



*WOOD BUFFALO
ENVIRONMENTAL
ASSOCIATION*

MARCH 2015

MONTHLY REPORT



CONTINUOUS MONITORING
April 21, 2015

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospherics Inc
Calgary, Alberta



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April 21, 2015

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

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

Enclosed is the March 2015 ambient air quality monitoring report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter
AMS 2 - Mildred Lake
AMS 3 - Lower Camp B (meteorology)
AMS 4 - Buffalo Viewpoint
AMS 5 - Mannix
AMS 6 - Patricia McInnes
AMS 7 - Athabasca Valley
AMS 8 - Fort Chipewyan
AMS 9 - Barge Landing
AMS 11 - Lower Camp (air quality)
AMS 12 - Millennium Mine
AMS 13 - Fort McKay South
AMS 14 - Anzac
AMS 15 - CNRL Horizon
AMS 16 - Shell Muskeg River
AMS 17 - Wapasu
AMS 19 - Firebag
AMS 502 - ConocoPhillips Surmont

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

Member	EPEA Approval No.
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01
Cenovus Energy	48522-01-00
Connacher Oil and Gas Ltd.	240008-00-03
ConocoPhillips Canada	48263-00-00

Member	EPEA Approval No.
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.	241311-00-00
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 Metis Local 63
Fort McMurray First Nation 468
Fort McMurray Métis Local 1935

Government and Non-Industrial Organizations

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

Figure 1 shows the location of the air monitoring stations and forest health passive towers in the WBEA network.

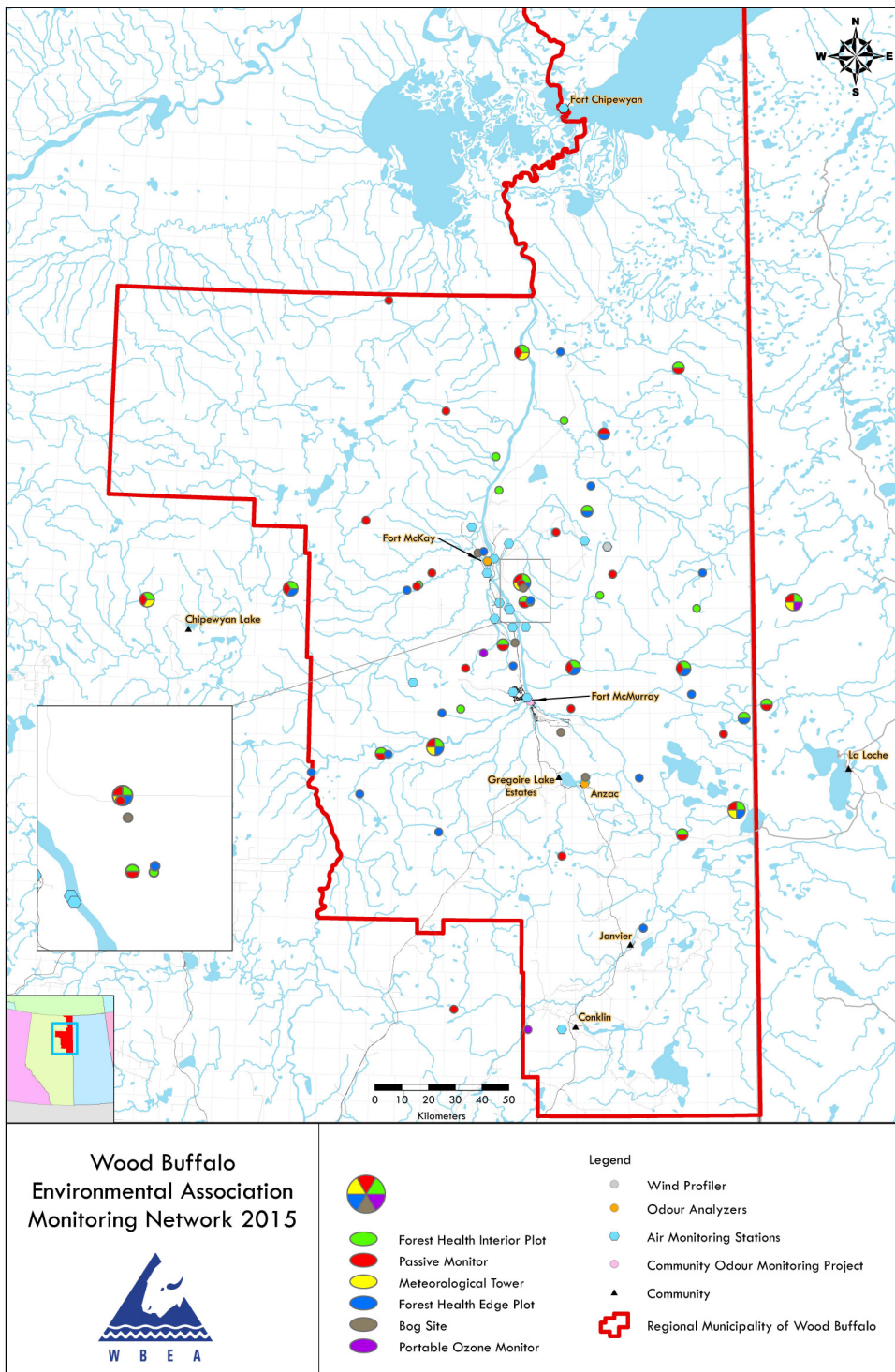


Figure 1 Map of WBEA Air Monitoring Network.

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

1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

There were no ambient concentrations in excess of the air quality objectives as indicated in the Air Monitoring Directive Section III.A.3 (a & b) for SO₂, CO, H₂S, NO₂, NH₃, O₃ and PM_{2.5}.

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 the reporting precision. The final 24-hour data values were calculated from final 1-hour values.

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

1.2 Revisions to CASA Data Warehouse

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

2.0 Operational Status

2.1 Continuous Monitoring

In March 2015, there were no incidents resulting in compliance monitoring instruments operating less than 90 % of the time.

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

2.2 Intermittent Monitoring

The January to March 2015 results for passive and integrated monitoring of PAH, VOC, RSC, PM_{2.5} and PM₁₀ s were not available in time for submission with this report. These results will be submitted at a later date.

3.0 Monitoring Notes

General Network Notes

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

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

Station 1, Fort McKay- Bertha Ganter

Maintenance on the daily zero and span systems and confirmation of TRS analyzer responses on March 1 interrupted the normal operations of the analyzer for 2 hours.

There were two issues associated with operation of the PM_{2.5} analyzer resulting in 7 hours of invalid data. Maintenance to the sample inlet, flow audits and zero reference checks on March 6 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour. The PM_{2.5} analyzer experienced three episodes of excessive baseline drifts during this reporting period, resulting in 6 hours of invalid data.

Maintenance and cleaning of the sample manifold on March 23 affected the normal operations of the SO₂, THC, TRS and O₃ analyzers for 1 hour.

Depletion and replacement of the hydrogen gas cylinder at the station on March 24 affected the normal operations of the THC analyzer for 1 hour.

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. Additional time for stabilization after exposure to high concentrations of the NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 hour following the daily spans have been reported as invalid for a total of 31 hours this month.

The TRS analyzer experienced seven episodes of intermittent unstable operations during this reporting period, resulting in 8 hours of invalid data. Follow-up maintenance on the thermocouple during routine calibrations on March 6 resolved the intermittent operational issue.

Freezing temperatures, ice buildup and maintenance to defrost the meteorological sensors resulted in 40 hours of invalid data this reporting period.

The temperature sensors at 2 and 10 m are identical but 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

Depletion and replacement of the hydrogen gas cylinder at the station on March 12 affected the normal operations of the THC analyzer for 2 hours.

Station 3, Lower Camp B - Meteorology

Freezing temperatures and ice buildup on the meteorological sensors on March 15 resulted in 10 to 14 hours of invalid data.

Station 4, Buffalo Viewpoint

No operational issues to report.

Station 5, Mannix

Maintenance on the daily zero and span systems and confirmation of TRS analyzer responses on March 14 interrupted the normal operations of the analyzer for 4 hours.

Freezing temperatures and ice buildup on the meteorological sensors on March 15 resulted in 12 to 13 hours of invalid data.

Station 6, Patricia McInnes

There were three issues associated with operation of the NH₃ analyzer resulting in 72 hours of invalid data. Maintenance, replacement and calibration of the NH₃ analyzer between March 11 and 12 interrupted the normal operations of the analyzer for 23 hours. The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span and routine monthly multipoint calibration periods. Additional time for stabilization after exposure to high concentrations of the NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 to 4 hours following the daily spans have been reported as invalid for 47 hours this month. A power outage at the station on March 15 affected the normal operations of the analyzer for 2 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on March 12 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

Station 7, Athabasca Valley

A power outage at the station on March 4 to replace the ATCO power meter interrupted the normal operations of all air quality analyzers for 1 hour.

Maintenance and replacement of the sample manifold on March 6 affected the normal operations of the SO₂, TRS, O₃ and NO₂ analyzers for 5 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on March 23 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

Maintenance on the daily zero and span systems and confirmation of CO analyzer responses on March 11 interrupted the normal operations of the analyzer for 1 hour.

Station 8, Fort Chipewyan

Maintenance to the sample inlet, flow audits and zero reference checks on March 5 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

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

Station 9, Barge Landing

Freezing temperatures and ice buildup on the meteorological sensors between March 15 and 16 resulted in 37 hours of invalid data.

Station 11, Lower Camp

Freezing temperatures and ice buildup on the meteorological sensors resulted in 41 hours of invalid data this reporting period.

The H₂S analyzer experienced three episodes of excessive baseline drift this month, resulting in 13 hours of invalid data.

Station 12, Millennium Mine

Depletion and replacement of the hydrogen gas cylinder at the station on March 3 affected the normal operations of the THC analyzer for 2 hours.

Maintenance and cleaning of the sample manifold on March 24 affected the normal operations of the SO₂ analyzer for 1 hour.

There were two issues associated with operation of the PM_{2.5} analyzer, resulting in 18 hours of data being flagged as invalid. Maintenance to the sample inlet, flow audits and zero reference checks on March 24 and 27 interrupted the normal operations of the PM_{2.5} analyzer for 3 hours. The PM_{2.5} analyzer experienced a single episode of excessive baseline drift on March 26 resulting in 15 hours of invalid data.

Maintenance on the daily zero and span systems and confirmation of NO₂ and THC analyzer responses on March 25 interrupted the normal operations of these analyzers for 1 hour.

Freezing temperatures and ice buildup on the meteorological sensors on between March 15 and 16 resulted in 37 hours of invalid data.

Station 13, Fort McKay South

Replacement of the sample pump and a follow-up calibration of the THC analyzer on March 12 affected the normal operation of the analyzer for 25 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on March 23 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour. The PM_{2.5} analyzer experienced two episodes of excessive baseline drifts resulting in 9 hours of invalid data this reporting period.

Freezing temperatures and ice buildup on the meteorological sensors on between March 15 and 16 resulted in 37 hours of invalid data.

Station 14, Anzac

The SO₂ analyzer experienced extended stabilization periods after the daily span checks this reporting month, resulting in 6 hours of invalid data. The SO₂ analyzer experienced two episodes of excessive baseline drifts on March 16 and 23 resulting in 13 hours of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on March 23 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours. The PM_{2.5} analyzer experienced four episodes of excessive baseline drifts resulting in 5 hours of invalid data this reporting period.

Station 15, CNRL Horizon

The THC analyzer experienced a single episode of excessive baseline drift on March 16 resulting in 2 hours of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on March 25 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours. The PM_{2.5} analyzer experienced two episodes of excessive baseline drifts resulting in 3 hours of invalid data this reporting period.

Freezing temperatures and ice buildup on the meteorological sensors between March 15 and 16 resulted in 35 hours of invalid data.

Station 16, Shell Muskeg River

Maintenance to the sample inlet, flow audits and zero reference checks on March 17 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

Freezing temperatures and ice buildup on the meteorological sensors between March 15 and 16 resulted in 37 hours of invalid data.

Station 17, Wapasu

The normal operations of the NO_x analyzer was interrupted on March 10 for 3 hours to confirm analyzer responses to in-situ calibrator O₃ concentrations. These O₃ concentration responses were used in subsequent calibration of the O₃ analyzer at the station.

A power outage at the station on March 14 interrupted the normal operations of all parameters for 6 to 7 hours. A tripped circuit breaker following the power outage resulted in an additional 25 hours of downtime for the SO₂ analyzer.

Maintenance to the sample inlet, flow audits and zero reference checks on March 15 and 19 interrupted the normal operations of the PM_{2.5} analyzer for 3 hours.

The H₂S analyzer experienced a single episode of excessive baseline drift on March 31 resulting in 1 hour of invalid data.

Freezing temperatures and ice buildup on the meteorological sensors between March 15 and 16 resulted in 39 hours of invalid data.

Station 19, Firebag

Freezing temperatures and ice buildup on the meteorological sensors resulted in 38 hours of invalid data this reporting period.

Station 502, ConocoPhillips Surmont

WBEA commissioned an ambient air quality survey at the ConocoPhillips facility to fulfill Alberta Environment's Environmental Protection and Enhancement Act (EPEA) facility approval number 48263-00-00. This station is equipped with ambient air quality analyzers for SO₂, H₂S, NO, NO₂, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

There were two issues associated with operation of the SO₂ analyzer, resulting in 12 hours of data being flagged as invalid. The SO₂ analyzer experienced extended stabilization periods after the daily span checks on March 3 and 6 resulting in 2 hours of invalid data. The SO₂ analyzer also experienced a single episode of excessive baseline drift on March 12 resulting in 10 hours of invalid data.

The H₂S analyzer experienced two episodes of excessive baseline drifts resulting in 2 hours of invalid data this reporting period.

Maintenance and cleaning of the sample manifold on March 23 affected the normal operations of the H₂S analyzer for 1 hour.

Freezing temperatures and ice buildup on the meteorological sensors resulted in 3 hours of invalid data this reporting period.

If additional information is required, please contact either Sanjay Prasad at (403) 703 8931 or the Wood Buffalo Environmental Association at (780) 799 4420.

Yours sincerely,

Aurora Atmospheric Inc.

Sanjay Prasad
Air Quality Scientist

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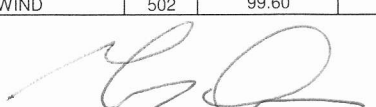
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
MONTHLY AIR MONITORING SUMMARY
for AMD SECTION III.B.1(c)

MARCH 2015
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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	3	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	SO2(ppm)	1	99.87	0.044	0	0.006	0
206355-00-00	SO2(ppm)	2	100.00	0.046	0	0.007	0
46586-00-00	SO2(ppm)	4	100.00	0.017	0	0.003	0
216466-00-04	SO2(ppm)	5	100.00	0.067	0	0.016	0
137467-00-00	SO2(ppm)	6	100.00	0.020	0	0.005	0
20809-01-00	SO2(ppm)	7	99.19	0.019	0	0.006	0
241311-00-00	SO2(ppm)	8	100.00	0.002	0	0.001	0
094-02-00	SO2(ppm)	11	100.00	0.045	0	0.005	0
305529-00-00	SO2(ppm)	12	100.00	0.026	0	0.003	0
026-02-00	SO2(ppm)	13	100.00	0.031	0	0.005	0
228044-00-00	SO2(ppm)	14	97.45	0.015	0	0.002	0
73203-01-00	SO2(ppm)	15	100.00	0.024	0	0.006	0
	SO2(ppm)	16	100.00	0.023	0	0.007	0
	SO2(ppm)	17	95.83	0.029	0	0.004	0
	SO2(ppm)	19	100.00	0.017	0	0.004	0
	SO2(ppm)	502	98.39	0.010	0	0.004	0
	H2S(ppm)	2	100.00	0.004	0	0.002	0
	H2S(ppm)	4	100.00	0.006	0	0.001	0
	H2S(ppm)	5	99.46	0.006	0	0.002	0
	H2S(ppm)	11	98.25	0.007	0	0.002	0
	H2S(ppm)	17	98.92	0.001	0	0.000	0
	H2S(ppm)	19	100.00	0.007	0	0.001	0
	H2S(ppm)	502	99.60	0.002	0	0.001	0
	TRS(ppm)	1	98.52	0.003	0	0.001	0
	TRS(ppm)	6	100.00	0.002	0	0.001	0
	TRS(ppm)	7	99.33	0.002	0	0.001	0
	TRS(ppm)	9	100.00	0.003	0	0.001	0
	TRS(ppm)	12	99.87	0.002	0	0.001	0
	TRS(ppm)	13	100.00	0.002	0	0.001	0
	TRS(ppm)	14	100.00	0.002	0	0.001	0
	TRS(ppm)	15	100.00	0.001	0	0.000	0
	THC(ppm)	1	99.73	3.1	-	2.3	-
	THC(ppm)	2	99.73	6.7	-	3.3	-
	THC(ppm)	4	100.00	5.6	-	3.4	-
	THC(ppm)	5	100.00	4.3	-	2.8	-
	THC(ppm)	6	100.00	2.4	-	2.0	-
	THC(ppm)	7	99.87	2.6	-	2.0	-
	THC(ppm)	9	100.00	5.3	-	2.8	-
	THC(ppm)	11	100.00	6.1	-	3.3	-
	THC(ppm)	12	99.60	6.5	-	3.0	-
	THC(ppm)	13	96.64	3.9	-	2.9	-
	THC(ppm)	14	100.00	2.4	-	2.1	-
	THC(ppm)	15	99.73	7.6	-	3.0	-
	THC(ppm)	16	100.00	6.5	-	3.1	-
	THC(ppm)	17	99.06	3.8	-	2.2	-
	THC(ppm)	19	100.00	2.5	-	2.2	-
	O3(ppm)	1	99.87	0.046	0	0.038	-
	O3(ppm)	6	100.00	0.045	0	0.039	-

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

MARCH 2015
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APPROVAL NUMBERS	REPORT DATE						
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289664-00-00	3	2015					
254465-00-00							
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48522-01-00	CONTINUOUS AMBIENT MONITORING						
240008-00-03				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03	O3(ppm)	7	99.19	0.046	0	0.035	-
189942-00-02	O3(ppm)	8	100.00	0.038	0	0.034	-
206355-00-00	O3(ppm)	13	100.00	0.041	0	0.032	-
46586-00-00	O3(ppm)	14	100.00	0.051	0	0.046	-
216466-00-04	O3(ppm)	17	99.19	0.048	0	0.042	-
137467-00-00	NO2(ppm)	1	100.00	0.038	0	0.019	-
20809-01-00	NO2(ppm)	6	100.00	0.039	0	0.015	-
241311-00-02	NO2(ppm)	7	99.33	0.048	0	0.026	-
094-02-00	NO2(ppm)	8	100.00	0.018	0	0.012	-
305529-00-00	NO2(ppm)	12	99.87	0.057	0	0.032	-
026-02-00	NO2(ppm)	13	100.00	0.034	0	0.017	-
228044-00-00	NO2(ppm)	14	100.00	0.020	0	0.006	-
73203-01-00	NO2(ppm)	15	100.00	0.047	0	0.022	-
	NO2(ppm)	16	100.00	0.054	0	0.025	-
	NO2(ppm)	17	98.79	0.032	0	0.013	-
	NO2(ppm)	19	100.00	0.097	0	0.015	-
	NO2(ppm)	502	100.00	0.021	0	0.008	-
	CO(ppm)	7	99.19	0.6	-	0.2	0
	NH3(ppm)	1	95.83	0	-	0	0
	NH3(ppm)	6	90.32	0	-	0	0
	PM2.5(ug/m ³)	1	99.06	93.5	-	11.5	0
	PM2.5(ug/m ³)	6	99.73	64.7	-	12.6	0
	PM2.5(ug/m ³)	7	99.60	30	-	13.3	0
	PM2.5(ug/m ³)	8	99.73	17	-	6.5	0
	PM2.5(ug/m ³)	12	97.58	31.7	-	13.8	0
	PM2.5(ug/m ³)	13	98.66	21.8	-	8.7	0
	PM2.5(ug/m ³)	14	99.06	13.2	-	7.1	0
	PM2.5(ug/m ³)	15	99.33	21.3	-	11.3	0
	PM2.5(ug/m ³)	16	99.73	37.3	-	11.9	0
	PM2.5(ug/m ³)	17	98.79	27.4	-	5.9	0
	WIND	1	94.62	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	98.39	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	100.00	-	-	-	-
	WIND	8	99.73	-	-	-	-
	WIND	9	95.03	-	-	-	-
	WIND	11	94.49	-	-	-	-
	WIND	12	95.03	-	-	-	-
	WIND	13	95.03	-	-	-	-
	WIND	14	100.00	-	-	-	-
	WIND	15	95.30	-	-	-	-
	WIND	16	95.03	-	-	-	-
	WIND	17	94.76	-	-	-	-
	WIND	19	94.89	-	-	-	-
	WIND	502	99.60	-	-	-	-
							
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
MARCH 2015

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	708	35	36	99.87	44	0	6	0
TRS(ppb) Average	698	35	46	98.52	3	0	1	0
THC(ppm) Average	707	35	37	99.73	3.1	-	2.3	-
NMHC(ppm) Average	707	35	37	99.73	0.578	-	0.031	-
CH4(ppm) Average	707	35	37	99.73	3.1	-	2.3	-
O3 (ppb) Average	708	35	36	99.87	46	0	38	-
NO2 (ppb) Average	708	36	36	100.00	38	0	19	-
NO (ppb) Average	708	36	36	100.00	29	-	8	-
NOX (ppb) Average	708	36	36	100.00	58	-	26	-
NH3 (ppb) Average	672	41	72	95.83	0	0	0	-
PM2.5 (ug/m3) Average	737	0	7	99.06	93.5	-	11.5	0
Wind Speed 10 m (km/h) Average	704	0	40	94.62	20	-	13	-
Wind Direction 10 m (deg) Average	704	0	40	94.62	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	15.7	-	6.1	-
Temperature 10 m (C) Average	744	0	0	100.00	15.7	-	7.0	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	90	-
Precipitation (mm) Total	744	0	0	100.00	1.5	-	4.6	-
Surface Wetness (% of range) Average	744	0	0	100.00	44	-	15	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	625	-	198	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.5	3	-	0	0	0	1	1	3	44
TRS (ppb) Average	698	0.6	0	-	0	0	0	1	1	1	3
THC (ppm) Average	707	1.99	0.2	-	1.8	1.9	1.9	1.9	2.1	2.2	3.1
NMHC(ppm) Average	707	0.005	0.03	-	0	0	0	0	0	0	0.578
CH4(ppm) Average	707	1.99	0.2	-	1.8	1.9	1.9	1.9	2.1	2.2	3.1
O3 (ppb) Average	708	24.6	12	-	2	7	15	26	33	40	46
NO2 (ppb) Average	708	9.5	7	-	0	1	5	8	13	18	38
NO (ppb) Average	708	2.5	5	-	0	0	0	0	3	7	29
NOX (ppb) Average	708	11.9	10	-	0	1	5	10	16	24	58
NH3 (ppb) Average	672	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	737	5.61	6	-	0	1.2	2.4	4.1	7	10.9	93.5
Wind Speed 10 m (km/h) Average	704	5.8	4	-	0	2	3	5	8	11	20
Wind Direction 10 m (deg) Average	704	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-4.78	8.8	-	-33.3	-16.2	-9.8	-4.3	1.5	5.8	15.7
Temperature 10 m (C) Average	744	-4.11	8.6	-	-31.6	-15.1	-9.6	-3.9	2.2	5.9	15.7
Relative Humidity (%) Average	744	66.2	19	-	18	40	51	68	82	90	97
Precipitation (mm) Total	744	-	-	10.41	0	0	0	0	0	0	1.5
Surface Wetness (% of range) Average	744	1.1	5	-	0	0	0	0	0	0	44
Global Solar Radiation (W/m2) Average	744	115.4	166	-	0	0	0	4	214	412	625

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	23 Mar 2015 13:00	23 Mar 2015 13:00	1	Maintenance - manifold cleaning
TRS	01 Mar 2015 03:00	01 Mar 2015 03:00	1	Intermittent unstable operation - thermocouple malfunction
TRS	01 Mar 2015 10:00	01 Mar 2015 11:00	2	Maintenance on daily zero and span system
TRS	02 Mar 2015 19:00	02 Mar 2015 20:00	2	Intermittent unstable operation - thermocouple malfunction
TRS	03 Mar 2015 10:00	03 Mar 2015 10:00	1	Intermittent unstable operation - thermocouple malfunction
TRS	03 Mar 2015 13:00	03 Mar 2015 13:00	1	Intermittent unstable operation - thermocouple malfunction
TRS	04 Mar 2015 11:00	04 Mar 2015 11:00	1	Intermittent unstable operation - thermocouple malfunction
TRS	04 Mar 2015 13:00	04 Mar 2015 13:00	1	Intermittent unstable operation - thermocouple malfunction
TRS	04 Mar 2015 20:00	04 Mar 2015 20:00	1	Intermittent unstable operation - thermocouple malfunction
TRS	23 Mar 2015 13:00	23 Mar 2015 13:00	1	Maintenance - manifold cleaning
NMHC, CH4, THC	23 Mar 2015 13:00	23 Mar 2015 13:00	1	Maintenance - manifold cleaning
NMHC, CH4, THC	24 Mar 2015 13:00	24 Mar 2015 13:00	1	Maintenance -daily span gas cylinder replaced
O3	23 Mar 2015 13:00	23 Mar 2015 13:00	1	Maintenance - manifold cleaning
NH3	01 Mar 2015 05:00	31 Mar 2015 05:00	31	Stabilization after daily span
PM2.5	05 Mar 2015 16:00	05 Mar 2015 16:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	06 Mar 2015 13:00	06 Mar 2015 14:00	2	Intermittent unstable operation - excessive baseline drift
PM2.5	06 Mar 2015 15:00	06 Mar 2015 15:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	07 Mar 2015 16:00	07 Mar 2015 18:00	3	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	15 Mar 2015 01:00	16 Mar 2015 14:00	38	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	16 Mar 2015 15:00	16 Mar 2015 16:00	2	Maintenance - frozen sensors removed for thawing

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Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 44 ppb on Mar 4 13:00	Maximum Daily Average: 5.6 ppb on Mar 26
Minimum Value: 0 ppb on Mar 26 07:00	Hours of Data: 708
Maximum Diurnal Average: 4.3 ppb at hour 13	Hours of Missing Data: 36
Monthly Average: 1.5 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.2 ppb on Mar 21	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.5 ppb at hour 7	
Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=1 Q ₃ =1 P ₉₀ =3 P ₉₉ =16	

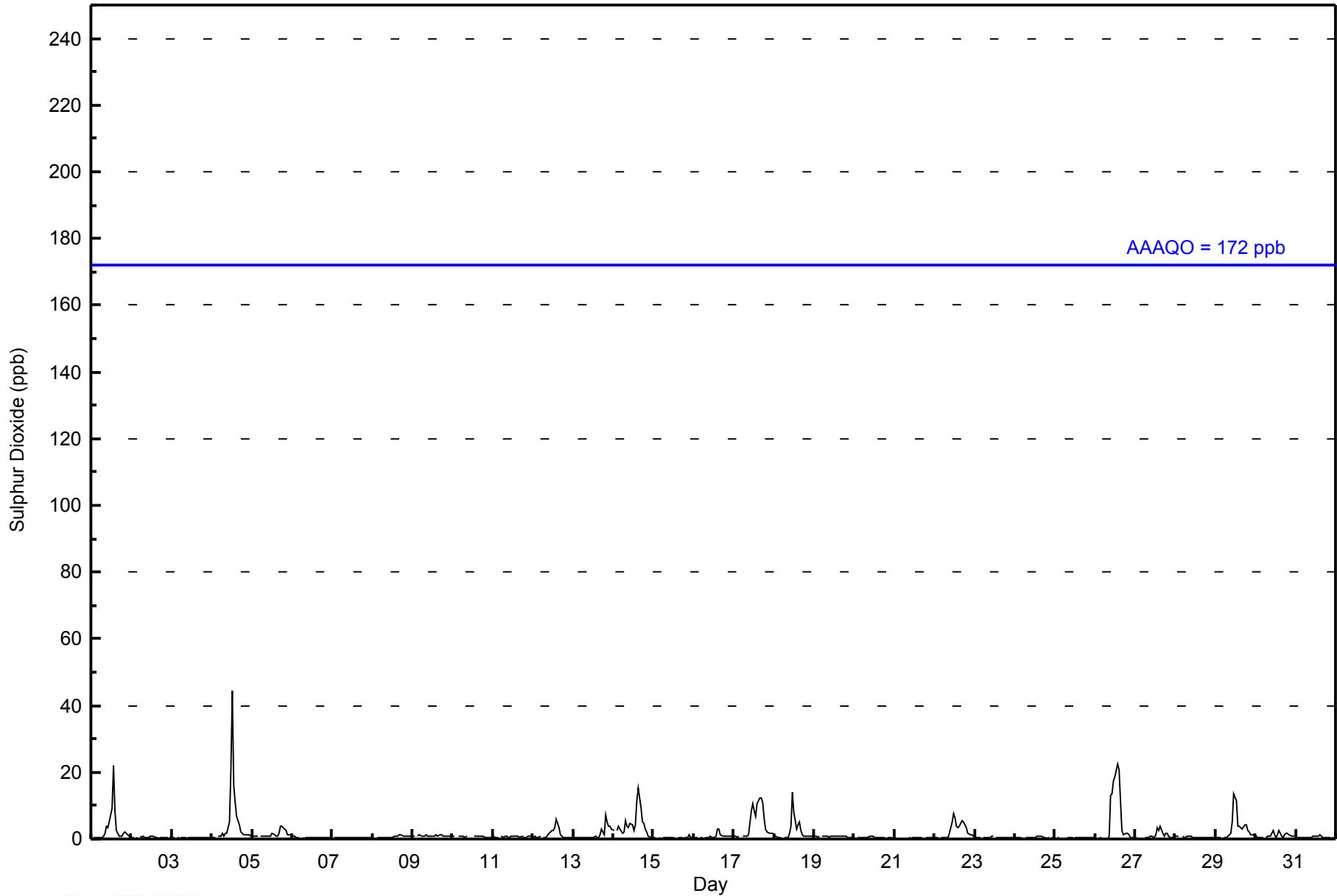
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	0	0	0	0	1	2	4	4	7	9	22	8	3	1	1	1	2	2	2	1	1	3.1	22
2-Mar	0	0	0	0	Z	1	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
3-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
4-Mar	0	0	0	Z	1	1	2	1	2	2	5	21	44	16	11	7	4	2	2	1	1	1	1	1	5.5	44
5-Mar	1	1	1	1	Z	1	1	1	1	1	1	2	1	1	1	2	4	4	3	2	1	1	1	1	1.4	4
6-Mar	1	1	1	0	0	Z	0	0	1	1	0	1	0	1	1	1	1	0	0	1	1	0	0	0	0.5	1
7-Mar	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
8-Mar	0	Z	0	0	0	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.7	1
9-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1
10-Mar	1	1	Z	1	1	1	1	1	1	1	C	C	C	C	1	1	1	1	1	1	1	1	1	1	0.7	1
11-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
12-Mar	1	1	1	1	1	Z	0	0	1	1	2	2	2	3	6	3	1	1	1	0	1	0	0	1	1.3	6
13-Mar	Z	0	1	0	0	0	0	0	1	0	1	0	1	1	1	1	1	3	1	7	5	4	3	1.6	7	
14-Mar	3	Z	2	4	3	2	2	5	4	3	5	4	3	4	12	15	10	5	5	3	2	1	1	1	4.2	15
15-Mar	0	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0.4	1
16-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	0.8	3
17-Mar	1	1	1	1	Z	1	1	1	1	1	8	11	9	7	11	12	12	11	6	3	2	2	2	2	4.5	12
18-Mar	1	1	0	0	0	Z	0	0	1	2	4	14	8	3	4	5	3	1	1	1	1	1	1	1	2.3	14
19-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
20-Mar	1	Z	1	1	0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.4	1
21-Mar	0	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
22-Mar	0	1	0	Z	0	1	0	0	1	2	5	8	6	4	4	4	5	5	4	3	2	1	1	1	2.6	8
23-Mar	1	1	1	0	Z	0	0	1	1	1	1	1	M	1	0	0	1	1	0	0	0	0	0	0	0.5	1
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1
25-Mar	Z	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
26-Mar	0	Z	0	0	0	0	0	0	1	13	14	17	19	22	21	11	3	1	1	2	1	1	0	0	5.6	22
27-Mar	0	0	Z	0	0	0	0	0	0	1	1	0	1	3	3	4	2	1	2	2	1	1	0	1	1.0	4
28-Mar	1	1	1	Z	1	1	0	1	1	1	1	0	0	1	1	0	1	0	1	1	1	0	1	0	0.6	1
29-Mar	1	1	1	0	Z	0	1	1	1	1	5	13	11	4	4	3	3	4	4	3	2	1	1	1	2.9	13
30-Mar	1	1	1	1	1	Z	0	1	1	1	2	1	1	1	2	1	1	1	2	2	1	1	1	1	1.0	2
31-Mar	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	96.89	96.89
11 - 20	17	2.40	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: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	91	78	28	17	24	13	8	30	79	76	33	27	13	37	41	53	648
11 - 20	0	0	0	0	0	0	0	3	12	2	0	0	0	0	0	0	17
21 - 60	0	0	0	0	0	0	0	0	3	2	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	91	78	28	17	24	13	8	33	94	80	33	27	13	37	41	53	670

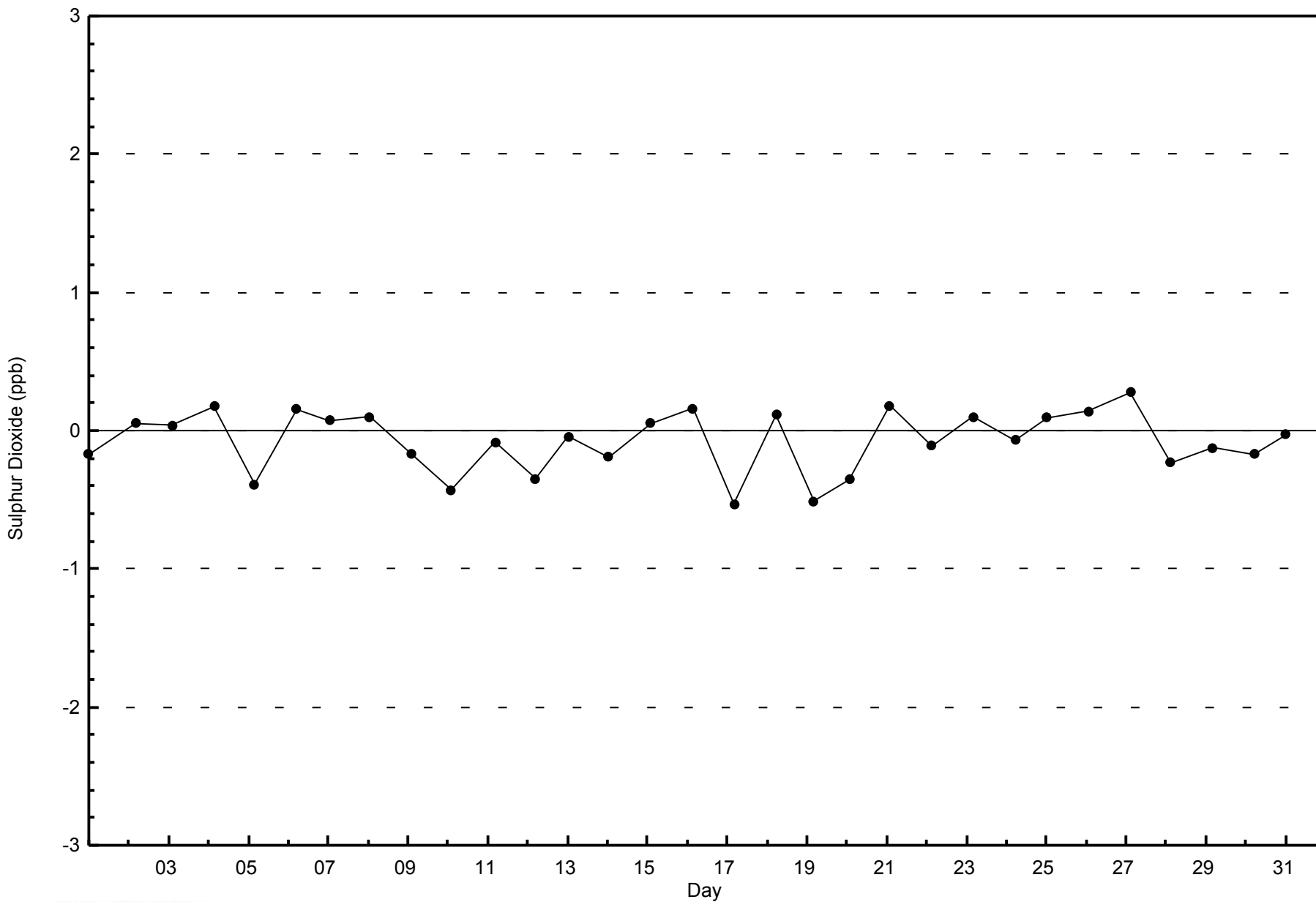
Total Number of Valid Hours: 670

Total Number of Hours: 744



WBEA
Zero Responses

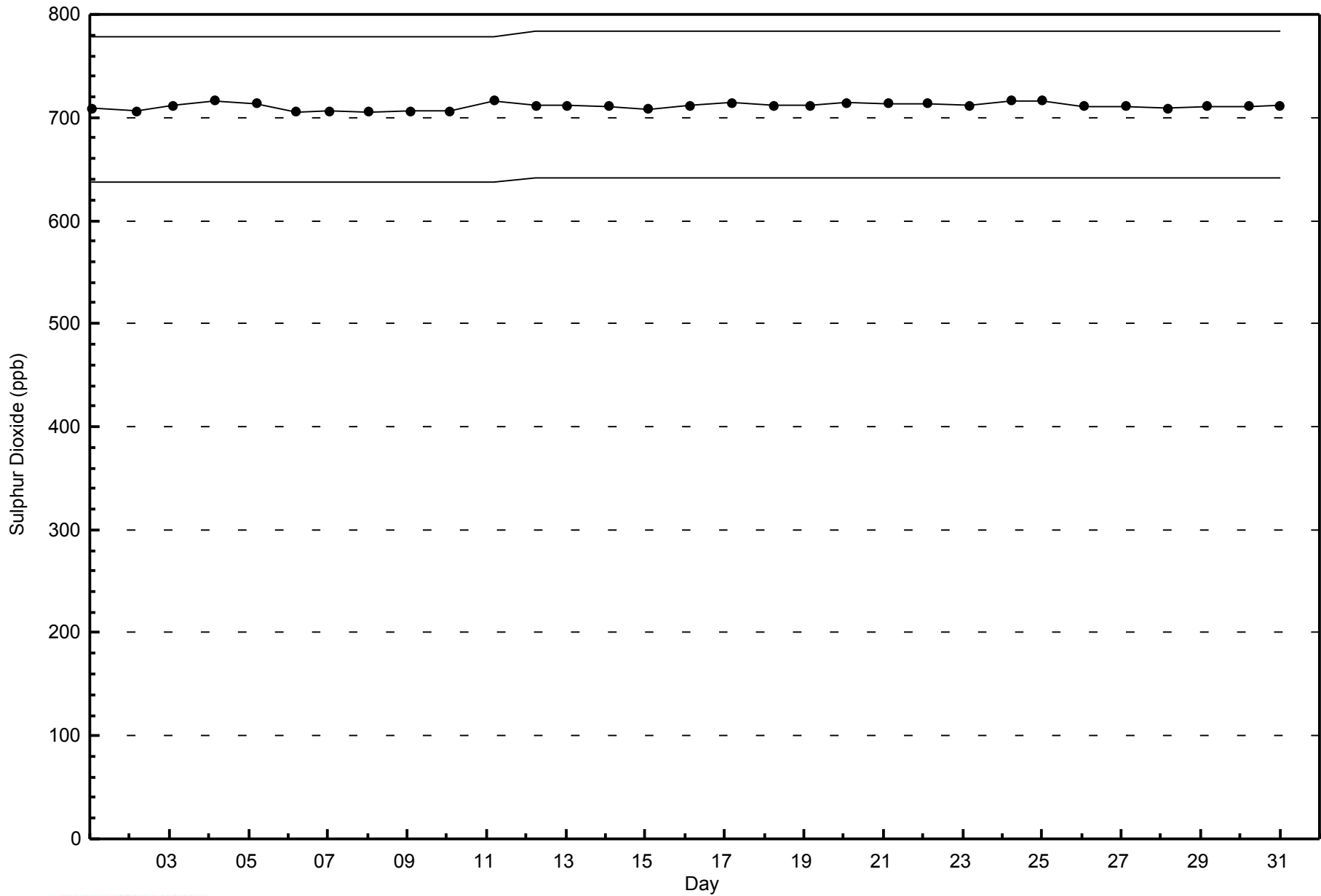
Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Maximum Value: 3 ppb on Mar 4 12:00	Maximum Daily Average: 1.4 ppb on Mar 14	Hours in Service: 744
Minimum Value: 0 ppb on Mar 28 23:00	Minimum Daily Average: 0.4 ppb on Mar 11	Minimum Diurnal Average: 0.5 ppb at hour 3	Hours of Data: 698
Maximum Diurnal Average: 0.8 ppb at hour 12	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2		Hours of Missing Data: 46
Monthly Average: 0.6 ppb			Hours of Calibration: 35
			Percent Operational Time: 98.5

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

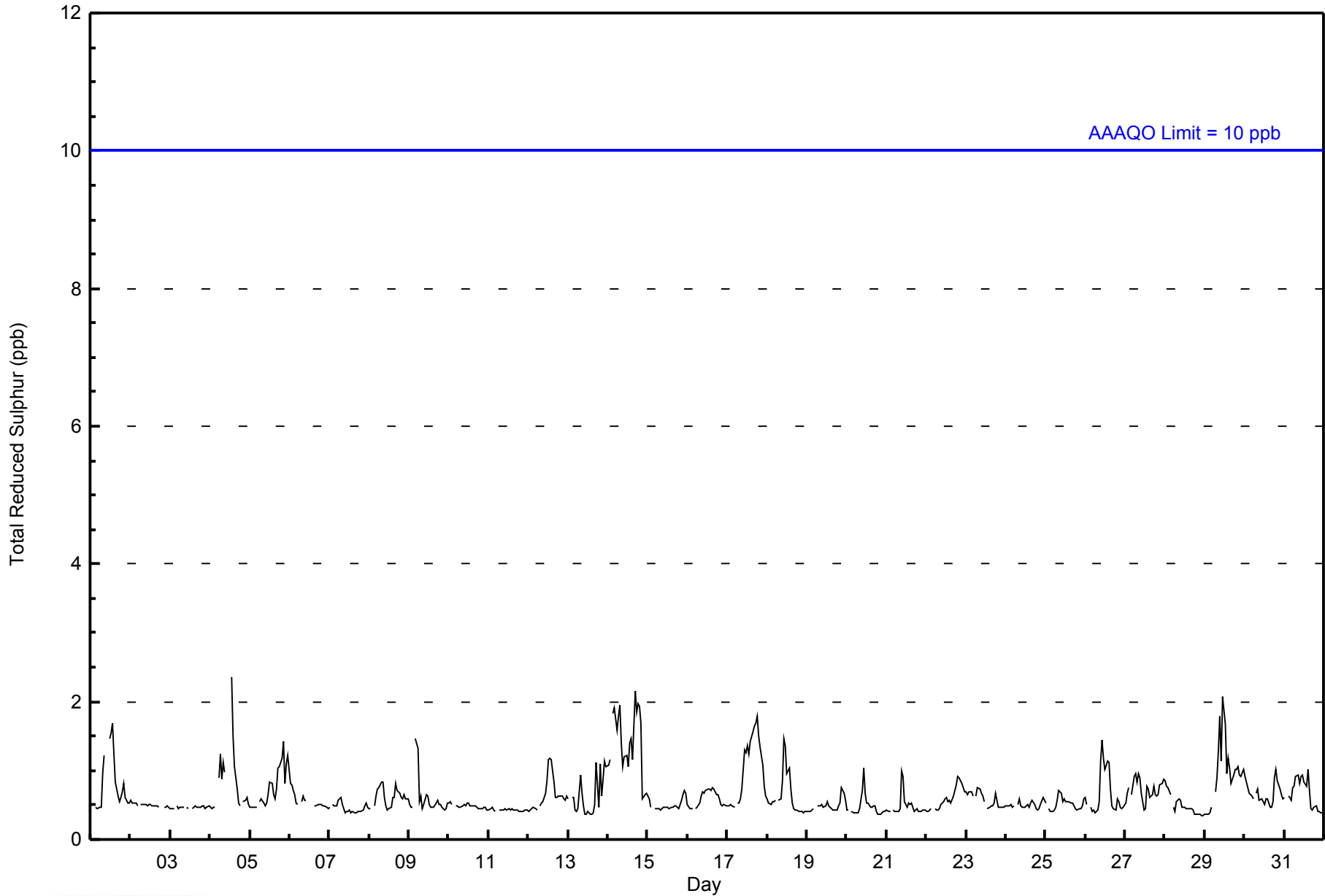
0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	Diurnal Average	
1	1	1	2	2	2	2	2	2	1	2	1	3	2	2	2	2	2	2	2	2	2	2	1	1	1	Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	697	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



WBEA
Frequency Distribution

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

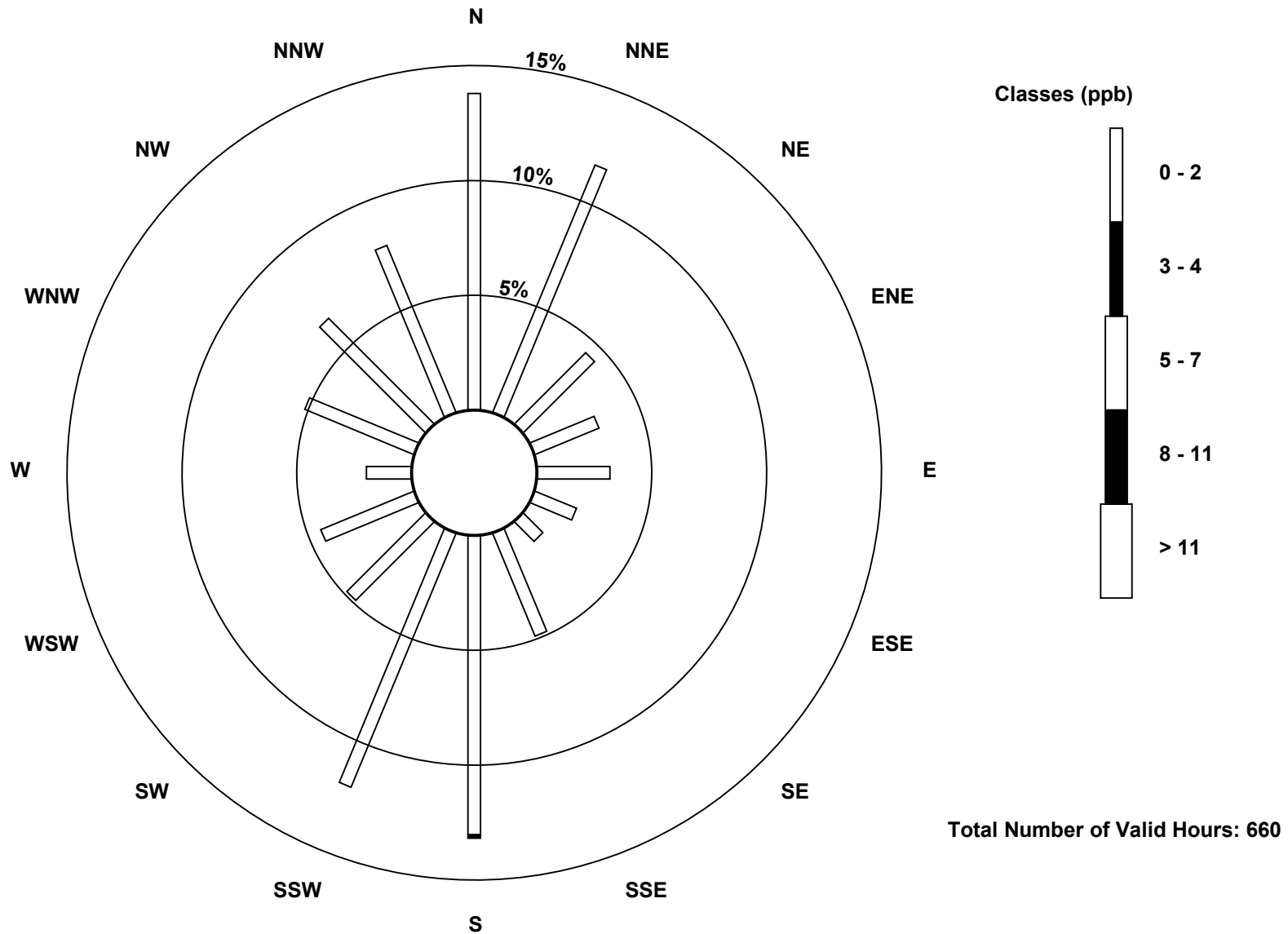
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	91	77	29	20	21	13	8	32	86	79	32	29	13	34	43	52	659
3 - 4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	77	29	20	21	13	8	32	87	79	32	29	13	34	43	52	660

Total Number of Valid Hours: 660

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

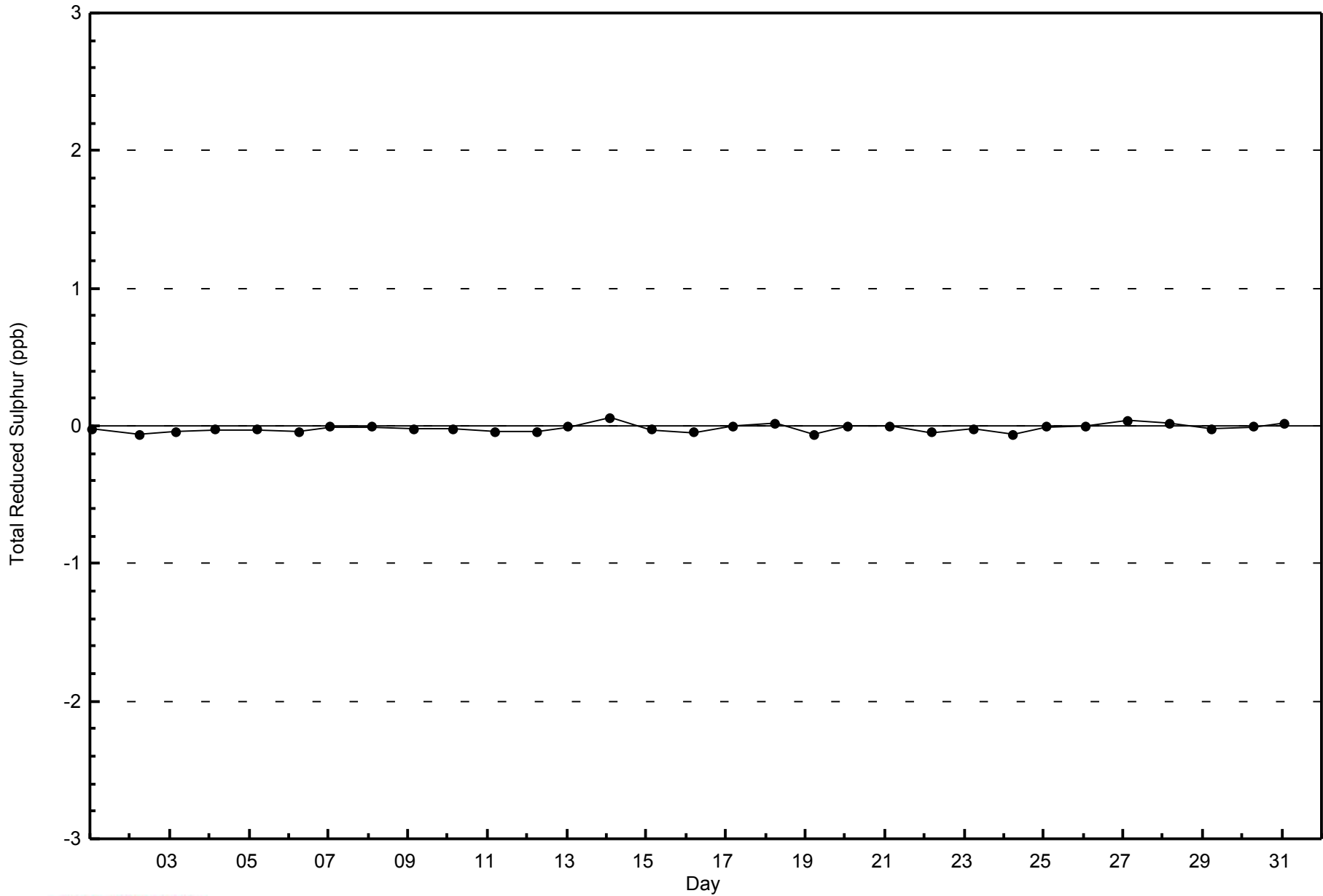
**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter (AMS 1)**





WBEA
Zero Responses

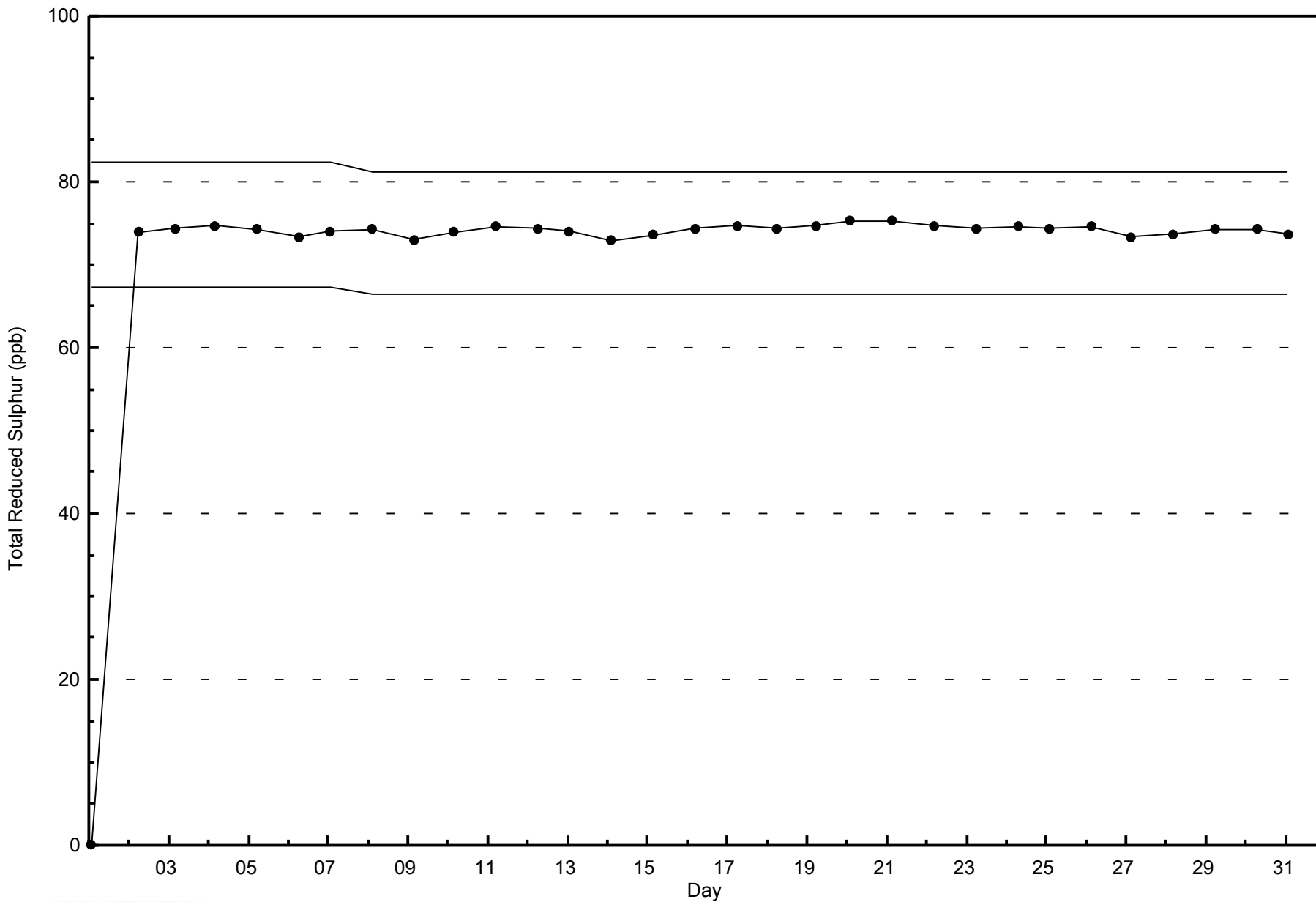
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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



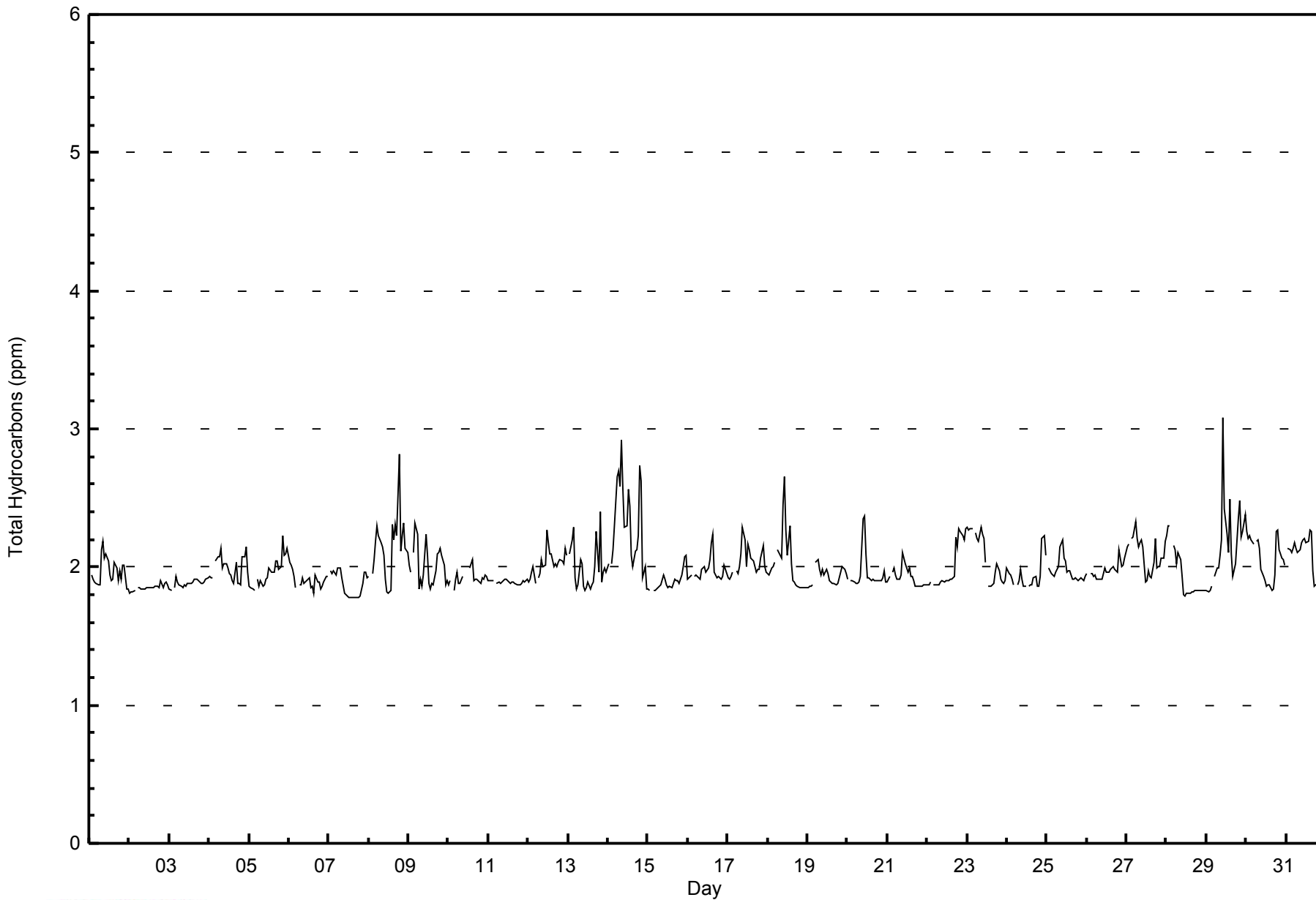


Maximum Value: 3.1 ppm on Mar 29 11:00		Maximum Daily Average: 2.3 ppm on Mar 14		Hours in Service: 744																						
Minimum Value: 1.8 ppm on Mar 7 15:00		Minimum Daily Average: 1.9 ppm on Mar 2		Hours of Data: 707																						
Maximum Diurnal Average: 2.1 ppm at hour 11		Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Missing Data: 37																						
Monthly Average: 1.99 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.6		Hours of Calibration: 35																						
				Percent Operational Time: 99.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.1	2.1	2.0	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	2.0	1.8	1.8	2.0	2.2
2-Mar	1.8	1.8	1.8	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9
3-Mar	1.8	1.8	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
4-Mar	1.9	1.9	1.9	Z	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.1	2.1	2.1	2.0	2.0	2.1
5-Mar	1.9	1.9	1.8	1.8	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	2.2	2.1	2.1	2.1	2.0	2.2
6-Mar	2.0	2.0	2.0	1.9	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9
7-Mar	Z	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	1.9	1.9	2.0
8-Mar	1.9	Z	2.0	2.1	2.2	2.3	2.2	2.2	2.1	2.1	1.9	1.8	1.8	1.8	2.3	2.2	2.3	2.2	2.8	2.1	2.2	2.3	2.1	2.1	2.1	2.8
9-Mar	2.0	2.0	Z	2.1	2.3	2.2	1.8	1.9	1.9	1.9	2.2	2.1	1.9	1.8	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.0	1.9	1.9	2.0	2.3
10-Mar	1.9	1.9	Z	1.8	1.9	2.0	1.9	1.9	1.9	C	C	C	C	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
11-Mar	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
12-Mar	1.9	1.9	2.0	2.0	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.3
13-Mar	Z	2.1	2.2	2.3	1.9	1.8	1.9	2.1	2.0	1.9	1.8	1.8	1.9	1.8	1.9	1.9	2.0	2.3	2.0	2.4	1.9	2.0	2.0	2.0	2.0	2.4
14-Mar	2.0	Z	2.0	2.1	2.3	2.7	2.7	2.6	2.9	2.6	2.3	2.3	2.6	2.4	2.1	2.0	2.1	2.1	2.2	2.7	2.6	1.9	2.0	1.8	2.3	2.9
15-Mar	1.8	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	1.9	2.1
16-Mar	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2
17-Mar	1.9	1.9	1.9	2.0	Z	2.0	2.0	2.0	2.1	2.3	2.2	2.0	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.3
18-Mar	2.0	1.9	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.4	2.7	2.3	2.1	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.7
19-Mar	1.9	1.9	1.9	1.9	Z	2.0	2.1	2.0	1.9	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.1
20-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.4
21-Mar	1.9	1.9	Z	2.0	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
22-Mar	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.3	2.3	2.2	2.2	2.3	2.3
23-Mar	2.3	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.0	M	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.3
24-Mar	2.0	2.0	1.9	1.9	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.2	2.1	1.9	2.2
25-Mar	Z	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
26-Mar	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.0	2.1
27-Mar	2.1	2.2	Z	2.2	2.2	2.3	2.2	2.1	2.2	2.2	2.1	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.2	2.0	2.0	2.0	2.1	2.1	2.2	2.3
28-Mar	2.2	2.3	2.3	Z	2.2	2.1	2.0	2.1	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.3
29-Mar	1.8	1.8	1.8	1.9	Z	1.9	2.0	2.0	2.1	2.2	3.1	2.4	2.2	2.1	2.5	2.1	1.9	2.0	2.2	2.3	2.5	2.2	2.3	2.4	2.2	3.1
30-Mar	2.3	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	2.3	2.3	2.1	2.1	2.1	2.0	2.1	2.3
31-Mar	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	2.1	2.3
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	521	73.69	73.69
2.1 - 3.0	185	26.17	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

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

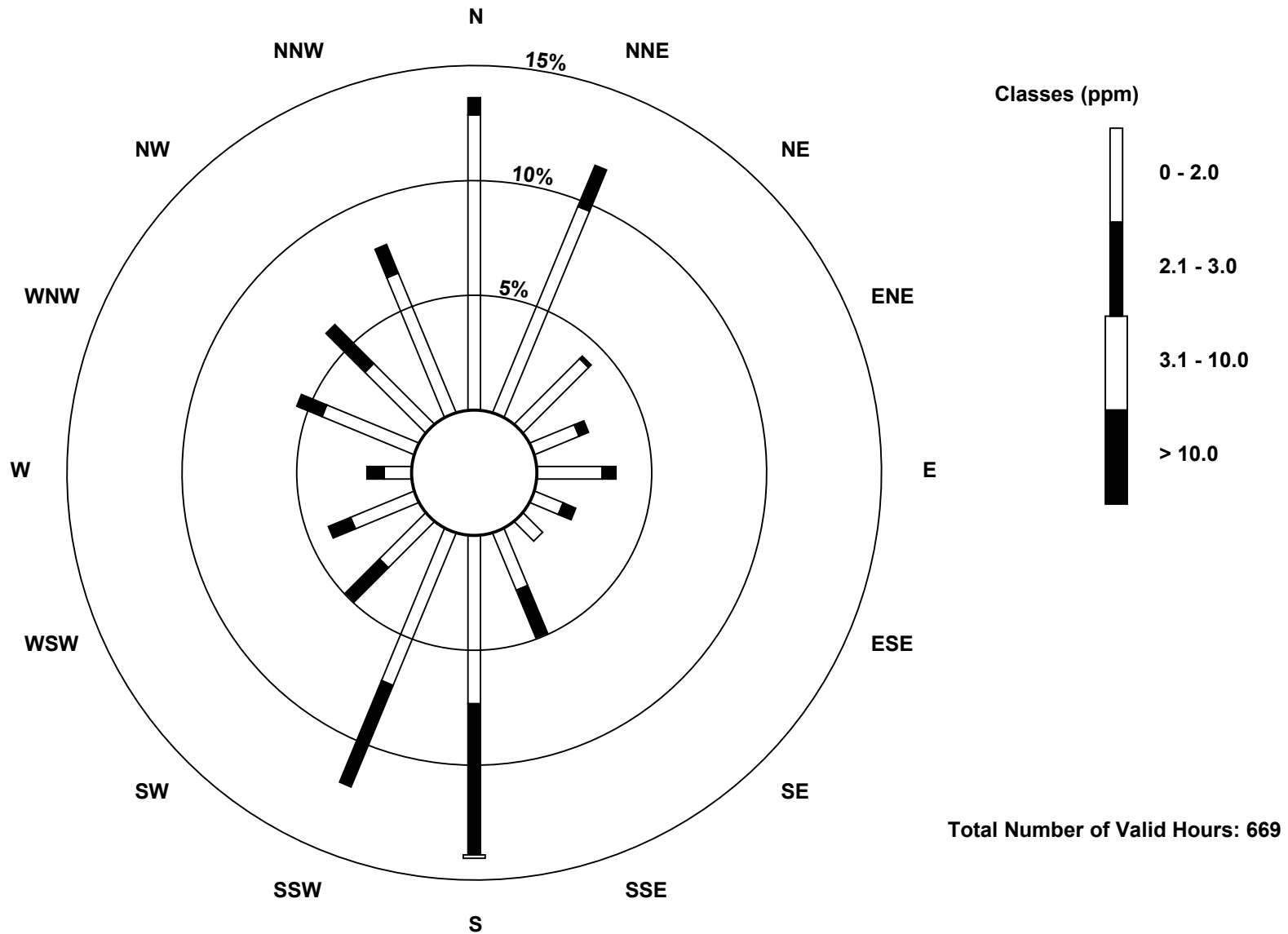
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	86	65	27	14	19	9	8	18	49	48	19	20	8	29	25	44	488
2.1 - 3.0	5	13	1	3	4	4	0	15	44	32	14	7	5	8	16	9	180
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	78	28	17	23	13	8	33	94	80	33	27	13	37	41	53	669

Total Number of Valid Hours: 669

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

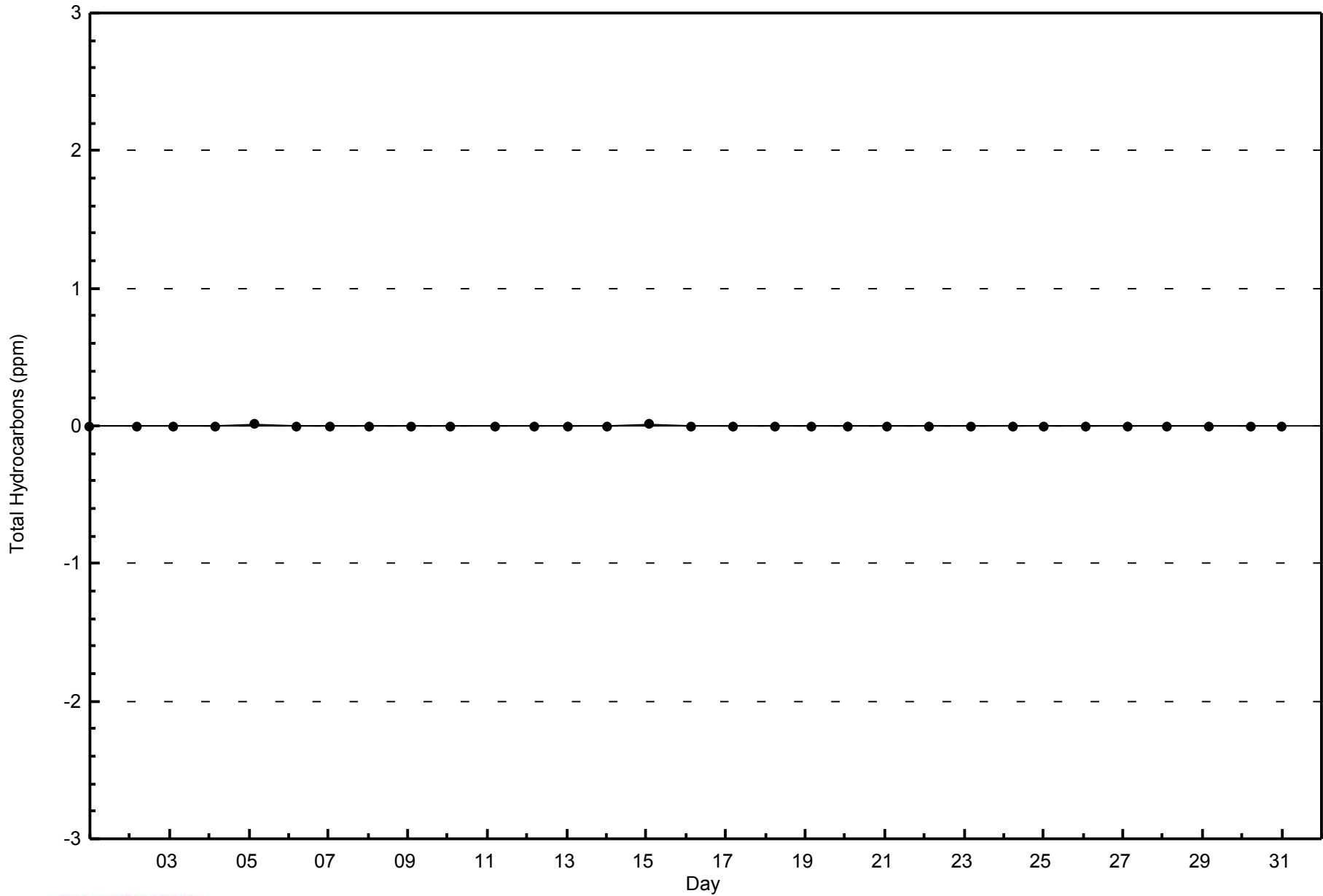
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

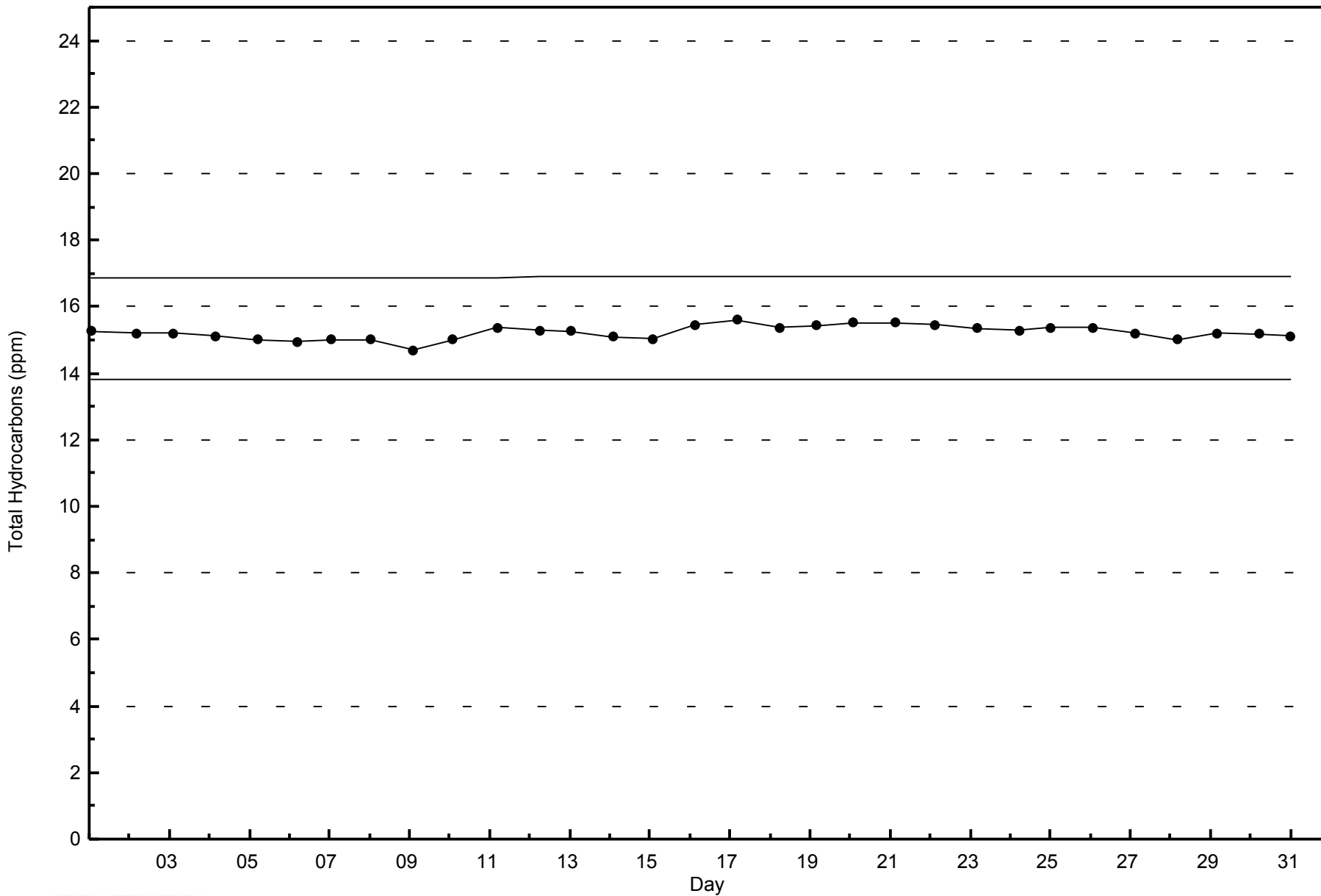
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

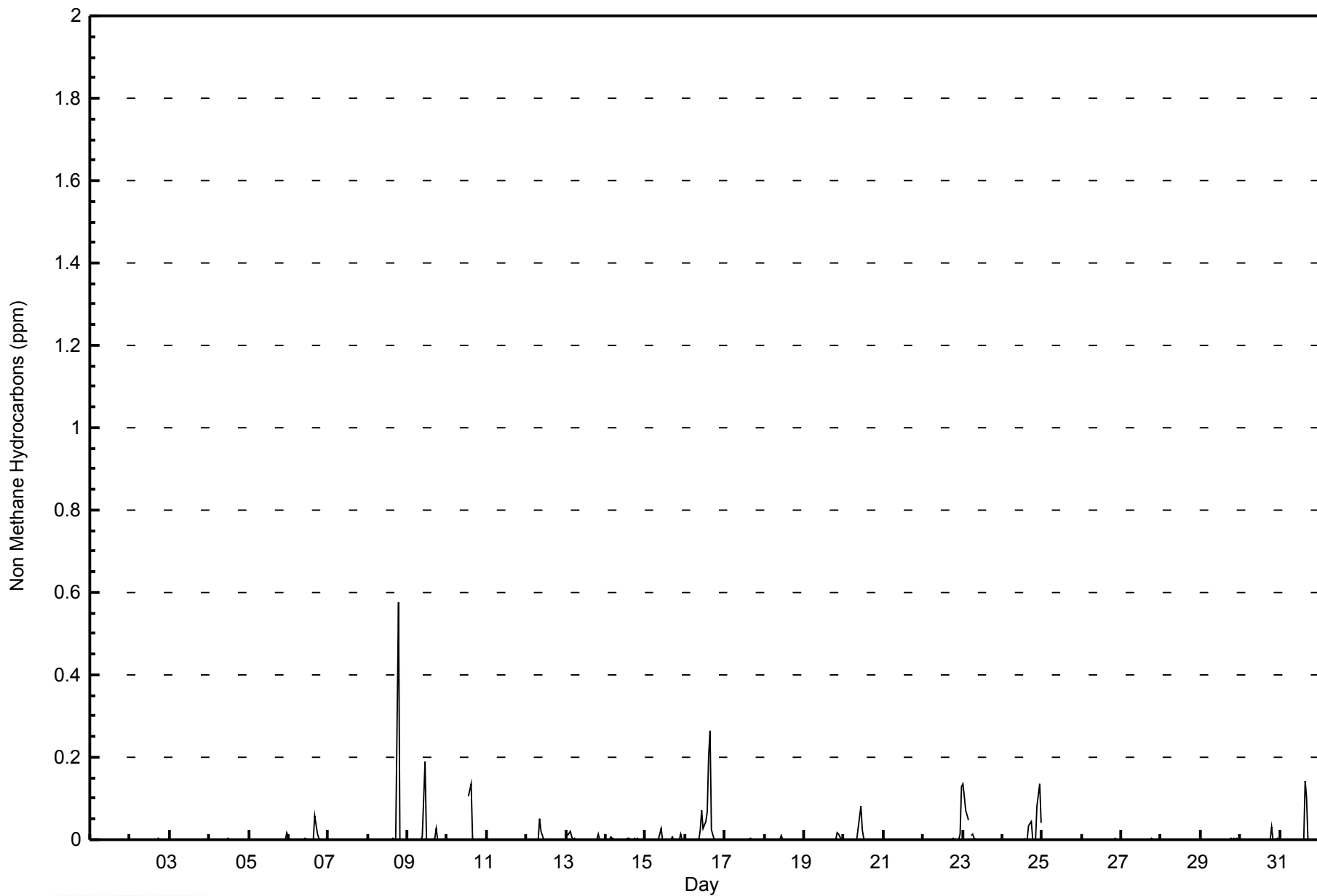
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - March 2015





WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	658	93.07	93.07
0.006 - 0.05	30	4.24	97.31
0.06 - 0.1	15	2.12	99.43
> 0.1	4	0.57	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

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

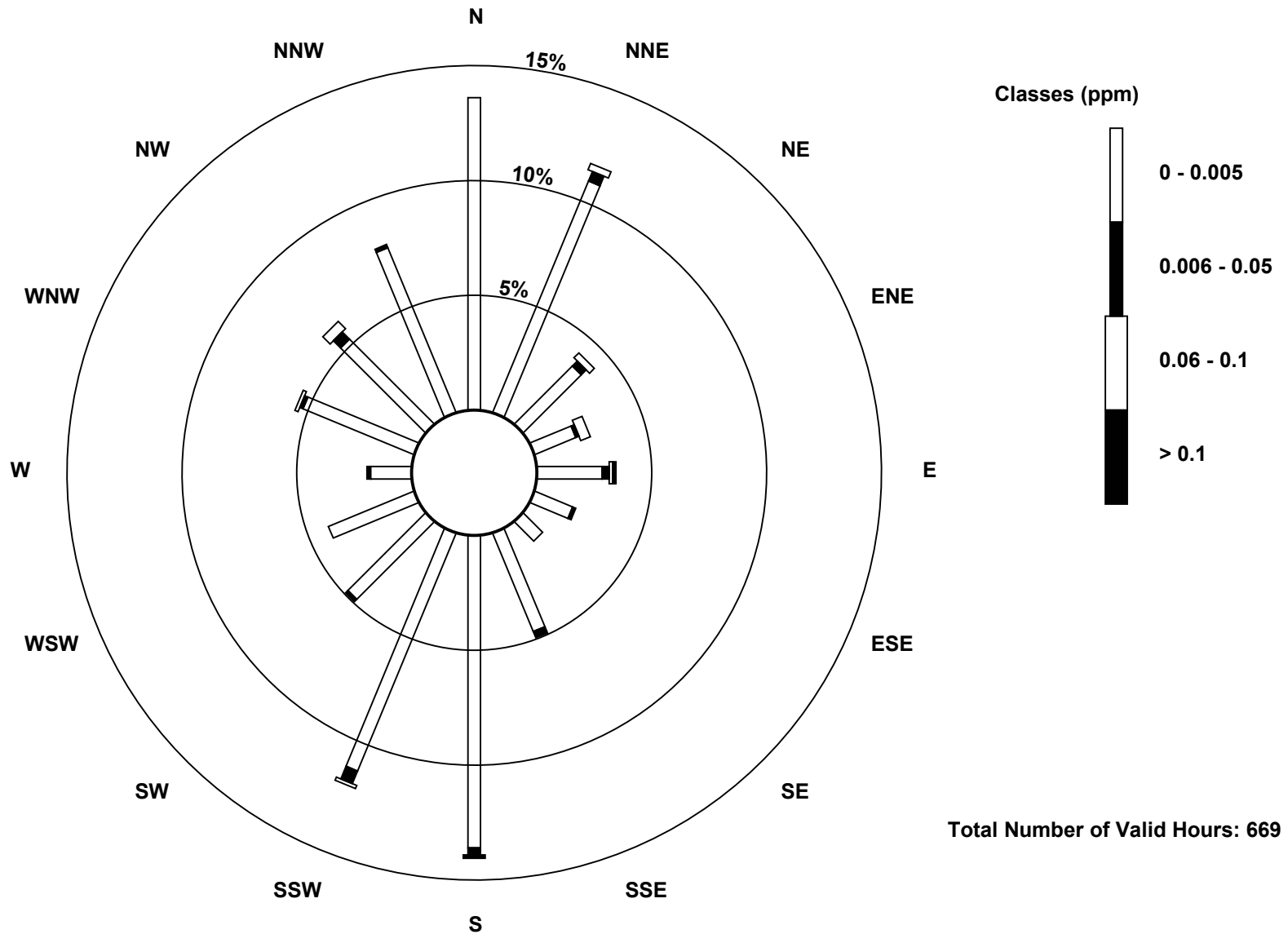
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	91	73	24	13	19	12	8	31	91	75	32	27	12	35	35	52	630
0.006 - 0.05	0	3	2	1	2	1	0	2	2	4	1	0	1	1	3	1	24
0.06 - 0.1	0	2	2	3	1	0	0	0	0	1	0	0	0	1	3	0	13
> 0.1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
Totals	91	78	28	17	23	13	8	33	94	80	33	27	13	37	41	53	669

Total Number of Valid Hours: 669

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

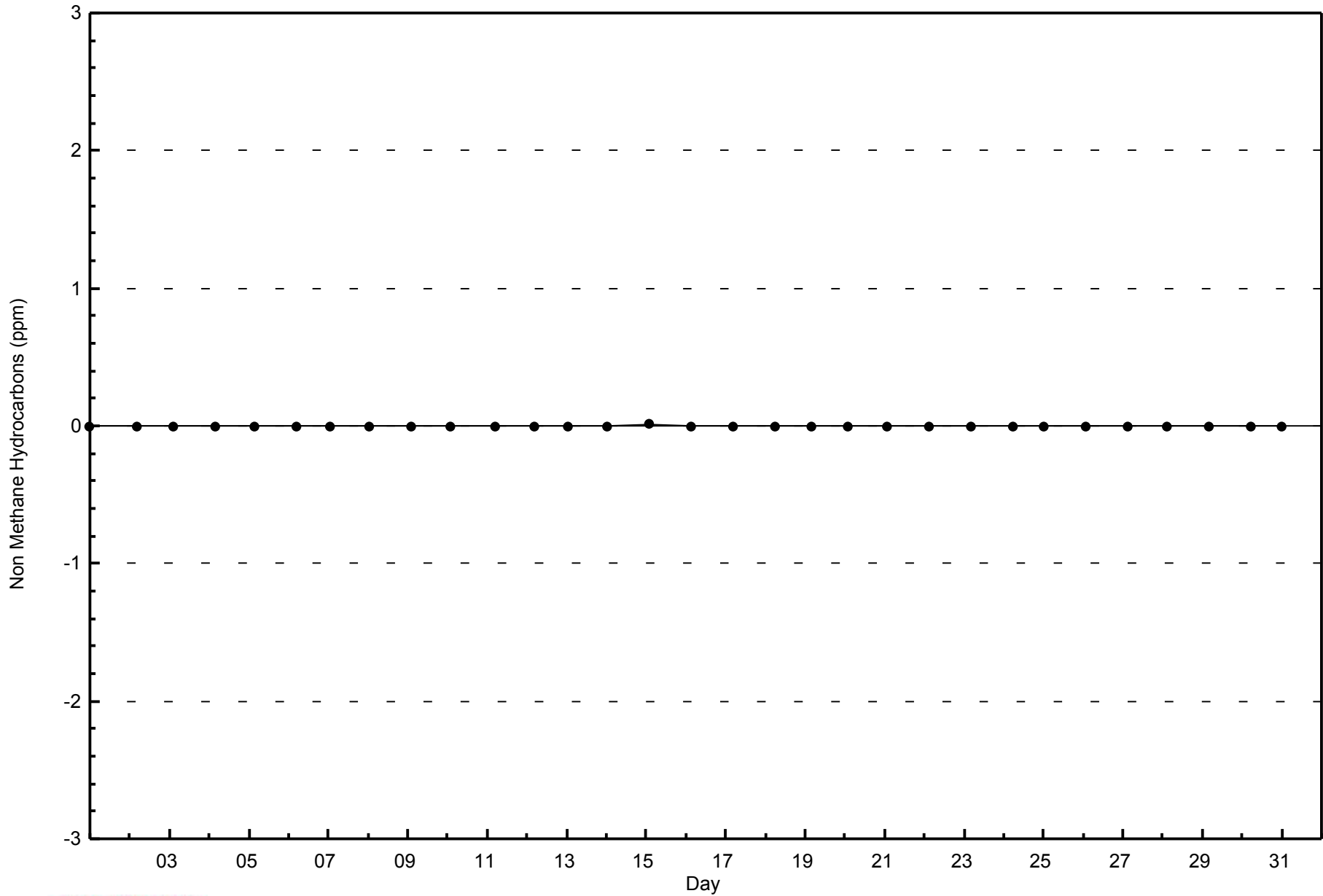
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

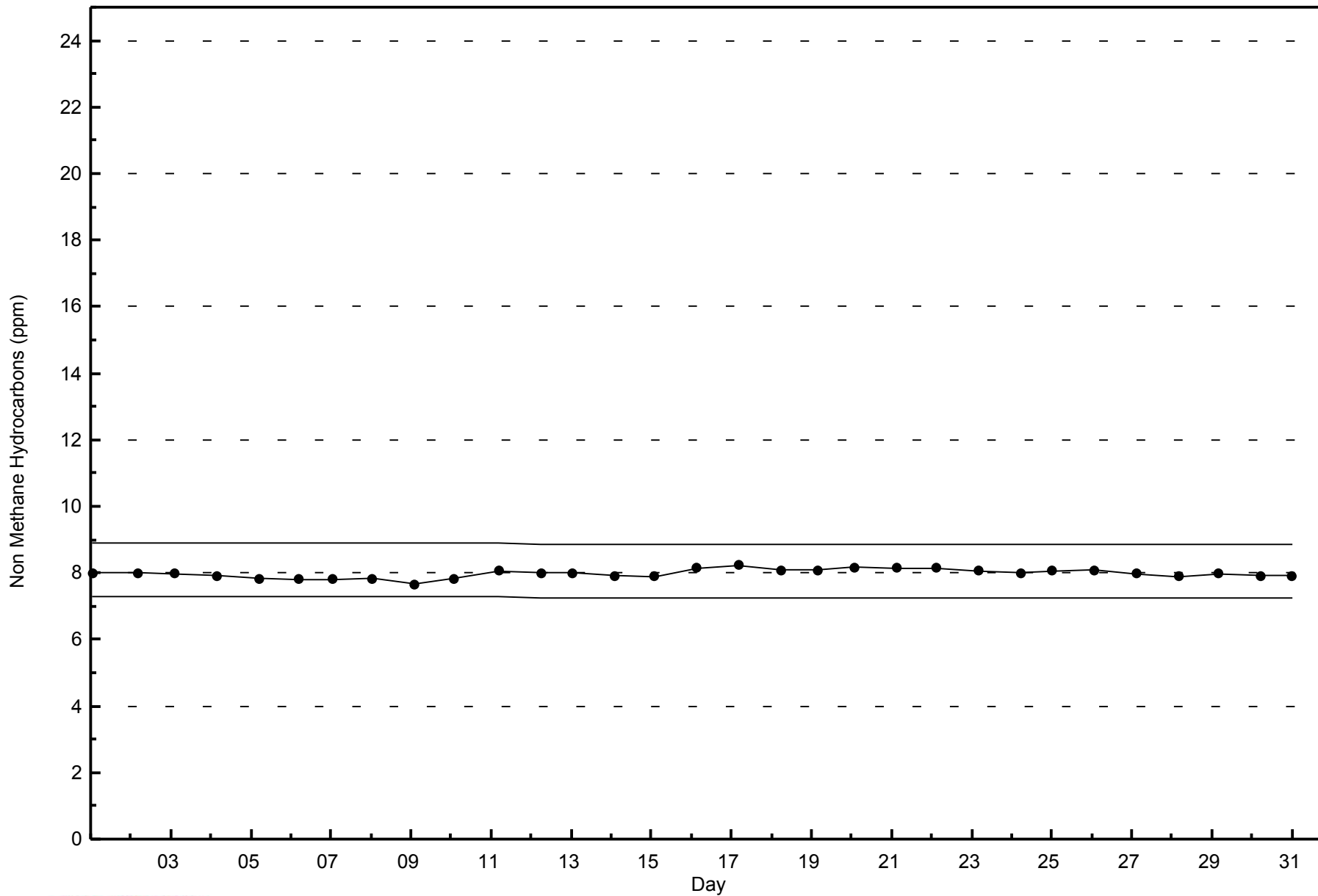
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.1 ppm on Mar 29 11:00	Maximum Daily Average: 2.3 ppm on Mar 14		Hours of Data:	707
Minimum Value: 1.8 ppm on Mar 7 15:00	Minimum Daily Average: 1.9 ppm on Mar 2		Hours of Missing Data:	37
Maximum Diurnal Average: 2.1 ppm at hour 11	Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Calibration:	35
Monthly Average: 1.99 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.6		Percent Operational Time:	99.7

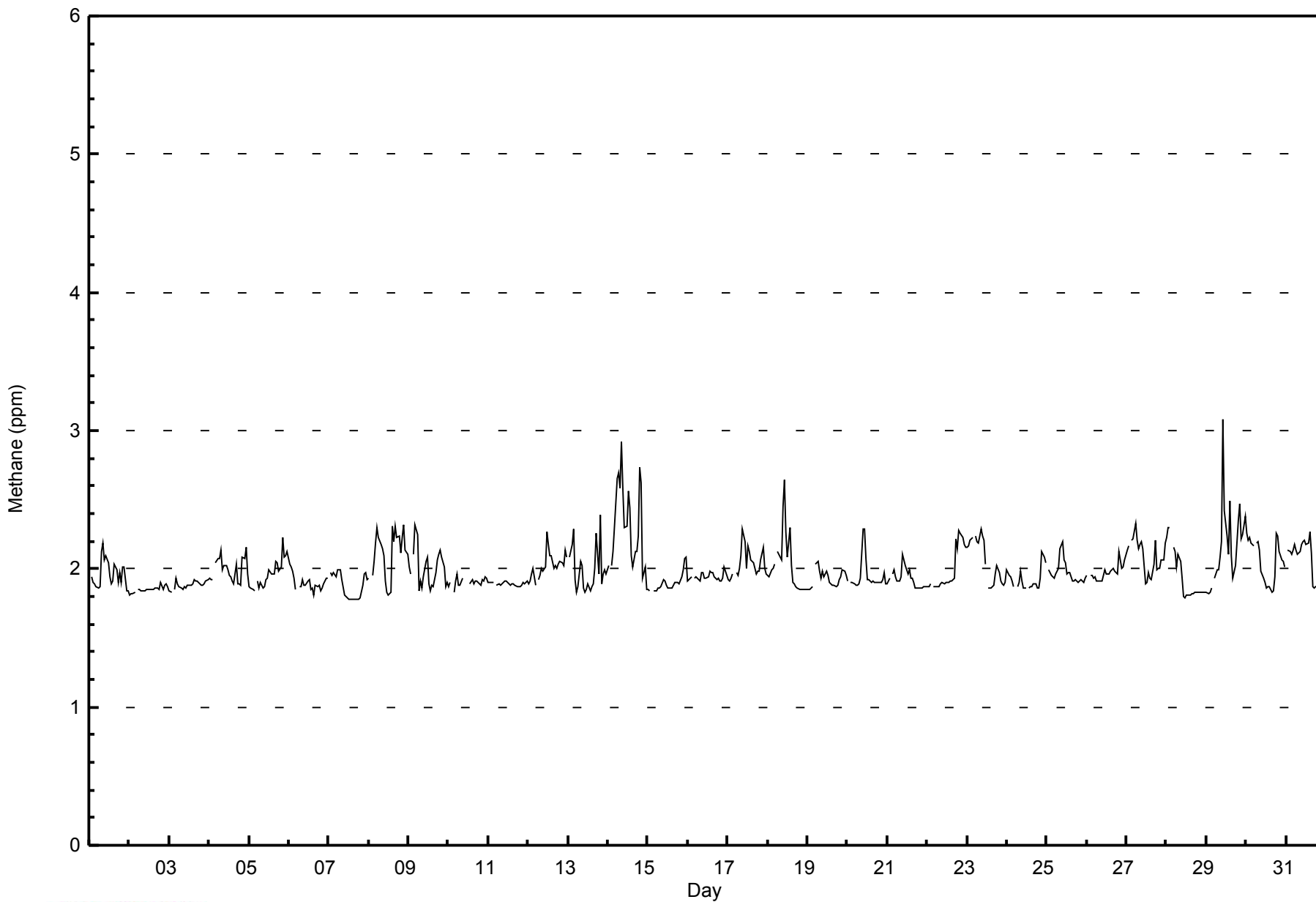
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																											
1-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.1	2.1	2.0	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	2.0	1.8	1.8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

Z - zerospan C - Calibration M - Maintenance



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	527	74.54	74.54
2.1 - 3.0	179	25.32	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

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

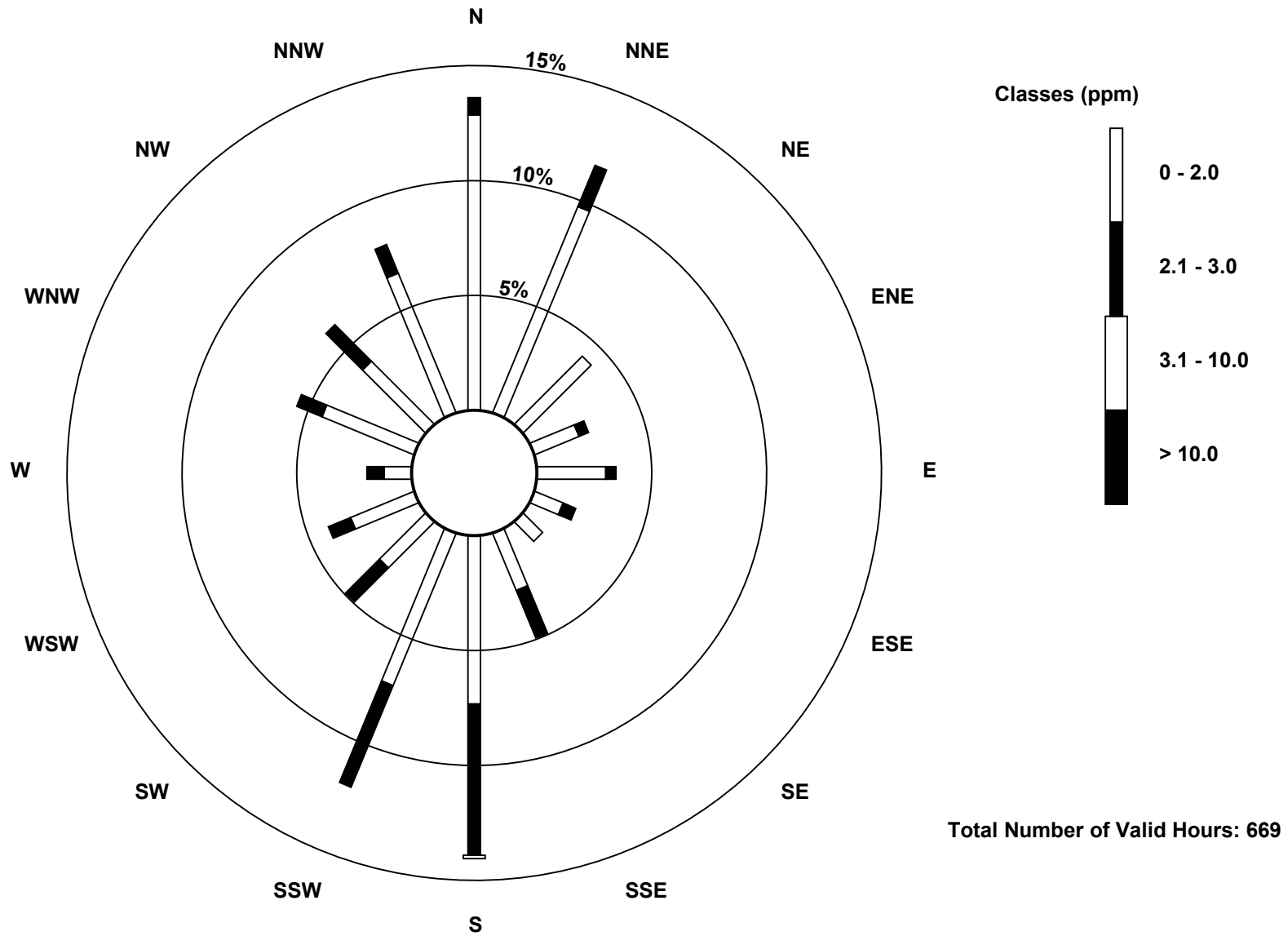
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	86	65	28	14	20	9	8	18	49	48	19	20	8	29	26	44	491
2.1 - 3.0	5	13	0	3	3	4	0	15	44	32	14	7	5	8	15	9	177
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	78	28	17	23	13	8	33	94	80	33	27	13	37	41	53	669

Total Number of Valid Hours: 669

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

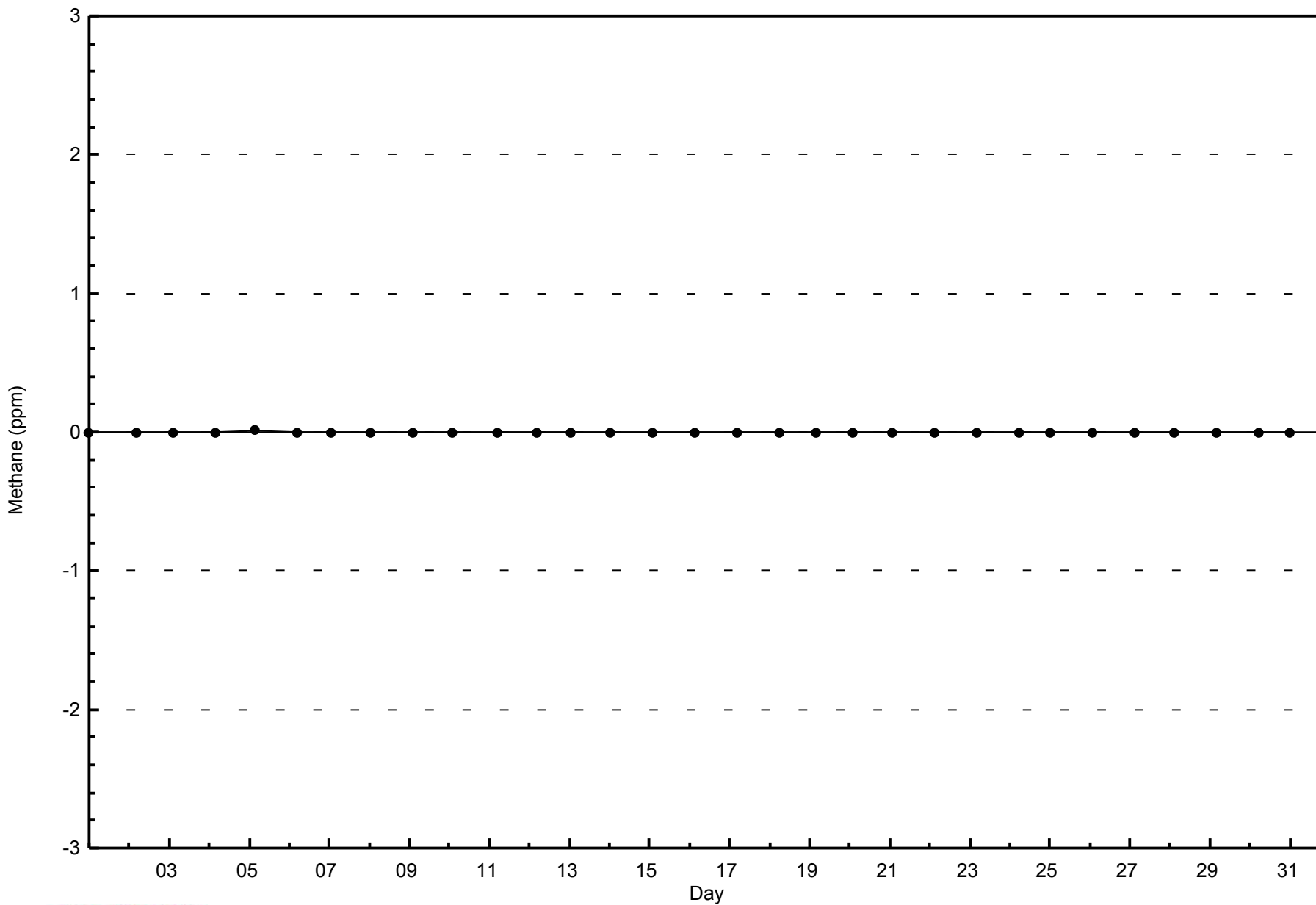
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

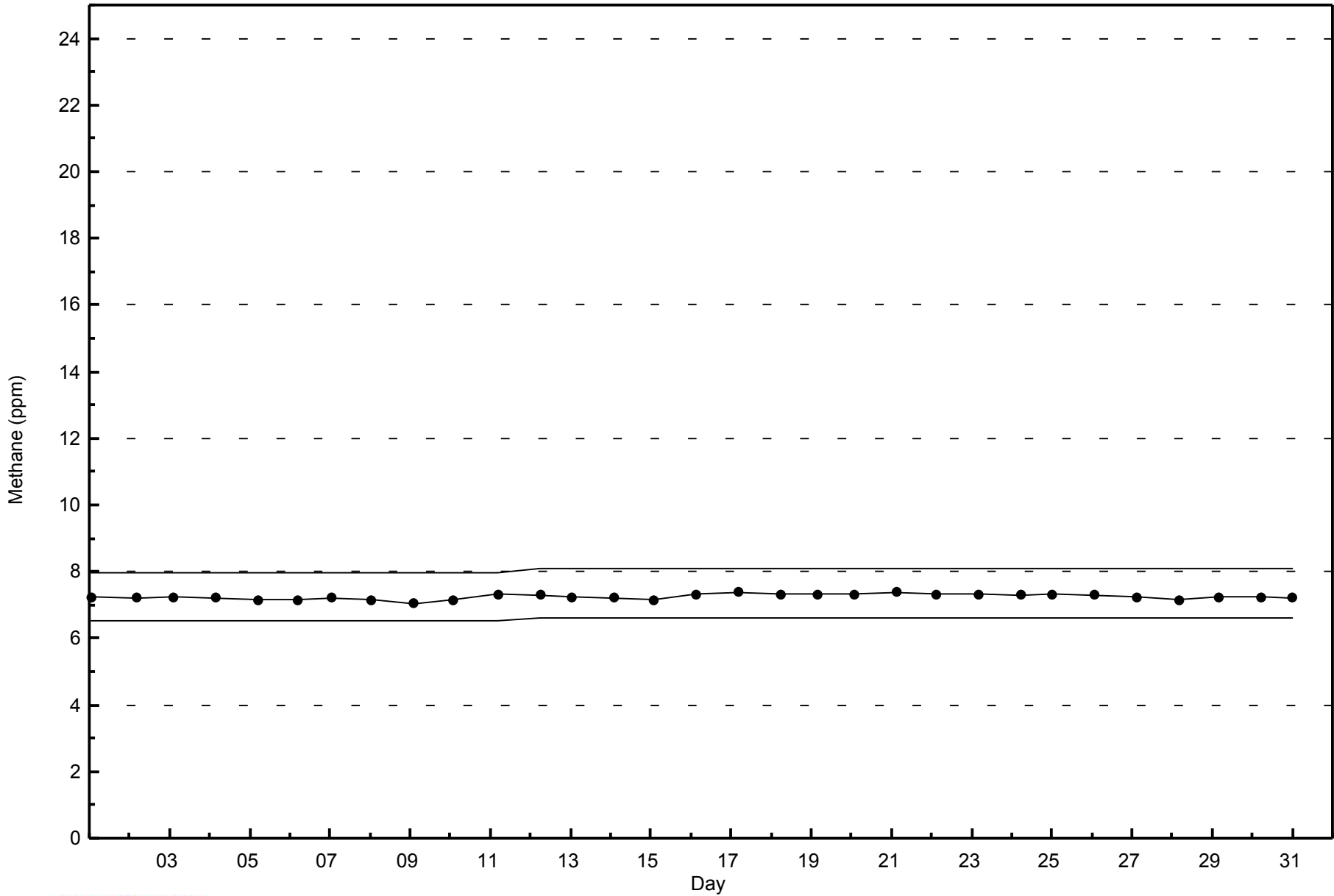
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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





Maximum Value: 29 ppb on Mar 18 10:00	Maximum Daily Average: 8.0 ppb on Mar 4	Hours in Service: 744
Minimum Value: 0 ppb on Mar 2 02:00	Minimum Daily Average: 0.1 ppb on Mar 2	Hours of Data: 708
Maximum Diurnal Average: 7.5 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 1	Hours of Missing Data: 36
Monthly Average: 2.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 26	Hours of Calibration: 36
		Percent Operational Time: 100.0

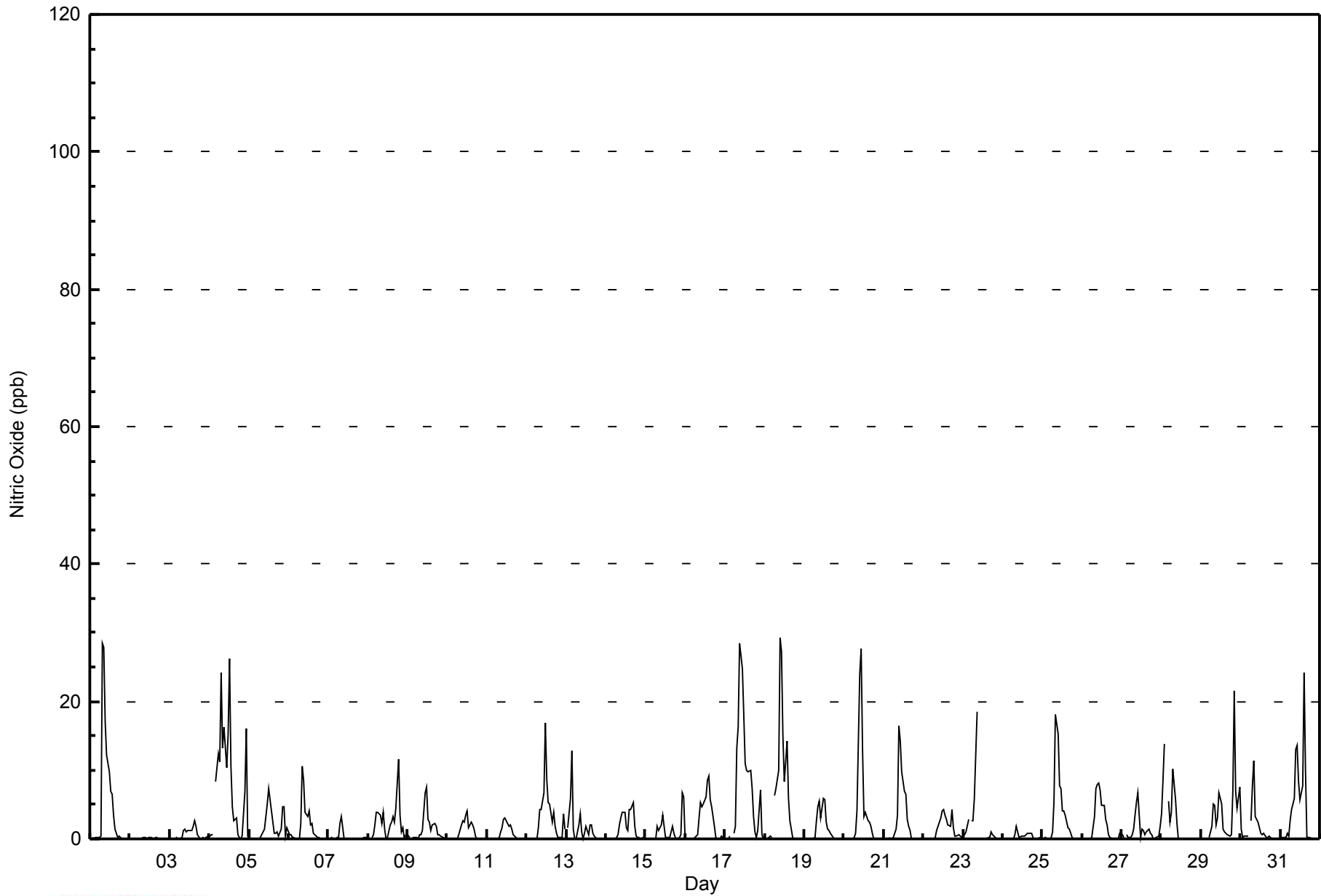
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	0	0	0	0	28	28	17	12	10	7	6	3	1	0	0	0	0	0	0	0	0	5.0	28
2-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Mar	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	2	3	2	1	0	0	0	0	0	0	0.7	3
4-Mar	0	1	1	Z	8	12	11	24	13	16	10	15	26	10	5	3	3	1	0	0	0	7	16	0	8.0	26
5-Mar	0	0	0	0	Z	0	0	0	1	1	3	5	7	4	2	1	1	1	0	2	5	5	0	2	1.8	7
6-Mar	1	1	0	0	0	Z	0	2	11	9	4	3	4	2	2	1	1	0	0	0	0	0	0	0	1.8	11
7-Mar	Z	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
8-Mar	0	Z	0	1	2	4	4	3	2	4	1	0	0	2	2	3	2	4	12	4	1	2	0	1	2.4	12
9-Mar	0	0	Z	0	0	0	0	1	1	1	7	8	3	2	1	2	2	2	1	1	0	0	0	0	1.4	8
10-Mar	0	0	Z	0	0	0	0	1	2	3	2	4	4	2	2	2	1	0	0	0	0	0	0	0	1.0	4
11-Mar	0	0	0	0	Z	0	0	0	1	2	3	3	2	2	2	1	1	0	0	0	0	0	0	0	0.7	3
12-Mar	0	0	0	0	0	Z	0	2	4	4	7	17	9	5	5	2	4	2	1	0	0	0	4	1	3.0	17
13-Mar	Z	2	6	13	1	0	0	2	4	1	0	1	2	1	2	2	1	0	0	0	0	0	0	0	1.6	13
14-Mar	0	Z	0	0	0	0	0	1	2	3	4	4	2	1	4	4	5	2	0	0	0	0	0	0	1.4	5
15-Mar	0	0	Z	0	0	0	0	2	1	2	4	2	0	0	0	1	2	1	0	0	0	1	7	6	1.3	7
16-Mar	0	0	0	Z	0	0	0	1	3	5	5	5	6	9	9	6	5	2	0	0	0	0	0	0	2.4	9
17-Mar	0	0	0	0	Z	1	2	13	16	28	25	18	11	10	10	10	7	3	1	0	1	7	1	0	7.2	28
18-Mar	0	0	0	0	0	Z	6	7	10	29	27	15	8	14	6	3	1	0	0	0	0	0	0	0	5.6	29
19-Mar	0	0	0	0	Z	0	0	3	5	5	3	6	6	3	1	1	1	0	0	0	0	0	0	0	1.5	6
20-Mar	0	Z	0	0	0	0	0	1	4	24	28	13	3	4	3	2	2	1	0	0	0	0	0	0	3.7	28
21-Mar	0	0	Z	0	0	0	0	1	4	17	14	10	7	7	3	2	1	0	0	0	0	0	0	0	2.9	17
22-Mar	0	0	0	Z	0	0	0	0	1	2	3	4	4	3	3	2	2	4	2	0	0	1	0	0	1.4	4
23-Mar	0	1	1	3	Z	3	3	6	18	C	C	C	C	C	0	0	0	1	1	0	0	0	0	0	2.0	18
24-Mar	0	0	0	0	0	Z	0	1	2	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.4	2
25-Mar	Z	0	0	0	0	0	1	5	18	15	8	7	4	4	3	2	1	1	0	0	0	0	0	0	3.1	18
26-Mar	0	Z	0	0	0	0	0	3	7	8	8	7	5	5	3	2	1	0	0	0	0	0	0	1	2.2	8
27-Mar	1	0	Z	1	0	0	1	1	3	5	7	0	1	1	1	1	1	1	1	0	0	0	0	2	1.3	7
28-Mar	4	8	14	Z	6	2	4	10	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	14
29-Mar	0	0	0	0	Z	0	2	5	5	2	3	7	5	1	1	1	1	0	1	7	22	7	4	7	3.5	22
30-Mar	1	0	0	0	0	Z	3	8	11	3	2	2	1	1	1	0	0	0	0	0	0	0	0	0	1.5	11
31-Mar	Z	0	0	0	1	0	3	4	6	13	14	8	6	8	24	10	0	0	0	0	0	0	0	0	4.2	24
	0.3	0.5	0.9	0.7	0.8	0.9	1.3	4.5	6.2	7.5	6.8	5.8	4.5	3.6	3.3	2.2	1.6	1.0	0.6	0.5	1.0	1.0	1.1	0.7	Diurnal Average	
	4	8	14	13	8	12	11	28	28	29	28	18	26	14	24	10	7	4	12	7	22	7	16	7	Diurnal Maximum	

Z - zerospan C - Calibration



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	696	98.31	98.31
21 - 40	12	1.69	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	91	76	29	20	23	13	8	28	91	78	32	27	13	37	40	52	658
21 - 40	0	2	0	0	1	0	0	3	3	1	1	0	0	0	1	0	12
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	78	29	20	24	13	8	31	94	79	33	27	13	37	41	52	670

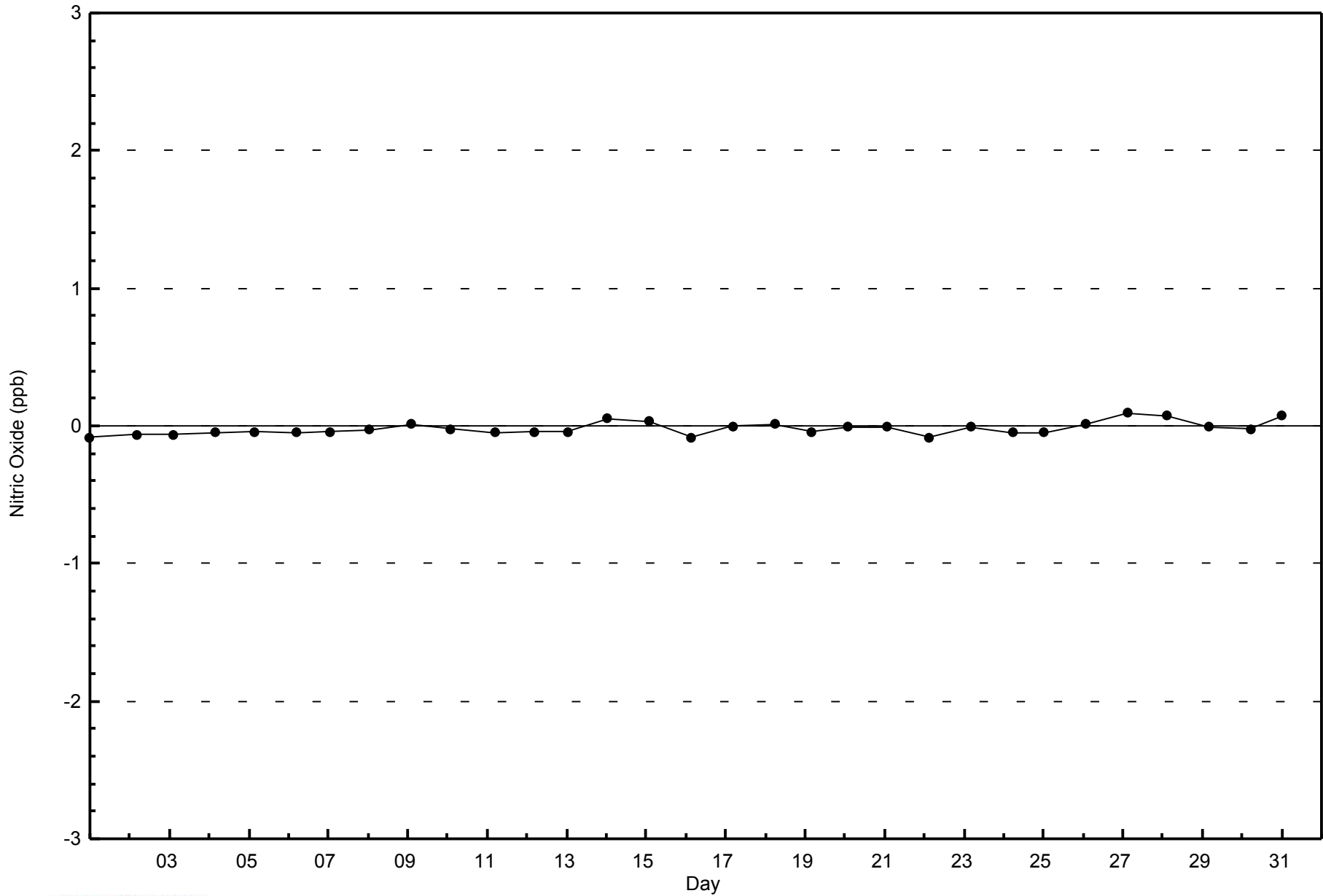
Total Number of Valid Hours: 670

Total Number of Hours: 744



WBEA
Zero Responses

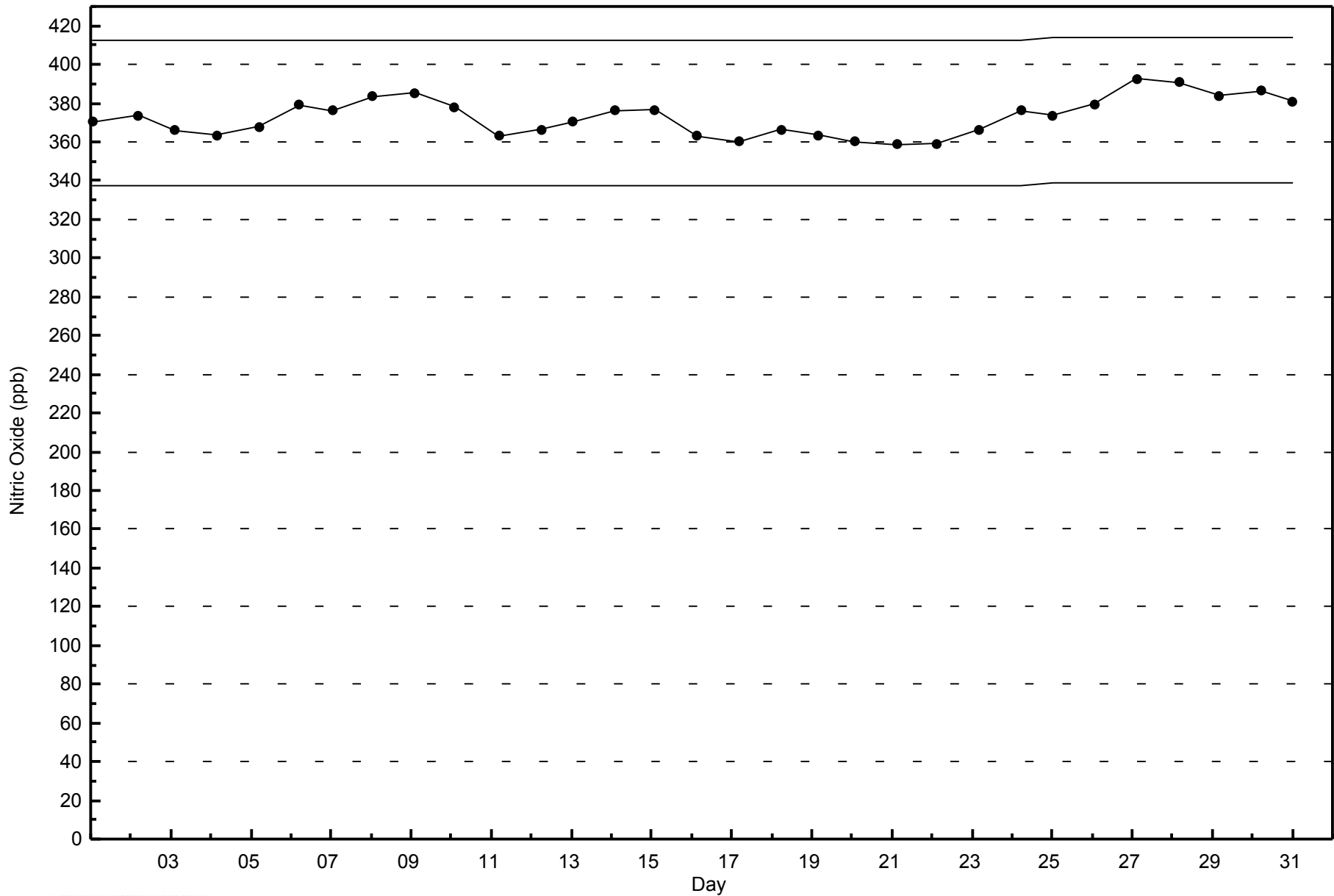
Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 38 ppb on Mar 4 23:00	Maximum Daily Average: 19.1 ppb on Mar 8
Minimum Value: 0 ppb on Mar 15 05:00	Hours of Data: 708
Maximum Diurnal Average: 11.9 ppb at hour 21	Hours of Missing Data: 36
Monthly Average: 9.5 ppb	Hours of Calibration: 36
Minimum Daily Average: 1.6 ppb on Mar 2	Percent Operational Time: 100.0
Minimum Diurnal Average: 7.1 ppb at hour 16	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 5 Median = 8 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 33	

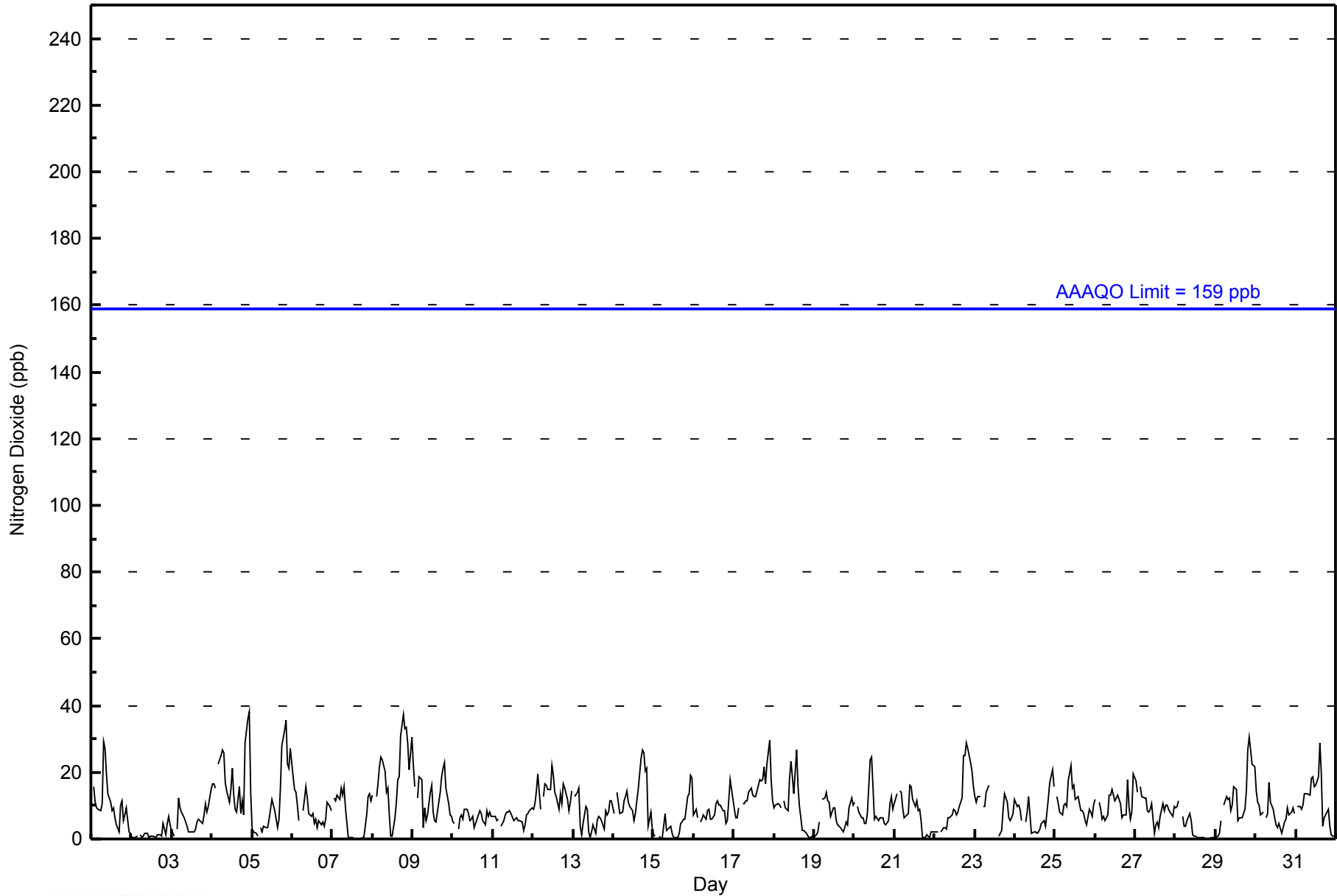
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	16	11	9	9	8	11	29	27	20	14	11	9	9	6	4	2	10	12	5	7	9	2	2	10.6	29																						
2-Mar	0	0	1	1	Z	1	1	1	2	2	1	1	1	1	0	1	1	1	1	5	1	5	7	4	1.6	7																						
3-Mar	2	1	Z	3	12	9	8	6	5	4	2	2	2	3	5	6	6	5	7	11	8	10	15	5.8	15																							
4-Mar	17	17	15	Z	22	25	27	26	17	14	11	15	21	13	9	8	16	8	12	7	29	36	38	14	18.1	38																						
5-Mar	3	2	2	1	Z	3	2	4	4	4	6	9	12	9	6	3	6	15	28	33	36	22	21	27	11.1	36																						
6-Mar	19	15	14	10	6	Z	8	12	16	12	8	7	8	5	6	3	6	4	5	4	6	11	10	9	8.8	19																						
7-Mar	Z	12	12	13	12	15	13	16	9	1	0	0	0	0	0	0	0	0	1	7	13	14	12	6.6	16																							
8-Mar	13	Z	13	17	22	25	24	20	14	15	7	1	1	6	11	18	19	31	37	33	33	29	21	31	19.1	37																						
9-Mar	22	16	Z	12	19	18	3	9	6	7	14	16	8	6	5	8	14	19	21	23	15	11	7	7	12.4	23																						
10-Mar	5	5	Z	3	6	7	6	9	9	8	5	6	7	4	6	7	8	8	6	4	8	7	8	7	6.4	9																						
11-Mar	7	7	5	6	Z	4	5	7	8	8	9	8	6	6	6	6	6	5	3	4	7	8	8	9	6.4	9																						
12-Mar	9	11	15	20	9	Z	13	17	16	15	15	22	19	14	13	9	14	11	16	15	12	8	11	14	13.7	22																						
13-Mar	Z	13	14	15	4	1	5	10	9	2	0	2	4	2	6	7	6	5	3	8	7	8	11	11	6.7	15																						
14-Mar	8	Z	14	11	8	8	12	13	15	11	10	8	6	8	12	15	24	27	26	20	21	4	8	3	12.5	27																						
15-Mar	1	1	Z	1	0	0	4	8	3	4	4	2	1	1	1	2	5	5	6	6	13	13	19	18	5.0	19																						
16-Mar	7	9	6	Z	5	6	7	6	8	9	6	6	7	10	11	10	10	8	8	5	5	11	18	12	8.3	18																						
17-Mar	9	6	6	9	Z	11	11	12	12	14	15	13	13	13	15	18	17	18	21	17	22	30	18	11	14.3	30																						
18-Mar	9	10	11	10	9	Z	11	9	9	18	23	19	14	27	16	10	6	3	3	2	1	1	0	1	9.6	27																						
19-Mar	1	1	2	5	Z	12	12	14	12	11	7	9	9	6	4	4	4	2	3	5	4	9	12	10	6.9	14																						
20-Mar	11	Z	10	8	6	6	5	5	8	24	25	16	6	7	6	6	6	6	5	4	5	11	13	9	9.0	25																						
21-Mar	10	13	Z	15	14	10	6	7	8	16	16	12	10	12	8	9	5	1	1	1	1	1	2	2	7.8	16																						
22-Mar	2	2	2	Z	2	3	3	3	6	7	7	9	9	7	8	10	12	25	25	29	27	23	20	16	11.2	29																						
23-Mar	13	11	13	13	Z	10	10	14	16	C	C	C	C	C	1	2	3	9	14	11	7	6	6	8	9.1	16																						
24-Mar	12	10	10	9	6	Z	5	8	13	7	2	2	2	2	2	3	5	6	4	8	12	17	21	16	7.8	21																						
25-Mar	Z	13	11	8	7	10	11	10	17	22	15	16	12	12	13	8	8	8	5	4	9	8	7	10	10.6	22																						
26-Mar	12	Z	11	9	6	7	5	7	13	13	15	13	12	13	12	11	6	7	7	18	10	6	8	19	10.4	19																						
27-Mar	17	14	Z	16	13	12	12	9	8	9	10	2	4	5	3	7	11	8	10	10	9	8	7	10	9.3	17																						
28-Mar	9	10	12	Z	7	4	4	6	8	5	1	1	1	1	1	1	1	0	0	0	0	0	0	0	3.0	12																						
29-Mar	0	1	2	5	Z	10	13	12	12	9	10	16	15	6	7	6	7	9	14	27	31	27	23	22	12.2	31																						
30-Mar	15	11	10	7	8	Z	6	8	17	11	9	6	4	4	5	2	4	5	6	9	7	8	9	8	7.7	17																						
31-Mar	Z	10	10	9	10	14	14	14	13	18	19	16	16	19	29	19	4	7	7	9	4	1	1	1	11.4	29																						
																								9.0	8.7	9.2	9.0	9.2	9.2	8.9	10.6	10.9	10.6	9.5	8.8	7.9	7.5	7.4	7.1	7.7	8.9	10.1	10.8	11.9	11.5	11.6	10.9	Diurnal Average
																								22	17	15	20	22	25	27	29	27	24	25	22	21	27	29	19	24	31	37	33	36	36	38	31	Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	654	92.37	92.37
21 - 40	54	7.63	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

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

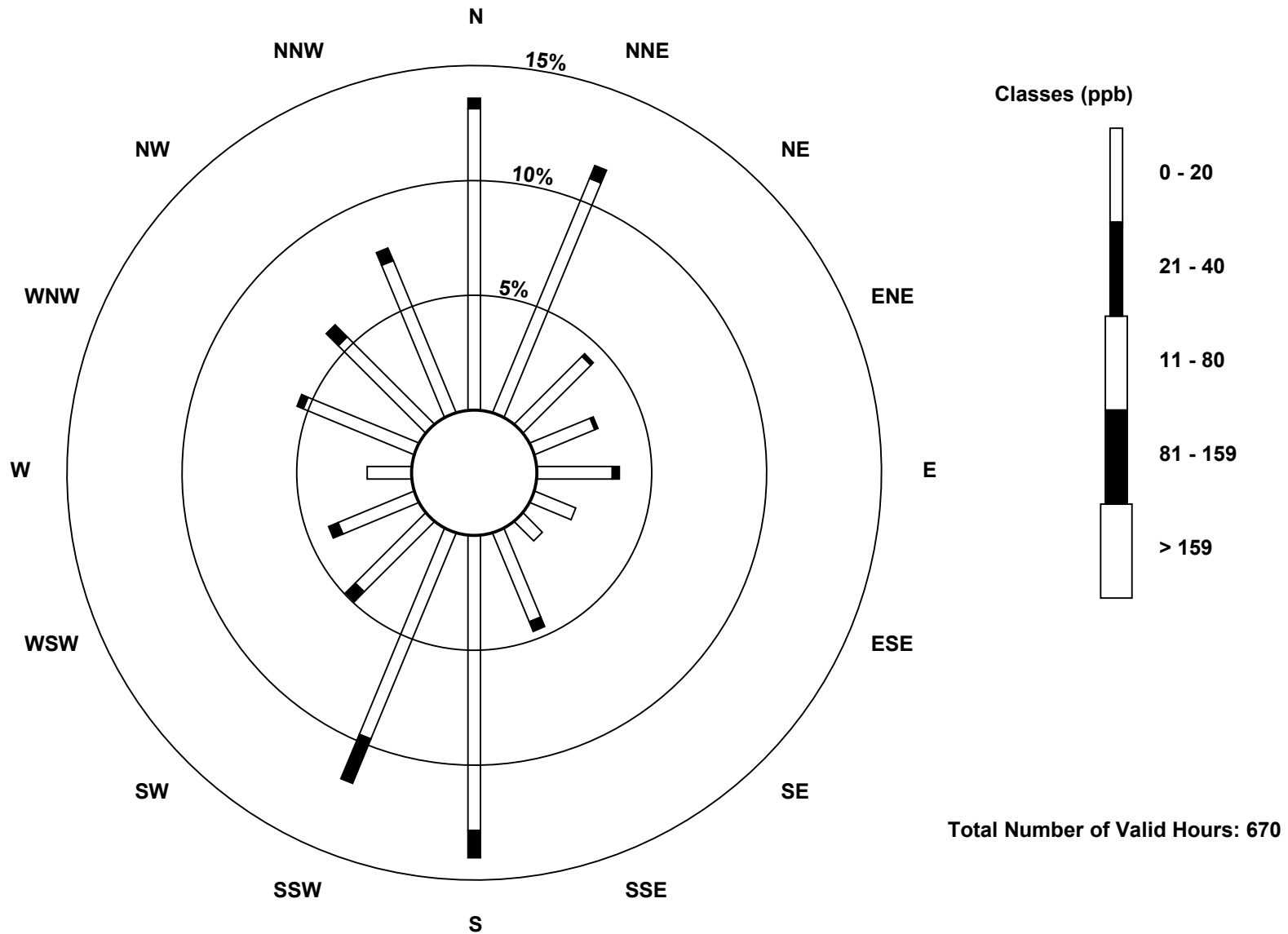
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	74	28	19	22	13	8	28	86	65	29	24	13	35	36	48	616
21 - 40	3	4	1	1	2	0	0	3	8	14	4	3	0	2	5	4	54
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	78	29	20	24	13	8	31	94	79	33	27	13	37	41	52	670

Total Number of Valid Hours: 670

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

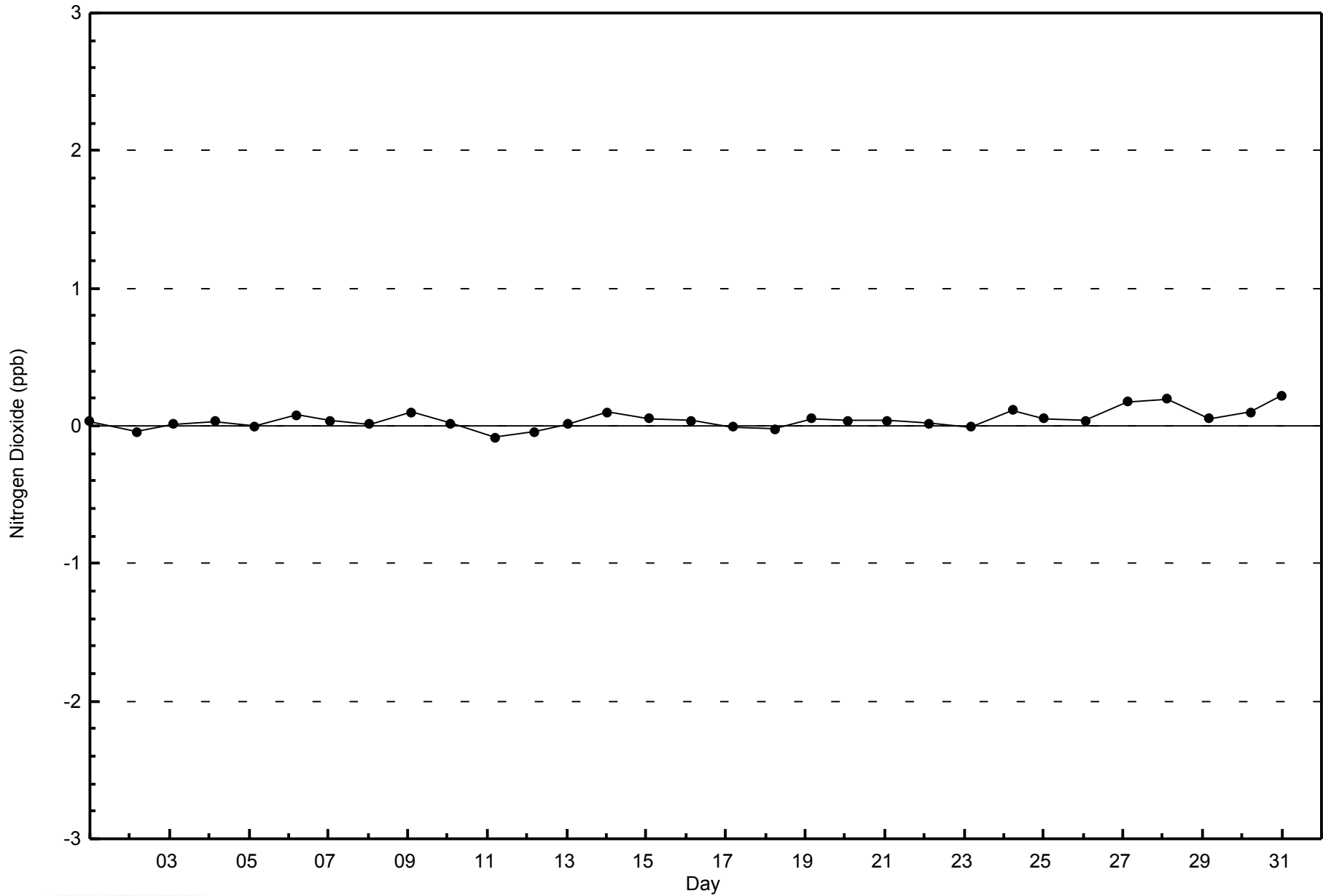
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

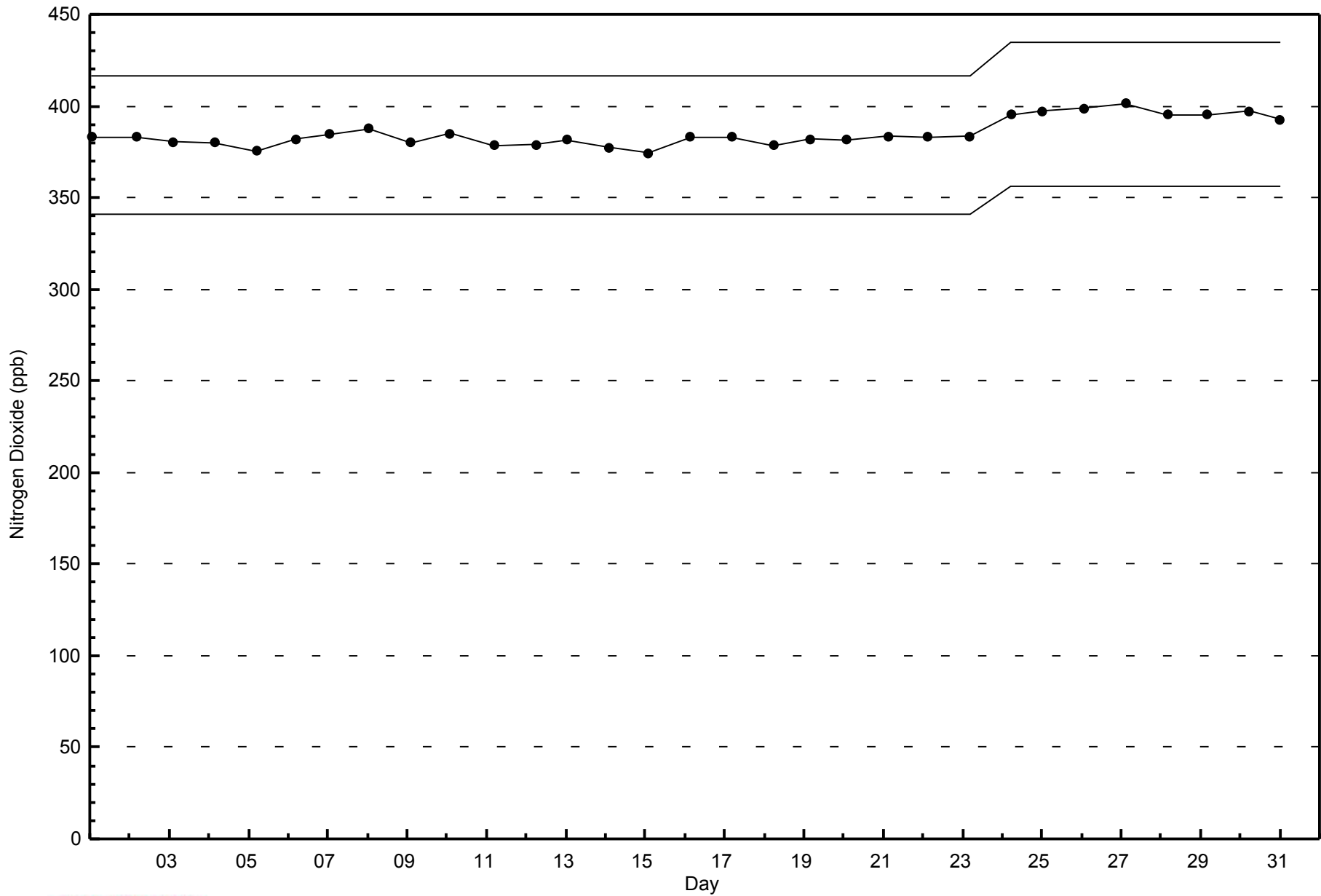
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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



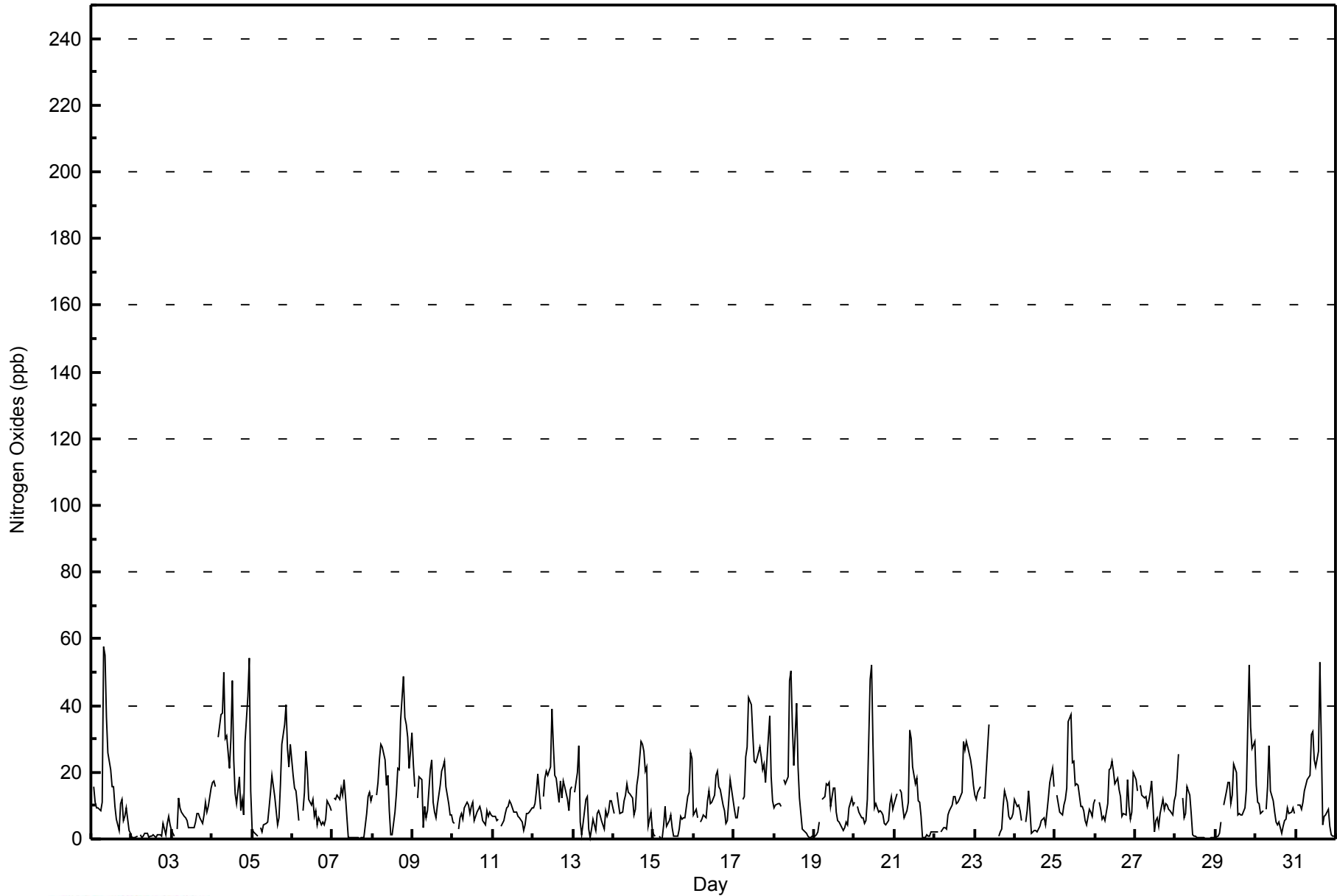


Maximum Value: 58 ppb on Mar 1 08:00																	Maximum Daily Average: 26.1 ppb on Mar 4																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 28 20:00																	Minimum Daily Average: 1.7 ppb on Mar 2																	Hours of Data: 708	
Maximum Diurnal Average: 18.1 ppb at hour 10																	Minimum Diurnal Average: 9.2 ppb at hour 2																	Hours of Missing Data: 36	
Monthly Average: 11.9 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 5 Median = 10 Q ₃ = 16 P ₉₀ = 24 P ₉₉ = 49																	Hours of Calibration: 36	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	16	11	9	9	8	11	58	55	37	26	21	15	16	10	6	2	11	12	5	7	9	2	2	15.6	58									
2-Mar	0	0	1	1	Z	1	1	1	2	2	1	1	1	1	1	1	1	1	1	5	1	4	7	4	1.7	7									
3-Mar	2	1	Z	3	12	9	8	7	6	5	3	4	3	3	5	7	8	6	5	7	11	8	10	15	6.5	15									
4-Mar	17	17	16	Z	31	37	38	50	30	31	21	30	47	24	13	11	19	8	12	7	29	43	54	14	26.1	54									
5-Mar	3	2	1	1	Z	3	2	4	5	5	9	14	19	13	8	4	7	16	28	34	40	27	21	29	12.9	40									
6-Mar	19	15	14	10	6	Z	8	14	26	21	12	10	12	7	8	4	6	4	5	4	6	11	10	9	10.6	26									
7-Mar	Z	12	12	13	12	15	13	18	13	1	0	0	0	0	0	0	0	0	0	1	8	13	14	12	6.9	18									
8-Mar	13	Z	13	17	24	29	27	24	16	19	8	1	1	8	13	21	21	36	49	37	34	30	21	32	21.5	49									
9-Mar	23	16	Z	12	19	18	3	10	6	8	21	24	11	8	6	10	16	20	22	23	16	11	7	7	13.8	24									
10-Mar	5	5	Z	3	6	7	6	9	11	10	8	10	11	5	8	9	10	8	6	4	8	7	8	7	7.5	11									
11-Mar	7	7	5	6	Z	4	5	8	9	10	11	11	8	8	8	7	6	5	3	4	7	8	8	9	7.2	11									
12-Mar	9	11	15	20	9	Z	13	18	21	19	22	39	28	19	18	11	17	12	17	16	12	9	15	16	16.7	39									
13-Mar	Z	14	20	28	5	1	5	12	13	3	1	3	6	2	8	9	7	6	3	8	7	8	11	11	8.3	28									
14-Mar	8	Z	14	11	8	8	12	13	17	14	14	12	7	9	16	19	29	28	26	21	21	4	8	3	13.9	29									
15-Mar	1	1	Z	1	0	0	4	10	4	6	7	4	1	1	1	3	7	6	6	6	13	14	26	24	6.3	26									
16-Mar	7	9	6	Z	5	6	7	7	11	14	11	11	13	19	20	16	15	10	9	5	5	11	18	12	10.8	20									
17-Mar	9	6	6	10	Z	12	13	25	28	42	40	31	23	23	24	28	25	21	22	17	24	37	19	11	21.5	42									
18-Mar	9	10	11	10	10	Z	18	16	18	47	50	34	22	41	22	12	8	3	3	2	1	1	0	1	15.2	50									
19-Mar	1	1	2	5	Z	12	13	17	16	17	10	15	15	8	6	5	4	2	3	5	4	9	12	10	8.4	17									
20-Mar	11	Z	10	8	6	6	5	6	12	48	52	29	9	11	8	9	8	7	5	4	5	11	13	9	12.7	52									
21-Mar	10	13	Z	15	14	10	7	9	11	33	30	22	17	18	11	11	7	1	1	1	1	1	2	2	10.6	33									
22-Mar	2	2	2	Z	2	3	3	3	7	8	10	13	13	11	11	12	14	29	27	29	28	24	21	16	12.6	29									
23-Mar	13	12	14	16	Z	12	12	20	34	C	C	C	C	C	1	2	3	10	14	11	7	6	6	8	11.2	34									
24-Mar	12	10	10	9	5	Z	5	9	14	8	2	2	2	2	3	4	6	6	4	8	12	17	21	16	8.2	21									
25-Mar	Z	13	11	8	7	10	12	15	35	37	23	23	16	16	16	10	10	8	6	4	9	8	7	10	13.7	37									
26-Mar	12	Z	11	9	6	7	6	11	21	21	23	20	16	18	15	13	7	8	7	18	10	6	8	20	12.6	23									
27-Mar	18	14	Z	16	13	12	13	10	12	14	17	2	5	6	4	8	12	9	11	10	9	8	7	11	10.6	18									
28-Mar	13	18	25	Z	12	6	8	16	13	8	1	1	1	1	1	1	1	0	0	0	0	0	0	0	5.5	25									
29-Mar	0	1	2	5	Z	10	14	17	17	11	13	22	20	7	8	7	7	9	15	34	52	34	27	29	15.7	52									
30-Mar	16	11	11	8	9	Z	9	16	28	14	11	8	5	4	5	2	4	6	6	9	7	8	9	8	9.3	28									
31-Mar	Z	10	10	9	11	14	16	18	19	31	32	24	22	26	53	29	4	7	7	9	4	1	1	1	15.6	53									
																								Diurnal Average											
																								Diurnal Maximum											
9.3 9.2 10.1 9.7 10.1 10.1 10.2 15.0 17.1 18.1 16.3 14.7 12.4 11.2 10.7 9.4 9.3 9.9 10.7 11.3 12.9 12.5 12.7 11.6																																			
23 18 25 28 31 37 38 58 55 48 52 39 47 41 53 29 29 36 49 37 52 43 54 32																																			
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	596	84.18	84.18
21 - 40	97	13.70	97.88
41 - 80	15	2.12	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



WBEA
Frequency Distribution

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

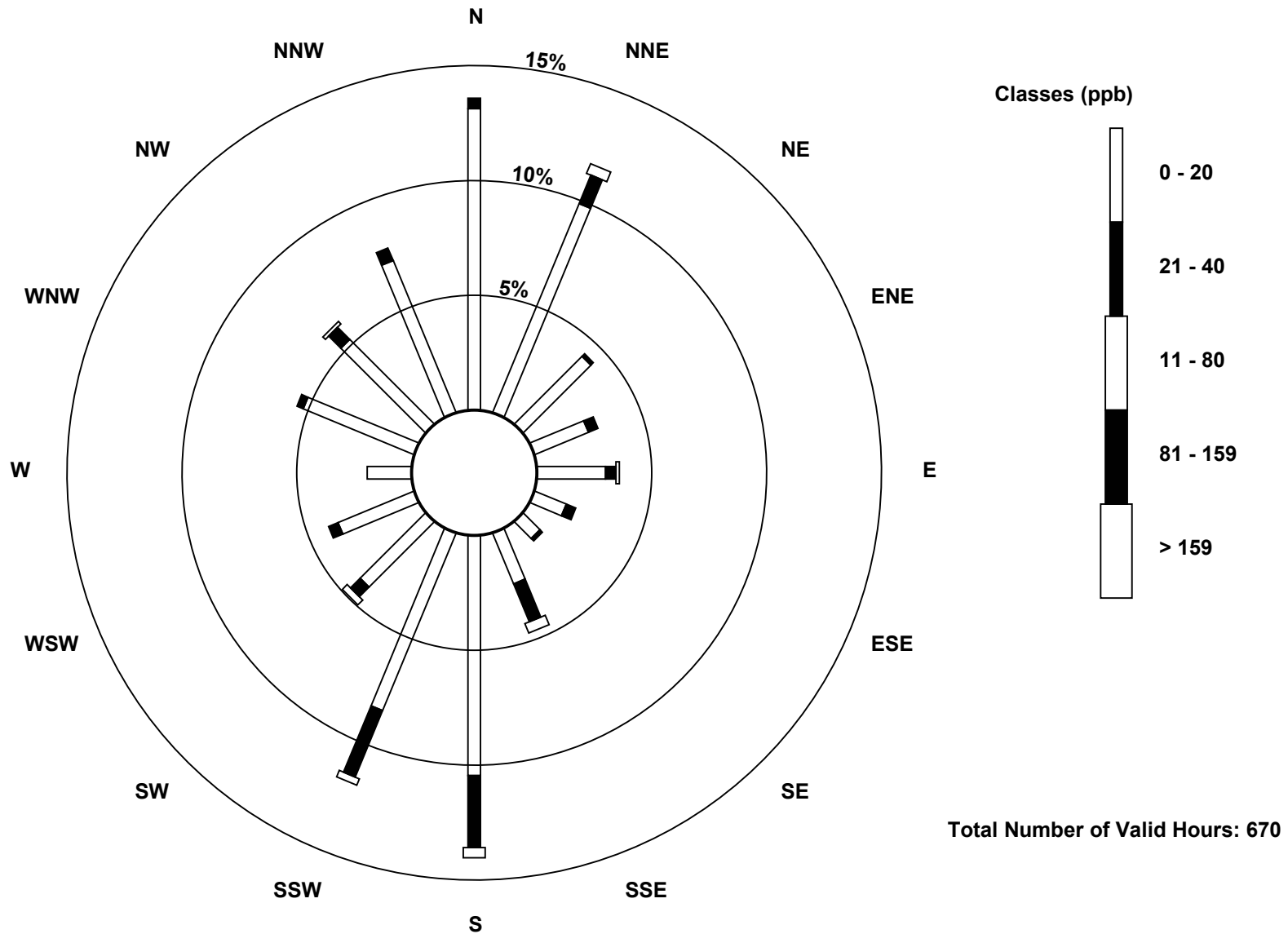
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	66	28	17	20	10	7	16	70	56	27	24	13	35	35	48	560
21 - 40	3	9	1	3	3	3	1	12	21	21	4	3	0	2	5	4	95
11 - 80	0	3	0	0	1	0	0	3	3	2	2	0	0	0	1	0	15
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	78	29	20	24	13	8	31	94	79	33	27	13	37	41	52	670

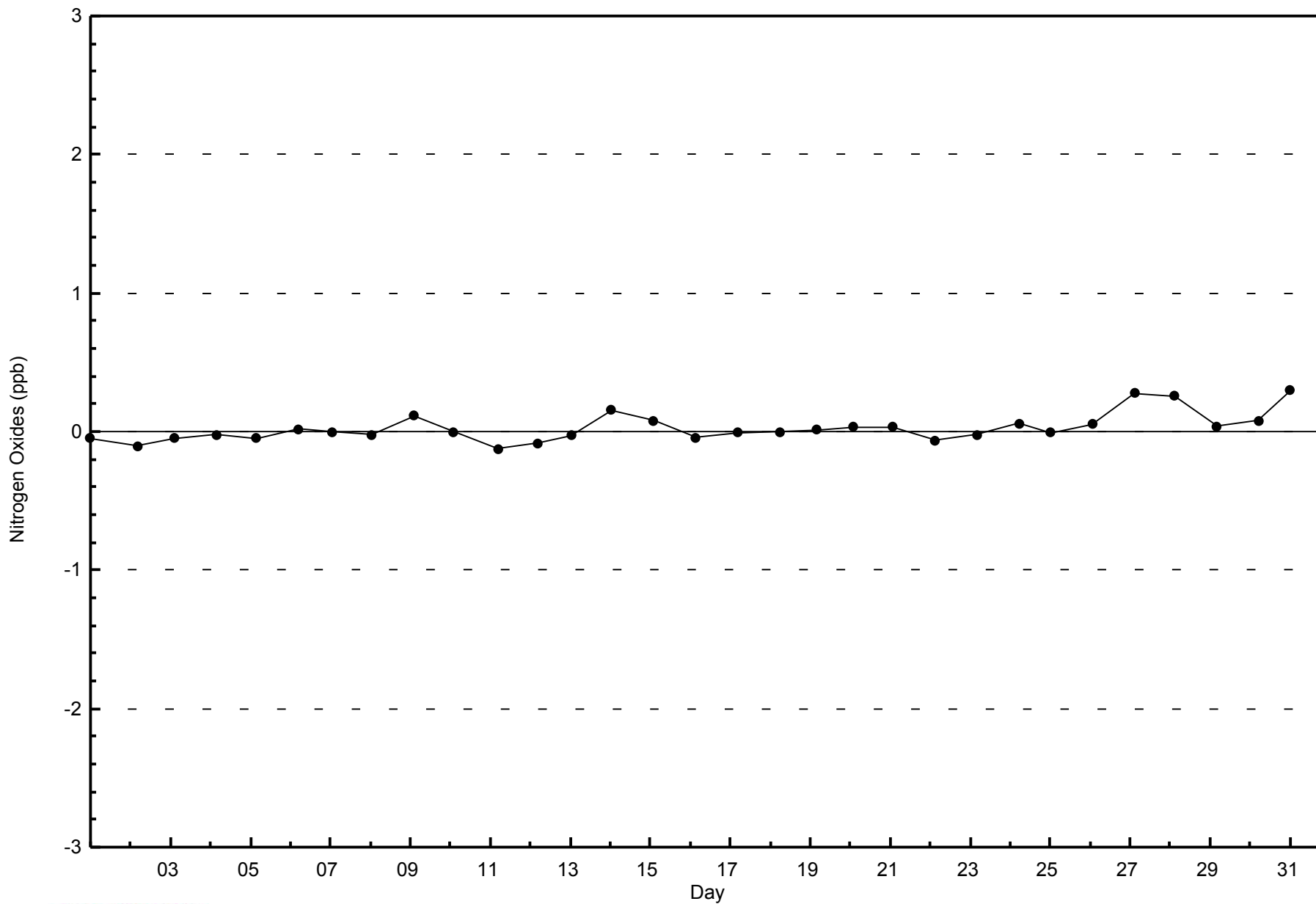
Total Number of Valid Hours: 670

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

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

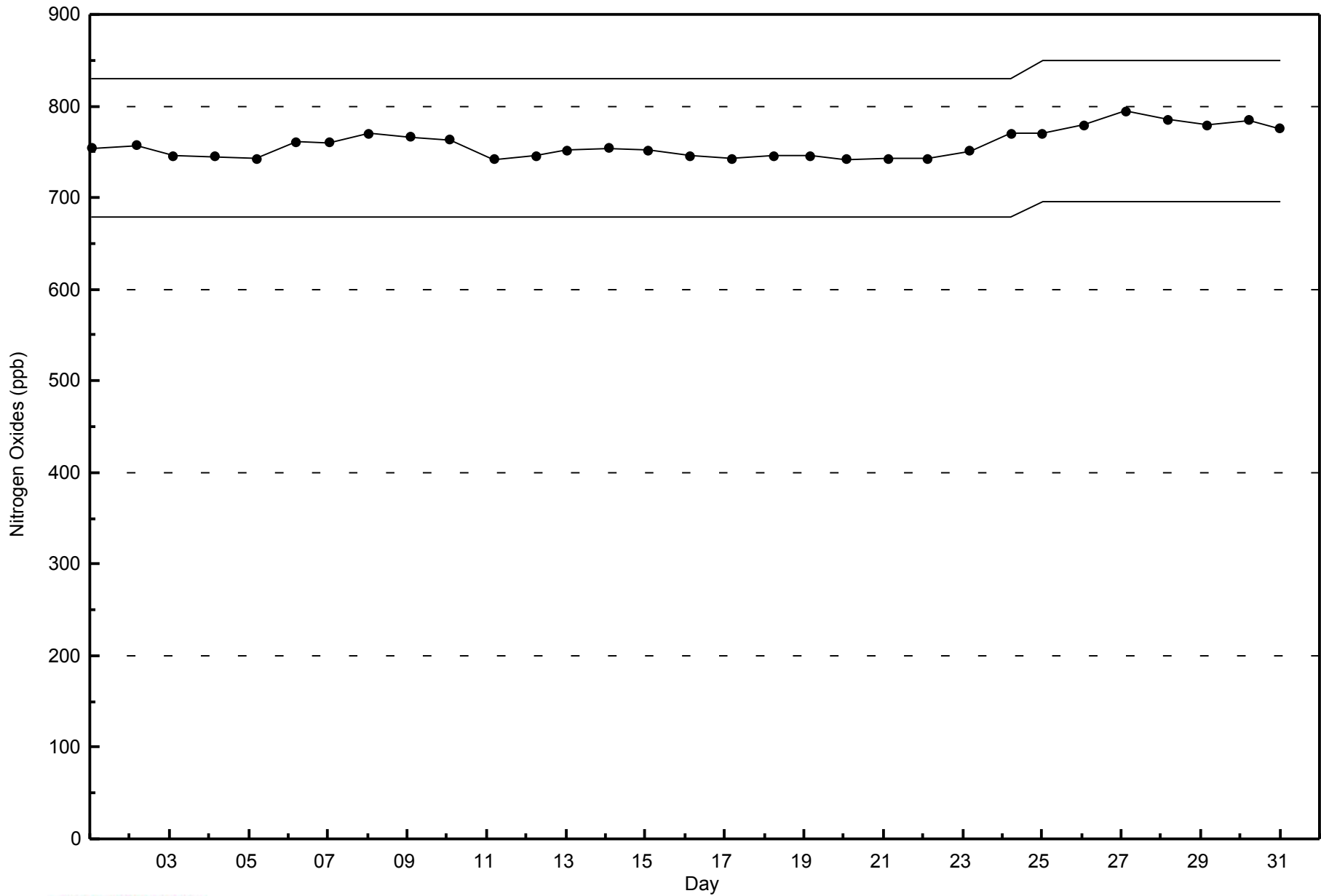






WBEA
Span Responses

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 46 ppb on Mar 28 14:00	Maximum Daily Average: 37.7 ppb on Mar 2		Hours of Data:	708
Minimum Value: 2 ppb on Mar 4 07:00	Minimum Daily Average: 15.0 ppb on Mar 27		Hours of Missing Data:	36
Maximum Diurnal Average: 33.8 ppb at hour 16	Minimum Diurnal Average: 16.9 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 24.6 ppb	Percentiles: P ₁ = 3 P ₁₀ = 7 Q ₁ = 15 Median = 26 Q ₃ = 33 P ₉₀ = 40 P ₉₉ = 45		Percent Operational Time:	99.9

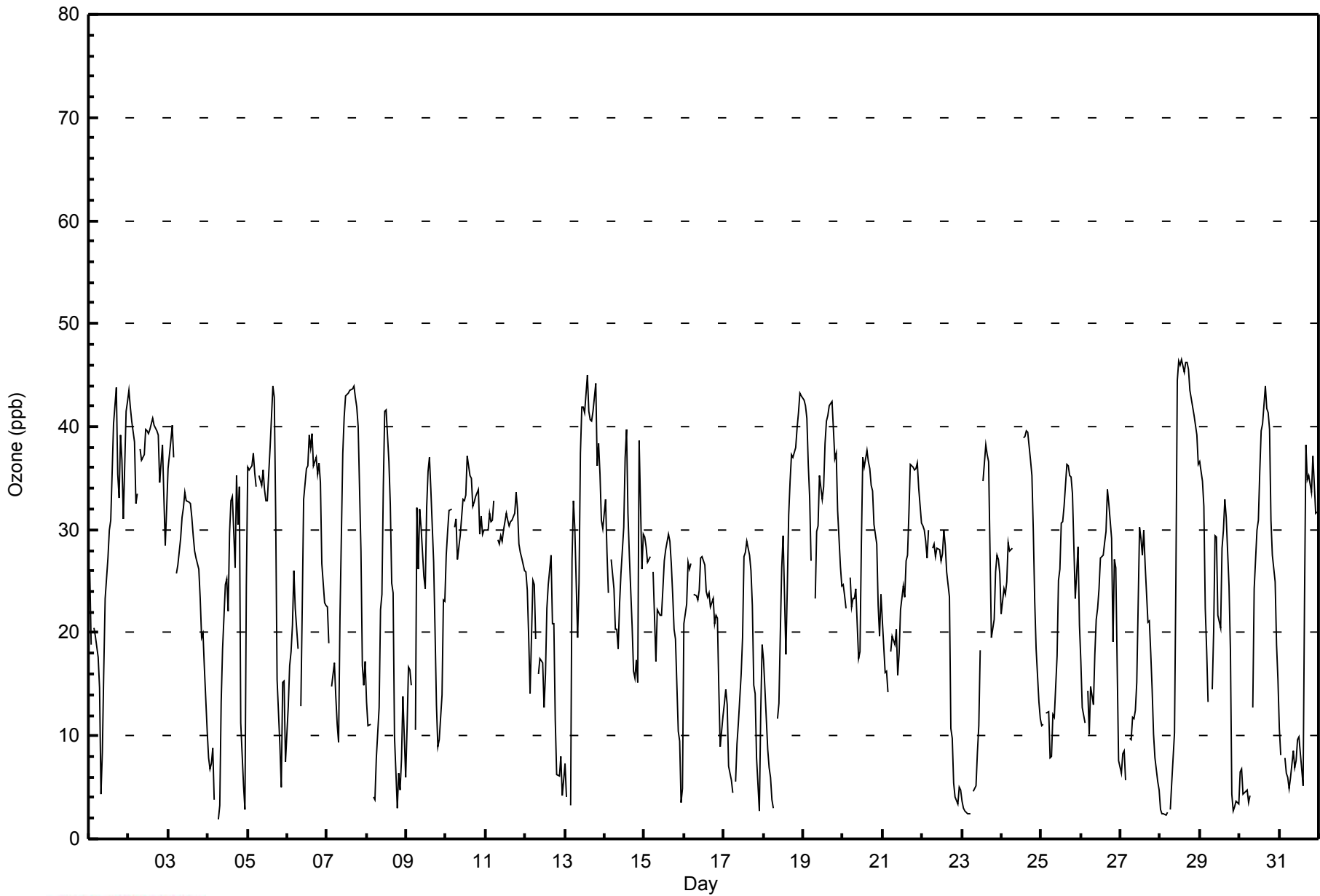
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	26	19	Z	21	20	18	15	4	8	16	23	27	30	31	35	40	44	35	33	39	37	31	42	42	27.7	44																							
2-Mar	43	42	41	39	33	33	Z	38	37	37	40	40	39	40	41	40	40	40	39	35	38	33	29	32	37.7	43																							
3-Mar	36	39	40	37	Z	26	27	29	31	32	34	33	33	32	31	29	28	27	26	23	20	20	17	10	28.7	40																							
4-Mar	8	7	7	9	4	Z	2	3	13	18	25	25	22	30	33	33	26	35	30	34	11	5	3	25	17.8	35																							
5-Mar	36	36	36	37	36	34	Z	35	34	36	34	33	33	38	41	44	43	31	15	9	5	15	15	7	29.8	44																							
6-Mar	13	17	18	21	26	22	18	Z	13	23	33	36	36	39	38	39	36	37	35	36	35	27	23	23	28.0	39																							
7-Mar	23	19	Z	15	17	14	11	9	22	37	41	43	43	43	44	44	44	43	42	40	28	17	15	17	29.1	44																							
8-Mar	13	11	11	Z	4	4	8	13	22	24	34	41	42	37	32	25	24	10	3	6	5	8	14	6	17.2	42																							
9-Mar	11	17	16	15	Z	11	32	26	32	30	25	24	32	36	37	34	27	20	13	9	10	14	23	23	22.5	37																							
10-Mar	28	30	32	32	Z	30	31	27	29	31	33	33	33	37	35	35	32	33	33	34	30	31	30	30	31.7	37																							
11-Mar	30	30	32	31	31	33	Z	29	29	29	29	30	32	31	30	31	31	32	34	32	29	28	27	26	30.2	34																							
12-Mar	26	24	20	14	25	25	19	Z	16	17	17	13	16	22	25	28	21	21	11	6	6	8	4	6	17.0	28																							
13-Mar	7	4	Z	3	27	33	30	19	25	37	42	42	41	45	41	41	41	42	44	36	38	35	31	30	32.0	45																							
14-Mar	33	28	24	Z	27	24	20	20	18	23	26	30	37	40	32	28	21	16	16	17	15	39	26	30	25.6	40																							
15-Mar	29	28	27	27	Z	26	22	17	22	22	22	24	27	28	30	29	27	24	20	19	10	9	4	5	21.7	30																							
16-Mar	21	23	27	26	27	Z	24	24	23	24	27	27	27	24	24	24	22	23	21	22	21	15	9	12	22.4	27																							
17-Mar	13	15	13	7	6	5	Z	6	9	11	16	20	27	28	29	28	26	23	15	14	8	3	12	19	15.2	29																							
18-Mar	17	14	9	7	6	4	3	Z	12	13	20	26	29	18	24	31	35	37	37	38	40	41	43	43	23.9	43																							
19-Mar	43	42	41	36	33	27	Z	23	30	30	35	33	34	38	41	41	42	43	40	37	37	32	26	25	35.2	43																							
20-Mar	25	24	22	Z	25	22	23	23	24	17	18	29	37	36	38	37	36	34	34	30	29	23	20	24	27.4	38																							
21-Mar	21	16	16	14	Z	18	20	19	20	16	18	22	25	23	27	27	32	36	36	36	36	36	34	31	25.2	36																							
22-Mar	30	30	29	27	30	Z	28	29	27	28	28	27	28	30	28	26	23	11	10	5	4	3	5	5	21.4	30																							
23-Mar	4	3	3	2	2	2	Z	5	5	8	11	18	M	35	38	37	37	28	20	21	26	28	27	26	17.5	38																							
24-Mar	22	24	24	25	29	28	Z	25	C	C	C	C	39	39	40	39	37	35	30	23	18	13	12	12	27.9	40																							
25-Mar	11	11	Z	12	12	8	8	12	12	18	25	26	31	31	32	36	36	35	35	34	23	26	28	21	22.8	36																							
26-Mar	17	13	11	Z	14	10	15	13	18	21	22	24	27	28	29	30	34	32	29	19	27	26	17	8	21.1	34																							
27-Mar	6	8	9	6	Z	10	10	12	12	13	15	30	29	28	30	27	21	21	18	14	10	8	6	5	15.0	30																							
28-Mar	3	2	2	2	3	Z	3	5	10	25	45	46	46	46	45	46	46	46	44	42	41	40	39	36	28.9	46																							
29-Mar	37	35	32	22	18	13	Z	15	20	29	29	22	20	28	30	33	31	25	18	4	3	3	4	3	20.7	37																							
30-Mar	7	7	4	4	5	3	4	Z	13	24	30	31	36	40	40	44	42	41	40	31	27	25	19	15	23.2	44																							
31-Mar	11	8	Z	8	6	6	5	6	9	7	8	10	10	7	5	23	38	35	35	34	37	34	32	32	17.6	38																							
																								20.9	20.2	21.0	18.5	18.6	18.1	16.9	17.8	20.0	23.3	26.8	28.9	31.1	32.5	33.0	33.8	33.0	30.7	27.8	25.4	22.9	22.0	20.5	20.2	Diurnal Average	
																								43	42	41	39	36	34	32	38	37	37	45	46	46	46	45	46	46	46	44	42	41	41	43	43	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	243	34.32	34.32
21 - 50	465	65.68	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



WBEA
Frequency Distribution

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

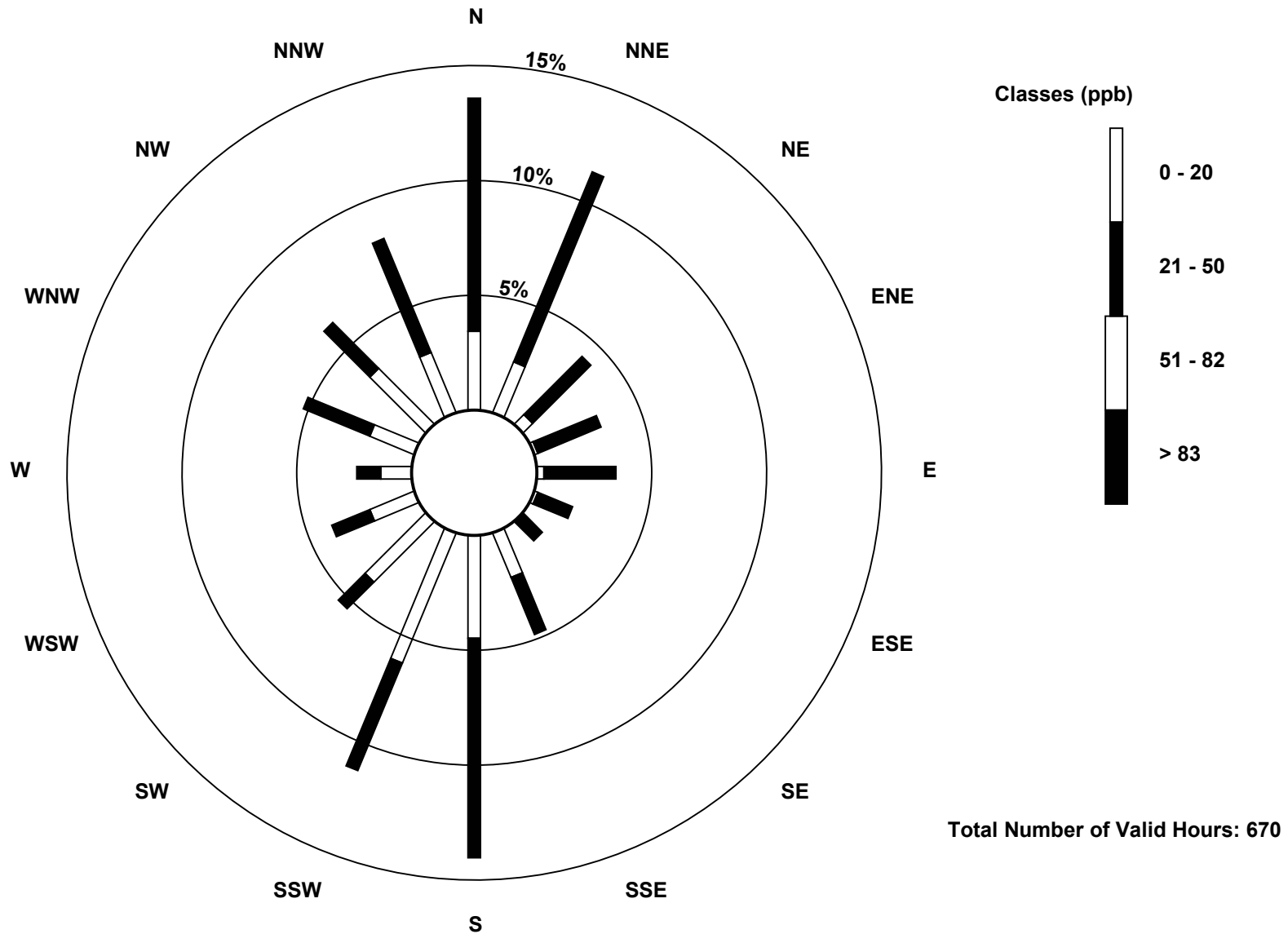
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	16	4	1	2	1	0	14	30	41	25	14	9	14	23	19	236
21 - 50	68	60	24	20	21	11	8	18	64	34	11	12	7	21	19	36	434
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	76	28	21	23	12	8	32	94	75	36	26	16	35	42	55	670

Total Number of Valid Hours: 670

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

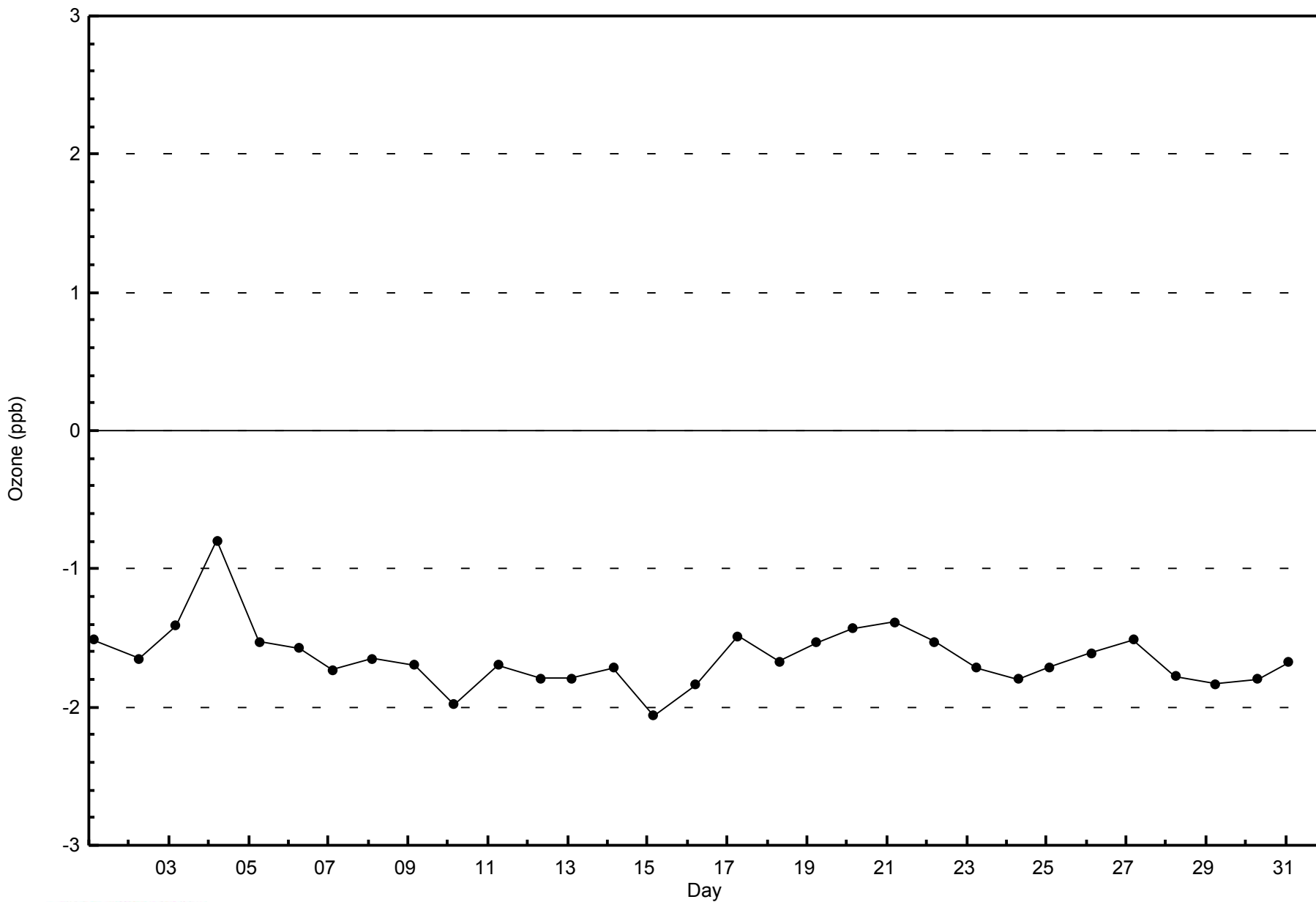
Ozone (O₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

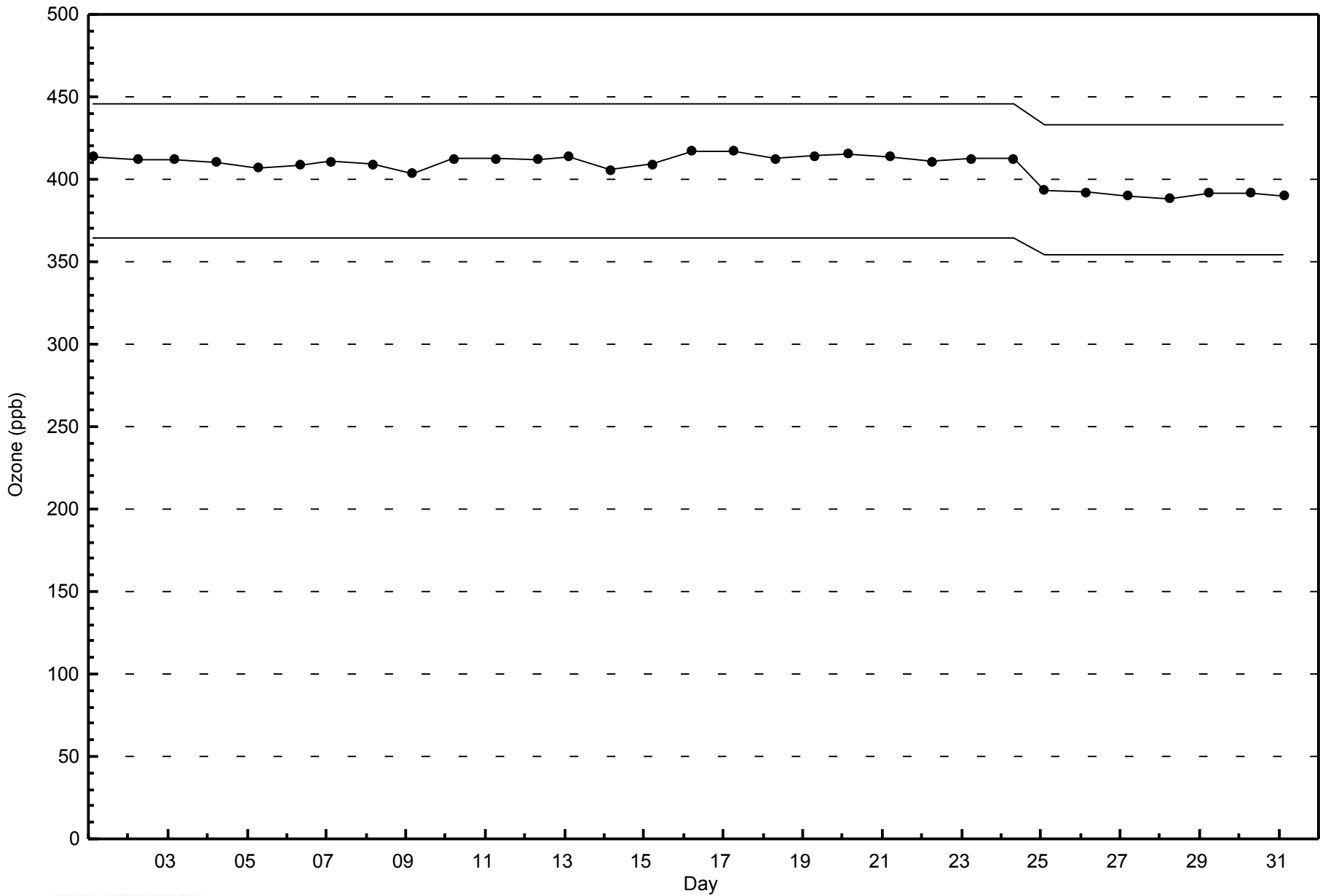
Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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



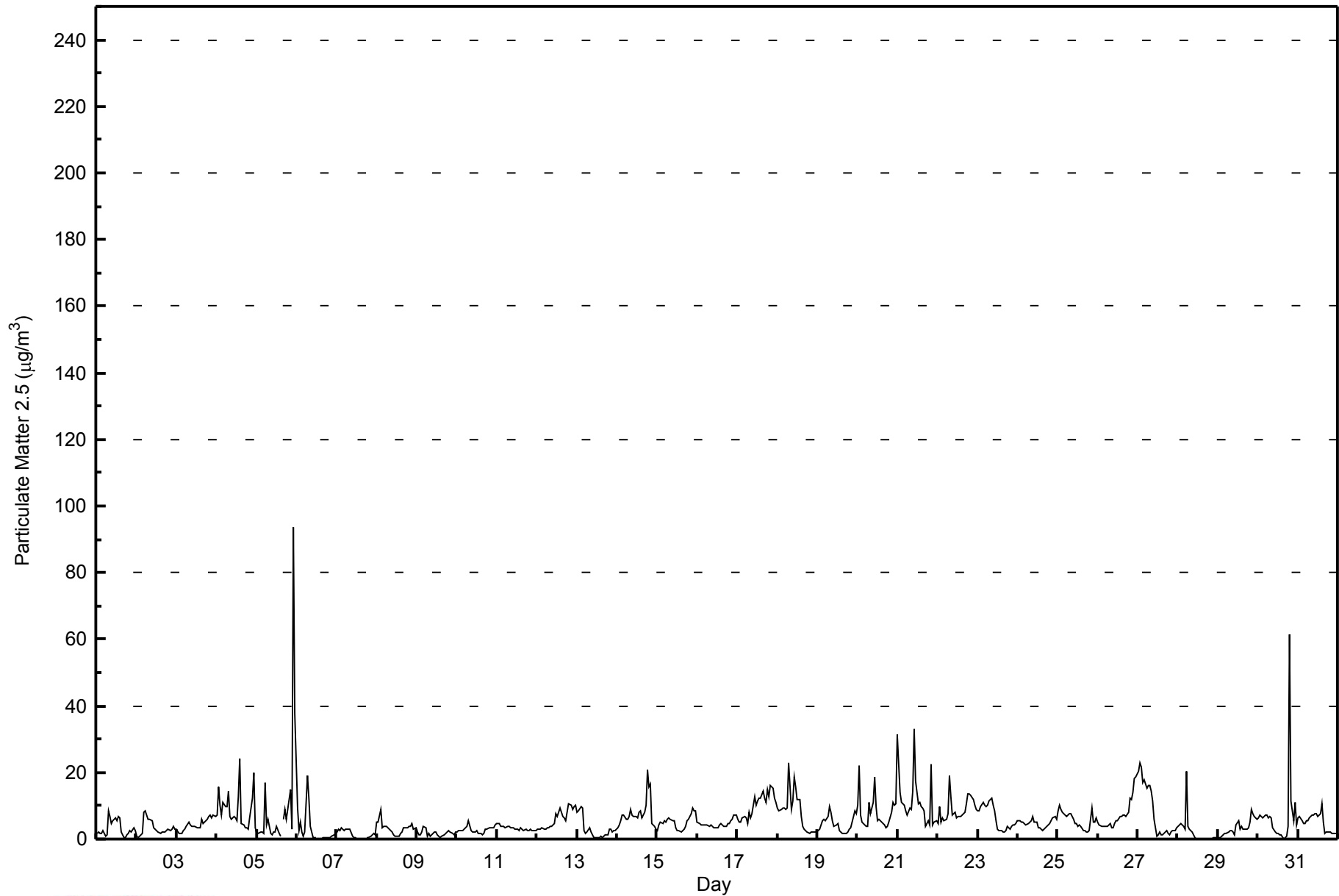


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																															
Maximum Value: 93.5 µg/m ³ on Mar 5 23:00		Maximum Daily Average: 11.5 µg/m ³ on Mar 21																																															
Minimum Value: 0.0 µg/m ³ on Mar 28 17:00		Hours of Data: 737																																															
Maximum Diurnal Average: 9.0 µg/m ³ at hour 23		Hours of Missing Data: 7																																															
Monthly Average: 5.61 µg/m ³		Hours of Calibration: 0																																															
Minimum Daily Average: 1.5 µg/m ³ on Mar 7		Percent Operational Time: 99.1																																															
Minimum Diurnal Average: 3.6 µg/m ³ at hour 17																																																	
Percentiles: P ₁ = 0.1 P ₁₀ = 1.2 Q ₁ = 2.4 Median = 4.1 Q ₃ = 7.0 P ₉₀ = 10.9 P ₉₉ = 21.8																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	1.7	1.9	1.5	1.6	2.6	0.9	1.1	8.3	6.7	4.8	5.3	6.2	5.7	6.7	6.5	2.1	0.3	0.6	1.1	1.7	2.4	2.1	3.5	2.6	3.3	8.3																							
2-Mar	0.9	0.6	1.0	1.8	8.3	8.4	7.2	5.7	5.8	5.5	3.5	2.9	2.5	1.9	1.9	2.1	1.9	2.2	2.4	3.0	2.3	2.8	3.8	3.0	3.4	8.4																							
3-Mar	3.0	1.8	1.6	1.9	2.7	2.8	3.7	5.2	4.2	3.9	3.8	3.6	3.3	3.3	3.4	6.0	4.7	5.0	5.8	6.8	7.0	6.2	7.2	6.6	4.3	7.2																							
4-Mar	7.2	15.8	10.2	7.1	11.2	9.9	9.7	14.3	6.9	5.8	6.6	6.5	5.4	12.9	24.2	4.5	4.4	3.4	3.5	3.1	6.2	12.4	20.1	3.6	9.0	24.2																							
5-Mar	1.9	1.8	2.0	2.0	1.8	17.0	4.3	6.1	1.5	1.3	2.1	2.1	3.6	1.8	0.9	UO	5.9	9.1	5.8	11.7	14.7	2.9	93.5	37.6	10.1	93.5																							
6-Mar	9.3	2.7	5.3	2.1	0.9	2.0	19.1	12.2	3.8	2.0	0.5	0.2	UO	UO	M	0.2	0.4	0.5	0.6	0.6	0.6	1.0	1.3	1.6	3.2	19.1																							
7-Mar	2.1	3.0	2.5	3.3	2.5	3.0	2.8	2.8	3.0	0.8	0.5	0.4	0.1	0.1	UO	UO	UO	0.2	0.3	0.7	1.1	1.6	1.2	1.5	3.3																								
8-Mar	5.0	5.1	8.8	3.2	3.9	3.8	4.0	3.1	2.7	2.1	1.4	1.0	0.9	1.0	1.8	2.2	3.3	3.3	3.5	3.7	3.9	4.5	3.0	3.5	3.3	8.8																							
9-Mar	2.0	1.4	1.5	2.2	4.0	3.6	0.9	1.7	0.9	1.5	2.2	2.1	1.5	0.8	0.4	0.8	1.2	1.8	2.2	2.5	1.9	1.7	1.4	2.3	1.8	4.0																							
10-Mar	2.3	2.4	2.6	2.7	3.0	3.5	3.8	5.6	2.6	2.1	2.3	2.3	2.6	1.7	1.7	1.4	1.7	2.8	3.2	3.2	3.3	3.5	3.2	4.1	2.8	5.6																							
11-Mar	4.7	4.8	4.0	3.9	3.7	3.4	4.0	3.8	3.5	3.6	3.2	3.0	3.2	2.7	3.4	3.1	2.7	2.8	2.6	2.5	2.9	2.6	2.6	2.5	3.3	4.8																							
12-Mar	2.8	3.1	3.0	3.3	3.0	2.8	3.2	3.5	4.0	3.7	4.6	7.6	7.0	7.8	9.4	6.7	6.3	5.7	7.9	10.4	10.0	8.7	9.7	10.2	6.0	10.4																							
13-Mar	8.0	8.6	9.8	9.5	2.8	1.8	2.2	3.5	2.2	1.1	0.6	0.6	0.4	0.4	0.6	0.4	0.7	1.4	1.2	3.1	2.8	2.1	2.7	2.6	2.9	9.8																							
14-Mar	3.2	4.4	5.4	7.1	7.0	6.0	6.0	6.6	8.8	7.1	6.7	6.9	6.4	8.2	8.4	6.2	7.9	10.1	20.6	15.7	16.6	4.5	3.8	3.0	7.8	20.6																							
15-Mar	2.4	4.1	5.1	4.8	5.5	5.2	5.8	6.3	5.7	5.5	5.6	3.5	2.5	2.4	2.2	2.5	3.2	4.0	5.5	6.1	7.8	9.1	8.7	8.3	5.1	9.1																							
16-Mar	5.2	4.6	4.4	4.3	4.2	4.2	4.1	4.0	4.1	3.7	3.4	3.4	3.4	4.3	4.5	4.1	4.0	3.9	4.8	4.7	5.5	6.0	7.2	7.4	4.6	7.4																							
17-Mar	6.1	5.3	5.2	6.3	7.0	6.3	4.7	8.0	6.4	7.6	12.9	10.1	11.3	12.2	12.4	14.5	12.5	10.9	14.9	12.6	16.2	15.2	12.3	11.0	10.1	16.2																							
18-Mar	9.4	8.4	9.1	9.5	9.1	9.0	9.3	23.0	8.9	11.3	18.7	15.8	11.8	11.7	6.8	4.0	3.0	2.4	1.9	1.9	2.2	2.0	2.2	2.3	8.1	23.0																							
19-Mar	2.4	2.8	4.3	5.7	6.0	5.5	6.6	9.6	8.2	5.7	3.9	4.4	4.7	2.8	2.0	1.8	1.5	1.7	2.1	3.1	3.2	5.1	8.3	7.8	4.5	9.6																							
20-Mar	10.0	22.0	7.0	5.0	4.1	3.9	4.0	10.9	7.5	11.1	18.7	9.7	5.4	6.0	5.1	4.8	4.1	3.5	3.9	5.0	8.1	10.8	10.1	10.5	8.0	22.0																							
21-Mar	31.2	13.9	10.8	10.5	10.1	8.4	7.3	9.2	8.8	14.4	33.0	17.6	10.6	11.1	9.8	9.4	8.3	3.9	5.6	4.2	22.3	4.1	5.0	5.4	11.5	33.0																							
22-Mar	4.7	9.6	4.9	6.2	5.4	5.8	7.6	19.0	12.6	7.2	7.9	6.4	6.7	6.7	6.6	7.2	7.9	10.6	13.4	13.4	12.9	11.9	10.0	8.9	8.9	19.0																							
23-Mar	8.3	8.6	9.9	11.0	10.2	9.7	10.0	11.3	12.2	10.0	8.5	5.7	3.1	2.5	2.4	2.3	2.1	2.6	3.6	3.1	3.6	4.1	4.2	4.6	6.4	12.2																							
24-Mar	5.4	5.6	5.3	5.1	4.6	4.3	4.8	5.2	5.4	6.8	5.0	4.9	3.4	3.2	3.0	2.6	3.1	3.6	4.1	4.5	5.6	6.3	7.0	5.9	4.8	7.0																							
25-Mar	8.3	10.1	8.9	8.2	7.3	6.9	7.1	7.5	7.7	5.8	4.6	4.8	3.9	4.3	3.6	2.7	2.4	2.1	1.9	2.7	9.5	5.1	5.1	6.5	5.7	10.1																							
26-Mar	5.1	4.3	3.9	3.7	3.7	3.8	3.8	4.5	3.5	3.4	4.5	5.4	5.7	6.7	6.8	7.3	7.2	6.7	8.0	12.3	11.9	13.9	18.3	18.6	7.2	18.6																							
27-Mar	20.2	22.8	21.7	16.9	17.7	15.2	16.2	16.1	14.3	11.4	6.0	0.8	1.2	2.2	1.1	1.2	2.1	2.5	1.7	1.4	2.2	2.7	2.6	3.3	8.5	22.8																							
28-Mar	4.0	4.4	4.6	3.8	2.9	20.3	3.7	3.1	2.2	1.3	0.4	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.4	2.2	20.3																							
29-Mar	0.4	0.6	0.8	1.3	1.8	1.8	2.3	2.5	2.5	2.3	1.4	4.4	5.3	2.9	3.9	3.1	2.9	2.9	3.3	4.9	8.7	7.7	7.0	6.1	3.4	8.7																							
30-Mar	6.2	7.0	6.9	6.3	7.1	7.3	6.5	6.9	6.4	3.4	2.2	1.9	1.6	1.2	1.2	0.1	0.6	0.6	3.8	61.3	11.6	5.7	10.9	4.2	7.1	61.3																							
31-Mar	6.2	6.6	5.3	4.6	4.7	5.6	5.7	6.4	7.3	7.0	7.8	7.7	7.0	7.8	10.5	5.1	1.6	2.0	2.1	2.1	1.7	1.6	1.8	1.9	5.0	10.5																							
																								6.1	6.4	5.7	5.3	5.4	6.2	5.9	7.6	5.8	5.3	6.1	4.9	4.3	4.6	4.8	3.7	3.6	3.8	4.6	6.8	6.7	5.4	9.0	6.4	Diurnal Average	
																								31.2	22.8	21.7	16.9	17.7	20.3	19.1	23.0	14.3	14.4	33.0	17.6	11.8	12.9	24.2	14.5	12.5	10.9	20.6	61.3	22.3	15.2	93.5	37.6	Diurnal Maximum	
M - Maintenance																								UO - Unstable Operation																									
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	399	54.14	54.14
6 - 15	247	33.51	87.65
16 - 25	27	3.66	91.32
26 - 80	4	0.54	91.86
> 81.0	1	0.14	91.99

Total Number of Valid Hours: 737

Total Number of Hours: 744



WBEA
Frequency Distribution

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

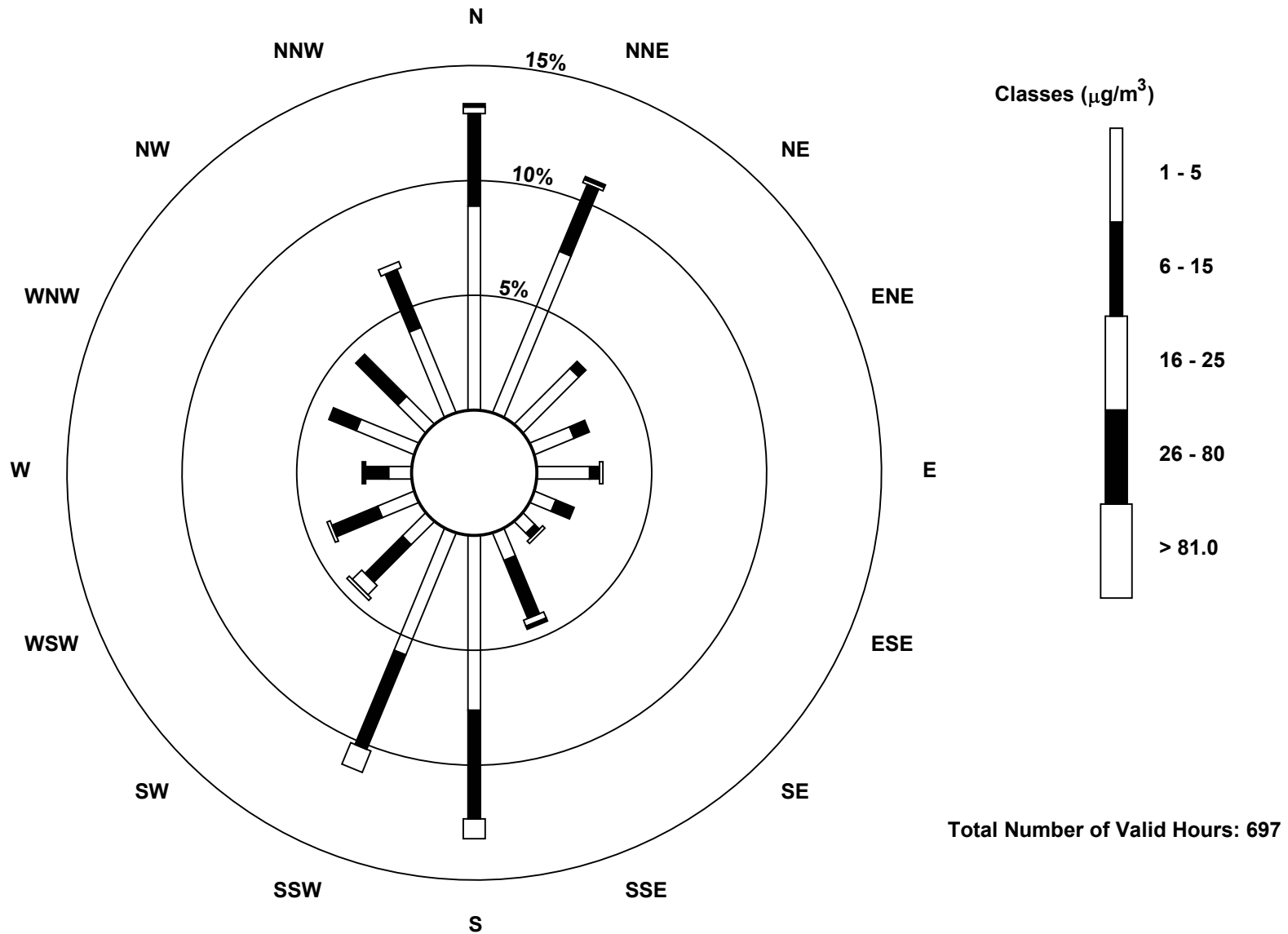
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	62	53	24	13	16	7	5	9	53	40	10	12	7	19	12	28	370
6 - 15	28	22	3	5	3	6	2	19	33	31	16	15	7	9	18	19	236
16 - 25	2	1	0	0	1	0	1	2	6	7	4	1	0	0	0	2	27
26 - 80	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	4
> 81.0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Totals	93	77	27	18	20	13	8	31	92	78	31	28	15	28	30	49	638

Total Number of Valid Hours: 697

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - March 2015

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Mar 1 01:00	Maximum Daily Average: 0.0 ppb on Mar 1	Hours in Service: 744
Minimum Value: 0 ppb on Mar 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Data: 672
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 of Missing Data: 72
			Hours of Calibration: 41
			Percent Operational Time: 95.8

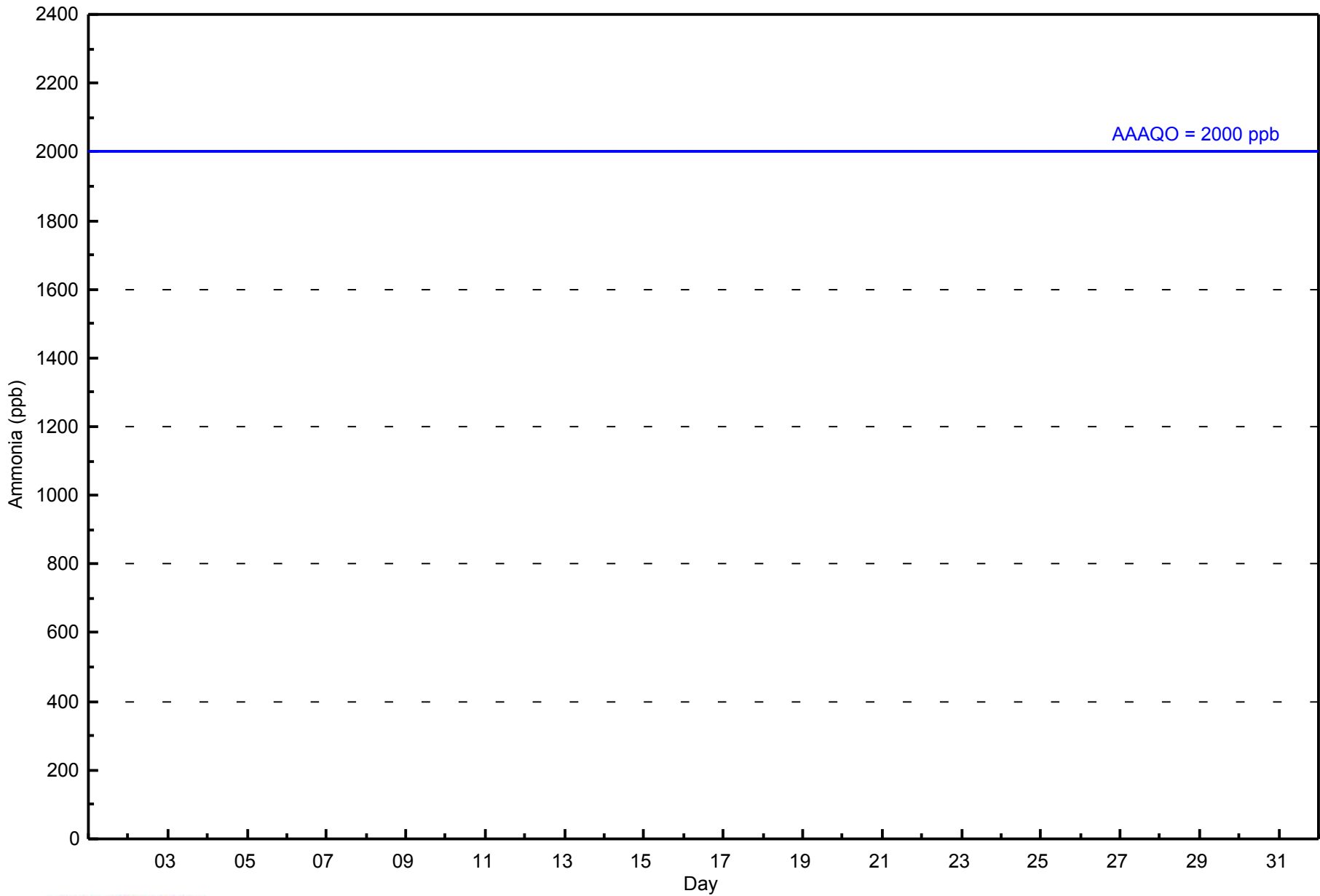
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Mar	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Mar	0	0	0	0	0	Z	RE	0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

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	672	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: 672

Total Number of Hours: 744



WBEA
Frequency Distribution

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

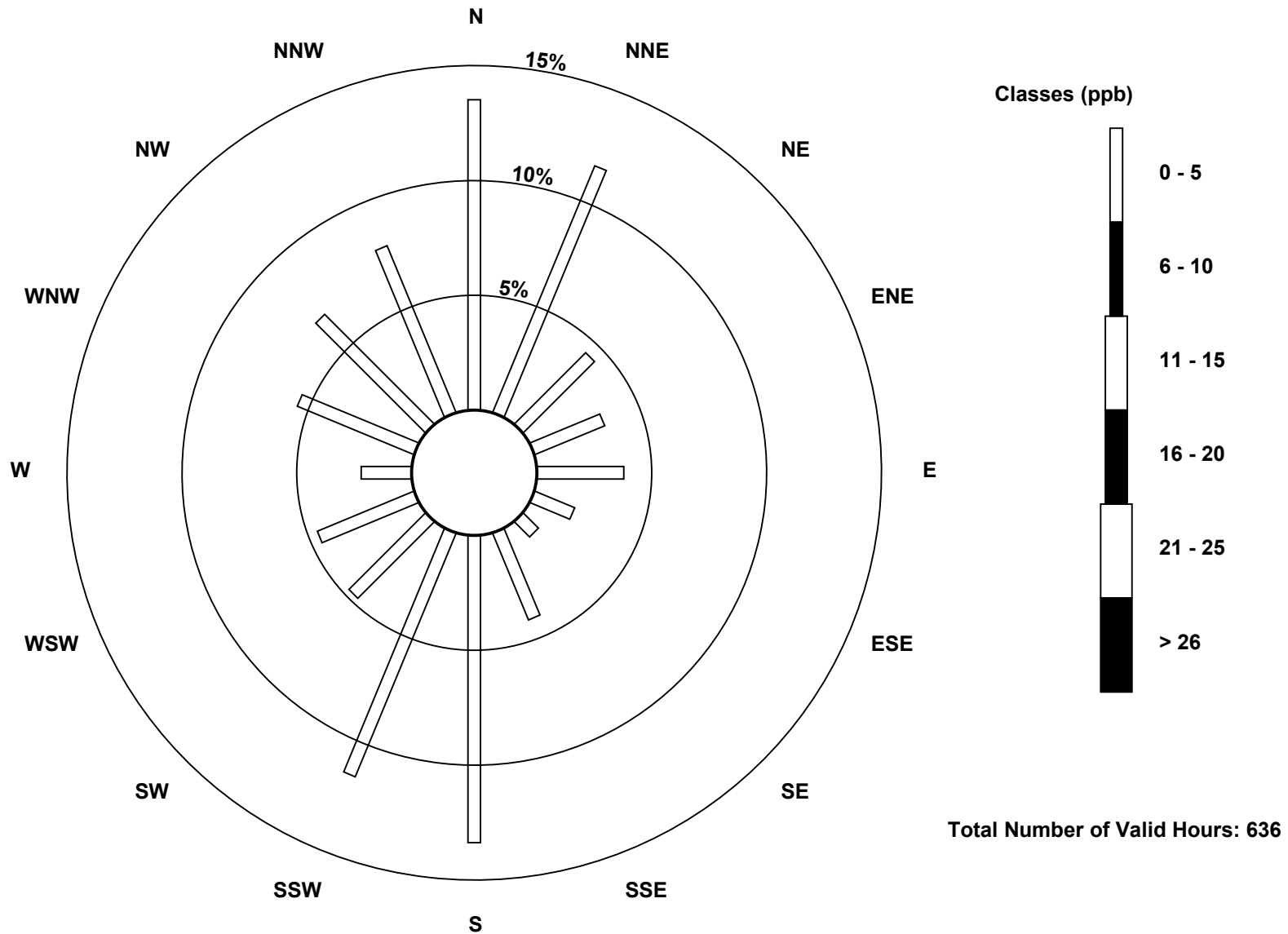
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	86	74	28	21	24	12	6	26	85	73	30	29	14	35	43	50	636
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 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	86	74	28	21	24	12	6	26	85	73	30	29	14	35	43	50	636

Total Number of Valid Hours: 636

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

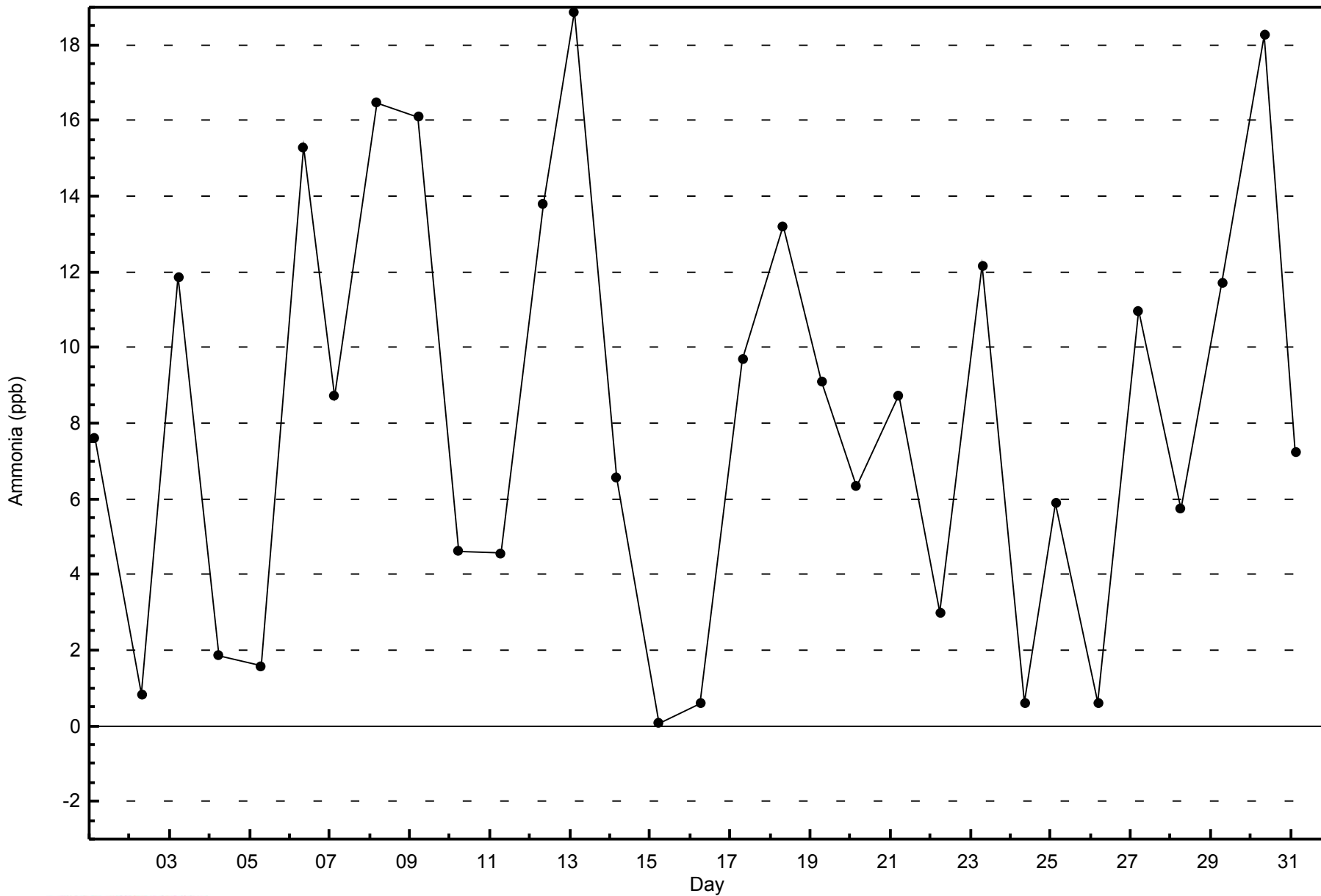
Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

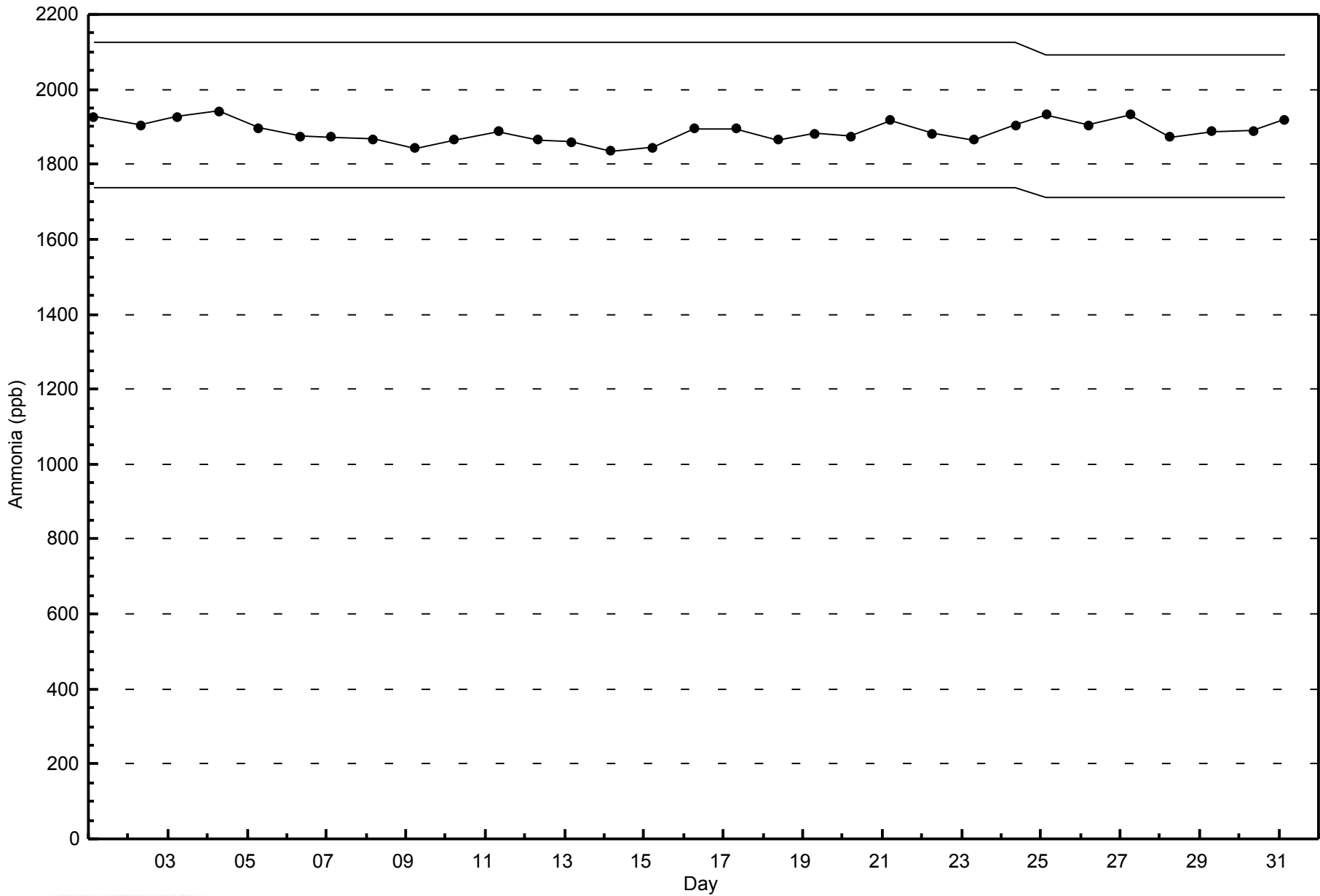
Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - March 2015





WBEA
Span Responses

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



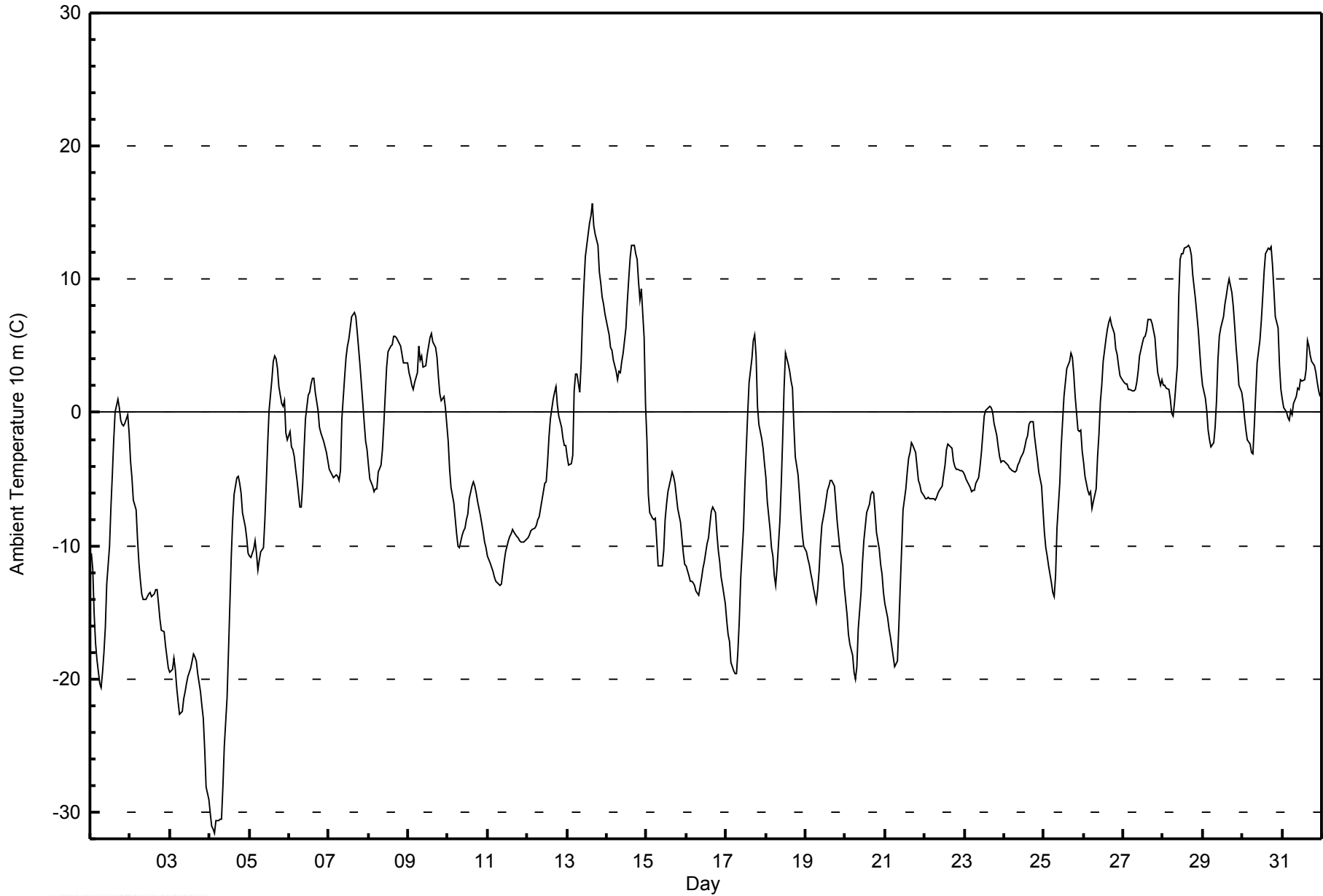


Maximum Value: 15.7 C on Mar 13 16:00		Maximum Daily Average: 7.0 C on Mar 13		Hours in Service: 744																						
Minimum Value: -31.6 C on Mar 4 04:00		Minimum Daily Average: -21.1 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.2 C at hour 17		Minimum Diurnal Average: -9.2 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -4.11 C		Percentiles: P ₁ = -30.2 P ₁₀ = -15.1 Q ₁ = -9.6 Median = -3.9 Q ₃ = 2.2 P ₉₀ = 5.9 P ₉₉ = 12.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-10.6	-11.8	-15.0	-17.3	-18.6	-20.4	-20.7	-19.5	-18.1	-16.1	-12.8	-10.1	-7.1	-4.7	-2.1	0.0	0.9	0.4	-0.6	-0.9	-1.0	-0.8	-0.2	-1.5	-8.7	0.9
2-Mar	-3.6	-4.9	-6.6	-7.4	-9.5	-11.3	-12.5	-13.6	-14.0	-14.1	-13.8	-13.6	-13.5	-13.8	-13.6	-13.2	-13.3	-14.4	-15.5	-16.3	-16.5	-17.5	-18.3	-19.2	-12.9	-3.6
3-Mar	-19.5	-19.3	-18.5	-19.3	-20.6	-21.7	-22.6	-22.5	-21.4	-21.0	-20.4	-19.8	-19.2	-18.7	-18.2	-18.3	-18.6	-19.6	-20.9	-22.0	-23.0	-25.3	-28.1	-29.1	-21.1	-18.2
4-Mar	-30.1	-31.1	-31.2	-31.6	-30.7	-30.6	-30.5	-30.5	-28.1	-25.1	-21.4	-17.9	-14.4	-10.7	-8.0	-6.1	-4.9	-4.8	-5.3	-6.1	-7.5	-8.5	-9.4	-10.6	-18.1	-4.8
5-Mar	-10.7	-10.9	-10.3	-9.6	-10.6	-11.8	-11.1	-10.5	-10.2	-8.0	-5.3	-2.4	0.1	2.5	3.8	4.3	4.0	3.3	2.0	0.6	0.5	0.9	-1.5	-2.1	-3.9	4.3
6-Mar	-1.4	-2.5	-2.8	-3.4	-4.2	-5.1	-7.1	-7.1	-5.4	-2.7	-0.5	1.3	1.5	2.1	2.6	2.6	1.6	0.1	-1.1	-1.5	-1.9	-2.1	-3.0	-3.6	-1.8	2.6
7-Mar	-4.2	-4.5	-4.7	-4.9	-4.6	-4.7	-5.1	-4.3	-0.5	2.6	4.1	5.0	5.5	6.3	7.2	7.6	7.2	6.0	4.7	3.5	0.7	-0.8	-2.2	-2.8	0.7	7.6
8-Mar	-4.0	-5.0	-5.5	-5.9	-5.8	-5.7	-4.4	-4.0	-2.8	-0.9	1.4	3.4	4.6	5.0	5.1	5.8	5.7	5.6	5.2	5.0	4.3	3.7	3.8	3.8	0.8	5.8
9-Mar	3.0	2.6	2.0	1.7	2.3	3.0	4.9	4.0	4.3	3.4	3.5	4.4	5.0	5.6	5.9	5.3	4.9	4.1	2.7	1.5	0.8	1.2	0.4	-0.9	3.1	5.9
10-Mar	-2.2	-4.2	-5.7	-6.7	-7.9	-9.1	-10.1	-10.1	-9.2	-8.9	-8.6	-8.0	-7.6	-6.5	-5.5	-5.2	-5.6	-6.0	-6.7	-7.7	-8.3	-9.0	-9.7	-10.2	-7.5	-2.2
11-Mar	-10.8	-11.3	-11.6	-11.9	-12.4	-12.6	-12.8	-13.0	-12.8	-12.1	-11.2	-10.4	-9.6	-9.3	-9.1	-8.8	-9.0	-9.4	-9.4	-9.6	-9.8	-9.8	-9.7	-9.6	-10.7	-8.8
12-Mar	-9.4	-9.2	-8.9	-8.8	-8.6	-8.4	-8.1	-7.9	-7.2	-6.6	-5.3	-5.2	-3.7	-1.9	-0.5	1.0	1.5	1.9	0.5	-0.2	-1.1	-1.9	-2.5	-2.5	-4.3	1.9
13-Mar	-3.3	-3.9	-3.8	-3.2	1.6	2.9	2.8	1.5	3.7	7.2	9.7	11.7	12.5	14.2	14.7	15.7	14.0	13.4	12.6	10.5	9.7	8.6	8.2	7.4	7.0	15.7
14-Mar	6.4	5.9	4.9	4.7	4.0	3.1	2.5	3.1	3.0	3.9	4.5	6.4	8.3	10.0	11.7	12.6	12.5	12.0	11.5	9.8	8.4	9.2	5.6	0.6	6.9	12.6
15-Mar	-2.1	-6.2	-7.5	-7.9	-8.0	-7.9	-9.6	-11.5	-11.6	-11.5	-10.4	-8.0	-6.9	-6.0	-4.9	-4.5	-4.8	-5.3	-6.3	-7.2	-8.3	-9.4	-10.6	-11.4	-7.8	-2.1
16-Mar	-11.5	-12.3	-12.7	-12.6	-12.7	-12.9	-13.4	-13.7	-13.1	-12.5	-11.7	-11.2	-9.9	-9.4	-8.4	-7.4	-7.1	-7.5	-9.1	-10.4	-11.2	-12.3	-13.0	-14.4	-11.3	-7.1
17-Mar	-15.6	-16.6	-17.1	-18.8	-19.4	-19.6	-19.6	-18.0	-15.6	-12.4	-8.6	-5.4	-2.7	-0.1	2.2	4.1	5.4	5.9	4.3	0.5	-0.9	-1.9	-2.7	-3.8	-7.4	5.9
18-Mar	-4.9	-6.6	-8.7	-10.2	-10.7	-12.2	-13.0	-11.6	-8.2	-5.3	-1.9	1.8	4.5	3.6	3.1	2.3	1.8	-1.0	-3.3	-4.7	-6.1	-7.7	-9.1	-10.0	-4.9	4.5
19-Mar	-10.5	-11.0	-11.4	-12.0	-12.6	-13.1	-14.2	-13.3	-11.9	-10.0	-8.4	-7.3	-6.6	-5.8	-5.6	-5.1	-5.1	-5.6	-6.9	-8.3	-9.3	-10.4	-11.5	-13.1	-9.5	-5.1
20-Mar	-14.1	-15.2	-16.6	-17.4	-18.3	-19.5	-20.0	-19.0	-16.2	-13.5	-11.3	-9.6	-8.6	-7.5	-6.9	-6.2	-5.9	-6.0	-7.4	-9.0	-10.3	-11.4	-12.2	-13.5	-12.3	-5.9
21-Mar	-14.3	-15.4	-16.2	-16.9	-17.6	-18.3	-19.0	-18.6	-16.0	-13.1	-10.2	-7.3	-5.8	-4.5	-3.4	-3.0	-2.3	-2.5	-3.0	-4.1	-5.1	-5.4	-5.9	-6.3	-9.8	-2.3
22-Mar	-6.5	-6.5	-6.3	-6.5	-6.5	-6.5	-6.6	-6.4	-6.1	-5.8	-5.6	-4.7	-3.9	-2.8	-2.3	-2.4	-2.7	-3.6	-4.1	-4.3	-4.3	-4.4	-4.4	-4.4	-4.9	-2.3
23-Mar	-4.7	-5.0	-5.3	-5.7	-5.9	-5.8	-5.8	-5.3	-4.8	-4.1	-3.0	-1.7	-0.3	0.2	0.4	0.5	0.4	0.1	-0.8	-1.7	-2.5	-3.3	-3.7	-3.6	-3.0	0.5
24-Mar	-3.7	-3.8	-3.9	-4.1	-4.3	-4.4	-4.5	-4.4	-3.9	-3.8	-3.4	-3.0	-2.5	-2.1	-1.7	-0.9	-0.7	-0.7	-1.9	-2.7	-3.5	-4.5	-5.5	-7.3	-3.4	-0.7
25-Mar	-9.0	-10.2	-10.8	-11.5	-12.7	-13.5	-13.8	-12.3	-8.7	-5.3	-2.6	-0.7	1.2	2.2	3.3	3.9	4.5	4.2	2.9	1.2	-1.4	-1.4	-1.3	-2.9	-3.9	4.5
26-Mar	-3.8	-4.7	-5.9	-6.1	-6.0	-7.2	-6.7	-5.7	-3.3	-1.7	0.8	2.0	3.9	5.5	6.2	6.8	7.1	6.6	5.9	4.8	4.3	3.6	2.8	2.6	0.5	7.1
27-Mar	2.3	2.1	2.1	1.7	1.7	1.7	1.6	1.8	2.3	3.0	4.2	5.2	5.6	5.7	6.2	7.0	7.0	6.6	6.1	5.6	4.1	3.0	2.0	2.5	3.8	7.0
28-Mar	2.0	2.1	1.8	1.8	1.0	0.0	-0.3	0.8	3.6	8.6	11.5	11.9	11.9	12.4	12.4	12.6	12.4	11.8	10.3	8.4	7.3	6.2	4.6	3.1	6.6	12.6
29-Mar	2.0	1.1	0.2	-1.3	-2.0	-2.5	-2.2	-1.1	0.9	3.9	5.7	6.4	7.1	8.1	8.8	9.5	10.0	9.0	7.9	6.4	4.9	3.6	2.0	1.5	3.7	10.0
30-Mar	0.8	-0.4	-1.3	-2.0	-2.3	-3.0	-3.1	-1.0	1.4	3.7	5.4	6.8	8.6	10.6	11.9	12.3	12.2	12.5	11.1	9.2	7.2	6.3	3.5	1.8	4.7	12.5
31-Mar	1.0	0.4	0.1	-0.3	-0.6	0.2	-0.2	0.6	1.2	1.9	1.8	2.4	2.4	2.5	3.2	5.4	5.0	4.2	3.8	3.6	2.9	2.3	1.6	1.2	1.9	5.4
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	26	3.49	3.49
-20 - 0	459	61.69	65.19
0 - 10	229	30.78	95.97
10 - 20	30	4.03	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

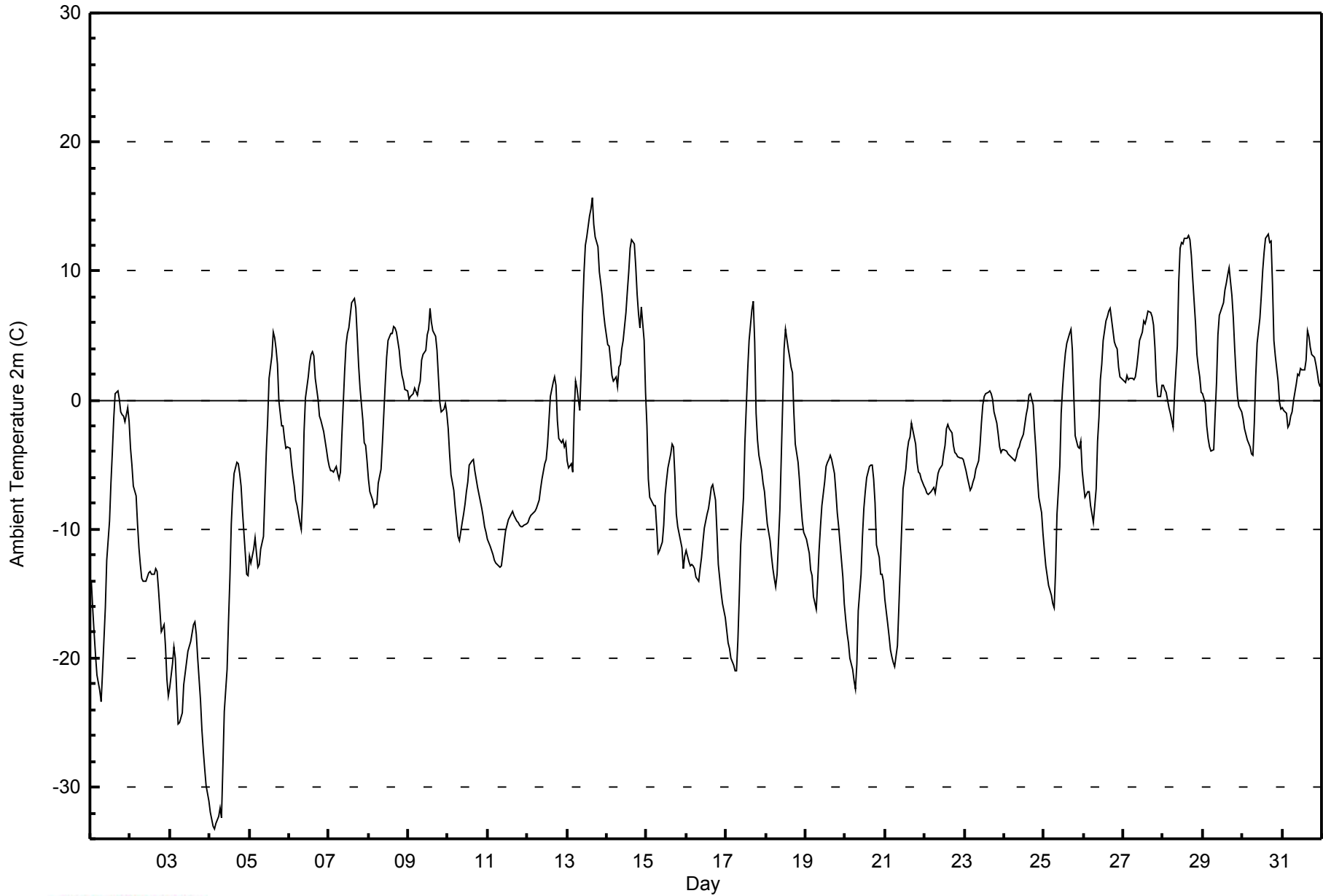


Maximum Value: 15.7 C on Mar 13 16:00		Maximum Daily Average: 6.1 C on Mar 13		Hours in Service: 744																						
Minimum Value: -33.3 C on Mar 4 04:00		Minimum Daily Average: -22.4 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.7 C at hour 16		Minimum Diurnal Average: -10.6 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -4.78 C		Percentiles: P ₁ = -31.7 P ₁₀ = -16.2 Q ₁ = -9.8 Median = -4.3 Q ₃ = 1.5 P ₉₀ = 5.8 P ₉₉ = 12.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-14.0	-16.2	-18.0	-19.8	-21.3	-22.5	-23.3	-21.1	-18.6	-16.1	-12.4	-9.4	-6.5	-4.1	-1.4	0.5	0.7	0.0	-0.9	-1.1	-1.2	-1.7	-0.6	-1.7	-9.6	0.7
2-Mar	-3.7	-5.0	-6.7	-7.5	-9.6	-11.5	-12.7	-13.8	-14.1	-14.0	-13.7	-13.4	-13.3	-13.5	-13.5	-13.0	-13.3	-14.6	-16.3	-17.9	-17.5	-19.1	-21.6	-22.9	-13.4	-3.7
3-Mar	-22.3	-20.4	-19.2	-20.0	-22.6	-25.1	-25.0	-24.2	-22.0	-21.2	-20.3	-19.5	-18.7	-18.0	-17.4	-17.2	-18.1	-20.0	-23.3	-25.5	-27.1	-28.6	-29.9	-31.1	-22.4	-17.2
4-Mar	-32.0	-32.5	-33.0	-33.3	-32.8	-32.3	-31.6	-32.4	-28.4	-24.1	-20.8	-17.2	-13.8	-9.6	-7.2	-5.7	-4.8	-4.9	-5.7	-6.7	-8.6	-11.9	-13.5	-13.6	-19.0	-4.8
5-Mar	-12.1	-12.7	-11.6	-10.6	-11.9	-13.0	-12.7	-11.6	-10.6	-7.4	-4.0	-1.6	1.7	3.4	5.2	4.8	4.0	2.8	0.0	-2.0	-2.1	-3.0	-3.7	-3.6	-4.7	5.2
6-Mar	-3.8	-4.9	-5.9	-6.6	-7.8	-8.2	-9.5	-10.0	-7.3	-2.4	0.2	1.7	2.9	3.6	3.8	3.4	1.7	0.1	-1.3	-1.6	-2.0	-2.4	-3.9	-4.6	-2.7	3.8
7-Mar	-5.1	-5.5	-5.4	-5.5	-5.1	-5.7	-6.2	-5.5	-2.8	2.2	4.2	5.1	5.6	6.5	7.5	7.9	7.1	5.0	2.7	0.9	-1.6	-3.3	-3.5	-4.7	-0.2	7.9
8-Mar	-6.1	-7.1	-7.8	-8.3	-8.1	-8.0	-6.5	-5.4	-3.3	-1.0	1.2	3.3	4.7	5.2	5.2	5.7	5.5	5.3	3.9	2.7	1.9	1.4	0.8	0.8	-0.6	5.7
9-Mar	0.1	0.3	0.4	0.5	1.0	0.4	1.0	1.5	3.1	3.5	3.9	5.0	5.5	7.1	6.1	5.4	5.0	3.9	1.8	-0.1	-1.0	-0.7	-0.3	-1.0	2.2	7.1
10-Mar	-2.2	-4.2	-5.8	-7.0	-8.3	-9.4	-10.6	-10.9	-9.5	-8.8	-8.0	-7.1	-6.3	-5.1	-4.7	-4.6	-5.5	-6.1	-6.8	-7.8	-8.4	-9.0	-9.8	-10.2	-7.3	-2.2
11-Mar	-10.8	-11.3	-11.7	-12.0	-12.4	-12.7	-12.9	-13.0	-12.8	-12.0	-11.0	-10.2	-9.3	-9.1	-8.9	-8.6	-8.9	-9.4	-9.5	-9.6	-9.8	-9.8	-9.7	-9.6	-10.6	-8.6
12-Mar	-9.4	-9.2	-8.9	-8.8	-8.6	-8.4	-8.1	-7.8	-6.9	-6.1	-4.9	-4.6	-3.5	-1.5	0.3	1.4	1.8	1.1	-1.6	-3.0	-3.3	-3.0	-3.7	-3.3	-4.6	1.8
13-Mar	-4.7	-5.2	-5.0	-5.6	-1.1	1.5	0.9	-0.8	2.3	6.7	9.8	12.0	12.6	14.3	14.8	15.7	13.6	12.6	11.9	9.9	9.1	8.1	6.8	5.8	6.1	15.7
14-Mar	4.3	4.2	3.1	1.9	1.5	1.8	1.0	2.5	2.8	3.9	4.6	6.8	8.5	9.9	11.8	12.4	12.1	10.4	8.2	6.7	5.6	7.3	4.6	0.6	5.7	12.4
15-Mar	-2.0	-6.1	-7.5	-8.0	-8.1	-8.1	-9.9	-11.9	-11.7	-11.0	-9.7	-7.3	-6.3	-5.3	-4.2	-3.4	-3.6	-5.9	-8.8	-9.8	-10.9	-11.5	-13.1	-12.1	-8.2	-2.0
16-Mar	-11.7	-12.5	-12.8	-12.7	-12.8	-13.1	-13.7	-14.1	-13.1	-12.2	-11.0	-9.9	-8.8	-8.4	-7.6	-6.8	-6.6	-7.7	-10.2	-12.7	-13.8	-14.9	-15.7	-16.8	-11.7	-6.6
17-Mar	-17.9	-18.8	-19.2	-20.0	-20.6	-21.0	-21.0	-18.6	-15.1	-11.2	-7.6	-3.3	-0.5	2.3	4.6	7.0	7.6	4.5	-1.0	-3.1	-4.3	-5.5	-6.5	-7.1	-8.2	7.6
18-Mar	-8.4	-9.6	-10.9	-12.1	-13.1	-13.8	-14.5	-13.5	-8.5	-4.4	-0.3	3.9	5.5	3.9	3.3	2.6	2.2	-1.1	-3.4	-4.8	-6.3	-7.9	-9.3	-10.3	-5.4	5.5
19-Mar	-10.8	-11.4	-11.9	-13.2	-13.6	-15.2	-16.2	-14.0	-11.6	-9.8	-8.2	-6.3	-5.2	-4.8	-4.6	-4.3	-4.6	-5.7	-7.1	-8.7	-9.8	-11.2	-13.7	-15.7	-9.9	-4.3
20-Mar	-17.0	-18.0	-18.8	-20.0	-20.8	-21.7	-22.4	-20.4	-16.3	-13.5	-10.6	-8.3	-7.1	-6.1	-5.1	-5.0	-5.1	-6.2	-8.0	-11.2	-12.2	-13.5	-13.5	-14.0	-13.1	-5.0
21-Mar	-15.5	-17.3	-18.2	-19.3	-19.9	-20.3	-20.7	-19.0	-16.1	-13.1	-10.1	-6.9	-5.3	-4.0	-3.2	-2.9	-1.8	-2.3	-3.4	-4.9	-5.5	-5.7	-6.1	-6.7	-10.3	-1.8
22-Mar	-6.9	-7.2	-7.3	-7.3	-7.1	-6.7	-7.2	-6.5	-5.7	-5.4	-5.1	-4.2	-3.5	-2.2	-1.9	-2.2	-2.5	-3.5	-4.1	-4.2	-4.4	-4.5	-4.5	-4.6	-4.9	-1.9
23-Mar	-5.0	-5.5	-6.0	-7.0	-6.8	-6.4	-6.1	-5.4	-4.7	-3.5	-1.8	-0.4	0.3	0.5	0.6	0.7	0.5	0.1	-0.9	-1.8	-2.7	-3.6	-4.0	-3.8	-3.0	0.7
24-Mar	-3.8	-4.0	-4.1	-4.3	-4.4	-4.5	-4.7	-4.4	-3.9	-3.6	-3.2	-2.7	-1.9	-1.2	-0.6	0.4	0.5	-0.4	-2.3	-4.0	-5.9	-7.6	-8.8	-10.3	-3.7	0.5
25-Mar	-11.6	-12.8	-13.6	-14.4	-15.1	-15.8	-16.1	-13.2	-8.8	-5.1	-1.1	1.0	2.5	3.6	4.4	5.1	5.5	3.8	0.4	-2.7	-3.6	-3.8	-3.2	-5.5	-5.0	5.5
26-Mar	-6.5	-7.5	-7.1	-7.2	-8.2	-8.9	-9.5	-6.9	-3.2	-1.3	1.6	2.8	4.6	6.2	6.5	6.9	7.1	6.2	4.5	4.2	4.0	2.6	1.8	1.7	-0.2	7.1
27-Mar	1.4	1.3	1.9	1.6	1.7	1.7	1.6	1.8	2.5	3.5	4.6	5.3	6.1	5.9	6.3	6.9	6.8	6.4	5.8	4.1	1.4	0.3	0.3	1.1	3.4	6.9
28-Mar	1.1	0.8	0.6	-0.6	-1.0	-1.6	-2.1	0.5	4.2	9.1	11.8	12.2	12.1	12.5	12.5	12.7	12.4	11.3	9.3	5.9	3.6	2.5	1.8	0.6	5.5	12.7
29-Mar	0.5	-0.2	-2.0	-3.0	-3.6	-3.9	-3.8	-1.2	1.4	5.1	6.5	6.9	7.5	8.6	9.1	9.8	10.3	8.1	6.3	4.0	2.0	0.2	-0.5	-0.9	2.8	10.3
30-Mar	-1.5	-2.2	-2.7	-3.1	-3.6	-4.1	-4.3	-1.8	1.8	4.4	6.4	8.1	10.0	11.5	12.6	12.8	12.2	12.3	9.0	4.6	3.4	1.5	-0.1	-0.7	3.6	12.8
31-Mar	-0.6	-0.8	-1.1	-2.2	-1.8	-1.2	-0.9	-0.1	1.2	2.0	1.9	2.4	2.4	2.4	3.0	5.4	4.9	4.0	3.6	3.4	2.8	2.1	1.4	1.1	1.5	5.4
																								Diurnal Average		
																								Diurnal Maximum		
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	44	5.91	5.91
-20 - 0	463	62.23	68.15
0 - 10	210	28.23	96.37
10 - 20	27	3.63	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

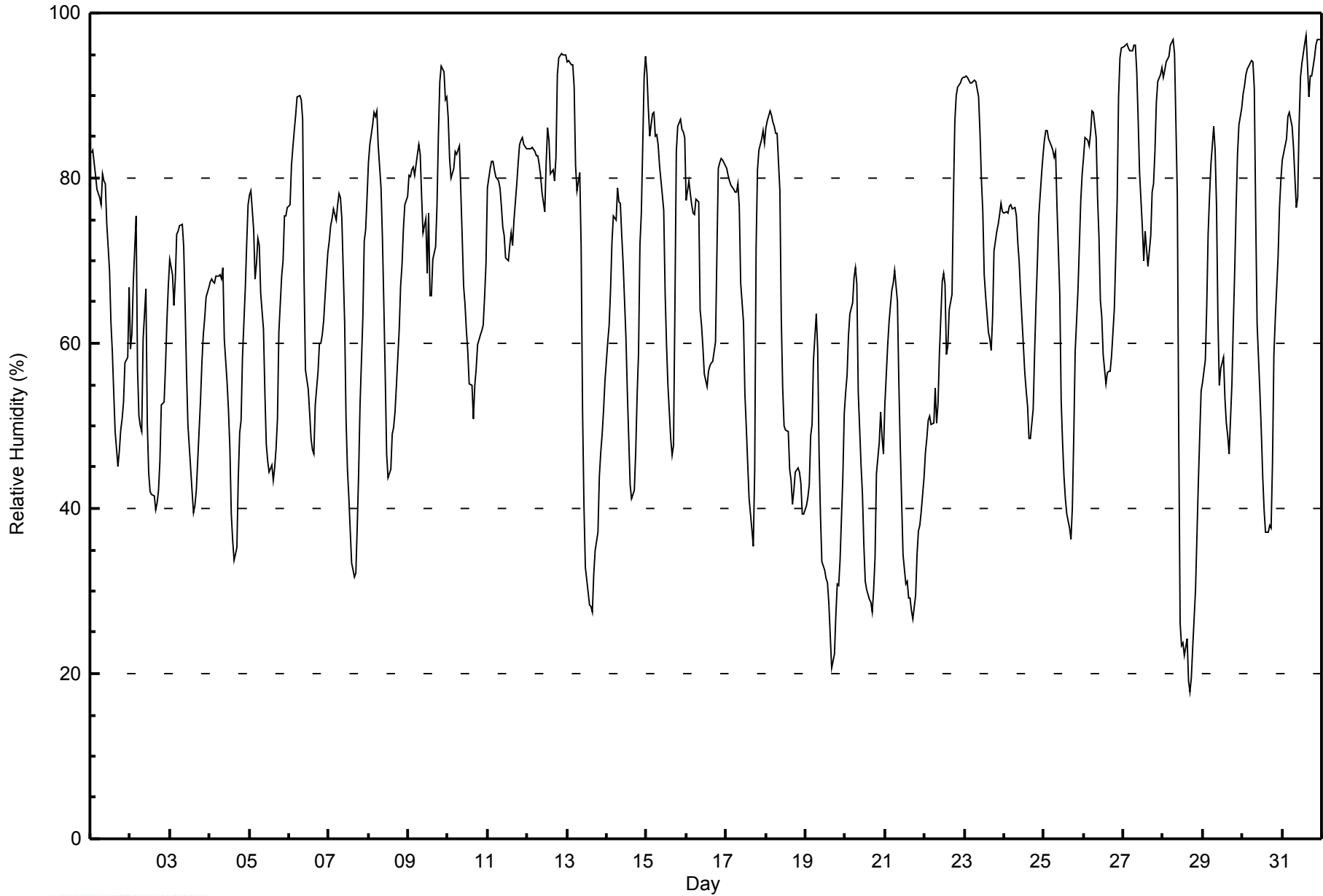


Maximum Value: 97 % on Mar 31 15:00																			Maximum Daily Average: 89.7 % on Mar 31						Hours in Service: 744	
Minimum Value: 18 % on Mar 28 17:00																			Minimum Daily Average: 38.9 % on Mar 19						Hours of Data: 744	
Maximum Diurnal Average: 79.4 % at hour 7																			Minimum Diurnal Average: 47.8 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 66.2 %																			Percentiles: P ₁ = 23 P ₁₀ = 40 Q ₁ = 51 Median = 68 Q ₃ = 82 P ₉₀ = 90 P ₉₉ = 96						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	83	83	82	80	79	78	77	80	80	79	75	69	63	59	54	49	45	47	50	51	53	58	58	67	66.6	83
2-Mar	59	61	67	75	57	51	50	49	60	67	50	44	42	42	41	40	41	42	46	53	53	57	63	67	53.3	75
3-Mar	70	68	65	68	73	74	74	74	72	65	57	50	45	42	39	40	42	46	53	58	61	63	66	67	59.6	74
4-Mar	67	68	67	67	68	68	68	68	69	61	55	52	47	39	36	34	35	44	49	51	58	67	72	77	57.8	77
5-Mar	78	78	74	68	70	73	72	66	62	54	48	46	44	45	43	45	47	51	61	68	70	75	75	76	62.1	78
6-Mar	77	82	84	86	88	90	90	89	87	68	57	54	51	48	47	47	53	57	60	60	61	63	69	71	68.2	90
7-Mar	72	74	75	76	75	77	78	78	75	63	51	45	41	37	33	32	32	38	44	53	63	72	74	78	59.8	78
8-Mar	82	84	87	88	87	88	84	79	73	65	56	47	44	45	49	50	52	55	62	67	70	74	77	78	68.3	88
9-Mar	80	80	81	81	80	83	84	83	78	73	75	69	76	66	66	70	72	77	85	92	94	93	89	90	79.9	94
10-Mar	87	82	80	81	83	83	83	84	73	67	65	61	59	55	55	51	55	57	60	61	62	62	66	70	68.4	87
11-Mar	79	81	82	82	81	80	80	79	77	74	73	70	70	72	73	72	75	79	82	84	85	85	84	84	78.4	85
12-Mar	84	84	84	84	83	83	83	82	80	78	76	82	86	84	81	81	80	83	92	95	95	95	95	95	85.1	95
13-Mar	94	94	94	94	91	81	78	81	72	52	40	33	31	28	28	27	32	35	37	44	47	49	52	55	57.1	94
14-Mar	60	62	66	72	75	75	79	77	77	73	70	61	54	48	43	41	42	47	54	59	72	76	92	95	65.4	95
15-Mar	93	88	85	88	88	85	85	84	82	78	76	66	60	55	48	46	48	65	83	86	87	86	86	85	76.4	93
16-Mar	77	80	78	77	76	76	77	77	64	62	60	56	55	57	57	58	58	60	71	81	82	82	82	82	70.2	82
17-Mar	81	80	80	79	79	78	78	79	76	67	63	54	50	45	41	37	35	45	72	81	83	85	86	84	68.3	86
18-Mar	86	87	88	88	87	86	85	85	78	63	55	50	49	49	45	43	41	42	44	45	44	43	39	39	61.0	88
19-Mar	40	41	43	49	50	58	64	59	47	39	34	33	32	31	29	25	21	22	27	31	31	34	44	52	38.9	64
20-Mar	54	56	61	64	65	68	69	67	54	45	42	36	31	30	29	29	28	30	34	44	48	52	49	47	47.1	69
21-Mar	53	60	62	65	66	67	69	65	55	48	41	34	31	31	29	29	28	27	30	34	37	38	40	44	45.1	69
22-Mar	47	48	51	51	50	50	55	50	53	59	67	68	67	59	60	64	66	78	87	90	91	92	92	92	66.1	92
23-Mar	92	92	92	91	91	92	92	92	90	85	80	76	68	66	61	60	59	63	71	74	74	76	77	76	78.8	92
24-Mar	76	76	76	77	77	76	77	76	72	70	66	60	56	54	52	48	48	52	59	65	70	75	80	83	67.5	83
25-Mar	85	86	86	85	84	83	83	83	77	66	53	48	44	41	39	38	36	40	49	59	67	72	77	80	65.0	86
26-Mar	83	85	85	84	85	88	88	85	78	73	65	63	59	55	56	57	57	59	64	71	77	90	95	96	74.8	96
27-Mar	96	96	96	96	95	95	96	96	93	87	81	74	70	74	71	69	73	78	79	83	89	92	93	93	86.1	96
28-Mar	92	93	94	95	96	96	97	95	78	49	26	23	24	22	24	19	18	19	23	30	37	43	49	54	54.1	97
29-Mar	55	58	64	73	78	82	86	83	77	63	55	57	58	53	50	49	47	55	62	69	76	83	86	88	67.1	88
30-Mar	90	91	93	93	94	94	94	91	75	62	54	49	44	40	37	37	38	38	46	59	63	71	77	80	67.1	94
31-Mar	82	83	85	88	88	87	86	84	77	78	86	92	94	96	97	94	90	92	92	95	96	97	97	97	89.7	97
																								Diurnal Average	Diurnal Maximum	
																								76.0	96	
																								76.9	96	
																								77.6	96	
																								78.8	96	
																								78.7	96	
																								78.9	96	
																								79.4	97	
																								78.1	96	
																								72.9	93	
																								65.6	87	
																								59.7	86	
																								55.6	92	
																								53.1	94	
																								50.7	96	
																								48.9	97	
																								47.8	94	
																								48.1	90	
																								52.3	92	
																								59.0	92	
																								64.2	95	
																								67.6	96	
																								70.9	97	
																								73.5	97	
																								75.5	97	



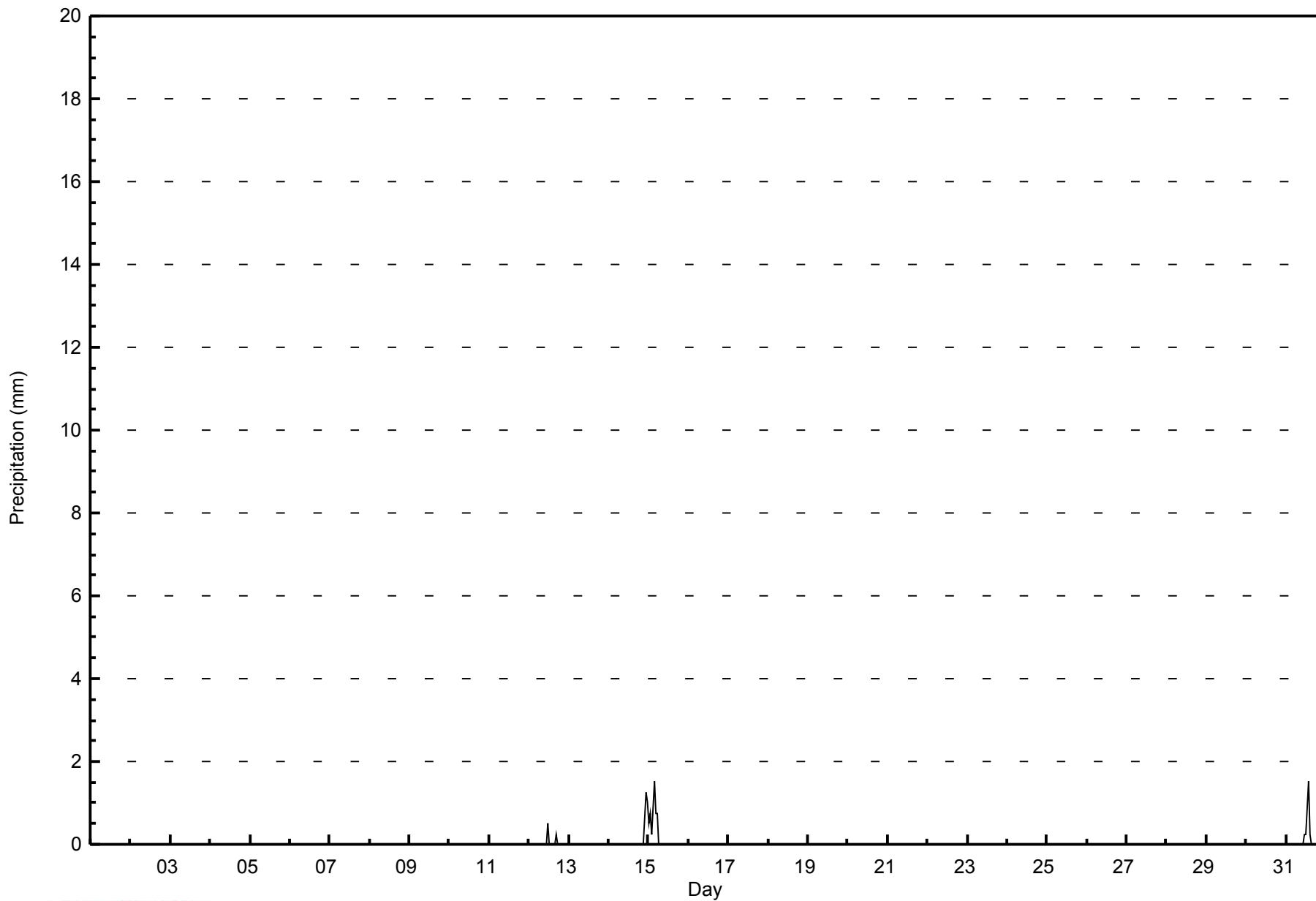
WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort McKay - Bertha Ganter - March 2015





Maximum Value: 1.5 mm on Mar 15 04:00		Maximum Daily Total: 4.6 mm on Mar 15		Hours in Service: 744																								
Minimum Value: 0.0 mm on Mar 1 01:00		Minimum Daily Total: 0.0 mm on Mar 1		Hours of Data: 744																								
Maximum Diurnal Total: 1.5 mm at hour 4		Minimum Diurnal Total: 0.0 mm at hour 7		Hours of Missing Data: 0																								
Monthly Total: 10.41 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.8		Hours of Calibration: 0																								
				Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.0	2.3	1.3	0.0
15-Mar	0.5	0.8	0.3	1.5	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	1.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	2.8	1.5	0.0
		0.5	0.8	0.3	1.5	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.8	0.3	1.5	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.3	1.3	1.0	Diurnal Average		
		0.5	0.8	0.3	1.5	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.5	0.3	1.5	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.3	1.3	1.0	Diurnal Maximum		





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	735	98.79	98.79
0.4 - 0.5	2	0.27	99.06
0.6 - 0.7	0	0.00	99.06
0.8 - 1.4	5	0.67	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

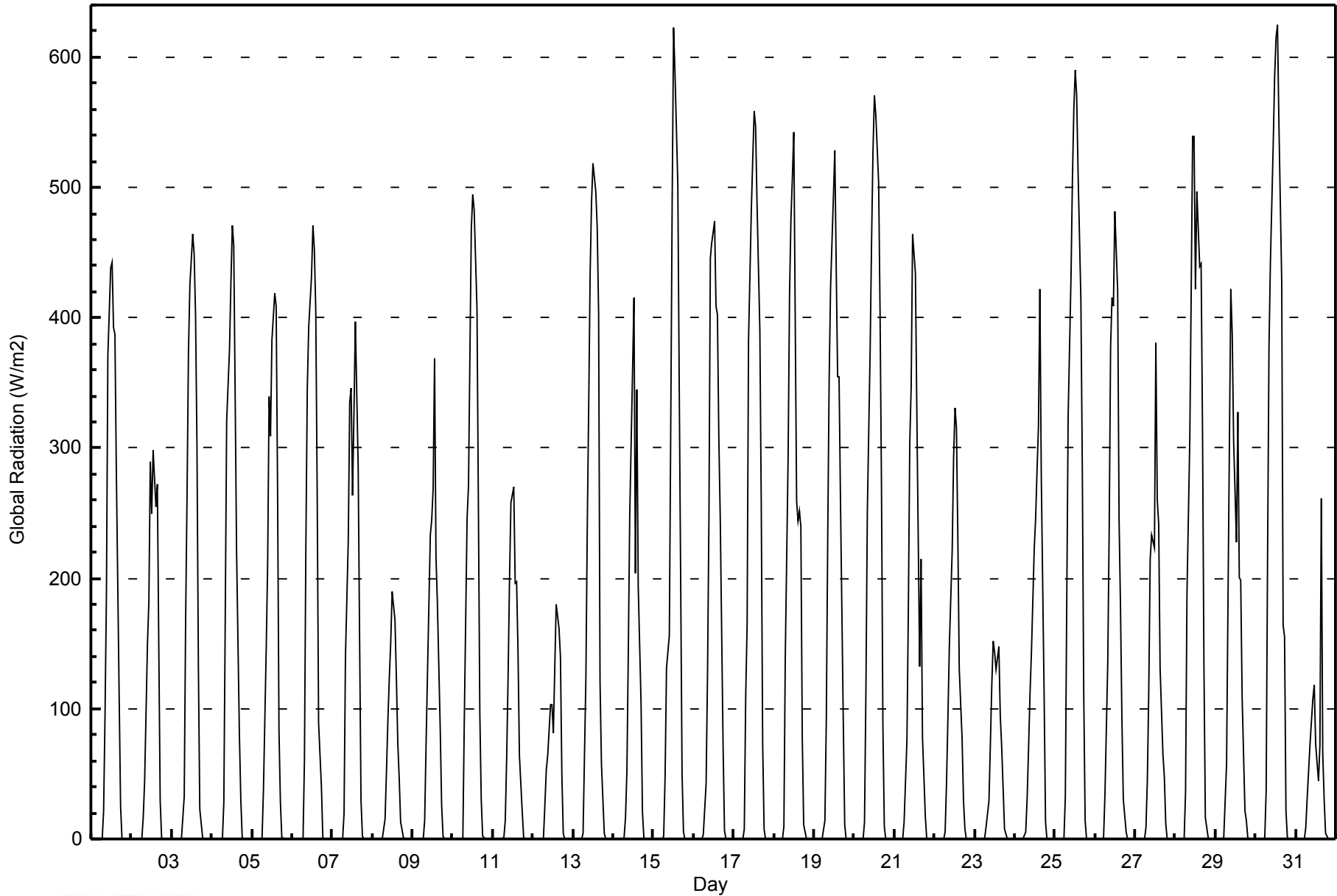


Maximum Value: 625 W/m2 on Mar 30 14:00		Maximum Daily Average: 198.1 W/m2 on Mar 30		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Mar 1 20:00		Minimum Daily Average: 40.8 W/m2 on Mar 31		Hours of Data: 744																						
Maximum Diurnal Average: 394.4 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 24		Hours of Missing Data: 0																						
Monthly Average: 115.4 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 4 Q ₃ = 214 P ₉₀ = 412 P ₉₉ = 557		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	0	0	22	95	189	371	438	442	392	387	282	109	25	0	0	0	0	0	0	114.7	442
2-Mar	0	0	0	0	0	0	0	16	45	150	182	290	249	298	255	272	148	30	1	0	0	0	0	0	80.6	298
3-Mar	0	0	0	0	0	0	0	33	169	265	374	425	464	449	403	303	133	23	1	0	0	0	0	0	126.8	464
4-Mar	0	0	0	0	0	0	0	28	170	321	376	426	471	456	341	221	80	31	1	0	0	0	0	0	121.8	471
5-Mar	0	0	0	0	0	0	0	37	147	213	340	309	383	418	409	268	83	28	1	0	0	0	0	0	109.9	418
6-Mar	0	0	0	0	0	0	0	60	224	345	393	431	471	452	406	267	89	40	1	0	0	0	0	0	132.5	471
7-Mar	0	0	0	0	0	0	0	20	140	230	336	346	264	326	397	285	153	29	2	0	0	0	0	0	105.3	397
8-Mar	0	0	0	0	0	0	0	15	52	91	123	150	190	169	124	74	47	14	1	0	0	0	0	0	43.7	190
9-Mar	0	0	0	0	0	0	0	14	72	127	233	246	269	369	217	181	85	26	3	0	0	0	0	0	76.8	369
10-Mar	0	0	0	0	0	0	1	89	246	271	373	468	494	482	407	255	96	30	2	0	0	0	0	0	134.1	494
11-Mar	0	0	0	0	0	0	1	14	63	124	200	259	270	196	197	144	64	21	1	0	0	0	0	0	64.7	270
12-Mar	0	0	0	0	0	0	1	26	53	64	103	103	82	131	180	162	140	50	5	0	0	0	0	0	45.7	180
13-Mar	0	0	0	0	0	0	4	123	242	333	434	489	518	497	470	404	121	58	4	0	0	0	0	0	154.1	518
14-Mar	0	0	0	0	0	0	1	16	52	144	248	359	416	204	345	194	104	20	1	0	0	0	0	0	87.8	416
15-Mar	0	0	0	0	0	0	2	48	131	156	318	488	622	588	502	347	200	50	6	0	0	0	0	0	144.1	622
16-Mar	0	0	0	0	0	0	4	42	126	246	446	457	474	409	403	308	247	72	7	0	0	0	0	0	135.0	474
17-Mar	0	0	0	0	0	0	8	110	165	383	484	523	559	547	488	390	256	72	7	0	0	0	0	0	166.3	559
18-Mar	0	0	0	0	0	0	10	141	294	419	476	508	542	259	244	252	239	78	11	0	0	0	0	0	144.8	542
19-Mar	0	0	0	0	0	0	15	92	232	353	423	492	528	438	355	354	261	90	11	0	0	0	0	0	151.9	528
20-Mar	0	0	0	0	0	0	13	114	251	376	459	528	571	555	504	403	271	88	10	0	0	0	0	0	172.6	571
21-Mar	0	0	0	0	0	0	13	76	176	304	347	464	433	328	230	133	215	78	17	0	0	0	0	0	117.2	464
22-Mar	0	0	0	0	0	0	5	43	94	148	222	292	330	316	231	130	77	29	8	0	0	0	0	0	80.3	330
23-Mar	0	0	0	0	0	0	1	10	29	73	118	152	143	131	147	94	71	39	8	0	0	0	0	0	42.3	152
24-Mar	0	0	0	0	0	0	6	31	69	110	142	223	246	284	317	422	277	111	14	0	0	0	0	0	93.9	422
25-Mar	0	0	0	0	0	0	33	183	326	431	506	560	590	571	512	413	285	113	15	0	0	0	0	0	189.1	590
26-Mar	0	0	0	0	0	0	34	136	238	378	415	409	482	421	245	178	92	30	6	0	0	0	0	0	127.7	482
27-Mar	0	0	0	0	0	0	9	45	115	215	233	224	381	261	242	131	65	48	12	0	0	0	0	0	82.6	381
28-Mar	0	0	0	0	0	0	36	187	307	421	539	539	422	497	439	442	313	133	16	1	0	0	0	0	178.9	539
29-Mar	0	0	0	0	0	1	57	181	301	422	387	305	228	328	201	199	110	22	14	1	0	0	0	0	114.8	422
30-Mar	0	0	0	0	0	1	37	218	378	443	534	586	615	625	550	427	164	155	22	1	0	0	0	0	198.1	625
31-Mar	0	0	0	0	0	1	9	31	73	90	108	118	73	44	72	261	66	31	5	0	0	0	0	0	40.8	261
		0.0	0.0	0.0	0.0	0.0	0.1	9.7	71.0	163.7	252.8	330.3	374.4	394.4	369.1	329.6	264.5	150.4	53.7	6.9	0.1	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	1	57	218	378	443	539	586	622	625	550	442	313	155	22	1	0	0	0	0	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	406	54.57	54.57
21 - 100	79	10.62	65.19
101 - 300	129	17.34	82.53
301 - 600	127	17.07	99.60
601 - 900	3	0.40	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 20 km/h on Mar 28 16:00	Maximum Daily Speed Average: 12.9 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 14 20:00	Minimum Daily Speed Average: 0.5 km/h on Mar 22	Hours of Data: 704
Maximum Diurnal Speed Average: 2.8 km/h at hour 24	Minimum Diurnal Speed Average: 0.6 km/h at hour 8	Hours of Missing Data: 40
Monthly Average Velocity: 0.6 km/h 337.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 19	Percent Operational Time: 94.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	NNW1	WNW2	WNW1	WSW2	SW2	SW2	SSW3	SSW6	S5	SSW9	S9	S11	S11	S13	S13	S12	SSW13	SSW13	S11	S10	S8	WSW4	NNW12	NNW16	SSW5.3	NNW16
2-Mar	N18	N16	NNE11	N12	NNW20	NNW20	NNW19	NNW16	N9	N10	NNW19	NNW15	NNW18	NNW16	NNW19	NNW20	NNW18	NNW15	NNW8	NW8	NW7	NE1	W2	WNW6	NNW12.9	NNW20
3-Mar	WNW8	WNW11	NW11	NNW7	NW3	NNW4	N5	N6	NNE8	NNE9	NNE10	NNE10	NNE10	NNE8	NE8	E9	ENE6	ENE4	ENE2	ESE1	WSW2	W3	WSW2	WSW2	N4.0	NW11
4-Mar	WSW2	SW3	WSW2	SW3	SSW5	SSW5	SSW5	SW4	SSW7	SSE7	S12	S12	S13	S9	S10	S9	SSW7	SW8	SSW8	SSW7	SSW7	SSW5	SW5	WSW5	SSW6.3	S13
5-Mar	WNW8	WNW7	WNW6	WNW9	W2	SW3	WSW4	SSW4	S7	SSE5	SSE6	S7	SSE8	SSE10	SSE11	S11	S7	S6	SSW5	SSW2	WSW3	WNW4	SW2	SSE2	SSW3.7	SSE11
6-Mar	WNW2	SW2	SSW5	ESE1	NNE1	W2	S1	SSW1	SSE2	SE3	E4	ENE6	E9	E8	E9	ENE8	ENE6	NE6	NNE4	NE5	NNE4	NNW3	NNW2	NNW2	ENE2.3	E9
7-Mar	WSW1	S3	SSW3	SSW2	S4	SSW3	NE2	NE1	WNW4	WNW7	NW11	NW14	NW12	WNW11	WNW11	WNW11	NW11	NW8	NW6	NNW3	NW3	NNW4	W3	WNW4.8	NW14	
8-Mar	SW2	SSW3	SSW3	SSW4	SSW5	SSW5	SSW5	S6	S6	S4	SSW5	WSW6	WSW6	SSW7	S7	S6	S7	S6	S5	S4	S2	SSW4	SSW3	S3	SSW4.4	S7
9-Mar	NE1	SW1	SSW4	S5	SSW3	SW1	NW4	WNW3	NNW1	ENE6	E5	E4	NE1	SSE6	NNW9	NNW7	NE3	NNE5	N5	NW5	NW5	NW6	N7	NNE6	N1.7	NNW9
10-Mar	NNE9	NNE10	NNE8	NNE6	NNE5	NNE5	N5	N4	NNE7	NE6	ENE5	ENE7	ENE7	E6	NE7	NE7	NNE7	NNE7	N7	N10	NNE8	NNE8	NNE8	N8	NNE6.5	NNE10
11-Mar	N9	N9	N8	N9	N9	N10	N10	N10	N10	N9	N9	N10	N10	N10	N10	N10	N9	N9	N8	N7	N7	N7	N6	N7	N8.9	N10
12-Mar	N6	N5	N4	NNW4	N4	NNW2	N2	WNW1	SSW2	S2	S1	SSE4	SW3	SW2	SSE2	SW4	WNW3	SSW2	S3	WSW1	N3	N3	NNW4	NW4	NW1.1	N6
13-Mar	W2	SW2	SSW4	SSW4	W7	WSW5	SSW6	S4	SSW6	WSW8	WSW8	SW9	SSW15	SSW14	S15	S15	S12	S12	S14	S13	S12	S13	S7	SSW8	SSW8.3	S15
14-Mar	SSW6	S7	S6	SSW5	SSW5	S6	SSW5	SSW7	S6	S7	S11	SSE11	S13	S11	S11	S10	S9	SSW3	SW4	SSW0	WSW3	WSW4	N6	N11	S5.3	S13
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	NE6	NE6	N5	N5	N5	N5	NW4	WNW1	----	NE6
17-Mar	W3	WNW3	WNW2	SW3	SW2	WSW2	WSW2	SSW2	SSE3	SSE6	S8	SSE7	SSE8	SSE8	S7	SSE6	S6	SSW5	WSW3	N4	NNW2	N2	NNW3	N2	S2.3	SSE8
18-Mar	N3	NNW1	SW1	NW1	WNW1	SW2	SW1	N2	ESE2	SSE4	SSE5	SSE5	ENE4	NNE9	NNE9	NNE10	NNE12	NNE14	NNE13	NNE13	NNE12	NNE12	NNE11	NNE8	NNE4.8	NNE14
19-Mar	NNE7	NNE6	N6	N4	NNE4	NNW1	WSW1	SSW2	SE2	NNE7	NE7	E7	E10	E8	E9	ENE8	NE9	NNE8	NNE6	NNE5	NNE5	NNE5	N3	NNW3	NE4.3	E10
20-Mar	N2	NNW2	W1	NW1	NNW1	WNW1	NNW2	NNE1	ENE3	NNE6	E5	ESE7	E8	E7	E7	E7	ENE6	NE6	NNE5	N5	N6	N6	N6	NNE6	NE3.1	E8
21-Mar	N5	N2	N1	NNW3	N2	N2	N3	N3	NNE3	NNE6	NNE6	NNE6	NNE5	NE6	NNE8	NE7	ESE5	SE10	ESE7	SE7	SE9	ESE7	ESE4	NE3	ENE2.9	SE10
22-Mar	NNE4	NE3	ENE3	ENE1	SSE2	S3	SSE1	N2	S4	S5	S3	SE0	WSW3	SSW3	NNE3	N6	NW6	NNW7	NNW3	E3	ENE1	N1	NW2	NW1	N0.5	NNW7
23-Mar	NW1	WNW1	SSW1	NW2	NW1	WNW2	NNW1	WNW1	SW1	SSW3	SSE4	SSE6	SSW3	NNW5	NNW5	NNE3	NE3	NNE5	NNE6	NNE7	N7	N7	N6	NNE5	N1.9	NNE7
24-Mar	N4	N4	N5	N6	N6	N5	NNW4	N5	NNE5	NNE5	NNE6	NE6	E4	ESE6	ESE7	E7	E6	E5	ENE4	NE4	NNE3	NNE3	NW2	NW2	NE3.4	ESE7
25-Mar	NNW1	N1	NNW2	N3	N3	NNW1	N3	NNE2	NNE4	NNE4	ESE6	ESE6	E6	E6	ENE5	E6	NE4	N5	N4	N2	SW3	SSW5	SSW4	S2	ENE1.7	E6
26-Mar	NE2	N2	N3	NNE4	NNW3	W1	N2	NW1	S4	S9	S9	S9	SSW9	SSW8	SSW8	S8	S5	SSE5	SSE3	WSW4	SW5	SW3	SSW2	SSW3	SSW3.1	S9
27-Mar	SSW3	S2	SSW4	S4	S5	S6	S7	SSW6	S7	S8	S9	SW10	S10	S11	S9	SSW10	SSW7	SSW7	SSW7	SW2	NNW2	WNW3	WNW2	WSW4	SSW5.4	S11
28-Mar	SW2	S2	SSW3	NW2	W3	SSW2	SW3	S3	SSE4	WNW4	NNW12	NNW14	NNW14	NW16	NW15	NNW20	NW19	NW18	NW10	NW7	NW6	WNW7	WNW8	WNW5	NW7.1	NNW20
29-Mar	WNW6	W3	SW3	SSW3	SSW4	SSW3	SSW5	S7	S7	S7	S6	S9	S8	S8	S7	S3	SE3	NNE3	NNE4	NNW4	NW3	NW4	WNW3	NW3	SSW2.5	S9
30-Mar	NW2	NW1	W2	NNW1	W4	WSW1	W2	ESE2	SSE3	S4	SE5	SSE7	SSE10	S12	SSW10	SSW11	SW8	SSW8	SSW4	W2	N4	WSW1	WNW2	NNW2	SSW2.9	S12
31-Mar	WSW3	SW2	W1	NNW2	SW2	SSW3	NW1	NNW1	NW1	SSW2	SSE1	NNE6	NNE4	NNE6	NNE6	ENE7	NE9	NNE8	NE9	NE9	NNE9	N12	NNE12	N12	NNE4.1	N12

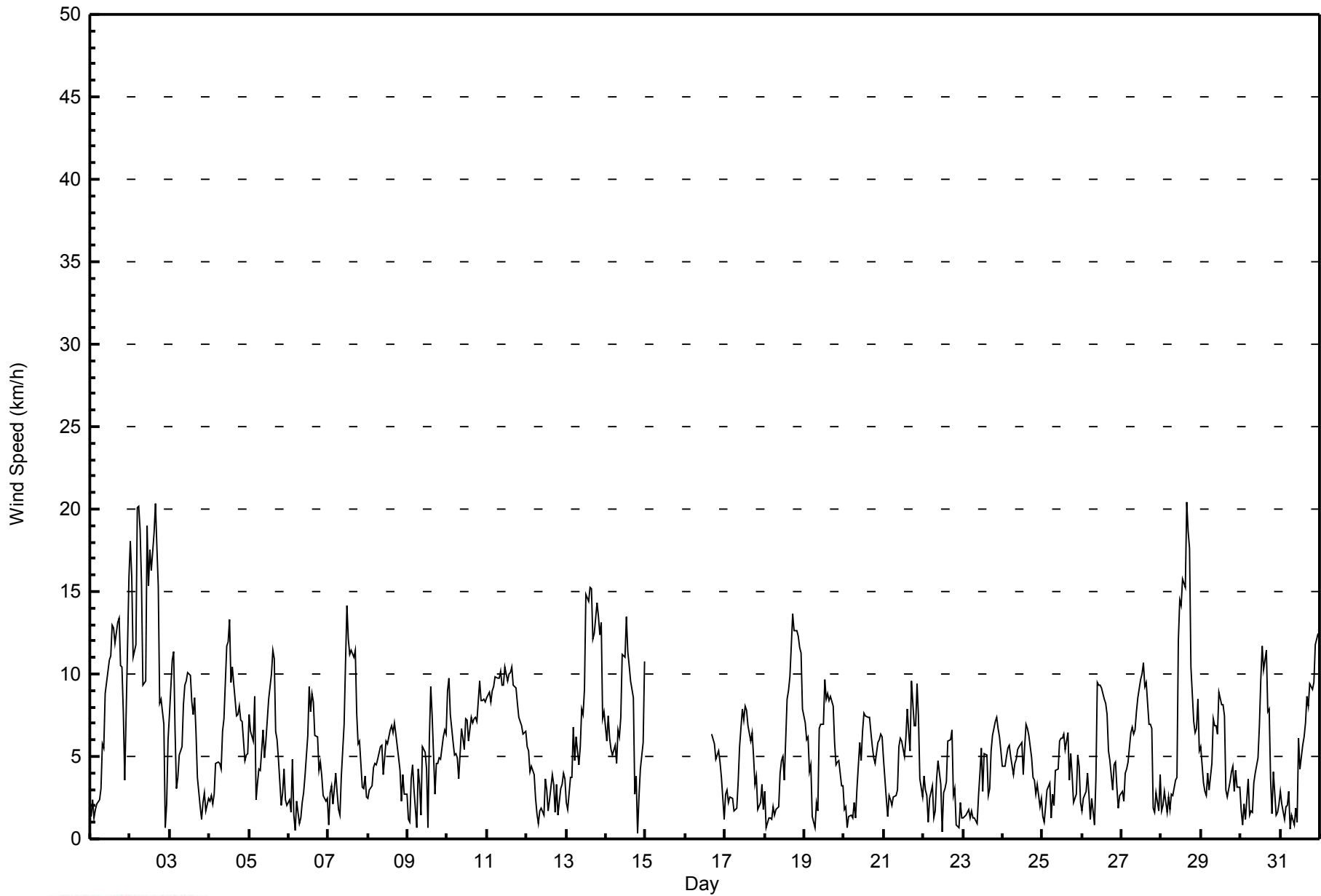
NNW2.6	NNW1.9	NW1.3	NNW1.5	NW1.5	NNW1.3	NNW1.4	W0.6	SSE0.9	SE0.9	SSE1.0	SSE1.5	SSE1.8	SSE1.8	SE1.0	ESE0.6	NNE0.7	N1.2	N1.0	N1.5	NNW1.6	NNW1.9	NNW2.7	NNW2.8	Diurnal Average	
N18	N16	NW11	N12	NNW20	NNW20	NNW19	NNW16	N10	N10	NNW19	NNW15	NNW18	NNW16	NNW19	NNW20	NW19	NW18	S14	S13	S12	S13	NNE12	NNW16	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	374	53.13	53.13
6 - 11	274	38.92	92.05
12 - 19	52	7.39	99.43
20 - 28	4	0.57	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

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

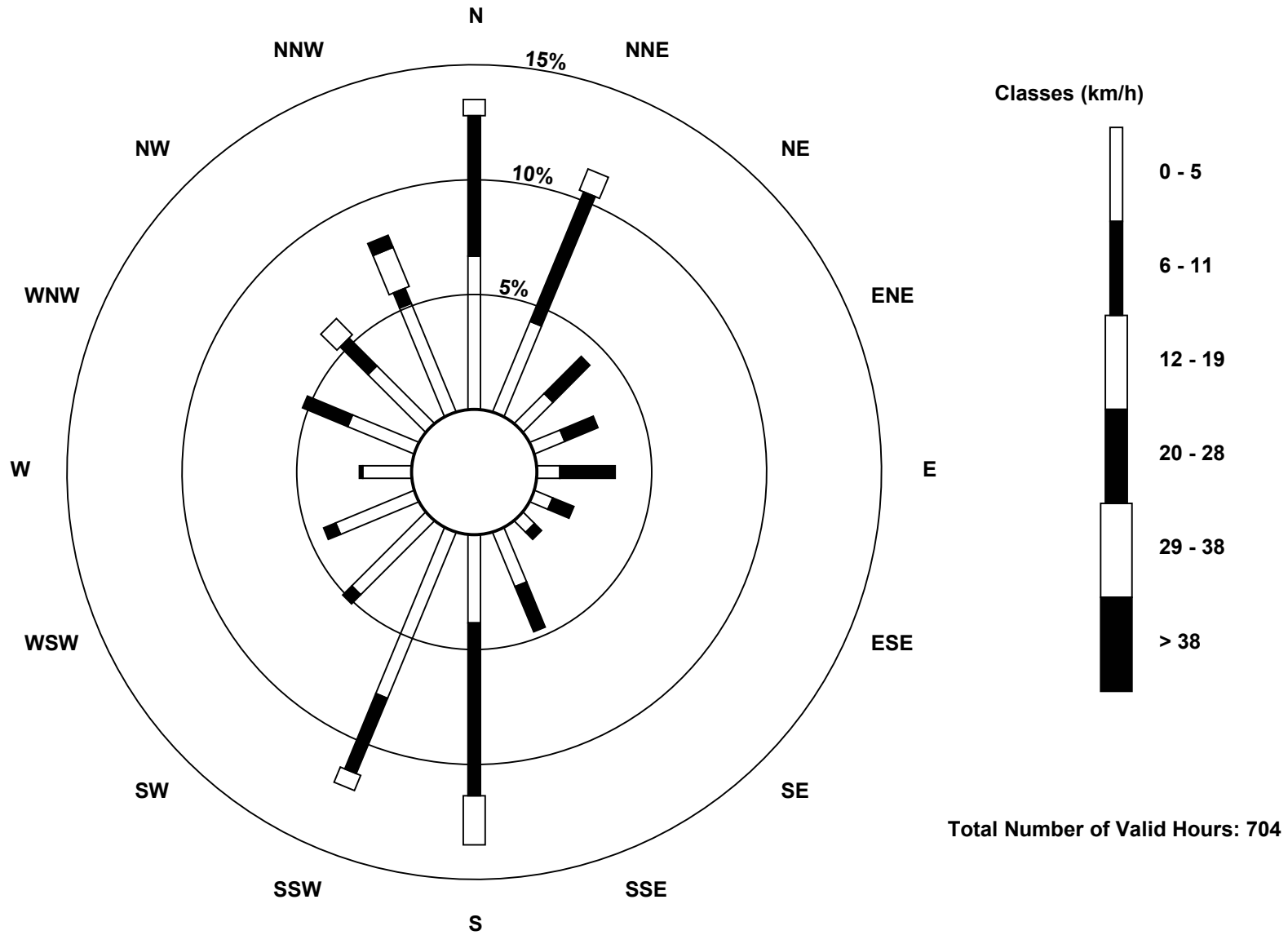
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	47	30	13	10	7	6	5	18	27	55	32	26	15	22	25	36	374
6 - 11	43	43	16	11	17	7	3	15	53	25	4	4	1	15	12	5	274
12 - 19	5	7	0	0	0	0	0	0	15	5	0	0	0	0	7	13	52
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	95	80	29	21	24	13	8	33	95	85	36	30	16	37	44	58	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on Mar 2 06:00	Hours of Data: 704
Minimum Value: 0 km/h on Mar 25 07:00	Hours of Missing Data: 40
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 94.6

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

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - March 2015

Direction of Maximum Speed: 328 deg on Mar 28 16:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 341.8 deg on Mar 2	Hours of Data: 704
Direction of Minimum Speed: 197 deg on Mar 14 20:00	Direction of Minimum Daily Speed Average: 0.5 deg on Mar 22
Direction of Minimum Speed: 197 deg on Mar 14 20:00	Hours of Missing Data: 40
Monthly Average Direction: 268.9 deg	Percent Operational Time: 94.6

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	341	301	292	244	234	233	209	201	191	192	178	170	179	174	176	177	194	196	189	187	183	255	323	340	196.6	
2-Mar	358	4	12	2	344	340	342	346	6	354	336	338	345	347	335	328	331	333	333	318	310	50	261	289	341.8	
3-Mar	292	302	310	348	323	333	358	357	14	18	30	32	19	28	38	79	75	66	71	110	238	263	237	244	5.5	
4-Mar	245	223	241	218	211	201	203	214	194	158	176	179	185	177	177	183	195	214	200	206	193	212	218	244	194.7	
5-Mar	288	287	294	298	271	223	258	204	173	163	159	177	165	168	160	174	178	183	198	202	238	287	218	167	201.5	
6-Mar	288	232	196	121	21	259	186	200	154	144	91	68	96	91	81	76	65	54	31	53	15	327	342	332	73.9	
7-Mar	239	190	195	194	188	198	52	43	292	300	305	304	309	302	297	303	311	316	304	317	341	313	343	261	301.0	
8-Mar	217	203	212	200	199	192	195	178	177	183	206	237	239	194	176	177	178	176	176	184	170	198	195	188	192.4	
9-Mar	36	216	207	183	194	223	315	292	335	69	82	98	44	150	336	337	55	13	352	318	317	310	1	14	353.0	
10-Mar	14	21	12	15	13	16	1	4	19	45	65	78	75	79	52	44	20	16	9	10	26	27	17	8	27.5	
11-Mar	8	7	8	4	4	7	7	6	7	10	7	2	7	7	9	7	5	6	3	7	4	1	0	359	5.7	
12-Mar	354	356	350	345	3	332	8	282	197	171	182	164	235	219	149	227	282	212	178	241	349	5	347	315	316.7	
13-Mar	279	219	193	209	268	255	211	184	207	249	251	225	198	203	188	191	186	183	189	191	188	185	191	195	201.5	
14-Mar	207	191	185	200	199	185	199	205	187	179	175	168	173	176	177	178	186	193	231	197	252	242	352	8	187.7	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	41	49	359	352	358	349	316	294	--	
17-Mar	277	298	297	224	223	242	242	208	167	161	179	158	161	162	170	166	173	209	238	358	338	349	340	360	188.9	
18-Mar	353	329	236	304	295	236	224	8	102	162	160	156	61	12	20	20	19	18	23	16	14	16	16	17	20.3	
19-Mar	13	16	9	7	17	329	243	197	126	13	38	88	92	90	86	63	38	25	27	25	27	16	0	328	40.6	
20-Mar	355	340	263	320	337	298	329	28	64	28	86	117	98	97	99	83	62	42	14	6	2	2	5	12	46.3	
21-Mar	3	358	349	344	355	359	349	11	31	32	20	16	13	42	31	47	122	136	114	135	134	120	120	44	62.4	
22-Mar	25	45	64	74	155	169	148	6	170	182	178	131	252	203	17	356	326	328	345	101	60	355	325	317	5.9	
23-Mar	309	295	198	305	305	283	330	293	223	193	166	166	194	340	330	21	43	14	32	24	11	8	6	15	3.1	
24-Mar	6	1	7	355	8	353	334	10	31	26	22	51	99	106	106	88	89	84	64	40	30	32	304	322	37.9	
25-Mar	333	355	337	9	5	337	352	13	22	30	114	109	93	96	77	86	39	358	357	359	226	204	198	170	59.0	
26-Mar	38	4	11	13	344	269	354	317	179	190	187	181	192	192	192	189	182	162	163	237	224	222	202	211	194.2	
27-Mar	201	189	206	185	183	184	189	193	178	175	186	214	180	181	189	200	193	195	196	235	334	301	288	258	194.5	
28-Mar	218	191	211	315	270	210	235	179	165	293	331	329	333	323	315	328	320	314	324	323	307	296	302	299	314.3	
29-Mar	290	273	218	205	213	196	209	186	178	169	177	174	173	183	176	186	124	16	14	343	316	312	301	309	200.8	
30-Mar	325	309	273	332	270	254	264	112	153	171	135	165	167	181	213	211	227	204	205	279	2	246	289	328	203.1	
31-Mar	248	231	259	329	222	213	310	338	321	202	149	14	15	17	21	66	42	22	37	34	14	9	12	10	18.2	

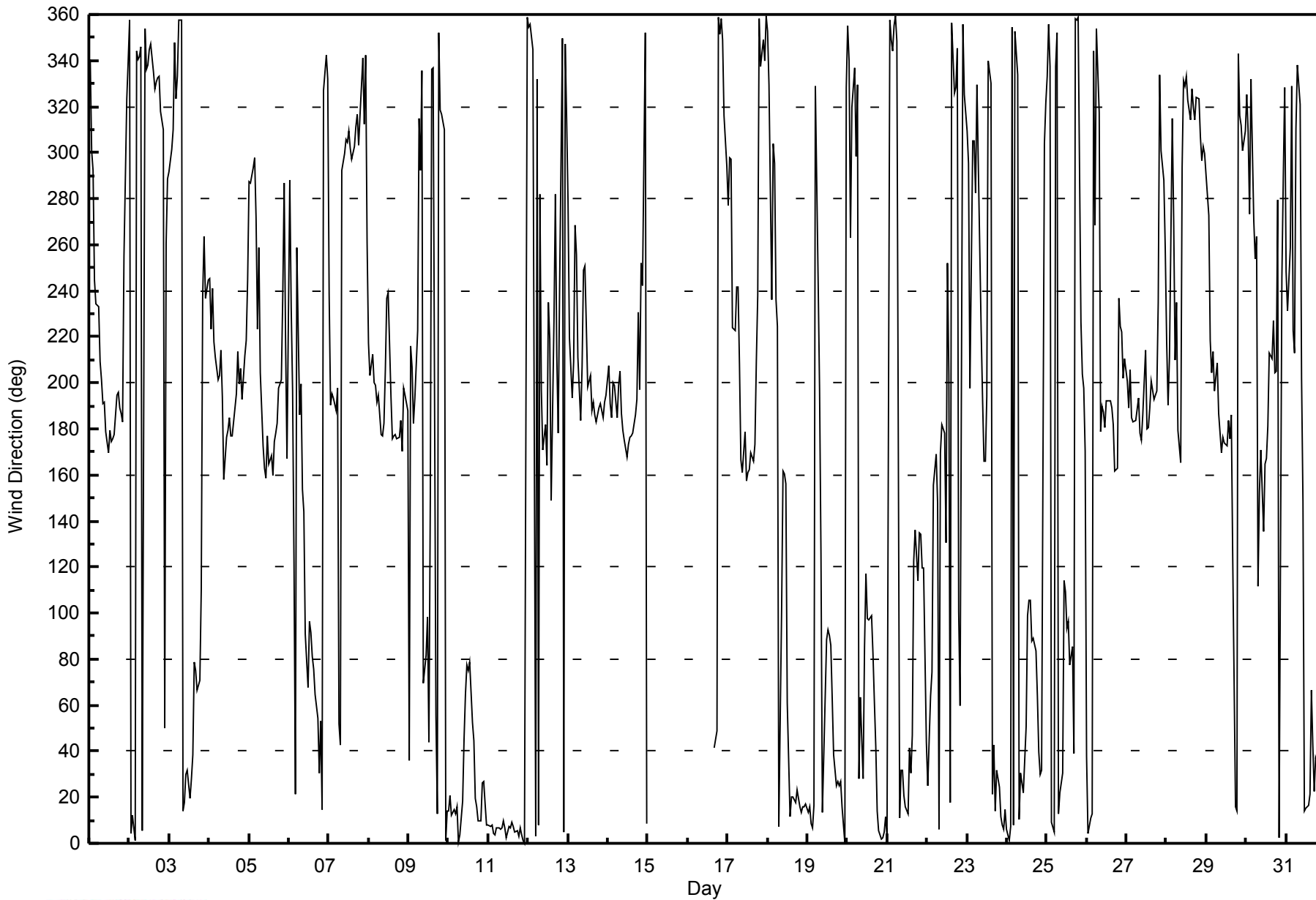
332.9 330.1 310.7 326.9 307.4 282.1 298.9 277.9 150.3 144.2 147.0 148.1 152.3 149.6 128.3 101.5 26.6 1.0 3.7 354.9 347.0 333.2 338.6 338.4
 Diurnal Average

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - March 2015





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 109 deg on Mar 22 12:00	Hours of Data: 704
Minimum Value: 9 deg on Mar 5 11:00	Hours of Missing Data: 40
	Hours of Calibration: 0
	Percent Operational Time: 94.6
Percentiles: P ₁ = 11 P ₁₀ = 14 Q ₁ = 20 Median = 30 Q ₃ = 44 P ₉₀ = 60 P ₉₉ = 91	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	81	39	61	46	21	23	20	15	16	15	18	13	16	11	12	14	15	14	13	13	13	50	27	23	81
2-Mar	28	31	30	30	25	24	25	25	34	32	24	27	25	27	23	22	22	21	20	12	35	95	55	16	95
3-Mar	13	11	14	28	43	34	26	19	30	44	48	40	45	46	29	38	43	54	69	31	11	53	18	69	
4-Mar	31	23	18	24	15	12	16	18	20	12	15	15	16	23	16	28	24	14	15	12	21	17	29	31	
5-Mar	27	15	21	16	59	45	49	45	21	15	9	21	14	14	13	16	14	14	20	51	24	14	31	35	59
6-Mar	52	72	28	67	84	35	71	69	33	38	64	53	22	33	26	31	35	47	41	43	39	28	50	47	84
7-Mar	59	37	21	55	31	32	51	79	31	32	28	24	24	27	31	28	21	17	15	31	31	28	28	22	79
8-Mar	45	18	14	18	21	10	14	13	13	43	53	38	42	37	15	13	12	12	14	21	19	24	20	34	53
9-Mar	78	90	26	23	50	86	18	49	81	29	32	28	95	30	42	33	51	55	35	40	26	14	37	32	95
10-Mar	30	38	32	27	33	34	24	35	44	52	51	44	46	51	45	45	34	32	32	29	37	40	35	27	52
11-Mar	34	30	32	27	26	25	26	26	29	33	30	29	30	28	32	28	29	28	28	29	28	26	26	25	34
12-Mar	31	28	31	26	29	40	61	101	62	60	84	21	43	56	28	49	35	63	24	28	26	29	29	32	101
13-Mar	37	50	43	36	38	55	32	31	30	45	48	42	16	18	15	15	14	14	13	12	13	13	22	15	55
14-Mar	17	16	13	21	22	15	22	14	24	24	12	11	11	12	12	13	14	54	50	94	54	35	63	35	94
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	47	54	30	19	15	15	17	78	78
17-Mar	35	48	39	34	24	47	19	32	17	11	19	13	12	14	11	11	15	10	22	39	51	29	27	49	51
18-Mar	32	43	36	52	67	41	61	39	55	18	13	15	72	29	35	37	35	31	36	30	33	30	29	30	72
19-Mar	30	33	31	34	41	67	74	52	70	36	47	47	27	35	38	44	42	37	38	37	31	23	20	68	74
20-Mar	23	55	73	63	74	57	39	48	56	42	58	37	31	39	40	37	44	43	26	15	17	16	20	21	74
21-Mar	31	65	62	23	23	17	23	38	60	36	34	49	57	51	35	42	57	21	16	15	15	20	29	33	65
22-Mar	16	24	25	74	31	27	70	51	40	44	42	109	66	53	84	35	24	22	55	19	55	40	13	19	109
23-Mar	29	42	49	34	48	30	71	88	84	35	16	12	54	44	27	72	49	32	38	33	26	22	28	88	
24-Mar	26	21	23	21	25	22	20	31	42	43	46	50	74	55	30	35	33	31	39	28	33	30	50	57	74
25-Mar	71	69	26	14	17	45	19	52	33	52	23	30	44	43	56	39	69	29	14	60	24	15	17	45	71
26-Mar	61	32	56	14	45	41	30	62	31	17	20	17	20	22	15	16	18	19	49	27	21	18	75	44	75
27-Mar	31	62	41	28	16	15	16	13	11	11	22	22	23	12	16	15	17	16	18	79	62	44	76	20	79
28-Mar	68	51	18	50	16	51	16	19	15	70	24	26	25	23	25	21	20	20	19	15	10	13	12	17	70
29-Mar	38	59	37	34	26	35	16	18	20	19	32	14	15	18	14	74	58	31	21	18	55	26	51	37	74
30-Mar	61	92	23	71	23	53	48	64	35	26	41	20	15	14	36	20	35	25	19	60	25	39	40	47	92
31-Mar	30	38	71	51	48	27	85	60	87	81	94	25	60	34	43	47	42	39	43	40	26	25	27	27	94
	81	92	73	74	84	86	85	101	87	81	94	109	95	56	84	74	69	63	55	94	62	95	76	78	
	Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 5, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:40
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Cal cyl conc	50 ppm	Cal cylinder expiry	Sep 26 2017
Cal cyl Ref	SA140071A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000 mv	DACS channel #	SE1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-689	-689
Analyzer Range (mv)	1000	1000	Lamp voltage	741	739
Calculated slope	0.996174	0.982822	Chamber temp.	43.0	43.0
Calculated intercept	0.884922	0.675988	Pressure (mmHg)	746.0	715.7
Analyzer Background	42.8	42.8	Flow (lpm)	0.500	0.500
Analyzer Coefficient	0.802	0.802	Intensity	356xx	356xx

Analyzer make Thermo 43C Analyzer serial # 509110888

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.1	NA
as found span	5500	78.1	710.0	722.0	0.983
calibrator zero	5500	0.0	0.0	-0.1	NA
high point	5500	78.1	710.0	722.0	0.983
second point	5500	43.8	398.2	404.4	0.985
third point	5500	21.9	199.1	201.1	0.990
as left zero	5500	0.0	0.0	0.0	NA
as left span	5500	78.1	710.0	723.3	0.982
Average Correction Factor					0.986

Corrected As found 722.1 Previous response 711.8 % change -1.4%

Notes:

Sample inlet filter changed after as founds.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

SO₂ Calibration Summary

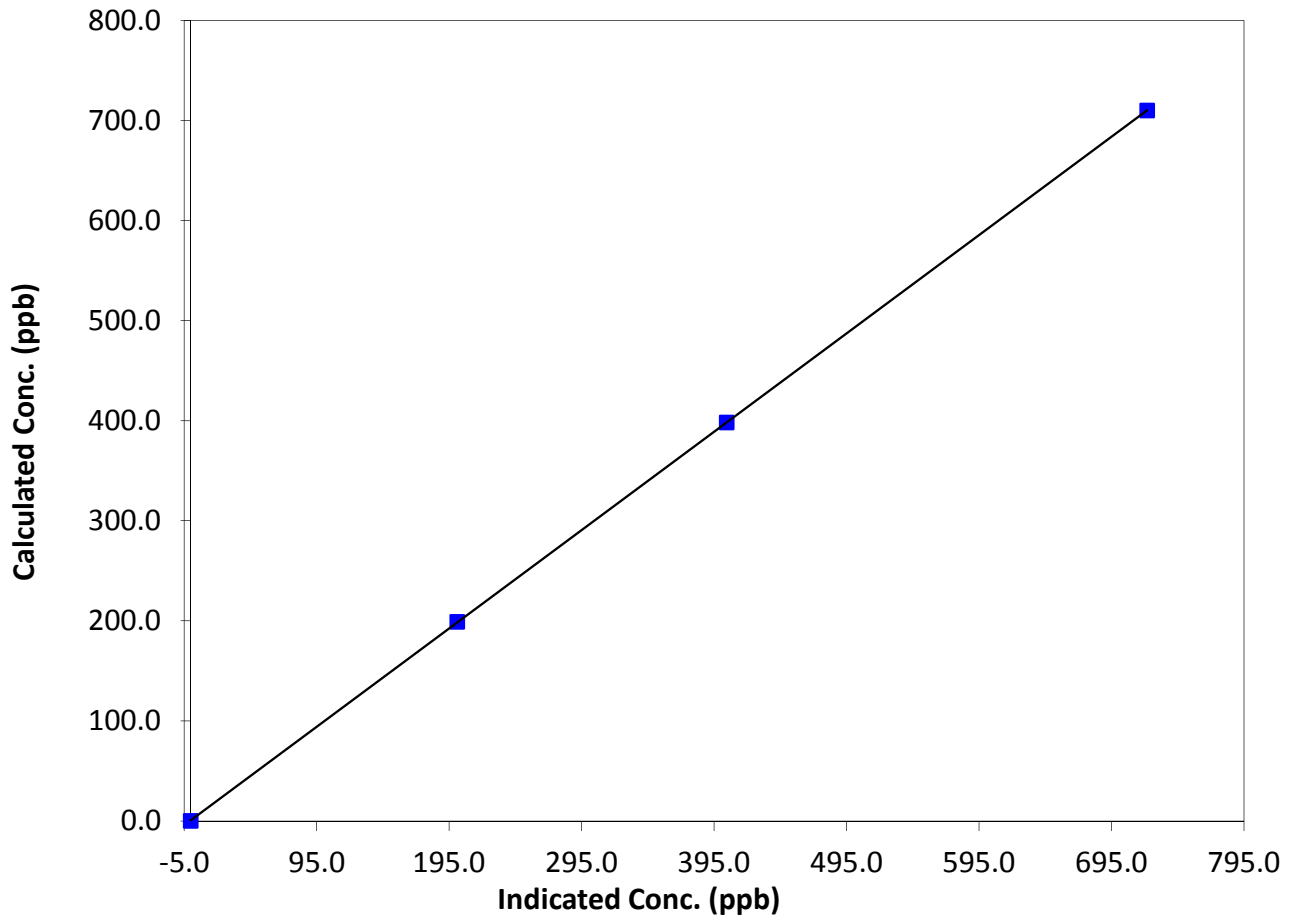
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 5, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	12:40
Analyzer make	Thermo 43C	Analyzer serial #	509110888

Calibration Data

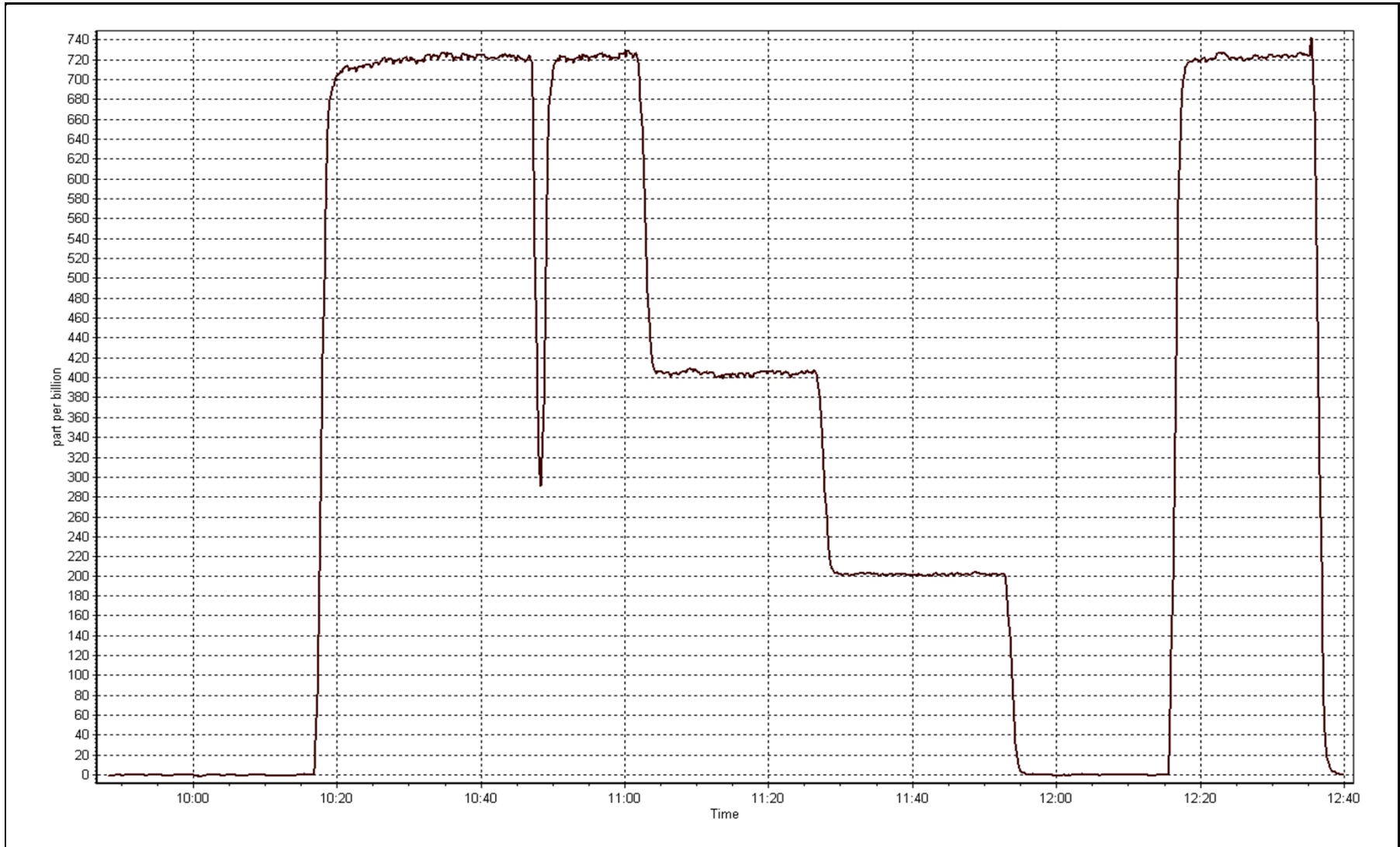
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
710.0	722.0	0.9834		
398.2	404.4	0.9845	Slope	0.982822
199.1	201.1	0.9901		
			Intercept	0.675988

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 10, 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	14:10
Barometric Pressure	739 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	1730512
Cal Gas Concentration	10.6 ppm H2S	Cal Gas Expiry Date	Dec 21 2012
Gas Cert Reference	LL27480	SO2 gas conc.	50.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	5000	DACS channel #	digital

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-859	-859
Analyzer Range (input)	100	100	Lamp voltage	1169	1172
Calculated slope	0.999917	1.013130	Chamber temp.	45	45
Calculated intercept	0.060480	-0.101624	Pressure	678	672
Analyzer Background	1.63	1.63	Flow	0.419	0.412
Analyzer Coefficient	0.976	0.976	Intensity	80	80
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153461
Converter make/model	CDN-101	Converter serial #	305

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	6500	0.0	0.00	-0.04	NA
as found span	6500	46.0	75.0	73.9	1.015
SO2 scrubber check	5500	21.9	199.1	0.50	NA
calibrator zero	6500	0.0	0.00	0.09	NA
high point	6500	46.0	75.0	74.2	1.011
second point	6500	24.6	40.1	39.5	1.015
third point	6500	12.3	20.1	20.0	1.002
as left zero	6500	0.0	0.0	0.14	NA
as left span	6500	46.0	75.0	74.8	1.003
Average Correction Factor					1.009

Corrected As found	73.9	Previous response	75.0	% change	1.4%
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Notes:

SOx scrubber check done after as found zero. Replaced thermocouple in converter after as found span to address some intermittent baseline shifts. No adjustments required.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

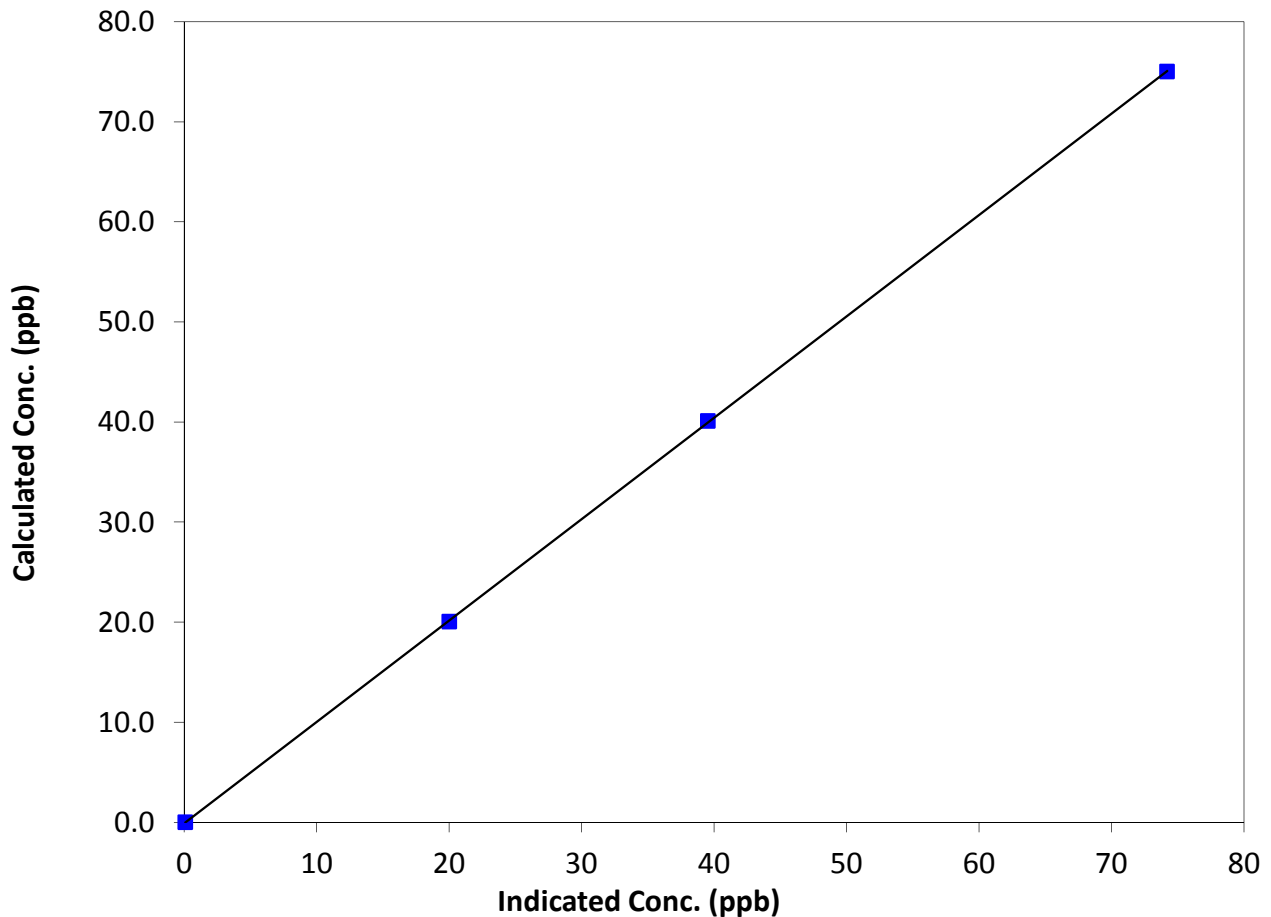
Station Information

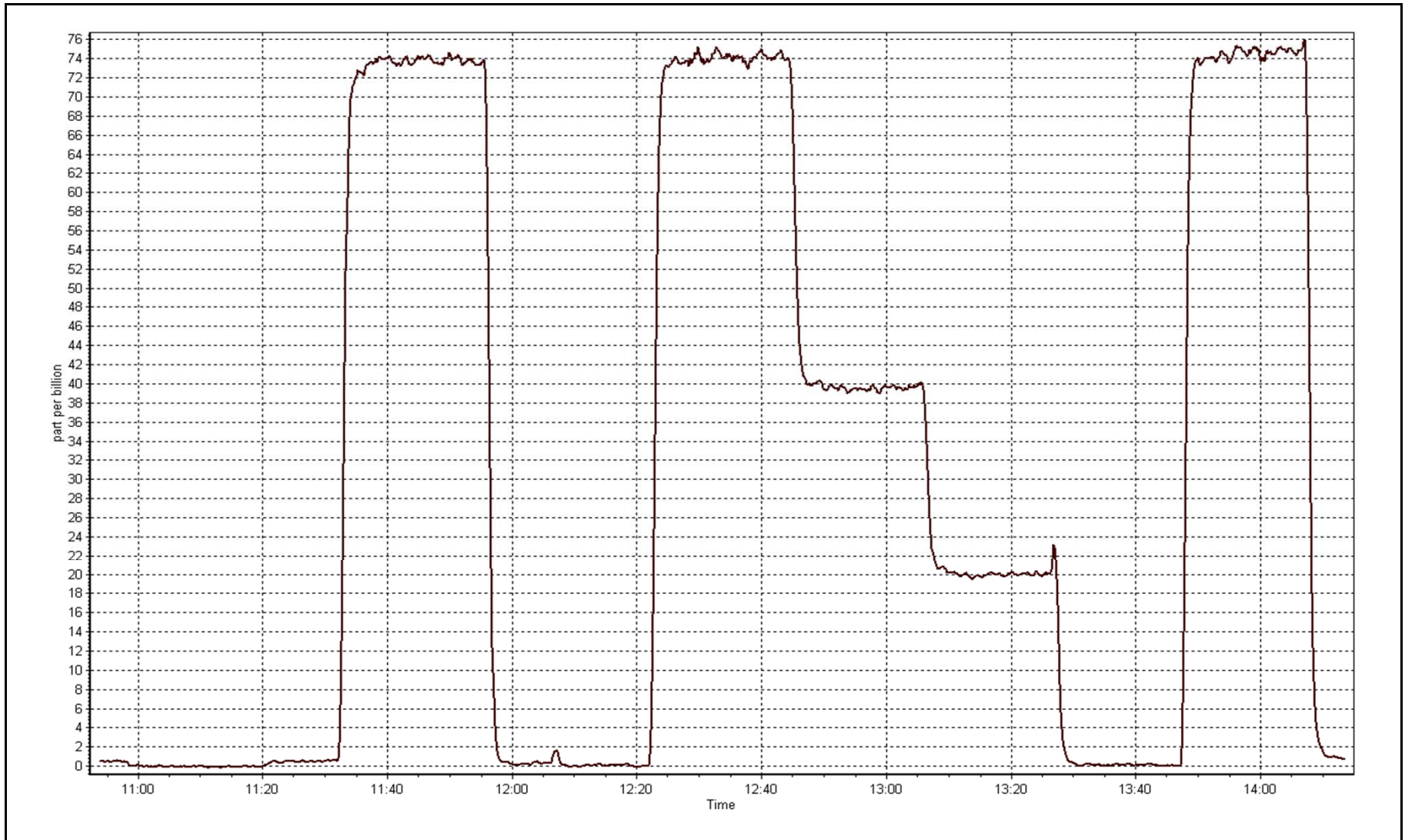
Calibration Date	March 6, 2015	Previous Calibration	February 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:55	End Time (MST)	14:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999985
75.0	74.2	1.0110		
40.1	39.5	1.0148	Slope	1.013130
20.1	20.0	1.0019		
			Intercept	-0.101624

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Tuesday, March 10, 2015	Prev Calibration	Thursday, February 05, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:40
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
Cal Gas Cert Ref	SA140071A	Cal Gas Exp Date	Sep 26 2017
CH4 Cal Gas Conc.	499.0	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	35.0	31.6
THC Range (input)	50	50	Flame Temp	401.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	40.0	40.4
NMHC Range (input)	50	50	Fuel Pressure	42.0	42.2
THC Calc slope	0.979056	0.986999	Air Pressure	32.0	32.2
THC Calc intercept	0.039206	0.025551	Det Temp	175.0	175.0
NMHC Calc slope	0.999533	0.986010	Filter Temp	175.0	175.0
NMHC Calc intercept	0.017072	0.012292	Column Temp	74.0	75.0

Analyzer make Thermo 55i Analyzer serial # 1331259520

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	N/A
as found span	5500	78.1	14.97	15.16	0.988
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	78.1	14.97	15.16	0.988
second point	5500	43.8	8.40	8.47	0.991
third point	5500	21.9	4.20	4.20	1.000
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	78.1	14.97	15.31	0.978
Average Correction Factor					0.993

Corrected As found 15.16 Previous response 15.26 % change 0.6%

Notes:

Hydrogen cylinder and inlet filter changed after as founds. No adjustments required.

