	19	17	12	13	15	21	19	20	18	19	15	18	22	28	62	30	29	46	62
13-Jan	50	38	67	70	48	59	76	59	80	74	49	97	54	14	26	11	9	10	10	8	10	10	20	11	97
14-Jan	11	14	17	14	15	14	18	18	19	16	13	25	18	19	15	15	13	11	11	13	13	14	13	16	25
15-Jan	16	16	12	11	12	14	17	17	18	13	37	22	21	28	20	28	19	16	16	19	14	18	20	23	37
16-Jan	16	16	19	22	33	39	71	45	76	35	41	50	22	20	37	15	29	15	22	40	30	37	13	24	76
17-Jan	17	13	16	31	61	29	18	42	59	45	10	30	40	19	13	19	24	27	11	19	13	11	14	15	61
18-Jan	21	13	14	14	13	13	13	13	16	15	12	13	15	17	17	28	17	14	13	23	13	14	15	15	28
19-Jan	13	17	30	22	23	13	17	48	58	40	37	27	29	66	50	28	24	13	14	14	16	16	23	19	66
20-Jan	14	17	18	17	20	11	11	18	14	11	41	43	54	29	48	47	33	27	15	11	12	13	17	14	54
21-Jan	15	14	13	12	9	24	21	27	33	14	10	11	13	13	15	14	12	13	14	13	13	18	14	12	33
22-Jan	30	15	38	13	24	56	18	23	37	24	87	31	79	69	73	42	15	12	16	13	10	12	11	15	87
23-Jan	15	11	11	10	16	21	12	11	9	13	9	18	26	26	27	17	12	17	54	60	59	93	51	25	93
24-Jan	14	15	18	14	14	15	25	18	15	22	21	26	20	17	17	19	14	16	16	17	18	17	16	15	26
25-Jan	14	75	18	20	19	29	48	23	17	17	19	23	20	19	18	15	13	12	14	14	11	13	11	11	75
26-Jan	13	19	19	24	18	19	17	17	16	16	18	18	16	17	20	21	19	19	19	16	17	17	16	16	24
27-Jan	17	15	15	16	15	15	17	16	16	16	17	16	16	16	17	16	17	18	16	14	15	15	31	17	31
28-Jan	13	14	19	13	13	30	15	16	12	14	12	17	17	17	23	34	35	21	17	17	16	17	17	17	35
29-Jan	15	16	17	17	16	16	15	15	17	16	16	14	15	16	17	16	15	14	14	15	15	15	14	13	17
30-Jan	32	10	15	11	16	13	15	14	14	18	21	20	20	24	21	15	22	24	24	16	11	11	11	14	32
31-Jan	22	10	9	10	17	13	15	12	22	14	9	15	12	15	13	13	18	22	21	23	11	11	14	14	23
	66	75	67	90	76	75	76	85	80	86	87	97	79	69	73	49	89	49	58	92	68	93	92	72	
	Diurnal Maximum																								

Wood Buffalo Environmental Association
Install SO2 Calibration Report

W B E A

Station Information

Calibration Date	December 16, 2015	Last Calibration	November 13, 2015
Station Name	Cenovus - Christina Lake	Station Number	AMS 103
Reason:	Install		
Start Time (MST)	10:45	End Time (MST)	16:00
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	Sep-8-2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-698	-698
Analyzer IP address	192.168.1.43		Lamp voltage	839	836
Calculated slope	0.994405	0.993471	Chamber temp	45.1	45.0
Calculated intercept	1.653035	1.436051	Pressure	687.3	680.0
Analyzer Background	13.3	12.9	Flow	0.432	0.422
Analyzer Coefficient	1.017	1.021	Intensity	91	91

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					
as found span					
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	79.3	793.0	798.1	0.994
second point	5000	39.7	397.0	395.8	1.003
third point	5000	19.8	198.0	197.2	1.004
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	79.3	793.0	797.4	0.995
				Average Correction Factor	1.000

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Inlet filter was replaced prior to calibration. Adjusted zero and span. Initial span is low and unstable because the gas cylinder was only partially opened. After the cylinder was fully opened, returned back to zero and then continued.

Calibration Performed By: Evan Magill

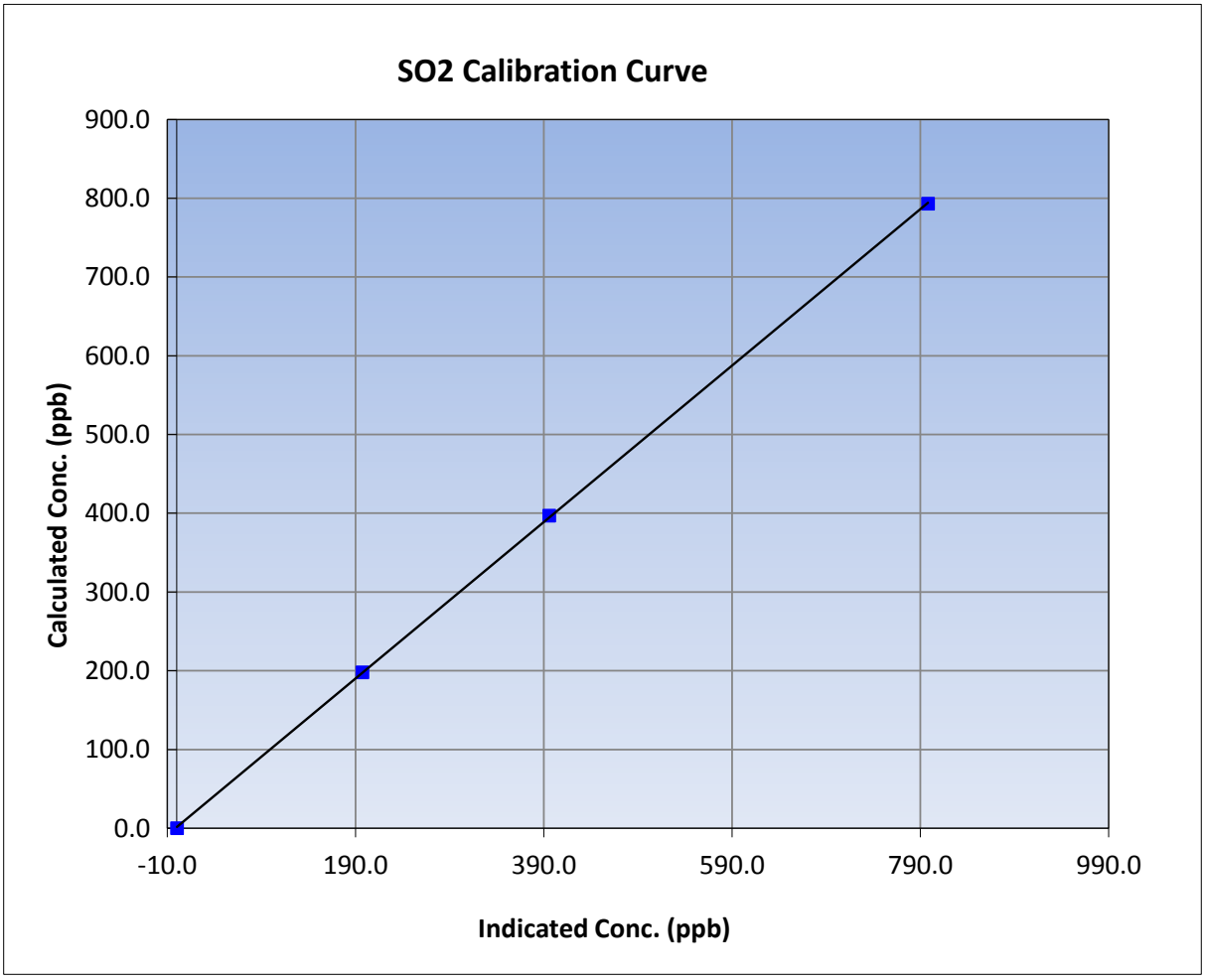
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

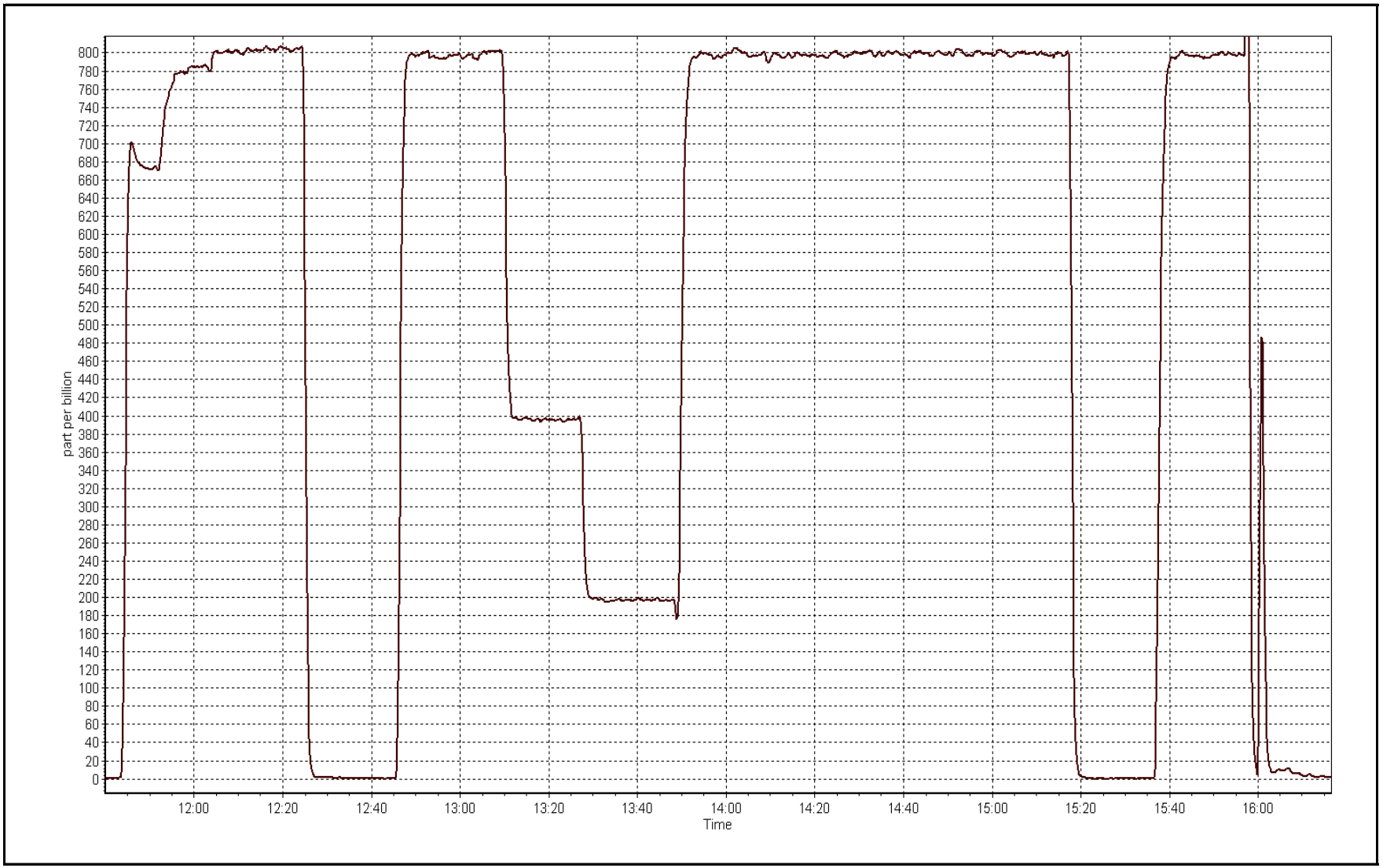
Calibration Date	December 16, 2015	Previous Calibration	November 13, 2015
Station Name	Cenovus - Christina Lake	Station Number	AMS 103
Start Time (MST)	10:45	End Time (MST)	16:00
Analyzer make	Thermo 43i	Analyzer serial #	118148497

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999970
793.0	798.1	0.9936		
397.0	395.8	1.0030	Slope	0.993471
198.0	197.2	1.0041		
			Intercept	1.436051



SO2 Calibration Plot Date: December 16, 2015



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	January 19, 2016	Last Calibration	December 16, 2015
Station Name	Cenovus - Christina Lake	Station Number	AMS 504
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	18:00
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	Sep-8-2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-698	-698
Analyzer IP address	192.168.1.43		Lamp voltage	836	842
Calculated slope	0.993471	0.990147	Chamber temp	45.0	44.9
Calculated intercept	1.436051	2.126881	Pressure	680.0	677.9
Analyzer Background	12.9	14.0	Flow	0.422	0.339
Analyzer Coefficient	1.021	1.048	Intensity	91	91

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	0.8	----
as found span	5000	79.3	793.0	773.1	1.026
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	79.3	793.0	800.6	0.991
second point	5000	39.7	397.0	395.5	1.004
third point	5000	19.8	198.0	197.1	1.005
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	79.3	793.0	796.9	0.995
				Average Correction Factor	1.000

Corrected As found	772.3	Previous response	796.8	% change	3.2%

Notes:

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

Calibration Performed By: Evan Magill

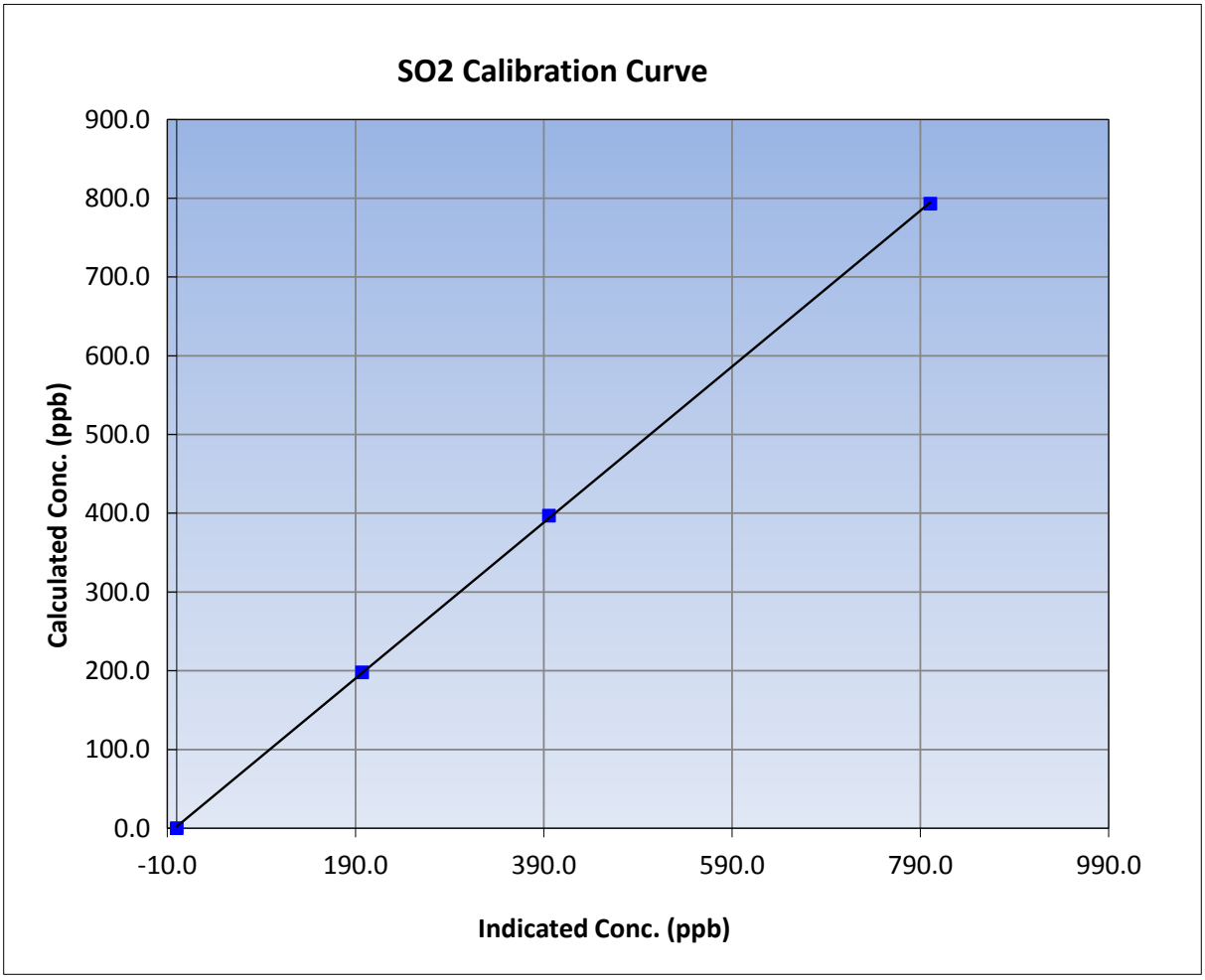
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

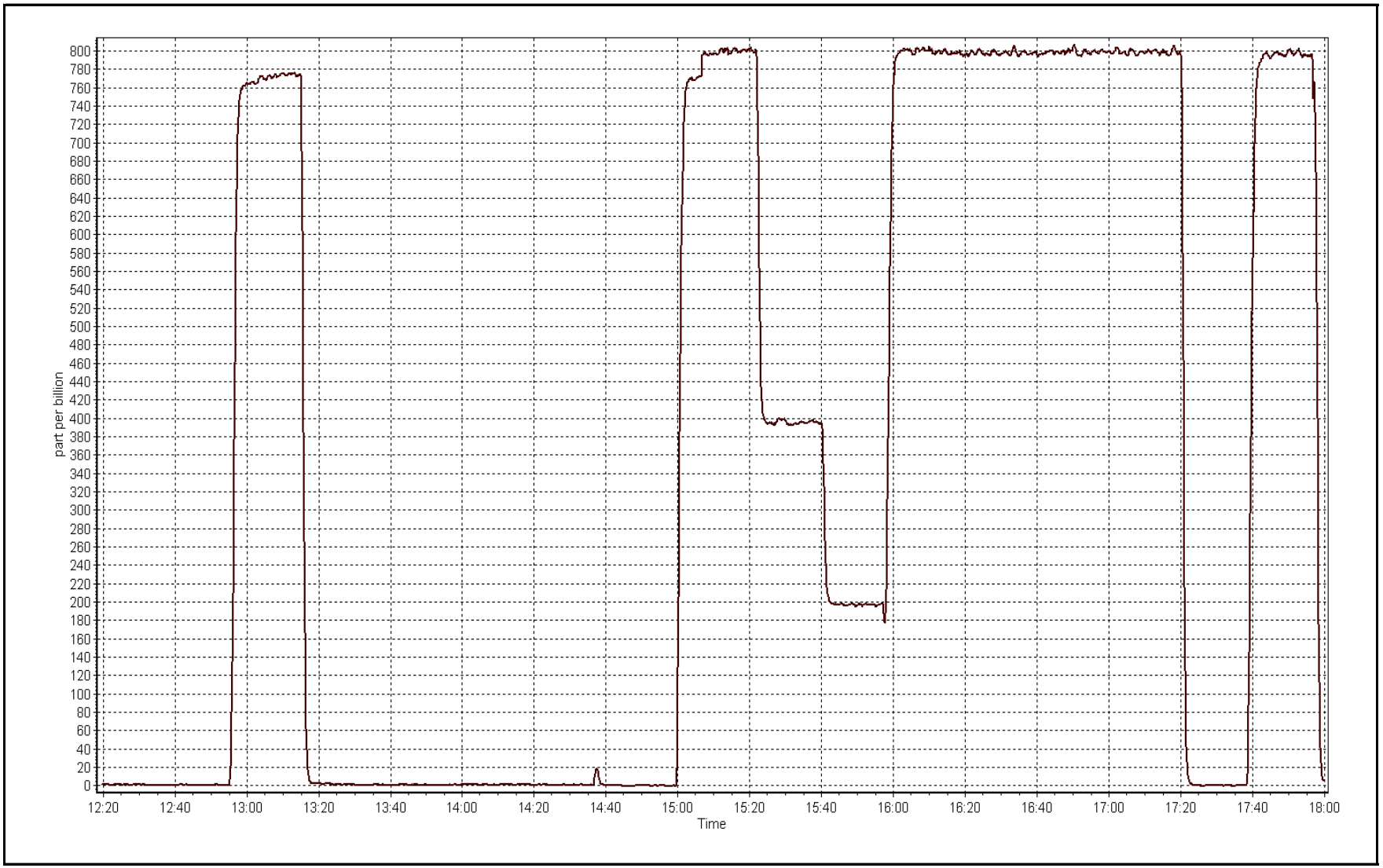
Calibration Date	January 19, 2016	Previous Calibration	December 16, 2015
Station Name	Cenovus - Christina Lake	Station Number	AMS 504
Start Time (MST)	12:30	End Time (MST)	18:00
Analyzer make	Thermo 43i	Analyzer serial #	118148497

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999944
793.0	800.6	0.9906		
397.0	395.5	1.0038	Slope	0.990147
198.0	197.1	1.0045		
			Intercept	2.126881



SO2 Calibration Plot Date: January 19, 2016



Wood Buffalo Environmental Association
Install H2S Calibration Report

Station Information

Calibration Date	December 18, 2015	Last Calibration	November 17, 2015
Station Name	Cenovus	Station Number	AMS 500
Reason:	Install		
Start Time (MST)	10:30	End Time (MST)	13:20
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	NA	-680
Analyzer IP address	192.168.1.42		Lamp voltage	NA	978
Calculated slope	NA	0.993262	Chamber temp	NA	45
Calculated intercept	NA	0.035681	Pressure	NA	655.0
Analyzer Background	NA	1.99	Flow	NA	0.436
Analyzer Coefficient	NA	0.907	Intensity	NA	91
			Converter temp.	NA	800

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					
as found span					
SO2 scrubber check	5000	20.0	200.0	1.6	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	39.3	80.2	80.7	0.994
second point	5000	19.7	40.2	40.5	0.993
third point	6000	11.9	20.2	20.2	1.001
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	39.3	80.2	80.9	0.991
				Average Correction Factor	0.996

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Replaced inlet filter before calibration. Adjusted zero and span. Scrubber check done after 3rd point.

Calibration Performed By: Evan Magill

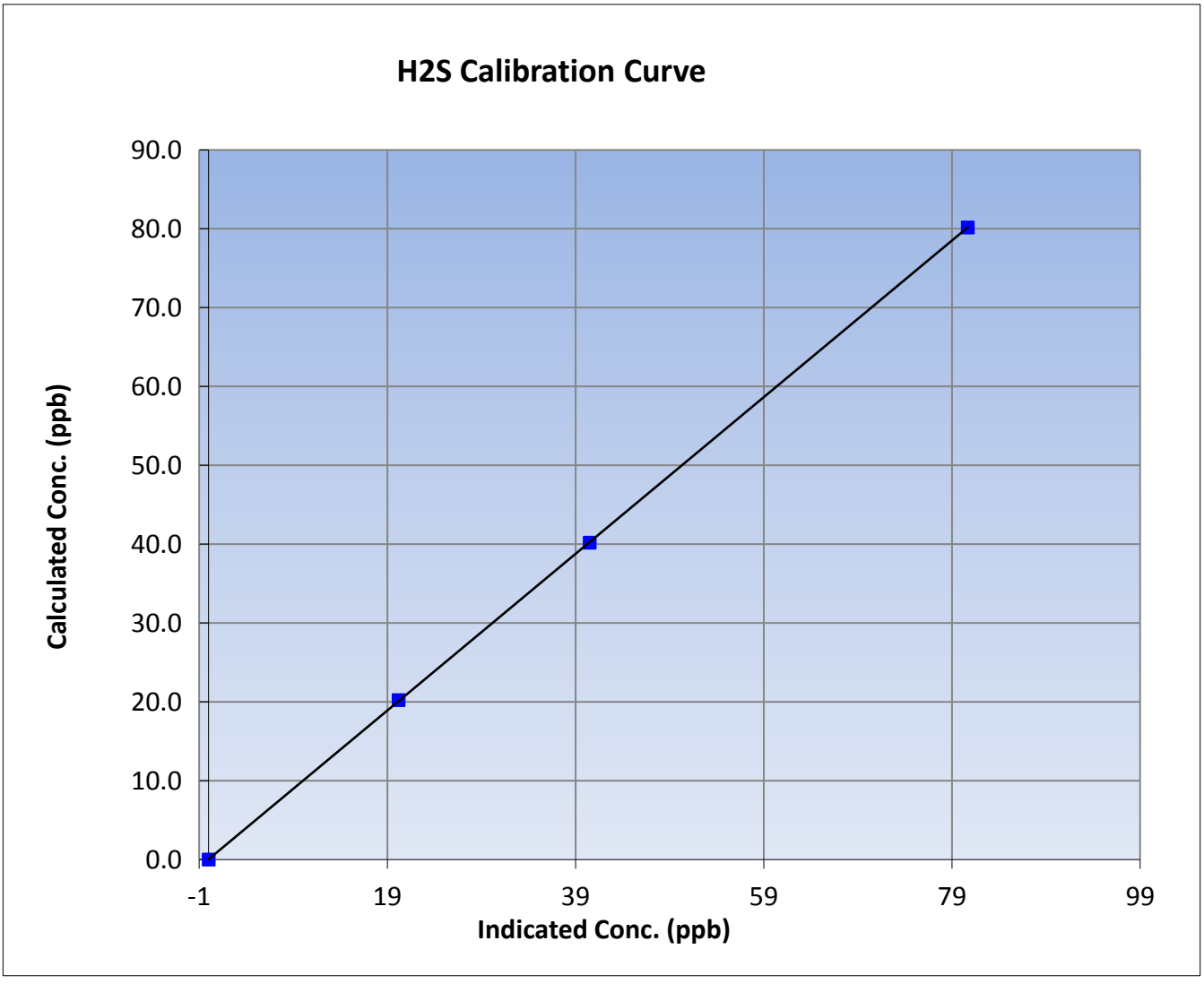
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

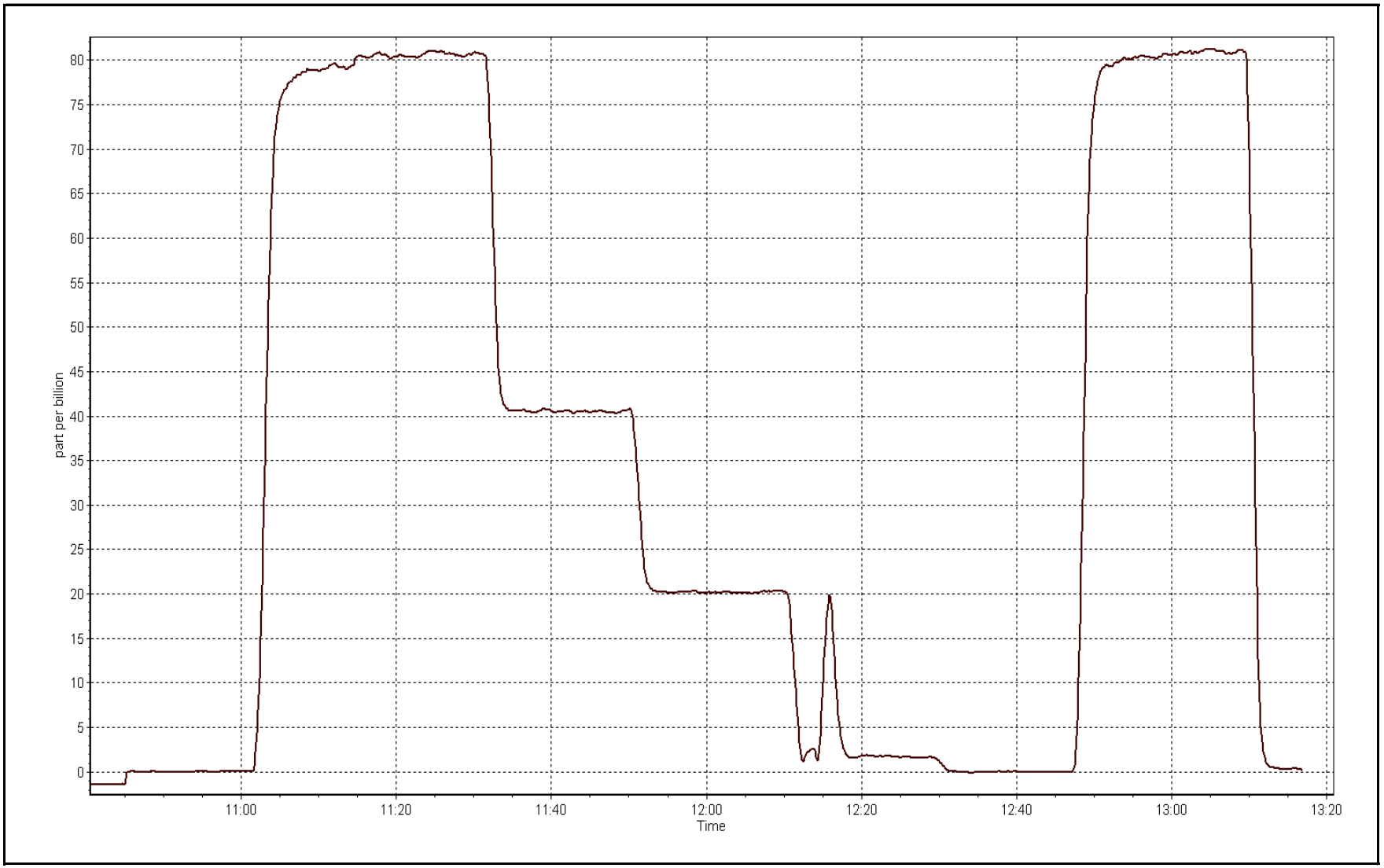
Calibration Date	December 18, 2015	Previous Calibration	November 17, 2015
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	10:30	End Time (MST)	13:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999993
80.2	80.7	0.9937		
40.2	40.5	0.9925	Slope	0.993262
20.2	20.2	1.0015		
			Intercept	0.035681



H2S Calibration Plot Date: December 18, 2015



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 20, 2016	Last Calibration	December 18, 2015
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:05
Gas Cert Reference	LL23598	Station temp.	22 Deg C
Cal Gas Concentration	10.2 ppm	Cal Gas Exp Date	5/30/2016
Calibrator Make/Model	API 700	Serial Number	451
ZAG air Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	Serial Number	2575
SO2 gas concentration	50 ppm	SO2 gas cert/exp	LL107928 09-Aug-18

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-680	-680
Analyzer IP address	192.168.1.42		Lamp voltage	978	985
Calculated slope	0.993262	1.005565	Chamber temp	45	45
Calculated intercept	0.035681	0.023109	Pressure	655.0	659.3
Analyzer Background	1.99	1.76	Flow	0.436	0.438
Analyzer Coefficient	0.907	0.907	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	-0.2	----
as found span	5000	39.3	80.2	79.7	1.006
SO2 scrubber check	5000	20.0	200.0	1.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	39.3	80.2	79.7	1.006
second point	5000	19.7	40.2	40.1	1.002
third point	6000	11.9	20.2	20.0	1.013
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	39.3	80.2	80.4	0.997
				Average Correction Factor	1.007

Corrected As found	79.9	Previous response	80.7	% change	1.0%

Notes:

Replaced inlet filter and scrubber check done after as founds. Adjusted zero.

Calibration Performed By: Evan Magill

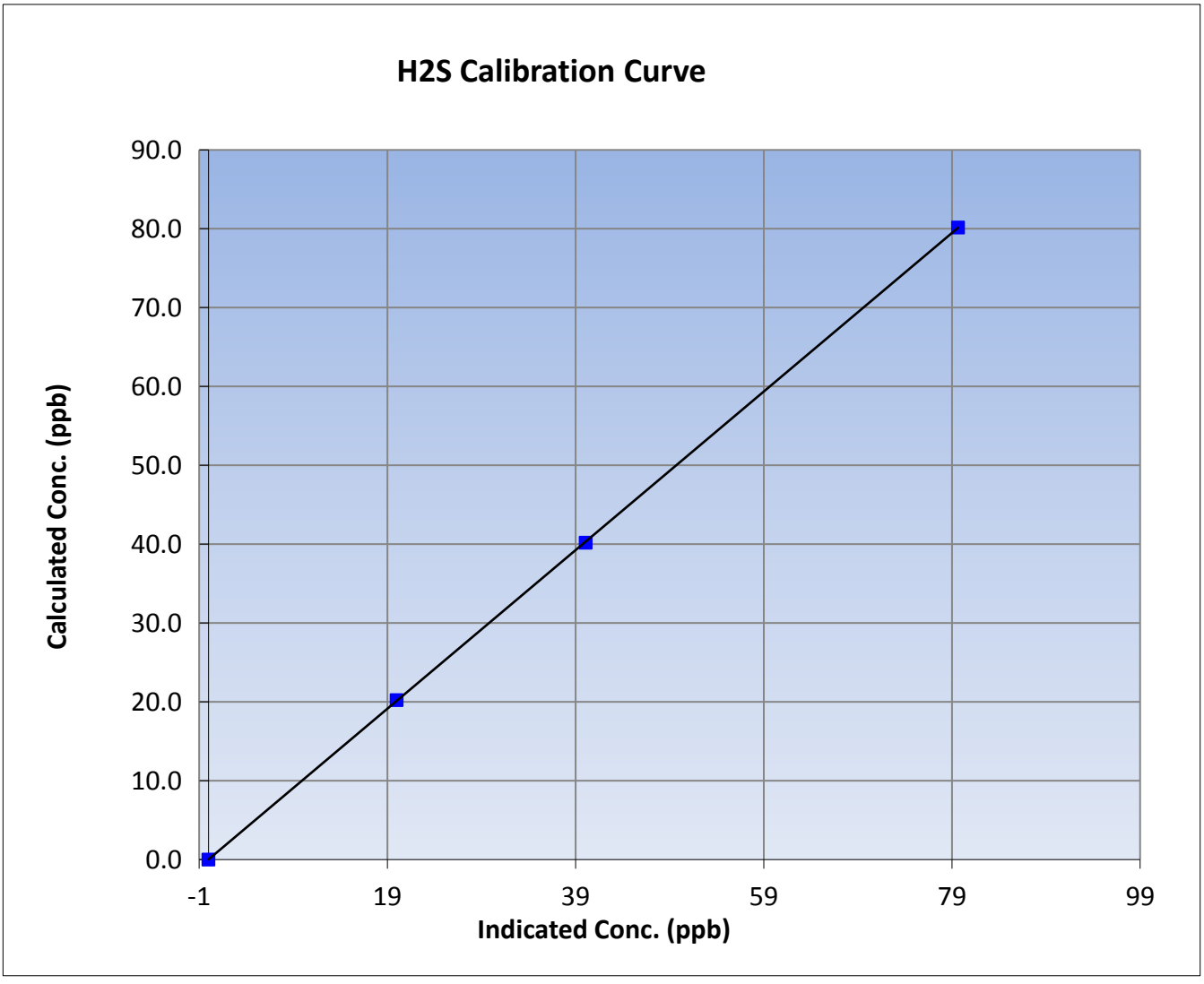
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

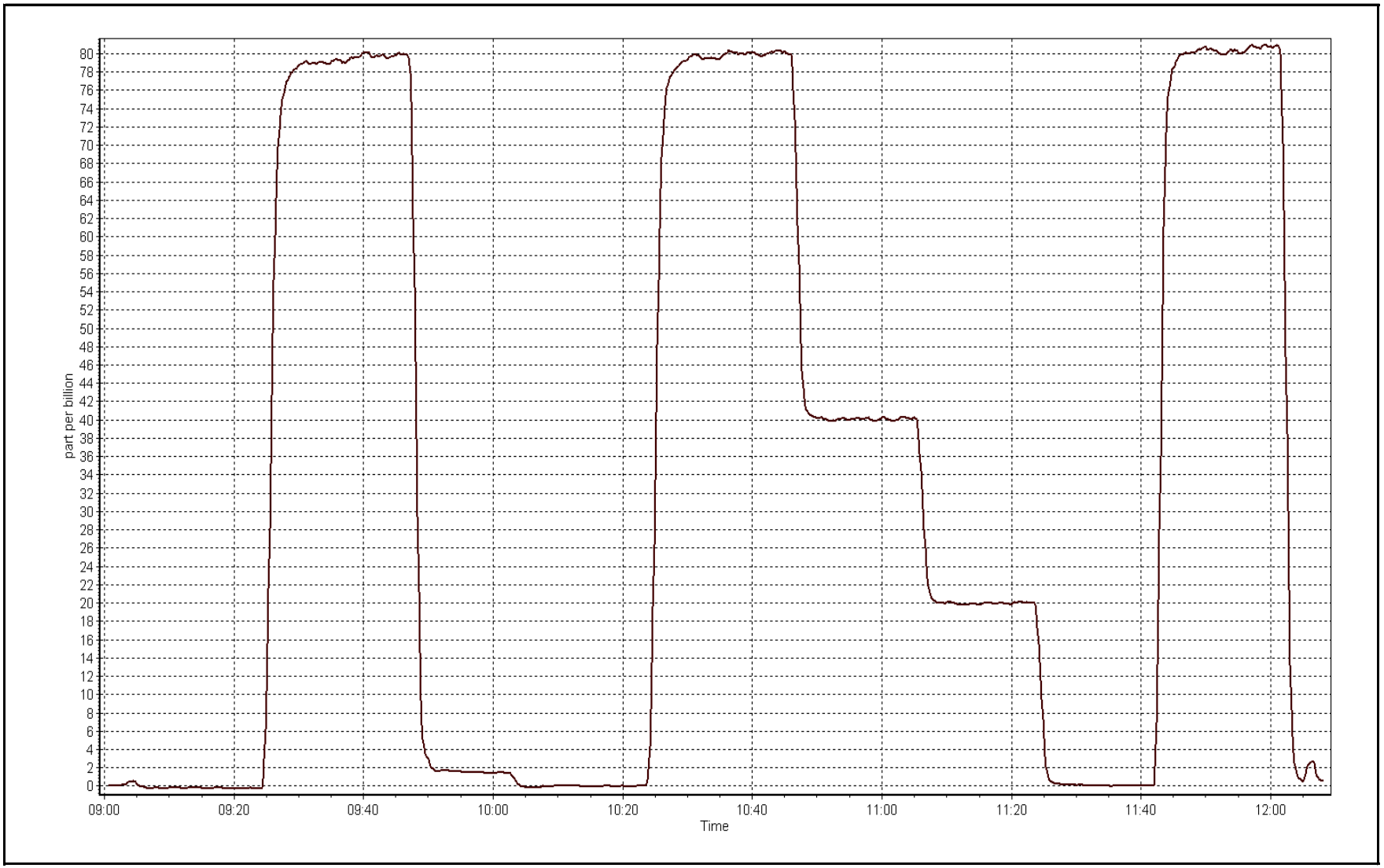
Calibration Date	January 20, 2016	Previous Calibration	December 18, 2015
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	9:00	End Time (MST)	12:05
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999989
80.2	79.7	1.0064		
40.2	40.1	1.0024	Slope	1.005565
20.2	20.0	1.0125		
			Intercept	0.023109



H2S Calibration Plot Date: January 20, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	December 18, 2015	Previous Calibration	December 16, 2015
Station Name	Cenovus	Station Number	AMS 500
Reason:	Install		
Start Time (MST)	13:30	End Time (MST)	16:50
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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.995644	0.992311	0.988271
	Data Offset	1.704376	2.089867	-3.062856
Current Calibration	Data Slope	0.995782	0.993285	1.003330
	Data Offset	1.678270	2.182946	-0.687187

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.080		1.080	
NOX coefficient	1.082		1.082	
NO2 coefficient	1.000		1.000	
NO bkgrnd	-0.6		-0.6	
NOX bkgrnd	-0.5		-0.5	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	316.3	Deg C	315.3	Deg C
PMT voltage	826	V	826	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	85	ccm	85	ccm
R Cell press NO	26.6	mmHg	26.8	mmHg
R Cell Press Nox	26.8	mmHg	27.1	mmHg
NO sample flow	0.486	lpm	0.491	lpm
Nox sample Flow	0.481	lpm	0.486	lpm

Notes:

No adjustments.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: December 18, 2015 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										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
high point	5000	79.3	805.7	800.9	4.8	808.3	805.2	3.1	0.9968	0.9947
second point	5000	39.6	402.3	400.0	2.4	401.3	399.3	2.0	1.0025	1.0016
third point	5000	19.8	201.2	200.0	1.2	198.9	197.2	1.7	1.0116	1.0140
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.5	0.0	----	----
as left span	5000	79.3	805.7	448.7	357.0	806.9	450.4	356.5	0.9986	0.9963
								Average Correction Factor	1.0036	1.0034

Corrcted 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 5000 ccm Source Gas Flow 79.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	448.7	361.0	809.3	448.7	360.6	0.9801	1.0000	1.0011	99.9%
2nd NO2 (200)	----	585.3	224.4	808.7	585.3	223.4	0.9807	1.0000	1.0044	99.6%
3rd NO2 (100)	----	691.8	117.9	811.3	691.8	119.6	0.9775	1.0000	0.9859	101.4%
4th NO2 (0)	809.6	----	0.9	810.5	804.9	5.6	0.9785	1.0059	N/A	----
					Average Correction Factor		0.9792	1.0015	0.9972	100.3%

Calibration Performed By: Evan Magill

Wood Buffalo Environmental Association

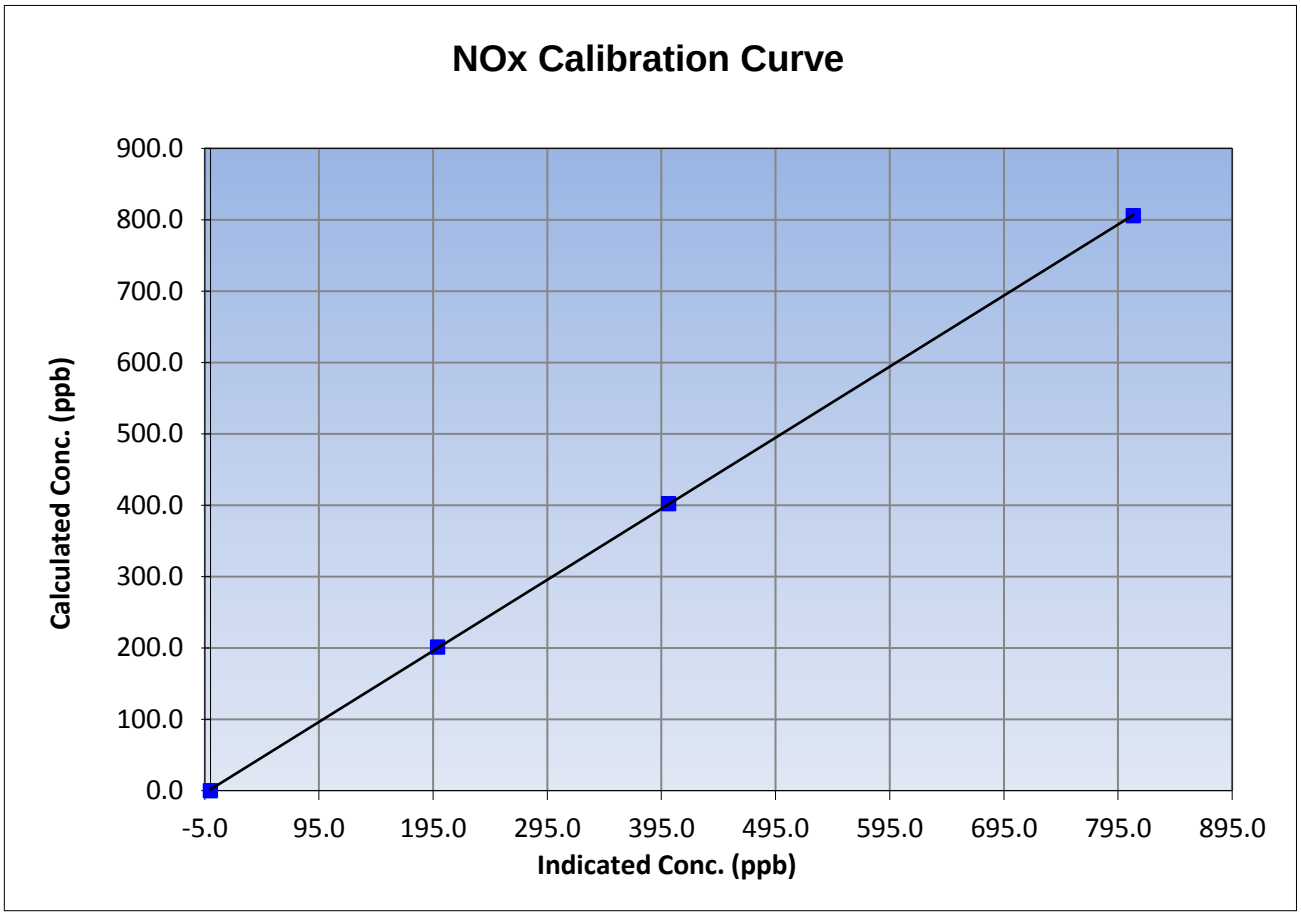
NO_X Calibration Summary

Station Information

Calibration Date	December 18, 2015	Previous Calibration	December 16, 2015
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:30	End Time (MST)	16:50
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	----	Correlation Coefficient	0.999982
805.7	808.3	0.9968		
402.3	401.3	1.0025	Slope	0.995782
201.2	198.9	1.0116		
			Intercept	1.678270



Wood Buffalo Environmental Association

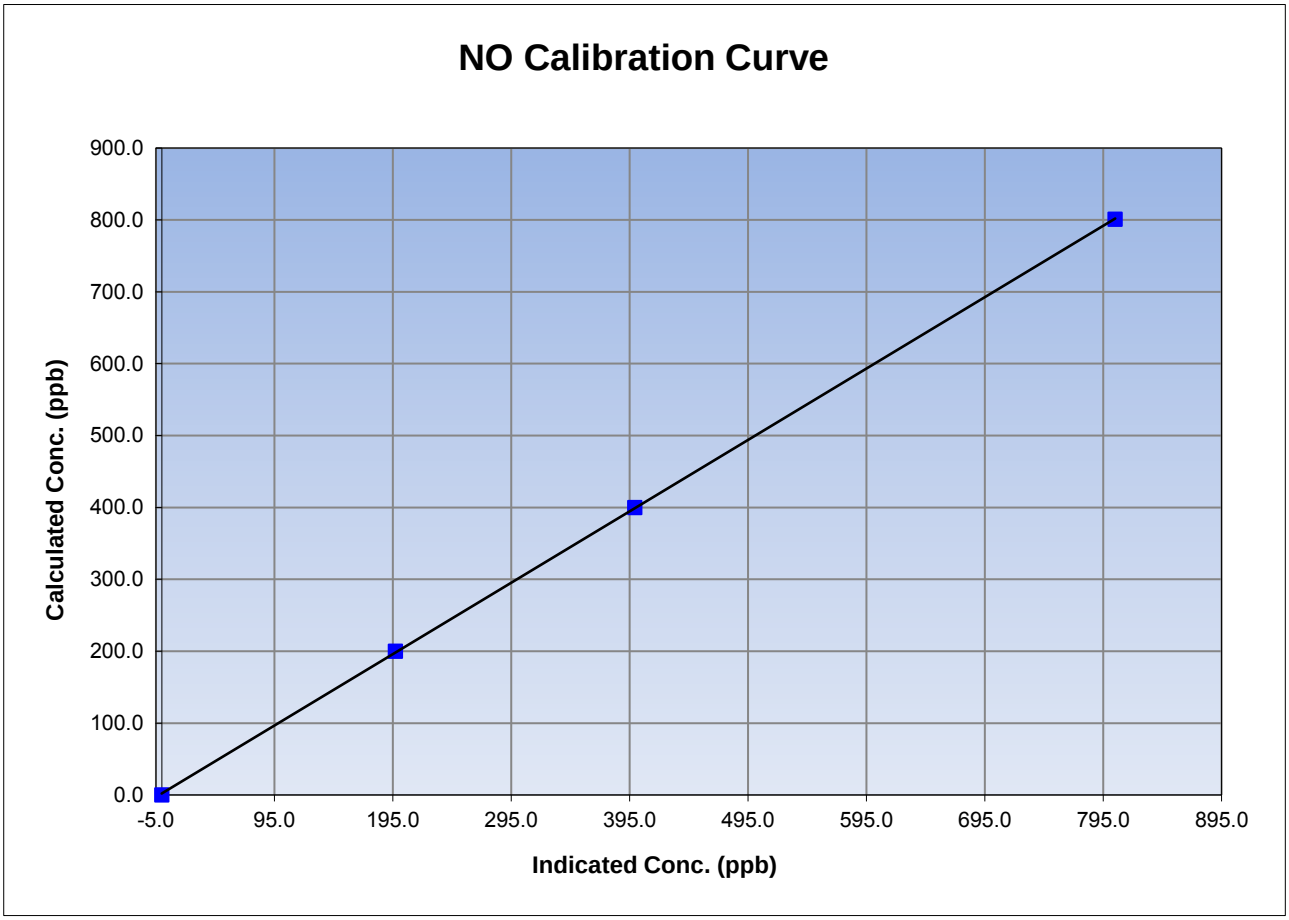
NO Calibration Summary

Station Information

Calibration Date	December 18, 2015	Previous Calibration	December 16, 2015
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:30	End Time (MST)	16:50
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	-0.2	N/A	Correlation Coefficient	0.999972
800.9	805.2	0.9947		
400.0	399.3	1.0016	Slope	0.993285
200.0	197.2	1.0140		
			Intercept	2.182946



Wood Buffalo Environmental Association

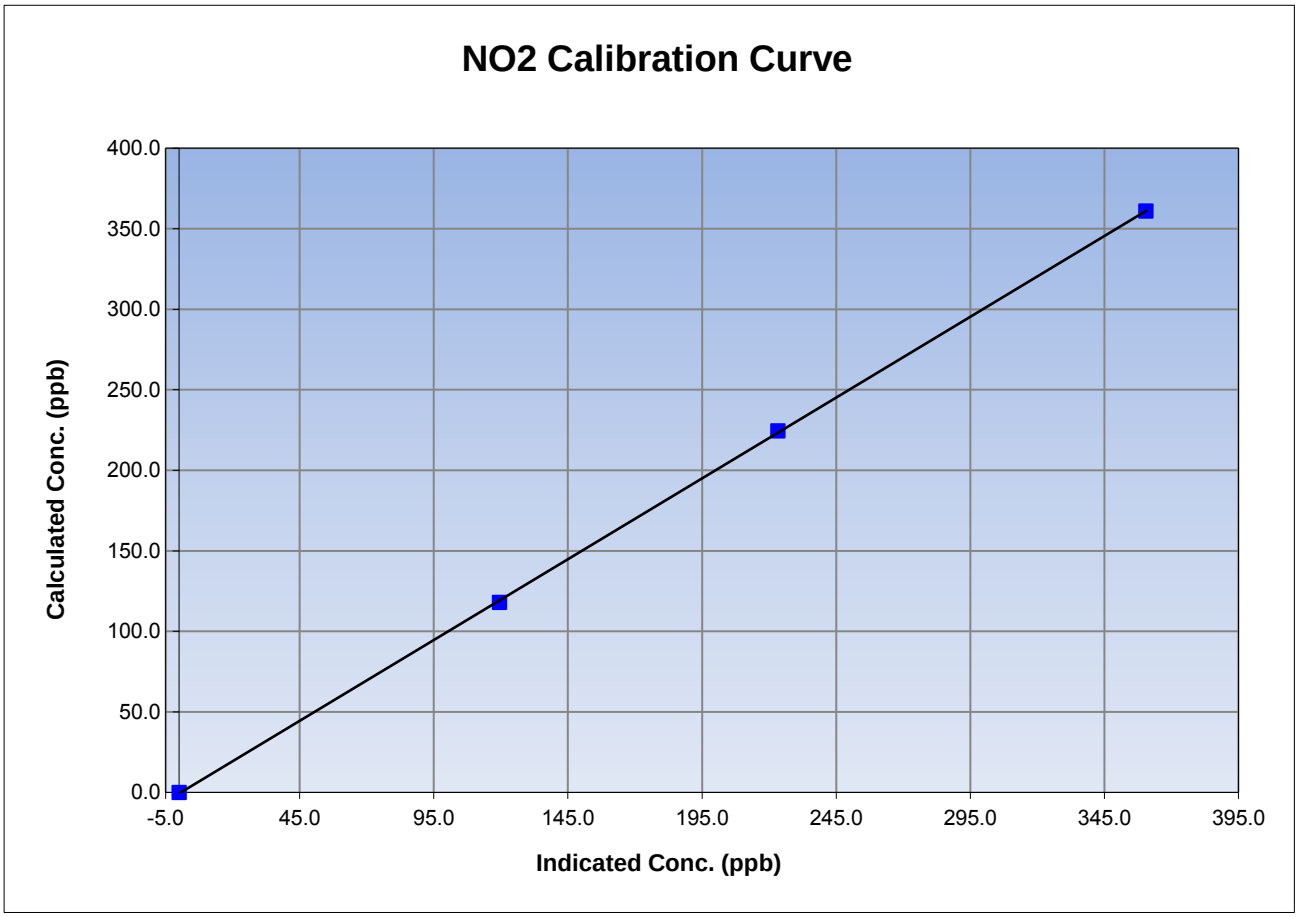
NO_2 Calibration Summary

Station Information

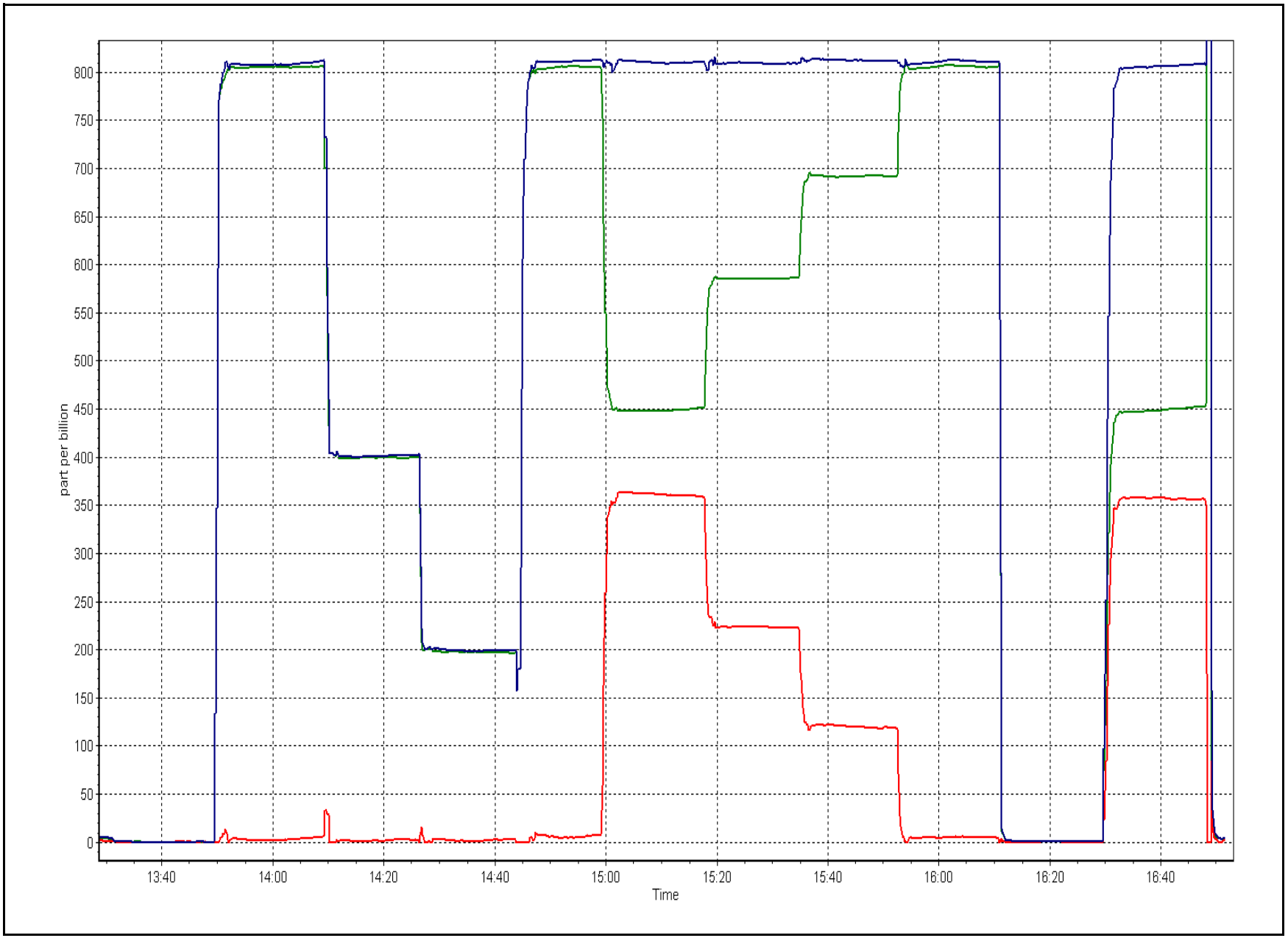
Calibration Date	December 18, 2015	Previous Calibration	December 16, 2015
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	13:30	End Time (MST)	16:50
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999956
361.0	360.6	1.0011		
224.4	223.4	1.0044	Slope	1.003330
117.9	119.6	0.9859		
			Intercept	-0.687187



NOX Calibration Plot Date: December 18, 2015



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 19, 2016	Previous Calibration	December 18, 2015
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	18:00
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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.995782	0.993285	0.991454
	Data Offset	1.678270	2.182946	-2.166807
Current Calibration	Data Slope	0.998652	0.997538	0.996096
	Data Offset	1.064492	1.246343	-0.820353

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.080		1.080	
NOX coefficient	1.082		1.082	
NO2 coefficient	1.000		1.000	
NO bkgrnd	-0.6		-0.6	
NOX bkgrnd	-0.5		-0.5	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	315.3	Deg C	315.2	Deg C
PMT voltage	826	V	831	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	85	ccm	85	ccm
R Cell press NO	26.8	mmHg	220.97	mmHg
R Cell Press Nox	27.1	mmHg	223.51	mmHg
NO sample flow	0.491	lpm	0.491	lpm
Nox sample Flow	0.486	lpm	0.486	lpm

Notes:

Changed inlet filter after as founds. No adjustments.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 19, 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	0.3	0.2	0.1	----	----
as found span	5000	79.3	805.7	800.9	4.8	806.2	802.3	3.9	0.9994	0.9983
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	----	----
high point	5000	79.3	805.7	800.9	4.8	806.2	802.3	3.9	0.9994	0.9983
second point	5000	39.6	402.3	400.0	2.4	401.7	399.2	2.5	1.0015	1.0019
third point	5000	19.8	201.2	200.0	1.2	198.7	197.6	1.0	1.0127	1.0118
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.5	0.0	----	----
as left span	5000	79.3	805.7	448.1	357.6	805.6	448.9	356.7	1.0002	0.9982
								Average Correction Factor	1.0045	1.0040

Corrcted As found NO_X= 805.9 NO= 802.1 Percent Change NO_X= 0.2% NO= 0.3%

Previous Response NO_X= 807.4 NO= 804.2

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	808.3	802.5	0.1	0.9968	0.9981	----	----
1st NO2 (300)	448.1	359.2	808.8	448.1	360.8	0.9961	----	0.9955	100.5%
2nd NO2 (200)	583.2	224.0	809.5	583.2	226.2	0.9953	----	0.9901	101.0%
3rd NO2 (100)	690.7	116.5	809.3	690.7	118.6	0.9955	----	0.9823	101.8%
2nd NO ref point		4.8	806.6	800.5	6.1	0.9989	1.0005	----	----
				Average Correction Factor		0.9965		0.9893	101.1%

Calibration Performed By: Evan Magill

Wood Buffalo Environmental Association

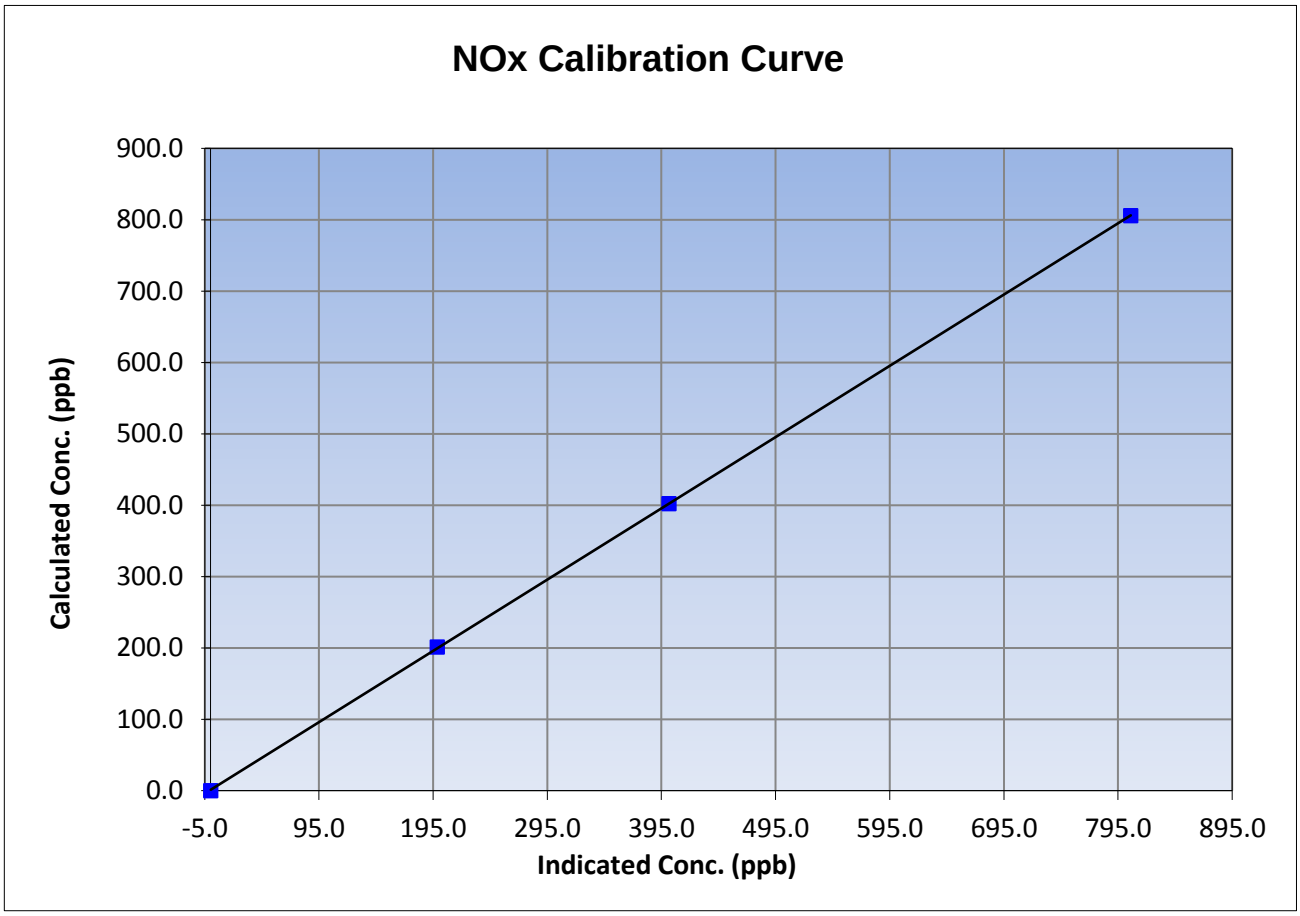
NO_X Calibration Summary

Station Information

Calibration Date	January 19, 2016	Previous Calibration	December 18, 2015
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	12:30	End Time (MST)	18:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999986
805.7	806.2	0.9994		
402.3	401.7	1.0015	Slope	0.998652
201.2	198.7	1.0127		
			Intercept	1.064492



Wood Buffalo Environmental Association

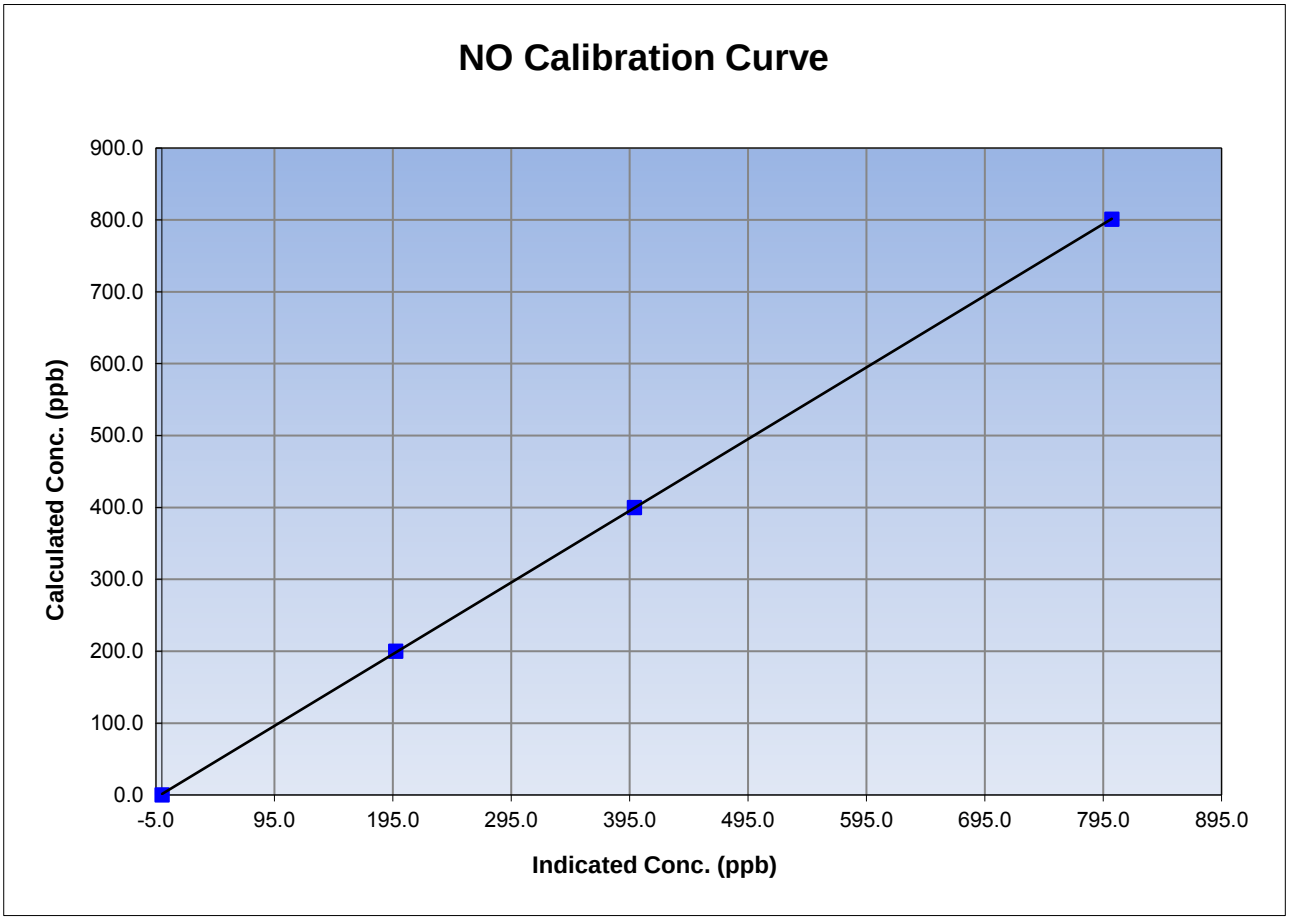
NO Calibration Summary

Station Information

Calibration Date	January 19, 2016	Previous Calibration	December 18, 2015
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	12:30	End Time (MST)	18:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999985
800.9	802.3	0.9983		
400.0	399.2	1.0019	Slope	0.997538
200.0	197.6	1.0118		
			Intercept	1.246343



Wood Buffalo Environmental Association

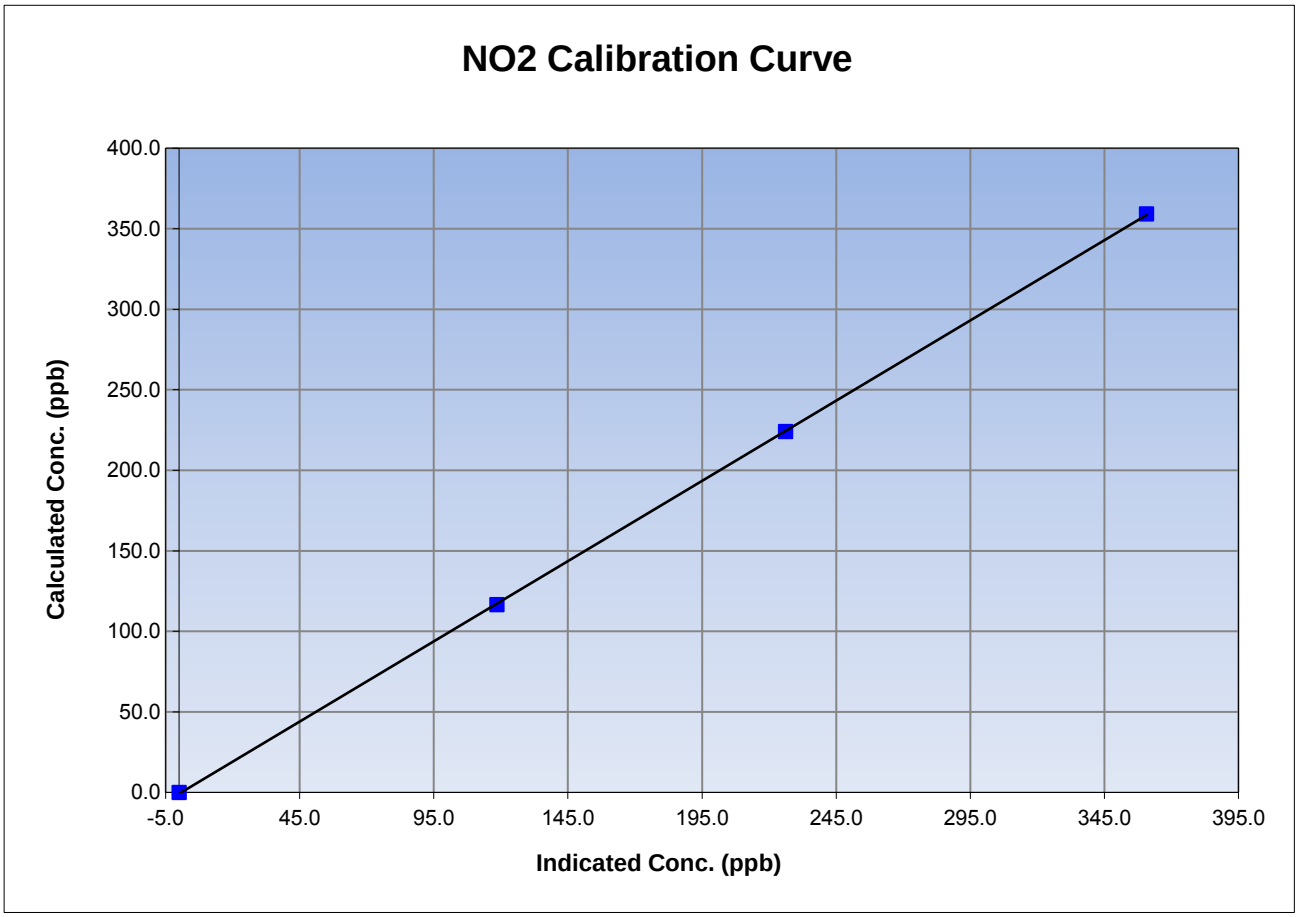
NO_2 Calibration Summary

Station Information

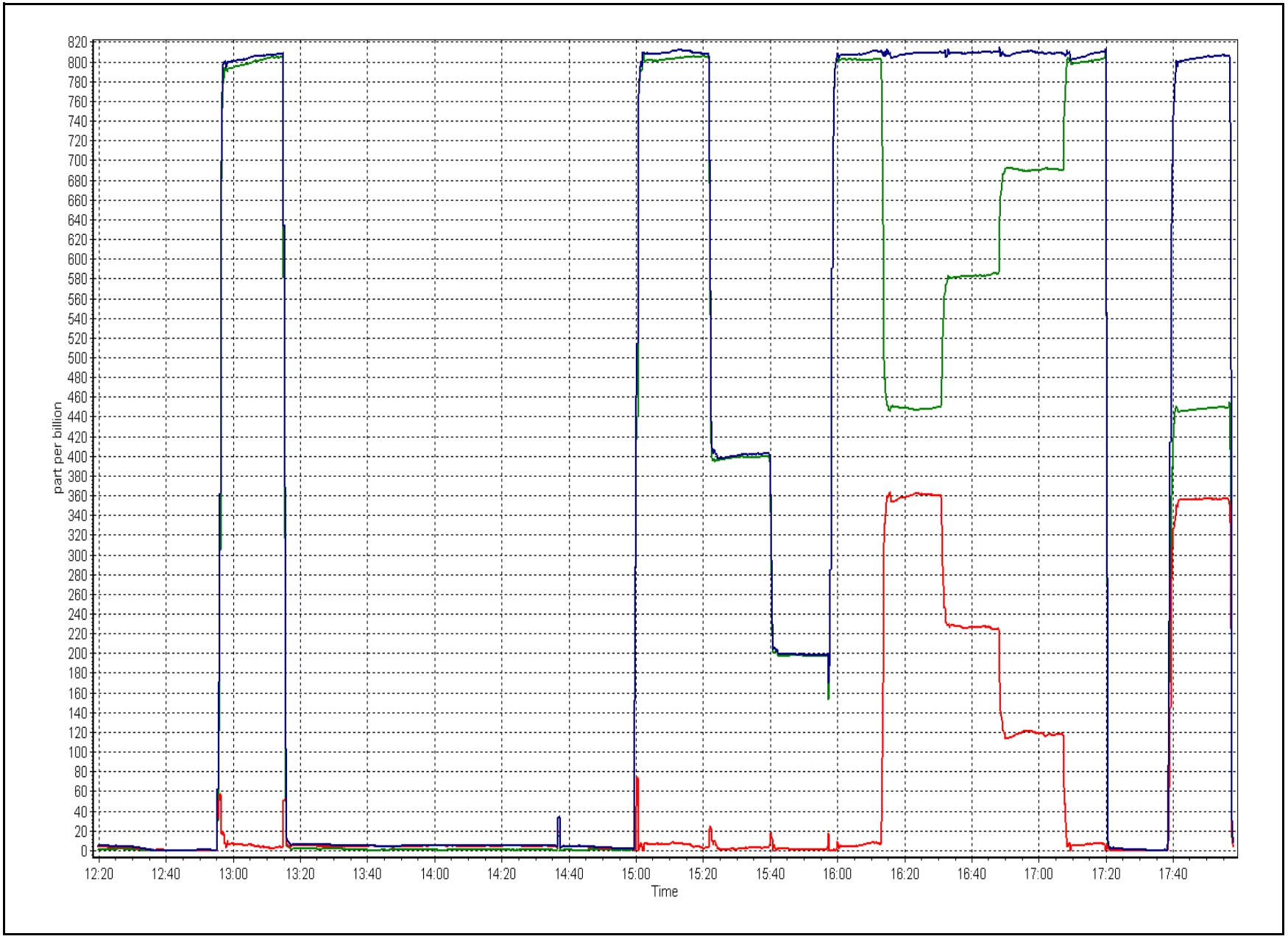
Calibration Date	January 19, 2016	Previous Calibration	December 18, 2015
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	12:30	End Time (MST)	18:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999973
359.2	360.8	0.9955		
224.0	226.2	0.9901	Slope	0.996096
116.5	118.6	0.9823		
			Intercept	-0.820353



NOX Calibration Plot Date: January 19, 2016



Wood Buffalo Environmental Association

Install WS/WD Calibration Report

Station Information

Calibration Date	December-16-15	Previous Calibration	January-12-15
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine / Installation / Removal		
Start Time (MST)	11:25	End Time (MST)	12:10
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	K13090

WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	P22393
DACS make	Campbel Scientific CR3000	DACS serial No.	2575
DACS voltage range	5000	DACS channel #	P2

	Before		After
Calculated slope	0.999517212	Calculated slope	0.999614
Calculated intercept	-0.019039445	Calculated intercept	-0.029255

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.3	0.9952
400	39.4	39.4	0.9990
600	58.6	58.6	1.0001
800	77.8	77.8	0.9989
Average Correction Factor			0.9983

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	P10614
DACS make	Campbel Scientific CR3000	DACS serial No.	2575
DACS voltage range	5000	DACS channel #	SE 24

	Before		After
Calculated slope	1.005411997	Calculated slope	1.008412
Calculated intercept	0.523904406	Calculated intercept	-0.011666

As Found Declination (west of North): NA

As Left Declination (west of North): 16.0

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	0.3	n/a
90	89.0	1.0111
180	178.5	1.0084
270	267.6	1.0090
360	357.2	1.0078
Average Correction Factor		1.0091

Notes:

Compass used to determine declination, verified with solar noon at 12:20 MST.

Calibration Performed By: Evan Magill

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 501
STATOIL LEISMER
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
JANUARY 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	13	0	2	0
H2S (ppb) Average	690	34	54	97.31	1	0	0	0
NO2 (ppb) Average	709	35	35	100	15	0	7	-
NO (ppb) Average	709	35	35	100	17	-	2	-
NOX (ppb) Average	709	35	35	100	26	-	7	-
Temperature 2 m (C) Average	744	0	0	100	4.5	-	1.3	-
Relative Humidity (%) Average	744	0	0	100	97	-	92	-
Wind Speed 10 m (km/h) Average	744	0	0	100	35	-	23	-
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 - STATOIL LEISMER (AMS 501)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.7	1	-	0	0	0	0	1	2	13
H2S (ppb) Average	690	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	709	2.9	2	-	0	1	1	2	4	6	15
NO (ppb) Average	709	0.4	1	-	0	0	0	0	0	1	17
NOX (ppb) Average	709	3.4	3	-	0	1	1	3	4	7	26
Temperature 2 m (C) Average	744	-11.46	7.7	-	-31	-21.4	-16.7	-11.7	-6.1	-0.5	4.5
Relative Humidity (%) Average	744	80.1	10	-	41	65	76	83	87	89	97
Wind Speed 10 m (km/h) Average	744	7.5	6	-	0	2	3	5	9	16	35
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S	19 Jan 2016 10:00	19 Jan 2016 10:00	1	Maintenance - remote daily zero/span check
H2S	05 Jan 2016 23:00	06 Jan 2016 01:00	3	Intermittent unstable operation - excessive baseline drift
H2S	06 Jan 2016 05:00	06 Jan 2016 05:00	1	Intermittent unstable operation - excessive baseline drift
H2S	06 Jan 2016 08:00	06 Jan 2016 08:00	1	Intermittent unstable operation - excessive baseline drift
H2S	06 Jan 2016 10:00	06 Jan 2016 12:00	3	Intermittent unstable operation - excessive baseline drift
H2S	06 Jan 2016 15:00	06 Jan 2016 15:00	1	Intermittent unstable operation - excessive baseline drift
H2S	09 Jan 2016 03:00	09 Jan 2016 03:00	1	Intermittent unstable operation - excessive baseline drift
H2S	09 Jan 2016 07:00	09 Jan 2016 07:00	1	Intermittent unstable operation - excessive baseline drift
H2S	09 Jan 2016 09:00	09 Jan 2016 09:00	1	Intermittent unstable operation - excessive baseline drift
H2S	19 Jan 2016 14:00	19 Jan 2016 15:00	2	Maintenance - daily zero/span check
H2S	28 Jan 2016 21:00	28 Jan 2016 22:00	2	Intermittent unstable operation - excessive baseline drift
H2S	29 Jan 2016 09:00	29 Jan 2016 09:00	1	Intermittent unstable operation - excessive baseline drift
H2S	31 Jan 2016 01:00	31 Jan 2016 01:00	1	Intermittent unstable operation - excessive baseline drift
H2S	31 Jan 2016 04:00	31 Jan 2016 04:00	1	Intermittent unstable operation - excessive baseline drift

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 13 ppb on Feb 1 00:00 Maximum Daily Average: 2.5 ppb on Jan 7

Minimum Value: 0 ppb on Jan 25 13:00 Minimum Daily Average: 0.1 ppb on Jan 27

Maximum Diurnal Average: 1.0 ppb at hour 13 Minimum Diurnal Average: 0.4 ppb at hour 1

Monthly Average: 0.7 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	35
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Jan	0	Z	3	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.6	4
3-Jan	0	1	Z	1	1	1	1	2	3	4	3	1	1	1	1	2	3	3	3	3	3	1	1	1	1.7	4
4-Jan	1	1	1	Z	2	2	2	2	2	1	1	2	2	1	2	2	2	1	2	4	1	1	1	0	1.5	4
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Jan	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Jan	Z	2	2	1	2	4	3	3	4	3	2	5	6	3	1	1	2	3	2	2	2	2	1	0	2.5	6
8-Jan	0	Z	0	0	0	0	0	0	1	1	2	2	1	1	1	1	1	0	0	1	1	1	1	1	0.7	2
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
10-Jan	1	1	1	Z	1	1	1	1	1	1	1	3	5	4	1	0	0	0	0	0	0	2	0	1	1.2	5
11-Jan	1	0	1	0	Z	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Jan	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Jan	0	Z	0	0	0	0	3	2	1	1	1	1	1	1	1	1	1	3	4	4	4	2	1	1	1.4	4
15-Jan	1	1	Z	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	2	2	2	1	1	1	1	0	0	0	0	0	0.7	2
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
18-Jan	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-Jan	Z	0	0	0	0	0	0	0	1	M	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Jan	1	Z	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1.0	3
21-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1.0	2
22-Jan	1	1	1	Z	1	1	1	1	1	C	C	C	C	1	0	1	0	0	1	1	1	1	1	1	0.6	1
23-Jan	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
24-Jan	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Jan	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	0	0	Z	1	1	1	0	0	1	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0.6	2
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
30-Jan	0	0	0	0	0	Z	0	0	0	1	1	5	2	2	1	4	0	0	0	6	2	1	2	1	1.3	6
31-Jan	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	2	1	2	3	4	7	13	1.9	13
	0.4	0.5	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.9	1.0	0.8	0.6	0.6	0.5	0.7	0.6	0.9	0.7	0.7	0.7	0.8	Diurnal Average	
	1	2	3	4	2	4	3	3	4	4	3	5	6	4	2	4	3	3	4	6	4	4	7	13	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

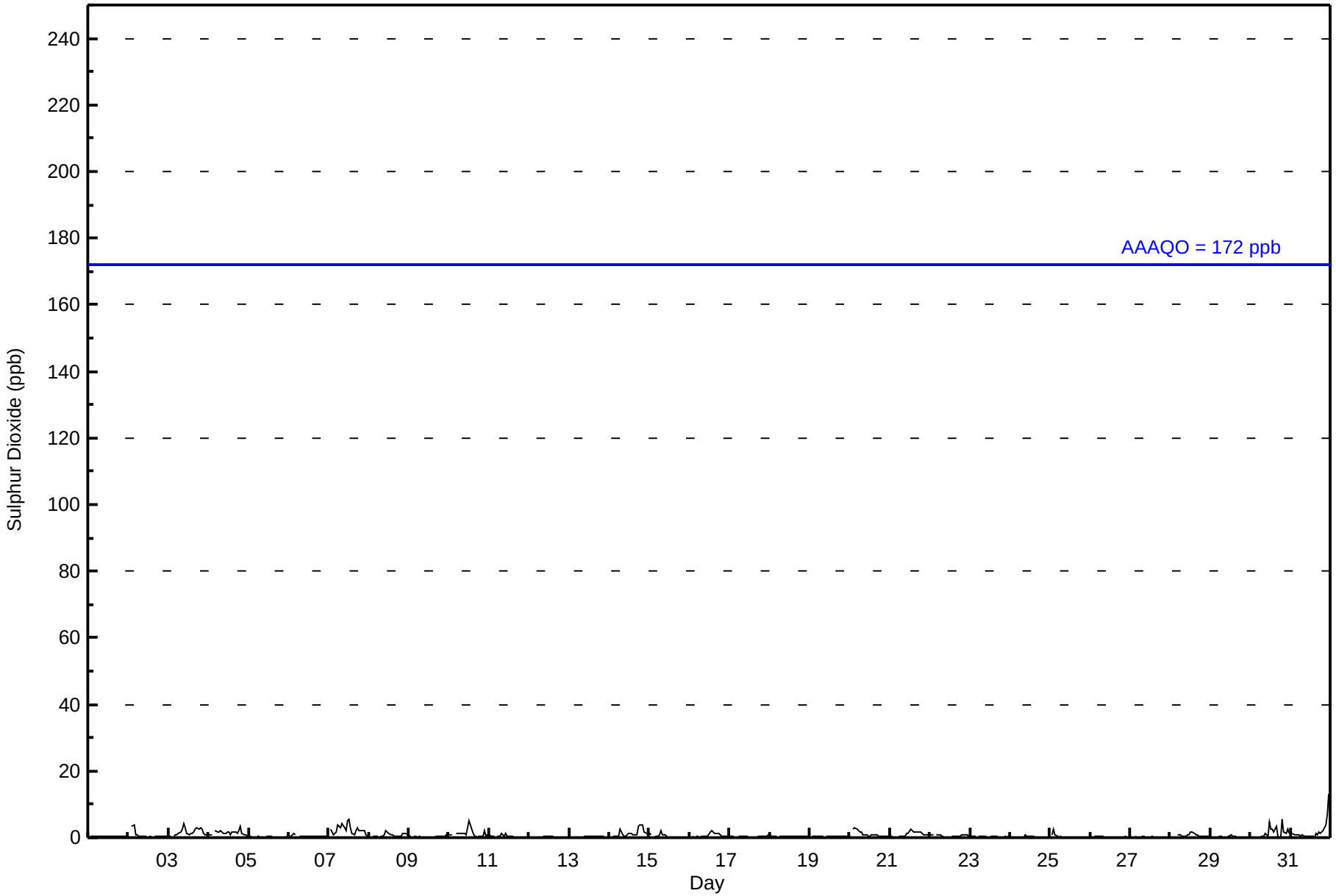
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - January 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 (SO_2) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	61	26	16	31	45	27	34	62	36	77	40	18	52	101	25	56	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	62	26	16	31	45	27	34	62	36	77	40	18	52	101	25	56	708

Total Number of Valid Hours: 708

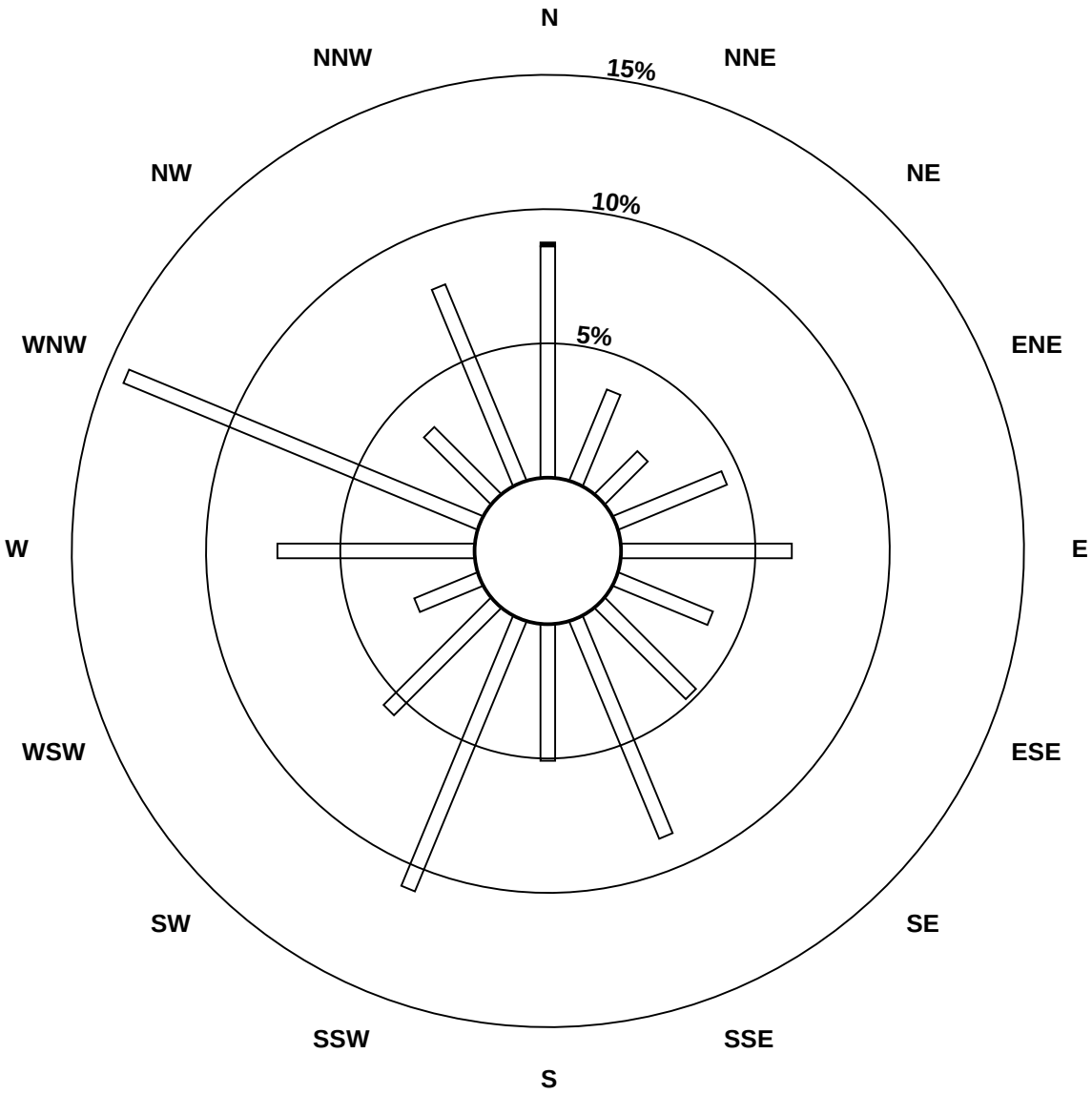
Total Number of Hours: 744

Wood Buffalo Environmental Association

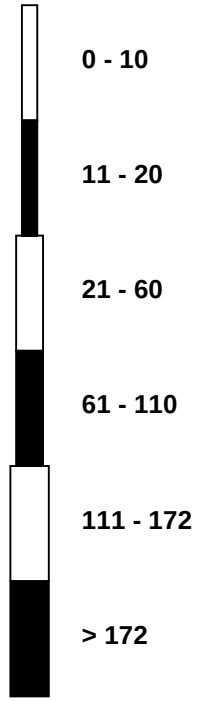
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



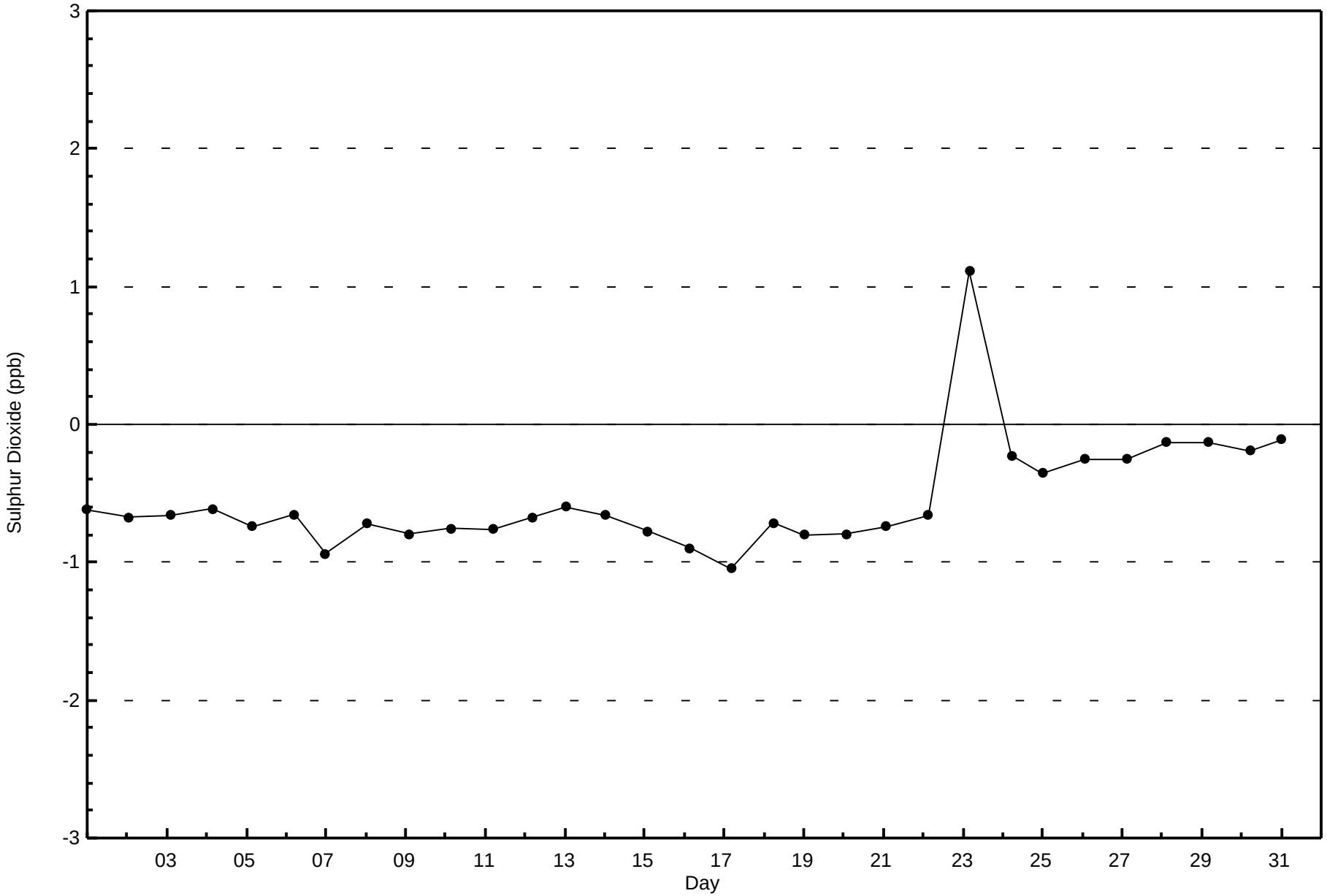
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - January 2016



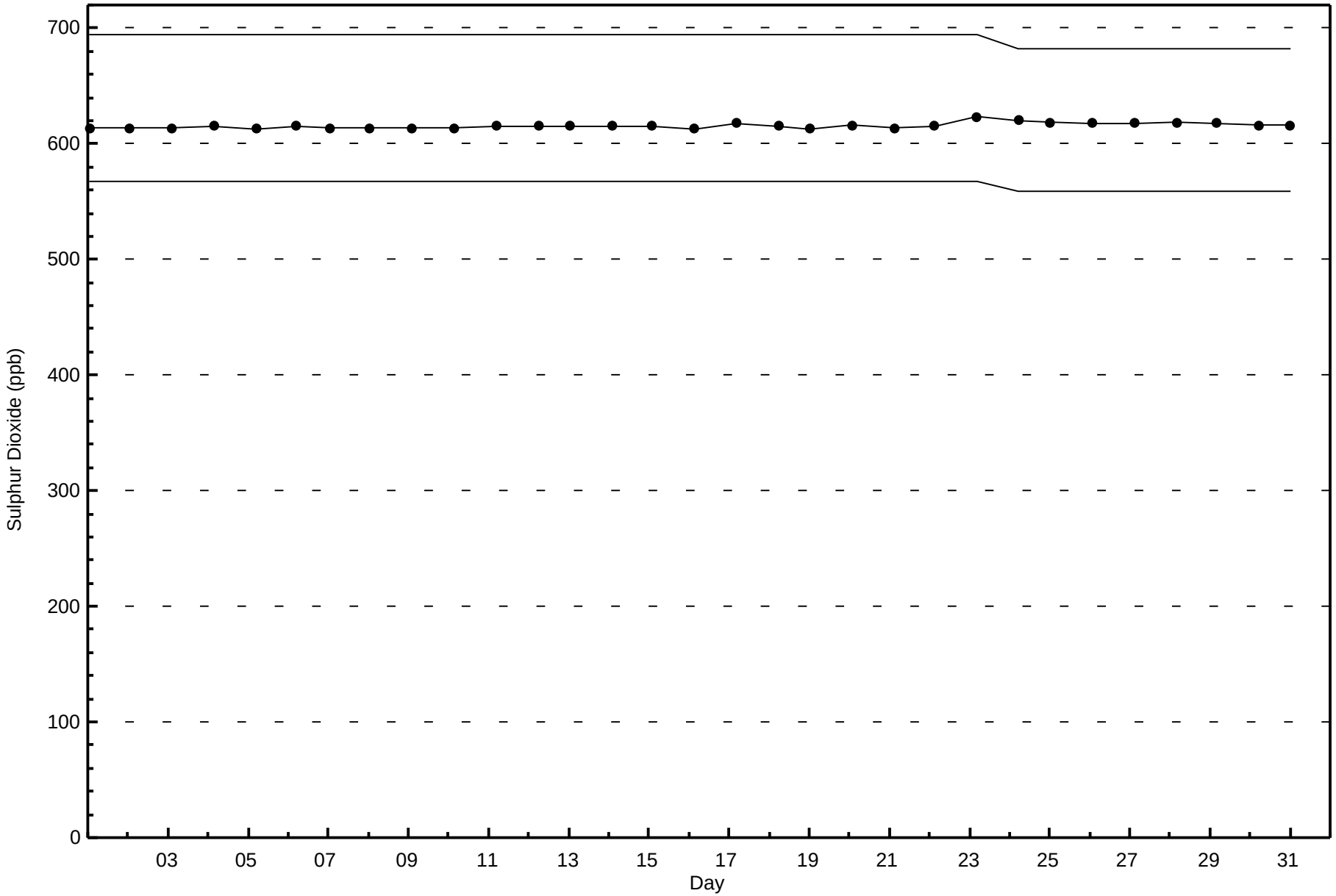
501-11

Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - January 2016



501-12

Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Jan 22 20:00 Maximum Daily Average: 0.5 ppb on Jan 30

Minimum Value: 0 ppb on Jan 8 05:00 Minimum Daily Average: 0.1 ppb on Jan 8

Maximum Diurnal Average: 0.3 ppb at hour 12 Minimum Diurnal Average: 0.2 ppb at hour 2

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 in Service:	744
Hours of Data:	690
Hours of Missing Data:	54
Hours of Calibration:	34
Percent Operational Time:	97.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
3-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0.3	0
6-Jan	UO	0	0	0	UO	0	Z	UO	0	UO	UO	UO	0	0	UO	0	0	0	0	0	0	0	0	0	--	0
7-Jan	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Jan	0	0	UO	Z	0	0	UO	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Jan	0	0	1	0	Z	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
17-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Jan	0	Z	0	0	0	0	0	0	0	M	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0.2	0
20-Jan	0	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Jan	0	0	0	Z	0	0	0	0	1	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0.2	1
28-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	UO	UO	0	0	0.3	1
29-Jan	0	0	0	1	1	Z	0	1	UO	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0.4	1
30-Jan	0	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0	1	1	0.5	1
31-Jan	UO	Z	0	UO	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1
	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	Diurnal Average	
	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation

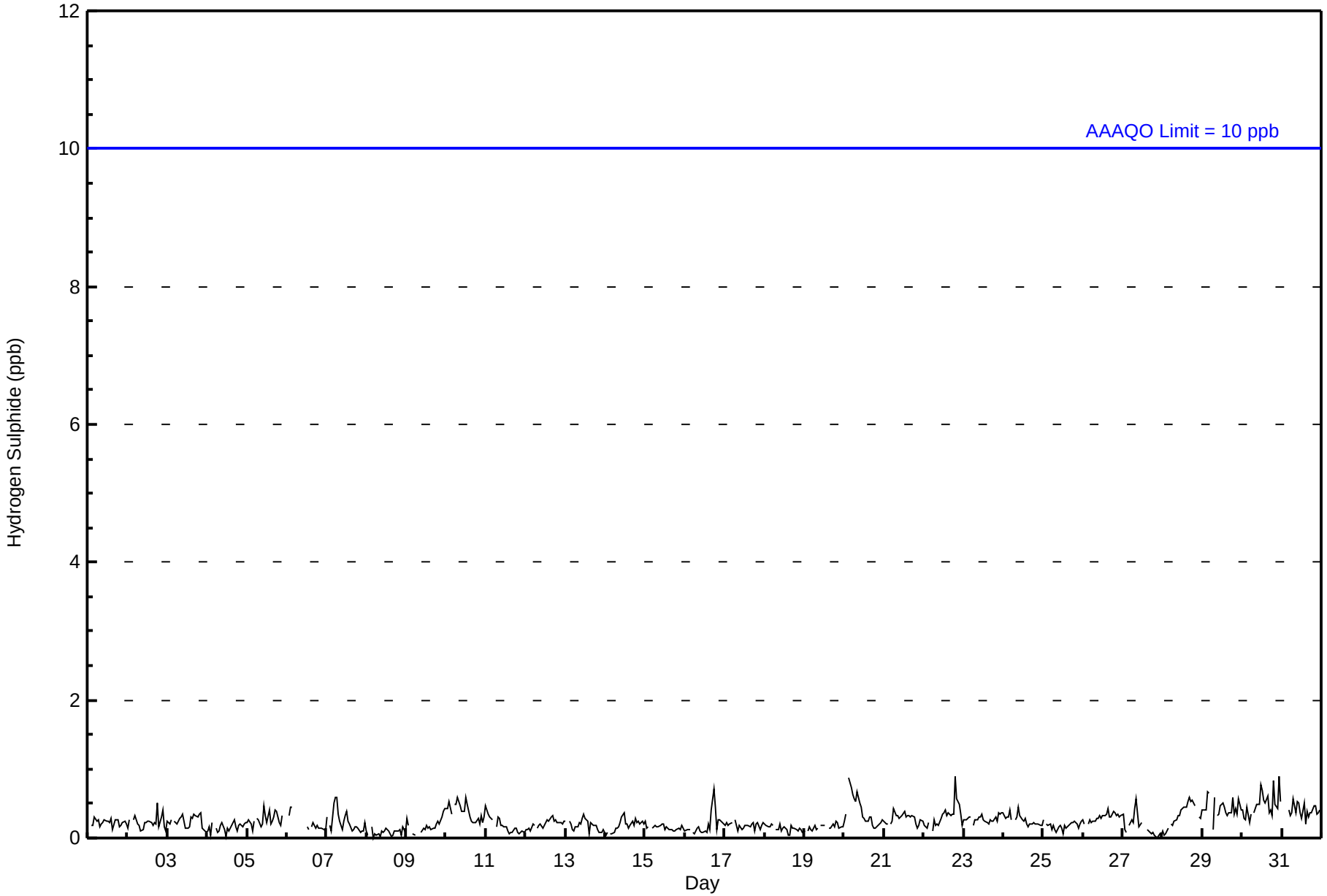
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - January 2016



501-14

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	690	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: 690

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	66	25	18	28	38	25	36	61	35	76	39	17	51	98	26	51	690
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	66	25	18	28	38	25	36	61	35	76	39	17	51	98	26	51	690

Total Number of Valid Hours: 690

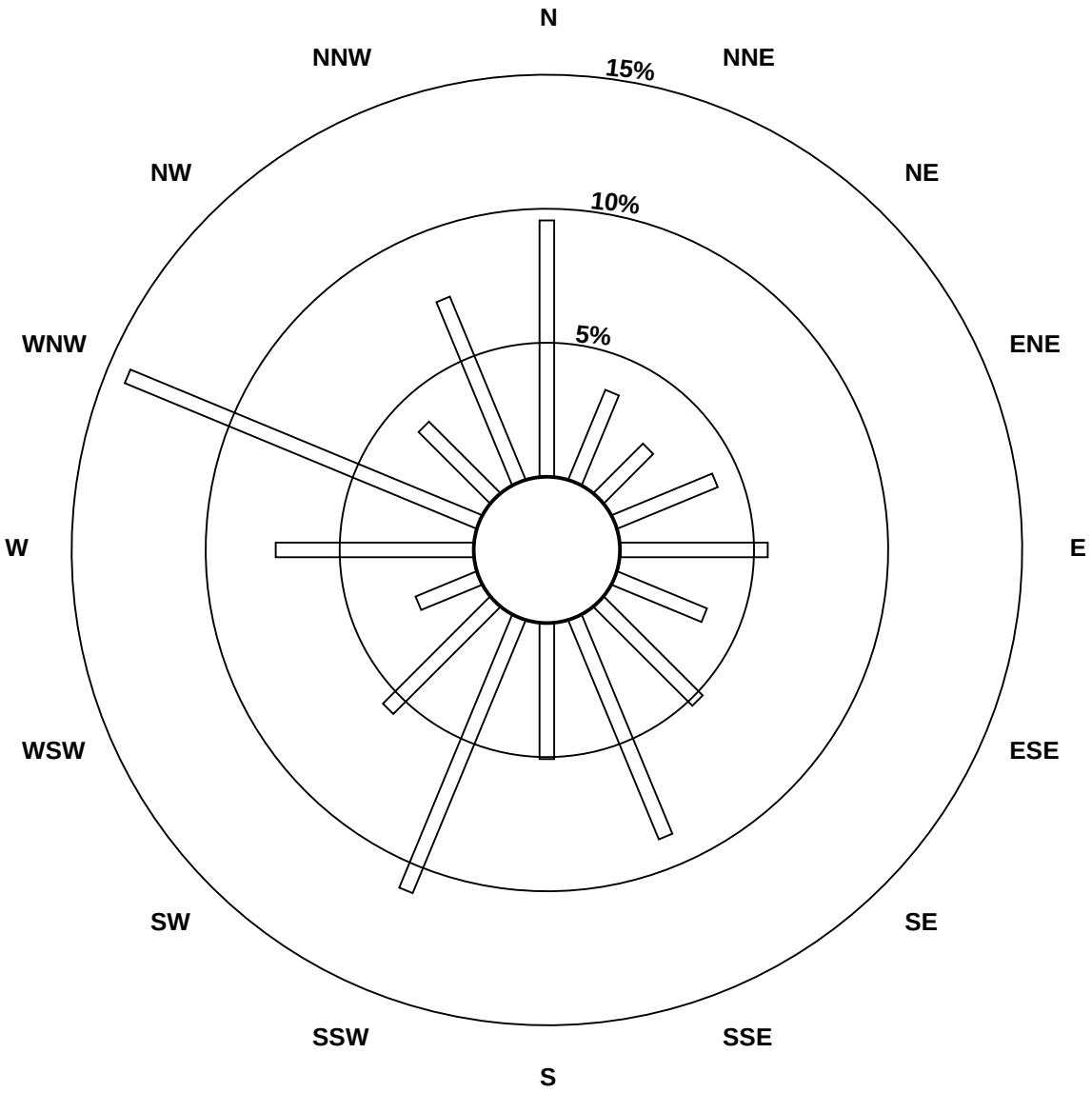
Total Number of Hours: 744

Wood Buffalo Environmental Association

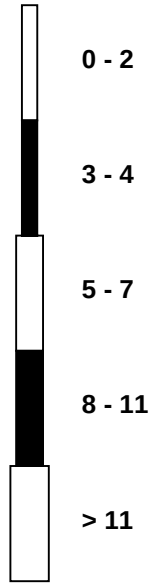
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



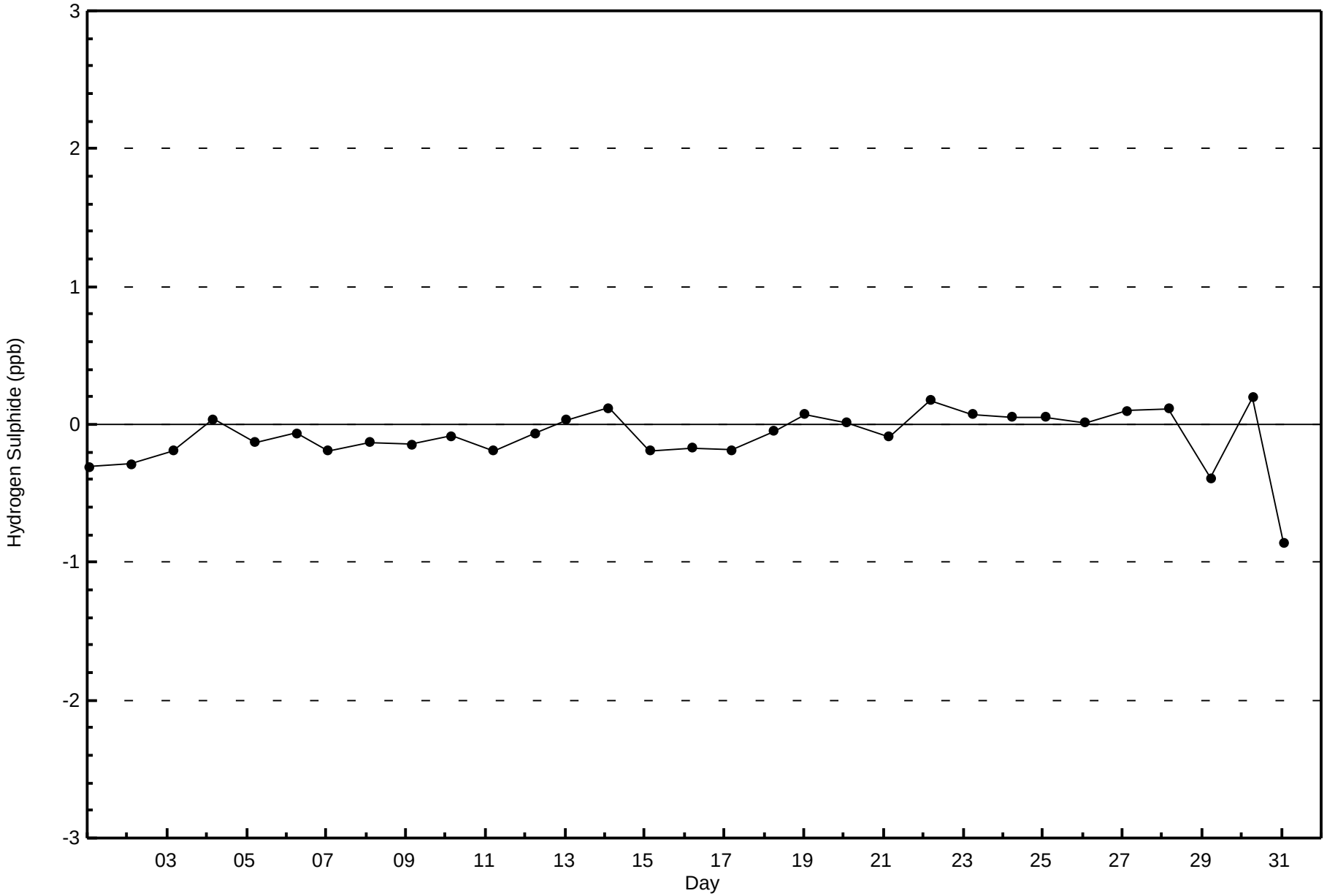
Total Number of Valid Hours: 690

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - January 2016



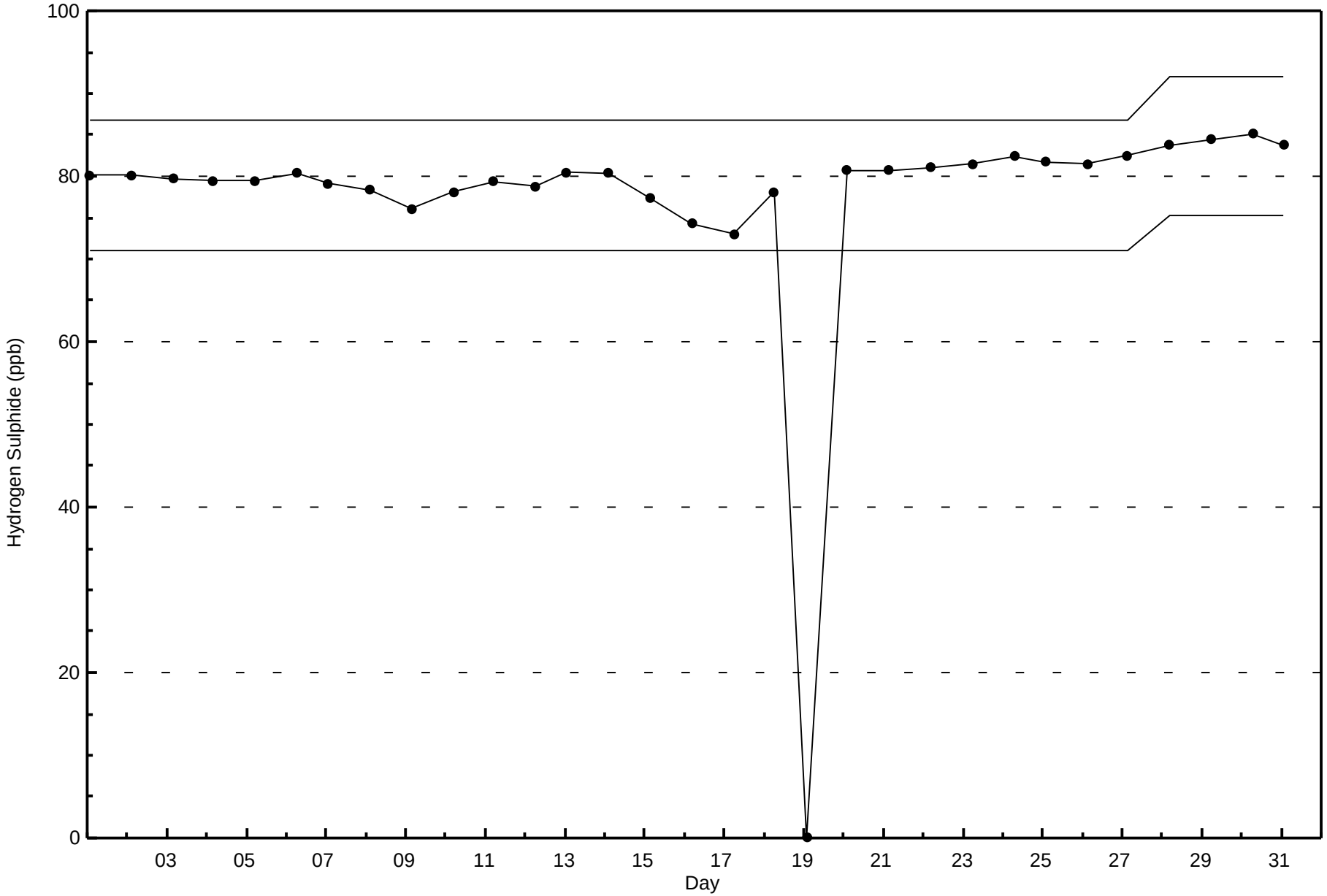
501-18

Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - January 2016



501-19

Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - January 2016

Maximum Value: 17 ppb on Jan 16 18:00

Maximum Daily Average: 1.8 ppb on Jan 30

Minimum Value: 0 ppb on Jan 1 04:00

Minimum Daily Average: 0.0 ppb on Jan 1

Maximum Diurnal Average: 1.2 ppb at hour 12

Minimum Diurnal Average: 0.0 ppb at hour 1

Monthly Average: 0.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Jan	0	Z	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
3-Jan	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
4-Jan	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0.4	1
5-Jan	0	0	0	0	Z	0	0	0	0	1	3	2	1	1	0	0	0	0	2	2	0	0	0	0	0.6	3
6-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	1
7-Jan	Z	0	0	0	0	0	1	1	1	0	2	2	2	1	1	2	0	1	0	0	0	0	0	0	0.7	2
8-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	2	0	0	0	0	0	0	0.3	2
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Jan	0	0	0	Z	0	0	0	1	0	1	1	5	7	5	1	0	0	1	0	0	0	2	0	0	1.1	7
11-Jan	0	0	1	0	Z	0	0	0	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	2
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0.3	1
14-Jan	0	Z	0	0	0	0	0	1	0	1	3	6	1	1	1	1	0	0	0	0	0	0	0	0	0.7	6
15-Jan	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Jan	0	0	0	Z	0	0	0	1	0	0	1	1	1	1	1	0	6	17	6	1	1	0	0	0	1.6	17
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Jan	Z	0	0	0	0	0	0	0	0	1	0	1	1	0	2	1	0	0	0	0	0	0	0	0	0.3	2
20-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
21-Jan	0	0	Z	0	0	0	0	0	0	1	2	2	3	2	2	1	0	0	0	0	0	0	0	0	0.6	3
22-Jan	0	0	0	Z	0	0	0	0	0	C	C	C	C	3	2	1	0	0	0	0	0	0	0	0	0.4	3
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0.2	1
24-Jan	0	0	0	0	0	Z	0	0	0	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	2
25-Jan	Z	1	3	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Jan	0	0	Z	0	0	0	0	7	9	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	9
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2
30-Jan	0	0	0	0	0	Z	0	0	1	2	2	8	4	3	2	5	0	0	0	7	2	1	3	1	1.8	8
31-Jan	Z	0	0	0	0	0	2	2	1	3	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0.6	3
	0.0	0.1	0.3	0.2	0.1	0.1	0.2	0.4	0.5	0.6	0.8	1.2	1.1	1.0	0.7	0.5	0.3	0.8	0.3	0.4	0.1	0.2	0.1	0.1	Diurnal Average	
	0	1	3	3	1	0	2	7	9	3	3	8	7	5	2	5	6	17	6	7	2	2	3	1	Diurnal Maximum	