Calibration Performed By: Michael Martineau



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	N/A
as found span	5500	78.1	7.89	7.99	0.987
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	78.1	7.89	7.99	0.987
second point	5500	43.8	4.42	4.48	0.987
third point	5500	21.9	2.21	2.21	1.001
calibrator zero					
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	78.1	7.89	8.04	0.981
Average Correction Factor					0.992

Corrected As found 7.99 Previous response 7.87 % change -1.4%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	78.1	7.09	7.17	0.988
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	78.1	7.09	7.17	0.988
second point	5500	43.8	3.97	4.00	0.993
third point	5500	21.9	1.99	1.99	0.998
calibrator zero					
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	78.1	7.09	7.27	0.975
Average Correction Factor					

Corrected As found 7.17 Previous response 7.38 % change 2.9%



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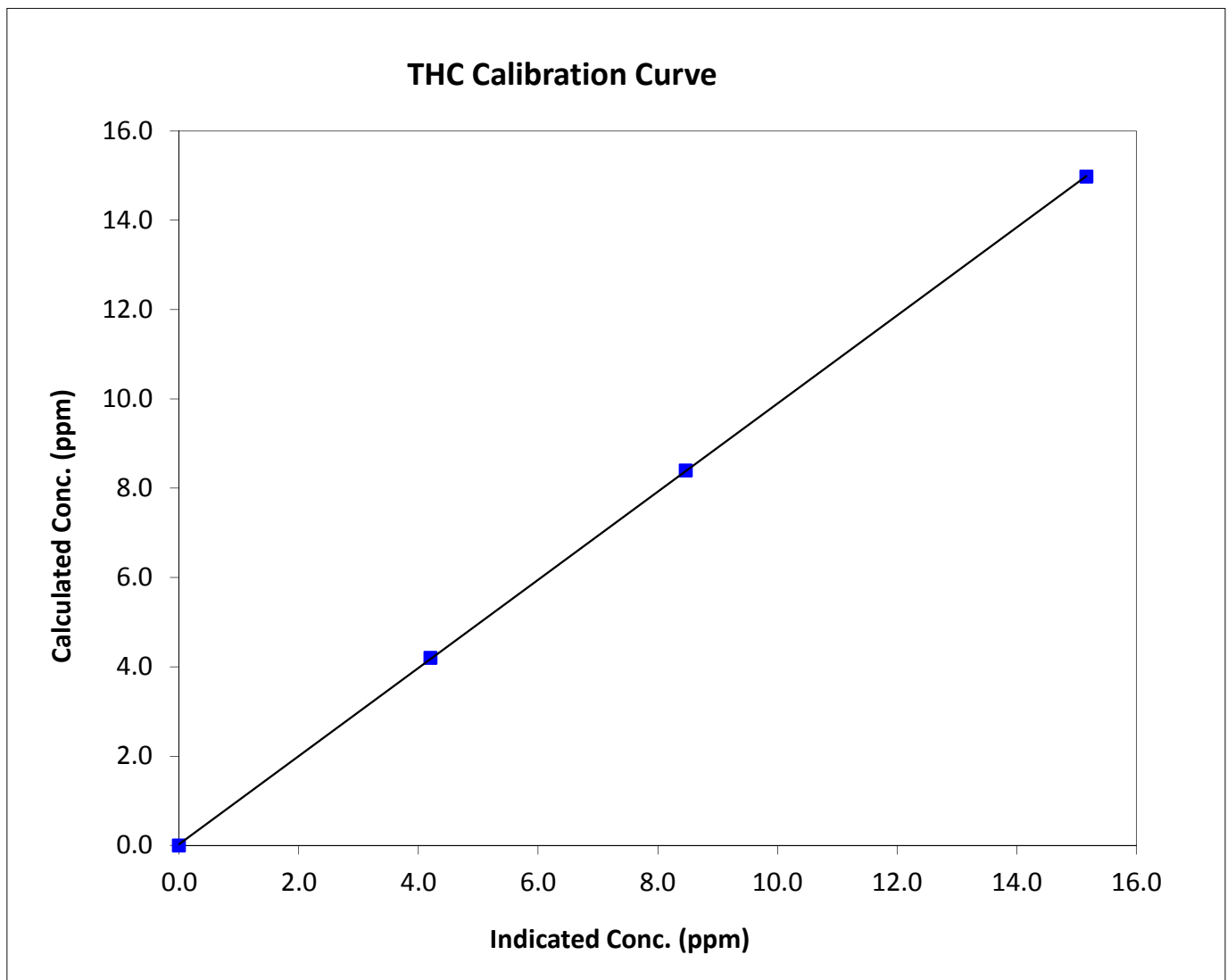
THC Calibration Summary

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 5, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	12:40
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999985
14.97	15.16	0.9877		
8.40	8.47	0.9915	Slope	0.986999
4.20	4.20	0.9997		
			Intercept	0.025551





Wood Buffalo Environmental Association

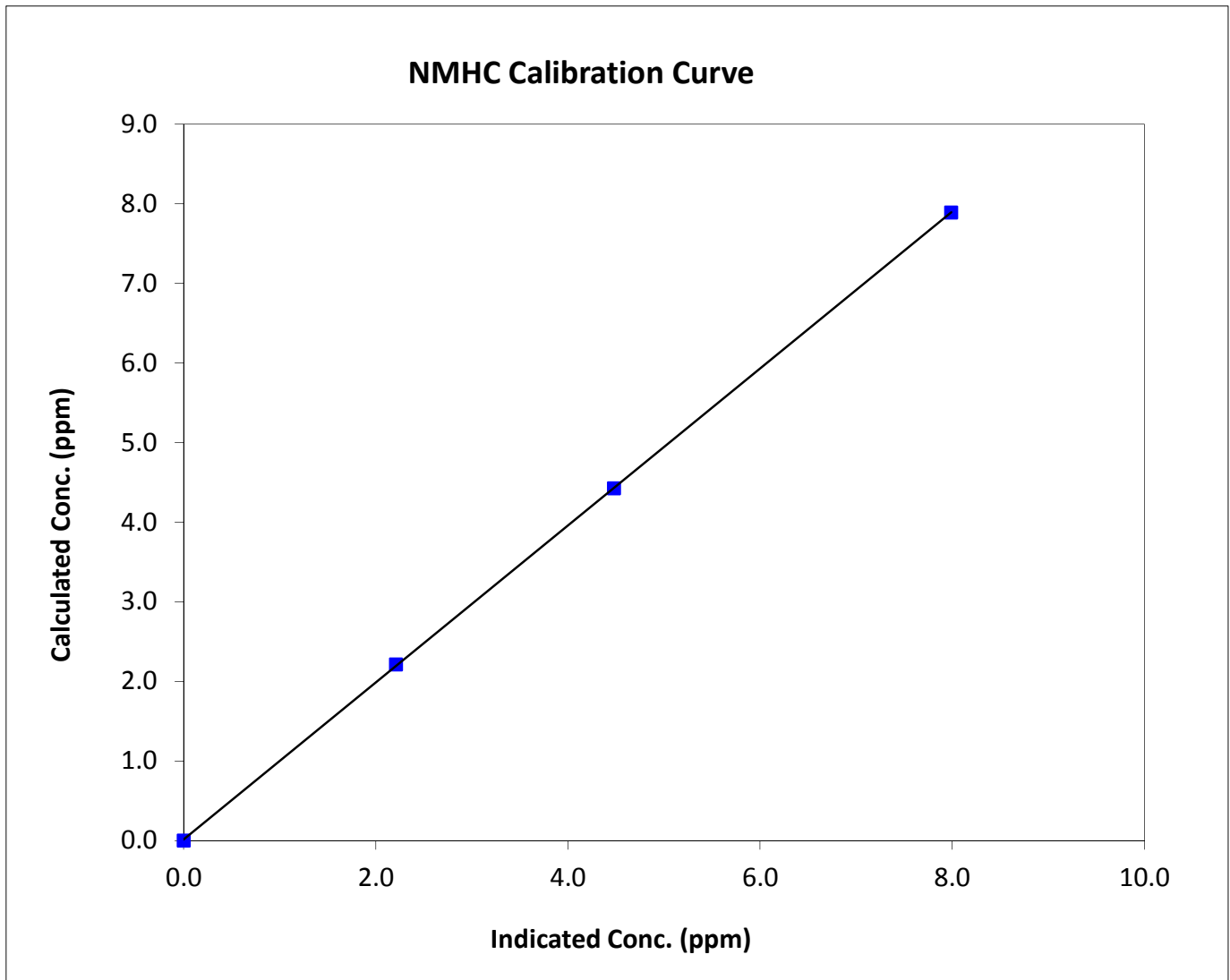
NMHC Calibration Summary

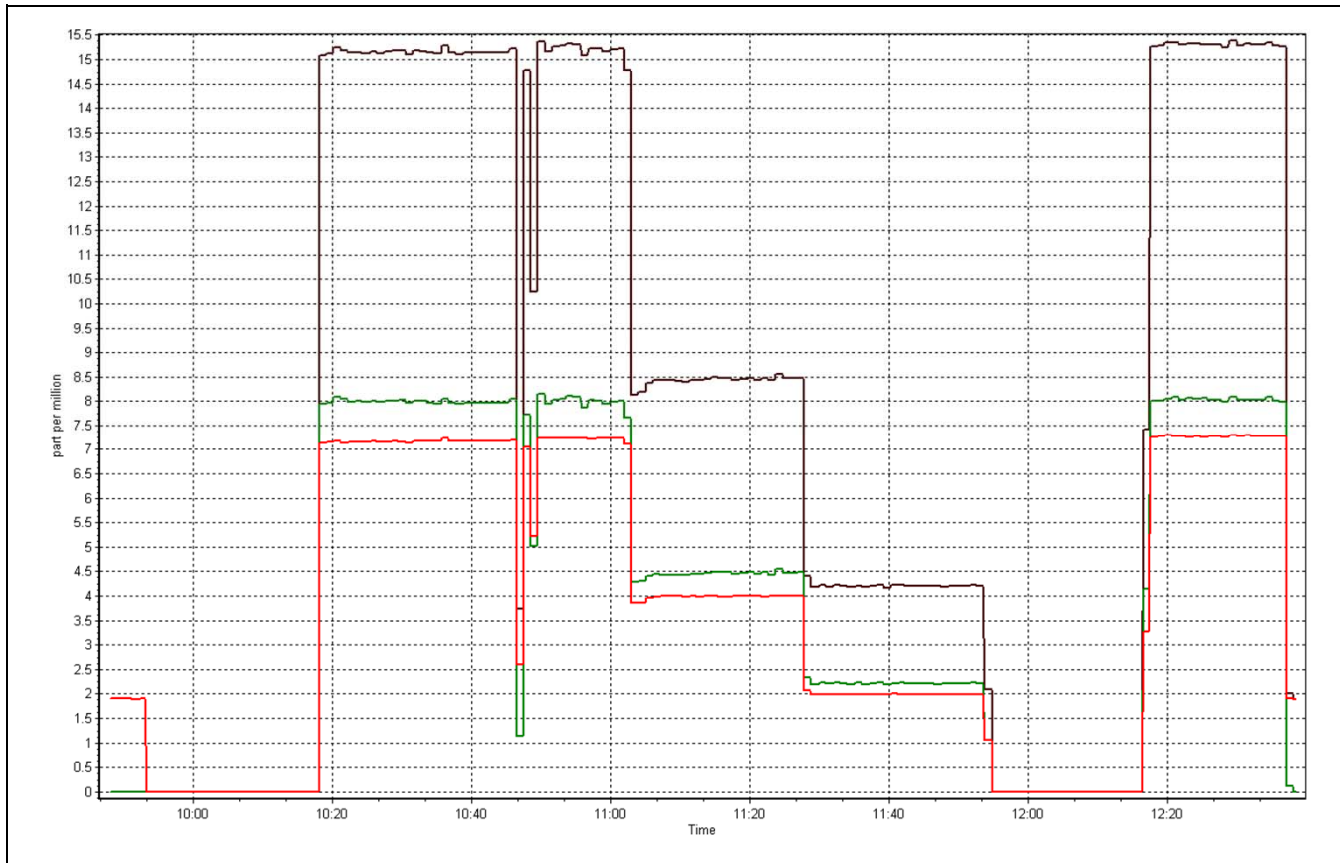
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 5, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	12:40
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999982
7.89	7.99	0.9872		
4.42	4.48	0.9875	Slope	0.986010
2.21	2.21	1.0009		
			Intercept	0.012292







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 24, 2015	Previous Calibration	February 6, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	12:00
Barometric Pressure	N/A mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
NO2 calibration used	Monday, March 23, 2015	Transfer Standard	na
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	5000	DACS channel #	Digital

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	24.0	25.1
Analyzer Range (input)	500	500	Lamp temp.	53.0	53.6
Calculated slope	0.991621	0.999514	Pressure	684.0	668.4
Calculated intercept	0.159105	-0.316016	Flow cell A	0.734	0.715
Analyzer Background	-0.3	-0.3	Flow cell B	0.737	0.717
Analyzer Coefficient	1.010	0.958	Cell A Intensity	84xxx	79700
			Cell B Intensity	79xxx	74400

Analyzer make Thermo 49i Analyzer serial # 1300156233

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	-0.4	N/A
as found span	5000	1.10	387.2	409.1	0.946
calibrator zero	5500	0.00	0.0	-0.4	N/A
high point	5000	1.10	387.2	387.0	1.001
second point	5000	0.60	198.9	200.8	0.991
third point	5000	0.35	103.1	103.4	0.997
calibrator zero					
as left zero	N/A	0.00	0.0	-0.6	NA
as left span	N/A	1.10	387.2	389.3	0.995
Average Correction Factor					0.996

Corrected As found 409.5 Previous response 390.3 % change -4.7%
Average Correction

Notes:

Adjusted span. Diagnostics indicate no issues with analyzer.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

O₃ Calibration Summary

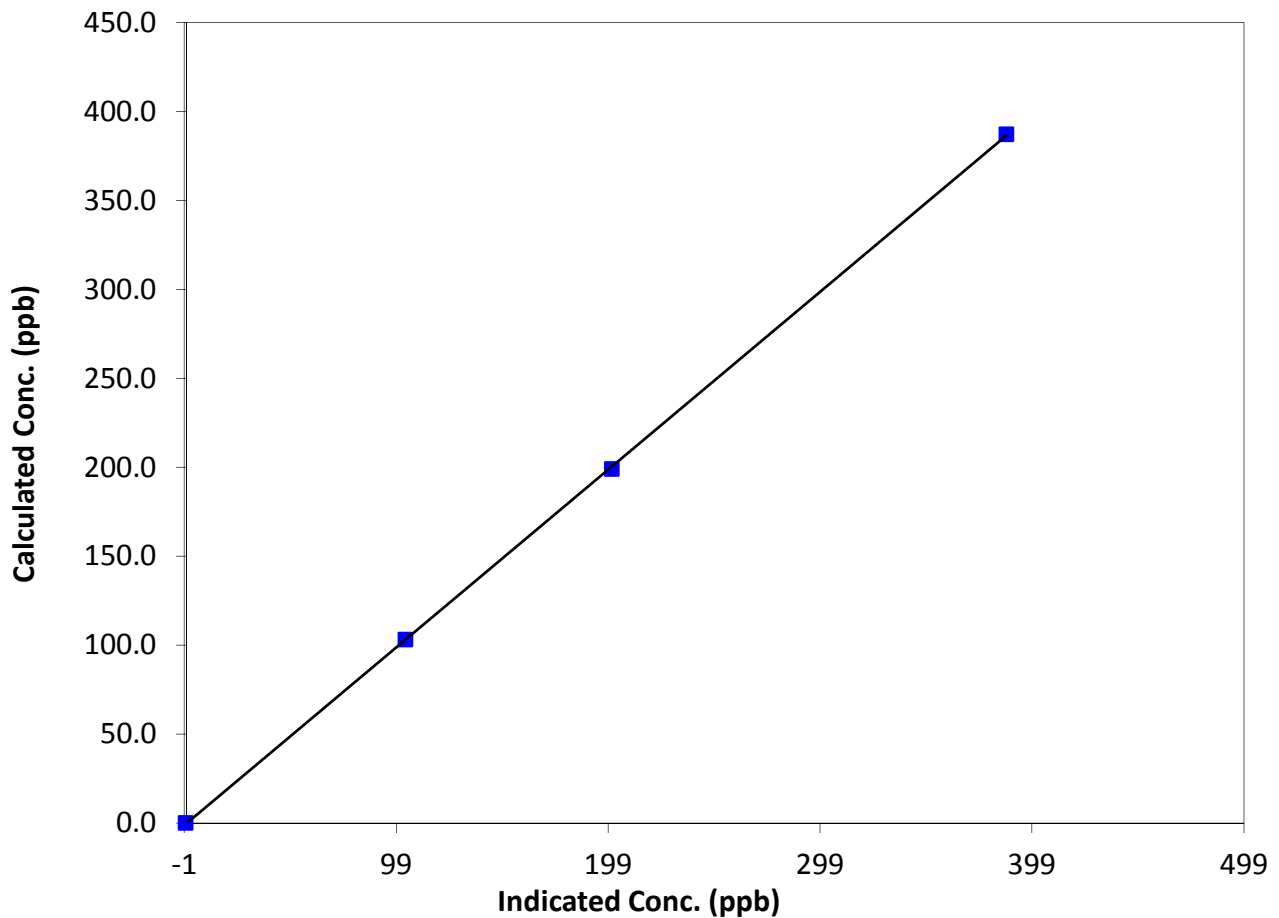
Station Information

Calibration Date	Tuesday, March 24, 2015	Previous Calibration	February 6, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:10	End Time (MST)	12:00
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

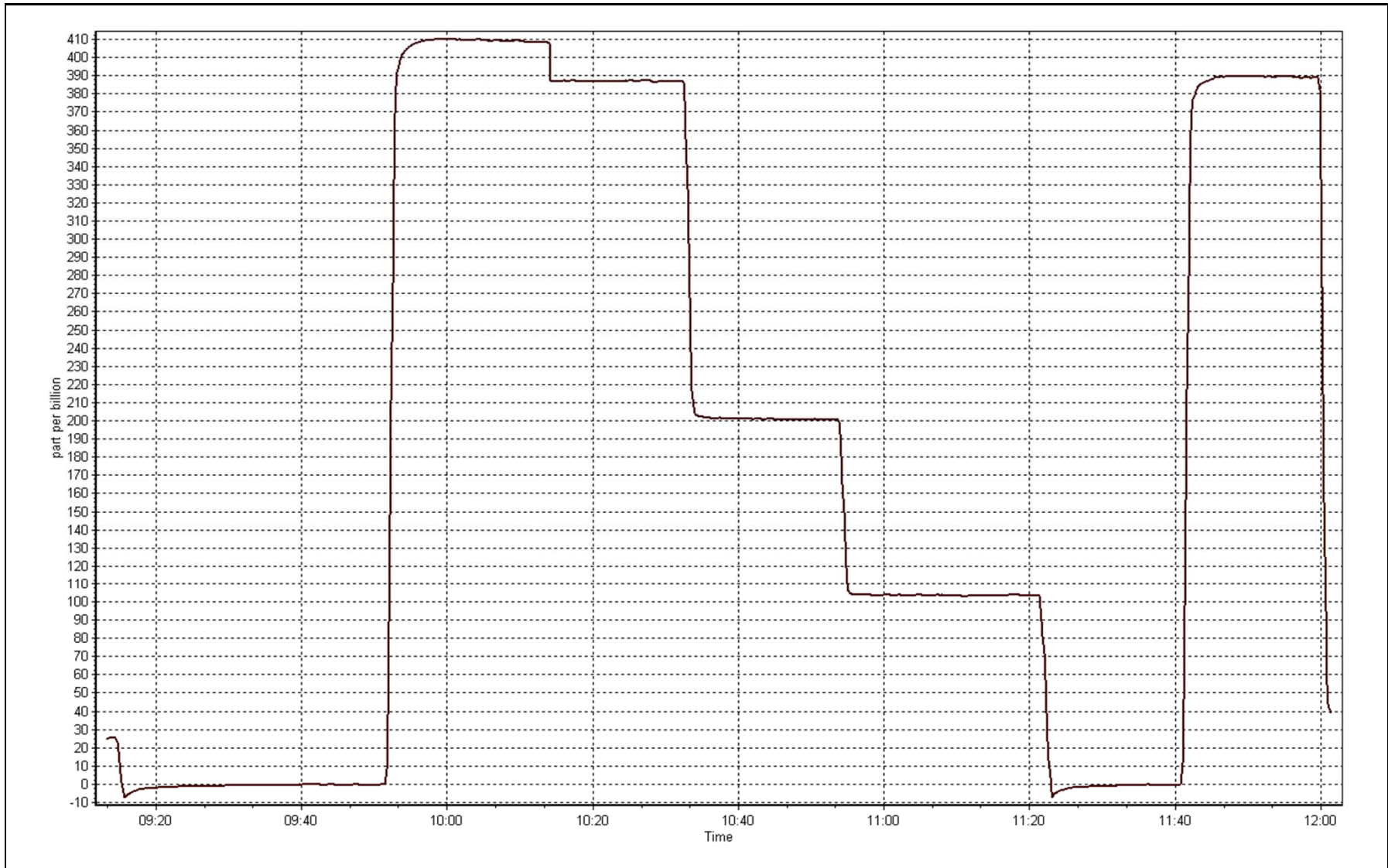
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999960
387.2	387.0	1.0006		
198.9	200.8	0.9905	Slope	0.999514
103.1	103.4	0.9971		
			Intercept	-0.316016

O₃ Calibration Curve



O3 Calibration Plot

Date: March 24, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 5, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:40
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	1730512
NO cal gas conc	52.8 ppm	Cal cyl serial #	SA140071A
NOx cal gas conc	52.8 ppm	Cal cyl expiry date	Sept 26 2017

DACS Information

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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	5000	5000	5000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.001305	1.003579	1.004842
	Data Offset	0.596914	0.633565	0.607503
After	Data Slope	0.998435	0.998115	1.002853
	Data Offset	0.832293	1.206945	0.228046
Channel #		digital	digital	digital
Voltage Range		0-5000mv	0-5000mv	0-5000mv

Analyzer Information

Analyzer make/model Thermo 42i NO/NO2/NOx Analyzer Analyzer serial # 1218153357

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.815	ppb	0.849	ppb
NOx coefficient	1.000	ppb	0.998	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	5.8		6.1	
NOx bkgrnd	5.9		6.2	
Chamber Temp	50.0	Deg C	50.4	Deg C
Moly Temp	326.0	Deg C	328.0	Deg C
PMT Temp	-2.7	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	206.0	mmHg	207.5	mmHg
Sample Flow	503.0	ccm	472.0	ccm

Notes:

Adjusted span. Diagnostics OK; percent change likely due to new calibration gas cylinder. As lefts not completed due to NH3 calibration.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date: March 23, 2015 Station Number: AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.47	0.04	0.43	N/A	N/A
as found span	5500	78.1	749.8	749.8	0.0	726.3	723.5	2.8	1.032	1.036
calibrator zero	5500	0.0	0.0	0.0	0.0	0.5	0.0	0.4	N/A	N/A
high point	5500	78.1	749.8	749.8	0.0	750.8	750.7	0.2	0.999	0.999
second point	5500	43.8	420.5	420.5	0.0	419.8	419.5	0.2	1.002	1.002
third point	5500	21.9	210.2	210.2	0.0	208.3	208.0	0.3	1.010	1.011
calibrator zero										
as left zero										
as left span										
Average Correction Factor									1.003	1.004

Corrected As found NO_x= 725.8 NO= 723.5 Percent Change NO_x= 3.1% NO= 3.2%
 Previous Response NO_x= 748.2 NO= 746.5

GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 78.10 ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.4			N/A	
1st NO ₂ (300)	N/A	361.9	387.2	748.1	361.9	386.2	0.988	1.000	1.002	99.8%
2nd NO ₂ (200)	N/A	550.1	198.9	747.8	550.1	197.7	0.989	1.000	1.006	99.4%
3rd NO ₂ (100)	N/A	645.9	103.1	747.9	645.9	102.0	0.988	1.000	1.011	98.9%
4th NO ₂ (0)	749.0	N/A	0.0	749.0	749.0	0.0	0.987	1.000	N/A	N/A
Average Correction Factor							0.988	1.000	1.007	99.4%

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

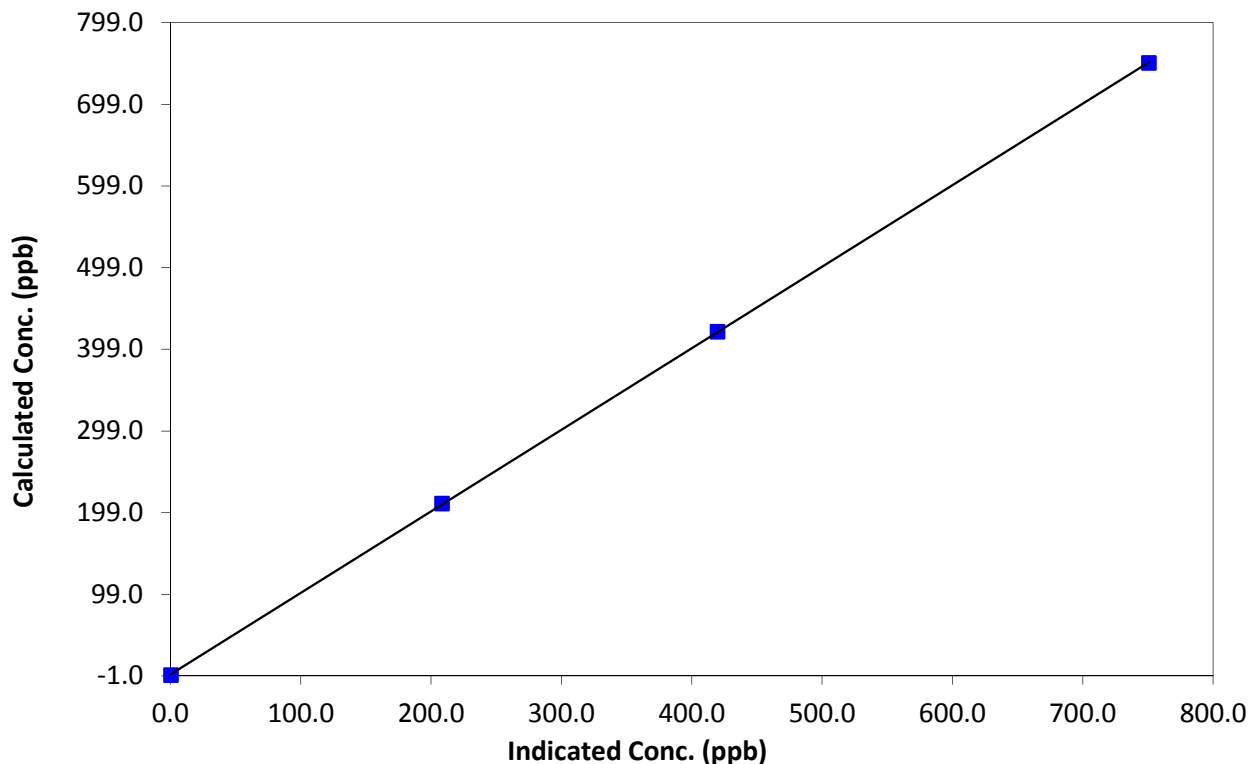
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 5, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	13:40
Analyzer make	Thermo 42i NO/NO ₂ /NO _x Analyzer	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999985
749.8	750.8	0.9986		
420.5	419.8	1.0017	Slope	0.998435
210.2	208.3	1.0095		
			Intercept	0.832293

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

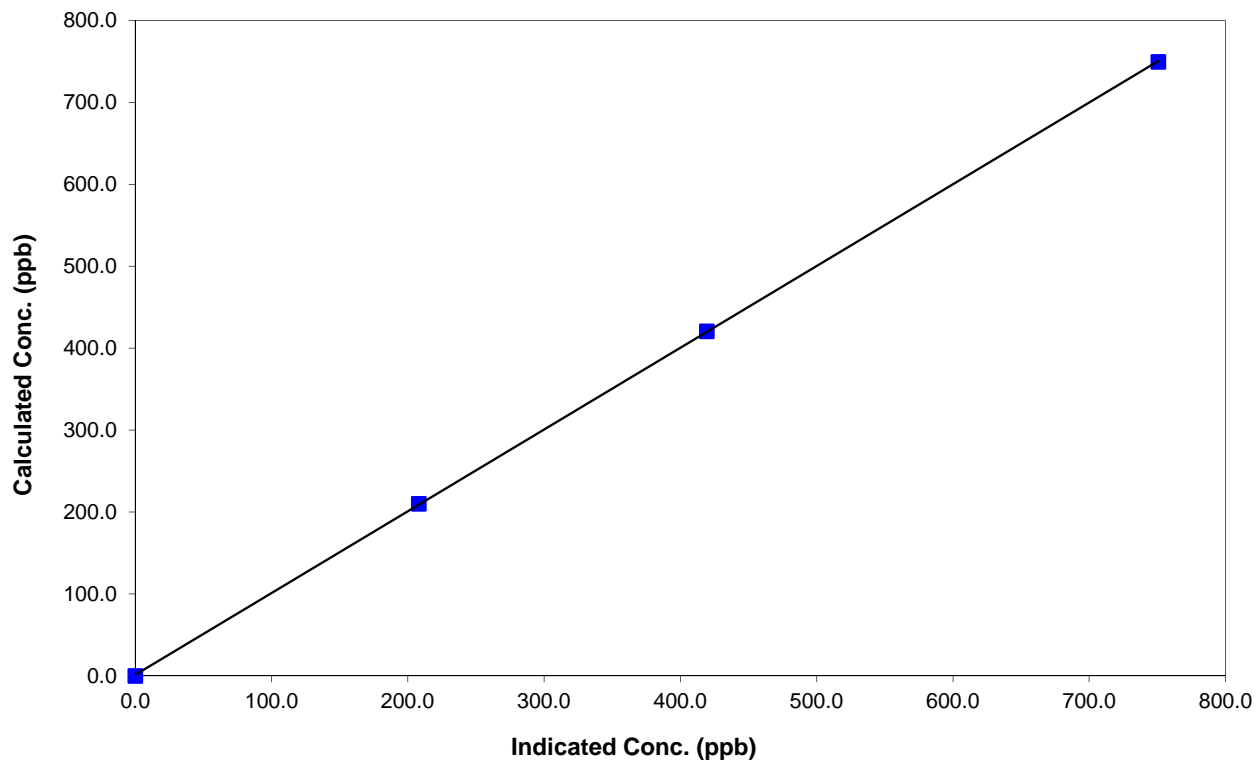
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 5, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	13:40
Analyzer make	Thermo 42i NO/NO2/NOx Analyzer	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	0.999986
749.8	750.7	0.9988		
420.5	419.5	1.0022	Slope	0.998115
210.2	208.0	1.0107		
			Intercept	1.206945

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

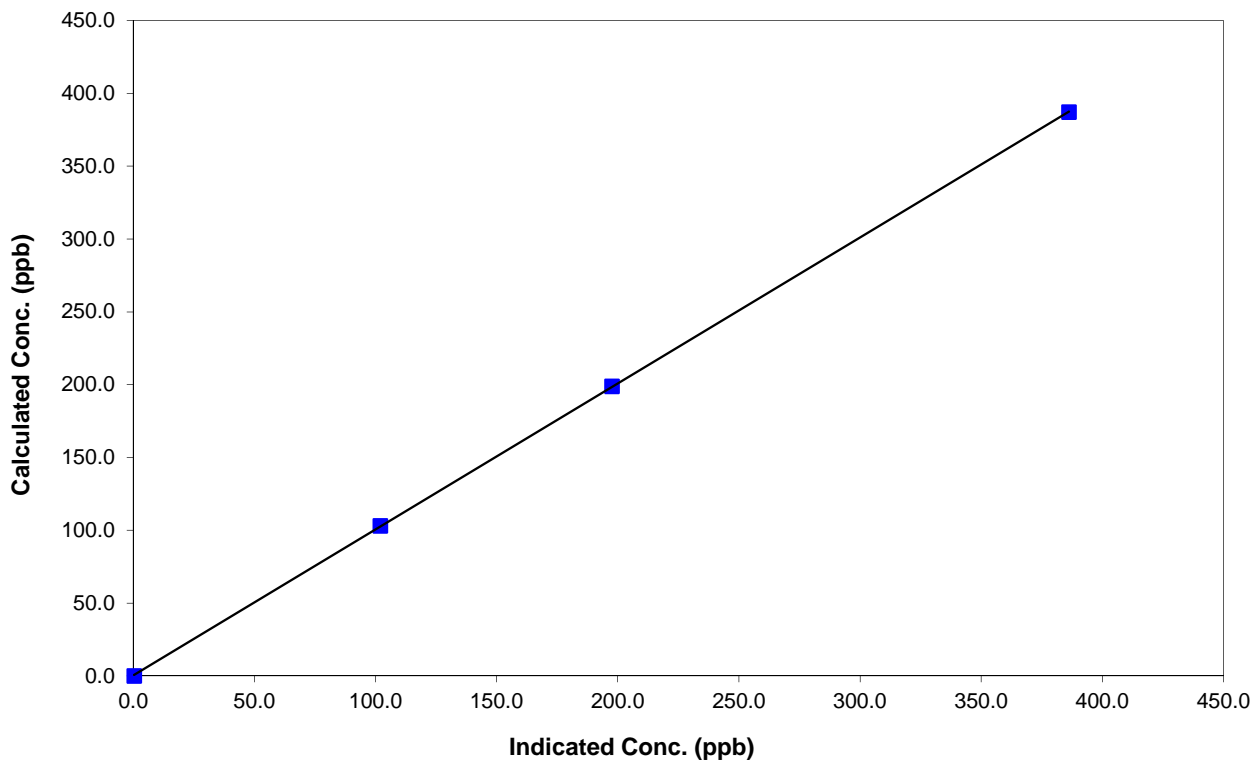
Station Information

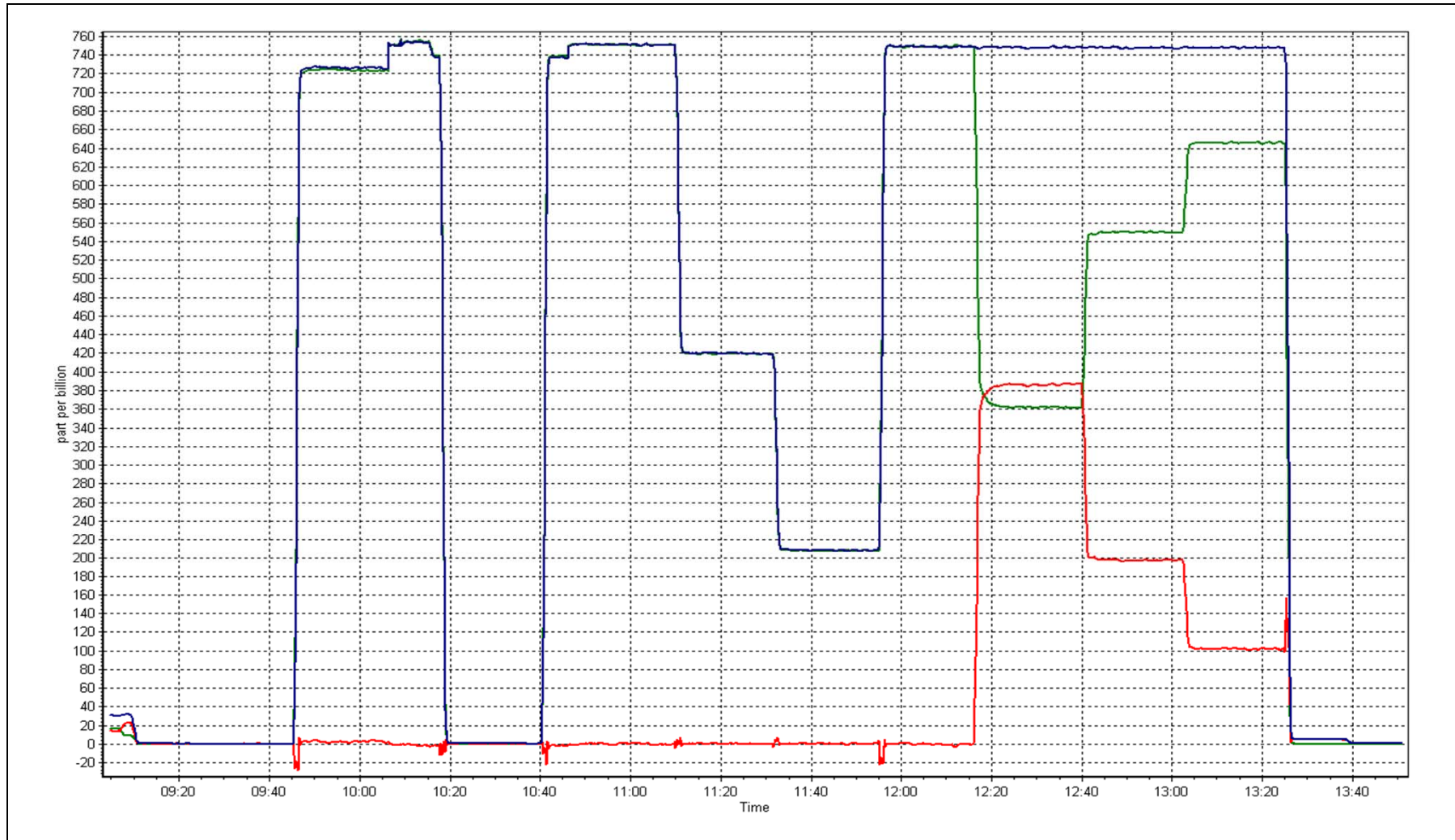
Calibration Date	March 23, 2015	Previous Calibration	February 5, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	13:40
Analyzer make	Thermo 42i NO/NO ₂ /NO _x Analyzer	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999986
387.2	386.2	1.0024		
198.9	197.7	1.0063	Slope	1.002853
103.1	102.0	1.0109		
			Intercept	0.228046

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	March 23, 2015	NOX Previous Cal Date	February 6, 2015
NH3 Calibration Date	March 23, 2015	NH3 Previous Cal Date	February 6, 2015
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	16:00
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	1730512
NH3 Cal Gas Conc	192.0 ppm	NH3 Expiry Date / SN	March 3, 2012 LL156612
NOx Cal Gas Conc	52.8 ppm	NO Expiry Date / SN	September 26, 2017 SA140071A
NO Cal Gas Conc	52.8 ppm		

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	2582
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Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.986231	1.000000	1.000412	1.000000	0.986731
	Data Offset	18.598157	2.000000	1.039306	1.000000	17.515685
Cal Stats After	Data Slope	1.002647	0.994785	0.997654	0.996512	1.002049
	Data Offset	-6.699135	-6.404847	1.201157	1.811754	-2.139571
IP address		192.168.1.17				

Analyzer Information

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

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
NO BKG	0.1	ppb	-0.1	ppb
NOx BKG	0.0	ppb	0.0	ppb
Nt BKG	0.1		0.1	
NO coefficient	0.960		1.109	
NO2 coefficient		ppb		ppb
NOx coefficient	1.028		1.190	
NH3 coefficient	0.890		0.890	
Nt coefficient	1.030		1.189	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.0	Deg C	315.7	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	85.0	ccm
R Cell Press	6.5	mmHg	4.5	mmHg
PMT Voltage	614.0	v	645.0	v
Sample Flow 1 NO	521.0	ccm	519.0	ccm
Sample Flow 2 Nox	521.0	ccm	523.0	ccm
Sample Flow 3 Nt	521.0	ccm	554.0	ccm

Notes:

replaced pump and charcoal scrubber after as founds. Adjusted zero and Nox/NO/Nt span. No NH3 converter adjustment required. Dips on graph are the result of comm errors, not indicative of analyzer performance



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date: March 23, 2015 Station Number: AMS 1

NH3 Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO _x conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-2.4	-2.9	0.5	NA	NA
as found NO	5500	78.1	749.8	749.8	NA	735.4	730.8	4.4	1.020	NA
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.9	-1.2	0.4	NA	NA
high NO point	5500	78.1	749.8	749.8	NA	750.3	750.2	0.1	0.999	NA
NO/O3 point	5500	78.1	749.8	749.8	NA	752.8	752.4	0.4	0.996	NA
as found NH ₃	6500	67.7	1999.8	NA	1999.8	2013.4	14.9	1998.6	0.993	1.001
first NH ₃	6500	67.7	1999.8	NA	1999.8	2013.4	14.9	1998.6	0.993	1.001
second NH ₃	6500	33.9	1001.4	NA	1001.4	1015.2	8.6	1006.6	0.986	0.995
third NH ₃	6500	17.0	502.2	NA	502.2	519.6	4.5	515.2	0.966	0.975
Average Correction Factor									0.9976	0.9900

Corrected As Found NH₃ = 1998.1 ppb Previous Response NH₃ = 2009.1 ppb NH₃ percent change 0.6%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: March 23, 2015 Station Number: AMS 1

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	Nt Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-2.9	-2.5	-2.4	N/A	N/A
as found span	5500	78.1	749.8	749.8	749.8	730.8	734.6	735.4	1.0259	1.0207
calibrator zero	5500	0.0	0.0	0.0	0.0	-1.2	-1.2	-0.9	N/A	N/A
high point	5500	78.1	749.8	749.8	749.8	750.2	750.8	750.3	0.9995	0.9987
second point	5500	43.8	420.5	420.5	420.5	420.6	420.2	421.5	0.9997	1.0006
third point	5500	21.9	210.2	210.2	210.2	209.4	208.3	207.2	1.0043	1.0093
calibrator zero										
as left zero	5500									
as left span	5500									
Average Correction Factor									1.0011	1.0029

	Nt	NO _x	NO	NO ₂
Corrected As found	737.74	733.71	737.03	386.4
Previous Response	747.8	748.4	733.6	375.9
Percent Change	1.4%	2.0%	-0.5%	-2.7%

GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 78.10 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			1.8			N/A	
1st NO ₂ (300)	N/A	363.3	387.3	751.5	363.3	388.2	0.9977	1.0000	0.9976	100.2%
2nd NO ₂ (200)	N/A	552.8	197.8	753.2	552.8	200.3	0.9955	1.0000	0.9871	101.3%
3rd NO ₂ (100)	N/A	650.7	99.9	752.4	650.7	101.8	0.9964	1.0000	0.9817	101.9%
4th NO ₂ (0)	750.6	N/A	1.8	752.4	750.6	1.8	0.9965	1.0000	N/A	N/A
Average Correction Factor							0.9965	1.0000	0.9888	101.1%

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

NH3 Calibration Summary

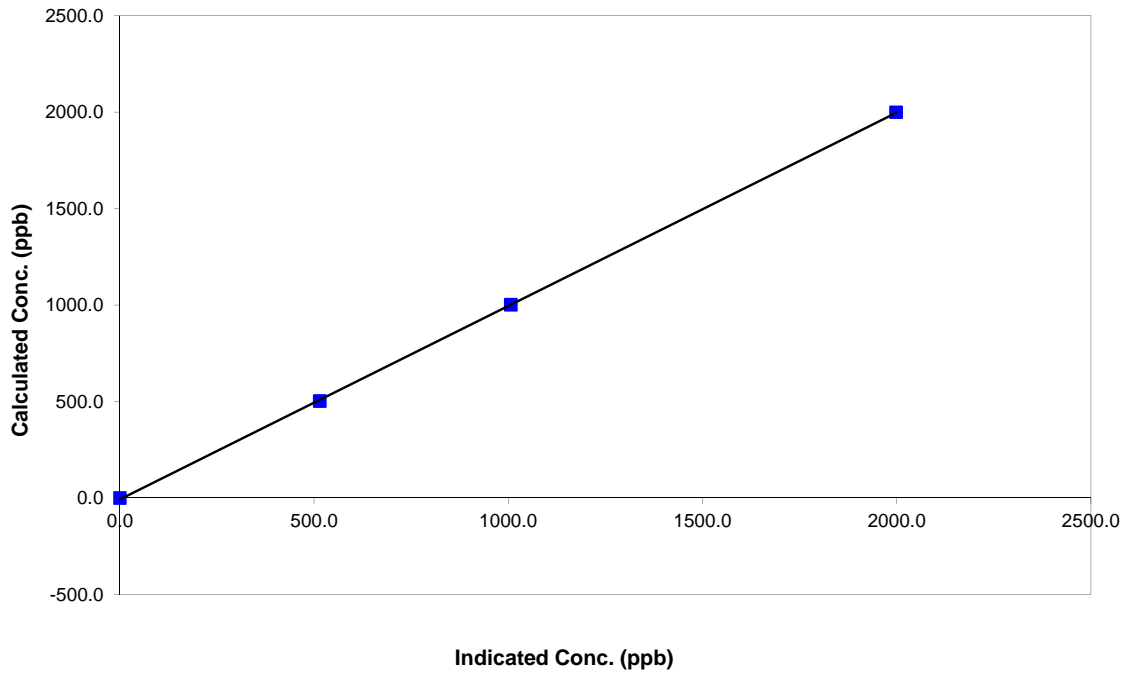
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 6, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	16:00
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	0.4	N/A	Correlation Coefficient	0.999951
1999.8	1998.6	1.0006		
1001.4	1006.6	0.9947		
502.2	515.2	0.9748		
			Slope	1.002647
			Intercept	-6.699135

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

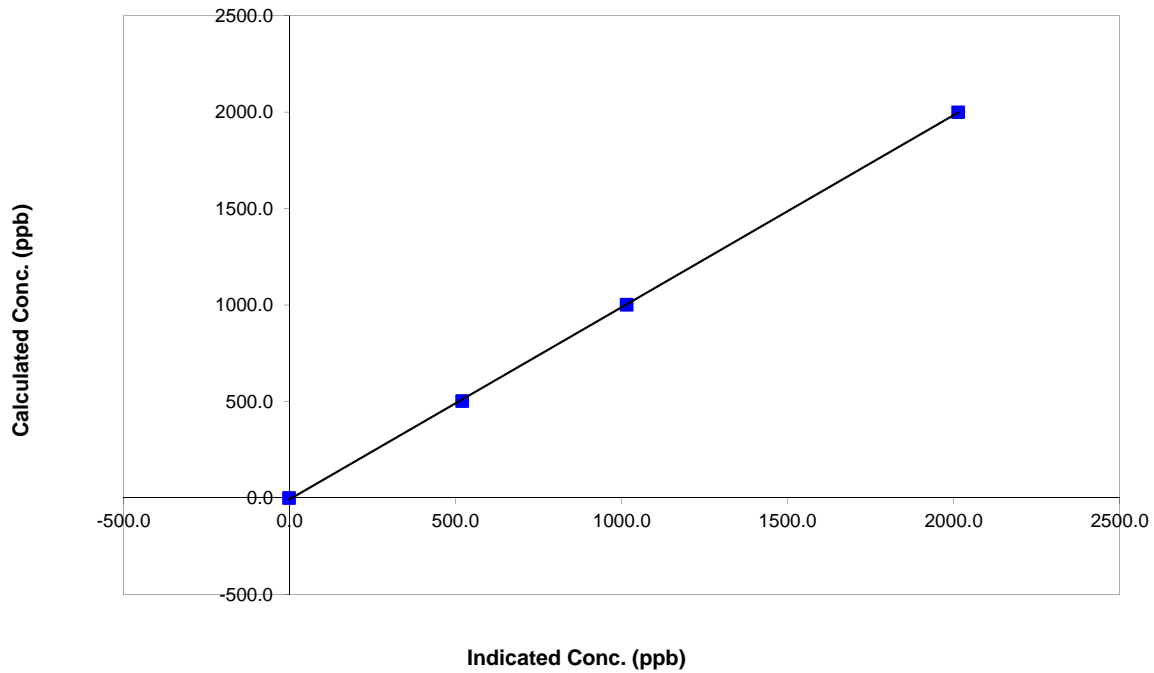
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 6, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	16:00
Analyzer make	API T201	Analyzer serial #	152

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.9	N/A	Correlation Coefficient	0.999937
1999.8	2013.4	0.9932		
1001.4	1015.2	0.9863	Slope	0.994785
502.2	519.6	0.9664		
			Intercept	-6.404847

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

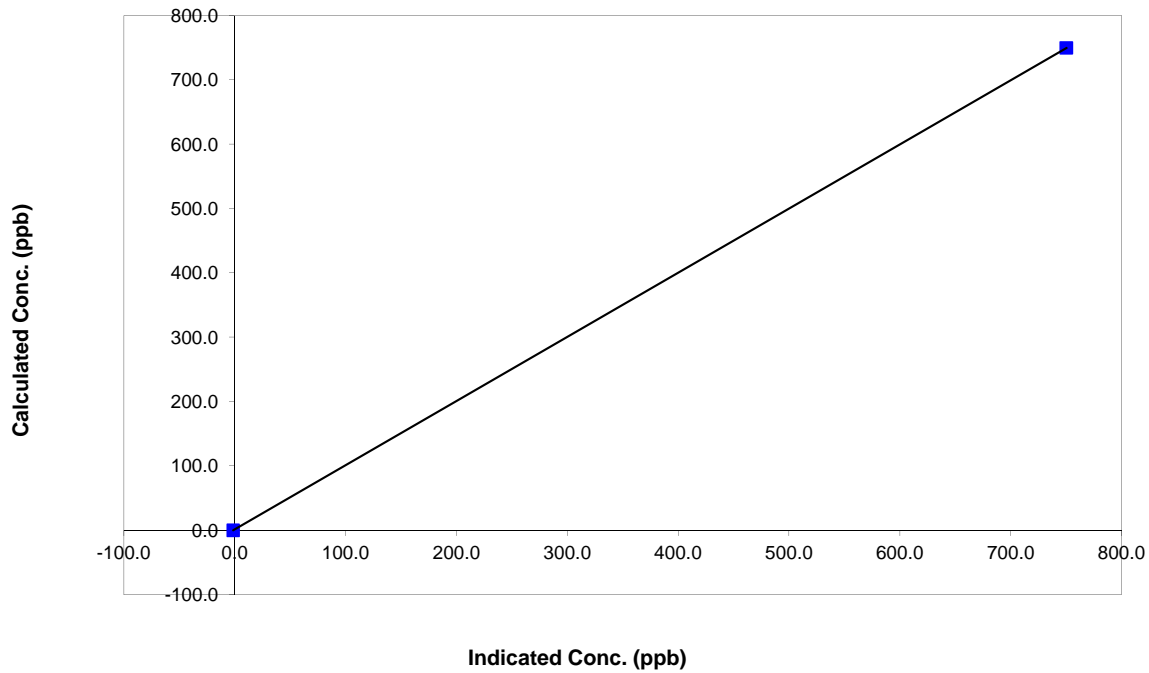
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 6, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	16:00
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	-1.2	N/A	Correlation Coefficient	0.999999
749.8	750.2	0.9995		
420.5	420.6	0.9997	Slope	0.997654
210.2	209.4	1.0043		
			Intercept	1.201157

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

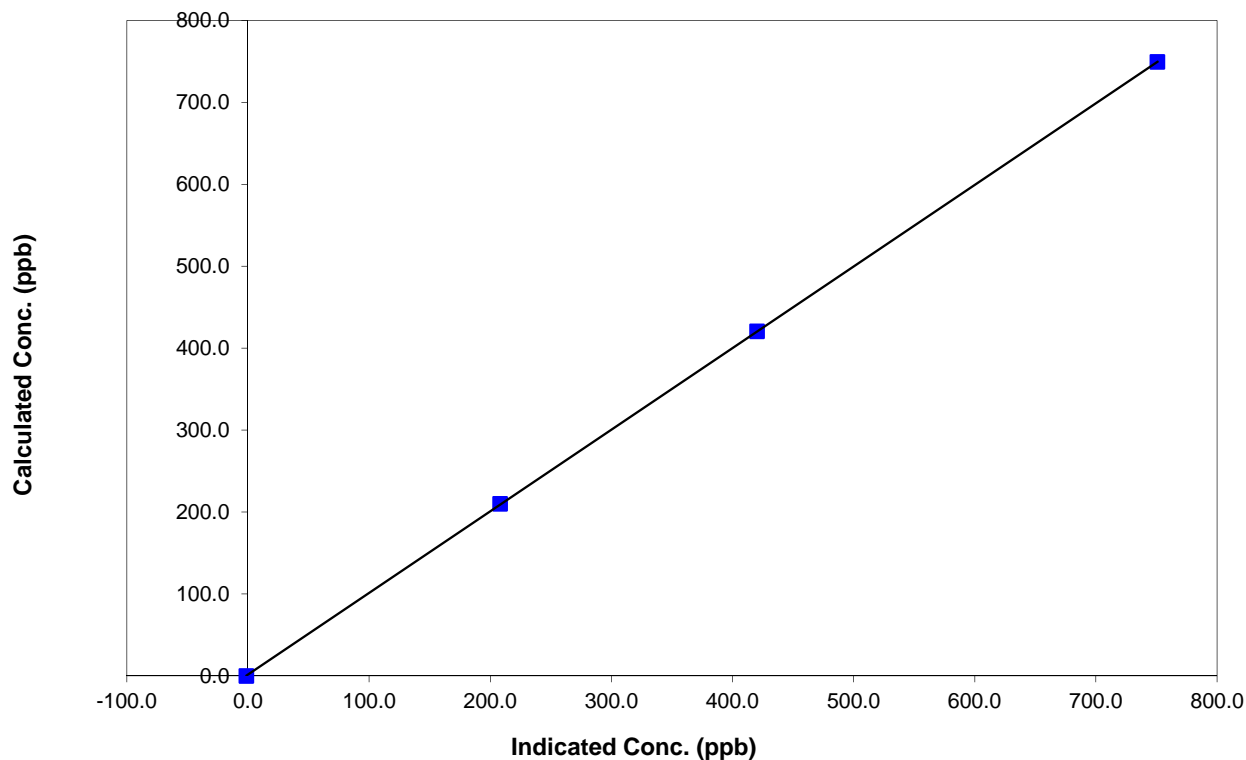
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 6, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	16:00
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	-1.2	N/A	Correlation Coefficient	0.999996
749.8	750.8	0.9987		
420.5	420.2	1.0006	Slope	0.996512
210.2	208.3	1.0093		
			Intercept	1.811754

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

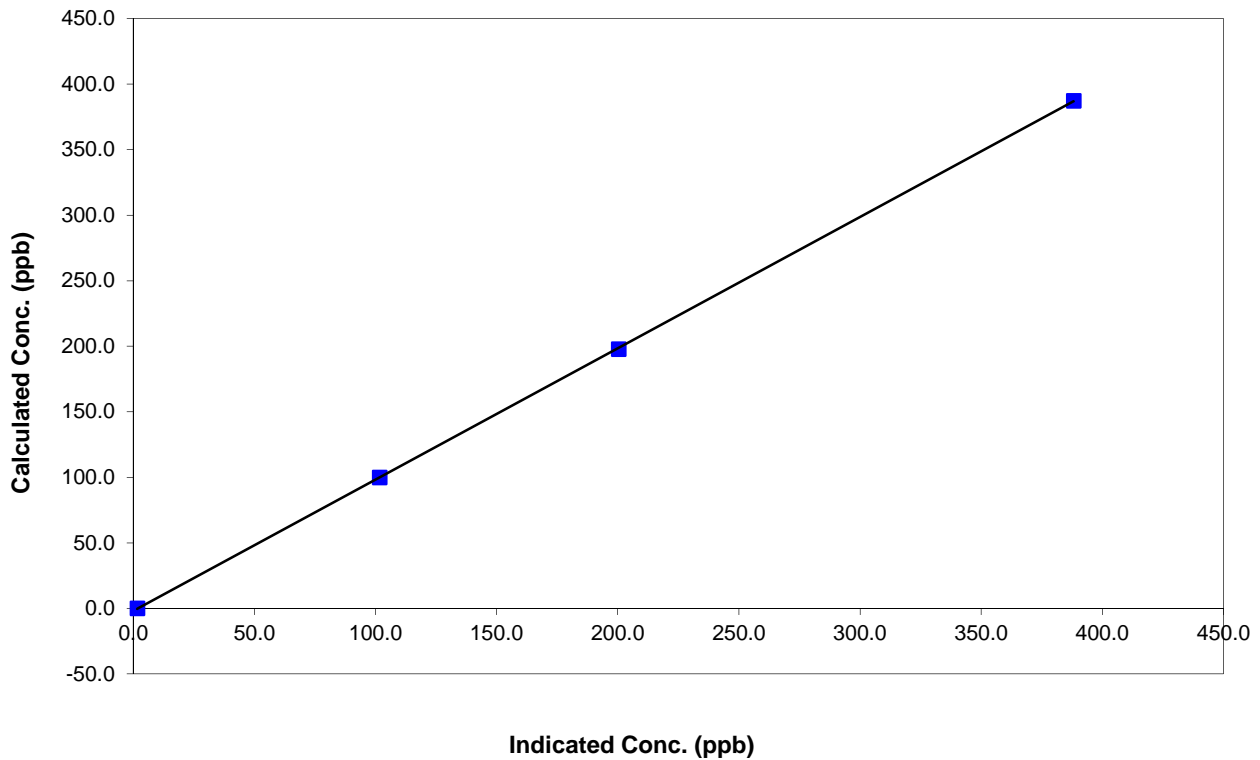
Station Information

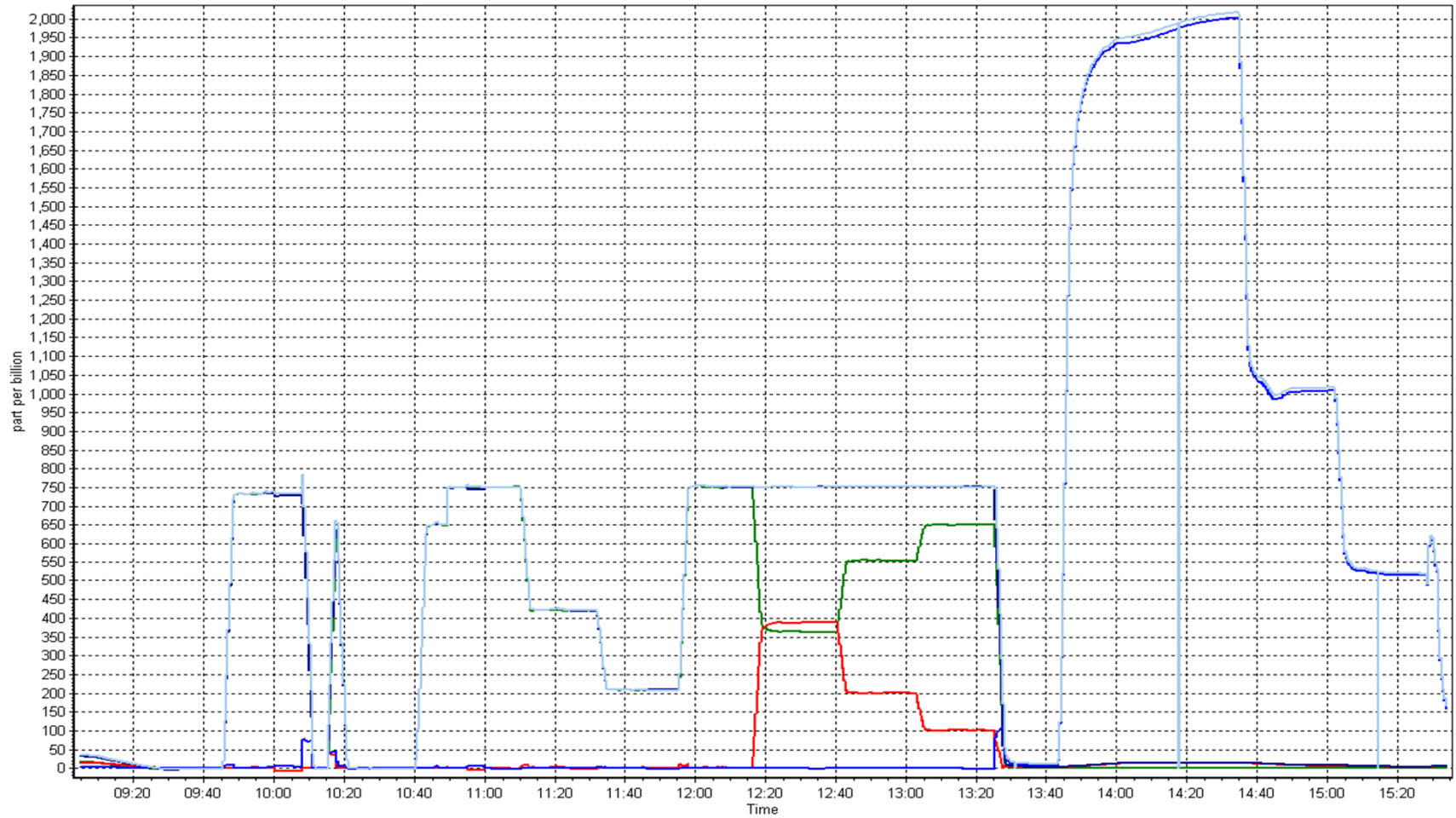
Calibration Date	March 23, 2015	Previous Calibration	February 6, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	16:00
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.8	N/A	Correlation Coefficient	0.999987
387.3	388.2	0.9976		
197.8	200.3	0.9871	Slope	1.002049
99.9	101.8	0.9817		
			Intercept	-2.139571

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 2
MILDRED LAKE
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	710	34	34	100.00	46	0	7	0
H2S (ppb) Average	710	34	34	100.00	4	0	2	0
THC (ppm) Average	707	35	37	99.73	6.7	-	3.3	-
Temperature (C) Average	744	0	0	100.00	13.2	-	6.6	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	92	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	33	-	21	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	2.4	4	-	0	0	1	1	2	6	46
H2S (ppb) Average	710	0.6	1	-	0	0	0	0	1	1	4
THC (ppm) Average	707	2.51	0.6	-	1.9	2.1	2.2	2.3	2.6	3.1	6.7
Temperature 2 m (C) Average	744	-3.97	8.4	-	-30.9	-14.7	-9.4	-3.5	2.4	5.6	13.2
Relative Humidity (%) Average	744	67.8	18	-	25	44	54	69	83	90	100
Wind Speed 10 m (km/h) Average	744	8.6	5	-	0	3	5	8	11	15	33
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	12 Mar 2015 11:00	12 Mar 2015 12:00	2	Maintenance - replaced fuel cylinder and relit FID

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 46 ppb on Mar 25 12:00	Maximum Daily Average: 7.2 ppb on Mar 14		Hours of Data:	710
Minimum Value: 0 ppb on Mar 11 08:00	Minimum Daily Average: 0.4 ppb on Mar 11		Hours of Missing Data:	34
Maximum Diurnal Average: 4.8 ppb at hour 12	Minimum Diurnal Average: 1.0 ppb at hour 2		Hours of Calibration:	34
Monthly Average: 2.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 19		Percent Operational Time:	100.0

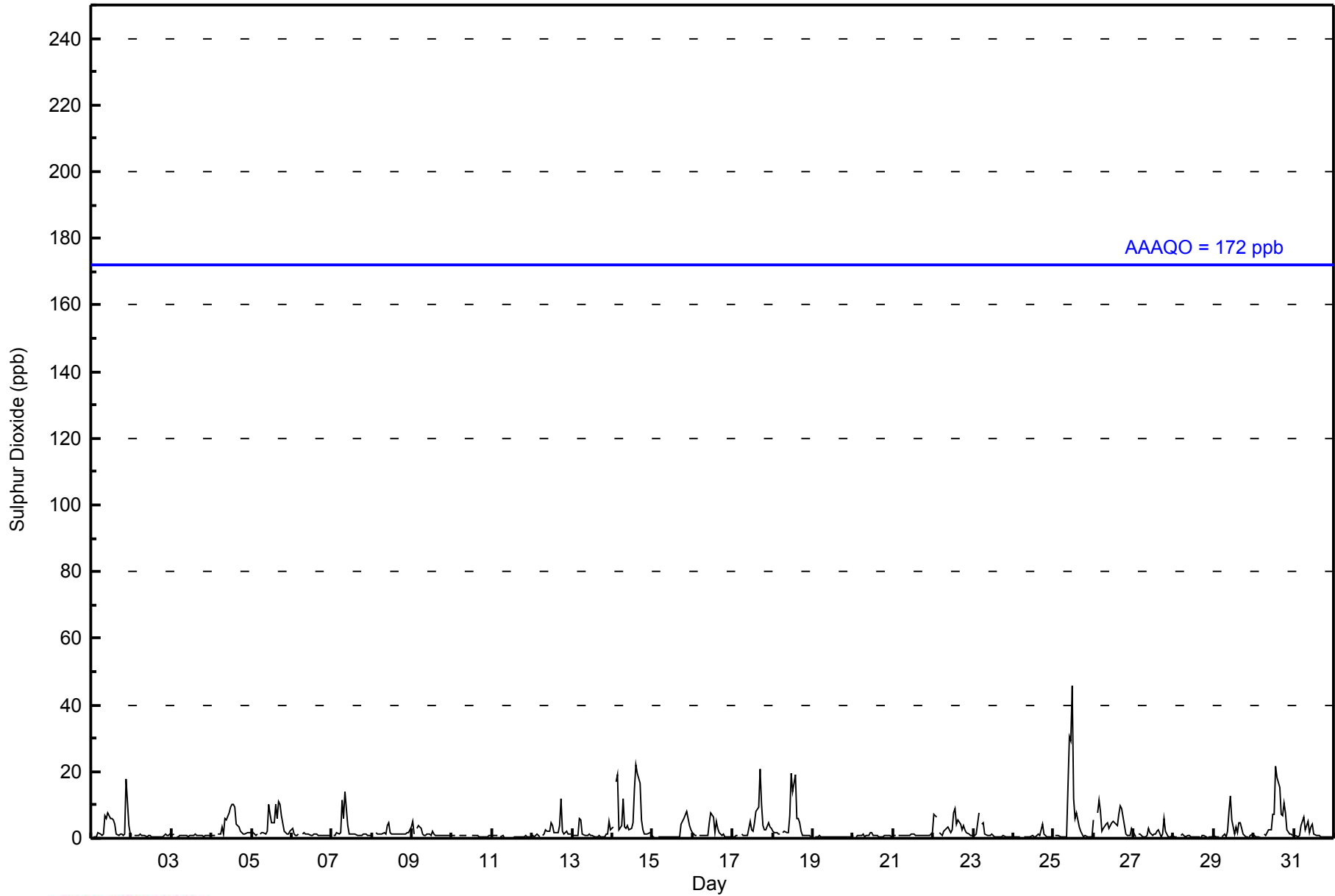
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	1	0	0	2	1	1	1	7	6	7	6	6	6	4	1	1	1	1	1	1	18	4	1	3.4	18	
2-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0	1	1	1	1	0.8	1	
3-Mar	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
4-Mar	1	1	1	Z	1	1	3	1	6	5	8	10	10	10	9	4	4	2	2	1	1	2	1	2	3.8	10	
5-Mar	2	2	1	1	Z	1	2	2	1	2	10	7	5	5	10	6	11	10	7	2	2	1	1	2	4.0	11	
6-Mar	3	1	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	3	
7-Mar	Z	1	1	2	1	2	11	6	14	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.5	14	
8-Mar	1	Z	2	1	1	1	1	2	1	4	5	1	1	1	1	1	1	1	1	1	1	2	2	3	1.7	5	
9-Mar	5	1	Z	3	4	3	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1.5	5	
10-Mar	1	1	1	Z	1	1	1	1	1	C	C	C	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
11-Mar	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1
12-Mar	1	1	1	1	1	Z	1	1	2	2	2	5	4	2	2	2	4	12	2	1	2	1	1	1	2.2	12	
13-Mar	Z	1	1	1	6	5	1	1	1	1	1	1	1	0	0	0	1	1	0	1	1	1	5	3	1.5	6	
14-Mar	3	Z	17	19	3	4	12	3	3	4	2	3	5	15	22	20	16	5	3	1	1	1	2	1	7.2	22	
15-Mar	1	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	5	6	8	6	4	3	1.8	8	
16-Mar	2	1	1	Z	1	1	1	1	1	1	5	8	6	2	5	3	2	1	1	1	1	0	0	1	1.9	8	
17-Mar	1	1	1	1	Z	1	1	1	1	1	5	3	2	5	8	9	21	10	4	2	3	5	3	3	3.9	21	
18-Mar	2	2	2	1	1	Z	2	2	2	2	7	20	14	19	6	6	5	2	1	1	1	1	1	1	4.2	20	
19-Mar	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0.5	1	
20-Mar	1	Z	1	1	1	1	1	0	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2	
21-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0.9	2	
22-Mar	7	7	6	Z	2	1	2	2	3	3	2	3	8	9	4	6	4	3	4	3	2	1	1	1	3.6	9	
23-Mar	1	1	1	8	Z	4	4	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1.3	8		
24-Mar	0	0	0	0	0	Z	0	0	1	0	1	1	1	1	1	1	1	4	1	1	1	1	1	1	0.8	4	
25-Mar	Z	1	1	1	1	1	1	1	1	30	29	46	12	6	8	3	2	1	1	1	1	0	0	0	6.3	46	
26-Mar	6	Z	8	11	8	2	3	4	5	3	4	4	5	4	4	7	10	9	4	1	1	1	1	3	4.6	11	
27-Mar	1	1	Z	1	1	1	0	1	1	3	2	1	1	1	2	2	1	1	6	2	1	0	1	1	1.4	6	
28-Mar	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.5	1	
29-Mar	1	0	0	0	Z	1	1	0	2	8	13	5	1	3	2	5	5	1	1	1	0	0	1	1	2.3	13	
30-Mar	1	1	0	0	0	Z	1	1	2	2	2	7	7	21	18	15	7	7	11	8	3	1	1	1	5.2	21	
31-Mar	Z	1	1	1	4	5	6	2	5	2	3	4	1	1	1	1	1	0	0	0	0	0	0	0	1.8	6	
																								Diurnal Average			
																								Diurnal Maximum			

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	684	96.34	96.34
11 - 20	20	2.82	99.15
21 - 60	6	0.85	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA
Frequency Distribution

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

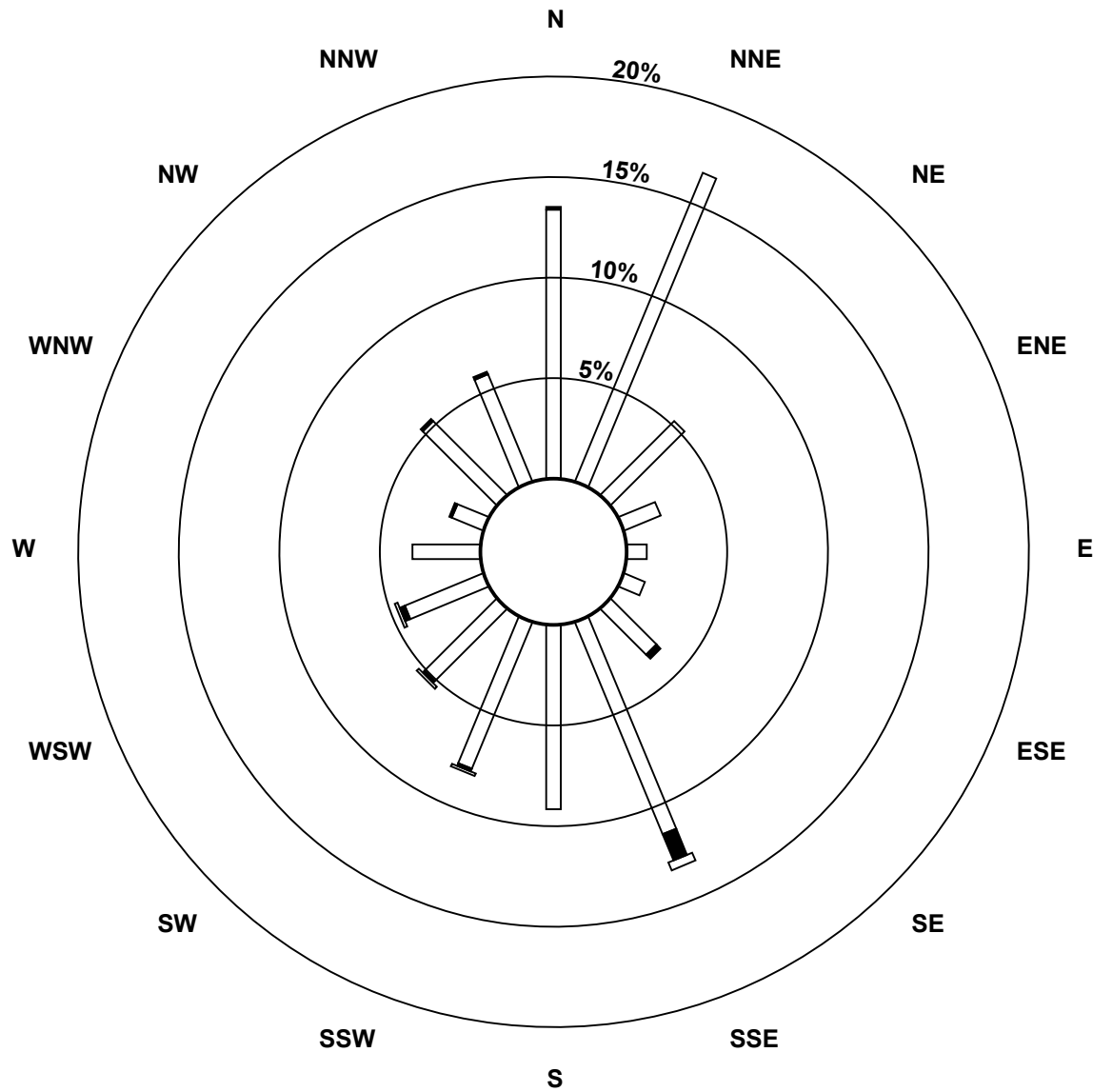
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	95	118	37	14	7	8	23	81	65	56	36	30	24	12	37	41	684
11 - 20	1	0	0	0	0	0	2	10	0	1	1	2	0	1	1	1	20
21 - 60	0	0	0	0	0	0	0	3	0	1	1	1	0	0	0	0	6
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	118	37	14	7	8	25	94	65	58	38	33	24	13	38	42	710

Total Number of Valid Hours: 710

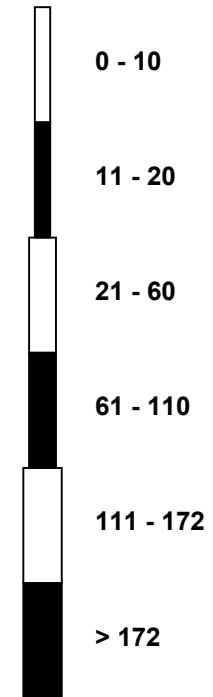
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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



Classes (ppb)

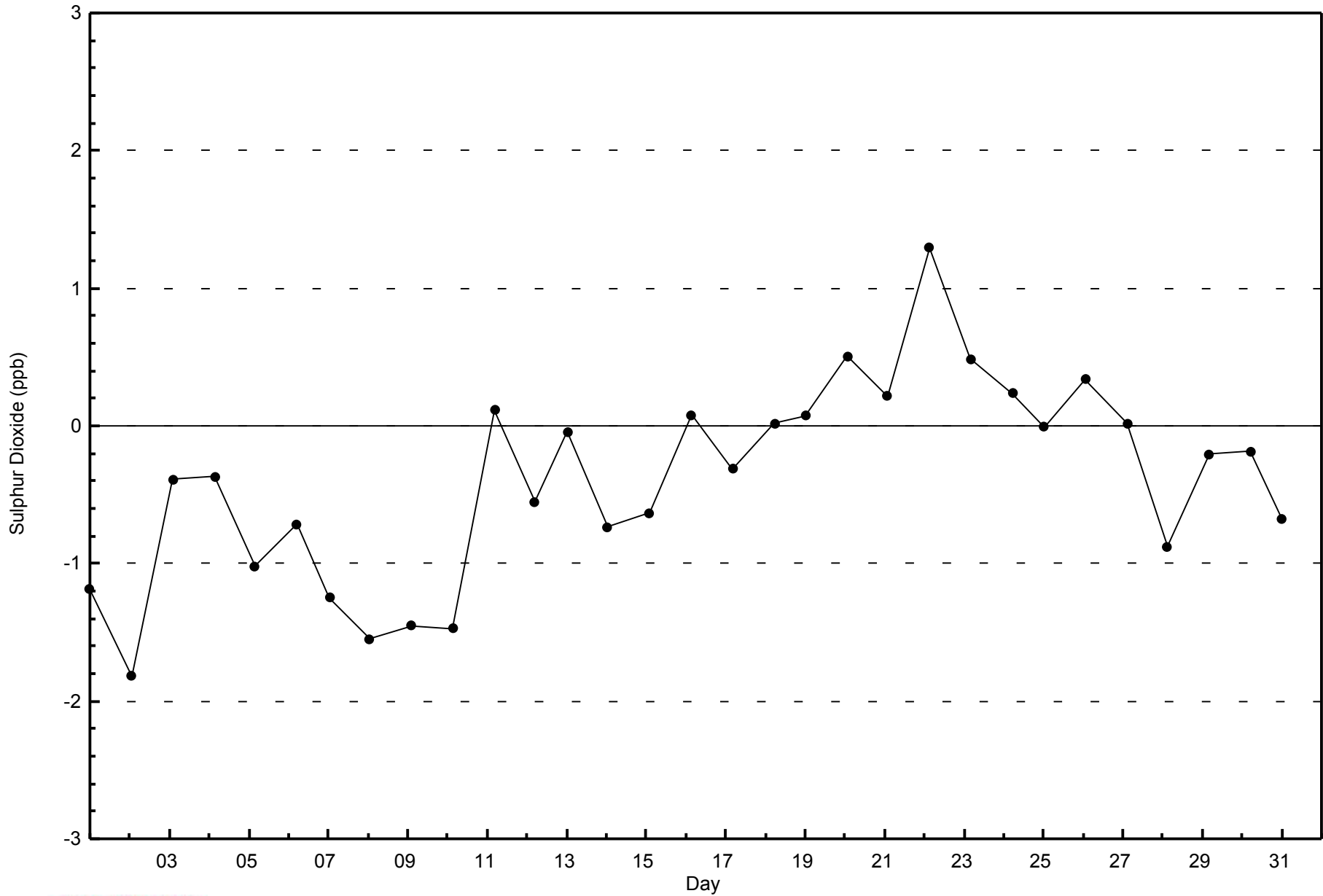


Total Number of Valid Hours: 710



WBEA
Zero Responses

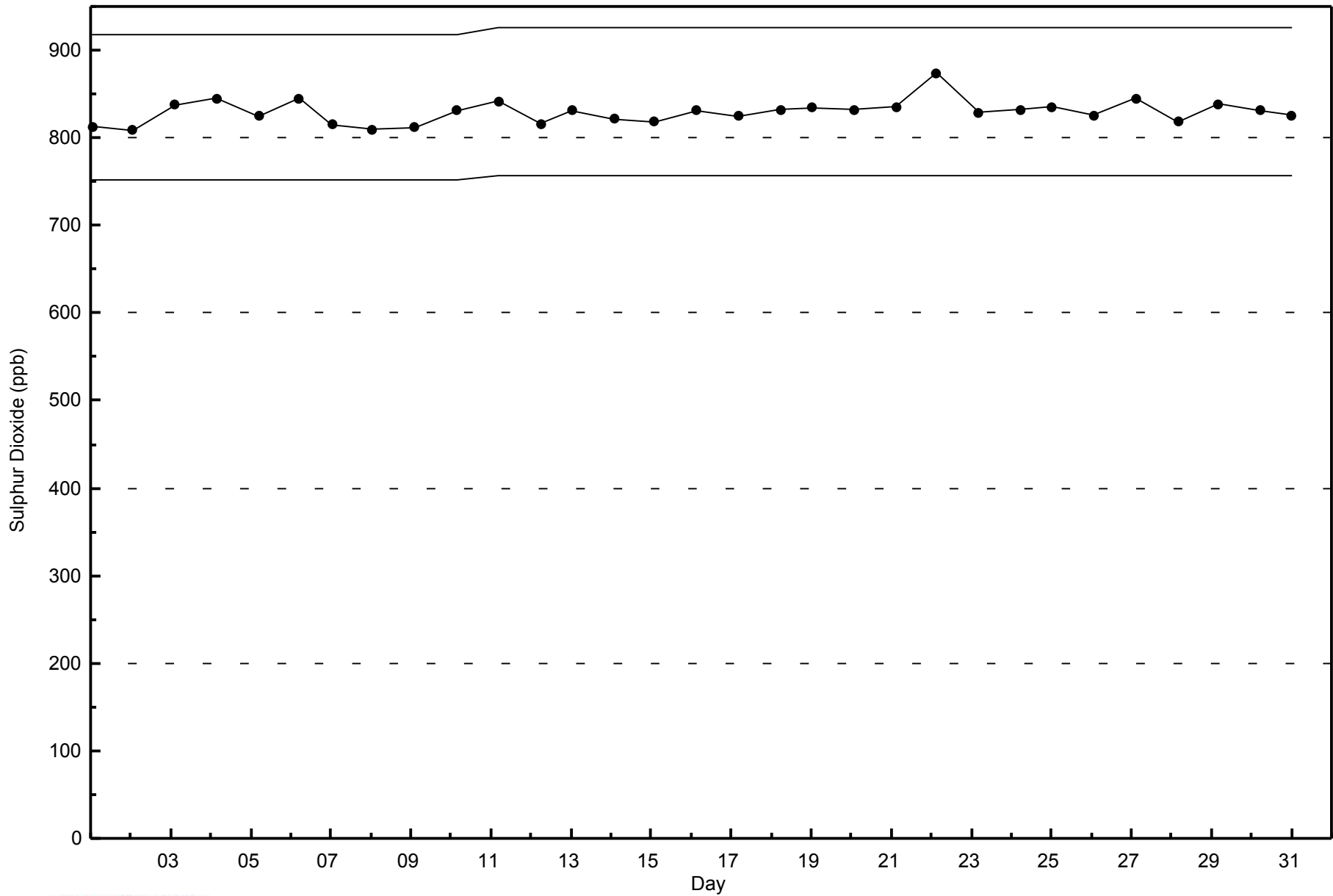
Sulphur Dioxide (SO₂) - ppb
Mildred Lake - March 2015





WBEA
Span Responses

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4 ppb on Mar 5 05:00	Maximum Daily Average: 1.5 ppb on Mar 14
Minimum Value: 0 ppb on Mar 13 20:00	Hours of Data: 710
Maximum Diurnal Average: 0.9 ppb at hour 11	Hours of Missing Data: 34
Monthly Average: 0.6 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.2 ppb on Mar 2	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.4 ppb at hour 21	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 3	

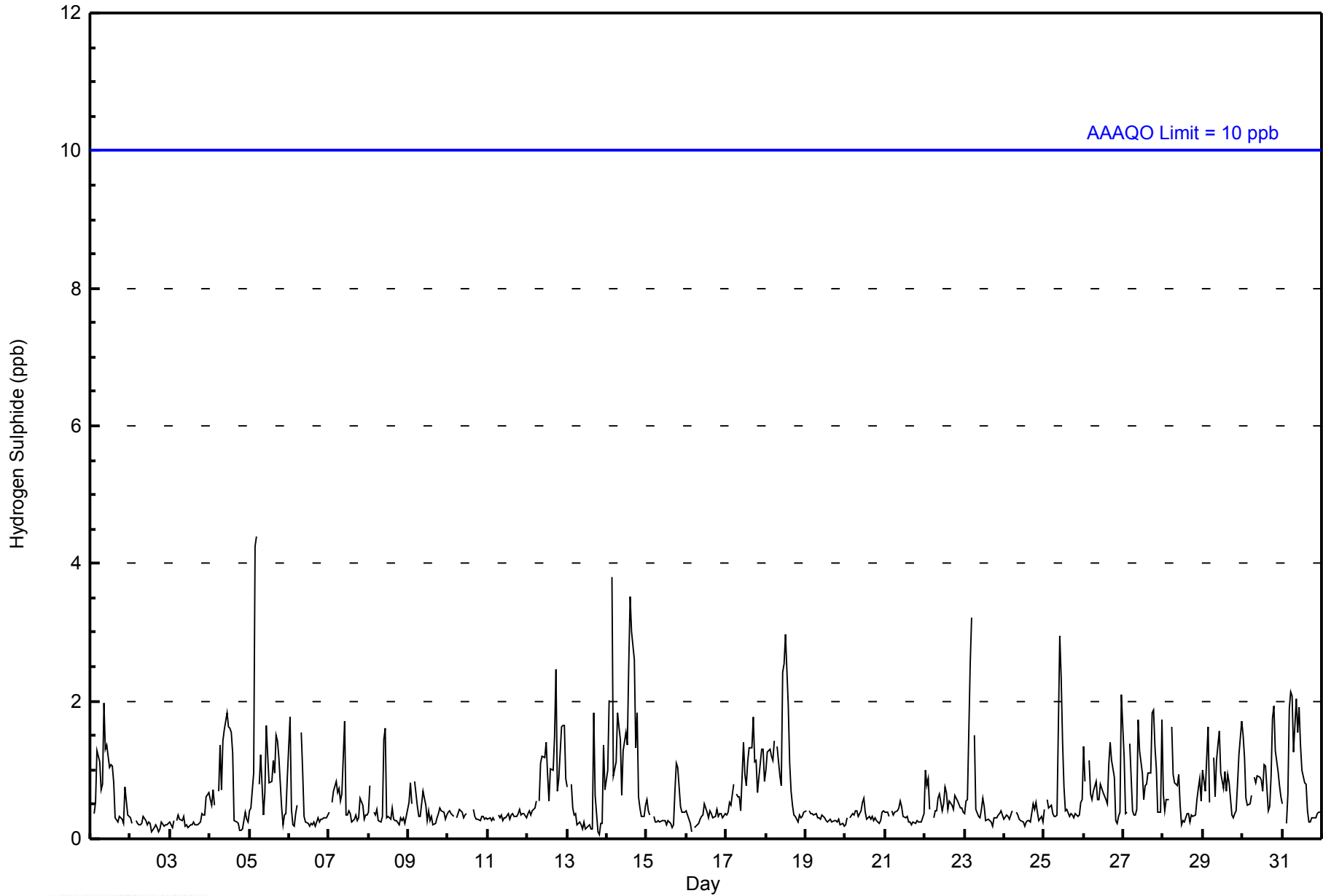
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	Z	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0.7	2
2-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Mar	0	0	0	Z	0	0	0	0	0	0	0	0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

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	698	98.31	98.31
3 - 4	12	1.69	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA
Frequency Distribution

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

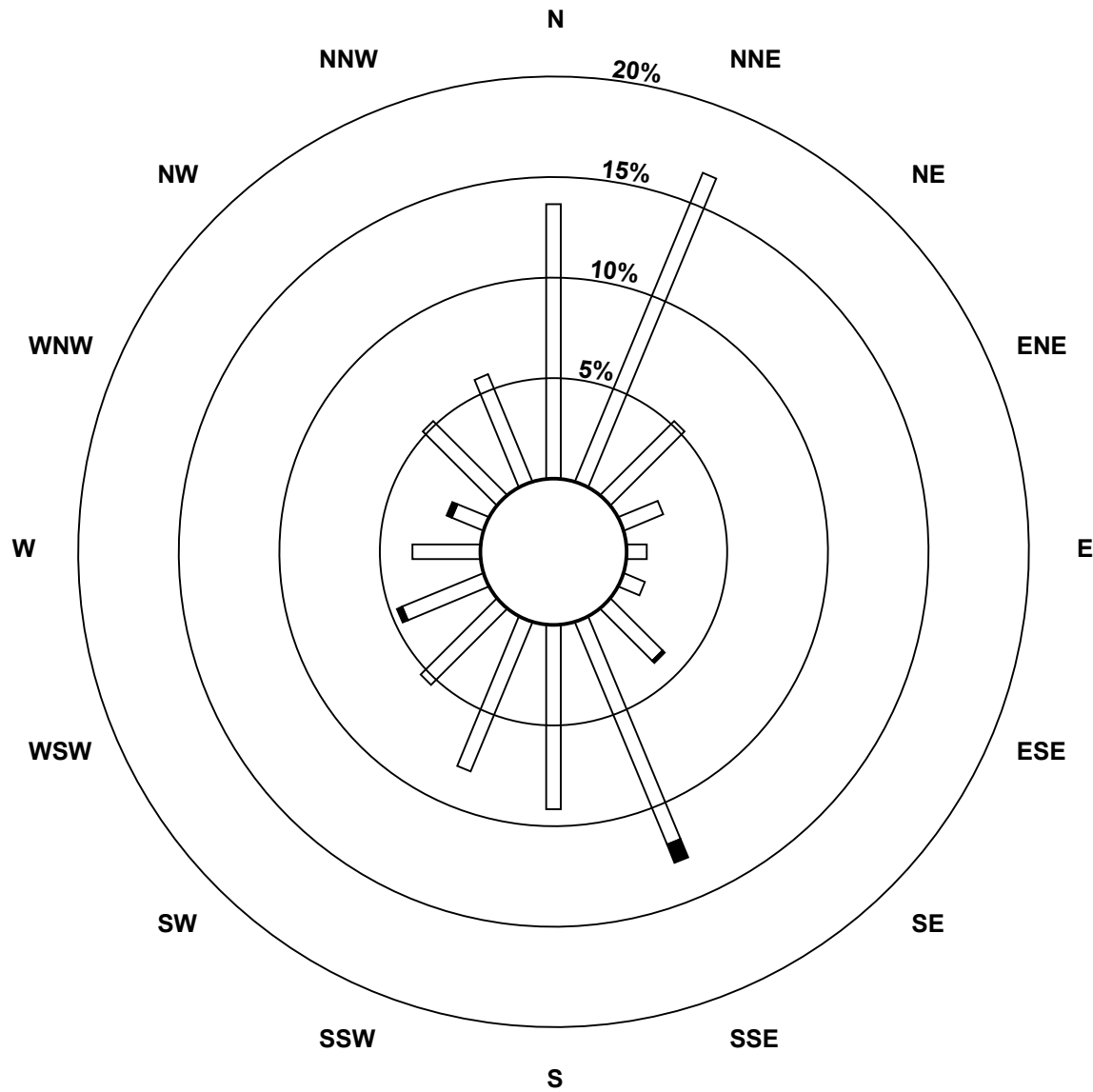
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	97	118	37	15	7	8	26	85	65	57	38	31	24	12	37	41	698
3 - 4	0	0	0	0	0	0	1	7	0	0	0	2	0	2	0	0	12
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	97	118	37	15	7	8	27	92	65	57	38	33	24	14	37	41	710

Total Number of Valid Hours: 710

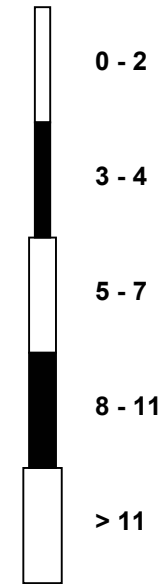
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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



Classes (ppb)

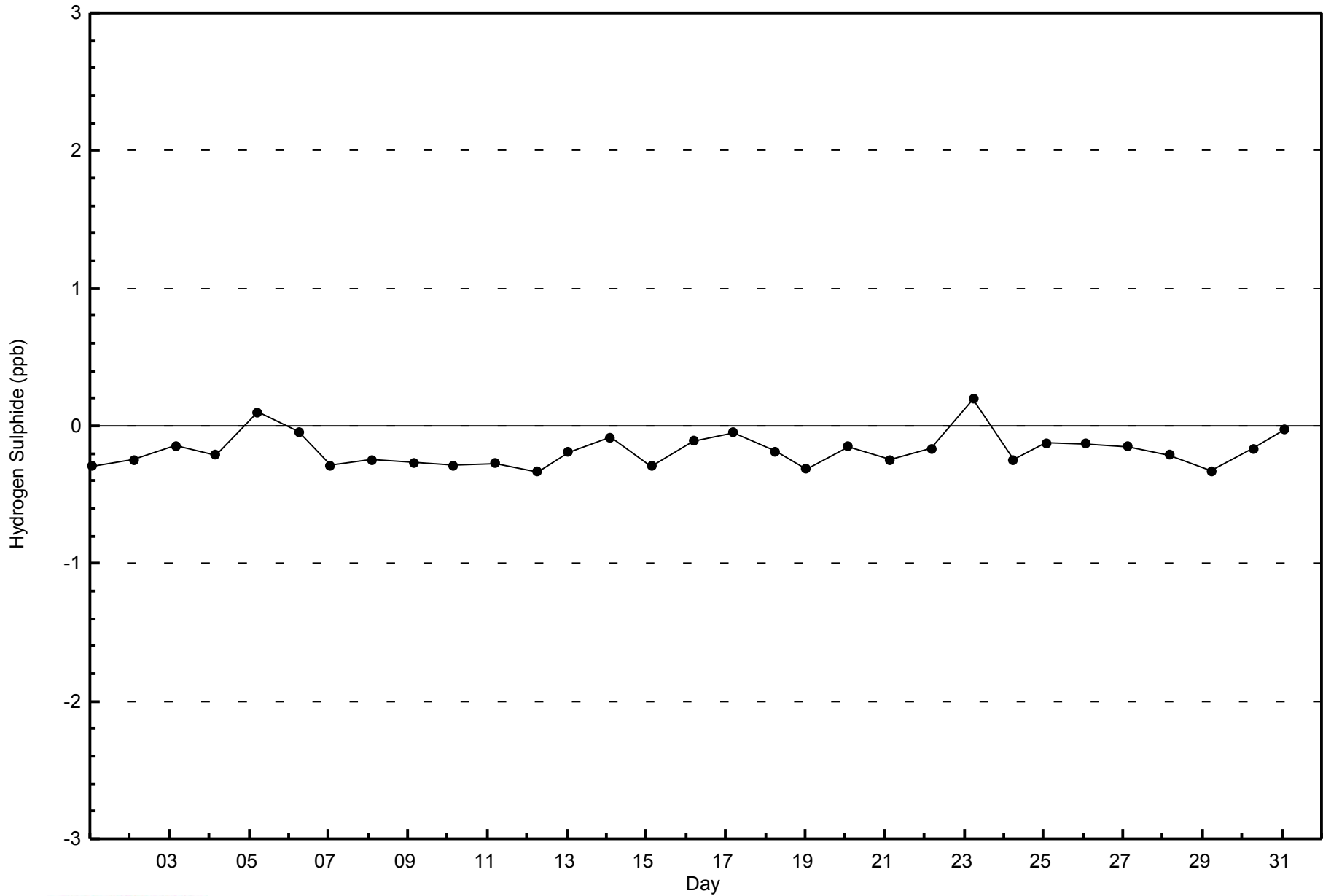


Total Number of Valid Hours: 710



WBEA
Zero Responses

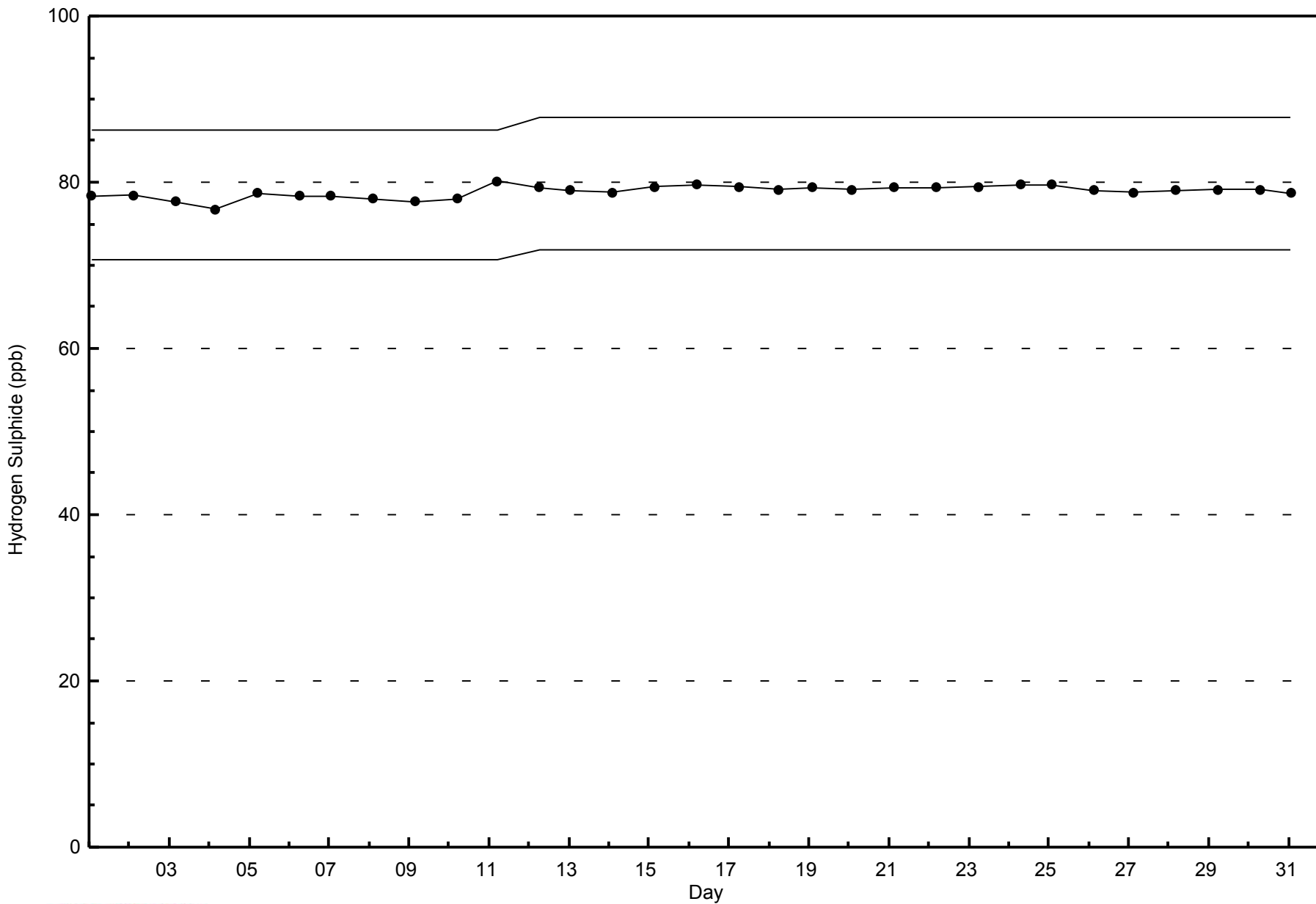
Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - March 2015





WBEA
Span Responses

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



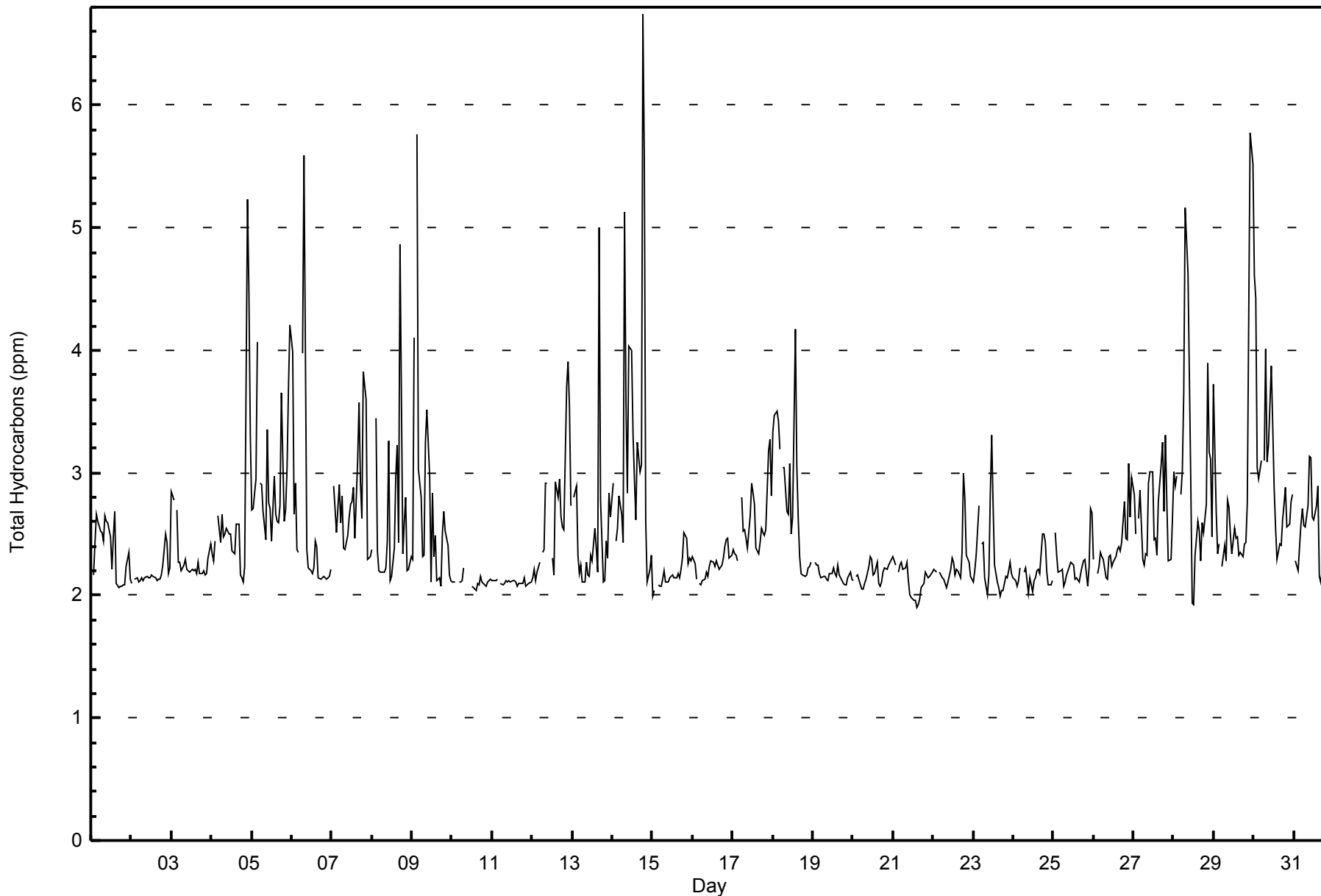


Maximum Value: 6.7 ppm on Mar 14 19:00		Maximum Daily Average: 3.3 ppm on Mar 14		Hours in Service: 744																							
Minimum Value: 1.9 ppm on Mar 21 15:00		Minimum Daily Average: 2.1 ppm on Mar 11		Hours of Data: 707																							
Maximum Diurnal Average: 2.6 ppm at hour 8		Minimum Diurnal Average: 2.4 ppm at hour 6		Hours of Missing Data: 37																							
Monthly Average: 2.51 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.6 P ₉₀ = 3.1 P ₉₉ = 5.1		Hours of Calibration: 35																							
				Percent Operational Time: 99.7																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	2.2	2.4	2.7	2.6	2.5	2.5	2.4	2.7	2.6	2.6	2.5	2.2	2.5	2.7	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.1	2.4	2.7	
2-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.4	2.2	2.2	2.2	2.5	
3-Mar	2.8	2.8	Z	2.7	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.8	
4-Mar	2.3	2.3	2.4	Z	2.7	2.4	2.7	2.5	2.5	2.6	2.5	2.5	2.4	2.4	2.3	2.6	2.6	2.2	2.1	2.1	2.2	5.2	4.5	3.3	2.7	5.2	
5-Mar	2.7	2.7	2.9	4.1	Z	2.9	2.9	2.7	2.5	3.3	2.8	2.7	2.4	3.0	2.7	2.6	2.6	2.7	3.7	2.6	2.7	3.0	3.7	4.2	3.0	4.2	
6-Mar	4.0	2.7	2.9	2.4	2.4	Z	4.0	5.6	4.0	2.4	2.2	2.2	2.2	2.2	2.4	2.4	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.7	5.6	
7-Mar	Z	2.9	2.7	2.5	2.9	2.6	2.8	2.4	2.4	2.5	2.6	2.7	2.8	2.9	2.5	3.1	3.6	2.9	2.6	3.8	3.6	2.3	2.3	2.3	2.8	3.8	
8-Mar	2.4	Z	3.4	2.4	2.2	2.2	2.2	2.2	2.2	2.4	3.3	2.1	2.2	2.4	3.0	3.2	2.4	4.9	2.3	2.6	2.8	2.2	2.2	2.3	2.6	4.9	
9-Mar	2.3	4.1	Z	5.8	3.0	2.8	2.3	2.3	3.2	3.5	3.0	2.1	2.8	2.3	2.5	2.1	2.1	2.1	2.5	2.7	2.5	2.4	2.2	2.1	2.7	5.8	
10-Mar	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	C	C	C	C	2.1	2.1	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
11-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
12-Mar	2.1	2.2	2.1	2.2	2.3	Z	2.4	2.4	2.9	2.9	M	M	2.3	2.2	2.9	2.8	3.0	2.6	2.6	2.5	3.7	3.9	3.5	2.7	2.7	3.9	
13-Mar	Z	2.8	2.9	2.3	2.2	2.2	2.1	2.1	2.3	2.2	2.2	2.3	2.3	2.5	2.4	2.2	5.0	2.8	2.1	2.1	2.4	2.3	2.8	2.6	2.5	5.0	
14-Mar	2.9	Z	2.4	2.5	2.8	2.7	2.4	5.1	3.6	2.8	4.0	4.0	3.3	2.9	2.6	3.3	3.0	3.1	6.7	5.6	2.6	2.1	2.2	2.3	3.3	6.7	
15-Mar	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.5	2.5	2.3	2.3	2.3	2.2	2.5	
16-Mar	2.3	2.3	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.5	2.3	2.3	2.3	2.5
17-Mar	2.4	2.3	2.3	2.3	Z	2.8	2.5	2.5	2.5	2.4	2.6	2.9	2.8	2.7	2.4	2.3	2.4	2.6	2.5	2.5	2.5	3.2	3.3	2.8	2.6	3.3	
18-Mar	3.3	3.5	3.5	3.4	3.2	Z	3.0	3.0	2.7	2.7	3.1	2.5	2.6	4.2	3.0	2.6	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.8	4.2	
19-Mar	Z	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.3	
20-Mar	2.1	Z	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	
21-Mar	2.3	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.3	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.3	
22-Mar	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.3	3.0	2.8	2.3	2.3	2.2	2.1	2.3	3.0	
23-Mar	2.1	2.2	2.3	2.7	Z	2.4	2.4	2.1	2.0	2.2	2.8	3.3	2.7	2.2	2.1	2.1	2.0	2.0	2.0	2.2	2.1	2.2	2.3	2.2	2.3	3.3	
24-Mar	2.1	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.1	2.0	2.1	2.0	2.1	2.1	2.2	2.2	2.5	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.5	
25-Mar	Z	2.5	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.1	2.2	2.7	2.7	2.3	2.7	
26-Mar	2.3	Z	2.2	2.2	2.4	2.3	2.3	2.1	2.1	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.8	2.5	2.5	3.1	2.6	3.0	2.4	3.1	
27-Mar	2.8	2.5	Z	2.6	2.9	2.3	2.2	2.3	2.3	2.9	3.0	3.0	2.5	2.5	2.3	2.8	3.1	3.3	2.7	3.3	2.8	2.3	2.3	2.6	2.7	3.3	
28-Mar	3.0	2.9	3.0	Z	2.8	3.0	3.7	5.2	4.6	3.8	2.9	1.9	1.9	2.3	2.6	2.5	2.3	2.6	2.5	2.7	3.9	3.2	3.1	2.5	3.0	5.2	
29-Mar	3.7	2.7	2.3	2.4	Z	2.2	2.4	2.3	2.8	2.7	2.5	2.3	2.6	2.5	2.5	2.3	2.4	2.3	2.4	2.4	2.8	4.2	5.8	5.5	2.9	5.8	
30-Mar	4.6	4.4	3.0	2.9	3.1	Z	3.1	4.0	3.1	3.2	3.9	3.4	2.9	2.6	2.3	2.4	2.4	2.6	2.7	2.9	2.6	2.6	2.8	2.8	3.1	4.6	
31-Mar	Z	2.3	2.2	2.4	2.6	2.7	2.6	2.6	2.7	3.1	3.1	2.6	2.6	2.7	2.9	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	3.1	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	19	2.69	2.69
2.1 - 3.0	615	86.99	89.67
3.1 - 10.0	73	10.33	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	3	3	4	0	0	4	2	0	0	1	0	0	0	0	0	2	19
2.1 - 3.0	90	114	31	13	4	4	22	87	57	48	26	26	18	7	32	36	615
3.1 - 10.0	3	1	2	0	3	0	1	6	8	8	12	7	6	6	6	4	73
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	118	37	13	7	8	25	93	65	57	38	33	24	13	38	42	707

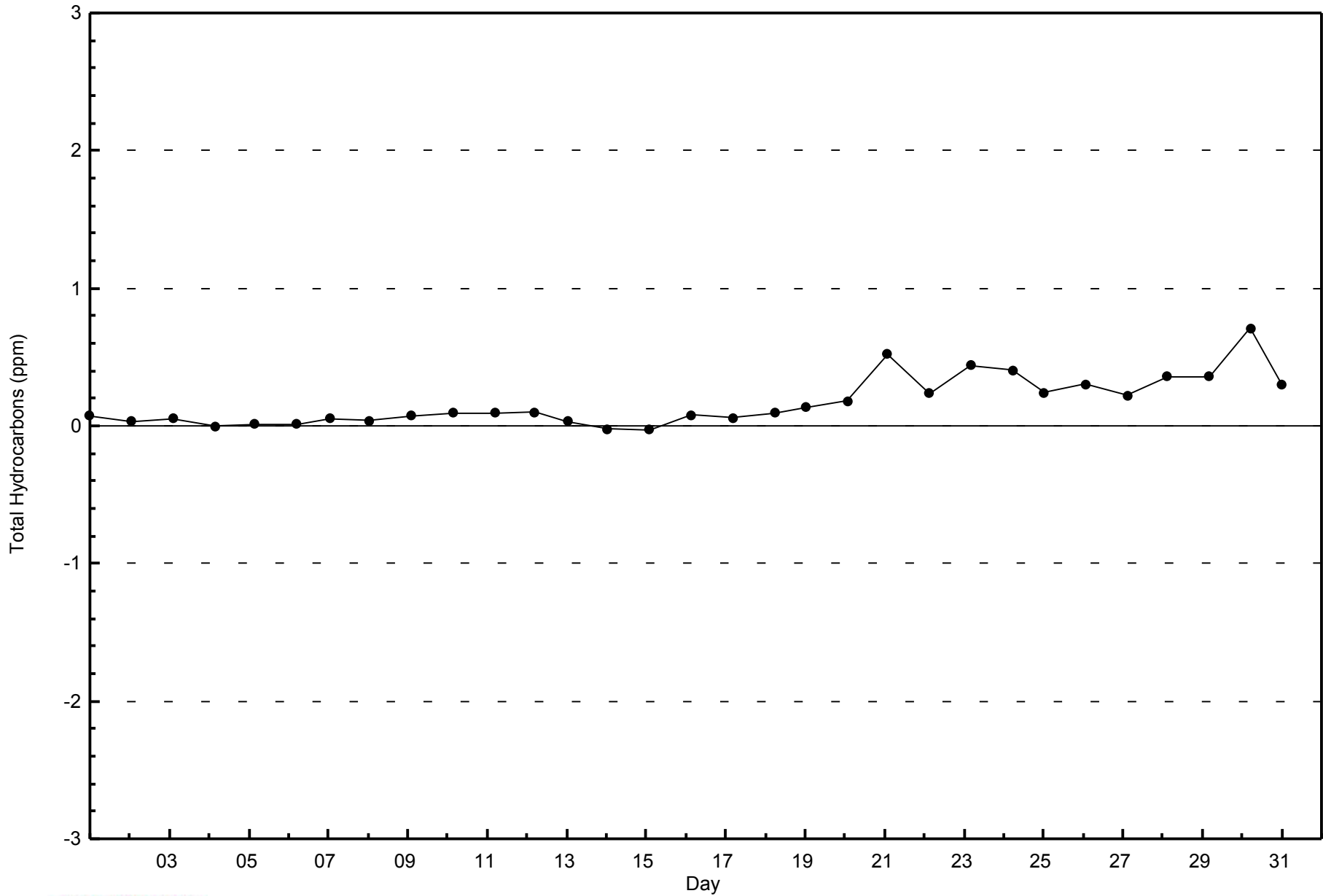
Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Zero Responses

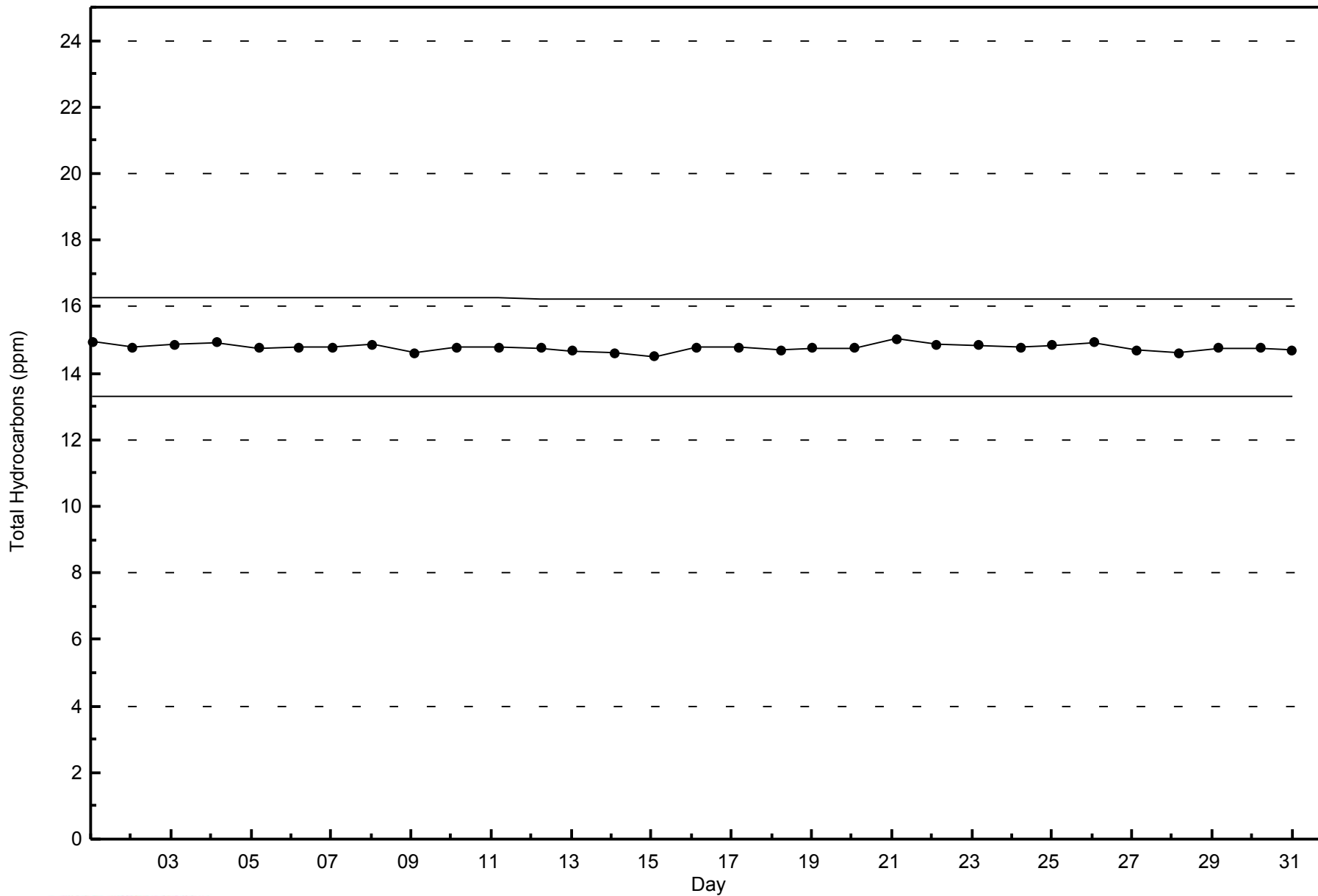
Total Hydrocarbons (THC) - ppm
Mildred Lake - March 2015





WBEA
Span Responses

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



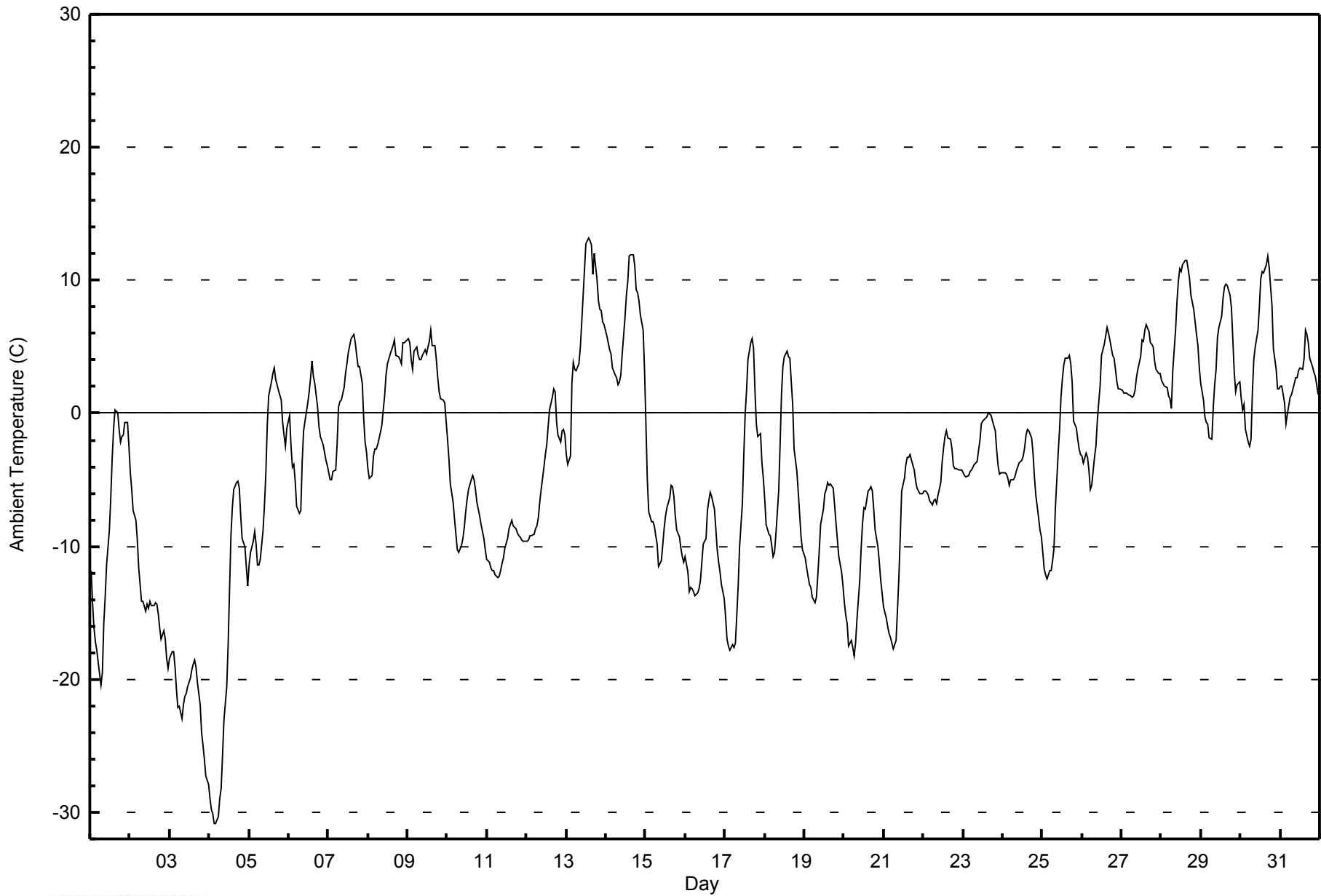


Maximum Value: 13.2 C on Mar 13 14:00		Maximum Daily Average: 6.6 C on Mar 13		Hours in Service: 744																						
Minimum Value: -30.9 C on Mar 4 04:00		Minimum Daily Average: -21.4 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.1 C at hour 16		Minimum Diurnal Average: -8.4 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: -3.97 C		Percentiles: P ₁ = -28.2 P ₁₀ = -14.7 Q ₁ = -9.4 Median = -3.5 Q ₃ = 2.4 P ₉₀ = 5.6 P ₉₉ = 11.9		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-11.8	-14.3	-16.2	-17.2	-17.8	-19.6	-20.5	-19.5	-15.8	-13.8	-11.4	-8.8	-6.4	-3.4	-1.2	0.2	0.0	-1.2	-2.2	-1.8	-1.6	-0.7	-0.7	-2.5	-8.7	0.2
2-Mar	-4.5	-5.7	-7.3	-8.0	-9.5	-11.6	-12.8	-14.2	-14.2	-14.9	-14.3	-14.6	-14.2	-14.4	-14.4	-14.2	-14.4	-15.0	-16.2	-17.0	-16.3	-17.0	-18.5	-19.1	-13.4	-4.5
3-Mar	-18.4	-17.9	-17.9	-19.1	-20.8	-22.2	-22.0	-22.9	-21.9	-21.3	-21.1	-20.6	-19.9	-19.3	-18.9	-18.5	-19.1	-20.2	-21.9	-24.0	-24.9	-26.0	-27.2	-27.9	-21.4	-17.9
4-Mar	-28.9	-29.8	-30.1	-30.9	-30.9	-30.3	-28.9	-28.2	-25.7	-23.1	-20.6	-17.4	-13.3	-9.2	-7.1	-5.7	-5.3	-5.1	-5.6	-7.7	-9.4	-10.1	-11.5	-13.0	-17.8	-5.1
5-Mar	-11.4	-10.4	-9.6	-8.9	-9.8	-11.4	-11.4	-11.0	-8.8	-6.9	-4.4	-0.9	1.3	2.4	3.0	3.4	2.6	2.1	1.7	1.0	-0.6	-1.6	-2.5	-1.1	-3.9	3.4
6-Mar	-0.2	-2.5	-4.0	-3.8	-5.1	-7.0	-7.6	-7.3	-3.6	-1.3	-0.6	0.8	1.6	2.7	3.9	2.8	2.2	0.5	-1.0	-1.7	-2.1	-2.4	-3.5	-3.9	-1.8	3.9
7-Mar	-4.4	-5.0	-5.0	-4.4	-4.3	-2.3	0.5	0.8	1.0	2.0	3.0	3.7	4.6	5.1	5.6	6.0	5.3	4.4	3.5	3.5	2.2	-0.4	-2.2	-2.9	0.8	6.0
8-Mar	-4.2	-4.9	-4.6	-3.2	-2.7	-2.7	-2.4	-1.4	-0.9	0.2	1.3	2.9	3.7	4.5	4.8	5.1	5.5	4.3	4.3	4.1	3.7	5.3	5.3	5.5	1.4	5.5
9-Mar	5.6	5.3	4.0	3.3	4.7	5.0	4.4	4.0	4.0	4.4	4.8	4.5	5.0	5.4	6.3	5.1	5.1	4.0	2.7	1.6	1.1	1.0	0.8	-0.6	3.8	6.3
10-Mar	-1.9	-3.4	-5.3	-6.7	-7.9	-9.1	-10.2	-10.5	-10.0	-9.4	-8.5	-7.4	-6.5	-5.7	-5.0	-4.7	-5.0	-5.7	-6.7	-7.7	-8.3	-8.9	-9.4	-10.3	-7.3	-1.9
11-Mar	-11.0	-11.2	-11.7	-11.8	-11.9	-12.2	-12.3	-12.3	-11.8	-11.3	-10.9	-10.1	-9.4	-8.6	-8.3	-8.0	-8.4	-8.6	-9.0	-9.2	-9.3	-9.5	-9.6	-9.6	-10.3	-8.0
12-Mar	-9.6	-9.5	-9.2	-9.2	-9.1	-8.7	-8.4	-7.9	-6.7	-5.7	-4.1	-3.1	-2.3	-1.0	0.2	1.2	1.8	1.7	-0.5	-1.7	-2.1	-1.3	-1.2	-1.6	-4.1	1.8
13-Mar	-3.1	-3.8	-3.2	2.2	3.8	3.3	3.2	3.7	4.9	6.8	8.8	10.8	12.8	13.2	13.0	12.7	10.5	12.0	10.0	8.5	7.8	7.7	6.9	6.6	6.6	13.2
14-Mar	5.8	5.3	4.8	4.5	3.4	2.9	2.6	2.2	2.3	2.9	4.4	7.2	8.9	9.9	11.8	11.9	11.1	9.3	9.1	8.5	7.4	6.2	3.2	3.2	6.6	11.9
15-Mar	-0.9	-5.1	-7.4	-8.2	-8.1	-8.5	-9.2	-9.8	-11.5	-11.1	-9.9	-8.6	-7.7	-7.0	-6.3	-5.4	-5.5	-6.2	-7.7	-8.7	-9.3	-10.2	-10.8	-11.2	-8.1	-0.9
16-Mar	-10.8	-11.9	-13.4	-13.1	-13.1	-13.4	-13.7	-13.5	-13.2	-12.6	-11.2	-9.8	-9.4	-7.3	-6.6	-6.0	-6.3	-7.2	-8.7	-10.3	-11.2	-11.9	-12.9	-13.9	-10.9	-6.0
17-Mar	-15.3	-17.0	-17.5	-17.9	-17.4	-17.6	-17.3	-15.2	-13.0	-10.0	-6.8	-3.3	0.0	1.8	4.0	5.3	5.6	4.8	1.8	-0.8	-1.7	-1.5	-3.7	-4.8	-6.6	5.6
18-Mar	-6.4	-8.3	-9.1	-9.2	-9.9	-10.8	-10.5	-9.1	-5.8	-2.4	1.4	3.6	4.2	4.7	4.2	4.1	2.4	0.7	-2.6	-4.4	-6.0	-7.7	-9.3	-10.3	-4.0	4.7
19-Mar	-10.9	-11.6	-12.3	-12.8	-13.1	-13.8	-14.3	-13.8	-12.2	-10.3	-8.4	-7.2	-6.1	-5.7	-5.2	-5.4	-5.3	-5.7	-6.9	-8.3	-9.5	-10.8	-11.9	-13.0	-9.8	-5.2
20-Mar	-14.2	-15.2	-15.8	-17.5	-17.0	-17.6	-18.3	-17.3	-15.5	-12.6	-10.1	-8.3	-7.1	-7.2	-5.8	-5.8	-5.6	-5.8	-7.2	-8.8	-10.0	-11.2	-12.5	-13.5	-11.7	-5.6
21-Mar	-14.5	-15.4	-16.0	-16.5	-16.9	-17.3	-17.7	-17.1	-14.7	-12.3	-9.2	-5.9	-4.8	-3.9	-3.3	-3.3	-3.1	-3.5	-4.2	-5.2	-5.6	-5.9	-6.0	-6.0	-9.5	-3.1
22-Mar	-5.8	-5.8	-5.9	-6.1	-6.6	-6.9	-6.6	-6.4	-6.7	-6.1	-5.2	-3.7	-2.5	-1.8	-1.4	-1.8	-1.9	-2.6	-3.9	-4.1	-4.2	-4.2	-4.3	-4.3	-4.5	-1.4
23-Mar	-4.5	-4.7	-4.7	-4.7	-4.4	-4.2	-4.1	-3.9	-3.6	-2.8	-2.1	-0.8	-0.6	-0.5	-0.2	0.1	-0.1	-0.2	-0.6	-1.3	-2.8	-4.0	-4.6	-4.5	-2.6	0.1
24-Mar	-4.5	-4.4	-4.6	-4.9	-5.4	-5.0	-5.0	-4.8	-4.4	-4.0	-3.8	-3.5	-3.2	-2.6	-1.6	-1.2	-1.3	-1.8	-3.0	-4.8	-6.2	-7.0	-8.8	-9.3	-4.4	-1.2
25-Mar	-10.5	-11.7	-12.2	-12.4	-11.9	-11.9	-11.1	-10.1	-7.1	-3.0	-1.2	1.2	2.5	3.7	4.1	4.2	4.4	3.7	2.4	-0.6	-1.2	-1.9	-2.7	-3.1	-3.6	4.4
26-Mar	-3.2	-3.7	-3.0	-3.3	-4.2	-5.8	-5.4	-3.3	-2.5	-0.6	0.8	2.0	4.4	5.2	5.9	6.4	6.0	5.5	4.3	4.2	3.3	2.4	1.9	1.8	0.8	6.4
27-Mar	1.7	1.5	1.5	1.5	1.4	1.3	1.2	1.3	1.8	2.7	3.3	4.2	5.5	5.4	6.2	6.6	6.1	5.3	5.2	5.0	4.0	3.3	3.0	3.0	3.4	6.6
28-Mar	2.5	2.3	2.1	1.9	1.4	1.1	0.4	3.2	6.2	8.4	10.0	10.9	10.7	11.2	11.5	11.5	10.9	10.1	8.9	7.8	6.9	5.9	5.1	3.4	6.4	11.5
29-Mar	2.3	1.0	-0.3	-0.7	-0.8	-1.9	-1.9	0.5	2.1	3.3	5.7	6.4	7.3	8.6	9.5	9.8	9.6	8.9	8.0	5.5	3.1	1.6	2.2	2.3	3.8	9.8
30-Mar	1.1	0.2	0.7	-1.2	-2.1	-2.5	-1.9	1.7	4.0	5.0	6.2	8.1	10.2	10.7	10.5	11.2	11.9	10.9	9.5	8.1	4.9	3.3	1.8	1.9	4.8	11.9
31-Mar	2.0	2.0	0.8	-0.8	0.0	0.6	1.2	1.4	2.2	2.7	2.7	3.2	3.4	3.3	4.2	6.3	5.9	5.3	4.1	3.5	3.1	2.8	2.1	1.4	2.6	6.3
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Mildred Lake - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Mildred Lake - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	27	3.63	3.63
-20 - 0	453	60.89	64.52
0 - 10	239	32.12	96.64
10 - 20	25	3.36	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

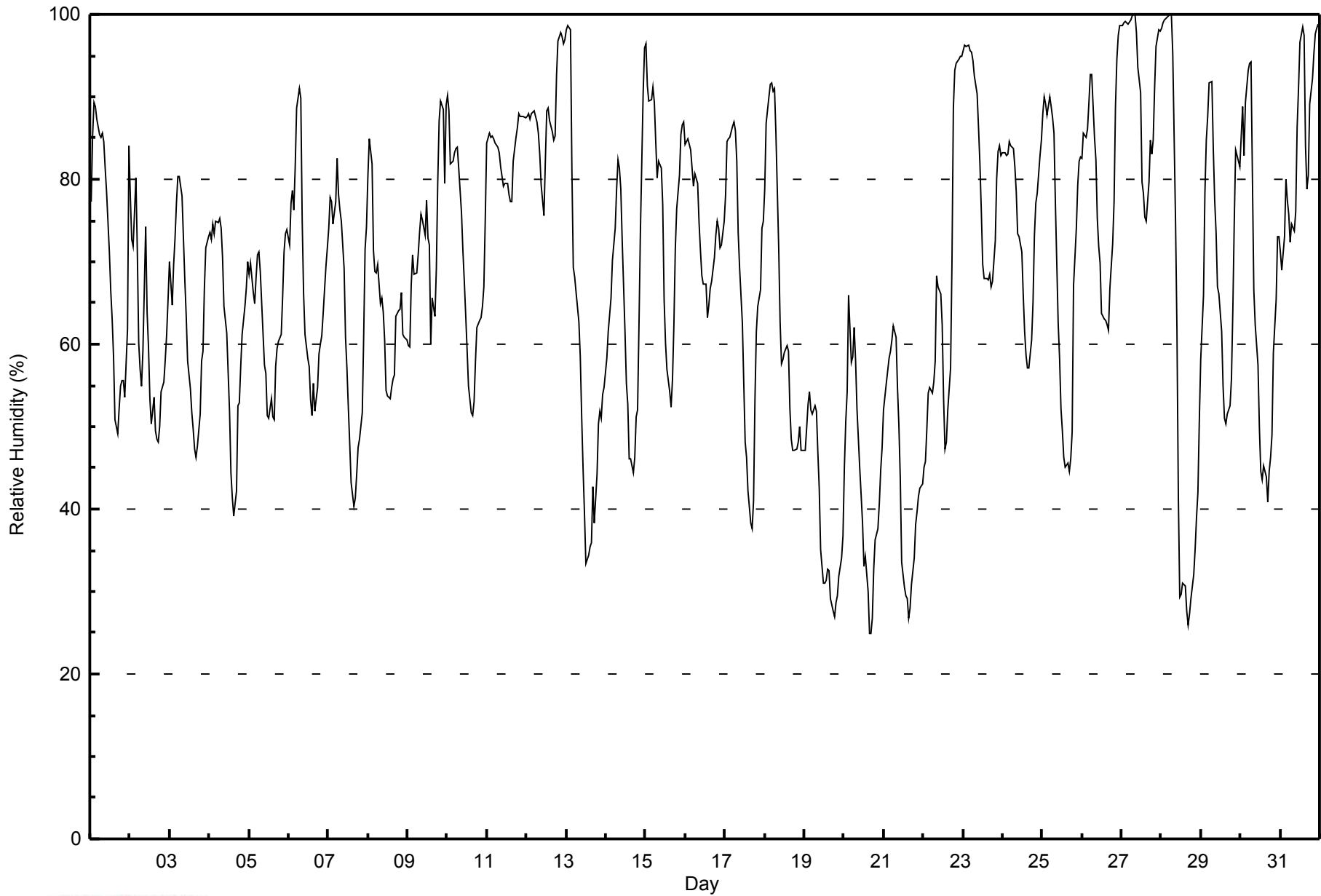


Maximum Value: 100 % on Mar 27 08:00														Maximum Daily Average: 91.6 % on Mar 27														Hours in Service: 744	
Minimum Value: 25 % on Mar 20 16:00														Minimum Daily Average: 39.1 % on Mar 19														Hours of Data: 744	
Maximum Diurnal Average: 79.7 % at hour 6														Minimum Diurnal Average: 52.0 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 67.8 %														Percentiles: P ₁ = 28 P ₁₀ = 44 Q ₁ = 54 Median = 69 Q ₃ = 83 P ₉₀ = 90 P ₉₉ = 100														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	77	85	89	89	87	85	85	86	85	81	78	71	67	63	59	51	49	52	55	56	56	54	62	84	71.1	89			
2-Mar	78	73	72	80	71	60	57	55	59	74	64	60	53	50	54	49	49	48	50	54	55	58	61	65	60.5	80			
3-Mar	70	65	70	73	77	80	80	78	73	68	63	58	55	52	50	47	46	48	51	58	59	67	72	73	63.9	80			
4-Mar	74	73	75	73	75	75	75	74	70	65	61	57	52	44	41	39	42	53	53	57	61	65	67	70	62.1	75			
5-Mar	68	70	66	65	68	71	71	69	61	58	56	51	51	53	51	51	57	59	60	61	66	71	73	74	62.7	74			
6-Mar	72	77	79	76	82	89	91	90	75	66	61	58	57	53	51	55	52	55	59	60	61	64	70	72	67.7	91			
7-Mar	74	78	77	75	77	82	78	76	75	69	61	57	52	48	43	40	41	44	47	48	52	61	72	74	62.7	82			
8-Mar	80	85	82	71	69	69	70	65	66	64	61	54	54	53	55	56	56	63	64	64	66	61	61	60	64.6	85			
9-Mar	60	60	67	71	69	69	71	74	76	75	73	77	73	72	60	66	63	69	80	87	89	89	79	89	73.2	89			
10-Mar	90	88	82	82	83	84	84	81	76	71	68	64	59	55	52	51	53	58	62	63	63	65	67	75	69.9	90			
11-Mar	84	86	85	85	85	84	84	83	81	80	79	80	79	78	77	77	82	85	86	88	88	88	88	87	83.4	88			
12-Mar	88	88	87	88	88	88	87	86	83	79	76	82	88	89	87	86	85	85	92	97	98	97	96	97	88.2	98			
13-Mar	98	99	98	81	69	68	66	63	59	51	45	39	33	34	35	36	43	38	44	50	52	51	54	55	56.8	99			
14-Mar	58	61	64	66	70	74	79	82	81	79	73	62	55	53	46	46	44	46	51	52	62	73	91	96	65.2	96			
15-Mar	96	91	89	90	91	89	85	80	82	81	77	65	60	57	54	52	56	62	72	76	81	85	87	87	77.0	96			
16-Mar	84	85	84	84	81	79	81	79	75	71	68	67	67	63	65	67	68	70	73	75	74	72	72	75	74.2	85			
17-Mar	78	85	85	85	87	87	86	82	74	69	63	55	48	46	42	38	38	41	53	62	65	67	74	75	66.0	87			
18-Mar	79	87	90	92	92	91	91	86	72	63	58	58	59	60	59	52	48	47	47	47	48	50	47	47	65.4	92			
19-Mar	47	50	53	54	52	52	53	52	47	42	35	31	31	31	33	32	29	28	27	29	29	32	34	37	39.1	54			
20-Mar	45	51	54	66	58	58	62	58	52	45	42	38	33	34	30	25	25	27	33	36	38	41	45	47	43.5	66			
21-Mar	52	55	57	58	59	61	62	61	55	50	44	34	31	30	29	27	28	31	34	38	40	42	43	43	44.2	62			
22-Mar	45	46	50	54	55	54	55	58	68	67	66	62	53	47	48	52	57	70	89	93	94	95	95	95	65.4	95			
23-Mar	96	96	96	96	96	95	94	92	90	86	82	76	70	68	68	68	68	67	68	73	80	83	84	83	82.3	96			
24-Mar	83	83	83	83	85	84	84	81	78	73	73	71	66	61	59	57	57	60	65	73	77	78	83	85	74.4	85			
25-Mar	88	90	89	88	90	89	87	86	77	63	58	52	49	46	45	46	45	46	49	67	74	79	82	83	69.5	90			
26-Mar	83	86	85	86	89	93	93	85	82	75	72	70	64	63	63	62	62	67	72	77	89	95	97	99	79.5	99			
27-Mar	99	99	99	99	99	99	100	100	100	98	93	91	80	78	75	75	80	85	83	85	91	96	98	98	91.6	100			
28-Mar	98	99	99	100	100	100	100	95	75	62	42	29	30	31	31	28	26	27	29	32	35	39	42	51	58.3	100			
29-Mar	58	66	78	85	88	92	92	84	78	74	67	66	62	55	51	50	52	53	56	64	75	84	83	82	70.5	92			
30-Mar	85	89	83	89	93	94	94	80	67	62	57	50	45	44	45	44	41	45	46	49	59	65	73	73	65.5	94			
31-Mar	71	69	73	80	77	76	72	75	74	76	86	91	97	99	97	84	79	81	89	92	95	98	98	99	84.5	99			
	76.1	77.8	78.7	79.5	79.4	79.7	79.7	77.3	73.1	69.0	64.6	60.6	57.2	55.2	53.4	52.0	52.3	55.2	59.4	63.4	66.8	69.8	72.5	75.1	Diurnal Average				
	99	99	99	100	100	100	100	100	100	98	93	91	97	99	97	86	85	85	92	97	98	98	98	99	Diurnal Maximum				



WBEA
Hourly Averages

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





Maximum Speed: 33 km/h on Mar 2 07:00	Maximum Daily Speed Average: 20.7 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 4 23:00	Minimum Daily Speed Average: 1.4 km/h on Mar 25	Hours of Data: 744
Maximum Diurnal Speed Average: 3.7 km/h at hour 2	Minimum Diurnal Speed Average: 0.5 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 1.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 27	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	NE5	NW1	SW4	S3	SSE5	SSW5	SSW5	S6	SSE7	SSE9	SSE12	SSE11	SSE13	SSE14	S13	SSW16	SSW18	SSW10	S11	S11	S8	WSW8	NW17	N21	S5.7	N21
2-Mar	N30	NNE27	NNE22	N19	N29	N28	N33	N22	N19	N16	NNW24	NNW25	N24	N25	NNW25	NNW29	NNW26	NNW24	NNW14	NNW12	NW14	NNW8	NNE5	NW7	N20.7	N33
3-Mar	NW12	NW14	NW14	NNW8	N7	N6	N9	N8	N10	NNE15	NNE15	NNE15	N17	N13	NNE12	NNE11	NE10	ENE7	ENE5	ENE5	ENE4	S3	SSW5	S5	N7.1	N17
4-Mar	SSW5	SSW6	SSW4	SW5	SSW5	S5	S8	SSW8	S8	SSE10	SSE10	SSE10	SSE11	SSE13	SSE14	SSE16	S10	SW10	SW11	SSW9	S6	SSE7	E0	WSW5	S7.4	SSE16
5-Mar	W7	WNW9	NW13	WNW13	WNW9	WSW6	W7	W9	W2	E4	SSE5	S6	S7	S7	SSE8	S9	SSE9	SSE8	S6	SSW6	SW5	SSW5	SW6	W4	SW3.9	NW13
6-Mar	WSW4	WSW2	WSW7	W9	NW2	W3	NW4	N1	NNE4	NE6	NNE8	N9	N9	NNW5	SW6	SW4	NE9	NE11	NE9	NE9	NE7	N5	NNE2	N5	N3.3	NE11
7-Mar	NNW2	S3	SE4	SE4	S4	W4	WNW14	WNW14	NW12	NW14	NW15	NW14	NW11	NW12	NW12	NW11	NW11	NW10	NW10	WNW12	NNW9	N7	N4	NNW2	NW7.5	NW15
8-Mar	SW4	SSW3	SW4	WSW5	WSW7	WSW7	SSW6	WSW9	SSW9	SSW7	SSW7	WSW12	SW8	SW8	SSW8	SW7	SW8	SW5	SW7	WSW4	SW4	W6	W6	WNW8	SW6.1	WSW12
9-Mar	WNW10	NNW8	S2	SSE2	WSW4	NW7	NNW7	NNW9	NW10	NW11	NNW9	NNW7	WNW5	NNW8	NW12	NNW14	NNW11	N9	N7	N8	N6	N6	NNW10	NNE11	NNW7.1	NNW14
10-Mar	NNE13	NNE15	NNE15	NNE10	NNE8	NNE10	NNE6	ENE7	ENE8	NE9	NNE9	NNE7	NE6	NNE8	NE8	NNE10	NNE10	NNE12	NNE15	NNE18	NNE16	NNE16	NNE14	NNE15	NNE10.9	NNE18
11-Mar	NNE16	NNE16	NNE17	N16	NNE15	NNE16	NNE17	NNE18	NNE15	NNE15	NNE18	N20	NNE18	NNE18	NNE16	NNE14	NNE15	NNE14	NNE13	NNE11	NNE10	NNE9	NNE9	N11	NNE14.8	N20
12-Mar	N9	NNE6	NNE5	N5	NNE7	NNE3	NNE3	S2	SW4	S3	SSW4	SSE12	S10	S11	S11	S11	SSE8	N2	NE4	SE2	SSW6	E3	NE3	N4	SSE1.6	SSE12
13-Mar	NNE3	NNW2	SW1	W11	W12	WSW11	WSW12	WSW12	SW9	WSW13	WSW8	WSW9	WSW8	SW8	SW10	SSW13	SSE13	S19	SSW16	S13	S12	S12	SSE14	SSE14	SSW8.3	S19
14-Mar	SSE12	SSE11	SSE14	SSE14	SSE17	SSE16	SSE11	S9	S9	S7	S9	S10	S11	SSE8	SSE9	SSE7	SSE6	SE5	SW5	WSW6	W7	WSW10	W7	N15	S7.1	SSE17
15-Mar	NE20	NNE27	NNW29	NNW24	NNW22	N11	NNW9	NNW10	NNE10	NNE9	NNW9	NNW14	NW13	NNW12	NNW8	NW6	NE3	SSE3	SSE6	S7	SSW7	SSW6	SW4	SSW2	NNW7.7	NNW29
16-Mar	N9	NNE16	NNE14	N8	N10	NNE7	ENE4	NE5	NNE6	NE7	N6	N6	N7	N6	NE6	NE10	NNE11	NNE11	N11	N10	N11	NNE9	NNE9	N6	NNE8.2	NNE16
17-Mar	N4	N2	N2	S2	SSW4	SSW3	SW5	SW4	SSW7	S9	S7	S6	SSW5	SSE7	SSE7	SSE6	SSE7	SSE5	SE5	ESE5	NNE5	N9	NNW4	N5	S2.3	S9
18-Mar	WNW3	WSW2	S3	SSW2	SW2	SE2	SSE4	SW4	SSW5	SSW4	SSW5	SE4	WSW5	NNW8	NNE16	NNE15	NNE17	NNE18	NNE21	NNE21	NNE18	N17	NNE17	N13	NNE5.9	NNE21
19-Mar	N10	N6	N5	N4	NNE5	NNE6	NNE6	NNE6	NNE9	N10	N11	NNE10	NNE7	NE9	NNE11	NE12	NE11	NE11	NE10	NE10	NE11	NE10	NE7	NNE6	NNE8.1	NE12
20-Mar	NNE5	N6	NNE7	NNE4	N7	N6	N6	N5	N6	NNW3	SW5	SW6	W7	NNW11	NNW4	NNE9	NNE9	NE9	NNE8	NNE9	NNE11	NNE13	N12	N11	N6.0	NNE13
21-Mar	N11	N11	N10	N10	N10	N10	N9	N7	N5	N8	N8	SE9	ESE8	SE9	ESE11	ESE13	ESE13	SE13	SE10	SE9	ESE14	ESE12	ESE10	SE8	ENE5.4	ESE14
22-Mar	SSE9	SSE8	SSE8	SSE8	E2	ENE4	SE6	SSE8	SSE8	SSE7	S7	SW6	SSW6	SSW5	W3	NNW6	N7	NW6	NNW4	ENE4	ENE4	NE3	NNE3	NNE2	SSE2.1	SSE9
23-Mar	SSE2	S4	SE4	SSE5	SSE3	S5	S6	S5	SSW3	SSW2	WSW3	WSW3	N1	NE4	SE3	N3	NNE7	NNE8	NE6	NNE6	NNE8	N10	N10	NNE10	NE1.4	N10
24-Mar	N9	N9	N8	N10	N9	N9	N8	NNE9	NNE10	NE10	N11	N10	NNW8	NNW6	WNW4	SSW7	S7	SSE4	E5	ENE6	NE5	NNE5	NE2	NNE4.8	N11	
25-Mar	WSW2	NNE2	NE3	NNE4	NNE6	NNE5	N5	N6	N3	WSW3	SW5	SSW6	SW7	SSW9	SSW9	W5	W2	NW2	ENE3	SSE3	SSE7	S8	S6	S7	SSW1.4	SSW9
26-Mar	SE9	SE5	SSE8	SE6	SE5	SE4	SSE6	SSE14	SSE12	SSE13	SSE12	SSE12	SSE14	SSE12	SE10	SSE10	SSE11	SSE11	SSW7	SW8	WSW6	SW5	SE4	SSE5	SSE7.8	SSE14
27-Mar	S4	S4	S4	SSE4	SSW6	SSW9	S7	S6	SSE6	SSE8	SSE8	S6	SSE9	SSE10	SE9	SSE10	SSE11	SSE8	SSE9	S6	SSW6	N2	SSE4	S5	S6.4	SSE11
28-Mar	SSW4	N2	E2	E1	W2	SW2	SW3	SW4	WSW3	W4	NW10	NNW18	NNW21	NW15	NW19	NW23	NW23	NW19	NW18	NW15	NW12	WNW12	WNW12	W8	NW9.3	NW23
29-Mar	W5	WSW5	WSW6	WSW6	SW7	S4	S5	S7	SSE6	SSE6	SSE8	SSE7	S7	SSE8	SSE8	SSE10	SE7	E5	NE4	NNE2	NW3	WSW3	W4	W5	S3.5	SSE10
30-Mar	W3	WNW4	N8	NNE5	N1	ENE2	SW4	SSW3	SSW3	SSW6	SW6	SW1	SSW5	SSE10	SSE2	SSW5	S8	SSE7	SSE7	SE6	SE6	NE3	S5	SSW6	S2.5	SSE10
31-Mar	S3	SSW7	SSW5	SSE3	SSE3	SSE4	SSE3	S4	SSE5	SSW2	NE3	NNE8	N8	NNE11	NNE7	ENE15	ENE14	NE13	NNE13	NNE14	NNE15	NNE14	NNE17	N17	NE5.4	N17

N3.3	N3.7	N3.0	NNW2.3	NNW2.6	NNW1.9	NW1.8	NNW1.4	NNE0.6	NNE0.5	NNW1.4	NNW1.4	NW1.2	N1.0	NNE0.6	NE1.1	NE2.3	NNE2.5	NNE2.2	NNE2.1	NNE2.4	N2.8	N3.0	N3.5		Diurnal Average
N30	NNE27	NNW29	NNW24	N29	N28	N33	N22	N19	N16	NNW24	NNW25	N24	N25	NNW25	NNW29	NNW26	NNW24	NNE21	NNE21	NNE18	N17	NNE17	N21		Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

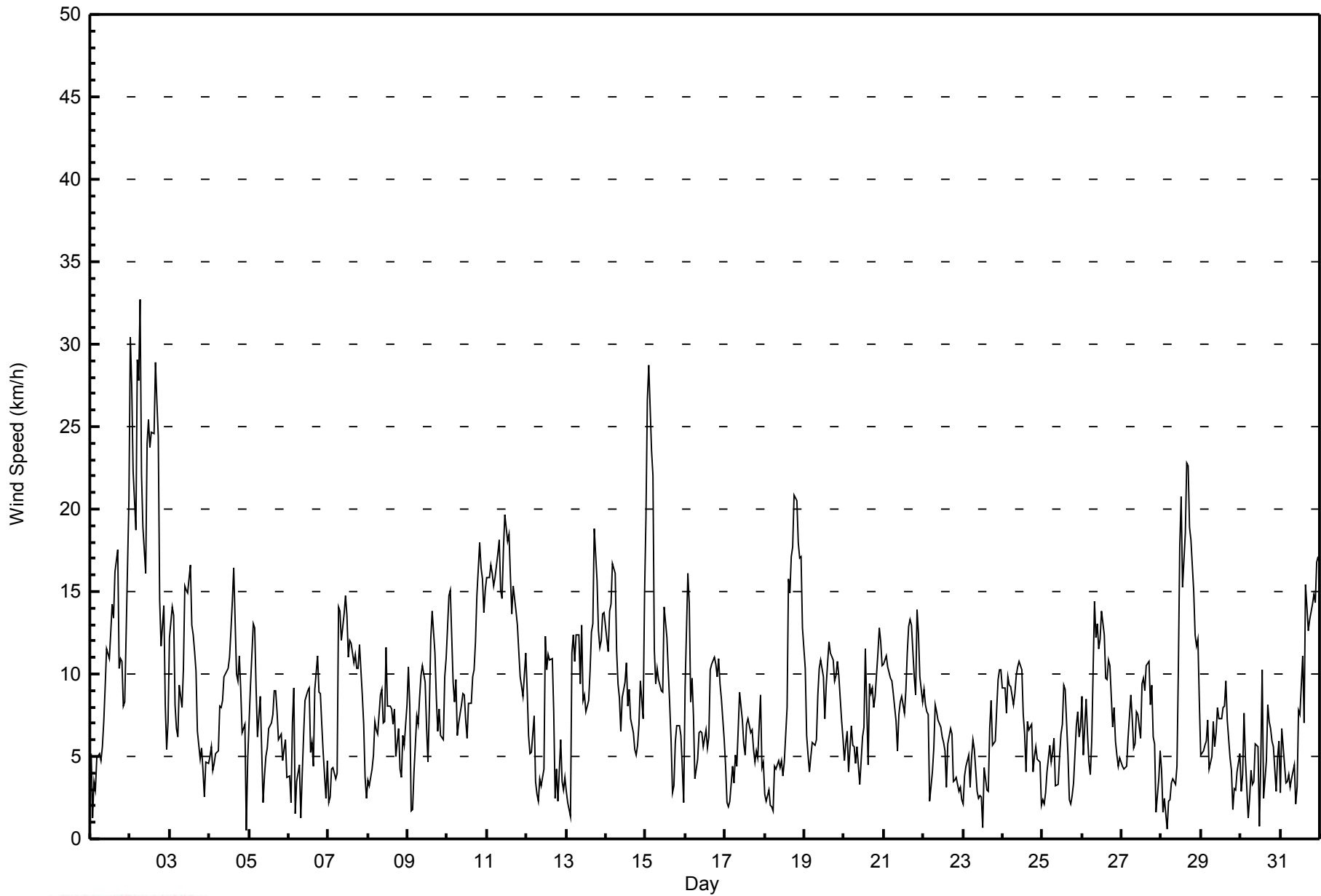
Wind Speed (WS) - km/h
Mildred Lake - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 2 05:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Mar 18 03:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	2	2	3	2	3	6	5	6
2-Mar	7	7	6	5	9	8	8	5	5	4	9	5	5	5	7	6	6	5	4	2	3	3	1	2	9
3-Mar	3	3	3	3	1	1	2	2	3	4	4	4	4	4	3	3	2	3	1	1	1	1	1	1	4
4-Mar	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	1	1	2	2	3
5-Mar	2	4	3	3	3	2	2	2	2	2	1	1	1	2	2	2	2	2	1	1	1	2	1	1	4
6-Mar	2	2	2	2	2	2	1	2	1	4	3	3	4	2	2	2	3	3	2	2	2	1	1	1	4
7-Mar	1	1	1	1	1	4	4	4	4	5	4	3	3	4	3	3	3	2	2	3	2	2	3	2	5
8-Mar	2	1	2	2	2	2	2	3	2	2	4	4	3	2	1	2	2	1	2	1	2	2	2	3	4
9-Mar	3	2	2	2	3	2	2	3	2	3	3	2	2	3	5	4	4	5	2	2	1	1	2	2	5
10-Mar	3	4	5	2	2	3	2	2	2	3	3	3	3	3	3	2	2	3	4	4	4	4	3	3	5
11-Mar	3	3	3	3	3	3	3	4	3	3	3	3	4	4	4	3	3	3	3	2	3	2	2	2	4
12-Mar	2	2	1	2	2	1	1	1	1	1	1	4	3	2	2	2	2	2	1	1	1	1	1	2	4
13-Mar	1	1	2	3	4	3	4	4	2	3	3	3	3	3	3	3	2	5	4	3	2	2	2	3	5
14-Mar	2	2	3	3	3	3	2	2	2	3	2	2	2	2	2	1	1	1	2	3	2	3	2	6	6
15-Mar	6	8	8	7	5	5	4	5	2	2	3	3	3	3	2	2	2	1	1	1	1	2	1	2	8
16-Mar	4	3	4	2	2	3	1	1	1	2	3	2	2	2	2	3	3	2	2	2	2	2	2	1	4
17-Mar	1	2	2	2	1	1	1	2	1	2	2	2	1	1	1	1	1	2	1	1	3	2	1	1	3
18-Mar	1	1	1	1	2	1	1	2	1	1	1	2	1	5	4	3	4	5	5	5	6	6	4	3	6
19-Mar	2	2	1	1	1	1	1	2	2	2	3	3	3	3	4	3	3	3	2	2	3	2	2	1	4
20-Mar	1	1	1	1	1	1	1	1	1	2	1	2	2	3	3	3	2	2	2	2	2	2	2	2	3
21-Mar	1	1	1	1	1	1	1	1	1	1	2	3	2	4	3	3	3	3	2	2	2	2	2	2	4
22-Mar	2	2	2	2	1	1	2	1	2	2	2	1	1	2	1	2	2	3	2	1	1	1	1	1	3
23-Mar	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	2	1	2	2	3
24-Mar	2	1	1	2	2	2	1	2	2	2	3	4	3	4	2	3	2	2	2	1	1	1	1	1	4
25-Mar	1	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	2	2
26-Mar	3	2	2	2	2	1	2	3	3	3	2	2	3	3	2	2	3	3	3	3	2	1	1	1	3
27-Mar	1	1	1	1	2	2	2	1	2	1	2	1	3	2	2	2	2	2	2	2	2	1	2	2	3
28-Mar	2	1	1	2	1	1	1	1	1	2	3	4	4	4	5	6	6	4	4	4	3	2	3	3	6
29-Mar	1	2	1	2	1	1	1	2	2	2	2	1	2	2	2	2	1	1	1	1	2	1	2	2	2
30-Mar	2	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	1	2	2	2	2	1	3
31-Mar	2	2	2	1	2	1	1	2	2	2	2	3	2	2	3	4	3	3	3	4	4	3	3	3	4
																	Diurnal Maximum								



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	224	30.11	30.11
6 - 11	360	48.39	78.49
12 - 19	133	17.88	96.37
20 - 28	22	2.96	99.33
29 - 38	5	0.67	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Frequency Distribution

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

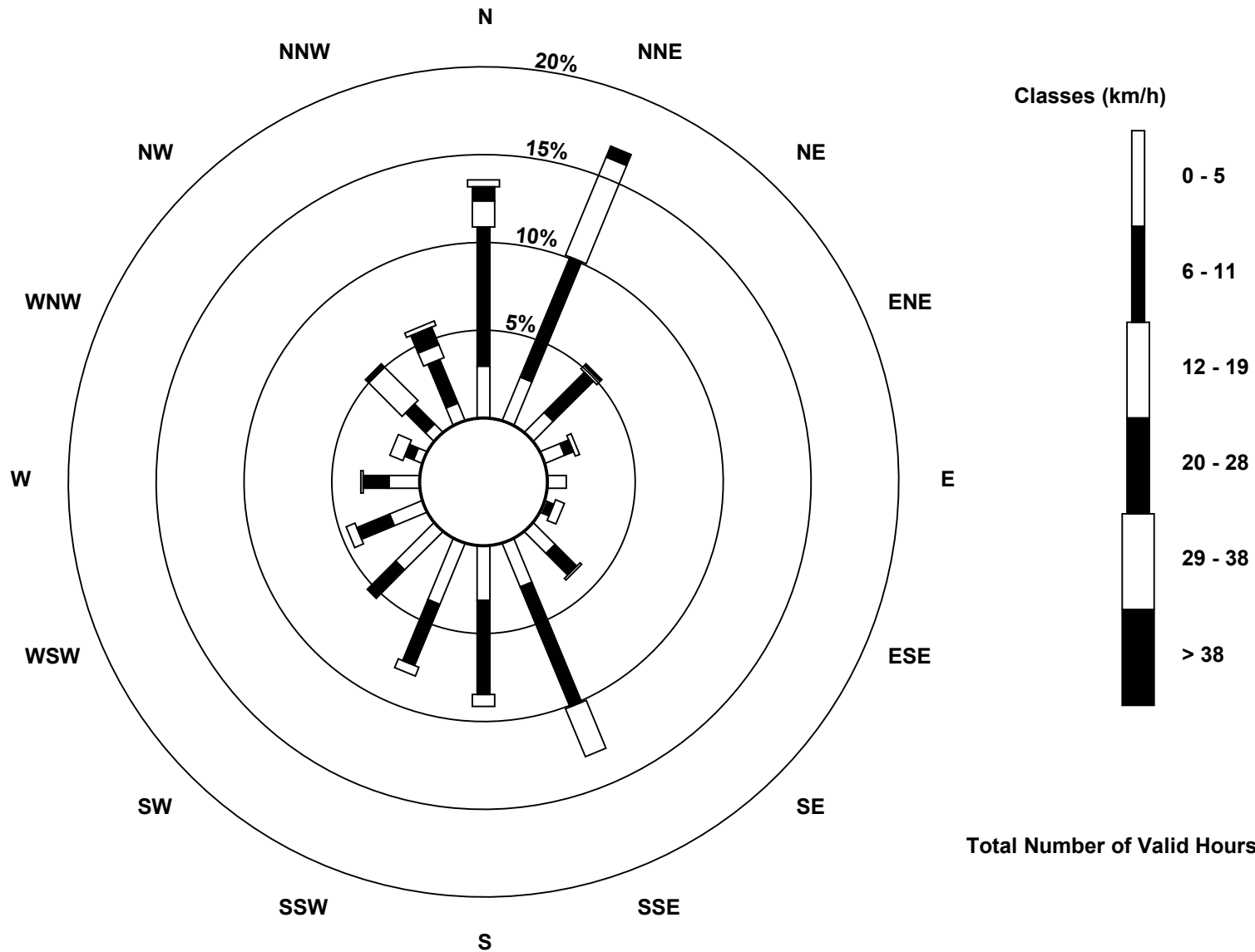
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	22	20	12	9	8	1	13	20	23	28	23	15	13	4	5	8	224
6 - 11	59	55	24	4	0	3	13	55	40	28	17	15	11	4	12	20	360
12 - 19	11	45	2	2	0	4	1	22	5	4	0	4	1	6	20	6	133
20 - 28	6	5	1	0	0	0	0	0	0	0	0	0	0	0	2	8	22
29 - 38	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	125	39	15	8	8	27	97	68	60	40	34	25	14	39	44	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 350 deg on Mar 2 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 352.8 deg on Mar 2	Hours of Data: 744
Direction of Minimum Speed: 90 deg on Mar 4 23:00	Direction of Minimum Daily Speed Average: 1.4 deg on Mar 25
Direction of Minimum Speed: 90 deg on Mar 4 23:00	Hours of Missing Data: 0
Monthly Average Direction: 251.9 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	54	317	219	187	165	209	209	182	166	161	164	149	150	158	171	197	196	192	173	183	184	251	319	349	184.2
2-Mar	1	13	15	10	354	352	350	354	3	2	348	348	354	355	346	345	342	346	348	332	315	347	27	321	352.8
3-Mar	315	315	308	340	3	349	3	6	8	25	24	31	6	10	20	18	56	62	64	69	78	188	197	190	9.1
4-Mar	207	200	199	216	196	189	184	194	172	160	158	156	150	157	156	167	188	233	227	212	178	160	90	237	181.1
5-Mar	261	288	305	300	302	246	260	269	272	101	166	179	182	173	166	169	159	161	176	196	221	207	222	267	226.5
6-Mar	242	255	244	268	322	280	312	7	30	38	23	353	356	338	226	215	40	45	34	36	37	5	12	350	358.7
7-Mar	344	189	137	140	171	270	300	301	309	310	318	317	307	321	322	314	317	325	320	302	327	0	3	334	314.1
8-Mar	216	195	229	240	245	240	196	237	212	203	198	246	228	214	203	225	233	228	226	252	235	262	270	282	229.9
9-Mar	300	332	191	147	248	312	327	334	312	308	339	343	291	337	326	347	340	351	359	357	351	352	339	16	333.8
10-Mar	22	31	27	29	28	26	28	57	64	42	14	29	44	21	36	30	25	24	18	20	30	30	24	17	28.0
11-Mar	14	15	13	11	14	13	15	14	19	15	13	9	12	13	16	21	18	21	18	16	26	15	13	5	14.7
12-Mar	6	21	18	3	13	16	16	186	218	186	206	164	185	180	174	172	166	3	47	134	209	96	50	2	150.5
13-Mar	12	344	225	261	264	258	245	247	222	248	244	242	248	228	218	203	167	191	192	184	177	172	156	162	212.9
14-Mar	152	150	154	160	163	165	165	186	191	182	182	171	170	156	152	150	132	225	237	265	256	261	5	5	172.5
15-Mar	34	22	348	337	335	356	333	344	32	19	341	326	324	334	337	325	53	147	127	188	213	206	214	209	348.3
16-Mar	11	15	19	2	10	29	69	50	32	53	4	359	352	359	34	37	26	12	11	8	11	16	12	5	17.3
17-Mar	5	353	352	175	205	196	214	226	204	177	188	191	197	166	165	163	156	156	125	121	12	4	340	6	175.1
18-Mar	287	247	179	209	224	130	165	225	210	201	192	145	239	331	14	23	20	15	20	19	18	9	12	9	12.1
19-Mar	8	6	4	360	21	21	22	22	25	354	6	15	31	37	12	43	45	39	42	38	42	51	47	28	26.7
20-Mar	12	8	15	16	3	10	11	357	356	348	226	234	264	329	329	24	33	35	26	19	16	15	9	11	5.2
21-Mar	10	8	6	4	4	7	5	9	7	350	2	143	121	125	121	117	107	129	128	127	114	112	108	132	77.6
22-Mar	154	151	160	164	87	62	136	159	148	166	188	224	212	196	261	344	354	312	338	73	75	40	21	22	155.6
23-Mar	158	175	144	161	154	182	179	191	213	205	252	239	1	43	141	355	21	24	44	29	12	10	11	12	42.3
24-Mar	10	7	8	8	8	6	1	19	32	39	9	356	348	342	303	202	174	187	161	86	75	52	25	51	16.5
25-Mar	248	18	35	30	18	17	5	5	357	237	216	211	220	209	207	268	269	324	71	162	160	171	174	169	208.5
26-Mar	146	143	152	135	125	135	162	166	165	167	165	155	153	153	141	147	147	147	197	236	249	222	143	161	160.1
27-Mar	183	187	176	147	195	192	189	183	164	162	165	170	168	161	145	165	167	158	161	174	209	5	163	179	170.8
28-Mar	211	3	82	98	272	218	228	222	258	266	315	335	333	320	311	311	321	320	317	316	308	299	297	275	311.0
29-Mar	259	250	238	243	215	170	171	185	153	162	159	168	171	160	155	152	134	93	39	28	310	251	279	278	182.5
30-Mar	274	287	355	21	360	78	219	210	211	213	227	232	192	152	164	209	176	163	155	138	124	34	186	197	181.4
31-Mar	191	200	204	150	153	167	156	185	161	205	52	17	8	18	32	67	68	43	21	30	22	22	12	11	37.5

0.4	4.5	359.9	345.9	343.2	346.8	323.2	301.6	14.3	14.5	334.4	334.2	313.0	4.1	20.6	36.4	51.9	33.3	27.6	21.4	15.3	9.5	1.2	357.9	
Diurnal Average																								

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

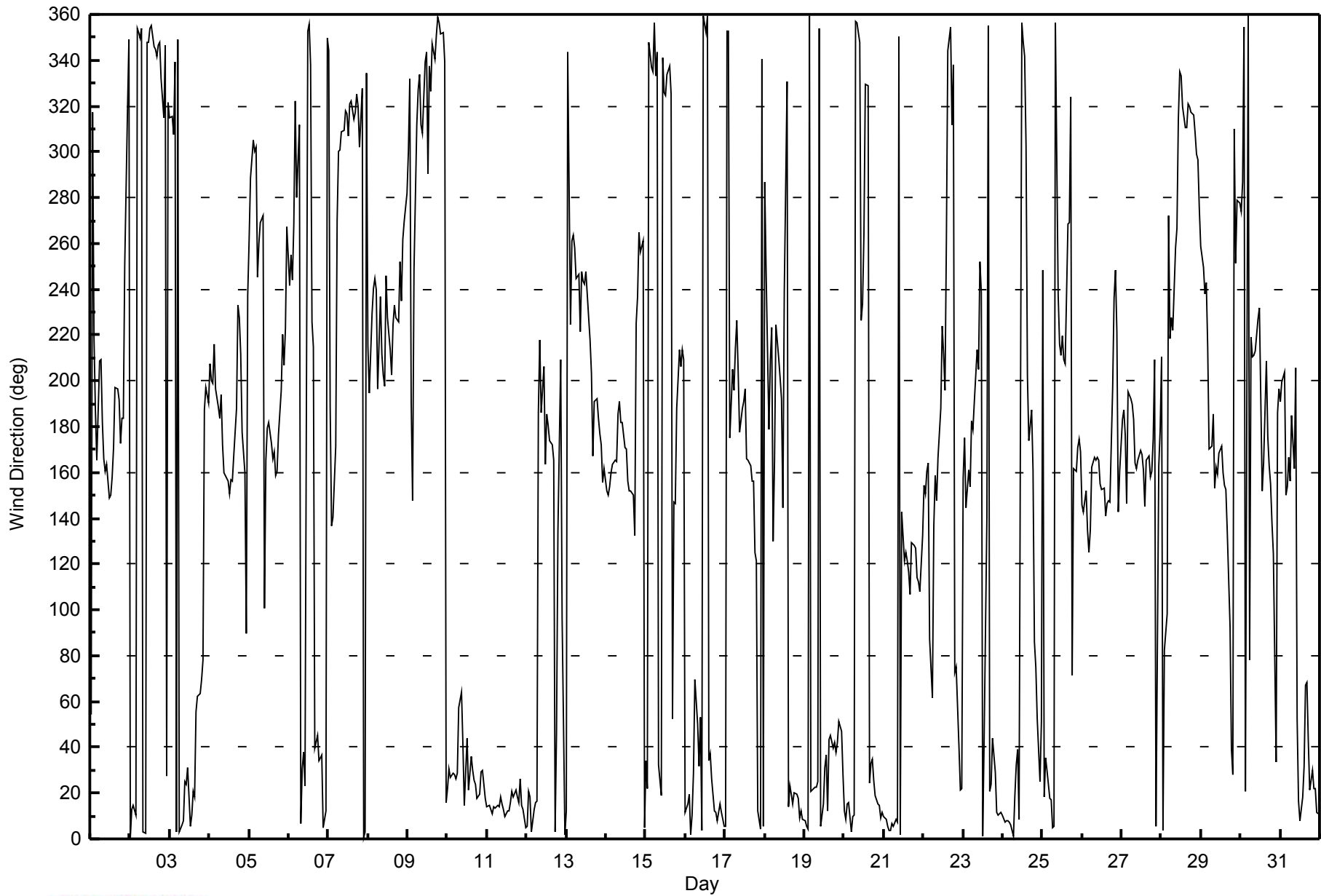
Mildred Lake - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on Mar 30 12:00																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: 8 deg on Mar 24 21:00																									
Percentiles: P ₁ = 10 P ₁₀ = 12 Q ₁ = 15 Median = 18 Q ₃ = 27 P ₉₀ = 47 P ₉₉ = 86																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Mar	17	52	12	14	19	12	12	20	15	16	14	17	18	15	17	13	12	15	12	15	17	46	22	11	52
2-Mar	15	18	16	15	15	15	13	13	17	15	14	13	14	15	15	12	12	11	10	10	14	29	15	17	29
3-Mar	15	14	15	41	15	12	15	11	15	20	20	23	19	24	22	21	18	19	16	10	36	52	10	12	52
4-Mar	12	21	37	13	13	21	13	11	20	15	15	16	17	16	15	10	30	25	19	16	18	11	89	24	89
5-Mar	18	35	14	14	16	25	21	15	83	57	18	21	18	19	14	12	13	11	18	10	25	24	11	38	83
6-Mar	35	74	19	17	76	37	10	77	32	26	26	27	35	56	24	18	21	17	17	16	19	22	24	20	77
7-Mar	42	42	21	22	36	75	17	17	22	21	15	18	17	17	15	15	14	13	13	14	31	54	54	57	75
8-Mar	22	16	28	26	21	27	36	24	21	24	39	22	25	22	14	21	21	24	31	39	37	26	28	26	39
9-Mar	20	28	86	86	55	24	22	13	16	16	38	17	56	22	22	17	19	10	16	15	14	9	12	15	86
10-Mar	17	19	19	16	19	18	20	24	25	30	28	38	48	35	31	24	19	16	15	14	16	16	15	14	48
11-Mar	13	13	13	12	13	13	13	12	15	15	15	13	15	16	16	18	15	15	16	15	17	19	17	14	19
12-Mar	18	18	23	26	13	30	44	67	46	41	29	13	26	16	14	12	15	91	24	52	17	50	50	21	91
13-Mar	27	69	92	19	20	24	24	24	20	19	29	24	25	22	20	18	11	18	13	16	14	12	13	14	92
14-Mar	14	14	13	12	11	11	18	18	21	29	21	12	15	15	14	13	15	19	48	54	26	21	28	42	54
15-Mar	18	19	16	13	11	16	19	42	17	20	19	17	18	15	23	37	52	31	12	15	16	11	28	84	84
16-Mar	35	15	14	21	14	21	21	20	24	28	36	43	23	39	43	24	18	15	12	12	10	12	12	12	43
17-Mar	26	61	31	65	12	23	12	17	18	21	22	31	33	14	16	17	17	14	10	10	54	12	16	19	65
18-Mar	37	36	18	35	76	72	31	18	17	23	27	51	24	32	19	17	15	15	16	16	16	16	14	15	76
19-Mar	15	17	15	22	17	17	15	15	18	17	23	27	52	29	28	20	20	21	16	17	15	13	13	10	52
20-Mar	16	10	9	15	15	16	15	22	18	66	35	32	45	18	70	25	27	18	15	13	13	15	12	12	70
21-Mar	11	12	11	11	12	12	12	14	16	16	40	34	35	26	21	16	16	17	16	17	12	11	12	21	40
22-Mar	17	19	16	16	54	17	36	16	20	26	32	22	21	36	74	24	19	34	49	16	17	16	14	42	74
23-Mar	53	11	18	11	21	21	22	21	28	33	59	69	90	43	49	70	28	18	18	26	12	13	12	12	90
24-Mar	12	13	12	14	12	13	13	14	18	20	23	20	29	45	69	56	35	19	35	12	8	23	14	61	69
25-Mar	57	63	13	11	11	12	15	15	27	43	29	23	24	16	15	48	79	77	59	18	14	9	14	19	79
26-Mar	21	18	19	19	24	23	28	13	15	14	17	17	16	15	21	18	16	17	27	21	24	22	24	20	28
27-Mar	15	15	13	25	17	12	15	16	19	15	15	14	22	16	17	14	11	19	17	18	32	72	47	34	72
28-Mar	56	74	46	87	35	15	26	11	35	42	17	13	9	17	16	16	14	15	14	13	13	13	13	21	87
29-Mar	17	24	17	20	18	43	33	19	40	29	33	22	21	21	18	16	21	26	9	77	43	47	26	25	77
30-Mar	38	39	12	15	78	32	22	20	35	20	24	106	64	21	94	73	14	16	20	22	19	51	48	10	106
31-Mar	36	11	29	53	55	27	20	35	55	66	68	27	25	14	42	17	18	17	15	18	16	15	14	14	68
	57	74	92	87	78	75	44	77	83	66	68	106	90	56	94	73	79	91	59	77	54	72	89	84	
	Diurnal Maximum																								



WBEA
Hourly Averages

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



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 18, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	12:05
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
Cal Gas Concentration	59.4 ppm	Cal Gas Expiry Date	3/26/2012
Gas Cert Reference	cc307191		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8364
DACS voltage range	0-5v	DACS channel #	SE1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-652	-652
Analyzer Range (mv)	1000	1000	Lamp voltage	781	777
Calculated slope	1.002241	1.000062	Chamber temp.	45.1	45.1
Calculated intercept	1.827246	0.014808	Pressure (mmHg)	695.0	708.3
Analyzer Background	26.9	25.2	Flow (lpm)	0.491	0.500
Analyzer Coefficient	1.111	1.119	Intensity	90	90

Analyzer make TEI 431 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	-1.3	NA
as found span	5000	69.9	830.4	824.3	1.007
calibrator zero	5000	0.0	0.0	0.3	0.000
high point	5000	69.9	830.4	830.9	0.999
second point	5000	35.4	420.6	419.3	1.003
third point	5000	17.7	210.3	210.6	0.998
calibrator zero					
as left zero	5000	0.0	0.0	0.3	0.000
as left span	5000	69.9	830.4	834.8	0.995
Average Correction Factor					1.000

Corrected As found 825.5 Previous response 826.7 % change 0.1%

Notes:

Small adjustments made to zero and span. Inlet filter changed after 3rd point.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

SO₂ Calibration Summary

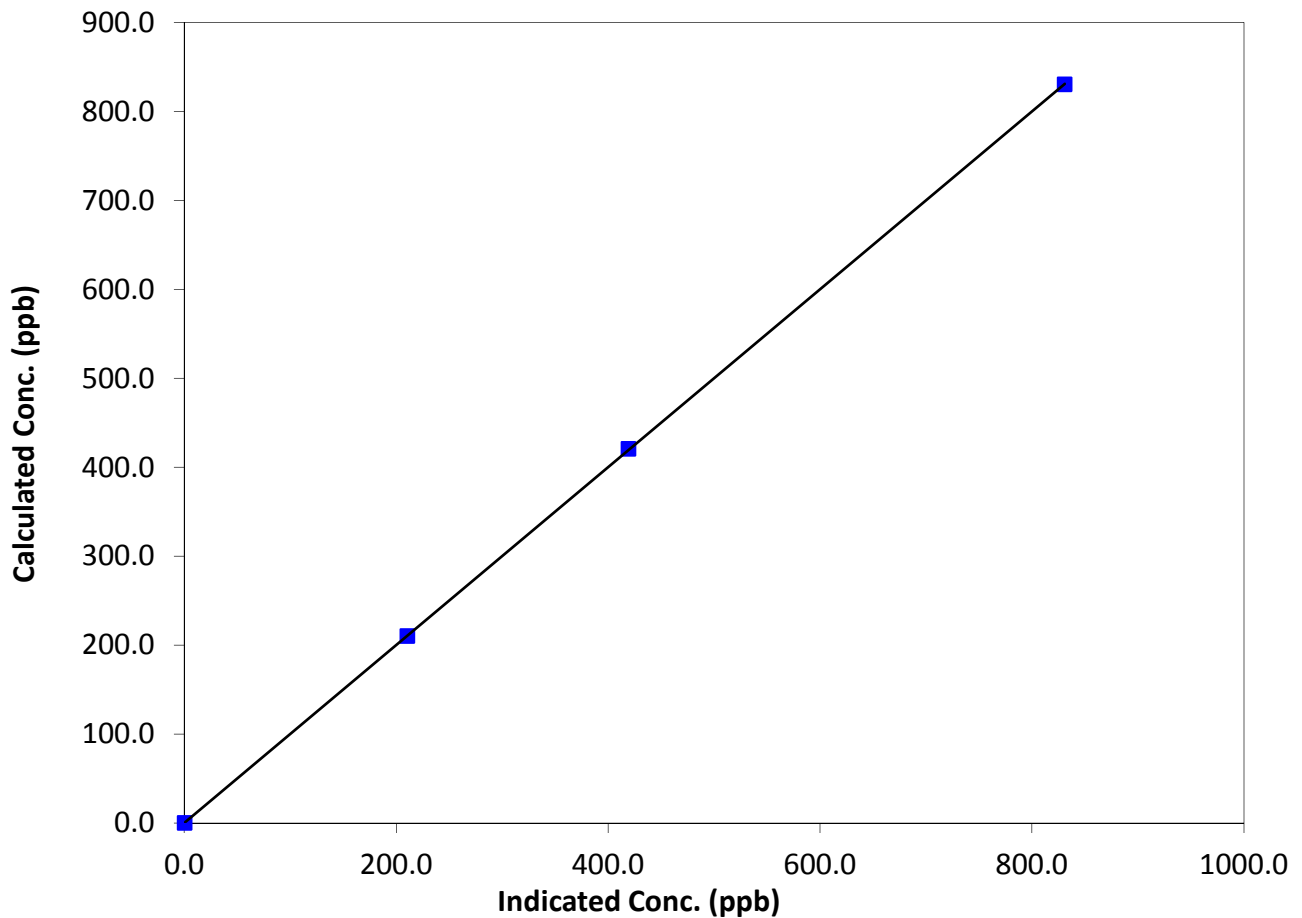
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 18, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	8:45	End Time (MST)	12:05
Analyzer make	TEI 43I	Analyzer serial #	JC1404901075

Calibration Data

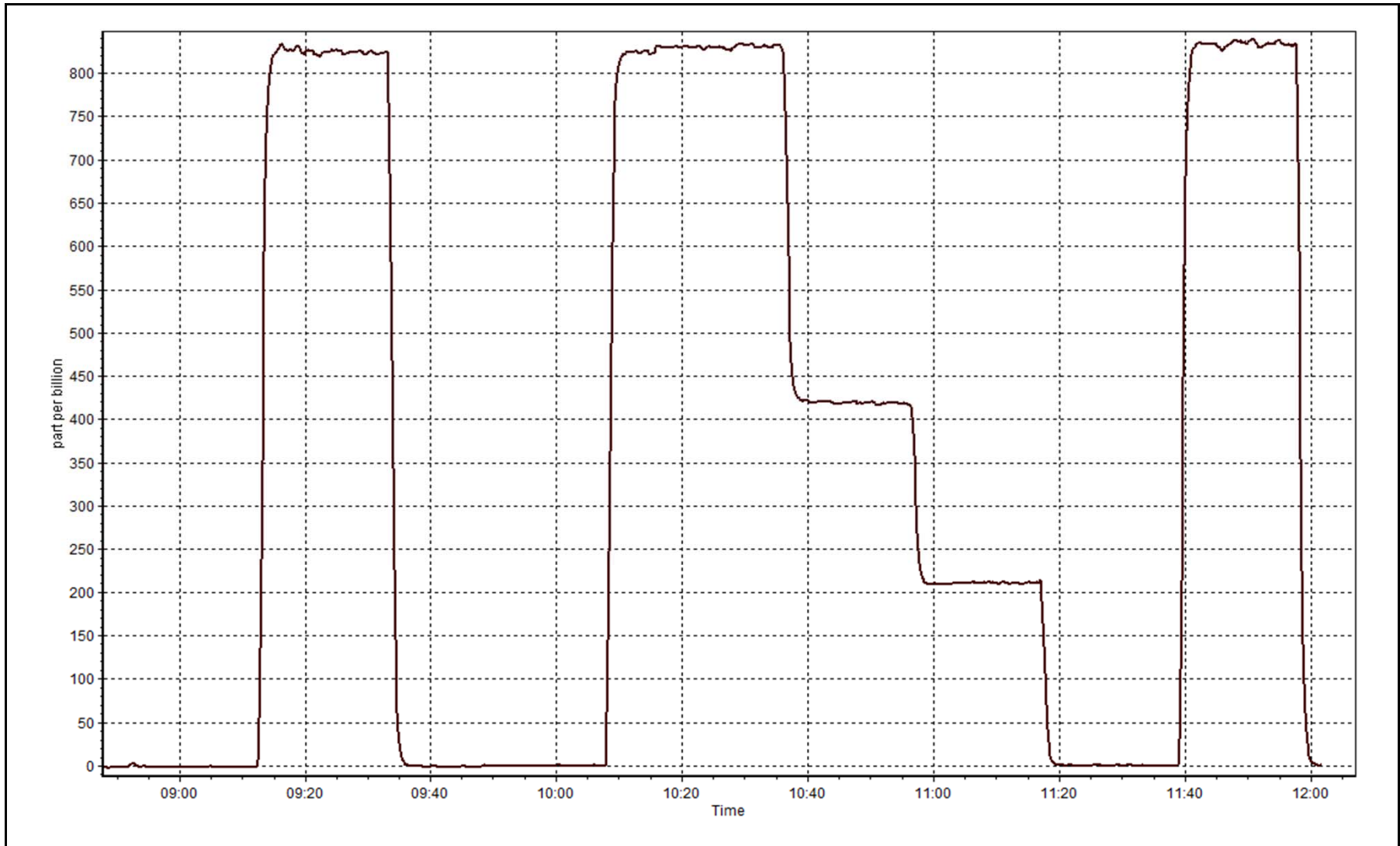
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999994
830.4	830.9	0.9994		
420.6	419.3	1.0031	Slope	1.000062
210.3	210.6	0.9984		
			Intercept	0.014808

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 10, 2015





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 19, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	12:02	End Time (MST)	14:50
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11541008
Cal Gas Concentration	5.04 ppm H2S	Cal Gas Expiry Date	9/9/2017
Gas Cert Reference		SO2 gas conc.	59.4 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8364
DACS voltage range	0-5v	DACS channel #	SE2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-601	-601
Analyzer Range (mv)	100	100	Lamp voltage	776	778
Calculated slope	1.004184	0.992198	Chamber temp.	45	45
Calculated intercept	0.240560	0.283702	Pressure	543.0	550.0
Analyzer Background	14.4	14.4	Flow	1.000	1.010
Analyzer Coefficient	0.909	0.918	Intensity	86	87
			Converter temp.	326	324

Analyzer make/model	TEI 450i	Analyzer serial #	815129107
Converter make/model	n/a	Converter serial #	n/a

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	NA
as found span	4000	63.5	80.0	79.2	1.010
SO2 scrubber check	5000	17.7	210.3	0.1	NA
calibrator zero	4000	0.0	0.0	-0.2	NA
high point	4000	63.5	80.0	80.4	0.995
second point	4000	31.8	40.1	40.1	0.999
third point	4000	15.9	20.0	19.7	1.016
calibrator zero					
as left zero	5000	0.0	0.0	-0.1	NA
as left span	4000	63.5	80.0	80.3	0.996
Average Correction Factor					1.003

Corrected As found	79.4	Previous response	79.4	% change	0.1%
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Notes:

Scrubber check completed after as found zero. Filter changed after 3rd point. Adjusted span.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

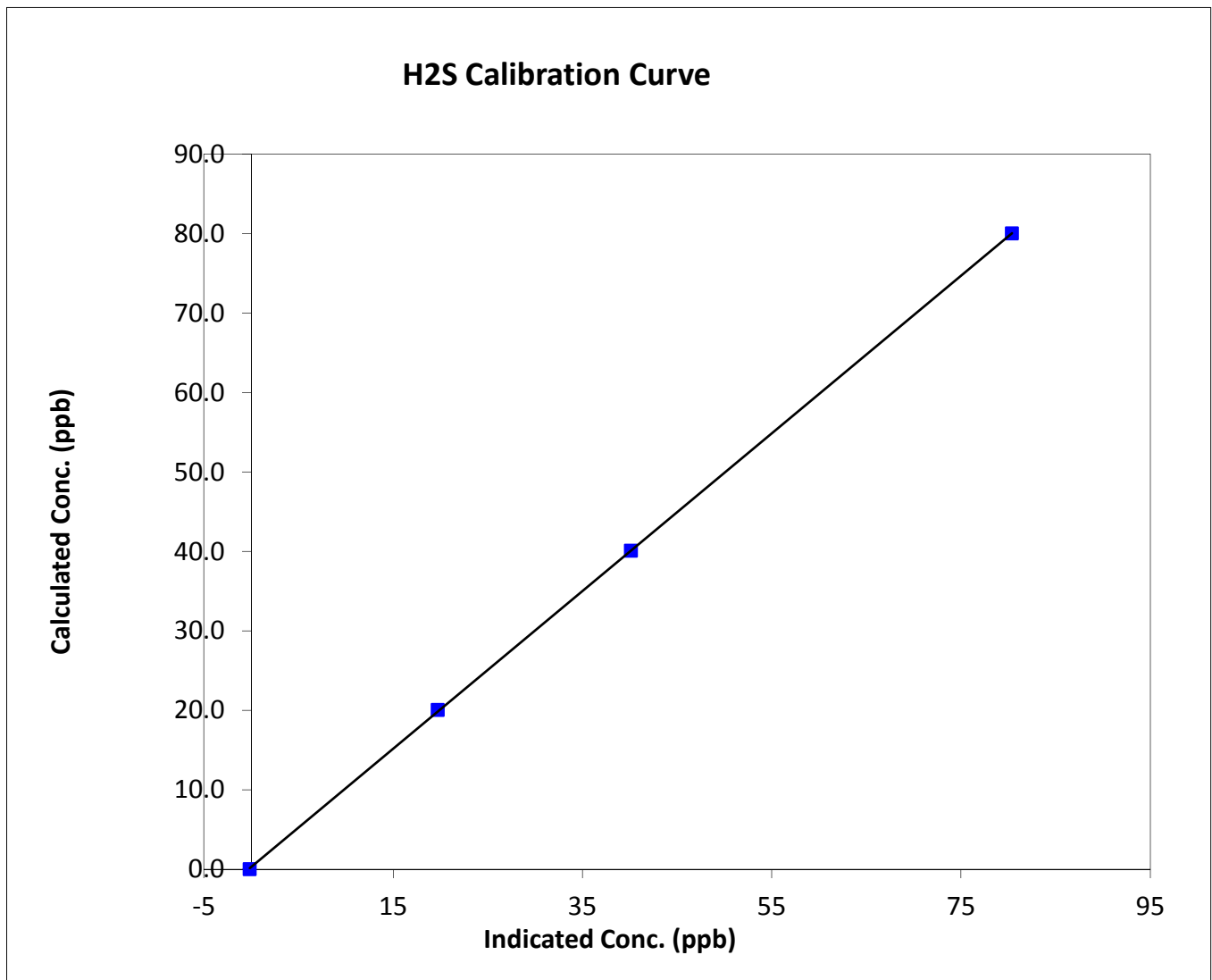
H2S Calibration Summary

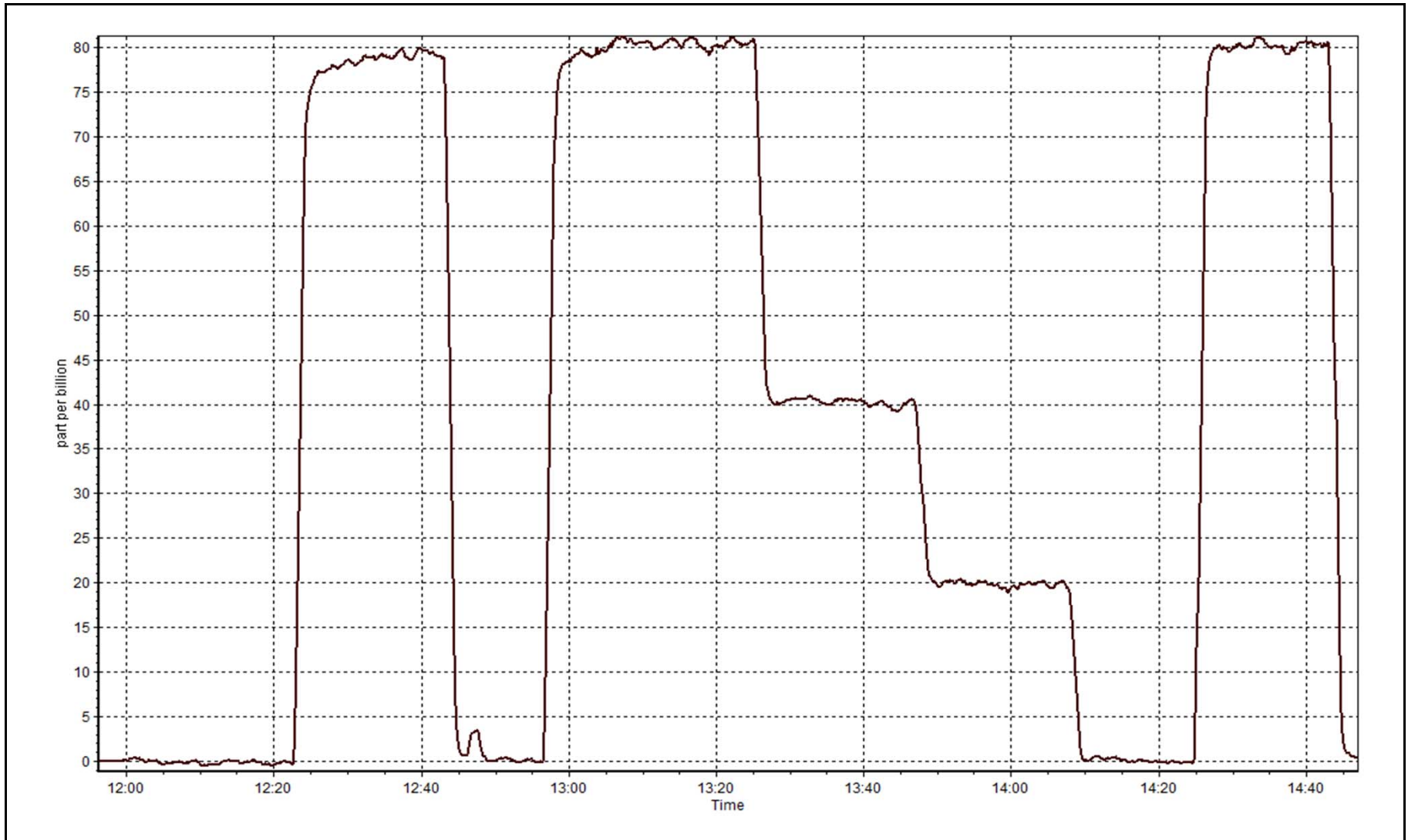
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 19, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	12:02	End Time (MST)	14:50
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999984
80.0	80.4	0.9953		
40.1	40.1	0.9987	Slope	0.992198
20.0	19.7	1.0164		
			Intercept	0.283702







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 18, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	12:05
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
Gas Cert Reference	cc307191	Cal Gas Expiry Date	3/26/2012
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1060.5 ppm
C3H8 Cal Gas Conc.	202 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8364
DACS voltage range	0-5v	DACS channel #	SE3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	25	25	Air or Bypass press	39.8	39.8
Calculated slope	0.997139	1.001927	Fuel Pressure	25.6	25.7
Calculated intercept	0.018237	-0.018005			
BKG	2.40	2.48			
COEF	4.850	4.854			

Analyzer make 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	0.08	N/A
as found span	5000	69.9	14.83	14.87	0.997
calibrator zero	5000	0.0	0.00	0.03	N/A
high point	5000	69.9	14.83	14.83	1.000
second point	5000	35.4	7.51	7.48	1.004
third point	5000	17.7	3.75	3.77	0.996
calibrator zero					
as left zero	5000	0.0	0.00	0.03	N/A
as left span	5000	69.9	14.83	14.83	1.000
Average Correction Factor					1.000

Corrected As found 14.79 Previous response 14.85 % change 0.4%

Notes:

Small adjustments made to zero and span. Inlet filter changed after 3rd point.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

THC Calibration Summary

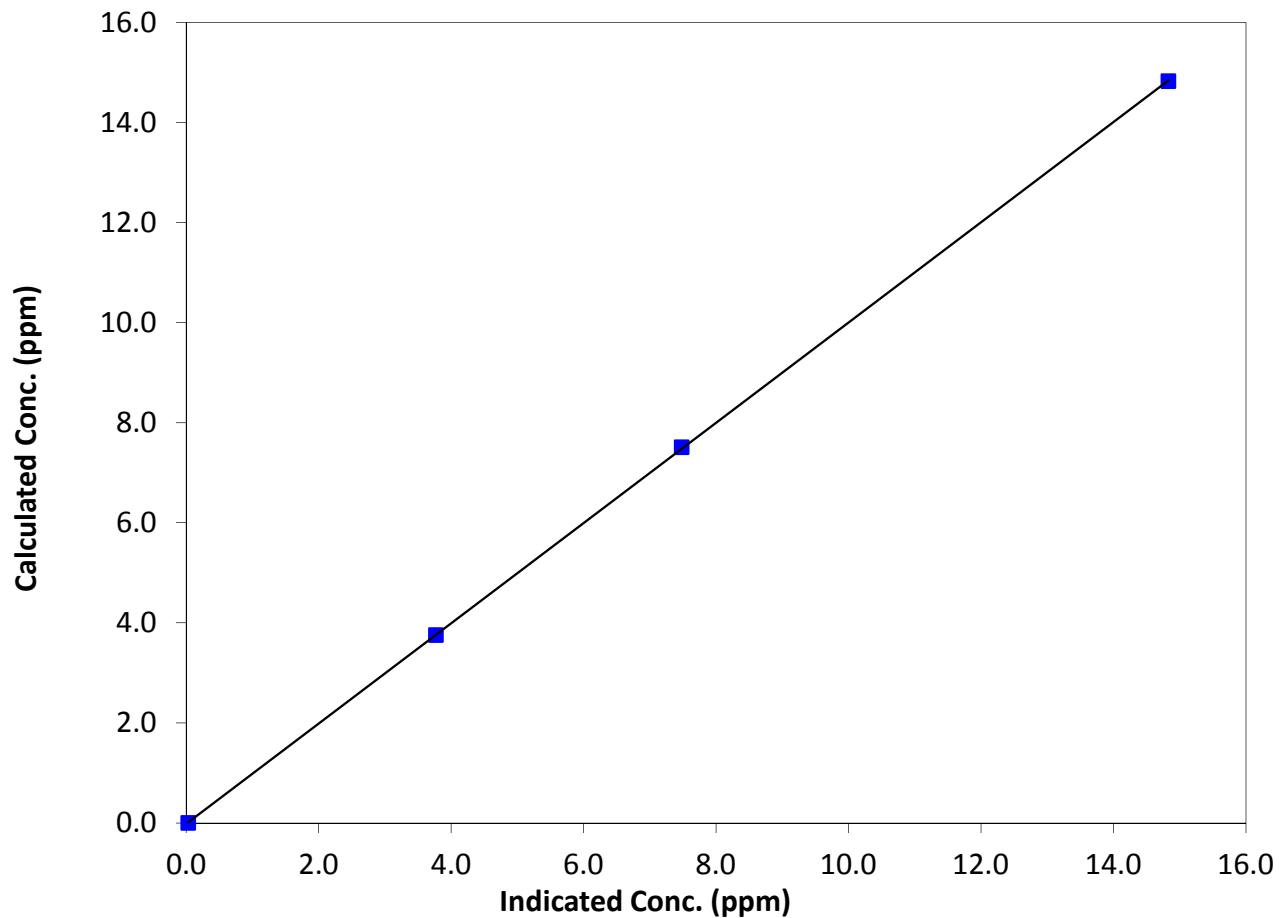
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 18, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	8:45	End Time (MST)	12:05
Analyzer make	51i-LT	Analyzer serial #	1300156231

Calibration Data

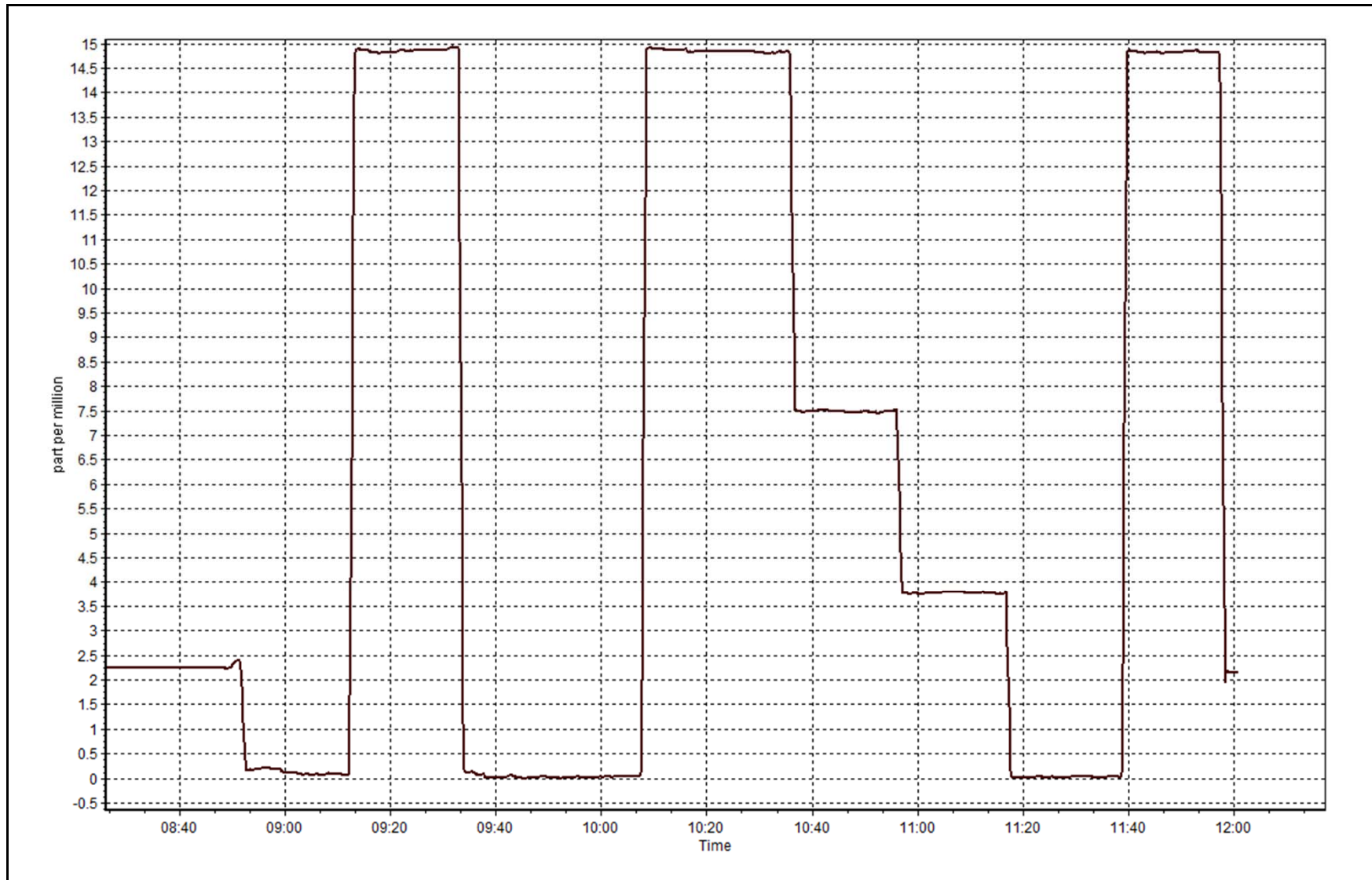
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	N/A	Correlation Coefficient	0.999988
14.83	14.83	0.9997		
7.51	7.48	1.0038	Slope	1.001927
3.75	3.77	0.9958		
			Intercept	-0.018005

THC Calibration Curve



THC Calibration Plot

Date: March 10, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 3
LOWER CAMP METEOROLOGY
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	744	0	0	100.00	15.2	-	7.2	-
Temperature 45 m (C) Average	744	0	0	100.00	15.3	-	7.7	-
Temperature 100 m (C) Average	744	0	0	100.00	15.6	-	8.7	-
Temperature 167 m (C) Average	744	0	0	100.00	15.3	-	9.2	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	99	-	87.0	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	98	-	86.0	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	99	-	87.0	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	99	-	89.0	-
Wind Speed 20 m (km/h) Average	734	0	10	98.66	24	-	15.0	-
Wind Speed 45 m (km/h) Average	730	0	14	98.12	31	-	20.0	-
Wind Speed 100 m (km/h) Average	730	0	14	98.12	44	-	30.0	-
Wind Speed 167 m (km/h) Average	729	0	15	97.98	48	-	34.0	-
Wind Direction 20 m (deg) Average	734	0	10	98.66	-	-	-	-
Wind Direction 45 m (deg) Average	730	0	14	98.12	-	-	-	-
Wind Direction 100 m (deg) Average	730	0	14	98.12	-	-	-	-
Wind Direction 167 m (deg) Average	729	0	15	97.98	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	734	0	10	98.66	0.6	-	-	-
Vertical Wind Speed 45 m (km/h) Average	730	0	14	98.12	1.5	-	-	-
Vertical Wind Speed 100 m (km/h) Average	730	0	14	98.12	2.5	-	-	-
Vertical Wind Speed 167 m (km/h) Average	729	0	15	97.98	4.1	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	-3.72	8.5	-	-29.4	-15	-9.1	-3.3	2.8	6.1	15.2
Temperature 45 m (C) Average	744	-3.56	8.5	-	-29.3	-14.6	-9	-3.1	2.9	6.1	15.3
Temperature 100 m (C) Average	744	-3.26	8.4	-	-27.7	-14.4	-9.2	-3	3.4	6.5	15.6
Temperature 167 m (C) Average	744	-3.13	8.3	-	-25.3	-13.8	-9.2	-3.2	3.8	6.7	15.3
Relative Humidity 20 m (%) Average	744	66.2	18	-	21	43	52	68	81	90	99
Relative Humidity 45 m (%) Average	744	64.5	18	-	20	41	50	65	79	87	98
Relative Humidity 100 m (%) Average	744	62.9	18	-	20	38	49	63	78	86	99
Relative Humidity 167 m (%) Average	744	62	18	-	20	37	48	61	78	86	99
Wind Speed 20 m (km/h) Average	734	6.7	5	-	0	2	3	6	10	13	24
Wind Speed 45 m (km/h) Average	730	8.9	6	-	0	2	4	8	13	17	31
Wind Speed 100 m (km/h) Average	730	12.9	8	-	0	4	7	11	18	24	44
Wind Speed 167 m (km/h) Average	729	15.5	9	-	0	5	9	14	21	27	48
Wind Direction 20 m (deg) Average	734	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	730	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	730	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	729	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	734	-0.05	0.2	-	-0.7	-0.3	-0.1	0	0.1	0.1	0.6
Vertical Wind Speed 45 m (km/h) Average	730	0.06	0.4	-	-1.6	-0.4	-0.2	0	0.4	0.6	1.5
Vertical Wind Speed 100 m (km/h) Average	730	0.16	0.5	-	-1.8	-0.4	-0.1	0.1	0.4	0.7	2.5
Vertical Wind Speed 167 m (km/h) Average	729	0.35	0.6	-	-1.8	-0.3	0	0.3	0.6	1.1	4.1

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	15 Mar 2015 01:00	15 Mar 2015 10:00	10	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	15 Mar 2015 01:00	15 Mar 2015 14:00	14	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	15 Mar 2015 01:00	15 Mar 2015 14:00	14	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	15 Mar 2015 01:00	15 Mar 2015 15:00	15	Flat line in sensor output signal - Sensor frozen

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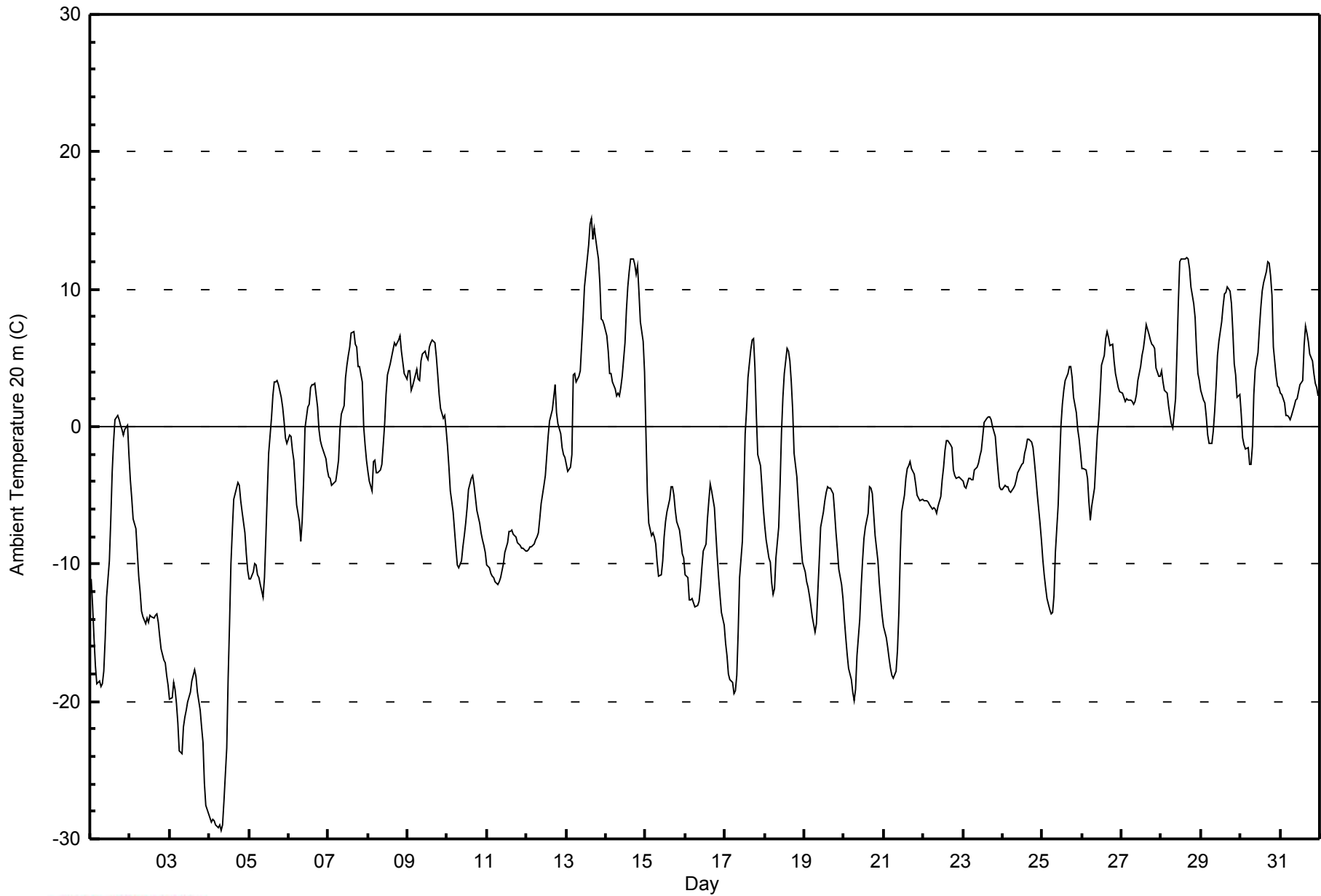


Maximum Value: 15.2 C on Mar 13 16:00		Maximum Daily Average: 7.2 C on Mar 13		Hours in Service: 744																						
Minimum Value: -29.4 C on Mar 4 08:00		Minimum Daily Average: -21.2 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.7 C at hour 16		Minimum Diurnal Average: -8.7 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -3.72 C		Percentiles: P ₁ = -28.6 P ₁₀ = -15.0 Q ₁ = -9.1 Median = -3.3 Q ₃ = 2.8 P ₉₀ = 6.1 P ₉₉ = 11.8		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-11.1	-13.0	-15.4	-17.4	-18.7	-18.5	-18.9	-18.7	-17.8	-15.5	-12.4	-9.7	-6.8	-3.4	-1.2	0.5	0.8	0.5	0.1	-0.2	-0.6	-0.3	0.1	-2.0	-8.3	0.8
2-Mar	-3.8	-5.2	-6.8	-7.5	-9.1	-10.8	-12.0	-13.4	-13.8	-14.3	-13.9	-14.2	-13.7	-13.8	-13.9	-13.7	-13.6	-14.2	-15.3	-16.2	-17.0	-17.2	-18.1	-18.8	-12.9	-3.8
3-Mar	-19.8	-19.7	-18.6	-19.1	-20.1	-21.5	-23.6	-23.8	-21.8	-21.2	-20.7	-20.0	-19.3	-18.5	-18.1	-17.7	-18.2	-19.4	-20.6	-21.9	-23.0	-25.9	-27.5	-28.2	-21.2	-17.7
4-Mar	-28.5	-28.8	-28.6	-28.7	-29.0	-29.2	-29.0	-29.4	-29.0	-27.3	-23.4	-18.3	-14.3	-10.0	-7.5	-5.3	-4.4	-4.1	-4.3	-5.4	-6.2	-7.7	-9.2	-10.5	-17.4	-4.1
5-Mar	-11.1	-11.1	-10.6	-10.0	-10.1	-10.8	-11.0	-11.5	-12.4	-11.0	-8.0	-4.9	-1.9	0.6	2.2	3.2	3.2	3.4	3.1	2.1	1.4	0.4	-0.9	-1.2	-4.4	3.4
6-Mar	-0.7	-0.7	-1.7	-2.5	-4.1	-5.7	-6.9	-8.3	-6.8	-4.0	-0.1	1.4	1.6	2.8	3.0	3.1	3.1	1.4	-0.2	-1.1	-1.4	-1.7	-2.3	-3.2	-1.4	3.1
7-Mar	-3.7	-3.8	-4.2	-4.2	-4.0	-3.3	-2.4	-0.2	0.9	1.5	3.6	4.4	5.1	5.8	6.8	6.9	6.0	5.8	4.3	4.4	3.2	0.0	-1.3	-2.4	1.2	6.9
8-Mar	-3.3	-4.0	-4.7	-2.5	-2.5	-3.4	-3.3	-3.1	-2.8	-1.3	0.2	2.4	3.8	4.6	5.1	5.6	6.1	5.9	6.3	6.6	5.5	4.7	3.8	3.5	1.4	6.6
9-Mar	4.1	4.1	2.6	3.0	3.3	4.2	3.5	3.4	4.8	5.3	5.5	5.0	4.9	5.8	6.1	6.3	6.1	5.1	3.7	2.4	1.4	0.6	0.8	-0.3	3.8	6.3
10-Mar	-1.4	-3.0	-4.7	-6.2	-7.5	-8.8	-10.1	-10.3	-9.8	-8.7	-7.9	-7.0	-5.9	-4.5	-3.7	-3.6	-4.2	-5.2	-6.1	-7.0	-7.7	-8.2	-8.7	-9.2	-6.6	-1.4
11-Mar	-10.1	-10.3	-10.7	-10.9	-10.9	-11.3	-11.5	-11.3	-10.9	-10.5	-10.0	-9.1	-8.5	-7.6	-7.7	-7.5	-7.8	-8.1	-8.4	-8.6	-8.6	-8.8	-8.9	-9.0	-9.5	-7.5
12-Mar	-9.1	-8.9	-8.8	-8.7	-8.6	-8.3	-8.1	-7.7	-6.7	-5.6	-4.3	-3.5	-2.2	-0.7	0.4	1.2	2.1	3.0	1.0	0.2	-0.5	-1.5	-2.0	-2.3	-3.7	3.0
13-Mar	-2.7	-3.3	-2.9	-2.0	3.7	3.9	3.2	3.7	4.0	6.0	7.9	10.2	11.2	13.2	14.7	15.2	13.6	14.4	12.9	12.2	10.5	7.8	7.7	7.5	7.2	15.2
14-Mar	6.6	5.5	3.9	3.9	3.3	2.8	2.3	2.4	2.2	2.8	3.7	6.1	8.4	10.1	11.3	12.2	12.2	11.8	11.1	11.7	9.8	7.6	6.2	4.0	6.7	12.2
15-Mar	-0.5	-4.8	-7.0	-8.0	-7.7	-8.0	-8.5	-9.9	-10.9	-10.8	-9.8	-8.0	-6.9	-6.2	-5.3	-4.4	-4.4	-4.9	-6.1	-6.9	-7.5	-8.4	-9.3	-9.6	-7.2	-0.5
16-Mar	-10.8	-11.0	-12.6	-12.6	-12.5	-12.8	-13.1	-13.0	-12.7	-11.7	-10.3	-9.1	-8.5	-6.7	-5.3	-4.1	-4.7	-5.9	-7.7	-9.5	-11.0	-12.3	-13.5	-14.4	-10.2	-4.1
17-Mar	-15.8	-16.7	-18.0	-18.4	-18.6	-19.4	-19.2	-18.1	-15.0	-11.0	-8.4	-4.7	-0.5	1.3	3.6	5.5	6.4	6.4	4.3	0.8	-2.1	-2.9	-4.4	-6.0	-7.1	6.4
18-Mar	-7.3	-8.3	-9.6	-9.9	-11.4	-12.3	-11.8	-9.5	-7.3	-4.2	-0.4	2.1	3.9	5.7	5.5	4.8	3.2	1.2	-2.0	-3.7	-5.4	-7.1	-8.6	-9.8	-4.2	5.7
19-Mar	-10.6	-11.3	-11.7	-12.3	-13.0	-13.9	-15.0	-14.3	-12.0	-9.7	-7.3	-6.2	-5.4	-4.8	-4.4	-4.5	-4.5	-4.9	-6.2	-7.8	-9.0	-10.3	-11.5	-12.5	-9.3	-4.4
20-Mar	-14.0	-15.4	-16.6	-17.6	-18.4	-19.3	-20.0	-19.1	-16.7	-14.1	-11.7	-9.8	-8.2	-7.3	-6.3	-4.4	-4.5	-4.9	-6.4	-7.9	-9.8	-11.4	-12.6	-13.7	-12.1	-4.4
21-Mar	-14.6	-15.4	-16.1	-16.9	-17.5	-18.1	-18.3	-17.8	-16.3	-13.5	-9.2	-6.2	-5.0	-3.7	-3.1	-2.9	-2.6	-3.0	-3.5	-4.2	-5.0	-5.2	-5.4	-5.3	-9.5	-2.6
22-Mar	-5.4	-5.4	-5.3	-5.5	-5.7	-6.0	-5.9	-6.0	-6.3	-5.8	-5.0	-3.8	-3.0	-1.8	-1.0	-1.0	-1.3	-1.5	-3.1	-3.6	-3.8	-3.7	-3.8	-3.8	-4.1	-1.0
23-Mar	-4.0	-4.3	-4.5	-3.7	-3.8	-3.9	-3.9	-3.2	-3.0	-2.6	-2.2	-1.7	-0.7	0.3	0.6	0.7	0.7	0.5	0.0	-0.7	-2.0	-3.3	-4.3	-4.6	-2.2	0.7
24-Mar	-4.6	-4.3	-4.3	-4.4	-4.6	-4.8	-4.5	-4.2	-3.9	-3.4	-3.2	-2.7	-2.6	-1.9	-1.5	-0.9	-0.9	-1.1	-1.5	-2.6	-3.7	-4.9	-7.0	-8.3	-3.6	-0.9
25-Mar	-9.6	-10.8	-11.7	-12.5	-13.3	-13.6	-13.5	-12.3	-9.2	-5.7	-2.6	0.1	1.7	2.6	3.3	3.9	4.3	4.4	3.6	2.2	1.0	-0.2	-0.9	-1.9	-3.8	4.4
26-Mar	-3.0	-3.1	-3.1	-3.8	-5.5	-6.9	-5.8	-4.5	-2.5	-0.7	0.5	2.3	4.5	5.2	6.4	6.9	6.5	5.9	6.0	4.8	3.9	3.4	2.8	2.6	0.9	6.9
27-Mar	2.5	2.2	1.9	2.0	2.0	1.9	1.8	1.6	1.9	2.4	3.3	4.3	5.2	5.7	6.6	7.4	6.7	6.3	6.0	5.9	5.6	4.2	3.7	3.6	3.9	7.4
28-Mar	4.1	3.3	2.6	2.4	1.5	0.8	0.2	-0.1	2.1	5.4	9.1	12.0	12.2	12.2	12.2	12.3	12.2	11.5	10.2	9.0	7.9	5.6	3.8	3.4	6.5	12.3
29-Mar	2.7	1.9	1.7	0.8	-0.6	-1.2	-1.2	-0.3	1.2	2.9	5.2	6.2	7.6	8.7	9.7	9.8	10.2	9.9	8.9	7.0	4.6	3.8	2.1	2.3	4.3	10.2
30-Mar	0.9	-0.8	-1.3	-1.7	-1.5	-2.8	-2.7	-1.4	2.3	4.2	5.4	7.1	8.6	9.9	10.5	11.3	12.0	11.9	11.0	9.5	5.8	3.6	3.0	2.8	4.5	12.0
31-Mar	2.5	2.3	1.7	0.8	0.8	0.7	0.5	0.8	1.5	1.9	2.1	2.5	3.1	3.3	5.9	7.3	6.8	6.2	5.3	4.8	3.9	3.2	2.8	2.2	3.0	7.3
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	25	3.36	3.36
-20 - 0	446	59.95	63.31
0 - 10	242	32.53	95.83
10 - 20	31	4.17	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

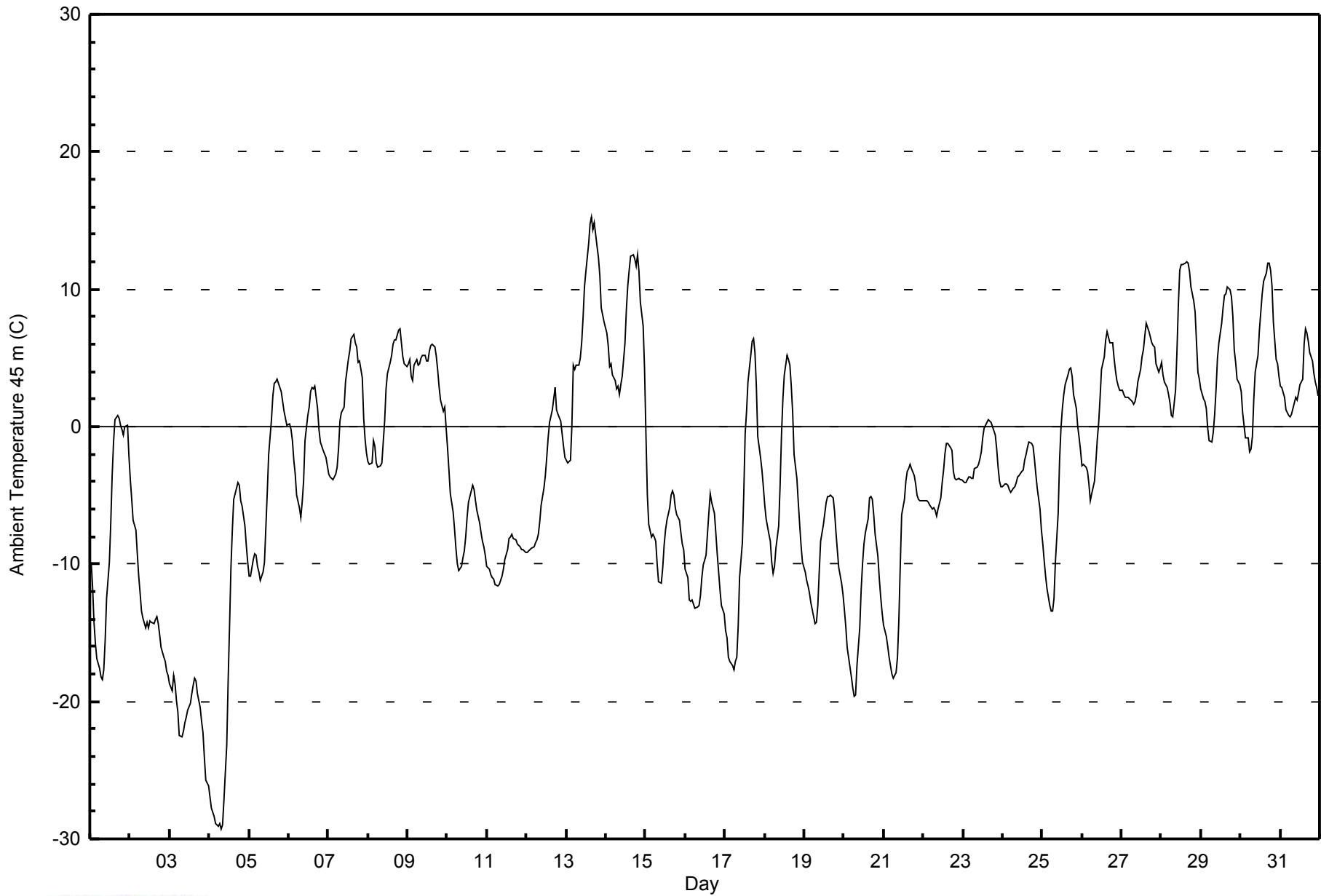


Maximum Value: 15.3 C on Mar 13 16:00		Maximum Daily Average: 7.7 C on Mar 13		Hours in Service: 744																						
Minimum Value: -29.3 C on Mar 4 08:00		Minimum Daily Average: -20.9 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.5 C at hour 17		Minimum Diurnal Average: -8.2 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -3.56 C		Percentiles: P ₁ = -27.8 P ₁₀ = -14.6 Q ₁ = -9.0 Median = -3.1 Q ₃ = 2.9 P ₉₀ = 6.1 P ₉₉ = 12.0		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-9.9	-11.7	-14.2	-15.8	-16.9	-17.6	-18.2	-18.4	-17.7	-15.5	-12.5	-9.9	-7.0	-3.5	-1.2	0.5	0.8	0.6	0.1	-0.2	-0.6	0.0	0.1	-2.1	-8.0	0.8
2-Mar	-3.9	-5.3	-6.8	-7.5	-9.2	-10.9	-12.1	-13.4	-13.9	-14.6	-14.3	-14.6	-14.1	-14.2	-14.3	-14.0	-13.8	-14.3	-15.2	-16.0	-16.8	-17.1	-17.8	-18.1	-13.0	-3.9
3-Mar	-18.7	-19.2	-18.1	-18.7	-19.9	-20.8	-22.4	-22.6	-22.2	-21.6	-21.2	-20.7	-20.2	-19.5	-18.8	-18.3	-18.5	-19.4	-20.5	-21.5	-22.2	-24.1	-25.7	-26.1	-20.9	-18.1
4-Mar	-27.0	-27.7	-28.1	-28.4	-28.9	-29.1	-28.9	-29.3	-29.0	-27.1	-23.2	-18.5	-14.6	-10.2	-7.5	-5.3	-4.5	-4.1	-4.3	-5.4	-5.8	-7.2	-8.7	-9.9	-17.2	-4.1
5-Mar	-10.8	-10.9	-9.6	-9.3	-9.4	-10.1	-10.6	-11.2	-10.6	-9.9	-7.3	-4.8	-2.0	0.5	2.2	3.2	3.3	3.5	3.2	2.5	1.9	1.1	0.6	0.1	-3.9	3.5
6-Mar	0.2	-0.2	-1.1	-2.4	-3.5	-5.0	-5.9	-6.6	-5.5	-4.0	-1.0	0.8	1.4	2.6	2.8	2.8	3.0	1.3	-0.2	-1.1	-1.4	-1.7	-2.2	-2.8	-1.2	3.0
7-Mar	-3.5	-3.7	-3.8	-3.8	-3.5	-2.9	-1.6	0.4	1.0	1.4	3.3	4.1	4.9	5.5	6.4	6.7	6.1	5.8	4.7	4.8	3.6	0.6	-0.9	-1.9	1.4	6.7
8-Mar	-2.6	-2.7	-2.6	-1.0	-1.4	-2.6	-3.0	-2.8	-2.6	-1.2	0.4	2.7	3.8	4.7	5.2	6.0	6.4	6.3	7.0	7.1	6.1	5.1	4.6	4.3	2.0	7.1
9-Mar	4.6	4.9	3.6	3.4	4.5	4.9	4.5	4.6	5.0	5.2	5.2	4.7	4.8	5.5	5.9	6.0	5.8	5.1	4.1	2.8	2.0	1.1	1.5	-0.1	4.1	6.0
10-Mar	-1.5	-3.2	-4.9	-6.2	-7.5	-8.8	-10.0	-10.5	-10.1	-9.5	-9.0	-8.0	-6.6	-5.5	-4.7	-4.3	-4.5	-5.4	-6.1	-7.0	-7.8	-8.3	-8.8	-9.3	-7.0	-1.5
11-Mar	-10.2	-10.4	-10.8	-11.0	-11.1	-11.5	-11.6	-11.5	-11.2	-10.9	-10.4	-9.7	-9.0	-8.1	-8.0	-7.8	-8.1	-8.3	-8.5	-8.7	-8.7	-9.0	-9.0	-9.1	-9.7	-7.8
12-Mar	-9.2	-9.1	-8.9	-8.9	-8.7	-8.4	-8.2	-7.8	-6.9	-5.7	-4.5	-3.5	-2.3	-0.8	0.3	1.2	2.1	2.8	1.3	0.9	0.4	-0.5	-1.4	-2.2	-3.7	2.8
13-Mar	-2.4	-2.7	-2.5	0.1	4.5	4.2	4.5	4.4	5.0	6.1	7.9	10.2	11.3	13.4	14.8	15.3	14.3	14.8	13.1	12.3	11.0	8.7	8.1	7.6	7.7	15.3
14-Mar	6.8	5.9	4.4	4.6	3.8	3.4	2.8	2.9	2.4	3.0	3.7	6.1	8.5	10.3	11.4	12.4	12.5	12.2	11.7	12.5	11.3	9.1	7.3	4.2	7.2	12.5
15-Mar	-0.6	-5.0	-7.1	-8.0	-7.8	-8.0	-8.4	-10.0	-11.3	-11.3	-10.2	-8.6	-7.5	-6.8	-5.9	-5.0	-4.7	-5.0	-5.9	-6.4	-6.9	-7.7	-8.5	-8.9	-7.3	-0.6
16-Mar	-10.3	-11.0	-12.6	-12.7	-12.6	-12.9	-13.2	-13.2	-13.0	-12.3	-11.0	-10.1	-9.3	-7.8	-6.3	-4.8	-5.5	-6.3	-7.8	-9.2	-10.6	-11.9	-13.0	-13.6	-10.5	-4.8
17-Mar	-14.8	-15.3	-16.8	-17.1	-17.3	-17.7	-17.1	-16.8	-14.6	-11.0	-8.5	-4.9	-0.5	1.1	3.2	5.2	6.2	6.4	5.4	2.9	-0.7	-2.2	-3.2	-4.4	-6.4	6.4
18-Mar	-5.7	-6.7	-7.8	-8.3	-9.8	-10.7	-10.2	-8.8	-7.2	-4.2	-0.6	2.0	3.8	5.2	4.9	4.5	3.0	1.0	-2.0	-3.7	-5.5	-7.1	-8.7	-9.8	-3.9	5.2
19-Mar	-10.5	-11.2	-11.6	-12.1	-12.8	-13.3	-14.4	-14.3	-13.0	-10.6	-8.3	-7.1	-6.3	-5.5	-5.1	-5.1	-5.0	-5.2	-6.2	-7.8	-9.0	-10.3	-11.4	-12.2	-9.5	-5.0
20-Mar	-13.3	-14.5	-16.1	-16.8	-18.2	-19.0	-19.7	-19.5	-17.4	-14.6	-11.9	-10.0	-8.6	-7.7	-6.7	-5.2	-5.1	-5.3	-6.4	-7.8	-9.5	-11.1	-12.4	-13.5	-12.1	-5.1
21-Mar	-14.4	-15.2	-16.0	-16.7	-17.4	-17.9	-18.3	-17.9	-16.8	-14.0	-10.0	-6.4	-5.3	-4.0	-3.3	-3.0	-2.7	-3.1	-3.5	-4.1	-5.0	-5.3	-5.4	-5.4	-9.6	-2.7
22-Mar	-5.4	-5.4	-5.4	-5.5	-5.7	-6.0	-5.9	-6.1	-6.5	-6.0	-5.2	-4.1	-3.1	-2.0	-1.2	-1.3	-1.5	-1.7	-3.3	-3.7	-3.8	-3.8	-3.8	-3.9	-4.2	-1.2
23-Mar	-3.9	-4.0	-4.1	-3.6	-3.7	-3.8	-3.8	-3.0	-3.0	-2.7	-2.4	-1.8	-0.8	-0.1	0.3	0.5	0.4	0.3	0.0	-0.6	-1.7	-2.9	-3.9	-4.4	-2.2	0.5
24-Mar	-4.4	-4.2	-4.2	-4.3	-4.6	-4.7	-4.5	-4.4	-4.1	-3.7	-3.6	-3.3	-3.1	-2.5	-2.1	-1.5	-1.1	-1.2	-1.5	-2.3	-3.4	-4.4	-6.0	-7.5	-3.6	-1.1
25-Mar	-8.5	-9.8	-10.8	-11.8	-13.0	-13.4	-13.4	-12.5	-9.9	-6.3	-2.4	-0.1	1.4	2.3	3.1	3.7	4.1	4.2	3.7	2.4	1.3	0.0	-0.8	-1.7	-3.7	4.2
26-Mar	-2.8	-2.8	-2.9	-3.2	-4.2	-5.4	-4.9	-4.0	-2.5	-0.9	0.3	2.1	4.2	5.1	6.3	6.9	6.5	6.1	6.1	5.0	4.0	3.4	2.9	2.6	1.2	6.9
27-Mar	2.6	2.3	2.1	2.1	2.1	1.9	1.8	1.6	1.8	2.3	3.3	4.2	5.0	5.6	6.6	7.5	6.9	6.5	6.1	5.9	5.8	4.6	4.0	4.3	4.0	7.5
28-Mar	4.6	3.8	3.3	2.9	2.3	1.7	0.8	0.7	2.6	5.4	8.8	11.4	11.8	11.8	11.9	12.1	11.9	11.3	10.2	9.1	8.3	6.1	4.0	3.5	6.7	12.1
29-Mar	2.8	2.0	1.8	1.3	-0.1	-1.0	-1.1	-0.4	0.9	2.7	5.0	6.1	7.6	8.6	9.6	9.7	10.2	9.9	9.5	8.0	5.6	4.7	3.4	3.0	4.6	10.2
30-Mar	2.5	1.0	0.1	-0.8	-0.8	-1.9	-1.6	-0.7	2.0	3.9	5.2	7.0	8.4	9.7	10.5	11.2	11.9	11.9	11.4	10.3	7.6	4.9	4.6	3.7	5.1	11.9
31-Mar	3.0	2.8	2.2	1.3	1.0	0.8	0.7	0.9	1.7	2.1	2.0	2.5	3.0	3.5	6.0	7.1	6.8	6.2	5.4	4.8	3.9	3.3	2.8	2.3	3.2	7.1
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	25	3.36	3.36
-20 - 0	438	58.87	62.23
0 - 10	248	33.33	95.56
10 - 20	33	4.44	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

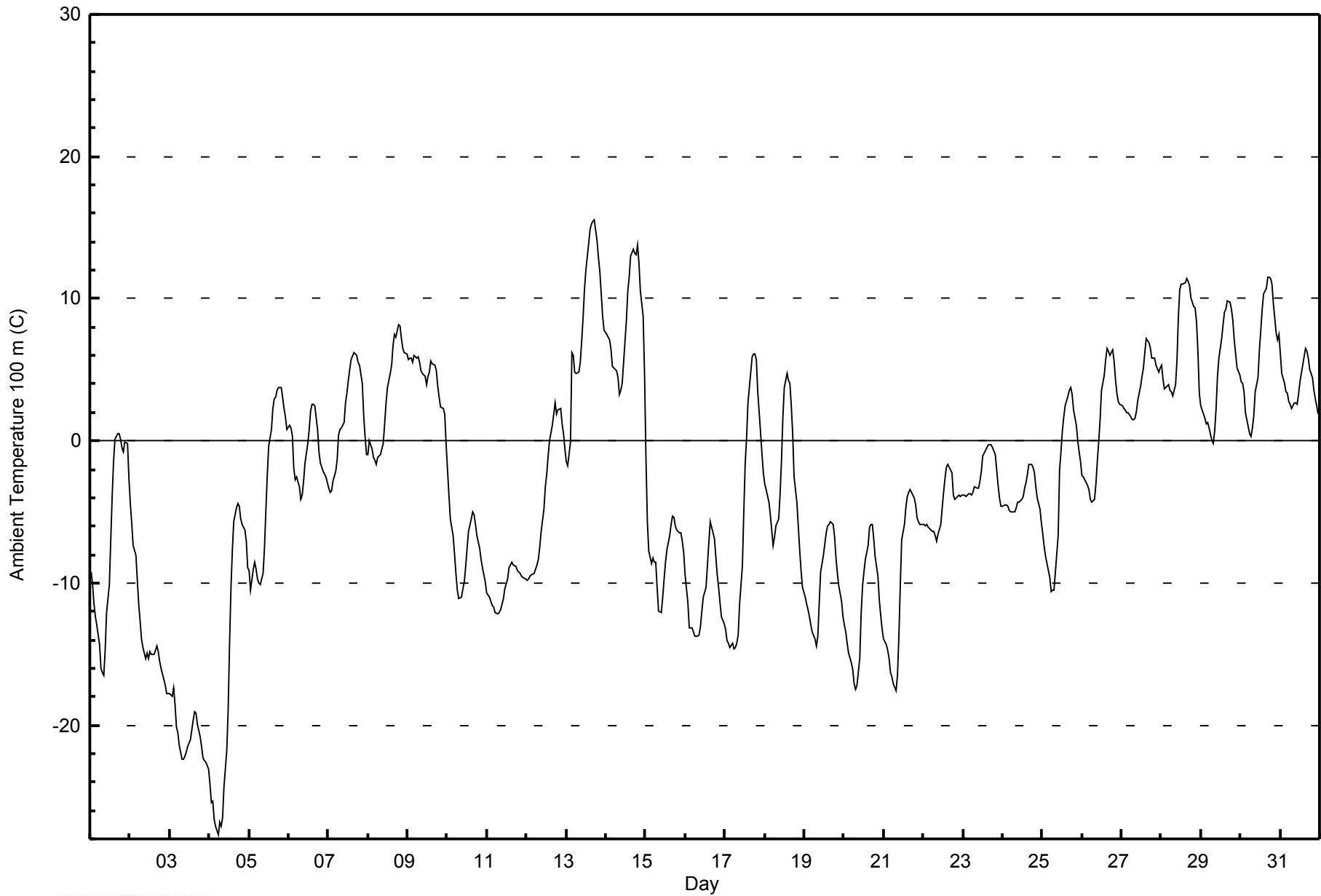


Maximum Value: 15.6 C on Mar 13 18:00		Maximum Daily Average: 8.7 C on Mar 13		Hours in Service: 744																						
Minimum Value: -27.7 C on Mar 4 06:00		Minimum Daily Average: -20.7 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.2 C at hour 17		Minimum Diurnal Average: -7.3 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -3.26 C		Percentiles: P ₁ = -25.4 P ₁₀ = -14.4 Q ₁ = -9.2 Median = -3.0 Q ₃ = 3.4 P ₉₀ = 6.5 P ₉₉ = 13.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-9.2	-10.1	-11.5	-12.3	-13.0	-14.4	-16.0	-16.3	-16.5	-14.7	-12.1	-10.1	-7.0	-3.9	-1.5	0.1	0.5	0.5	0.1	-0.5	-0.8	0.0	-0.2	-2.6	-7.1	0.5
2-Mar	-4.4	-5.8	-7.3	-8.0	-9.8	-11.5	-12.6	-13.9	-14.5	-15.3	-15.0	-15.3	-14.8	-15.0	-14.7	-14.5	-14.9	-15.5	-16.0	-16.7	-17.2	-17.8	-17.8	-13.5	-4.4	
3-Mar	-17.8	-18.0	-17.3	-18.6	-20.2	-20.5	-21.4	-22.4	-22.4	-22.2	-21.9	-21.5	-21.0	-20.3	-19.7	-19.0	-19.2	-19.9	-20.8	-21.5	-22.3	-22.5	-22.5	-23.1	-20.7	-17.3
4-Mar	-24.2	-25.4	-25.3	-26.7	-27.1	-27.7	-26.8	-27.1	-26.5	-24.4	-21.8	-18.9	-14.3	-10.4	-7.7	-5.7	-4.7	-4.4	-4.6	-5.5	-5.9	-6.3	-7.0	-8.9	-16.1	-4.4
5-Mar	-9.2	-10.5	-9.1	-8.5	-9.0	-9.7	-10.0	-10.1	-9.3	-7.6	-4.9	-2.4	-0.4	0.8	2.3	3.0	3.1	3.6	3.8	3.7	3.0	2.3	1.7	0.8	-3.0	3.8
6-Mar	1.1	0.9	0.3	-2.0	-2.8	-2.6	-3.2	-4.1	-3.8	-2.8	-1.6	-0.2	0.8	2.1	2.6	2.6	2.4	0.8	-0.7	-1.5	-1.9	-2.2	-2.5	-2.9	-0.9	2.6
7-Mar	-3.3	-3.6	-3.5	-2.8	-2.1	-1.4	0.4	0.8	0.9	1.3	2.7	3.4	4.2	5.0	5.7	6.2	6.1	6.0	5.5	5.3	4.1	1.7	0.3	-0.9	1.7	6.2
8-Mar	-0.9	0.1	-0.6	-1.1	-1.4	-1.7	-1.2	-0.9	-0.6	-0.1	1.2	2.7	3.8	4.7	5.3	6.7	7.4	7.3	8.1	8.1	7.2	6.5	6.2	6.1	3.0	8.1
9-Mar	5.7	5.8	5.9	5.5	6.0	5.8	5.9	5.5	4.9	4.7	4.5	4.0	4.6	4.9	5.6	5.4	5.3	4.9	3.9	3.1	2.4	2.3	1.9	-0.3	4.5	6.0
10-Mar	-2.1	-3.8	-5.5	-6.7	-7.9	-9.3	-10.5	-11.1	-11.0	-10.4	-9.9	-8.9	-7.5	-6.4	-5.5	-5.0	-5.2	-5.9	-6.7	-7.6	-8.3	-8.9	-9.4	-9.9	-7.6	-2.1
11-Mar	-10.7	-10.9	-11.3	-11.5	-11.7	-12.1	-12.2	-12.1	-11.8	-11.5	-11.1	-10.5	-9.8	-8.9	-8.8	-8.6	-8.7	-8.9	-9.1	-9.2	-9.3	-9.6	-9.6	-9.7	-10.3	-8.6
12-Mar	-9.8	-9.7	-9.5	-9.4	-9.3	-9.0	-8.8	-8.3	-7.5	-6.3	-4.8	-3.2	-2.3	-1.1	0.0	1.1	1.8	2.7	1.9	2.2	2.2	1.2	0.6	-0.6	-3.6	2.7
13-Mar	-1.4	-1.8	0.0	6.2	6.0	4.8	4.7	4.8	5.5	7.0	8.6	10.7	12.1	13.9	14.9	15.2	15.4	15.6	14.1	12.9	11.9	10.3	8.7	7.8	8.7	15.6
14-Mar	7.5	7.3	7.1	6.4	5.3	5.1	4.9	4.5	3.3	3.6	4.1	7.0	8.5	10.5	11.5	13.0	13.4	13.2	13.1	13.7	12.5	10.6	8.8	4.7	8.3	13.7
15-Mar	-1.1	-5.6	-7.7	-8.6	-8.3	-8.5	-8.5	-10.3	-12.0	-12.1	-11.0	-9.7	-8.6	-7.6	-6.7	-5.9	-5.3	-5.4	-6.0	-6.3	-6.5	-6.5	-7.0	-7.8	-7.6	-1.1
16-Mar	-9.4	-11.4	-13.1	-13.2	-13.2	-13.5	-13.7	-13.8	-13.7	-13.0	-12.0	-10.9	-10.3	-8.8	-7.2	-5.7	-6.1	-6.9	-8.2	-9.4	-10.3	-11.4	-12.3	-12.9	-10.8	-5.7
17-Mar	-13.3	-14.0	-14.2	-14.5	-14.3	-14.6	-14.5	-14.2	-13.6	-11.4	-8.8	-5.1	-1.6	0.2	2.7	4.8	5.9	6.1	6.1	5.7	3.4	0.6	-0.9	-2.3	-5.1	6.1
18-Mar	-3.0	-3.4	-4.3	-5.2	-6.3	-7.3	-6.8	-5.9	-5.5	-3.7	-1.4	1.7	3.7	4.7	4.2	4.0	2.4	0.5	-2.5	-4.3	-6.0	-7.6	-9.2	-10.3	-3.0	4.7
19-Mar	-11.0	-11.5	-11.9	-12.4	-12.9	-13.5	-13.9	-14.4	-13.7	-11.3	-9.2	-8.0	-7.3	-6.5	-6.0	-5.9	-5.7	-5.8	-6.7	-8.2	-9.4	-10.2	-11.3	-12.3	-10.0	-5.7
20-Mar	-13.0	-13.4	-14.3	-14.9	-15.6	-16.1	-17.1	-17.5	-17.2	-15.3	-12.1	-10.2	-9.2	-8.3	-7.4	-6.1	-5.8	-5.9	-6.8	-8.1	-9.6	-11.2	-12.3	-13.3	-11.7	-5.8
21-Mar	-13.9	-14.3	-14.7	-15.4	-16.3	-16.6	-17.1	-17.6	-16.5	-13.8	-10.2	-7.0	-5.9	-4.7	-3.9	-3.7	-3.4	-3.6	-4.0	-4.5	-5.4	-5.7	-5.9	-5.9	-9.6	-3.4
22-Mar	-5.9	-6.0	-5.9	-6.1	-6.2	-6.4	-6.4	-6.7	-7.1	-6.6	-5.9	-4.7	-3.7	-2.6	-1.9	-1.7	-2.1	-2.2	-3.9	-4.1	-4.0	-3.8	-3.9	-3.8	-4.6	-1.7
23-Mar	-3.8	-3.9	-3.9	-3.7	-3.7	-3.8	-3.6	-3.2	-3.3	-3.3	-2.8	-2.2	-1.0	-0.8	-0.5	-0.3	-0.3	-0.3	-0.5	-1.0	-2.0	-3.1	-4.0	-4.6	-2.5	-0.3
24-Mar	-4.6	-4.5	-4.5	-4.6	-4.9	-5.0	-5.0	-5.0	-4.7	-4.3	-4.3	-4.1	-3.9	-3.3	-2.9	-2.4	-1.6	-1.7	-1.8	-2.2	-3.2	-4.0	-4.8	-5.8	-3.9	-1.6
25-Mar	-6.6	-7.4	-8.1	-8.6	-9.6	-10.6	-10.5	-10.5	-9.3	-6.6	-2.1	-0.8	0.7	1.7	2.5	3.2	3.6	3.8	3.3	2.2	1.1	0.0	-0.8	-1.5	-3.0	3.8
26-Mar	-2.5	-2.6	-2.9	-3.1	-3.5	-4.1	-4.3	-4.1	-3.0	-1.4	-0.1	1.5	3.6	4.7	5.8	6.5	6.3	6.0	6.4	5.6	4.4	3.4	2.8	2.6	1.2	6.5
27-Mar	2.5	2.3	2.2	2.0	2.0	1.7	1.5	1.5	1.6	2.1	2.9	3.8	4.5	5.2	6.2	7.2	6.9	6.5	5.9	5.8	5.8	5.3	4.9	5.1	4.0	7.2
28-Mar	5.3	4.4	3.7	3.9	3.9	3.6	3.4	3.2	4.0	5.6	8.7	10.6	11.0	11.0	11.2	11.4	11.3	10.9	10.0	9.4	9.4	8.4	6.3	3.4	7.2	11.4
29-Mar	2.5	1.9	1.6	1.2	1.3	0.9	0.0	-0.2	0.7	2.3	4.5	5.9	7.2	8.2	9.1	9.3	9.8	9.7	9.2	8.5	7.1	6.2	5.1	4.7	4.9	9.8
30-Mar	4.1	4.1	3.4	2.0	1.0	0.5	0.3	0.9	1.8	3.5	4.4	6.4	7.8	9.3	10.3	10.8	11.5	11.5	11.5	11.1	9.6	7.6	7.1	7.5	6.2	11.5
31-Mar	6.1	4.8	4.0	3.4	3.4	2.8	2.5	2.3	2.7	2.6	2.6	3.3	4.1	5.3	5.9	6.5	6.3	5.8	5.0	4.4	3.5	3.0	2.5	1.9	4.0	6.5
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	27	3.63	3.63
-20 - 0	429	57.66	61.29
0 - 10	254	34.14	95.43
10 - 20	34	4.57	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

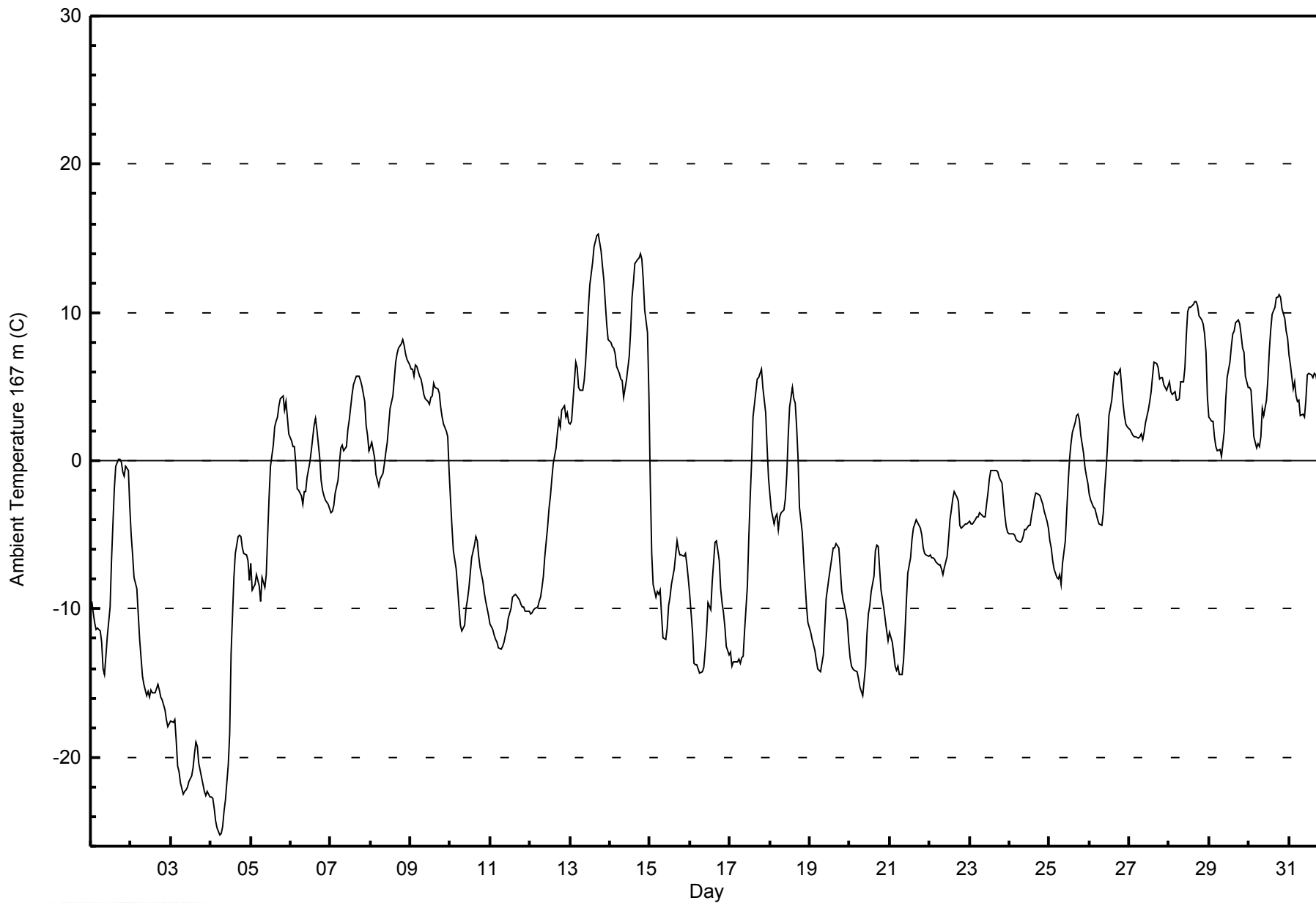


Maximum Value: 15.3 C on Mar 13 18:00		Maximum Daily Average: 9.2 C on Mar 13		Hours in Service: 744																						
Minimum Value: -25.3 C on Mar 4 06:00		Minimum Daily Average: -20.8 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 0.9 C at hour 17		Minimum Diurnal Average: -6.6 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -3.13 C		Percentiles: P ₁ = -22.8 P ₁₀ = -13.8 Q ₁ = -9.2 Median = -3.2 Q ₃ = 3.8 P ₉₀ = 6.7 P ₉₉ = 13.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-9.5	-10.3	-11.0	-11.4	-11.3	-11.5	-12.3	-14.0	-14.4	-13.2	-11.8	-9.8	-6.7	-4.2	-1.9	-0.4	0.1	0.1	0.0	-0.7	-1.1	-0.4	-0.7	-3.2	-6.7	0.1
2-Mar	-5.0	-6.4	-7.9	-8.6	-10.4	-12.1	-13.3	-14.5	-15.1	-15.8	-15.5	-15.9	-15.5	-15.6	-15.7	-15.3	-15.1	-15.5	-16.0	-16.1	-16.8	-17.4	-17.9	-17.8	-14.0	-5.0
3-Mar	-17.5	-17.7	-17.5	-18.9	-20.6	-21.0	-21.7	-22.5	-22.3	-22.2	-22.0	-21.6	-21.2	-20.7	-19.7	-18.9	-19.2	-20.4	-21.3	-21.8	-22.3	-22.6	-22.3	-22.7	-20.8	-17.5
4-Mar	-22.7	-22.8	-23.4	-24.2	-24.8	-25.3	-25.1	-24.7	-23.7	-22.8	-20.5	-18.4	-13.0	-10.4	-7.9	-6.2	-5.1	-5.0	-5.2	-5.9	-6.2	-6.4	-6.8	-8.1	-15.2	-5.0
5-Mar	-6.9	-8.8	-8.3	-7.7	-8.1	-8.4	-9.5	-7.8	-8.5	-7.7	-5.0	-2.5	-0.4	1.1	2.3	2.7	3.0	3.7	4.1	4.4	3.5	4.0	2.9	1.8	-2.3	4.4
6-Mar	1.3	1.0	0.9	-0.2	-1.9	-2.0	-2.4	-2.9	-2.1	-2.1	-1.1	-0.1	0.7	1.5	2.4	2.9	2.1	0.2	-1.3	-2.0	-2.4	-2.6	-2.9	-3.3	-0.7	2.9
7-Mar	-3.5	-3.5	-3.1	-2.1	-1.3	-0.2	0.9	1.0	0.6	0.9	2.1	2.8	3.6	4.4	5.1	5.7	5.7	5.7	5.4	5.1	4.0	2.4	1.7	0.7	1.8	5.7
8-Mar	1.0	1.2	0.2	-0.9	-1.4	-1.7	-1.3	-0.9	-0.1	0.6	1.2	2.4	3.6	4.4	5.5	6.7	7.2	7.6	7.9	8.2	7.8	7.2	6.8	6.5	3.3	8.2
9-Mar	6.2	6.2	5.7	6.5	6.4	5.7	5.5	5.0	4.5	4.2	4.0	3.8	4.3	4.3	5.2	4.9	4.8	4.5	3.6	3.0	2.5	2.0	1.6	-0.8	4.3	6.5
10-Mar	-2.7	-4.4	-6.1	-7.3	-8.5	-9.9	-11.1	-11.5	-11.1	-10.0	-9.4	-8.6	-7.6	-6.6	-5.7	-5.1	-5.4	-6.4	-7.2	-8.2	-8.9	-9.5	-10.0	-10.4	-8.0	-2.7
11-Mar	-11.0	-11.3	-11.8	-12.0	-12.3	-12.6	-12.7	-12.5	-12.2	-11.7	-11.4	-10.6	-10.0	-9.2	-9.1	-9.0	-9.1	-9.4	-9.7	-9.8	-9.9	-10.1	-10.1	-10.2	-10.7	-9.0
12-Mar	-10.3	-10.3	-10.0	-10.0	-9.8	-9.5	-9.2	-8.5	-7.8	-6.4	-4.5	-3.3	-2.3	-1.2	-0.2	0.9	1.9	2.8	2.3	3.4	3.7	3.0	3.2	2.5	-3.3	3.7
13-Mar	2.4	2.7	5.3	6.7	6.3	4.9	4.8	4.8	5.4	6.7	8.3	10.4	11.9	13.4	14.4	14.8	15.2	15.3	14.1	13.1	12.2	10.7	9.2	8.2	9.2	15.3
14-Mar	8.0	7.7	7.6	7.2	6.3	5.9	5.5	5.4	4.3	4.8	5.4	7.0	8.7	11.0	12.1	13.3	13.6	13.7	13.9	13.6	12.1	10.2	8.6	4.4	8.8	13.9
15-Mar	-1.6	-6.3	-8.3	-9.2	-8.8	-9.0	-8.8	-10.4	-11.9	-12.1	-11.3	-9.8	-9.2	-8.3	-7.3	-6.3	-5.4	-6.0	-6.4	-6.4	-6.4	-6.3	-7.1	-8.0	-7.9	-1.6
16-Mar	-9.0	-11.6	-13.7	-13.7	-13.8	-14.1	-14.3	-14.2	-13.9	-12.8	-11.5	-9.6	-10.1	-8.2	-6.8	-5.5	-5.4	-6.7	-8.6	-9.5	-10.2	-11.2	-12.5	-13.1	-10.8	-5.4
17-Mar	-12.9	-13.9	-13.6	-13.5	-13.6	-13.4	-13.7	-13.3	-13.2	-11.4	-8.4	-5.2	-2.4	-0.1	3.0	4.7	5.5	5.6	5.9	6.2	4.9	3.2	0.9	-1.1	-4.6	6.2
18-Mar	-2.3	-3.3	-4.3	-3.8	-3.6	-4.7	-3.8	-3.5	-3.3	-2.6	-1.0	1.6	3.6	4.9	4.2	3.9	2.3	0.2	-3.1	-4.9	-6.6	-8.2	-9.7	-10.9	-2.5	4.9
19-Mar	-11.6	-12.0	-12.4	-12.8	-13.4	-14.1	-14.3	-13.6	-13.1	-11.2	-9.3	-7.9	-7.2	-6.5	-5.9	-5.9	-5.6	-5.9	-7.2	-8.7	-9.4	-9.8	-10.8	-12.3	-10.0	-5.6
20-Mar	-13.2	-13.8	-14.0	-14.2	-14.2	-14.7	-15.3	-15.6	-15.9	-13.9	-11.7	-10.3	-9.8	-8.8	-7.8	-6.1	-5.7	-5.8	-7.3	-8.7	-9.9	-10.7	-11.5	-12.1	-11.3	-5.7
21-Mar	-11.5	-12.2	-13.0	-13.8	-14.1	-13.8	-14.4	-14.4	-13.5	-11.7	-9.4	-7.5	-6.5	-5.3	-4.6	-4.3	-4.0	-4.2	-4.6	-5.1	-5.9	-6.2	-6.4	-6.4	-8.9	-4.0
22-Mar	-6.4	-6.6	-6.5	-6.7	-6.8	-7.0	-7.0	-7.3	-7.6	-7.2	-6.5	-5.3	-4.0	-3.3	-2.5	-2.1	-2.4	-2.8	-4.4	-4.6	-4.4	-4.3	-4.3	-4.2	-5.2	-2.1
23-Mar	-4.1	-4.2	-4.2	-4.0	-3.8	-3.8	-3.5	-3.6	-3.7	-3.8	-2.9	-2.2	-1.2	-0.7	-0.7	-0.7	-0.6	-0.7	-1.1	-1.5	-2.6	-3.7	-4.5	-4.8	-2.8	-0.6
24-Mar	-4.9	-4.9	-4.9	-5.1	-5.3	-5.4	-5.5	-5.4	-5.1	-4.7	-4.6	-4.4	-4.3	-3.7	-3.2	-2.6	-2.2	-2.2	-2.4	-2.6	-3.0	-3.4	-4.1	-4.6	-4.1	-2.2
25-Mar	-5.4	-5.9	-6.7	-7.3	-7.8	-7.9	-7.7	-8.4	-6.9	-5.4	-3.4	-1.5	0.1	1.2	1.9	2.6	3.0	3.2	2.7	1.7	0.5	-0.5	-1.0	-1.5	-2.5	3.2
26-Mar	-2.3	-2.7	-3.1	-3.3	-3.6	-4.0	-4.2	-4.4	-3.5	-1.8	-0.5	1.1	3.0	4.1	5.2	6.0	5.9	5.8	6.1	5.1	3.9	3.1	2.5	2.2	0.9	6.1
27-Mar	2.1	2.0	1.7	1.7	1.6	1.6	1.6	1.8	1.5	1.9	2.6	3.4	4.0	4.6	5.7	6.7	6.6	6.2	5.5	5.6	5.6	5.1	4.8	5.1	3.7	6.7
28-Mar	5.3	4.7	4.5	4.6	4.1	4.1	4.2	5.3	5.3	6.3	8.5	10.1	10.4	10.3	10.5	10.8	10.7	10.4	9.8	9.5	9.2	8.6	7.3	4.3	7.4	10.8
29-Mar	3.0	2.7	2.7	1.7	0.9	0.6	0.7	0.3	1.1	2.0	4.1	5.6	6.7	7.7	8.5	8.7	9.3	9.5	9.2	8.4	7.6	7.3	5.7	4.9	5.0	9.5
30-Mar	4.9	4.8	3.2	1.6	0.9	1.1	1.0	1.6	3.5	3.0	4.0	5.5	7.4	8.9	9.9	10.4	11.0	11.0	11.2	11.0	10.3	9.6	8.8	8.3	6.4	11.2
31-Mar	7.1	6.4	4.9	5.3	4.4	4.0	4.1	3.1	3.2	3.0	4.1	5.8	5.9	5.8	5.6	5.9	5.8	5.3	4.5	3.9	3.1	2.6	2.0	1.5	4.5	7.1
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	28	3.76	3.76
-20 - 0	420	56.45	60.22
0 - 10	263	35.35	95.56
10 - 20	33	4.44	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

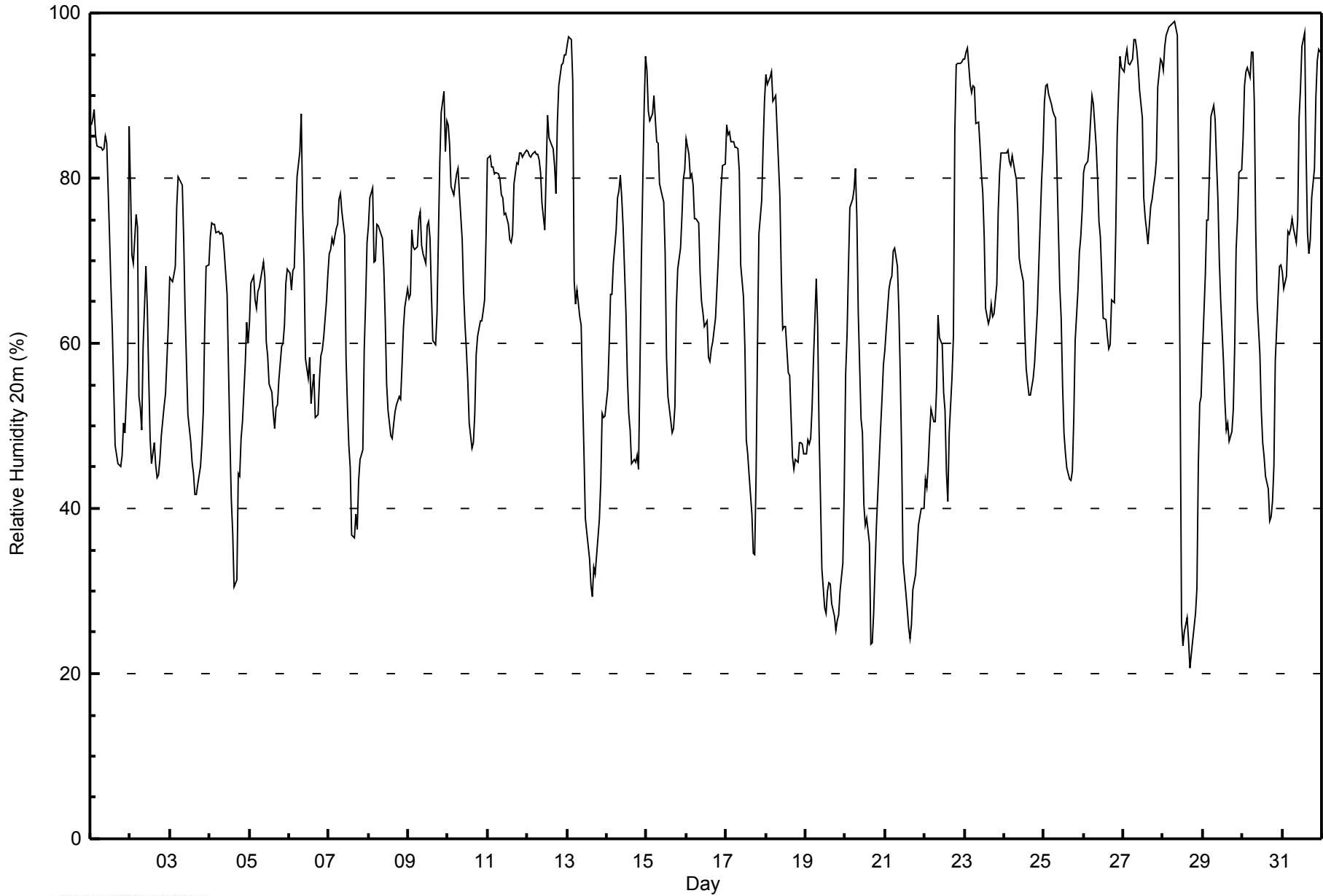


Maximum Value: 99 % on Mar 28 08:00																			Maximum Daily Average: 87.5 % on Mar 27						Hours in Service: 744																			
Minimum Value: 21 % on Mar 28 17:00																			Minimum Daily Average: 39.3 % on Mar 19						Hours of Data: 744																			
Maximum Diurnal Average: 79.4 % at hour 7																			Minimum Diurnal Average: 48.6 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 66.2 %																			Percentiles: P ₁ = 24 P ₁₀ = 43 Q ₁ = 52 Median = 68 Q ₃ = 81 P ₉₀ = 90 P ₉₉ = 97						Hours of Calibration: 0																			
																			Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Mar	86	87	88	85	84	84	84	83	84	85	84	73	67	61	55	48	45	45	45	46	50	49	58	86	69.3	88																		
2-Mar	79	71	70	76	74	54	52	49	60	69	64	56	48	45	48	45	44	44	46	49	52	54	58	62	57.1	79																		
3-Mar	68	68	68	69	77	80	80	79	73	64	58	51	48	46	44	42	42	43	45	48	52	62	69	70	60.1	80																		
4-Mar	73	75	74	74	73	74	73	73	73	71	66	57	49	41	37	30	31	44	44	49	51	58	63	60	58.9	75																		
5-Mar	63	67	68	65	64	66	67	68	70	68	60	59	55	54	52	50	52	53	56	60	60	62	67	69	61.4	70																		
6-Mar	68	66	69	69	75	80	83	88	76	70	58	56	58	53	55	56	51	51	56	58	59	61	65	68	64.6	88																		
7-Mar	71	71	73	72	74	74	78	78	76	73	58	52	48	45	37	36	39	37	43	46	47	59	65	72	59.4	78																		
8-Mar	74	78	79	70	70	74	74	73	73	69	63	55	52	49	48	50	52	52	53	53	57	62	64	67	63.0	79																		
9-Mar	65	66	74	72	71	72	75	76	72	71	70	74	75	73	66	60	60	64	73	82	88	90	83	87	73.3	90																		
10-Mar	86	84	79	78	79	81	81	78	73	66	62	59	55	50	47	48	52	59	61	63	63	64	65	73	66.9	86																		
11-Mar	82	83	81	81	80	81	81	80	78	78	76	76	74	73	72	73	79	82	82	83	83	82	83	83	79.4	83																		
12-Mar	83	83	82	83	83	83	83	82	81	77	74	81	88	85	84	84	82	78	87	91	94	94	95	95	84.6	95																		
13-Mar	96	97	97	92	68	65	66	63	62	54	47	39	37	34	31	29	33	32	36	39	43	51	51	51	54.7	97																		
14-Mar	54	60	66	66	70	74	78	78	80	78	74	64	56	52	50	45	46	46	46	45	57	70	88	95	64.0	95																		
15-Mar	93	88	87	88	90	87	84	84	79	78	77	71	58	53	51	49	50	52	64	69	72	75	80	81	73.4	93																		
16-Mar	85	83	80	80	79	75	75	75	69	65	64	62	63	58	58	59	60	63	67	70	75	79	82	82	71.1	85																		
17-Mar	86	85	86	84	84	84	84	84	81	70	66	59	48	47	44	39	35	34	44	60	73	77	84	89	67.8	89																		
18-Mar	92	91	92	93	89	90	90	86	78	68	62	62	62	57	56	51	46	45	46	46	48	48	48	47	66.4	93																		
19-Mar	47	48	48	48	52	58	68	62	50	41	33	28	27	30	31	31	28	27	25	26	27	30	33	43	39.3	68																		
20-Mar	56	61	69	76	78	79	81	75	64	51	49	41	38	39	36	24	24	27	33	38	46	50	53	57	51.8	81																		
21-Mar	59	64	67	68	68	71	71	69	64	57	47	34	30	28	26	24	26	30	32	35	38	39	40	40	46.9	71																		
22-Mar	44	43	45	49	52	51	50	55	63	61	60	54	52	44	41	49	56	61	86	94	94	94	94	94	61.9	94																		
23-Mar	94	95	96	91	90	91	91	87	87	84	80	78	73	64	62	63	65	63	64	67	76	81	83	83	79.6	96																		
24-Mar	83	83	83	82	81	83	81	80	76	70	69	67	61	57	55	54	54	56	58	61	64	70	80	83	70.5	83																		
25-Mar	89	91	91	90	89	88	88	87	81	67	63	55	49	47	45	44	43	45	51	60	66	71	73	76	68.8	91																		
26-Mar	81	81	82	84	87	90	89	84	80	75	73	68	63	63	61	59	60	65	65	74	85	90	95	93	77.0	95																		
27-Mar	93	95	96	94	94	94	97	97	96	94	91	87	78	75	74	72	77	77	79	80	82	91	94	94	87.5	97																		
28-Mar	93	96	97	98	98	99	99	99	97	79	55	26	23	25	27	24	21	22	24	27	30	45	53	54	58.8	99																		
29-Mar	59	68	75	75	81	88	89	87	82	78	70	65	58	53	49	50	48	49	52	60	71	75	81	81	68.5	89																		
30-Mar	85	91	93	93	92	95	95	89	74	65	59	52	48	46	44	42	38	39	41	45	58	66	69	70	66.2	95																		
31-Mar	69	67	68	74	73	74	75	74	72	75	87	91	96	98	83	73	71	73	78	81	90	94	96	95	80.2	98																		
																			76.1	77.0	78.2	78.1	78.1	78.6	79.4	78.2	74.9	69.9	65.1	59.8	56.1	53.0	50.6	48.6	48.7	50.3	54.2	58.2	63.0	67.5	71.4	74.2	Diurnal Average	
																			96	97	97	98	98	99	99	99	97	94	91	91	96	98	84	84	82	82	87	94	94	94	96	95	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	65	8.74	8.74
40 - 60	207	27.82	36.56
60 - 80	269	36.16	72.72
80 - 100	203	27.28	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

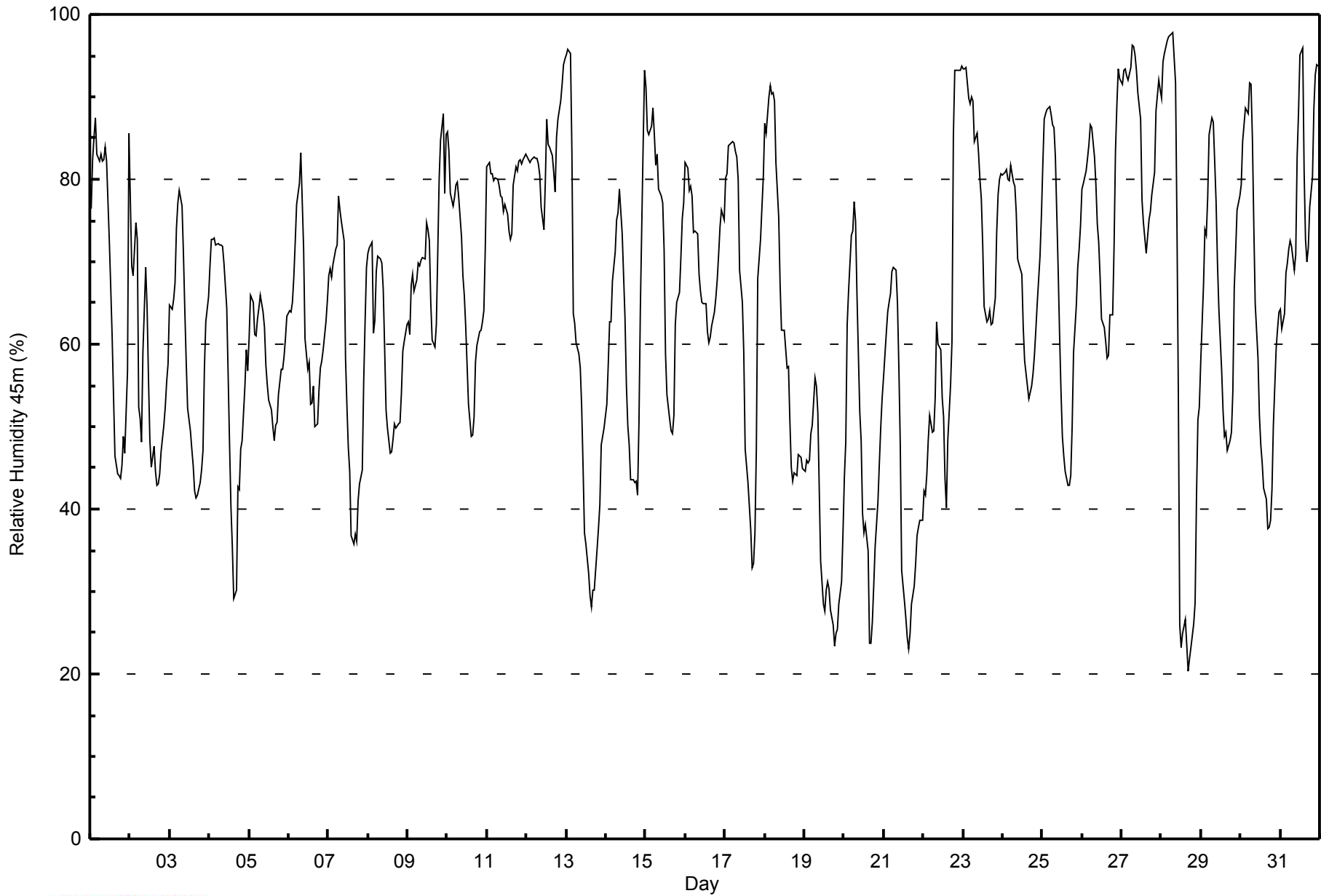


Maximum Value: 98 % on Mar 28 08:00																			Maximum Daily Average: 86.3 % on Mar 27						Hours in Service: 744																								
Minimum Value: 20 % on Mar 28 17:00																			Minimum Daily Average: 37.2 % on Mar 19						Hours of Data: 744																								
Maximum Diurnal Average: 77.2 % at hour 7																			Minimum Diurnal Average: 47.8 % at hour 17						Hours of Missing Data: 0																								
Monthly Average: 64.5 %																			Percentiles: P ₁ = 24 P ₁₀ = 41 Q ₁ = 50 Median = 65 Q ₃ = 79 P ₉₀ = 87 P ₉₉ = 96						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	76	82	85	87	83	82	83	82	82	84	82	72	67	61	54	47	44	44	44	45	49	47	57	86	67.7	87																							
2-Mar	78	70	68	75	73	52	51	48	59	69	64	56	48	45	48	45	43	43	44	47	50	52	55	58	55.9	78																							
3-Mar	65	64	65	67	74	77	79	77	71	64	58	52	49	47	45	42	41	42	43	45	47	57	63	66	58.4	79																							
4-Mar	69	73	73	73	72	72	72	72	72	70	64	56	48	40	35	29	30	43	42	47	48	55	59	57	57.2	73																							
5-Mar	61	66	65	61	61	63	64	66	64	62	57	55	53	52	50	48	50	50	54	57	57	59	61	63	58.3	66																							
6-Mar	64	64	65	68	72	77	80	83	77	72	61	57	58	53	53	55	50	50	54	57	58	59	63	65	63.1	83																							
7-Mar	68	69	68	70	71	72	78	76	75	73	58	53	48	44	37	36	37	36	41	43	45	55	63	69	57.7	78																							
8-Mar	71	72	72	61	63	69	71	70	70	67	59	52	50	47	47	49	50	50	50	51	54	59	60	62	59.4	72																							
9-Mar	63	61	67	69	66	68	70	70	70	71	70	75	74	72	65	61	60	62	71	80	85	88	78	85	70.9	88																							
10-Mar	86	83	78	77	78	79	80	78	73	68	66	62	57	53	49	49	51	58	60	62	62	63	64	72	66.9	86																							
11-Mar	82	82	81	81	80	80	80	79	78	78	76	77	76	74	73	73	79	81	81	82	82	82	82	83	79.3	83																							
12-Mar	83	82	82	82	83	83	83	82	80	77	74	80	87	84	84	83	81	79	85	87	89	92	94	95	83.7	95																							
13-Mar	95	96	95	83	64	63	60	59	57	52	45	37	36	32	29	28	30	30	35	38	41	48	49	50	52.2	96																							
14-Mar	53	57	63	63	68	71	75	76	79	76	73	63	55	50	48	44	44	43	43	42	51	64	84	93	61.6	93																							
15-Mar	91	86	85	86	89	85	82	83	79	78	77	71	59	54	51	49	49	51	62	65	66	70	75	77	71.8	91																							
16-Mar	82	81	79	79	78	74	74	73	68	66	65	65	65	61	60	61	62	64	66	68	71	74	76	75	70.3	82																							
17-Mar	80	81	84	84	85	84	83	83	80	69	65	59	47	45	43	37	33	33	37	47	68	73	77	80	64.9	85																							
18-Mar	87	86	90	91	90	91	89	82	75	67	62	62	62	57	57	51	45	43	44	44	47	46	46	45	65.0	91																							
19-Mar	45	46	46	46	49	50	56	55	52	43	34	28	28	30	31	30	28	26	23	25	25	28	31	37	37.2	56																							
20-Mar	44	48	62	66	73	74	77	75	66	52	48	39	37	38	35	24	24	26	31	35	41	45	50	53	48.5	77																							
21-Mar	56	61	64	65	66	69	69	69	65	57	48	33	29	27	24	23	25	29	31	33	37	38	39	39	45.6	69																							
22-Mar	42	42	44	48	51	49	50	54	63	60	59	54	51	44	40	48	55	60	85	93	93	93	93	94	61.1	94																							
23-Mar	93	93	94	90	89	90	90	85	86	83	80	78	72	65	63	63	64	62	63	66	74	78	80	81	78.3	94																							
24-Mar	81	81	81	80	80	82	80	79	76	70	70	68	62	58	56	55	53	55	56	59	62	65	71	76	69.0	82																							
25-Mar	82	87	88	89	89	88	87	86	83	69	61	54	49	47	45	43	43	44	50	59	65	69	72	74	67.5	89																							
26-Mar	79	80	81	82	84	87	86	83	79	75	72	68	63	62	60	58	59	64	63	72	83	89	93	92	75.6	93																							
27-Mar	91	93	93	93	92	94	96	96	95	93	90	87	78	75	73	71	75	76	78	79	81	88	92	91	86.3	96																							
28-Mar	90	94	95	97	97	97	98	98	92	75	54	26	23	25	27	24	20	22	23	26	29	42	51	52	57.3	98																							
29-Mar	58	67	74	73	78	85	88	87	82	77	70	64	57	52	49	49	47	48	49	54	67	71	76	78	66.7	88																							
30-Mar	79	85	87	89	88	92	92	85	74	65	58	51	48	46	42	41	38	38	39	42	50	60	62	64	63.1	92																							
31-Mar	64	62	64	69	70	72	73	72	69	71	83	88	95	96	81	73	70	72	77	80	89	93	94	94	77.8	96																							
																								72.8	74.0	75.4	75.6	76.0	76.4	77.2	76.2	73.9	69.4	64.7	59.5	55.8	52.8	50.1	48.0	47.8	49.2	52.5	55.8	60.1	64.6	68.1	71.2	Diurnal Average	
																								95	96	95	97	97	97	98	98	95	93	90	88	95	96	84	83	81	81	85	93	93	93	94	95	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	69	9.27	9.27
40 - 60	216	29.03	38.31
60 - 80	288	38.71	77.02
80 - 100	171	22.98	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

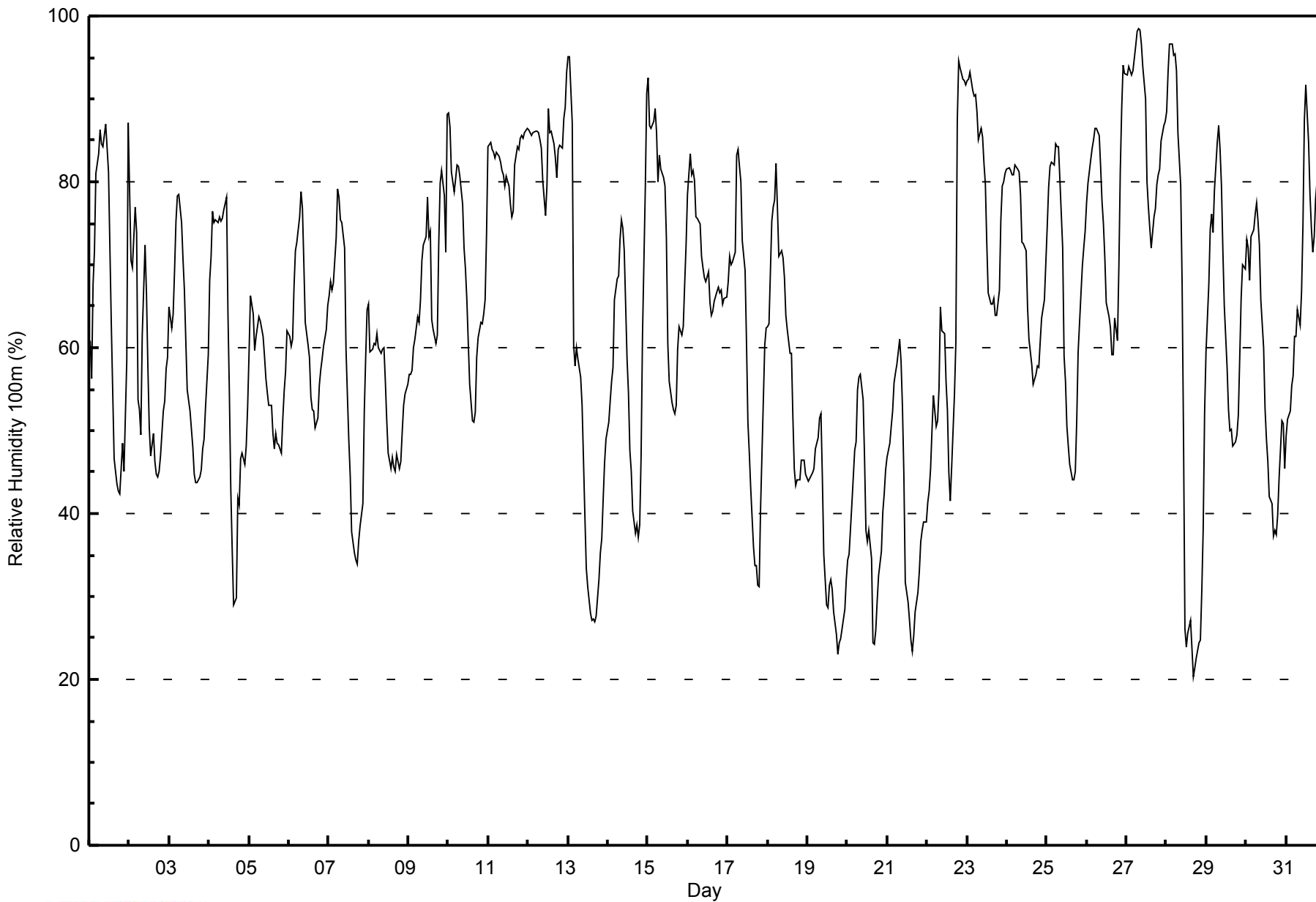


Maximum Value: 99 % on Mar 27 08:00																			Maximum Daily Average: 87.3 % on Mar 27						Hours in Service: 744	
Minimum Value: 20 % on Mar 28 17:00																			Minimum Daily Average: 36.1 % on Mar 19						Hours of Data: 744	
Maximum Diurnal Average: 74.1 % at hour 7																			Minimum Diurnal Average: 48.1 % at hour 17						Hours of Missing Data: 0	
Monthly Average: 62.9 %																			Percentiles: P ₁ = 24 P ₁₀ = 38 Q ₁ = 49 Median = 63 Q ₃ = 78 P ₉₀ = 86 P ₉₉ = 96						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	61	56	68	72	81	83	86	85	84	86	87	81	72	63	55	47	44	43	42	45	48	45	58	87	65.8	87
2-Mar	79	71	70	77	74	54	53	50	62	72	67	58	50	47	50	46	45	44	45	47	52	53	57	59	57.5	79
3-Mar	65	62	64	69	75	78	79	75	71	67	61	55	52	50	48	45	44	44	44	45	48	49	53	59	58.4	79
4-Mar	68	71	76	75	75	75	76	75	76	77	78	64	55	43	36	29	30	42	41	47	47	46	48	53	58.4	78
5-Mar	59	66	64	60	61	62	64	63	61	59	56	55	53	53	50	48	50	49	48	47	51	55	57	62	56.4	66
6-Mar	61	60	61	67	72	73	76	79	77	70	63	60	59	54	53	52	50	52	55	57	59	60	62	65	62.4	79
7-Mar	66	68	67	68	73	79	78	75	75	72	60	54	49	45	38	35	34	34	37	38	41	52	59	65	56.8	79
8-Mar	65	60	60	60	60	62	60	59	60	60	56	51	47	45	47	46	45	47	45	46	50	53	54	56	54.0	65
9-Mar	57	57	57	60	61	64	63	66	70	72	73	78	73	74	63	62	60	62	73	80	81	78	71	88	68.6	88
10-Mar	88	87	81	79	80	82	82	81	77	72	70	66	61	56	51	51	52	59	61	63	63	64	66	74	69.4	88
11-Mar	84	85	84	84	83	84	83	82	81	81	79	81	79	77	76	76	82	84	84	85	86	85	86	86	82.4	86
12-Mar	86	86	86	86	86	86	86	85	84	80	76	79	89	86	86	85	83	80	84	84	84	88	89	93	84.9	93
13-Mar	95	95	87	60	58	60	59	56	53	47	40	33	31	28	27	27	28	32	35	37	42	46	49	48.0	95	
14-Mar	51	54	56	58	66	68	69	73	75	74	72	59	55	48	45	40	38	39	37	39	47	62	79	91	58.0	91
15-Mar	93	87	87	87	89	86	80	83	82	81	79	73	60	56	53	53	52	53	60	62	62	63	68	72	71.7	93
16-Mar	78	83	81	81	80	76	76	75	71	70	69	68	69	65	64	64	66	67	67	67	67	65	66	66	70.9	83
17-Mar	68	71	70	70	71	83	84	82	80	73	69	61	51	47	43	36	34	34	31	31	41	54	60	62	58.6	84
18-Mar	63	63	75	77	78	82	77	71	72	71	68	64	62	59	59	52	45	43	44	44	46	46	46	45	60.6	82
19-Mar	44	44	45	45	45	48	49	52	52	44	35	29	29	31	32	31	28	26	23	24	25	26	28	32	36.1	52
20-Mar	34	35	38	41	48	49	55	56	57	54	47	38	37	38	35	24	24	26	30	33	35	40	42	45	40.0	57
21-Mar	47	48	51	52	56	57	58	61	58	53	45	32	29	27	25	23	25	28	31	33	37	38	39	39	41.3	61
22-Mar	41	43	45	50	54	50	51	55	65	62	62	56	52	45	42	46	54	61	87	95	94	92	92	92	61.9	95
23-Mar	92	92	93	91	90	90	88	85	86	85	82	80	73	67	65	65	66	64	64	67	75	79	80	81	79.3	93
24-Mar	82	82	81	81	81	82	82	81	78	73	73	72	65	61	60	58	56	57	58	58	61	64	66	70	69.9	82
25-Mar	75	79	82	82	82	85	84	84	80	72	59	56	51	48	46	44	44	45	51	59	66	70	72	74	66.3	85
26-Mar	78	80	83	84	85	86	86	86	82	78	75	71	65	64	62	59	59	64	61	70	81	89	94	93	76.4	94
27-Mar	93	94	93	93	93	97	98	99	98	97	94	90	80	77	74	72	76	77	80	81	82	85	87	87	87.3	99
28-Mar	88	93	97	97	95	95	93	86	79	68	49	26	24	26	27	24	20	21	23	24	25	31	38	52	54.3	97
29-Mar	59	68	74	76	74	79	85	87	84	79	72	65	58	53	50	50	48	49	49	52	59	66	70	69	65.6	87
30-Mar	73	72	68	73	74	76	77	75	72	66	60	53	49	46	42	41	37	38	37	40	44	51	51	45	56.8	77
31-Mar	49	51	52	55	57	61	61	64	63	67	75	87	92	85	79	74	72	73	78	82	90	94	96	96	73.1	96
																			69.1						Diurnal Average	
																			95						Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	85	11.42	11.42
40 - 60	237	31.85	43.28
60 - 80	260	34.95	78.23
80 - 100	162	21.77	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

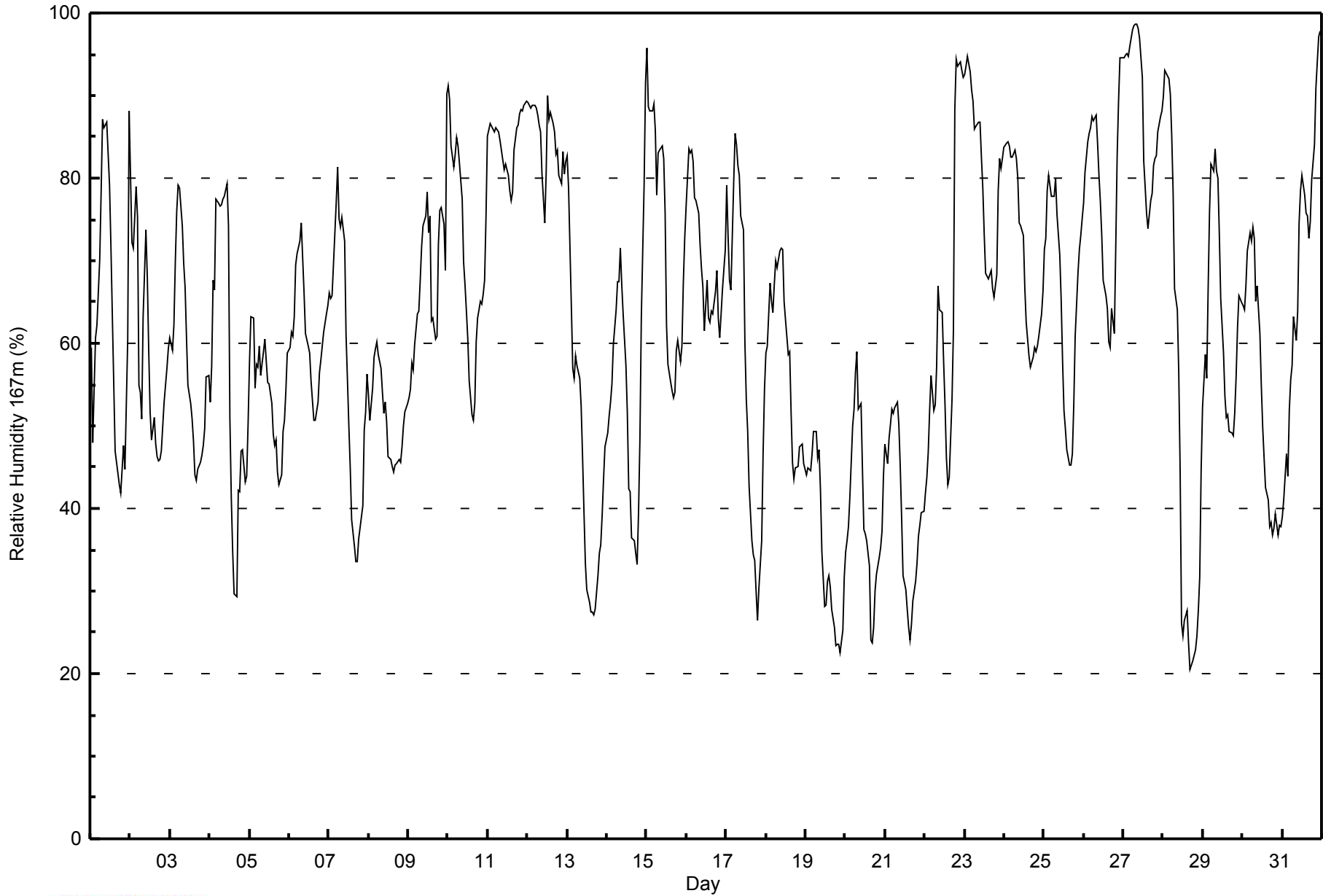


Maximum Value: 99 % on Mar 27 08:00																			Maximum Daily Average: 88.8 % on Mar 27						Hours in Service: 744	
Minimum Value: 20 % on Mar 28 17:00																			Minimum Daily Average: 35.3 % on Mar 19						Hours of Data: 744	
Maximum Diurnal Average: 72.5 % at hour 6																			Minimum Diurnal Average: 48.5 % at hour 17						Hours of Missing Data: 0	
Monthly Average: 62.0 %																			Percentiles: P ₁ = 24 P ₁₀ = 37 Q ₁ = 48 Median = 61 Q ₃ = 78 P ₉₀ = 86 P ₉₉ = 96						Hours of Calibration: 0	
																			Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	59	48	55	61	62	70	78	87	86	86	87	79	72	63	55	47	44	43	42	45	48	45	61	88	63.0	88
2-Mar	80	72	72	79	75	55	54	51	63	74	68	59	52	48	51	48	46	46	46	47	53	55	57	59	58.7	80
3-Mar	61	59	62	70	76	79	79	74	70	67	61	55	53	51	48	44	43	45	46	46	48	50	56	56	58.2	79
4-Mar	53	57	68	66	78	77	77	77	78	78	79	74	51	41	35	30	29	42	42	47	47	43	44	50	56.8	79
5-Mar	58	63	63	55	58	57	60	56	59	61	58	55	55	53	49	48	48	44	43	44	49	51	54	59	54.1	63
6-Mar	60	61	61	63	70	71	72	75	70	66	61	60	59	55	53	51	51	53	57	58	60	61	64	65	61.5	75
7-Mar	66	65	66	69	77	81	75	74	75	72	61	56	50	45	39	35	34	34	36	38	40	50	52	56	56.1	81
8-Mar	54	51	55	58	59	60	59	57	54	51	53	51	46	46	45	44	45	45	46	46	48	50	52	53	51.1	60
9-Mar	53	54	58	57	60	64	64	68	72	74	75	78	73	75	63	63	60	61	72	76	76	74	69	90	68.0	90
10-Mar	91	89	84	81	83	85	84	82	77	70	67	64	60	55	51	51	53	60	63	65	65	66	68	75	70.4	91
11-Mar	85	87	86	86	86	86	86	85	83	82	81	82	80	79	77	78	83	86	86	88	88	88	89	89	84.4	89
12-Mar	89	89	89	89	89	88	88	87	86	81	75	81	90	87	88	87	86	83	83	80	79	83	80	82	84.9	90
13-Mar	83	79	64	57	56	59	57	56	52	46	40	33	30	29	27	27	28	32	34	36	39	44	47	45.1	83	
14-Mar	49	51	53	55	60	64	67	68	72	67	64	57	51	42	42	36	36	34	33	40	48	63	79	92	55.2	92
15-Mar	96	89	88	88	89	86	78	83	83	84	82	76	62	57	55	54	53	54	59	60	58	60	67	73	72.3	96
16-Mar	77	84	83	83	82	78	77	76	72	69	67	62	68	63	62	64	63	66	69	63	61	64	67	71	70.4	84
17-Mar	79	73	68	66	79	85	84	82	80	75	74	60	53	49	43	36	34	34	30	26	30	36	47	54	57.5	85
18-Mar	59	60	67	65	64	67	70	69	71	72	71	65	63	59	59	52	46	44	45	45	47	48	48	45	58.3	72
19-Mar	44	45	45	45	47	49	49	46	47	42	35	28	28	31	32	31	28	26	23	24	23	23	25	32	35.3	49
20-Mar	35	36	38	41	50	52	56	59	52	53	45	37	37	36	33	24	24	26	30	32	34	35	37	44	39.4	59
21-Mar	48	45	48	50	52	51	52	53	50	45	39	32	30	28	26	24	26	29	31	33	37	38	39	40	39.5	53
22-Mar	42	44	47	52	56	52	53	57	67	64	64	58	53	46	43	44	53	62	88	94	94	94	93	92	62.9	94
23-Mar	93	94	95	93	91	89	86	86	87	87	83	79	73	68	68	69	67	66	68	78	82	81	82	82	80.5	95
24-Mar	84	84	84	84	82	83	83	82	80	75	74	73	67	63	60	58	57	58	60	59	60	61	64	66	70.9	84
25-Mar	71	73	78	80	78	78	78	80	76	71	65	58	52	50	47	45	45	47	53	61	68	71	73	75	65.5	80
26-Mar	77	81	84	85	86	87	87	88	84	80	77	73	68	66	64	60	60	64	61	72	83	89	95	95	77.8	95
27-Mar	95	95	95	95	96	98	99	99	99	98	97	92	82	79	76	74	77	78	82	82	83	86	87	88	88.8	99
28-Mar	90	93	93	92	90	85	78	67	64	57	45	26	25	26	28	24	20	21	22	23	25	28	32	45	49.8	93
29-Mar	52	59	56	66	76	82	81	84	81	80	73	65	59	54	51	51	49	49	49	52	56	62	66	65	63.2	84
30-Mar	65	64	67	71	73	72	74	73	65	67	61	55	50	46	42	41	38	38	37	38	39	37	38	38	53.7	74
31-Mar	39	41	47	44	52	56	57	63	60	64	75	78	80	78	76	75	73	75	80	84	91	94	97	98	69.8	98
	67.2	67.2	68.3	69.3	71.9	72.5	72.3	72.3	71.5	69.6	66.3	61.3	57.2	53.9	51.2	48.9	48.5	49.7	51.9	53.9	56.5	58.9	62.0	66.6	Diurnal Average	
	96	95	95	95	96	98	99	99	99	98	97	92	90	87	88	87	86	86	88	94	94	94	97	98	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	97	13.04	13.04
40 - 60	252	33.87	46.91
60 - 80	238	31.99	78.90
80 - 100	157	21.10	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 24 km/h on Mar 13 20:00	Maximum Daily Speed Average: 14.6 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 29 02:00	Minimum Daily Speed Average: 0.6 km/h on Mar 23	Hours of Data: 734
Maximum Diurnal Speed Average: 1.8 km/h at hour 2	Minimum Diurnal Speed Average: 0.3 km/h at hour 6	Hours of Missing Data: 10
Monthly Average Velocity: 0.3 km/h 45.7 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 21	Percent Operational Time: 98.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	N1	NW2	SW1	SE1	SE2	SSE3	SSE6	SSE5	SE5	SSE8	SSE14	SSE13	SSE18	SSE18	SSE18	S15	S14	S12	SSE19	SSE16	SSE12	SSW5	NW14	NNW12	SSE7.3	SSE19	
2-Mar	NNW18	N23	N20	N16	N19	NNW20	NNW20	NNW17	N15	N12	NNW14	NNW17	NNW18	NNW18	NNW18	NNW18	NNW20	NNW17	NNW10	NNW8	N5	NNE4	N3	NW3	NNW14.6	N23	
3-Mar	NNW4	NNE3	NW8	N7	NNW6	NNW3	NNW5	NW3	NNW6	N13	N13	N13	N13	N11	N10	NNE8	NNE6	NE5	NE2	NE2	NW1	N1	SSE1	WNW0	N5.6	N13	
4-Mar	SSE1	SSE4	SSE9	SSE10	SSE10	SSE9	SE10	SE9	SE11	SSE13	SSE14	SSE9	SSE14	SSE15	SSE18	SSE22	SSE17	SW10	SW11	S7	SSE9	SSE9	SSE3	SW2	SSE9.6	SSE22	
5-Mar	WSW7	WNW3	WNW3	N3	NNW2	S2	SSE3	SSW3	SE11	SSE14	SSE15	SSE15	SSE13	SSE11	SSE10	SSE11	SSE9	SSE8	SSE4	SE1	NW1	SSW2	SE4	SE7	SSE5.4	SSE15	
6-Mar	SSE7	SW5	SW5	W5	WSW4	W1	W2	SE3	NW2	WNW2	N6	NNW4	WSW3	SW1	WSW5	W4	N4	NNE7	N6	N5	N3	NNW4	N1	NW2	NW1.6	NNE7	
7-Mar	WNW1	ENE1	SE3	SE2	SE4	SE3	W1	WNW9	W10	WSW6	NW9	NW12	NW12	NW9	NW11	NW10	WNW8	NW8	WNW7	WNW13	NW7	N4	NNW3	WNW2	NW5.0	WNW13	
8-Mar	E1	SSE1	SE4	SSE7	SSE8	SSE9	SSE11	SSE10	SSE8	SSE11	SSE9	SSE7	WSW4	SSE6	SSE9	SE5	SSE2	SE8	S5	SW3	SSE3	S2	SSE6	SSE5	SSE5.7	SSE11	
9-Mar	SSE4	SSE5	SE12	SSE8	SSE7	SW2	SSW3	NW3	WNW9	WNW12	NW10	NNW2	WSW7	NW2	W8	NNW10	NNW8	NNW6	NNW4	NNW4	NNW3	NNW3	NNW6	N8	NW2.3	WNW12	
10-Mar	N9	NNE11	NNE9	N7	N5	NNE5	N4	NE3	NE6	N8	N8	NNW7	NNW6	NNW6	NNW8	N9	N10	N10	N12	N13	N10	N9	NNE8	N10	N7.7	N13	
11-Mar	N11	N10	N10	N9	N10	N8	N9	N9	NNW6	N9	N10	NNW9	N11	N11	N11	N9	N10	N9	N10	N9	N7	N7	NNW5	NNW8	N9.0	N11	
12-Mar	NNW6	NNW4	NNW4	NNW4	NNW4	NNW3	NNW3	W2	WNW3	S0	N2	SSE6	SSW7	SW8	SSE12	SSE11	SSE5	NNW0	NNW2	WSW2	W0	NNW2	N3	NNW3	WSW0.7	SSE12	
13-Mar	NW2	NW2	NW2	SW2	W12	WSW6	SSE11	SSE6	SSE8	W14	W10	W7	WSW7	SW10	SSW10	S14	SSE19	S18	S21	S24	SSE23	SSE15	SE10	ESE7	S7.8	S24	
14-Mar	SSE14	SSE11	SE12	SSE18	SSE15	SSE15	SSE11	SSE12	SSE4	SE8	SE8	SSE12	SSE12	SSE11	SSE9	SSE10	SSE7	SSE7	SW1	WSW8	W11	W13	W8	NNW11	SSE7.3	SSE18	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE6	NNE5	NW9	NW11	NW8	NNW3	SE2	S2	SSE6	SSE6	SE3	SE4	SSE3	SSE6	---	NW11
16-Mar	NNW5	N10	N10	NNW6	NNW7	N6	NNE3	N4	N7	N6	N4	NNW5	N6	N5	N4	N6	N9	N10	N9	N6	N4	N5	N3	N3	N5.8	N10	
17-Mar	NW2	NW2	NW3	NNE1	NNW1	NW1	N1	NW2	SE1	S2	SSE6	SSE4	SSW2	SSW3	SSW3	SSW3	S4	S2	SW2	SSE1	NNW2	NNW3	NW1	NW1	SW0.7	SSE6	
18-Mar	S0	N0	N1	NW1	NNW3	NW1	S1	S4	S5	S4	SSW2	SSW4	SW3	NNW4	NNW11	N11	NNE11	N13	N15	N15	N12	N13	N12	N9	N4.5	N15	
19-Mar	N8	N5	N4	NNW5	NNW4	NNW4	NNW3	N2	N4	NNW6	NNW7	N8	N9	NNE6	N8	N10	N10	N9	NNE8	NNE7	NE9	NE8	NNE5	N3	N6.0	N10	
20-Mar	N5	NNW4	NNW3	NNW3	NNW4	NW3	NW3	N3	N3	NW3	WSW6	WSW7	WSW9	WSW11	WSW10	N8	N9	N8	N7	N6	N5	N7	N5	N6	NW3.9	WSW11	
21-Mar	N5	N5	N4	N5	NNW4	NNW3	NNW2	NNW3	N4	NNE5	N4	SSE10	SSE10	SE9	SE12	ESE9	SE11	SE11	SE10	ESE9	ESE9	ESE8	ESE6	SE8	ESE3.7	SE12	
22-Mar	S3	SSW3	SSE5	SSE4	SSE1	NE1	SE3	SSE11	SSE8	SSE8	SSE8	S5	WSW4	SSE5	SSE4	NE3	N4	NNW4	NW4	N2	NNW2	NNW2	NNW3	N3	SSE1.8	SSE11	
23-Mar	W1	NW1	NW0	SSE5	SSE4	SSE2	SE3	SSE8	SSE1	WSW2	WSW3	SW4	SW2	N4	NNE3	N3	N4	NNE5	ENE3	N3	N5	N5	N4	N4	NNE0.6	SSE8	
24-Mar	NNW2	N2	N3	N4	NNW3	NNW2	NW3	N4	N6	N7	N8	N7	NNW7	NNW5	NNW4	WNW4	S4	SSE9	SSE5	E3	NE2	NNE3	NNW3	N2	N2.4	SSE9	
25-Mar	NNW2	NNW2	NNW2	NNW3	NW3	NNW4	NW3	NNW2	N2	NW1	SW3	SSW4	SSE9	SSE8	SSE9	SSE10	SSE8	S6	S5	S1	SSE6	SSE9	SSE7	SSE6	SSE2.7	SSE10	
26-Mar	NE1	NE1	SSE1	NW1	NNW4	N4	S1	NW2	SSE6	SSE12	SSE13	SSE11	SSE10	SSE12	SE9	SSE10	SE11	SSE13	S7	WSW6	WSW6	SSE3	SE5	SSE7	SSE4.9	SSE13	
27-Mar	SE4	SE3	SE2	SSE4	SSE5	SSE8	SSE9	SSE9	SSE8	SSE11	SSE8	SSE3	SSE11	SSE9	SSE10	SSE14	SSE15	SSE14	SSE10	SSE8	S7	NNW3	SW1	ESE1	SSE7.0	SSE15	
28-Mar	SSE4	NNW1	NNW1	WNW1	NNW0	SSW0	SSE2	SSE4	SSE4	S3	SSW2	NNW11	NW16	NW14	NW18	NW22	NW21	NW14	NW16	NW15	NW11	W11	W7	NNE2	NW6.5	NW22	
29-Mar	ENE2	NE0	SW2	SSE7	SE10	SE9	SE7	SSE9	SSE10	SSE8	SSE10	SSE11	SSE9	SSE7	SE8	SSE9	SE6	ENE1	NNW3	NW2	W1	WNW1	NNW4	WNW3	SSE4.4	SSE11	
30-Mar	NNW3	N2	NNW4	NW3	NW3	NNW1	ESE1	WSW1	WNW1	SSW2	SW3	SSE3	SSE4	SSE10	SSE7	S3	SSE11	SSE7	E0	E1	NNW1	NW2	SSE6	SSE9	SSE1.8	SSE11	
31-Mar	SSE10	SSE9	SE5	SSE5	SSE7	SE6	SSE7	SSE5	SE1	NW1	N3	N4	N5	N7	ENE9	ENE13	ENE11	NE10	NNE9	NE10	NNE9	NNE10	N12	N12	ENE3.8	ENE13	

N1.4	N1.8	NNE1.2	NE0.5	N0.3	E0.3	SE1.0	SSE1.3	SE0.9	S0.9	SSE0.4	SE0.5	SW1.3	SSW1.0	S1.1	SE0.8	E1.1	ENE0.7	N0.5	NNW0.9	NNE0.7	N1.4	N1.7	N1.7	Diurnal Average
NNW18	N23	N20	SSE18	N19	NNW20	NNW20	NNW17	N15	W14	SSE15	NNW17	SSE18	NNW18	NNW18	SSE22	NW21	S18	S21	S24	SSE23	SSE15	NW14	N12	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

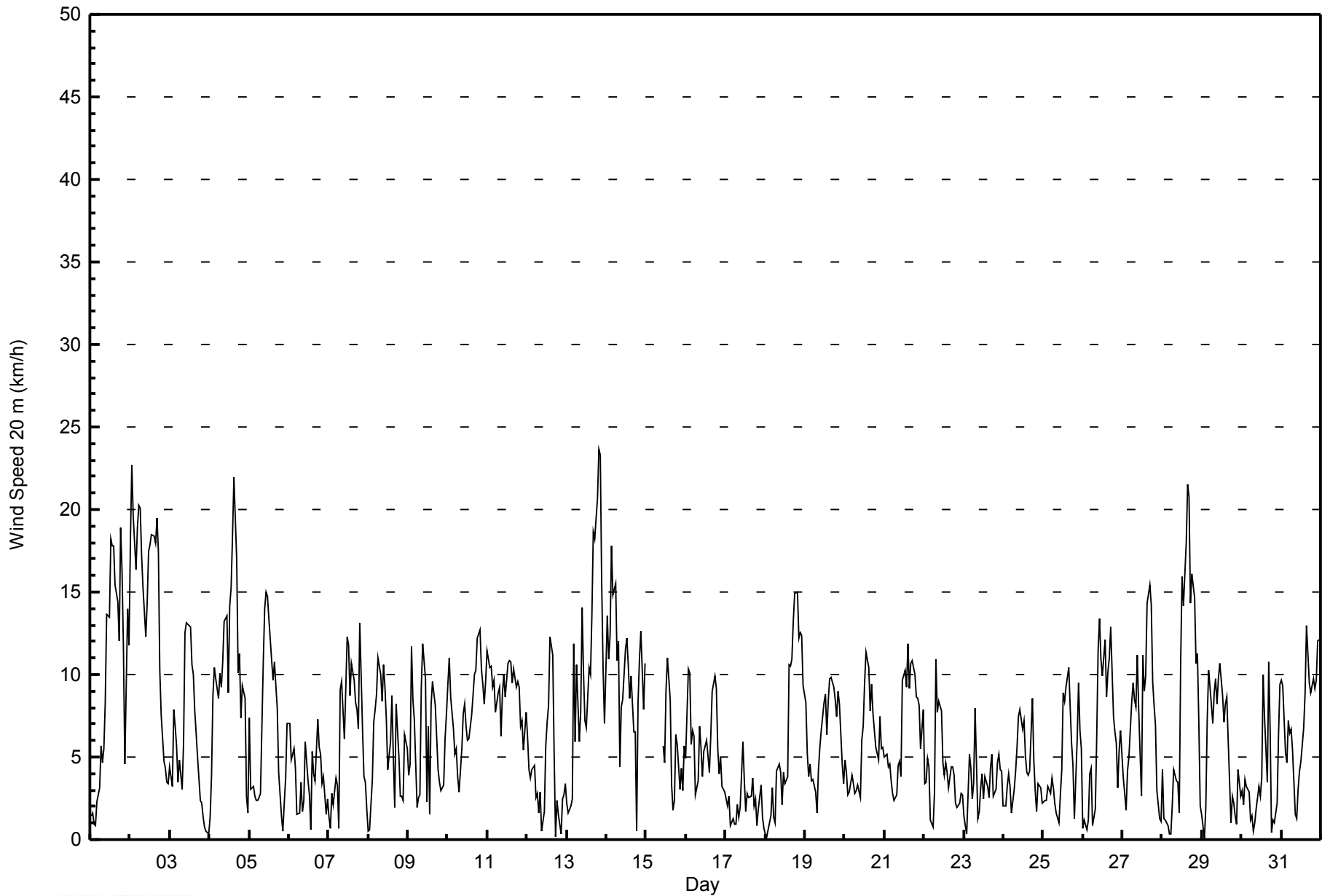
Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 2 02:00																	Hours in Service: 744 Hours of Data: 734 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.7								
Minimum Value: 0 km/h on Mar 28 06:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Mar	1	1	1	1	1	1	1	1	2	6	3	4	5	4	3	4	3	3	3	4	4	4	6	5	6
2-Mar	8	8	7	6	7	8	8	7	6	5	7	6	7	7	6	8	6	7	4	3	2	2	1	1	8
3-Mar	2	1	4	3	1	1	1	2	2	5	5	5	4	4	4	3	3	2	1	2	1	1	1	1	5
4-Mar	1	2	3	2	2	2	2	3	3	3	3	4	6	4	4	5	5	5	2	2	3	2	2	2	6
5-Mar	5	3	3	2	2	1	2	2	4	3	3	3	3	3	2	3	3	3	2	1	1	2	1	2	5
6-Mar	5	2	2	3	3	1	1	1	1	1	3	2	3	2	2	2	3	3	2	2	2	1	1	2	5
7-Mar	1	1	1	1	2	2	1	4	4	3	5	5	5	5	4	3	3	2	2	5	3	1	1	2	5
8-Mar	1	1	2	1	2	3	2	2	2	3	3	3	3	4	2	3	2	2	2	2	1	1	2	1	4
9-Mar	2	2	5	2	4	1	1	2	4	4	4	2	3	3	4	4	3	4	2	1	1	1	2	3	5
10-Mar	3	5	4	3	2	2	2	2	3	3	3	3	3	2	3	3	3	3	4	4	4	3	3	3	5
11-Mar	3	3	4	3	3	3	3	3	3	3	4	4	4	4	4	3	3	3	3	3	2	3	2	2	4
12-Mar	3	2	2	2	2	2	1	1	2	1	1	4	4	3	3	5	3	2	2	1	1	1	2	2	5
13-Mar	2	1	1	3	3	3	5	4	3	4	3	3	3	3	4	5	3	4	4	5	5	5	4	3	5
14-Mar	3	2	4	3	2	3	3	3	3	3	4	3	3	2	3	2	3	2	3	3	3	3	2	5	5
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	5	4	4	3	1	2	1	2	2	1	2	3	5
16-Mar	4	4	4	2	2	3	1	2	2	2	2	2	2	2	3	3	3	3	3	2	2	2	2	1	4
17-Mar	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2	1	1	1	2
18-Mar	1	1	1	1	1	1	1	2	2	2	1	2	2	2	4	4	4	5	5	5	5	5	4	4	5
19-Mar	3	2	2	2	1	1	1	1	1	2	3	3	3	3	3	4	4	4	3	3	3	3	2	1	4
20-Mar	1	1	1	2	1	1	1	1	2	2	2	2	3	3	4	3	3	3	2	2	1	3	3	1	4
21-Mar	2	2	2	2	1	1	1	1	2	2	2	5	3	4	4	4	4	4	3	3	4	3	2	4	5
22-Mar	2	2	2	2	1	1	2	3	3	3	2	2	2	3	2	2	2	3	3	1	1	1	1	1	3
23-Mar	1	0	1	2	2	2	2	2	2	1	2	1	1	2	1	2	2	2	1	1	2	2	2	2	2
24-Mar	1	1	1	1	2	1	2	2	2	3	3	3	3	3	2	3	2	3	2	1	1	1	1	1	3
25-Mar	1	1	1	1	1	1	1	1	1	1	1	3	3	2	2	2	2	2	3	2	2	2	2	2	3
26-Mar	2	1	1	2	2	2	2	1	4	3	3	4	3	6	4	4	4	3	6	2	3	2	2	2	6
27-Mar	2	1	2	1	1	3	3	3	2	3	3	3	3	3	2	4	4	5	3	4	4	2	1	1	5
28-Mar	4	1	1	1	1	0	1	1	1	2	2	5	6	6	7	7	7	5	5	4	3	4	4	2	7
29-Mar	2	1	2	3	2	2	2	3	3	3	3	4	2	3	3	3	2	1	2	2	1	2	2	2	4
30-Mar	1	2	1	1	2	1	2	1	1	1	2	2	3	3	5	2	4	3	1	2	2	2	3	3	5
31-Mar	2	3	3	2	2	3	2	2	3	2	1	2	3	3	5	6	5	4	3	4	4	3	4	4	6
																	Diurnal Maximum								
AF - Analyzer Failure																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

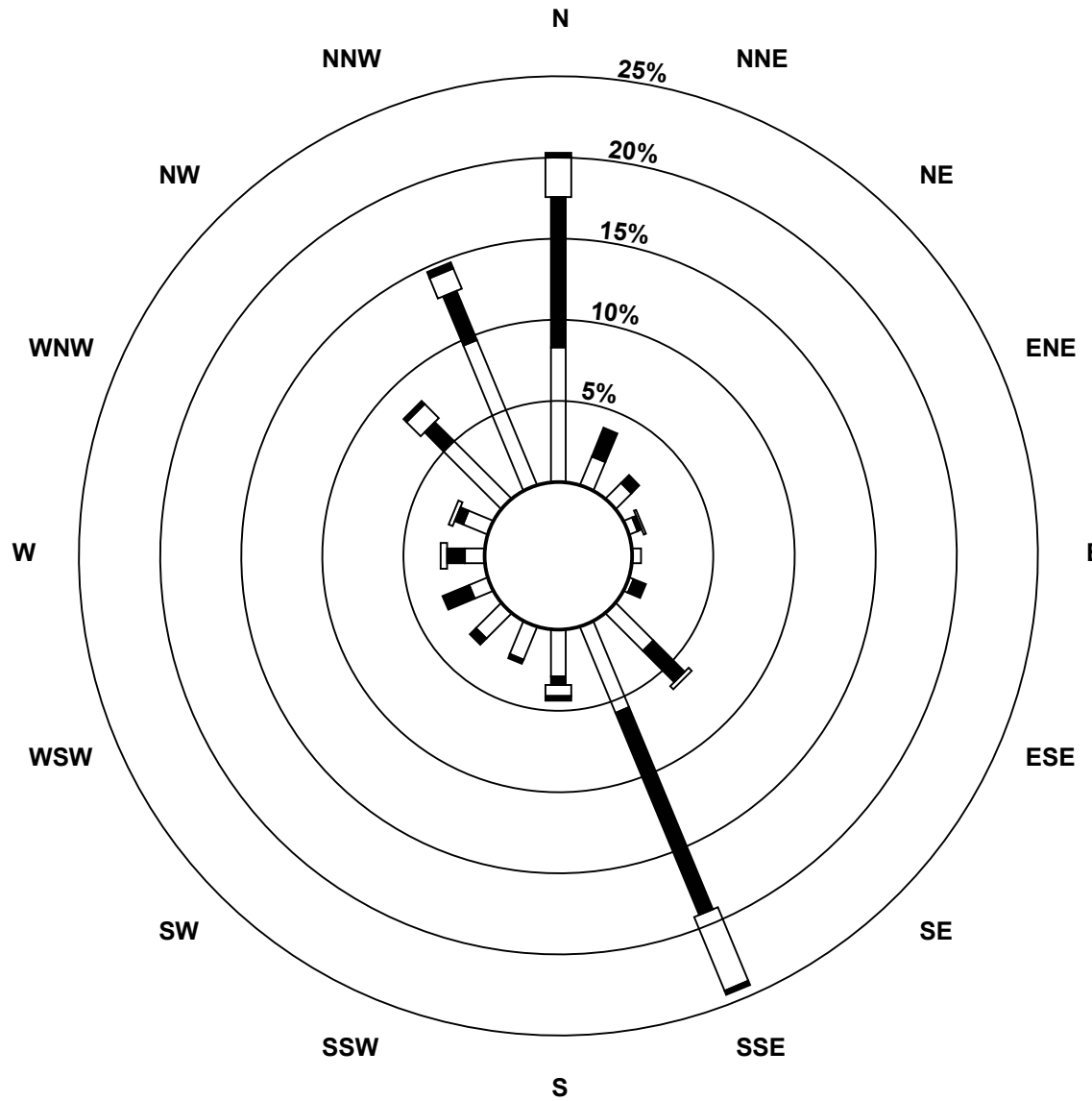
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	352	47.96	47.96
6 - 11	285	38.83	86.78
12 - 19	86	11.72	98.50
20 - 28	11	1.50	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 734

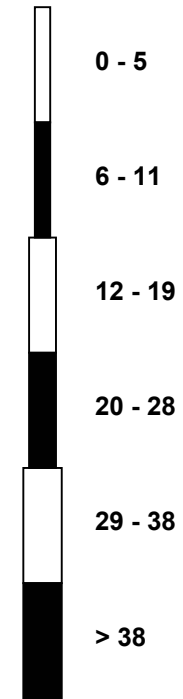
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Classes (km/h)



Total Number of Valid Hours: 734



Maximum Speed: 31 km/h on Mar 2 02:00	Maximum Daily Speed Average: 19.9 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 31 10:00	Minimum Daily Speed Average: 0.8 km/h on Mar 12	Hours of Data: 730
Maximum Diurnal Speed Average: 2.9 km/h at hour 2	Minimum Diurnal Speed Average: 0.2 km/h at hour 11	Hours of Missing Data: 14
Monthly Average Velocity: 0.7 km/h 16.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 13 P ₉₀ = 17 P ₉₉ = 26	Percent Operational Time: 98.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	N3	NW3	SW2	SE1	SE6	SSE6	SSE9	SSE6	SE8	SSE12	SSE17	SSE18	SSE23	SSE21	SSE20	S17	S16	S13	SSE20	SSE17	SSE14	SSW6	NW17	NNW16	SSE8.8	SSE23
2-Mar	NNW25	N31	N28	N23	N27	NNW27	NNW27	NNW24	N21	N17	NNW20	NNW23	NNW24	NNW25	NNW25	NNW24	NNW25	NNW23	NNW13	NNW11	N8	NEE6	N6	NW6	NNW19.9	N31
3-Mar	NNW8	NNE5	NW13	N10	NNW8	NNW5	NNW9	NW7	NNW8	N19	N19	N19	N18	N14	N13	NNE11	NNE10	NE8	NE4	NE4	NW1	N1	SSE1	WNN1	N8.2	N19
4-Mar	SSE4	SSE8	SSE11	SSE13	SSE12	SSE10	SE12	SE11	SE14	SSE15	SSE16	SSE12	SSE17	SSE19	SSE22	SSE24	SSE18	SW13	SW14	S8	SSE12	SSE13	SSE6	SW3	SSE11.9	SSE24
5-Mar	WSW13	WNW5	WNW6	N4	NNW5	S2	SSE3	SSW4	SE6	SSE13	SSE15	SSE17	SSE15	SSE13	SSE10	SSE12	SSE10	SSE10	SSE6	SE3	NW1	SSW3	SE6	SSE8	SSE5.7	SSE17
6-Mar	SSE7	SW6	SW9	W8	WSW5	W3	W5	SE3	NW1	WNN3	N8	NNW5	WSW3	SW1	WSW7	W6	N6	NNE11	N8	N7	N5	NNW6	N3	NW4	NW2.5	NNE11
7-Mar	WNN2	ENE1	SE4	SE4	SE8	SE6	W4WNN14	W13	WSW8	NW11	NW15	NW15	NW11	NW13	NW12	WNN11	WNN11	WNN10	WNN19	NW10	N7	NNW5	WNN2	WNN6.6	WNN19	
8-Mar	E1	SSE2	SE5	SSE7	SSE8	SSE10	SSE14	SSE12	SSE12	SSE13	SSE11	SSE7	WSW7	SSE7	SSE10	SE5	SSE3	SE8	S7	SW5	SSE3	S3	SSE8	SSE7	SSE6.8	SSE14
9-Mar	SSE3	SSE5	SE13	SSE10	SSE6	SW5	SSW3	NW7	WNN13	WNN15	NW12	NNW3	WSW9	NW2	W10	NNW13	NNW10	NNW9	NNW7	NNW6	NNW6	NNW6	NNW10	N11	NW3.9	WNN15
10-Mar	N14	NNE17	NNE13	N10	N8	NNE8	N6	NE5	NE7	N10	N10	NNW8	NNW7	NNW7	NNW10	N11	N13	N14	N17	N18	N15	N14	NNE13	N14	N10.8	N18
11-Mar	N15	N15	N14	N13	N13	N11	N12	N13	NNW8	N12	N13	NNW12	N14	N15	N16	N13	N14	N13	N13	N13	N9	N10	NNW7	NNW10	N12.3	N16
12-Mar	NNW8	NNW5	NNW5	NNW5	NNW6	NNW3	NNW3	W2	WNN4	S0	N2	SSE8	SSW9	SW10	SSE15	SSE14	SSE8	NNW0	NNW5	WSW2	W1	NNW3	N5	NNW5	WSW0.8	SSE15
13-Mar	NW3	NW4	NW2	SW8	W18	WSW10	SSE9	SSE5	SSE6	W20	W14	W10	WSW9	SW14	SSW12	S16	SSE21	S20	S22	S25	SSE27	SSE20	SE14	ESE10	SSW9.1	SSE27
14-Mar	SSE17	SSE14	SE15	SSE22	SSE17	SSE20	SSE16	SSE16	SSE7	SE10	SE12	SE14	SSE15	SSE13	SSE12	SSE13	SSE8	SSE9	SW2	WSW13	W17	W20	W13	NNW14	SSE9.3	SSE22
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	NW10
16-Mar	NNW7	N15	N14	NNW8	NNW9	N9	NNE4	N5	N8	N6	N5	NNW6	N7	N6	N5	N8	N12	N14	N13	N9	N7	N8	N5	N4	N8.0	N15
17-Mar	NW4	NW4	NW4	NNE1	NNW1	NW1	N2	NW1	SE3	S3	SSE7	SSE4	SSW1	SSW3	SSW3	SSW4	S5	S3	SW1	SSE2	NNW3	NNW5	NW2	NW2	SW0.8	SSE7
18-Mar	S1	N1	N1	NW2	NNW4	NW3	S2	S8	S7	S5	SSW3	SSW5	SW4	NNW5	NNW14	N15	NNE17	N20	N22	N23	N18	N18	N17	N13	N6.6	N23
19-Mar	N12	N8	N6	NNW7	NNW6	NNW7	NNW5	N4	N5	NNW7	NNW8	N11	N11	NNE9	N11	N14	N14	N14	NNE14	NNE12	NE14	NE13	NNE8	N5	N8.7	N14
20-Mar	N6	NNW6	NNW5	NNW5	NNW5	NW5	NW4	N4	N4	NW3	WSW6	WSW7	WSW11	WSW14	WSW12	N10	N12	N11	N10	N8	N7	N10	N8	N8	NNW5.4	WSW14
21-Mar	N7	N8	N7	N6	NNW5	NNW4	NNW4	NNW3	N5	NNE5	N4	SSE11	SSE11	SE11	SE15	ESE12	SE14	SE14	SE13	ESE12	ESE12	ESE11	ESE8	SE10	ESE4.7	SE15
22-Mar	S4	SSW4	SSE6	SSE5	SSE2	NE1	SE4	SSE13	SSE10	SSE10	SSE9	S5	WSW4	SSE5	SSE4	NE4	N6	NNW6	NW5	N3	NNW2	NNW3	NNW3	N3	SSE2.0	SSE13
23-Mar	W1	NW1	NW2	SSE7	SSE6	SSE4	SE6	SSE10	SSE2	WSW2	WSW4	SW4	SW2	N5	NNE4	N3	N7	NNE8	ENE5	N5	N8	N8	N7	N7	NNE1.2	SSE10
24-Mar	NNW4	N4	N5	N6	NNW5	NNW3	NW4	N6	N8	N11	N11	N9	NNW9	NNW6	NNW5	WNN4	S5	SSE9	SSE6	E6	NE3	NNE4	NNW4	N3	N3.7	N11
25-Mar	NNW3	NNW4	NNW4	NNW5	NW4	NNW6	NW3	NNW3	N2	NW1	SW2	SSW4	SSE11	SSE9	SSE11	SSE11	SSE10	S7	S6	S2	SSE8	SSE12	SSE9	SSE8	SSE3.0	SSE12
26-Mar	NE2	NE4	SSE2	NW1	NNW3	N4	S4	NW1	SSE8	SSE14	SSE15	SSE13	SSE12	SSE15	SE11	SSE14	SE15	SSE16	S8	WSW10	WSW9	SSE3	SE7	SSE9	SSE6.5	SSE16
27-Mar	SE5	SE4	SE4	SSE6	SSE7	SSE11	SSE11	SSE10	SSE11	SSE15	SSE10	SSE4	SSE14	SSE11	SSE13	SSE17	SSE19	SSE18	SSE12	SSE10	S9	NNW4	SW0	ESE3	SSE9.0	SSE19
28-Mar	SSE5	NNW0	NNW1	WNN1	NNW2	SSW0	SSE4	SSE6	SSE4	S4	SSW3	NNW14	NW19	NW18	NW22	NW27	NW25	NW17	NW20	NW19	NW16	W17	W11	NNE3	NW8.3	NW27
29-Mar	ENE2	NE1	SW3	SSE6	SE12	SE12	SE9	SSE12	SSE12	SSE10	SSE12	SSE14	SSE11	SSE9	SE10	SSE11	SE8	ENE2	NNW4	NW3	W3	WNN2	NNW6	WNN5	SSE5.4	SSE14
30-Mar	NNW3	N3	NNW7	NW4	NW4	NNW3	ESE1	WSW1	WNN1	SSW2	SW3	SSE2	SSE4	SSE12	SSE8	S4	SSE12	SSE8	E3	E4	NNW2	NW3	SSE7	SSE13	SSE2.0	SSE13
31-Mar	SSE12	SSE10	SE8	SSE7	SSE9	SE8	SSE8	SSE6	SE3	NW0	N4	N6	N7	N10	ENE13	ENE19	ENE17	NE14	NNE14	NE14	NNE14	NNE15	N17	N17	NE5.7	ENE19

N2.3	N2.9	N1.9	NNE0.9	NNW0.8	NNE0.3	SE1.0	SE1.1	ESE0.9	S0.7	SSE0.2	SE0.4	SW1.4	SSW1.2	SSE0.9	E0.8	ENE1.6	NE1.6	N1.5	N1.9	N1.6	N2.3	N2.5	N2.5	Diurnal Average	
NNW25	N31	N28	N23	N27	NNW27	NNW27	NNW24	N21	W20	NNW20	NNW23	NNW24	NNW25	NNW25	NW27	NW25	NNW23	S22	S25	SSE27	SSE20	NW17	N17	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

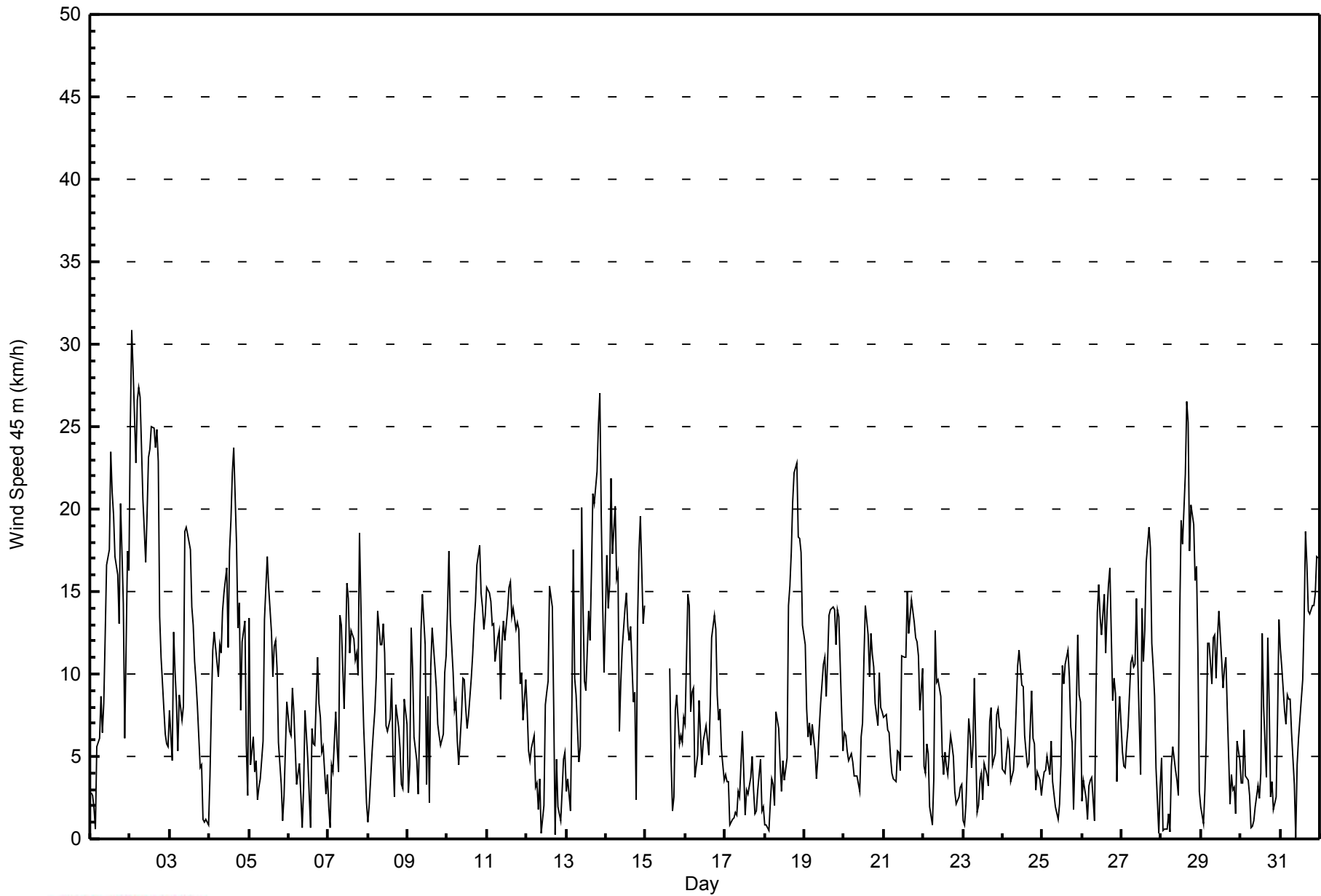
Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 2 02:00 Minimum Value: 0 km/h on Mar 25 02:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8																	Hours in Service: 744 Hours of Data: 730 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	2	1	1	1	2	1	2	1	2	7	3	4	5	4	4	4	3	3	4	5	5	4	6	5	7
2-Mar	9	9	8	6	8	9	9	8	6	6	9	6	7	7	7	8	7	7	4	4	2	3	1	2	9
3-Mar	2	1	5	3	2	1	2	3	2	6	6	6	5	4	4	3	3	3	1	2	1	1	1	1	6
4-Mar	3	2	2	2	2	2	2	3	2	3	2	3	5	6	4	4	4	6	5	2	2	2	3	2	6
5-Mar	8	3	4	2	2	2	2	2	4	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	8
6-Mar	5	2	2	4	3	2	2	1	1	1	4	2	3	2	3	3	4	4	3	2	3	2	1	2	5
7-Mar	1	1	2	2	2	2	3	3	4	4	5	5	5	6	4	3	3	3	3	5	4	2	2	1	6
8-Mar	1	1	2	2	2	3	2	2	3	2	4	3	4	4	2	3	2	2	3	4	2	2	2	2	4
9-Mar	2	3	4	2	3	2	2	3	5	5	4	3	4	3	4	5	3	4	2	2	1	1	3	3	5
10-Mar	4	6	5	3	3	3	2	2	4	3	3	3	2	2	3	3	3	3	3	4	4	4	4	3	6
11-Mar	3	3	4	3	3	3	3	3	3	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	4
12-Mar	3	2	2	3	2	2	1	1	3	1	1	5	5	3	4	6	3	2	3	1	2	2	2	3	6
13-Mar	2	2	1	6	3	4	4	3	3	4	4	3	3	3	4	5	4	4	4	5	5	5	4	3	6
14-Mar	3	2	3	2	2	2	3	2	3	3	5	3	2	2	3	2	3	2	3	4	4	2	2	5	5
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	3	2	2	1	2	2	2	3	3	3
16-Mar	5	4	4	2	2	3	2	2	2	2	2	2	2	2	2	4	3	3	3	2	2	2	1	5	
17-Mar	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	1	1	1	1	3	2	1	1	3
18-Mar	1	1	1	1	2	1	1	3	2	2	2	2	2	3	4	4	4	7	6	6	6	5	4	4	7
19-Mar	3	2	2	2	2	1	2	2	1	2	3	3	3	4	3	4	4	4	3	3	4	3	3	2	4
20-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	2	4	3	3	3	3	2	1	3	3	1	4
21-Mar	1	2	2	2	2	1	2	1	1	2	2	5	3	4	4	4	5	4	3	3	4	3	3	4	5
22-Mar	3	2	2	2	1	2	2	3	3	2	2	2	2	3	2	2	2	3	3	1	1	1	1	1	3
23-Mar	1	1	1	2	2	2	2	2	2	1	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2
24-Mar	1	1	1	2	3	2	2	3	2	3	3	3	3	3	3	3	2	3	1	1	1	1	1	1	3
25-Mar	1	0	1	1	2	1	1	1	1	1	1	3	3	2	2	2	2	3	3	2	3	2	3	3	3
26-Mar	3	2	2	2	2	2	3	2	5	4	3	3	3	7	5	5	4	3	6	3	3	2	3	2	7
27-Mar	2	1	2	1	1	3	3	3	2	2	3	3	4	2	2	4	3	4	3	4	4	2	2	2	4
28-Mar	4	2	1	1	1	0	1	1	1	2	2	6	6	6	7	7	7	5	5	4	3	4	6	3	7
29-Mar	2	2	2	3	2	2	2	4	4	3	4	4	2	3	3	2	2	1	2	1	2	1	2	2	4
30-Mar	1	2	2	1	1	1	1	1	1	1	2	2	3	3	5	2	4	3	2	2	2	2	5	3	5
31-Mar	2	3	3	2	3	3	2	3	3	2	2	3	4	4	5	6	5	4	4	5	4	4	4	4	6
	9	9	8	6	8	9	9	8	6	7	9	6	7	7	7	8	7	7	6	6	6	5	6	5	
	Diurnal Maximum																								
AF - Analyzer Failure																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

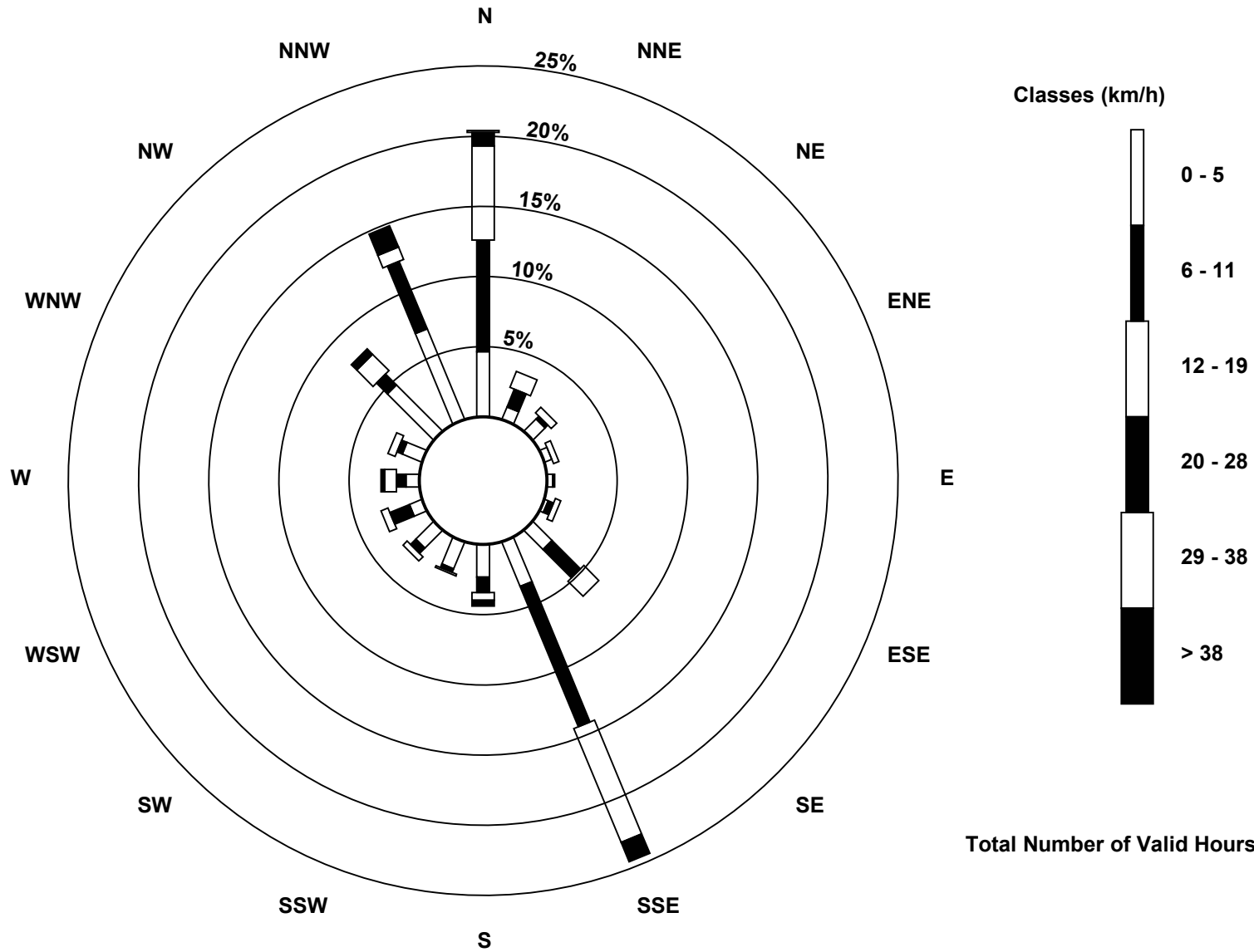
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	253	34.66	34.66
6 - 11	253	34.66	69.32
12 - 19	184	25.21	94.52
20 - 28	39	5.34	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 730

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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





Maximum Speed: 44 km/h on Mar 2 02:00	Maximum Daily Speed Average: 29.1 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 17 04:00	Minimum Daily Speed Average: 2.0 km/h on Mar 23	Hours of Data: 730
Maximum Diurnal Speed Average: 3.8 km/h at hour 2	Minimum Diurnal Speed Average: 0.2 km/h at hour 10	Hours of Missing Data: 14
Monthly Average Velocity: 1.1 km/h 348.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 11 Q ₃ = 18 P ₉₀ = 24 P ₉₉ = 36	Percent Operational Time: 98.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Mar	NE9	NNE5	ENE1	SE5	SSE12	SSE14	SSE17	SSE15	SE19	SSE21	SSE19	SE20	SE29	SSE25	SSE23	S22	S24	S22	S23	S21	SSE14	SW12	WNW26	NNW26	SSE12.0	SE29		
2-Mar	NNW37	N44	N42	N33	N39	NNW41	NNW40	NNW35	NNW29	N23	NNW27	NNW32	NNW33	NNW36	NNW36	NNW34	NW36	NNW34	NNW23	NW21	NW13	N10	N9	NW10	NNW29.1	N44		
3-Mar	WNW20	WNW18	WNW27	NNW16	N13	NNW10	N16	N15	N16	N26	N26	N25	N22	NNW18	N16	NNE13	NNE12	NE11	NE8	ENE11	ENE5	SSE3	SE7	SSE8	N11.5	WNW27		
4-Mar	SSE10	SSE10	SSE14	SSE14	SSE19	SSE18	SSE17	SSE13	SSE19	SE18	SE19	SE16	SSE20	SSE22	SSE25	SSE27	S16	SW17	SW22	SSW11	S12	SSE15	SSE7	WSW14	SSE14.9	SSE27		
5-Mar	WSW25	W14	WNW16	WNW13	WNW11	WSW12	WSW14	WSW19	WSW10	SSE5	SSE4	S4	SSE6	SSE8	SE5	SE10	SE14	SE13	SSE12	S9	S6	WSW8	SW8	SW8	SW6.5	WSW25		
6-Mar	WSW11	W11	WSW15	WSW21	W8	W8	WNW6	WSW3	N3	NNE8	N12	N7	NW4	NW1	WSW3	W4	NNE8	NE15	NNE12	NNE11	NNE8	N7	N4	NNW9	NW4.3	WSW21		
7-Mar	NNW6	N2	SE4	SSE7	S6	WSW7	W21	W25	W20	W10	NW16	WNW23	WNW21	WNW16	NW17	WNW18	WNW20	NW22	NW21	WNW31	NW20	N8	NW5	NNW6	WNW12.5	WNW31		
8-Mar	WSW2	SSW6	SW7	SSW8	SW10	SW9	SW9	SSW7	SSE11	SSE11	S6	SW7	WSW12	S7	S7	SW12	SW13	SSW9	SW20	SW19	SW16	WSW8	WSW4	WSW11	SW8.7	SW20		
9-Mar	W13	W6	S3	S6	WSW11	WNW11	NW11	NW16	WNW22	WNW23	NW16	NNW5	W8	NW5	W12	NNW19	NW16	NNW15	N11	NNW13	NNW10	NNW15	NW19	N16	NW10.4	WNW23		
10-Mar	N19	NNE24	NNE19	N15	NNE12	NNE12	NNE9	NE9	NE10	N12	N10	NNW9	NNW7	NNW8	NNW11	N14	N16	N18	N22	N25	N21	NNE20	N18	N18	N14.6	N25		
11-Mar	N20	N20	N20	N17	N17	N16	N18	N18	N13	N16	N17	N17	N18	N20	N19	N18	N18	N17	N18	N17	N13	N14	NNW10	NNW14	N16.7	N20		
12-Mar	NNW11	N7	NNW6	NNW7	NNW9	NNW4	NNW4	SW1	W5	SE2	SW2	SE18	SSE17	S12	SSE18	SSE19	SE13	SE3	NNE4	ESE7	SSE11	SE11	SE10	NNE3	SE3.5	SSE19		
13-Mar	NW3	NW5	WSW6	WSW30	WSW33	WSW22	SW10	SW14	WSW14	WSW29	WSW22	WSW14	SW17	SW25	SSW18	S19	S27	S30	S39	S35	S30	SSE26	SE22	SE16	SSW16.3	S39		
14-Mar	SE21	SSE20	SSE23	SE29	SE24	SE29	SE28	SSE22	SSE13	SSE10	SSE16	SSE10	SE14	SE14	SE17	SSE14	SE14	SE15	SSW6	WSW23	WSW24	WSW27	WSW22	NNW17	SSE13.0	SE29		
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW12	NW6	ENE2	ESE4	SE11	SSE11	S9	S9	S5	SSW5	---	NW12
16-Mar	N10	N22	N20	NNW11	NNW13	N12	NNE6	N7	N9	N5	N6	N8	N7	N6	NNE9	N14	N16	N18	N17	N14	N15	NNW13	NNW10	N11.3	N22			
17-Mar	NNW8	NNW5	NNW4	WNW0	SE3	SE8	SSE5	S5	S4	SE6	SE8	SE5	SE3	SE7	SE7	SE7	SE7	ESE5	SE6	SE7	E3	NNW9	NW4	NNW8	SE2.2	NNW9		
18-Mar	W4	W4	SE6	SSE6	SSE4	ESE3	SE10	SSE11	SSE11	SE10	SE8	SE8	SSE4	NNW6	N19	N18	N23	N28	N32	N32	N27	N26	N25	N19	NNE8.2	N32		
19-Mar	N19	N15	N13	N14	N12	N11	N13	NNE9	NNW7	NNW8	NNW10	N13	N13	N11	N14	N18	N18	N19	NNE19	NNE18	NE23	NE26	NE16	NE8	NNE13.4	NE26		
20-Mar	NNE5	NNE8	NE6	E4	N3	NNW4	N3	NW5	NNW3	NW4	W3	WSW5	W10	WSW12	W12	N12	N14	N15	N15	N14	N12	N16	N12	N11	NNW6.2	N16		
21-Mar	N9	N10	N8	NNW11	NNW13	NNW11	NNW10	NNW9	NNW7	NW6	WNW4	SE15	SSE11	SE14	ESE19	ESE16	ESE18	SE20	SE19	ESE19	ESE21	ESE19	ESE14	SE16	E6.5	ESE21		
22-Mar	ESE12	SSE6	SE9	SE8	SSE5	SSE3	SE7	SSE15	SE12	SSE12	SSE10	SSE6	W2	SE7	SE5	NE2	NNW7	NW5	NW6	NE3	ESE4	SE2	SE1	SE3	SE4.3	SSE15		
23-Mar	S4	SSE5	SE9	SSE12	SSE10	SSE9	SSE10	SSE8	SSW3	SW3	SSW2	SSW2	S1	N6	N6	N5	N9	NNE11	ENE8	NNE9	N11	N13	N13	N12	NE2.0	N13		
24-Mar	N10	NNW9	NNW10	NNW12	NNW13	N10	NNW8	N9	NNE10	N13	N14	N12	NNW11	NNW8	NNW7	WNW5	SSE4	SSE8	SE9	ESE15	ESE11	ESE5	NE3	SSE2	N5.5	ESE15		
25-Mar	SSE2	NNW1	NNE1	ENE2	ENE4	NNE4	NNW6	NW4	W3	SE1	SE7	SE13	SE10	SE11	SE12	SE12	SE10	SSE8	S4	SSE10	SSE16	SSE16	SE19	SE5.5	SE19			
26-Mar	SE16	SE13	SE10	SE11	SE8	SE9	SE14	SE8	SE16	SE17	SSE16	SE16	SE17	SE19	SE18	SE21	SE26	SE24	SSW15	SW18	SW15	SW8	SE9	SSE11	SSE12.7	SE26		
27-Mar	SSE7	SSE6	SSE8	SSE9	S6	SSE11	S11	SSE11	SSE10	SSE14	SE11	SSE7	SE16	SSE13	SE15	SSE21	SSE23	SSE24	SE20	SSE15	SSE11	SSW0	N1	S5	SSE11.4	SSE24		
28-Mar	SSW7	SE4	SE4	ESE3	W2	W3	WSW6	WSW9	WSW10	W9	WNW7	NNW18	NW26	NW24	WNW29	WNW37	NW36	NW29	NW32	NW33	WNW32	WNW27	W24	W9	WNW15.3	WNW37		
29-Mar	W7	WSW11	WSW12	SW9	SSW8	S6	SSE14	SSE14	SE12	SE11	SE14	SE16	SE12	SE11	SE13	SE14	SE11	ESE5	NE4	NE2	WSW2	WSW7	W14	WNW10	SSE5.7	SE16		
30-Mar	WNW6	W10	NW12	NNE7	NNE5	NNE4	SSW2	ESE4	ENE3	SW1	SW3	SSE2	SE3	SE12	SE6	SW5	SSE11	SE9	SE7	SE9	SE7	SSE7	SSE9	SSE10	SSE2.7	SE12		
31-Mar	SSE8	S6	SSE9	SSE9	SSE14	SE16	SE16	SE11	SSE6	SSE4	N3	N9	N10	ENE15	ENE23	ENE26	ENE25	NE20	NE20	NE22	NE23	NNE23	N23	N24	ENE9.3	ENE26		

NNW3.4	NNW3.8	NNW2.5	NW1.0	NW1.5	NNW0.8	SSW0.7	SW1.1	SW0.5	SSW0.2	NNW0.7	NE0.7	WSW0.7	SE1.0	E1.0	ENE1.0	ENE2.0	NE2.3	N1.7	N2.0	N1.5	N2.3	NNW2.9	NNW3.6	Diurnal Average	
NNW37	N44	N42	N33	N39	NNW41	NNW40	NNW35	NNW29	WSW29	NNW27	NNW32	NNW33	NNW36	NNW36	NNW37	NW36	NNW34	S39	S35	WNW32	WSW27	WNW26	NNW26	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

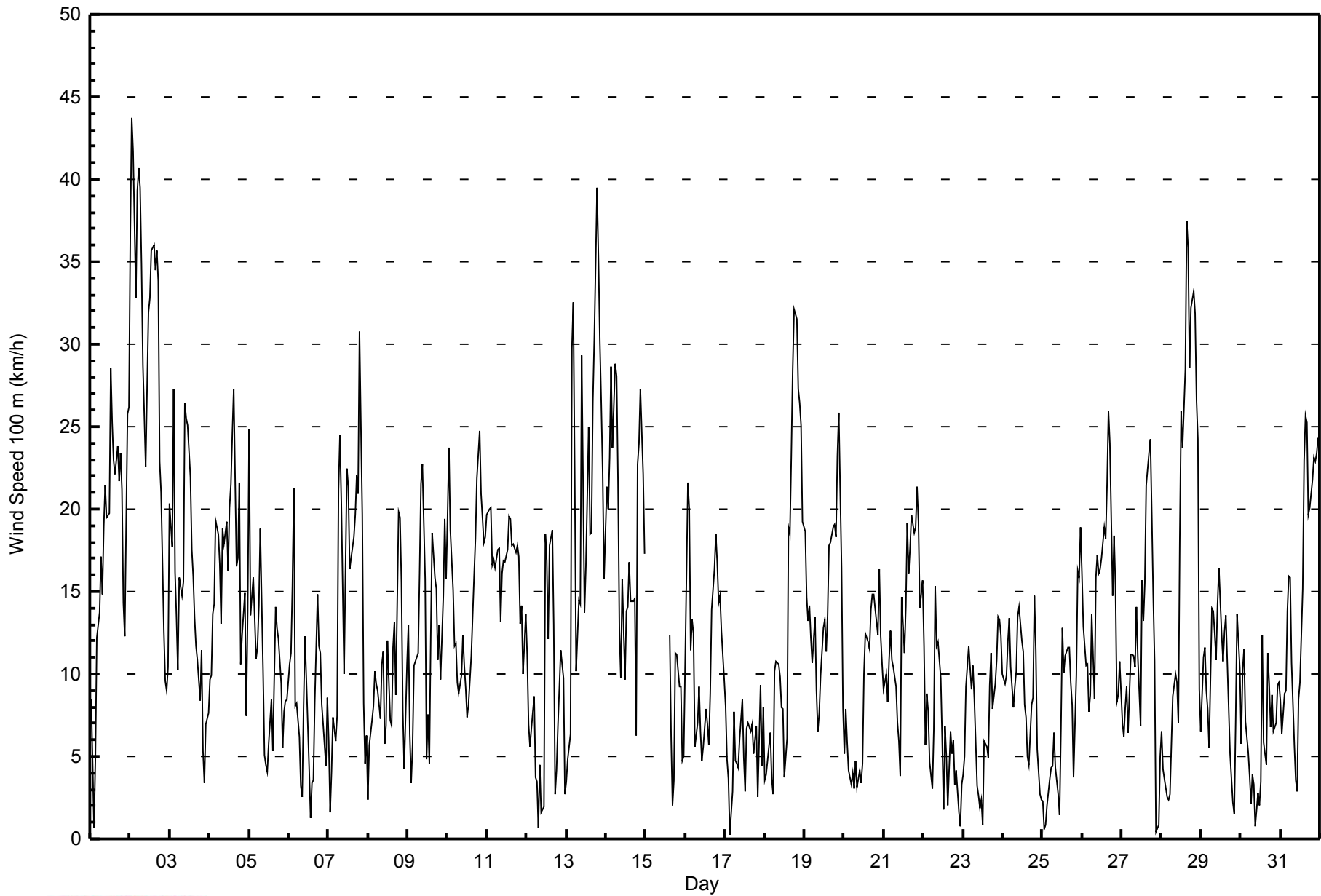
Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Mar 2 11:00 Minimum Value: 0 km/h on Mar 30 06:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8																	Hours in Service: 744 Hours of Data: 730 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	2	2	1	3	2	1	2	4	3	3	2	3	3	3	4	5	4	3	3	4	5	4	6	6	6	
2-Mar	9	8	6	5	8	9	10	9	6	6	12	6	7	7	7	8	6	8	4	4	3	4	1	4	12	
3-Mar	3	4	4	5	2	2	3	3	3	5	4	4	4	3	3	3	2	2	3	2	2	1	2	2	5	
4-Mar	2	3	4	3	2	3	5	3	3	3	4	3	2	3	4	4	5	5	4	4	3	2	3	4	5	
5-Mar	6	6	4	4	4	4	5	6	5	1	1	1	2	3	2	2	1	1	1	3	2	3	2	3	6	
6-Mar	3	2	5	4	4	2	2	1	1	2	4	2	3	2	2	1	5	3	3	3	3	2	1	2	5	
7-Mar	1	1	2	2	2	4	4	4	4	8	7	6	5	7	5	3	4	2	3	7	7	2	4	3	8	
8-Mar	2	2	2	3	3	4	3	3	4	3	3	4	3	3	2	4	3	4	3	3	2	4	1	5	5	
9-Mar	6	3	2	2	3	2	2	3	6	5	3	3	4	4	6	5	3	4	4	3	2	2	4	2	6	
10-Mar	3	4	4	2	3	3	2	3	3	2	2	2	2	2	2	3	2	2	2	3	3	3	3	2	4	
11-Mar	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	3	
12-Mar	3	2	2	3	2	2	1	1	3	1	2	6	8	4	3	4	2	3	1	1	2	3	3	2	8	
13-Mar	2	1	7	2	3	5	5	4	3	3	5	4	5	3	5	5	5	5	5	5	5	5	5	3	7	
14-Mar	4	3	4	2	2	3	3	2	4	3	5	2	2	3	2	3	2	2	4	6	3	2	3	4	6	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	3	2	2	1	3	3	2	2	3	3	
16-Mar	9	4	4	2	2	3	2	1	1	1	2	2	2	2	2	4	2	2	1	2	1	1	1	1	9	
17-Mar	3	1	1	1	2	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	3	1	1	2	3	
18-Mar	2	2	2	2	2	2	2	2	1	1	1	1	2	3	3	3	3	6	4	5	5	4	4	3	6	
19-Mar	2	3	3	1	2	1	3	3	1	2	3	3	2	2	2	3	3	3	2	3	4	3	4	1	4	
20-Mar	1	2	2	1	1	1	1	1	1	1	2	2	3	2	3	3	2	2	2	2	2	2	2	1	3	
21-Mar	1	2	2	2	2	1	1	1	1	1	2	4	2	4	3	3	5	4	3	3	4	3	3	3	5	
22-Mar	3	3	3	3	2	2	4	3	3	2	2	2	2	3	2	2	2	3	4	1	2	1	1	1	4	
23-Mar	1	2	2	1	1	2	3	3	2	1	1	1	1	2	1	2	2	2	2	1	2	2	2	1	3	
24-Mar	1	1	1	2	3	2	2	3	2	2	2	2	3	2	3	3	2	2	1	2	2	2	1	1	3	
25-Mar	1	0	1	1	1	2	1	1	1	1	1	4	3	2	2	2	2	3	3	3	3	3	3	3	4	
26-Mar	4	3	3	3	4	2	4	4	5	3	3	3	3	5	4	5	3	3	3	3	1	5	4	2	5	
27-Mar	2	2	2	1	2	3	3	3	2	2	2	3	4	2	3	4	3	3	2	4	4	3	2	3	4	
28-Mar	3	1	1	2	1	1	2	1	2	2	3	6	6	6	7	7	6	5	5	3	2	2	4	7	7	
29-Mar	4	5	4	3	2	2	3	3	2	2	3	3	3	2	3	2	2	2	2	1	1	3	5	3	5	
30-Mar	1	4	2	1	1	0	2	2	1	1	1	2	3	2	4	3	4	3	3	2	2	3	3	2	4	
31-Mar	3	1	2	2	3	1	2	2	2	2	3	4	4	4	6	6	6	4	4	6	5	4	3	3	6	
																	Diurnal Maximum 9 8 7 5 8 9 10 9 6 8 12 6 8 7 7 8 6 8 5 7 7 5 6 7									
AF - Analyzer Failure																										



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

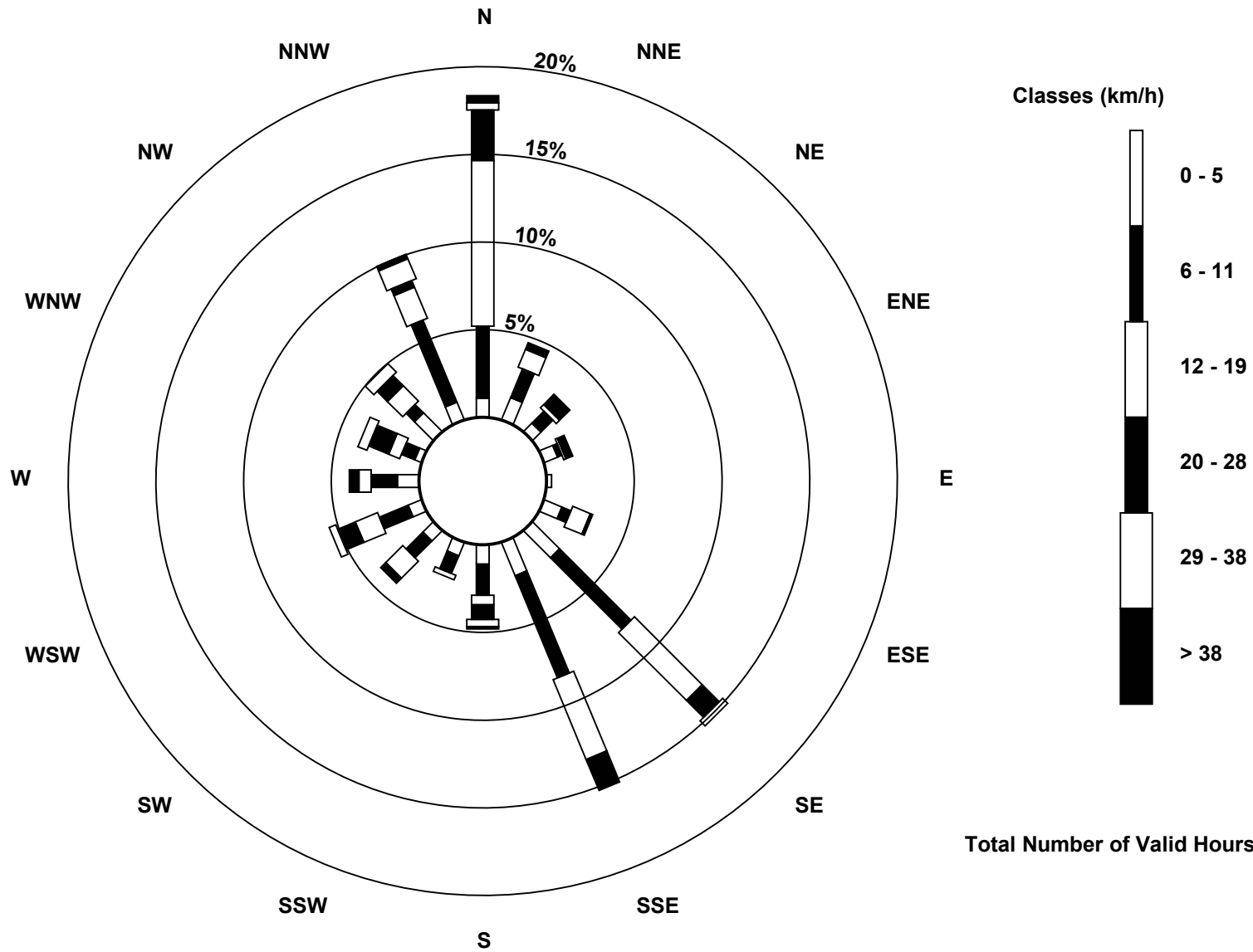
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	127	17.40	17.40
6 - 11	247	33.84	51.23
12 - 19	223	30.55	81.78
20 - 28	97	13.29	95.07
29 - 38	30	4.11	99.18
> 38	6	0.82	100.00

Total Number of Valid Hours: 730

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Total Number of Valid Hours: 730