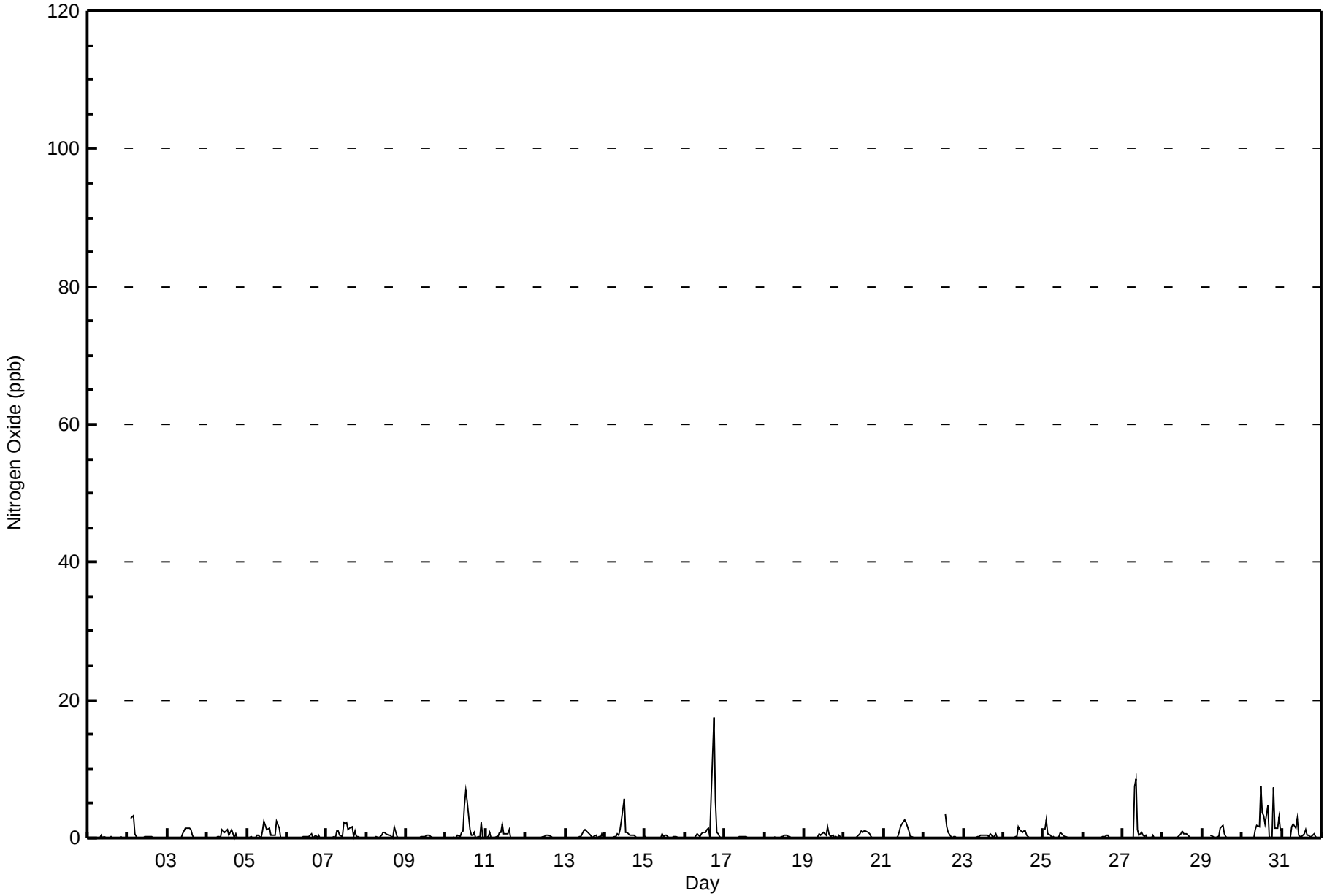
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - January 2016



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Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	62	26	16	31	45	27	34	62	36	77	40	18	52	101	25	57	709
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	62	26	16	31	45	27	34	62	36	77	40	18	52	101	25	57	709

Total Number of Valid Hours: 709

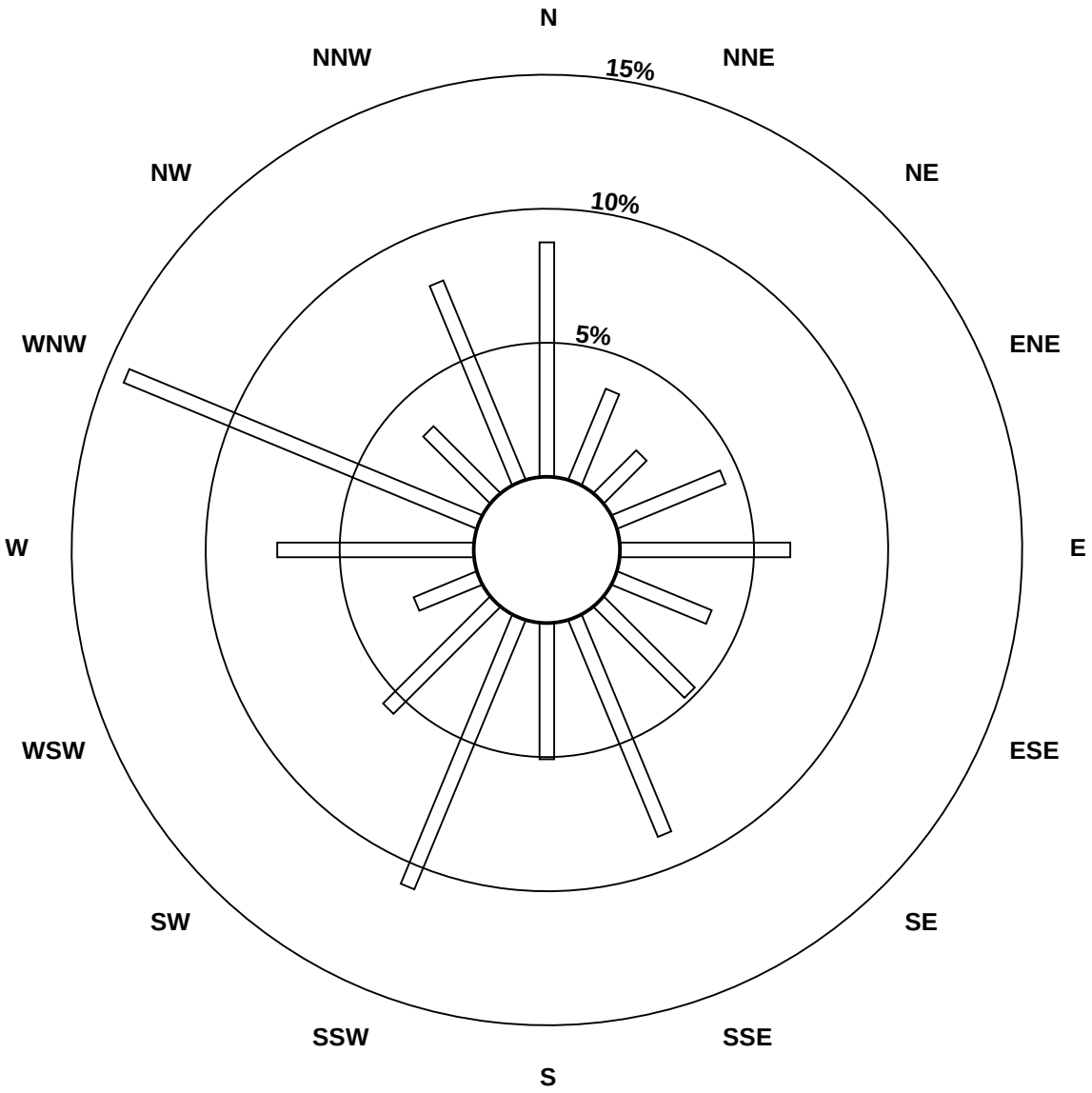
Total Number of Hours: 744

Wood Buffalo Environmental Association

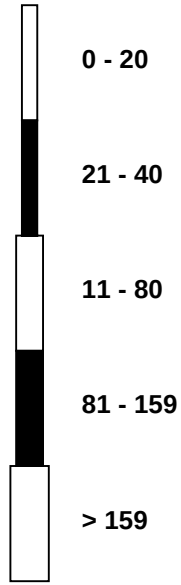
Wind Rose Jan 2016

Nitrogen Oxide (NO) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



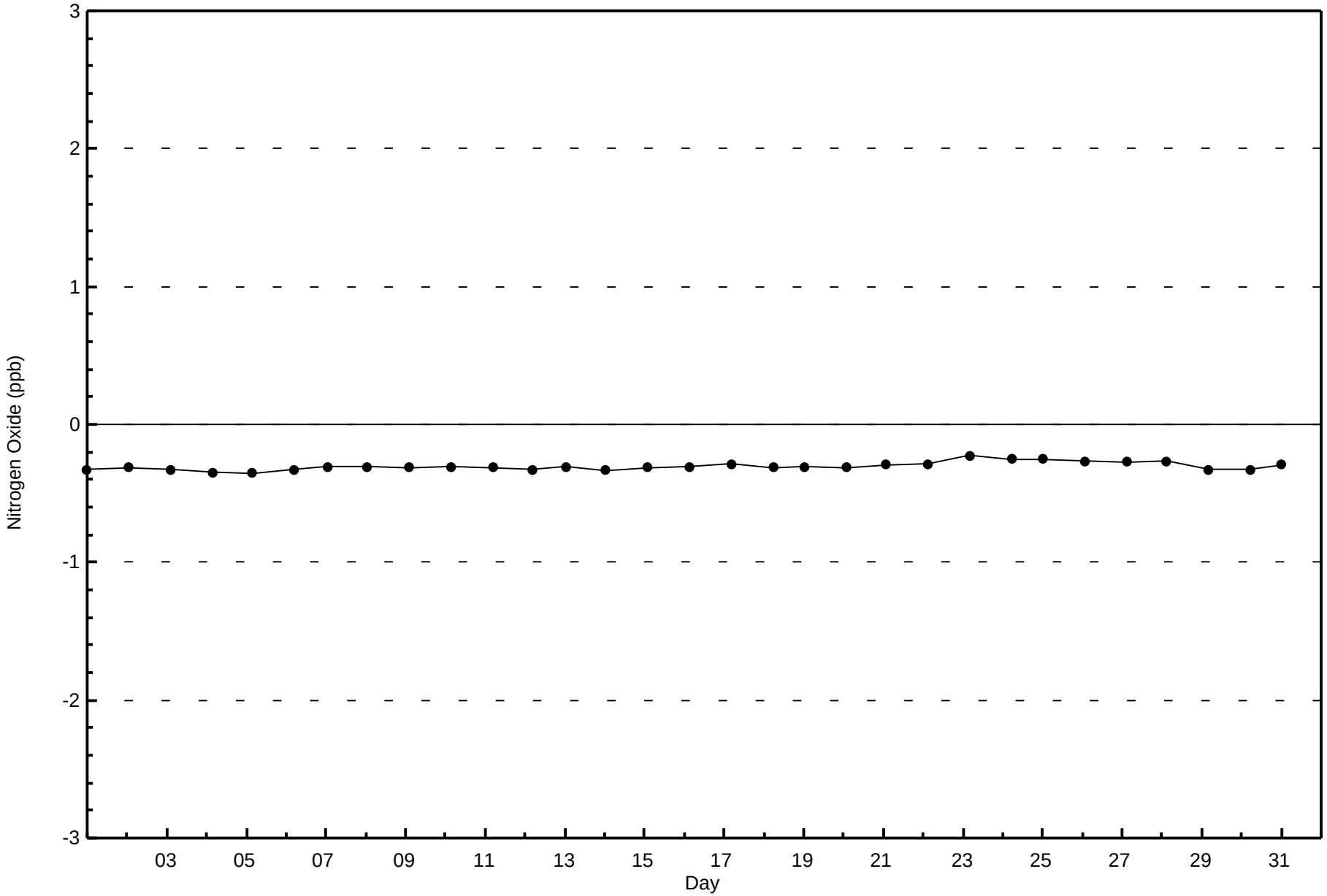
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - January 2016



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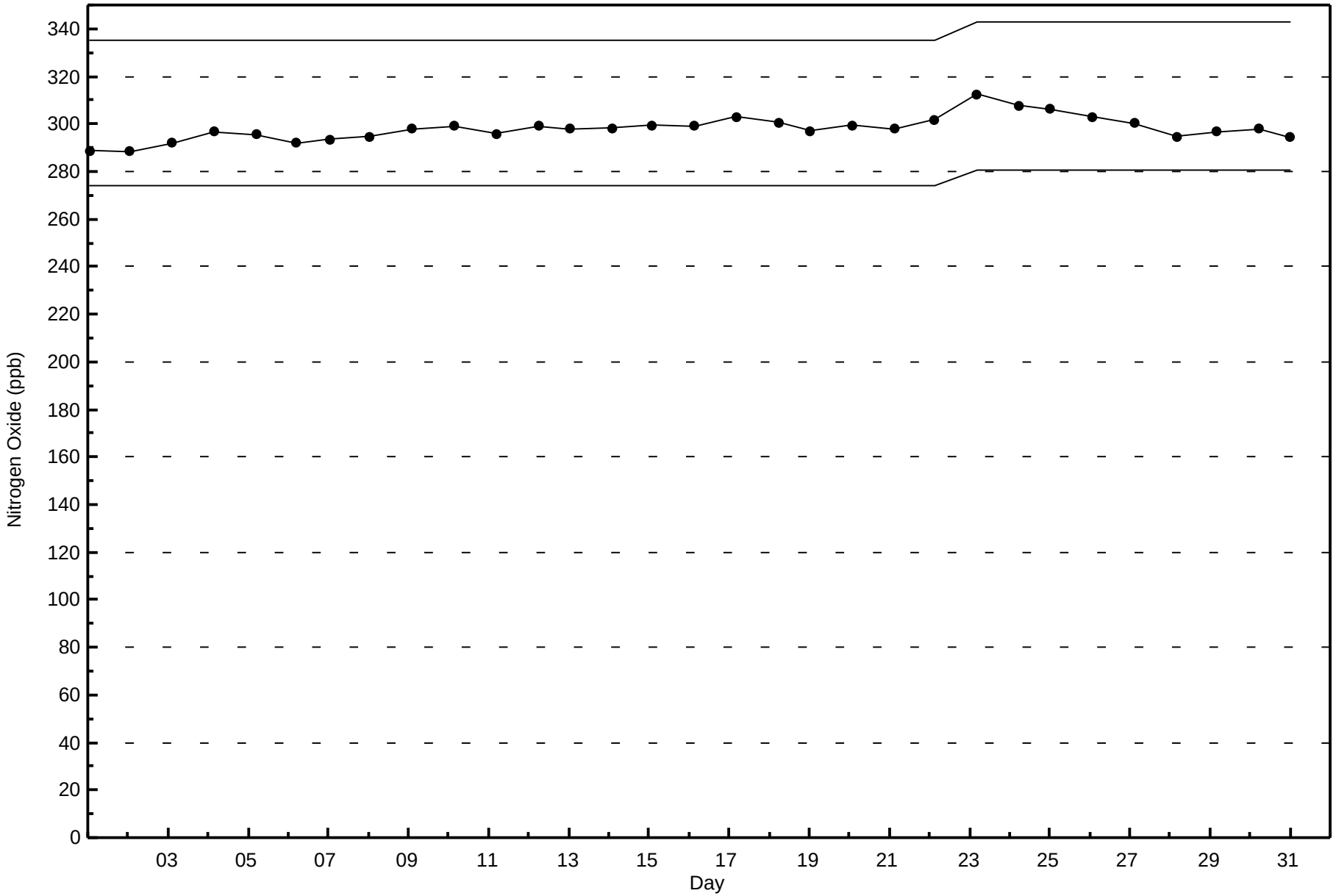
Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 15 ppb on Jan 7 05:00 Maximum Daily Average: 7.0 ppb on Jan 3

Minimum Value: 0 ppb on Jan 15 05:00 Minimum Daily Average: 0.7 ppb on Jan 29

Maximum Diurnal Average: 3.6 ppb at hour 8 Minimum Diurnal Average: 2.6 ppb at hour 4

Monthly Average: 2.9 ppb Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 4$ $P_{90} = 6$ $P_{99} = 10$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0.9	2
2-Jan	1	Z	5	5	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	1.7	5
3-Jan	2	2	Z	3	4	5	7	9	10	9	7	6	6	7	8	9	10	10	10	10	9	6	6	6	7.0	10
4-Jan	6	5	7	Z	8	6	8	8	5	5	4	3	4	2	3	6	4	3	4	6	5	5	5	4	4.9	8
5-Jan	3	3	3	2	Z	3	5	4	3	4	5	4	3	3	2	2	2	2	3	3	3	3	3	2	3.1	5
6-Jan	2	2	3	4	3	Z	2	1	1	1	1	1	2	2	3	2	2	2	1	1	1	1	1	1	1.7	4
7-Jan	Z	4	5	5	15	14	13	7	5	4	5	5	6	5	4	4	4	5	3	3	3	3	2	2	5.4	15
8-Jan	1	Z	2	2	1	1	2	2	2	2	5	3	2	2	2	2	2	4	3	3	4	4	4	3	2.4	5
9-Jan	2	2	Z	1	1	1	1	1	1	2	1	1	1	2	2	2	2	3	4	5	5	8	9	9	2.8	9
10-Jan	9	9	9	Z	10	11	12	12	9	7	6	7	8	6	3	2	2	2	2	2	1	3	2	6	6.0	12
11-Jan	7	4	3	2	Z	1	2	4	3	2	2	1	1	1	2	1	1	2	1	1	1	1	1	1	1.8	7
12-Jan	1	1	1	1	1	Z	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4	2.2	4
13-Jan	Z	3	3	3	3	3	3	3	4	4	4	5	5	4	3	4	3	3	2	2	1	1	1	1	3.0	5
14-Jan	2	Z	1	1	2	1	3	2	1	4	5	3	3	3	4	3	3	4	5	4	4	3	3	2	2.8	5
15-Jan	2	2	Z	1	0	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.9	2
16-Jan	1	1	1	Z	1	1	1	3	3	2	2	2	2	2	3	2	8	9	5	3	5	7	3	4	2.9	9
17-Jan	5	4	3	4	Z	4	2	2	2	1	1	1	1	1	1	1	1	2	2	1	2	2	3	3	2.0	5
18-Jan	3	3	3	2	3	Z	3	3	3	2	1	1	1	2	2	2	2	2	2	3	3	3	3	3	2.4	3
19-Jan	Z	4	4	3	3	4	4	3	3	3	2	2	2	2	4	2	2	2	2	2	2	2	2	2	2.7	4
20-Jan	4	Z	8	12	11	10	10	10	10	5	4	3	4	4	4	5	6	2	2	2	2	3	3	3	5.5	12
21-Jan	3	3	Z	3	3	6	10	10	6	5	5	5	5	6	6	7	8	8	7	5	4	4	4	4	5.5	10
22-Jan	4	4	4	Z	3	3	4	4	4	C	C	C	C	6	5	6	6	6	9	9	6	5	4	4	4.9	9
23-Jan	3	3	3	3	Z	3	3	3	3	3	3	2	2	2	2	2	2	3	2	3	3	5	4	4	2.8	5
24-Jan	3	3	3	3	3	Z	2	2	2	3	3	2	2	2	2	1	1	2	2	2	2	2	2	3	2.3	3
25-Jan	Z	3	5	3	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1.8	5
26-Jan	2	Z	2	2	2	2	1	1	1	1	1	1	1	2	2	3	2	2	1	1	1	1	1	1	1.5	3
27-Jan	1	1	Z	0	0	0	1	6	7	2	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1.5	7
28-Jan	1	1	1	Z	2	2	2	2	2	3	3	4	4	5	4	5	4	5	4	4	3	1	1	1	2.6	5
29-Jan	0	0	1	0	Z	1	1	0	1	1	1	2	2	1	1	0	0	1	1	1	1	1	1	1	0.7	2
30-Jan	1	1	1	1	1	Z	1	1	1	3	3	8	4	4	3	7	2	1	2	10	2	2	5	2	2.8	10
31-Jan	Z	3	3	2	2	2	3	5	3	4	2	1	1	2	1	2	3	3	3	4	4	4	6	8	3.1	8
	2.8	2.8	3.2	2.6	3.3	3.4	3.5	3.6	3.2	2.9	2.8	2.7	2.7	2.7	2.6	2.8	2.9	3.1	2.9	3.1	2.8	2.8	2.7	2.8	Diurnal Average	
	9	9	9	12	15	14	13	12	10	9	7	8	8	7	8	9	10	10	10	10	9	8	9	9	Diurnal Maximum	

Z - zerospan C - Calibration

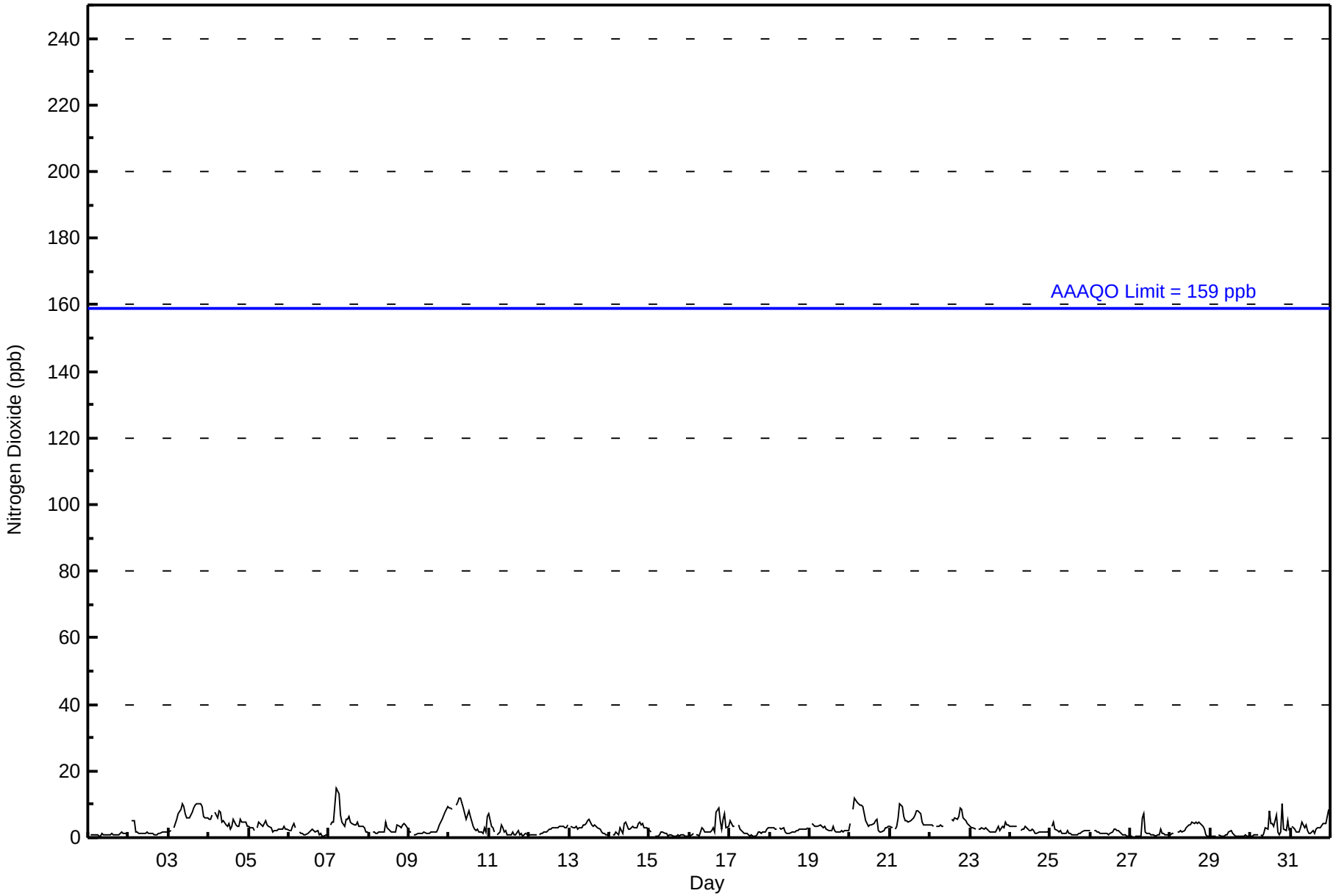
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - January 2016



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Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	62	26	16	31	45	27	34	62	36	77	40	18	52	101	25	57	709
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	62	26	16	31	45	27	34	62	36	77	40	18	52	101	25	57	709

Total Number of Valid Hours: 709

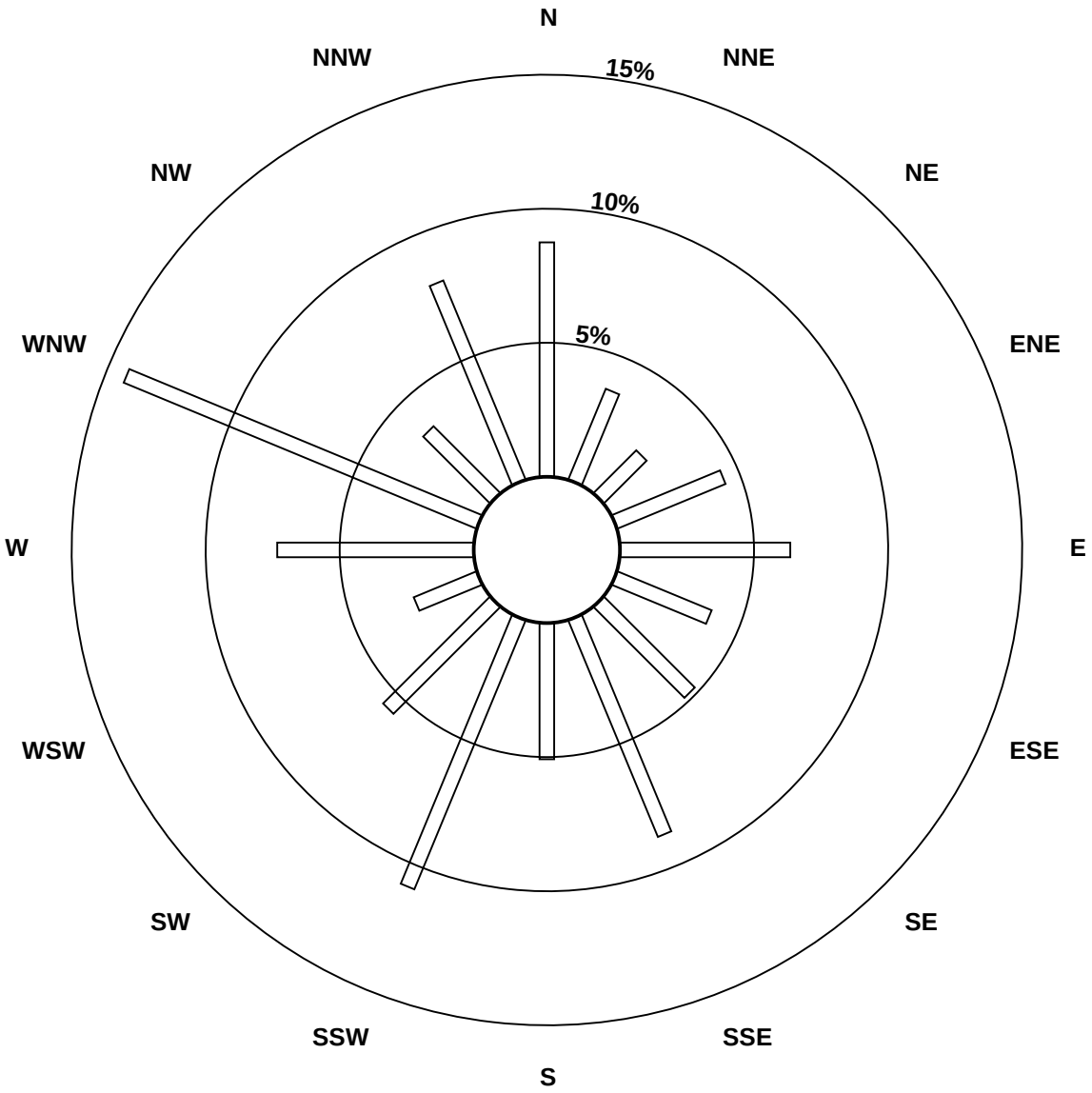
Total Number of Hours: 744

Wood Buffalo Environmental Association

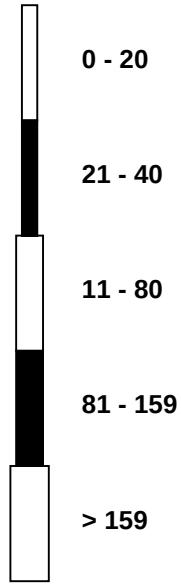
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



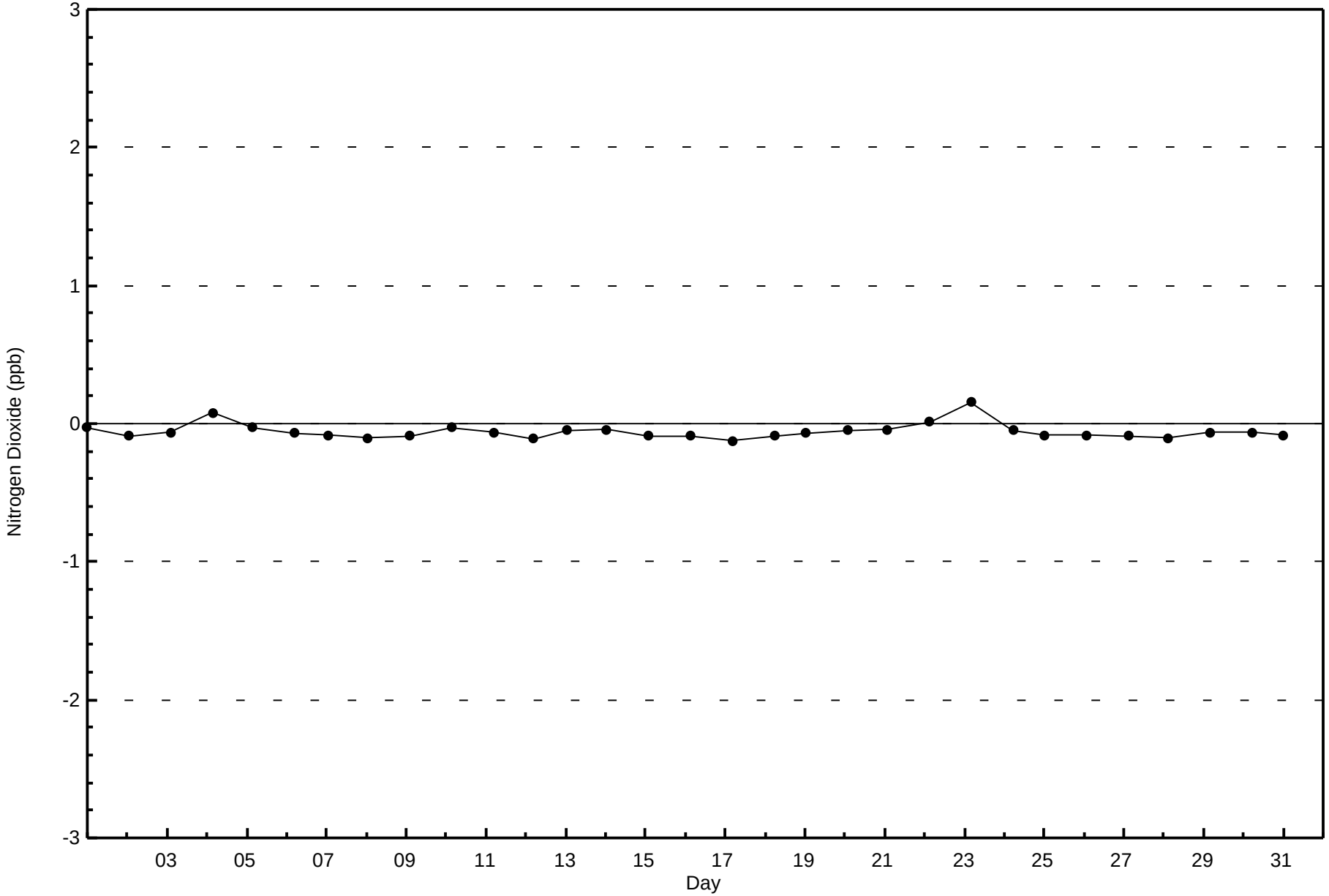
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - January 2016



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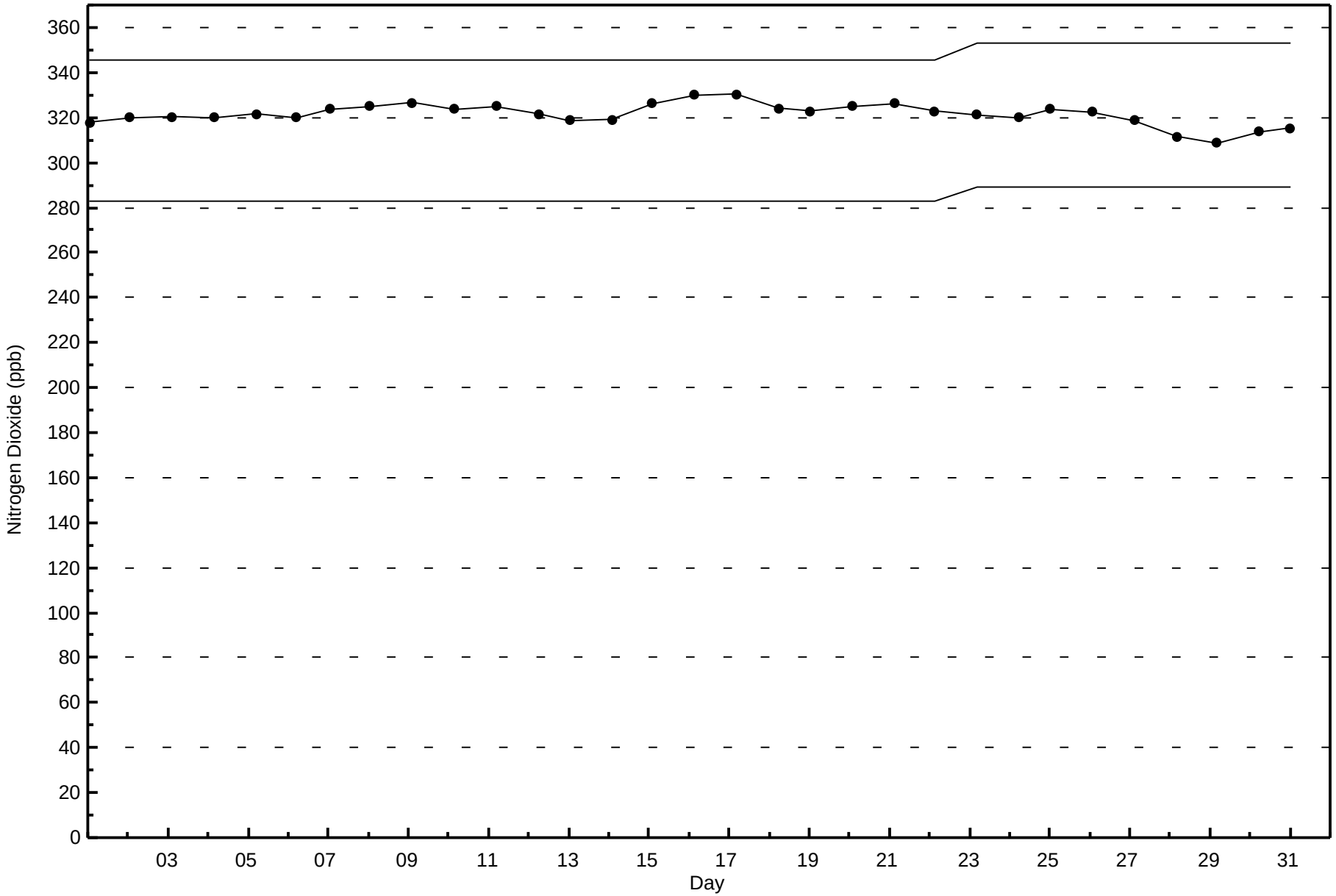
Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - January 2016

Maximum Value: 26 ppb on Jan 16 18:00

Maximum Daily Average: 7.4 ppb on Jan 3

Minimum Value: 0 ppb on Jan 15 05:00

Minimum Daily Average: 0.9 ppb on Jan 1

Maximum Diurnal Average: 4.1 ppb at hour 8

Minimum Diurnal Average: 2.7 ppb at hour 4

Monthly Average: 3.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 3 $Q_3 = 4$ $P_{90} = 7$ $P_{99} = 14$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0.9	2
2-Jan	1	Z	8	8	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	2.0	8
3-Jan	2	2	Z	3	4	5	7	9	10	10	8	7	7	8	9	9	10	10	10	10	9	6	6	6	7.4	10
4-Jan	6	5	7	Z	8	6	8	8	5	6	5	4	5	3	4	7	4	4	4	6	5	5	5	4	5.3	8
5-Jan	3	3	3	2	Z	3	5	5	3	5	7	6	4	4	2	3	3	2	5	4	3	3	3	2	3.7	7
6-Jan	2	2	3	4	3	Z	2	1	1	1	1	1	2	3	3	3	2	3	1	2	1	1	1	1	1.8	4
7-Jan	Z	4	4	5	15	14	14	8	5	4	8	7	9	6	6	6	4	6	3	3	3	3	2	2	6.1	15
8-Jan	1	Z	2	2	1	1	2	2	2	2	6	4	3	2	2	2	2	6	3	3	4	4	4	3	2.7	6
9-Jan	2	2	Z	1	1	1	1	1	1	2	1	1	2	2	2	2	2	3	4	5	5	8	9	9	2.8	9
10-Jan	9	9	9	Z	10	11	12	12	9	8	7	12	15	12	4	3	3	3	2	2	1	5	2	6	7.1	15
11-Jan	7	4	4	2	Z	1	2	4	4	3	4	2	1	2	3	1	1	2	1	1	1	1	1	1	2.2	7
12-Jan	1	1	1	1	1	Z	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	3	3	4	2.3	4
13-Jan	Z	3	3	3	3	3	3	3	4	4	5	6	7	5	4	4	3	3	3	2	1	1	2	1	3.3	7
14-Jan	2	Z	1	1	1	1	3	3	2	6	8	8	3	4	4	3	3	5	5	4	4	3	3	2	3.4	8
15-Jan	2	2	Z	1	0	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	1.0	2
16-Jan	1	1	1	Z	1	1	1	3	3	2	3	2	2	4	4	2	14	26	11	3	6	7	3	4	4.5	26
17-Jan	5	4	3	4	Z	4	2	2	2	2	1	1	1	1	1	1	1	2	1	1	2	2	2	3	2.1	5
18-Jan	3	3	3	2	3	Z	3	3	3	2	1	2	2	2	2	2	2	2	2	3	3	3	3	3	2.4	3
19-Jan	Z	4	4	3	3	4	4	3	3	4	3	3	3	3	5	3	2	2	2	2	2	3	2	2	3.0	5
20-Jan	4	Z	8	12	11	10	10	10	10	6	5	4	5	5	5	6	6	2	2	2	2	3	3	3	5.8	12
21-Jan	3	3	Z	3	3	6	10	10	6	6	7	7	8	8	8	8	8	8	7	5	4	4	4	4	6.0	10
22-Jan	4	4	4	Z	3	3	4	4	4	C	C	C	C	9	7	7	6	6	9	9	6	5	4	4	5.3	9
23-Jan	3	3	3	3	Z	3	3	3	3	3	3	3	2	2	2	2	3	3	2	4	3	5	4	4	3.0	5
24-Jan	3	3	3	3	3	Z	2	2	3	5	4	3	3	3	3	1	1	1	2	2	2	2	2	3	2.6	5
25-Jan	Z	5	7	3	3	2	2	1	1	2	3	2	2	1	1	1	1	1	1	2	2	2	2	2	2.1	7
26-Jan	2	Z	2	2	1	2	1	1	1	1	1	1	2	2	3	3	2	2	1	1	1	1	1	1	1.5	3
27-Jan	0	0	Z	0	0	0	0	13	16	3	2	2	1	1	1	1	1	1	3	1	1	1	1	1	2.3	16
28-Jan	1	1	1	Z	2	2	2	2	2	3	4	4	5	5	5	5	4	5	4	3	3	1	1	0	2.8	5
29-Jan	0	0	0	0	Z	1	1	0	1	1	1	3	4	2	1	1	1	1	1	0	1	1	1	1	1.0	4
30-Jan	1	1	1	1	1	Z	1	1	3	5	4	15	8	8	5	12	2	1	2	17	4	4	8	3	4.5	17
31-Jan	Z	3	3	2	2	2	5	7	4	7	3	1	1	3	2	3	3	3	3	5	4	4	6	8	3.7	8
	2.8	2.8	3.4	2.7	3.4	3.4	3.7	4.1	3.7	3.5	3.7	3.9	3.8	3.7	3.3	3.3	3.2	3.9	3.2	3.5	2.9	3.0	2.8	2.9	Diurnal Average	
	9	9	9	12	15	14	14	13	16	10	8	15	15	12	9	12	14	26	11	17	9	8	9	9	Diurnal Maximum	

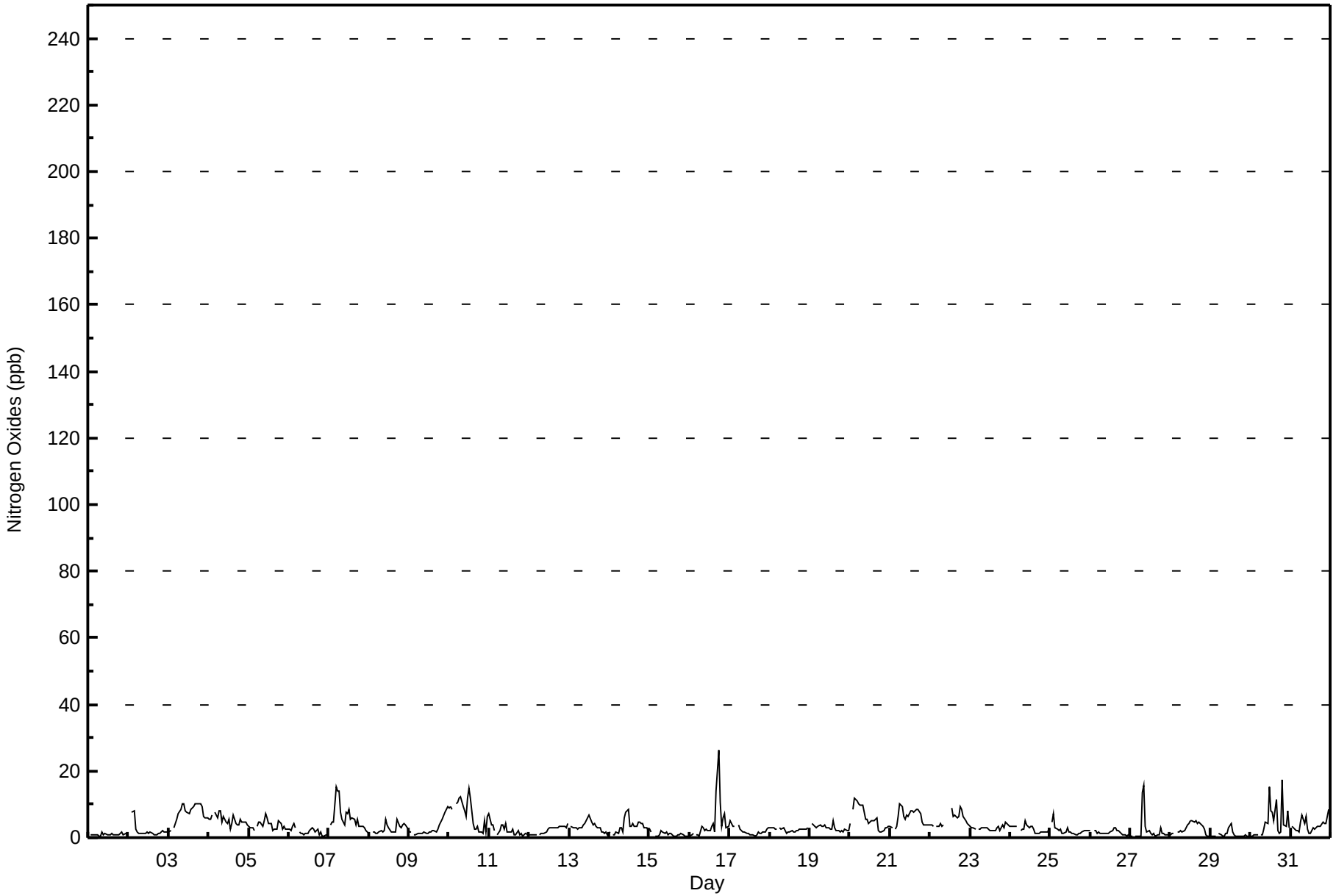
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - January 2016



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Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	99.86	99.86
21 - 40	1	0.14	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	62	26	16	31	45	26	34	62	36	77	40	18	52	101	25	57	708
21 - 40	0	0	0	0	0	1	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	62	26	16	31	45	27	34	62	36	77	40	18	52	101	25	57	709

Total Number of Valid Hours: 709

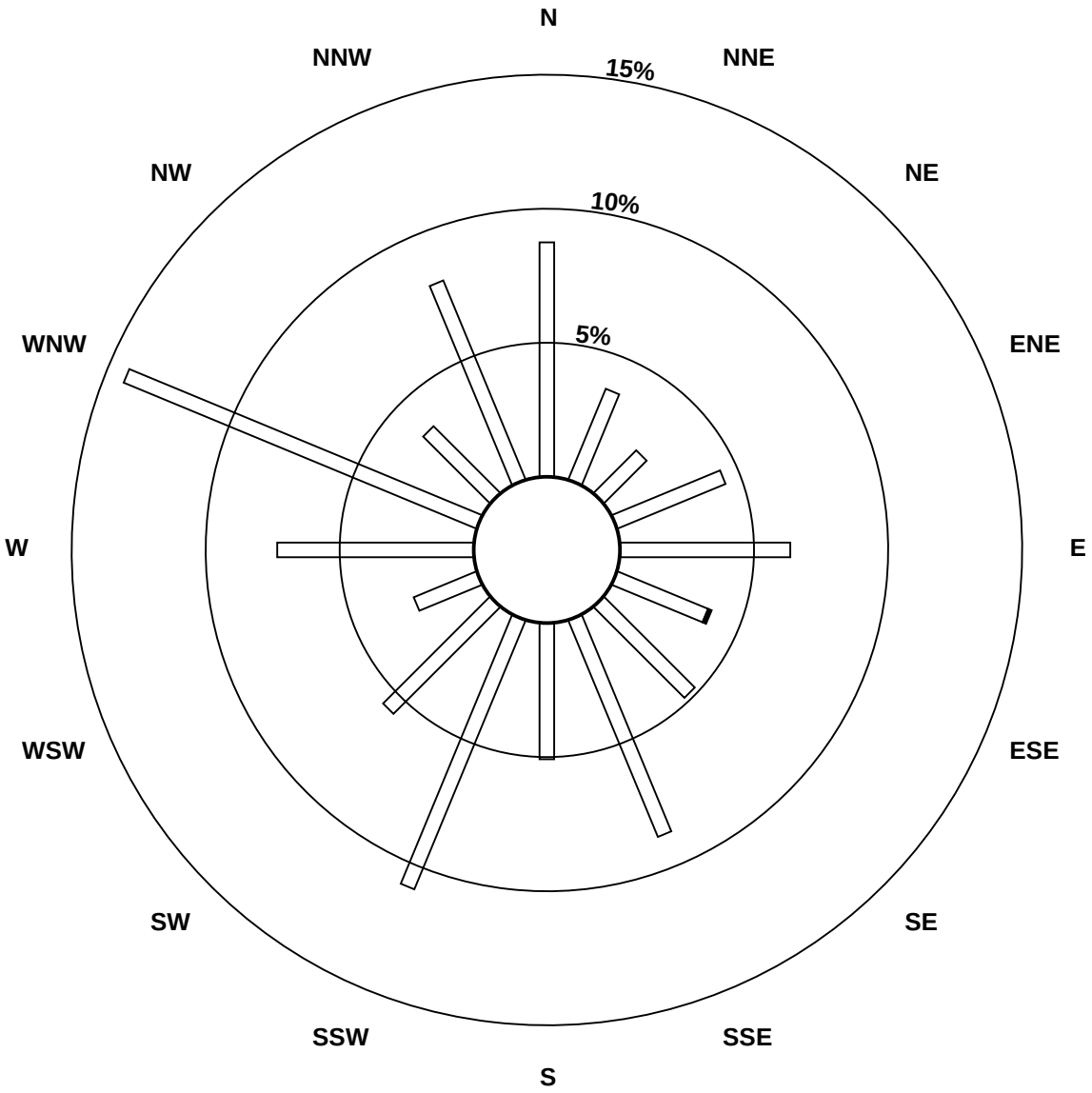
Total Number of Hours: 744

Wood Buffalo Environmental Association

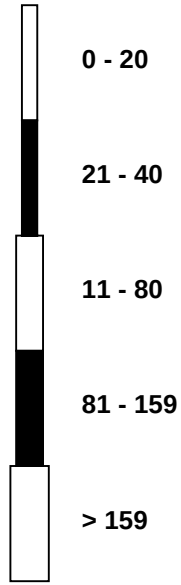
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



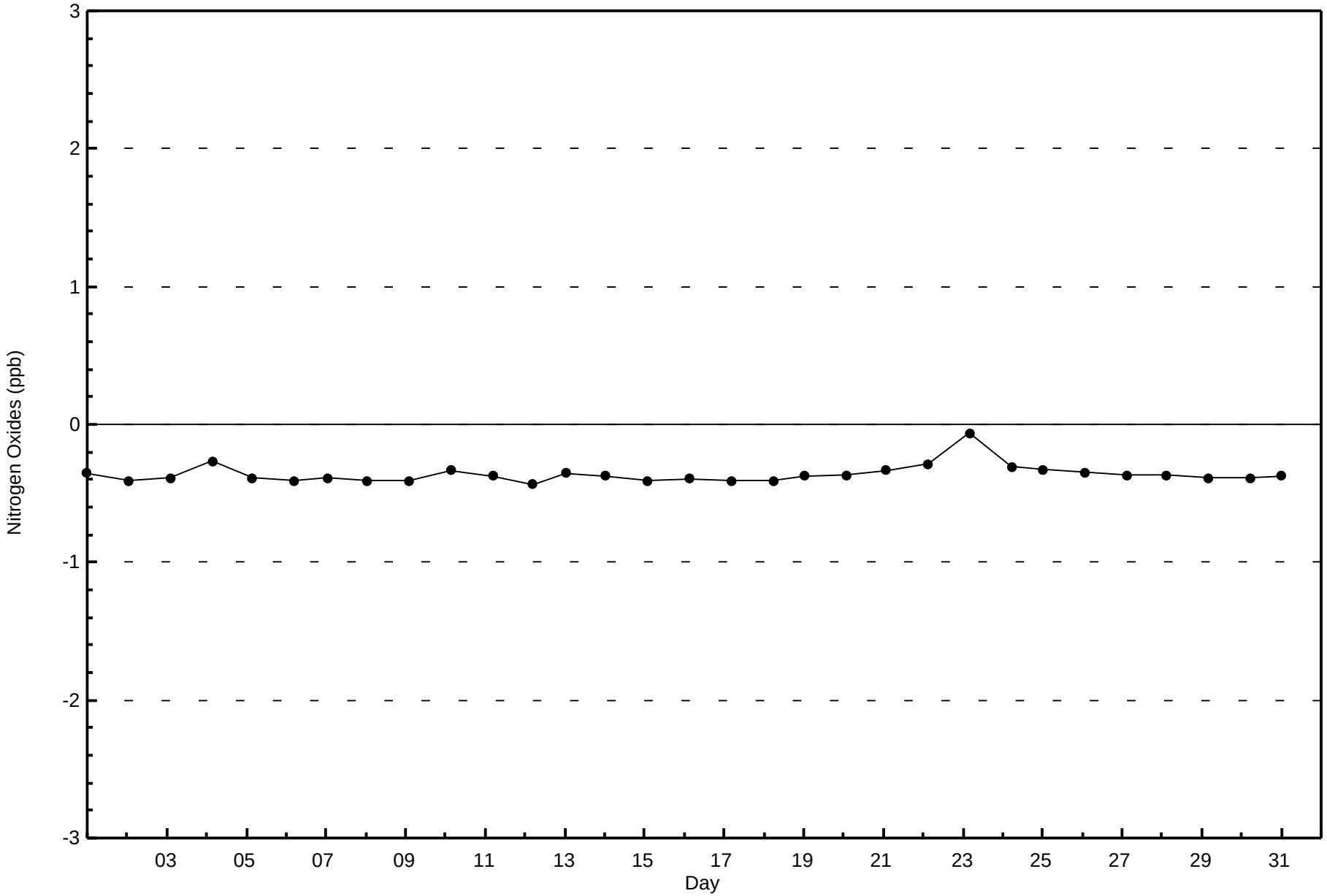
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - January 2016