Maximum Speed: 48 km/h on Mar 2 06:00	Maximum Daily Speed Average: 33.7 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 23 11:00	Minimum Daily Speed Average: 1.4 km/h on Mar 30	Hours of Data: 729
Maximum Diurnal Speed Average: 4.0 km/h at hour 2	Minimum Diurnal Speed Average: 0.3 km/h at hour 14	Hours of Missing Data: 15
Monthly Average Velocity: 1.6 km/h 306.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 9 Median = 14 Q ₃ = 21 P ₉₀ = 27 P ₉₉ = 44	Percent Operational Time: 98.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Mar	NE9	NNE8	ENE3	SE3	SSE8	S14	S20	S20	SSE20	SSE19	S18	SSE16	SSE25	SSE22	S22	S24	S24	S22	S30	S28	SSW18	WSW19	WNW30	NNW33	S12.3	NNW33		
2-Mar	NNW43	N48	N45	N37	N44	NNW48	NNW46	NNW41	N32	N25	NNW31	NNW35	NNW36	NNW39	NNW41	NNW39	NNW40	NNW38	NNW29	NW28	NW23	NNW12	NNW9	NW18	NNW33.7	NNW48		
3-Mar	NW28	NW31	NW35	NNW21	N19	N14	N22	NNE22	N22	N29	N26	N26	N23	N18	N16	NNE14	NNE12	NE12	NE11	ENE15	ENE13	ESE8	SSE10	S9	N14.1	WNW35		
4-Mar	S13	S16	S19	S16	SSE17	SSE21	SSE23	S24	SSE22	SSE20	SSE15	SSE17	SSE22	SSE21	SSE24	S24	S19	SW20	SW24	SSW19	SSW14	SSW13	SW8	WSW23	S17.0	S24		
5-Mar	W31	W27	WNW23	WNW27	WNW21	W20	WSW23	W22	W10	WSW2	WSW4	WSW10	SW8	SSW7	SSW3	S7	SSE10	SSE11	S14	SSW12	SW12	W18	W16	WSW21	W12.0	WNW31		
6-Mar	WSW18	WNW8	W12	W24	WNW11	NW7	NW12	NW11	NNW11	NNE14	NNW8	NNW6	NNW1	NNW2	N5	NNE9	NE17	NNE15	NE16	NE12	NE7	NE4	NNW7	NNW6.2	W24			
7-Mar	NNW8	WNW4	SSW4	WSW11	WSW13	W23	W31	W30	W23	WNW14	NW21	WNW27	WNW26	NNW20	NNW20	WNW21	NW27	NW27	NW27	WNW36	NW25	N9	NW4	W6	WNW17.7	WNW36		
8-Mar	W11	WSW14	WSW22	WSW22	WSW22	WSW22	SW19	WSW18	SW9	SSW8	WSW13	WSW16	WSW19	SSW9	SW14	SW20	WSW20	SW18	WSW25	WSW25	WSW24	WSW20	WSW18	W23	WSW17.6	WSW25		
9-Mar	W23	WNW17	WSW4	WSW12	W19	WNW17	NW16	NW20	WNW26	WNW27	NW18	NW7	WNW7	NNW7	WNW15	NNW21	NW19	NNW19	N15	NNW18	NNW16	NNW20	NNW25	N18	NW15.1	WNW27		
10-Mar	N21	NNE25	NNE19	N16	NNE15	NNE14	NNE14	NE15	NE11	N12	N10	N9	NNW7	N8	N11	N14	N15	N18	N22	N27	NNE22	NNE21	NNE19	NNE19	NNE15.7	N27		
11-Mar	NNE20	NNE20	NNE21	NNE18	N17	N17	N18	NNE19	N16	NNE16	N17	N17	N18	N20	N19	N18	N17	N18	N18	N19	NNE13	N15	N11	N14	N17.2	NNE21		
12-Mar	N11	N7	N5	NNW6	N9	NNE4	NNE3	SE4	WSW5	SSE7	S8	SSE21	SSE24	S17	SSE19	SSE19	S11	SSW5	ESE3	SE10	SSE12	SSE14	SSE14	SSW7	SSE6.0	SSE24		
13-Mar	SW6	WSW13	WSW34	W44	W45	WSW37	WSW24	WSW26	WSW25	WSW39	WSW28	SW17	SW22	SW26	SSW21	S23	S28	S33	S43	S43	S37	S30	SSE28	S23	SW23.9	W45		
14-Mar	SSE26	S27	SSE25	SSE25	SSE22	SSE24	SSE25	SSE20	SSE19	S14	S14	S8	S9	S8	SSE15	S11	SSE14	S14	SW15	WSW29	WSW28	WSW30	WSW29	NNW18	S14.2	WSW30		
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW7	ENE2	ESE3	SE9	S12	S14	S15	SSW11	SW8	---	S15
16-Mar	N14	N24	NNE22	N12	N15	N13	NE7	NNE7	N9	NNE6	N5	N5	N7	N7	NNE6	NNE9	NNE13	N15	N19	N22	N19	NNE19	NNE14	NE8	N12.2	N24		
17-Mar	NE5	NNW4	NW6	WSW2	S5	SSE7	S12	S8	S9	SSE6	SSE11	SSE9	S6	SE8	SSE6	SE5	ESE7	ESE6	SE7	SE11	SE9	NNW5	NNW8	N11	SSE3.7	S12		
18-Mar	NNW3	W4	SW1	S3	SSW6	SSW5	SSE10	SSE13	SSE10	SSE8	SE9	ESE9	ESE6	NNW8	N19	NNE18	NNE23	N28	N33	N34	N29	N29	N26	N23	NNE8.8	N34		
19-Mar	N23	N19	N19	N19	N13	N13	NNE18	NNE18	NNE11	NNW10	NNW11	N13	N13	NNE12	N14	NNE18	NNE18	NNE19	NNE21	NNE25	NE30	NE27	ENE25	ENE14	NNE16.0	NE30		
20-Mar	E8	ENE8	ENE7	ESE7	SE9	SSE5	SE5	SW3	W3	NNW3	WNW2	WNW4	WNW9	W11	W11	N12	N14	N14	NNE16	NNE18	NNE16	NE19	ENE13	E7	NNE4.8	NE19		
21-Mar	ESE7	E9	ESE10	ESE6	ESE5	ESE9	ESE8	SE8	ESE8	ESE8	ESE7	SE16	SE11	SE14	ESE20	ESE17	ESE18	SE20	SE19	SE21	ESE26	ESE24	ESE18	SE20	ESE13.5	ESE26		
22-Mar	SE16	SE8	SSE11	SE9	SSE6	SSE5	SSE9	SSE16	SE12	SE12	SE9	SSE6	SE1	SE8	ESE5	ESE2	NNW4	WNW4	WNW6	ENE4	SE6	SE4	SE5	SSE6	SE5.9	SE16		
23-Mar	S7	S7	SSE9	SSE11	SSE10	SSE10	S12	SSW10	SSW6	WSW3	SW0	WSW1	NNW1	NNE6	N6	N6	N9	NNE12	NE9	NE12	NNE14	N16	NNE17	NNE17	NE2.3	NNE17		
24-Mar	NNE13	N12	NNE12	N13	N17	N15	N12	N13	NNE12	NNE13	N14	N12	NNW12	NNW8	NNW8	NW6	SE4	SSE8	SE9	E14	ESE15	ESE12	ESE7	SE11	NNE7.0	N17		
25-Mar	SSE10	S6	S4	SE5	ESE13	SE16	SE17	ESE7	ESE8	SE9	SSE9	SE11	SE12	SE9	SE10	SE11	SE11	SSE10	S9	S7	SSE11	SSE16	SSE19	SSE24	SE10.5	SSE24		
26-Mar	SE26	SE22	SE15	SE17	SE16	SE16	SE22	SE16	SE22	SSE15	SSE13	SSE15	SE18	SE21	SE20	SE26	SE31	SSE26	SW19	SW20	WSW17	SW11	SSE7	SSE9	SSE15.7	SE31		
27-Mar	S9	S8	S9	SSE8	SSW8	S10	S11	S9	S6	SSE8	SSE9	S8	SSE14	SSE14	SSE15	SSE21	SSE22	SSE25	SSE22	SSE14	S14	S6	SSW1	SSW8	SSE11.2	SSE25		
28-Mar	SSW11	SW5	WNW4	NW7	NW8	WNW8	WNW8	WNW12	WNW10	WNW12	WNW12	NNW20	NW28	NW27	WNW33	WNW45	NW42	NW36	NW42	NW43	NW37	WNW33	WNW31	W24	WNW21.4	WNW45		
29-Mar	W21	W24	W18	WSW15	SW14	SW9	S9	S10	SSE8	SSE9	SE13	SSE15	SSE11	SE10	SE12	SE14	SE11	ESE8	E8	SSE2	SW4	WSW17	WNW16	NW12	SSW6.1	W24		
30-Mar	NW10	WNW15	NW12	NNE9	N7	N10	NNW5	W3	NNE3	W1	SW3	SW1	SSE3	SE11	SSE4	WSW6	SSE9	SSE9	SSE8	SE9	SSE10	SSW8	SW9	SW11	SW1.4	WNW15		
31-Mar	SSW12	S12	S13	S10	SSE15	SSE14	SSE13	SSE11	SSE10	SSE8	E5	NE9	ENE12	E27	E33	ENE31	ENE33	ENE25	NE26	NE30	NE33	NE30	NNE26	NNE29	ENE12.0	NE33		

NNW3.7	NW4.0	NW3.6	NNW3.7	WNW2.9	W2.8	SW2.1	WSW2.0	WSW1.2	WSW0.7	NNW1.3	NW0.8	WSW1.3	SE0.3	NE0.5	NNW0.8	NE1.3	NNE1.7	N1.4	NNW2.4	NNW1.5	NNW2.5	NW3.1	NW3.3	Diurnal Average	
NNW43	N48	N45	W44	W45	NNW48	NNW46	NNW41	N32	WSW39	NNW31	NNW35	NNW36	NNW39	NNW41	WNW45	NW42	NNW38	S43	S43	NW37	WNW33	WNW31	NNW33	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

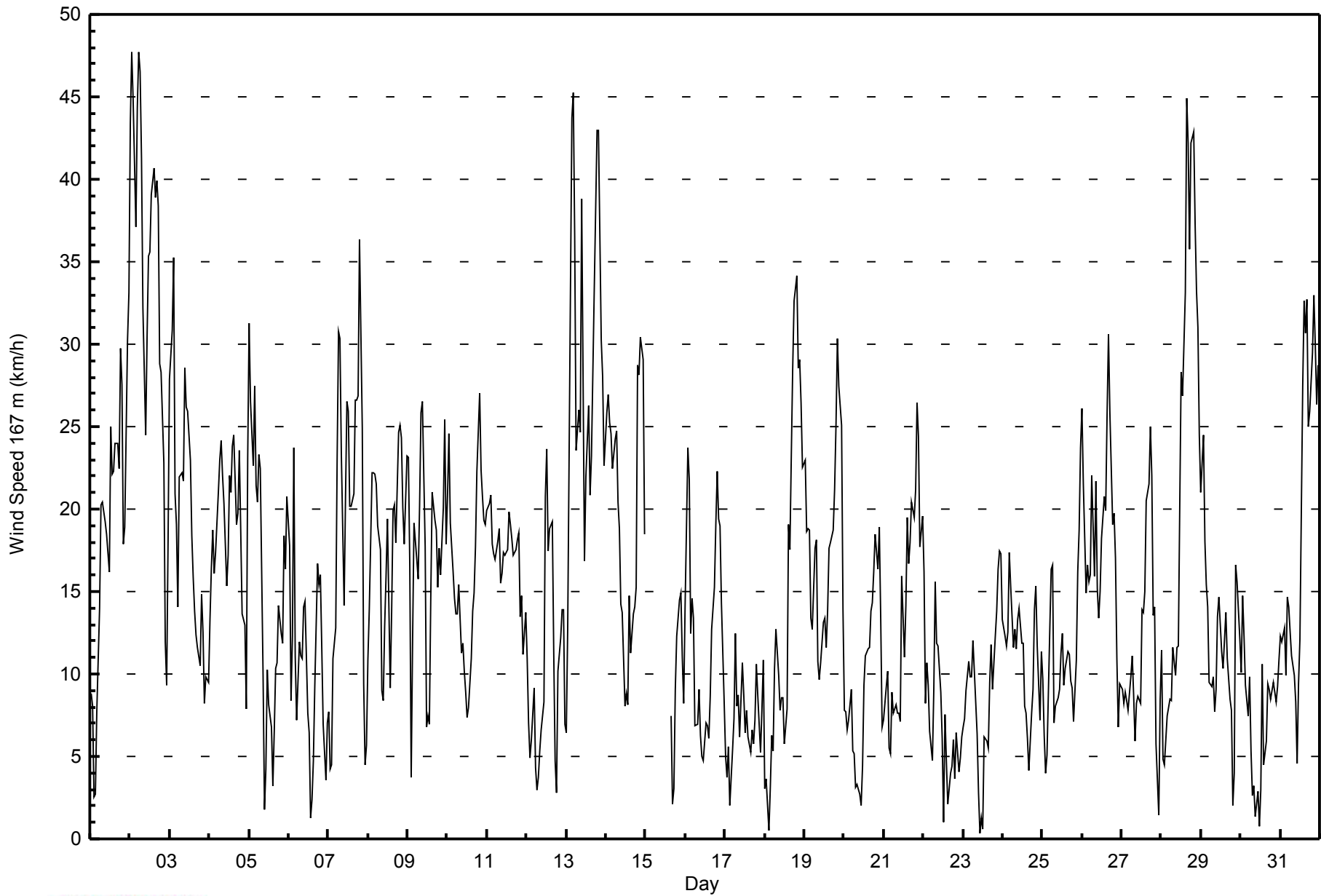
Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Mar 2 11:00														Hours in Service: 744 Hours of Data: 729 Hours of Missing Data: 15 Hours of Calibration: 0 Percent Operational Time: 98.0											
Minimum Value: 1 km/h on Mar 18 03:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 8																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Mar	2	3	2	1	2	2	2	2	2	3	3	2	4	2	2	4	2	2	3	4	5	4	5	6	6
2-Mar	10	8	7	4	9	9	9	8	6	6	13	6	6	6	5	7	5	7	3	3	5	4	1	5	13
3-Mar	4	3	3	5	3	2	4	3	3	5	4	3	3	3	3	3	2	2	2	1	1	1	1	1	5
4-Mar	1	4	2	2	1	2	2	2	2	2	3	2	3	2	4	2	4	4	4	3	3	2	2	6	6
5-Mar	4	4	4	5	3	4	2	6	3	2	2	2	3	1	2	2	2	2	2	3	4	2	5	2	6
6-Mar	3	4	5	2	6	2	1	2	2	3	4	2	3	3	2	2	4	4	3	3	3	2	1	3	6
7-Mar	1	1	2	2	3	5	2	3	7	10	6	6	6	7	6	4	3	2	2	8	8	4	2	2	10
8-Mar	2	2	2	3	3	5	4	5	3	2	5	6	3	3	4	3	2	2	3	3	2	5	2	3	6
9-Mar	6	2	4	4	4	3	2	5	6	5	4	3	5	5	6	4	4	4	3	4	2	2	5	3	6
10-Mar	3	4	4	3	3	4	3	3	4	2	2	2	2	3	2	2	2	2	3	3	4	3	3	2	4
11-Mar	2	2	3	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	3
12-Mar	2	2	1	2	2	1	1	1	3	3	2	6	7	3	3	4	3	2	3	1	2	2	3	1	7
13-Mar	2	4	7	2	3	4	7	4	3	3	6	4	4	3	3	4	3	3	5	3	4	4	5	4	7
14-Mar	6	3	3	3	3	3	4	2	3	4	5	1	2	2	2	2	2	2	6	6	4	2	2	4	6
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	1	1	2	2	3	5	5	5
16-Mar	8	3	4	2	2	3	2	1	1	2	2	3	2	2	3	2	2	2	1	1	1	2	2	8	8
17-Mar	2	1	1	1	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	4	1	5	3	5	5
18-Mar	1	1	1	2	1	2	3	2	1	1	2	1	2	3	3	2	3	6	5	6	5	4	3	3	6
19-Mar	2	3	3	1	2	1	3	2	3	2	3	2	2	3	2	3	3	3	2	2	2	2	4	2	4
20-Mar	3	2	1	1	1	2	1	1	1	1	2	3	3	3	3	3	3	2	2	2	2	3	2	1	3
21-Mar	1	1	2	2	2	2	2	2	1	1	3	3	2	4	3	3	5	4	2	3	3	3	4	3	5
22-Mar	2	3	4	3	3	3	4	2	2	2	2	3	2	3	1	2	3	3	4	1	3	3	2	2	4
23-Mar	1	1	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	1	2	2	2	2	1	2
24-Mar	2	1	1	2	1	2	3	2	2	2	1	2	3	2	3	2	2	2	1	2	1	2	1	2	3
25-Mar	2	1	1	2	3	2	2	2	1	2	2	4	3	2	2	2	2	3	3	4	4	3	3	4	4
26-Mar	2	5	3	3	4	3	3	4	3	4	3	3	3	5	3	5	2	5	2	2	1	4	3	2	5
27-Mar	2	2	2	2	2	2	2	1	1	2	2	2	4	2	3	3	3	3	3	2	3	4	1	3	4
28-Mar	4	3	1	2	1	1	2	1	1	2	4	6	5	6	8	7	7	6	5	3	2	2	3	6	8
29-Mar	3	4	2	4	2	4	3	3	2	3	2	3	3	2	3	2	2	3	2	2	3	6	5	1	6
30-Mar	2	6	3	1	1	2	3	1	1	1	2	1	2	2	3	3	3	2	2	2	1	1	1	1	6
31-Mar	2	4	3	2	3	2	2	2	4	3	2	3	5	4	6	6	5	4	5	6	5	5	3	3	6
Diurnal Maximum																									
10 8 7 5 9 9 9 8 7 10 13 6 7 7 8 7 7 7 7 6 8 8 6 5 6																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

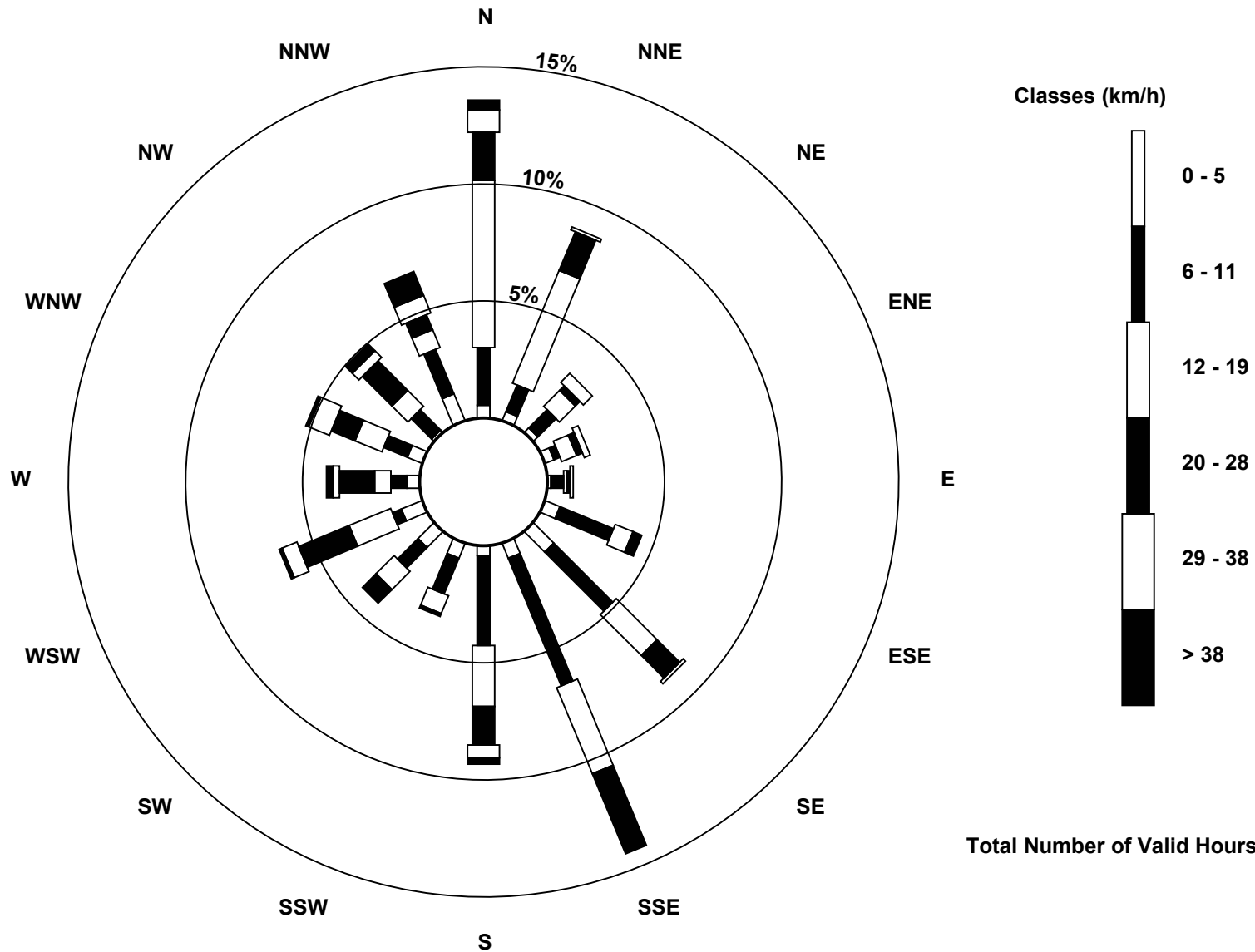
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	73	10.01	10.01
6 - 11	217	29.77	39.78
12 - 19	230	31.55	71.33
20 - 28	146	20.03	91.36
29 - 38	43	5.90	97.26
> 38	20	2.74	100.00

Total Number of Valid Hours: 729

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - March 2015

Direction of Maximum Speed: 169 deg on Mar 13 20:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 345.5 deg on Mar 2	Hours of Data: 734
Direction of Minimum Speed: 55 deg on Mar 29 02:00	Hours of Missing Data: 10
Direction of Minimum Daily Speed Average: 0.6 deg on Mar 23	Percent Operational Time: 98.7
Monthly Average Direction: 321.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	9	307	215	132	145	161	163	148	143	154	159	155	148	162	162	179	180	174	166	166	156	194	308	341	166.1
2-Mar	348	358	6	355	355	342	341	343	351	354	343	346	336	343	342	339	330	336	329	334	8	15	351	307	345.5
3-Mar	345	21	318	354	331	340	340	323	331	10	8	7	355	353	4	15	29	46	54	36	319	351	153	301	359.4
4-Mar	167	165	153	156	149	149	144	142	143	155	157	150	152	152	158	167	167	225	224	174	162	155	164	230	161.4
5-Mar	258	287	285	11	344	188	166	193	145	148	148	149	152	151	156	154	151	153	161	129	319	198	144	156	157.2
6-Mar	154	231	234	280	253	266	260	141	312	288	353	346	253	220	245	259	11	29	4	1	355	343	352	322	305.8
7-Mar	303	65	145	136	145	139	281	292	277	246	323	317	313	307	315	306	299	316	301	295	319	355	333	287	304.0
8-Mar	93	156	131	149	160	155	151	147	149	149	148	147	242	157	151	142	160	144	174	215	166	184	161	162	155.0
9-Mar	152	159	146	148	152	228	196	322	303	301	321	342	244	313	264	343	333	339	330	341	348	339	337	358	308.5
10-Mar	5	24	25	6	7	28	6	48	47	4	352	345	330	343	342	352	358	360	358	1	5	11	12	3	4.1
11-Mar	357	1	356	359	355	351	355	355	345	355	356	346	353	359	7	6	356	357	356	357	359	352	336	330	355.0
12-Mar	332	340	338	329	341	327	328	271	292	181	354	148	201	215	158	159	151	335	348	256	278	344	353	335	245.7
13-Mar	320	310	307	234	261	242	149	156	156	262	262	261	252	231	200	180	166	176	174	169	161	149	131	121	185.9
14-Mar	147	150	146	147	149	153	152	152	153	145	146	151	152	149	149	152	155	160	220	249	263	261	268	335	162.2
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	21	21	309	313	317	337	138	176	148	148	138	143	168	152	--
16-Mar	347	355	355	328	338	358	27	2	357	358	5	347	5	358	360	5	351	352	353	350	356	356	356	356	354.3
17-Mar	308	326	321	12	328	323	351	312	134	173	164	165	203	204	211	194	175	169	236	159	327	327	318	317	224.6
18-Mar	182	357	354	312	342	306	179	175	172	170	193	198	223	341	348	3	16	10	6	8	5	3	357	358	0.8
19-Mar	359	352	1	335	341	348	341	353	352	330	342	359	0	16	2	7	8	9	22	32	43	48	17	358	6.1
20-Mar	1	343	341	340	332	325	322	352	8	324	243	238	252	254	258	349	353	360	7	356	357	1	1	4	325.1
21-Mar	358	2	352	355	346	333	331	342	8	13	358	160	164	145	127	110	126	139	138	123	106	114	108	137	112.4
22-Mar	172	194	167	158	158	56	142	158	151	165	164	179	237	157	161	36	6	328	320	352	344	336	330	351	164.6
23-Mar	276	319	323	162	151	153	138	159	160	254	241	227	214	357	20	3	11	26	60	360	351	355	359	356	20.0
24-Mar	347	355	356	352	348	330	320	1	8	6	7	5	343	339	334	284	181	167	157	89	48	12	344	358	356.6
25-Mar	343	343	336	334	324	340	309	339	351	307	218	194	155	164	161	162	159	173	186	182	155	155	155	153	167.7
26-Mar	46	40	154	324	342	350	178	305	154	158	161	155	152	156	138	150	146	157	174	252	245	158	143	151	159.0
27-Mar	138	124	138	148	160	151	162	157	152	155	149	147	155	163	153	162	156	154	164	164	175	334	236	114	156.6
28-Mar	147	331	328	291	327	202	154	151	154	178	197	344	324	316	305	306	319	316	318	318	307	272	281	26	309.9
29-Mar	61	55	234	158	144	142	144	150	148	153	158	154	155	148	141	147	140	73	335	322	275	300	339	300	149.7
30-Mar	332	350	339	321	310	327	112	247	283	212	232	161	161	151	166	187	156	150	91	96	340	326	155	150	164.6
31-Mar	154	150	143	147	151	145	153	155	132	324	350	358	350	352	67	69	67	36	26	36	30	13	0	1	57.9

0.2	4.4	12.2	47.2	355.4	84.0	139.1	148.3	124.3	169.8	157.8	140.4	227.8	200.9	172.2	126.1	98.8	67.0	351.4	348.0	19.5	3.4	350.2	7.0
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

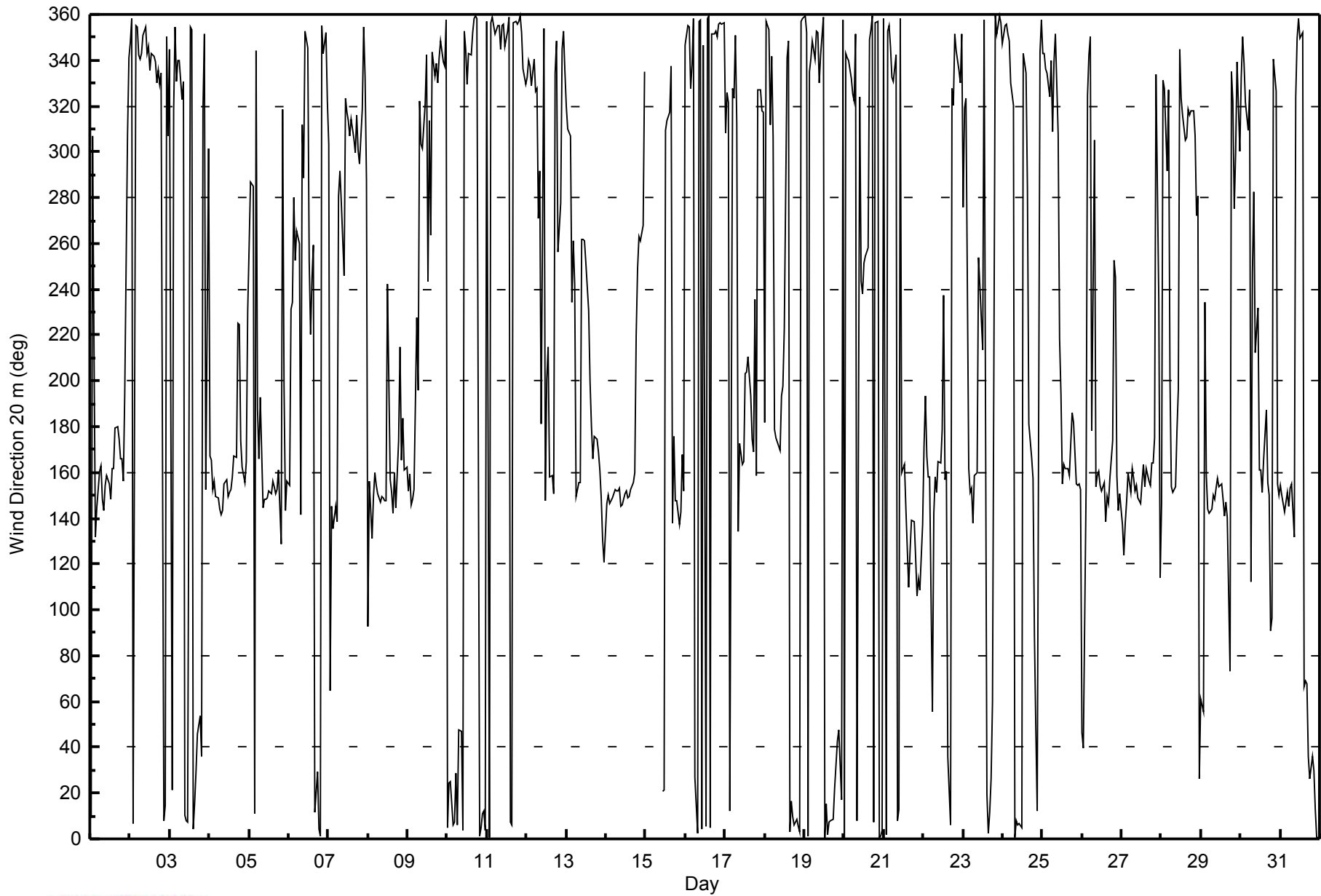
Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 118 deg on Mar 29 02:00																			Hours in Service: 744						
Minimum Value: 6 deg on Mar 1 19:00																			Hours of Data: 734						
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 16 Median = 22 Q ₃ = 39 P ₉₀ = 67 P ₉₉ = 96																			Hours of Missing Data: 10						
																			Hours of Calibration: 0						
																			Percent Operational Time: 98.7						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	83	58	55	77	18	16	9	20	17	42	10	13	13	11	8	12	10	11	6	8	13	58	24	17	83
2-Mar	18	17	19	16	20	18	18	18	19	20	20	19	17	18	17	18	17	15	14	20	19	22	15	30	30
3-Mar	25	20	25	23	14	24	18	52	16	22	22	22	21	23	24	29	25	25	25	37	65	82	84	96	96
4-Mar	29	16	9	8	10	11	10	14	15	10	9	20	19	12	10	6	7	21	13	15	10	12	73	83	83
5-Mar	57	78	55	52	63	44	55	52	8	8	7	9	9	11	7	10	10	8	16	86	92	49	21	12	92
6-Mar	53	19	25	38	35	58	64	25	40	36	25	65	84	90	22	26	63	24	24	19	41	21	65	39	90
7-Mar	50	72	34	41	22	30	88	18	19	31	36	21	19	33	24	27	24	13	20	19	29	20	48	73	88
8-Mar	72	87	16	11	14	16	11	8	15	12	13	23	39	33	12	31	67	6	38	80	27	40	11	16	87
9-Mar	41	35	13	12	27	65	42	54	19	18	33	74	28	97	27	19	22	16	22	23	31	19	18	23	97
10-Mar	21	22	25	22	24	27	28	44	31	25	19	29	38	27	21	19	16	17	15	16	18	19	21	18	44
11-Mar	14	16	16	19	18	21	20	18	20	19	18	20	19	19	21	22	16	17	18	18	20	18	21	16	22
12-Mar	18	23	26	29	21	40	37	62	54	89	85	50	41	26	11	19	38	93	56	50	92	53	75	34	93
13-Mar	30	71	55	55	11	25	23	53	16	12	13	19	23	15	26	18	7	11	9	7	7	11	18	21	71
14-Mar	14	10	11	7	6	7	12	9	59	20	24	11	10	8	16	7	19	12	109	45	14	9	15	37	109
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	29	43	46	24	30	75	67	27	9	18	72	22	37	57	75
16-Mar	43	18	15	21	20	22	35	27	17	24	40	29	25	33	35	31	16	15	14	17	22	15	25	17	43
17-Mar	35	54	27	88	45	63	59	34	51	38	16	29	36	27	21	22	20	35	16	71	84	22	39	79	88
18-Mar	87	103	69	45	18	56	53	28	17	24	31	28	49	39	20	18	21	22	20	19	21	19	17	16	103
19-Mar	17	20	27	20	26	16	39	57	22	28	24	23	26	35	24	23	23	22	19	20	18	18	25	17	57
20-Mar	10	25	15	26	17	14	14	30	28	58	17	14	20	16	39	25	17	20	20	17	13	13	16	12	58
21-Mar	15	20	30	18	19	19	26	25	19	19	43	35	10	24	21	22	22	20	15	21	22	21	21	21	43
22-Mar	33	20	24	22	98	84	40	12	18	14	16	24	35	36	29	58	51	36	47	28	31	33	35	19	98
23-Mar	61	56	92	14	18	76	37	14	95	76	25	14	21	46	37	41	25	27	24	29	15	15	17	19	95
24-Mar	26	30	14	15	60	70	48	23	22	22	21	27	32	46	50	56	25	14	28	24	40	24	27	41	70
25-Mar	21	20	25	23	21	20	31	34	50	72	32	40	16	12	11	9	15	21	40	69	14	10	14	18	72
26-Mar	97	89	103	94	39	25	103	66	72	13	10	15	17	18	24	18	16	11	35	14	17	47	20	13	103
27-Mar	22	22	73	14	10	13	13	13	13	11	17	87	16	20	11	12	11	12	15	19	47	54	70	88	88
28-Mar	52	89	56	55	92	83	26	15	18	33	73	26	21	21	18	17	16	16	14	13	14	15	40	79	92
29-Mar	75	118	66	23	8	11	14	18	16	21	16	14	12	19	15	14	12	66	60	48	65	93	22	67	118
30-Mar	35	44	24	19	35	37	71	90	59	52	38	44	40	13	59	56	10	12	88	72	93	79	27	8	93
31-Mar	8	7	39	13	9	22	11	27	89	78	46	48	51	21	27	24	26	22	22	27	26	22	15	16	89
97 118 103 94 98 84 103 90 95 89 85 87 84 97 59 75 67 93 109 86 93 93 84 96																									
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - March 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 354 deg on Mar 2 02:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 339.3 deg on Mar 2	Hours of Data: 730
Direction of Minimum Speed: 224 deg on Mar 31 10:00	Hours of Missing Data: 14
Direction of Minimum Daily Speed Average: 0.3 deg on Mar 12	Percent Operational Time: 98.1
Monthly Average Direction: 321.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	11	296	257	191	143	147	147	139	133	141	147	142	139	151	154	171	171	168	160	159	148	207	298	335	156.6
2-Mar	341	354	2	350	349	336	333	337	344	348	336	339	329	335	334	332	323	328	324	325	360	9	345	298	339.3
3-Mar	319	344	302	350	332	324	344	330	332	6	3	2	349	348	357	8	22	37	45	41	336	288	286	189	352.5
4-Mar	160	151	138	141	139	138	136	134	134	140	142	138	142	141	147	160	160	216	217	171	153	144	149	237	150.9
5-Mar	249	290	293	344	338	210	203	219	149	135	135	138	140	140	144	142	140	141	147	141	120	172	142	148	151.2
6-Mar	162	234	231	263	254	274	252	168	47	290	352	346	264	245	237	246	9	25	360	357	357	339	350	324	304.0
7-Mar	316	65	135	132	140	129	254	277	270	244	314	307	306	300	307	297	297	307	295	287	312	349	327	293	295.0
8-Mar	67	140	140	158	162	148	139	136	138	141	138	148	243	148	144	147	175	136	194	209	173	195	153	153	151.8
9-Mar	188	160	137	134	158	248	235	312	296	292	314	335	239	312	257	336	328	334	329	334	334	343	332	355	307.9
10-Mar	2	18	18	3	3	21	1	38	40	2	349	340	329	340	338	347	355	355	353	356	1	6	7	357	0.4
11-Mar	351	356	352	355	351	347	350	350	341	351	352	341	348	355	3	2	351	352	351	353	354	347	333	325	350.7
12-Mar	328	337	332	322	334	322	323	270	286	183	339	139	178	201	145	146	139	45	350	252	168	346	352	340	230.3
13-Mar	330	310	340	252	251	240	155	183	164	252	251	254	237	219	194	172	162	170	168	163	156	141	124	115	186.3
14-Mar	135	139	137	140	142	143	140	143	138	139	134	140	141	137	137	142	141	142	106	240	250	248	247	327	154.2
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	308	326	104	154	135	145	146	139	148	146	--
16-Mar	339	349	347	324	333	354	18	360	354	357	0	343	3	354	355	0	345	345	347	340	343	348	347	327	348.0
17-Mar	300	310	326	283	243	239	164	192	130	145	148	146	175	174	180	163	154	129	174	190	329	334	320	279	186.1
18-Mar	198	246	289	246	321	326	170	152	156	157	160	172	206	331	344	359	10	6	2	4	2	359	354	352	359.7
19-Mar	353	349	355	335	337	339	343	1	343	324	337	355	356	9	360	3	4	4	15	23	37	39	19	359	2.3
20-Mar	357	347	345	347	339	337	328	346	2	322	240	234	246	247	253	344	347	356	3	353	345	349	351	351	326.3
21-Mar	351	351	349	347	342	336	338	337	355	2	349	149	153	134	118	102	117	129	129	116	101	108	104	127	101.0
22-Mar	140	177	154	148	149	100	139	149	140	153	152	164	231	141	146	21	2	320	313	353	350	334	326	348	145.4
23-Mar	248	270	125	150	143	141	133	149	161	248	236	219	212	357	12	359	4	21	58	3	344	343	343	346	25.3
24-Mar	336	342	344	342	340	338	322	355	2	3	1	357	335	334	331	281	169	157	142	93	79	22	8	5	355.9
25-Mar	313	329	331	331	335	345	328	332	331	295	225	181	143	152	151	151	146	160	171	178	145	145	147	147	153.3
26-Mar	103	92	134	114	341	4	144	187	138	146	148	143	138	142	127	135	134	143	170	239	237	172	137	141	145.7
27-Mar	139	126	129	138	151	143	154	147	142	144	138	136	143	152	142	154	148	145	149	152	162	332	271	138	146.0
28-Mar	146	0	309	268	245	185	153	135	141	209	243	335	316	307	296	296	310	308	308	307	298	263	264	5	298.5
29-Mar	30	307	230	168	138	133	136	139	138	141	145	142	144	137	132	136	128	83	339	339	253	254	301	279	141.9
30-Mar	288	331	342	326	318	320	209	81	275	215	231	152	149	138	152	192	146	139	120	110	334	343	151	140	148.9
31-Mar	140	135	134	134	139	133	139	138	119	224	346	345	348	349	65	64	62	31	21	31	27	9	356	356	49.9

346.0 358.2 6.5 13.0 346.6 31.4 126.6 130.8 98.5 137.2 82.7 94.4 199.4 156.4 134.6 80.8 65.5 39.7 6.1 347.7 8.1 357.2 345.1 360.0
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Mar 28 02:00	Hours in Service: 744 Hours of Data: 730 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1
Minimum Value: 3 deg on Mar 5 11:00	
Percentiles: P ₁ = 5 P ₁₀ = 8 Q ₁ = 12 Median = 17 Q ₃ = 29 P ₉₀ = 56 P ₉₉ = 92	

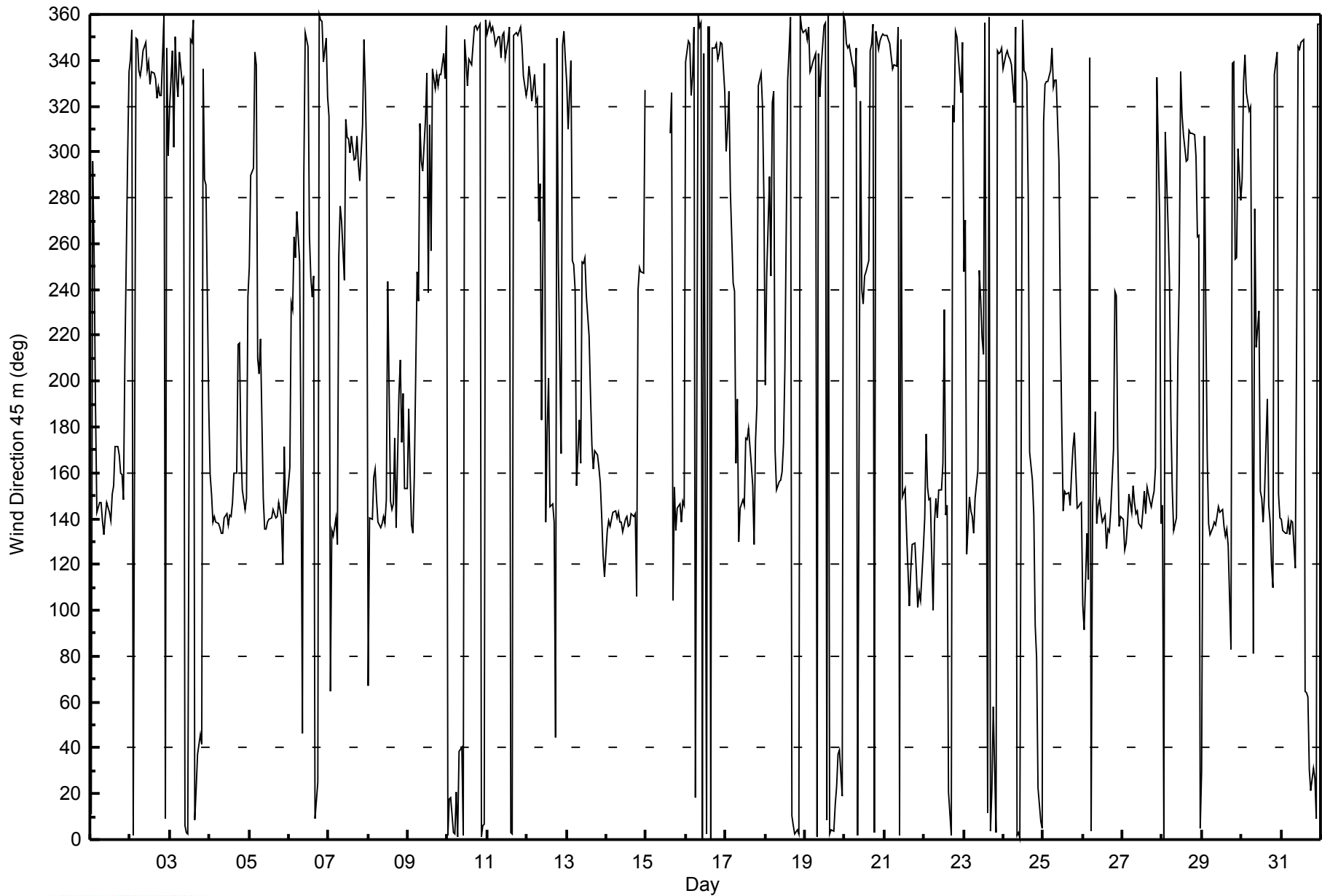
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	84	39	50	84	9	6	7	14	12	32	7	9	8	10	7	9	7	9	6	8	11	49	22	14	84
2-Mar	13	14	14	13	18	14	15	15	14	16	18	16	15	15	14	15	14	12	13	13	16	18	11	23	23
3-Mar	11	16	19	28	13	10	12	10	14	15	16	16	16	18	19	24	19	19	15	19	81	55	51	58	81
4-Mar	34	10	6	5	6	9	8	11	10	6	5	15	13	8	9	5	7	20	12	14	9	4	60	74	74
5-Mar	39	66	26	28	23	53	45	56	33	7	3	4	5	7	6	7	6	5	12	48	82	38	15	12	82
6-Mar	57	16	14	30	27	23	18	47	76	26	20	49	80	87	21	21	56	19	18	17	34	15	22	24	87
7-Mar	35	75	23	15	8	18	59	13	15	33	31	17	16	27	21	23	18	10	17	14	29	14	40	46	75
8-Mar	49	30	15	14	18	17	7	6	8	7	11	26	30	34	10	29	41	10	29	35	27	40	8	24	49
9-Mar	60	45	10	10	29	20	57	24	16	14	34	66	24	95	25	18	21	13	14	14	15	10	13	21	95
10-Mar	15	15	17	17	18	22	19	27	25	21	16	23	31	20	16	15	12	11	11	12	14	14	15	14	31
11-Mar	11	12	12	14	13	14	14	14	17	14	14	14	13	15	14	15	12	14	13	13	14	14	17	13	17
12-Mar	15	20	21	20	14	28	29	68	59	90	68	52	39	24	9	15	22	93	31	22	76	43	21	20	93
13-Mar	57	25	70	17	8	18	27	50	23	6	8	14	20	11	24	15	6	8	7	6	6	8	14	16	70
14-Mar	11	8	8	5	4	4	6	5	37	15	16	7	5	6	8	5	12	8	93	38	10	4	9	41	93
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	26	49	72	31	8	9	24	16	22	52	72
16-Mar	28	15	12	16	17	15	29	21	12	18	35	24	19	26	29	20	11	10	11	12	11	13	21	23	35
17-Mar	22	39	27	74	51	56	54	43	28	41	13	24	48	36	26	17	13	15	41	26	74	16	29	41	74
18-Mar	73	79	78	38	21	33	33	11	10	21	39	25	51	32	17	12	15	15	15	13	16	15	12	11	79
19-Mar	13	16	19	15	18	11	25	27	18	23	23	19	18	26	19	17	17	16	11	14	13	12	17	13	27
20-Mar	13	16	8	11	13	11	10	20	23	54	14	12	16	10	39	20	12	17	14	12	10	9	13	8	54
21-Mar	10	10	14	11	14	15	17	17	14	16	36	46	9	21	16	16	18	15	10	16	14	14	15	16	46
22-Mar	36	22	22	19	73	90	32	10	14	11	12	22	38	34	26	57	26	32	44	22	48	30	29	16	90
23-Mar	49	44	61	10	10	38	18	11	90	63	24	14	25	40	30	38	14	22	16	26	11	10	11	11	90
24-Mar	12	16	10	12	43	42	34	17	15	16	14	20	28	37	41	52	26	12	24	11	30	19	19	27	52
25-Mar	21	9	13	14	15	11	23	27	38	72	53	44	13	10	9	7	12	19	25	65	11	8	12	15	72
26-Mar	87	55	61	92	60	38	61	90	53	11	7	12	13	14	18	13	11	8	30	12	10	45	13	9	92
27-Mar	17	14	26	9	7	10	12	11	9	7	11	82	13	16	8	11	11	11	13	13	50	60	91	65	91
28-Mar	43	101	65	75	58	63	19	10	20	29	73	19	17	18	14	14	13	14	12	10	10	12	25	64	101
29-Mar	73	92	48	29	10	7	8	13	11	17	11	9	8	13	11	9	9	49	21	44	32	66	22	47	92
30-Mar	21	19	14	17	29	18	67	82	62	50	40	47	44	10	63	57	7	10	65	43	79	78	26	5	82
31-Mar	5	6	15	9	8	14	7	29	53	92	41	25	31	21	20	18	19	17	18	19	19	16	11	13	92
Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - March 2015

Direction of Maximum Speed: 356 deg on Mar 2 02:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 339.5 deg on Mar 2	Hours of Data: 730
Direction of Minimum Speed: 295 deg on Mar 17 04:00	Direction of Minimum Daily Speed Average: 2.0 deg on Mar 23
Direction of Minimum Speed: 295 deg on Mar 17 04:00	Hours of Missing Data: 14
Monthly Average Direction: 301.1 deg	Percent Operational Time: 98.1

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	51	29	67	127	149	151	150	149	145	148	152	144	144	154	158	177	178	179	172	170	167	236	296	334	161.7
2-Mar	343	356	3	354	350	336	334	340	347	349	335	340	329	336	333	331	324	328	329	320	320	356	8	315	339.5
3-Mar	301	296	296	339	356	337	351	359	355	8	4	4	351	348	359	14	27	39	48	58	73	147	144	155	354.4
4-Mar	150	155	156	150	151	153	157	160	151	147	144	141	148	147	154	161	172	217	220	203	170	162	162	240	163.1
5-Mar	258	269	289	289	292	244	237	249	238	160	161	178	161	147	145	145	143	148	154	171	189	238	232	232	221.8
6-Mar	237	263	244	249	268	268	289	256	11	13	4	349	324	326	243	260	21	34	17	25	28	359	356	333	319.0
7-Mar	338	350	124	156	173	237	262	270	271	270	309	303	301	303	307	300	303	308	307	291	309	354	318	330	294.7
8-Mar	242	212	224	212	223	221	215	210	153	155	189	219	241	172	185	228	231	211	226	228	229	243	242	254	217.4
9-Mar	266	278	172	189	240	282	315	318	298	294	317	333	260	321	281	331	325	331	349	337	337	332	325	5	311.8
10-Mar	7	19	16	7	12	22	13	43	38	6	356	348	342	345	345	353	1	1	0	2	10	12	11	5	6.9
11-Mar	1	5	2	5	360	357	360	360	351	360	355	350	353	356	4	0	357	0	357	360	3	353	347	335	357.7
12-Mar	337	351	337	328	341	343	339	225	275	132	226	146	157	183	153	155	144	145	20	105	148	137	139	20	144.5
13-Mar	321	317	254	256	254	249	220	232	237	248	245	239	219	222	200	179	172	177	177	175	171	160	144	142	205.3
14-Mar	146	154	148	143	144	146	142	148	152	162	149	157	145	143	137	148	140	145	207	239	251	252	250	329	164.7
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	308	325	57	123	132	158	180	178	181	195	--
16-Mar	355	359	360	339	343	1	28	9	358	7	4	354	357	3	10	17	356	354	353	350	350	351	346	344	355.7
17-Mar	348	328	332	295	142	146	168	185	184	138	142	139	133	132	133	139	129	111	124	124	83	334	317	330	127.9
18-Mar	277	260	132	149	155	106	145	155	148	141	137	143	154	327	351	6	11	8	5	7	4	1	357	357	14.3
19-Mar	357	355	359	352	352	354	7	22	348	332	339	354	358	11	4	8	9	8	18	27	43	54	55	42	12.3
20-Mar	33	33	54	81	9	341	5	309	332	306	263	244	260	254	263	351	352	3	11	8	353	355	358	356	345.7
21-Mar	2	359	360	343	338	345	342	339	340	326	296	144	149	129	117	103	118	129	131	122	110	114	116	130	99.4
22-Mar	123	149	145	144	148	159	144	147	139	147	147	152	259	129	130	36	348	311	310	38	121	133	135	129	138.6
23-Mar	189	151	140	152	150	150	151	165	204	230	210	199	186	10	8	359	3	22	59	30	2	355	352	350	53.0
24-Mar	352	346	348	347	346	350	342	355	12	9	358	355	338	336	340	300	158	158	134	102	105	109	53	155	7.1
25-Mar	163	338	22	59	61	27	26	335	321	277	131	145	139	143	139	148	144	146	165	169	151	149	147	145	141.6
26-Mar	135	131	129	128	124	130	137	139	138	145	147	144	137	137	127	134	134	141	205	234	236	222	144	152	147.4
27-Mar	162	156	152	148	171	160	170	156	147	147	143	158	146	150	143	156	155	150	143	147	165	207	5	175	152.7
28-Mar	194	142	125	118	271	262	252	248	247	260	286	329	315	309	298	297	307	308	304	305	302	286	271	266	295.3
29-Mar	264	255	245	226	206	178	151	150	139	137	138	144	143	137	135	136	127	106	35	36	252	240	271	283	167.3
30-Mar	292	270	312	14	14	27	212	121	65	234	226	153	139	126	145	225	150	141	136	130	133	149	156	164	148.1
31-Mar	164	171	166	159	150	143	136	145	155	152	5	8	355	59	78	71	72	48	36	41	38	24	6	8	64.1

328.6 340.0 342.4 310.7 312.7 284.0 197.3 234.9 221.9 205.9 348.2 38.7 242.3 124.9 86.7 56.6 61.6 37.9 4.6 352.7 4.6 349.6 334.2 339.1
 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 100 m (WD100m) - deg

Lower Camp Met Tower - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 94 deg on Mar 27 23:00	Hours of Data: 730
Minimum Value: 2 deg on Mar 14 06:00	Hours of Missing Data: 14
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 19 P ₉₀ = 36 P ₉₉ = 86	Hours of Calibration: 0
	Percent Operational Time: 98.1

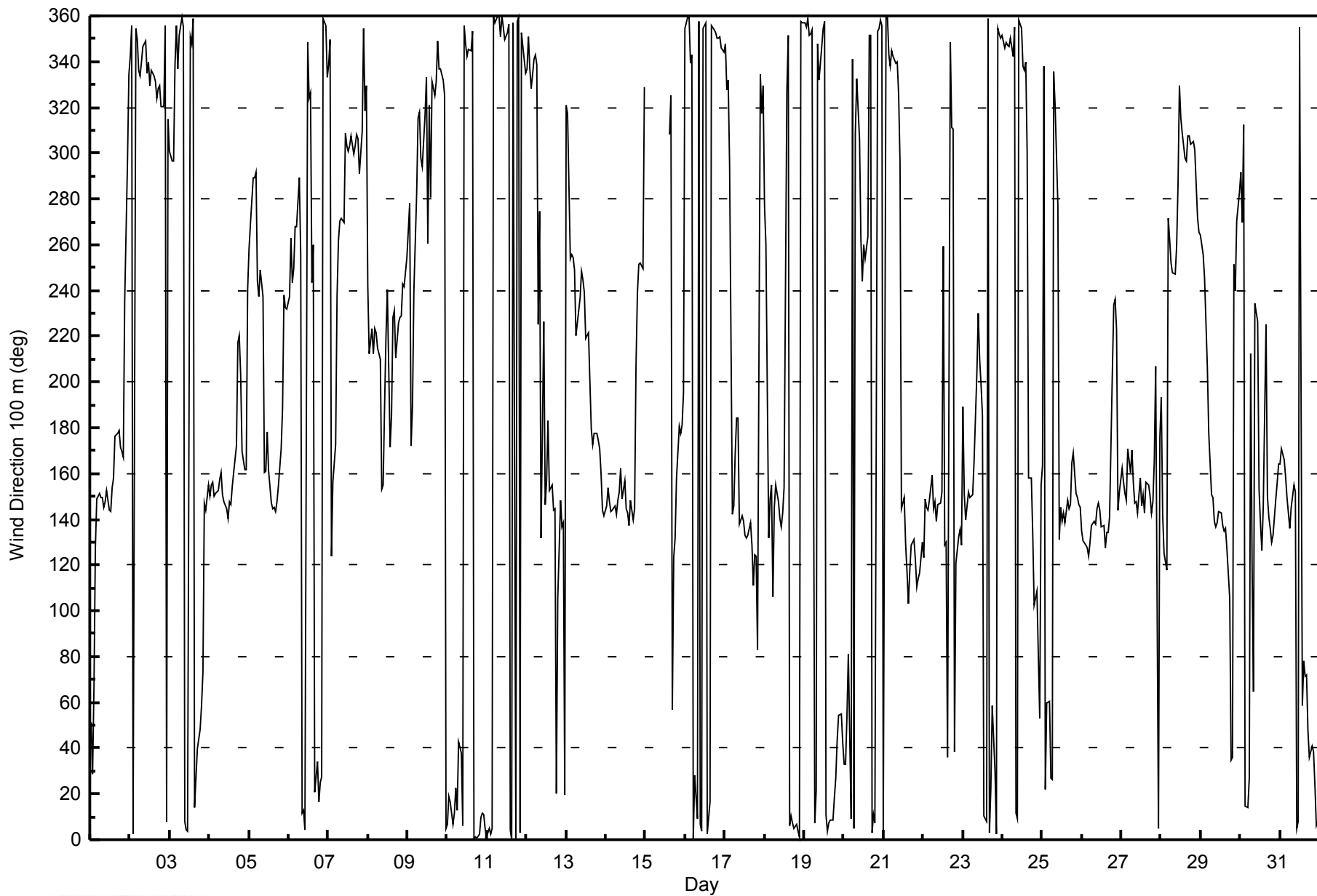
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	17	26	66	19	7	4	5	10	6	8	4	4	4	5	5	10	5	5	5	8	13	30	22	9	66
2-Mar	10	8	7	7	14	9	11	10	11	11	14	12	11	10	9	10	9	8	8	7	20	19	7	22	22
3-Mar	7	7	6	36	12	6	12	7	8	8	9	10	10	11	10	18	15	12	11	7	30	14	9	7	36
4-Mar	6	6	9	7	4	7	10	13	9	7	4	5	7	5	7	3	16	14	6	12	11	6	15	11	16
5-Mar	13	22	11	12	13	14	11	14	25	13	13	16	14	22	16	9	5	6	7	18	22	22	13	25	25
6-Mar	23	7	7	9	19	10	9	22	52	12	13	26	58	86	51	26	40	12	15	15	19	18	13	11	86
7-Mar	9	33	20	12	17	35	5	7	9	62	24	12	10	19	16	15	8	6	9	6	27	11	51	19	62
8-Mar	42	15	16	17	11	24	22	24	12	12	31	37	8	29	25	10	14	13	6	6	6	14	20	10	42
9-Mar	15	39	64	32	7	25	15	7	12	9	32	53	48	59	26	15	17	9	9	11	10	4	8	16	64
10-Mar	9	9	12	9	12	14	12	15	18	12	13	16	25	20	14	12	8	6	6	7	9	8	8	8	25
11-Mar	5	6	6	7	8	8	6	6	10	8	7	8	7	8	7	8	8	8	7	7	8	8	10	7	10
12-Mar	10	10	14	16	11	33	29	85	29	67	56	10	28	17	8	8	6	87	41	14	9	8	8	59	87
13-Mar	27	16	30	3	3	8	25	15	9	3	7	13	12	5	20	17	6	7	2	4	7	7	14	16	30
14-Mar	13	9	6	3	3	2	3	3	16	15	11	13	8	10	5	6	8	8	45	16	6	2	4	47	47
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	38	71	28	8	12	15	11	20	36	71
16-Mar	56	10	9	12	10	10	16	18	6	11	24	19	12	11	23	19	7	5	5	5	5	4	8	56	
17-Mar	13	29	11	88	24	13	11	38	34	16	11	18	43	16	5	5	7	8	5	7	71	7	21	12	88
18-Mar	34	39	6	20	18	38	11	10	4	4	8	11	60	19	13	8	8	8	7	7	7	7	6	6	60
19-Mar	6	7	8	6	7	8	9	13	18	19	18	12	12	15	14	11	10	10	6	9	8	5	7	14	19
20-Mar	16	9	13	11	30	13	19	23	29	25	47	25	16	9	38	18	11	11	7	9	8	6	5	8	47
21-Mar	7	11	12	9	3	4	4	6	10	11	51	19	7	17	10	10	13	10	6	11	7	8	8	8	51
22-Mar	10	25	19	14	26	74	21	7	8	7	8	23	86	24	17	69	30	35	41	26	36	53	92	30	92
23-Mar	21	15	7	6	8	11	14	19	25	24	39	29	88	25	14	21	10	17	11	21	10	7	7	5	88
24-Mar	6	6	5	5	8	10	14	10	13	9	9	14	17	26	31	49	32	13	19	3	5	20	29	32	49
25-Mar	29	70	59	25	20	24	32	12	23	41	76	38	8	10	9	8	11	16	18	34	12	7	8	7	76
26-Mar	11	9	11	13	19	10	13	15	13	8	6	8	7	9	7	6	4	7	26	4	4	35	10	9	35
27-Mar	15	15	10	6	15	13	10	16	13	7	8	34	13	14	8	9	7	10	7	8	10	93	94	39	94
28-Mar	30	36	14	54	69	15	17	7	5	10	28	15	12	14	11	9	8	10	7	5	4	9	11	56	69
29-Mar	57	30	15	19	15	27	8	10	9	14	10	7	8	8	8	7	7	23	41	53	61	14	16	16	61
30-Mar	12	17	17	14	11	11	71	39	36	86	34	67	62	8	70	58	9	10	19	8	12	17	8	10	86
31-Mar	10	12	10	9	6	7	4	12	24	39	70	37	24	20	11	12	12	14	12	14	13	13	7	8	70
	57	70	66	88	69	74	71	85	52	86	76	67	88	86	70	69	71	87	45	53	71	93	94	59	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - March 2015





Maximum Value: 0.6 km/h on Mar 13 17:00																				Maximum Daily Average: 0.1 km/h on Mar 8					Hours in Service: 744				
Minimum Value: -0.7 km/h on Mar 28 17:00																				Minimum Daily Average: -0.2 km/h on Mar 11					Hours of Data: 734				
Maximum Diurnal Average: 0.0 km/h at hour 5																				Minimum Diurnal Average: -0.2 km/h at hour 13					Hours of Missing Data: 10				
Monthly Average: -0.05 km/h																				Percentiles: P ₁ = -0.5 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.3					Hours of Calibration: 0				
																				Percent Operational Time: 98.7									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.2	-0.1	-0.2	0.0	-0.1	-0.2	0.1	-0.1	0.2	0.2	0.3	0.3	0.4	0.1	0.2	-0.5	0.1	0.0	0.4			
2-Mar	-0.1	-0.6	-0.3	-0.3	-0.2	0.0	-0.2	-0.1	-0.2	-0.3	0.0	-0.3	-0.2	-0.2	-0.2	0.0	-0.2	-0.4	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	0.0			
3-Mar	-0.1	0.0	-0.1	-0.1	0.0	-0.1	-0.2	-0.1	-0.2	-0.2	-0.1	-0.2	-0.4	-0.3	-0.4	-0.1	0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1			
4-Mar	0.1	0.1	0.2	0.1	-0.1	0.1	-0.1	-0.2	-0.2	-0.1	-0.2	0.1	-0.2	-0.1	-0.2	0.3	0.2	-0.2	-0.2	0.3	0.3	0.3	0.1	0.0	0.0	0.3			
5-Mar	0.0	-0.2	0.0	-0.1	0.0	0.1	0.1	0.0	0.5	0.4	0.0	0.0	0.1	0.1	0.1	0.0	-0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.1	0.5			
6-Mar	0.2	-0.1	0.0	-0.3	-0.1	0.0	0.0	0.2	0.0	0.0	-0.2	0.1	-0.1	-0.2	0.0	0.1	0.0	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.2			
7-Mar	0.0	0.1	0.1	0.1	0.0	0.2	0.1	-0.2	-0.3	-0.1	0.0	-0.1	-0.2	-0.1	-0.4	-0.3	-0.2	-0.1	-0.2	-0.4	-0.1	-0.2	-0.1	0.0	-0.1	0.2			
8-Mar	0.1	0.1	0.1	0.4	0.4	0.2	0.4	0.3	0.0	-0.1	0.1	0.1	-0.1	0.0	0.1	0.2	0.1	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.4			
9-Mar	0.2	0.1	0.2	0.3	0.2	0.0	0.1	0.0	-0.3	-0.3	-0.3	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.3			
10-Mar	-0.1	0.1	0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.2	-0.5	-0.2	0.1	-0.3	0.1	-0.3	-0.4	-0.3	-0.4	-0.2	0.0	-0.2	0.1	-0.2	-0.1	0.1			
11-Mar	-0.5	-0.2	-0.5	-0.4	-0.3	-0.1	-0.2	-0.2	0.0	-0.2	-0.5	0.0	-0.5	-0.3	-0.4	-0.3	-0.4	-0.4	-0.2	-0.2	-0.2	-0.1	0.1	0.0	-0.2	0.1			
12-Mar	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.1	-0.1	0.0	-0.2	-0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	-0.1	0.0	0.1			
13-Mar	0.0	0.0	0.0	0.1	-0.3	-0.1	0.2	0.2	0.2	-0.4	-0.5	-0.3	-0.4	-0.3	0.0	0.2	0.6	0.2	0.5	0.5	0.3	0.0	-0.3	-0.1	0.0	0.6			
14-Mar	-0.2	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.1	0.0	-0.4	-0.1	-0.1	0.0	-0.1	0.0	0.0	-0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.1	0.0			
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.2	0.4	-0.1	-0.3	-0.2	0.3	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	--	0.4		
16-Mar	-0.2	-0.1	-0.2	0.1	0.1	-0.1	-0.1	0.2	0.0	-0.5	-0.3	0.6	0.3	-0.4	0.0	0.0	-0.2	-0.4	-0.2	-0.2	0.1	0.0	-0.2	0.0	-0.1	-0.1	0.6		
17-Mar	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	-0.1	-0.1	0.1	-0.2	-0.1	0.0	-0.1	0.0	0.0	0.1	0.1	0.0	-0.1	0.1	0.1	0.0	0.1		
18-Mar	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	-0.1	-0.3	-0.1	0.1	-0.2	-0.4	-0.1	-0.1	-0.1	-0.2	-0.1	-0.2	-0.3	-0.4	-0.1	0.1			
19-Mar	-0.1	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.3	0.0	0.0	-0.3	-0.5	0.2	-0.3	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.1	-0.1	-0.1	-0.1	0.2			
20-Mar	-0.2	-0.1	0.0	0.0	-0.1	-0.1	0.0	-0.2	-0.1	0.0	-0.1	-0.6	-0.1	-0.4	-0.3	-0.1	-0.5	0.1	0.0	-0.3	-0.1	-0.3	-0.2	-0.2	-0.2	0.1			
21-Mar	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.2	-0.3	-0.2	-0.2	-0.1	-0.3	0.0	-0.3	-0.2	-0.4	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	0.1	-0.2	0.2			
22-Mar	0.1	0.0	0.1	0.1	0.0	-0.1	0.1	-0.1	0.0	0.0	-0.2	0.0	-0.3	0.1	0.2	-0.1	0.0	-0.1	-0.1	0.2	0.0	0.0	-0.1	0.0	0.0	0.2			
23-Mar	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	-0.1	-0.1	-0.3	0.1	0.2	0.1	0.1	0.2	0.1	0.0	-0.1	-0.1	0.0	0.1	-0.1	0.0	0.2			
24-Mar	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.1	0.0	0.1	0.0	-0.2	-0.2	-0.1	0.1	0.1	0.0	-0.1	0.0	0.0	0.0	0.1			
25-Mar	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.2	-0.2	-0.1	-0.1	0.0	0.0	-0.2	-0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2			
26-Mar	0.0	0.1	0.0	0.1	0.1	-0.1	0.1	0.0	0.1	-0.3	-0.5	0.0	0.0	-0.2	-0.1	-0.1	0.0	-0.1	0.2	-0.2	-0.1	0.0	0.1	0.0	0.0	0.2			
27-Mar	0.1	0.1	0.0	0.1	0.2	-0.2	-0.1	0.0	0.0	-0.2	-0.1	-0.1	-0.1	0.0	0.0	0.2	-0.2	-0.1	-0.2	0.1	0.0	-0.1	0.0	0.1	0.0	0.2			
28-Mar	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.0	-0.1	0.0	0.1	-0.3	-0.5	-0.2	-0.5	-0.4	-0.7	-0.3	-0.2	-0.5	-0.4	-0.4	-0.4	0.0	-0.2	0.2			
29-Mar	0.1	0.2	0.1	0.2	0.4	0.1	-0.1	-0.4	0.0	0.1	0.0	-0.1	-0.1	0.2	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.1	0.0	-0.1	-0.1	0.0	0.4			
30-Mar	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	-0.1	0.1	-0.1	0.2	0.0	0.1	0.0	0.1	0.1	0.0	0.2	0.2	0.0	0.2			
31-Mar	0.1	0.1	0.2	0.2	0.0	0.0	0.1	0.1	0.1	-0.1	0.0	-0.1	-0.2	-0.3	-0.1	-0.2	-0.2	-0.2	-0.1	-0.2	-0.1	0.0	-0.2	-0.3	-0.1	0.2			
																								Diurnal Average					
																								Diurnal Maximum					
AF - Analyzer Failure																													



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.5 km/h on Mar 2 02:00 Minimum Value: 0.1 km/h on Mar 28 06:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.6 Median = 1.1 Q ₃ = 1.7 P ₉₀ = 2.2 P ₉₉ = 3.7																								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 Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	0.2	0.2	0.2	0.1	0.1	0.2	0.5	0.5	1.1	1.9	1.8	2.3	2.9	2.3	1.9	1.7	1.7	1.3	1.8	1.8	1.7	1.1	2.7	2.4	2.9
2-Mar	3.8	4.5	4.3	3.4	4.0	4.2	4.1	3.8	3.1	2.5	3.2	3.6	3.6	3.7	3.8	3.7	3.7	3.4	1.9	1.3	0.8	1.0	0.3	0.4	4.5
3-Mar	0.6	0.4	1.7	1.4	0.9	0.3	0.5	1.1	3.1	3.2	3.1	2.8	2.4	2.4	2.0	1.7	1.3	0.5	0.5	0.3	0.1	0.1	0.1	3.2	
4-Mar	0.2	0.4	0.8	1.1	1.1	1.1	1.3	1.4	1.8	1.9	1.6	2.1	2.3	2.4	2.4	1.9	1.5	1.3	1.3	0.9	0.7	0.9	0.5	0.8	2.4
5-Mar	2.1	1.4	0.9	0.5	0.6	0.7	0.8	1.2	1.0	1.4	1.8	2.1	1.9	1.7	1.0	1.1	1.1	0.8	0.5	0.4	0.3	0.4	0.5	0.8	2.1
6-Mar	1.0	0.6	0.8	1.7	0.6	0.2	0.3	0.3	0.2	0.5	1.5	1.6	1.4	1.1	1.1	0.9	1.3	1.8	1.2	1.1	0.9	0.7	0.3	0.3	1.8
7-Mar	0.2	0.1	0.3	0.3	0.5	0.5	0.7	1.6	1.5	1.4	2.1	2.6	2.3	1.9	2.1	1.8	1.5	1.3	1.0	2.2	1.3	0.5	0.4	0.2	2.6
8-Mar	0.1	0.1	0.3	0.8	0.8	1.3	1.1	0.9	1.3	1.5	1.2	1.3	0.9	0.7	0.8	0.6	0.4	0.5	0.8	0.7	0.5	0.3	0.4	0.5	1.5
9-Mar	0.7	0.5	1.1	0.8	1.0	0.5	0.4	0.6	1.6	2.2	2.1	1.2	1.0	1.1	1.5	1.9	1.6	1.2	0.6	0.5	0.3	0.4	0.9	1.4	2.2
10-Mar	2.2	2.9	2.2	1.6	1.2	1.4	1.0	0.9	1.6	1.9	1.8	1.9	1.8	1.8	1.9	1.9	1.8	2.0	2.3	2.5	2.3	2.2	2.0	2.0	2.9
11-Mar	2.0	2.0	2.1	1.9	1.9	1.8	2.0	2.0	1.6	1.9	2.0	2.1	2.3	2.4	2.5	2.3	2.0	1.9	2.0	1.9	1.4	1.6	1.1	1.4	2.5
12-Mar	1.3	0.9	0.8	0.8	1.0	0.6	0.7	0.6	0.9	0.8	0.9	1.5	1.6	1.1	1.9	1.6	1.2	0.6	0.5	0.1	0.3	0.4	0.5	0.6	1.9
13-Mar	0.3	0.2	0.1	0.7	1.5	1.2	1.2	1.0	0.9	2.0	1.5	1.3	1.3	1.4	1.5	1.6	1.7	1.9	2.2	2.2	1.6	1.6	1.5	2.2	
14-Mar	1.3	0.9	1.1	1.2	1.0	1.3	1.2	1.0	1.0	1.1	1.7	1.6	1.5	1.0	1.5	0.9	0.7	0.6	0.8	1.3	1.2	1.4	1.0	2.3	2.3
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.6	1.8	2.4	2.3	2.1	1.5	1.0	0.5	0.3	0.5	0.6	0.4	0.3	0.6	2.4
16-Mar	1.0	2.1	1.9	1.2	1.4	1.5	0.6	1.0	1.3	1.5	1.6	1.9	1.6	1.8	1.5	1.8	1.7	1.8	1.7	1.1	0.7	0.7	0.5	0.3	2.1
17-Mar	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.4	0.7	1.1	1.1	0.7	1.0	0.9	0.7	0.5	0.3	0.2	0.1	0.4	0.3	0.1	0.3	1.1
18-Mar	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.5	0.7	0.9	0.8	1.0	0.9	1.3	2.2	2.1	2.7	3.2	3.4	3.4	3.0	2.8	2.5	1.8	3.4
19-Mar	1.7	1.1	0.9	0.8	0.6	0.4	0.4	0.6	1.1	1.5	1.7	2.1	2.1	2.1	2.2	2.4	2.3	2.2	2.1	1.7	2.0	1.8	1.1	0.5	2.4
20-Mar	0.6	0.4	0.3	0.3	0.4	0.4	0.2	0.5	1.1	1.3	1.4	1.4	1.8	1.8	1.8	1.9	1.8	1.7	1.5	1.0	0.7	1.1	0.9	0.8	1.9
21-Mar	0.8	0.9	0.8	0.8	0.6	0.5	0.5	0.8	1.2	1.4	1.3	1.6	1.4	1.9	2.3	1.9	2.2	2.2	1.8	1.6	1.8	1.8	1.3	1.6	2.3
22-Mar	1.1	0.9	1.1	0.9	0.7	0.8	0.7	1.5	1.4	1.4	1.3	1.2	1.2	1.3	1.2	1.4	1.3	1.1	1.2	0.8	0.7	0.4	0.5	0.5	1.5
23-Mar	0.2	0.1	0.3	0.6	0.5	0.5	0.5	1.1	0.5	0.7	0.8	0.8	0.8	1.4	1.2	1.0	1.3	1.4	0.7	0.6	0.7	0.8	0.7	0.8	1.4
24-Mar	0.4	0.5	0.5	0.7	0.8	0.6	0.7	1.0	1.4	1.8	1.9	1.9	1.8	1.7	1.6	1.5	1.0	1.0	0.6	0.5	0.4	0.4	0.2	0.2	1.9
25-Mar	0.2	0.2	0.2	0.2	0.3	0.6	0.4	0.7	0.8	1.0	0.9	1.5	1.6	1.4	1.5	1.3	1.2	0.9	0.8	0.4	0.8	1.2	0.9	1.0	1.6
26-Mar	0.9	0.7	0.6	0.7	0.6	0.6	0.7	0.7	1.5	2.0	1.7	1.8	2.0	1.9	1.9	2.0	2.1	1.5	0.9	0.8	0.6	0.6	0.6	0.8	2.1
27-Mar	0.6	0.3	0.4	0.4	0.5	1.1	1.3	1.1	1.2	1.6	1.5	1.1	2.0	1.4	1.2	1.8	1.9	1.8	1.3	1.2	0.9	0.5	0.3	0.4	2.0
28-Mar	0.6	0.3	0.2	0.1	0.1	0.1	0.2	0.6	0.6	0.9	1.1	2.4	3.1	2.9	3.2	3.9	3.7	2.7	2.7	2.4	1.6	1.5	1.8	1.2	3.9
29-Mar	1.0	1.1	1.1	0.9	0.8	0.8	0.9	1.7	1.8	1.4	1.7	1.5	1.3	1.4	1.5	1.4	0.8	0.4	0.3	0.3	0.3	0.3	0.5	0.5	1.8
30-Mar	0.2	0.2	0.4	0.2	0.2	0.1	0.1	0.3	0.6	1.0	1.3	1.3	1.4	1.8	1.4	1.1	1.3	0.9	0.3	0.4	0.3	0.3	0.3	0.8	1.8
31-Mar	1.0	0.9	0.6	0.5	0.7	0.9	0.9	0.7	0.6	0.5	0.7	0.9	1.2	1.3	2.2	3.2	2.8	2.2	2.2	2.6	2.4	2.2	2.2	2.3	3.2
3.8 4.5 4.3 3.4 4.0 4.2 4.1 3.8 3.1 3.1 3.2 3.6 3.6 3.7 3.8 3.9 3.7 3.4 3.4 3.4 3.0 2.8 2.7 2.4																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 1.5 km/h on Mar 8 07:00																				Maximum Daily Average: 0.5 km/h on Mar 14					Hours in Service: 744				
Minimum Value: -1.6 km/h on Mar 28 17:00																				Minimum Daily Average: -0.6 km/h on Mar 2					Hours of Data: 730				
Maximum Diurnal Average: 0.1 km/h at hour 7																				Minimum Diurnal Average: 0.0 km/h at hour 23					Hours of Missing Data: 14				
Monthly Average: 0.06 km/h																				Percentiles: P ₁ = -1.1 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.4 P ₉₀ = 0.6 P ₉₉ = 1.2					Hours of Calibration: 0				
																				Percent Operational Time: 98.1									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	0.0	0.0	0.0	0.0	0.4	0.4	0.5	0.5	0.2	0.5	0.7	0.6	1.0	0.9	0.9	0.0	-0.2	0.3	0.7	0.9	0.6	0.2	-1.0	-0.3	0.3	1.0			
2-Mar	-0.5	-0.7	-0.3	-0.8	-0.5	-0.8	-0.9	-0.8	-0.6	-0.6	-0.5	-0.8	-1.1	-0.7	-0.7	-0.6	-1.1	-1.0	-0.5	-0.7	-0.2	-0.2	-0.2	-0.2	-0.6	-0.2			
3-Mar	-0.5	-0.1	-0.6	-0.3	-0.3	-0.2	-0.4	-0.4	-0.3	-0.2	-0.3	-0.1	-0.8	-0.5	-0.4	-0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	-0.2	0.1			
4-Mar	0.2	0.5	1.0	0.9	0.4	0.4	0.2	0.2	0.3	0.5	0.5	0.6	0.7	0.9	0.7	0.6	0.5	-0.3	-0.2	0.3	0.8	1.4	0.5	0.1	0.5	1.4			
5-Mar	0.0	-0.4	-0.2	-0.2	0.0	-0.1	0.0	-0.4	0.5	1.3	1.0	1.1	1.0	0.8	0.6	0.7	0.6	0.7	0.2	0.3	0.2	0.0	0.5	0.7	0.4	1.3			
6-Mar	0.5	-0.3	-0.1	-0.8	-0.2	0.0	0.0	0.2	0.1	-0.1	-0.3	0.2	0.4	-0.2	0.1	0.0	0.1	0.1	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.5			
7-Mar	0.0	0.1	0.5	0.3	0.5	0.5	-0.1	-0.5	-0.6	-0.1	-0.4	-0.7	-0.4	-0.4	-0.7	-0.6	-0.6	-0.6	-0.5	-1.0	-0.3	-0.4	-0.2	0.0	-0.3	0.5			
8-Mar	0.1	0.1	0.5	0.5	0.6	1.0	1.5	1.1	0.7	0.6	0.9	0.4	-0.1	0.5	0.6	0.4	0.2	0.8	0.2	0.2	0.1	0.1	0.5	0.5	0.5	1.5			
9-Mar	0.2	0.3	1.1	1.0	0.5	-0.1	0.0	-0.4	-0.7	-0.6	-0.5	0.2	0.1	-0.2	-0.2	-0.5	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.4	-0.1	-0.1	1.1			
10-Mar	-0.3	0.2	0.1	0.0	0.0	-0.1	-0.1	0.1	0.2	-0.3	-0.6	-0.4	0.0	-0.4	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.2	-0.1	0.0	-0.2	-0.2	0.2			
11-Mar	-0.6	-0.2	-0.5	-0.4	-0.3	-0.3	-0.4	-0.3	-0.1	-0.2	-0.6	-0.1	-0.7	-0.6	-0.4	-0.2	-0.6	-0.3	-0.5	-0.3	-0.2	-0.2	0.0	-0.3	-0.3	0.0			
12-Mar	-0.2	-0.1	-0.2	-0.2	-0.2	0.0	-0.1	0.0	-0.1	0.1	0.0	0.5	0.2	0.0	0.7	0.5	0.3	0.0	-0.1	0.0	0.1	0.0	-0.2	-0.3	0.0	0.7			
13-Mar	-0.1	-0.1	0.0	-0.1	-0.5	-0.1	0.5	0.1	0.4	-0.6	-0.7	-0.4	-0.5	-0.2	-0.1	0.3	1.1	0.2	0.4	0.8	1.4	1.3	0.4	0.2	0.1	1.4			
14-Mar	0.7	0.9	0.8	1.0	0.7	1.1	1.2	1.1	0.1	0.5	0.2	1.0	0.9	0.9	0.6	1.0	0.4	0.4	0.2	-0.2	-0.4	-0.3	-0.2	-0.5	0.5	1.2			
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.5	0.3	0.2	0.2	0.5	0.5	0.5	0.4	0.4	0.6	--	0.6			
16-Mar	-0.3	-0.2	-0.4	-0.2	0.0	-0.3	0.0	0.1	-0.4	-0.4	0.6	0.2	-0.1	-0.2	0.0	0.0	-0.5	-0.5	-0.3	-0.1	-0.2	-0.2	-0.1	-0.2	-0.1	0.6			
17-Mar	-0.2	0.0	-0.1	0.0	0.0	0.0	0.1	0.1	0.2	-0.1	0.2	0.2	-0.4	-0.3	-0.1	-0.1	0.2	0.2	0.1	0.0	-0.1	-0.3	0.0	0.0	0.0	0.2			
18-Mar	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	-0.1	-0.2	0.0	0.1	-0.4	-0.4	0.0	-0.1	-0.3	-0.3	-0.1	-0.5	-0.4	-0.4	-0.1	0.3			
19-Mar	-0.2	-0.2	-0.1	-0.2	-0.2	-0.3	-0.2	-0.1	-0.3	-0.2	-0.1	-0.2	-0.5	0.2	-0.4	0.0	-0.2	-0.1	-0.1	0.0	0.4	0.4	-0.1	-0.3	-0.1	0.4			
20-Mar	-0.4	-0.3	-0.2	-0.1	-0.3	-0.2	-0.1	-0.2	-0.1	0.2	-0.1	-0.6	-0.1	-0.4	-0.2	-0.1	-0.6	0.0	-0.1	-0.3	-0.2	-0.3	-0.4	-0.3	-0.2	0.2			
21-Mar	-0.3	-0.3	-0.1	-0.2	-0.3	-0.2	0.0	0.2	-0.3	-0.1	-0.1	0.4	0.2	0.4	0.5	0.4	0.5	0.7	0.5	0.5	0.5	0.5	0.2	0.5	0.2	0.7			
22-Mar	0.4	-0.1	0.2	0.2	0.0	-0.3	0.3	0.5	0.4	0.4	0.1	0.0	-0.3	0.3	0.4	0.0	0.0	-0.2	-0.1	0.2	0.0	-0.1	-0.2	-0.1	0.1	0.5			
23-Mar	0.0	0.1	0.3	0.3	0.6	0.2	0.3	0.6	0.3	0.0	-0.1	-0.3	0.1	0.3	0.2	0.3	0.1	0.1	0.1	-0.1	-0.2	-0.1	0.0	-0.1	0.1	0.6			
24-Mar	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.0	-0.1	0.0	-0.2	0.0	-0.3	0.3	-0.3	-0.2	-0.1	0.3	0.3	0.1	-0.1	-0.1	0.0	0.1	0.0	0.3			
25-Mar	-0.1	0.0	0.0	-0.2	-0.1	-0.3	-0.1	-0.1	0.2	0.4	-0.1	0.0	0.4	0.4	0.5	0.3	0.4	0.1	0.3	0.1	0.6	0.7	0.4	0.5	0.2	0.7			
26-Mar	0.1	0.2	0.1	0.0	0.0	0.0	0.2	0.0	0.6	0.4	0.3	0.6	0.7	0.7	0.6	0.8	0.9	0.8	0.3	-0.1	0.0	0.1	0.4	0.4	0.3	0.9			
27-Mar	0.4	0.4	0.4	0.4	0.6	0.4	0.3	0.4	0.5	0.6	0.4	0.2	0.7	0.3	0.7	0.9	1.0	1.0	0.2	0.3	0.2	-0.3	0.0	0.3	0.4	1.0			
28-Mar	0.3	0.0	0.1	0.1	0.0	0.0	0.4	0.4	0.2	-0.2	0.2	-0.5	-1.2	-0.7	-1.2	-1.3	-1.6	-0.5	-1.1	-1.2	-0.9	-0.6	-0.4	0.1	-0.4	0.4			
29-Mar	0.1	0.1	0.0	0.4	1.3	0.9	0.4	0.1	0.8	0.5	0.6	0.7	0.6	0.5	0.4	0.6	0.4	0.1	-0.2	0.0	0.0	0.0	-0.4	-0.2	0.3	1.3			
30-Mar	-0.1	0.0	-0.3	-0.1	-0.1	0.0	0.1	0.2	0.2	0.2	-0.1	0.1	0.1	0.8	0.3	0.4	0.7	0.5	0.3	0.2	0.0	0.0	0.5	1.2	0.2	1.2			
31-Mar	1.1	0.9	0.7	0.6	0.6	0.6	0.7	0.6	0.2	0.0	-0.2	-0.2	-0.4	-0.5	0.5	0.4	0.4	0.2	-0.1	0.1	0.3	-0.1	-0.3	-0.4	0.2	1.1			
																								Diurnal Average					
																								Diurnal Maximum					
0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.1 0.0 0.1 0.1 0.1 0.1 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0																													
1.1 0.9 1.1 1.0 1.3 1.1 1.5 1.1 0.8 1.3 1.0 1.1 1.0 0.9 0.9 1.0 1.1 1.0 0.7 0.9 1.4 1.4 0.5 1.2																													
AF - Analyzer Failure																													



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 km/h on Mar 2 07:00 Minimum Value: 0.1 km/h on Mar 28 06:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.7 Median = 1.1 Q ₃ = 1.7 P ₉₀ = 2.3 P ₉₉ = 4.3																								Hours in Service: 744 Hours of Data: 730 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	0.3	0.2	0.2	0.1	0.3	0.3	0.5	0.6	1.1	2.0	1.8	2.1	2.5	2.3	1.9	2.0	1.9	1.5	1.7	1.9	1.6	1.5	3.0	3.0	3.0
2-Mar	4.3	4.6	4.4	3.4	4.4	4.7	4.8	4.2	3.3	2.7	3.7	3.9	4.1	4.2	4.3	4.4	4.2	4.0	2.2	1.4	0.9	1.1	0.3	0.5	4.8
3-Mar	0.8	0.6	2.1	1.6	1.1	0.4	0.6	0.7	1.3	3.1	3.3	3.1	2.8	2.5	2.4	2.0	1.9	1.2	0.6	0.5	0.4	0.2	0.2	0.1	3.3
4-Mar	0.4	0.5	0.8	0.9	0.9	1.1	1.4	1.5	1.7	1.4	1.4	2.0	2.0	2.2	2.1	1.9	1.4	1.4	1.6	1.1	0.8	0.8	0.7	1.0	2.2
5-Mar	2.1	1.8	1.1	0.7	0.9	0.8	1.1	1.4	0.8	0.8	1.0	1.3	1.3	1.3	0.8	0.8	0.7	0.6	0.6	0.7	0.6	0.6	0.8	1.2	2.1
6-Mar	1.4	0.8	1.2	2.3	0.7	0.4	0.4	0.4	0.3	0.6	1.6	1.7	1.5	1.2	0.9	0.6	1.3	1.9	1.4	1.2	1.0	0.7	0.3	0.3	2.3
7-Mar	0.2	0.1	0.3	0.4	0.5	0.6	1.0	2.0	1.7	1.6	2.4	2.9	2.7	2.3	2.3	2.1	1.7	1.4	1.0	2.4	1.4	0.5	0.5	0.3	2.9
8-Mar	0.2	0.2	0.6	0.9	1.2	1.6	1.0	1.0	1.1	1.1	0.9	1.6	0.9	0.8	0.9	0.8	0.6	0.5	1.1	1.1	0.8	0.5	0.5	0.7	1.6
9-Mar	0.9	0.7	0.9	0.8	1.1	0.6	0.3	0.8	1.7	2.4	2.2	1.3	1.1	1.2	1.5	2.1	1.8	1.4	0.8	0.6	0.3	0.5	1.1	1.5	2.4
10-Mar	2.2	2.9	2.4	1.7	1.4	1.5	1.0	1.1	1.7	2.0	1.9	2.0	2.0	1.9	2.1	2.0	1.7	2.0	2.2	2.6	2.4	2.3	2.1	2.1	2.9
11-Mar	1.9	2.1	2.0	1.9	2.0	1.9	1.9	1.9	1.6	1.9	2.0	2.2	2.2	2.5	2.4	2.3	1.9	2.0	2.0	2.0	1.5	1.6	1.3	1.7	2.5
12-Mar	1.4	1.0	0.8	0.9	1.1	0.7	0.8	0.7	0.9	0.8	0.9	1.7	1.7	1.3	1.6	1.8	1.4	0.7	0.4	0.1	0.3	0.4	0.6	0.7	1.8
13-Mar	0.3	0.2	0.2	0.9	1.7	1.5	1.4	1.2	1.0	1.6	1.2	1.3	1.3	1.5	1.5	1.8	1.6	2.0	2.3	2.4	2.1	1.4	1.6	1.8	2.4
14-Mar	1.3	1.0	0.9	0.9	0.8	1.0	0.9	0.9	1.1	1.1	1.5	1.2	1.0	0.7	1.1	0.7	0.8	0.6	1.2	1.3	1.0	0.7	0.7	2.4	2.4
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.3	1.8	1.3	0.5	0.4	0.6	0.8	0.6	0.6	0.8	2.3
16-Mar	1.1	2.2	2.1	1.4	1.6	1.5	0.7	1.0	1.2	1.5	1.8	1.9	1.7	1.9	1.6	1.8	1.7	1.8	1.7	1.2	0.7	0.6	0.5	0.3	2.2
17-Mar	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.7	1.0	1.0	0.7	0.9	0.8	0.5	0.6	0.3	0.2	0.2	0.4	0.3	0.1	0.5	1.0
18-Mar	0.2	0.2	0.1	0.2	0.2	0.1	0.3	0.6	0.7	0.9	0.7	1.0	0.9	1.4	2.2	2.1	2.6	3.3	3.6	3.4	3.3	2.8	2.5	1.8	3.6
19-Mar	1.8	1.2	1.0	1.1	0.7	0.4	0.5	0.7	1.2	1.7	2.0	2.2	2.0	2.2	2.0	2.4	2.3	2.1	1.9	1.7	2.1	1.9	1.2	0.6	2.4
20-Mar	0.5	0.4	0.4	0.3	0.4	0.4	0.3	0.6	1.2	1.4	1.4	1.3	1.8	1.7	2.0	2.1	1.7	1.8	1.6	1.1	0.7	1.0	0.8	0.6	2.1
21-Mar	0.7	0.8	0.9	0.8	0.6	0.6	0.7	0.8	1.0	1.3	1.3	1.4	1.4	1.9	2.0	1.9	2.2	2.0	1.5	1.5	1.9	1.9	1.4	1.5	2.2
22-Mar	1.3	1.1	1.3	1.0	0.8	0.9	0.9	1.4	1.2	1.4	1.3	1.3	1.4	1.4	1.2	1.4	1.3	1.1	1.3	0.8	0.7	0.5	0.6	0.5	1.4
23-Mar	0.1	0.2	0.4	0.7	0.6	0.6	0.6	1.1	0.6	0.7	0.7	0.9	1.4	1.3	1.1	1.2	1.3	0.7	0.7	0.9	1.0	0.8	0.8	1.4	
24-Mar	0.6	0.6	0.5	0.8	1.1	0.7	0.9	1.1	1.4	1.9	1.8	2.0	1.9	1.9	1.9	1.5	1.1	1.0	0.5	0.6	0.5	0.4	0.2	0.2	2.0
25-Mar	0.2	0.1	0.1	0.2	0.4	0.7	0.4	0.7	0.9	1.0	0.9	1.6	1.5	1.3	1.3	1.0	1.1	1.1	0.9	0.5	1.0	1.3	1.1	1.2	1.6
26-Mar	1.2	1.0	0.8	0.9	0.8	0.7	0.9	0.9	1.7	1.8	1.5	1.7	1.8	1.6	1.9	2.0	2.0	1.4	1.1	0.8	0.7	0.7	0.5	0.7	2.0
27-Mar	0.7	0.5	0.5	0.4	0.5	1.1	1.3	1.0	1.1	1.2	1.3	1.2	1.7	1.3	1.1	1.6	1.7	1.7	1.5	1.3	0.9	0.6	0.4	0.5	1.7
28-Mar	0.7	0.4	0.2	0.2	0.1	0.1	0.4	0.6	0.6	1.0	1.3	2.6	3.4	3.3	3.6	4.4	4.1	3.1	3.4	2.6	1.7	1.4	2.0	1.7	4.4
29-Mar	1.3	1.4	1.3	1.1	0.9	0.7	0.8	1.5	1.6	1.2	1.6	1.3	1.1	1.2	1.3	1.2	0.8	0.5	0.3	0.3	0.4	0.3	0.7	0.6	1.6
30-Mar	0.3	0.3	0.4	0.2	0.3	0.1	0.2	0.3	0.7	1.1	1.4	1.4	1.6	1.4	1.5	1.2	1.0	0.8	0.5	0.5	0.3	0.5	0.6	0.7	1.6
31-Mar	0.6	0.6	0.7	0.6	0.6	0.8	0.6	0.6	0.7	0.5	0.6	0.8	1.2	1.6	2.4	3.2	3.1	2.5	2.3	2.7	2.6	2.3	2.3	2.4	3.2
4.3 4.6 4.4 3.4 4.4 4.7 4.8 4.2 3.3 3.1 3.7 3.9 4.1 4.2 4.3 4.4 4.2 4.0 3.6 3.4 3.3 2.8 3.0 3.0																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 2.5 km/h on Mar 22 01:00																				Maximum Daily Average: 0.9 km/h on Mar 26					Hours in Service: 744				
Minimum Value: -1.8 km/h on Mar 6 04:00																				Minimum Daily Average: -0.5 km/h on Mar 2					Hours of Data: 730				
Maximum Diurnal Average: 0.3 km/h at hour 21																				Minimum Diurnal Average: 0.1 km/h at hour 2					Hours of Missing Data: 14				
Monthly Average: 0.16 km/h																				Percentiles: P ₁ = -1.2 P ₁₀ = -0.4 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.8					Hours of Calibration: 0				
																				Percent Operational Time: 98.1									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	0.0	0.0	0.0	0.2	0.7	0.9	1.3	0.8	0.2	2.2	1.2	0.8	1.0	1.4	0.9	-0.3	-0.6	-0.5	0.2	0.6	0.4	-0.1	-0.9	-0.5	0.4	2.2			
2-Mar	-0.5	0.3	0.4	0.3	0.0	-1.2	-0.7	-0.8	-0.3	-0.2	-0.6	-0.4	-1.1	-1.0	-1.4	-1.0	-1.0	-1.1	-0.8	-0.5	0.4	-0.1	-0.2	-0.4	-0.5	0.4			
3-Mar	-0.7	-0.3	-0.2	0.4	-0.1	-0.3	-0.3	-0.2	0.0	0.1	0.0	0.3	-0.6	-0.4	-0.3	0.0	0.7	0.2	0.1	0.1	-0.1	0.1	0.4	0.4	0.0	0.7			
4-Mar	0.6	0.5	0.7	0.7	0.3	0.0	-0.7	-0.5	-0.3	-0.1	0.3	0.8	1.6	1.1	1.3	-0.4	-0.3	0.2	0.7	0.2	0.2	0.5	0.4	1.0	0.4	1.6			
5-Mar	1.7	0.0	-0.5	-0.3	-0.4	-0.9	-0.2	-1.3	-0.2	0.2	0.2	0.0	0.1	0.2	0.2	0.4	0.6	0.6	0.5	0.6	0.1	0.1	0.2	0.1	0.1	1.7			
6-Mar	0.1	-0.2	0.2	-1.8	-0.2	0.2	-0.1	0.0	0.0	0.0	-0.1	0.0	1.1	0.2	0.5	0.0	0.2	0.3	-0.1	0.1	0.1	0.0	0.0	-0.1	0.0	1.1			
7-Mar	-0.1	0.0	0.2	0.4	0.1	-0.1	0.4	0.3	-0.6	-0.4	-0.3	-1.0	-0.2	-0.7	-0.2	-0.7	-0.5	-0.5	-0.3	-1.1	-0.2	0.0	-0.1	-0.1	-0.2	0.4			
8-Mar	0.0	0.0	0.0	0.2	0.6	0.6	0.3	0.0	0.6	0.3	0.0	-0.1	0.5	0.2	0.0	0.0	0.2	0.0	0.5	1.2	0.5	0.3	0.2	0.1	0.3	1.2			
9-Mar	-0.1	-0.3	0.2	0.1	0.1	-0.2	-0.3	-0.4	-0.6	-0.7	-0.5	0.7	0.5	0.0	-0.3	-0.3	-0.3	-0.6	0.1	-0.1	-0.1	-0.4	-0.4	0.3	-0.1	0.7			
10-Mar	0.3	0.6	0.3	0.6	0.2	-0.2	0.0	0.2	0.2	-0.1	-0.8	-1.0	0.0	-0.2	-0.1	0.2	-0.1	0.2	0.2	0.1	0.3	0.3	0.3	0.2	0.1	0.6			
11-Mar	0.0	0.2	0.3	0.1	0.5	0.2	0.5	0.1	0.2	0.1	0.1	0.3	-0.1	-0.1	-0.2	0.2	0.0	0.2	0.1	0.2	0.2	-0.1	0.1	-0.2	0.1	0.5			
12-Mar	-0.2	0.1	-0.1	-0.1	-0.3	0.1	-0.1	-0.1	-0.3	0.1	0.1	1.6	1.0	0.0	1.5	1.7	1.2	0.4	0.0	0.2	0.7	0.6	0.5	0.0	0.4	1.7			
13-Mar	-0.1	-0.1	-0.1	0.5	0.3	0.1	-0.2	0.0	0.4	0.6	0.0	0.4	0.3	1.1	0.2	0.0	0.3	-0.7	-0.4	0.0	0.5	1.6	1.0	0.3	0.3	1.6			
14-Mar	0.3	0.7	1.1	0.4	0.1	1.0	2.1	1.8	0.3	0.2	0.9	0.4	0.6	0.9	1.2	1.1	0.8	0.6	-0.1	0.4	0.4	0.6	0.6	0.2	0.7	2.1			
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.5	0.5	0.7	0.3	0.6	0.4	0.0	-0.1	0.0	0.1	--	0.7			
16-Mar	0.0	0.3	0.0	0.1	0.1	-0.1	0.0	0.0	-0.4	-0.5	0.2	0.0	-0.4	-0.6	-0.3	0.2	0.0	-0.1	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.3			
17-Mar	0.1	-0.1	0.0	0.0	0.2	0.5	0.0	0.3	0.2	0.1	0.4	0.0	-0.4	-0.3	0.3	0.2	0.2	0.1	0.2	0.3	0.1	-0.1	-0.1	-0.1	0.1	0.5			
18-Mar	0.0	0.0	0.3	0.4	0.2	0.1	0.6	0.3	0.7	0.7	0.0	0.0	0.3	0.2	0.0	0.2	0.1	0.6	0.0	0.0	1.0	0.1	0.3	0.1	0.3	1.0			
19-Mar	0.1	0.0	0.0	-0.1	-0.2	-0.1	-0.1	-0.2	-0.3	-0.4	0.4	-0.3	-0.6	0.0	-0.4	0.0	-0.1	0.4	-0.1	0.1	0.2	0.4	0.2	-0.2	0.0	0.4			
20-Mar	-0.2	-0.1	0.0	0.1	0.0	0.0	0.1	-0.3	-0.1	-0.2	-0.2	-0.7	0.0	0.1	-0.2	0.0	-0.6	0.3	0.5	0.0	0.0	-0.1	-0.3	-0.3	-0.1	0.5			
21-Mar	-0.2	-0.1	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.2	0.4	0.1	0.4	0.5	0.4	0.9	1.4	0.7	0.8	0.8	0.8	0.4	0.6	0.3	1.4			
22-Mar	2.5	-0.1	0.3	0.2	0.0	-0.4	0.5	0.6	0.5	0.6	0.0	0.1	-0.2	0.6	0.3	0.1	0.2	0.0	-0.1	0.0	0.4	-0.1	0.0	0.2	0.3	2.5			
23-Mar	0.0	0.2	0.6	0.3	0.7	0.3	0.6	-0.2	0.1	0.3	-0.1	0.2	0.4	0.1	0.0	0.2	0.0	0.0	0.3	0.3	0.0	0.1	0.1	0.0	0.2	0.7			
24-Mar	0.0	-0.1	0.0	0.0	0.0	0.3	0.1	0.1	0.1	0.2	0.0	-0.3	-0.4	0.6	-0.5	0.1	-0.3	0.3	0.4	0.6	0.3	0.1	0.1	0.1	0.1	0.6			
25-Mar	0.1	0.0	0.0	0.0	0.1	0.1	0.1	-0.1	-0.1	0.1	-0.1	0.5	0.2	0.4	0.4	-0.1	0.3	0.9	0.5	0.2	0.6	0.9	0.6	1.2	0.3	1.2			
26-Mar	1.5	0.8	0.2	0.1	0.1	0.4	0.5	0.0	1.4	1.1	0.7	0.8	1.1	1.0	1.5	1.7	2.1	1.5	1.0	0.9	0.8	0.4	0.5	0.5	0.9	2.1			
27-Mar	0.3	0.0	0.4	0.5	0.1	0.4	0.1	0.4	0.4	0.6	0.5	0.9	0.9	0.3	0.5	0.3	1.8	2.4	0.6	0.7	0.3	0.0	0.0	0.0	0.5	2.4			
28-Mar	-0.1	0.3	0.1	0.2	-0.1	0.0	0.1	0.0	0.2	-0.2	0.5	-0.3	-0.9	-0.4	-1.0	-1.4	-1.6	-0.9	-1.4	-1.4	-0.9	-0.3	1.2	0.9	-0.3	1.2			
29-Mar	-0.8	-0.5	-0.9	-0.1	-0.1	0.1	0.5	0.6	0.7	0.2	0.7	0.8	0.4	0.2	0.1	0.5	0.3	0.3	-0.1	0.1	0.2	0.2	-0.2	-0.1	0.1	0.8			
30-Mar	-0.2	-0.2	-0.4	0.1	0.0	0.0	0.0	0.2	0.3	0.5	-0.4	0.2	0.1	0.3	-0.2	0.8	0.4	0.5	0.6	0.4	0.3	0.5	0.3	0.4	0.2	0.8			
31-Mar	0.3	0.1	0.3	0.4	0.7	0.7	1.2	0.8	0.2	0.1	0.0	-0.1	0.0	0.6	0.8	0.2	0.5	0.2	0.3	0.3	0.6	0.4	0.6	0.5	0.4	1.2			
																								Diurnal Average					
																								Diurnal Maximum					
0.2 0.1 0.1 0.1 0.1 0.1 0.2 0.1 0.1 0.2 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.2 0.2 0.2																													
2.5 0.8 1.1 0.7 0.7 1.0 2.1 1.8 1.4 2.2 1.2 1.6 1.6 1.4 1.5 1.7 2.1 2.4 1.0 1.2 1.0 1.6 1.2 1.2																													
AF - Analyzer Failure																													



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.2 km/h on Mar 2 07:00 Minimum Value: 0.1 km/h on Mar 1 03:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.2 Q ₃ = 1.7 P ₉₀ = 2.3 P ₉₉ = 4.2																								Hours in Service: 744 Hours of Data: 730 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	0.4	0.3	0.1	0.3	0.4	0.5	0.7	1.1	1.6	1.9	1.9	1.6	2.0	2.1	1.9	1.9	1.7	1.3	1.4	2.1	1.9	2.1	2.6	3.3	3.3
2-Mar	4.5	4.4	4.2	3.2	4.4	5.0	5.2	4.3	3.2	2.7	3.8	4.1	4.0	4.1	4.2	4.3	4.0	3.7	2.3	1.2	1.7	1.4	0.5	0.9	5.2
3-Mar	1.2	1.4	1.8	1.9	1.1	0.5	0.9	1.0	1.6	2.9	2.5	2.7	2.4	2.7	2.3	2.2	2.0	1.5	0.8	0.7	0.8	0.3	0.4	0.5	2.9
4-Mar	0.5	0.6	0.9	0.9	1.0	1.2	1.2	1.4	1.1	1.1	1.2	1.4	1.4	1.9	2.1	1.1	1.3	1.7	1.4	1.2	1.0	1.0	0.9	1.8	2.1
5-Mar	1.6	2.7	1.6	1.6	1.5	1.7	1.6	1.8	0.9	0.6	0.6	0.5	0.7	0.8	0.6	0.9	0.8	0.9	0.9	1.3	1.3	1.0	1.1	1.7	2.7
6-Mar	1.4	1.0	1.3	3.0	1.1	0.7	0.4	0.3	0.4	1.1	1.7	1.8	2.1	1.3	1.0	0.7	1.3	2.2	1.7	1.6	1.3	0.5	0.3	0.2	3.0
7-Mar	0.2	0.2	0.5	0.9	0.7	1.2	1.3	2.2	1.7	1.7	2.9	2.9	2.9	2.4	2.7	1.7	1.6	1.0	0.9	1.6	1.2	0.4	1.0	0.3	2.9
8-Mar	0.2	0.3	1.2	1.3	1.5	2.2	1.7	1.4	1.3	0.9	1.2	2.3	1.2	1.0	1.1	1.2	0.8	0.9	1.3	1.5	1.3	0.7	0.8	1.0	2.3
9-Mar	1.2	1.0	0.9	1.2	0.8	0.9	0.6	1.1	1.3	2.1	2.3	1.5	1.6	1.5	1.7	2.3	1.8	1.6	0.6	0.6	0.6	0.6	1.2	1.3	2.3
10-Mar	1.9	2.7	2.7	1.7	1.7	1.8	1.5	1.6	2.1	1.8	1.9	2.0	2.2	2.2	2.3	2.1	1.3	1.3	1.5	2.0	2.4	2.2	1.9	1.5	2.7
11-Mar	1.1	1.2	1.3	1.3	1.5	1.5	1.3	1.3	1.6	1.3	1.6	1.9	2.0	1.9	1.7	1.6	1.5	1.5	1.5	1.5	1.3	1.2	1.1	1.3	2.0
12-Mar	1.2	0.9	0.8	0.6	1.0	0.8	0.8	0.4	0.8	0.8	0.7	1.8	1.6	1.6	1.8	1.6	1.3	0.9	0.4	0.3	0.7	0.6	0.7	0.7	1.8
13-Mar	0.3	0.4	0.7	1.1	1.3	1.7	2.1	1.9	1.3	1.0	0.8	1.0	1.7	1.4	1.8	1.6	1.3	1.8	1.6	1.8	1.9	2.2	2.7	2.3	2.7
14-Mar	2.2	2.3	1.7	1.1	1.1	1.4	1.2	1.0	1.4	1.3	1.5	1.0	1.1	0.9	1.0	0.9	1.0	1.0	1.6	1.7	1.2	0.6	0.7	2.0	2.3
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.4	2.1	1.3	0.8	0.4	1.0	1.3	1.0	0.9	0.9	2.4
16-Mar	0.9	1.9	1.9	1.2	1.5	1.2	0.8	0.7	0.8	1.0	1.3	1.6	1.2	1.2	1.3	1.4	1.3	1.0	0.8	1.0	0.3	0.4	0.5	0.4	1.9
17-Mar	0.3	0.3	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.6	0.7	0.8	0.9	0.8	0.5	0.5	0.5	0.4	0.3	0.4	0.6	0.4	0.4	0.7	0.9
18-Mar	0.5	0.4	0.3	0.5	0.5	0.3	0.5	0.7	0.5	0.5	0.6	0.7	0.7	1.1	1.8	1.5	2.1	2.7	2.5	3.1	2.7	2.6	1.8	1.5	3.1
19-Mar	1.5	0.9	0.9	0.9	0.5	0.6	0.5	0.8	1.0	1.8	2.5	2.3	2.1	2.3	2.0	2.2	2.1	2.0	1.5	2.0	2.0	1.5	1.2	0.8	2.5
20-Mar	0.6	0.5	0.3	0.4	0.4	0.2	0.2	0.3	0.4	0.8	1.2	1.2	2.2	1.9	2.3	2.3	1.7	1.4	1.5	1.5	0.9	0.8	0.5	0.4	2.3
21-Mar	0.5	0.9	0.9	0.6	0.4	0.4	0.5	0.6	0.5	0.4	1.1	1.5	1.2	2.0	2.0	2.4	2.7	2.0	1.4	1.1	1.8	2.1	1.6	1.8	2.7
22-Mar	1.5	1.7	1.8	1.4	1.3	1.4	1.2	1.6	1.4	1.4	1.5	1.7	1.5	1.8	1.3	1.4	1.3	1.4	1.0	0.4	1.0	0.8	0.9	0.7	1.8
23-Mar	0.4	0.5	0.7	0.9	0.9	0.8	0.9	1.3	0.7	0.7	0.4	0.6	1.0	1.4	1.1	1.2	0.8	1.1	0.8	0.9	1.1	1.1	1.1	0.7	1.4
24-Mar	0.6	0.6	0.4	0.6	1.1	1.1	1.1	1.2	1.3	1.5	1.7	1.7	2.3	2.5	2.3	1.9	1.1	1.2	0.7	0.4	0.5	0.4	0.3	0.4	2.5
25-Mar	0.4	0.2	0.2	0.2	0.4	0.8	0.7	0.4	0.5	0.9	0.8	1.7	1.5	1.4	1.3	1.1	1.1	1.6	1.2	0.9	1.8	1.6	1.5	1.8	1.8
26-Mar	1.8	1.5	1.3	1.4	1.1	1.1	1.4	1.6	2.2	1.6	1.7	1.8	2.0	1.7	1.8	1.9	1.6	1.6	1.2	0.9	0.6	1.0	0.8	0.9	2.2
27-Mar	1.1	0.7	0.8	0.7	0.7	1.3	1.5	1.1	0.8	0.9	1.1	1.2	1.6	1.5	1.4	1.5	1.9	1.9	1.7	1.6	1.1	0.8	0.3	0.8	1.9
28-Mar	0.9	0.6	0.3	0.4	0.2	0.1	0.2	0.7	0.6	1.1	1.7	3.1	3.7	3.4	3.8	4.2	4.0	3.3	2.9	2.0	1.0	1.0	1.8	2.9	4.2
29-Mar	2.6	2.6	2.3	1.7	1.2	0.9	1.0	1.0	1.0	1.1	1.4	1.4	1.3	1.2	1.5	1.4	0.9	0.8	0.6	0.4	0.6	0.7	1.0	0.7	2.6
30-Mar	0.5	0.8	0.6	0.4	0.4	0.2	0.3	0.3	0.6	1.2	1.1	1.8	1.5	1.1	2.0	1.6	1.0	1.0	0.9	0.8	0.5	0.6	0.7	0.8	2.0
31-Mar	0.8	0.7	0.9	0.8	0.7	0.7	0.7	1.0	1.1	0.7	0.6	0.8	1.4	2.1	2.9	4.1	3.7	3.0	2.7	3.8	3.7	2.7	1.8	2.1	4.1
4.5 4.4 4.2 3.2 4.4 5.0 5.2 4.3 3.2 2.9 3.8 4.1 4.0 4.1 4.2 4.3 4.0 3.7 2.9 3.8 3.7 2.7 2.7 3.3																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 4.1 km/h on Mar 22 01:00		Maximum Daily Average: 1.4 km/h on Mar 26		Hours in Service: 744																						
Minimum Value: -1.8 km/h on Mar 29 01:00		Minimum Daily Average: -0.4 km/h on Mar 2		Hours of Data: 729																						
Maximum Diurnal Average: 0.7 km/h at hour 21		Minimum Diurnal Average: 0.2 km/h at hour 11		Hours of Missing Data: 15																						
Monthly Average: 0.35 km/h		Percentiles: P ₁ = -1.2 P ₁₀ = -0.3 Q ₁ = 0.0 Median = 0.3 Q ₃ = 0.6 P ₉₀ = 1.1 P ₉₉ = 2.2		Hours of Calibration: 0																						
				Percent Operational Time: 98.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0.2	0.1	0.1	0.2	0.2	0.0	0.2	0.6	0.7	1.8	0.4	0.0	0.2	0.7	0.2	0.6	0.2	0.6	-0.4	0.5	1.1	1.1	-0.6	-0.6	0.3	1.8
2-Mar	-0.6	0.5	0.3	0.5	0.4	-0.8	-0.5	-0.6	-0.4	-0.5	-0.6	-0.5	-1.2	-1.3	-1.4	-1.3	-1.0	-1.2	-0.4	-0.3	1.4	-0.2	-0.2	-0.4	-0.4	1.4
3-Mar	-0.4	0.0	0.3	0.9	-0.1	-0.2	0.0	0.0	-0.1	0.1	0.2	0.5	-0.8	-0.5	-0.4	-0.1	0.8	0.5	0.3	0.5	0.3	0.4	0.6	0.1	0.1	0.9
4-Mar	0.0	0.1	0.4	0.5	0.1	0.5	-0.8	-0.4	0.5	0.6	0.4	0.9	1.1	0.8	1.1	0.0	0.3	1.4	1.8	1.7	1.2	1.2	0.4	2.0	0.7	2.0
5-Mar	1.7	1.4	0.1	0.3	-0.3	-0.7	0.3	-0.6	-0.1	-0.1	0.1	0.1	0.3	0.4	0.2	0.2	0.3	0.2	0.2	1.4	0.7	0.2	0.6	1.5	0.3	1.7
6-Mar	0.9	-0.4	0.1	-1.1	0.1	0.0	-0.1	-0.1	-0.1	0.2	-0.2	0.0	1.0	0.3	0.7	0.2	0.4	0.5	-0.2	0.2	0.3	0.0	0.1	0.0	0.1	1.0
7-Mar	-0.1	0.0	0.3	0.5	0.5	0.4	1.0	0.7	-0.3	-0.6	-0.3	-0.9	-0.1	-0.8	0.0	-0.7	-0.2	-0.3	0.0	-0.8	0.2	0.2	-0.1	0.1	0.0	1.0
8-Mar	0.0	0.5	0.7	2.3	2.6	1.7	1.0	0.8	0.5	0.7	0.4	0.5	1.5	0.4	0.9	1.0	1.2	1.3	1.2	1.8	1.5	0.8	0.6	0.6	1.0	2.6
9-Mar	0.7	-0.3	0.0	0.3	0.3	0.1	-0.3	-0.6	-0.4	-0.5	-0.3	1.1	0.5	0.0	-0.1	-0.3	0.0	-0.7	0.1	-0.1	-0.2	-0.3	-0.3	0.6	0.0	1.1
10-Mar	0.5	0.9	0.4	0.7	0.3	0.0	0.3	0.7	0.4	-0.4	-1.0	-1.2	-0.2	0.0	-0.2	0.4	-0.1	0.4	0.1	0.1	0.3	0.3	0.3	0.1	0.1	0.9
11-Mar	0.0	0.4	0.5	0.1	0.7	0.5	0.6	0.5	0.3	0.1	0.3	0.6	0.1	0.1	-0.2	0.4	0.1	0.4	0.2	0.2	0.3	0.1	0.1	0.1	0.3	0.7
12-Mar	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.4	0.6	1.6	1.5	0.1	1.3	1.1	0.6	0.5	0.2	0.7	0.6	0.7	0.7	0.7	0.5	1.6
13-Mar	0.4	0.3	0.6	1.5	1.3	0.9	0.8	1.1	1.4	1.2	0.6	1.3	2.0	2.2	1.5	0.8	0.2	0.3	-0.6	-0.5	0.9	1.1	0.9	0.2	0.8	2.2
14-Mar	-0.3	0.0	0.7	-0.5	-0.2	0.4	1.7	1.2	0.6	0.2	0.9	0.4	0.5	1.2	0.4	0.6	0.1	1.0	1.4	0.8	0.8	0.7	0.3	0.6	0.6	1.7
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.8	0.8	0.1	0.5	0.5	0.5	0.5	0.6	0.6	--	0.8
16-Mar	0.0	0.3	-0.3	0.1	0.2	0.1	-0.1	0.0	-0.4	-0.6	0.2	-0.3	-0.8	-1.0	-0.4	0.3	0.0	0.1	0.1	0.0	0.1	0.2	0.2	0.1	-0.1	0.3
17-Mar	0.1	0.1	0.1	0.2	0.2	0.4	0.3	0.4	0.1	0.3	0.3	0.0	0.1	0.1	0.6	0.2	0.2	0.3	0.5	0.8	0.7	0.1	0.1	0.1	0.3	0.8
18-Mar	0.2	0.2	0.1	0.2	0.5	0.4	0.4	0.5	0.4	0.4	0.3	0.0	0.2	0.2	0.1	0.5	-0.1	0.7	0.1	-0.1	1.5	0.2	0.5	0.1	0.3	1.5
19-Mar	0.3	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	-0.5	0.2	-0.4	-0.9	0.0	-0.7	0.0	0.2	0.4	0.1	0.3	0.8	0.9	1.2	0.5	0.1	1.2
20-Mar	0.3	0.0	0.2	0.4	0.6	0.3	0.4	0.3	0.1	0.0	-0.1	-0.8	0.1	0.4	-0.1	0.0	-0.6	0.6	0.5	0.3	0.3	0.2	0.0	0.4	0.2	0.6
21-Mar	0.6	0.7	0.7	0.3	0.3	0.6	0.4	0.4	0.5	0.5	0.5	0.2	-0.3	0.5	0.4	0.6	1.6	1.7	1.0	1.1	1.5	1.4	0.9	0.9	0.7	1.7
22-Mar	4.1	0.4	0.8	0.5	0.3	-0.3	0.5	0.5	0.3	0.6	-0.3	0.2	0.3	0.4	0.3	0.4	0.4	0.4	0.2	0.2	0.6	-0.3	0.5	0.5	0.5	4.1
23-Mar	0.3	0.3	0.4	-0.1	0.2	0.3	0.3	-0.2	0.6	0.3	0.1	0.1	-0.3	-0.1	0.1	0.1	0.1	0.1	0.4	0.6	0.1	0.2	0.4	0.4	0.2	0.6
24-Mar	0.2	0.1	0.1	0.1	0.4	0.8	0.5	0.1	0.0	0.2	-0.2	-0.6	-0.3	0.2	-0.6	0.2	-0.2	0.5	0.6	1.0	1.1	0.7	0.3	0.8	0.2	1.1
25-Mar	0.2	0.2	0.2	0.3	0.9	0.9	1.1	0.4	0.5	0.6	0.5	1.1	-0.3	0.2	0.2	-0.5	0.1	1.4	0.7	0.7	0.3	0.6	0.8	1.6	0.5	1.6
26-Mar	3.1	1.8	0.8	0.7	0.9	1.0	1.2	0.9	2.2	1.3	0.4	0.3	1.0	1.4	2.0	2.6	3.1	1.8	2.1	1.6	1.5	1.1	0.4	0.3	1.4	3.1
27-Mar	0.4	0.1	0.2	0.4	0.6	0.6	0.5	0.6	0.5	0.3	0.3	1.2	0.6	0.1	0.5	0.4	1.7	2.5	0.9	0.6	0.4	0.2	0.2	0.4	0.6	2.5
28-Mar	0.7	0.4	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.3	0.4	0.1	-0.8	-0.1	-1.1	-1.3	-1.2	-0.9	-1.2	-1.1	-0.6	0.0	1.5	2.0	-0.2	2.0
29-Mar	-1.8	0.4	-0.8	0.4	0.8	0.4	0.1	0.6	0.5	0.1	0.6	0.8	0.2	0.3	0.0	0.6	0.5	1.1	0.4	0.3	0.4	1.1	0.2	0.1	0.3	1.1
30-Mar	-0.1	-0.2	-0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.5	-0.3	0.1	0.2	0.1	-0.2	1.0	0.2	0.8	0.9	0.6	0.6	0.7	0.6	0.8	0.3	1.0
31-Mar	0.9	0.4	0.6	0.3	0.5	0.7	0.8	0.7	0.6	0.5	0.1	0.2	0.8	2.2	2.0	1.2	1.3	0.1	0.4	1.1	1.2	0.6	0.5	0.5	0.8	2.2
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 km/h on Mar 2 02:00 Minimum Value: 0.2 km/h on Mar 18 03:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.7 Median = 1.1 Q ₃ = 1.7 P ₉₀ = 2.3 P ₉₉ = 3.9																								Hours in Service: 744 Hours of Data: 729 Hours of Missing Data: 15 Hours of Calibration: 0 Percent Operational Time: 98.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	0.3	0.4	0.2	0.2	0.3	0.4	0.7	0.9	1.0	1.3	1.4	1.3	1.8	1.4	1.0	1.5	1.1	0.9	0.9	1.3	1.3	2.4	2.9	2.6	2.9
2-Mar	4.3	4.8	4.6	3.3	3.9	4.4	4.8	4.1	3.1	2.6	3.5	3.9	3.4	3.6	3.4	3.5	3.8	3.2	1.9	1.1	2.0	1.8	0.7	1.0	4.8
3-Mar	1.3	1.6	1.7	2.3	1.3	0.7	1.0	1.2	2.0	3.1	3.0	3.1	2.5	2.8	2.3	2.5	2.1	1.4	0.6	0.4	0.6	0.4	0.5	0.5	3.1
4-Mar	0.5	0.6	0.9	0.9	0.9	0.9	1.1	1.1	1.0	1.1	1.4	1.5	1.4	1.4	1.2	0.9	1.5	1.8	1.4	1.2	0.8	0.9	1.1	1.9	1.9
5-Mar	1.4	2.2	1.3	1.8	1.4	1.3	1.0	1.2	0.7	0.7	1.1	0.5	0.6	0.8	0.6	0.8	0.8	0.7	0.7	1.5	2.1	0.9	1.0	1.2	2.2
6-Mar	1.3	0.8	0.9	2.0	0.7	0.5	0.3	0.4	1.0	1.3	1.9	2.1	2.2	1.4	1.4	1.0	1.5	2.0	1.9	1.7	1.4	0.5	0.3	0.4	2.2
7-Mar	0.3	0.3	0.6	0.8	0.7	1.1	1.2	1.8	1.7	2.2	3.5	3.0	2.8	2.6	2.7	1.8	1.3	0.7	0.7	1.4	1.5	0.6	1.1	0.7	3.5
8-Mar	0.4	0.4	0.9	1.0	1.4	2.3	2.1	1.4	1.5	0.8	1.3	2.4	0.9	1.1	0.9	1.1	0.7	0.9	1.1	1.0	0.7	1.0	0.9	0.8	2.4
9-Mar	1.5	1.4	0.9	1.7	1.4	1.1	0.9	1.4	1.0	1.7	2.3	1.8	1.8	1.7	2.0	2.3	2.0	1.8	0.6	1.0	0.8	0.8	1.3	1.4	2.3
10-Mar	2.0	2.8	2.8	1.9	1.8	1.8	1.6	1.5	2.1	1.9	2.0	1.9	2.2	2.2	2.3	2.1	1.4	1.5	1.7	2.2	2.7	2.4	2.0	1.5	2.8
11-Mar	1.0	1.1	1.2	1.4	1.3	1.4	1.4	1.2	1.1	1.0	1.4	1.3	1.5	1.7	1.7	1.7	1.3	1.5	1.5	1.8	1.5	1.1	0.9	0.7	1.8
12-Mar	0.6	0.6	0.5	0.4	0.5	0.4	0.4	0.5	0.8	0.7	0.6	2.1	1.8	1.2	1.4	1.1	1.0	0.6	0.6	0.3	0.6	0.8	0.9	0.6	2.1
13-Mar	0.5	0.8	1.1	1.1	1.2	1.1	2.2	1.5	1.4	1.0	0.8	1.0	1.7	1.6	1.8	1.7	1.1	1.5	1.2	1.3	1.6	1.5	2.4	2.0	2.4
14-Mar	2.0	1.8	1.8	1.6	1.6	1.6	1.6	1.0	1.3	1.1	1.1	0.8	0.8	0.7	1.1	0.6	1.3	0.9	2.3	2.1	1.5	0.5	0.7	2.2	2.3
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.3	1.3	0.9	0.6	0.6	0.8	0.8	1.2	1.0	2.3
16-Mar	1.0	2.0	2.3	1.0	1.2	1.2	0.9	0.6	0.6	1.0	1.5	1.3	1.3	1.3	1.2	1.6	1.2	0.9	0.6	0.6	0.3	0.4	0.6	0.7	2.3
17-Mar	0.4	0.4	0.3	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.5	0.4	0.6	0.5	0.5	0.4	0.6	0.5	0.4	0.6	0.7
18-Mar	0.5	0.4	0.2	0.3	0.5	0.4	0.5	0.5	0.5	0.4	0.6	0.7	0.6	0.9	1.4	1.8	2.2	3.0	2.5	3.3	3.1	2.7	1.9	1.8	3.3
19-Mar	1.6	1.0	0.9	0.5	0.6	0.7	0.4	0.7	0.8	1.6	2.4	2.5	2.3	2.6	2.3	2.7	2.7	2.1	1.1	1.4	1.0	0.4	0.5	0.6	2.7
20-Mar	0.8	0.6	0.3	0.3	0.4	0.3	0.2	0.2	0.3	0.4	1.0	1.4	2.5	1.9	2.2	2.6	1.9	1.8	1.6	1.5	1.4	0.9	0.5	0.4	2.6
21-Mar	0.5	0.6	0.8	0.8	0.8	0.6	0.7	0.6	0.5	0.4	1.2	1.7	1.4	2.3	2.3	2.6	2.9	2.1	1.3	1.1	1.7	1.8	1.7	2.1	2.9
22-Mar	1.2	2.3	1.9	1.5	1.7	1.8	1.4	1.8	1.7	1.5	1.5	1.8	1.6	1.9	1.2	1.2	1.5	1.7	1.1	0.5	1.2	1.3	1.3	0.9	2.3
23-Mar	0.5	0.5	0.7	0.9	0.9	0.8	0.8	1.1	0.9	0.7	0.4	0.7	1.2	1.1	1.2	1.1	1.1	1.1	0.7	0.7	1.1	1.2	1.1	0.7	1.2
24-Mar	0.6	0.4	0.4	0.5	0.7	0.9	1.0	0.8	1.3	1.6	1.9	1.9	2.3	2.6	2.6	2.1	1.4	1.3	0.9	0.3	0.3	0.6	0.4	0.6	2.6
25-Mar	0.6	0.4	0.3	0.4	0.7	1.4	0.7	0.7	0.3	0.7	1.1	1.9	1.7	1.5	1.4	1.3	1.3	1.5	1.0	1.1	1.8	1.5	1.5	1.8	1.9
26-Mar	1.2	1.6	1.5	1.5	1.1	1.0	1.4	1.6	1.9	1.7	1.7	1.9	2.2	2.0	1.8	1.7	0.9	1.6	1.1	0.8	0.7	0.8	0.6	0.9	2.2
27-Mar	0.8	0.6	0.7	0.7	0.8	0.8	0.9	0.7	0.6	0.8	1.0	1.2	1.5	1.4	1.4	1.2	1.2	1.5	1.7	1.7	0.9	0.8	0.4	0.8	1.7
28-Mar	1.1	0.7	0.2	0.6	0.3	0.3	0.2	0.3	0.2	0.6	1.9	3.2	3.8	3.7	3.6	4.0	3.8	3.2	2.6	1.3	0.6	1.1	1.3	3.7	4.0
29-Mar	2.7	3.0	1.8	1.3	1.1	0.7	0.5	0.8	0.8	0.9	1.5	1.4	1.5	1.2	1.7	1.4	1.0	1.2	0.7	0.5	0.9	0.9	0.9	0.5	3.0
30-Mar	0.5	0.7	0.8	0.6	0.4	0.3	0.3	0.2	0.3	1.3	1.0	1.3	1.3	1.2	2.4	1.6	1.0	1.1	1.3	1.2	0.8	0.5	0.5	0.8	2.4
31-Mar	0.7	0.6	0.7	0.6	0.7	0.7	0.6	0.9	1.5	1.2	0.7	0.8	1.9	2.2	2.7	3.8	3.3	2.9	2.8	3.8	3.5	2.6	2.2	2.3	3.8
4.3 4.8 4.6 3.3 3.9 4.4 4.8 4.1 3.1 3.1 3.5 3.9 3.8 3.7 3.6 4.0 3.8 3.2 2.8 3.8 3.5 2.7 2.9 3.7																									
Diurnal Maximum																									
AF - Analyzer Failure																									

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 4
BUFFALO VIEWPOINT
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	709	35	35	100.00	17	0	3	0
H2S (ppb) Average	707	37	37	100.00	6	0	1	0
THC (ppm) Average	709	35	35	100.00	5.6	-	3.4	-
Temperature (C) Average	744	0	0	100.00	15.8	-	8.4	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	89	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	41	-	27	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.9	2	-	0	0	0	0	1	2	17
H2S (ppb) Average	707	0.3	0	-	0	0	0	0	0	1	6
THC (ppm) Average	709	2.39	0.4	-	2	2.2	2.2	2.3	2.4	2.8	5.6
Temperature 2 m (C) Average	744	-3.72	8.6	-	-32.7	-14.3	-9.5	-3.2	2.8	6.3	15.8
Relative Humidity (%) Average	744	66.5	18	-	26	42	53	67	81	90	99
Wind Speed 10 m (km/h) Average	744	10.2	6	-	1	4	6	9	12	18	41
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 17 ppb on Mar 20 12:00	Maximum Daily Average: 3.0 ppb on Mar 20		Hours of Data:	709
Minimum Value: 0 ppb on Mar 15 08:00	Minimum Daily Average: 0.1 ppb on Mar 19		Hours of Missing Data:	35
Maximum Diurnal Average: 2.3 ppb at hour 14	Minimum Diurnal Average: 0.3 ppb at hour 3		Hours of Calibration:	35
Monthly Average: 0.9 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =2 P ₉₉ =10		Percent Operational Time:	100.0

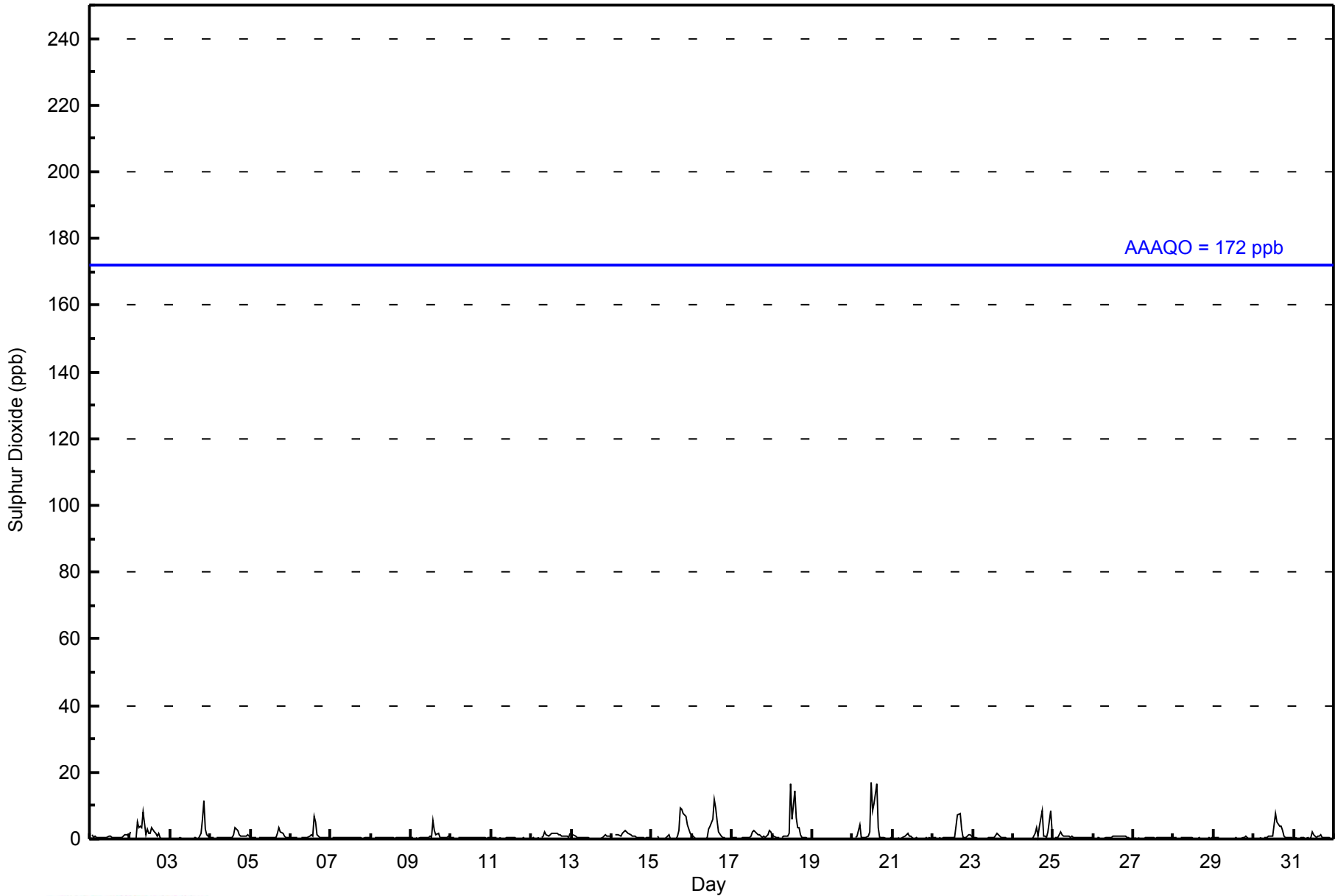
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	1	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0.6	1
2-Mar	2	Z	0	0	5	3	4	4	8	1	3	1	2	3	2	2	1	2	1	0	0	0	0	1.9	8	
3-Mar	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	2	6	11	3	1	1.4	11	
4-Mar	0	0	0	Z	0	1	0	1	1	0	0	0	0	1	1	3	3	1	1	1	1	1	1	0.9	3	
5-Mar	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	3	2	2	1	1	0	0.7	3	
6-Mar	1	1	1	0	0	Z	0	0	0	1	1	1	1	1	7	5	1	0	0	0	0	0	0	1.0	7	
7-Mar	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	
8-Mar	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	
9-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	5	2	1	2	1	2	1	0	1	1	0	0.8	5	
10-Mar	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1	
11-Mar	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-Mar	0	0	0	0	0	Z	1	1	2	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1.0	2	
13-Mar	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1	
14-Mar	1	Z	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	0	0	0	0	0	1.0	2	
15-Mar	0	0	Z	1	0	0	0	0	0	1	1	0	0	0	0	1	2	9	9	7	7	4	3	2.1	9	
16-Mar	1	0	0	Z	0	0	0	0	0	0	3	4	6	12	9	6	2	1	0	0	0	0	0	2.0	12	
17-Mar	0	0	0	0	Z	0	0	0	0	1	0	1	2	2	2	1	1	1	1	1	1	1	3	1.0	3	
18-Mar	1	1	1	1	1	Z	1	1	1	1	2	16	6	14	6	4	3	1	0	0	0	0	0	2.6	16	
19-Mar	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-Mar	0	Z	1	1	4	1	0	0	0	1	2	17	8	11	17	3	0	0	0	0	0	0	0	3.0	17	
21-Mar	0	0	Z	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	4	7	8	3	0	0	1	1	1	1.3	8	
23-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	0	0	1	0	0	0	0.4	2	
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	2	3	1	4	8	1	1	1	2	8	1.5	8	
25-Mar	Z	0	0	1	2	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2	
26-Mar	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	
27-Mar	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-Mar	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-Mar	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	
30-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	4	8	5	4	4	3	1	0	0	0	0	1.5	8	
31-Mar	Z	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0.5	2	
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	99.01	99.01
11 - 20	7	0.99	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



WBEA
Frequency Distribution

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

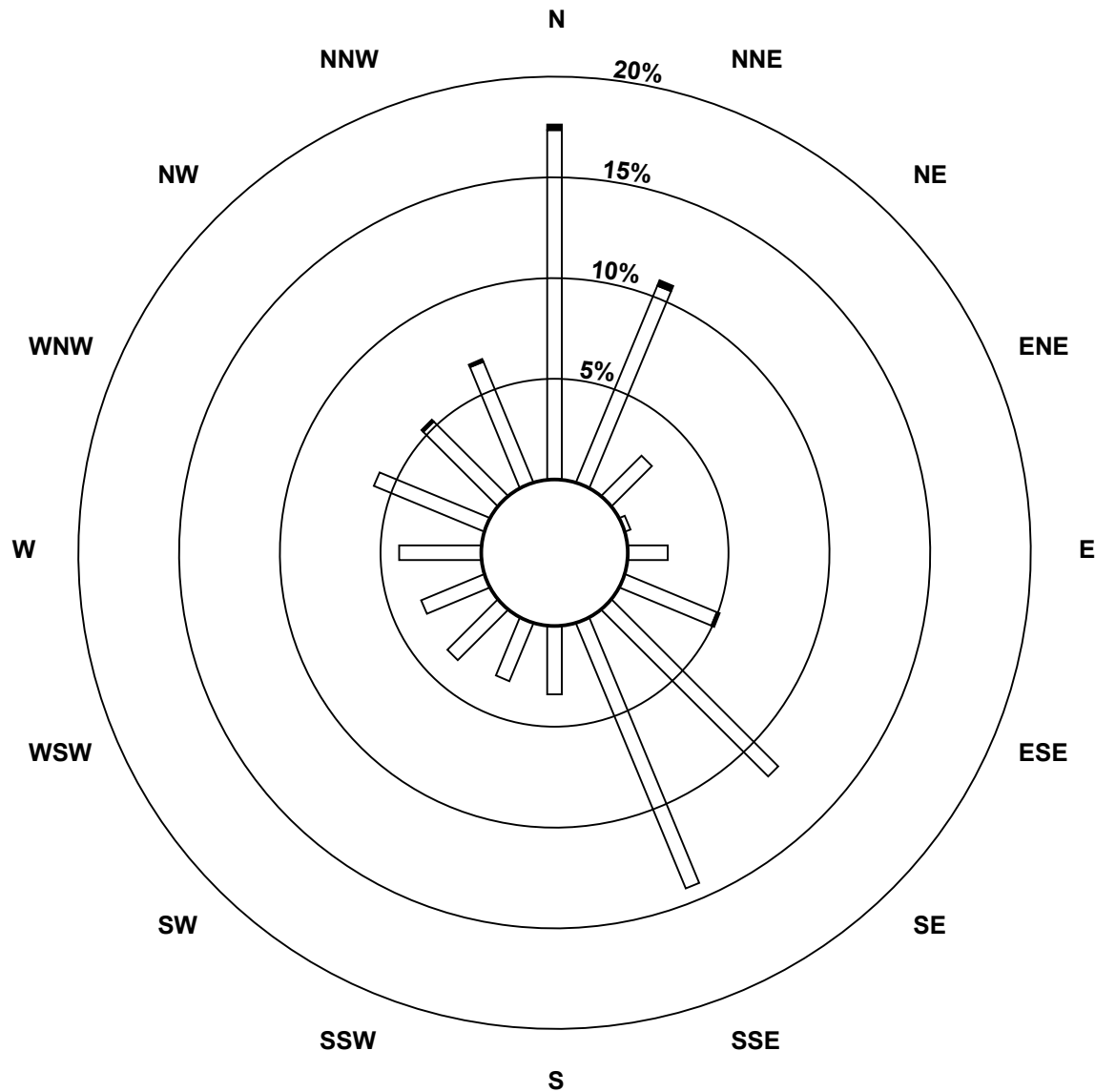
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	123	75	20	2	14	35	83	101	24	22	25	24	29	42	37	46	702
11 - 20	2	2	0	0	0	1	0	0	0	0	0	0	0	0	1	1	7
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	125	77	20	2	14	36	83	101	24	22	25	24	29	42	38	47	709

Total Number of Valid Hours: 709

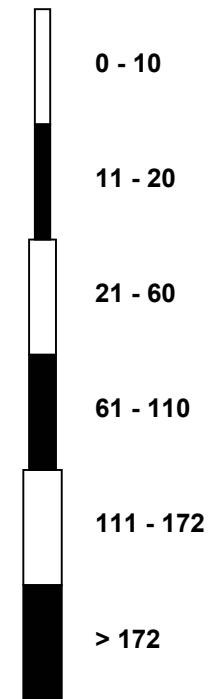
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Classes (ppb)

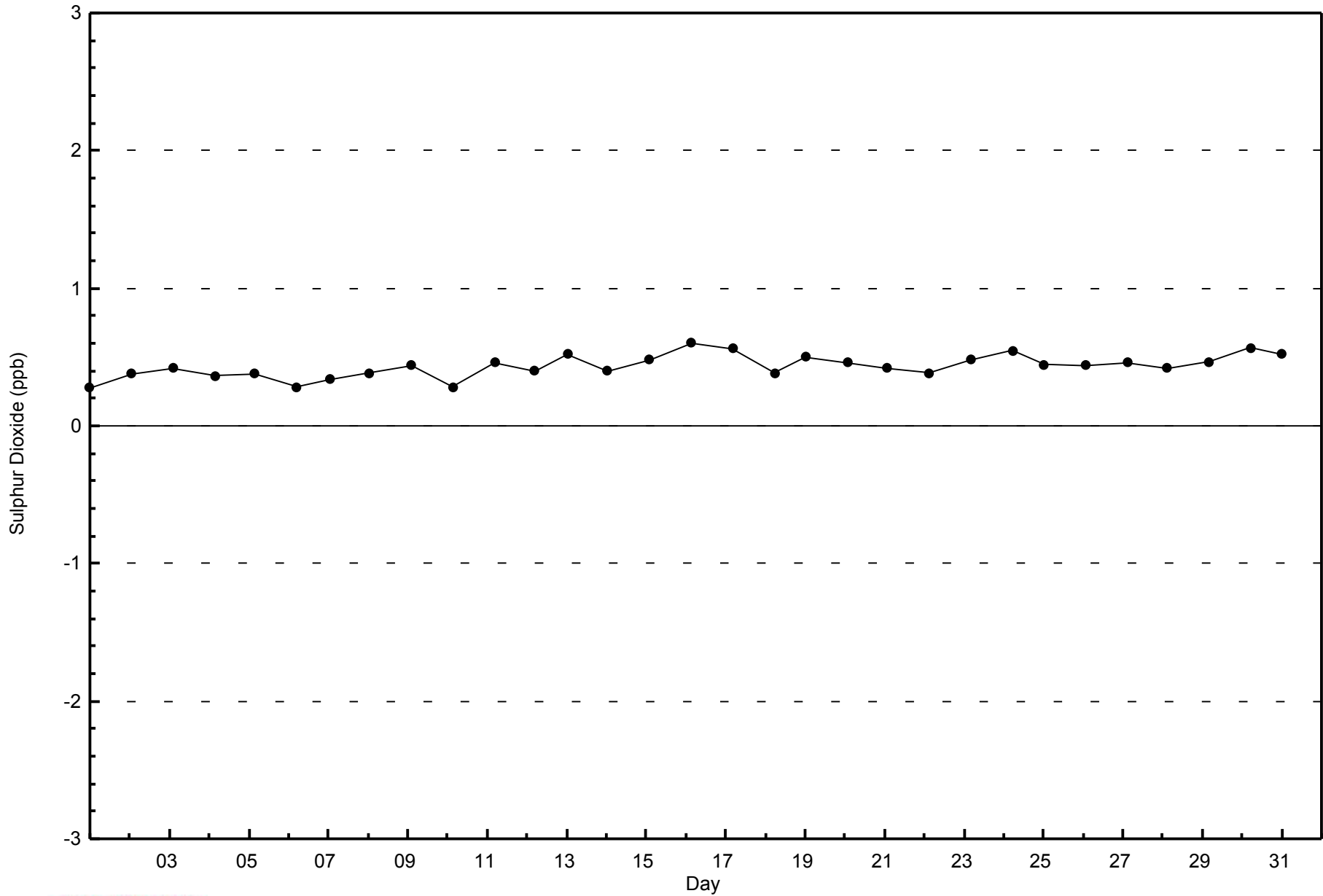


Total Number of Valid Hours: 709



WBEA
Zero Responses

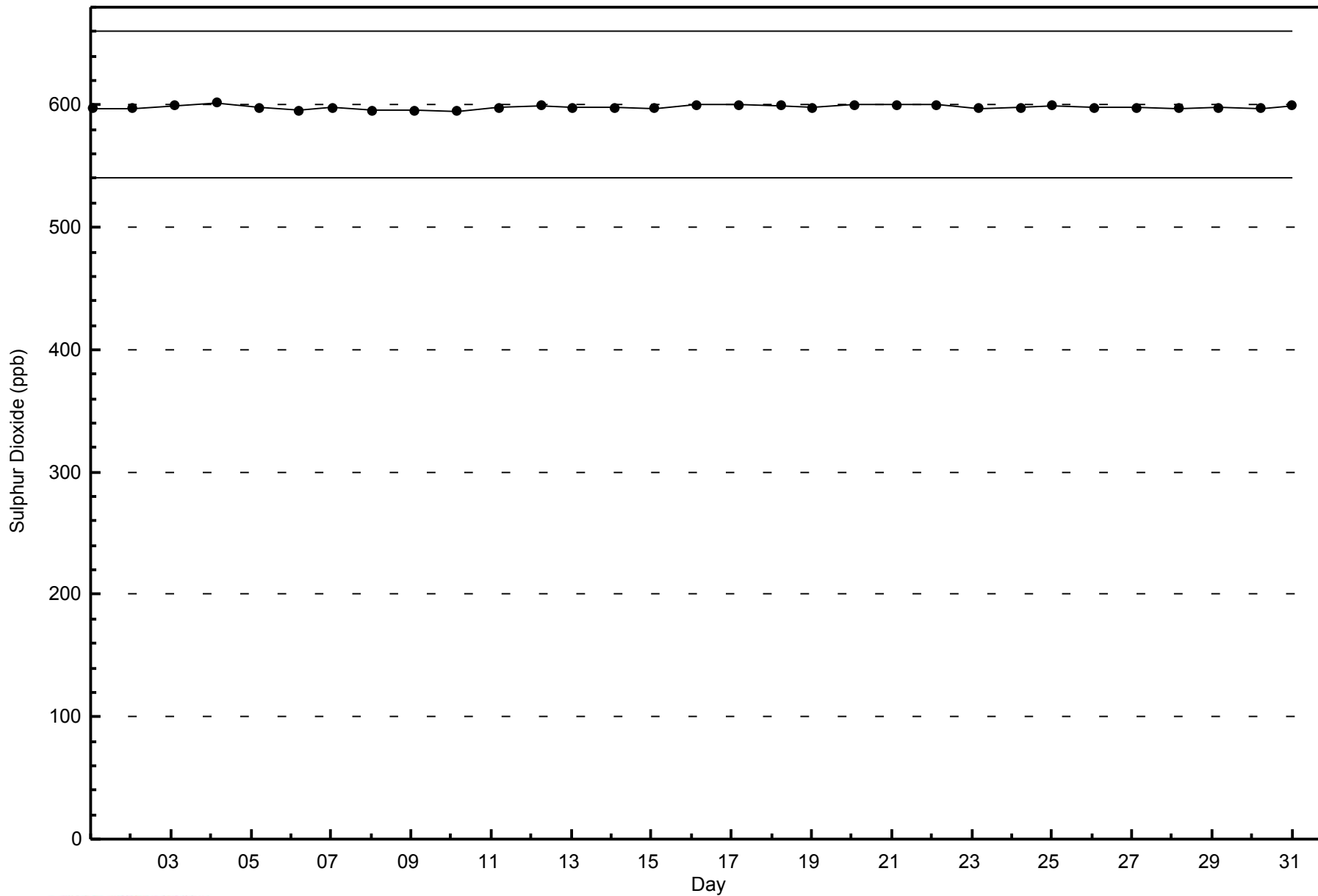
Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - March 2015





WBEA
Span Responses

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





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 ppb on Mar 18 12:00	Maximum Daily Average: 1.1 ppb on Mar 18		Hours of Data:	707
Minimum Value: 0 ppb on Mar 1 21:00	Minimum Daily Average: 0.1 ppb on Mar 7		Hours of Missing Data:	37
Maximum Diurnal Average: 0.5 ppb at hour 12	Minimum Diurnal Average: 0.2 ppb at hour 18		Hours of Calibration:	37
Monthly Average: 0.3 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =0 P ₉₀ =1 P ₉₉ =2		Percent Operational Time:	100.0

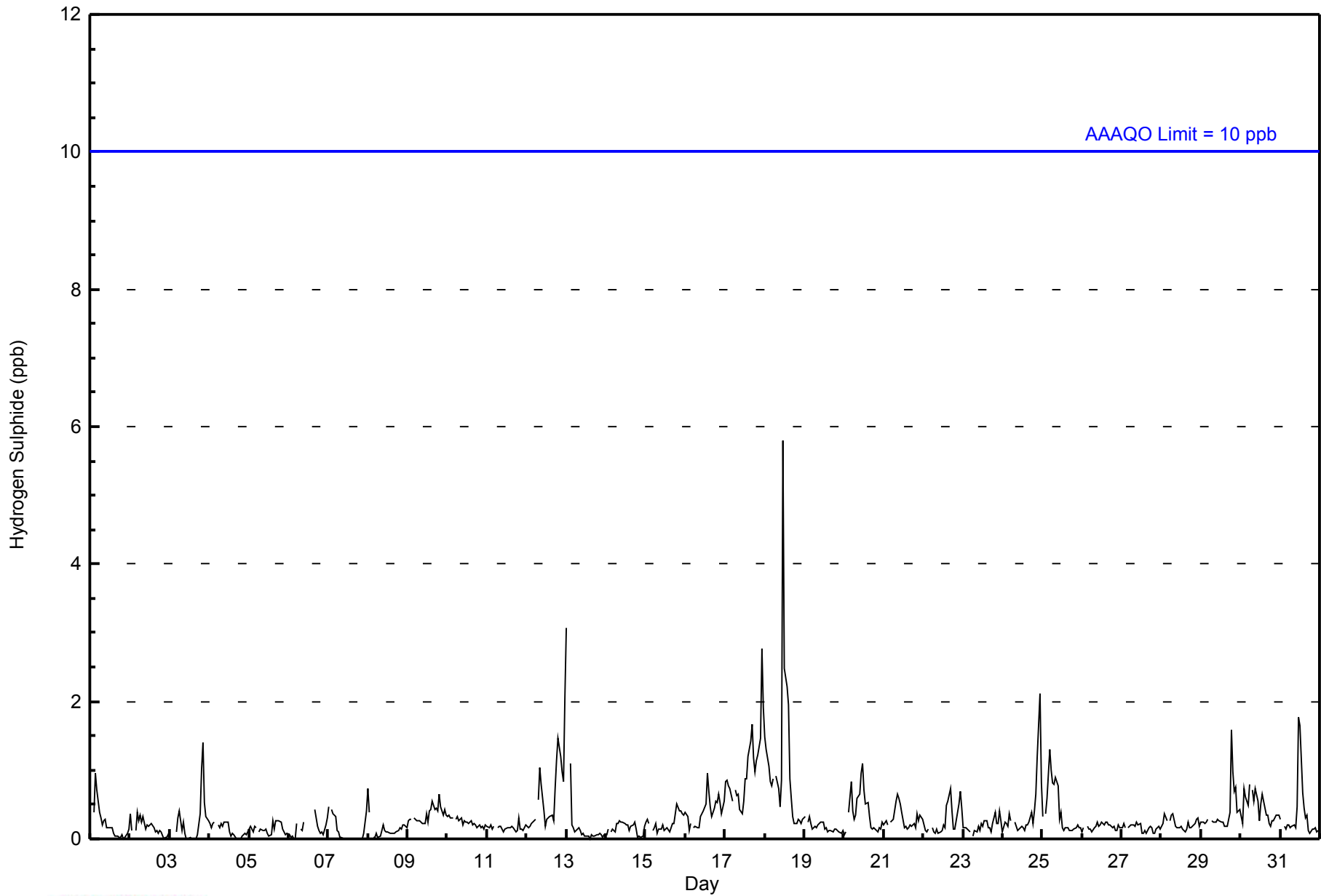
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
2-Mar	0	0	Z	0	0	0	0	0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

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - March 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.58	99.58
3 - 4	2	0.28	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: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - March 2015

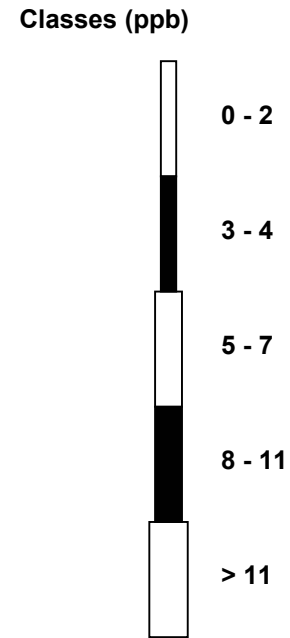
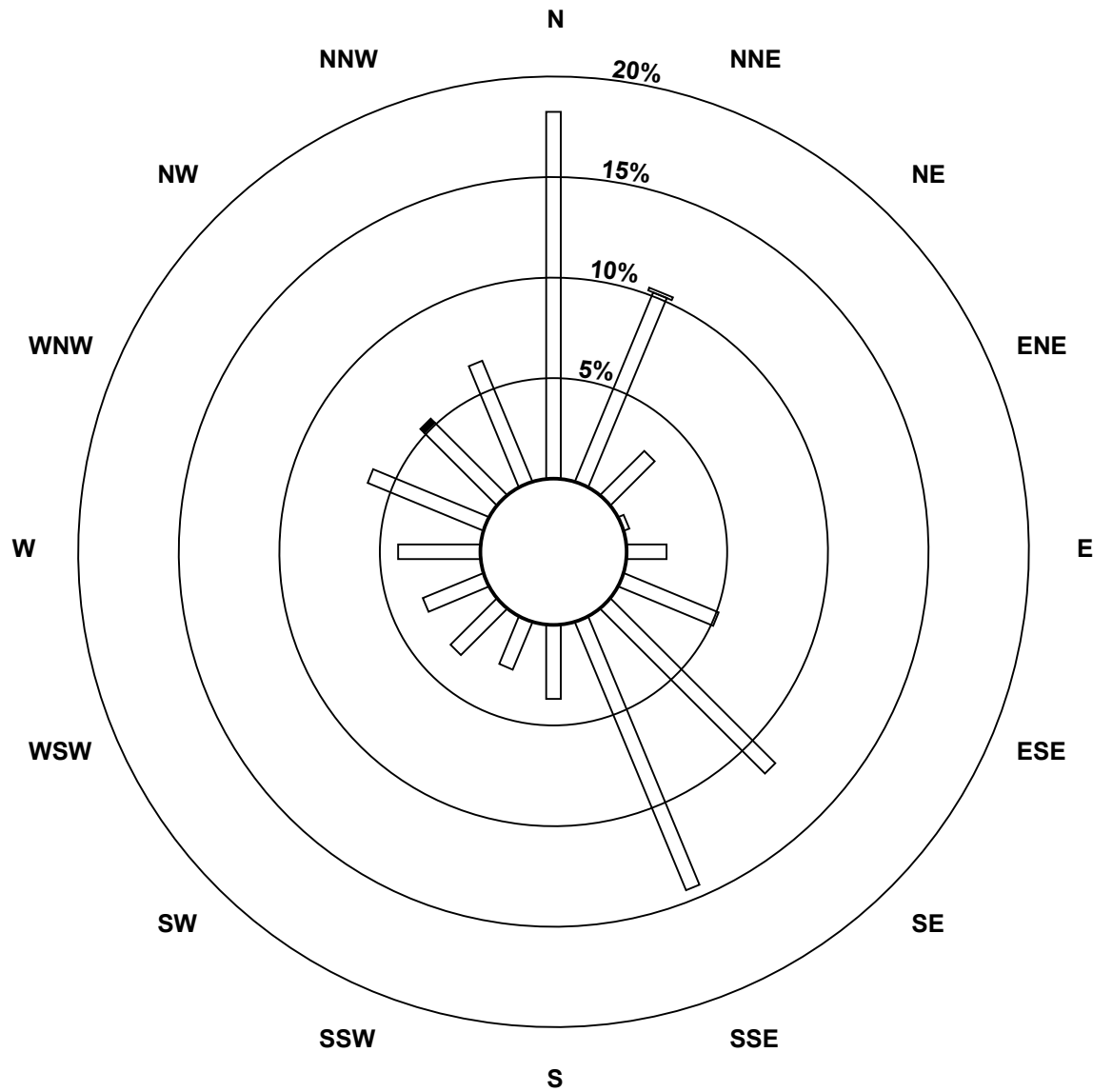
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	129	72	22	2	14	36	82	102	26	18	23	23	29	44	36	46	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
5 - 7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	129	73	22	2	14	36	82	102	26	18	23	23	29	44	38	46	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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

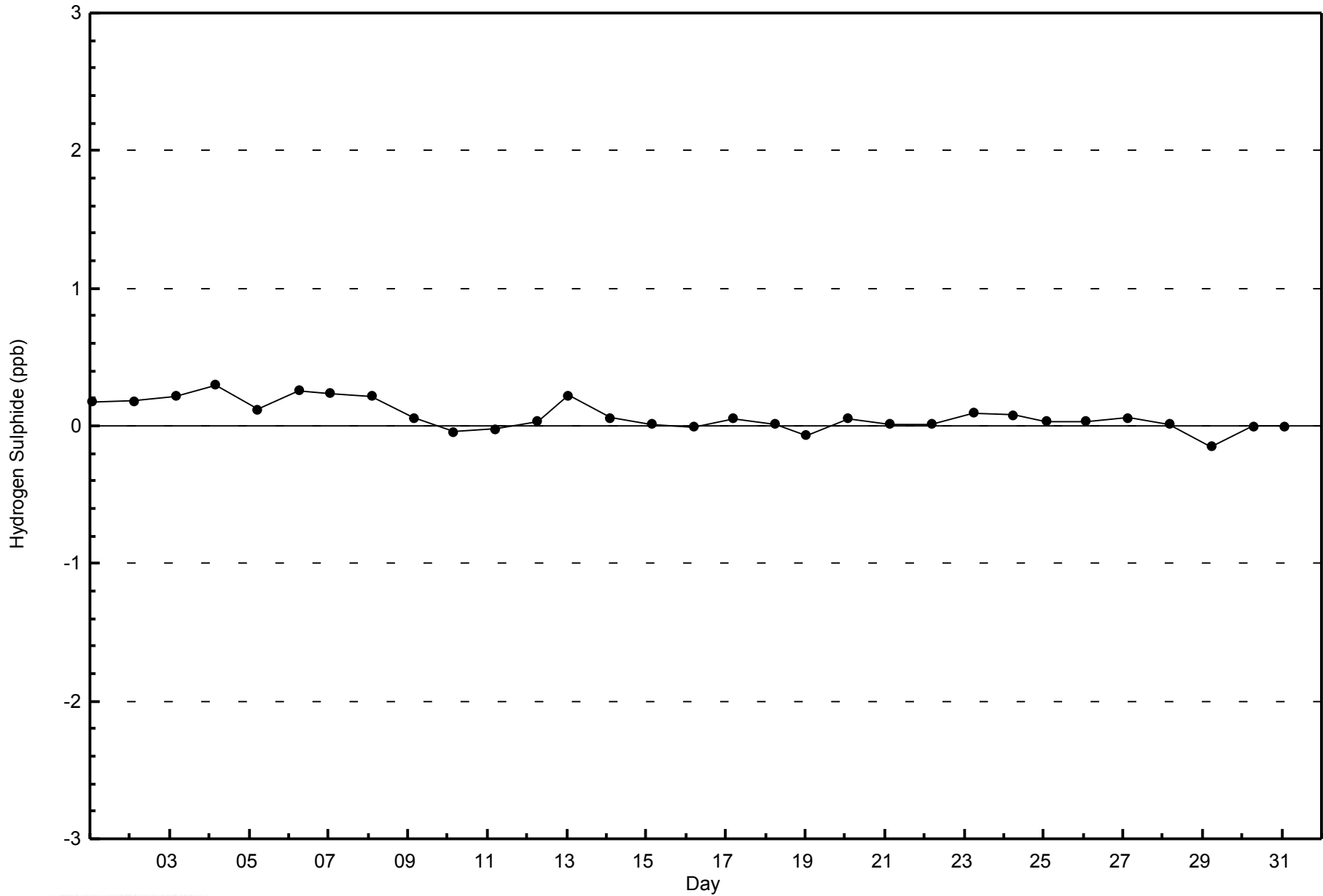


Total Number of Valid Hours: 707



WBEA
Zero Responses

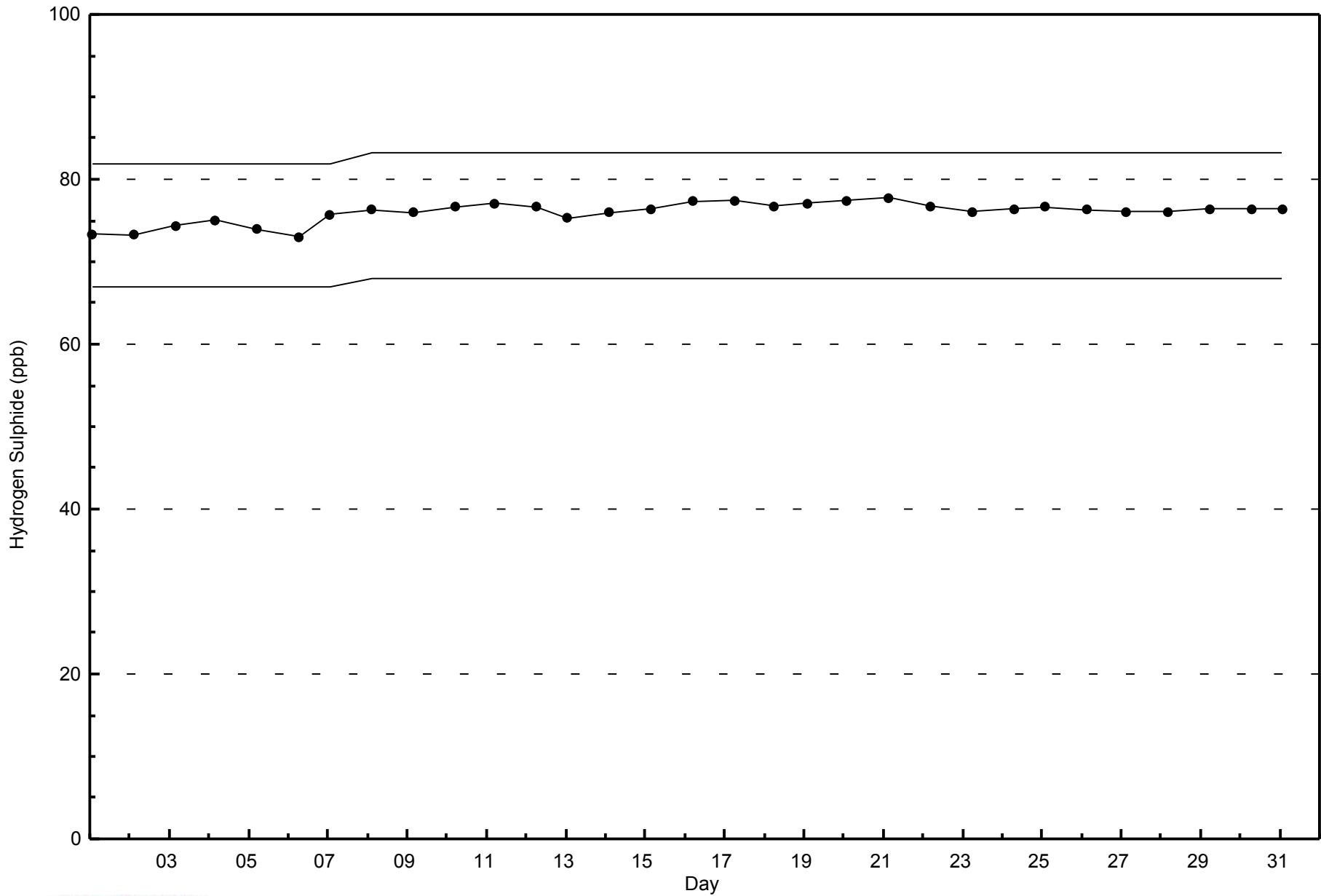
Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - March 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

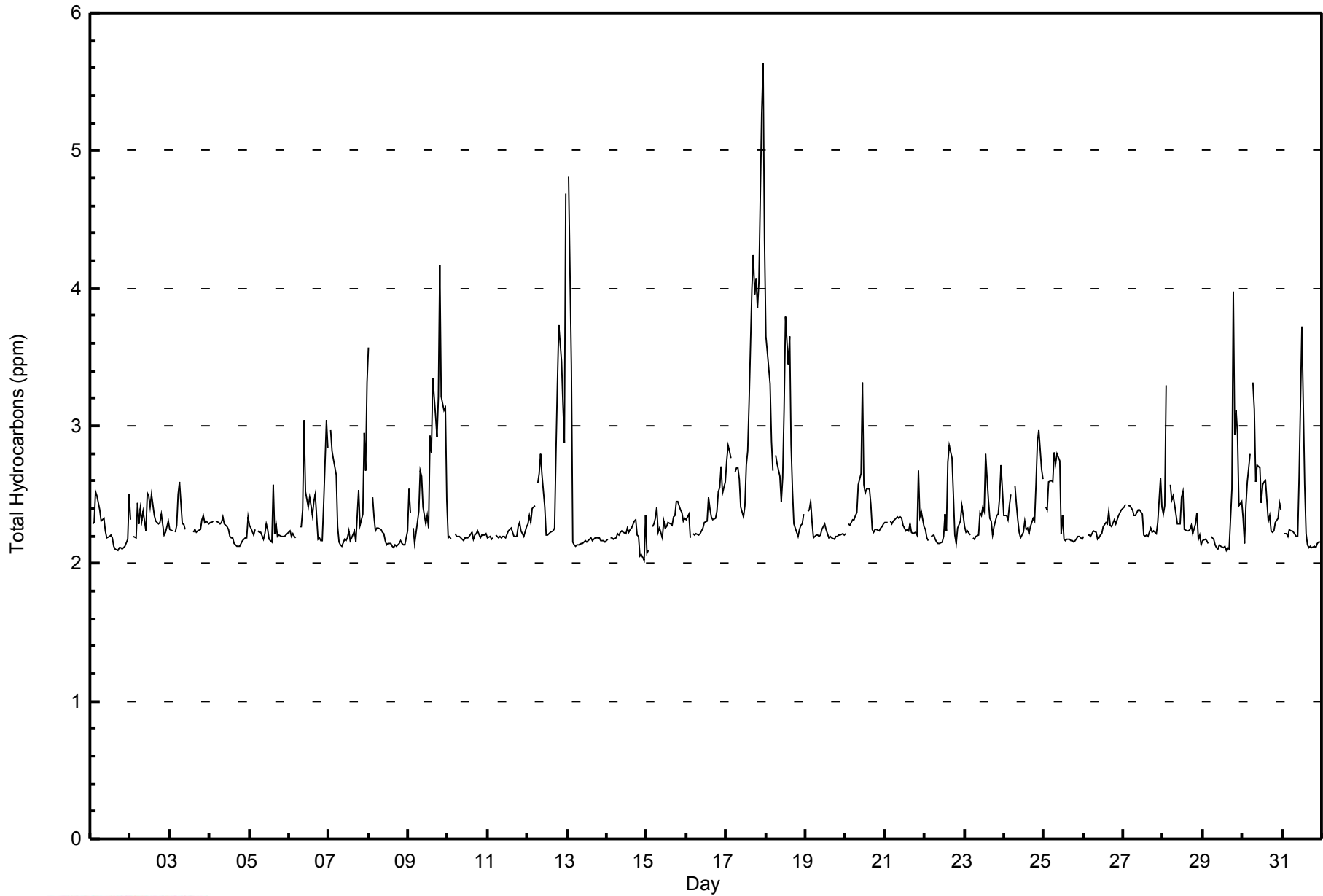
Buffalo Viewpoint - March 2015

Maximum Value: 5.6 ppm on Mar 17 23:00		Maximum Daily Average: 3.4 ppm on Mar 17		Hours in Service: 744																							
Minimum Value: 2.0 ppm on Mar 14 23:00		Minimum Daily Average: 2.2 ppm on Mar 10		Hours of Data: 709																							
Maximum Diurnal Average: 2.5 ppm at hour 24		Minimum Diurnal Average: 2.3 ppm at hour 6		Hours of Missing Data: 35																							
Monthly Average: 2.39 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 4.1		Hours of Calibration: 35																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	2.3	2.3	2.5	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.2	2.5	
2-Mar	2.3	Z	2.2	2.2	2.4	2.3	2.4	2.3	2.4	2.2	2.5	2.5	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.2	2.2	2.3	2.3	2.3	2.3	2.5
3-Mar	2.3	2.2	Z	2.2	2.3	2.5	2.6	2.3	2.3	2.2	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.6	
4-Mar	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	
5-Mar	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	2.6	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	
6-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.4	3.0	2.5	2.4	2.5	2.4	2.3	2.4	2.5	2.2	2.2	2.2	2.2	2.4	3.0	2.8	2.4	3.0	
7-Mar	Z	3.0	2.8	2.8	2.6	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.3	2.4	2.9	2.7	3.3	2.4	3.3	
8-Mar	3.6	Z	2.5	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.3	3.6	
9-Mar	2.5	2.4	Z	2.3	2.1	2.3	2.4	2.7	2.6	2.4	2.3	2.3	2.3	2.9	2.8	3.3	3.1	2.9	3.2	4.2	3.2	3.1	3.1	2.5	2.7	4.2	
10-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
11-Mar	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	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.3	
12-Mar	2.3	2.4	2.3	2.4	2.4	Z	2.6	2.7	2.8	2.6	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.8	3.3	3.7	3.5	3.2	2.9	4.7	2.7	4.7	
13-Mar	Z	4.8	3.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	4.8	
14-Mar	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	2.3	2.2	2.2	2.2	2.2	2.0	2.1	2.0	2.3	2.2	2.3	
15-Mar	2.1	2.1	Z	2.3	2.3	2.3	2.4	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	
16-Mar	2.3	2.4	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.4	2.3	2.3	2.3	2.4	2.5	2.6	2.7	2.5	2.6	2.4	2.7	
17-Mar	2.7	2.9	2.8	2.8	Z	2.7	2.7	2.7	2.6	2.4	2.3	2.4	2.7	2.8	3.2	4.0	4.2	4.0	4.1	3.9	4.0	5.3	5.6	4.3	3.4	5.6	
18-Mar	3.7	3.5	3.3	2.9	2.7	Z	2.8	2.7	2.6	2.4	2.6	3.1	3.8	3.4	3.7	2.9	2.5	2.3	2.3	2.2	2.3	2.3	2.3	2.4	2.8	3.8	
19-Mar	Z	2.4	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	
20-Mar	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.7	3.3	2.6	2.5	2.5	2.5	2.4	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.4	3.3	
21-Mar	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.7	2.3	2.4	2.3	2.3	2.7	
22-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.4	2.2	2.7	2.9	2.8	2.5	2.2	2.1	2.3	2.3	2.4	2.4	2.3	2.9	
23-Mar	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.4	2.8	2.5	2.3	2.3	2.2	2.3	2.3	2.4	2.5	2.7	2.5	2.3	2.8	
24-Mar	2.3	2.4	2.3	2.4	2.5	Z	2.6	2.4	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.6	2.9	3.0	2.7	2.6	2.4	3.0	
25-Mar	Z	2.4	2.4	2.6	2.6	2.6	2.8	2.7	2.8	2.7	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	2.4	2.8	
26-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.4	
27-Mar	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.6	2.4	2.3	2.6	
28-Mar	2.4	2.4	3.3	Z	2.6	2.5	2.5	2.4	2.3	2.3	2.3	2.5	2.5	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.4	2.2	2.2	2.1	2.4	3.3	
29-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	4.0	2.9	3.1	2.9	2.4	2.4	4.0	
30-Mar	2.3	2.1	2.4	2.6	2.8	Z	3.3	3.1	2.6	2.7	2.7	2.4	2.6	2.6	2.6	2.3	2.4	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	3.3	
31-Mar	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	3.2	3.7	2.6	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	3.7	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.4 2.5 2.4 2.4 2.4 2.3 2.4 2.4 2.3 2.3 2.3 2.4 2.4 2.4 2.4 2.4 2.3 2.4 2.4 2.4 2.5 2.5 2.5 2.5 2.5			
																								3.7 4.8 3.4 2.9 2.8 2.7 3.3 3.1 2.8 3.0 3.3 3.2 3.8 3.4 3.7 4.0 4.2 4.0 4.1 4.2 4.0 5.3 5.6 4.7			
Z - zerospan																								C - Calibration			



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.28	0.28
2.1 - 3.0	666	93.94	94.22
3.1 - 10.0	41	5.78	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
2.1 - 3.0	120	75	17	2	13	35	81	98	21	20	21	23	29	42	28	41	666
3.1 - 10.0	5	2	3	0	1	1	2	3	3	2	2	1	0	0	10	6	41
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	125	77	20	2	14	36	83	101	24	22	25	24	29	42	38	47	709

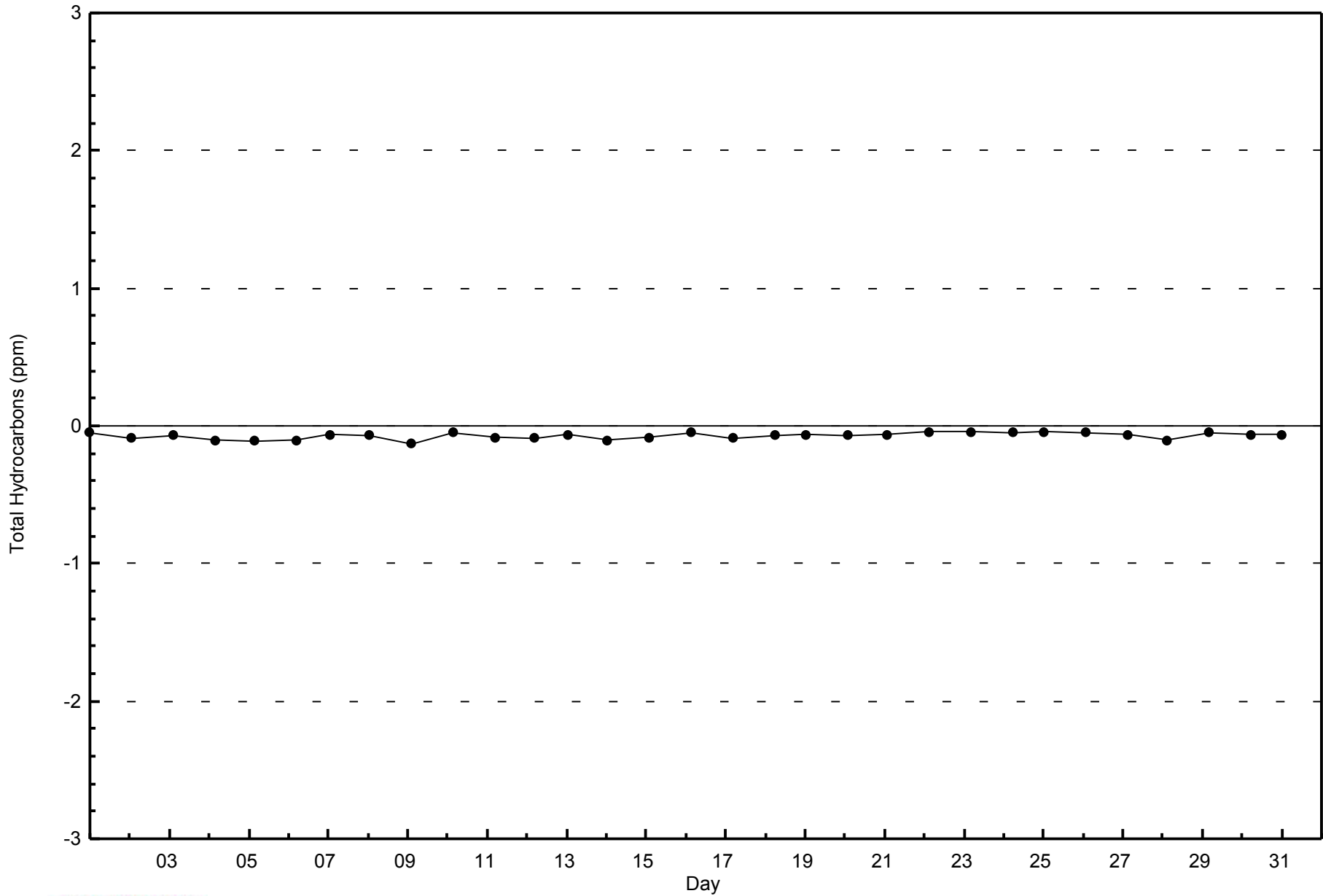
Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Zero Responses

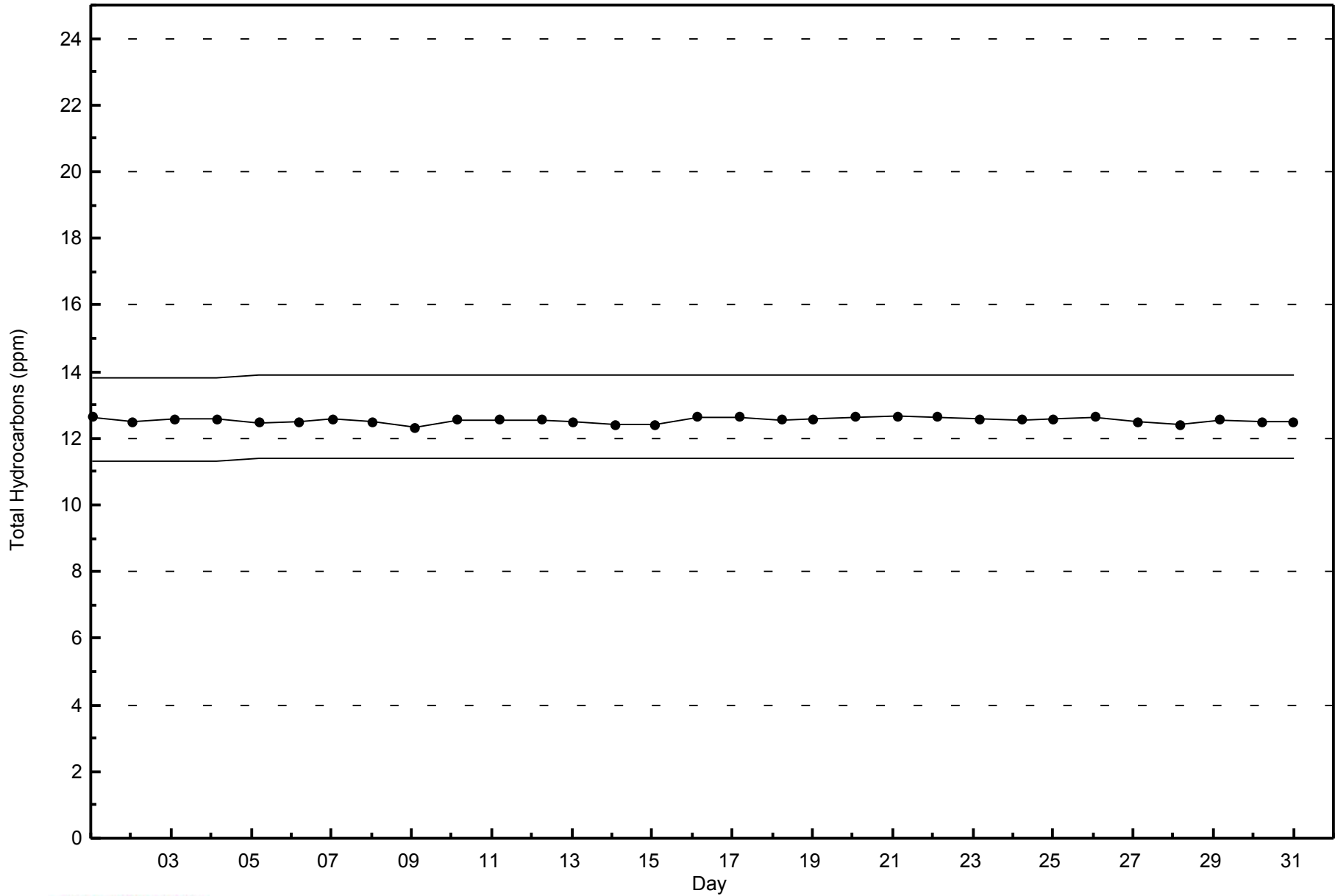
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - March 2015





WBEA
Span Responses

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





Wood Buffalo Environmental Association
Summary of Hour Averages

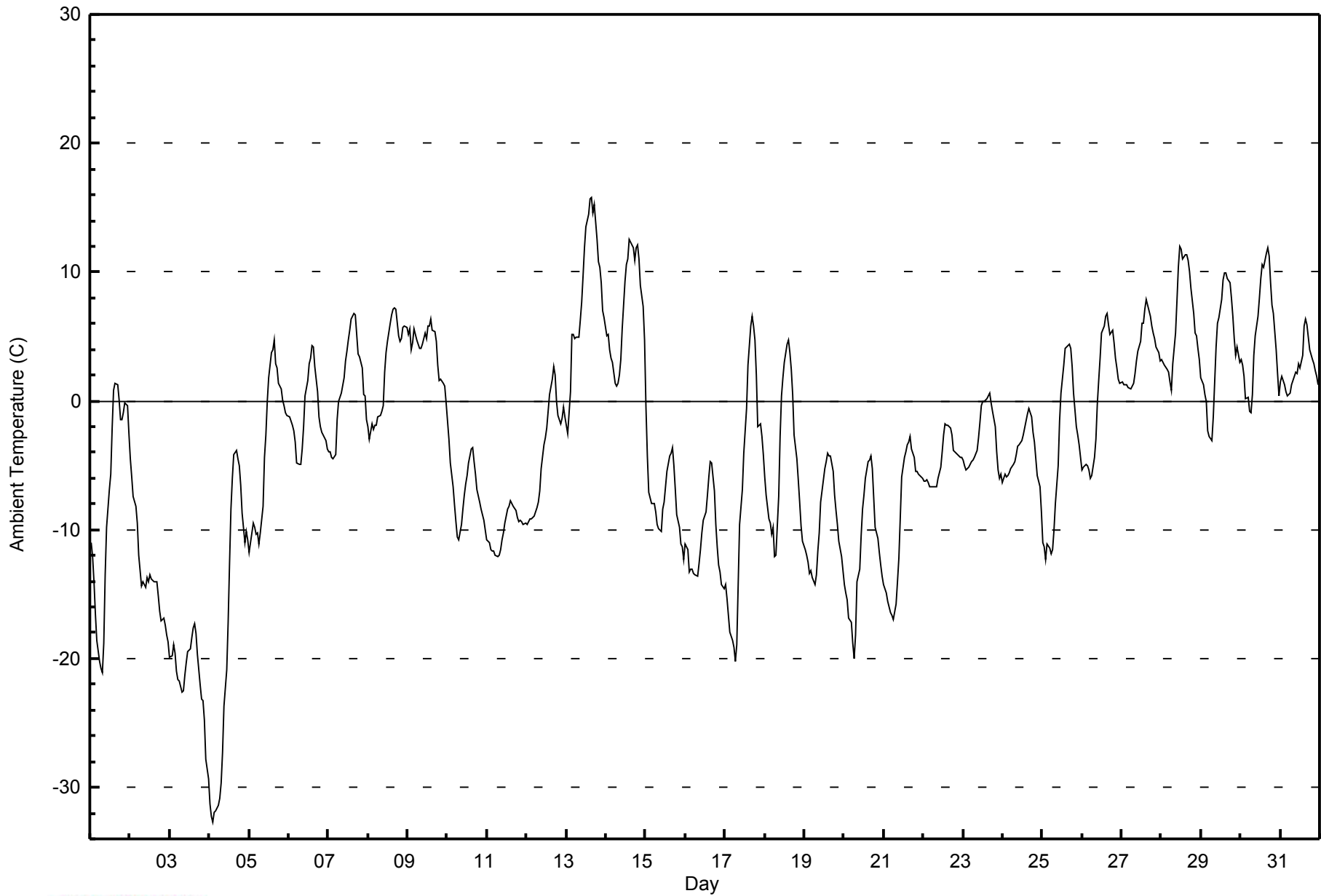
Ambient Temperature (AT) - C
Buffalo Viewpoint - March 2015

Maximum Value: 15.8 C on Mar 13 16:00		Maximum Daily Average: 8.4 C on Mar 13		Hours in Service: 744																						
Minimum Value: -32.7 C on Mar 4 03:00		Minimum Daily Average: -21.2 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.8 C at hour 16		Minimum Diurnal Average: -8.6 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -3.72 C		Percentiles: P ₁ = -29.7 P ₁₀ = -14.3 Q ₁ = -9.5 Median = -3.2 Q ₃ = 2.8 P ₉₀ = 6.3 P ₉₉ = 11.7		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-11.0	-12.1	-14.1	-16.6	-18.6	-20.2	-20.7	-21.1	-18.8	-13.5	-9.8	-6.9	-5.7	-2.1	0.9	1.4	1.2	0.1	-1.4	-1.5	-0.9	-0.2	-0.4	-2.6	-8.1	1.4
2-Mar	-4.4	-5.9	-7.4	-8.1	-9.4	-11.9	-13.1	-14.4	-14.0	-14.4	-13.7	-14.1	-13.5	-13.8	-14.0	-14.1	-14.0	-15.2	-16.3	-17.1	-16.8	-17.4	-18.2	-18.7	-13.3	-4.4
3-Mar	-19.9	-19.8	-18.9	-19.5	-21.0	-21.6	-21.7	-22.6	-22.5	-21.3	-20.3	-19.5	-19.3	-18.4	-17.6	-17.3	-18.0	-19.7	-22.1	-23.1	-23.2	-24.8	-27.9	-29.3	-21.2	-17.3
4-Mar	-31.3	-32.2	-32.7	-31.9	-31.9	-31.4	-30.8	-29.7	-27.2	-23.7	-20.9	-17.2	-12.6	-8.4	-6.0	-4.1	-3.8	-4.5	-5.1	-6.6	-8.7	-11.0	-10.1	-10.8	-18.0	-3.8
5-Mar	-11.7	-11.0	-9.5	-9.9	-10.4	-10.3	-11.1	-10.3	-8.2	-4.4	-2.7	0.0	1.8	3.7	4.0	4.7	2.9	2.5	1.4	0.9	0.0	-0.4	-0.9	-1.1	-3.3	4.7
6-Mar	-1.2	-1.6	-1.9	-2.3	-3.2	-4.8	-4.9	-4.9	-3.7	-2.0	0.4	1.6	2.9	3.3	4.3	4.2	2.7	0.7	-1.2	-2.0	-2.4	-2.7	-3.1	-3.8	-1.1	4.3
7-Mar	-4.0	-3.9	-4.4	-4.4	-4.1	-1.5	0.0	0.3	0.6	1.7	3.1	3.8	4.8	5.5	6.3	6.8	6.7	5.2	3.6	3.5	2.6	0.5	0.4	-1.4	1.3	6.8
8-Mar	-2.0	-3.0	-1.8	-2.3	-1.9	-1.8	-1.3	-1.1	-0.8	-0.4	2.2	3.7	4.6	6.0	6.7	7.1	7.3	7.1	5.1	4.6	4.8	5.7	5.8	5.7	2.5	7.3
9-Mar	5.2	5.6	4.0	4.5	5.6	4.7	4.4	4.0	4.1	4.4	5.3	4.8	5.9	5.8	6.4	5.5	5.4	4.6	2.8	1.6	1.7	1.3	1.1	-0.1	4.1	6.4
10-Mar	-1.6	-3.0	-4.8	-6.7	-8.1	-9.3	-10.6	-10.8	-9.6	-8.4	-7.4	-6.4	-5.8	-4.8	-3.8	-3.6	-4.7	-5.7	-6.9	-7.9	-8.4	-8.9	-9.3	-10.1	-6.9	-1.6
11-Mar	-10.7	-11.1	-11.5	-11.6	-11.7	-11.9	-12.1	-12.0	-11.6	-10.7	-10.2	-9.5	-8.4	-8.2	-7.8	-7.9	-8.2	-8.6	-9.1	-9.3	-9.2	-9.4	-9.5	-9.5	-10.0	-7.8
12-Mar	-9.5	-9.3	-9.1	-9.2	-8.9	-8.6	-8.3	-7.9	-7.0	-5.3	-3.4	-2.8	-2.1	-0.8	0.5	1.7	2.7	2.0	0.0	-1.1	-1.8	-1.4	-0.5	-1.2	-3.8	2.7
13-Mar	-1.9	-2.5	0.8	5.2	5.2	4.8	4.9	5.0	6.3	7.7	9.7	11.9	13.5	14.5	15.7	15.8	14.6	15.3	12.6	10.8	10.4	9.2	7.0	6.5	8.4	15.8
14-Mar	5.1	5.2	3.9	3.4	3.0	1.4	1.1	1.3	2.0	3.2	5.6	9.2	10.6	11.0	12.5	12.3	11.9	10.9	11.9	12.1	11.0	9.0	7.3	4.7	7.1	12.5
15-Mar	-0.5	-4.3	-7.1	-7.9	-7.9	-8.0	-8.6	-9.5	-10.0	-10.1	-8.4	-7.8	-6.7	-5.5	-4.3	-4.1	-3.6	-5.0	-6.9	-8.8	-9.9	-11.1	-11.3	-12.3	-7.5	-0.5
16-Mar	-11.1	-11.6	-13.3	-13.1	-13.1	-13.4	-13.5	-13.6	-12.6	-11.5	-10.2	-9.3	-8.6	-7.3	-5.9	-4.7	-4.9	-6.9	-9.6	-11.4	-12.7	-13.3	-14.3	-14.6	-10.8	-4.7
17-Mar	-14.2	-15.3	-16.6	-18.0	-18.6	-19.1	-20.3	-19.0	-14.2	-9.6	-6.8	-4.0	-2.3	-0.6	2.7	5.8	6.6	5.8	4.7	2.1	-2.0	-1.8	-2.7	-4.2	-6.7	6.6
18-Mar	-5.9	-7.3	-9.2	-9.5	-10.4	-9.8	-12.1	-12.0	-7.4	-2.8	0.4	1.8	3.0	4.4	4.7	3.7	2.5	0.5	-2.7	-4.5	-6.1	-7.9	-9.8	-10.9	-4.5	4.7
19-Mar	-11.5	-11.9	-12.5	-13.4	-13.2	-13.7	-14.3	-13.5	-11.6	-10.2	-7.8	-6.1	-5.2	-4.7	-4.0	-4.3	-4.3	-5.4	-7.3	-8.5	-9.6	-10.9	-12.0	-13.1	-9.6	-4.0
20-Mar	-14.2	-14.9	-15.4	-16.8	-17.2	-18.8	-20.0	-18.1	-14.0	-13.0	-10.5	-8.4	-7.3	-6.0	-4.7	-4.6	-4.3	-5.3	-7.6	-9.8	-10.7	-11.7	-12.7	-13.6	-11.7	-4.3
21-Mar	-14.3	-14.9	-15.6	-16.0	-16.4	-16.7	-16.9	-15.8	-14.1	-12.2	-9.1	-5.9	-4.4	-4.0	-3.4	-3.2	-2.8	-3.8	-4.4	-5.4	-5.4	-5.7	-5.8	-6.0	-9.3	-2.8
22-Mar	-6.2	-6.2	-6.1	-6.4	-6.7	-6.7	-6.6	-6.6	-6.7	-6.0	-5.1	-4.0	-2.6	-1.8	-1.9	-1.9	-2.1	-2.7	-3.8	-4.0	-4.1	-4.3	-4.4	-4.3	-4.6	-1.8
23-Mar	-4.6	-5.0	-5.3	-5.1	-4.9	-4.7	-4.4	-3.8	-2.8	-1.7	-0.4	0.0	0.0	0.2	0.4	0.6	-0.2	-0.8	-2.0	-4.0	-5.4	-6.0	-5.7	-2.9	0.6	
24-Mar	-6.4	-5.7	-5.9	-5.8	-5.6	-5.3	-5.0	-4.7	-4.1	-3.6	-3.4	-3.1	-2.7	-2.1	-1.6	-1.1	-0.6	-1.3	-2.5	-3.2	-4.5	-5.7	-6.7	-8.6	-4.1	-0.6
25-Mar	-11.0	-11.4	-12.3	-11.1	-11.4	-11.8	-11.6	-10.1	-7.9	-5.1	-1.6	0.6	1.7	2.8	4.0	4.3	4.4	4.1	2.7	0.6	-1.9	-2.7	-3.4	-4.4	-3.9	4.4
26-Mar	-5.3	-5.1	-4.9	-5.1	-5.3	-6.0	-5.8	-4.4	-3.0	-0.2	1.6	3.4	5.3	5.8	6.6	6.8	5.9	5.1	5.4	4.5	3.3	2.6	1.7	1.4	0.6	6.8
27-Mar	1.5	1.3	1.3	1.2	1.0	1.0	1.1	1.4	2.1	3.1	3.9	4.7	6.0	6.1	7.1	7.9	7.0	6.5	5.8	5.2	4.9	4.1	3.7	3.0	3.8	7.9
28-Mar	3.2	3.0	2.8	2.5	2.2	1.5	0.8	2.9	5.3	7.8	10.3	12.0	11.8	11.0	11.3	11.3	11.0	10.1	8.8	6.8	5.3	5.0	4.0	3.2	6.4	12.0
29-Mar	1.8	1.2	0.5	0.0	-2.3	-2.8	-3.1	-1.3	1.4	4.2	6.0	6.5	7.8	9.4	10.0	9.9	9.5	9.2	8.0	6.6	4.8	3.5	4.1	3.0	4.1	10.0
30-Mar	3.2	2.8	1.9	0.2	0.3	-0.9	-1.0	0.5	3.5	5.0	6.6	8.0	9.5	10.6	10.3	11.4	11.9	11.2	9.2	7.4	6.8	3.9	2.1	0.4	5.2	11.9
31-Mar	1.4	2.0	1.2	0.7	0.4	0.5	0.6	1.2	1.9	2.3	2.1	2.9	2.6	3.5	5.9	6.4	6.0	5.0	3.9	3.2	2.8	2.4	1.9	1.3	2.6	6.4
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	29	3.90	3.90
-20 - 0	437	58.74	62.63
0 - 10	246	33.06	95.70
10 - 20	32	4.30	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

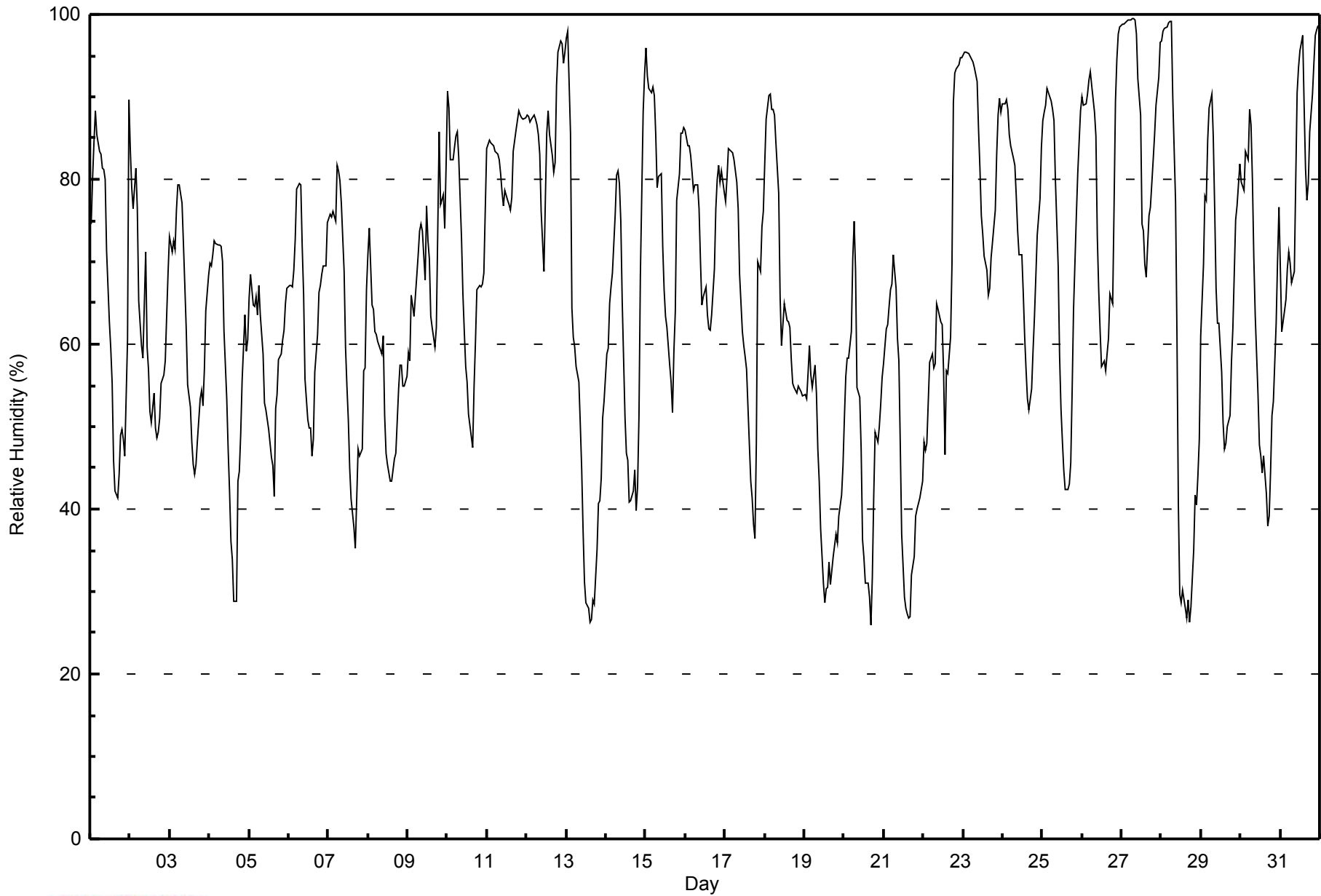


Maximum Value: 99 % on Mar 27 08:00										Maximum Daily Average: 88.9 % on Mar 27										Hours in Service: 744							
Minimum Value: 26 % on Mar 20 17:00										Minimum Daily Average: 42.8 % on Mar 19										Hours of Data: 744							
Maximum Diurnal Average: 78.9 % at hour 7										Minimum Diurnal Average: 49.4 % at hour 16										Hours of Missing Data: 0							
Monthly Average: 66.5 %										Percentiles: P ₁ = 27 P ₁₀ = 42 Q ₁ = 53 Median = 67 Q ₃ = 81 P ₉₀ = 90 P ₉₉ = 99										Hours of Calibration: 0							
																				Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	74	80	85	88	85	83	83	81	81	80	71	63	60	55	46	42	41	44	49	50	48	46	61	90	66.2	90	
2-Mar	84	79	76	81	76	65	63	60	58	71	60	57	52	51	54	50	49	49	51	55	56	58	63	69	62.0	84	
3-Mar	73	71	72	72	76	79	79	77	72	67	62	55	52	48	45	44	45	48	53	54	52	57	64	68	62.1	79	
4-Mar	70	69	71	72	72	72	72	72	70	62	53	47	42	36	34	29	29	43	45	49	56	64	59	60	56.2	72	
5-Mar	66	68	65	65	66	63	67	64	59	53	52	51	50	46	45	42	52	54	58	59	61	62	65	67	58.2	68	
6-Mar	67	67	67	69	73	79	80	79	72	66	56	51	50	50	47	49	57	61	66	67	69	69	69	75	64.7	80	
7-Mar	75	76	75	76	75	82	81	80	77	69	60	55	51	45	41	38	35	41	47	47	47	57	57	67	60.6	82	
8-Mar	71	74	65	64	61	61	60	59	59	61	51	47	45	43	43	45	46	47	55	57	57	55	55	56	55.8	74	
9-Mar	59	58	66	65	63	68	71	74	75	74	68	77	73	70	63	62	60	62	74	86	77	78	74	82	69.9	86	
10-Mar	91	89	82	82	84	85	86	83	73	66	61	57	55	52	49	47	55	60	67	67	67	67	69	76	69.6	91	
11-Mar	84	85	84	84	84	83	83	82	81	78	77	79	77	77	76	78	83	86	87	88	88	87	87	87	82.8	88	
12-Mar	88	88	87	87	88	87	87	85	83	76	69	77	86	88	85	83	81	82	91	96	97	96	94	95	86.5	97	
13-Mar	97	98	86	64	61	60	57	56	50	45	37	31	29	28	26	27	29	28	35	41	41	44	51	53	48.9	98	
14-Mar	59	60	65	67	69	76	80	81	79	75	65	51	47	46	41	41	42	45	40	43	51	68	88	93	61.3	93	
15-Mar	96	93	91	91	91	90	85	79	80	81	72	67	63	62	57	55	52	59	64	77	81	86	86	86	76.8	96	
16-Mar	86	84	84	83	81	79	79	79	77	70	65	66	67	63	62	62	64	69	77	80	82	80	81	79	74.9	86	
17-Mar	77	80	84	84	83	82	81	80	76	68	61	60	59	57	52	43	41	38	36	48	70	69	74	76	65.9	84	
18-Mar	82	87	90	90	88	89	88	84	78	66	60	62	65	63	63	62	58	55	55	54	55	55	54	54	69.1	90	
19-Mar	54	53	56	60	56	55	57	54	47	43	38	31	29	30	31	34	31	34	36	37	36	39	42	45	42.8	60	
20-Mar	51	56	58	58	61	70	75	69	55	54	47	36	34	31	31	29	26	32	42	49	48	50	53	56	48.8	75	
21-Mar	58	62	62	65	67	67	71	67	61	58	48	37	29	28	27	27	27	32	34	39	40	41	41	43	47.1	71	
22-Mar	48	47	48	53	58	59	57	58	65	64	63	62	57	47	57	56	61	70	89	93	93	94	95	95	66.2	95	
23-Mar	95	95	95	95	95	95	94	94	92	86	81	76	73	71	69	66	67	70	72	76	83	88	90	88	83.6	95	
24-Mar	89	89	90	89	85	84	83	82	78	74	71	71	66	61	57	53	52	55	59	63	68	73	78	84	73.0	90	
25-Mar	87	88	89	91	90	89	88	87	80	70	59	52	48	45	42	42	43	46	54	64	76	81	85	88	70.2	91	
26-Mar	90	89	89	90	92	93	91	88	85	73	67	62	57	58	57	59	61	66	65	77	89	95	98	98	78.7	98	
27-Mar	99	99	99	99	99	99	99	99	99	98	92	88	75	74	70	68	76	77	79	82	85	89	92	97	88.9	99	
28-Mar	97	98	98	98	99	99	99	99	90	77	61	41	30	29	30	28	27	29	26	28	35	42	40	44	48	58.1	99
29-Mar	61	70	78	78	85	89	90	85	76	67	63	62	57	51	47	48	50	51	58	62	68	75	77	82	67.9	90	
30-Mar	80	79	79	83	82	88	87	80	70	64	54	48	46	44	46	42	38	39	45	51	53	63	70	77	62.8	88	
31-Mar	69	62	64	65	69	71	70	68	69	80	90	94	96	97	89	81	77	79	86	90	94	97	98	99	81.5	99	
	76.6	77.2	77.5	77.7	77.9	78.8	78.9	76.6	72.8	68.3	61.7	58.1	55.4	53.1	51.0	49.4	50.2	53.2	58.0	62.5	65.5	68.5	71.4	75.2	Diurnal Average		
	99	99	99	99	99	99	99	99	99	98	92	94	96	97	89	83	83	86	91	96	97	97	98	99	Diurnal Maximum		



WBEA
Hourly Averages

Relative Humidity (RH) - %
Buffalo Viewpoint - March 2015





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

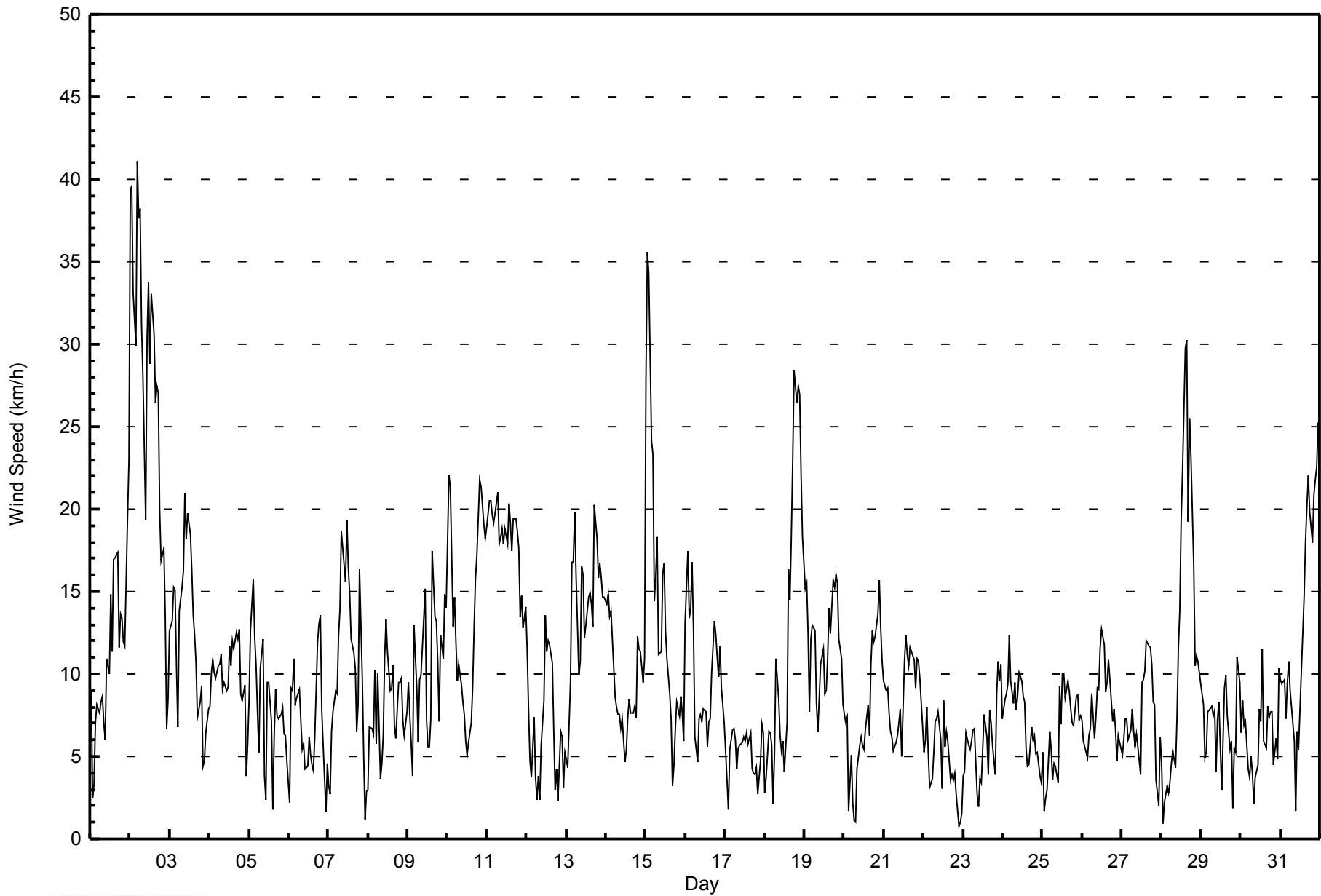
Wind Speed (WS) - km/h
Buffalo Viewpoint - March 2015

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	146	19.62	19.62
6 - 11	370	49.73	69.35
12 - 19	170	22.85	92.20
20 - 28	41	5.51	97.72
29 - 38	14	1.88	99.60
> 38	3	0.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Frequency Distribution

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

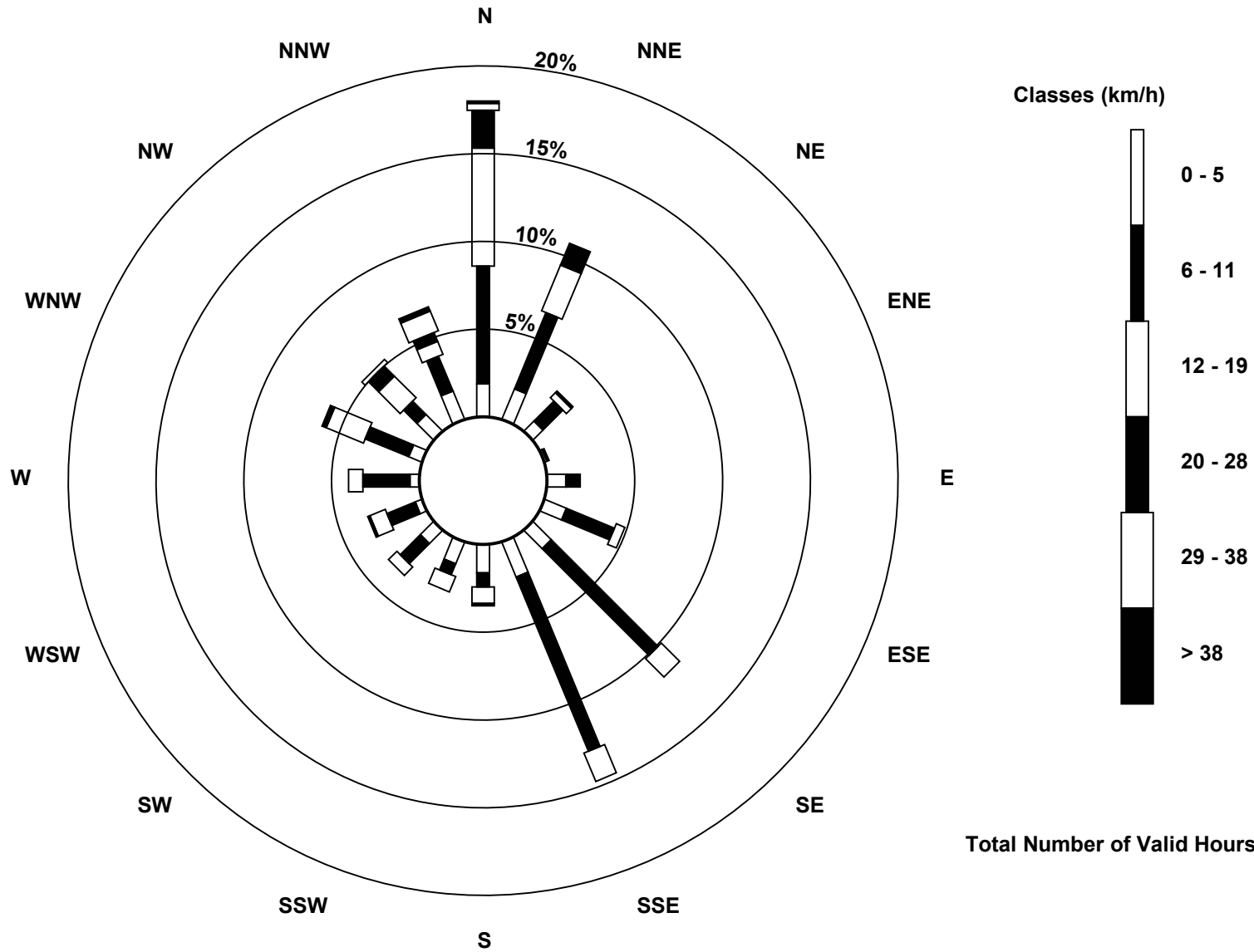
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	14	14	6	1	8	10	11	16	12	10	8	3	4	6	10	13	146
6 - 11	50	35	12	1	6	22	64	80	6	5	12	13	20	20	8	16	370
12 - 19	50	21	3	0	0	4	11	13	7	7	5	7	6	17	13	6	170
20 - 28	16	10	1	0	0	0	0	0	1	0	0	1	0	2	6	4	41
29 - 38	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9	14
> 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3
Totals	134	80	22	2	14	36	86	109	26	22	25	24	30	45	39	50	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - March 2015

Direction of Maximum Speed: 343 deg on Mar 2 05:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 337.6 deg on Mar 2	Hours of Data: 744
Direction of Minimum Speed: 82 deg on Mar 22 22:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.1 deg on Mar 17	Percent Operational Time: 100.0
Monthly Average Direction: 295.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	45	206	201	148	147	152	164	159	155	145	148	129	126	135	195	178	178	173	153	161	166	238	292	324	168.7
2-Mar	343	358	4	0	343	331	335	335	340	358	336	338	336	340	338	333	328	332	326	310	307	297	296	302	337.6
3-Mar	286	302	288	298	4	311	347	5	360	7	9	3	0	5	8	11	30	44	46	53	105	184	168	147	356.8
4-Mar	156	155	170	159	161	159	159	157	153	137	133	126	125	123	139	170	195	210	209	182	151	133	115	259	159.1
5-Mar	285	280	278	284	280	240	226	264	257	313	196	247	252	283	109	225	130	137	137	159	164	180	211	229	242.4
6-Mar	239	299	246	250	288	282	277	268	314	25	11	22	2	13	19	24	22	22	16	17	19	341	288	289	334.0
7-Mar	327	194	133	152	146	262	274	275	262	270	293	291	288	291	285	295	294	291	283	291	279	5	309	346	280.3
8-Mar	207	182	236	233	240	284	263	310	122	136	239	243	238	232	232	233	222	191	166	165	184	205	219	270	222.2
9-Mar	279	266	151	229	253	281	281	290	288	285	296	340	333	24	284	330	326	324	327	306	314	314	322	344	306.1
10-Mar	9	13	13	17	24	22	26	36	48	40	26	15	18	358	0	360	1	7	3	8	18	12	11	9	14.3
11-Mar	8	12	7	10	8	8	10	7	5	8	360	1	3	358	358	351	358	1	353	351	357	354	351	355	1.9
12-Mar	352	5	354	333	357	3	332	190	227	154	162	146	166	154	154	159	151	278	10	183	161	125	163	314	147.7
13-Mar	304	334	254	251	247	244	229	243	246	251	235	229	206	208	197	189	159	177	169	159	162	157	141	148	205.1
14-Mar	137	144	137	144	155	150	155	157	163	145	157	148	124	129	131	131	135	199	234	236	238	231	328	161.1	
15-Mar	19	8	335	321	318	328	305	302	336	13	323	315	314	328	336	6	25	72	135	157	165	162	156	149	337.3
16-Mar	2	1	351	350	354	11	33	33	10	22	9	19	11	27	33	18	355	354	356	351	351	357	346	333	2.1
17-Mar	302	287	295	152	142	148	152	175	156	141	126	354	6	11	33	42	56	100	105	155	171	344	305	326	85.0
18-Mar	215	183	144	145	167	285	162	158	152	154	20	16	358	319	0	3	352	357	360	2	357	354	356	354	2.1
19-Mar	353	349	353	351	11	12	13	20	14	357	353	352	359	354	356	13	21	3	20	20	29	34	29	31	8.9
20-Mar	25	26	32	150	3	12	163	208	330	10	4	8	340	356	329	319	354	6	13	8	8	4	12	16	4.9
21-Mar	17	15	15	13	11	11	7	8	4	7	357	79	107	111	107	102	106	116	114	117	98	107	102	114	73.7
22-Mar	130	141	146	152	144	136	142	150	123	118	108	333	354	81	291	293	281	271	180	135	101	82	330	214	135.3
23-Mar	172	146	140	145	153	155	148	153	162	308	310	336	18	32	45	35	10	1	42	5	7	350	338	354	32.3
24-Mar	355	353	355	343	348	346	339	360	356	1	6	357	341	359	16	43	83	130	121	93	120	46	55	92	10.7
25-Mar	182	132	114	24	44	23	14	357	8	32	112	93	118	135	126	135	124	135	169	151	137	156	153	142	121.4
26-Mar	143	154	146	138	139	141	151	158	142	140	132	123	121	130	115	121	123	130	204	225	230	187	127	149	142.6
27-Mar	154	148	142	148	147	147	150	166	152	133	127	117	132	129	138	169	154	153	158	163	171	156	84	168	149.2
28-Mar	190	306	311	164	210	186	222	245	260	275	293	318	311	302	308	306	293	308	306	308	291	264	272	268	294.4
29-Mar	275	270	227	202	165	140	156	149	137	109	119	126	125	115	119	125	125	101	42	197	234	247	274	282	162.1
30-Mar	260	242	313	357	355	45	206	164	340	7	358	30	59	124	93	94	135	125	135	141	128	159	148	144	115.3
31-Mar	148	158	152	152	139	136	154	151	137	136	26	343	0	33	38	46	48	31	19	21	25	20	10	9	44.3

350.5 352.1 345.2 326.5 340.0 331.5 301.7 303.5 334.4 12.3 348.0 350.1 358.8 15.9 5.3 2.6 27.5 16.5 17.1 8.4 15.5 354.4 341.6 343.0
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

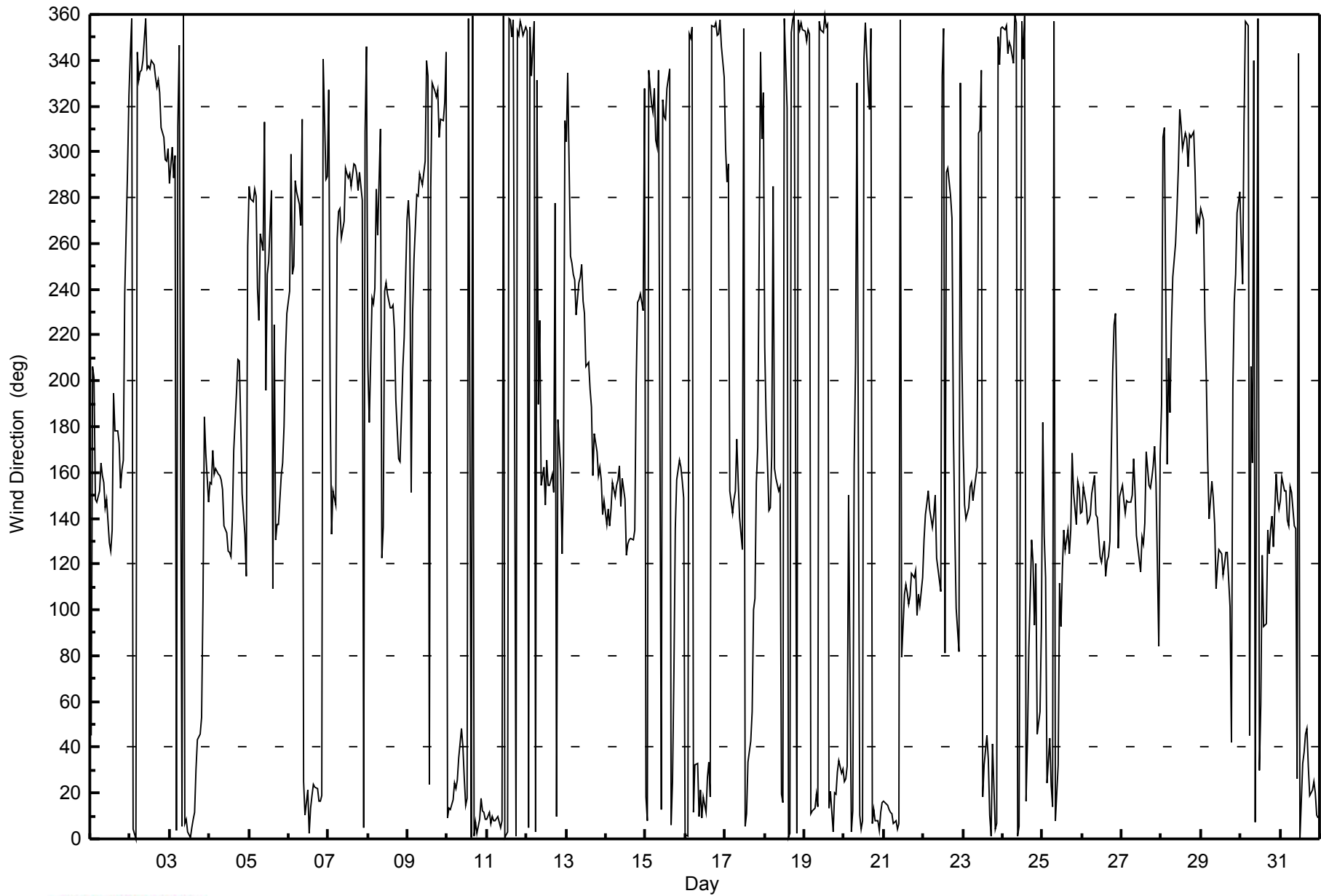
Wind Direction (WD) - deg
Buffalo Viewpoint - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 91 deg on Mar 20 08:00																			Hours of Data: 744						
Minimum Value: 4 deg on Mar 31 04:00																			Hours of Missing Data: 0						
Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 13 Median = 16 Q ₃ = 23 P ₉₀ = 43 P ₉₉ = 80																			Hours of Calibration: 0						
Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 13 Median = 16 Q ₃ = 23 P ₉₀ = 43 P ₉₉ = 80																			Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	16	85	20	9	6	5	10	13	12	17	18	19	15	22	18	19	18	17	13	15	18	29	25	12	85
2-Mar	18	19	16	17	17	12	13	15	15	15	16	13	14	12	13	13	13	11	10	10	11	13	39	28	39
3-Mar	12	9	14	21	20	13	23	12	12	13	14	15	16	14	12	13	17	13	7	11	21	15	20	7	23
4-Mar	8	4	8	9	10	12	9	9	16	17	16	17	16	19	19	22	19	19	15	15	16	7	73	29	73
5-Mar	22	13	13	9	15	28	50	15	14	55	72	19	16	27	78	46	16	14	8	10	22	26	16	42	78
6-Mar	75	18	14	16	43	21	10	19	42	14	30	23	21	25	24	25	16	12	11	11	18	23	77	32	77
7-Mar	28	25	13	16	18	35	15	15	16	17	14	13	13	15	20	16	17	18	20	15	19	28	52	58	58
8-Mar	34	22	18	20	25	48	25	42	80	21	31	14	17	15	15	13	20	14	6	8	20	21	21	21	80
9-Mar	12	18	61	58	13	14	20	11	12	16	15	40	35	26	50	18	12	11	16	33	11	8	11	24	61
10-Mar	13	14	14	13	13	15	14	13	18	20	24	32	39	20	21	14	14	11	14	15	12	12	12	12	39
11-Mar	13	12	14	11	11	14	12	13	11	13	15	14	15	16	15	12	14	14	13	12	13	13	13	13	16
12-Mar	15	14	21	71	19	29	45	33	62	25	19	17	21	17	18	19	23	73	22	68	21	26	69	21	73
13-Mar	16	50	65	12	13	13	15	18	15	13	17	17	18	17	19	19	16	17	16	15	16	17	16	14	65
14-Mar	10	12	11	15	16	17	16	18	21	28	28	44	58	15	15	14	10	10	30	21	12	12	10	58	58
15-Mar	14	18	21	14	12	11	19	12	30	13	27	15	15	22	24	13	38	26	12	12	6	13	16	47	47
16-Mar	20	16	14	12	13	17	16	21	16	18	18	20	19	35	27	25	12	10	9	8	9	8	8	8	35
17-Mar	23	43	84	14	6	14	9	23	18	42	39	35	12	13	13	13	31	25	16	17	70	19	9	22	84
18-Mar	74	40	12	6	14	71	39	11	12	27	39	16	19	26	19	13	15	16	16	16	16	16	15	14	74
19-Mar	11	12	12	15	10	10	9	13	22	12	14	15	17	17	17	19	18	13	12	12	12	13	12	13	22
20-Mar	10	11	17	61	29	32	79	91	38	18	17	26	38	24	22	39	14	13	11	8	9	11	9	9	91
21-Mar	8	8	6	7	8	9	5	10	11	16	16	63	27	21	20	21	22	18	16	15	17	16	16	16	63
22-Mar	14	16	19	20	25	18	19	22	20	23	32	88	16	51	38	23	79	84	46	30	20	68	66	56	88
23-Mar	24	15	9	13	13	16	18	18	33	70	45	39	27	16	18	34	14	18	24	27	10	11	7	12	70
24-Mar	16	11	8	13	10	14	19	15	18	15	14	15	24	17	35	52	46	19	11	21	11	25	30	35	52
25-Mar	11	46	51	18	7	12	32	13	16	52	30	50	22	22	31	22	20	22	17	16	9	10	10	14	52
26-Mar	13	17	16	23	18	12	14	20	19	23	21	17	17	20	19	17	15	16	21	15	13	20	10	17	23
27-Mar	15	9	11	10	10	13	16	16	20	17	17	34	23	20	19	19	17	16	16	20	19	74	76	43	76
28-Mar	61	82	58	18	43	21	33	23	24	20	17	22	14	13	12	12	18	12	13	10	16	10	11	15	82
29-Mar	8	11	25	29	14	23	18	17	17	51	33	17	56	39	18	16	14	15	23	82	45	56	15	16	82
30-Mar	30	17	41	14	36	58	23	23	68	58	53	17	42	20	57	45	18	14	30	7	58	27	42	7	68
31-Mar	9	8	6	4	9	9	9	19	39	85	27	56	31	16	16	17	16	12	14	12	13	13	13	12	85
																			75 85 84 71 43 71 79 91 80 85 72 88 58 51 78 52 79 84 46 82 70 74 77 58						
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - March 2015



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 3, 2015	Previous Calibration	February 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:41	End Time (MST)	13:10
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	51.00 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107926		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	11

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-592	-593
Analyzer Range (mv)	1000	1000	Lamp voltage	840	841
Calculated slope	0.994962	0.996193	Chamber temp.	45.4	45.2
Calculated intercept	-0.202835	-0.457976	Pressure (mmHg)	700.6	705.4
Analyzer Background	9.3	9.2	Flow (lpm)	0.501	0.504
Analyzer Coefficient	0.877	0.877	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	58.8	599.8	602.0	0.996
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	58.8	599.8	602.0	0.996
second point	5000	29.4	299.9	303.0	0.990
third point	5000	14.7	149.9	150.2	0.998
calibrator zero					
as left zero	5000	0.0	0.0	0.6	NA
as left span	5000	58.8	599.8	604.4	0.992
Average Correction Factor					0.995

Corrected As found 601.7 Previous response 603.0 % change 0.2%

Notes:

No adjustments required. Changed the inlet filter after as founds.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

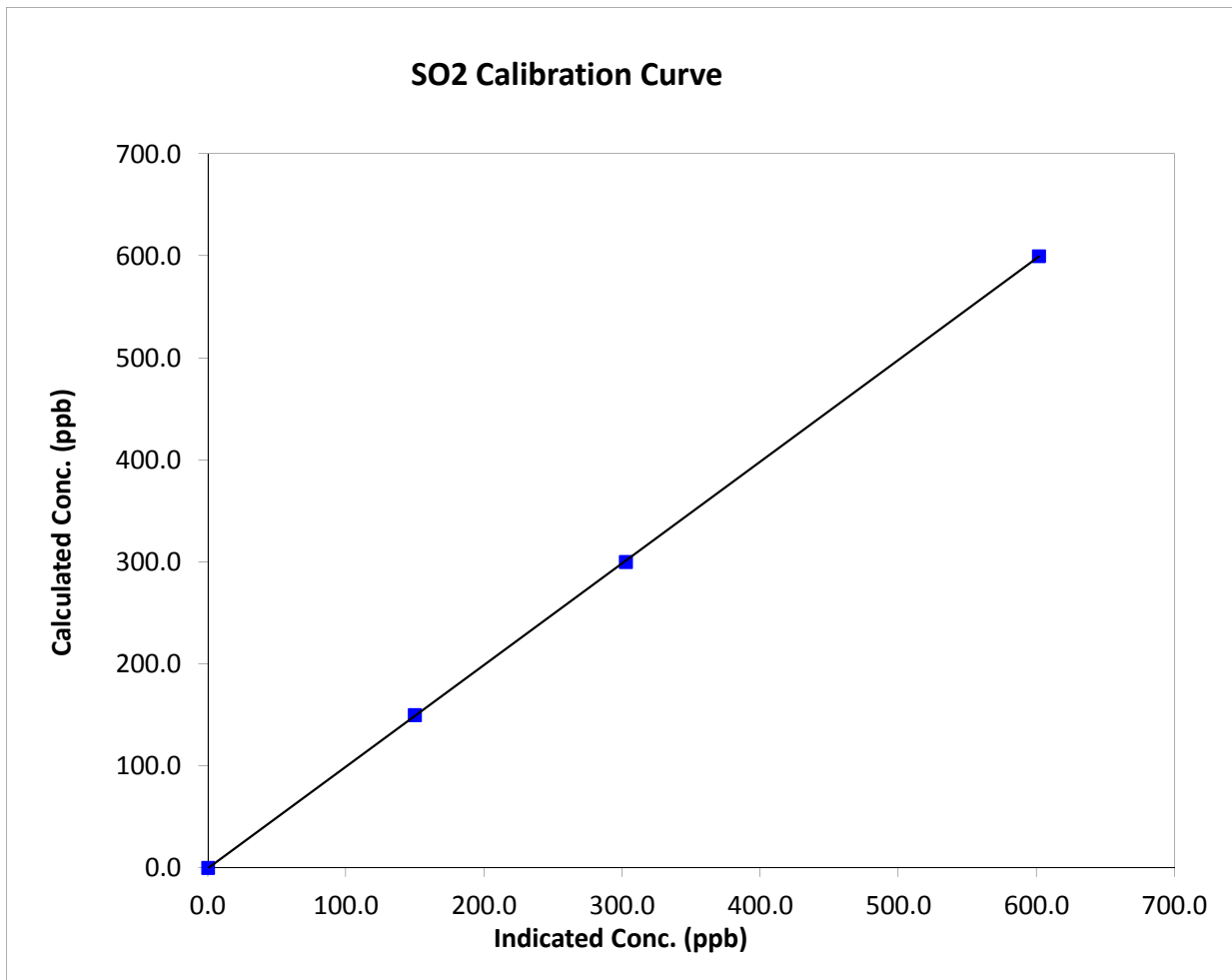
SO₂ Calibration Summary

Station Information

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

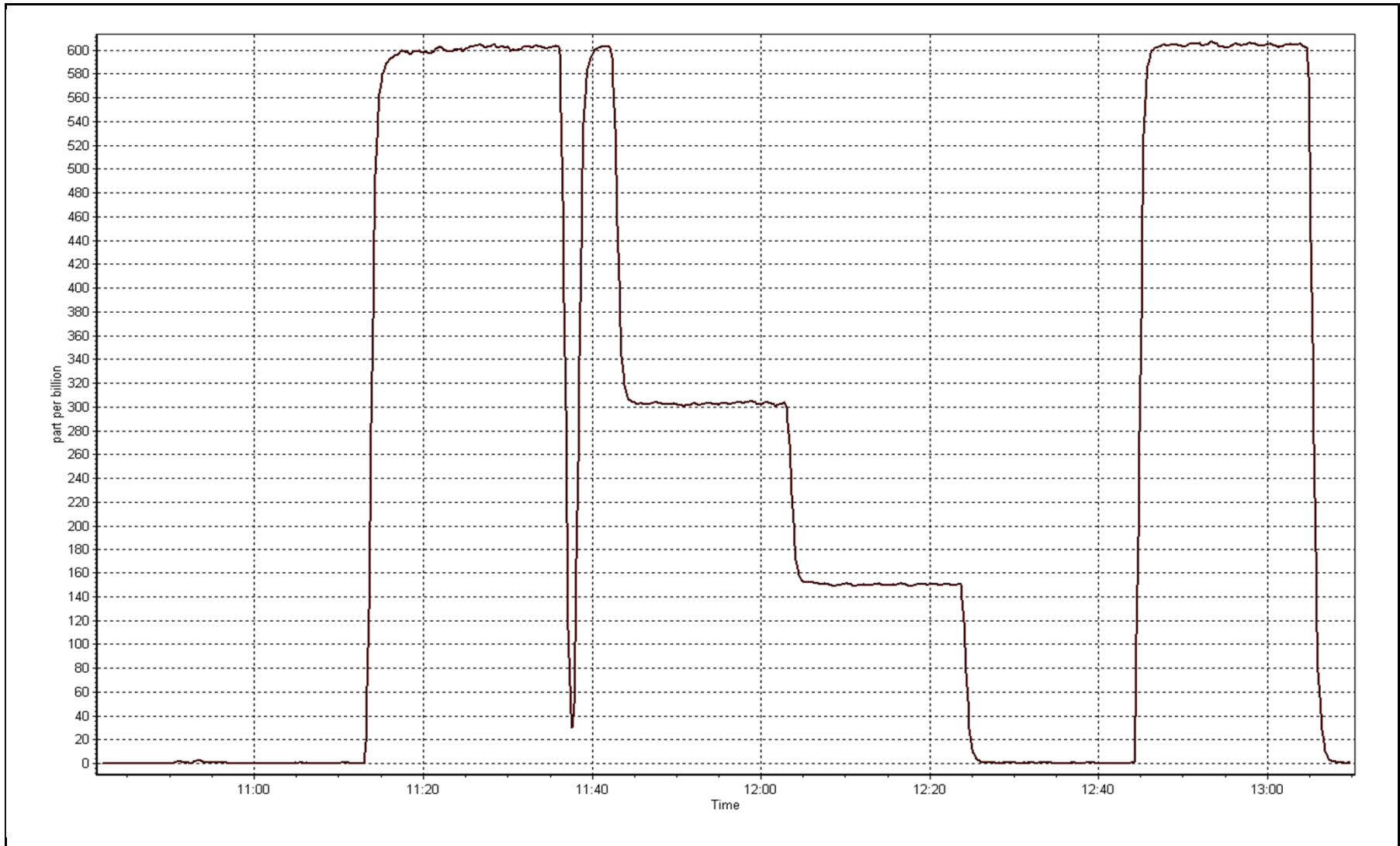
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999984
599.8	602.0	0.9964		
299.9	303.0	0.9897	Slope	0.996193
149.9	150.2	0.9983		
			Intercept	-0.457976



SO2 Calibration Plot

Date: March 3, 2015





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 5, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	15:47
Barometric Pressure	NA mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11551008
Cal Gas Concentration	9.75 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL101590	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	dig

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-617	-618
Analyzer Range (mv)	100	100	Lamp voltage	872	873
Calculated slope	0.999405	0.995082	Chamber temp.	45	45
Calculated intercept	-0.338715	-0.517344	Pressure	549.9	554.4
Analyzer Background	13.9	14.7	Flow	1.053	1.056
Analyzer Coefficient	0.852	0.887	Intensity	94	94
			Converter temp.	329	332

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	NA
as found span	6000	46.1	74.9	76.8	0.975
SO2 scrubber check	5000	14.7	149.9	1.6	NA
calibrator zero	6000	0.0	0.0	0.2	NA
high point	6000	46.1	74.9	75.5	0.992
second point	6000	25.8	41.9	43.0	0.976
third point	6000	15.3	24.9	25.8	0.963
calibrator zero					
as left zero	5000	0.0	0.0	0.7	NA
as left span	6000	46.1	74.9	77.1	0.972
Average Correction Factor					0.977

Corrected As found	76.7	Previous response	75.3	% change	-1.8%
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Notes:

SOX scrubber was replaced with new SOX scrubber beads. Adjusted both zero and span. Inlet filter changed.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

H2S Calibration Summary

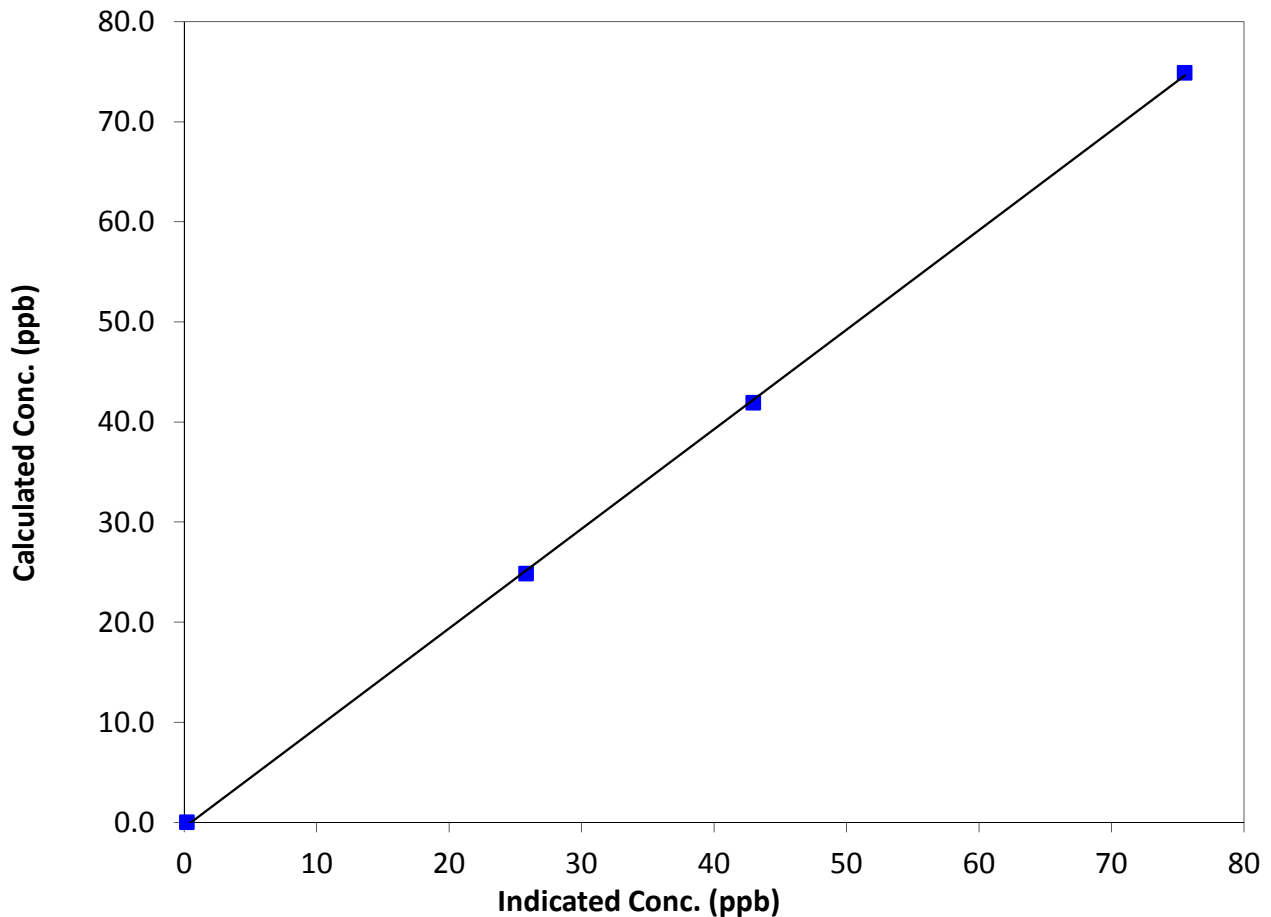
Station Information

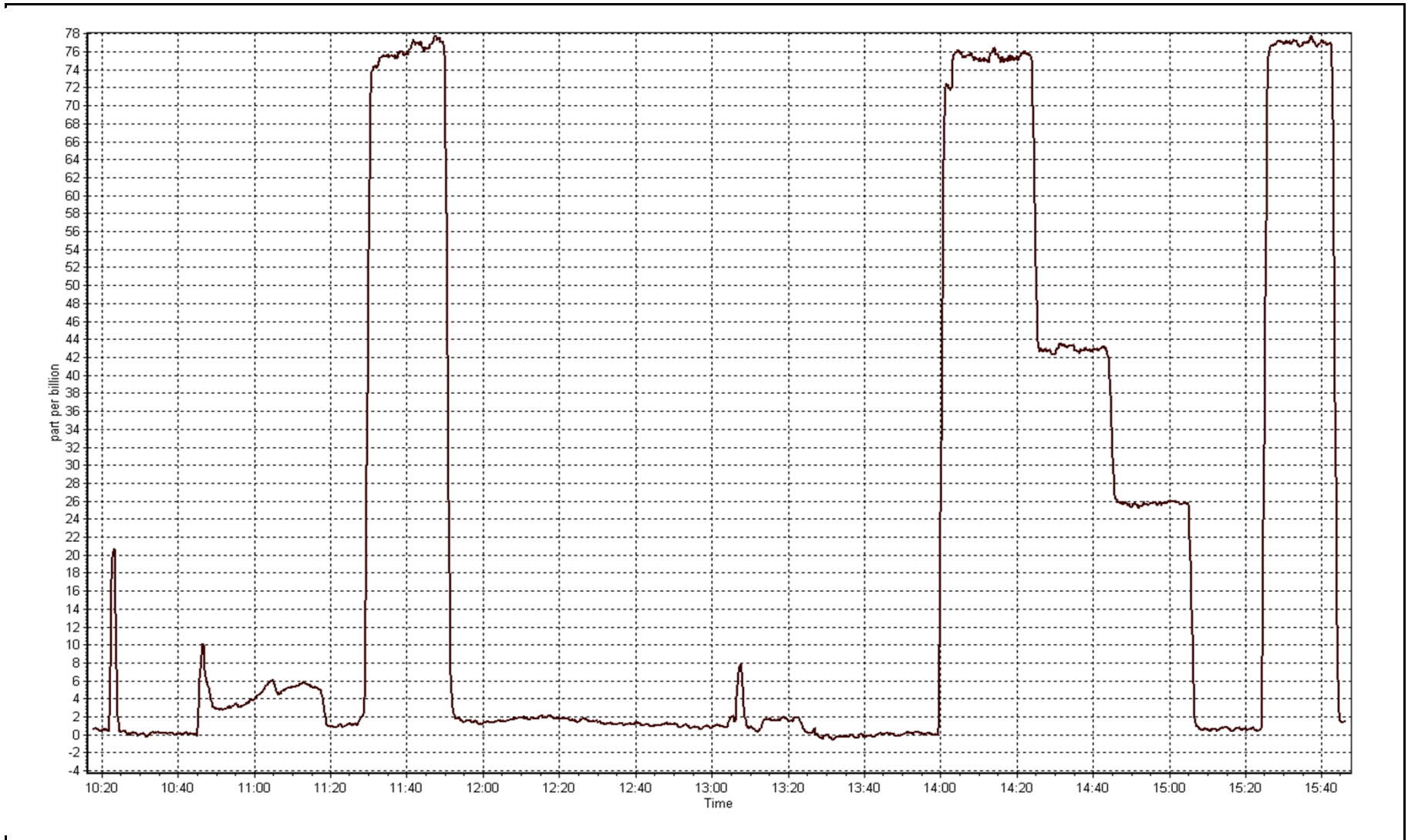
Calibration Date	March 6, 2015	Previous Calibration	February 5, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:15	End Time (MST)	15:47
Analyzer make	TEI 450i	Analyzer serial #	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999878
74.9	75.5	0.9918		
41.9	43.0	0.9761	Slope	0.995082
24.9	25.8	0.9633		
			Intercept	-0.517344

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, March 03, 2015	Previous Calibration	Tuesday, February 03, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:41	End Time (MST)	13:10
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	LL107926	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1067.8 ppm
C3H8 Cal Gas Conc.	201 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.5	8.5
Analyzer Range (mv)	25	25	Air or Bypass press	30.4	30.4
Calculated slope	0.997009	0.995201	Fuel Pressure	19.8	19.8
Calculated intercept	0.026688	0.046555			
BKG	1.3	1.3			
COEF	4.046	4.046			

Analyzer make TEI 51i-LT Analyzer serial # 1201650671

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.06	N/A
as found span	5000	58.8	12.56	12.56	1.000
calibrator zero	5000	0.0	0.00	-0.06	N/A
high point	5000	58.8	12.56	12.56	1.000
second point	5000	29.4	6.28	6.28	1.000
third point	5005	14.7	3.14	3.11	1.008
calibrator zero					
as left zero	5000	0.0	0.00	-0.07	N/A
as left span	5000	58.8	12.56	12.62	0.995
Average Correction Factor					1.003

Corrected As found 12.62 Previous response 12.57 % change -0.4%

Notes:

No adjustments required. Changed the inlet filter after as founds.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

THC Calibration Summary

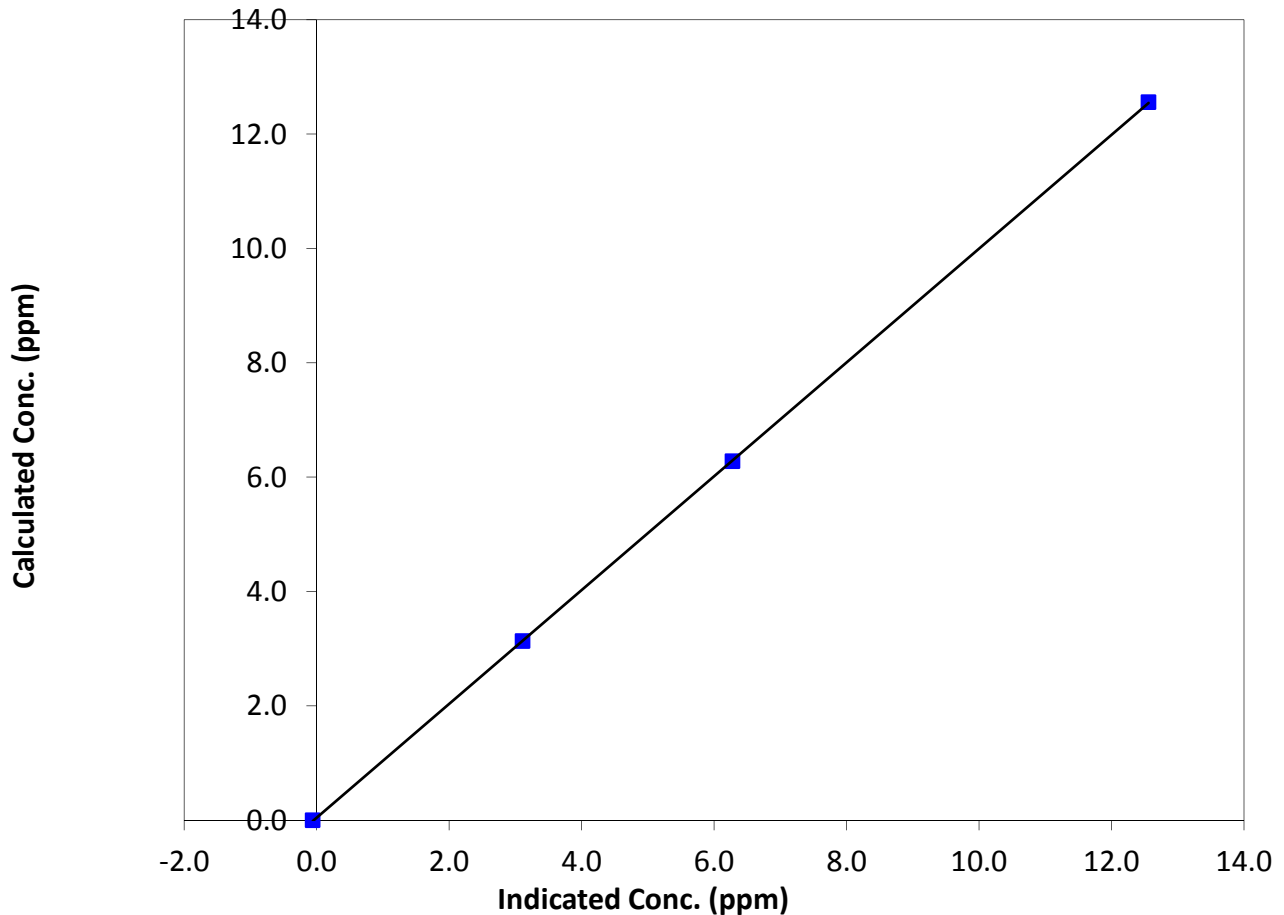
Station Information

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

Calibration Data

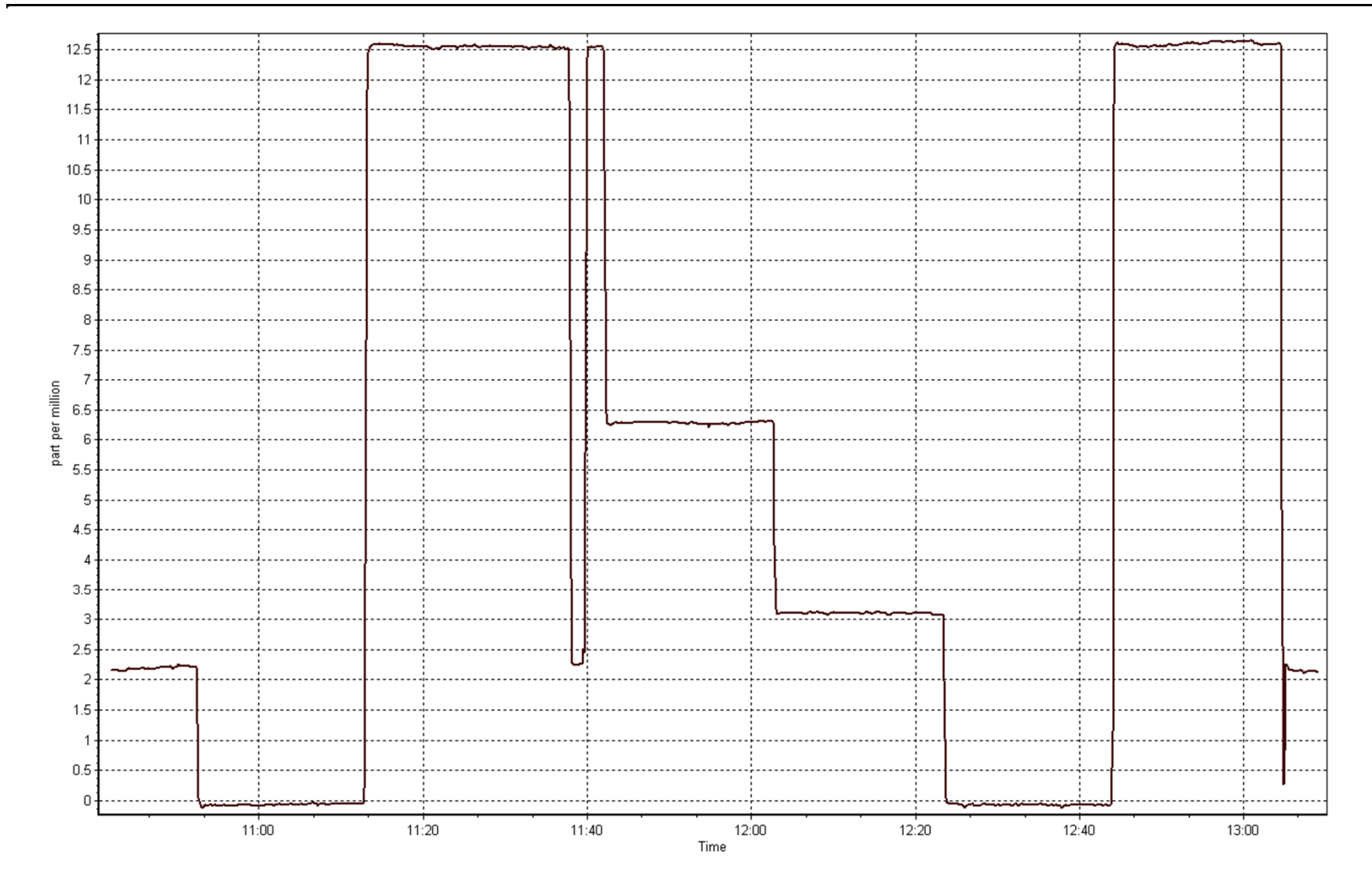
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.06	N/A	Correlation Coefficient	0.999993
12.56	12.56	0.9997		
6.28	6.28	0.9997	Slope	0.995201
3.14	3.11	1.0084		
			Intercept	0.046555

THC Calibration Curve



THC Calibration Plot

Date: March 3, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 5
MANNIX
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	709	35	35	100.00	67	0	16	0
H2S (ppb) Average	704	36	40	99.46	6	0	2	0
THC (ppm) Average	709	35	35	100.00	4.3	-	2.8	-
Temperature 2 m (C) Average	732	0	12	98.39	14.5	-	7.3	-
Temperature 20 m (C) Average	732	0	12	98.39	14.7	-	8.7	-
Temperature 45 m (C) Average	732	0	12	98.39	14.8	-	9.3	-
Temperature 75 m (C) Average	732	0	12	98.39	14.9	-	9.5	-
Temperature 90 m (C) Average	732	0	12	98.39	14.8	-	9.6	-
Relative Humidity 2 m (%) Average	732	0	12	98.39	98	-	89	-
Relative Humidity 20 m (%) Average	732	0	12	98.39	99	-	89	-
Relative Humidity 45 m (%) Average	732	0	12	98.39	98	-	89	-
Relative Humidity 75 m (%) Average	732	0	12	98.39	98	-	89	-
Relative Humidity 90 m (%) Average	732	0	12	98.39	99	-	89	-
Wind Speed 20 m (km/h) Average	732	0	12	98.39	33	-	23	-
Wind Speed 45 m (km/h) Average	732	0	12	98.39	43	-	30	-
Wind Speed 75 m (km/h) Average	732	0	12	98.39	48	-	34	-
Wind Speed 90 m (km/h) Average	731	0	13	98.25	49	-	35	-
Wind Direction 20 m (deg) Average	732	0	12	98.39	-	-	-	-
Wind Direction 45 m (deg) Average	732	0	12	98.39	-	-	-	-
Wind Direction 75 m (deg) Average	732	0	12	98.39	-	-	-	-
Wind Direction 90 m (deg) Average	731	0	13	98.25	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	732	0	12	98.39	0.9	-	-	-
Vertical Wind Speed 45 m (km/h) Average	732	0	12	98.39	1.2	-	-	-
Vertical Wind Speed 75 m (km/h) Average	732	0	12	98.39	1.7	-	-	-
Vertical Wind Speed 90 m (km/h) Average	731	0	13	98.25	4.6	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	3	7	-	0	0	0	0	2	9	67
H2S (ppb) Average	704	0.6	1	-	0	0	0	0	1	1	6
THC (ppm) Average	709	2.3	0.3	-	2	2.1	2.1	2.2	2.3	2.6	4.3
Temperature 2 m (C) Average	732	-3.53	8.1	-	-28.3	-13.9	-8.8	-3.2	2.6	5.8	14.5
Temperature 20 m (C) Average	732	-3.09	8.3	-	-28.2	-13.7	-8.7	-2.9	3.3	6.3	14.7
Temperature 45 m (C) Average	732	-3.01	8.3	-	-27.9	-13.7	-8.7	-2.8	3.7	6.6	14.8
Temperature 75 m (C) Average	732	-2.96	8.3	-	-25.8	-13.4	-8.8	-2.8	3.9	6.8	14.9
Temperature 90 m (C) Average	732	-2.95	8.3	-	-25	-13.4	-8.8	-2.9	4.1	6.8	14.8
Relative Humidity 2 m (%) Average	732	66.4	17	-	29	44	54	67	80	87	98
Relative Humidity 20 m (%) Average	732	63.6	17	-	25	40	50	64	77	86	99
Relative Humidity 45 m (%) Average	732	62.2	18	-	23	38	49	62	76	86	98
Relative Humidity 75 m (%) Average	732	61.7	18	-	22	37	49	61	76	86	98
Relative Humidity 90 m (%) Average	732	62	18	-	22	37	49	61	77	87	99
Wind Speed 20 m (km/h) Average	732	9.6	5	-	1	3	6	9	12	17	33
Wind Speed 45 m (km/h) Average	732	13.3	7	-	0	5	8	12	17	23	43
Wind Speed 75 m (km/h) Average	732	15.4	9	-	1	5	9	14	20	27	48
Wind Speed 90 m (km/h) Average	731	16.7	9	-	1	6	10	15	22	29	49
Wind Direction 20 m (deg) Average	732	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	732	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	732	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	731	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	732	-0.03	0.3	-	-1.5	-0.4	-0.2	0	0.2	0.3	0.9
Vertical Wind Speed 45 m (km/h) Average	732	0.11	0.4	-	-1.7	-0.5	-0.2	0.2	0.4	0.6	1.2
Vertical Wind Speed 75 m (km/h) Average	732	0.11	0.3	-	-1.1	-0.3	-0.1	0.1	0.3	0.5	1.7
Vertical Wind Speed 90 m (km/h) Average	731	0.7	1	-	-1.3	-0.3	0	0.5	1.2	2	4.6

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	14 Mar 2015 11:00	14 Mar 2015 14:00	4	Maintenance - confirm analyzer response + calibrator
Temperature, Relative Humidity 2 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 20 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 45 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 75 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 90 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 75 m	15 Mar 2015 01:00	15 Mar 2015 12:00	12	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	15 Mar 2015 01:00	15 Mar 2015 13:00	13	Flat line in sensor output signal - Sensor frozen

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Summary of Hour Averages

Mannix - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 67 ppb on Mar 11 21:00	Maximum Daily Average: 16.0 ppb on Mar 11		Hours of Data:	709
Minimum Value: 0 ppb on Mar 19 20:00	Minimum Daily Average: 0.0 ppb on Mar 29		Hours of Missing Data:	35
Maximum Diurnal Average: 5.3 ppb at hour 21	Minimum Diurnal Average: 1.3 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 3.0 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =2 P ₉₀ =9 P ₉₉ =40		Percent Operational Time:	100.0

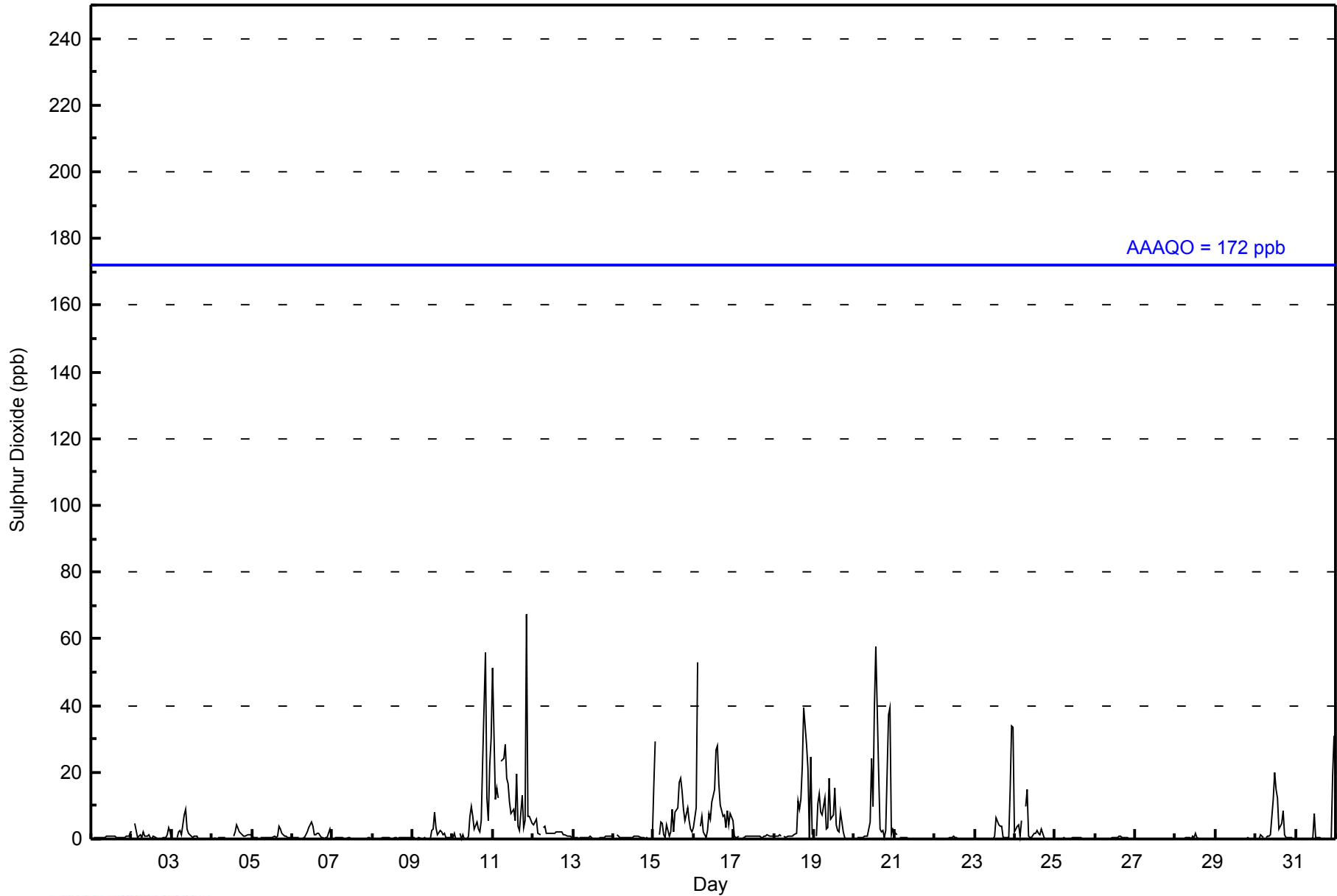
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	2	0.6	2																							
2-Mar	2	Z	5	1	1	1	0	2	1	1	1	0	0	1	0	0	0	0	0	0	0	1	3	2	1.0	5																							
3-Mar	0	0	Z	1	2	2	1	7	9	3	2	1	0	1	1	1	0	0	0	0	0	0	0	0	1.4	9																							
4-Mar	0	0	0	Z	1	1	1	1	0	1	C	C	C	C	1	2	4	2	2	1	1	1	1	1	1.1	4																							
5-Mar	1	0	0	0	Z	0	0	0	1	1	0	1	1	1	1	1	4	3	2	1	1	1	0	1	0.8	4																							
6-Mar	1	0	0	0	0	Z	0	0	1	2	4	5	4	1	1	1	1	0	0	0	0	0	3	0	1.3	5																							
7-Mar	Z	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-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	2	3	8	3	1	2	2	1	2	1	0	0	1	1.3	8																							
10-Mar	1	2	0	Z	2	0	1	0	0	1	7	10	7	3	5	3	2	6	23	56	12	5	22	30	8.6	56																							
11-Mar	51	12	15	12	Z	23	24	29	18	17	11	7	9	5	20	4	2	13	3	5	67	7	7	4	16.0	67																							
12-Mar	4	5	6	2	1	Z	3	4	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	0	2.1	6																							
13-Mar	Z	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1																							
14-Mar	1	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1																							
15-Mar	16	29	Z	1	5	5	1	0	4	1	2	9	2	8	9	17	18	14	9	6	9	5	3	2	7.7	29																							
16-Mar	4	9	53	Z	4	7	2	0	3	8	6	11	15	27	28	17	10	7	7	4	9	4	8	5	10.7	53																							
17-Mar	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
18-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	2	12	9	12	22	39	29	21	0	24	1	7.9	39																							
19-Mar	Z	1	11	13	8	7	12	3	3	18	6	7	15	4	3	2	8	2	1	0	0	0	0	0	5.4	18																							
20-Mar	0	Z	0	0	0	0	1	1	1	5	24	10	40	58	20	3	2	3	0	3	37	40	1	3	11.0	58																							
21-Mar	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
23-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	6	4	4	4	0	0	0	0	15	34	34	0	4.5	34																							
24-Mar	2	4	4	1	5	Z	10	15	1	0	1	1	2	2	2	1	3	0	0	0	0	0	0	0	2.4	15																							
25-Mar	Z	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																							
26-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0.3	1																							
27-Mar	0	0	Z	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-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0.2	2																							
29-Mar	0	0	0	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-Mar	0	0	0	1	0	Z	0	1	1	1	12	20	15	12	3	5	9	1	0	0	0	0	0	0	3.6	20																							
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	19	31	2.6	31																						
																								3.5	2.6	3.8	1.4	1.3	1.9	2.0	2.2	1.6	2.1	2.8	3.4	4.1	4.7	3.9	2.5	2.8	2.6	3.0	3.6	5.3	2.8	4.3	3.9	Diurnal Average	
																								51	29	53	13	8	23	24	29	18	18	24	20	40	58	28	17	18	22	39	56	67	40	34	34	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mannix - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	652	91.96	91.96
11 - 20	31	4.37	96.33
21 - 60	25	3.53	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: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - March 2015

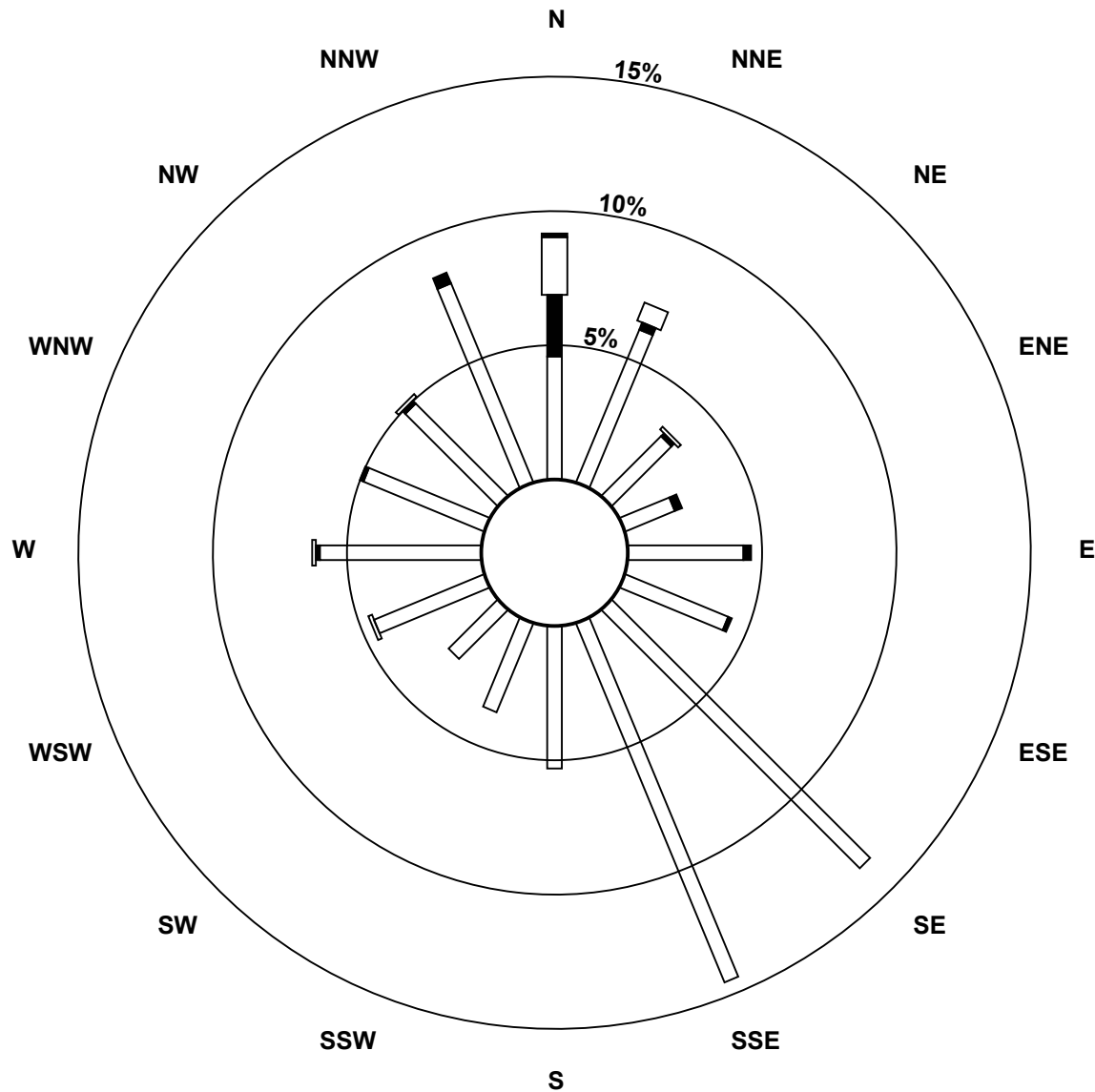
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	32	43	22	14	30	29	95	101	37	25	18	31	42	34	34	56	643
11 - 20	16	2	1	2	2	1	0	0	0	0	0	0	1	1	1	3	30
21 - 60	15	5	1	0	0	0	0	0	0	0	0	1	1	0	1	0	24
61 - 110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	50	24	16	32	30	95	101	37	25	18	32	44	35	36	59	698

Total Number of Valid Hours: 698

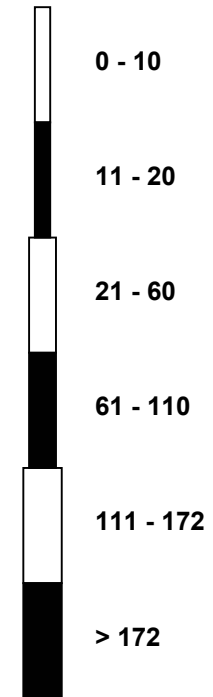
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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



Classes (ppb)

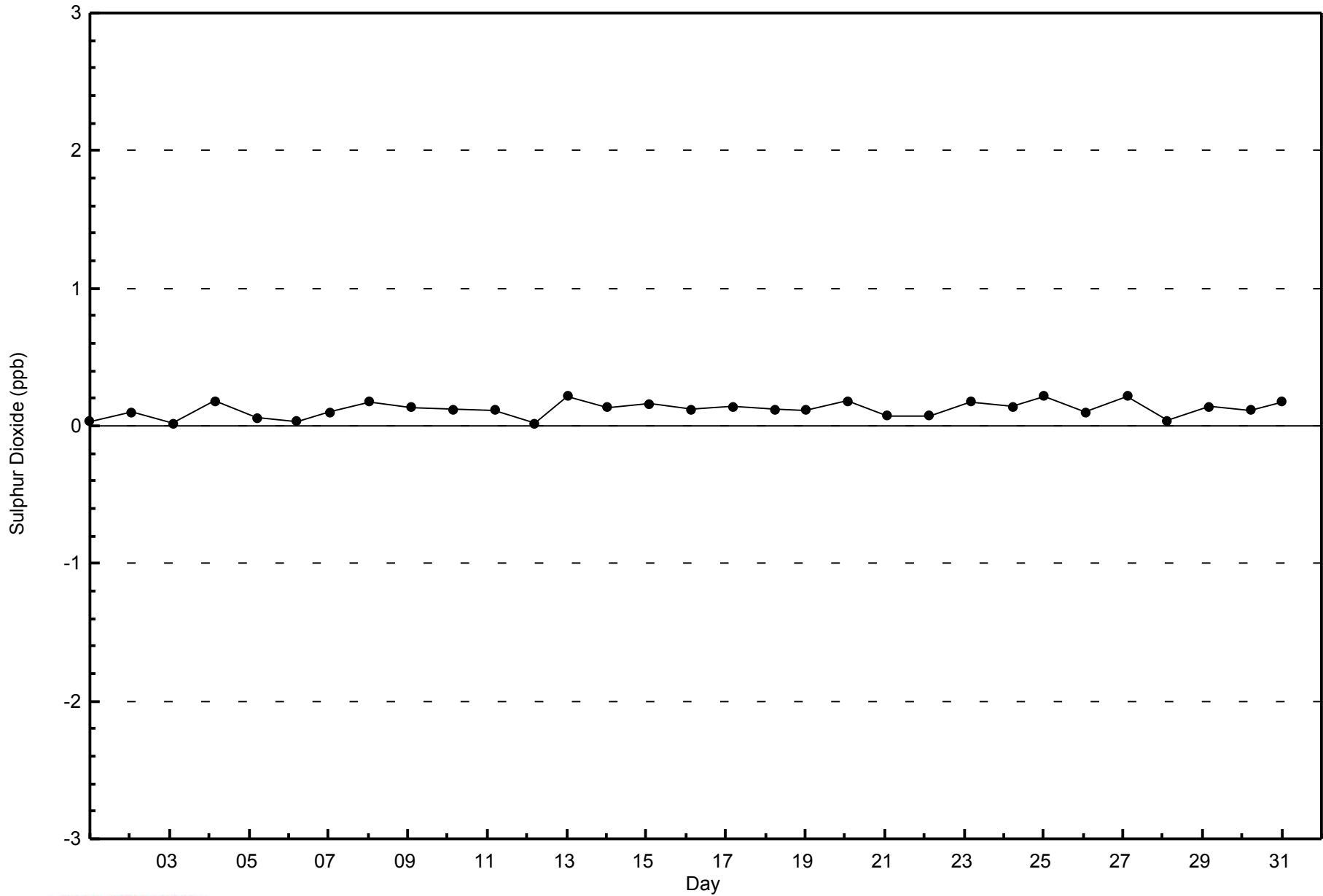


Total Number of Valid Hours: 698



WBEA
Zero Responses

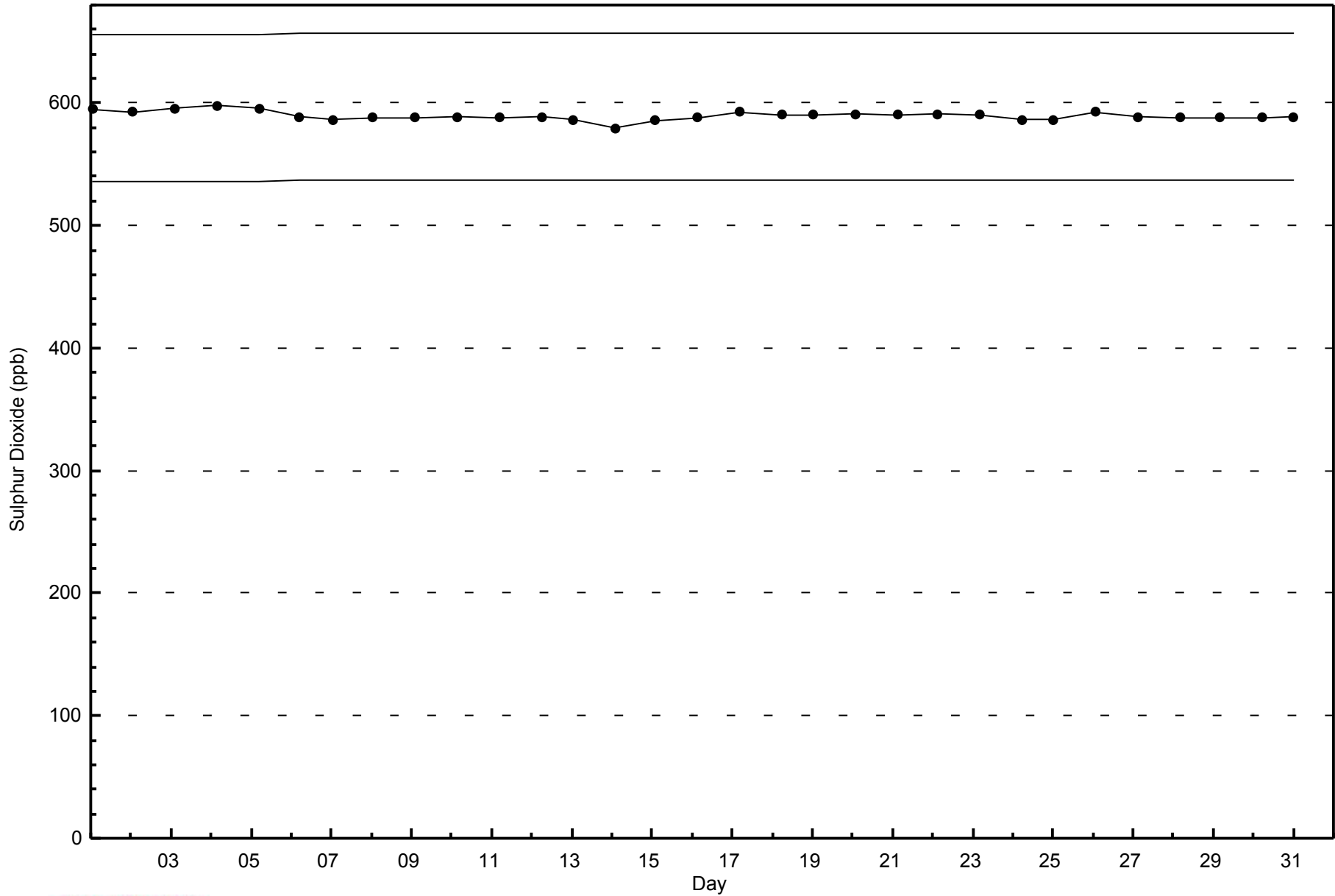
Sulphur Dioxide (SO₂) - ppb
Mannix - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mannix - March 2015





Summary of Hour Averages

Mannix - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 ppb on Mar 31 12:00	Maximum Daily Average: 1.6 ppb on Mar 11		Hours of Data:	704
Minimum Value: 0 ppb on Mar 3 02:00	Minimum Daily Average: 0.1 ppb on Mar 22		Hours of Missing Data:	40
Maximum Diurnal Average: 0.7 ppb at hour 5	Minimum Diurnal Average: 0.4 ppb at hour 17		Hours of Calibration:	36
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		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-Mar	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
2-Mar	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
3-Mar	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.4	1
4-Mar	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Mar	0	1	1	0	1	1	Z	1	2	2	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0.8	2
7-Mar	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
8-Mar	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1
9-Mar	1	1	0	Z	0	0	0	1	0	0	C	C	C	C	C	1	1	1	2	1	1	1	1	1	0.8	2
10-Mar	0	0	1	1	Z	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.6	1
11-Mar	1	0	1	2	3	Z	4	5	2	3	2	1	1	1	2	0	0	1	0	1	2	1	1	1	1.6	5
12-Mar	1	1	1	0	0	2	Z	1	1	1	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0.7	2
13-Mar	1	Z	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
14-Mar	0	0	Z	0	0	0	0	0	0	0	M	M	M	M	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Mar	1	1	1	Z	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
16-Mar	1	1	1	1	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1
17-Mar	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	1	2	1	2	2	2	2	1	1	1	1.1	2
18-Mar	2	1	1	1	1	1	Z	1	1	0	0	0	1	1	3	2	1	1	1	1	1	0	1	0	0.9	3
19-Mar	1	Z	0	1	0	1	1	0	1	2	1	0	1	0	0	0	0	0	0	0	1	1	1	1	0.6	2
20-Mar	1	0	Z	1	1	1	1	1	1	1	1	1	2	3	1	0	0	0	0	0	1	1	3	1	1.0	3
21-Mar	2	3	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	1	1	0.4	1
24-Mar	0	1	1	1	2	1	Z	2	1	1	1	1	0	0	0	0	0	0	1	1	0	1	1	1	0.7	2
25-Mar	1	Z	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
26-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
27-Mar	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
28-Mar	0	0	1	1	Z	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
29-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.5	1
30-Mar	0	0	0	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	1	1	2	1	1	1.0	2
31-Mar	0	Z	0	0	0	0	0	0	1	1	1	6	1	1	1	1	1	1	1	1	1	0	1	1	1.0	6

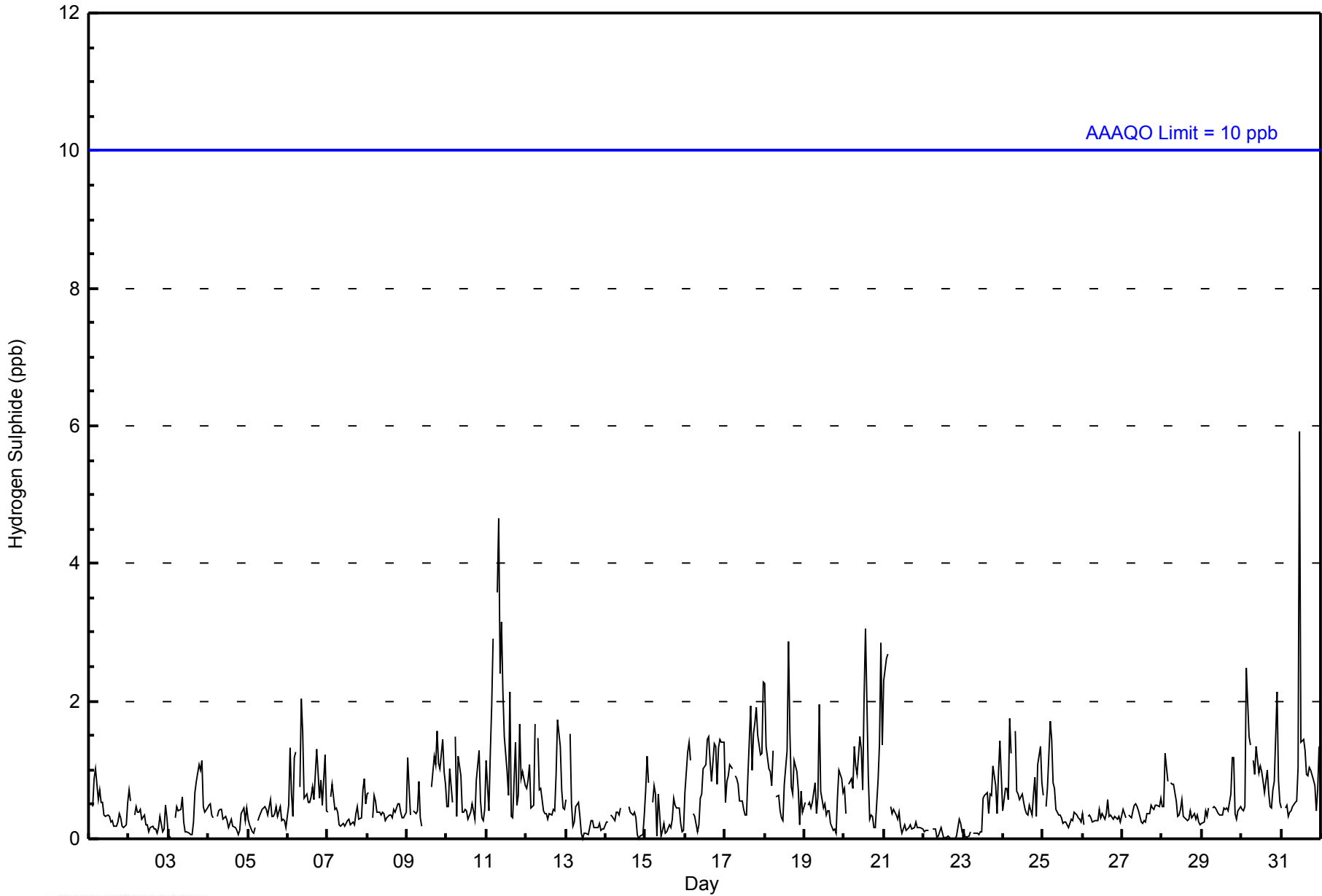
0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.5	0.6	0.5	0.5	0.6	0.5	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.6	Diurnal Average
2	3	3	2	3	2	4	5	2	3	2	6	2	3	3	2	1	2	2	2	2	2	2	3	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mannix - March 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	694	98.58	98.58
3 - 4	8	1.14	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: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - March 2015

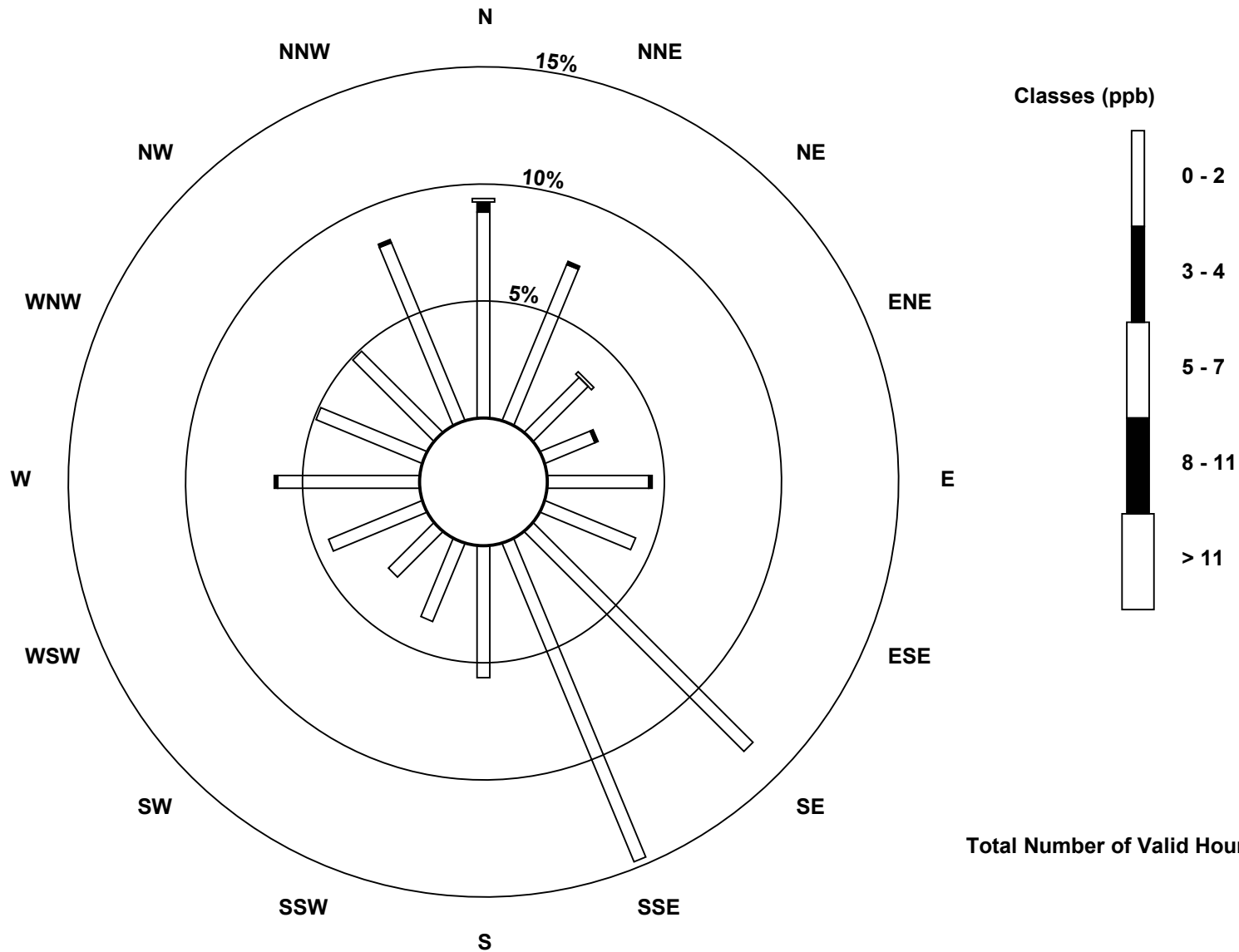
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	61	50	23	16	30	29	92	102	39	25	19	30	42	34	34	57	683
3 - 4	3	1	0	1	1	0	0	0	0	0	0	0	1	0	0	1	8
5 - 7	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	51	24	17	31	29	92	102	39	25	19	30	43	34	34	58	693

Total Number of Valid Hours: 693

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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

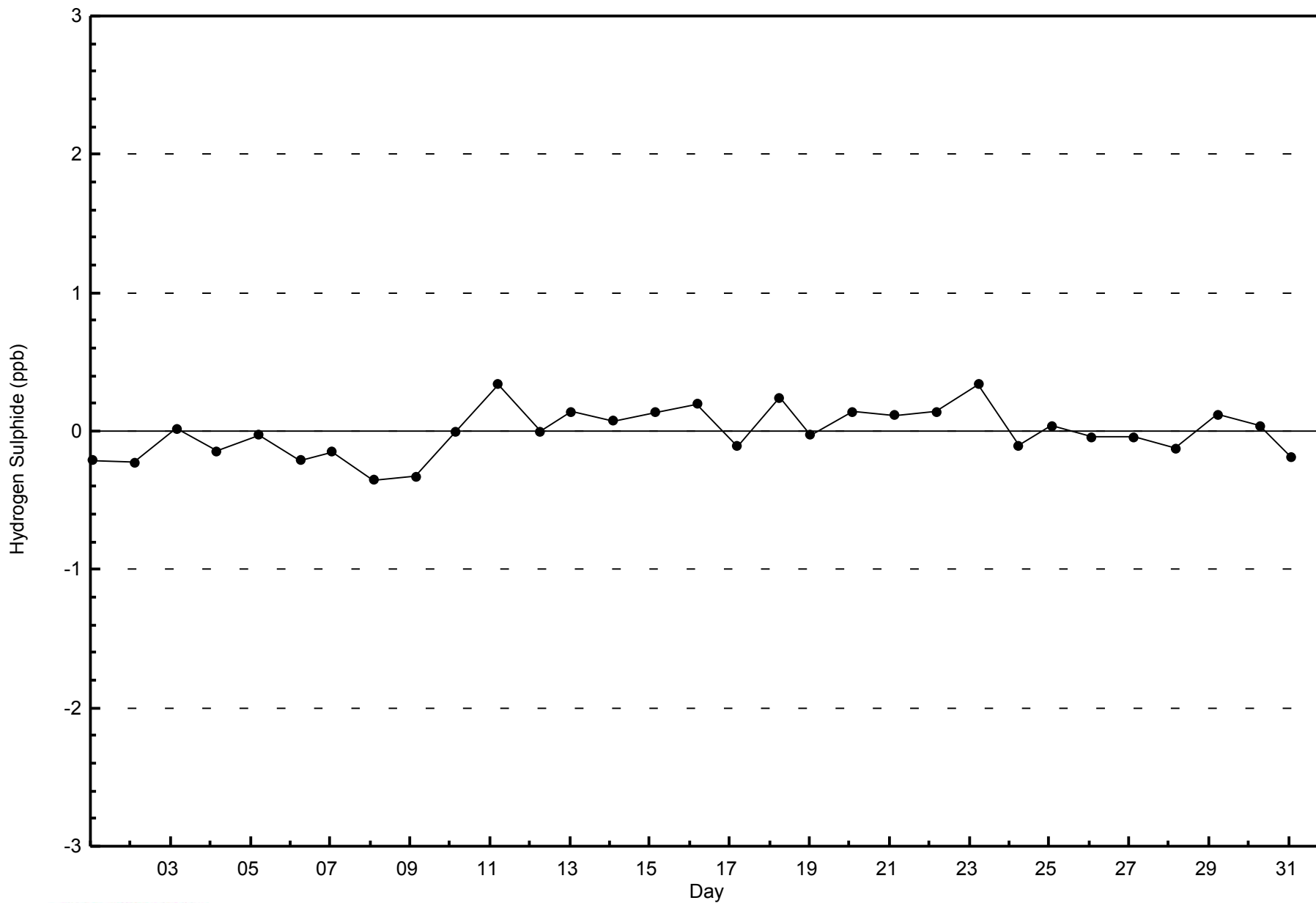


Total Number of Valid Hours: 693



WBEA
Zero Responses

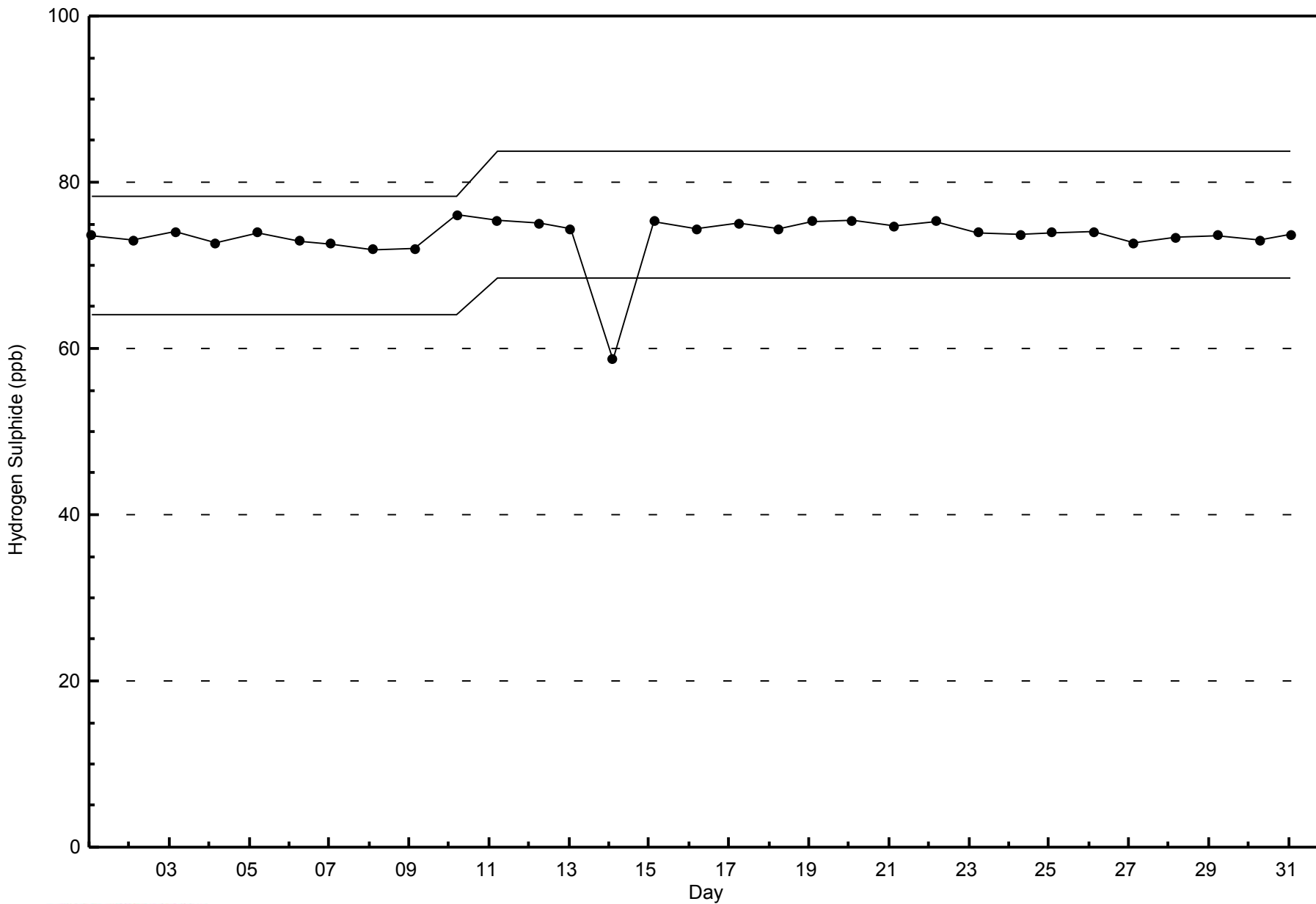
Hydrogen Sulphide (H₂S) - ppb
Mannix - March 2015





WBEA
Span Responses

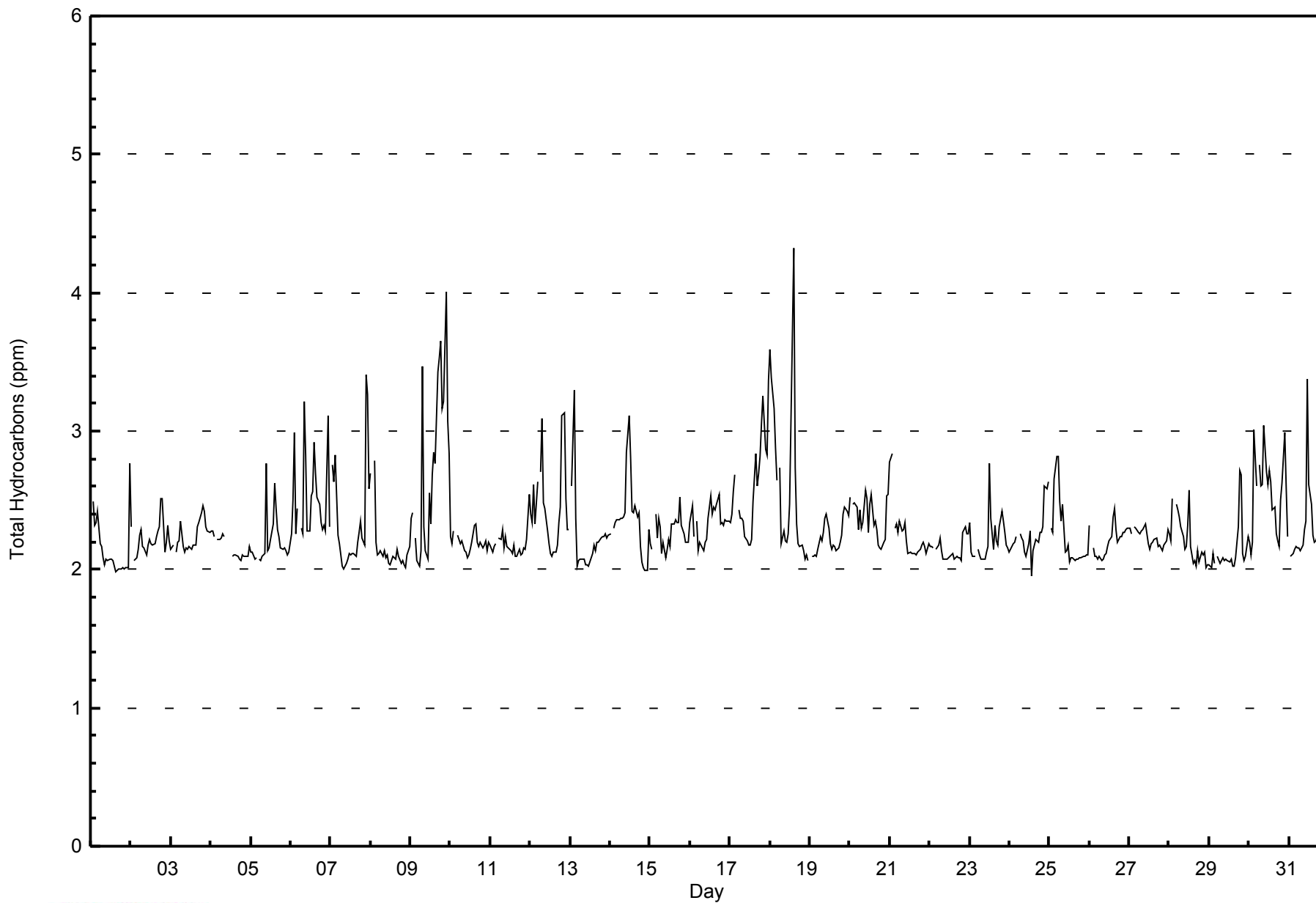
Hydrogen Sulphide (H₂S) - ppb
Mannix - March 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mannix - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	37	5.22	5.22
2.1 - 3.0	647	91.26	96.47
3.1 - 10.0	25	3.53	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - March 2015

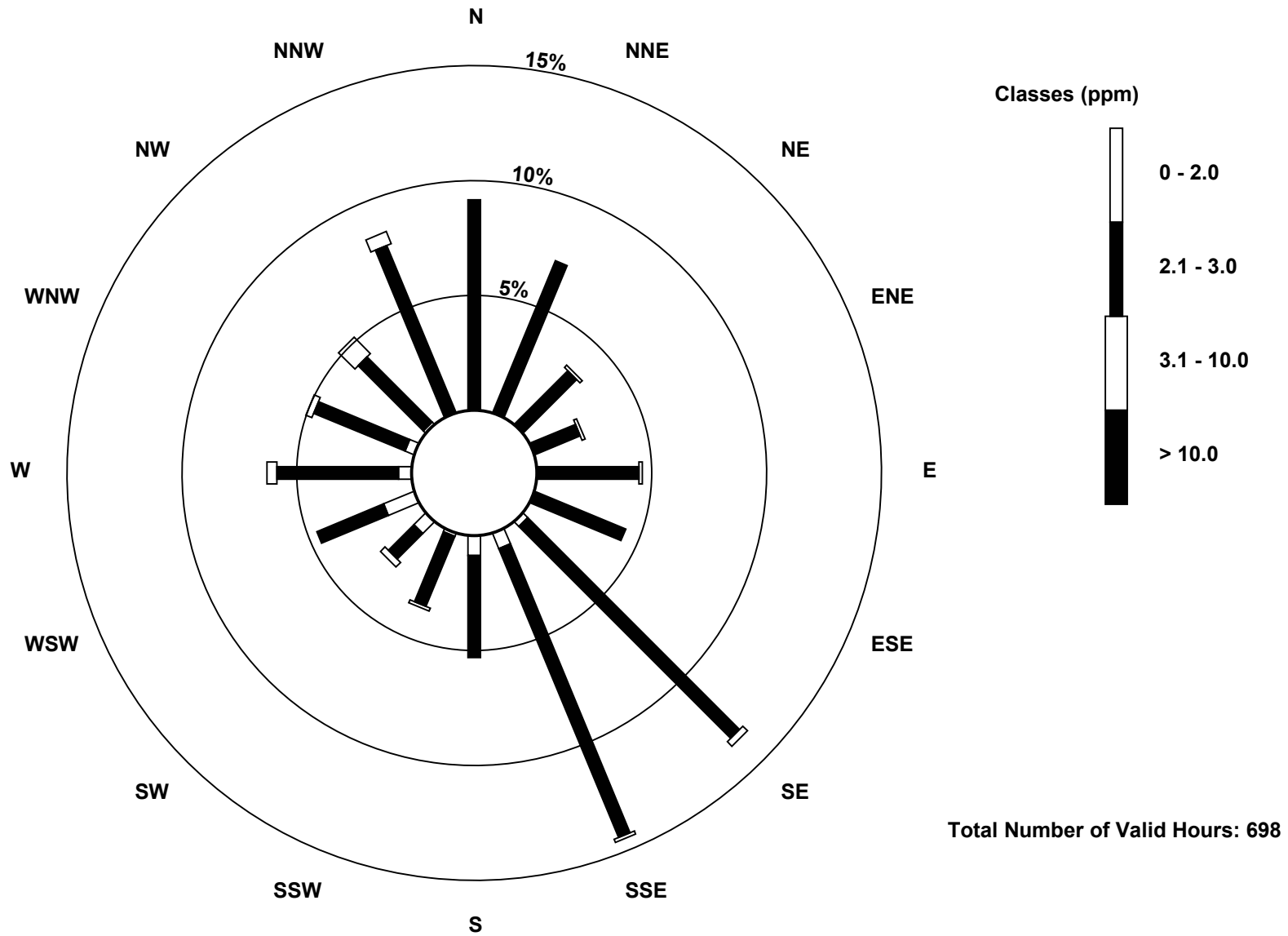
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	2	5	6	1	5	10	4	3	1	0	37
2.1 - 3.0	64	50	23	15	31	30	91	95	31	23	11	22	37	30	28	55	636
3.1 - 10.0	0	0	1	1	1	0	2	1	0	1	2	0	3	2	7	4	25
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	50	24	16	32	30	95	101	37	25	18	32	44	35	36	59	698

Total Number of Valid Hours: 698

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

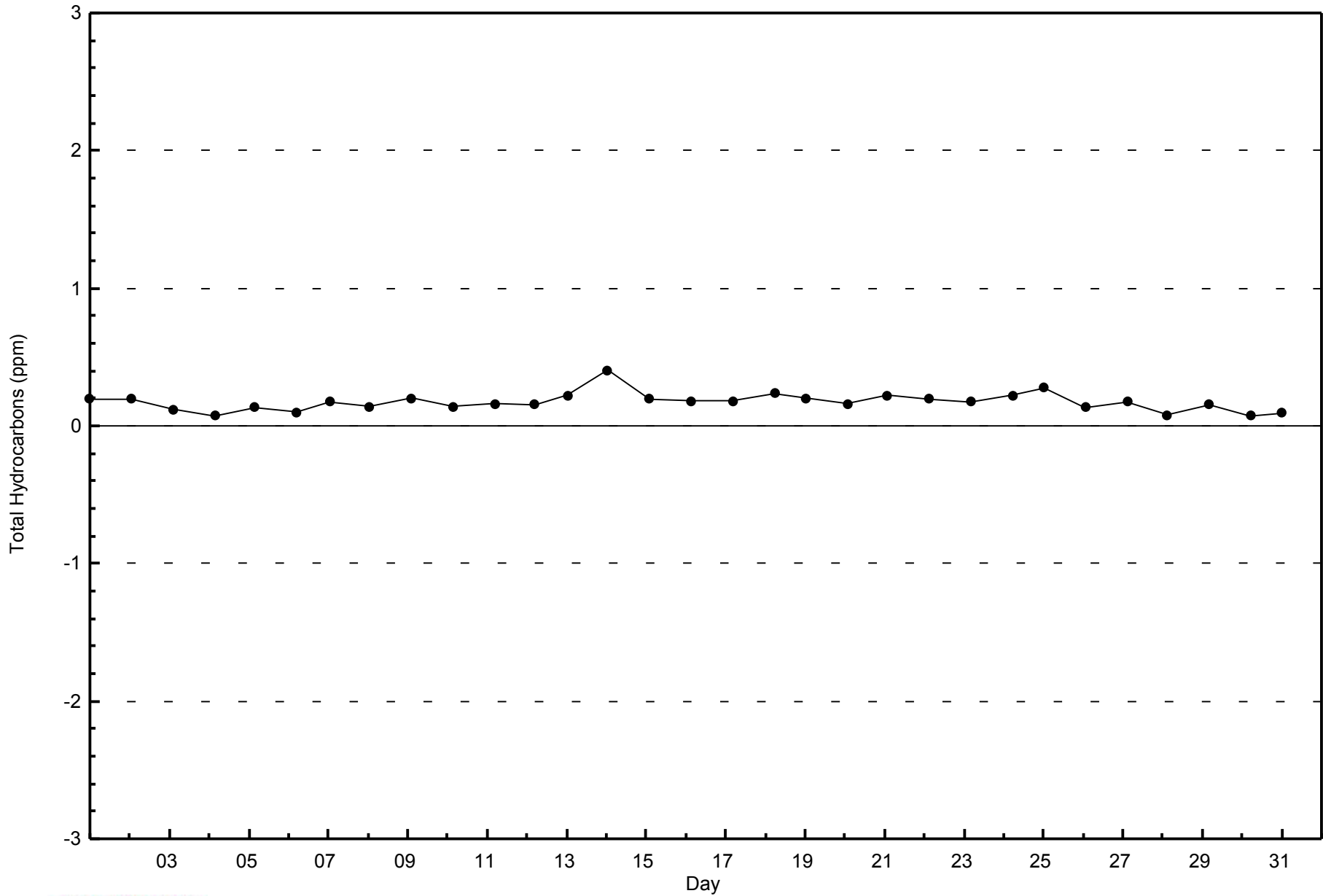
**Total Hydrocarbons (THC) - ppm
Mannix (AMS 5)**





WBEA
Zero Responses

Total Hydrocarbons (THC) - ppm
Mannix - March 2015

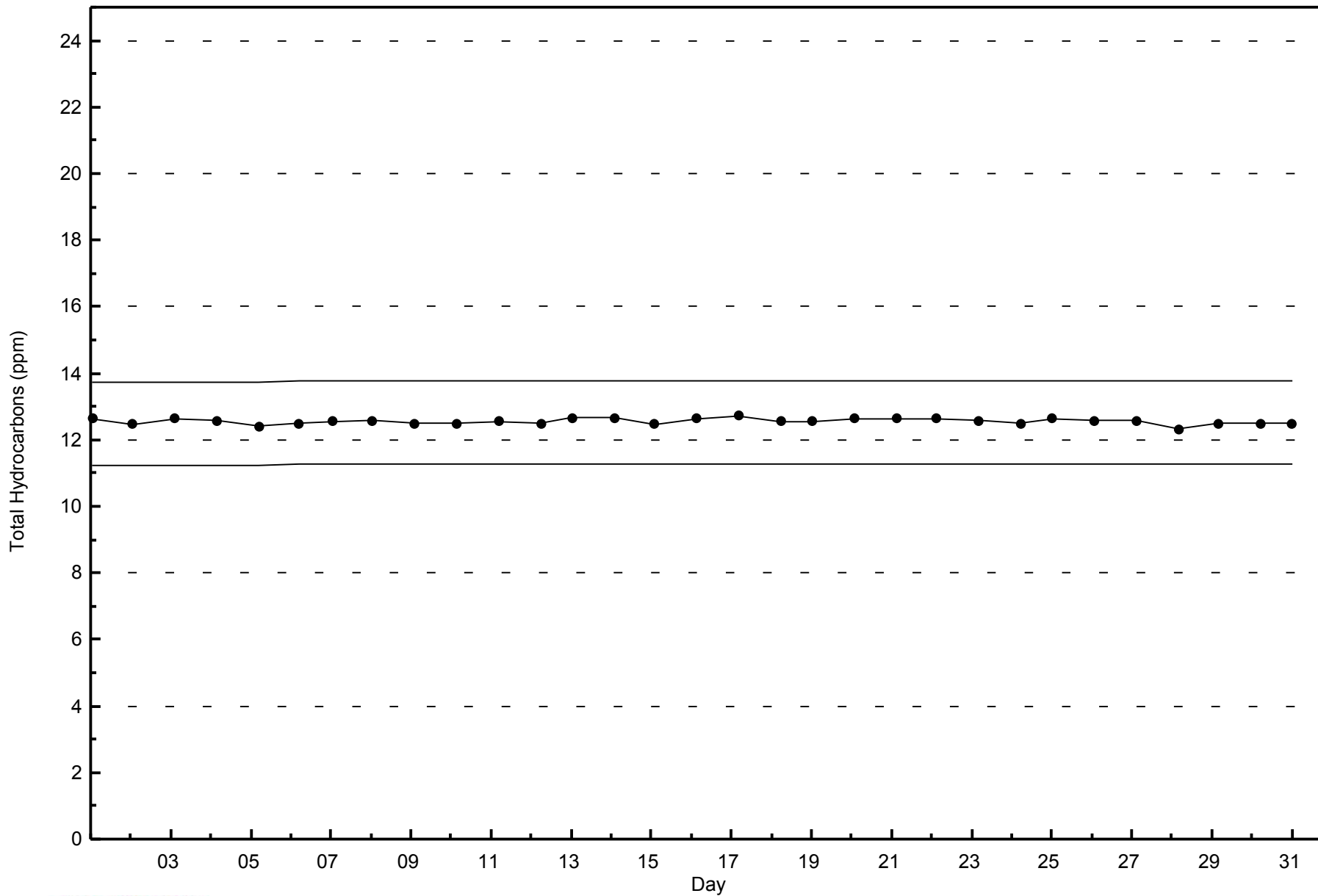




WBEA
Span Responses

Total Hydrocarbons (THC) - ppm

Mannix - March 2015



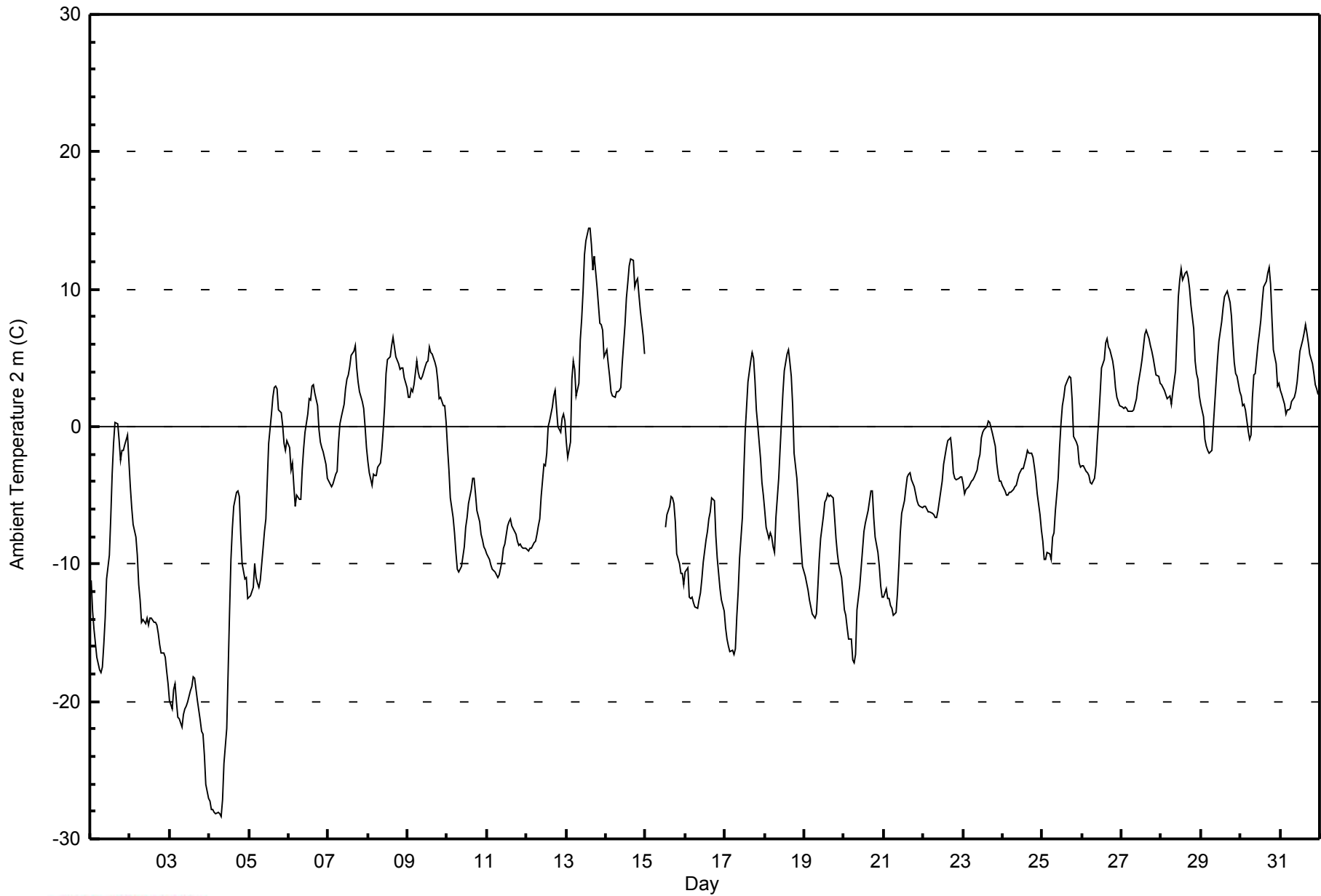


Maximum Value: 14.5 C on Mar 13 14:00		Maximum Daily Average: 7.3 C on Mar 13		Hours in Service: 744																							
Minimum Value: -28.3 C on Mar 4 08:00		Minimum Daily Average: -20.9 C on Mar 3		Hours of Data: 732																							
Maximum Diurnal Average: 1.3 C at hour 16		Minimum Diurnal Average: -7.7 C at hour 7		Hours of Missing Data: 12																							
Monthly Average: -3.53 C		Percentiles: P ₁ = -27.3 P ₁₀ = -13.9 Q ₁ = -8.8 Median = -3.2 Q ₃ = 2.6 P ₉₀ = 5.8 P ₉₉ = 11.9		Hours of Calibration: 0																							
				Percent Operational Time: 98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	-11.2	-13.4	-14.8	-15.8	-16.8	-17.7	-17.9	-17.5	-15.9	-13.9	-11.1	-9.3	-6.6	-3.5	-1.2	0.3	0.2	-1.0	-2.5	-1.7	-1.8	-1.3	-0.6	-2.5	-8.2	0.3	
2-Mar	-4.4	-5.8	-7.1	-8.0	-9.4	-11.5	-12.6	-14.2	-14.0	-14.4	-13.9	-14.4	-13.9	-14.3	-14.2	-14.4	-15.0	-15.9	-16.4	-16.5	-16.8	-17.8	-18.8	-13.2	-4.4		
3-Mar	-20.0	-20.6	-19.1	-18.7	-20.0	-21.1	-21.2	-21.8	-21.0	-20.6	-20.3	-20.0	-19.3	-18.9	-18.2	-18.3	-19.1	-20.0	-21.3	-22.2	-22.4	-23.9	-26.0	-27.0	-20.9	-18.2	
4-Mar	-27.3	-27.9	-27.9	-28.0	-28.2	-28.0	-28.1	-28.3	-27.1	-24.5	-21.9	-17.8	-13.5	-9.7	-7.4	-5.8	-4.8	-4.7	-5.1	-7.8	-10.0	-11.0	-10.9	-12.5	-17.4	-4.7	
5-Mar	-12.4	-12.3	-11.7	-10.0	-11.0	-11.4	-11.7	-11.2	-8.8	-7.6	-6.7	-3.9	-1.2	0.9	2.2	2.8	3.0	2.7	1.2	1.0	0.1	-1.2	-1.8	-1.0	-4.6	3.0	
6-Mar	-1.5	-3.2	-2.7	-4.2	-5.8	-5.0	-5.3	-5.2	-3.2	-1.6	-0.5	0.9	2.0	1.9	2.9	3.1	2.5	1.6	-0.2	-1.2	-1.6	-1.9	-2.7	-3.7	-1.4	3.1	
7-Mar	-4.0	-4.2	-4.4	-4.1	-3.5	-3.2	-1.1	0.2	0.7	1.6	2.7	3.4	3.7	4.4	5.2	5.4	5.9	4.3	3.3	2.6	1.9	1.4	0.0	-1.5	0.9	5.9	
8-Mar	-2.6	-3.4	-4.2	-3.5	-3.6	-3.6	-3.0	-2.6	-1.6	-0.2	1.5	3.8	4.8	5.1	5.9	6.5	5.8	5.1	4.6	4.2	4.3	4.3	3.5	2.8	1.4	6.5	
9-Mar	2.1	2.2	2.7	2.5	3.0	4.7	4.0	3.5	3.4	3.6	4.4	4.7	4.7	5.8	5.4	5.3	4.7	4.3	3.4	2.0	2.1	1.5	1.5	0.3	3.4	5.8	
10-Mar	-1.5	-3.1	-5.2	-6.6	-7.7	-9.1	-10.4	-10.6	-10.2	-9.5	-8.7	-7.3	-6.6	-5.6	-4.6	-3.8	-3.8	-4.8	-6.1	-6.9	-7.8	-8.2	-8.7	-9.0	-6.9	-1.5	
11-Mar	-9.2	-9.6	-10.1	-10.4	-10.4	-10.6	-11.0	-10.7	-10.3	-9.7	-8.9	-8.5	-7.3	-6.9	-6.7	-7.3	-7.4	-7.9	-8.3	-8.6	-8.5	-8.8	-8.8	-8.8	-9.0	-6.7	
12-Mar	-9.0	-9.0	-8.8	-8.9	-8.5	-8.3	-7.9	-7.3	-6.7	-5.1	-2.7	-2.8	-2.0	0.0	0.4	1.5	2.2	2.7	1.3	0.0	-0.4	0.6	0.9	0.4	-3.2	2.7	
13-Mar	-1.1	-2.2	-1.2	3.4	4.8	4.1	2.2	3.1	6.3	7.8	9.8	12.6	13.6	14.5	14.4	13.2	11.4	12.4	10.2	8.8	7.5	7.4	7.0	5.1	7.3	14.5	
14-Mar	5.6	4.5	3.7	2.5	2.2	2.1	2.5	2.6	2.6	2.9	4.6	7.5	9.3	10.4	11.7	12.2	12.1	10.1	10.6	10.8	9.5	8.4	6.6	5.3	6.7	12.2	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-7.3	-6.4	-5.8	-5.1	-5.2	-5.6	-6.9	-9.3	-9.9	-10.6	-10.7	-11.5	--	-5.1
16-Mar	-10.6	-10.2	-12.4	-12.5	-12.4	-12.8	-13.2	-13.2	-12.6	-12.1	-11.0	-9.9	-8.3	-7.7	-6.7	-6.2	-5.2	-5.4	-7.9	-9.6	-10.7	-11.8	-12.6	-13.4	-10.3	-5.2	
17-Mar	-14.7	-15.5	-15.9	-16.4	-16.3	-16.6	-16.2	-13.8	-12.0	-9.6	-6.6	-3.3	-0.4	1.4	3.3	4.8	5.4	5.0	3.4	1.3	0.1	-2.4	-4.1	-5.0	-6.0	5.4	
18-Mar	-6.1	-7.3	-8.1	-7.8	-8.0	-8.7	-9.1	-6.7	-3.8	-1.6	0.4	2.4	4.1	5.3	5.6	4.7	3.7	1.5	-1.9	-3.8	-5.4	-7.3	-8.7	-10.1	-3.2	5.6	
19-Mar	-10.9	-11.4	-11.9	-12.6	-13.1	-13.6	-13.9	-13.6	-11.7	-9.6	-8.1	-6.5	-5.5	-5.3	-4.9	-5.0	-5.0	-5.2	-6.7	-8.1	-9.2	-10.0	-11.0	-12.1	-9.4	-4.9	
20-Mar	-13.3	-13.7	-14.6	-15.4	-15.4	-17.0	-17.2	-16.6	-13.3	-11.6	-10.3	-8.9	-7.6	-7.0	-6.1	-5.4	-4.7	-4.7	-6.6	-8.1	-9.2	-10.2	-11.6	-12.4	-10.9	-4.7	
21-Mar	-12.5	-11.8	-12.5	-12.5	-13.1	-13.2	-13.7	-13.5	-12.1	-10.1	-7.7	-6.3	-5.4	-4.5	-3.7	-3.4	-3.3	-3.9	-4.4	-4.9	-5.4	-5.7	-5.8	-5.9	-8.1	-3.3	
22-Mar	-5.7	-5.8	-6.0	-6.2	-6.2	-6.3	-6.4	-6.6	-6.6	-6.1	-4.7	-4.0	-2.8	-2.2	-1.5	-1.1	-0.8	-1.8	-3.3	-3.8	-3.9	-3.8	-3.6	-3.7	-4.3	-0.8	
23-Mar	-4.1	-4.8	-4.6	-4.4	-4.2	-3.9	-3.9	-3.7	-3.1	-2.4	-2.0	-0.8	-0.4	-0.2	0.0	0.4	0.3	-0.1	-0.5	-1.4	-2.7	-3.5	-3.9	-3.9	-2.4	0.4	
24-Mar	-4.3	-4.7	-5.0	-5.0	-4.8	-4.8	-4.6	-4.3	-4.3	-3.8	-3.5	-3.1	-3.0	-2.7	-2.2	-1.7	-1.9	-1.9	-2.3	-3.0	-3.7	-4.9	-6.5	-7.5	-3.9	-1.7	
25-Mar	-8.4	-9.7	-9.7	-9.2	-9.3	-9.6	-8.1	-7.7	-6.1	-3.8	-1.6	0.2	1.5	2.2	2.9	3.5	3.7	3.5	2.0	-0.7	-1.1	-1.4	-2.7	-3.0	-3.0	3.7	
26-Mar	-2.8	-2.9	-3.2	-3.3	-3.6	-4.1	-4.2	-3.7	-2.9	-1.1	0.5	2.3	4.3	4.9	6.1	6.4	5.8	5.6	4.8	4.0	2.8	2.2	1.8	1.5	0.9	6.4	
27-Mar	1.4	1.3	1.4	1.4	1.2	1.1	1.1	1.3	1.6	2.1	3.0	4.2	4.9	5.8	6.7	7.0	6.4	5.9	5.5	5.0	4.4	3.7	3.6	3.2	3.5	7.0	
28-Mar	3.0	2.8	2.6	2.0	2.2	2.2	1.6	2.5	4.1	6.7	9.4	10.7	11.4	10.7	11.1	11.2	10.8	10.0	8.9	7.1	4.8	3.9	3.4	2.3	6.1	11.4	
29-Mar	1.6	0.8	-0.9	-1.4	-1.7	-1.9	-1.7	0.0	1.6	3.2	4.9	6.3	7.6	8.6	9.5	9.7	9.9	9.0	8.0	6.2	4.7	3.9	3.6	2.5	3.9	9.9	
30-Mar	2.2	1.5	1.6	1.2	-0.3	-0.9	-0.6	2.2	3.8	3.8	6.0	6.8	7.7	9.1	10.1	10.5	11.2	11.6	10.4	7.8	5.6	4.5	3.0	3.1	5.1	11.6	
31-Mar	2.6	2.4	1.6	0.9	1.3	1.2	1.4	1.8	2.2	2.5	3.3	4.4	5.5	6.3	6.8	7.5	6.8	6.1	5.3	4.6	3.9	3.0	2.8	2.4	3.6	7.5	
																								Diurnal Average			
																								Diurnal Maximum			
MS - Missing																											



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	26	3.55	3.55
-20 - 0	429	58.61	62.16
0 - 10	250	34.15	96.31
10 - 20	27	3.69	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Summary of Hour Averages

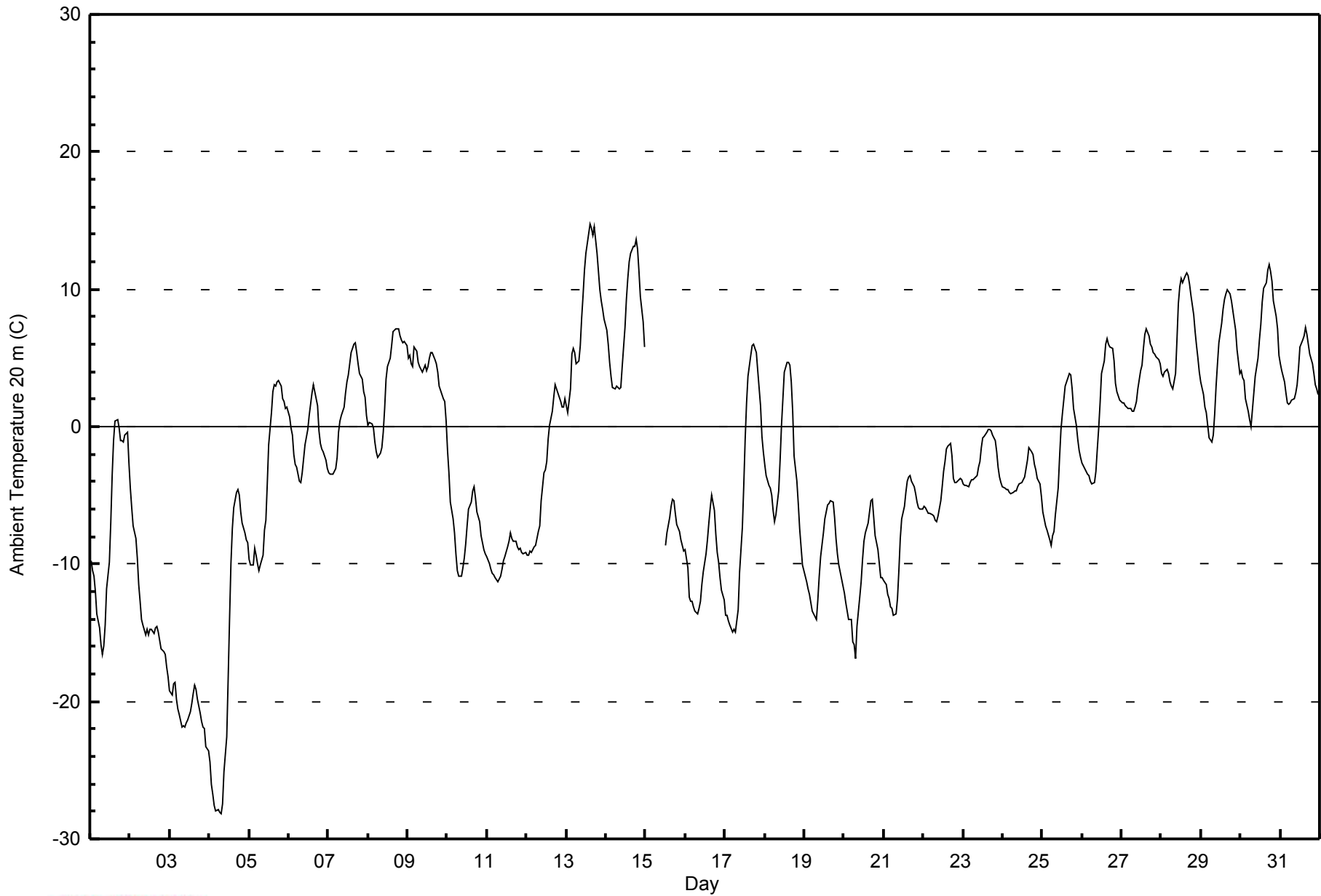
Mannix - March 2015

Maximum Value: 14.7 C on Mar 13 15:00		Maximum Daily Average: 8.7 C on Mar 13		Hours in Service: 744																							
Minimum Value: -28.2 C on Mar 4 08:00		Minimum Daily Average: -20.7 C on Mar 3		Hours of Data: 732																							
Maximum Diurnal Average: 1.3 C at hour 17		Minimum Diurnal Average: -7.1 C at hour 7		Hours of Missing Data: 12																							
Monthly Average: -3.09 C		Percentiles: P ₁ = -26.2 P ₁₀ = -13.7 Q ₁ = -8.7 Median = -2.9 Q ₃ = 3.3 P ₉₀ = 6.3 P ₉₉ = 12.7		Hours of Calibration: 0																							
				Percent Operational Time: 98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	-9.7	-10.5	-10.9	-12.0	-13.6	-14.7	-15.8	-16.5	-15.9	-14.4	-11.8	-9.9	-7.0	-3.6	-1.0	0.4	0.5	-0.1	-1.0	-1.0	-1.1	-0.7	-0.4	-2.6	-7.2	0.5	
2-Mar	-4.5	-5.9	-7.2	-8.1	-9.6	-11.5	-12.7	-14.1	-14.4	-15.2	-14.7	-15.1	-14.8	-14.7	-15.0	-14.7	-14.6	-15.0	-15.6	-16.2	-16.4	-16.6	-17.4	-18.2	-13.4	-4.5	
3-Mar	-19.2	-19.6	-18.7	-18.6	-19.9	-20.5	-21.0	-21.8	-21.8	-21.8	-21.5	-21.3	-20.8	-20.1	-19.4	-18.8	-19.1	-19.8	-20.9	-21.5	-21.8	-22.0	-23.3	-23.5	-20.7	-18.6	
4-Mar	-24.4	-26.0	-26.8	-27.5	-27.9	-27.9	-28.1	-28.2	-27.4	-25.1	-22.6	-18.4	-14.0	-9.9	-7.5	-5.9	-4.8	-4.6	-5.0	-6.2	-7.0	-7.7	-8.2	-8.5	-16.7	-4.6	
5-Mar	-9.7	-10.0	-10.1	-8.8	-9.3	-10.0	-10.5	-10.1	-9.3	-7.5	-6.8	-4.1	-1.3	1.1	2.5	3.1	3.0	3.3	3.4	3.0	2.0	1.8	1.4	1.5	-3.4	3.4	
6-Mar	0.7	-0.1	-0.6	-2.1	-2.8	-2.9	-4.0	-4.1	-3.4	-2.3	-1.3	-0.2	0.8	1.6	2.5	3.0	2.5	1.5	-0.3	-1.2	-1.6	-1.9	-2.5	-3.0	-0.9	3.0	
7-Mar	-3.4	-3.5	-3.5	-3.4	-3.0	-2.3	-0.4	0.4	0.8	1.5	2.5	3.2	3.7	4.6	5.4	6.0	6.1	5.4	4.6	3.9	3.5	2.6	2.1	0.8	1.6	6.1	
8-Mar	0.1	0.3	0.2	-0.1	-1.1	-1.8	-2.3	-1.9	-1.5	-0.4	1.3	3.5	4.4	5.0	5.9	7.0	7.1	7.1	7.2	6.6	6.3	6.1	6.2	5.9	3.0	7.2	
9-Mar	5.0	5.2	4.6	4.4	5.8	5.5	4.7	4.4	4.1	4.0	4.4	4.1	4.4	5.0	5.4	5.3	4.8	4.6	3.9	2.9	2.7	2.0	1.8	0.5	4.1	5.8	
10-Mar	-1.7	-3.4	-5.5	-6.7	-7.8	-9.2	-10.4	-10.9	-10.9	-10.2	-9.6	-8.5	-7.2	-6.0	-5.5	-4.6	-4.4	-5.2	-6.2	-6.9	-8.0	-8.4	-9.0	-9.2	-7.3	-1.7	
11-Mar	-9.5	-9.9	-10.4	-10.7	-10.7	-11.0	-11.3	-11.1	-10.9	-10.4	-9.7	-9.5	-8.7	-8.3	-7.7	-8.1	-8.3	-8.3	-8.8	-9.0	-8.8	-9.2	-9.2	-9.2	-9.5	-7.7	
12-Mar	-9.4	-9.4	-9.1	-9.1	-8.8	-8.6	-8.2	-7.6	-7.2	-5.4	-3.4	-3.2	-2.5	-0.9	0.1	1.2	2.1	3.1	2.7	2.5	1.8	1.4	1.5	2.0	-3.1	3.1	
13-Mar	1.5	1.1	2.8	5.2	5.7	5.4	4.6	4.8	5.9	7.9	9.5	11.4	12.6	14.0	14.7	14.5	13.9	14.5	12.6	11.3	10.0	9.2	8.6	7.8	8.7	14.7	
14-Mar	7.0	6.0	4.7	3.7	2.8	2.8	3.0	2.8	2.8	2.9	4.3	7.2	9.3	10.8	12.0	12.6	13.1	13.1	13.6	12.9	11.2	9.5	7.6	5.8	7.6	13.6	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-8.7	-7.7	-6.6	-5.8	-5.3	-5.4	-6.3	-7.1	-7.6	-8.2	-8.7	-9.1	--	-5.3
16-Mar	-8.9	-10.3	-12.4	-12.8	-12.7	-13.1	-13.4	-13.6	-13.3	-12.8	-11.5	-10.6	-9.2	-8.2	-7.0	-5.9	-5.0	-6.1	-7.8	-9.1	-9.9	-11.0	-11.9	-12.6	-10.4	-5.0	
17-Mar	-13.7	-13.7	-14.1	-14.5	-14.9	-14.7	-14.9	-14.2	-13.3	-10.6	-7.3	-4.2	-1.0	1.8	3.7	5.2	5.9	6.0	5.7	5.4	4.1	1.6	-0.7	-1.8	-4.8	6.0	
18-Mar	-2.8	-3.6	-4.2	-4.5	-5.0	-6.1	-6.9	-6.4	-4.7	-2.4	0.1	2.1	4.0	4.7	4.7	4.5	3.3	1.1	-2.1	-4.0	-5.6	-7.4	-8.8	-10.1	-2.5	4.7	
19-Mar	-10.9	-11.3	-11.8	-12.3	-12.8	-13.4	-13.9	-14.0	-12.6	-10.8	-9.4	-7.7	-6.7	-6.2	-5.7	-5.6	-5.4	-5.5	-6.6	-8.1	-9.3	-10.1	-11.0	-11.6	-9.7	-5.4	
20-Mar	-12.1	-12.8	-13.4	-14.1	-14.0	-15.7	-15.9	-16.9	-14.5	-12.4	-11.2	-9.7	-8.4	-7.7	-7.0	-6.2	-5.4	-5.3	-6.6	-7.9	-9.0	-10.0	-11.0	-11.0	-10.8	-5.3	
21-Mar	-11.1	-11.5	-12.2	-12.5	-13.1	-13.2	-13.7	-13.6	-12.5	-10.5	-8.1	-6.7	-5.8	-4.8	-4.0	-3.7	-3.5	-4.0	-4.4	-4.9	-5.5	-5.9	-6.0	-6.0	-8.2	-3.5	
22-Mar	-5.8	-5.9	-6.1	-6.3	-6.3	-6.4	-6.5	-6.8	-6.9	-6.5	-5.3	-4.4	-3.3	-2.5	-1.7	-1.4	-1.3	-2.2	-3.8	-4.1	-4.0	-3.9	-3.7	-3.9	-4.5	-1.3	
23-Mar	-4.2	-4.3	-4.3	-4.3	-4.1	-3.9	-3.9	-3.8	-3.6	-3.0	-2.6	-1.6	-0.8	-0.7	-0.4	-0.2	-0.2	-0.3	-0.6	-1.0	-1.9	-2.9	-3.7	-4.1	-2.5	-0.2	
24-Mar	-4.4	-4.5	-4.5	-4.6	-4.8	-4.8	-4.8	-4.6	-4.7	-4.3	-4.1	-4.1	-3.9	-3.6	-3.1	-2.4	-1.5	-1.8	-2.0	-2.7	-3.2	-3.7	-4.2	-5.1	-3.8	-1.5	
25-Mar	-6.2	-6.7	-7.2	-7.6	-8.2	-8.7	-7.9	-7.7	-6.4	-4.5	-2.2	-0.2	0.9	2.0	2.9	3.6	3.8	3.7	2.8	1.3	0.1	-0.9	-1.7	-2.2	-2.4	3.8	
26-Mar	-2.7	-2.9	-3.3	-3.4	-3.5	-4.0	-4.2	-4.0	-3.3	-1.6	-0.1	1.7	3.9	4.8	6.0	6.4	6.0	5.8	5.7	4.8	3.2	2.5	2.2	2.0	0.9	6.4	
27-Mar	1.8	1.7	1.6	1.5	1.4	1.3	1.1	1.2	1.4	1.8	2.8	4.1	4.5	5.7	6.7	7.2	6.6	6.0	5.8	5.4	5.3	5.1	4.9	4.6	3.7	7.2	
28-Mar	3.8	3.7	4.0	4.2	3.8	3.2	2.9	2.8	3.9	6.3	9.0	10.1	10.7	10.5	11.0	11.2	10.9	10.4	9.5	8.2	6.9	5.9	5.0	4.0	6.7	11.2	
29-Mar	3.2	2.3	1.4	1.1	0.1	-0.8	-1.2	-0.6	0.9	3.0	4.6	6.1	7.5	8.6	9.3	9.6	10.0	9.6	9.1	8.4	7.8	7.1	5.6	3.9	4.9	10.0	
30-Mar	4.1	3.6	3.3	2.0	1.1	0.5	0.0	1.2	2.4	3.6	5.0	6.3	7.5	9.0	10.1	10.5	11.4	11.8	11.3	10.5	9.1	8.0	7.1	5.2	6.0	11.8	
31-Mar	4.6	4.1	3.2	2.5	1.7	1.6	1.7	1.9	2.0	2.4	3.0	4.3	5.8	6.3	6.6	7.2	6.7	6.0	5.3	4.6	3.9	3.0	2.8	2.3	3.9	7.2	
																								Diurnal Average			
																								Diurnal Maximum			
MS - Missing																											



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	26	3.55	3.55
-20 - 0	415	56.69	60.25
0 - 10	260	35.52	95.77
10 - 20	31	4.23	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Summary of Hour Averages

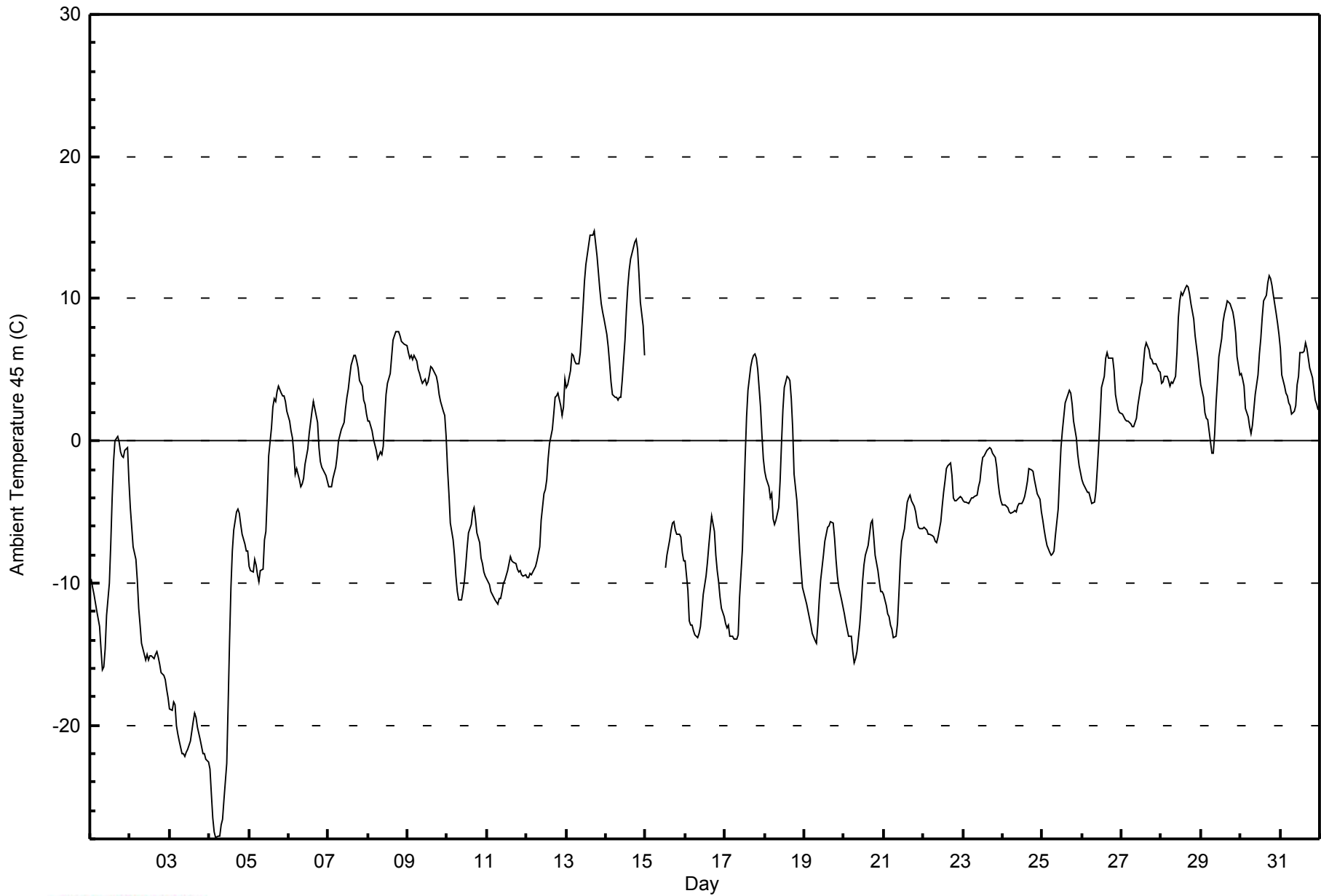
Mannix - March 2015

Maximum Value: 14.8 C on Mar 13 18:00		Maximum Daily Average: 9.3 C on Mar 13		Hours in Service: 744																							
Minimum Value: -27.9 C on Mar 4 05:00		Minimum Daily Average: -20.7 C on Mar 3		Hours of Data: 732																							
Maximum Diurnal Average: 1.1 C at hour 17		Minimum Diurnal Average: -6.9 C at hour 8		Hours of Missing Data: 12																							
Monthly Average: -3.01 C		Percentiles: P ₁ = -25.4 P ₁₀ = -13.7 Q ₁ = -8.7 Median = -2.8 Q ₃ = 3.7 P ₉₀ = 6.6 P ₉₉ = 13.6		Hours of Calibration: 0																							
				Percent Operational Time: 98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	-9.7	-10.3	-10.8	-11.4	-12.0	-13.1	-14.7	-16.1	-15.9	-14.6	-12.2	-10.1	-7.2	-4.0	-1.4	0.0	0.3	0.0	-0.7	-1.1	-1.2	-0.7	-0.5	-2.8	-7.1	0.3	
2-Mar	-4.7	-6.1	-7.4	-8.4	-9.8	-11.7	-12.9	-14.3	-14.7	-15.5	-15.0	-15.5	-15.1	-15.1	-15.3	-15.0	-14.8	-15.2	-15.7	-16.3	-16.5	-16.8	-17.5	-18.1	-13.6	-4.7	
3-Mar	-18.9	-19.0	-18.4	-18.6	-20.0	-20.6	-21.1	-22.0	-22.0	-22.2	-21.9	-21.7	-21.1	-20.4	-19.8	-19.1	-19.4	-20.1	-21.0	-21.6	-22.0	-22.0	-22.4	-22.6	-20.7	-18.4	
4-Mar	-23.1	-24.9	-26.5	-27.5	-27.9	-27.8	-27.8	-27.0	-26.6	-25.3	-22.7	-18.6	-14.2	-10.3	-7.8	-6.2	-5.0	-4.8	-5.1	-5.9	-6.6	-7.3	-7.8	-7.8	-16.4	-4.8	
5-Mar	-8.8	-9.1	-9.2	-8.4	-8.7	-9.4	-9.9	-9.2	-9.1	-7.0	-6.4	-3.9	-1.1	0.9	2.4	3.0	2.8	3.4	3.8	3.4	3.2	3.2	2.8	2.1	-2.9	3.8	
6-Mar	1.4	0.7	0.2	-0.9	-2.3	-2.0	-2.7	-3.2	-3.1	-2.6	-1.6	-0.5	0.5	1.3	2.1	2.7	2.3	1.3	-0.5	-1.4	-1.8	-2.0	-2.5	-2.8	-0.7	2.7	
7-Mar	-3.2	-3.3	-3.2	-2.6	-1.8	-1.0	0.1	0.4	0.8	1.3	2.3	3.1	3.7	4.5	5.3	6.0	6.0	5.6	5.1	4.3	3.8	2.9	2.6	1.9	1.9	6.0	
8-Mar	1.4	1.4	0.7	0.1	-0.3	-0.6	-1.2	-0.8	-0.9	-0.4	1.5	3.3	4.1	4.8	5.9	7.1	7.4	7.7	7.7	7.4	7.0	6.8	6.8	6.7	3.5	7.7	
9-Mar	6.2	5.8	6.0	5.7	6.1	5.6	5.0	4.7	4.4	4.1	4.4	3.9	4.2	4.7	5.3	5.2	4.7	4.6	4.0	3.3	2.8	2.0	1.8	0.3	4.4	6.2	
10-Mar	-2.0	-3.7	-5.8	-6.9	-8.0	-9.5	-10.6	-11.2	-11.2	-10.6	-9.9	-8.8	-7.6	-6.4	-5.9	-5.0	-4.7	-5.5	-6.5	-7.1	-8.2	-8.7	-9.2	-9.5	-7.6	-2.0	
11-Mar	-9.7	-10.1	-10.6	-10.8	-11.0	-11.2	-11.5	-11.1	-11.1	-10.6	-10.0	-9.8	-9.1	-8.6	-8.1	-8.4	-8.6	-8.6	-9.0	-9.2	-9.1	-9.4	-9.5	-9.5	-9.8	-8.1	
12-Mar	-9.6	-9.6	-9.3	-9.4	-9.0	-8.8	-8.5	-7.9	-7.5	-5.6	-3.7	-3.4	-2.7	-1.3	-0.2	0.8	1.9	3.1	3.2	3.3	2.5	1.8	2.3	4.4	-3.1	4.4	
13-Mar	3.7	3.9	4.9	6.1	6.0	5.7	5.4	5.5	6.2	7.8	9.5	11.3	12.4	13.8	14.5	14.5	14.5	14.8	13.0	11.8	10.6	9.6	9.1	8.5	9.3	14.8	
14-Mar	7.5	6.7	5.4	4.2	3.2	3.1	3.1	2.9	3.1	3.0	4.2	7.1	9.2	10.9	12.0	12.8	13.5	14.0	14.2	13.5	11.8	9.8	8.1	6.0	7.9	14.2	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-9.0	-8.0	-7.0	-6.3	-5.7	-5.7	-6.3	-6.6	-6.5	-6.8	-7.9	-8.4	--	-5.7
16-Mar	-8.4	-10.5	-12.6	-13.0	-13.0	-13.4	-13.6	-13.8	-13.6	-13.1	-11.9	-10.8	-9.6	-8.5	-7.3	-6.3	-5.3	-6.4	-8.1	-9.2	-10.0	-11.0	-11.8	-12.4	-10.6	-5.3	
17-Mar	-12.8	-13.2	-12.9	-13.8	-13.7	-13.9	-13.9	-14.0	-13.6	-11.0	-7.6	-4.3	-1.2	1.7	3.6	5.2	5.8	6.0	6.1	5.9	5.0	2.4	0.4	-1.3	-4.4	6.1	
18-Mar	-2.2	-2.7	-3.2	-4.0	-3.7	-5.5	-5.9	-5.6	-4.7	-2.8	-0.2	2.1	3.7	4.5	4.5	4.2	3.0	0.9	-2.3	-4.2	-5.9	-7.6	-9.0	-10.3	-2.4	4.5	
19-Mar	-11.1	-11.5	-12.0	-12.4	-13.0	-13.6	-14.1	-14.2	-13.0	-11.2	-9.8	-8.1	-7.1	-6.6	-6.0	-5.9	-5.7	-5.8	-6.8	-8.3	-9.5	-10.3	-11.2	-11.7	-9.9	-5.7	
20-Mar	-12.1	-12.8	-13.3	-13.7	-13.8	-14.9	-15.6	-15.3	-14.8	-13.0	-11.6	-9.9	-8.7	-8.0	-7.3	-6.6	-5.8	-5.6	-6.8	-8.1	-9.1	-9.9	-10.6	-10.6	-10.7	-5.6	
21-Mar	-10.8	-11.6	-12.2	-12.4	-13.0	-13.2	-13.8	-13.7	-12.9	-10.8	-8.5	-7.1	-6.2	-5.1	-4.3	-4.0	-3.9	-4.2	-4.6	-5.0	-5.7	-6.1	-6.2	-6.2	-8.4	-3.9	
22-Mar	-6.1	-6.1	-6.3	-6.5	-6.5	-6.7	-6.8	-7.1	-7.2	-6.8	-5.7	-4.6	-3.6	-2.8	-2.0	-1.7	-1.6	-2.5	-4.0	-4.2	-4.2	-4.0	-3.9	-4.1	-4.8	-1.6	
23-Mar	-4.3	-4.3	-4.4	-4.4	-4.2	-4.0	-4.0	-3.9	-3.8	-3.2	-2.8	-1.9	-1.1	-1.0	-0.7	-0.6	-0.5	-0.6	-0.9	-1.2	-1.9	-3.0	-3.8	-4.2	-2.7	-0.5	
24-Mar	-4.5	-4.5	-4.6	-4.7	-5.0	-5.1	-5.0	-4.9	-5.0	-4.6	-4.4	-4.4	-4.2	-4.0	-3.5	-2.8	-1.9	-2.1	-2.2	-2.8	-3.2	-3.7	-4.1	-5.0	-4.0	-1.9	
25-Mar	-5.6	-6.3	-6.8	-7.3	-7.9	-8.1	-7.9	-7.8	-6.7	-4.8	-2.5	-0.5	0.7	1.7	2.6	3.3	3.5	3.4	2.6	1.4	0.2	-1.0	-1.7	-2.2	-2.4	3.5	
26-Mar	-2.8	-3.0	-3.4	-3.6	-3.6	-4.1	-4.4	-4.3	-3.5	-1.9	-0.3	1.6	3.7	4.5	5.8	6.2	5.8	5.8	5.9	4.9	3.3	2.7	2.2	2.0	0.8	6.2	
27-Mar	1.8	1.7	1.5	1.4	1.3	1.2	1.0	1.0	1.3	1.6	2.5	3.8	4.1	5.4	6.5	6.9	6.4	5.9	5.7	5.4	5.4	5.4	4.9	4.8	3.6	6.9	
28-Mar	4.1	4.1	4.5	4.6	4.3	3.8	4.2	4.0	4.5	6.2	8.7	9.9	10.4	10.3	10.7	10.9	10.8	10.4	9.7	8.6	7.4	6.6	5.8	4.8	7.0	10.9	
29-Mar	3.9	3.1	2.0	1.6	1.5	0.7	-0.9	-0.8	0.5	2.7	4.3	5.9	7.2	8.3	9.0	9.4	9.8	9.7	9.3	9.1	8.5	7.6	5.9	4.6	5.1	9.8	
30-Mar	4.7	4.4	3.8	2.3	1.7	1.0	0.5	1.1	2.1	3.3	4.6	6.1	7.2	8.6	9.8	10.3	11.1	11.6	11.4	11.0	10.2	8.9	8.2	7.5	6.3	11.6	
31-Mar	6.5	4.6	3.8	3.4	3.1	2.7	2.5	1.9	2.1	2.4	4.0	4.5	6.2	6.2	6.3	6.9	6.5	5.8	5.1	4.4	3.7	2.8	2.6	2.1	4.2	6.9	
																								Diurnal Average			
																								Diurnal Maximum			
																								Diurnal Minimum			
MS - Missing																											