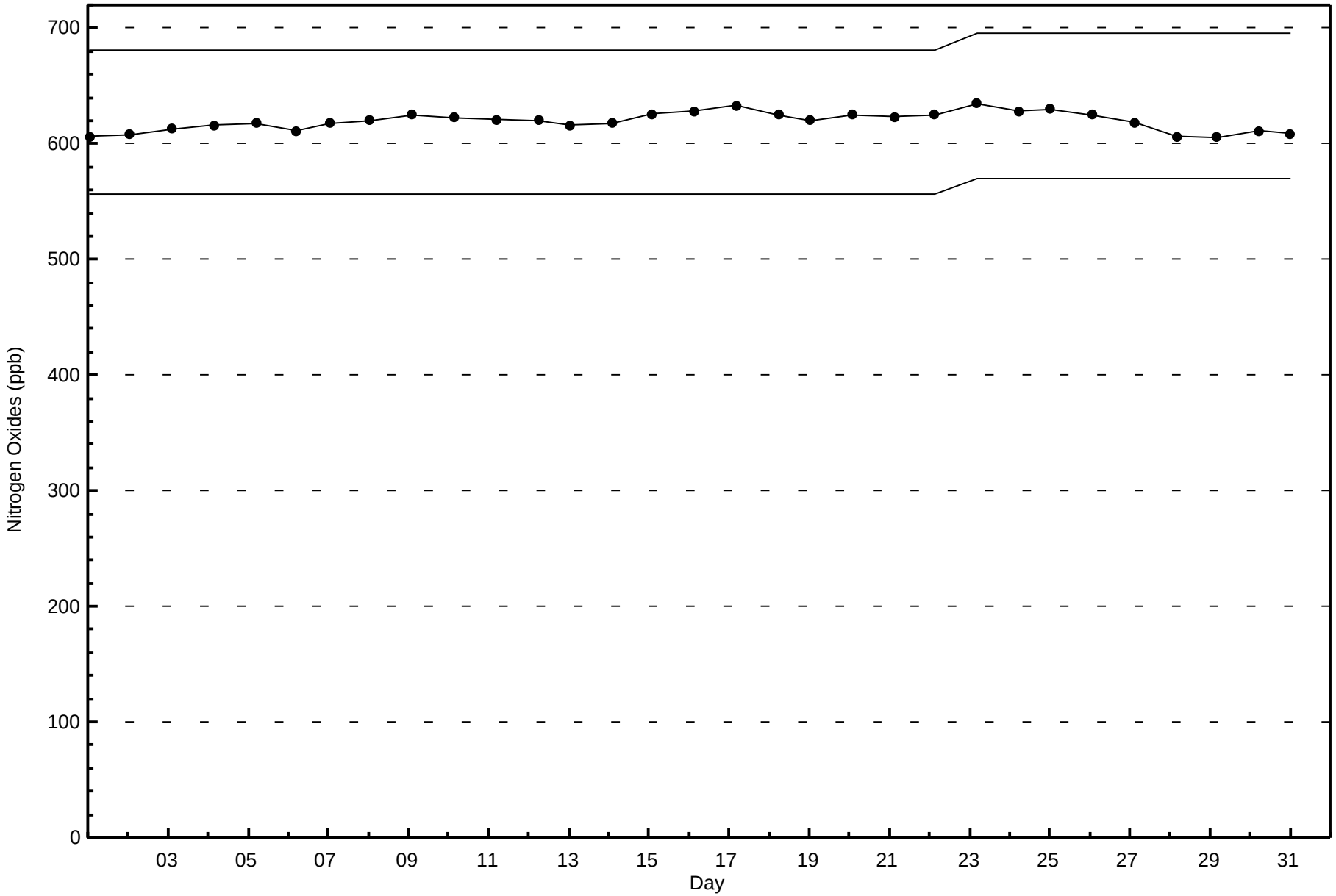


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Statoil - Leismer - January 2016

Maximum Value: 4.5 C on Jan 26 20:00

Maximum Daily Average: 1.3 C on Jan 27

Minimum Value: -31.0 C on Jan 17 03:00

Minimum Daily Average: -26.5 C on Jan 16

Maximum Diurnal Average: -8.7 C at hour 15

Minimum Diurnal Average: -12.7 C at hour 9

Monthly Average: -11.46 C

Percentiles: P_1 = -29.0 P_{10} = -21.4 Q_1 = -16.7 Median = -11.7 Q_3 = -6.1 P_{90} = -0.5 P_{99} = 3.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

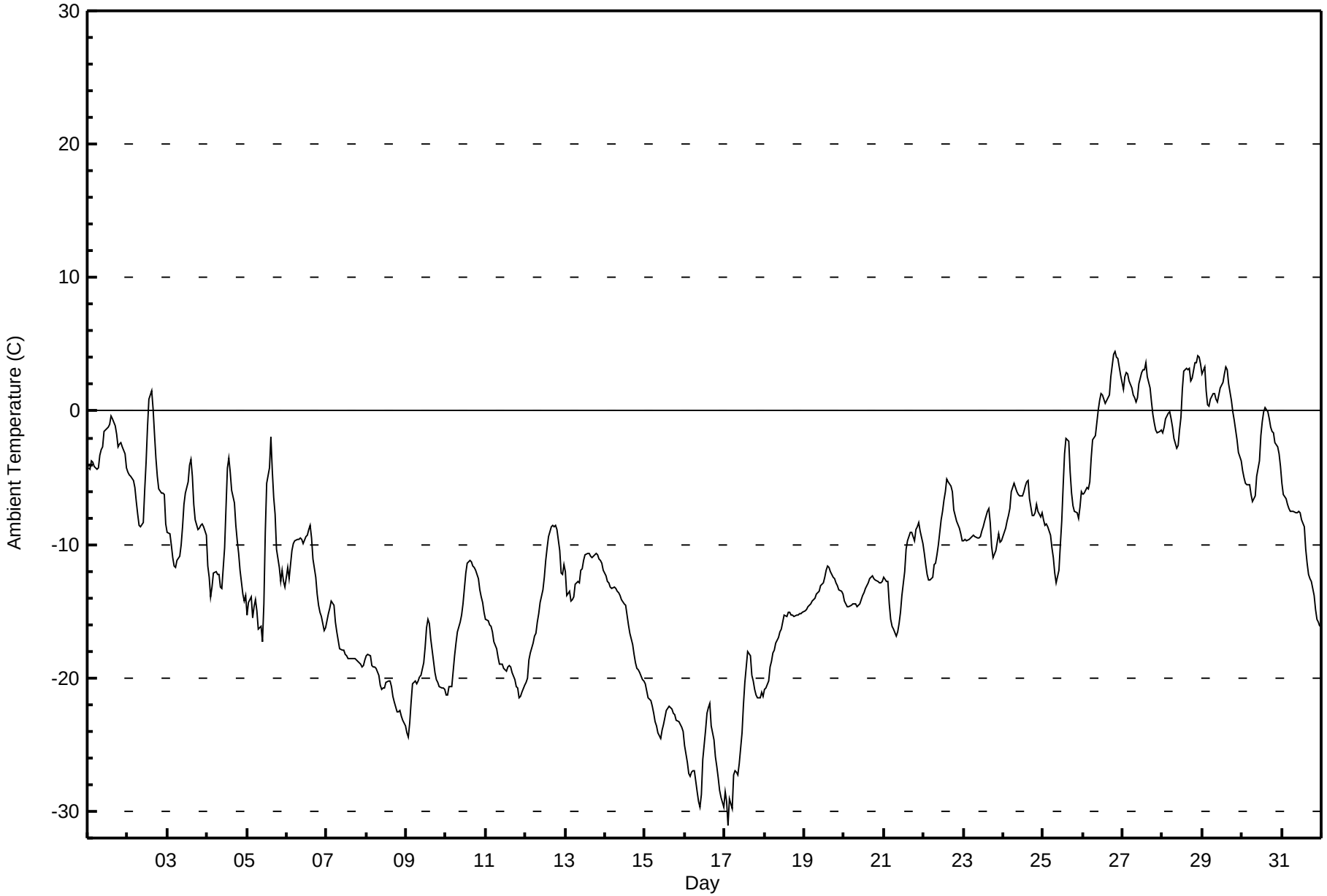
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-4.3	-4.3	-3.7	-3.8	-4.2	-4.3	-4.3	-3.3	-2.9	-2.7	-1.5	-1.3	-1.2	-1.0	-0.4	-0.5	-1.1	-1.7	-2.7	-2.5	-2.3	-2.7	-3.2	-4.2	-2.7	-0.4
2-Jan	-4.6	-4.7	-4.9	-5.2	-5.8	-6.7	-7.7	-8.6	-8.7	-8.3	-5.9	-3.8	-1.3	0.9	1.5	0.2	-1.7	-3.5	-4.9	-5.8	-6.2	-6.1	-6.2	-8.5	-4.9	1.5
3-Jan	-9.1	-9.2	-10.1	-10.9	-11.6	-11.7	-11.2	-10.8	-10.1	-8.6	-7.0	-6.1	-5.3	-4.0	-3.6	-4.9	-7.0	-8.2	-8.8	-8.8	-8.5	-8.4	-8.7	-9.3	-8.4	-3.6
4-Jan	-11.6	-12.5	-14.0	-13.1	-12.2	-12.0	-12.3	-12.3	-13.2	-13.3	-10.2	-7.2	-4.3	-3.5	-4.6	-5.9	-6.9	-8.6	-9.7	-10.7	-12.0	-13.7	-14.3	-13.8	-10.5	-3.5
5-Jan	-15.3	-14.3	-13.9	-15.5	-14.6	-14.2	-15.0	-16.3	-16.1	-17.3	-14.4	-9.1	-5.4	-4.3	-2.0	-4.5	-6.5	-7.7	-10.3	-11.7	-12.8	-11.9	-12.8	-13.2	-11.6	-2.0
6-Jan	-11.7	-12.6	-11.5	-10.4	-10.0	-9.7	-9.6	-9.6	-9.6	-9.7	-9.9	-9.4	-9.3	-8.9	-8.6	-9.5	-11.0	-12.5	-13.8	-14.5	-15.0	-15.4	-16.5	-16.2	-11.5	-8.6
7-Jan	-15.7	-15.2	-14.7	-14.3	-14.5	-15.8	-16.5	-17.2	-17.8	-17.9	-17.9	-18.2	-18.3	-18.5	-18.5	-18.5	-18.6	-18.6	-18.7	-18.8	-19.0	-19.2	-19.0	-18.6	-17.5	-14.3
8-Jan	-18.4	-18.2	-18.3	-19.1	-19.2	-19.2	-19.3	-19.8	-20.5	-20.9	-20.8	-20.8	-20.4	-20.2	-20.3	-20.6	-21.4	-21.8	-22.5	-22.6	-22.4	-22.8	-23.2	-23.6	-20.7	-18.2
9-Jan	-24.1	-24.4	-23.4	-21.8	-20.4	-20.3	-20.4	-20.2	-19.9	-19.8	-18.8	-17.7	-16.2	-15.6	-16.0	-17.1	-18.8	-19.6	-20.1	-20.3	-20.6	-20.8	-20.8	-20.8	-19.9	-15.6
10-Jan	-21.3	-21.3	-20.7	-20.6	-19.5	-18.3	-17.4	-16.6	-15.8	-15.3	-14.4	-13.3	-12.2	-11.4	-11.2	-11.3	-11.6	-11.7	-12.0	-12.6	-13.4	-13.9	-14.3	-15.1	-15.2	-11.2
11-Jan	-15.6	-15.8	-16.0	-16.1	-16.5	-17.3	-17.9	-18.5	-19.0	-19.0	-19.0	-19.3	-19.5	-19.2	-19.1	-19.1	-19.6	-20.1	-20.7	-20.8	-21.4	-21.4	-21.1	-20.5	-18.9	-15.6
12-Jan	-20.4	-20.0	-18.7	-18.1	-17.4	-16.9	-16.7	-15.9	-15.2	-14.4	-13.4	-12.4	-11.2	-10.2	-9.4	-8.7	-8.6	-8.7	-8.5	-8.9	-10.5	-12.1	-12.2	-11.5	-13.3	-8.5
13-Jan	-12.1	-13.8	-13.5	-14.3	-14.1	-14.0	-13.0	-12.8	-12.8	-12.0	-11.8	-11.2	-10.8	-10.6	-10.7	-10.8	-11.0	-10.9	-10.7	-10.8	-11.0	-11.2	-11.4	-11.9	-12.0	-10.6
14-Jan	-12.4	-12.8	-12.9	-13.2	-13.3	-13.2	-13.3	-13.5	-13.6	-13.8	-14.2	-14.5	-14.6	-15.3	-16.0	-16.7	-17.5	-18.3	-18.9	-19.3	-19.4	-19.6	-20.1	-20.2	-15.7	-12.4
15-Jan	-20.5	-21.0	-21.5	-21.7	-22.1	-22.6	-23.2	-23.6	-24.1	-24.5	-23.9	-23.5	-22.9	-22.5	-22.1	-22.2	-22.4	-22.6	-22.8	-23.1	-23.3	-23.5	-23.7	-24.0	-22.8	-20.5
16-Jan	-25.1	-26.4	-27.2	-27.3	-27.0	-27.0	-27.0	-28.5	-29.2	-29.7	-28.7	-26.1	-23.9	-22.6	-22.2	-21.9	-23.6	-24.6	-25.9	-26.6	-27.4	-28.4	-28.9	-29.6	-26.5	-21.9
17-Jan	-28.6	-29.3	-31.0	-29.1	-29.8	-27.2	-27.0	-27.0	-27.3	-26.5	-24.1	-22.0	-20.4	-19.2	-18.0	-18.3	-19.8	-20.2	-20.9	-21.3	-21.4	-21.4	-21.1	-21.4	-23.9	-18.0
18-Jan	-20.9	-20.7	-20.2	-19.2	-18.8	-18.1	-17.9	-17.4	-16.9	-16.5	-16.3	-15.9	-15.3	-15.4	-15.1	-15.1	-15.3	-15.3	-15.3	-15.3	-15.3	-15.2	-15.2	-15.1	-16.7	-15.1
19-Jan	-15.0	-14.9	-14.7	-14.5	-14.5	-14.2	-14.0	-13.8	-13.6	-13.5	-13.1	-12.9	-12.5	-11.9	-11.7	-11.7	-12.0	-12.4	-12.6	-12.9	-13.1	-13.4	-13.5	-13.8	-13.3	-11.7
20-Jan	-14.3	-14.5	-14.6	-14.7	-14.5	-14.5	-14.4	-14.5	-14.6	-14.5	-14.1	-13.9	-13.6	-13.3	-12.9	-12.6	-12.5	-12.3	-12.6	-12.6	-12.7	-12.9	-12.9	-12.8	-13.6	-12.3
21-Jan	-12.4	-12.8	-12.7	-14.4	-15.6	-16.1	-16.4	-16.8	-16.6	-15.9	-15.0	-13.8	-12.1	-10.3	-9.7	-9.4	-9.1	-9.1	-9.7	-8.9	-8.7	-8.4	-9.0	-9.9	-12.2	-8.4
22-Jan	-10.7	-11.5	-12.3	-12.7	-12.7	-12.5	-11.5	-11.4	-10.8	-10.0	-8.1	-7.6	-6.7	-6.1	-5.1	-5.3	-5.7	-6.0	-7.4	-7.9	-8.3	-8.7	-9.2	-9.7	-9.1	-5.1
23-Jan	-9.7	-9.6	-9.7	-9.6	-9.5	-9.4	-9.3	-9.4	-9.5	-9.5	-9.4	-9.0	-8.6	-8.3	-7.6	-7.3	-8.4	-10.2	-11.0	-10.4	-9.8	-9.2	-9.8	-9.8	-9.3	-7.3
24-Jan	-9.4	-8.8	-8.2	-7.8	-7.3	-6.0	-5.4	-5.8	-6.0	-6.3	-6.4	-6.3	-6.1	-5.6	-5.3	-5.3	-6.6	-7.8	-7.9	-7.6	-7.0	-7.5	-8.0	-7.6	-6.9	-5.3
25-Jan	-8.2	-8.6	-8.5	-8.7	-9.3	-10.2	-11.0	-12.2	-12.9	-12.0	-10.0	-8.2	-5.6	-3.2	-2.1	-2.3	-4.6	-6.2	-7.1	-7.5	-7.6	-8.0	-7.2	-6.0	-7.8	-2.1
26-Jan	-6.2	-6.1	-5.7	-5.8	-5.3	-3.6	-2.1	-1.8	-0.9	0.1	0.7	1.3	1.2	0.6	0.8	1.0	1.2	2.6	4.2	4.5	4.1	3.9	3.4	2.7	-0.2	4.5
27-Jan	1.6	2.5	2.9	2.8	2.2	1.7	1.2	1.0	0.7	1.0	2.0	2.9	3.1	3.1	3.6	2.6	1.8	0.6	-0.2	-0.9	-1.4	-1.6	-1.5	-1.5	1.3	3.6
28-Jan	-1.6	-1.3	-0.6	-0.1	-0.1	-0.6	-1.2	-2.1	-2.8	-2.6	-1.5	-0.5	1.6	3.0	3.2	3.1	3.2	2.3	2.5	3.6	3.6	4.1	4.1	3.5	1.0	4.1
29-Jan	2.8	3.3	1.5	0.5	0.3	0.9	1.3	1.3	0.9	0.7	1.2	1.7	2.1	2.8	3.3	3.1	2.1	0.7	-0.1	-0.6	-1.5	-2.2	-3.1	-3.7	0.8	3.3
30-Jan	-4.5	-5.0	-5.4	-5.5	-5.5	-6.3	-6.8	-6.6	-6.3	-4.9	-3.7	-1.8	-0.8	0.0	0.2	-0.1	-0.6	-1.2	-1.5	-1.7	-2.3	-2.7	-3.2	-4.1	-3.3	0.2
31-Jan	-5.4	-6.2	-6.6	-7.0	-7.3	-7.5	-7.5	-7.5	-7.6	-7.6	-7.5	-7.6	-8.2	-8.7	-10.3	-11.4	-12.2	-12.6	-12.7	-13.8	-14.9	-15.6	-15.8	-16.1	-9.9	-5.4
	-12.4	-12.6	-12.6	-12.6	-12.6	-12.5	-12.5	-12.6	-12.7	-12.4	-11.5	-10.6	-9.6	-9.0	-8.7	-9.1	-9.9	-10.5	-11.1	-11.3	-11.7	-11.9	-12.2	-12.5	Diurnal Average	
	2.8	3.3	2.9	2.8	2.2	1.7	1.3	1.3	0.9	1.0	2.0	2.9	3.1	3.1	3.6	3.1	3.2	2.6	4.2	4.5	4.1	4.1	4.1	3.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Statoil - Leismer - January 2016



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Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	115	15.46	15.46
-20 - 0	562	75.54	90.99
0 - 10	67	9.01	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Statoil - Leismer - January 2016

Maximum Value: 97 % on Jan 26 11:00

Maximum Daily Average: 92.1 % on Jan 24

Minimum Value: 41 % on Jan 3 15:00

Minimum Daily Average: 55.5 % on Jan 1

Maximum Diurnal Average: 82.1 % at hour 9

Minimum Diurnal Average: 75.1 % at hour 15

Monthly Average: 80.1 %

Percentiles: $P_1 = 48$ $P_{10} = 65$ $Q_1 = 76$ Median = 83 $Q_3 = 87$ $P_{90} = 89$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

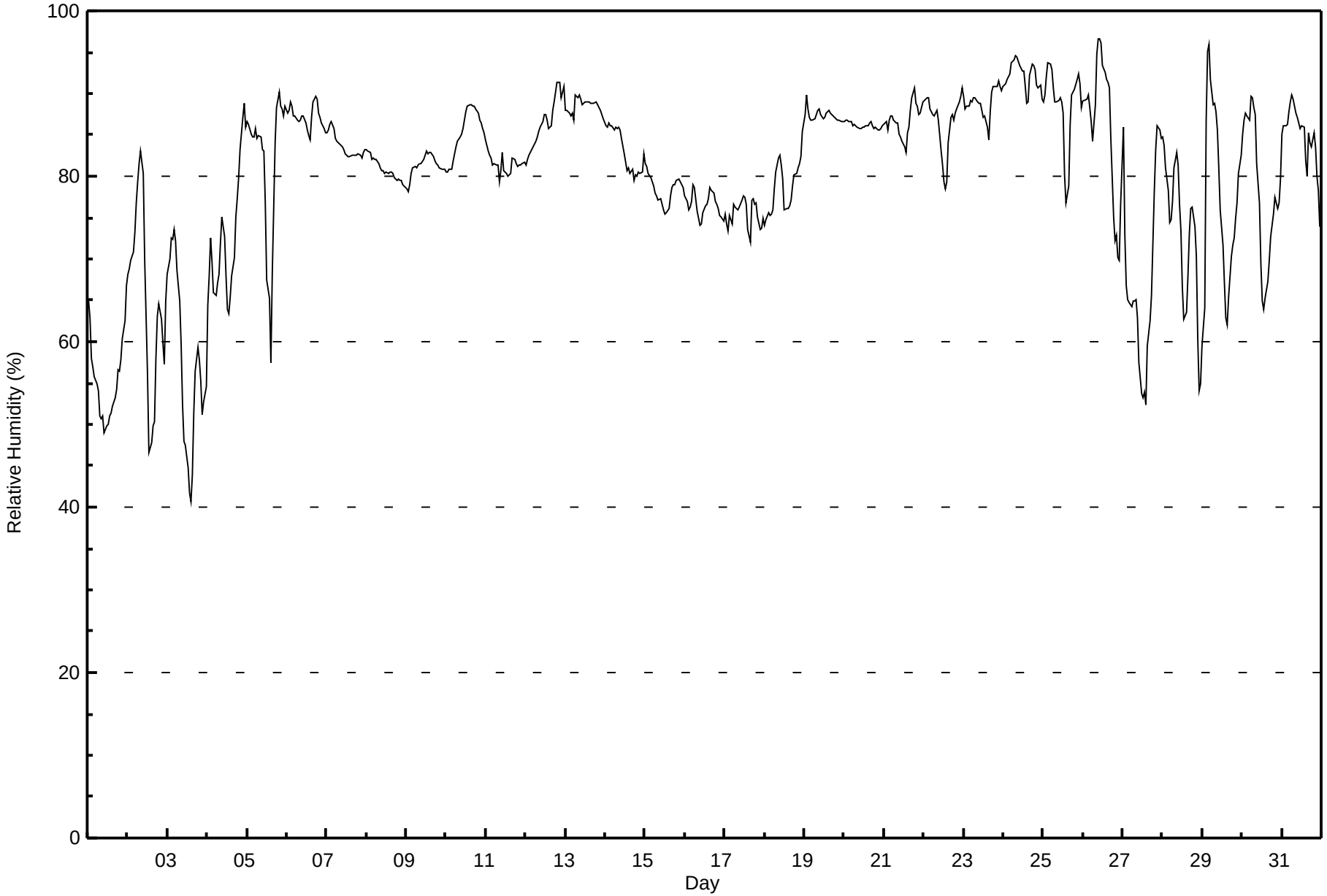
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	65	63	58	57	56	55	54	51	51	51	49	50	50	51	51	52	53	54	57	56	58	60	63	67	55.5	67
2-Jan	68	69	70	71	73	77	79	81	83	80	70	63	56	47	48	50	50	58	63	65	63	60	57	65	65.2	83
3-Jan	68	70	73	72	74	72	69	65	60	52	48	47	45	42	41	44	51	56	59	58	55	51	53	55	57.5	74
4-Jan	64	68	72	70	66	66	67	68	72	75	73	68	64	63	66	68	70	75	77	80	83	87	89	86	72.4	89
5-Jan	87	86	85	85	85	86	85	85	85	83	83	77	67	65	58	68	76	84	88	90	88	88	87	89	81.7	90
6-Jan	88	88	89	88	87	87	87	87	87	87	87	86	86	85	84	87	89	90	89	88	87	86	86	85	87.1	90
7-Jan	85	86	86	87	86	85	84	84	84	84	83	83	82	82	82	83	83	83	83	83	83	82	83	83	83.6	87
8-Jan	83	83	83	82	82	82	82	82	81	81	81	80	81	80	81	81	80	80	80	80	79	79	79	79	80.8	83
9-Jan	78	78	79	80	81	81	81	81	81	82	82	83	83	83	83	83	82	82	81	81	81	81	81	81	81.3	83
10-Jan	80	81	81	81	82	83	83	84	85	85	86	87	88	89	89	89	88	88	88	88	87	86	86	85	85.3	89
11-Jan	84	83	83	82	81	82	81	81	79	81	83	81	80	80	80	80	82	82	82	81	81	81	81	82	81.5	84
12-Jan	81	82	83	83	84	84	84	85	85	86	87	87	87	87	86	86	88	89	90	91	91	90	90	91	86.6	91
13-Jan	88	88	88	87	88	87	90	90	90	89	89	89	89	89	89	89	89	89	89	89	88	88	87	87	88.4	90
14-Jan	86	86	86	86	86	86	86	86	86	86	85	83	82	81	81	80	81	80	80	80	80	80	81	83	83.1	86
15-Jan	82	81	80	80	79	79	78	78	77	77	77	76	75	76	76	78	79	79	79	79	80	79	79	79	78.4	82
16-Jan	78	77	76	76	77	79	79	76	75	74	74	76	76	77	77	79	78	78	77	77	76	75	75	74	76.5	79
17-Jan	75	74	73	75	74	77	76	76	76	76	77	78	77	77	74	72	77	77	77	77	75	74	74	75	75.6	78
18-Jan	74	75	76	75	75	76	79	80	82	83	81	80	76	76	76	76	77	79	80	80	81	81	82	85	78.6	85
19-Jan	88	90	88	87	87	87	87	87	88	88	87	87	87	88	88	88	88	87	87	87	87	87	87	87	87.4	90
20-Jan	87	87	87	87	87	86	86	86	86	86	86	86	86	86	86	86	87	86	86	86	86	86	86	86	86.1	87
21-Jan	86	87	86	87	87	87	87	86	86	85	85	84	83	83	85	86	88	89	91	89	89	88	88	89	86.7	91
22-Jan	89	89	90	89	88	87	87	88	88	87	83	81	79	78	79	84	87	87	87	88	88	89	90	91	86.4	91
23-Jan	90	88	88	88	89	89	89	90	89	89	89	88	87	87	86	84	88	90	91	91	91	91	91	90	88.9	91
24-Jan	91	91	92	92	92	94	94	95	94	94	93	93	93	91	89	89	92	94	93	93	91	91	91	89	92.1	95
25-Jan	89	90	92	94	94	93	91	89	89	89	89	89	88	80	77	79	86	90	90	91	92	92	91	88	88.8	94
26-Jan	89	89	89	90	88	87	84	89	95	97	97	96	93	93	92	91	91	85	75	72	73	70	70	77	86.3	97
27-Jan	86	73	67	65	65	64	65	65	65	63	58	54	53	54	52	60	63	66	72	78	83	86	86	85	67.7	86
28-Jan	85	84	81	78	74	75	77	81	83	81	77	73	67	63	64	68	73	76	76	74	70	60	54	55	72.9	85
29-Jan	60	64	87	95	96	92	89	89	88	86	81	76	72	67	63	62	65	70	72	73	75	77	80	83	77.4	96
30-Jan	85	87	88	87	87	90	90	88	87	81	77	69	65	64	65	67	70	73	74	75	78	76	77	80	78.3	90
31-Jan	85	86	86	86	88	89	90	89	88	87	86	86	86	86	82	80	85	84	84	85	84	80	78	74	84.8	90
	81.4	81.3	81.9	82.1	81.9	82.0	81.9	82.0	82.1	81.5	80.0	78.5	76.9	75.7	75.1	76.4	78.6	80.0	80.5	80.7	80.7	80.1	80.0	80.7	Diurnal Average	
	91	91	92	95	96	94	94	95	95	97	97	96	93	93	92	91	92	94	93	93	92	92	91	91	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Statoil - Leismer - January 2016



501-45

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	53	7.12	7.12
60 - 80	215	28.90	36.02
80 - 100	476	63.98	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

Statoil - Leismer - January 2016

Maximum Speed: 35 km/h on Jan 29 07:00

Maximum Daily Speed Average: 23.2 km/h on Jan 29

Minimum Speed Value: 0 km/h on Jan 16 20:00

Minimum Daily Speed Average: 0.8 km/h on Jan 8

Maximum Diurnal Speed Average: 4.3 km/h at hour 11

Minimum Diurnal Speed Average: 1.5 km/h at hour 18

Monthly Average Velocity: 3.1 km/h 297.8 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 5 $Q_3 = 9$ $P_{90} = 16$ $P_{99} = 30$

Hours in Service: 744

Hours of Data: 744

Hours of Missing Data: 0

Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	WNW15	WNW17	WNW17	WNW17	W12	WNW15	W15	WNW15	WNW19	WNW19	WNW20	WNW20	WNW21	WNW21	WNW18	WNW19	W15	W8	W7	WNW14	WNW16	WNW14	WNW12	W11	WNW15.6	WNW21
2-Jan	WNW10	WNW16	NNW16	NNW18	NNW15	WNW8	WNW8	W5	WSW2	SSW3	SSW3	SW3	WSW4	W7	SW7	SSW7	SSW3	SSW6	SSW5	SW3	WNW2	W3	WSW4	S3	W4.5	NNW18
3-Jan	S3	SSW3	SW2	SSW4	SSW4	SSW5	SSW4	SSW4	SSW3	WSW1	SSW6	SSW8	SW9	SW8	SW7	SSW7	SSW5	SSW4	SSW4	WNW3	W4	SSW5	W2	NNW4	SSW4.1	SW9
4-Jan	ESE2	E2	N4	N7	N7	NNE7	N7	N9	N9	N7	N12	N12	N10	N11	N10	N9	NNW7	NNW8	N9	NNW9	NNW7	NW3	NNW4	N5	N7.0	N12
5-Jan	WNW5	NW4	N5	N6	N6	N6	NNW4	N7	N5	NNW1	N3	NW1	NW0	N2	SSW2	ENE2	E2	ESE2	E3	ENE3	NE5	ENE6	E3	ENE5	NNE2.5	N7
6-Jan	E5	E3	SE3	ESE4	E4	ENE6	E7	E6	E5	ESE7	E6	E5	E5	ENE5	ENE4	ENE4	E5	E5	E6	E5	E4	NNE3	NNE3	NNE3	E4.4	E7
7-Jan	NNE3	NNE3	N2	N4	N7	N8	N8	N9	N9	N9	NNW7	NNW6	N7	NNW8	N6	N6	NNW7	NNW6	NNW7	NW5	WNW5	W5	WNW6	WNW5	NNW5.6	N9
8-Jan	WNW5	NW4	NNE3	NE3	ENE3	ENE2	NE2	ENE3	ENE3	NE3	E2	SSE2	SSE1	SSE2	SSE2	SSE2	SSE2	SE2	SE2	SSE2	SSE2	SSE2	S2	S2	E0.8	WNW5
9-Jan	S2	SSW1	S1	SW2	SW2	SSW2	SSW2	SSW2	SW2	WSW2	SW2	SW2	SW2	SSW3	SSW4	SSW4	SSW4	SW3	SW2	SW2	SW2	SSW3	S2	SSW1	SSW2.1	SSW4
10-Jan	SSW1	SE1	SSE1	WNW2	WNW3	W3	W3	W6	WNW10	WNW11	WNW11	NW13	NW15	NW18	NNW17	NNW15	NNW15	NNW14	NNW14	NNW14	NNW14	NNW15	NNW13	N12	NW9.2	NW18
11-Jan	NNW13	NNW14	NNW14	NNW17	NNW17	NNW18	NNW15	NNW15	NNW15	NNW13	NW18	NNW14	NNW12	NNW9	N8	NW5	WNW6	WSW3	SSW2	SSE3	S3	S3	SSE4	SE3	NNW8.4	NNW18
12-Jan	SE5	SE5	SSE4	SSE4	SSE5	SSE6	SE5	SSE6	SSE7	S6	SSW6	SW6	SW5	SSW5	SSW4	S2	SSW4	SSW4	WSW3	WSW3	S2	S2	WSW2	NW5	S3.4	SSE7
13-Jan	N2	SSE4	E2	NE4	ENE1	SE3	ESE5	SSE3	E2	ESE5	SE4	ESE5	ESE5	ESE6	ESE6	ESE8	ESE7	E5	E4	E6	E5	E4	ENE5	ENE5	ESE4.0	ESE8
14-Jan	NE6	NE5	ENE3	NE5	ENE4	NNE6	N7	N9	NNE8	N8	N10	N11	N10	N12	N13	N14	N13	N13	N11	NNE9	NNE7	NNE7	NNE7	ENE6	NNE7.9	N14
15-Jan	NE7	E7	ENE5	ENE4	E5	ENE6	ENE6	ENE5	ENE4	NE4	NNE4	ENE6	E5	NNE1	E2	E4	E3	ESE5	E4	ENE4	ENE5	E4	ESE4	SE1	ENE4.2	NE7
16-Jan	ENE1	NNE2	NNE3	N3	NNW3	WNW5	NW6	NNE6	NNW4	N3	W3	W2	WSW3	NW2	NNW3	WSW2	SSE1	ESE2	E1	N0	NNW1	NNE3	E2	N2	NNW1.6	NW6
17-Jan	NNW2	N3	NNE2	E1	SE1	S2	S1	SSE1	SE2	SSE3	S4	SSE6	SSE8	S7	S8	S10	SE7	SE10	SSE9	SSE9	SSE11	SSE10	SE9	SE8	SSE4.7	SSE11
18-Jan	SE9	SE7	SE9	SE8	SE9	SE8	SE6	SE6	SSE7	SSE9	S9	S7	SSW7	SSW6	SW4	SSW4	SW4	SSW4	SSW3	SW3	SW3	SW3	SW4	W4	SSE4.7	S9
19-Jan	W4	W5	W2	SW2	SW3	W3	W3	W6	NW4	NNW4	WNW3	NNW4	NNW4	W2	NNW2	NNE4	NNE6	NNE6	NE5	NE5	E4	NE3	ENE3	ESE4	NNW1.6	NNE6
20-Jan	ESE5	SE3	ESE5	ESE4	E2	SE1	ESE2	ESE4	SSE4	SE4	SSE5	SSE6	SSE5	SSE5	SSE6	SSE5	S5	SSW5	S4	S5	SSW5	SSW5	SSW5	SSW5	SSE3.9	SSE6
21-Jan	SSW6	SSW6	SSW8	SSW6	S5	S5	SSE6	SSE6	SSE6	SE7	SSE6	SSE7	SSE9	SSE9	SSE12	SE10	SE12	SE11	SSE10	SSE12	S12	SSW8	SSW8	SSW6	SSE7.3	SSE12
22-Jan	SW7	SSW6	SSW4	SSW4	WSW3	W3	WNW3	WSW3	SW1	W3	WNW4	N5	N7	N3	NE4	NE5	NE4	SE7	E7	ENE6	ENE6	E6	E6	E8	ENE1.0	E8
23-Jan	E6	E4	ENE4	NE5	NE4	ENE3	SSE3	ESE4	ESE5	ESE5	ESE5	SE6	ESE5	SE4	SSE3	SE1	SE3	E2	SSE3	SSE3	S1	WNW3	W4	SSE3	ESE2.6	E6
24-Jan	S3	S2	S3	S3	SSW3	W5	WNW15	WNW14	WNW15	WNW14	WNW14	WNW13	WNW13	WNW13	WNW11	W8	W6	W6	WNW4	WNW7	WNW10	WNW11	WNW11	WNW16	WNW8.4	WNW16
25-Jan	WNW16	WNW13	NW12	WNW10	WNW10	WNW10	NW4	SW1	SSW1	SE4	SSE4	SSW4	S4	SW5	SW6	SSW7	SSW6	SSW6	SSW6	SSW4	SSW2	SSW4	W3	WNW6	W3.9	WNW16
26-Jan	WNW7	WNW6	W2	S2	SSW3	WSW3	WSW2	SW2	SW3	WSW5	WSW5	SW5	SW8	SW7	SW7	SW6	WSW6	W16	W27	W20	W21	W30	WNW30	WNW33	W9.6	WNW33
27-Jan	WNW24	WNW26	WNW31	WNW27	WNW26	WNW27	WNW29	WNW30	WNW30	WNW30	WNW30	WNW27	WNW23	WNW18	WNW16	W11	W8	SW3	SW2	S3	S3	SSE4	SSE4	SSE4	WNW16.9	WNW31
28-Jan	SSE7	SSW4	SSE4	SE5	SSE6	SSE8	SSE8	S7	SSW5	SSW4	SSW4	S4	SSW6	SW7	SSW8	SSW6	W6	SSW5	W5	W7	W16	WNW25	W27	W21	SW5.6	W27
29-Jan	W18	W27	W23	W23	WNW26	WNW35	WNW35	WNW34	WNW33	WNW30	WNW28	WNW27	WNW25	WNW23	WNW23	WNW22	WNW19	WNW19	WNW18	WNW19	WNW17	WNW15	WNW11	W10	WNW23.2	WNW35
30-Jan	W10	W11	WNW12	WNW11	WNW9	W6	W8	W7	WNW10	NW14	WNW17	NW14	NW15	NW15	NW15	NW15	WNW13	WNW11	WNW14	NW19	NNW20	NW20	NW17	NNW13	NW12.4	NNW20
31-Jan	NNE8	NNW9	NNW10	NNW10	N5	N2	NNE3	N8	N9	N8	NNW8	NNE5	NNE6	NNW13	N14	N13	N14	NNW11	NNW12	N13	N16	N15	N12	N11	N9.6	N16
	WNW2.6	WNW3.4	WNW3.3	NW3.2	NW3.0	WNW3.4	WNW3.5	NW3.5	NW3.9	WNW3.6	WNW4.3	WNW3.5	WNW3.5	WNW4.0	WNW3.3	WNW2.5	WNW2.1	W1.5	WNW2.1	WNW2.3	WNW2.9	WNW3.6	WNW3.4	WNW3.2	Diurnal Average	
	WNW24	W27	WNW31	WNW27	WNW26	WNW35	WNW35	WNW34	WNW33	WNW30	WNW30	WNW27	WNW25	WNW23	WNW23	WNW22	WNW19	WNW19	W27	W20	W21	W30	WNW30	WNW33	Diurnal Maximum	

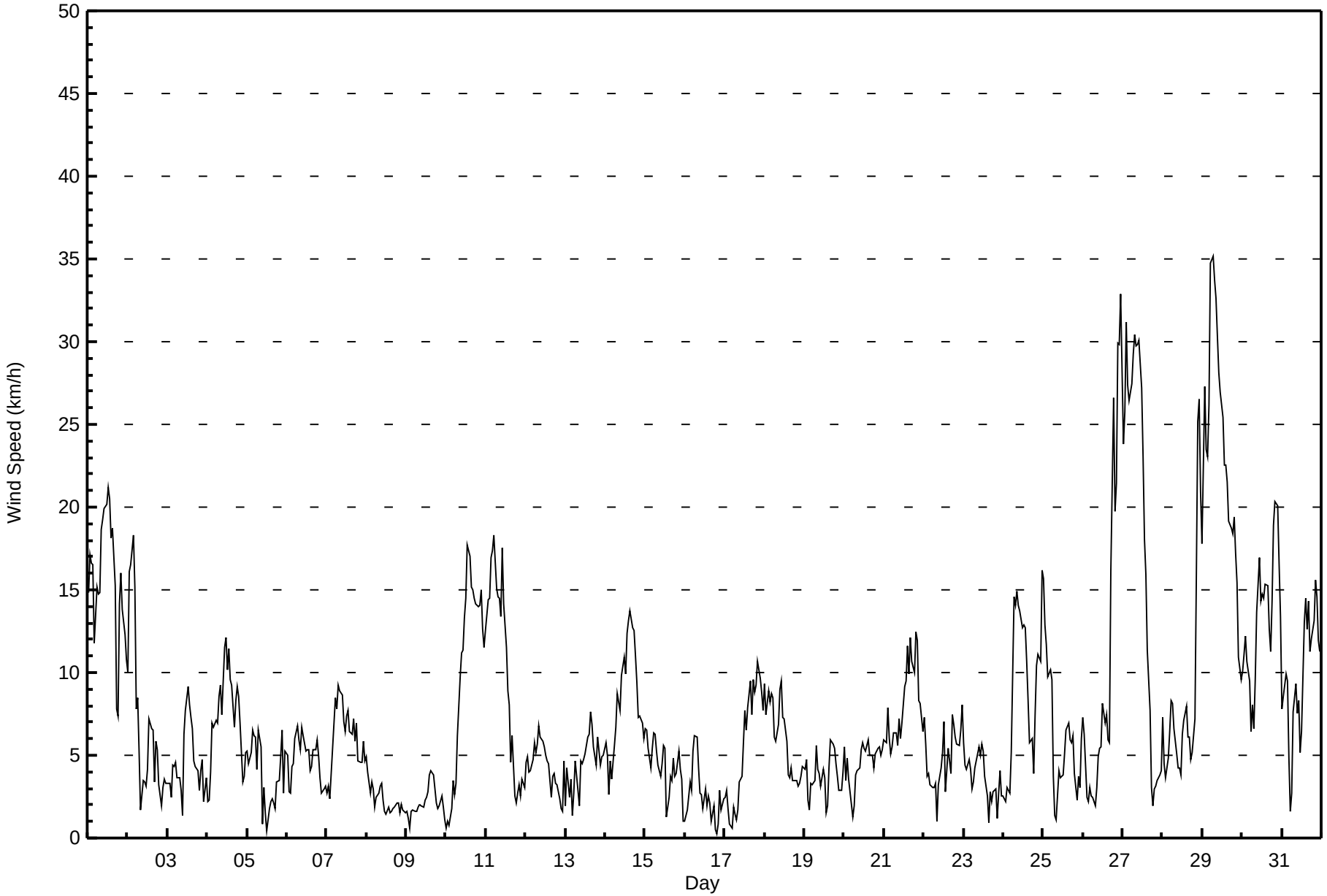
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Statoil - Leismer - January 2016



501-48

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	378	50.81	50.81
6 - 11	220	29.57	80.38
12 - 19	103	13.84	94.22
20 - 28	29	3.90	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

Statoil - Leismer - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	18	15	16	25	34	22	21	35	29	55	30	17	23	14	11	13	378
6 - 11	35	13	2	8	11	5	16	26	7	24	11	1	18	25	1	17	220
12 - 19	15	0	0	0	0	0	1	2	1	0	0	0	6	38	13	27	103
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	8	19	1	1	29
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	13	0	0	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	28	18	33	45	27	38	63	37	79	41	18	56	109	26	58	744

Total Number of Valid Hours: 744

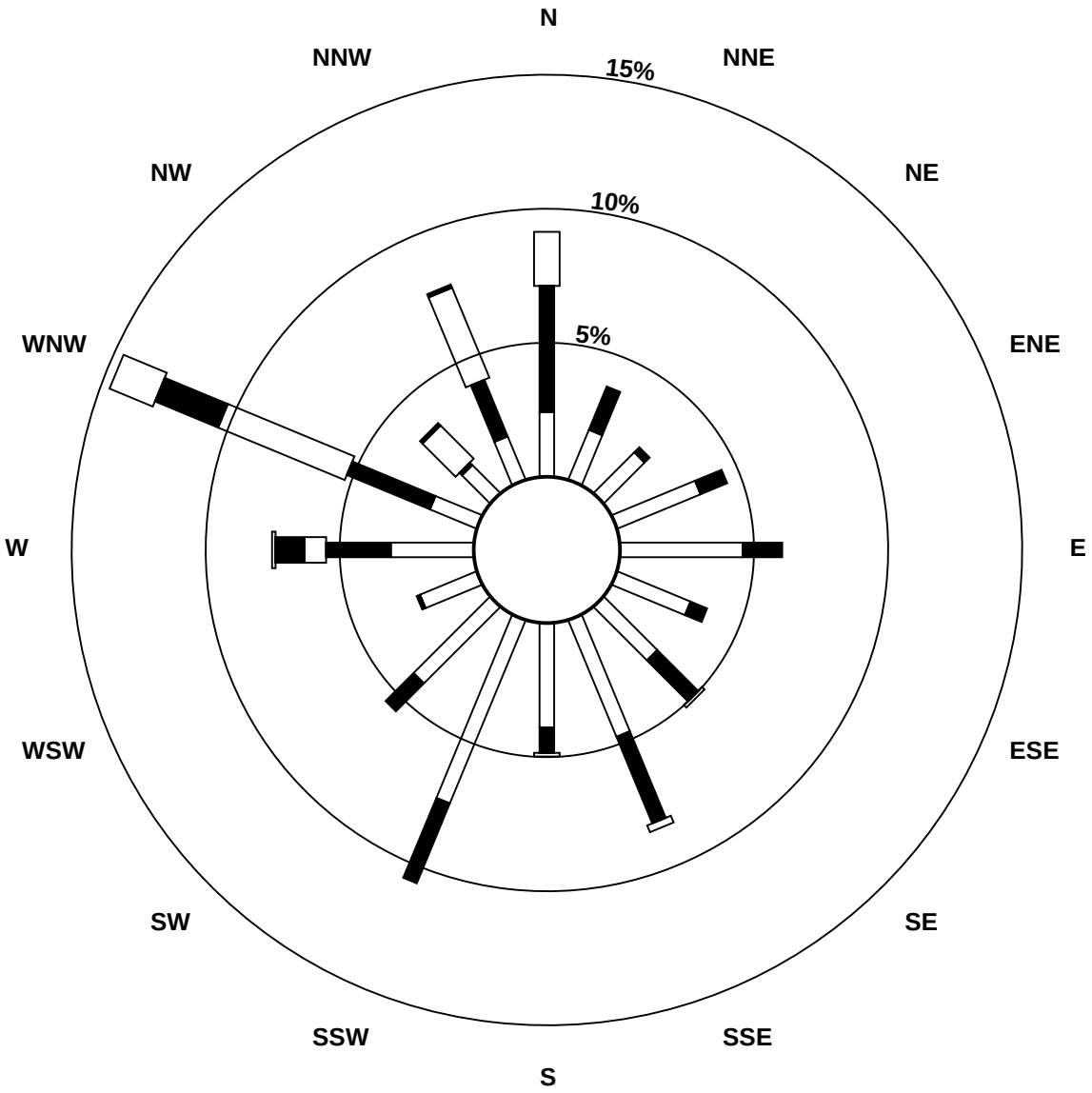
Total Number of Hours: 744

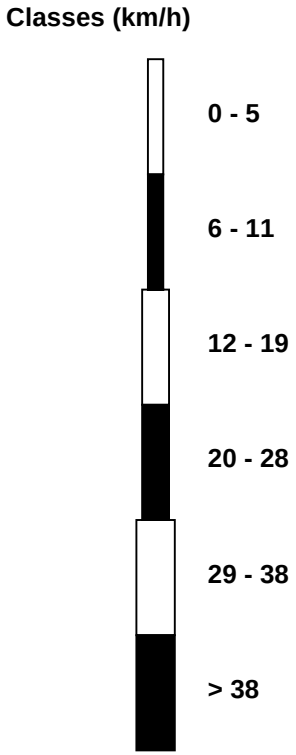
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

Statoil - Leismer (AMS501)





Total Number of Valid Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Statoil - Leismer - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Jan 27 00:00

Minimum Value: 0 km/h on Jan 8 16:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

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

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Statoil - Leismer - January 2016

Direction of Maximum Speed: 298 deg on Jan 29 07:00
Direction of Maximum Daily Speed Average: 290.8 deg on Jan 29

Direction of Minimum Speed: 358 deg on Jan 16 20:00

Direction of Minimum Daily Speed Average: 0.8 deg on Jan 8

Monthly Average Direction: 278.3 deg

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	283	289	294	284	276	285	281	283	292	293	294	288	289	287	288	283	280	271	276	289	292	288	286	281	286.5
2-Jan	288	298	331	332	338	294	282	281	241	197	205	222	240	277	214	212	205	204	209	217	285	266	243	187	280.2
3-Jan	187	198	217	207	195	201	198	197	208	239	202	203	215	220	218	212	199	198	205	292	262	213	270	333	213.5
4-Jan	112	97	2	1	356	14	5	354	355	354	1	9	0	6	3	358	337	343	352	345	334	317	333	350	356.9
5-Jan	287	322	1	358	350	360	343	2	359	329	354	322	314	353	208	75	95	116	80	78	53	62	98	64	15.7
6-Jan	94	91	128	123	85	77	94	88	89	120	92	86	83	57	70	70	80	94	88	100	99	28	15	29	85.9
7-Jan	26	13	354	2	3	358	350	355	357	354	336	347	351	332	349	352	347	338	331	312	286	274	288	286	341.5
8-Jan	286	320	16	40	58	58	38	59	63	43	85	147	148	165	160	162	164	142	145	163	157	164	177	184	93.7
9-Jan	182	195	181	234	216	210	206	203	220	237	228	221	233	206	202	205	210	218	214	226	219	200	187	205	211.6
10-Jan	195	143	160	294	289	268	259	274	286	289	290	311	324	326	330	333	339	337	336	338	341	330	337	350	323.1
11-Jan	335	332	331	338	345	338	347	340	342	332	325	338	335	333	350	316	283	250	200	161	171	170	165	144	333.8
12-Jan	138	144	160	152	158	154	146	149	162	169	205	214	228	207	210	184	203	213	245	243	186	175	238	322	183.5
13-Jan	7	147	84	50	69	125	114	162	81	123	127	113	121	123	106	105	105	97	85	97	83	83	76	77	102.3
14-Jan	56	54	67	47	65	18	11	7	15	1	356	357	357	0	352	350	356	4	9	18	27	31	22	61	11.6
15-Jan	53	90	71	78	94	58	67	71	78	41	32	75	101	26	79	101	91	106	92	65	66	98	113	139	77.2
16-Jan	57	19	32	353	348	286	317	16	331	2	280	262	242	307	330	253	164	112	89	358	339	16	80	3	337.2
17-Jan	339	4	23	85	126	173	183	168	134	160	179	160	167	171	187	170	141	137	149	155	150	149	142	137	153.7
18-Jan	143	128	136	134	133	125	139	136	151	156	169	169	199	210	221	205	228	199	198	223	235	236	234	268	167.1
19-Jan	265	267	260	233	234	262	265	280	308	333	300	337	331	263	339	21	15	22	47	47	84	50	74	102	336.6
20-Jan	115	134	122	123	88	132	110	118	149	139	165	164	154	162	159	161	171	201	191	185	198	203	198	201	162.1
21-Jan	199	195	207	199	175	178	161	155	152	146	156	162	165	153	148	140	124	124	154	166	171	202	203	210	165.1
22-Jan	216	210	211	211	256	280	288	245	225	272	301	9	353	3	52	39	53	124	98	69	76	86	96	92	77.4
23-Jan	96	89	74	46	38	73	151	123	103	104	120	129	123	134	151	143	125	93	159	158	181	291	273	159	112.5
24-Jan	170	177	189	183	207	262	282	289	291	296	297	291	291	296	296	275	267	277	288	285	285	285	285	298	284.7
25-Jan	296	296	326	303	295	290	320	228	199	142	163	195	188	215	220	211	204	206	211	212	209	201	275	285	260.2
26-Jan	287	283	268	184	202	250	241	220	234	245	238	223	217	216	217	217	238	279	280	275	277	280	284	292	268.8
27-Jan	286	288	292	289	285	290	291	295	296	298	298	297	294	290	287	273	273	218	214	179	184	159	147	168	288.6
28-Jan	161	197	158	140	157	152	154	176	204	194	195	179	195	216	210	212	268	210	269	259	275	282	281	276	234.4
29-Jan	276	277	277	281	291	299	298	295	295	297	296	297	299	296	292	288	287	285	286	289	291	294	284	281	290.8
30-Jan	281	277	283	283	284	261	272	268	295	305	297	317	320	316	317	321	288	283	287	317	327	326	326	332	304.4
31-Jan	23	348	335	340	349	357	16	350	357	357	344	19	16	345	349	2	354	340	348	3	355	354	359	1	354.2
	284.6	288.8	303.7	308.7	306.8	301.9	299.8	304.4	308.1	302.6	295.9	300.5	293.4	295.6	292.4	292.1	294.8	279.4	289.6	298.2	299.5	294.4	291.6	303.2	
	Diurnal Average																								

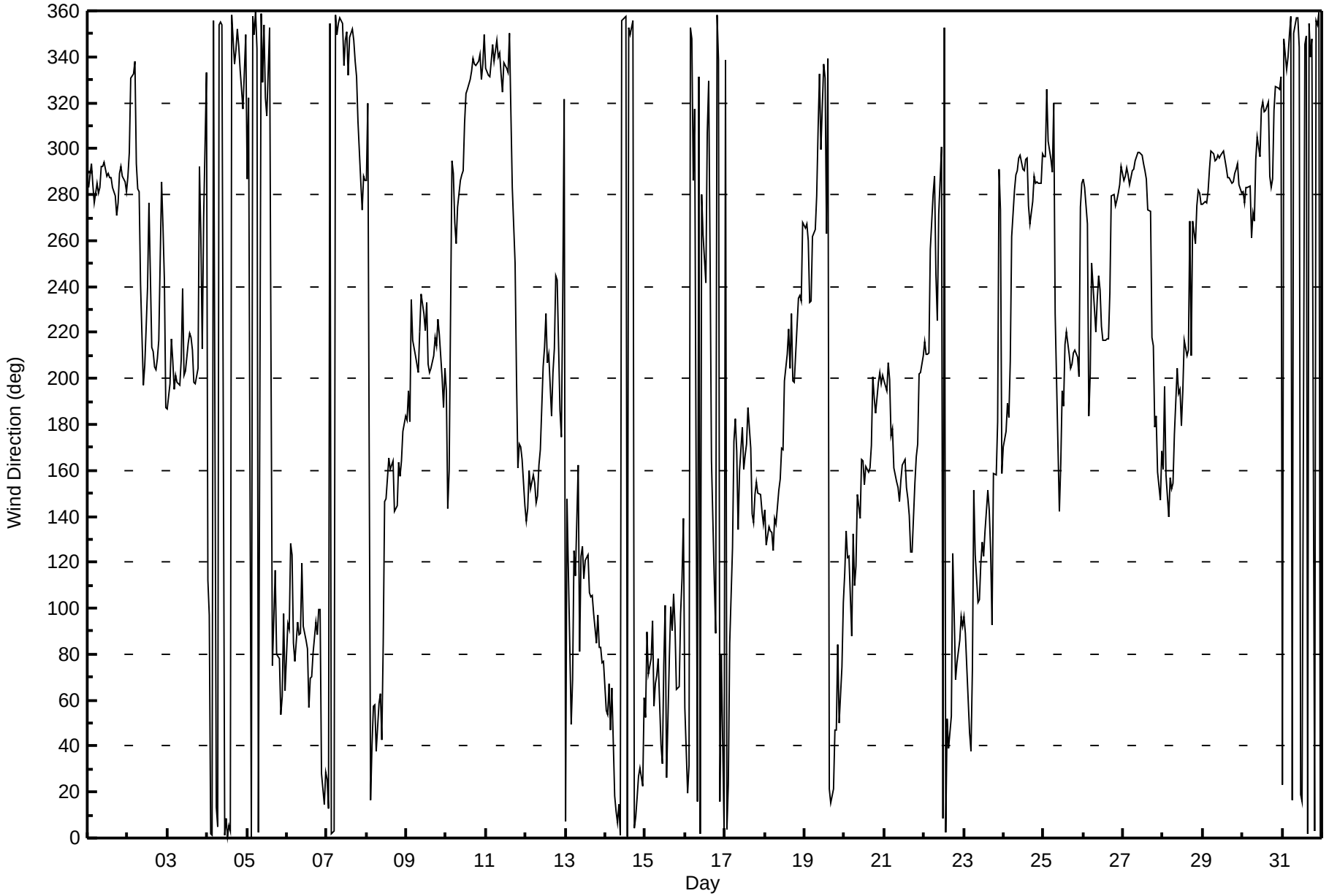
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Statoil - Leismer - January 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Statoil - Leismer - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 94 deg on Jan 3 10:00

Minimum Value: 6 deg on Jan 30 01:00

Percentiles: $P_1 = 8$ $P_{10} = 11$ $Q_1 = 13$ Median = 19 $Q_3 = 29$ $P_{90} = 45$ $P_{99} = 84$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	10	11	10	11	19	13	11	16	12	10	12	12	11	11	11	12	13	20	24	11	11	10	11	8	24
2-Jan	12	10	11	8	10	23	16	18	57	14	24	28	28	19	24	12	18	13	17	31	54	30	43	20	57
3-Jan	18	21	36	21	20	20	27	23	53	94	13	14	14	19	18	15	11	12	18	54	46	20	64	41	94
4-Jan	75	51	51	14	31	15	19	7	9	9	12	14	15	15	13	12	12	7	10	18	30	35	40	34	75
5-Jan	24	40	16	38	21	20	22	29	29	81	19	62	91	32	56	30	43	52	21	29	18	24	59	29	91
6-Jan	39	67	60	63	31	26	20	23	20	21	28	26	29	23	28	25	24	27	26	30	39	14	26	17	67
7-Jan	24	18	33	14	15	15	15	16	15	20	17	25	24	23	23	25	18	21	16	34	26	24	20	25	34
8-Jan	19	29	35	16	24	40	26	29	26	19	32	49	43	27	24	14	21	18	15	10	14	10	16	15	49
9-Jan	15	24	62	36	41	31	26	17	26	37	36	29	31	22	19	15	14	28	37	34	29	25	28	42	62
10-Jan	44	35	82	67	24	53	32	12	12	10	11	19	12	11	11	12	12	12	13	12	12	11	15	14	82
11-Jan	11	12	12	13	15	13	12	14	14	14	16	15	17	17	19	41	17	25	17	19	18	23	12	15	41
12-Jan	12	13	13	14	13	10	11	13	11	15	18	23	28	26	27	54	18	14	33	32	51	75	48	28	75
13-Jan	92	25	33	12	48	26	28	54	42	23	22	18	20	17	20	17	19	23	27	22	28	25	29	30	92
14-Jan	25	22	36	18	31	21	19	15	17	18	12	14	14	15	13	12	14	15	13	15	17	16	15	25	36
15-Jan	29	28	27	29	20	31	24	25	30	32	27	37	37	92	62	48	43	39	39	33	28	27	28	78	92
16-Jan	81	58	19	20	18	20	38	12	33	50	30	54	42	65	24	44	57	34	86	63	68	20	47	59	86
17-Jan	17	21	70	79	88	30	39	56	21	15	19	19	12	17	18	17	15	16	12	8	10	12	13	15	88
18-Jan	13	17	18	18	18	16	18	19	13	11	11	17	20	21	37	33	20	24	22	17	28	24	24	29	37
19-Jan	20	21	45	73	23	32	29	18	22	28	35	33	25	52	43	31	22	17	30	25	35	54	40	23	73
20-Jan	20	23	24	23	44	65	40	23	12	23	16	19	16	18	16	16	18	19	15	15	18	18	17	16	65
21-Jan	16	15	14	13	15	15	12	7	9	8	13	12	12	15	11	14	15	16	13	10	14	17	20	29	29
22-Jan	16	14	25	13	36	41	50	30	74	51	59	15	10	49	34	17	34	21	22	29	24	27	24	23	74
23-Jan	22	28	25	20	22	32	16	21	18	18	16	18	16	26	18	83	28	37	28	22	76	42	36	29	83
24-Jan	21	21	13	19	22	37	14	12	11	13	14	12	13	15	9	18	17	15	22	19	11	9	9	9	37
25-Jan	9	12	15	20	17	15	62	31	62	11	23	20	21	23	24	16	12	11	14	25	55	16	40	19	62
26-Jan	10	12	39	52	32	66	60	66	51	33	31	27	18	18	17	20	30	14	12	17	14	11	10	12	66
27-Jan	11	10	11	10	11	10	10	11	11	10	11	11	12	12	13	19	25	38	63	36	28	26	37	18	63
28-Jan	9	14	18	14	8	7	10	13	14	12	17	23	26	20	20	26	35	17	36	33	16	11	12	14	36
29-Jan	15	14	13	11	11	11	11	11	11	10	11	11	11	11	11	10	9	9	9	9	8	8	8	7	15
30-Jan	6	8	7	10	12	23	17	14	15	17	12	14	18	16	19	15	9	9	11	14	11	10	11	14	23
31-Jan	14	16	12	13	19	75	88	9	12	12	16	52	48	16	14	16	15	11	17	14	13	14	12	15	88
	92	67	82	79	88	75	88	66	74	94	59	62	91	92	62	83	57	52	86	63	76	75	64	78	
	Diurnal Maximum																								

Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	January 22, 2016	Last Calibration	December 11, 2015
Station Name	Statoil - Leismer	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	12:48
Gas Cert Reference	S990374A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2579

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	549	549
Analyzer IP address	192.168.1.72		Lamp voltage	2706	2684
Calculated slope	0.985259	1.001264	Chamber temp	50.1	50.0
Calculated intercept	1.880115	0.559419	Pressure	25.5	25.3
Analyzer Background	18.2	17.6	Flow	443	446
Analyzer Coefficient	1.052	1.051	Intensity	67	66

Analyzer make	API T100	Analyzer serial #	721

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.6	----
as found span	5000	63.1	631.0	628.9	1.003
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	63.1	631.0	630.1	1.001
second point	5000	31.6	316.0	314.2	1.006
third point	5000	15.8	158.0	157.1	1.006
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	63.1	631.0	623.3	1.012
				Average Correction Factor	1.004

Corrected As found	629.5	Previous response	638.6	% change	1.4%

Notes:

no maintenance done, filter changed out, Zero adjusted

Calibration Performed By: Melissa Lemay

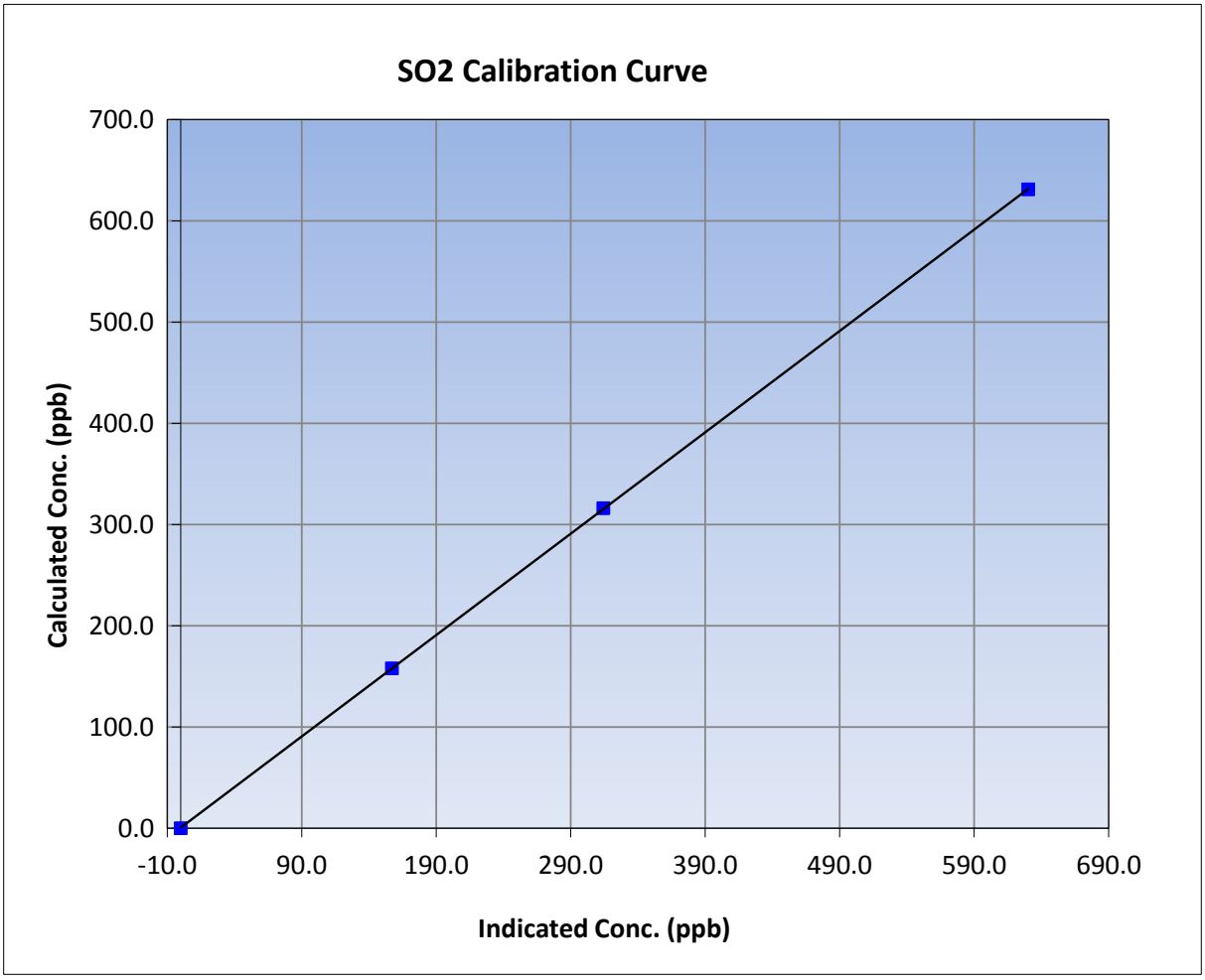
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

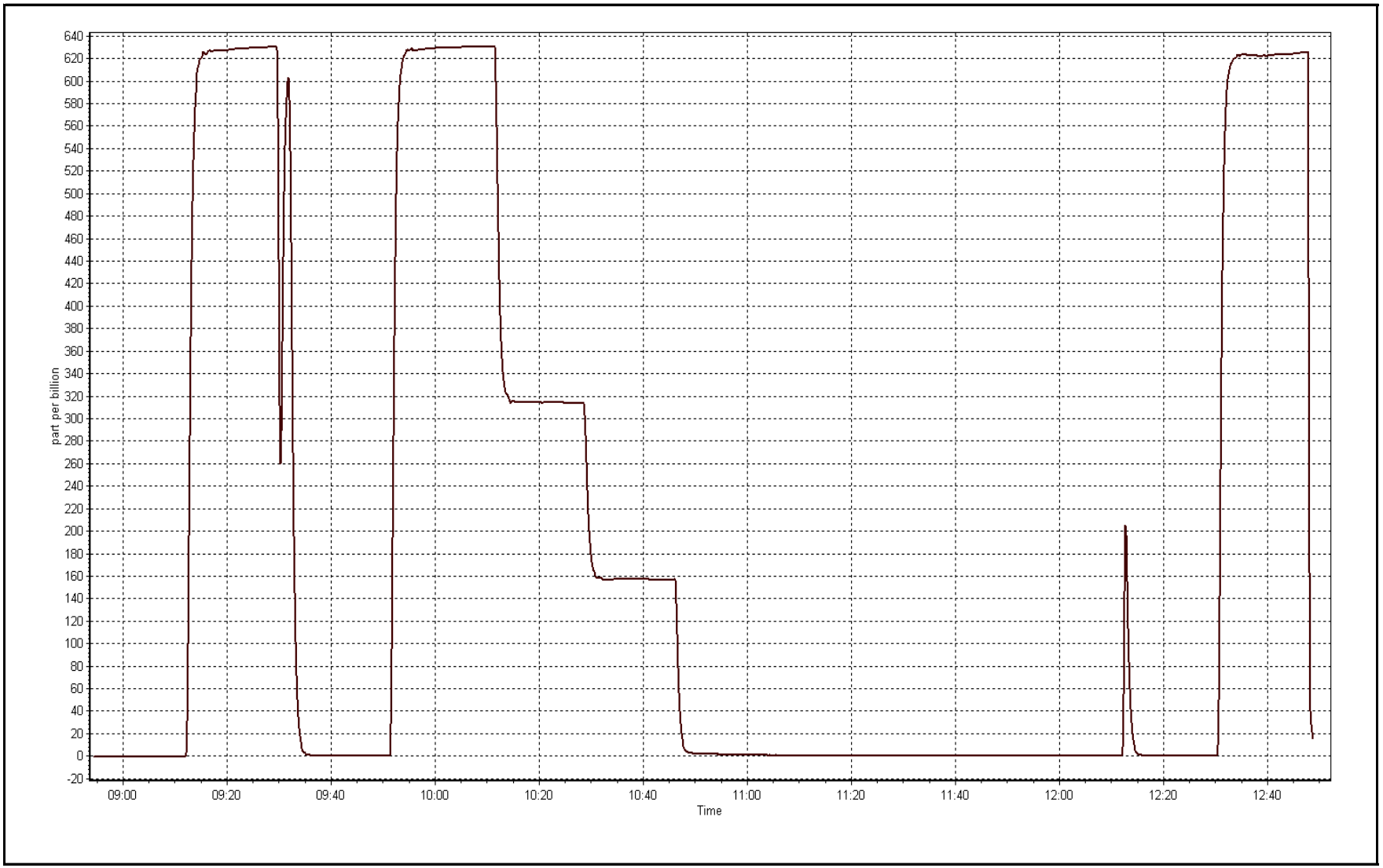
Calibration Date	January 22, 2016	Previous Calibration	December 11, 2015
Station Name	Statoil - Leismer	Station Number	AMS 501
Start Time (MST)	8:55	End Time (MST)	12:48
Analyzer make	API T100	Analyzer serial #	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999994
631.0	630.1	1.0014		
316.0	314.2	1.0057	Slope	1.001264
158.0	157.1	1.0057		
			Intercept	0.559419



SO2 Calibration Plot Date: January 22, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	January 27, 2016	Last Calibration	December 16, 2015
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	14:43
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	504	504
Analyzer IP address	192.168.1.75		Lamp voltage	1926	1874
Calculated slope	0.996424	1.004056	Chamber temp	50	50
Calculated intercept	0.315264	-0.532406	Pressure	22.4	22.2
Analyzer Background	20.7	21.2	Flow	535	530
Analyzer Coefficient	1.006	1.054	Intensity	48	46
			Converter temp.	314	314

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	na	Converter serial #	na

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	78.6	80.0	82.1	0.975
SO2 scrubber check	5000	15.8	158.0	2.5	----
calibrator zero	5000	0.0	0.0	0.4	----
high point	5000	78.6	80.0	80.1	0.999
second point	5000	39.3	40.0	40.6	0.985
third point	5000	24.6	25.0	25.5	0.982
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	78.6	80.0	80.4	0.995
				Average Correction Factor	0.989

Corrected As found	81.9	Previous response	80.0	% change	-2.3%

Notes:

SOX scrubber replaced after as found captured; span adjustment performed.

Calibration Performed By: Melissa Lemay

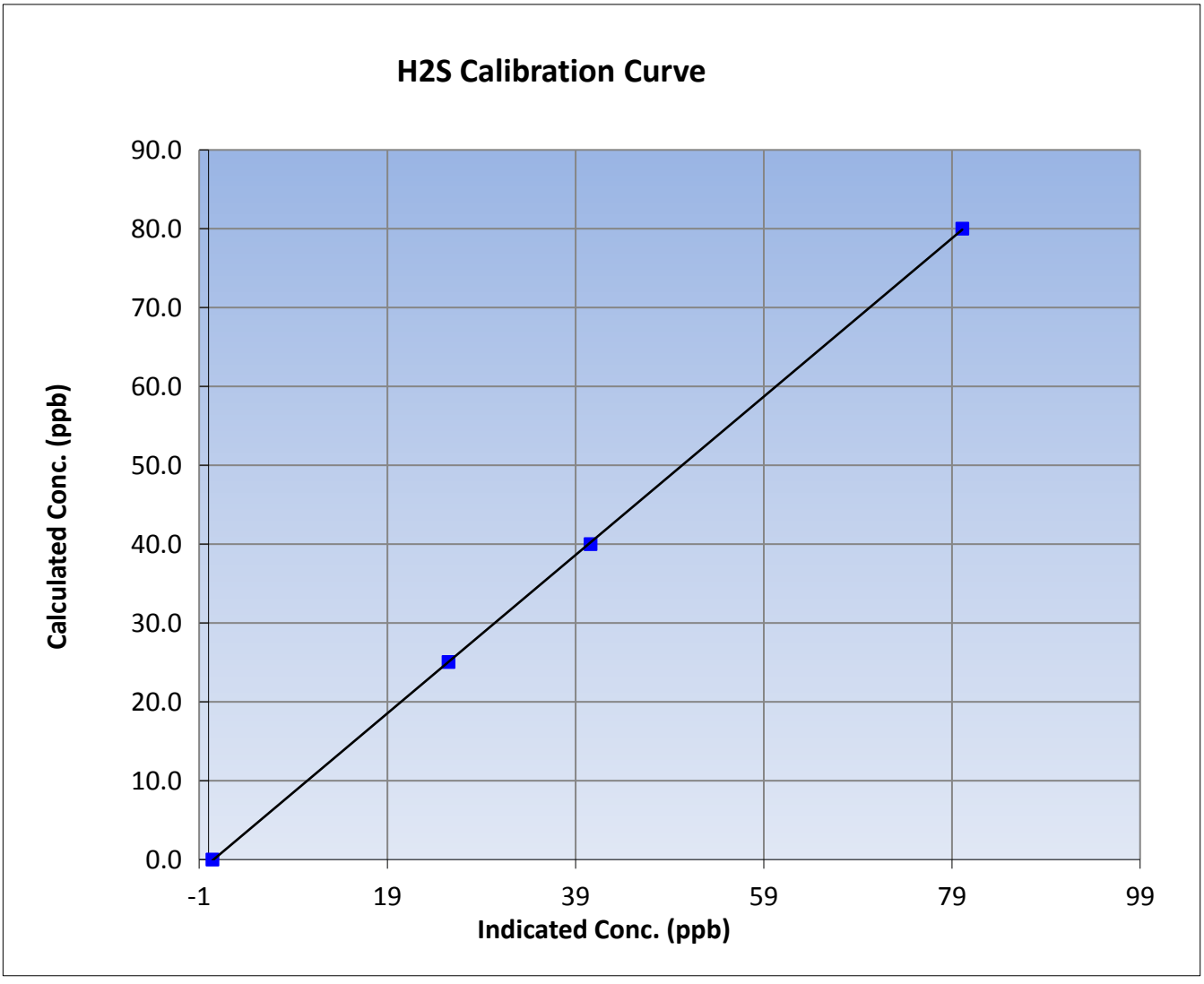
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

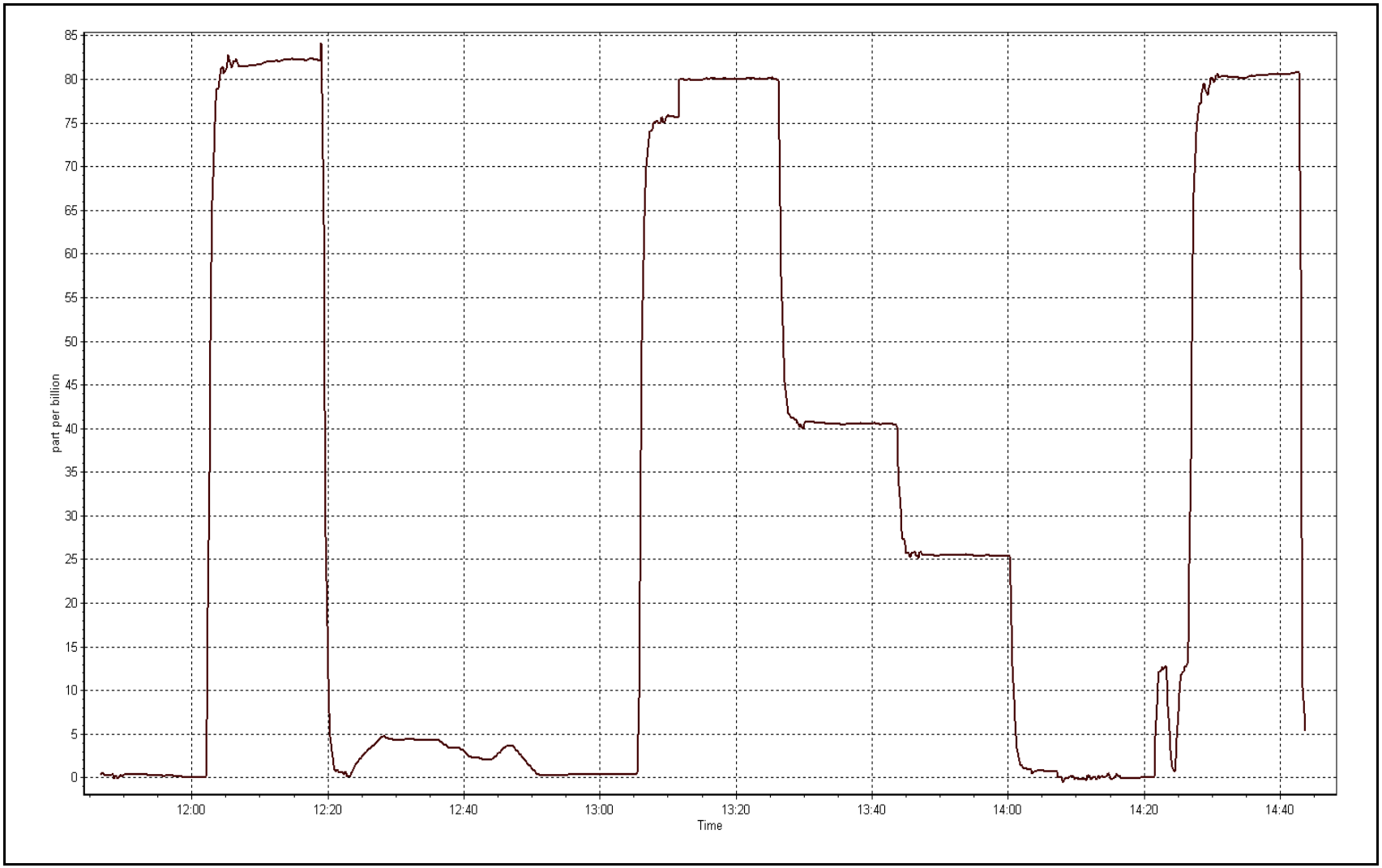
Calibration Date	January 27, 2016	Previous Calibration	December 16, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	11:45	End Time (MST)	14:43
Analyzer make	API T101	Analyzer serial #	157

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999975
80.0	80.1	0.9989		
40.0	40.6	0.9854	Slope	1.004056
25.0	25.5	0.9821		
			Intercept	-0.532406



H2S Calibration Plot Date: January 27, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 11, 2015
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	12:48
NO Cal Gas Conc	47.5 ppm	Gas Cert Reference	S990374A
NOx Cal Gas Conc	47.5 ppm	Cal Gas Expiry Date	26-Sep-17
Calibrator	Sabio 4010	Serial Number	11581008
Zero air Generator	Teledyne API T701	Serial Number	4522

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2579

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998673	0.999258	1.027093
	Data Offset	1.933621	1.956048	-0.185896
Current Calibration	Data Slope	1.001602	1.001655	1.032641
	Data Offset	0.894122	1.255844	-0.629582

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1118148498

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.835		0.820	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.4		4.3	
NOX bkgrnd	4.5		4.5	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	324.7	Deg C	324.7	Deg C
PMT voltage	-756.7	V	-756.3	V
PMT Temp	-3.1	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	182.2	mmHg	177.7	mmHg
R Cell Press Nox	182.2	mmHg	177.7	mmHg
NO sample flow	0.733	lpm	0.727	lpm
Nox sample Flow	0.733	lpm	0.727	lpm

Notes:

Span adjusted, Due to drift during the GPT, the second high GPT point used, filter changed out,

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 22, 2016 Station Number: AMS 501

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.3	0.2	----	----
as found span	5000	63.1	599.5	599.5	0.0	615.8	614.4	1.4	0.9734	0.9757
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
high point	5000	63.1	599.5	599.5	0.0	598.3	598.0	0.4	1.0019	1.0024
second point	5000	31.6	300.2	300.2	0.0	297.5	297.1	0.4	1.0091	1.0104
third point	5000	15.8	150.1	150.1	0.0	148.8	148.1	0.7	1.0087	1.0135
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
as left span	5000	63.1	599.5	290.0	309.5	616.8	305.2	311.6	0.9719	0.9502
								Average Correction Factor	1.0066	1.0088

Corrcted As found NO_X= 615.8 NO= 614.7 Percent Change NO_X= -2.8% NO= -2.7%

Previous Response NO_X= 598.3 NO= 597.9

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 63.10 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	290.0	311.2	591.6	290.0	301.6	1.0006	1.0000	1.0318	96.9%
2nd NO2 (200)	----	405.6	195.6	595.8	405.6	190.2	0.9936	1.0000	1.0284	97.2%
3rd NO2 (100)	----	486.7	114.5	598.8	486.7	112.2	0.9886	1.0000	1.0205	98.0%
4th NO2 (0)	601.2	----	0.0	601.2	601.2	0.0	0.9847	1.0000	N/A	----
					Average Correction Factor		0.9919	1.0000	1.0269	97.4%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

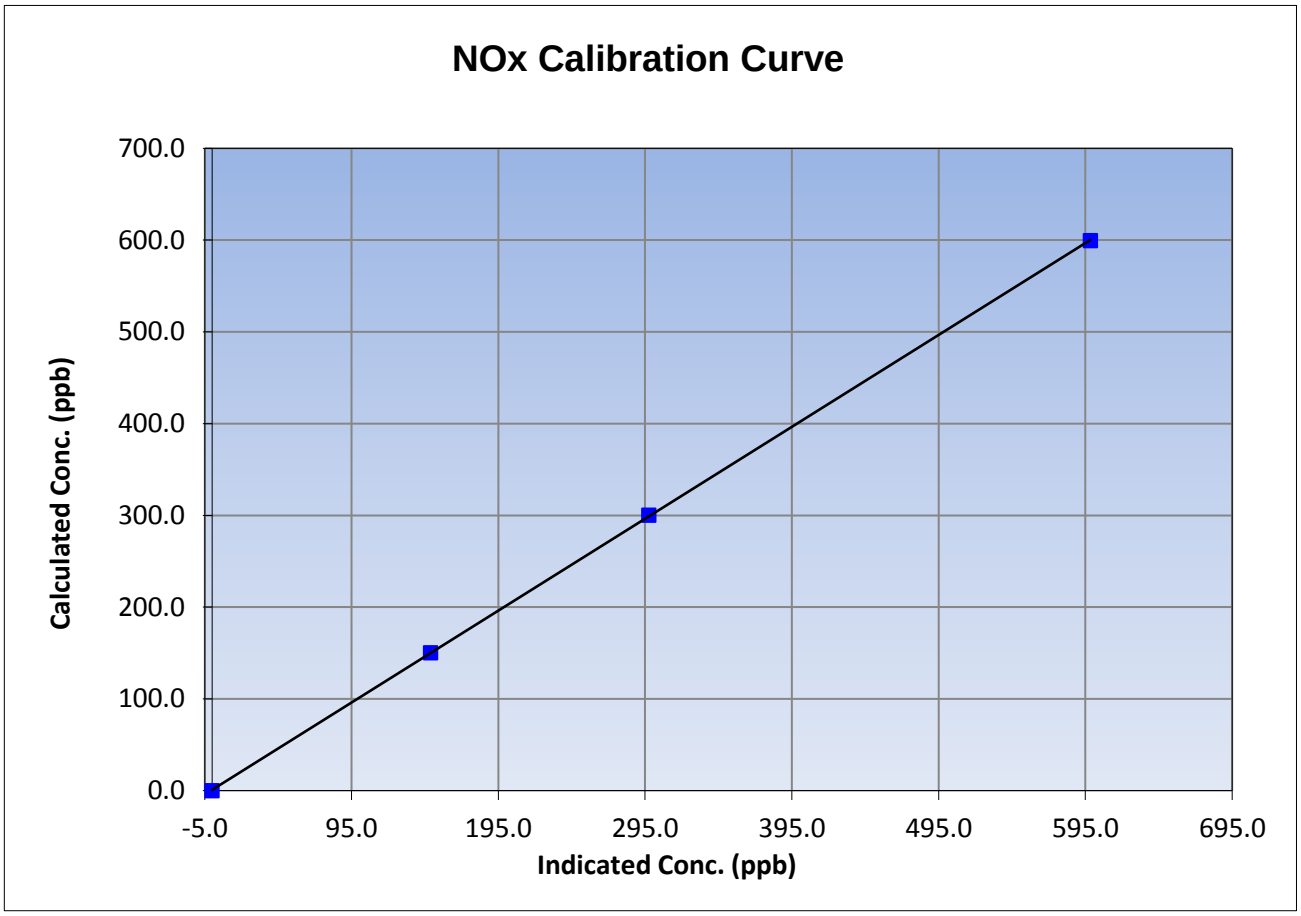
NO_X Calibration Summary

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 11, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:55	End Time (MST)	12:48
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999985
599.5	598.3	1.0019		
300.2	297.5	1.0091	Slope	1.001602
150.1	148.8	1.0087		
			Intercept	0.894122



Wood Buffalo Environmental Association

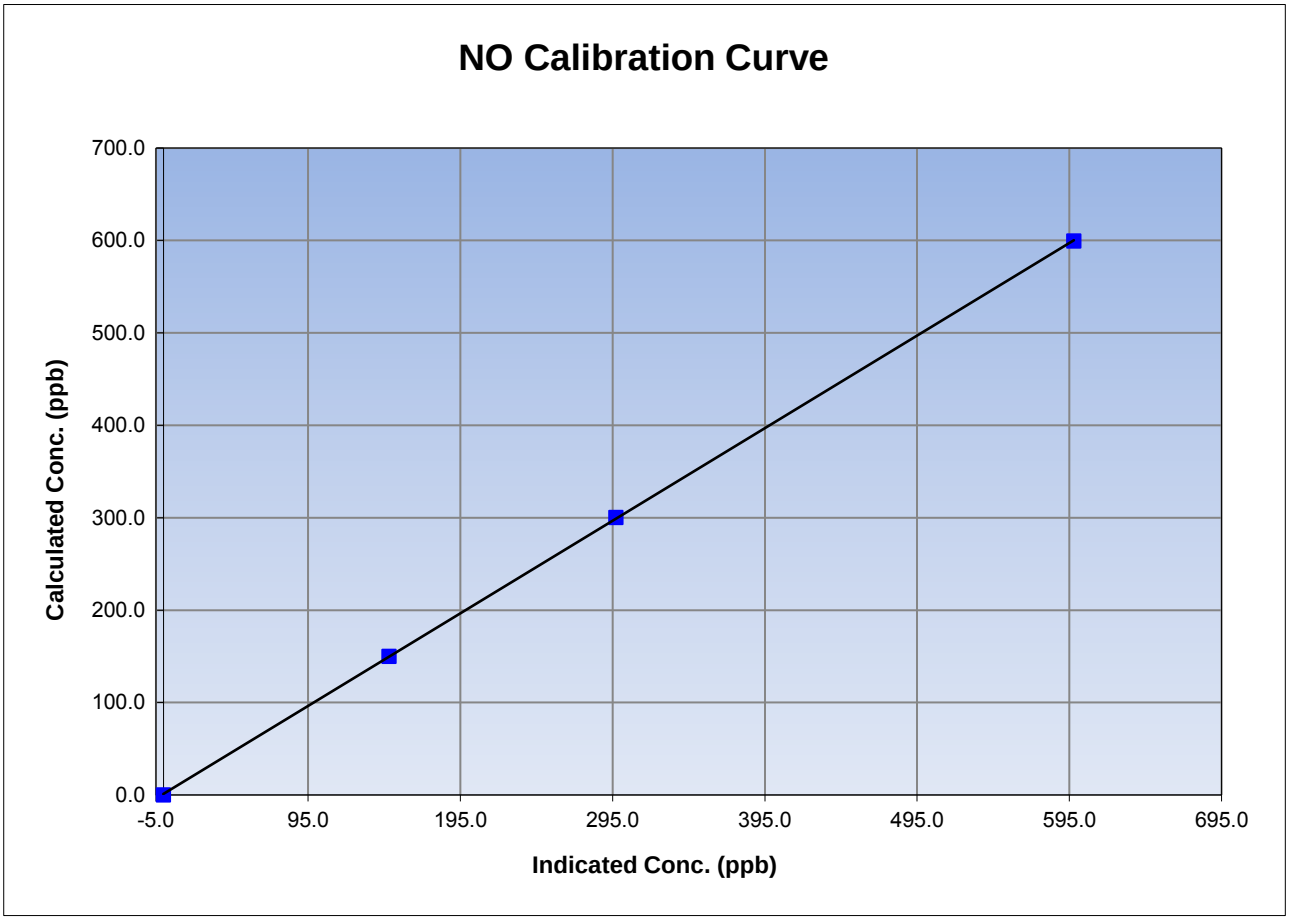
NO Calibration Summary

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 11, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:55	End Time (MST)	12:48
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999981
599.5	598.0	1.0024		
300.2	297.1	1.0104	Slope	1.001655
150.1	148.1	1.0135		
			Intercept	1.255844



Wood Buffalo Environmental Association

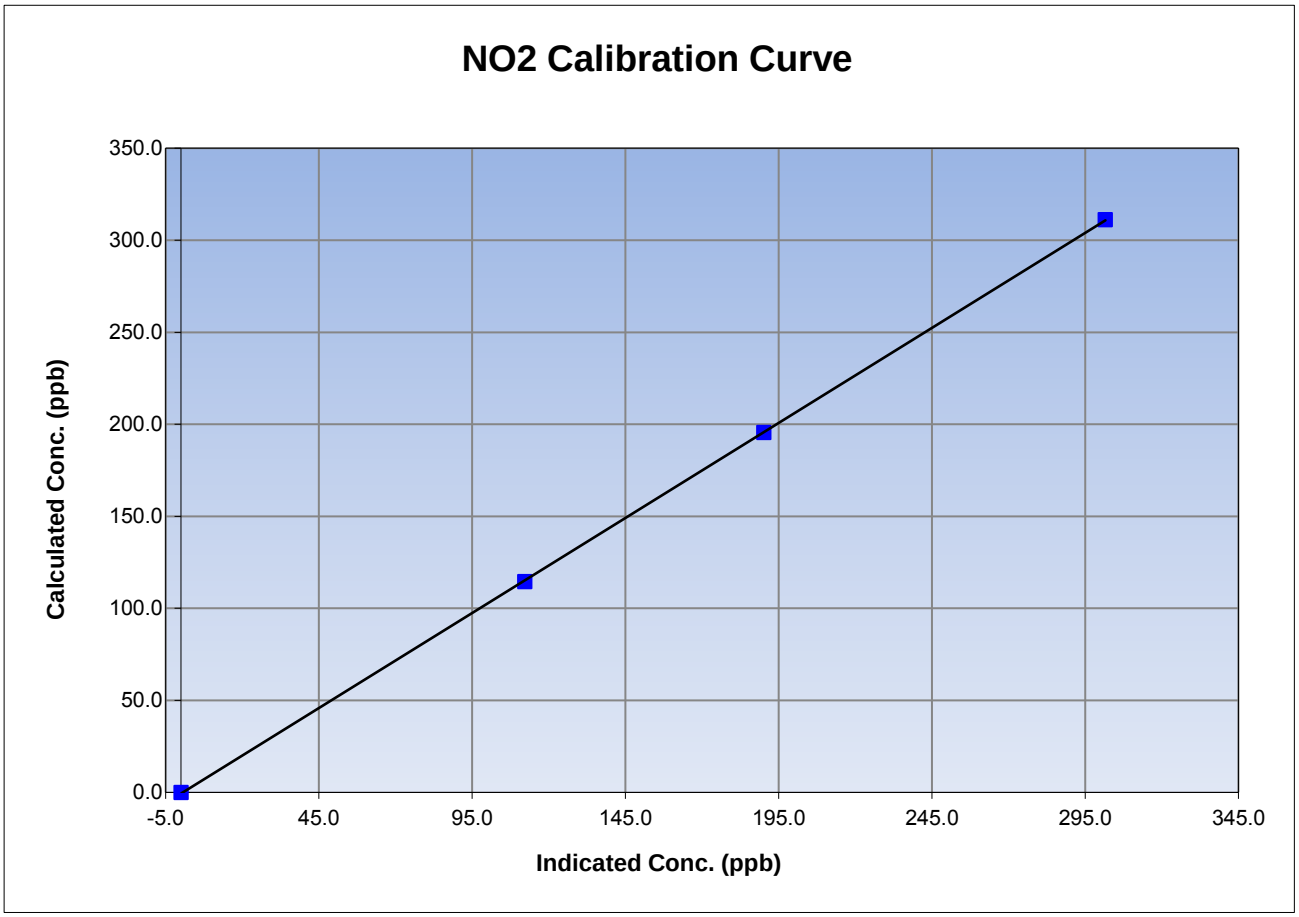
NO_2 Calibration Summary

Station Information

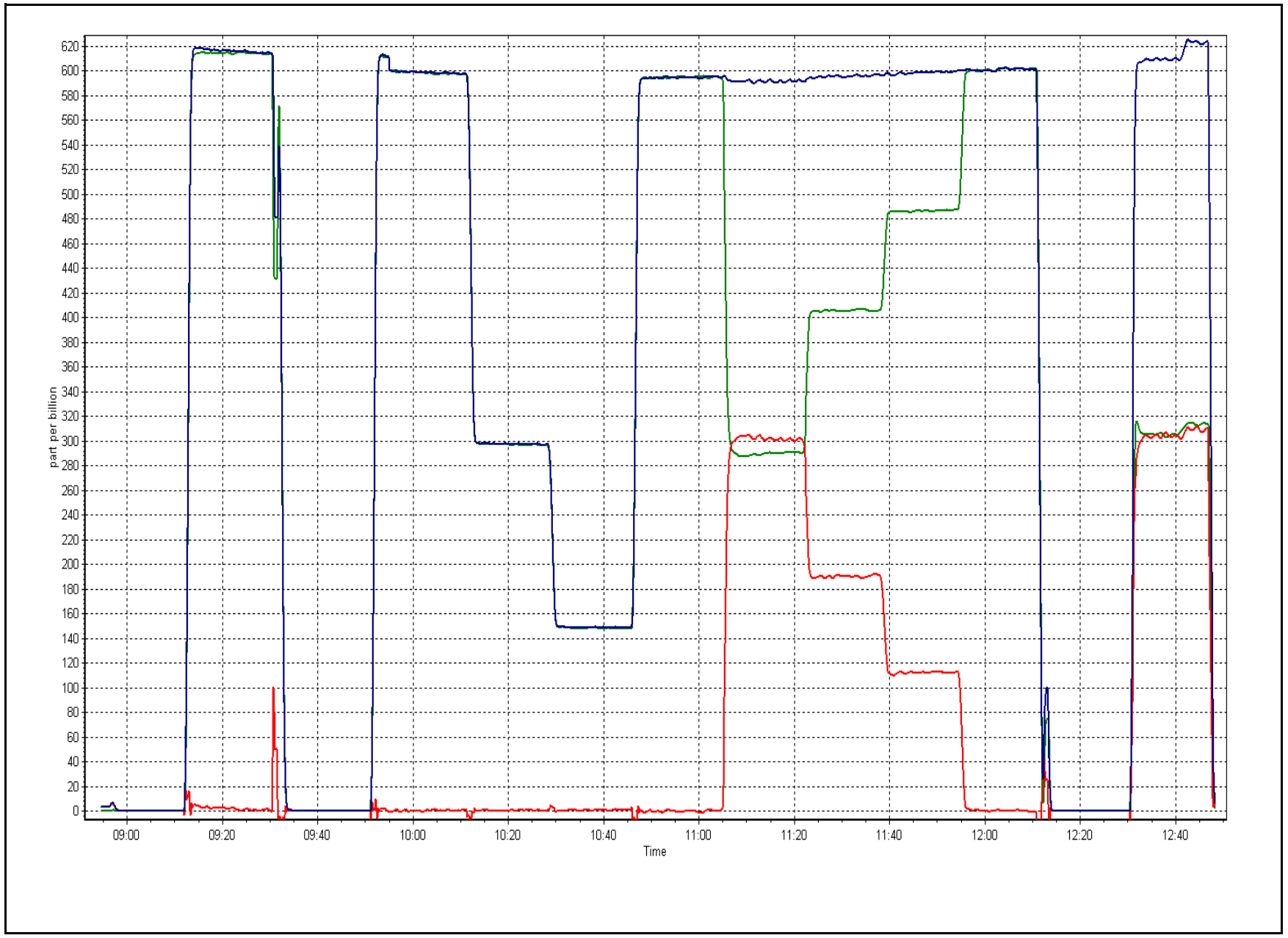
Calibration Date	January 22, 2016	Previous Calibration	December 11, 2015
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	8:55	End Time (MST)	12:48
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999981
311.2	301.6	1.0318		
195.6	190.2	1.0284	Slope	1.032641
114.5	112.2	1.0205		
			Intercept	-0.629582



NOX Calibration Plot Date: January 22, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 502
CONOCOPHILLIPS
SURMONT
JANUARY 2016

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

February 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
JANUARY 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	672	37	72	95.30	18	0	4	0
H2S (ppb) Average	699	38	45	99.06	1	0	1	0
NO2 (ppb) Average	707	37	37	100.00	29	0	10	-
NO (ppb) Average	707	37	37	100.00	24	-	7	-
NOX (ppb) Average	707	37	37	100.00	44	-	16	-
Temperature 2 m (C) Average	744	0	0	100.00	6.2	-	2.8	-
Relative Humidity (%) Average	744	0	0	100.00	94	-	91	-
Wind Speed 10 m (km/h) Average	736	0	8	98.92	42	-	30	-
Wind Direction 10 m (deg) Average	736	0	8	98.92	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
JANUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	672	1.2	2	-	0	0	0	1	1	3	18
H2S (ppb) Average	699	0.3	0	-	0	0	0	0	0	1	1
NO2 (ppb) Average	707	5.6	4	-	0	1	2	5	8	11	29
NO (ppb) Average	707	2.5	3	-	0	0	1	1	3	6	24
NOX (ppb) Average	707	8.1	7	-	0	1	3	6	11	17	44
Temperature 2 m (C) Average	744	-10.58	8.2	-	-26.6	-21.2	-17.5	-11.2	-3.6	1	6.2
Relative Humidity (%) Average	744	77.4	13	-	20	59	72	82	86	90	94
Wind Speed 10 m (km/h) Average	736	10.7	9	-	1	3	4	8	15	23	42
Wind Direction 10 m (deg) Average	736	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	05 Jan 2016 09:00	05 Jan 2016 11:00	3	Unstable operation - excessive baseline drift
SO2	06 Jan 2016 12:00	06 Jan 2016 17:00	6	Unstable operation - excessive baseline drift
SO2	06 Jan 2016 19:00	06 Jan 2016 21:00	3	Unstable operation - excessive baseline drift
SO2	07 Jan 2016 08:00	07 Jan 2016 11:00	4	Unstable operation - excessive baseline drift
SO2	09 Jan 2016 09:00	09 Jan 2016 11:00	3	Unstable operation - excessive baseline drift
SO2	11 Jan 2016 23:00	11 Jan 2016 23:00	1	Unstable operation - excessive baseline drift
SO2	12 Jan 2016 02:00	12 Jan 2016 03:00	2	Unstable operation - excessive baseline drift
SO2	25 Jan 2016 06:00	25 Jan 2016 13:00	8	Unstable operation - excessive baseline drift
SO2	27 Jan 2016 09:00	27 Jan 2016 09:00	1	Unstable operation - excessive baseline drift
SO2	27 Jan 2016 20:00	27 Jan 2016 23:00	4	Unstable operation - excessive baseline drift
H2S	02 Jan 2016 02:00	02 Jan 2016 02:00	1	Unstable operation - excessive baseline drift
H2S	03 Jan 2016 21:00	03 Jan 2016 21:00	1	Unstable operation - excessive baseline drift
H2S	05 Jan 2016 03:00	05 Jan 2016 03:00	1	Unstable operation - excessive baseline drift
H2S	08 Jan 2016 08:00	08 Jan 2016 08:00	1	Unstable operation - excessive baseline drift
H2S	24 Jan 2016 18:00	24 Jan 2016 18:00	1	Unstable operation - excessive baseline drift
H2S	27 Jan 2016 07:00	27 Jan 2016 07:00	1	Unstable operation - excessive baseline drift
H2S	28 Jan 2016 00:00	28 Jan 2016 00:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	16 Jan 2016 02:00	16 Jan 2016 03:00	2	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 20:00	16 Jan 2016 21:00	2	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	16 Jan 2016 23:00	17 Jan 2016 01:00	3	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	17 Jan 2016 05:00	17 Jan 2016 05:00	1	Flat line in sensor output signal - sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 18 ppb on Jan 3 20:00

Maximum Daily Average: 3.8 ppb on Jan 3

Minimum Value: 0 ppb on Jan 11 22:00

Minimum Daily Average: 0.3 ppb on Jan 13

Maximum Diurnal Average: 1.9 ppb at hour 20

Minimum Diurnal Average: 0.7 ppb at hour 4

Monthly Average: 1.2 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 3$ $P_{99} = 8$

Hours in Service:	744
Hours of Data:	672
Hours of Missing Data:	72
Hours of Calibration:	37
Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	3
2-Jan	1	Z	0	0	0	0	0	0	0	0	2	0	1	1	1	1	0	0	0	0	0	1	1	0	0.5	2
3-Jan	0	0	Z	1	1	0	0	0	0	1	2	2	1	1	1	1	2	8	9	18	17	10	6	4	3.8	18
4-Jan	3	2	2	Z	3	3	2	2	1	2	3	2	6	2	1	2	2	2	2	3	2	2	2	4	2.6	6
5-Jan	4	3	1	0	Z	1	0	0	UO	UO	UO	1	1	1	2	2	2	2	2	2	2	2	2	1	1.6	4
6-Jan	1	1	1	1	1	Z	1	0	0	0	0	UO	UO	UO	UO	UO	UO	0	UO	UO	UO	4	4	1	--	4
7-Jan	Z	1	1	1	1	1	0	UO	UO	UO	UO	0	0	0	1	2	3	5	3	2	2	2	2	1	1.5	5
8-Jan	1	Z	1	1	1	4	5	3	3	2	2	1	1	1	2	2	2	2	1	1	1	0	1	1	1.7	5
9-Jan	1	1	Z	0	0	0	0	0	UO	UO	UO	0	0	1	1	1	1	1	1	1	1	1	1	1	0.7	1
10-Jan	1	1	1	Z	3	1	1	1	3	2	1	1	4	3	1	1	1	1	2	5	5	4	3	2	2.1	5
11-Jan	1	1	1	5	Z	1	6	10	8	6	5	6	4	2	1	1	0	0	0	0	0	0	UO	0	2.6	10
12-Jan	0	UO	UO	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
13-Jan	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Jan	0	Z	0	0	2	4	2	0	1	3	3	3	2	1	1	0	1	1	0	1	1	1	0	0	1.1	4
15-Jan	0	0	Z	3	2	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0.6	3
16-Jan	1	1	1	Z	0	0	0	0	0	0	1	2	6	6	8	7	3	2	3	3	2	1	1	1	2.1	8
17-Jan	1	0	1	0	Z	0	0	0	1	0	0	1	1	1	1	1	2	2	2	2	2	1	4	4	1.2	4
18-Jan	5	5	3	1	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1.2	5
19-Jan	Z	1	1	1	1	0	0	0	0	1	1	0	0	1	1	1	1	1	2	3	3	2	1	1	0.9	3
20-Jan	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.5	1
21-Jan	0	0	Z	0	0	0	0	0	1	0	1	2	4	3	5	2	2	7	6	4	4	1	1	1	2.0	7
22-Jan	1	1	1	Z	1	1	1	1	1	1	C	C	C	C	C	C	3	2	1	1	1	1	1	1	--	3
23-Jan	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	4	0.6	4
25-Jan	Z	4	1	0	0	UO	UO	UO	UO	UO	UO	UO	UO	0	1	2	1	1	1	0	0	0	0	0	--	4
26-Jan	0	Z	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0.6	1
27-Jan	0	0	Z	0	0	0	0	0	UO	6	6	10	0	0	3	2	0	0	0	UO	UO	UO	UO	0	1.6	10
28-Jan	1	0	0	Z	1	3	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.6	3
29-Jan	1	1	0	0	Z	0	0	0	1	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0.5	2
30-Jan	0	0	0	0	0	Z	0	0	0	2	0	3	1	7	4	4	2	2	1	1	3	1	0	0	1.5	7
31-Jan	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	4	2	1	1	1	0	0	1	0.9	4
	1.0	1.2	0.8	0.7	0.8	0.9	0.8	0.9	0.9	1.2	1.3	1.5	1.4	1.4	1.4	1.5	1.4	1.5	1.5	1.9	1.8	1.3	1.2	1.1	Diurnal Average	
	5	5	3	5	3	4	6	10	8	6	6	10	6	7	8	7	4	8	9	18	17	10	6	4	Diurnal Maximum	

Z - zerospan C - Calibration UO - Unstable Operation

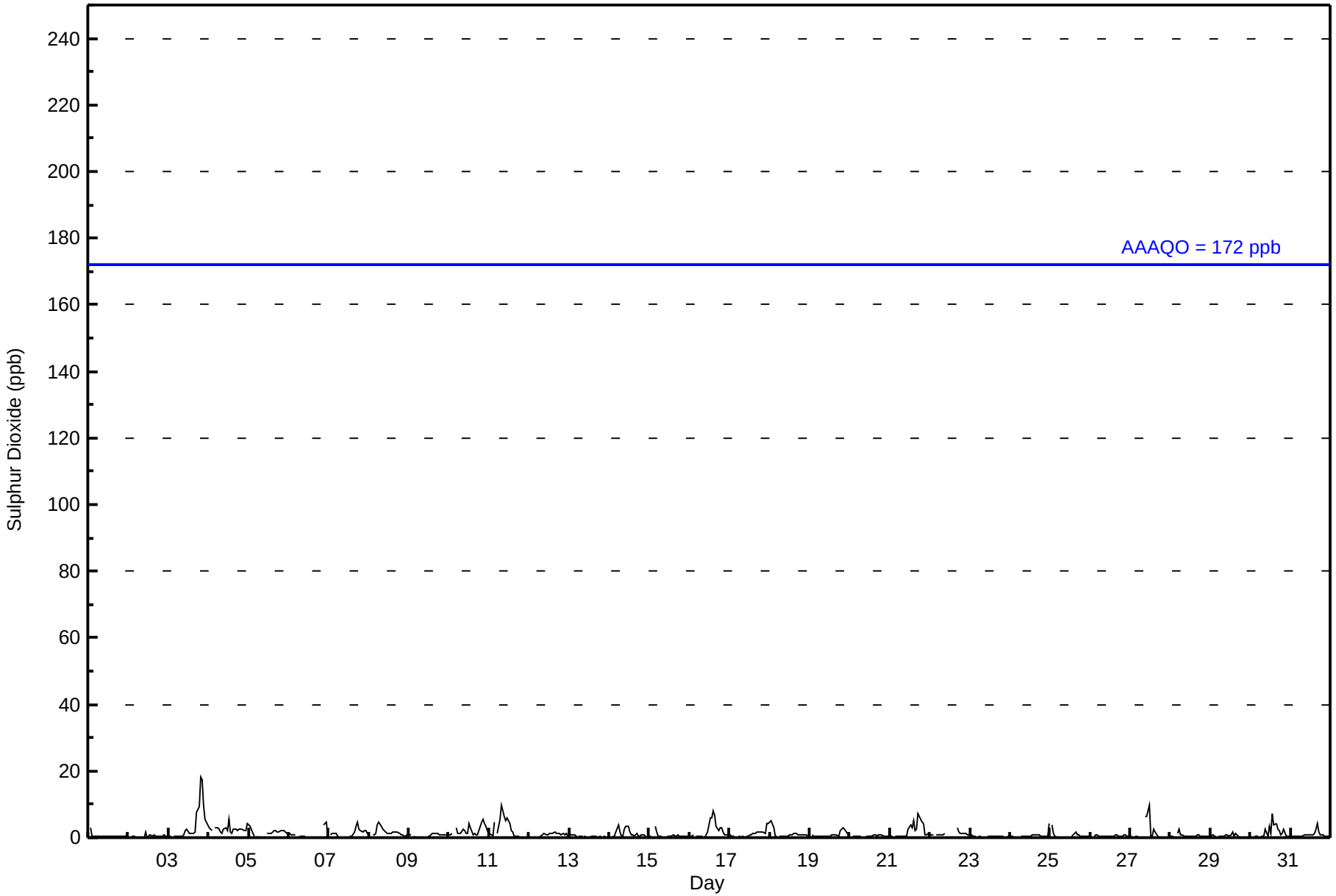
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - January 2016



Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	670	99.70	99.70
11 - 20	2	0.30	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: 672

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	55	31	19	10	11	13	40	37	52	39	42	50	115	70	16	63	663
11 - 20	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	31	19	10	11	13	40	37	52	39	42	52	115	70	16	63	665

Total Number of Valid Hours: 665

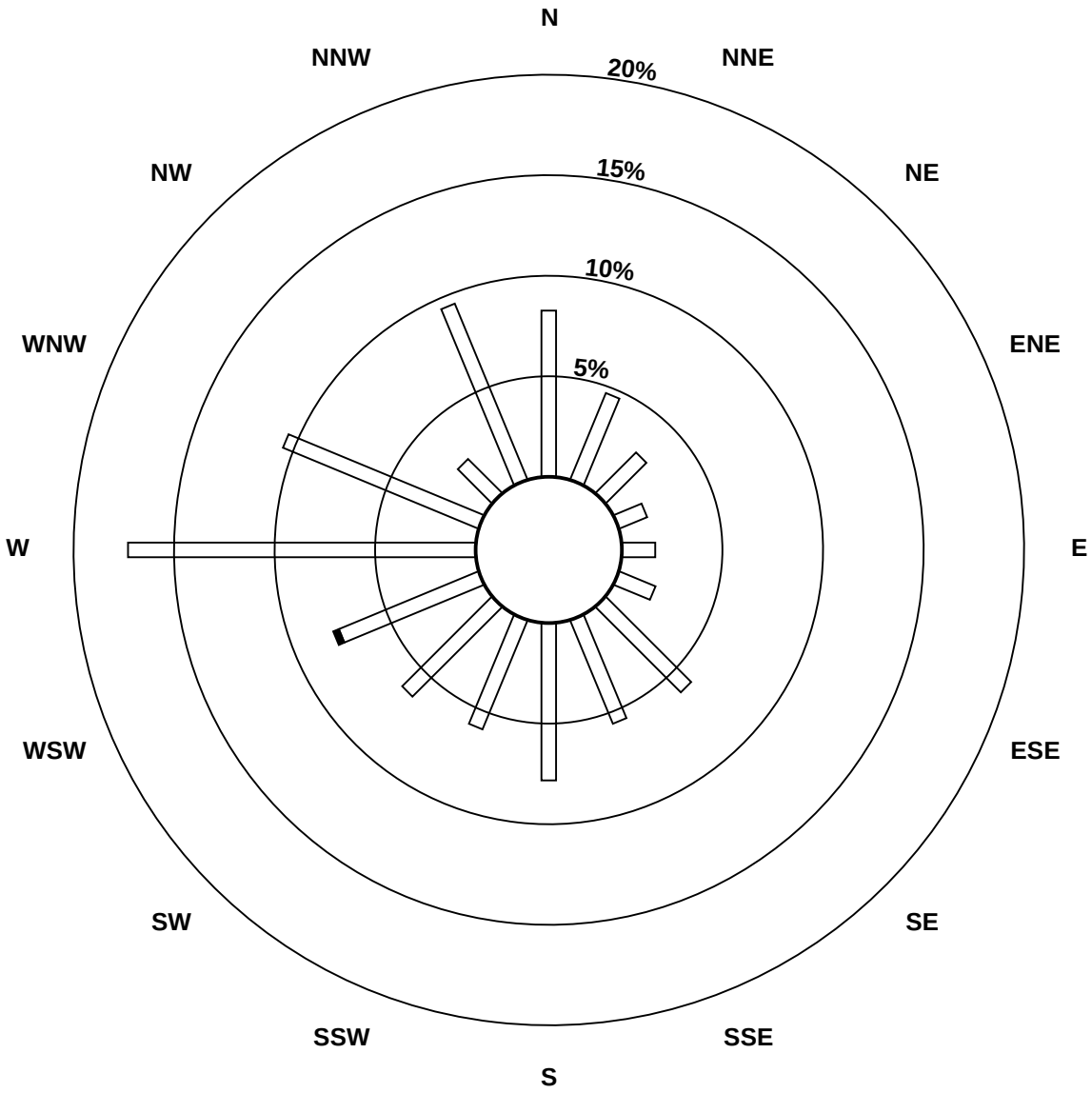
Total Number of Hours: 744

Wood Buffalo Environmental Association

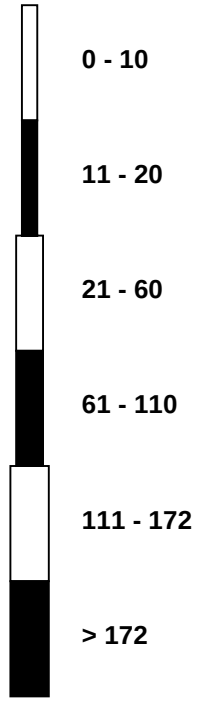
Wind Rose Jan 2016

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



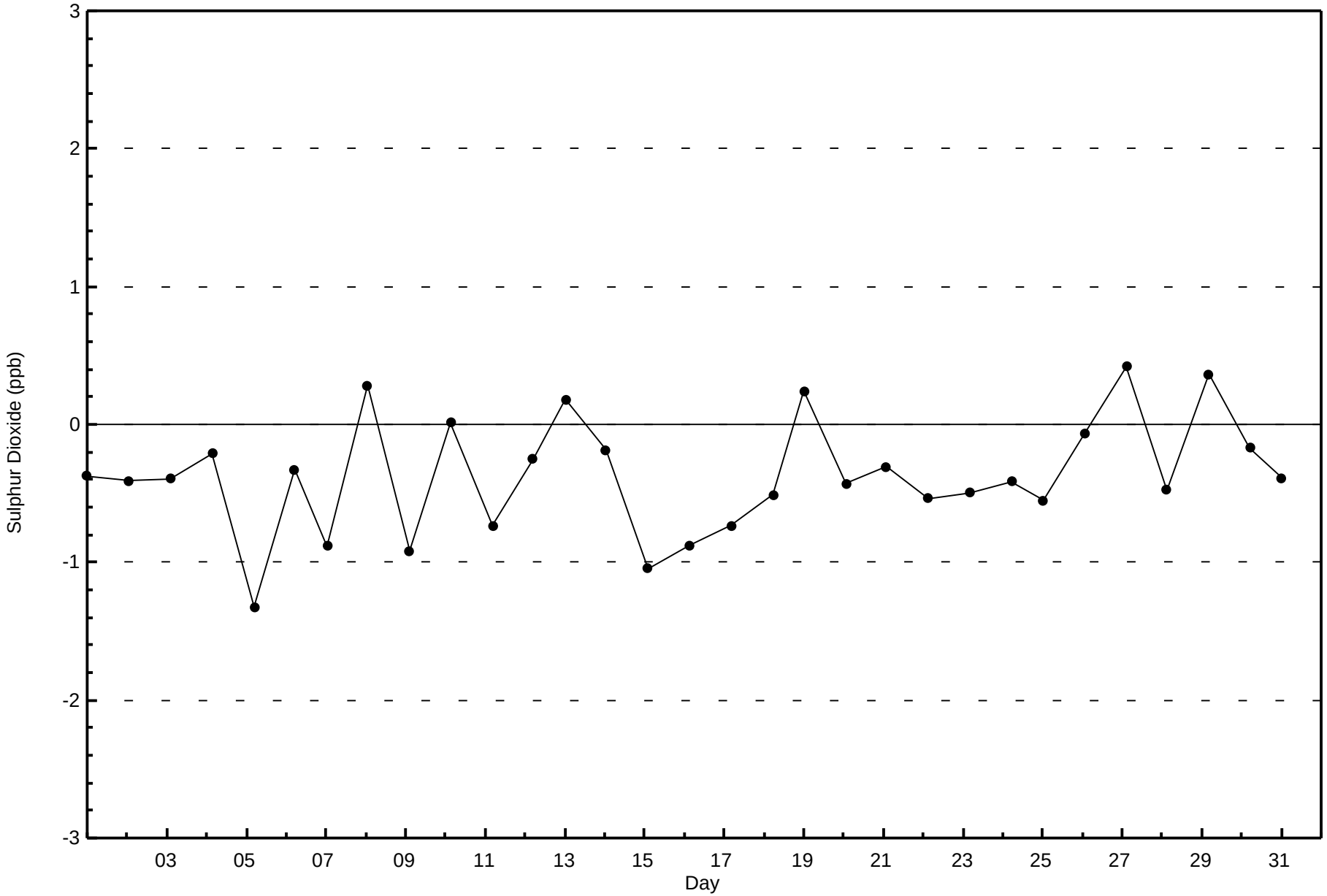
Total Number of Valid Hours: 665

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - January 2016



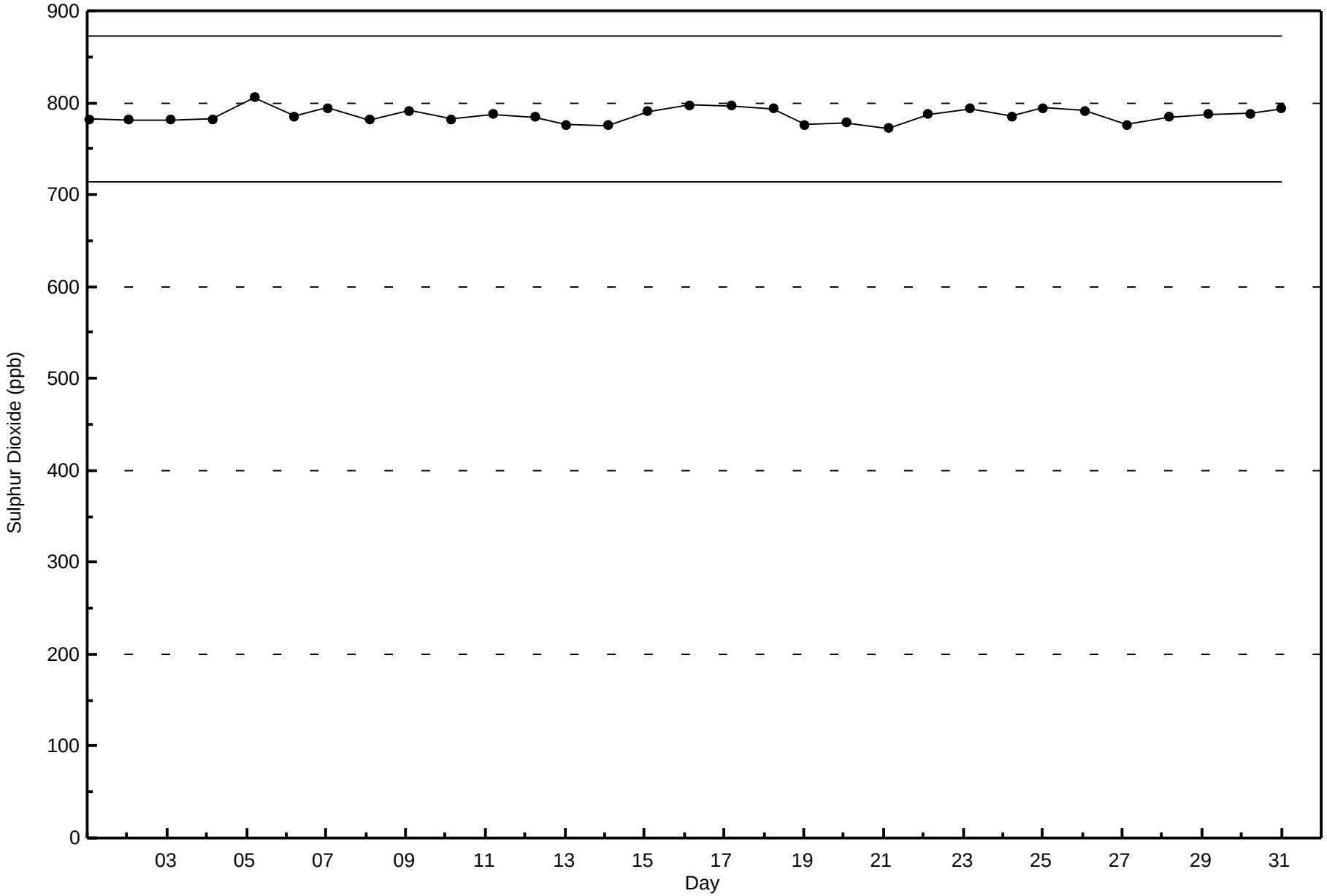
502-11

Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Jan 22 17:00

Maximum Daily Average: 0.6 ppb on Jan 10

Minimum Value: 0 ppb on Jan 11 17:00

Minimum Daily Average: 0.1 ppb on Jan 2

Maximum Diurnal Average: 0.4 ppb at hour 14

Minimum Diurnal Average: 0.2 ppb at hour 6

Monthly Average: 0.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	699
Hours of Missing Data:	45
Hours of Calibration:	38
Percent Operational Time:	99.1