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	28	3.83	3.83
-20 - 0	408	55.74	59.56
0 - 10	266	36.34	95.90
10 - 20	30	4.10	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Summary of Hour Averages

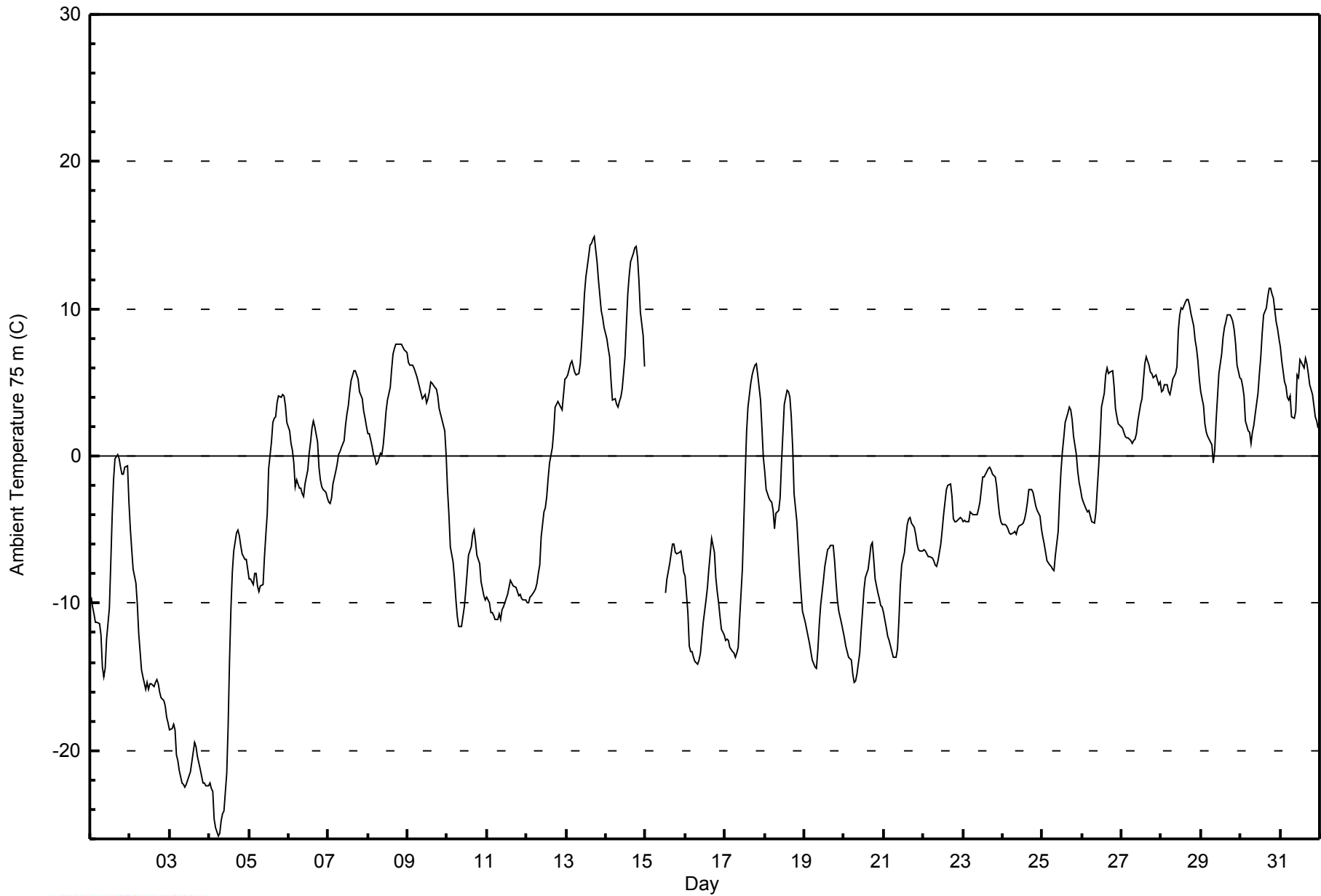
Mannix - March 2015

Maximum Value: 14.9 C on Mar 13 18:00		Maximum Daily Average: 9.5 C on Mar 13		Hours in Service: 744																							
Minimum Value: -25.8 C on Mar 4 06:00		Minimum Daily Average: -20.9 C on Mar 3		Hours of Data: 732																							
Maximum Diurnal Average: 0.9 C at hour 17		Minimum Diurnal Average: -6.6 C at hour 8		Hours of Missing Data: 12																							
Monthly Average: -2.96 C		Percentiles: P ₁ = -22.8 P ₁₀ = -13.4 Q ₁ = -8.8 Median = -2.8 Q ₃ = 3.9 P ₉₀ = 6.8 P ₉₉ = 13.4		Hours of Calibration: 0																							
				Percent Operational Time: 98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	-9.6	-10.2	-10.7	-11.3	-11.3	-11.4	-12.1	-14.3	-15.0	-14.5	-12.4	-10.4	-7.3	-4.1	-1.6	-0.2	0.1	-0.1	-0.7	-1.2	-1.3	-0.8	-0.7	-3.1	-6.8	0.1	
2-Mar	-5.0	-6.4	-7.7	-8.6	-10.1	-12.0	-13.2	-14.5	-15.0	-15.8	-15.4	-15.8	-15.5	-15.5	-15.7	-15.3	-15.2	-15.5	-16.0	-16.4	-16.6	-17.0	-17.7	-18.2	-13.9	-5.0	
3-Mar	-18.6	-18.5	-18.2	-18.6	-20.3	-20.7	-21.4	-22.2	-22.3	-22.5	-22.3	-22.0	-21.5	-20.8	-20.1	-19.5	-19.8	-20.4	-21.3	-21.7	-22.2	-22.2	-22.4	-22.4	-20.9	-18.2	
4-Mar	-22.2	-22.6	-22.7	-24.7	-25.3	-25.8	-25.6	-24.8	-24.3	-24.1	-21.5	-18.3	-13.8	-10.4	-7.9	-6.4	-5.2	-5.0	-5.4	-6.0	-6.6	-7.0	-7.0	-7.6	-15.4	-5.0	
5-Mar	-8.3	-8.3	-8.7	-8.0	-8.0	-8.8	-9.2	-8.8	-8.7	-6.8	-5.3	-3.9	-0.9	0.9	2.3	2.6	2.7	3.6	4.1	4.0	4.2	4.1	3.5	2.3	-2.5	4.2	
6-Mar	1.7	0.9	0.4	-0.5	-2.0	-1.6	-2.2	-2.2	-2.5	-2.8	-1.9	-0.9	0.2	1.0	1.9	2.4	2.0	1.0	-0.7	-1.6	-2.1	-2.2	-2.5	-2.8	-0.7	2.4	
7-Mar	-3.2	-3.2	-2.8	-1.9	-1.1	-0.6	0.1	0.3	0.6	1.1	2.1	2.8	3.4	4.3	5.1	5.8	5.8	5.5	5.3	4.4	3.9	3.0	2.6	2.0	1.9	5.8	
8-Mar	1.6	1.5	0.7	0.1	-0.1	-0.5	-0.5	0.2	0.1	0.7	1.8	3.0	3.8	4.6	5.9	6.9	7.3	7.6	7.6	7.6	7.6	7.4	7.3	7.0	3.7	7.6	
9-Mar	6.4	6.2	6.2	6.2	6.0	5.5	5.1	4.7	4.3	3.9	4.1	3.6	3.9	4.4	5.1	5.0	4.6	4.5	4.1	3.3	2.8	2.1	1.7	0.1	4.3	6.4	
10-Mar	-2.2	-4.0	-6.1	-7.2	-8.3	-9.8	-10.9	-11.5	-11.5	-10.9	-10.3	-9.2	-8.0	-6.8	-6.2	-5.3	-5.0	-5.8	-6.7	-7.3	-8.5	-9.0	-9.5	-9.7	-7.9	-2.2	
11-Mar	-9.6	-10.0	-10.6	-10.6	-10.8	-11.1	-11.1	-10.7	-11.1	-10.5	-10.2	-10.0	-9.4	-8.9	-8.5	-8.7	-8.8	-8.9	-9.2	-9.5	-9.4	-9.7	-9.8	-9.7	-9.9	-8.5	
12-Mar	-9.9	-9.9	-9.6	-9.5	-9.2	-9.0	-8.6	-8.0	-7.4	-5.5	-3.8	-3.5	-2.7	-1.5	-0.5	0.6	1.7	3.3	3.6	3.7	3.3	3.2	4.2	5.2	-2.9	5.2	
13-Mar	5.3	5.5	6.2	6.5	6.0	5.7	5.5	5.6	6.3	7.7	9.2	11.0	12.2	13.6	14.4	14.5	14.8	14.9	13.2	12.0	11.0	9.9	9.4	8.7	9.5	14.9	
14-Mar	8.0	7.3	6.8	5.1	3.8	3.9	3.5	3.3	3.7	3.9	4.6	6.8	8.9	11.0	12.3	13.2	13.8	14.2	14.2	13.5	11.9	9.8	8.2	6.1	8.2	14.2	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-9.3	-8.3	-7.3	-6.6	-6.0	-6.0	-6.5	-6.6	-6.5	-6.4	-7.1	-7.8	--	-6.0
16-Mar	-8.2	-10.6	-12.9	-13.3	-13.3	-13.7	-13.9	-14.1	-13.9	-13.4	-12.3	-11.3	-9.7	-8.9	-7.7	-6.7	-5.6	-6.5	-8.2	-9.2	-9.9	-10.9	-11.8	-12.2	-10.8	-5.6	
17-Mar	-12.5	-12.4	-12.5	-13.0	-13.2	-13.4	-13.6	-13.4	-13.0	-11.1	-7.7	-4.6	-1.3	1.6	3.4	4.9	5.6	5.9	6.2	6.3	5.5	3.8	2.0	-0.1	-4.0	6.3	
18-Mar	-1.1	-2.3	-2.9	-3.0	-3.1	-3.7	-4.9	-3.8	-3.7	-2.8	-0.5	1.5	3.5	4.5	4.3	4.0	2.7	0.6	-2.6	-4.5	-6.2	-7.9	-9.3	-10.6	-2.2	4.5	
19-Mar	-11.3	-11.8	-12.2	-12.7	-13.3	-13.8	-14.3	-14.4	-13.2	-11.5	-10.1	-8.5	-7.4	-6.9	-6.4	-6.3	-6.0	-6.1	-7.1	-8.6	-9.8	-10.6	-11.4	-11.8	-10.2	-6.0	
20-Mar	-12.3	-12.9	-13.2	-13.7	-13.9	-14.8	-15.3	-15.2	-14.8	-13.4	-11.9	-10.5	-9.1	-8.3	-7.7	-6.9	-6.1	-5.9	-7.0	-8.3	-9.3	-9.7	-10.1	-10.2	-10.9	-5.9	
21-Mar	-10.6	-11.6	-12.2	-12.5	-12.9	-13.2	-13.7	-13.7	-13.0	-11.2	-8.9	-7.4	-6.6	-5.5	-4.6	-4.3	-4.2	-4.5	-4.9	-5.3	-6.0	-6.4	-6.5	-6.5	-8.6	-4.2	
22-Mar	-6.3	-6.4	-6.6	-6.8	-6.8	-7.0	-7.1	-7.4	-7.5	-7.1	-6.0	-5.0	-3.9	-3.1	-2.3	-2.0	-1.9	-2.8	-4.3	-4.5	-4.4	-4.2	-4.1	-4.2	-5.1	-1.9	
23-Mar	-4.4	-4.4	-4.4	-4.5	-3.8	-3.9	-4.0	-4.0	-4.0	-3.6	-3.1	-2.2	-1.4	-1.4	-1.0	-0.9	-0.8	-0.9	-1.2	-1.4	-2.1	-3.1	-3.9	-4.4	-2.9	-0.8	
24-Mar	-4.7	-4.7	-4.8	-4.9	-5.2	-5.3	-5.2	-5.2	-5.3	-4.9	-4.8	-4.7	-4.5	-4.3	-3.8	-3.2	-2.3	-2.3	-2.3	-2.4	-2.9	-3.4	-3.7	-4.1	-4.9	-4.2	-2.3
25-Mar	-5.5	-6.0	-6.6	-7.1	-7.3	-7.5	-7.7	-7.8	-6.7	-5.1	-2.9	-1.0	0.3	1.3	2.3	2.9	3.3	3.2	2.5	1.3	0.1	-1.0	-1.8	-2.3	-2.5	3.3	
26-Mar	-2.8	-3.1	-3.6	-3.8	-3.7	-4.1	-4.5	-4.6	-3.8	-2.2	-0.7	1.1	3.3	4.3	5.5	6.0	5.7	5.7	5.8	4.7	3.2	2.7	2.2	2.1	0.6	6.0	
27-Mar	1.9	1.6	1.4	1.2	1.3	1.1	0.9	1.1	1.1	1.5	2.4	3.5	3.9	5.2	6.2	6.7	6.2	5.7	5.6	5.3	5.4	5.5	4.8	5.1	3.5	6.7	
28-Mar	4.4	4.4	4.8	4.8	4.4	4.2	4.7	5.2	5.6	6.1	8.5	9.6	10.1	10.0	10.5	10.7	10.6	10.3	9.7	8.8	7.9	7.3	6.5	5.2	7.2	10.7	
29-Mar	4.3	3.4	2.2	1.6	1.4	1.1	0.8	-0.5	0.4	2.4	4.0	5.6	6.9	8.1	8.8	9.1	9.6	9.5	9.4	9.1	8.5	7.6	6.2	5.3	5.2	9.6	
30-Mar	5.2	4.8	4.1	2.3	1.7	1.6	0.8	1.6	2.1	2.8	4.2	5.6	6.8	8.3	9.5	10.0	10.9	11.4	11.4	11.1	10.8	9.2	8.6	7.9	6.4	11.4	
31-Mar	7.4	6.4	5.1	4.8	4.0	3.8	4.1	2.7	2.6	3.1	5.5	5.3	6.6	6.1	6.0	6.6	6.2	5.6	4.9	4.2	3.4	2.6	2.4	1.9	4.6	7.4	
																								Diurnal Average			
																								Diurnal Maximum			
																								8.0 7.3 6.8 6.5 6.0 5.7 5.5 5.6 6.3 7.7 9.2 11.0 12.2 13.6 14.4 14.5 14.8 14.9 14.2 13.5 11.9 9.9 9.4 8.7			
MS - Missing																											



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	29	3.96	3.96
-20 - 0	404	55.19	59.15
0 - 10	269	36.75	95.90
10 - 20	30	4.10	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Summary of Hour Averages

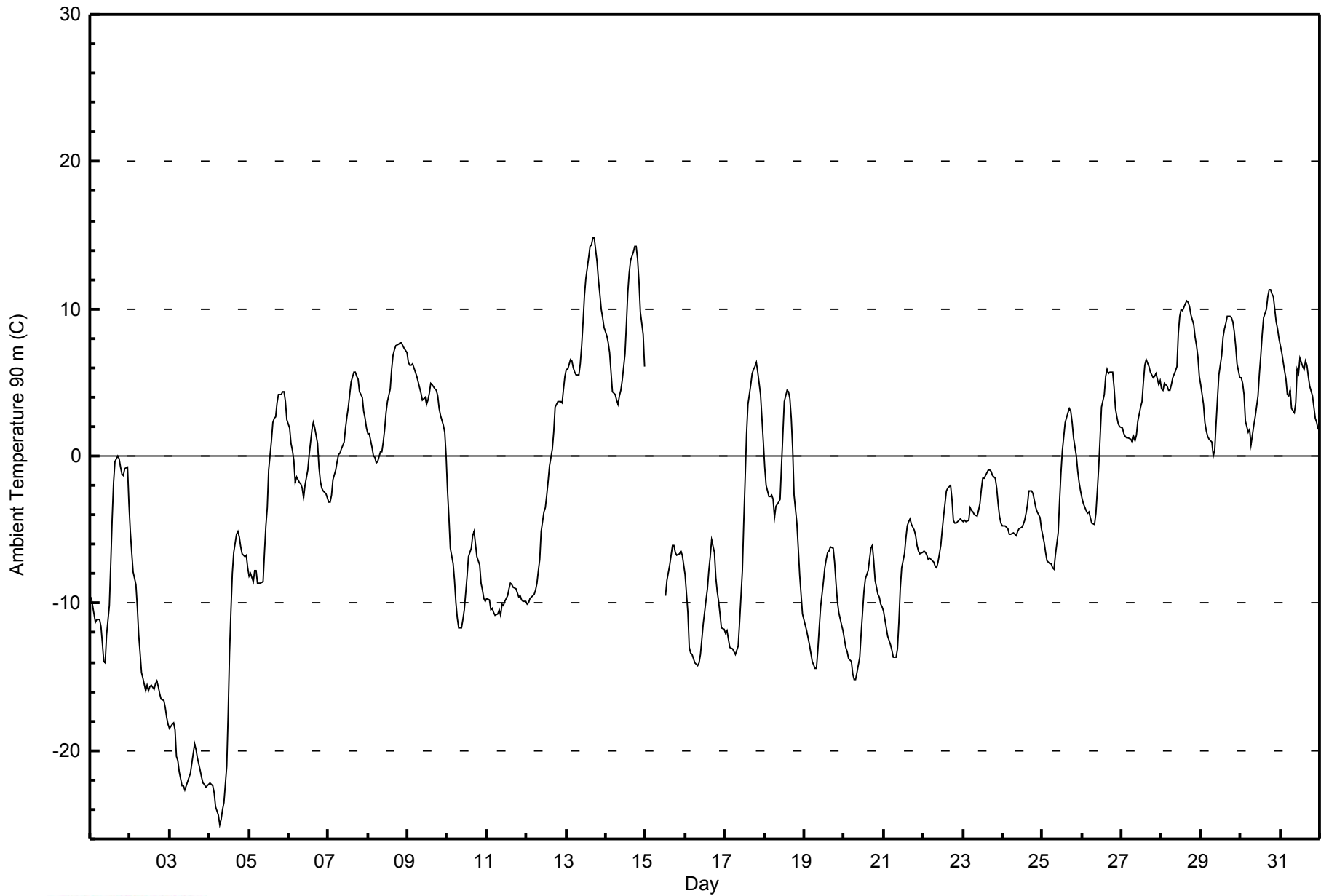
Mannix - March 2015

Maximum Value: 14.8 C on Mar 13 18:00		Maximum Daily Average: 9.6 C on Mar 13		Hours in Service: 744																							
Minimum Value: -25.0 C on Mar 4 07:00		Minimum Daily Average: -21.0 C on Mar 3		Hours of Data: 732																							
Maximum Diurnal Average: 0.8 C at hour 17		Minimum Diurnal Average: -6.4 C at hour 8		Hours of Missing Data: 12																							
Monthly Average: -2.95 C		Percentiles: P ₁ = -22.7 P ₁₀ = -13.4 Q ₁ = -8.8 Median = -2.9 Q ₃ = 4.1 P ₉₀ = 6.8 P ₉₉ = 13.6		Hours of Calibration: 0																							
				Percent Operational Time: 98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	-9.6	-10.2	-10.7	-11.3	-11.1	-11.1	-11.5	-12.8	-14.0	-14.1	-12.1	-10.2	-7.3	-4.3	-1.8	-0.4	0.0	-0.2	-0.7	-1.3	-1.3	-0.9	-0.8	-3.2	-6.7	0.0	
2-Mar	-5.1	-6.5	-7.9	-8.8	-10.2	-12.2	-13.4	-14.7	-15.1	-15.9	-15.5	-16.0	-15.6	-15.6	-15.8	-15.5	-15.3	-15.6	-16.1	-16.5	-16.6	-17.0	-17.8	-18.2	-14.0	-5.1	
3-Mar	-18.5	-18.2	-18.1	-18.6	-20.4	-20.7	-21.4	-22.4	-22.4	-22.7	-22.4	-22.2	-21.6	-20.9	-20.2	-19.6	-19.9	-20.5	-21.4	-21.8	-22.3	-22.3	-22.5	-22.3	-21.0	-18.1	
4-Mar	-22.2	-22.3	-22.4	-22.9	-23.8	-24.4	-25.0	-24.7	-24.0	-23.6	-21.0	-17.5	-13.4	-10.5	-8.0	-6.6	-5.3	-5.1	-5.5	-6.1	-6.7	-6.9	-6.8	-7.6	-15.1	-5.1	
5-Mar	-8.2	-8.0	-8.5	-7.8	-7.8	-8.6	-8.6	-8.7	-8.5	-6.5	-4.7	-3.5	-1.0	1.1	2.3	2.6	2.7	3.6	4.1	4.2	4.4	4.3	3.7	2.5	-2.3	4.4	
6-Mar	1.9	0.9	0.4	-0.3	-1.8	-1.4	-1.8	-1.9	-2.2	-2.9	-2.0	-1.0	0.1	0.9	1.8	2.3	1.9	0.9	-0.8	-1.7	-2.2	-2.3	-2.5	-2.8	-0.7	2.3	
7-Mar	-3.2	-3.1	-2.7	-1.6	-0.9	-0.4	0.1	0.2	0.5	1.0	1.9	2.7	3.3	4.2	5.0	5.7	5.7	5.4	5.2	4.4	4.0	3.0	2.6	1.9	1.9	5.7	
8-Mar	1.6	1.5	0.6	0.0	-0.1	-0.5	-0.3	0.3	0.3	1.0	1.8	2.9	3.7	4.6	5.9	6.8	7.2	7.5	7.6	7.7	7.7	7.5	7.3	7.0	3.7	7.7	
9-Mar	6.4	6.2	6.2	6.3	6.0	5.4	5.0	4.7	4.2	3.8	4.0	3.6	3.8	4.3	5.0	4.9	4.6	4.5	4.1	3.2	2.8	2.1	1.6	0.1	4.3	6.4	
10-Mar	-2.4	-4.1	-6.3	-7.3	-8.4	-9.9	-11.0	-11.7	-11.7	-11.1	-10.4	-9.3	-8.1	-6.8	-6.3	-5.4	-5.1	-5.9	-6.8	-7.4	-8.6	-9.1	-9.6	-9.8	-8.0	-2.4	
11-Mar	-9.6	-9.8	-10.5	-10.3	-10.6	-10.8	-10.8	-10.5	-10.8	-10.1	-10.2	-9.9	-9.5	-9.0	-8.6	-8.7	-8.9	-9.0	-9.3	-9.6	-9.5	-9.8	-9.8	-9.8	-9.8	-9.8	-8.6
12-Mar	-10.0	-10.0	-9.7	-9.6	-9.4	-9.1	-8.6	-7.8	-7.0	-5.1	-3.8	-3.5	-2.7	-1.7	-0.6	0.4	1.6	3.3	3.5	3.7	3.7	3.6	4.6	5.4	-2.9	5.4	
13-Mar	5.9	5.9	6.5	6.5	6.0	5.7	5.5	5.5	6.2	7.5	9.1	10.9	12.1	13.5	14.3	14.4	14.8	14.8	13.2	12.0	11.0	9.9	9.4	8.8	9.6	14.8	
14-Mar	8.2	7.7	7.1	5.7	4.4	4.1	3.8	3.5	4.0	4.5	5.1	7.0	8.9	11.1	12.4	13.3	13.8	14.2	14.2	13.4	11.9	9.8	8.3	6.1	8.4	14.2	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-9.5	-8.4	-7.4	-6.7	-6.1	-6.1	-6.6	-6.7	-6.6	-6.4	-6.8	-7.4	--	-6.1
16-Mar	-8.1	-10.6	-13.0	-13.4	-13.4	-13.8	-14.1	-14.2	-14.0	-13.5	-12.5	-11.4	-9.8	-9.0	-7.8	-6.8	-5.7	-6.5	-8.2	-9.2	-9.9	-10.8	-11.6	-11.8	-10.8	-5.7	
17-Mar	-12.0	-11.8	-12.5	-13.0	-13.1	-13.3	-13.4	-13.2	-12.9	-11.3	-7.8	-4.5	-1.5	1.5	3.5	4.9	5.6	5.9	6.1	6.4	5.7	4.2	2.6	1.0	-3.9	6.4	
18-Mar	-0.8	-2.0	-2.8	-2.7	-2.6	-2.9	-4.2	-3.5	-3.1	-3.0	-0.6	1.5	3.7	4.5	4.4	3.9	2.6	0.5	-2.7	-4.6	-6.3	-8.0	-9.4	-10.7	-2.0	4.5	
19-Mar	-11.4	-11.9	-12.3	-12.8	-13.4	-14.0	-14.4	-14.4	-13.2	-11.6	-10.3	-8.6	-7.6	-7.1	-6.5	-6.4	-6.2	-6.2	-7.2	-8.7	-9.9	-10.6	-11.4	-11.9	-10.3	-6.2	
20-Mar	-12.4	-13.0	-13.3	-13.8	-13.9	-14.8	-15.2	-15.2	-14.7	-13.6	-12.0	-10.6	-9.2	-8.4	-7.8	-7.0	-6.2	-6.1	-7.2	-8.4	-9.4	-9.6	-10.0	-10.2	-10.9	-6.1	
21-Mar	-10.5	-11.6	-12.2	-12.5	-12.8	-13.2	-13.7	-13.7	-13.1	-11.3	-9.0	-7.6	-6.6	-5.6	-4.8	-4.4	-4.3	-4.7	-5.0	-5.4	-6.1	-6.5	-6.6	-6.6	-8.7	-4.3	
22-Mar	-6.4	-6.6	-6.7	-7.0	-7.0	-7.1	-7.2	-7.5	-7.6	-7.2	-6.1	-5.1	-4.0	-3.2	-2.4	-2.1	-2.0	-2.9	-4.4	-4.6	-4.5	-4.3	-4.3	-4.3	-5.2	-2.0	
23-Mar	-4.5	-4.4	-4.4	-4.3	-3.5	-3.7	-3.8	-3.9	-4.1	-3.7	-3.2	-2.3	-1.5	-1.5	-1.1	-1.0	-0.9	-1.0	-1.3	-1.5	-2.2	-3.3	-4.0	-4.5	-2.9	-0.9	
24-Mar	-4.7	-4.7	-4.8	-4.9	-5.3	-5.3	-5.3	-5.3	-5.4	-5.1	-4.9	-4.8	-4.7	-4.4	-3.9	-3.3	-2.4	-2.3	-2.5	-3.0	-3.5	-3.8	-4.1	-4.9	-4.3	-2.3	
25-Mar	-5.4	-5.9	-6.5	-7.1	-7.3	-7.3	-7.6	-7.7	-6.7	-5.2	-3.1	-1.1	0.4	1.3	2.3	2.9	3.2	3.0	2.3	1.2	0.0	-1.1	-1.8	-2.3	-2.5	3.2	
26-Mar	-2.9	-3.2	-3.7	-3.9	-3.8	-4.2	-4.6	-4.7	-3.9	-2.3	-0.7	1.2	3.3	4.2	5.4	5.9	5.6	5.7	5.7	4.6	3.2	2.6	2.1	2.0	0.6	5.9	
27-Mar	1.9	1.6	1.3	1.2	1.3	1.1	1.0	1.4	1.1	1.5	2.3	3.4	3.7	5.1	6.2	6.6	6.1	5.7	5.5	5.3	5.4	5.6	4.9	5.1	3.5	6.6	
28-Mar	4.5	4.5	4.9	4.8	4.4	4.4	4.9	5.3	5.8	6.1	8.4	9.5	9.9	9.9	10.3	10.5	10.5	10.2	9.6	8.9	8.0	7.5	6.7	5.4	7.3	10.5	
29-Mar	4.8	3.5	2.2	1.7	1.3	1.1	0.9	0.0	0.4	2.2	3.9	5.5	6.9	8.0	8.6	9.0	9.5	9.5	9.4	9.1	8.5	7.5	6.3	5.3	5.2	9.5	
30-Mar	5.4	4.9	4.2	2.4	1.7	1.9	0.8	1.4	2.1	2.7	4.1	5.6	6.8	8.3	9.4	9.9	10.8	11.3	11.3	11.1	10.9	9.1	8.7	8.0	6.4	11.3	
31-Mar	7.5	7.0	5.8	5.3	4.2	4.1	4.4	3.3	3.0	3.7	5.9	5.6	6.7	6.1	5.9	6.5	6.2	5.5	4.7	4.1	3.3	2.6	2.3	1.8	4.8	7.5	
																								Diurnal Average			
																								Diurnal Maximum			
MS - Missing																											



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	29	3.96	3.96
-20 - 0	403	55.05	59.02
0 - 10	273	37.30	96.31
10 - 20	27	3.69	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

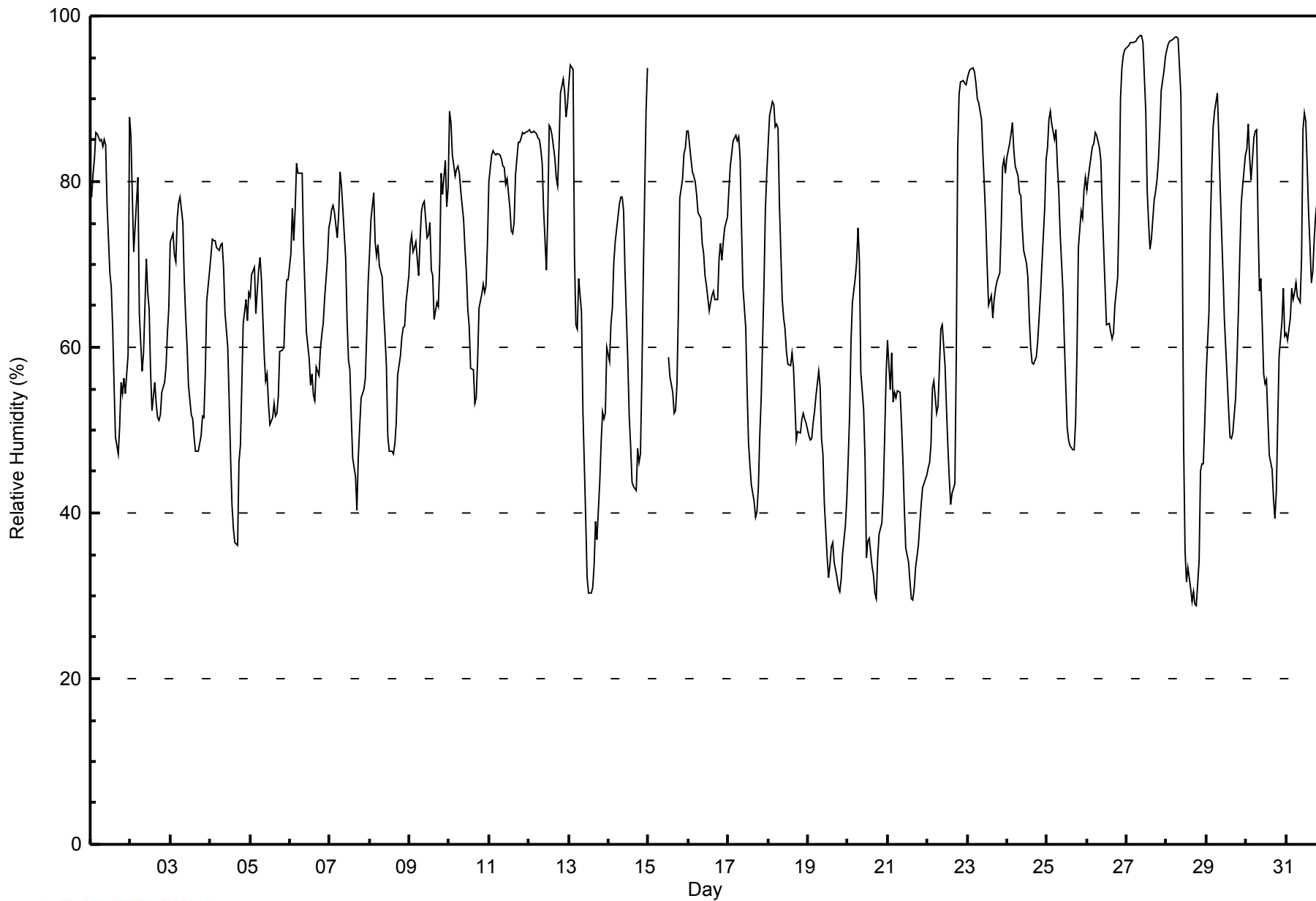
Mannix - March 2015

Maximum Value: 98 % on Mar 27 09:00																		Maximum Daily Average: 89.2 % on Mar 27																		Hours in Service: 744							
Minimum Value: 29 % on Mar 28 19:00																		Minimum Daily Average: 41.8 % on Mar 19																		Hours of Data: 732							
Maximum Diurnal Average: 77.7 % at hour 7																		Minimum Diurnal Average: 51.3 % at hour 16																		Hours of Missing Data: 12							
Monthly Average: 66.4 %																		Percentiles: P ₁ = 30 P ₁₀ = 44 Q ₁ = 54 Median = 67 Q ₃ = 80 P ₉₀ = 87 P ₉₉ = 97																		Hours of Calibration: 0							
																																				Percent Operational Time: 98.4							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-Mar	78	81	83	86	86	85	85	84	85	84	77	69	67	62	55	49	47	51	56	54	56	54	59	88	70.1	88																	
2-Mar	86	78	72	78	81	64	61	57	59	71	67	65	57	52	56	53	52	51	52	55	56	58	62	65	62.7	86																	
3-Mar	73	74	71	70	76	77	78	75	68	64	60	55	52	51	49	47	47	47	49	52	52	57	66	69	61.7	78																	
4-Mar	71	73	73	73	72	72	72	73	70	64	60	54	47	41	38	36	36	46	48	55	63	66	63	67	59.7	73																	
5-Mar	66	69	70	64	67	69	71	68	59	56	57	53	51	51	53	52	52	54	60	60	60	65	68	68	60.9	71																	
6-Mar	71	77	73	77	82	81	81	81	72	67	62	59	55	57	54	54	58	57	60	62	63	66	71	74	67.2	82																	
7-Mar	75	77	77	76	73	76	81	80	77	71	63	59	57	52	47	44	40	47	50	54	55	56	62	68	63.2	81																	
8-Mar	71	75	79	73	71	72	70	69	65	61	58	49	47	48	47	48	51	57	59	61	62	63	65	69	62.1	79																	
9-Mar	72	74	72	72	73	69	73	77	77	78	73	73	75	69	69	63	65	65	70	81	78	83	77	79	73.2	83																	
10-Mar	89	87	83	81	81	82	81	79	75	72	69	65	63	57	57	53	54	59	65	66	68	67	68	73	70.5	89																	
11-Mar	80	83	84	83	83	83	83	83	82	82	80	80	77	74	74	75	81	85	85	85	86	86	86	86	86	81.9	86																
12-Mar	86	86	86	86	86	85	85	84	82	77	69	76	87	86	86	83	81	80	84	91	92	91	88	89	84.4	92																	
13-Mar	92	94	94	71	63	62	68	64	52	46	39	32	30	30	31	34	39	37	44	49	52	51	52	60	53.6	94																	
14-Mar	58	63	65	70	73	76	77	78	78	77	69	58	52	48	44	43	43	48	46	47	56	68	88	94	63.3	94																	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	59	57	55	52	52	55	64	78	80	83	84	86	--	86																
16-Mar	86	83	81	81	80	79	76	76	73	71	69	67	64	65	66	67	66	66	71	73	70	73	74	76	73.0	86																	
17-Mar	79	82	83	85	86	85	85	83	75	67	62	55	48	46	43	41	40	40	43	49	54	67	77	81	64.9	86																	
18-Mar	85	88	90	89	87	87	86	77	66	64	62	59	58	58	59	58	53	49	50	50	51	52	51	51	65.8	90																	
19-Mar	49	49	49	51	52	54	57	55	49	47	41	35	32	34	36	36	34	32	31	31	32	35	38	42	41.8	57																	
20-Mar	47	52	61	66	68	70	74	70	57	53	47	35	37	37	34	33	30	30	35	37	39	43	49	57	48.2	74																	
21-Mar	61	55	59	53	55	54	55	55	51	46	41	36	34	32	30	30	31	33	36	39	41	43	44	45	44.0	61																	
22-Mar	45	46	48	55	56	52	53	58	62	63	58	53	48	44	41	42	44	59	84	91	92	92	92	92	61.2	92																	
23-Mar	93	93	94	94	93	92	90	90	87	83	79	75	70	65	66	64	66	67	68	69	74	82	83	81	79.9	94																	
24-Mar	83	85	86	87	84	82	81	79	78	74	72	70	69	64	60	58	58	59	61	64	66	70	77	83	72.8	87																	
25-Mar	84	88	88	87	85	86	82	79	74	67	61	55	50	49	48	48	48	51	60	72	76	76	79	81	69.7	88																	
26-Mar	79	80	83	84	85	86	86	84	82	77	72	67	63	63	62	61	62	65	69	77	90	94	95	96	77.5	96																	
27-Mar	96	96	97	97	97	97	97	97	98	98	97	88	79	75	72	73	78	79	80	83	86	91	93	95	89.2	98																	
28-Mar	96	97	97	97	97	97	97	97	90	73	48	35	32	33	31	29	31	29	29	34	45	46	46	51	60.8	97																	
29-Mar	57	64	75	82	87	89	91	86	79	74	69	63	56	52	49	49	50	54	59	64	71	77	79	83	69.1	91																	
30-Mar	84	87	83	80	85	86	86	75	67	68	57	56	56	51	47	45	42	39	42	51	59	63	67	61	64.1	87																	
31-Mar	62	61	64	67	66	67	68	66	65	71	86	88	87	76	72	68	69	73	76	79	84	91	94	95	74.8	95																	
																		75.1	76.5	77.2	77.1	77.6	77.2	77.7	75.9	71.9	68.8	64.1	59.5	56.8	54.2	52.6	51.3	51.5	53.6	57.5	61.6	64.9	68.0	70.9	74.3	Diurnal Average	
																		96	97	97	97	97	97	97	97	98	98	97	88	87	86	86	83	81	85	85	91	92	94	95	96	Diurnal Maximum	
MS - Missing																																											



WBEA
Hourly Averages

Relative Humidity (RH) - %
Mannix - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	53	7.24	7.24
40 - 60	216	29.51	36.75
60 - 80	275	37.57	74.32
80 - 100	188	25.68	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Summary of Hour Averages

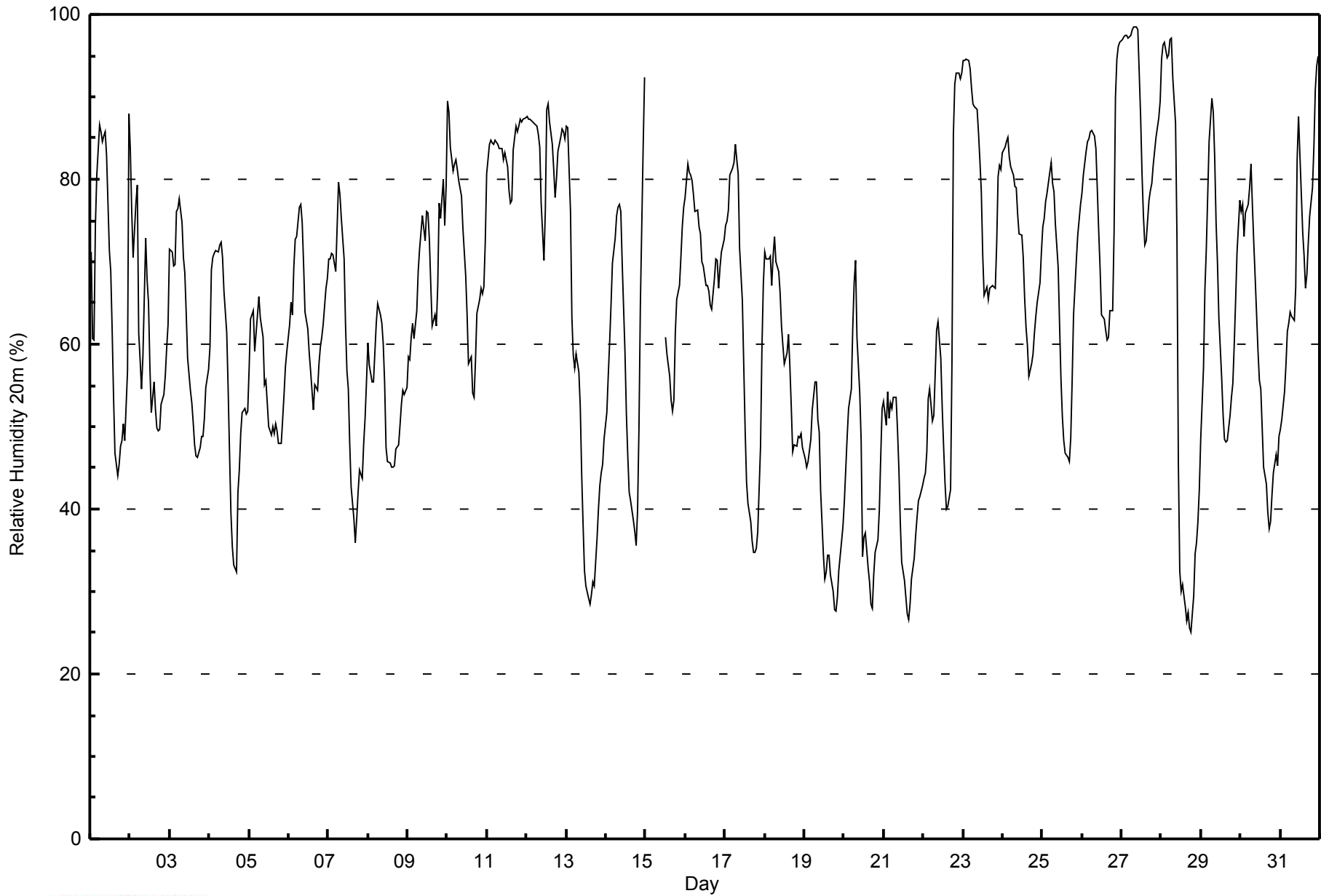
Mannix - March 2015

Maximum Value: 99 % on Mar 27 10:00																			Maximum Daily Average: 88.6 % on Mar 27						Hours in Service: 744																								
Minimum Value: 25 % on Mar 28 19:00																			Minimum Daily Average: 39.9 % on Mar 19						Hours of Data: 732																								
Maximum Diurnal Average: 75.4 % at hour 7																			Minimum Diurnal Average: 49.6 % at hour 17						Hours of Missing Data: 12																								
Monthly Average: 63.6 %																			Percentiles: P ₁ = 28 P ₁₀ = 40 Q ₁ = 50 Median = 64 Q ₃ = 77 P ₉₀ = 86 P ₉₉ = 97						Hours of Calibration: 0																								
																									Percent Operational Time: 98.4																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	71	61	61	74	81	87	86	84	85	86	83	71	69	62	54	47	44	45	48	48	50	48	57	88	66.2	88																							
2-Mar	84	76	70	77	79	61	58	55	58	73	68	65	57	52	55	52	50	49	50	53	54	56	59	62	61.4	84																							
3-Mar	72	71	70	70	76	77	78	75	70	69	64	58	54	53	51	48	46	46	47	49	49	51	55	57	60.6	78																							
4-Mar	60	69	71	71	71	71	72	72	70	66	61	55	47	40	35	33	32	42	45	49	52	52	51	52	55.9	72																							
5-Mar	57	63	64	59	61	64	66	63	61	55	56	53	50	49	50	49	50	49	48	48	51	54	57	59	55.7	66																							
6-Mar	62	65	63	69	73	73	77	77	75	70	64	62	59	57	54	52	55	54	58	60	61	62	67	68	64.0	77																							
7-Mar	70	70	71	71	69	74	80	78	75	70	62	57	55	48	43	39	36	39	42	45	44	48	51	55	58.0	80																							
8-Mar	60	57	55	55	59	63	65	64	62	60	55	47	46	46	45	45	45	47	48	50	53	54	54	55	53.8	65																							
9-Mar	58	58	61	63	61	64	69	71	74	76	73	76	76	73	67	62	64	62	67	77	75	80	74	79	69.2	80																							
10-Mar	90	88	84	81	82	82	81	80	78	74	71	68	64	58	59	54	54	58	64	65	67	66	67	72	71.1	90																							
11-Mar	81	84	85	84	84	85	84	84	84	84	82	83	82	79	77	77	84	86	86	86	87	87	87	87	83.8	87																							
12-Mar	88	87	87	87	87	87	86	85	84	77	70	76	88	89	87	84	81	78	80	83	85	86	86	85	84.0	89																							
13-Mar	86	86	76	63	59	57	59	57	52	44	38	33	31	29	28	30	31	31	36	40	43	44	45	48	47.8	86																							
14-Mar	52	56	60	65	70	73	76	77	77	76	70	59	51	46	42	41	39	37	36	40	50	65	84	92	59.7	92																							
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	61	59	56	53	52	53	61	65	67	71	74	77	--	77																							
16-Mar	78	82	81	80	80	78	76	76	74	73	70	70	67	67	66	65	64	68	70	70	67	69	71	73	72.4	82																							
17-Mar	74	75	76	80	81	82	84	82	81	72	65	57	50	43	41	38	36	35	35	35	37	48	60	67	59.8	84																							
18-Mar	71	70	70	71	67	71	73	70	69	66	62	60	58	59	61	57	52	47	48	48	49	49	49	47	60.2	73																							
19-Mar	46	45	46	47	48	52	55	55	51	49	42	34	32	32	34	34	32	30	28	28	29	32	36	38	39.9	55																							
20-Mar	41	45	49	52	55	62	67	70	61	54	48	34	37	37	33	31	28	28	32	35	36	40	46	52	44.8	70																							
21-Mar	53	50	54	51	53	52	54	53	50	45	39	34	31	29	27	27	29	32	34	37	39	41	41	43	41.5	54																							
22-Mar	44	44	47	53	55	51	51	57	62	63	58	52	48	43	40	40	42	58	85	91	93	93	92	93	60.7	93																							
23-Mar	94	94	95	94	93	91	89	89	88	86	82	78	71	66	67	65	67	67	67	67	72	80	82	81	80.3	95																							
24-Mar	83	84	85	85	83	81	81	79	79	76	73	70	66	62	60	56	58	59	61	63	65	67	71	71	71.7	85																							
25-Mar	74	75	77	78	81	82	79	78	75	69	62	56	51	48	47	46	46	49	56	64	70	73	75	77	66.2	82																							
26-Mar	78	80	83	85	85	86	86	85	84	79	74	69	64	63	62	60	61	64	64	74	90	95	96	97	77.6	97																							
27-Mar	97	97	98	97	97	97	98	98	99	99	98	88	81	76	72	73	78	79	79	82	83	85	88	90	88.6	99																							
28-Mar	95	96	97	95	95	97	97	92	87	73	46	33	30	31	28	26	27	26	25	29	35	36	38	42	57.3	97																							
29-Mar	48	57	67	72	78	85	90	88	83	75	70	63	56	52	48	48	48	51	54	55	60	65	71	77	65.1	90																							
30-Mar	76	77	73	76	77	79	82	77	72	68	59	56	55	50	45	43	40	38	38	42	44	47	45	49	58.6	82																							
31-Mar	50	51	54	57	61	62	64	63	63	67	82	88	83	73	71	67	68	72	76	79	84	91	94	95	71.5	95																							
																								69.8	70.6	71.0	72.1	73.3	74.2	75.4	74.5	72.7	69.8	65.0	60.3	57.1	54.0	51.9	50.0	49.6	50.9	53.7	56.6	59.3	62.4	65.2	68.7	Diurnal Average	
																								97	97	98	97	97	97	98	98	99	99	98	88	88	89	87	84	84	86	86	91	93	95	96	97	Diurnal Maximum	
MS - Missing																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	77	10.52	10.52
40 - 60	235	32.10	42.62
60 - 80	269	36.75	79.37
80 - 100	151	20.63	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744

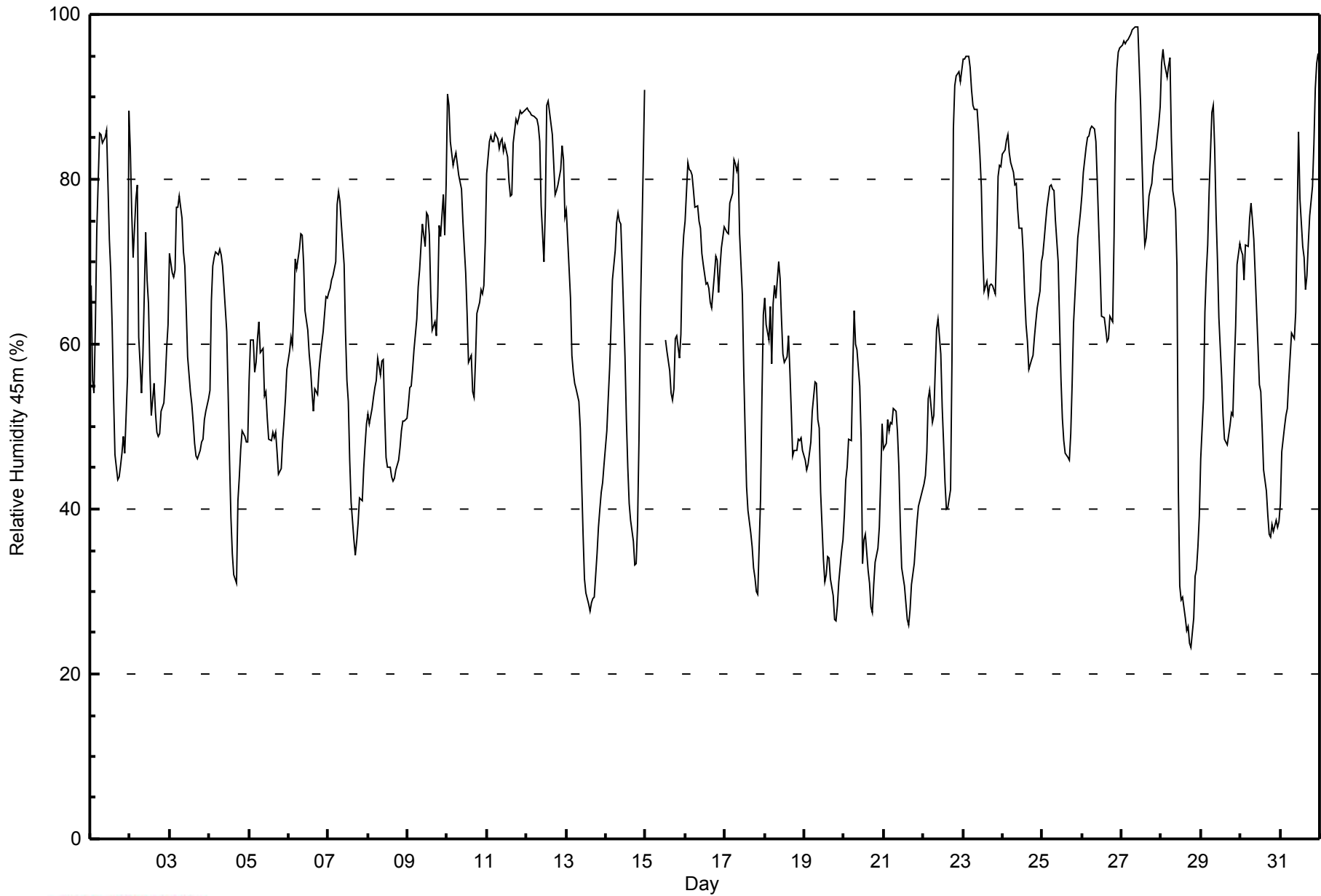


Maximum Value: 98 % on Mar 27 10:00																			Maximum Daily Average: 88.5 % on Mar 27						Hours in Service: 744																			
Minimum Value: 23 % on Mar 28 19:00																			Minimum Daily Average: 39.4 % on Mar 19						Hours of Data: 732																			
Maximum Diurnal Average: 73.5 % at hour 7																			Minimum Diurnal Average: 49.2 % at hour 17						Hours of Missing Data: 12																			
Monthly Average: 62.2 %																			Percentiles: P ₁ = 27 P ₁₀ = 38 Q ₁ = 49 Median = 62 Q ₃ = 76 P ₉₀ = 86 P ₉₉ = 96						Hours of Calibration: 0																			
																									Percent Operational Time: 98.4																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Mar	67	56	54	62	74	86	86	84	85	85	86	73	69	62	54	47	44	44	45	47	49	47	56	88	64.5	88																		
2-Mar	84	76	71	78	79	61	58	54	59	74	68	65	57	51	55	52	49	49	49	52	53	56	60	62	61.2	84																		
3-Mar	71	69	68	69	77	77	78	75	71	69	64	58	54	53	50	48	46	46	47	48	49	51	52	53	60.2	78																		
4-Mar	54	65	70	71	71	71	72	71	69	67	61	54	46	39	35	32	31	41	44	47	49	49	48	48	54.4	72																		
5-Mar	56	61	61	57	58	61	63	59	60	54	54	51	48	48	49	49	49	47	44	45	48	51	53	57	53.4	63																		
6-Mar	59	61	60	64	70	69	72	73	73	70	64	62	59	57	54	52	55	54	57	59	60	62	66	66	62.4	73																		
7-Mar	66	67	68	68	70	77	78	77	75	70	61	56	53	46	41	36	34	36	38	41	41	45	48	50	56.0	78																		
8-Mar	52	50	52	54	55	56	58	56	58	58	52	46	45	45	44	43	44	45	46	47	50	51	51	51	50.3	58																		
9-Mar	53	55	55	57	59	63	67	69	72	75	72	76	76	73	66	62	63	61	66	74	73	78	73	79	67.3	79																		
10-Mar	90	89	85	82	83	83	82	80	79	75	72	69	64	58	59	54	54	58	64	65	67	66	67	72	71.5	90																		
11-Mar	81	85	85	85	85	86	85	84	85	85	83	84	83	80	78	78	84	87	87	87	88	88	88	88	84.5	88																		
12-Mar	89	88	88	88	88	87	87	86	85	77	70	77	89	90	88	85	82	78	79	79	81	84	82	75	83.4	90																		
13-Mar	76	73	66	59	57	55	55	53	50	43	37	32	30	29	28	29	29	29	35	38	40	42	43	45	44.6	76																		
14-Mar	49	53	57	62	68	71	75	76	75	75	69	59	51	45	41	39	36	33	33	38	48	63	81	91	57.9	91																		
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	61	59	57	54	53	55	61	61	58	61	70	73	--	73																	
16-Mar	75	82	81	81	81	79	77	77	75	74	71	70	67	67	65	64	69	71	70	66	69	72	74	74	72.6	82																		
17-Mar	74	74	73	77	78	82	82	81	82	73	66	57	49	43	40	37	35	33	32	30	30	41	54	63	57.7	82																		
18-Mar	66	62	61	65	58	65	67	66	70	68	63	59	58	58	61	57	52	46	47	47	48	48	49	47	57.8	70																		
19-Mar	46	45	46	47	48	52	55	55	51	50	42	34	31	32	34	34	32	29	27	26	28	31	35	36	39.4	55																		
20-Mar	39	44	45	48	48	57	64	60	59	55	48	33	36	37	33	31	28	27	31	33	35	38	44	50	42.7	64																		
21-Mar	47	48	51	50	51	50	52	52	49	45	38	33	31	29	27	26	28	31	33	36	38	40	41	42	40.3	52																		
22-Mar	43	44	47	53	54	50	51	57	62	63	59	52	48	43	40	40	42	58	86	91	93	93	92	93	60.7	93																		
23-Mar	95	95	95	95	94	91	89	88	89	86	83	79	71	66	68	66	67	67	67	66	72	80	82	81	80.5	95																		
24-Mar	83	84	85	85	83	82	81	79	80	77	74	74	71	66	62	60	57	58	59	61	63	64	67	70	71.9	85																		
25-Mar	71	73	75	77	79	79	79	79	75	70	63	56	51	48	47	46	46	49	55	63	69	73	74	76	65.5	79																		
26-Mar	78	81	84	85	85	86	86	86	85	80	74	69	63	63	62	60	61	63	63	73	89	93	95	96	77.6	96																		
27-Mar	96	97	96	97	97	98	98	98	98	98	98	89	82	76	72	73	78	79	79	82	83	84	87	89	88.5	98																		
28-Mar	94	96	94	92	94	95	85	79	76	70	42	31	29	29	27	25	26	24	23	27	32	33	35	39	54.0	96																		
29-Mar	46	53	64	69	72	78	88	89	84	76	70	63	56	51	48	48	48	50	52	51	57	62	70	72	63.3	89																		
30-Mar	71	71	68	72	72	75	77	75	73	68	60	55	54	50	45	42	39	37	37	38	37	39	38	39	55.5	77																		
31-Mar	41	47	50	51	52	56	59	61	61	64	75	86	78	72	70	67	68	72	76	79	84	91	94	95	68.7	95																		
																			67.1	68.0	68.4	69.9	71.3	72.6	73.5	72.7	72.1	69.7	64.7	60.0	56.8	53.7	51.6	49.6	49.2	50.2	52.6	55.0	57.4	60.4	63.4	66.6	Diurnal Average	
																			96	97	96	97	97	98	98	98	98	98	98	89	89	90	88	85	84	87	87	91	93	93	95	96	Diurnal Maximum	
MS - Missing																																												



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	89	12.16	12.16
40 - 60	248	33.88	46.04
60 - 80	259	35.38	81.42
80 - 100	136	18.58	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



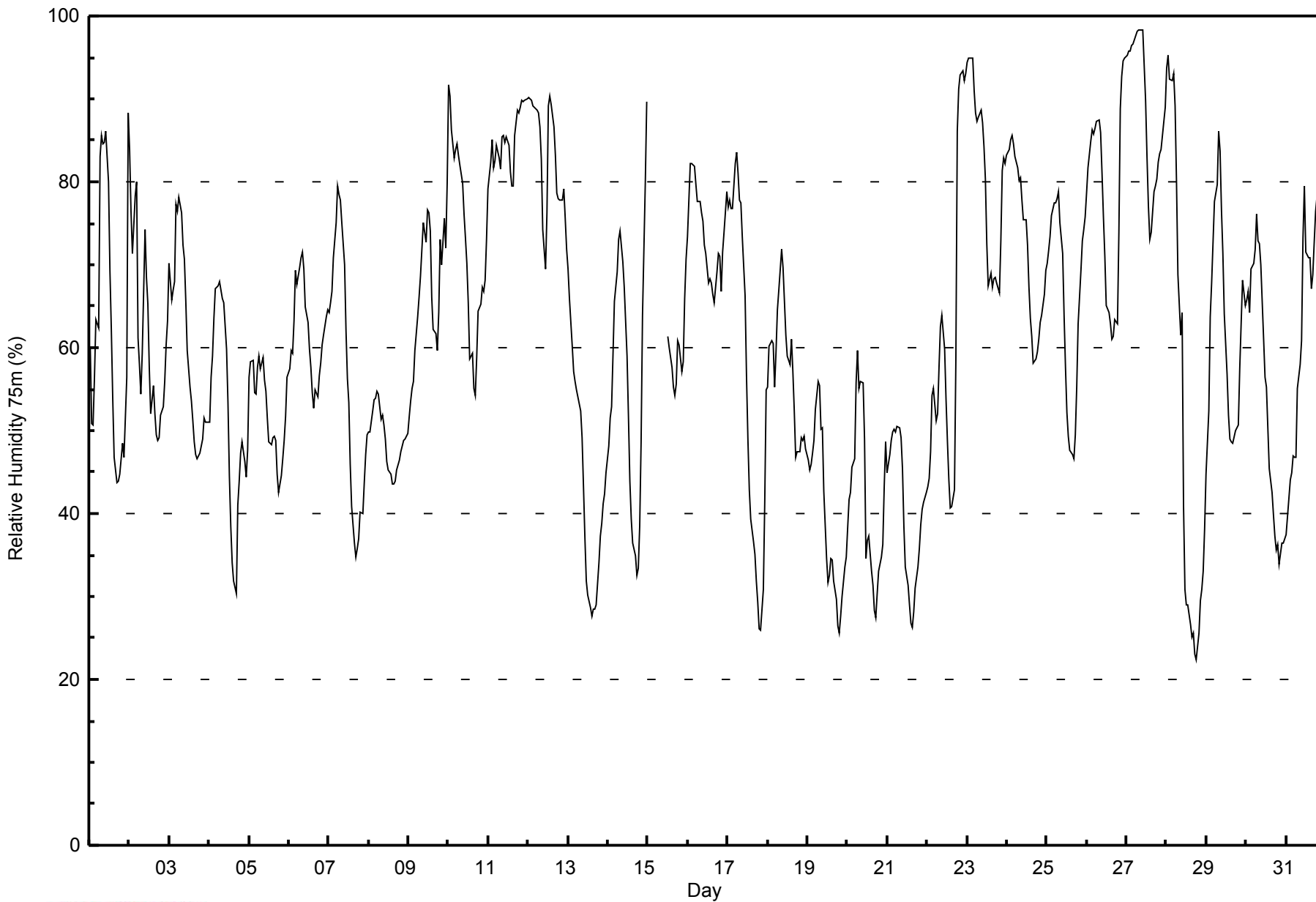
Maximum Value: 98 % on Mar 27 09:00																			Maximum Daily Average: 88.8 % on Mar 27						Hours in Service: 744	
Minimum Value: 22 % on Mar 28 19:00																			Minimum Daily Average: 39.5 % on Mar 19						Hours of Data: 732	
Maximum Diurnal Average: 71.8 % at hour 7																			Minimum Diurnal Average: 49.5 % at hour 17						Hours of Missing Data: 12	
Monthly Average: 61.7 %																			Percentiles: P ₁ = 26 P ₁₀ = 37 Q ₁ = 49 Median = 61 Q ₃ = 76 P ₉₀ = 86 P ₉₉ = 96						Hours of Calibration: 0	
																									Percent Operational Time: 98.4	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	60	51	51	56	63	62	83	86	85	85	86	80	69	62	54	47	44	44	45	47	48	47	56	88	62.5	88
2-Mar	84	76	71	78	80	61	58	54	59	74	68	65	58	52	55	52	50	49	49	52	53	56	60	63	61.7	84
3-Mar	70	66	67	68	77	77	78	76	72	71	66	60	55	54	51	49	47	47	47	48	49	52	51	51	60.3	78
4-Mar	51	56	59	64	67	68	68	67	66	65	60	53	45	38	34	32	30	41	44	47	49	46	44	48	51.8	68
5-Mar	57	58	58	55	54	58	59	58	59	56	55	52	49	48	49	49	49	45	43	45	47	49	52	57	52.4	59
6-Mar	57	60	59	63	69	68	70	71	71	70	65	63	60	58	55	53	55	54	57	58	60	62	64	65	61.9	71
7-Mar	64	65	67	71	75	80	78	78	75	70	62	56	53	46	41	36	35	36	37	40	40	44	47	49	56.1	80
8-Mar	50	50	52	54	54	55	54	51	52	51	49	46	45	45	44	44	44	45	46	47	48	49	49	50	48.9	55
9-Mar	52	54	55	56	60	64	66	69	72	75	73	77	76	74	66	62	62	60	64	73	70	76	72	80	66.9	80
10-Mar	92	90	86	83	84	85	83	82	80	76	73	70	65	59	59	55	54	59	64	65	67	67	68	73	72.5	92
11-Mar	79	82	85	82	83	84	83	81	85	86	85	85	84	81	79	80	86	89	88	89	90	90	90	90	84.8	90
12-Mar	90	90	90	89	89	89	88	87	83	74	69	76	89	90	89	87	83	79	78	78	78	79	76	72	83.0	90
13-Mar	69	66	60	57	56	55	54	52	49	43	37	32	30	29	28	28	29	34	37	39	41	42	45	43.4	69	
14-Mar	48	51	53	59	66	69	73	74	72	70	67	59	52	44	39	36	35	32	33	39	49	64	80	90	56.5	90
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	61	60	58	55	54	56	61	60	57	58	66	71	--	71
16-Mar	73	82	82	82	82	80	78	78	76	75	72	71	68	68	68	66	65	69	71	71	67	72	74	79	73.8	82
17-Mar	77	78	77	77	82	84	81	78	77	73	66	57	49	43	39	37	35	32	29	26	26	31	42	55	56.3	84
18-Mar	55	60	61	61	55	59	65	67	72	70	66	62	59	58	61	57	52	47	47	47	49	49	49	48	57.3	72
19-Mar	47	45	46	47	49	53	56	56	50	50	43	35	32	32	35	34	32	30	26	26	28	30	34	35	39.5	56
20-Mar	38	42	43	46	47	56	60	55	56	56	49	35	37	37	33	31	28	27	30	33	35	36	43	49	41.7	60
21-Mar	45	47	49	50	50	50	51	50	49	45	39	34	31	29	27	26	28	31	33	36	39	41	41	43	40.1	51
22-Mar	43	44	48	54	55	51	52	58	63	64	60	54	49	44	41	41	43	59	86	91	93	93	92	93	61.2	93
23-Mar	94	95	95	95	91	88	87	88	89	87	84	80	73	67	69	67	68	68	68	67	73	81	83	82	80.8	95
24-Mar	83	84	85	86	85	83	82	80	81	78	75	75	72	67	64	61	58	59	60	61	63	64	66	69	72.6	86
25-Mar	70	72	73	76	78	77	78	79	75	71	64	58	52	49	48	47	47	50	55	63	69	73	74	76	65.6	79
26-Mar	79	82	85	86	86	86	87	87	86	81	76	71	65	64	63	61	61	63	63	74	89	93	95	95	78.2	95
27-Mar	95	96	96	96	97	98	98	98	98	98	98	90	83	77	73	74	79	79	80	82	83	84	87	89	88.8	98
28-Mar	94	95	92	92	93	89	80	69	61	64	41	31	29	29	27	25	26	23	22	26	30	31	33	38	51.7	95
29-Mar	45	52	64	68	73	78	80	86	84	77	71	64	57	52	49	49	48	50	50	51	57	63	68	65	62.5	86
30-Mar	66	67	64	69	70	72	76	73	72	70	61	56	55	50	45	43	40	37	36	36	34	37	36	37	54.3	76
31-Mar	38	40	44	45	47	47	47	55	58	61	73	80	72	71	71	67	69	73	76	80	85	91	95	96	65.8	96
																			65.5						Diurnal Average	
																			95						Diurnal Maximum	
MS - Missing																										



WBEA
Hourly Averages

Relative Humidity 75m (RH75m) - %

Mannix - March 2015





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	93	12.70	12.70
40 - 60	260	35.52	48.22
60 - 80	245	33.47	81.69
80 - 100	134	18.31	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744

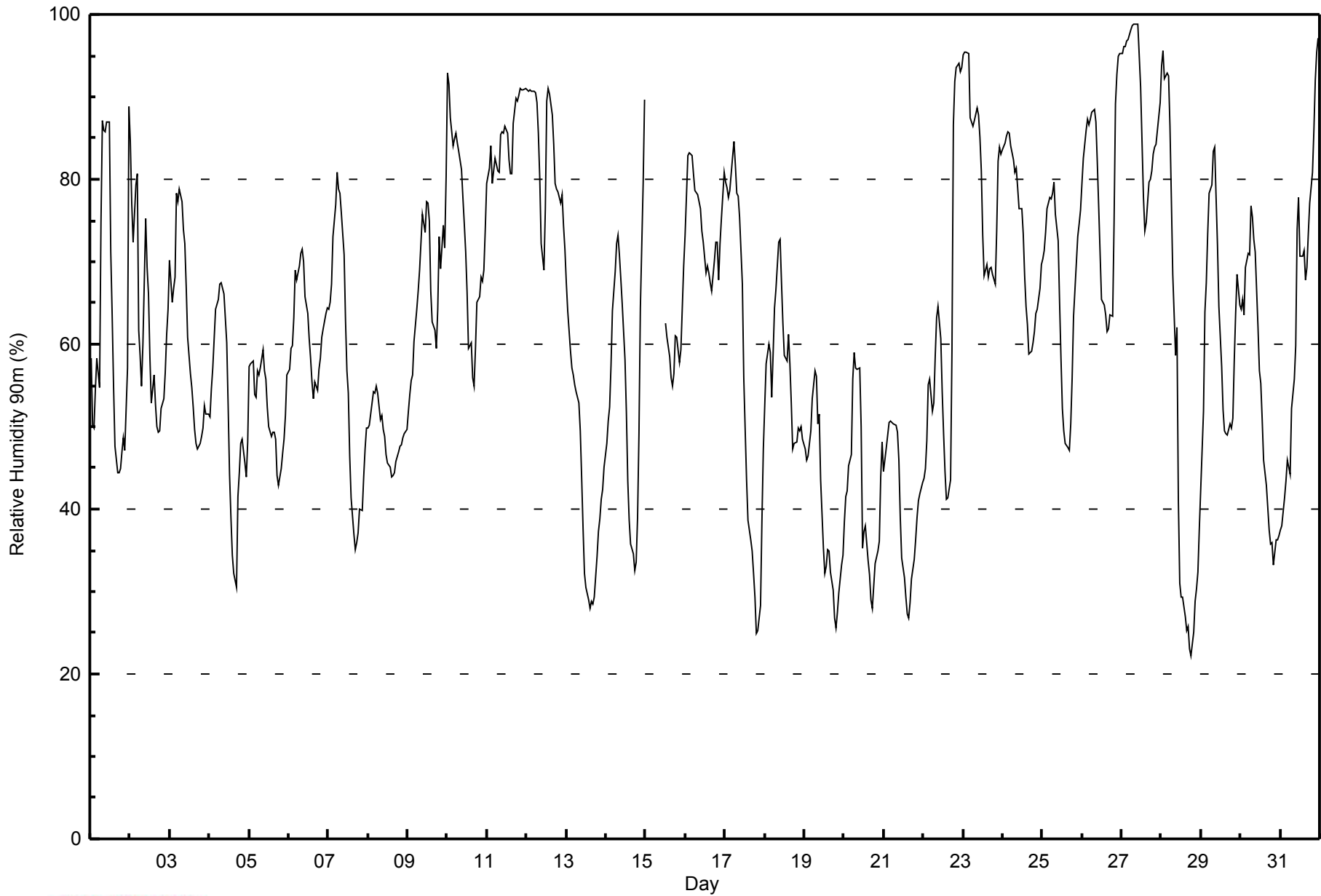


Maximum Value: 99 % on Mar 27 09:00																			Maximum Daily Average: 89.3 % on Mar 27						Hours in Service: 744																							
Minimum Value: 22 % on Mar 28 19:00																			Minimum Daily Average: 40.0 % on Mar 19						Hours of Data: 732																							
Maximum Diurnal Average: 71.6 % at hour 8																			Minimum Diurnal Average: 50.0 % at hour 17						Hours of Missing Data: 12																							
Monthly Average: 62.0 %																			Percentiles: P ₁ = 26 P ₁₀ = 37 Q ₁ = 49 Median = 61 Q ₃ = 77 P ₉₀ = 87 P ₉₉ = 96						Hours of Calibration: 0																							
																									Percent Operational Time: 98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	58	50	50	55	58	55	75	87	86	86	87	87	71	64	55	48	44	44	45	47	49	47	57	89	62.2	89																						
2-Mar	85	77	72	79	81	62	59	55	60	75	69	66	58	53	56	53	50	49	50	52	53	57	61	64	62.4	85																						
3-Mar	70	65	67	68	78	77	79	77	74	72	67	61	56	55	52	50	48	47	48	49	50	52	52	52	61.1	79																						
4-Mar	51	55	57	61	64	65	67	67	67	66	60	53	44	39	34	32	31	41	44	48	49	46	44	48	51.4	67																						
5-Mar	57	58	58	54	54	57	56	57	59	57	56	52	50	49	49	49	48	44	43	45	47	49	51	56	52.3	59																						
6-Mar	57	60	60	63	69	68	70	71	72	70	66	64	61	58	55	53	55	54	57	58	61	62	64	64	62.1	72																						
7-Mar	64	65	67	73	77	81	79	78	76	71	63	57	54	46	41	37	35	36	37	40	40	44	47	50	56.6	81																						
8-Mar	50	50	53	54	54	55	54	51	51	50	49	47	46	45	44	44	44	46	47	48	48	49	49	50	49.0	55																						
9-Mar	52	54	56	56	60	64	66	69	72	76	74	77	77	75	66	63	62	60	64	73	69	74	72	80	67.2	80																						
10-Mar	93	92	87	84	85	86	84	83	81	78	75	71	66	59	60	56	55	60	65	66	68	68	69	74	73.5	93																						
11-Mar	80	81	84	80	81	83	81	81	85	86	86	86	86	82	81	81	87	90	90	90	91	91	91	91	85.1	91																						
12-Mar	91	91	91	91	91	90	89	86	80	72	69	77	89	91	90	88	84	80	79	79	77	78	74	72	83.3	91																						
13-Mar	67	64	59	57	56	55	54	53	50	44	38	32	30	29	28	29	29	29	34	37	39	41	42	45	43.4	67																						
14-Mar	48	51	52	57	64	69	72	73	71	68	65	58	52	43	39	36	35	32	34	39	49	64	79	90	55.9	90																						
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	63	61	58	56	55	56	61	61	58	59	64	69	--	69																						
16-Mar	73	83	83	83	83	81	79	78	77	76	74	72	69	70	69	67	67	70	72	72	68	72	75	81	74.8	83																						
17-Mar	80	79	78	79	83	85	82	78	78	75	67	56	50	44	39	36	35	32	29	25	25	28	39	47	56.2	85																						
18-Mar	53	58	60	59	54	59	64	67	72	73	68	63	59	58	61	58	53	47	48	48	50	49	50	49	57.4	73																						
19-Mar	47	46	46	48	50	53	57	56	50	51	44	35	32	33	35	35	32	30	27	26	28	30	33	34	40.0	57																						
20-Mar	39	42	42	45	47	56	59	57	57	57	50	35	37	38	34	32	29	28	31	33	35	36	44	48	42.1	59																						
21-Mar	45	47	49	51	51	50	50	50	49	46	39	34	32	29	27	27	29	31	34	36	39	41	42	43	40.5	51																						
22-Mar	44	45	48	55	56	52	53	58	63	65	61	54	49	45	41	41	44	59	87	92	94	94	93	94	61.9	94																						
23-Mar	95	95	95	95	88	87	86	87	89	88	85	81	73	68	70	68	69	69	69	67	74	82	84	83	81.2	95																						
24-Mar	84	84	85	86	86	84	82	81	81	79	76	76	73	68	64	62	59	59	60	62	64	64	67	70	73.2	86																						
25-Mar	70	71	74	77	78	78	78	80	76	72	65	58	52	49	48	47	47	50	56	63	70	73	75	76	66.0	80																						
26-Mar	79	82	86	87	87	87	88	88	87	82	77	71	65	65	64	62	62	64	63	75	89	93	95	95	78.9	95																						
27-Mar	95	96	96	97	97	98	99	99	99	99	99	91	85	78	74	75	80	80	81	83	84	84	88	89	89.3	99																						
28-Mar	94	96	92	93	93	86	78	68	59	62	41	31	29	29	27	25	26	23	22	25	29	30	32	38	51.2	96																						
29-Mar	42	52	64	67	73	78	79	83	84	78	72	65	57	52	50	49	49	50	50	51	58	64	68	65	62.5	84																						
30-Mar	64	65	64	69	71	71	77	75	73	71	62	57	55	51	46	43	40	37	36	36	33	36	36	37	54.4	77																						
31-Mar	37	38	41	43	46	45	44	52	56	60	74	78	71	71	71	68	69	73	77	81	86	92	95	97	65.3	97																						
																								65.5	66.4	67.3	68.9	70.4	70.5	71.4	71.6	71.1	70.1	65.8	61.5	57.8	54.7	52.6	50.6	50.0	50.8	52.9	55.0	57.1	59.7	62.4	65.8	Diurnal Average
																								95	96	96	97	97	98	99	99	99	99	99	99	91	89	91	88	87	90	90	92	94	94	95	97	Diurnal Maximum
MS - Missing																																																



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	93	12.70	12.70
40 - 60	260	35.52	48.22
60 - 80	239	32.65	80.87
80 - 100	140	19.13	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Maximum Speed: 33 km/h on Mar 2 03:00	Maximum Daily Speed Average: 22.3 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 17 22:00	Minimum Daily Speed Average: 1.6 km/h on Mar 30	Hours of Data: 732
Maximum Diurnal Speed Average: 1.8 km/h at hour 23	Minimum Diurnal Speed Average: 0.2 km/h at hour 5	Hours of Missing Data: 12
Monthly Average Velocity: 0.7 km/h 350.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 27	Percent Operational Time: 98.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	NNE6	NNW2	W1	SSW2	SE5	SSE8	SSE9	SSE10	SSE13	SE12	SSE12	SE11	SE16	SSE16	SSE15	S18	S18	S16	SSE17	SSE15	S12	SW10	NNW19	NW20	SSE7.9	NW20	
2-Mar	NNW28	NNW30	N33	NNW24	NNW27	NNW30	NNW29	NNW26	NNW23	NNW17	NNW24	NW26	NNW25	NNW26	NW26	NW26	NW26	NNW16	NW17	WNW19	NW11	NNW7	WNW8	NNW22.3	N33		
3-Mar	W15	WNW14	WNW18	NW15	N12	NNW11	NNW14	N15	N20	NNW17	N15	NNW17	NNW17	NNW15	NNW13	NNE9	NNE10	NNE9	NNE7	NE8	ENE6	SE3	SSW5	S6	NNW9.0	N20	
4-Mar	SSE9	SSE10	SSE10	SSE11	SSE11	SSE14	SE13	SSE11	SE13	SE12	SE12	SE12	SE16	SSE15	SSE18	SSE17	S13	SSW12	SW16	S9	SSE10	SSE11	SSE6	WSW5	SSE10.9	SSE18	
5-Mar	WSW12	W18	W11	W16	W13	WSW11	WSW10	WSW11	SW3	ESE3	SE3	ESE5	SE4	ESE7	E6	ESE6	SE7	SE6	SSE7	S7	SSW7	WSW7	WSW8	WSW9	SW4.5	W18	
6-Mar	SSE3	E3	W12	WSW13	N3	WNW8	WNW11	WNW6	NNW3	NNE11	NNE10	NNW6	NNW4	NNW4	WNW5	NNE3	E6	NNE9	NNE11	NNE12	NE8	N5	W2	W7	NNW3.8	WSW13	
7-Mar	WNW5	W3	ESE2	SSE6	SSE8	SSW4	W15	W18	W16	W19	WNW18	WNW17	W16	WNW16	WNW16	WNW16	WNW14	WNW10	WNW11	W17	W14	WNW9	NW4	WSW5	W10.2	W19	
8-Mar	W6	SW7	SW6	SSW8	S8	SSE10	SSE8	SSE8	SE9	SSE7	SSW8	SW9	SSW6	SSE5	SSW5	SW8	S3	SSW6	S8	S9	SW9	SW8	SSW6	SW4	SSW6.1	SSE10	
9-Mar	W1	SSE3	SSE9	SSE5	SW7	W9	W7	WNW9	W14	W16	WNW17	NW9	WNW8	NNW8	WNW10	NW13	NW13	NW11	NW11	NW10	NW13	NW10	NW15	NNW10	WNW7.9	WNW17	
10-Mar	N14	N19	NNE18	NNE11	NNE12	NNE14	NNE14	NE11	NE11	NNE11	NNE7	N4	NE3	NNE3	NNW6	NNW7	N8	N12	N13	N20	NNE21	NNE16	N18	NNE18	NNE11.8	NNE21	
11-Mar	NNE17	N18	N16	N14	N12	N12	N17	N12	N10	N12	N9	N10	NNW11	NNW13	N11	NNW12	NNW12	N10	NNW11	NNW9	N8	NNW11	NNW8	NW10	N11.5	N18	
12-Mar	NW8	NNW4	WNW5	W7	NW6	N3	W4	SSW3	WSW5	SSE4	S7	SSE13	SSE8	S7	SSE12	SSE12	SE5	SE4	NNE3	E4	SSE6	SE7	SSE8	SSE4	SSE2.9	SSE13	
13-Mar	S2	WSW2	W10	W19	WSW17	WSW10	S7	S8	SW9	WSW18	WSW15	SW13	SW15	SSW14	S14	SSE16	SSE18	SSE21	S24	SSE21	SSE19	SSE16	SSE20	SSE17	SSW11.5	S24	
14-Mar	SSE15	SSE14	SSE12	SE10	SSE12	SE10	SE10	SSE11	SSE9	SSE9	SE8	SE5	SE6	ESE4	SE6	SE6	SE7	SSE8	SSW11	WSW16	WSW12	WSW15	WSW10	WNW9	S6.5	WSW16	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	N4	E3	SE4	SSE8	S8	S8	S6	S5	---	NW15
16-Mar	N9	N16	N19	NNW9	NNW9	NNW8	NNE7	N7	N6	NNE6	ENE5	NE5	N4	NNE5	NE5	ENE7	NW3	NNW11	NNW12	N11	N8	NNW7	NNW6	NW4	N7.2	N19	
17-Mar	W5	W3	NW3	SSE1	SSW3	S7	SSE9	S7	S7	SSE7	SE7	SE7	SSE6	E4	ENE4	ENE4	ENE6	ENE4	E5	ESE4	SE4	SW1	W1	ENE3	SE2.8	SSE9	
18-Mar	SW1	W5	SW5	SSE3	SSW5	SW2	SE7	SSE7	SSE5	SE4	SE4	SE5	ENE3	NNW5	NNW11	NNE13	N12	N16	N24	N23	N18	NNW20	N17	NNW15	N5.6	N24	
19-Mar	NNW12	NNW13	N11	N9	N11	N7	NNE8	NNE9	NNE5	NW5	NW9	NNW7	N7	NNE11	NNE11	NNE14	N13	N14	NNE18	NNE21	NNE17	NE15	NE10	NE6	N10.2	NNE21	
20-Mar	NE5	N3	NNE3	NNE1	E3	SW3	E1	WSW3	WSW2	NE3	NW2	NE3	WSW3	W6	WNW7	NW9	NNW9	N9	N12	N14	NNE14	NNE15	NNE8	NE5	N4.2	NNE15	
21-Mar	ENE6	E9	ENE8	E10	E7	ESE7	ESE5	ESE6	E9	E8	E11	ESE13	E13	E11	ESE11	E12	ESE13	ESE13	ESE11	ESE10	E14	E11	E11	ESE8	E9.6	E14	
22-Mar	SE9	SE9	SE8	SSE8	SE7	SE9	SE7	SE10	SE9	SE7	SE6	SE5	SE6	SE7	SE4	SSE8	S5	S7	SSW4	SSE4	ESE3	E2	SE3	S3	SE6.0	SE10	
23-Mar	S4	SSE6	SSE6	SE4	SSE8	SSE7	SSE7	SSE8	S4	SW2	W3	W3	NE3	NNE6	NE4	NNW4	NNE7	NNE7	NE8	NE6	N9	N11	N11	N13	NE1.9	N13	
24-Mar	N11	N9	N7	N8	NNW7	NNW6	NNW7	N8	NNE11	NNE6	N9	NNW10	NNW11	NNW10	WNW8	W6	ESE4	SE7	E6	ENE9	E8	E5	E3	ESE3	N4.4	N11	
25-Mar	SSE4	SE4	ESE4	ESE4	E5	ENE1	ESE5	ESE5	ESE6	SE8	SE8	E6	SE9	SE9	ESE7	SE8	SE8	SSE10	SSE9	SSE10	SSE11	SSE9	SSE7	SE9	SE6.4	SSE11	
26-Mar	SE11	SE13	SE10	SE11	SE10	SE11	SE13	SE13	SE11	SE11	SE10	SE10	SE10	SE11	SE8	SE9	SE13	SE10	SSW7	SW8	SSW6	S8	SSE8	SSE6	SE9.2	SE13	
27-Mar	SSE6	SSE5	SSE4	SE4	S5	S9	SSE11	SSE8	SSE5	SSE7	SE7	S10	SSE11	SE8	SE7	SSE14	SE11	SE11	SSE11	SE7	S6	SSE5	NW2	S5	SSE7.2	SSE14	
28-Mar	WSW3	S2	WNW1	WSW3	WSW5	WSW6	W7	W6	W6	WSW6	WNW11	WNW16	NW17	WNW20	WNW27	WNW28	WNW24	WNW22	WNW22	WNW17	W14	W12	W14	WSW12	WNW11.9	WNW28	
29-Mar	WSW13	WSW10	SSW6	S7	S8	SSE8	SSE10	SSE9	SE7	ESE6	SE9	SE8	SE7	SE7	SE11	SE9	SE6	ESE3	NE2	SSW6	SSW11	SSW7	W13	W9	S5.1	W13	
30-Mar	W8	W10	WNW10	N6	NW5	NNE5	SSW4	S2	SW1	E3	W3	ENE5	E8	ESE10	E7	ENE7	SE8	SE7	SE4	ESE4	SE4	E3	SE6	SSE10	ESE1.6	WNW10	
31-Mar	SSE10	SSE11	SSE12	SSE7	SE9	SE7	SSE9	SSE8	SSE6	SE5	N5	NE4	NNE12	NE17	ENE20	ENE24	NE20	NE19	NNE18	NE18	NNE20	NNE18	N23	N23	NE8.5	ENE24	
NW1.6 NW1.6 NNW1.6 W0.9 WSW0.2 SSW0.5 S0.7 SSE0.9 SE0.4 E0.6 NW0.6 NNE0.5 N0.4 NNE1.1 N1.0 NE1.0 ENE1.4 NE1.4 N1.6 N1.5 N1.0 NNW1.3 NW1.8 NW1.8																								Diurnal Average			
NNW28 NNW30 N33 NNW24 NNW27 NNW30 NNW29 NNW26 NNW23 W19 NNW24 NW26 NNW25 NNW26 WNW27 WNW28 NW26 NW26 S24 N23 NNE21 NNW20 N23 N23																								Diurnal Maximum			

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



Summary of Hour Standard Deviations

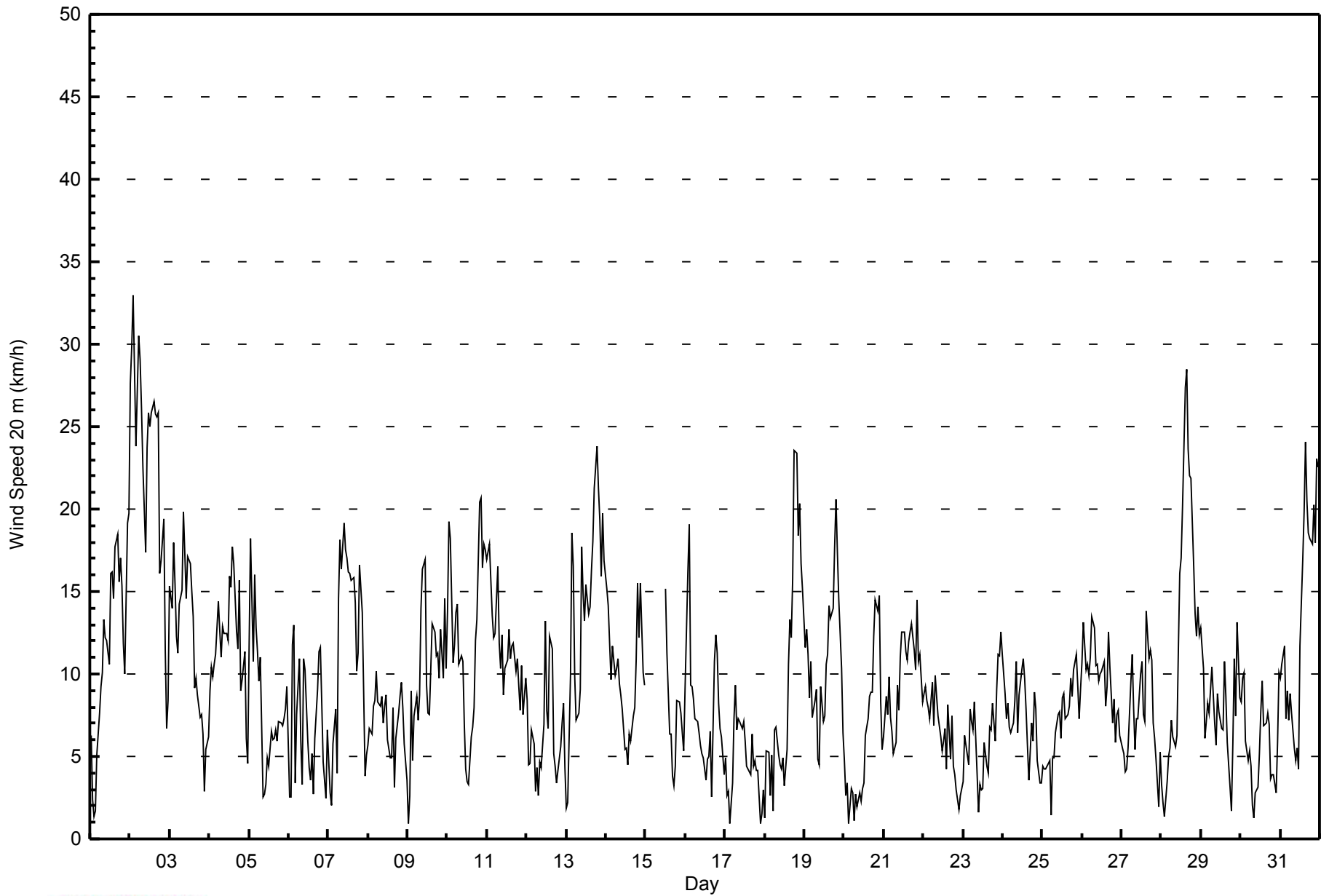
Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 2 07:00																	Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4								
Minimum Value: 1 km/h on Mar 17 04:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Mar	2	1	1	1	2	1	2	3	4	3	4	3	4	4	4	6	6	4	3	4	3	3	8	5	8
2-Mar	8	9	9	7	8	8	9	8	7	5	9	7	6	7	7	6	7	7	4	4	4	4	2	3	9
3-Mar	2	2	3	4	4	3	5	5	6	5	5	5	4	4	3	3	2	3	2	2	1	1	1	6	
4-Mar	1	2	2	3	3	4	3	2	3	3	3	4	4	4	5	4	5	4	5	3	1	1	3	3	5
5-Mar	2	3	2	3	3	1	1	3	2	1	2	2	2	2	2	3	2	1	2	2	1	1	2	3	3
6-Mar	1	1	4	3	2	3	2	2	2	4	3	2	2	2	1	2	2	3	2	2	3	1	1	2	4
7-Mar	1	1	1	3	2	3	4	3	3	4	4	4	4	3	3	4	3	2	2	2	2	3	1	2	4
8-Mar	1	2	2	1	2	2	2	2	3	2	3	4	2	2	4	3	2	1	1	2	2	1	2	2	4
9-Mar	2	2	3	2	2	3	3	3	2	2	3	5	3	3	3	4	4	3	2	2	3	2	4	4	5
10-Mar	4	5	5	4	3	4	4	3	3	3	2	2	2	2	2	3	3	3	4	6	4	4	4	4	6
11-Mar	4	4	4	4	4	4	4	4	3	3	3	3	4	4	4	4	3	4	3	3	3	3	2	2	4
12-Mar	3	2	1	3	3	1	2	2	3	2	3	4	4	3	3	4	2	2	2	1	2	3	3	2	4
13-Mar	2	1	4	3	3	4	2	2	4	4	4	5	5	4	5	4	4	5	5	4	4	4	4	4	5
14-Mar	3	3	3	2	2	2	3	3	3	3	3	2	3	2	3	2	2	2	6	7	5	3	2	4	7
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	3	4	3	3	2	1	2	2	2	1	2	4
16-Mar	6	7	6	3	3	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	2	2	2	1	7
17-Mar	1	2	1	1	1	2	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	2	1	2	3
18-Mar	2	1	1	1	2	2	3	3	2	2	2	2	1	2	4	3	4	5	7	8	6	6	6	4	8
19-Mar	4	5	3	3	3	2	2	2	2	3	3	3	3	3	4	4	3	3	4	4	4	4	3	3	5
20-Mar	2	1	1	1	2	2	1	2	2	2	2	2	3	3	2	2	2	3	3	3	3	4	1	1	4
21-Mar	3	3	2	2	3	3	2	2	3	2	4	4	4	4	4	4	5	5	4	4	4	3	3	3	5
22-Mar	3	3	3	2	3	3	3	3	3	3	3	2	3	3	3	2	3	3	3	2	1	1	2	1	3
23-Mar	1	1	1	2	2	2	2	3	2	1	1	1	2	2	2	2	2	3	2	1	2	3	3	3	3
24-Mar	2	3	2	2	2	2	2	3	3	2	3	3	3	3	3	3	2	3	2	2	1	2	1	2	3
25-Mar	1	1	1	1	2	1	2	2	2	3	3	3	3	3	3	3	3	3	2	2	3	2	2	2	3
26-Mar	5	4	3	4	3	3	3	4	3	3	3	3	4	3	4	4	4	3	2	2	1	2	2	2	5
27-Mar	1	1	3	2	1	2	2	2	2	2	2	3	3	3	3	4	3	2	3	2	2	2	2	4	4
28-Mar	2	2	1	1	1	1	2	2	2	2	4	4	5	5	6	7	7	6	5	5	1	2	2	1	7
29-Mar	1	2	3	2	2	2	3	3	3	3	3	3	3	3	3	3	2	2	1	3	2	3	5	2	5
30-Mar	2	2	2	1	2	3	2	1	1	2	2	2	2	3	3	2	2	2	3	1	2	2	2	2	3
31-Mar	1	2	3	2	2	2	2	3	3	2	3	3	3	5	4	5	5	4	4	5	5	5	5	6	6
																	Diurnal Maximum								
MS - Missing																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	169	23.09	23.09
6 - 11	356	48.63	71.72
12 - 19	166	22.68	94.40
20 - 28	37	5.05	99.45
29 - 38	4	0.55	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



WBEA
Frequency Distribution

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

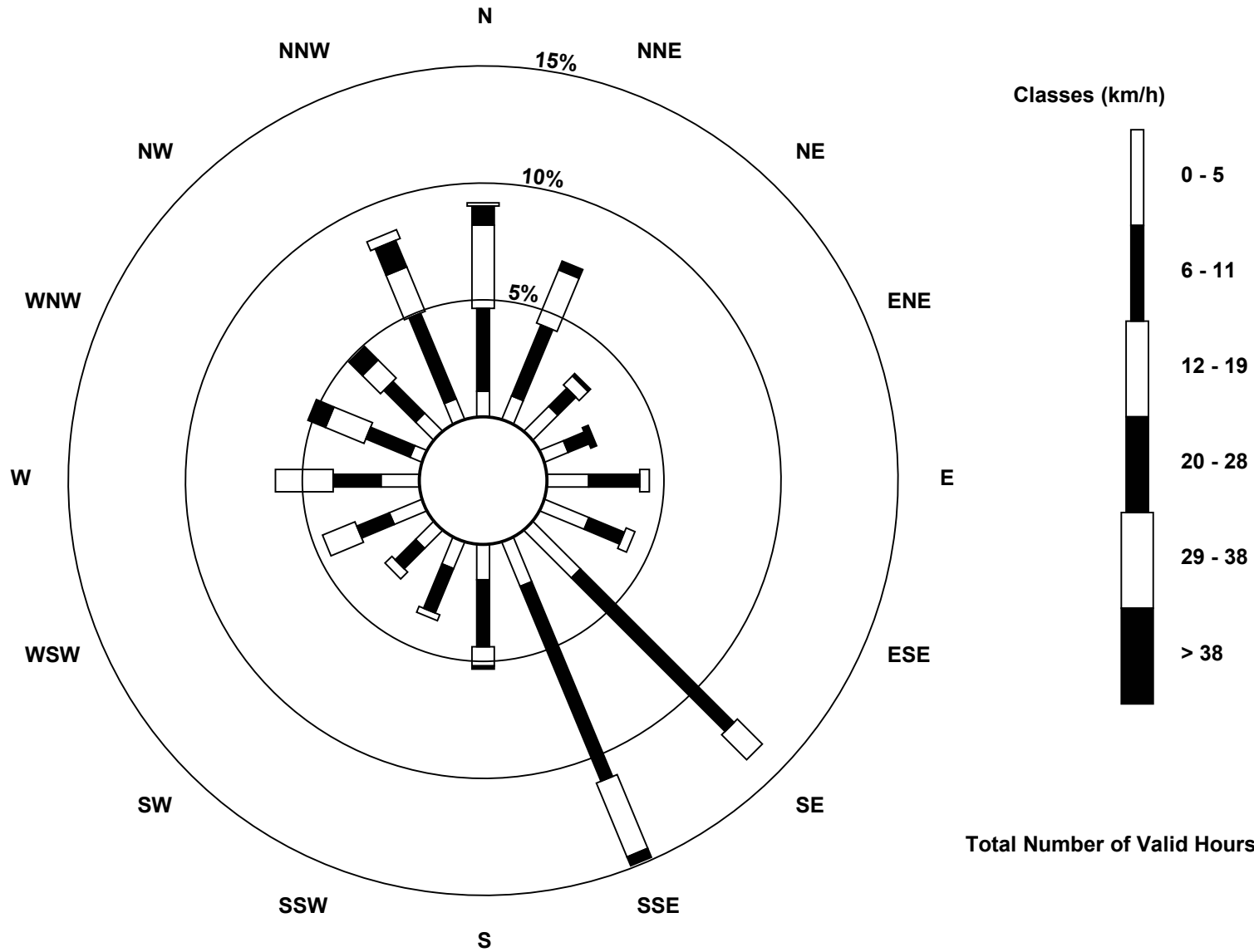
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	8	11	8	13	15	21	15	11	9	8	11	12	4	8	7	169
6 - 11	26	24	8	7	16	12	68	66	21	15	9	11	15	15	14	29	356
12 - 19	26	18	4	0	3	3	11	25	6	2	3	11	18	13	8	15	166
20 - 28	6	3	1	2	0	0	0	3	1	0	0	0	0	6	6	9	37
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	53	24	17	32	30	100	109	39	26	20	33	45	38	36	63	732

Total Number of Valid Hours: 732

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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





Maximum Speed: 43 km/h on Mar 2 03:00	Maximum Daily Speed Average: 29.1 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 5 10:00	Minimum Daily Speed Average: 1.2 km/h on Mar 30	Hours of Data: 732
Maximum Diurnal Speed Average: 2.6 km/h at hour 24	Minimum Diurnal Speed Average: 0.3 km/h at hour 21	Hours of Missing Data: 12
Monthly Average Velocity: 0.5 km/h 324.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 17 P ₉₀ = 23 P ₉₉ = 35	Percent Operational Time: 98.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	NE9	NNE5	ENE1	SSE2	SSE10	SSE16	SSE19	SSE19	SSE20	SSE16	SSE15	SE14	SE20	SSE20	SSE19	S25	S27	S23	SSE24	S22	S19	SW16	NNW24	NW25	SSE12.1	S27	
2-Mar	NNW36	N40	N43	NNW32	NNW35	NNW40	NNW38	NNW34	NNW29	NNW22	NNW30	NW32	NNW31	NNW33	NNW33	NNW33	NW33	NW33	NNW22	NW22	WNW27	NW16	NNW10	NNW12	NNW29.1	N43	
3-Mar	W20	WNW21	WNW25	NW21	N17	NNW17	N20	N21	N26	N23	N18	NNW22	NNW20	NNW18	NNW16	NNE11	NNE11	NNE11	NNE10	NE11	ENE8	ESE5	SSE7	SSE12	NNW11.7	N26	
4-Mar	SSE16	SSE18	SSE17	SSE17	SSE19	SSE23	SSE22	SSE21	SSE22	SE18	SE16	SE15	SE19	SSE19	SSE22	SSE22	S19	SSW17	SW22	SSW16	SSE16	SSE17	SSE11	W9	SSE16.6	SSE23	
5-Mar	WSW18	W25	W18	W21	WNW18	WSW15	WSW15	W18	W7	ESE0	SSE3	SE5	SE5	ESE6	ESE6	ESE6	SE10	SE11	SSE14	S13	SSW13	WSW13	WSW16	WSW14	WSW7.4	W25	
6-Mar	SW6	NE3	W17	WSW20	NW7	WNW14	W17	WNW11	NNW8	NNE15	NNE13	N7	NNW5	NNW5	NW6	NNE3	ENE7	NNE11	NNE15	NNE15	NE11	N6	NNW1	W7	NNW5.7	WSW20	
7-Mar	NW7	WNW4	E2	S5	S9	WSW11	W21	W22	W20	W23	WNW22	WNW21	W19	WSW21	WNW20	WNW20	WNW19	WNW15	WNW18	W22	W19	NW12	NNW7	WSW6	WNW13.9	W23	
8-Mar	WSW8	WSW10	WSW11	SW12	SSW11	S12	SSE14	S13	SSE13	SSE10	SW12	SW13	SSW10	S8	SW8	SW13	SW7	SSW11	SSW13	SSW17	SW19	SW17	SW13	WSW11	SSW10.7	SW19	
9-Mar	W10	W5	S11	SSW7	WSW12	W12	W11	WNW13	WNW18	WNW21	WNW22	NW11	WNW9	NNW9	WNW13	NW18	NW17	NW16	NNW17	NW15	NW19	NNW15	NW20	NNW14	WNW11.9	WNW22	
10-Mar	N18	N25	NNE23	NNE14	NNE14	NNE17	NNE18	NNE13	NNE13	NNE13	NNE8	N5	NE4	NNE4	NNW7	NNW8	N10	N16	N18	N28	NNE26	NNE21	NNE22	NNE22	NNE14.9	N28	
11-Mar	NNE23	N24	N21	N19	N17	N17	N21	N16	N14	N16	N11	N14	N14	N16	N14	NNW15	NNW15	N14	NNW14	N12	N11	NNW13	NNW9	NW11	N15.1	NNE24	
12-Mar	NW10	NNW5	WNW5	WNW7	NW7	N3	WNW4	S3	SW5	SSE7	S10	SSE17	SSE13	S11	SSE15	SSE14	SE7	SE8	E3	ESE6	SSE12	SSE14	SSE17	SSW9	SSE5.1	SSE17	
13-Mar	SW9	WSW12	WSW22	W27	WSW24	WSW16	SSW12	SW13	WSW14	WSW23	WSW20	SW19	SW21	SSW21	S22	SSE24	SSE26	S30	S35	SSE31	SSE28	SSE24	SSE29	S25	SSW17.7	S35	
14-Mar	SSE24	SSE23	SSE20	SE16	SE19	SE16	SE16	SE16	SSE15	SSE14	SSE12	SE8	SE7	SE8	SE11	SE12	SSE14	SSW17	WSW21	WSW21	WSW23	WSW17	WNW14	S10.9	SSE24		
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	---	S18
16-Mar	N10	N23	N26	NNW12	NNW11	NNW11	NNE9	N8	N8	NNE6	NE6	NE5	N4	NNE5	NE5	ENE7	NW3	NNW13	NNW17	N16	N13	N11	N10	NNW6	N9.6	N26	
17-Mar	NW4	NW3	NNW3	SE4	SSE8	SSE11	SSE14	SSE11	S9	SSE8	SSE9	SE9	SSE7	ESE4	E4	E5	E7	E7	E8	ESE6	SE8	SSE2	ESE1	NNE4	SE4.9	SSE14	
18-Mar	E1	W4	WSW3	S2	S8	SSW7	SSE9	SSE13	SE6	SSE6	SE5	ESE5	ENE4	NNW6	NNW14	NNE18	N17	N21	N32	N31	N24	NNW27	N23	N20	N7.4	N32	
19-Mar	NNW16	NNW17	N15	N12	N14	N11	NNE11	NNE11	NNE6	NNW5	NW10	NNW9	N9	NNE12	NNE13	NNE17	N16	N17	NNE23	NNE27	NNE22	NE20	NE14	NE9	N13.1	NNE27	
20-Mar	ENE7	NE2	NE4	ESE3	E5	SE3	ENE3	S2	WSW2	NE3	NNW2	NE3	WSW3	W6	WNW8	NW10	NNW10	N11	NNE17	NNE19	N19	NNE19	NE9	ENE6	NNE4.9	NNE19	
21-Mar	E9	E12	E11	E12	ESE11	ESE9	ESE8	ESE8	E11	E9	E13	ESE15	E15	ESE14	ESE13	E14	ESE15	ESE16	ESE15	ESE14	E17	E13	E13	ESE10	ESE12.2	E17	
22-Mar	SE12	SE12	SE11	SE10	SE10	SE12	SE9	SE12	SE11	SE9	SE7	SE6	SE6	SE8	SE5	SSE9	S6	S10	SSW5	SSE5	E4	E3	ESE4	SSE5	SE7.6	SE12	
23-Mar	S7	SSE11	SSE9	SSE8	SSE12	SSE11	SSE10	SSE12	S7	SW2	W4	W3	NE3	NNE6	NE4	NNW5	NNE8	NNE8	NE10	NE9	NNE12	N16	N16	N17	ENE2.3	N17	
24-Mar	N16	N13	N11	N11	NNW9	NNW9	NNW9	NNE11	NNE13	NNE7	N10	NW12	NW13	NW11	WNW9	W6	ESE4	SE8	E8	E12	E10	E7	ESE5	ESE5	N5.9	N16	
25-Mar	SSE9	SE7	SE7	ESE7	E8	ESE5	ESE7	ESE7	ESE9	SE9	SE9	E7	SE10	SE11	ESE8	SE9	SE10	SSE12	SSE13	SSE16	SSE17	SSE14	SSE12	SE14	SE9.3	SSE17	
26-Mar	SE15	SE18	SE15	SE15	SE15	SE16	SE18	SE17	SE14	SE13	SE11	SE12	SE12	SE14	SE11	SE13	SE17	SE16	SSW12	SW14	SSW11	S12	SSE12	SSE11	SE12.6	SE18	
27-Mar	S11	SSE10	SSE8	SE6	S10	S14	SSE15	S11	SSE7	SSE9	SSE9	S14	SSE13	SE10	SE10	SSE18	SE15	SE16	SSE16	SSE12	SSE10	S10	WSW2	S10	SSE10.6	SSE18	
28-Mar	SSW7	SSW6	WNW5	WNW6	WNW8	WNW7	WNW11	WNW12	W11	WSW8	WNW15	WNW19	NW21	WNW26	WNW35	WNW36	WNW29	WNW31	WNW30	WNW25	WNW19	W19	W21	WSW18	WNW16.7	WNW36	
29-Mar	W18	WSW15	WSW9	SSW8	SSW12	SSE10	SSE17	SSE12	SSE8	SE6	SE10	SE10	SE9	SE9	SE13	SE11	SE8	ESE6	E4	SSW12	SW17	SW10	W18	WNW14	S6.5	WSW18	
30-Mar	W12	W15	WNW16	N11	NNW9	NNE8	S4	S3	WSW1	ENE2	W4	ENE5	E8	ESE10	E8	NE8	SE9	SE9	SE7	SE8	SSE10	SW2	SSE5	SSE11	SE1.2	WNW16	
31-Mar	SSE15	SSE19	SSE18	SSE16	SE16	SE13	SE15	SSE12	SSE9	SSE9	NNE9	NE8	NE17	NE22	ENE24	ENE29	NE25	NE24	NE24	NE23	NNE26	NNE24	N30	N31	ENE11.4	N31	

WNW2.0	NW2.0	NW2.2	W1.4	SSW0.5	SSW1.0	S1.6	S1.8	SSE0.8	ESE0.7	WNW0.8	NNE0.5	N0.4	NNE1.0	N1.0	NE1.1	ENE1.5	ENE1.4	NNE1.5	N1.1	WNW0.3	NW1.4	NNW1.9	WNW2.6	Diurnal Average	
NNW36	N40	N43	NNW32	NNW35	NNW40	NNW38	NNW34	NNW29	WSW23	NNW30	NW32	NNW31	NNW33	WNW35	NNW36	NW33	NW33	S35	N31	SSE28	NNW27	N30	N31	Diurnal Maximum	

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



Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 km/h on Mar 2 07:00			Hours of Data:	732
Minimum Value: 1 km/h on Mar 15 21:00			Hours of Missing Data:	12
			Hours of Calibration:	0
			Percent Operational Time:	98.4
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 9				

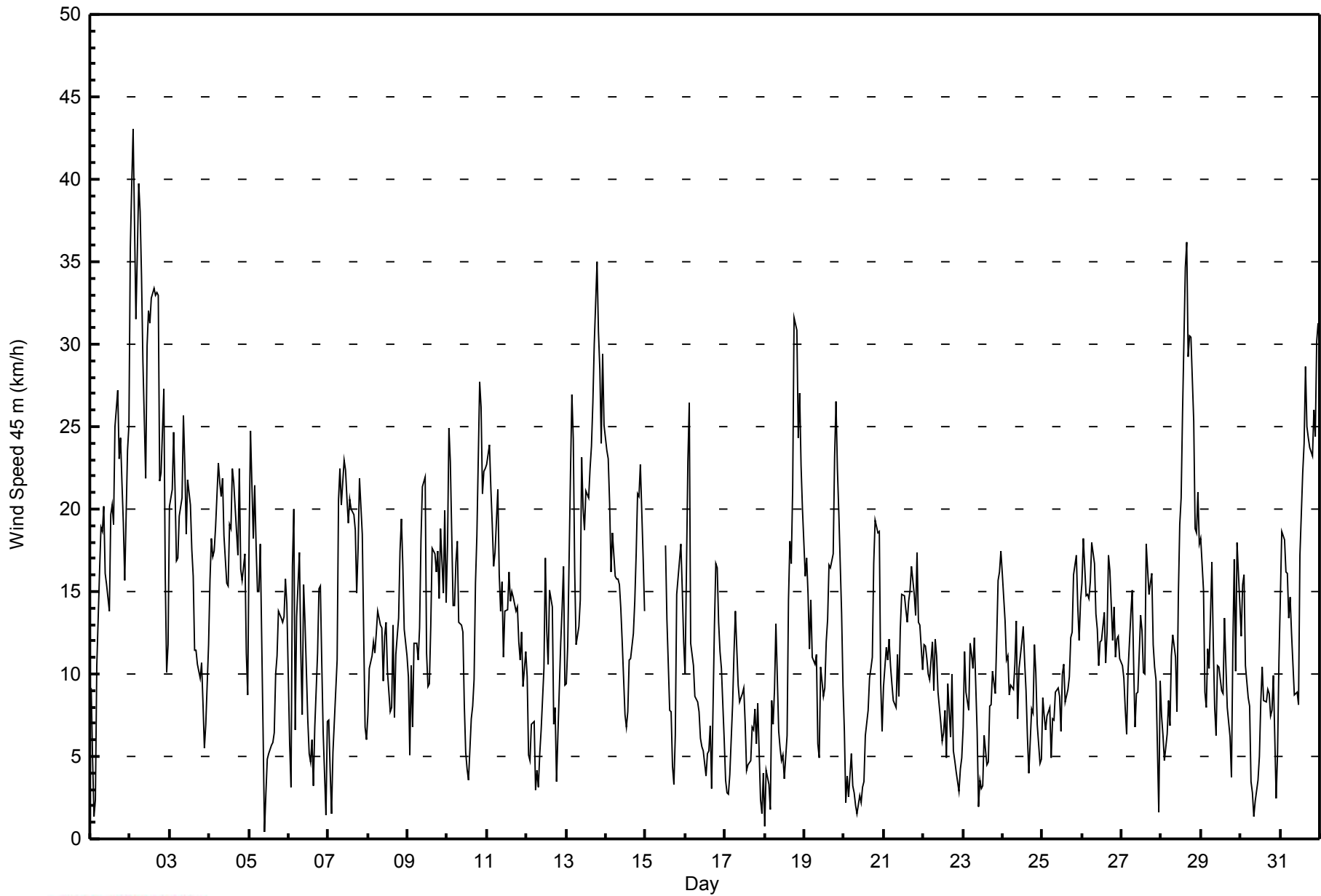
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Mar	2	2	1	2	3	1	2	2	4	3	4	3	3	4	4	5	5	3	3	3	3	3	8	5	8																						
2-Mar	9	9	9	6	8	9	10	9	7	4	10	6	6	6	7	6	7	7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

MS - Missing



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	92	12.57	12.57
6 - 11	247	33.74	46.31
12 - 19	262	35.79	82.10
20 - 28	100	13.66	95.77
29 - 38	28	3.83	99.59
> 38	3	0.41	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



WBEA
Frequency Distribution

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

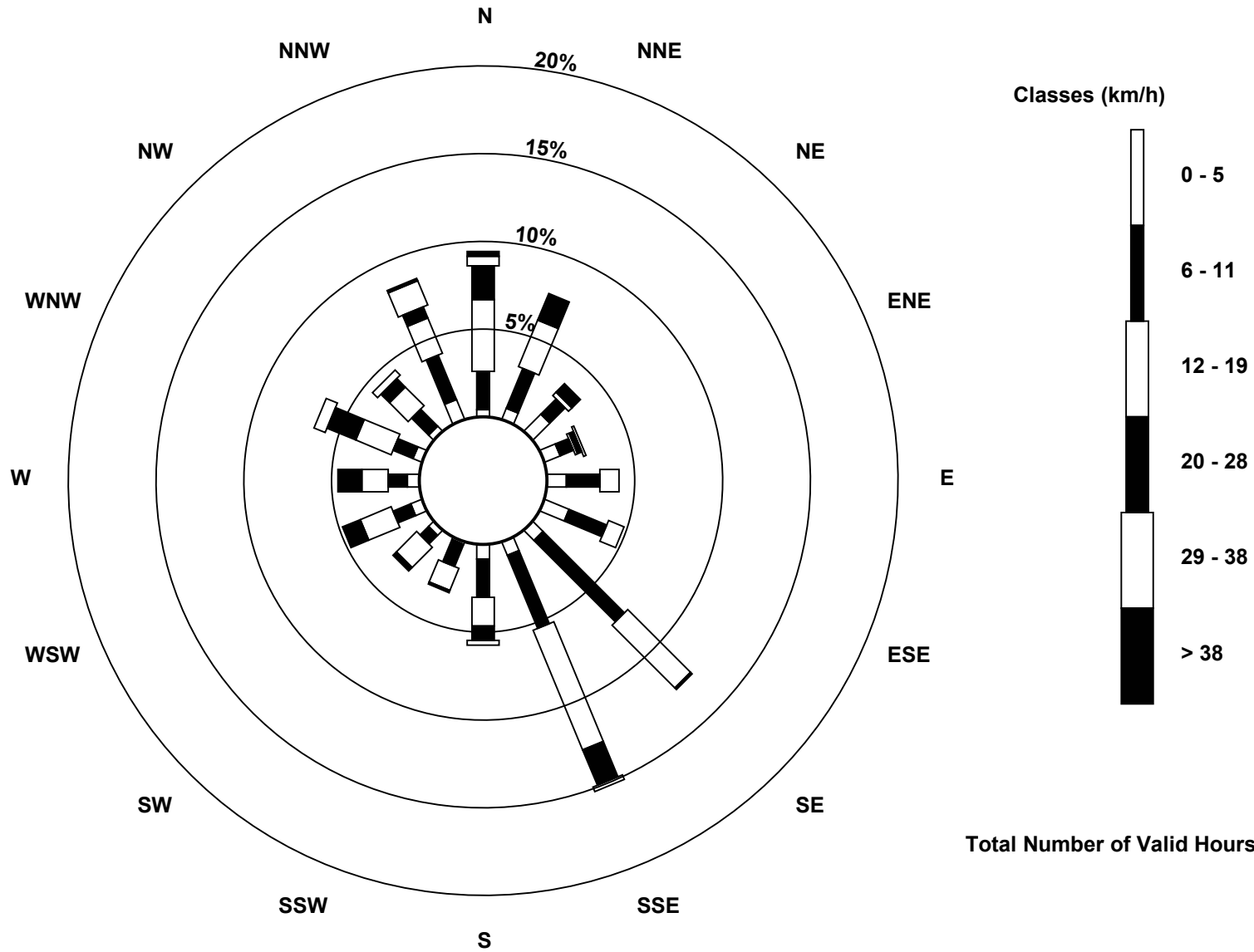
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	5	10	7	8	11	6	6	6	1	3	5	5	4	3	9	92
6 - 11	16	18	9	6	14	17	48	33	16	10	5	8	8	9	10	20	247
12 - 19	30	21	2	1	8	7	37	54	12	10	12	14	11	16	11	16	262
20 - 28	14	12	5	2	0	0	1	16	6	1	2	8	10	13	5	5	100
29 - 38	4	0	0	1	0	0	0	2	2	0	0	0	0	5	3	11	28
> 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
Totals	69	56	26	17	30	35	92	111	42	22	22	35	34	47	32	62	732

Total Number of Valid Hours: 732

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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





Maximum Speed: 48 km/h on Mar 2 03:00	Maximum Daily Speed Average: 33.0 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 17 02:00	Minimum Daily Speed Average: 0.1 km/h on Mar 30	Hours of Data: 732
Maximum Diurnal Speed Average: 3.4 km/h at hour 24	Minimum Diurnal Speed Average: 0.0 km/h at hour 13	Hours of Missing Data: 12
Monthly Average Velocity: 0.8 km/h 284.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 14 Q ₃ = 20 P ₉₀ = 27 P ₉₉ = 40	Percent Operational Time: 98.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24						
1-Mar	NE13	NNE8	ENE3	SE2	SSE11	SSE17	SSE25	SSE29	SSE28	SSE18	SSE18	SSE16	SSE23	SSE23	SSE22	S28	S31	S27	SSE30	S26	S24	SW19	W26	NW30	S14.6	S31				
2-Mar	NNW41	N45	N48	N37	NNW40	NNW45	NNW43	NNW40	NNW33	NNW25	NNW33	NNW36	NNW34	NNW37	NNW37	NW38	NNW38	NNW26	NW25	WNW31	NW19	NW12	NW14	NNW33.0	N48					
3-Mar	WNW24	WNW28	WNW30	NW25	N19	NNW22	N23	N23	N29	N26	N20	N23	NNW21	NNW18	NNW16	NNE12	NNE12	NE12	NE12	NE13	ENE10	ESE5	SSE9	SSE14	NNW13.5	WNW30				
4-Mar	SSE18	S22	S26	S24	SSE26	SSE31	SSE33	SSE31	SSE30	SSE25	SSE19	SSE20	SSE23	SSE22	SSE27	SSE25	S22	SSW20	SW26	SSW19	S18	S19	SSW11	W13	S21.3	SSE33				
5-Mar	W23	W32	W25	WNW27	WNW24	W19	WSW23	W23	W14	WNW7	W5	SSE4	SSE5	SE4	ESE4	SE5	SE12	SSE15	SSE18	S16	SW16	W18	W19	WSW18	WSW10.8	W32				
6-Mar	WSW11	N4	W20	WSW26	WNW12	WNW18	WNW17	NW14	NNW12	NNE21	NNE15	N7	N5	NNW5	NW6	NNE4	ENE7	NNE13	NNE18	NNE18	NE13	NNE7	NE2	W5	NNW6.8	WSW26				
7-Mar	WNW7	W5	W3	WSW8	SW9	W18	W25	W25	W23	W25	WNW24	WNW22	W20	WNW22	WNW22	WNW21	WNW20	WNW17	WNW21	WNW26	W23	NW15	NW9	W7	WNW16.8	WNW26				
8-Mar	W9	WSW15	WSW14	WSW15	SW12	SSW12	SSW12	SSW13	S13	S12	SW17	SW15	SSW12	S10	SW11	SW16	SW10	SW13	SW16	SW21	SW26	WSW23	WSW18	WSW17	SW13.7	SW26				
9-Mar	W16	W12	SSW8	WSW11	WSW15	W14	WNW13	WNW15	WNW21	WNW24	WNW24	NW12	WNW10	NNW10	WNW14	NW20	NW21	NW21	NNW22	NW17	NW23	NNW20	NW24	NNW17	NW14.8	NW24				
10-Mar	N20	NNE28	NNE26	NNE16	NNE16	NNE20	NNE20	NNE16	NNE15	NNE13	NNE9	N6	NE4	NNE4	NNW7	NNW8	N10	N17	N21	N31	NNE29	NNE23	NNE23	NNE24	NNE16.6	N31				
11-Mar	NNE24	NNE24	N23	NNE20	NNE18	N19	NNE21	NNE17	N16	NNE17	N13	N16	N15	N18	N16	N16	N15	N16	N14	N13	N12	NNW13	NNW10	NNW12	N16.2	NNE24				
12-Mar	NW10	NNW5	NW4	NW6	NW7	NNW3	NNW3	SSE4	SSW6	SSE11	S14	SSE21	SSE16	S13	SSE17	SSE16	SE9	SSE10	SE3	ESE5	SSE16	SSE21	S20	SW15	SSE6.9	SSE21				
13-Mar	SW20	WSW22	WSW34	WSW34	WSW30	WSW22	SW16	SW17	WSW18	WSW27	SW22	SW21	SW24	SSW24	S25	SSE27	SSE32	S35	S43	S38	SSE34	SSE30	SSE36	S31	SSW22.3	S43				
14-Mar	SSE31	SSE32	SSE27	SE18	SE21	SE19	SE18	SE19	SE18	SSE20	SSE18	SE9	SE7	SE10	SE13	SSE15	SSE16	S18	SSW20	WSW24	WSW27	WSW28	WSW22	W17	S14.0	SSE32				
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	NNW18	NW14	NNW8	NNW8	NNW4	ENE3	SE5	SSE15	S17	S20	S23	SSW14	---	S23
16-Mar	NNW11	N28	N31	N14	NNW12	N12	NNE9	N8	N8	NNE6	NE6	N6	N3	NNE5	NE6	ENE7	NNW3	NNW13	N19	N20	N17	N15	N14	N7	N11.0	N31				
17-Mar	NNW4	NNW1	E1	SE8	SSE13	SE12	SSE15	SSE12	SSE11	SSE9	SSE12	SSE12	SSE9	SE4	ESE4	ESE4	E6	E6	ESE5	SE6	SE9	SSE7	SW2	ENE4	SE6.5	SSE15				
18-Mar	SSE4	S3	SSW4	SSE6	SSE10	SSE11	SSE10	SSE13	SE11	SSE9	SE6	SE5	E4	NNW5	N16	NNE21	N20	N24	N36	N35	N27	N31	N25	N23	NNE7.9	N36				
19-Mar	N19	NNW20	N18	N13	N15	N13	N11	NNE14	NNE7	NNW5	NW10	NNW9	N9	NNE12	NNE14	NNE17	NNE18	NNE19	NNE26	NNE30	NNE27	NE25	NE18	ENE13	NNE14.9	NNE30				
20-Mar	E8	E3	ENE3	SE4	ESE4	SE3	SE2	S4	SSW2	NE2	NNE2	NE4	WSW3	WSW6	WNW8	NW10	NNW10	N12	NNE19	NNE22	NNE21	NNE18	ENE9	ESE7	NNE4.6	NNE22				
21-Mar	ESE9	E11	E11	ESE8	ESE7	ESE7	ESE7	ESE8	E10	E9	E11	ESE12	E13	E12	ESE11	E13	ESE12	ESE12	ESE12	ESE11	E16	ESE12	E11	SE9	ESE10.5	E16				
22-Mar	SE11	SE11	SE11	SE11	SE10	SE10	SE9	SE12	SE11	SE8	SE7	SE6	SE7	SE7	SE5	SE9	S6	S11	S6	SE5	ESE3	E4	SE5	S8	SE7.7	SE12				
23-Mar	S9	SSE14	SSE12	SSE12	SSE16	SSE17	SSE15	SSE16	S9	SW3	W4	W3	NE3	NNE7	NE5	NNW5	NNE9	NNE9	NE12	NE11	NNE14	N17	N19	NNE20	E2.7	NNE20				
24-Mar	NNE18	N15	NNE13	N13	N10	N12	N10	NNE12	NNE15	NNE7	N11	NNW12	NW13	NW11	WNW9	WNW6	ESE4	SE7	E8	E14	E9	E9	ESE5	ESE5	NNE6.8	NNE18				
25-Mar	SSE12	SSE11	SE9	ESE6	ESE8	ESE6	ESE7	ESE7	SE8	ESE8	E6	SE10	SE9	ESE7	SE9	SE9	SSE13	SSE15	SSE19	SSE22	SSE20	SE17	SE16	SE10.3	SSE22					
26-Mar	SE13	SE17	SE16	SE14	SE12	SE14	SE17	SE17	SE12	SE13	SE9	SE11	SE10	SE12	SE9	SE11	SE14	SE19	SSW15	SW16	SSW14	S12	SSE14	SSE15	SSE12.2	SE19				
27-Mar	SSE14	SSE12	SSE10	SSE8	S12	S17	SSE18	S14	SSE8	SSE10	SSE10	S15	SSE13	SE12	SE11	SSE20	SSE16	SE19	SSE20	SSE16	SSW15	SSE14	SSW4	S15	SSE13.2	SSE20				
28-Mar	S13	SSW8	NW8	NW9	NW9	NW9	NW12	WNW15	WNW13	W10	WNW16	NW20	NW22	WNW28	WNW37	WNW40	WNW31	WNW35	WNW36	WNW32	WNW25	W25	W27	W24	WNW19.5	WNW40				
29-Mar	W24	W20	WSW12	SW8	SW12	SSW6	SSE16	SSE15	SSE9	SE6	SE10	SE11	SE10	SE9	SE14	SE11	SE7	SE6	ESE4	SSW15	SW19	WSW12	W22	WNW17	SSW7.0	W24				
30-Mar	WNW13	W16	WNW20	N12	N11	N11	WSW2	W1	WSW1	NE1	W4	ENE5	E7	ESE9	E7	NE8	SE8	SE9	SE9	SE11	S13	WSW6	SW4	SSW7	WNW0.1	WNW20				
31-Mar	S11	SSE23	S21	SSE18	SSE21	SE20	SE18	SE16	SE9	SSE13	NE10	NE12	NE21	ENE28	ENE27	ENE33	ENE30	NE28	NE27	NE27	NE31	NNE29	NNE33	NNE34	ENE13.3	NNE34				

W2.8	WNW2.6	WNW2.9	W2.6	WSW1.0	SW1.2	SSW1.8	S2.1	S1.0	S0.9	W1.2	NNW0.2	NE0.0	NNE0.8	N0.7	NE1.0	E1.2	NE1.3	NNE1.4	N1.0	W1.0	NNW1.7	WNW2.8	WNW3.4	Diurnal Average
NNW41	N45	N48	N37	NNW40	NNW45	NNW43	NNW40	NNW33	WSW27	NNW33	NNW36	NNW34	NNW37	WNW37	WNW40	NW38	NNW38	S43	S38	SSE34	N31	SSE36	NNE34	Diurnal Maximum

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



Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 11 km/h on Mar 2 11:00	Hours of Data: 732
Minimum Value: 1 km/h on Mar 28 08:00	Hours of Missing Data: 12
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 9	Hours of Calibration: 0
	Percent Operational Time: 98.4

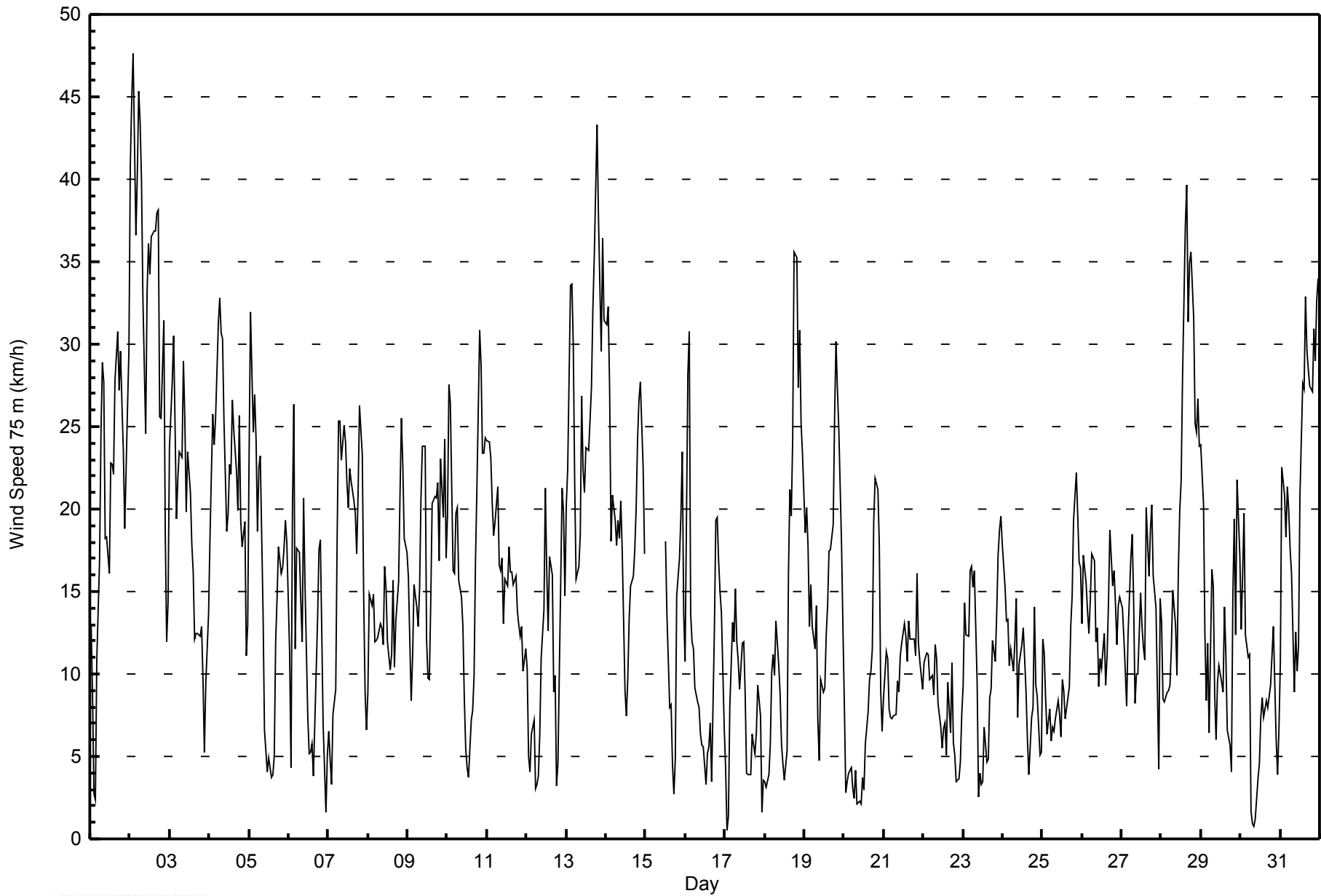
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	2	3	2	1	2	1	3	2	4	3	3	3	3	3	4	5	4	3	3	4	3	3	7	5	7
2-Mar	9	9	9	6	8	9	11	10	7	4	11	6	6	6	7	6	7	7	4	4	3	6	2	4	11
3-Mar	3	2	3	5	4	3	6	5	6	5	5	5	4	3	3	3	2	3	2	2	2	3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

MS - Missing



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	83	11.34	11.34
6 - 11	189	25.82	37.16
12 - 19	250	34.15	71.31
20 - 28	149	20.36	91.67
29 - 38	52	7.10	98.77
> 38	9	1.23	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



WBEA
Frequency Distribution

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

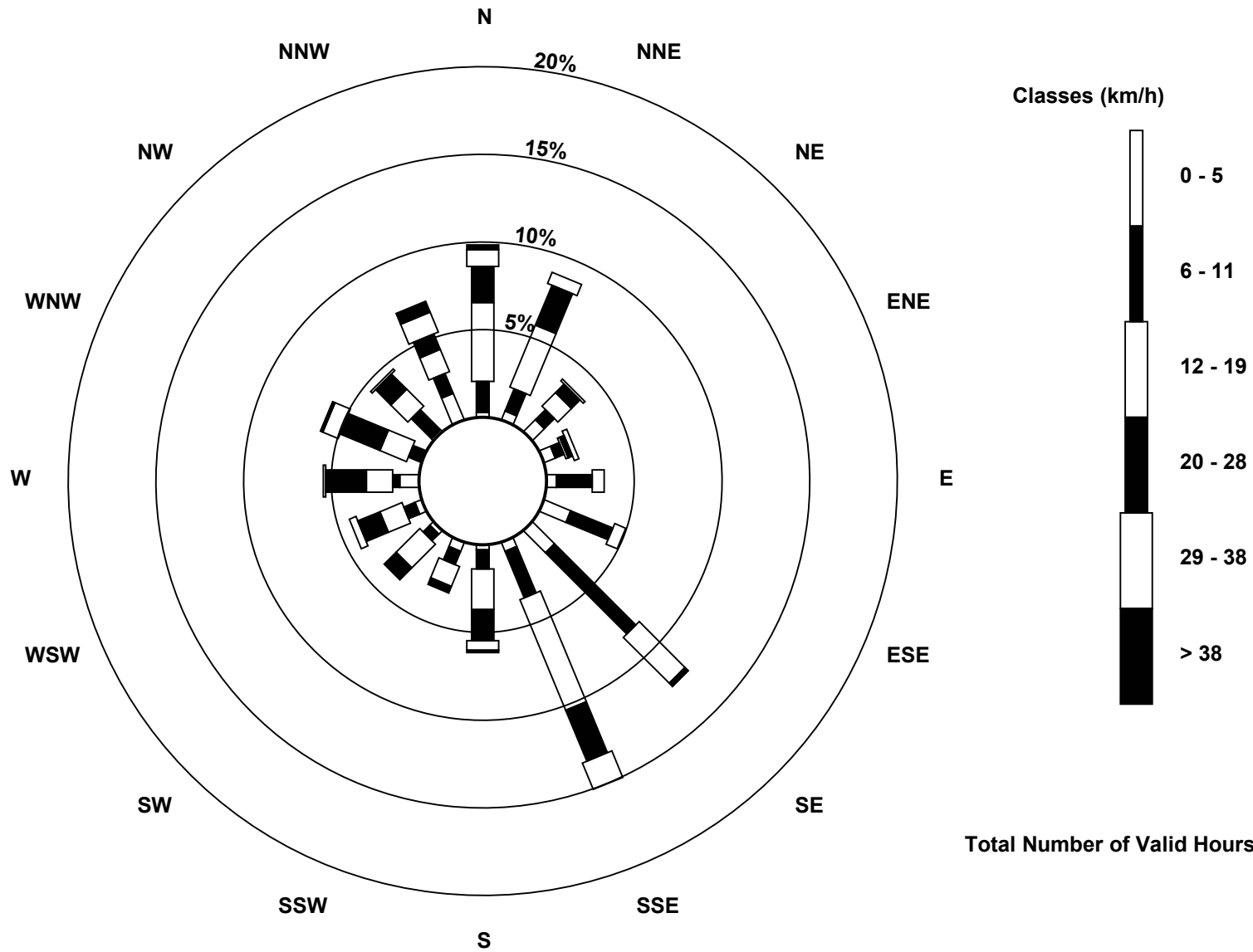
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	4	7	5	4	12	13	4	2	4	2	3	8	0	1	12	83
6 - 11	13	10	6	4	15	19	48	21	8	6	4	5	3	6	12	9	189
12 - 19	33	28	8	1	5	5	27	50	17	9	14	10	11	12	10	10	250
20 - 28	15	18	5	2	0	0	2	23	13	3	7	10	17	18	9	7	149
29 - 38	7	5	1	2	0	0	0	12	4	0	0	3	1	7	1	9	52
> 38	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0	5	9
Totals	72	65	27	14	24	36	90	110	45	22	27	31	40	44	33	52	732

Total Number of Valid Hours: 732

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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





Maximum Speed: 49 km/h on Mar 2 03:00	Maximum Daily Speed Average: 34.5 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 30 10:00	Minimum Daily Speed Average: 0.4 km/h on Mar 30	Hours of Data: 731
Maximum Diurnal Speed Average: 3.5 km/h at hour 24	Minimum Diurnal Speed Average: 0.2 km/h at hour 12	Hours of Missing Data: 13
Monthly Average Velocity: 0.7 km/h 261.5 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 15 Q ₃ = 22 P ₉₀ = 29 P ₉₉ = 41	Percent Operational Time: 98.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	NNE14	NNE9	ENE3	SE3	SSE11	SSE17	SSE24	SSE29	SSE30	SSE17	SSE21	SSE18	SE25	SSE24	SSE24	S29	S32	S29	SSE32	S29	S25	SSW20	W27	NW31	SSE15.4	SSE32	
2-Mar	NNW43	NNW47	N49	NNW39	NNW42	NW47	NW46	NNW42	NNW34	NNW26	NW34	NW37	NW35	NNW38	NW38	NW38	NW39	NW40	NW27	NW27	WNW33	WNW19	NW13	WNW15	NNW34.5	N49	
3-Mar	WNW24	WNW29	WNW32	NW27	N20	NNW23	NNW25	N24	N30	NNW27	N21	NNW24	NNW21	NNW18	NNW16	N13	NNE13	NNE13	NNE13	NE13	ENE11	ESE7	SE10	SSE15	NNW14.3	WNW32	
4-Mar	SSE19	SSE24	SSE28	S25	SSE22	S31	SSE33	SSE30	SSE30	SSE27	SSE19	SSE22	SSE26	SSE24	SSE29	SSE27	S24	SSW21	SSW27	S20	S19	S19	SSW12	W15	SSE22.0	SSE33	
5-Mar	WSW25	W34	W27	W29	WNW26	W20	WSW25	W25	W17	WNW10	W10	SSW4	SSE4	SE4	ESE5	ESE7	SE13	SE15	SSE17	S16	SW17	W19	W19	WSW20	WSW12.1	W34	
6-Mar	WSW13	NNW5	W21	WSW28	W14	WNW17	WNW17	NW14	NNW14	NNE23	N16	N7	NNW5	NNW5	NW6	N4	ENE8	NNE14	NNE18	NNE19	NE13	NNE7	ENE2	WSW4	NNW7.4	WSW28	
7-Mar	WNW7	W5	W6	WSW11	WSW11	W21	W27	W26	W24	W26	W24	W22	W20	W23	W22	W20	WNW20	WNW18	WNW21	W28	W25	WNW15	WNW10	W7	W17.8	W28	
8-Mar	W10	WSW17	WSW15	WSW16	SW13	SW12	SSW13	SSW14	SSW13	SSW12	SW18	SW16	SSW13	S11	SW12	SW17	SW12	SW14	SW17	SW23	SW28	WSW25	WSW20	WSW20	SW15.1	SW28	
9-Mar	W18	W15	SSW8	WSW13	WSW17	W15	WNW14	WNW16	W21	W24	WNW24	NW13	WNW10	NW10	WNW15	NW21	NW22	NW22	NNW23	NW18	NW24	NNW22	NW26	NNW18	WNW16.0	NW26	
10-Mar	N20	N28	NNE28	N17	NNE17	NNE21	N21	NNE17	NNE15	NNE13	NNE9	N5	NNE4	NNE4	NNW7	NNW8	N10	N17	N22	N32	N30	N24	N24	NNE25	N17.3	N32	
11-Mar	NNE24	NNE24	N23	NNE20	NNE18	N19	NNE21	NNE16	N17	NNE16	N14	N16	N16	N19	N17	NNW17	N16	N17	N14	N14	N13	NNW13	NNW10	NW12	N16.4	NNE24	
12-Mar	NW11	NNW5	NW4	NW6	NW7	NW3	NNW3	SE6	S9	SE14	SSE16	SE24	SSE18	S14	SSE18	SSE17	SE10	SSE10	SE3	ESE7	SE17	SSE23	S21	SW18	SSE7.8	SE24	
13-Mar	SW25	WSW27	WSW37	WSW36	WSW32	WSW24	SW18	SW18	WSW20	WSW27	SW23	SSW22	SSW24	SSW25	S26	SSE29	SSE34	SSE37	SSE47	SSE42	SSE36	SSE32	SSE39	SSE35	SSW24.0	SSE47	
14-Mar	SSE34	SSE37	SSE31	SE22	SE23	SE23	SE22	SE21	SSE20	SSE23	SSE19	SE10	SE9	SE11	SE14	SSE17	SSE17	S19	SSW22	WSW25	WSW28	WSW29	WSW25	W19	S15.7	SSE37	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	AF	NW14	NW8	NW8	NNW5	ENE3	ESE6	SSE15	SSE17	S20	S26	SSW16	---	S26
16-Mar	NNW12	N31	N32	NNW14	NNW13	N12	N9	N8	N8	NNE6	NE5	NNE6	NNW3	NNE5	NE6	NE7	NW4	NNW12	NNW20	N20	N18	N17	N16	N7	N11.7	N32	
17-Mar	NNW4	SE2	ESE3	SE11	SE14	SE16	SSE17	SE14	SSE12	SE11	SE14	SE14	SSE10	SE5	ESE5	ESE5	E8	E8	ESE8	SE10	SE11	SSE10	SSW5	ESE2	SE8.3	SSE17	
18-Mar	SSE7	S6	S4	SSE8	SSE13	SSE16	SSE13	SE16	SE15	SSE12	SE7	ESE6	E4	NNW5	N17	N22	N20	N25	N37	N36	N29	NNW32	N27	NNW25	NNE7.2	N37	
19-Mar	NNW20	NNW22	N19	NNW14	N16	N14	N12	N16	NNE8	NW5	NW10	NNW9	NNW9	N13	NNE14	NNE18	N18	N19	N26	NNE32	NNE30	NE27	NE20	NE14	N15.7	NNE32	
20-Mar	ENE9	E4	ENE3	SE6	ESE6	SE5	ESE4	SSE4	S2	NNE2	NNE2	NE4	WSW3	WSW6	WNW8	NW10	NNW10	N12	N20	N23	N22	NNE17	E10	ESE9	NNE4.5	N23	
21-Mar	ESE13	E13	E13	E11	ESE13	ESE14	ESE15	ESE14	E13	E11	E15	E16	E16	E17	E15	E17	ESE17	ESE20	ESE17	ESE16	E21	E17	E15	ESE12	E14.9	E21	
22-Mar	SE12	SE12	SE13	SE12	SE11	ESE12	SE10	SE13	SE12	SE9	SE7	ESE7	SE7	ESE8	ESE6	SE10	SSE7	SSE11	S6	SE6	E5	E5	ESE6	SSE9	SE8.6	SE13	
23-Mar	S10	SSE14	SSE14	SSE14	SSE16	SSE18	SSE18	SSE18	S11	SW3	WSW4	W3	NNE4	NNE7	NE5	NNW5	N9	NNE9	NE13	NE11	N14	N18	N20	N20	E2.5	N20	
24-Mar	NNE19	N16	NNE14	N14	N12	N13	N11	N13	NNE15	NNE8	N11	NW12	NW13	NW11	WNW9	WNW6	E4	SE8	E9	ENE16	E13	E11	E9	ESE8	NNE7.2	NNE19	
25-Mar	SSE14	SE14	SE11	ESE10	ESE14	ESE14	ESE12	ESE14	ESE10	ESE10	E7	SE11	ESE10	ESE8	SE10	SE10	SSE13	SSE16	SSE21	SSE25	SE22	SE19	SE18	SE12.9	SSE25		
26-Mar	ESE17	ESE20	SE18	ESE17	ESE16	ESE16	SE19	SE19	SE14	SE14	SE11	SE12	SE13	SE14	ESE12	ESE14	ESE18	SE21	SSW17	SSW17	SSW15	S11	SSE14	SSE16	SE13.6	SE21	
27-Mar	SSE15	SSE13	SSE11	SE10	SSE12	SSE18	SSE20	S17	SSE9	SSE11	SSE11	S15	SE14	SE13	SE12	SSE21	SE17	SE20	SSE22	SSE18	SSE17	SSE16	S6	S17	SSE14.6	SSE22	
28-Mar	S17	SSW10	WNW10	WNW10	NW10	NW10	NW11	WNW14	WNW13	W11	WNW16	WNW20	NW22	WNW28	WNW37	WNW40	W32	WNW36	WNW37	WNW34	WNW27	W26	W28	W26	WNW20.2	WNW40	
29-Mar	W26	WSW23	WSW15	WSW10	SW13	SW6	SSE14	SSE17	SSE10	SE8	SE12	SE12	SE10	SE10	SE15	SE12	ESE9	ESE8	ESE6	SSW16	SW20	WSW14	W22	WNW16	SSW7.3	W26	
30-Mar	WNW12	W16	WNW21	N13	N12	N13	WNW3	NNW3	W1	NW1	W4	ENE5	E8	E12	E9	NE8	ESE9	SE10	SE10	SE13	S14	WSW8	WSW5	SW7	NW0.4	WNW21	
31-Mar	S10	SSE20	S21	SSE14	SE21	SE23	SE18	SE19	SE12	SE16	NE10	NNE13	NE22	NE31	NE29	NE35	NE32	NE30	NNE29	NE29	NNE34	NNE31	N34	N35	ENE14.0	NE35	

W2.9	WNW2.8	WNW3.1	W2.8	WSW1.1	SSW1.3	S1.9	SSE2.3	S1.5	S1.3	WSW1.3	SSE0.2	SE1.0	NE0.7	NNE0.4	ENE1.0	E1.5	ENE1.4	NNE1.3	N0.9	W1.1	WNW1.9	W3.0	W3.5	Diurnal Average
NNW43	NNW47	N49	NNW39	NNW42	NW47	NW46	NNW42	NNW34	WSW27	NW34	NW37	NW35	NNW38	NW38	WNW40	NW39	NW40	SSE47	SSE42	SSE36	NNW32	SSE39	N35	Diurnal Maximum

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



Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 11 km/h on Mar 2 11:00	Hours of Data: 731
Minimum Value: 1 km/h on Mar 7 01:00	Hours of Missing Data: 13
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 9	Hours of Calibration: 0
	Percent Operational Time: 98.3

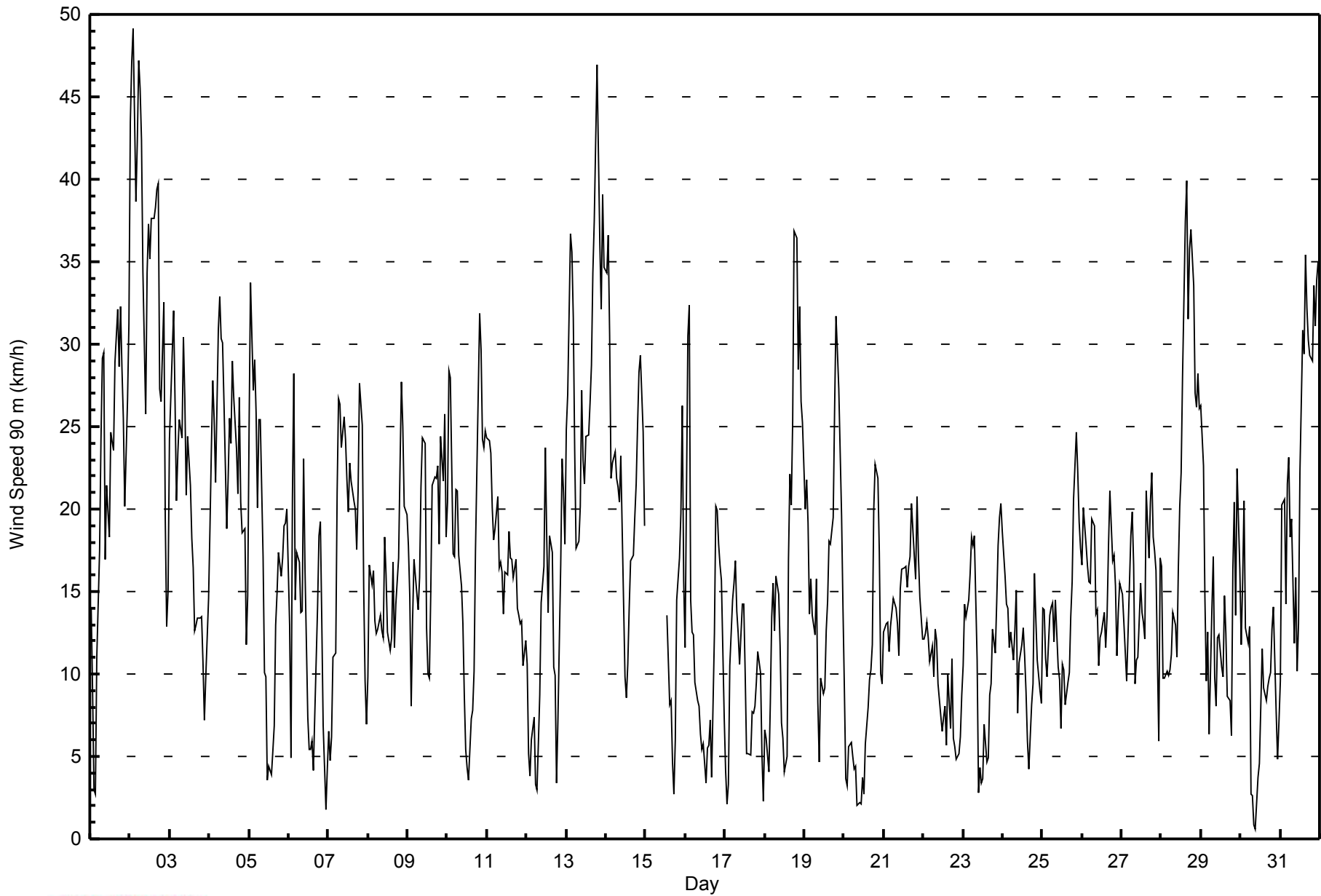
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	2	4	1	1	3	1	3	2	2	3	3	2	2	3	4	5	4	3	3	4	3	4	6	5	6
2-Mar	9	9	9	5	8	9	11	10	7	4	11	6	5	6	7	6	6	6	4	4	3	6	2	3	11
3-Mar	4	2	2	5	4	2	6	5	6	5	5	5	4	3	3	3	2	2	2	1	2	3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

AF - Analyzer Failure MS - Missing



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	65	8.89	8.89
6 - 11	155	21.20	30.10
12 - 19	273	37.35	67.44
20 - 28	159	21.75	89.19
29 - 38	65	8.89	98.08
> 38	14	1.92	100.00

Total Number of Valid Hours: 731

Total Number of Hours: 744



WBEA
Frequency Distribution

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

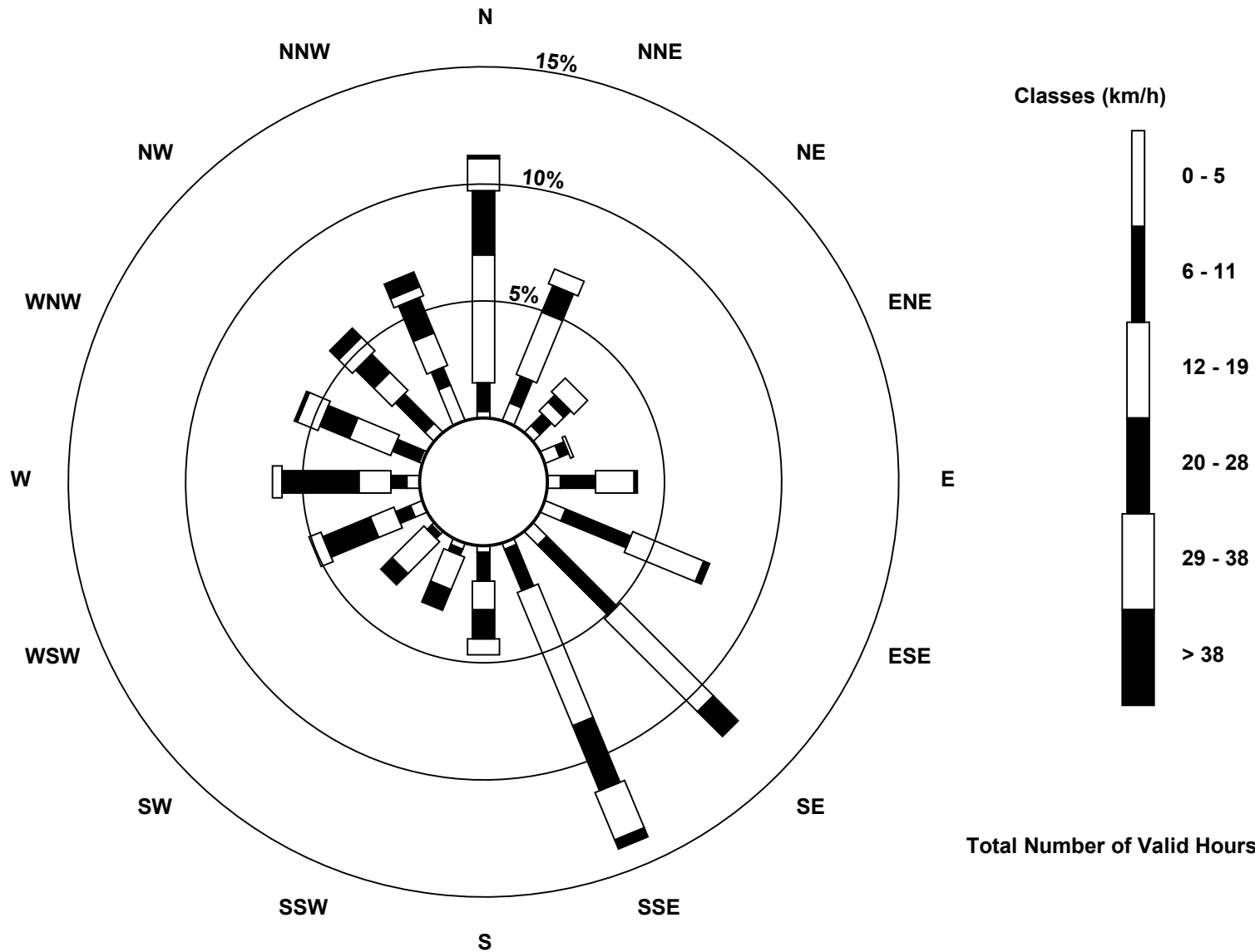
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	6	3	5	4	7	6	2	2	2	1	4	4	1	4	12	65
6 - 11	9	9	5	3	11	22	31	14	9	2	2	5	5	9	13	6	155
12 - 19	40	21	4	1	12	24	41	45	9	11	14	8	10	14	8	11	273
20 - 28	20	9	3	0	1	2	11	22	9	7	5	16	24	10	8	12	159
29 - 38	10	5	6	0	0	0	0	16	5	0	0	4	3	7	6	3	65
> 38	1	0	0	0	0	0	0	3	0	0	0	0	0	1	4	5	14
Totals	82	50	21	9	28	55	89	102	34	22	22	37	46	42	43	49	731

Total Number of Valid Hours: 731

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

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





Summary of Hour Averages

Mannix - March 2015

Direction of Maximum Speed: 351 deg on Mar 2 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 330.0 deg on Mar 2	Hours of Data: 732
Direction of Minimum Speed: 222 deg on Mar 17 22:00	Direction of Minimum Daily Speed Average: 1.6 deg on Mar 30
Direction of Minimum Speed: 222 deg on Mar 17 22:00	Hours of Missing Data: 12
Monthly Average Direction: 268.8 deg	Percent Operational Time: 98.4

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	26	339	271	198	136	147	147	149	150	146	151	136	142	156	157	174	176	170	163	168	177	215	282	322	166.4	
2-Mar	336	347	351	346	344	329	328	335	337	342	327	322	328	333	324	326	322	323	328	304	296	308	335	288	330.0	
3-Mar	275	283	283	307	2	331	345	2	352	348	350	346	335	327	337	12	33	33	30	46	61	128	209	174	340.1	
4-Mar	157	157	152	151	148	150	145	147	143	141	143	140	141	148	156	159	170	208	217	190	158	158	149	254	158.1	
5-Mar	254	270	275	268	272	238	247	250	217	118	127	121	129	103	100	111	134	138	154	175	202	239	247	237	227.9	
6-Mar	155	80	267	243	6	294	282	295	337	19	13	348	344	341	301	22	82	32	19	19	40	360	265	272	340.6	
7-Mar	301	276	112	160	156	210	270	272	275	278	288	286	277	283	286	282	301	291	283	275	268	301	307	245	277.7	
8-Mar	275	229	216	213	172	158	151	154	146	153	212	221	192	163	208	231	182	197	188	189	217	229	207	217	195.0	
9-Mar	276	158	165	158	234	264	270	291	278	281	284	309	295	330	284	320	320	323	326	306	316	320	316	330	298.2	
10-Mar	11	10	23	17	27	26	17	35	35	28	23	1	42	18	330	333	351	360	357	5	13	15	11	14	13.4	
11-Mar	12	10	4	4	359	1	6	4	354	6	353	357	347	344	350	340	342	353	342	341	359	332	330	315	353.9	
12-Mar	319	333	284	276	306	0	277	202	241	156	175	150	162	181	153	156	128	141	26	91	147	138	147	153	167.1	
13-Mar	183	254	263	260	249	237	178	191	230	248	237	214	214	205	183	163	162	168	172	163	160	151	160	165	193.4	
14-Mar	154	154	151	146	147	141	138	147	155	151	146	132	132	122	127	130	144	149	212	258	247	254	249	285	170.3	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	305	321	330	333	351	82	134	167	183	181	191	174	--
16-Mar	356	4	4	339	335	340	12	1	360	32	62	43	8	29	47	72	318	330	338	351	350	348	344	326	358.7	
17-Mar	273	280	304	157	199	169	167	175	180	156	144	145	147	100	77	74	75	72	81	108	125	222	262	60	140.7	
18-Mar	222	266	223	161	198	222	136	158	155	142	124	124	68	328	342	14	360	359	8	10	357	344	355	346	1.5	
19-Mar	345	338	349	350	356	2	14	14	13	326	312	337	349	12	14	17	9	9	13	16	22	41	49	42	7.1	
20-Mar	52	359	26	31	84	222	97	248	252	51	326	47	255	262	293	304	331	357	9	11	13	12	17	39	357.3	
21-Mar	77	81	73	94	100	105	119	113	89	85	96	102	96	100	105	98	106	110	115	123	92	98	94	122	100.0	
22-Mar	132	136	136	148	140	134	135	142	141	140	142	130	143	137	127	150	174	177	205	150	102	94	127	175	142.9	
23-Mar	180	168	151	145	160	155	152	164	189	227	276	259	41	32	50	330	12	30	47	36	9	3	3	6	50.1	
24-Mar	9	0	1	349	328	337	338	10	19	22	2	323	312	312	295	276	119	142	93	76	96	80	93	110	3.4	
25-Mar	154	132	114	105	82	60	109	110	102	135	129	90	139	133	116	137	141	157	157	164	154	147	151	144	134.6	
26-Mar	129	135	133	129	136	140	141	135	134	138	136	135	131	134	129	132	132	131	197	214	205	169	152	152	141.6	
27-Mar	168	167	153	142	173	169	162	165	149	148	144	170	150	132	130	156	145	142	149	146	169	164	312	175	154.7	
28-Mar	239	177	284	255	256	249	268	268	272	255	287	300	309	291	296	296	284	294	293	295	276	261	259	248	283.4	
29-Mar	249	246	210	170	178	152	159	152	143	122	129	128	136	132	143	139	124	113	48	193	207	203	268	276	175.1	
30-Mar	266	262	295	6	318	28	211	185	236	83	272	65	87	102	84	60	130	136	136	115	125	83	135	156	111.9	
31-Mar	162	158	160	152	146	141	147	156	153	144	2	36	33	54	59	57	52	35	33	37	32	17	9	8	55.3	

316.6 324.7 326.3 276.9 238.8 194.5 176.0 164.5 132.9 95.0 304.2 16.4 356.8 18.3 4.1 34.8 56.3 38.3 8.3 6.3 10.5 340.3 318.7 308.9
Diurnal Average

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



Summary of Hour Standard Deviations

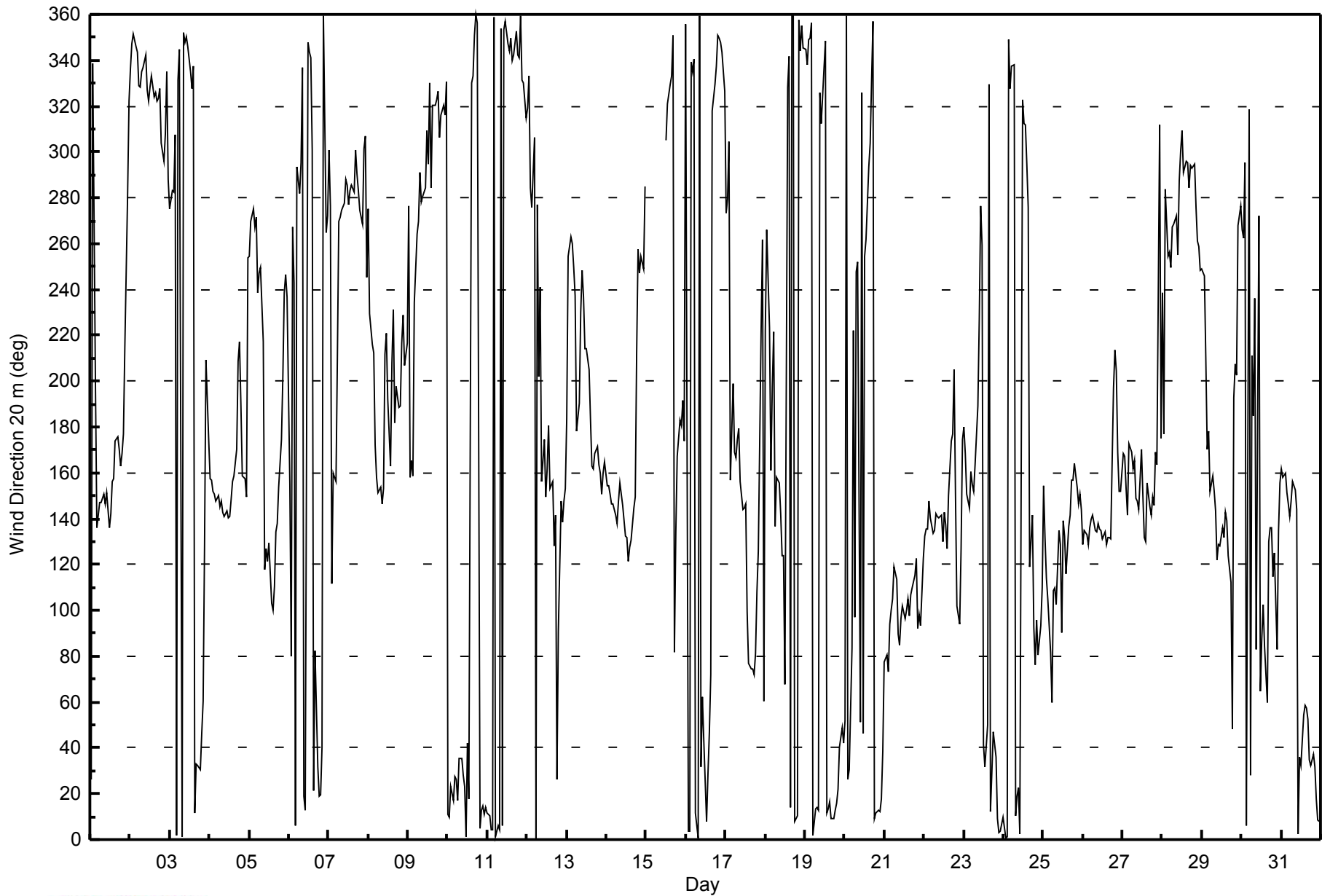
Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744													
Maximum Value: 98 deg on Mar 9 01:00														Hours of Data: 732													
Minimum Value: 3 deg on Mar 5 02:00														Hours of Missing Data: 12													
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 11 Median = 15 Q ₃ = 22 P ₉₀ = 40 P ₉₉ = 85														Hours of Calibration: 0													
														Percent Operational Time: 98.4													
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	20	38	46	53	10	7	8	11	11	10	12	11	9	10	14	14	12	10	7	8	15	25	23	12	53		
2-Mar	13	13	12	11	15	13	12	13	14	13	14	12	13	13	13	12	11	12	11	12	8	17	22	34	34		
3-Mar	6	7	7	31	16	14	16	13	13	14	17	17	15	14	14	32	16	14	12	10	22	34	20	8	34		
4-Mar	10	11	10	11	10	10	9	9	10	11	11	11	8	12	11	9	17	17	13	17	6	5	19	59	59		
5-Mar	5	3	12	8	10	6	8	11	63	19	18	18	18	21	16	20	11	11	7	22	11	10	10	10	63		
6-Mar	50	55	22	7	51	41	7	19	33	16	15	32	41	57	19	61	18	16	11	10	17	30	53	25	61		
7-Mar	9	16	49	15	11	51	8	6	10	11	9	10	8	8	8	8	12	7	15	6	6	14	25	21	51		
8-Mar	8	11	18	17	10	9	8	10	9	15	32	19	22	29	40	17	25	7	7	14	12	9	12	55	55		
9-Mar	98	63	20	40	13	18	24	20	6	7	8	30	23	19	17	22	13	14	15	21	11	11	13	27	98		
10-Mar	13	14	11	15	15	12	10	15	14	18	29	52	55	56	31	26	22	12	13	12	9	11	9	9	56		
11-Mar	11	10	11	11	12	14	10	12	12	11	19	15	16	14	19	14	13	20	13	15	20	14	13	11	20		
12-Mar	16	24	20	31	23	34	29	55	40	34	21	14	31	21	11	11	24	38	46	23	22	13	11	50	55		
13-Mar	86	50	11	8	10	23	20	20	23	11	13	14	12	15	16	14	8	9	9	7	7	10	10	8	86		
14-Mar	9	10	9	11	8	9	11	11	20	21	15	16	20	18	13	9	12	11	28	17	12	8	7	44	44		
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	14	18	31	26	41	24	21	11	12	11	13	22	41	
16-Mar	25	16	15	14	14	16	22	12	16	21	33	36	48	32	38	21	66	11	11	11	13	15	14	17	66		
17-Mar	27	73	29	75	25	8	9	27	20	22	16	16	23	28	25	24	13	12	11	10	9	97	74	37	97		
18-Mar	71	14	14	18	24	93	31	15	17	39	26	23	39	24	19	13	15	14	12	13	15	12	14	13	93		
19-Mar	15	14	16	13	11	19	11	12	23	45	19	44	35	21	16	12	12	13	10	8	11	11	11	18	45		
20-Mar	18	25	20	90	59	48	84	53	85	45	67	48	86	28	29	17	21	17	10	9	9	8	8	23	90		
21-Mar	21	14	16	8	13	17	20	20	11	15	18	15	15	16	18	16	20	16	20	18	11	14	10	20	21		
22-Mar	11	11	14	12	14	10	12	13	15	16	28	28	27	20	46	17	36	37	46	27	14	59	38	15	59		
23-Mar	27	8	11	21	9	15	12	16	29	58	23	37	57	20	35	28	26	17	13	15	10	9	11	10	58		
24-Mar	9	16	12	14	15	18	15	19	12	21	21	18	14	18	25	37	41	17	20	16	7	15	14	21	41		
25-Mar	19	13	20	19	18	58	18	27	18	13	21	30	22	17	29	17	18	17	10	7	9	10	13	11	58		
26-Mar	13	10	11	12	12	10	11	12	11	12	13	11	15	11	17	14	11	12	30	10	18	13	10	11	30		
27-Mar	12	12	44	24	13	8	8	8	19	13	14	15	16	17	13	11	13	8	10	14	32	33	63	48	63		
28-Mar	57	73	84	21	15	11	6	12	16	13	17	18	11	11	10	10	11	11	9	9	8	6	8	5	84		
29-Mar	5	7	40	19	13	15	10	13	28	20	20	14	15	30	11	13	15	42	64	46	6	11	19	17	64		
30-Mar	18	4	17	22	39	21	46	47	70	52	53	45	20	15	34	31	16	11	32	12	37	39	8	12	70		
31-Mar	6	8	7	12	11	10	9	22	39	45	27	81	17	16	14	10	12	10	10	11	12	13	9	10	81		
														Diurnal Maximum													
														98 73 84 90 59 93 84 55 85 58 67 81 86 57 46 61 66 42 64 46 37 97 74 59													
MS - Missing																											



WBEA
Hourly Averages

Wind Direction 20 m (WD20m) - deg
Mannix - March 2015





Direction of Maximum Speed: 354 deg on Mar 2 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 332.0 deg on Mar 2	Hours of Data: 732
Direction of Minimum Speed: 114 deg on Mar 5 10:00	Direction of Minimum Daily Speed Average: 1.2 deg on Mar 30
Direction of Minimum Speed: 114 deg on Mar 5 10:00	Hours of Missing Data: 12
Monthly Average Direction: 271.0 deg	Percent Operational Time: 98.4

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	38	22	70	166	156	161	159	153	154	150	154	140	145	155	160	175	178	173	166	172	182	215	282	325	168.0	
2-Mar	338	349	354	348	345	331	330	336	339	345	329	324	330	335	327	328	324	326	330	308	299	309	331	299	332.0	
3-Mar	281	291	287	308	4	338	349	2	355	350	355	348	338	332	340	12	33	32	32	47	62	119	156	167	344.0	
4-Mar	159	163	155	154	151	154	153	157	147	144	146	143	144	150	156	159	174	207	218	194	168	166	164	262	162.5	
5-Mar	256	270	277	274	284	254	255	262	268	114	150	126	134	116	105	118	134	143	156	175	210	254	252	244	239.3	
6-Mar	230	45	269	255	313	287	279	292	333	19	14	353	343	336	310	18	78	31	22	22	43	9	337	274	332.9	
7-Mar	313	302	94	180	175	253	271	273	274	278	288	286	277	284	286	283	302	294	291	279	273	313	327	257	281.3	
8-Mar	254	249	241	231	202	181	166	170	159	161	224	225	197	172	216	234	216	213	206	203	223	232	226	247	210.7	
9-Mar	273	264	177	206	251	271	281	296	282	283	287	316	296	333	289	324	322	326	332	317	321	328	319	333	301.7	
10-Mar	11	11	23	17	27	25	17	33	33	28	24	3	37	19	337	334	356	2	1	7	14	15	12	14	14.0	
11-Mar	13	11	5	7	3	3	6	6	357	6	358	359	353	349	355	345	348	357	347	349	3	337	334	320	357.7	
12-Mar	323	340	297	284	315	349	295	188	231	161	174	150	160	180	154	156	136	146	79	109	147	149	162	211	166.3	
13-Mar	233	243	256	260	252	245	210	214	237	249	237	217	215	207	185	164	164	171	173	167	163	157	161	169	199.3	
14-Mar	159	158	152	145	145	143	134	144	156	153	153	135	136	130	135	143	157	166	207	254	249	255	246	282	172.3	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	306	324	331	333	348	77	131	162	174	180	188	185	--
16-Mar	349	4	6	345	338	348	15	3	359	30	56	43	1	27	45	68	326	335	342	357	357	356	359	343	0.6	
17-Mar	314	317	337	129	150	147	156	167	177	155	147	145	152	113	94	90	81	91	95	118	130	150	102	26	134.6	
18-Mar	90	264	239	183	184	194	148	162	144	152	136	123	73	340	347	15	3	1	9	11	360	347	357	349	5.8	
19-Mar	348	343	353	352	358	3	12	15	18	331	318	339	351	12	17	19	10	11	15	17	24	39	50	52	9.6	
20-Mar	70	41	44	103	98	132	78	170	238	55	346	50	257	259	297	307	333	2	12	12	11	16	36	78	12.6	
21-Mar	93	89	86	100	105	110	118	113	93	86	99	104	97	102	106	97	107	111	115	121	94	101	98	122	102.7	
22-Mar	130	133	135	146	137	130	134	139	138	136	143	128	140	132	129	148	173	174	195	147	98	99	120	168	140.1	
23-Mar	176	166	153	151	161	159	159	164	183	219	270	263	37	25	47	337	13	30	47	39	14	5	5	8	67.4	
24-Mar	11	6	9	358	341	348	347	13	22	22	3	326	314	314	299	281	114	140	94	79	98	88	105	112	10.5	
25-Mar	155	140	128	114	97	113	115	111	106	131	124	94	136	129	118	134	139	158	158	165	154	150	148	144	136.4	
26-Mar	127	131	130	128	131	134	138	133	132	137	133	133	128	133	128	129	129	133	202	216	204	175	154	152	141.6	
27-Mar	169	165	159	143	173	171	163	169	152	151	147	173	150	135	134	156	146	142	150	151	166	171	253	177	157.4	
28-Mar	205	192	296	290	293	289	288	283	273	252	289	303	311	292	296	296	285	296	295	299	284	265	267	257	286.8	
29-Mar	259	257	240	203	207	167	160	155	149	129	129	130	136	136	143	139	124	120	98	200	224	230	272	285	188.5	
30-Mar	273	267	296	10	347	16	188	186	243	74	270	65	90	104	87	55	129	135	142	136	162	234	167	160	126.2	
31-Mar	164	159	163	159	141	134	134	151	148	147	25	37	40	56	59	58	54	35	34	39	32	20	10	9	63.1	

295.0 314.3 317.4 275.9 198.0 192.8 173.8 174.5 160.2 119.6 294.6 16.3 2.8 25.1 7.8 44.5 74.2 56.4 18.4 8.6 296.8 308.8 303.2 295.7

Diurnal Average

MS - Missing

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



Summary of Hour Standard Deviations

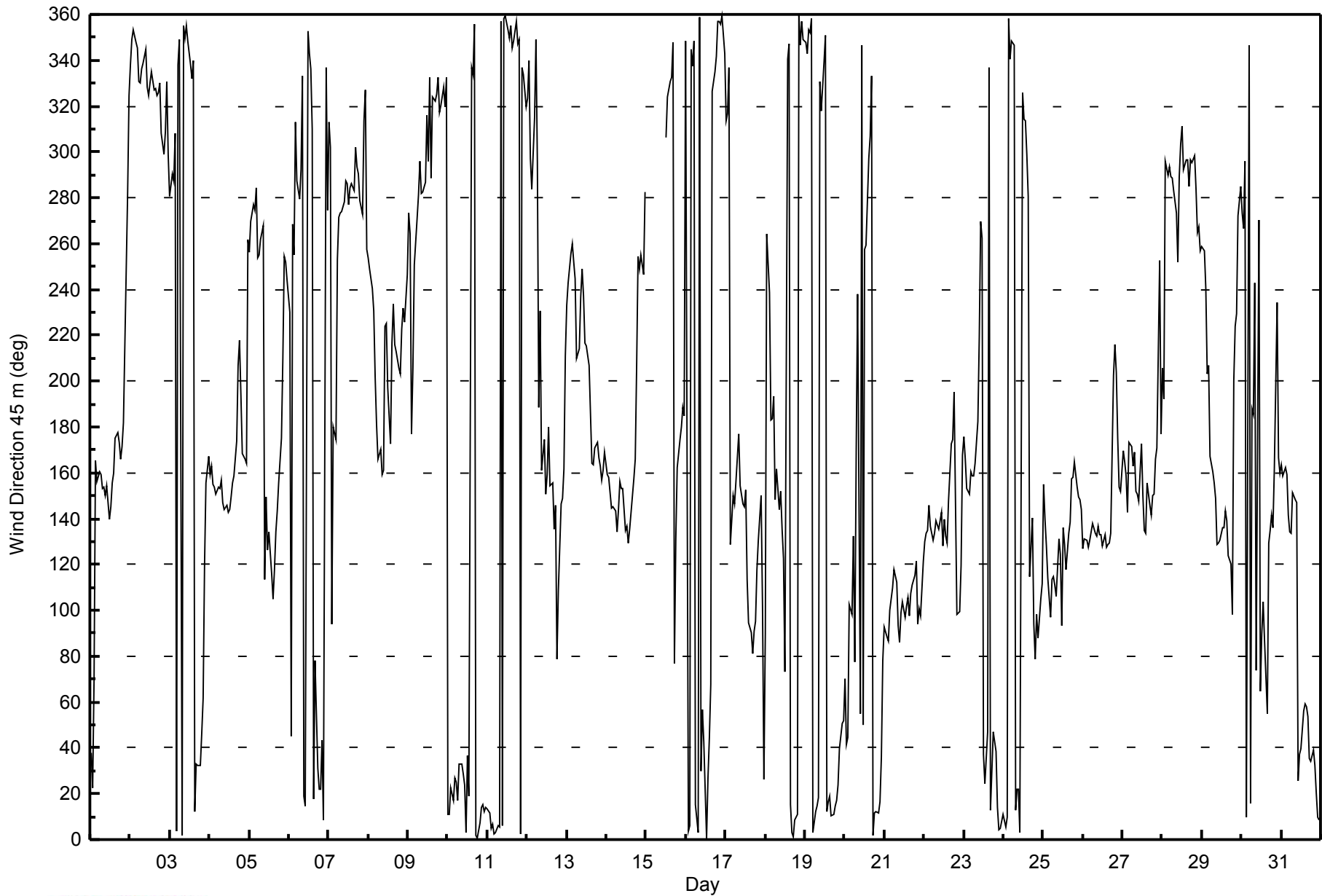
Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																								
Maximum Value: 95 deg on Mar 5 10:00														Hours of Data: 732																								
Minimum Value: 2 deg on Mar 4 22:00														Hours of Missing Data: 12																								
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 17 P ₉₀ = 30 P ₉₉ = 77														Hours of Calibration: 0																								
														Percent Operational Time: 98.4																								
Day	Hourly Period Ending At (MST)																								Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24														
1-Mar	11	15	63	33	7	4	7	6	8	7	9	9	7	8	12	9	7	6	5	6	11	21	22	11	63													
2-Mar	11	10	8	8	13	11	10	11	12	10	12	11	12	10	11	10	9	10	9	10	6	16	16	24	24													
3-Mar	6	4	5	29	12	11	12	9	9	10	13	13	12	12	12	27	12	11	9	7	16	21	7	2	29													
4-Mar	6	8	7	8	6	5	5	4	6	7	8	9	7	9	8	7	14	13	9	12	4	2	9	31	31													
5-Mar	7	3	7	7	8	9	6	9	82	95	55	12	13	25	15	14	5	5	4	14	11	9	6	4	95													
6-Mar	54	52	17	5	37	23	4	10	15	11	13	29	44	50	19	58	18	13	9	7	14	26	73	29	73													
7-Mar	6	11	54	37	19	22	6	5	7	9	7	8	8	7	7	8	10	5	10	5	6	15	11	12	54													
8-Mar	6	7	11	8	9	10	6	10	8	11	25	13	14	23	34	7	10	4	4	9	5	3	5	11	34													
9-Mar	8	29	21	28	14	16	15	14	5	6	6	27	22	15	16	20	10	11	13	14	9	8	10	23	29													
10-Mar	10	11	9	12	12	9	7	11	12	13	23	45	38	52	28	21	18	8	9	7	6	8	5	5	52													
11-Mar	6	5	7	6	7	7	5	8	7	8	13	9	12	11	14	10	9	14	11	13	13	11	10	9	14													
12-Mar	15	22	17	24	19	39	34	59	39	28	17	12	28	14	9	8	17	16	45	17	10	9	7	17	59													
13-Mar	12	12	6	5	7	13	17	14	13	8	11	11	9	11	12	11	6	6	5	5	5	8	8	6	17													
14-Mar	6	6	5	6	5	8	8	8	17	15	11	12	13	9	6	7	11	9	24	15	7	5	4	44	44													
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	12	16	28	24	38	28	14	9	5	3	6	6	38													
16-Mar	55	12	9	14	11	13	16	8	13	18	25	34	47	28	34	18	59	7	8	6	8	8	7	8	59													
17-Mar	34	63	30	27	9	7	5	24	14	16	12	15	17	26	22	14	14	10	8	6	7	73	70	37	73													
18-Mar	80	14	23	35	17	17	20	10	17	22	24	19	38	20	15	9	11	10	8	9	12	8	11	10	80													
19-Mar	11	12	14	11	7	12	8	10	21	38	16	38	28	18	12	9	8	9	6	5	9	8	10	12	38													
20-Mar	12	36	18	29	14	21	60	54	84	55	64	42	77	24	26	14	19	14	6	6	6	6	18	23	84													
21-Mar	18	10	10	4	6	11	13	13	9	15	15	11	11	12	14	12	15	12	15	13	9	10	9	15	18													
22-Mar	6	7	11	9	10	6	8	10	10	16	23	22	25	18	40	13	33	34	43	24	11	24	24	9	43													
23-Mar	14	4	7	13	6	11	9	8	15	53	21	25	57	18	31	22	21	12	11	11	11	5	6	5	57													
24-Mar	4	9	8	12	12	11	13	14	9	18	19	15	11	17	23	34	36	14	20	14	6	10	10	14	36													
25-Mar	16	11	14	15	14	10	11	12	12	13	18	25	15	15	25	16	15	14	8	6	6	8	9	9	25													
26-Mar	9	7	6	6	7	6	8	7	7	9	11	9	13	7	12	10	6	8	25	8	9	11	8	6	25													
27-Mar	8	7	16	13	8	4	6	6	17	10	11	10	15	12	9	10	11	5	6	9	18	17	77	30	77													
28-Mar	45	55	41	11	8	7	3	8	8	11	14	17	9	9	8	8	10	8	7	6	10	3	6	3	55													
29-Mar	2	4	14	17	7	21	6	11	26	18	16	10	10	18	8	13	13	21	34	36	8	8	15	9	36													
30-Mar	15	3	17	17	27	16	54	29	67	78	40	45	18	13	34	28	12	9	12	10	27	66	16	8	78													
31-Mar	7	4	4	5	9	6	4	16	30	24	21	62	14	12	10	8	10	8	7	8	9	10	5	5	62													
														80	63	63	37	37	39	60	59	84	95	64	62	77	52	40	58	59	34	45	36	27	73	77	44	
														Diurnal Maximum																								
MS - Missing																																						



WBEA
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Mannix - March 2015





Summary of Hour Averages

Mannix - March 2015

Direction of Maximum Speed: 355 deg on Mar 2 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 333.3 deg on Mar 2	Hours of Data: 732
Direction of Minimum Speed: 335 deg on Mar 17 02:00	Hours of Missing Data: 12
Direction of Minimum Daily Speed Average: 0.1 deg on Mar 30	Percent Operational Time: 98.4
Monthly Average Direction: 265.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	41	29	72	144	160	163	164	158	159	153	158	149	148	157	163	175	178	175	168	174	186	217	281	326	169.7
2-Mar	339	351	355	350	347	333	331	338	339	345	329	327	331	335	328	328	326	327	332	310	301	309	326	305	333.3
3-Mar	289	298	290	309	5	345	351	2	358	352	358	350	339	335	342	12	31	34	35	50	65	114	148	156	346.7
4-Mar	160	169	171	169	164	166	163	165	155	152	155	150	150	154	158	160	177	207	216	195	178	179	200	266	169.8
5-Mar	260	273	279	282	291	266	258	268	275	295	264	154	150	140	117	124	139	148	160	183	226	272	262	250	252.8
6-Mar	246	357	264	256	289	291	292	307	337	20	16	358	349	340	316	19	74	33	27	29	50	22	40	269	334.2
7-Mar	299	279	266	244	229	264	272	273	273	277	286	287	277	285	285	283	302	295	295	282	277	310	318	277	281.7
8-Mar	265	253	249	241	227	207	197	204	186	190	233	229	200	184	224	233	221	220	218	216	232	239	238	254	225.4
9-Mar	270	276	195	244	258	276	294	299	285	284	288	318	296	333	292	325	322	326	336	323	322	334	322	336	303.9
10-Mar	11	12	23	17	26	26	18	33	33	29	24	7	38	24	345	339	3	5	4	10	17	18	15	17	16.1
11-Mar	24	21	10	18	13	9	12	17	5	13	4	3	357	354	358	351	355	2	356	357	5	342	340	327	4.6
12-Mar	326	346	312	306	323	330	327	154	197	153	170	150	156	176	155	157	143	151	134	123	148	164	186	230	168.3
13-Mar	234	242	254	258	253	247	223	227	241	249	236	217	215	207	186	166	166	172	174	169	168	164	165	172	203.3
14-Mar	164	162	150	138	140	139	136	139	154	161	163	146	143	138	145	153	166	176	206	252	249	254	246	281	174.9
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	306	324	329	332	345	70	128	155	171	176	185	197	--
16-Mar	339	5	8	352	340	356	19	6	1	29	49	42	356	30	49	63	335	344	349	4	5	6	7	359	4.6
17-Mar	336	335	96	141	147	141	151	151	160	151	148	149	156	134	118	105	94	99	106	131	134	152	214	66	139.5
18-Mar	164	189	199	155	167	165	150	148	139	157	144	124	84	348	353	18	7	3	9	10	2	350	359	352	15.4
19-Mar	352	347	356	353	360	5	11	14	22	332	322	342	353	14	19	20	13	14	16	19	27	42	54	58	13.0
20-Mar	79	84	70	136	106	129	124	177	205	55	21	56	257	256	300	310	336	7	15	16	14	29	73	107	24.0
21-Mar	105	93	94	102	109	115	117	112	98	91	101	105	97	100	107	97	107	112	118	122	94	102	101	124	104.4
22-Mar	132	134	137	144	137	131	135	139	138	136	140	128	139	131	129	145	170	172	188	140	103	100	127	170	140.8
23-Mar	177	167	160	159	167	159	161	165	182	223	262	269	34	26	49	341	15	32	48	41	17	7	8	12	92.9
24-Mar	17	11	18	8	353	359	357	17	24	22	2	328	316	315	302	285	108	138	92	81	97	91	102	118	16.8
25-Mar	159	151	139	122	105	116	117	109	112	131	123	98	135	128	118	133	139	158	157	162	154	151	146	143	140.2
26-Mar	130	133	134	132	131	133	137	136	134	140	135	135	131	135	129	130	131	140	206	216	205	187	159	157	146.7
27-Mar	168	160	158	149	169	170	165	175	161	156	154	174	151	141	142	155	148	143	152	153	162	166	195	178	159.4
28-Mar	188	208	308	308	309	308	305	296	289	261	291	305	313	293	297	297	285	298	297	300	290	274	275	261	290.1
29-Mar	262	260	255	233	221	198	161	162	155	139	134	135	140	141	144	141	127	124	121	206	233	242	276	292	204.8
30-Mar	285	275	296	10	359	4	254	277	250	47	278	67	92	102	88	51	131	138	146	146	183	246	231	196	284.8
31-Mar	174	166	176	168	149	145	140	145	140	149	56	38	51	60	62	61	58	40	38	42	36	24	13	12	68.7

278.2 295.5 297.0 275.0 249.4 234.0 192.7 179.8 186.6 170.0 266.0 348.5 40.0 18.9 350.6 46.3 78.8 54.7 17.5 4.1 275.4 291.8 284.5 290.1
Diurnal Average

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

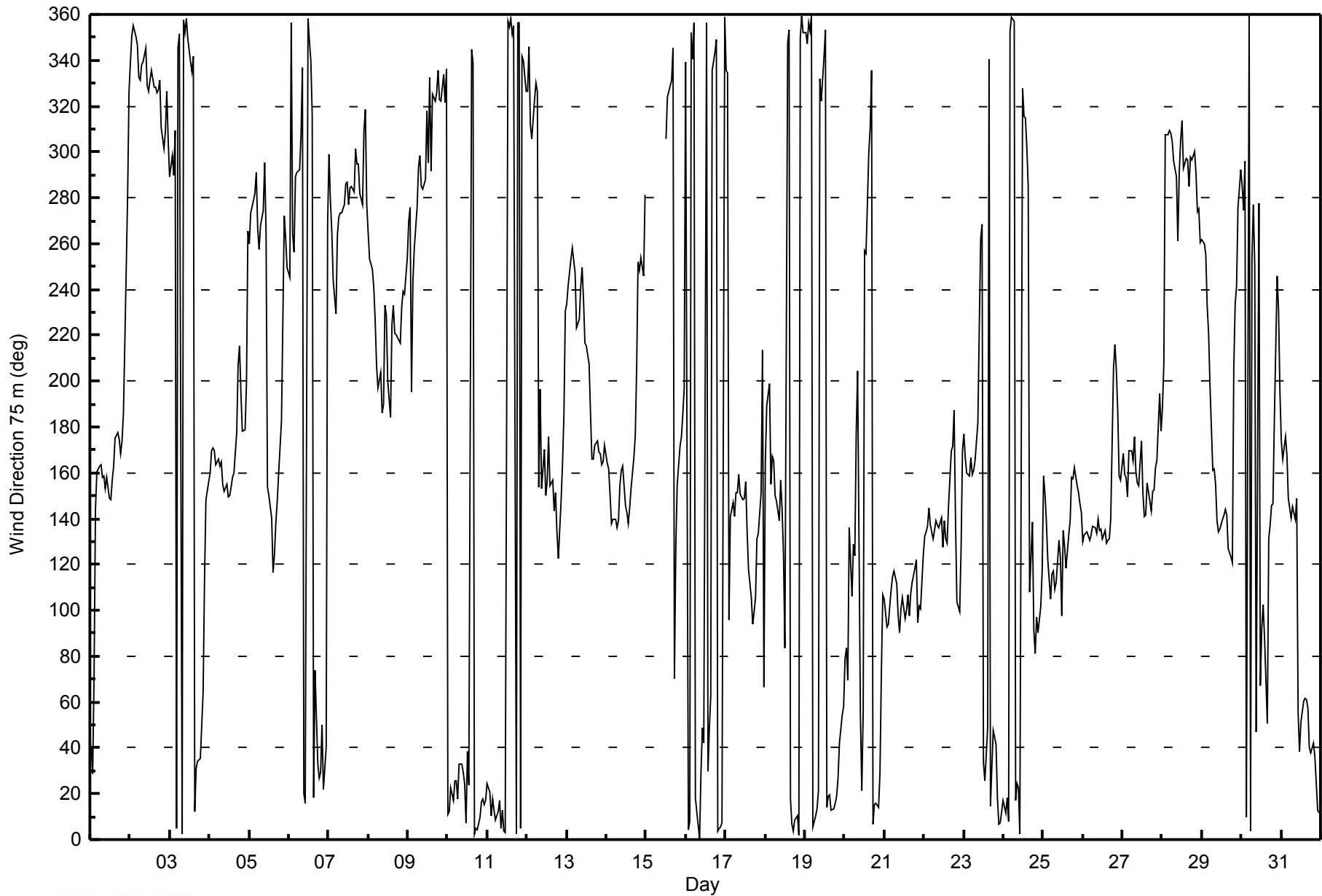


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																								
Maximum Value: 96 deg on Mar 17 02:00														Hours of Data: 732																								
Minimum Value: 2 deg on Mar 23 02:00														Hours of Missing Data: 12																								
Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 15 P ₉₀ = 27 P ₉₉ = 74														Hours of Calibration: 0																								
														Percent Operational Time: 98.4																								
Day	Hourly Period Ending At (MST)																								Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24														
1-Mar	5	5	36	21	7	3	4	3	5	5	7	8	5	7	10	8	6	5	4	6	9	20	22	9	36													
2-Mar	10	9	7	6	12	10	8	9	11	8	11	9	10	9	9	9	7	8	8	10	5	14	12	15	15													
3-Mar	8	3	6	29	10	8	10	7	8	8	13	12	12	11	24	10	8	7	6	13	19	8	3	29														
4-Mar	5	2	4	7	3	3	2	2	4	4	7	7	6	7	6	13	13	7	10	4	4	23	16	23														
5-Mar	6	2	5	6	5	9	3	6	15	25	48	24	13	37	18	13	5	3	5	14	11	10	4	48														
6-Mar	18	38	13	4	25	8	9	12	17	6	10	27	41	37	19	52	15	11	8	7	12	25	61	48														
7-Mar	8	12	53	31	12	10	5	5	7	9	7	8	7	6	7	8	9	5	9	6	6	13	9	10														
8-Mar	7	6	9	5	9	11	11	8	13	19	12	10	14	12	27	7	8	4	5	7	3	3	2	7														
9-Mar	5	13	26	13	13	13	10	12	5	6	5	26	21	14	15	19	9	11	12	9	8	6	8	20														
10-Mar	10	9	7	11	10	8	6	10	10	12	21	42	35	42	28	24	17	6	7	5	5	6	4	5														
11-Mar	6	9	7	7	8	7	7	10	5	6	11	7	10	10	10	9	8	12	11	12	9	11	10	9														
12-Mar	14	25	20	21	13	29	39	38	31	16	15	11	22	11	8	7	11	12	28	13	10	7	18	8														
13-Mar	7	7	5	4	6	9	14	10	10	7	10	9	8	10	11	10	6	6	4	4	4	8	6	5														
14-Mar	5	4	6	4	3	4	5	4	12	11	8	10	13	8	6	5	9	7	22	13	6	4	4	45														
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	11	15	27	20	37	32	14	10	6	4	4	7														
16-Mar	67	10	7	14	11	13	13	9	12	17	29	28	65	26	30	19	50	7	7	4	5	4	5	18														
17-Mar	26	96	60	10	6	7	5	12	8	15	10	10	13	19	20	14	14	12	14	10	8	14	94	53														
18-Mar	70	32	27	9	7	9	14	11	10	12	19	17	30	20	12	7	8	9	6	8	10	7	10	9														
19-Mar	10	10	12	11	6	8	7	8	20	40	17	34	28	16	10	8	7	8	4	3	7	5	6	10														
20-Mar	9	48	25	17	18	11	21	14	59	77	70	34	76	36	24	16	19	13	4	4	5	10	20	19														
21-Mar	18	7	8	10	12	13	12	13	11	15	16	13	11	12	14	13	16	13	15	14	10	12	11	15														
22-Mar	7	8	11	8	9	8	8	9	9	13	20	18	20	16	35	12	31	31	38	22	14	19	22	6														
23-Mar	12	2	6	8	3	8	6	5	9	40	17	31	64	15	28	22	18	11	9	9	10	4	4	4														
24-Mar	4	5	7	12	9	8	12	12	7	17	19	14	10	15	23	35	36	13	20	11	9	9	13	18														
25-Mar	10	9	11	15	13	12	12	13	13	13	19	22	14	15	23	16	13	13	6	7	4	6	6	7														
26-Mar	9	7	6	7	7	6	7	6	8	8	12	9	12	7	13	10	8	9	17	8	5	11	7	5														
27-Mar	8	6	11	10	6	2	4	4	14	8	10	9	14	10	10	8	9	4	4	6	7	10	56	19														
28-Mar	18	41	16	7	5	5	5	7	7	12	13	18	9	8	7	7	10	7	6	4	9	5	8	3														
29-Mar	2	4	7	19	8	28	4	7	20	18	15	10	8	12	6	11	15	15	17	25	10	6	13	7														
30-Mar	12	5	18	14	19	5	64	94	87	83	38	40	18	14	35	27	14	10	9	6	21	20	26	19														
31-Mar	13	4	6	5	7	4	3	10	23	18	25	41	13	9	8	6	9	6	7	6	7	9	5	4														
														70	96	60	31	25	29	64	94	87	83	70	42	76	42	35	52	50	32	38	25	21	25	94	53	
Diurnal Maximum																																						
MS - Missing																																						



WBEA
Hourly Averages

Wind Direction 75 m (WD75m) - deg
Mannix - March 2015





Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 96 deg on Mar 30 10:00			Hours of Data:	731
Minimum Value: 2 deg on Mar 31 06:00			Hours of Missing Data:	13
			Hours of Calibration:	0
			Percent Operational Time:	98.3
Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 14 P ₉₀ = 26 P ₉₉ = 63				

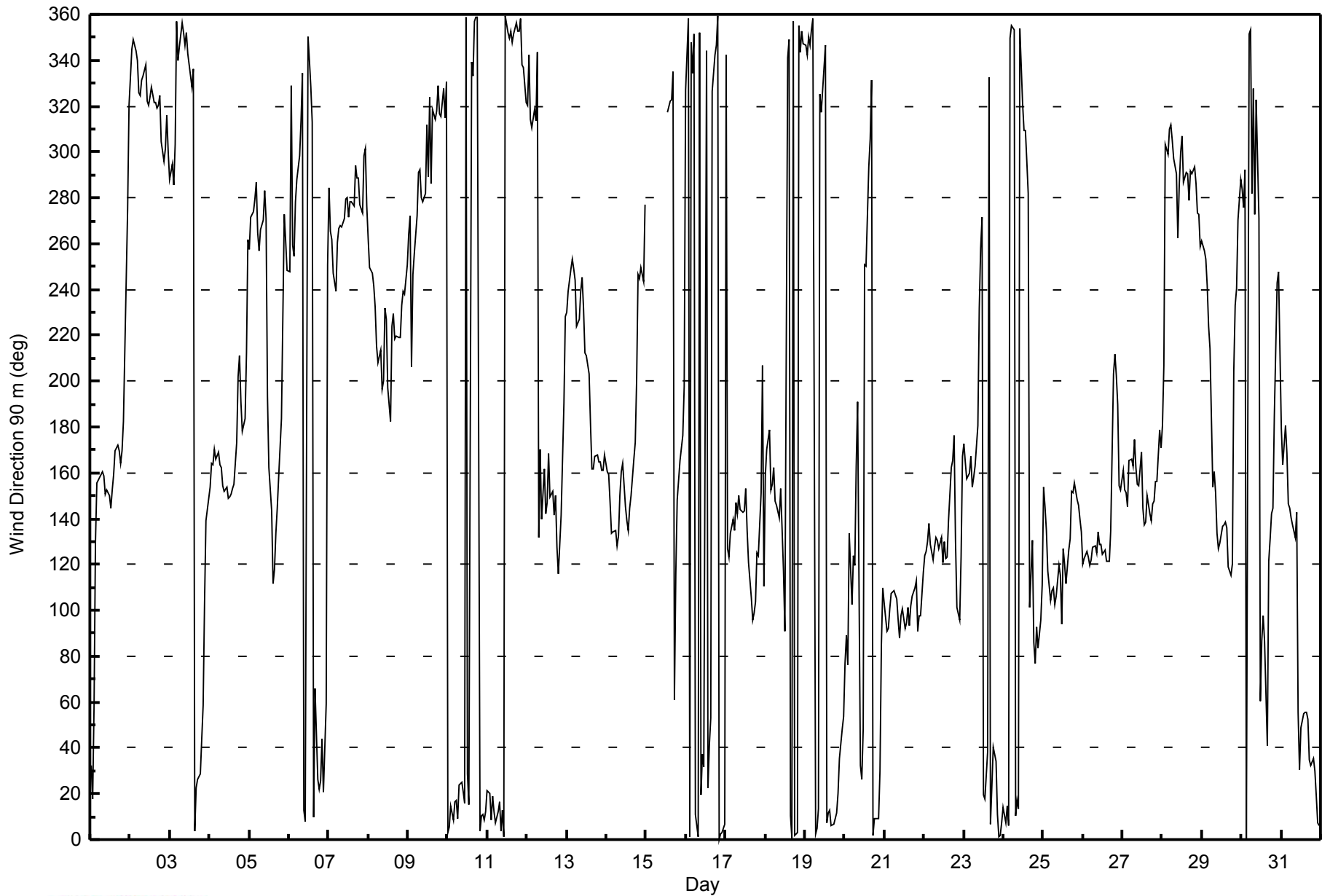
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	4	6	38	12	8	2	3	3	4	6	5	7	4	7	10	8	6	4	4	5	9	20	20	8	38
2-Mar	9	9	7	6	12	9	8	9	10	7	10	9	10	9	9	8	7	8	7	10	5	13	11	13	13
3-Mar	8	3	6	28	9	8	9	6	7	8	13	11	11	11	11	23	9	7	7	7	12	16	7	3	28
4-Mar	6	4	3	3	5	3	2	2	3	3	6	6	5	7	6	5	13	13	7	9	4	7	22	14	22
5-Mar	5	2	5	5	3	9	4	5	4	14	16	32	17	46	16	12	7	2	6	15	12	9	11	4	46
6-Mar	9	33	11	4	17	6	10	12	17	5	10	25	35	32	20	48	14	11	7	7	11	24	65	49	65
7-Mar	6	9	19	19	9	7	5	5	7	8	6	8	7	6	7	8	8	5	9	6	5	10	5	8	19
8-Mar	6	5	7	5	8	12	12	8	14	19	9	10	14	8	23	7	8	4	5	6	2	3	2	5	23
9-Mar	5	10	31	11	12	12	9	10	5	6	5	24	19	13	15	19	8	10	11	7	8	5	8	20	31
10-Mar	9	9	6	10	9	7	6	9	10	12	19	40	37	41	26	23	15	6	6	5	4	5	4	5	41
11-Mar	6	9	8	7	9	9	8	10	5	7	11	6	10	9	9	8	7	10	11	11	8	12	10	8	12
12-Mar	14	26	25	31	11	27	41	27	21	10	13	12	23	11	7	6	11	14	32	11	10	9	21	7	41
13-Mar	5	6	4	4	5	8	13	10	9	6	10	9	8	11	11	10	6	6	4	4	4	7	6	5	13
14-Mar	4	4	6	5	4	4	4	6	16	11	8	11	14	8	9	4	7	6	21	12	5	3	4	43	43
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	AF	16	27	20	36	35	10	11	6	4	3	11	36
16-Mar	42	9	6	13	12	12	12	9	13	18	33	26	56	24	28	20	44	8	7	3	4	3	4	22	56
17-Mar	29	59	36	7	6	5	7	7	6	14	8	8	12	16	15	12	9	8	10	5	5	12	23	51	59
18-Mar	57	18	14	7	5	6	9	8	8	9	20	16	32	37	11	6	7	8	6	7	10	6	9	8	57
19-Mar	9	9	11	11	6	7	6	8	22	39	18	34	27	15	9	7	7	7	3	3	6	4	5	11	39
20-Mar	9	42	23	14	14	10	15	13	59	76	72	37	76	37	24	15	18	12	4	4	5	12	16	14	76
21-Mar	14	7	6	5	5	6	7	8	8	14	14	12	11	10	12	12	13	9	12	10	9	10	9	13	14
22-Mar	4	6	11	8	9	5	8	10	9	13	22	21	23	16	38	12	31	31	38	18	10	16	21	5	38
23-Mar	12	3	5	8	5	6	5	5	7	35	19	30	59	15	31	21	17	10	8	8	10	4	4	4	59
24-Mar	4	5	6	13	8	7	11	12	7	15	19	13	9	14	22	33	41	15	18	10	6	6	6	15	41
25-Mar	7	8	9	8	7	5	5	8	7	12	22	26	14	15	24	17	14	12	6	6	3	5	6	8	26
26-Mar	5	5	4	4	4	4	6	5	7	8	12	8	13	7	12	10	6	12	14	8	5	13	8	3	14
27-Mar	11	6	10	10	8	3	4	3	11	7	9	9	14	9	9	8	9	4	4	5	6	7	42	15	42
28-Mar	13	37	12	5	4	9	8	5	6	11	13	17	9	7	7	7	10	7	6	4	7	5	8	3	37
29-Mar	3	3	4	15	9	28	5	6	20	20	13	10	8	12	6	10	14	10	15	21	10	5	11	6	28
30-Mar	9	5	18	13	15	4	48	68	80	96	37	41	26	12	35	27	12	8	10	7	21	14	16	19	96
31-Mar	16	5	9	9	5	2	4	8	19	16	31	30	13	8	8	6	8	6	7	6	7	8	5	4	31
Diurnal Maximum																									
57 59 38 31 17 28 48 68 80 96 72 41 76 46 38 48 44 35 38 21 21 24 65 51																									

AF - Analyzer Failure MS - Missing



WBEA
Hourly Averages

Wind Direction 90 m (WD90m) - deg
Mannix - March 2015





Summary of Hour Averages

Mannix - March 2015

Maximum Value: 0.9 km/h on Mar 13 21:00		Maximum Daily Average: 0.3 km/h on Mar 4		Hours in Service: 744																							
Minimum Value: -1.5 km/h on Mar 2 03:00		Minimum Daily Average: -0.7 km/h on Mar 2		Hours of Data: 732																							
Maximum Diurnal Average: 0.0 km/h at hour 16		Minimum Diurnal Average: -0.1 km/h at hour 3		Hours of Missing Data: 12																							
Monthly Average: -0.03 km/h		Percentiles: P ₁ = -1.0 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.2 P ₉₀ = 0.3 P ₉₉ = 0.7		Hours of Calibration: 0																							
				Percent Operational Time: 98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	-0.1	-0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.5	0.4	0.5	0.4	0.3	0.6	0.6	0.3	0.1	0.3	0.7	0.4	0.2	-0.1	-0.3	-0.7	0.2	0.7	
2-Mar	-0.9	-1.0	-1.5	-1.0	-1.0	-1.0	-1.0	-0.7	-0.8	-0.7	-0.6	-0.7	-0.9	-0.8	-0.7	-0.8	-0.7	-1.0	-0.3	-0.5	-0.3	-0.2	-0.1	-0.1	-0.7	-0.1	
3-Mar	-0.2	-0.2	-0.4	-0.5	-0.2	-0.3	-0.4	-0.1	-0.7	-0.5	-0.1	-0.5	-0.5	-0.4	-0.5	0.2	0.3	0.2	0.0	0.1	0.2	0.1	-0.1	0.1	-0.2	0.3	
4-Mar	0.3	0.4	0.4	0.2	0.4	0.5	0.5	0.4	0.4	0.2	0.2	0.3	0.1	0.4	0.6	0.6	0.3	-0.3	-0.4	0.0	0.4	0.5	0.2	0.0	0.3	0.6	
5-Mar	-0.4	-0.1	-0.2	-0.3	-0.2	-0.4	-0.5	-0.5	-0.5	0.0	0.2	0.5	0.2	0.4	0.2	0.3	0.4	0.2	0.3	0.3	0.1	-0.2	-0.1	-0.1	0.0	0.5	
6-Mar	0.0	0.1	-0.4	-0.4	-0.1	-0.4	-0.3	-0.2	0.0	-0.1	-0.3	0.0	0.2	0.1	-0.2	0.0	0.2	0.0	-0.1	-0.2	0.1	0.0	0.0	0.0	-0.1	0.2	
7-Mar	0.0	0.0	0.1	0.1	0.1	-0.1	-0.3	-0.2	-0.1	-0.2	-0.3	-0.2	-0.2	-0.2	-0.3	-0.2	-0.2	-0.2	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	-0.2	0.1	
8-Mar	0.0	-0.1	-0.2	-0.2	-0.1	0.2	0.1	0.2	0.3	0.1	-0.2	-0.1	0.1	0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	0.0	0.3	
9-Mar	0.0	0.1	0.0	0.1	-0.3	-0.1	-0.2	-0.2	-0.1	-0.3	-0.2	-0.2	-0.2	-0.1	-0.3	-0.4	-0.5	-0.3	-0.5	-0.2	-0.5	-0.4	-0.5	-0.2	-0.2	0.1	
10-Mar	-0.2	-0.6	0.1	0.0	0.0	0.1	-0.3	0.2	0.2	-0.1	0.0	0.1	0.2	0.2	0.0	-0.1	-0.1	-0.5	-0.5	-0.6	-0.6	-0.4	-0.5	-0.4	-0.2	0.2	
11-Mar	-0.4	-0.2	-0.5	-0.3	-0.5	-0.1	-0.6	-0.3	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.4	-0.3	-0.2	-0.1	-0.2	-0.5	-0.2	-0.2	-0.3	-0.1	
12-Mar	-0.3	-0.1	0.0	0.0	0.1	0.0	-0.1	0.0	0.0	-0.1	0.3	0.4	0.3	0.2	0.4	0.4	0.2	0.2	0.0	0.1	0.2	0.3	0.3	0.0	0.1	0.4	
13-Mar	0.0	-0.1	-0.3	-0.4	-0.6	-0.2	-0.1	-0.1	-0.3	-0.4	-0.2	-0.3	-0.4	-0.1	0.1	0.5	0.7	0.5	0.3	0.8	0.9	0.7	0.7	0.6	0.1	0.9	
14-Mar	0.6	0.7	0.3	0.4	0.3	0.4	0.2	0.3	0.3	0.4	0.4	0.3	0.2	0.3	0.2	0.4	0.4	-0.3	-0.3	-0.4	-0.5	-0.3	-0.4	-0.4	0.2	0.7	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-0.5	-0.5	0.1	-0.1	0.0	0.1	0.2	0.2	0.0	0.0	-0.1	0.0	--	0.2
16-Mar	-0.3	-0.3	-0.5	-0.3	-0.3	-0.3	0.0	-0.3	0.0	0.3	0.0	0.3	0.3	-0.1	0.1	0.1	-0.1	-0.4	-0.4	-0.4	-0.2	-0.2	-0.3	-0.1	-0.1	0.3	
17-Mar	-0.1	-0.1	-0.1	0.1	-0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.4	0.2	0.0	0.1	0.2	0.1	0.2	0.2	0.0	-0.1	0.0	0.1	0.4	
18-Mar	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.3	0.2	0.0	0.0	0.5	0.5	0.0	0.0	-0.3	-0.1	-0.2	-0.5	-0.6	-0.8	-0.3	-0.6	-0.6	-0.5	-0.1	0.5	
19-Mar	-0.3	-0.4	-0.5	-0.3	-0.4	-0.2	-0.1	-0.4	-0.1	0.2	-0.2	0.1	0.2	-0.1	-0.2	-0.3	-0.5	-0.6	-0.5	-0.6	-0.1	0.4	0.1	0.2	-0.2	0.4	
20-Mar	0.2	-0.1	0.0	0.1	0.1	-0.1	0.0	-0.2	-0.1	0.0	-0.1	0.0	0.3	-0.2	-0.3	-0.2	-0.1	-0.3	-0.4	-0.4	-0.4	-0.4	-0.2	0.0	-0.1	0.3	
21-Mar	0.1	0.4	0.4	0.2	0.2	0.2	0.2	0.3	0.1	0.0	0.3	0.2	0.1	0.1	0.4	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.4	0.1	0.2	0.4	
22-Mar	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.0	0.3	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.3	
23-Mar	0.0	0.2	0.2	0.2	0.4	0.3	0.2	0.3	0.0	0.1	-0.2	0.0	-0.1	0.1	0.2	-0.2	0.1	0.0	0.2	0.0	-0.3	-0.5	-0.5	-0.5	0.0	0.4	
24-Mar	-0.3	-0.3	-0.3	-0.3	-0.3	-0.1	-0.3	-0.3	-0.1	-0.2	0.0	-0.3	-0.3	-0.4	-0.2	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	-0.1	0.2	
25-Mar	0.1	0.2	0.2	0.1	0.2	0.1	0.0	0.3	0.2	0.1	0.5	0.4	0.2	0.3	0.2	0.1	0.2	0.2	0.4	0.4	0.5	0.4	0.2	0.2	0.2	0.5	
26-Mar	0.1	0.2	0.1	0.0	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.4	0.0	0.3	0.4	0.0	0.2	0.0	-0.2	-0.1	0.2	0.4	0.3	0.1	0.4	
27-Mar	0.1	0.2	0.1	0.2	0.1	0.3	0.4	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.5	0.3	0.3	0.3	0.3	0.2	0.1	-0.1	0.1	0.2	0.5	
28-Mar	0.0	0.0	0.0	-0.1	0.0	-0.2	-0.1	-0.1	-0.1	-0.3	-0.2	-0.5	-0.5	-0.2	-0.6	-0.5	-0.4	-0.4	-0.5	-0.4	-0.1	-0.3	-0.4	-0.5	-0.3	0.0	
29-Mar	-0.5	-0.3	-0.1	0.0	-0.1	0.2	0.5	0.3	0.3	0.3	0.5	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.0	-0.1	-0.3	-0.2	-0.1	-0.2	0.1	0.5
30-Mar	-0.1	-0.2	-0.3	-0.1	-0.2	0.0	-0.2	0.3	0.0	0.0	0.1	0.0	0.2	0.0	0.4	0.0	0.2	0.0	0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.4	
31-Mar	0.2	0.5	0.4	0.3	0.3	0.3	0.3	0.1	0.1	0.1	-0.1	0.0	-0.1	0.4	0.2	0.5	0.3	0.0	0.0	0.0	0.1	-0.3	-0.8	-0.5	0.1	0.5	
																								Diurnal Average			
																								Diurnal Maximum			
MS - Missing																											



Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.4 km/h on Mar 2 03:00 Minimum Value: 0.1 km/h on Mar 18 03:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 2.0 P ₉₉ = 3.2																								Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4		
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0.5	0.3	0.1	0.2	0.4	0.6	0.9	1.1	1.7	1.6	1.6	1.6	1.9	1.9	1.9	2.3	2.5	1.7	1.4	1.6	1.6	1.5	1.9	2.3	2.5	
2-Mar	3.7	4.2	4.4	3.3	3.7	4.0	3.8	3.4	3.0	2.4	3.2	3.2	3.2	3.4	3.1	3.3	3.2	3.1	2.2	1.6	1.9	1.3	0.9	0.6	4.4	
3-Mar	0.6	0.8	1.3	1.7	1.8	1.5	2.1	2.3	2.9	2.5	2.4	2.6	2.2	1.9	1.9	1.7	1.5	1.2	0.9	0.8	0.7	0.3	0.2	0.3	2.9	
4-Mar	0.5	0.8	1.1	1.5	1.6	1.8	1.6	1.1	1.5	1.8	1.5	1.7	1.8	1.9	2.0	1.9	1.6	1.6	1.9	1.1	0.6	0.6	0.5	0.7	2.0	
5-Mar	0.5	0.4	0.6	0.9	0.4	0.4	0.6	0.6	0.6	0.5	0.8	1.1	1.0	0.8	1.0	1.1	0.9	0.6	0.4	0.6	0.5	0.3	0.2	0.4	1.1	
6-Mar	0.2	0.5	0.8	0.6	0.4	0.5	0.5	0.5	0.5	1.7	1.6	1.4	1.2	1.1	0.8	0.7	0.6	1.1	1.2	1.3	1.0	0.6	0.2	0.3	1.7	
7-Mar	0.3	0.1	0.2	0.3	0.5	0.5	1.0	1.2	1.4	1.8	1.8	1.5	1.3	1.4	1.3	1.1	1.4	0.7	0.7	0.8	0.5	0.5	0.1	0.2	1.8	
8-Mar	0.1	0.3	0.5	0.6	0.4	0.6	0.7	0.8	0.9	0.8	1.0	1.2	1.1	0.9	1.0	1.0	0.4	0.4	0.5	0.9	1.1	0.5	0.4	0.3	1.2	
9-Mar	0.5	0.5	0.7	0.6	0.8	0.9	0.6	0.6	0.7	1.1	1.5	1.2	0.8	1.1	0.9	1.6	1.4	1.3	1.2	0.8	1.2	1.0	1.6	1.3	1.6	
10-Mar	1.8	2.7	2.5	1.7	1.6	1.8	1.8	1.7	1.8	1.7	1.6	1.5	1.4	1.3	1.4	1.3	1.2	1.7	2.0	2.7	2.3	2.1	2.1	1.9	2.7	
11-Mar	1.9	2.2	2.0	1.9	1.7	1.8	1.9	1.7	1.4	1.7	1.6	1.8	1.7	1.9	1.9	1.7	1.6	1.7	1.5	1.4	1.3	1.3	0.9	1.0	2.2	
12-Mar	1.0	0.7	0.6	0.7	0.9	0.6	0.7	0.6	0.8	0.9	1.1	1.6	1.5	1.2	1.4	1.4	0.9	0.5	0.2	0.2	0.4	0.9	0.9	0.3	1.6	
13-Mar	0.3	0.3	0.8	1.6	2.0	1.6	1.0	0.9	1.2	2.2	1.8	1.8	1.9	1.9	2.0	1.7	1.3	2.1	2.5	1.8	1.6	1.6	1.8	1.4	2.5	
14-Mar	1.5	1.4	1.2	0.9	1.1	0.9	1.3	1.0	1.1	1.0	1.2	1.2	1.0	0.9	1.0	0.7	0.6	0.5	1.4	1.4	1.3	1.5	0.8	1.5	1.5	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	1.7	1.5	1.6	1.4	1.0	0.6	0.5	0.5	0.4	0.3	1.7
16-Mar	1.2	2.4	3.0	1.3	1.2	1.2	1.1	0.9	1.2	1.3	1.3	1.5	1.4	1.4	1.2	1.3	0.9	1.3	1.5	1.5	1.1	0.9	0.6	0.4	3.0	
17-Mar	0.3	0.2	0.3	0.2	0.2	0.5	0.6	0.9	1.1	1.2	1.2	1.3	1.2	1.1	0.9	0.7	0.6	0.4	0.3	0.4	0.4	0.3	0.3	0.2	1.3	
18-Mar	0.3	0.2	0.1	0.1	0.4	0.3	0.5	0.6	0.7	0.8	1.1	1.2	0.8	0.7	1.7	1.7	1.9	2.3	3.1	3.2	2.7	2.8	2.6	2.2	3.2	
19-Mar	1.9	2.0	1.7	1.2	1.3	1.2	1.1	1.2	1.1	1.2	1.6	1.8	1.8	1.9	1.8	1.9	1.7	1.7	2.1	2.2	2.1	2.1	1.4	1.0	2.2	
20-Mar	0.6	0.3	0.3	0.2	0.4	0.4	0.2	0.4	0.7	1.0	1.3	1.4	1.5	1.5	1.5	1.4	1.5	1.4	1.5	1.6	1.5	1.5	0.6	0.5	1.6	
21-Mar	0.7	1.0	1.0	0.9	1.0	1.1	1.2	1.2	1.3	1.4	2.0	2.0	1.8	1.8	2.0	1.6	2.0	2.2	2.0	1.8	1.8	1.5	1.4	1.4	2.2	
22-Mar	1.3	1.2	1.4	1.1	1.0	1.3	1.0	1.4	1.3	1.4	1.4	1.3	1.3	1.5	1.2	1.1	1.2	1.3	0.9	0.6	0.4	0.4	0.6	0.3	1.5	
23-Mar	0.4	0.5	0.7	0.7	0.8	0.9	0.7	1.0	0.7	0.8	0.8	1.0	0.9	1.1	1.1	0.9	1.2	1.0	1.1	0.6	0.7	1.2	1.4	1.5	1.5	
24-Mar	1.2	1.0	0.8	0.8	1.0	1.1	0.9	1.1	1.3	1.1	1.6	1.4	1.3	1.3	1.3	1.5	1.1	1.0	0.6	0.8	0.6	0.4	0.3	0.4	1.6	
25-Mar	0.2	0.3	0.3	0.6	0.6	0.3	0.9	1.0	1.1	1.4	1.6	1.5	1.6	1.7	1.4	1.3	1.3	1.2	0.8	0.7	1.2	1.1	0.8	1.0	1.7	
26-Mar	1.8	1.8	1.6	1.8	1.6	1.4	1.7	1.9	1.6	1.5	1.5	1.5	1.9	1.4	1.4	1.6	2.0	1.5	0.8	0.8	0.5	0.6	0.7	0.5	2.0	
27-Mar	0.4	0.4	0.5	0.4	0.5	0.7	1.0	0.7	0.7	0.9	1.0	1.3	1.4	1.4	1.2	1.5	1.2	1.2	1.3	0.9	0.6	0.4	0.3	0.4	1.5	
28-Mar	0.6	0.3	0.2	0.1	0.4	0.3	0.2	0.5	0.6	0.9	1.4	1.8	1.9	2.2	2.8	3.1	2.2	2.5	2.3	1.6	0.5	0.6	0.7	0.6	3.1	
29-Mar	0.6	0.5	0.4	0.3	0.4	0.6	1.0	1.1	1.2	1.3	1.6	1.4	1.1	1.2	1.4	1.2	0.9	0.6	0.4	0.6	0.7	0.4	0.8	0.4	1.6	
30-Mar	0.2	0.4	0.6	0.7	0.5	0.4	0.4	0.6	0.9	1.0	1.3	1.5	1.5	1.5	1.4	1.0	1.1	1.0	0.4	0.3	0.3	0.4	0.4	0.5	1.5	
31-Mar	0.4	0.8	1.0	0.7	0.9	0.8	0.7	1.0	0.8	0.8	0.8	0.8	1.4	2.1	2.3	3.0	2.5	2.3	2.2	2.3	2.7	2.4	2.6	2.8	3.0	
3.7 4.2 4.4 3.3 3.7 4.0 3.8 3.4 3.0 2.5 3.2 3.2 3.2 3.4 3.1 3.3 3.2 3.1 3.1 3.2 2.7 2.8 2.6 2.8																										
Diurnal Maximum																										
MS - Missing																										



Summary of Hour Averages

Mannix - March 2015

Maximum Value: 1.2 km/h on Mar 25 11:00																				Maximum Daily Average: 0.5 km/h on Mar 4					Hours in Service: 744		
Minimum Value: -1.7 km/h on Mar 2 03:00																				Minimum Daily Average: -0.9 km/h on Mar 2					Hours of Data: 732		
Maximum Diurnal Average: 0.2 km/h at hour 16																				Minimum Diurnal Average: 0.0 km/h at hour 24					Hours of Missing Data: 12		
Monthly Average: 0.11 km/h																				Percentiles: P ₁ = -1.2 P ₁₀ = -0.5 Q ₁ = -0.2 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.6 P ₉₉ = 0.9					Hours of Calibration: 0		
																									Percent Operational Time: 98.4		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	0.0	0.0	0.1	0.3	0.5	0.8	0.7	0.7	0.9	0.7	0.8	0.7	0.7	0.9	0.9	0.8	0.5	0.6	0.8	0.5	0.4	-0.1	-0.3	-0.8	0.5	0.9	
2-Mar	-1.0	-1.4	-1.7	-1.3	-1.0	-1.4	-1.0	-0.8	-0.9	-0.8	-0.8	-0.7	-1.2	-1.2	-1.3	-1.3	-1.2	-1.3	-0.6	-0.4	-0.6	-0.1	0.1	-0.2	-0.9	0.1	
3-Mar	-0.3	-0.6	-0.7	-0.5	0.2	-0.5	-0.4	0.0	-0.3	-0.5	0.3	-0.6	-0.7	-0.4	-0.4	0.6	0.6	0.5	0.1	0.2	0.3	0.4	0.4	0.3	-0.1	0.6	
4-Mar	0.7	0.6	0.6	0.5	0.9	1.1	0.7	0.6	0.8	0.6	0.5	0.6	0.5	0.8	1.0	0.8	0.7	0.0	-0.3	0.1	0.5	0.5	0.3	-0.1	0.5	1.1	
5-Mar	-0.5	-0.5	-0.5	-0.4	-0.5	-0.5	-0.5	-0.6	-0.1	0.3	0.4	0.4	0.5	0.4	0.6	0.7	0.4	0.5	0.6	0.3	-0.2	-0.3	-0.3	-0.4	0.0	0.7	
6-Mar	0.0	0.2	-0.4	-0.4	-0.1	-0.5	-0.2	-0.2	-0.1	0.0	-0.3	0.1	0.8	0.2	-0.1	0.3	0.4	0.3	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.8	
7-Mar	0.0	0.0	0.1	0.1	0.2	-0.3	-0.5	-0.4	-0.2	-0.1	-0.4	-0.4	0.0	-0.4	-0.5	-0.4	-0.3	-0.3	-0.5	-0.5	-0.4	-0.3	-0.1	0.0	-0.2	0.2	
8-Mar	0.1	-0.1	-0.2	-0.2	-0.1	0.2	0.2	0.3	0.6	0.2	-0.3	0.0	0.3	0.4	0.1	0.0	0.0	-0.1	-0.2	-0.2	-0.3	-0.5	-0.2	-0.2	0.0	0.6	
9-Mar	-0.1	0.0	0.1	0.0	-0.3	-0.1	-0.2	-0.3	-0.3	-0.5	-0.5	-0.3	-0.2	-0.2	-0.3	-0.5	-0.7	-0.5	-0.6	-0.4	-0.8	-0.6	-0.6	-0.1	-0.3	0.1	
10-Mar	-0.1	-0.3	0.4	0.2	0.2	0.2	0.0	0.3	0.7	0.1	0.2	0.4	0.3	0.5	0.2	0.1	0.2	-0.2	-0.2	-0.5	-0.4	-0.2	-0.3	-0.3	0.1	0.7	
11-Mar	0.2	0.4	-0.3	-0.2	-0.3	0.0	-0.5	-0.2	-0.2	-0.2	0.1	-0.1	0.1	0.1	0.2	-0.3	-0.4	-0.2	0.0	0.2	0.1	-0.5	-0.2	-0.1	-0.1	0.4	
12-Mar	-0.2	0.0	0.3	0.0	0.3	0.1	0.0	0.2	0.1	0.2	0.4	0.6	0.5	0.6	0.7	0.7	0.5	0.5	0.2	0.3	0.5	0.6	0.4	0.0	0.3	0.7	
13-Mar	-0.2	-0.2	-0.6	-0.7	-0.9	-0.2	0.0	-0.2	-0.4	-0.6	-0.5	-0.2	-0.3	0.0	0.3	0.8	0.8	1.0	0.7	0.9	1.0	1.0	1.0	0.7	0.1	1.0	
14-Mar	0.9	0.9	0.8	0.7	0.8	0.8	0.6	0.6	0.6	0.7	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.6	-0.2	-0.4	-0.6	-0.6	-0.5	-0.4	0.4	0.9	
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-0.5	-0.3	0.3	0.1	0.2	0.4	0.5	0.4	0.3	0.4	0.2	0.2	--	0.5
16-Mar	-0.2	-0.1	-0.2	-0.4	-0.3	0.0	0.1	-0.1	0.2	0.8	0.1	0.9	0.9	0.1	0.4	0.2	-0.1	-0.3	-0.3	-0.3	-0.1	-0.1	-0.1	0.0	0.0	0.9	
17-Mar	0.1	0.0	0.1	0.2	0.3	0.6	0.6	0.5	0.2	0.2	0.2	0.0	0.3	0.6	0.4	0.1	0.3	0.4	0.2	0.3	0.4	0.4	0.2	0.1	0.3	0.6	
18-Mar	0.1	0.1	0.1	0.2	0.1	0.0	0.5	0.5	0.3	0.3	0.8	0.7	0.0	0.0	-0.2	0.1	-0.1	-0.1	-0.2	-0.5	-0.1	-0.8	-0.4	-0.4	0.0	0.8	
19-Mar	-0.2	-0.5	-0.2	-0.3	-0.3	-0.1	0.0	-0.3	0.1	0.4	0.0	0.3	0.7	0.3	0.1	-0.1	-0.4	-0.2	-0.1	-0.4	0.1	0.4	0.3	0.6	0.0	0.7	
20-Mar	0.6	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.4	-0.2	-0.4	-0.2	0.1	-0.2	-0.2	-0.1	-0.4	0.0	0.2	0.2	0.1	0.6	
21-Mar	0.3	0.5	0.4	0.5	0.5	0.5	0.6	0.7	0.2	0.1	0.5	0.6	0.2	0.3	0.7	0.5	0.7	0.6	0.9	0.5	0.4	0.7	0.6	0.4	0.5	0.9	
22-Mar	0.2	0.1	0.4	0.5	0.2	0.2	0.3	0.3	0.1	0.3	0.4	0.3	0.6	0.1	0.2	0.3	0.5	0.3	0.0	0.1	0.1	0.3	0.4	0.2	0.3	0.6	
23-Mar	0.2	0.4	0.5	0.5	0.6	0.5	0.6	0.2	0.1	-0.2	-0.1	0.2	0.5	0.6	-0.2	0.1	0.2	0.2	0.1	-0.2	-0.3	-0.3	-0.2	0.2	0.2	0.6	
24-Mar	-0.2	-0.2	-0.1	-0.4	-0.3	0.0	-0.1	-0.1	0.1	-0.1	0.2	-0.3	-0.3	-0.3	-0.3	0.1	0.2	0.3	0.2	0.5	0.4	0.3	0.3	0.3	0.0	0.5	
25-Mar	0.3	0.4	0.4	0.3	0.2	0.4	0.3	0.5	0.5	0.4	1.2	0.7	0.1	0.4	0.4	0.4	0.2	0.5	0.6	0.5	0.7	0.5	0.5	0.5	0.5	1.2	
26-Mar	0.4	0.5	0.4	0.3	0.4	0.5	0.5	0.5	0.2	0.3	0.4	0.0	0.8	0.0	0.7	0.7	0.3	0.4	0.1	-0.1	0.0	0.4	0.6	0.6	0.4	0.8	
27-Mar	0.3	0.2	0.3	0.3	0.2	0.4	0.6	0.4	0.4	0.4	0.3	0.5	0.5	0.4	0.3	0.8	0.7	0.6	0.8	0.5	0.5	0.2	0.1	0.2	0.4	0.8	
28-Mar	0.3	0.1	0.0	-0.1	-0.1	-0.1	-0.3	-0.1	0.0	-0.3	-0.3	-0.6	-0.6	-0.3	-0.6	-0.5	-0.5	-0.8	-0.5	-0.6	-0.3	-0.5	-0.5	-0.5	-0.3	0.3	
29-Mar	-0.5	-0.2	-0.1	0.0	-0.2	0.4	0.7	0.5	0.3	0.4	0.6	0.6	0.4	0.6	0.4	0.3	0.4	0.4	0.4	0.0	-0.3	-0.1	-0.3	-0.3	0.2	0.7	
30-Mar	-0.2	-0.3	-0.5	0.1	0.0	0.1	0.1	0.4	0.2	0.1	0.3	0.0	0.1	0.2	0.8	0.1	0.4	0.3	0.3	0.5	0.5	0.0	0.2	0.4	0.2	0.8	
31-Mar	0.3	0.9	0.6	0.6	0.8	0.8	0.8	0.4	0.4	0.4	0.1	0.1	-0.2	0.4	0.3	0.9	0.5	0.1	0.1	0.3	0.3	0.0	-0.6	-0.6	0.3	0.9	
																								Diurnal Average			
																								Diurnal Maximum			
MS - Missing																											



Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 km/h on Mar 2 02:00 Minimum Value: 0.1 km/h on Mar 18 03:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.2 Q ₃ = 1.7 P ₉₀ = 2.2 P ₉₉ = 4.2																								Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	0.6	0.5	0.2	0.2	0.3	0.4	0.7	1.1	1.8	1.7	1.8	1.4	2.0	2.1	2.2	2.3	2.2	1.5	1.3	1.6	1.7	1.5	2.0	2.8	2.8
2-Mar	4.2	4.8	4.6	3.6	4.2	4.6	4.6	4.3	3.5	2.8	3.9	3.8	3.7	3.8	3.7	3.9	3.8	3.6	2.7	1.6	1.8	1.5	1.1	0.7	4.8
3-Mar	0.8	0.8	1.1	1.7	1.9	1.7	2.2	2.4	3.4	2.7	2.7	2.9	2.7	2.7	2.4	2.2	1.8	1.4	1.1	0.7	0.7	0.5	0.2	0.2	3.4
4-Mar	0.4	0.6	1.0	1.4	1.4	1.6	1.5	0.9	1.3	1.7	1.5	1.7	1.8	2.2	2.2	2.0	1.7	1.6	1.9	0.9	0.5	0.4	0.5	1.1	2.2
5-Mar	0.4	0.5	0.6	0.8	0.4	0.4	0.6	0.5	0.6	0.6	0.7	0.9	0.9	0.9	1.2	1.2	0.7	0.5	0.4	0.5	0.4	0.4	0.3	0.4	1.2
6-Mar	0.3	0.7	0.4	0.4	0.7	0.6	0.3	0.3	0.7	1.8	1.9	1.6	1.6	1.4	1.0	0.9	0.7	1.1	1.1	1.1	0.9	0.5	0.3	0.2	1.9
7-Mar	0.2	0.1	0.3	0.4	0.6	0.6	1.0	1.3	1.6	2.1	1.9	1.6	1.4	1.3	1.3	1.1	1.4	0.7	0.5	1.2	0.7	0.5	0.2	0.2	2.1
8-Mar	0.2	0.5	0.6	0.6	0.5	0.7	0.6	0.7	0.9	0.8	1.0	1.4	1.1	0.9	1.3	1.1	0.5	0.3	0.2	0.5	0.7	0.4	0.4	0.5	1.4
9-Mar	0.8	0.8	0.7	0.8	1.0	1.2	0.4	0.6	0.8	1.1	1.3	1.6	0.7	1.3	1.0	1.9	1.6	1.4	1.1	0.8	1.2	1.2	1.7	1.6	1.9
10-Mar	1.9	2.5	2.8	1.9	1.8	2.1	1.7	1.9	2.3	2.2	2.0	2.0	1.9	1.8	1.8	1.6	1.4	1.6	2.0	2.1	2.0	2.0	1.5	1.5	2.8
11-Mar	1.7	1.6	1.5	1.5	1.7	1.5	1.5	1.4	1.4	1.5	1.7	1.6	2.1	2.0	2.1	1.8	1.8	1.9	1.7	1.7	1.3	1.3	1.0	1.3	2.1
12-Mar	1.2	0.8	0.7	0.5	1.0	0.6	0.6	0.6	0.7	0.9	1.1	1.7	1.3	1.4	1.7	1.6	0.8	0.5	0.2	0.4	0.5	0.9	0.8	0.4	1.7
13-Mar	0.5	0.7	1.0	1.7	2.0	2.0	1.3	1.2	1.5	2.3	1.9	1.6	2.0	2.0	1.8	1.7	1.3	2.1	2.3	1.9	1.4	1.5	1.9	1.5	2.3
14-Mar	1.5	1.5	1.1	0.8	0.9	0.7	1.0	0.9	0.9	1.0	1.3	1.1	1.0	0.7	0.7	0.6	0.5	0.4	2.0	1.4	1.2	0.9	0.5	1.5	2.0
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	2.2	2.3	2.0	1.8	1.2	0.8	0.7	0.4	0.2	0.3	0.4	0.3	2.3
16-Mar	1.2	2.5	3.0	1.7	1.5	1.4	1.2	0.9	1.3	1.6	1.4	1.8	1.6	1.6	1.6	1.4	1.1	1.3	1.5	1.2	1.0	0.8	0.6	0.3	3.0
17-Mar	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.8	1.1	1.2	1.4	1.3	1.3	1.2	1.1	0.7	0.6	0.5	0.4	0.5	0.4	0.5	0.2	0.3	1.4
18-Mar	0.3	0.3	0.1	0.2	0.4	0.4	0.5	0.6	0.6	0.9	1.2	1.2	0.7	0.6	1.6	1.5	1.8	2.5	3.1	3.2	2.9	3.0	2.9	2.5	3.2
19-Mar	2.3	2.6	2.1	1.3	1.2	1.1	1.1	1.4	1.5	1.6	2.0	2.2	2.2	2.2	2.2	2.1	1.7	1.6	1.6	1.9	2.3	2.1	1.4	1.2	2.6
20-Mar	0.9	0.4	0.3	0.3	0.5	0.4	0.3	0.3	0.7	1.2	1.6	1.7	1.8	2.0	2.0	1.9	1.9	1.3	1.3	1.3	1.4	1.3	0.6	0.7	2.0
21-Mar	0.8	1.0	1.1	0.7	0.9	1.2	1.5	1.4	1.2	1.5	2.2	2.2	2.0	2.0	2.3	1.9	2.1	2.2	2.0	1.9	1.9	1.9	1.6	1.5	2.3
22-Mar	1.1	1.2	1.5	1.2	1.1	1.2	1.0	1.5	1.3	1.6	1.8	1.6	1.7	1.7	1.5	1.4	1.5	1.6	0.9	0.5	0.5	0.6	0.8	0.4	1.8
23-Mar	0.3	0.3	0.7	0.8	0.7	0.8	0.8	1.0	0.8	0.8	0.7	1.0	1.3	1.3	1.3	1.4	1.4	1.2	1.0	0.7	0.6	0.9	1.2	1.1	1.4
24-Mar	0.7	0.8	0.7	0.8	1.1	1.1	0.9	1.2	1.4	1.4	1.7	1.7	1.6	1.6	1.7	1.7	1.4	1.1	0.8	1.0	0.8	0.6	0.4	0.5	1.7
25-Mar	0.3	0.3	0.4	0.7	0.7	0.7	1.2	1.0	1.3	1.5	1.9	1.8	1.9	1.9	1.6	1.7	1.5	1.3	0.8	0.7	1.2	1.2	0.8	0.9	1.9
26-Mar	1.5	1.5	1.3	1.4	1.3	1.1	1.5	1.6	1.4	1.6	1.7	1.5	2.1	1.3	1.5	1.6	1.6	1.2	0.8	0.6	0.5	0.3	0.6	0.5	2.1
27-Mar	0.2	0.3	0.4	0.5	0.3	0.5	0.9	0.6	0.7	1.0	1.0	1.3	1.6	1.5	1.1	1.6	1.2	1.1	1.2	0.9	0.8	0.3	0.4	0.4	1.6
28-Mar	0.5	0.3	0.4	0.2	0.3	0.2	0.1	0.2	0.3	0.9	1.3	2.0	2.5	2.2	3.0	3.3	2.2	2.5	2.4	1.5	0.7	0.5	0.5	0.4	3.3
29-Mar	0.3	0.4	0.4	0.4	0.4	0.6	0.7	1.2	1.2	1.3	1.7	1.4	1.0	1.2	1.5	1.2	0.9	0.8	0.6	0.5	0.4	0.5	0.9	0.3	1.7
30-Mar	0.2	0.3	0.5	0.7	0.4	0.3	0.2	0.7	0.9	1.3	1.7	1.7	1.5	1.7	1.6	1.0	1.2	0.9	0.3	0.4	0.5	0.7	0.5	0.6	1.7
31-Mar	0.5	0.8	0.7	0.6	0.6	0.6	0.5	0.9	0.9	0.8	0.7	0.8	1.5	2.3	2.6	3.0	2.6	2.1	2.2	2.2	3.1	2.4	2.1	2.2	3.1
4.2 4.8 4.6 3.6 4.2 4.6 4.6 4.3 3.5 2.8 3.9 3.8 3.7 3.8 3.7 3.9 3.8 3.6 3.1 3.2 3.1 3.0 2.9 2.8																									
Diurnal Maximum																									
MS - Missing																									



Summary of Hour Averages

Mannix - March 2015

Maximum Value: 1.7 km/h on Mar 1 10:00 Maximum Daily Average: 0.4 km/h on Mar 1																				Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4						
Minimum Value: -1.1 km/h on Mar 2 03:00 Minimum Daily Average: -0.3 km/h on Mar 2 Maximum Diurnal Average: 0.2 km/h at hour 15 Minimum Diurnal Average: 0.0 km/h at hour 4 Monthly Average: 0.11 km/h Percentiles: $P_1 = -0.6$ $P_{10} = -0.3$ $Q_1 = -0.1$ Median = 0.1 $Q_3 = 0.3$ $P_{90} = 0.5$ $P_{99} = 1.0$																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0.1	0.1	0.1	0.1	0.3	0.6	0.8	1.0	1.2	1.7	1.2	0.3	0.2	0.5	0.5	0.6	0.2	0.5	0.5	0.3	0.1	-0.2	0.2	-0.4	0.4	1.7
2-Mar	-0.5	-0.6	-1.1	-0.9	-0.4	-0.6	-0.2	-0.3	-0.4	-0.8	-0.3	-0.1	-0.4	-0.7	-0.5	-0.5	-0.4	-0.5	-0.1	0.1	0.2	0.4	0.6	0.1	-0.3	0.6
3-Mar	0.1	0.1	-0.3	0.0	0.5	-0.1	0.1	0.5	0.1	0.2	1.1	-0.1	-0.4	-0.2	-0.1	0.7	0.7	0.5	0.2	0.2	0.3	0.1	0.2	0.5	0.2	1.1
4-Mar	0.6	0.4	0.5	0.5	0.9	0.9	0.7	0.5	0.6	0.1	0.2	0.3	0.0	0.5	0.6	0.5	0.4	0.0	-0.6	-0.1	0.3	0.3	0.0	-0.3	0.3	0.9
5-Mar	-0.4	-0.2	-0.3	-0.2	0.2	-0.4	-0.5	-0.5	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.5	-0.1	0.1	0.5	0.1	-0.3	-0.2	-0.2	-0.3	-0.1	0.5
6-Mar	-0.1	0.2	-0.3	-0.3	0.0	-0.3	0.2	0.1	-0.1	0.4	-0.1	0.2	1.0	0.5	0.0	0.5	0.4	0.3	0.2	0.2	0.3	0.2	0.1	0.2	0.2	1.0
7-Mar	0.3	0.1	0.0	-0.1	-0.1	-0.1	-0.2	-0.2	0.1	0.4	0.0	-0.1	0.3	-0.1	-0.2	-0.1	0.2	0.1	-0.1	-0.2	-0.3	0.0	0.0	0.1	0.0	0.4
8-Mar	0.0	-0.2	-0.2	-0.3	-0.2	-0.3	-0.2	-0.2	0.1	0.0	-0.5	0.0	0.1	0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.4	-0.6	-0.3	-0.1	-0.2	0.1
9-Mar	-0.1	0.1	-0.1	-0.1	-0.3	-0.1	0.1	0.1	0.0	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.4	-0.4	-0.2	0.3	-0.1	0.3
10-Mar	0.4	0.2	0.5	0.5	0.4	0.1	0.3	0.3	0.7	0.3	0.2	0.7	0.2	0.6	0.4	0.5	0.5	0.1	0.3	0.0	0.0	0.4	0.0	0.0	0.3	0.7
11-Mar	0.8	1.0	0.2	0.2	0.0	0.4	-0.1	0.2	0.0	0.2	0.4	0.3	0.2	0.7	0.7	0.0	-0.2	0.0	0.4	0.8	0.4	-0.2	-0.1	0.1	0.3	1.0
12-Mar	0.0	0.1	0.4	0.2	0.5	0.0	0.0	0.1	0.1	0.2	0.2	-0.1	0.1	0.5	0.4	0.4	0.1	0.2	0.1	-0.1	0.2	0.3	0.0	-0.3	0.1	0.5
13-Mar	-0.4	-0.4	-0.6	-0.7	-0.6	-0.2	-0.1	-0.3	-0.4	-0.5	-0.4	-0.2	-0.5	-0.2	0.1	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.7	0.4	0.0	0.7
14-Mar	0.6	0.8	0.3	0.0	0.0	0.0	-0.3	-0.1	0.6	0.5	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.4	-0.4	-0.4	-0.5	-0.6	-0.6	-0.2	0.1	0.8
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	0.0	-0.3	0.6	0.1	0.3	0.2	0.2	0.2	0.3	0.1	-0.1	--	0.6
16-Mar	-0.1	0.6	0.3	-0.3	-0.4	0.2	0.3	-0.1	0.1	0.8	0.1	1.0	1.3	-0.1	0.5	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.1	0.0	0.2	1.3
17-Mar	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.3	0.1	0.1	-0.1	-0.2	0.1	0.4	0.3	-0.1	0.3	0.2	0.0	0.0	0.0	0.2	0.1	0.2	0.1	0.4
18-Mar	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	-0.1	0.2	0.5	0.4	-0.1	0.1	0.1	0.4	0.3	0.3	0.7	0.0	0.6	-0.2	0.2	0.1	0.2	0.7
19-Mar	0.0	-0.2	0.0	-0.1	0.0	0.1	0.2	-0.2	-0.1	0.6	0.3	0.5	0.9	0.5	0.4	0.1	-0.3	0.0	0.4	-0.1	0.4	0.6	0.8	0.5	0.2	0.9
20-Mar	0.5	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.4	0.0	0.0	0.2	-0.3	-0.3	0.0	0.4	0.0	0.3	0.2	0.0	0.3	0.3	0.0	0.1	0.5
21-Mar	0.0	0.1	0.0	0.4	0.7	0.7	0.6	0.9	0.0	0.0	0.2	0.7	-0.6	-0.1	0.3	0.1	0.1	0.2	0.4	-0.1	-0.2	0.3	0.3	0.0	0.2	0.9
22-Mar	-0.5	-0.4	-0.1	-0.1	-0.3	-0.6	-0.4	-0.2	-0.6	0.0	0.1	0.1	0.3	-0.3	0.0	-0.1	0.4	0.0	-0.1	-0.2	0.1	0.4	0.3	0.1	-0.1	0.4
23-Mar	0.2	0.3	0.4	0.5	0.3	0.5	0.4	0.5	0.1	-0.2	-0.3	-0.2	0.1	0.7	0.6	-0.3	0.2	0.1	0.2	0.2	-0.1	-0.1	-0.1	0.2	0.2	0.7
24-Mar	0.1	0.0	0.2	-0.2	-0.2	0.3	0.0	0.0	0.0	-0.1	0.5	0.2	-0.1	0.0	-0.2	0.1	-0.1	-0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5
25-Mar	0.2	0.2	0.0	-0.1	0.0	0.3	0.2	0.4	0.6	0.0	1.1	1.0	-0.6	0.0	0.2	0.0	-0.1	0.2	0.5	0.5	0.4	0.2	0.0	-0.1	0.2	1.1
26-Mar	-0.5	-0.5	-0.4	-0.5	-0.5	-0.3	-0.4	-0.3	-0.5	-0.3	0.1	-0.6	0.2	-0.9	0.4	0.2	-0.5	-0.3	-0.1	-0.2	-0.2	0.0	0.3	0.5	-0.2	0.5
27-Mar	0.2	0.3	0.2	0.1	0.1	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.1	-0.1	-0.1	0.5	0.2	0.0	0.6	0.3	0.4	0.2	0.2	0.1	0.2	0.6
28-Mar	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.3	-0.2	0.0	-0.1	-0.3	0.3	0.4	0.4	0.2	-0.2	0.1	0.1	0.0	-0.3	-0.3	-0.5	0.0	0.4
29-Mar	-0.6	-0.2	-0.1	-0.1	-0.3	0.1	0.7	0.5	0.1	0.1	0.2	0.1	0.1	0.4	-0.2	-0.1	0.1	0.2	0.3	-0.1	-0.4	-0.2	-0.1	0.0	0.0	0.7
30-Mar	0.0	-0.1	-0.1	0.3	0.2	0.2	0.0	0.2	0.5	0.0	0.2	-0.1	0.0	-0.3	1.0	0.2	0.1	-0.1	0.1	0.2	0.2	-0.1	0.0	0.0	0.1	1.0
31-Mar	0.1	0.7	0.3	0.4	0.4	0.2	0.1	0.1	0.2	0.1	0.3	0.1	0.2	0.8	0.8	1.0	0.8	0.3	0.3	0.6	0.7	0.3	-0.1	-0.1	0.4	1.0
																								Diurnal Average		
																								Diurnal Maximum		
MS - Missing																										



Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 km/h on Mar 2 02:00 Minimum Value: 0.2 km/h on Mar 18 03:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.7 Median = 1.2 Q ₃ = 1.8 P ₉₀ = 2.3 P ₉₉ = 3.8																								Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4			
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	0.5	0.4	0.3	0.2	0.2	0.3	0.5	0.6	1.0	1.5	2.2	1.1	1.7	1.8	2.1	2.2	2.1	1.4	1.3	1.6	1.8	1.7	2.2	2.5	2.5		
2-Mar	4.0	4.8	4.3	3.2	3.8	4.2	4.4	3.9	3.3	2.4	3.7	3.6	3.5	3.5	3.3	3.6	3.3	3.2	2.6	1.7	1.7	1.6	1.2	1.0	4.8		
3-Mar	0.8	0.8	1.0	1.8	2.1	1.3	2.3	2.3	3.6	2.8	2.9	3.2	2.7	3.0	2.7	2.3	2.0	1.3	0.9	0.4	0.8	0.8	0.3	0.2	3.6		
4-Mar	0.3	0.4	0.5	0.7	0.9	0.8	0.7	0.7	0.8	1.1	1.1	1.3	1.4	1.8	2.0	1.7	1.5	1.7	1.5	0.8	0.5	0.5	0.6	1.3	2.0		
5-Mar	0.5	0.5	0.8	1.0	0.4	0.3	0.6	0.6	0.6	0.6	0.5	0.6	0.5	1.0	1.2	1.2	0.7	0.3	0.3	0.4	0.4	0.5	0.3	0.5	1.2		
6-Mar	0.3	0.9	0.5	0.4	0.8	0.7	0.4	0.4	0.9	1.6	1.7	1.7	1.9	1.6	1.0	1.2	0.9	1.0	0.9	0.8	0.9	0.4	0.5	0.3	1.9		
7-Mar	0.3	0.2	0.6	0.7	0.8	0.8	1.2	1.6	1.9	2.4	1.9	2.0	1.7	1.5	1.3	1.3	1.6	0.8	0.5	1.4	0.8	0.7	0.2	0.3	2.4		
8-Mar	0.3	0.6	0.9	0.7	0.7	0.9	0.7	0.7	0.8	0.8	1.0	1.2	0.9	0.8	1.4	1.1	0.7	0.3	0.3	0.4	0.4	0.3	0.3	0.7	1.4		
9-Mar	1.0	0.9	0.8	1.0	1.2	1.3	0.6	0.8	1.1	1.0	1.4	1.6	0.9	1.4	1.3	1.9	1.4	1.1	0.6	0.7	1.0	1.1	1.4	1.4	1.9		
10-Mar	1.8	2.2	2.3	1.8	1.9	2.1	1.6	1.9	2.4	2.4	2.3	2.2	2.0	1.9	2.0	1.9	1.6	1.5	1.8	1.9	1.8	1.8	1.3	1.5	2.4		
11-Mar	1.5	1.8	1.2	1.4	1.4	1.3	1.4	1.1	1.1	1.0	1.3	1.4	1.9	2.0	1.9	1.7	1.7	1.9	1.8	2.0	1.3	1.2	0.9	1.1	2.0		
12-Mar	1.0	0.8	0.6	0.4	0.9	0.4	0.6	0.6	0.7	0.9	1.0	1.3	1.2	1.3	1.5	1.5	0.8	0.5	0.5	0.9	0.6	1.0	0.8	0.7	1.5		
13-Mar	0.7	0.9	1.2	1.9	2.2	2.2	1.7	1.6	1.8	2.1	1.7	1.5	1.8	1.8	1.7	1.5	1.2	2.3	2.0	1.9	1.4	1.6	1.6	1.7	2.3		
14-Mar	1.3	1.5	1.0	1.1	0.7	0.6	1.0	0.7	0.9	0.8	0.9	0.9	0.9	0.7	0.7	0.5	0.5	0.5	2.5	1.8	1.0	0.8	0.4	1.6	2.5		
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	2.7	2.5	2.2	1.9	1.5	0.8	0.8	0.3	0.2	0.2	0.4	0.5	2.7
16-Mar	0.9	2.1	2.6	2.2	1.5	1.6	1.2	0.7	1.4	1.8	1.5	1.9	1.8	1.6	1.9	1.4	1.3	1.0	1.2	0.7	0.7	0.6	0.5	0.4	2.6		
17-Mar	0.4	0.3	0.6	0.4	0.3	0.5	0.3	0.4	0.7	1.0	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.0	1.2	0.8	0.7	0.4	0.2	0.4	1.2		
18-Mar	0.4	0.3	0.2	0.2	0.5	0.4	0.5	0.6	0.8	0.9	1.1	1.2	0.9	0.5	1.4	1.2	1.5	2.2	2.7	2.8	2.9	2.7	3.0	2.5	3.0		
19-Mar	2.3	2.6	2.1	1.5	1.1	1.0	1.0	1.3	1.6	1.7	2.2	2.4	2.5	2.4	2.4	2.3	1.7	1.4	1.3	1.4	1.9	1.5	1.0	1.0	2.6		
20-Mar	1.0	0.6	0.4	0.6	0.9	0.5	0.6	0.2	0.6	1.4	1.7	1.8	1.9	2.1	2.2	2.2	2.1	1.4	0.9	1.1	1.3	1.3	0.9	1.2	2.2		
21-Mar	1.5	1.3	1.3	1.6	1.8	1.9	1.9	1.9	1.7	1.7	2.7	3.1	2.7	2.9	2.8	2.5	2.7	2.9	2.7	2.2	2.3	2.6	2.3	1.9	3.1		
22-Mar	1.1	1.2	1.7	1.2	1.2	1.3	1.1	1.5	1.3	1.8	2.0	1.9	1.9	1.9	1.7	1.5	1.7	1.9	0.9	0.6	0.9	0.8	1.0	0.4	2.0		
23-Mar	0.3	0.3	0.5	0.7	0.4	0.6	0.6	0.8	0.7	0.7	0.6	1.0	1.5	1.4	1.5	1.5	1.5	1.1	0.8	0.5	0.8	0.9	1.0	0.9	1.5		
24-Mar	0.6	0.8	0.7	0.8	1.1	0.9	1.0	1.3	1.3	1.5	1.8	1.8	1.8	1.8	1.8	1.9	1.5	1.3	1.0	1.1	1.4	0.8	1.0	0.9	1.9		
25-Mar	0.3	0.3	0.6	1.1	1.6	1.5	1.8	1.6	1.9	1.6	2.2	2.1	2.0	2.1	2.0	1.8	1.6	1.4	0.8	0.5	1.0	1.0	0.7	0.7	2.2		
26-Mar	1.6	1.5	1.2	1.3	1.3	1.2	1.5	1.6	1.2	1.5	1.8	1.5	2.3	1.3	1.9	1.8	1.7	1.3	0.8	0.6	0.3	0.2	0.4	0.3	2.3		
27-Mar	0.2	0.3	0.3	0.4	0.2	0.4	0.6	0.4	0.5	0.8	0.9	1.2	1.7	1.5	1.2	1.3	1.2	0.9	1.1	0.8	1.0	0.4	0.5	0.5	1.7		
28-Mar	0.8	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.7	1.4	2.2	2.4	2.2	3.1	3.5	2.4	2.6	2.4	1.3	0.7	0.4	0.6	0.5	3.5		
29-Mar	0.4	0.5	0.5	0.4	0.6	0.5	0.5	1.0	1.1	1.2	1.6	1.5	1.1	1.6	1.4	1.2	1.3	1.2	1.0	0.5	0.5	0.6	0.9	0.4	1.6		
30-Mar	0.2	0.5	0.5	0.6	0.5	0.3	0.3	0.6	0.9	1.2	1.6	1.6	1.7	2.1	2.0	1.1	1.5	0.9	0.4	0.4	0.6	0.8	0.5	0.7	2.1		
31-Mar	0.5	0.5	0.4	0.5	0.6	0.4	0.4	0.9	1.3	0.9	0.7	0.8	1.6	2.3	2.5	2.9	2.6	1.8	2.2	2.1	2.8	2.3	1.8	1.8	2.9		
4.0 4.8 4.3 3.2 3.8 4.2 4.4 3.9 3.6 2.8 3.7 3.6 3.5 3.5 3.3 3.6 3.3 3.2 2.7 2.8 2.9 2.7 3.0 2.5																											
Diurnal Maximum																											
MS - Missing																											



Summary of Hour Standard Deviations

Mannix - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 km/h on Mar 2 02:00 Minimum Value: 0.2 km/h on Mar 1 04:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.7 Median = 1.1 Q ₃ = 1.7 P ₉₀ = 2.3 P ₉₉ = 3.8																								Hours in Service: 744 Hours of Data: 731 Hours of Missing Data: 13 Hours of Calibration: 0 Percent Operational Time: 98.3	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	0.4	0.3	0.2	0.2	0.3	0.2	0.4	0.5	0.8	1.6	1.4	1.1	1.5	1.6	2.1	2.3	2.1	1.5	1.3	1.6	1.8	2.0	2.4	2.4	2.4
2-Mar	3.9	4.8	4.5	3.1	3.9	4.1	4.3	3.8	3.1	2.3	3.6	3.4	3.5	3.5	3.3	3.4	3.0	3.2	2.6	1.9	1.6	1.8	1.2	1.3	4.8
3-Mar	1.1	0.8	1.0	2.1	2.3	1.2	2.2	2.6	3.5	2.6	2.9	3.2	2.7	3.1	2.8	2.4	2.0	1.2	0.7	0.4	0.7	0.5	0.3	0.2	3.5
4-Mar	0.3	0.4	0.4	0.6	0.9	0.7	0.6	0.7	0.7	0.9	0.9	1.4	1.4	1.7	1.9	1.7	1.5	1.9	1.6	0.9	0.6	0.6	0.7	1.5	1.9
5-Mar	0.7	0.6	0.9	1.2	0.6	0.4	0.8	0.6	0.8	0.7	0.8	0.6	0.6	0.9	0.9	0.9	0.6	0.3	0.3	0.4	0.7	0.6	0.4	0.8	1.2
6-Mar	0.6	1.1	0.8	0.5	1.2	0.6	0.5	0.6	1.1	1.5	1.7	2.0	2.0	1.6	1.1	1.4	0.8	1.0	0.9	0.8	0.9	0.4	0.5	0.6	2.0
7-Mar	0.3	0.4	0.8	1.0	1.0	1.0	1.3	1.7	2.0	2.5	1.9	1.9	1.9	1.6	1.4	1.4	1.6	0.7	0.6	1.4	0.9	1.0	0.3	0.4	2.5
8-Mar	0.5	0.7	1.1	0.9	1.0	1.0	0.8	0.8	0.8	0.8	1.2	1.2	1.0	0.9	1.6	1.3	0.7	0.4	0.4	0.5	0.5	0.4	0.3	0.9	1.6
9-Mar	1.2	1.1	0.9	1.2	1.3	1.4	0.6	0.9	1.1	1.1	1.4	1.5	1.0	1.4	1.4	1.9	1.6	1.3	0.9	0.9	1.3	1.1	1.4	1.5	1.9
10-Mar	2.0	2.3	2.3	1.9	1.9	2.0	1.6	1.9	2.5	2.5	2.5	2.2	2.0	2.0	2.3	2.1	1.6	1.5	1.9	2.0	1.9	1.8	1.4	1.6	2.5
11-Mar	1.6	1.8	1.4	1.4	1.6	1.3	1.5	1.2	1.1	1.0	1.3	1.3	1.9	2.1	2.0	1.8	1.7	1.9	2.0	2.0	1.3	1.1	0.9	1.1	2.1
12-Mar	1.1	0.9	0.7	0.7	0.9	0.4	0.7	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.5	1.4	0.7	0.5	0.3	0.5	0.7	1.0	0.9	0.9	1.5
13-Mar	1.0	1.2	1.5	2.2	2.5	2.6	2.0	1.7	2.0	2.3	1.9	1.6	2.0	1.9	1.8	1.6	1.2	2.2	2.0	1.9	1.4	1.7	1.6	1.8	2.6
14-Mar	1.2	1.4	1.1	1.0	0.8	0.7	0.9	0.7	1.0	0.9	0.8	0.8	0.8	0.7	0.7	0.5	0.5	0.5	2.8	2.2	1.1	0.8	0.5	1.9	2.8
15-Mar	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	AF	2.6	2.2	1.9	1.5	0.8	0.7	0.3	0.2	0.3	0.4	0.8	2.6
16-Mar	1.0	2.1	2.7	2.3	1.6	1.6	1.3	0.7	1.4	1.8	1.5	2.0	1.8	1.7	1.9	1.4	1.4	1.0	1.1	0.7	0.6	0.6	0.6	0.4	2.7
17-Mar	0.5	0.4	0.6	0.4	0.3	0.3	0.4	0.3	0.7	1.1	1.2	1.2	1.2	0.9	0.9	0.8	0.7	0.5	0.6	0.6	0.6	0.3	0.3	0.4	1.2
18-Mar	0.5	0.4	0.2	0.3	0.6	0.5	0.4	0.4	0.6	0.8	1.0	0.9	0.7	0.5	1.4	1.1	1.5	2.4	2.8	2.9	2.9	2.6	2.9	2.5	2.9
19-Mar	2.3	2.6	2.1	1.6	1.2	1.1	1.0	1.3	1.5	1.7	2.3	2.5	2.7	2.5	2.4	2.3	1.9	1.5	1.2	1.3	1.8	1.3	0.9	0.9	2.7
20-Mar	0.9	0.5	0.4	0.6	0.6	0.4	0.4	0.2	0.5	1.4	1.7	1.7	1.9	2.3	2.2	2.3	2.2	1.5	0.9	1.2	1.3	1.4	0.8	1.0	2.3
21-Mar	0.8	0.9	0.7	0.7	1.0	1.1	1.4	1.3	1.0	1.4	2.1	2.4	2.1	2.2	2.1	1.9	2.1	2.0	2.0	1.8	1.6	1.8	1.7	1.5	2.4
22-Mar	0.9	1.2	1.7	1.2	1.3	1.2	1.1	1.5	1.4	1.7	1.8	1.7	1.8	1.7	1.6	1.5	1.8	2.1	0.8	0.5	0.6	0.7	0.8	0.4	2.1
23-Mar	0.3	0.2	0.4	0.7	0.4	0.5	0.5	0.7	0.7	0.7	0.5	0.8	1.4	1.4	1.5	1.6	1.5	1.1	0.7	0.5	0.8	1.1	1.1	0.9	1.6
24-Mar	0.7	0.8	0.7	0.9	1.1	0.9	1.1	1.4	1.3	1.6	1.9	1.9	2.0	2.0	2.0	2.0	1.6	1.2	0.8	0.9	0.8	0.7	0.4	0.6	2.0
25-Mar	0.3	0.3	0.6	0.8	0.9	1.0	1.3	0.8	1.2	1.4	1.8	1.7	1.9	1.9	1.8	1.9	1.6	1.5	0.8	0.5	1.0	0.9	0.7	0.9	1.9
26-Mar	1.6	1.4	1.1	1.2	1.2	1.1	1.3	1.4	1.2	1.5	1.7	1.4	2.0	1.3	1.7	1.8	1.7	1.2	0.9	0.7	0.4	0.2	0.3	0.2	2.0
27-Mar	0.3	0.3	0.4	0.5	0.3	0.4	0.5	0.4	0.5	0.8	0.9	1.2	1.9	1.5	1.2	1.4	1.3	0.7	1.1	0.9	1.1	0.5	0.6	0.8	1.9
28-Mar	1.0	0.4	0.6	0.4	0.5	0.5	0.5	0.3	0.4	0.7	1.4	2.1	2.3	2.0	2.9	3.3	2.4	2.4	2.3	1.4	0.8	0.5	0.6	0.6	3.3
29-Mar	0.4	0.6	0.7	0.8	0.7	0.6	0.5	0.9	1.1	0.9	1.2	1.5	1.0	1.5	1.4	1.2	1.1	1.2	0.8	0.6	0.6	0.8	1.4	0.5	1.5
30-Mar	0.3	0.5	0.8	0.8	0.5	0.5	0.4	0.5	0.8	1.1	1.5	1.5	1.4	1.6	1.4	1.2	1.2	0.9	0.4	0.4	0.7	0.8	0.7	0.6	1.6
31-Mar	0.5	0.5	0.6	0.7	0.5	0.3	0.3	0.9	1.2	1.0	0.6	0.9	1.8	2.2	2.5	2.6	2.3	1.8	2.2	2.3	2.9	2.4	2.1	2.0	2.9
3.9 4.8 4.5 3.1 3.9 4.1 4.3 3.8 3.5 2.6 3.6 3.4 3.5 3.5 3.3 3.4 3.0 3.2 2.8 2.9 2.9 2.6 2.9 2.5																									
Diurnal Maximum																									
AF - Analyzer Failure MS - Missing																									



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 4, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:00
Barometric Pressure	730 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	50 ppm	Cal Gas Expiry Date	26-Sep-17
Gas Cert Reference	S960161A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range		DACS channel #	N/A

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-634	-634
Analyzer Range (mv)	1000	1000	Lamp voltage	877	878
Calculated slope	0.995077	0.995534	Chamber temp.	44.9	44.8
Calculated intercept	0.038451	-0.191646	Pressure (mmHg)	690.0	701.0
Analyzer Background	7.4	7.3	Flow (lpm)	0.465	0.474
Analyzer Coefficient	1.022	1.009	Intensity	90	88

Analyzer make TEI 43i Analyzer serial # 1008841399

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	NA
as found span	5000	60.0	600.0	601.3	0.998
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	60.0	600.0	602.4	0.996
second point	5000	30.0	300.0	302.9	0.990
third point	5000	15.0	150.0	150.2	0.999
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	58.8	588.0	602.0	0.977
Average Correction Factor					0.995

Corrected As found 601.3 Previous response 602.9 % change 0.3%

Notes:

Changed the inlet filter after the as founds. Span adjusted. THC span adjustments causing a long high point.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

SO₂ Calibration Summary

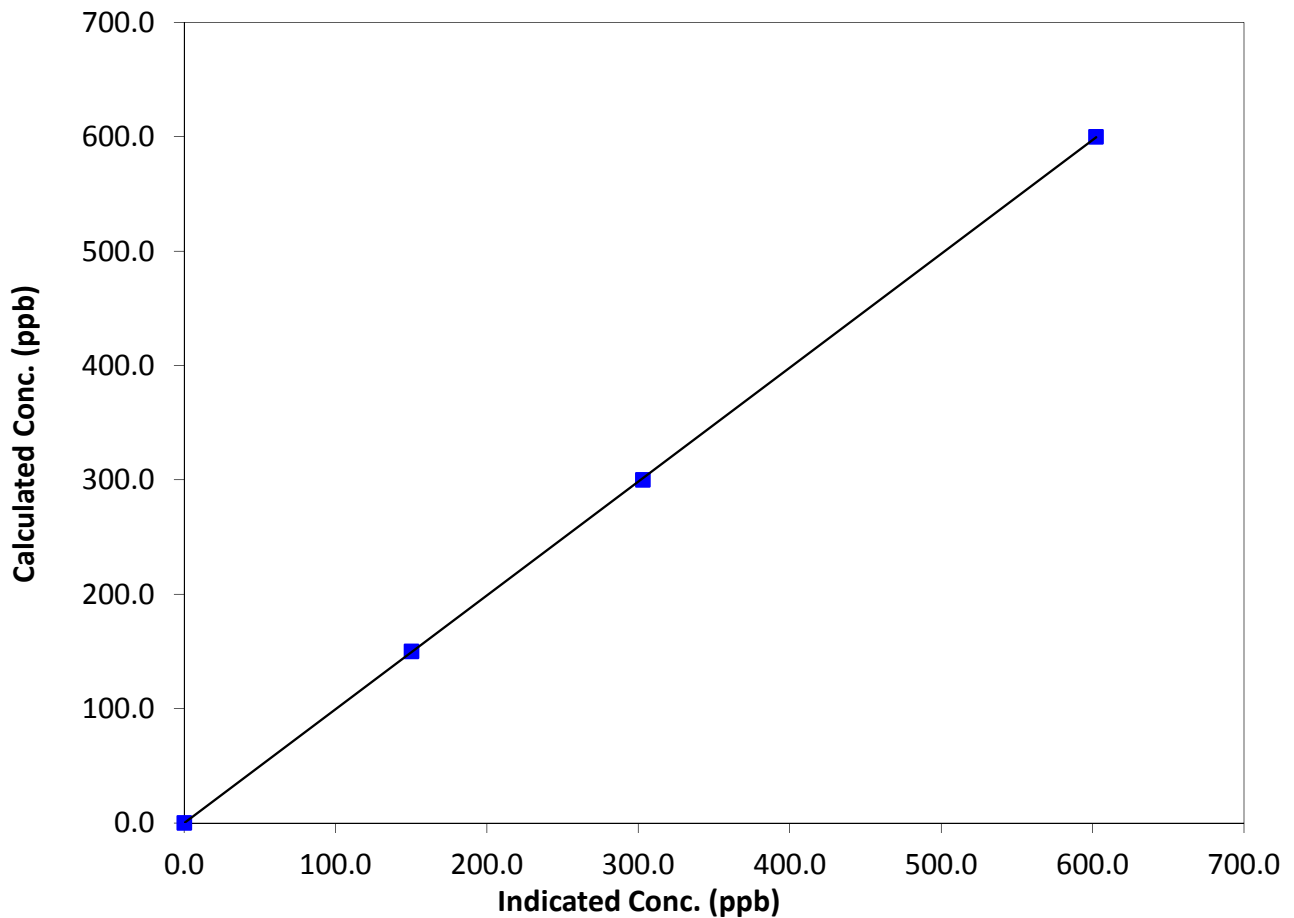
Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 4, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:15	End Time (MST)	12:00
Analyzer make	TEI 43i	Analyzer serial #	1008841399

Calibration Data

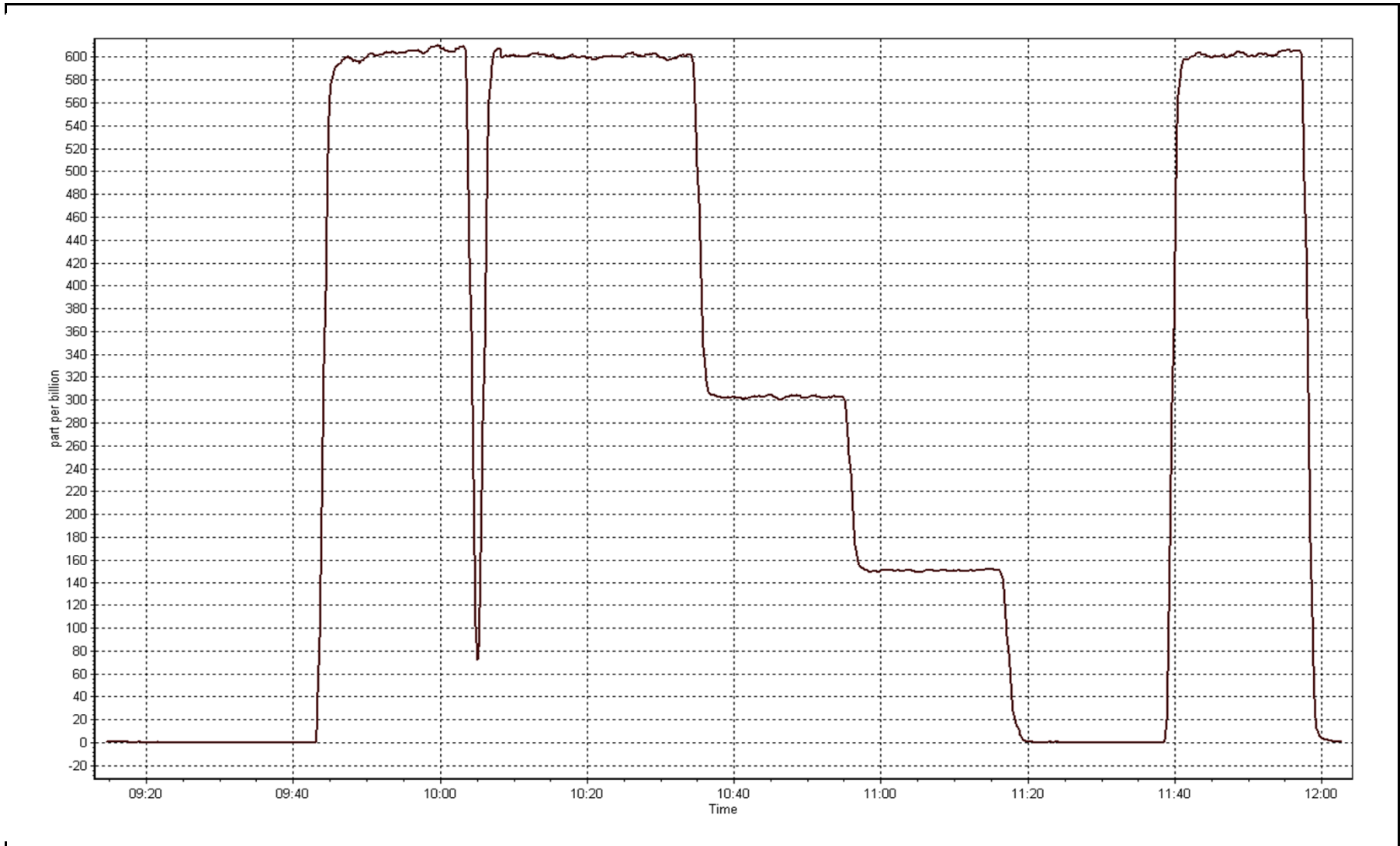
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999987
600.0	602.4	0.9961		
300.0	302.9	0.9904	Slope	0.995534
150.0	150.2	0.9987		
			Intercept	-0.191646

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 4, 2015





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 9, 2015	Previous Calibration	February 6, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	15:00
Barometric Pressure	725 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11061107
Cal Gas Concentration	5.04 ppm H2S	Cal Gas Expiry Date	9-Sep-17
Gas Cert Reference	CC62844	SO2 gas conc.	50.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	28

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-624	-624
Analyzer Range (ppb)	100	100	Lamp voltage	886	887
Calculated slope	1.009352	0.986617	Chamber temp.	45	45
Calculated intercept	-0.304998	-0.280270	Pressure	515.0	520.1
Analyzer Background	16.7	16.6	Flow	1.063	1.066
Analyzer Coefficient	1.290	1.325	Intensity (%)	115	116
			Converter temp.	323	323

Analyzer make/model	TEI 450i	Analyzer serial #	815129108
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	-0.25	NA
as found span	5000	74.4	75.0	73.59	1.019
SO2 scrubber check	5000	30.0	300.0	0.9	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	74.4	75.0	76.0	0.986
second point	5000	41.7	42.0	43.3	0.972
third point	5000	24.8	25.0	25.8	0.969
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	74.4	75.0	75.5	0.993
Average Correction Factor					0.976

Corrected As found	73.8	Previous response	74.6	% change	1.0%
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Notes:

Adjusted both zero and span. Inlet filter was changed after 3rd point.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

H2S Calibration Summary

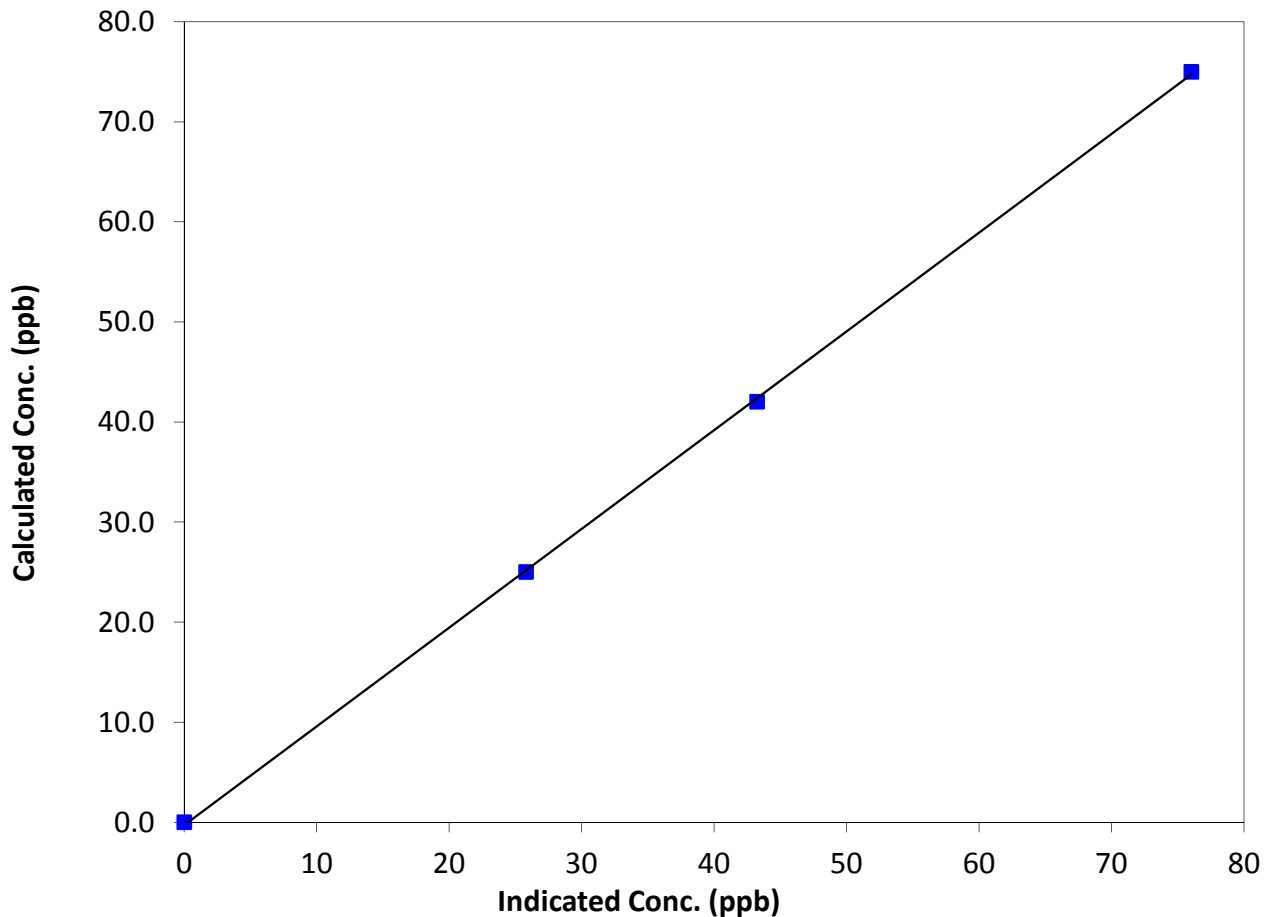
Station Information

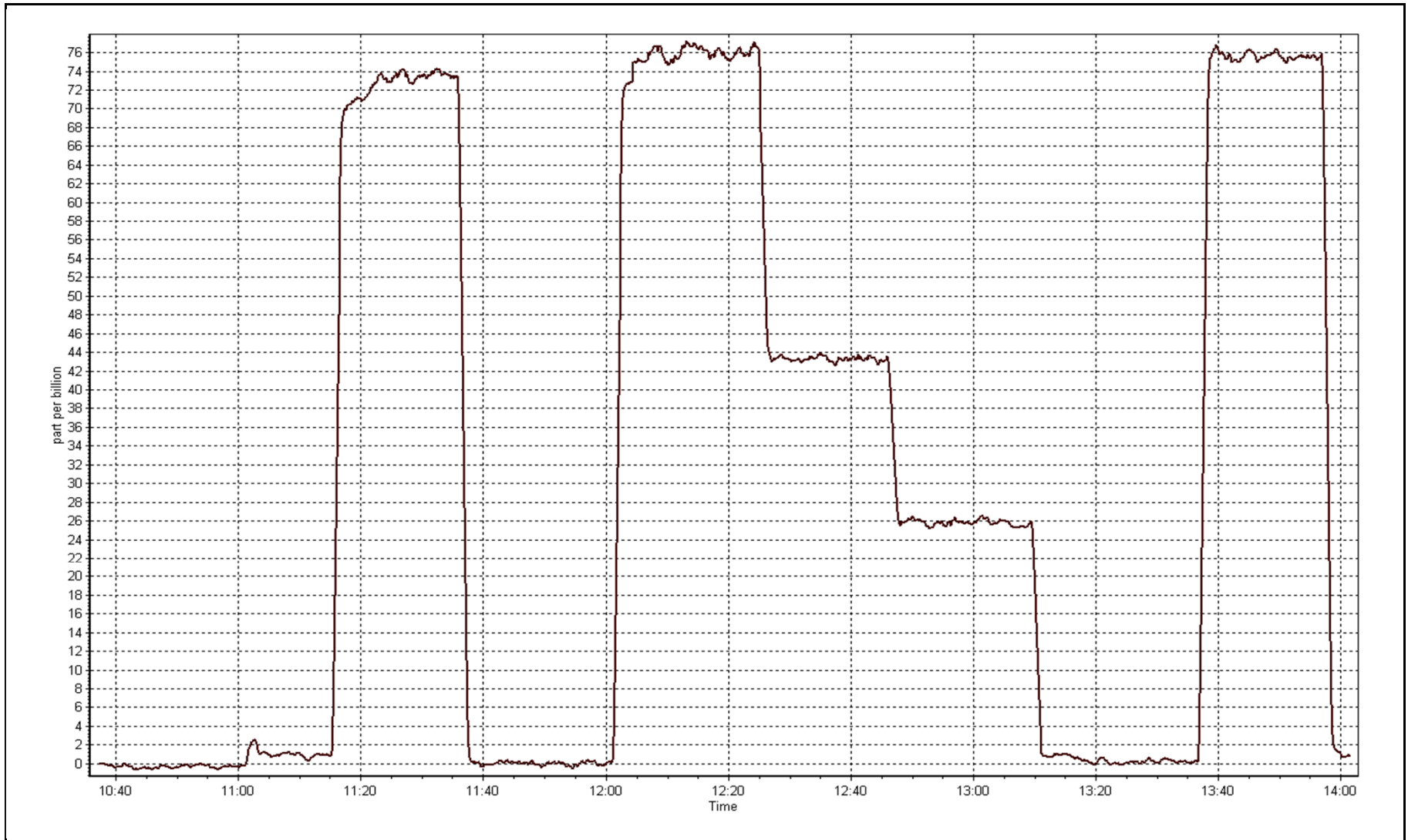
Calibration Date	March 9, 2015	Previous Calibration	February 6, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:35	End Time (MST)	15:00
Analyzer make	TEI 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999899
75.0	76.0	0.9864		
42.0	43.3	0.9719	Slope	0.986617
25.0	25.8	0.9689		
			Intercept	-0.280270

H2S Calibration Curve







Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 14, 2015	Previous Calibration	March 9, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:20
Barometric Pressure	725 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11061107
Cal Gas Concentration	5.04 ppm H2S	Cal Gas Expiry Date	9-Sep-17
Gas Cert Reference	CC62844	SO2 gas conc.	50.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	28

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-624	-624
Analyzer Range (ppb)	100	100	Lamp voltage	887	889
Calculated slope	0.986617	1.001672	Chamber temp.	45	45
Calculated intercept	-0.280270	-0.210351	Pressure	520.1	508.3
Analyzer Background	16.6	16.8	Flow	1.066	1.045
Analyzer Coefficient	1.325	1.325	Intensity (%)	116	116
			Converter temp.	323	323

Analyzer make/model	TEI 450i	Analyzer serial #	815129108
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	0.21	NA
as found span	5000	74.4	75.0	75.08	0.999
SO2 scrubber check	5000	30.0	300.0	0.9	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	74.4	75.0	75.1	0.999
second point					
third point					
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	74.4	75.0	75.1	0.999
Average Correction Factor					0.999

Corrected As found	74.9	Previous response	76.3	% change	1.9%
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Notes:

A/D card was loosened up a bit causing low daily spans, inserted in tightly. No adjustments made.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

H2S Calibration Summary

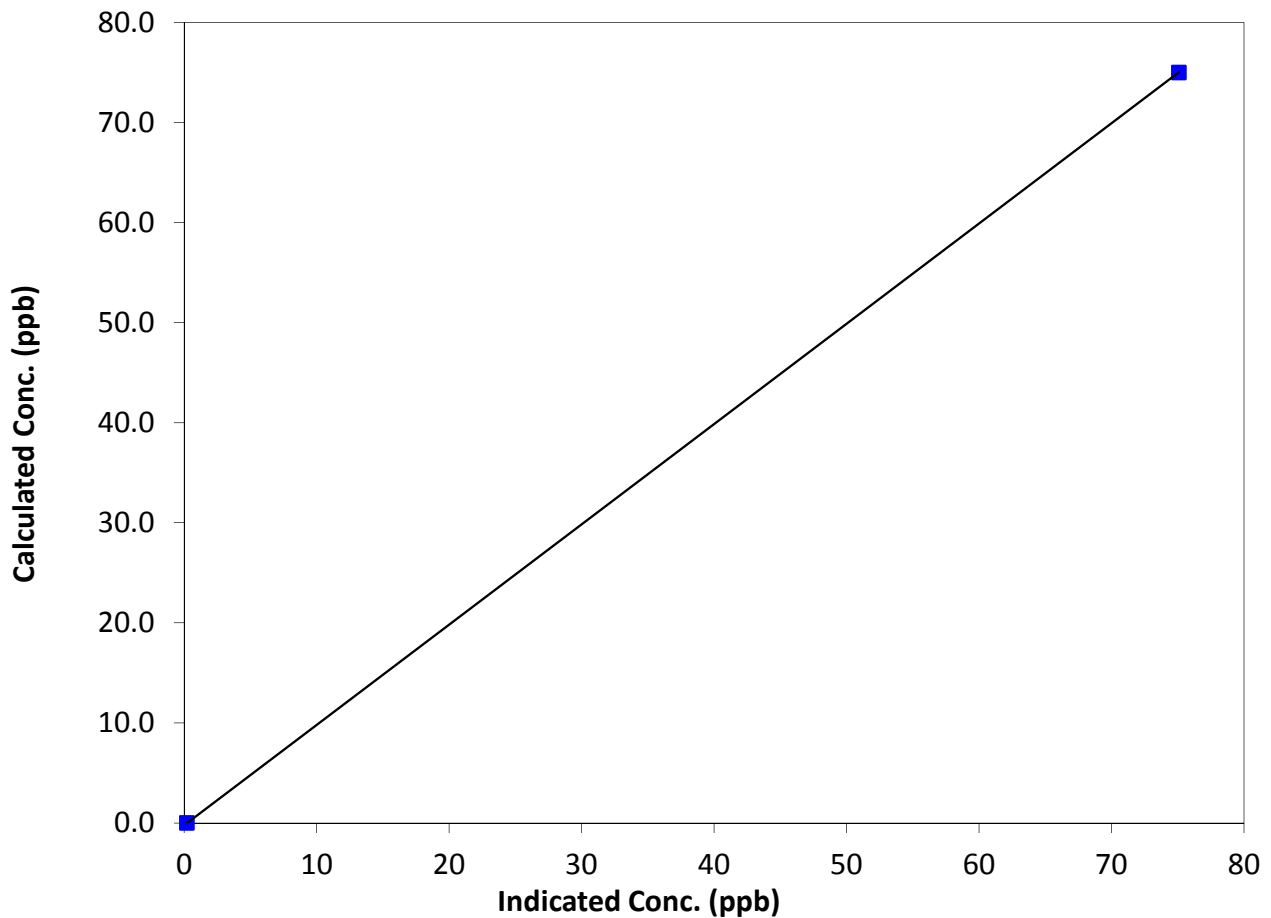
Station Information

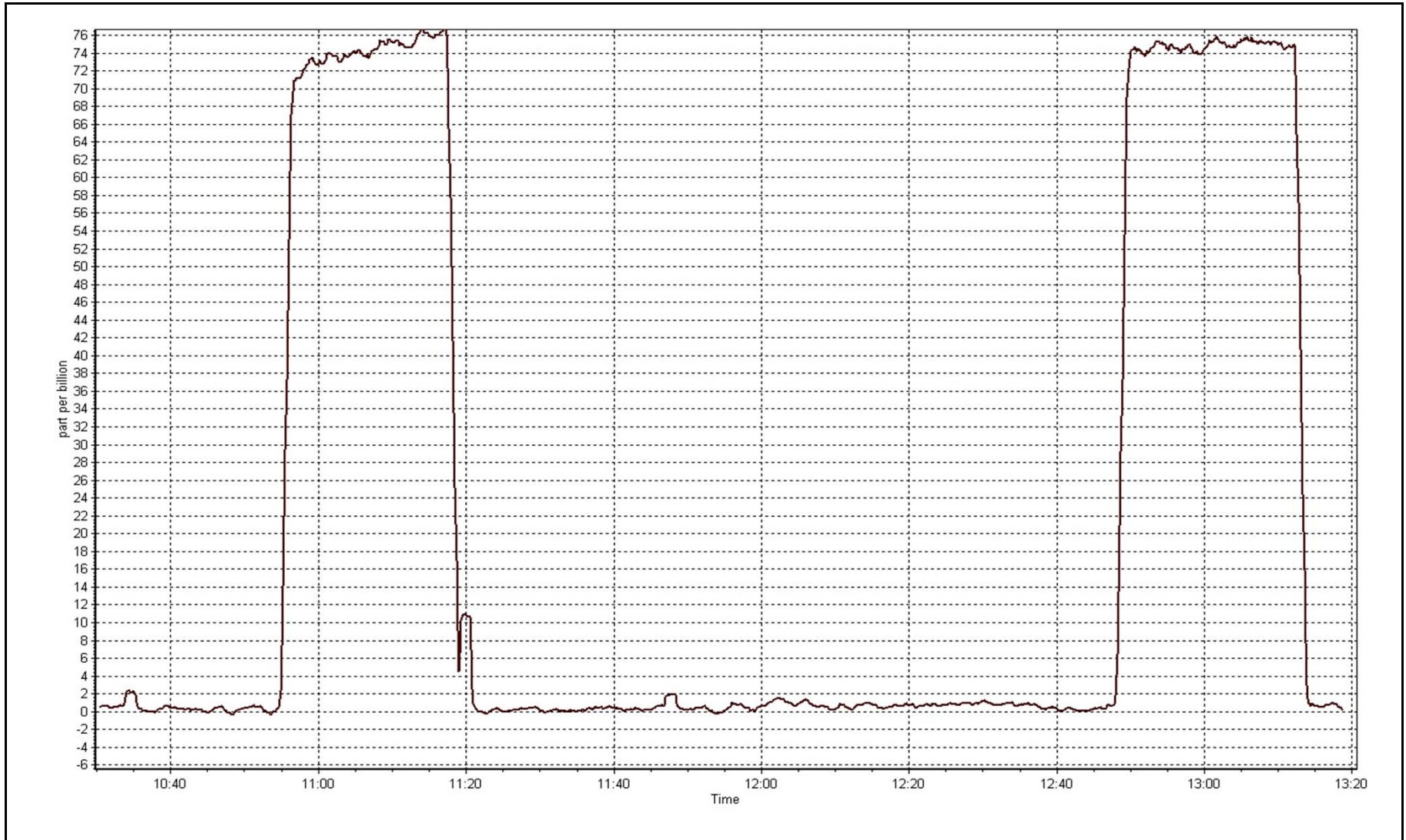
Calibration Date	March 14, 2015	Previous Calibration	March 9, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	10:30	End Time (MST)	13:20
Analyzer make	TEI 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	1.000000
75.0	75.1	0.9989		
			Slope	1.001672
			Intercept	-0.210351

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Wednesday, March 04, 2015	Previous Calibration	Wednesday, February 05, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:00
Barometric Pressure	740 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	S960161A	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	9.4	9.4
Analyzer Range (ppm)	25	25	Air	42.3	42.3
Calculated slope	1.009054	1.009889	Fuel Pressure	20.2	20.2
Calculated intercept	-0.072550	-0.064496	Detector Temp	124.9	125.0
Bkg	3.49	3.49	Flame Temp	158.7	158.5
Slope	3.722	3.722			

Analyzer make TEI 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	0.05	N/A
as found span	5000	60.0	12.46	12.36	1.008
calibrator zero	5000	0.0	0.00	0.05	N/A
high point	5000	60.0	12.46	12.38	1.006
2nd point	5000	30.0	6.23	6.27	0.993
3rd point	5000	15.0	3.11	3.14	0.992
calibrator zero					
as left zero	5000	0.0	0.00	0.07	N/A
as left span	5000	58.8	12.21	12.40	0.984
Average Correction Factor					0.997

Corrected As found 12.31 Previous response 12.42 % change 0.9%

Notes:

Changed inlet filter after the as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

THC Calibration Summary

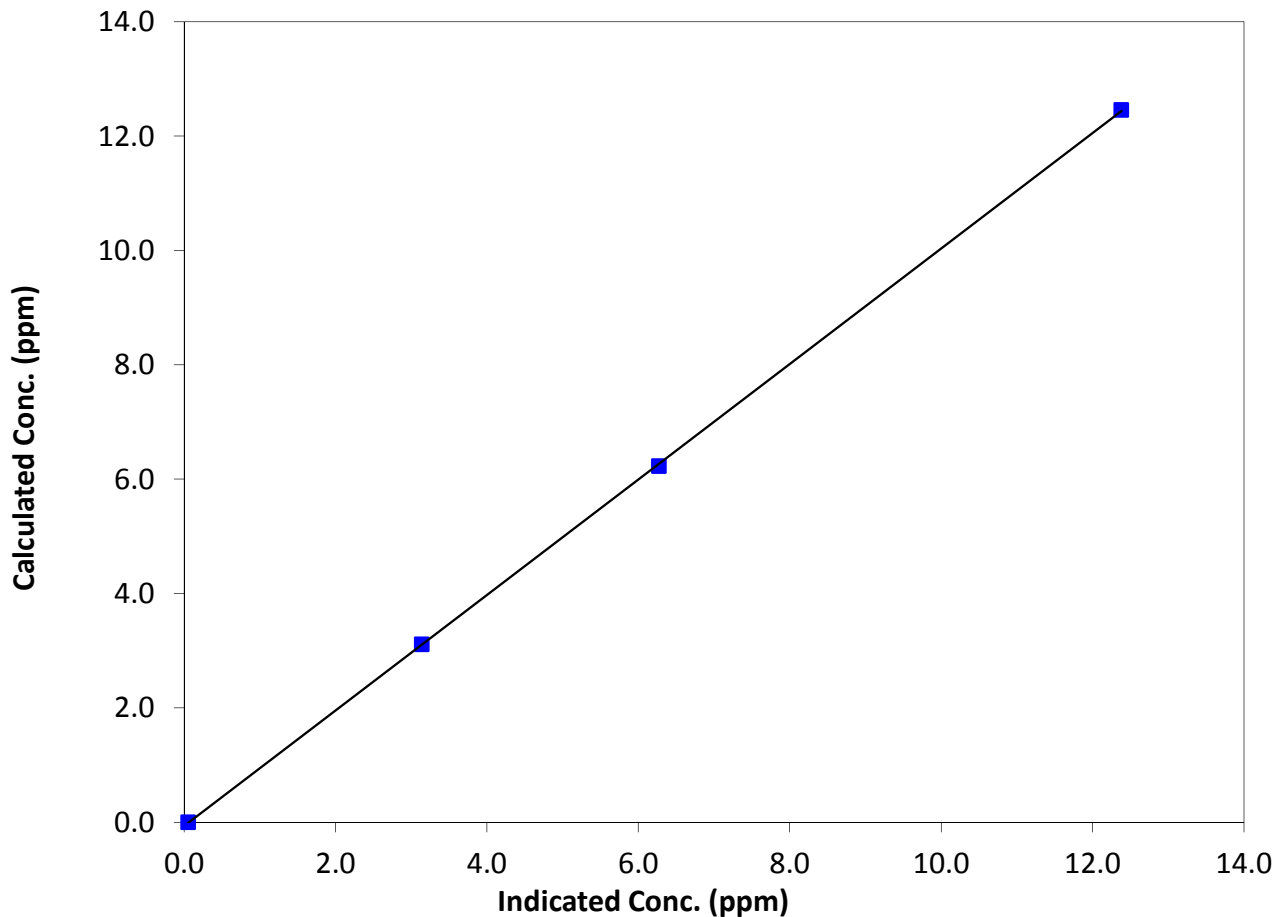
Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 5, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:15	End Time (MST)	12:00
Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295

Calibration Data

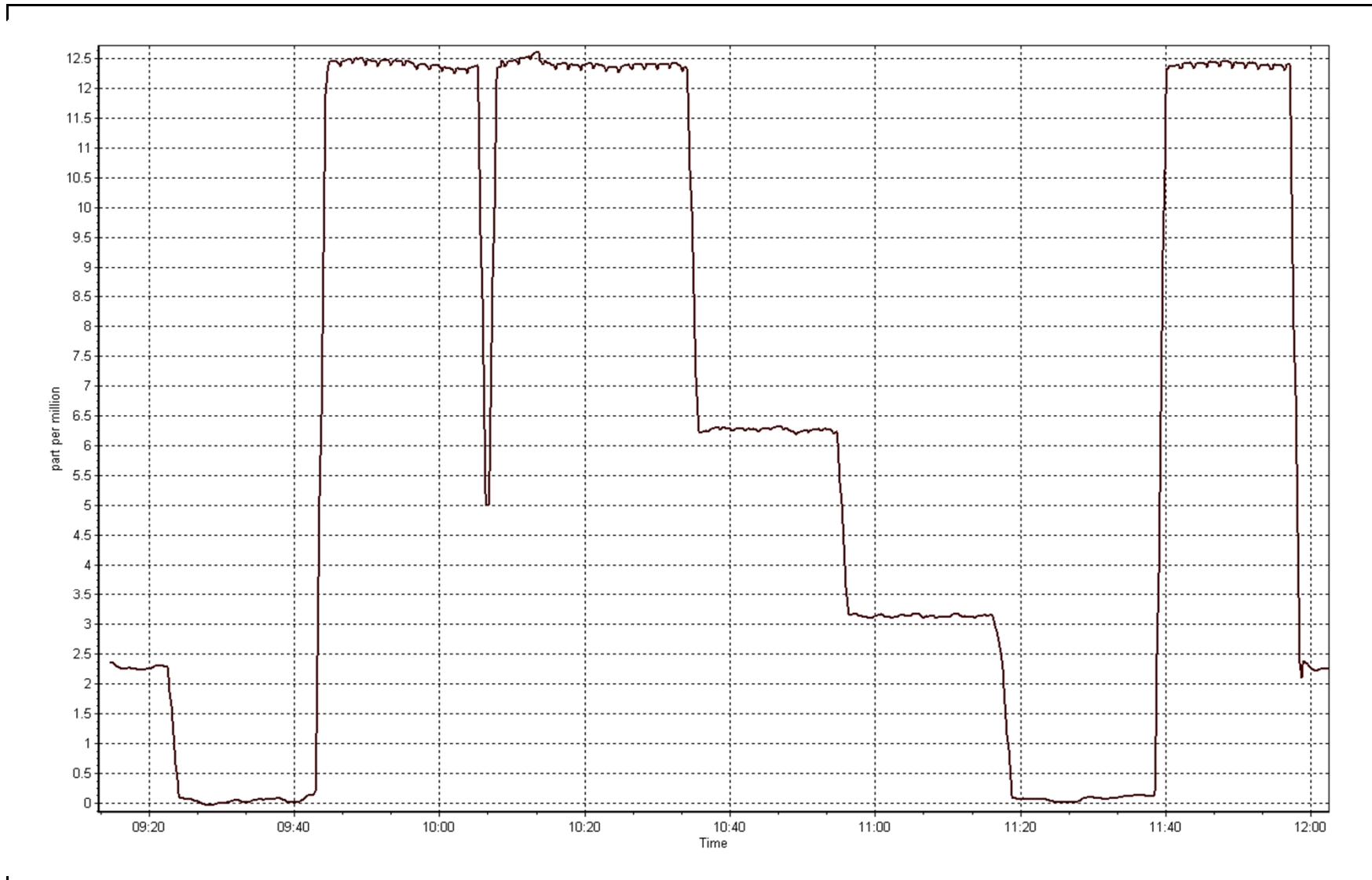
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	N/A	Correlation Coefficient	0.999975
12.46	12.38	1.0061		
6.23	6.27	0.9933	Slope	1.009889
3.11	3.14	0.9917		
			Intercept	-0.064496

THC Calibration Curve



THC Calibration Plot

Date: March 4, 2015



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
MARCH 2015

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	709	35	35	100.00	20	0	5	0
TRS (ppb) Average	709	35	35	100.00	2	0	1	0
THC (ppm) Average	709	35	35	100.00	2.4	-	2	-
NMHC(ppm) Average	709	35	35	100.00	0.201	-	0.009	-
CH4(ppm) Average	709	35	35	100.00	2.4	-	2	-
O3 (ppb) Average	709	35	35	100.00	45	0	39	-
NO2 (ppb) Average	708	36	36	100.00	39	0	15	-
NO (ppb) Average	708	36	36	100.00	32	-	10	-
NOX (ppb) Average	708	36	36	100.00	66	-	25	-
NH3 (ppb) Average	620	52	124	90.32	0	0	0	-
PM2.5 (ug/m3) Average	742	0	2	99.73	64.7	-	12.6	0
Temperature 2 m (C) Average	744	0	0	100.00	15.4	-	8.5	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	88	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	35	-	23	-
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)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	1	2	-	0	0	0	0	1	3	20
TRS (ppb) Average	709	0.5	0	-	0	0	0	0	1	1	2
THC (ppm) Average	709	1.95	0.1	-	1.8	1.9	1.9	1.9	2	2	2.4
NMHC(ppm) Average	709	0.001	0.008	-	0	0	0	0	0	0	0.201
CH4(ppm) Average	709	1.95	0.1	-	1.8	1.9	1.9	1.9	2	2	2.4
O3 (ppb) Average	709	27.5	10	-	2	12	20	29	36	40	45
NO2 (ppb) Average	708	7.2	7	-	0	0	2	6	10	17	39
NO (ppb) Average	708	2.4	4	-	0	0	0	1	3	6	32
NOX (ppb) Average	708	9.6	10	-	0	0	3	7	13	21	66
NH3 (ppb) Average	620	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	742	4.78	5	-	0.2	1.2	2.2	3.7	5.9	8.9	64.7
Temperature 2 m (C) Average	744	-3.28	8.7	-	-32.7	-14.2	-8.5	-3.1	3.4	6.6	15.4
Relative Humidity (%) Average	744	64.7	18	-	20	39	52	66	80	86	98
Wind Speed 10 m (km/h) Average	744	9.7	6	-	0	3	5	9	13	17	35
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NH3	11 Mar 2015 11:00	12 Mar 2015 09:00	23	Maintenance - replaced analyzer and follow-up calibration
NH3	12 Mar 2015 23:00	31 Mar 2015 10:00	47	Stabilization after daily span
NH3	15 Mar 2015 17:00	15 Mar 2015 18:00	2	Power Spike followed by stabilization period
PM2.5	12 Mar 2015 16:00	12 Mar 2015 17:00	2	Maintenance - Flow and zero check, sample head cleaning

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Mar 16 19:00	Maximum Daily Average: 4.8 ppb on Mar 16		Hours of Data:	709
Minimum Value: 0 ppb on Mar 29 06:00	Minimum Daily Average: 0.1 ppb on Mar 29		Hours of Missing Data:	35
Maximum Diurnal Average: 1.9 ppb at hour 19	Minimum Diurnal Average: 0.5 ppb at hour 24		Hours of Calibration:	35
Monthly Average: 1.0 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =3 P ₉₉ =8		Percent Operational Time:	100.0

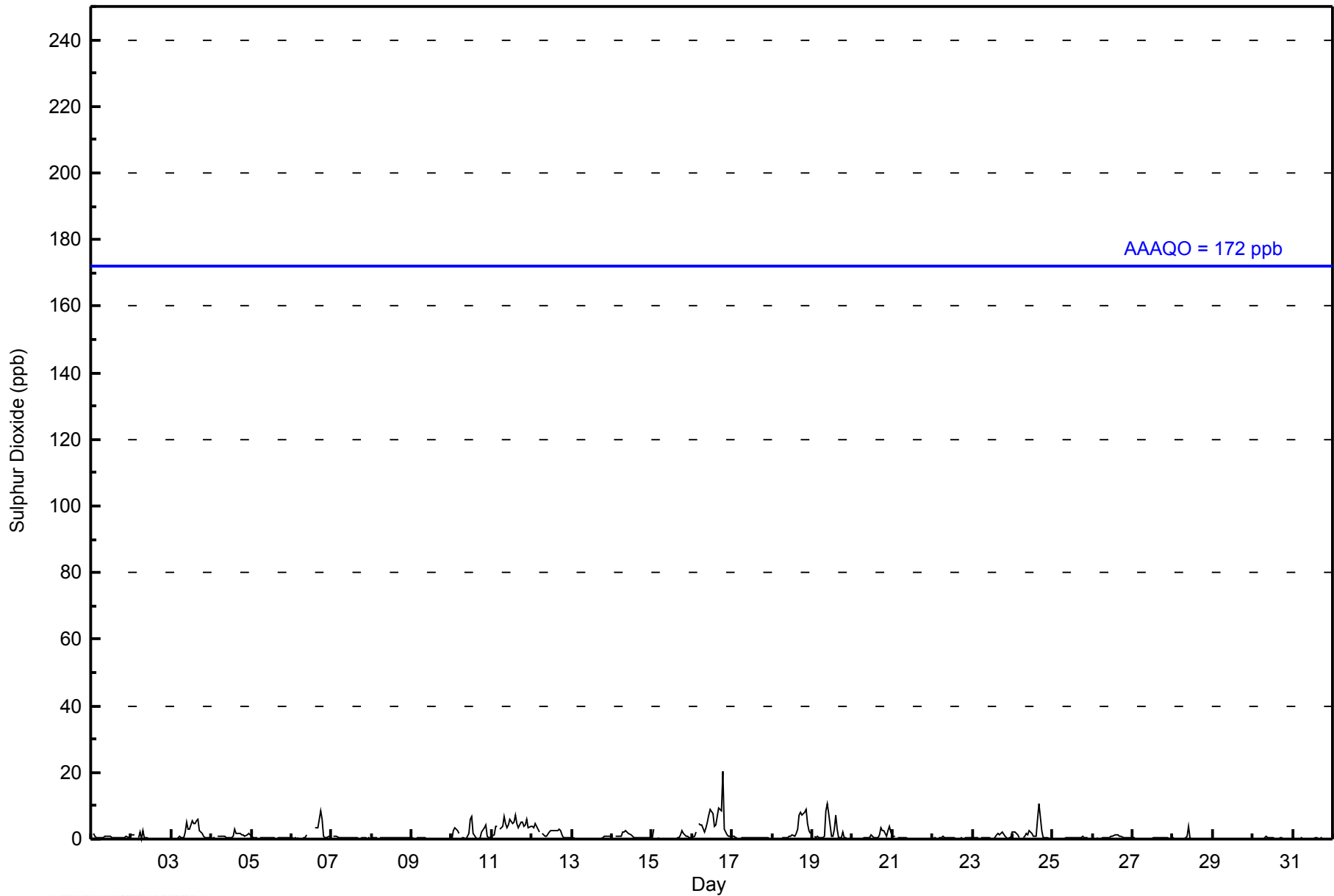
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	2	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0.6	2
2-Mar	1	1	1	Z	1	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
3-Mar	0	0	Z	0	0	1	0	0	2	5	3	3	6	5	5	5	6	2	2	1	1	0	0	2.1	6	
4-Mar	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	3	2	2	2	1	1	1	1	2	1	1.0	3
5-Mar	1	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
6-Mar	0	0	0	0	0	Z	0	0	1	1	C	C	C	C	3	3	3	8	6	1	0	0	1	1	1.6	8
7-Mar	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
8-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Mar	0	3	3	2	2	Z	1	0	0	1	2	6	7	2	1	0	0	0	2	3	4	1	0	0	1.7	7
11-Mar	1	1	4	4	Z	3	4	7	5	3	4	6	5	5	7	5	3	5	5	4	4	6	3	4	4.3	7
12-Mar	4	3	5	4	2	Z	2	1	1	1	2	3	2	2	3	3	3	2	1	1	0	1	0	0	2.0	5
13-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.3	1
14-Mar	1	Z	1	1	1	1	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.9	2
15-Mar	0	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	1	1	1	0	0.6	3
16-Mar	0	1	2	Z	5	4	4	2	3	5	7	9	8	4	4	7	9	8	20	3	2	1	1	1	4.8	20
17-Mar	1	1	1	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
18-Mar	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	2	3	7	8	7	8	9	5	3	2	2.6	9
19-Mar	Z	1	0	1	0	0	0	1	8	11	8	1	1	3	7	3	0	1	2	0	0	0	0	0	2.2	11
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	4	2	2	1	2	4	2	1.1	4
21-Mar	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Mar	0	0	1	Z	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0.4	1
23-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	2	2	1	0	0	0	1	0.6	2
24-Mar	2	2	2	1	0	Z	0	1	2	1	3	2	1	1	1	6	10	3	0	0	0	0	0	0	1.7	10
25-Mar	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
26-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
27-Mar	0	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-Mar	0	0	0	Z	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4
29-Mar	0	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-Mar	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Mar	Z	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
	0.6	0.8	0.9	0.7	0.6	0.6	0.6	0.8	1.0	1.3	1.3	1.3	1.3	1.0	1.4	1.4	1.7	1.7	1.9	1.1	0.9	0.8	0.6	0.5	Diurnal Average	
	4	3	5	4	5	4	4	7	8	11	8	9	8	5	7	7	10	8	20	8	9	6	4	4	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

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



WBEA
Frequency Distribution

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

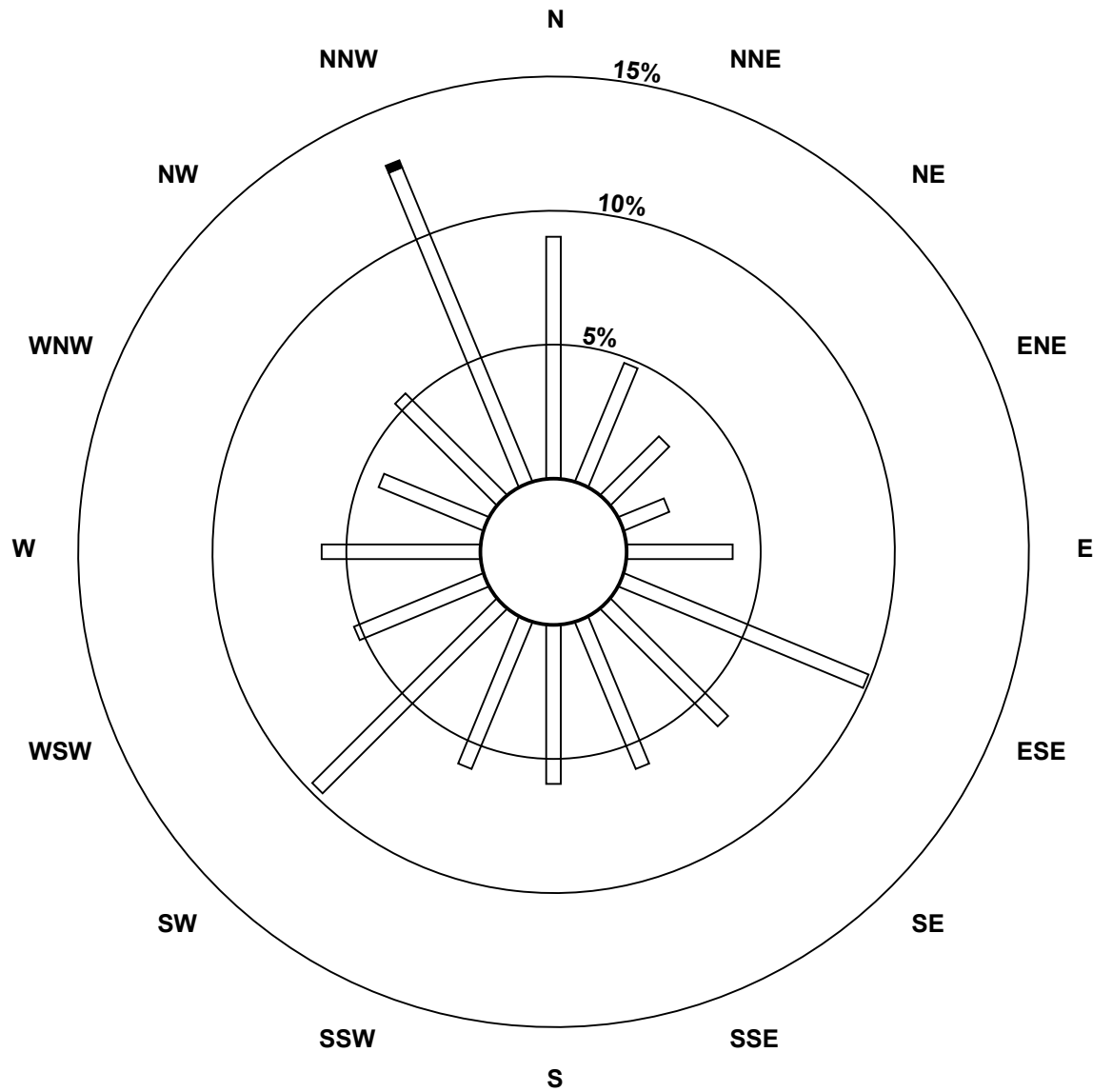
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	64	34	22	13	28	70	44	42	42	42	69	37	42	30	38	90	707
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	64	34	22	13	28	70	44	42	42	42	69	37	42	30	38	92	709

Total Number of Valid Hours: 709

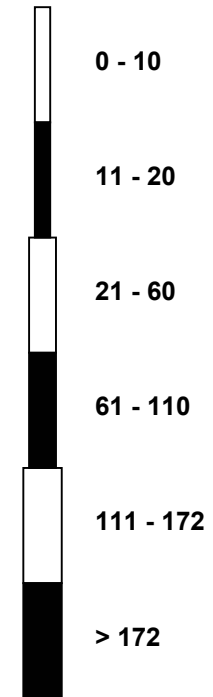
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Classes (ppb)

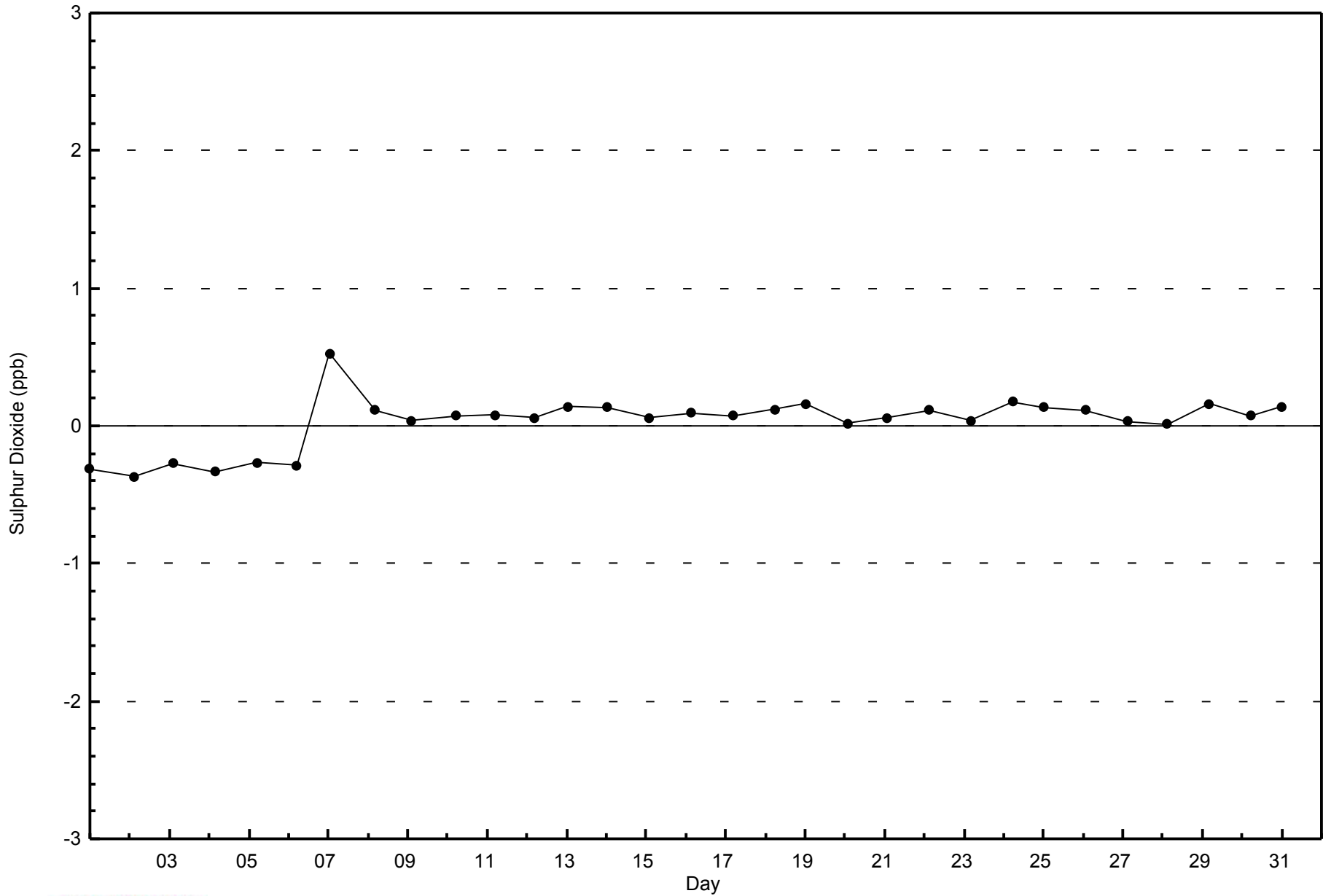


Total Number of Valid Hours: 709



WBEA
Zero Responses

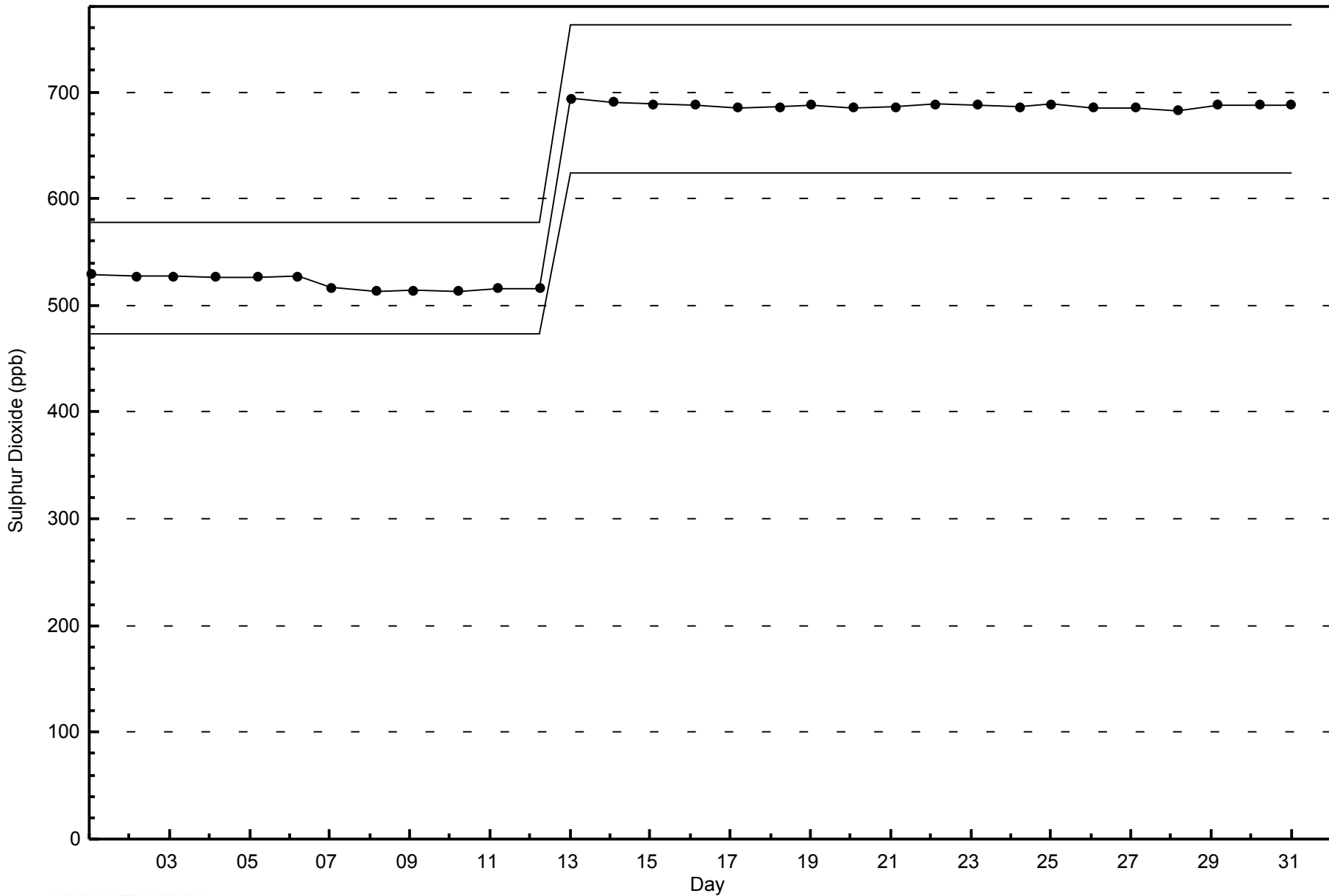
Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - March 2015





WBEA
Span Responses

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





Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Mar 18 17:00	Maximum Daily Average: 0.7 ppb on Mar 11		Hours of Data:	709
Minimum Value: 0 ppb on Mar 15 10:00	Minimum Daily Average: 0.3 ppb on Mar 28		Hours of Missing Data:	35
Maximum Diurnal Average: 0.5 ppb at hour 10	Minimum Diurnal Average: 0.4 ppb at hour 24		Hours of Calibration:	35
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 =1		Percent Operational Time:	100.0

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

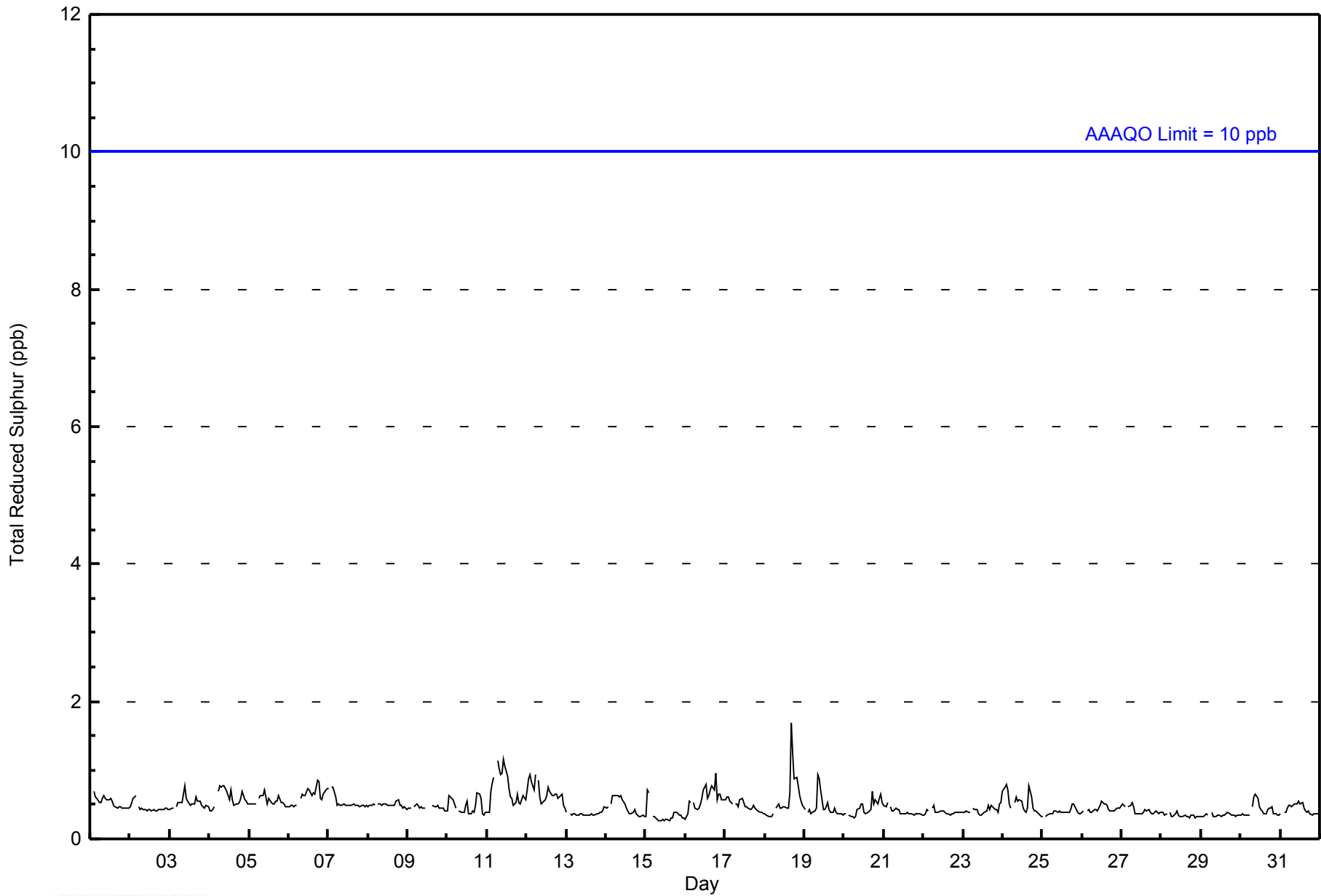
0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	Diurnal Average
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

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



WBEA
Frequency Distribution

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

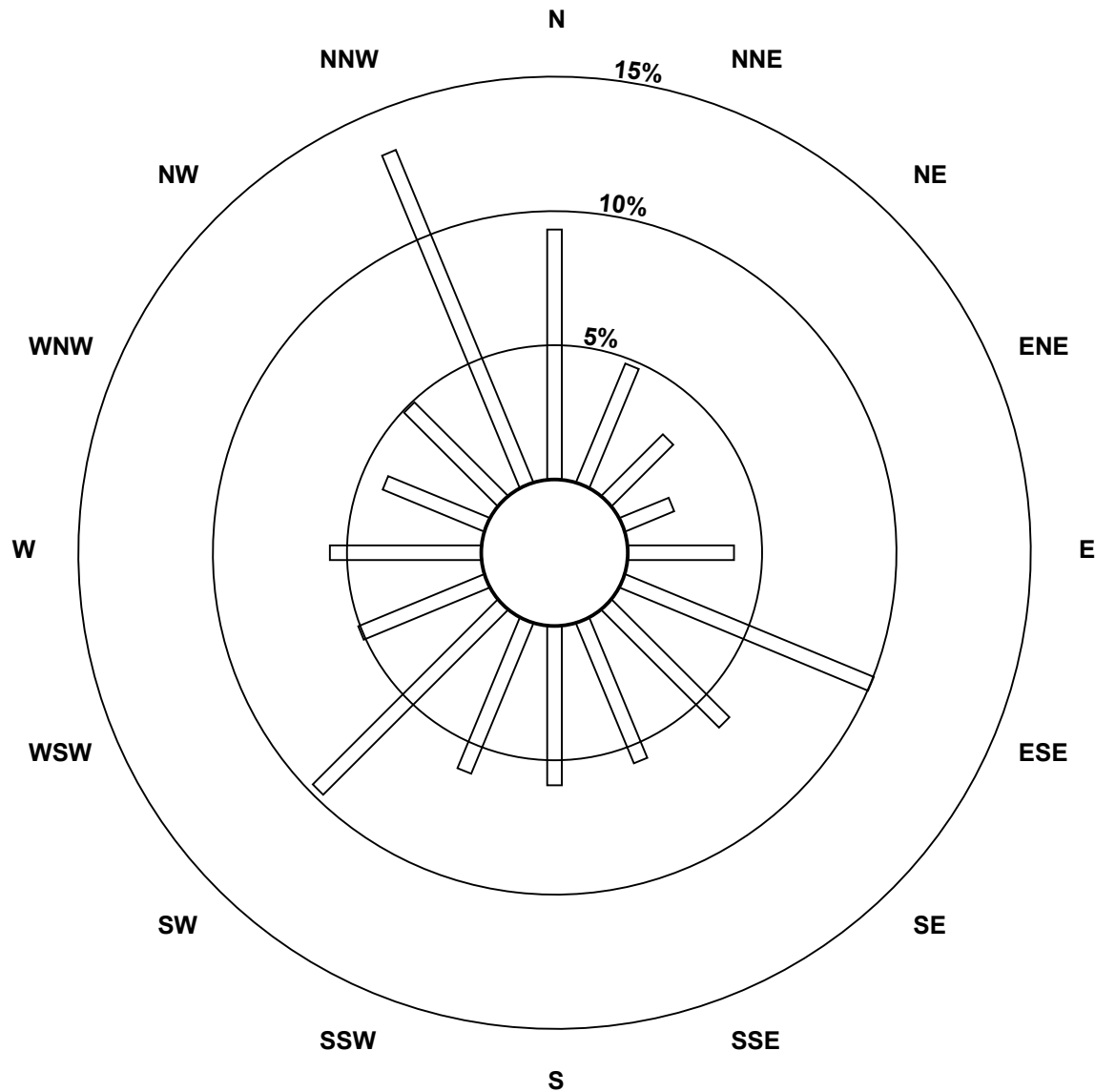
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	66	34	23	14	28	71	44	40	42	43	69	36	40	29	35	95	709
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	34	23	14	28	71	44	40	42	43	69	36	40	29	35	95	709

Total Number of Valid Hours: 709

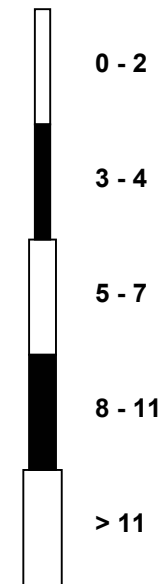
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Classes (ppb)

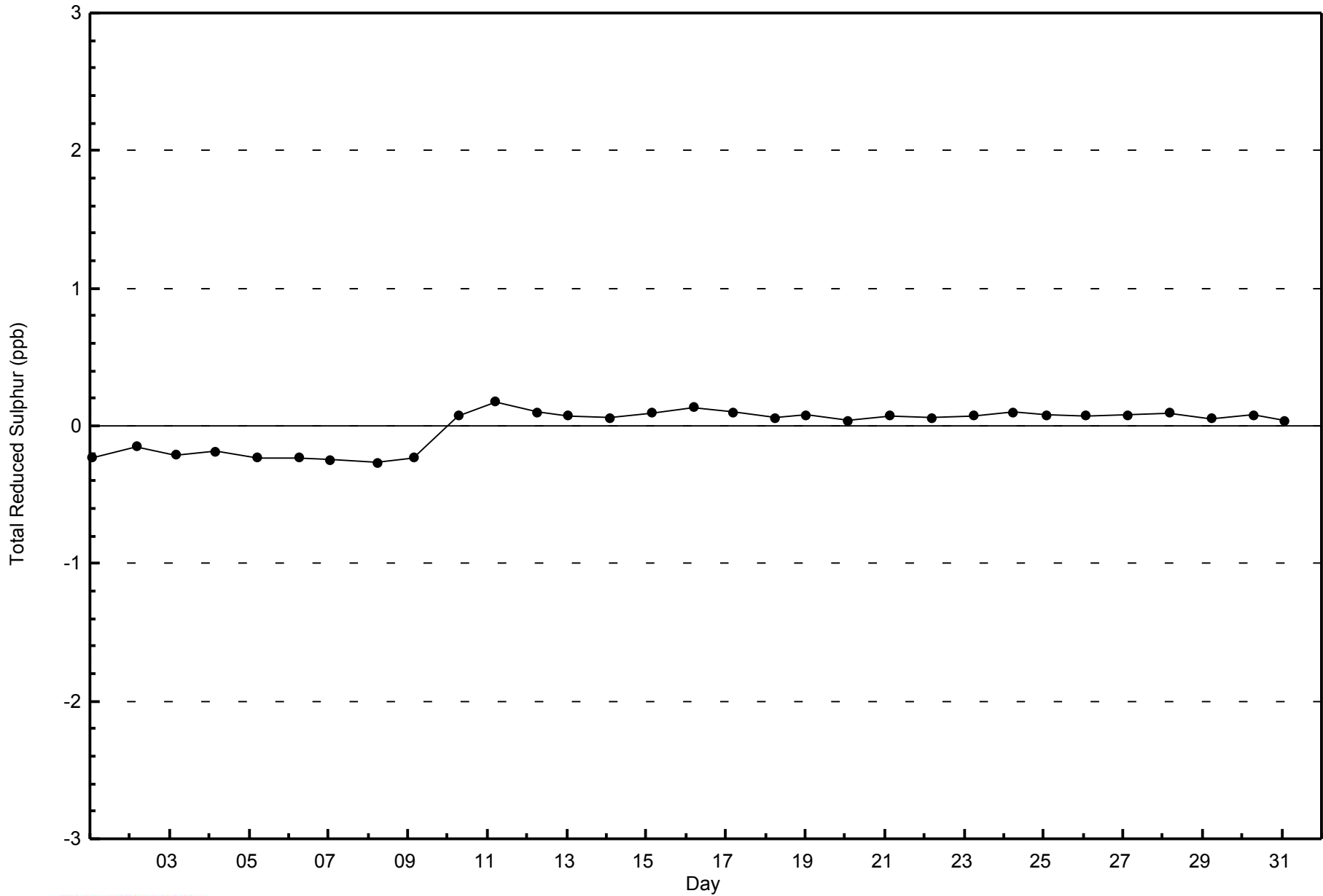


Total Number of Valid Hours: 709



WBEA
Zero Responses

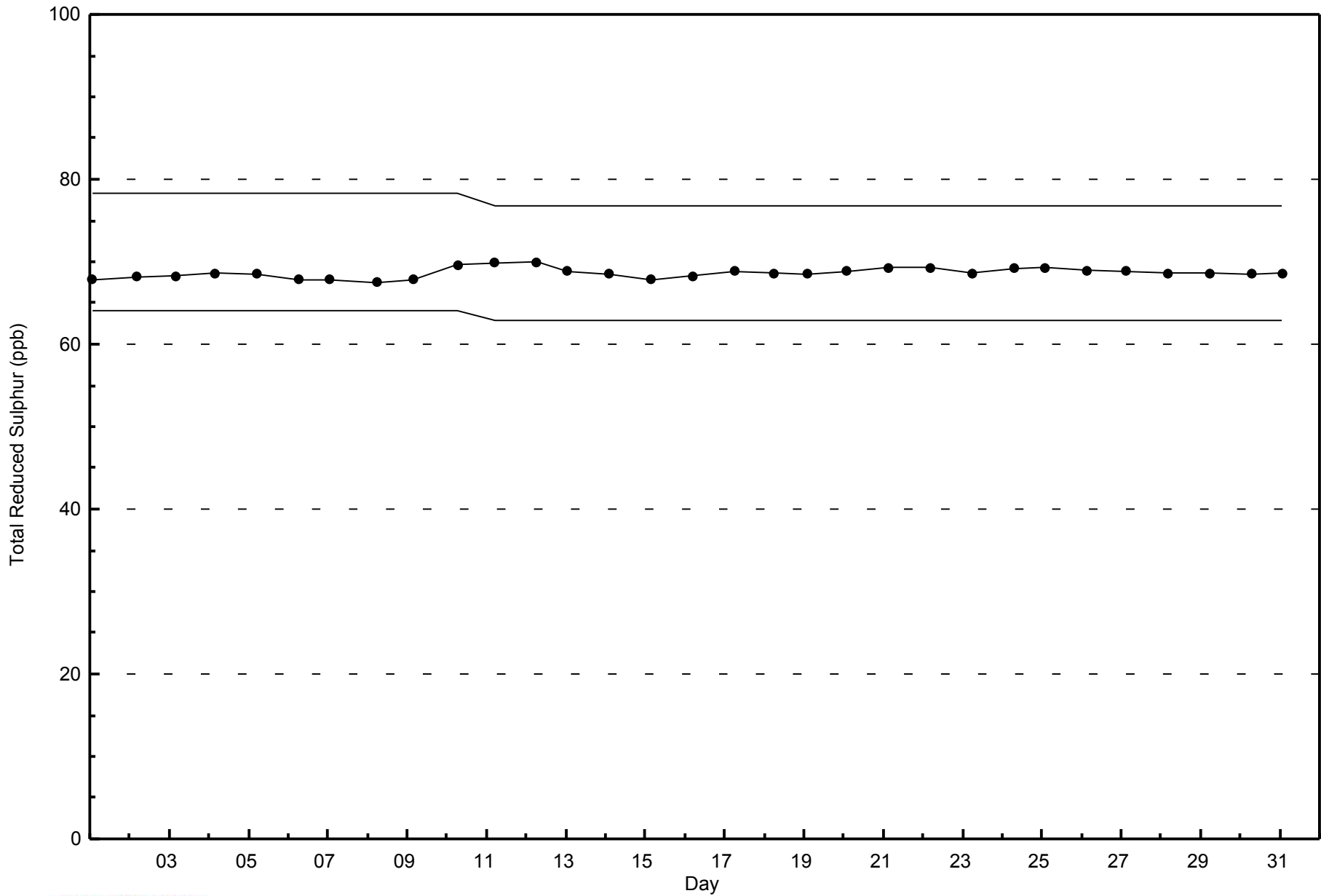
Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - March 2015