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

Z - zerospan C - Calibration UO - Unstable Operation

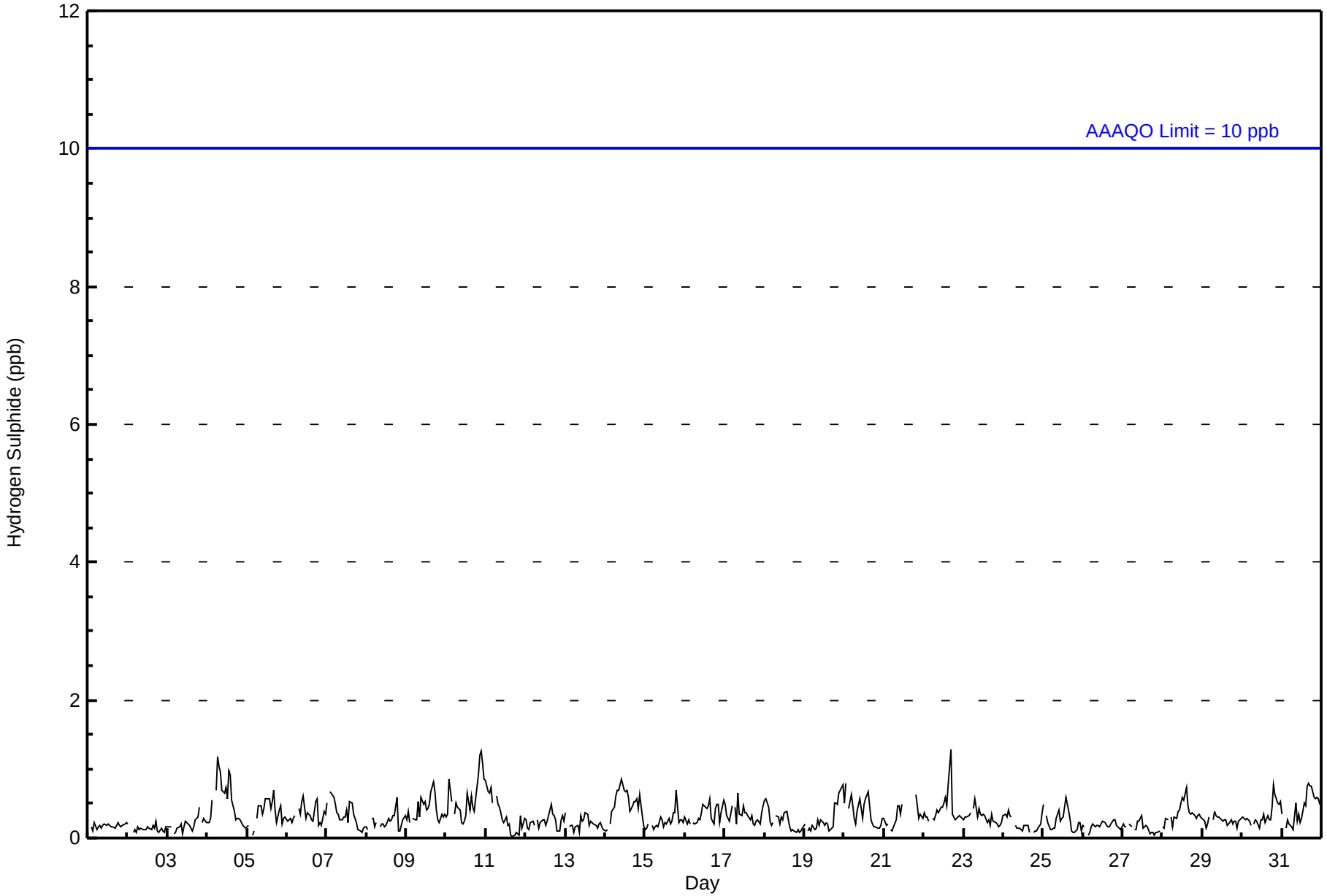
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	699	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: 699

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	58	33	24	10	12	16	40	33	51	45	44	60	111	70	16	68	691
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	33	24	10	12	16	40	33	51	45	44	60	111	70	16	68	691

Total Number of Valid Hours: 691

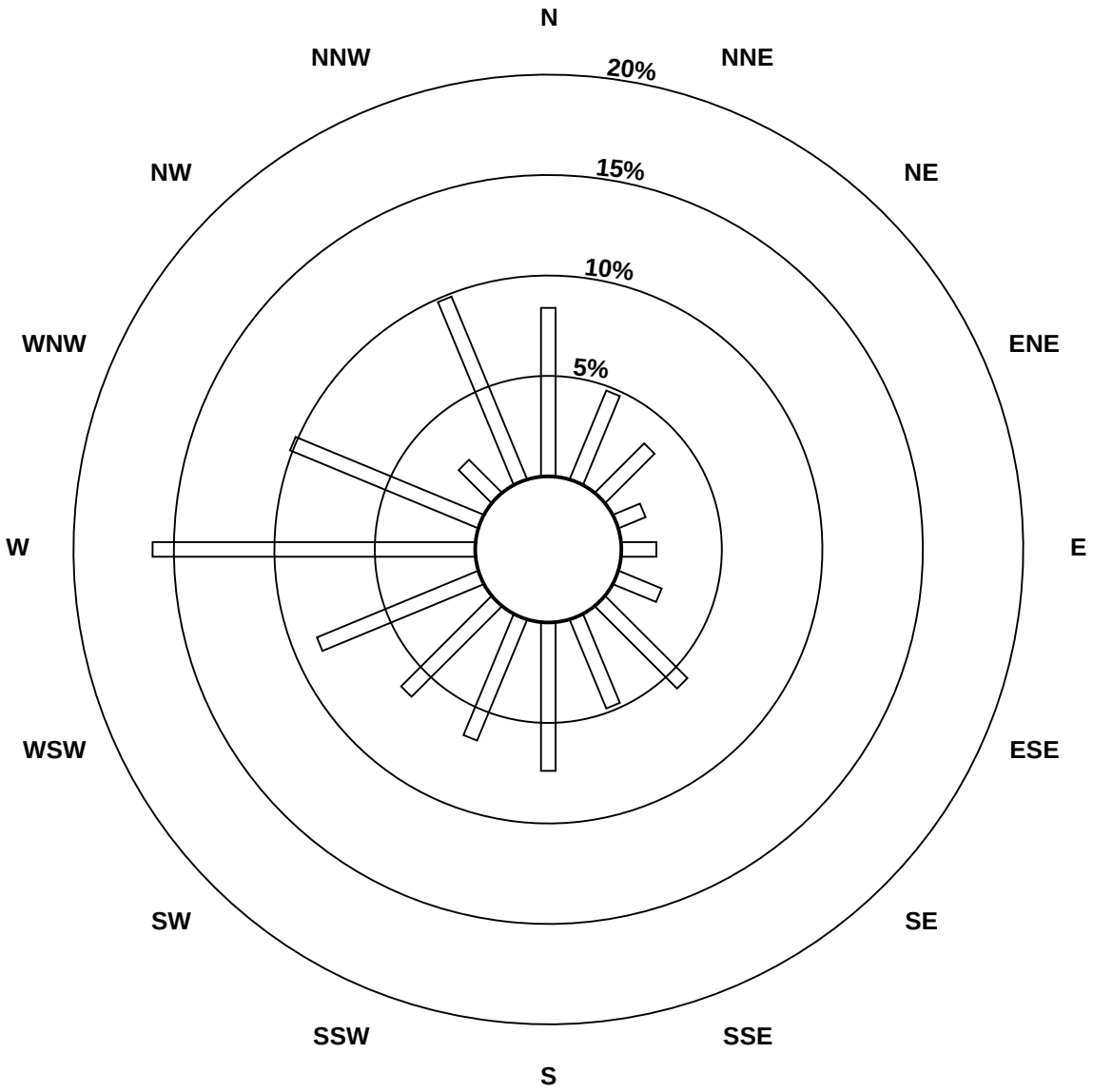
Total Number of Hours: 744

Wood Buffalo Environmental Association

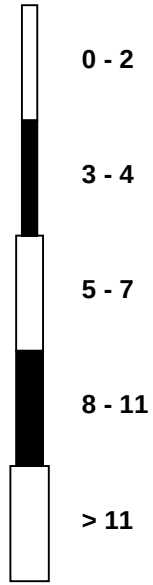
Wind Rose Jan 2016

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



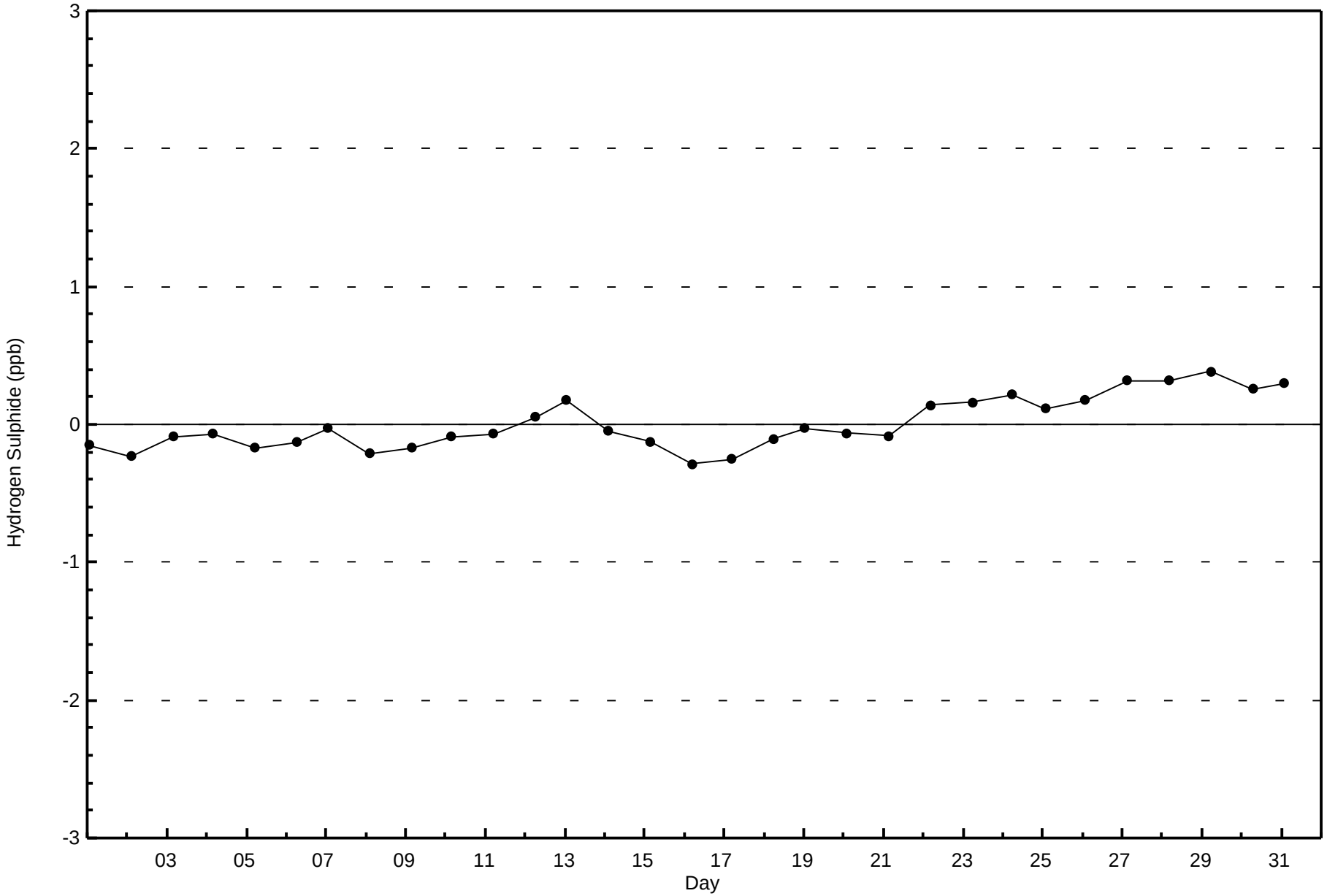
Total Number of Valid Hours: 691

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - January 2016

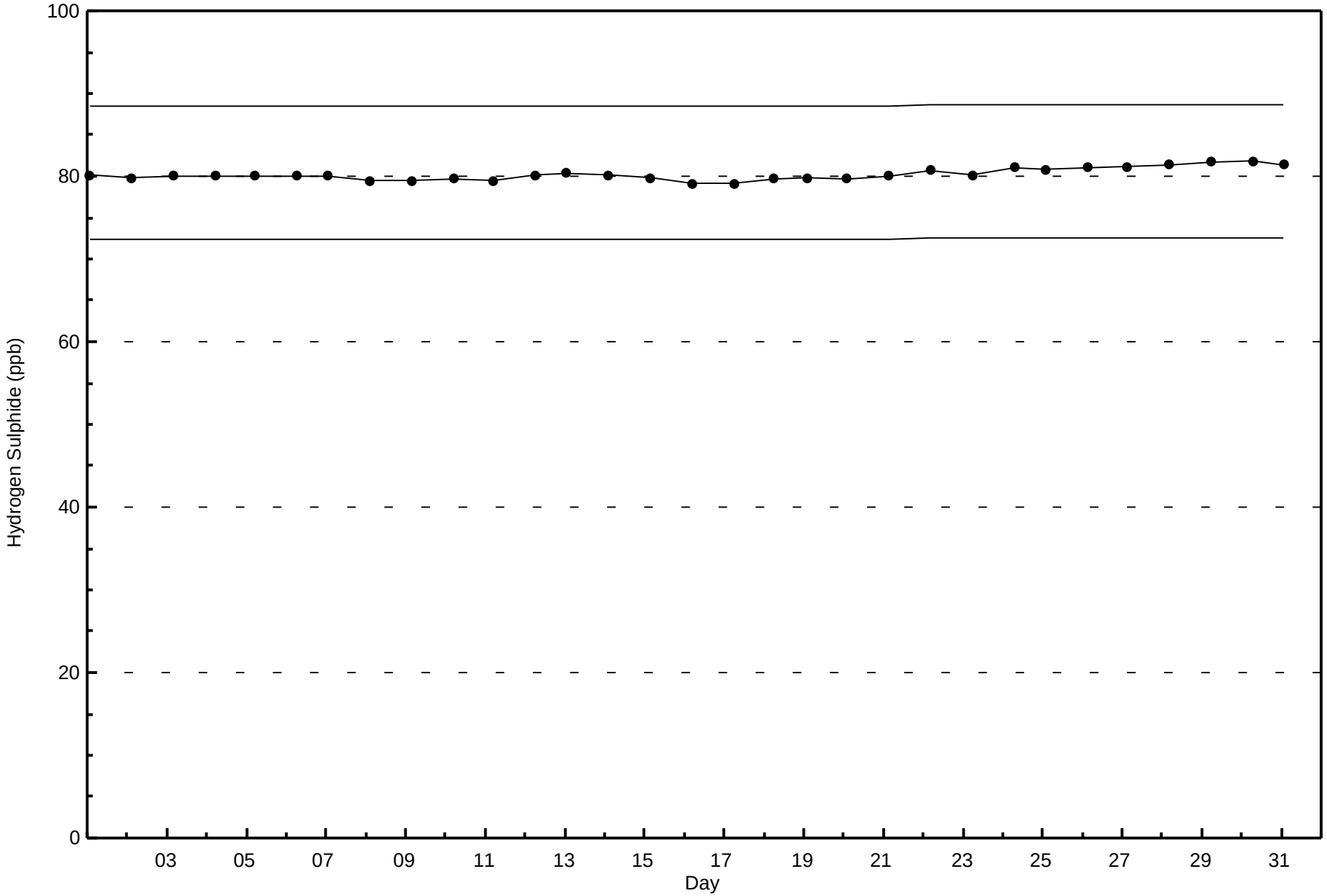


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - January 2016

Maximum Value: 24 ppb on Jan 5 17:00

Maximum Daily Average: 6.6 ppb on Jan 21

Minimum Value: 0 ppb on Jan 1 03:00

Minimum Daily Average: 0.3 ppb on Jan 1

Maximum Diurnal Average: 3.8 ppb at hour 17

Minimum Diurnal Average: 1.0 ppb at hour 6

Monthly Average: 2.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 1 $Q_3 = 3$ $P_{90} = 6$ $P_{99} = 14$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.3	2
2-Jan	1	Z	1	1	1	2	1	1	1	2	4	3	3	3	2	2	3	4	2	1	1	1	1	1	1.8	4
3-Jan	2	2	Z	1	1	1	1	1	2	2	2	3	3	1	1	1	1	2	0	1	1	0	1	1	1.3	3
4-Jan	0	1	3	Z	1	1	0	0	1	1	2	2	4	4	5	3	2	2	2	1	1	1	2	2	1.7	5
5-Jan	2	2	2	2	Z	2	2	7	6	2	4	6	4	3	5	14	24	9	5	8	9	2	4	3	5.6	24
6-Jan	2	2	0	1	3	Z	7	5	4	11	16	6	5	7	7	5	3	5	12	1	1	1	1	0	4.6	16
7-Jan	Z	1	1	1	1	1	1	2	2	1	1	1	2	2	2	4	2	5	2	2	1	1	1	0	1.4	5
8-Jan	1	Z	0	0	0	0	2	1	0	1	2	2	3	6	4	5	8	8	3	0	0	1	1	1	2.2	8
9-Jan	1	2	Z	3	0	2	5	8	2	9	5	8	3	4	8	9	13	9	5	3	1	2	1	3	4.6	13
10-Jan	3	3	19	Z	4	1	2	4	3	2	2	3	7	4	1	1	1	2	2	1	3	7	2	2	3.3	19
11-Jan	1	1	1	1	Z	2	7	10	8	6	6	5	3	2	1	0	1	1	1	3	2	5	3	2	3.2	10
12-Jan	6	3	1	2	2	Z	5	5	3	5	6	5	3	3	8	8	8	7	6	1	1	3	10	7	4.7	10
13-Jan	Z	7	3	3	4	2	7	6	4	9	6	6	9	9	3	3	2	2	3	2	2	2	0	1	4.1	9
14-Jan	1	Z	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0.4	1
15-Jan	1	0	Z	0	0	1	1	1	1	0	1	1	1	2	1	3	2	1	0	0	0	1	2	0	0.9	3
16-Jan	2	0	1	Z	0	0	1	0	1	1	1	1	3	3	4	3	3	2	5	6	6	3	2	6	2.4	6
17-Jan	5	3	2	3	Z	3	4	1	23	4	4	9	7	6	6	5	10	6	4	3	2	2	8	9	5.6	23
18-Jan	11	12	8	3	2	Z	3	7	8	3	5	4	7	6	5	6	3	2	1	3	4	1	2	1	4.7	12
19-Jan	Z	1	0	1	2	0	0	0	0	0	1	2	2	2	2	3	2	0	0	0	0	2	1	0	1.0	3
20-Jan	0	Z	0	0	0	1	1	1	1	1	5	3	4	4	6	5	4	5	5	2	1	1	1	1	2.2	6
21-Jan	1	1	Z	1	1	1	2	5	11	12	7	7	10	8	14	6	8	19	14	9	9	1	1	3	6.6	19
22-Jan	1	1	1	Z	0	0	0	3	2	2	C	C	C	C	C	C	1	1	3	1	1	2	1	1	--	3
23-Jan	1	2	1	0	Z	1	4	1	1	3	2	4	6	4	2	3	2	9	4	1	1	0	0	0	2.4	9
24-Jan	3	2	0	2	0	Z	0	0	1	2	2	1	1	1	1	2	1	1	1	1	0	0	1	6	1.2	6
25-Jan	Z	6	2	1	1	1	3	2	7	11	5	7	4	8	9	8	6	2	1	2	0	1	1	0	3.8	11
26-Jan	0	Z	0	0	0	0	0	0	1	1	3	2	1	1	1	1	0	1	1	0	1	1	0	0	0.6	3
27-Jan	0	0	Z	0	0	0	0	0	0	4	6	7	0	0	2	1	0	0	0	0	0	0	1	0	0.9	7
28-Jan	1	2	1	Z	1	3	0	1	1	2	1	2	3	4	5	1	0	0	0	1	0	1	0	1	1.4	5
29-Jan	1	1	0	1	Z	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Jan	0	0	0	0	0	Z	0	0	0	2	0	4	0	6	3	4	3	2	1	1	1	1	1	0	1.3	6
31-Jan	Z	1	1	1	1	2	2	1	2	2	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1.3	2
	1.8	2.2	1.9	1.1	1.1	1.0	1.9	2.4	3.1	3.4	3.4	3.6	3.4	3.5	3.7	3.6	3.8	3.5	2.7	1.9	1.5	1.4	1.6	1.7	Diurnal Average	
	11	12	19	3	4	3	7	10	23	12	16	9	10	9	14	14	24	19	14	9	9	7	10	9	Diurnal Maximum	

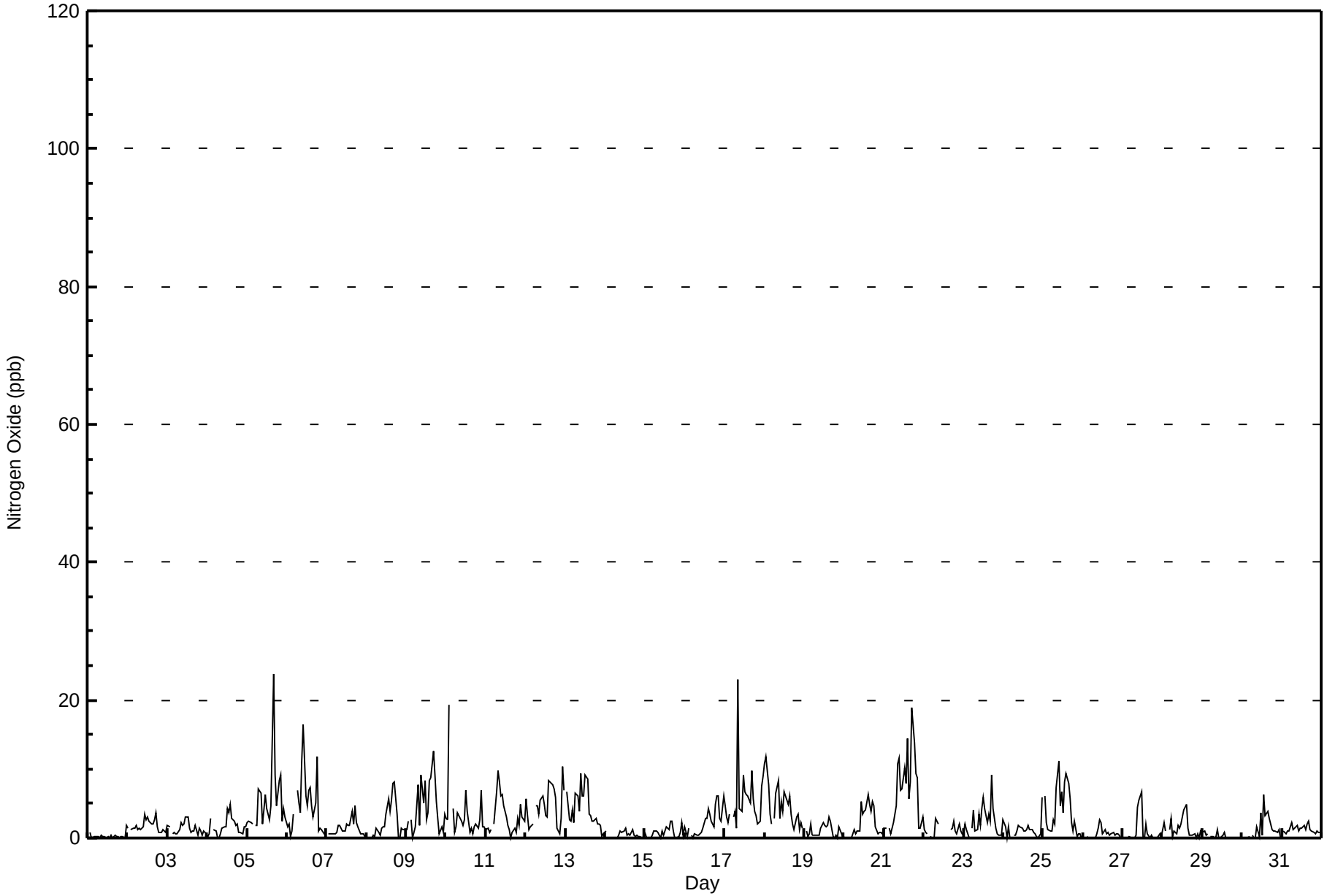
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	99.72	99.72
21 - 40	2	0.28	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 Oxide (NO) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	58	33	20	11	12	15	40	37	55	45	43	58	115	73	16	67	698
21 - 40	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	33	20	11	12	15	40	38	55	45	44	58	115	73	16	67	700

Total Number of Valid Hours: 700

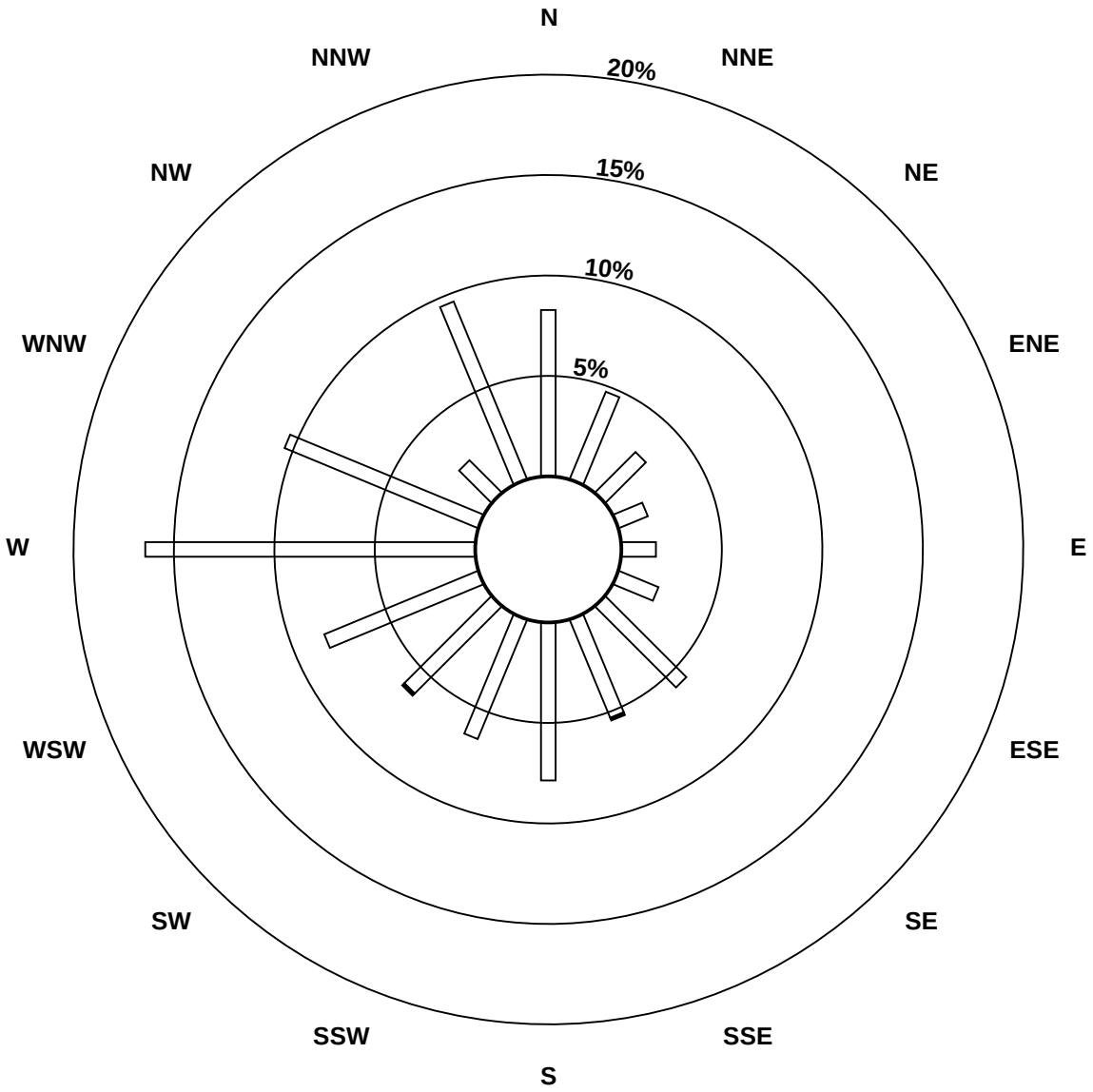
Total Number of Hours: 744

Wood Buffalo Environmental Association

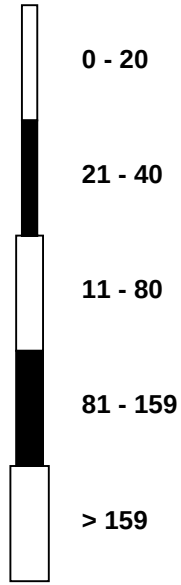
Wind Rose Jan 2016

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



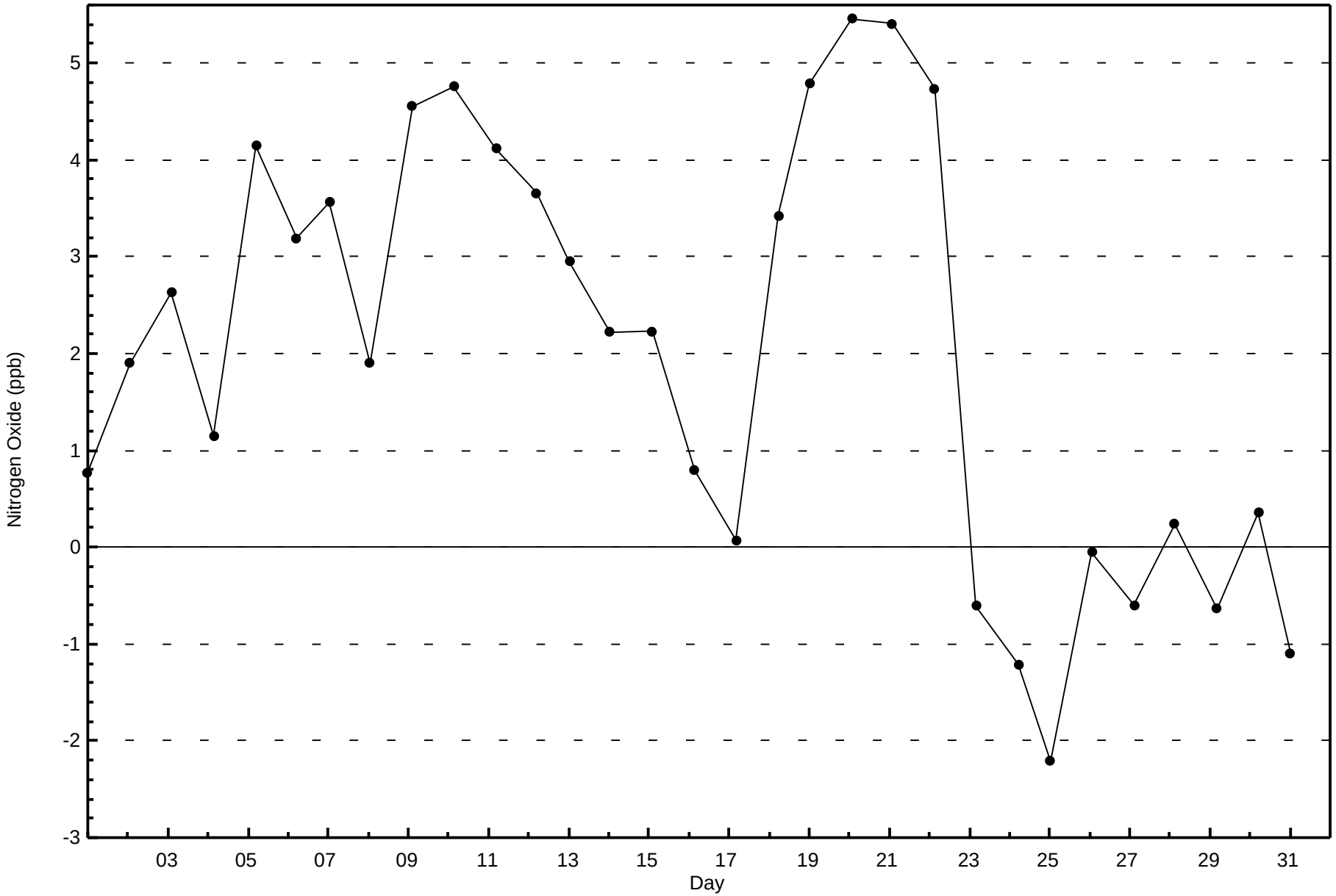
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - January 2016



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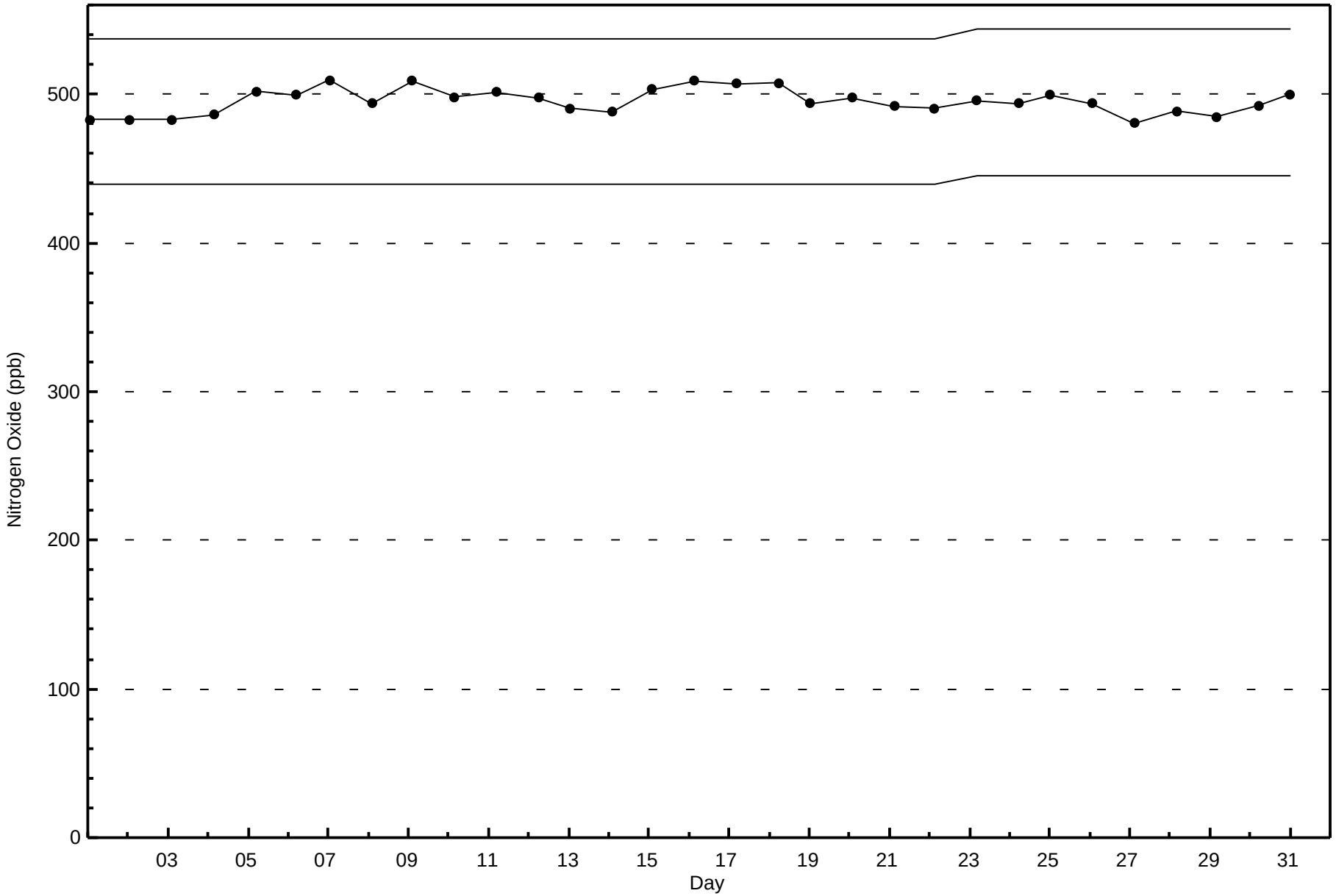
Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 29 ppb on Jan 3 21:00

Maximum Daily Average: 10.4 ppb on Jan 9

Minimum Value: 0 ppb on Jan 1 19:00

Minimum Daily Average: 0.6 ppb on Jan 1

Maximum Diurnal Average: 7.4 ppb at hour 18

Minimum Diurnal Average: 4.1 ppb at hour 6

Monthly Average: 5.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 5 $Q_3 = 8$ $P_{90} = 11$ $P_{99} = 20$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	4	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
2-Jan	0	Z	0	0	0	0	0	0	0	0	2	1	1	0	1	1	1	8	1	0	0	2	1	2	0.9	8
3-Jan	3	0	Z	0	1	2	1	1	6	4	7	6	4	3	4	4	5	16	18	28	29	17	11	8	7.7	29
4-Jan	8	8	10	Z	8	6	4	4	4	5	5	4	6	5	7	5	5	4	4	4	3	2	2	2	4.9	10
5-Jan	3	2	0	0	Z	1	3	13	13	8	8	6	5	3	5	15	20	19	12	14	10	5	8	5	7.7	20
6-Jan	4	2	3	5	7	Z	13	13	11	17	14	9	6	7	11	11	8	11	3	2	1	2	5	5	7.4	17
7-Jan	Z	10	16	12	9	5	5	4	5	2	2	3	3	4	4	8	7	9	6	6	5	5	5	3	5.9	16
8-Jan	3	Z	2	3	3	4	5	5	5	4	4	4	4	7	7	8	9	9	9	4	4	5	7	8	5.3	9
9-Jan	8	10	Z	13	3	8	6	19	8	18	9	10	4	4	11	15	25	20	15	9	5	7	7	9	10.4	25
10-Jan	10	12	23	Z	12	9	10	13	10	7	5	5	7	5	3	3	2	3	9	13	21	24	15	10	10.0	24
11-Jan	5	3	4	9	Z	6	7	7	8	7	7	6	4	3	2	1	2	3	3	3	4	11	8	9	5.3	11
12-Jan	8	6	4	8	4	Z	9	8	4	9	9	7	7	9	10	14	13	17	20	12	9	13	14	14	9.8	20
13-Jan	Z	17	7	8	8	7	6	4	5	5	6	7	6	5	4	3	3	4	3	2	2	2	1	4	5.1	17
14-Jan	4	Z	1	1	1	3	2	5	7	6	5	5	4	4	4	4	6	5	6	6	6	6	4	2	4.2	7
15-Jan	3	2	Z	2	3	3	6	5	4	3	4	2	2	3	3	3	6	4	5	5	5	7	6	5	3.8	7
16-Jan	5	3	6	Z	4	3	4	4	5	4	3	3	4	5	8	11	10	11	19	20	16	6	10	19	7.9	20
17-Jan	16	6	7	6	Z	6	10	3	7	5	6	9	5	7	6	7	7	11	8	8	8	7	14	15	7.9	16
18-Jan	16	14	10	3	4	Z	4	4	2	5	5	6	6	5	8	9	5	3	2	3	4	3	6	4	5.6	16
19-Jan	Z	5	4	3	4	3	3	2	3	3	5	6	5	4	4	6	7	4	10	14	16	17	13	11	6.5	17
20-Jan	11	Z	9	7	9	10	9	6	9	7	6	7	8	6	8	7	10	9	9	6	6	5	6	6	7.7	11
21-Jan	6	3	Z	5	4	4	5	10	14	11	8	9	10	9	13	12	13	19	14	13	12	6	5	6	9.2	19
22-Jan	5	6	4	Z	6	6	5	7	11	9	C	C	C	C	C	C	12	8	7	7	8	8	7	5	--	12
23-Jan	5	7	7	6	Z	5	10	7	5	7	6	8	7	6	4	4	4	10	8	5	3	3	3	5	5.9	10
24-Jan	9	8	7	10	7	Z	4	4	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	5	3.9	10
25-Jan	Z	5	3	3	1	1	2	3	9	14	7	5	3	7	7	10	8	4	2	3	3	4	4	1	4.7	14
26-Jan	2	Z	2	1	2	1	1	2	3	4	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1.9	4
27-Jan	1	1	Z	1	1	0	0	0	1	4	5	6	1	1	2	1	1	1	1	0	1	1	2	3	1.5	6
28-Jan	7	7	4	Z	7	8	4	4	4	6	6	6	6	8	11	6	4	4	3	2	2	1	1	1	4.8	11
29-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	2	2	1	2	2	1	1	1	2	2	1	1	1.1	2
30-Jan	3	3	3	3	4	Z	3	3	5	5	2	4	2	6	4	4	4	4	8	9	10	8	4	1	4.4	10
31-Jan	Z	1	1	1	2	4	6	3	3	3	3	3	2	2	3	8	9	5	4	2	1	2	2	2	3.2	9
	5.7	5.5	5.3	4.4	4.4	4.1	4.8	5.2	5.7	6.0	5.2	5.1	4.2	4.4	5.3	6.2	6.8	7.4	6.8	6.6	6.4	5.9	5.7	5.6	Diurnal Average	
	16	17	23	13	12	10	13	19	14	18	14	10	10	9	13	15	25	20	20	28	29	24	15	19	Diurnal Maximum	

Z - zerospan C - Calibration

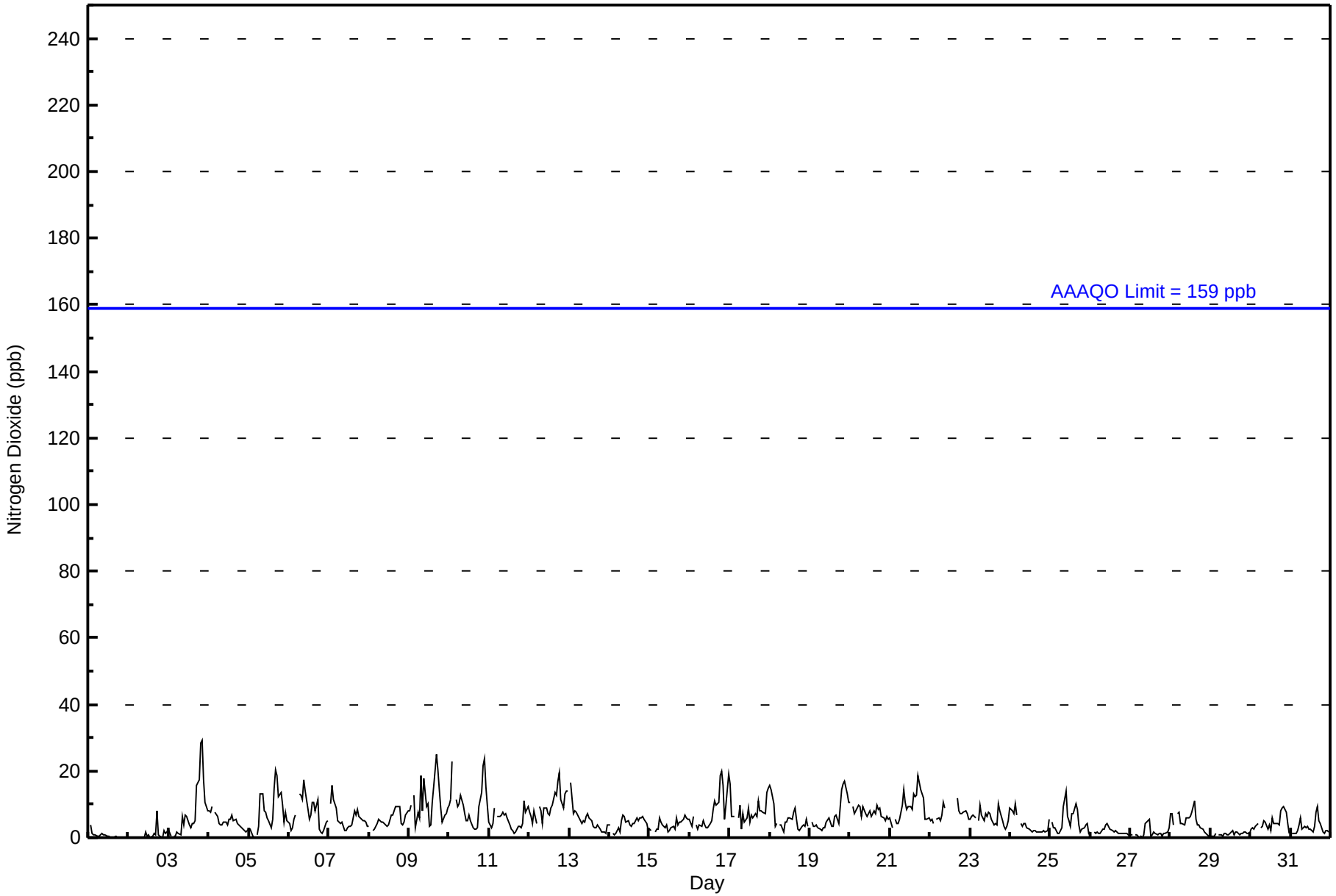
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - January 2016



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Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	99.15	99.15
21 - 40	6	0.85	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 Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	58	33	20	11	12	15	40	38	55	44	44	55	115	73	16	65	694
21 - 40	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	2	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	58	33	20	11	12	15	40	38	55	45	44	58	115	73	16	67	700

Total Number of Valid Hours: 700

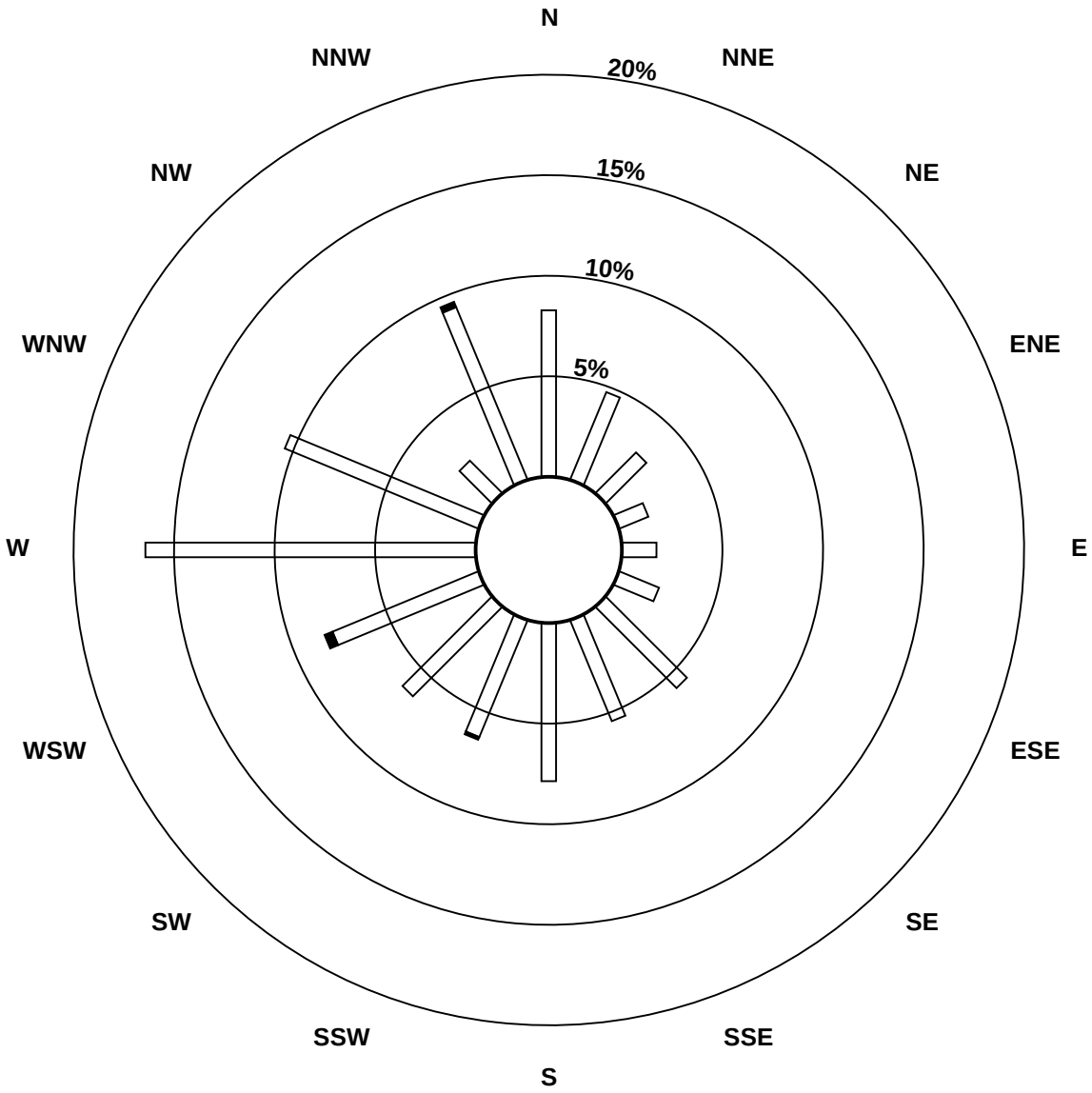
Total Number of Hours: 744

Wood Buffalo Environmental Association

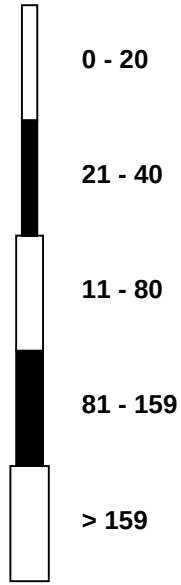
Wind Rose Jan 2016

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



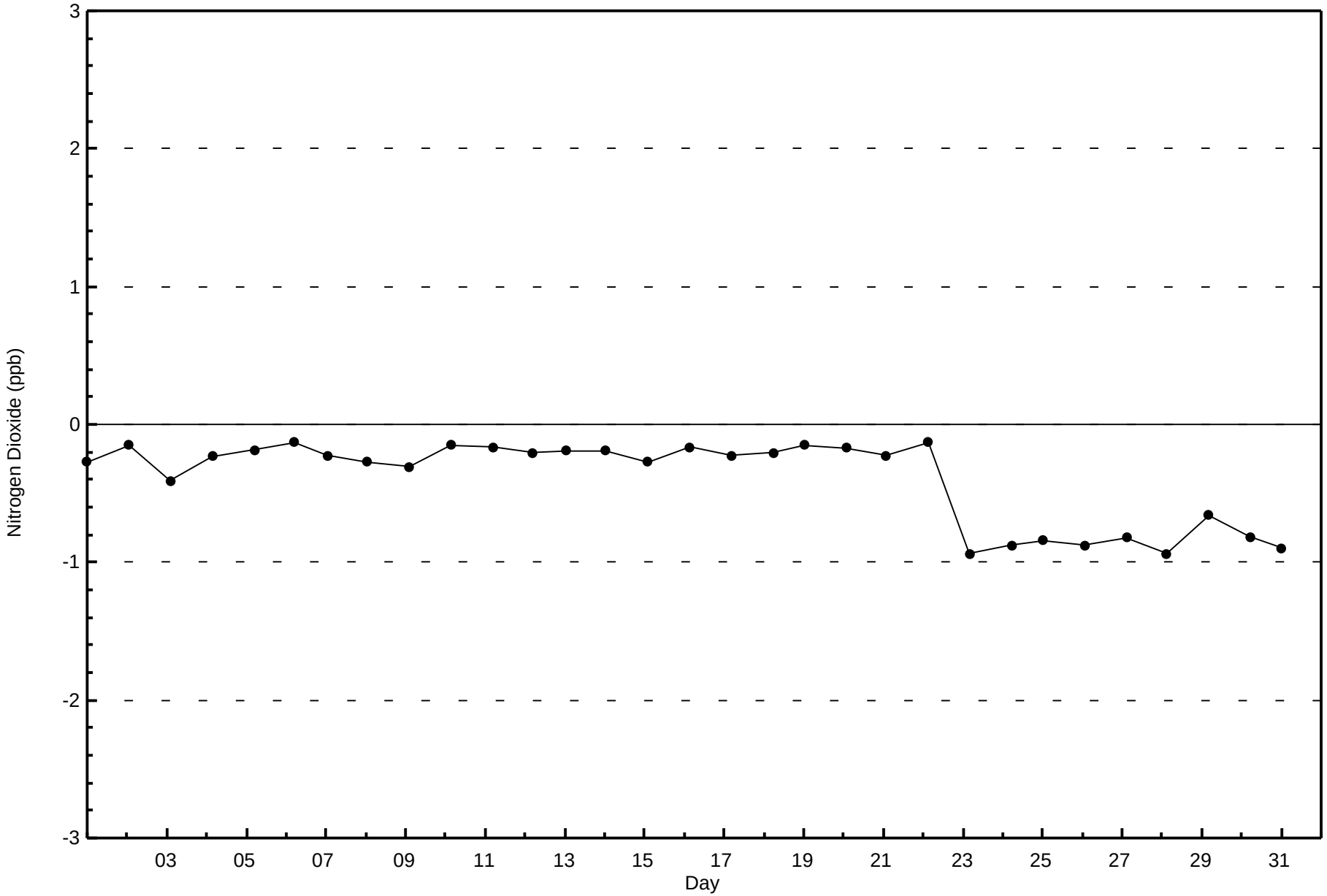
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - January 2016

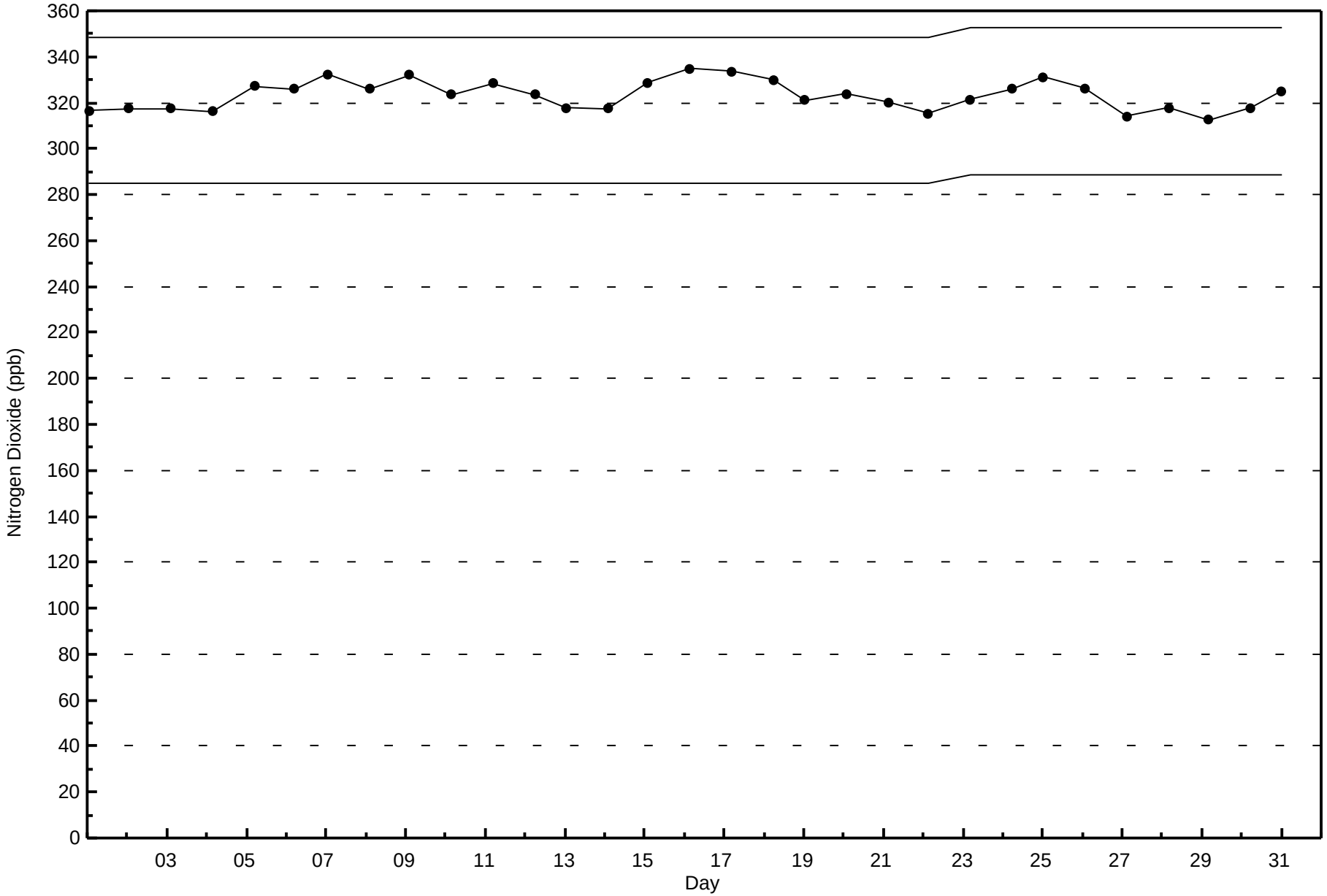


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - January 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - January 2016

Maximum Value: 44 ppb on Jan 5 17:00

Maximum Daily Average: 15.9 ppb on Jan 21

Minimum Value: 0 ppb on Jan 27 08:00

Minimum Daily Average: 0.8 ppb on Jan 1

Maximum Diurnal Average: 10.9 ppb at hour 18

Minimum Diurnal Average: 5.1 ppb at hour 6

Monthly Average: 8.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 3$ Median = 6 $Q_3 = 11$ $P_{90} = 17$ $P_{99} = 30$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	Z	5	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	0	0	0	0	0	0	2	0.8	5
2-Jan	2	Z	1	1	1	2	1	1	1	2	5	3	4	3	3	3	4	12	2	1	1	4	2	3	2.7	12
3-Jan	4	2	Z	1	1	2	2	2	9	6	9	9	7	5	5	5	6	18	18	30	30	18	12	9	9.1	30
4-Jan	8	8	12	Z	9	7	4	4	4	6	6	6	10	9	12	8	8	6	6	4	4	3	3	4	6.6	12
5-Jan	5	5	3	2	Z	3	5	20	20	10	12	12	9	6	10	29	44	28	17	22	19	7	12	8	13.4	44
6-Jan	6	4	3	6	10	Z	20	18	15	29	30	15	10	14	18	16	11	16	14	3	3	3	6	5	12.0	30
7-Jan	Z	11	16	12	9	6	5	6	7	3	3	4	5	5	6	12	9	13	8	8	5	6	5	4	7.3	16
8-Jan	4	Z	2	3	4	4	7	5	5	6	6	5	7	12	11	13	17	17	13	4	4	6	8	9	7.5	17
9-Jan	9	12	Z	15	3	9	10	26	10	27	14	19	6	7	19	24	38	30	20	12	5	8	8	12	15.0	38
10-Jan	13	14	42	Z	16	10	12	17	12	10	7	8	14	9	4	4	3	5	11	15	24	31	17	11	13.3	42
11-Jan	6	4	5	10	Z	8	13	17	16	13	14	11	7	4	4	1	2	5	4	6	6	16	11	12	8.4	17
12-Jan	13	9	5	9	6	Z	14	13	8	14	15	12	10	12	18	21	21	24	25	13	10	16	25	21	14.5	25
13-Jan	Z	23	10	10	12	9	13	11	9	14	13	13	15	14	7	6	5	6	5	4	4	4	2	4	9.2	23
14-Jan	5	Z	1	1	1	3	2	5	7	7	6	6	5	4	5	5	7	6	6	6	6	6	4	2	4.7	7
15-Jan	3	2	Z	2	3	4	7	5	5	3	5	2	3	5	5	5	8	5	5	5	5	8	8	6	4.7	8
16-Jan	7	4	8	Z	4	3	4	4	5	5	3	4	7	8	13	15	12	13	24	26	22	8	12	25	10.2	26
17-Jan	21	9	9	10	Z	9	14	4	30	9	10	18	11	13	12	13	16	17	12	11	10	10	21	24	13.6	30
18-Jan	27	26	18	7	6	Z	7	10	10	8	10	10	13	11	13	15	9	5	3	6	7	5	8	5	10.3	27
19-Jan	Z	6	4	4	6	3	3	3	3	4	6	8	6	5	5	9	9	4	10	15	16	19	14	11	7.5	19
20-Jan	11	Z	9	7	9	10	11	7	10	8	12	11	12	10	14	12	14	14	13	8	7	6	7	6	9.9	14
21-Jan	8	5	Z	7	5	6	8	15	25	22	15	16	20	17	27	18	21	38	28	23	21	7	7	9	15.9	38
22-Jan	6	6	5	Z	6	6	5	10	13	11	C	C	C	C	C	C	13	9	10	8	8	10	8	6	--	13
23-Jan	6	8	8	6	Z	6	14	8	6	11	8	12	13	10	6	8	6	19	12	7	4	3	4	5	8.3	19
24-Jan	11	10	7	12	7	Z	5	4	5	6	5	4	3	3	3	4	3	3	2	3	2	1	3	11	5.1	12
25-Jan	Z	11	5	4	2	2	5	5	17	25	11	12	7	15	17	18	14	6	3	5	3	5	5	1	8.6	25
26-Jan	2	Z	2	1	1	1	1	2	3	5	7	6	3	3	2	3	2	2	2	2	2	2	2	1	2.5	7
27-Jan	1	1	Z	1	1	0	0	0	1	9	10	12	1	1	4	2	1	2	1	0	1	1	2	3	2.4	12
28-Jan	8	9	5	Z	9	11	4	5	5	8	7	8	9	12	16	7	4	4	4	3	2	2	1	2	6.2	16
29-Jan	2	2	1	2	Z	1	1	0	1	2	1	1	2	3	1	2	1	1	1	1	2	2	1	1	1.4	3
30-Jan	3	3	3	3	5	Z	3	3	5	6	3	8	3	12	7	8	7	6	10	10	11	8	6	1	5.8	12
31-Jan	Z	2	2	2	3	6	8	4	5	5	4	4	4	4	5	10	12	6	5	3	2	3	3	2	4.5	12
	7.6	7.7	7.2	5.4	5.4	5.1	6.7	7.6	8.8	9.5	8.6	8.6	7.6	7.8	9.0	9.9	10.6	10.9	9.5	8.5	7.9	7.3	7.3	7.3	Diurnal Average	
	27	26	42	15	16	11	20	26	30	29	30	19	20	17	27	29	44	38	28	30	30	31	25	25	Diurnal Maximum	

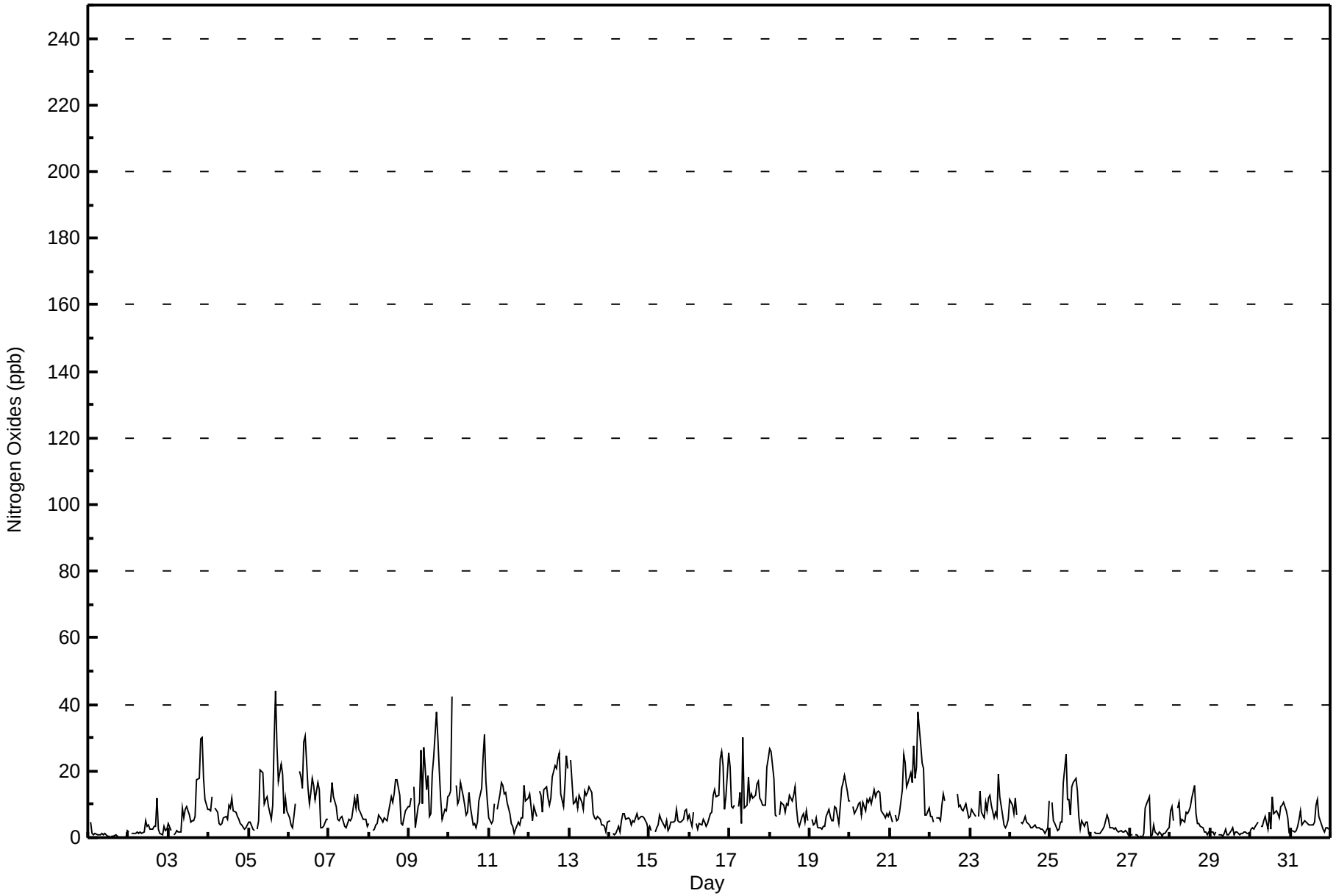
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - January 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	665	94.06	94.06
21 - 40	40	5.66	99.72
11 - 80	2	0.28	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

ConocoPhillips - Surmont - January 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	58	33	19	11	12	13	36	25	52	41	40	54	114	73	16	65	662
21 - 40	0	0	1	0	0	2	4	12	3	4	4	3	1	0	0	2	36
11 - 80	0	0	0	0	0	0	0	1	0	0	0	1	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	58	33	20	11	12	15	40	38	55	45	44	58	115	73	16	67	700

Total Number of Valid Hours: 700

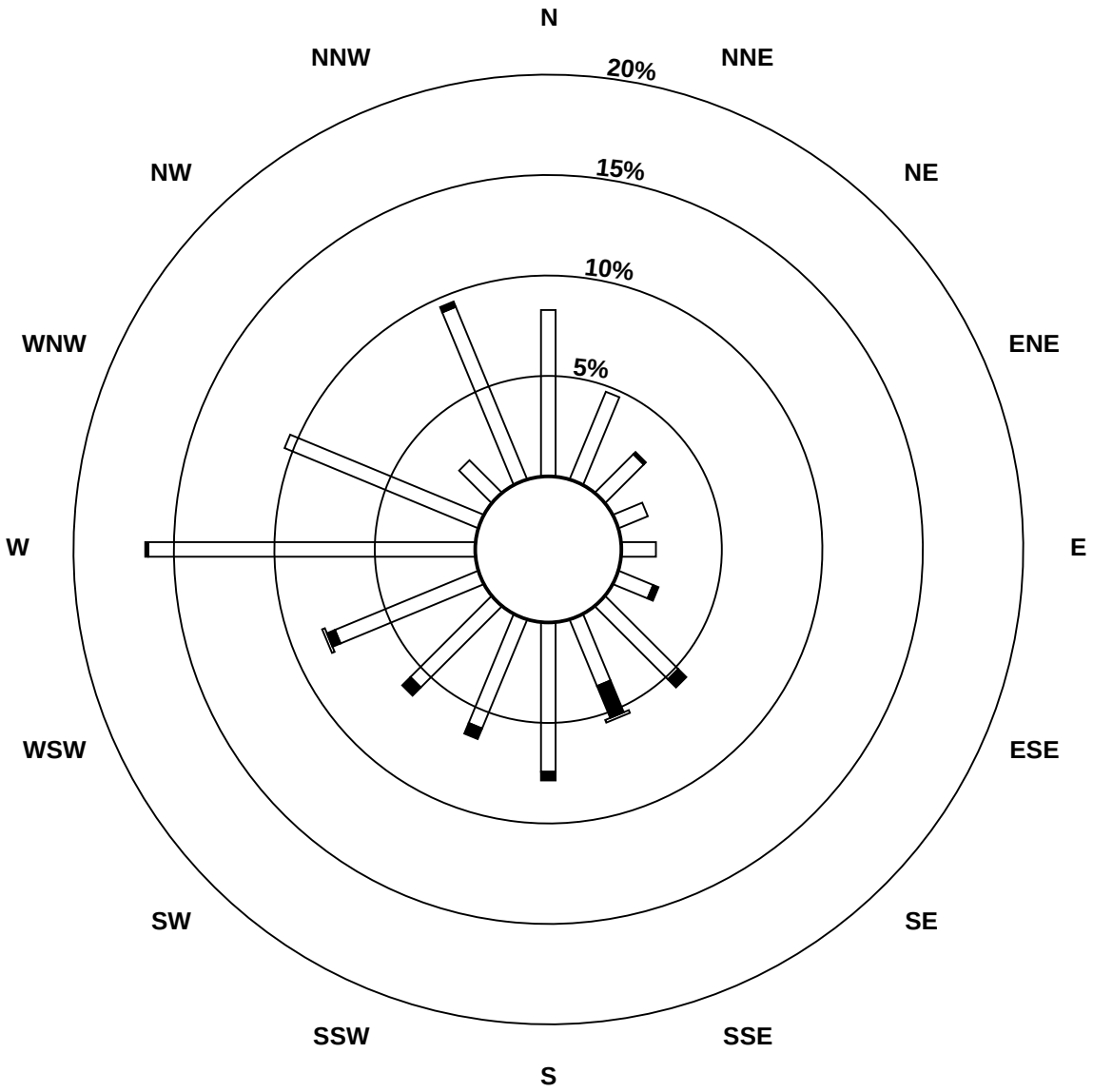
Total Number of Hours: 744

Wood Buffalo Environmental Association

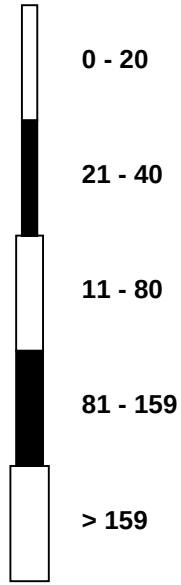
Wind Rose Jan 2016

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



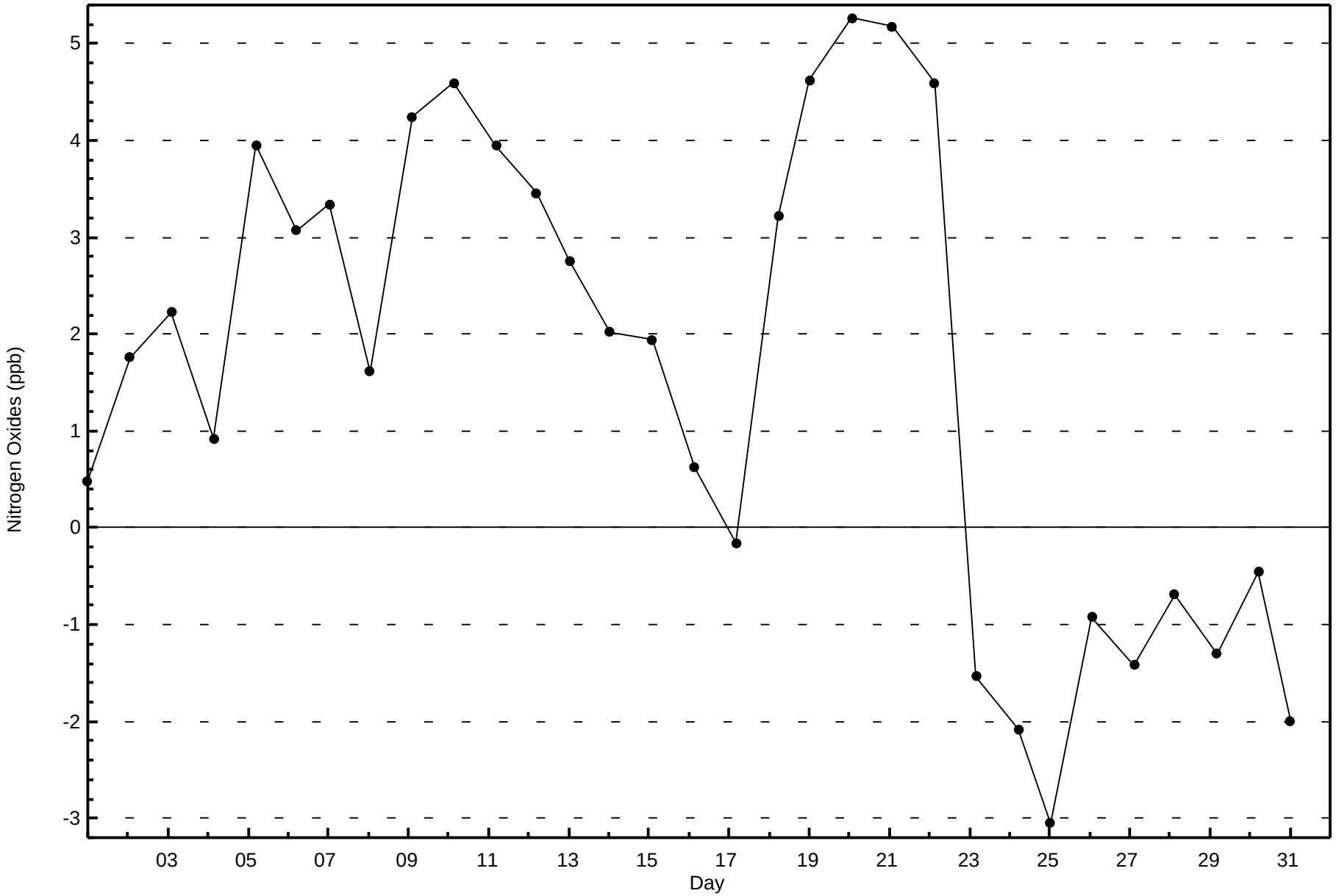
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - January 2016

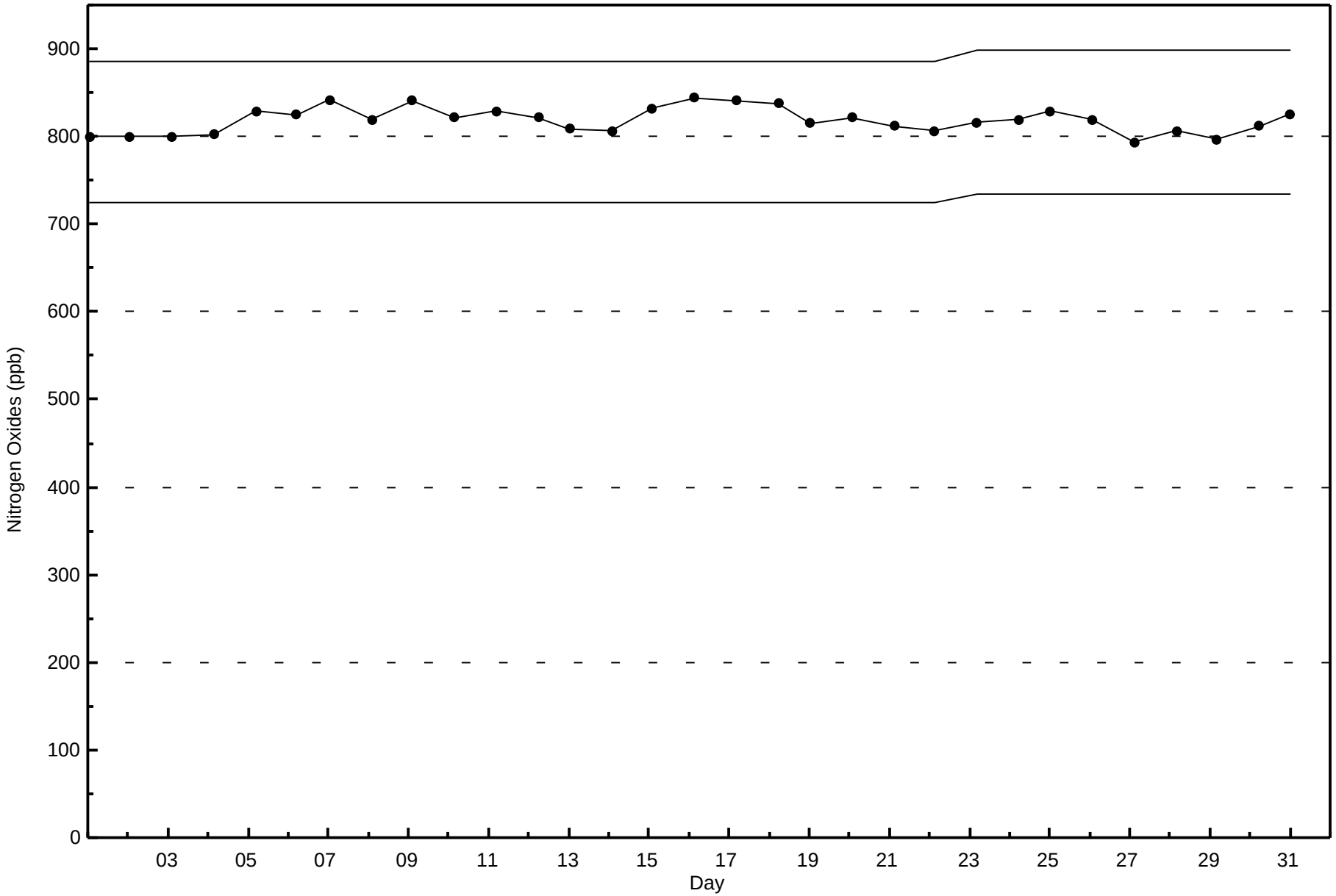


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - January 2016



Maximum Value: 6.2 C on Jan 28 21:00

Maximum Daily Average: 2.8 C on Jan 28

Minimum Value: -26.6 C on Jan 16 03:00

Minimum Daily Average: -23.4 C on Jan 16

Maximum Diurnal Average: -8.8 C at hour 14

Minimum Diurnal Average: -11.5 C at hour 8

Monthly Average: -10.58 C

Percentiles: P_1 = -25.7 P_{10} = -21.2 Q_1 = -17.5 Median = -11.2 Q_3 = -3.6 P_{90} = 1.0 P_{99} = 4.8

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

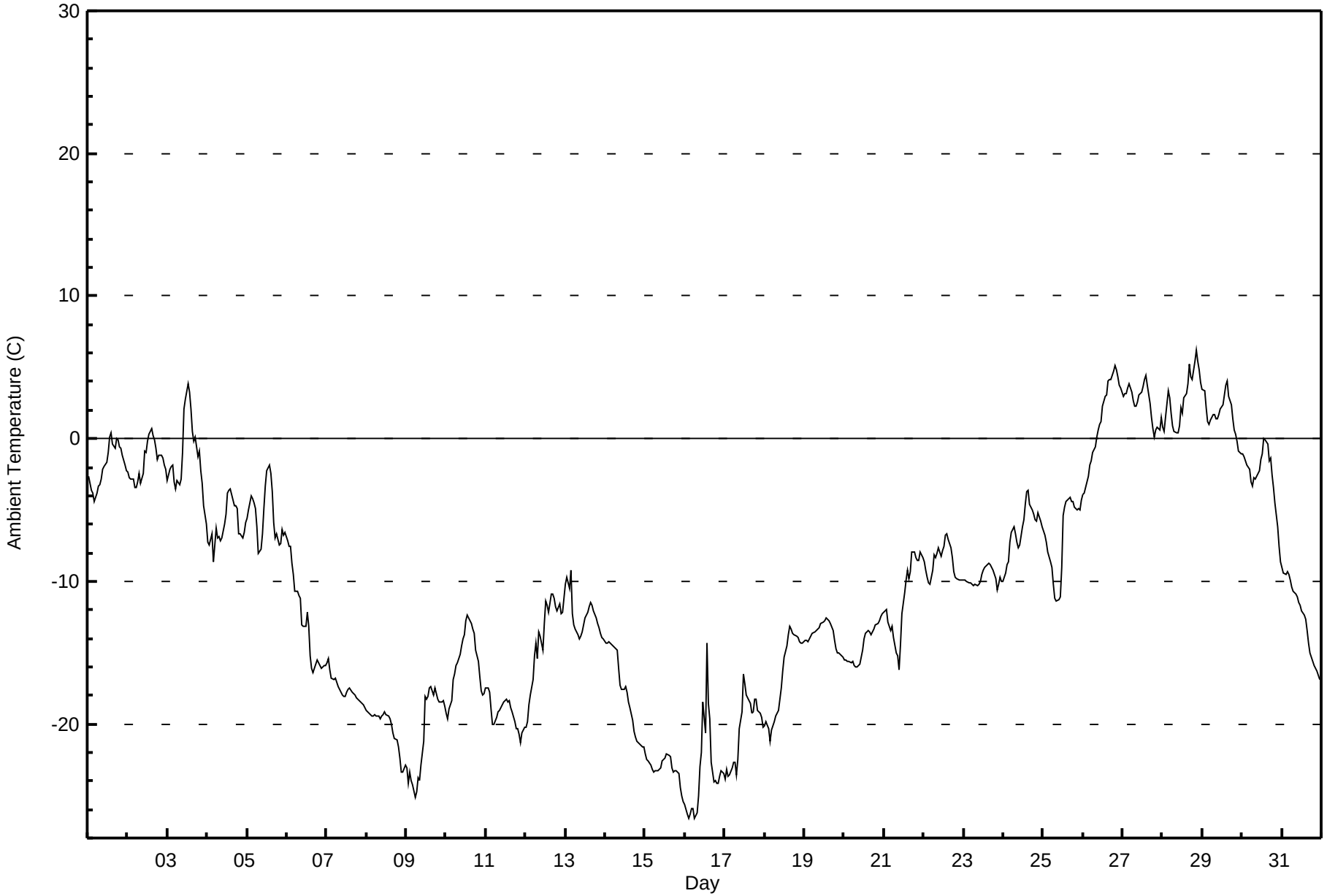
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	-2.6	-3.1	-3.6	-3.8	-4.4	-3.9	-3.3	-3.2	-2.9	-2.1	-2.0	-1.7	-0.9	0.1	0.4	-0.4	-0.6	0.0	-0.1	-0.6	-0.7	-1.2	-1.8	-2.2	-1.9	0.4
2-Jan	-2.4	-2.7	-2.8	-2.9	-3.4	-3.4	-3.0	-2.5	-3.1	-2.4	-0.9	-0.9	-0.1	0.3	0.7	0.2	-0.1	-0.7	-1.5	-1.1	-1.2	-1.3	-1.9	-2.2	-1.6	0.7
3-Jan	-2.9	-2.2	-2.0	-1.9	-3.1	-3.5	-3.0	-3.2	-2.8	-1.0	2.1	2.8	3.8	3.3	2.0	0.5	-0.2	0.1	-1.2	-0.8	-2.2	-3.1	-4.7	-6.0	-1.2	3.8
4-Jan	-7.3	-7.4	-7.0	-6.7	-8.7	-6.2	-7.0	-6.9	-7.1	-7.0	-6.0	-5.2	-3.8	-3.6	-3.5	-3.9	-4.7	-4.7	-4.9	-6.7	-6.6	-7.0	-6.6	-5.9	-6.0	-3.5
5-Jan	-5.5	-5.0	-4.0	-4.2	-4.5	-4.9	-6.2	-8.0	-7.7	-6.7	-4.9	-3.3	-2.2	-1.8	-2.5	-3.7	-5.9	-7.0	-6.7	-7.4	-7.3	-6.4	-6.8	-6.5	-5.4	-1.8
6-Jan	-7.2	-7.6	-7.6	-8.8	-9.5	-10.7	-10.7	-11.0	-11.2	-13.1	-13.2	-13.1	-12.2	-13.2	-15.2	-16.1	-16.4	-15.8	-15.5	-15.7	-15.9	-16.1	-15.9	-15.9	-12.8	-7.2
7-Jan	-15.7	-15.4	-16.2	-16.8	-16.8	-16.8	-17.0	-17.3	-17.6	-18.0	-18.1	-18.1	-17.8	-17.6	-17.5	-17.7	-17.9	-17.9	-18.1	-18.3	-18.4	-18.6	-18.7	-18.9	-17.6	-15.4
8-Jan	-19.0	-19.1	-19.3	-19.5	-19.4	-19.4	-19.4	-19.5	-19.6	-19.5	-19.3	-19.2	-19.4	-19.5	-19.7	-20.0	-20.6	-21.0	-21.1	-21.6	-22.4	-23.4	-23.4	-22.9	-20.3	-19.0
9-Jan	-23.1	-24.2	-23.4	-23.9	-24.2	-25.2	-24.7	-23.8	-24.0	-22.9	-21.2	-18.1	-18.3	-18.1	-17.5	-17.4	-18.0	-17.5	-17.9	-18.3	-18.5	-18.5	-18.4	-18.8	-20.7	-17.4
10-Jan	-19.3	-19.6	-18.9	-18.4	-16.9	-16.5	-15.9	-15.7	-15.1	-14.5	-14.0	-13.7	-12.8	-12.3	-12.7	-13.0	-13.3	-13.6	-14.9	-15.6	-16.7	-17.7	-18.0	-17.9	-15.7	-12.3
11-Jan	-17.5	-17.5	-17.8	-18.9	-20.0	-20.1	-19.6	-19.2	-19.0	-18.9	-18.7	-18.4	-18.3	-18.4	-18.4	-18.9	-19.2	-19.8	-20.3	-20.3	-20.7	-21.3	-20.6	-20.2	-19.3	-17.5
12-Jan	-20.2	-19.9	-18.6	-17.9	-16.9	-15.2	-14.4	-15.4	-13.6	-13.9	-14.9	-13.0	-11.4	-11.6	-12.2	-10.9	-10.9	-11.2	-11.7	-12.0	-11.6	-12.3	-12.2	-11.2	-13.9	-10.9
13-Jan	-10.2	-9.8	-10.5	-9.2	-12.3	-13.1	-13.4	-13.8	-14.1	-13.9	-13.6	-13.1	-12.6	-12.2	-11.7	-11.4	-11.6	-12.1	-12.6	-13.0	-13.2	-13.7	-13.9	-14.0	-12.5	-9.2
14-Jan	-14.3	-14.3	-14.3	-14.3	-14.4	-14.7	-14.7	-14.8	-16.1	-17.3	-17.5	-17.5	-17.4	-17.8	-18.5	-18.9	-19.7	-20.5	-20.9	-21.2	-21.4	-21.5	-21.6	-21.6	-17.7	-14.3
15-Jan	-22.1	-22.5	-22.6	-22.9	-23.2	-23.4	-23.3	-23.3	-23.3	-23.1	-22.6	-22.5	-22.4	-22.1	-22.2	-22.3	-23.1	-23.4	-23.3	-23.3	-23.5	-24.5	-25.0	-25.4	-23.1	-22.1
16-Jan	-25.7	-26.3	-26.6	-26.4	-25.9	-25.9	-26.6	-26.2	-25.1	-23.0	-22.0	-18.5	-20.6	-14.3	-18.6	-19.7	-22.7	-24.1	-24.0	-24.2	-24.2	-23.7	-23.3	-23.5	-23.4	-14.3
17-Jan	-23.9	-23.2	-23.7	-23.6	-23.1	-22.7	-22.7	-23.5	-22.5	-20.4	-19.2	-16.5	-17.2	-18.0	-18.2	-18.5	-19.3	-19.1	-18.3	-18.3	-19.1	-19.3	-19.6	-20.2	-20.4	-16.5
18-Jan	-20.1	-19.8	-20.3	-21.2	-20.5	-20.2	-19.9	-19.4	-19.0	-18.3	-17.5	-16.3	-15.4	-14.5	-13.7	-13.2	-13.3	-13.6	-13.8	-13.8	-13.9	-14.3	-14.4	-14.3	-16.7	-13.2
19-Jan	-14.1	-14.2	-14.2	-14.1	-13.8	-13.6	-13.5	-13.5	-13.3	-13.3	-13.0	-12.8	-12.8	-12.6	-12.6	-12.8	-13.0	-13.4	-14.1	-14.7	-15.0	-15.0	-15.2	-15.4	-13.8	-12.6
20-Jan	-15.5	-15.5	-15.6	-15.7	-15.7	-15.7	-15.9	-16.0	-16.0	-15.8	-15.3	-14.8	-14.1	-13.6	-13.5	-13.6	-13.7	-13.5	-13.3	-13.0	-12.9	-12.8	-12.5	-12.3	-14.4	-12.3
21-Jan	-12.2	-12.0	-12.9	-13.2	-13.4	-13.2	-14.0	-15.1	-15.3	-16.2	-14.5	-12.3	-10.8	-9.9	-9.2	-9.8	-9.3	-7.9	-8.0	-8.3	-8.6	-8.5	-7.9	-8.4	-11.3	-7.9
22-Jan	-8.6	-9.2	-9.8	-10.1	-10.2	-9.2	-8.1	-8.4	-8.1	-7.6	-8.3	-7.8	-7.5	-6.8	-6.7	-7.1	-7.6	-8.3	-9.3	-9.7	-9.9	-10.0	-9.9	-9.9	-8.7	-6.7
23-Jan	-9.9	-9.9	-10.0	-10.1	-10.1	-10.2	-10.3	-10.2	-10.3	-10.2	-10.0	-9.6	-9.2	-9.0	-8.8	-8.7	-8.9	-9.0	-9.2	-9.8	-10.6	-10.2	-9.8	-10.0	-9.8	-8.7
24-Jan	-10.0	-9.4	-8.8	-8.6	-7.3	-6.5	-6.2	-6.6	-7.2	-7.6	-7.4	-6.1	-5.7	-4.6	-3.7	-3.6	-4.6	-5.0	-5.3	-5.7	-5.7	-5.2	-5.7	-6.1	-6.4	-3.6
25-Jan	-6.4	-6.8	-7.2	-7.9	-8.6	-9.1	-10.2	-11.2	-11.4	-11.3	-11.1	-9.0	-5.4	-4.8	-4.4	-4.2	-4.2	-4.4	-4.4	-4.8	-5.0	-4.9	-5.0	-4.3	-6.9	-4.2
26-Jan	-3.9	-3.8	-3.0	-2.7	-1.9	-1.6	-0.9	-0.5	0.1	0.6	1.0	1.2	2.3	2.9	3.1	4.0	4.1	4.1	4.7	5.1	4.9	4.3	3.8	3.6	1.3	5.1
27-Jan	3.0	3.2	3.2	3.5	3.8	3.3	2.6	2.3	2.3	2.5	3.0	3.3	3.7	4.1	4.4	3.8	2.5	1.5	0.7	0.1	0.6	0.8	0.6	1.5	2.5	4.4
28-Jan	0.8	0.5	1.5	3.4	2.9	1.8	0.9	0.5	0.4	0.4	0.9	2.2	1.8	2.8	3.1	3.8	5.2	4.3	4.2	5.4	6.2	5.4	4.8	3.9	2.8	6.2
29-Jan	3.5	3.4	2.1	1.2	1.0	1.3	1.7	1.7	1.4	1.4	1.7	2.1	2.4	3.1	3.7	4.1	3.0	2.3	1.4	0.7	0.3	-0.2	-0.9	-1.0	1.7	4.1
30-Jan	-1.0	-1.2	-1.6	-1.8	-2.2	-3.0	-3.4	-2.7	-2.9	-2.6	-2.2	-1.5	-1.1	0.0	-0.1	-0.4	-1.6	-1.4	-2.5	-3.4	-4.5	-6.2	-7.5	-8.6	-2.6	0.0
31-Jan	-9.0	-9.4	-9.5	-9.4	-9.5	-10.0	-10.4	-10.7	-10.9	-11.1	-11.4	-11.7	-12.1	-12.4	-12.6	-13.4	-14.3	-15.1	-15.4	-15.9	-16.1	-16.3	-16.6	-16.9	-12.5	-9.0
	-11.0	-11.1	-11.1	-11.2	-11.4	-11.3	-11.4	-11.5	-11.5	-11.2	-10.6	-9.8	-9.3	-8.8	-8.9	-9.1	-9.7	-9.9	-10.2	-10.5	-10.8	-11.0	-11.2	-11.3	Diurnal Average	
	3.5	3.4	3.2	3.5	3.8	3.3	2.6	2.3	2.3	2.5	3.0	3.3	3.8	4.1	4.4	4.1	5.2	4.3	4.7	5.4	6.2	5.4	4.8	3.9	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

ConocoPhillips - Surmont - January 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	95	12.77	12.77
-20 - 0	550	73.92	86.69
0 - 10	99	13.31	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

ConocoPhillips - Surmont - January 2016

Maximum Value: 94 % on Jan 24 07:00

Maximum Daily Average: 90.9 % on Jan 23

Minimum Value: 20 % on Jan 3 11:00

Minimum Daily Average: 33.5 % on Jan 3

Maximum Diurnal Average: 78.8 % at hour 8

Minimum Diurnal Average: 74.9 % at hour 15

Monthly Average: 77.4 %

Percentiles: $P_1 = 30$ $P_{10} = 59$ $Q_1 = 72$ Median = 82 $Q_3 = 86$ $P_{90} = 90$ $P_{99} = 93$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

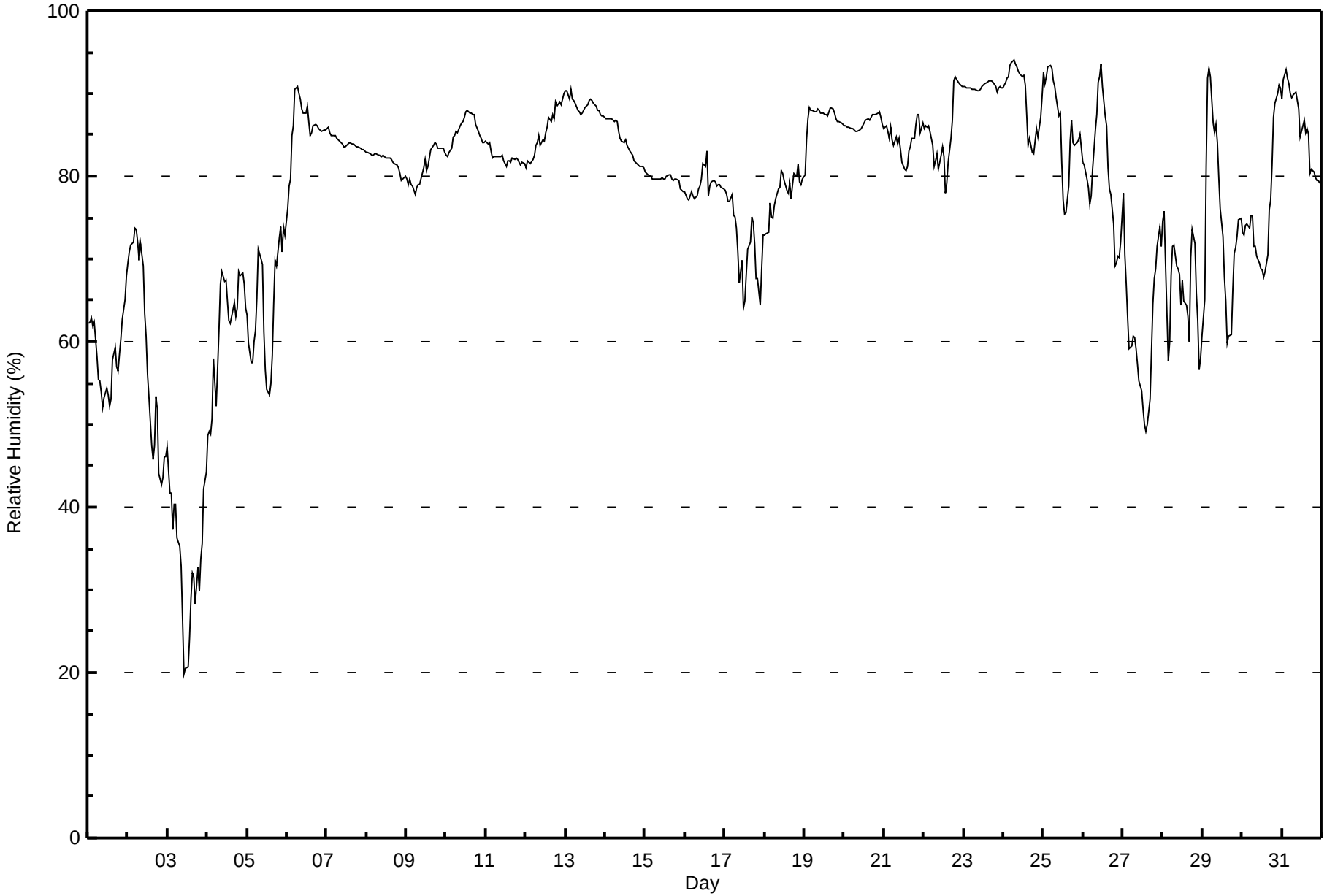
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	62	62	63	62	62	58	56	55	54	52	53	54	54	52	53	58	59	57	56	59	60	63	65	68	58.2	68
2-Jan	69	71	72	72	74	74	72	70	72	69	63	61	56	53	48	46	47	53	52	44	43	44	46	46	59.0	74
3-Jan	47	42	42	37	40	40	36	35	33	26	20	21	21	24	29	32	32	28	33	30	34	36	42	44	33.5	47
4-Jan	49	49	49	51	58	52	57	62	67	69	67	67	65	63	62	63	65	63	64	68	68	68	67	64	61.5	69
5-Jan	63	60	58	57	60	61	65	71	70	69	61	57	54	54	55	58	65	70	69	72	74	71	74	73	64.2	74
6-Jan	76	79	80	85	86	90	91	90	89	88	88	88	89	87	85	85	86	86	86	86	86	85	86	86	85.9	91
7-Jan	86	86	85	85	85	85	85	84	84	84	84	84	84	84	84	84	84	84	84	84	83	83	83	83	84.1	86
8-Jan	83	83	83	83	83	83	83	83	82	82	83	82	82	82	82	82	82	81	81	81	80	80	80	80	81.9	83
9-Jan	80	79	80	79	79	78	79	79	79	80	81	82	81	81	82	83	84	84	84	83	83	83	83	83	81.2	84
10-Jan	83	82	83	83	85	85	85	85	86	86	87	87	88	88	88	88	87	87	86	85	85	85	84	84	85.6	88
11-Jan	84	84	84	83	82	82	82	82	82	82	82	82	81	82	82	82	82	82	82	82	82	81	82	81	82.3	84
12-Jan	81	82	82	81	82	83	84	84	85	84	84	84	85	86	87	87	88	87	89	88	89	89	89	90	85.4	90
13-Jan	90	90	89	90	89	89	89	88	88	88	88	88	88	89	89	89	89	89	88	88	88	88	87	87	88.6	90
14-Jan	87	87	87	87	87	87	87	87	85	85	84	84	84	84	83	83	83	82	82	81	81	81	81	81	84.2	87
15-Jan	81	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	79	79	78	78	79.6	81
16-Jan	78	77	77	78	78	78	77	78	79	79	80	82	81	83	78	79	79	79	79	79	79	79	79	78	78.8	83
17-Jan	78	78	77	77	78	75	75	74	71	67	70	64	65	68	71	72	75	74	72	68	68	64	69	73	71.8	78
18-Jan	73	73	73	77	75	75	76	77	78	79	81	80	79	78	78	79	77	79	80	80	82	79	79	80	77.9	82
19-Jan	80	84	87	88	88	88	88	88	88	88	88	88	87	87	87	88	88	88	88	87	87	87	86	86	87.0	88
20-Jan	86	86	86	86	86	86	86	86	85	86	86	86	87	87	87	87	87	88	87	87	88	88	87	86	86.5	88
21-Jan	86	86	85	85	86	84	84	85	84	85	83	82	81	81	81	83	84	85	85	86	87	88	85	86	84.4	88
22-Jan	86	86	86	86	85	84	81	82	83	81	83	83	82	78	79	82	85	87	92	92	92	91	91	91	85.3	92
23-Jan	91	91	91	91	91	90	90	91	90	90	91	91	91	91	91	92	91	92	91	91	90	91	91	91	90.9	92
24-Jan	91	91	92	92	93	94	94	94	93	93	92	92	92	91	87	84	85	83	83	84	86	85	87	90	89.5	94
25-Jan	92	91	92	93	93	93	92	91	89	87	88	82	77	75	76	79	84	87	84	84	84	84	85	83	86.1	93
26-Jan	82	81	80	79	77	78	81	86	87	91	92	94	91	87	86	81	78	78	74	69	70	70	70	72	80.6	94
27-Jan	78	70	67	63	59	60	61	60	59	57	55	54	52	50	49	50	53	59	65	68	69	71	74	72	61.4	78
28-Jan	75	76	69	58	60	68	72	72	69	69	68	64	67	65	64	63	60	70	73	72	66	63	57	58	66.6	76
29-Jan	61	65	81	92	93	92	86	85	86	84	80	76	73	68	65	60	61	61	66	71	71	73	75	75	75.0	93
30-Jan	73	73	74	74	74	75	75	72	71	70	69	69	69	68	68	71	76	77	81	87	89	90	91	91	76.1	91
31-Jan	89	92	93	92	91	90	89	90	90	89	88	85	85	87	85	86	85	80	81	80	80	80	79	79	86.1	93
	78.1	78.0	78.2	78.2	78.7	78.6	78.6	78.8	78.8	78.0	77.4	76.5	75.9	75.3	74.9	75.3	76.1	76.8	77.4	77.3	77.5	77.3	77.8	78.1	Diurnal Average	
	92	92	93	93	93	94	94	94	93	93	92	94	92	91	91	92	91	92	92	92	92	91	91	91	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

ConocoPhillips - Surmont - January 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	1	0.13	0.13
20 - 40	16	2.15	2.28
40 - 60	67	9.01	11.29
60 - 80	239	32.12	43.41
80 - 100	421	56.59	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

ConocoPhillips - Surmont - January 2016

Maximum Speed: 42 km/h on Jan 29 08:00

Maximum Daily Speed Average: 29.4 km/h on Jan 1

Minimum Speed Value: 1 km/h on Jan 12 19:00

Minimum Daily Speed Average: 0.4 km/h on Jan 6

Maximum Diurnal Speed Average: 7.4 km/h at hour 3

Minimum Diurnal Speed Average: 3.0 km/h at hour 15

Monthly Average Velocity: 5.9 km/h 273.0 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 4$ Median = 8 $Q_3 = 15$ $P_{90} = 23$ $P_{99} = 37$

Hours in Service:	744
Hours of Data:	736
Hours of Missing Data:	8
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Jan	W13	W10	W35	W35	W35	W34	W37	W34	W32	W26	W30	W27	W27	W30	W30	W28	W34	W37	W37	WNW31	WNW33	WNW31	WNW26	WNW23	W29.4	W37
2-Jan	WNW20	W20	W22	W21	W19	W16	W9	W17	W17	WSW19	WSW19	WSW19	WSW19	WSW17	W9	WSW14	WSW16	SW13	WSW11	WSW9	WSW7	WNW4	SW2	S3	W13.6	W22
3-Jan	S4	SW9	SW10	SW15	WSW13	SW15	SW12	SW12	SW13	SW15	SW15	SW15	SW13	SW14	SW13	SW15	SW21	WSW24	WSW18	WSW17	WSW13	WSW14	WNW9	W8	SW13.1	WSW24
4-Jan	WSW7	W4	W7	NNW13	NNW16	NNW18	NNW19	NNW15	NNW16	NNW20	NNW20	NNW19	NNW17	NNW14	NNW14	NNW14	NW13	NW13	NW14	WNW12	WNW11	WSW12	W10	W9	NW12.1	NNW20
5-Jan	WNW10	W10	W14	W14	WNW13	WNW12	WNW10	SE1	WSW9	WNW5	WSW6	S3	SSW5	SSE3	ESE5	SE5	SSE3	SW4	S5	S6	S6	SE9	SE8	SSE11	WSW3.8	W14
6-Jan	S8	SSW10	S7	SE2	SSW5	SSE3	SSE3	SSE5	S2	SE3	ESE4	ESE1	SSW3	E2	NE5	NNE4	NNE5	NNW4	N4	N4	N5	N4	N5	N6	ESE0.4	SSW10
7-Jan	N6	N4	N7	N8	NNW8	NNW8	NNW7	NNW7	NNW6	NNW6	NNW6	NNW6	N6	NNW5	N5	N5	NNW4	NW5	W4	W4	WSW3	W4	W4	W4	NNW4.8	NNW8
8-Jan	W4	NNW3	N2	ENE1	N3	NE2	E3	ENE2	E3	E2	ENE3	ENE3	ESE2	ESE2	ESE2	SE3	SE2	SE3	SSW4	SSW5	SSW4	SSW3	SSW4	S5	SE1.1	S5
9-Jan	SSW4	SSW3	WSW5	NNW2	WNW4	W3	SW4	NE1	ENE2	ESE1	SSW3	S2	ESE2	ESE3	SE3	SSW2	SSW3	SSW3	SW3	WSW3	WSW4	WSW4	WSW4	WSW4	SW1.9	WSW5
10-Jan	WSW4	WSW3	WSW4	WSW3	WNW5	WNW4	WNW2	WSW3	WNW4	WNW5	WNW7	WNW8	NW8	NNW8	N8	NNW9	N7	NNW8	NNW9	NNW10	NNW10	NNW8	NNW8	NNW7	NW5.3	NNW10
11-Jan	NNW8	NNW10	NNW10	NNW13	NNW13	NNW10	NNW10	NW10	NNW10	NW9	NW9	NW8	NW6	WNW6	WNW5	W6	W5	W4	WSW3	SSW4	SSW5	SW5	SW4	S3	NW5.7	NNW13
12-Jan	S3	SSW2	SSW3	SSW2	SW5	SW5	SW4	S3	SSW6	SSE4	S4	SSW4	SW3	E1	SE3	SSW3	SSE1	W1	S1	SE2	S4	SSW3	SW5	WSW3	SSW2.7	SSW6
13-Jan	SE2	SE3	SSW5	SSE4	SE4	SE4	SE5	SE5	SE5	SE4	SE5	SE5	ESE5	ESE4	ESE4	ESE4	E4	E4	E4	ENE4	NE4	ENE4	ENE4	NE4	ESE3.3	SE5
14-Jan	NE4	NNE4	N5	N6	N6	N6	NNW7	N6	NNW6	NNW7	NNW7	NNW7	NNW7	NNW8	NNW7	N6	N7	NNW8	NNW7	N6	N6	N6	N5	NE5	N6.1	NNW8
15-Jan	NE5	NE4	N5	N5	NNE5	NNE4	NNE4	NNE4	NNE4	NNE3	N4	NE3	ENE3	NE4	NE3	NNE4	NNE3	WNW2	WNW2	N4	NNE3	NE3	SE2	SW3	NNE2.9	N5
16-Jan	W4	AF	AF	WNW3	WNW3	W3	W3	WNW3	NW4	WNW3	NW3	NNW3	NNW2	NE1	E2	NE2	N2	WNW3	SW1	AF	AF	SW3	AF	AF	WNW1.9	NW4
17-Jan	AF	WSW3	WSW2	WSW2	AF	SW2	SW2	SW4	SW3	SSW3	SW4	SSW4	SSE4	S5	S5	SSE5	SE8	S12	S16	S18	S19	S18	S17	SSE15	S7.2	S19
18-Jan	SSE18	SSE18	SSE17	SE17	SE16	SE15	SE12	SE14	SE13	SE12	SE11	SSE8	SSE8	S9	SSE7	SE9	S9	SSW9	SW6	WSW6	WSW5	W8	WSW5	WSW7	SSE8.6	SSE18
19-Jan	WSW6	WNW10	W8	W5	W7	W8	WNW9	W8	WNW6	WNW5	NNW1	NNE3	N5	N5	NNE8	NNE6	NNE8	N11	N12	N11	NNE8	N8	N10	N9	NNW5.4	N12
20-Jan	N8	N8	N7	N8	N8	N6	N6	NNE5	N5	WNW3	E3	SE4	SE4	SE5	SSE6	S7	SSE6	SSE6	SSE7	S9	SSE8	S9	S8	S7	SE1.3	S9
21-Jan	S7	SSW9	SW10	S8	SE6	S11	S10	SSE10	SSE9	SE8	S12	SSW9	S15	S18	SSE17	SSE17	SSE23	SSE21	SSE19	SSE17	S20	S12	SSW9	S14	S12.4	SSE23
22-Jan	SW8	SW7	SW10	WSW5	SW4	W11	WNW14	W5	SSW2	NNE6	NE7	ESE5	NE4	NE4	NE6	N11	N10	NNE10	N9	NNE8	NE8	NE9	NE8	ENE6	N2.7	WNW14
23-Jan	NE5	NNE6	NNE5	NNE4	N5	NNE5	NNE4	N4	NNE3	ENE4	E4	SE6	SE9	SSE5	ESE3	E4	ESE5	SE3	SSE3	SSW5	SW8	WSW9	WSW7	W4	E1.0	WSW9
24-Jan	SSW6	SW6	SSW4	SSE3	SSW3	SW4	W9	W14	W14	W14	W11	W12	W11	WNW11	WNW10	W9	W16	WSW25	W26	W25	W20	WNW25	WNW23	NW17	W12.2	W26
25-Jan	NNW11	WNW18	NW11	WNW9	WNW14	WNW9	WSW6	SSW6	S5	SSE7	S9	S9	SSW10	S8	S9	SSE8	S8	SSW9	WSW17	SW13	SW8	SSW7	S4	W18	SW6.1	W18
26-Jan	W31	W28	W21	W15	W18	W22	W19	W9	W10	WSW8	WSW12	WSW14	WSW14	WSW11	WSW17	W23	W24	W26	W34	W35	W36	W38	W37	W39	W22.2	W39
27-Jan	W37	W37	W32	W37	WNW35	WNW31	W30	WNW33	WNW33	WNW29	WNW30	WNW27	WNW28	WNW24	WNW20	WNW16	W13	WSW15	WSW18	WSW16	WSW16	WSW16	SW11	SSW9	W23.4	W37
28-Jan	SE12	SSE10	S11	SSW10	S14	S17	S17	SSW15	SSW9	S7	SSW10	SSW9	S9	S8	SSE6	SW6	WSW22	WSW18	WSW21	W26	W31	W29	W31	W28	SW11.6	W31
29-Jan	W25	W29	W30	W28	WNW31	WNW37	WNW39	WNW42	WNW36	WNW32	WNW35	WNW33	WNW31	WNW28	WNW19	WNW13	WNW15	WNW22	W25	W25	W19	W19	W23	W22	W27.2	WNW42
30-Jan	W21	W23	W23	W24	W22	W17	W19	W23	W21	WNW19	WNW21	WNW18	WNW16	NW16	WNW15	NNW13	NNW8	NW10	N7	N12	N14	NNW18	N14	N13	WNW14.6	W24
31-Jan	N12	N11	NNE9	N7	NNE7	NNE9	NE7	NNE8	N8	NNE9	N12	NNE13	N14	NNW14	N16	NNW16	NNW17	NNW16	NNW16	NNW18	NNW18	NNW18	NNW18	NNW18	N12.5	NNW18
	W5.8	W6.7	W7.4	W6.8	WNW7.2	W6.8	W6.7	W6.1	W6.1	WNW5.2	W5.5	W5.1	W4.9	W4.3	WNW3.0	W3.3	W4.7	W6.6	W7.1	W7.1	W6.7	W6.8	W6.2	W5.8	Diurnal Average	
	W37	W37	W35	W37	WNW35	WNW37	WNW39	WNW42	WNW36	WNW32	WNW35	WNW33	WNW31	W30	W30	W28	W34	W37	W37	W35	W36	W38	W37	W39	Diurnal Maximum	