WBEA
Span Responses

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



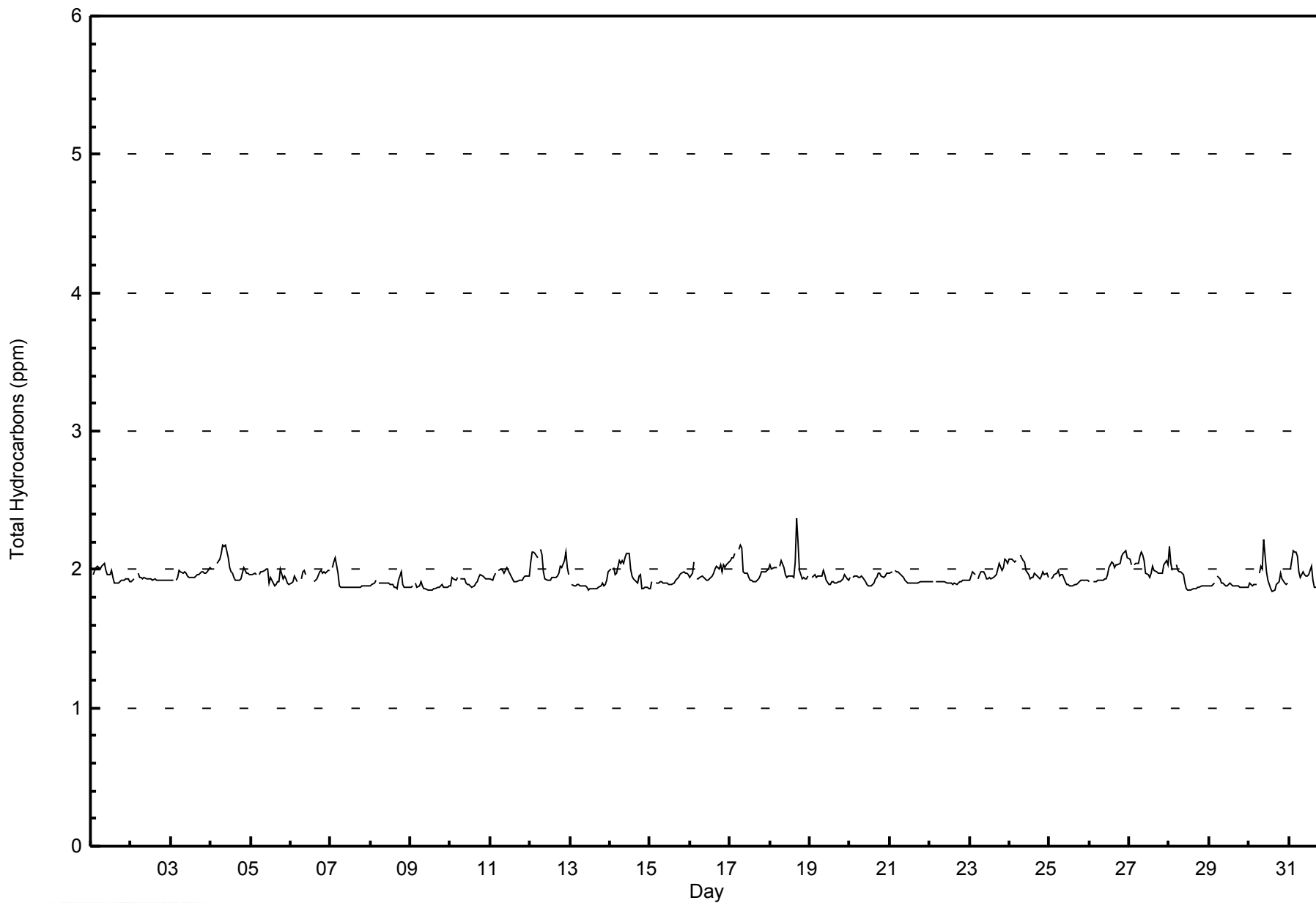


Maximum Value: 2.4 ppm on Mar 18 17:00		Maximum Daily Average: 2.0 ppm on Mar 27		Hours in Service: 744																							
Minimum Value: 1.8 ppm on Mar 30 15:00		Minimum Daily Average: 1.9 ppm on Mar 9		Hours of Data: 709																							
Maximum Diurnal Average: 2.0 ppm at hour 8		Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Missing Data: 35																							
Monthly Average: 1.95 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.2		Hours of Calibration: 35																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	
2-Mar	1.9	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
3-Mar	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4-Mar	2.0	2.0	2.0	Z	2.0	2.1	2.1	2.2	2.2	2.2	2.1	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	2.2	2.2
5-Mar	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.0
6-Mar	1.9	1.9	2.0	1.9	1.9	Z	1.9	2.0	2.0	2.0	C	C	C	C	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
7-Mar	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
8-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
9-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
10-Mar	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
11-Mar	1.9	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	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	2.0	2.0
12-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1
13-Mar	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	1.9	2.0
14-Mar	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
15-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
16-Mar	1.9	2.0	2.1	Z	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
17-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
18-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.1	2.4	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.4
19-Mar	Z	1.9	1.9	2.0	1.9	2.0	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0
20-Mar	1.9	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	1.9	2.0
21-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
22-Mar	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
23-Mar	1.9	2.0	2.0	2.0	Z	1.9	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	2.1	2.1	2.0	2.0	2.1	2.1
24-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.1
25-Mar	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
26-Mar	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
27-Mar	2.1	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
28-Mar	2.2	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
29-Mar	1.9	1.9	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
30-Mar	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.2	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.2
31-Mar	Z	2.0	2.1	2.1	2.1	2.1	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	645	90.97	90.97
2.1 - 3.0	64	9.03	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



WBEA
Frequency Distribution

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

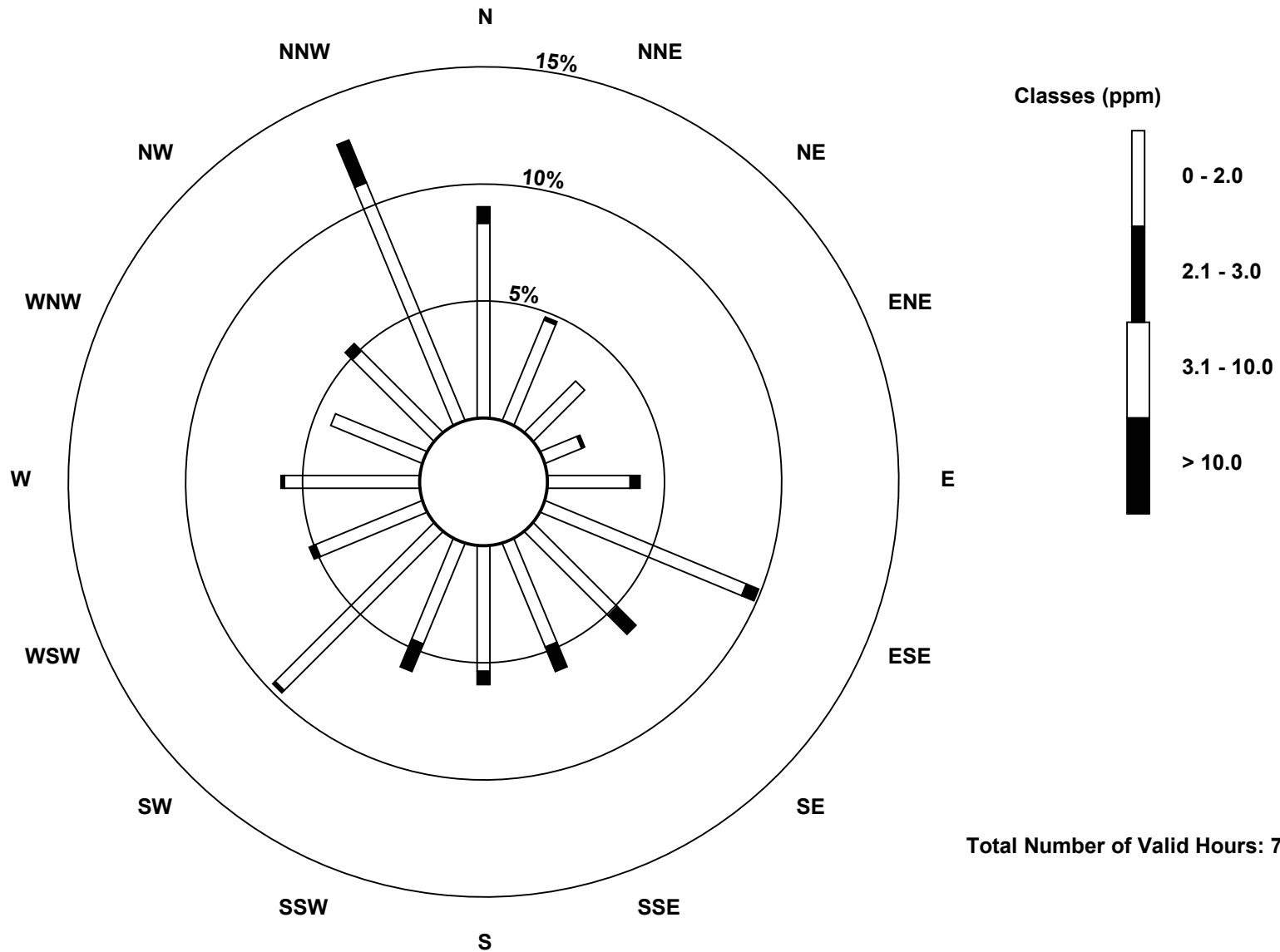
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	59	33	22	12	25	66	36	34	38	33	68	35	41	30	35	78	645
2.1 - 3.0	5	1	0	1	3	4	8	8	4	9	1	2	1	0	3	14	64
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	34	22	13	28	70	44	42	42	42	69	37	42	30	38	92	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

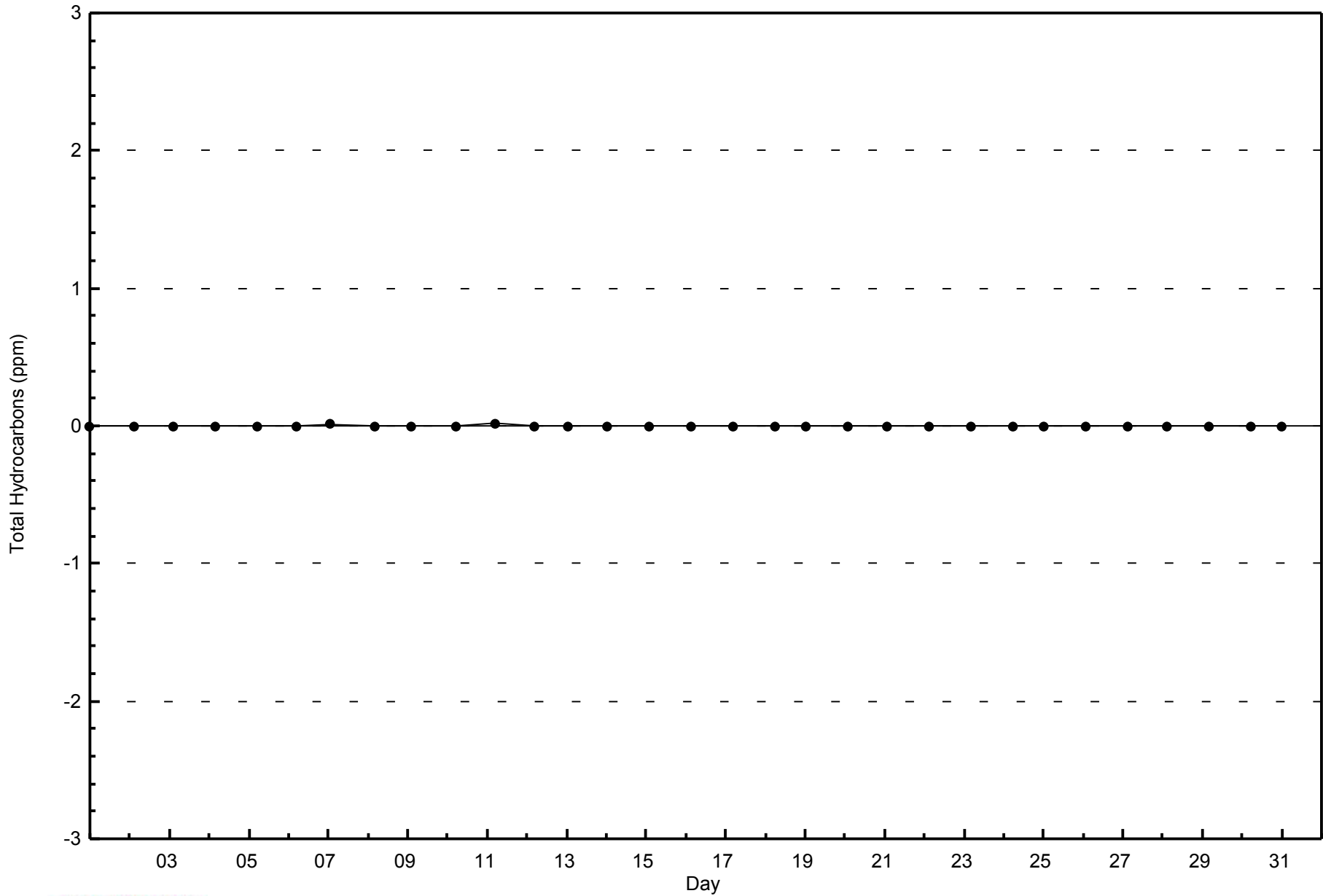
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)





WBEA
Zero Responses

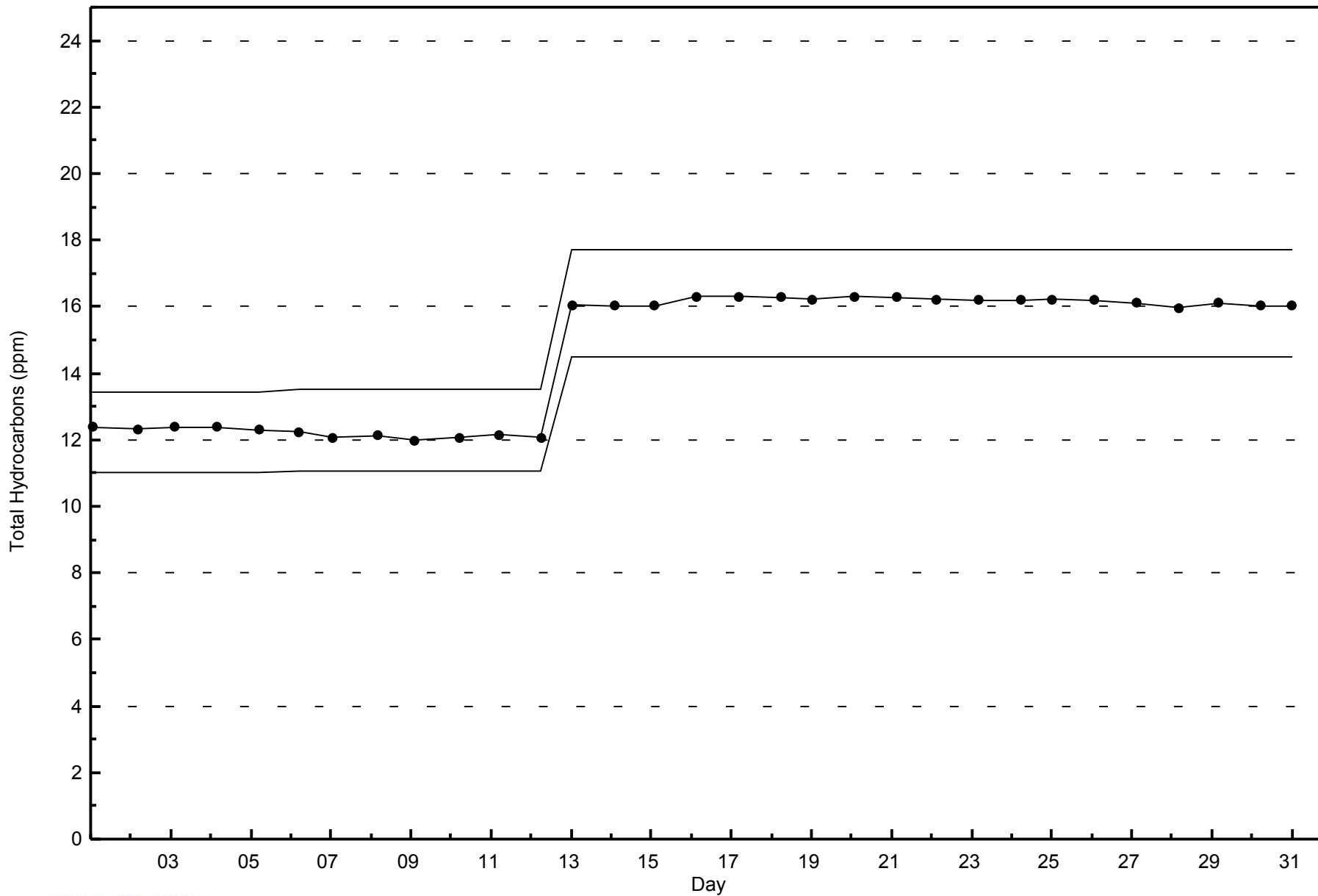
Total Hydrocarbons (THC) - ppm
Patricia McInnes - March 2015





WBEA
Span Responses

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

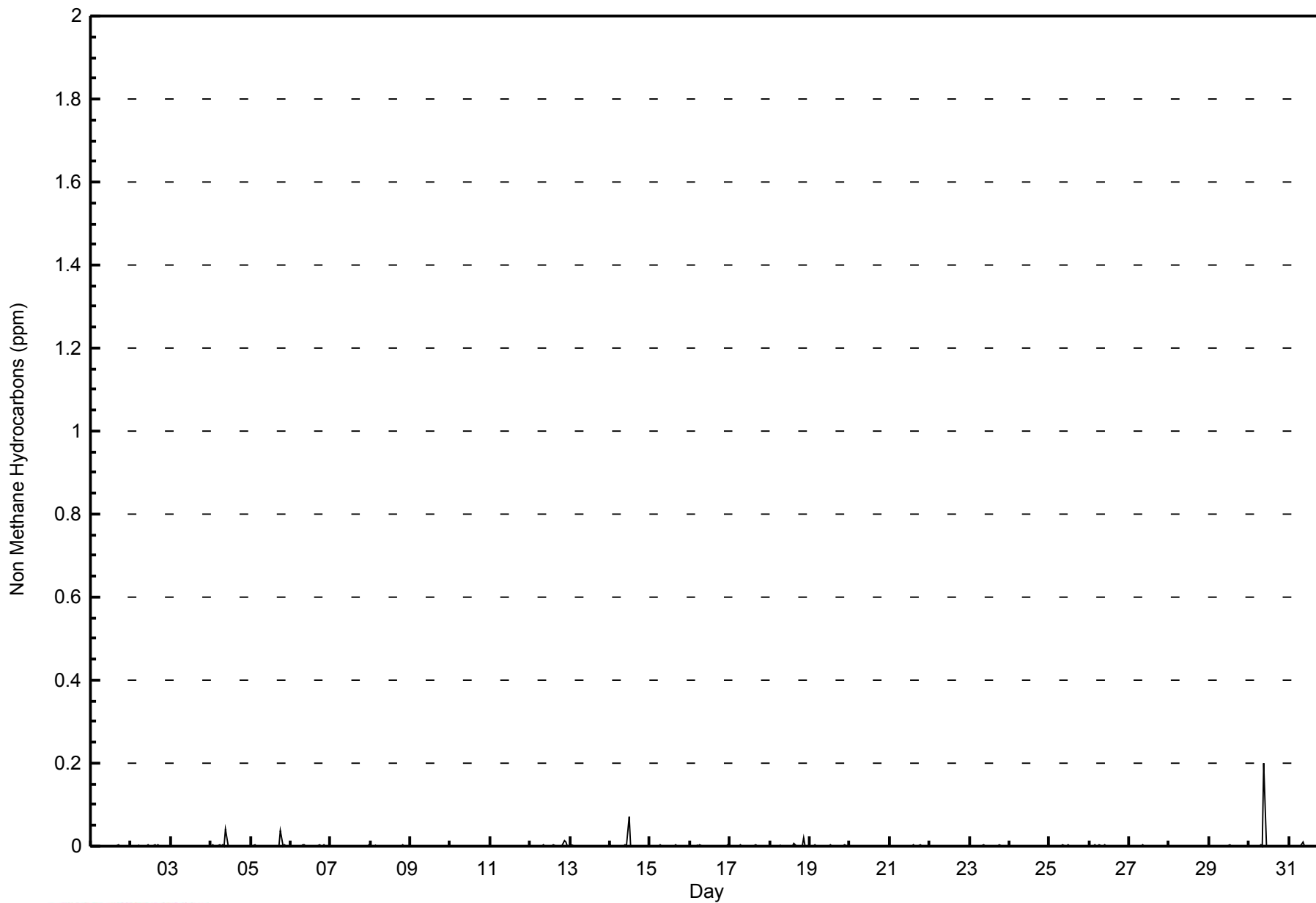




WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - March 2015





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	700	98.73	98.73
0.006 - 0.05	7	0.99	99.72
0.06 - 0.1	1	0.14	99.86
> 0.1	1	0.14	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

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

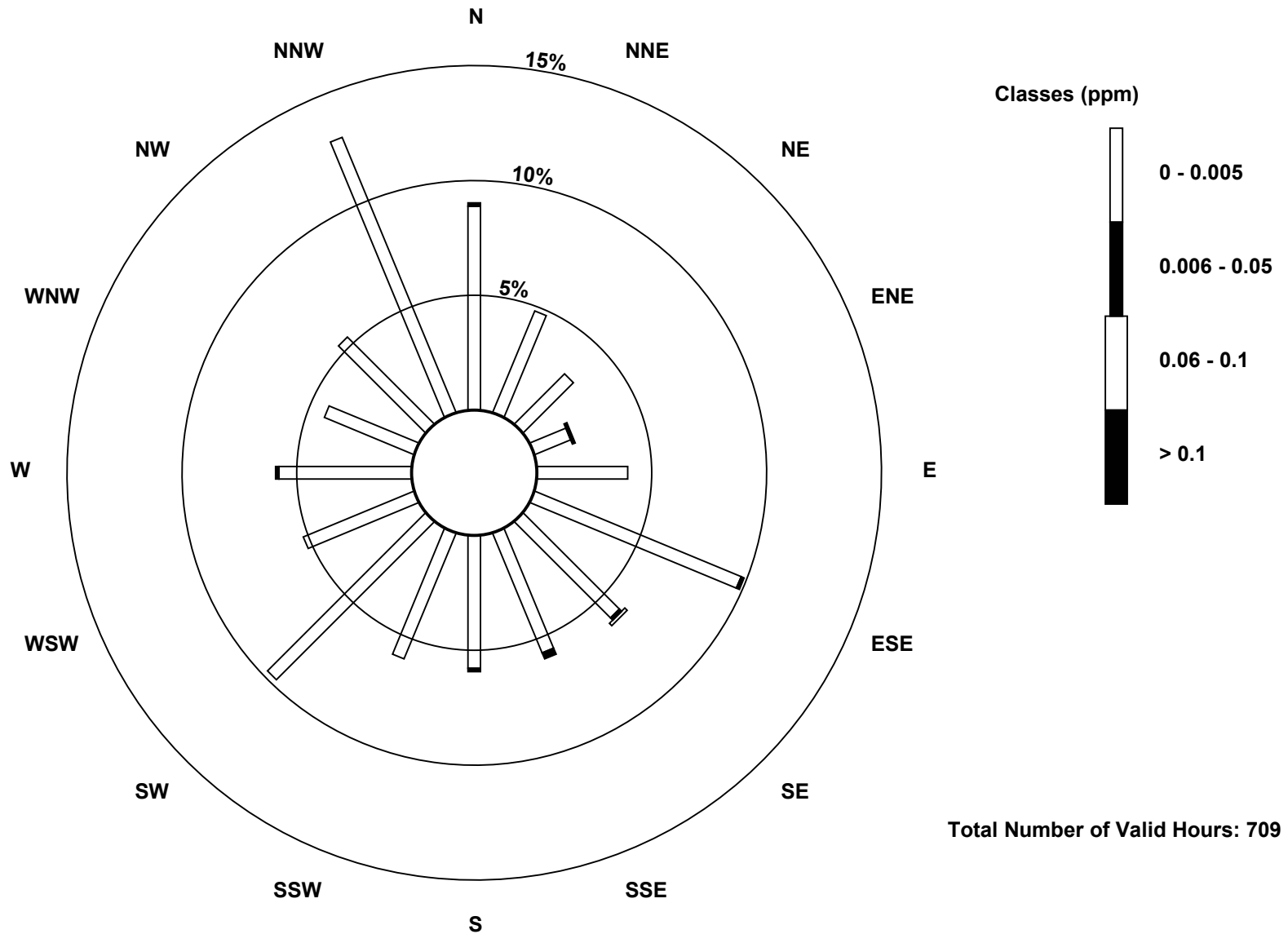
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	63	34	22	12	28	69	42	40	41	42	69	37	41	30	38	92	700
0.006 - 0.05	1	0	0	0	0	1	1	2	1	0	0	0	1	0	0	0	7
0.06 - 0.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
> 0.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	64	34	22	13	28	70	44	42	42	42	69	37	42	30	38	92	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

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



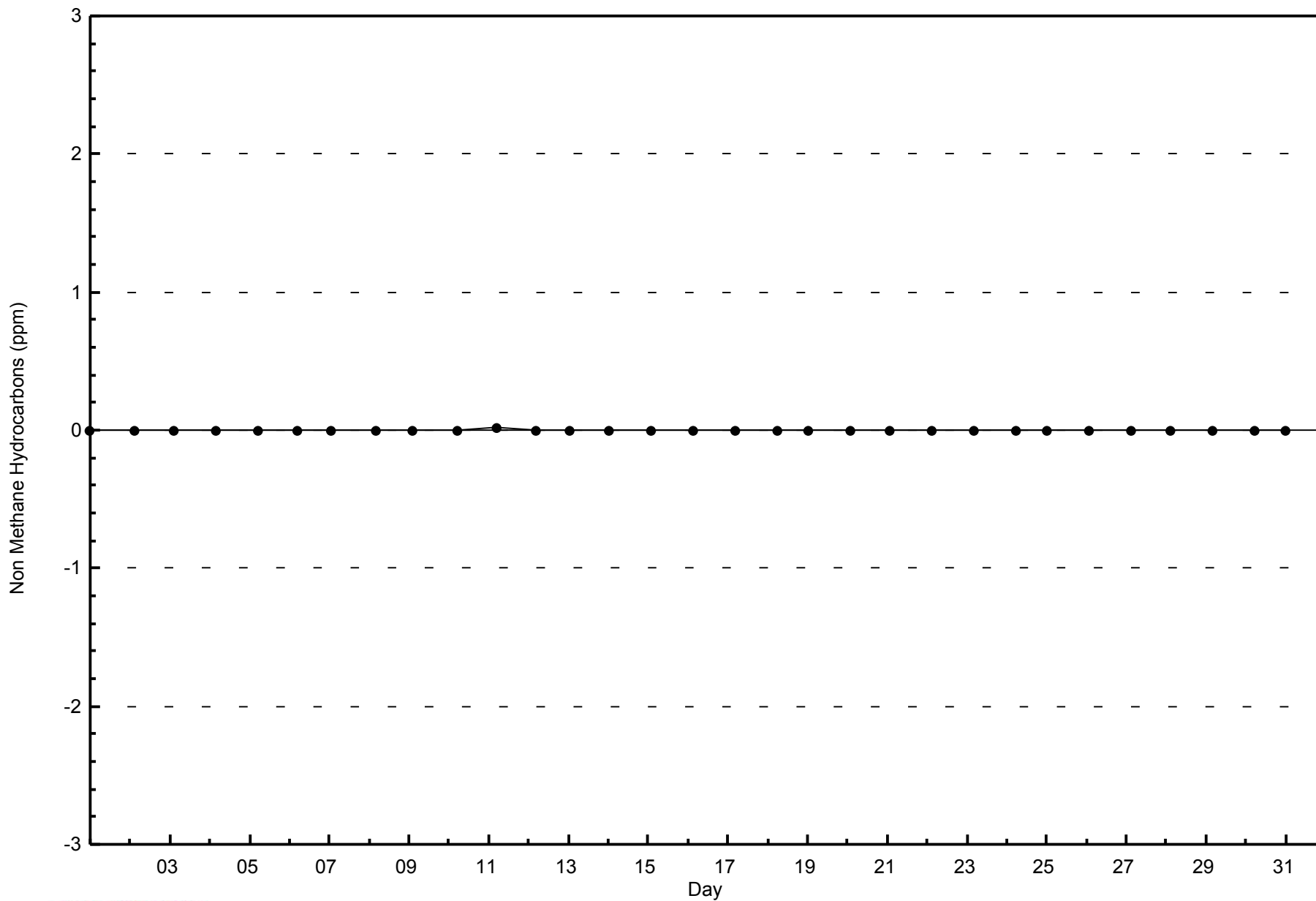


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

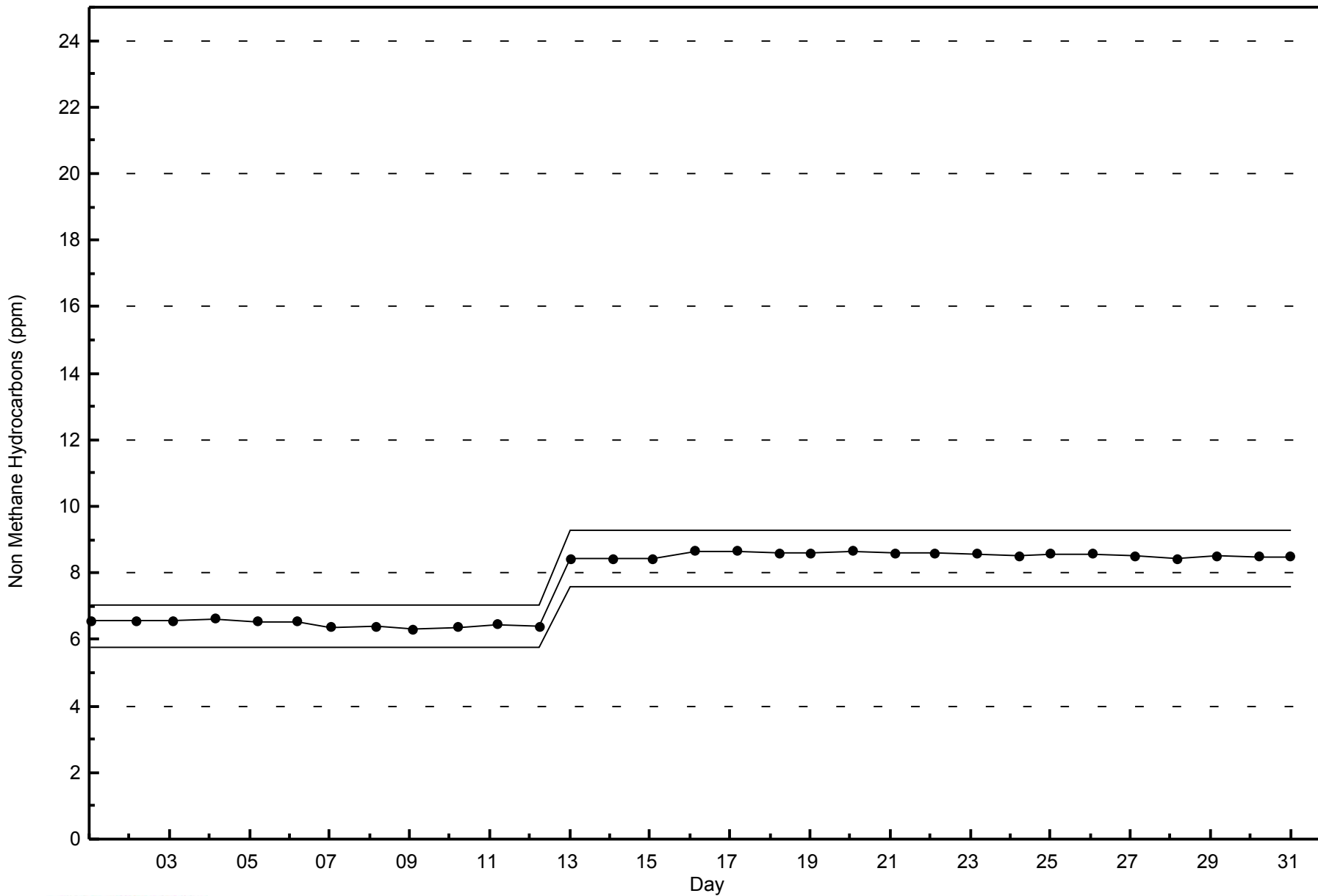
Patricia McInnes - March 2015





WBEA
Span Responses

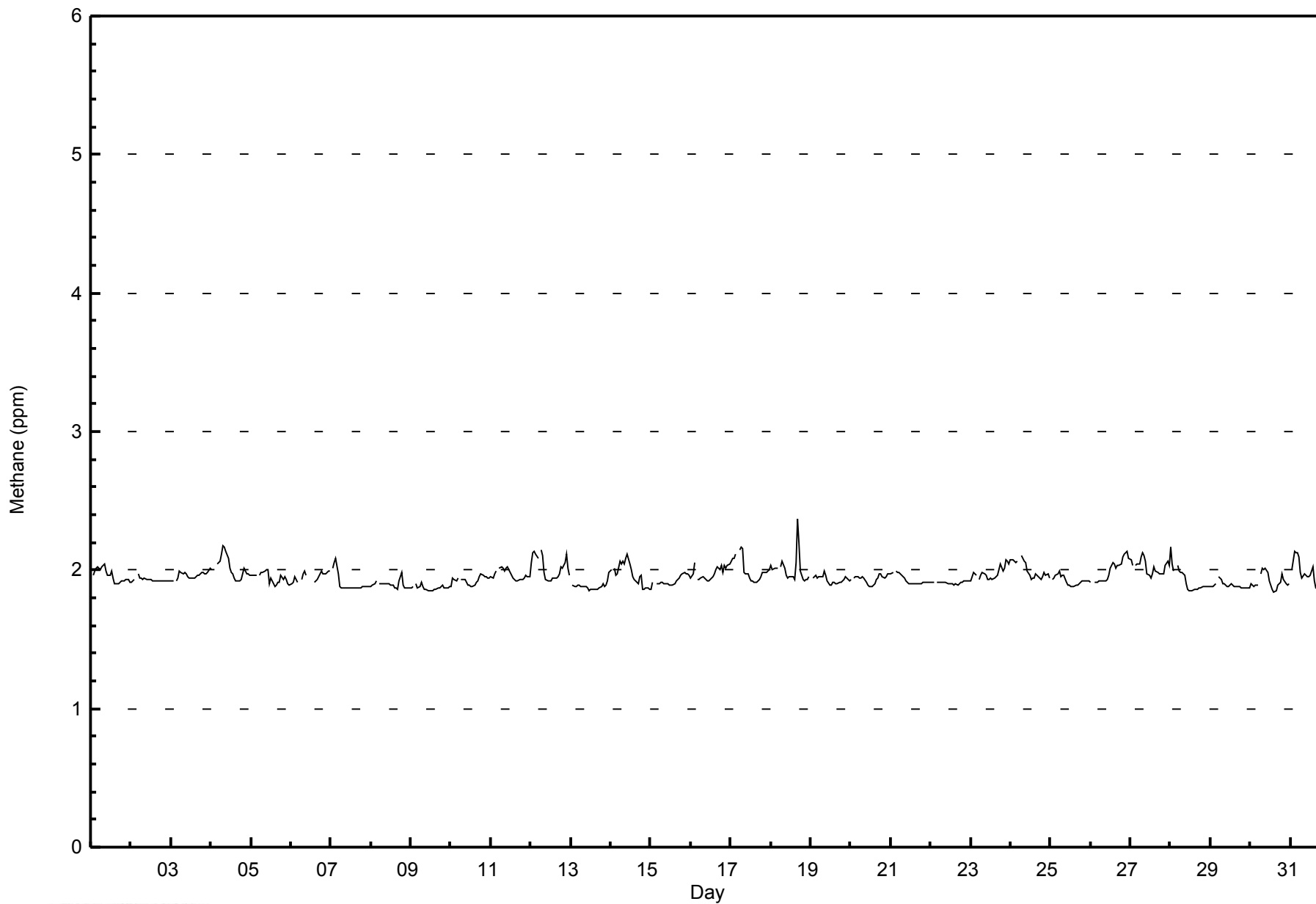
Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - March 2015





WBEA
Hourly Averages

Methane (CH₄) - ppm
Patricia McInnes - March 2015





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	648	91.40	91.40
2.1 - 3.0	61	8.60	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



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - March 2015

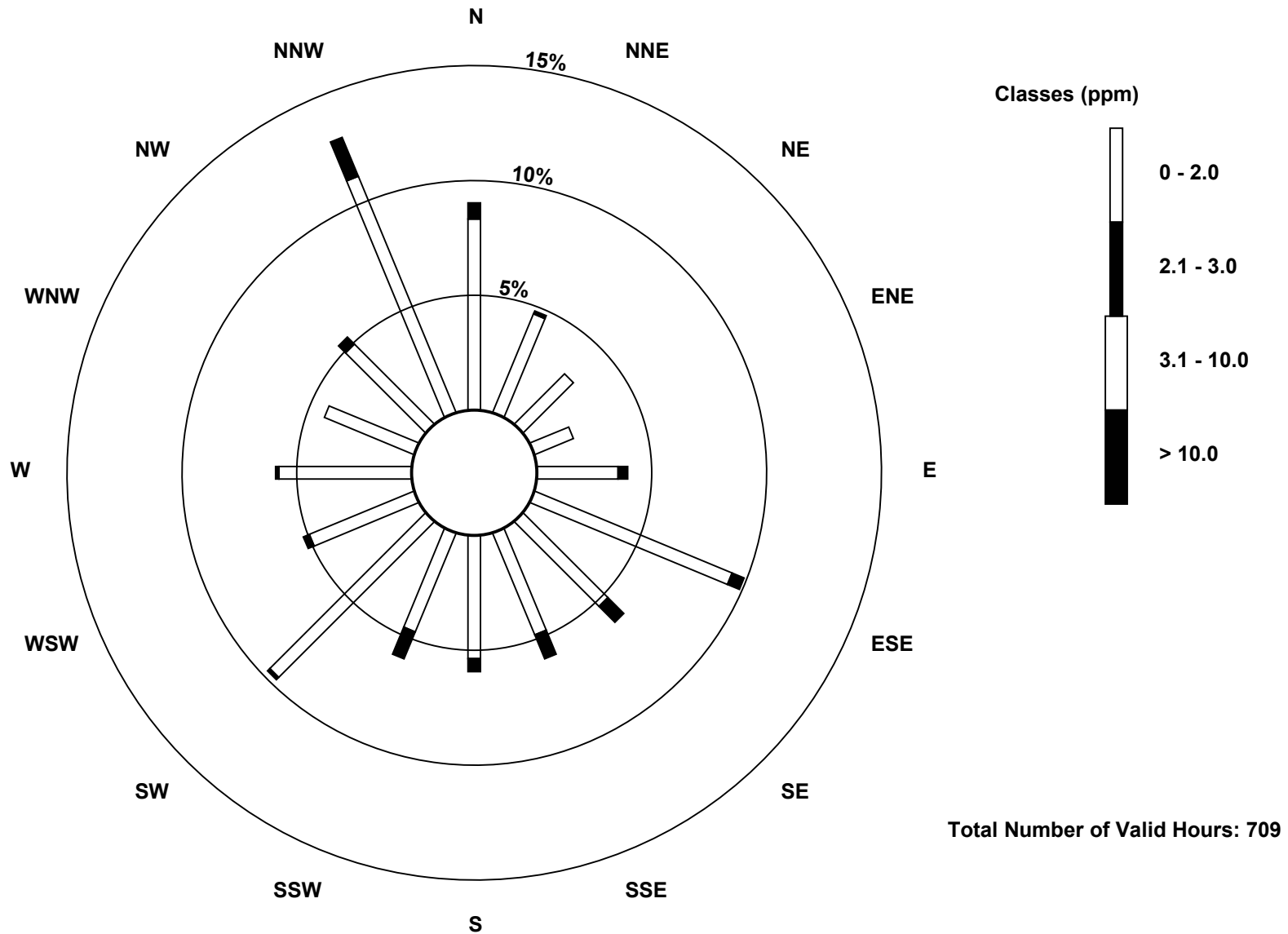
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	59	33	22	13	25	66	37	34	38	33	68	35	41	30	35	79	648
2.1 - 3.0	5	1	0	0	3	4	7	8	4	9	1	2	1	0	3	13	61
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	34	22	13	28	70	44	42	42	42	69	37	42	30	38	92	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

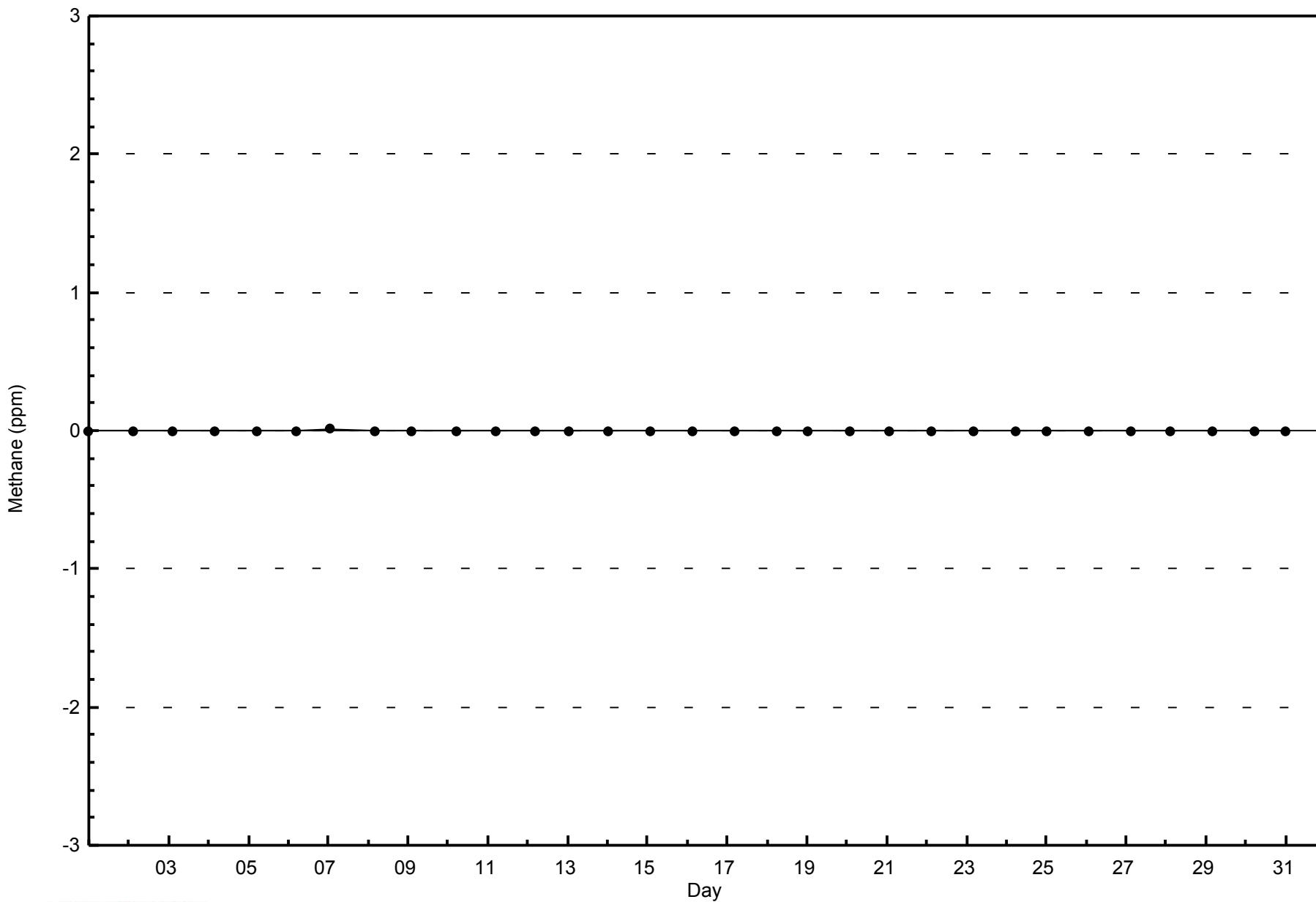
Methane (CH₄) - ppm
Patricia McInnes (AMS 6)





WBEA
Zero Responses

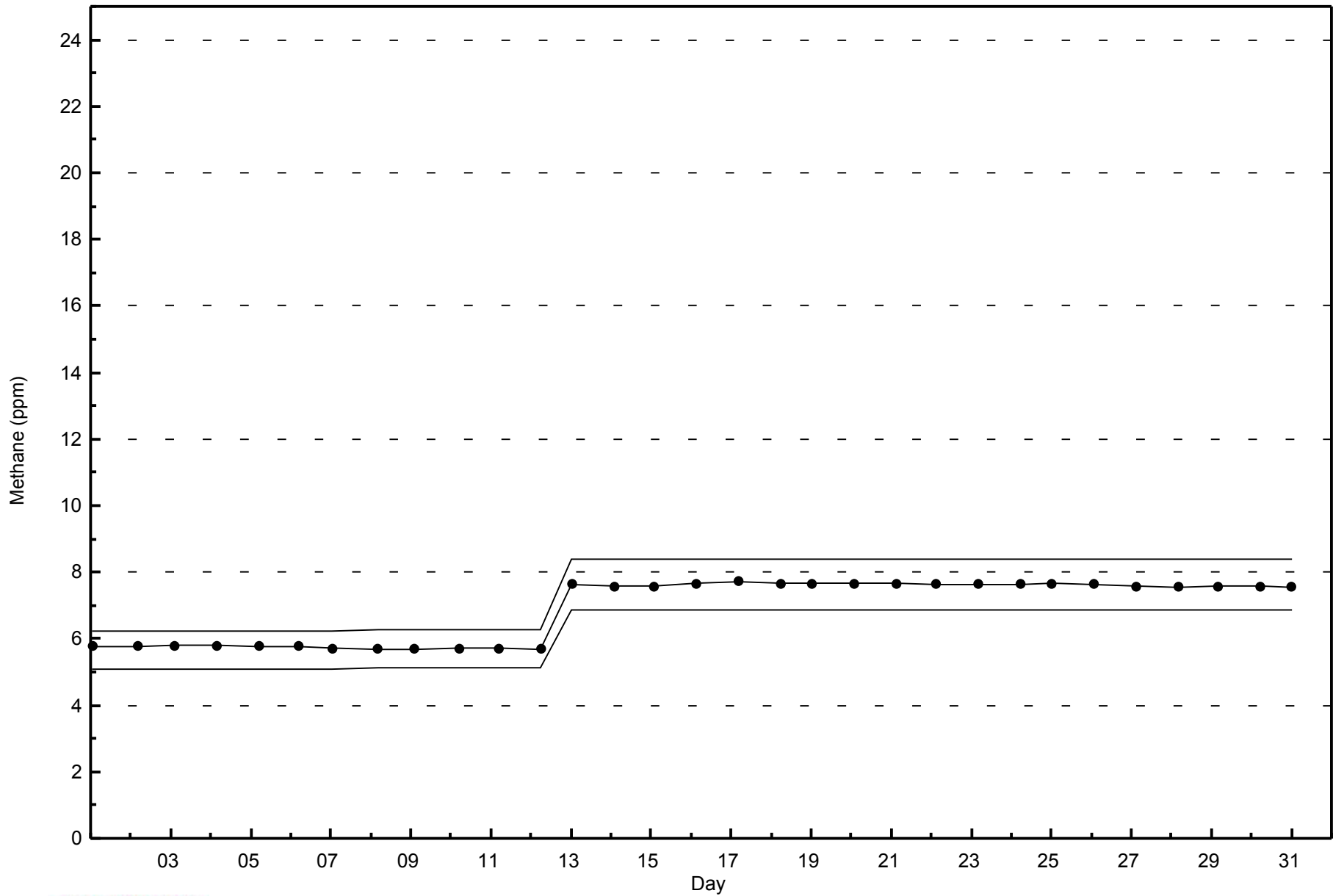
Methane (CH₄) - ppm
Patricia McInnes - March 2015





WBEA
Span Responses

Methane (CH₄) - ppm
Patricia McInnes - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 45 ppb on Mar 31 16:00	Maximum Daily Average: 38.8 ppb on Mar 13		Hours of Data:	709
Minimum Value: 2 ppb on Mar 4 05:00	Minimum Daily Average: 13.9 ppb on Mar 17		Hours of Missing Data:	35
Maximum Diurnal Average: 34.4 ppb at hour 16	Minimum Diurnal Average: 20.1 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 27.5 ppb	Percentiles: P ₁ = 4 P ₁₀ = 12 Q ₁ = 20 Median = 29 Q ₃ = 36 P ₉₀ = 40 P ₉₉ = 44		Percent Operational Time:	100.0

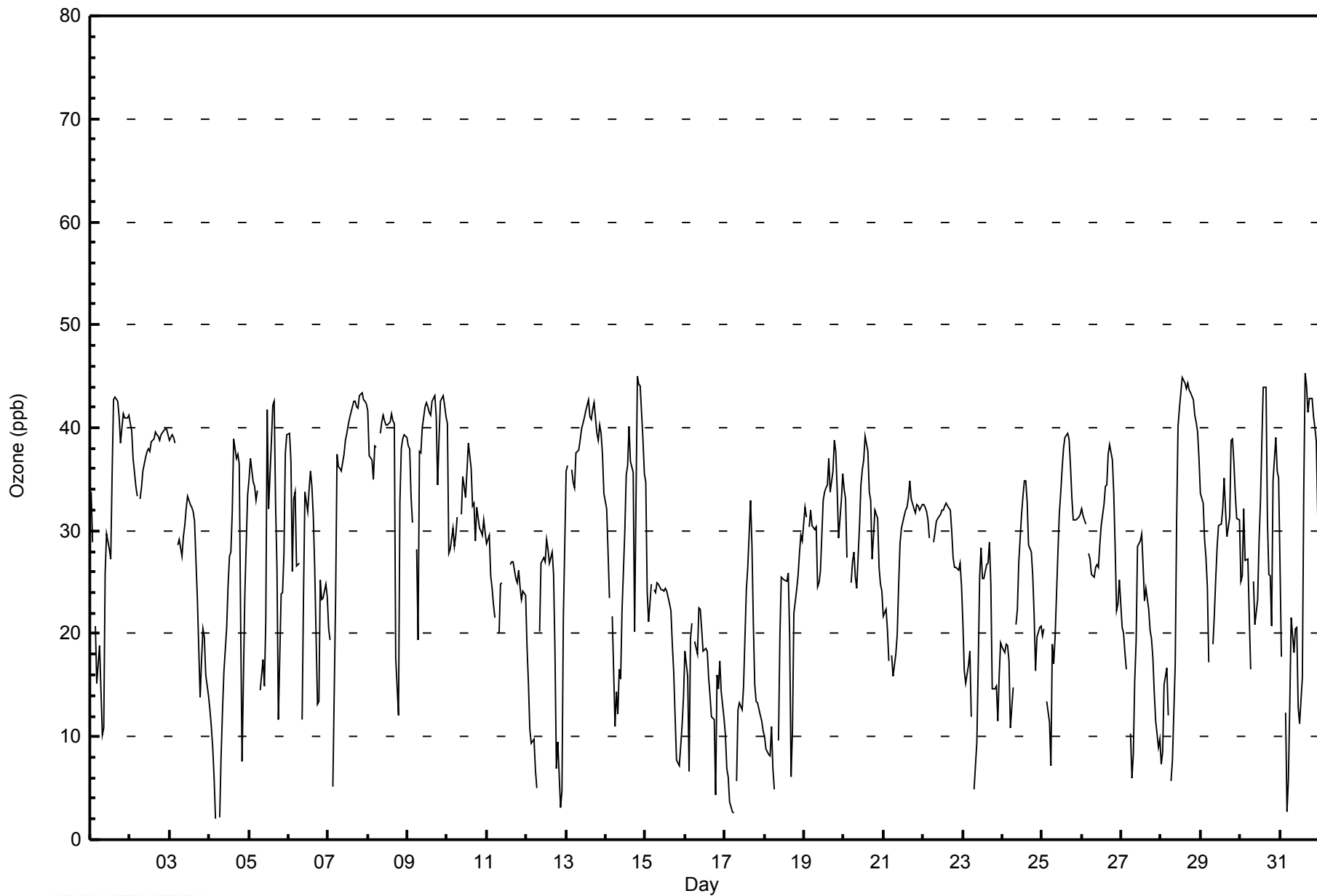
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	34	29	Z	21	15	19	15	10	11	26	30	28	27	35	43	43	43	41	39	40	41	41	41	41	31.0	43																								
2-Mar	40	40	37	34	33	Z	33	34	36	37	38	38	38	39	39	40	39	39	39	39	39	40	40	40	39	37.9	40																							
3-Mar	39	39	39	39	Z	29	29	28	29	31	32	33	32	32	31	27	24	14	17	20	20	16	14	28.1	39																									
4-Mar	13	11	9	6	2	Z	2	8	12	16	21	25	28	28	32	39	37	37	36	21	8	24	29	34	20.7	39																								
5-Mar	35	37	35	34	33	34	Z	15	18	15	21	42	32	39	42	43	33	26	12	24	24	28	37	39	30.3	43																								
6-Mar	39	37	26	33	34	27	27	Z	12	24	34	32	34	36	34	31	26	13	13	25	23	23	25	24	27.5	39																								
7-Mar	21	19	Z	5	24	37	36	36	36	37	39	39	40	41	42	43	43	42	42	43	43	43	43	42	36.3	43																								
8-Mar	42	37	37	35	38	38	Z	39	41	41	41	40	40	41	41	41	40	18	12	33	38	39	39	39	37.0	42																								
9-Mar	38	38	33	31	Z	28	19	38	37	40	42	42	42	41	41	43	43	41	34	39	43	43	42	41	38.3	43																								
10-Mar	40	28	28	30	29	30	31	Z	32	35	34	33	36	39	36	32	33	29	32	30	30	30	31	30	32.1	40																								
11-Mar	29	30	26	24	23	22	Z	20	25	25	C	C	C	C	27	27	27	25	25	26	25	23	24	24	25.0	30																								
12-Mar	19	15	11	9	10	7	5	Z	20	27	27	27	29	28	27	28	26	18	7	9	3	5	22	29	17.7	29																								
13-Mar	36	36	Z	36	35	34	38	38	39	40	40	41	42	43	41	41	42	42	39	39	40	40	37	34	38.8	43																								
14-Mar	32	28	24	Z	22	11	14	12	17	16	22	30	35	36	40	37	36	20	33	45	44	44	39	36	29.2	45																								
15-Mar	35	24	21	25	Z	24	24	25	25	24	24	24	24	24	23	22	19	16	12	8	7	9	11	14	20.2	35																								
16-Mar	18	16	7	19	21	Z	19	18	23	22	20	18	19	18	16	14	12	12	4	16	15	17	14	12	16.1	23																								
17-Mar	10	7	6	4	3	3	Z	6	13	13	13	15	20	24	26	33	29	21	15	13	13	12	12	11	13.9	33																								
18-Mar	10	9	8	8	11	7	5	Z	10	20	26	25	25	25	26	20	6	11	22	24	26	28	30	29	17.8	30																								
19-Mar	32	31	Z	30	32	30	30	30	25	25	26	33	34	34	34	37	34	36	39	38	34	29	33	36	32.3	39																								
20-Mar	34	33	27	Z	25	27	28	26	24	30	34	36	37	39	38	34	33	27	29	32	31	26	25	24	30.5	39																								
21-Mar	22	22	20	17	Z	18	16	18	20	25	29	30	31	32	32	33	35	33	32	32	33	32	32	32	27.3	35																								
22-Mar	32	32	32	31	29	Z	29	30	31	31	32	32	32	32	33	32	32	30	27	26	26	26	27	25	30.0	33																								
23-Mar	21	16	15	17	18	12	Z	5	10	17	26	28	25	25	27	27	29	25	15	15	15	11	16	19	18.9	29																								
24-Mar	19	18	19	19	17	11	15	Z	21	22	27	32	33	35	35	33	29	28	26	22	16	20	21	21	23.3	35																								
25-Mar	20	20	Z	13	11	7	19	17	20	28	32	34	36	38	39	39	39	36	33	31	31	31	31	32	27.7	39																								
26-Mar	32	31	31	Z	28	27	26	25	26	27	26	29	31	32	34	34	37	38	37	34	28	22	23	25	29.8	38																								
27-Mar	21	20	18	17	Z	10	6	8	15	19	29	29	30	27	23	24	22	20	19	18	14	11	9	10	18.3	30																								
28-Mar	7	8	15	17	12	Z	6	8	17	31	40	42	43	45	44	44	44	44	43	43	41	41	40	37	31.0	45																								
29-Mar	34	33	29	27	25	17	Z	19	22	25	28	30	31	32	35	32	29	31	39	39	37	33	31	31	30.0	39																								
30-Mar	25	26	32	27	27	22	17	Z	25	21	23	29	33	39	44	44	31	26	26	21	35	39	36	35	29.6	44																								
31-Mar	27	18	Z	12	3	6	13	22	18	20	21	13	11	16	34	45	44	42	43	43	41	40	39	31	26.1	45																								
																								27.6	25.5	23.4	22.2	21.5	20.6	20.1	21.4	22.8	26.2	29.2	31.0	31.7	33.2	34.2	34.4	32.2	28.8	27.1	28.5	27.9	28.1	28.8	28.6	Diurnal Average		
																								42	40	39	39	38	38	38	39	41	41	42	42	43	45	44	45	44	44	44	43	45	44	44	43	42	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Patricia McInnes - March 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	184	25.95	25.95
21 - 50	525	74.05	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



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - March 2015

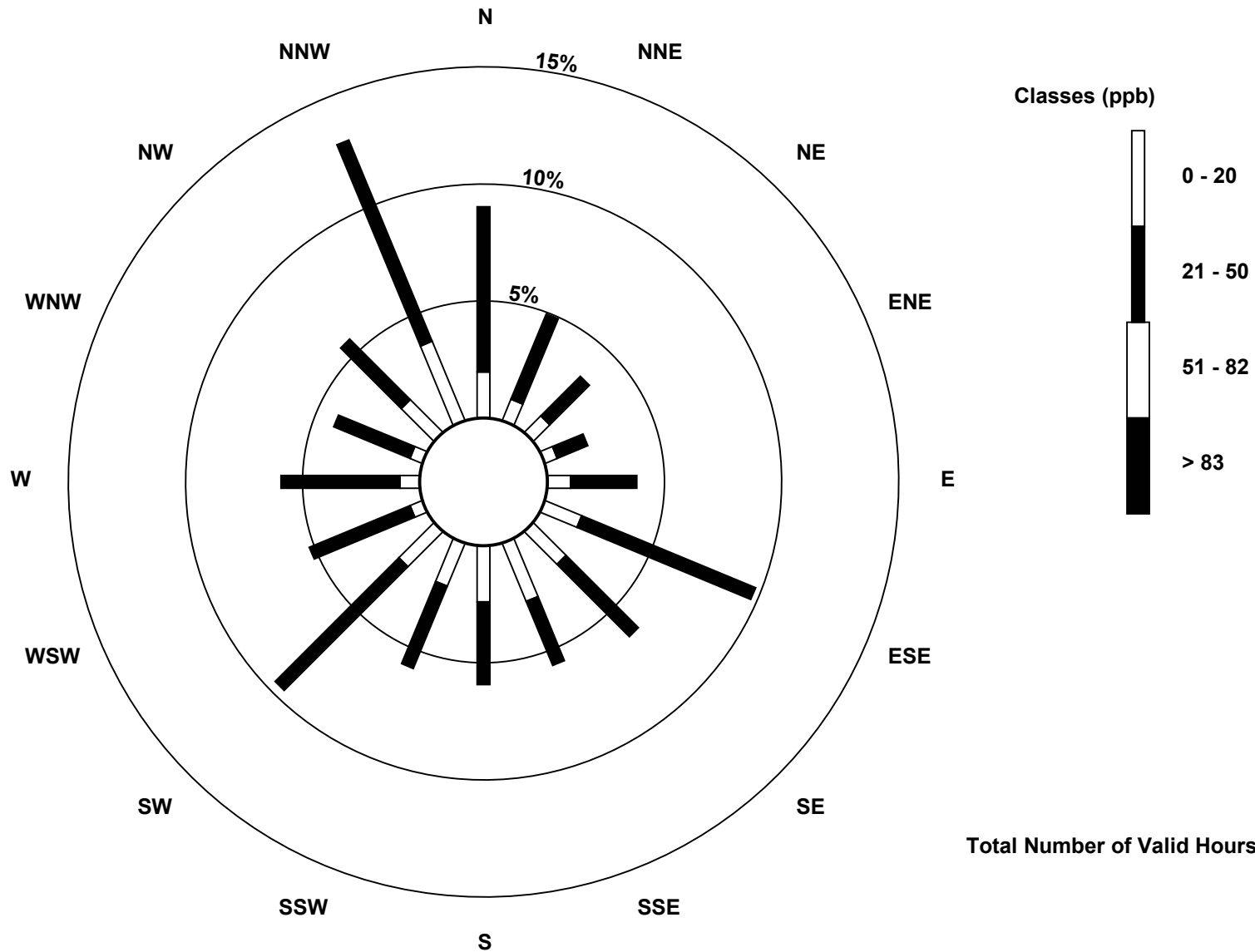
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	14	7	7	4	7	12	14	19	17	14	15	4	6	4	14	26	184
21 - 50	50	28	17	10	20	57	31	21	25	27	53	33	36	25	26	66	525
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	35	24	14	27	69	45	40	42	41	68	37	42	29	40	92	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

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

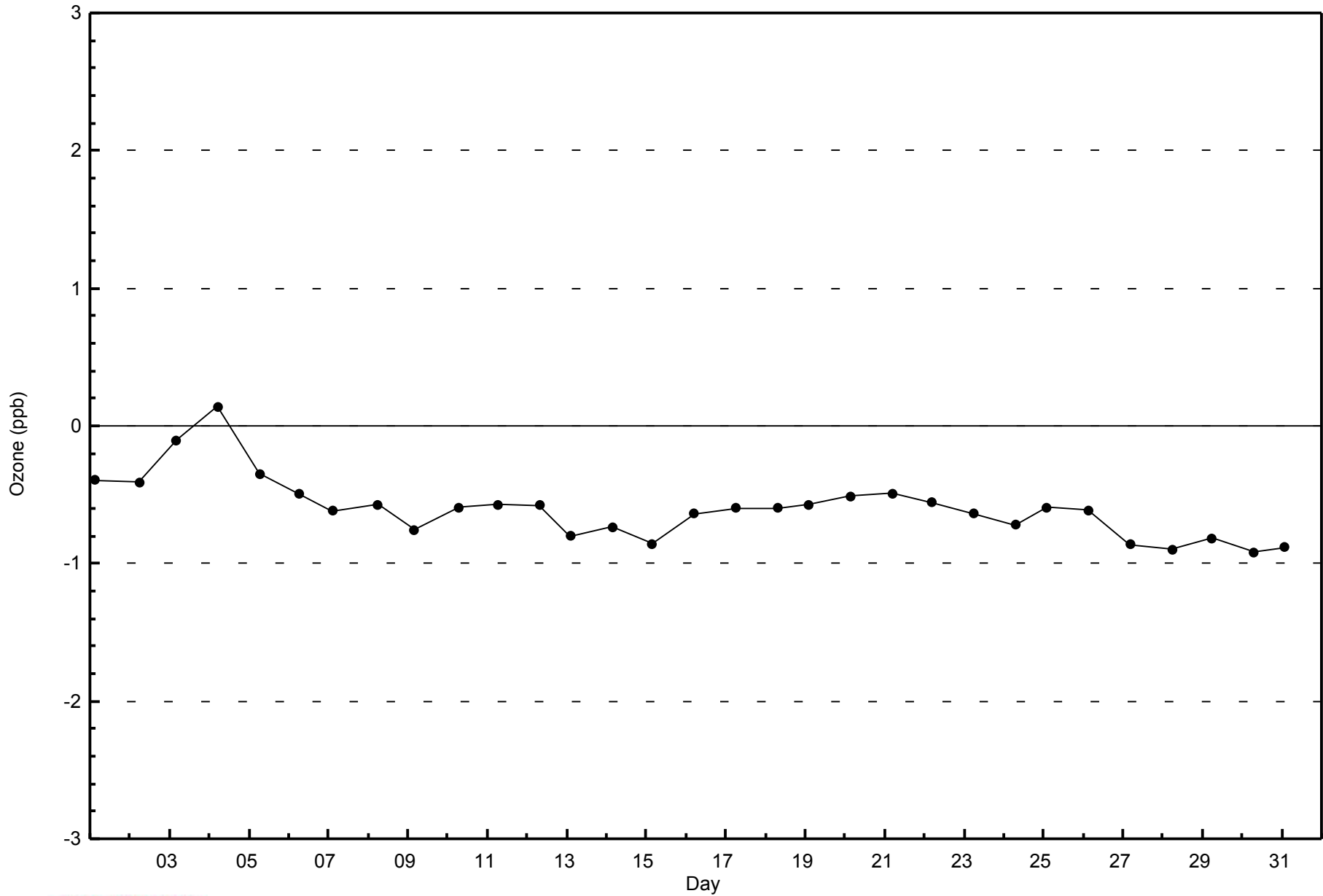


Total Number of Valid Hours: 709



WBEA
Zero Responses

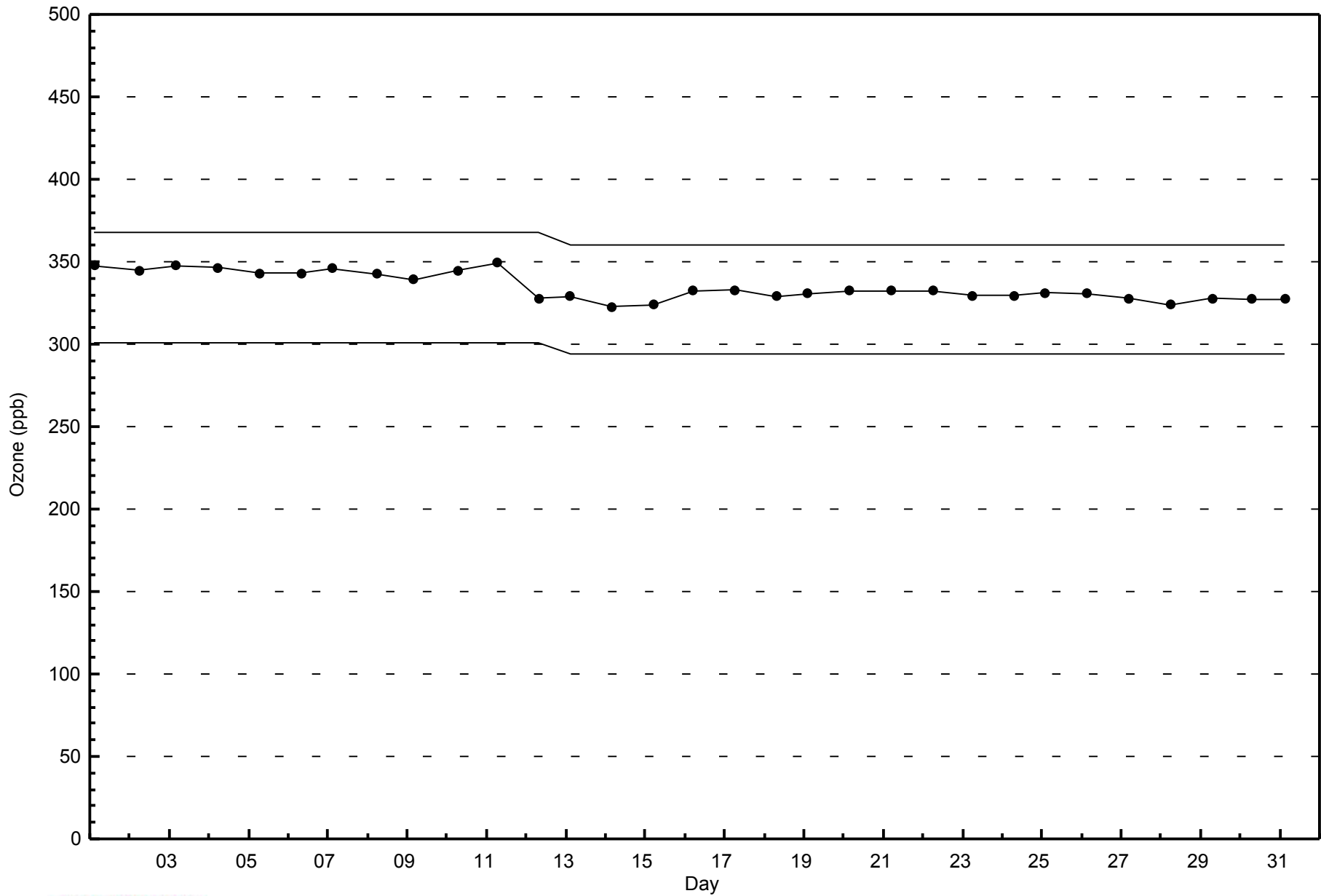
Ozone (O₃) - ppb
Patricia McInnes - March 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Patricia McInnes - March 2015



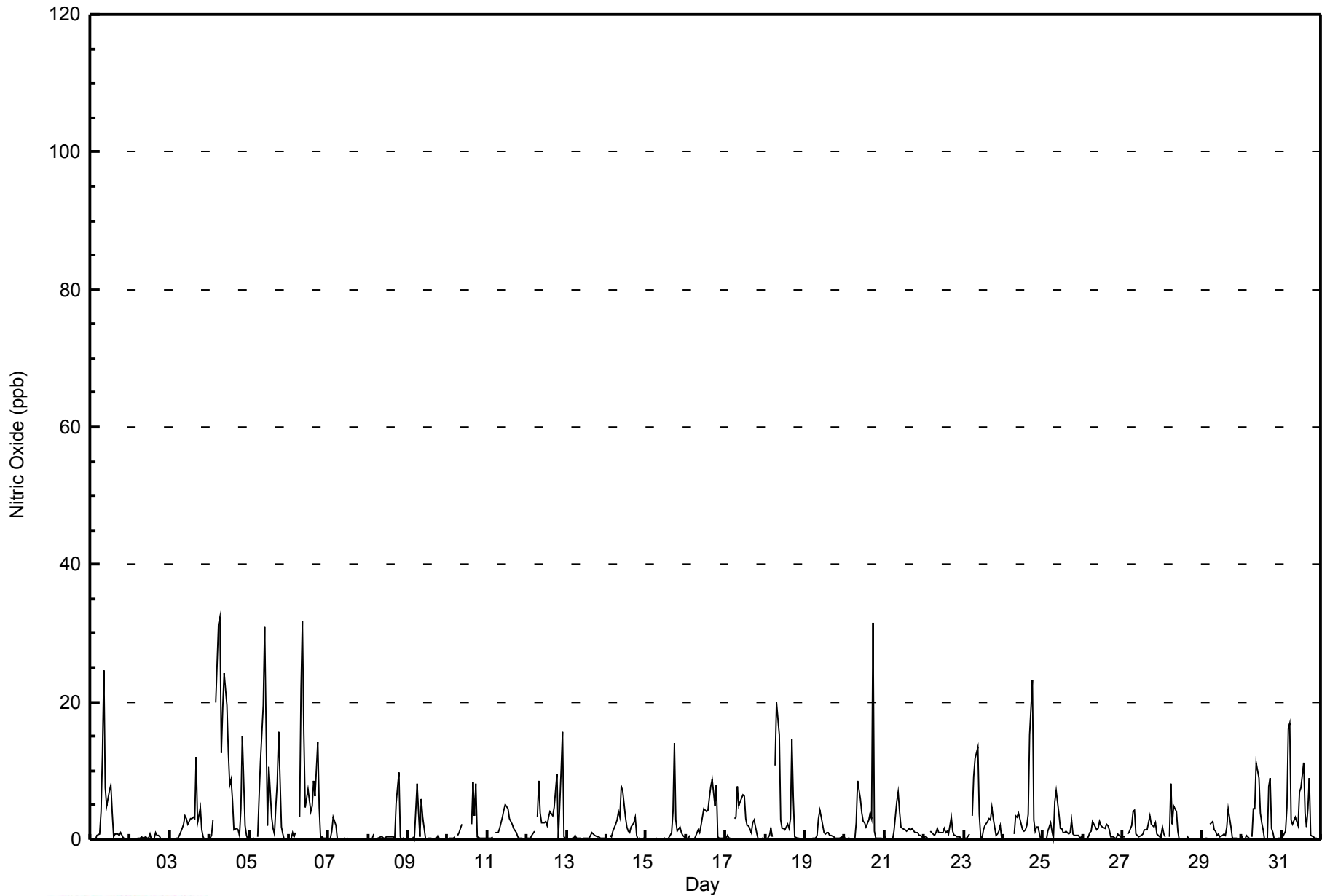


Maximum Value: 32 ppb on Mar 4 07:00																	Maximum Daily Average: 9.8 ppb on Mar 4																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 2 22:00																	Minimum Daily Average: 0.3 ppb on Mar 2																	Hours of Data: 708	
Maximum Diurnal Average: 6.3 ppb at hour 9																	Minimum Diurnal Average: 0.1 ppb at hour 24																	Hours of Missing Data: 36	
Monthly Average: 2.4 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 24																	Hours of Calibration: 36	
																	Percent Operational Time: 100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	0	0	0	1	1	4	12	25	8	5	7	8	4	0	1	1	1	1	1	0	0	0	0	3.4	25									
2-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0.3	1									
3-Mar	0	0	Z	0	0	0	1	2	2	4	3	2	3	3	3	3	12	3	5	1	0	0	0	2.1	12										
4-Mar	0	1	3	Z	20	31	32	13	19	24	19	13	8	9	6	1	2	1	1	4	15	2	1	0	9.8	32									
5-Mar	0	0	0	0	Z	0	6	11	20	31	17	2	11	3	2	1	5	8	16	2	1	0	0	5.9	31										
6-Mar	0	0	1	0	1	Z	3	22	32	16	5	7	6	4	5	9	6	14	5	0	0	0	0	5.9	32										
7-Mar	Z	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3									
8-Mar	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	5	10	0	0	0	0	0.9	10										
9-Mar	0	0	Z	0	0	8	4	0	6	3	0	0	0	0	0	0	0	0	1	0	0	0	0	1.1	8										
10-Mar	0	0	0	0	0	Z	1	1	2	C	C	C	C	C	2	8	3	8	0	0	0	0	0	1.6	8										
11-Mar	0	0	0	0	Z	1	1	2	2	3	4	5	4	3	3	2	2	1	0	0	0	0	0	1.6	5										
12-Mar	0	0	0	1	1	Z	3	8	4	2	2	3	2	3	4	4	5	7	9	0	10	16	0	3.7	16										
13-Mar	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.3	1										
14-Mar	0	Z	1	0	1	2	3	4	3	8	7	3	2	1	1	2	2	3	1	0	0	0	0	2.0	8										
15-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	4	14	3	1	2	1	1	1.2	14										
16-Mar	0	0	1	Z	0	0	0	1	1	2	3	4	4	4	6	8	9	5	8	0	0	0	0	2.5	9										
17-Mar	0	1	0	0	Z	3	3	8	5	6	6	6	3	2	2	1	2	3	2	1	0	0	0	2.4	8										
18-Mar	0	0	1	2	0	Z	11	20	15	3	2	2	2	2	2	3	15	6	0	0	0	0	0	3.7	20										
19-Mar	Z	0	0	0	0	0	0	1	3	4	3	1	1	1	1	1	1	0	0	0	0	0	0	0.8	4										
20-Mar	0	Z	0	0	0	0	0	2	8	6	4	3	3	2	3	4	3	32	1	0	0	0	0	3.1	32										
21-Mar	1	0	Z	0	0	0	1	5	7	4	2	2	1	1	1	2	1	2	1	1	1	1	1	1.5	7										
22-Mar	0	0	0	Z	1	1	1	1	2	1	1	1	2	1	1	1	3	1	1	1	0	0	0	0.9	3										
23-Mar	0	0	0	1	Z	3	9	12	13	4	0	0	2	2	3	3	5	3	1	1	1	2	0	3.0	13										
24-Mar	0	0	0	0	0	Z	1	3	3	4	3	1	1	1	2	4	15	23	3	1	2	2	0	3.1	23										
25-Mar	Z	0	0	1	2	1	0	5	7	4	2	2	1	1	1	1	1	3	1	1	1	0	0	1.6	7										
26-Mar	0	Z	0	1	1	1	3	2	1	2	3	2	2	2	2	2	1	0	0	0	0	1	1	1.2	3										
27-Mar	0	0	Z	1	1	2	4	4	1	1	0	1	1	1	2	1	4	2	2	2	2	1	0	1.5	4										
28-Mar	2	1	0	Z	0	8	2	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	8										
29-Mar	0	0	0	0	Z	2	3	1	1	1	1	1	1	1	1	2	5	2	0	0	0	0	0	0.9	5										
30-Mar	0	0	0	1	0	Z	0	5	4	11	9	4	2	1	0	0	8	9	2	1	0	0	0	2.6	11										
31-Mar	Z	0	1	5	16	17	3	2	3	3	2	7	7	11	4	2	4	9	1	0	0	0	0	4.3	17										
																								Diurnal Average											
																								Diurnal Maximum											
0.3 0.2 0.4 0.7 2.0 3.4 3.2 5.0 6.3 5.1 3.5 2.7 2.6 2.2 1.9 2.2 3.8 5.5 2.5 0.7 1.2 0.9 0.2 0.1 2 1 3 5 20 31 32 22 32 31 19 13 11 11 6 9 15 32 16 4 15 16 2 1																																			
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	98.73	98.73
21 - 40	9	1.27	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

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

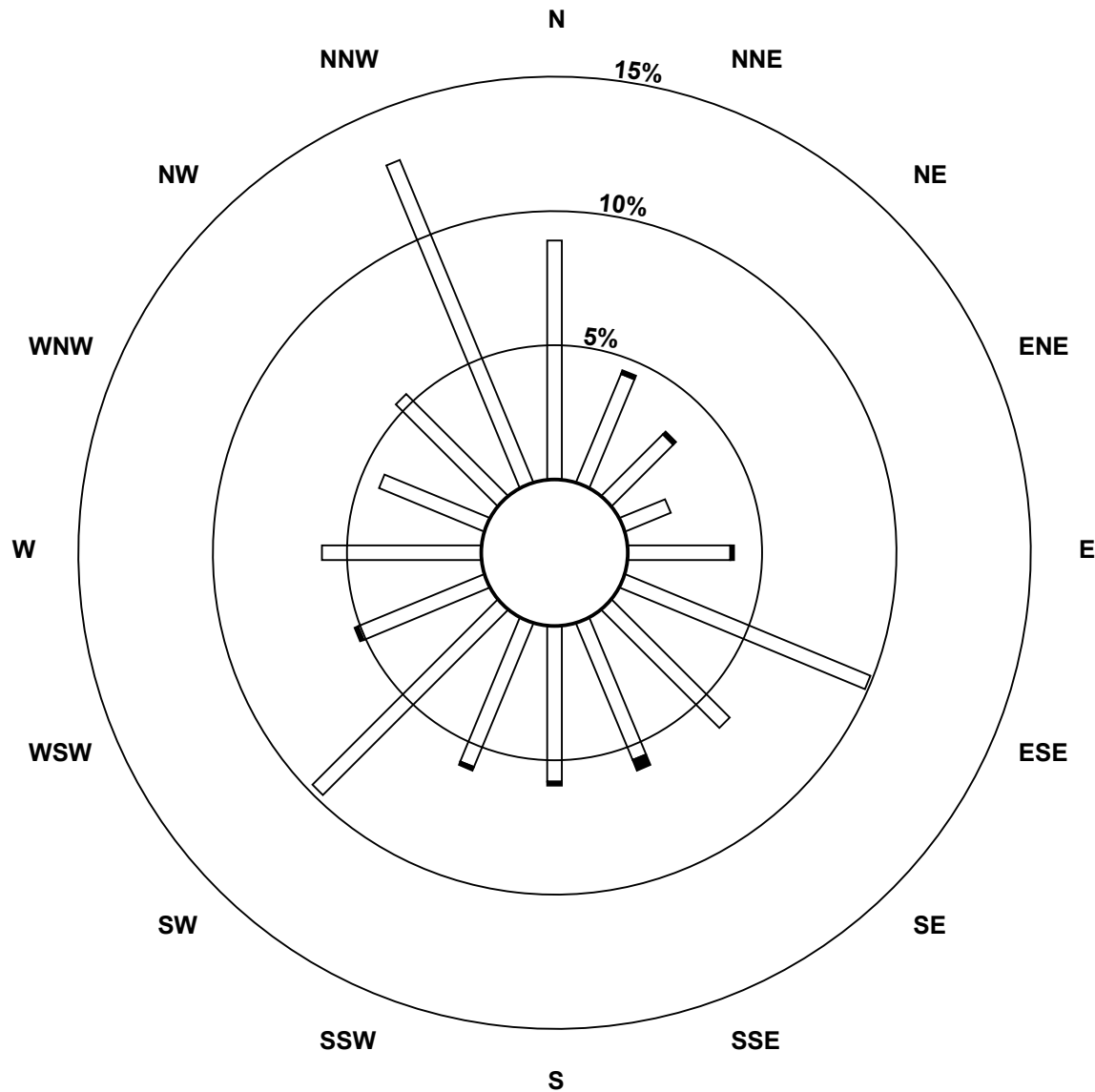
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	63	31	23	13	27	70	44	39	41	41	69	36	42	30	38	92	699
21 - 40	0	1	1	0	1	0	0	3	1	1	0	1	0	0	0	0	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	32	24	13	28	70	44	42	42	42	69	37	42	30	38	92	708

Total Number of Valid Hours: 708

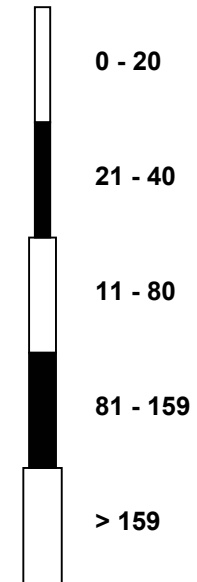
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Classes (ppb)

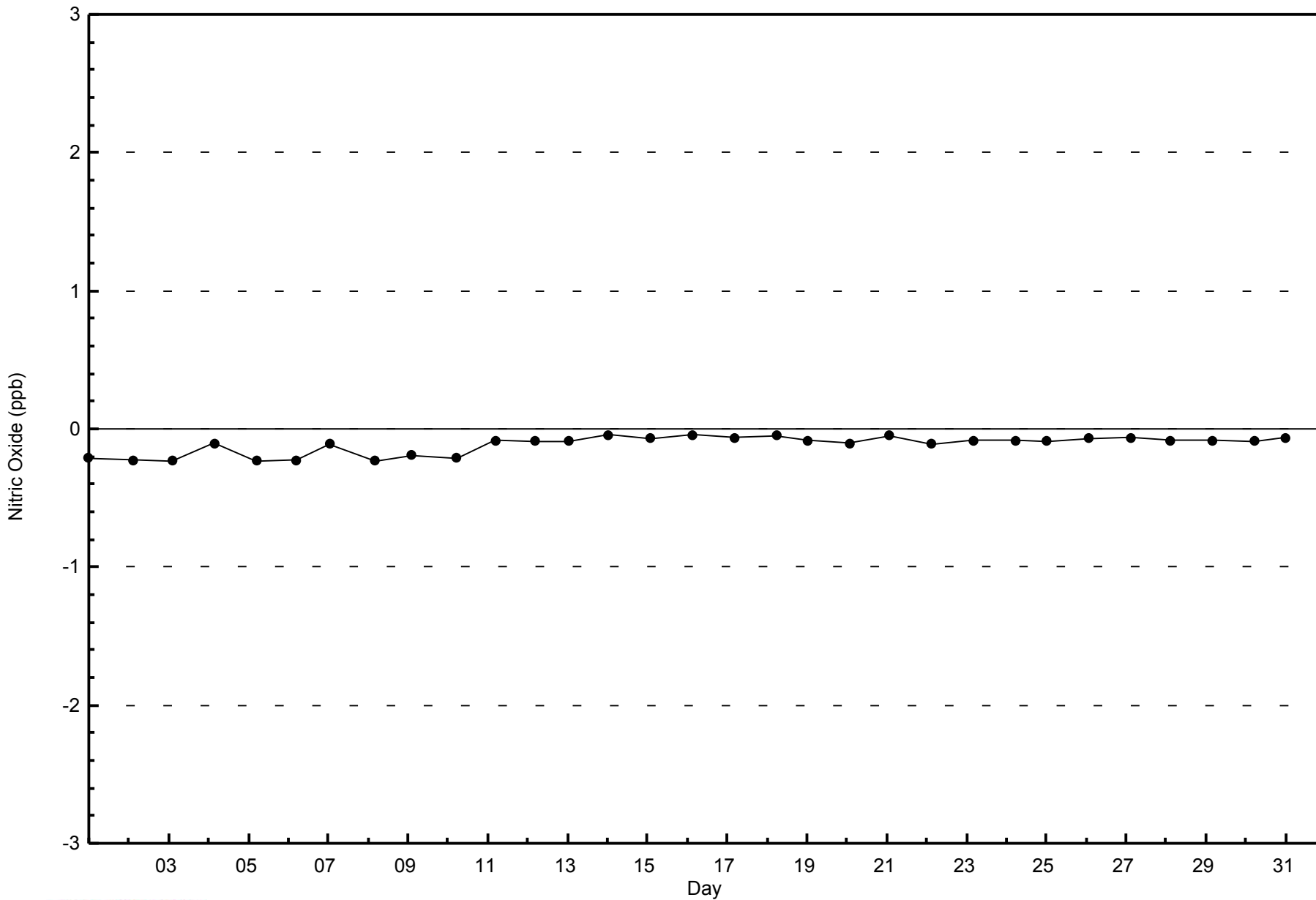


Total Number of Valid Hours: 708



WBEA
Zero Responses

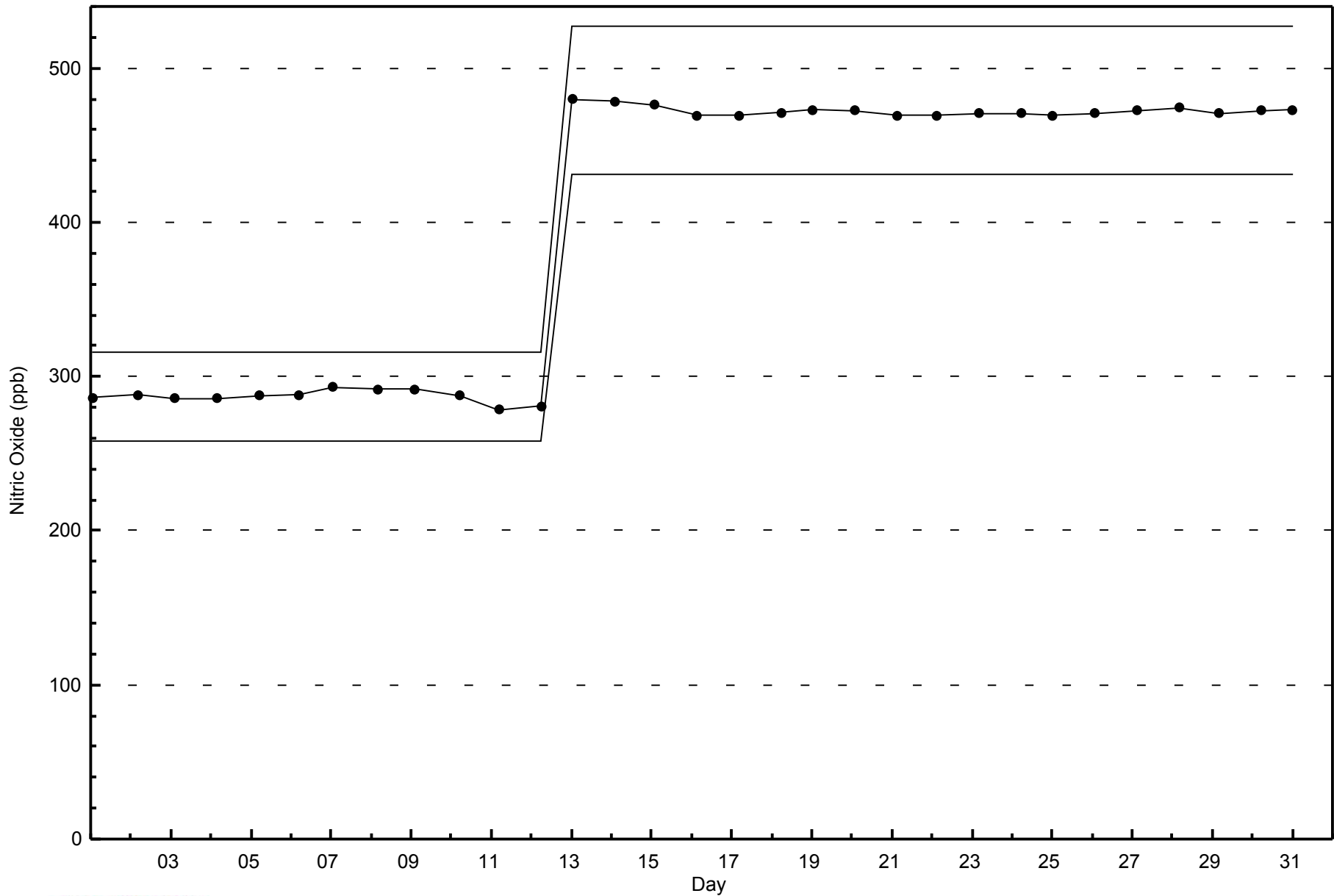
Nitric Oxide (NO) - ppb
Patricia McInnes - March 2015





WBEA
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Patricia McInnes - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 39 ppb on Mar 4 21:00	Maximum Daily Average: 15.1 ppb on Mar 4
Minimum Value: 0 ppb on Mar 7 06:00	Hours of Data: 708
Maximum Diurnal Average: 12.0 ppb at hour 19	Hours of Missing Data: 36
Monthly Average: 7.2 ppb	Hours of Calibration: 36
Minimum Daily Average: 1.1 ppb on Mar 2	Percent Operational Time: 100.0
Minimum Diurnal Average: 3.8 ppb at hour 15	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 6 Q ₃ = 10 P ₉₀ = 17 P ₉₉ = 31	

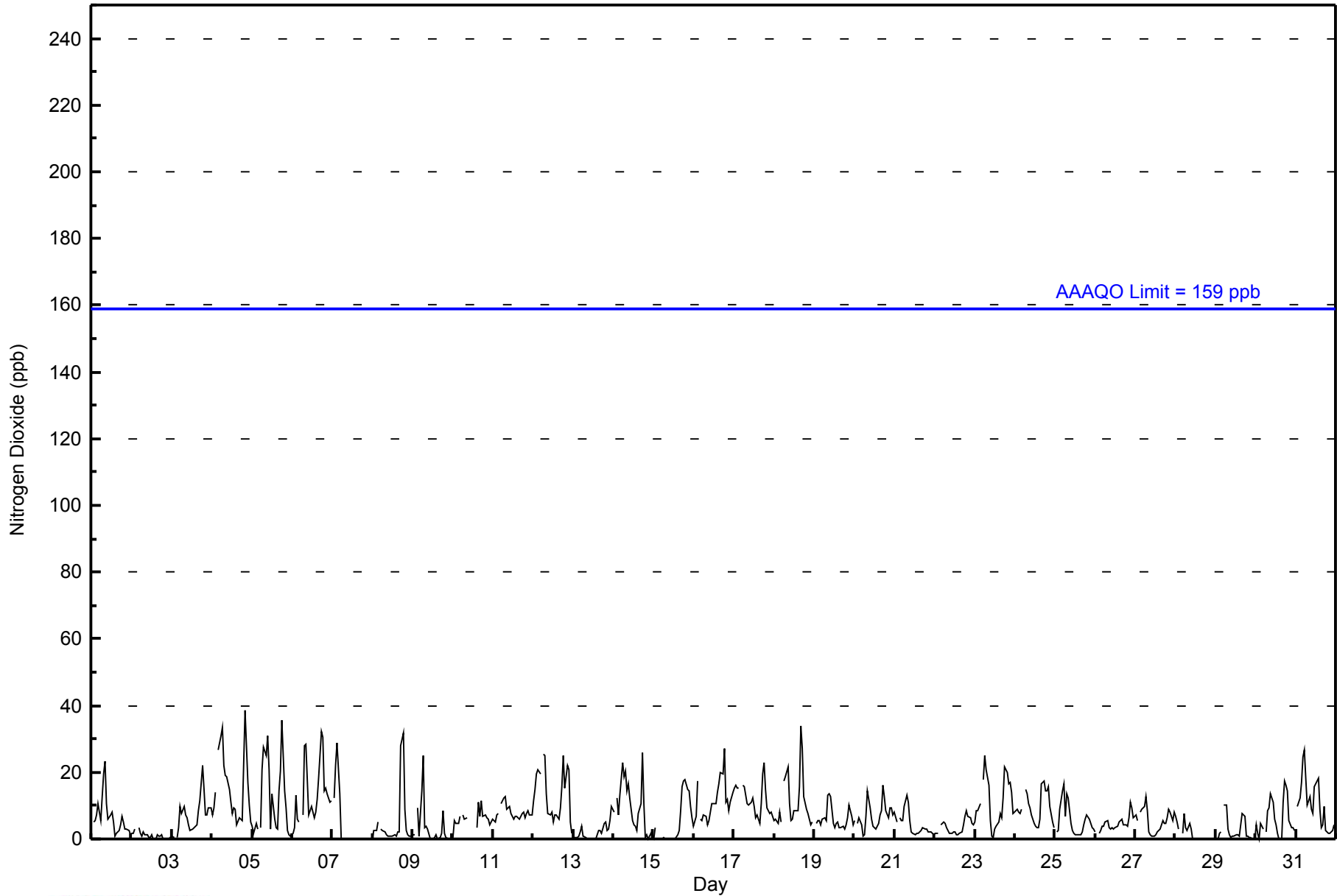
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	5	6	7	11	5	13	19	23	10	6	7	8	5	1	2	3	4	7	5	3	3	3	1	6.8	23																							
2-Mar	2	2	3	Z	3	2	1	2	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	1.1	3																							
3-Mar	1	0	Z	0	4	10	8	10	7	6	4	3	3	3	4	4	9	12	22	15	7	7	9	9	6.8	22																							
4-Mar	7	10	14	Z	27	31	33	22	19	19	15	11	8	9	9	4	7	6	6	22	39	17	10	5	15.1	39																							
5-Mar	4	2	5	3	Z	4	21	28	25	31	21	3	13	6	3	3	14	20	36	14	10	3	1	1	11.7	36																							
6-Mar	2	4	13	6	5	Z	7	28	29	18	7	10	8	6	8	12	18	32	30	14	15	14	11	12	13.4	32																							
7-Mar	Z	12	22	29	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.4	29																							
8-Mar	0	3	3	5	Z	3	3	2	1	1	1	1	1	1	1	2	2	28	32	9	3	1	1	1	4.5	32																							
9-Mar	1	1	Z	9	1	14	25	3	4	3	0	0	0	0	1	0	1	2	9	2	1	0	0	0	3.4	25																							
10-Mar	0	6	5	5	7	Z	7	6	6	C	C	C	C	C	4	11	7	11	7	7	6	6	4	5	6.1	11																							
11-Mar	6	5	7	8	Z	11	12	13	9	9	10	8	6	7	7	6	6	8	8	7	8	8	7	7	7.9	13																							
12-Mar	12	15	20	21	19	Z	25	25	14	8	7	8	5	7	7	6	9	16	25	15	22	21	5	2	13.6	25																							
13-Mar	Z	1	0	1	2	4	1	1	0	0	0	0	0	0	1	3	3	2	5	5	3	3	6	10	2.1	10																							
14-Mar	8	Z	12	7	13	23	19	20	14	17	12	5	4	4	3	8	11	26	11	1	1	0	2	0	9.6	26																							
15-Mar	0	4	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	8	16	17	18	15	14	10	6	4.9	18																							
16-Mar	4	7	17	Z	6	6	7	7	4	6	8	11	11	11	14	17	20	20	27	11	12	8	11	14	11.2	27																							
17-Mar	15	16	15	15	Z	16	16	13	10	10	11	12	10	7	7	5	11	19	23	15	10	8	8	7	12.1	23																							
18-Mar	6	6	5	8	5	Z	17	19	22	11	6	6	8	9	8	16	34	27	13	9	8	6	4	5	11.1	34																							
19-Mar	Z	5	6	6	4	6	6	6	13	13	13	5	3	5	5	4	4	4	3	4	6	10	7	4	6.1	13																							
20-Mar	6	Z	5	6	4	1	1	7	15	9	6	4	4	3	5	7	8	16	13	9	6	9	9	7	6.9	16																							
21-Mar	8	5	Z	6	6	6	10	13	11	6	2	2	1	2	2	2	3	3	3	3	2	2	2	1	4.4	13																							
22-Mar	2	2	2	Z	4	5	5	4	3	2	2	2	2	1	1	2	2	4	7	9	7	6	5	4	3.5	9																							
23-Mar	5	8	8	11	Z	18	25	21	16	6	1	0	3	4	5	8	6	12	22	20	17	17	14	8	11.0	25																							
24-Mar	8	9	8	8	9	Z	15	13	11	9	7	5	4	3	3	6	17	17	14	14	16	10	5	4	9.3	17																							
25-Mar	Z	2	2	9	14	17	7	13	12	5	2	2	1	1	1	1	2	4	6	7	6	5	3	3	5.6	17																							
26-Mar	2	Z	2	3	4	4	5	5	4	3	4	3	4	4	5	6	6	4	4	4	6	11	9	6	4.7	11																							
27-Mar	7	6	Z	8	9	10	13	9	2	1	1	1	1	2	3	3	5	5	5	6	9	8	6	8	5.5	13																							
28-Mar	7	5	3	Z	2	8	4	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	8																							
29-Mar	0	0	2	2	Z	10	10	3	1	1	1	1	1	1	1	4	8	7	1	1	1	1	0	0	2.4	10																							
30-Mar	4	2	0	5	3	Z	2	8	9	14	11	6	4	2	0	0	11	17	16	14	6	3	3	3	6.2	17																							
31-Mar	Z	10	12	17	25	27	18	10	13	9	8	16	17	18	9	3	4	10	3	2	2	2	3	4	10.4	27																							
																								4.6	5.3	7.6	7.8	8.0	9.5	10.8	10.7	9.8	7.6	5.5	4.3	4.4	4.1	3.8	4.8	7.7	11.4	12.0	8.5	7.9	6.6	5.1	4.5	Diurnal Average	
																								15	16	22	29	27	31	33	28	29	31	21	16	17	18	14	17	34	32	36	22	39	21	14	14	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	667	94.21	94.21
21 - 40	41	5.79	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

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

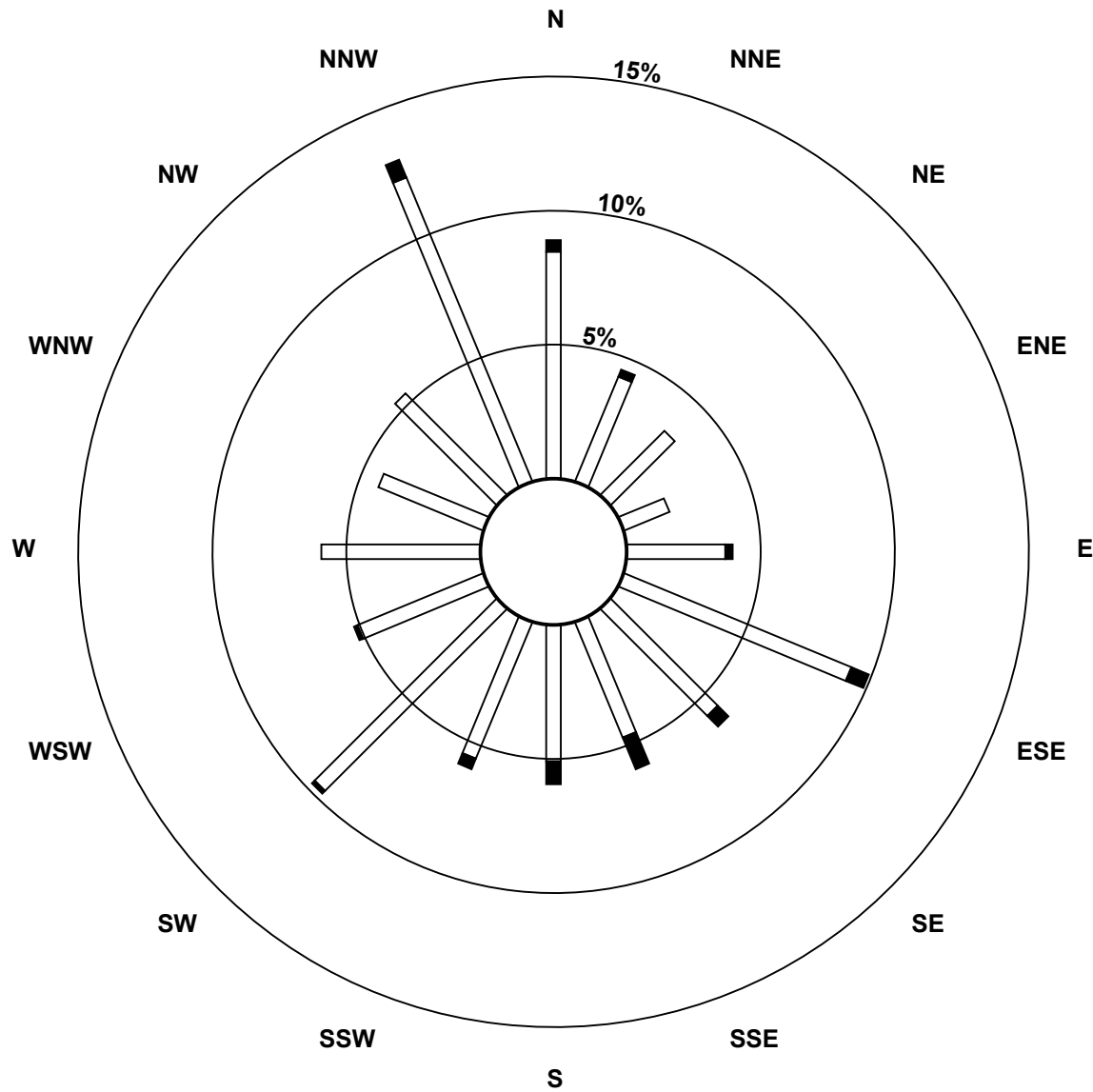
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	60	30	24	13	26	65	40	33	36	39	68	36	42	30	38	87	667
21 - 40	3	2	0	0	2	5	4	9	6	3	1	1	0	0	0	5	41
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	32	24	13	28	70	44	42	42	42	69	37	42	30	38	92	708

Total Number of Valid Hours: 708

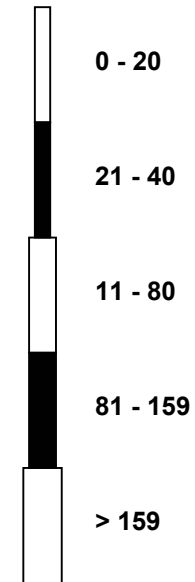
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Classes (ppb)

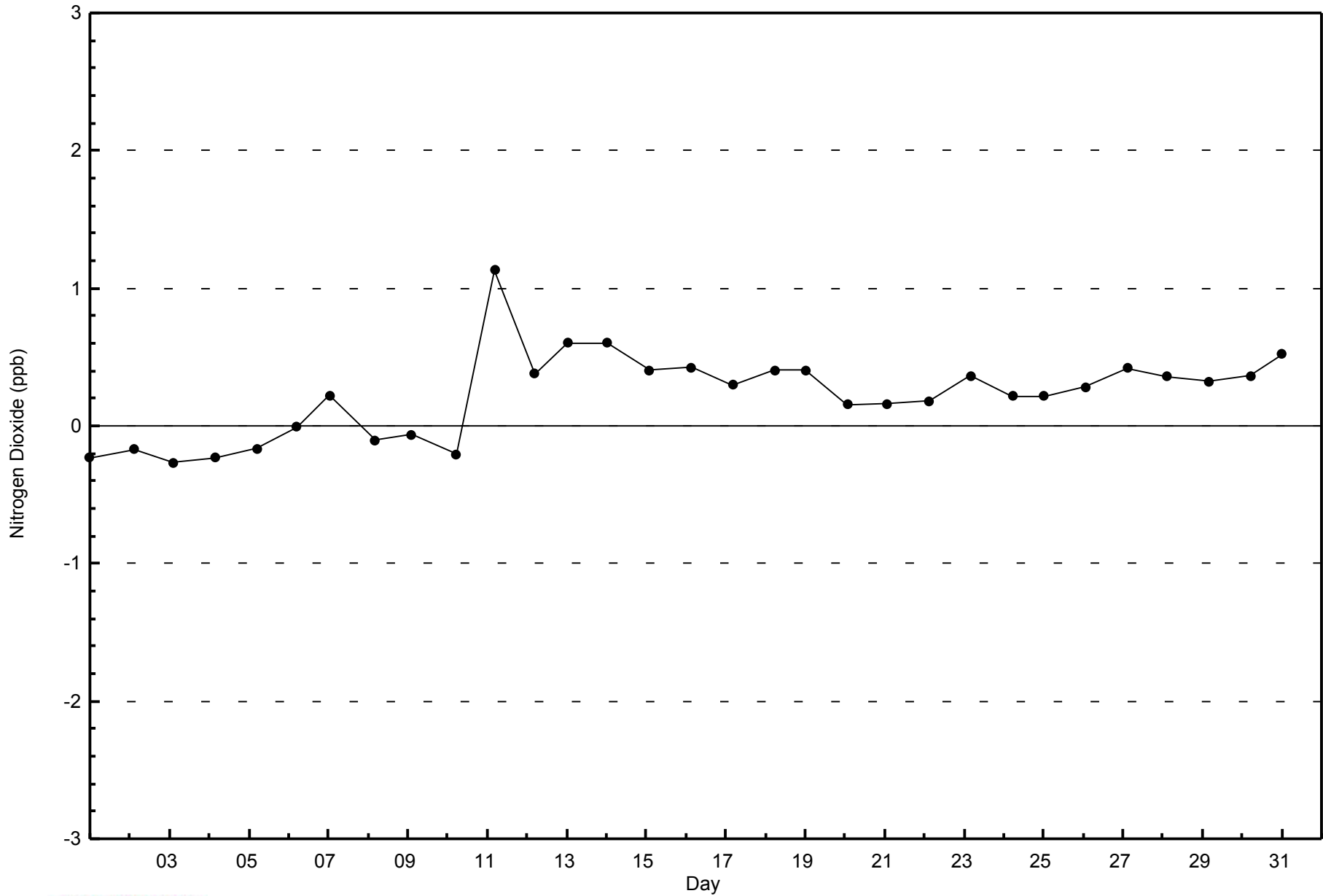


Total Number of Valid Hours: 708



WBEA
Zero Responses

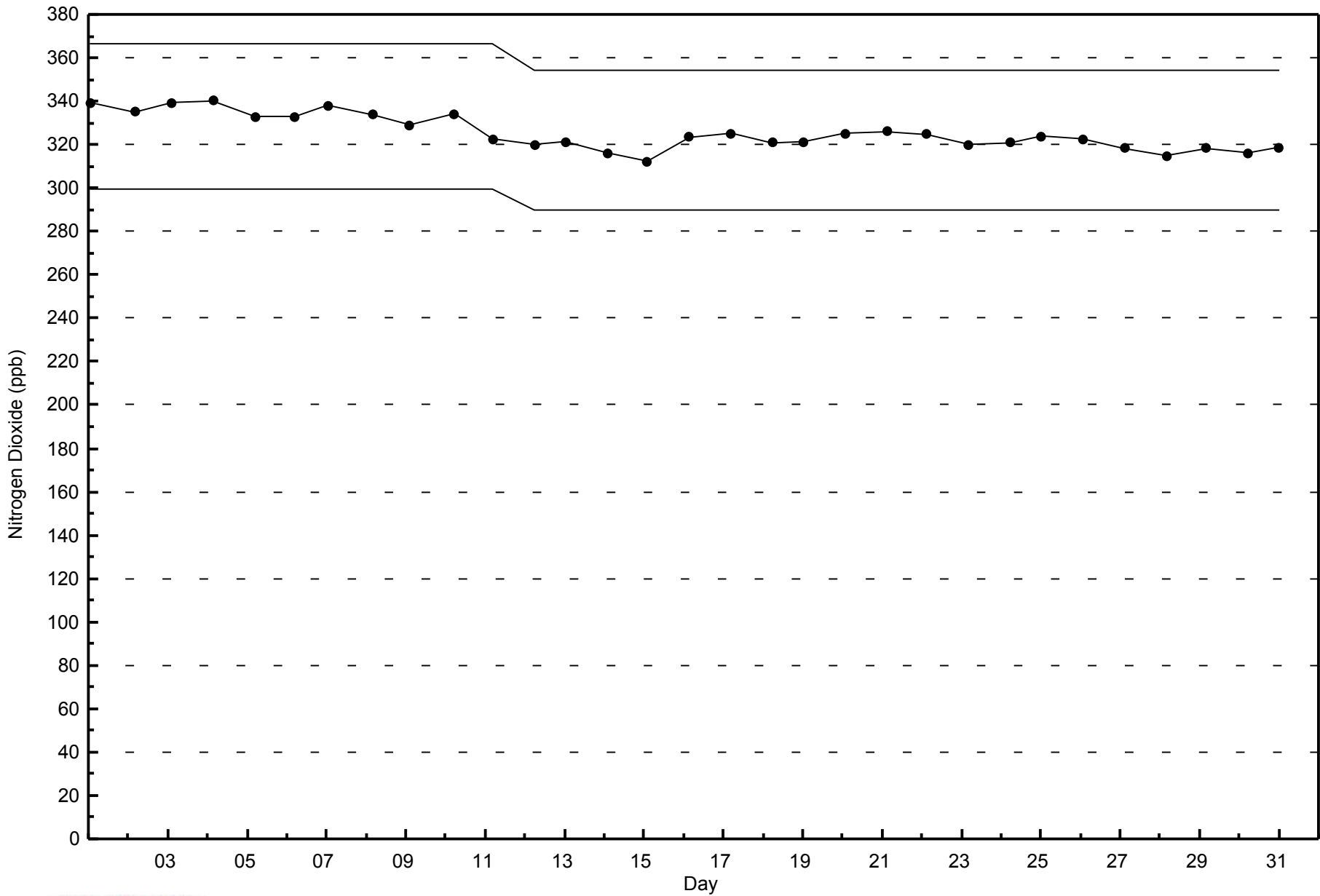
Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - March 2015





WBEA
Span Responses

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



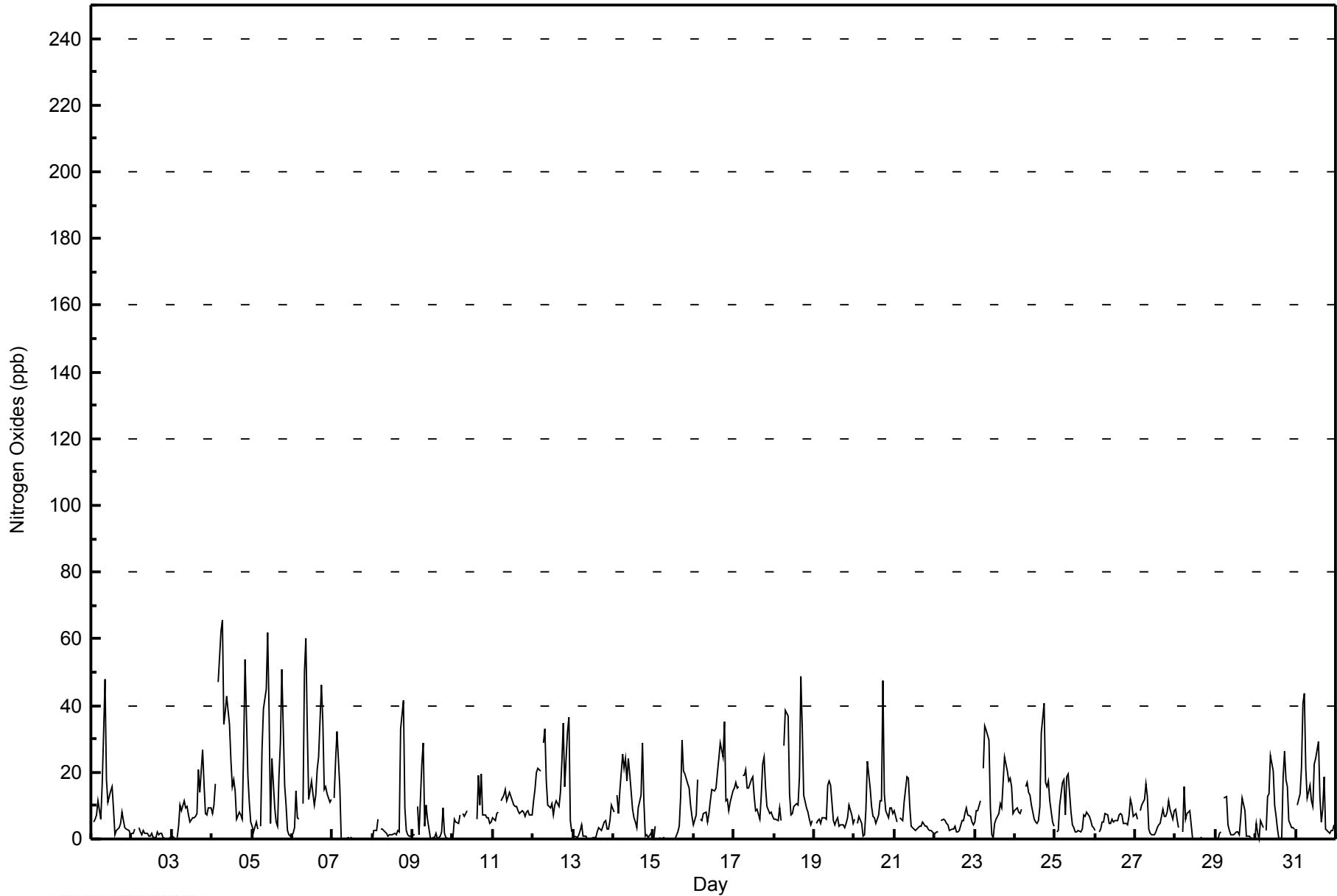


Maximum Value: 66 ppb on Mar 4 07:00																	Maximum Daily Average: 24.9 ppb on Mar 4																	Hours in Service: 744															
Minimum Value: 0 ppb on Mar 7 06:00																	Minimum Daily Average: 1.3 ppb on Mar 2																	Hours of Data: 708															
Maximum Diurnal Average: 16.8 ppb at hour 18																	Minimum Diurnal Average: 4.6 ppb at hour 24																	Hours of Missing Data: 36															
Monthly Average: 9.6 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 3 Median = 7 Q ₃ = 13 P ₉₀ = 21 P ₉₉ = 49																	Hours of Calibration: 36															
																																		Percent Operational Time: 100.0															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	5	6	7	12	6	17	32	48	18	11	14	16	9	1	2	4	5	8	6	3	3	2	1	10.3	48																							
2-Mar	2	2	3	Z	3	2	1	3	1	2	1	1	2	0	0	2	1	2	2	0	0	0	0	0	1.3	3																							
3-Mar	1	0	Z	0	4	10	8	12	9	10	7	5	6	6	7	7	21	14	27	16	7	7	9	9	8.9	27																							
4-Mar	8	10	17	Z	47	62	66	34	38	43	34	24	16	18	15	6	8	7	6	27	54	19	11	5	24.9	66																							
5-Mar	4	2	5	3	Z	4	27	39	45	62	38	5	24	9	5	4	19	29	51	16	10	3	1	1	17.6	62																							
6-Mar	2	4	14	6	6	Z	11	50	60	33	12	17	14	10	13	21	24	46	35	15	16	14	11	12	19.4	60																							
7-Mar	Z	12	23	32	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7	32																							
8-Mar	0	3	3	6	Z	3	3	2	2	1	1	1	1	2	1	2	2	33	41	9	3	1	1	1	5.3	41																							
9-Mar	1	1	Z	10	1	22	29	4	10	6	0	0	0	0	2	0	1	2	9	2	1	0	0	0	4.4	29																							
10-Mar	0	6	5	5	7	Z	8	7	8	C	C	C	C	C	6	19	10	20	7	7	7	6	5	5	7.6	20																							
11-Mar	6	5	8	8	Z	12	13	15	11	13	14	13	10	10	10	9	8	9	8	7	8	9	7	7	9.5	15																							
12-Mar	12	15	20	21	20	Z	29	33	17	10	9	11	7	10	11	10	14	23	35	16	32	36	6	2	17.3	36																							
13-Mar	Z	1	0	1	2	4	1	1	0	0	0	0	0	0	2	4	3	2	5	5	3	3	6	10	2.4	10																							
14-Mar	8	Z	13	8	14	25	21	24	17	24	20	9	6	5	4	9	13	29	11	1	1	0	2	1	11.6	29																							
15-Mar	0	4	Z	0	0	0	0	0	0	0	0	0	0	0	2	4	13	30	20	19	17	15	10	7	6.1	30																							
16-Mar	4	7	18	Z	6	6	8	8	5	8	11	15	15	15	20	24	29	24	35	11	12	9	11	14	13.7	35																							
17-Mar	15	17	15	15	Z	19	19	21	15	15	18	19	13	8	9	6	13	22	25	16	10	8	8	7	14.5	25																							
18-Mar	6	6	5	9	6	Z	28	39	37	14	7	8	10	11	10	19	49	33	13	9	8	6	4	5	14.8	49																							
19-Mar	Z	5	6	6	5	6	6	6	16	18	16	5	4	6	6	4	4	4	3	5	7	10	7	5	6.9	18																							
20-Mar	6	Z	5	7	4	1	1	9	23	15	10	7	6	5	7	11	11	48	14	9	6	9	9	7	10.1	48																							
21-Mar	9	5	Z	7	6	5	11	19	18	10	4	3	3	3	3	4	4	5	4	4	3	3	3	2	5.9	19																							
22-Mar	2	2	2	Z	6	6	5	5	4	3	3	3	4	2	2	3	5	6	7	9	7	7	5	4	4.4	9																							
23-Mar	5	9	9	11	Z	21	34	33	30	9	1	1	5	6	8	11	9	17	24	20	17	18	16	8	14.0	34																							
24-Mar	8	9	8	8	9	Z	16	17	14	13	10	6	5	5	5	10	32	41	17	16	17	12	5	4	12.4	41																							
25-Mar	Z	2	2	10	17	18	7	19	19	8	4	3	2	2	3	2	3	7	7	8	7	5	4	3	7.1	19																							
26-Mar	2	Z	2	3	5	5	8	7	5	5	6	5	5	6	7	8	7	5	5	4	7	12	10	7	5.9	12																							
27-Mar	8	6	Z	9	10	12	17	13	3	2	1	1	2	4	4	4	9	7	7	8	11	9	6	9	6.9	17																							
28-Mar	9	6	3	Z	2	16	6	8	9	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2.7	16																							
29-Mar	0	0	2	2	Z	12	13	4	3	1	1	1	2	2	1	6	12	9	1	1	1	1	0	0	3.3	13																							
30-Mar	5	2	0	5	3	Z	2	13	14	25	20	10	7	3	0	0	19	26	18	16	6	3	3	3	8.8	26																							
31-Mar	Z	10	14	21	41	43	21	12	16	12	10	22	24	29	13	5	9	18	3	2	2	2	3	4	14.6	43																							
																								4.9	5.5	8.0	8.5	10.1	12.9	14.1	15.7	16.1	12.7	9.0	7.0	7.0	6.2	5.7	6.9	11.5	16.8	14.4	9.2	9.1	7.5	5.3	4.6	Diurnal Average	
																								15	17	23	32	47	62	66	50	60	62	38	24	24	29	20	24	49	48	51	27	54	36	16	14	Diurnal Maximum	
Z - zerospan																								C - Calibration																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	630	88.98	88.98
21 - 40	60	8.47	97.46
41 - 80	18	2.54	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



WBEA
Frequency Distribution

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

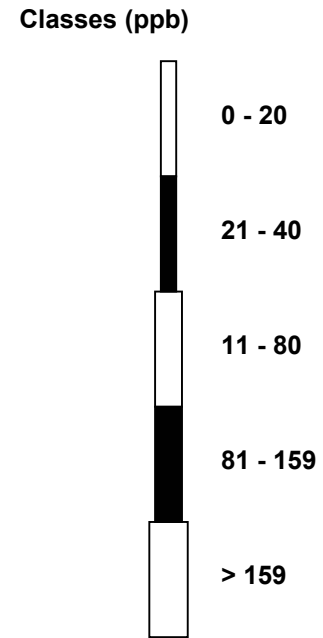
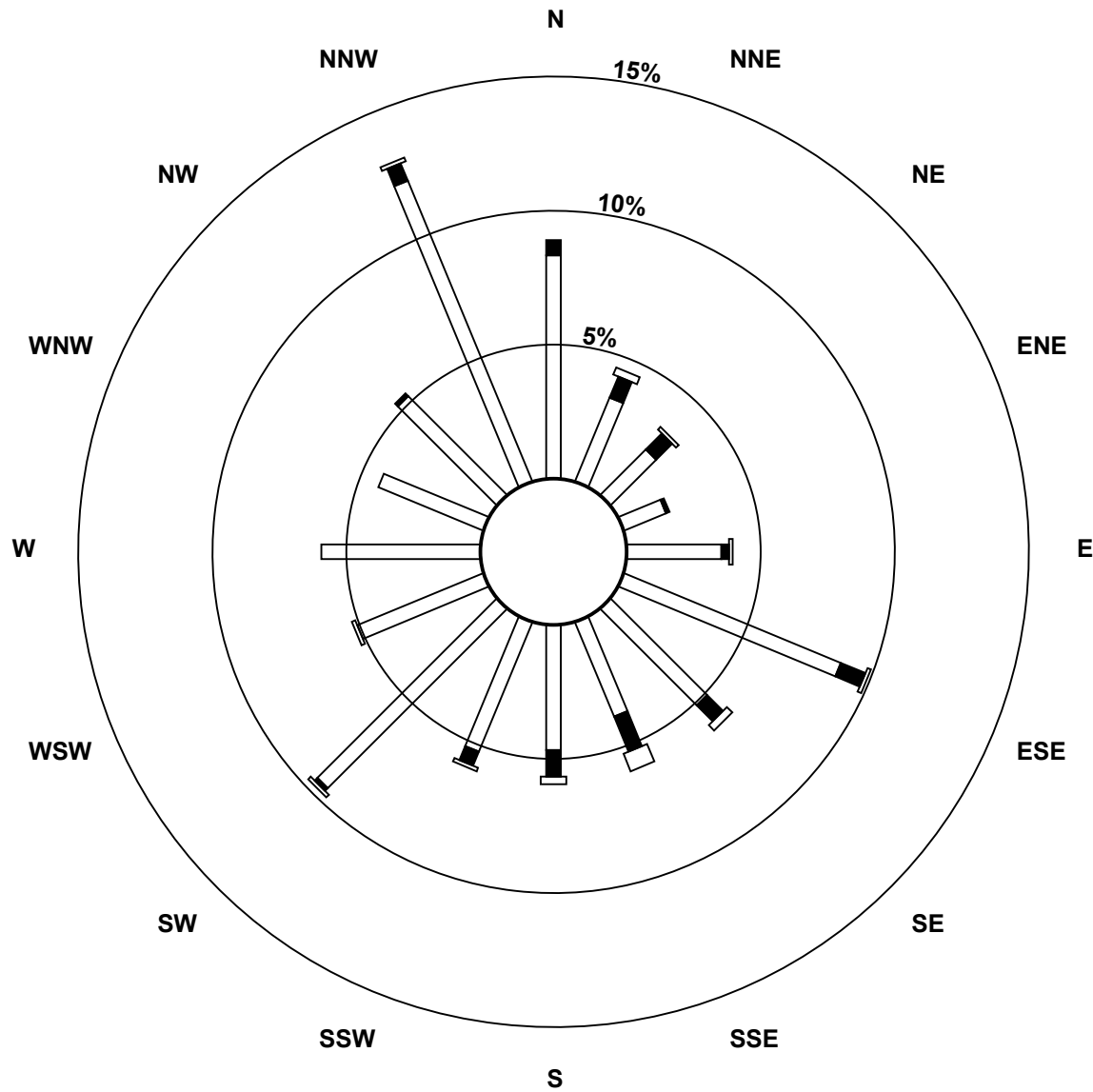
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	24	17	12	25	62	36	27	33	37	67	36	42	30	37	86	630
21 - 40	4	6	6	1	2	7	6	10	7	4	1	0	0	0	1	5	60
11 - 80	0	2	1	0	1	1	2	5	2	1	1	1	0	0	0	1	18
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	32	24	13	28	70	44	42	42	42	69	37	42	30	38	92	708

Total Number of Valid Hours: 708

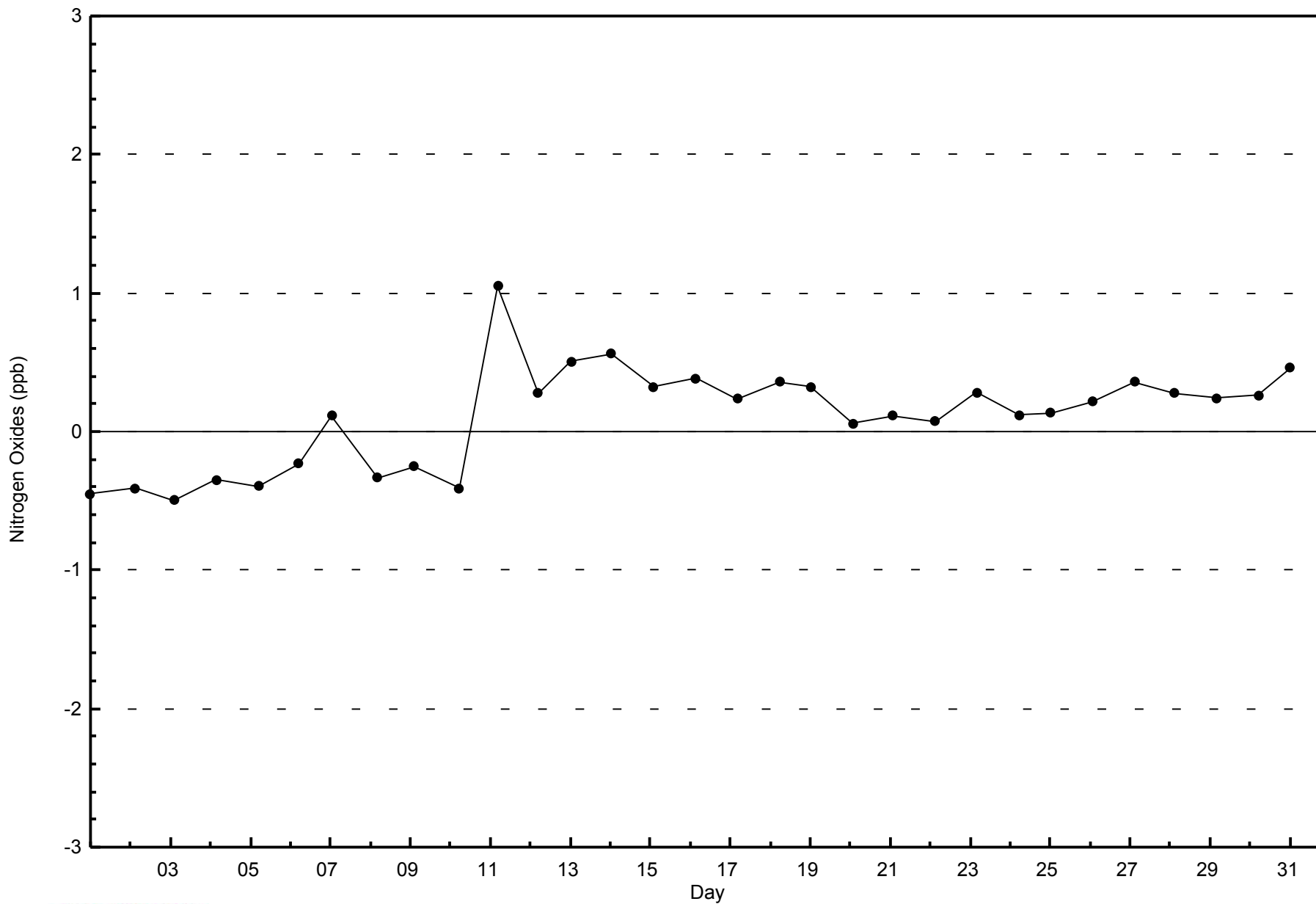
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



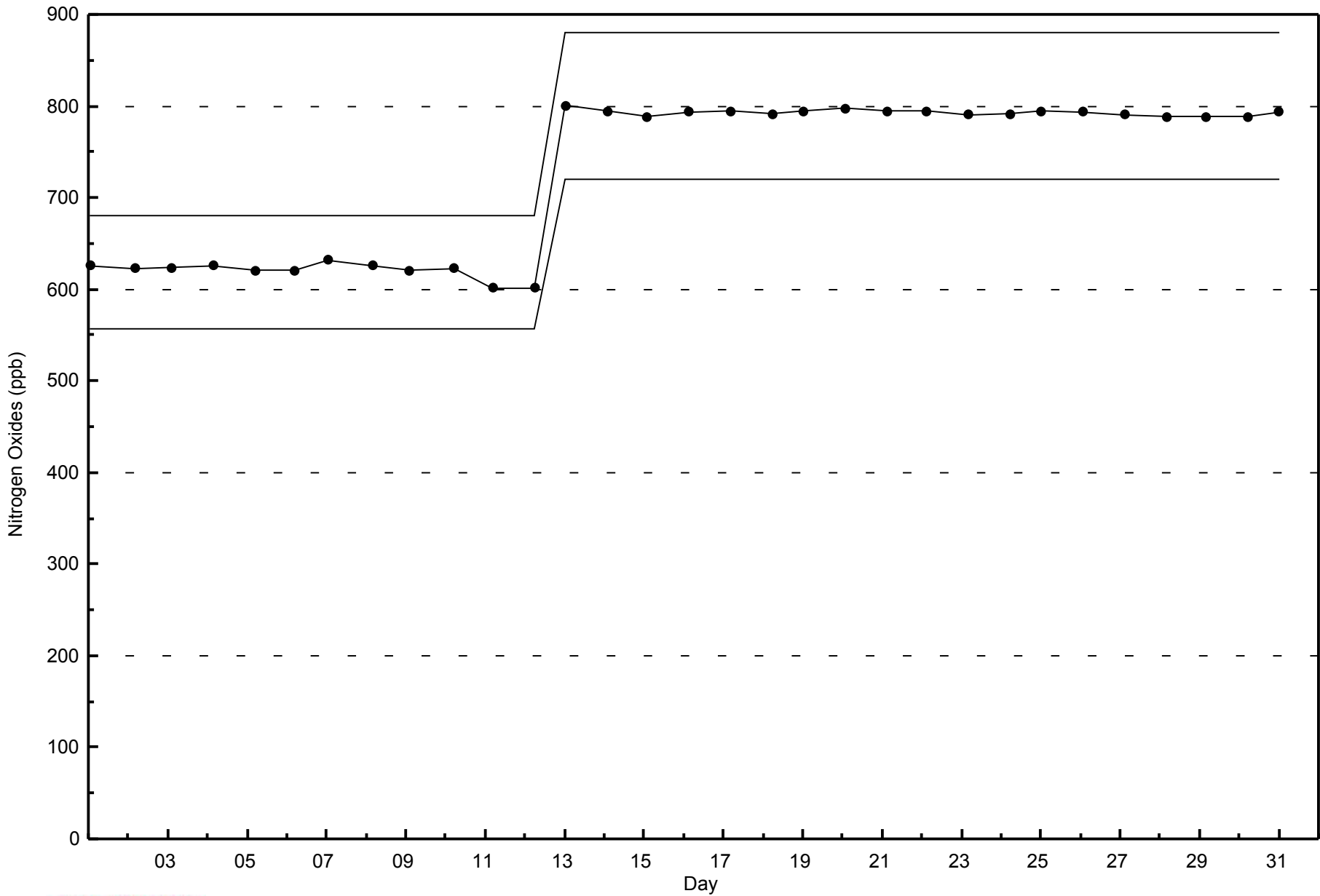
Total Number of Valid Hours: 708





WBEA
Span Responses

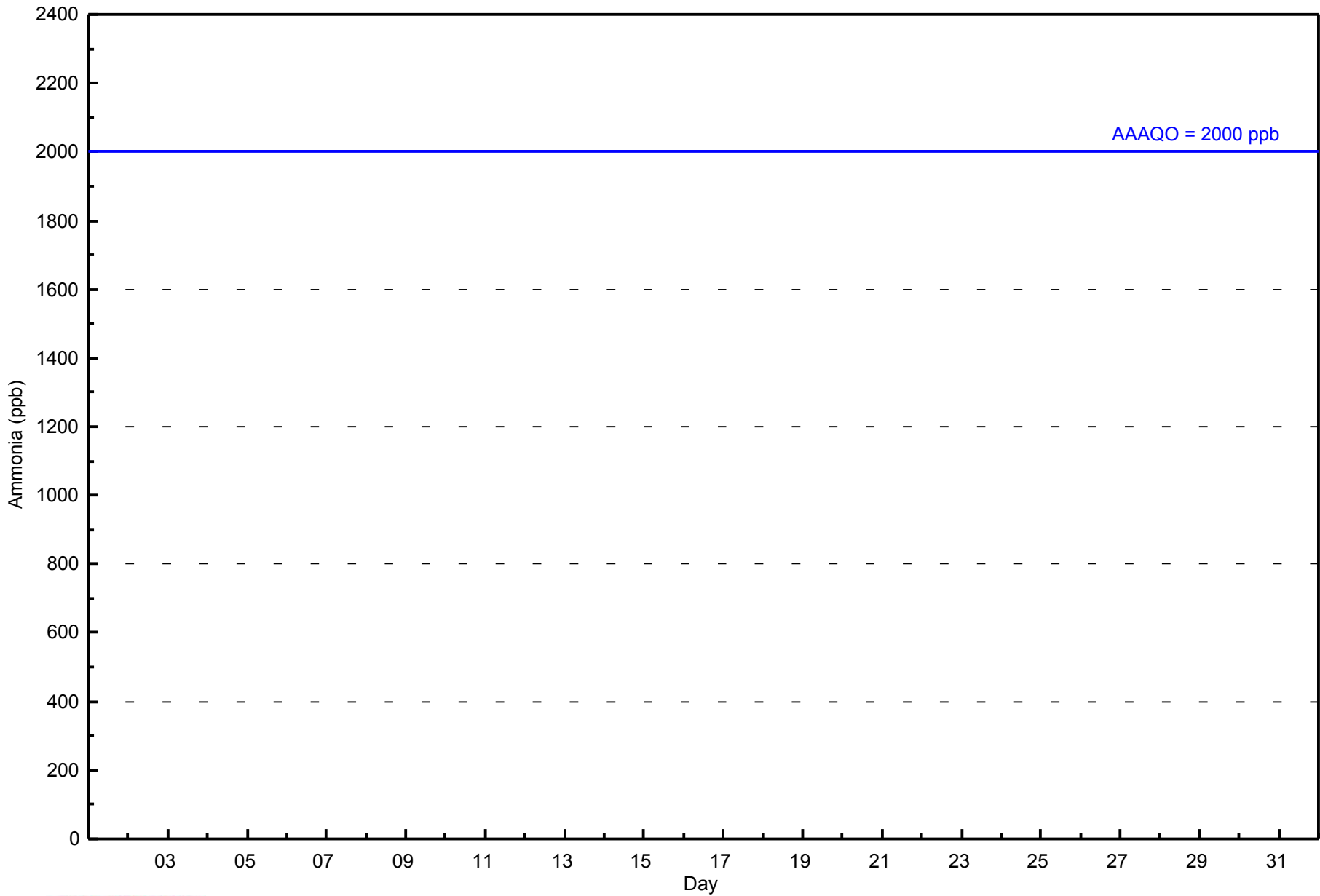
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - March 2015





WBEA
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - March 2015





WBEA
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	620	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: 620

Total Number of Hours: 744



WBEA
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - March 2015

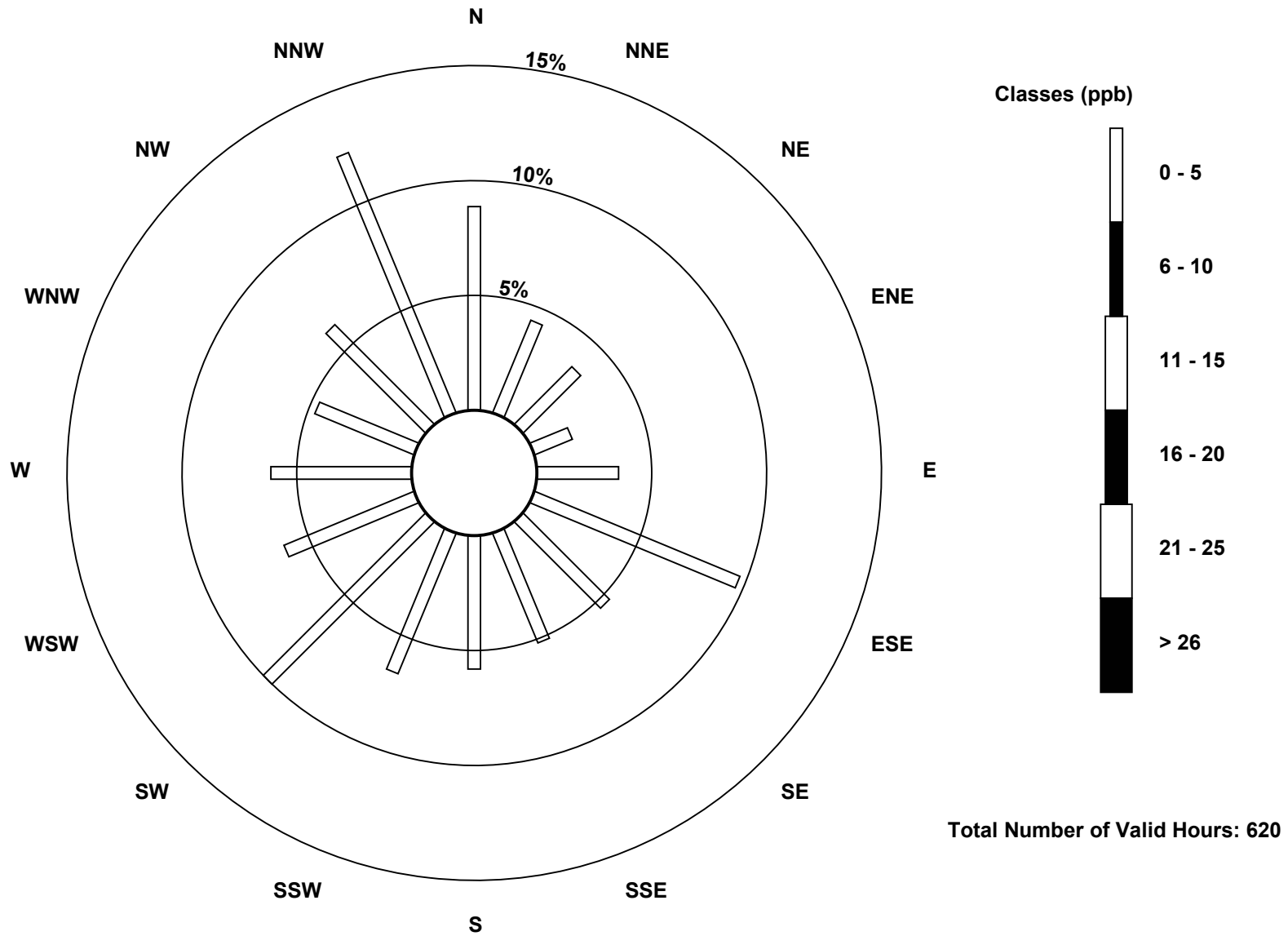
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	55	27	22	11	22	60	33	32	36	41	62	38	38	29	38	76	620
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	55	27	22	11	22	60	33	32	36	41	62	38	38	29	38	76	620

Total Number of Valid Hours: 620

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

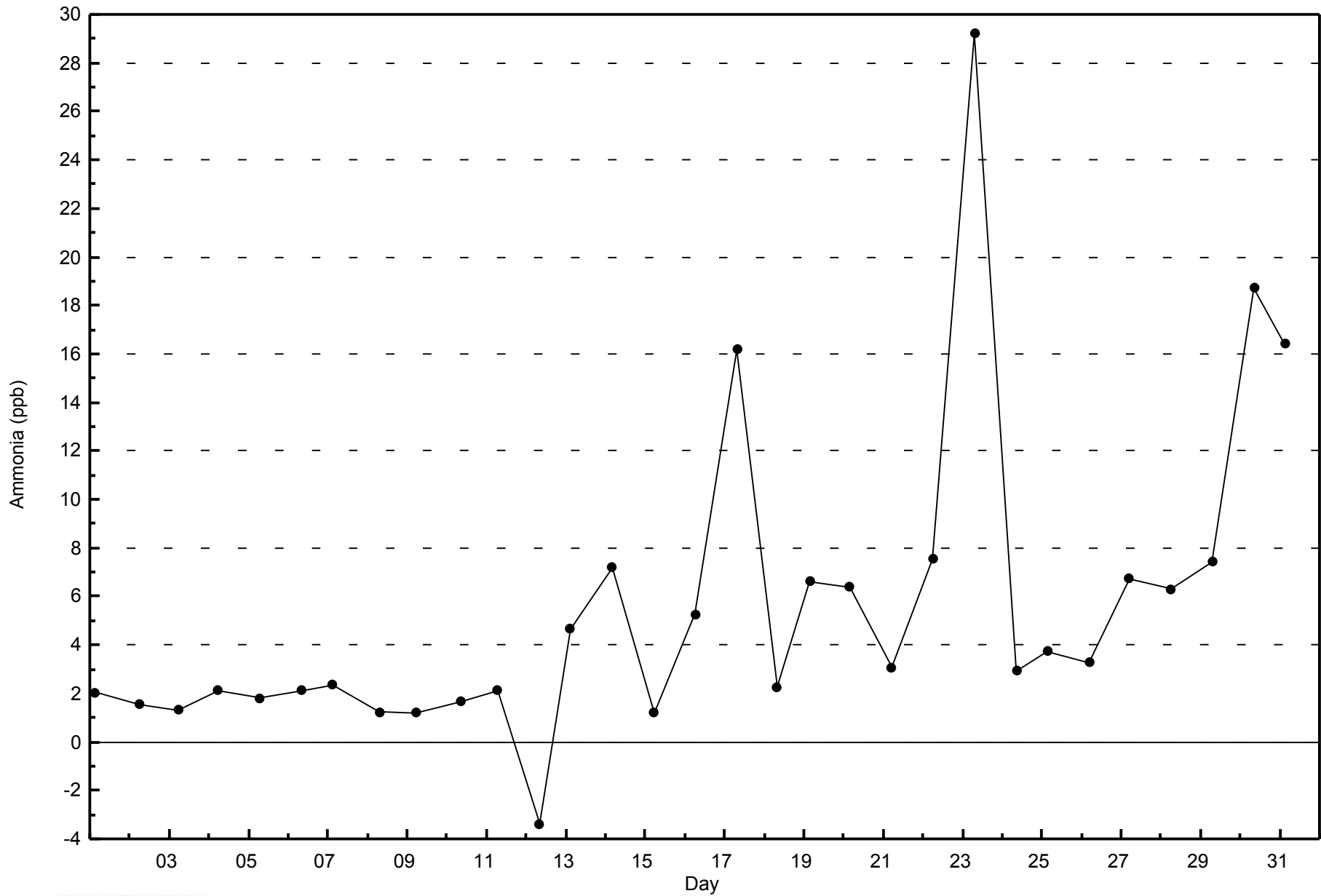
Ammonia (NH₃) - ppb
Patricia McInnes (AMS 6)





WBEA
Zero Responses

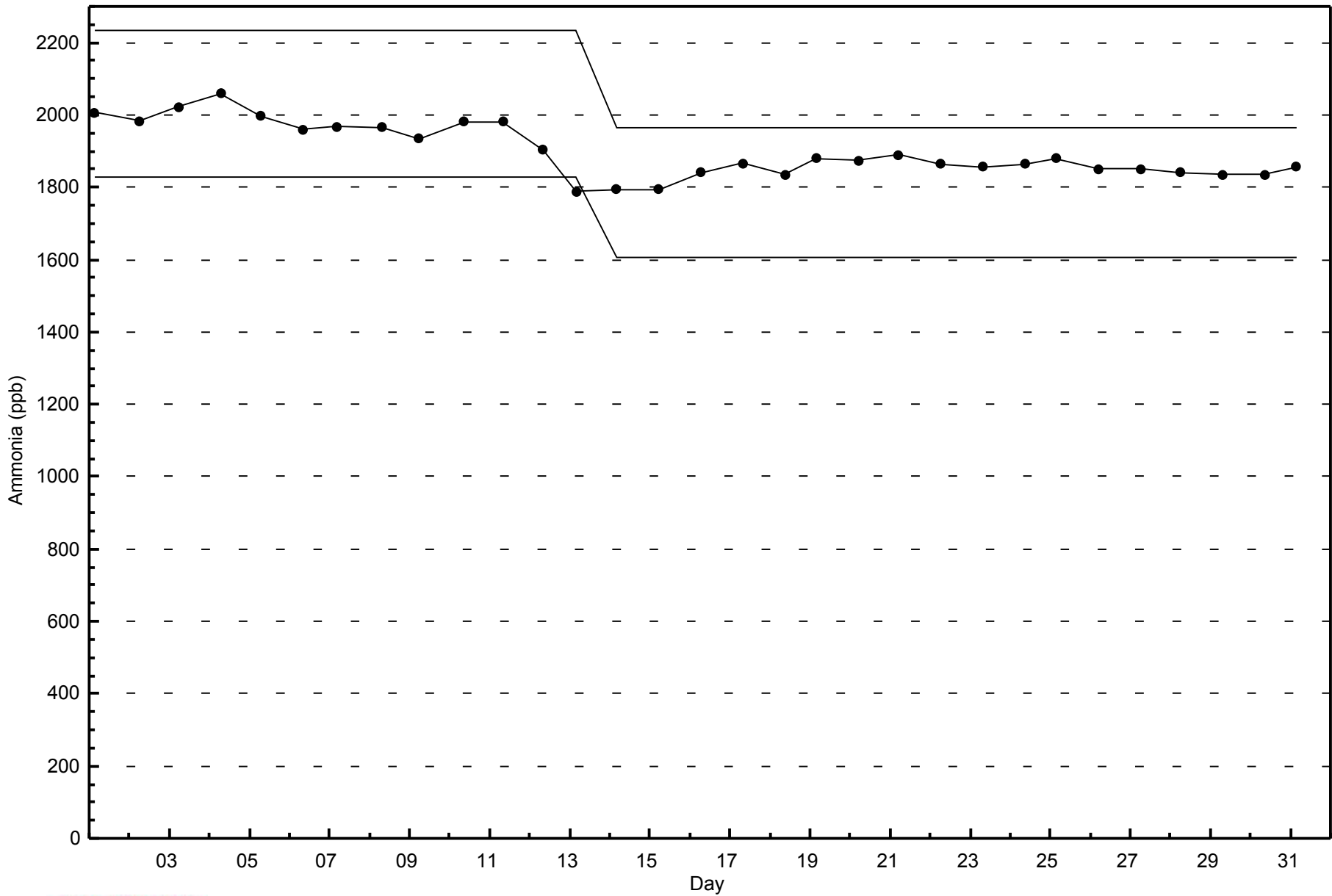
Ammonia (NH₃) - ppb
Patricia McInnes - March 2015





WBEA
Span Responses

Ammonia (NH₃) - ppb
Patricia McInnes - March 2015





Summary of Hour Averages

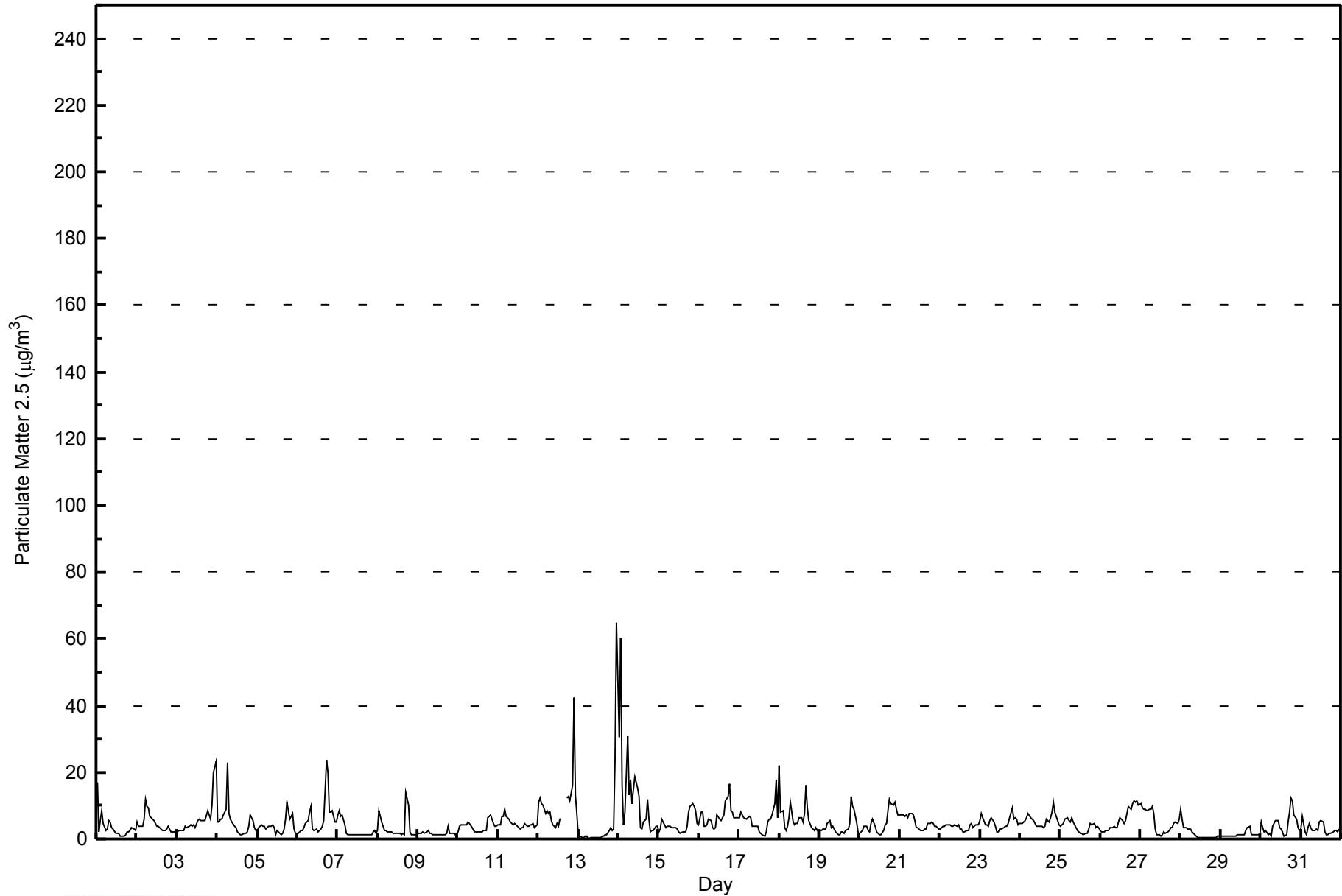
Patricia McInnes - March 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																															
Maximum Value: 64.7 µg/m ³ on Mar 14 00:00		Maximum Daily Average: 12.6 µg/m ³ on Mar 14																																															
Minimum Value: 0.2 µg/m ³ on Mar 13 07:00		Hours of Data: 742																																															
Maximum Diurnal Average: 6.6 µg/m ³ at hour 2		Hours of Missing Data: 2																																															
Monthly Average: 4.78 µg/m ³		Hours of Calibration: 0																																															
Minimum Daily Average: 1.3 µg/m ³ on Mar 29		Percent Operational Time: 99.7																																															
Minimum Diurnal Average: 2.5 µg/m ³ at hour 15																																																	
Percentiles: P ₁ = 0.5 P ₁₀ = 1.2 Q ₁ = 2.2 Median = 3.7 Q ₃ = 5.9 P ₉₀ = 8.9 P ₉₉ = 23.5																																																	
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-Mar	16.8	2.3	5.7	8.7	4.6	2.5	3.2	5.4	5.1	3.3	2.8	1.5	1.6	1.5	1.0	1.0	1.0	1.1	2.0	2.1	2.6	3.4	2.9	2.7	3.5	16.8																							
2-Mar	4.9	3.9	3.8	4.0	6.1	11.9	9.8	9.2	6.8	6.1	5.4	4.7	4.0	3.6	2.9	2.6	2.4	2.5	2.9	4.0	2.3	2.2	2.1	1.9	4.6	11.9																							
3-Mar	2.1	2.4	2.5	2.4	2.6	3.6	3.6	3.6	4.3	3.8	4.0	3.5	5.5	6.0	5.7	5.3	5.4	5.7	8.5	7.3	5.9	10.1	19.8	23.5	6.1	23.5																							
4-Mar	4.9	5.0	6.1	5.8	7.1	8.9	22.9	7.8	5.9	5.0	3.9	3.2	2.3	1.8	1.5	1.1	1.6	1.6	2.0	3.9	7.3	5.3	3.4	2.4	5.0	22.9																							
5-Mar	2.7	3.3	4.3	3.8	3.7	3.1	3.5	3.9	3.8	4.0	3.3	1.3	2.4	1.7	1.3	1.7	3.0	5.8	10.9	6.0	6.6	7.8	3.2	1.9	3.9	10.9																							
6-Mar	1.7	1.9	2.6	2.6	3.3	4.6	5.7	8.3	9.7	2.8	2.5	3.0	2.2	2.5	2.9	4.0	5.6	23.7	19.9	8.0	8.2	8.6	5.3	5.1	6.0	23.7																							
7-Mar	7.4	8.3	6.7	7.2	4.3	1.7	1.3	1.2	1.2	1.2	1.1	1.2	1.1	1.1	1.2	1.2	1.2	1.3	1.5	1.3	1.4	2.2	2.7	1.8	2.5	8.3																							
8-Mar	2.6	8.4	5.1	3.9	2.7	2.4	2.1	2.0	1.9	1.7	1.7	1.5	1.5	1.6	1.4	1.5	1.4	13.8	10.0	2.0	1.2	1.1	1.1	1.4	3.1	13.8																							
9-Mar	1.6	1.7	1.9	2.1	1.5	2.3	2.7	1.5	1.5	1.4	1.2	1.2	1.2	1.3	1.4	1.3	1.5	1.7	3.8	1.8	1.7	1.7	1.4	1.6	1.7	3.8																							
10-Mar	2.1	3.9	4.2	4.3	4.3	4.4	4.9	4.6	3.4	2.5	2.3	2.3	2.3	2.0	2.2	2.4	2.3	2.5	6.3	7.1	6.1	4.6	4.0	3.8	3.7	7.1																							
11-Mar	4.1	4.2	6.7	6.7	8.9	6.7	5.9	5.2	4.8	4.4	4.5	4.1	3.3	3.2	3.2	3.3	4.6	3.9	3.7	4.2	4.1	4.5	3.6	4.4	4.7	8.9																							
12-Mar	10.9	12.2	10.4	10.2	7.6	8.5	7.8	7.9	5.3	4.1	3.3	4.8	3.7	5.7	5.8	M	M	12.1	12.8	11.4	16.3	42.3	13.2	7.8	10.2	42.3																							
13-Mar	1.4	0.7	0.5	0.6	0.9	0.6	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.7	0.9	1.1	1.5	2.6	3.3	2.4	2.8	23.6	64.7	4.7	64.7																							
14-Mar	30.7	60.4	16.0	4.1	7.8	31.0	13.3	17.8	10.5	14.7	18.6	15.3	12.6	3.5	3.1	5.1	5.8	11.8	6.0	2.2	2.5	2.7	3.7	3.9	12.6	60.4																							
15-Mar	2.0	2.9	6.0	4.3	3.6	4.0	4.0	3.8	3.3	3.2	3.2	2.8	2.3	1.8	2.0	2.1	2.3	3.7	7.9	9.9	10.4	9.8	8.5	4.8	4.5	10.4																							
16-Mar	4.3	8.1	8.1	3.9	3.8	4.2	5.8	5.6	3.3	3.1	3.4	7.2	6.1	5.6	6.2	7.3	11.4	12.7	16.3	8.3	8.1	6.2	6.2	6.2	6.7	16.3																							
17-Mar	6.1	7.9	7.2	6.5	6.1	6.2	6.7	6.4	3.9	3.8	4.0	3.6	2.0	1.8	1.2	1.0	2.0	5.2	6.1	6.0	7.4	10.6	17.9	6.3	5.7	17.9																							
18-Mar	22.0	8.2	8.4	3.6	2.6	3.7	6.4	11.0	5.3	4.3	4.7	4.7	6.3	6.4	5.2	7.7	16.2	9.5	5.5	3.3	2.8	2.4	3.5	2.6	6.5	22.0																							
19-Mar	2.6	2.4	2.8	2.9	3.1	4.8	5.6	3.4	4.0	2.9	2.2	1.3	1.4	2.2	2.0	1.8	2.6	3.1	4.7	12.9	9.6	9.0	4.6	1.8	3.9	12.9																							
20-Mar	1.9	2.1	2.7	3.8	3.7	2.4	2.0	4.5	6.1	3.6	2.1	1.5	1.3	1.4	2.4	4.1	4.8	8.5	11.9	10.5	10.4	11.2	9.0	7.2	5.0	11.9																							
21-Mar	7.2	7.1	7.3	6.7	7.3	6.2	7.6	7.8	7.4	5.5	3.6	3.4	2.6	2.4	2.6	2.8	3.0	4.8	4.7	4.9	4.8	3.7	4.0	3.1	5.0	7.8																							
22-Mar	3.2	3.6	3.6	3.6	4.1	4.0	4.2	3.9	4.0	4.2	3.6	4.1	3.1	2.8	2.3	2.3	2.5	2.7	4.0	4.5	3.4	4.3	4.3	4.1	3.6	4.5																							
23-Mar	5.4	7.5	6.3	4.4	4.0	4.0	5.5	6.1	5.1	3.9	2.2	1.9	2.8	3.1	3.5	3.9	3.7	4.5	6.3	9.2	6.1	6.3	5.8	4.4	4.8	9.2																							
24-Mar	4.6	4.9	5.2	5.6	6.4	7.8	6.5	6.1	5.3	4.6	3.8	3.7	3.8	3.9	3.4	3.7	6.0	5.3	6.3	7.8	11.1	8.1	5.5	4.4	5.6	11.1																							
25-Mar	4.0	4.3	4.5	5.8	6.4	5.5	4.9	6.5	5.1	3.2	2.6	2.3	1.9	1.7	1.5	1.9	1.8	2.8	4.5	4.3	4.5	3.5	3.7	3.3	3.8	6.5																							
26-Mar	2.6	2.2	2.2	2.6	2.6	2.5	3.3	3.3	3.9	3.3	3.4	5.0	6.2	5.7	4.6	5.3	7.5	9.6	9.0	10.6	11.3	11.2	11.4	10.2	5.8	11.4																							
27-Mar	10.8	9.3	8.8	9.1	8.4	8.9	9.1	9.6	7.8	3.0	1.2	1.2	0.8	1.3	2.3	1.9	2.2	2.6	3.2	3.4	4.5	5.1	4.5	5.9	5.2	10.8																							
28-Mar	8.9	6.0	3.6	3.2	3.0	3.1	2.9	2.3	1.2	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.7	0.8	1.8	8.9																							
29-Mar	0.9	0.7	0.7	0.6	0.7	0.8	0.8	0.7	1.0	1.0	1.1	1.2	1.4	1.1	1.2	2.3	3.6	3.6	1.4	1.5	1.3	1.3	1.4	1.3	1.3	3.6																							
30-Mar	5.1	3.3	2.2	2.5	1.3	1.5	1.0	3.9	4.5	5.3	5.6	3.4	2.9	2.2	1.0	1.3	5.0	8.0	12.4	11.5	7.1	6.0	3.3	2.4	4.3	12.4																							
31-Mar	3.0	6.7	2.2	1.3	3.2	4.6	3.2	2.7	2.6	2.8	2.5	5.1	5.4	5.2	2.0	1.2	1.5	1.7	1.8	2.3	2.5	2.4	2.1	2.9	3.0	6.7																							
																								6.1	6.6	5.1	4.4	4.4	5.4	5.4	4.5	3.7	3.4	3.3	3.1	2.7	2.5	2.7	3.8	5.7	6.4	5.7	5.6	6.5	6.0	6.4	Diurnal Average		
																								30.7	60.4	16.0	10.2	8.9	31.0	22.9	17.8	10.5	14.7	18.6	15.3	12.6	6.4	6.2	7.7	16.2	23.7	19.9	12.9	16.3	42.3	23.6	64.7	Diurnal Maximum	
M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	489	65.90	65.90
6 - 15	190	25.61	91.51
16 - 25	15	2.02	93.53
26 - 80	5	0.67	94.21
> 81.0	0	0.00	94.21

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	44	27	16	9	17	64	34	22	26	22	45	27	30	24	27	55	489
6 - 15	23	7	8	5	11	8	9	13	10	17	13	6	6	4	11	39	190
16 - 25	1	1	0	0	0	0	2	2	2	0	2	0	1	0	0	4	15
26 - 80	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	35	24	14	28	72	46	41	38	39	60	33	37	28	38	98	699

Total Number of Valid Hours: 742

Total Number of Hours: 744

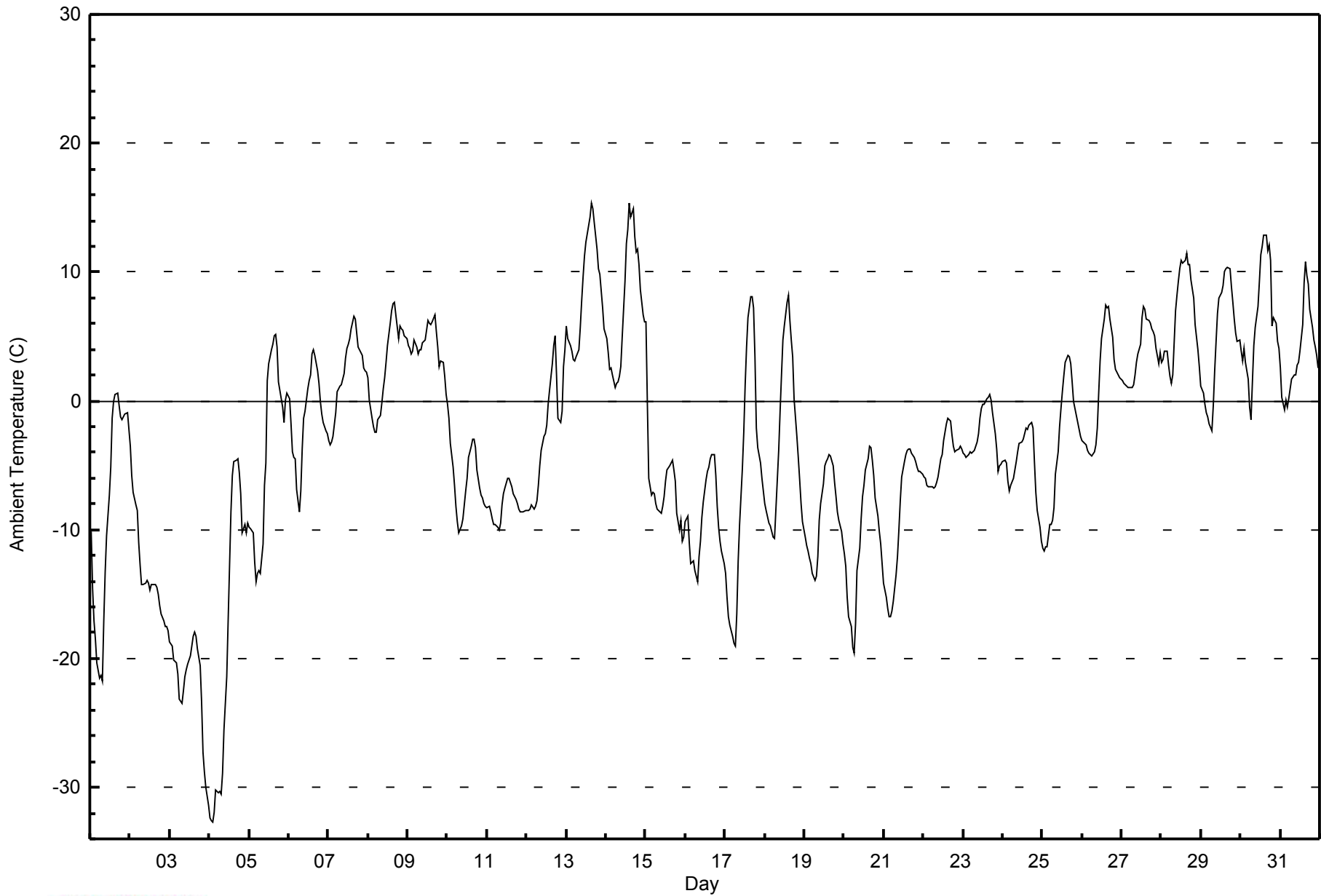


Maximum Value: 15.4 C on Mar 14 15:00		Maximum Daily Average: 8.5 C on Mar 13		Hours in Service: 744																						
Minimum Value: -32.7 C on Mar 4 03:00		Minimum Daily Average: -21.9 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 2.2 C at hour 16		Minimum Diurnal Average: -8.4 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -3.28 C		Percentiles: P ₁ = -30.3 P ₁₀ = -14.2 Q ₁ = -8.5 Median = -3.1 Q ₃ = 3.4 P ₉₀ = 6.6 P ₉₉ = 13.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-10.1	-14.6	-17.1	-18.4	-20.4	-21.6	-21.3	-21.7	-17.0	-13.3	-10.5	-7.3	-5.2	-1.3	0.0	0.5	0.6	-0.4	-1.2	-1.4	-1.3	-1.1	-0.9	-2.2	-8.6	0.6
2-Mar	-3.5	-5.8	-7.1	-8.1	-8.6	-11.0	-12.8	-14.2	-14.3	-14.2	-14.0	-14.1	-14.6	-14.3	-14.2	-14.2	-14.5	-15.0	-15.9	-16.5	-17.0	-17.5	-17.5	-17.9	-13.2	-3.5
3-Mar	-18.7	-19.0	-20.1	-20.2	-20.4	-21.2	-23.2	-23.5	-22.5	-21.4	-20.9	-20.4	-19.7	-19.1	-18.3	-18.0	-18.2	-19.2	-20.6	-23.4	-27.2	-28.8	-30.0	-31.4	-21.9	-18.0
4-Mar	-32.4	-32.6	-32.7	-31.9	-30.2	-30.4	-30.3	-30.5	-28.9	-25.5	-21.4	-17.0	-12.8	-8.7	-5.8	-4.8	-4.6	-4.5	-5.6	-7.2	-10.3	-9.6	-10.2	-9.5	-18.2	-4.5
5-Mar	-9.8	-9.9	-10.2	-12.6	-14.0	-13.4	-13.1	-13.4	-11.1	-6.6	-4.8	1.5	2.9	4.0	4.4	5.1	5.1	4.2	1.5	0.1	-0.5	-1.7	0.1	0.6	-3.8	5.1
6-Mar	0.2	-1.8	-3.9	-4.4	-4.5	-6.9	-8.6	-7.0	-3.8	-1.4	-0.8	0.9	1.5	2.0	3.6	4.0	3.5	2.3	1.3	0.0	-1.0	-1.6	-2.3	-2.6	-1.3	4.0
7-Mar	-3.1	-3.4	-3.1	-2.7	-1.0	0.7	0.9	1.2	1.3	2.1	3.3	4.0	4.4	4.8	5.6	6.6	6.4	5.3	4.2	4.0	3.6	2.6	2.4	2.2	2.2	6.6
8-Mar	1.8	0.1	-1.4	-2.0	-2.5	-2.4	-1.5	-1.2	-0.2	1.0	1.8	3.0	4.3	6.0	7.0	7.5	7.7	6.7	4.8	5.8	5.6	5.5	5.1	4.9	2.8	7.7
9-Mar	4.3	4.1	3.7	3.8	4.8	4.1	3.6	3.9	4.0	4.5	4.7	5.5	6.2	6.1	6.0	6.1	6.7	5.4	4.2	2.7	3.1	3.0	2.0	0.5	4.3	6.7
10-Mar	-0.3	-1.3	-3.3	-5.2	-6.6	-8.2	-9.3	-10.3	-9.7	-9.2	-8.0	-7.0	-6.0	-4.4	-3.5	-3.0	-2.9	-3.6	-5.3	-6.8	-7.3	-7.5	-7.9	-8.2	-6.0	-0.3
11-Mar	-8.2	-8.2	-8.6	-9.2	-9.6	-9.6	-9.8	-10.0	-9.5	-8.1	-7.2	-6.8	-6.1	-6.0	-6.3	-6.7	-7.2	-7.6	-7.9	-8.4	-8.6	-8.6	-8.6	-8.5	-8.1	-6.0
12-Mar	-8.5	-8.5	-8.4	-8.1	-8.4	-8.2	-7.7	-6.5	-5.1	-3.9	-2.8	-2.5	-1.9	-0.3	0.9	2.9	4.3	5.0	2.0	-1.4	-1.7	-0.8	2.7	3.9	-2.6	5.0
13-Mar	5.8	4.8	4.3	3.9	3.3	3.1	3.4	3.9	5.7	7.8	9.6	11.2	12.3	13.6	14.3	15.4	15.0	13.8	11.8	10.2	9.8	8.5	7.3	5.6	8.5	15.4
14-Mar	4.8	3.8	2.4	2.6	2.0	1.0	1.3	1.4	2.0	2.7	4.9	9.3	12.2	13.3	15.4	14.3	14.9	12.8	11.6	11.8	10.6	8.6	6.7	6.2	7.4	15.4
15-Mar	6.2	-0.2	-6.0	-7.4	-7.1	-7.2	-8.0	-8.4	-8.5	-8.7	-8.2	-7.4	-6.3	-5.4	-5.1	-4.9	-4.7	-5.3	-6.2	-8.7	-10.0	-9.3	-10.8	-10.5	-6.6	6.2
16-Mar	-9.4	-9.0	-11.0	-12.6	-12.6	-12.4	-13.1	-14.0	-12.0	-10.8	-9.1	-7.8	-6.1	-5.5	-5.2	-4.5	-4.2	-4.2	-5.8	-8.2	-9.8	-10.9	-11.7	-12.6	-9.3	-4.2
17-Mar	-13.4	-15.3	-16.7	-17.4	-18.3	-18.8	-19.1	-16.6	-12.4	-9.5	-5.3	-2.4	1.3	4.1	6.5	8.1	8.1	7.2	3.5	-2.2	-3.7	-4.8	-6.0	-7.0	-6.2	8.1
18-Mar	-7.9	-8.5	-9.5	-9.7	-10.1	-10.5	-10.6	-8.4	-3.8	-0.8	2.0	4.7	5.9	7.7	8.2	6.3	4.7	3.5	0.2	-2.8	-4.4	-6.2	-7.9	-9.4	-2.8	8.2
19-Mar	-10.6	-11.3	-11.6	-12.2	-12.7	-13.4	-14.0	-13.6	-12.1	-9.3	-7.9	-6.4	-5.1	-4.7	-4.5	-4.2	-4.3	-5.0	-6.3	-7.4	-8.6	-9.3	-10.2	-11.1	-9.0	-4.2
20-Mar	-11.8	-12.9	-15.2	-16.8	-17.5	-19.2	-19.5	-17.2	-13.1	-11.4	-9.2	-7.4	-6.6	-5.4	-4.5	-3.5	-3.7	-4.6	-5.8	-7.6	-8.9	-10.1	-11.1	-12.6	-10.6	-3.5
21-Mar	-14.2	-15.2	-16.1	-16.7	-16.8	-16.3	-15.6	-13.5	-12.1	-10.0	-7.8	-6.0	-4.7	-4.2	-3.8	-3.7	-3.7	-4.1	-4.4	-4.8	-5.1	-5.4	-5.5	-5.7	-9.0	-3.7
22-Mar	-5.9	-6.0	-6.5	-6.6	-6.7	-6.7	-6.7	-6.6	-6.4	-5.9	-4.5	-4.2	-3.1	-2.4	-1.8	-1.4	-1.6	-2.7	-3.6	-4.0	-3.9	-3.7	-3.5	-3.7	-4.5	-1.4
23-Mar	-4.1	-4.2	-4.4	-4.1	-4.0	-4.1	-4.0	-3.8	-3.2	-2.5	-1.3	-0.6	-0.3	-0.3	0.2	0.3	0.5	0.0	-1.0	-2.6	-3.8	-5.4	-5.0	-4.9	-2.6	0.5
24-Mar	-4.7	-4.6	-4.8	-6.2	-7.0	-6.6	-6.0	-5.4	-4.7	-4.0	-3.3	-3.1	-3.0	-2.6	-2.1	-2.3	-1.9	-1.6	-2.1	-4.7	-7.0	-8.5	-9.8	-10.8	-4.9	-1.6
25-Mar	-11.4	-11.7	-11.3	-11.3	-9.6	-9.6	-9.3	-8.3	-5.7	-4.0	-2.0	-0.6	0.7	1.9	3.0	3.5	3.4	2.9	1.5	0.0	-1.1	-1.6	-2.3	-2.7	-3.6	3.5
26-Mar	-3.1	-3.2	-3.5	-3.8	-4.1	-4.2	-4.2	-4.0	-3.5	-2.1	0.6	3.0	4.9	6.3	7.4	7.2	7.3	6.4	4.9	3.2	2.5	2.2	2.0	1.8	1.0	7.4
27-Mar	1.6	1.4	1.3	1.2	1.0	1.0	1.1	1.3	2.0	2.9	3.7	4.4	6.5	7.3	7.1	6.3	6.2	6.1	5.6	5.4	5.1	4.0	2.8	3.8	3.7	7.3
28-Mar	3.0	3.2	3.9	3.9	2.8	1.9	1.4	2.0	7.0	8.2	9.3	10.3	10.9	10.7	10.9	11.5	10.6	10.6	9.4	8.0	5.9	5.0	3.9	2.6	6.5	11.5
29-Mar	1.2	0.6	-0.3	-1.0	-1.2	-1.8	-2.3	-0.4	2.3	4.6	6.8	8.0	8.4	9.0	10.1	10.2	10.4	10.2	8.9	7.7	6.4	5.2	4.6	4.8	4.7	10.4
30-Mar	3.8	3.1	4.1	3.0	1.7	-0.5	-1.5	1.4	4.3	5.7	7.3	9.3	11.3	12.0	12.9	12.9	11.7	12.1	10.9	5.8	6.4	6.0	4.6	4.0	6.3	12.9
31-Mar	2.6	0.3	-0.7	0.1	-0.4	0.2	0.9	1.7	2.0	2.1	2.8	3.0	3.9	6.0	9.2	10.8	9.7	9.0	7.1	5.7	4.7	4.2	3.5	2.6	3.8	10.8
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	31	4.17	4.17
-20 - 0	423	56.85	61.02
0 - 10	253	34.01	95.03
10 - 20	37	4.97	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

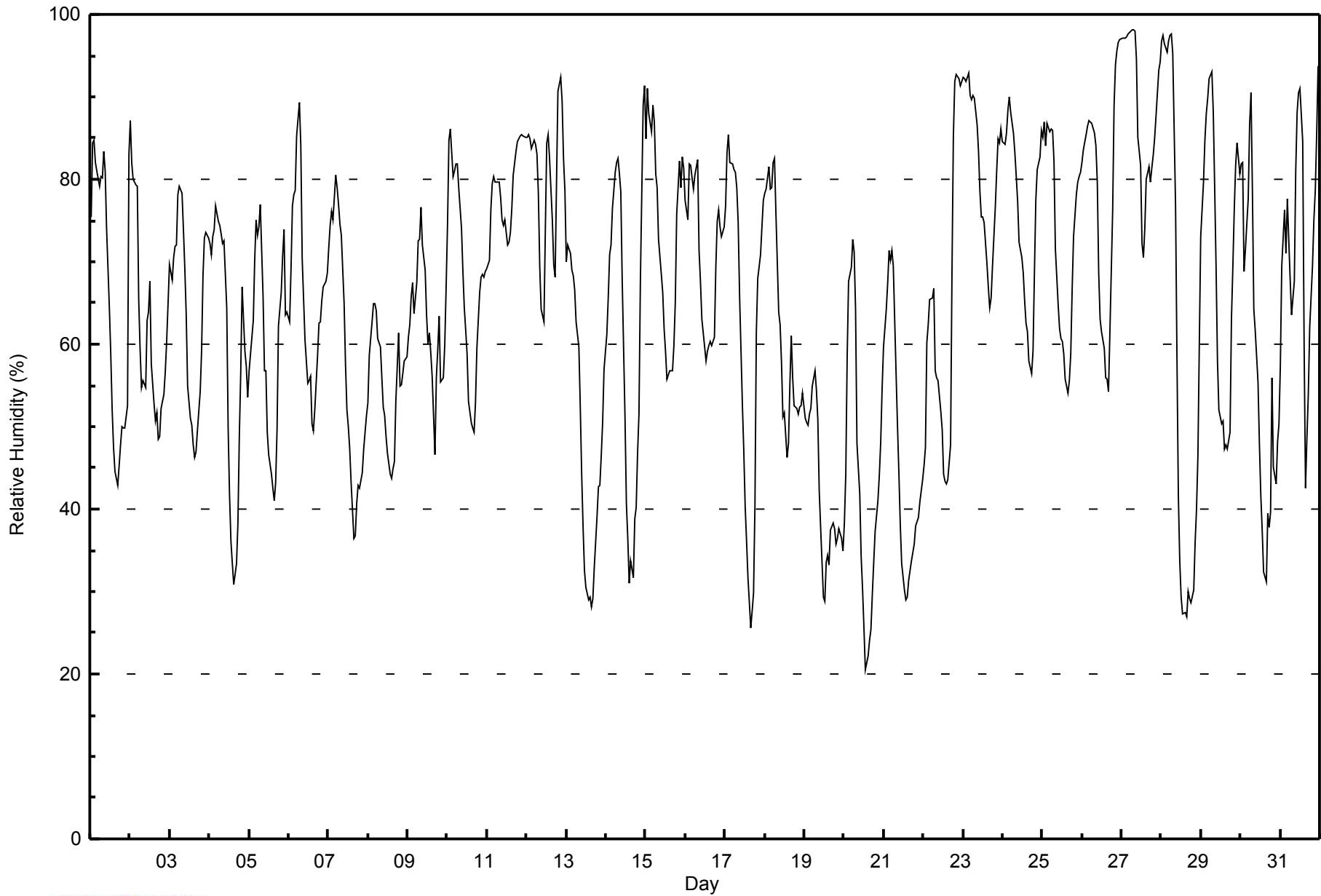


Maximum Value: 98 % on Mar 27 08:00																		Maximum Daily Average: 88.4 % on Mar 27																		Hours in Service: 744													
Minimum Value: 20 % on Mar 20 14:00																		Minimum Daily Average: 41.9 % on Mar 19																		Hours of Data: 744													
Maximum Diurnal Average: 79.1 % at hour 6																		Minimum Diurnal Average: 47.1 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 64.7 %																		Percentiles: P ₁ = 27 P ₁₀ = 39 Q ₁ = 52 Median = 66 Q ₃ = 80 P ₉₀ = 86 P ₉₉ = 97																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	76	84	85	82	81	79	80	80	83	81	74	64	59	52	47	45	43	45	48	50	50	50	53	83	65.6	85																							
2-Mar	87	82	80	79	79	65	59	55	56	55	63	64	68	58	53	51	52	48	49	52	54	57	60	65	62.1	87																							
3-Mar	70	68	70	72	72	78	79	78	74	69	64	55	51	50	48	46	47	49	54	59	68	73	74	73	64.2	79																							
4-Mar	72	71	73	74	77	75	74	73	72	73	64	50	42	36	33	31	33	38	49	56	67	59	57	54	58.5	77																							
5-Mar	57	59	63	70	75	73	74	77	66	57	57	49	47	44	43	41	43	50	62	66	71	74	64	64	60.2	77																							
6-Mar	63	69	77	78	79	85	89	84	70	65	61	55	56	56	50	49	52	59	63	63	65	67	68	69	66.3	89																							
7-Mar	72	74	76	75	80	79	77	75	73	65	57	52	50	47	43	36	37	41	43	43	44	47	49	51	57.8	80																							
8-Mar	53	59	63	65	65	64	61	60	56	52	51	49	47	44	44	45	46	53	61	55	55	56	58	58	55.0	65																							
9-Mar	61	62	66	68	64	67	73	73	77	72	69	64	60	61	59	56	47	56	59	63	55	56	60	67	63.1	77																							
10-Mar	75	85	86	80	81	82	82	79	74	69	64	62	59	53	50	50	49	53	60	66	68	69	68	69	68.0	86																							
11-Mar	69	70	76	79	80	80	80	80	78	75	74	75	72	72	74	76	80	83	85	85	85	85	85	85	78.6	85																							
12-Mar	85	85	85	84	85	84	83	78	69	64	63	74	84	85	83	75	70	68	80	91	92	90	83	79	79.9	92																							
13-Mar	70	72	71	69	68	67	63	60	52	44	38	33	30	29	29	28	29	33	39	43	43	46	50	57	48.5	72																							
14-Mar	61	66	71	72	77	81	82	83	81	78	68	51	41	36	31	34	32	39	40	47	52	68	89	91	61.2	91																							
15-Mar	85	91	88	86	89	87	81	79	73	68	66	62	59	56	57	57	60	65	76	82	79	83	81	81	73.6	91																							
16-Mar	78	75	82	82	80	79	80	82	71	68	63	61	58	59	60	60	60	61	69	75	76	74	73	74	70.9	82																							
17-Mar	77	83	85	82	82	81	81	79	75	66	53	47	40	36	32	26	28	30	40	62	68	71	74	77	61.4	85																							
18-Mar	78	79	82	79	79	82	83	76	64	62	58	51	52	46	48	55	61	56	52	52	52	52	53	54	62.7	83																							
19-Mar	51	50	50	52	52	55	57	54	51	42	38	29	29	34	34	33	37	38	38	36	36	38	36	35	41.9	57																							
20-Mar	38	44	58	68	69	73	71	64	48	42	34	30	26	20	22	24	25	30	34	37	41	44	48	55	43.6	73																							
21-Mar	60	64	67	71	70	71	69	56	50	44	38	33	30	29	29	31	33	34	36	38	38	39	41	44	46.6	71																							
22-Mar	45	47	60	62	65	66	67	57	56	56	52	50	44	43	43	44	48	69	85	92	93	92	91	92	63.3	93																							
23-Mar	92	92	92	93	90	90	90	90	87	83	79	75	75	70	67	64	66	70	77	81	85	84	86	86	81.4	93																							
24-Mar	85	84	86	88	90	88	86	83	80	77	72	71	69	65	63	62	58	56	59	69	77	81	83	86	75.7	90																							
25-Mar	85	87	84	87	86	86	86	82	72	65	62	61	60	59	56	54	56	59	67	73	78	80	80	81	72.7	87																							
26-Mar	82	84	85	87	87	87	87	86	84	80	69	63	62	60	56	56	54	61	76	89	94	96	97	97	78.2	97																							
27-Mar	97	97	97	97	98	98	98	98	98	95	85	82	72	71	74	80	82	80	81	83	85	88	93	94	88.4	98																							
28-Mar	97	97	96	95	97	97	98	95	77	58	42	34	29	27	27	27	30	29	29	30	36	40	46	60	58.1	98																							
29-Mar	73	80	85	88	90	92	93	88	79	69	58	52	50	51	47	48	47	49	63	69	76	82	84	81	70.6	93																							
30-Mar	82	82	69	72	78	87	90	79	64	62	55	48	42	37	32	31	40	38	40	56	45	43	48	50	57.1	90																							
31-Mar	57	69	76	71	78	73	68	64	68	81	88	91	91	85	60	43	49	54	62	69	75	79	86	94	72.0	94																							
																								72.0	74.6	76.9	77.6	78.8	79.1	78.7	75.7	70.2	65.8	60.6	56.0	53.3	50.9	48.3	47.1	48.0	51.1	56.7	62.0	64.7	66.4	68.3	71.1	Diurnal Average	
																								97	97	97	97	98	98	98	98	98	95	88	91	91	85	83	80	82	83	85	92	94	96	97	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Patricia McInnes - March 2015





Maximum Speed: 35 km/h on Mar 2 02:00	Maximum Daily Speed Average: 22.2 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 6 09:00	Minimum Daily Speed Average: 2.0 km/h on Mar 6	Hours of Data: 744
Maximum Diurnal Speed Average: 3.9 km/h at hour 24	Minimum Diurnal Speed Average: 1.3 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 2.0 km/h 309.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 13 P ₉₀ = 17 P ₉₉ = 28	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	NNW6	WNW3	WSW4	W3	SW2	SSW2	S4	S5	SSE5	SSE7	S8	SE7	ESE8	SSE9	SSW17	S17	S16	S14	SSE12	S12	SSW13	SW17	WSW17	WNW17	SSW6.5	SSW17
2-Mar	NNW29	NNW35	N28	NNW20	NNW27	NNW34	NNW34	NNW28	NNW23	NNW28	NW20	NNW25	NNW22	NW27	NW27	NW30	NW24	NW25	NW14	WNW14	WNW15	WNW9	W9	W7	NNW22.2	NNW35
3-Mar	W7	W12	WSW12	W14	WNW7	N6	WNW5	NNW8	NNW8	NNW10	N17	N21	NNW20	N16	N16	N14	NNE11	NNE10	N7	N4	NW3	WSW4	W4	SW2	NNW7.7	N21
4-Mar	SW3	SSE4	S4	S5	SSE6	SSE5	S5	S5	S6	SSE6	SE7	SE8	SE8	ESE6	SSE10	S17	S12	SSW14	SW14	S6	S6	SSW9	SSW8	WSW10	S6.5	S17
5-Mar	WSW11	WSW14	SW9	WSW7	WSW8	WSW9	SSW6	S5	SSE3	E2	ESE4	WNW10	NE5	E4	SSW6	SSW3	SSE5	SSW5	ESE2	SW3	W3	W6	WSW11	SW12	SW4.2	WSW14
6-Mar	SW11	SW7	S6	SSW9	SW7	SSW4	WSW4	SSW2	WSW0	NNE7	N15	NNE8	NE12	NE11	E6	ESE5	NE3	NNE5	N8	NNW11	NNW10	NNW8	NNW5	SW6	N2.0	N15
7-Mar	NW1	SSW2	ESE3	SSE2	SW9	WSW14	WSW15	W17	W18	W21	W21	W21	WNW20	W20	W17	W18	W16	W11	W12	W15	W10	WSW11	WSW13	WSW12	W12.7	W21
8-Mar	WSW10	SW6	SW7	SSW8	SW10	SW11	SW10	SW12	SW15	SW19	SW17	SW9	SW11	SSW10	SW11	SW10	WSW7	S5	SW4	SW8	SW10	SW11	WSW12	SW13	SW10.1	SW19
9-Mar	SW10	SW9	SE8	SSW7	WSW10	SW5	NNW4	NW7	W9	WNW13	WNW15	WNW15	NW10	WNW7	NW12	NW14	NW21	NNW12	NW6	NW6	WNW14	WNW12	WNW10	W10	WNW8.0	NW21
10-Mar	W11	N13	N19	N16	N11	N13	N14	N12	N10	N14	NNE9	NNE9	NNE10	N8	N7	NNE7	N8	NNE11	NNW13	NNW17	NNW17	N17	N15	N15	N11.6	N19
11-Mar	N14	N12	N12	N13	N13	N13	N12	N12	N12	N11	N12	NNW15	NNW16	NNW17	NNW17	NNW17	NNW17	NNW17	NNW15	NNW16	NNW13	NNW12	NNW10	N10	NNW13.6	NNW17
12-Mar	N11	N9	N6	NNW5	N8	N8	NNE5	ESE3	ESE8	SE9	SSE7	SE9	SE11	SE6	E7	SE7	ESE6	ESE4	E3	WNW1	S5	SSE6	SSW10	SW13	ESE2.2	SW13
13-Mar	SW15	SW13	SW16	SW14	SSW11	SSW12	SW14	SW16	SW17	WSW17	SW15	SW17	SSW16	SW16	S16	S14	S18	SSE18	SSE13	S12	SSW13	S12	SSE8	SSE10	SSW12.8	SSE18
14-Mar	SSE12	SSE10	SE8	SE10	SE8	SE6	SE7	SSE5	S6	SSE3	SE4	SE7	SSE8	S8	SSE7	S8	S7	SSE6	SW8	WSW12	WSW11	WSW13	WSW7	SW12	S6.0	WSW13
15-Mar	WSW23	N28	NNW31	NW23	WNW22	WNW19	W15	W15	WNW20	WNW25	NW19	NW17	NW13	NNW14	NNE10	NE9	NE9	NE9	ENE6	E1	SSW5	SSW6	SW6	SW10	NW10.4	NNW31
16-Mar	SW10	NNW14	NNW19	NNW14	NW9	NW7	NW4	WNW4	NNW6	NNE7	NE6	NE8	NE7	NE8	NNE11	NNE13	N11	NNW10	NNW10	NNW11	NNW9	NNW8	NNW9	NNW8	NNW7.6	NNW19
17-Mar	NNW3	SW3	W3	W3	WNW2	WSW2	SSW3	S3	SSE6	SE5	E3	SE4	SE7	SE8	SE8	SSE7	ESE7	ESE7	SE4	WNW2	W3	W3	SW3	SW3	SSE2.2	SE8
18-Mar	NNW2	SW2	SW2	S3	SSW3	S5	SSE3	E3	ESE5	SSE5	ESE7	ESE6	ENE3	NE2	W2	N13	NNW15	NNW19	NNW22	N23	N21	NNW19	NNW19	NNW17	N5.8	N23
19-Mar	NNW16	NNW13	NNW12	NNW12	NNW12	NNW10	NNW7	NNW9	NNW10	NNW5	N8	NNE9	NNE8	N10	N14	NNE15	N16	NNW15	NNW14	N14	N14	N12	NE10	NE8	N10.8	N16
20-Mar	ENE6	ENE6	NE4	N5	NNW4	NW4	NW4	NNW4	NE5	ESE2	ENE3	NNW4	N5	NNE6	NNW5	WNW2	N6	NNE10	N8	NNW10	NNW10	NNW6	NNW6	NNW5	N4.5	NNW10
21-Mar	NNW5	NW4	NW5	NNW4	NW5	NW4	E5	E6	ENE7	E8	E13	E12	E13	ESE14	ESE14	ESE15	ESE16	ESE16	ESE14	ESE14	ESE15	ESE12	E10	ESE13	E8.0	ESE16
22-Mar	ESE11	ESE12	ESE10	ESE7	SE7	SE9	ESE7	E8	ESE9	ESE8	ESE7	ESE7	ESE9	ESE9	ESE7	ESE7	SE8	SE5	NE4	NNE6	NNE5	E3	SE5	SSW4	ESE6.4	ESE12
23-Mar	SSW4	S3	ESE3	ESE3	ESE4	SE4	SSE4	SSE4	SSE3	S4	SW5	SW7	N5	NNE9	NE8	NNE10	NNE11	NNE11	N9	NNW6	NNW8	NNW7	NNW10	NNW10	N2.6	NNE11
24-Mar	NNW10	NNW10	NNW10	NW7	NW9	NNW11	NW9	NNW7	NNW8	NNW7	N8	NNW10	N10	N13	N16	NNE15	NNE11	NE9	E6	NE2	N4	N2	NNE4	NNW2	N7.5	N16
25-Mar	NW4	NW1	ESE2	E4	E3	NW1	NW3	NNE4	ENE3	E9	ESE12	ESE14	ESE10	ESE11	ESE12	SE11	SSE12	ESE11	SSE9	SE9	SE8	SE10	SE9	SE10	ESE6.3	ESE14
26-Mar	ESE12	ESE11	ESE12	ESE11	ESE11	ESE12	ESE11	ESE10	SE10	SE9	ESE6	ESE9	E10	E12	E12	ESE12	S11	SSW13	SSW10	SSW10	SSW5	ESE4	ESE5	SE5	SE8.0	SSW13
27-Mar	E4	SE4	SE4	ESE3	S5	SSE3	SE5	SSE6	S6	SSW9	SW13	S8	SSE8	ESE7	ESE11	ESE11	ESE10	ESE11	ESE9	SE8	ESE5	SE2	SSW3	SSW3	SE5.1	SW13
28-Mar	SSW1	SSW4	SW5	NNW5	NW3	SW4	SW4	W2	SW1	WNW7	NW12	NW17	NW21	NW24	WNW21	WNW21	WNW24	W19	W16	W13	W11	W12	WSW14	WSW12	WNW10.3	NW24
29-Mar	WSW13	WSW13	SW6	SW8	SSW7	S8	SSW5	S5	SSE6	S11	S12	S9	S9	S9	SSE7	E7	E6	S8	SW16	SSW14	SW13	SW13	WSW15	W9	SSW7.9	SW16
30-Mar	W3	WSW7	W10	W5	W8	WNW4	W2	WNW1	ESE2	ENE6	ENE6	E5	E7	E2	WSW16	WSW13	NNE10	NE4	SSE2	SW5	SW9	SW9	SW9	SSW8	WSW2.7	WSW16
31-Mar	SE4	SSE4	SSE6	S5	SE3	SE5	SSE4	SE7	SE4	NNE3	NW4	NE5	NW6	NNE7	NE9	ENE19	ENE23	ENE20	NE18	NE18	NNE15	N16	N18	N15	NE6.5	ENE23

W3.7	NW3.0	NW2.5	NNW2.5	NNW2.3	NNW2.0	NNW2.2	NNW1.8	W1.3	NNW1.7	NW1.7	NNW2.1	NNE2.6	N2.5	N1.7	NNE1.6	NNE2.3	NNE2.0	NNW1.6	NW3.0	NNW3.3	NNW3.3	W3.6	W3.9	Diurnal Average	
NNW29	NNW35	NNW31	NNW23	NNW27	NNW34	NNW34	NNW28	NNW23	NNW28	W21	NNW25	NNW22	NW27	NW27	NW30	WNW24	NW25	NNW22	N23	N21	NNW19	NNW19	NNW17	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

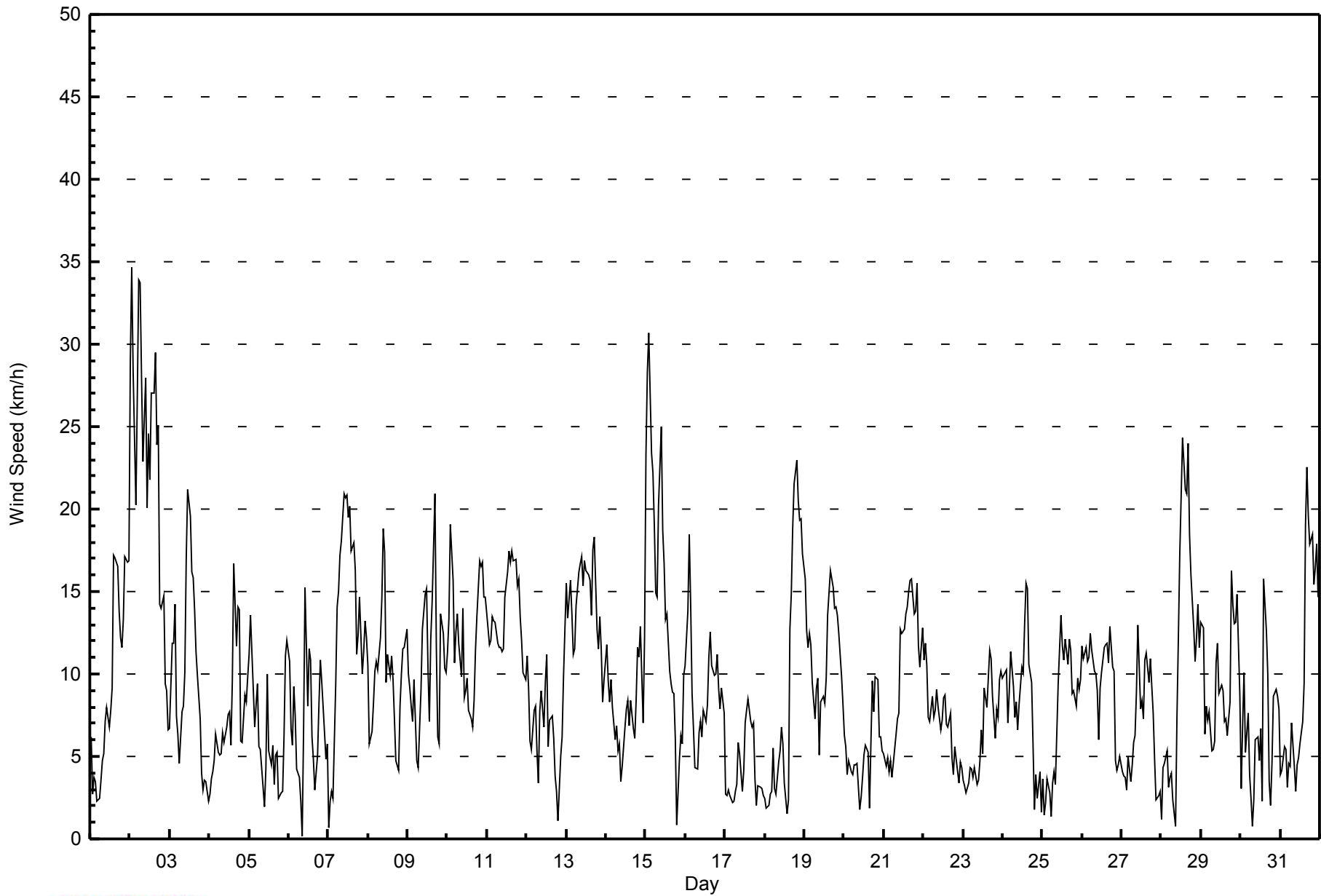
Wind Speed (WS) - km/h
Patricia McInnes - March 2015

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	194	26.08	26.08
6 - 11	309	41.53	67.61
12 - 19	198	26.61	94.22
20 - 28	37	4.97	99.19
29 - 38	6	0.81	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Frequency Distribution

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

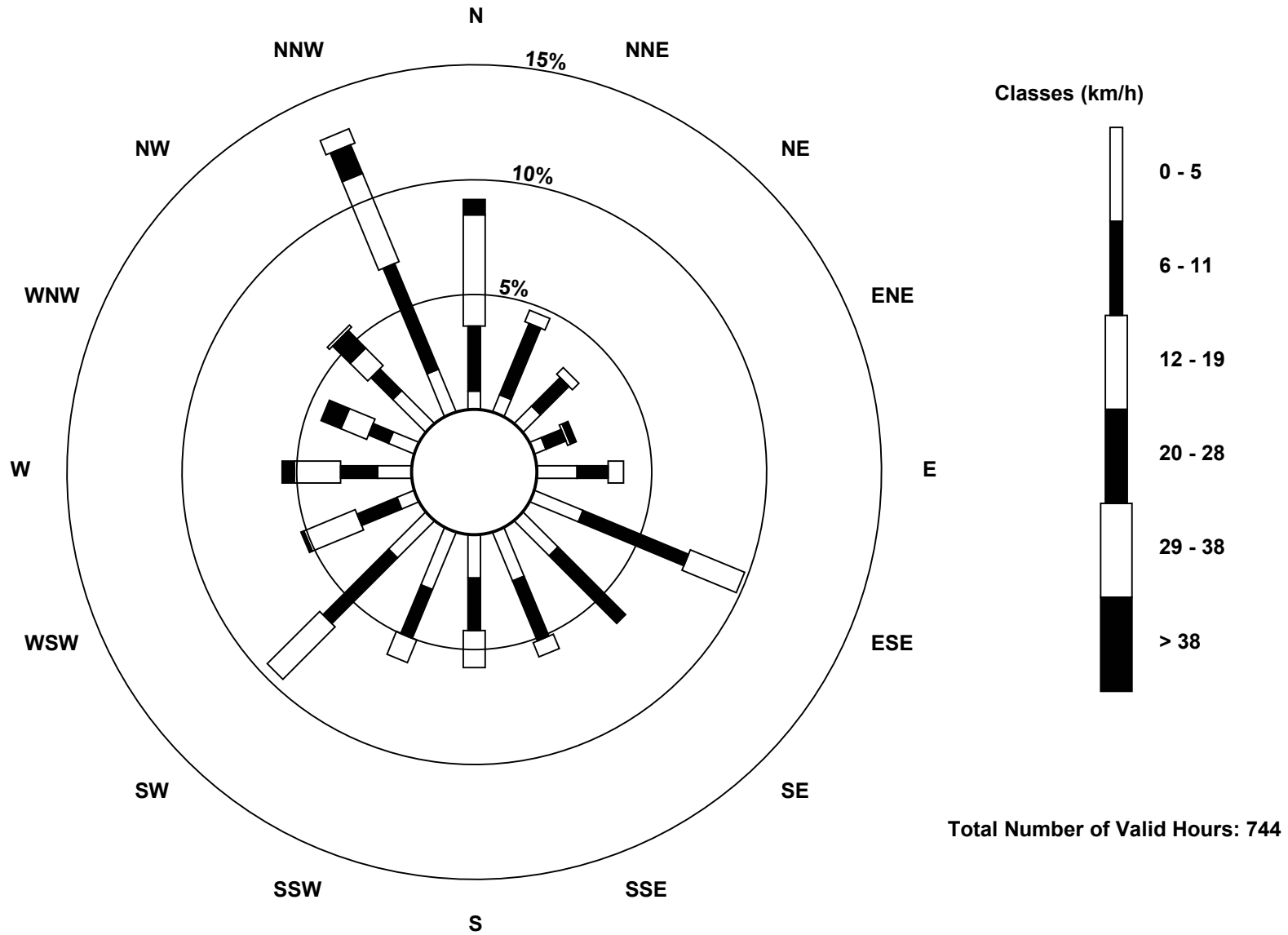
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	6	8	4	13	17	16	17	14	20	17	6	11	9	15	15	194
6 - 11	21	25	13	7	10	37	31	21	17	17	30	14	12	7	10	37	309
12 - 19	36	4	3	1	5	19	0	5	12	8	24	18	15	9	8	31	198
20 - 28	5	0	0	2	0	0	0	0	0	0	0	1	4	7	8	10	37
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	35	24	14	28	73	47	43	43	45	71	39	42	32	42	98	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg
Patricia McInnes - March 2015

Direction of Maximum Speed: 341 deg on Mar 2 02:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 326.5 deg on Mar 2	Hours of Data: 744
Direction of Minimum Speed: 243 deg on Mar 6 09:00	Direction of Minimum Daily Speed Average: 2.0 deg on Mar 6
Direction of Minimum Speed: 243 deg on Mar 6 09:00	Hours of Missing Data: 0
Monthly Average Direction: 288.8 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	339	284	255	269	230	211	173	179	157	149	171	125	112	150	198	182	186	180	166	179	206	223	245	300	195.6
2-Mar	329	341	350	348	340	333	332	331	327	327	326	329	338	318	322	321	322	321	314	294	294	282	275	275	326.5
3-Mar	263	274	253	266	301	349	301	332	328	342	358	1	347	355	351	356	15	13	8	351	322	254	260	231	333.9
4-Mar	220	168	187	180	161	163	180	191	172	153	142	139	133	119	150	178	183	211	217	190	182	193	206	256	181.0
5-Mar	258	246	224	243	244	237	200	178	158	88	109	302	53	87	207	203	152	211	116	225	259	263	249	235	230.4
6-Mar	229	219	180	213	219	201	242	199	243	20	8	17	38	40	86	111	46	22	354	347	343	342	327	219	351.4
7-Mar	310	212	109	157	233	257	257	269	269	276	270	277	289	279	276	281	271	264	262	280	259	256	254	256	268.2
8-Mar	250	228	224	210	225	227	222	220	222	220	230	227	226	203	227	225	240	182	218	223	233	235	237	227	225.5
9-Mar	226	217	145	200	243	218	345	310	281	283	289	292	308	303	317	307	319	334	319	304	298	297	288	264	289.4
10-Mar	279	350	3	4	9	1	355	350	7	9	28	30	21	5	4	14	11	14	347	339	345	352	356	357	358.4
11-Mar	358	0	353	356	353	356	356	354	353	3	352	345	343	342	343	341	342	341	345	341	345	343	343	351	348.3
12-Mar	353	5	353	346	358	351	16	119	117	133	148	132	134	143	101	124	115	114	81	303	178	167	213	224	113.3
13-Mar	225	231	226	221	206	207	234	228	235	241	235	217	203	214	176	177	179	167	168	183	193	183	158	150	205.0
14-Mar	158	149	137	137	138	145	141	154	189	147	136	132	155	171	152	172	169	161	215	237	244	250	239	235	177.7
15-Mar	252	351	338	313	296	293	278	281	289	297	311	317	324	335	29	40	43	47	77	101	208	208	225	230	310.7
16-Mar	232	333	333	331	307	317	321	289	344	24	48	45	40	39	20	13	8	345	340	339	334	327	333	328	345.6
17-Mar	331	220	259	278	285	241	210	191	153	138	81	137	127	128	125	151	102	109	128	299	271	270	228	216	153.9
18-Mar	332	228	235	183	207	191	163	79	120	150	119	118	75	54	278	359	339	339	344	352	353	346	346	337	350.4
19-Mar	337	330	340	334	342	343	339	334	347	347	8	20	14	5	351	12	5	346	337	350	354	9	36	38	353.6
20-Mar	60	64	42	357	348	304	312	345	55	110	57	348	356	24	341	291	351	22	8	341	337	344	346	343	0.7
21-Mar	331	321	321	346	312	312	87	79	72	89	98	96	96	105	104	108	109	110	116	109	110	115	101	107	98.4
22-Mar	114	120	122	123	127	131	113	101	115	112	109	115	111	117	114	119	129	125	56	28	25	80	136	205	113.8
23-Mar	195	173	118	118	119	130	148	168	165	190	226	234	6	23	37	18	12	17	9	348	345	341	335	332	9.9
24-Mar	332	335	338	326	322	323	322	343	334	334	352	345	356	360	7	17	25	42	84	38	5	353	12	338	352.5
25-Mar	316	310	115	84	91	324	307	14	75	99	113	104	111	116	118	139	147	120	151	141	135	127	133	128	119.8
26-Mar	116	119	117	115	120	116	121	120	125	125	108	107	101	99	97	107	172	197	203	210	201	120	121	136	128.3
27-Mar	96	128	133	107	174	168	138	161	191	210	219	185	159	122	113	123	106	116	118	124	105	137	208	210	145.3
28-Mar	212	199	227	327	304	236	226	264	229	287	305	316	313	312	292	292	286	280	279	273	262	266	253	255	285.0
29-Mar	239	239	219	215	194	180	193	183	167	190	185	187	176	180	155	92	94	188	216	211	220	222	240	265	203.6
30-Mar	274	245	267	270	276	294	276	282	122	73	62	79	82	97	250	240	14	49	147	229	233	229	224	209	247.6
31-Mar	143	164	154	180	137	127	162	136	141	20	318	48	325	15	39	73	75	57	40	36	19	8	7	351	46.7

276.4 304.9 317.3 299.3 287.2 288.8 285.8 284.1 274.0 294.9 317.3 346.6 15.3 7.8 359.9 18.5 15.8 15.7 330.9 310.6 297.4 282.4 277.9 270.3
 Diurnal Average

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

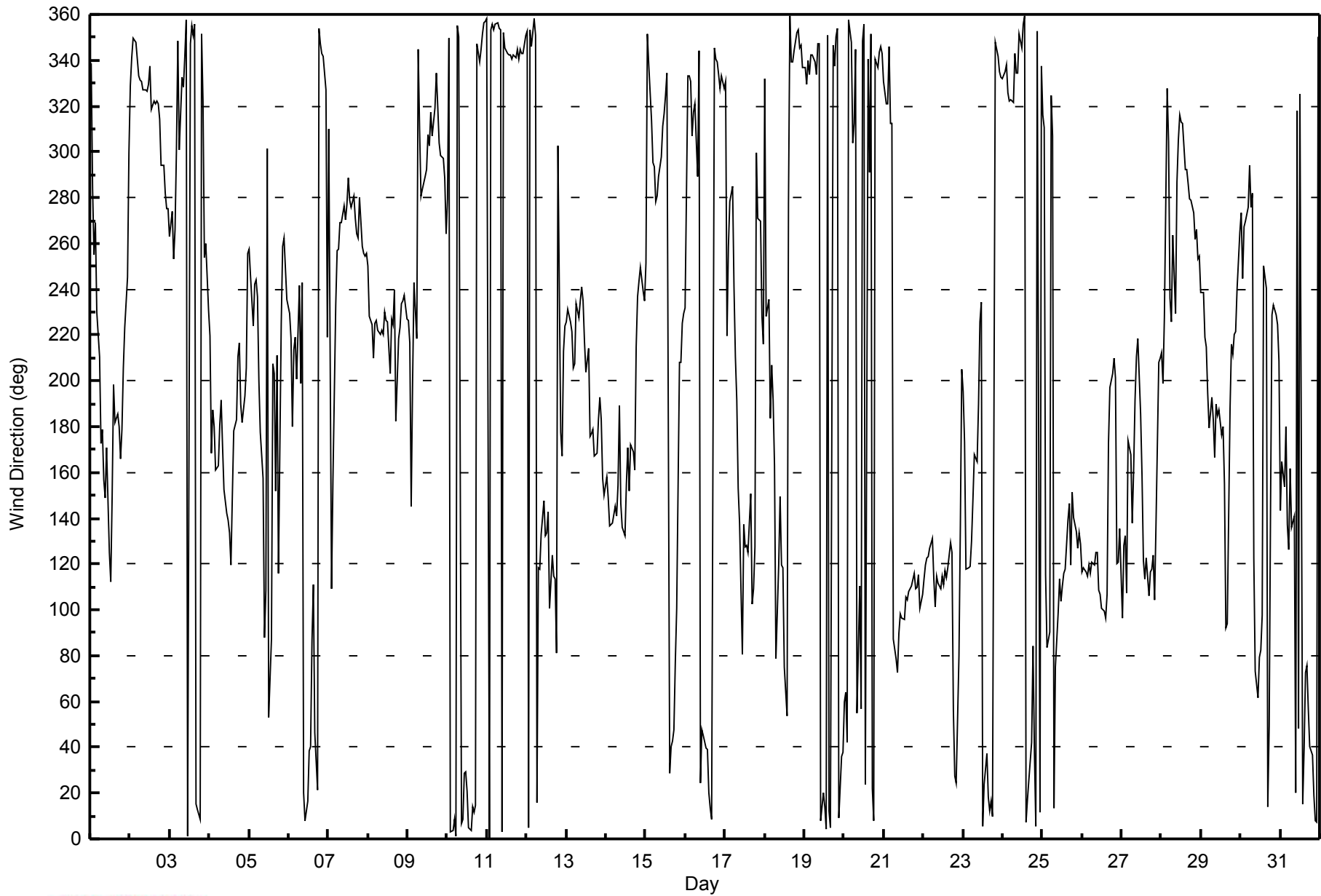


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 96 deg on Mar 28 09:00																			Hours of Data: 744						
Minimum Value: 4 deg on Mar 14 01:00																			Hours of Missing Data: 0						
Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 12 Median = 16 Q ₃ = 24 P ₉₀ = 41 P ₉₉ = 84																			Hours of Calibration: 0						
Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	16	28	26	12	37	35	28	11	15	15	19	32	14	32	15	14	13	11	11	14	13	17	17	20	37
2-Mar	12	14	15	13	13	11	11	11	12	12	11	13	15	13	12	12	12	11	12	11	10	13	13	36	36
3-Mar	30	10	10	11	37	21	32	24	15	13	17	15	16	16	14	18	18	12	12	22	32	9	8	25	37
4-Mar	22	12	16	10	11	8	14	14	12	25	16	14	14	28	28	12	15	18	14	15	18	11	14	52	52
5-Mar	37	9	8	7	9	9	32	12	47	77	39	32	54	46	58	69	39	32	22	77	60	15	12	8	77
6-Mar	10	23	18	15	46	26	45	69	85	21	14	26	12	16	18	30	46	26	11	11	12	12	69	20	85
7-Mar	82	33	27	49	37	9	10	11	10	13	11	13	16	14	16	15	16	11	11	13	10	9	8	8	82
8-Mar	10	12	14	13	10	9	12	11	11	10	15	20	15	18	18	22	19	13	16	7	8	8	8	8	22
9-Mar	10	11	23	33	13	66	82	23	18	20	14	15	33	37	35	17	20	15	23	17	15	13	11	15	82
10-Mar	21	20	15	15	12	13	13	13	17	16	23	20	19	22	22	29	17	13	13	10	12	13	13	13	29
11-Mar	12	12	13	11	12	13	12	12	12	12	11	10	11	10	10	10	11	10	12	10	12	11	15	15	15
12-Mar	13	16	18	25	13	17	22	83	16	18	24	24	15	26	15	20	25	23	44	59	14	23	11	13	83
13-Mar	11	9	9	11	10	13	10	9	10	11	13	15	15	17	14	14	12	13	12	10	13	14	29	10	29
14-Mar	4	11	9	12	9	17	16	33	25	44	40	19	32	22	18	11	14	11	29	25	21	8	21	16	44
15-Mar	14	17	18	13	11	11	12	11	11	12	14	15	25	16	24	21	19	19	19	82	10	9	17	7	82
16-Mar	10	35	9	12	13	19	22	21	27	21	25	25	26	23	15	13	14	16	10	12	12	11	13	19	35
17-Mar	54	54	32	36	46	36	18	20	22	27	54	53	20	17	20	26	35	11	15	31	12	16	37	22	54
18-Mar	40	49	59	40	50	12	61	42	19	21	18	32	72	92	83	12	8	9	13	15	15	15	13	10	92
19-Mar	10	11	14	8	10	12	19	16	16	38	25	22	30	26	19	16	14	14	8	13	13	12	20	14	38
20-Mar	18	20	29	16	16	14	13	26	44	86	90	54	46	47	48	89	26	14	16	9	12	12	13	18	90
21-Mar	19	14	14	17	10	17	22	12	16	20	15	18	20	16	16	16	18	15	13	14	13	15	14	13	22
22-Mar	14	14	17	16	14	16	15	13	17	25	29	35	24	24	34	24	32	45	28	10	21	40	27	11	45
23-Mar	24	15	17	20	13	18	20	13	36	36	30	18	72	14	22	16	14	12	15	10	7	5	7	8	72
24-Mar	9	8	8	10	6	6	7	22	14	19	19	17	24	16	17	15	16	21	13	57	41	39	16	57	57
25-Mar	20	61	45	26	28	70	15	24	44	17	20	16	17	21	19	22	19	16	15	12	12	13	12	11	70
26-Mar	12	13	14	15	15	13	14	15	15	19	36	22	19	14	15	13	24	18	13	11	14	18	20	23	36
27-Mar	26	19	34	63	17	25	16	16	17	15	14	23	24	36	15	14	15	14	15	14	21	56	51	73	73
28-Mar	69	39	65	25	31	28	14	32	96	12	12	19	16	14	15	18	13	13	10	9	8	8	9	12	96
29-Mar	9	9	29	19	23	17	16	22	23	17	16	19	18	15	23	13	12	48	11	10	9	8	11	43	48
30-Mar	49	33	9	65	20	35	44	72	53	19	26	55	32	87	19	25	22	51	61	20	5	5	11	15	87
31-Mar	32	19	13	10	32	15	26	39	40	71	81	70	38	28	26	15	12	18	15	12	12	14	13	12	81
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Patricia McInnes - March 2015



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 3, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	13:48
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Cal Gas Concentration	47.0 ppm	Cal Gas Expiry Date	12/12/2016
Gas Cert Reference	SA130110A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
DACS voltage range	0-5000mV	DACS channel #	SE 1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-677	-677
Analyzer Range (mv)	1000	1000	Lamp voltage	773	773
Calculated slope	0.997039	0.996073	Chamber temp.	45.0	45.2
Calculated intercept	0.599486	0.834298	Pressure (mmHg)	700.0	694.0
Analyzer Background	5.5	5.1	Flow (lpm)	0.447	0.444
Analyzer Coefficient	1.031	1.003	Intensity	91	90

Analyzer make Thermo 43i Analyzer serial # 1008841397

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	5000	55.1	517.9	531.1	0.975
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	55.1	517.9	519.8	0.996
second point	5000	27.7	260.4	259.6	1.003
third point	5000	13.8	129.7	128.7	1.008
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	55.3	519.8	518.3	1.003
Average Correction Factor					1.002

Corrected As found 531.5 Previous response 518.9 % change -2.4%

Notes:

Zero and Span with small adjustments. Filter changed after As Finds

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

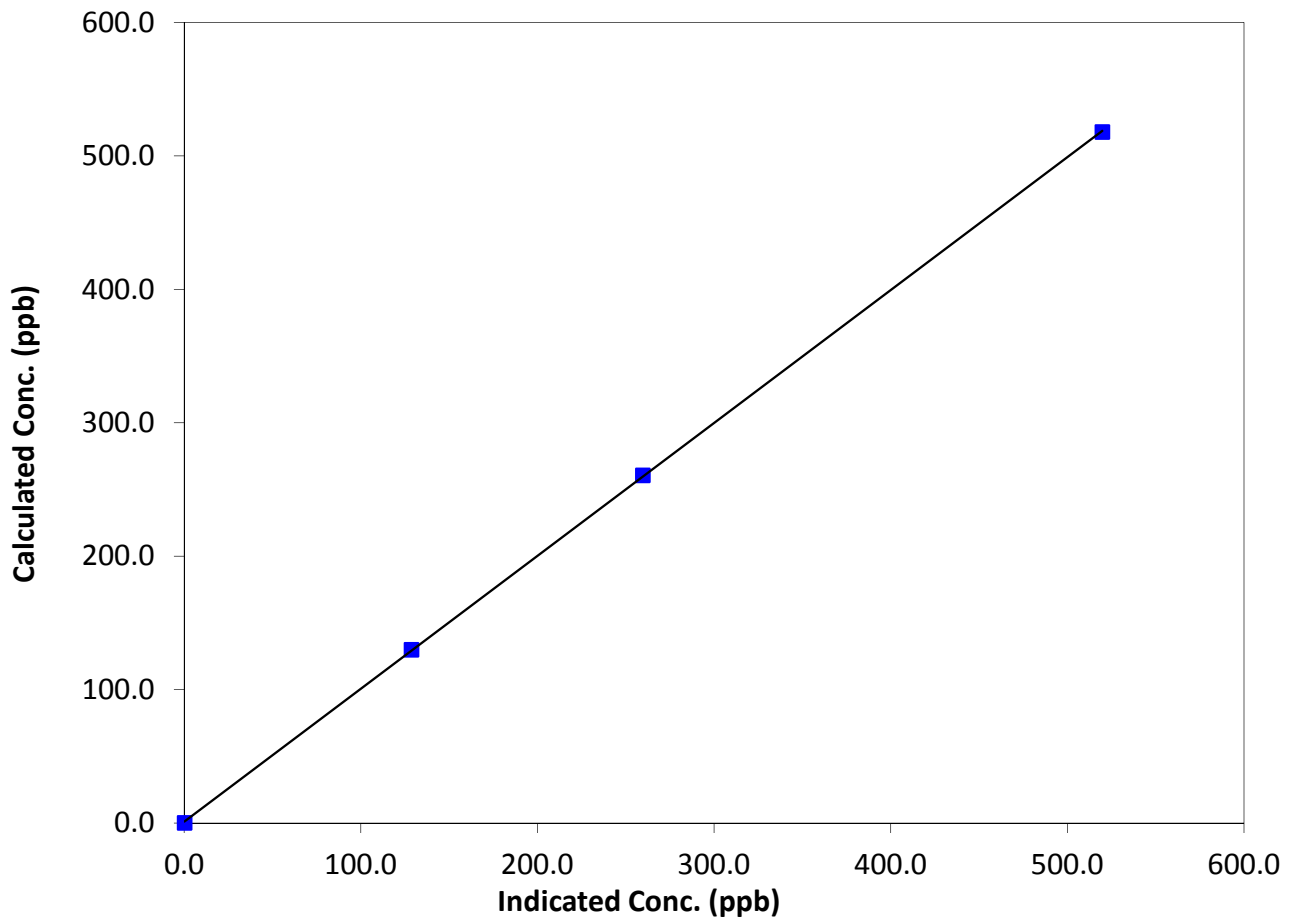
Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 3, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:15	End Time (MST)	13:48
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

Calibration Data

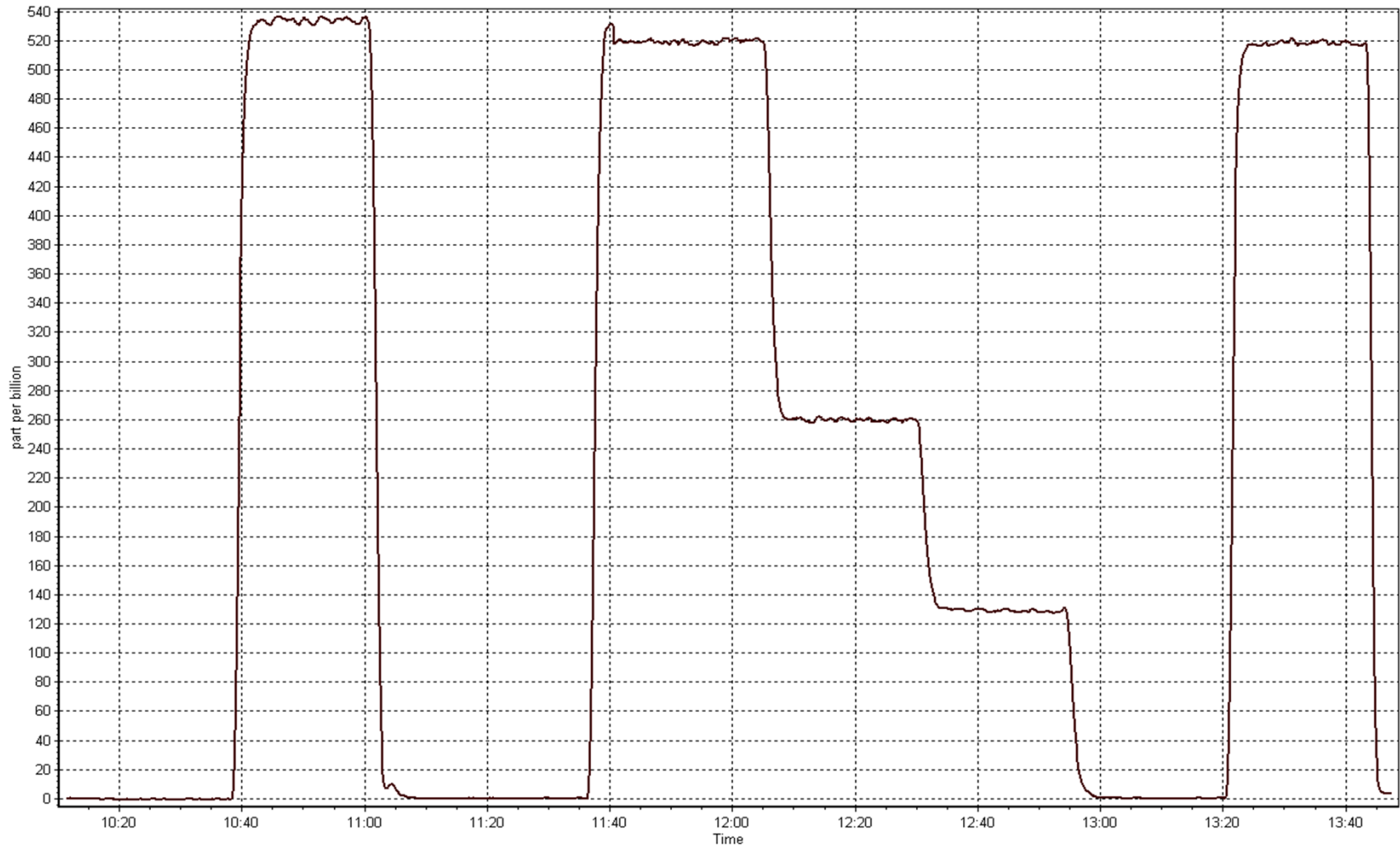
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999980
517.9	519.8	0.9964		
260.4	259.6	1.0030	Slope	0.996073
129.7	128.7	1.0081		
			Intercept	0.834298

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 6, 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 9, 2015	Previous Calibration	February 4, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	14:35
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	1220
Cal Gas Concentration	4.84 ppm H2S	Cal Gas Expiry Date	June 10 2014
Gas Cert Reference	ALM009562	SO2 gas conc.	47.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
DACS voltage range	Ethernet connection	DACS channel #	192.168.1.44

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-720	-720
Analyzer Range (input)	100	100	Lamp voltage	1002	1022
Calculated slope	1.006712	0.991993	Chamber temp.	45	45
Calculated intercept	0.116984	0.065925	Pressure	694.2	689.4
Analyzer Background	2.55	2.26	Flow	0.439	0.426
Analyzer Coefficient	1.206	1.213	Intensity	91	90
			Converter temp.	850	850

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153358
Converter make/model	JC Andelle model 26	Converter serial #	20101-07

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	NA
as found span	5000	72.3	70.0	69.5	1.008
SO2 scrubber check	5000	13.8	129.7	0.8	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	72.3	70.0	70.6	0.992
second point	5000	36.2	35.0	35.2	0.996
third point	5000	18.6	18.0	17.9	1.007
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	72.3	70.0	71.4	0.981
Average Correction Factor					0.998

Corrected As found	69.7	Previous response	69.4	% change	-0.4%
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Notes:

Small adjustments to zero and span. Filter changed after As Found. Scrubber check after third point

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

TRS Calibration Summary

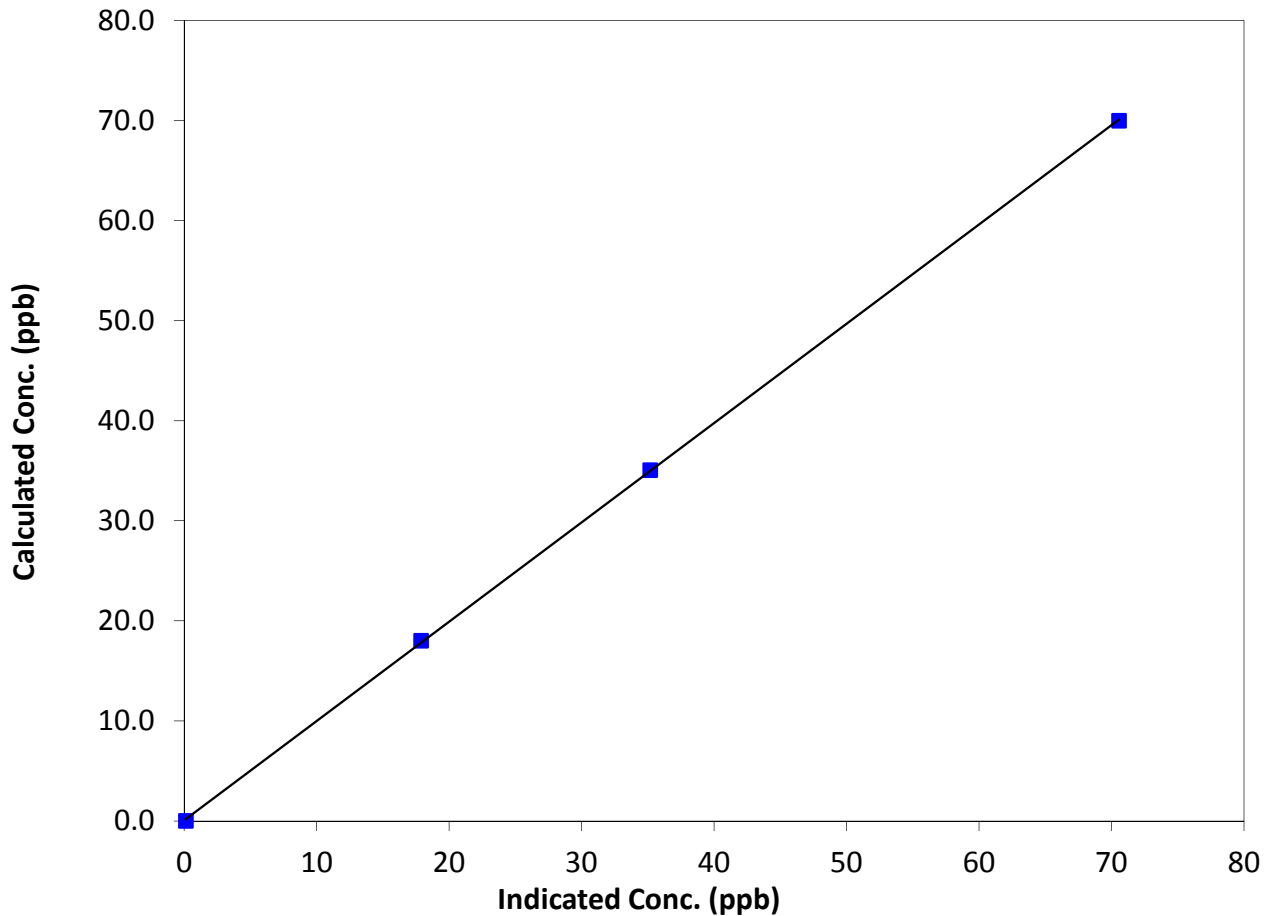
Station Information

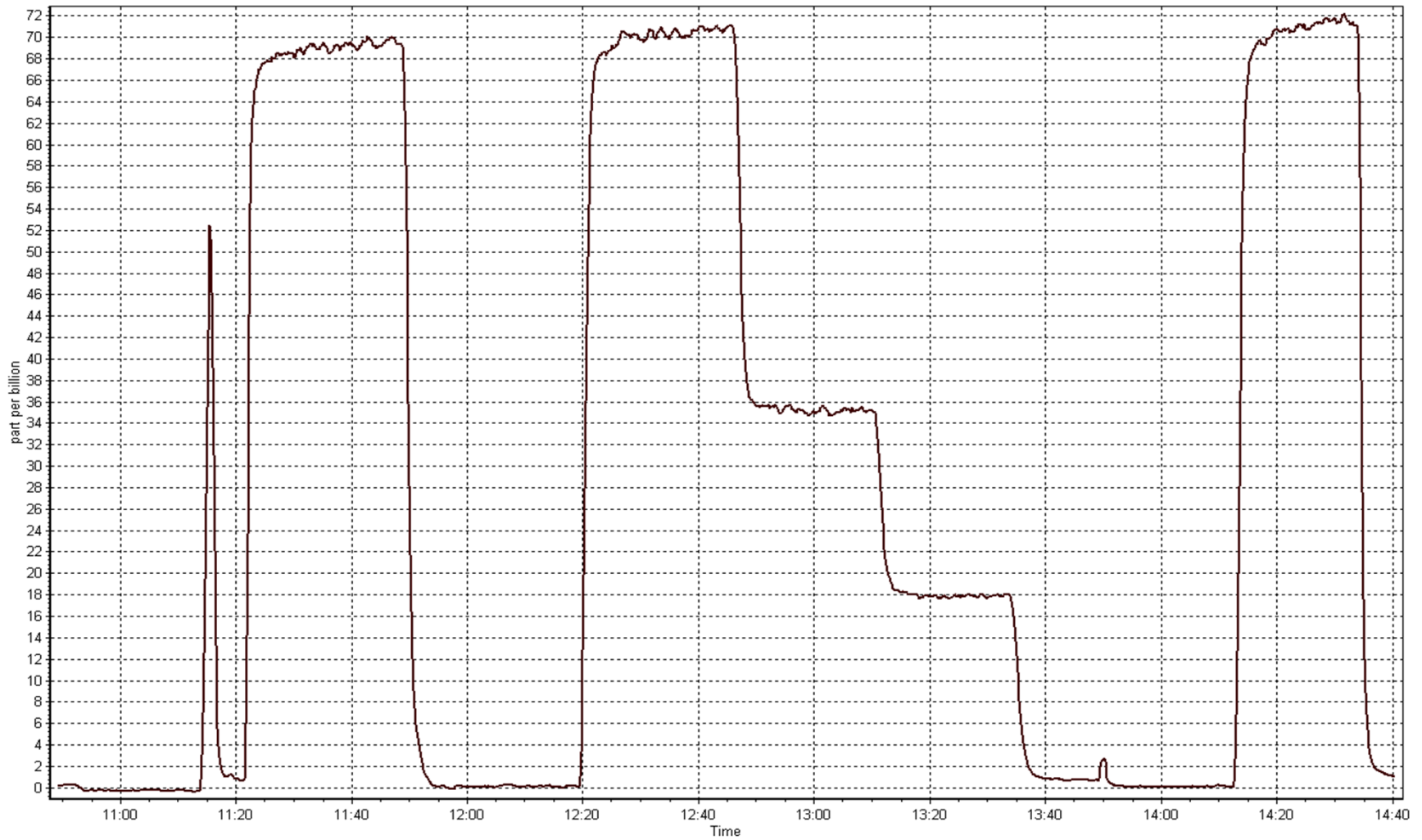
Calibration Date	March 9, 2015	Previous Calibration	February 4, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:50	End Time (MST)	14:35
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999967
70.0	70.6	0.9917		
35.0	35.2	0.9958	Slope	0.991993
18.0	17.9	1.0070		
			Intercept	0.065925

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Friday, March 06, 2015	Prev Calibration	Tuesday, February 03, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	13:48
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1220
Gas Cert Reference	SA130110A	Cal Gas Expiry Date	Monday, December 12, 2016
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	Before	After		Before	After
CH4 Range (ppm)	50	50	Internal Temp	37.6	36.6
CH4 Range (input)	50	50	Flame Temp	400.5	399.4
NMHC Range (ppm)	50	50	Carrier Pressure	34.5	34.5
NMHC Range (input)	50	50	Fuel Pressure	42.3	42.3
THC Calc slope	0.997818	0.998164	Air Pressure	32.4	32.4
THC Calc intercept	0.018013	0.012749	Detector Temp	175.0	175.0
NMHC Calc slope	0.995339	1.000159	Filter Temp	175.0	175.0
NMHC Calc intercept	0.013997	-0.005338			

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	5000	0.0	0.00	0.00	N/A
as found span	5000	55.1	12.04	12.28	0.980
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.1	12.04	12.06	0.998
second point	5000	27.7	6.05	6.02	1.005
third point	5000	13.8	3.01	3.01	1.002
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.1	12.04	12.06	0.998
Average Correction Factor					1.002

Corrected As found 12.28 Previous response 12.04 % change -1.9%

Notes:

Span adjusted, H2 changed after High point was adjusted. Filter changed after As Finds

Calibration Performed By: Ryan Power



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	N/A
as found span	5000	55.1	6.39	6.60	0.969
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.1	6.39	6.40	0.999
second point	5000	27.7	3.21	3.21	1.001
third point	5000	13.8	1.60	1.62	0.989
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.1	6.39	6.38	1.002
Average Correction Factor					0.996

Corrected As found 6.60 Previous response 6.41 % change -2.9%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration CH4 (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.1	5.64	5.68	0.993
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.1	5.64	5.66	0.997
second point	5000	27.7	2.84	2.81	1.009
third point	5000	13.8	1.41	1.39	1.017
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.1	5.64	5.68	0.993
Average Correction Factor					

Corrected As found 5.68 Previous response 5.63 % change -0.8%



Wood Buffalo Environmental Association

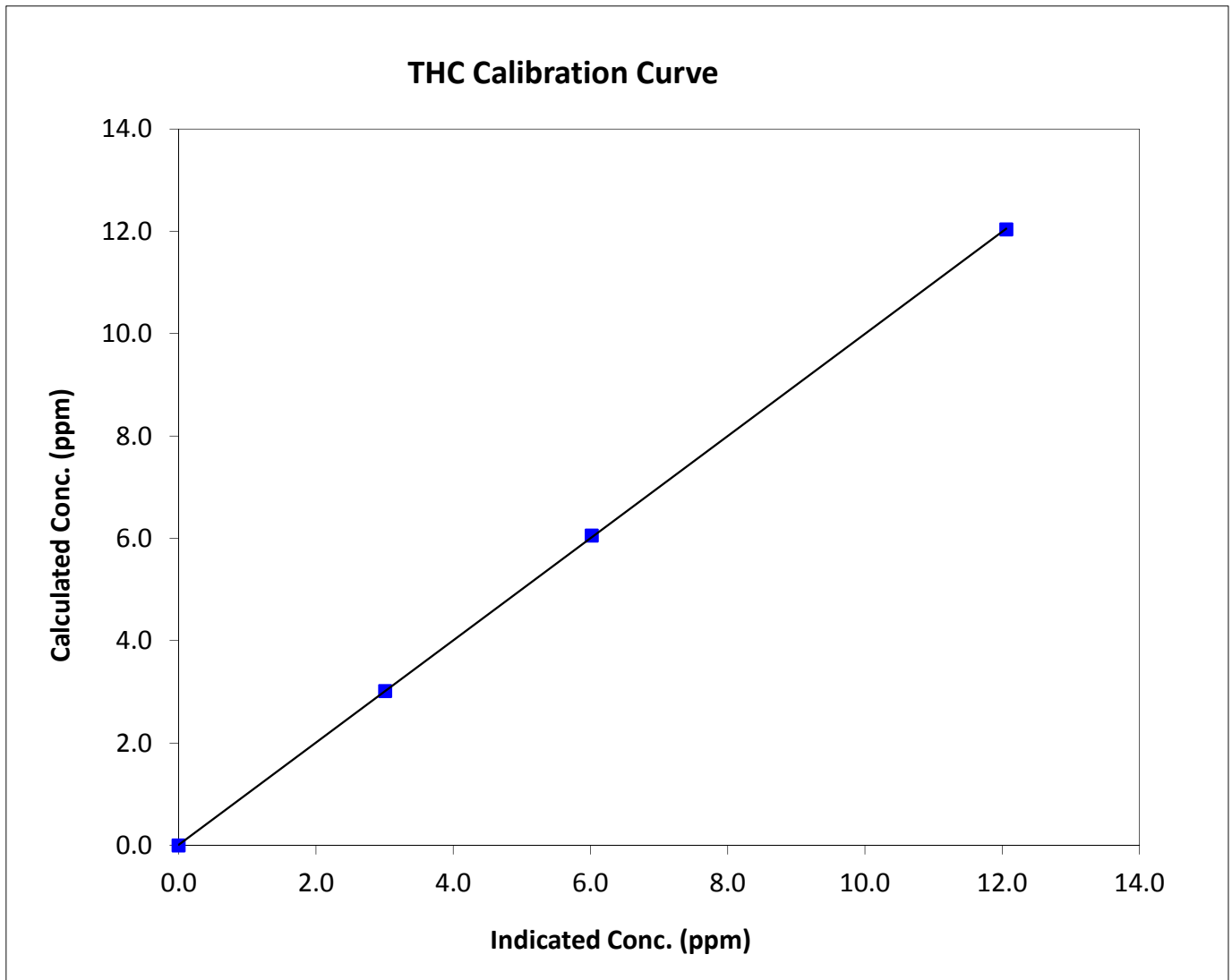
THC Calibration Summary

Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 3, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:15	End Time (MST)	13:48
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	N/A	Correlation Coefficient	0.999985
12.04	12.06	0.9981		
6.05	6.02	1.0052	Slope	0.998164
3.01	3.01	1.0015		
			Intercept	0.012749





Wood Buffalo Environmental Association

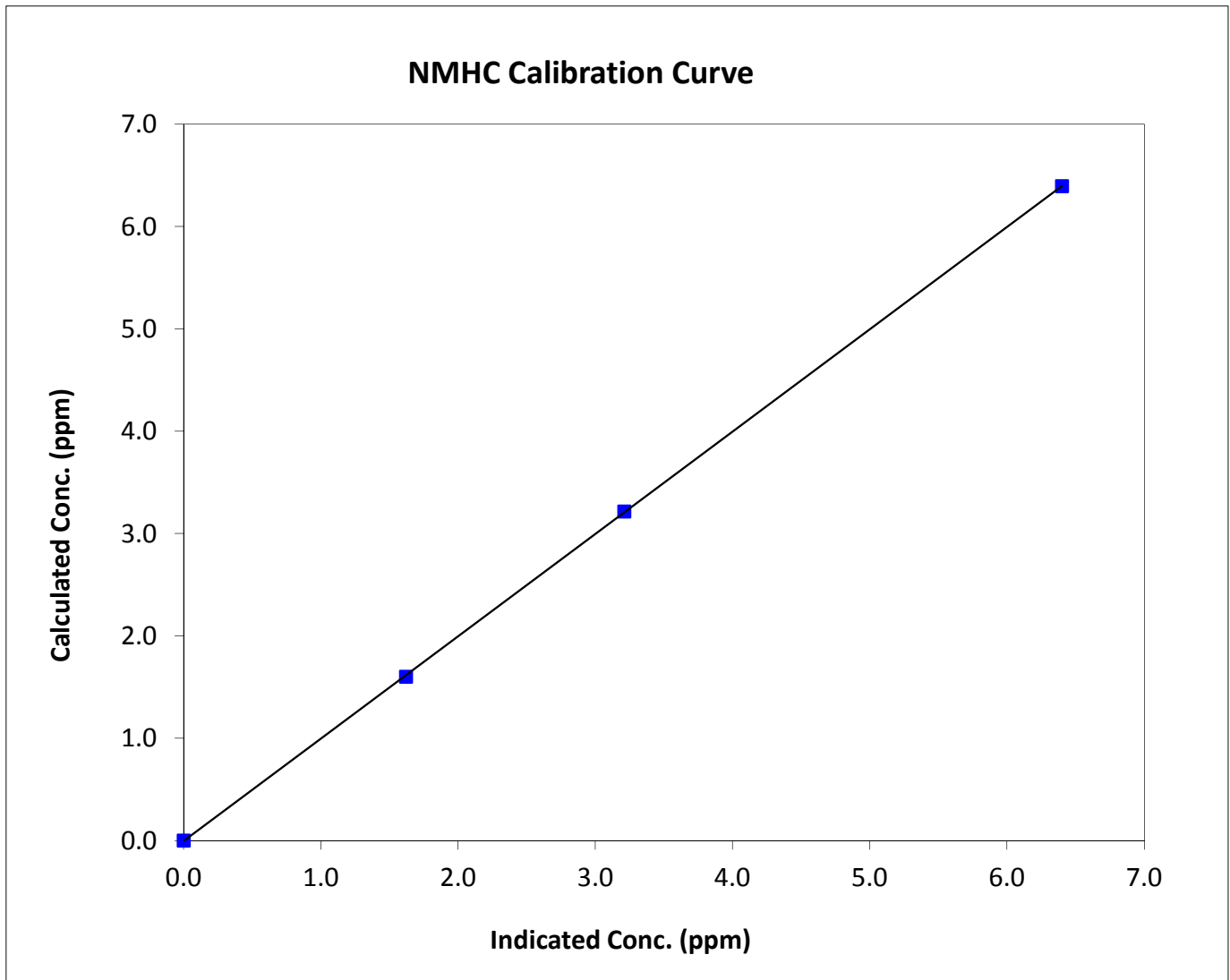
NMHC Calibration Summary

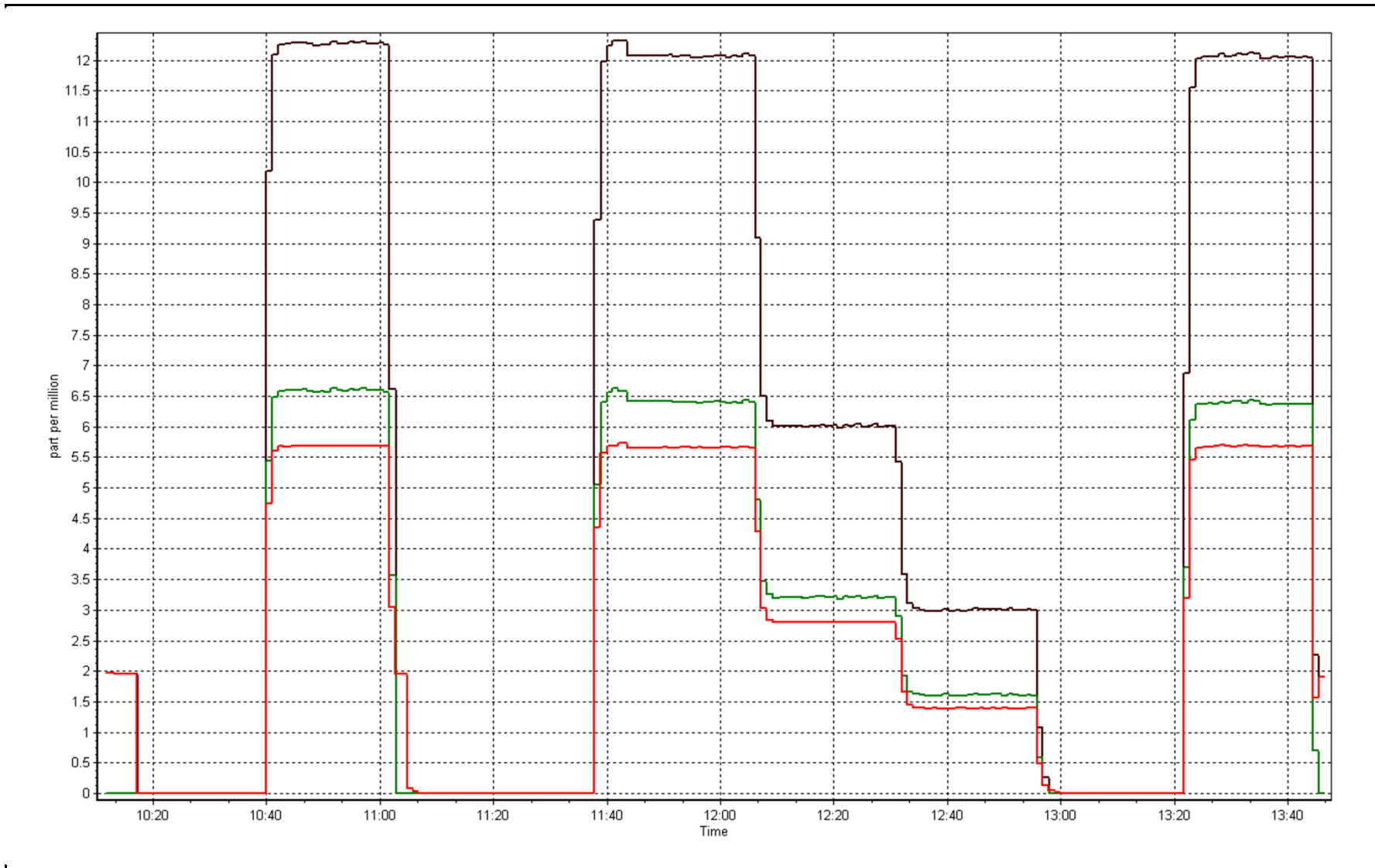
Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 3, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:15	End Time (MST)	13:48
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	N/A	Correlation Coefficient	0.999987
6.39	6.40	0.9991		
3.21	3.21	1.0014	Slope	1.000159
1.60	1.62	0.9886		
			Intercept	-0.005338







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 4, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	13:30
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
NO2 calibration used	Wednesday, January 07, 2015	Transfer Standard	SA130110A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	27.8	27.7
Analyzer Range (input)	500	500	Lamp temp.	53.5	53.5
Calculated slope	1.003550	0.997566	Pressure	659.0	665.3
Calculated intercept	-0.725692	-0.690646	Flow cell A	0.697	0.702
Analyzer Background	-0.4	-0.4	Flow cell B	0.723	0.727
Analyzer Coefficient	1.004	0.951	Cell A Intensity	84500	83860
			Cell B Intensity	79100	78475

Analyzer make Thermo 49i Analyzer serial # 1300156234

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Gen Drive Vs. Ref (mv)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.000	0.0	0.1	N/A
as found span	5000	1053 / 621	331.6	350.7	0.946
calibrator zero	5000	0.000	0.0	0.1	N/A
high point	5000	1053 / 621	331.6	332.3	0.998
second point	5000	958 / 430	204.7	207.1	0.988
third point	5000	834 / 220	82.9	84.0	0.987
calibrator zero					
as left zero	5000	0.000	0.0	0.3	N/A
as left span	5000	1060 / 615	333.1		
Average Correction Factor					0.991

Corrected As found 350.6 Previous response 331.2 % change -5.6%

Notes:

Span adjusted. Filter changed after third point. Diagnostics look normal. -5.6% change more than likely due to calibrator change

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

O₃ Calibration Summary

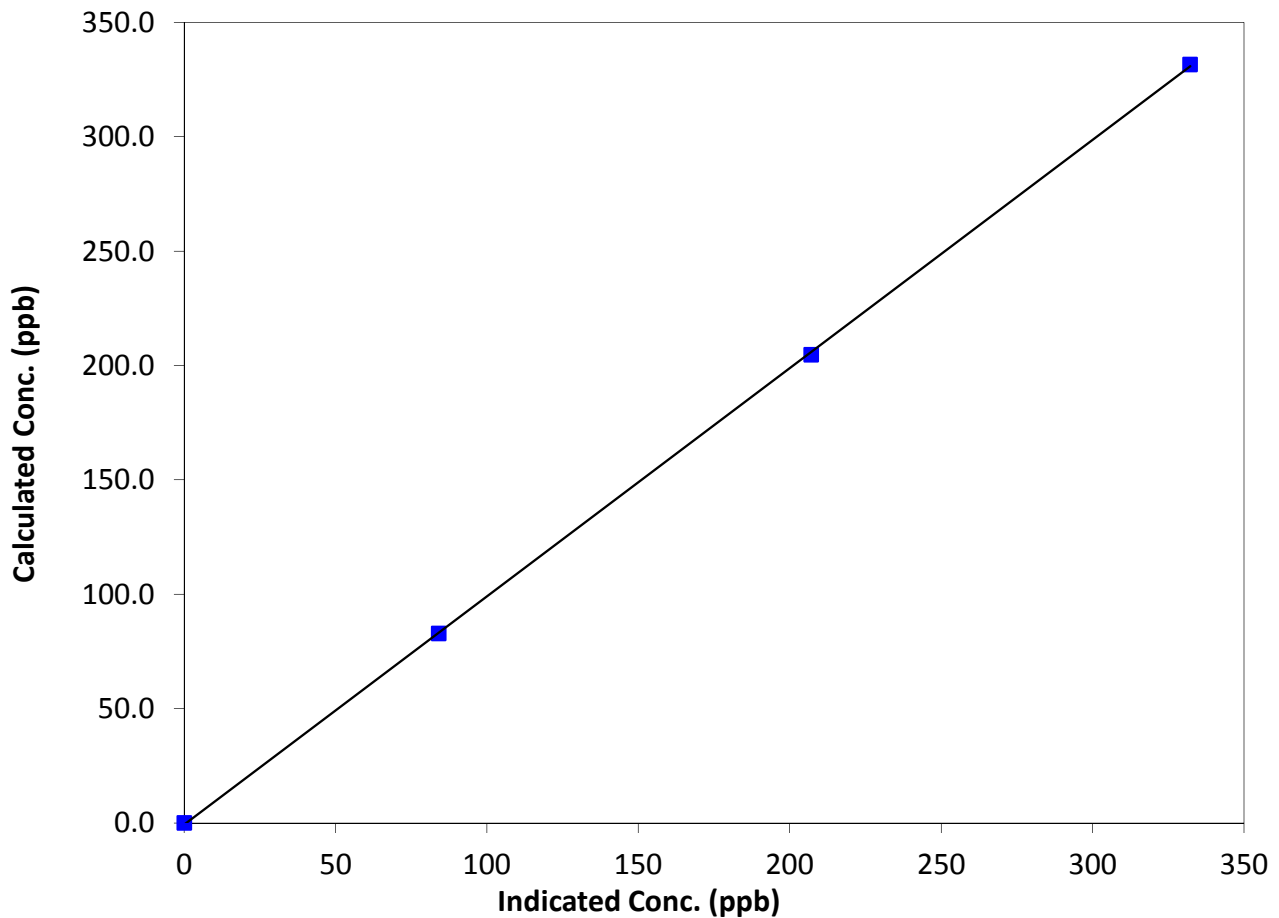
Station Information

Calibration Date	Wednesday, March 11, 2015	Previous Calibration	February 4, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:45	End Time (MST)	13:30
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

Calibration Data

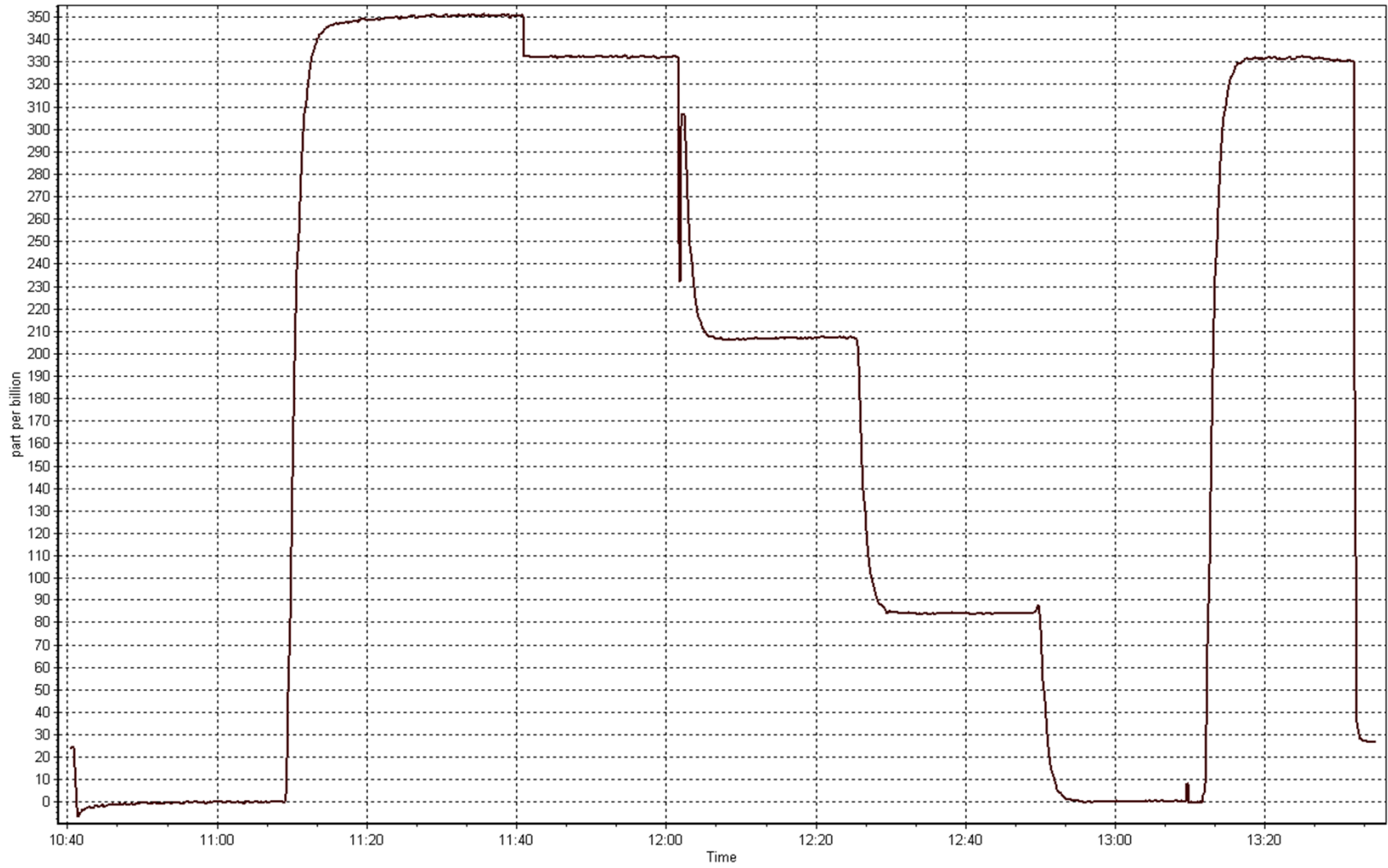
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999957
331.6	332.3	0.9980		
204.7	207.1	0.9883	Slope	0.997566
82.9	84.0	0.9866		
			Intercept	-0.690646

O₃ Calibration Curve



O3 Calibration Plot

Date: March 11, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 3, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:50
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	14300410
NO Cal Gas Conc	54.4 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	SA130110A

DACs Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 9036

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.990121	0.989387	1.011243
	Data Offset	-0.034388	0.524573	-0.629259
After	Data Slope	0.994558	0.993611	1.000234
	Data Offset	1.059229	1.947178	-0.073800
IP address:		192.168.1.42		
Voltage Range		N/A		

Analyzer Information

Analyzer make/model Thermo Scientific 42i Analyzer serial # 1218153460

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.991		0.943	
NOX coefficient	0.997		0.995	
NO2 coefficient	1.000		1.000	
NO bkgnd	2.7		2.5	
NOX bkgnd	3.3		2.7	
Chamber Temp	50.7	Deg C	50.4	Deg C
Moly Temp	322	Deg C	327.4	Deg C
PMT voltage	-761	V	-761	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	166.7	mmHg	165.1	mmHg
R Cell Press Nox	166.4	mmHg	164.7	mmHg
NO sample flow	0.872	ccm	0.859	ccm
Nox sample Flow	0.868	ccm	0.857	ccm

Notes:

Zero and span with adjustments. Filter changed after As Finds. No As Lefts as NH3 calibration followed this calibration.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 10, 2015

Station Number:

AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.2	-0.4	N/A	N/A
as found span	5000	55.2	600.0	600.0	0.0	627.6	626.6	1.1	0.9560	0.9576
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	N/A	N/A
high point	5000	55.2	600.0	600.0	0.0	602.8	603.0	-0.1	0.9954	0.9952
second point	5000	27.7	301.4	301.4	0.0	301.4	300.2	1.2	1.0001	1.0040
third point	5000	13.9	151.2	151.2	0.0	149.9	148.5	1.4	1.0088	1.0185
calibrator zero										
as left zero										
as left span										
Average Correction Factor									1.0014	1.0059

Corrected As found

NO_x= 628.2

NO= 626.8

Percent Change

NO_x= -3.5%

NO= -3.3%

Previous Response

NO_x= 606.1

NO= 605.9

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

55.15

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO ₂ (300)	N/A	273.2	331.6	604.8	273.2	331.6	0.9813	1.0000	1.0001	100.0%
2nd NO ₂ (200)	N/A	400.2	204.7	604.9	400.2	204.8	0.9811	1.0000	0.9996	100.0%
3rd NO ₂ (100)	N/A	521.9	82.9	604.8	521.9	82.9	0.9812	1.0000	1.0000	100.0%
4th NO ₂ (0)	604.8	N/A	-0.1	604.7	604.8	-0.1	0.9814	1.0000	N/A	N/A
Average Correction Factor							0.9813	1.0000	0.9999	100.0%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

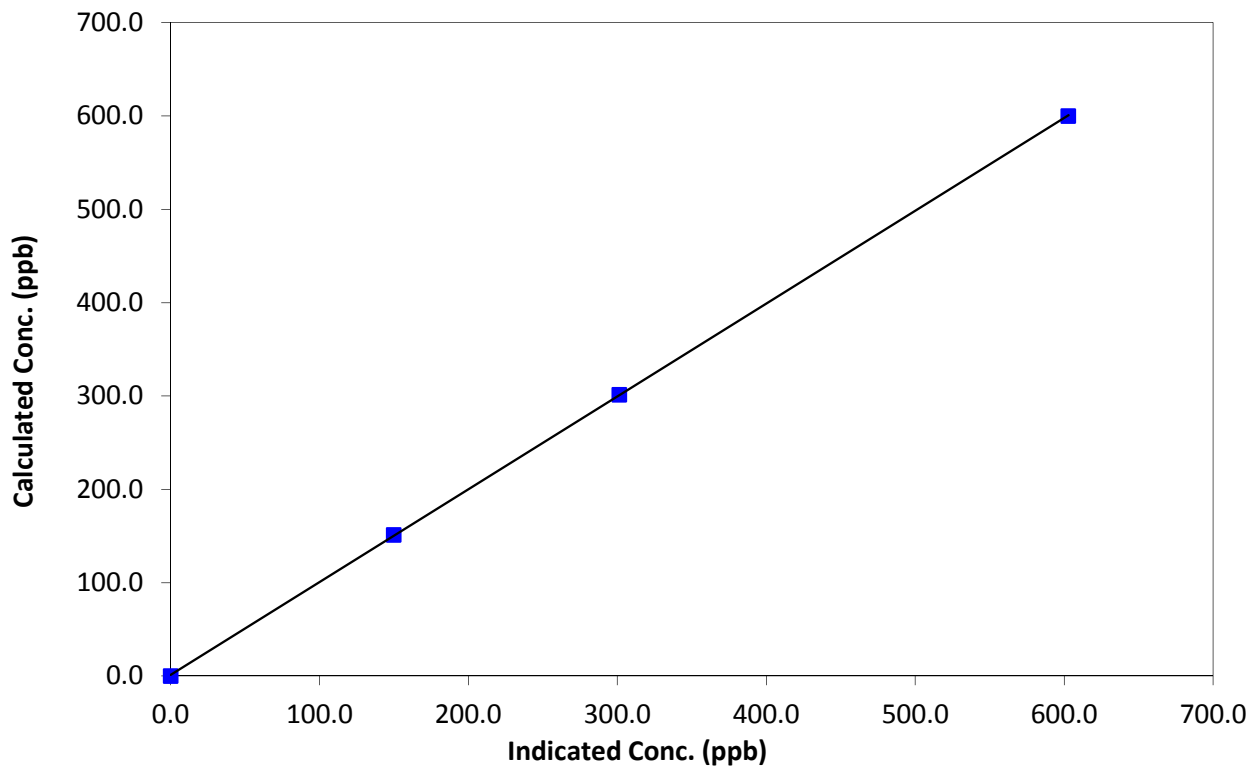
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 3, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo Scientific 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	0.999984
600.0	602.8	0.9954		
301.4	301.4	1.0001	Slope	0.994558
151.2	149.9	1.0088		
			Intercept	1.059229

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

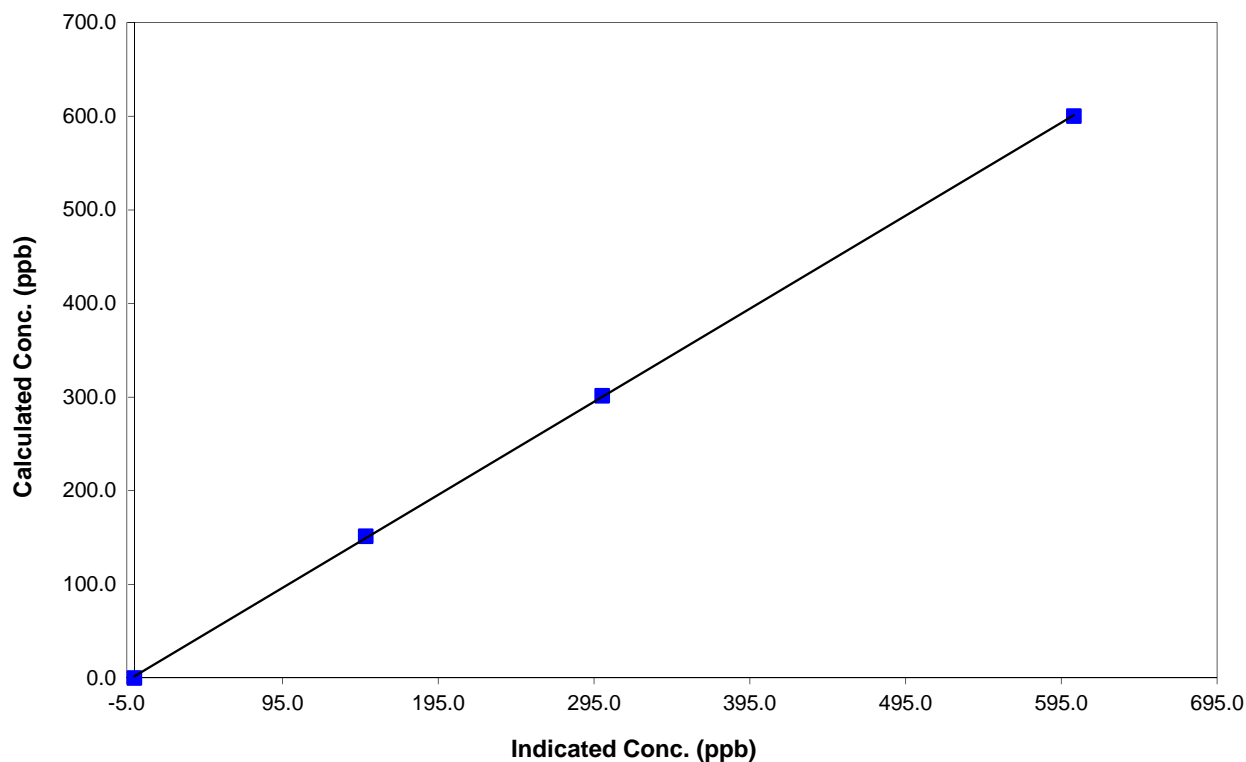
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 3, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999954
600.0	603.0	0.9952		
301.4	300.2	1.0040	Slope	0.993611
151.2	148.5	1.0185		
			Intercept	1.947178

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

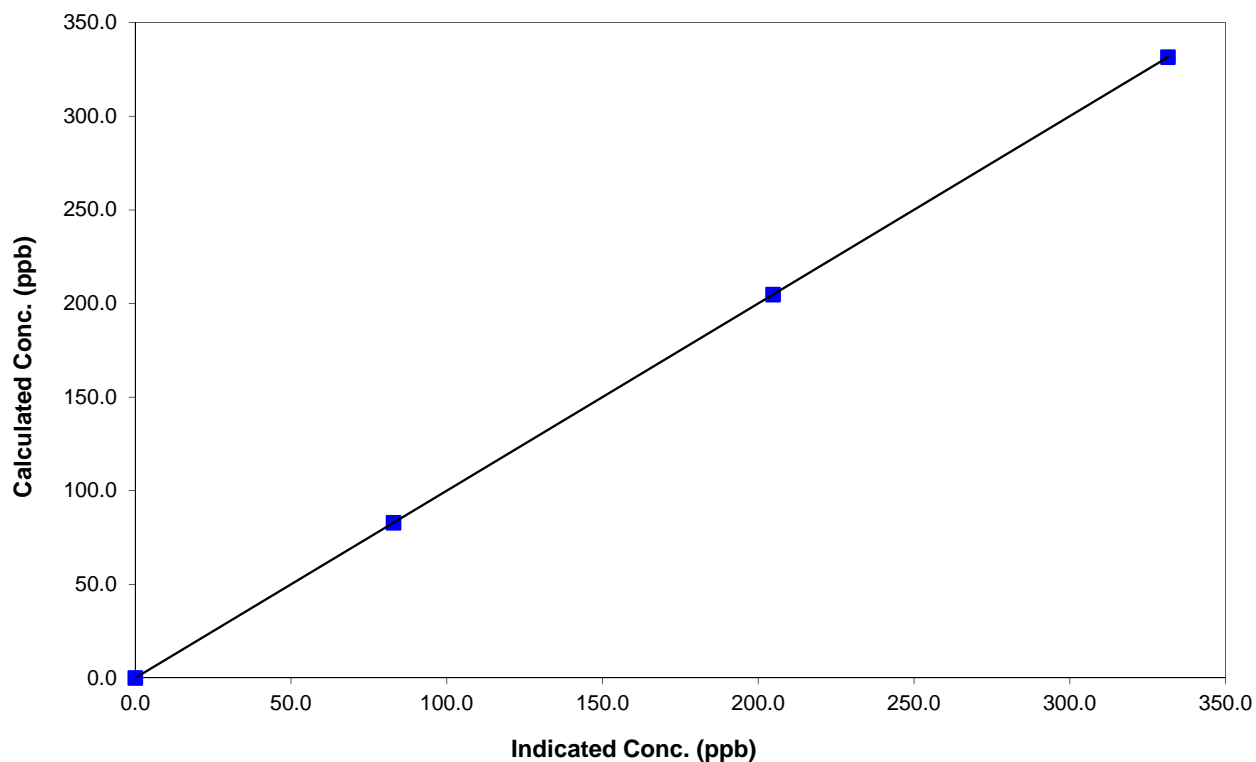
Station Information

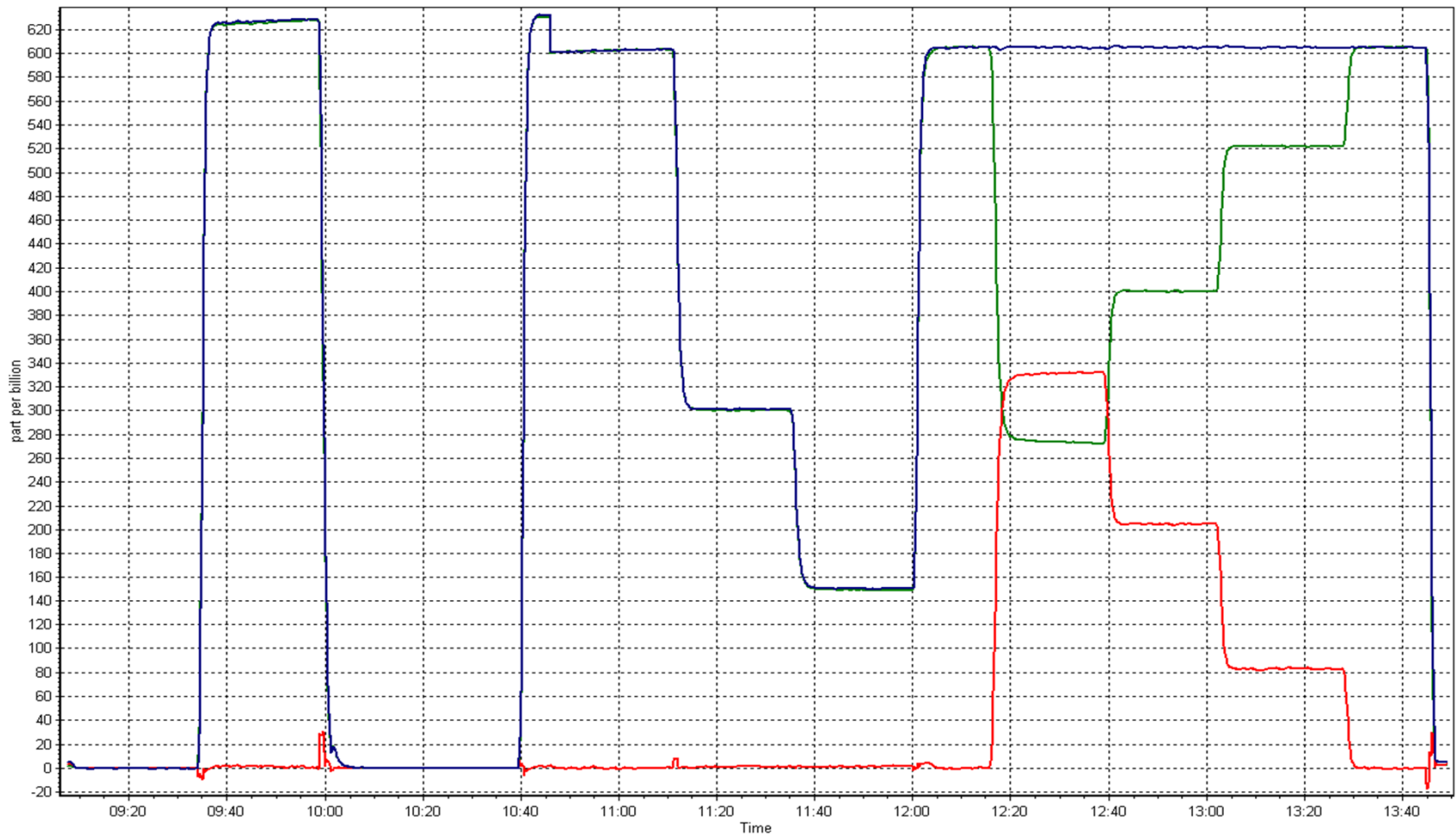
Calibration Date	March 10, 2015	Previous Calibration	February 3, 2015
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	1.000000
331.6	331.6	1.0001		
204.7	204.8	0.9996	Slope	1.000234
82.9	82.9	1.0000		
			Intercept	-0.073800

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	March 10, 2015	NOX Previous Cal Date	February 24, 2015
NH3 Calibration Date	March 10, 2015	NH3 Previous Cal Date	February 24, 2015
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	16:40
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	192 ppm	Serial Number	14300410
NOx Cal Gas Conc	54.4 ppm	NH3 Expiry Date / SN	3/Apr/2012 LL86349
NO Cal Gas Conc	54.4 ppm	NO Expiry Date / SN	12/Dec/2016 SA130110A

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	9036
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Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.980991	0.981012	1.000023	0.996899	1.003278
	Data Offset	14.745846	15.760196	0.700091	2.609667	0.411344
Cal Stats After	Data Slope	1.004475	1.003495	0.993643	0.995762	1.003704
	Data Offset	16.981611	17.559036	3.262250	3.677140	-2.602149
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	Thermo 17i	Analyzer serial #	1426262596	
Converter	Thermo 17i	Converter serial #	1426262596	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	10.6	ppb	10.9	ppb
NOx BKG	11.6	ppb	10.0	ppb
Nt BKG	14.5		12.6	
NO coefficient	1.207		1.217	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	0.927		0.931	
NH3 coefficient	0.870		0.916	
Nt coefficient	0.981		0.992	
NH3 conv temp	750	DegC	749	Deg C
Chamber Temp	50.4	Deg C	50.5	Deg C
Moly Temp	322.0	Deg C	327.4	Deg C
PMT Temp	-8.7	Deg C	-8.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	102.3	mmHg	102.3	mmHg
PMT Voltage	-837.7	v	-838.0	v
Sample Flow 1 NO	545.0	ccm	533.0	ccm
Sample Flow 2 Nox	525.0	ccm	515.0	ccm
Sample Flow 3 Nt	497.0	ccm	486.0	ccm

Notes:

Zero and Span adjusted. Filter changed after As Finds. Third point fail



Wood Buffalo Environmental Association

NH3 Calibration Summary

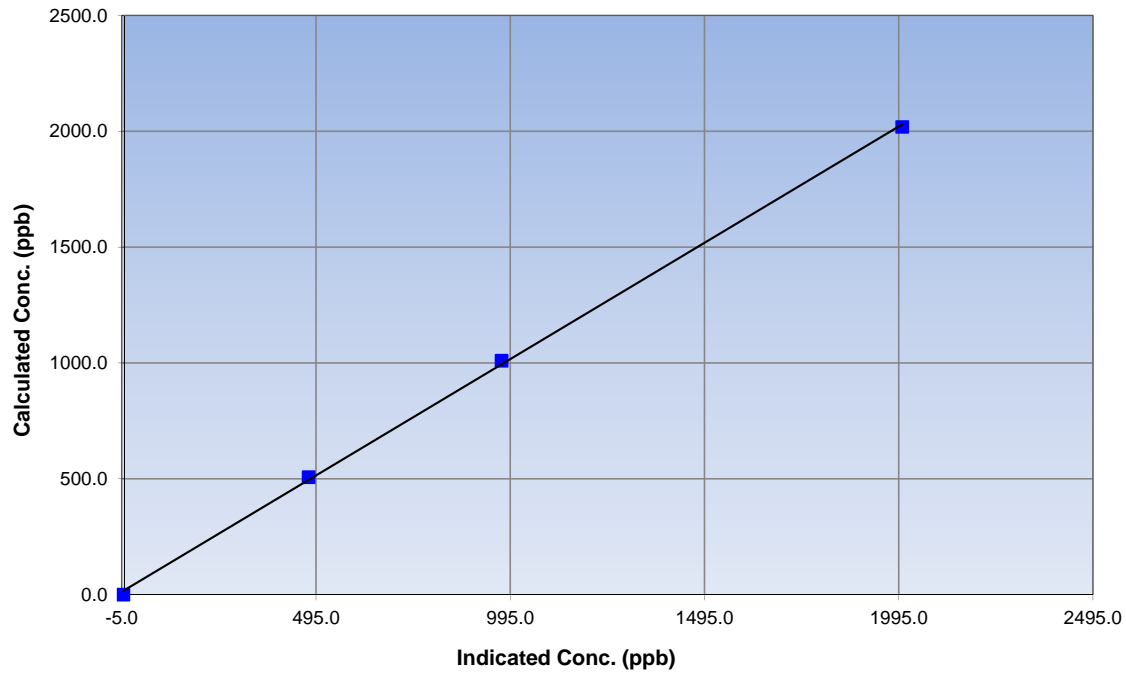
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 24, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999659
2019.8	2004.2	1.0078		
1009.9	973.1	1.0378	Slope	1.004475
506.9	476.2	1.0644		
			Intercept	16.981611

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

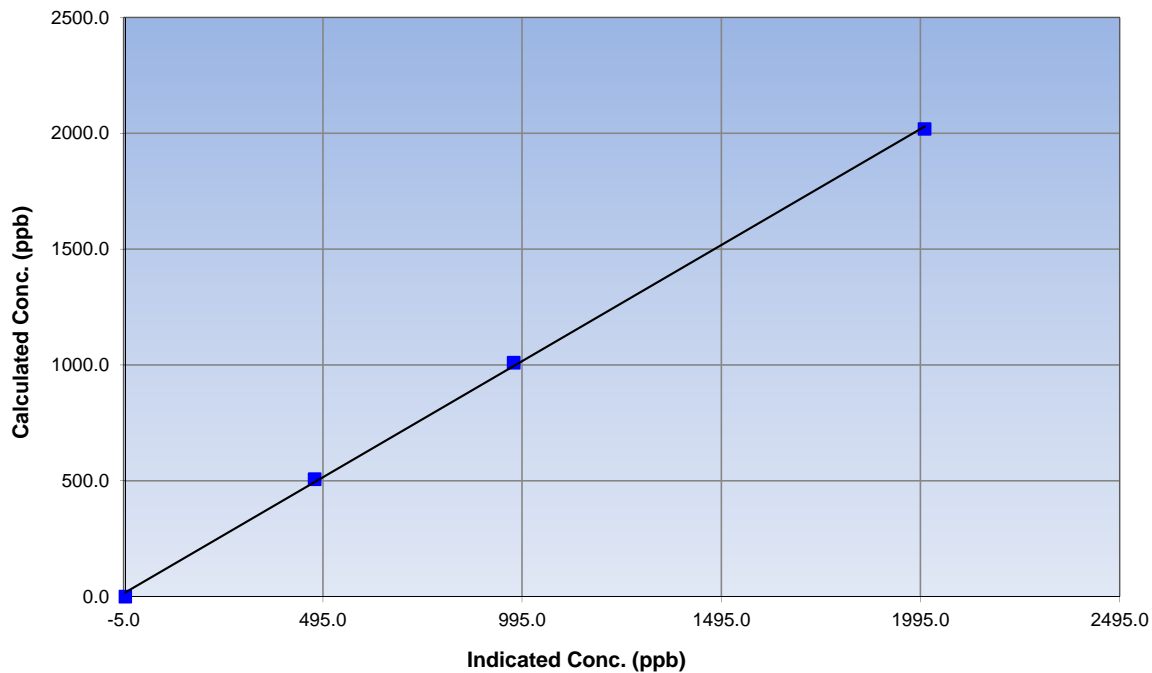
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 24, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999643
2019.8	2005.6	1.0071		
1009.9	974.0	1.0368	Slope	1.003495
506.9	474.9	1.0674		
			Intercept	17.559036

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

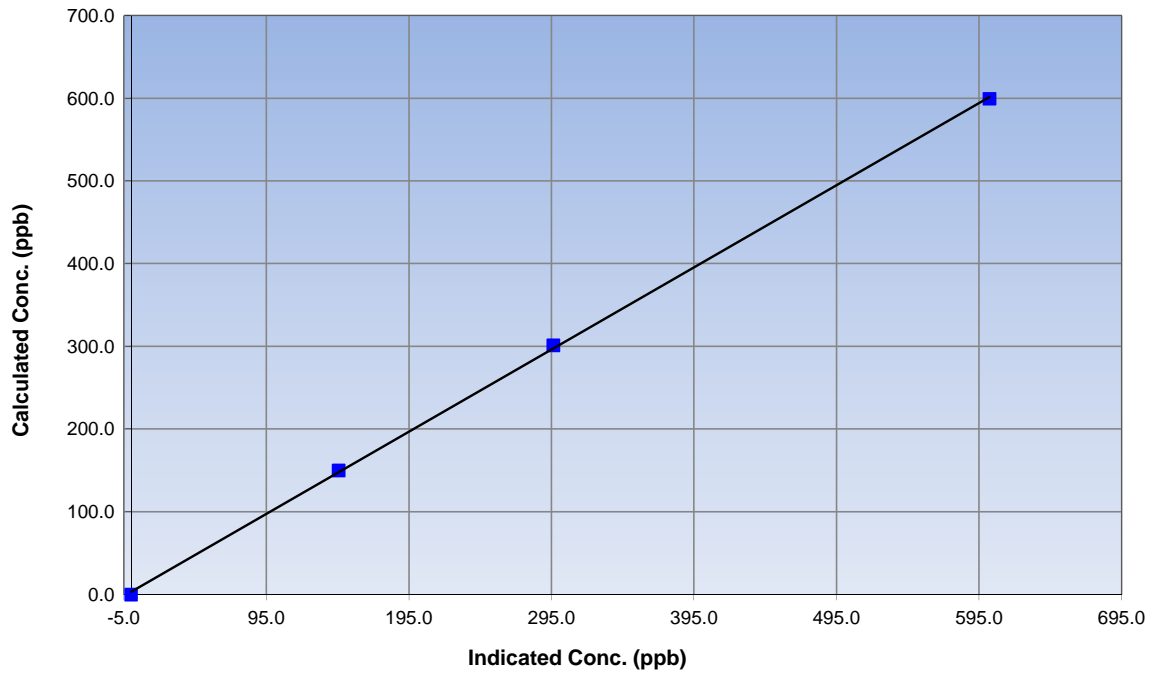
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 24, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999835
599.5	602.3	0.9954		
301.4	296.5	1.0164	Slope	0.993643
150.1	145.8	1.0301		
			Intercept	3.262250

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

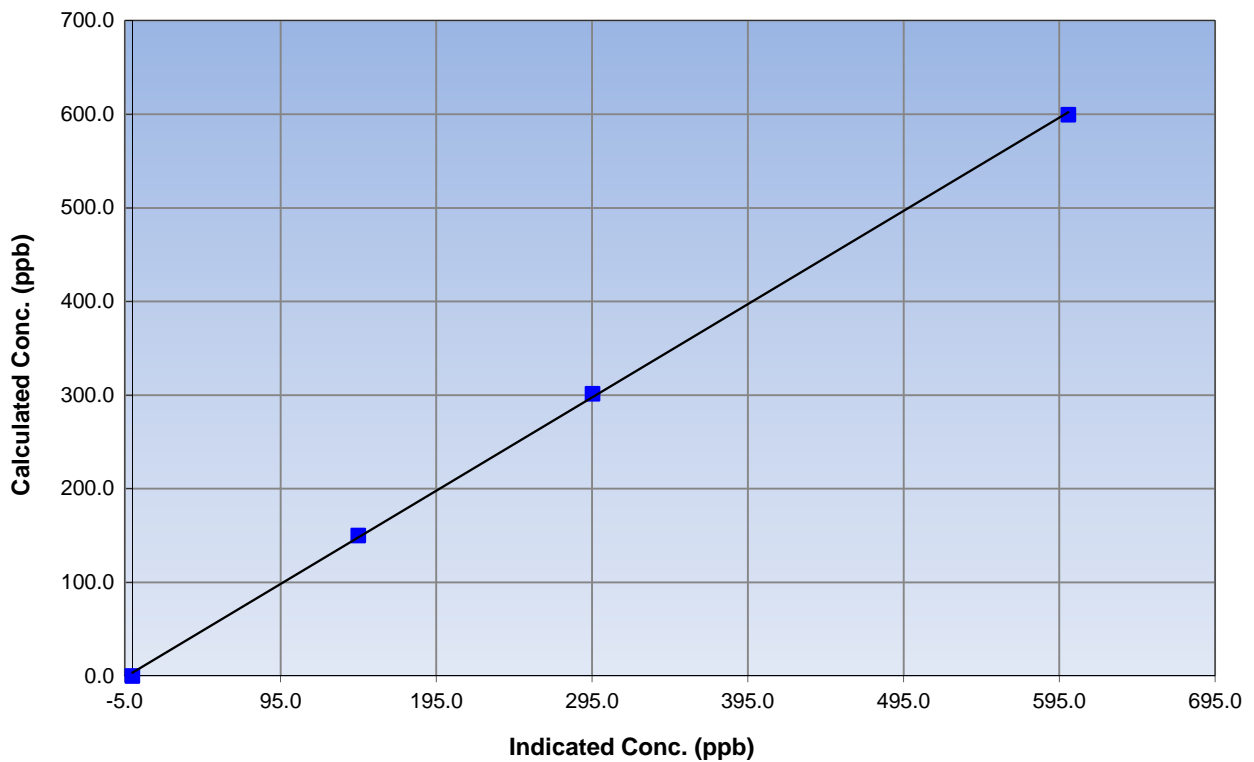
Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 24, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999807
599.5	600.7	0.9979		
301.4	295.2	1.0209	Slope	0.995762
150.1	144.8	1.0368		
			Intercept	3.677140

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

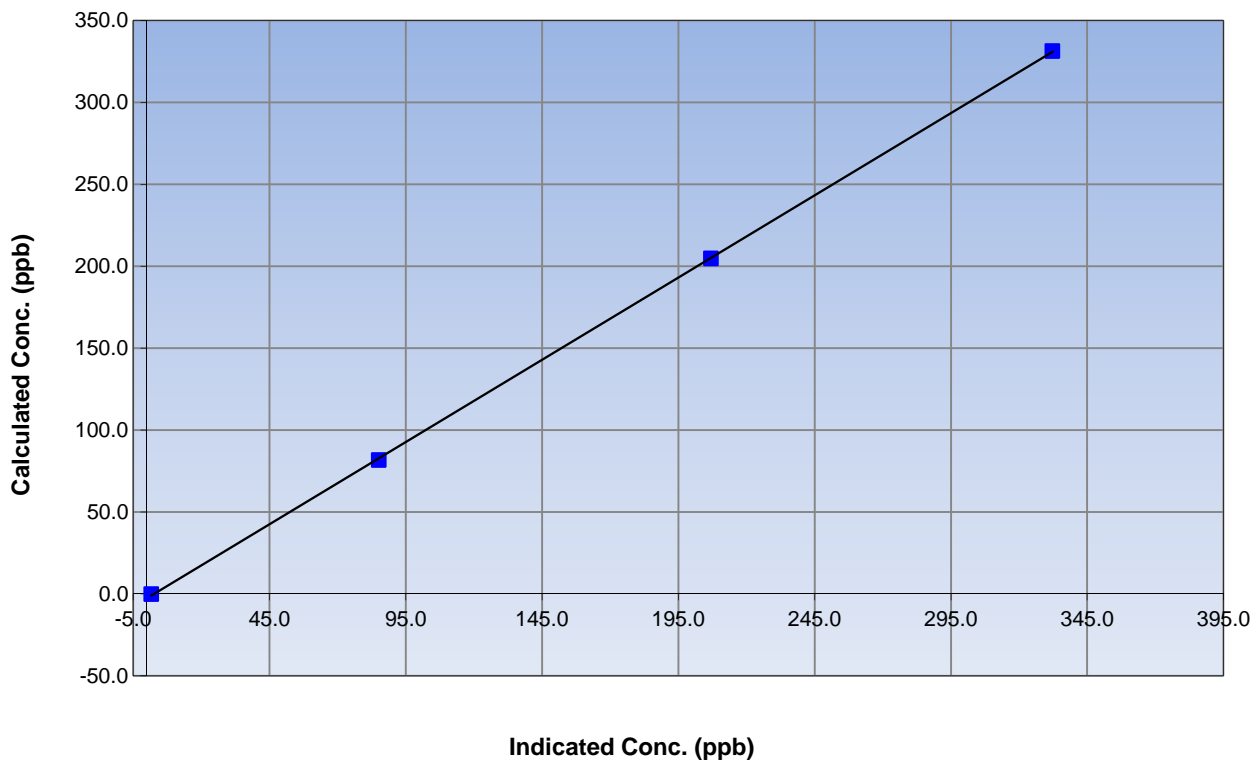
Station Information

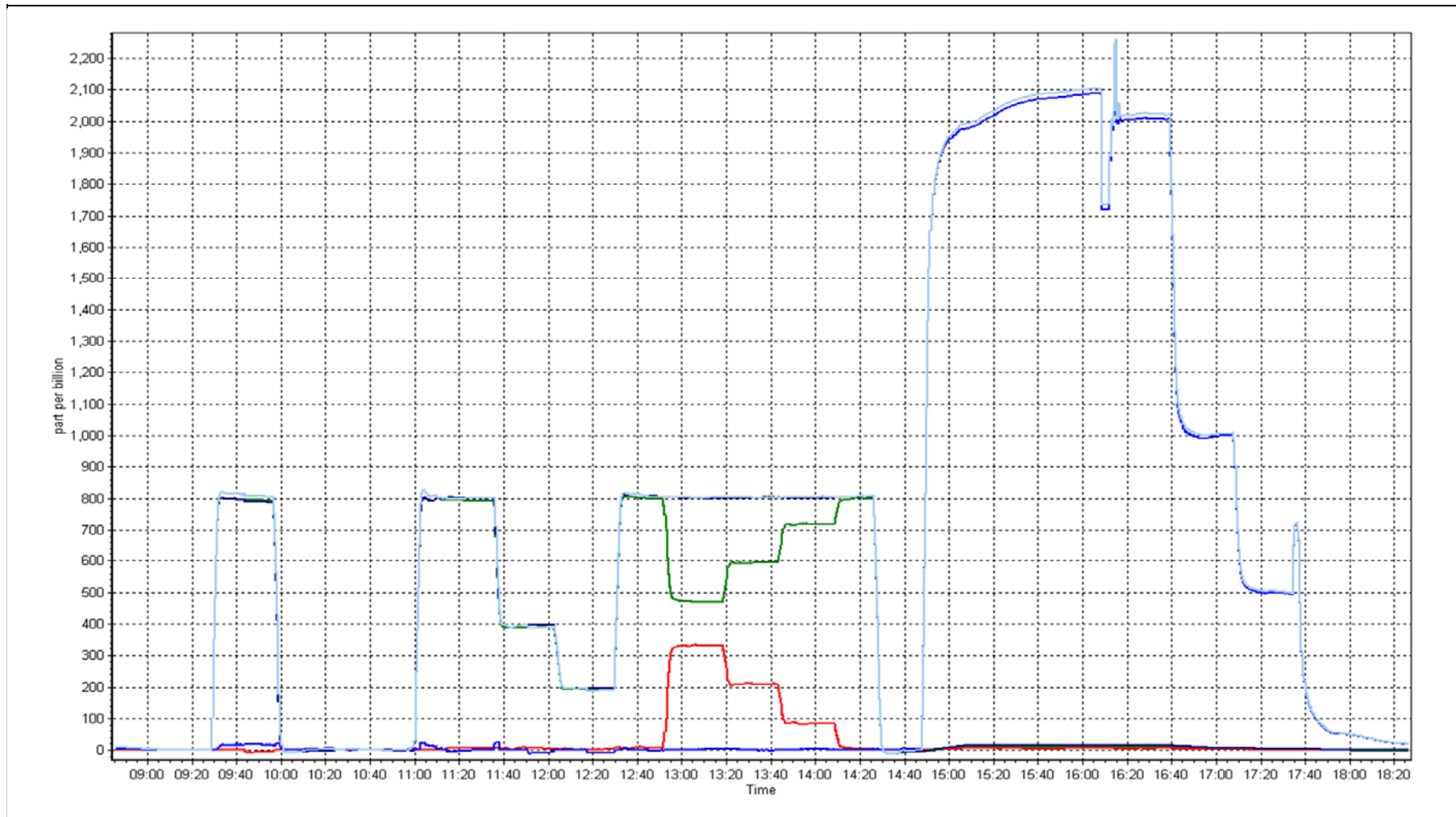
Calibration Date	March 10, 2015	Previous Calibration	February 24, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.6	----	Correlation Coefficient	0.999960
331.3	332.2	0.9973		
204.9	207.0	0.9896	Slope	1.003704
81.7	85.1	0.9598		
			Intercept	-2.602149

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	March 12, 2015	NOX Previous Cal Date	March 10, 2015
NH3 Calibration Date	March 12, 2015	NH3 Previous Cal Date	March 10, 2015
Reason:	Removal		
Start Time (MST)	8:35	End Time (MST)	
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	192 ppm	Serial Number	14300410
NOx Cal Gas Conc	54.4 ppm	NH3 Expiry Date / SN	3/Apr/2012 LL86349
NO Cal Gas Conc	54.4 ppm	NO Expiry Date / SN	12/Dec/2016 SA130110A

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	9036
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Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.004475	1.003495	0.993643	0.995762	1.003704
	Data Offset	16.981611	17.559036	3.262250	3.677140	-2.602149
Cal Stats After	Data Slope	1.063684	1.058239	0.988248	0.991028	
	Data Offset	-1.159415	-1.396876	-0.227297	-0.208116	
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	Thermo 17i	Analyzer serial #	1426262596	
Converter	Thermo 17i	Converter serial #	1426262596	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	10.9	ppb	NA	ppb
NOx BKG	10.0	ppb	NA	ppb
Nt BKG	12.6		NA	
NO coefficient	1.217		NA	
NO2 coefficient	1.000	ppb	NA	ppb
NOx coefficient	0.931		NA	
NH3 coefficient	0.916		NA	
Nt coefficient	0.992		NA	
NH3 conv temp	749	DegC	NA	Deg C
Chamber Temp	50.5	Deg C	NA	Deg C
Moly Temp	327.4	Deg C	NA	Deg C
PMT Temp	-8.8	Deg C	NA	Deg C
O3 flow	ok	ccm	NA	ccm
R Cell Press	102.3	mmHg	NA	mmHg
PMT Voltage	-838.0	v	NA	v
Sample Flow 1 NO	533.0	ccm	NA	ccm
Sample Flow 2 Nox	515.0	ccm	NA	ccm
Sample Flow 3 Nt	486.0	ccm	NA	ccm

Notes:

Removal calibration, analyzer was replaced with Teledyne API T201. Nightly NH3 zero/span used.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date: March 12, 2015 Station Number: AMS 6

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO _x conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	1.3	0.2	1.1	----	----
as found NO	5000	73.5	799.7	799.7	----	816.9	809.4	7.5	0.979	----
calibrator zero	5000	0.0	0.0	0.0	0.0	1.3	0.2	1.1	----	----
high NO point	5000	73.5	799.7	799.7	----	816.9	809.4	7.5	0.979	----
NO/O ₃ point										
as found NH ₃	5000	52.6	2019.8	NA	2019.8	1910.0	0.0	1900.0	1.058	1.063
first NH ₃	5000	52.6	2019.8	NA	2019.8	1910.0	0.0	1900.0	1.058	1.063
second NH ₃										
third NH ₃										
Average Correction Factor									0.9789	1.0631

NH ₃ Corrected As Found	NH ₃ = 1898.9 ppb	Previous Response	NH ₃ = 1993.9 ppb	NH ₃ percent change	5.0%
Nt Corrected As Found	Nt = 815.6 ppb	Previous Response	Nt = 779.3 ppb	Nt percent change	-4.4%
NO _x Corrected As Found	NO _x = 809.2 ppb	Previous Response	NO _x = 801.5 ppb	NO _x percent change	-0.9%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: March 12, 2015 Station Number: AMS 6

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	1.3	----	----
as found span	5000	73.5	799.7	799.7	799.7	809.4	807.1	816.9	0.9880	0.9908
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	1.3	----	----
high point	5000	73.5	799.7	799.7	799.7	809.4	807.1	816.9	0.9880	0.9908
second point										
third point										
as left zero										
as left span										
Average Correction Factor									0.9880	0.9908

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	815.6	809.2	806.9	NA
Previous Response	779.3	801.5	806.9	NA
Percent Change	-4.4%	-0.9%	0.0%	NA

GPT Calibration Data

Total Flow 5000 ccm Source Gas Flow 73.50 ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero										
1st NO ₂ (300)										
2nd NO ₂ (200)										
3rd NO ₂ (100)										
4th NO ₂ (0)										
Average Correction Factor										

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NH3 Calibration Summary

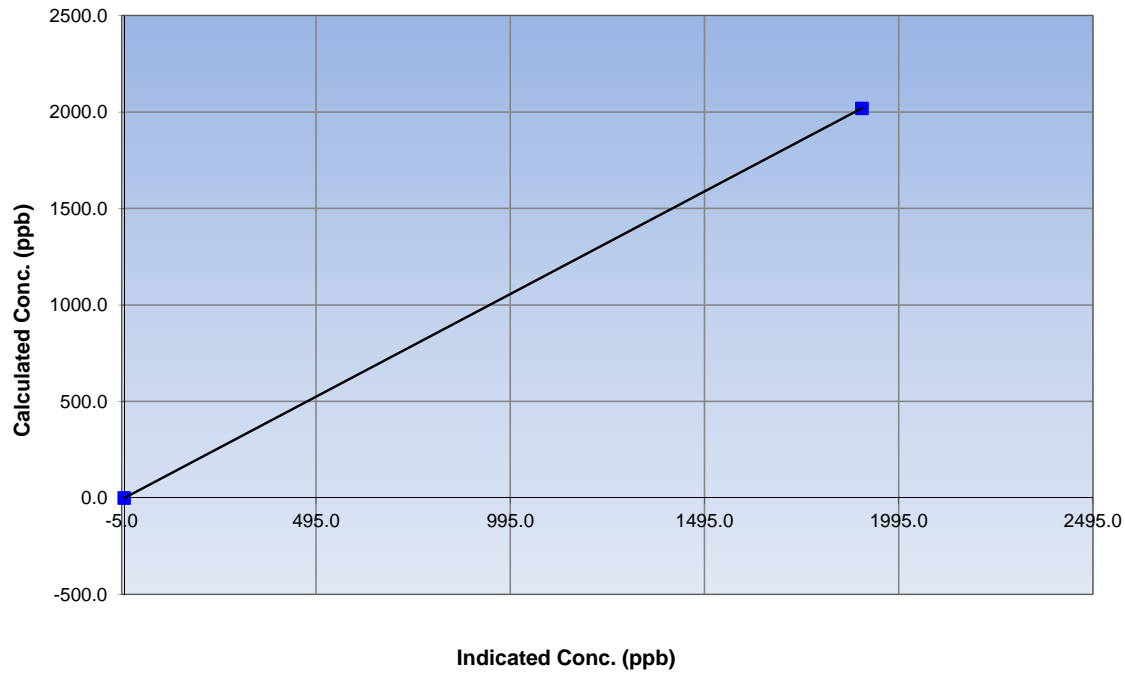
Station Information

Calibration Date	March 12, 2015	Previous Calibration	March 10, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:35	End Time (MST)	
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.1	----	Correlation Coefficient	1.000000
2019.8	1900.0	1.0631		
			Slope	1.063684
			Intercept	-1.159415

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

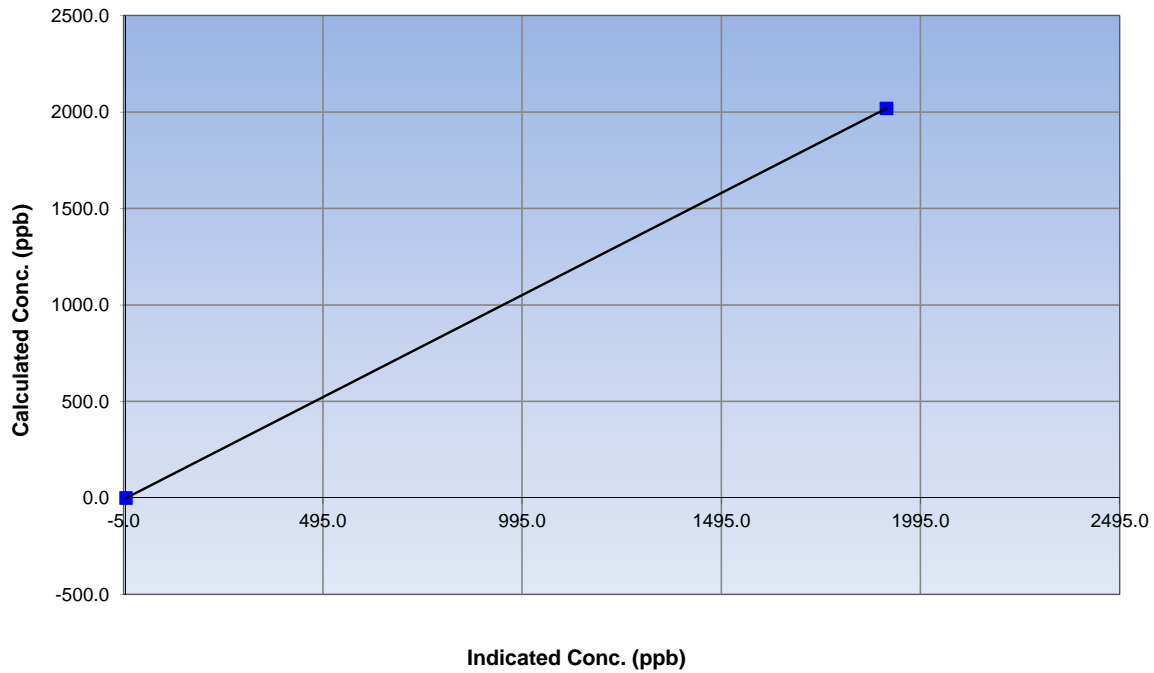
Station Information

Calibration Date	March 12, 2015	Previous Calibration	March 10, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:35	End Time (MST)	
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.3	----	Correlation Coefficient	1.000000
2019.8	1910.0	1.0575		
			Slope	1.058239
			Intercept	-1.396876

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

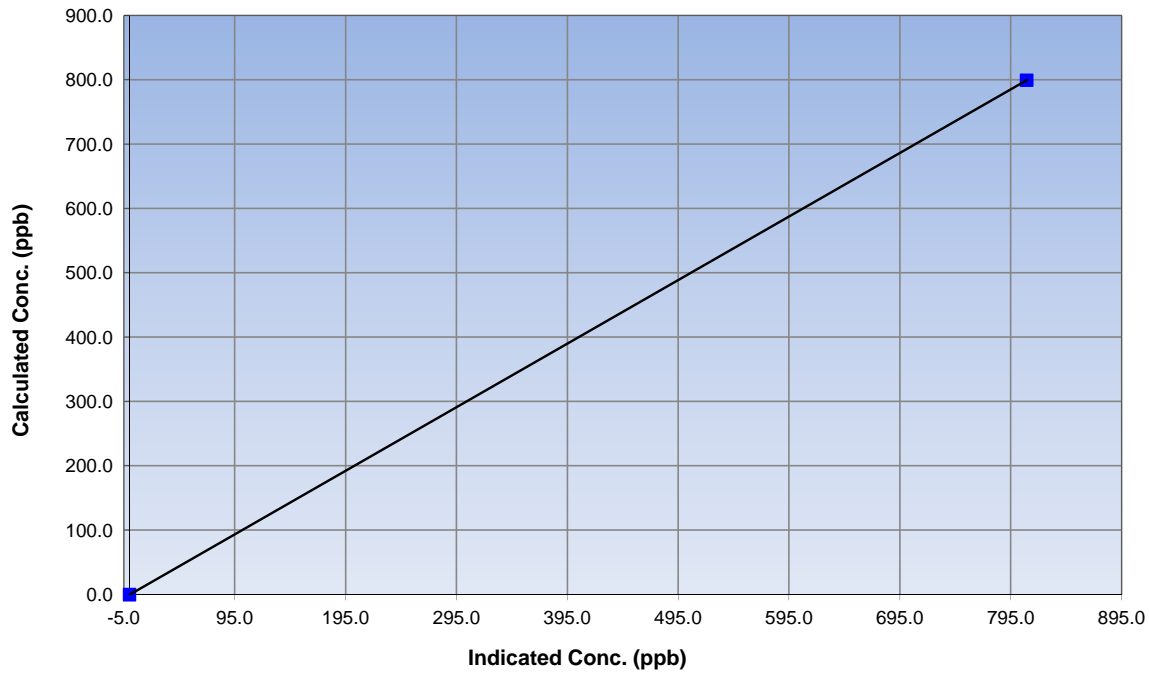
Station Information

Calibration Date	March 12, 2015	Previous Calibration	March 10, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:35	End Time (MST)	
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	1.000000
799.7	809.4	0.9880		
			Slope	0.988248
			Intercept	-0.227297

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

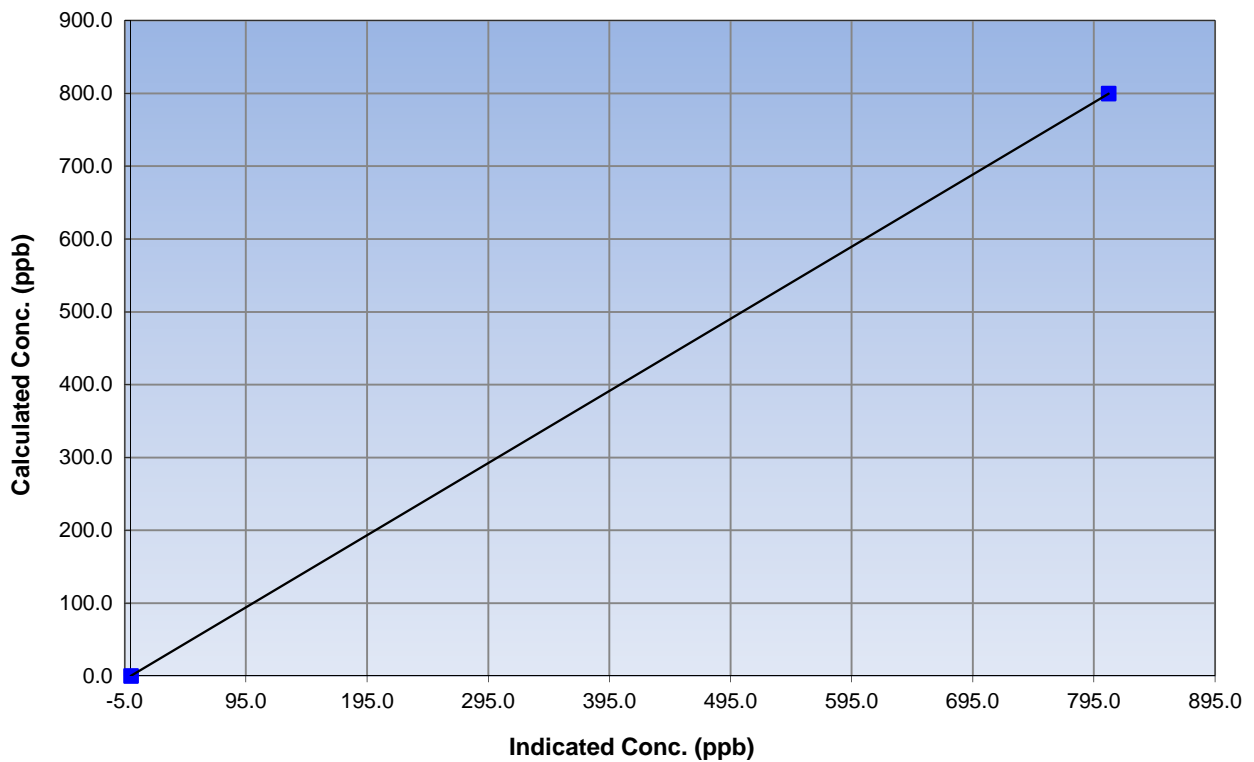
Station Information

Calibration Date	March 12, 2015	Previous Calibration	March 10, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:35	End Time (MST)	
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

Calibration Information

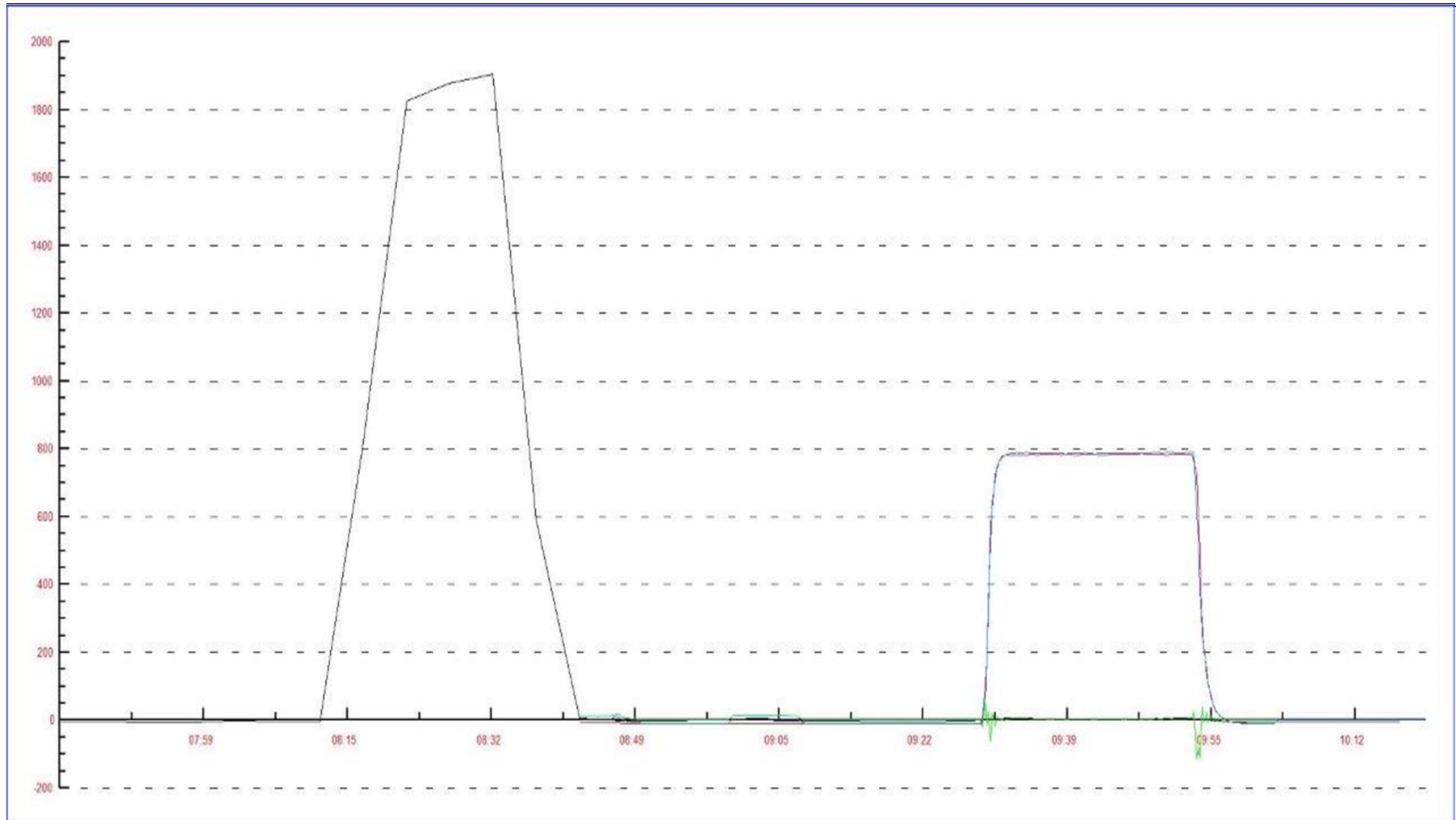
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	1.000000
799.7	807.1	0.9908		
			Slope	0.991028
			Intercept	-0.208116

NO Calibration Curve



NH3, NO/NOx As Founds

Date: March 12, 2015





Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	March 12, 2015	NOX Previous Cal Date	NA
NH3 Calibration Date	March 12, 2015	NH3 Previous Cal Date	NA
Reason:	Install		
Start Time (MST)	11:30	End Time (MST)	20:00
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	192 ppm	Serial Number	14300410
NOx Cal Gas Conc	54.4 ppm	NH3 Expiry Date / SN	3/Apr/2012 LL86349
NO Cal Gas Conc	54.4 ppm	NO Expiry Date / SN	12/Dec/2016 SA130110A

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	NA	NA	NA	NA	NA
	Data Offset	NA	NA	NA	NA	NA
Cal Stats After	Data Slope	1.005630	0.993563	1.001660	1.000046	1.010502
	Data Offset	0.125766	-0.031237	1.999530	2.437933	-0.228722
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	215	
Converter	API 501 NH3	Converter serial #	217	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	NA	ppb	-3.6	ppb
NOx BKG	NA	ppb	-2.8	ppb
Nt BKG	NA		-0.1	
NO coefficient	NA		0.953	
NO2 coefficient	NA	ppb	1.000	ppb
NOx coefficient	NA		0.956	
NH3 coefficient	NA		0.916	
Nt coefficient	NA		0.954	
NH3 conv temp	NA	DegC	749	Deg C
Chamber Temp	NA	Deg C	50.0	Deg C
Moly Temp	NA	Deg C	316.7	Deg C
PMT Temp	NA	Deg C	7.0	Deg C
O3 flow	NA	ccm	85.0	ccm
R Cell Press	NA	mmHg	4.5	mmHg
PMT Voltage	NA	v	693.0	v
Sample Flow 1 NO	NA	ccm	536.0	ccm
Sample Flow 2 Nox	NA	ccm	531.0	ccm
Sample Flow 3 Nt	NA	ccm	535.0	ccm

Notes:

Install calibration



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date: March 12, 2015 Station Number: AMS 6

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO _x conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero										
as found NO										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
high NO point	5000	73.5	799.7	799.7	----	800.1	797.7	2.4	1.000	----
NO/O ₃ point	5000	73.5	799.7	799.7	----	804.0	800.6	3.4	0.995	----
as found NH ₃										
first NH ₃	5000	52.6	2019.8	NA	2019.8	2033.4	24.6	2008.8	0.993	1.006
second NH ₃	5000	26.3	1009.9	NA	1009.9	1015.3	12.3	1003.0	0.995	1.007
third NH ₃	5000	13.2	506.9	NA	506.9	511.0	6.4	504.7	0.992	1.004
Average Correction Factor									0.9971	1.0056

NH ₃ Corrected As Found	NH ₃ =	NA ppb	Previous Response	NH ₃ =	NA ppb	NH ₃ percent change	NA
Nt Corrected As Found	Nt =	NA ppb	Previous Response	Nt =	NA ppb	Nt percent change	NA
NO _x Corrected As Found	NO _x =	NA ppb	Previous Response	NO _x =	NA ppb	NO _x percent change	NA



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: March 12, 2015 Station Number: AMS 6

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	0.0	----	----
high point	5000	73.5	799.7	799.7	799.7	797.7	799.1	800.1	1.0025	1.0007
second point	5000	36.8	400.4	400.4	400.4	395.8	394.8	394.2	1.0116	1.0141
third point	5000	18.4	200.2	200.2	200.2	196.3	196.3	196.3	1.0198	1.0198
as left zero										
as left span										
Average Correction Factor									1.0113	1.0115

Corrected As found	Nt	NO _x	NO	NO ₂
Previous Response	NA	NA	NA	NA
Percent Change	NA	NA	NA	NA

GPT Calibration Data

Total Flow 5000 ccm Source Gas Flow 73.50 ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.2			----	
1st NO ₂ (300)	----	466.6	333.9	797.0	466.6	330.4	1.0033	1.0000	1.0105	99.0%
2nd NO ₂ (200)	----	592.8	207.7	798.9	592.8	206.1	1.0009	1.0000	1.0075	99.3%
3rd NO ₂ (100)	----	719.0	81.5	799.8	719.0	80.8	0.9999	1.0000	1.0088	99.1%
4th NO ₂ (0)	800.5	----	0.1	800.6	800.5	0.2	0.9988	1.0000	----	----
Average Correction Factor							1.0007	1.0000	1.0089	99.1%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NH3 Calibration Summary

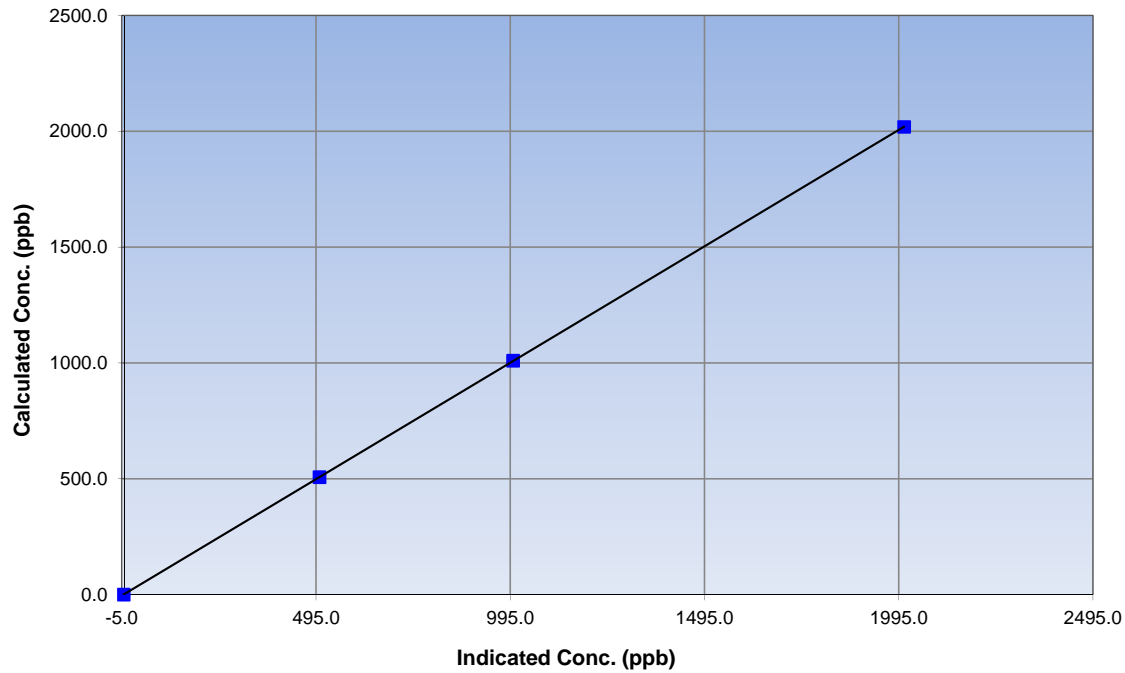
Station Information

Calibration Date	March 12, 2015	Previous Calibration	
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:30	End Time (MST)	20:00
Analyzer make	API T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999999
2019.8	2008.8	1.0055		
1009.9	1003.0	1.0069		
506.9	504.7	1.0044		
			Slope	1.005630
			Intercept	0.125766

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

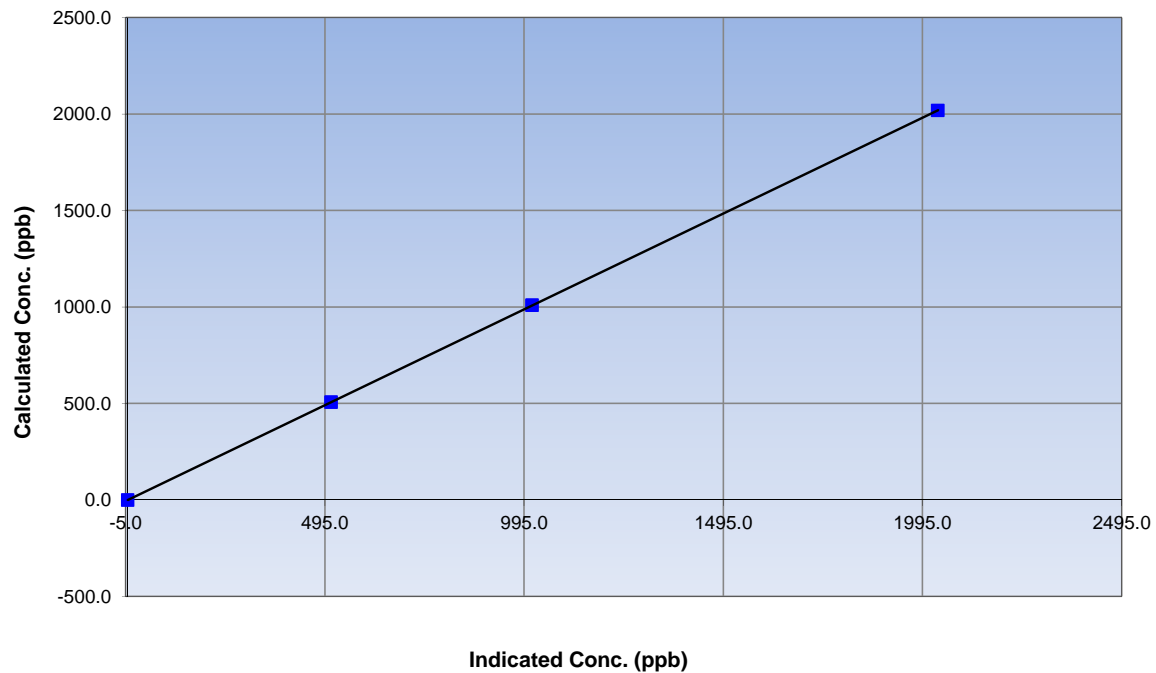
Station Information

Calibration Date	March 12, 2015	Previous Calibration	
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:30	End Time (MST)	20:00
Analyzer make	API T201	Analyzer serial #	215

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999999
2019.8	2033.4	0.9933		
1009.9	1015.3	0.9948	Slope	0.993563
506.9	511.0	0.9919		
			Intercept	-0.031237

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

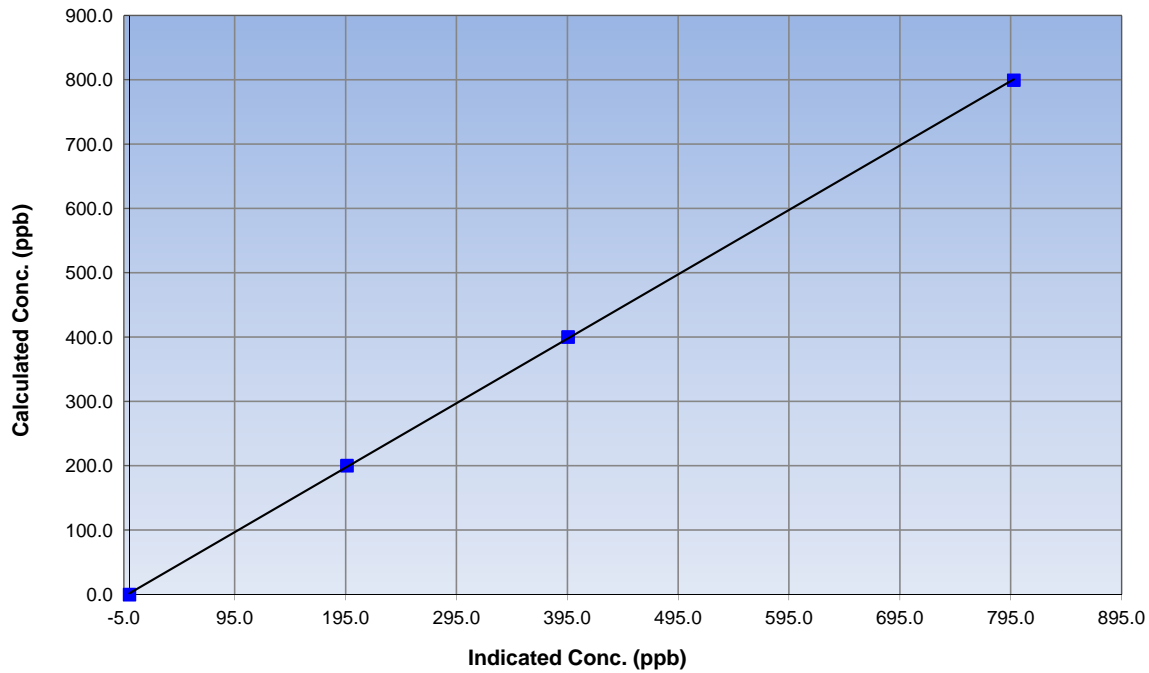
Station Information

Calibration Date	March 12, 2015	Previous Calibration	
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:30	End Time (MST)	20:00
Analyzer make	API T201	Analyzer serial #	215

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999964
799.7	797.7	1.0025		
400.4	395.8	1.0116	Slope	1.001660
200.2	196.3	1.0198		
			Intercept	1.999530

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

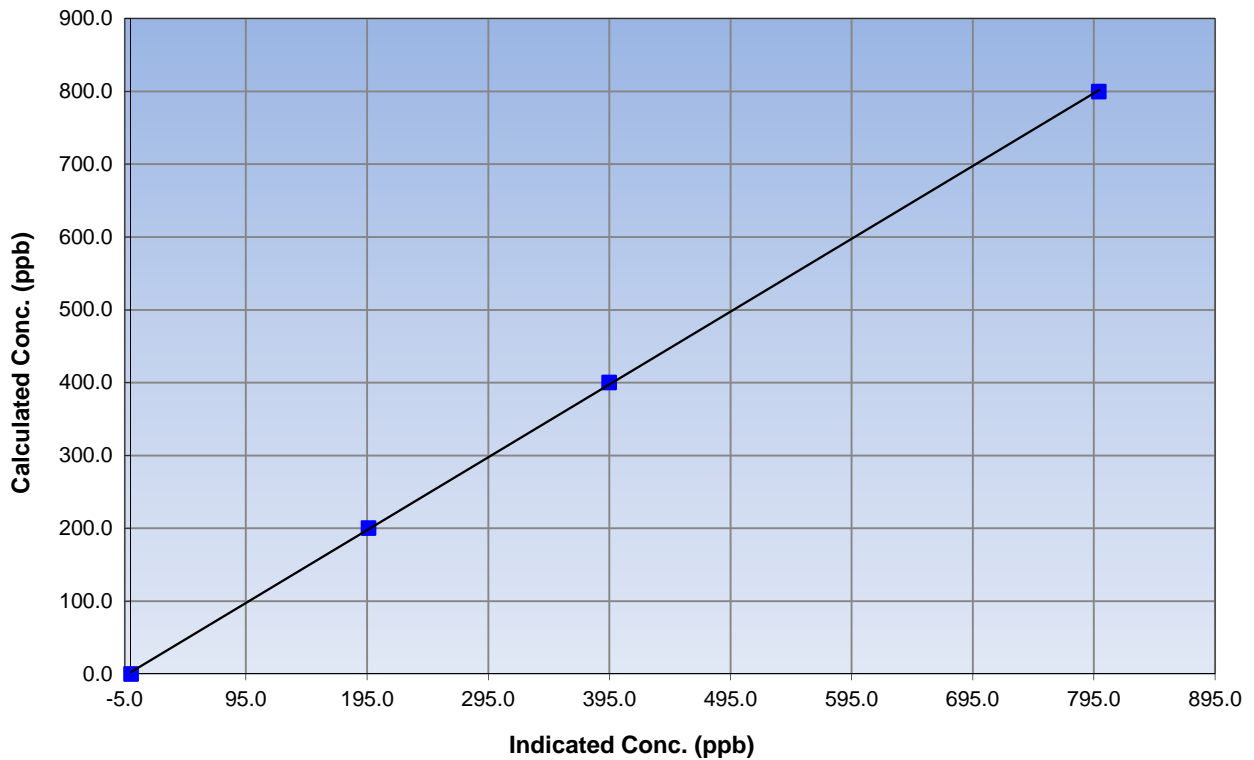
Station Information

Calibration Date	March 12, 2015	Previous Calibration	
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:30	End Time (MST)	20:00
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999936
799.7	799.1	1.0007		
400.4	394.8	1.0141	Slope	1.000046
200.2	196.3	1.0198		
			Intercept	2.437933

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

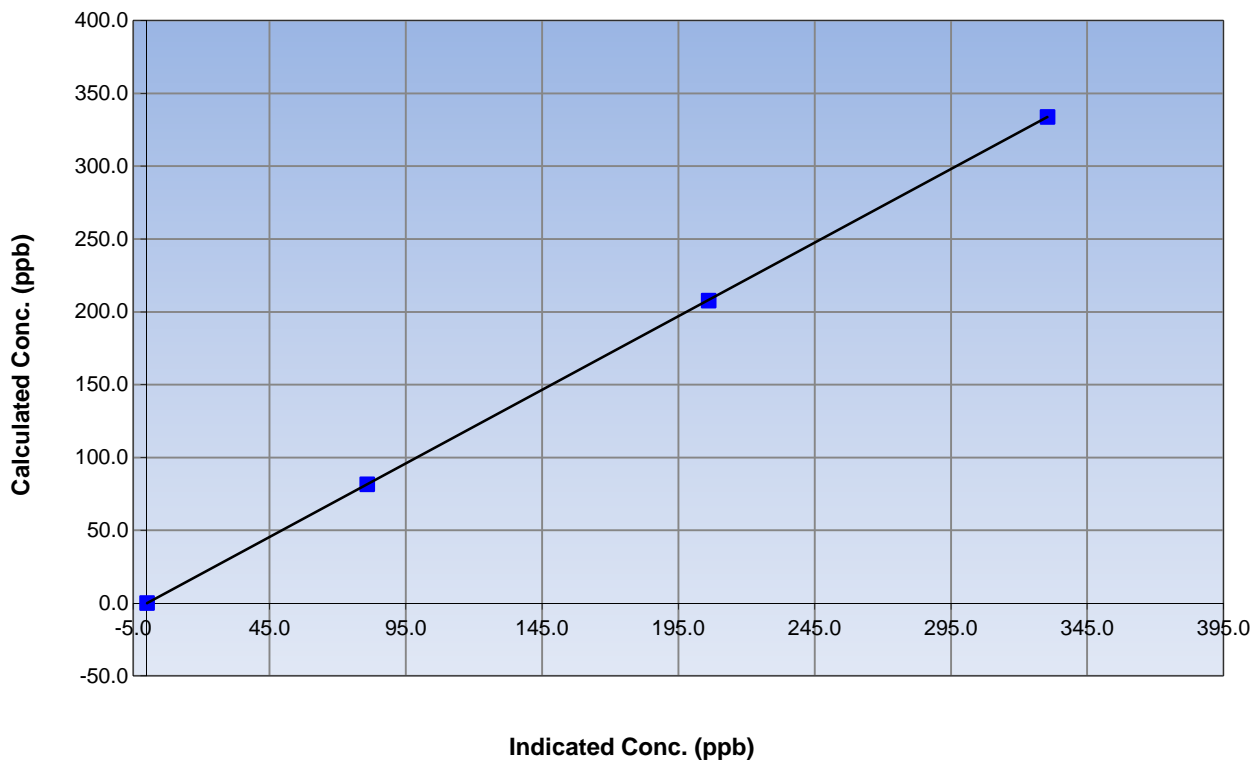
Station Information

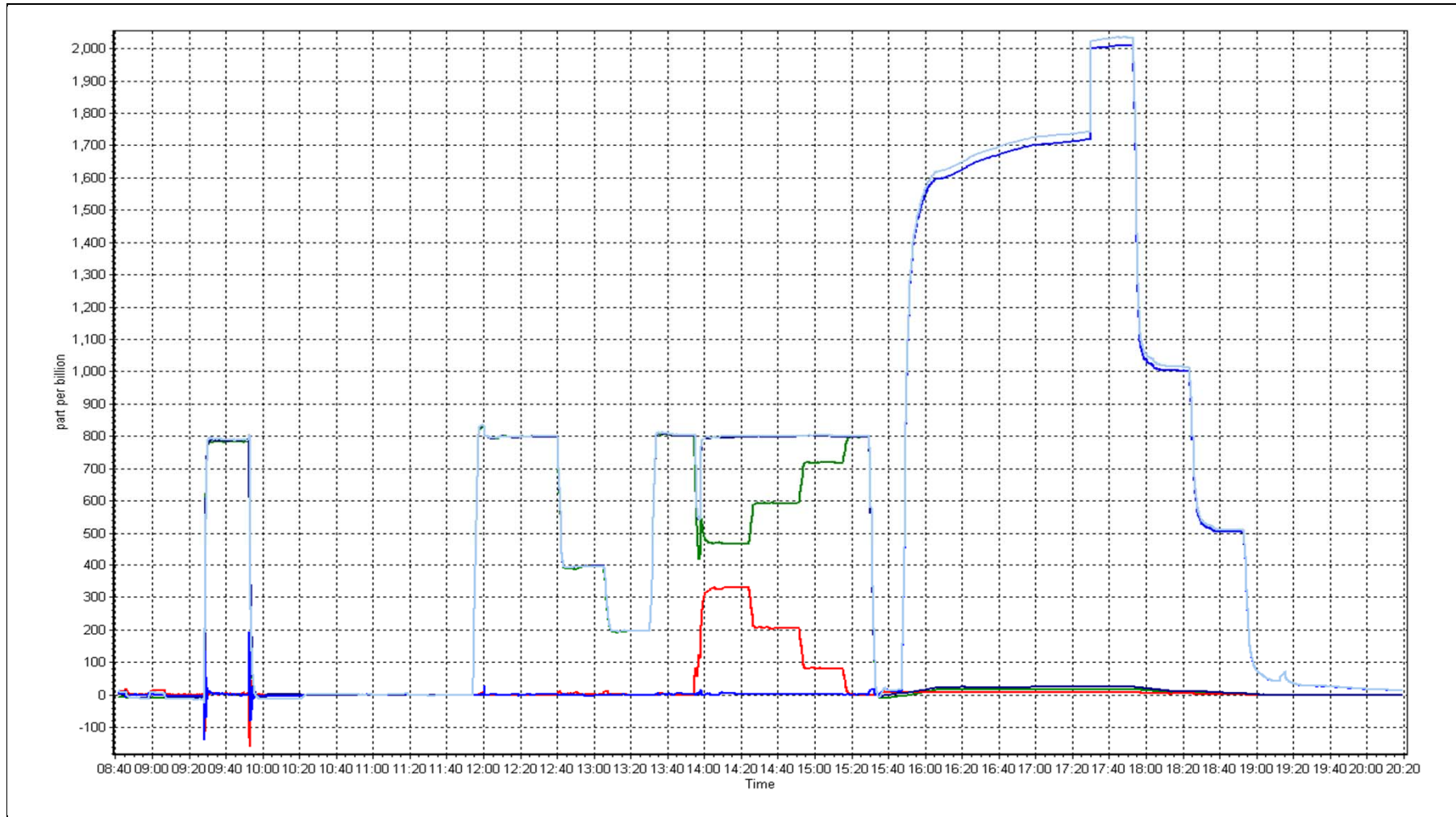
Calibration Date	March 12, 2015	Previous Calibration	
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:30	End Time (MST)	20:00
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999997
333.9	330.4	1.0105		
207.7	206.1	1.0075	Slope	1.010502
81.5	80.8	1.0088		
			Intercept	-0.228722

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 7
ATHABASCA VALLEY
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	702	36	42	99.19	19	0	6	0
TRS (ppb) Average	704	35	40	99.33	2	0	1	0
THC (ppm) Average	705	38	39	99.87	2.6	-	2	-
NMHC (ppm) Average	705	38	39	99.87	0.386	-	0.066	-
CH4(ppm) Average	705	38	39	99.87	2.3	-	2	-
O3 (ppb) Average	704	34	40	99.19	46	0	35	-
NO2 (ppb) Average	703	36	41	99.33	48	0	26	-
NO (ppb) Average	703	36	41	99.33	117	-	20	-
NOX (ppb) Average	703	36	41	99.33	164	-	46	-
PM2.5 (ug/m3) Average	741	0	3	99.60	30	-	13.3	0
CO(ppm) Average	704	34	40	99.19	0.6	0	0.2	-
Temperature 2 m (C) Average	744	0	0	100.00	16.7	-	7.6	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.5	-	29.4	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	88	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	36	-	25	-
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)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	702	1.3	2	-	0	0	1	1	1	3	19
TRS (ppb) Average	704	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	705	1.91	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.6
NMHC (ppm) Average	705	0.013	0.042	-	0	0	0	0	0	0	0.386
CH4(ppm) Average	705	1.9	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.3
O3 (ppb) Average	704	22.4	11	-	1	7	13	24	31	36	46
NO2 (ppb) Average	703	10.3	8	-	0	2	4	8	14	22	48
NO (ppb) Average	703	3.9	8	-	0	0	0	2	5	9	117
NOX (ppb) Average	703	14.2	15	-	0	2	5	10	18	30	164
PM2.5 (ug/m3) Average	741	5.55	3.5	-	0.3	2.5	3.4	4.8	6.7	9.2	30
CO(ppm) Average	704	0.11	0.1	-	0	0.1	0.1	0.1	0.1	0.2	0.6
Temperature 2 m (C) Average	744	-3.3	8.4	-	-31.2	-14.9	-8.2	-2.9	2.6	6.8	16.7
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	66.4	18	-	27	41	54	69	80	88	99
Wind Speed 10 m (km/h) Average	744	8.3	6	-	0	2	3	7	11	16	36
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	04 Mar 2015 12:00	04 Mar 2015 12:00	1	Maintenance - ATCO replaced smart meter
SO2	06 Mar 2015 10:00	06 Mar 2015 14:00	5	Maintenance - replaced station sample manifold
TRS	06 Mar 2015 10:00	06 Mar 2015 14:00	5	Maintenance - replaced station sample manifold
NMHC, CH4, THC	04 Mar 2015 12:00	04 Mar 2015 12:00	1	Maintenance - ATCO replaced smart meter
O3	04 Mar 2015 12:00	04 Mar 2015 12:00	1	Maintenance - ATCO replaced smart meter
O3	06 Mar 2015 10:00	06 Mar 2015 14:00	5	Maintenance - replaced station sample manifold
NO2, NO, NOX	06 Mar 2015 10:00	06 Mar 2015 14:00	5	Maintenance - replaced station sample manifold
PM2.5	04 Mar 2015 12:00	04 Mar 2015 12:00	1	Maintenance - ATCO replaced smart meter
PM2.5	23 Mar 2015 12:00	23 Mar 2015 13:00	2	Maintenance - Flow and zero check, sample head cleaning
CO	06 Mar 2015 10:00	06 Mar 2015 14:00	5	Maintenance - replaced station sample manifold
CO	11 Mar 2015 14:00	11 Mar 2015 14:00	1	Maintenance - confirm analyzer response

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 19 ppb on Mar 16 19:00	Maximum Daily Average: 6.3 ppb on Mar 11		Hours of Data:	702
Minimum Value: 0 ppb on Mar 28 01:00	Minimum Daily Average: 0.5 ppb on Mar 28		Hours of Missing Data:	42
Maximum Diurnal Average: 2.5 ppb at hour 17	Minimum Diurnal Average: 0.8 ppb at hour 8		Hours of Calibration:	36
Monthly Average: 1.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 11		Percent Operational Time:	99.2

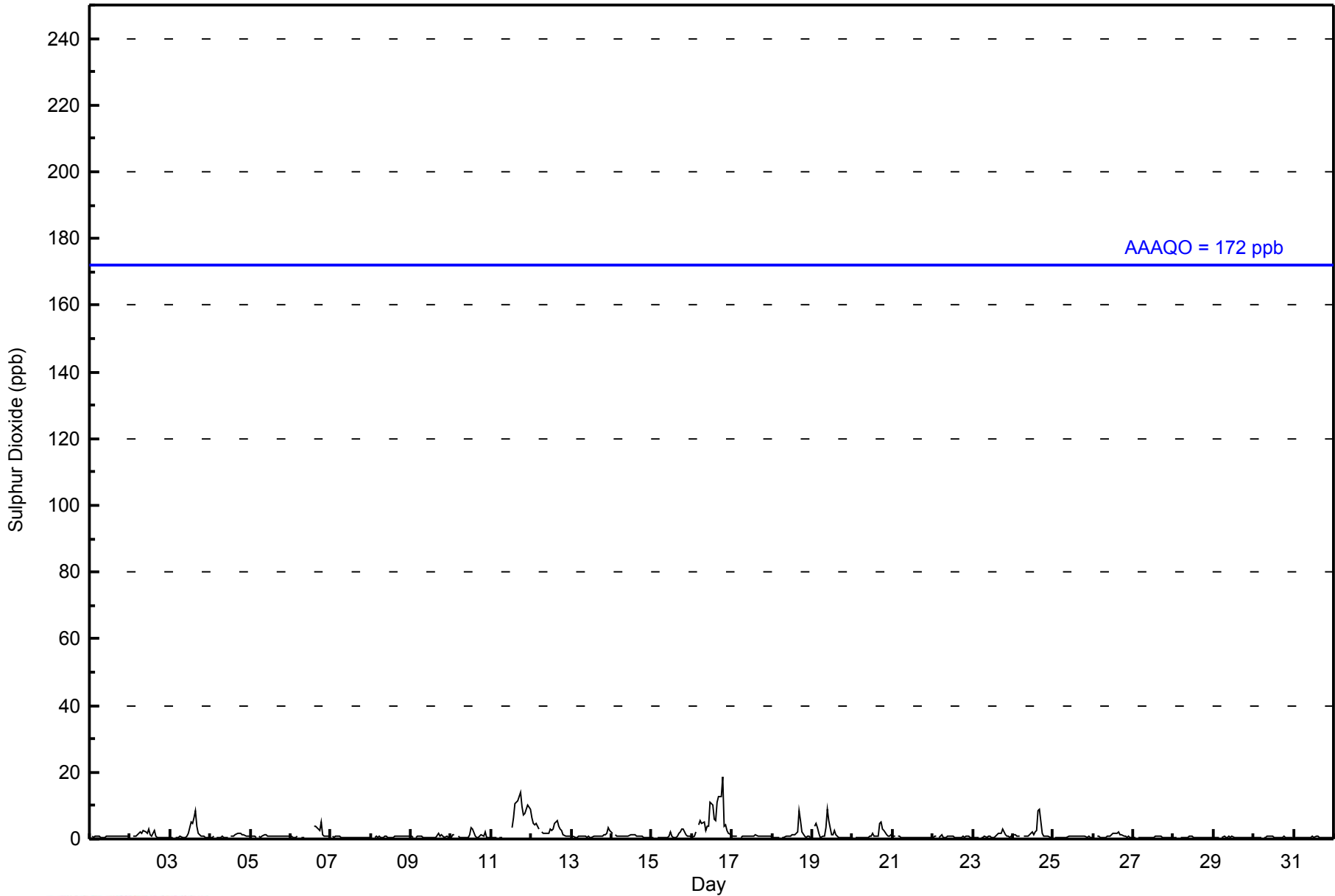
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
2-Mar	1	Z	1	1	1	2	2	2	2	2	2	3	1	1	3	1	1	1	0	1	0	0	0	0	1.2	3
3-Mar	0	0	Z	0	1	0	1	1	1	0	1	2	5	5	6	8	4	2	1	1	1	1	0	0	1.8	8
4-Mar	1	1	1	Z	1	1	1	1	0	1	1	M	1	1	1	1	2	2	1	1	1	1	1	1	0.9	2
5-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
6-Mar	1	0	0	0	1	Z	0	1	1	M	M	M	M	M	4	4	3	3	5	1	1	1	1	1	1.5	5
7-Mar	Z	1	1	1	1	1	1	0	0	1	1	0	1	0	1	1	0	0	0	1	1	0	0	0	0.5	1
8-Mar	1	Z	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
9-Mar	1	1	Z	1	1	1	1	0	0	0	0	0	1	1	1	1	2	1	1	1	1	1	1	0	0.7	2
10-Mar	1	1	1	Z	1	1	0	0	0	0	0	1	3	3	1	1	1	1	1	1	2	1	0	0	1.0	3
11-Mar	0	0	0	0	Z	0	1	C	C	C	C	C	4	6	10	11	11	14	10	7	8	9	10	9	6.3	14
12-Mar	7	5	4	4	3	Z	2	2	2	2	2	3	3	3	5	5	4	3	2	1	1	1	1	1	2.8	7
13-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	2	1.0	4
14-Mar	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	2
15-Mar	0	1	Z	1	1	0	0	0	0	1	2	1	0	1	1	2	2	3	3	1	1	1	1	1	1.0	3
16-Mar	1	1	2	Z	4	5	5	5	3	4	4	11	10	6	5	11	13	13	19	4	4	2	2	1	5.8	19
17-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
18-Mar	0	0	1	0	1	Z	0	1	1	1	1	1	1	1	2	2	8	5	2	1	1	1	1	1	1.4	8
19-Mar	Z	4	5	4	2	1	1	1	3	9	5	1	1	3	1	1	0	0	1	0	0	0	0	0	1.9	9
20-Mar	0	Z	0	0	0	0	0	0	0	1	1	1	2	1	1	1	5	5	3	3	1	1	1	1	1.3	5
21-Mar	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	0.6	1
22-Mar	1	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
23-Mar	1	1	0	1	Z	1	1	1	1	1	1	0	1	1	1	1	2	3	1	1	1	1	1	1	0.9	3
24-Mar	1	1	1	1	1	Z	1	1	1	1	1	2	1	2	2	8	9	2	1	1	1	1	1	1	1.8	9
25-Mar	Z	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
26-Mar	0	Z	1	1	1	0	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1.0	2
27-Mar	1	1	Z	0	1	1	1	0	1	1	0	1	1	1	1	1	1	1	0	0	1	0	1	1	0.6	1
28-Mar	0	0	0	Z	0	0	1	1	0	1	1	1	1	1	0	0	0	1	0	0	0	0	1	0	0.5	1
29-Mar	0	0	0	0	Z	1	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0.5	1
30-Mar	0	0	0	0	0	Z	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	0.6	1
31-Mar	Z	1	0	1	0	0	1	0	0	0	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0.5	1
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	694	98.86	98.86
11 - 20	8	1.14	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: 702

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 2015

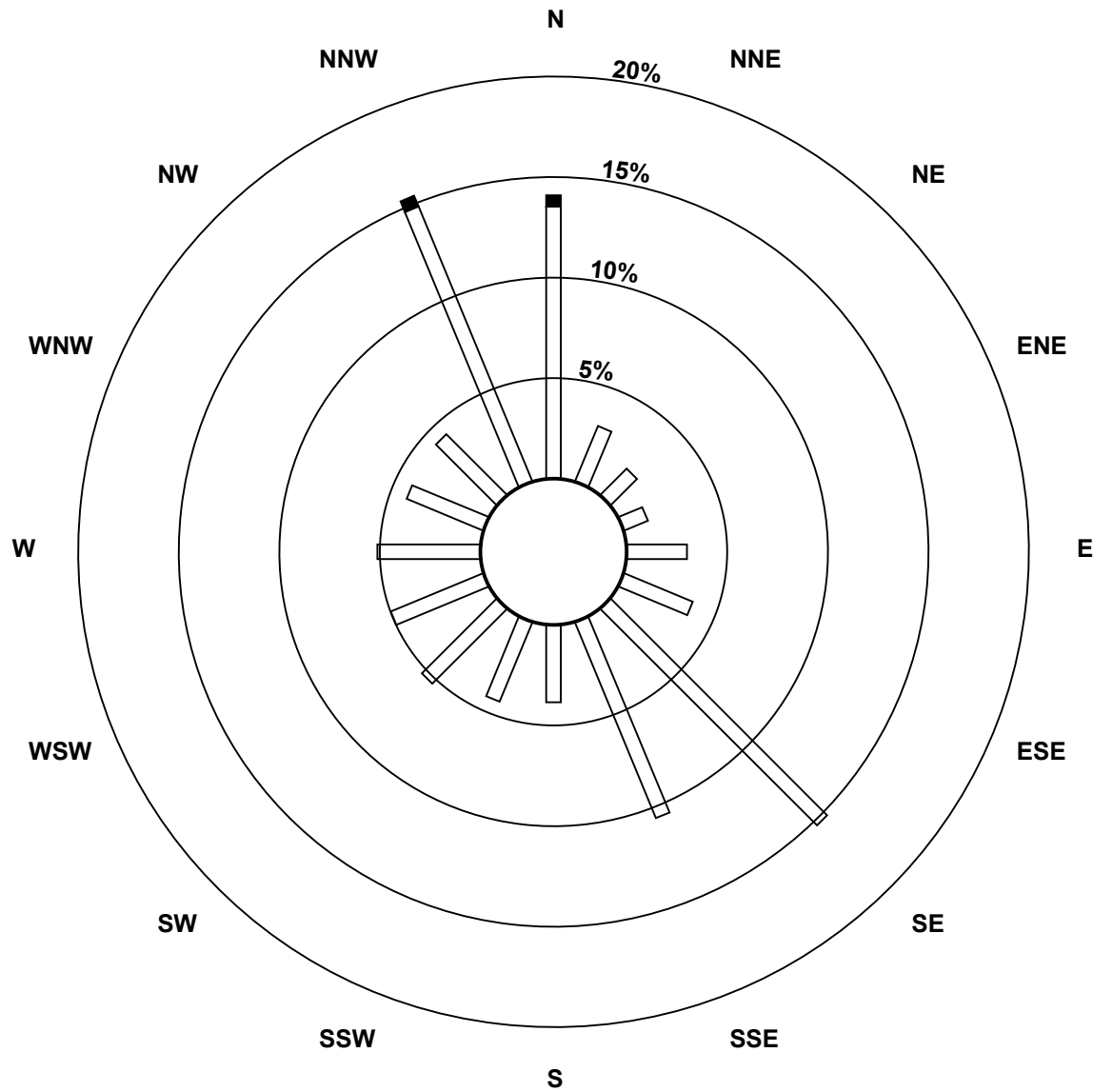
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	95	21	13	9	21	26	107	74	27	30	37	35	36	29	30	104	694
11 - 20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	99	21	13	9	21	26	107	74	27	30	37	35	36	29	30	108	702

Total Number of Valid Hours: 702

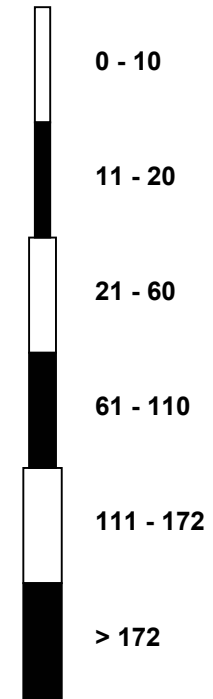
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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



Classes (ppb)

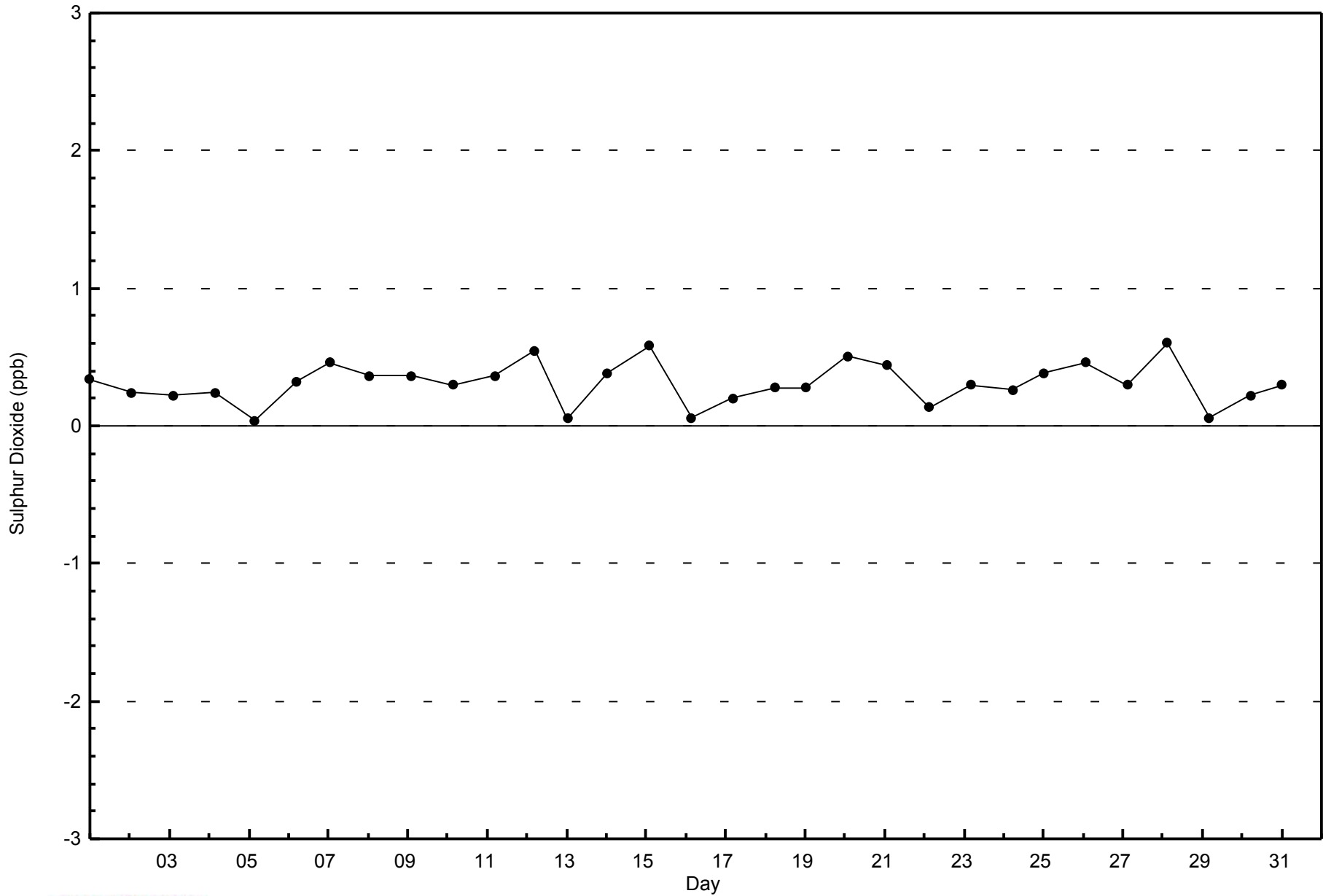


Total Number of Valid Hours: 702



WBEA
Zero Responses

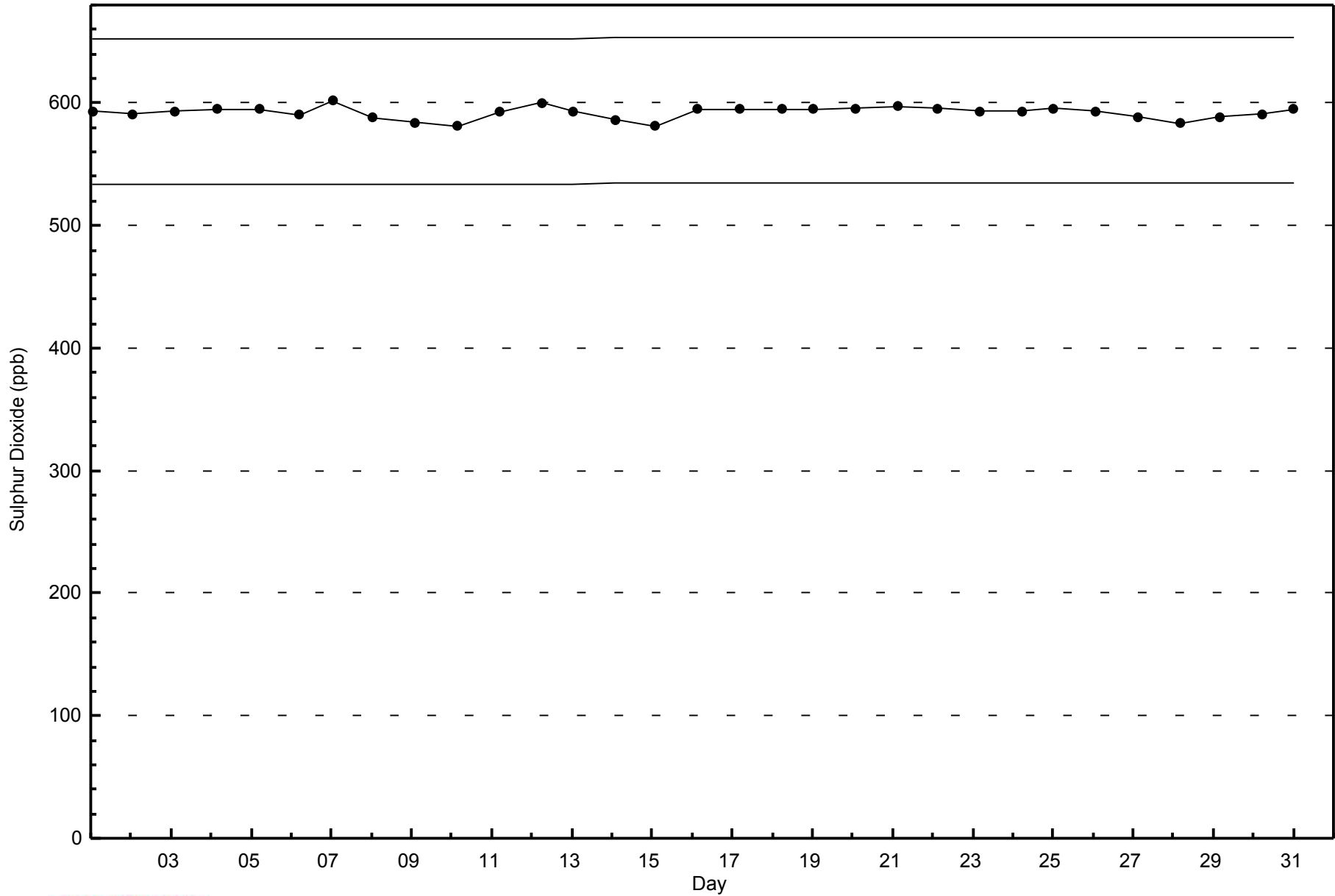
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 2015



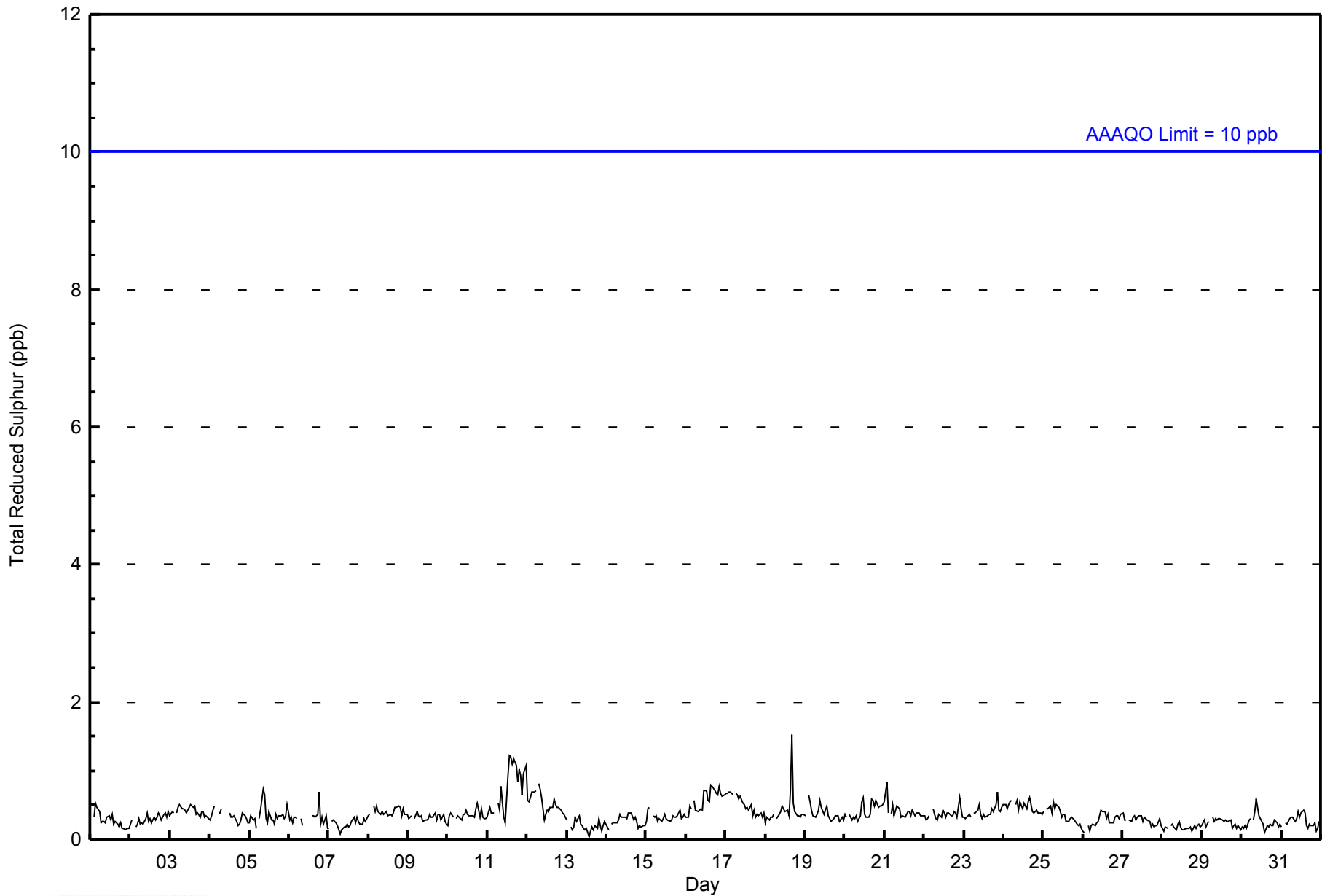


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744																																	
Maximum Value: 2 ppb on Mar 18 17:00																	Maximum Daily Average: 0.7 ppb on Mar 11																																	
Minimum Value: 0 ppb on Mar 13 14:00																	Minimum Daily Average: 0.2 ppb on Mar 28																																	
Maximum Diurnal Average: 0.4 ppb at hour 17																	Minimum Diurnal Average: 0.3 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 =1																																	
																	Hours of Data: 704																																	
																	Hours of Missing Data: 40																																	
																	Hours of Calibration: 35																																	
																	Percent Operational Time: 99.3																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	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	0.3	1																							
2-Mar	0	0	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																							
3-Mar	0	0	0	Z	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
4-Mar	0	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
5-Mar	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1																							
6-Mar	0	0	0	0	0	0	Z	0	0	M	M	M	M	M	0	0	0	0	1	0	0	0	0	0	0.3	1																								
7-Mar	0	Z	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-Mar	0	0	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																							
9-Mar	0	0	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																							
10-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1																							
11-Mar	0	0	0	0	0	Z	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
12-Mar	1	1	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.5	1																							
13-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
14-Mar	0	0	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																							
15-Mar	0	0	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-Mar	0	0	0	0	Z	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																							
17-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0.5	1																							
18-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0.4	2																							
19-Mar	0	Z	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
20-Mar	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	1	0	0	0	1	0	0.4	1																							
21-Mar	1	1	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1																							
23-Mar	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1																							
24-Mar	1	1	0	1	1	1	Z	1	1	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0.5	1																							
25-Mar	0	Z	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
26-Mar	0	0	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-Mar	0	0	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																							
28-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
29-Mar	0	0	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-Mar	0	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																							
31-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
																								0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	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	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																																																		



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	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: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - March 2015

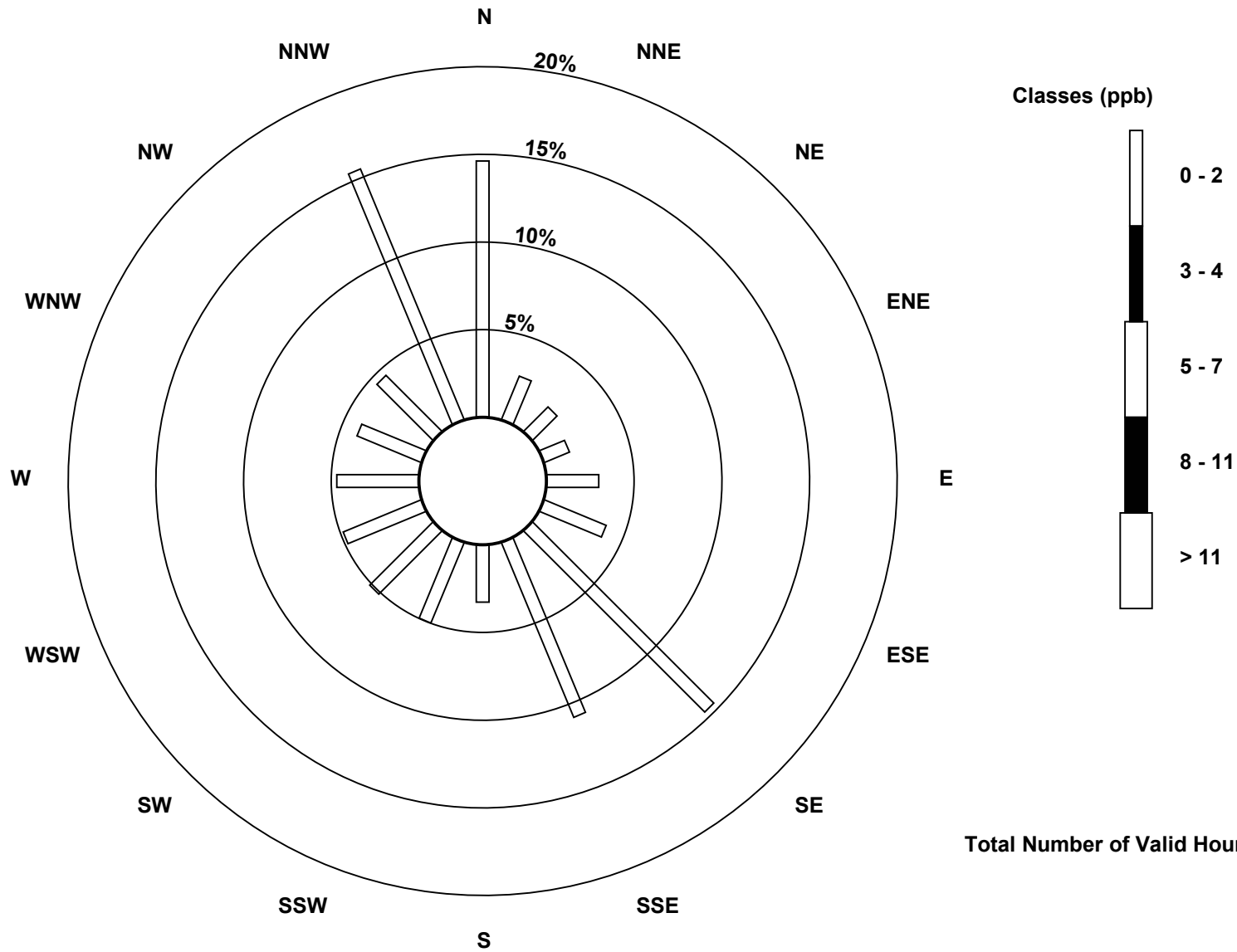
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	103	19	14	11	21	27	103	76	23	35	36	34	33	28	32	109	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	19	14	11	21	27	103	76	23	35	36	34	33	28	32	109	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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

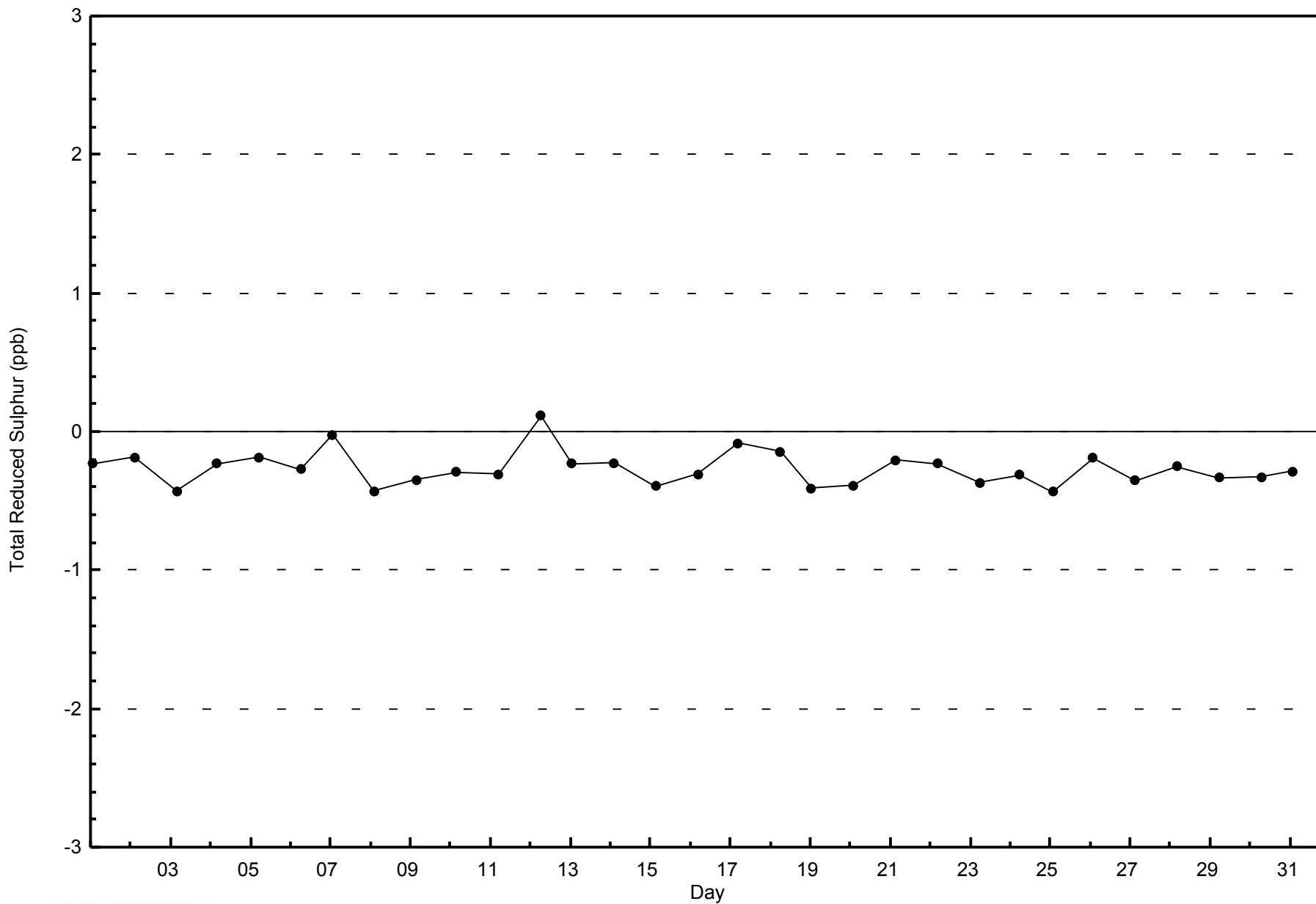


Total Number of Valid Hours: 704



WBEA
Zero Responses

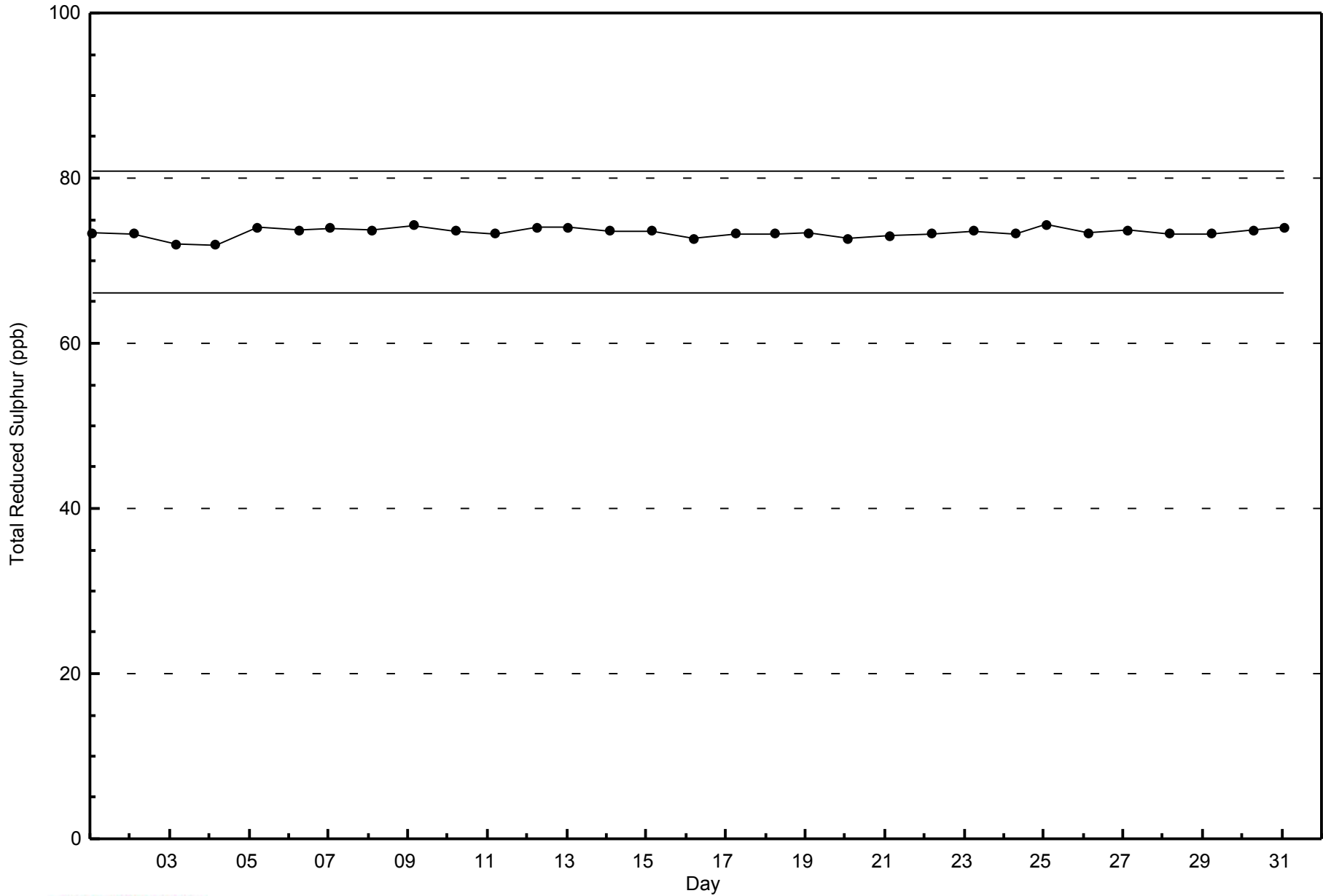
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - March 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - March 2015



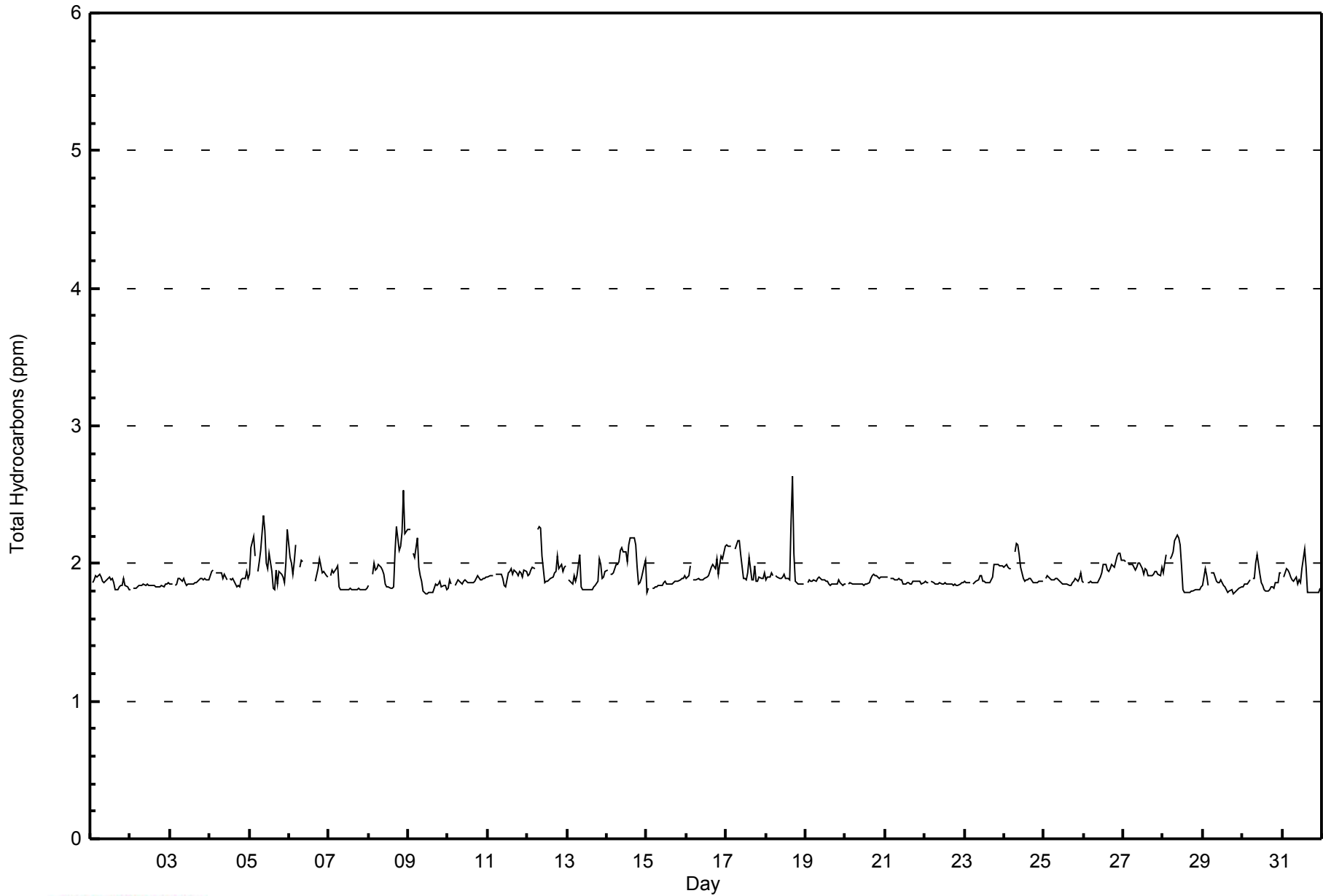


Maximum Value: 2.6 ppm on Mar 18 17:00		Maximum Daily Average: 2.0 ppm on Mar 14		Hours in Service: 744																										
Minimum Value: 1.8 ppm on Mar 9 12:00		Minimum Daily Average: 1.8 ppm on Mar 2		Hours of Data: 705																										
Maximum Diurnal Average: 2.0 ppm at hour 9		Minimum Diurnal Average: 1.9 ppm at hour 13		Hours of Missing Data: 39																										
Monthly Average: 1.91 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.9 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.3		Hours of Calibration: 38																										
				Percent Operational Time: 99.9																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24						
1-Mar	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	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.9	1.9				
2-Mar	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9			
3-Mar	1.8	1.8	Z	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9			
4-Mar	1.9	1.9	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	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	1.9	2.0			
5-Mar	1.9	2.1	2.2	2.0	Z	1.9	2.0	2.1	2.3	2.2	2.0	2.0	2.1	1.9	1.8	1.8	2.0	1.8	1.9	1.9	1.9	2.0	2.2	2.0	2.0	2.3	2.3			
6-Mar	2.0	2.0	1.9	2.0	2.1	Z	2.0	2.0	2.0	C	C	C	C	C	C	C	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	--	2.1		
7-Mar	Z	1.9	2.0	1.9	2.0	2.0	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	1.8	2.0	2.0
8-Mar	1.8	Z	1.9	2.0	1.9	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	2.1	2.3	2.1	2.1	2.2	2.5	2.2	2.2	2.0	2.0	2.0	2.5	2.5	
9-Mar	2.2	2.3	Z	2.1	2.0	2.2	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.3	2.3	
10-Mar	1.8	1.9	1.8	Z	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
11-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	2.0	1.9	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
12-Mar	1.9	1.9	2.0	2.0	2.0	Z	2.2	2.3	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.3	2.3
13-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.1	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	1.9	1.9	1.9	1.9	2.1	2.1	
14-Mar	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.1	2.0	1.8	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.2	2.2	
15-Mar	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
16-Mar	1.9	1.9	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.0	2.1	1.9	1.9	2.1	2.1	
17-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.1	1.9	1.9	1.9	1.9	2.0	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	2.2
18-Mar	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	2.3	2.6	2.1	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.6	2.6	
19-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	
20-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
22-Mar	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
23-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0
24-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.1	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	1.9	1.9	1.9	1.9	1.9	2.1
25-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
26-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	2.1	2.1	
27-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
28-Mar	1.9	2.0	2.1	Z	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.2
29-Mar	1.8	2.0	1.9	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0
30-Mar	1.8	1.9	1.8	1.8	1.9	Z	1.9	1.9	2.0	2.1	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1
31-Mar	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	2.0	2.1	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1
																								Diurnal Average						
																								Diurnal Maximum						
Z - zerospan C - Calibration M - Maintenance																														



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	640	90.78	90.78
2.1 - 3.0	65	9.22	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2015

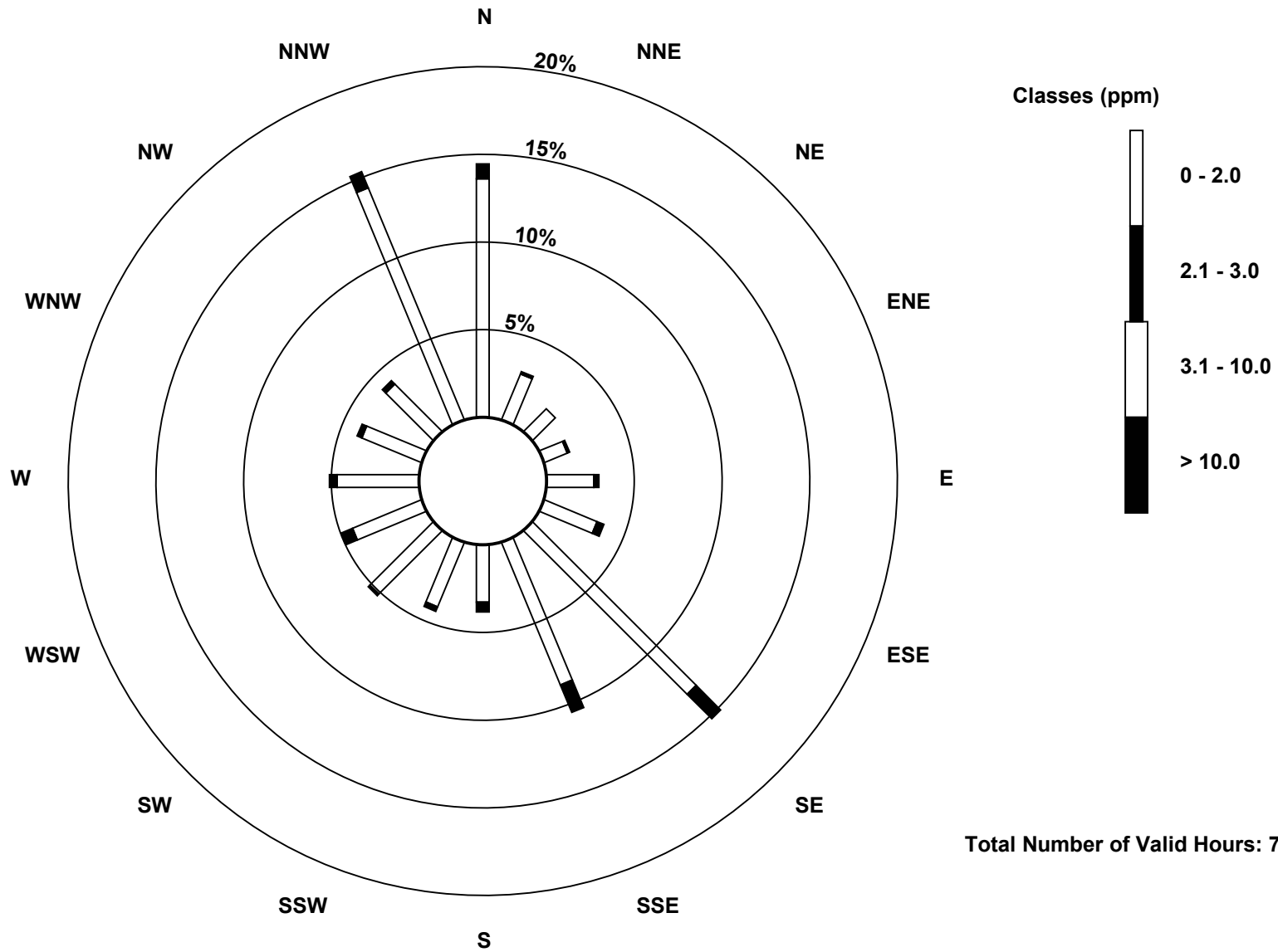
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	96	20	13	10	19	23	93	62	23	28	36	30	33	26	27	101	640
2.1 - 3.0	6	1	0	1	2	3	14	12	4	2	1	5	3	2	2	7	65
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	21	13	11	21	26	107	74	27	30	37	35	36	28	29	108	705

Total Number of Valid Hours: 705

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

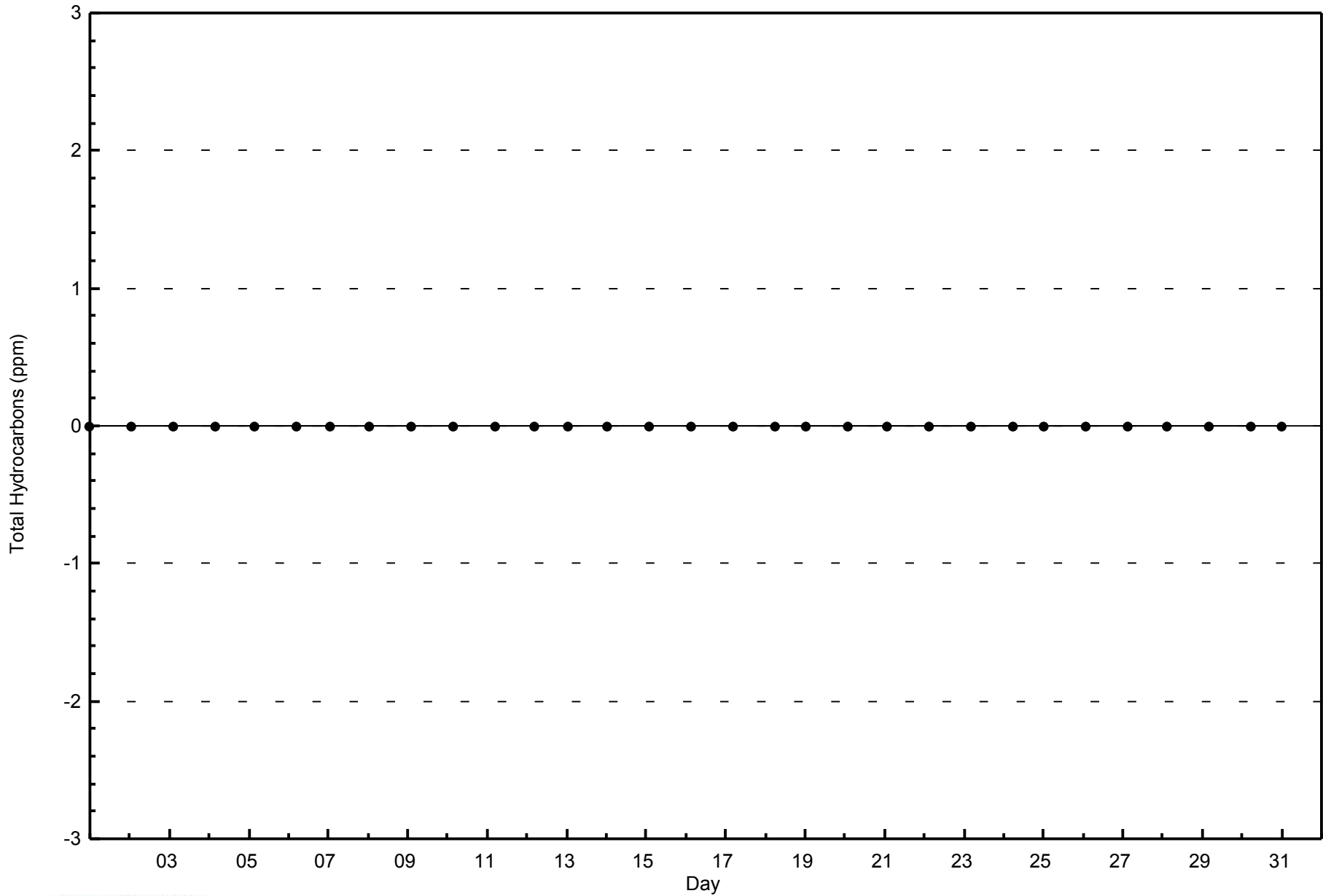
**Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)**





WBEA
Zero Responses

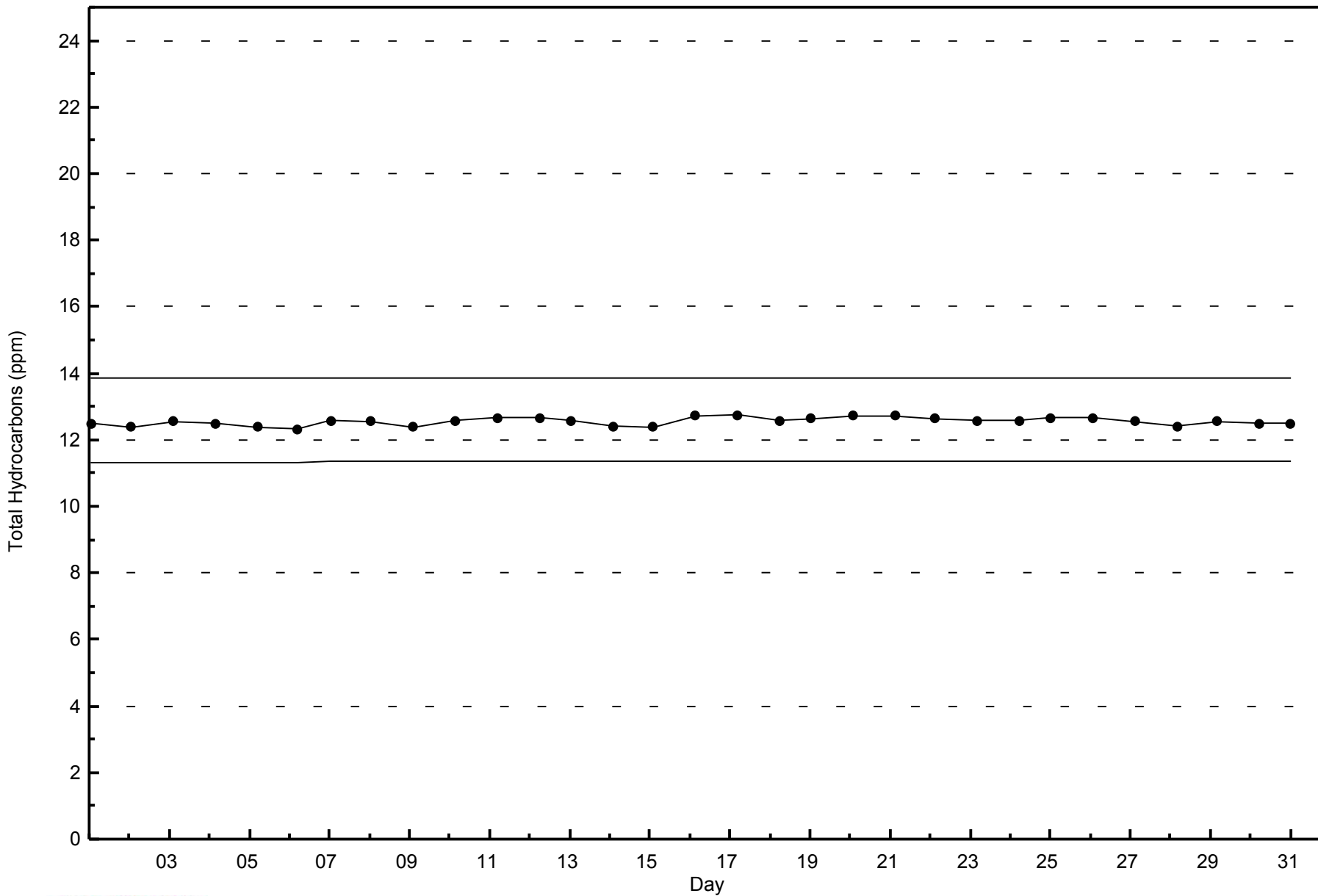
Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2015



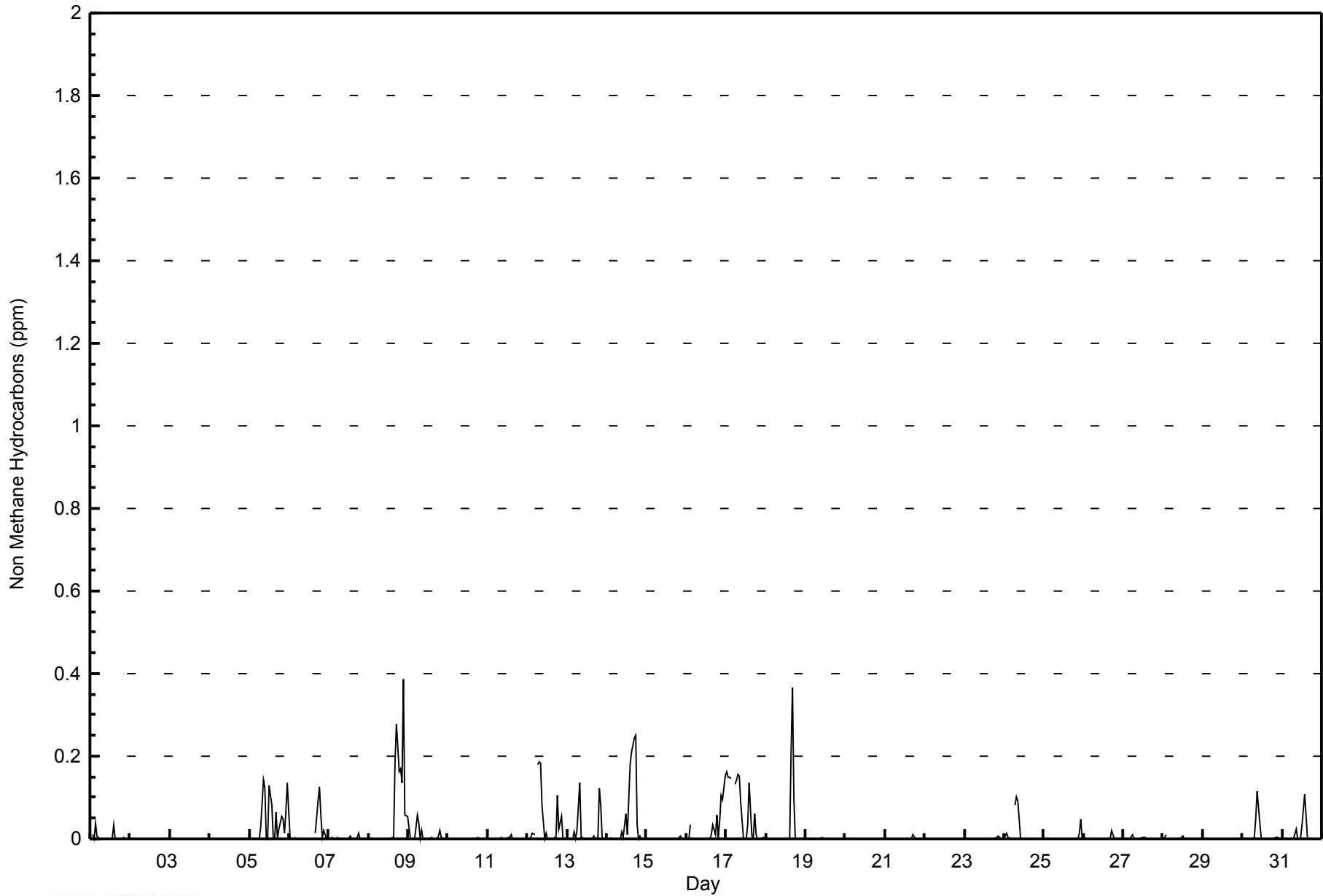


Maximum Value: 0.386 ppm on Mar 8 22:00		Maximum Daily Average: 0.066 ppm on Mar 17		Hours in Service: 744																							
Minimum Value: 0.000 ppm on Mar 1 07:00		Minimum Daily Average: 0.000 ppm on Mar 22		Hours of Data: 705																							
Maximum Diurnal Average: 0.030 ppm at hour 17		Minimum Diurnal Average: 0.002 ppm at hour 5		Hours of Missing Data: 39																							
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 = 0.2		Hours of Calibration: 38																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	0.010	0.000	0.036	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.034	0.000	0.000	0.000	0.001	0.000	0.002	0.000	0.000	0.000	0.004	0.036	
2-Mar	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-Mar	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	0.001	0.000	0.001	0.000	0.000	0.000	0.001	
4-Mar	0.000	0.000	0.000	Z	0.000	0.001	0.002	0.000	0.000	0.000	0.001	M	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.001	0.001	0.001	0.000	0.002	
5-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.027	0.141	0.121	0.004	0.002	0.129	0.080	0.000	0.000	0.064	0.000	0.025	0.053	0.046	0.014	0.064	0.134	0.039	0.141	
6-Mar	0.002	0.000	0.000	0.001	0.002	Z	0.000	0.000	0.000	C	C	C	C	C	C	C	0.013	0.093	0.124	0.057	0.004	0.020	0.001	0.000	--	0.124	
7-Mar	Z	0.000	0.004	0.001	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.001	0.002	0.102	0.112	0.000	0.000	0.000	0.000	0.001	0.112	
8-Mar	0.000	Z	0.001	0.000	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.003	0.002	0.187	0.280	0.162	0.171	0.137	0.386	0.059	0.055	0.063	0.386	
9-Mar	0.027	0.002	Z	0.000	0.000	0.057	0.039	0.000	0.021	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.006	0.020	0.002	0.001	0.000	0.000	0.008	0.057	
10-Mar	0.000	0.001	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	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.002	
11-Mar	0.000	0.001	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.003	0.003	0.009	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.009	
12-Mar	0.000	0.000	0.005	0.013	0.011	Z	0.180	0.187	0.184	0.083	0.000	0.013	0.000	0.000	0.000	0.000	0.002	0.000	0.104	0.025	0.055	0.001	0.000	0.001	0.038	0.187	
13-Mar	Z	0.000	0.000	0.000	0.017	0.000	0.019	0.135	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.003	0.121	0.080	0.003	0.000	0.000	0.017	0.135	
14-Mar	0.000	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.017	0.003	0.062	0.011	0.096	0.179	0.209	0.243	0.250	0.032	0.000	0.005	0.000	0.001	0.000	0.048	0.250	
15-Mar	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	0.001	0.007	0.000	0.000	0.000	0.000	0.007	
16-Mar	0.000	0.000	0.033	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.012	0.035	0.010	0.057	0.003	0.044	0.105	0.095	0.153	0.024	0.153		
17-Mar	0.161	0.148	0.150	0.146	Z	0.131	0.142	0.154	0.153	0.089	0.000	0.000	0.000	0.034	0.135	0.005	0.002	0.062	0.010	0.000	0.001	0.000	0.004	0.000	0.066	0.161	
18-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.210	0.368	0.097	0.000	0.000	0.000	0.000	0.000	0.029	0.368		
19-Mar	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
20-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.002	
21-Mar	0.000	0.000	Z	0.001	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	0.012	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.012	
22-Mar	0.000	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
23-Mar	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	0.005	0.008	0.002	0.000	0.001	0.001	0.008	
24-Mar	0.001	0.013	0.005	0.000	0.002	Z	0.080	0.103	0.092	0.048	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	0.015	0.103	
25-Mar	Z	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.014	0.049	0.000	0.003	0.049	0.049	
26-Mar	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	0.019	0.000	0.000	0.001	0.000	0.001	0.000	0.001	0.019	
27-Mar	0.000	0.000	Z	0.000	0.000	0.009	0.001	0.000	0.001	0.001	0.000	0.003	0.002	0.005	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.009	
28-Mar	0.000	0.003	0.011	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.005	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.011	
29-Mar	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
30-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.002	0.003	0.049	0.114	0.038	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.003	0.002	0.001	0.000	0.009	0.114	
31-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.030	0.109	0.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.109	
		0.008	0.007	0.008	0.008	0.002	0.008	0.015	0.020	0.022	0.016	0.002	0.003	0.006	0.011	0.014	0.015	0.030	0.027	0.017	0.015	0.013	0.018	0.009	0.011	Diurnal Average	
		0.161	0.148	0.150	0.146	0.017	0.131	0.180	0.187	0.184	0.121	0.038	0.062	0.129	0.109	0.179	0.210	0.368	0.280	0.162	0.171	0.137	0.386	0.095	0.153	Diurnal Maximum	
Z - zerospan		C - Calibration			M - Maintenance																						



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	598	84.82	84.82
0.006 - 0.05	51	7.23	92.06
0.06 - 0.1	37	5.25	97.30
> 0.1	19	2.70	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - March 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	88	19	12	10	19	22	88	57	22	25	36	29	28	25	26	92	598
0.006 - 0.05	6	1	1	1	2	1	8	5	4	4	0	3	5	1	0	9	51
0.06 - 0.1	6	0	0	0	0	2	9	8	0	0	1	1	2	2	3	3	37
> 0.1	2	1	0	0	0	1	2	4	1	1	0	2	1	0	0	4	19
Totals	102	21	13	11	21	26	107	74	27	30	37	35	36	28	29	108	705

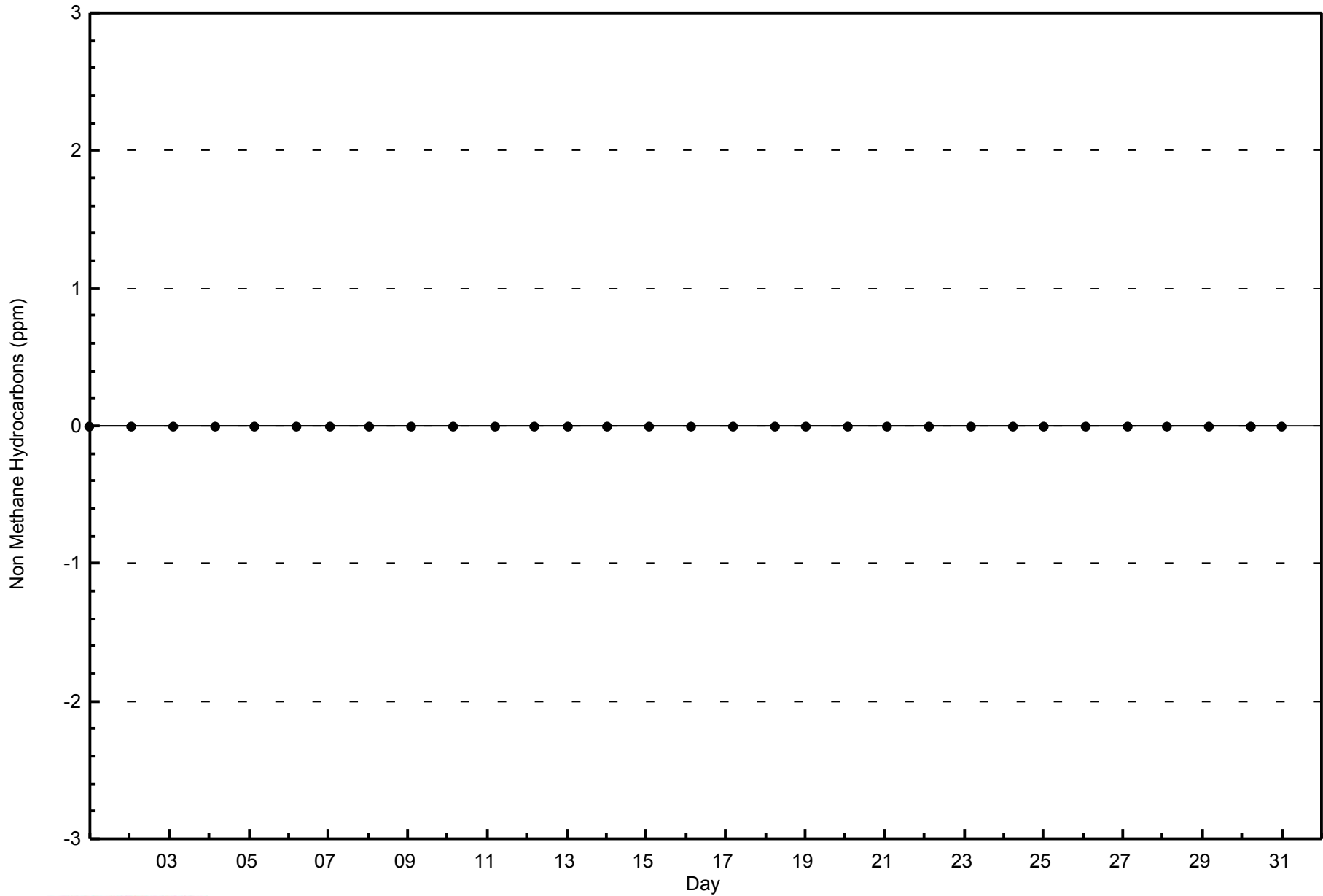
Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Zero Responses

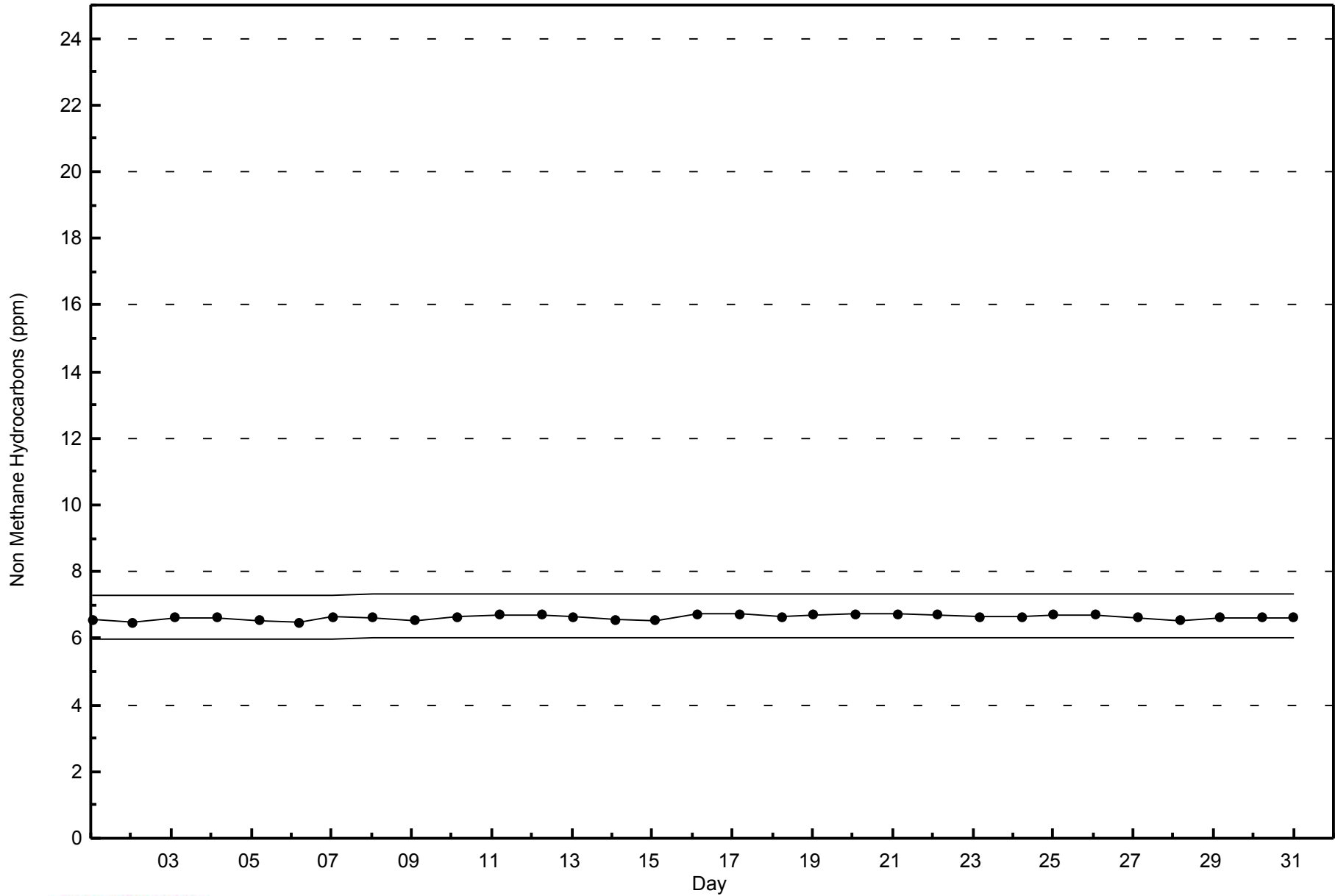
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - March 2015





WBEA
Span Responses

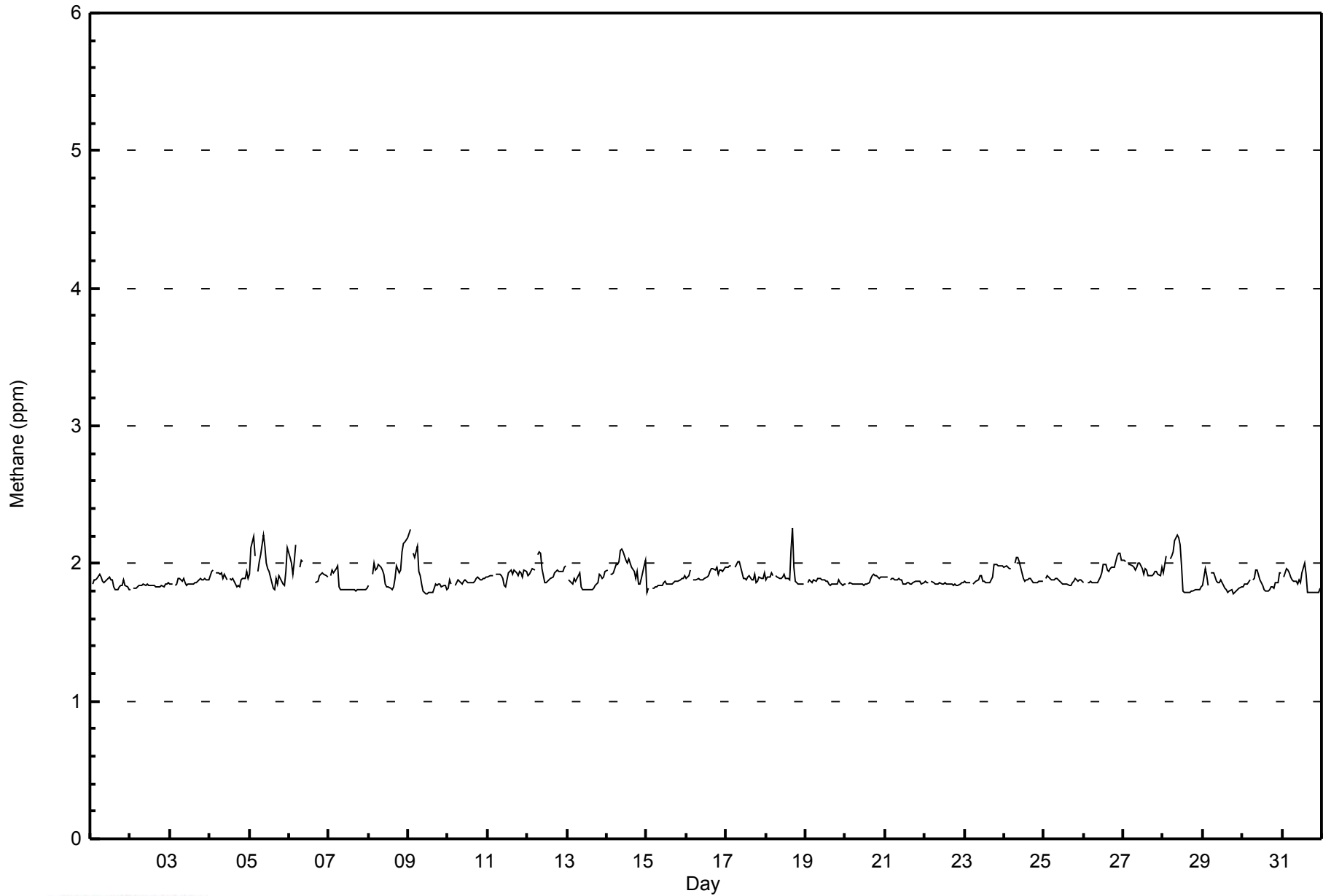
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - March 2015





WBEA
Hourly Averages

Methane (CH₄) - ppm
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	672	95.32	95.32
2.1 - 3.0	33	4.68	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - March 2015

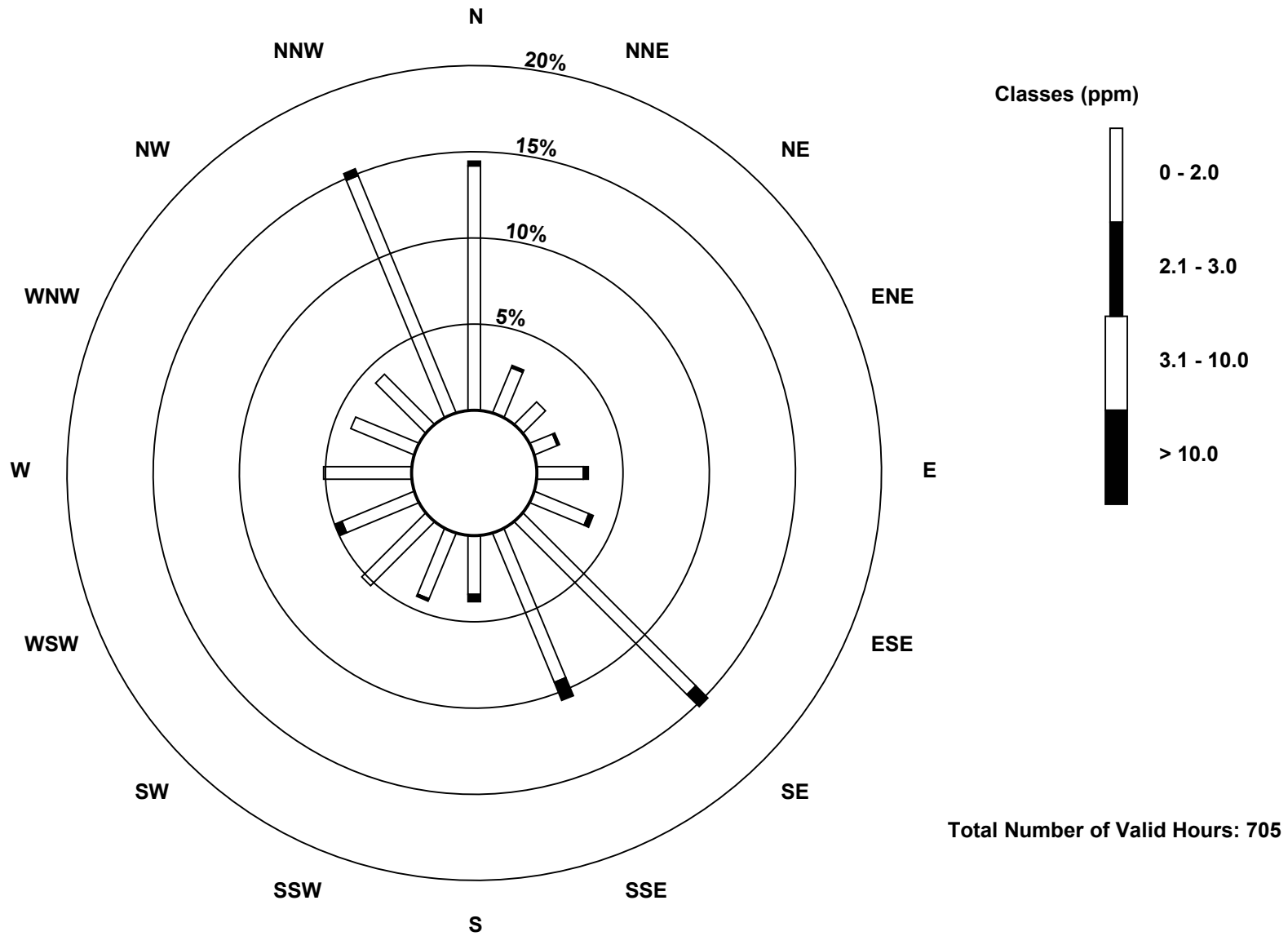
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	100	20	13	10	19	24	100	66	24	29	37	32	36	28	29	105	672
2.1 - 3.0	2	1	0	1	2	2	7	8	3	1	0	3	0	0	0	3	33
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	21	13	11	21	26	107	74	27	30	37	35	36	28	29	108	705

Total Number of Valid Hours: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

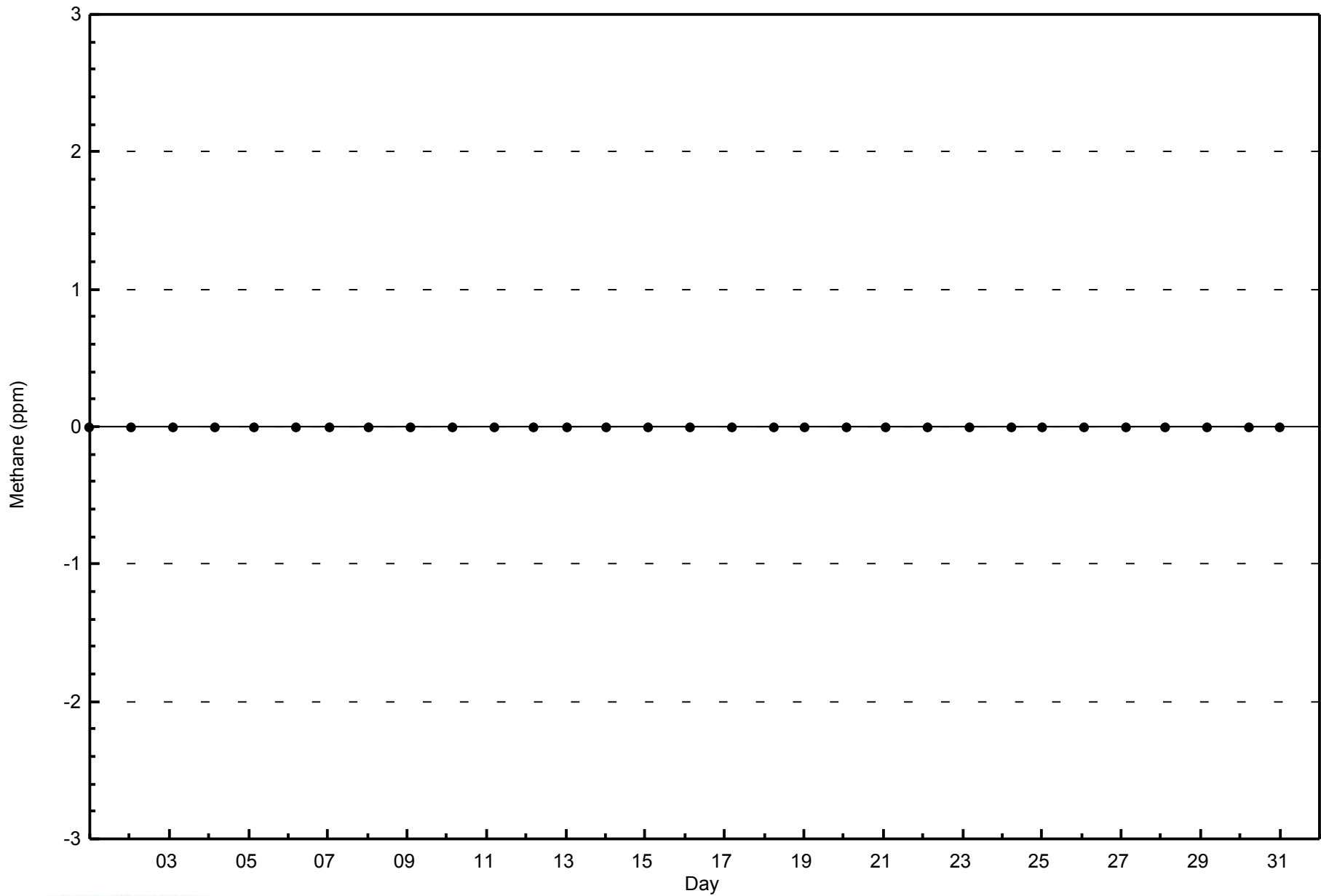
Methane (CH₄) - ppm
Athabasca Valley (AMS 7)





WBEA
Zero Responses

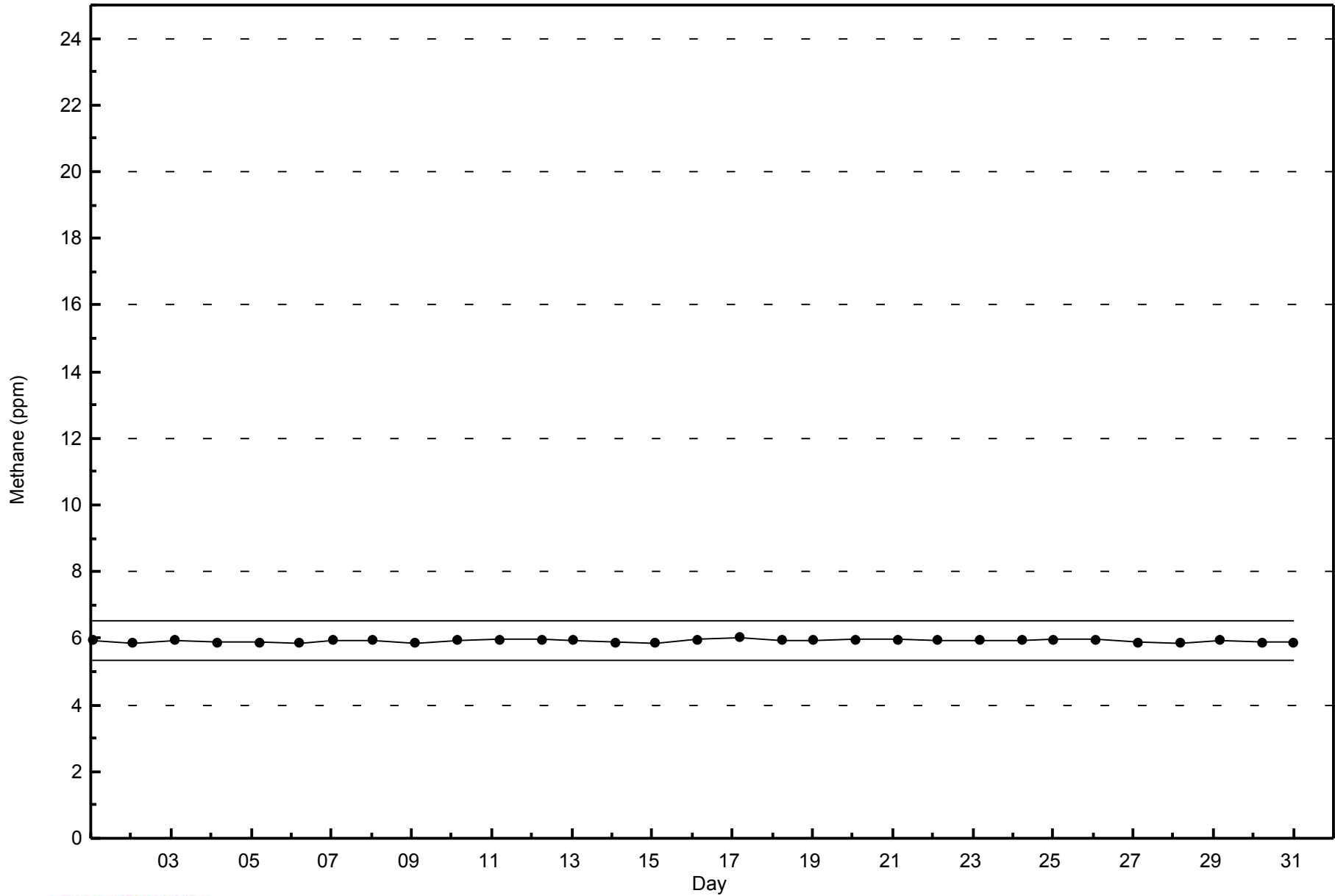
Methane (CH₄) - ppm
Athabasca Valley - March 2015





WBEA
Span Responses

Methane (CH₄) - ppm
Athabasca Valley - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 46 ppb on Mar 31 17:00	Maximum Daily Average: 35.0 ppb on Mar 19		Hours of Data:	704
Minimum Value: 1 ppb on Mar 6 00:00	Minimum Daily Average: 11.3 ppb on Mar 27		Hours of Missing Data:	40
Maximum Diurnal Average: 31.1 ppb at hour 16	Minimum Diurnal Average: 12.6 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 22.4 ppb	Percentiles: P ₁ = 2 P ₁₀ = 7 Q ₁ = 13 Median = 24 Q ₃ = 31 P ₉₀ = 36 P ₉₉ = 43		Percent Operational Time:	99.2

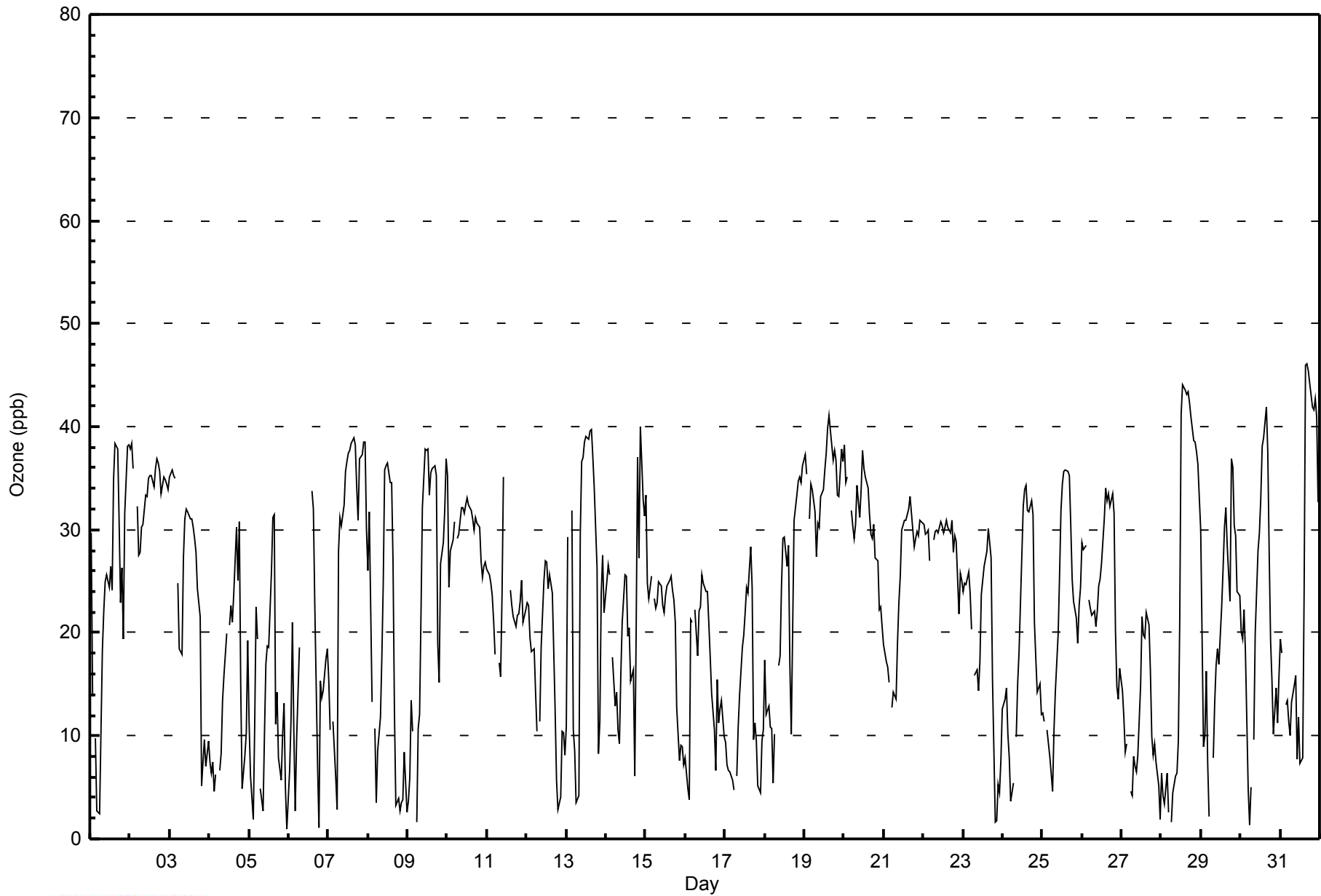
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	30	14	Z	10	3	2	10	18	22	25	26	24	26	24	35	38	38	31	23	26	19	32	38	38	24.1	38																							
2-Mar	38	38	36	Z	32	28	28	30	31	33	33	35	35	35	34	36	37	37	36	33	35	35	35	34	34.1	38																							
3-Mar	35	36	35	35	Z	25	18	18	27	31	32	32	31	31	30	29	28	24	21	5	7	10	7	9	24.3	36																							
4-Mar	8	6	8	5	6	Z	7	8	13	16	20	M	21	23	21	24	30	25	31	15	5	8	10	19	14.9	31																							
5-Mar	11	6	2	11	23	19	Z	5	3	10	17	19	19	26	31	31	11	14	8	6	10	13	5	1	13.1	31																							
6-Mar	7	12	21	11	3	10	19	Z	19	M	M	M	M	M	34	32	23	7	1	15	14	14	18	18	15.3	34																							
7-Mar	15	11	Z	11	6	3	28	31	30	32	36	37	37	38	38	39	38	34	31	37	37	39	39	30	29.5	39																							
8-Mar	26	32	13	Z	11	3	9	12	18	25	36	36	37	35	35	27	12	3	4	3	4	4	8	3	17.1	37																							
9-Mar	4	6	13	10	Z	2	11	12	22	32	38	38	38	33	36	36	36	35	19	15	27	29	32	37	24.3	38																							
10-Mar	35	24	28	29	31	Z	29	30	32	32	32	32	33	32	32	31	30	31	31	30	27	25	26	27	30.0	35																							
11-Mar	26	26	25	24	21	18	Z	17	16	24	35	C	C	C	24	23	22	21	22	22	23	25	21	22	22.7	35																							
12-Mar	23	23	20	18	18	14	10	Z	11	19	25	27	27	24	26	24	18	12	6	3	4	10	10	8	16.6	27																							
13-Mar	11	29	Z	32	11	8	4	4	30	37	37	39	39	39	40	40	37	34	26	8	11	24	28	22	25.6	40																							
14-Mar	25	27	26	Z	18	13	14	11	9	16	21	26	26	20	20	15	16	6	20	37	27	40	33	31	21.6	40																							
15-Mar	33	25	23	26	Z	23	22	23	25	25	23	22	24	25	25	25	24	23	21	13	8	9	9	7	21.0	33																							
16-Mar	8	5	4	21	21	Z	22	18	22	22	26	25	24	24	21	18	14	11	7	15	11	13	13	10	16.3	26																							
17-Mar	9	7	7	7	6	5	Z	6	11	14	19	20	22	24	24	28	24	10	11	10	5	4	9	11	12.7	28																							
18-Mar	17	12	13	11	11	5	10	Z	17	18	25	29	29	26	28	17	10	21	31	33	35	35	35	36	21.9	36																							
19-Mar	37	35	Z	31	34	34	32	27	31	30	33	34	36	37	40	41	40	37	38	37	33	33	38	37	35.0	41																							
20-Mar	38	35	35	Z	32	30	29	31	34	31	34	38	36	35	34	32	30	29	30	27	27	22	23	21	31.0	38																							
21-Mar	19	17	17	15	Z	13	14	14	19	23	25	30	31	31	31	32	33	32	28	29	30	29	31	31	25.0	33																							
22-Mar	30	30	30	30	27	Z	29	30	30	30	31	30	30	30	31	30	30	31	28	29	29	22	26	25	29.0	31																							
23-Mar	24	25	25	26	24	20	Z	16	16	14	17	24	25	26	28	30	29	27	15	2	2	5	5	8	18.8	30																							
24-Mar	13	14	15	10	8	4	5	Z	16	10	15	18	28	32	34	34	32	32	33	31	21	17	14	15	12	19.4	34																						
25-Mar	12	11	Z	11	8	6	5	11	14	20	26	32	34	36	36	36	35	31	25	23	21	19	23	24	21.7	36																							
26-Mar	29	28	28	Z	23	22	22	22	21	22	25	25	27	31	34	33	33	32	34	32	20	15	14	17	25.6	34																							
27-Mar	14	12	8	9	Z	5	4	8	7	6	8	15	22	20	20	22	21	16	10	8	9	8	5	2	11.3	22																							
28-Mar	6	4	3	6	3	Z	2	5	6	6	10	21	41	44	43	43	43	42	41	39	38	38	36	33	24.1	44																							
29-Mar	30	9	10	16	7	2	Z	8	13	17	18	17	23	26	30	32	28	23	37	36	30	29	24	24	21.3	37																							
30-Mar	20	19	22	18	5	1	5	Z	10	20	28	30	33	38	39	42	38	28	19	15	10	15	11	16	21.0	42																							
31-Mar	19	18	Z	13	13	11	10	13	15	16	8	12	7	8	24	46	46	45	44	42	42	43	41	33	24.7	46																							
																								21.1	19.2	18.7	17.1	15.5	12.6	15.3	16.4	18.9	22.0	25.3	27.7	29.1	29.5	30.9	31.1	28.6	25.3	23.5	21.5	20.0	21.3	21.5	20.8	Diurnal Average	
																								38	38	36	35	34	34	32	31	34	37	38	39	41	44	43	46	46	45	44	42	42	43	41	38	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	288	40.91	40.91
21 - 50	416	59.09	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - March 2015

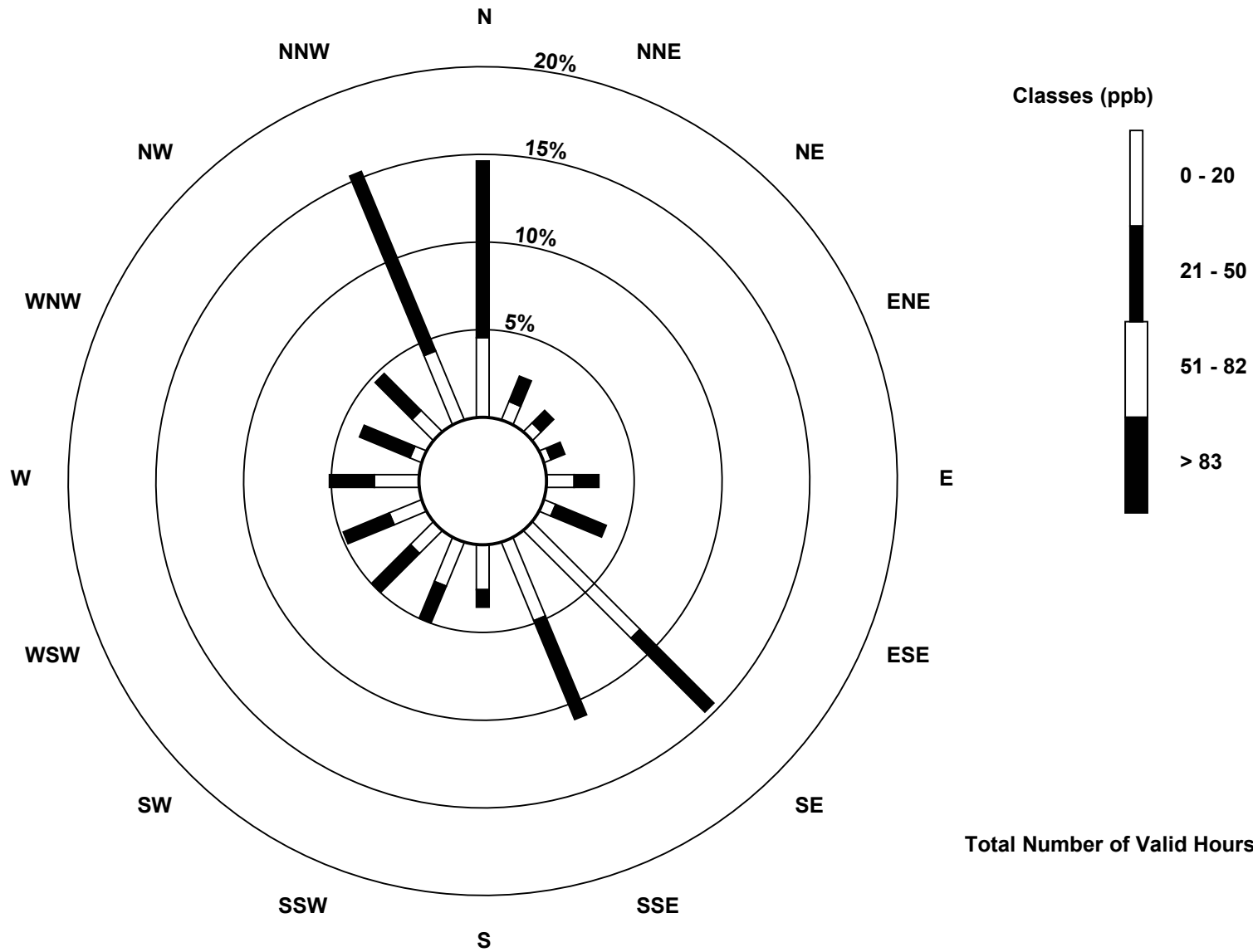
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	8	5	3	11	5	61	34	18	19	13	14	18	5	12	30	288
21 - 50	71	11	7	6	10	22	42	43	7	16	22	20	18	22	21	78	416
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	19	12	9	21	27	103	77	25	35	35	34	36	27	33	108	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

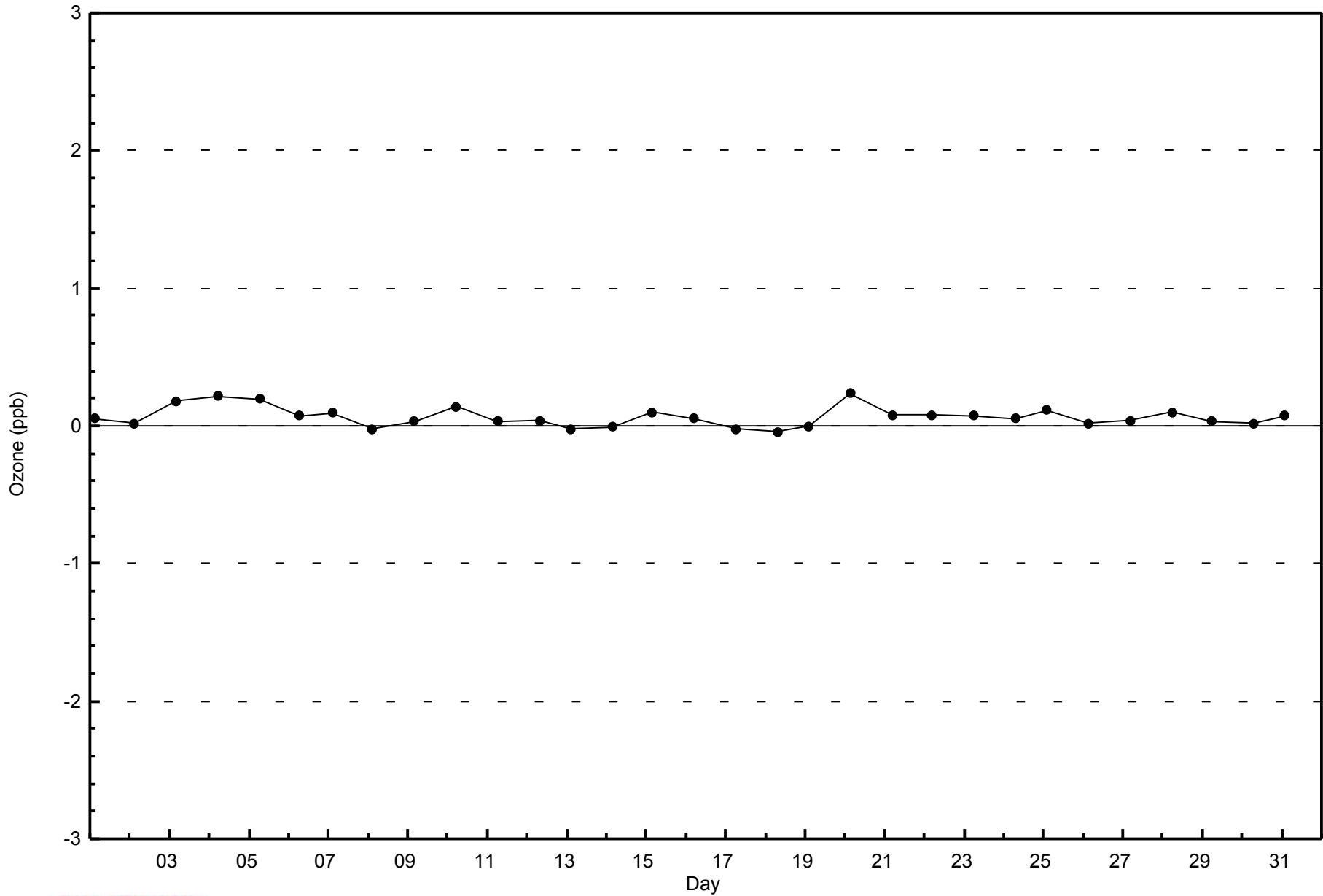
Ozone (O₃) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

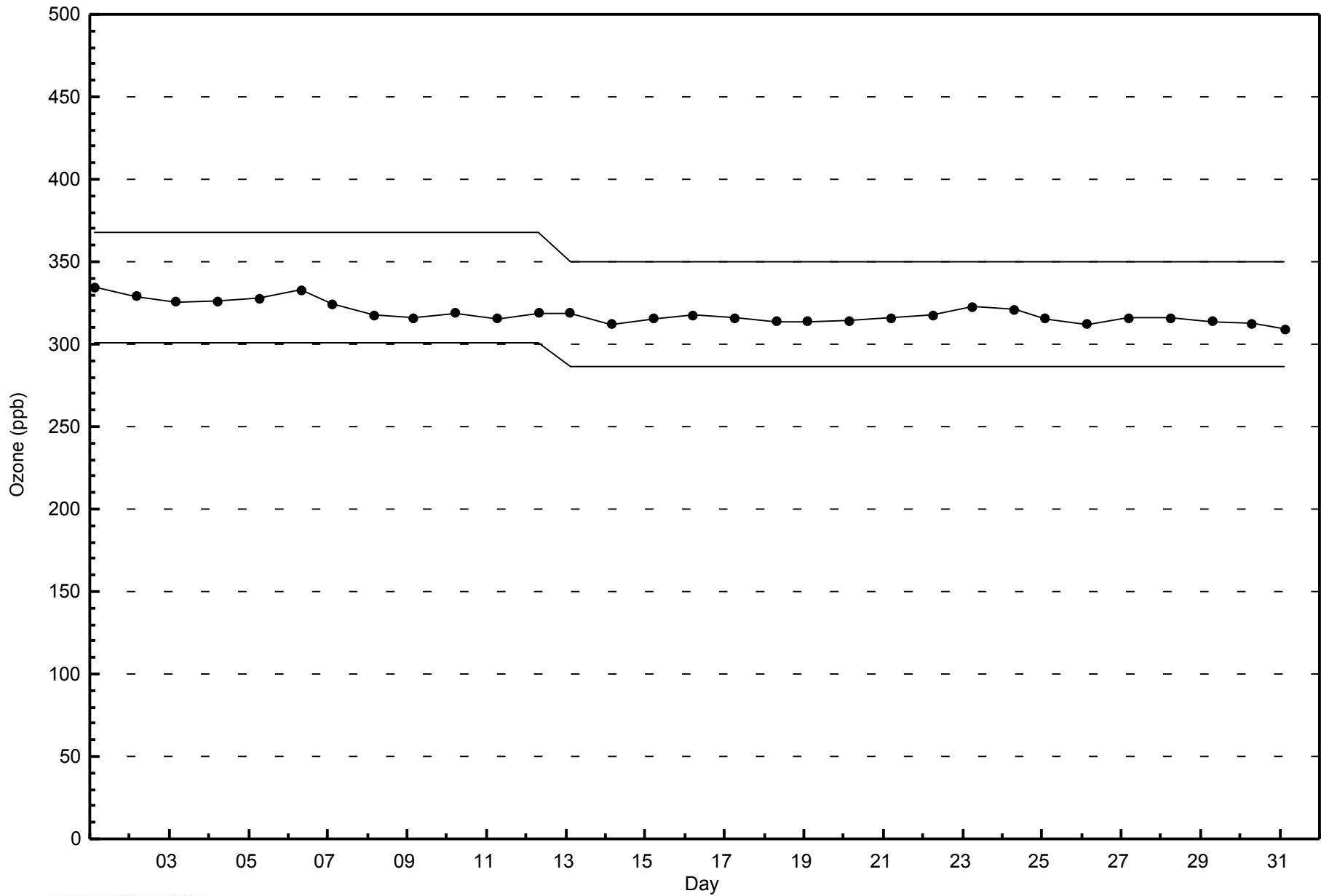
Ozone (O₃) - ppb
Athabasca Valley - March 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - March 2015



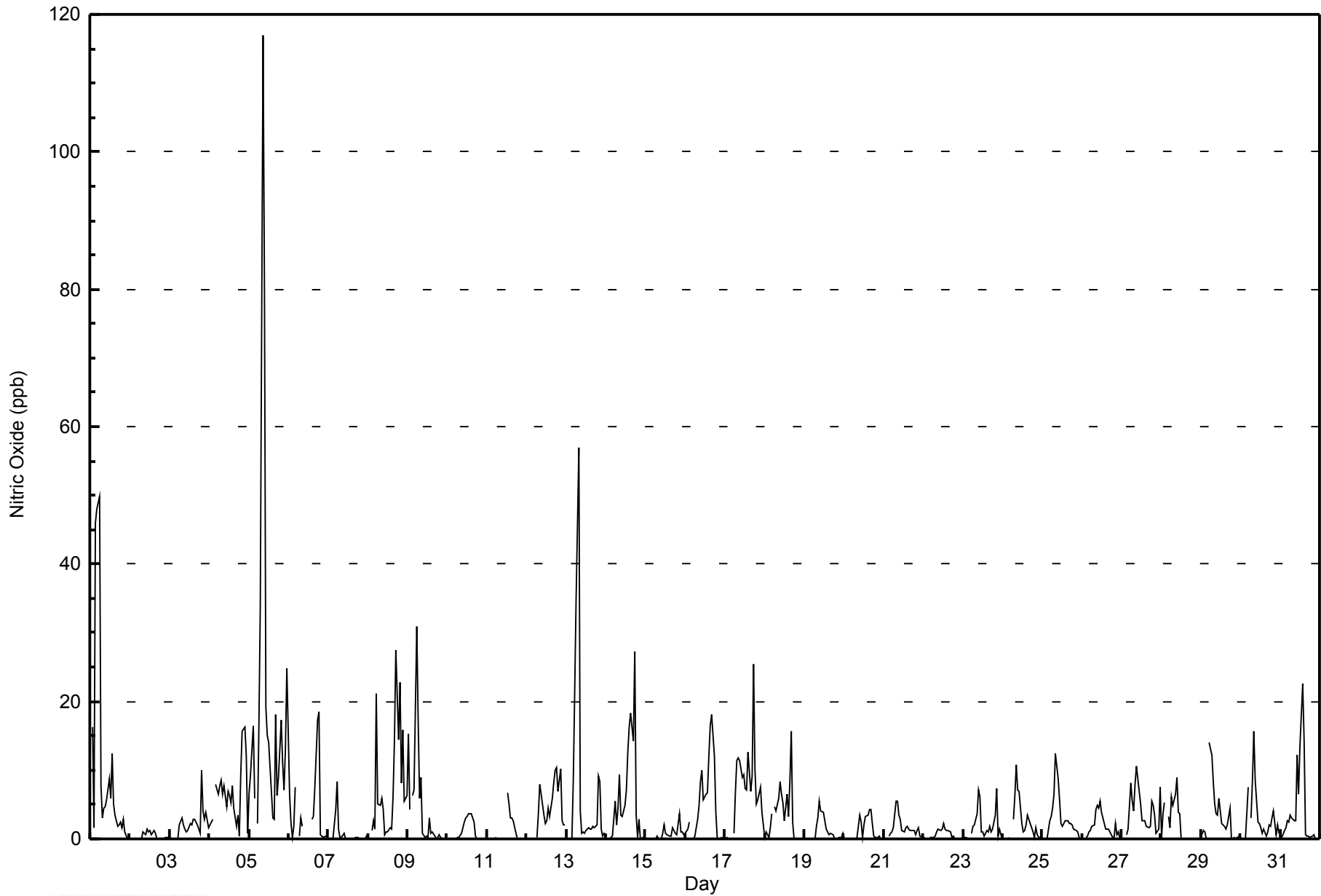


Maximum Value: 117 ppb on Mar 5 09:00																		Maximum Daily Average: 19.8 ppb on Mar 5																		Hours in Service: 744																																																																																	
Minimum Value: 0 ppb on Mar 2 06:00																		Minimum Daily Average: 0.4 ppb on Mar 2																		Hours of Data: 703																																																																																	
Maximum Diurnal Average: 9.0 ppb at hour 9																		Minimum Diurnal Average: 1.3 ppb at hour 3																		Hours of Missing Data: 41																																																																																	
Monthly Average: 3.9 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 2 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 29																		Hours of Calibration: 36																																																																																	
																																				Percent Operational Time: 99.3																																																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																																																																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																																																																													
1-Mar	Z	16	2	46	48	50	8	3	4	5	6	9	6	12	5	3	2	2	2	2	3	1	0	0	10.2	50																																																																																											
2-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																																																																																											
3-Mar	0	0	Z	0	0	0	2	3	2	2	1	1	2	2	3	3	2	2	1	10	4	3	4	2	2.1	10																																																																																											
4-Mar	2	3	3	Z	8	7	8	9	6	8	5	7	6	5	8	5	2	3	0	9	16	16	12	1	6.4	16																																																																																											
5-Mar	7	9	16	6	Z	2	16	34	117	79	19	15	14	7	3	3	18	6	9	17	11	7	13	25	19.8	117																																																																																											
6-Mar	6	2	0	2	7	Z	1	3	2	M	M	M	M	M	3	3	7	17	18	1	0	0	0	0	4.1	18																																																																																											
7-Mar	Z	0	0	0	4	8	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	8																																																																																											
8-Mar	0	Z	1	3	1	21	5	5	6	4	1	1	1	2	2	6	14	27	14	23	8	16	6	6	7.5	27																																																																																											
9-Mar	15	4	Z	6	7	31	17	6	9	1	0	0	0	3	1	1	0	0	0	1	0	0	0	0	4.5	31																																																																																											
10-Mar	0	0	0	Z	0	0	0	0	1	2	2	3	3	4	4	3	2	0	0	0	0	0	0	0	1.1	4																																																																																											
11-Mar	0	0	0	0	Z	0	0	C	C	C	C	C	7	5	3	3	3	1	0	0	0	0	0	0	1.2	7																																																																																											
12-Mar	0	0	0	0	0	Z	0	4	8	6	3	2	3	4	3	6	8	10	10	7	10	3	2	2	4.0	10																																																																																											
13-Mar	Z	0	0	0	9	21	35	57	4	1	1	1	1	2	1	1	2	2	2	9	8	1	0	1	7.0	57																																																																																											
14-Mar	0	Z	0	0	0	6	2	4	9	3	3	5	7	13	16	18	14	27	3	0	3	0	0	0	5.9	27																																																																																											
15-Mar	0	0	Z	0	0	0	0	0	0	0	1	2	1	1	0	0	2	1	1	1	4	1	1	1	0.7	4																																																																																											
16-Mar	1	1	2	Z	0	0	0	3	5	8	10	6	7	7	12	16	18	12	4	0	0	0	0	0	4.9	18																																																																																											
17-Mar	0	0	0	0	Z	1	7	11	12	11	9	9	7	7	13	7	9	25	10	5	6	8	4	2	7.1	25																																																																																											
18-Mar	0	1	0	2	4	Z	5	4	6	8	6	5	3	6	3	8	16	2	0	0	0	0	0	0	3.5	16																																																																																											
19-Mar	Z	0	0	0	0	0	0	2	3	5	4	4	3	1	1	1	1	1	0	0	0	0	0	1	1.1	5																																																																																											
20-Mar	0	Z	0	0	0	0	0	0	0	3	2	0	2	3	4	4	4	2	0	0	0	0	0	0	1.2	4																																																																																											
21-Mar	0	0	Z	0	1	1	2	6	5	4	3	1	1	2	2	1	1	1	1	1	1	2	1	0	1.6	6																																																																																											
22-Mar	0	0	0	Z	0	0	0	0	1	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0.6	2																																																																																											
23-Mar	0	0	0	0	Z	1	2	2	4	7	6	1	1	0	1	1	2	1	1	3	7	0	1	1	1.9	7																																																																																											
24-Mar	0	0	0	0	0	Z	3	6	11	7	7	2	1	1	2	3	3	2	1	0	2	1	0	1	2.3	11																																																																																											
25-Mar	Z	0	0	0	3	3	4	7	12	9	6	2	2	2	3	3	2	2	2	1	1	1	0	0	2.9	12																																																																																											
26-Mar	0	Z	0	0	1	1	2	2	4	5	4	5	4	2	1	1	1	1	0	0	2	1	1	0	1.8	5																																																																																											
27-Mar	0	0	Z	1	1	8	6	4	8	10	9	5	3	3	3	2	2	2	5	5	4	1	1	7	3.9	10																																																																																											
28-Mar	0	4	5	Z	3	2	6	5	6	9	4	4	0	0	0	0	0	0	0	0	0	0	0	0	2.1	9																																																																																											
29-Mar	0	1	1	0	Z	14	12	8	5	4	4	6	2	2	2	1	2	5	0	0	0	0	0	0	3.1	14																																																																																											
30-Mar	0	0	0	0	8	Z	3	8	16	9	2	2	2	1	1	0	1	2	2	3	4	1	2	1	2.9	16																																																																																											
31-Mar	Z	0	1	2	3	2	3	3	3	3	12	6	13	23	14	1	0	0	0	0	1	0	0	0	4.0	23																																																																																											
																		1.3				1.6				1.3				2.6				4.2				6.9				4.8				6.7				9.0				7.5				4.6				3.8				3.5				4.1				3.8				3.5				4.5				5.1				2.9				3.2				3.1				2.0				1.6				1.7				Diurnal Average			
																		15				16				16				46				48				50				35				57				117				79				19				15				14				23				16				18				18				27				18				23				16				16				13				25				Diurnal Maximum			
Z - zerospan																		C - Calibration																		M - Maintenance																																																																																	



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	686	97.58	97.58
21 - 40	11	1.56	99.15
41 - 80	5	0.71	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - March 2015

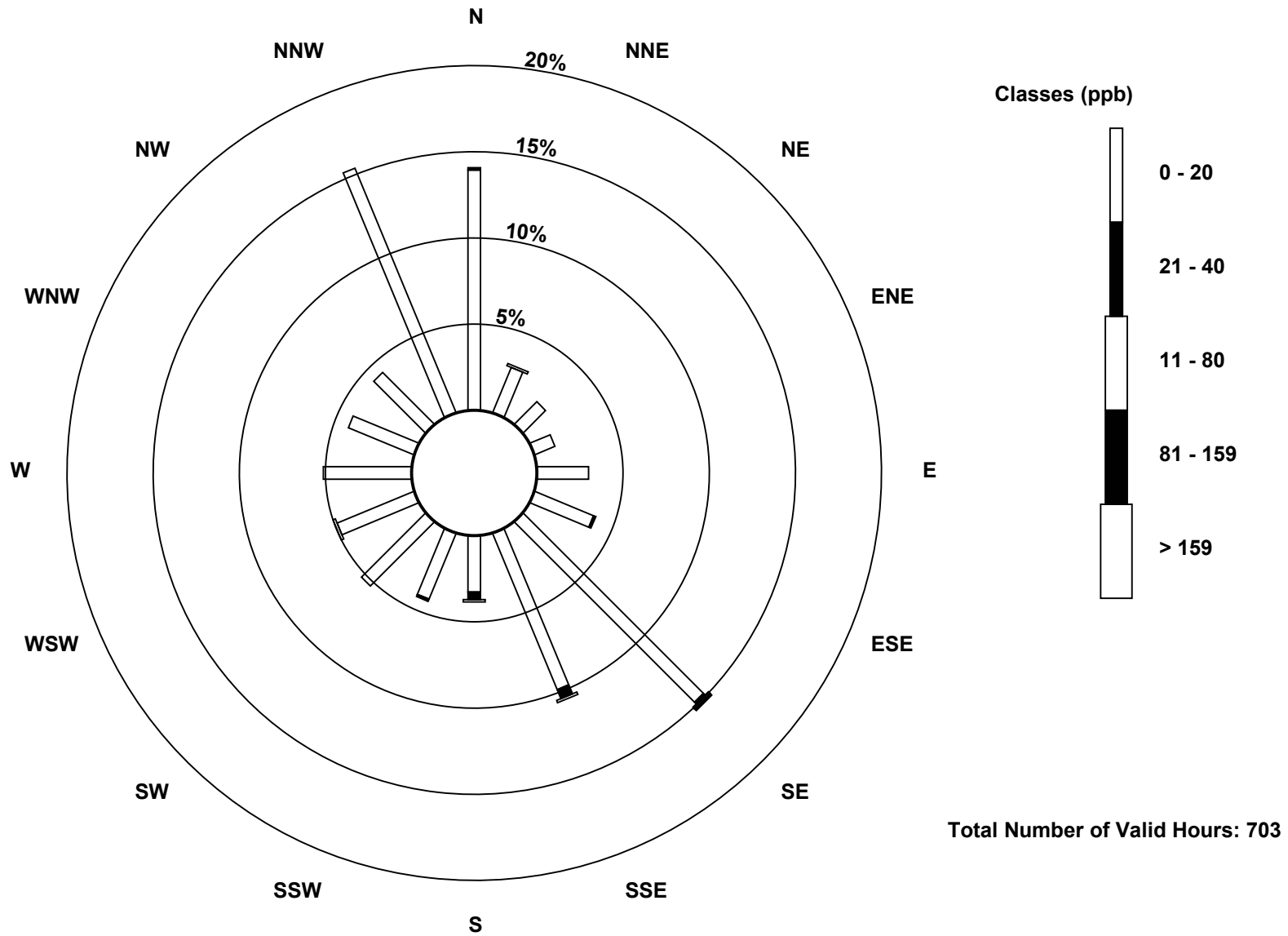
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	98	20	13	9	21	26	104	69	23	29	37	34	36	29	30	108	686
21 - 40	1	0	0	0	0	1	1	4	3	1	0	0	0	0	0	0	11
11 - 80	0	1	0	0	0	0	1	1	1	0	0	1	0	0	0	0	5
81 - 159	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	21	13	9	21	27	107	74	27	30	37	35	36	29	30	108	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

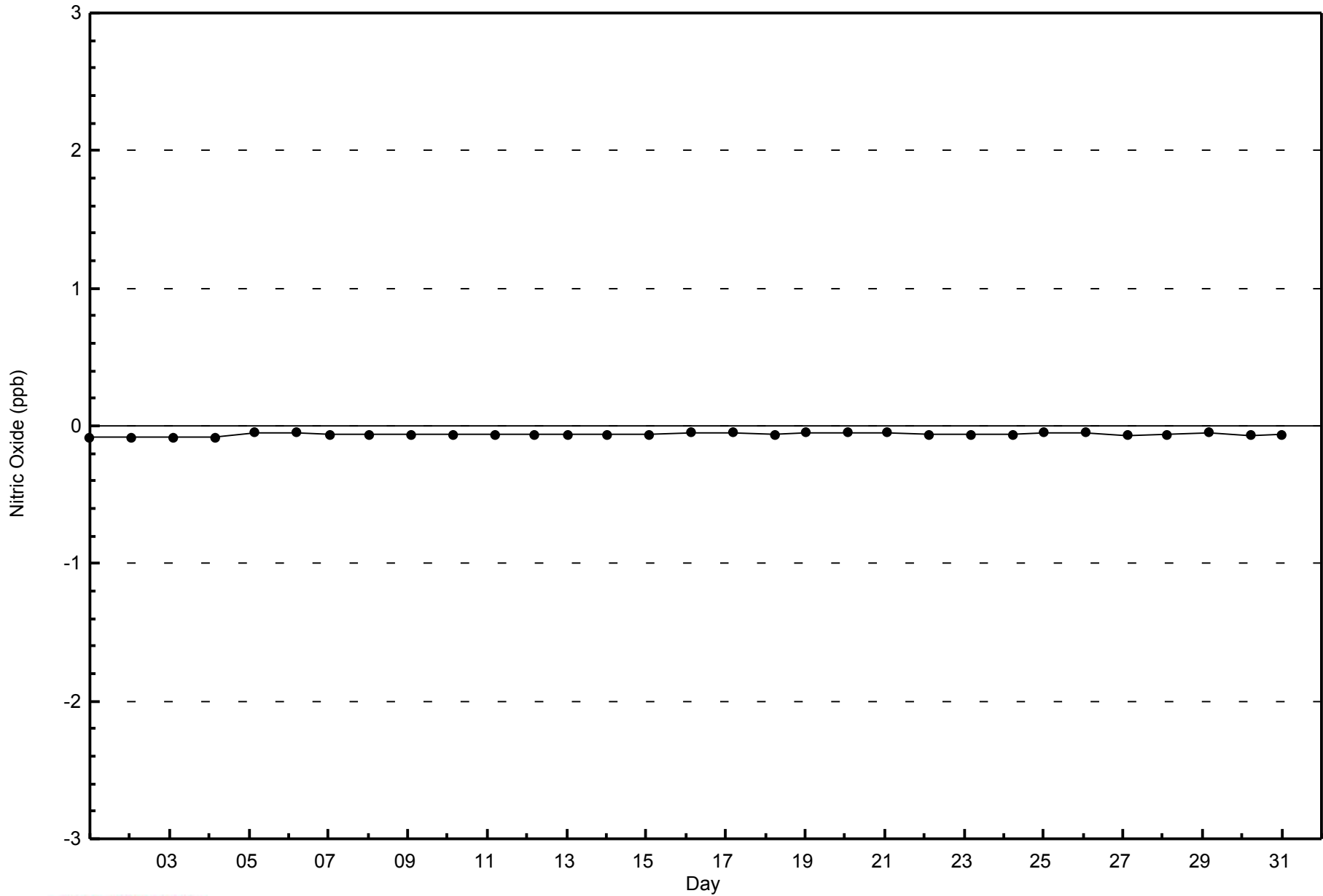
Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

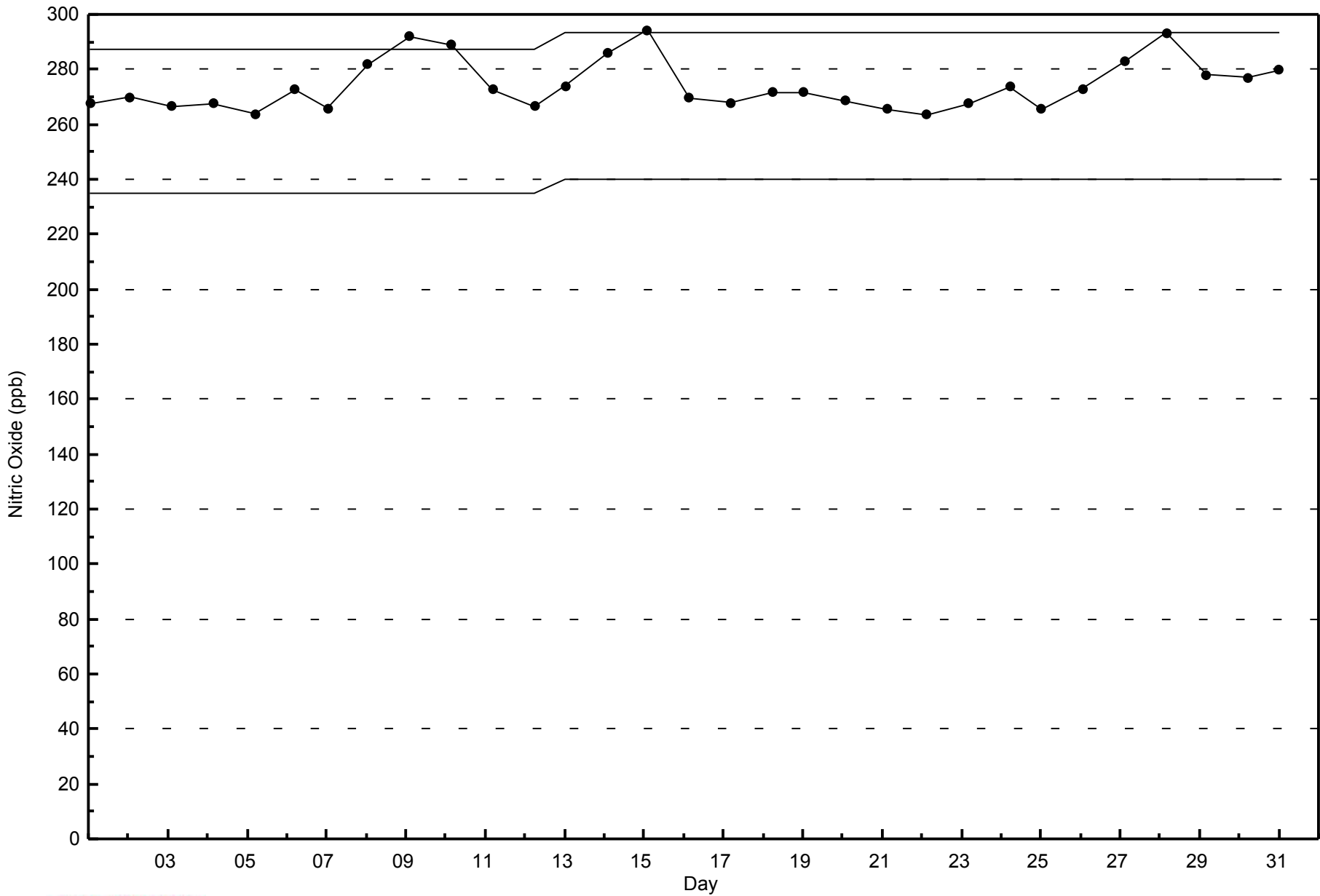
Nitric Oxide (NO) - ppb
Athabasca Valley - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Athabasca Valley - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

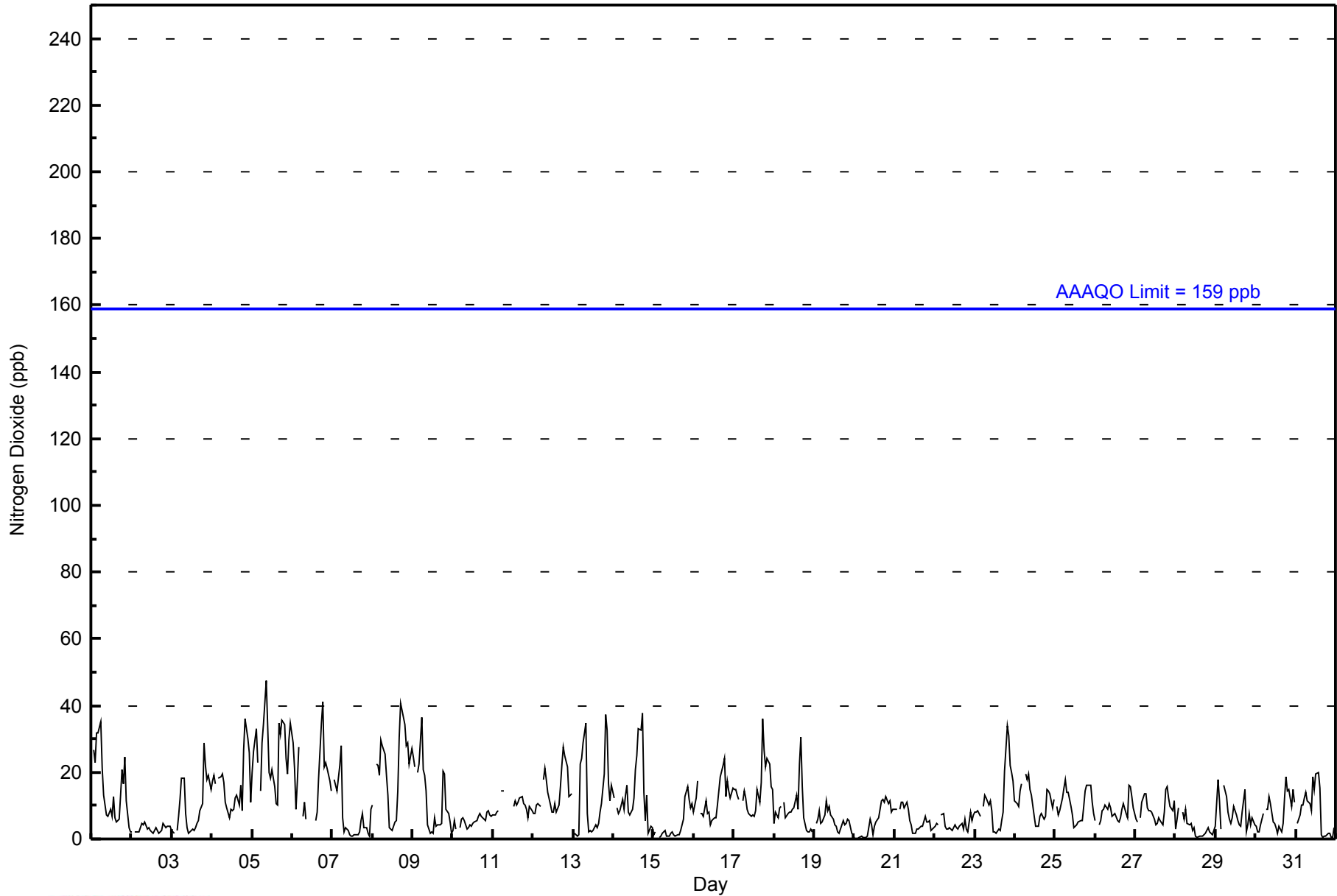
Athabasca Valley - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 48 ppb on Mar 5 09:00										Maximum Daily Average: 26.1 ppb on Mar 5										Hours of Data: 703						
Minimum Value: 0 ppb on Mar 20 01:00										Minimum Daily Average: 3.0 ppb on Mar 2										Hours of Missing Data: 41						
Maximum Diurnal Average: 14.8 ppb at hour 20										Minimum Diurnal Average: 5.6 ppb at hour 12										Hours of Calibration: 36						
Monthly Average: 10.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 14 P ₉₀ = 22 P ₉₉ = 37										Percent Operational Time: 99.3						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	27	23	32	32	35	21	13	10	7	7	9	7	13	7	5	6	13	21	17	24	11	3	2	15.0	35
2-Mar	2	Z	2	2	2	3	5	4	5	3	3	2	2	2	4	3	2	2	3	5	3	4	4	4	3.0	5
3-Mar	3	2	Z	2	7	12	18	18	8	3	2	2	3	3	4	5	5	8	11	29	22	18	19	15	9.5	29
4-Mar	18	19	17	Z	18	19	20	17	11	9	7	9	8	9	12	13	10	16	8	27	36	30	26	11	16.0	36
5-Mar	20	26	33	23	Z	15	29	35	48	34	20	18	21	16	10	10	35	31	36	35	24	20	30	35	26.1	48
6-Mar	29	21	9	17	28	Z	7	11	6	M	M	M	M	M	6	8	18	35	41	21	23	21	17	15	18.5	41
7-Mar	Z	18	16	14	22	28	6	2	3	3	1	1	1	1	1	1	2	6	8	4	4	2	1	9	6.7	28
8-Mar	10	Z	23	22	19	30	28	25	19	13	4	3	3	5	6	15	31	41	37	34	28	29	22	27	20.5	41
9-Mar	25	22	Z	20	22	37	21	19	15	4	2	2	2	7	4	4	4	5	21	19	9	8	5	2	12.0	37
10-Mar	3	6	3	Z	3	6	7	6	3	3	4	4	5	5	6	7	8	7	6	6	8	9	7	7	5.5	9
11-Mar	7	7	8	9	Z	14	14	C	C	C	C	C	10	11	10	11	12	13	11	10	9	6	10	8	10.1	14
12-Mar	8	8	10	11	10	Z	18	21	18	14	10	8	8	11	8	10	16	22	28	25	22	13	13	14	14.0	28
13-Mar	Z	2	1	1	22	24	29	35	8	2	3	2	3	4	3	5	8	11	19	37	33	17	11	16	12.8	37
14-Mar	12	Z	9	8	8	12	9	13	16	8	7	9	12	21	25	33	38	14	6	13	2	4	3	3	13.7	38
15-Mar	1	2	Z	0	1	2	2	3	1	1	2	2	1	1	1	1	3	4	6	13	16	12	9	11	4.1	16
16-Mar	8	12	18	Z	8	8	7	11	8	8	4	6	6	7	10	14	19	22	24	13	17	15	12	15	11.8	24
17-Mar	15	15	13	12	Z	11	14	12	9	8	7	7	7	8	15	11	17	36	27	22	24	22	16	15	14.9	36
18-Mar	5	8	6	9	10	Z	11	6	8	8	8	9	10	13	9	23	31	16	6	3	2	2	3	2	9.0	31
19-Mar	Z	5	6	9	5	5	7	12	9	10	7	6	4	4	2	2	3	6	4	5	6	6	2	1	5.4	12
20-Mar	0	Z	0	1	1	1	1	1	1	6	4	1	4	5	7	9	11	12	11	13	10	11	8	9	5.4	13
21-Mar	9	9	Z	9	11	11	9	11	9	6	4	2	2	3	3	4	4	4	7	5	5	6	3	3	6.0	11
22-Mar	4	5	4	Z	7	8	4	3	3	3	3	3	4	3	3	4	5	3	6	3	2	8	6	7	4.4	8
23-Mar	8	8	8	7	Z	10	13	12	10	12	9	2	2	3	3	5	8	20	34	31	22	20	17	17	11.6	34
24-Mar	12	11	10	15	17	Z	20	18	20	15	13	7	4	4	4	7	8	6	7	15	14	14	9	12	11.2	20
25-Mar	Z	10	7	9	12	15	18	14	14	10	7	4	4	4	5	5	6	10	15	16	16	11	8	8	10.2	18
26-Mar	6	Z	4	6	9	9	10	9	11	9	7	7	8	6	5	6	9	11	8	6	16	16	13	10	8.6	16
27-Mar	6	5	Z	6	11	14	14	9	9	8	8	6	4	5	7	6	4	8	15	16	12	10	8	12	8.7	16
28-Mar	3	6	9	Z	8	6	9	5	4	5	3	3	1	1	1	1	1	1	2	3	2	2	1	3	3.4	9
29-Mar	4	18	11	3	Z	16	13	8	6	5	6	10	7	5	4	4	8	15	2	4	8	4	6	4	7.4	18
30-Mar	4	2	2	4	8	Z	9	9	13	11	5	5	3	2	4	2	5	12	19	14	15	10	15	11	7.9	19
31-Mar	Z	5	7	10	10	12	14	11	11	9	19	15	20	20	15	1	1	1	1	2	2	0	0	3	8.2	20
8.8 10.6 10.0 10.0 11.9 13.8 13.0 12.5 10.4 8.1 6.4 5.6 5.8 6.6 6.5 7.5 10.6 13.5 14.2 14.8 14.7 11.7 10.1 10.0																								Diurnal Average		
29 27 33 32 32 37 29 35 48 34 20 18 21 21 25 33 35 41 41 37 36 30 30 35																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	617	87.77	87.77
21 - 40	83	11.81	99.57
41 - 80	3	0.43	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - March 2015

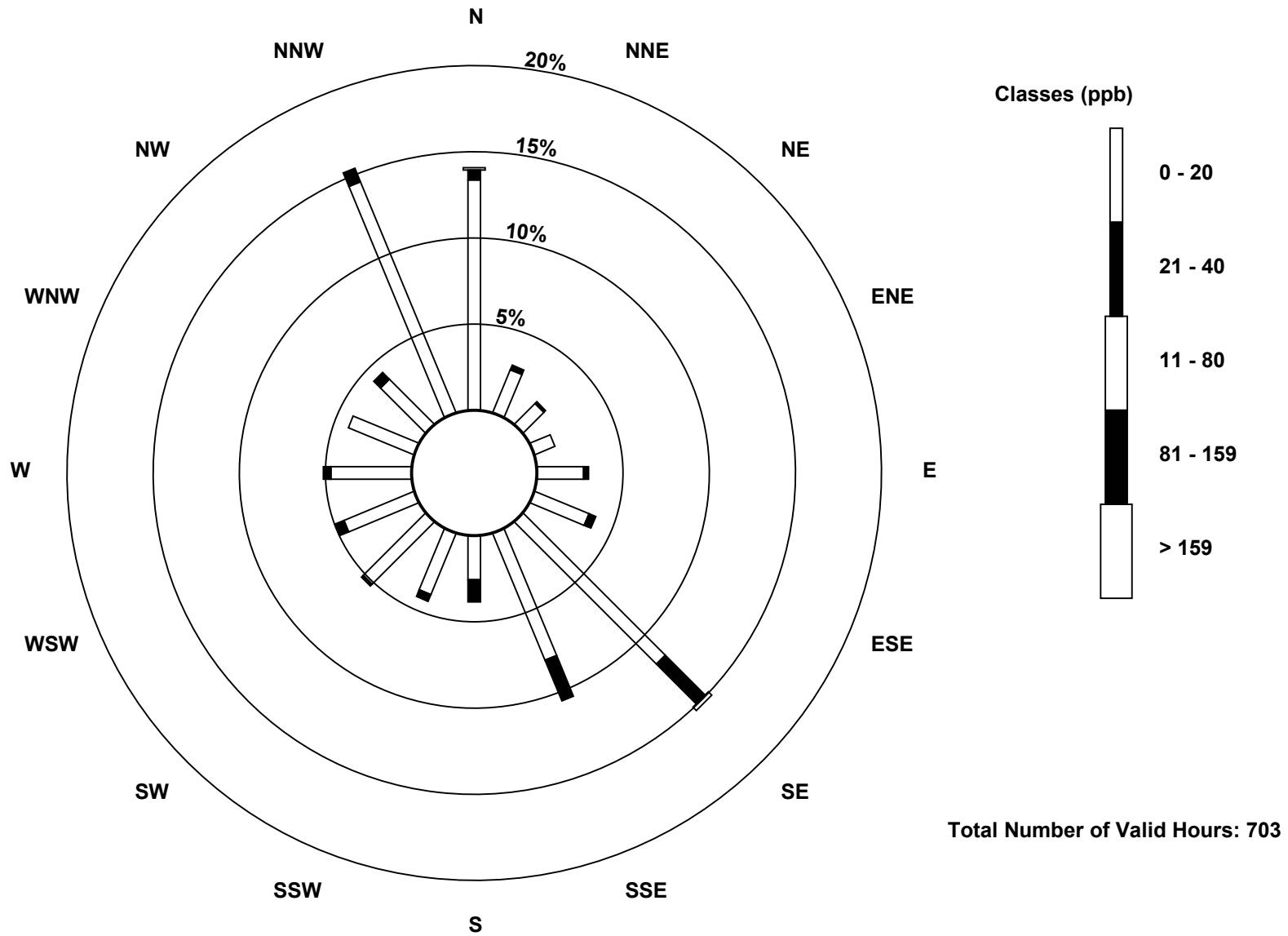
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	94	19	12	9	19	24	82	56	18	27	36	31	33	29	26	102	617
21 - 40	4	2	1	0	2	3	23	18	9	3	1	4	3	0	4	6	83
41 - 80	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	21	13	9	21	27	107	74	27	30	37	35	36	29	30	108	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

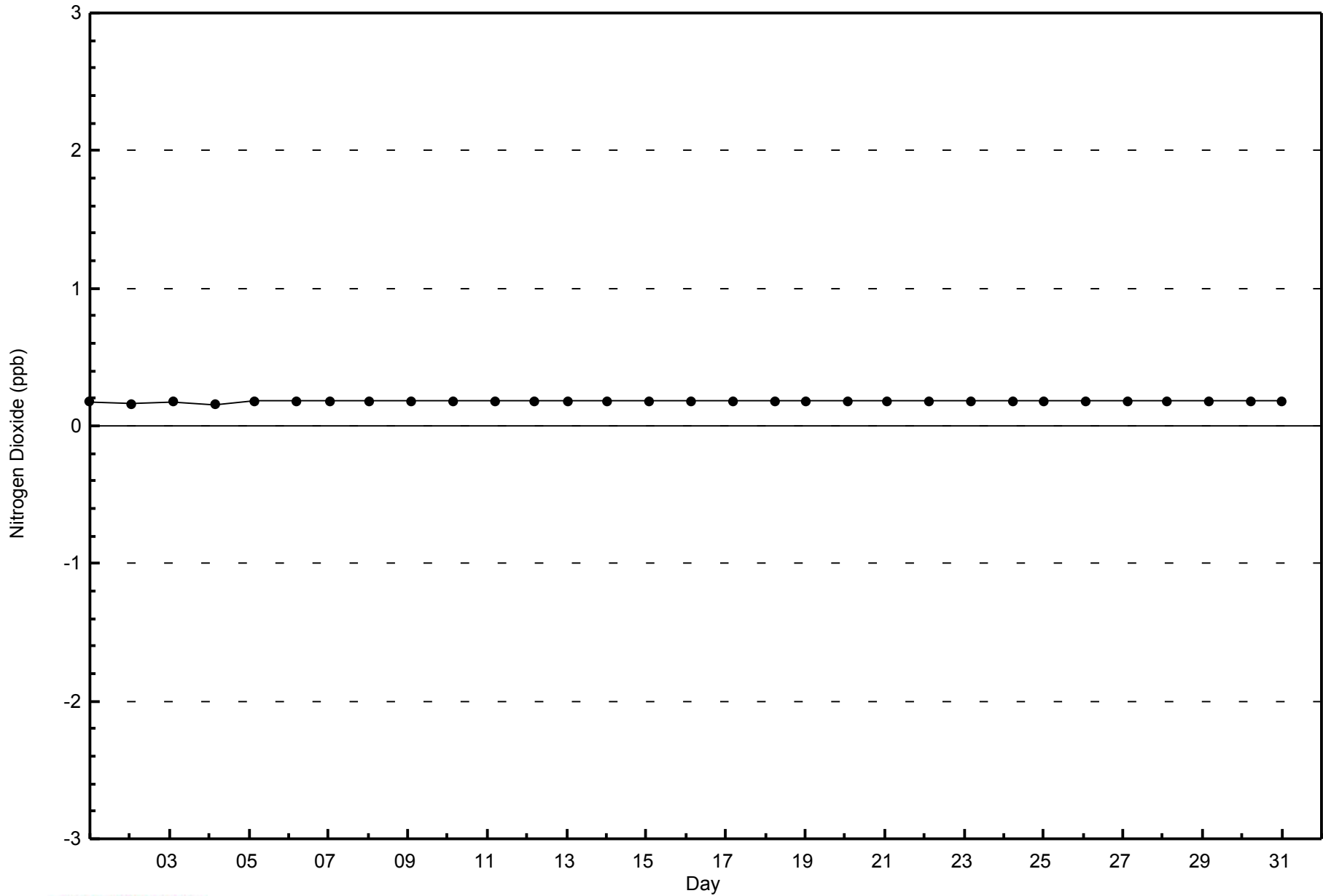
**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)**





WBEA
Zero Responses

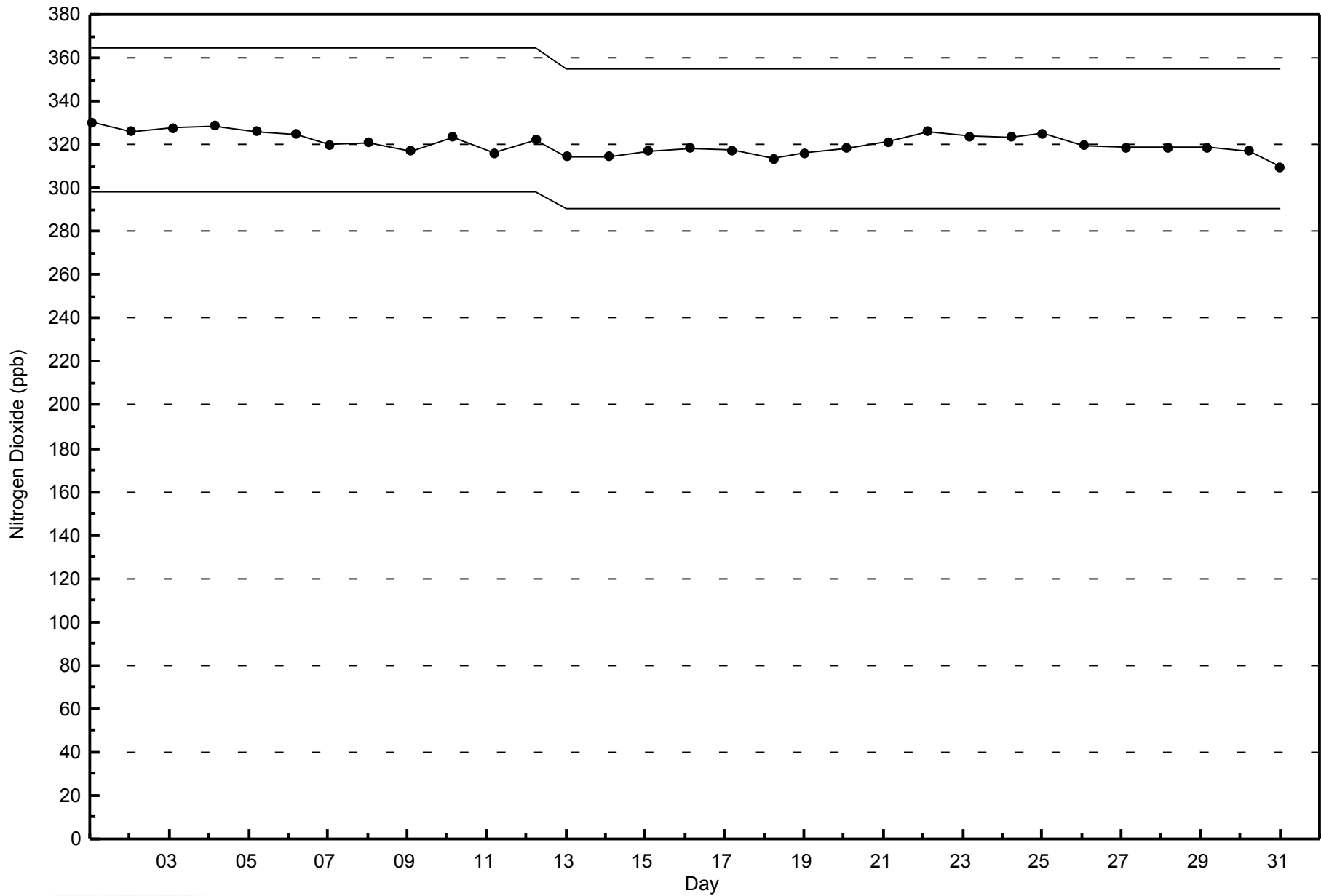
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - March 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

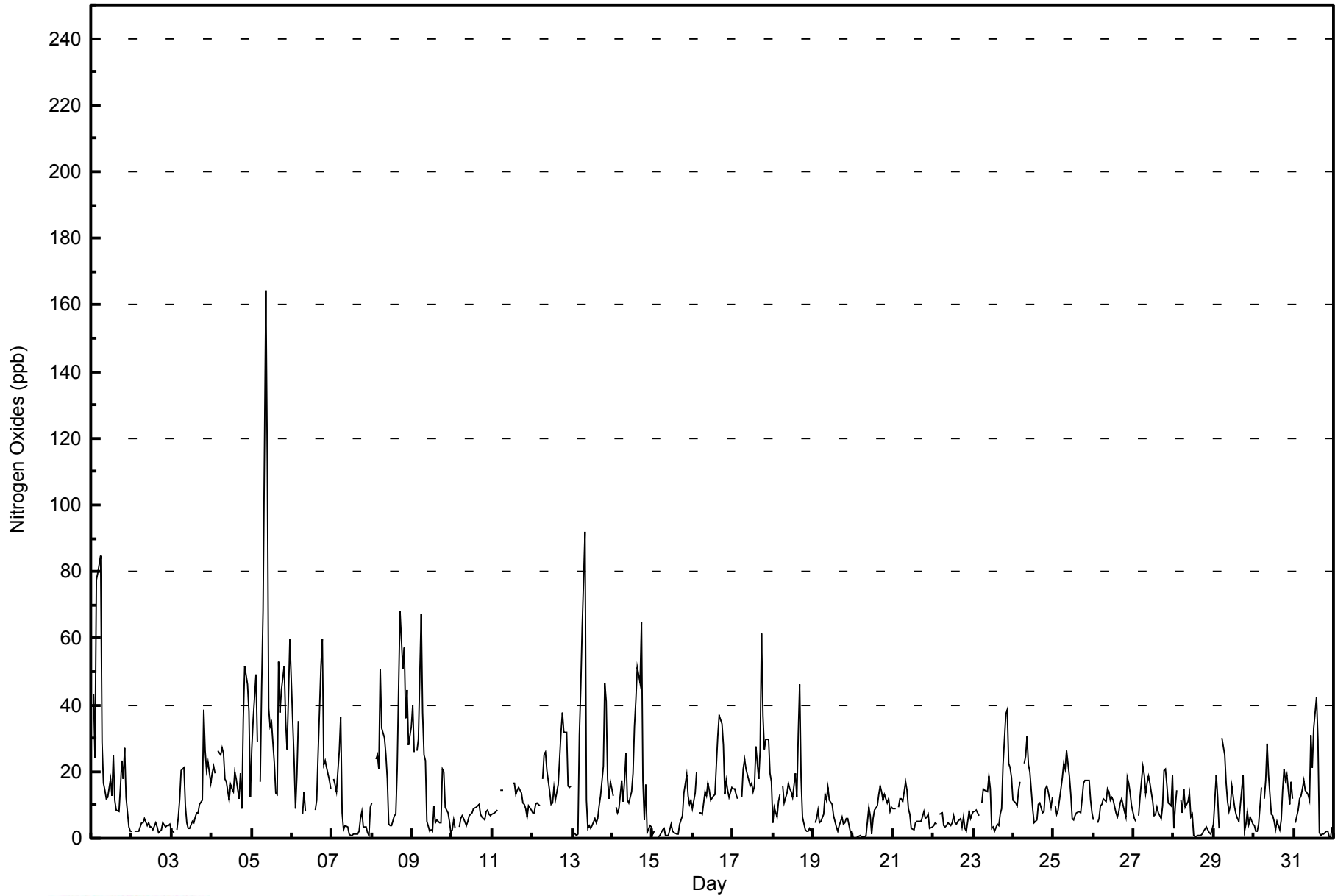
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2015

Maximum Value: 164 ppb on Mar 5 09:00														Maximum Daily Average: 45.9 ppb on Mar 5														Hours in Service: 744			
Minimum Value: 0 ppb on Mar 20 01:00														Minimum Daily Average: 3.4 ppb on Mar 2														Hours of Data: 703			
Maximum Diurnal Average: 20.8 ppb at hour 6														Minimum Diurnal Average: 9.3 ppb at hour 13														Hours of Missing Data: 41			
Monthly Average: 14.2 ppb														Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 10 Q ₃ = 18 P ₉₀ = 30 P ₉₉ = 63														Hours of Calibration: 36			
																												Percent Operational Time: 99.3			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Mar	Z	43	24	78	80	85	29	16	15	12	12	18	13	25	12	9	8	15	23	18	27	12	3	2	25.2	85					
2-Mar	2	Z	2	2	2	3	5	4	6	4	5	3	3	2	5	3	2	2	3	5	3	4	4	4	3.4	6					
3-Mar	3	2	Z	2	7	12	20	21	10	5	3	3	5	5	6	8	8	10	12	39	26	20	23	17	11.5	39					
4-Mar	19	21	20	Z	26	25	27	26	18	17	11	16	15	14	20	18	12	19	9	36	52	46	38	12	22.4	52					
5-Mar	27	36	49	29	Z	17	45	68	164	113	39	33	35	22	14	13	53	38	45	52	35	27	43	60	45.9	164					
6-Mar	35	23	9	19	35	Z	7	14	8	M	M	M	M	M	8	11	25	52	60	22	23	21	17	15	22.6	60					
7-Mar	Z	18	16	14	26	37	8	3	4	4	1	1	1	1	1	1	2	6	8	4	3	2	1	9	7.4	37					
8-Mar	10	Z	24	25	21	51	33	30	25	18	4	4	4	7	7	21	45	68	51	57	36	45	28	34	28.1	68					
9-Mar	40	26	Z	26	30	67	38	25	23	5	2	2	2	10	5	5	5	5	21	20	9	8	5	2	16.5	67					
10-Mar	2	6	3	Z	3	6	7	6	4	5	7	7	8	9	9	10	10	7	6	6	8	9	7	7	6.5	10					
11-Mar	7	7	8	9	Z	14	14	C	C	C	C	C	17	16	13	14	15	14	11	10	9	6	10	8	11.3	17					
12-Mar	8	7	10	11	10	Z	18	25	26	21	14	10	10	15	11	16	24	32	38	32	32	16	15	16	18.0	38					
13-Mar	Z	2	1	1	31	45	64	92	12	3	4	3	4	6	5	6	10	13	22	46	41	18	12	17	19.8	92					
14-Mar	13	Z	9	8	9	17	11	18	25	12	11	14	19	33	41	51	47	65	17	6	16	2	4	3	19.6	65					
15-Mar	1	2	Z	0	1	2	2	3	1	1	2	4	2	2	1	1	4	5	7	13	19	13	10	11	4.8	19					
16-Mar	9	14	20	Z	8	8	7	14	13	16	14	11	13	13	22	31	37	34	28	13	17	15	12	15	16.7	37					
17-Mar	15	15	13	12	Z	12	21	24	21	19	16	17	14	15	27	18	26	61	37	27	30	30	19	17	22.0	61					
18-Mar	5	9	6	11	13	Z	16	11	13	16	15	14	12	20	12	31	46	18	6	3	2	2	3	2	12.5	46					
19-Mar	Z	5	6	9	5	5	7	13	12	15	12	10	7	5	3	2	4	6	4	4	6	6	2	2	6.5	15					
20-Mar	0	Z	0	0	1	1	1	0	1	9	7	1	6	8	10	13	16	14	11	13	11	12	8	9	6.6	16					
21-Mar	9	9	Z	9	12	12	11	17	14	9	7	3	3	4	5	5	5	5	8	6	6	7	3	3	7.5	17					
22-Mar	4	5	4	Z	7	8	4	3	4	5	4	5	7	5	4	5	6	3	6	3	2	8	6	7	5.0	8					
23-Mar	8	8	9	7	Z	11	15	14	14	19	15	3	3	2	4	4	7	9	22	37	38	22	21	18	13.5	38					
24-Mar	12	11	10	15	17	Z	23	24	30	22	20	9	5	5	6	10	10	8	8	15	16	14	9	12	13.5	30					
25-Mar	Z	10	7	9	15	18	22	21	26	18	13	6	6	7	8	8	8	12	17	17	17	17	11	7	13.0	26					
26-Mar	6	Z	5	6	10	10	12	11	15	14	11	12	11	8	6	8	10	12	8	6	18	17	14	10	10.4	18					
27-Mar	6	5	Z	7	12	22	19	14	16	19	17	11	7	7	9	7	6	10	20	21	16	11	10	19	12.6	22					
28-Mar	3	10	14	Z	11	7	15	9	11	14	6	7	1	1	1	1	1	1	2	3	2	2	1	3	5.5	15					
29-Mar	4	19	12	3	Z	30	25	17	11	8	10	16	9	7	6	5	10	19	2	4	8	4	6	4	10.5	30					
30-Mar	4	2	2	4	15	Z	12	17	28	19	7	7	5	3	5	2	6	14	21	17	19	10	17	12	10.9	28					
31-Mar	Z	5	8	12	13	15	17	14	13	11	31	21	33	43	30	2	1	1	1	2	2	0	0	3	12.1	43					
																												Diurnal Average			
10.0														12.3														11.3			
40														43														49			
																												78			
																												80			
																												85			
																												64			
																												92			
																												164			
																												113			
																												39			
																												33			
																												35			
																												43			
																												41			
																												51			
																												53			
																												68			
																												60			
																												57			
																												52			
																												46			
																												43			
																												60			
																												Diurnal Maximum			
Z - zerospan														C - Calibration														M - Maintenance			



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	564	80.23	80.23
21 - 40	102	14.51	94.74
41 - 80	33	4.69	99.43
81 - 159	3	0.43	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2015

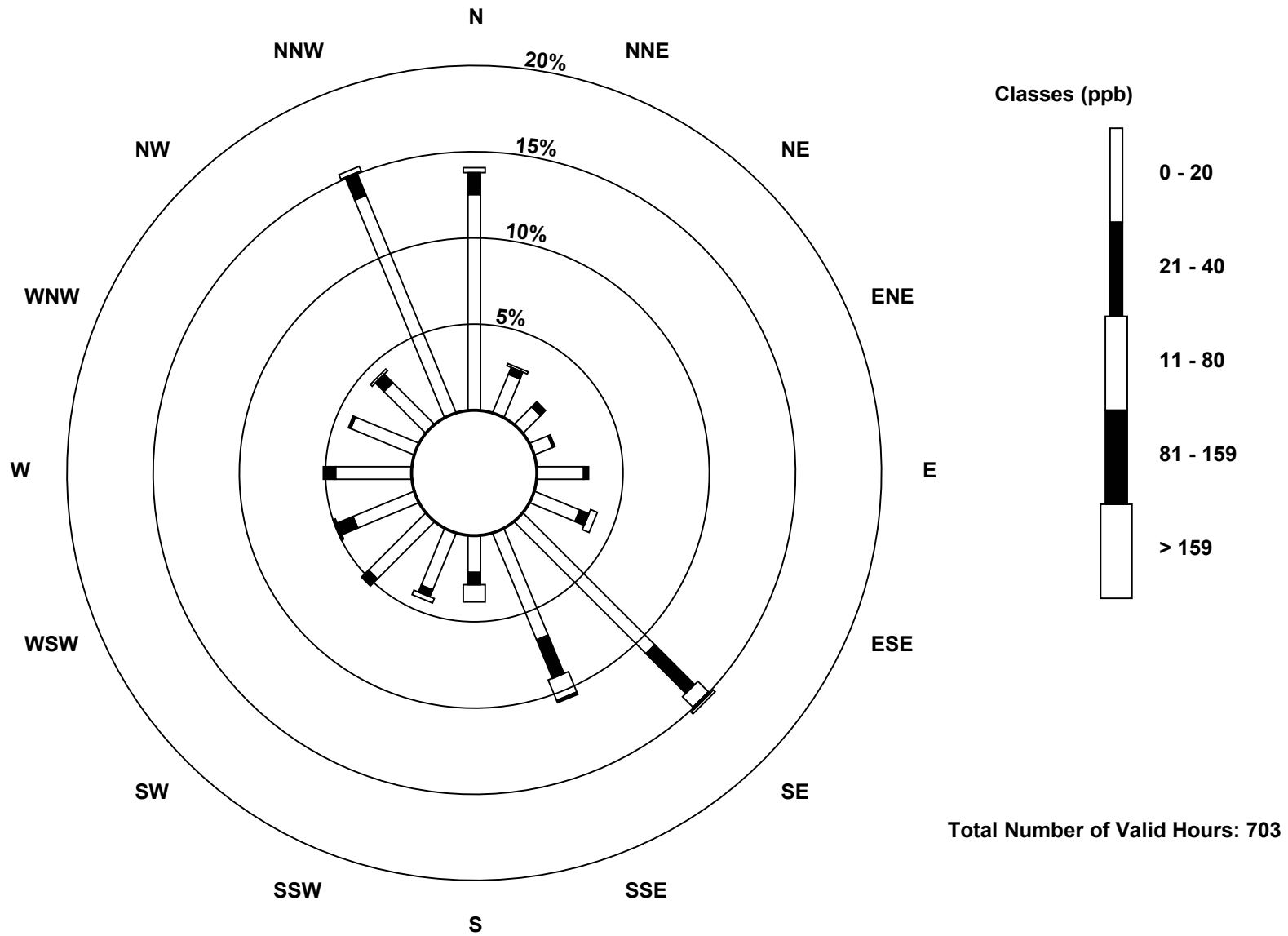
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	17	10	8	19	20	76	47	15	25	33	27	31	28	24	96	564
21 - 40	9	3	3	1	2	4	23	17	5	3	4	7	5	1	5	10	102
11 - 80	2	1	0	0	0	3	6	9	7	2	0	0	0	0	1	2	33
81 - 159	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	3
> 159	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Totals	99	21	13	9	21	27	107	74	27	30	37	35	36	29	30	108	703

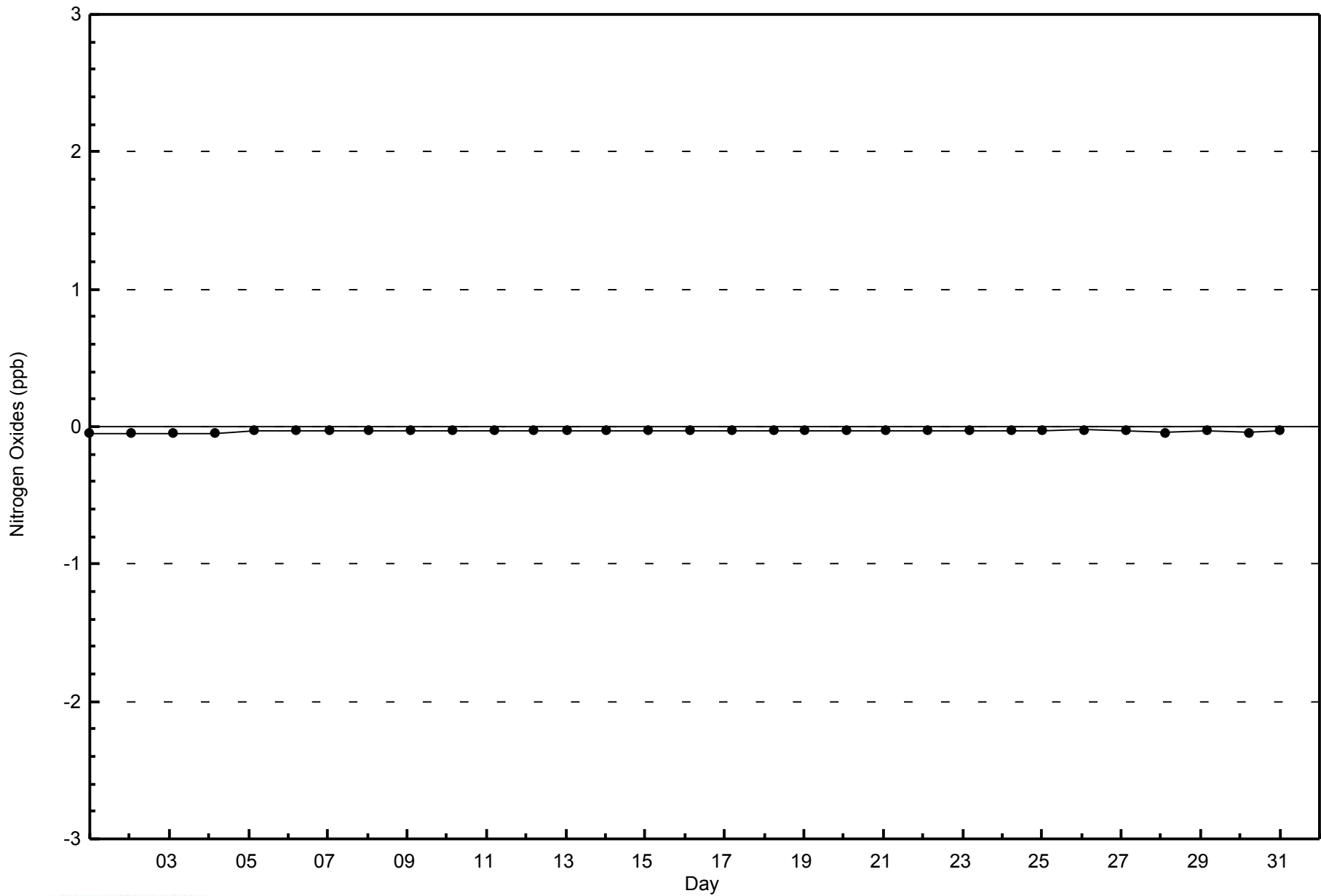
Total Number of Valid Hours: 703

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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

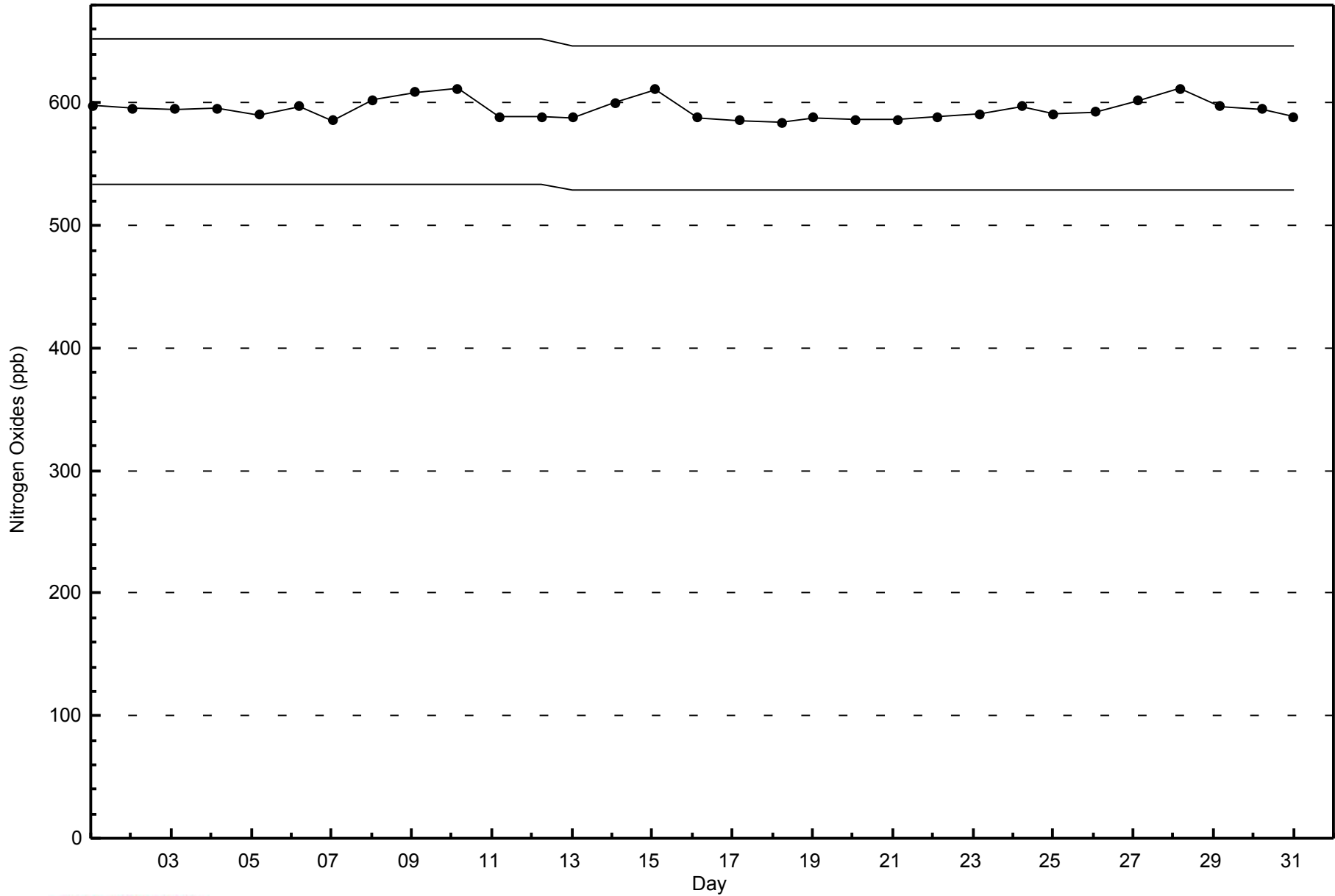






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2015





Summary of Hour Averages

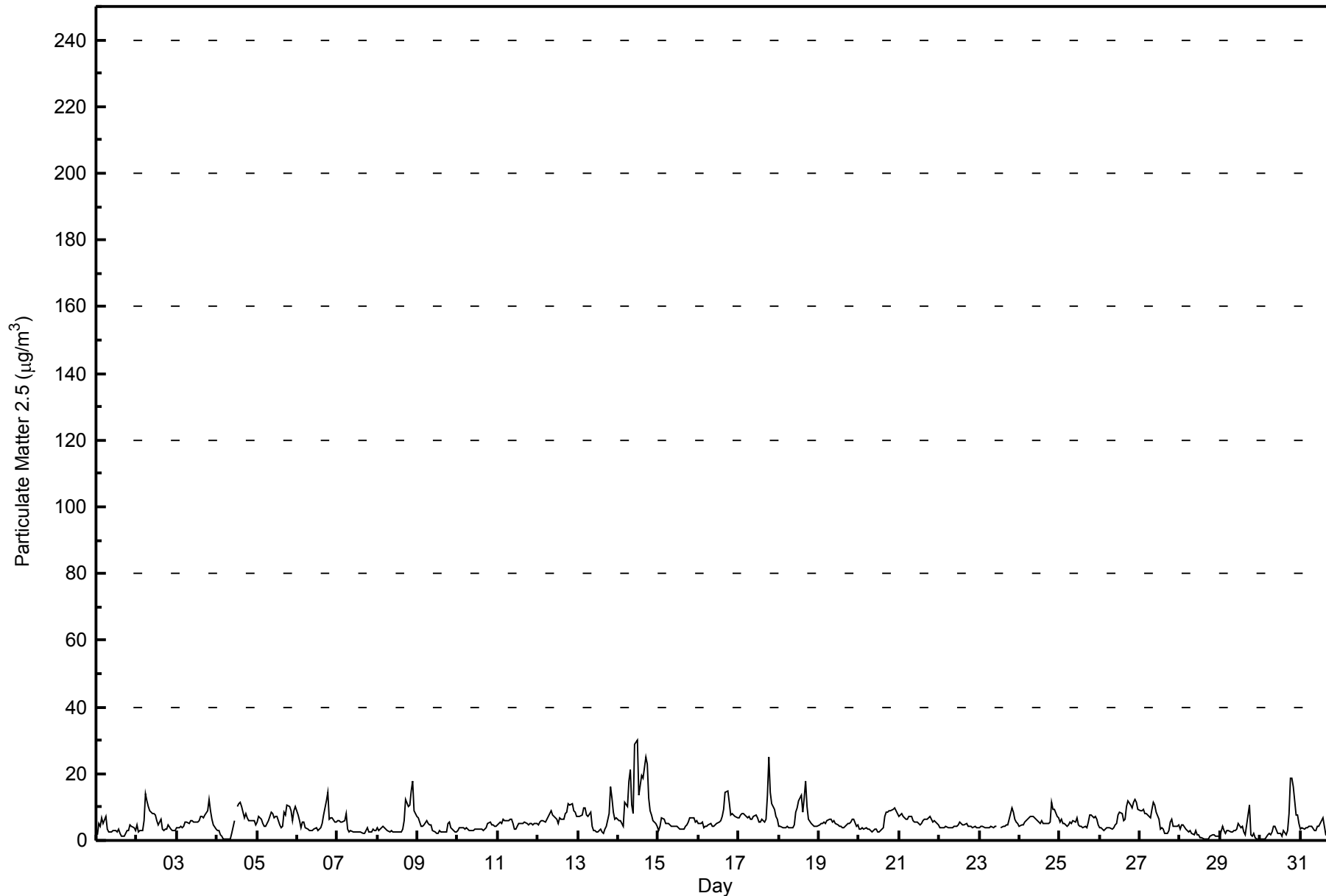
Athabasca Valley - March 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																								
Maximum Value: 30.0 µg/m ³ on Mar 14 12:00		Maximum Daily Average: 13.3 µg/m ³ on Mar 14																								
Minimum Value: 0.3 µg/m ³ on Mar 30 01:00		Hours of Data: 741																								
Maximum Diurnal Average: 7.7 µg/m ³ at hour 19		Hours of Missing Data: 3																								
Monthly Average: 5.55 µg/m ³		Hours of Calibration: 0																								
Minimum Daily Average: 1.9 µg/m ³ on Mar 28		Percent Operational Time: 99.6																								
Minimum Diurnal Average: 4.5 µg/m ³ at hour 1																										
Percentiles: P ₁ = 0.5 P ₁₀ = 2.5 Q ₁ = 3.4 Median = 4.8 Q ₃ = 6.7 P ₉₀ = 9.2 P ₉₉ = 17.6																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1.6	4.9	4.4	7.0	5.3	7.1	3.3	2.6	2.7	2.6	2.8	3.2	2.7	3.3	2.2	1.2	1.3	2.2	3.2	3.1	4.6	4.0	3.7	3.0	3.4	7.1
2-Mar	4.8	2.4	2.8	2.8	6.0	13.8	11.9	10.1	8.8	7.9	7.9	7.8	5.7	4.5	6.5	3.5	3.1	3.2	3.4	4.7	3.4	3.1	3.0	2.8	5.6	13.8
3-Mar	3.7	3.9	4.2	3.7	4.3	5.7	5.5	5.1	6.1	5.8	5.6	5.4	5.5	6.1	7.1	7.0	6.8	7.6	8.9	12.4	8.7	6.2	4.8	3.2	6.0	12.4
4-Mar	3.1	2.9	1.5	1.3	0.6	0.5	0.4	0.6	2.3	5.9	M	10.2	11.0	11.6	10.3	6.7	8.1	6.7	6.1	5.8	5.8	6.0	4.9	4.9	4.9	11.6
5-Mar	5.3	7.4	6.5	5.2	4.3	4.3	5.3	6.0	8.5	7.9	6.9	7.0	7.3	4.9	3.9	4.3	8.5	7.5	10.5	10.3	9.0	6.0	9.1	10.4	6.9	10.5
6-Mar	7.6	6.1	3.8	5.7	5.3	3.8	3.2	3.2	2.8	3.0	3.5	3.8	3.1	3.3	3.7	5.0	7.6	11.8	14.5	6.6	6.7	6.6	5.5	5.6	5.5	14.5
7-Mar	5.8	5.9	5.6	5.5	6.1	8.0	3.4	2.7	2.8	2.6	2.6	2.7	2.6	2.4	2.4	2.1	2.3	2.8	3.8	2.7	2.7	3.2	3.0	3.0	3.6	8.0
8-Mar	3.6	3.1	3.9	4.1	3.9	3.5	2.9	2.6	2.9	2.7	2.4	2.5	2.7	2.5	2.7	3.5	5.9	12.1	10.1	10.5	14.6	17.7	8.7	7.4	5.7	17.7
9-Mar	6.6	5.5	4.3	4.1	4.5	6.0	5.0	4.8	4.5	2.9	2.6	2.1	2.2	2.9	2.4	2.5	2.6	2.5	5.1	5.5	4.0	3.0	2.7	2.6	3.8	6.6
10-Mar	3.0	3.9	3.9	3.8	3.4	3.6	3.4	3.1	2.8	3.0	3.5	3.6	3.5	3.5	3.4	3.1	3.6	3.8	5.1	5.5	4.8	4.5	4.3	4.3	3.8	5.5
11-Mar	4.8	5.3	5.0	6.2	6.1	6.1	5.8	6.2	6.3	5.1	3.2	3.2	4.9	5.3	5.2	4.9	5.3	5.2	4.8	5.1	5.2	4.8	5.2	5.3	5.2	6.3
12-Mar	4.7	5.4	5.9	5.9	5.6	6.4	7.3	8.2	9.0	7.5	6.8	6.2	5.3	6.9	6.3	6.5	7.9	8.5	11.2	10.6	10.9	9.0	8.3	7.3	7.4	11.2
13-Mar	7.0	7.2	7.7	9.8	9.9	7.7	7.4	8.5	4.3	3.1	3.0	2.4	2.5	3.2	2.7	2.2	3.4	4.2	8.0	16.2	12.8	8.6	6.3	6.7	6.5	16.2
14-Mar	5.8	5.7	5.1	4.4	11.5	10.0	17.8	21.3	10.4	8.2	28.7	30.0	13.7	16.4	19.4	18.9	24.9	22.7	12.5	8.9	7.7	5.9	5.2	4.1	13.3	30.0
15-Mar	2.8	4.3	6.8	6.2	5.1	4.9	5.0	4.6	4.2	4.0	4.2	4.4	3.7	3.4	3.3	3.6	4.1	4.8	5.3	6.6	6.6	6.8	5.7	6.0	4.8	6.8
16-Mar	5.1	5.2	5.7	4.0	4.2	4.3	4.6	5.0	4.4	4.3	4.5	4.9	5.4	5.9	7.4	9.5	14.5	14.7	11.5	7.8	8.0	7.7	7.1	6.9	6.8	14.7
17-Mar	6.9	7.8	8.0	8.0	7.3	6.8	7.2	6.5	6.4	7.1	7.6	6.8	5.6	5.6	6.4	5.4	6.5	13.5	25.0	14.5	11.0	9.4	7.2	6.5	8.5	25.0
18-Mar	4.3	4.3	4.0	3.9	3.9	4.1	3.9	3.9	3.6	4.5	8.4	9.7	12.0	13.7	8.4	12.8	18.0	10.1	6.2	5.0	4.7	4.3	4.4	4.1	6.8	18.0
19-Mar	4.6	5.2	5.2	5.4	5.2	6.0	6.5	6.2	5.5	5.9	4.9	4.7	4.1	4.1	3.9	3.8	4.4	4.9	4.9	5.5	6.2	6.5	4.4	4.6	5.1	6.5
20-Mar	3.4	3.3	3.6	3.4	3.7	3.3	3.3	3.1	2.7	3.4	3.3	2.6	2.7	3.0	3.8	7.1	8.3	8.6	8.9	8.9	9.2	9.7	8.7	7.9	5.2	9.7
21-Mar	7.4	8.1	7.0	6.7	6.5	6.5	7.3	7.1	5.8	5.5	5.5	5.4	4.8	5.3	5.9	6.2	6.2	6.3	7.3	6.3	5.6	6.0	5.5	4.8	6.2	8.1
22-Mar	3.9	4.0	3.9	3.8	4.1	4.0	3.9	3.7	3.8	4.2	4.2	4.6	5.3	5.0	4.8	4.7	5.2	4.4	4.3	4.3	3.8	4.0	3.7	3.7	4.2	5.3
23-Mar	4.0	4.3	4.2	4.0	3.7	3.7	4.0	4.1	3.9	4.3	4.2	M	M	3.9	4.4	4.2	4.7	4.7	6.2	9.7	8.3	6.2	5.5	5.1	4.9	9.7
24-Mar	4.4	4.6	4.8	5.3	6.1	6.6	7.0	7.2	7.2	6.6	6.4	5.5	5.1	6.0	5.3	5.2	5.2	5.2	5.7	11.5	9.4	9.5	7.4	6.6	6.4	11.5
25-Mar	5.6	6.5	5.2	5.0	4.2	4.8	5.3	5.3	6.0	5.6	6.9	4.6	4.3	4.2	3.9	4.1	3.6	5.5	7.6	7.8	6.8	7.3	6.3	4.6	5.5	7.8
26-Mar	3.7	3.7	3.1	3.2	3.6	3.6	4.0	3.6	3.9	4.5	4.9	7.5	8.5	8.0	6.0	6.5	10.1	11.9	10.8	9.7	11.5	12.1	11.3	9.2	6.9	12.1
27-Mar	9.0	9.0	9.1	8.1	8.1	7.1	6.8	9.2	11.6	10.6	8.6	6.3	3.4	4.0	3.2	2.0	1.9	2.9	5.6	6.2	4.3	4.2	4.0	4.7	6.2	11.6
28-Mar	3.2	4.8	4.8	3.5	2.8	2.5	3.0	2.0	1.7	3.0	1.7	1.5	0.9	0.7	0.6	0.5	0.4	0.5	1.1	1.7	1.8	1.3	1.3	1.5	1.9	4.8
29-Mar	1.3	4.3	3.1	2.3	2.8	3.0	2.5	2.4	2.9	3.1	3.5	5.2	3.7	4.1	2.4	1.8	4.7	10.5	1.8	1.2	2.3	0.7	0.6	0.3	2.9	10.5
30-Mar	0.3	0.3	0.4	0.5	1.5	2.0	1.9	2.6	4.2	4.1	2.0	2.2	2.0	1.2	2.8	1.8	2.8	8.0	18.5	18.8	16.0	7.4	7.7	5.1	4.8	18.8
31-Mar	3.2	3.6	3.6	3.7	3.7	4.1	4.2	4.4	3.0	3.0	4.3	4.0	5.3	6.7	4.4	1.7	1.7	1.8	1.7	1.7	1.8	1.8	1.7	2.2	3.2	6.7
4.5 4.9 4.7 4.7 5.0 5.3 5.3 4.9 4.8 5.5 5.5 5.0 5.2 5.0 5.0 6.2 7.1 7.7 7.6 7.0 6.2 5.4 5.0																								Diurnal Average		
9.0 9.0 9.1 9.8 11.5 13.8 17.8 21.3 11.6 10.6 28.7 30.0 13.7 16.4 19.4 18.9 24.9 22.7 25.0 18.8 16.0 17.7 11.3 10.4																								Diurnal Maximum		
M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	431	58.16	58.16
6 - 15	276	37.25	95.41
16 - 25	14	1.89	97.30
26 - 80	2	0.27	97.57
> 81.0	0	0.00	97.57

Total Number of Valid Hours: 741

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Athabasca Valley - March 2015

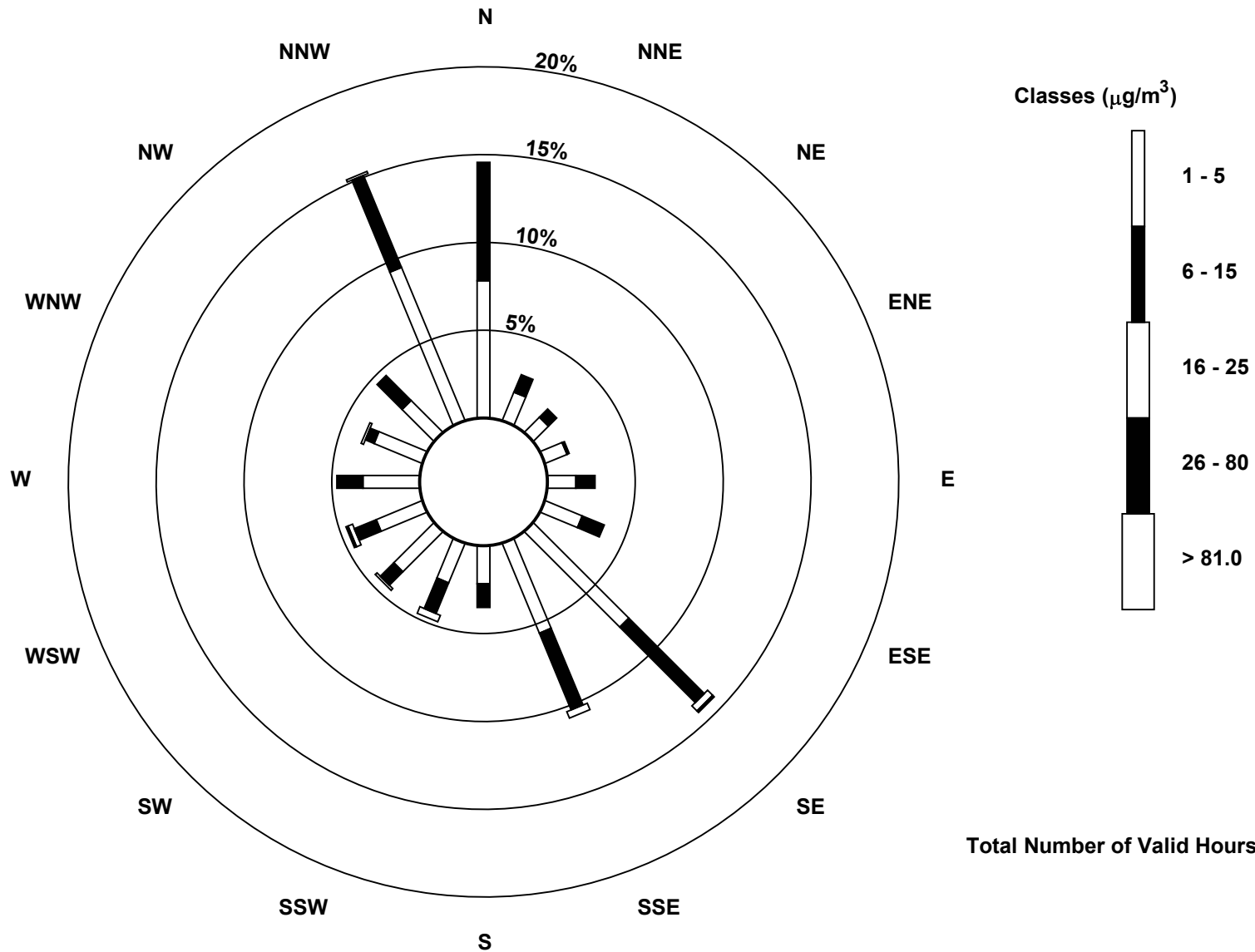
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	58	13	9	10	12	17	57	41	16	18	24	21	24	22	19	70	431
6 - 15	50	8	5	1	8	10	45	35	10	14	8	10	11	4	15	42	276
16 - 25	0	0	0	0	0	0	3	3	0	3	1	2	0	1	0	1	14
26 - 80	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	108	21	14	11	20	27	106	79	26	35	33	34	35	27	34	113	723

Total Number of Valid Hours: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

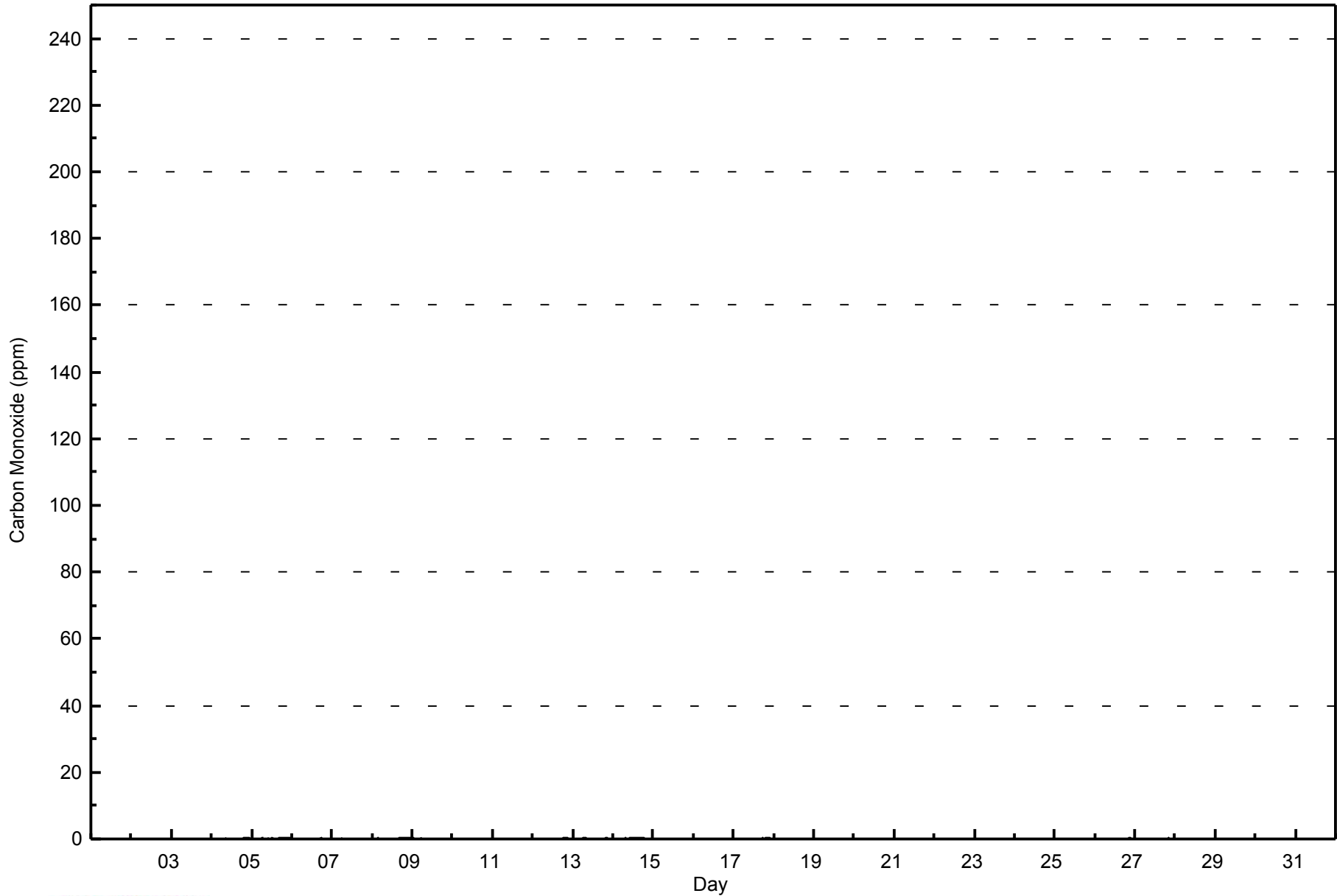
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
 Athabasca Valley (AMS 7)





WBEA
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	689	97.87	97.87
0.4 - 0.5	14	1.99	99.86
0.6 - 0.7	1	0.14	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: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - March 2015

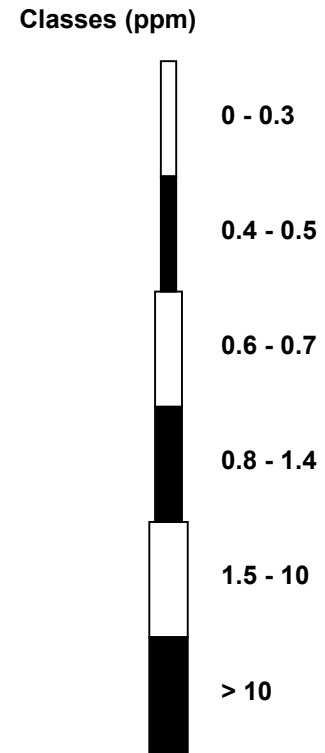
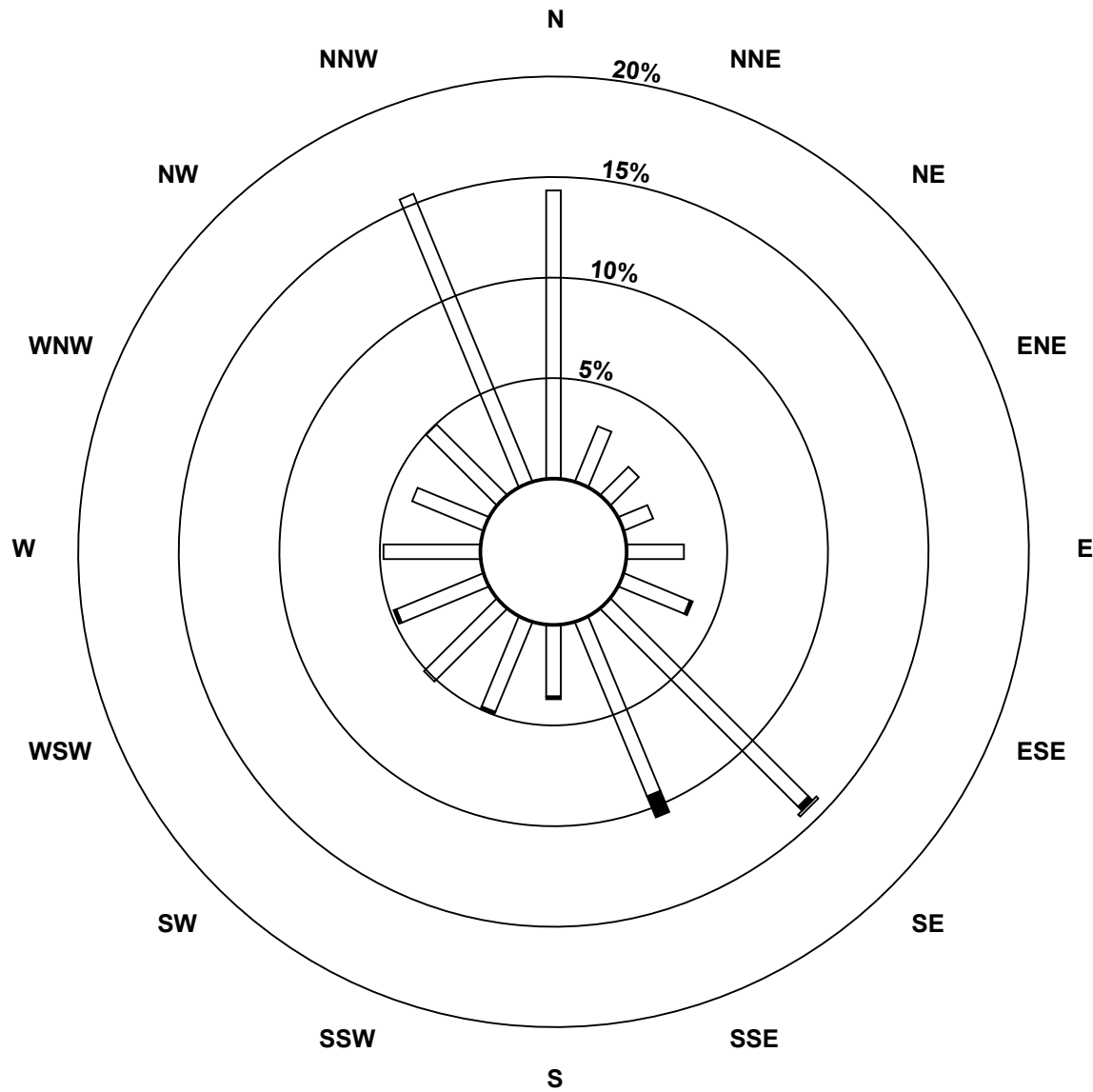
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	101	21	14	11	20	25	98	66	25	34	36	33	34	27	35	109	689
0.4 - 0.5	0	0	0	0	0	1	2	8	1	1	0	1	0	0	0	0	14
0.6 - 0.7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	21	14	11	20	26	101	74	26	35	36	34	34	27	35	109	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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

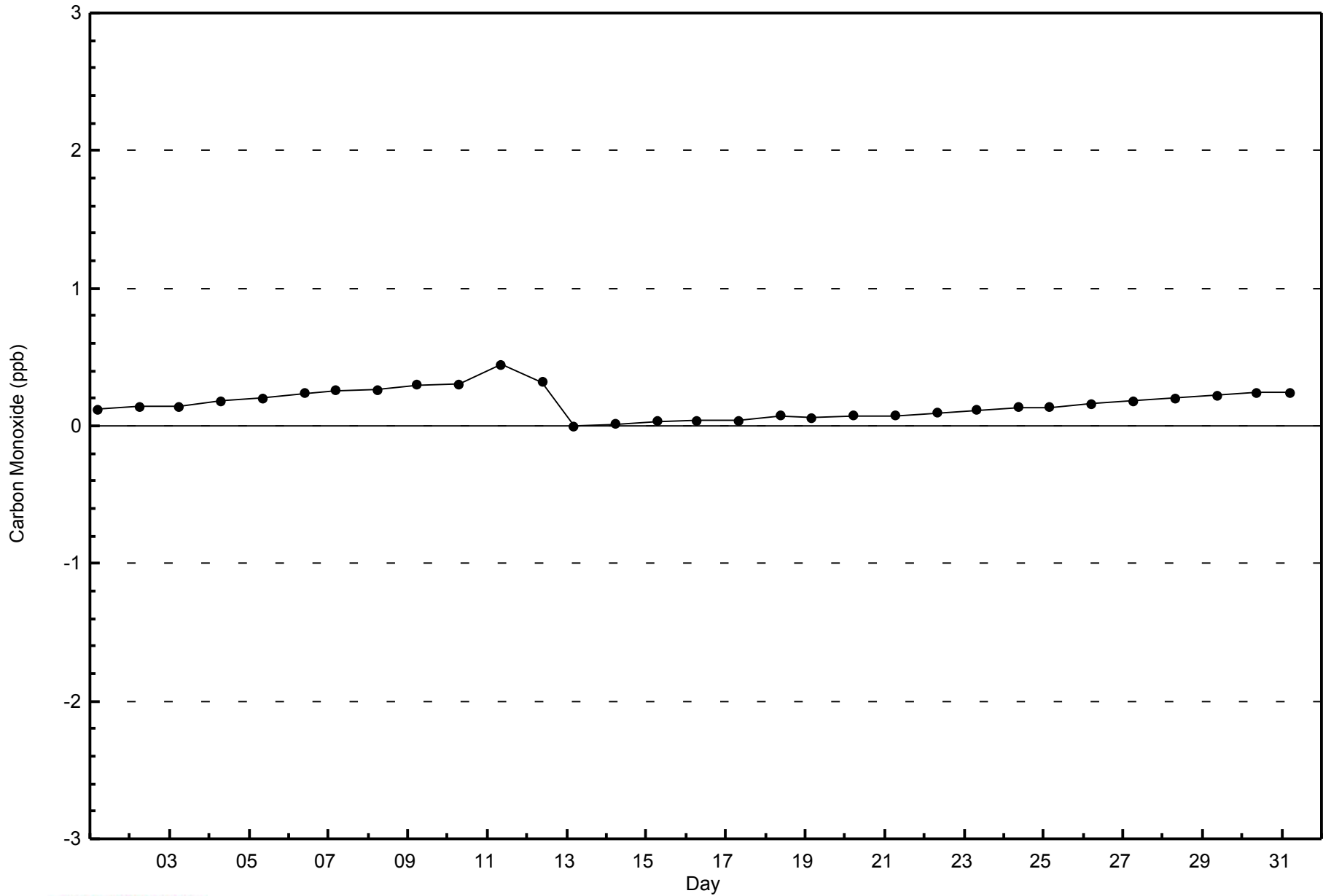


Total Number of Valid Hours: 704



WBEA
Zero Responses

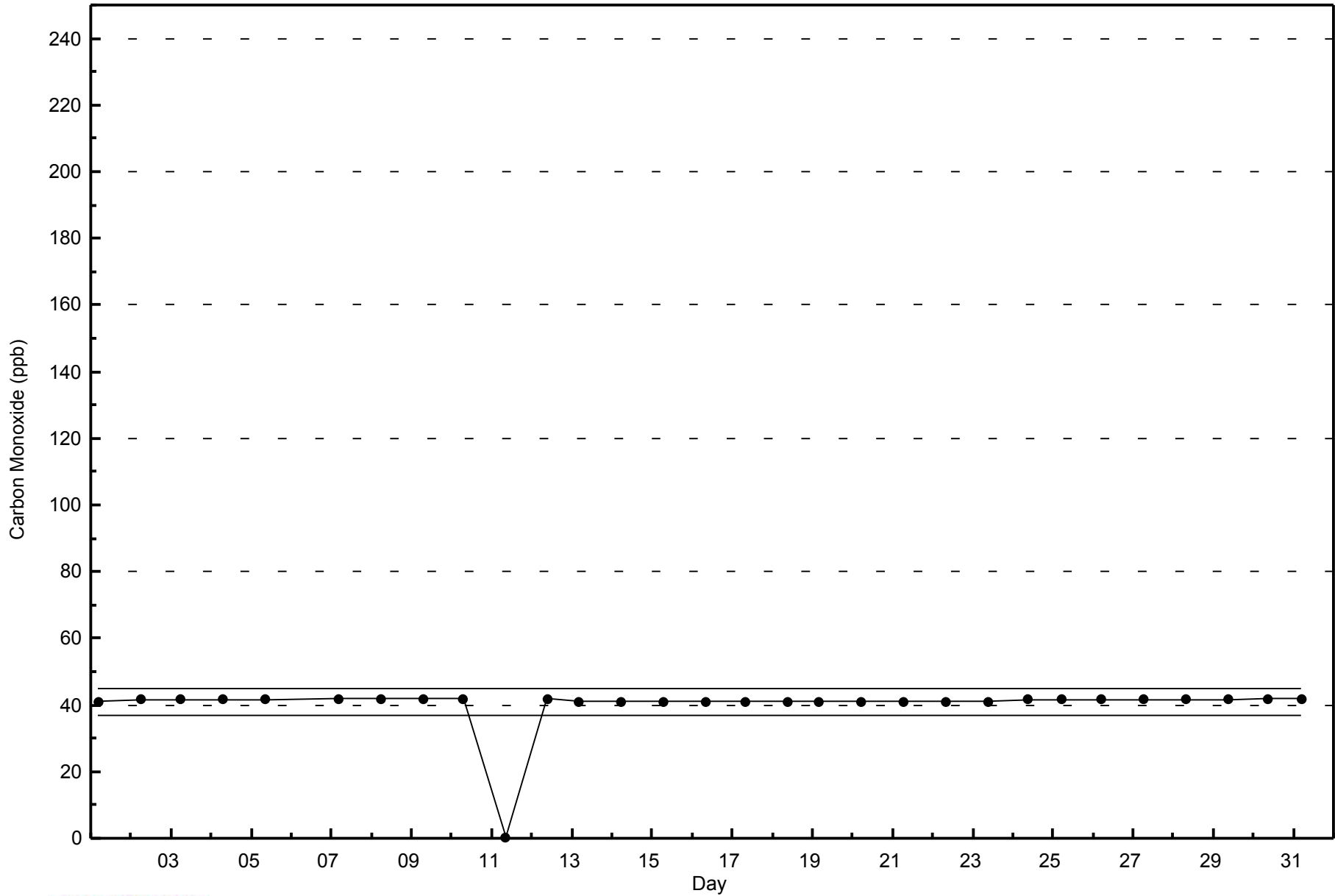
Carbon Monoxide (CO) - ppb
Athabasca Valley - March 2015





WBEA
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - March 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

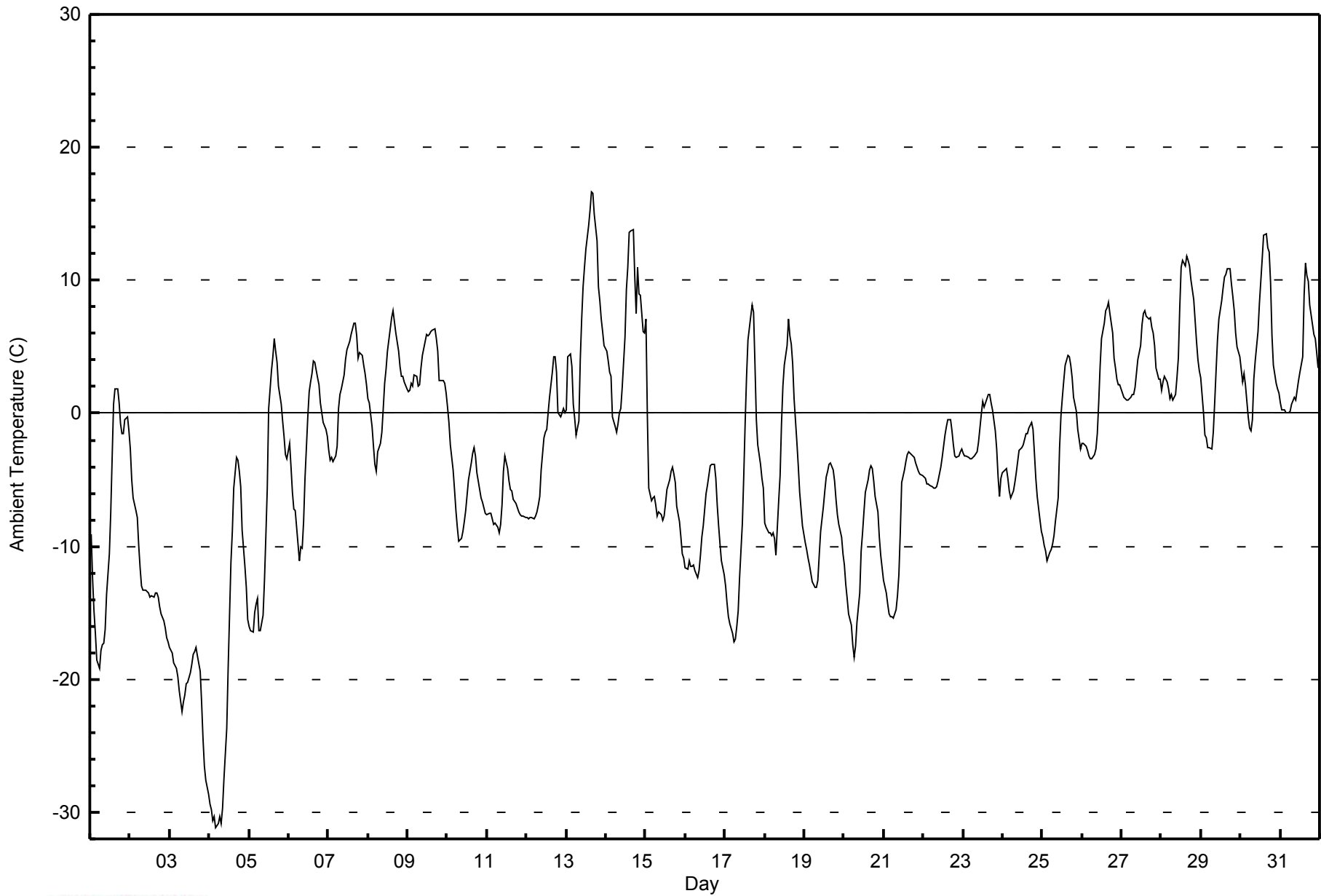
Ambient Temperature (AT) - C
Athabasca Valley - March 2015

Maximum Value: 16.7 C on Mar 13 16:00		Maximum Daily Average: 7.6 C on Mar 13		Hours in Service: 744																						
Minimum Value: -31.2 C on Mar 4 05:00		Minimum Daily Average: -20.7 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 2.6 C at hour 17		Minimum Diurnal Average: -8.3 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -3.30 C		Percentiles: P ₁ = -29.7 P ₁₀ = -14.9 Q ₁ = -8.2 Median = -2.9 Q ₃ = 2.6 P ₉₀ = 6.8 P ₉₉ = 13.7		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-9.0	-12.4	-14.9	-16.6	-18.5	-19.2	-17.8	-17.4	-17.3	-16.2	-13.6	-10.6	-7.4	-3.3	0.7	1.9	1.8	0.8	-0.8	-1.6	-1.6	-0.5	-0.2	-1.4	-8.1	1.9
2-Mar	-2.7	-5.0	-6.4	-7.3	-7.9	-9.9	-11.6	-13.0	-13.3	-13.3	-13.4	-13.6	-13.9	-13.7	-13.8	-13.5	-13.5	-13.9	-14.6	-15.0	-15.6	-16.2	-16.8	-17.2	-12.3	-2.7
3-Mar	-17.6	-18.1	-18.8	-19.0	-19.2	-19.8	-20.8	-22.5	-21.7	-21.2	-20.4	-20.2	-19.5	-18.8	-18.1	-17.9	-17.6	-18.3	-19.4	-21.6	-24.4	-26.6	-27.6	-28.7	-20.7	-17.6
4-Mar	-29.3	-29.8	-30.6	-30.3	-31.2	-30.8	-30.3	-30.8	-29.7	-27.4	-23.7	-19.1	-15.2	-11.2	-8.9	-5.6	-3.3	-3.5	-4.3	-5.5	-8.8	-11.6	-13.1	-15.5	-18.7	-3.3
5-Mar	-16.0	-16.4	-16.5	-15.0	-14.3	-13.9	-16.3	-16.3	-15.2	-12.5	-9.2	-5.6	0.4	3.2	4.3	5.6	4.7	3.8	2.0	0.7	-0.5	-1.8	-3.1	-3.5	-6.3	5.6
6-Mar	-2.2	-4.1	-5.9	-7.1	-7.4	-8.6	-11.1	-10.0	-10.2	-8.1	-4.8	-0.3	1.6	2.4	3.0	3.9	3.9	2.7	2.1	0.8	0.0	-0.7	-1.3	-1.7	-2.6	3.9
7-Mar	-2.8	-3.5	-3.3	-3.6	-3.2	-2.5	0.4	1.4	1.8	2.9	4.0	4.8	5.1	5.5	5.9	6.8	6.8	5.8	4.1	4.6	4.3	3.6	3.0	2.2	2.3	6.8
8-Mar	1.1	0.7	-1.0	-2.5	-3.8	-4.3	-2.9	-2.2	-1.5	0.3	2.2	3.3	4.6	6.3	7.2	7.7	6.9	6.0	4.7	3.5	2.7	2.8	2.4	1.8	1.9	7.7
9-Mar	1.6	1.7	2.2	2.0	2.8	2.8	2.1	2.1	3.4	4.3	5.4	5.9	5.9	6.0	6.1	6.3	6.3	5.7	4.6	2.5	2.4	2.5	2.2	1.6	3.7	6.3
10-Mar	0.4	-0.7	-2.4	-4.2	-5.8	-7.3	-8.6	-9.6	-9.4	-8.8	-8.2	-7.3	-6.2	-5.0	-3.7	-3.0	-2.6	-3.3	-4.5	-5.7	-6.3	-6.6	-7.1	-7.6	-5.5	0.4
11-Mar	-7.6	-7.5	-7.6	-7.9	-8.4	-8.3	-8.6	-9.0	-8.3	-6.9	-4.3	-3.2	-4.2	-5.1	-5.7	-5.8	-6.5	-6.8	-7.1	-7.4	-7.6	-7.7	-7.7	-7.8	-7.0	-3.2
12-Mar	-7.9	-7.9	-7.8	-7.8	-7.9	-7.7	-7.4	-6.9	-6.2	-4.3	-1.9	-1.4	-1.2	0.0	1.3	3.1	4.3	4.3	3.1	0.1	-0.3	0.0	0.3	0.1	-2.5	4.3
13-Mar	0.3	4.3	4.4	3.5	0.6	-0.4	-1.6	-0.5	4.1	7.1	9.5	11.0	12.3	14.1	15.3	16.7	16.5	15.0	13.0	9.6	8.5	7.1	6.1	5.1	7.6	16.7
14-Mar	4.6	4.0	3.1	2.8	-0.3	-1.0	-1.4	-0.8	0.0	0.4	1.9	5.7	9.3	11.0	13.6	13.8	13.8	10.2	7.5	11.0	9.0	8.8	6.1	6.1	5.8	13.8
15-Mar	7.1	-0.2	-5.7	-6.5	-6.4	-6.3	-6.9	-7.7	-7.4	-7.6	-8.1	-7.7	-6.8	-5.7	-5.0	-4.4	-4.0	-4.6	-5.2	-6.9	-8.2	-9.4	-10.6	-10.9	-6.0	7.1
16-Mar	-11.6	-11.7	-11.1	-11.5	-11.5	-11.4	-11.8	-12.4	-11.8	-10.7	-9.3	-8.4	-6.0	-5.5	-4.6	-4.0	-3.9	-3.8	-4.9	-6.9	-8.5	-9.8	-11.1	-12.1	-8.9	-3.8
17-Mar	-13.0	-14.2	-15.3	-15.9	-16.5	-17.2	-17.0	-16.0	-14.9	-12.4	-8.3	-4.7	-0.7	2.8	5.5	7.4	8.1	7.6	3.7	-0.5	-2.4	-3.9	-4.9	-5.6	-6.2	8.1
18-Mar	-8.2	-8.6	-9.0	-8.9	-9.2	-9.0	-9.5	-10.7	-6.6	-4.7	-0.8	2.0	3.7	5.1	7.1	5.9	5.2	3.7	1.1	-2.1	-3.9	-5.9	-7.2	-8.5	-3.3	7.1
19-Mar	-9.7	-10.2	-10.8	-11.4	-12.1	-12.6	-13.1	-13.1	-12.5	-10.6	-8.8	-7.0	-5.8	-4.8	-4.4	-3.9	-3.8	-4.2	-5.1	-6.5	-7.6	-8.4	-9.3	-10.6	-8.6	-3.8
20-Mar	-11.4	-12.8	-13.9	-15.1	-16.0	-17.4	-18.4	-17.5	-15.7	-13.5	-10.3	-8.9	-7.4	-6.0	-5.0	-4.2	-4.0	-4.1	-5.1	-6.2	-7.4	-9.3	-10.6	-11.6	-10.5	-4.0
21-Mar	-12.6	-13.5	-14.4	-15.0	-15.3	-15.3	-15.4	-14.7	-13.7	-12.1	-8.9	-5.2	-4.2	-3.6	-3.1	-2.9	-2.9	-3.1	-3.3	-3.7	-4.1	-4.3	-4.5	-4.7	-8.4	-2.9
22-Mar	-4.8	-4.9	-5.3	-5.3	-5.4	-5.6	-5.7	-5.6	-5.5	-5.1	-4.0	-3.3	-2.5	-1.6	-1.0	-0.5	-0.4	-1.3	-2.4	-3.3	-3.3	-3.2	-2.9	-2.7	-3.6	-0.4
23-Mar	-3.0	-3.2	-3.3	-3.4	-3.4	-3.4	-3.3	-3.2	-2.9	-2.2	-1.1	-0.1	0.9	0.5	1.1	1.4	1.4	0.8	0.3	-1.3	-2.7	-4.8	-6.3	-4.9	-1.9	1.4
24-Mar	-4.5	-4.3	-4.2	-4.9	-5.8	-6.4	-5.9	-5.2	-4.5	-3.6	-2.8	-2.6	-2.4	-2.0	-1.5	-1.5	-1.1	-0.7	-1.2	-3.0	-4.9	-6.3	-8.0	-8.8	-4.0	-0.7
25-Mar	-9.2	-9.9	-10.4	-11.0	-10.5	-10.2	-9.9	-9.2	-8.1	-6.3	-2.6	-0.1	1.2	2.4	3.6	4.3	4.3	3.7	2.6	1.2	0.1	-1.2	-2.0	-2.7	-3.3	4.3
26-Mar	-2.2	-2.3	-2.5	-2.8	-3.2	-3.4	-3.4	-3.1	-2.7	-1.5	0.7	3.5	5.6	6.8	7.7	7.9	8.4	7.6	6.0	4.2	3.4	2.5	2.2	2.1	1.7	8.4
27-Mar	1.6	1.2	1.1	1.0	1.0	1.2	1.4	1.4	2.0	3.0	4.1	5.1	6.7	7.5	7.7	7.3	7.1	7.2	6.5	6.1	5.1	3.4	2.6	2.6	3.9	7.7
28-Mar	1.7	2.4	2.8	2.4	1.9	1.1	1.4	1.0	1.5	2.7	4.1	7.9	11.0	11.5	11.1	11.8	11.5	11.1	10.0	8.6	6.9	5.4	4.1	3.2	5.7	11.8
29-Mar	2.7	0.1	-1.6	-1.9	-2.5	-2.6	-2.7	-1.4	0.8	3.2	5.5	7.1	8.5	9.5	10.2	10.4	10.9	10.9	9.7	8.8	7.7	6.0	5.0	4.3	4.5	10.9
30-Mar	3.3	2.3	3.0	2.1	-0.2	-1.1	-1.3	-0.5	2.6	3.9	6.2	8.2	9.9	11.6	13.4	13.5	12.5	12.1	9.8	5.8	3.6	2.3	1.8	1.6	5.3	13.5
31-Mar	0.8	0.2	0.2	0.1	0.0	0.1	0.2	0.7	1.2	1.0	1.7	2.5	3.1	4.2	8.9	11.3	10.4	9.9	8.2	6.6	5.9	5.6	4.6	3.4	3.8	11.3
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Athabasca Valley - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	22	2.96	2.96
-20 - 0	436	58.60	61.56
0 - 10	255	34.27	95.83
10 - 20	31	4.17	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

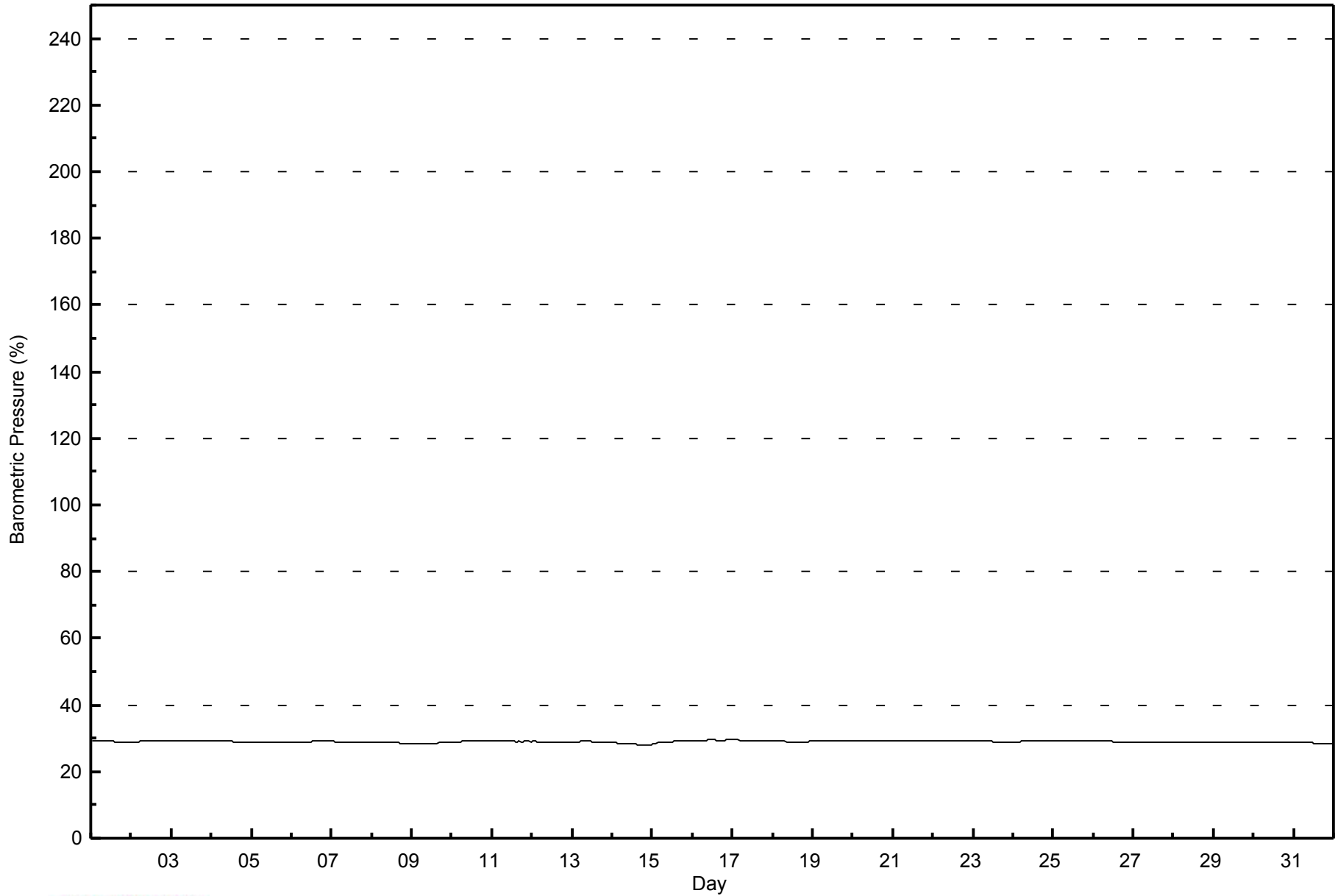


Maximum Value: 29.5 % on Mar 16 11:00																				Maximum Daily Average: 29.4 % on Mar 16					Hours in Service: 744		
Minimum Value: 28.1 % on Mar 14 19:00																				Minimum Daily Average: 28.3 % on Mar 14					Hours of Data: 744		
Maximum Diurnal Average: 29.0 % at hour 10																				Minimum Diurnal Average: 29.0 % at hour 18					Hours of Missing Data: 0		
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 of Calibration: 0		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	29.1	29.3
2-Mar	28.8	28.9	29.0	29.0	29.0	29.1	29.1	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.3	29.3	29.3	29.3	29.2	29.4
3-Mar	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.4
4-Mar	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.1	29.1	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	29.1	29.4
5-Mar	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	28.8	28.8	28.8	28.8	28.9	28.9	28.9
6-Mar	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	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	29.0	29.1
7-Mar	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0
8-Mar	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.7	28.7	28.9
9-Mar	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.8	28.6	28.8	28.8
10-Mar	28.8	28.8	28.9	28.9	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
11-Mar	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	29.0	29.0	29.1	29.1	29.1
12-Mar	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
13-Mar	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.9	29.1
14-Mar	28.7	28.6	28.6	28.6	28.5	28.5	28.5	28.4	28.4	28.4	28.3	28.3	28.3	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.2	28.3	28.3	28.7
15-Mar	28.2	28.3	28.5	28.6	28.7	28.8	28.8	28.8	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	28.9	29.1	29.1
16-Mar	29.1	29.2	29.2	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.4	29.5	29.5
17-Mar	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.3	29.5	29.5
18-Mar	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.1	29.1
19-Mar	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	29.1	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
20-Mar	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	29.3	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
21-Mar	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
22-Mar	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.2	29.3	29.3
23-Mar	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
24-Mar	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.1	29.2	29.2
25-Mar	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
26-Mar	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1	29.1
27-Mar	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.8	28.9	28.9
28-Mar	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.9	28.9
29-Mar	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.9	28.9
30-Mar	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
31-Mar	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.8
																								Diurnal Average			
																								Diurnal Maximum			



WBEA
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - March 2015



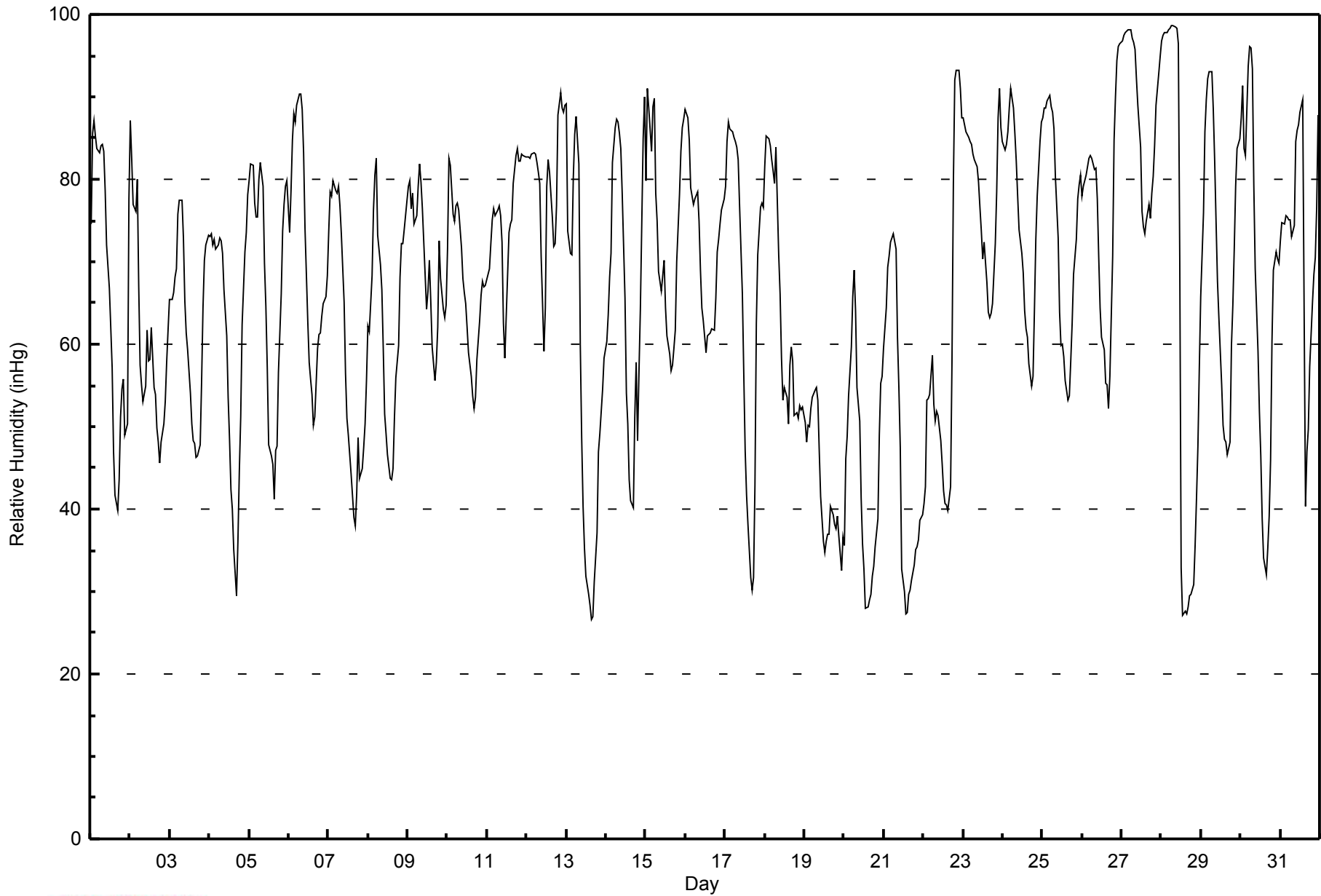


Maximum Value: 99 inHg on Mar 28 08:00																			Maximum Daily Average: 88.0 inHg on Mar 27						Hours in Service: 744																			
Minimum Value: 27 inHg on Mar 13 16:00																			Minimum Daily Average: 43.2 inHg on Mar 19						Hours of Data: 744																			
Maximum Diurnal Average: 80.5 inHg at hour 6																			Minimum Diurnal Average: 47.9 inHg at hour 16						Hours of Missing Data: 0																			
Monthly Average: 66.4 inHg																			Percentiles: P ₁ = 28 P ₁₀ = 41 Q ₁ = 54 Median = 69 Q ₃ = 80 P ₉₀ = 88 P ₉₉ = 98						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Mar	75	86	87	85	84	83	84	84	83	79	72	67	62	57	47	42	40	44	51	55	56	49	50	78	66.6	87																		
2-Mar	87	82	77	76	80	67	58	55	53	55	62	58	58	62	55	54	50	48	46	48	50	53	58	62	60.5	87																		
3-Mar	65	65	66	68	69	76	77	77	73	65	61	59	54	50	48	48	46	47	48	55	64	70	72	73	62.5	77																		
4-Mar	73	73	72	73	72	72	73	72	71	67	61	54	48	42	40	35	30	36	45	51	62	71	74	78	60.2	78																		
5-Mar	80	82	82	77	75	75	80	82	79	70	64	57	48	46	45	41	47	38	57	66	74	77	79	80	67.2	82																		
6-Mar	74	79	85	88	87	89	90	90	88	83	74	63	58	56	54	50	51	59	61	61	63	65	66	68	71.0	90																		
7-Mar	74	78	78	80	79	78	79	77	73	65	57	51	49	47	44	39	38	42	49	44	45	47	50	56	59.1	80																		
8-Mar	62	61	68	76	81	83	73	70	67	60	51	49	47	44	44	45	51	56	60	68	72	72	74	78	62.9	83																		
9-Mar	79	80	76	78	75	76	79	82	80	76	68	64	66	70	65	60	56	58	62	73	68	64	63	65	70.1	82																		
10-Mar	72	83	82	76	75	77	77	76	72	68	66	65	62	59	56	54	52	54	58	63	66	68	67	67	67.2	83																		
11-Mar	68	69	72	75	76	76	76	77	76	72	63	58	68	73	75	75	80	83	84	82	82	83	83	83	75.4	84																		
12-Mar	83	83	83	83	83	83	82	81	80	71	59	64	79	82	81	75	72	72	77	88	90	89	88	89	79.9	90																		
13-Mar	89	74	71	71	80	85	88	82	60	49	40	35	32	30	28	27	27	31	37	47	49	52	55	58	54.0	89																		
14-Mar	60	64	68	71	82	86	87	87	86	84	78	66	54	50	44	41	40	51	58	48	57	64	85	90	66.7	90																		
15-Mar	80	91	89	83	89	90	78	75	69	66	68	70	64	61	59	57	59	62	70	78	83	86	87	87	73.9	91																		
16-Mar	89	87	85	79	78	77	78	78	75	69	64	63	59	61	61	61	62	62	66	71	73	75	76	78	71.9	89																		
17-Mar	79	85	87	86	86	85	85	84	82	77	66	56	47	42	38	32	30	32	43	62	71	77	77	77	66.1	87																		
18-Mar	81	85	85	84	82	81	80	84	71	66	58	53	55	54	50	57	60	58	51	52	51	53	52	52	64.8	85																		
19-Mar	51	48	50	50	52	54	54	55	53	47	42	36	35	36	37	37	40	39	38	38	39	37	32	37	43.2	55																		
20-Mar	36	46	49	54	60	66	69	64	55	51	41	36	33	28	28	29	30	32	33	35	39	49	55	56	44.7	69																		
21-Mar	59	64	69	71	72	73	73	71	61	55	47	33	30	27	27	30	30	31	33	35	35	36	39	39	47.6	73																		
22-Mar	41	43	53	53	54	59	53	51	52	51	48	45	42	41	41	40	43	58	80	92	93	93	91	87	58.5	93																		
23-Mar	88	87	86	85	85	84	83	82	81	80	77	74	70	72	68	64	63	64	65	72	78	87	91	86	78.0	91																		
24-Mar	85	84	84	86	89	91	89	86	82	78	74	71	69	64	62	61	58	55	56	64	73	78	85	87	75.3	91																		
25-Mar	87	89	89	90	90	89	88	86	80	73	64	60	60	59	56	53	54	58	63	68	73	78	79	81	73.5	90																		
26-Mar	78	79	80	82	83	83	83	81	81	78	71	64	61	59	55	55	52	56	71	85	90	94	96	97	75.6	97																		
27-Mar	97	97	98	98	98	98	97	97	96	92	89	84	76	74	73	75	77	75	78	80	84	89	93	95	88.0	98																		
28-Mar	97	97	98	98	98	98	99	99	98	98	96	71	33	27	28	27	28	29	30	31	36	41	48	57	65.1	99																		
29-Mar	66	76	86	90	92	93	93	89	82	75	68	63	55	50	49	48	47	48	60	65	71	79	84	85	71.3	93																		
30-Mar	87	91	84	83	94	96	96	93	79	69	59	52	46	39	34	32	35	39	46	60	69	71	70	70	66.5	96																		
31-Mar	73	75	75	76	75	75	75	73	74	85	86	87	88	90	64	40	47	50	57	65	69	70	77	88	72.2	90																		
																			74.6	76.9	77.8	78.2	79.8	80.5	79.9	78.7	74.6	70.1	64.4	59.0	55.1	53.3	50.2	47.9	48.1	50.8	55.5	61.1	65.2	68.2	70.8	73.6	Diurnal Average	
																			97	97	98	98	98	98	99	99	98	98	96	87	88	90	81	75	80	83	84	92	93	94	96	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - inHg
Athabasca Valley - March 2015





Maximum Speed: 36 km/h on Mar 2 06:00	Maximum Daily Speed Average: 22.9 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 29 04:00	Minimum Daily Speed Average: 0.7 km/h on Mar 17	Hours of Data: 744
Maximum Diurnal Speed Average: 3.0 km/h at hour 20	Minimum Diurnal Speed Average: 0.7 km/h at hour 8	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 330.8 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 7 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 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		
1-Mar	N3	NNW1	NW2	NNE1	S1	SE4	SE8	SE12	SE12	SE13	SE12	SE10	SE10	SE4	SSW11	S13	S12	SSE10	SE14	SE12	SE8	SSW8	WSW12	NNW17	SSE6.0	NNW17
2-Mar	NNW30	NNW29	N27	NNW20	NNW24	NNW36	NNW34	NNW33	NNW28	NNW25	NNW23	NNW31	NNW28	NW26	NNW26	NNW27	NW29	NW29	NW20	NNW17	W20	W16	WSW11	SW8	NNW22.9	NNW36
3-Mar	WSW9	WSW10	WSW14	W18	WNW9	N7	W4	W4	NNW10	NNW16	N17	NNW18	N15	N14	N14	NNW15	N9	N7	N4	NW3	WSW3	SW3	WSW1	ENE1	NNW6.7	NNW18
4-Mar	NE0	ESE0	SW2	SSE2	S6	SSE6	SE9	SE6	SE8	SE9	SE12	ESE7	ESE7	E3	NNE1	SSW4	SSE10	SSW9	SW11	SSE5	S2	SSW4	SW4	SW4	SSE4.2	SE12
5-Mar	SW2	E2	ESE2	S1	SSW2	S4	S2	ESE2	SE1	WSW2	SSW2	SE1	SE2	ESE6	ESE7	SE5	SE6	SE10	SE4	S2	WSW2	SSW2	SSE3	SSE4	SE2.4	SE10
6-Mar	SE10	SE5	SW3	SE3	SE3	SSW2	WSW3	SW2	W4	NW3	NW6	NNW11	N10	N8	NW7	WNW5	W2	NW3	N7	N11	N9	N9	NNW6	SW5	NNW2.9	NNW11
7-Mar	NW3	WNW2	NE1	N1	SSE2	SE3	SW13	WSW14	WSW11	W8	NNW19	NNW20	NNW21	NNW20	W23	NNW17	W19	W12	W12	W16	W13	WSW13	WSW11	WSW3	W10.5	W23
8-Mar	SSW3	SSW3	SE3	SE5	SSE3	SSE3	SE7	SE7	SE8	SSE6	SSW9	SW10	SW9	S3	SW6	SSE3	ESE4	SE7	SSE3	S3	SSE3	SSE5	SSE4	SSE3	SSE4.1	SW10
9-Mar	SE2	SE3	SSE5	S4	S3	SSE4	W2	SW4	WSW8	WSW11	NNW13	NNW12	N9	SW4	NW6	NW12	NNW16	N9	W4	W4	WNW9	WNW5	WNW6	W11	WNW4.3	NNW16
10-Mar	W10	NNW17	N17	N14	N10	N10	N10	N9	N10	N11	NNW8	NNW10	NNW9	NW11	NW12	NNW10	NNW9	N11	N12	N12	N12	NNW16	NNW15	N15	NNW11.1	NNW17
11-Mar	N14	NNW14	N14	N16	N16	N15	N16	N16	N12	N9	ENE10	ENE9	NNW14	N16	N18	N15	N16	N14	NNW13	NNW16	NNW13	NNW11	NNW12	NNW11	N13.0	N18
12-Mar	NNW12	NNW11	NNW8	N7	NNW10	NNW12	NNW7	NNE3	N4	SE2	SSE8	SE11	SSE13	SSE9	SE11	SE10	SE8	SSE10	SE6	E0	SSE3	SSE6	SSE7	SE5	ESE2.1	SSE13
13-Mar	SSE2	WSW13	WSW14	WSW7	SSE3	S3	S3	SSE3	SW9	WSW14	SW11	SW13	SW11	SW8	SSW12	SSE14	SSE12	SSE14	SSE11	SE7	SE9	SE12	SE14	SE10	SSW7.1	WSW14
14-Mar	SSE10	SSE10	SSE9	SE10	WNW1	SW5	SW4	SSW3	S4	SSW2	W1	SE6	SE8	SE6	SE5	SSE5	SSE4	SSW3	SSW6	W11	SW6	WSW13	SW7	SW9	S4.3	WSW13
15-Mar	W20	NNW35	NNW33	NW29	NW19	NW14	NNW14	W13	NNW24	NW24	NNW14	N12	N12	N11	N11	N8	NNE7	ENE7	ENE5	W3	S1	S2	SW1	SSW1	NW10.6	NNW35
16-Mar	SW2	NNW8	NNW12	NNW15	NW8	NNW7	N5	NNW4	N7	N8	NNE5	NNW7	N2	NNW8	NNW11	NNW16	NNW15	NNW13	N11	N12	NNW9	NNW6	N6	NNW6	NNW8.2	NNW16
17-Mar	N3	W2	W4	WNW3	NW2	W3	SW1	WSW3	WSW4	WNW1	W4	W3	NW2	E3	ESE5	E6	ESE4	SSE5	WSW2	W2	SSW0	NE1	SSW2	SSW3	SW0.7	E6
18-Mar	W4	SSW3	W1	SSW3	SW4	SSW3	SW4	WSW4	SE5	E2	ENE4	NNE2	N3	NE2	N5	NNW15	NNW17	N15	NNW23	NNW24	NNW25	NNW20	N16	NNW17	NNW7.1	NNW25
19-Mar	NNW18	NNW15	NNW10	NNW10	NNW9	NNW8	N9	N8	N9	N7	NNW9	NNW10	NNW10	NNW14	NNW16	NNW17	NNW17	NNW17	N14	NNW13	NNW12	N8	NNE6	NE5	NNW11.2	NNW18
20-Mar	N5	NE4	NNE4	NNE5	N3	WNW3	NW3	NNW2	NNW4	WNW3	WNW3	WNW3	NW5	NNW5	NW6	NW6	NNW9	NNW10	N8	N9	N4	NNW4	N2	N5	NNW4.2	NNW10
21-Mar	N5	N4	NNE4	NNE2	NE3	NE2	N2	N3	NNW4	NNW5	NNE2	ESE10	ESE11	SE13	SE13	ESE13	SE15	SE14	SE11	SE12	SE12	SE9	ESE8	ESE8	ESE5.6	SE15
22-Mar	ESE8	SE10	SE10	ESE6	SSE7	SE8	ESE5	ESE7	ESE9	SE9	SSE7	S10	SSE11	S10	SSE10	SSE9	SSE8	ESE5	SSE3	N5	N5	N3	SE5	SE7	SE5.9	SSE11
23-Mar	SSE6	SE8	SE7	SE7	SE7	SE8	SE8	SE7	SE9	SE6	SSE3	SW7	NNE2	NNW9	N6	NNW7	NNW12	N9	N8	NNW6	NNW5	NW4	NNW7	N9	ENE1.5	NNW12
24-Mar	N7	N8	NNW9	NNW5	NNW3	NW3	NNW4	NW5	N7	N6	N9	N10	N11	N13	N12	N8	NE7	E5	NW2	NW3	WSW3	NW4	NNW2	N5.4	N13	
25-Mar	NW2	NNE2	NNE1	NE2	NNE3	NNE2	NNE2	NNE3	N5	N3	SSE8	SSE14	SSE13	SSE14	SSE13	SSE12	SSE13	SSE11	SSE9	SSE7	SE7	SE5	SE6	SE4	SSE4.7	SSE14
26-Mar	SE11	SSE9	SE13	SE12	SE12	SE11	SE12	SSE12	SSE11	SSE9	SSE11	SSE10	SSE8	ESE9	ESE11	ESE13	SSE9	S8	SSW9	SSW9	SSE4	SE4	SE4	SE5	SSE8.7	SE13
27-Mar	E3	E1	SE1	SSE0	SE2	SSE3	SE7	SE10	SE7	SE7	SE6	E5	ESE5	SE12	SE13	SE13	ESE8	SE11	SE6	SSE6	E2	NNW2	W3	S1	SE5.0	SE13
28-Mar	WSW3	S3	SSE6	N2	W2	ENE1	SE0	WSW3	S1	E3	N2	NNW6	NNW18	NW27	NW22	NW23	NNW28	NNW21	W18	W15	WSW16	WSW14	WSW8	SSW8	WNW8.0	WNW28
29-Mar	SSW7	SE5	SSW1	ENE0	SSE1	SSE2	SSE1	SSE2	ESE5	E6	E4	E2	SE2	SE2	E7	E6	ESE3	SSW9	SW11	SSW9	SSW7	E4	SW4	SW5	SSE2.9	SW11
30-Mar	WSW3	W3	SW5	WSW4	NNW4	NW3	NNW3	WNW3	ENE4	NNW4	NNW7	NNE4	NE4	ENE8	S7	SW11	WNW5	NNW3	WNW2	WSW4	SSW1	N0	S1	SSW3	WNW1.4	SW11
31-Mar	SSW3	S4	SSE6	SSE5	SE6	SE6	SE5	SE7	SE5	N3	NE3	NNW3	N7	N6	NE8	E21	E23	E17	ENE16	NE12	NNE13	NNE12	N13	N11	ENE5.7	E23

NNW1.9	NNW2.7	NNW2.3	NNW2.5	NNW1.9	NNW1.6	NW1.1	NNW0.7	NW1.1	NNW2.0	NNW1.4	NNW1.9	N2.6	N2.9	NNW2.5	NNW2.3	NNW2.5	N1.5	NNW1.7	NW3.0	NW2.5	NNW1.8	NNW1.4	NNW1.2	Diurnal Average
NNW30	NNW35	NNW33	NW29	NNW24	NNW36	NNW34	NNW33	NNW28	NNW25	NNW23	NNW31	NNW28	NW27	NNW26	NNW27	NW29	NNW29	NNW23	NNW24	NNW25	NNW20	N16	WNW17	Diurnal Maximum

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

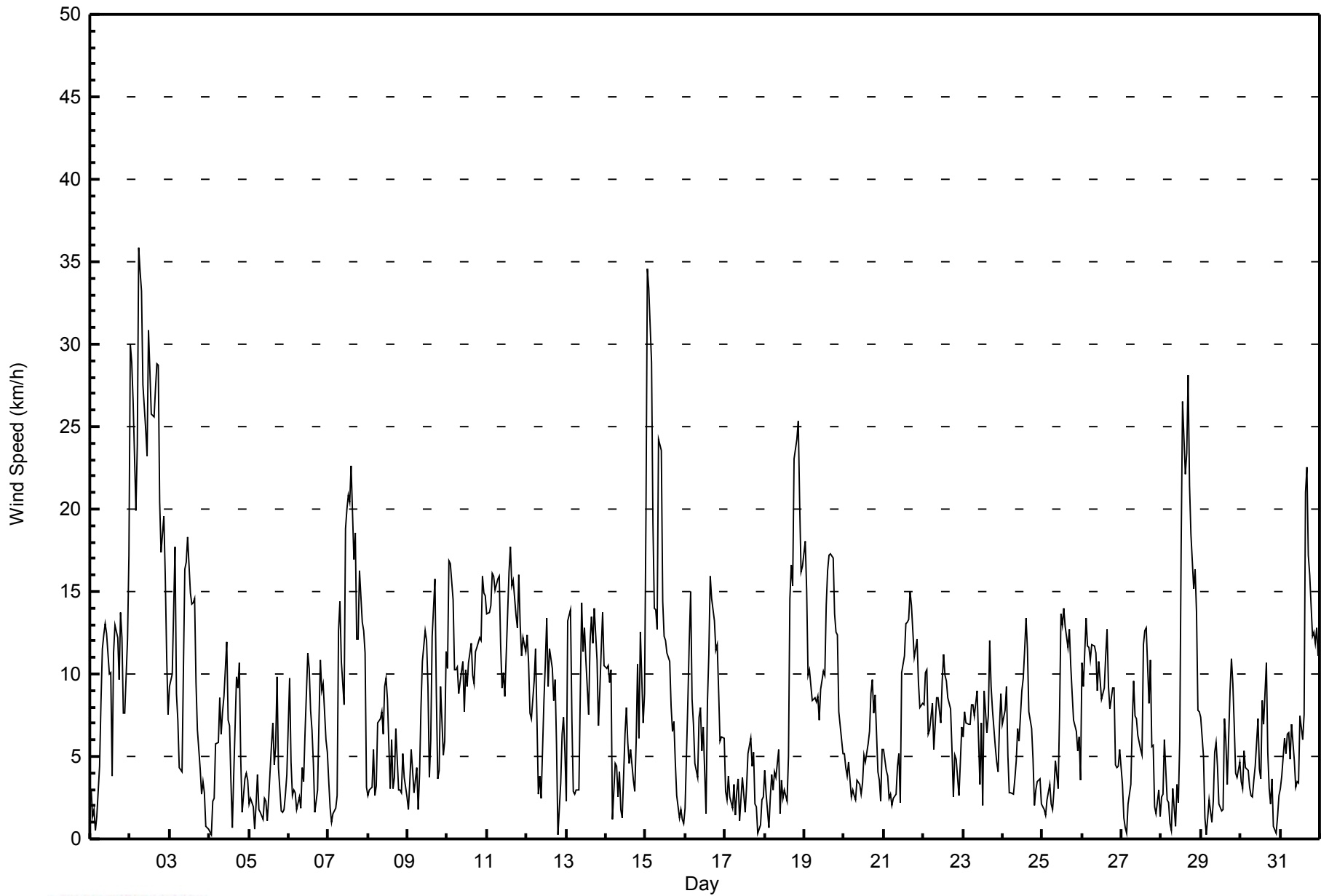


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																								
Maximum Value: 12 km/h on Mar 2 01:00														Hours of Data: 744																								
Minimum Value: 1 km/h on Mar 20 06:00														Hours of Missing Data: 0																								
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 8														Hours of Calibration: 0																								
														Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24														
1-Mar	1	1	1	1	1	2	3	3	3	3	2	3	3	2	5	5	4	3	3	2	2	3	5	5	5													
2-Mar	12	8	8	5	7	8	6	9	5	6	5	7	5	5	5	5	6	6	4	3	3	2	3	2	12													
3-Mar	5	4	6	3	6	2	2	1	3	4	4	4	3	3	3	2	2	1	1	2	2	2	1	6														
4-Mar	1	1	2	2	2	2	2	3	2	4	3	2	2	1	3	3	2	5	4	1	1	2	1	2	5													
5-Mar	2	2	2	2	2	2	1	1	1	2	2	1	1	1	3	2	2	2	1	1	1	1	2	2	3													
6-Mar	2	4	2	2	1	2	2	1	1	1	3	2	2	3	2	1	1	1	3	3	2	2	3	2	4													
7-Mar	1	1	1	1	1	2	4	3	3	5	4	5	4	5	4	4	4	3	3	2	2	2	2	2	5													
8-Mar	2	2	1	1	1	2	1	2	2	3	4	2	2	1	2	1	1	3	3	1	1	2	1	1	4													
9-Mar	1	2	3	3	2	2	1	3	3	2	3	3	3	3	3	6	4	3	1	1	5	3	3	2	6													
10-Mar	5	5	4	4	3	3	3	2	2	2	2	2	2	2	2	2	1	2	3	3	3	4	3	3	5													
11-Mar	3	2	3	3	3	3	3	3	3	4	3	3	4	3	4	3	3	4	4	3	2	2	3	2	4													
12-Mar	3	2	2	2	3	2	2	1	1	4	2	4	3	2	2	2	3	2	3	2	3	2	2	2	4													
13-Mar	2	3	2	5	1	2	2	2	3	3	2	3	3	3	4	4	3	4	3	2	3	3	2	2	5													
14-Mar	2	3	3	3	1	2	2	2	3	2	1	4	2	2	1	1	1	1	4	4	2	2	3	4	4													
15-Mar	5	9	9	10	4	3	4	4	4	5	5	3	3	3	2	2	2	2	1	1	1	2	1	1	10													
16-Mar	1	5	5	3	1	2	1	2	3	1	2	3	2	2	2	2	2	2	3	3	3	2	2	4	5													
17-Mar	1	2	1	1	1	1	1	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	2													
18-Mar	2	2	1	2	1	2	2	1	3	2	2	1	1	1	3	4	3	4	6	6	5	5	4	4	6													
19-Mar	4	4	2	3	2	2	2	2	2	1	2	2	3	2	2	3	3	3	3	3	3	2	2	2	4													
20-Mar	1	1	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2													
21-Mar	2	1	2	1	1	1	1	1	1	1	3	3	3	3	4	3	4	4	3	4	3	3	2	2	4													
22-Mar	3	3	3	3	2	2	1	2	2	2	2	2	2	2	2	3	2	3	2	1	1	1	3	2	3													
23-Mar	1	1	1	2	1	2	2	2	2	2	2	3	1	1	2	2	2	2	2	1	1	1	2	2	3													
24-Mar	2	2	2	2	1	1	1	2	2	1	2	2	2	3	2	2	2	2	1	1	1	1	1	1	3													
25-Mar	1	1	1	1	1	1	1	1	1	1	5	3	3	3	3	3	3	2	2	2	2	2	2	2	5													
26-Mar	2	3	3	3	2	2	3	3	3	2	3	2	2	2	3	3	2	2	3	3	1	2	2	2	3													
27-Mar	2	2	1	1	1	2	2	2	2	1	2	1	3	3	3	4	3	2	2	2	1	1	1	1	4													
28-Mar	1	2	3	2	2	1	1	3	1	1	2	4	4	7	4	6	8	4	3	2	2	3	3	4	8													
29-Mar	3	2	1	1	1	2	2	2	2	3	2	1	2	2	2	1	1	5	3	4	2	2	2	4	5													
30-Mar	3	1	2	2	1	1	1	1	1	2	1	2	2	2	3	4	4	2	1	2	1	2	1	1	4													
31-Mar	1	1	2	2	2	2	2	2	3	2	2	3	3	3	6	6	6	7	4	4	4	4	3	2	7													
														12	9	9	10	7	8	6	9	5	6	5	7	5	7	6	6	8	7	6	6	5	5	5	5	
Diurnal Maximum																																						



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Athabasca Valley - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	300	40.32	40.32
6 - 11	260	34.95	75.27
12 - 19	143	19.22	94.49
20 - 28	30	4.03	98.52
29 - 38	11	1.48	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - March 2015

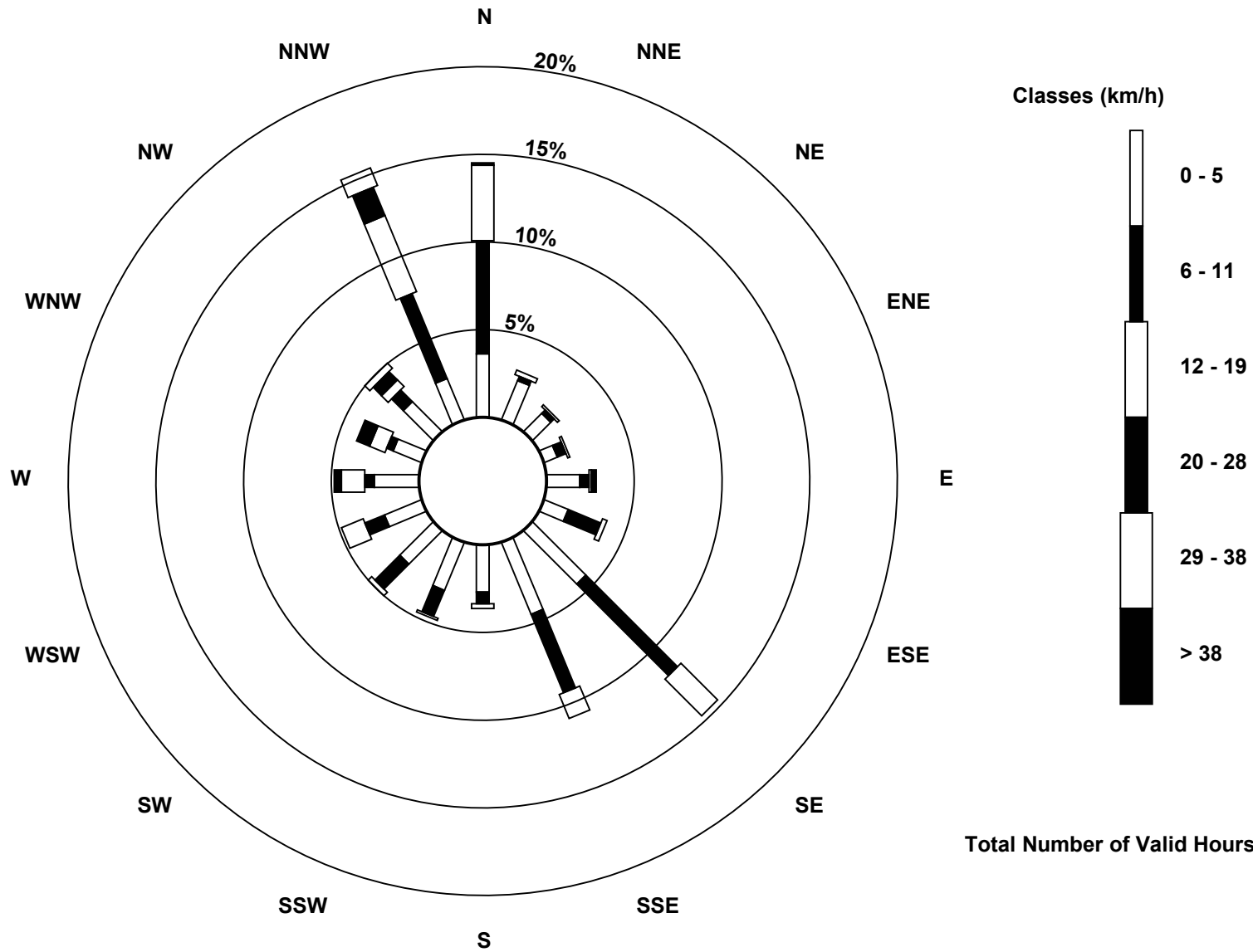
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	27	18	11	6	14	11	32	33	20	22	20	17	19	13	18	19	300
6 - 11	48	2	2	4	4	15	55	36	5	12	15	9	4	3	7	39	260
12 - 19	32	2	1	1	1	2	22	11	2	1	2	10	10	7	4	35	143
20 - 28	1	0	0	0	2	0	0	0	0	0	0	0	3	6	5	13	30
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	11
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	108	22	14	11	21	28	109	80	27	35	37	36	36	29	37	114	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

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





Wood Buffalo Environmental Association

Summary of Hour Averages

**Wind Direction (WD) - deg
Athabasca Valley - March 2015**

Direction of Maximum Speed: 337 deg on Mar 2 06:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 328.0 deg on Mar 2	Hours of Data: 744
Direction of Minimum Speed: 75 deg on Mar 29 04:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Mar 17	Percent Operational Time: 100.0
Monthly Average Direction: 311.3 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	359	342	308	32	171	141	139	141	141	137	135	138	136	146	209	174	175	152	140	138	141	195	249	293	159.7
2-Mar	334	348	357	346	346	337	328	334	330	336	330	341	332	326	340	329	320	320	316	297	281	262	249	231	328.0
3-Mar	237	249	251	260	298	350	278	279	339	345	356	347	358	356	355	345	5	9	7	314	255	222	257	76	325.9
4-Mar	52	106	224	149	181	149	137	142	132	143	133	123	103	88	29	206	165	206	216	164	180	210	218	236	160.4
5-Mar	221	81	104	188	212	184	169	120	144	242	205	133	124	106	104	142	139	140	133	185	256	194	167	147	146.0
6-Mar	145	143	222	130	142	212	245	226	276	307	323	332	353	6	313	297	279	318	350	349	350	353	347	221	331.0
7-Mar	324	291	41	352	156	134	235	244	252	279	288	289	299	290	280	292	279	275	267	269	260	255	256	243	274.4
8-Mar	200	194	142	133	149	150	136	141	140	148	211	220	223	188	216	166	115	142	164	181	153	149	149	153	168.1
9-Mar	138	145	149	175	174	150	268	227	248	250	292	290	353	228	320	312	332	351	276	270	289	298	296	259	285.8
10-Mar	265	338	355	357	7	3	0	352	350	351	331	331	332	323	322	338	344	352	354	351	354	347	348	351	344.8
11-Mar	350	347	355	352	350	352	349	351	355	1	77	73	346	351	350	353	351	350	347	342	342	348	340	341	352.7
12-Mar	346	348	339	352	348	340	346	19	4	132	163	142	148	155	139	146	140	147	144	100	151	158	155	141	118.1
13-Mar	152	241	243	257	147	191	177	159	233	239	226	221	233	228	210	167	168	154	151	143	145	143	138	143	192.0
14-Mar	148	151	153	138	286	232	226	204	169	192	259	131	138	135	144	154	154	200	204	266	223	245	225	226	184.3
15-Mar	263	345	341	322	309	313	284	279	293	308	340	356	11	9	353	351	14	64	65	264	180	174	221	208	325.4
16-Mar	230	332	342	339	318	330	355	333	5	357	12	340	8	344	342	335	333	338	351	350	346	345	351	339	341.9
17-Mar	349	277	268	285	307	271	215	240	253	285	267	276	321	81	104	94	112	154	258	269	212	47	198	202	235.4
18-Mar	268	205	273	209	224	212	236	250	125	83	63	28	352	46	349	344	344	352	345	343	343	347	356	347	343.5
19-Mar	344	336	345	341	343	346	349	351	349	353	344	336	328	341	343	340	345	342	349	347	345	0	12	42	345.4
20-Mar	1	47	24	25	3	293	326	344	344	286	285	300	319	327	324	325	337	343	355	351	9	341	5	357	343.0
21-Mar	5	7	16	14	42	34	10	355	333	331	15	112	112	129	127	122	132	125	128	125	127	125	105	118	110.2
22-Mar	122	138	144	123	150	145	111	109	117	136	159	171	163	174	156	154	153	111	152	355	350	359	132	138	140.6
23-Mar	150	142	141	134	127	131	137	137	138	138	166	221	30	347	6	347	345	355	360	338	347	318	341	351	58.3
24-Mar	353	350	345	336	337	317	314	336	313	353	6	353	354	3	6	0	352	42	86	316	311	256	307	330	351.2
25-Mar	322	21	32	42	19	16	22	17	351	353	162	151	159	161	162	162	149	150	160	159	152	140	139	127	147.8
26-Mar	140	150	139	138	140	132	145	149	147	151	149	159	149	110	112	123	162	185	211	204	161	134	138	143	146.9
27-Mar	101	80	136	164	127	155	130	134	132	132	143	80	108	141	136	132	116	135	142	150	85	345	272	183	131.0
28-Mar	240	183	154	354	274	73	124	243	174	81	355	331	328	318	318	305	294	286	280	266	257	252	237	201	289.1
29-Mar	201	135	201	75	164	163	156	167	119	101	99	97	145	141	100	98	105	192	221	207	194	87	215	215	162.0
30-Mar	244	263	232	255	339	306	327	283	71	339	343	21	51	71	191	233	293	333	299	237	206	2	190	204	286.6
31-Mar	201	189	153	150	141	145	133	134	136	11	37	346	355	350	54	89	91	81	60	43	31	29	9	360	67.2

303.9 338.0 338.9 337.1 340.2 342.8 316.3 300.1 322.5 329.8 326.4 332.1 349.3 350.7 344.1 346.3 344.3 4.6 328.0 311.6 313.6 301.9 296.6 289.7
Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

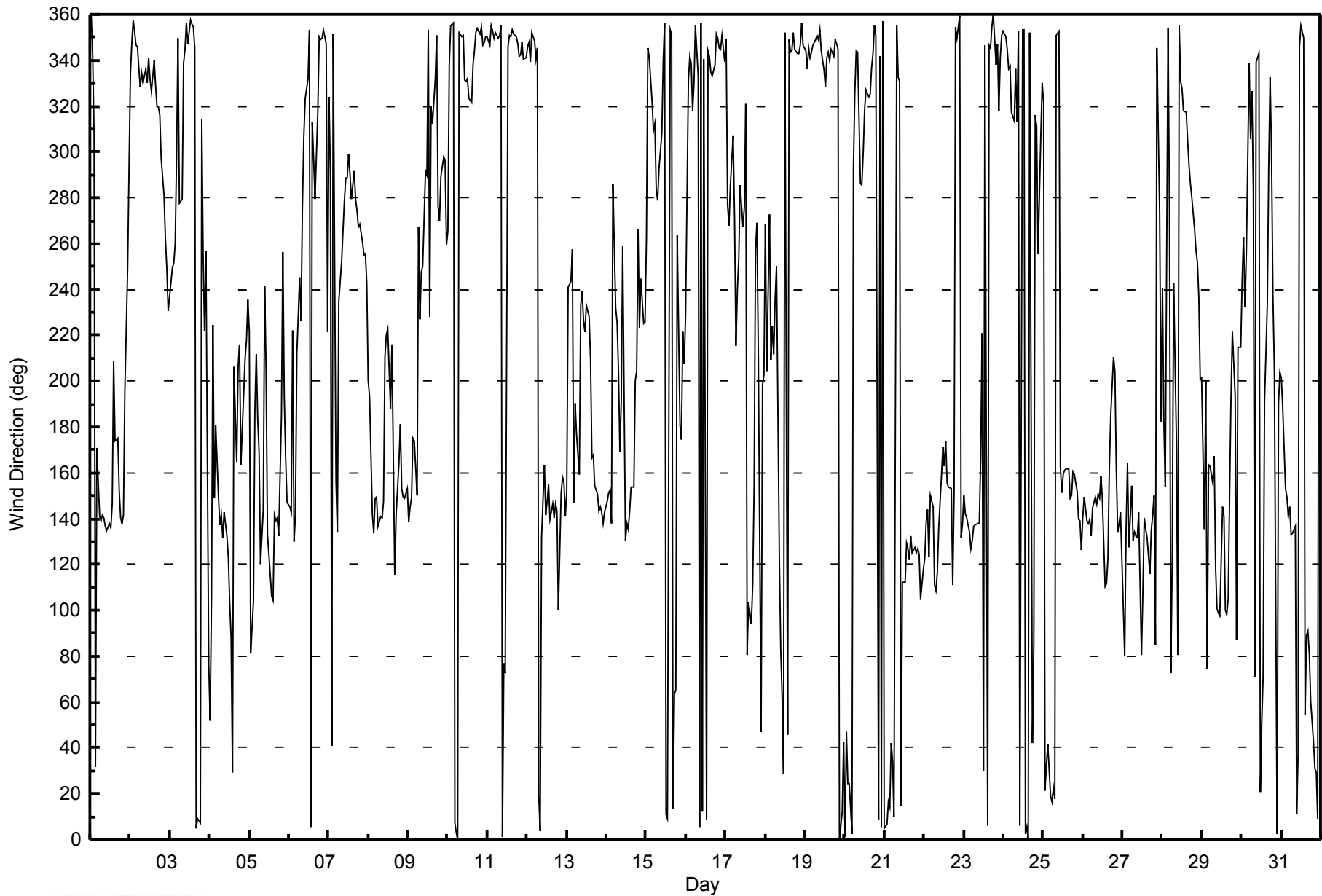
Wind Direction (WD) - deg
Athabasca Valley - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on Mar 12 20:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 6 deg on Mar 16 17:00																									
Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 15 Median = 22 Q ₃ = 45 P ₉₀ = 68 P ₉₉ = 96																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	35	58	36	71	60	31	24	14	13	17	12	12	16	66	37	24	26	20	11	10	19	34	20	20	71
2-Mar	12	18	20	16	15	14	10	11	11	14	17	14	10	12	13	13	12	11	10	13	11	13	13	12	20
3-Mar	18	19	13	13	45	19	40	33	14	14	18	15	18	18	17	11	21	22	18	50	32	75	94	95	95
4-Mar	97	106	86	95	41	41	21	36	19	44	14	26	22	66	95	70	19	34	22	22	78	48	16	52	106
5-Mar	72	70	75	108	77	44	78	76	74	84	92	89	57	22	19	50	16	11	26	62	82	87	59	41	108
6-Mar	10	53	82	59	58	79	77	63	28	23	28	9	24	33	23	37	64	37	16	16	14	14	57	50	82
7-Mar	27	35	62	53	61	67	24	13	17	42	18	16	15	17	12	21	17	10	8	12	8	9	9	48	67
8-Mar	57	48	47	24	51	47	11	14	23	53	52	12	12	60	41	58	24	29	57	53	45	21	35	55	60
9-Mar	70	66	57	53	69	43	90	68	29	19	17	21	27	65	56	21	18	14	19	24	39	45	32	11	90
10-Mar	39	10	19	18	16	17	18	18	16	17	21	16	17	15	15	11	13	16	19	18	19	13	14	14	39
11-Mar	13	8	14	12	11	12	13	12	18	32	16	30	20	16	15	17	17	17	16	10	12	15	12	10	32
12-Mar	13	15	12	16	17	11	18	30	29	98	23	20	18	20	14	16	21	16	39	112	63	34	22	27	112
13-Mar	89	16	9	47	74	55	66	65	36	10	14	14	16	29	23	17	22	15	13	13	11	12	11	11	89
14-Mar	12	15	19	22	77	24	62	62	49	95	92	61	18	26	24	17	40	25	66	28	37	10	45	29	95
15-Mar	24	13	15	11	11	12	21	10	13	14	21	19	16	18	19	19	28	18	20	47	72	62	82	84	84
16-Mar	60	36	15	11	14	21	14	34	21	18	49	26	95	15	10	7	6	8	16	21	22	14	21	26	95
17-Mar	34	64	22	23	33	27	89	60	24	85	40	27	44	39	30	24	26	15	35	42	103	87	59	37	103
18-Mar	29	35	79	39	18	30	24	55	62	89	47	54	33	65	56	12	13	17	14	13	12	15	19	15	89
19-Mar	13	12	15	15	14	16	16	15	14	15	14	14	18	11	10	9	12	10	16	13	14	16	15	28	28
20-Mar	20	36	32	23	39	28	30	39	27	28	35	25	43	27	26	23	12	14	15	15	47	36	58	24	58
21-Mar	28	26	43	35	48	46	35	32	12	15	77	28	25	18	19	21	21	19	17	19	18	23	19	20	77
22-Mar	21	19	17	28	22	20	23	21	21	20	28	17	17	17	21	23	24	54	88	11	15	47	55	16	88
23-Mar	15	13	13	14	12	12	15	16	12	30	57	11	88	11	22	17	11	16	18	11	17	18	15	14	88
24-Mar	15	14	12	19	26	20	29	40	38	15	20	19	16	17	17	20	28	29	14	59	37	27	23	48	59
25-Mar	42	51	55	56	22	36	46	32	21	44	81	17	18	16	17	19	17	21	15	20	21	28	23	64	81
26-Mar	15	20	12	15	13	14	16	15	14	17	18	21	23	22	20	16	18	36	16	26	19	23	24	34	36
27-Mar	62	88	81	95	69	60	14	12	16	13	24	16	65	15	13	14	21	13	30	30	68	44	46	80	95
28-Mar	50	70	47	87	46	79	92	72	81	49	35	43	17	15	16	17	15	11	9	11	7	11	57	42	92
29-Mar	38	31	63	99	80	60	81	66	43	51	25	65	75	65	24	14	46	33	15	29	31	61	52	73	99
30-Mar	75	62	39	63	16	44	28	62	26	38	11	46	53	24	48	32	59	82	71	23	85	79	71	42	85
31-Mar	44	36	25	31	31	29	32	26	54	68	56	89	28	45	66	15	15	17	20	21	20	23	18	17	89
	97	106	86	108	80	79	92	76	81	98	92	89	95	66	95	70	64	82	88	112	103	87	94	95	
	Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - March 2015



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:15	End Time (MST)	11:28
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	50 ppm	Cal Gas Expiry Date	26-Sep-17
Gas Cert Reference	S970259A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
DACS voltage range	0-5V	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-681	-681
Analyzer Range (mv)	1000	1000	Lamp voltage	817	817
Calculated slope	0.997276	1.000207	Chamber temp.	43.6	43.6
Calculated intercept	1.252457	0.945259	Pressure (mmHg)	710.1	710.1
Analyzer Background	10.5	10.5	Flow (lpm)	0.553	0.553
Analyzer Coefficient	0.829	0.829	Intensity	48500	48500

Analyzer make Thermo 43c Analyzer serial # 607415781

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	NA
as found span	5000	60.7	607.0	606.7	1.000
calibrator zero	5000	0.0	0.0	0.4	NA
high point	5000	60.7	607.0	606.7	1.000
second point	5000	30.4	304.0	302.0	1.007
third point	5000	15.2	152.0	149.9	1.014
calibrator zero					
as left zero	6000	0.0	0.0	0.8	NA
as left span	5000	60.7	607.0	609.6	0.996
Average Correction Factor					1.007

Corrected As found 606.3 Previous response 607.4 % change 0.2%

Notes:

no adjustments required.

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

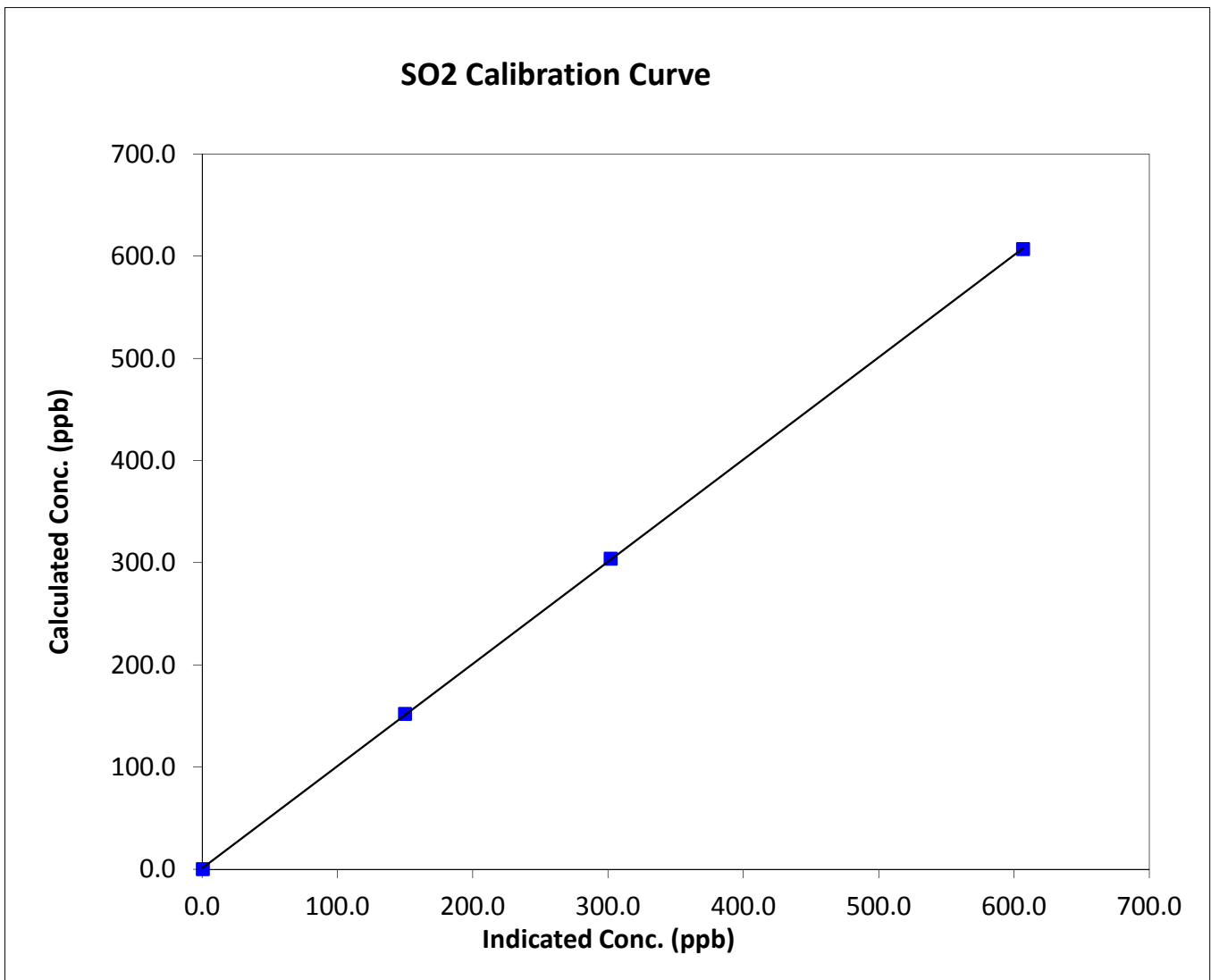
SO₂ Calibration Summary

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:15	End Time (MST)	11:28
Analyzer make	Thermo 43c	Analyzer serial #	607415781

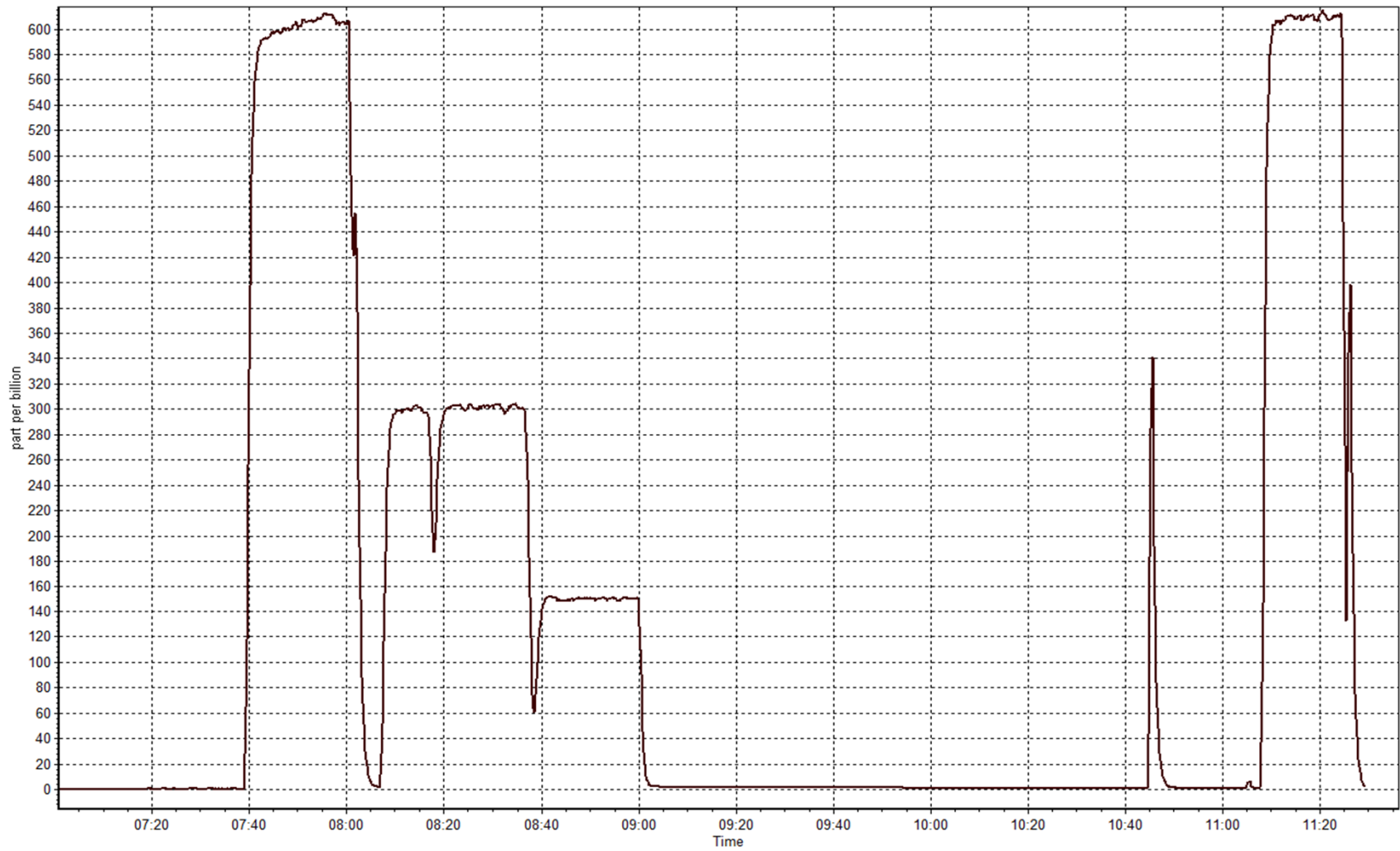
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999977
607.0	606.7	1.0005		
304.0	302.0	1.0066	Slope	1.000207
152.0	149.9	1.0140		
			Intercept	0.945259



SO2 Calibration Plot

Date: March 11, 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	10:45
Barometric Pressure	735 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	5.02 ppm H2S	Cal Gas Expiry Date	9/9/2017
Gas Cert Reference	ALMO52589	SO2 gas conc.	50.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575
DACS voltage range	0-5V	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-619	-619
Analyzer Range (input)	100	100	Lamp voltage	806	806
Calculated slope	1.000875	0.994132	Chamber temp.	44	44
Calculated intercept	0.009573	0.116911	Pressure	689.6	689.6
Analyzer Background	18.6	18.6	Flow	0.477	0.477
Analyzer Coefficient	1.064	1.071	Intensity	43300	43300
			Converter temp.	800	800

Analyzer make/model	TEI 45C	Analyzer serial #	630718530
Converter make/model	Model 26 Thermal Oxidizer	Converter serial #	20101-14

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	NA
as found span	6000	79.8	75.0	74.1	1.012
SO2 scrubber check	5000	14.7	149.4	0.5	NA
calibrator zero	6000	0.0	0.0	-0.1	NA
high point	6000	89.6	75.0	75.3	0.996
second point	6000	50.2	42.0	42.2	0.995
third point	6000	29.9	25.0	24.9	1.005
calibrator zero	5000	0.0	0.0	-0.1	NA
as left zero	5000	0.0	0.0	-0.1	NA
as left span	6000	89.6	75.0	74.8	1.002
Average Correction Factor					0.999

Corrected As found	74.2	Previous response	74.9	% change	1.0%
--------------------	------	-------------------	------	----------	------

Notes:

Scrubber checked before as founds, span adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

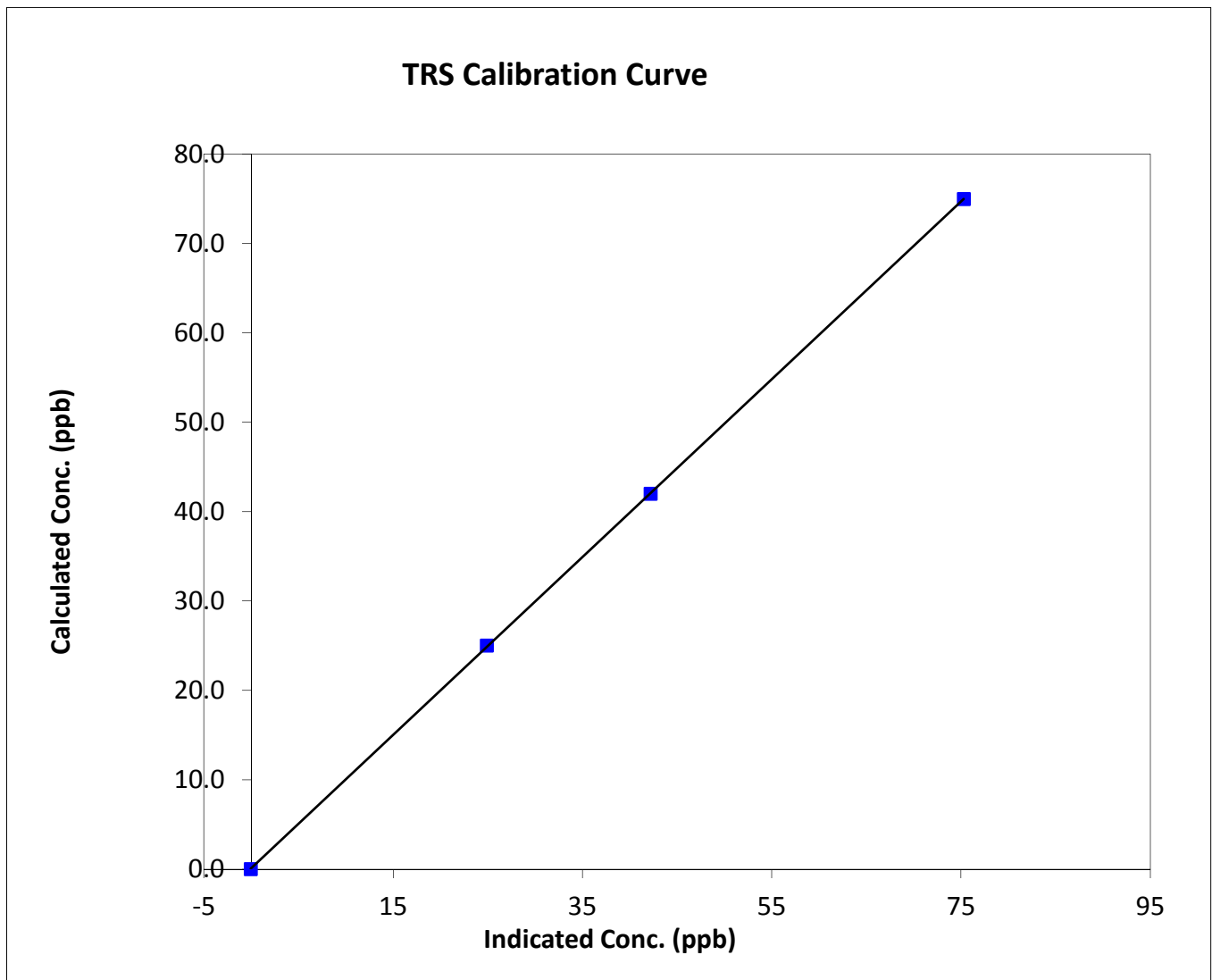
TRS Calibration Summary

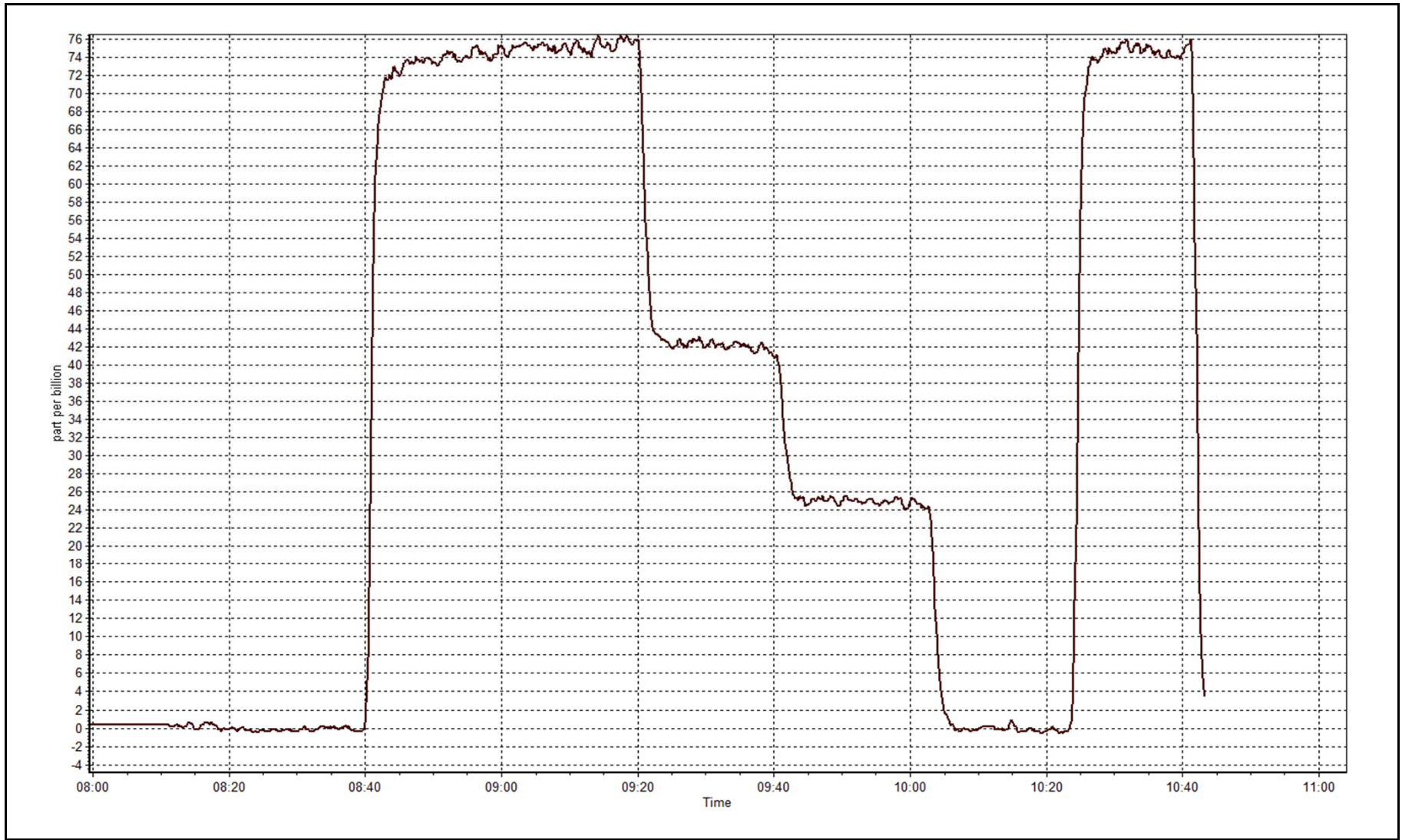
Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:10	End Time (MST)	10:45
Analyzer make	TEI 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999990
75.0	75.3	0.9956		
42.0	42.2	0.9953	Slope	0.994132
25.0	24.9	1.0047		
			Intercept	0.116911







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Friday, March 06, 2015	Prev Calibration	Friday, February 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	15:25
Barometric Pressure	750 mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	S970259A	Cal Gas Expiry Date	Tuesday, September 26, 2017
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	31.7	34.5
THC Range (input)	50	50	Flame Temp	309.2	310.0
NMHC Range (ppm)	50	50	Carrier Pressure	36.8	36.8
NMHC Range (input)	50	50	Fuel Pressure	42.1	42.1
THC Calc slope	0.999680	0.999518	Air Pressure	32.2	32.2
THC Calc intercept	0.013614	0.020258			
NMHC Calc slope	1.000179	1.000015			
NMHC Calc intercept	0.000226	-0.001793			

Analyzer make Thermo Scientific 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	0.01	N/A
as found span	5000	60.7	12.63	12.40	1.018
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	12.63	12.63	1.000
second point	5000	30.4	6.32	6.27	1.008
third point	5000	15.2	3.16	3.14	1.007
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	60.7	12.63	12.59	1.003
Average Correction Factor					1.005

Corrected As found 12.39 Previous response 12.62 % change 1.8%

Notes:

Performed removal calibration but replacement analyzer showed diagnostic failures. Re-installed analyzer. Hydrogen 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	N/A
as found span	5000	60.7	6.68	6.51	1.026
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	6.68	6.68	1.000
second point	5000	30.4	3.34	3.34	1.001
third point	5000	15.2	1.67	1.68	0.995
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	60.7	6.68	6.66	1.003
Average Correction Factor					0.999

Corrected As found 6.51 Previous response 6.68 % change 2.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.01	N/A
as found span	5000	60.7	5.95	5.89	1.010
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	5.95	5.95	1.000
second point	5000	30.4	2.98	2.94	1.013
third point	5000	15.2	1.49	1.46	1.020
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	60.7	5.95	5.93	1.003
Average Correction Factor					

Corrected As found 5.88 Previous response 5.94 % change 1.0%



Wood Buffalo Environmental Association

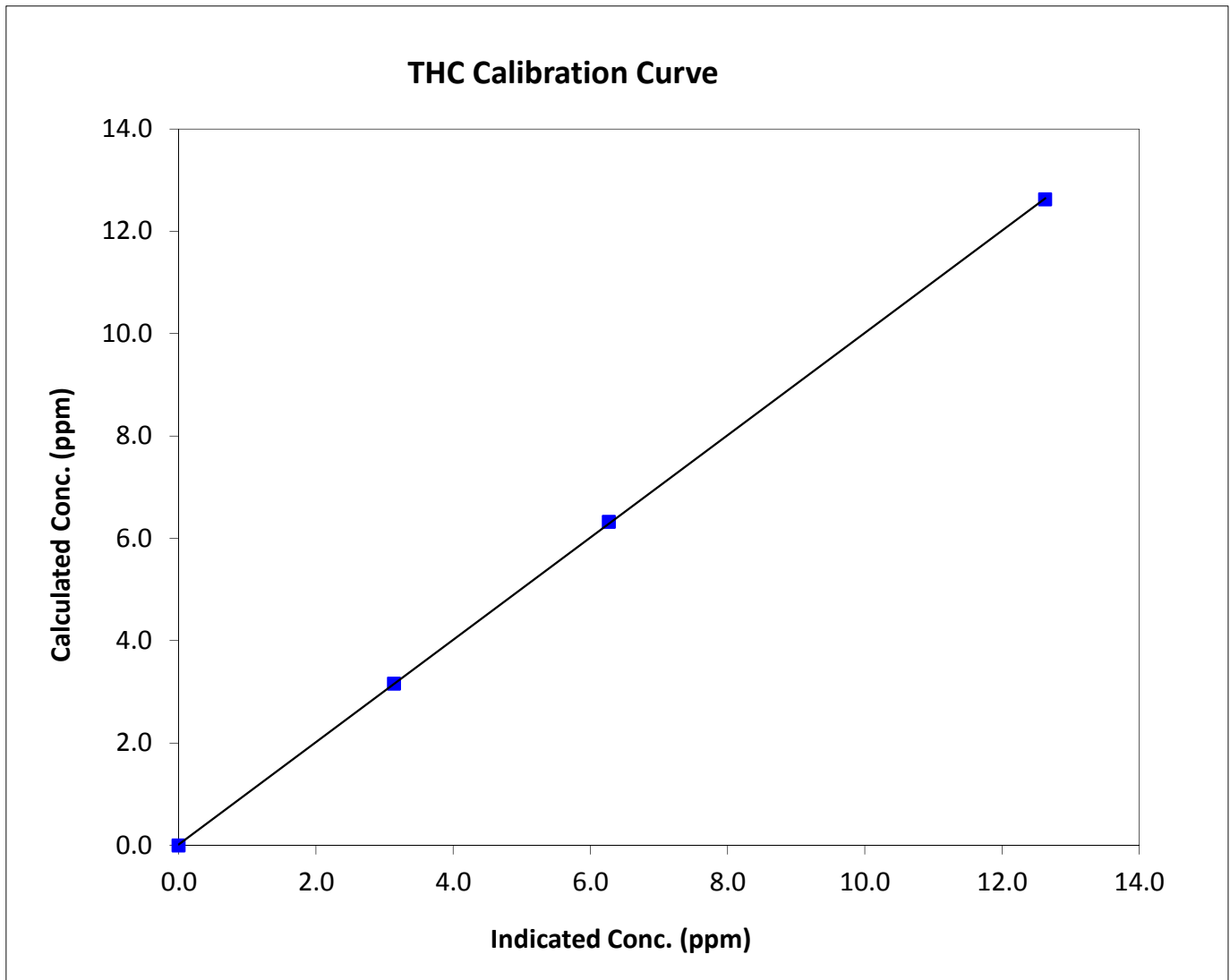
THC Calibration Summary

Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:25
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999976
12.63	12.63	0.9997		
6.32	6.27	1.0085	Slope	0.999518
3.16	3.14	1.0069		
			Intercept	0.020258





Wood Buffalo Environmental Association

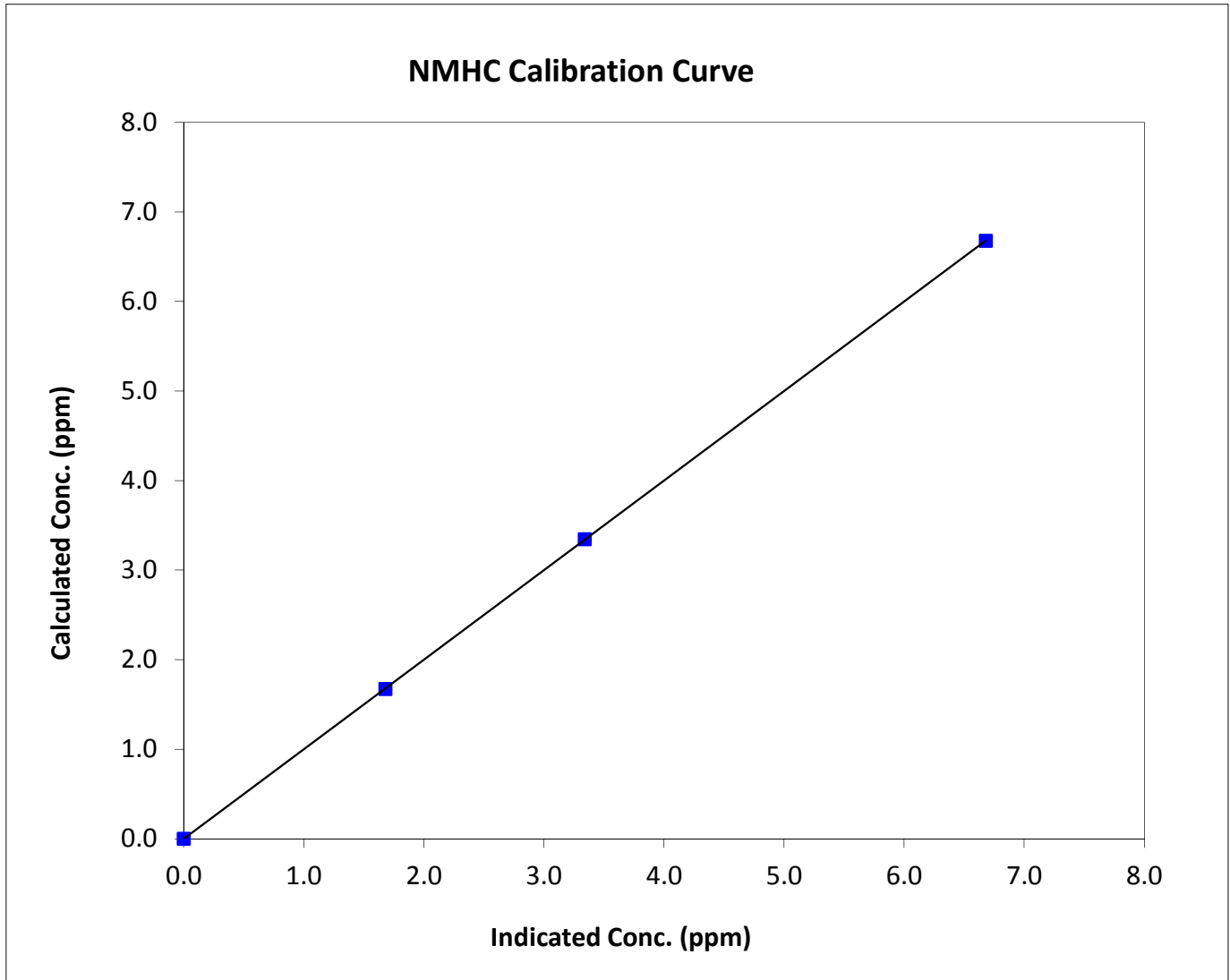
NMHC Calibration Summary

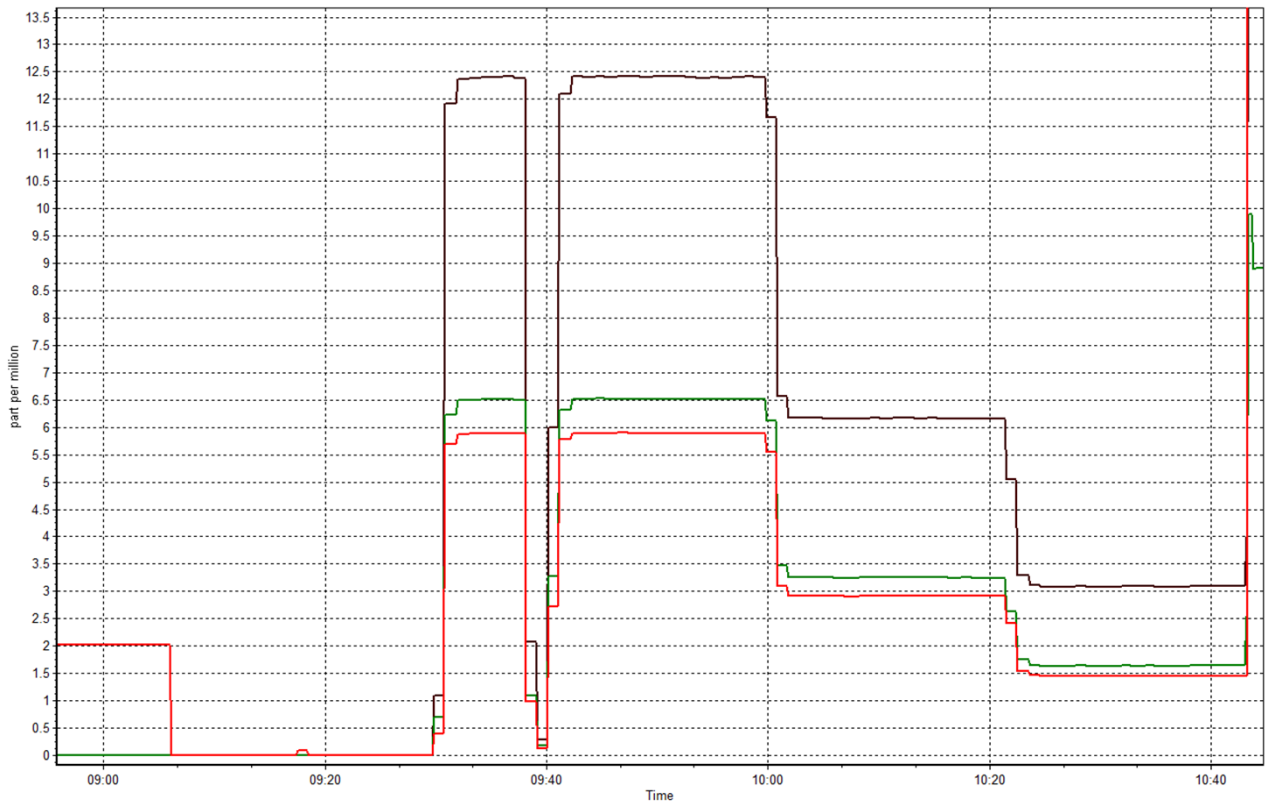
Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:25
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1426262594

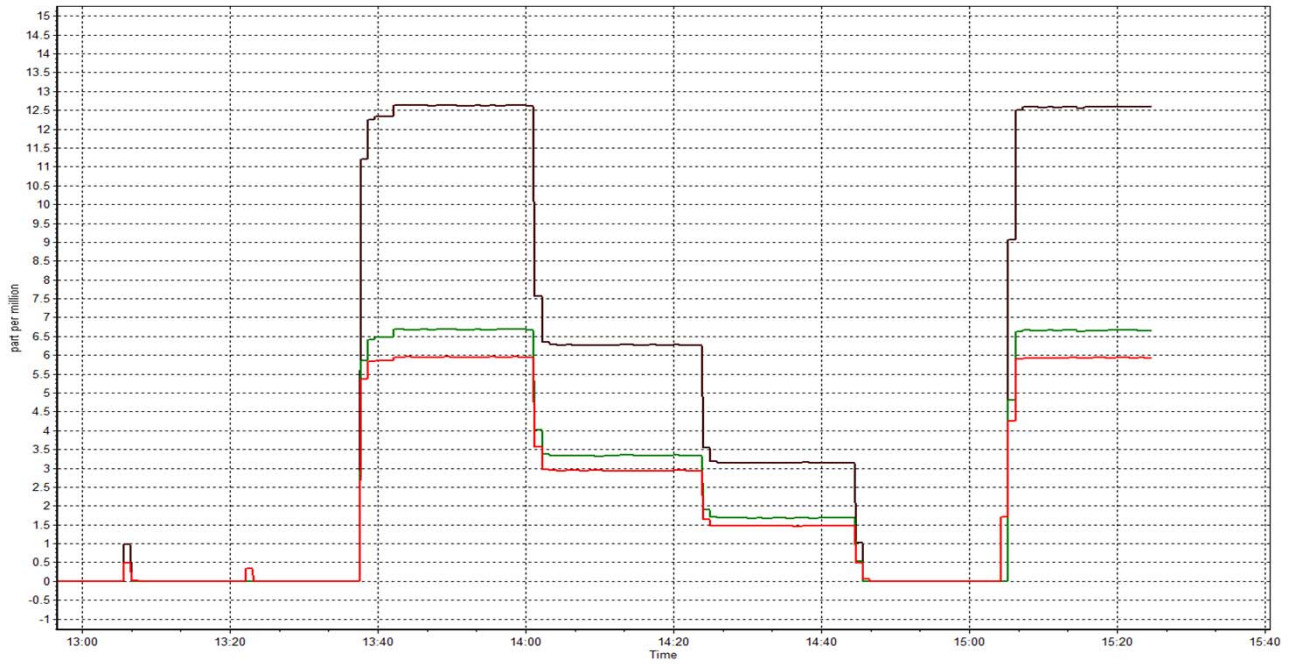
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999997
6.68	6.68	0.9996		
3.34	3.34	1.0012	Slope	1.000015
1.67	1.68	0.9952		
			Intercept	-0.001793





Installation calibration





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	13:26
Barometric Pressure	750 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
NO2 calibration used	Wednesday, March 11, 2015	Transfer Standard	N/A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
DACS voltage range	0-5V	DACS channel #	5

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	28.9	28.9
Analyzer Range (input)	500	500	Lamp temp.	70.8	70.8
Calculated slope	1.005097	1.015586	Pressure	723.1	723.1
Calculated intercept	-1.649159	-0.135834	Flow cell A	0.680	0.680
Analyzer Background	-0.2	-0.2	Flow cell B	0.745	0.745
Analyzer Coefficient	1.008	1.008	Cell A Intensity	104345	104345
			Cell B Intensity	87.847	87.847

Analyzer make TEI 49C Analyzer serial # 607415760

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.0	N/A
as found span	5000	N/A	326.2	321.3	1.015
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	N/A	326.2	321.3	1.015
second point	5000	N/A	166.6	164.1	1.015
third point	5000	N/A	84.2	83.3	1.011
calibrator zero					
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	N/A	326.20	316.9	1.029
Average Correction Factor					1.014

Corrected As found 321.3 Previous response 326.2 % change 1.5%

Notes:

filter changed out, No adjustments or maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

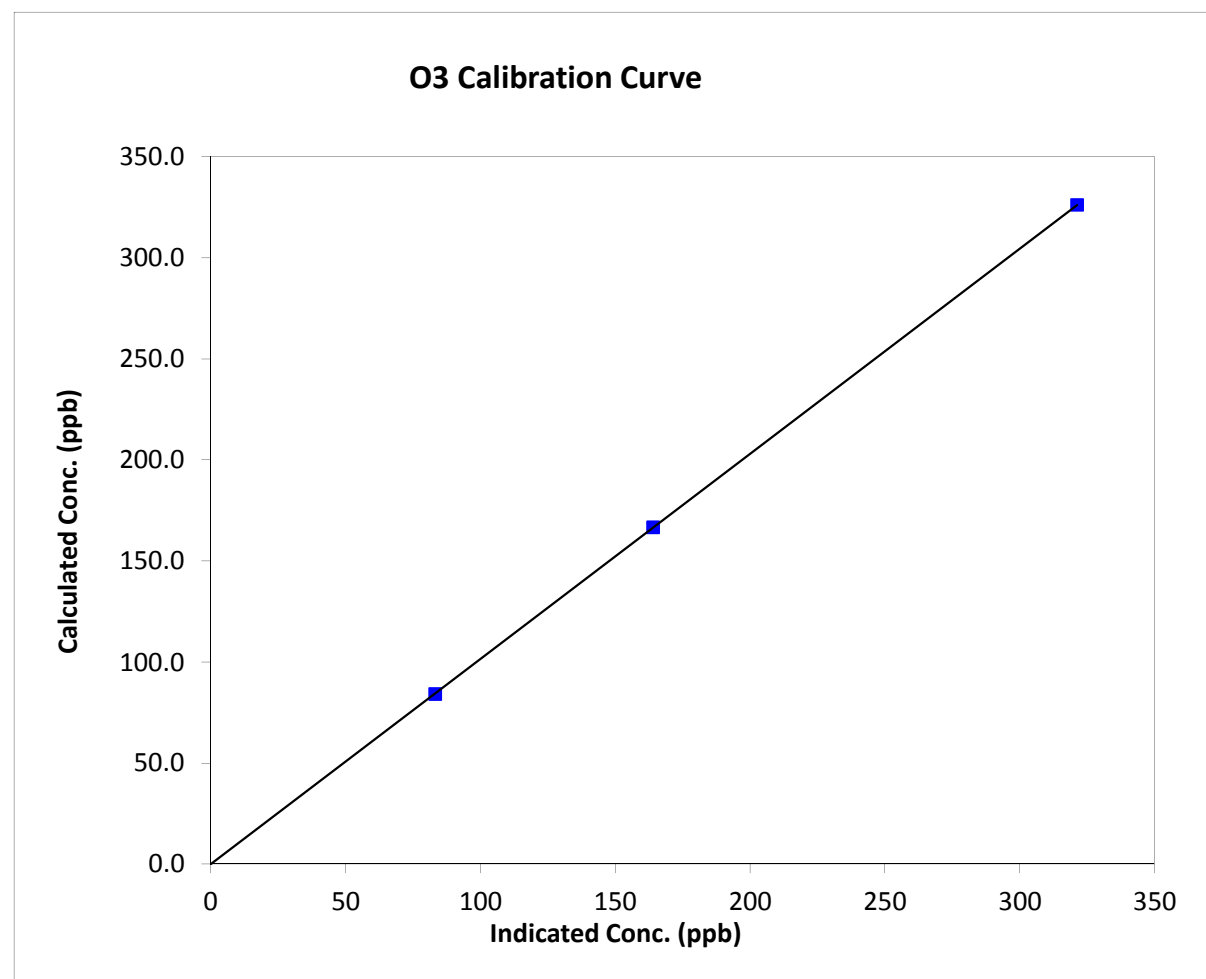
O₃ Calibration Summary

Station Information

Calibration Date	Wednesday, March 11, 2015	Previous Calibration	February 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:25	End Time (MST)	13:26
Analyzer make	TEI 49C	Analyzer serial #	607415760

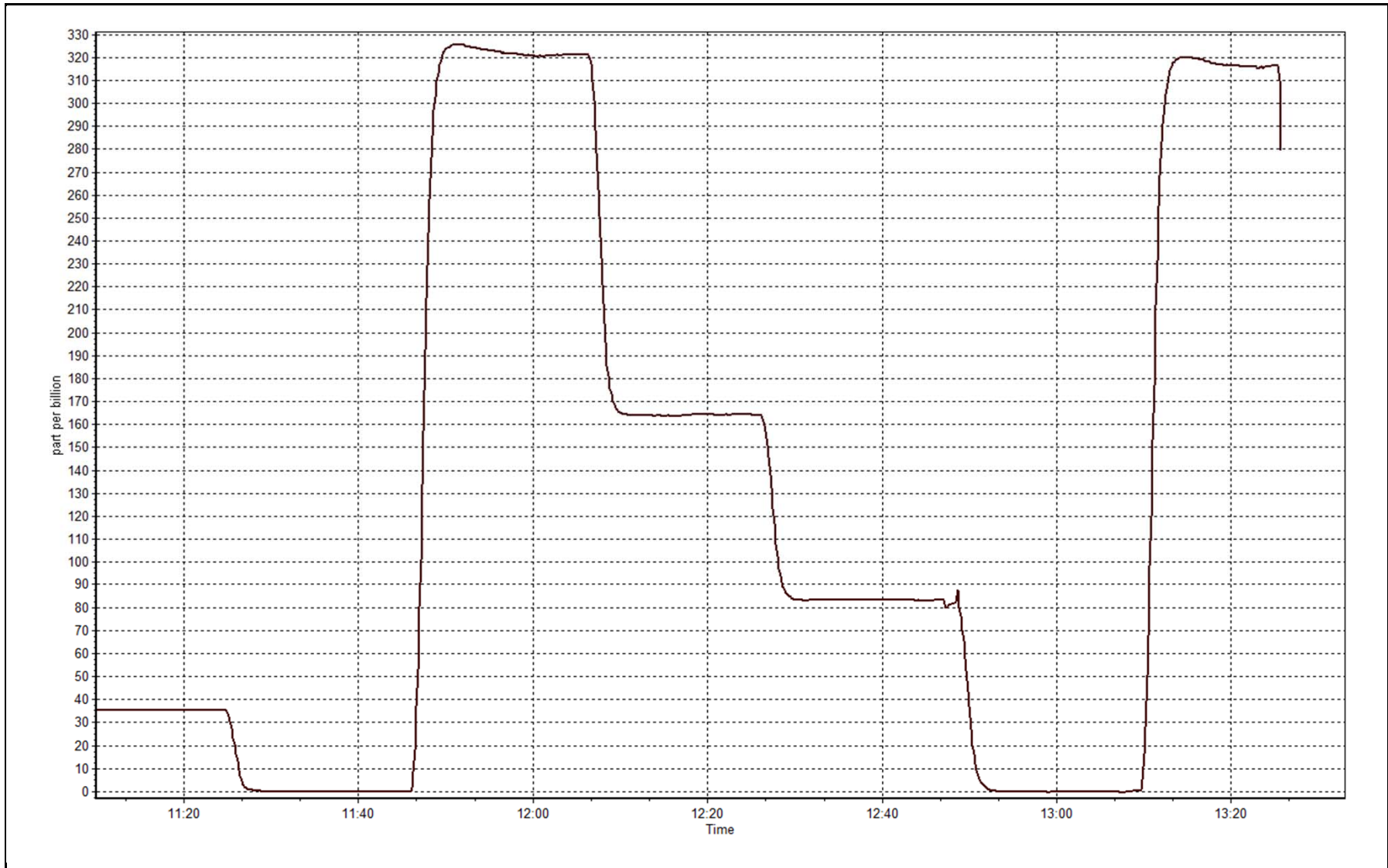
Calibration Data

Calculated concentration (ppb) (C _c)	Indicated concentration (ppb) (I _c)	Correction factor (C _c /I _c)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
326.2	321.3	1.0153		
166.6	164.1	1.0152	Slope	1.01586
84.2	83.3	1.0108		
			Intercept	-0.135834



O3 Calibration Plot

Date: March 11, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	7:15	End Time (MST)	11:28
Barometric Pressure	740 mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	11021107
NO Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	September 26, 2017
NOx Cal Gas Conc	49.4 ppm	Cal Gas Serial #	S970259A

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 2575

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.000201	1.000361	1.000163
	Data Offset	1.531028	1.589235	-0.671796
After	Data Slope	1.006069	1.006856	1.001078
	Data Offset	2.476996	2.432264	-0.798766
Channel #		1	2	3
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model Thermo 42c Analyzer serial # 601114773

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.783	ppb	0.783	ppb
NOX coefficient	1.000	ppb	1.000	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.3		3.3	
NOX bkgrnd	3.5		3.5	
Nt coefficient	n/a		n/a	
Chamber Temp	49.6	Deg C	49.6	Deg C
Moly Temp	324.0	Deg C	324.0	Deg C
PMT Temp	-3.5	Deg C	-3.5	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	174.1	mmHg	174.1	mmHg
Sample Flow	0.787	ccm	0.787	ccm

Notes:

No adjustments or maintenance made, filter changed out



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 11, 2015

Station Number:

AMS 7

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	N/A	N/A
as found span	5000	60.7	599.7	599.7	0.0	595.3	594.6	0.9	1.0074	1.0086
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	N/A	N/A
high point	5000	60.7	599.7	599.7	0.0	595.3	594.6	0.9	1.0074	1.0086
second point	5000	30.4	300.4	300.4	0.0	293.4	294.0	0.4	1.0237	1.0216
third point	5000	15.2	150.2	150.2	0.0	145.4	144.9	0.2	1.0328	1.0364
calibrator zero										
as left zero	6000	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	N/A	N/A
as left span	5000	60.7	599.7	265.9	333.8	589.8	269.3	324.7	1.0168	0.9874
Average Correction Factor									1.0213	1.0222

Corrected As found

NO_x= 595.3

NO= 594.7

Percent Change

NO_x= 0.5%

NO= 0.5%

Previous Response

NO_x= 598.1

NO= 597.9

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 NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO ₂ (300)	N/A	265.9	326.2	592.0	265.9	326.5	1.0009	1.0000	0.9991	100.1%
2nd NO ₂ (200)	N/A	425.5	166.6	592.2	425.5	167.0	1.0005	1.0000	0.9976	100.2%
3rd NO ₂ (100)	N/A	507.9	84.2	592.5	507.9	85.9	1.0000	1.0000	0.9803	102.0%
4th NO ₂ (0)	592.1	N/A	0.2	592.3	592.1	0.3	1.0004	1.0000	N/A	N/A
Average Correction Factor							1.0005	1.0000	0.9923	100.8%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

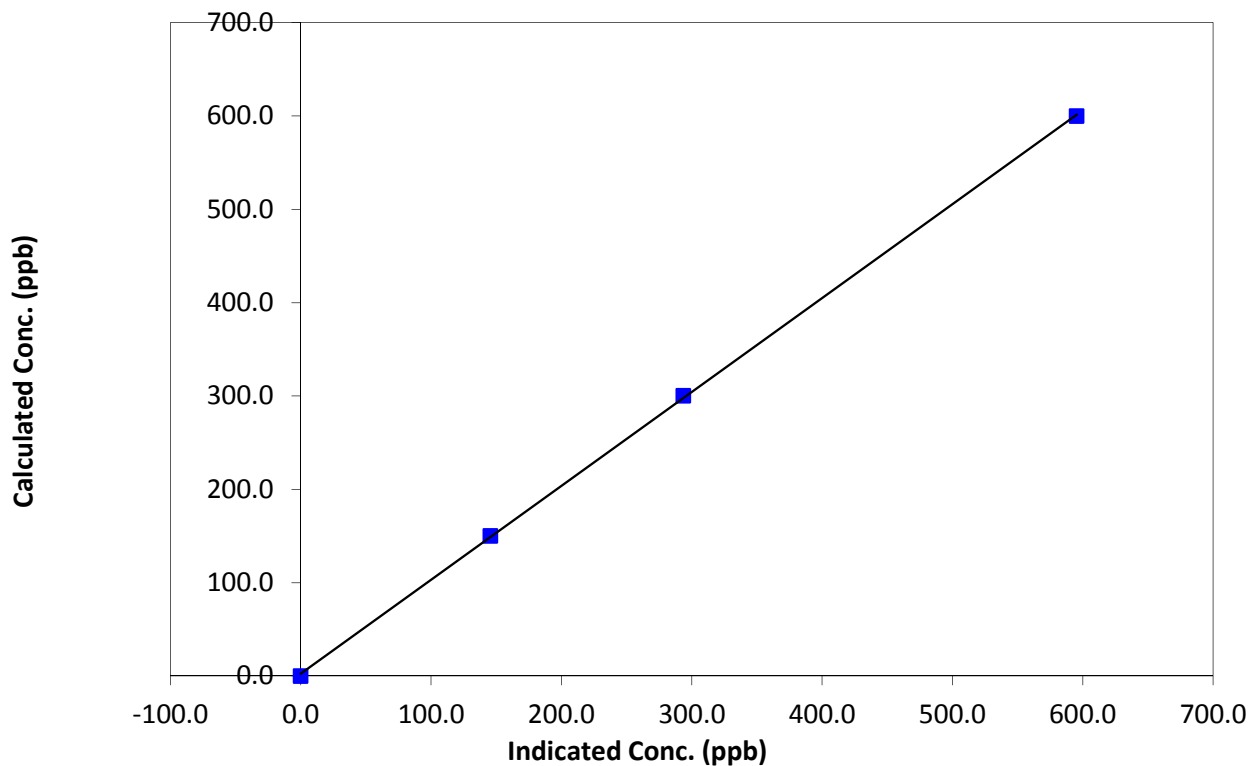
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:15	End Time (MST)	11:28
Analyzer make	Thermo 42c	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999908
599.7	595.3	1.0074		
300.4	293.4	1.0237	Slope	1.006069
150.2	145.4	1.0328		
			Intercept	2.476996

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

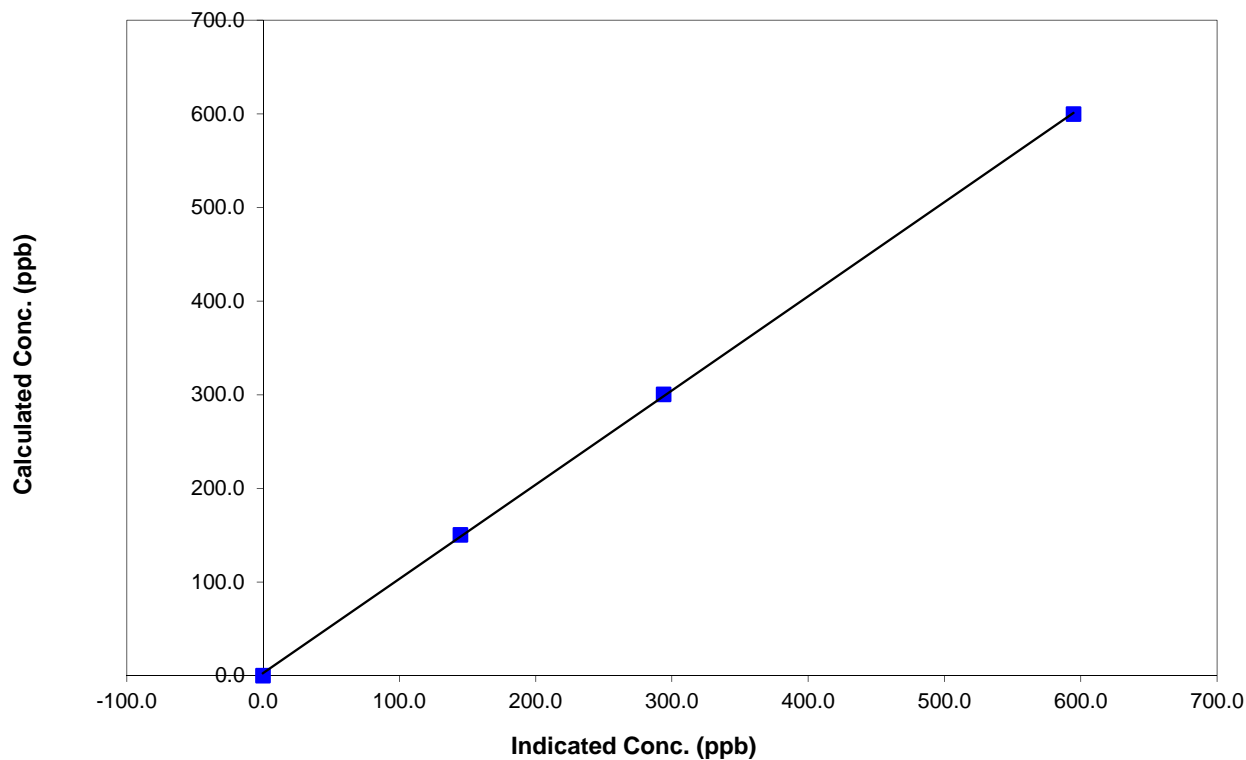
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:15	End Time (MST)	11:28
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	0.999926
599.7	594.6	1.0086		
300.4	294.0	1.0216	Slope	1.006856
150.2	144.9	1.0364		
			Intercept	2.432264

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

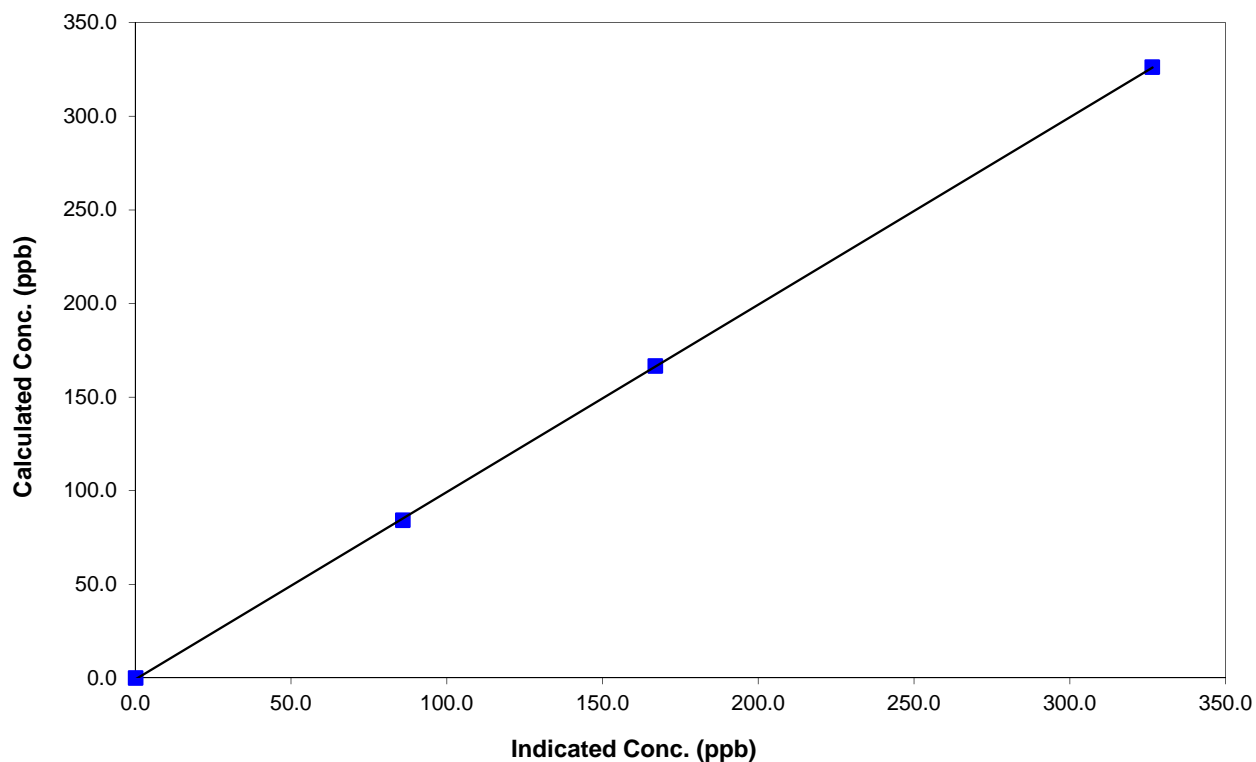
Station Information

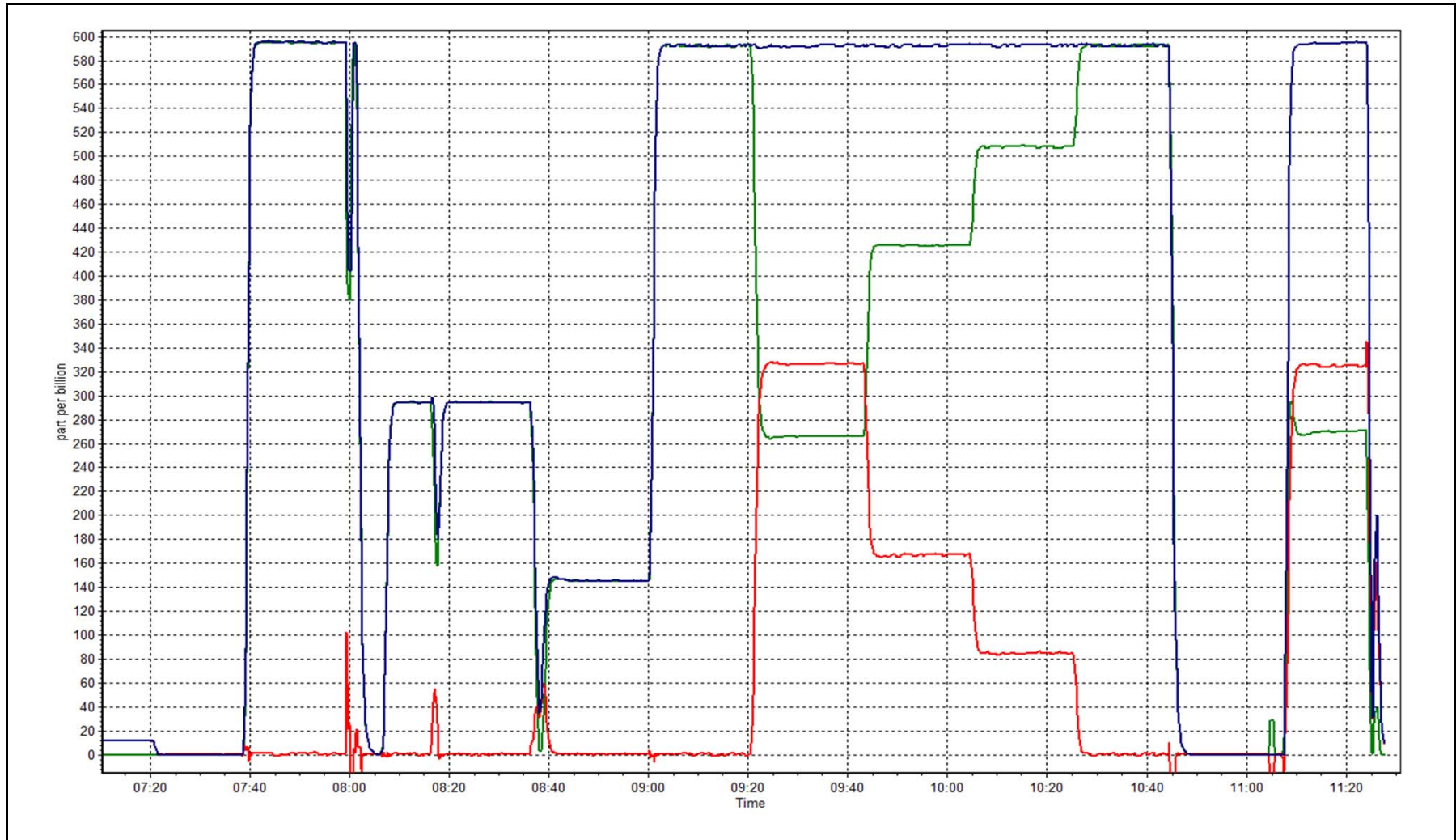
Calibration Date	March 11, 2015	Previous Calibration	February 12, 2015
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:15	End Time (MST)	11:28
Analyzer make	Thermo 42c	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999976
326.2	326.5	0.9991		
166.6	167.0	0.9976	Slope	1.001078
84.2	85.9	0.9803		
			Intercept	-0.798766

NO₂ Calibration Curve







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	13:26
Barometric Pressure	750 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
NO2 calibration used	Wednesday, March 11, 2015	Transfer Standard	N/A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
DACS voltage range	0-5V	DACS channel #	5

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	28.9	28.9
Analyzer Range (input)	500	500	Lamp temp.	70.8	70.8
Calculated slope	1.005097	1.015586	Pressure	723.1	723.1
Calculated intercept	-1.649159	-0.135834	Flow cell A	0.680	0.680
Analyzer Background	-0.2	-0.2	Flow cell B	0.745	0.745
Analyzer Coefficient	1.008	1.008	Cell A Intensity	104345	104345
			Cell B Intensity	87.847	87.847

Analyzer make TEI 49C Analyzer serial # 607415760

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.0	N/A
as found span	5000	N/A	326.2	321.3	1.015
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	N/A	326.2	321.3	1.015
second point	5000	N/A	166.6	164.1	1.015
third point	5000	N/A	84.2	83.3	1.011
calibrator zero					
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	N/A	326.20	316.9	1.029
Average Correction Factor					1.014

Corrected As found 321.3 Previous response 326.2 % change 1.5%

Notes:

filter changed out, No adjustments or maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

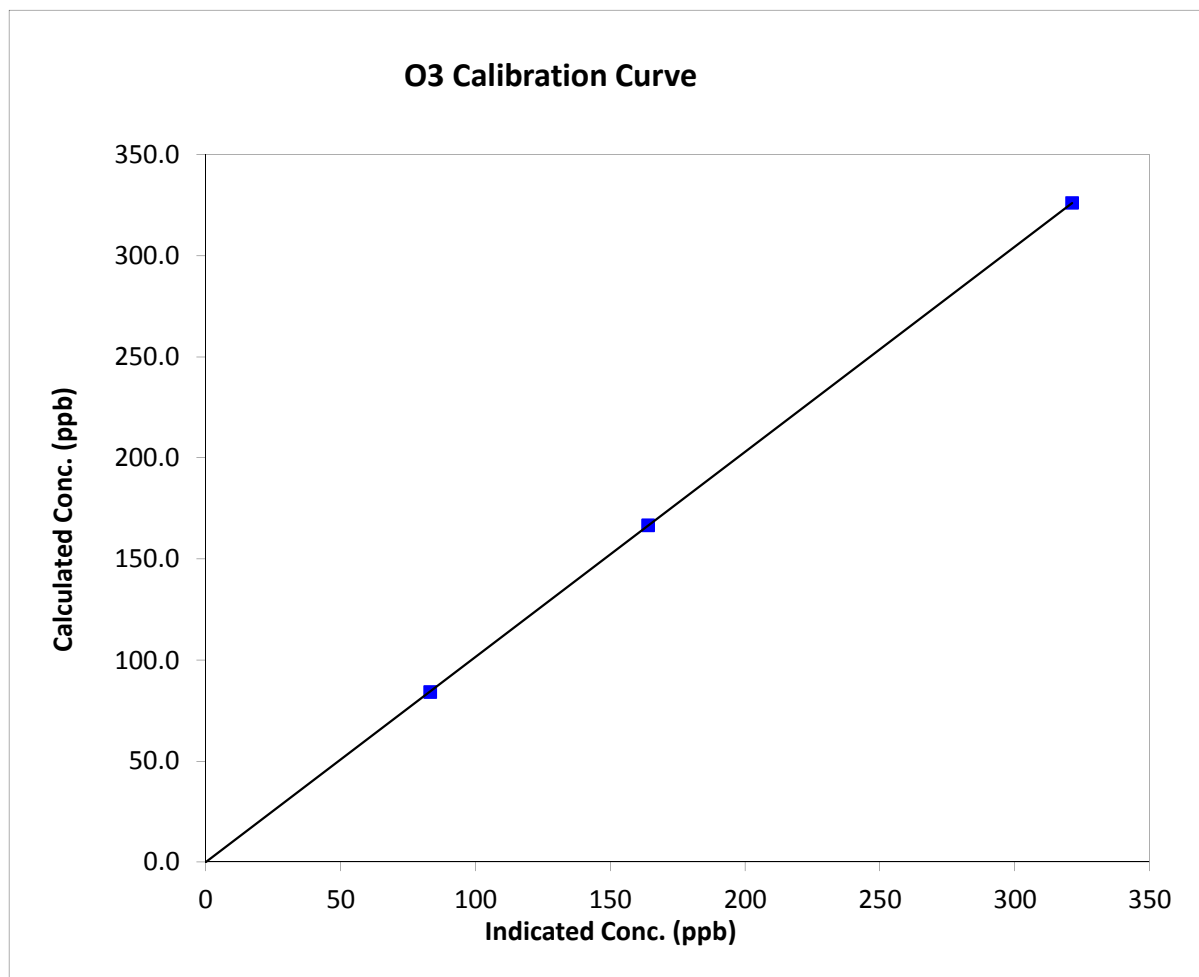
O₃ Calibration Summary

Station Information

Calibration Date	Wednesday, March 11, 2015	Previous Calibration	February 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:25	End Time (MST)	13:26
Analyzer make	TEI 49C	Analyzer serial #	607415760

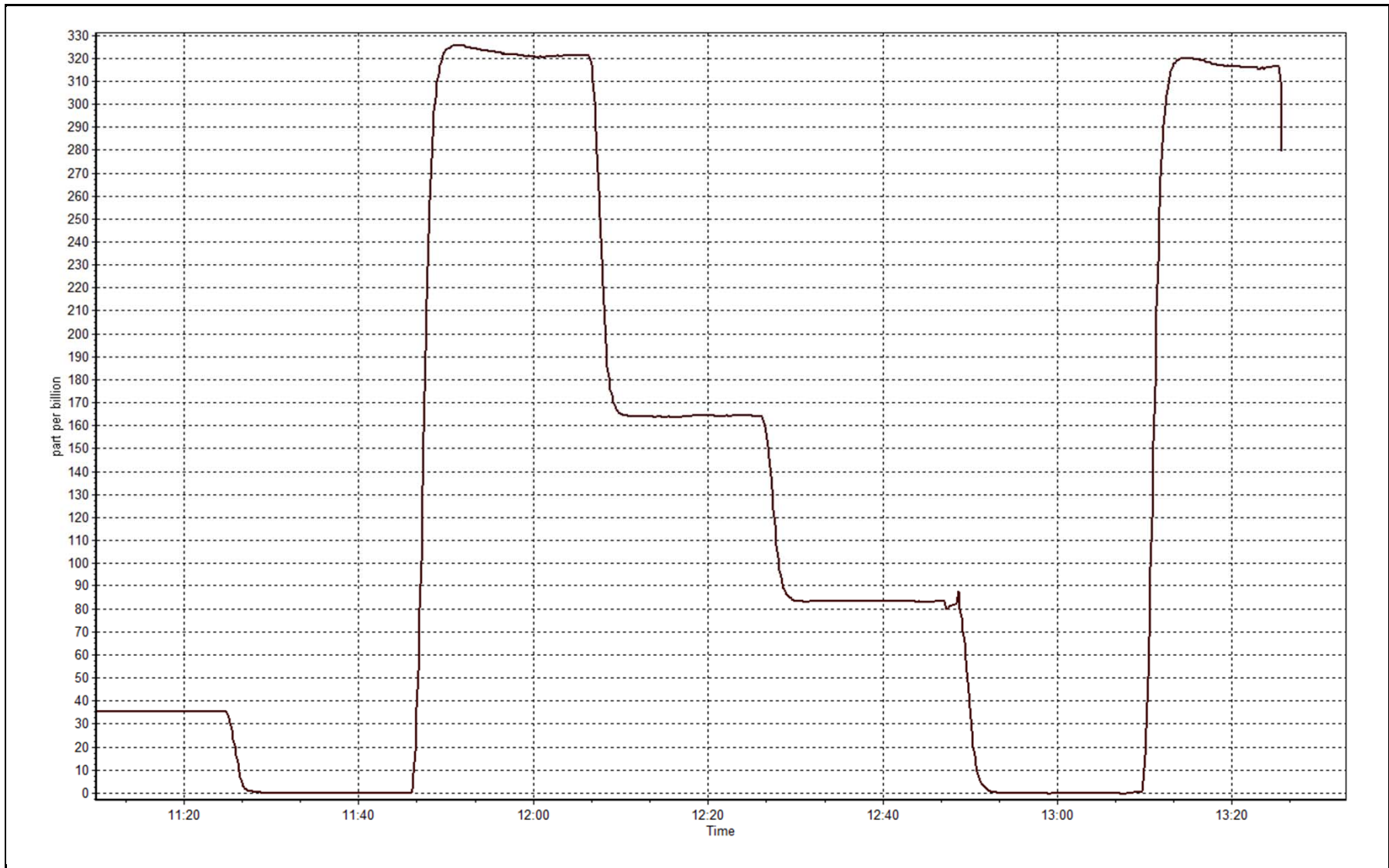
Calibration Data

Calculated concentration (ppb) (C _c)	Indicated concentration (ppb) (I _c)	Correction factor (C _c /I _c)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
326.2	321.3	1.0153		
166.6	164.1	1.0152	Slope	1.01586
84.2	83.3	1.0108		
			Intercept	-0.135834



O3 Calibration Plot

Date: March 11, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	708	36	36	100.00	2	0	1	0
O3(ppb) Average	708	36	36	100.00	38	0	34	-
NO2(ppb) Average	707	37	37	100.00	18	0	12	-
NO(ppb) Average	707	37	37	100.00	3	-	1	-
NOX(ppb) Average	707	37	37	100.00	20	-	13	-
PM2.5(ug/m3) Average	742	0	2	99.73	17	-	6.5	0
Wind Speed 10 m (km/h) Average	742	0	2	99.73	40	-	25	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	10.9	-	4.7	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	91	-
Precipitation (mm) Total	744	0	0	100.00	1.5	-	2	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	695	-	219	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	708	0.2	0	-	0	0	0	0	0	0	0	2
O3(ppb) Average	708	25.3	7	-	6	15	20	27	32	34	34	38
NO2(ppb) Average	707	5.1	4	-	1	2	2	4	7	10	10	18
NO(ppb) Average	707	0.5	0	-	0	0	0	0	1	1	1	3
NOX(ppb) Average	707	5.6	4	-	1	2	3	4	8	11	11	20
PM2.5(ug/m3) Average	742	3.55	1.8	-	0.9	1.9	2.4	3.1	4.2	5.7	5.7	17
Wind Speed 10 m (km/h) Average	742	14.3	7	-	0	6	9	13	19	25	25	40
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-9.47	8.2	-	-30.3	-20.4	-15.3	-9	-3.9	1.7	1.7	10.9
Relative Humidity (%) Average	744	69.2	15	-	26	49	58	69	82	90	90	96
Precipitation (mm) Total	744	-	-	3.81	0	0	0	0	0	0	0	1.5
Global Solar Radiation (W/m2) Average	744	148.6	205	-	0	0	0	8	283	502	502	695

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	05 Mar 2015 09:00	05 Mar 2015 10:00	2	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	13 Mar 2015 03:00	13 Mar 2015 03:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	25 Mar 2015 01:00	25 Mar 2015 01:00	1	Flat line in sensor output signal - Sensor frozen

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Mar 14 09:00	Maximum Daily Average: 1.2 ppb on Mar 14		Hours of Data:	708
Minimum Value: 0 ppb on Mar 11 04:00	Minimum Daily Average: 0.0 ppb on Mar 10		Hours of Missing Data:	36
Maximum Diurnal Average: 0.2 ppb at hour 12	Minimum Diurnal Average: 0.1 ppb at hour 2		Hours of Calibration:	36
Monthly Average: 0.2 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =0 P ₉₀ =0 P ₉₉ =2		Percent Operational Time:	100.0

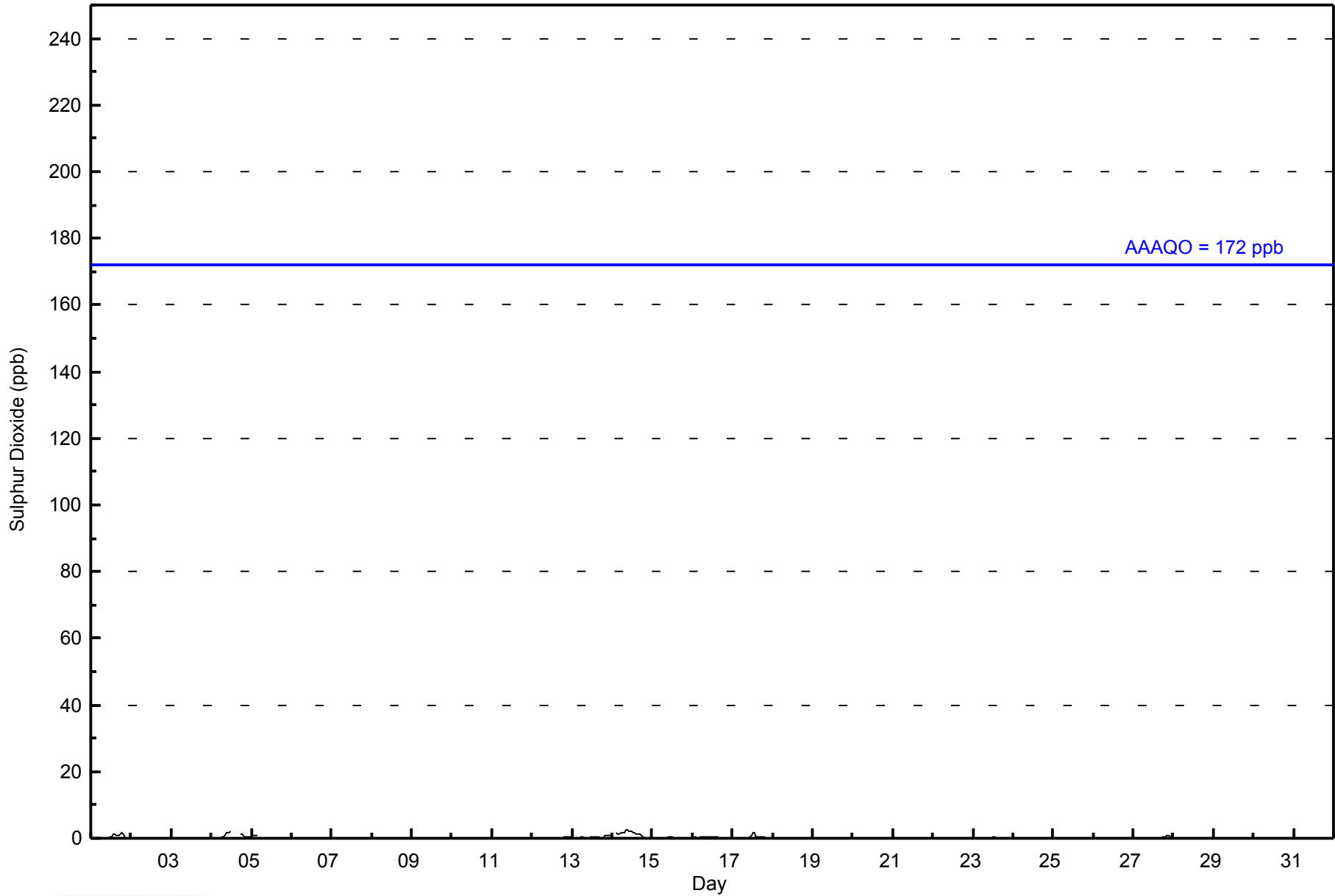
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	1	0	0	0	0	0.4	2
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Mar	0	0	0	Z	0	0	0	1	1	2	2	2	C	C	C	C	C	1	1	1	0	0	0	0	0.7	2
5-Mar	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Mar	Z	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-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Mar	0	0	Z	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-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Mar	0	0	0	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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1
13-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
14-Mar	1	Z	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	1.2	2
15-Mar	0	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-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-Mar	0	0	0	0	Z	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
18-Mar	0	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-Mar	Z	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-Mar	0	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Mar	0	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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Mar	Z	0	0	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-Mar	0	Z	0	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.2	1
28-Mar	0	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
29-Mar	0	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-Mar	0	0	0	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-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	Diurnal Average	
	1	1	2	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	1	1	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - March 2015

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



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - March 2015

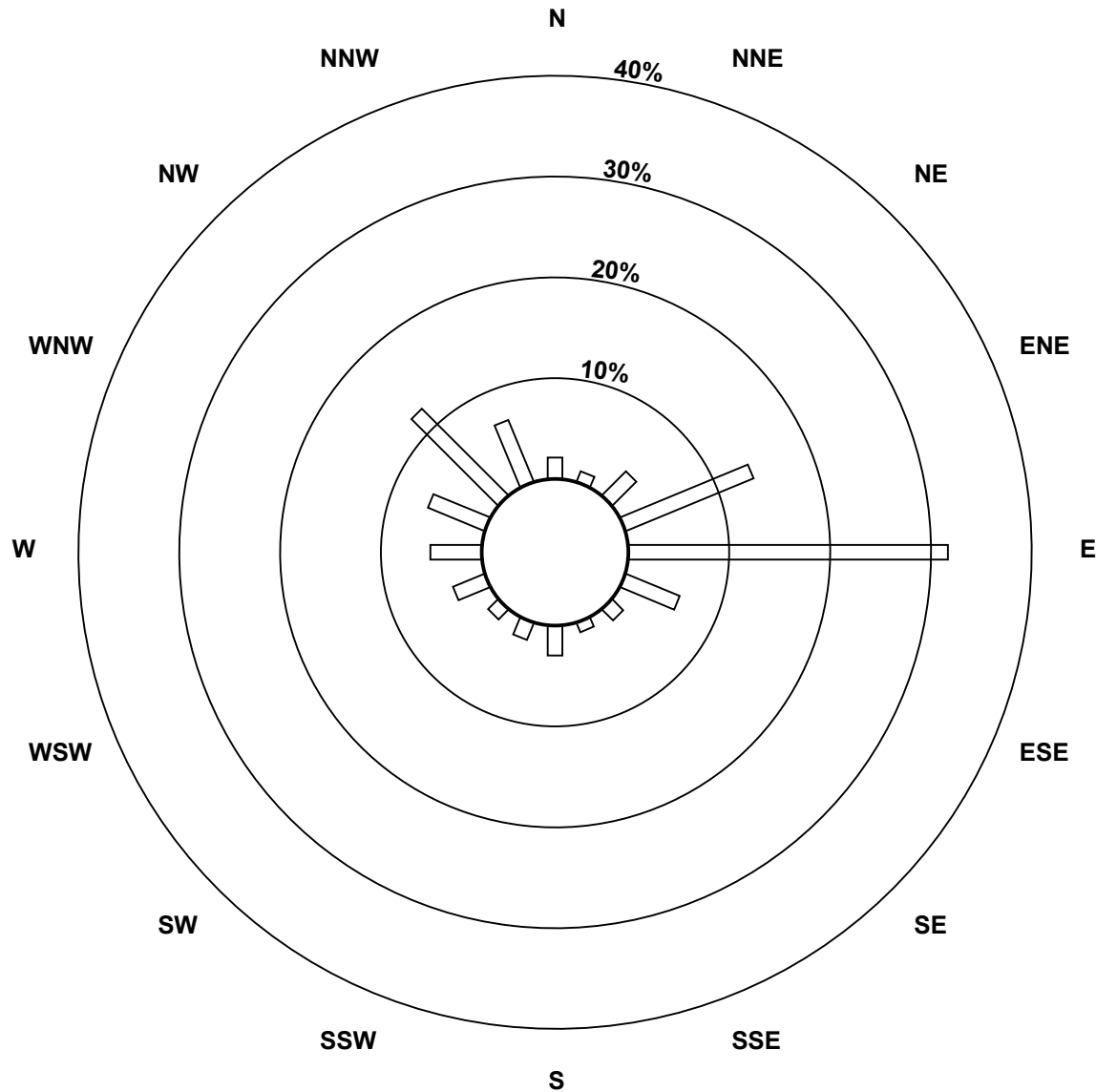
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	15	8	24	97	224	41	11	7	21	13	10	24	36	43	86	47	707
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	15	8	24	97	224	41	11	7	21	13	10	24	36	43	86	47	707