AF - Analyzer Failure

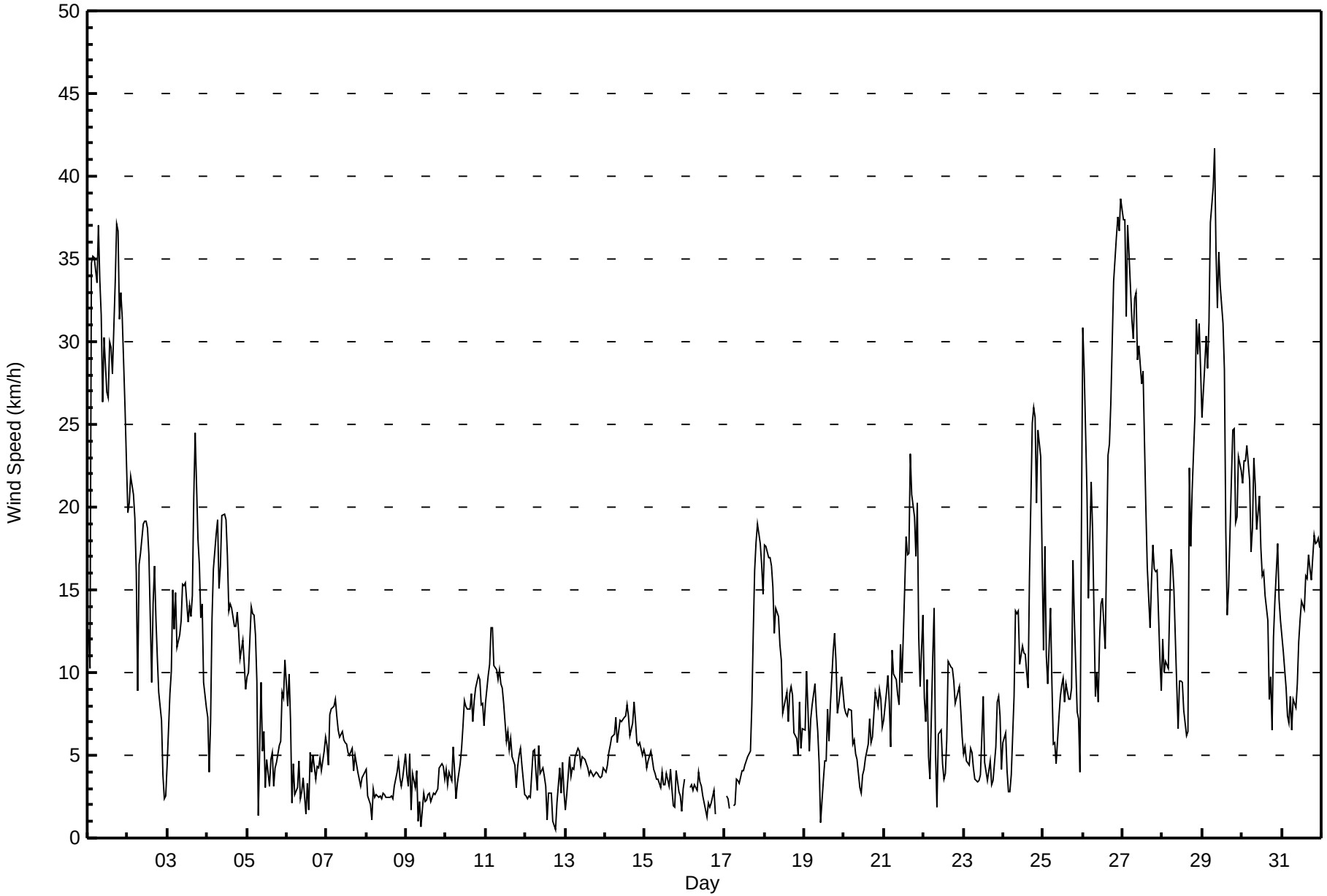
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - January 2016



502-48

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	268	36.41	36.41
6 - 11	223	30.30	66.71
12 - 19	144	19.57	86.28
20 - 28	53	7.20	93.48
29 - 38	45	6.11	99.59
> 38	3	0.41	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - January 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	22	19	18	10	12	16	25	13	17	29	21	20	17	18	3	8	268
6 - 11	33	14	6	1	0	0	9	16	23	16	12	14	21	14	8	36	223
12 - 19	9	1	0	0	0	0	8	8	14	1	14	24	21	14	5	25	144
20 - 28	0	0	0	0	0	0	0	2	1	0	1	4	31	12	0	2	53
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	29	16	0	0	45
> 38	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3
Totals	64	34	24	11	12	16	42	39	55	46	48	62	120	76	16	71	736

Total Number of Valid Hours: 736

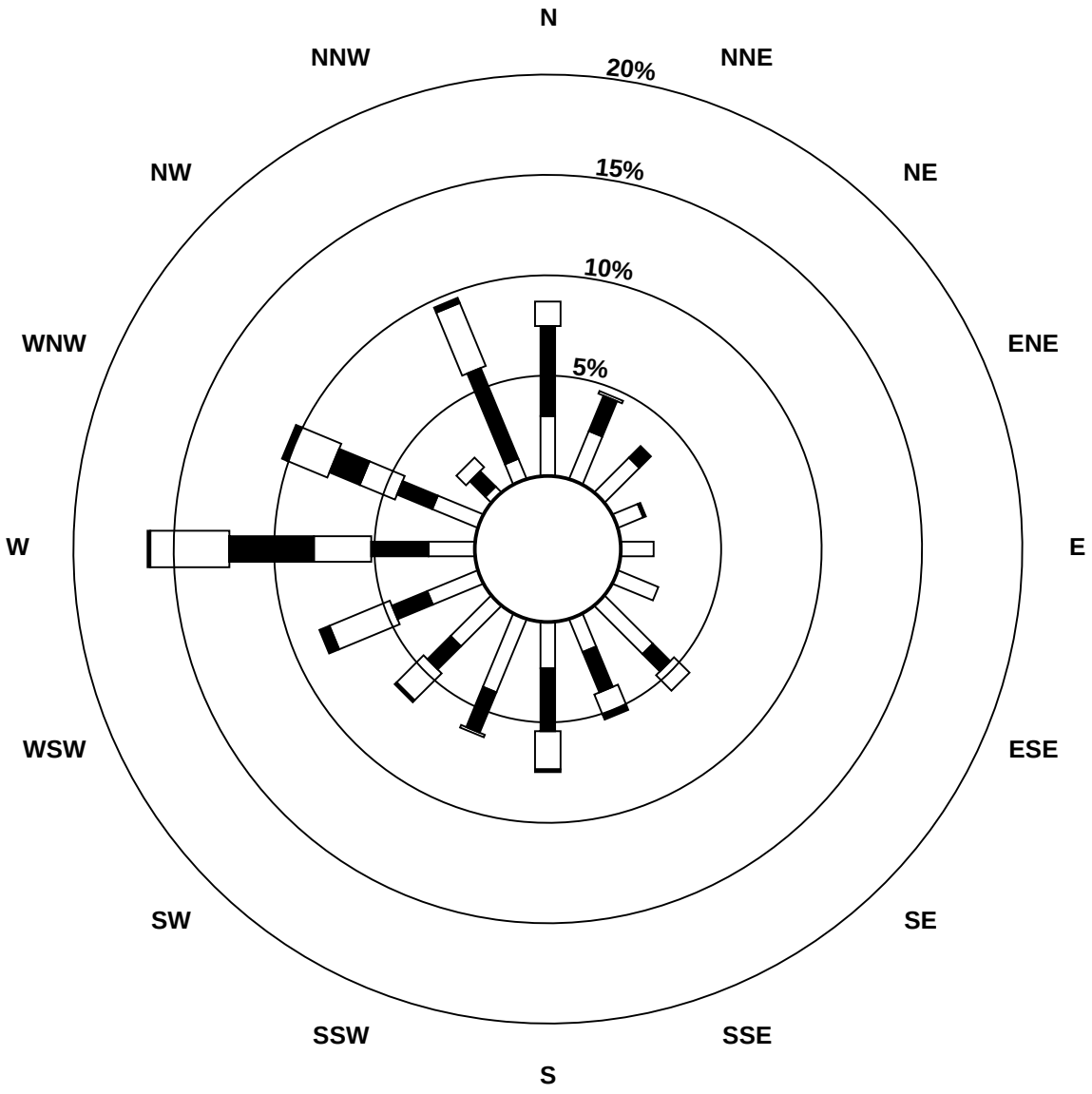
Total Number of Hours: 744

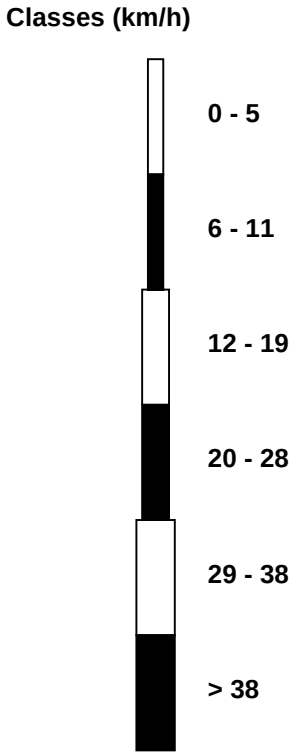
Wood Buffalo Environmental Association

Wind Rose Jan 2016

Wind Speed (WS) - km/h

ConocoPhillips - Surmont (AMS502)





Total Number of Valid Hours: 736

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - January 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 km/h on Jan 1 02:00

Minimum Value: 0 km/h on Jan 16 18:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 5$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	736
Hours of Missing Data:	8
Hours of Calibration:	0
Percent Operational Time:	98.9

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - January 2016

Direction of Maximum Speed: 283 deg on Jan 29 08:00
Direction of Maximum Daily Speed Average: 272.8 deg on Jan 1

Direction of Minimum Speed: 169 deg on Jan 12 19:00
Direction of Minimum Daily Speed Average: 0.4 deg on Jan 6

Monthly Average Direction: 273.2 deg

Hours in Service:	744
Hours of Data:	736
Hours of Missing Data:	8
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Jan	280	271	266	264	260	266	269	270	274	277	268	269	272	274	273	262	265	271	273	286	285	288	287	294	272.8
2-Jan	293	279	279	277	275	278	277	270	265	256	252	250	252	257	260	243	243	232	238	240	254	283	221	180	261.8
3-Jan	183	222	221	235	237	230	227	216	228	233	233	227	222	219	230	217	236	243	249	243	258	244	294	268	234.7
4-Jan	247	259	267	330	330	336	339	341	338	338	339	342	329	347	347	328	317	309	312	294	290	257	269	270	321.2
5-Jan	282	272	278	275	294	290	296	126	237	285	253	191	200	150	114	144	156	219	177	169	189	143	142	159	237.4
6-Jan	189	200	190	146	193	148	156	148	190	130	115	108	197	86	34	19	22	332	350	2	358	6	353	355	112.8
7-Jan	358	9	352	352	347	345	347	338	338	346	345	338	358	343	359	1	334	308	278	266	257	268	275	263	335.5
8-Jan	279	337	2	60	7	53	80	67	81	94	59	59	120	119	119	125	132	137	194	200	201	200	194	188	133.4
9-Jan	197	205	237	333	294	260	231	46	69	123	212	187	102	109	130	197	212	213	219	241	252	256	247	250	226.1
10-Jan	244	245	238	254	302	292	299	240	286	287	290	294	304	339	350	346	352	348	346	345	348	348	347	342	321.8
11-Jan	346	345	344	344	341	341	333	322	327	323	313	309	313	287	302	274	275	261	245	196	201	231	224	190	314.6
12-Jan	189	205	197	199	219	222	221	182	202	164	172	201	232	96	129	212	162	264	169	131	187	211	222	241	199.4
13-Jan	137	136	202	165	139	142	134	132	137	131	127	126	123	122	119	115	100	81	81	69	56	58	64	40	115.8
14-Jan	35	22	8	6	356	355	346	349	347	344	346	346	344	345	346	356	350	345	346	349	353	349	359	38	353.5
15-Jan	45	49	11	3	25	25	32	23	18	12	11	47	72	38	38	18	16	293	295	353	18	54	127	235	23.2
16-Jan	272	AF	AF	296	284	280	279	288	315	303	311	327	348	37	83	35	6	283	234	AF	AF	232	AF	AF	301.0
17-Jan	AF	241	246	238	AF	223	220	230	223	213	218	200	162	183	173	158	143	175	186	186	184	182	172	159	182.8
18-Jan	160	160	152	140	138	134	131	136	134	133	133	160	168	181	155	132	187	209	227	237	242	264	255	245	159.5
19-Jan	255	285	278	273	281	281	285	280	293	301	345	23	6	353	24	20	14	1	356	2	21	7	4	3	333.5
20-Jan	5	358	3	3	2	0	10	19	7	284	86	128	142	143	161	180	152	164	163	175	164	176	175	186	129.2
21-Jan	176	206	222	184	144	178	175	168	159	132	177	193	180	175	161	148	152	162	155	161	170	186	194	184	170.3
22-Jan	215	219	226	247	226	278	285	260	194	21	49	109	49	55	48	8	10	22	11	27	45	42	39	59	3.3
23-Jan	56	29	30	17	5	12	33	5	19	60	90	124	130	159	103	100	110	134	166	203	221	242	254	273	90.6
24-Jan	208	228	198	163	199	220	270	277	278	279	275	279	279	286	285	268	262	257	260	261	278	282	295	305	271.0
25-Jan	329	303	310	292	288	285	239	204	170	163	180	183	194	177	177	165	181	211	239	235	219	205	179	269	234.7
26-Jan	264	265	268	272	279	266	271	274	268	248	250	243	242	237	247	260	264	263	266	267	269	272	273	279	265.4
27-Jan	272	277	274	277	284	285	280	284	286	296	300	299	288	285	292	289	263	256	249	246	243	239	228	198	277.3
28-Jan	142	162	184	197	183	178	185	195	197	175	196	209	190	182	156	226	254	253	255	271	271	270	276	267	230.9
29-Jan	268	267	268	273	282	287	284	283	284	289	289	288	291	292	287	289	286	284	273	267	278	280	267	275	280.8
30-Jan	275	275	278	274	276	268	268	275	275	283	289	300	293	305	299	327	333	310	10	351	353	347	355	352	296.6
31-Jan	353	1	14	11	24	32	45	18	5	13	3	12	358	347	349	347	345	346	348	345	348	346	344	346	356.0
	267.8	268.6	268.1	276.4	281.7	278.0	277.6	274.0	277.2	285.6	278.4	275.3	269.3	273.0	282.4	275.6	265.8	264.5	263.8	265.9	268.4	271.3	277.1	275.5	
	Diurnal Average																								

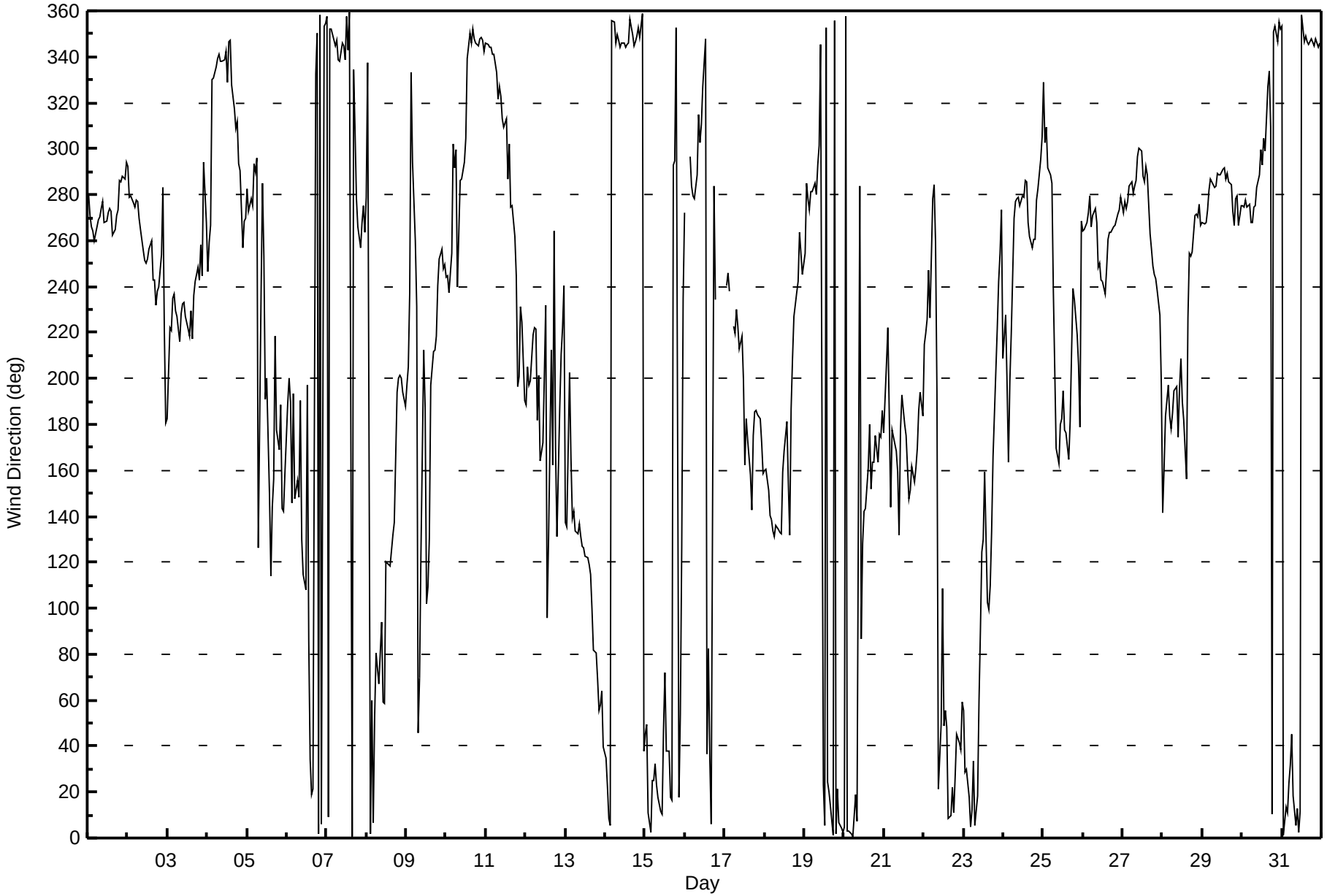
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - January 2016



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 92 deg on Jan 12 18:00

Minimum Value: 5 deg on Jan 4 22:00

Percentiles: P_1 = 7 P_{10} = 9 Q_1 = 11 Median = 15 Q_3 = 22 P_{90} = 36 P_{99} = 78

Hours in Service:	744
Hours of Data:	736
Hours of Missing Data:	8
Hours of Calibration:	0
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Jan	31	77	9	9	8	10	11	11	12	11	9	10	10	10	10	8	9	9	10	10	9	9	10	10	77
2-Jan	10	9	8	8	7	8	10	8	7	9	8	8	8	8	26	19	10	10	12	35	21	66	81	47	81
3-Jan	54	13	14	9	11	9	11	12	13	13	13	15	15	14	14	14	12	9	16	53	46	18	46	44	54
4-Jan	35	84	24	25	14	10	7	11	12	10	12	11	13	14	12	17	15	13	15	6	11	5	7	7	84
5-Jan	9	12	8	7	10	10	7	78	14	59	25	38	35	49	15	23	47	40	34	32	31	9	8	26	78
6-Jan	20	16	46	84	49	54	45	23	75	53	45	75	47	69	10	37	18	36	26	28	22	22	18	14	84
7-Jan	19	19	15	13	13	11	14	19	22	14	17	27	19	28	18	17	34	26	19	17	11	11	14	16	34
8-Jan	18	53	57	64	22	31	29	34	25	24	24	27	22	20	20	15	35	13	25	19	21	23	17	17	64
9-Jan	25	28	18	65	23	13	21	75	21	77	15	21	21	11	12	30	15	18	17	23	12	12	10	11	77
10-Jan	9	17	10	13	10	29	38	19	28	11	12	11	15	17	15	12	14	15	12	11	12	12	13	21	38
11-Jan	14	11	11	11	10	11	15	16	16	17	15	18	29	16	29	13	13	15	23	13	14	15	18	33	33
12-Jan	33	29	38	39	15	17	22	46	14	24	31	19	21	90	37	49	70	92	79	47	39	60	27	36	92
13-Jan	50	32	19	25	24	14	16	11	12	11	11	11	10	12	12	13	13	15	16	14	20	19	15	16	50
14-Jan	13	14	15	14	16	15	11	14	14	13	11	13	13	12	14	16	15	10	12	14	16	13	16	14	16
15-Jan	13	17	20	18	20	20	16	24	19	25	20	25	31	24	25	17	17	50	48	14	21	31	38	16	50
16-Jan	16	AF	AF	28	20	17	14	30	25	23	29	39	58	56	14	30	36	7	64	AF	AF	10	AF	AF	64
17-Jan	AF	10	7	13	AF	20	15	11	13	14	15	22	28	22	28	23	12	24	17	15	14	14	16	17	28
18-Jan	15	16	18	10	10	10	10	9	9	10	11	21	26	26	28	20	22	16	14	12	8	9	12	10	28
19-Jan	14	10	10	21	22	10	9	13	26	36	81	55	23	49	21	16	17	14	17	15	13	25	13	14	81
20-Jan	14	14	15	16	16	26	13	11	15	45	54	27	31	26	18	21	23	19	20	22	26	23	16	19	54
21-Jan	20	17	14	29	30	18	18	26	21	13	22	15	14	12	15	13	11	13	13	17	17	20	22	23	30
22-Jan	29	23	15	27	59	9	10	27	53	34	27	22	34	37	39	13	13	11	13	13	14	15	18	17	59
23-Jan	15	15	18	18	19	16	20	18	13	17	18	11	13	54	31	17	10	31	31	25	10	18	15	61	61
24-Jan	24	20	29	57	22	21	17	13	12	12	11	11	10	9	10	15	13	8	8	9	9	8	10	10	57
25-Jan	25	12	24	22	9	10	14	18	23	21	22	20	15	21	16	19	16	21	10	13	15	17	55	17	55
26-Jan	8	9	10	14	13	9	13	16	14	26	17	12	12	15	14	12	10	9	9	10	10	9	10	10	26
27-Jan	9	10	10	10	10	10	10	10	11	12	12	13	11	11	12	11	7	9	8	9	9	10	17	22	22
28-Jan	8	21	17	16	14	14	13	14	17	26	18	15	18	24	40	69	9	9	8	10	12	12	11	11	69
29-Jan	12	11	9	9	10	10	10	10	9	11	10	10	11	10	11	10	10	9	9	9	10	10	11	10	12
30-Jan	8	9	9	10	10	11	9	9	8	18	10	14	11	15	13	33	42	40	32	14	15	14	17	13	42
31-Jan	16	16	14	20	16	13	16	14	17	16	14	15	17	15	14	14	12	13	12	10	12	12	11	11	20
	54	84	57	84	59	54	45	78	75	77	81	75	58	90	40	69	70	92	79	53	46	66	81	61	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	January 22, 2016	Last Calibration	December 8, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:33	End Time (MST)	15:15
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	517	518
Analyzer IP address	192.168.1.43		Lamp voltage	2131	2040
Calculated slope	0.997555	1.006898	Chamber temp	50.0	50.0
Calculated intercept	-0.455546	-0.848253	Pressure	21.5	21.6
Analyzer Background	21.1	21.1	Flow	0.533	0.531
Analyzer Coefficient	1.011	1.011	Intensity	53	50

Analyzer make	API T100	Analyzer serial #	598

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	83.2	803.7	794.0	1.012
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	83.2	803.7	798.5	1.006
second point	5000	41.6	401.9	400.9	1.002
third point	5000	20.8	200.9	200.6	1.002
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	83.2	803.7	791.0	1.016
				Average Correction Factor	1.004

Corrected As found	794.1	Previous response	806.1	% change	1.5%

Notes:

Inlet filter replaced after as founds. Charcoal fill and purafil canisters replaced in zero air gen after as founds. No adjustments. As left zero began at 14:37 MST.

Calibration Performed By: Asad Hidayat

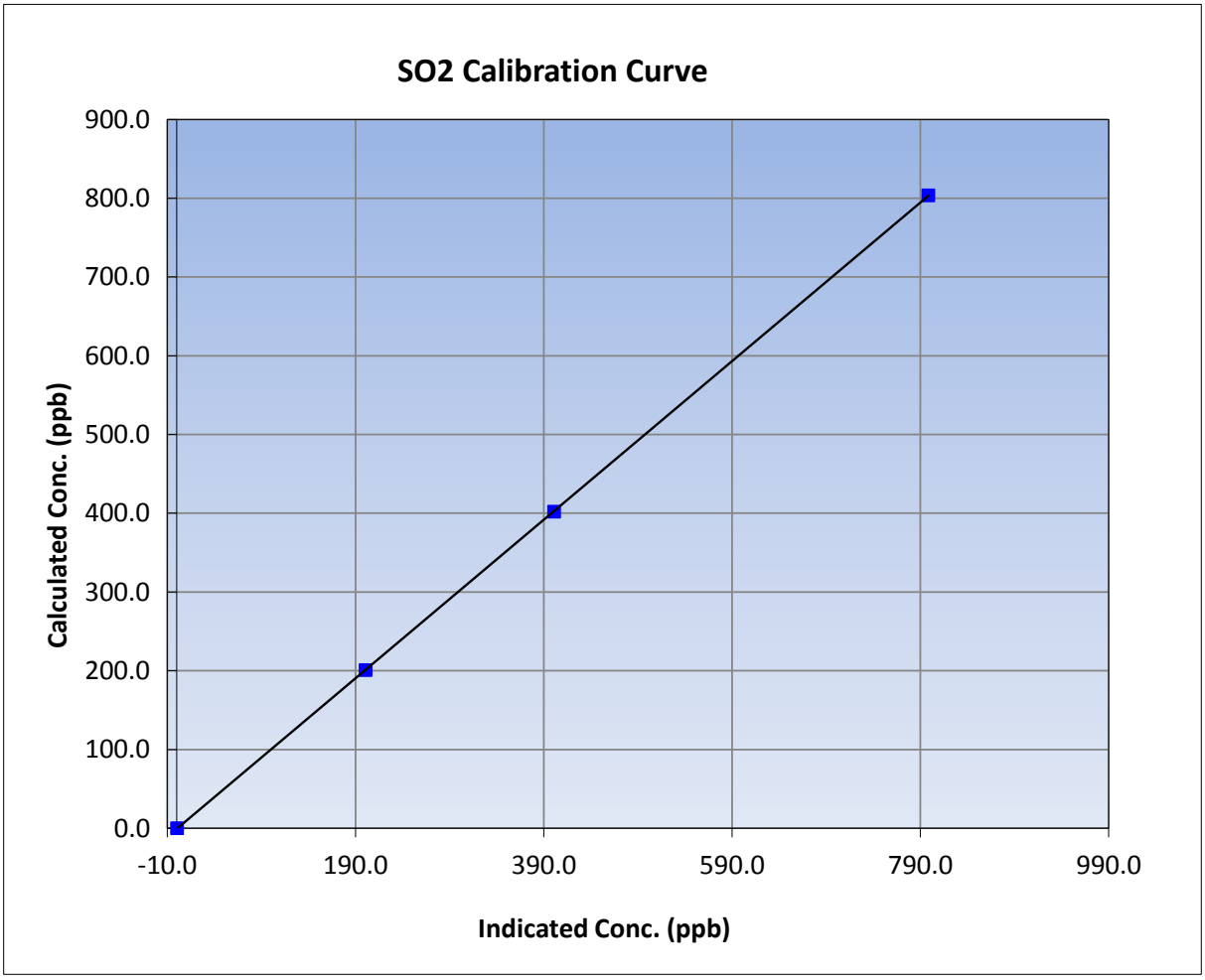
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

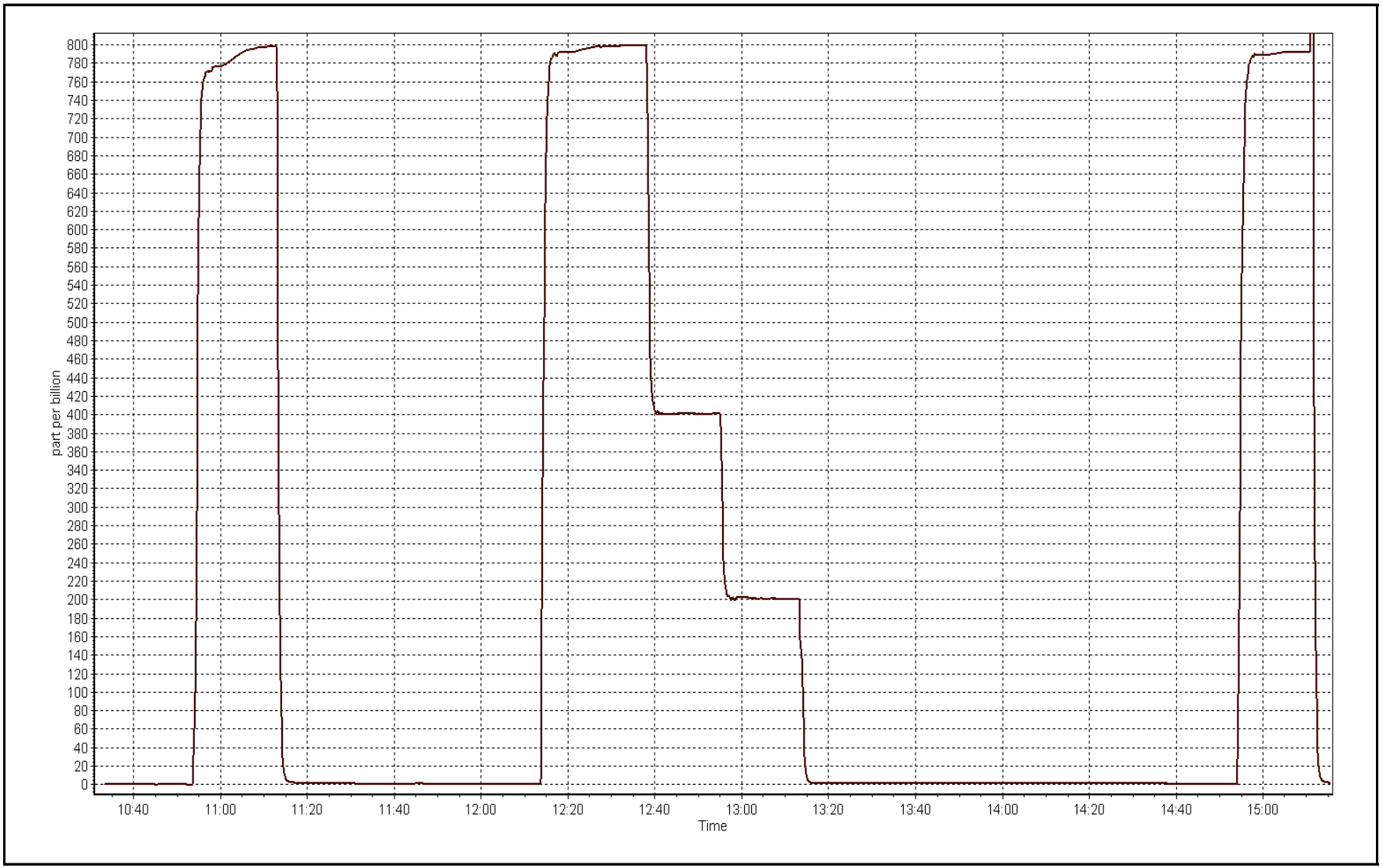
Calibration Date	January 22, 2016	Previous Calibration	December 8, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:33	End Time (MST)	15:15
Analyzer make	API T100	Analyzer serial #	598

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
803.7	798.5	1.0065		
401.9	400.9	1.0024	Slope	1.006898
200.9	200.6	1.0018		
			Intercept	-0.848253



SO2 Calibration Plot Date: January 22, 2016



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	21/12/2012
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	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%

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

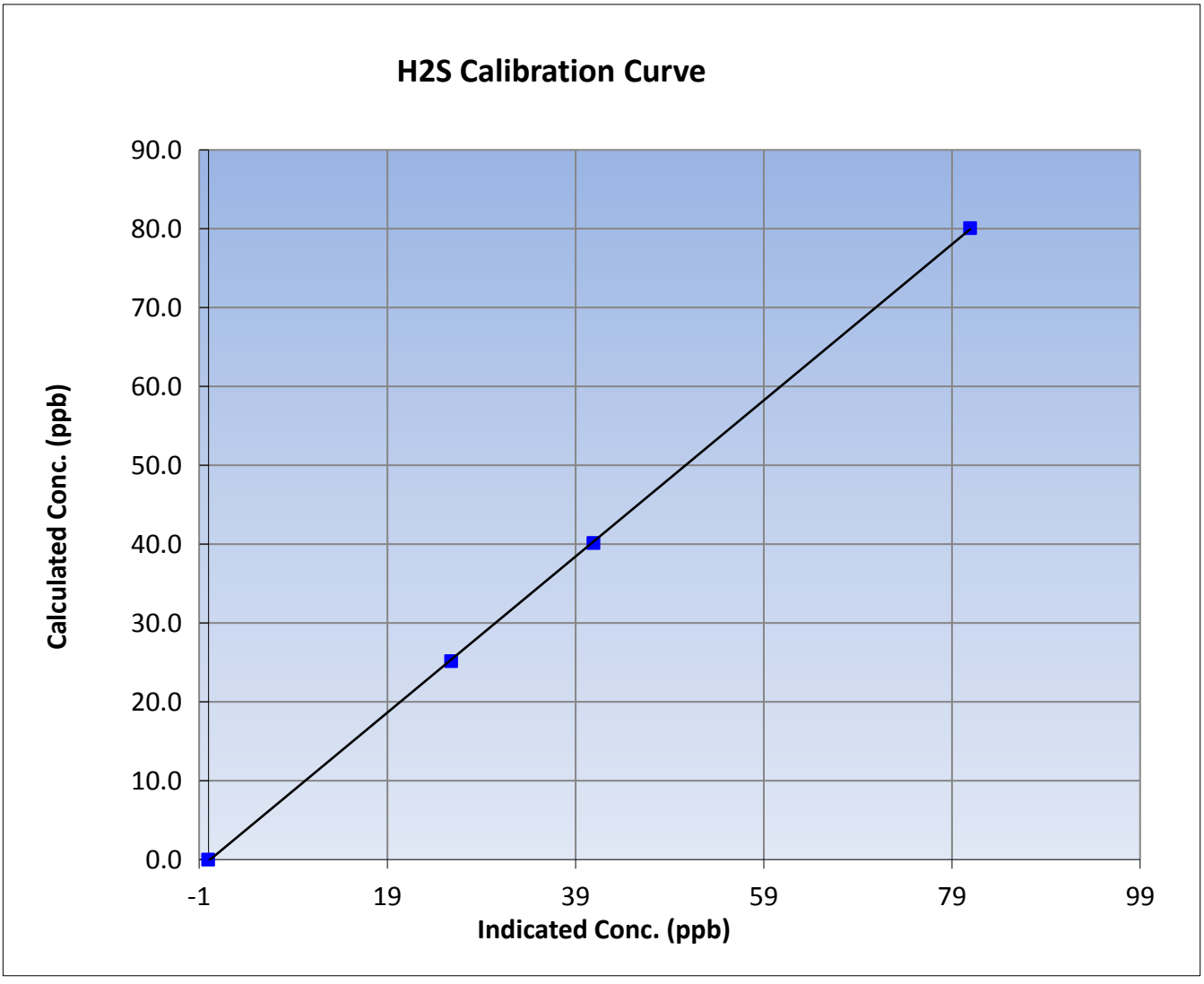
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

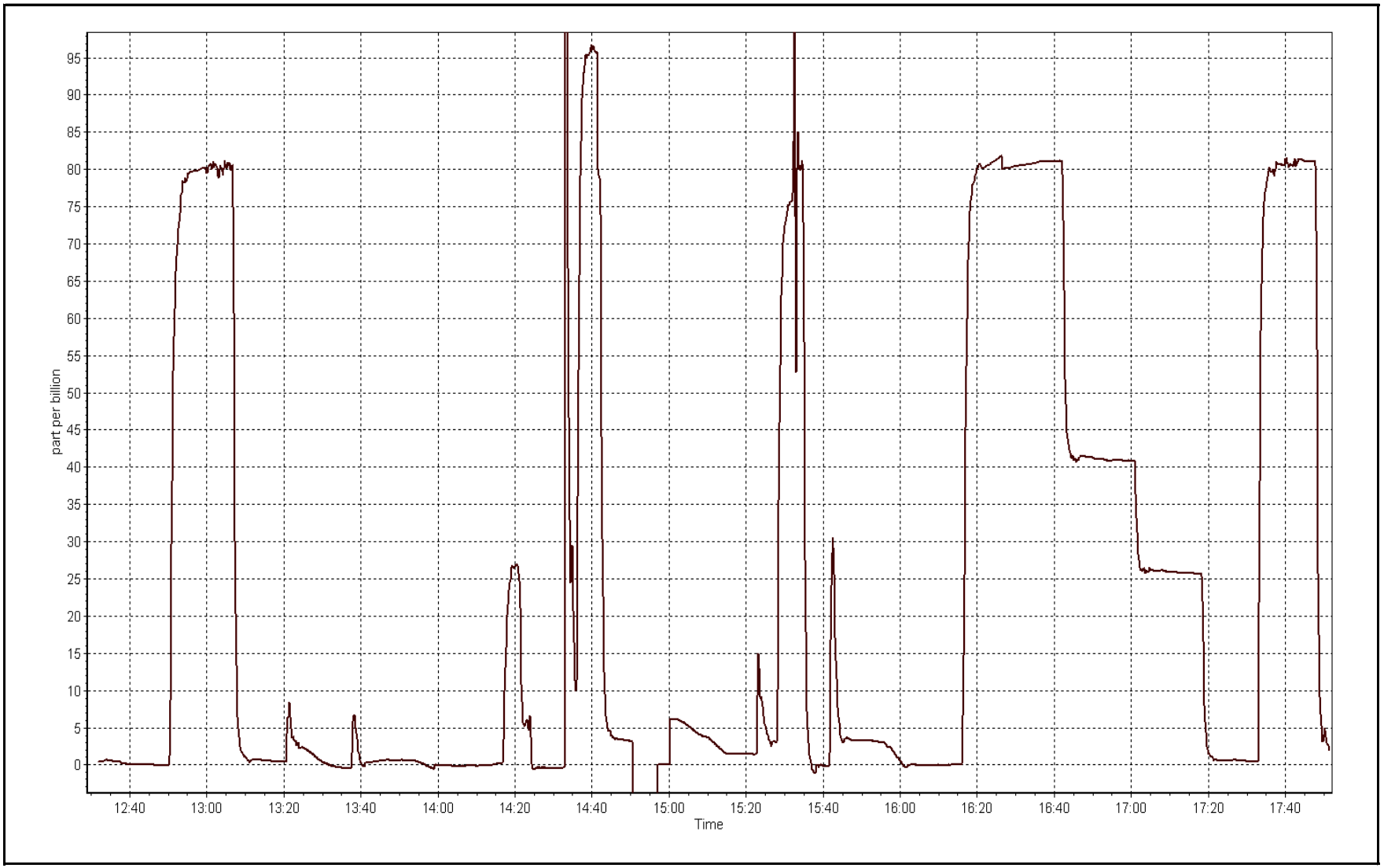
Calibration Date	January 21, 2016	Previous Calibration	December 4, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	12:30	End Time (MST)	17:52
Analyzer make	API T101	Analyzer serial #	197

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
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 8, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:32	End Time (MST)	15:15
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOx Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	12-Feb-18
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998108	0.996969	0.996160
	Data Offset	-0.392630	0.064844	-1.323711
Current Calibration	Data Slope	0.999582	0.999492	1.002663
	Data Offset	0.231709	0.046028	-0.082380

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.951		0.969	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.4		8.3	
NOX bkgrnd	4.7		9.3	
Chamber Temp	50.2	Deg C	50.5	Deg C
Moly Temp	322.4	Deg C	322.1	Deg C
PMT voltage	-866.5	V	-866.5	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	157	mmHg	160.6	mmHg
R Cell Press Nox	156.7	mmHg	160.9	mmHg
NO sample flow	0.651	lpm	0.654	lpm
Nox sample Flow	0.649	lpm	0.653	lpm

Notes:

Sample inlet filter replaced after as founds. Charcoal fill and purafill canisters replaced inside zero air gen after as founds. Adjusted both zero and span.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 22, 2016 Station Number: AMS 502

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	4.1	3.6	0.5	----	----
as found span	5000	83.2	800.4	800.4	0.0	792.3	791.1	1.2	1.0102	1.0117
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	83.2	800.4	800.4	0.0	800.1	800.3	-0.2	1.0003	1.0001
second point	5000	41.6	400.2	400.2	0.0	401.2	401.6	-0.3	0.9975	0.9966
third point	5000	20.8	200.1	200.1	0.0	199.2	199.5	-0.3	1.0044	1.0029
as left zero	5000	0.0	0.0	0.0	0.0	-1.1	-0.2	-0.9	----	----
as left span	5000	83.2	800.4	485.1	315.2	800.4	488.0	312.4	1.0000	0.9941
								Average Correction Factor	1.0007	0.9999

Corrcted As found NO_X= 788.2 NO= 787.5 Percent Change NO_X= 1.8% NO= 1.9%

Previous Response NO_X= 802.3 NO= 802.8

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	794.6	794.3	0.0	1.0073	1.0076	----	----
1st NO2 (300)	485.1	309.2	793.9	485.1	308.7	1.0082	----	1.0015	99.9%
2nd NO2 (200)	580.2	214.1	793.1	580.2	213.0	1.0092	----	1.0055	99.5%
3rd NO2 (100)	681.9	112.5	794.6	681.9	112.8	1.0072	----	0.9973	100.3%
2nd NO ref point		0.0	795.8	795.3	0.5	1.0057	1.0064	----	----
				Average Correction Factor		1.0076		1.0014	99.9%

Calibration Performed By: Asad Hidayat

Wood Buffalo Environmental Association

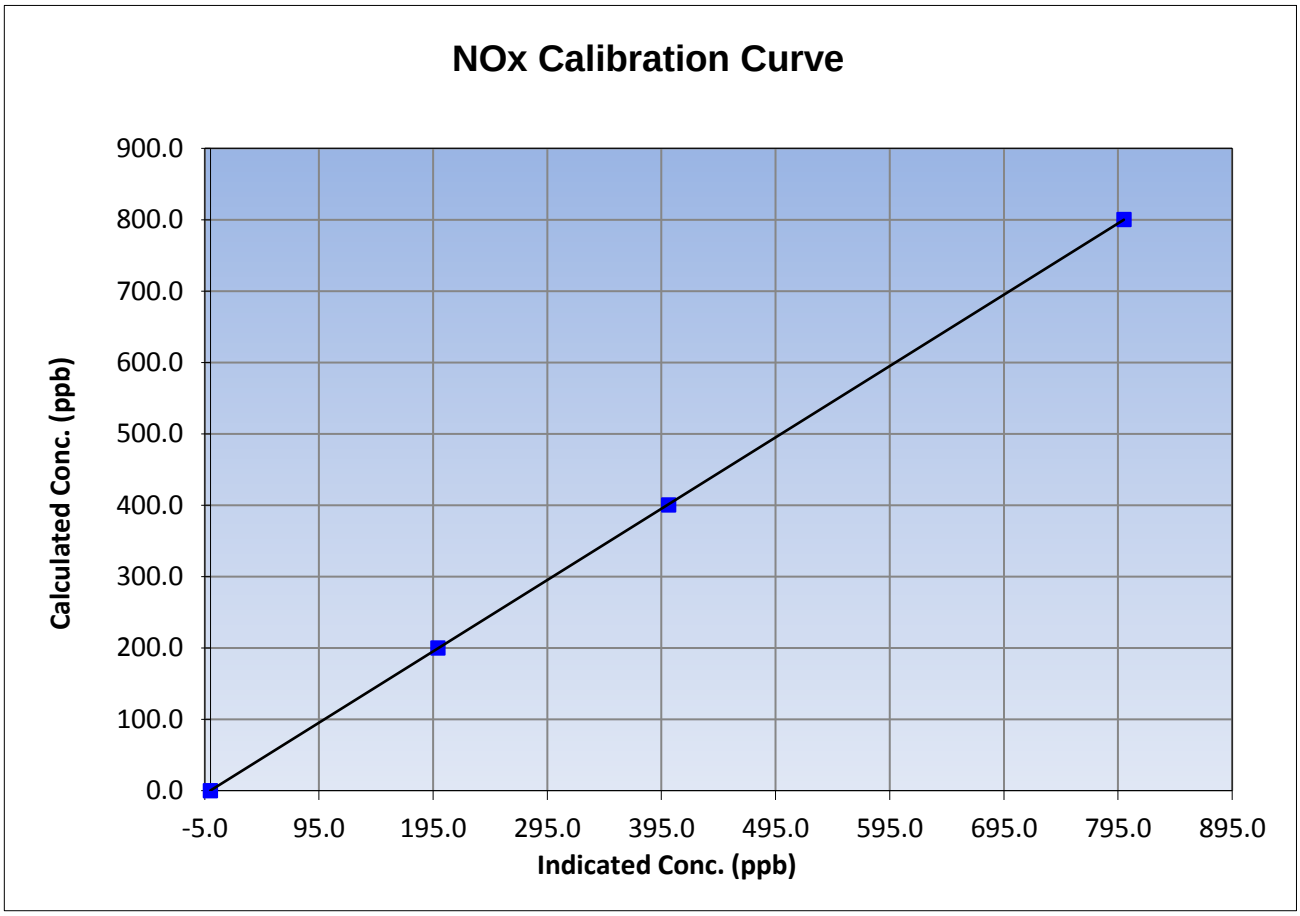
NO_X Calibration Summary

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 8, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:32	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999995
800.4	800.1	1.0003		
400.2	401.2	0.9975	Slope	0.999582
200.1	199.2	1.0044		
			Intercept	0.231709



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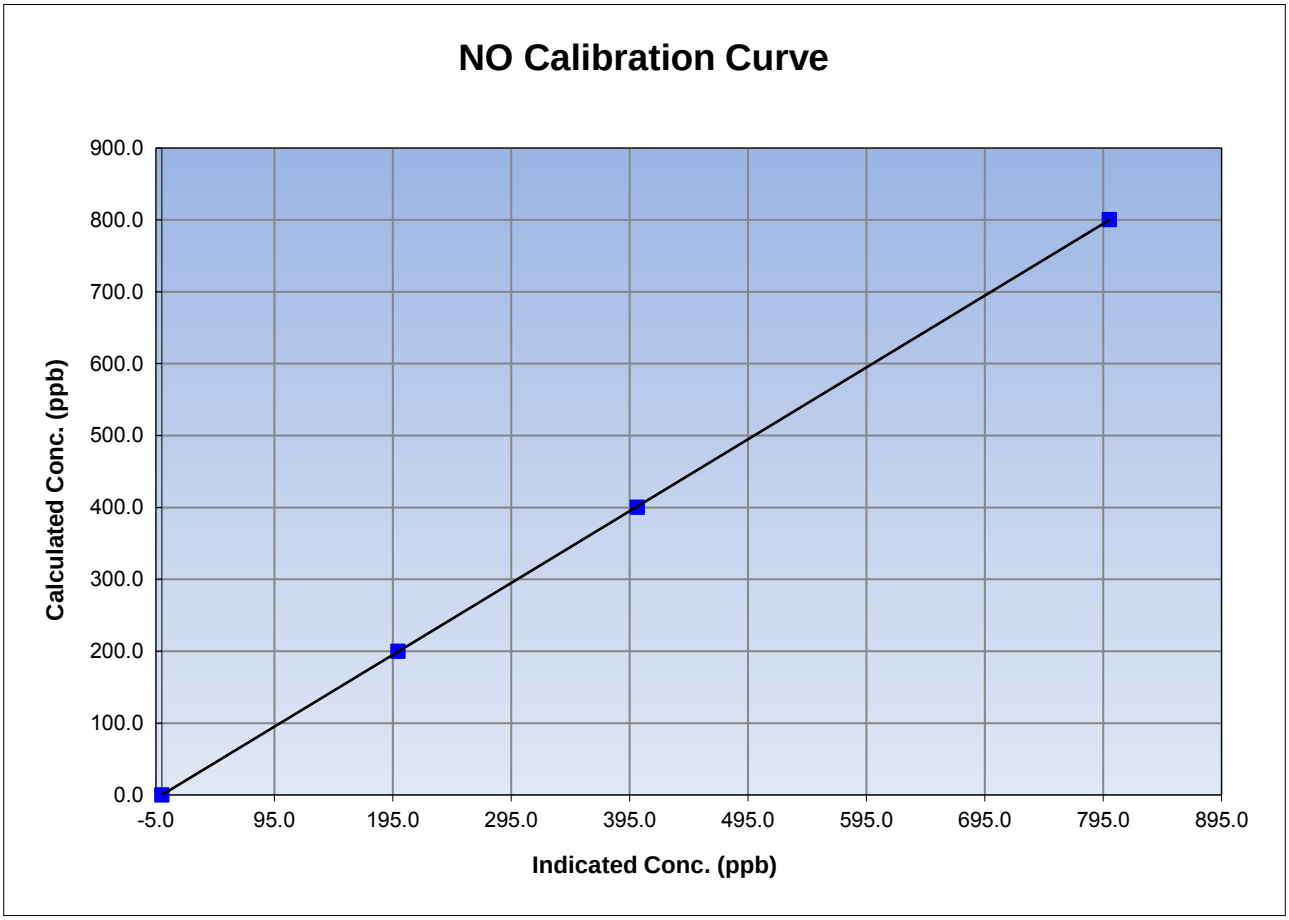
NO Calibration Summary

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 8, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:32	End Time (MST)	15:15
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	0.999994
800.4	800.3	1.0001		
400.2	401.6	0.9966	Slope	0.999492
200.1	199.5	1.0029		
			Intercept	0.046028



Wood Buffalo Environmental Association

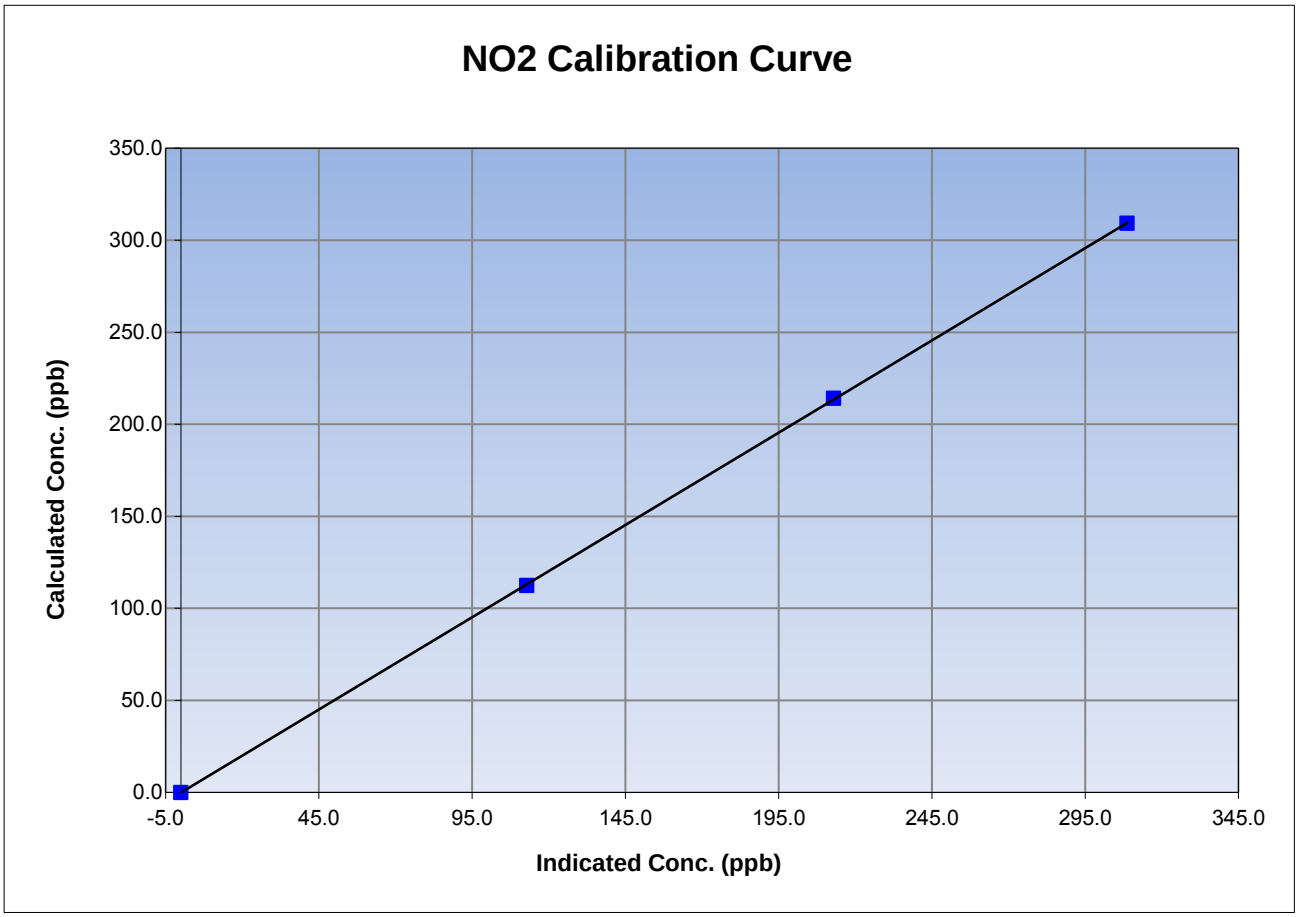
NO_2 Calibration Summary

Station Information

Calibration Date	January 22, 2016	Previous Calibration	December 8, 2015
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:32	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999984
309.2	308.7	1.0015		
214.1	213.0	1.0055	Slope	1.002663
112.5	112.8	0.9973		
			Intercept	-0.082380



NOX Calibration Plot Date: January 22, 2016