Total Number of Valid Hours: 707

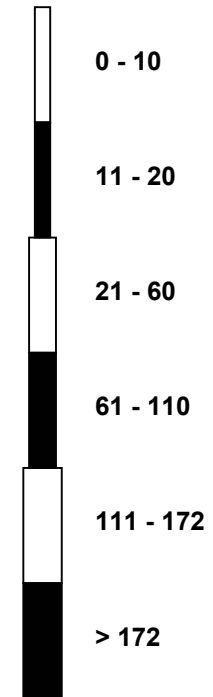
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)**



Classes (ppb)

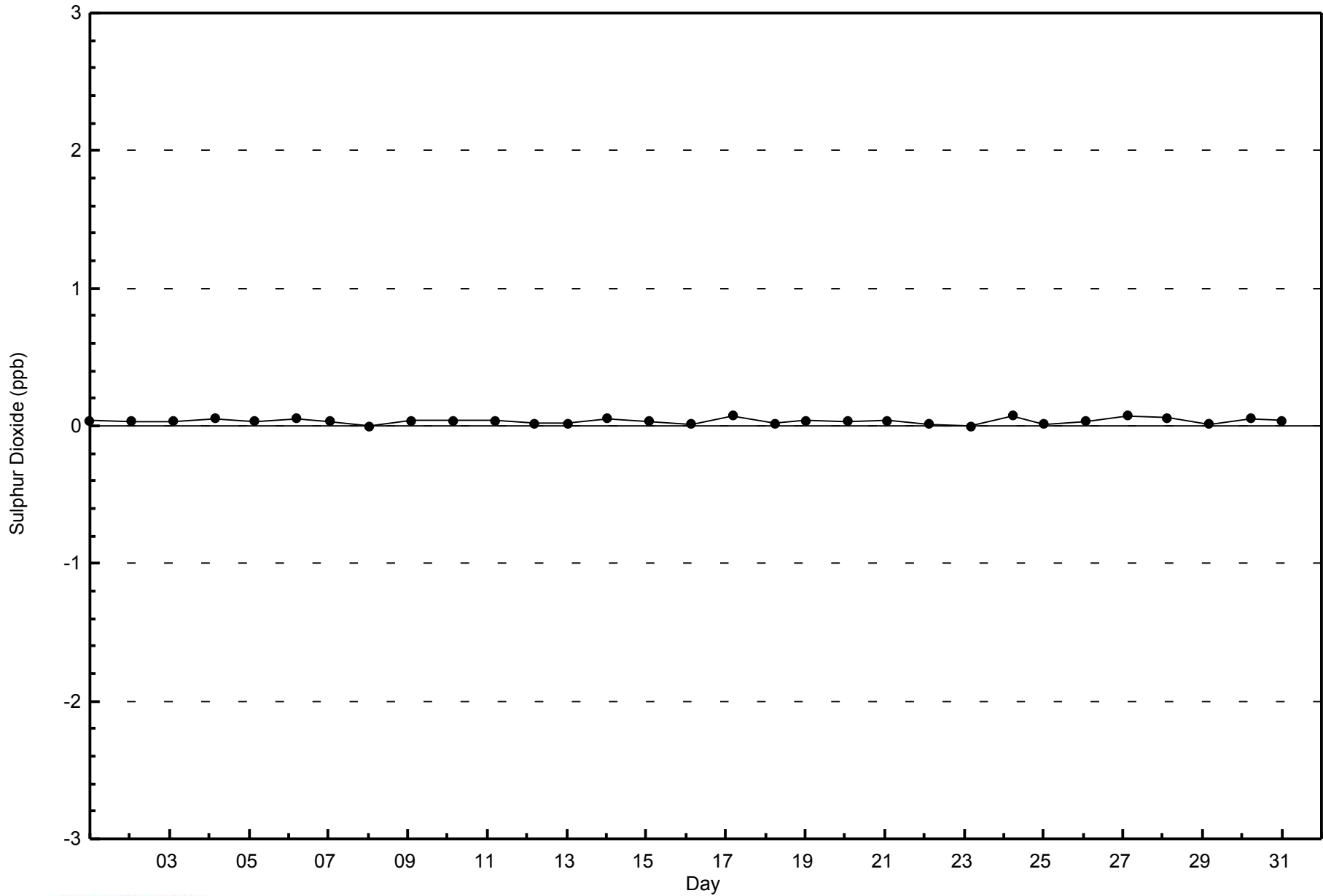


Total Number of Valid Hours: 707



WBEA
Zero Responses

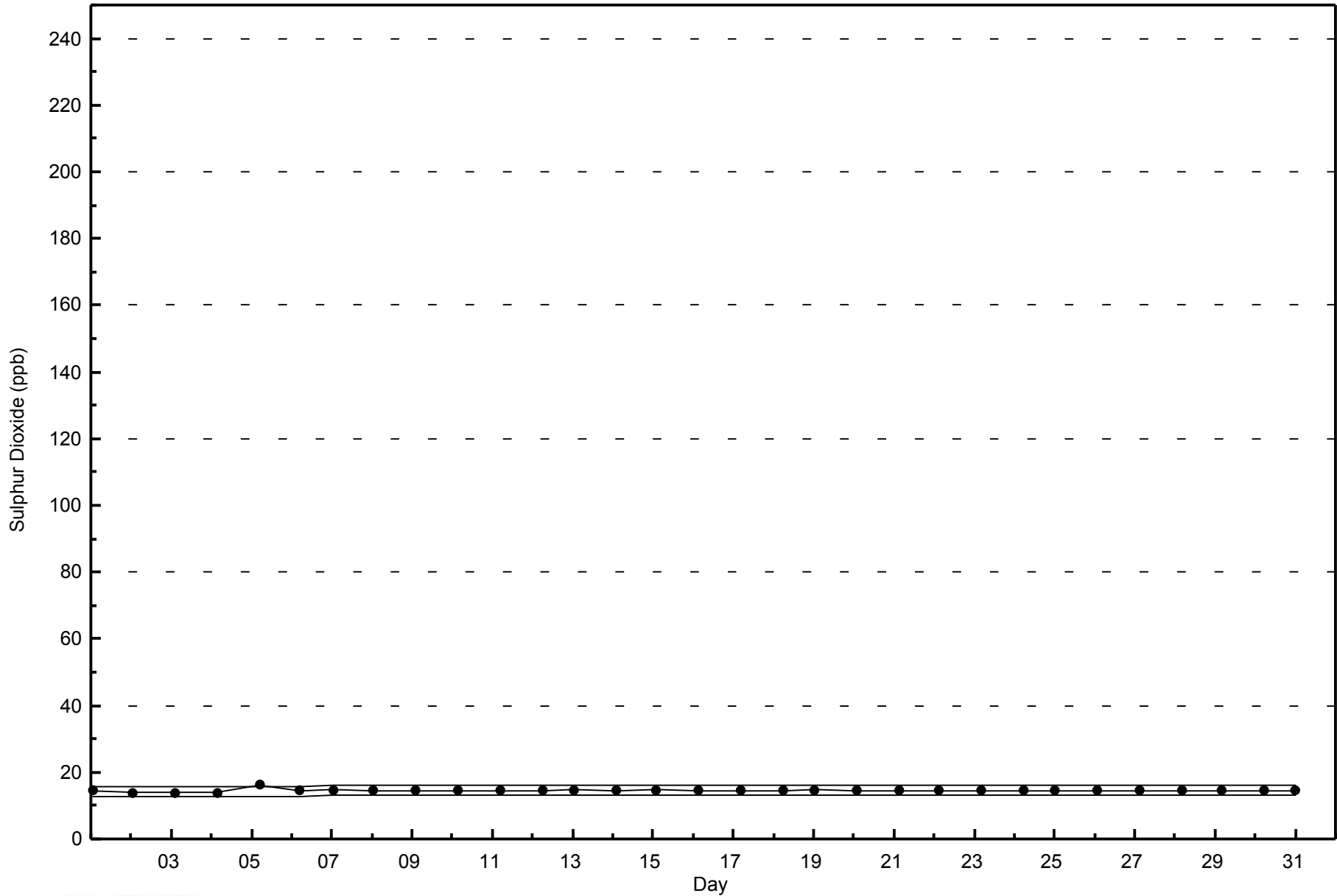
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - March 2015



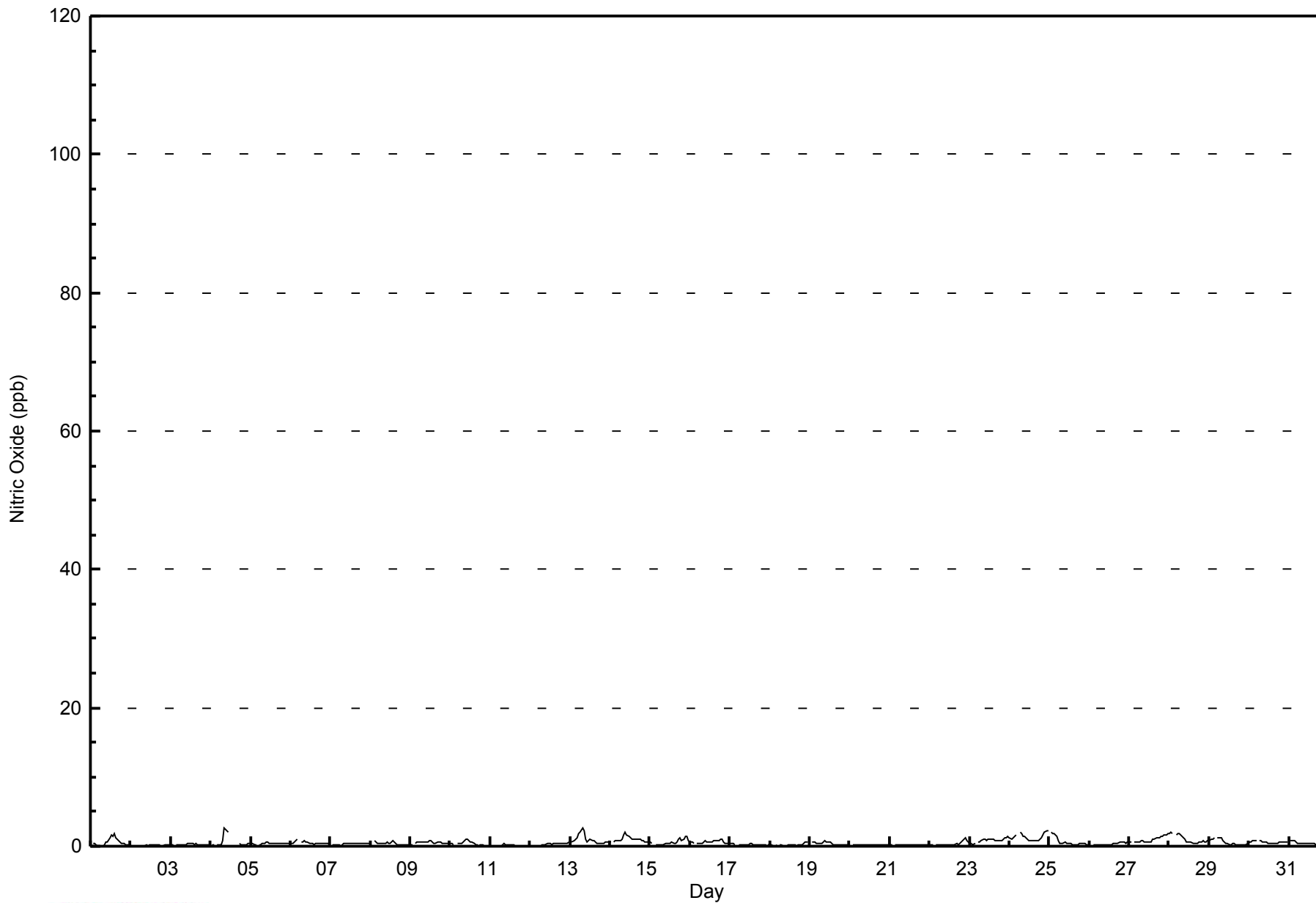


Maximum Value: 3 ppb on Mar 13 08:00																	Maximum Daily Average: 1.3 ppb on Mar 24																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 2 04:00																	Minimum Daily Average: 0.1 ppb on Mar 2																	Hours of Data: 707	
Maximum Diurnal Average: 0.6 ppb at hour 9																	Minimum Diurnal Average: 0.4 ppb at hour 17																	Hours of Missing Data: 37	
Monthly Average: 0.5 ppb																	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =1 P ₉₉ =2																	Hours of Calibration: 37	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	0	0	0	0	0	0	0	0	1	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0.6	2									
2-Mar	0	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0									
4-Mar	0	0	0	Z	0	0	0	1	3	3	2	C	C	C	C	C	C	0	0	0	0	0	0	0	--	3									
5-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1									
6-Mar	0	0	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1									
7-Mar	Z	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									
8-Mar	0	Z	1	1	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1									
9-Mar	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0.5	1									
10-Mar	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1									
11-Mar	0	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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1									
13-Mar	Z	1	1	1	1	2	2	3	2	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1.0	3									
14-Mar	1	Z	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2									
15-Mar	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	2	1	1	0.6	2									
16-Mar	1	1	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1									
17-Mar	0	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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1									
19-Mar	Z	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1									
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0									
21-Mar	0	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									
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1									
23-Mar	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1									
24-Mar	1	1	1	1	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1.3	2									
25-Mar	Z	2	2	2	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2									
26-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0.3	1									
27-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	0.9	2									
28-Mar	2	2	2	Z	2	2	2	2	2	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1.0	2									
29-Mar	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1									
30-Mar	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0.6	1									
31-Mar	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1									
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - March 2015

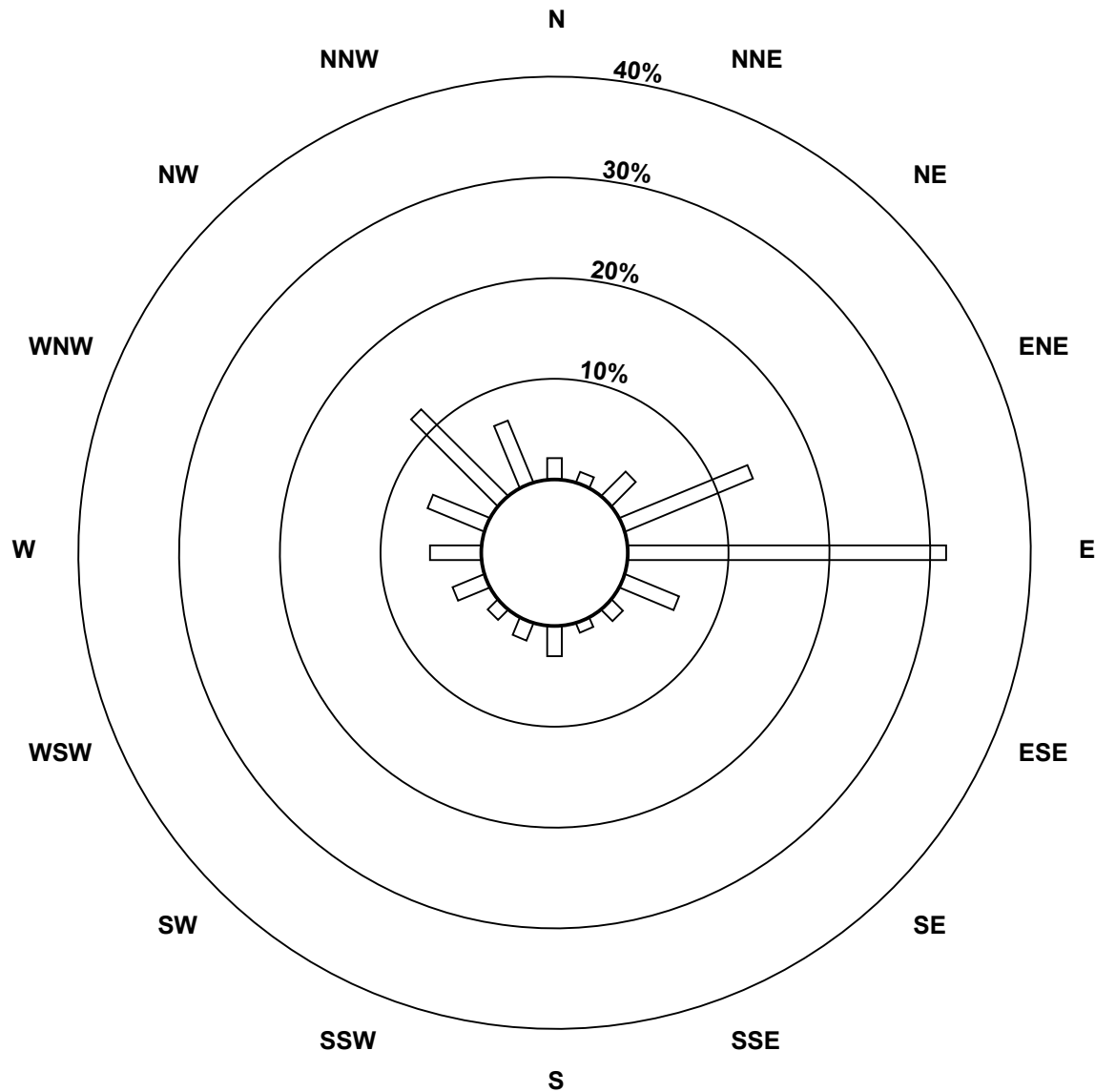
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	15	8	24	97	223	41	11	7	21	13	10	24	36	43	86	47	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	15	8	24	97	223	41	11	7	21	13	10	24	36	43	86	47	706

Total Number of Valid Hours: 706

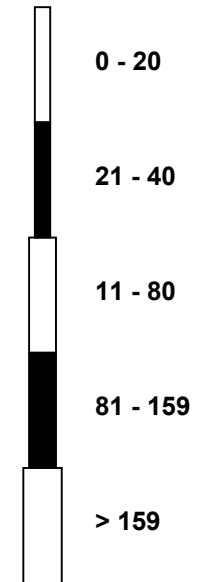
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)



Classes (ppb)

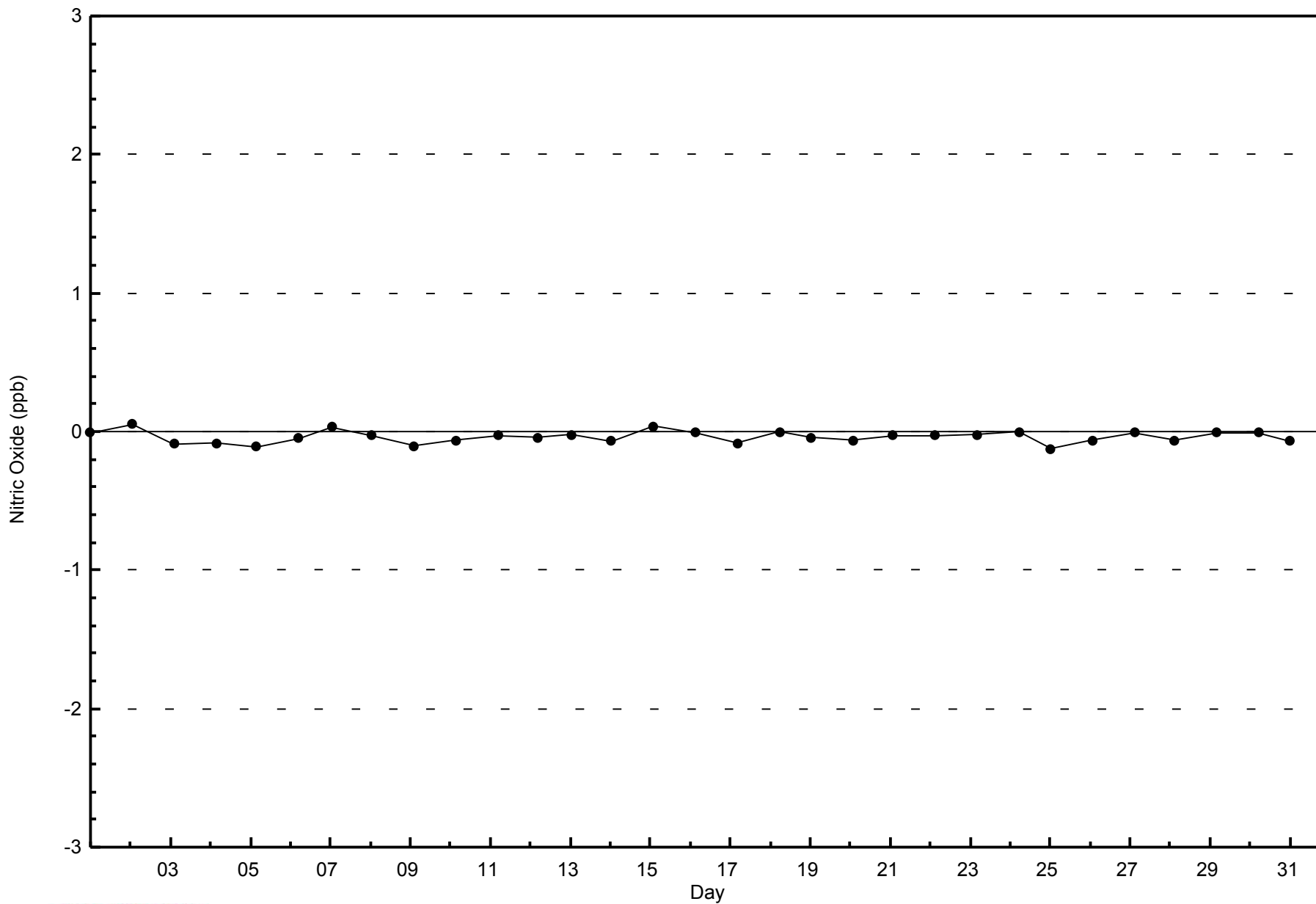


Total Number of Valid Hours: 706



WBEA
Zero Responses

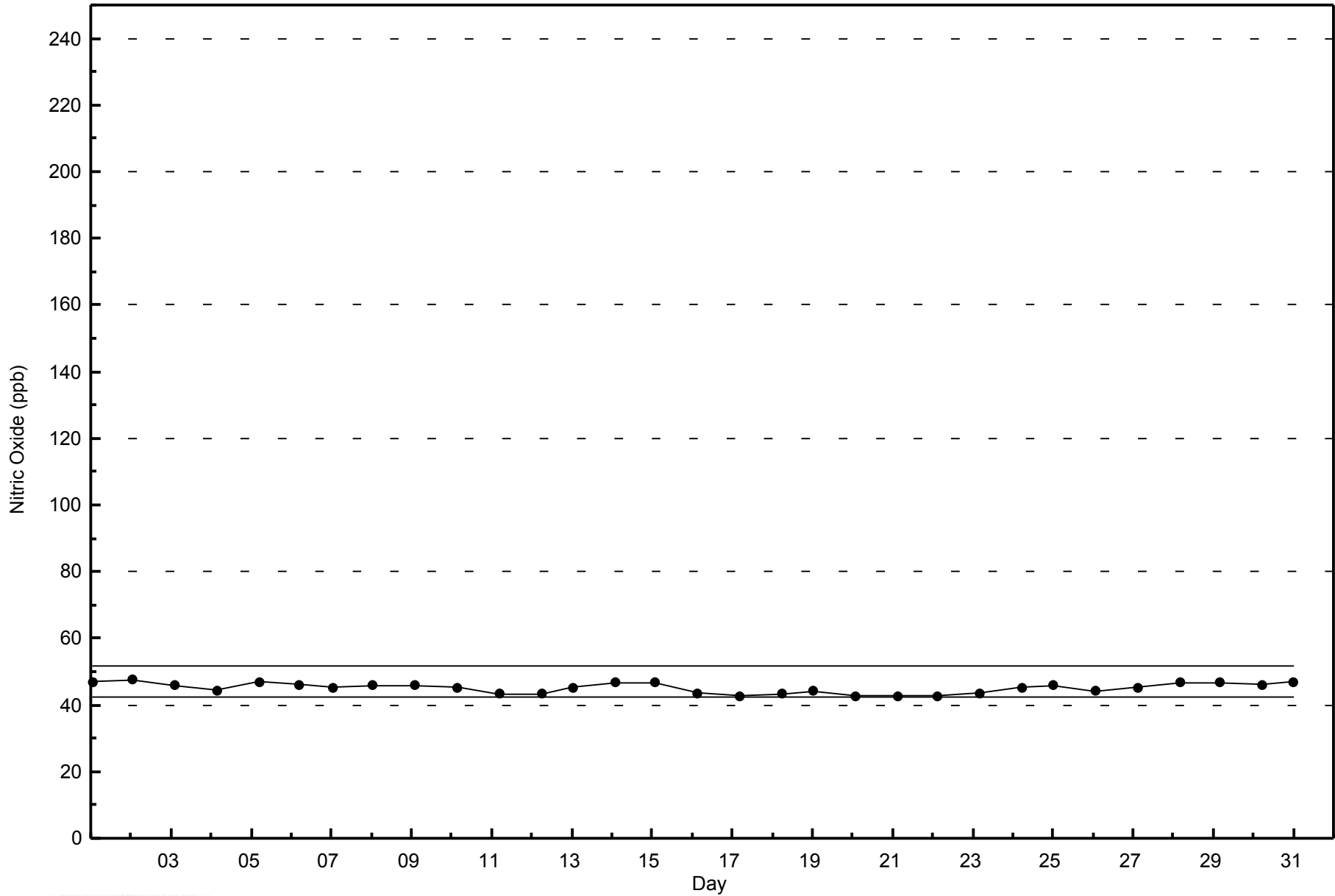
Nitric Oxide (NO) - ppb
Fort Chipewyan - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort Chipewyan - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort Chipewyan - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 18 ppb on Mar 25 04:00	Maximum Daily Average: 11.8 ppb on Mar 24		Hours of Data:	707
Minimum Value: 1 ppb on Mar 3 08:00	Minimum Daily Average: 1.3 ppb on Mar 2		Hours of Missing Data:	37
Maximum Diurnal Average: 5.9 ppb at hour 3	Minimum Diurnal Average: 4.6 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 5.1 ppb	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 4 Q ₃ = 7 P ₉₀ = 10 P ₉₉ = 16		Percent Operational Time:	100.0

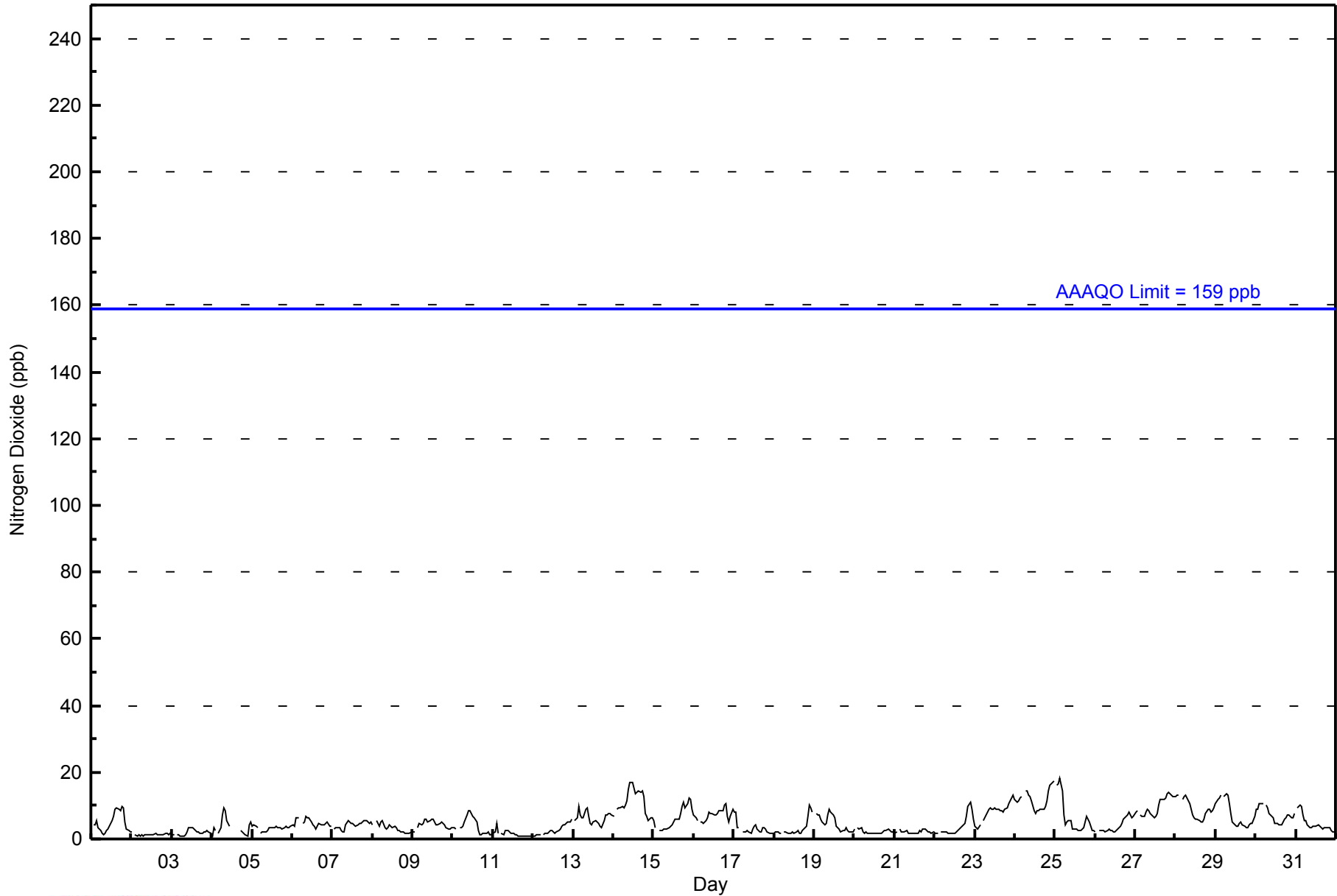
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	4	4	5	3	3	2	1	2	2	3	5	6	7	9	9	9	8	10	9	5	3	3	2	5.0	10																							
2-Mar	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	1	2	1.3	2																							
3-Mar	1	1	Z	1	1	1	1	1	1	1	2	3	4	3	3	2	2	2	2	2	2	2	2	2	2.0	4																							
4-Mar	1	4	2	Z	2	4	7	9	8	6	4	C	C	C	C	C	C	2	2	2	1	1	4	5	--	9																							
5-Mar	4	4	4	4	Z	2	2	2	2	2	3	4	3	4	4	4	3	3	3	4	4	3	4	4	3.3	4																							
6-Mar	4	4	6	7	7	Z	5	5	7	6	6	5	4	4	3	4	5	4	4	4	5	5	4	4	4.8	7																							
7-Mar	Z	3	3	4	3	3	2	2	4	5	5	5	5	4	4	4	5	5	5	5	5	5	5	5	4.2	5																							
8-Mar	4	Z	5	5	4	5	6	3	3	4	4	4	4	4	4	3	2	2	2	2	2	2	2	2	3.3	6																							
9-Mar	2	2	Z	4	5	4	5	6	6	5	5	6	6	5	4	4	5	5	5	4	4	3	3	3	4.4	6																							
10-Mar	3	4	3	Z	4	4	4	5	7	8	9	8	7	7	5	2	1	1	2	2	2	2	1	1	3.9	9																							
11-Mar	2	2	5	2	Z	2	1	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.7	5																							
12-Mar	1	1	1	1	1	Z	1	2	2	2	3	3	2	2	2	3	3	4	4	4	5	5	5	6	2.7	6																							
13-Mar	Z	6	7	10	7	7	6	9	9	7	5	4	5	6	5	5	4	4	6	7	7	8	8	7	6.3	10																							
14-Mar	7	Z	9	9	10	10	9	10	12	15	17	17	15	14	14	14	15	13	8	7	6	6	6	6	11.1	17																							
15-Mar	6	3	Z	2	2	3	3	3	3	3	4	4	5	6	6	6	8	10	11	9	11	12	12	9	6.1	12																							
16-Mar	7	6	6	Z	5	5	5	5	7	8	8	8	7	7	8	9	9	9	10	11	7	5	7	9	7.2	11																							
17-Mar	8	8	4	3	Z	2	2	2	2	2	2	3	4	4	3	2	2	3	3	3	2	2	2	2	3.1	8																							
18-Mar	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	3	2	2	3	3	4	7	10	9	8	3.3	10																							
19-Mar	Z	8	7	7	6	5	4	5	7	9	8	7	6	4	3	3	2	3	3	3	3	2	2	2	4.8	9																							
20-Mar	3	Z	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2.2	3																							
21-Mar	2	2	Z	3	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	2	2	2	2	2.2	3																							
22-Mar	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	3	4	4	5	7	10	11	9	6	3.7	11																								
23-Mar	4	3	3	4	Z	6	6	7	9	9	9	9	9	9	9	8	8	9	9	11	12	12	13	8.1	13																								
24-Mar	12	11	12	12	13	Z	14	14	13	13	11	9	8	8	9	9	9	10	11	14	16	17	18	11.8	18																								
25-Mar	Z	16	17	18	15	7	4	5	5	6	3	3	3	3	3	3	3	5	7	5	4	3	3	6.2	18																								
26-Mar	2	Z	3	3	3	3	2	2	3	3	3	2	2	3	4	4	5	6	7	7	8	7	7	7	4.1	8																							
27-Mar	8	8	Z	7	7	7	8	9	8	8	7	6	7	8	10	12	12	12	12	14	14	14	13	13	9.7	14																							
28-Mar	13	13	13	Z	12	13	13	12	11	9	7	6	6	6	5	5	5	6	8	9	9	8	9	10	8.9	13																							
29-Mar	11	12	12	13	Z	13	13	13	13	11	8	5	5	4	4	5	5	4	4	4	4	5	5	7	7.3	13																							
30-Mar	9	9	11	10	11	Z	10	9	8	7	6	5	5	5	4	4	5	6	7	7	7	6	6	8	7.1	11																							
31-Mar	Z	9	10	10	7	5	5	4	4	3	4	4	4	4	4	3	3	3	3	3	3	3	2	2	4.5	10																							
																								4.8	5.7	5.9	5.8	5.3	4.6	4.9	5.2	5.3	5.2	5.0	4.8	4.7	4.6	4.6	4.6	4.7	4.9	5.3	5.4	5.5	5.4	5.4	5.4	Diurnal Average	
																								13	16	17	18	15	13	14	14	13	15	17	17	15	14	14	14	14	14	15	13	14	14	16	17	18	Diurnal Maximum

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 2015

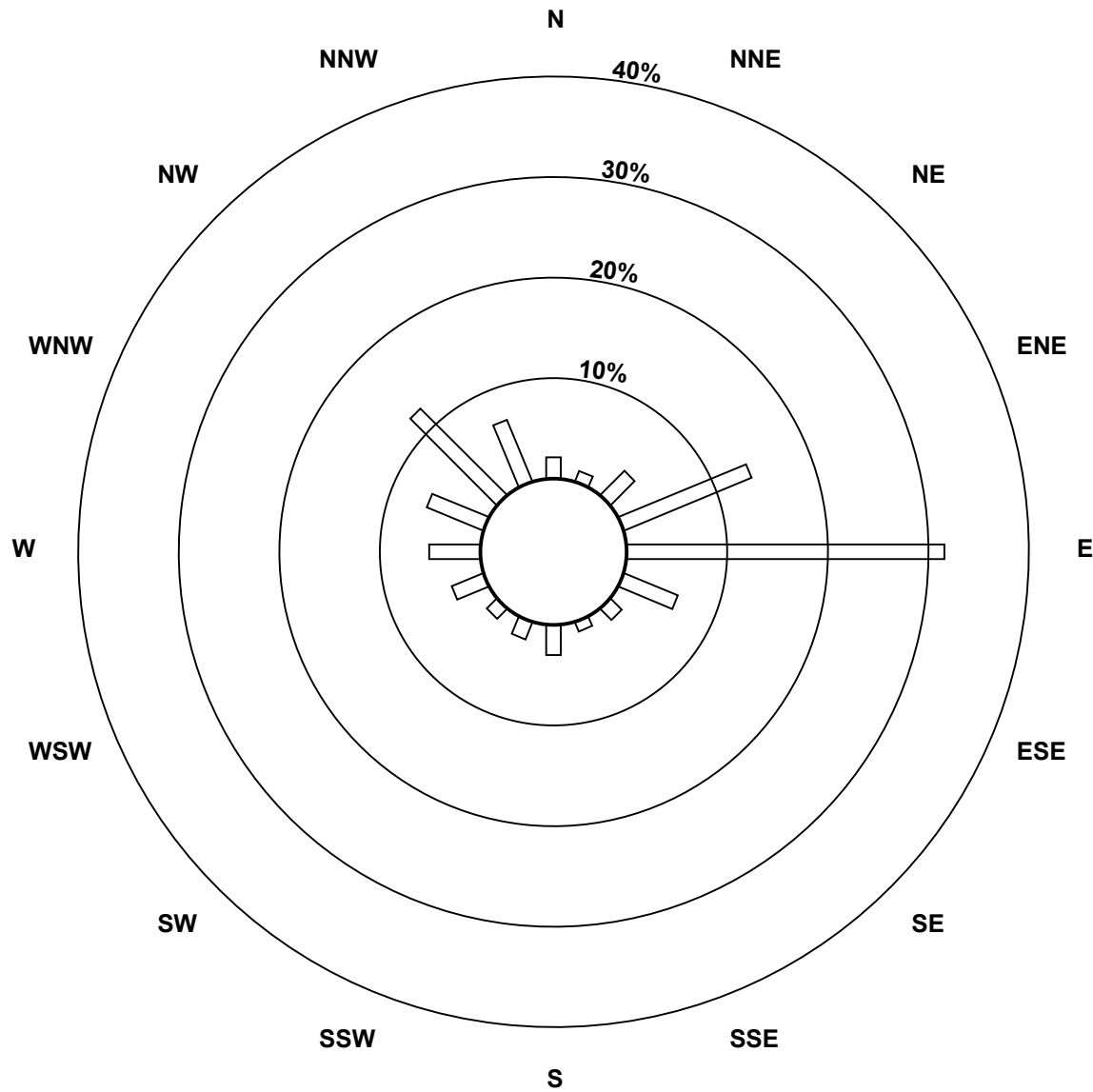
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	15	8	24	97	223	41	11	7	21	13	10	24	36	43	86	47	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	15	8	24	97	223	41	11	7	21	13	10	24	36	43	86	47	706

Total Number of Valid Hours: 706

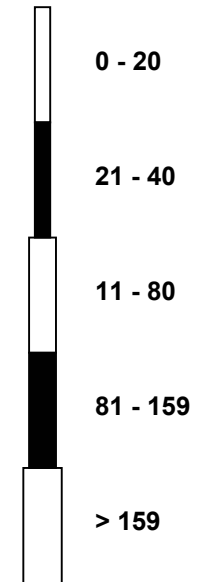
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)**



Classes (ppb)

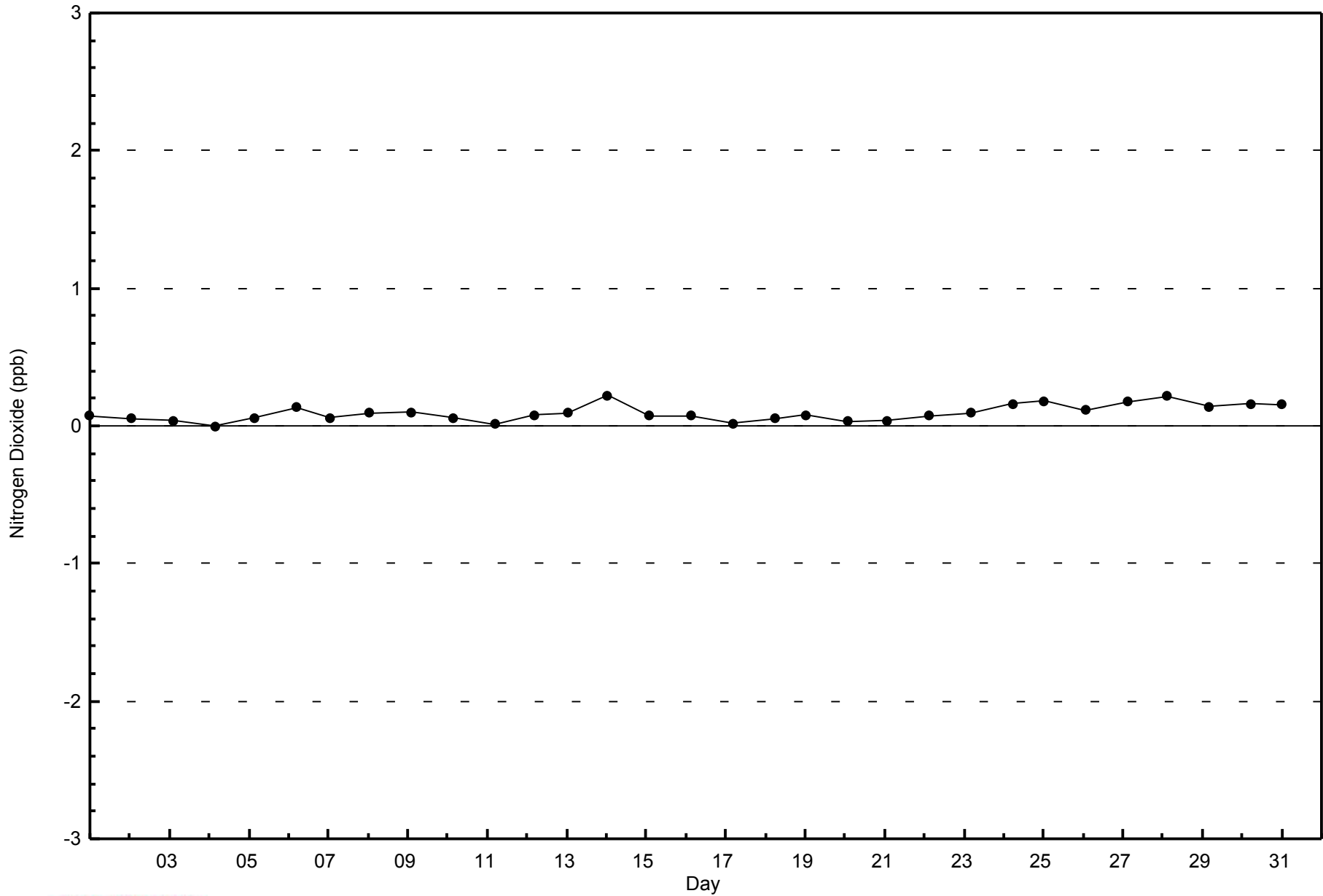


Total Number of Valid Hours: 706



WBEA
Zero Responses

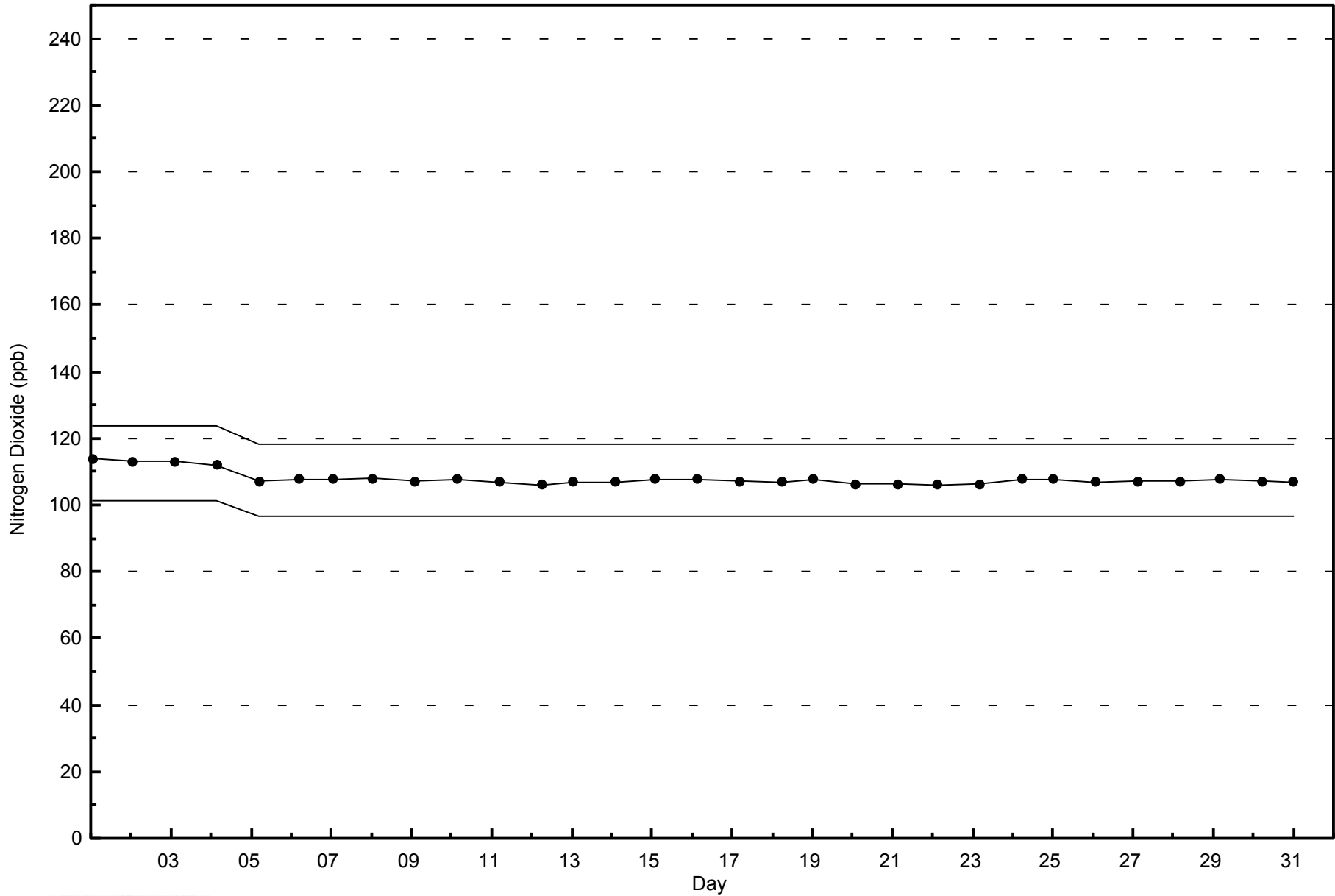
Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 2015





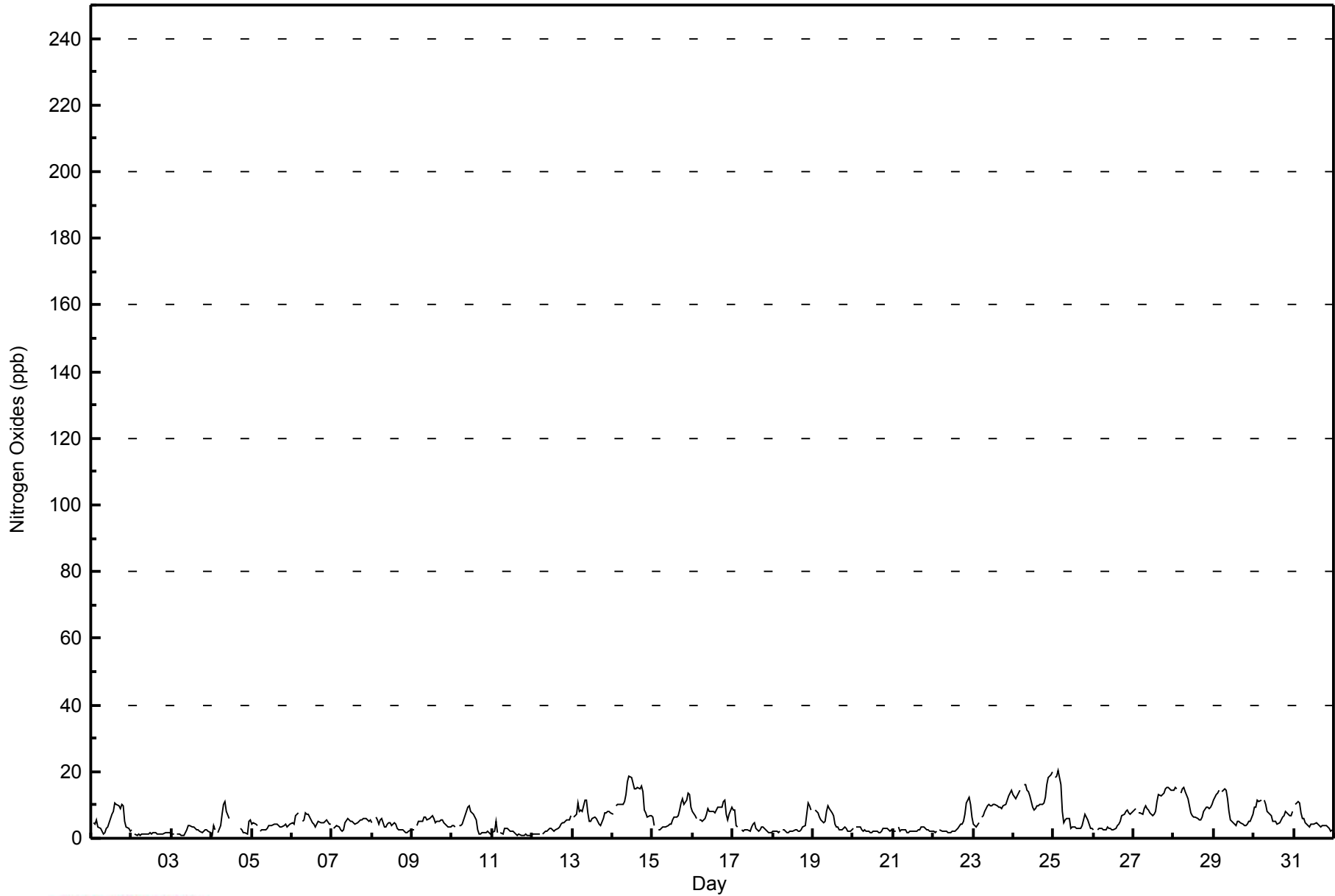
Maximum Value: 20 ppb on Mar 25 04:00																		Maximum Daily Average: 13.1 ppb on Mar 24						Hours in Service: 744		
Minimum Value: 1 ppb on Mar 3 08:00																		Minimum Daily Average: 1.4 ppb on Mar 2						Hours of Data: 707		
Maximum Diurnal Average: 6.5 ppb at hour 3																		Minimum Diurnal Average: 5.0 ppb at hour 6						Hours of Missing Data: 37		
Monthly Average: 5.6 ppb																		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 4 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 18						Hours of Calibration: 37		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	5	4	6	3	3	2	1	2	3	3	6	7	8	11	10	10	9	10	10	5	3	3	2	5.5	11
2-Mar	2	Z	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	2	2	1	2	1.4	2
3-Mar	1	1	Z	1	1	1	1	1	2	3	4	4	4	3	3	3	2	2	2	2	2	3	2	2	2.2	4
4-Mar	1	4	2	Z	2	4	7	10	11	8	6	C	C	C	C	C	C	3	2	2	2	1	5	6	--	11
5-Mar	4	5	4	4	Z	2	3	3	3	3	4	4	4	4	4	4	4	4	3	4	4	4	4	4	3.6	5
6-Mar	5	4	7	7	7	Z	5	6	8	7	7	5	5	4	3	4	5	5	4	5	5	5	4	4	5.4	8
7-Mar	Z	3	3	4	3	3	2	3	5	6	6	5	5	5	4	5	5	5	6	6	6	5	5	5	4.5	6
8-Mar	5	Z	6	5	4	5	6	4	3	4	5	4	4	5	4	3	3	2	2	2	2	2	2	2	3.7	6
9-Mar	3	2	Z	4	5	5	5	7	7	6	6	7	7	6	5	5	5	6	5	5	4	4	3	4	4.9	7
10-Mar	4	4	3	Z	4	4	4	5	8	9	10	8	8	7	6	3	1	1	2	2	2	2	1	1	4.3	10
11-Mar	2	2	5	2	Z	2	1	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1.8	5
12-Mar	1	1	1	1	1	Z	1	2	2	2	3	3	3	2	3	3	3	4	5	5	5	6	6	7	3.0	7
13-Mar	Z	6	7	11	8	8	8	12	12	8	5	5	6	6	6	5	4	4	6	8	8	8	8	8	7.2	12
14-Mar	7	Z	10	10	10	10	10	11	13	17	19	18	16	15	15	15	15	16	14	9	8	6	7	7	12.1	19
15-Mar	6	4	Z	3	3	3	3	3	3	4	4	4	5	6	6	7	8	11	12	10	11	14	13	9	6.7	14
16-Mar	8	7	6	Z	6	6	5	6	7	9	8	8	8	8	9	9	9	9	11	12	7	5	7	9	7.8	12
17-Mar	9	8	4	4	Z	2	2	2	3	2	2	3	4	5	3	2	3	4	4	3	2	2	2	2	3.3	9
18-Mar	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	3	2	2	3	3	4	7	11	10	9	3.5	11
19-Mar	Z	8	8	8	6	6	5	5	8	10	9	8	7	4	4	3	3	3	3	3	3	2	2	2	5.2	10
20-Mar	3	Z	3	3	3	2	2	3	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2.4	3
21-Mar	2	2	Z	3	2	2	2	3	2	2	2	2	2	2	3	2	3	3	3	3	3	2	2	2	2.4	3
22-Mar	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	3	3	4	4	5	7	11	12	10	7	4.0	12
23-Mar	4	4	3	5	Z	6	7	8	10	10	10	10	10	10	10	9	9	9	10	10	12	13	14	14	9.0	14
24-Mar	13	12	13	13	14	Z	16	16	14	14	13	9	8	9	10	10	10	10	11	12	16	18	19	20	13.1	20
25-Mar	Z	18	18	20	16	8	5	5	6	6	3	3	3	3	3	3	3	4	5	7	6	4	3	3	6.8	20
26-Mar	3	Z	3	3	3	3	2	3	3	3	3	2	2	3	4	4	5	7	7	8	8	8	7	7	4.4	8
27-Mar	8	9	Z	7	8	7	9	10	9	9	8	7	7	8	11	13	13	13	14	15	15	15	14	15	10.6	15
28-Mar	14	15	15	Z	14	15	15	14	12	10	8	7	6	6	6	5	5	6	8	9	9	9	9	10	9.9	15
29-Mar	12	13	13	14	Z	14	15	14	12	8	6	5	4	4	5	5	5	4	4	4	4	5	5	7	7.9	15
30-Mar	9	9	12	11	11	Z	11	10	8	8	7	5	5	5	4	4	5	6	7	8	8	7	7	8	7.7	12
31-Mar	Z	10	11	11	8	6	6	5	4	4	4	4	4	5	4	4	3	4	4	4	4	3	2	2	4.9	11
																		Diurnal Average		Diurnal Maximum						
																		5.2		14						
																		6.2		18						
																		6.5		18						
																		6.3		20						
																		5.8		16						
																		5.0		15						
																		5.4		16						
																		5.8		16						
																		6.0		14						
																		5.9		17						
																		5.6		19						
																		5.3		18						
																		5.2		16						
																		5.1		15						
																		5.1		15						
																		5.1		15						
																		5.1		15						
																		5.3		16						
																		5.7		14						
																		5.9		15						
																		6.0		16						
																		5.9		18						
																		5.9		19						
																		5.9		20						

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 2015

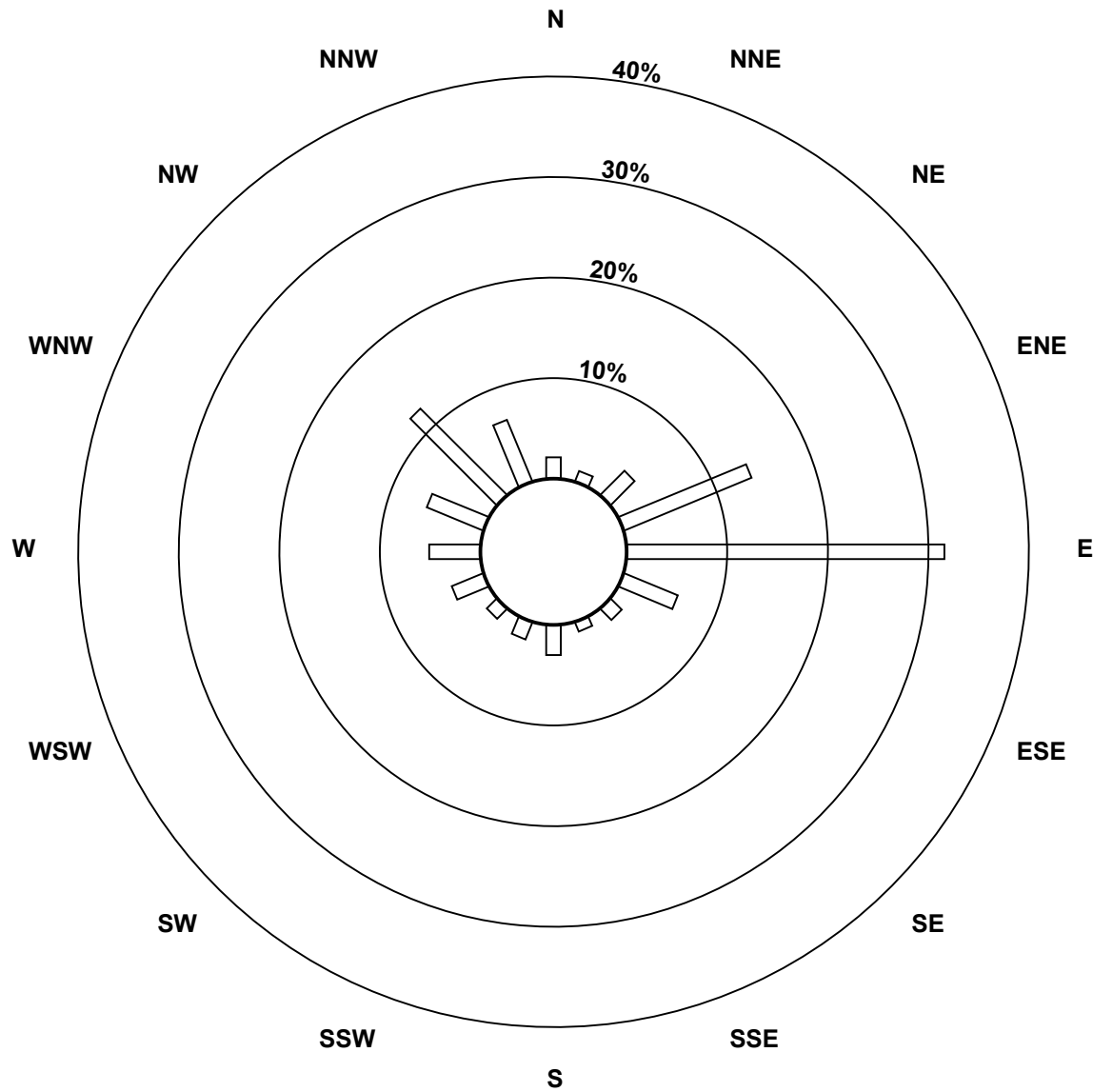
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	15	8	24	97	223	41	11	7	21	13	10	24	36	43	86	47	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	15	8	24	97	223	41	11	7	21	13	10	24	36	43	86	47	706

Total Number of Valid Hours: 706

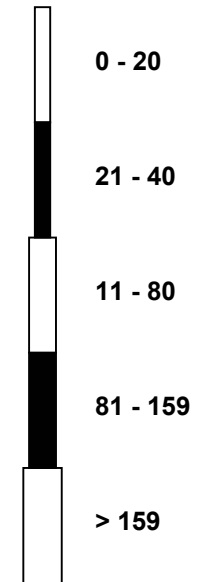
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

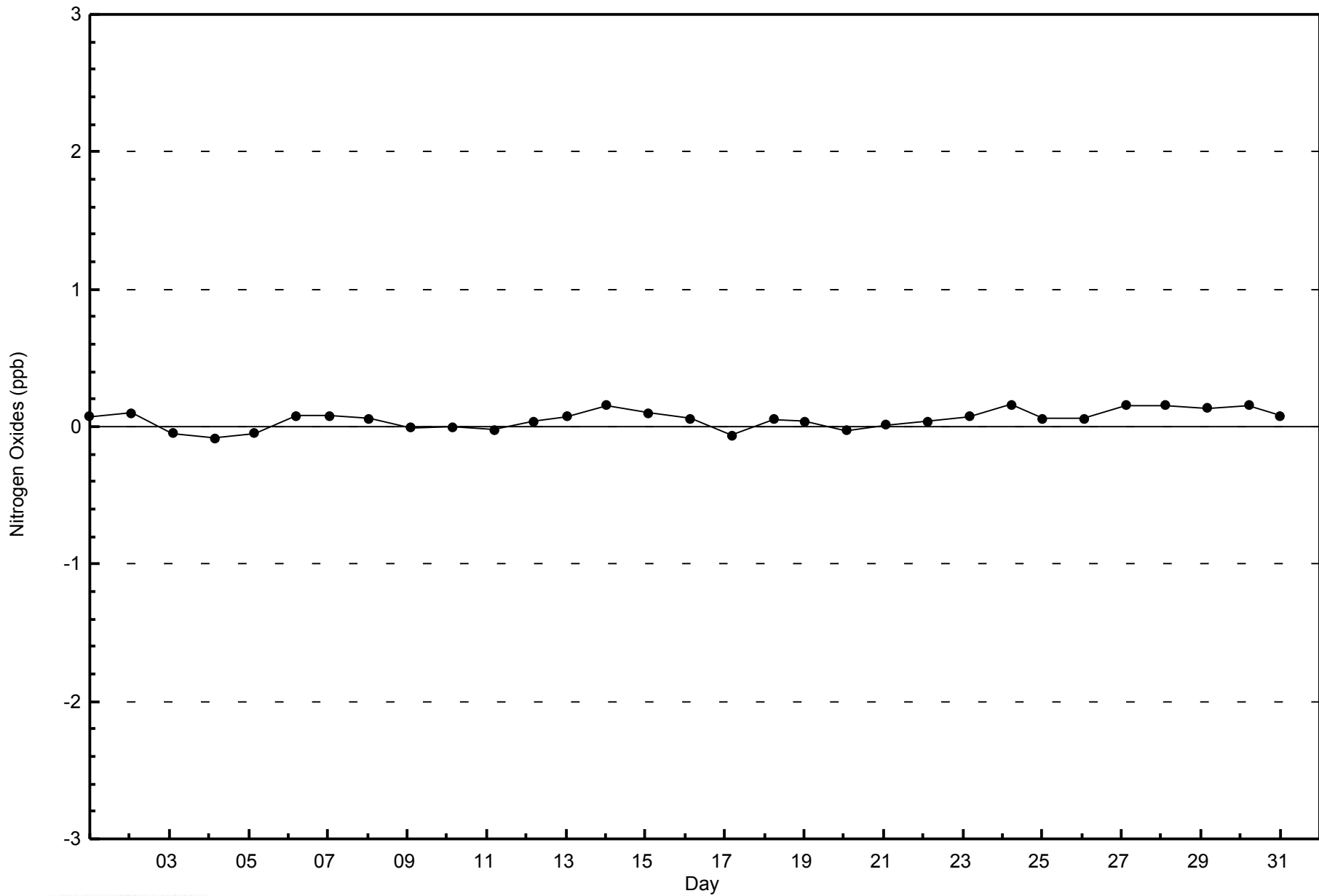
**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)**



Classes (ppb)



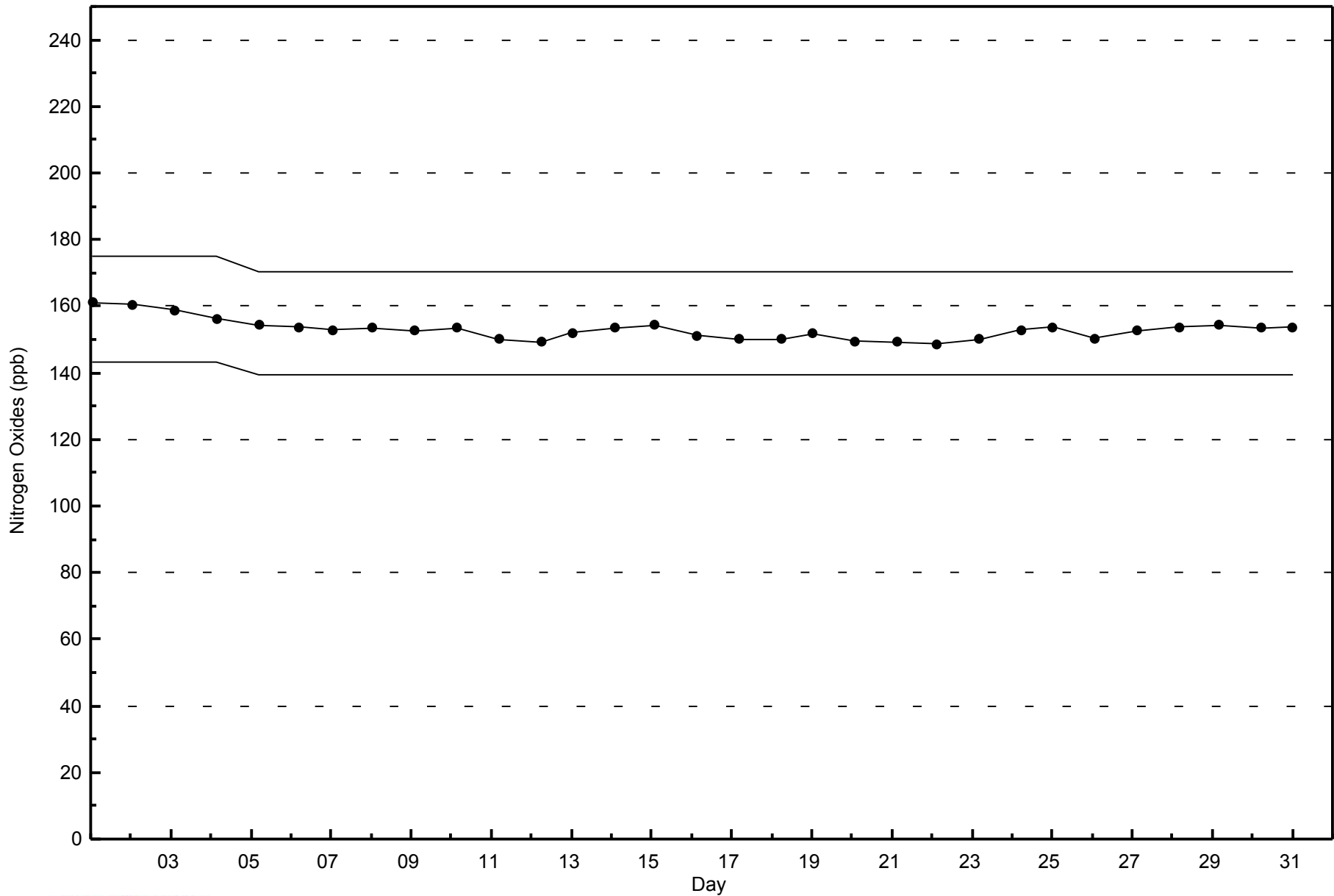
Total Number of Valid Hours: 706





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 38 ppb on Mar 11 16:00	Maximum Daily Average: 34.1 ppb on Mar 11		Hours of Data:	708
Minimum Value: 6 ppb on Mar 15 22:00	Minimum Daily Average: 13.5 ppb on Mar 24		Hours of Missing Data:	36
Maximum Diurnal Average: 27.4 ppb at hour 17	Minimum Diurnal Average: 23.3 ppb at hour 4		Hours of Calibration:	36
Monthly Average: 25.3 ppb	Percentiles: P ₁ = 7 P ₁₀ = 15 Q ₁ = 20 Median = 27 Q ₃ = 32 P ₉₀ = 34 P ₉₉ = 37		Percent Operational Time:	100.0

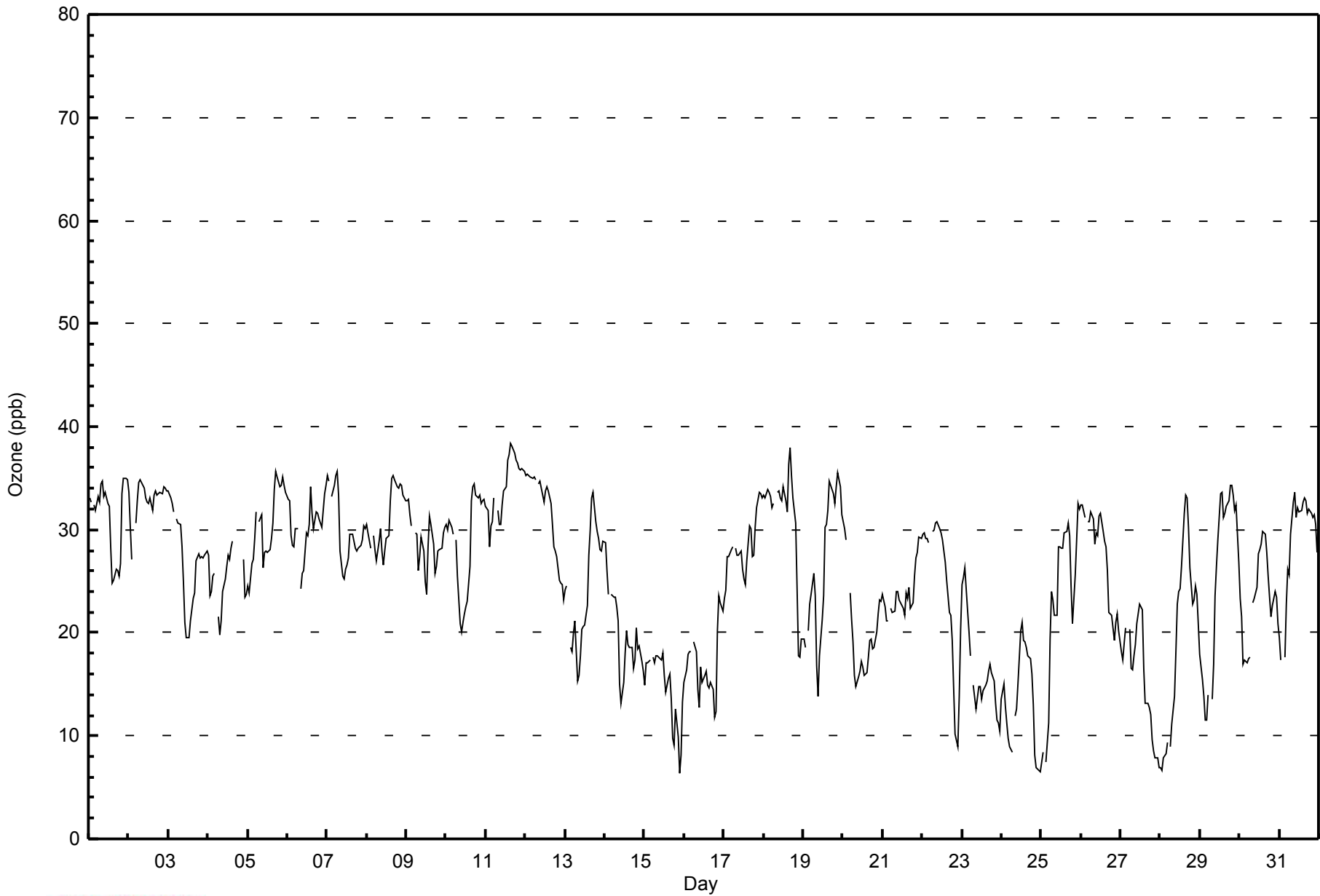
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	33	33	Z	32	32	33	33	34	35	33	34	32	32	28	25	25	26	26	25	27	33	35	35	35	31.2	35																								
2-Mar	34	30	Z	31	33	35	35	35	35	34	33	33	33	33	32	33	34	33	33	34	34	34	34	34	33.0	35																								
3-Mar	34	33	32	32	Z	31	31	31	28	25	21	20	20	21	22	23	24	27	28	27	27	28	28	28	26.9	34																								
4-Mar	28	24	24	26	26	Z	22	20	21	24	25	26	27	27	28	29	C	C	C	C	C	27	23	24	25.0	29																								
5-Mar	25	24	27	27	29	32	Z	31	31	26	28	28	28	28	29	31	34	36	35	34	34	35	34	34	30.4	36																								
6-Mar	33	33	29	28	28	30	30	Z	24	26	26	30	29	30	34	32	30	32	32	31	31	30	33	34	30.3	34																								
7-Mar	35	35	Z	33	34	35	36	33	28	25	25	26	27	27	30	30	29	28	28	28	29	30	30	30	30.0	36																								
8-Mar	31	30	28	Z	29	28	27	29	30	28	27	28	29	29	33	35	35	35	34	34	34	34	33	33	31.0	35																								
9-Mar	33	33	32	30	Z	30	30	26	27	29	28	25	24	28	31	30	29	26	26	28	28	28	30	30	28.8	33																								
10-Mar	31	30	31	30	29	Z	29	26	21	20	21	22	23	23	26	33	34	34	33	33	33	33	33	33	28.7	34																								
11-Mar	32	32	28	30	31	33	Z	32	31	30	32	34	34	37	37	38	38	37	37	36	36	36	36	36	34.1	38																								
12-Mar	35	35	35	35	35	35	35	Z	34	35	33	33	34	34	34	33	31	28	28	27	25	25	25	23	31.6	35																								
13-Mar	24	25	Z	19	18	20	21	15	16	18	20	21	21	23	27	30	33	34	31	30	29	28	28	29	24.3	34																								
14-Mar	29	26	24	Z	24	23	23	22	21	15	13	15	18	20	19	19	19	17	17	20	18	19	17	16	19.8	29																								
15-Mar	15	17	17	17	Z	18	17	18	18	17	17	18	16	14	16	16	14	10	9	13	10	6	8	13	14.5	18																								
16-Mar	15	16	18	18	18	Z	19	18	14	13	17	15	16	16	15	15	15	15	12	12	20	24	23	22	16.8	24																								
17-Mar	23	24	27	27	28	28	Z	28	27	28	28	26	25	25	27	30	30	27	27	30	32	34	34	33	28.3	34																								
18-Mar	33	33	34	34	33	32	32	Z	34	34	33	33	34	33	32	36	38	35	33	31	24	18	18	19	31.1	38																								
19-Mar	19	19	Z	20	23	24	26	24	17	14	18	21	24	30	30	32	35	34	33	32	34	36	34	32	26.5	36																								
20-Mar	31	30	29	Z	24	21	19	16	15	16	16	17	17	16	16	18	19	19	18	19	20	22	23	23	20.2	31																								
21-Mar	24	23	21	21	Z	22	22	22	24	24	23	23	22	22	24	23	24	22	23	25	27	28	29	29	23.9	29																								
22-Mar	30	30	29	29	29	Z	30	30	31	31	30	30	29	28	27	25	22	22	19	15	10	9	14	20	24.7	31																								
23-Mar	25	25	26	22	20	18	Z	15	13	14	15	15	14	14	15	15	16	17	16	15	13	12	11	10	16.4	26																								
24-Mar	14	15	13	11	10	9	8	Z	12	13	15	20	21	19	19	18	17	16	13	8	7	7	6	6	13.5	21																								
25-Mar	8	8	Z	7	11	19	24	23	22	22	28	28	28	28	30	30	31	29	25	21	26	29	33	32	23.6	33																								
26-Mar	32	32	31	Z	31	31	32	31	29	30	29	31	32	30	29	28	26	22	22	20	19	21	22	20	27.4	32																								
27-Mar	18	17	19	21	Z	20	16	16	18	19	21	23	23	22	17	13	13	13	12	10	9	8	8	7	15.7	23																								
28-Mar	7	7	8	8	9	Z	9	11	14	18	23	24	24	26	32	33	33	30	26	23	23	25	24	21	19.9	33																								
29-Mar	18	15	14	11	12	14	Z	13	17	24	26	29	33	34	31	32	32	33	34	34	33	32	32	27	25.3	34																								
30-Mar	23	22	17	17	17	18	18	Z	23	23	24	28	28	29	30	30	28	26	23	22	23	24	23	21	23.3	30																								
31-Mar	20	17	Z	18	23	26	26	30	33	34	31	32	32	32	33	33	33	32	32	32	31	31	31	28	29.0	34																								
																								25.5	24.9	24.9	23.3	24.4	25.5	24.9	24.2	23.9	23.9	24.6	25.3	25.7	26.1	26.8	27.4	27.4	26.5	25.7	25.2	25.2	25.3	25.6	25.3	Diurnal Average		
																								35	35	35	35	35	35	36	35	35	35	34	34	34	37	37	38	38	37	37	36	36	36	36	36	36	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	191	26.98	26.98
21 - 50	517	73.02	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



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - March 2015

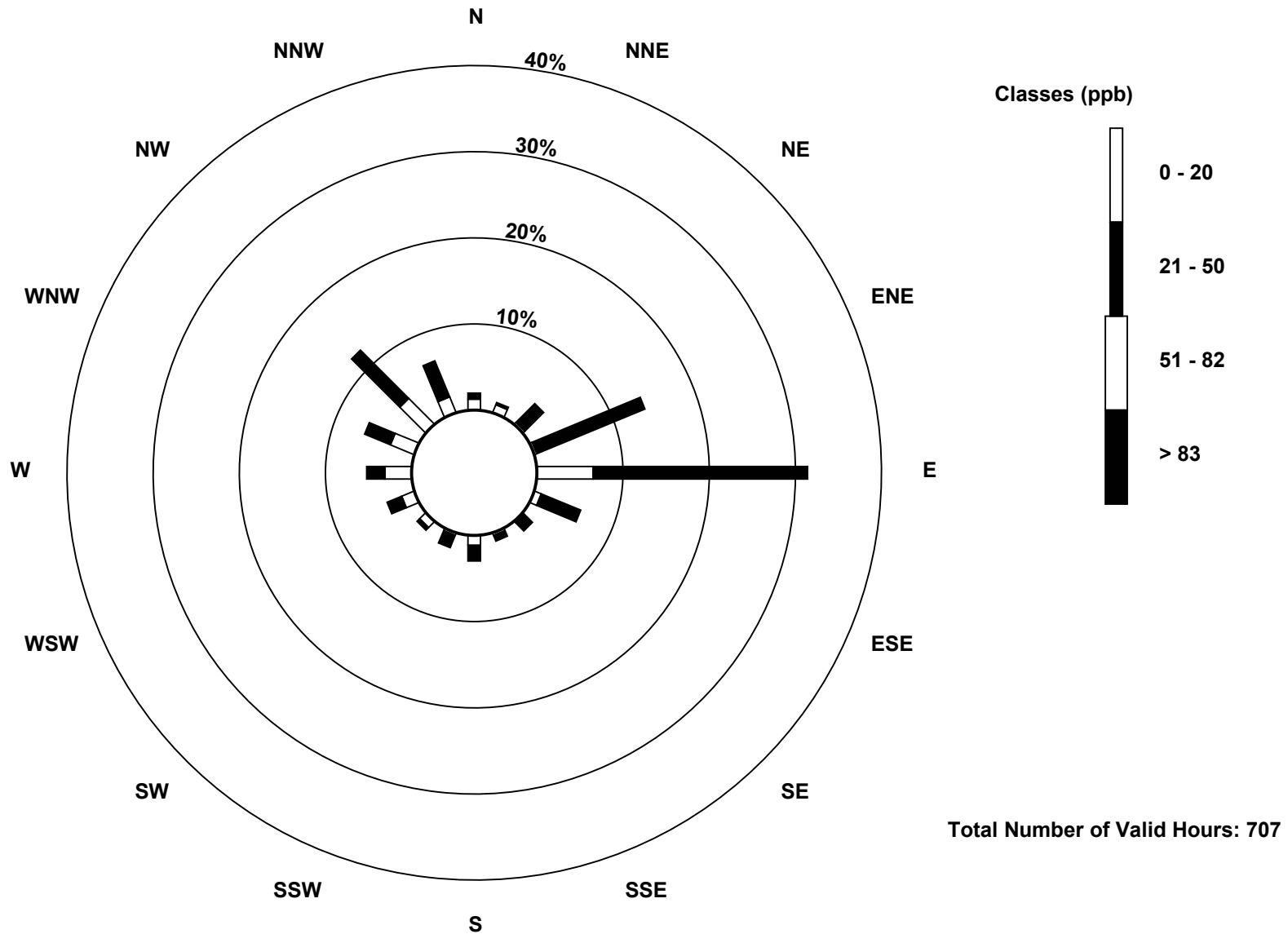
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	7	2	2	46	6	1	2	8	2	7	11	22	21	30	14	190
21 - 50	5	2	22	96	176	35	10	5	13	11	3	13	15	23	56	32	517
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	14	9	24	98	222	41	11	7	21	13	10	24	37	44	86	46	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

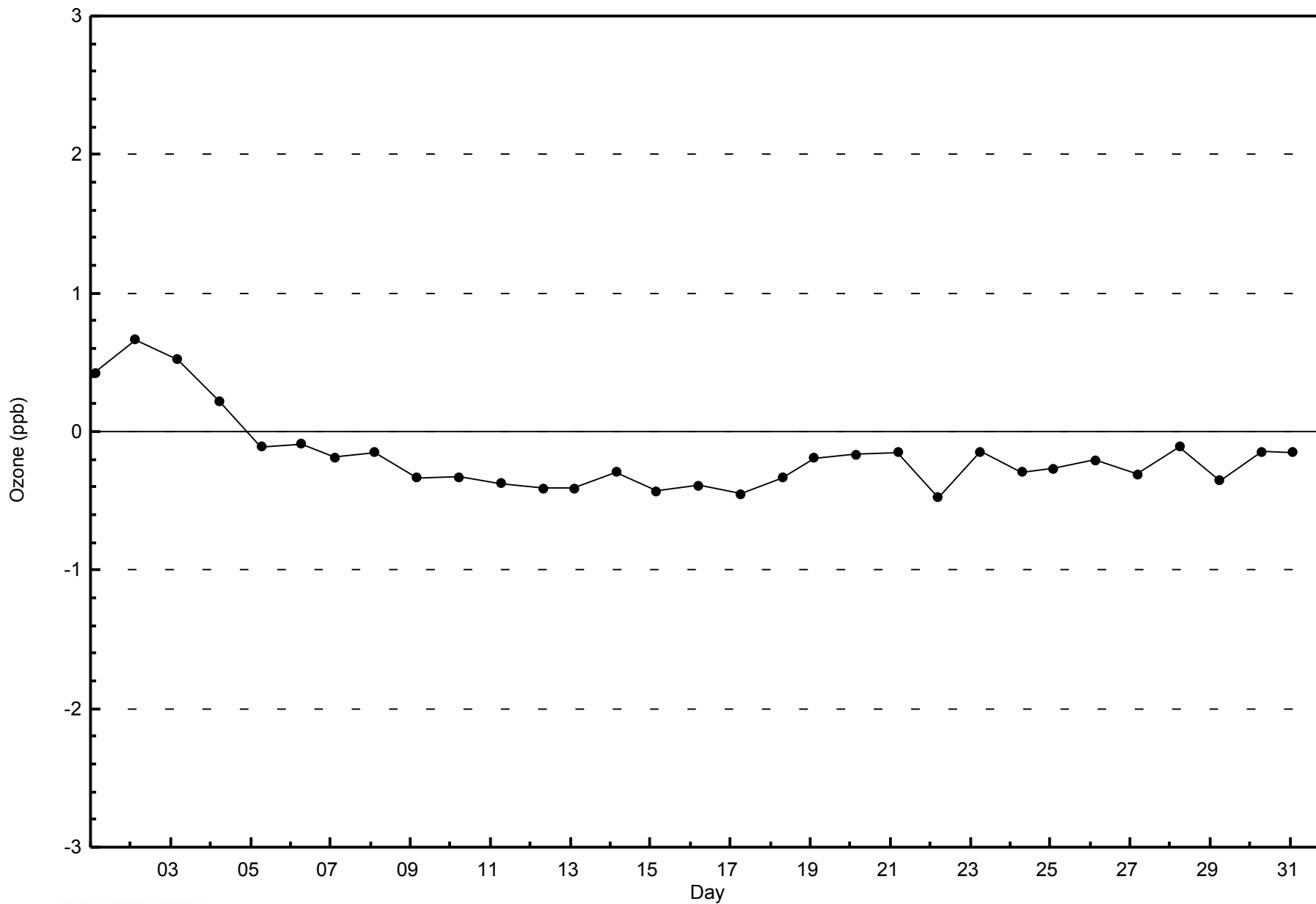
Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)





WBEA
Zero Responses

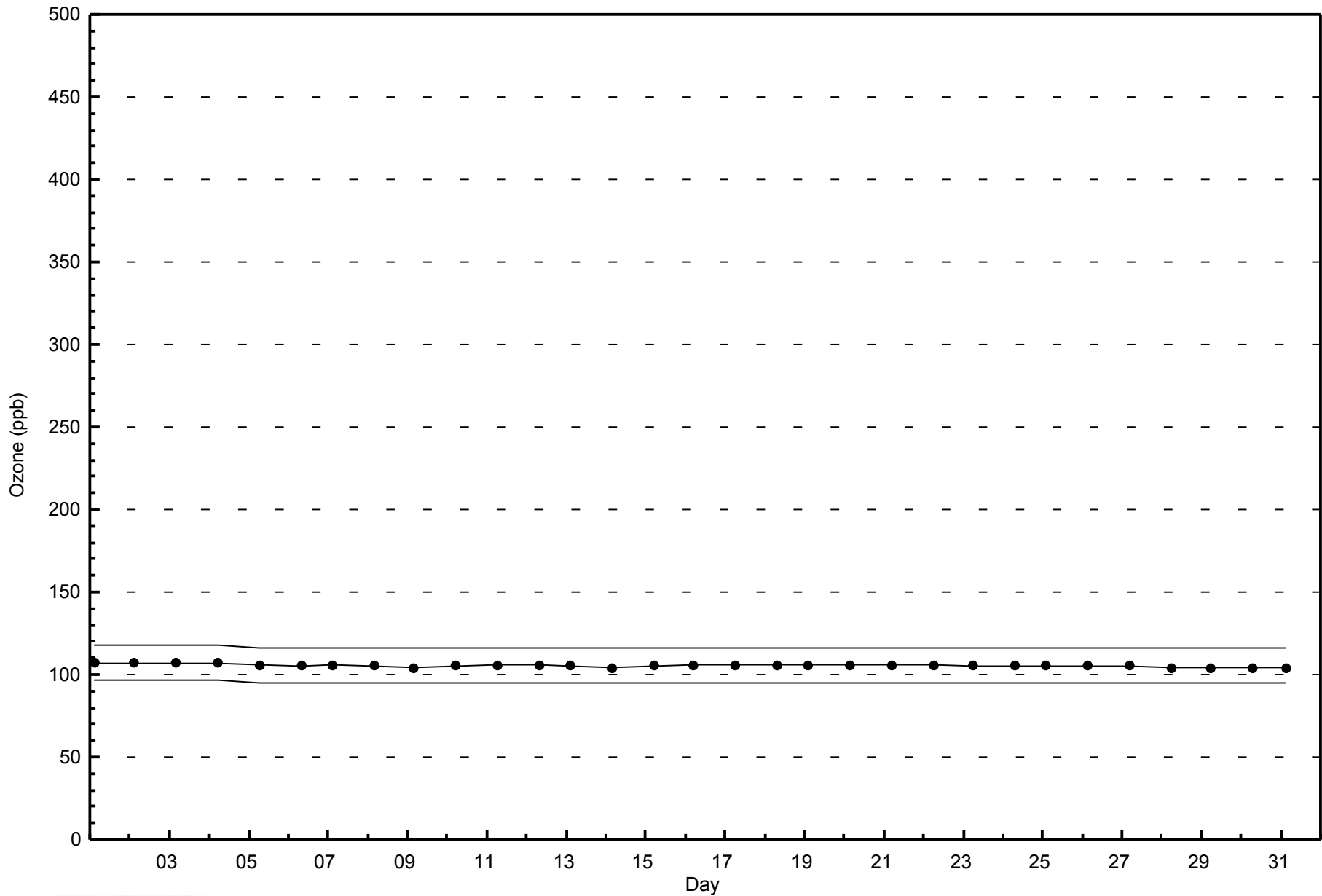
Ozone (O₃) - ppb
Fort Chipewyan - March 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Fort Chipewyan - March 2015





Summary of Hour Averages

Fort Chipewyan - March 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																								
Maximum Value: 17.0 µg/m ³ on Mar 2 03:00		Maximum Daily Average: 6.5 µg/m ³ on Mar 2																								
Minimum Value: 0.9 µg/m ³ on Mar 1 10:00		Hours of Data: 742																								
Maximum Diurnal Average: 4.5 µg/m ³ at hour 3		Hours of Missing Data: 2																								
Monthly Average: 3.55 µg/m ³		Hours of Calibration: 0																								
Minimum Daily Average: 1.9 µg/m ³ on Mar 18		Percent Operational Time: 99.7																								
Minimum Diurnal Average: 3.0 µg/m ³ at hour 16																										
Percentiles: P ₁ = 1.4 P ₁₀ = 1.9 Q ₁ = 2.4 Median = 3.1 Q ₃ = 4.2 P ₉₀ = 5.7 P ₉₉ = 10.5																										
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-Mar	2.0	6.0	3.4	2.4	1.4	1.5	1.1	1.0	1.0	0.9	1.1	2.0	2.1	2.3	2.7	3.0	3.2	4.0	4.2	4.0	4.3	4.6	4.1	3.7	2.8	6.0
2-Mar	4.1	11.6	17.0	13.7	11.0	9.1	7.4	6.4	5.4	5.3	5.7	5.7	5.3	5.3	5.1	4.5	5.0	4.6	4.1	3.6	3.5	3.6	4.0	5.7	6.5	17.0
3-Mar	4.1	3.5	3.8	4.3	4.3	4.8	5.3	5.0	5.5	5.2	5.5	6.0	6.2	5.8	5.5	5.1	5.2	5.1	5.2	8.4	7.9	9.5	8.1	8.4	5.7	9.5
4-Mar	5.3	7.6	5.0	4.5	4.9	5.6	6.3	7.1	7.1	5.7	4.9	4.6	4.7	4.5	4.1	4.1	4.1	4.2	4.2	4.0	3.8	4.2	6.3	7.6	5.2	7.6
5-Mar	5.7	7.8	4.4	3.4	2.4	2.0	2.2	2.5	M	M	3.5	2.9	2.8	2.7	2.9	2.8	2.9	3.0	3.2	3.2	3.4	3.3	3.0	3.4	3.3	7.8
6-Mar	2.9	3.9	4.4	3.9	3.0	3.0	3.1	4.6	3.9	2.5	2.6	2.2	2.2	2.1	1.8	1.9	2.1	2.5	2.3	2.0	2.6	2.4	2.7	3.0	2.8	4.6
7-Mar	3.6	4.1	3.9	4.3	4.6	4.1	3.6	3.5	3.0	2.7	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.2	2.7	2.0	2.1	2.1	2.7	4.6
8-Mar	2.0	1.8	1.8	1.8	1.8	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.2	2.3	2.2	2.3	2.8	2.8	2.7	2.7	2.6	2.5	2.4	2.2	2.8
9-Mar	2.5	2.6	4.2	4.0	5.0	3.6	4.1	4.5	3.5	2.0	3.2	4.0	3.7	3.1	3.3	3.2	2.5	1.8	1.8	1.9	2.1	2.4	2.4	2.1	3.1	5.0
10-Mar	2.1	2.4	2.5	2.8	2.8	3.2	4.3	2.4	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.2	2.7	3.3	2.4	3.1	3.2	3.3	3.1	4.1	2.8	4.3
11-Mar	2.9	3.1	3.4	2.9	3.2	3.0	2.3	2.7	2.8	2.5	2.4	2.4	2.7	2.5	2.5	2.2	1.9	1.9	1.9	2.0	2.7	2.7	2.8	2.9	2.6	3.4
12-Mar	2.7	2.7	2.7	3.1	2.7	2.6	2.8	2.6	2.7	2.7	2.8	2.6	2.7	2.7	2.7	2.6	2.7	2.6	2.6	2.9	3.5	5.0	4.6	4.4	3.0	5.0
13-Mar	4.2	5.9	6.8	6.0	4.3	3.2	4.2	4.6	2.9	2.9	2.0	2.7	2.9	2.8	2.6	2.3	2.0	1.9	1.9	2.3	2.2	2.6	2.7	2.7	3.3	6.8
14-Mar	3.6	5.0	4.9	5.2	5.6	5.9	6.0	6.3	6.6	6.3	5.2	4.0	4.2	5.2	5.5	5.7	5.8	8.0	4.3	4.9	7.0	9.4	7.4	7.2	5.8	9.4
15-Mar	7.2	7.2	7.7	5.9	5.0	4.7	5.0	4.6	4.2	3.7	3.5	3.8	3.4	3.0	3.3	3.2	2.8	2.7	3.7	5.0	7.1	6.2	2.9	2.3	4.5	7.7
16-Mar	2.5	2.0	2.2	2.3	2.5	9.9	12.4	2.5	1.8	1.7	1.8	1.8	1.8	1.7	1.8	1.8	1.9	2.2	5.0	2.7	3.0	3.7	14.0	5.8	3.7	14.0
17-Mar	5.2	3.5	1.8	1.8	1.9	1.7	1.9	1.9	1.9	1.9	1.9	2.5	3.3	3.0	2.2	2.2	2.4	2.4	2.5	2.8	2.6	2.4	2.4	1.8	2.4	5.2
18-Mar	1.7	1.7	1.8	1.8	1.8	1.7	1.7	1.8	1.8	1.8	1.8	2.1	2.2	2.1	2.0	1.9	1.6	1.6	2.3	2.6	1.9	1.8	1.8	1.8	1.9	2.6
19-Mar	1.8	1.8	1.8	1.7	1.5	1.3	1.6	1.1	1.4	1.6	1.9	2.1	2.0	2.2	2.5	2.5	2.5	2.6	2.9	4.1	2.7	2.6	2.9	3.8	2.2	4.1
20-Mar	3.3	3.5	4.1	5.3	5.7	5.9	6.5	7.3	6.5	5.9	5.6	5.3	5.2	5.3	5.2	5.3	5.3	5.1	5.1	5.8	6.9	5.7	5.3	4.8	5.4	7.3
21-Mar	5.2	5.9	6.4	6.0	5.4	5.3	5.5	4.7	4.2	4.0	3.8	3.7	3.7	3.6	3.8	3.5	3.5	3.6	3.6	3.7	3.6	3.6	3.4	3.2	4.3	6.4
22-Mar	3.2	3.4	3.5	3.4	3.3	3.2	3.1	3.0	2.8	2.6	3.1	2.9	2.7	2.7	2.8	3.0	2.8	2.9	3.0	3.6	3.1	7.3	2.6	2.5	3.2	7.3
23-Mar	2.9	3.2	3.1	3.2	3.2	3.0	3.0	3.5	2.6	2.4	2.4	2.9	3.4	3.4	3.3	3.4	3.4	3.4	3.5	3.7	3.6	3.8	6.3	6.9	3.5	6.9
24-Mar	4.6	7.2	4.3	4.4	4.7	4.7	7.7	6.0	4.2	3.8	3.4	2.9	2.8	3.1	3.1	3.4	3.9	4.2	4.5	5.5	6.0	5.4	5.3	5.2	4.6	7.7
25-Mar	6.8	8.7	13.2	9.7	4.7	4.6	3.2	2.3	2.5	2.8	2.6	2.5	2.3	2.4	2.3	2.3	2.4	2.4	2.5	2.7	3.6	3.3	2.6	2.4	3.9	13.2
26-Mar	2.3	2.3	2.3	2.6	2.4	2.1	1.8	2.1	2.4	2.4	2.4	2.7	2.9	2.7	3.0	3.0	2.7	3.0	3.1	3.7	3.6	3.9	4.1	4.2	2.8	4.2
27-Mar	3.7	3.6	3.7	4.2	3.1	3.6	4.1	3.0	3.6	3.4	4.1	4.4	5.0	3.8	3.2	3.0	2.9	2.4	3.2	3.5	3.2	3.2	3.1	3.1	3.5	5.0
28-Mar	3.4	3.6	3.3	2.9	2.9	2.7	2.6	2.7	2.6	2.5	2.4	2.9	2.4	2.1	2.2	2.6	2.4	2.1	2.1	2.1	2.0	2.1	2.2	2.6	2.6	3.6
29-Mar	2.9	3.3	3.1	3.0	2.6	3.0	3.3	6.3	4.4	3.1	2.8	3.4	3.2	3.1	3.4	3.1	3.1	4.2	3.5	3.9	4.1	3.5	3.5	3.4	3.5	6.3
30-Mar	3.4	3.5	3.4	3.7	4.3	4.0	3.7	3.7	3.7	3.3	2.8	2.8	2.8	2.7	2.8	2.7	2.6	2.6	3.0	3.5	3.4	3.5	3.4	3.2	3.3	4.3
31-Mar	3.8	4.6	4.3	4.6	4.6	4.5	3.5	2.5	2.0	2.0	2.0	2.0	1.9	2.1	2.2	2.5	3.0	2.9	2.9	2.2	2.2	2.8	3.3	4.0	3.0	4.6
																								Diurnal Average		
																								Diurnal Maximum		
																								3.6 4.4 4.5 4.1 3.8 3.9 4.0 3.7 3.4 3.1 3.0 3.1 3.1 3.0 3.0 3.0 3.0 3.2 3.2 3.5 3.7 3.9 4.0 3.9		
																								7.2 11.6 17.0 13.7 11.0 9.9 12.4 7.3 7.1 6.3 5.7 6.0 6.2 5.8 5.5 5.7 5.8 8.0 5.2 8.4 7.9 9.5 14.0 8.4		

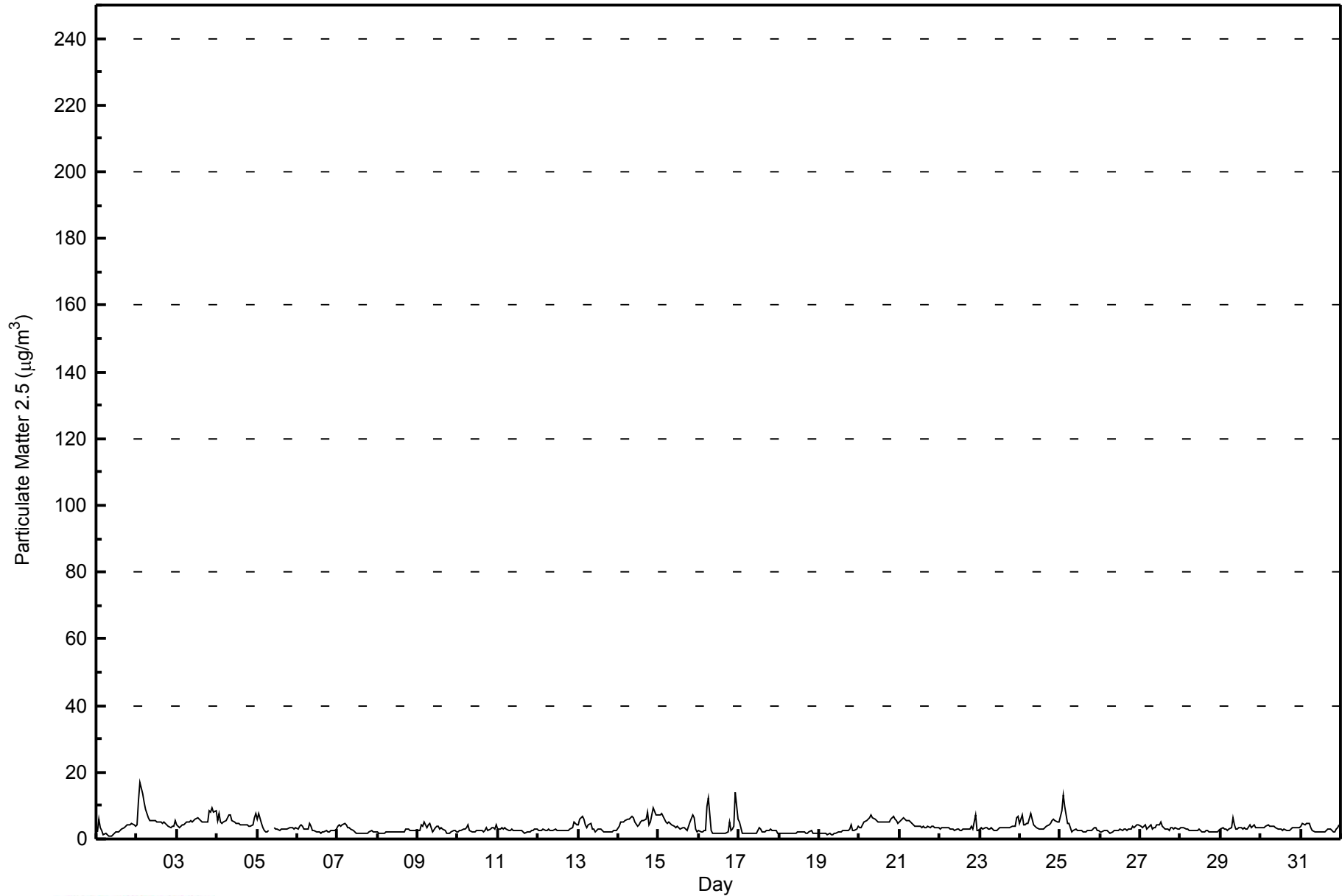
M - Maintenance

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



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	656	88.41	88.41
6 - 15	83	11.19	99.60
16 - 25	1	0.13	99.73
26 - 80	0	0.00	99.73
> 81.0	0	0.00	99.73

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Chipewyan - March 2015

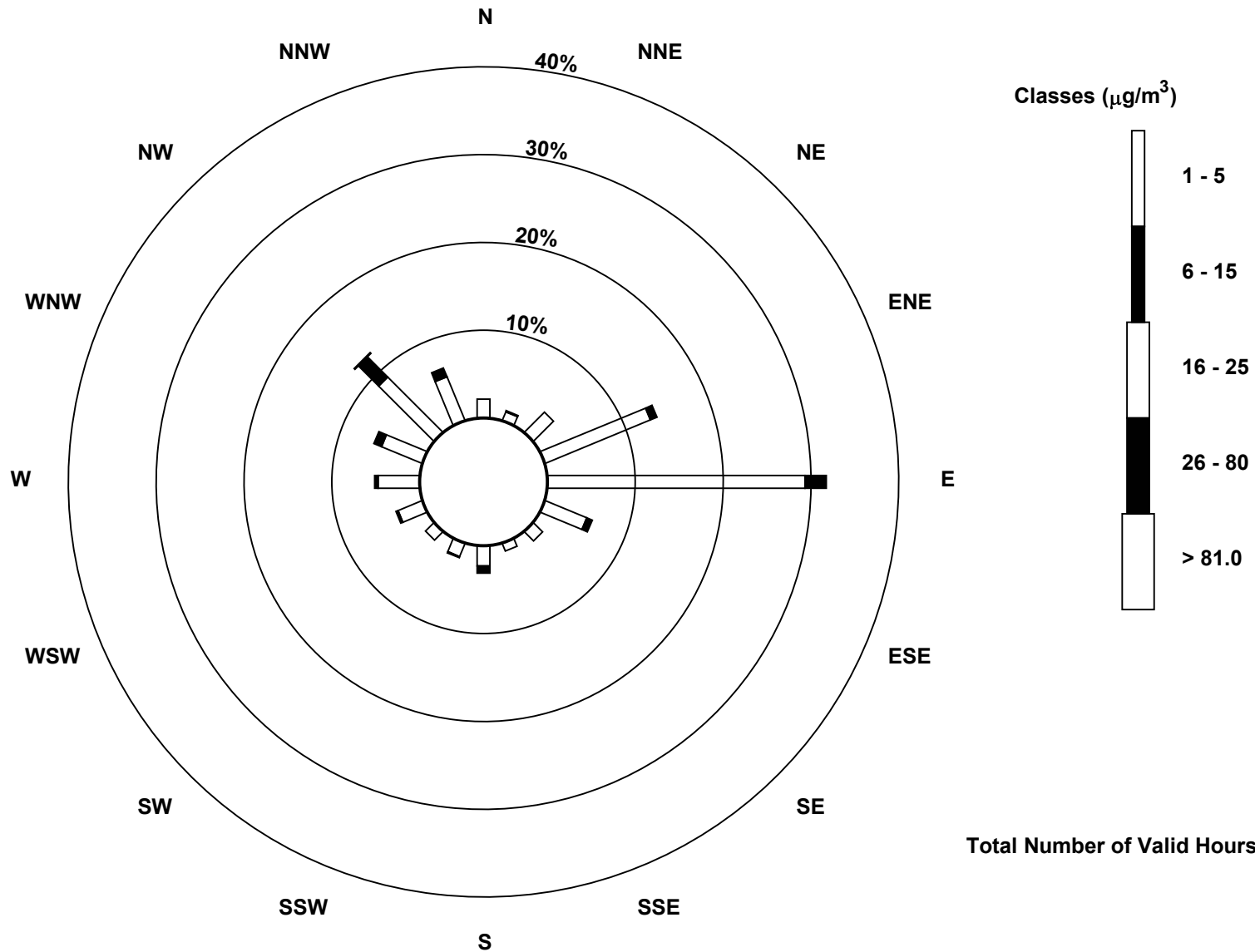
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	16	8	24	96	217	38	11	7	17	12	10	22	35	37	66	40	656
6 - 15	0	1	0	6	18	5	0	0	6	1	0	2	3	7	24	8	81
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	16	9	24	102	235	43	11	7	23	13	10	24	38	44	91	48	738

Total Number of Valid Hours: 740

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 740

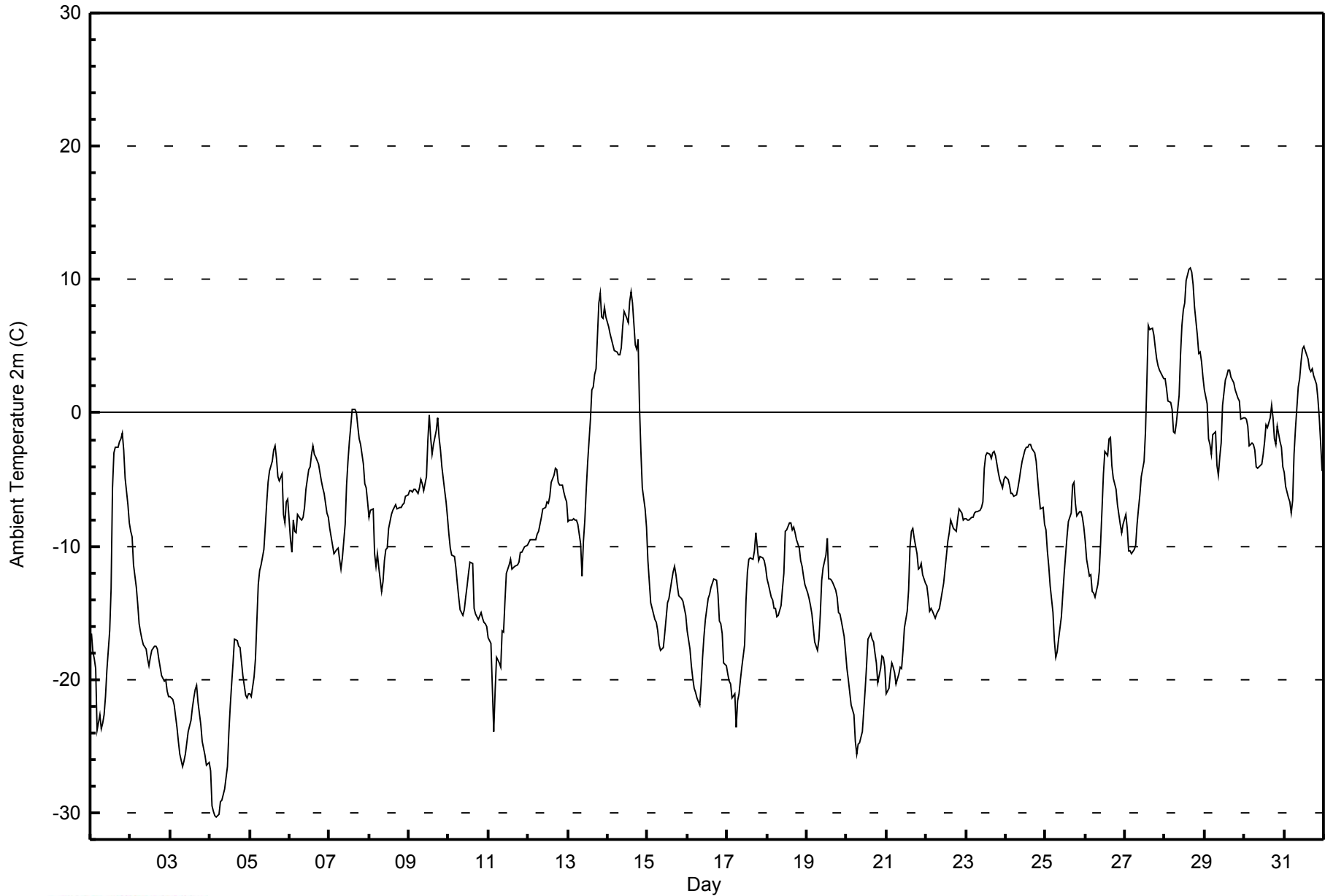


Maximum Value: 10.9 C on Mar 28 16:00		Maximum Daily Average: 4.7 C on Mar 28		Hours in Service: 744																																												
Minimum Value: -30.3 C on Mar 4 05:00		Minimum Daily Average: -24.0 C on Mar 4		Hours of Data: 744																																												
Maximum Diurnal Average: -5.7 C at hour 16		Minimum Diurnal Average: -13.1 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: -9.47 C		Percentiles: P ₁ = -28.7 P ₁₀ = -20.4 Q ₁ = -15.3 Median = -9.0 Q ₃ = -3.9 P ₉₀ = 1.7 P ₉₉ = 8.9		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	-16.5	-17.9	-18.5	-19.1	-23.8	-22.6	-23.7	-23.3	-22.7	-21.3	-19.3	-16.3	-13.1	-5.7	-3.0	-2.6	-2.5	-2.2	-2.0	-1.5	-2.8	-4.9	-6.9	-8.3	-12.5	-1.5																						
2-Mar	-8.9	-9.3	-11.5	-13.1	-14.3	-15.8	-16.4	-17.0	-17.3	-17.7	-18.5	-18.9	-18.3	-17.9	-17.5	-17.5	-17.7	-18.4	-19.1	-19.7	-20.1	-20.0	-20.8	-21.3	-17.0	-8.9																						
3-Mar	-21.3	-21.5	-21.9	-22.8	-23.6	-24.7	-25.6	-26.6	-26.2	-25.6	-24.8	-23.9	-23.0	-22.1	-21.4	-20.8	-20.4	-21.7	-23.4	-24.6	-25.2	-25.7	-26.4	-26.3	-23.7	-20.4																						
4-Mar	-26.9	-29.5	-29.9	-30.2	-30.3	-30.1	-29.2	-29.1	-28.7	-28.2	-26.6	-24.1	-22.0	-20.3	-18.7	-17.0	-17.0	-17.5	-17.6	-18.7	-19.7	-21.2	-21.4	-21.1	-24.0	-17.0																						
5-Mar	-21.1	-21.3	-19.8	-18.5	-15.6	-12.9	-11.8	-11.4	-10.3	-8.6	-6.8	-5.2	-4.3	-3.7	-2.8	-2.5	-3.4	-4.8	-5.1	-4.6	-7.6	-8.2	-6.7	-6.4	-9.3	-2.5																						
6-Mar	-9.5	-10.5	-8.1	-8.9	-9.0	-7.6	-7.9	-8.0	-7.8	-7.1	-5.8	-4.3	-4.1	-3.1	-2.5	-3.1	-3.3	-3.8	-4.5	-5.1	-5.6	-6.1	-7.5	-7.8	-6.3	-2.5																						
7-Mar	-8.7	-9.3	-9.9	-10.6	-10.2	-10.2	-11.0	-11.7	-10.9	-8.4	-5.4	-3.6	-2.2	-1.0	0.3	0.3	0.0	-1.0	-2.0	-2.4	-3.8	-5.3	-5.6	-6.7	-5.8	0.3																						
8-Mar	-7.9	-7.3	-7.2	-10.5	-11.6	-10.6	-11.6	-13.4	-12.6	-11.1	-10.3	-10.1	-8.7	-7.6	-7.3	-7.1	-6.9	-7.2	-7.1	-7.1	-6.9	-6.8	-6.2	-6.1	-8.7	-6.1																						
9-Mar	-5.8	-5.8	-5.9	-5.7	-5.7	-6.1	-5.6	-4.9	-5.3	-5.8	-4.8	-2.1	-0.2	-1.8	-3.1	-2.4	-1.3	-0.4	-1.9	-2.8	-4.1	-5.9	-6.7	-7.8	-4.2	-0.2																						
10-Mar	-9.1	-10.1	-10.7	-10.8	-11.6	-12.7	-13.8	-14.8	-15.2	-14.8	-13.8	-13.0	-12.0	-11.2	-11.3	-14.7	-15.1	-15.3	-15.5	-15.0	-15.4	-15.7	-15.8	-16.0	-13.5	-9.1																						
11-Mar	-16.9	-17.3	-20.5	-23.9	-20.8	-18.4	-18.8	-19.1	-16.3	-16.5	-14.1	-12.0	-11.4	-10.9	-11.7	-11.6	-11.5	-11.4	-11.2	-10.5	-10.4	-10.2	-10.1	-10.0	-14.4	-10.0																						
12-Mar	-9.7	-9.5	-9.5	-9.5	-9.5	-9.1	-8.9	-8.3	-7.8	-7.2	-7.1	-6.7	-6.8	-6.2	-5.2	-4.6	-4.2	-4.3	-5.2	-5.4	-5.4	-5.9	-6.3	-6.7	-7.0	-4.2																						
13-Mar	-8.1	-8.1	-8.1	-7.9	-8.0	-8.1	-8.4	-9.8	-12.2	-9.6	-8.0	-5.7	-3.7	-0.5	1.8	1.9	2.9	3.3	8.2	9.0	7.2	7.1	7.9	7.2	-2.1	9.0																						
14-Mar	6.5	5.9	5.5	5.1	4.7	4.6	4.4	4.3	4.9	6.5	7.7	7.1	6.8	8.4	9.1	8.3	5.1	4.8	5.5	0.5	-2.9	-5.6	-7.2	-8.6	3.8	9.1																						
15-Mar	-11.1	-12.7	-14.2	-15.1	-15.5	-15.8	-16.3	-17.3	-17.8	-17.6	-16.6	-15.4	-14.3	-14.0	-12.6	-12.0	-11.5	-12.2	-13.0	-13.7	-13.9	-14.2	-14.6	-15.2	-14.4	-11.1																						
16-Mar	-16.3	-17.7	-18.9	-19.9	-20.7	-21.0	-21.4	-21.9	-20.3	-18.3	-16.8	-15.5	-13.9	-13.6	-13.1	-12.7	-12.5	-12.6	-13.6	-15.7	-15.8	-16.6	-18.8	-19.0	-16.9	-12.5																						
17-Mar	-19.6	-20.1	-20.4	-21.4	-21.1	-23.6	-21.6	-21.1	-20.0	-19.1	-17.4	-14.0	-11.9	-10.9	-10.9	-11.0	-10.3	-9.0	-10.1	-11.1	-10.7	-10.9	-11.1	-11.6	-15.4	-9.0																						
18-Mar	-12.4	-12.8	-13.8	-14.0	-14.7	-14.7	-15.3	-15.1	-14.4	-13.2	-12.1	-8.9	-8.8	-8.3	-8.2	-8.8	-8.5	-9.0	-9.5	-10.2	-11.0	-11.5	-12.2	-12.9	-11.7	-8.2																						
19-Mar	-13.5	-13.9	-14.4	-15.1	-16.1	-17.1	-17.8	-17.0	-15.1	-12.6	-11.6	-10.6	-9.4	-12.5	-12.4	-12.5	-12.8	-13.3	-13.8	-15.0	-15.0	-15.6	-16.8	-18.0	-14.3	-9.4																						
20-Mar	-19.2	-20.0	-21.0	-21.9	-22.7	-24.7	-25.5	-24.8	-24.8	-24.0	-22.4	-20.7	-19.0	-17.0	-16.6	-16.9	-17.2	-18.0	-18.8	-20.3	-19.2	-18.3	-18.4	-19.1	-20.4	-16.6																						
21-Mar	-21.1	-20.6	-19.5	-18.8	-19.1	-19.5	-20.3	-19.6	-19.1	-19.1	-17.8	-16.1	-14.9	-13.3	-10.0	-8.9	-8.6	-9.4	-10.6	-11.7	-11.6	-11.3	-12.1	-12.8	-15.2	-8.6																						
22-Mar	-13.0	-13.8	-14.9	-14.6	-14.9	-15.4	-15.1	-14.9	-14.6	-14.0	-12.8	-11.7	-10.7	-9.7	-9.0	-8.0	-8.7	-8.8	-8.8	-8.0	-7.2	-7.5	-8.0	-7.9	-11.3	-7.2																						
23-Mar	-7.9	-8.0	-8.1	-7.9	-7.8	-7.6	-7.4	-7.4	-7.3	-7.1	-6.7	-4.2	-3.2	-3.0	-3.1	-3.4	-3.0	-2.9	-3.2	-4.5	-5.0	-5.3	-5.7	-5.0	-5.6	-2.9																						
24-Mar	-4.8	-5.0	-5.4	-6.0	-6.1	-6.2	-6.2	-5.7	-5.0	-4.2	-3.6	-2.8	-2.6	-2.6	-2.4	-2.3	-2.7	-3.0	-3.6	-4.9	-6.2	-7.2	-7.1	-8.3	-4.7	-2.3																						
25-Mar	-8.8	-10.4	-11.5	-13.0	-14.9	-17.0	-18.4	-17.9	-17.0	-15.2	-13.6	-12.0	-10.6	-9.4	-8.1	-7.5	-5.4	-5.2	-6.8	-7.7	-7.4	-7.5	-7.8	-8.6	-10.9	-5.2																						
26-Mar	-9.6	-11.0	-12.3	-12.1	-13.4	-13.5	-13.9	-12.9	-12.0	-9.7	-7.2	-4.6	-2.9	-3.2	-2.0	-1.9	-3.9	-4.9	-5.8	-6.9	-7.6	-8.4	-9.0	-8.4	-8.2	-1.9																						
27-Mar	-7.6	-8.6	-10.3	-10.3	-10.6	-10.3	-10.0	-8.3	-7.2	-6.2	-4.8	-3.7	-1.5	2.4	6.6	6.3	6.3	5.9	4.9	4.0	3.6	3.2	2.7	2.6	-2.1	6.6																						
28-Mar	2.6	1.8	0.9	0.8	0.3	-1.4	-1.6	-0.8	1.3	4.3	6.5	7.7	8.2	9.9	10.8	10.9	10.6	9.6	7.9	5.9	4.4	4.6	3.8	2.7	4.7	10.9																						
29-Mar	1.7	0.7	-2.0	-2.4	-3.1	-1.7	-1.4	-3.9	-4.7	-3.4	-2.3	0.6	2.5	2.8	3.2	3.3	2.6	2.2	1.7	1.4	1.1	0.9	-0.5	-0.3	0.0	3.3																						
30-Mar	-0.3	-0.5	-1.0	-2.5	-2.3	-2.4	-2.8	-4.1	-4.2	-4.1	-3.8	-3.1	-2.1	-0.9	-1.1	-0.4	0.6	-0.4	-2.0	-2.4	-1.0	-2.1	-2.6	-4.0	-2.1	0.6																						
31-Mar	-4.5	-5.5	-6.4	-6.6	-7.5	-6.6	-3.1	-1.2	1.9	2.5	3.8	4.8	5.0	4.3	4.1	3.3	3.1	3.3	2.8	2.1	1.1	-0.4	-2.2	-4.3	-0.3	5.0																						
																								-10.6	-11.3	-11.9	-12.5	-12.9	-13.0	-13.1	-13.1	-12.5	-11.5	-10.2	-8.7	-7.5	-6.5	-5.7	-5.7	-5.7	-6.1	-6.6	-7.3	-7.9	-8.5	-9.0	-9.5	Diurnal Average
																								6.5	5.9	5.5	5.1	4.7	4.6	4.4	4.3	4.9	6.5	7.7	7.7	8.2	9.9	10.8	10.9	10.6	9.6	8.2	9.0	7.2	7.1	7.9	7.2	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	82	11.02	11.02
-20 - 0	570	76.61	87.63
0 - 10	89	11.96	99.60
10 - 20	3	0.40	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

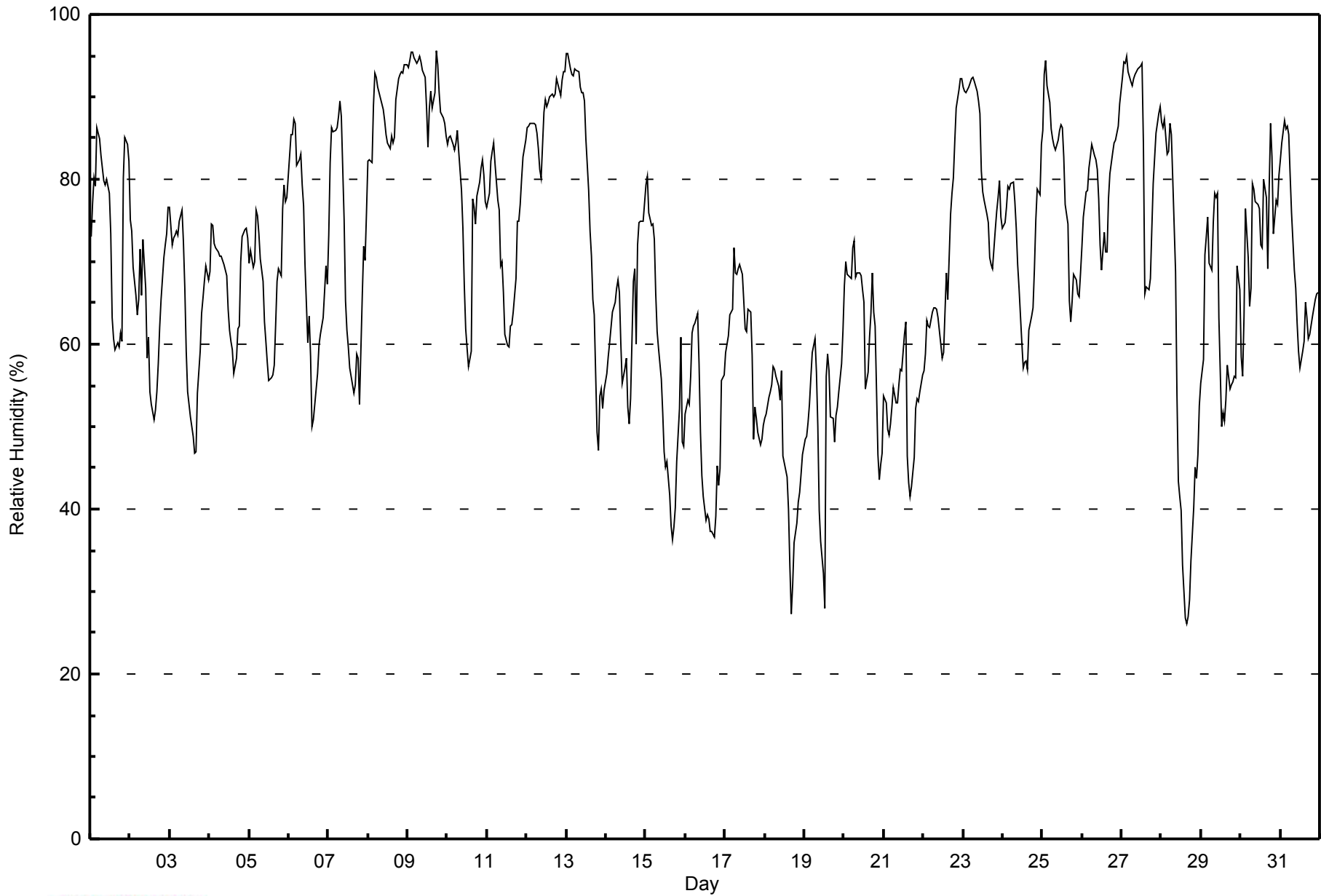


Maximum Value: 96 % on Mar 9 18:00																		Maximum Daily Average: 91.5 % on Mar 9																		Hours in Service: 744													
Minimum Value: 26 % on Mar 28 16:00																		Minimum Daily Average: 46.5 % on Mar 18																		Hours of Data: 744													
Maximum Diurnal Average: 77.0 % at hour 6																		Minimum Diurnal Average: 60.3 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 69.2 %																		Percentiles: P ₁ = 32 P ₁₀ = 49 Q ₁ = 58 Median = 69 Q ₃ = 82 P ₉₀ = 90 P ₉₉ = 95																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	73	77	80	79	86	85	83	81	80	79	80	78	73	63	61	59	60	60	61	60	80	85	84	82	74.7	86																							
2-Mar	75	74	69	66	64	65	72	66	73	67	58	61	54	53	51	52	54	58	62	65	70	72	73	77	64.6	77																							
3-Mar	77	72	73	73	74	73	75	76	72	67	59	54	51	50	49	47	47	54	59	64	66	68	70	68	64.0	77																							
4-Mar	69	75	74	72	72	71	71	71	70	70	68	64	62	60	59	56	58	62	62	70	73	74	74	73	67.9	75																							
5-Mar	70	71	69	70	76	76	73	70	68	63	60	58	56	56	56	57	62	68	69	68	76	79	77	78	67.8	79																							
6-Mar	83	85	85	87	87	82	82	83	79	77	70	60	63	59	50	51	53	56	60	61	62	63	69	67	69.8	87																							
7-Mar	73	82	86	86	86	86	88	90	88	75	65	62	60	57	56	54	55	59	58	53	66	72	70	76	70.9	90																							
8-Mar	82	82	82	89	93	92	91	90	89	89	87	85	84	84	85	84	85	90	92	93	93	93	94	94	88.5	94																							
9-Mar	94	94	95	95	95	94	94	95	94	93	92	89	84	89	91	89	91	96	94	91	88	87	87	85	91.5	96																							
10-Mar	84	85	85	84	84	84	86	83	79	74	67	62	59	57	59	78	77	75	78	80	81	82	80	77	76.7	86																							
11-Mar	77	78	82	83	84	82	77	76	70	70	66	61	60	60	62	62	64	68	75	75	77	80	83	85	73.2	85																							
12-Mar	86	87	87	87	87	87	86	84	81	80	88	90	89	89	90	90	90	90	92	92	90	92	93	93	88.3	93																							
13-Mar	95	95	93	93	93	93	93	93	91	91	91	90	85	79	74	71	65	64	49	47	54	55	52	54	77.5	95																							
14-Mar	56	58	60	62	64	65	67	68	66	60	55	57	58	52	50	53	68	69	60	72	75	75	75	77	63.5	77																							
15-Mar	79	80	76	74	75	73	66	62	60	56	52	47	45	46	42	38	36	38	40	46	52	61	48	48	55.7	80																							
16-Mar	52	53	53	56	61	62	63	64	58	49	44	41	39	39	39	37	37	37	39	45	43	45	56	56	48.7	64																							
17-Mar	59	60	61	64	64	72	69	69	69	70	68	65	62	62	64	64	59	48	52	51	49	48	49	50	60.3	72																							
18-Mar	51	52	54	54	55	57	57	56	55	53	57	46	46	44	40	33	27	31	36	38	41	42	44	47	46.5	57																							
19-Mar	49	49	50	53	56	59	61	57	50	40	36	32	28	56	59	57	51	51	48	51	52	54	58	62	50.8	62																							
20-Mar	67	70	69	68	68	72	73	68	69	69	68	67	65	55	57	61	64	69	64	62	47	44	45	47	62.7	73																							
21-Mar	54	53	50	49	50	52	55	53	53	55	57	57	61	63	46	43	42	43	46	52	53	53	54	56	52.1	63																							
22-Mar	57	59	63	62	62	64	64	64	64	63	60	58	59	64	69	65	76	78	80	85	89	91	92	92	70.0	92																							
23-Mar	91	91	91	91	92	92	92	92	91	90	88	81	78	77	76	75	71	70	69	74	76	78	80	75	82.5	92																							
24-Mar	74	75	77	79	79	79	80	77	74	70	67	60	57	58	58	57	62	63	64	69	75	79	78	84	70.6	84																							
25-Mar	86	93	94	91	89	86	85	84	84	85	86	87	86	83	77	75	65	63	65	68	68	66	66	69	79.2	94																							
26-Mar	72	75	78	79	81	83	84	83	82	81	78	72	69	74	71	71	78	81	83	84	85	86	86	89	79.4	89																							
27-Mar	92	94	94	95	93	92	91	92	93	93	93	94	94	84	66	67	67	68	74	79	83	86	88	89	85.9	95																							
28-Mar	87	86	87	83	83	87	85	80	69	54	43	41	40	33	27	26	27	29	34	40	45	44	47	52	55.4	87																							
29-Mar	55	58	71	73	75	70	69	75	78	78	78	63	50	52	51	53	57	55	55	55	56	56	69	67	63.3	78																							
30-Mar	59	56	63	76	70	65	67	79	79	77	77	76	72	72	80	78	69	79	87	83	73	77	77	80	73.9	87																							
31-Mar	82	84	87	86	86	85	81	76	69	67	63	59	57	59	60	65	63	61	61	63	64	65	66	66	69.9	87																							
																								72.9	74.3	75.5	76.2	76.9	77.0	76.7	76.0	74.0	71.0	68.5	65.1	62.8	62.2	60.5	60.3	60.6	62.2	63.6	65.7	67.9	69.4	70.5	71.5	Diurnal Average	
																								95	95	95	95	95	94	94	95	94	93	93	94	94	89	91	90	91	96	94	93	93	93	94	94	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipewyan - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	26	3.49	3.49
40 - 60	192	25.81	29.30
60 - 80	316	42.47	71.77
80 - 100	210	28.23	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

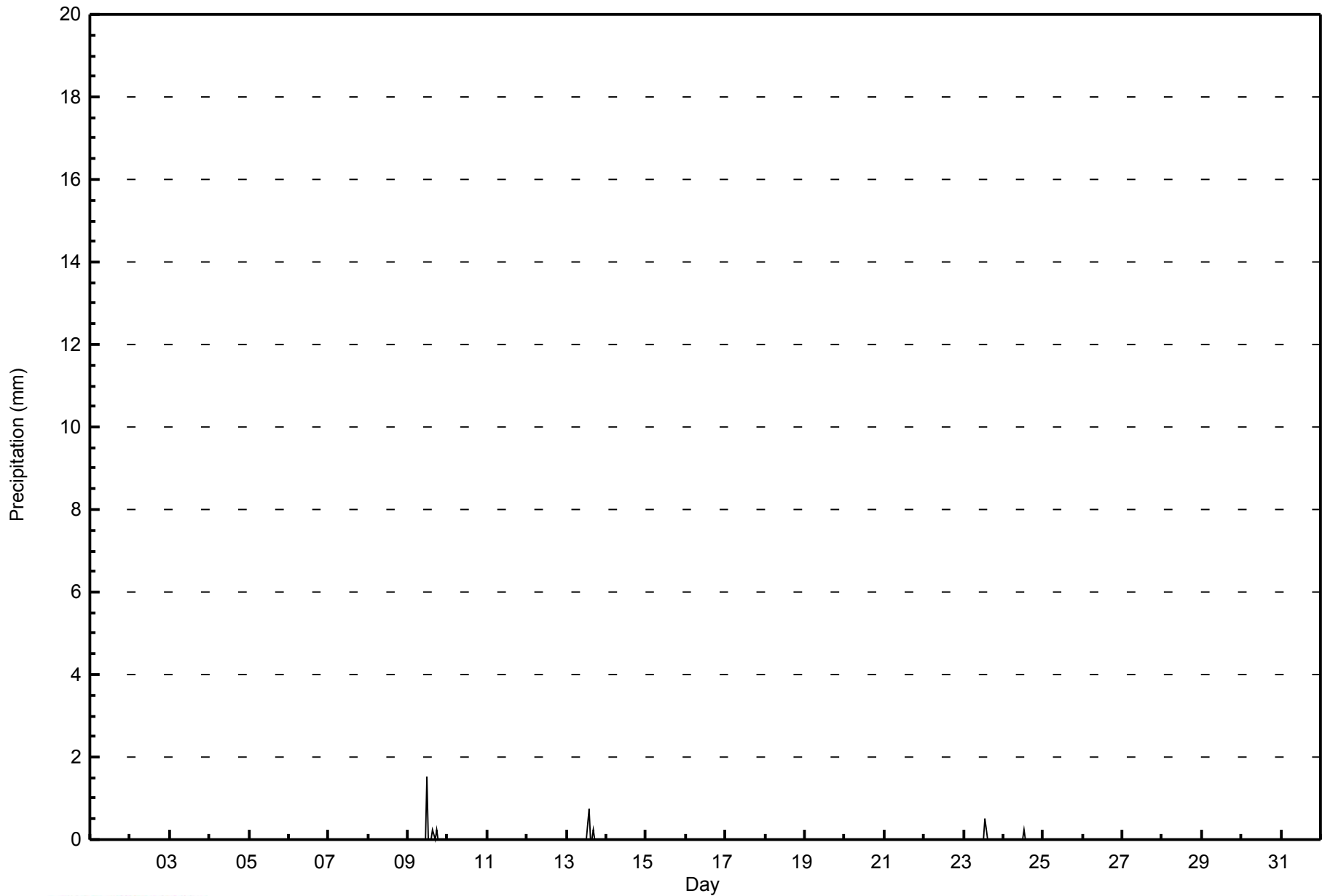


Maximum Value: 1.5 mm on Mar 9 12:00		Maximum Daily Total: 2.0 mm on Mar 9		Hours in Service: 744																								
Minimum Value: 0.0 mm on Mar 1 01:00		Minimum Daily Total: 0.0 mm on Mar 1		Hours of Data: 744																								
Maximum Diurnal Total: 1.5 mm at hour 12		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																								
Monthly Total: 3.81 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.3		Hours of Calibration: 0																								
				Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5
10-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8
14-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
24-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
25-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	1.3	0.0	0.3	0.3	0.3	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	1.5	0.3	0.8	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - March 2015

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	741	99.60	99.60
0.4 - 0.5	1	0.13	99.73
0.6 - 0.7	0	0.00	99.73
0.8 - 1.4	1	0.13	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

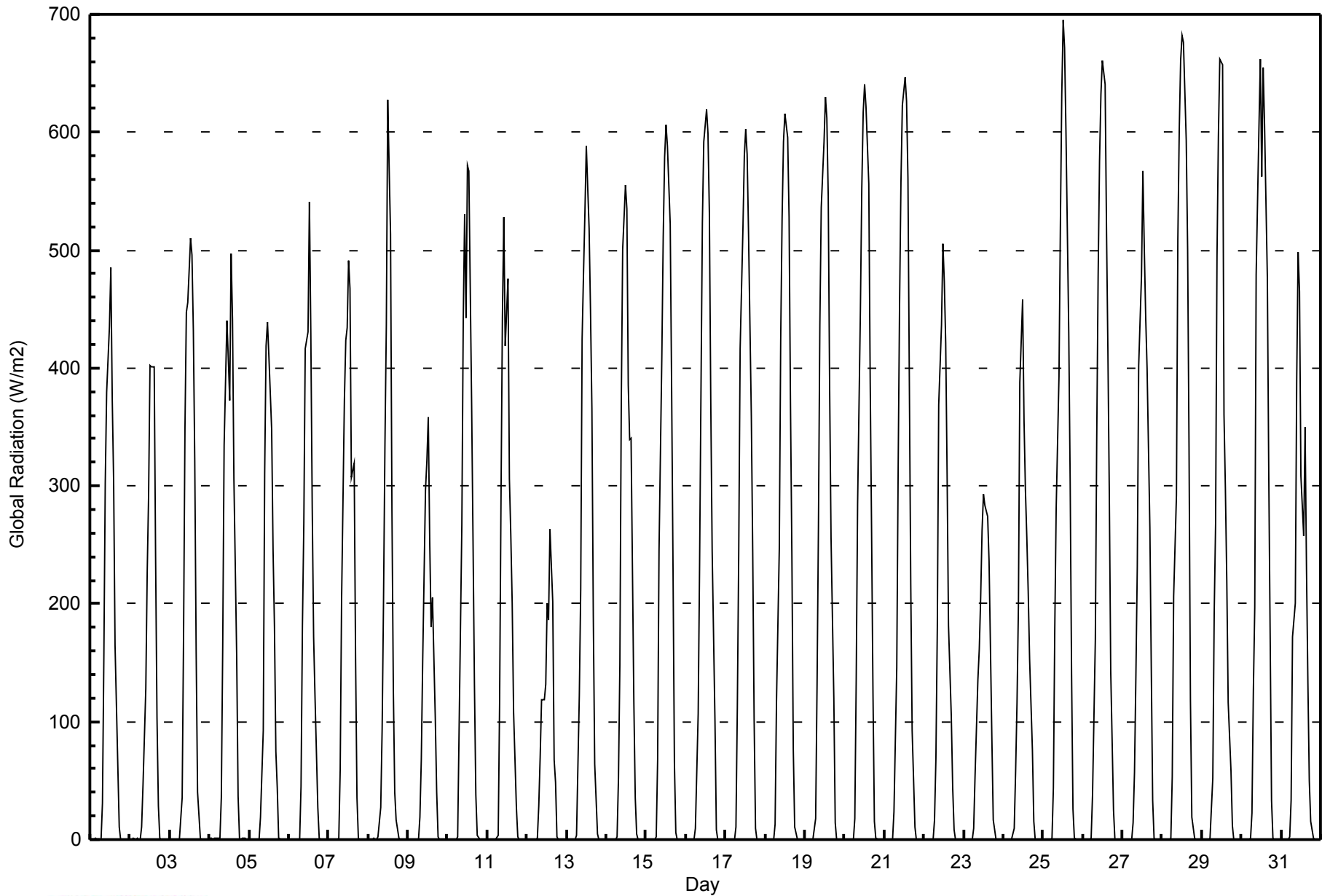


Maximum Value: 695 W/m2 on Mar 25 13:00		Maximum Daily Average: 218.6 W/m2 on Mar 28		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Mar 5 04:00		Minimum Daily Average: 60.0 W/m2 on Mar 12		Hours of Data: 744																						
Maximum Diurnal Average: 522.3 W/m2 at hour 13		Minimum Diurnal Average: 0.1 W/m2 at hour 22		Hours of Missing Data: 0																						
Monthly Average: 148.6 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 8 Q ₃ = 283 P ₉₀ = 502 P ₉₉ = 661		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	1	0	1	0	31	154	303	380	436	485	373	304	165	61	11	0	0	1	0	1	0	112.8	485
2-Mar	0	0	1	1	1	1	0	11	47	128	227	292	402	401	401	240	104	28	1	0	0	0	0	0	95.2	402
3-Mar	0	0	0	0	1	0	1	36	174	349	447	455	510	496	432	322	160	40	1	0	0	0	0	0	142.7	510
4-Mar	1	1	1	1	1	1	1	35	164	335	440	408	373	497	442	307	155	36	1	0	1	1	0	0	133.3	497
5-Mar	0	0	0	0	0	0	0	19	93	311	419	439	411	347	246	180	75	43	2	0	1	0	0	0	107.7	439
6-Mar	0	0	0	0	0	0	1	45	182	268	417	431	541	429	282	173	121	27	1	0	0	0	0	0	121.5	541
7-Mar	0	0	0	0	0	0	1	60	203	373	423	434	492	468	308	319	154	36	1	0	0	0	1	0	136.4	492
8-Mar	1	0	0	1	0	0	2	27	94	205	335	436	628	514	281	129	40	16	1	0	0	0	0	0	112.9	628
9-Mar	0	0	0	0	0	0	1	19	68	152	297	322	358	255	181	206	103	40	2	0	0	0	0	0	83.4	358
10-Mar	0	0	0	0	0	0	2	90	267	441	530	443	572	568	369	253	131	38	3	0	0	0	0	0	154.5	572
11-Mar	0	0	0	0	0	0	4	116	290	442	528	419	475	306	259	200	108	27	2	0	0	0	0	0	132.5	528
12-Mar	0	0	0	0	0	0	2	28	70	118	119	132	200	187	264	202	68	49	3	0	0	0	0	0	60.0	264
13-Mar	0	0	0	0	0	0	3	122	212	425	480	531	589	518	448	366	189	64	5	0	0	0	0	0	164.7	589
14-Mar	0	0	0	0	0	0	2	52	148	369	501	555	535	385	339	341	117	36	5	0	0	0	0	0	141.1	555
15-Mar	0	0	0	0	0	0	3	68	246	410	512	579	606	589	522	385	232	66	6	0	0	0	0	0	175.9	606
16-Mar	0	0	0	0	0	0	9	107	233	380	523	592	619	599	532	372	244	100	8	0	0	0	1	0	180.1	619
17-Mar	0	0	0	0	0	0	11	113	245	416	518	581	603	582	515	359	243	102	10	0	0	0	0	0	179.1	603
18-Mar	0	0	0	0	0	0	13	117	247	424	527	592	616	596	528	369	242	77	11	0	0	0	0	0	181.6	616
19-Mar	0	0	0	0	0	0	17	130	266	436	537	592	630	612	545	384	256	120	14	0	0	0	0	0	189.2	630
20-Mar	0	0	0	0	0	1	18	135	285	449	552	617	641	622	556	389	261	123	15	1	0	0	0	0	194.4	641
21-Mar	0	0	0	0	0	0	24	146	314	453	558	623	647	626	562	388	217	92	11	0	0	0	0	0	194.3	647
22-Mar	0	0	0	0	0	0	17	69	180	369	437	506	473	422	309	181	105	43	8	0	0	0	0	0	130.0	506
23-Mar	0	0	0	0	0	0	10	55	135	161	206	262	293	284	274	236	162	86	17	0	0	0	0	0	90.9	293
24-Mar	0	0	0	0	0	0	9	58	116	198	388	458	356	296	257	210	153	76	16	0	0	0	0	0	108.0	458
25-Mar	0	0	0	0	1	1	44	179	282	393	521	633	695	672	600	429	304	141	26	1	0	0	0	0	205.1	695
26-Mar	0	0	0	0	0	1	38	169	340	478	575	632	661	641	516	413	292	143	25	1	0	0	0	0	205.3	661
27-Mar	0	1	0	0	0	1	15	57	139	231	402	478	567	502	444	399	264	146	33	1	0	0	0	0	153.4	567
28-Mar	0	0	0	0	0	1	53	207	291	510	602	661	682	676	593	500	332	119	19	1	0	0	0	0	218.6	682
29-Mar	0	0	0	0	0	1	53	193	268	494	597	662	657	360	298	220	116	59	11	0	0	0	0	0	166.2	662
30-Mar	0	0	0	0	0	1	23	125	198	479	604	662	562	656	606	477	313	175	34	1	0	0	0	0	204.9	662
31-Mar	0	0	0	0	0	2	33	172	200	391	498	465	308	257	349	229	133	49	15	1	0	0	0	0	129.3	498
		0.1	0.1	0.1	0.1	0.1	0.3	13.3	89.9	198.4	351.2	454.8	494.5	522.3	475.4	405.2	301.3	176.0	71.3	10.0	0.3	0.1	0.1	0.1	0.1	Diurnal Average
		1	1	1	1	1	2	53	207	340	510	604	662	695	676	606	500	332	175	34	1	1	1	1	0	Diurnal Maximum



WBEA
Hourly Averages

Global Radiation (GR) - W/m²
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - March 2015

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	397	53.36	53.36
21 - 100	55	7.39	60.75
101 - 300	115	15.46	76.21
301 - 600	148	19.89	96.10
601 - 900	29	3.90	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 40 km/h on Mar 31 23:00	Maximum Daily Speed Average: 24.2 km/h on Mar 31	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 9 08:00	Minimum Daily Speed Average: 0.3 km/h on Mar 23	Hours of Data: 742
Maximum Diurnal Speed Average: 8.5 km/h at hour 16	Minimum Diurnal Speed Average: 4.5 km/h at hour 4	Hours of Missing Data: 2
Monthly Average Velocity: 6.1 km/h 59.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 13 Q ₃ = 19 P ₉₀ = 25 P ₉₉ = 33	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	WNW6	W6	W4	SE2	E9	E10	E10	E10	E11	E12	ESE15	ESE15	ESE15	SSE19	S22	S25	S27	SSW27	SSW27	WSW20	NW18	NW20	NW26	NNW23	S4.1	S27
2-Mar	NNW27	NW25	NW30	NW29	NW29	NW25	NW23	NW27	NW22	NW24	NW27	NW27	NW27	NW28	NW26	NW25	NW25	NW20	NW17	WNW14	WNW14	WNW13	WNW10	NW9	NW22.3	NW30
3-Mar	NW12	NW14	NW14	NW13	NNW11	NNW10	NNW9	NNW8	NNW9	NNW11	NNW13	NNW12	NNW12	NW14	NW12	WNW12	NW9	W8	W7	W7	WNW6	WNW5	WSW5	WSW6	NW9.0	NW14
4-Mar	SSW4	E8	E9	ESE10	E11	E13	ESE15	ESE14	E18	E21	E23	E26	E29	E27	E23	E21	E19	E15	ESE12	ESE7	NW7	NW10	E14.3	E29		
5-Mar	WNW8	WNW10	WNW16	WNW15	W13	W16	WNW13	WNW14	WNW13	WNW12	NW14	WNW9	WSW9	WSW9	WSW6	SW8	SE4	E8	SE7	SSE6	E11	ESE8	SSW9	WSW5	W5.9	WNW16
6-Mar	E5	E1	WNW7	NW8	NW12	NNW14	NNW13	NW14	NNW13	NNW13	NW11	NW15	W16	WNW16	NW18	NNW12	NW11	NW11	NNW9	N6	NNW4	NE4	E9	E9	NW8.2	NW18
7-Mar	E12	E8	E8	E9	E12	E11	E11	ESE7	E6	SW3	W12	W14	W16	WNW14	NNW12	NNW9	N7	N8	NNE7	E7	SE4	SSE5	ESE6	NE1.7	W16	
8-Mar	SE8	S10	SSE9	ESE10	E10	E7	E8	E10	E11	E9	E11	E12	E14	E15	ESE16	E18	ESE16	E15	E13	E15	E16	E16	ESE12	ESE11	ESE11.6	E18
9-Mar	E12	ESE11	ESE7	ESE5	S3	E3	E5	NNW0	SE6	SE6	ESE3	SSW4	SW2	ENE5	E4	S1	WSW4	NW10	NNW12	NNW14	NW14	NW17	NW16	NW16	N2.3	NW17
10-Mar	NNW16	NW15	NW18	NW13	NNW15	NNW13	NW11	NNW8	NNW9	NNW9	NNW7	NNW7	NW7	NNW5	SE6	E18	E15	E12	ESE8	E12	ENE14	ENE10	NE12	NE11	N6.0	E18
11-Mar	ENE10	ENE9	ENE10	ENE7	ENE11	NE17	ENE11	ENE13	ENE14	E16	ENE20	ENE21	ENE22	NE22	ENE33	NE33	ENE30	ENE27	NE26	ENE27	ENE29	ENE30	ENE30	ENE28	ENE20.6	ENE33
12-Mar	ENE24	ENE24	ENE22	ENE21	ENE22	ENE23	ENE22	ENE21	ENE22	ENE22	ENE15	E18	ENE22	ENE22	E20	E14	ENE9	SE4	SE5	WSW1	WSW6	W6	WSW2	E3	ENE13.9	ENE24
13-Mar	E4	E2	AF	NNE2	WNW6	NW6	NW3	SSE1	E7	E7	E11	E15	E13	E13	E18	E21	E19	ESE11	S25	SSW32	S24	SSW20	SSW26	SSW20	SE7.6	SSW32
14-Mar	SSW17	S16	S10	S13	SSW10	S11	S11	S10	S12	S11	S5	E3	E8	E7	SE7	E7	E10	ENE6	NNW17	NNW26	NNW28	NNW24	NNW23	NNW22	W1.0	NNW28
15-Mar	NW24	NW31	NW34	NW35	NW33	NW28	NW26	NW25	NW26	NW22	NW19	NW20	W19	W21	WNW17	NW13	NW10	NNW5	NNE3	NNE5	W3	NW6	N12	N11	NW17.7	NW35
16-Mar	NNW12	NNW13	NNW10	NW8	WNW9	NW9	NW10	WNW10	WNW10	WNW12	W13	W12	WSW13	WSW13	WSW12	WSW12	SW11	WSW6	W4	SW6	WSW4	WSW3	E5	E7	WNW6.8	W13
17-Mar	ENE7	E9	E8	E12	E14	E16	E16	E19	E20	E22	E24	E22	E23	E18	E18	E19	E17	ENE15	ENE16	ENE20	ENE25	ENE28	ENE29	ENE26	E18.2	ENE29
18-Mar	ENE29	ENE29	E31	ENE27	ENE27	ENE25	ENE26	ENE28	ENE33	ENE31	E24	ENE28	ENE30	ENE23	NE24	ENE30	NE27	NE22	NE19	NE15	NNE13	NNE13	N13	N13	ENE22.8	ENE33
19-Mar	N14	N15	N14	N12	NNW7	NNW6	NNW7	N14	N8	NW5	NW5	NW7	NNW9	E20	E14	E17	E17	E15	E13	ENE15	ENE21	E21	E18	E14	NE8.4	E21
20-Mar	ENE11	ENE10	ENE14	ENE12	E11	E9	E7	E10	ESE17	ESE21	E19	E20	E17	E17	E19	E19	E17	E13	E7	E8	ENE13	ENE18	E18	E14	E14.0	ESE21
21-Mar	E16	ENE13	ENE13	ENE16	E20	E16	ENE15	E17	E25	E22	E19	E20	E19	E19	E18	ENE19	ENE20	ENE17	NE16	ENE22	ENE22	ENE21	E22	E21	ENE18.3	E25
22-Mar	ENE22	ENE21	E18	E19	E16	E17	E19	E20	E23	E23	E23	E21	E20	E18	E18	E13	ESE15	ESE13	ESE7	NNE6	N4	ESE5	E8	E15	E15.4	E23
23-Mar	E15	E16	E13	E10	E9	E8	E8	E6	ESE5	E4	E3	SW1	WNW9	W9	W10	W11	WSW10	WSW8	WSW9	WSW8	W9	W8	WNW7	NW9	SW0.3	E16
24-Mar	NW11	NW10	W5	W5	W7	WNW6	NW7	NW8	NW8	NW7	NW8	NW9	NW8	WNW6	NW7	NW6	W10	W9	W8	W7	WNW7	WNW5	WNW6	WNW4	WNW6.7	NW11
25-Mar	AF	S2	E4	E6	E8	E9	ESE8	ESE9	E12	ESE21	E20	ESE20	E20	E21	E20	ENE23	ENE18	ENE11	ENE14	ENE17	E18	E22	E19	E13.9	ENE23	
26-Mar	E22	E21	E18	E19	E17	E17	E20	E18	E18	E19	E22	E24	E23	E21	E20	E19	E18	ESE13	E13	E10	E10	E13	E12	E11	E17.3	E24
27-Mar	E11	E9	E11	ESE11	E9	E8	E5	E7	E7	E8	E9	E10	E9	SSE6	S19	S23	S17	S20	S17	SSW13	SSW10	SW10	SW8	SW8	SSE7.4	S23
28-Mar	W8	WNW8	WNW10	WNW9	WNW10	WNW9	WNW10	WNW11	W10	W11	W14	WSW13	W16	W16	NW18	NW18	NW18	NW13	WNW11	W12	WNW14	WNW13	NW12	NNW11	WNW11.4	NW18
29-Mar	NNW10	NW6	SW4	WSW6	W8	WNW7	N4	E6	E10	E17	E16	E17	E21	E20	ENE18	ENE23	ENE23	ENE26	ENE31	ENE27	ENE23	ENE22	ENE20	NE12	ENE12.3	ENE31
30-Mar	NE12	N4	NNE2	S1	NE4	NNE5	NE4	E11	ESE12	ESE13	ESE11	E12	E13	E16	E19	E18	E15	E15	ESE14	E13	E13	E15	E15	E14	E10.6	E19
31-Mar	E10	E9	E9	E14	ESE18	E17	E16	E24	ENE27	E28	ENE23	ENE28	ENE25	ENE26	ENE31	ENE33	NE34	NE29	NE30	NE30	NE33	NE37	ENE40	NE31	ENE24.2	ENE40

NE6.2	NE4.7	NE4.6	NE4.5	NE4.9	NE5.2	NE5.4	NE5.9	ENE7.4	ENE7.5	ENE6.9	ENE7.2	ENE6.7	ENE6.4	ENE7.4	ENE8.5	ENE8.0	ENE6.5	ENE4.8	ENE5.0	NE6.4	NE6.6	NE6.6	NE6.3	Diurnal Average
ENE29	NW31	NW34	NW35	NW33	NW28	NW26	ENE28	ENE33	ENE31	NW27	ENE28	ENE30	E29	ENE33	NE33	NE34	NE29	ENE31	SSW32	NE33	NE37	ENE40	NE31	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

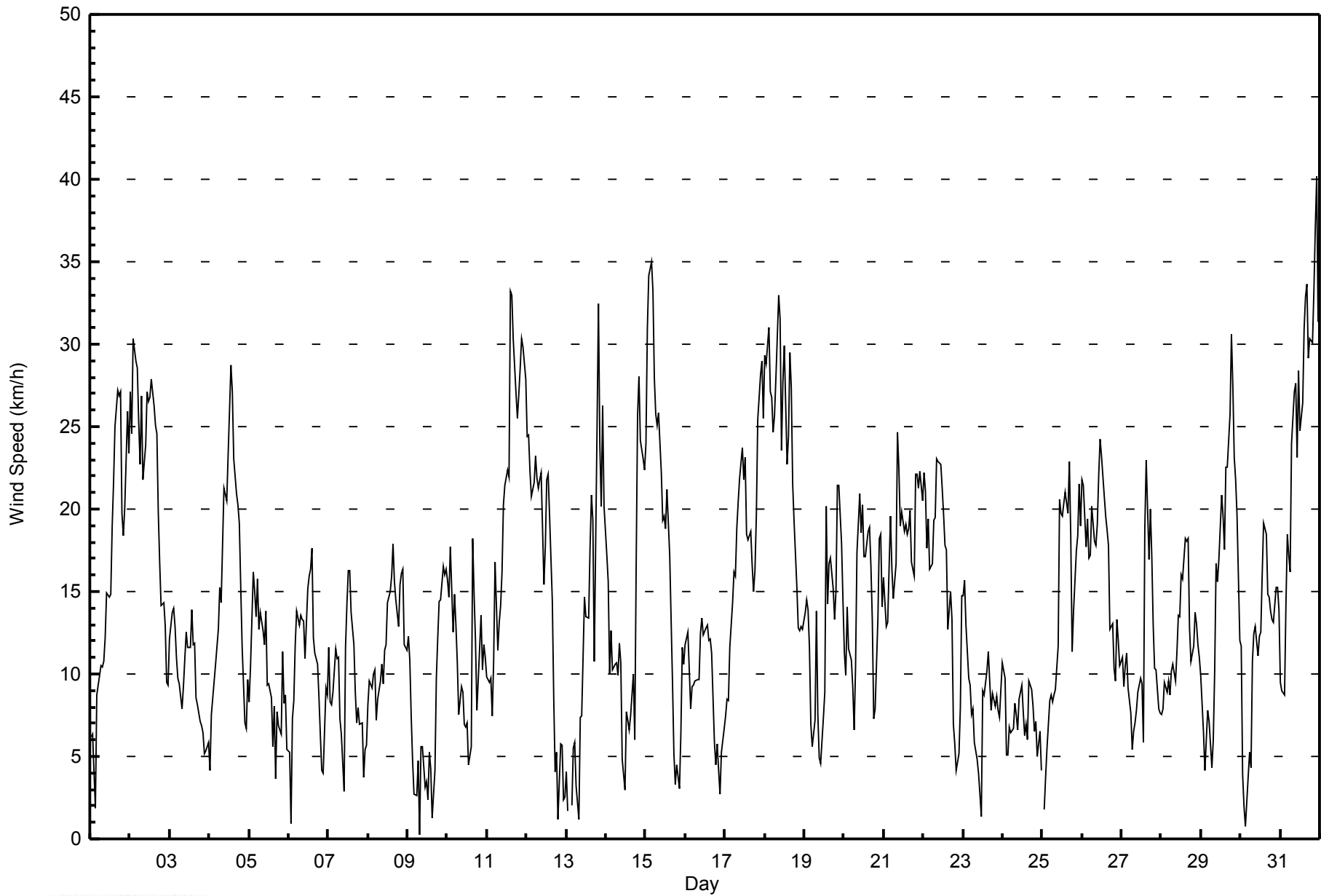
Wind Speed (WS) - km/h
Fort Chipewyan - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Mar 15 03:00														Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7											
Minimum Value: 0 km/h on Mar 23 09:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 9																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Mar	1	2	1	2	1	1	1	1	1	1	1	1	2	3	3	3	4	4	4	4	5	7	8	8	8
2-Mar	10	8	9	9	9	7	7	8	7	8	9	8	9	8	8	7	7	6	4	4	3	3	2	4	10
3-Mar	3	4	4	4	3	3	3	2	3	4	4	4	4	4	4	4	3	2	2	2	2	2	1	2	4
4-Mar	1	1	1	1	1	1	2	1	2	3	2	3	3	3	3	2	2	2	2	2	1	2	3	1	3
5-Mar	2	1	3	2	2	4	3	3	3	3	4	4	2	2	2	3	2	1	1	2	1	2	5	5	5
6-Mar	2	2	1	1	2	3	3	3	4	5	4	4	5	5	6	4	3	4	3	2	2	2	2	1	6
7-Mar	2	1	1	1	2	1	1	1	1	2	4	3	4	4	4	4	3	2	2	2	2	1	1	1	4
8-Mar	2	3	2	1	1	1	2	1	1	1	2	1	1	1	1	2	2	1	1	1	1	2	1	2	3
9-Mar	2	2	2	2	1	2	4	2	3	1	2	1	2	2	1	2	2	3	3	5	5	5	5	6	6
10-Mar	5	4	5	4	5	4	4	3	4	3	3	3	3	3	5	1	1	2	1	3	2	1	1	1	5
11-Mar	1	3	1	2	1	4	3	3	3	3	4	4	5	4	5	6	5	5	4	4	4	4	4	3	6
12-Mar	3	3	3	3	3	3	3	3	2	3	2	3	2	2	2	2	2	2	1	2	1	2	1	2	3
13-Mar	1	2	AF	2	2	2	2	2	3	1	2	2	2	3	2	2	2	3	6	4	3	4	4	2	6
14-Mar	3	3	2	3	3	2	2	2	2	2	2	2	4	2	1	1	2	3	6	7	8	8	7	7	8
15-Mar	8	9	10	9	9	7	8	7	7	6	6	6	6	5	5	4	4	2	3	2	2	1	3	4	10
16-Mar	4	4	3	2	1	1	2	2	2	3	3	3	3	3	3	3	2	2	1	1	2	1	1	1	4
17-Mar	1	1	1	2	2	2	3	2	2	3	2	3	3	2	3	3	3	2	3	3	4	4	3	3	4
18-Mar	4	4	4	3	4	3	3	4	4	4	4	4	4	5	5	5	6	5	4	3	2	2	2	2	6
19-Mar	3	3	2	3	3	3	5	3	4	3	2	3	3	4	1	2	1	1	2	2	4	2	2	2	5
20-Mar	2	2	2	2	1	1	2	7	3	2	1	1	2	1	2	1	1	3	2	2	3	4	2	2	7
21-Mar	1	2	2	4	3	3	3	5	2	3	2	2	1	2	3	3	3	3	3	3	2	2	2	2	5
22-Mar	2	3	2	3	3	3	3	2	2	2	3	2	1	1	1	3	2	2	2	1	2	4	2	2	4
23-Mar	2	2	2	1	1	1	1	1	0	1	1	1	3	2	2	3	2	2	2	2	2	1	2	3	3
24-Mar	2	2	2	1	1	1	1	2	2	2	2	4	3	3	3	3	3	2	2	1	1	1	1	1	4
25-Mar	AF	1	1	1	2	1	1	2	2	5	2	1	1	1	1	2	3	4	5	4	2	3	2	2	5
26-Mar	2	2	2	3	2	2	2	2	2	2	3	2	2	2	2	3	2	2	3	1	1	2	1	2	3
27-Mar	2	1	1	1	1	1	1	1	1	1	1	1	2	7	3	3	5	2	3	2	3	2	1	1	7
28-Mar	2	2	1	1	2	2	1	2	3	3	3	3	4	5	6	5	5	4	2	2	2	3	3	3	6
29-Mar	2	2	2	1	2	3	2	1	2	2	1	2	2	2	2	3	3	4	3	3	4	3	5	3	5
30-Mar	3	2	2	1	1	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	1	1	3
31-Mar	2	2	2	3	2	2	4	2	3	3	3	4	4	4	5	6	6	5	6	6	6	7	7	7	7
Diurnal Maximum																									
10 9 10 9 9 7 8 8 7 8 9 8 9 8 8 7 7 6 6 7 8 8 8 8 8																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort Chipewyan - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipewyan - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	70	9.43	9.43
6 - 11	240	32.35	41.78
12 - 19	249	33.56	75.34
20 - 28	149	20.08	95.42
29 - 38	33	4.45	99.87
> 38	1	0.13	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipewyan - March 2015

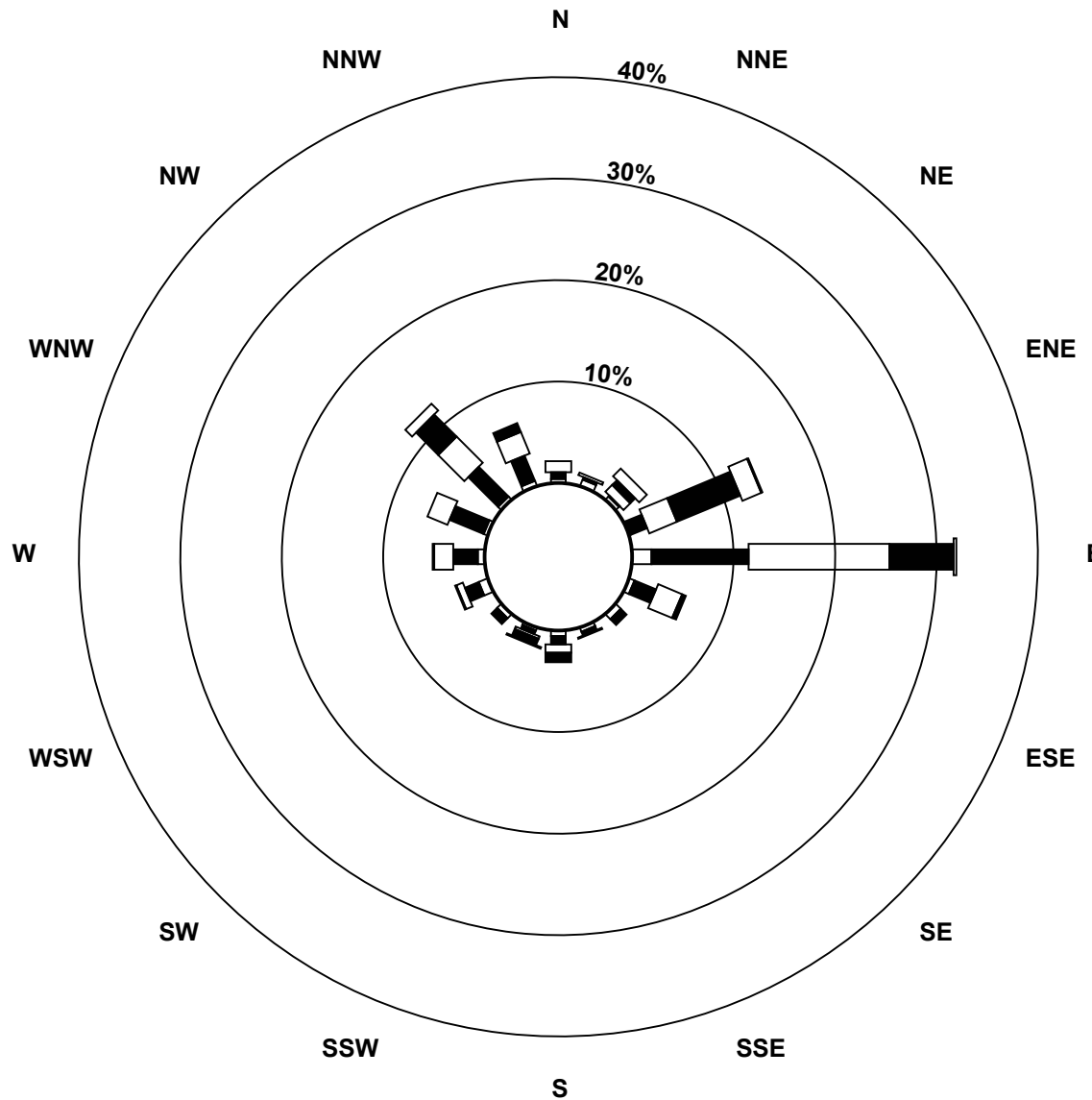
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	5	3	1	14	4	5	3	4	2	4	7	5	3	3	4	70
6 - 11	5	2	1	13	71	17	6	3	6	3	6	11	18	27	31	20	240
12 - 19	8	2	7	22	103	19	0	1	6	2	0	5	14	16	27	17	249
20 - 28	0	0	5	50	47	3	0	0	7	5	0	1	1	0	23	7	149
29 - 38	0	0	8	15	2	0	0	0	0	1	0	0	0	0	7	0	33
> 38	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	16	9	24	102	237	43	11	7	23	13	10	24	38	46	91	48	742

Total Number of Valid Hours: 742

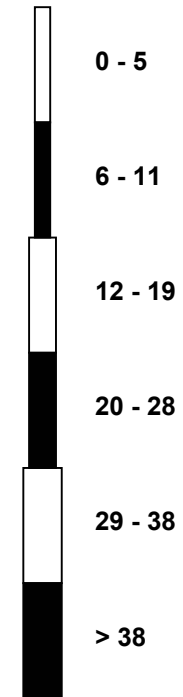
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)**



Classes (km/h)



Total Number of Valid Hours: 742



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - March 2015

Direction of Maximum Speed: 57 deg on Mar 31 23:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 64.7 deg on Mar 31	Hours of Data: 742
Direction of Minimum Speed: 331 deg on Mar 9 08:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.3 deg on Mar 23	Percent Operational Time: 99.7
Monthly Average Direction: 325.3 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	286	259	264	136	92	96	94	97	88	100	104	102	103	166	174	182	188	196	206	239	315	324	321	332	177.6
2-Mar	339	325	317	323	323	318	315	323	322	322	322	320	319	316	315	316	314	314	307	297	298	303	300	316	317.9
3-Mar	314	321	323	323	336	335	330	339	327	339	345	328	330	316	311	297	305	260	270	281	295	282	257	243	315.0
4-Mar	211	99	100	103	97	100	112	107	97	96	89	87	86	85	87	87	89	90	92	98	103	103	312	314	92.0
5-Mar	297	300	294	289	273	270	283	283	296	298	316	290	239	256	255	235	129	96	138	148	94	103	213	243	275.0
6-Mar	100	93	291	307	316	333	331	323	336	341	318	309	274	285	318	332	323	321	330	357	344	35	83	89	324.7
7-Mar	89	97	94	88	84	88	88	103	90	233	272	270	271	275	289	338	341	352	6	28	93	145	153	123	34.4
8-Mar	127	179	157	102	92	85	91	94	89	91	96	101	100	99	105	97	102	101	98	98	96	101	106	106	102.7
9-Mar	97	105	110	114	178	96	92	331	139	124	106	212	218	74	89	186	240	314	337	329	324	321	325	325	358.1
10-Mar	331	320	322	325	329	328	325	338	339	332	330	330	319	328	138	90	93	95	110	82	75	57	55	48	10.9
11-Mar	58	60	62	73	64	53	57	61	60	85	66	59	58	55	58	54	57	57	55	58	62	66	69	68	61.0
12-Mar	66	64	60	65	63	70	69	72	73	76	70	79	78	77	80	82	67	131	143	239	247	270	245	85	72.5
13-Mar	91	100	AF	27	296	317	323	148	94	89	91	95	97	98	96	92	89	111	189	193	190	192	196	202	146.2
14-Mar	202	191	173	190	193	176	170	182	188	185	187	84	91	92	126	99	90	73	339	339	341	329	336	330	274.6
15-Mar	321	313	312	313	312	307	308	309	314	311	312	306	278	275	295	317	319	346	12	21	267	319	3	353	311.6
16-Mar	348	339	335	313	301	307	313	289	292	289	279	261	245	245	255	248	235	251	276	228	258	253	91	88	281.9
17-Mar	78	92	85	92	90	101	83	83	85	87	86	85	83	90	91	88	82	65	59	62	68	73	77	74	80.7
18-Mar	69	75	79	73	67	64	63	64	67	69	81	66	64	58	54	60	55	43	42	35	24	14	358	350	59.4
19-Mar	351	350	352	355	341	335	343	353	4	321	309	317	332	95	97	89	86	87	80	62	74	80	83	84	48.5
20-Mar	68	71	74	78	81	81	84	90	107	105	100	97	95	92	92	95	98	93	91	70	69	81	83	83	88.3
21-Mar	85	76	65	73	81	79	78	84	84	81	95	90	91	95	85	69	71	61	54	63	65	76	80	79	77.8
22-Mar	77	78	87	81	79	82	82	81	83	85	86	86	90	89	94	94	110	106	110	14	2	113	90	91	85.9
23-Mar	92	87	88	89	95	91	88	94	109	91	97	234	290	270	264	260	245	245	251	256	268	280	297	311	233.0
24-Mar	323	319	277	261	280	295	304	317	318	316	309	315	319	295	317	315	263	260	264	277	292	299	292	284	297.7
25-Mar	AF	190	82	85	90	97	103	104	104	98	104	100	105	99	89	85	72	70	73	71	73	80	81	84	88.2
26-Mar	88	91	88	89	89	88	92	94	93	86	86	85	86	89	88	89	97	104	101	97	97	100	98	99	91.1
27-Mar	97	101	100	105	101	97	92	92	94	91	93	101	92	151	179	176	169	177	188	194	209	227	229	235	149.0
28-Mar	264	283	290	286	283	283	283	283	274	278	278	257	264	271	319	315	316	317	291	277	283	297	319	332	290.8
29-Mar	329	325	228	247	277	302	9	84	95	99	99	91	87	83	71	67	72	65	67	67	66	65	60	37	68.4
30-Mar	45	6	18	169	42	23	53	99	107	112	112	89	88	94	96	92	92	97	102	99	89	91	90	93	90.4
31-Mar	93	98	97	97	103	91	81	82	73	82	71	63	58	58	60	58	52	49	54	54	52	53	57	52	64.7
	45.1	40.8	34.4	44.1	42.7	44.8	49.6	55.9	65.5	70.1	66.7	64.9	67.9	75.1	73.6	72.6	74.3	73.3	70.8	58.2	50.8	53.0	53.6	46.8	

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

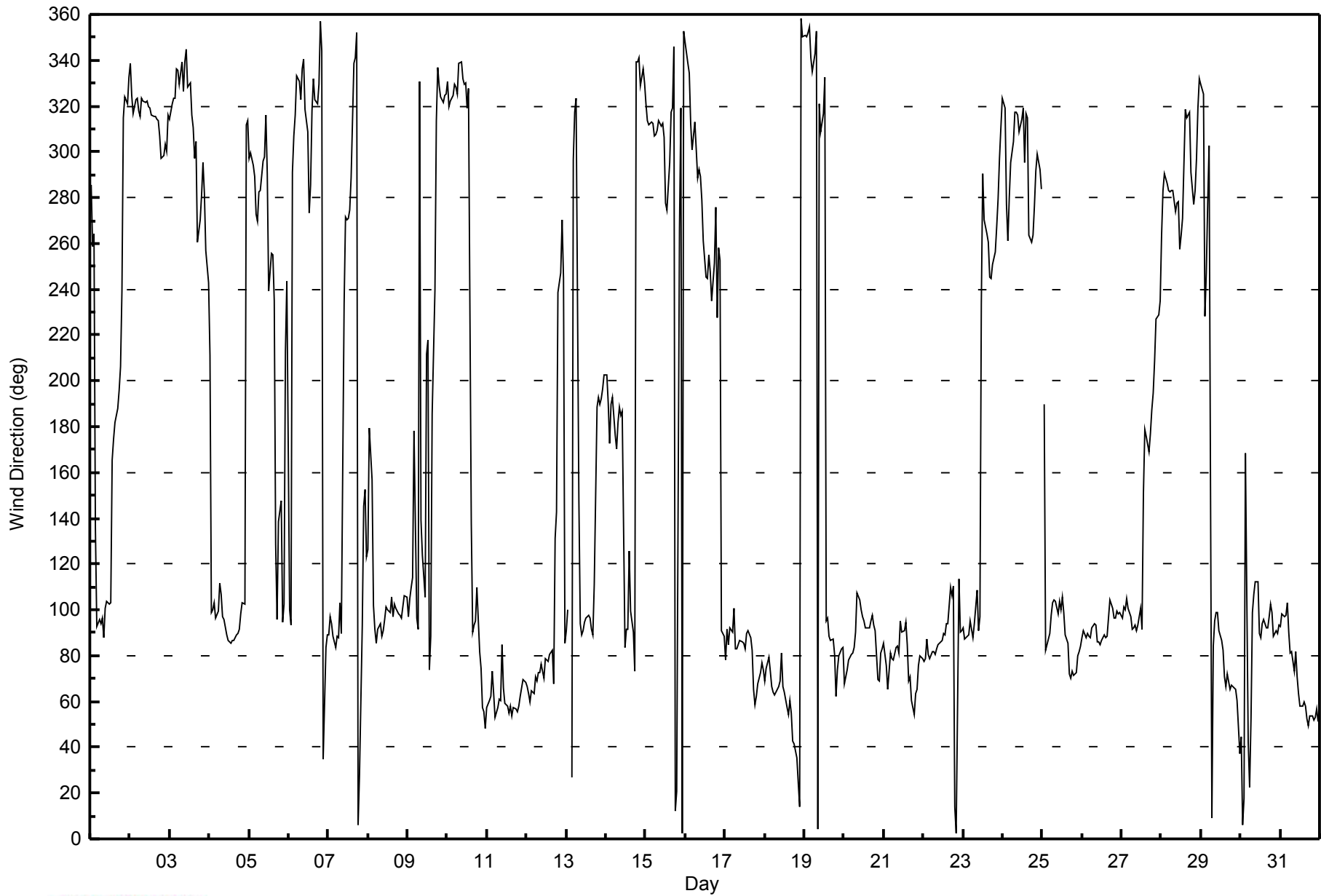
Wind Direction (WD) - deg
Fort Chipewyan - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 92 deg on Mar 9 08:00																		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																							
Minimum Value: 3 deg on Mar 20 17:00																																									
Percentiles: P ₁ = 4 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 19 P ₉₀ = 28 P ₉₉ = 84																																									
Day	Hourly Period Ending At (MST)																								Daily Maximum																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																	
1-Mar	18	12	14	68	12	9	9	9	11	8	4	4	12	18	9	7	7	7	8	31	17	18	19	22	68																
2-Mar	25	21	18	19	20	17	18	20	19	19	19	18	17	18	18	15	16	15	15	15	15	16	18	25																	
3-Mar	16	18	18	19	20	21	22	21	23	28	26	31	33	22	23	19	32	14	14	16	10	17	17	13	33																
4-Mar	41	14	10	10	7	11	10	9	6	6	4	5	5	5	6	7	7	7	9	8	25	25	16	41																	
5-Mar	17	9	12	10	12	13	12	15	15	18	18	33	20	23	35	16	51	12	30	23	12	14	30	71	71																
6-Mar	39	85	11	21	13	17	17	16	21	24	24	19	28	27	21	24	21	20	22	21	25	25	10	7	85																
7-Mar	6	8	5	7	7	6	4	7	8	92	17	16	15	14	23	26	24	17	17	18	39	40	25	20	92																
8-Mar	19	21	24	6	4	8	8	4	5	4	6	7	5	4	4	4	6	5	5	4	4	4	5	8	24																
9-Mar	6	6	15	66	64	84	75	92	24	11	47	32	79	50	16	86	21	28	22	20	21	19	20	19	92																
10-Mar	20	16	17	22	20	19	23	29	28	25	44	40	42	58	46	4	6	6	7	7	10	6	5	6	58																
11-Mar	5	8	5	15	8	8	10	8	12	14	13	10	10	11	10	9	9	9	9	9	9	8	8	7	15																
12-Mar	7	8	8	7	7	7	7	6	7	7	7	7	6	6	6	4	9	31	17	92	14	30	58	65	92																
13-Mar	35	76	AF	24	25	17	47	71	25	9	7	4	5	8	5	4	5	30	6	5	4	7	5	7	76																
14-Mar	8	10	14	11	15	21	30	17	11	9	33	75	54	18	21	17	13	46	21	19	23	21	22	24	75																
15-Mar	21	16	15	15	15	16	16	16	16	18	19	17	20	15	23	24	28	24	28	22	46	19	20	23	46																
16-Mar	22	20	24	20	10	10	11	12	15	14	19	20	22	19	22	18	12	19	12	15	16	47	11	10	47																
17-Mar	11	12	6	6	7	8	6	6	4	4	4	7	5	5	5	6	8	13	10	9	9	8	6	7	13																
18-Mar	7	7	6	8	7	8	7	7	7	7	12	8	8	13	11	10	11	12	11	12	14	16	17	17	17																
19-Mar	16	16	17	22	42	47	46	19	36	59	57	42	36	13	8	4	4	4	8	7	9	6	5	6	59																
20-Mar	13	8	7	7	8	9	12	19	8	6	4	4	6	4	4	4	3	7	12	16	7	9	6	7	19																
21-Mar	4	8	7	8	7	7	9	8	5	6	9	6	5	5	8	9	6	10	9	7	6	7	5	5	10																
22-Mar	6	5	7	7	7	7	6	6	5	5	5	5	4	6	5	14	7	9	24	17	22	46	9	5	46																
23-Mar	8	5	6	7	5	4	4	10	10	9	22	88	21	20	20	16	16	16	13	14	13	16	12	16	88																
24-Mar	14	14	32	23	15	8	12	13	18	21	27	32	41	42	36	43	25	17	14	12	8	8	4	21	43																
25-Mar	AF	62	15	13	13	6	7	7	10	9	3	4	5	4	4	6	8	6	20	10	7	7	6	6	62																
26-Mar	6	5	5	7	5	7	5	7	6	6	6	5	6	6	6	7	7	8	10	7	7	5	7	10	10																
27-Mar	11	9	6	6	5	6	7	6	8	7	4	8	10	64	11	7	10	6	8	9	15	11	8	10	64																
28-Mar	17	11	10	9	10	15	9	11	16	16	15	18	14	24	18	17	18	18	15	10	11	13	17	18	24																
29-Mar	14	17	52	16	13	17	19	18	9	7	7	6	4	5	9	7	7	7	7	7	7	8	8	14	52																
30-Mar	14	58	69	88	35	21	39	5	6	5	9	6	5	4	4	4	6	8	6	10	7	7	7	6	88																
31-Mar	11	15	9	5	6	6	10	6	7	6	8	7	9	9	9	9	10	10	10	11	10	9	9	11	15																
Diurnal Maximum																		41	85	69	88	64	84	75	92	36	92	57	88	79	64	46	86	51	46	30	92	46	47	58	71
AF - Analyzer Failure																																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort Chipewyan - March 2015



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 13, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	16:35
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	747
Cal Gas Concentration	2.45 ppm	Cal Gas Expiry Date	9/16/2016
Gas Cert Reference	LL103809		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205
DACS voltage range	0-5v	DACS channel #	DIFF 1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	20	20	PMT voltage (mV)	-826	-826
Analyzer Range (mv)	20	20	Flash power supply (V)	1012	1012
Calculated slope	0.998154	0.997198	Chamber temp.	45.1	45.2
Calculated intercept	-0.086707	-0.053851	Pressure (mm Hg)	722.2	704.0
Analyzer Background	1.2	1.21	Flow (l/m)	0.440	0.428
Analyzer Coefficient	1.027	1.038	UV Lamp (%)	90	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	5000	0.0	0.0	0.03	NA
as found span	5000	37.1	18.18	17.84	1.019
calibrator zero	5000	0.0	0.0	0.03	NA
high point	5000	37.1	18.18	18.28	0.994
second point	5000	19.8	9.70	9.77	0.993
third point	5000	9.9	4.85	4.96	0.978
calibrator zero					
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	37.1	18.2	18.0	1.013
Average Correction Factor					0.989

Corrected As found 17.8 Previous response 18.3 % change 2.7%

Notes:

Span with a slight adjustment, filter changed after third point

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

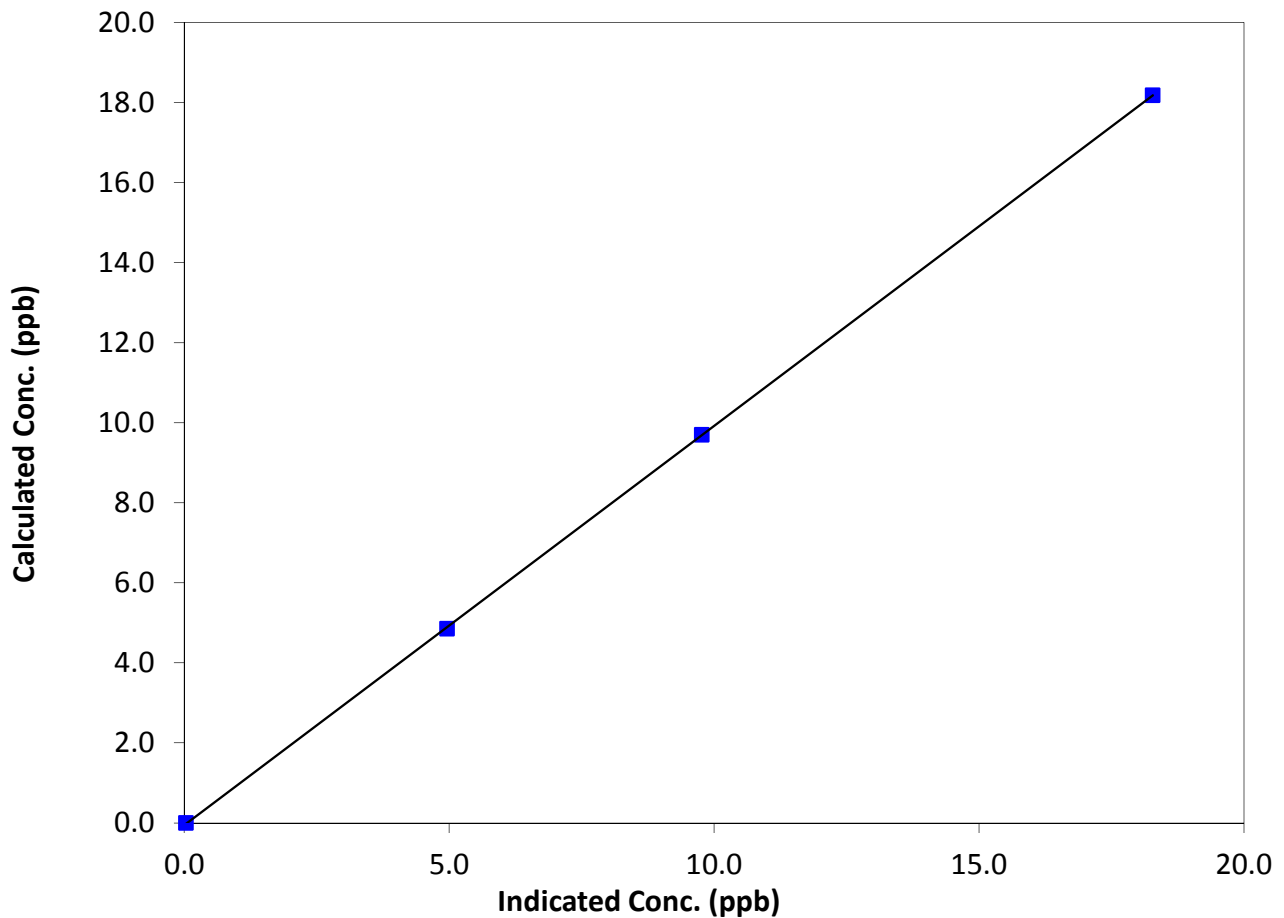
Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 13, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:45	End Time (MST)	16:35
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

Calibration Data

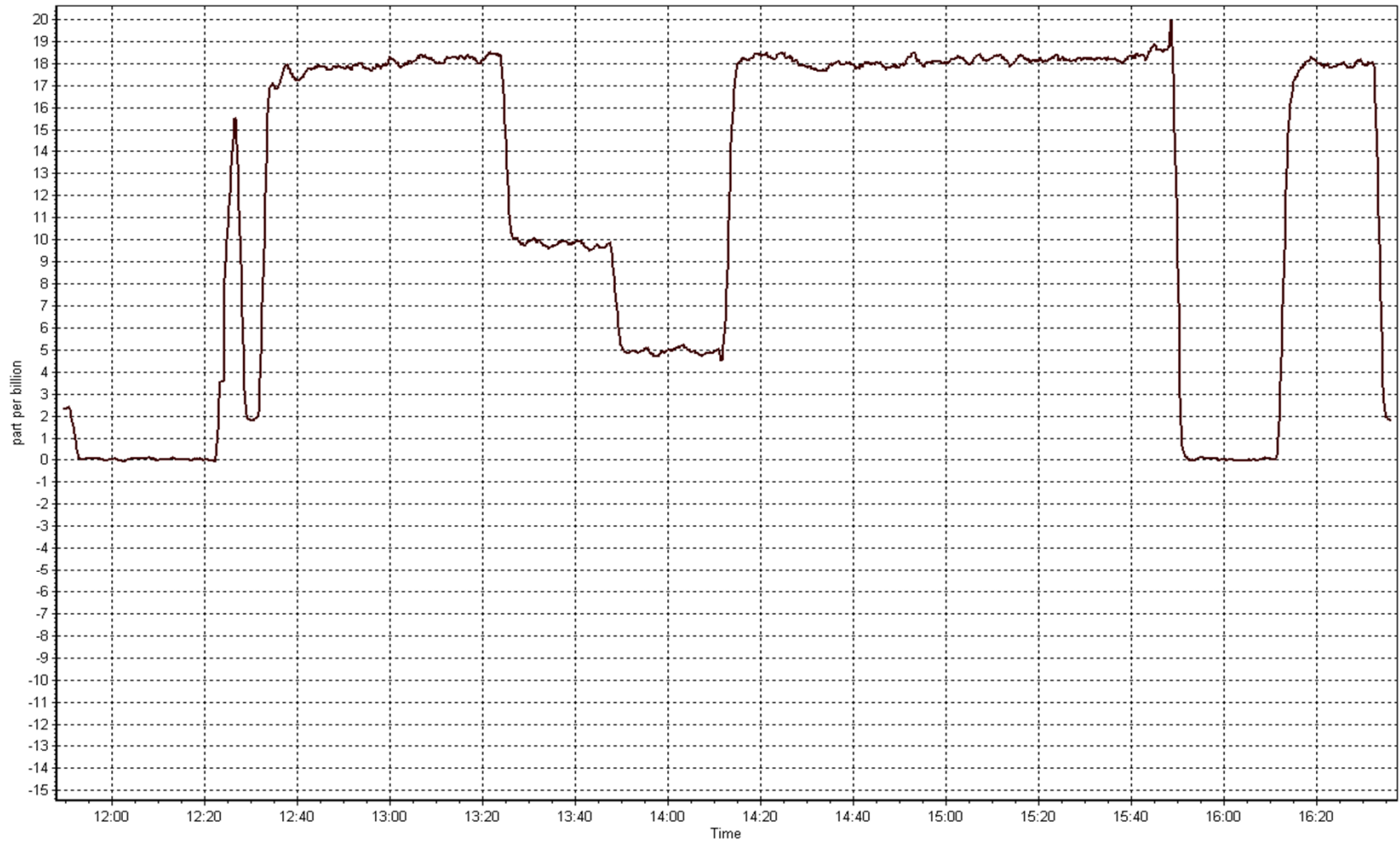
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999986
18.2	18.3	0.9945		
9.7	9.8	0.9930	Slope	0.997198
4.9	5.0	0.9780		
			Intercept	-0.053851

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 4, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 13, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	11:45	End Time (MST)	16:35
Barometric Pressure	740 mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	747
NO Cal Gas Conc	20.2 ppm	Cal Gas Expiry Date	September 16, 2016
NO _x Cal Gas Conc	20.3 ppm	Cal Gas Serial #	LL103809

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	200	200	200
	Analyzer Range (mv)	200	200	200
Before	Data Slope	1.000448	1.000235	0.993967
	Data Offset	0.161684	0.234682	-0.042502
After	Data Slope	1.001249	0.999719	0.997238
	Data Offset	-0.010097	0.049464	-0.117578
Channel #		DIFF 3	DIFF 1	DIFF 2
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model	API T200u	Analyzer serial #	172
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Test Point	before		after	
Concentration range	200	ppb	200	ppb
NO coefficient	1.175	ppb	1.110	ppb
NO _x coefficient	1.188	ppb	1.121	ppb
NO bkgrnd	0.1		0.1	
NO _x bkgrnd	0.2		0.2	
HVPS	502.0		502.0	
Chamber Temp	40.0	Deg C	40.0	Deg C
Moly Temp	316.0	Deg C	314.9	Deg C
PMT Temp	5.1	Deg C	5.1	Deg C
O ₃ flow	90.0	ccm	88.0	ccm
R Cell Press	3.8	"Hg	3.8	"Hg
Sample Flow	1152	ccm	1121	ccm

Notes:

Span adjusted, filter changed after GPT. High % change due to pump change last month. Pump settling



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 4, 2015

Station Number:

AMS 8

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A
as found span	5000	37.1	150.6	149.9	0.7	159.2	158.5	0.7	0.9460	0.9456
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A
high point	5000	37.1	150.6	149.9	0.7	150.5	150.0	0.6	1.0006	0.9993
second point	5000	19.8	80.4	80.0	0.4	80.0	79.7	0.4	1.0043	1.0040
third point	5000	9.9	40.2	40.0	0.2	40.4	40.1	0.2	0.9959	0.9969
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
as left span	5000	37.1	150.6	46.8	103.8	151.9	47.6	104.3	0.9914	0.9832
Average Correction Factor									1.0003	1.0001

Corrected As found

NO_x= 159.2

NO= 158.5

Percent Change

NO_x= -5.6%

NO= -5.6%

Previous Response

NO_x= 150.4

NO= 149.6

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

37.10

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO ₂ (100)	N/A	46.8	103.3	150.4	46.8	103.6	0.9941	1.0000	0.9974	100.3%
2nd NO ₂ (75)	N/A	71.5	78.6	150.5	71.5	79.0	0.9933	1.0000	0.9952	100.5%
3rd NO ₂ (50)	N/A	98.0	52.1	150.6	98.0	52.6	0.9929	1.0000	0.9912	100.9%
4th NO ₂ (0)	150.1	N/A	0.2	150.3	150.1	0.2	0.9948	1.0000	N/A	N/A
Average Correction Factor							0.9938	1.0000	0.9946	100.5%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

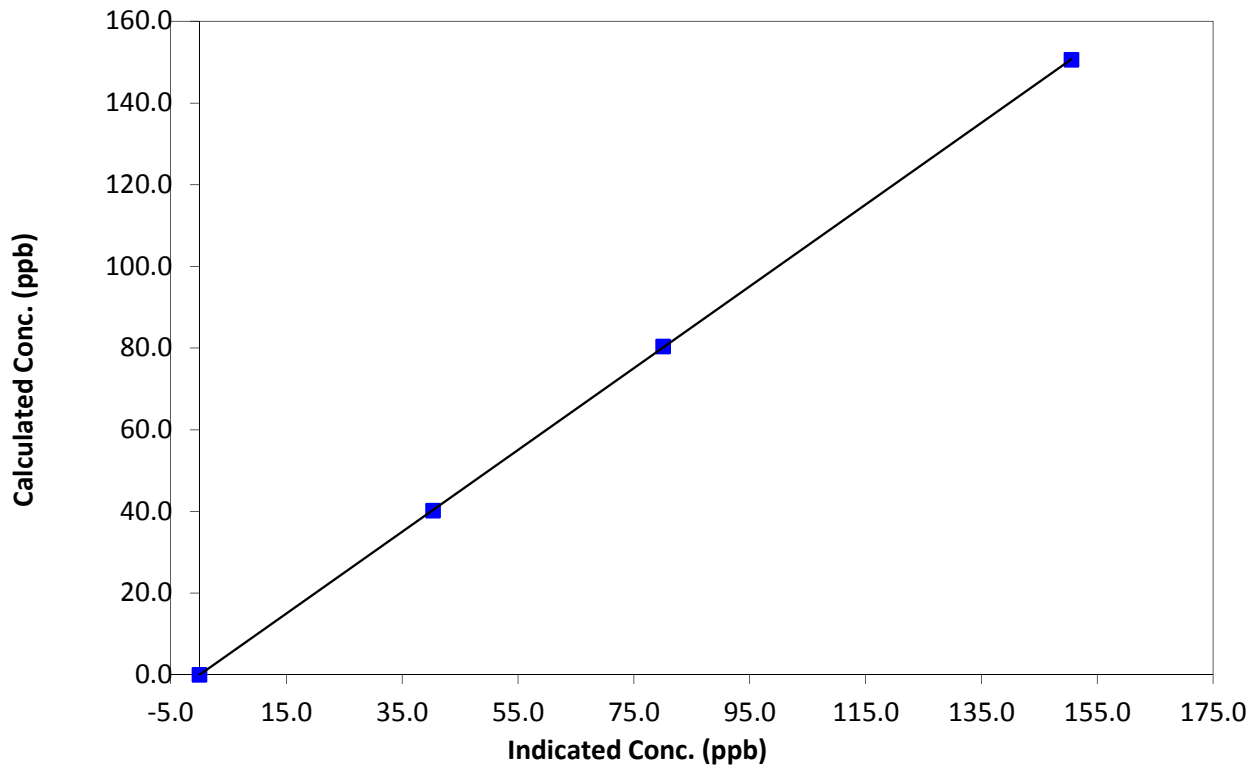
Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 13, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:45	End Time (MST)	16:35
Analyzer make	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	0.999991
150.6	150.5	1.0006		
80.4	80.0	1.0043	Slope	1.001249
40.2	40.4	0.9959		
			Intercept	-0.010097

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

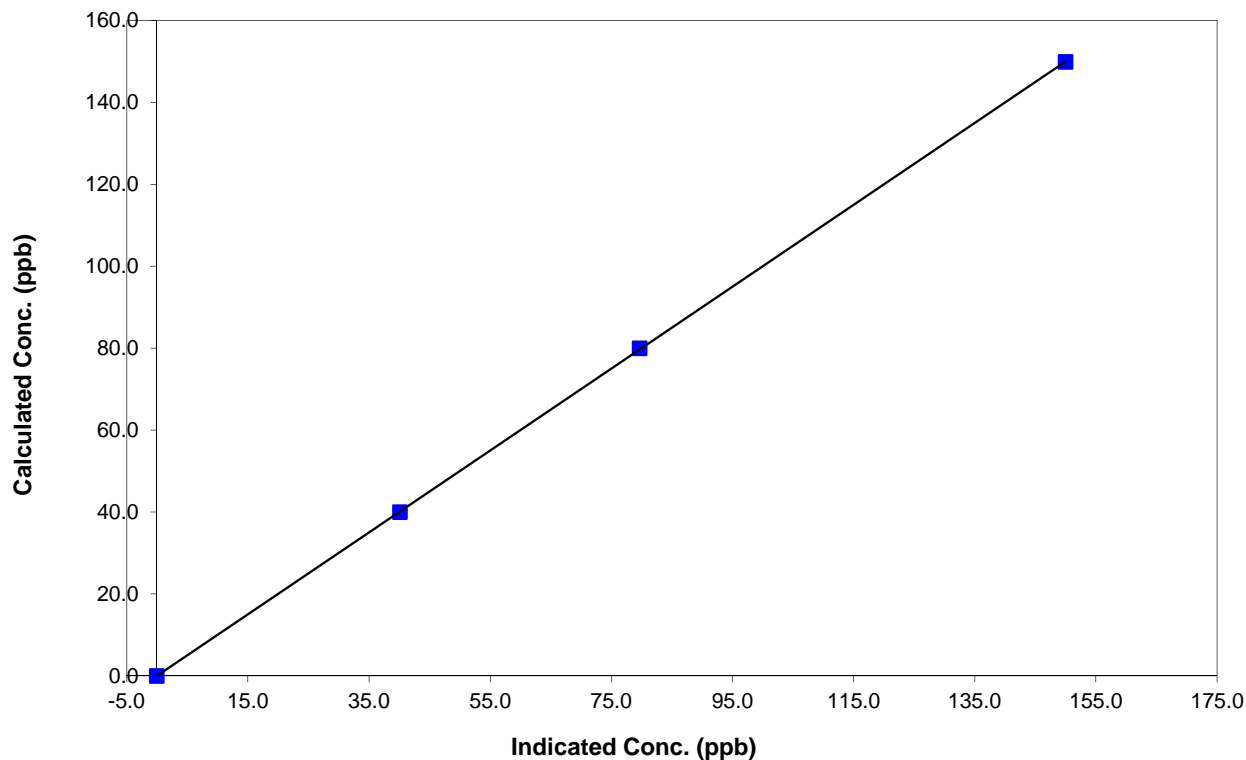
Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 13, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:45	End Time (MST)	16:35
Analyzer make	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	0.999990
149.9	150.0	0.9993		
80.0	79.7	1.0040	Slope	0.999719
40.0	40.1	0.9969		
			Intercept	0.049464

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

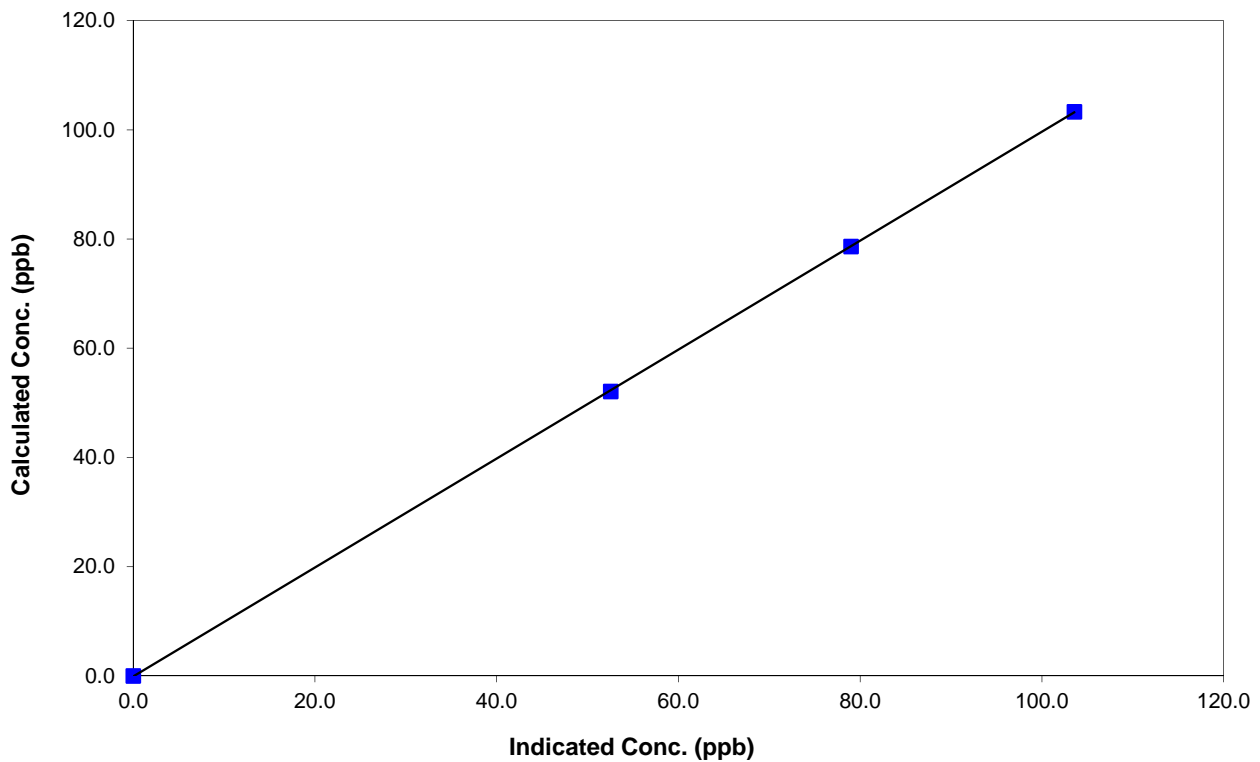
Station Information

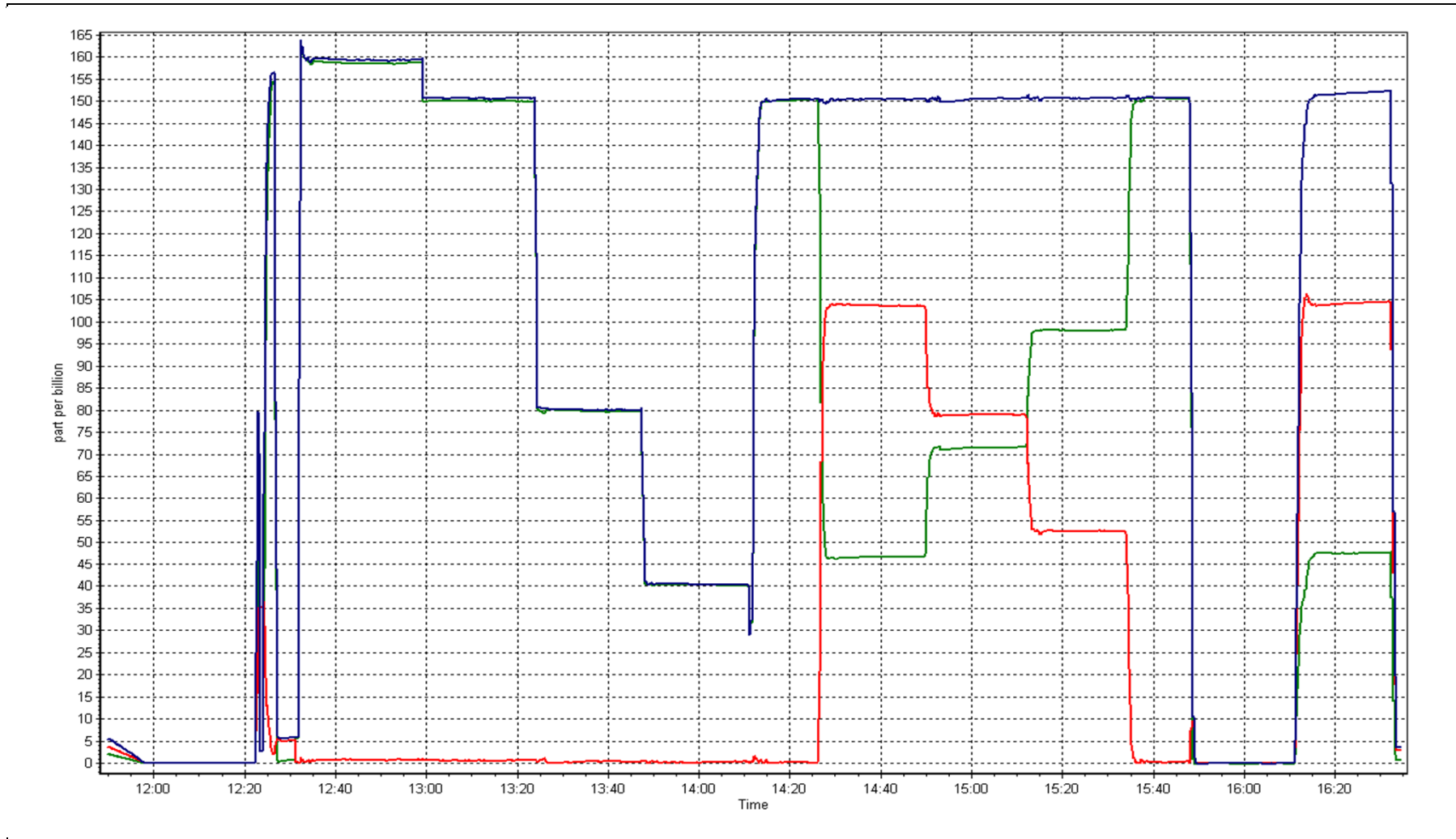
Calibration Date	March 4, 2015	Previous Calibration	February 13, 2015
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:45	End Time (MST)	16:35
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999988
103.3	103.6	0.9974		
78.6	79.0	0.9952	Slope	0.997238
52.1	52.6	0.9912		
			Intercept	-0.117578

NO₂ Calibration Curve







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 4, 2015	Previous Calibration	February 13, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	16:35	End Time (MST)	20:40
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	735
NO2 calibration used	Wednesday, December 03, 2014	Transfer Standard	NA
DACS make/model	Campebls CR3000	DACS serial No.	8205
DACS voltage range	0-5V	DACS channel #	Digital

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	200	200	Bench temp. (Deg C)	22.5	27.5
Analyzer Range (input)	200	200	Lamp temp. (Deg C)	58.0	58.0
Calculated slope	0.990563	0.999469	Pressure (in Hg)	27.6	27.1
Calculated intercept	-0.611961	-0.158837	Flow cell (LPM)	0.808	0.755
Analyzer Background	-0.60	0.0	Cell A Intensity	NA	NA
Analyzer Coefficient	1.015	1.014	Cell B Intensity	NA	NA

Analyzer make API T400 Analyzer serial # 1020

Calibration Data

Set Point	Dilution air flow rate (cc/min)	O3 Ref -- O3 Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.6	N/A
as found span	5000	197.5 -- 810.1	103.3	105.5	0.979
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	197.5 -- 810.1	103.3	103.2	1.001
second point	5000	148 -- 772	78.6	79.1	0.994
third point	5000	93 -- 715	52.1	52.6	0.991
calibrator zero					
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	197.5 -- 810.1	103.3	105.3	0.981
Average Correction Factor					0.996

Corrected As found 104.9 Previous response 104.9 % change 0.0%

Notes:

Zero and span adjusted. Filter changed after As Finds. Initial adjustment was not required, Span adjusted twice.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

O₃ Calibration Summary

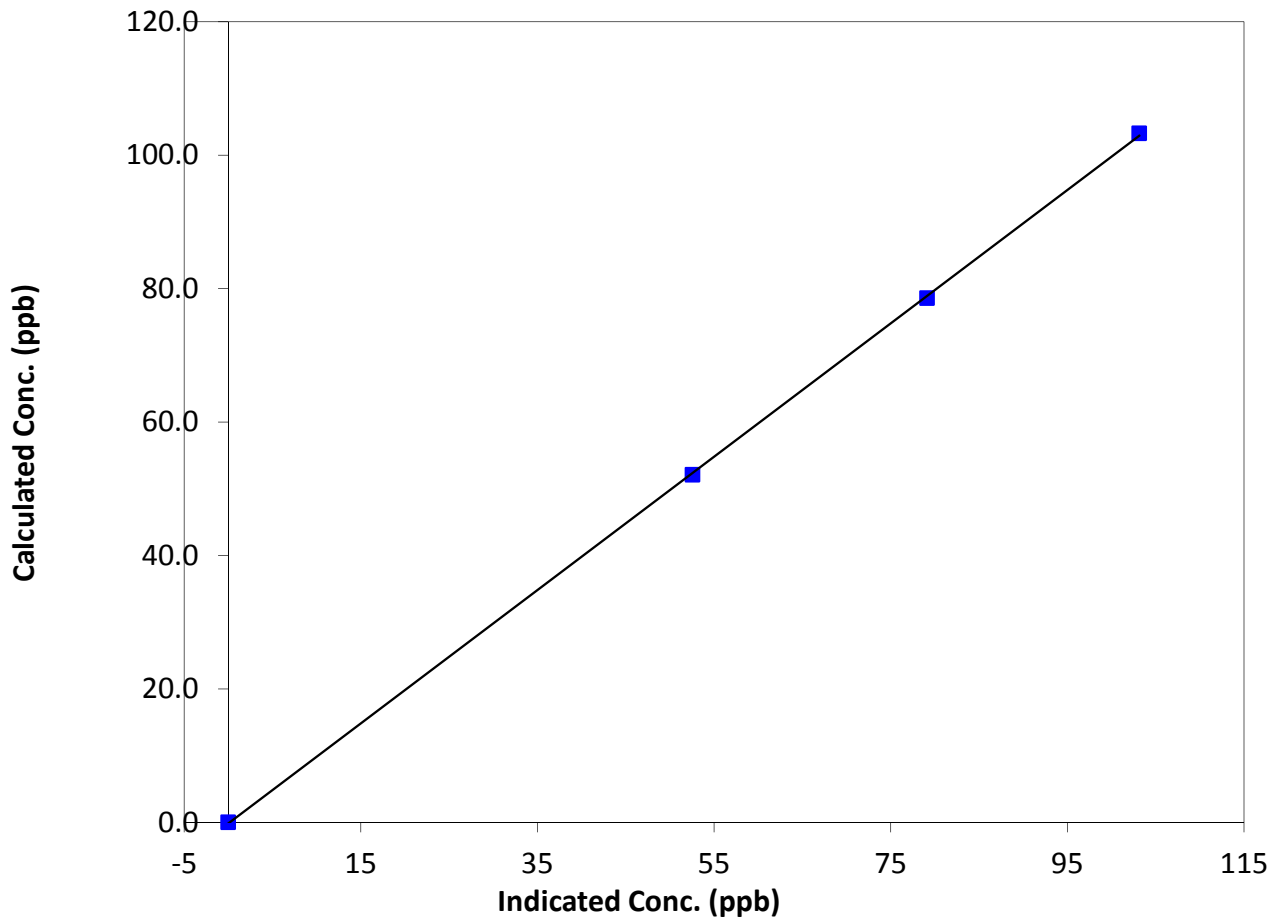
Station Information

Calibration Date	Wednesday, March 04, 2015	Previous Calibration	February 13, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:35	End Time (MST)	20:40
Analyzer make	API T400	Analyzer serial #	1020

Calibration Data

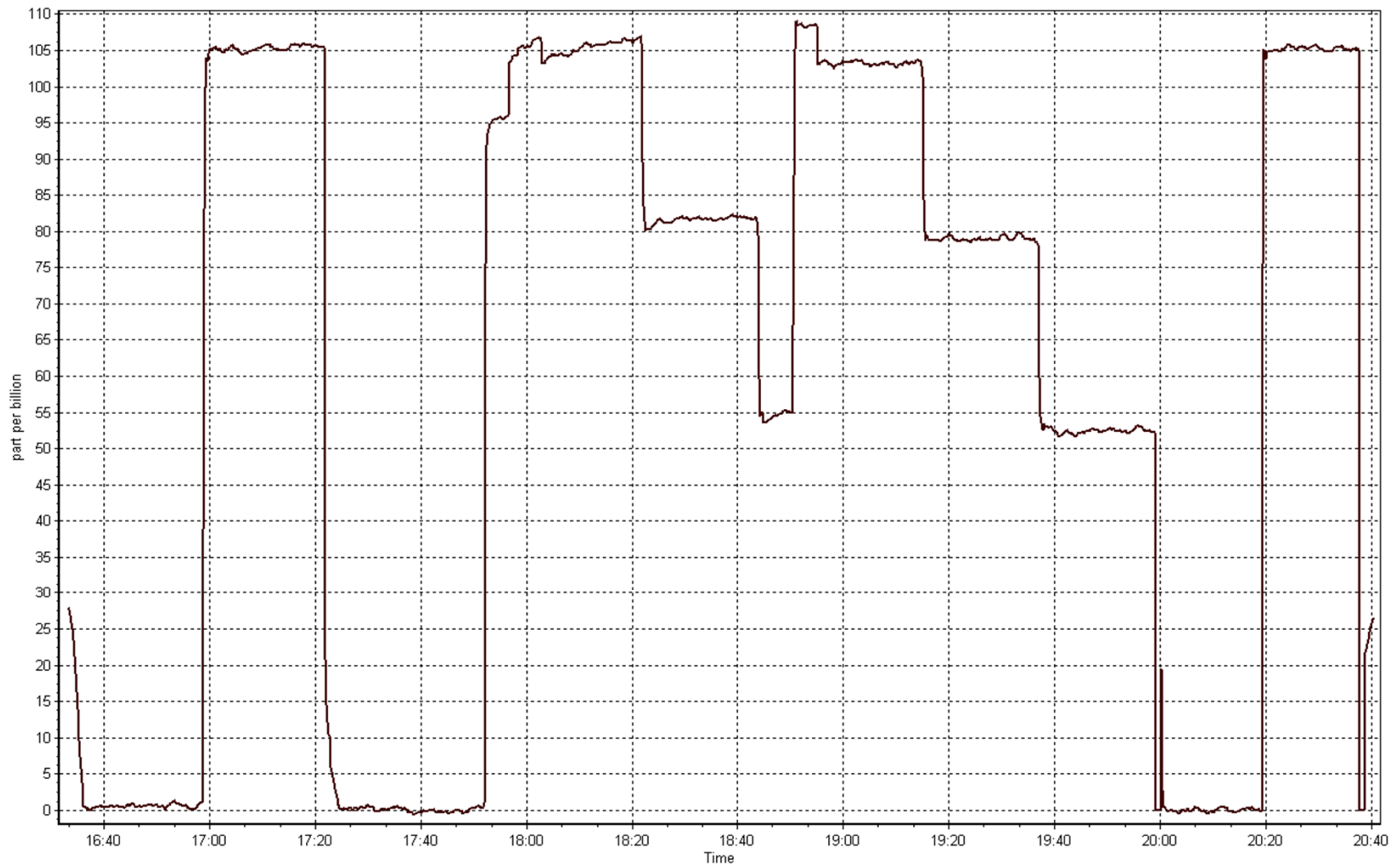
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999944
103.3	103.2	1.0015		
78.6	79.1	0.9937	Slope	0.999469
52.1	52.6	0.9914		
			Intercept	-0.158837

O₃ Calibration Curve



O3 Calibration Plot

Date: March 4, 2015



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 9 BARGE LANDING MARCH 2015

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospherics Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	709	35	35	100.00	3	0	1	0
THC(ppm) Average	707	37	37	100.00	5.3	-	2.8	-
Temperature (C) Average	744	0	0	100.00	15.8	-	6.6	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	87	-
Wind Speed 10 m (km/h) Average	707	0	37	95.03	19	-	12	-
Wind Direction 10 m (deg) Average	707	0	37	95.03	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	709	0.3	0	-	0	0	0	0	0	1	3
THC(ppm) Average	707	2.39	0.3	-	2	2.1	2.2	2.3	2.5	2.8	5.3
Temperature (C) Average	744	-4.29	8.6	-	-30.3	-14.8	-9.7	-4.2	2	6.1	15.8
Relative Humidity (%) Average	744	66.9	18	-	22	41	52	69	81	91	98
Wind Speed 10 m (km/h) Average	707	5.5	3	-	0	2	3	5	7	10	19
Wind Direction 10 m (deg) Average	707	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	15 Mar 2015 00:00	16 Mar 2015 12:00	37	Flat line in sensor output signal -sensor frozen

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3 ppb on Mar 4 11:00	Maximum Daily Average: 0.9 ppb on Mar 4		Hours of Data:	709
Minimum Value: 0 ppb on Mar 28 18:00	Minimum Daily Average: 0.1 ppb on Mar 24		Hours of Missing Data:	35
Maximum Diurnal Average: 0.5 ppb at hour 11	Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Calibration:	35
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2		Percent Operational Time:	100.0

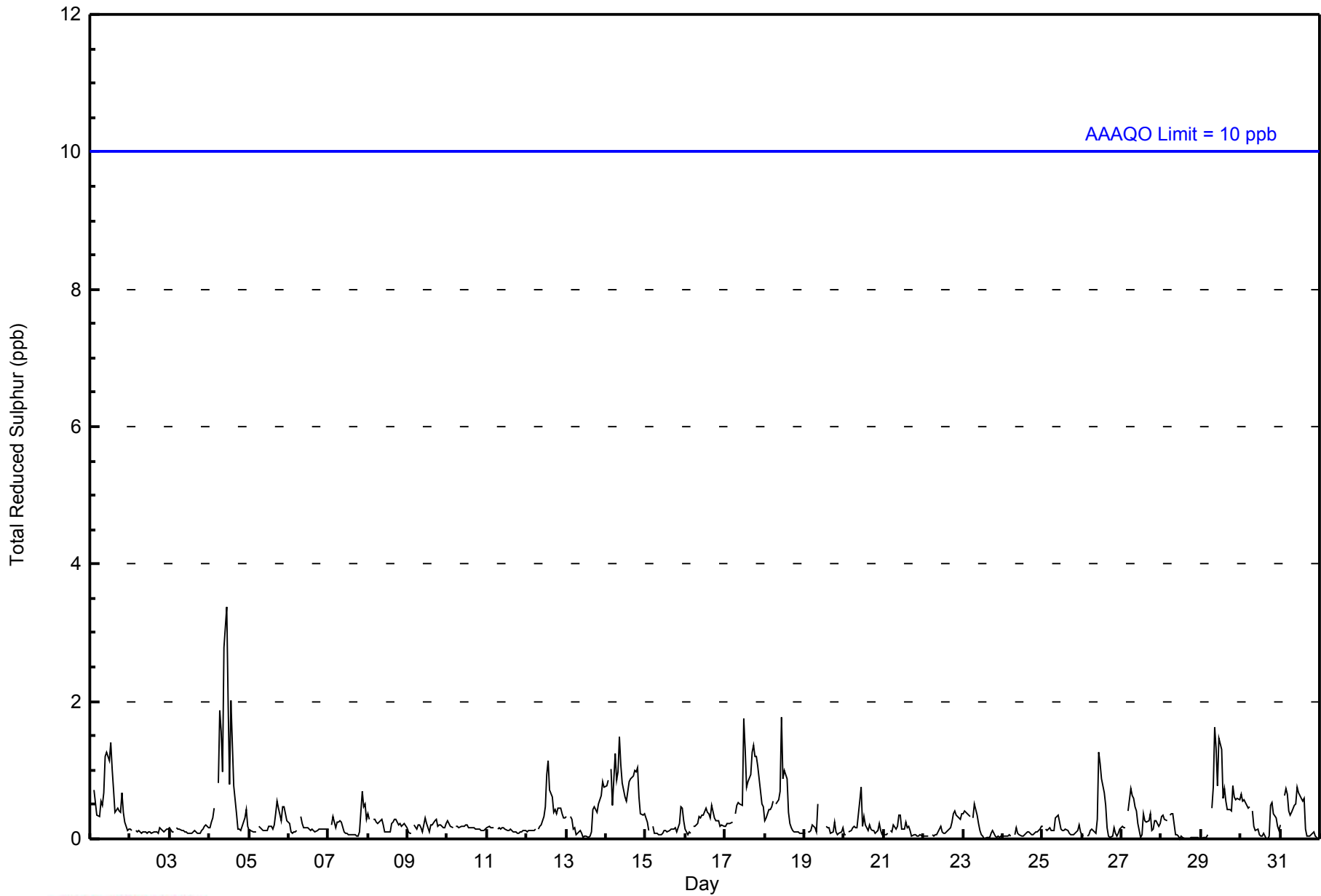
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1	Z	1	1	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0.6	1
2-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Mar	0	0	0	Z	0	0	0	0	0	0	0	0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

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - March 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	99.72	99.72
3 - 4	2	0.28	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - March 2015

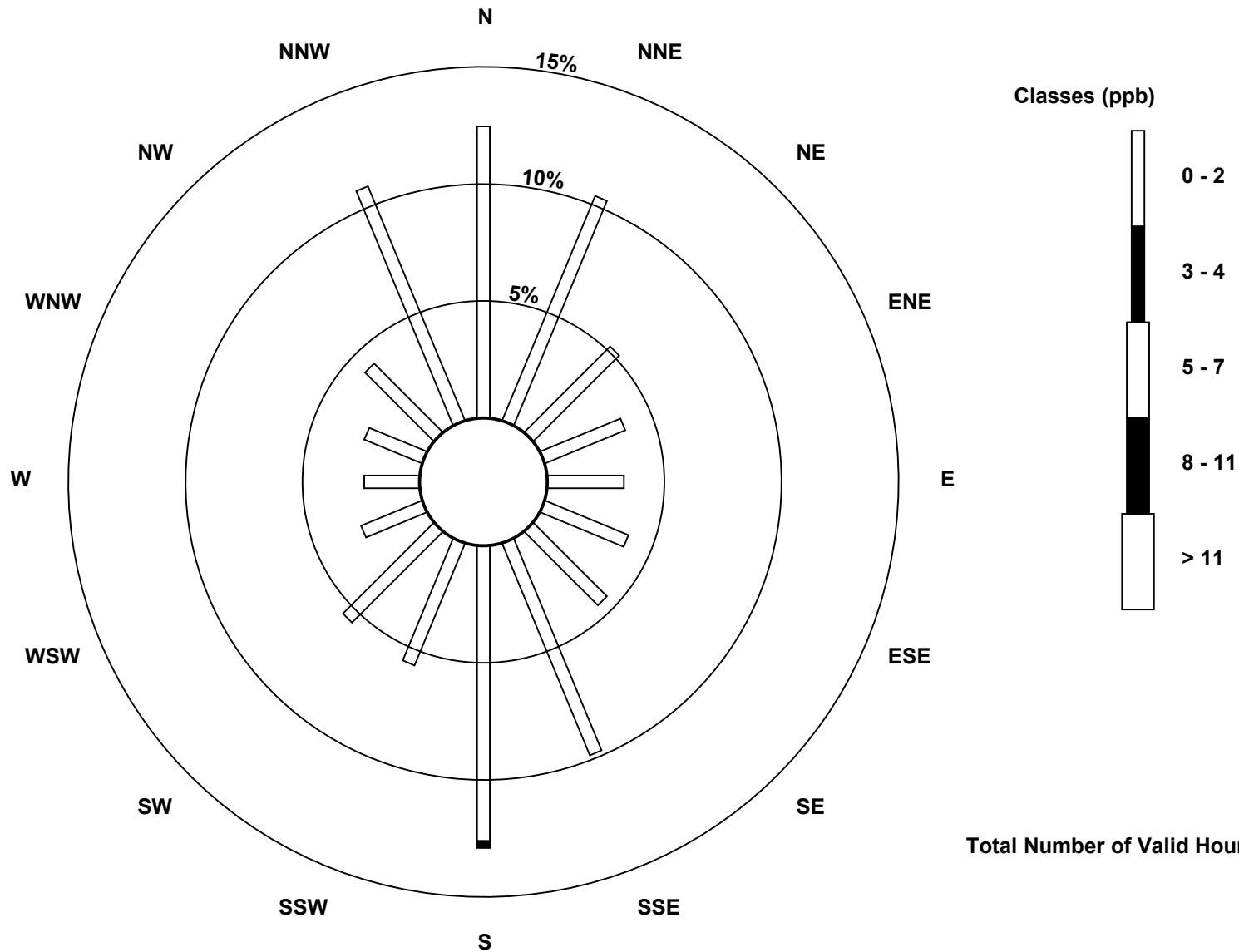
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	84	70	35	25	22	26	30	66	85	38	37	19	16	18	28	73	672
3 - 4	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	84	70	35	25	22	26	30	66	87	38	37	19	16	18	28	73	674

Total Number of Valid Hours: 674

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

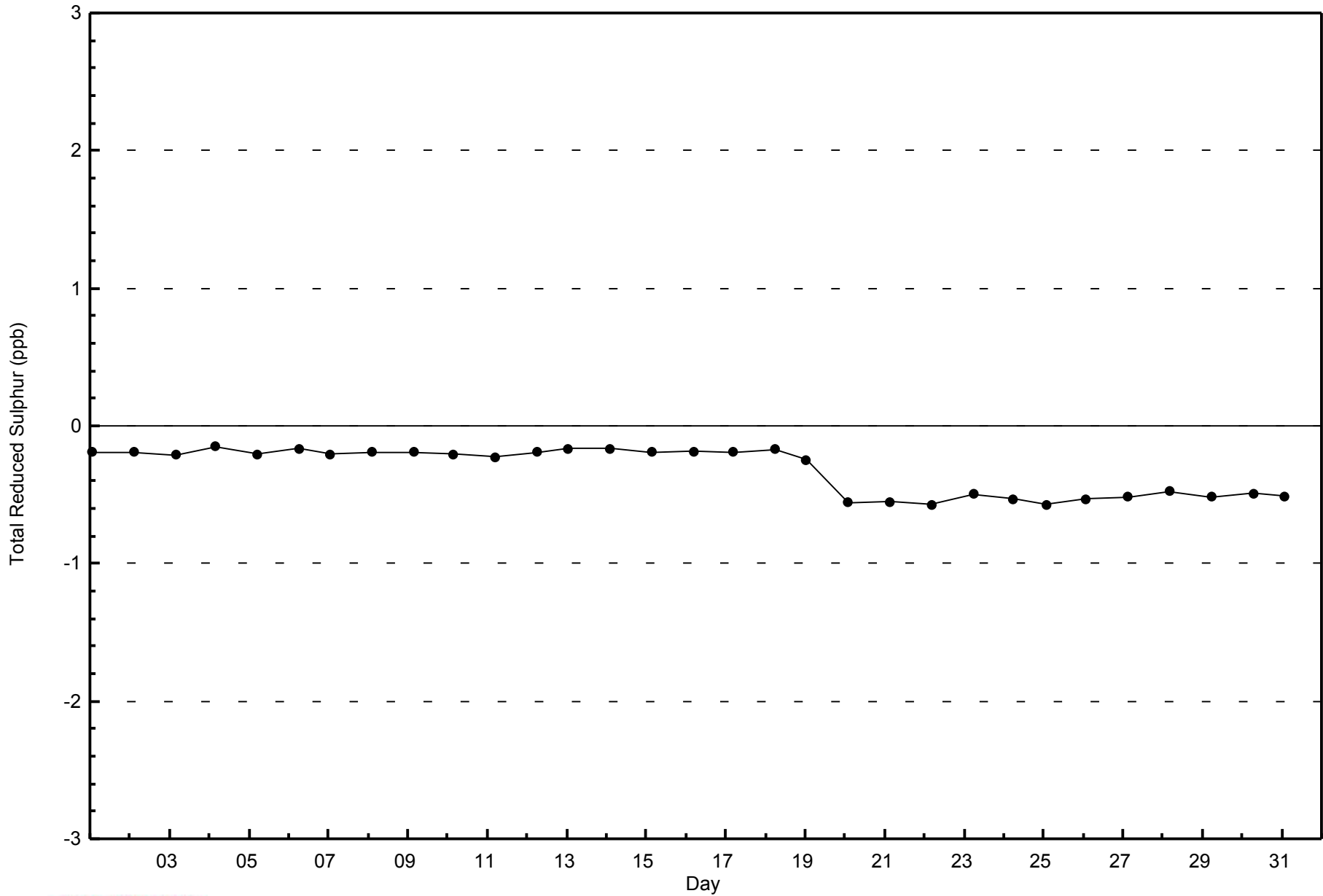
**Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)**





WBEA
Zero Responses

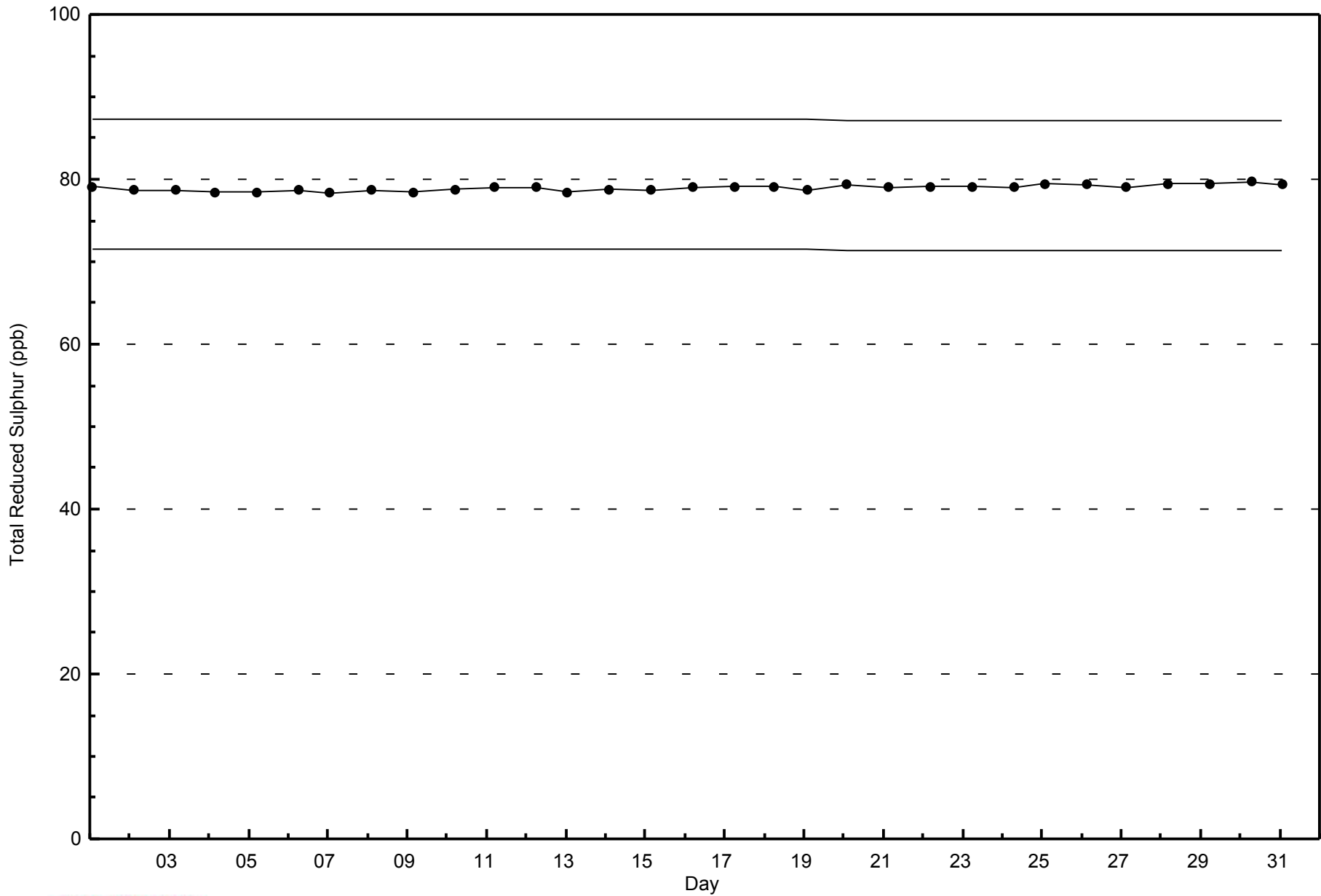
Total Reduced Sulphur (TRS) - ppb
Barge Landing - March 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Barge Landing - March 2015



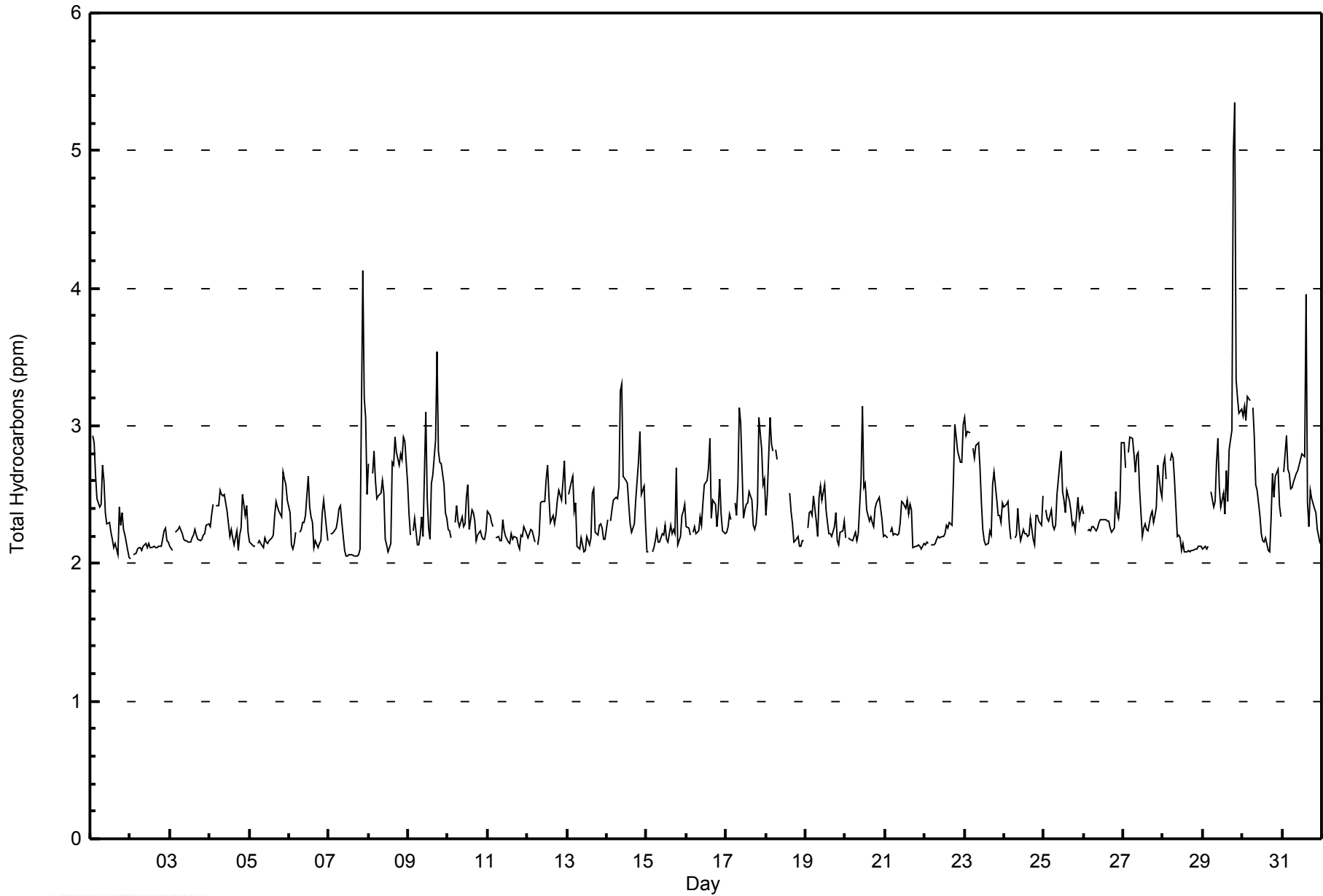


Maximum Value: 5.3 ppm on Mar 29 20:00																	Maximum Daily Average: 2.8 ppm on Mar 29																	Hours in Service: 744	
Minimum Value: 2.0 ppm on Mar 2 01:00																	Minimum Daily Average: 2.1 ppm on Mar 2																	Hours of Data: 707	
Maximum Diurnal Average: 2.5 ppm at hour 21																	Minimum Diurnal Average: 2.3 ppm at hour 14																	Hours of Missing Data: 37	
Monthly Average: 2.39 ppm																	Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.8 P ₉₉ = 3.3																	Hours of Calibration: 37	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	2.9	2.9	2.6	2.5	2.4	2.4	2.7	2.6	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.4	2.3	2.4	2.2	2.2	2.1	2.0	2.4	2.9									
2-Mar	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.1	2.3									
3-Mar	2.1	2.1	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3									
4-Mar	2.3	2.4	2.4	Z	2.4	2.4	2.5	2.5	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.3	2.5	2.3	2.4	2.2	2.3	2.5									
5-Mar	2.2	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.4	2.5	2.4	2.4	2.3	2.7	2.6	2.6	2.5	2.3	2.7								
6-Mar	2.4	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.3	2.3	2.4	2.6	2.4	2.3	2.3	2.1	2.2	2.1	2.1	2.2	2.4	2.5	2.3	2.2	2.3	2.6									
7-Mar	Z	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	4.1	3.2	3.1	2.5	2.3	4.1									
8-Mar	2.7	Z	2.7	2.8	2.6	2.5	2.5	2.5	2.6	2.5	2.2	2.1	2.1	2.1	2.7	2.7	2.9	2.8	2.7	2.8	2.8	2.9	2.9	2.6	2.6	2.9									
9-Mar	2.4	2.2	Z	2.2	2.3	2.1	2.1	2.2	2.3	2.2	3.1	2.5	2.3	2.2	2.6	2.6	2.9	3.5	2.8	2.7	2.7	2.6	2.4	2.3	2.5	3.5									
10-Mar	2.2	2.2	2.2	Z	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.5	2.6	2.2	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6									
11-Mar	2.4	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.4									
12-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.1	2.2	2.4	2.4	2.5	2.6	2.7	2.5	2.3	2.4	2.3	2.4	2.5	2.5	2.5	2.6	2.8	2.4	2.4	2.8									
13-Mar	Z	2.5	2.6	2.6	2.4	2.4	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.5	2.5	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.6									
14-Mar	2.3	Z	2.3	2.4	2.5	2.5	2.5	2.6	3.3	3.3	2.6	2.6	2.6	2.4	2.3	2.2	2.3	2.5	2.6	2.8	3.0	2.5	2.6	2.3	2.6	3.3									
15-Mar	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.7	2.1	2.2	2.3	2.4	2.4	2.2	2.7								
16-Mar	2.3	2.3	2.2	Z	2.2	2.3	2.2	2.2	2.3	2.3	2.4	2.6	2.6	2.7	2.9	2.3	2.5	2.4	2.3	2.4	2.6	2.4	2.2	2.2	2.4	2.9									
17-Mar	2.2	2.3	2.4	2.3	Z	2.4	2.3	2.6	3.1	3.0	2.3	2.4	2.4	2.4	2.5	2.5	2.3	2.3	2.3	2.4	3.1	2.8	2.6	2.6	2.5	3.1									
18-Mar	2.3	2.5	3.1	2.9	2.8	Z	2.8	2.8	C	C	C	C	C	C	2.5	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	--	3.1									
19-Mar	Z	2.3	2.4	2.4	2.3	2.5	2.3	2.2	2.5	2.6	2.5	2.6	2.4	2.3	2.2	2.2	2.2	2.3	2.4	2.2	2.1	2.2	2.2	2.3	2.3	2.6									
20-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	3.1	2.5	2.6	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.2	2.4	3.1									
21-Mar	2.2	2.2	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.5	2.4	2.4	2.5	2.4	2.4	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5									
22-Mar	2.1	2.2	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.6	3.0	2.9	2.8	2.7	2.7	3.0	2.4	3.0									
23-Mar	3.1	2.9	3.0	2.9	Z	2.8	2.8	2.9	2.9	2.7	2.4	2.3	2.2	2.1	2.1	2.2	2.2	2.6	2.7	2.5	2.4	2.4	2.3	2.4	2.5	3.1									
24-Mar	2.4	2.4	2.5	2.3	2.2	Z	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.3	2.3	2.3	2.3	2.5	2.3	2.5									
25-Mar	Z	2.4	2.3	2.3	2.4	2.3	2.2	2.3	2.5	2.7	2.8	2.5	2.5	2.4	2.5	2.5	2.4	2.3	2.3	2.2	2.5	2.3	2.4	2.4	2.4	2.8									
26-Mar	2.4	Z	2.2	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.5	2.4	2.3	2.4	2.9	2.3	2.9									
27-Mar	2.9	2.7	Z	2.8	2.9	2.9	2.8	2.7	2.8	2.8	2.5	2.2	2.3	2.3	2.2	2.2	2.4	2.4	2.3	2.3	2.4	2.7	2.5	2.5	2.5	2.9									
28-Mar	2.7	2.8	2.6	Z	2.7	2.8	2.8	2.6	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	2.3	2.8									
29-Mar	2.1	2.1	2.1	2.1	Z	2.5	2.4	2.4	2.7	2.9	2.6	2.4	2.5	2.4	2.7	2.5	2.8	3.0	5.0	5.3	3.3	3.2	3.1	3.1	2.8	5.3									
30-Mar	3.1	3.1	3.0	3.2	3.2	Z	3.1	2.9	2.6	2.5	2.4	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.7	2.5	2.6	2.7	2.4	2.3	2.6	3.2									
31-Mar	Z	2.7	2.9	2.7	2.7	2.5	2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.8	4.0	2.4	2.3	2.5	2.5	2.4	2.4	2.2	2.2	2.1	2.6	4.0									
																								Diurnal Average											
																								Diurnal Maximum											
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 2.3 2.4 2.3 2.3 2.4 2.4 2.5 2.5 2.5 2.4 2.4 2.4 2.4																																			
3.1 3.1 3.1 3.2 3.2 2.9 3.1 2.9 3.3 3.3 3.1 2.8 2.8 2.8 4.0 2.7 2.9 3.5 5.0 5.3 4.1 3.2 3.1 3.1 2.6 3.1																																			
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	3	0.42	0.42
2.1 - 3.0	680	96.18	96.61
3.1 - 10.0	24	3.39	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - March 2015

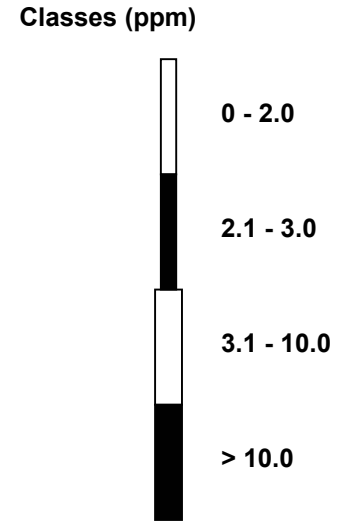
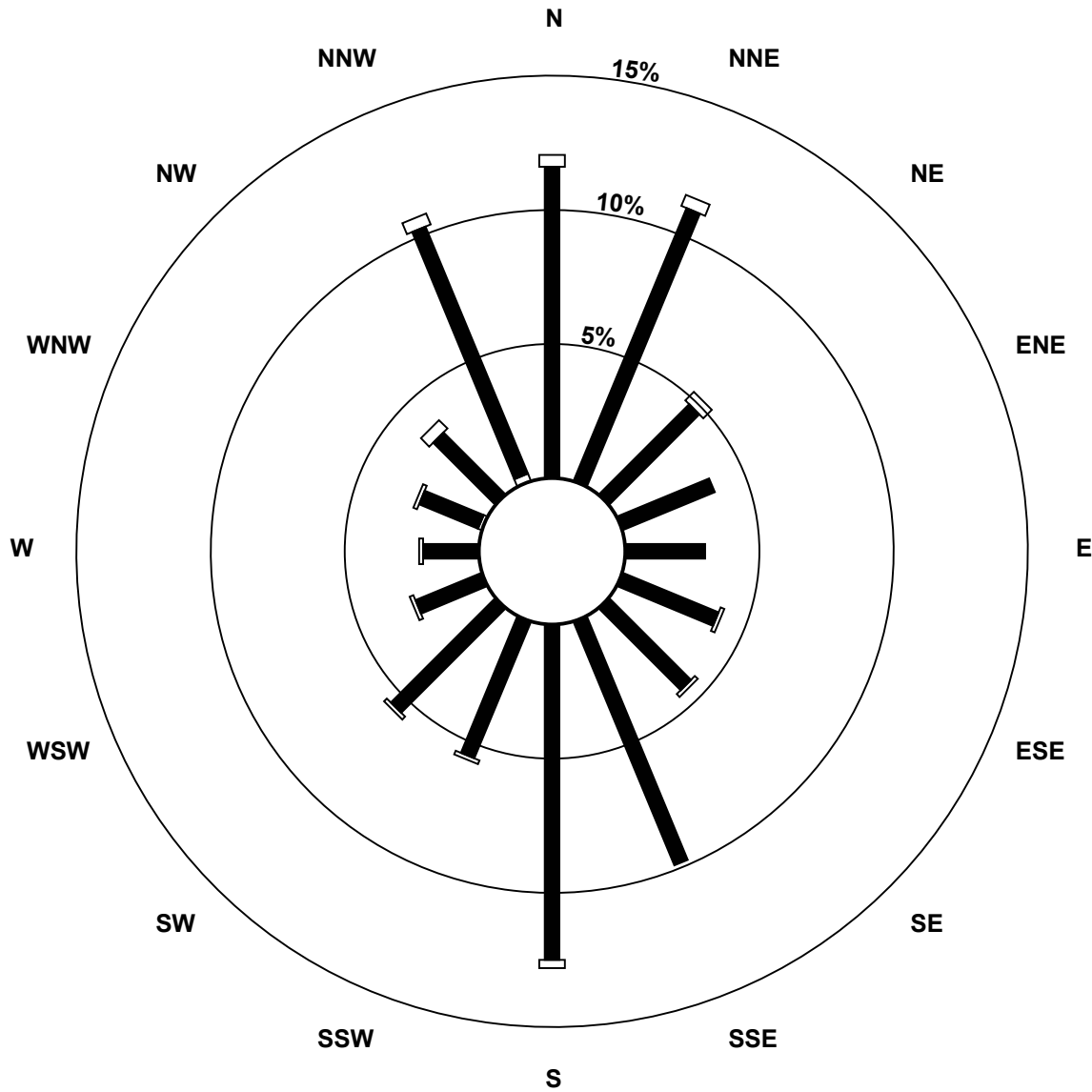
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	3
2.1 - 3.0	78	74	32	25	20	26	29	66	84	37	37	18	14	16	22	67	645
3.1 - 10.0	3	3	3	0	0	1	1	0	2	1	1	1	1	1	3	3	24
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	81	77	35	25	20	27	30	66	86	38	38	19	15	18	25	72	672

Total Number of Valid Hours: 672

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)**

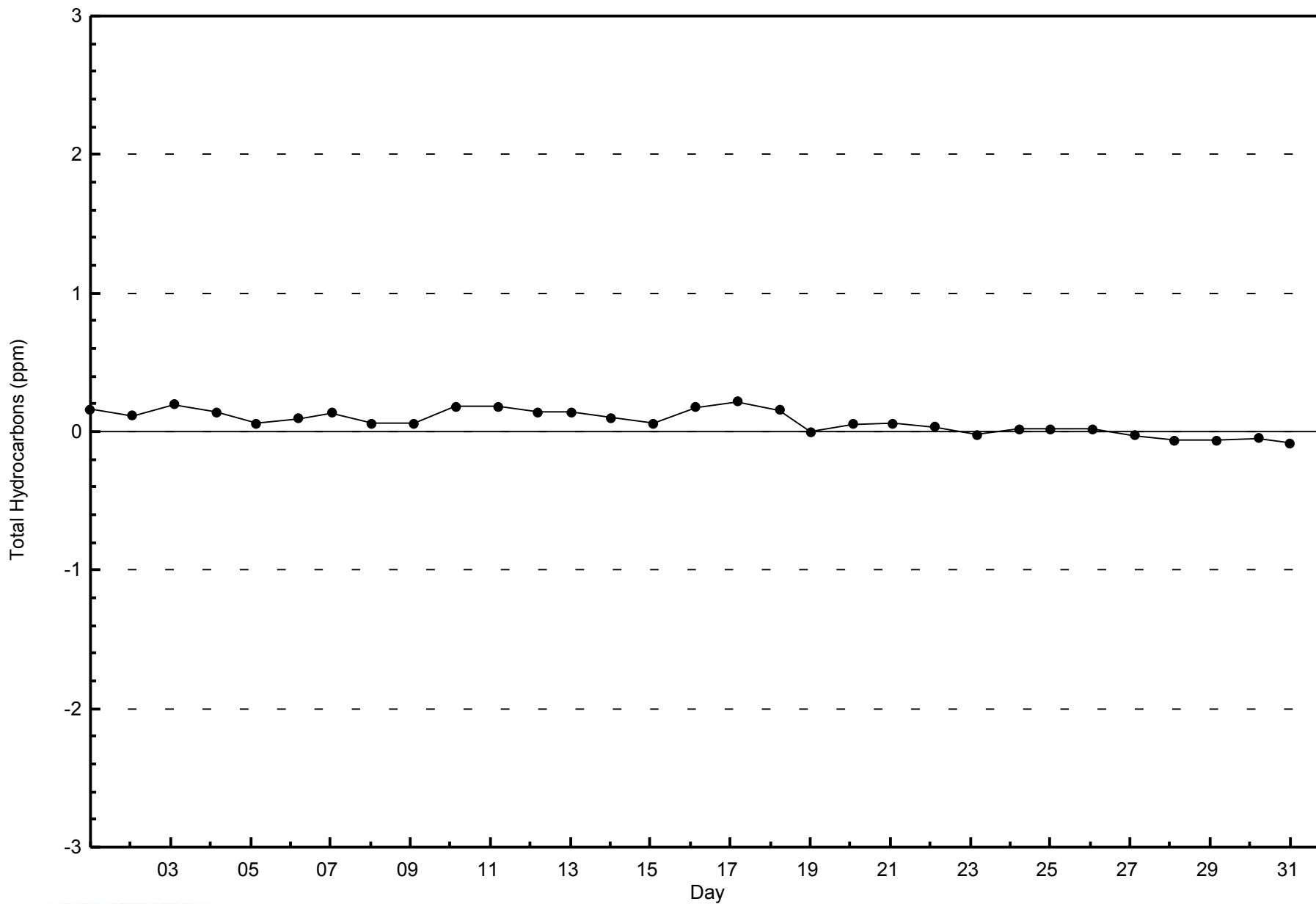


Total Number of Valid Hours: 672



WBEA
Zero Responses

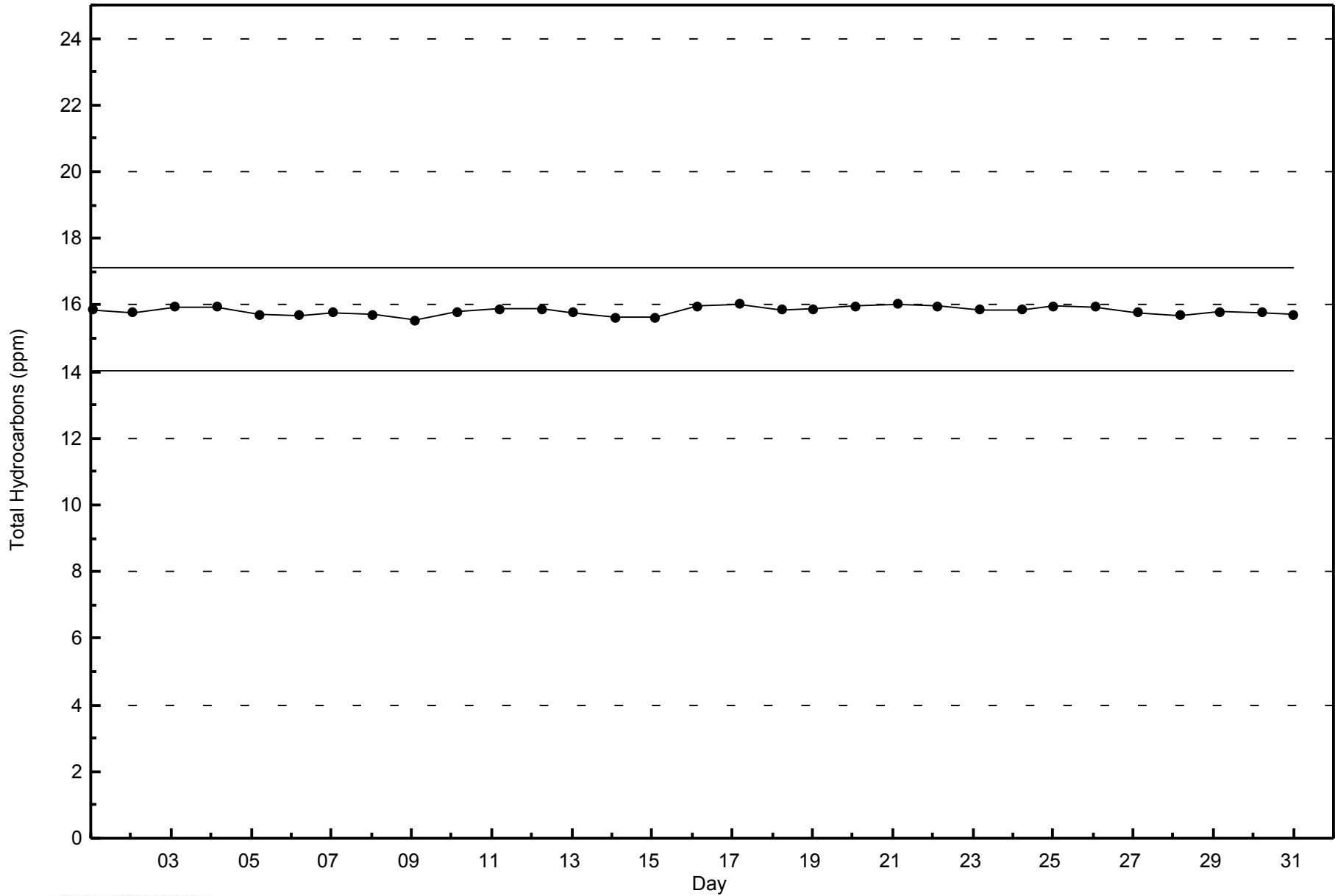
Total Hydrocarbons (THC) - ppm
Barge Landing - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Barge Landing - March 2015



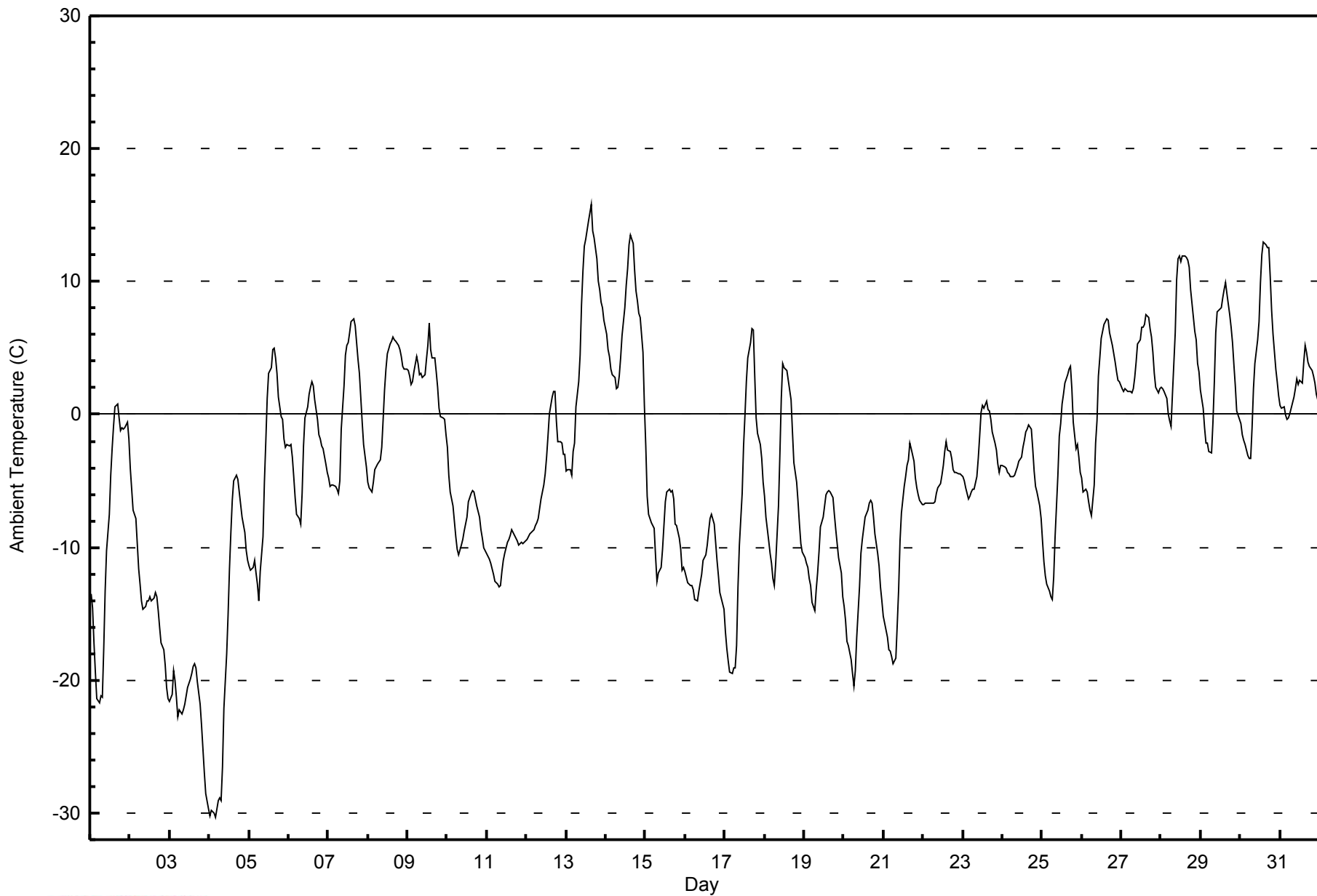


Maximum Value: 15.8 C on Mar 13 16:00		Maximum Daily Average: 6.6 C on Mar 14		Hours in Service: 744																						
Minimum Value: -30.3 C on Mar 4 05:00		Minimum Daily Average: -22.0 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.2 C at hour 16		Minimum Diurnal Average: -9.5 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -4.29 C		Percentiles: P ₁ = -29.0 P ₁₀ = -14.8 Q ₁ = -9.7 Median = -4.2 Q ₃ = 2.0 P ₉₀ = 6.1 P ₉₉ = 13.1		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-13.5	-14.5	-17.1	-19.4	-21.4	-21.7	-21.1	-21.3	-17.6	-13.3	-10.3	-7.5	-4.6	-2.6	-0.9	0.6	0.8	-0.2	-1.2	-1.0	-1.1	-1.0	-0.6	-1.9	-8.8	0.8
2-Mar	-4.1	-5.6	-7.2	-7.8	-9.8	-11.6	-12.8	-14.0	-14.7	-14.5	-14.0	-14.0	-13.7	-14.0	-13.8	-13.5	-13.8	-14.7	-16.0	-17.1	-17.7	-18.9	-20.5	-21.4	-13.5	-4.1
3-Mar	-21.6	-21.0	-19.3	-20.0	-21.2	-22.7	-22.2	-22.6	-22.2	-21.8	-21.2	-20.6	-20.0	-19.5	-19.0	-18.7	-19.1	-20.2	-21.8	-23.4	-25.1	-26.9	-28.5	-29.6	-22.0	-18.7
4-Mar	-30.2	-29.8	-29.9	-30.0	-30.3	-29.1	-28.8	-29.0	-26.5	-22.1	-18.0	-15.1	-11.6	-8.9	-6.5	-5.0	-4.5	-4.9	-5.8	-6.8	-7.7	-8.9	-10.3	-11.0	-17.1	-4.5
5-Mar	-11.5	-11.7	-11.5	-11.0	-12.0	-12.8	-14.0	-11.8	-9.2	-5.1	-2.0	1.2	3.1	3.5	4.8	5.0	4.3	3.1	1.3	-0.1	-0.4	-1.9	-2.5	-2.2	-3.9	5.0
6-Mar	-2.4	-2.3	-3.3	-4.7	-6.3	-7.5	-7.9	-8.2	-5.9	-2.3	-0.3	0.6	1.5	2.0	2.4	2.2	1.1	-0.4	-1.5	-1.9	-2.3	-2.6	-3.7	-4.3	-2.4	2.4
7-Mar	-4.7	-5.4	-5.3	-5.3	-5.4	-5.6	-5.9	-5.0	-1.1	2.2	4.5	5.2	5.4	6.1	7.0	7.2	6.7	5.4	4.1	3.1	-0.6	-2.2	-3.1	-4.0	0.1	7.2
8-Mar	-5.1	-5.5	-5.8	-5.1	-4.2	-4.0	-3.8	-3.4	-2.4	-0.4	1.8	3.4	4.5	5.3	5.6	5.8	5.7	5.5	5.2	4.9	4.3	3.6	3.4	3.5	1.0	5.8
9-Mar	3.3	2.8	2.3	2.4	3.2	4.4	3.8	3.0	3.1	2.8	3.0	4.1	5.2	6.9	4.9	4.2	4.2	3.3	2.1	0.5	-0.1	-0.2	-0.3	-1.5	2.8	6.9
10-Mar	-2.4	-4.6	-5.9	-6.9	-8.0	-9.2	-10.2	-10.5	-9.8	-9.4	-8.7	-8.3	-7.7	-6.6	-5.9	-5.7	-5.9	-6.3	-6.9	-7.7	-8.6	-9.3	-10.0	-10.2	-7.7	-2.4
11-Mar	-10.5	-10.9	-11.2	-11.6	-12.1	-12.6	-12.7	-13.0	-12.9	-11.9	-11.0	-10.5	-9.6	-9.4	-9.1	-8.6	-8.9	-9.3	-9.5	-9.8	-9.7	-9.7	-9.7	-9.6	-10.6	-8.6
12-Mar	-9.5	-9.2	-9.0	-8.9	-8.7	-8.3	-8.2	-7.9	-7.1	-6.3	-5.3	-4.4	-3.2	-1.7	0.1	1.3	1.7	1.7	-0.4	-2.1	-2.0	-2.2	-3.0	-3.0	-4.4	1.7
13-Mar	-4.2	-4.2	-4.2	-4.6	-2.7	-2.2	0.6	2.5	4.5	8.3	10.8	12.6	13.2	14.5	15.1	15.8	13.8	13.3	11.7	10.0	9.4	8.5	8.0	7.1	6.6	15.8
14-Mar	6.0	4.9	4.3	3.4	3.0	2.8	2.0	2.1	2.8	4.2	5.9	8.1	9.7	11.0	12.8	13.5	12.9	10.9	9.3	8.6	7.6	7.3	4.7	0.7	6.6	13.5
15-Mar	-2.3	-6.1	-7.5	-8.2	-8.4	-8.6	-10.7	-12.5	-12.0	-11.5	-10.1	-8.3	-6.6	-5.8	-5.7	-5.9	-5.7	-6.4	-8.2	-8.4	-9.3	-10.1	-11.7	-11.5	-8.4	-2.3
16-Mar	-11.8	-12.7	-12.8	-12.9	-12.9	-13.2	-13.9	-14.0	-13.3	-12.7	-12.0	-11.0	-10.5	-9.9	-8.8	-7.8	-7.5	-8.3	-9.6	-11.0	-12.1	-13.4	-13.8	-14.7	-11.7	-7.5
17-Mar	-16.4	-17.6	-18.5	-19.4	-19.5	-19.1	-19.1	-17.4	-12.9	-9.9	-5.9	-2.4	0.0	2.5	4.3	5.4	6.5	6.3	2.9	-0.2	-1.4	-2.3	-3.3	-5.1	-6.8	6.5
18-Mar	-6.1	-7.7	-9.6	-10.5	-11.2	-12.4	-12.9	-11.2	-6.9	-3.0	1.2	3.8	3.5	3.3	2.6	1.8	1.1	-1.3	-3.7	-5.1	-6.6	-8.3	-9.7	-10.4	-5.0	3.8
19-Mar	-10.8	-11.2	-11.5	-12.3	-12.8	-14.2	-14.8	-13.2	-11.9	-10.4	-8.4	-7.7	-6.9	-6.0	-5.8	-5.7	-5.8	-6.2	-7.5	-8.7	-9.8	-10.8	-12.0	-13.7	-9.9	-5.7
20-Mar	-14.4	-15.5	-17.0	-17.4	-18.5	-19.5	-20.4	-19.3	-16.7	-13.0	-10.4	-9.4	-8.6	-7.7	-7.2	-6.7	-6.5	-6.7	-7.7	-9.0	-10.5	-11.4	-13.0	-14.1	-12.5	-6.5
21-Mar	-15.2	-16.2	-16.7	-17.7	-17.8	-18.2	-18.8	-18.3	-15.8	-13.2	-9.5	-7.4	-5.4	-4.7	-3.8	-3.5	-2.2	-2.6	-3.6	-4.8	-5.5	-6.0	-6.5	-6.7	-10.0	-2.2
22-Mar	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7	-6.5	-6.0	-5.5	-5.2	-4.6	-3.8	-2.8	-2.0	-2.7	-2.8	-3.3	-4.2	-4.4	-4.4	-4.4	-4.5	-4.5	-4.9	-2.0
23-Mar	-4.7	-5.0	-5.5	-6.3	-6.2	-5.8	-5.6	-5.6	-4.6	-3.3	-1.6	0.1	0.6	0.5	1.0	0.4	0.2	-0.3	-1.3	-2.1	-2.7	-3.7	-4.3	-3.9	-2.9	1.0
24-Mar	-3.8	-3.9	-4.0	-4.3	-4.5	-4.6	-4.7	-4.6	-4.2	-3.9	-3.5	-3.2	-2.5	-1.9	-1.3	-1.1	-0.8	-1.1	-2.6	-4.2	-5.4	-5.9	-6.9	-7.8	-3.8	-0.8
25-Mar	-9.5	-11.1	-12.1	-12.8	-13.3	-13.7	-13.9	-12.2	-9.2	-4.6	-1.7	-0.7	0.8	1.6	2.4	3.0	3.5	3.6	2.0	-0.6	-2.6	-2.3	-3.2	-4.4	-4.6	3.6
26-Mar	-4.8	-5.8	-5.7	-5.9	-6.5	-7.2	-7.6	-5.3	-2.2	-0.5	2.9	4.2	5.7	6.8	7.0	7.2	7.1	6.1	5.2	4.6	3.9	3.2	2.6	2.4	0.7	7.2
27-Mar	1.9	1.8	1.9	1.8	1.7	1.7	1.6	1.9	2.7	3.9	5.3	5.6	6.5	6.6	6.7	7.6	7.3	6.5	5.8	4.7	3.1	2.1	1.6	1.9	3.8	7.6
28-Mar	2.0	1.9	1.7	1.2	0.1	-0.5	-0.9	1.5	6.1	10.1	11.7	12.0	11.5	11.9	11.9	11.9	11.6	11.1	9.4	7.4	6.2	5.6	3.8	3.2	6.4	12.0
29-Mar	1.9	0.5	-1.0	-2.2	-2.2	-2.8	-2.9	-0.6	2.5	6.2	7.8	7.8	8.0	8.8	9.4	9.9	9.1	7.5	6.6	5.4	3.8	2.1	0.3	-0.4	3.6	9.9
30-Mar	-0.7	-1.5	-2.0	-2.2	-3.1	-3.4	-3.3	-1.0	2.0	3.8	5.6	7.0	10.0	12.0	13.0	12.8	12.6	12.6	10.4	7.9	6.0	3.4	2.4	1.5	4.4	13.0
31-Mar	0.7	0.5	0.6	0.0	-0.4	-0.2	0.1	0.4	1.3	2.0	2.7	2.3	2.6	2.4	3.9	5.2	4.7	3.9	3.6	3.3	2.9	2.4	1.5	1.2	2.0	5.2
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Barge Landing - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	34	4.57	4.57
-20 - 0	463	62.23	66.80
0 - 10	218	29.30	96.10
10 - 20	29	3.90	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) - %

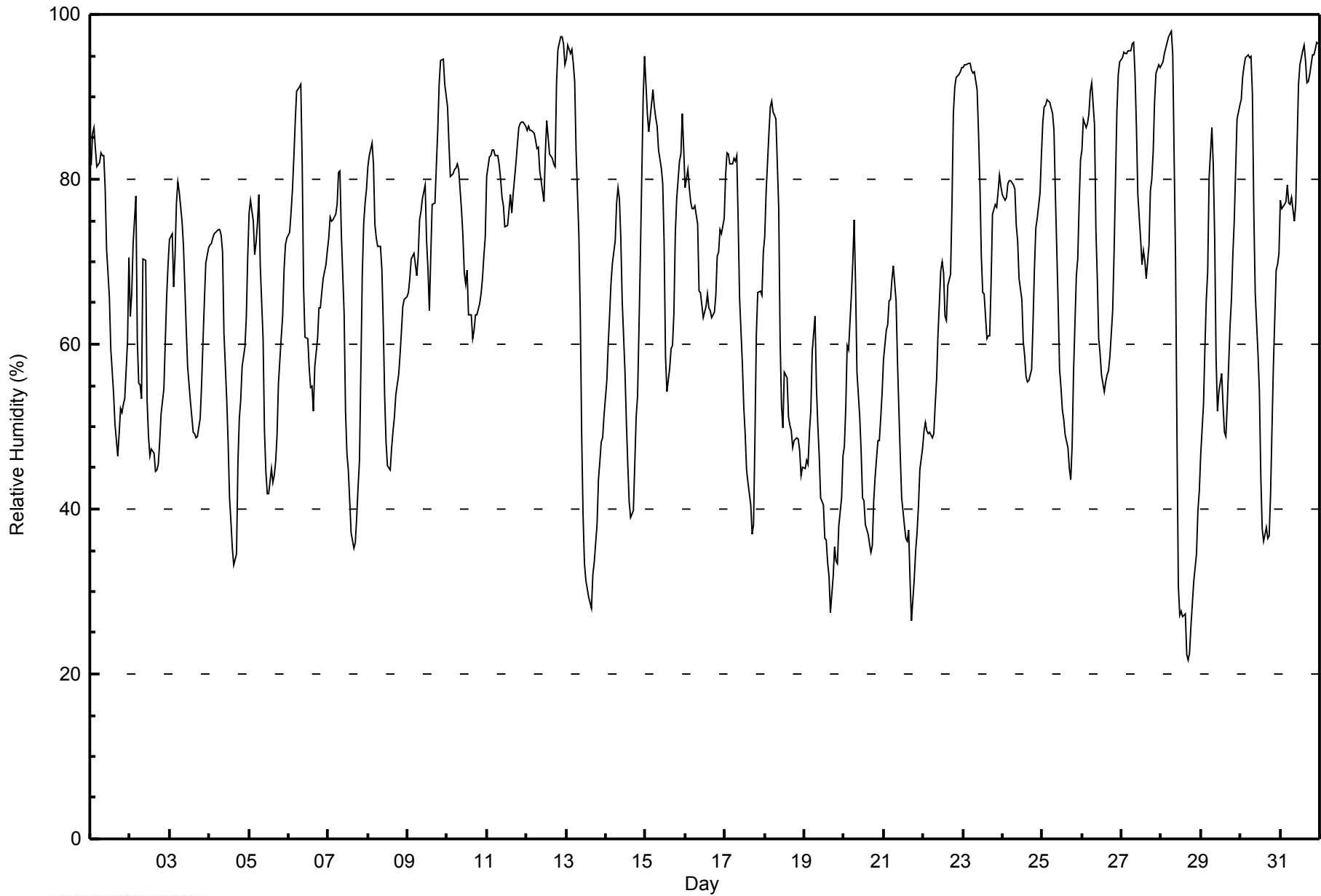
Barge Landing - March 2015

Maximum Value: 98 % on Mar 28 07:00																		Maximum Daily Average: 86.8 % on Mar 31																		Hours in Service: 744														
Minimum Value: 22 % on Mar 28 17:00																		Minimum Daily Average: 42.5 % on Mar 19																		Hours of Data: 744														
Maximum Diurnal Average: 80.3 % at hour 7																		Minimum Diurnal Average: 51.6 % at hour 16																		Hours of Missing Data: 0														
Monthly Average: 66.9 %																		Percentiles: P ₁ = 27 P ₁₀ = 41 Q ₁ = 52 Median = 69 Q ₃ = 81 P ₉₀ = 91 P ₉₉ = 97																		Hours of Calibration: 0														
																																				Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	82	86	86	84	82	82	83	83	83	79	71	66	59	57	54	50	46	49	52	52	53	53	60	71	67.6	86																								
2-Mar	63	66	72	78	61	55	55	53	70	70	53	49	46	47	47	45	45	45	48	52	55	60	66	70	57.2	78																								
3-Mar	73	73	67	71	77	80	78	75	72	67	62	57	53	51	49	49	49	49	51	55	60	65	70	72	63.6	80																								
4-Mar	72	72	73	73	74	74	74	73	71	61	53	48	41	39	35	33	35	46	51	53	57	60	63	70	58.4	74																								
5-Mar	76	78	75	71	72	75	78	70	61	49	45	42	42	45	43	44	46	49	55	61	63	69	72	73	60.5	78																								
6-Mar	74	76	79	82	87	91	91	91	82	67	61	61	57	55	55	52	57	61	64	64	66	68	70	71	70.1	91																								
7-Mar	73	75	75	75	76	77	81	81	73	64	52	47	45	41	37	35	36	39	43	46	69	75	77	79	61.2	81																								
8-Mar	82	83	84	82	75	73	72	72	69	63	54	48	45	45	47	50	51	54	56	59	61	65	65	66	63.3	84																								
9-Mar	66	68	70	71	71	68	71	75	76	78	79	73	69	64	71	77	77	82	86	92	94	95	91	90	77.2	95																								
10-Mar	89	84	80	81	81	81	82	81	76	73	69	67	69	63	64	61	62	64	64	65	66	68	71	73	72.2	89																								
11-Mar	80	83	83	83	84	83	83	82	80	78	77	74	74	76	78	76	78	82	84	86	87	87	87	86	81.3	87																								
12-Mar	86	86	86	86	86	85	84	84	81	80	77	83	87	85	83	83	82	81	92	96	97	97	96	94	86.5	97																								
13-Mar	95	96	95	96	94	92	83	73	64	49	39	33	31	29	28	32	34	38	44	46	48	49	51	57.0	96																									
14-Mar	56	60	64	67	70	73	77	79	78	73	65	57	51	45	41	39	40	45	51	54	62	71	90	95	62.5	95																								
15-Mar	92	88	86	89	91	89	87	86	84	81	79	72	58	54	57	59	60	64	73	78	82	83	88	84	77.7	92																								
16-Mar	79	81	79	77	76	76	77	75	66	66	65	63	65	66	64	64	63	64	66	71	71	74	73	75	70.7	81																								
17-Mar	81	83	83	82	82	83	82	83	75	66	58	52	49	45	43	41	37	38	49	61	66	66	66	71	64.2	83																								
18-Mar	73	78	86	89	90	88	88	87	77	61	52	50	57	56	51	50	50	47	48	49	48	47	44	45	63.0	90																								
19-Mar	45	46	45	49	52	59	63	55	50	46	41	41	36	36	34	32	27	32	35	34	33	38	41	46	42.5	63																								
20-Mar	48	52	60	59	66	70	75	67	57	51	47	41	41	38	37	36	35	36	41	44	48	48	51	54	50.1	75																								
21-Mar	58	62	62	65	65	68	70	65	58	52	46	41	38	36	36	37	31	27	31	35	37	40	45	47	48.1	70																								
22-Mar	49	50	50	49	49	49	49	53	56	61	69	70	69	63	63	67	69	77	88	91	92	93	93	93	67.2	93																								
23-Mar	94	94	94	94	94	93	93	93	91	86	79	71	66	66	61	61	61	68	76	77	77	78	81	79	80.2	94																								
24-Mar	78	78	78	79	80	80	79	79	74	73	68	65	60	59	56	55	56	57	63	69	74	75	78	83	70.7	83																								
25-Mar	87	89	89	90	89	89	88	86	78	65	57	55	52	51	49	47	45	44	48	57	68	70	77	82	68.8	90																								
26-Mar	83	87	86	87	88	91	92	87	74	68	61	59	56	54	55	56	57	58	64	71	80	88	93	94	74.6	94																								
27-Mar	95	95	95	95	96	96	97	97	93	86	78	73	70	71	70	68	72	79	80	83	90	93	94	94	85.8	97																								
28-Mar	94	94	95	97	97	98	98	95	70	49	31	27	28	27	27	22	22	23	26	31	33	34	40	42	54.2	98																								
29-Mar	47	53	59	66	69	80	86	82	73	58	52	54	56	53	49	49	53	62	65	71	75	81	87	89	65.4	89																								
30-Mar	90	92	94	95	95	95	95	90	76	66	59	54	44	38	36	38	37	37	42	50	57	69	70	71	66.2	95																								
31-Mar	77	77	77	77	79	77	77	78	75	77	84	92	94	96	96	94	92	92	93	95	95	96	97	97	86.8	97																								
																								75.3	77.0	77.7	78.7	78.9	79.6	80.3	78.4	73.0	66.5	60.8	57.6	55.2	53.3	52.2	51.6	51.6	54.3	58.8	62.7	66.6	69.5	72.4	74.5	Diurnal Average		
																								95	96	95	97	97	98	98	97	93	86	84	92	94	96	96	94	92	92	93	96	97	97	97	97	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - March 2015





Maximum Speed: 19 km/h on Mar 2 02:00	Maximum Daily Speed Average: 11.0 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 1 03:00	Minimum Daily Speed Average: 1.2 km/h on Mar 9	Hours of Data: 707
Maximum Diurnal Speed Average: 1.8 km/h at hour 23	Minimum Diurnal Speed Average: 0.2 km/h at hour 5	Hours of Missing Data: 37
Monthly Average Velocity: 0.5 km/h 14.3 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 7 P ₉₀ = 10 P ₉₉ = 16	Percent Operational Time: 95.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	ENE2	N1	W0	SSE2	SE3	SSE3	SSE4	SSE4	S5	S8	S10	S9	S8	S10	SSE10	S10	S11	S9	S9	S11	S8	SW6	NW9	NNW14	S4.9	NNW14	
2-Mar	NNW18	N19	N12	N12	NNW17	NNW17	NNW16	NNW13	N10	N8	NNW16	NNW15	NNW16	NNW13	NNW15	NNW14	NNW15	NW12	NNW7	NNW5	N2	ESE3	SSE1	WSW4	NNW11.0	N19	
3-Mar	WSW4	WNW4	NW6	N6	NNW3	N3	N6	N5	N8	NNE12	NNE11	NNE11	NNE10	NNE9	NE8	NE6	NE6	ENE5	E4	ESE4	SE1	SSW2	SSE3	SSE2	NNE4.1	NNE12	
4-Mar	S3	S5	SSW5	SSE5	SSE6	SSE7	S7	S6	S6	S7	S9	S9	S9	SSW9	S8	S8	SSW9	SSW8	SSW8	S7	S8	S6	S5	SSW6	S6.8	S9	
5-Mar	WSW7	WSW6	WSW3	NW2	SSW3	SSW4	SSW4	SW5	S5	SSE4	SSE4	SSE5	S5	SSE8	SSE9	S9	S6	SSE5	SE5	SSE4	SSW4	SE3	SSE4	SE3	S4.0	SSE9	
6-Mar	SW4	SSW4	SW5	SW1	ESE2	S2	SW2	SSE2	ESE4	E4	NE4	NE5	NE5	ENE6	ENE6	ENE9	ENE8	ENE8	NE5	NE6	NNE4	NNW2	NNW2	NNW3	ENE2.3	ENE9	
7-Mar	NW0	SE4	SSE4	SSE3	SE4	SE3	ESE4	ESE3	WSW2	W5	WNW9	NNW11	W9	WNW8	WNW10	W11	WNW10	WNW8	W6	NNW5	NE2	N2	NNW3	W2	W3.1	WNW11	
8-Mar	SSE3	SSE4	S4	SSE5	S5	S5	SSE5	SSE6	SSE6	S5	SSW6	SW8	SW8	SSW7	S7	S6	S6	S6	S5	S5	S3	SSE5	SSE4	SSE3	S4.8	SW8	
9-Mar	SW1	SE1	SSE4	SSE4	SE5	W3	NNW1	WSW3	ENE3	ENE5	NE4	NE2	SSE1	WSW2	NNW5	N3	ENE4	NNE4	N4	NNW3	NNW3	NW3	N5	NNE7	NNE1.2	NNE7	
10-Mar	NNE9	NNE11	N8	N7	NNE8	NNE6	N4	NNE4	NE6	NE6	NE6	NE6	NNE6	NE6	NNE7	NNE8	NNE7	NNE8	NNE8	NNE9	NNE10	NNE10	NNE10	NNE8	NNE7.2	NNE11	
11-Mar	NNE8	NNE8	NNE9	N7	N6	N6	N6	N7	N7	N6	N7	N8	N8	N9	N8	N7	N8	N7	N7	N7	N6	N6	N6	N5	N7.0	N9	
12-Mar	NNW5	N4	NNW4	NNW4	NNW4	NW2	NNW2	W2	SW2	SW1	WSW3	SSE4	SW4	SW3	WSW4	SSW6	WSW5	SSW2	SE4	E3	NNW2	N2	NNW5	NW5	WNW1.3	SSW6	
13-Mar	W2	SW3	SE4	SSE5	SW6	SE5	SW6	SW6	SW7	SW9	SW10	SW11	SSW13	SW13	S12	S13	SSE11	SSE12	S12	S13	SSE12	S12	SSE9	S9	S8.0	SSW13	
14-Mar	SSE7	S5	S7	SSW5	S7	S6	S5	SSW7	S7	S8	S10	S9	S11	S9	SSE8	S8	SSE6	SE3	SSW3	SSE1	SSW4	SSW4	N4	AF	S5.7	S11	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE7	NNE7	NE7	ENE6	NNE7	NNE7	N5	NNW5	NNW4	NNW4	NNW4	N3	---	NNE7	
17-Mar	W2	W1	E0	S3	S4	SSE4	S3	SSW4	SSW4	SW6	SW6	SSW6	S6	SSW6	WSW6	SW6	S5	SSW3	S3	N3	NNW4	NNW5	NNW7	NNW3	SW2.2	NNW7	
18-Mar	NNW3	NNW1	ESE1	WSW0	W1	SSE2	S2	SE1	SE1	SW3	SW4	NNW2	N5	NNW8	N8	N9	N10	N11	NNE13	N13	N12	N11	N12	NNE8	N4.8	N13	
19-Mar	N6	NNE8	N8	N3	N5	ESE1	E2	E4	NNE4	N5	NNE5	NNE7	NNE7	NNE8	NNE8	NNE9	NNE9	NNE7	NNE7	NE8	NE9	NE7	NE4	NNW3	NNE5.5	NE9	
20-Mar	NNW4	NNW4	NNW2	NNW4	NNW3	NNE1	NNW2	NNW4	NW4	N3	NNE4	NE5	NNE6	NNE7	NNE7	NNE7	NNE7	NNE7	NNE7	NNE6	NNE6	N4	N5	NNW4	NNW5	N4.4	NNE7
21-Mar	N3	N3	N2	NNE2	NE2	N2	NNW2	NNW4	NW3	NNW5	NW6	NNW8	NW6	NNE7	NNE8	NNE7	ESE5	ESE9	ESE6	ESE7	ESE10	E7	E6	E4	NE2.6	ESE10	
22-Mar	ENE3	ENE2	E4	E5	ESE5	ESE5	ESE5	E1	SE5	SSE5	SE1	N4	N4	N3	NW5	NNW6	NNW5	NW5	NW3	E3	E3	E3	NE1	NNW0	ENE1.6	NNW6	
23-Mar	NW1	NW1	ESE2	E1	E1	SSE1	SSE0	NW1	WSW2	SW3	SW4	SW5	SW5	NW4	WNW3	N4	N3	NNE5	NNE5	N6	N6	NNW4	N4	N5	NNW1.5	N6	
24-Mar	NNE6	NNE6	N4	NNW5	N5	NNW4	NNW4	N4	NNE5	NNE5	N6	NNE6	ENE5	ENE6	ENE6	E5	ENE5	ENE5	ENE5	ENE5	ENE4	NE4	NNE2	NNW2	NNE3.9	NNE6	
25-Mar	N2	ENE1	ENE2	N2	NNW2	NNW3	NNW3	NNW4	NNW4	NW4	NNE5	NNE5	NNE5	NNE6	NNE6	NNE7	NNW6	NNW5	N4	N3	SSE3	SSE6	ESE3	ESE5	N2.4	NNE7	
26-Mar	ESE4	SE3	ESE3	E3	N1	ESE3	ENE1	SE3	WSW3	SW5	SSW7	S7	S8	S7	SSE8	SSE8	SE7	SE7	ESE5	S5	SSW5	SSW4	SSE3	S4	SSE3.6	SSE8	
27-Mar	SE3	SSE3	S4	SSE4	SSE5	SSE6	S6	S6	S7	S6	SSW7	SW11	S8	S9	S8	S7	S6	SSE6	SSE5	SE1	SSE1	ESE3	SE2	SSW3	S4.9	SW11	
28-Mar	S2	S3	ESE4	SE1	SW2	S2	S3	SSE2	SW3	WSW4	NW9	NNW13	NW12	NW13	NNW14	NNW18	NNW14	NNW13	NW12	NW7	W5	W6	WNW3	WNW4	WNW5.7	WNW18	
29-Mar	WSW4	WSW4	SW5	SSW3	S5	SE5	SE5	SSE6	SSE6	SSW6	SSW5	S7	S7	SSE7	S6	SW3	NE3	NE3	N3	N3	NNW3	NW3	W3	W3	S2.4	SSE7	
30-Mar	WNW2	NW1	W0	NE1	SW3	SSE2	SE2	ESE3	E4	ENE4	NNE4	ENE5	SE7	SSE9	SSW11	SW11	SSW8	SSW9	S3	E2	NE3	E4	SE2	NE1	SSE2.0	SSW11	
31-Mar	ESE4	S3	SSE3	SSE2	SE4	SE3	ESE2	NW2	WNW2	SW1	SW0	NNW6	N4	N4	NNE7	NE8	NE10	NE10	NE10	NE10	NE11	NNE11	N10	N11	N12	NNE4.0	N12

NNW1.2	N0.9	ENE0.6	NE0.5	ESE0.2	SE0.7	SSE0.4	S0.3	SSE0.5	SW0.6	W1.2	NNW1.0	W0.5	NW0.3	NNE0.5	NNE0.4	NNE1.1	NNE1.1	NE1.4	NE1.6	NE1.3	NE1.0	N1.8	NNW1.8	Diurnal Average	
NNW18	N19	NNE12	N12	NNW17	NNW17	NNW16	NNW13	N10	NNE12	NNW16	NNW15	NNW16	NNW13	NNW15	WNW18	NNW15	NNW13	NNE13	N13	N12	SSE12	N12	NNW14	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 - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 7 km/h on Mar 2 00:00	Hours of Data: 707
Minimum Value: 0 km/h on Mar 25 04:00	Hours of Missing Data: 37
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 95.0

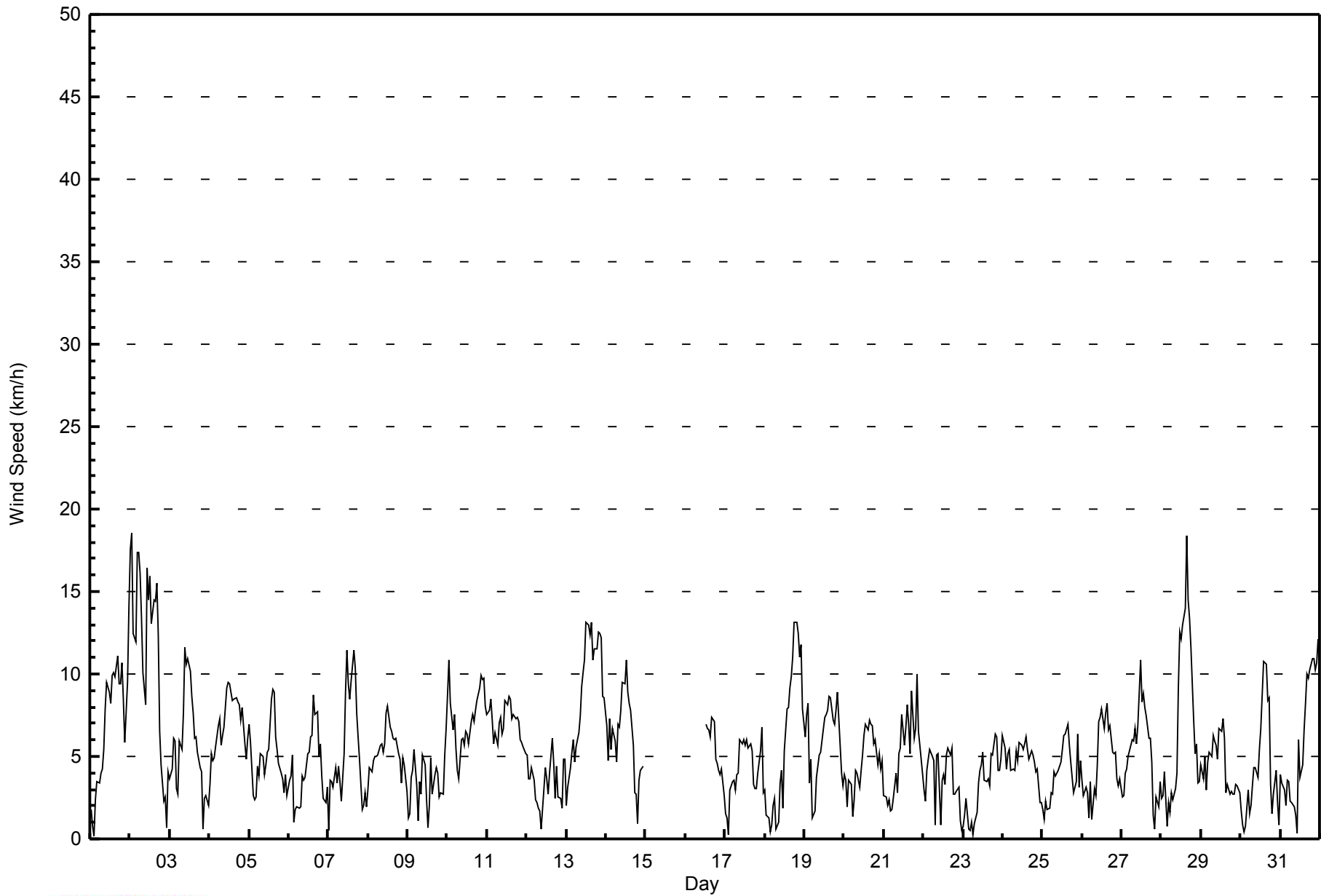
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	4	3	3	3	3	2	4	7	
2-Mar	6	7	4	4	6	6	6	4	4	3	6	4	5	4	5	5	5	4	3	1	1	1	1	2	
3-Mar	1	2	2	2	1	1	3	2	4	3	3	3	3	2	2	2	2	2	1	1	1	1	1	4	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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	402	56.86	56.86
6 - 11	265	37.48	94.34
12 - 19	40	5.66	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: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - March 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	45	16	17	18	20	24	30	46	32	20	25	16	12	7	18	56	402
6 - 11	37	58	18	8	2	4	3	22	55	18	14	3	4	6	6	7	265
12 - 19	6	3	0	0	0	0	0	3	4	1	1	0	0	5	4	13	40
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	77	35	26	22	28	33	71	91	39	40	19	16	18	28	76	707

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - March 2015

Direction of Maximum Speed: 4 deg on Mar 2 02:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 342.0 deg on Mar 2	Hours of Data: 707
Direction of Minimum Speed: 265 deg on Mar 1 03:00	Direction of Minimum Daily Speed Average: 1.2 deg on Mar 9
Direction of Minimum Speed: 265 deg on Mar 1 03:00	Hours of Missing Data: 37
Monthly Average Direction: 278.1 deg	Percent Operational Time: 95.0

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	60	356	265	148	135	158	153	158	180	175	183	178	188	178	167	170	177	185	171	173	177	219	307	332	180.6	
2-Mar	348	4	11	359	336	335	336	338	4	350	344	341	336	339	337	329	331	323	333	330	352	113	168	252	342.0	
3-Mar	250	282	315	360	348	1	357	356	3	17	20	26	25	31	35	47	49	61	86	115	140	193	156	158	21.4	
4-Mar	182	171	199	156	160	156	172	170	187	187	186	180	188	198	177	177	198	211	195	186	183	169	185	213	183.7	
5-Mar	246	253	255	308	197	197	199	217	177	162	160	167	178	165	165	173	174	165	142	153	196	136	149	132	180.7	
6-Mar	224	200	220	228	113	186	225	154	112	98	56	35	51	62	59	71	72	57	46	55	20	335	344	333	64.2	
7-Mar	317	137	158	160	125	132	106	107	245	275	292	284	279	294	282	271	292	300	277	308	56	6	335	266	280.8	
8-Mar	166	165	171	158	183	172	154	150	159	187	210	234	232	208	169	173	171	174	177	170	172	155	151	147	178.2	
9-Mar	225	128	151	158	140	275	341	240	75	65	48	41	168	243	332	10	66	20	356	337	332	309	2	29	25.8	
10-Mar	23	23	6	6	16	18	6	30	44	37	39	39	28	41	31	27	20	20	21	18	28	24	21	16	23.8	
11-Mar	14	17	19	4	352	352	354	355	2	11	359	359	355	358	6	360	358	352	349	353	10	1	1	349	0.7	
12-Mar	344	349	337	330	347	324	339	267	221	225	238	152	233	234	240	207	251	211	126	86	331	2	329	321	289.0	
13-Mar	277	227	129	155	220	142	217	220	223	226	231	216	202	214	181	179	168	168	169	172	168	169	158	185	188.8	
14-Mar	165	179	178	194	186	183	188	193	178	180	175	178	173	170	156	174	166	133	199	162	192	196	4	AF	176.7	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	25	27	46	61	22	15	356	347	348	343	335	6	--	
17-Mar	269	276	80	173	176	148	169	197	208	225	215	207	172	193	247	231	173	201	171	349	337	331	331	342	216.7	
18-Mar	344	343	116	249	262	165	173	139	144	236	230	327	8	347	6	10	11	1	12	6	359	5	10	16	2.9	
19-Mar	11	13	1	354	358	106	93	91	28	8	17	20	22	25	29	25	16	22	26	53	56	56	46	341	26.4	
20-Mar	340	334	332	337	336	25	329	338	325	352	20	34	20	21	18	26	20	14	20	16	5	359	339	348	4.3	
21-Mar	2	4	10	17	38	356	344	337	316	329	323	328	324	13	14	26	110	118	104	114	117	95	92	81	41.6	
22-Mar	72	70	89	94	111	117	115	81	136	148	136	0	8	358	326	344	333	309	322	95	90	81	45	332	60.3	
23-Mar	310	325	109	101	80	156	162	307	246	226	223	217	226	304	302	2	9	29	20	352	360	341	350	6	335.4	
24-Mar	12	12	2	334	350	333	334	350	25	13	10	32	65	65	77	84	61	71	69	70	74	52	20	339	31.9	
25-Mar	6	64	74	358	347	341	342	334	331	327	317	16	22	22	16	14	12	338	355	358	163	168	122	116	9.5	
26-Mar	108	125	112	93	10	109	76	125	242	230	207	185	189	191	152	148	135	130	120	190	208	198	164	181	163.2	
27-Mar	131	150	171	166	168	168	171	171	175	172	196	217	183	172	171	181	173	167	163	146	155	122	126	206	174.8	
28-Mar	178	177	122	143	230	180	178	157	229	251	310	293	306	307	296	299	300	298	307	304	281	267	288	285	290.9	
29-Mar	244	238	234	196	172	141	143	151	166	207	205	188	172	153	174	217	52	55	9	0	340	308	259	264	187.1	
30-Mar	298	312	273	38	217	161	142	109	90	62	27	72	143	165	208	214	207	212	178	81	49	94	144	38	164.8	
31-Mar	122	172	152	166	130	138	111	320	285	218	226	336	7	350	33	55	46	34	41	41	23	1	354	360	28.8	

348.6 3.8 56.3 45.2 110.9 138.0 147.6 190.6 164.4 227.2 274.9 284.5 276.6 320.6 18.1 27.6 30.4 21.6 43.3 44.0 46.4 40.3 4.5 346.5
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Barge Landing - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 102 deg on Mar 27 21:00	Hours of Data: 707
Minimum Value: 8 deg on Mar 30 22:00	Hours of Missing Data: 37
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 20 Median = 24 Q ₃ = 34 P ₉₀ = 52 P ₉₉ = 94	Hours of Calibration: 0
	Percent Operational Time: 95.0

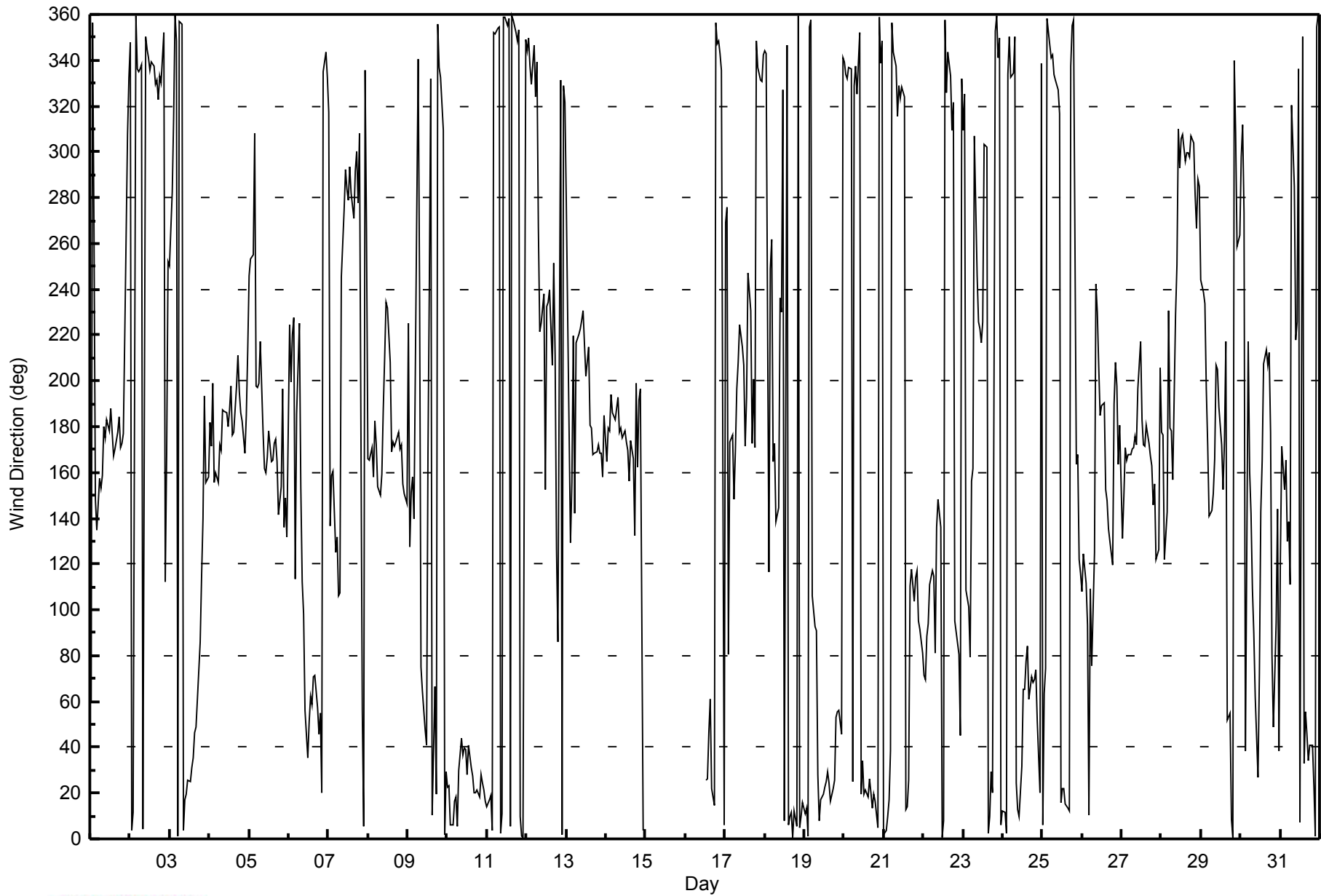
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	65	53	72	24	26	26	12	33	22	24	25	24	27	26	26	27	25	20	20	22	21	30	32	23	72
2-Mar	25	23	21	24	22	23	24	22	24	26	24	23	22	23	23	21	22	21	16	14	53	21	88	19	88
3-Mar	18	30	29	21	28	19	19	19	25	17	20	19	19	18	21	24	18	22	22	12	62	20	15	38	62
4-Mar	30	12	19	22	23	18	24	27	32	29	27	27	27	33	34	29	28	22	22	18	19	17	20	20	34
5-Mar	18	16	49	48	44	38	50	26	38	37	41	34	44	29	32	27	24	19	21	16	22	39	14	57	57
6-Mar	38	37	20	102	70	44	52	45	13	33	44	23	30	23	18	20	24	32	28	24	40	26	26	102	
7-Mar	72	13	21	28	23	35	18	23	74	28	31	31	30	32	34	27	28	23	27	43	66	35	20	46	74
8-Mar	31	21	23	22	21	15	12	14	17	31	32	18	20	35	23	18	18	18	17	13	29	10	17	50	50
9-Mar	60	83	50	20	15	48	79	36	73	24	26	51	87	85	48	72	21	25	34	52	24	25	29	17	87
10-Mar	19	19	23	20	18	21	28	33	21	25	32	24	23	34	23	18	18	17	17	21	16	15	16	18	34
11-Mar	19	20	18	23	23	20	20	21	20	22	25	21	24	23	22	23	23	22	20	20	19	22	22	19	25
12-Mar	25	25	25	26	26	35	37	81	75	87	47	28	45	28	37	35	24	46	17	28	17	34	26	20	87
13-Mar	39	37	25	25	33	42	41	20	20	21	17	23	26	22	26	25	23	22	20	21	22	21	20	20	42
14-Mar	19	22	16	19	21	22	28	18	29	26	23	26	22	24	25	25	20	45	73	96	48	33	83	96	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	20	26	24	22	18	22	18	19	16	12	27	27
17-Mar	46	77	86	31	21	20	18	21	28	34	37	33	45	43	37	37	26	27	30	79	16	11	14	18	86
18-Mar	24	22	78	73	62	61	59	95	92	49	34	69	29	24	24	22	21	22	20	23	23	22	20	18	95
19-Mar	21	19	20	55	17	61	86	23	34	32	38	25	19	23	18	18	18	17	17	19	18	19	38	19	86
20-Mar	9	8	15	13	10	55	32	19	24	45	45	38	29	24	23	19	21	17	14	15	16	18	15	32	55
21-Mar	25	24	33	24	23	20	19	19	20	19	21	21	36	22	20	18	56	19	18	12	12	19	18	18	56
22-Mar	21	30	16	15	16	14	12	83	49	36	100	41	44	58	30	26	21	25	39	16	14	15	45	12	100
23-Mar	34	29	15	66	65	40	93	91	51	20	24	22	29	53	41	34	40	23	31	22	21	21	16	17	93
24-Mar	15	16	20	19	21	20	18	25	19	29	26	24	28	29	22	23	25	19	16	17	25	21	35	18	35
25-Mar	18	53	18	31	25	21	20	18	22	26	38	33	20	21	20	19	22	25	14	33	40	16	23	9	53
26-Mar	24	26	20	18	66	15	85	29	52	37	40	33	35	37	29	25	19	16	22	24	22	23	17	27	85
27-Mar	42	22	24	20	21	21	22	22	25	30	36	22	34	27	27	26	26	26	32	94	102	44	58	20	102
28-Mar	55	44	12	94	28	57	14	35	29	40	27	26	24	24	29	26	24	26	21	21	31	29	57	44	94
29-Mar	24	32	13	46	29	23	14	23	30	39	47	36	31	28	33	43	38	40	30	49	49	31	36	42	49
30-Mar	46	54	79	79	51	56	38	18	23	28	51	30	40	33	30	25	30	27	41	44	37	8	48	63	79
31-Mar	24	23	37	56	37	27	50	31	54	79	95	24	39	36	22	21	20	20	19	21	18	20	22	22	95
Diurnal Maximum																									
72 83 86 102 70 61 93 95 92 87 100 69 87 85 48 72 56 46 73 96 102 44 88 63																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - March 2015



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Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 19, 2015	Previous Calibration	February 6, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	12:30
Barometric Pressure	NA mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11071107
Cal Gas Concentration	4.77 ppm H2S	Cal Gas Expiry Date	6/10/2014
Gas Cert Reference	CC62993	SO2 gas conc.	59.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
DACS voltage range		DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-690	-690
Analyzer Range (input)	100	100	Lamp voltage	1020	1025
Calculated slope	0.995202	0.997283	Chamber temp.	45	45
Calculated intercept	0.099270	0.103730	Pressure	690.3	692.1
Analyzer Background	2.08	2.44	Flow	0.436	0.437
Analyzer Coefficient	0.984	0.999	Intensity	91	90
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1331259320
Converter make/model	CDN-101	Converter serial #	519

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.2	NA
as found span	5000	83.7	79.8	79.6	1.003
SO2 scrubber check	6000	12.2	120.0	0.7	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	83.7	79.8	79.9	0.999
second point	5000	41.9	40.0	40.0	0.998
third point	5000	20.8	19.8	19.9	0.996
calibrator zero	6000	0.0	0.0		NA
as left zero	6000	0.0	0.0	-0.3	NA
as left span	5000	83.7	79.8	80.1	0.997
Average Correction Factor					0.998

Corrected As found	79.9	Previous response	80.1	% change	0.3%
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Notes:

Scrubber check done after as found zero. Adjusted span and zero. Changed inlet filter after 3rd point.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

TRS Calibration Summary

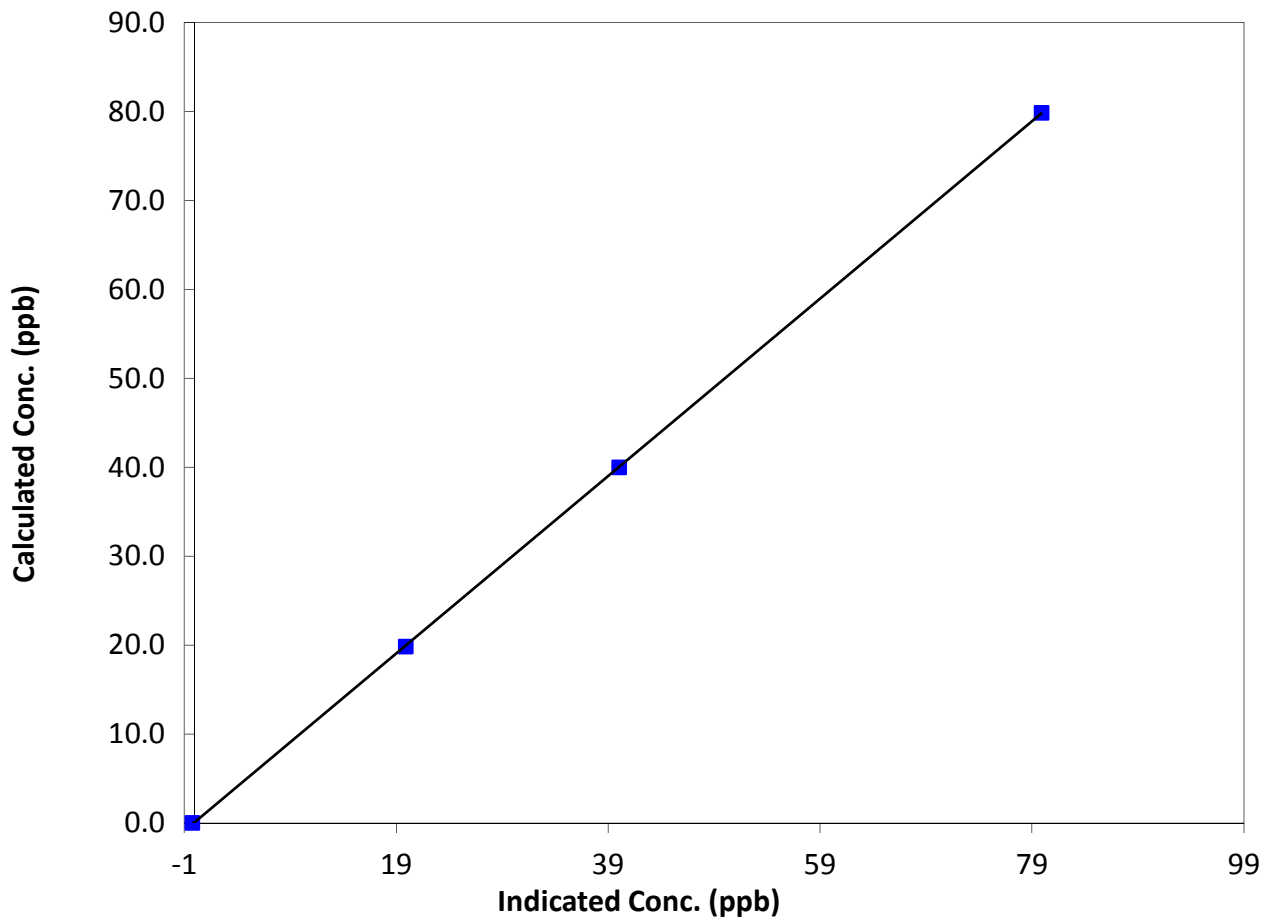
Station Information

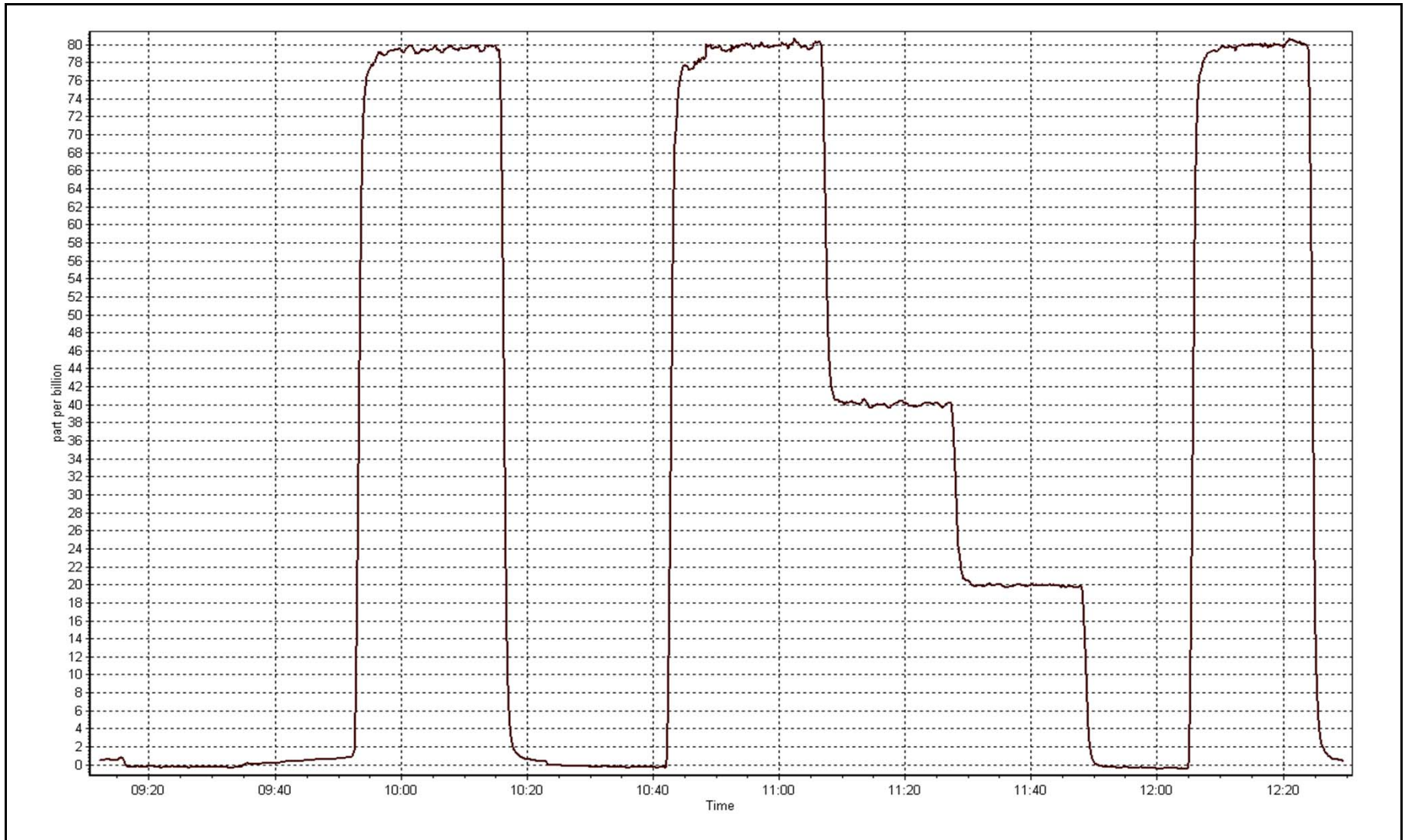
Calibration Date	March 19, 2015	Previous Calibration	February 6, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:10	End Time (MST)	12:30
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999989
79.8	79.9	0.9994		
40.0	40.0	0.9983	Slope	0.997283
19.8	19.9	0.9961		
			Intercept	0.103730

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Wednesday, March 18, 2015	Previous Calibration	Friday, February 06, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	13:20
Barometric Pressure	730 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Gas Cert Reference	LL104180	Cal Gas Expiry Date	11/24/2012
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
DACS voltage range		DACS channel #	5

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	9.1	9.1
Analyzer Range (mv)	25	25	Air or Bypass press	34.7	34.7
Calculated slope	1.005082	0.996014	Fuel Pressure	24.1	24.1
Calculated intercept	0.006739	0.037647	BKG	5.75	6.00
			COEF	4.334	4.412

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	0.16	N/A
as found span	6000	89.7	15.69	15.70	0.999
calibrator zero	6000	0.0	0.00	-0.03	N/A
high point	6000	92.0	15.69	15.72	0.998
second point	6000	49.2	8.39	8.39	1.000
third point	6000	18.5	3.16	3.12	1.011
calibrator zero					
as left zero	6000	0.0	0.00	-0.04	N/A
as left span	6000	92.0	15.69	15.73	0.998
Average Correction Factor					1.003

Corrected As found	15.54	Previous response	15.60	% change	0.4%
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Notes:

Cal gas cylinder was changed out after as founds. Slightly adjusted the span. Inlet filter changed after as founds.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

THC Calibration Summary

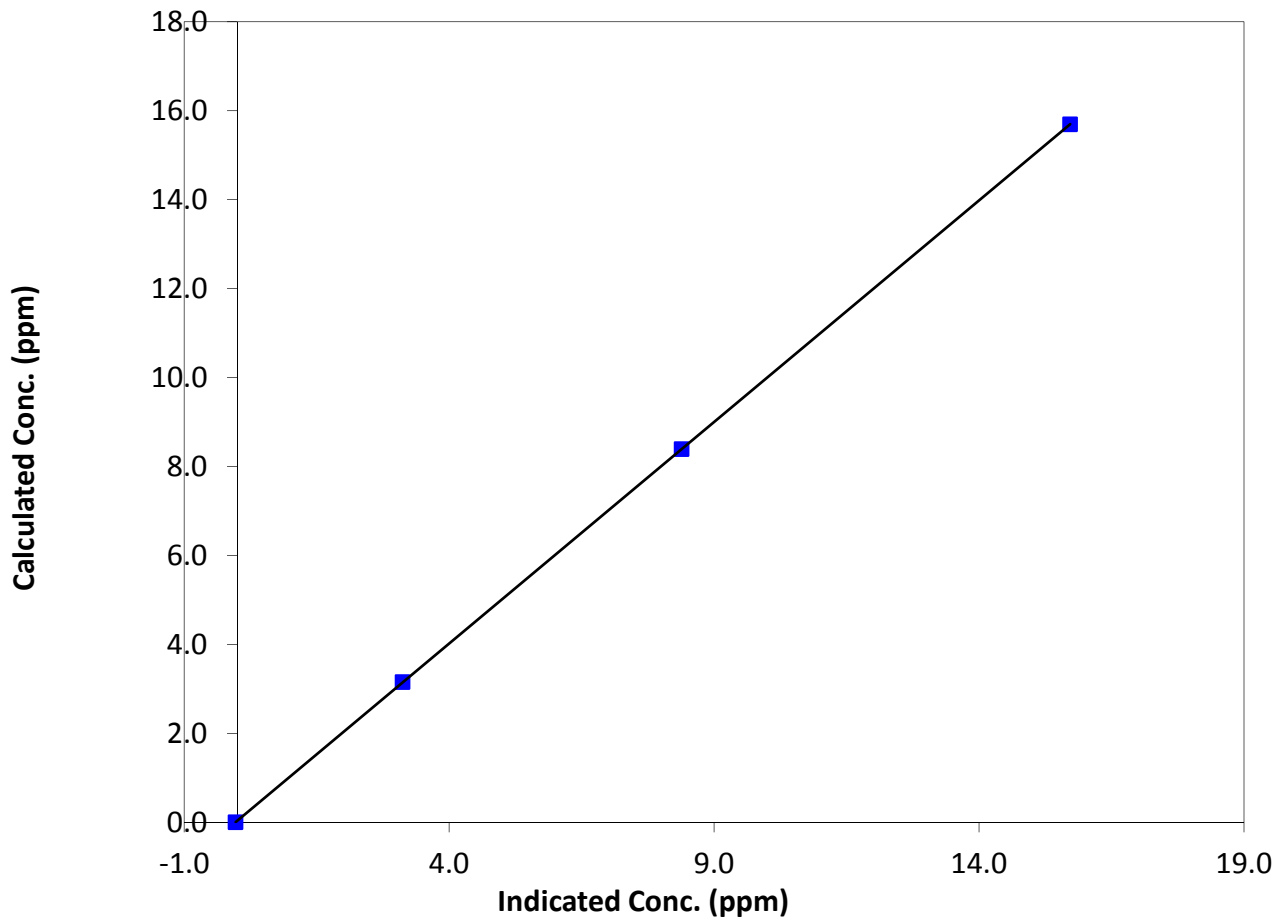
Station Information

Calibration Date	March 18, 2015	Previous Calibration	February 6, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	8:40	End Time (MST)	13:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

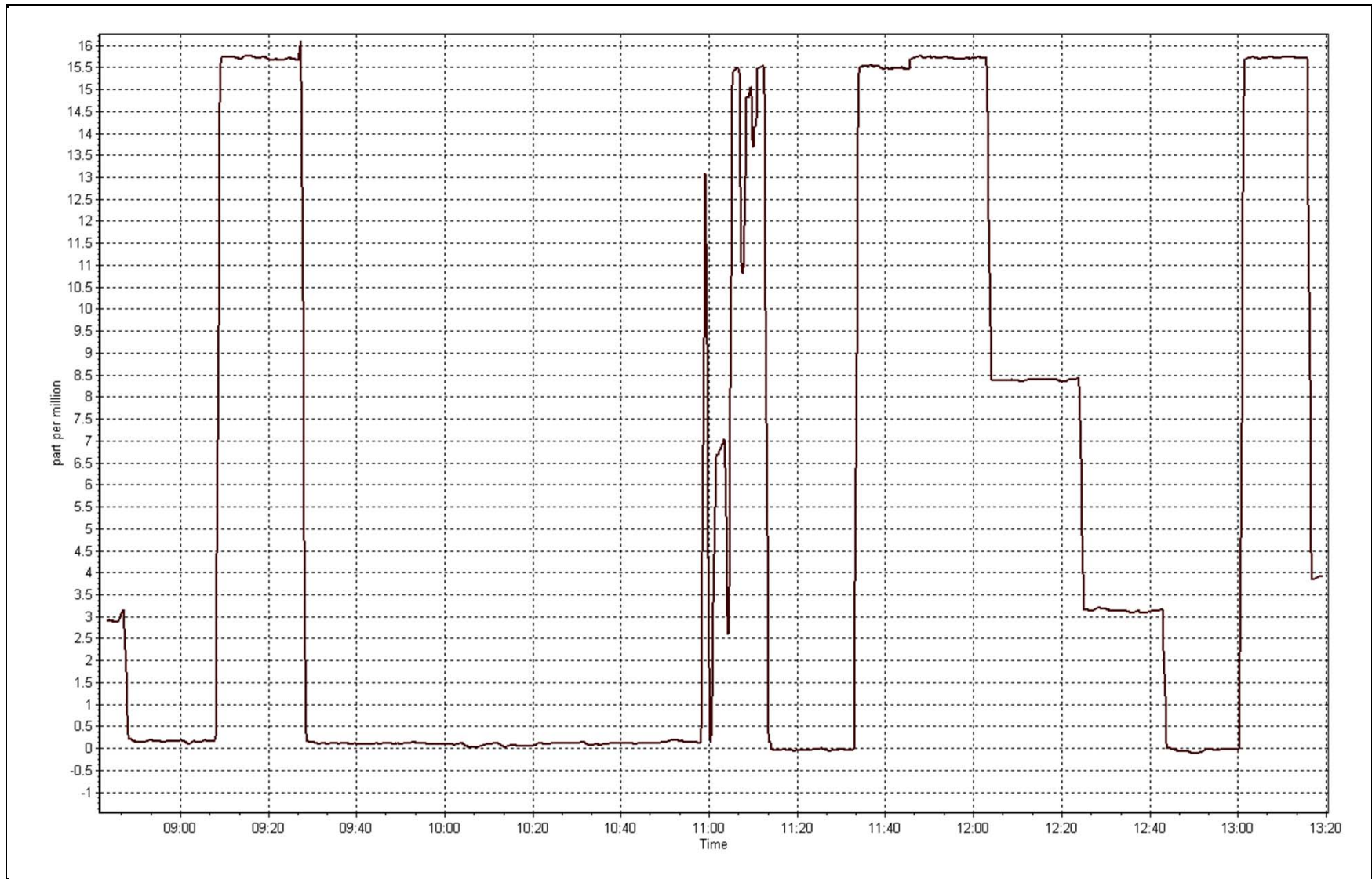
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999999
15.69	15.72	0.9983		
8.39	8.39	1.0003	Slope	0.996014
3.16	3.12	1.0115		
			Intercept	0.037647

THC Calibration Curve



THC Calibration Plot

Date: March 18, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 11 LOWER CAMP MARCH 2015

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospherics Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	709	35	35	100.00	45	0	5	0
H2S (ppb) Average	696	35	48	98.25	7	0	2	0
THC (ppm) Average	709	35	35	100.00	6.1	-	3.3	-
Temperature (C) Average	744	0	0	100.00	16.2	-	5.8	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	88	-
Wind Speed 10 m (km/h) Average	703	0	41	94.49	29	-	19	-
Wind Direction 10 m (deg) Average	703	0	41	94.49	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	1.9	4	-	0	0	0	0	1	5	45
H2S (ppb) Average	696	0.8	1	-	0	0	0	1	1	2	7
THC (ppm) Average	709	2.46	0.4	-	2	2.1	2.2	2.3	2.6	3	6.1
Temperature 2 m (C) Average	744	-4.24	8.6	-	-31.6	-15.8	-9.5	-3.8	1.9	5.5	16.2
Relative Humidity (%) Average	744	69.4	18	-	25	45	56	73	83	91	99
Wind Speed 10 m (km/h) Average	703	7.8	5	-	0	2	4	7	11	14	29
Wind Direction 10 m (deg) Average	703	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	31 Mar 2015 05:00	31 Mar 2015 05:00	1	Intermittent unstable operation - excessive baseline drift
H2S	31 Mar 2015 09:00	31 Mar 2015 11:00	3	Intermittent unstable operation - excessive baseline drift
H2S	31 Mar 2015 16:00	01 Apr 2015 00:00	9	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	08 Mar 2015 01:00	08 Mar 2015 01:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	15 Mar 2015 01:00	16 Mar 2015 15:00	39	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	28 Mar 2015 06:00	28 Mar 2015 06:00	1	Flat line in sensor output signal -sensor frozen

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 45 ppb on Mar 7 13:00	Maximum Daily Average: 5.4 ppb on Mar 7		Hours of Data:	709
Minimum Value: 0 ppb on Mar 25 06:00	Minimum Daily Average: 0.1 ppb on Mar 19		Hours of Missing Data:	35
Maximum Diurnal Average: 5.6 ppb at hour 13	Minimum Diurnal Average: 0.5 ppb at hour 6		Hours of Calibration:	35
Monthly Average: 1.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 21		Percent Operational Time:	100.0

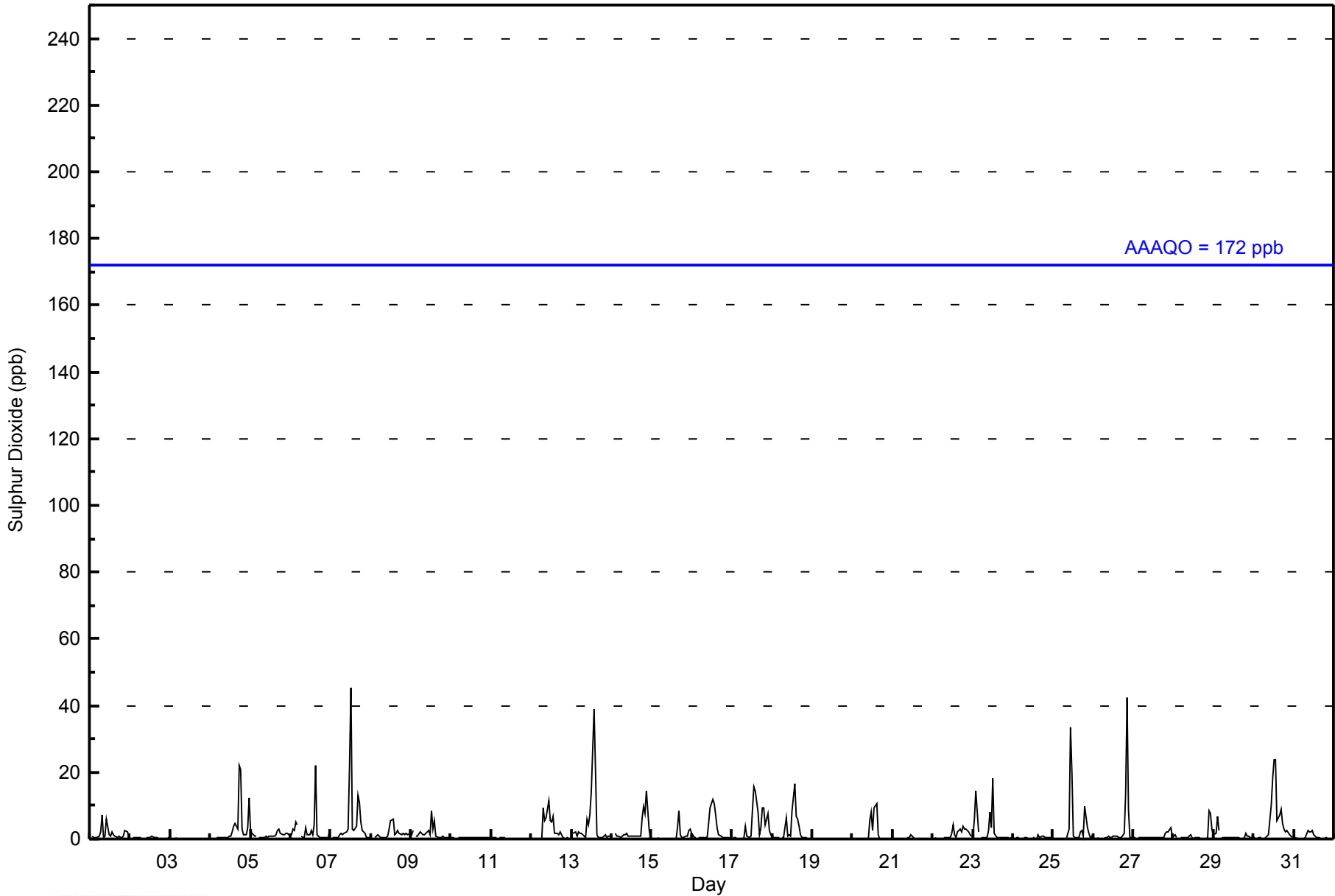
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	1	1	0	0	1	2	7	0	1	6	1	1	2	1	1	1	1	0	1	1	2	2	1	1.5	7																						
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
3-Mar	0	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-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	2	4	5	3	22	21	3	1	1	3	12	3.6	22																							
5-Mar	2	2	1	1	Z	0	0	1	1	1	1	1	1	1	1	2	3	2	1	1	2	2	1	1.2	3																							
6-Mar	1	3	3	5	4	Z	1	1	1	4	1	1	3	1	4	22	1	0	0	0	0	0	3	2.6	22																							
7-Mar	Z	0	1	1	1	1	2	1	1	2	3	22	45	3	3	4	13	11	5	2	2	1	1	0	5.4	45																						
8-Mar	1	Z	1	1	1	1	1	1	1	1	1	3	6	6	1	2	3	2	1	2	1	2	1	2	1.6	6																						
9-Mar	1	3	Z	1	1	2	2	1	1	2	3	1	8	3	6	1	1	1	1	1	1	0	0	0	1.8	8																						
10-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
11-Mar	0	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
12-Mar	0	0	0	0	0	Z	0	9	6	6	11	6	5	7	2	2	1	2	1	0	0	0	0	0	2.6	11																						
13-Mar	Z	2	2	1	2	2	2	1	0	6	4	7	14	39	21	1	0	1	0	1	1	1	1	1	4.7	39																						
14-Mar	1	Z	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	6	10	8	14	2	0	2.5	14																							
15-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	3	9	1	0	0	1	1	3	3	1.0	9																						
16-Mar	2	1	0	Z	0	0	0	0	0	1	5	9	12	11	7	3	1	1	1	0	0	0	0	0	2.5	12																						
17-Mar	0	0	0	0	Z	0	0	0	4	1	1	1	8	16	14	8	1	3	9	9	4	8	2	1	4.0	16																						
18-Mar	1	0	0	0	0	Z	0	1	6	1	1	1	8	17	7	6	4	1	0	0	0	0	0	0	2.5	17																						
19-Mar	Z	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-Mar	0	Z	0	0	0	0	0	0	0	0	6	8	2	10	11	1	0	0	0	0	0	0	0	0	1.7	11																						
21-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	2	4	1	0	2	3	2	4	3	3	2	1	1	1.4	4																						
23-Mar	1	6	14	2	Z	0	0	0	1	3	8	3	18	2	1	0	0	1	1	0	0	0	0	0	2.7	18																						
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.3	1																						
25-Mar	Z	0	0	0	0	0	0	0	0	3	34	20	1	0	0	0	2	3	1	10	3	1	1	1	3.5	34																						
26-Mar	0	Z	0	0	0	0	0	1	0	1	0	1	1	1	1	1	0	1	2	13	42	9	1	0	3.3	42																						
27-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	3	1	0.7	3																						
28-Mar	1	1	1	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	8	8	3	1.2	8																						
29-Mar	1	2	7	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0.9	7																						
30-Mar	0	0	0	0	0	Z	0	0	1	1	10	18	24	24	5	7	9	5	3	2	3	1	1	1	5.1	24																						
31-Mar	Z	0	0	0	0	0	0	0	3	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.6	3																						
																								0.6	0.9	1.3	0.7	0.6	0.5	0.5	0.9	1.0	1.3	3.4	3.8	5.6	4.8	3.0	2.4	1.9	2.0	2.0	2.1	2.5	1.9	1.1	1.1	Diurnal Average
																								2	6	14	5	4	2	2	9	6	6	34	22	45	39	21	22	13	22	21	13	42	14	8	12	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Lower Camp - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	681	96.05	96.05
11 - 20	17	2.40	98.45
21 - 60	11	1.55	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



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - March 2015

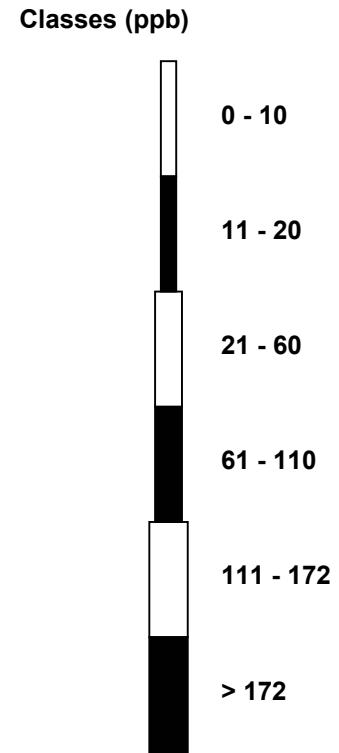
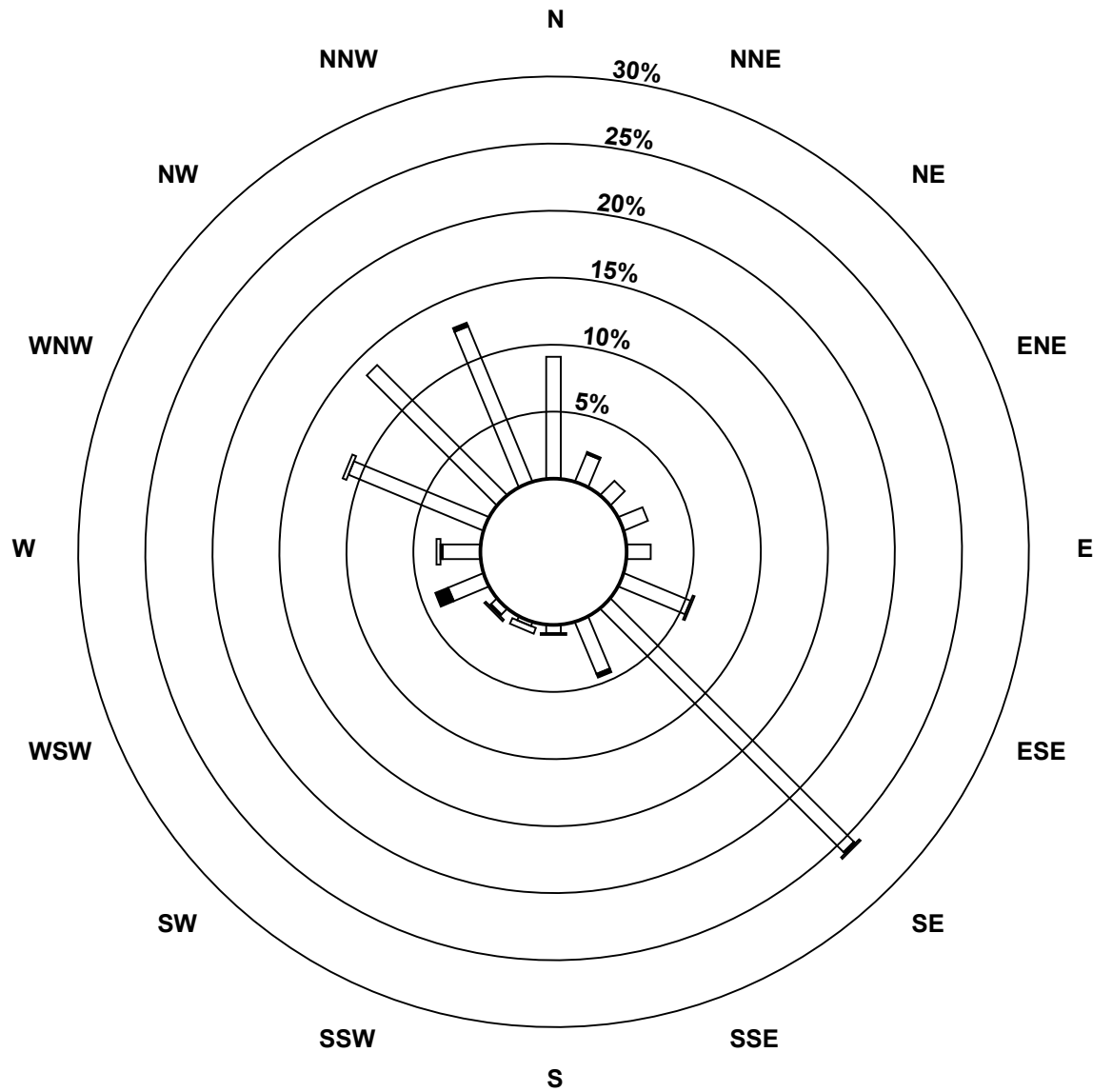
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	61	15	10	13	12	36	172	28	4	2	4	19	19	73	92	84	644
11 - 20	0	1	0	0	0	0	1	2	0	0	1	7	1	0	0	2	15
21 - 60	0	0	0	0	0	1	1	0	1	3	1	0	2	2	0	0	11
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	16	10	13	12	37	174	30	5	5	6	26	22	75	92	86	670

Total Number of Valid Hours: 670

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)**

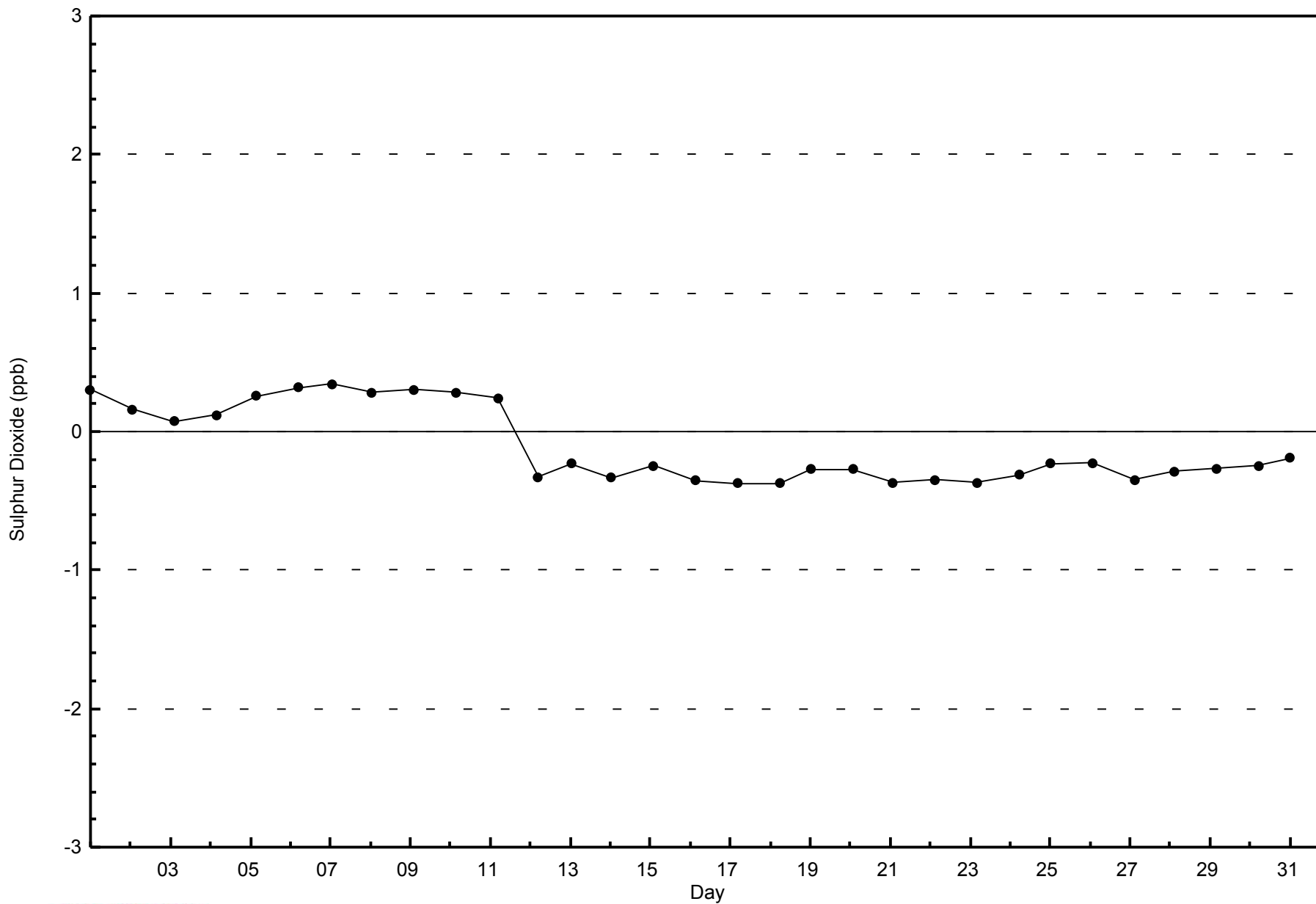


Total Number of Valid Hours: 670



WBEA
Zero Responses

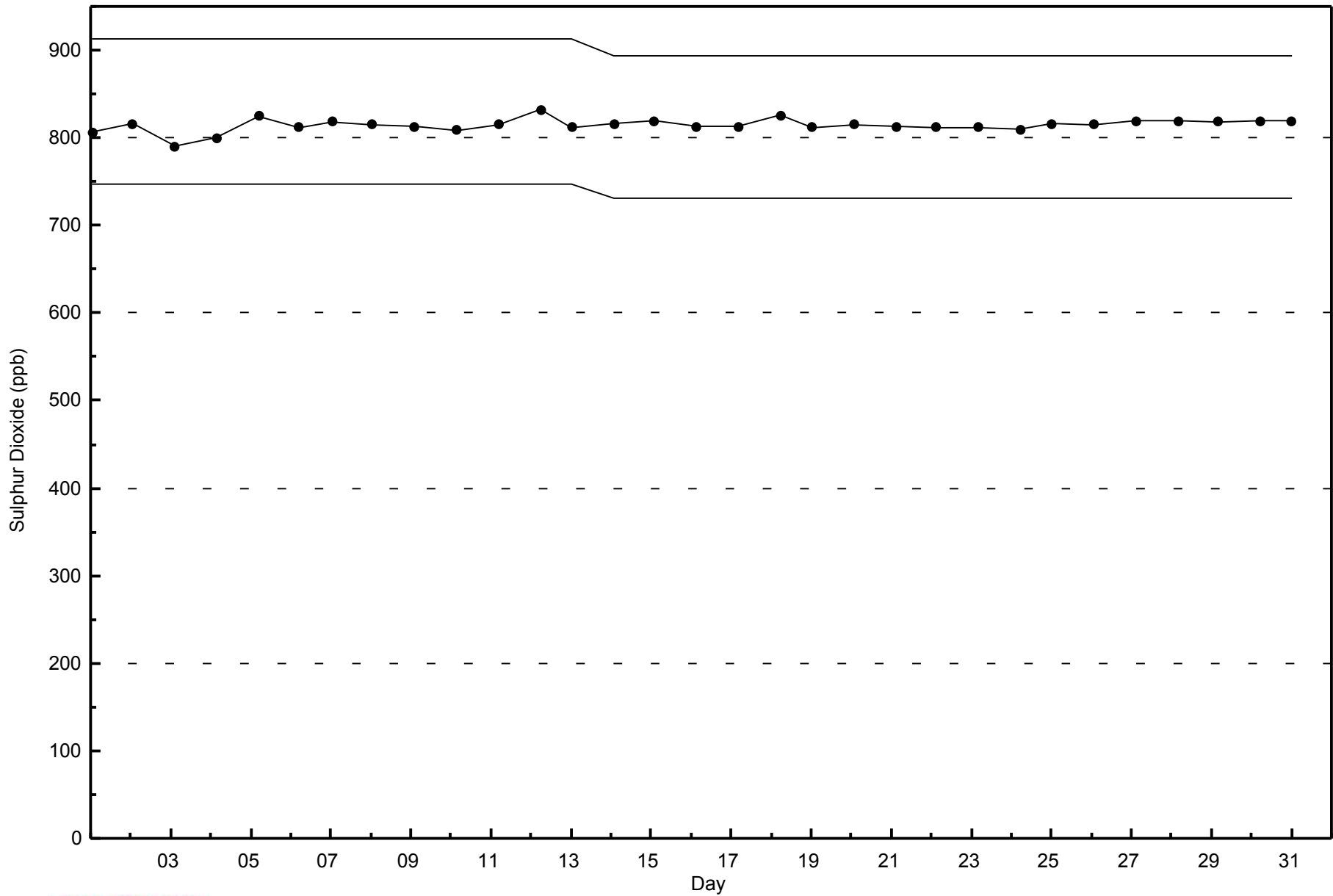
Sulphur Dioxide (SO₂) - ppb
Lower Camp - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - March 2015



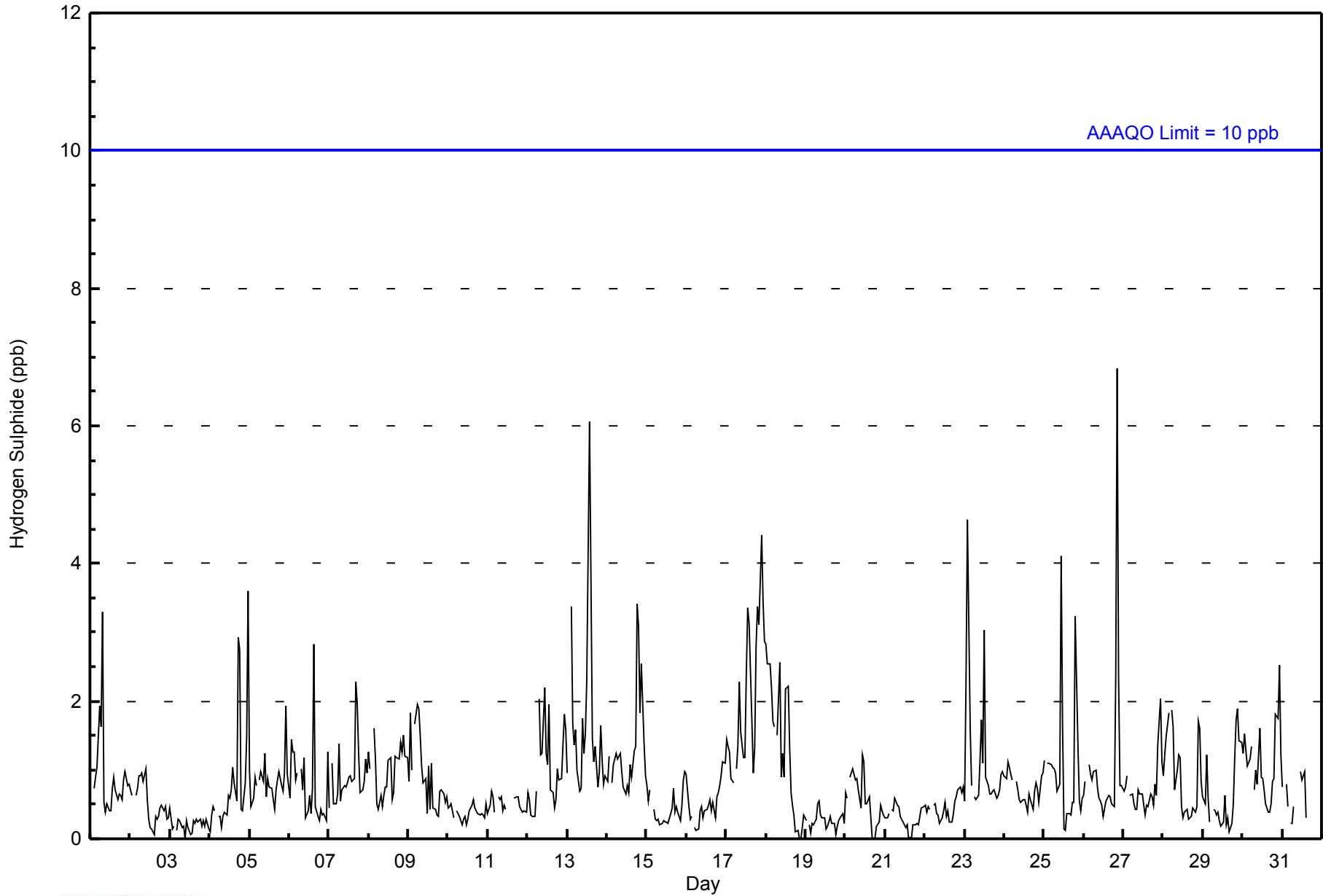


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 7 ppb on Mar 26 21:00										Maximum Daily Average: 2.0 ppb on Mar 17										Hours of Data: 696						
Minimum Value: 0 ppb on Mar 18 21:00										Minimum Daily Average: 0.2 ppb on Mar 3										Hours of Missing Data: 48						
Maximum Diurnal Average: 1.1 ppb at hour 3										Minimum Diurnal Average: 0.6 ppb at hour 17										Hours of Calibration: 35						
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 =4										Percent Operational Time: 98.3						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1	Z	1	1	1	2	2	3	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0.9	3
2-Mar	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
3-Mar	0	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-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	3	3	0	0	1	1	4	0.9	4
5-Mar	1	0	1	1	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	2	1	0.8	2
6-Mar	1	1	1	1	1	1	Z	1	1	1	0	0	1	0	1	3	0	0	0	0	0	0	0	1	0.8	3
7-Mar	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	0.9	2
8-Mar	1	1	Z	2	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
9-Mar	1	2	1	Z	2	2	2	1	1	1	1	0	1	0	1	0	0	0	0	1	1	1	1	1	0.9	2
10-Mar	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.4	1
11-Mar	0	0	1	1	0	Z	1	1	1	0	0	0	C	C	C	C	1	1	1	0	0	0	0	0	0.5	1
12-Mar	1	1	0	0	0	1	Z	2	1	1	2	1	1	2	1	1	0	1	1	1	1	1	2	2	1.0	2
13-Mar	1	Z	3	2	1	2	1	1	1	2	1	2	2	6	4	1	1	1	1	1	2	1	1	1	1.7	6
14-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	2	3	1	1	1.3	3
15-Mar	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0.4	1
16-Mar	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	1	1	1	0.5	1
17-Mar	1	1	1	1	1	Z	1	1	2	2	1	1	2	3	3	2	1	1	3	3	3	4	3	3	2.0	4
18-Mar	3	3	3	2	2	2	Z	2	3	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	1.2	3
19-Mar	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Mar	1	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	1
21-Mar	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Mar	0	0	0	0	Z	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	0.5	1
23-Mar	1	2	5	2	1	Z	1	1	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1.2	5
24-Mar	1	1	1	1	1	1	Z	1	1	1	1	1	0	0	1	1	0	1	0	1	1	1	1	1	0.7	1
25-Mar	1	Z	1	1	1	1	1	1	1	1	4	2	0	0	0	0	0	1	1	3	1	1	0	1	1.0	4
26-Mar	1	1	Z	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	2	7	2	1	1	1.1	7
27-Mar	1	1	1	Z	1	1	1	0	0	1	1	1	0	0	0	0	1	1	0	1	1	1	2	1	0.7	2
28-Mar	1	1	1	2	Z	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	0.9	2
29-Mar	1	1	1	1	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	2	1	1	0.7	2
30-Mar	1	2	1	1	1	1	Z	1	1	1	2	1	1	1	1	0	0	1	1	1	2	2	3	1	1.1	3
31-Mar	1	Z	1	0	UO	0	0	0	UO	UO	UO	1	1	1	0	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	1
0.8 0.9 1.1 0.9 0.8 0.9 0.8 0.8 0.8 0.7 0.9 0.7 0.8 0.9 0.8 0.6 0.6 0.7 0.8 0.9 1.0 1.0 1.0 1.0																								Diurnal Average		
3 3 5 2 2 2 2 3 3 2 4 2 3 6 4 3 2 3 3 3 7 4 3 4																								Diurnal Maximum		
Z - zerospan C - Calibration UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - March 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	667	95.83	95.83
3 - 4	26	3.74	99.57
5 - 7	3	0.43	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - March 2015

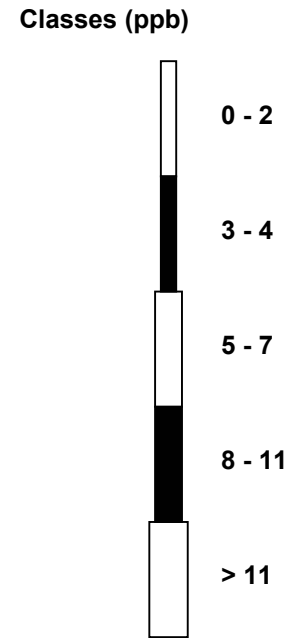
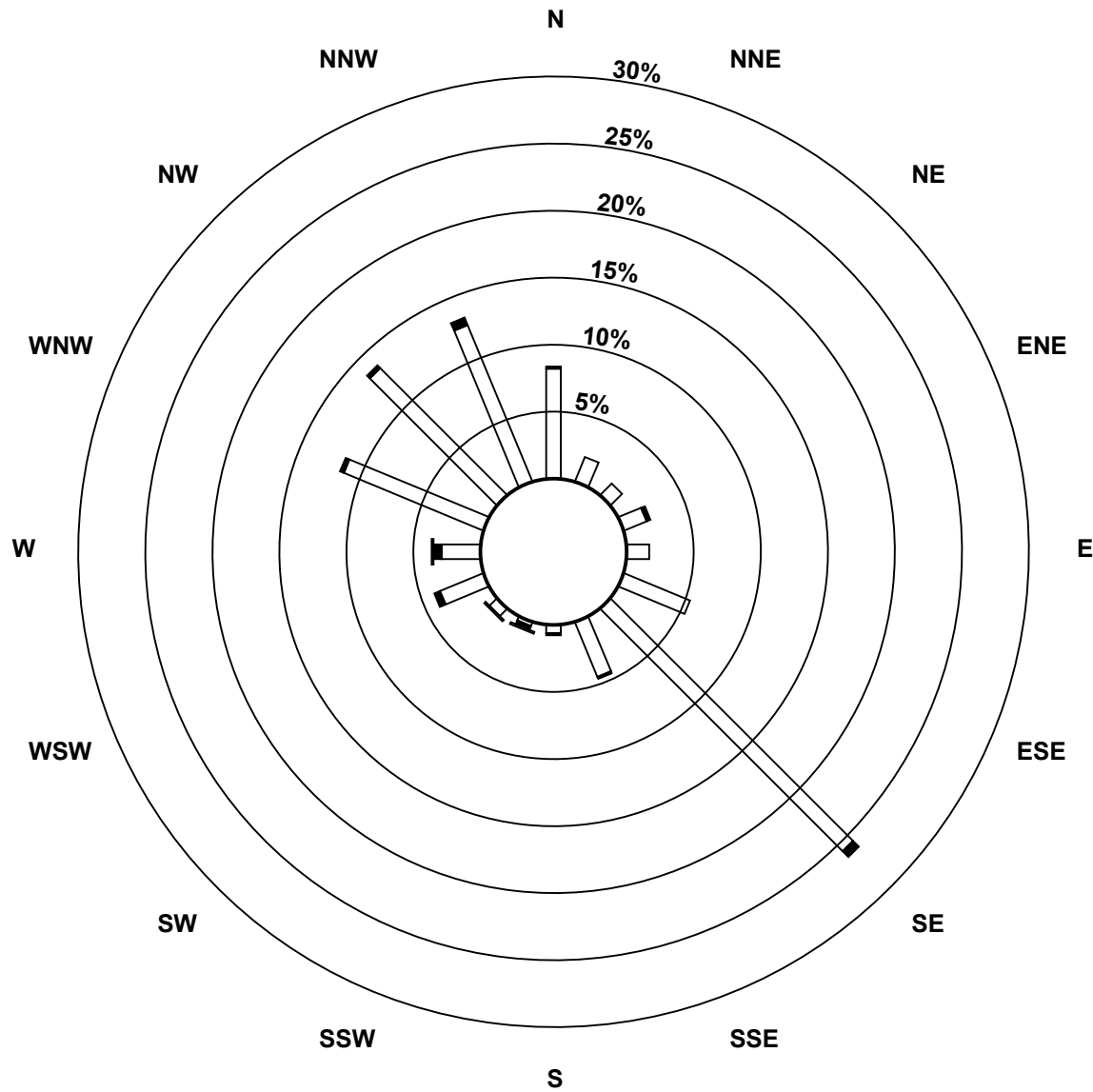
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	54	13	8	12	11	35	168	29	4	2	5	23	19	74	88	83	628
3 - 4	1	0	0	2	0	0	4	1	1	2	0	3	4	2	2	4	26
5 - 7	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	3
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	13	8	14	11	35	172	30	5	5	6	26	24	76	90	87	657

Total Number of Valid Hours: 657

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)

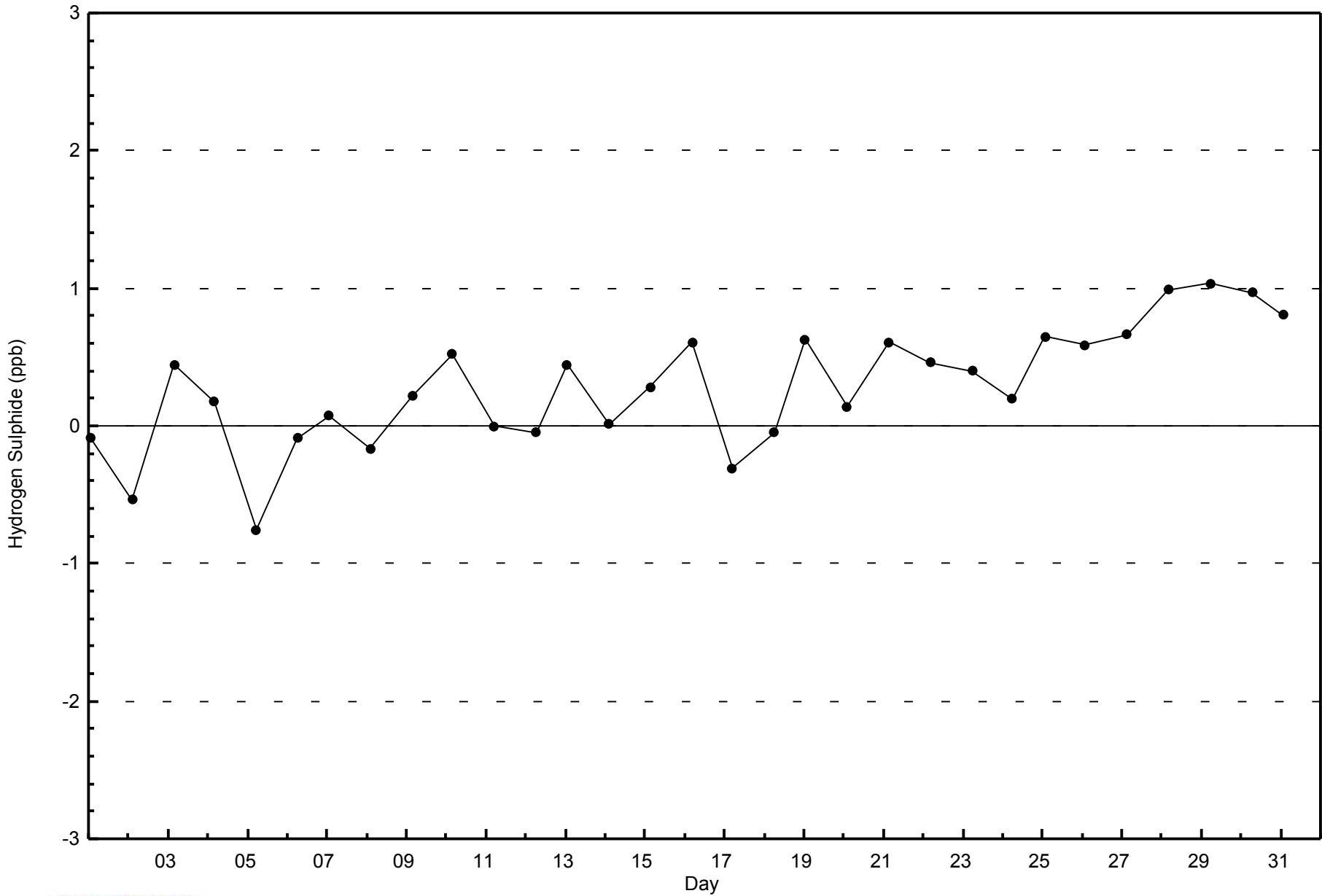


Total Number of Valid Hours: 657



WBEA
Zero Responses

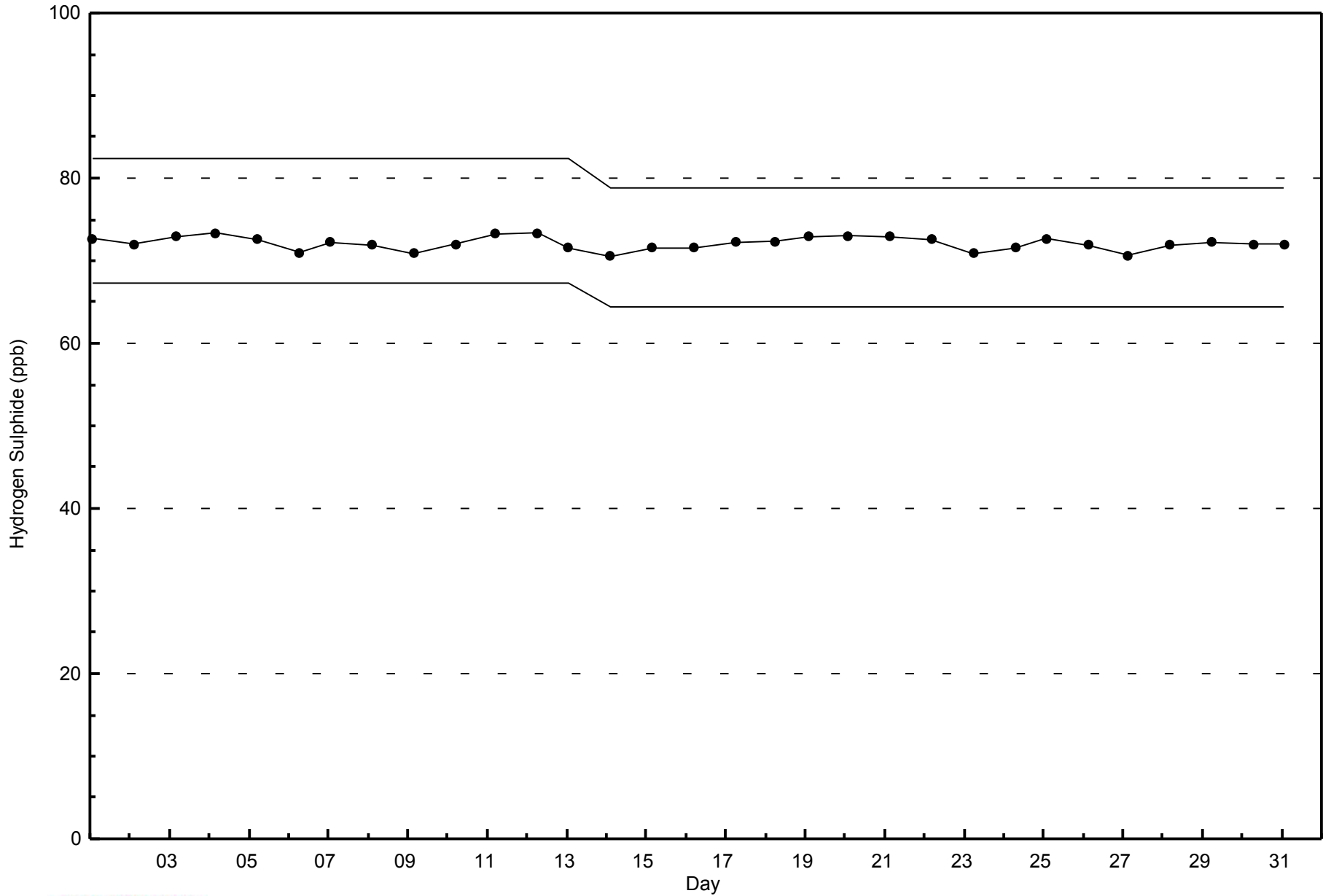
Hydrogen Sulphide (H₂S) - ppb
Lower Camp - March 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - March 2015



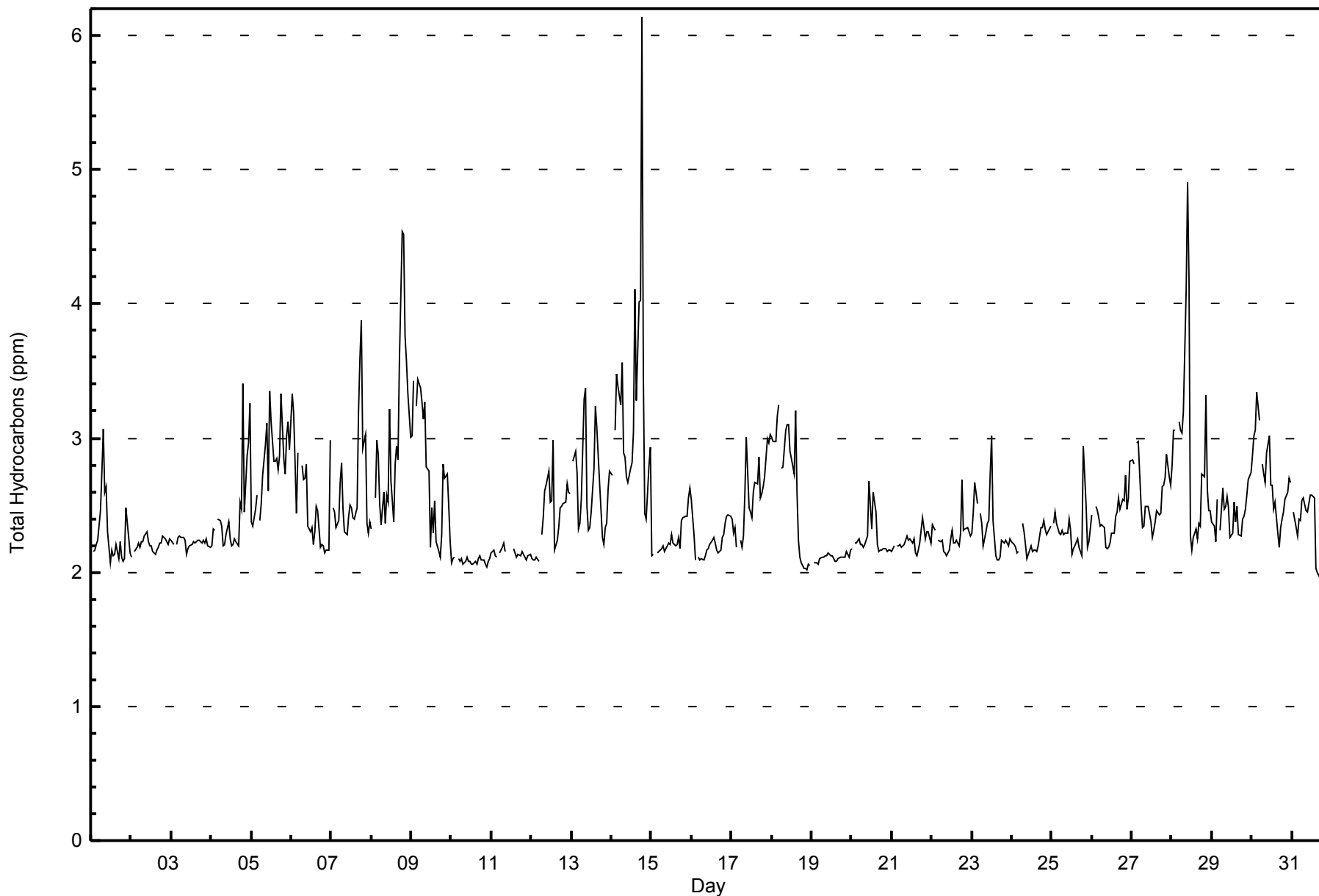


Maximum Value: 6.1 ppm on Mar 14 19:00		Maximum Daily Average: 3.3 ppm on Mar 14		Hours in Service: 744																																												
Minimum Value: 2.0 ppm on Mar 31 22:00		Minimum Daily Average: 2.1 ppm on Mar 10		Hours of Data: 709																																												
Maximum Diurnal Average: 2.6 ppm at hour 19		Minimum Diurnal Average: 2.4 ppm at hour 16		Hours of Missing Data: 35																																												
Monthly Average: 2.46 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 4.1		Hours of Calibration: 35																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	2.2	2.2	2.2	2.2	2.5	2.8	3.1	2.6	2.6	2.3	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.5	2.3	2.1	2.3	3.1																						
2-Mar	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3																						
3-Mar	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2																						
4-Mar	2.2	2.3	2.3	Z	2.4	2.4	2.3	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.5	3.4	2.4	2.9	3.0	3.3	2.4																						
5-Mar	2.4	2.3	2.5	2.6	Z	2.4	2.5	2.7	3.0	3.1	2.6	3.3	3.1	2.8	2.8	2.8	2.8	2.9	3.3	2.8	2.7	3.0	3.1	2.9	2.8	3.3																						
6-Mar	3.3	3.2	2.8	2.4	2.9	Z	2.8	2.7	2.7	2.8	2.3	2.3	2.3	2.2	2.3	2.5	2.5	2.2	2.2	2.2	2.1	2.2	2.2	3.0	2.5	3.3																						
7-Mar	Z	2.5	2.4	2.3	2.4	2.7	2.8	2.5	2.3	2.3	2.4	2.5	2.5	2.4	2.4	2.5	3.2	3.6	3.9	2.9	3.0	2.4	2.3	2.4	2.6	3.9																						
8-Mar	2.3	Z	2.6	3.0	2.9	2.5	2.4	2.6	2.4	2.6	2.5	3.2	2.7	2.4	2.8	2.9	2.8	3.6	4.5	4.5	3.8	3.6	3.3	3.0	3.0	4.5																						
9-Mar	3.0	3.4	Z	3.2	3.4	3.4	3.3	3.1	3.3	2.8	2.8	2.2	2.5	2.3	2.5	2.2	2.2	2.1	2.3	2.8	2.7	2.7	2.5	2.2	2.7	3.4																						
10-Mar	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	2.0	2.1	2.1	2.1	2.1																						
11-Mar	2.1	2.2	2.1	2.1	Z	2.1	2.2	2.2	2.2	C	C	C	C	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2																						
12-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.3	2.4	2.6	2.6	2.8	2.5	2.5	3.0	2.2	2.2	2.3	2.5	2.5	2.5	2.5	2.7	2.6	2.6	2.4	3.0																						
13-Mar	Z	2.8	2.9	2.7	2.3	2.4	2.5	3.3	3.4	2.5	2.3	2.3	2.5	2.8	3.2	3.1	2.9	2.7	2.3	2.2	2.3	2.4	2.6	2.8	2.7	3.4																						
14-Mar	2.7	Z	3.1	3.5	3.4	3.2	3.6	2.9	2.9	2.7	2.7	2.8	2.8	3.0	4.1	3.3	4.0	4.0	6.1	3.5	2.4	2.4	2.8	2.9	3.3	6.1																						
15-Mar	2.1	2.1	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.4	2.4	2.4	2.6	2.6	2.3	2.6																						
16-Mar	2.5	2.3	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.2	2.5																						
17-Mar	2.4	2.3	2.3	2.2	Z	2.2	2.2	2.3	2.6	3.0	2.5	2.4	2.4	2.6	2.7	2.7	2.9	2.6	2.6	2.6	2.7	3.0	3.0	3.0	2.6	3.0																						
18-Mar	3.0	3.0	3.0	3.2	3.2	Z	2.8	2.8	3.1	3.1	3.1	2.9	2.8	2.7	3.2	2.6	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.7	3.2																						
19-Mar	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	2.2	2.1	2.2	2.1	2.2																						
20-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.7	2.5	2.3	2.6	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.7																						
21-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.4	2.3	2.2	2.3	2.3	2.2	2.2	2.4																						
22-Mar	2.4	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.7	2.3	2.3	2.3	2.3	2.3	2.3	2.7																						
23-Mar	2.3	2.4	2.7	2.5	Z	2.4	2.4	2.2	2.3	2.4	2.4	2.7	3.0	2.4	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.0																						
24-Mar	2.2	2.2	2.2	2.1	2.2	Z	2.4	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.4																						
25-Mar	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.9	2.5	2.2	2.2	2.3	2.9																						
26-Mar	2.4	Z	2.5	2.5	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.6	2.5	2.5	2.5	2.7	2.5	2.5	2.8	2.4	2.8																						
27-Mar	2.8	2.8	Z	3.0	3.0	2.5	2.3	2.3	2.5	2.5	2.5	2.4	2.3	2.3	2.4	2.5	2.4	2.4	2.6	2.7	2.7	2.9	2.7	2.7	2.6	3.0																						
28-Mar	2.8	3.1	3.1	Z	3.1	3.1	3.0	3.2	4.1	4.9	4.2	2.3	2.2	2.3	2.3	2.2	2.4	2.3	2.7	2.7	3.3	2.6	2.5	2.5	2.9	4.9																						
29-Mar	2.4	2.3	2.2	2.5	Z	2.3	2.6	2.5	2.5	2.6	2.5	2.3	2.3	2.5	2.4	2.5	2.3	2.3	2.4	2.4	2.5	2.6	2.7	2.7	2.4	2.7																						
30-Mar	2.9	3.0	3.1	3.3	3.1	Z	2.8	2.7	2.7	2.9	3.0	2.7	2.6	2.5	2.5	2.3	2.2	2.3	2.4	2.5	2.5	2.6	2.7	2.7	2.7	3.3																						
31-Mar	Z	2.4	2.3	2.3	2.4	2.4	2.5	2.6	2.5	2.4	2.5	2.6	2.6	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.6																						
																								2.4	2.5	2.4	2.5	2.5	2.4	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.5	2.5	2.4	2.5	2.5	Diurnal Average
																								3.3	3.4	3.1	3.5	3.4	3.4	3.6	3.3	4.1	4.9	4.2	3.3	3.1	3.0	4.1	3.3	4.0	4.0	6.1	4.5	3.8	3.6	3.3	3.3	Diurnal Maximum
Z - zerospan C - Calibration																																																



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	14	1.97	1.97
2.1 - 3.0	635	89.56	91.54
3.1 - 10.0	60	8.46	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - March 2015

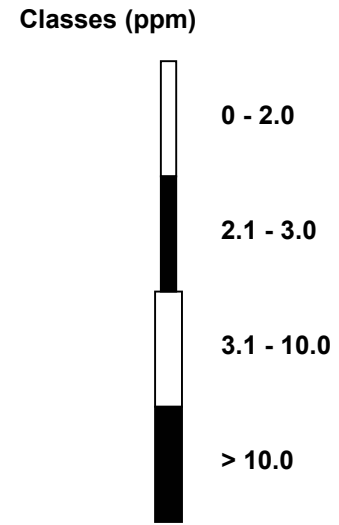
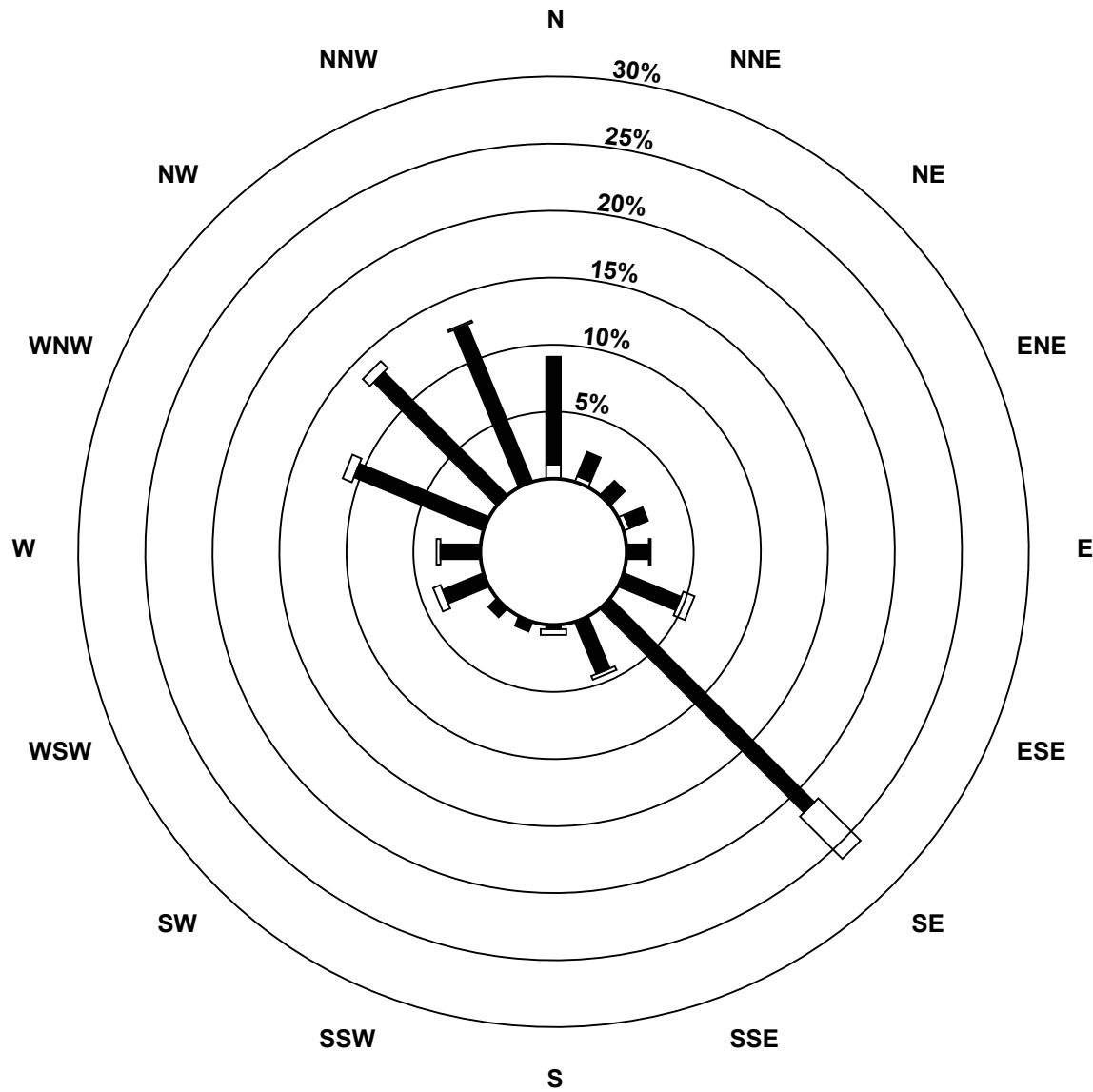
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	7	3	1	3	0	0	0	0	0	0	0	0	0	0	0	0	14
2.1 - 3.0	54	13	9	10	11	31	144	28	2	5	6	22	20	70	87	85	597
3.1 - 10.0	0	0	0	0	1	6	30	2	3	0	0	4	2	5	5	1	59
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	16	10	13	12	37	174	30	5	5	6	26	22	75	92	86	670

Total Number of Valid Hours: 670

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)**

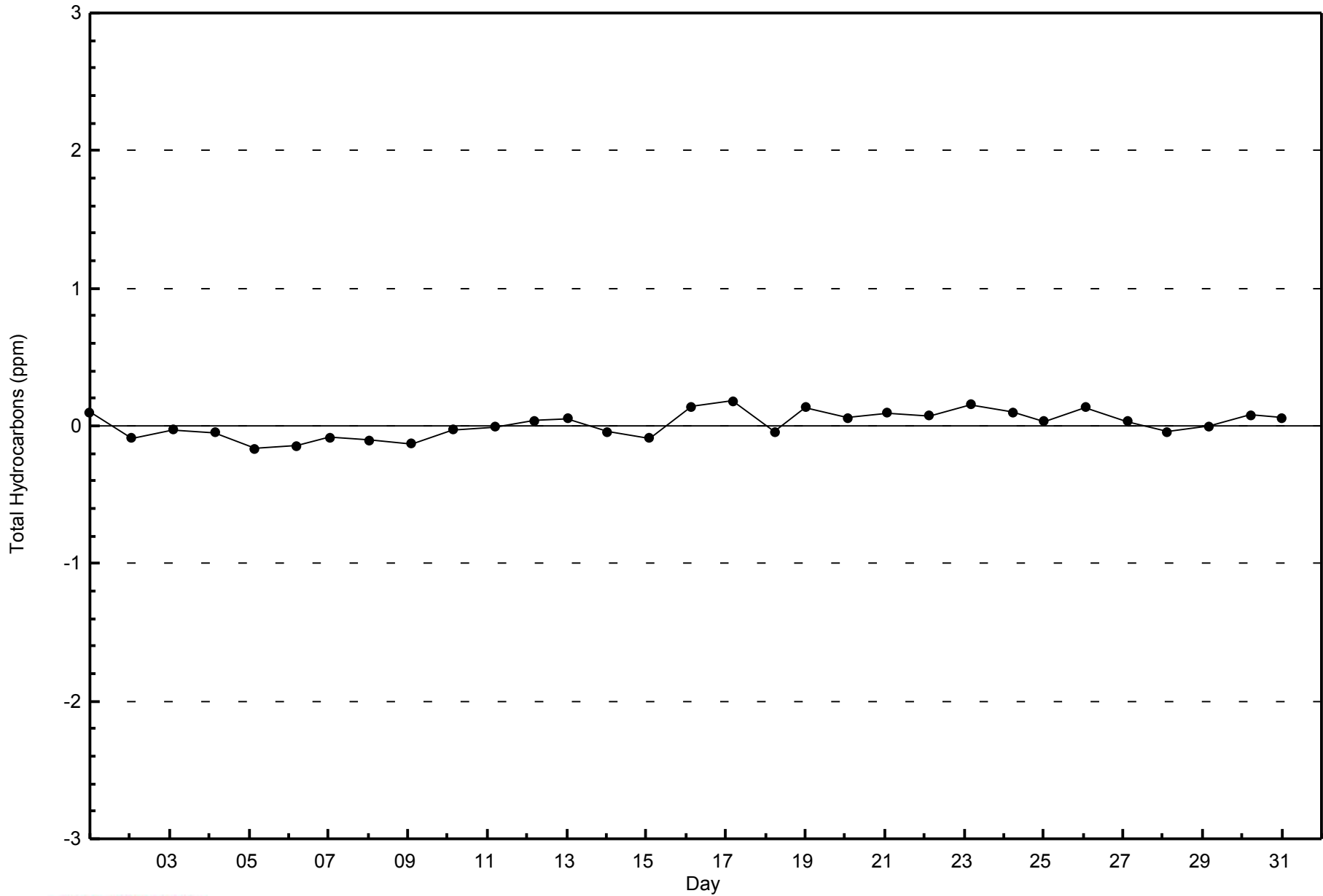


Total Number of Valid Hours: 670



WBEA
Zero Responses

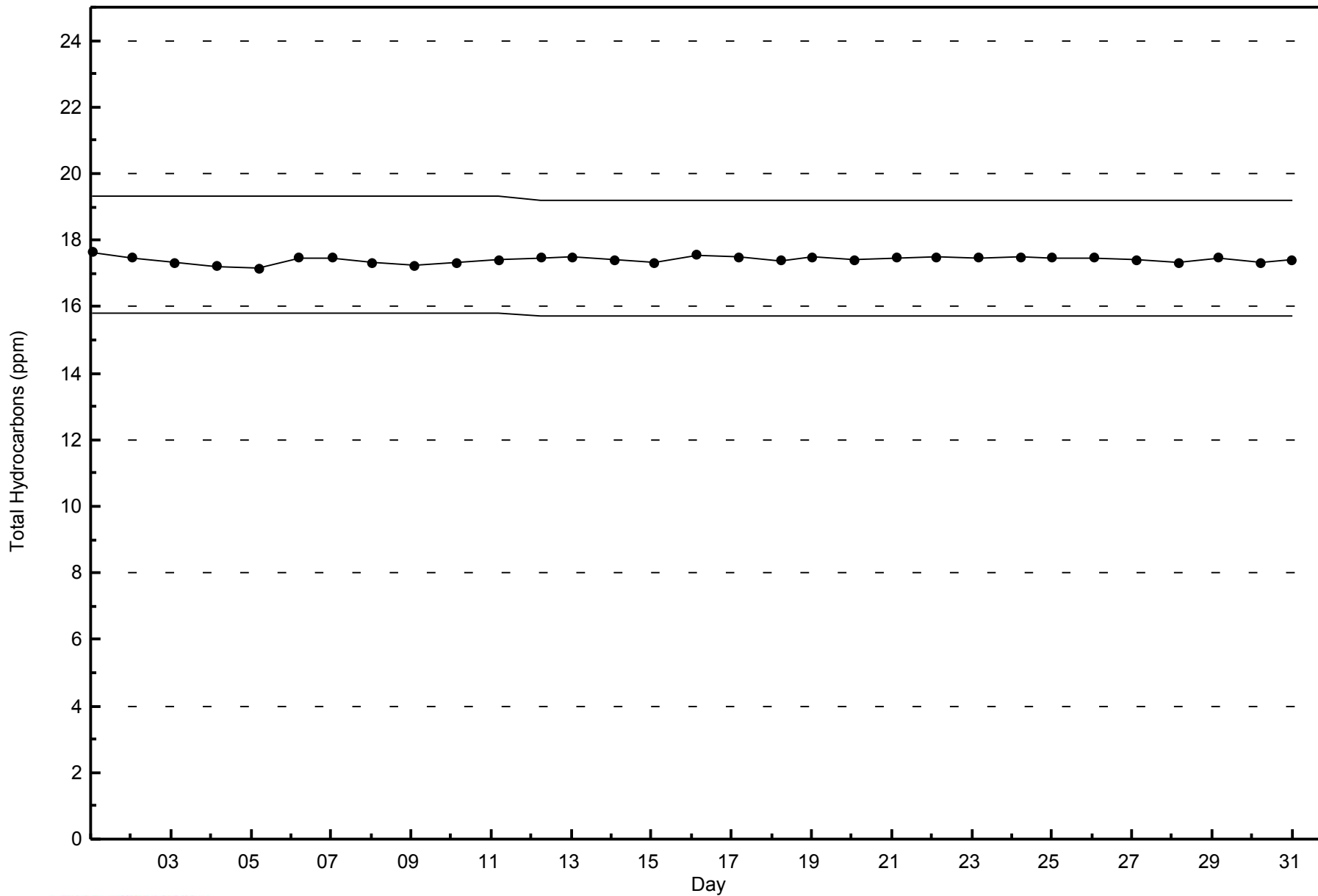
Total Hydrocarbons (THC) - ppm
Lower Camp - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Lower Camp - March 2015



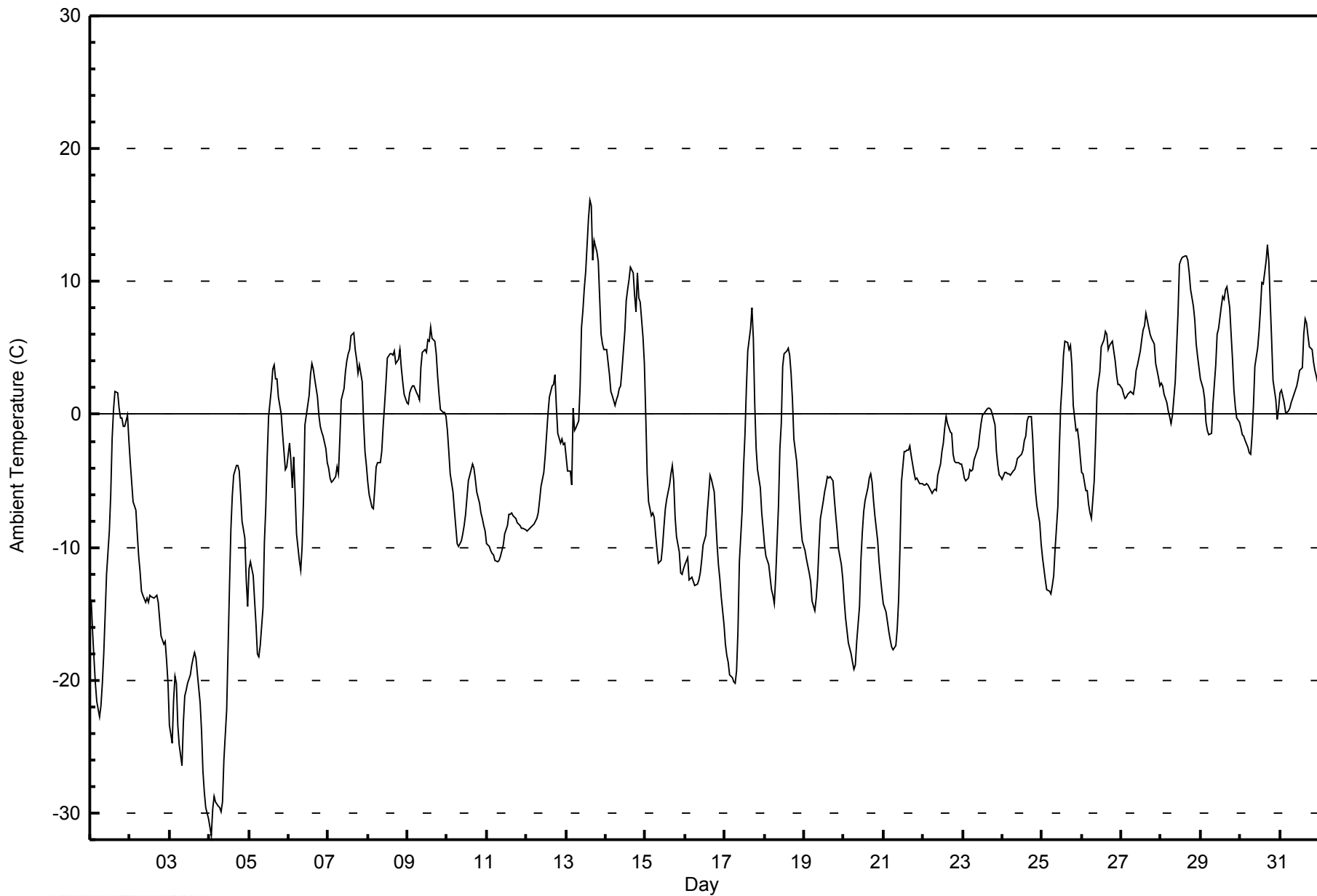


Maximum Value: 16.2 C on Mar 13 15:00		Maximum Daily Average: 5.8 C on Mar 28		Hours in Service: 744																							
Minimum Value: -31.6 C on Mar 4 02:00		Minimum Daily Average: -22.6 C on Mar 3		Hours of Data: 744																							
Maximum Diurnal Average: 1.8 C at hour 16		Minimum Diurnal Average: -9.6 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: -4.24 C		Percentiles: P ₁ = -29.5 P ₁₀ = -15.8 Q ₁ = -9.5 Median = -3.8 Q ₃ = 1.9 P ₉₀ = 5.5 P ₉₉ = 11.7		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	-13.9	-16.4	-18.3	-20.2	-21.6	-22.7	-21.9	-20.2	-18.1	-15.1	-12.1	-8.8	-6.1	-1.9	0.4	1.7	1.6	0.5	-0.3	-0.3	-0.9	-0.9	-0.1	-1.9	-9.1	1.7	
2-Mar	-3.7	-5.1	-6.6	-7.2	-8.9	-10.7	-11.9	-13.2	-13.6	-14.2	-13.8	-14.1	-13.6	-13.7	-13.8	-13.7	-13.6	-14.2	-15.4	-16.7	-17.3	-17.1	-18.6	-20.3	-13.0	-3.7	
3-Mar	-23.4	-24.7	-21.5	-19.7	-20.3	-23.4	-24.9	-26.5	-23.2	-21.2	-20.8	-20.2	-19.6	-18.9	-18.3	-18.0	-18.4	-19.5	-21.7	-23.8	-26.9	-28.5	-29.6	-30.4	-22.6	-18.0	
4-Mar	-31.0	-31.6	-29.7	-28.7	-29.2	-29.5	-29.6	-29.8	-29.2	-26.0	-22.2	-17.6	-13.0	-8.7	-6.2	-4.6	-3.9	-3.9	-4.3	-6.0	-8.1	-9.3	-12.4	-14.5	-17.9	-3.9	
5-Mar	-11.7	-11.1	-12.2	-14.1	-15.8	-18.0	-18.3	-17.4	-14.6	-9.6	-6.9	-3.2	-0.2	2.0	3.4	3.7	2.6	2.7	1.3	0.0	-1.4	-2.8	-4.2	-4.0	-6.2	3.7	
6-Mar	-2.2	-3.5	-5.6	-3.2	-6.0	-9.0	-11.0	-11.7	-9.9	-6.4	-0.8	0.7	1.5	3.0	3.8	3.4	2.7	1.3	0.0	-0.9	-1.3	-1.6	-2.6	-3.6	-2.6	3.8	
7-Mar	-4.1	-4.8	-5.1	-5.0	-4.7	-4.0	-4.5	-1.9	1.1	1.9	3.2	4.0	4.6	4.8	5.9	6.1	4.9	4.1	3.1	3.8	2.4	-0.5	-2.7	-3.8	0.4	6.1	
8-Mar	-5.1	-6.0	-7.0	-7.1	-5.6	-3.9	-3.6	-3.6	-2.7	-0.9	0.7	2.3	4.2	4.5	4.6	4.4	4.8	3.8	4.1	4.9	3.5	2.5	1.5	0.9	0.1	4.9	
9-Mar	0.7	1.7	2.0	2.2	2.2	1.6	1.4	1.1	3.5	4.7	4.8	4.6	5.6	5.5	6.6	5.7	5.5	4.5	2.9	1.5	0.4	0.1	0.2	-0.2	2.9	6.6	
10-Mar	-1.2	-2.8	-4.5	-5.9	-7.2	-8.5	-9.7	-9.9	-9.5	-8.9	-8.4	-7.5	-6.3	-5.0	-4.1	-3.8	-4.1	-4.9	-5.8	-6.7	-7.4	-7.9	-8.3	-8.8	-6.5	-1.2	
11-Mar	-9.7	-9.9	-10.3	-10.5	-10.6	-11.0	-11.1	-11.0	-10.7	-10.2	-9.8	-9.0	-8.3	-7.5	-7.5	-7.4	-7.6	-7.8	-8.1	-8.3	-8.3	-8.5	-8.6	-8.7	-9.2	-7.4	
12-Mar	-8.8	-8.7	-8.5	-8.5	-8.3	-8.0	-7.8	-7.4	-6.5	-5.5	-4.3	-3.1	-1.6	0.0	1.4	2.2	2.2	3.0	0.6	-1.4	-2.1	-1.9	-2.3	-2.2	-3.6	3.0	
13-Mar	-3.2	-4.3	-4.2	-5.3	0.5	-1.2	-1.0	-0.4	2.2	6.5	7.8	9.5	10.8	14.8	16.2	15.7	11.6	13.0	12.3	11.5	8.8	6.0	5.3	4.9	5.7	16.2	
14-Mar	4.9	4.0	3.0	1.8	1.5	0.7	1.1	1.4	1.9	2.2	3.5	6.2	8.6	9.4	10.1	11.0	10.7	9.0	7.8	10.6	8.7	8.4	5.8	3.8	5.7	11.0	
15-Mar	-0.1	-4.4	-6.6	-7.6	-7.5	-7.8	-9.0	-10.1	-11.2	-10.9	-10.0	-8.5	-7.1	-6.4	-5.3	-4.5	-3.9	-5.0	-7.7	-9.2	-10.4	-11.9	-12.0	-11.6	-7.9	-0.1	
16-Mar	-11.3	-10.7	-12.4	-12.4	-12.3	-12.5	-12.8	-12.8	-12.5	-11.9	-11.0	-9.8	-9.1	-7.4	-6.1	-4.6	-4.9	-5.8	-7.7	-9.7	-11.3	-12.4	-13.8	-15.8	-10.5	-4.6	
17-Mar	-17.3	-18.1	-18.6	-19.6	-19.8	-20.1	-20.3	-19.3	-16.3	-11.1	-7.2	-4.0	-1.5	2.0	4.8	6.4	8.0	5.7	0.8	-2.5	-4.2	-5.6	-7.4	-8.6	-8.1	8.0	
18-Mar	-9.9	-10.7	-11.3	-12.3	-13.2	-13.6	-14.2	-12.3	-6.9	-2.5	-0.7	3.6	4.6	4.8	5.0	4.4	3.0	1.1	-1.8	-3.5	-5.1	-6.8	-8.3	-9.5	-4.8	5.0	
19-Mar	-10.2	-10.9	-11.4	-11.9	-12.6	-14.0	-14.8	-13.8	-12.3	-9.9	-7.9	-6.6	-5.8	-5.3	-4.6	-4.7	-4.7	-5.0	-6.3	-7.7	-8.8	-10.1	-11.3	-12.3	-9.3	-4.6	
20-Mar	-13.9	-15.3	-16.2	-17.1	-18.0	-18.7	-19.2	-18.9	-17.1	-14.4	-11.0	-8.9	-7.3	-6.5	-5.5	-4.8	-4.5	-5.1	-6.4	-7.6	-9.5	-11.0	-12.3	-13.3	-11.8	-4.5	
21-Mar	-14.2	-14.9	-15.6	-16.3	-16.9	-17.5	-17.7	-17.4	-16.1	-13.9	-10.0	-5.1	-2.8	-2.8	-2.7	-2.7	-2.3	-3.1	-4.4	-4.9	-4.8	-5.0	-5.2	-5.2	-9.2	-2.3	
22-Mar	-5.3	-5.3	-5.3	-5.3	-5.5	-5.9	-5.7	-5.7	-5.8	-4.5	-3.7	-2.8	-2.2	-1.0	-0.2	-0.7	-1.3	-1.4	-2.9	-3.5	-3.6	-3.6	-3.7	-3.8	-3.7	-0.2	
23-Mar	-4.2	-4.8	-5.0	-4.8	-4.2	-4.3	-4.1	-3.4	-2.8	-2.5	-1.6	-0.6	-0.1	0.1	0.4	0.5	0.5	0.4	0.1	-0.8	-2.7	-3.9	-4.6	-4.7	-2.4	0.5	
24-Mar	-4.9	-4.4	-4.3	-4.5	-4.5	-4.6	-4.3	-4.2	-3.8	-3.4	-3.3	-3.0	-2.7	-1.9	-1.6	-0.5	-0.1	-0.2	-1.8	-4.2	-5.9	-6.9	-8.1	-9.7	-3.9	-0.1	
25-Mar	-10.8	-11.6	-12.4	-13.2	-13.3	-13.5	-12.9	-12.1	-10.2	-6.9	-2.7	0.6	2.2	4.5	5.5	5.4	4.9	5.2	3.7	0.7	-1.2	-1.1	-1.9	-3.2	-3.9	5.5	
26-Mar	-4.3	-4.5	-5.7	-5.7	-6.8	-7.4	-7.8	-5.0	-2.0	1.6	2.5	3.2	5.1	5.6	6.3	6.1	4.9	5.2	5.6	4.7	4.1	3.0	2.3	2.2	0.5	6.3	
27-Mar	1.9	1.5	1.2	1.4	1.5	1.7	1.7	1.5	2.1	3.3	3.7	4.7	5.6	6.4	6.6	7.7	6.5	6.0	5.8	5.6	5.3	3.8	2.8	2.2	3.8	7.7	
28-Mar	2.3	2.2	1.5	0.9	0.2	-0.1	-0.7	-0.1	2.5	5.1	7.6	11.3	11.6	11.8	12.0	12.0	11.6	10.7	9.4	8.1	7.1	5.4	4.4	3.5	5.8	12.0	
29-Mar	2.7	1.9	1.3	-0.6	-1.2	-1.5	-1.4	0.8	2.3	3.8	6.0	6.5	8.1	8.9	8.7	9.4	9.6	8.1	6.0	4.2	1.8	0.5	-0.3	-0.6	3.5	9.6	
30-Mar	-1.0	-1.6	-1.7	-1.9	-2.4	-2.9	-3.0	-1.5	0.7	3.6	5.0	6.3	8.0	9.9	9.8	11.5	12.7	11.5	8.5	5.6	2.6	1.1	-0.4	0.4	3.4	12.7	
31-Mar	1.7	1.8	0.9	0.2	0.2	0.3	0.5	0.9	1.5	1.8	2.1	2.7	3.3	3.5	6.0	7.1	6.8	6.0	5.1	4.8	4.0	3.3	2.9	2.4	2.9	7.1	
		-6.8	-7.5	-8.1	-8.5	-8.7	-9.4	-9.6	-9.2	-7.6	-5.7	-3.9	-2.1	-0.8	0.5	1.3	1.8	1.5	0.8	-0.6	-1.7	-3.0	-4.0	-4.9	-5.7	Diurnal Average	
		4.9	4.0	3.0	2.2	2.2	1.7	1.7	1.5	3.5	6.5	7.8	11.3	11.6	14.8	16.2	15.7	12.7	13.0	12.3	11.5	8.8	8.4	5.8	4.9	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Lower Camp - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	36	4.84	4.84
-20 - 0	448	60.22	65.05
0 - 10	238	31.99	97.04
10 - 20	22	2.96	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) - %

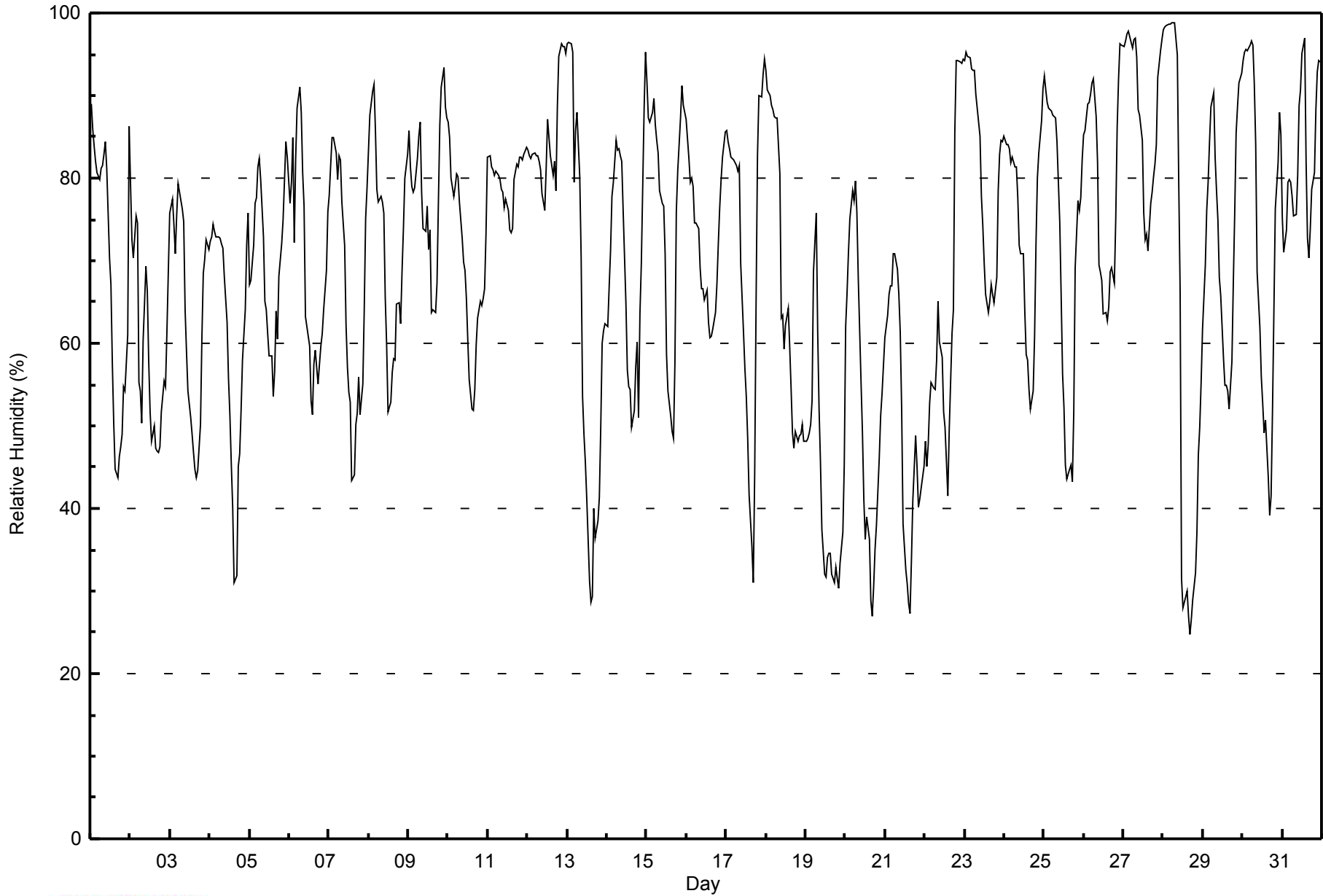
Lower Camp - March 2015

Maximum Value: 99 % on Mar 28 07:00																			Maximum Daily Average: 87.8 % on Mar 27						Hours in Service: 744																			
Minimum Value: 25 % on Mar 28 17:00																			Minimum Daily Average: 42.9 % on Mar 19						Hours of Data: 744																			
Maximum Diurnal Average: 82.0 % at hour 7																			Minimum Diurnal Average: 50.7 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 69.4 %																			Percentiles: P ₁ = 29 P ₁₀ = 45 Q ₁ = 56 Median = 73 Q ₃ = 83 P ₉₀ = 91 P ₉₉ = 98						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Mar	89	86	84	82	81	80	81	82	83	84	81	70	67	58	50	45	44	46	47	49	55	54	61	86	68.6	89																		
2-Mar	79	73	70	75	74	55	54	50	60	69	66	58	52	48	50	47	47	47	47	52	55	55	61	69	59.0	79																		
3-Mar	76	77	74	71	76	79	78	76	75	64	59	54	51	49	47	45	44	45	50	61	68	70	73	71	63.9	79																		
4-Mar	72	73	74	73	73	73	73	72	72	68	63	56	51	45	40	31	32	45	47	52	58	64	72	76	60.6	76																		
5-Mar	67	68	72	77	78	81	82	80	73	65	64	61	58	58	54	57	64	60	68	72	75	80	84	83	70.1	84																		
6-Mar	77	79	85	72	82	88	91	88	81	77	63	61	60	53	51	57	59	55	57	60	61	64	69	76	69.5	91																		
7-Mar	78	82	85	85	83	80	83	82	77	72	62	57	54	53	43	44	50	52	56	51	55	64	75	79	66.7	85																		
8-Mar	83	88	90	91	86	79	77	78	77	76	66	60	52	53	56	58	58	65	65	62	69	74	80	83	71.9	91																		
9-Mar	86	81	79	78	79	82	85	87	78	74	73	77	71	74	64	64	64	67	77	86	91	93	89	87	78.7	93																		
10-Mar	87	85	80	78	79	81	80	77	73	70	69	65	60	56	52	52	54	60	63	65	65	65	67	73	69.0	87																		
11-Mar	83	83	81	81	80	81	80	80	79	78	76	78	76	74	73	74	80	82	81	82	83	82	83	84	79.7	84																		
12-Mar	83	83	82	83	83	83	83	82	81	78	76	81	87	85	83	80	82	79	89	95	96	96	96	95	85.0	96																		
13-Mar	96	96	96	95	80	86	88	80	70	54	49	46	41	31	29	29	40	36	38	41	50	60	62	62	60.7	96																		
14-Mar	62	67	71	78	79	85	83	84	83	82	76	65	57	55	54	50	52	57	60	51	64	70	88	95	69.5	95																		
15-Mar	92	87	87	88	90	86	85	83	79	77	77	71	59	54	51	49	48	58	76	81	87	91	89	88	76.3	92																		
16-Mar	87	82	79	80	79	75	75	74	69	67	67	65	66	62	61	61	62	64	67	72	76	80	82	86	72.4	87																		
17-Mar	86	84	84	83	82	82	82	81	82	70	61	57	54	49	42	35	31	44	65	83	90	90	92	94	70.9	94																		
18-Mar	93	91	90	89	88	87	87	87	81	63	63	59	62	64	60	55	49	47	49	48	49	49	50	48	67.1	93																		
19-Mar	48	48	49	50	53	69	76	62	52	46	37	32	32	34	35	35	32	31	33	32	30	33	37	45	42.9	76																		
20-Mar	62	66	71	75	78	77	80	76	68	55	49	41	36	39	36	29	27	31	35	38	46	51	54	57	53.3	80																		
21-Mar	61	63	66	67	67	71	71	69	66	61	52	38	32	31	29	27	34	41	49	45	40	41	43	45	50.4	71																		
22-Mar	48	45	48	53	55	55	54	58	65	60	58	52	50	46	42	49	61	64	86	94	94	94	94	94	63.3	94																		
23-Mar	94	95	95	95	93	93	93	90	87	85	78	74	70	66	64	65	67	66	65	68	78	83	84	84	80.5	95																		
24-Mar	85	84	84	84	82	83	81	81	78	72	71	71	64	59	58	54	52	54	61	72	80	83	87	91	73.8	91																		
25-Mar	92	91	89	88	88	88	88	87	84	75	66	56	52	45	44	45	45	43	52	69	77	76	78	82	70.8	92																		
26-Mar	85	86	89	89	90	92	92	88	82	69	69	68	64	64	63	64	69	69	67	75	86	92	96	96	79.3	96																		
27-Mar	96	97	97	98	97	96	97	97	95	88	88	85	76	73	73	71	77	78	80	82	84	92	95	97	87.8	98																		
28-Mar	98	98	98	99	99	99	99	99	95	80	66	31	28	29	30	27	25	27	29	32	37	46	50	55	61.5	99																		
29-Mar	62	69	76	79	84	89	90	83	78	75	68	66	58	55	55	54	52	58	67	76	85	89	91	93	73.0	93																		
30-Mar	94	95	96	95	96	97	96	91	84	69	62	56	53	49	51	44	39	41	52	64	76	82	88	85	73.1	97																		
31-Mar	75	71	74	80	80	79	78	75	76	80	89	91	95	97	82	73	70	74	79	81	88	93	94	94	82.0	97																		
																			79.9	79.8	80.6	81.0	81.1	81.6	82.0	79.9	76.8	71.0	66.6	61.3	57.7	55.0	52.3	50.7	51.9	54.4	60.0	64.2	69.4	72.8	76.3	79.2	Diurnal Average	
																			98	98	98	99	99	99	99	99	95	88	89	91	95	97	83	80	82	82	89	95	96	96	96	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - March 2015





Maximum Speed: 29 km/h on Mar 2 03:00	Maximum Daily Speed Average: 19.0 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 18 07:00	Minimum Daily Speed Average: 0.7 km/h on Mar 17	Hours of Data: 703
Maximum Diurnal Speed Average: 2.8 km/h at hour 24	Minimum Diurnal Speed Average: 0.5 km/h at hour 6	Hours of Missing Data: 41
Monthly Average Velocity: 1.0 km/h 10.2 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 26	Percent Operational Time: 94.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	ENE1	NNW1	E1	E1	ESE2	ESE1	SSE2	SE4	SE10	SE12	SE12	SE19	SE20	SSE13	SSE12	SSE11	SSE9	SSE8	SSE11	SE14	SE10	S4WNW17	NW16	SE5.7	SE20	
2-Mar	NNW22	N27	N29	NNW19	NNW27	NNW28	NW28	NNW23	NNW18	NNW15	NNW20	NNW22	NW24	NNW25	NNW24	NNW24	NW27	NW24	NW13	NW9	NNW6	N5	NW5	WNW4	NNW19.0	N29
3-Mar	NW2	ESE2	WNW7	NNW9	WNW8	NW4	WNW6	W4	NW8	N20	N18	N19	NNW16	NNW14	N12	N10	NNE11	NE8	NE3	WNW1	NW0	NNW0	ENE0	NNW1	NNW6.6	N20
4-Mar	NNE1	ENE1	SE10	SE12	SE14	SE14	SE16	SE15	SE18	SE18	SE17	SE17	SE16	SE16	SE15	SSE15	SSE11	SSW7	SSW8	SSE6	SSE6	SE9	WNW1	SE1	SE10.3	SE18
5-Mar	WSW12	WNW7	WNW5	NNW2	NW4	SE6	SE7	SE10	SE11	SE12	SE14	SE15	SE14	SE12	SE10	SE11	SE9	SE7	ESE2	ENE0	NE2	SE1	SE3	SE6	SE5.4	SE15
6-Mar	SE6	SSE3	SSE3	SW2	SW4	ESE2	ESE1	SE4	WNW2	NW4	NW8	WNW6	WSW8	NNW2	WSW6	W4	N6	NNE11	N8	NNW7	NNW5	NW5	WNW2	W5	NW1.9	NNE11
7-Mar	WNW4	N1	SE3	E0	ESE3	ESE3	NE2	WNW6	W11	WSW9	NNW12	NNW14	NNW14	NNW11	WNW13	W10	WSW10	WSW10	WSW10	W15	W9	WNW4	WNW4	NW3	W6.3	W15
8-Mar	AF	ENE1	ESE3	SE5	SE6	SE8	SE10	SE10	SE12	SE9	SE10	SE9	SSE2	SE5	SE8	SE5	SE3	ESE5	SE4	E2	SE3	SE1	SE4	SE3	SE5.4	SE12
9-Mar	SE4	SE6	SE10	SE7	SE7	ESE2	SE3	NW2	WNW11	WNW14	WNW9	NNW4	WSW7	WNW4	WSW9	NW11	NW9	NW8	WNW6	WNW5	WNW4	WNW4	NW7	NNW10	WNW3.0	WNW14
10-Mar	N13	NNE19	NNE14	N11	N7	NNE8	N6	NE5	NE9	N11	NNW10	NW10	NW8	NW5	NNW9	NNW11	N11	NNW12	NNW12	N15	N13	N14	N12	N12	N10.0	NNE19
11-Mar	NNW10	N12	NNW10	NNW9	NNW9	NNW10	NNW10	NNW9	NNW9	NNW10	NNW12	NNW11	NNW12	NNW13	N15	N14	NNW11	NNW11	NNW11	NNW11	NNW8	NNW9	NW8	NW12	NNW10.5	N15
12-Mar	NW9	NNW6	NW6	NW6	NW7	NW4	NW4	NW2	NW5	NNE2	NNW3	SE8	SSE8	SSW7	SE12	SE11	SE9	WSW1	WNW3	N1	N0	W2	WNW2	W5	W0.8	SE12
13-Mar	W2	WNW3	WNW2	E2	W7	SE3	SE9	SE8	SE8	WSW12	W8	W7	WSW6	SW11	S8	S11	SSE11	SSE12	SSE13	SSE14	SSE16	SE13	SE9	ESE4	S5.3	SSE16
14-Mar	SE7	SE9	SE12	ESE13	ESE9	SE10	SE9	SE11	SE10	SE10	SE13	SE15	SE13	SE12	SE13	SE9	SE6	SE5	WNW2	WSW9	WSW7	WSW12	W7	NW12	SE6.5	SE15
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
17-Mar	WNW2	NW1	WNW3	N1	NNW1	NNW1	N1	NW3	SSE1	SE4	SE10	SE7	WNW3	WSW3	SSE3	SE4	SE6	S2	ENE1	ENE1	W3	NW3	NNW1	NNW1	SSE0.7	SE10
18-Mar	N0	NNW1	NW1	NW2	WNW3	WNW2	WNW0	ESE1	SE4	SE6	ESE3	SE8	SSW3	WSW7	NNW12	N13	N18	N21	N21	N22	N20	N17	N14	NNW10	N6.3	N22
19-Mar	NNW9	NW7	NNW5	NW6	NW5	NW3	NW2	NNW3	NW5	WNW7	NW9	NNW11	NNW11	N10	N11	N13	N13	N14	N13	NNE12	NE13	NE10	N4	NW4	N7.5	N14
20-Mar	NW3	WNW4	WNW4	NW3	WNW5	WNW5	NW5	NNW4	NNW5	NW5	W7	W6	WSW9	WSW12	WSW12	NNW9	NNW11	N11	N11	NNW6	NW5	NNW7	NNW5	NNW6	NW5.3	WSW12
21-Mar	NW5	NW5	NW5	NW5	NNW5	NW4	NW4	NW5	NNW6	N7	NNW5	SE9	SE10	ESE11	ESE14	E14	ESE16	SE16	ESE13	ESE11	E13	E13	E10	ESE11	E5.0	SE16
22-Mar	ESE8	S4	SE4	SE4	ESE2	NW3	SE5	SE10	SE9	SE9	SE9	SE6	WNW2	ESE7	ESE7	NNE5	N8	NNW6	NW5	NNW4	NW3	NW3	NW5	NW3	ESE1.8	SE10
23-Mar	W2	WNW1	W2	ESE3	ENE3	NE3	ESE4	SE7	SE2	NW3	WSW5	WSW4	NNW2	N6	N5	N5	N8	NNE9	ENE6	NNW5	NW6	NW6	NW4	NW4	N2.1	NNE9
24-Mar	W3	WNW2	NW3	NW3	NW4	WNW3	WNW5	NNW6	N8	N11	N12	N11	NNW10	NW7	NNW7	W7	SE4	SSE8	SE5	ENE1	WNW3	WNW4	WNW3	NW2	NNW3.5	N12
25-Mar	NW3	WNW3	WNW2	WNW3	WNW5	WNW4	WNW4	NW4	NNW4	NNW4	W5	SSE4	SE11	SE10	SE10	SE11	SE9	SE7	SSE4	W0	SE3	SE8	SE5	SE6	SSE2.1	SE11
26-Mar	ESE8	N3	NW3	NW3	WNW4	WNW4	WNW3	NNW4	SE10	SE15	SE14	SE13	SE14	SE13	ESE12	SE12	SE12	SE10	SSE5	SW5	SW6	ESE2	SE4	SE6	SE5.1	SE15
27-Mar	ESE3	ENE2	ESE1	SE2	SE3	SE8	SE9	SE10	SE10	SE11	SE12	SE7	SE13	SE8	SE10	SSE11	SE12	SE12	SSE9	SE7	SSE5	WNW3	SW2	E2	SE6.7	SE13
28-Mar	SE3	W2	NW1	WNW1	NW0	AF	E1	SE4	SE7	SE10	S3	NW11	NW20	WNW19	WNW23	WNW28	WNW24	WNW20	WNW18	WNW15	W13	WSW15	WSW10	WNW6	WNW8.5	WNW28
29-Mar	NNW6	NNE4	SW5	SE6	SE8	SE10	SE10	SE14	SE13	SE11	SE13	SE13	SE10	SE11	ESE11	SE10	SE7	WNW0	WNW3	WNW1	ENE0	NNE0	NW3	NNW2	SE5.5	SE14
30-Mar	WNW3	NW1	WNW4	WNW3	NW4	W3	E2	NNW1	NW3	N3	N4	NNE4	ESE6	SE15	SE10	SE4	SE12	SE7	E1	WNW0	WSW1	WNW2	SE5	ESE6	ESE1.6	SE15
31-Mar	SE9	SE8	SE7	ESE5	SE8	SE10	SE9	SE6	ESE2	N1	NW5	NW4	NW6	NW7	ENE12	ENE20	ENE18	NNE13	NNE13	NE14	NNE14	N14	N13	N14	NE5.3	ENE20

NNW1.7	N2.5	NNW1.4	N1.2	NNW1.3	NE0.5	ESE0.8	ESE1.7	ESE1.6	E1.1	NE0.7	E1.3	SSW0.6	S0.8	E1.1	NE1.6	NE2.1	NNE2.4	NNW2.2	NNW2.4	N1.7	NNW1.9	NW2.4	NNW2.8	Diurnal Average	
NNW22	N27	N29	NNW19	NNW27	NNW28	NW28	NNW23	SE18	N20	NNW20	NNW22	NW24	NNW25	NNW24	WNW28	NW27	NW24	N21	N22	N20	N17	WNW17	NW16	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Lower Camp - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 9 km/h on Mar 2 11:00	Hours of Data: 703
Minimum Value: 1 km/h on Mar 24 01:00	Hours of Missing Data: 41
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 94.5

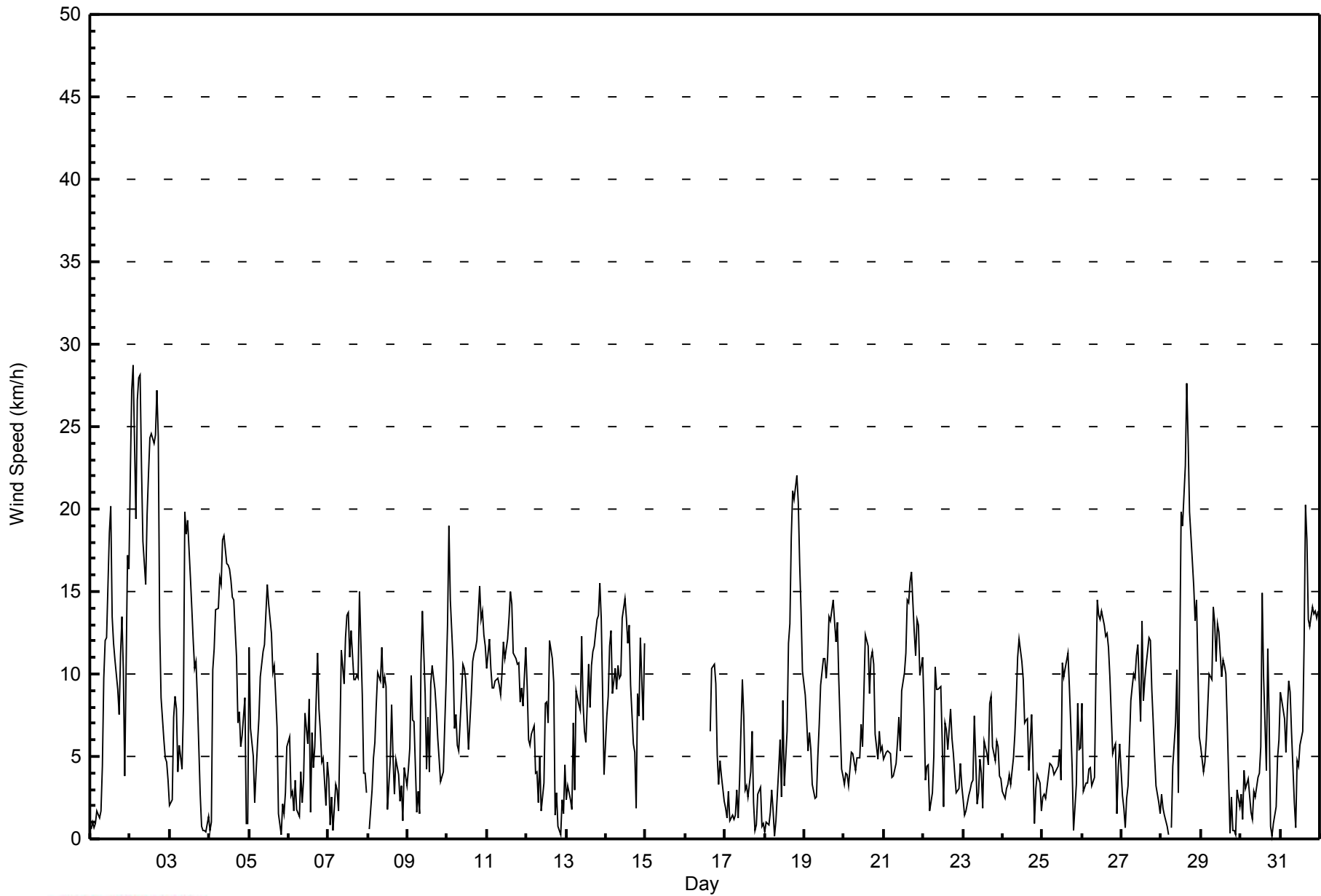
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	1	1	1	1	1	1	2	2	2	2	4	3	4	3	4	3	2	3	3	4	3	7	5	7
2-Mar	7	8	7	5	8	7	7	7	5	4	9	6	6	6	5	7	5	6	4	3	1	2	1	2	9
3-Mar	2	1	6	3	1	2	2	2	2	6	4	4	4	3	3	3	2	3	2	1	1	1	1	1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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	292	41.54	41.54
6 - 11	255	36.27	77.81
12 - 19	129	18.35	96.16
20 - 28	26	3.70	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - March 2015

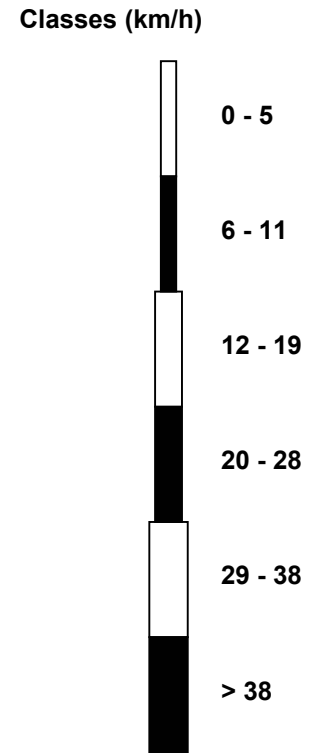
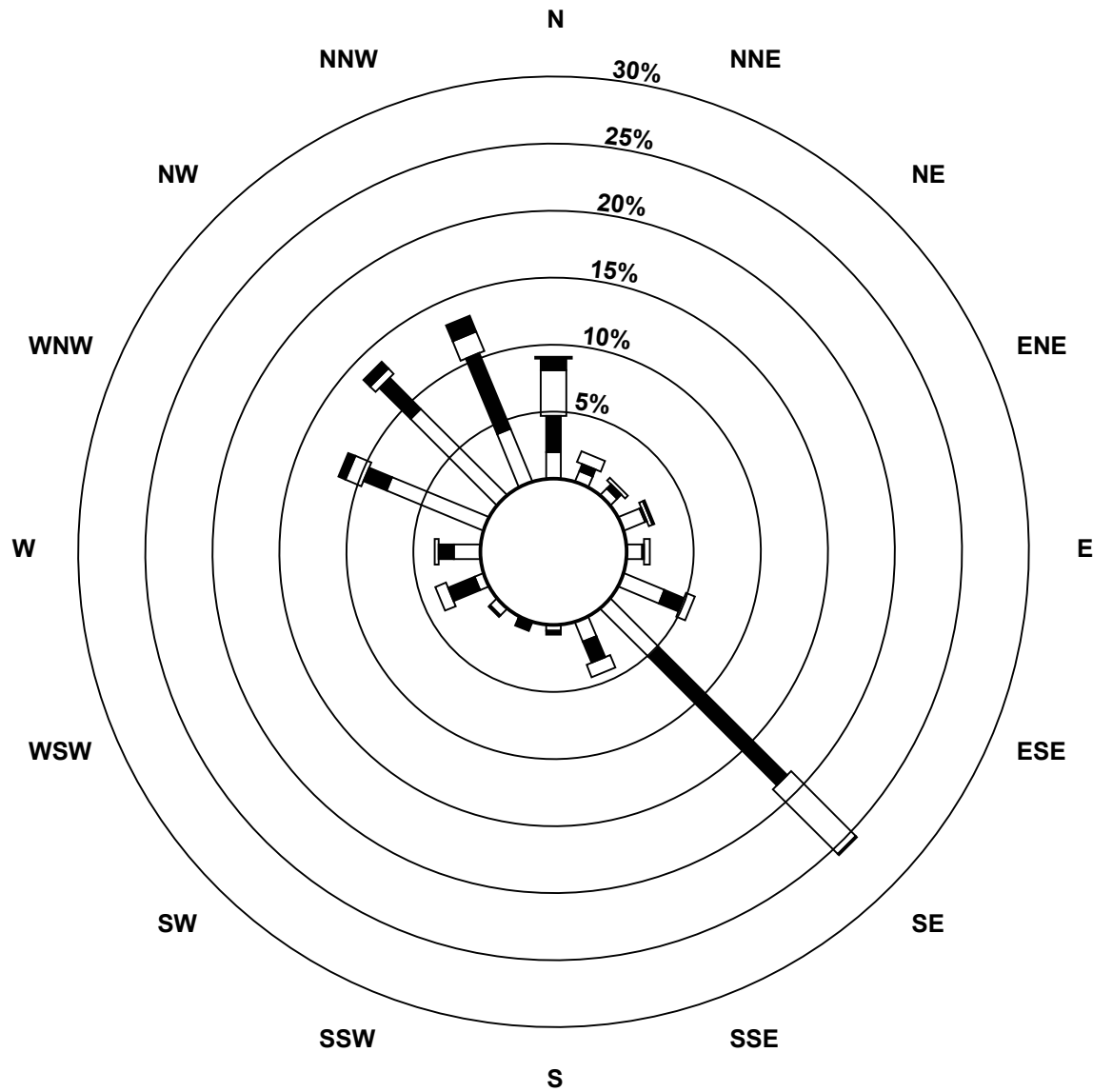
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	14	6	5	12	8	23	36	11	3	1	5	5	14	55	64	30	292
6 - 11	19	4	3	1	1	11	95	12	2	4	1	15	8	13	23	43	255
12 - 19	24	6	2	2	3	5	48	7	0	0	0	6	2	9	4	11	129
20 - 28	6	0	0	1	0	0	1	0	0	0	0	0	0	4	5	9	26
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	16	10	16	12	39	180	30	5	5	6	26	24	81	96	93	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Wind Speed (WS) - km/h
Lower Camp (AMS 11)**



Total Number of Valid Hours: 703



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - March 2015

Direction of Maximum Speed: 358 deg on Mar 2 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 333.1 deg on Mar 2	Hours of Data: 703
Direction of Minimum Speed: 286 deg on Mar 18 07:00	Hours of Missing Data: 41
Direction of Minimum Daily Speed Average: 0.7 deg on Mar 17	Percent Operational Time: 94.5
Monthly Average Direction: 318.7 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	57	338	79	96	117	120	148	135	135	137	131	131	129	147	147	166	165	159	152	146	140	172	294	326	145.3	
2-Mar	334	351	358	346	345	328	326	331	340	346	330	336	321	331	329	327	316	322	312	316	346	354	326	295	333.1	
3-Mar	325	112	291	340	303	310	292	279	304	357	358	359	341	340	349	0	31	47	43	286	314	329	72	343	346.6	
4-Mar	27	72	138	140	132	133	130	127	132	136	136	130	132	132	139	159	157	202	211	159	149	141	303	125	140.0	
5-Mar	237	303	283	342	305	130	133	134	134	136	131	133	134	135	138	134	130	130	102	76	49	142	128	138	138.7	
6-Mar	138	160	160	232	234	103	102	129	303	305	322	294	242	328	246	265	357	25	351	348	344	324	284	277	310.6	
7-Mar	286	355	133	95	121	108	42	282	273	255	299	294	284	293	298	281	253	255	256	278	279	302	302	305	280.2	
8-Mar	AF	63	118	135	143	143	140	135	135	133	136	140	149	129	134	124	139	111	131	100	130	138	136	135	133.7	
9-Mar	133	136	137	139	132	121	135	311	283	284	298	333	241	301	255	326	316	313	301	289	301	291	309	348	290.5	
10-Mar	357	15	17	359	356	22	353	51	47	353	335	317	312	323	335	341	350	347	347	352	356	1	1	358	355.7	
11-Mar	343	351	342	344	339	333	342	341	328	342	345	331	335	344	354	353	346	348	343	348	347	336	321	309	341.0	
12-Mar	312	327	324	315	324	306	306	306	308	12	333	124	161	198	137	138	137	258	293	4	359	280	286	279	271.0	
13-Mar	274	286	296	88	269	138	141	136	136	258	276	266	257	214	184	169	154	163	159	155	147	143	131	110	173.4	
14-Mar	137	139	132	119	111	129	137	137	138	132	132	133	135	135	131	137	141	141	297	239	255	254	266	326	143.0	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
17-Mar	303	304	286	4	340	337	352	321	150	126	140	138	297	244	165	143	144	180	69	66	281	306	333	339	168.5	
18-Mar	356	342	325	320	301	283	286	115	143	137	115	136	206	254	334	357	3	2	359	358	359	352	350	345	356.0	
19-Mar	344	324	336	305	311	321	320	346	319	303	320	341	342	0	357	0	1	3	8	17	38	46	358	322	351.8	
20-Mar	322	298	291	315	295	294	312	333	348	324	265	259	252	249	251	331	336	353	359	333	322	332	331	330	308.9	
21-Mar	317	324	318	323	335	315	324	321	344	353	338	128	135	121	102	90	120	125	123	108	100	101	101	114	95.8	
22-Mar	116	169	146	142	118	318	125	139	128	136	129	139	300	123	113	24	349	331	304	348	314	311	306	304	114.5	
23-Mar	275	289	263	104	58	115	130	125	323	241	245	329	354	360	359	355	14	58	343	318	321	317	322	353.2		
24-Mar	273	303	320	314	321	283	287	348	356	2	356	355	336	310	333	267	124	149	143	67	286	284	291	322	328.9	
25-Mar	313	299	303	302	290	302	299	324	337	328	264	160	126	137	135	135	132	146	163	274	138	140	138	126	147.4	
26-Mar	111	354	318	311	296	289	298	329	126	133	134	130	134	135	122	131	128	143	154	234	230	118	135	138	136.4	
27-Mar	106	69	120	126	137	132	136	138	135	134	130	143	134	142	136	149	142	143	150	146	156	293	222	93	139.0	
28-Mar	132	275	305	297	324	AF	84	128	139	136	183	321	307	297	292	293	299	297	296	295	281	250	258	294	289.0	
29-Mar	344	17	220	141	140	138	133	130	128	130	134	135	137	131	121	131	130	299	287	283	77	16	321	339	131.2	
30-Mar	296	326	290	292	310	281	89	341	326	9	5	23	113	133	132	133	138	137	98	287	243	285	133	117	122.5	
31-Mar	139	138	134	122	131	135	136	143	114	4	319	308	325	310	71	63	63	31	20	36	29	6	350	349	51.1	
	335.4	351.2	347.6	9.3	339.8	39.3	103.4	110.4	109.3	82.5	37.4	93.9	204.9	177.7	94.6	39.5	39.6	11.7	344.4	341.3	353.8	334.9	323.2	338.9		

Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Lower Camp - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on Mar 6 04:00	Hours of Data: 703
Minimum Value: 4 deg on Mar 30 14:00	Hours of Missing Data: 41
	Hours of Calibration: 0
	Percent Operational Time: 94.5
Percentiles: P ₁ = 6 P ₁₀ = 11 Q ₁ = 16 Median = 21 Q ₃ = 42 P ₉₀ = 67 P ₉₉ = 97	

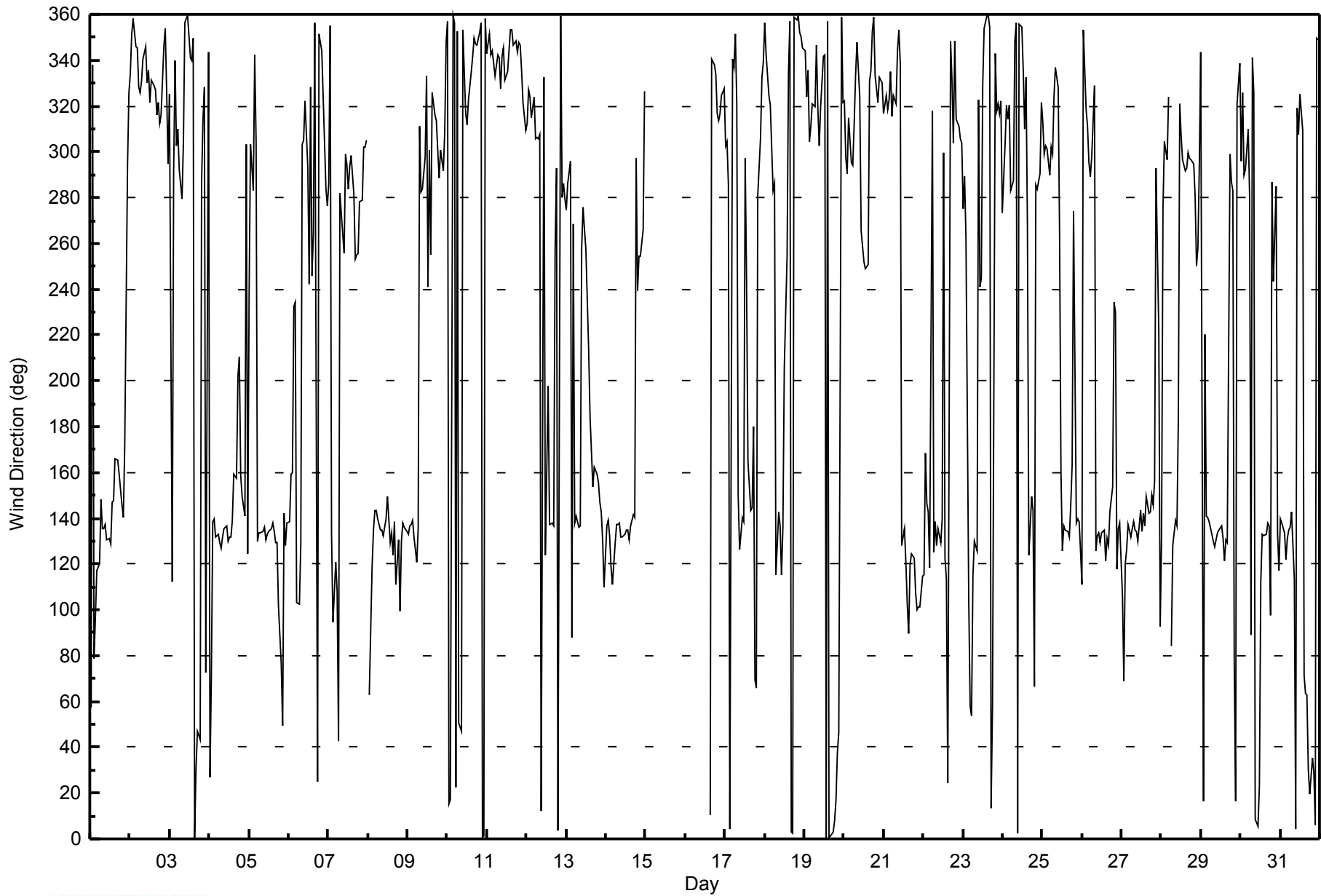
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	91	76	88	61	17	24	71	26	14	12	12	9	8	20	19	24	24	20	17	15	23	58	20	14	91	
2-Mar	18	21	18	18	21	14	15	16	19	17	20	19	16	18	16	15	14	12	13	17	19	20	16	40	40	
3-Mar	62	42	52	30	15	33	28	35	17	18	18	19	19	21	20	28	22	14	36	68	95	74	39	37	95	
4-Mar	46	69	13	12	12	10	11	11	12	8	8	10	10	12	16	21	20	28	24	16	18	7	94	91	94	
5-Mar	58	37	38	66	47	43	13	13	8	10	8	7	7	6	5	6	9	15	52	100	78	62	32	13	100	
6-Mar	35	67	93	105	88	65	71	52	50	31	30	45	26	80	23	26	36	23	23	18	36	28	58	28	105	
7-Mar	30	67	25	94	45	53	68	60	16	19	31	18	12	21	27	24	13	13	10	16	22	24	40	57	94	
8-Mar	AF	75	30	16	16	11	9	8	8	22	10	11	80	55	14	27	49	21	43	85	70	88	19	35	88	
9-Mar	36	25	13	17	30	82	75	78	34	15	41	42	25	49	14	26	23	19	21	21	37	20	18	27	82	
10-Mar	17	13	18	16	19	26	22	26	22	21	20	21	25	49	24	19	17	17	17	16	17	14	14	19	49	
11-Mar	17	18	20	18	17	17	17	18	17	19	17	18	17	19	16	15	18	19	17	19	17	17	15	10	20	
12-Mar	12	20	21	18	15	21	34	62	31	58	35	50	46	32	13	14	9	74	65	65	94	44	78	24	94	
13-Mar	40	37	44	56	72	65	12	17	11	24	25	19	48	23	36	23	18	19	19	18	14	11	17	42	72	
14-Mar	17	12	15	10	13	12	13	9	16	14	9	5	6	5	5	10	62	46	91	39	18	10	22	30	91	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
17-Mar	73	79	34	59	38	38	40	31	76	18	7	8	51	52	65	44	9	51	50	72	66	47	73	68	79	
18-Mar	95	71	48	46	25	41	92	65	44	12	70	11	68	15	27	18	16	16	16	17	17	18	17	18	95	
19-Mar	18	21	24	18	25	29	37	50	26	28	23	22	21	25	24	18	20	16	11	11	12	12	42	24	50	
20-Mar	29	35	8	33	9	9	16	31	35	43	20	26	21	13	16	34	19	18	16	19	16	15	20	18	43	
21-Mar	19	16	15	15	16	23	20	22	24	20	26	42	11	16	16	14	15	11	10	14	11	10	12	11	42	
22-Mar	22	44	33	34	99	63	44	17	15	12	12	40	88	52	22	62	42	47	41	27	33	53	26	29	99	
23-Mar	56	51	50	44	32	40	57	24	79	45	18	25	62	26	13	20	14	21	14	27	14	17	37	34	79	
24-Mar	19	29	24	19	30	42	24	21	18	15	16	16	23	29	39	31	62	25	20	66	33	18	34	56	66	
25-Mar	30	22	28	33	16	15	21	27	22	42	20	69	11	8	7	8	12	20	28	97	36	16	25	30	97	
26-Mar	28	50	53	75	62	28	46	66	56	10	9	9	9	11	16	12	14	16	58	49	20	75	30	18	75	
27-Mar	61	60	86	63	33	20	19	13	11	8	11	26	16	20	12	22	16	16	21	29	40	72	84	75	86	
28-Mar	78	82	59	84	49	AF	51	13	10	6	79	28	15	16	11	10	11	11	9	9	14	10	44	46	84	
29-Mar	29	56	52	16	11	10	9	9	10	10	9	8	7	8	11	8	13	87	64	96	95	98	37	86	98	
30-Mar	41	76	30	28	34	22	50	76	36	59	43	25	56	4	53	63	6	13	86	99	97	85	27	28	99	
31-Mar	14	11	10	38	17	11	12	23	77	88	45	40	41	33	34	15	17	14	18	17	18	18	17	17	88	
	95	82	93	105	99	82	92	78	79	88	79	69	88	80	65	63	62	87	91	100	97	98	94	91		
	Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - March 2015



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 4, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	12:33
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
Cal Gas Concentration	51.3 ppm	Cal Gas Expiry Date	
Gas Cert Reference	LL110099		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	SE1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-675	-675
Analyzer Range (mv)	1000	1000	Lamp voltage	807	807
Calculated slope	0.999652	0.998215	Chamber temp.	45.0	45.0
Calculated intercept	0.981259	1.040033	Pressure (mmHg)	707.8	713.8
Analyzer Background	10.4	10.9	Flow (lpm)	0.491	0.497
Analyzer Coefficient	0.995	1.006	Intensity	90	91

Analyzer make TEI 431 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	NA
as found span	5000	80.9	830.0	821.2	1.011
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	80.9	830.0	831.2	0.999
second point	5000	40.9	419.6	418.2	1.003
third point	5002	20.4	209.2	208.1	1.005
calibrator zero					
as left zero	5000	0.0	0.0	-0.1	NA
as left span	5000	80.9	830.0	827.0	1.004
Average Correction Factor					1.002

Corrected As found 821.0 Previous response 829.3 % change 1.0%

Notes:

Inlet filter replaced after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

SO₂ Calibration Summary

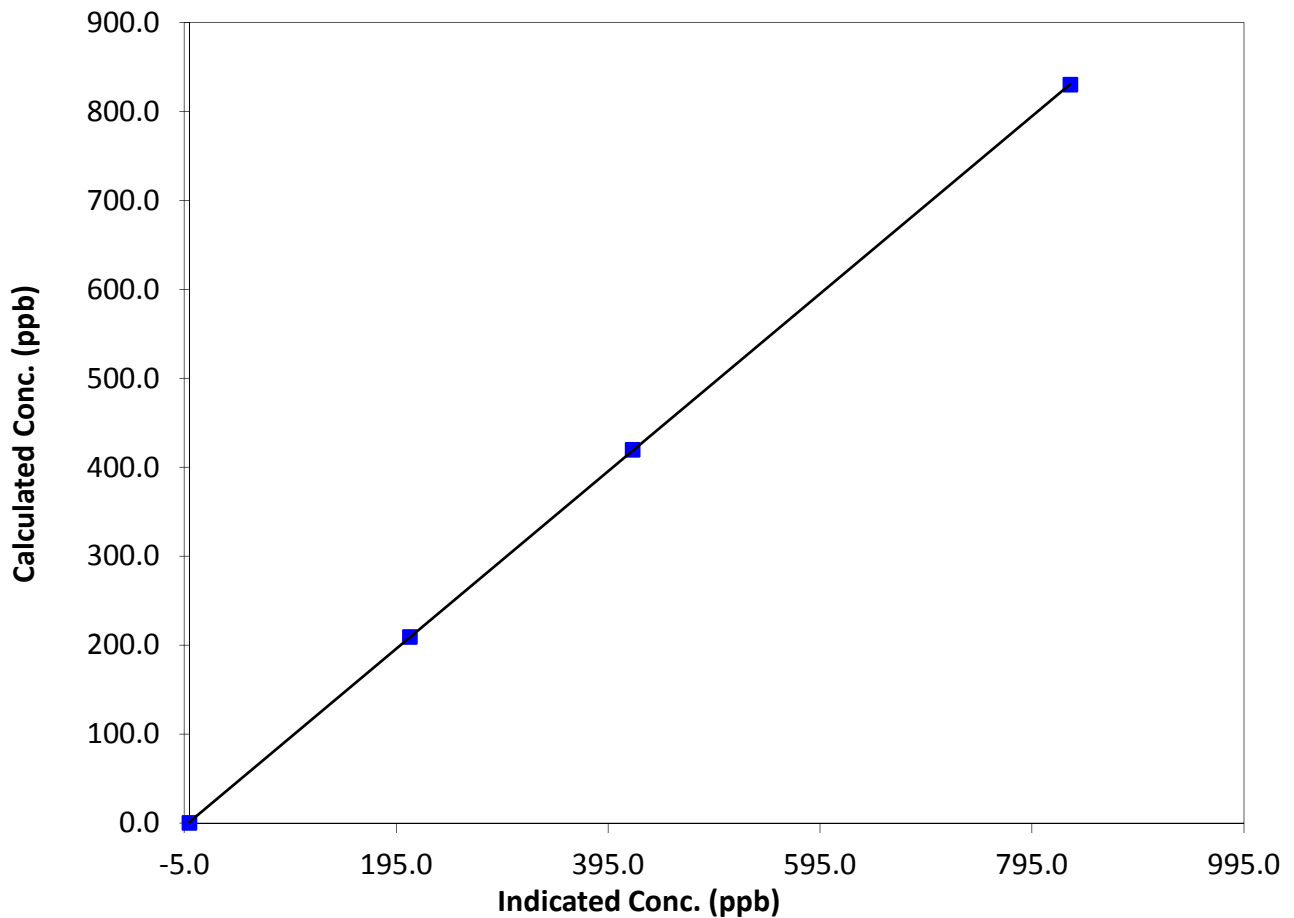
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 4, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:05	End Time (MST)	12:33
Analyzer make	TEI 43I	Analyzer serial #	100841398

Calibration Data

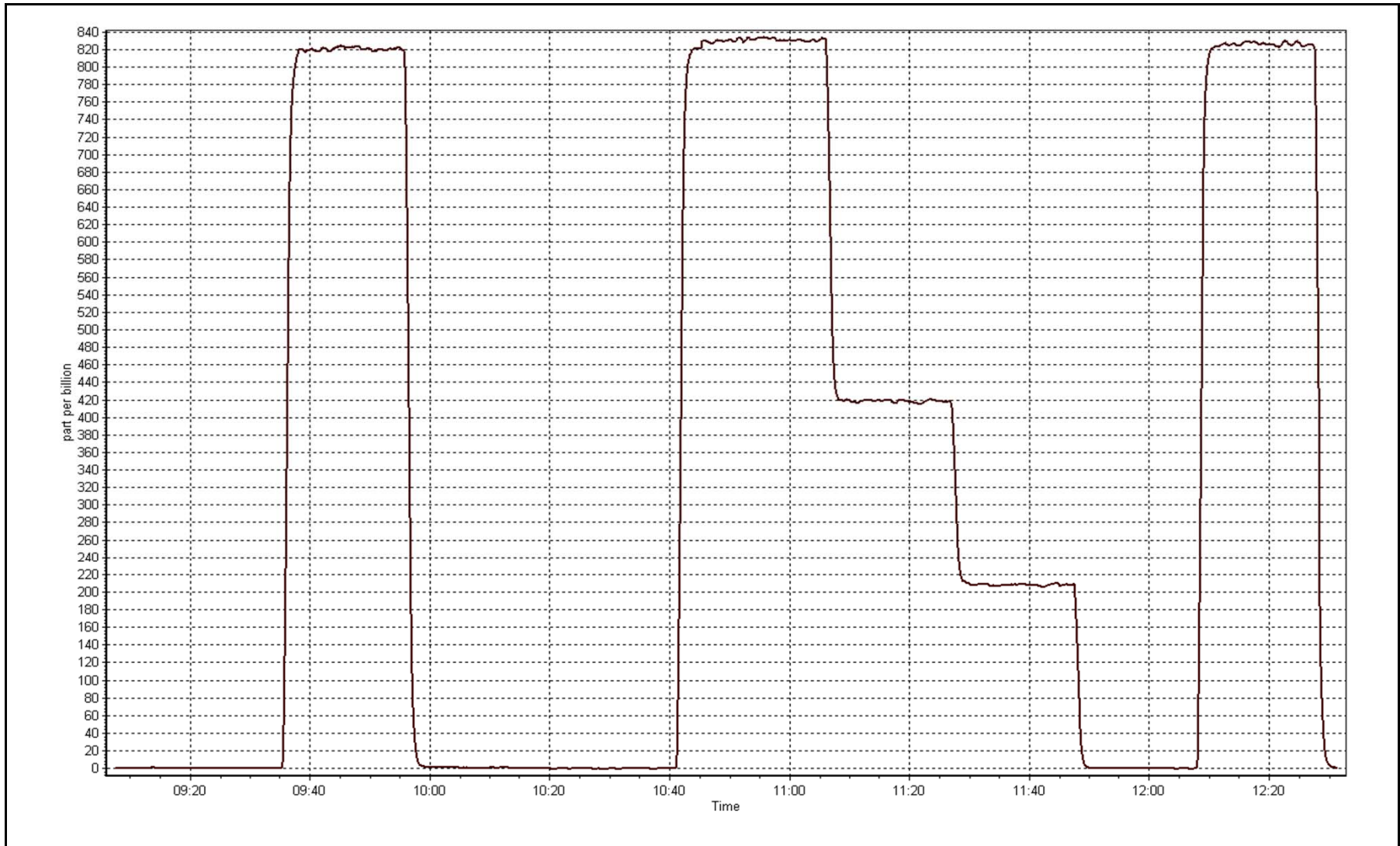
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999993
830.0	831.2	0.9987		
419.6	418.2	1.0034	Slope	0.998215
209.2	208.1	1.0054		
			Intercept	1.040033

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 11, 2015





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	12:27	End Time (MST)	15:25
Barometric Pressure	760 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11051107
Cal Gas Concentration	5.15 ppm H2S	Cal Gas Expiry Date	9/9/2017
Gas Cert Reference	LL110099	SO2 gas conc.	51.4 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	SE2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage (v)	-683	-684
Analyzer Range (mv)	100	100	Lamp voltage (v)	892	898
Calculated slope	0.985655	0.996168	Chamber temp. (deg C)	45	45
Calculated intercept	0.482633	-0.218323	Pressure (mmHg)	580.2	569.8
Analyzer Background	44.5	44.2	Flow(LPM)	1.149	1.147
Analyzer Coefficient	0.929	0.916	Intensity(%)	111	111
			Converter temp.(deg C)	340	342

Analyzer make/model	Thermo 450i	Analyzer serial #	922436966
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	0.0	NA
as found span	5000	72.9	75.1	74.1	1.013
SO2 scrubber check	5000	20.5	210.7	1.9	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5001	72.9	75.1	75.4	0.996
second point	5002	38.8	39.9	40.6	0.983
third point	5002	19.4	20.0	20.3	0.982
calibrator zero					
as left zero	5000	0.0	0.0	0.5	NA
as left span	4999	72.9	75.1	75.9	0.989
Average Correction Factor					0.987

Corrected As found	74.1	Previous response	75.7	% change	2.2%
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Notes:

Scrubber check performed after as founds. Inlet filter changed after as founds as well. Span Slightly adjusted.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

H2S Calibration Summary

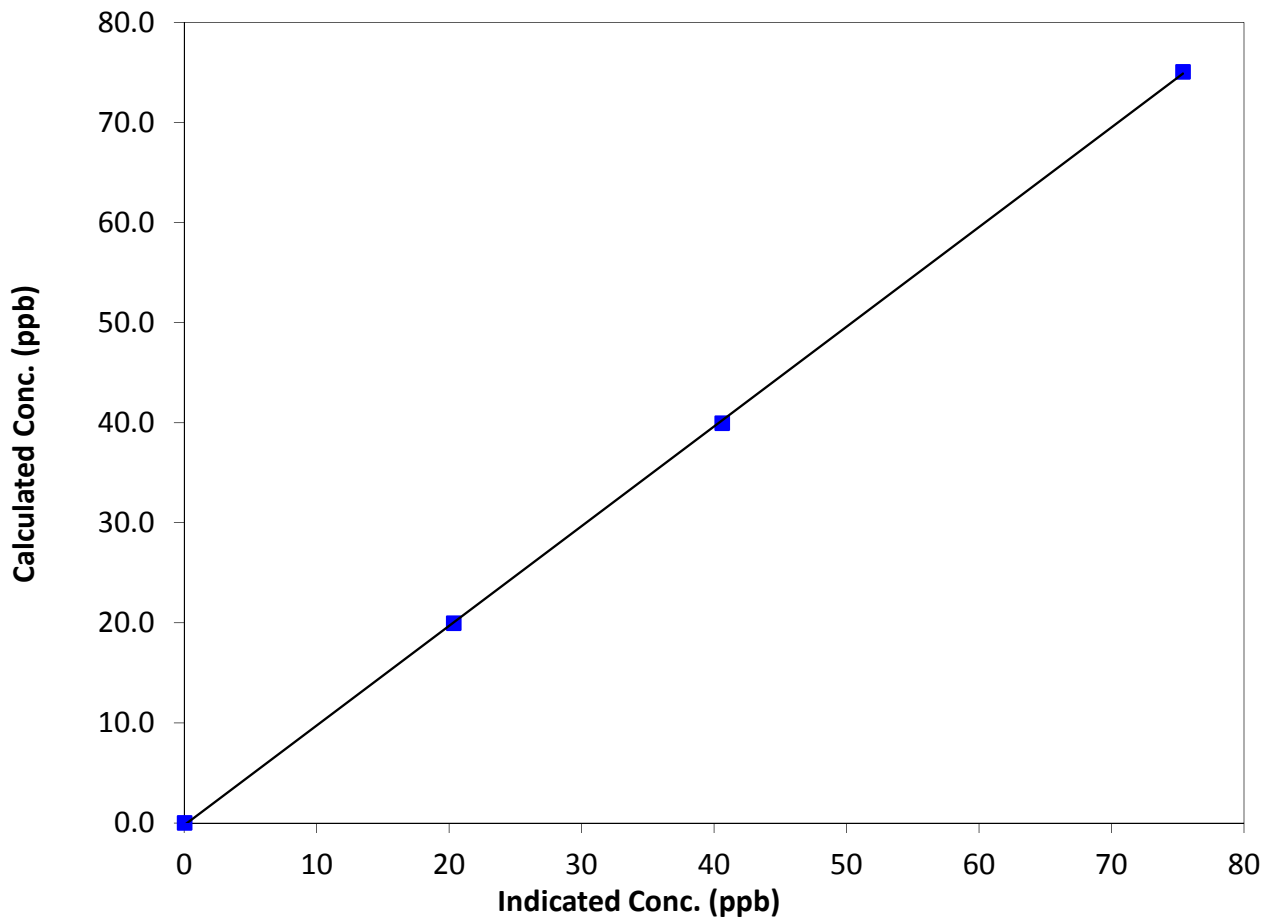
Station Information

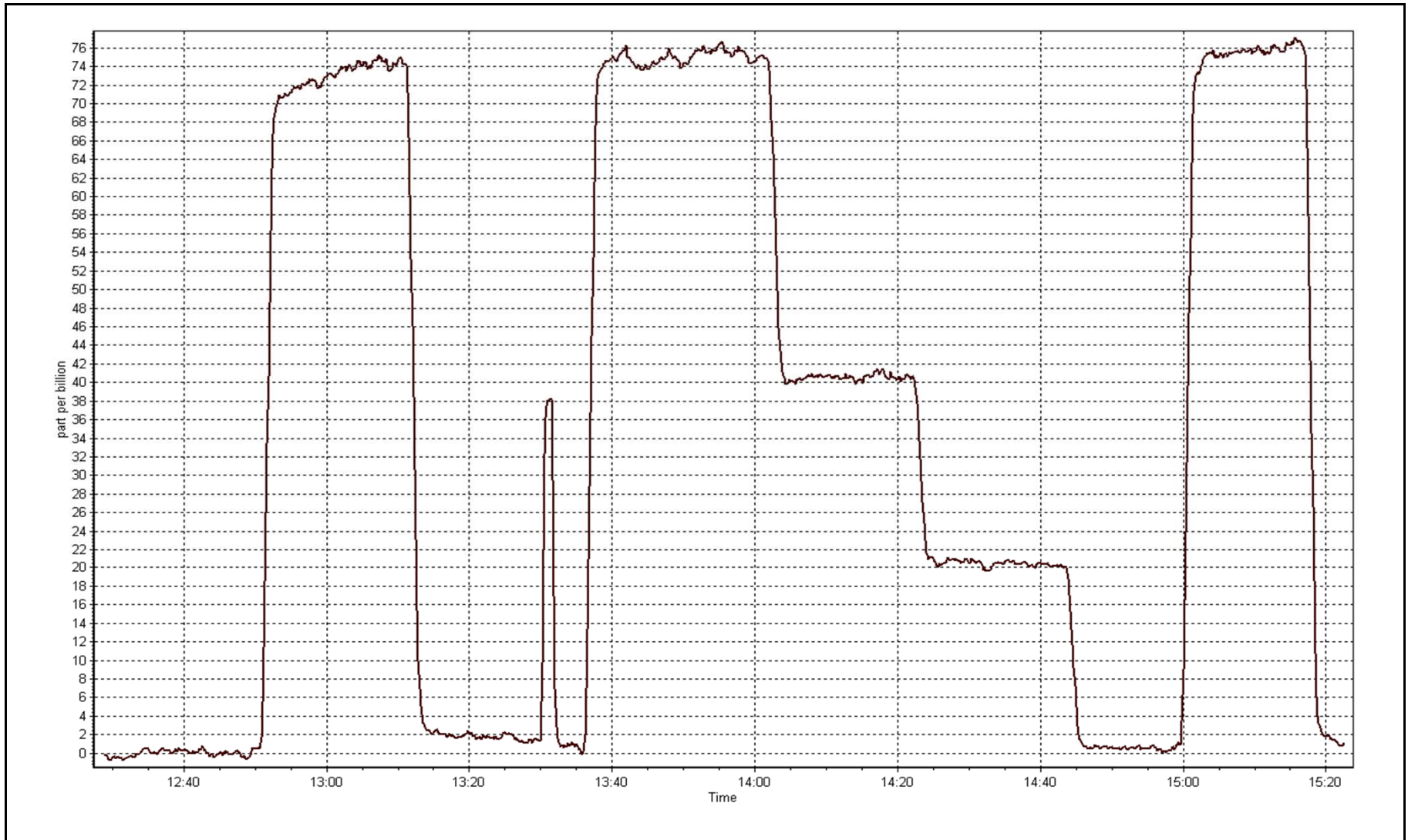
Calibration Date	March 11, 2015	Previous Calibration	February 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	12:27	End Time (MST)	15:25
Analyzer make	Thermo 450i	Analyzer serial #	922436966

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999948
75.1	75.4	0.9956		
39.9	40.6	0.9835	Slope	0.996168
20.0	20.3	0.9820		
			Intercept	-0.218323

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Wednesday, March 11, 2015	Previous Calibration	Sunday, February 15, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	12:33
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
Gas Cert Reference	LL110099	Cal Gas Expiry Date	
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1073.8 ppm
C3H8 Cal Gas Conc.	205 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	SE3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.5	8.5
Analyzer Range (mv)	25	25	Air or Bypass press	37.3	37.3
Calculated slope	0.992560	1.006581	Fuel Pressure	24.0	24.0
Calculated intercept	-0.079405	-0.062254			

Analyzer make	51i-LT	Analyzer serial #	1410661326
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.66	N/A
as found span	5000	80.9	17.37	17.54	0.990
calibrator zero	5000	0.0	0.00	0.05	N/A
high point	5001	80.9	17.37	17.32	1.003
second point	5000	40.9	8.78	8.77	1.002
third point	5002	20.4	4.38	4.44	0.986
calibrator zero					
as left zero	5000	0.0	0.00	0.10	N/A
as left span	5000	80.9	17.37	17.39	0.999
Average Correction Factor					0.997

Corrected As found	18.20	Previous response	17.58	% change	-3.4%
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Notes:

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

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

THC Calibration Summary

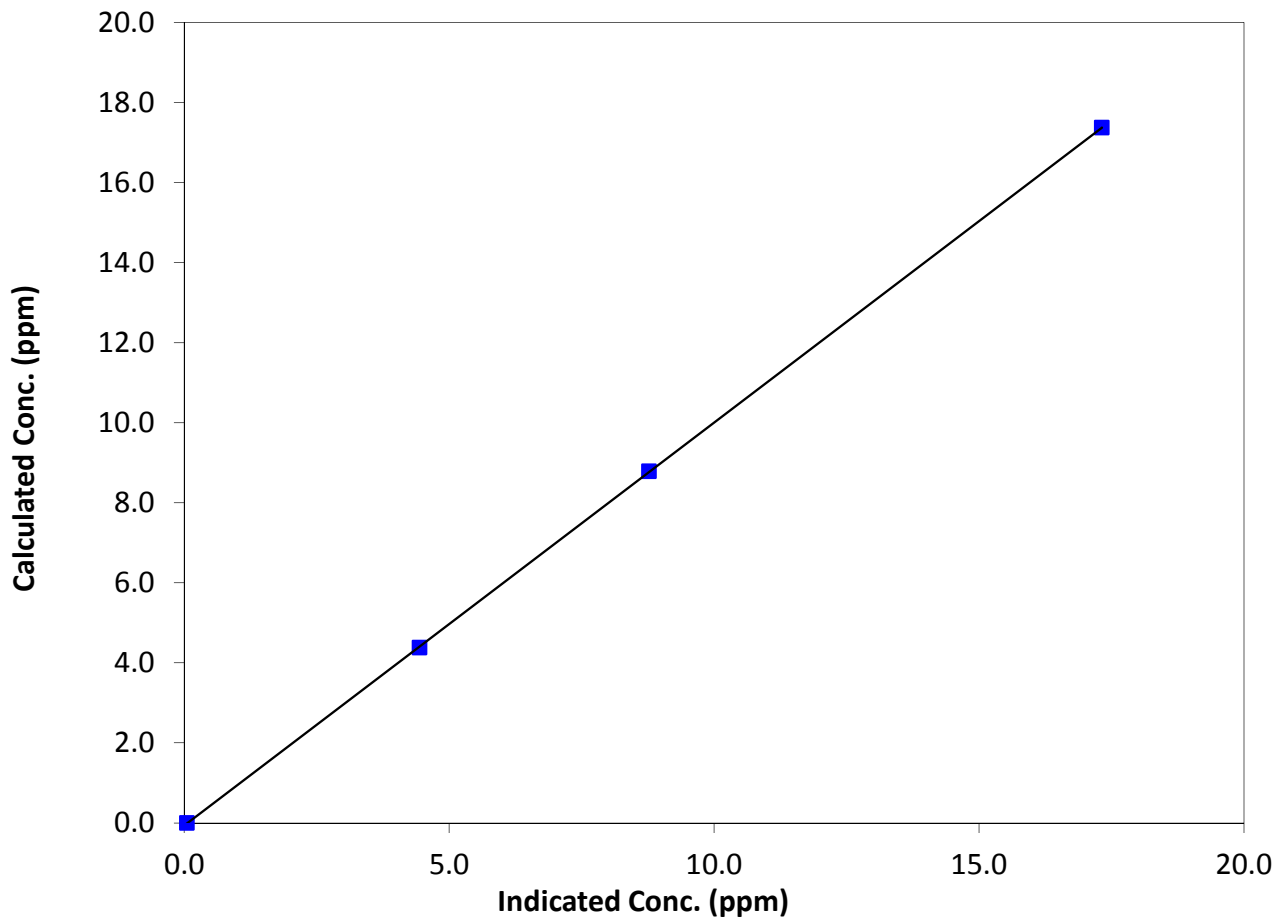
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 15, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:05	End Time (MST)	12:33
Analyzer make	51i-LT	Analyzer serial #	1410661326

Calibration Data

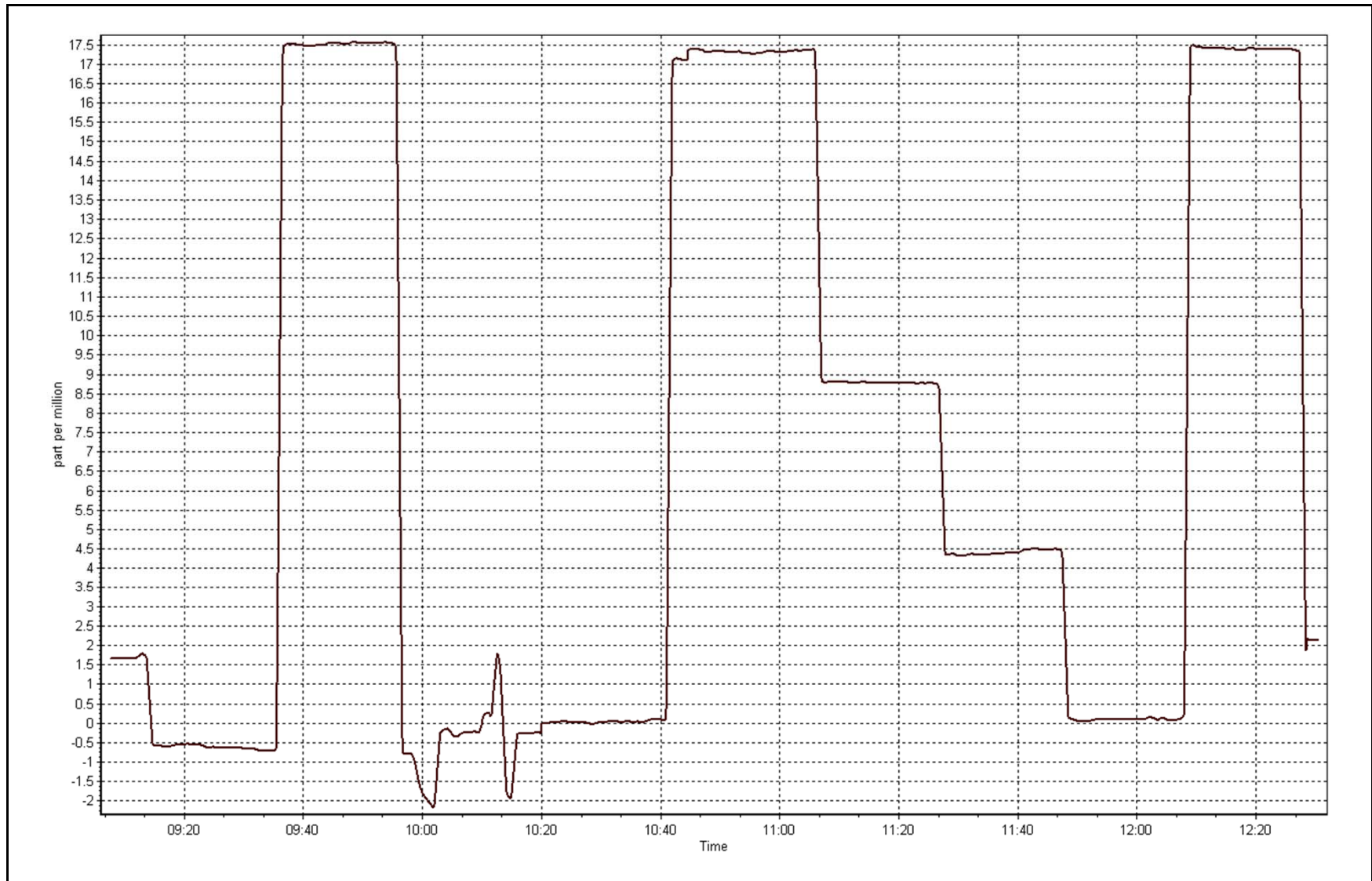
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	N/A	Correlation Coefficient	0.999993
17.37	17.32	1.0029		
8.78	8.77	1.0015	Slope	1.006581
4.38	4.44	0.9863		
			Intercept	-0.062254

THC Calibration Curve



THC Calibration Plot

Date: March 11, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 12
MILLENNIUM MINE
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospherics Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	708	36	36	100.00	26	0	3	0
TRS(ppb) Average	708	35	36	99.87	2	0	1	0
THC(ppm) Average	704	37	40	99.60	6.5	-	3	-
NO2(ppb) Average	707	36	37	99.87	57	0	32	-
NO(ppb) Average	707	36	37	99.87	226	-	46	-
NOX(ppb) Average	707	36	37	99.87	283	-	69	-
PM2.5(ug/m3) Average	726	0	18	97.58	31.7	-	13.8	0
Temperature 2 m (C) Average	744	0	0	100.00	13.7	-	7.3	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	90	-
Wind Speed 10 m (km/h) Average	707	0	37	95.03	31	-	16	-
Wind Direction 10 m (deg) Average	707	0	37	95.03	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	708	0.9	2	-	0	0	0	0	1	2	26
TRS(ppb) Average	708	0.4	0	-	0	0	0	0	0	1	2
THC(ppm) Average	704	2.47	0.5	-	2	2.1	2.2	2.3	2.6	3.1	6.5
NO2(ppb) Average	707	15.7	12	-	0	2	5	13	24	33	57
NO(ppb) Average	707	12.3	26	-	0	0	0	2	10	36	226
NOX(ppb) Average	707	28	36	-	0	2	6	16	36	67	283
PM2.5(ug/m3) Average	726	6.51	4.3	-	0.3	2.1	3.6	5.5	8.4	12.3	31.7
Temperature 2 m (C) Average	744	-3.49	8.2	-	-29.1	-14.4	-8.8	-3	2.9	5.8	13.7
Relative Humidity (%) Average	744	68.4	17	-	28	44	56	70	83	89	100
Wind Speed 10 m (km/h) Average	707	7.3	4	-	0	3	4	6	9	14	31
Wind Direction 10 m (deg) Average	707	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	24 Mar 2015 08:00	24 Mar 2015 08:00	1	Maintenance - manifold cleaning
THC	03 Mar 2015 09:00	03 Mar 2015 10:00	2	Maintenance - replaced fuel cylinder and relit FID
THC	25 Mar 2015 11:00	25 Mar 2015 11:00	1	Maintenance - confirm analyzer response
NO2, NO, NOX	25 Mar 2015 11:00	25 Mar 2015 11:00	1	Maintenance - confirm analyzer response
PM2.5	24 Mar 2015 09:00	24 Mar 2015 10:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	26 Mar 2015 20:00	27 Mar 2015 10:00	15	Intermittent unstable operation - excessive baseline drift
PM2.5	27 Mar 2015 11:00	27 Mar 2015 11:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	07 Mar 2015 02:00	07 Mar 2015 02:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	15 Mar 2015 01:00	16 Mar 2015 11:00	35	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	17 Mar 2015 04:00	17 Mar 2015 04:00	1	Flat line in sensor output signal -sensor frozen

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Summary of Hour Averages

Millennium - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 26 ppb on Mar 20 15:00	Maximum Daily Average: 3.5 ppb on Mar 16		Hours of Data:	708
Minimum Value: 0 ppb on Mar 27 15:00	Minimum Daily Average: 0.2 ppb on Mar 19		Hours of Missing Data:	36
Maximum Diurnal Average: 2.9 ppb at hour 15	Minimum Diurnal Average: 0.4 ppb at hour 7		Hours of Calibration:	36
Monthly Average: 0.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 12		Percent Operational Time:	100.0

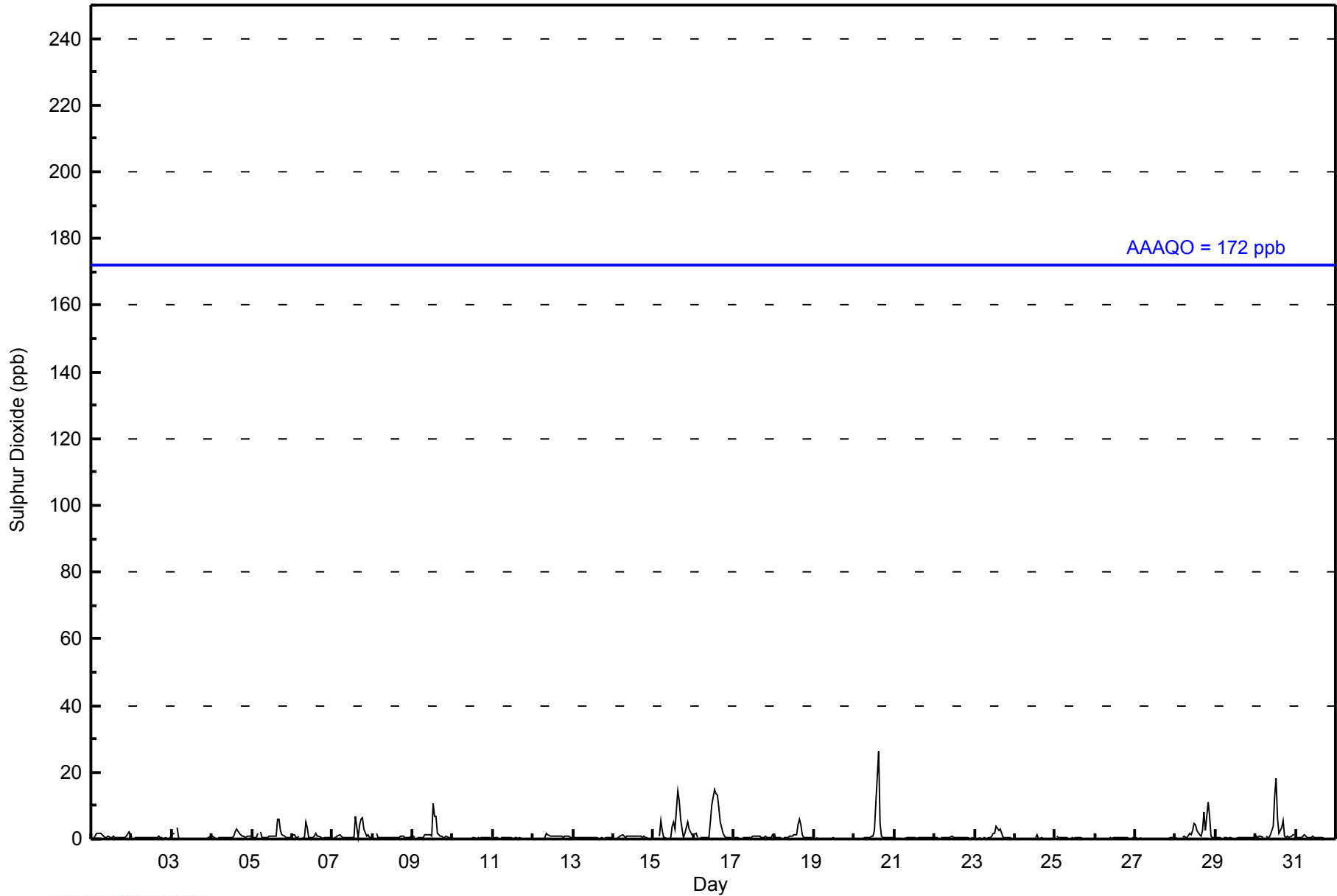
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	0	1	2	2	2	1	1	0	0	1	1	1	1	1	0	0	0	0	0	1	1	2	1	0.8	2																						
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.3	1																						
3-Mar	1	2	Z	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	4																						
4-Mar	1	1	0	Z	0	0	0	0	0	0	0	0	1	2	3	2	1	1	1	1	1	1	1	1	0.8	3																						
5-Mar	1	1	1	2	Z	2	1	0	1	1	1	1	1	1	1	6	6	3	1	1	1	1	0	1	1.4	6																						
6-Mar	1	1	1	0	1	Z	0	0	5	3	1	0	0	1	2	1	1	0	0	0	0	0	0	0	0.9	5																						
7-Mar	Z	0	0	1	1	1	0	0	0	0	0	0	0	7	1	4	6	6	6	3	1	1	1	1	1.5	7																						
8-Mar	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0.5	1																						
9-Mar	1	0	Z	0	0	0	0	1	1	1	1	1	11	7	7	2	1	1	0	0	1	0	0	0	1.7	11																						
10-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
12-Mar	0	0	0	0	0	Z	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	2																						
13-Mar	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
14-Mar	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1																						
15-Mar	0	0	Z	1	6	2	0	0	0	0	4	5	3	14	12	6	3	0	2	5	3	2	1	1	3.1	14																						
16-Mar	1	2	0	Z	0	0	0	0	0	0	5	10	15	13	13	10	5	2	1	0	0	0	0	0	3.5	15																						
17-Mar	0	0	0	1	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0.6	1																						
18-Mar	1	1	1	0	0	Z	0	0	1	1	1	1	1	1	4	6	4	1	0	0	0	0	0	0	1.2	6																						
19-Mar	Z	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																						
20-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	3	11	26	4	1	0	0	0	0	0	0	0	2.2	26																						
21-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
22-Mar	0	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
23-Mar	0	0	0	0	Z	0	0	0	0	0	1	2	2	4	3	3	2	0	0	0	0	0	0	0	0.9	4																						
24-Mar	0	0	0	0	0	Z	0	C	C	C	C	C	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1																						
25-Mar	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
26-Mar	0	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-Mar	0	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-Mar	1	0	0	Z	0	1	1	0	1	1	2	5	4	2	1	1	2	8	3	11	7	1	0	0	2.4	11																						
29-Mar	0	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																						
30-Mar	1	0	1	1	0	Z	1	1	0	1	4	13	18	7	2	4	6	1	1	1	0	1	1	1	2.8	18																						
31-Mar	Z	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
																								0.5	0.4	0.4	0.6	0.6	0.6	0.4	0.4	0.6	0.6	0.8	1.5	2.2	1.9	2.9	1.8	1.5	1.0	0.7	0.8	0.7	0.5	0.5	0.5	Diurnal Average
																								1	2	1	4	6	2	1	1	5	3	5	13	18	13	26	12	6	8	6	11	7	3	2	1	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	697	98.45	98.45
11 - 20	10	1.41	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



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - March 2015

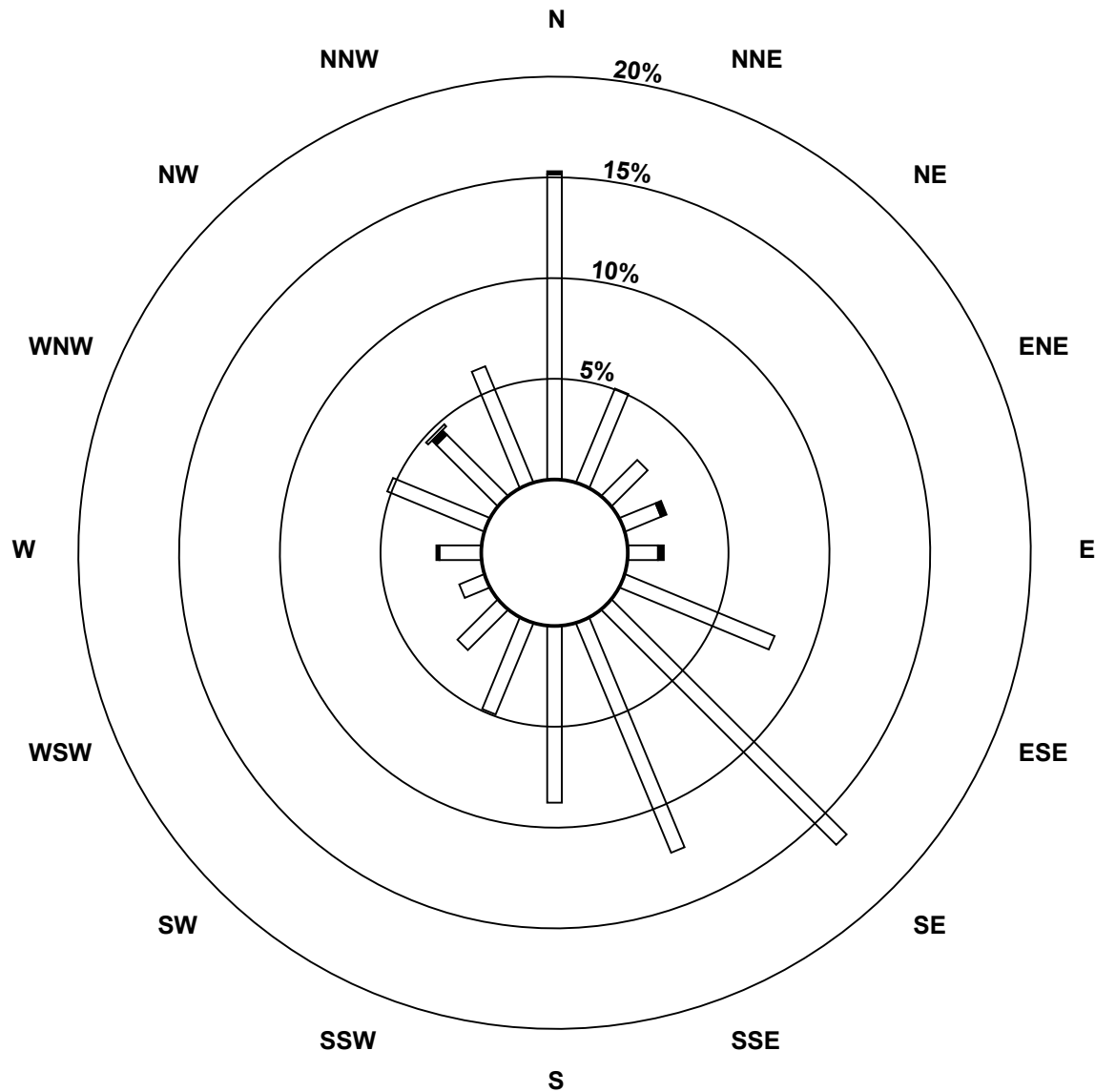
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	102	34	17	13	10	54	111	83	59	33	19	9	14	35	29	42	664
11 - 20	1	0	0	2	2	0	0	0	0	0	0	0	1	0	2	0	8
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	34	17	15	12	54	111	83	59	33	19	9	15	35	32	42	673

Total Number of Valid Hours: 673

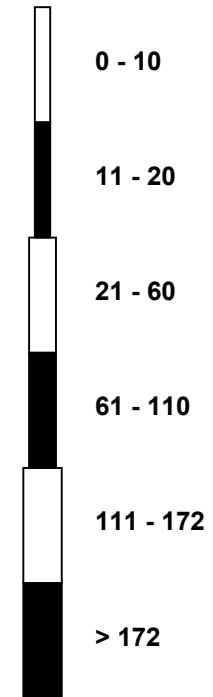
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Millennium (AMS 12)**



Classes (ppb)

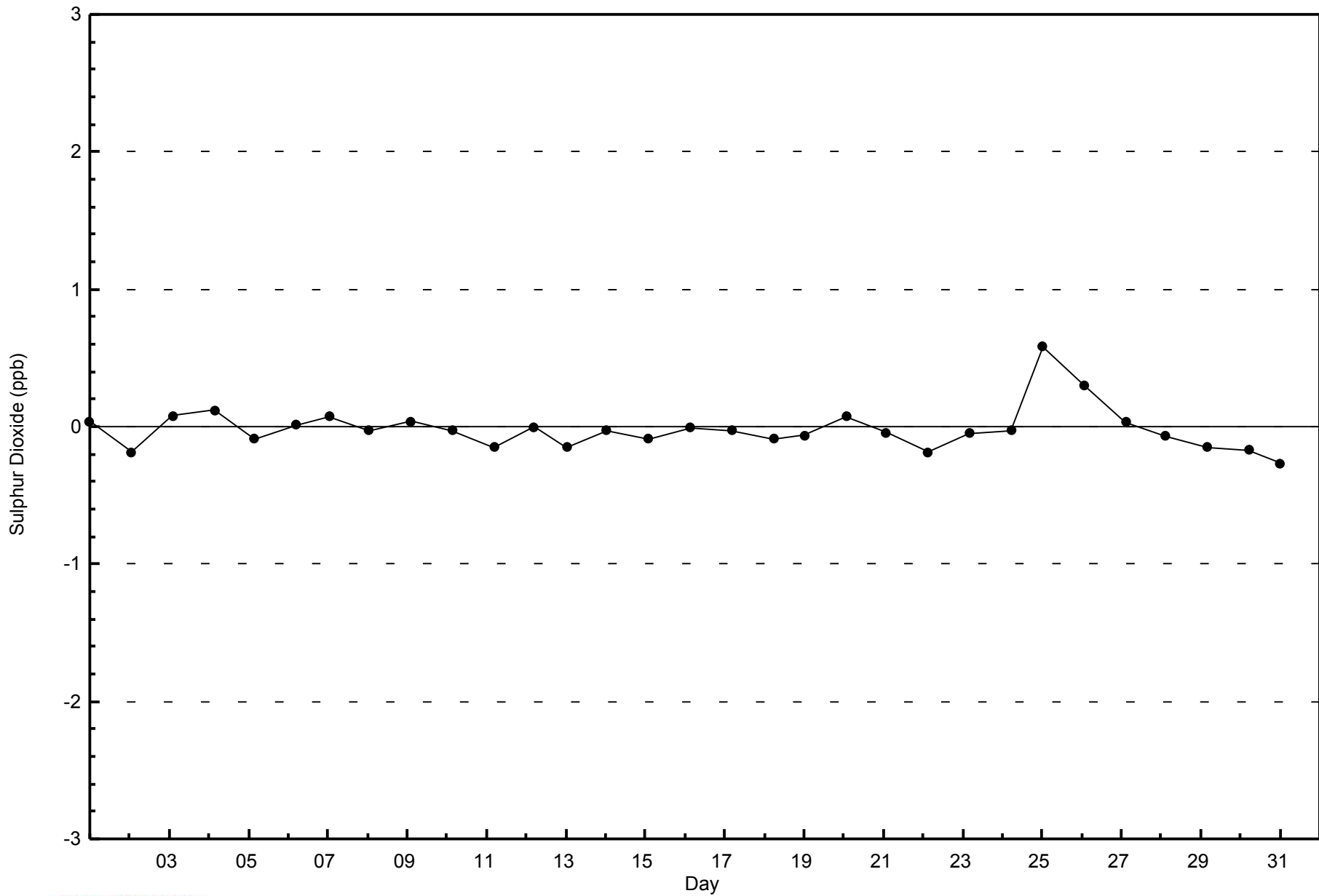


Total Number of Valid Hours: 673



WBEA
Zero Responses

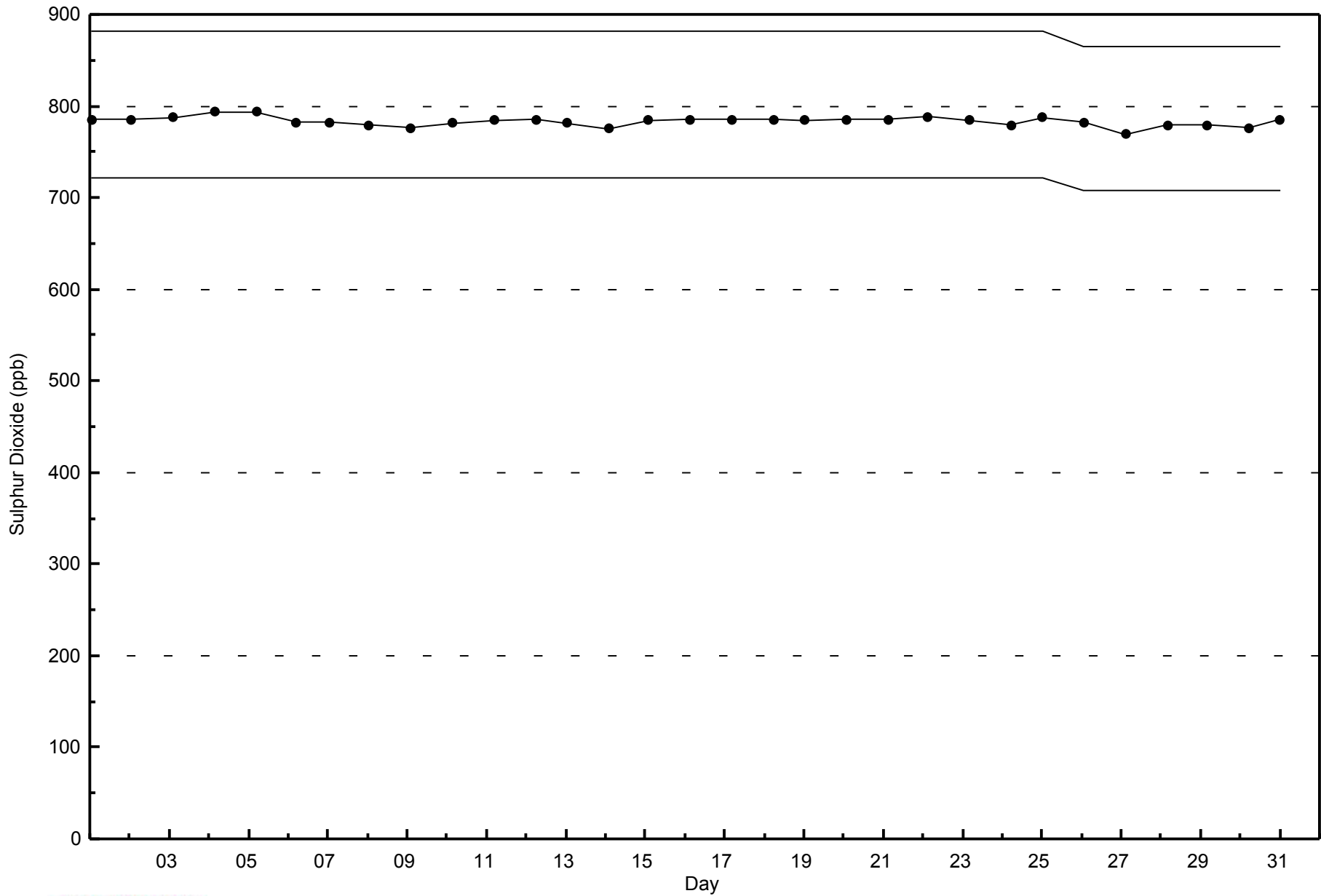
Sulphur Dioxide (SO₂) - ppb
Millennium - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Millennium - March 2015





Summary of Hour Averages

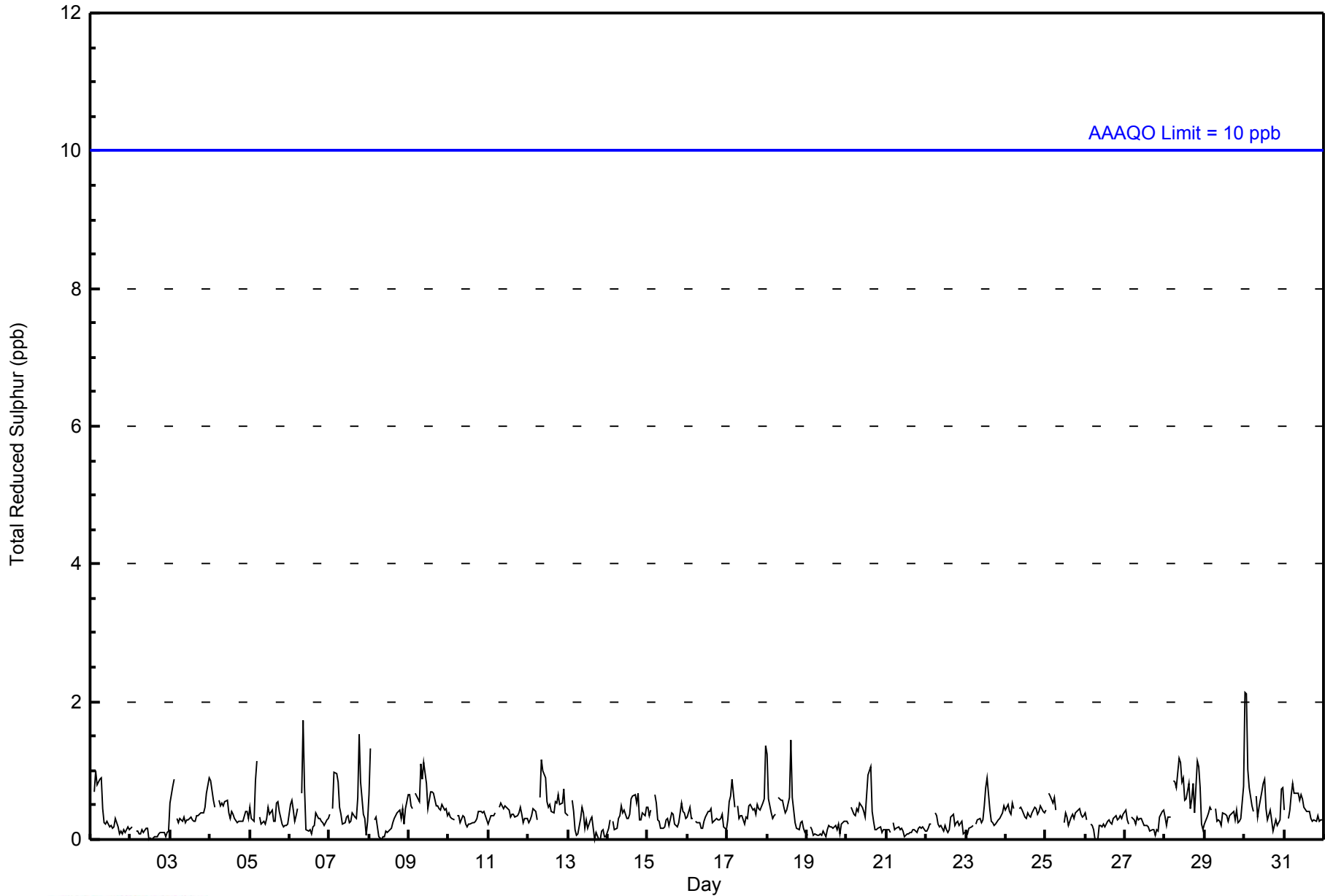
Millennium - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on Mar 30 01:00										Maximum Daily Average: 0.7 ppb on Mar 28										Hours of Data: 708						
Minimum Value: 0 ppb on Mar 2 12:00										Minimum Daily Average: 0.1 ppb on Mar 2										Hours of Missing Data: 36						
Maximum Diurnal Average: 0.5 ppb at hour 2										Minimum Diurnal Average: 0.3 ppb at hour 23										Hours of Calibration: 35						
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										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Mar	0	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-Mar	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
4-Mar	1	1	1	0	Z	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Mar	0	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
6-Mar	1	1	0	0	0	0	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
7-Mar	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0.5	2
8-Mar	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
9-Mar	1	0	0	Z	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1
10-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Mar	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Mar	0	0	0	0	0	0	Z	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	0	0	0.5	1
13-Mar	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.4	1
15-Mar	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
16-Mar	0	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-Mar	0	1	1	1	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	1	0.5	1
18-Mar	1	1	0	0	0	0	Z	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1
19-Mar	0	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-Mar	0	0	Z	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
21-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Mar	0	1	0	0	1	0	Z	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Mar	0	Z	1	1	1	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
26-Mar	0	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-Mar	0	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-Mar	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	0	0.7	1
29-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
30-Mar	2	2	1	1	0	0	Z	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.6	2
31-Mar	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
0.4 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4																								Diurnal Average		
2 2 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 2 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																										



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - March 2015

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



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - March 2015

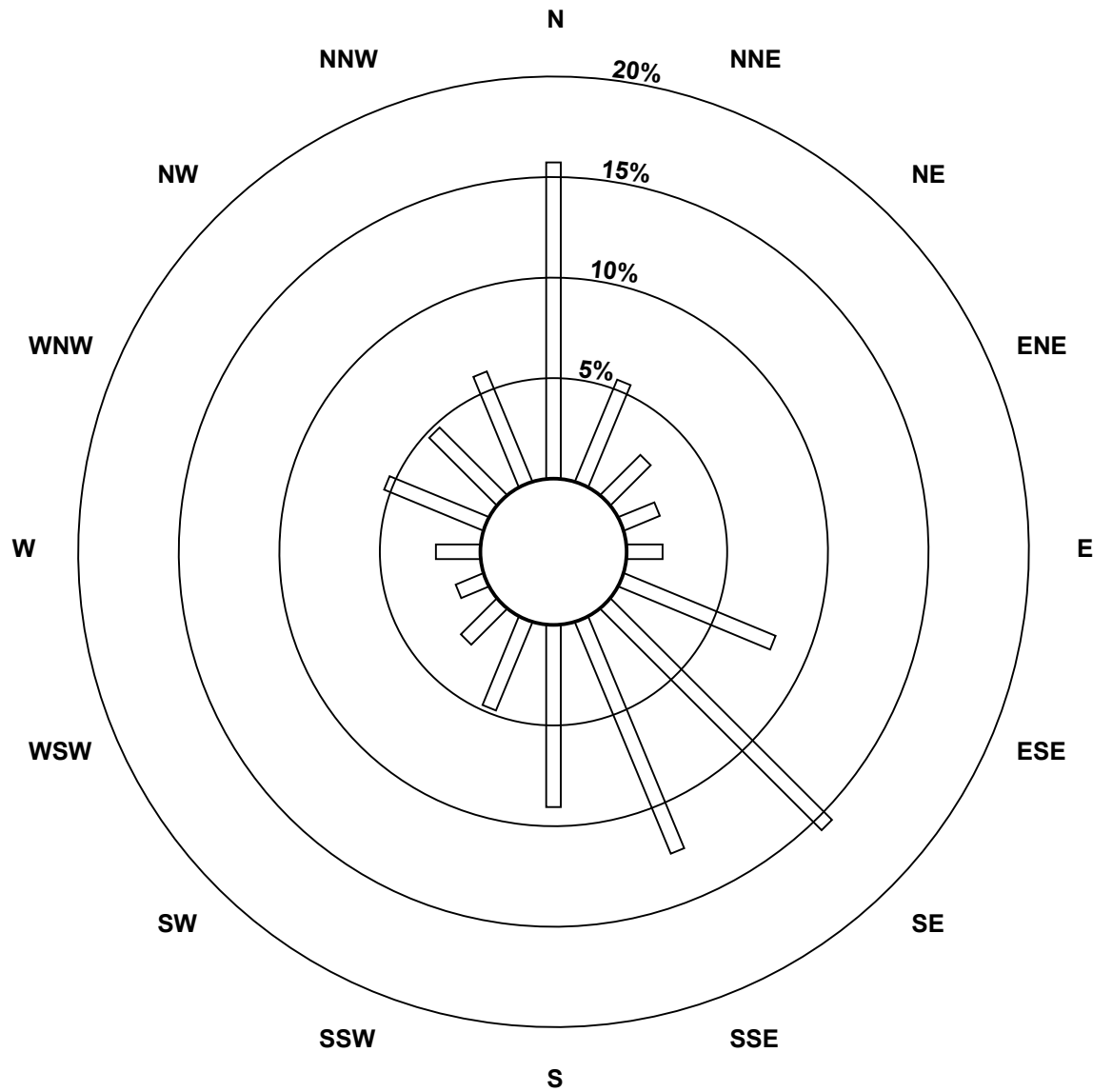
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	106	37	19	13	12	55	105	84	61	32	17	10	15	36	32	40	674
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	106	37	19	13	12	55	105	84	61	32	17	10	15	36	32	40	674

Total Number of Valid Hours: 674

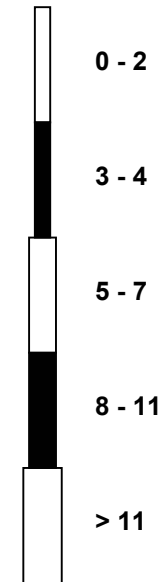
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Reduced Sulphur (TRS) - ppb
Millennium (AMS 12)**



Classes (ppb)

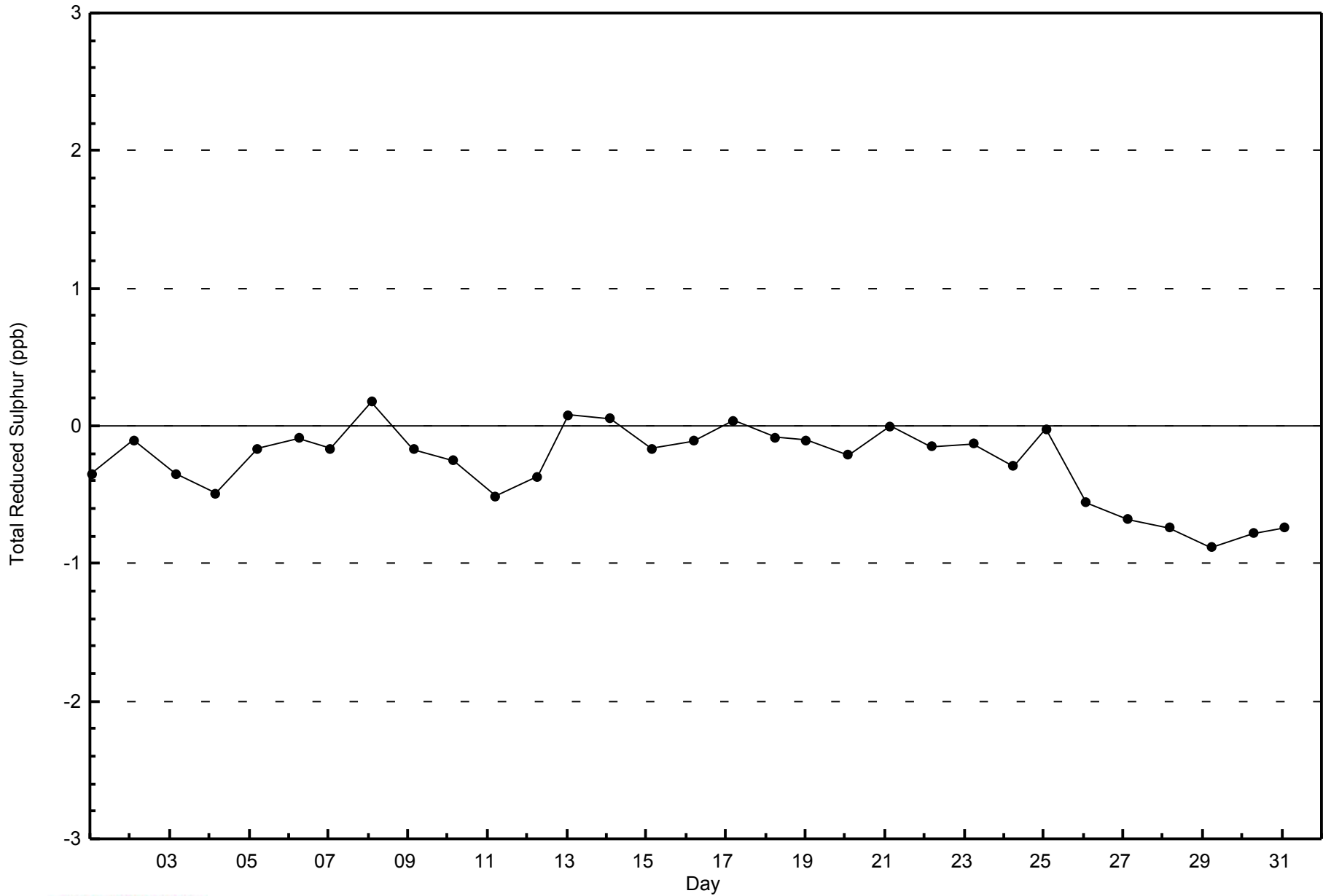


Total Number of Valid Hours: 674



WBEA
Zero Responses

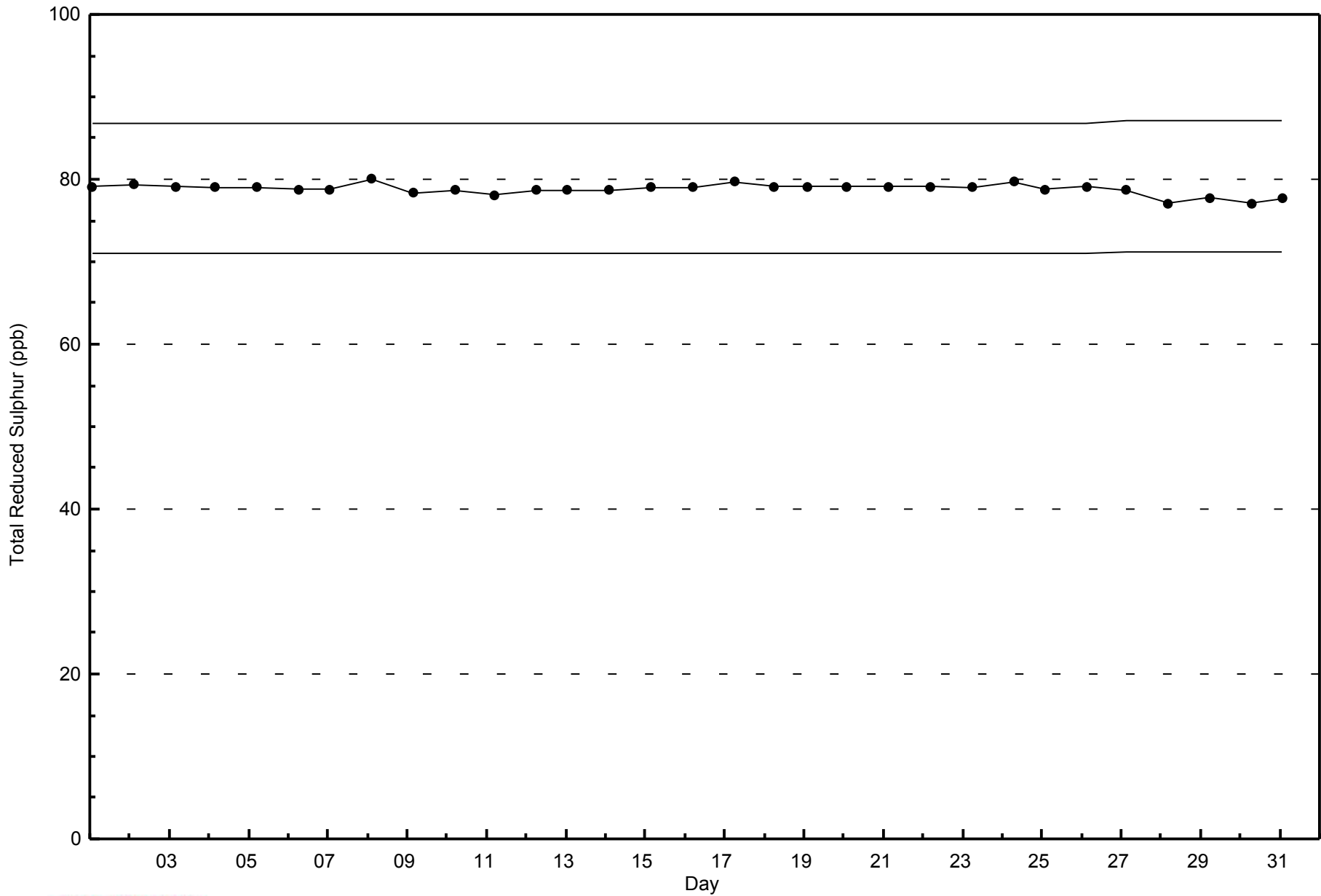
Total Reduced Sulphur (TRS) - ppb
Millennium - March 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Millennium - March 2015



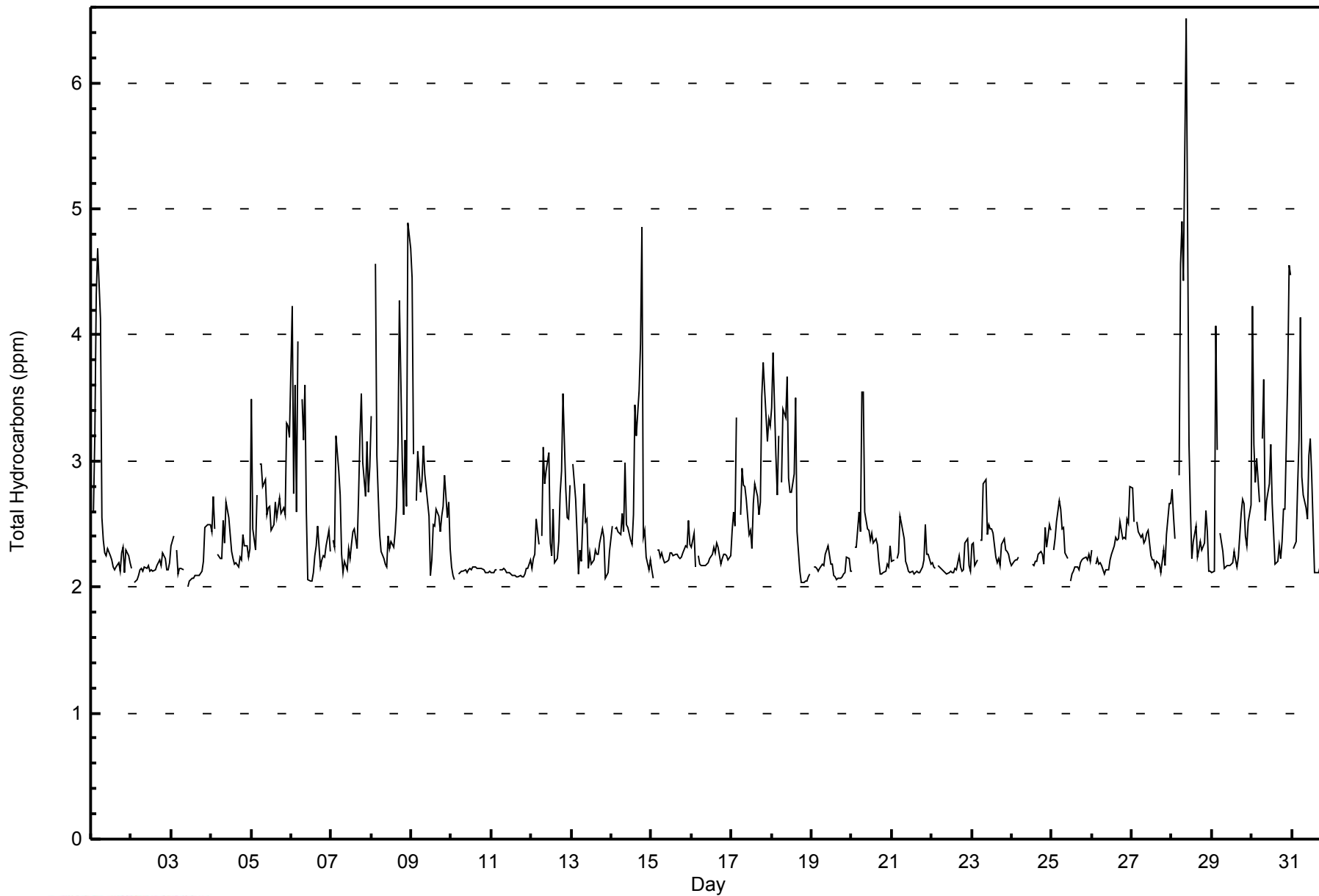


Maximum Value: 6.5 ppm on Mar 28 09:00		Maximum Daily Average: 3.0 ppm on Mar 28		Hours in Service: 744																							
Minimum Value: 2.0 ppm on Mar 3 11:00		Minimum Daily Average: 2.1 ppm on Mar 11		Hours of Data: 704																							
Maximum Diurnal Average: 2.7 ppm at hour 1		Minimum Diurnal Average: 2.3 ppm at hour 13		Hours of Missing Data: 40																							
Monthly Average: 2.47 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.6 P ₉₀ = 3.1 P ₉₉ = 4.7		Hours of Calibration: 37																							
				Percent Operational Time: 99.6																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	2.6	3.2	4.3	4.7	4.1	2.5	2.4	2.3	2.2	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.1	2.3	2.3	2.1	2.3	2.3	2.2	2.6	4.7	
2-Mar	2.1	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.3
3-Mar	2.3	2.4	Z	2.3	2.1	2.2	2.1	2.1	M	M	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.5	2.5	2.5	2.2	2.5	
4-Mar	2.4	2.7	2.5	Z	2.3	2.2	2.2	2.5	2.3	2.7	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.3	2.2	2.3	2.3	2.7	
5-Mar	3.5	2.5	2.3	2.7	Z	3.0	3.0	2.8	2.9	2.6	2.6	2.6	2.4	2.5	2.7	2.5	2.6	2.7	2.6	2.6	2.6	3.3	3.3	3.2	2.8	3.5	
6-Mar	4.2	2.7	3.6	2.6	3.9	Z	3.5	3.2	3.6	2.6	2.1	2.1	2.0	2.1	2.2	2.3	2.5	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.7	4.2	
7-Mar	Z	2.4	2.3	3.2	2.9	2.7	2.3	2.1	2.2	2.1	2.3	2.2	2.3	2.4	2.5	2.3	2.7	3.2	3.5	3.0	2.7	3.2	2.8	2.9	2.6	3.5	
8-Mar	3.4	Z	4.6	3.0	2.7	2.4	2.3	2.2	2.2	2.2	2.4	2.3	2.4	2.3	2.4	2.6	3.1	4.3	3.0	2.6	3.2	2.6	4.9	4.7	2.9	4.9	
9-Mar	4.5	3.1	Z	2.7	3.1	2.7	2.8	3.1	2.9	2.8	2.6	2.1	2.2	2.5	2.5	2.6	2.6	2.4	2.6	2.6	2.9	2.5	2.7	2.3	2.7	4.5	
10-Mar	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
11-Mar	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	2.2	2.1	2.2	
12-Mar	2.2	2.2	2.3	2.5	2.3	Z	2.4	3.1	2.8	2.9	3.1	2.4	2.3	2.6	2.2	2.2	2.4	2.7	2.9	3.5	2.8	2.6	2.5	2.8	2.6	3.5	
13-Mar	Z	3.0	2.7	2.4	2.1	2.3	2.2	2.8	2.5	2.5	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.4	2.1	2.1	2.1	2.3	2.3	3.0	
14-Mar	2.5	Z	2.5	2.5	2.4	2.4	2.6	2.4	3.0	2.5	2.5	2.4	2.3	2.6	3.4	3.2	3.6	3.9	4.9	2.4	2.5	2.2	2.1	2.2	2.7	4.9	
15-Mar	2.1	2.1	Z	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.3	2.3	2.5	
16-Mar	2.3	2.4	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.4	
17-Mar	2.4	2.6	2.5	3.3	Z	2.6	2.9	2.8	2.8	2.7	2.4	2.5	2.3	2.7	2.8	2.7	2.6	2.7	3.5	3.8	3.6	3.2	3.3	3.3	2.9	3.8	
18-Mar	3.4	3.9	3.0	2.7	3.2	Z	2.8	3.4	3.3	3.7	2.9	2.8	2.8	2.9	3.5	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.8	3.9	
19-Mar	Z	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.3	
20-Mar	2.1	Z	2.3	2.3	2.6	2.4	3.5	3.5	2.6	2.5	2.5	2.4	2.4	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.4	3.5	
21-Mar	2.2	2.2	Z	2.2	2.3	2.6	2.5	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.3	2.3	2.2	2.2	2.6	
22-Mar	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.3	2.4	2.2	2.1	2.2	2.4	
23-Mar	2.3	2.4	2.2	2.2	Z	2.4	2.4	2.8	2.9	2.4	2.5	2.5	2.5	2.4	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.2	2.2	2.4	2.9	
24-Mar	2.2	2.2	2.2	2.2	Z	2.4	C	C	C	C	C	C	C	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.5	2.3	2.5	2.4	-	2.5	
25-Mar	Z	2.3	2.4	2.5	2.7	2.6	2.5	2.5	2.3	2.2	M	2.0	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.7	
26-Mar	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.5	2.5	2.8	2.3	2.8	
27-Mar	2.8	2.5	Z	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.2	2.4	2.7	2.7	2.4	2.8	
28-Mar	2.8	2.6	2.4	Z	2.9	4.6	4.9	4.4	6.5	4.9	3.1	2.6	2.2	2.4	2.5	2.2	2.3	2.4	2.3	2.3	2.6	2.4	2.1	2.1	3.0	6.5	
29-Mar	2.1	2.1	4.1	3.1	Z	2.4	2.3	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.6	2.7	2.7	2.4	2.3	2.5	2.6	2.4	4.1	
30-Mar	4.2	3.1	2.8	3.0	2.7	Z	3.2	3.6	2.5	2.7	2.8	3.1	2.7	2.4	2.2	2.2	2.3	2.2	2.4	2.6	2.6	3.7	4.6	4.5	3.0	4.6	
31-Mar	Z	2.3	2.4	2.8	3.2	4.1	2.9	2.7	2.6	2.5	3.0	3.2	2.9	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.5	4.1	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.7 4.5			
																								2.5 3.9			
																								2.6 4.6			
																								2.6 4.3			
																								2.6 4.7			
																								2.6 4.6			
																								4.9 4.4			
																								6.5 6.5			
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WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	9	1.28	1.28
2.1 - 3.0	623	88.49	89.77
3.1 - 10.0	72	10.23	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - March 2015

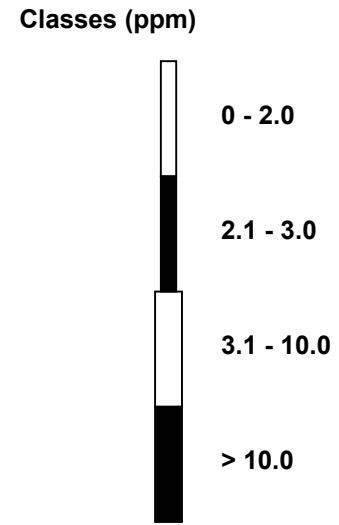
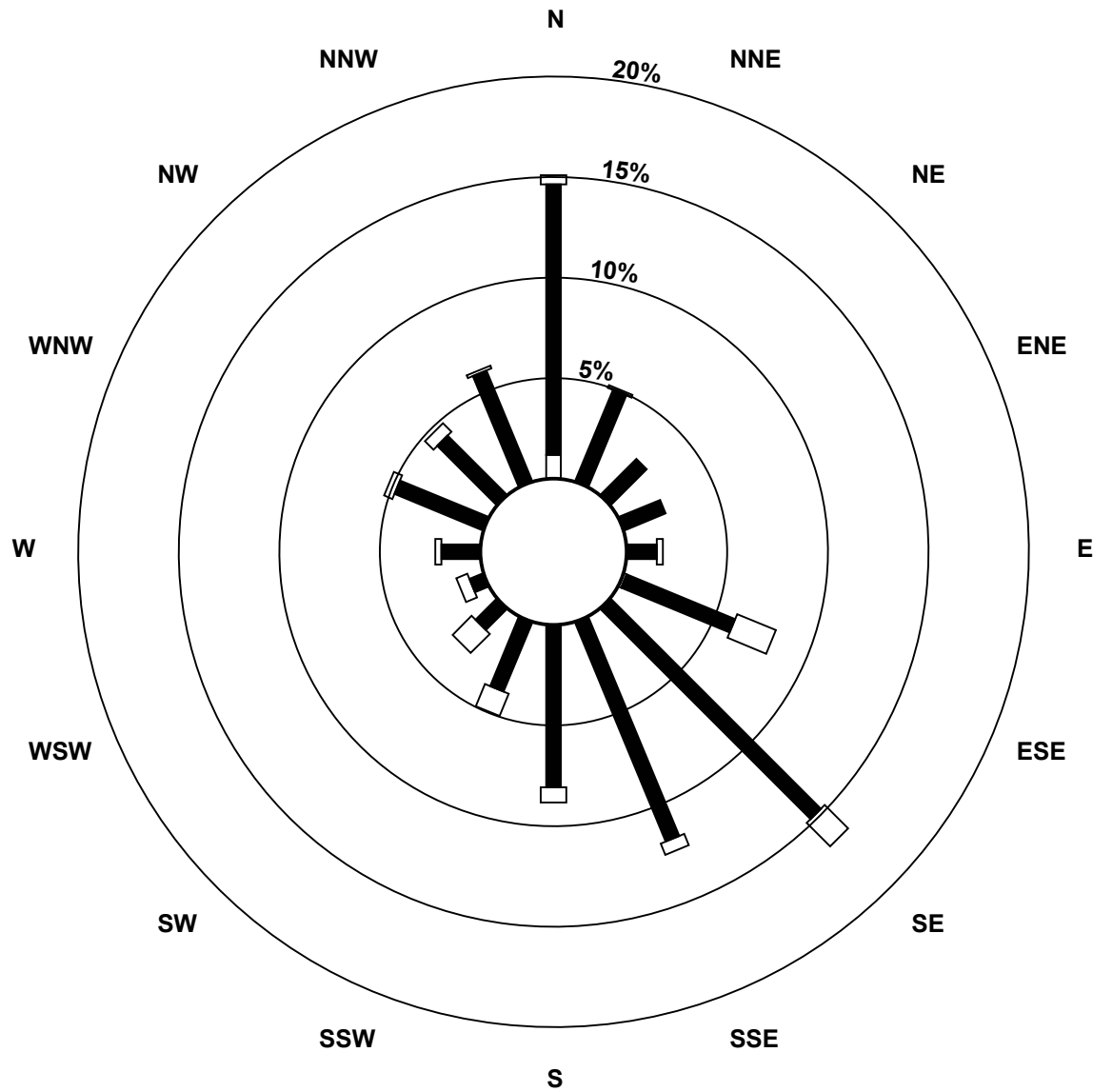
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	8	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	9
2.1 - 3.0	90	33	17	15	10	39	99	79	54	25	10	5	13	32	28	40	589
3.1 - 10.0	3	1	0	0	2	14	11	4	5	8	9	4	2	3	4	1	71
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	34	17	15	12	54	110	83	59	33	19	9	15	35	32	41	669

Total Number of Valid Hours: 669

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Hydrocarbons (THC) - ppm
Millennium (AMS 12)**

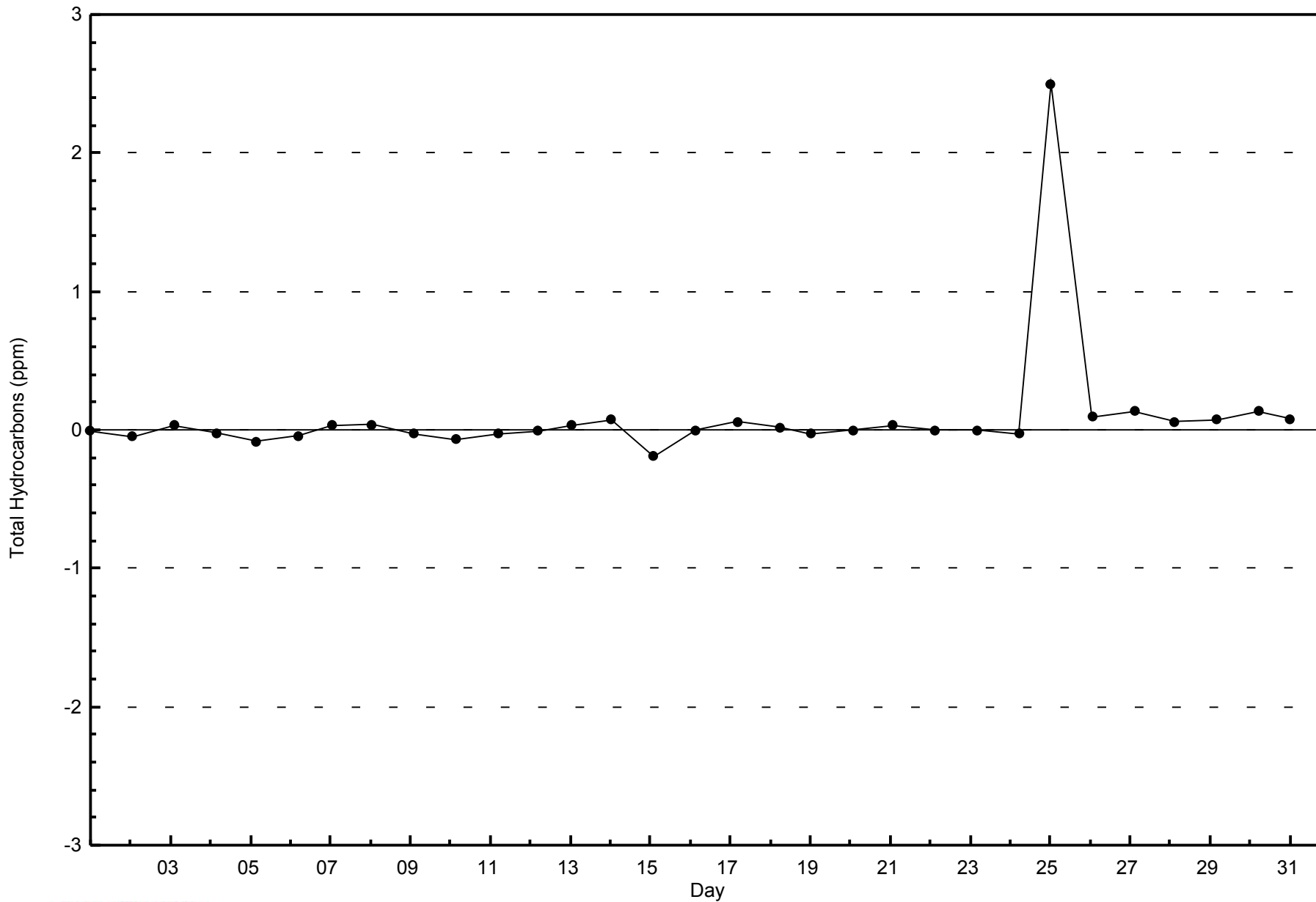


Total Number of Valid Hours: 669



WBEA
Zero Responses

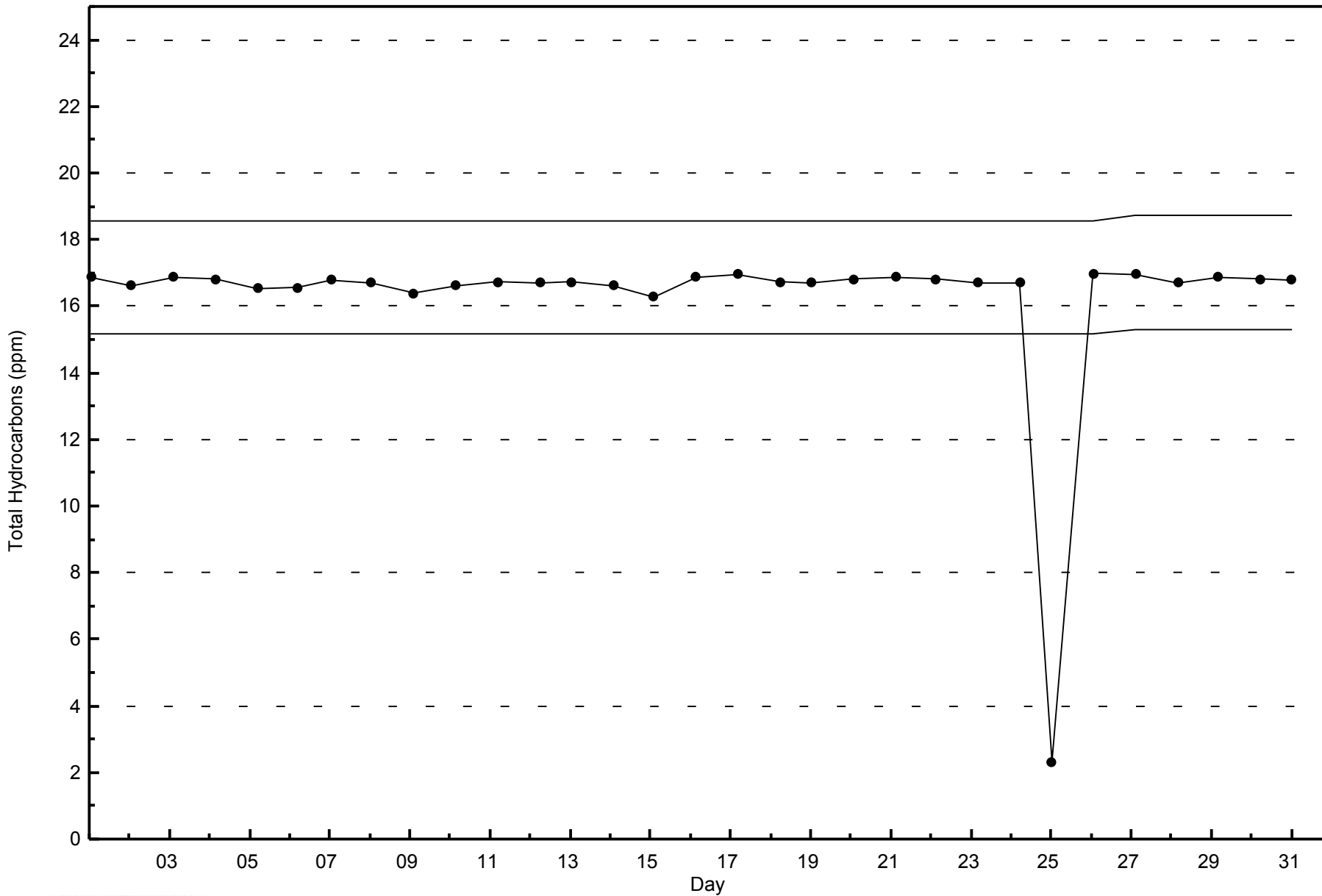
Total Hydrocarbons (THC) - ppm
Millennium - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Millennium - March 2015



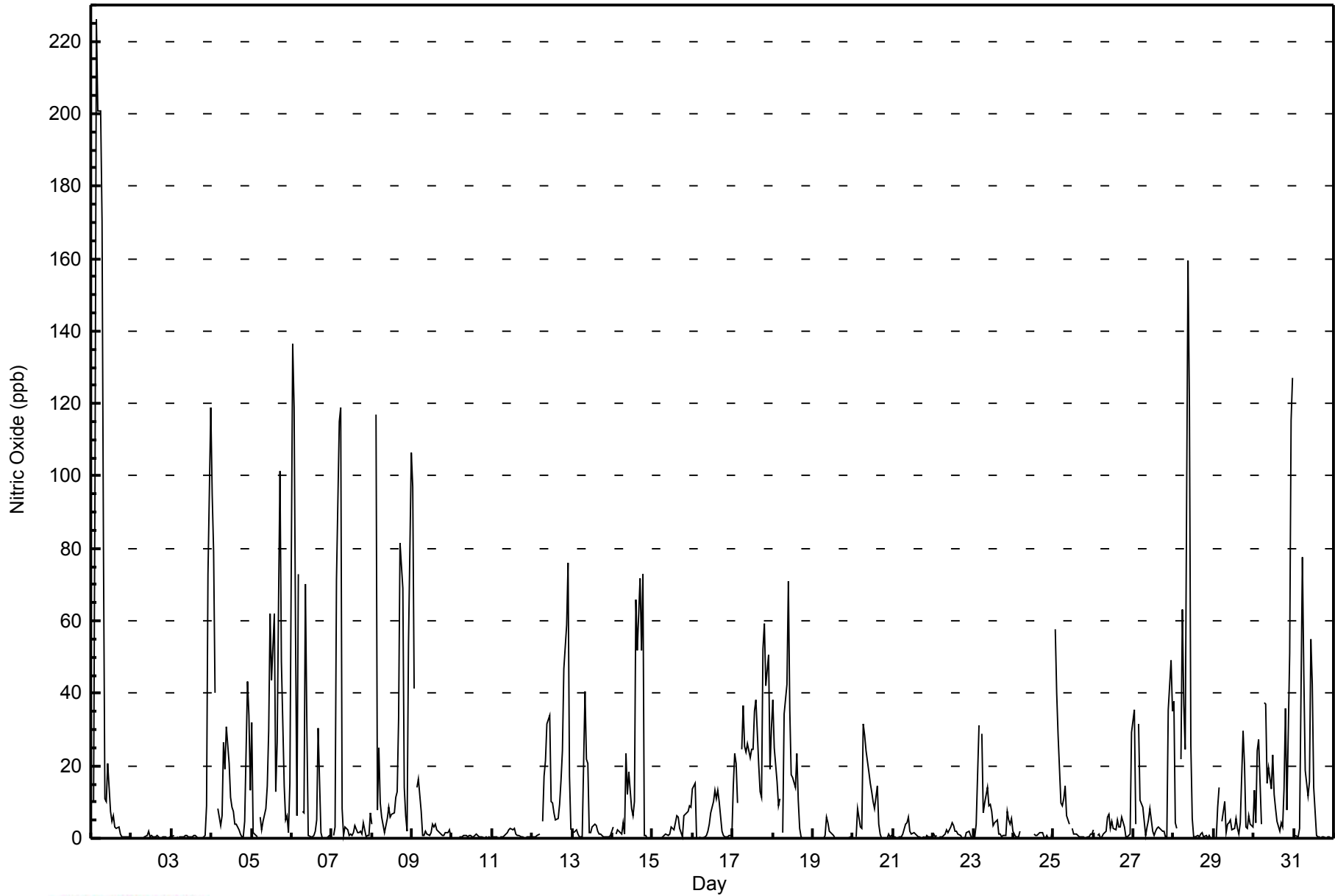


Maximum Value: 226 ppb on Mar 1 04:00																		Maximum Daily Average: 46.0 ppb on Mar 1																		Hours in Service: 744			
Minimum Value: 0 ppb on Mar 2 01:00																		Minimum Daily Average: 0.3 ppb on Mar 2																		Hours of Data: 707			
Maximum Diurnal Average: 21.9 ppb at hour 6																		Minimum Diurnal Average: 4.9 ppb at hour 21																		Hours of Missing Data: 37			
Monthly Average: 12.3 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 2 Q ₃ = 10 P ₉₀ = 36 P ₉₉ = 122																		Hours of Calibration: 36			
																																				Percent Operational Time: 99.9			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Mar	Z	10	98	226	201	201	170	80	11	10	21	7	5	6	3	3	3	1	0	0	0	0	0	0	46.0	226													
2-Mar	0	Z	0	0	0	0	0	0	0	1	2	0	1	1	0	1	1	0	0	0	0	0	0	0	0.3	2													
3-Mar	0	1	Z	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	1	9	73	119	9.1	119														
4-Mar	95	79	40	Z	8	4	6	26	19	31	21	11	9	7	4	4	2	1	0	0	5	43	34	13	20.1	95													
5-Mar	32	1	1	1	Z	6	2	5	8	14	29	62	44	62	13	26	65	102	49	14	5	6	2	15	24.5	102													
6-Mar	137	119	58	6	73	Z	7	7	70	32	1	0	0	1	2	5	30	2	0	0	0	0	1	1	24.0	137													
7-Mar	Z	1	3	71	115	119	8	1	3	2	1	1	1	1	3	2	2	2	1	4	0	1	1	7	15.3	119													
8-Mar	4	Z	117	8	25	10	6	2	4	6	8	6	7	7	11	13	33	81	69	14	6	2	54	107	26.0	117													
9-Mar	97	41	Z	14	16	7	1	1	2	1	1	2	4	3	4	2	2	1	1	1	2	2	2	1	9.0	97													
10-Mar	0	0	0	Z	0	0	0	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1													
11-Mar	0	0	0	0	Z	0	0	1	1	2	2	3	2	3	1	1	1	0	0	0	0	0	0	0	0.9	3													
12-Mar	0	0	0	1	1	Z	5	17	21	31	34	10	10	7	5	5	9	16	24	47	59	76	17	2	17.4	76													
13-Mar	Z	2	2	1	0	0	0	41	22	21	2	2	3	4	3	2	1	1	0	0	0	0	0	1	4.8	41													
14-Mar	3	Z	1	2	2	1	4	1	24	12	18	8	6	10	66	52	72	52	73	1	1	0	0	0	17.8	73													
15-Mar	0	0	Z	0	0	0	0	1	1	1	1	3	3	2	6	6	3	2	0	6	7	7	9	9	2.9	9													
16-Mar	14	15	0	Z	0	0	0	1	1	2	4	7	10	13	11	13	10	2	1	0	0	0	1	1	4.6	15													
17-Mar	14	23	21	10	Z	24	37	25	24	26	22	25	25	35	38	20	13	11	52	59	42	50	19	30	28.1	59													
18-Mar	38	25	16	9	11	Z	2	34	42	71	36	18	17	14	23	11	3	1	0	0	0	0	0	0	16.1	71													
19-Mar	Z	0	0	0	0	0	0	1	6	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	6													
20-Mar	0	Z	0	8	3	3	32	28	24	19	15	13	10	8	15	4	1	0	0	0	0	1	0	1	8.0	32													
21-Mar	0	0	Z	1	0	1	1	4	4	6	2	1	2	1	1	0	0	0	0	0	1	0	0	0	1.2	6													
22-Mar	1	1	1	Z	1	0	1	1	2	2	3	4	3	2	2	1	1	0	0	0	2	2	1	0	1.3	4													
23-Mar	0	1	4	31	Z	29	7	10	14	9	9	7	4	4	5	1	1	0	1	1	7	5	4	5	7.0	31													
24-Mar	2	1	0	0	2	Z	1	C	C	C	C	C	1	1	1	1	1	2	0	0	1	0	0	3	0.9	3													
25-Mar	Z	58	40	28	10	9	11	14	6	4	M	3	1	1	1	0	0	0	0	0	0	0	1	1	8.7	58													
26-Mar	2	Z	1	1	0	0	1	2	6	7	3	5	3	2	5	3	3	6	3	0	0	1	1	29	3.7	29													
27-Mar	36	4	Z	31	11	9	5	1	3	5	8	2	1	2	3	3	2	2	2	0	0	35	49	35	10.8	49													
28-Mar	38	4	3	Z	22	63	37	25	159	119	26	6	0	0	1	0	1	2	0	1	0	1	0	0	22.1	159													
29-Mar	0	0	8	14	Z	5	10	2	4	4	5	2	3	6	3	1	4	30	20	3	3	6	4	3	6.1	30													
30-Mar	13	4	24	27	4	Z	37	37	15	19	14	23	12	8	5	2	4	3	14	36	8	51	115	127	26.3	127													
31-Mar	Z	1	0	3	39	78	45	19	12	15	55	42	14	1	1	0	0	0	0	0	0	0	0	0	14.2	78													
																								Diurnal Average															
																								Diurnal Maximum															
Z - zerospan C - Calibration M - Maintenance																																							



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	585	82.74	82.74
21 - 40	63	8.91	91.65
41 - 80	39	5.52	97.17
81 - 159	15	2.12	99.29
> 159	4	0.57	99.86

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - March 2015

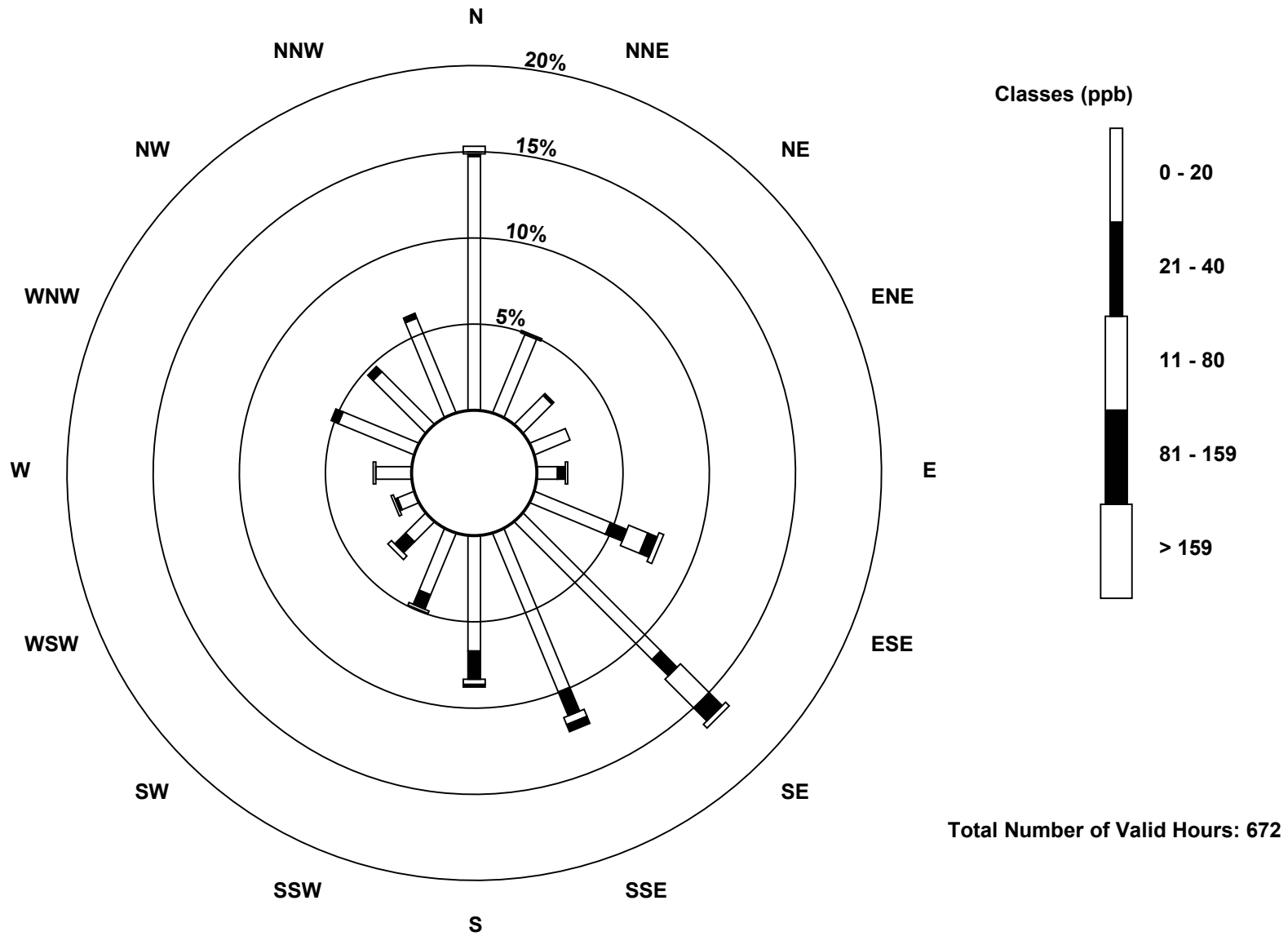
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	33	16	15	8	32	76	67	45	26	11	7	14	32	29	40	550
21 - 40	1	0	1	0	3	7	9	10	11	6	6	1	0	3	3	2	63
41 - 80	3	1	0	0	1	8	16	3	2	1	2	1	1	0	0	0	39
81 - 159	0	0	0	0	0	4	7	3	1	0	0	0	0	0	0	0	15
> 159	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	4
Totals	103	34	17	15	12	53	110	83	59	33	19	9	15	35	32	42	671

Total Number of Valid Hours: 672

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

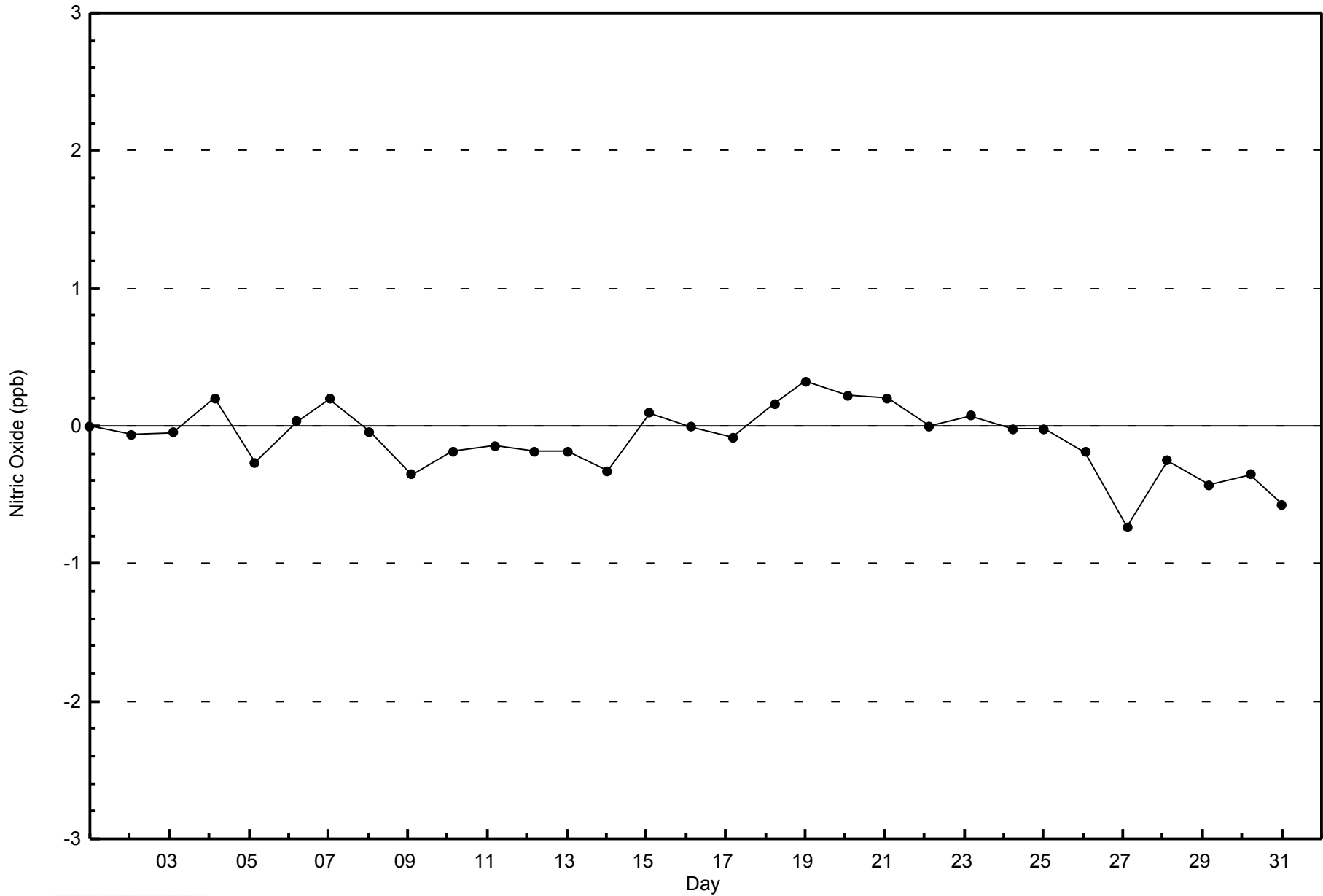
Nitric Oxide (NO) - ppb
Millennium (AMS 12)





WBEA
Zero Responses

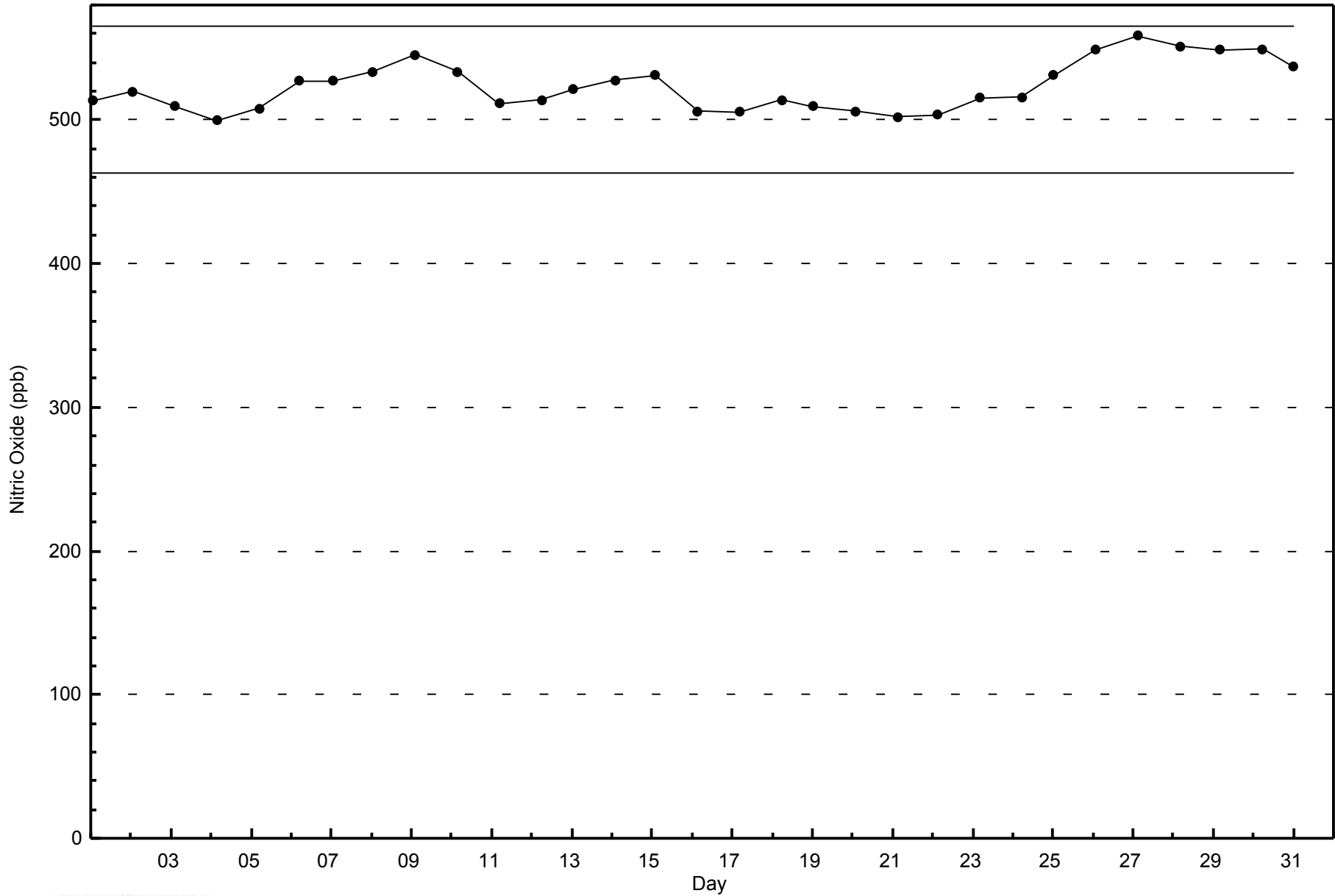
Nitric Oxide (NO) - ppb
Millennium - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Millennium - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

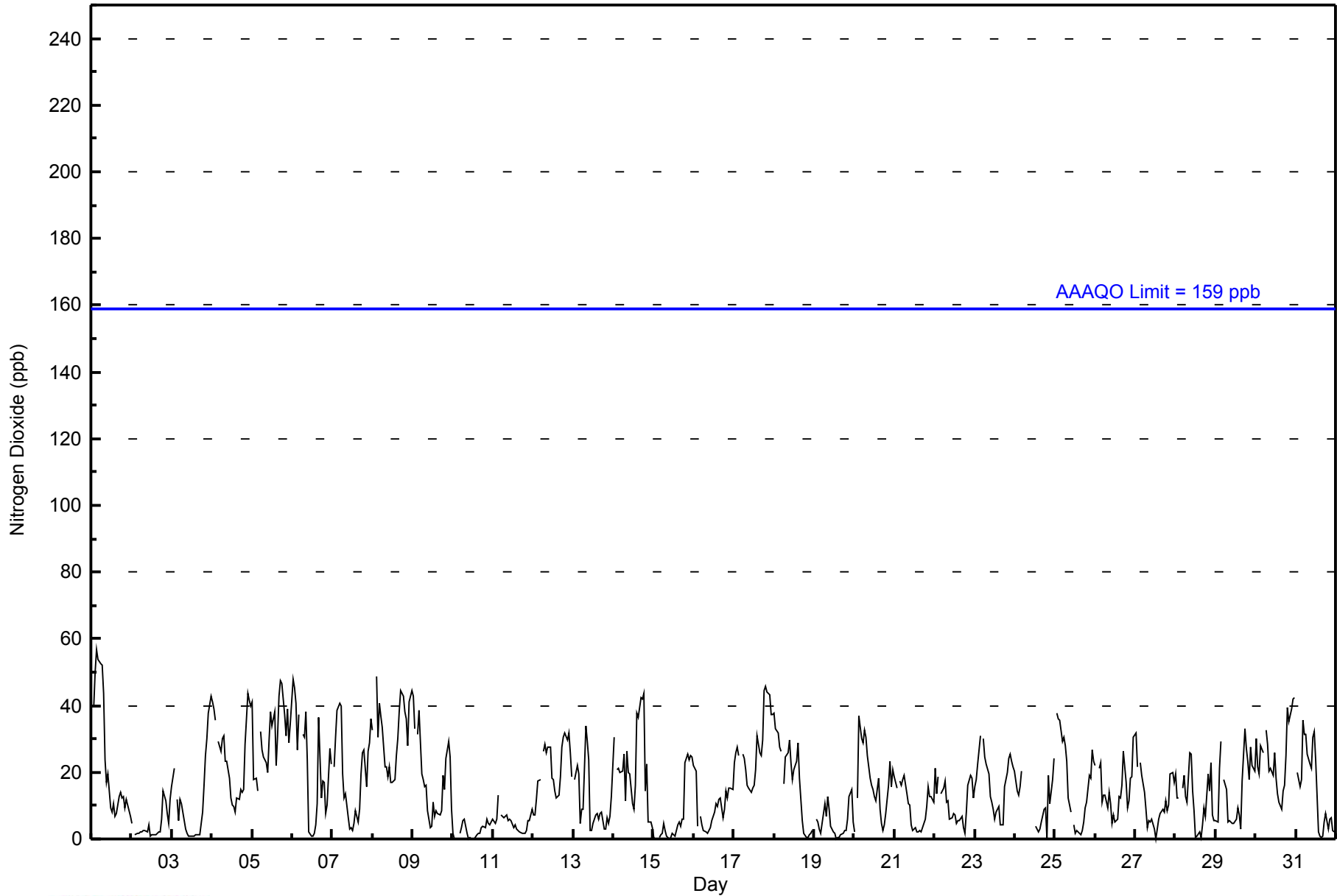
Millennium - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 57 ppb on Mar 1 04:00										Maximum Daily Average: 31.6 ppb on Mar 8										Hours of Data: 707																													
Minimum Value: 0 ppb on Mar 10 12:00										Minimum Daily Average: 2.4 ppb on Mar 10										Hours of Missing Data: 37																													
Maximum Diurnal Average: 22.9 ppb at hour 4										Minimum Diurnal Average: 8.3 ppb at hour 13										Hours of Calibration: 36																													
Monthly Average: 15.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 5 Median = 13 Q ₃ = 24 P ₉₀ = 33 P ₉₉ = 47										Percent Operational Time: 99.9																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	40	50	57	54	53	52	44	24	17	19	9	8	11	7	8	13	14	12	13	10	12	8	7	23.5	57																							
2-Mar	5	Z	1	2	2	2	2	3	3	2	4	1	1	1	1	2	2	2	6	15	11	8	5	12	4.0	15																							
3-Mar	16	21	Z	12	6	12	11	5	3	2	1	1	1	1	1	1	1	8	16	25	30	38	43	11.1	43																								
4-Mar	41	39	35	Z	29	26	30	31	23	23	18	12	10	10	8	12	12	15	14	15	28	44	42	40	24.3	44																							
5-Mar	41	18	18	14	Z	32	27	25	23	20	30	38	34	38	22	31	43	48	46	37	31	39	29	35	31.2	48																							
6-Mar	48	45	41	27	37	Z	31	31	38	24	2	1	1	2	4	11	37	12	17	17	8	10	27	23	21.4	48																							
7-Mar	Z	22	30	39	41	40	20	12	13	6	3	4	3	5	8	5	9	20	26	27	16	26	29	36	19.0	41																							
8-Mar	33	Z	49	30	41	37	34	22	21	19	22	17	17	18	25	30	38	44	43	38	36	28	41	45	31.6	49																							
9-Mar	43	33	Z	31	38	20	18	16	16	8	3	4	11	7	9	8	7	8	19	15	24	29	25	9	17.4	43																							
10-Mar	2	0	0	Z	2	3	5	6	2	0	1	0	0	0	1	2	2	3	4	4	6	5	4	5	2.4	6																							
11-Mar	6	5	6	13	Z	7	6	7	7	5	6	5	4	4	3	3	2	2	2	2	3	5	6	9	5.1	13																							
12-Mar	7	7	12	17	18	Z	26	29	26	27	28	18	18	14	12	13	19	27	31	32	30	32	26	19	21.2	32																							
13-Mar	Z	18	22	20	5	9	9	34	29	24	2	3	5	7	8	6	8	8	3	3	6	5	7	13	11.0	34																							
14-Mar	31	Z	21	21	20	20	25	11	26	20	19	11	9	16	38	37	42	42	44	14	22	5	5	4	21.9	44																							
15-Mar	0	0	Z	1	1	2	5	2	1	0	0	2	1	1	4	5	4	6	6	23	25	24	25	24	7.0	25																							
16-Mar	22	21	4	Z	7	4	3	2	2	3	3	6	8	11	10	12	12	6	9	15	12	15	15	15	9.4	22																							
17-Mar	23	26	28	25	Z	25	24	21	16	15	14	15	16	21	31	26	25	30	45	46	44	43	38	37	27.5	46																							
18-Mar	38	33	32	28	26	Z	17	25	26	30	23	18	21	23	29	18	12	5	2	0	1	1	2	2	17.8	38																							
19-Mar	Z	6	5	3	2	5	11	7	13	9	4	2	2	0	0	1	1	2	3	3	6	13	15	5	5.0	15																							
20-Mar	2	Z	12	37	30	29	33	30	25	18	16	15	13	11	18	9	5	3	4	8	16	23	16	21	17.1	37																							
21-Mar	19	15	Z	18	16	18	19	13	11	10	4	3	3	2	2	3	2	3	6	10	16	13	13	11	9.9	19																							
22-Mar	21	14	19	Z	14	15	17	11	12	6	6	8	7	5	6	6	7	4	2	8	16	19	18	12	10.9	21																							
23-Mar	16	18	23	31	Z	30	25	23	20	13	11	9	6	8	10	4	4	4	16	20	24	26	23	22	16.6	31																							
24-Mar	20	15	13	16	20	Z	14	C	C	C	C	C	C	4	3	2	3	5	9	9	0	19	10	18	24	11.4	24																						
25-Mar	Z	38	36	36	29	30	28	23	12	8	M	4	2	3	2	1	2	5	9	11	19	18	27	23	16.7	38																							
26-Mar	22	Z	21	23	11	13	13	9	14	11	5	7	5	6	13	12	16	26	17	9	12	18	19	31	14.5	31																							
27-Mar	32	22	Z	23	19	14	9	3	5	5	6	3	0	3	6	8	9	8	12	9	10	20	20	17	11.4	32																							
28-Mar	20	12	12	Z	15	19	13	11	26	25	14	8	0	1	2	0	4	9	7	20	14	23	7	5	11.7	26																							
29-Mar	5	5	21	29	Z	18	15	5	6	5	5	5	6	9	7	3	17	33	27	24	18	28	22	20	14.5	33																							
30-Mar	30	22	19	28	26	Z	33	28	21	21	19	26	18	13	11	9	15	16	25	39	35	39	42	43	25.1	43																							
31-Mar	Z	20	16	18	36	31	31	26	22	21	31	32	24	2	1	1	1	5	8	3	6	6	3	2	15.0	36																							
																								21.6	19.7	21.0	22.9	20.9	19.8	19.5	17.1	16.2	13.2	11.0	9.5	8.3	8.3	9.7	9.3	12.2	13.6	15.5	15.9	17.7	19.9	19.7	19.7	Diurnal Average	
																								48	45	50	57	54	53	52	44	38	30	31	38	34	38	38	37	43	48	46	46	44	44	42	45	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	481	68.03	68.03
21 - 40	193	27.30	95.33
41 - 80	33	4.67	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



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - March 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	95	28	15	11	6	24	53	56	41	17	7	3	10	28	24	37	455
21 - 40	8	6	2	4	5	20	41	25	17	16	10	6	4	7	8	5	184
11 - 80	0	0	0	0	1	10	16	2	1	0	2	0	1	0	0	0	33
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	103	34	17	15	12	54	110	83	59	33	19	9	15	35	32	42	672

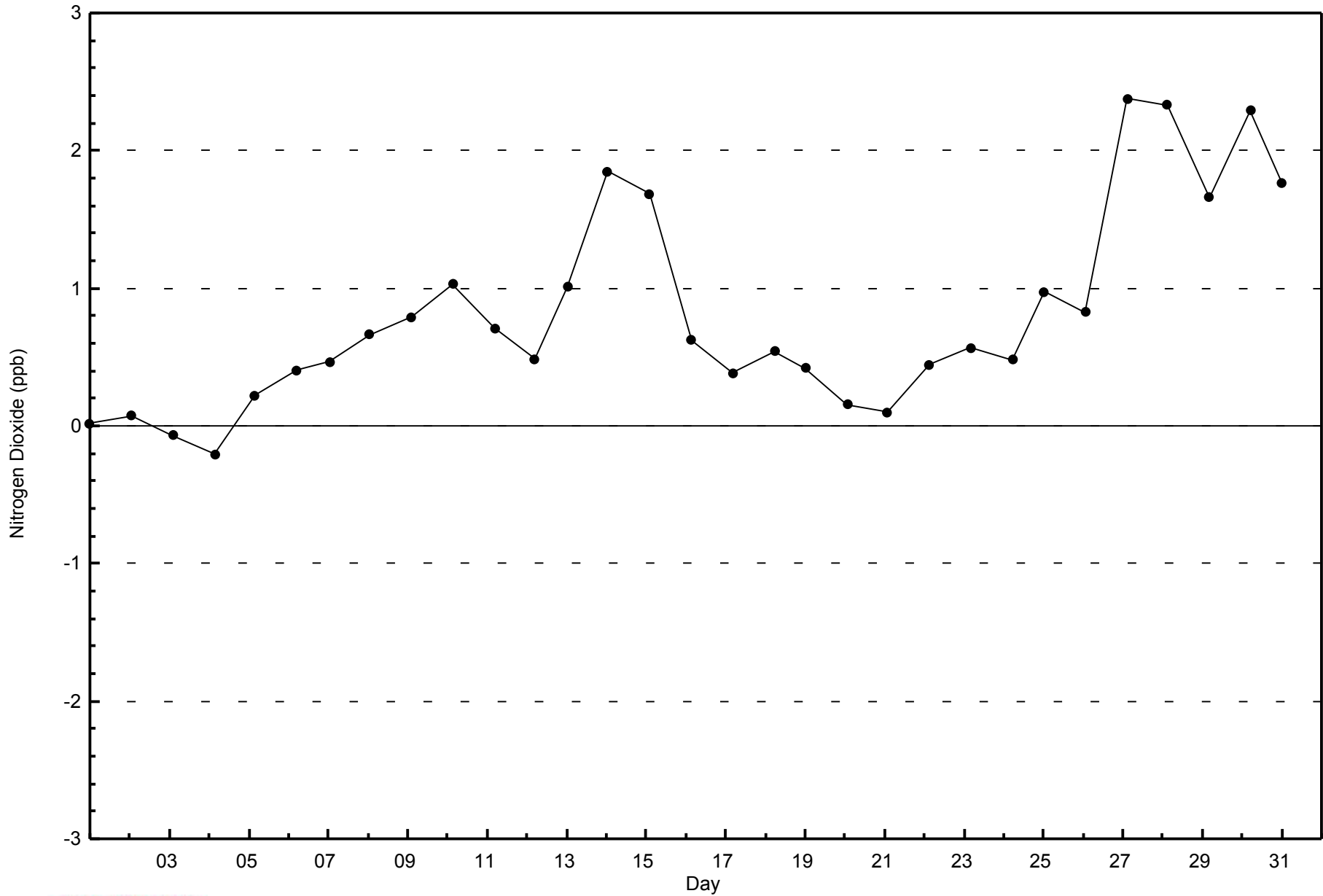
Total Number of Valid Hours: 672

Total Number of Hours: 744



WBEA
Zero Responses

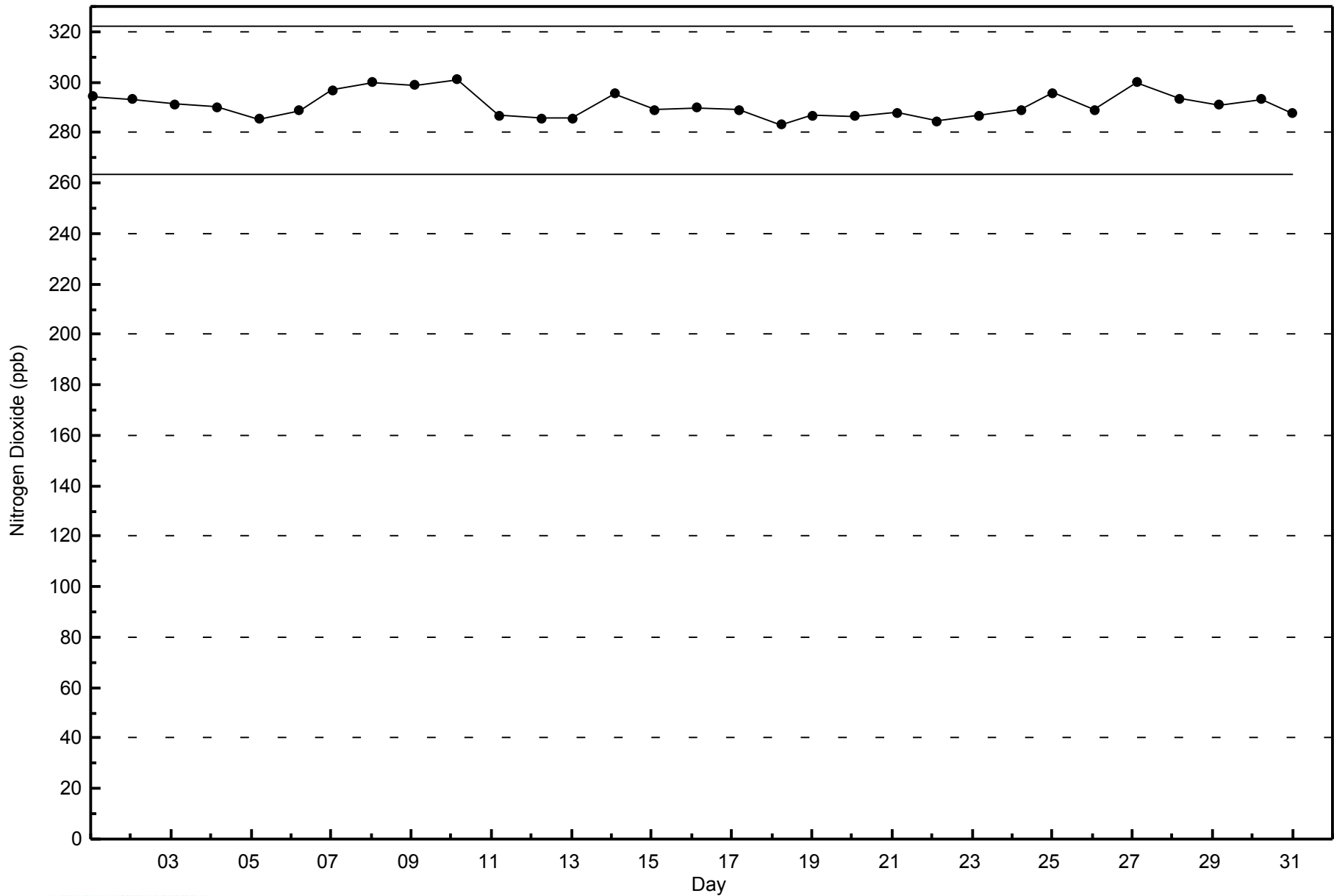
Nitrogen Dioxide (NO₂) - ppb
Millennium - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Millennium - March 2015



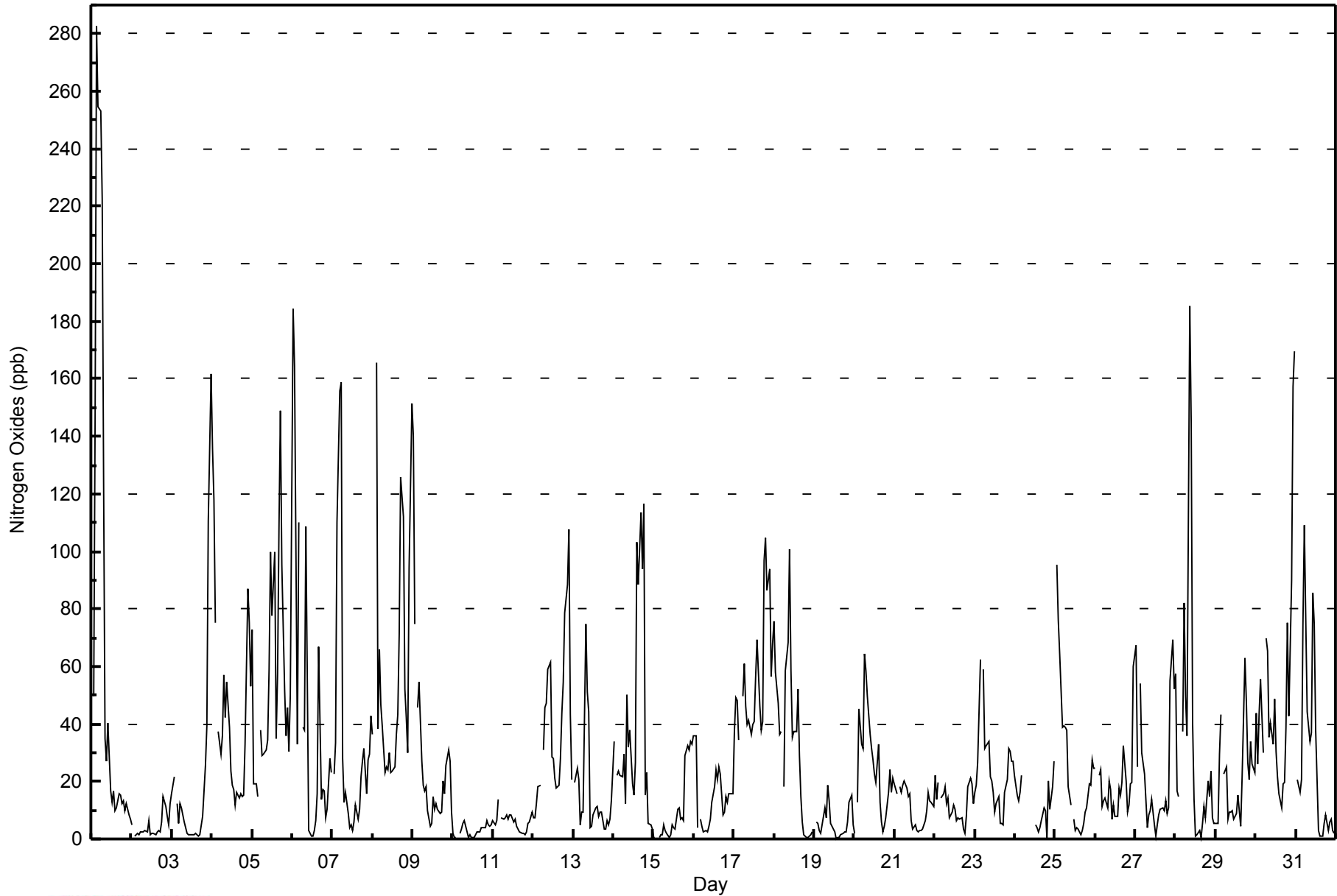


Maximum Value: 283 ppb on Mar 1 04:00																	Maximum Daily Average: 69.4 ppb on Mar 1																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 15 02:00																	Minimum Daily Average: 2.9 ppb on Mar 10																	Hours of Data: 707	
Maximum Diurnal Average: 42.8 ppb at hour 1																	Minimum Diurnal Average: 14.8 ppb at hour 13																	Hours of Missing Data: 37	
Monthly Average: 28.0 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 6 Median = 16 Q ₃ = 36 P ₉₀ = 67 P ₉₉ = 161																	Hours of Calibration: 36	
																																		Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	50	148	283	255	253	223	124	35	27	40	17	13	17	10	11	16	15	12	13	10	12	9	7	69.4	283									
2-Mar	5	Z	1	2	2	2	2	3	3	3	6	1	2	2	2	2	3	2	6	15	11	8	5	12	4.4	15									
3-Mar	16	22	Z	12	6	12	11	6	4	2	1	1	1	2	2	1	1	2	8	17	26	39	110	162	20.2	162									
4-Mar	136	118	75	Z	38	30	36	57	42	54	39	24	19	17	12	16	14	16	15	15	33	87	75	53	44.4	136									
5-Mar	73	19	19	15	Z	38	29	29	31	34	59	100	78	100	35	58	108	149	95	52	36	46	30	50	55.8	149									
6-Mar	184	164	98	33	110	Z	39	38	109	56	3	1	1	3	6	16	67	14	17	17	7	10	28	23	45.4	184									
7-Mar	Z	23	33	110	156	159	28	13	16	9	4	5	3	6	12	7	11	22	27	31	16	27	29	43	34.3	159									
8-Mar	37	Z	166	38	66	47	39	23	25	24	30	23	24	25	36	43	71	126	112	52	42	30	95	151	57.6	166									
9-Mar	140	75	Z	45	55	27	19	17	18	10	4	5	15	10	12	10	9	9	20	16	26	31	27	10	26.5	140									
10-Mar	2	0	0	Z	2	3	6	7	2	1	1	1	1	1	2	2	3	4	4	4	6	5	4	5	2.9	7									
11-Mar	6	5	6	14	Z	7	7	8	8	7	8	8	6	7	4	3	3	2	2	2	3	6	6	9	5.9	14									
12-Mar	8	7	12	18	19	Z	31	46	47	59	62	29	28	21	18	19	28	44	55	79	89	108	43	21	38.6	108									
13-Mar	Z	20	25	20	5	9	9	75	51	44	4	4	8	11	11	8	9	9	3	3	7	5	7	13	15.7	75									
14-Mar	34	Z	22	24	22	22	30	13	50	32	38	19	15	27	103	88	114	94	117	15	23	5	5	4	39.7	117									
15-Mar	0	0	Z	1	1	2	5	3	2	1	2	5	4	3	10	11	7	8	6	29	32	31	34	33	10.0	34									
16-Mar	36	36	4	Z	7	4	3	3	3	5	7	13	18	24	21	25	23	8	9	15	13	16	16	16	14.0	36									
17-Mar	37	49	48	35	Z	50	61	46	40	41	36	40	41	56	69	46	38	41	97	105	86	94	56	68	55.6	105									
18-Mar	76	58	47	37	37	Z	18	59	68	101	58	35	37	37	52	29	15	6	2	0	1	1	2	2	33.8	101									
19-Mar	Z	6	5	3	2	5	11	8	19	13	5	3	2	0	0	0	1	2	2	3	6	13	15	5	5.6	19									
20-Mar	2	Z	13	45	33	32	64	59	49	37	31	28	23	20	33	13	6	3	4	7	16	24	16	21	25.2	64									
21-Mar	19	16	Z	18	16	18	20	17	15	16	6	4	5	3	3	3	3	4	6	10	16	13	13	11	11.1	20									
22-Mar	22	14	19	Z	14	16	18	12	14	7	9	12	10	6	8	7	8	4	2	8	18	21	19	12	12.2	22									
23-Mar	16	19	26	62	Z	59	31	32	34	21	20	16	9	12	15	6	5	5	16	21	31	30	27	27	23.6	62									
24-Mar	22	15	13	16	22	Z	15	C	C	C	C	C	C	5	4	3	4	7	11	10	0	20	10	18	27	12.4	27								
25-Mar	Z	95	76	64	39	39	39	38	18	12	M	7	3	4	4	1	3	5	9	11	19	19	28	25	25.3	95									
26-Mar	25	Z	22	24	11	13	14	11	20	17	7	12	8	8	18	15	19	32	20	9	12	19	20	60	18.2	60									
27-Mar	67	25	Z	54	30	23	13	4	8	10	14	5	1	5	9	10	11	10	13	9	11	55	69	52	22.1	69									
28-Mar	57	17	15	Z	37	82	50	36	185	144	40	14	1	1	3	1	6	11	7	20	15	23	7	5	33.9	185									
29-Mar	5	5	30	43	Z	22	25	7	10	9	10	7	9	15	10	4	22	63	48	27	21	34	26	23	20.6	63									
30-Mar	44	26	43	56	30	Z	70	65	36	41	33	49	30	21	16	11	19	20	39	75	43	90	157	170	51.4	170									
31-Mar	Z	21	16	21	75	109	76	44	34	37	86	75	38	3	1	1	1	5	8	3	6	7	3	2	29.2	109									
42.8																	34.7																	Diurnal Average	
184																	164																	Diurnal Maximum	
Z - zerospan																	C - Calibration																	M - Maintenance	



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	415	58.70	58.70
21 - 40	151	21.36	80.06
41 - 80	90	12.73	92.79
81 - 159	41	5.80	98.59
> 159	10	1.41	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - March 2015

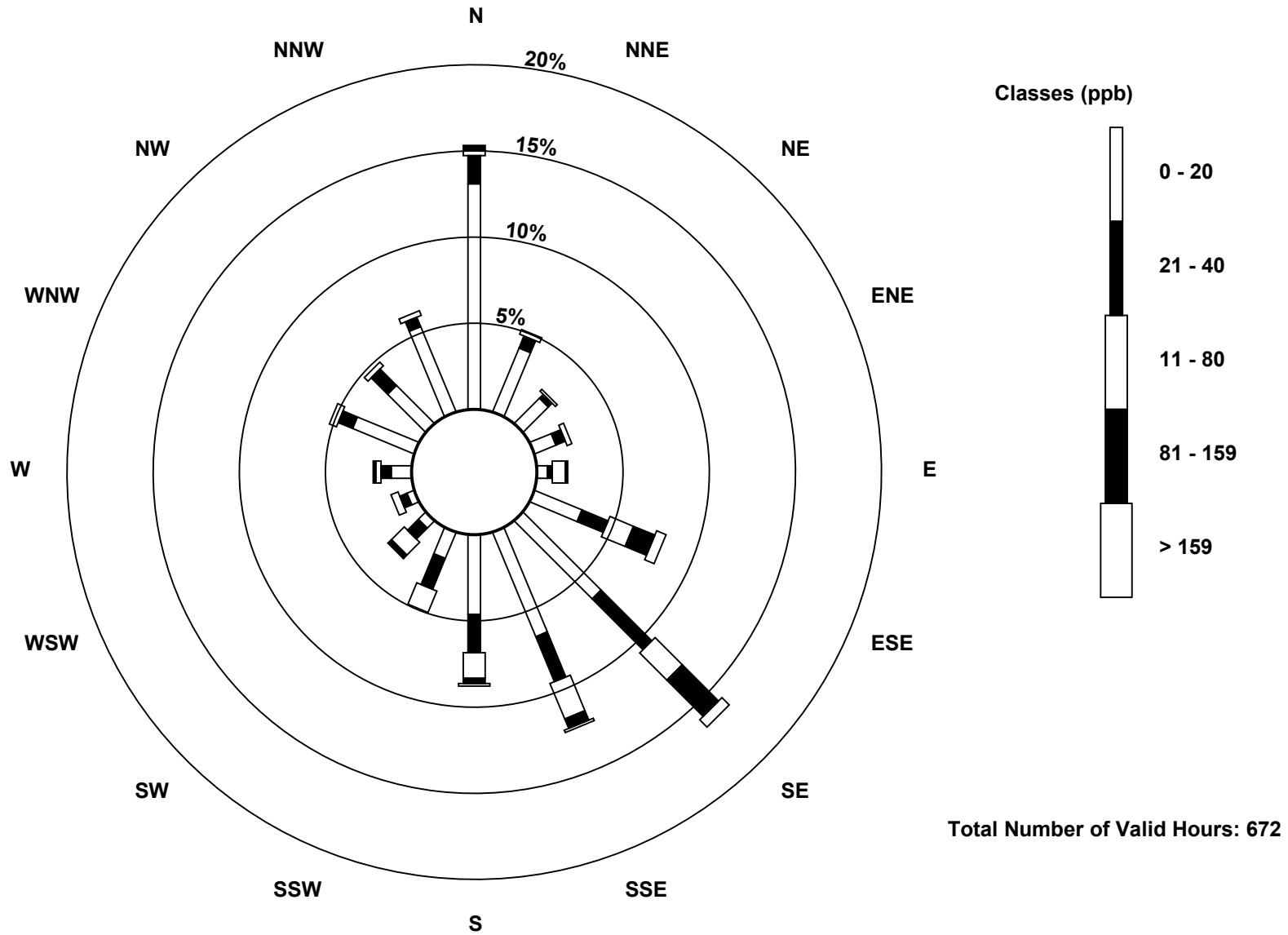
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	27	14	9	4	20	43	44	31	11	4	3	8	26	21	36	389
21 - 40	11	5	2	4	2	11	28	19	15	13	6	3	4	6	9	4	142
41 - 80	2	2	1	2	5	10	15	15	10	9	7	3	2	3	2	2	90
81 - 159	2	0	0	0	1	9	20	4	2	0	2	0	1	0	0	0	41
> 159	0	0	0	0	0	4	4	1	1	0	0	0	0	0	0	0	10
Totals	103	34	17	15	12	54	110	83	59	33	19	9	15	35	32	42	672

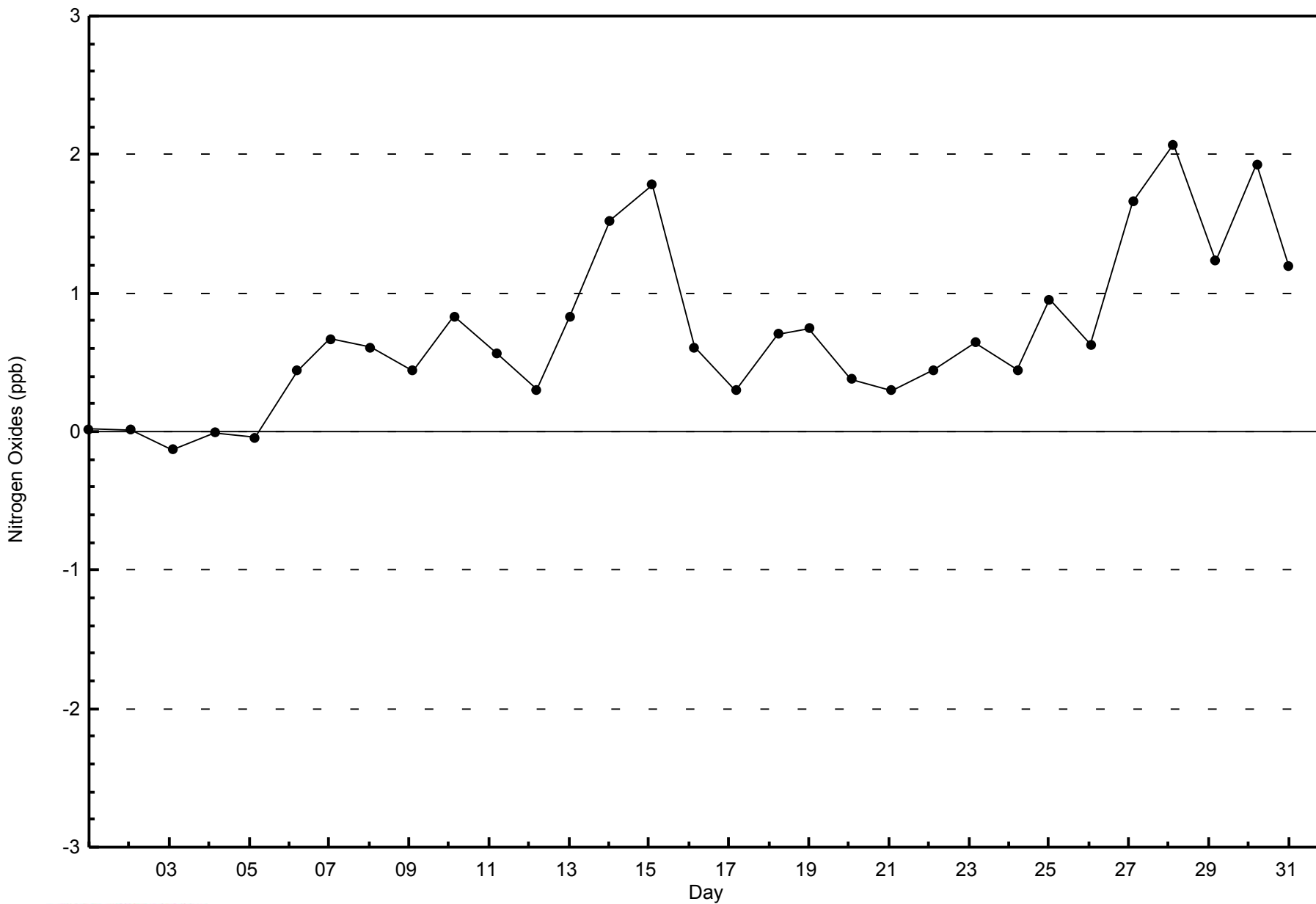
Total Number of Valid Hours: 672

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Nitrogen Oxides (NO_x) - ppb
Millennium (AMS 12)**

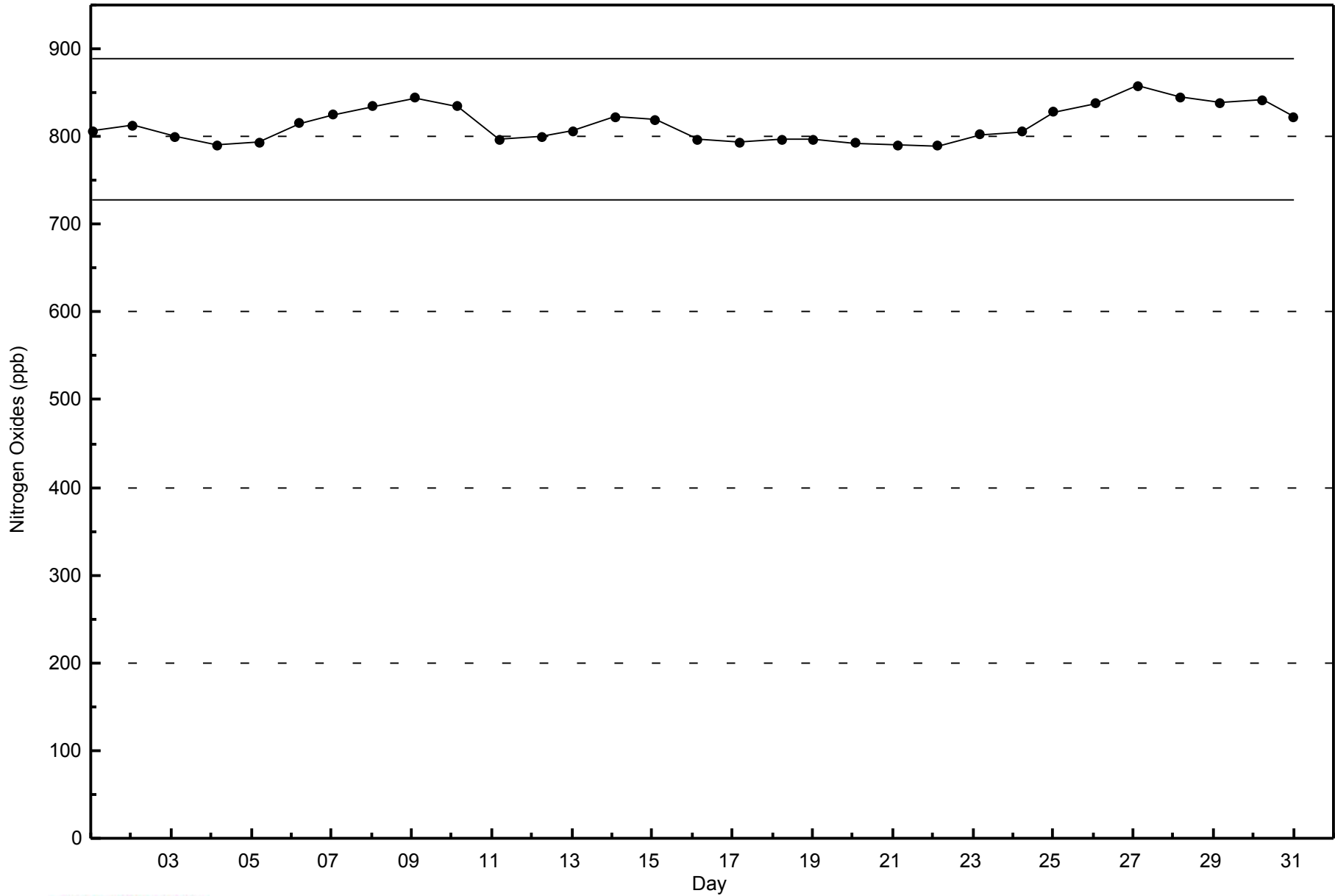






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Millennium - March 2015





Summary of Hour Averages

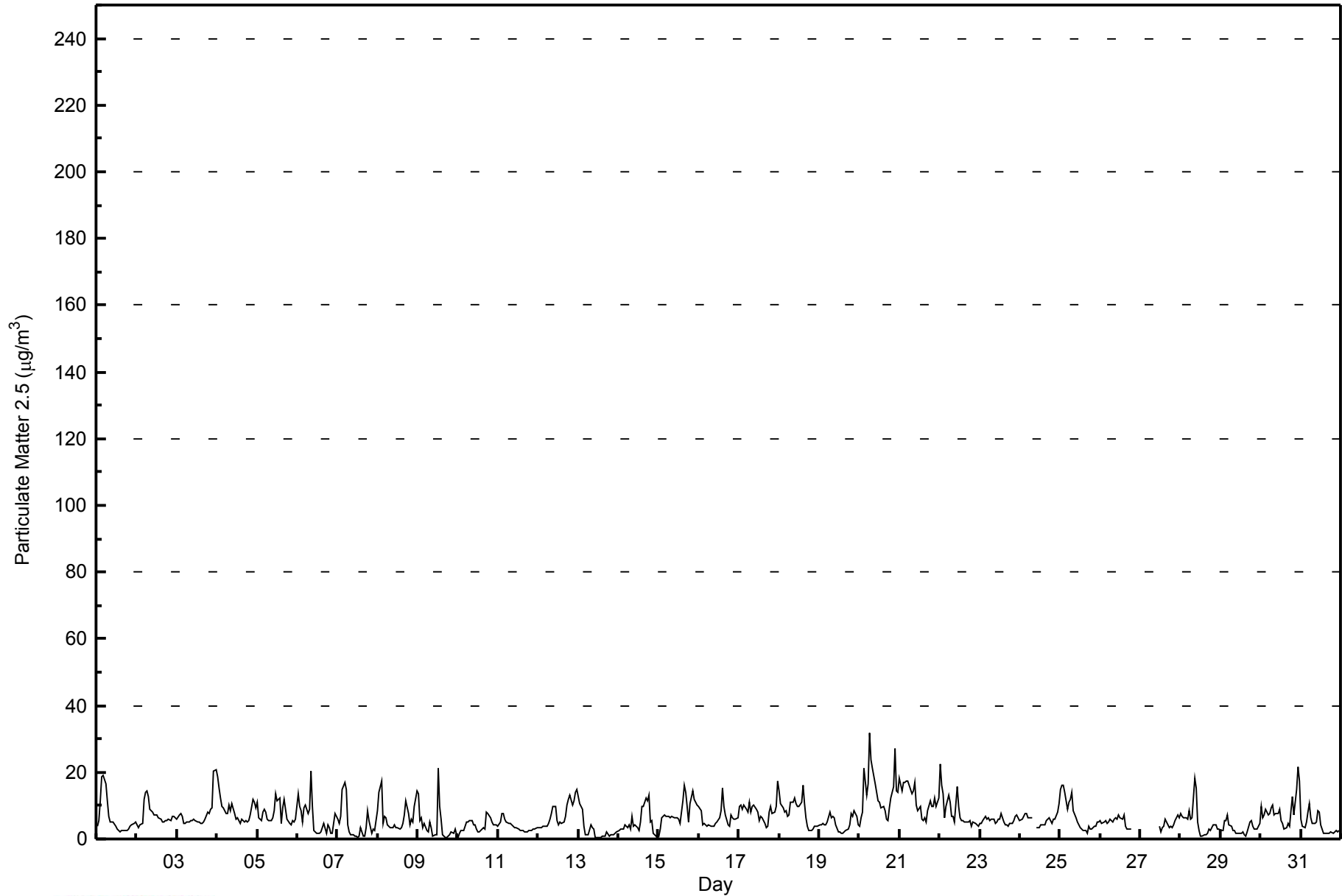
Millennium - March 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																								
Maximum Value: 31.7 µg/m ³ on Mar 20 07:00		Maximum Daily Average: 13.8 µg/m ³ on Mar 20																								
Minimum Value: 0.3 µg/m ³ on Mar 9 17:00		Hours of Data: 726																								
Maximum Diurnal Average: 8.3 µg/m ³ at hour 1		Hours of Missing Data: 18																								
Monthly Average: 6.51 µg/m ³		Hours of Calibration: 0																								
Minimum Daily Average: 2.7 µg/m ³ on Mar 13		Percent Operational Time: 97.6																								
Minimum Diurnal Average: 4.7 µg/m ³ at hour 17		Percentiles: P ₁ = 0.6 P ₁₀ = 2.1 Q ₁ = 3.6 Median = 5.5 Q ₃ = 8.4 P ₉₀ = 12.3 P ₉₉ = 21.2																								
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-Mar	4.0	5.6	11.3	18.5	18.9	16.7	11.5	7.0	5.1	5.0	5.2	3.6	2.9	2.6	2.2	2.5	2.6	2.6	2.6	3.1	3.8	4.1	4.5	5.1	6.3	18.9
2-Mar	4.3	3.2	4.2	4.5	11.8	14.0	14.5	12.7	8.8	8.3	7.2	7.3	7.0	6.3	5.8	4.9	5.0	5.4	5.7	5.8	5.6	6.9	6.6	6.3	7.2	14.5
3-Mar	5.9	7.2	7.7	6.7	4.7	4.5	5.2	5.2	5.4	5.6	5.7	5.4	5.0	4.9	4.8	4.9	5.2	6.0	8.2	7.7	8.9	9.3	20.4	20.7	7.3	20.7
4-Mar	18.9	15.1	12.2	9.6	9.2	7.8	7.7	10.3	8.5	10.4	7.5	5.8	6.3	5.5	4.6	5.8	5.3	5.3	5.2	5.3	7.4	12.0	11.0	9.5	8.6	18.9
5-Mar	11.1	6.4	5.5	8.2	8.8	8.2	5.8	5.7	5.7	6.5	8.6	13.6	11.4	12.4	4.6	9.4	11.7	9.0	6.1	4.6	4.4	5.4	4.9	6.0	7.7	13.6
6-Mar	13.6	9.8	8.5	5.1	9.5	10.2	7.7	8.9	20.1	9.9	2.5	1.8	1.8	1.8	2.1	3.3	4.7	1.5	4.2	3.4	1.6	1.8	7.7	6.7	6.2	20.1
7-Mar	5.8	4.7	6.9	14.9	17.1	14.9	4.2	2.0	1.3	1.1	0.7	0.9	0.6	0.7	3.3	0.9	0.7	3.2	8.6	5.5	1.7	3.2	2.5	5.3	4.6	17.1
8-Mar	8.3	13.9	17.3	4.8	6.7	6.2	4.1	3.3	3.3	3.5	4.3	3.6	3.2	3.0	3.5	4.6	7.3	11.4	7.5	4.2	5.9	5.0	9.7	14.3	6.6	17.3
9-Mar	13.5	5.7	6.2	3.5	4.8	2.5	2.3	5.3	3.5	0.8	1.1	1.3	21.4	9.6	5.8	1.4	0.3	0.4	0.9	1.2	2.2	1.6	2.9	1.3	4.2	21.4
10-Mar	0.6	1.6	2.5	2.6	3.6	4.9	5.3	5.3	5.5	4.4	4.1	3.0	2.3	2.2	3.1	3.4	2.9	7.9	7.8	6.2	4.9	4.1	4.0	4.0	4.0	7.9
11-Mar	3.7	4.9	7.7	7.7	6.0	5.2	4.6	4.6	4.1	3.8	3.4	3.2	2.8	2.6	2.7	2.7	2.3	2.2	2.5	2.6	2.6	2.9	2.8	3.3	3.8	7.7
12-Mar	3.4	3.3	3.5	3.9	3.8	3.9	4.8	5.7	7.6	9.6	9.7	5.6	4.2	5.0	4.6	5.2	6.9	10.2	11.7	13.2	10.4	11.4	13.9	15.0	7.4	15.0
13-Mar	12.7	10.5	8.9	3.7	1.1	1.3	1.3	4.2	3.3	3.0	0.6	0.5	0.6	0.6	1.0	1.0	2.1	1.0	1.1	1.2	1.4	1.7	2.1	2.1	2.7	12.7
14-Mar	2.7	2.9	3.0	3.2	4.3	3.5	4.2	2.9	6.7	3.7	4.2	3.3	2.5	4.9	9.7	9.8	12.1	11.3	13.0	5.0	5.6	1.7	1.0	1.4	5.1	13.0
15-Mar	0.7	3.0	6.4	7.2	6.9	7.0	6.7	6.2	6.6	6.4	6.2	6.5	5.9	4.8	11.5	15.9	14.0	9.7	5.1	10.8	14.3	11.8	11.0	10.2	8.1	15.9
16-Mar	9.9	8.7	4.3	4.5	4.4	4.0	4.1	3.9	3.9	4.0	4.7	5.2	6.3	8.5	15.1	9.7	7.2	4.3	4.0	7.4	6.2	5.9	5.8	6.3	6.2	15.1
17-Mar	9.6	10.2	8.9	10.4	8.9	8.0	11.0	7.9	9.7	10.0	9.0	7.9	5.6	6.8	6.2	4.7	3.6	3.7	8.2	9.8	7.4	8.1	9.9	17.2	8.4	17.2
18-Mar	14.4	10.8	9.2	8.2	8.5	6.6	7.2	11.2	11.0	12.1	10.6	9.9	9.8	11.1	16.3	10.4	6.2	3.8	2.7	2.7	3.0	3.8	4.0	3.9	8.2	16.3
19-Mar	4.2	4.3	4.8	4.1	4.2	5.2	8.1	6.5	6.7	6.5	4.2	2.3	2.3	1.7	1.7	1.9	2.6	3.0	4.4	7.5	6.9	8.4	6.9	4.3	4.7	8.4
20-Mar	3.9	6.3	8.0	21.3	13.0	16.4	31.7	23.6	21.2	16.4	14.0	11.5	11.1	9.2	9.9	8.4	5.9	5.7	9.4	12.1	15.9	27.1	14.5	14.1	13.8	31.7
21-Mar	18.4	14.3	16.7	16.9	17.4	17.3	16.2	13.4	14.4	16.9	10.2	8.6	9.8	5.8	5.3	6.4	5.2	8.5	11.4	9.9	10.0	12.3	9.8	12.2	12.0	18.4
22-Mar	22.4	16.3	13.6	6.5	10.0	12.9	10.9	6.9	7.0	5.2	15.6	9.9	6.3	5.6	5.6	5.0	5.2	5.2	5.6	3.7	4.9	4.6	4.3	3.9	8.2	22.4
23-Mar	4.6	4.8	5.5	6.6	6.0	6.5	5.6	5.8	5.8	4.6	5.1	5.8	5.9	7.5	4.9	4.4	4.2	3.7	4.6	4.8	5.4	7.0	7.0	6.3	5.5	7.5
24-Mar	5.6	5.9	6.7	7.6	7.7	6.4	6.2	6.4	M	M	3.6	3.3	4.1	4.2	4.2	4.3	5.3	6.4	5.7	4.7	6.0	6.0	7.9	10.7	5.9	10.7
25-Mar	14.7	16.2	15.9	14.2	9.0	10.9	12.0	14.1	8.5	6.6	5.1	4.3	3.3	2.8	2.5	2.4	1.8	3.7	3.0	3.1	3.9	4.0	5.2	5.1	7.2	16.2
26-Mar	5.5	4.5	5.2	5.4	4.5	5.2	5.7	5.1	6.1	6.3	5.9	7.2	6.5	5.9	7.0	3.8	2.9	3.0	2.9	UO	UO	UO	UO	UO	5.2	7.2
27-Mar	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	3.8	2.2	3.2	3.9	5.8	4.1	3.5	3.7	3.5	4.0	5.6	7.0	6.5	--	7.0
28-Mar	7.7	6.7	6.4	6.5	6.1	8.5	6.1	6.3	18.4	15.2	5.0	2.3	0.9	0.9	1.1	1.3	1.6	2.9	2.7	4.2	4.3	4.3	3.1	2.8	5.2	18.4
29-Mar	2.5	2.5	5.3	5.5	7.3	4.1	3.6	2.7	2.7	1.9	1.7	1.6	1.8	2.0	1.4	1.0	2.2	5.1	5.6	3.8	2.8	3.0	3.0	4.5	3.2	7.3
30-Mar	9.8	6.2	7.3	8.8	7.4	7.8	9.5	10.2	7.2	7.7	7.7	8.8	5.6	4.5	3.2	3.5	4.7	3.8	8.3	12.6	7.4	14.9	21.7	17.2	8.6	21.7
31-Mar	5.9	3.8	3.5	5.0	8.1	10.5	6.5	4.6	4.8	5.1	8.6	7.9	4.3	1.8	1.7	1.7	1.6	1.8	2.0	1.7	2.1	2.3	2.3	2.4	4.2	10.5
8.3 7.3 7.8 7.8 8.0 8.0 7.8 7.3 7.7 6.9 6.1 5.3 5.3 4.8 5.1 4.8 4.7 5.0 5.6 5.7 5.7 6.7 7.2 7.6																								Diurnal Average		
22.4 16.3 17.3 21.3 18.9 17.3 31.7 23.6 21.2 16.9 15.6 13.6 21.4 12.4 16.3 15.9 14.0 11.4 13.0 13.2 15.9 27.1 21.7 20.7																								Diurnal Maximum		
M - Maintenance UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	340	46.83	46.83
6 - 15	327	45.04	91.87
16 - 25	34	4.68	96.56
26 - 80	2	0.28	96.83
> 81.0	0	0.00	96.83

Total Number of Valid Hours: 726

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Millennium - March 2015

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	65	23	11	7	5	14	47	43	24	15	5	3	9	17	17	22	327
6 - 15	40	12	8	8	7	35	53	33	28	15	12	6	4	12	13	19	305
16 - 25	3	0	0	0	0	6	12	4	2	0	1	0	2	1	2	0	33
26 - 80	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	108	36	19	15	12	55	112	80	54	30	18	10	15	30	32	41	667

Total Number of Valid Hours: 689

Total Number of Hours: 744

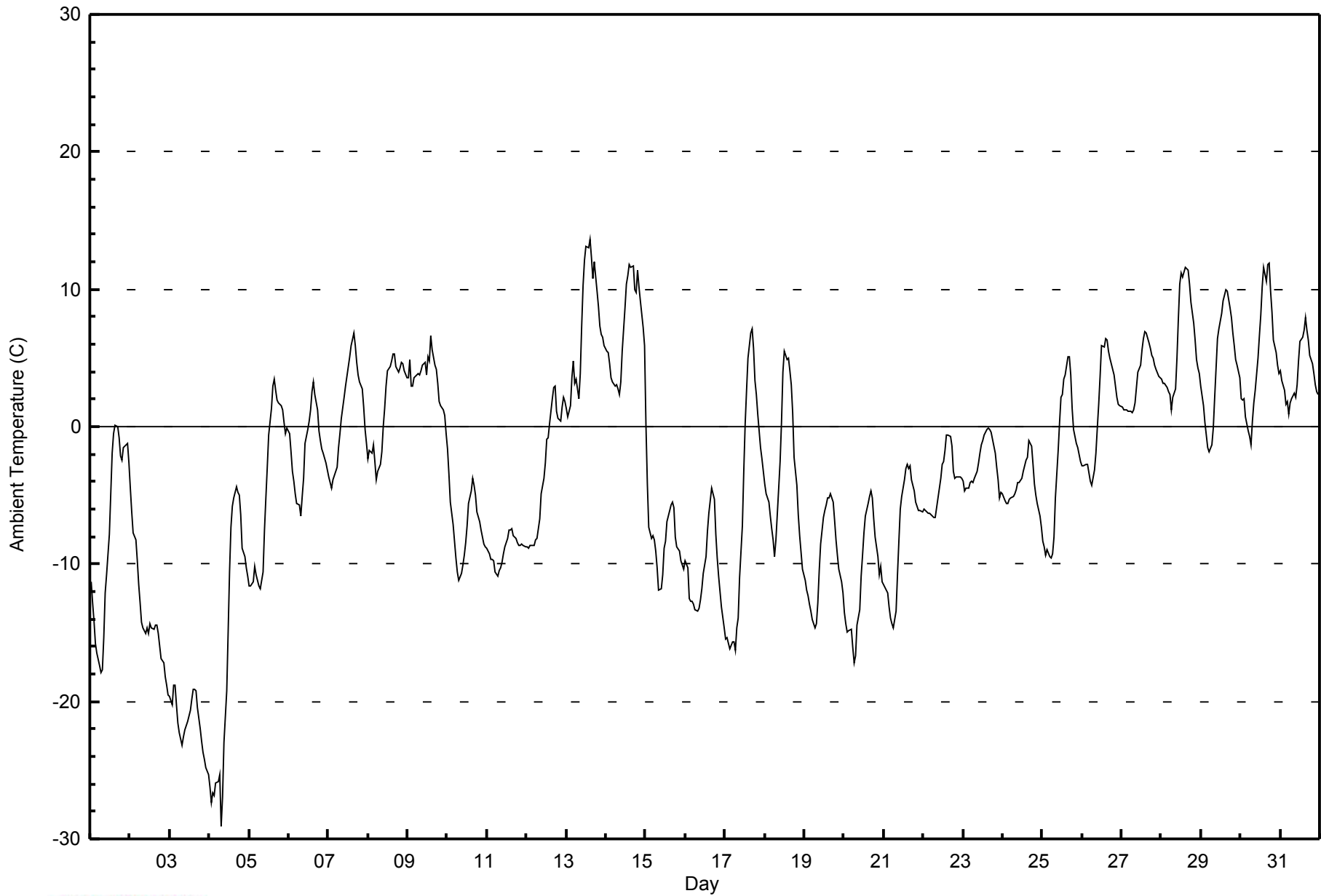


Maximum Value: 13.7 C on Mar 13 15:00		Maximum Daily Average: 7.3 C on Mar 13		Hours in Service: 744																						
Minimum Value: -29.1 C on Mar 4 08:00		Minimum Daily Average: -21.4 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.4 C at hour 16		Minimum Diurnal Average: -7.8 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -3.49 C		Percentiles: P ₁ = -25.8 P ₁₀ = -14.4 Q ₁ = -8.8 Median = -3.0 Q ₃ = 2.9 P ₉₀ = 5.8 P ₉₉ = 11.7		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-11.3	-12.9	-14.1	-15.7	-16.5	-17.4	-17.9	-17.7	-15.4	-12.1	-10.8	-7.8	-4.8	-1.9	-0.5	0.1	0.0	-0.8	-2.2	-2.5	-1.5	-1.4	-1.3	-2.6	-7.9	0.1
2-Mar	-4.4	-6.3	-7.7	-8.2	-9.8	-11.5	-12.8	-14.3	-14.7	-15.0	-14.6	-15.1	-14.4	-14.6	-14.7	-14.5	-14.4	-15.0	-15.9	-16.9	-17.2	-18.2	-18.8	-19.5	-13.7	-4.4
3-Mar	-19.6	-20.3	-18.8	-18.8	-20.3	-21.5	-22.3	-23.2	-22.6	-22.0	-21.8	-21.4	-20.7	-19.9	-19.1	-19.1	-19.3	-20.4	-21.9	-22.9	-23.7	-24.2	-24.8	-25.3	-21.4	-18.8
4-Mar	-26.2	-27.4	-26.6	-26.8	-26.0	-25.8	-25.4	-29.1	-26.9	-23.0	-19.2	-15.0	-10.6	-7.3	-5.8	-5.2	-4.4	-4.8	-5.0	-6.5	-8.9	-9.5	-10.3	-10.8	-16.1	-4.4
5-Mar	-11.6	-11.6	-11.2	-10.2	-10.7	-11.2	-11.6	-11.8	-10.5	-7.5	-5.2	-2.9	-0.6	1.4	2.9	3.4	2.7	2.0	1.7	1.6	1.2	0.4	-0.5	-0.1	-4.2	3.4
6-Mar	-0.5	-1.8	-3.2	-4.0	-4.9	-5.6	-5.7	-6.5	-5.1	-3.7	-1.3	-0.2	0.4	1.2	2.6	3.3	2.3	1.2	-0.4	-1.0	-1.6	-2.0	-2.7	-3.2	-1.8	3.3
7-Mar	-3.7	-4.1	-4.4	-3.8	-3.3	-2.9	-1.5	-0.5	0.6	2.1	2.9	3.7	4.4	5.1	5.9	6.8	5.9	4.6	3.7	3.2	2.8	1.5	-0.2	-1.2	1.2	6.8
8-Mar	-2.3	-1.7	-1.9	-1.3	-2.5	-3.8	-3.3	-2.7	-1.8	0.0	1.3	3.0	4.0	4.4	4.7	5.3	5.3	4.4	3.9	4.3	4.6	4.5	4.1	3.6	1.5	5.3
9-Mar	3.6	4.9	2.9	3.0	3.6	3.8	3.9	3.8	4.1	4.5	4.7	3.8	5.1	4.8	6.6	5.6	4.5	4.1	3.1	1.9	1.5	1.2	0.8	-0.5	3.5	6.6
10-Mar	-1.6	-3.5	-5.5	-7.1	-8.3	-9.5	-10.6	-11.1	-10.7	-10.1	-9.4	-8.4	-7.2	-5.6	-4.7	-3.8	-4.2	-5.0	-6.2	-6.9	-7.5	-8.1	-8.5	-8.8	-7.2	-1.6
11-Mar	-8.9	-9.2	-9.6	-9.7	-9.8	-10.6	-10.9	-10.5	-10.2	-9.8	-9.2	-8.8	-8.1	-7.6	-7.5	-7.5	-7.9	-8.1	-8.4	-8.6	-8.6	-8.5	-8.6	-8.7	-9.0	-7.5
12-Mar	-8.8	-8.8	-8.6	-8.7	-8.7	-8.3	-8.1	-7.4	-6.7	-4.9	-3.7	-2.6	-1.0	-0.9	0.2	2.0	2.8	2.9	1.1	0.6	0.5	1.4	2.1	1.8	-3.0	2.9
13-Mar	1.3	0.7	1.5	3.5	4.8	3.2	3.4	2.1	3.9	7.3	10.3	12.1	13.1	13.0	13.7	12.3	10.8	12.0	9.8	8.8	7.3	6.7	6.5	5.9	7.3	13.7
14-Mar	5.5	5.4	4.5	3.6	3.3	2.9	3.0	2.7	2.3	3.2	5.5	8.6	10.4	10.9	11.8	11.6	11.7	10.0	9.7	11.4	10.2	9.2	7.2	5.9	7.1	11.8
15-Mar	0.1	-4.2	-7.3	-8.1	-7.9	-8.2	-9.0	-10.3	-11.9	-11.8	-10.7	-8.9	-8.3	-6.9	-6.1	-5.7	-5.5	-5.9	-8.0	-8.8	-9.1	-9.7	-10.1	-10.4	-8.0	0.1
16-Mar	-9.8	-10.3	-12.5	-12.8	-12.7	-12.9	-13.3	-13.4	-13.2	-12.6	-11.8	-10.6	-9.4	-7.7	-6.4	-5.4	-4.5	-5.2	-7.8	-9.6	-10.9	-12.0	-13.1	-14.7	-10.5	-4.5
17-Mar	-15.5	-15.3	-15.8	-16.1	-15.7	-15.6	-16.2	-14.6	-13.9	-11.0	-7.3	-3.3	0.2	2.7	5.0	6.9	7.1	5.7	3.4	2.3	1.0	-1.5	-2.3	-3.3	-5.5	7.1
18-Mar	-4.2	-4.9	-5.5	-6.5	-7.5	-8.3	-9.4	-8.3	-4.5	-2.5	0.3	4.0	5.5	4.9	5.0	4.1	3.1	1.0	-2.2	-4.2	-6.4	-7.9	-9.2	-10.4	-3.1	5.5
19-Mar	-11.2	-11.8	-12.3	-12.9	-13.4	-14.1	-14.6	-14.3	-12.8	-10.5	-8.5	-6.7	-6.1	-5.7	-5.2	-5.1	-4.9	-5.5	-6.9	-8.3	-9.4	-10.4	-11.3	-12.1	-9.7	-4.9
20-Mar	-13.5	-14.4	-15.0	-14.8	-14.7	-16.1	-17.2	-16.7	-14.5	-13.3	-10.9	-9.3	-7.8	-6.6	-5.6	-5.1	-4.6	-5.2	-6.7	-8.1	-9.5	-10.8	-10.1	-11.3	-10.9	-4.6
21-Mar	-11.5	-11.9	-12.1	-13.1	-13.9	-14.3	-14.7	-13.4	-10.8	-8.4	-6.0	-5.1	-3.8	-3.0	-2.8	-3.0	-2.8	-3.8	-4.7	-5.5	-5.8	-6.1	-6.1	-6.2	-7.9	-2.8
22-Mar	-6.0	-6.1	-6.2	-6.3	-6.3	-6.5	-6.6	-6.6	-5.9	-5.2	-3.8	-2.7	-2.6	-1.7	-0.7	-0.6	-0.7	-1.4	-3.3	-3.7	-3.6	-3.6	-3.7	-3.7	-4.1	-0.6
23-Mar	-4.0	-4.7	-4.5	-4.4	-4.1	-4.0	-4.0	-3.8	-3.3	-2.7	-1.9	-1.3	-1.1	-0.6	-0.2	-0.1	-0.2	-0.4	-0.9	-2.0	-2.9	-3.8	-5.2	-4.8	-2.7	-0.1
24-Mar	-4.9	-5.4	-5.6	-5.6	-5.3	-5.2	-5.1	-4.9	-4.5	-4.1	-4.0	-3.8	-3.3	-2.9	-2.5	-2.2	-1.1	-1.4	-2.7	-4.1	-5.0	-5.6	-6.6	-7.3	-4.3	-1.1
25-Mar	-8.3	-8.7	-9.4	-8.9	-9.4	-9.6	-9.3	-8.1	-5.2	-1.7	0.3	2.2	2.4	3.4	3.7	5.1	5.1	3.8	1.3	-0.2	-1.2	-1.6	-2.0	-2.6	-2.5	5.1
26-Mar	-2.8	-2.8	-2.7	-2.8	-3.3	-3.9	-4.2	-3.2	-1.9	-0.1	1.6	3.7	5.9	5.8	6.4	6.3	5.5	5.0	4.2	3.8	2.9	2.2	1.7	1.5	1.2	6.4
27-Mar	1.5	1.3	1.3	1.2	1.1	1.1	1.1	1.2	1.7	2.8	4.0	4.4	5.6	6.4	6.9	6.9	6.1	5.7	5.2	4.9	4.5	4.1	3.6	3.5	3.6	6.9
28-Mar	3.5	3.1	3.1	2.9	2.5	2.3	1.2	2.2	2.8	5.0	7.8	10.3	11.2	10.9	11.6	11.5	11.4	10.4	9.1	7.5	6.3	4.9	4.3	3.9	6.2	11.6
29-Mar	3.0	1.5	0.3	-0.6	-1.5	-1.8	-1.3	-0.1	2.1	4.3	6.4	7.1	8.2	9.2	9.5	10.0	9.9	8.7	7.9	6.8	5.9	4.9	4.5	3.6	4.5	10.0
30-Mar	2.0	1.9	2.0	0.7	-0.3	-0.7	-1.3	0.4	1.7	2.7	5.0	6.6	8.1	10.2	11.6	10.5	11.8	11.9	9.9	8.3	6.3	5.4	4.5	3.9	5.1	11.9
31-Mar	4.0	3.4	2.7	1.7	1.8	0.9	1.8	2.1	2.5	2.2	3.1	4.8	6.2	6.5	7.0	7.9	7.0	6.3	5.2	4.6	3.8	3.1	2.5	2.3	3.9	7.9
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Millennium - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	27	3.63	3.63
-20 - 0	437	58.74	62.37
0 - 10	253	34.01	96.37
10 - 20	27	3.63	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

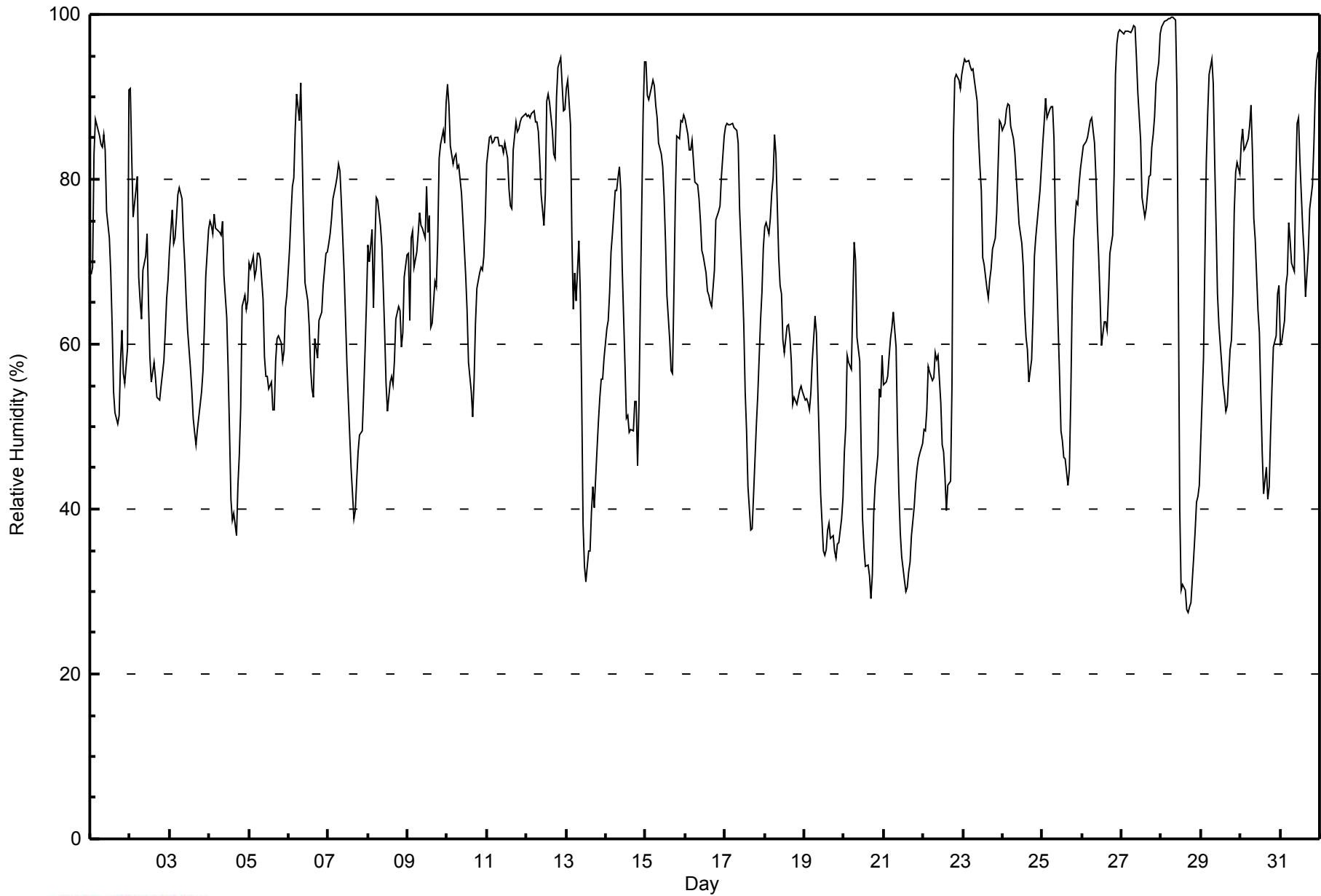


Maximum Value: 100 % on Mar 28 08:00																			Maximum Daily Average: 90.0 % on Mar 27						Hours in Service: 744																			
Minimum Value: 28 % on Mar 28 17:00																			Minimum Daily Average: 44.5 % on Mar 19						Hours of Data: 744																			
Maximum Diurnal Average: 80.5 % at hour 7																			Minimum Diurnal Average: 52.4 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 68.4 %																			Percentiles: P ₁ = 30 P ₁₀ = 44 Q ₁ = 56 Median = 70 Q ₃ = 83 P ₉₀ = 89 P ₉₉ = 99						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Mar	68	69	83	87	87	85	84	84	85	83	76	73	69	62	54	52	50	51	58	62	56	55	59	91	70.3	91																		
2-Mar	91	83	75	79	80	68	65	63	69	71	73	65	58	55	58	56	54	53	53	55	58	62	66	68	65.8	91																		
3-Mar	71	76	72	73	75	78	79	78	73	70	65	62	57	54	51	49	48	50	53	54	57	62	68	74	64.6	79																		
4-Mar	75	74	73	76	74	74	74	73	75	68	63	57	49	41	39	40	37	43	47	52	65	66	64	65	61.0	76																		
5-Mar	70	69	71	68	69	71	71	70	65	58	56	56	55	55	52	52	58	61	61	60	58	59	64	66	62.4	71																		
6-Mar	72	76	79	80	86	90	87	92	83	74	67	65	62	57	55	54	61	58	63	63	64	67	71	71	70.8	92																		
7-Mar	72	73	75	78	79	80	82	81	77	69	63	58	53	49	45	39	40	44	47	49	49	54	59	65	61.7	82																		
8-Mar	72	70	74	64	72	78	77	74	72	67	62	55	52	55	56	55	58	63	65	64	60	61	68	71	65.2	78																		
9-Mar	71	63	73	74	69	71	73	76	74	74	73	79	74	76	62	63	68	67	73	82	84	86	84	89	74.1	89																		
10-Mar	92	89	84	82	83	83	81	82	78	75	72	68	64	58	54	51	56	63	67	69	69	69	71	75	72.2	92																		
11-Mar	82	85	85	84	85	85	85	84	84	84	83	84	83	79	77	76	84	87	86	86	87	87	88	88	84.1	88																		
12-Mar	88	88	87	88	88	87	87	86	82	78	74	78	89	90	89	86	83	83	90	94	95	91	88	89	86.6	95																		
13-Mar	91	92	87	73	64	69	65	73	66	54	38	33	31	35	35	40	43	40	47	51	54	56	56	58	56.2	92																		
14-Mar	62	63	66	71	73	79	79	80	81	79	69	57	51	51	49	50	49	53	53	45	52	65	88	94	65.1	94																		
15-Mar	94	90	90	91	92	91	89	87	84	83	82	78	72	66	60	57	56	66	77	85	85	87	87	88	80.8	94																		
16-Mar	87	85	83	84	85	82	80	79	78	75	71	71	69	66	66	65	65	69	75	76	76	77	80	85	76.2	87																		
17-Mar	87	87	87	87	87	86	86	86	84	76	68	62	54	50	43	37	38	42	46	50	54	63	66	72	66.5	87																		
18-Mar	74	75	73	75	78	80	85	83	71	67	66	61	59	62	62	61	58	53	54	53	54	54	55	54	65.3	85																		
19-Mar	53	53	53	52	54	58	63	61	55	48	42	35	34	35	37	38	36	37	35	34	36	36	39	41	44.5	63																		
20-Mar	47	50	59	58	57	65	72	70	61	58	47	39	35	33	33	32	29	32	40	43	47	55	54	59	48.9	72																		
21-Mar	55	55	56	58	61	62	64	60	49	42	37	34	31	30	31	32	34	37	40	43	45	46	47	48	45.7	64																		
22-Mar	50	49	52	57	57	56	56	59	58	59	53	48	47	44	40	43	43	55	85	92	93	92	91	93	61.3	93																		
23-Mar	94	95	94	94	94	93	93	92	90	85	82	79	71	70	67	66	68	69	72	73	76	82	87	87	82.1	95																		
24-Mar	86	87	88	89	89	86	85	83	80	77	74	72	70	64	61	59	55	58	64	71	73	75	79	82	75.3	89																		
25-Mar	84	87	90	88	88	89	89	85	75	62	56	50	48	46	46	43	45	53	65	72	77	77	80	81	69.9	90																		
26-Mar	83	84	85	85	86	87	88	84	80	75	71	65	60	63	63	62	66	71	73	80	93	97	98	98	79.0	98																		
27-Mar	98	98	98	98	98	98	98	99	98	95	91	85	78	77	75	76	80	81	84	85	88	92	94	98	90.0	99																		
28-Mar	98	99	99	99	99	100	100	100	99	91	67	40	30	31	30	28	28	28	29	34	37	41	41	43	62.1	100																		
29-Mar	48	58	70	82	88	93	95	92	82	74	66	62	58	55	54	52	53	59	61	66	76	81	82	81	70.3	95																		
30-Mar	84	86	84	84	85	86	89	83	75	73	64	61	54	47	42	45	41	43	49	55	60	61	66	67	66.0	89																		
31-Mar	60	60	63	67	68	75	73	70	69	80	87	87	82	74	71	66	68	71	76	79	84	91	94	95	75.5	95																		
																			76.1	76.4	77.7	78.3	79.1	80.2	80.5	79.6	76.0	71.8	66.4	62.0	58.0	55.8	53.5	52.4	53.2	56.1	60.8	63.8	66.5	69.2	72.1	75.4	Diurnal Average	
																			98	99	99	99	99	100	100	100	99	95	91	87	89	90	89	86	84	87	90	94	95	97	98	98	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Millennium - March 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Millennium - March 2015

Maximum Speed: 31 km/h on Mar 2 03:00	Maximum Daily Speed Average: 15.9 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 23 11:00	Minimum Daily Speed Average: 1.8 km/h on Mar 17	Hours of Data: 707
Maximum Diurnal Speed Average: 3.0 km/h at hour 19	Minimum Diurnal Speed Average: 0.3 km/h at hour 7	Hours of Missing Data: 37
Monthly Average Velocity: 1.4 km/h 39.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 14 P ₉₉ = 23	Percent Operational Time: 95.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	NNE8	ENE2	SE3	SE5	ESE6	SE4	SE6	SE7	SE8	SSE7	S6	SSE7	SSE7	SSE8	S13	S14	S13	S13	SSE8	SSE6	S11	SSW7	WNW7	NW12	SSE5.4	S14
2-Mar	NNW17	N28	N31	N24	N29	NNW19	NNW19	NNW17	N19	N16	NNW14	NNW18	NNW14	NNW17	NNW15	NW17	NW18	NW17	NW10	NW7	N9	NNE8	N6	WNW4	NNW15.9	N31
3-Mar	W7	W7	WNW9	NNW12	N15	NNW6	N12	N10	N16	N21	N23	N18	N19	N14	N13	N14	NNE12	N9	NNE6	NE7	ENE5	SE3	SSE2	SSE3	N9.4	N23
4-Mar	SE5	S6	SSE6	SSE7	SSE6	SSE7	SSE6	S6	SSE6	S6	SSE5	S6	SSE8	S10	SSE10	SSE8	S12	SSW9	SSW10	SSW8	SSE6	SE8	SE6	S3	SSE6.6	S12
5-Mar	SW6	W6	WNW8	WNW6	WNW4	SW5	SW6	SW6	SSW3	SSE4	SE6	SE7	SE6	ESE6	ESE6	ESE7	SE6	SE5	SE6	SSE4	SSW8	SW5	SSW6	S4	S3.1	SSW8
6-Mar	ESE4	ESE2	SW7	SSW7	SE2	NW2	WNW3	N1	N5	N12	N14	N12	N11	NNE6	ENE1	ESE4	ESE3	NNE10	NNE10	NE9	NE7	N4	N2	WNW3	NNE3.7	N14
7-Mar	NW4	AF	ESE2	SE4	SE4	SSE3	W5	W4	WNW8	WNW10	WNW9	WNW10	WNW9	NW7	WNW8	WNW8	WNW6	WNW6	WNW8	NW7	NNW4	W2	W3	WNW4.9	WNW10	
8-Mar	N2	SE2	S3	SSW4	SSE4	SE6	SE7	SE7	SE8	SE6	SSE4	S5	S7	SE5	SE4	ESE3	ESE3	ESE5	SE5	SSE5	S7	S4	SE5	SE4	SSE4.3	SE8
9-Mar	ESE3	WSW4	SSE5	SE4	SSW6	SW5	W4	WNW6	WNW6	WNW9	NW7	N6	W5	NNW5	WNW8	NW9	NNW7	NNW6	NNW7	NNW5	NW6	NNW4	NW7	N9	NW3.9	N9
10-Mar	N15	N20	NNE20	NNE15	NNE14	NNE14	NNE14	NNE12	NNE13	N12	NNE8	N7	N6	NNW6	N8	NNW7	N9	N12	N12	NNE15	NNE16	N15	N14	N14	N12.1	N20
11-Mar	N12	N14	N12	N12	N11	N12	N13	N12	N10	N11	N11	N11	N14	N15	NNW12	N12	N12	N14	N14	N13	N10	NNW7	NNW6	NW7	N11.4	N15
12-Mar	NNW6	NNW4	WNW3	NW3	NW5	NNW3	NW3	SSW2	SW5	S4	SSW6	SSE8	SE9	SSW6	S6	SSE6	SE5	SE4	NE2	ESE5	SE5	SE6	SSE6	S5	S2.0	SE9
13-Mar	S4	SSW5	WSW3	WSW6	SW5	SSE4	SSW7	ESE5	SE6	SE4	SW8	SSW9	SSW10	S11	S10	SSE7	SSE7	S12	S12	SSE9	SSE7	SSE7	SE9	SE9	S6.3	S12
14-Mar	SE11	SE11	SE11	SE10	SE9	SE8	SE11	SE6	SSE5	SE5	SE6	SSE5	SSE5	SE4	SE7	SE5	SE6	ESE6	SSE2	SSW5	SW5	W7	WSW4	WNW6	SE5.2	SE11
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE6	N5	ENE3	ENE5	NE8	N4	NNW6	NNW9	N11	N8	N8	NNW6	NW3	---	N11
17-Mar	WNW3	WNW2	NNW2	AF	S4	SSE4	S4	S5	SSW7	SSW5	S5	SSE4	S5	ESE2	E3	E3	ENE4	E3	E4	ESE5	ESE4	W4	WSW4	NW3	SSE1.8	SSW7
18-Mar	SW4	SSW6	SSW7	SSW5	SW6	WSW3	NNW2	SSW2	SSW2	S1	E2	ESE4	ESE3	NW5	NW6	N14	N14	N18	N23	N24	N24	N21	N19	N15	N6.3	N24
19-Mar	N10	NNW8	N9	N10	N11	N9	N6	N6	NNE5	NW5	WNW7	NNW8	NNW9	N10	N10	N12	N12	N13	N16	NNE18	NNE15	NE14	NE11	ENE9	N9.3	NNE18
20-Mar	NE4	NE2	ENE4	SE3	ESE4	SSE3	WSW1	SW3	WNW3	N4	N3	N5	NW5	NW5	NW7	NW6	NNW7	N9	N12	N11	N9	NNE6	SE7	SSE3	N3.0	N12
21-Mar	SE5	SE6	ESE7	SE3	S1	W2	SSE2	ESE4	ESE7	ESE7	SE9	SE10	ESE8	ESE8	E7	ESE9	ESE11	ESE12	ESE10	ESE7	ESE8	ESE8	ESE8	ESE8	ESE6.7	ESE12
22-Mar	SE8	SE9	SE7	SE6	SE6	SE7	SE6	SE8	SE6	SSE6	SE6	SE5	S6	S5	S5	SSE5	S5	S6	S5	SSE3	E3	ESE4	SE6	SSE3	SSE5.3	SE9
23-Mar	S4	SSE3	SE4	SE5	SSE4	SSE4	SSE4	S3	SSW1	S4	SW0	NE3	NNE5	NNE5	NE6	N4	NNE6	NNE7	NNE7	NNE6	NNE7	NNE8	N7	N9	NE2.2	N9
24-Mar	N8	N8	N6	N7	NNW5	NNW5	NNW4	N6	NNE9	NNE7	N9	N9	NNW6	NNW7	NNW6	NNW5	ESE2	S5	ENE3	ENE6	E5	ENE5	E3	ESE4	NNE4.3	N9
25-Mar	S3	SE2	ESE2	ESE4	ESE3	S3	SSW1	NW2	SE4	SE7	SE6	ESE7	S7	S6	ESE1	S4	SSE5	S7	S5	SSE5	SSE5	SE6	SE7	SE7	SSE4.0	ESE7
26-Mar	ESE10	SE10	SE11	SE11	SE11	SE10	SE10	SE10	SE10	SE10	SE8	SSE7	SE8	SE8	SE10	SE12	SE12	SE9	SSE5	S6	SSW7	S5	SE5	SE4	SE8.4	SE12
27-Mar	S4	S4	SSE3	SE4	S4	SSE4	S5	SSE5	SSE5	SSE4	SSE5	S9	SSE6	S5	SSE6	SSE8	SE8	SSE8	SE9	SE9	SSE5	SSE6	N3	SSE3	SSE5.1	SE9
28-Mar	SSW2	SSE2	SSW1	SE2	S2	SW3	SW4	S3	SE4	SSE3	NW2	NW7	NW10	NW12	WNW16	WNW19	WNW16	WNW14	WNW15	NW10	WNW8	W4	W7	W7	WNW5.7	WNW19
29-Mar	W5	SW4	SSW5	SSE4	S4	SE5	SSE5	SSE6	SE7	SE6	SSE8	SE7	SE5	SSE5	SSE5	SE5	ESE4	SE5	ENE3	SSW7	SSW7	S4	WSW5	W5	SSE3.9	SSE8
30-Mar	W2	WSW4	WNW5	N3	NNW4	NE6	SW2	ESE2	NNE4	NNE5	ESE5	E5	E5	E6	ESE5	NE6	ESE6	SE5	SE4	SE6	SE7	ESE4	ESE5	SE6	E2.5	SE7
31-Mar	SSE5	SSE5	SSE5	SSE4	SSE5	SE4	SSE5	SSE6	S2	SSE5	N7	NNE7	NE12	NE18	ENE18	ENE20	ENE15	NE15	NE18	NE20	NE23	NNE21	NNE18	NNE19	NE8.6	NE23

NNE0.8	NNE0.8	NE1.0	ENE1.1	NE1.3	E0.8	ESE0.3	ESE0.8	ENE1.1	NE1.1	NNE1.0	NE1.6	NNE1.1	NNE1.5	NE1.3	NE2.1	NE1.7	NE1.9	NNE3.0	NNE2.8	NE2.4	NE2.4	NE1.4	NNE1.5	Diurnal Average
NNW17	N28	N31	N24	N29	NNW19	NNW19	NNW17	N19	N21	N23	NNW18	N19	NE18	ENE18	ENE20	NW18	N18	N23	N24	N24	NNE21	N19	NNE19	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

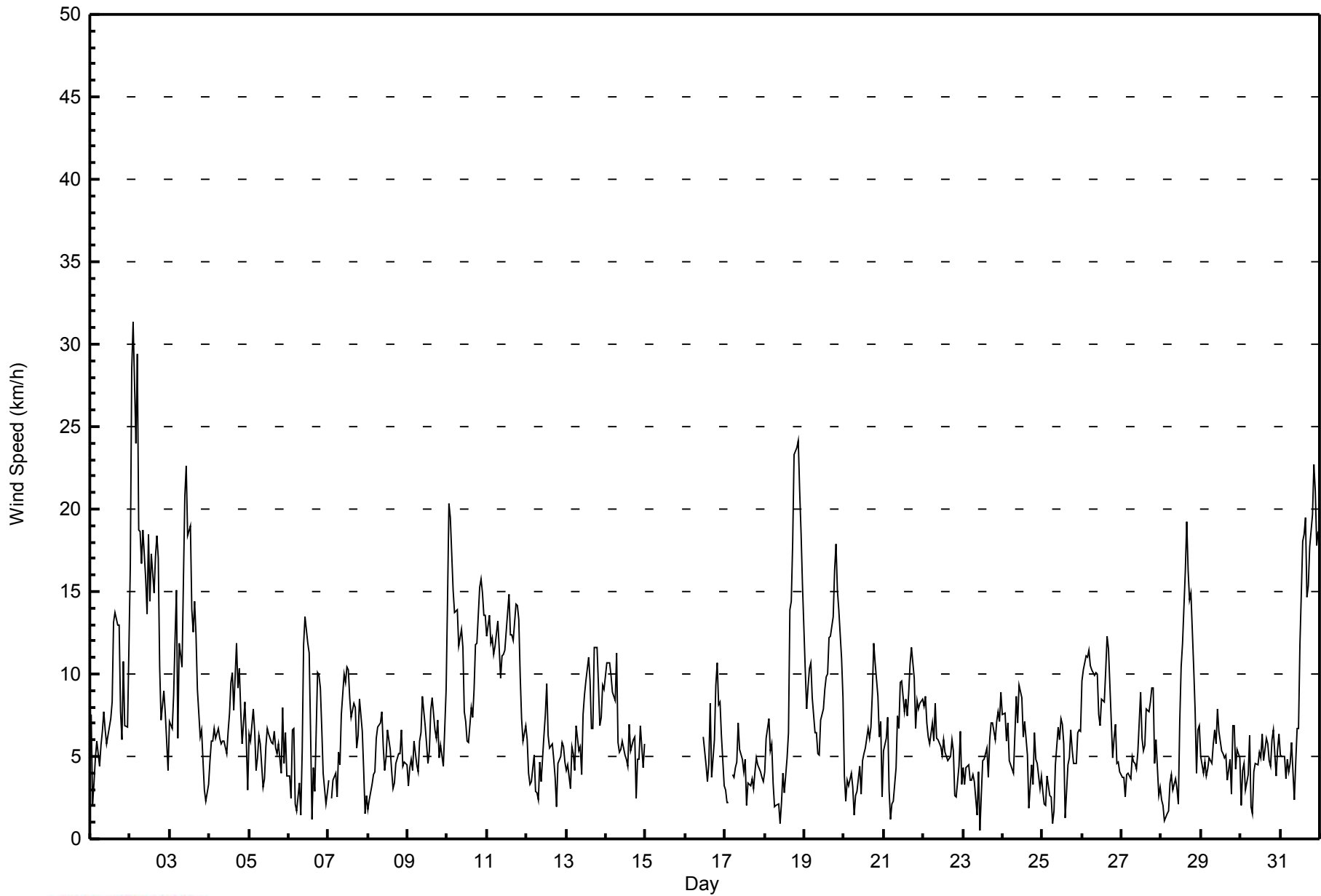
Wind Speed (WS) - km/h
Millennium - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 2 05:00 Minimum Value: 1 km/h on Mar 23 02:00 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: 707 Hours of Missing Data: 37 Hours of Calibration: 0 Percent Operational Time: 95.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	3	1	1	1	1	1	2	2	2	1	2	2	3	3	3	3	3	2	1	3	4	6	4	6
2-Mar	7	9	8	6	9	7	7	7	6	6	6	7	6	6	6	6	7	6	5	3	4	2	2	2	9
3-Mar	2	2	3	5	6	2	4	3	4	5	4	4	4	3	3	3	2	3	2	1	1	1	1	1	6
4-Mar	1	2	1	2	2	2	1	2	2	2	1	2	2	3	3	2	3	3	4	3	2	1	1	1	4
5-Mar	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	1	1	1	1	1	2	2	1	1	2
6-Mar	1	1	3	2	1	2	1	1	1	5	3	2	2	1	2	2	1	4	2	2	2	1	1	1	5
7-Mar	1	AF	1	1	2	2	2	2	3	4	3	4	4	3	3	3	2	2	2	5	2	2	1	1	5
8-Mar	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
9-Mar	1	2	2	2	1	2	1	2	2	3	3	3	2	2	4	4	2	3	3	2	2	2	3	3	4
10-Mar	4	4	4	3	4	3	3	3	3	3	2	2	2	2	2	3	3	3	3	3	3	2	2	2	4
11-Mar	2	2	2	2	2	3	3	3	2	3	2	2	2	3	3	3	3	3	3	3	3	2	2	2	3
12-Mar	2	2	2	2	2	2	1	1	2	1	2	2	4	1	2	2	2	2	2	1	1	2	2	1	4
13-Mar	2	1	2	2	2	2	2	1	1	1	3	3	3	2	3	2	2	3	3	2	1	1	3	2	3
14-Mar	2	2	3	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	2	3	2	2	2	6	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	1	2	3	1	2	2	2	2	2	1	1	3
17-Mar	1	1	1	AF	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
18-Mar	1	1	1	1	2	2	1	2	1	1	1	1	1	2	2	3	4	4	5	5	5	5	4	4	5
19-Mar	3	3	3	3	3	3	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3
20-Mar	1	2	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	3	2	2	2	2	2	2	3
21-Mar	2	2	2	2	2	1	1	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3
22-Mar	3	3	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	1	3
23-Mar	1	1	1	1	1	2	1	1	1	2	1	1	1	1	2	1	2	2	1	1	1	1	1	2	2
24-Mar	2	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	3	1	1	1	1	3
25-Mar	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	2	2	1	1	1	2	2	2	2
26-Mar	3	3	3	3	3	3	3	4	3	3	3	2	3	3	3	3	3	3	1	2	2	1	1	1	4
27-Mar	1	1	2	2	1	1	1	1	1	1	2	2	2	1	2	3	2	2	3	2	1	1	2	1	3
28-Mar	2	2	1	1	1	1	1	1	1	1	2	3	4	4	6	7	6	5	4	4	2	1	2	2	7
29-Mar	2	1	1	1	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	2	1	2	2	1	2
30-Mar	1	2	2	2	1	2	2	1	2	2	1	2	1	2	2	2	2	2	1	1	1	1	1	1	2
31-Mar	1	1	1	1	2	2	2	2	2	2	2	3	3	5	5	5	4	4	3	4	4	4	3	3	5
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Millennium - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Millennium - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	288	40.74	40.74
6 - 11	308	43.56	84.30
12 - 19	95	13.44	97.74
20 - 28	14	1.98	99.72
29 - 38	2	0.28	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Millennium - March 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	5	4	10	10	33	41	53	37	14	13	8	10	11	13	14	288
6 - 11	42	18	8	2	2	21	73	35	19	19	6	2	5	21	16	19	308
12 - 19	44	13	5	2	0	1	2	0	7	0	0	0	0	5	5	11	95
20 - 28	9	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	14
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	38	19	15	12	55	116	88	63	33	19	10	15	37	34	44	707

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Millennium - March 2015

Direction of Maximum Speed: 358 deg on Mar 2 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 343.2 deg on Mar 2	Hours of Data: 707
Direction of Minimum Speed: 234 deg on Mar 23 11:00	Direction of Minimum Daily Speed Average: 1.8 deg on Mar 17
Direction of Minimum Speed: 234 deg on Mar 23 11:00	Hours of Missing Data: 37
Monthly Average Direction: 255.6 deg	Percent Operational Time: 95.0

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	28	62	138	124	123	140	144	140	144	147	177	157	149	160	175	175	174	176	162	159	181	198	282	320	163.3	
2-Mar	336	354	358	359	357	336	340	339	354	351	343	345	337	346	336	322	316	317	326	325	351	15	3	293	343.2	
3-Mar	276	279	302	346	7	346	360	2	5	6	7	8	7	5	7	11	13	11	31	41	59	133	155	148	3.7	
4-Mar	140	190	159	157	154	153	155	190	158	172	167	171	164	174	166	163	177	194	207	194	147	132	127	174	167.9	
5-Mar	218	259	291	283	296	227	216	217	194	149	127	126	124	116	121	123	134	129	136	157	206	214	213	178	181.4	
6-Mar	122	112	218	199	124	308	295	5	8	10	360	6	9	12	57	102	106	22	21	34	52	358	3	284	17.9	
7-Mar	325	AF	104	140	144	163	277	281	284	290	295	296	294	295	311	285	298	297	318	284	309	337	260	278	293.3	
8-Mar	358	143	177	202	164	129	133	131	138	134	159	169	185	137	133	120	119	119	137	162	188	169	127	124	146.7	
9-Mar	119	258	165	144	205	233	262	285	295	287	313	353	279	346	294	316	330	328	343	329	319	333	310	358	307.1	
10-Mar	5	10	12	12	12	16	17	20	14	9	13	5	0	333	350	343	353	359	359	13	15	11	10	11	8.2	
11-Mar	7	7	2	11	6	356	3	2	355	356	354	353	358	359	348	351	349	359	355	353	358	337	329	322	356.3	
12-Mar	329	332	300	310	323	337	309	213	232	183	211	166	141	211	177	151	134	124	40	113	146	143	159	177	176.4	
13-Mar	185	202	244	240	229	148	193	119	125	145	236	195	199	179	173	159	160	170	170	165	153	154	145	141	173.6	
14-Mar	136	137	128	128	133	138	129	146	162	145	143	151	156	131	128	135	127	119	160	213	214	272	245	301	145.4	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	26	4	62	68	38	1	339	348	358	351	351	345	319	--	
17-Mar	296	295	327	AF	178	157	188	183	209	204	184	156	180	102	92	84	77	97	100	110	110	262	245	316	167.7	
18-Mar	224	203	204	205	227	243	346	208	201	173	82	123	108	325	322	11	2	358	1	1	2	2	4	0	355.4	
19-Mar	354	348	357	352	355	357	357	6	19	307	302	330	348	352	355	356	11	4	5	15	23	43	49	69	4.7	
20-Mar	53	42	70	135	104	164	251	225	299	9	2	351	311	320	309	319	342	356	4	7	2	14	135	152	360.0	
21-Mar	137	126	122	140	191	269	163	115	116	118	132	126	119	112	100	105	113	122	123	115	102	110	108	119	118.7	
22-Mar	124	131	137	143	127	132	141	143	145	147	140	138	187	177	173	161	185	174	170	160	96	111	143	161	147.2	
23-Mar	182	163	144	141	154	157	153	171	211	186	234	50	18	23	35	3	12	25	33	30	21	18	359	5	42.3	
24-Mar	2	355	5	1	337	344	343	355	20	16	6	4	348	334	348	343	119	183	68	66	83	78	101	116	11.7	
25-Mar	171	138	123	121	103	169	195	322	127	138	140	123	182	177	120	179	165	174	170	159	153	146	144	146	151.9	
26-Mar	123	125	129	128	125	125	137	141	140	143	145	152	144	137	125	131	129	134	152	190	194	172	141	131	137.8	
27-Mar	189	179	153	142	173	168	169	154	152	154	161	180	162	173	158	147	142	147	141	140	161	148	4	164	156.4	
28-Mar	193	166	198	139	184	215	218	187	136	162	314	318	317	304	292	297	293	299	299	311	294	281	281	259	288.9	
29-Mar	262	219	195	167	175	135	156	157	146	146	150	143	145	147	148	142	113	128	73	192	195	187	251	281	166.0	
30-Mar	278	257	302	349	346	34	216	114	16	30	111	97	87	97	114	44	123	143	128	130	136	106	116	132	96.7	
31-Mar	157	156	157	163	150	136	149	155	174	161	359	27	42	55	58	60	63	49	41	44	39	33	18	13	52.2	

22.5	16.6	36.1	62.2	49.2	87.4	112.2	115.1	70.7	55.6	20.7	45.0	32.9	31.8	39.6	33.9	46.2	36.4	24.1	32.0	37.5	40.1	36.3	14.2
Diurnal Average																							

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Millennium - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 106 deg on Mar 25 15:00			Hours of Data:	707
Minimum Value: 8 deg on Mar 3 20:00			Hours of Missing Data:	37
			Hours of Calibration:	0
			Percent Operational Time:	95.0
Percentiles: P ₁ = 10 P ₁₀ = 13 Q ₁ = 16 Median = 22 Q ₃ = 32 P ₉₀ = 45 P ₉₉ = 85				

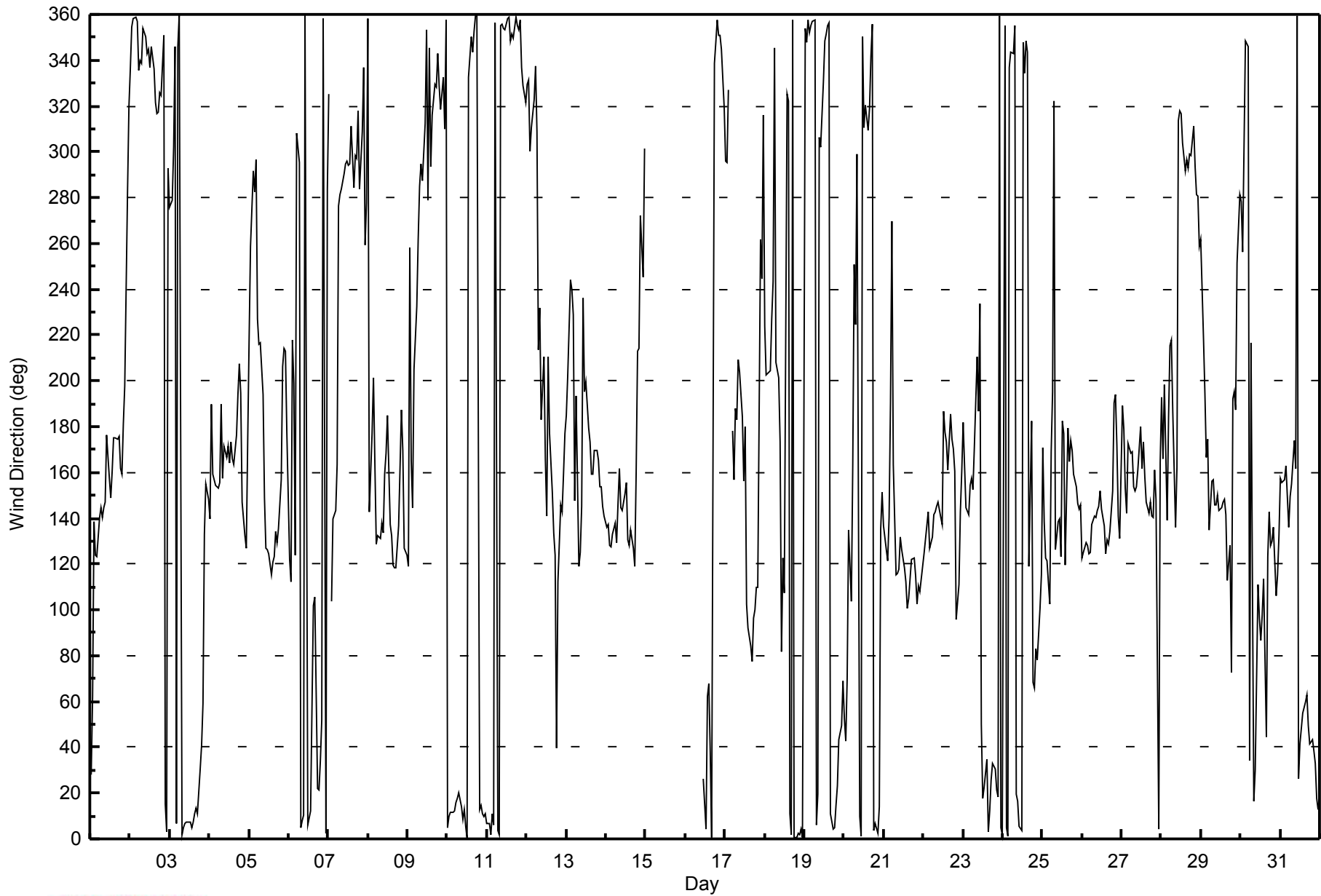
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	9	70	20	13	10	21	14	15	22	16	21	20	19	23	15	15	14	15	17	18	18	43	56	31	70	
2-Mar	33	23	20	18	23	34	33	34	24	27	32	32	34	33	36	32	29	29	33	31	42	21	24	38	42	
3-Mar	23	19	27	39	16	27	19	19	16	15	16	17	15	15	14	12	13	12	16	8	12	21	20	14	39	
4-Mar	13	25	17	15	13	13	13	24	22	23	20	20	22	19	19	17	20	18	19	19	10	10	10	31	31	
5-Mar	20	27	20	18	30	36	16	23	38	34	16	16	11	27	28	16	15	12	8	12	16	73	10	40	73	
6-Mar	18	67	35	13	54	86	43	57	11	13	18	13	11	16	92	34	44	12	12	13	17	30	44	64	92	
7-Mar	19	AF	30	23	47	62	24	35	28	30	30	33	28	28	35	32	28	30	26	25	31	33	47	47	62	
8-Mar	45	27	29	33	23	12	14	12	14	19	36	17	17	23	22	26	18	14	10	26	13	23	14	20	45	
9-Mar	31	53	33	44	10	40	32	31	27	32	38	45	47	40	41	39	36	30	26	37	25	32	32	29	53	
10-Mar	17	15	13	12	12	14	14	14	15	18	24	23	39	45	25	27	22	15	16	13	13	11	11	11	45	
11-Mar	11	10	14	11	14	16	14	14	18	17	17	15	15	14	20	17	17	16	19	16	18	25	25	23	25	
12-Mar	30	32	30	53	45	35	48	60	31	37	20	26	30	18	24	17	24	38	47	21	18	22	17	17	60	
13-Mar	26	28	54	36	48	33	20	19	16	31	32	23	30	15	16	16	15	16	15	16	14	15	14	15	54	
14-Mar	14	15	15	15	17	18	14	20	28	20	25	25	25	26	13	12	12	11	75	59	31	28	31	53	75	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	31	32	54	45	26	25	21	19	16	16	16	17	36	54	
17-Mar	34	54	33	AF	25	15	22	38	17	21	23	33	26	68	46	39	24	19	10	9	11	30	24	31	68	
18-Mar	20	12	9	12	15	58	37	54	49	89	71	44	53	23	28	12	15	17	19	18	18	17	17	89		
19-Mar	20	25	19	19	17	18	14	26	25	36	31	34	27	25	22	19	16	16	15	12	14	12	12	25	36	
20-Mar	33	47	28	22	28	20	68	41	47	34	86	52	50	55	40	35	31	19	14	14	13	49	19	54	86	
21-Mar	19	21	17	73	92	54	47	42	25	34	24	27	29	28	33	30	24	20	19	26	28	24	24	21	92	
22-Mar	19	18	20	21	24	21	22	20	24	28	32	45	24	35	43	27	42	27	20	27	38	31	17	17	45	
23-Mar	19	14	14	13	14	39	23	21	65	21	90	65	27	30	24	15	20	15	11	11	10	11	12	9	90	
24-Mar	14	14	12	11	23	32	38	26	15	21	15	14	29	32	38	36	84	18	51	11	21	20	30	29	84	
25-Mar	36	32	60	27	54	27	61	49	38	29	31	30	20	29	106	36	25	15	15	12	13	19	21	16	106	
26-Mar	17	16	16	16	15	17	18	21	20	18	24	24	24	22	17	16	17	18	16	21	17	15	14	19	24	
27-Mar	16	14	59	24	12	15	17	15	16	20	26	18	21	21	26	18	16	15	16	15	25	18	68	49	68	
28-Mar	74	74	72	85	11	15	12	25	21	39	83	39	33	32	30	30	28	28	25	27	23	37	26	19	85	
29-Mar	28	43	22	19	22	25	14	19	22	27	26	20	19	23	20	20	22	24	36	23	12	21	33	27	43	
30-Mar	39	26	44	53	17	12	81	58	43	42	40	36	40	32	53	39	21	21	17	14	12	43	11	12	81	
31-Mar	16	12	11	25	24	30	19	23	88	33	31	23	20	14	14	16	16	18	11	11	12	12	13	11	88	
74 74 72 85 92 86 81 60 88 89 90 65 53 68 106 39 84 38 75 59 42 73 68 64																										
Diurnal Maximum																										

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Millennium - March 2015



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 24, 2015	Previous Calibration	February 18, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	11:40
Barometric Pressure	724 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Cal Gas Concentration	48.3 ppm	Cal Gas Expiry Date	2/12/2018
Gas Cert Reference	LL104223		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581
DACS voltage range	0-5 volts	DACS channel #	1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-665	-665
Analyzer Range (mv)	1000	1000	Lamp voltage	794	798
Calculated slope	1.002122	0.992485	Chamber temp.	44.9	45.1
Calculated intercept	-0.204137	0.340061	Pressure (mmHg)	707.3	707.9
Analyzer Background	9.3	9.2	Flow (lpm)	0.434	0.434
	1.217	1.229	Intensity	91	91

Analyzer make	43i Thermo	Analyzer serial #	1118148499
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	NA
as found span	6000	94.1	801.4	791.6	1.012
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	98.9	796.1	802.1	0.993
second point	6000	49.7	400.1	402.4	0.994
third point	6000	24.9	200.4	201.4	0.995
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.994

Corrected As found	791.6	Previous response	799.9	% change	1.1%
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Notes:

New cal gas cylinder calibration. Span was adjusted.

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

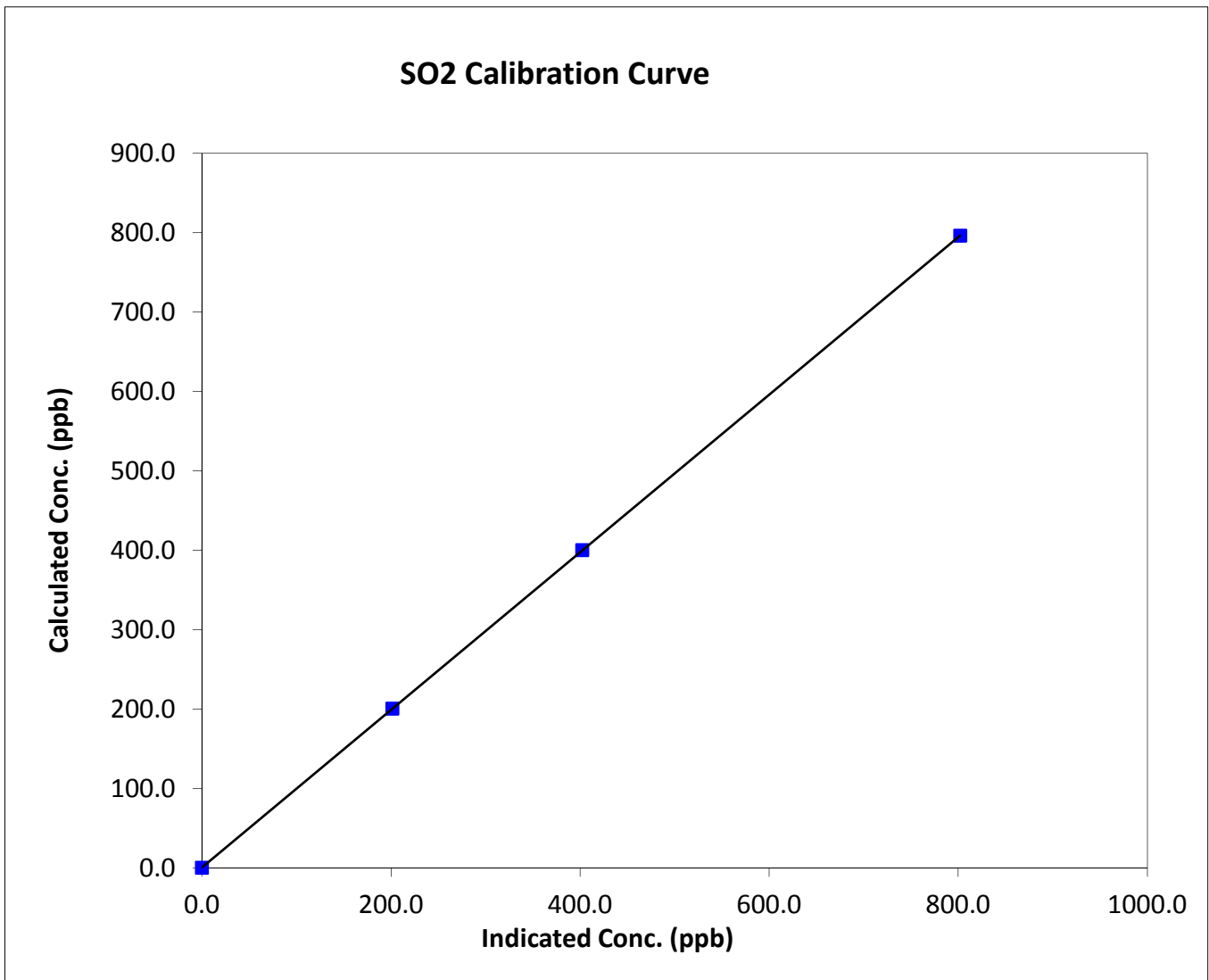
SO₂ Calibration Summary

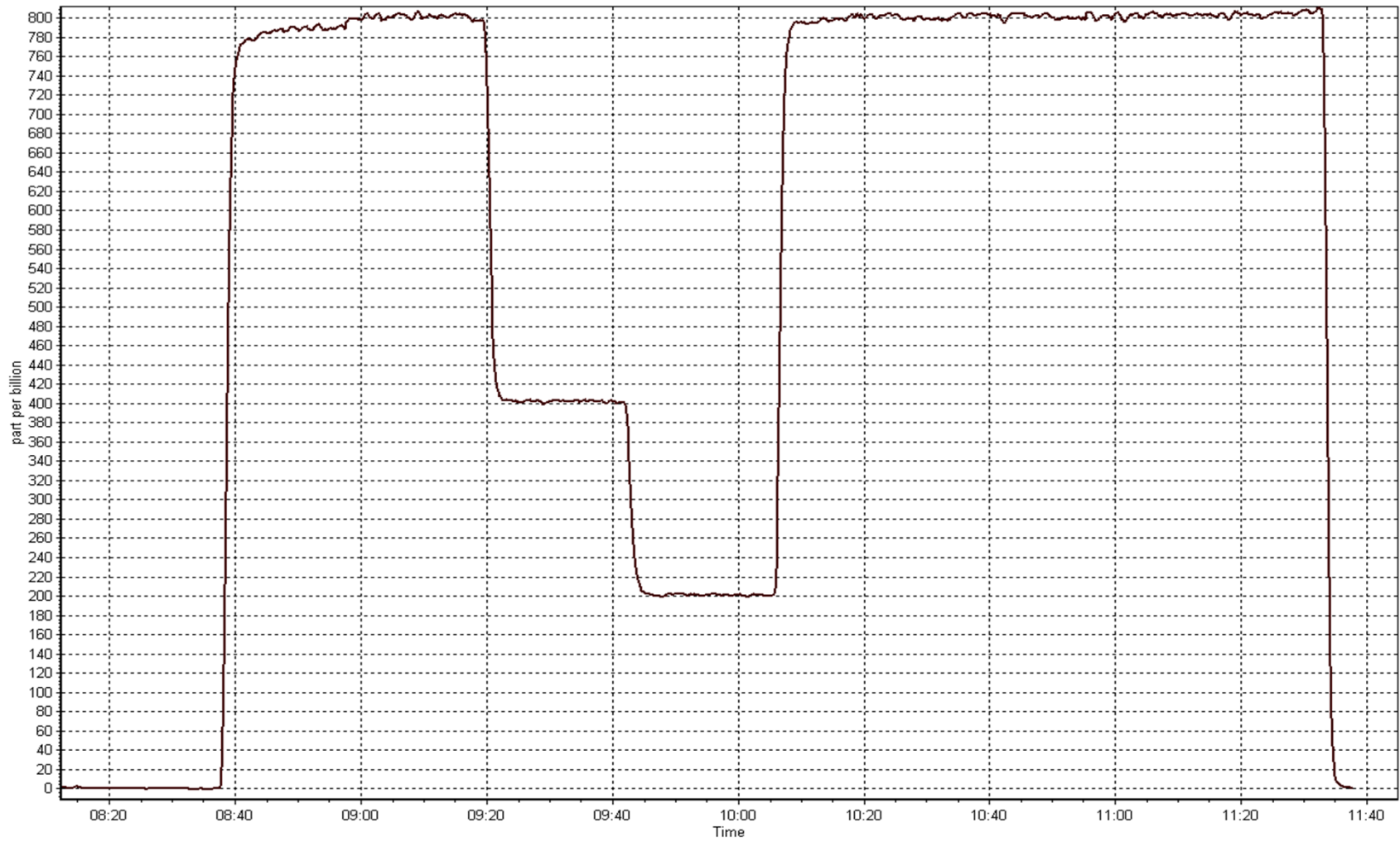
Station Information

Calibration Date	March 24, 2015	Previous Calibration	February 18, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:50	End Time (MST)	11:40
Analyzer make	43i Thermo	Analyzer serial #	1118148499

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
796.1	802.1	0.9926		
400.1	402.4	0.9942	Slope	0.992485
200.4	201.4	0.9953		
			Intercept	0.340061







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 19, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	7:40	End Time (MST)	10:22
Barometric Pressure	727 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11091107
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL84557	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0-5 volts	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-597	-597
Analyzer Range (input)	100	100	Lamp voltage	886	886
Calculated slope	0.997141	1.006489	Chamber temp.	44	44
Calculated intercept	0.255606	-0.248713	Pressure	688.7	688.7
Analyzer Background	18.9	18.9	Flow	0.605	0.605
Analyzer Coefficient	0.640	0.64	Intensity	46300	46300
			Converter temp.	817	817

Analyzer make/model	TEI 43C	Analyzer serial #	0509110887
Converter make/model	CDN-101	Converter serial #	375

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	NA
as found span	5000	38.5	80.1	79.6	1.006
SO2 scrubber check	6000	47.1	401.1	0.7	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	38.5	80.1	79.6	1.006
second point	5000	19.2	39.9	40.2	0.994
third point	5000	9.6	20.0	20.5	0.974
calibrator zero					
as left zero	6000	0.0	0.0	-0.3	NA
as left span	5000	38.5	80.1	79.6	1.006
Average Correction Factor					0.992

Corrected As found	79.8	Previous response	80.1	% change	0.4%
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Notes:

Filter changed out, scrubber checked before as founds, No adjustments or maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

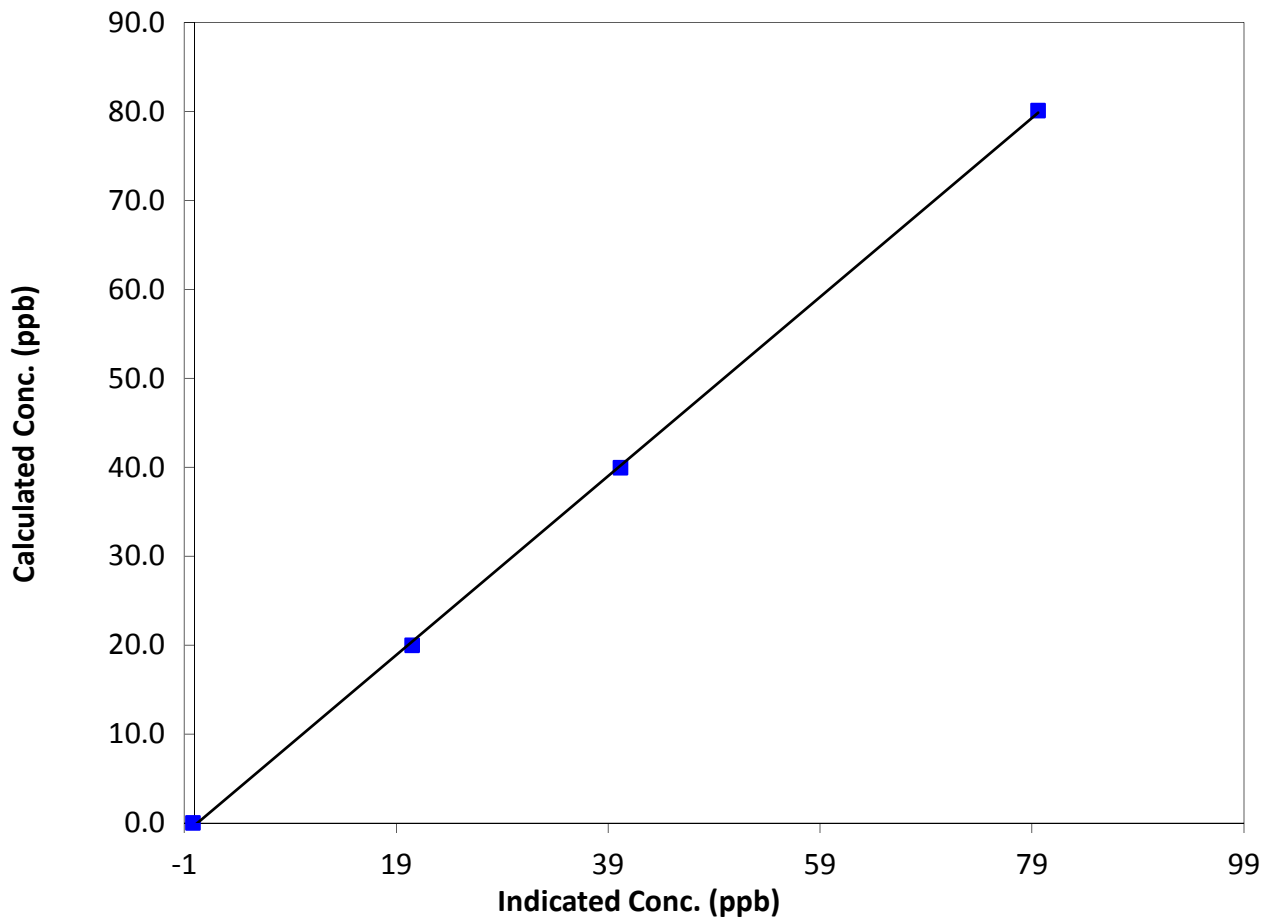
Station Information

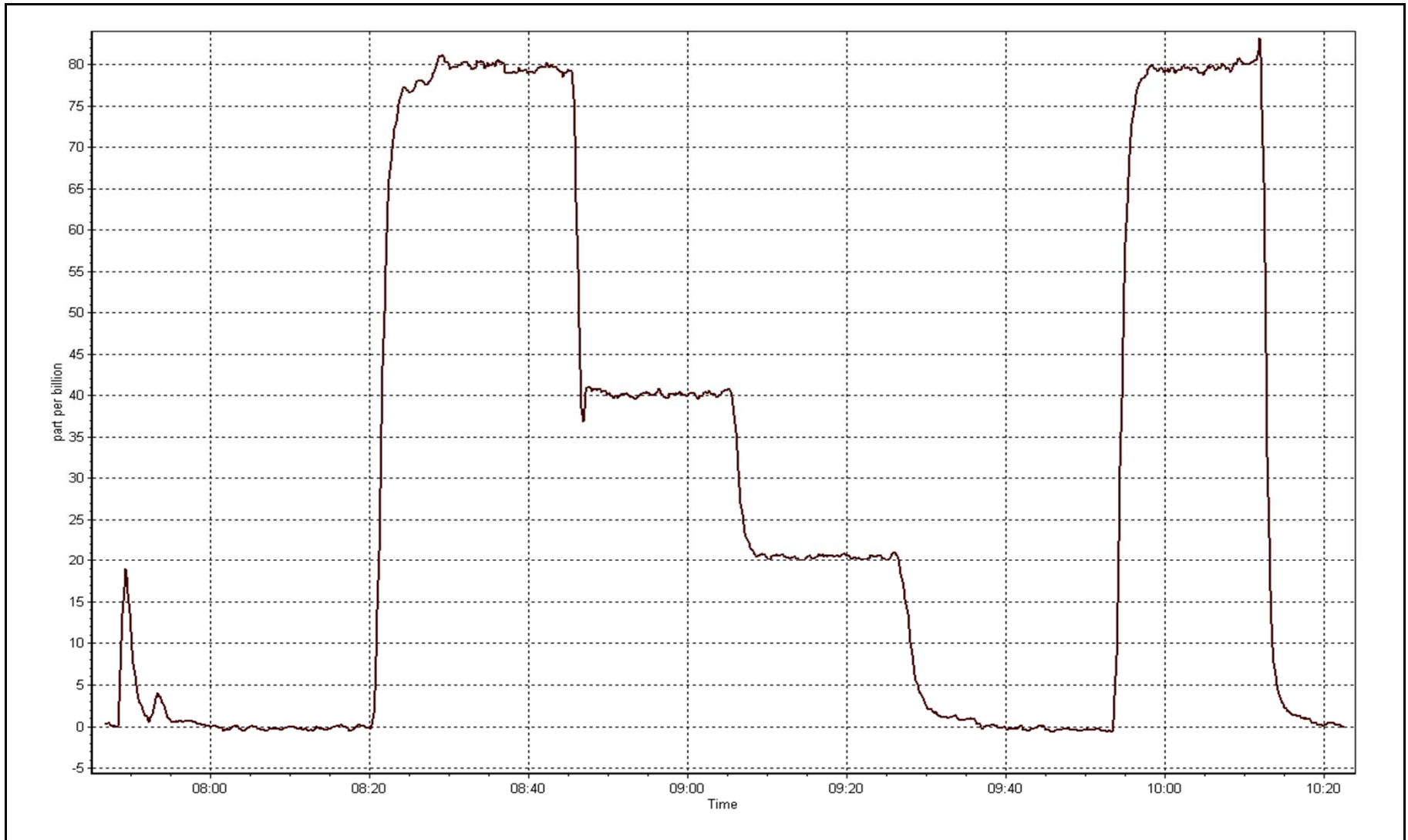
Calibration Date	March 25, 2015	Previous Calibration	February 19, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:40	End Time (MST)	10:22
Analyzer make	TEI 43C	Analyzer serial #	0509110887

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999865
80.1	79.6	1.0063		
39.9	40.2	0.9942	Slope	1.006489
20.0	20.5	0.9740		
			Intercept	-0.248713

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, March 24, 2015	Previous Calibration	Tuesday, March 03, 2015
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	11:35
Barometric Pressure	na mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Gas Cert Reference	LL104223	Cal Gas Expiry Date	2/12/2018
CH4 Cal Gas Conc.	489.0 ppm	CH4 Equiv Conc.	1017.0 ppm
C3H8 Cal Gas Conc.	192.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581
DACS voltage range	0 - 5 volts	DACS channel #	3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	11.7	11.8
Analyzer Range (mv)	25	25	Air or Bypass press	42.9	42.9
Calculated slope	1.005121	0.999138	Fuel Pressure	19.3	19.8
Calculated intercept	0.060307	0.028383		3.76	3.81
				2.08	2.24

Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	-0.05	N/A
as found span	6000	94.1	16.93	16.59	1.020
calibrator zero	6000	0.0	0.00	-0.04	N/A
high point	6000	98.9	16.76	16.75	1.001
second point	6000	49.7	8.42	8.39	1.004
third point	6000	24.9	4.22	4.22	1.000
calibrator zero					
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found	16.64	Previous response	16.78	% change	0.8%
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Notes:

New cal gas cylinder calibration. Span adjusted.

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

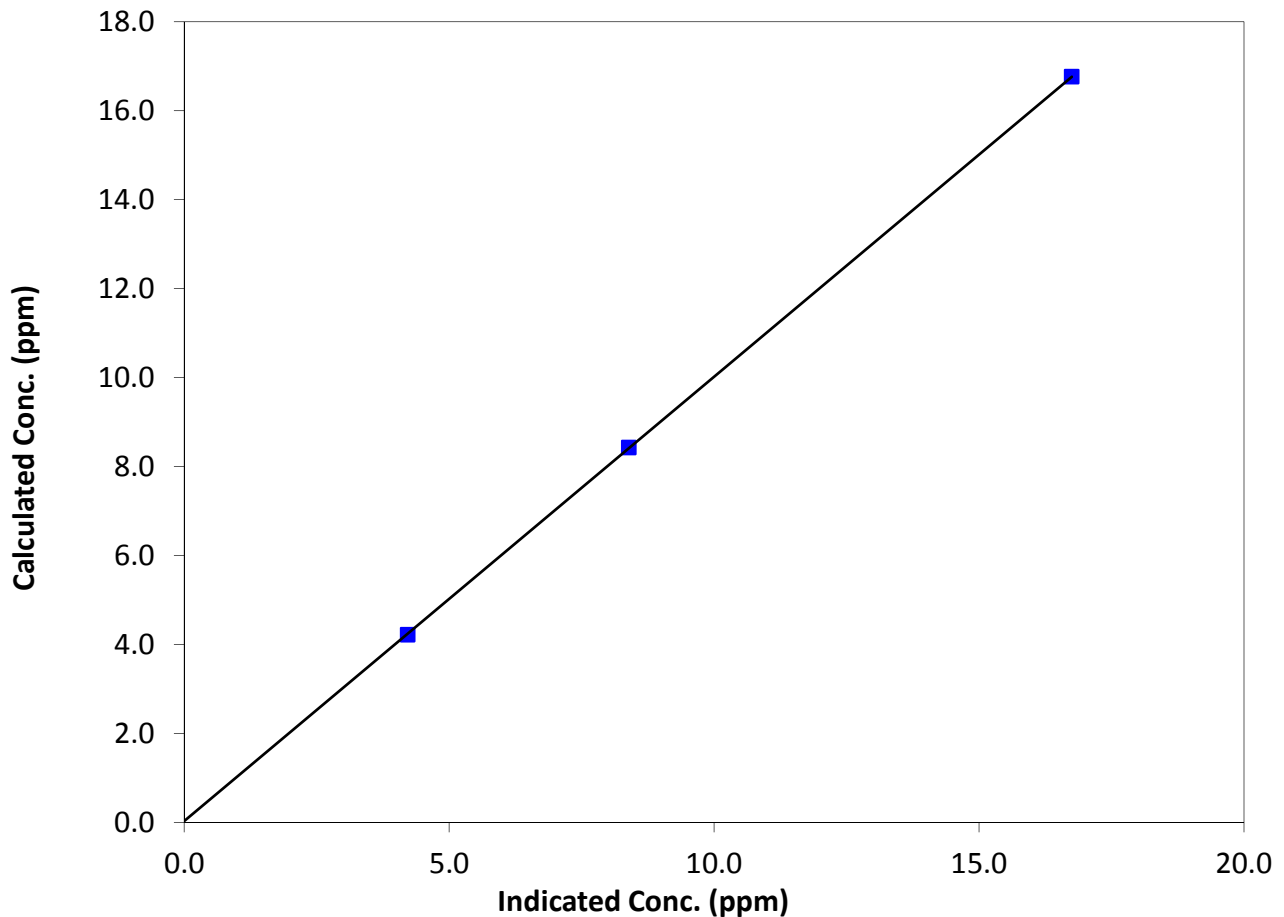
Station Information

Calibration Date	March 24, 2015	Previous Calibration	March 3, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	7:50	End Time (MST)	11:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

Calibration Data

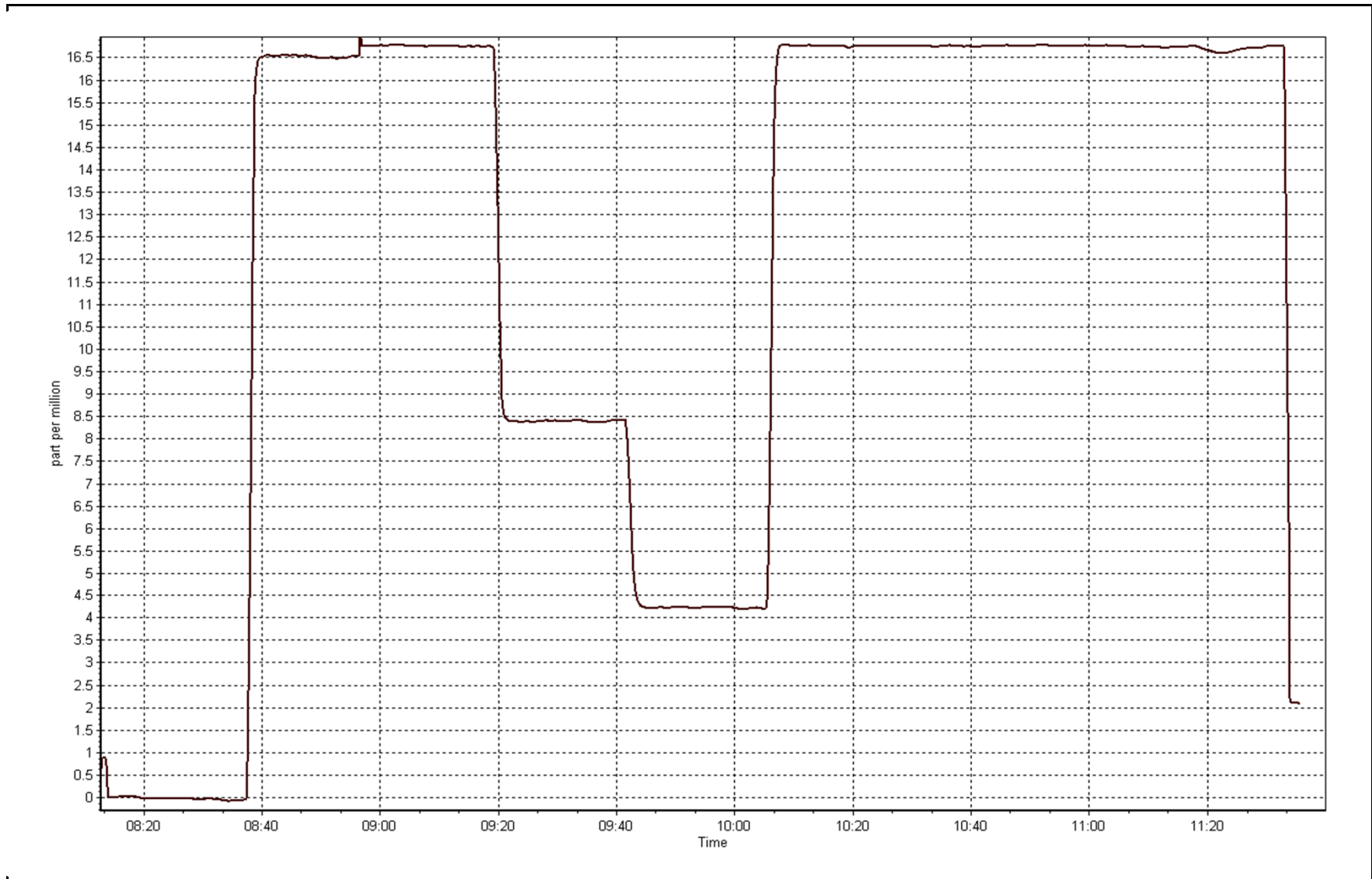
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	N/A	Correlation Coefficient	0.999994
16.76	16.75	1.0008		
8.42	8.39	1.0041	Slope	0.999138
4.22	4.22	1.0001		
			Intercept	0.028383

THC Calibration Curve



THC Calibration Plot

Date: March 24, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 24, 2015	Previous Calibration	February 18, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	7:50	End Time (MST)	11:40
Barometric Pressure	724 mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	11091107
NO Cal Gas Conc	48.3 ppm	Cal Gas Expiry Date	February 12, 2018
NOx Cal Gas Conc	48.3 ppm	Cal Gas Serial #	LL104223

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 2581

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.002298	1.003162	1.003689
	Data Offset	-0.112335	-0.213180	0.039397
After	Data Slope	0.997499	0.999819	0.998428
	Data Offset	0.991874	0.404214	0.096932
Channel #		7	6	5
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model API T200 Analyzer serial # 723

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.148	ppb	1.155	ppb
NOX coefficient	1.141	ppb	1.150	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	0.5		0.8	
NOX bkgrnd	1.6		2.0	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.3	Deg C	313.9	Deg C
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	87.0	ccm	88.0	ccm
R Cell Press	2.9	mmHg	2.9	mmHg
Sample Flow	504-499	ccm	501.000	ccm

Notes:

New cal gas cylinder calibration. Zero and Span was adjusted. Using second High GPT point for GPT calibration.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 24, 2015

Station Number:

AMS 12

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.0	-0.3	0.3	N/A	N/A
as found span	6000	94.1	799.9	799.9	0.0	795.9	795.5	0.4	1.0050	1.0055
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.6	-0.2	-0.4	N/A	N/A
high point	6000	98.9	796.1	796.1	0.0	797.3	795.9	1.4	0.9986	1.0003
second point	6000	49.7	400.1	400.1	0.0	400.2	400.0	0.3	0.9997	1.0003
third point	6000	24.9	200.4	200.4	0.0	199.3	199.7	-0.4	1.0058	1.0039
calibrator zero										
as left zero										
as left span										
Average Correction Factor									1.0014	1.0015

Corrected As found

NO_x= 795.9

NO= 795.7

Percent Change

NO_x= 0.3%

NO= 0.2%

Previous Response

NO_x= 798.1

NO= 797.5

GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

98.90

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.4			N/A	
1st NO ₂ (300)	N/A	488.7	301.2	790.0	488.7	301.4	0.9914	1.0000	0.9996	100.0%
2nd NO ₂ (200)	N/A	591.5	198.4	790.4	591.5	198.9	0.9909	1.0000	0.9974	100.3%
3rd NO ₂ (100)	N/A	693.5	96.4	790.2	693.5	96.7	0.9912	1.0000	0.9971	100.3%
4th NO ₂ (0)	789.9	N/A	-1.5	788.4	789.9	-1.2	0.9934	1.0000	N/A	N/A
Average Correction Factor							0.9918	1.0000	0.9981	100.2%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

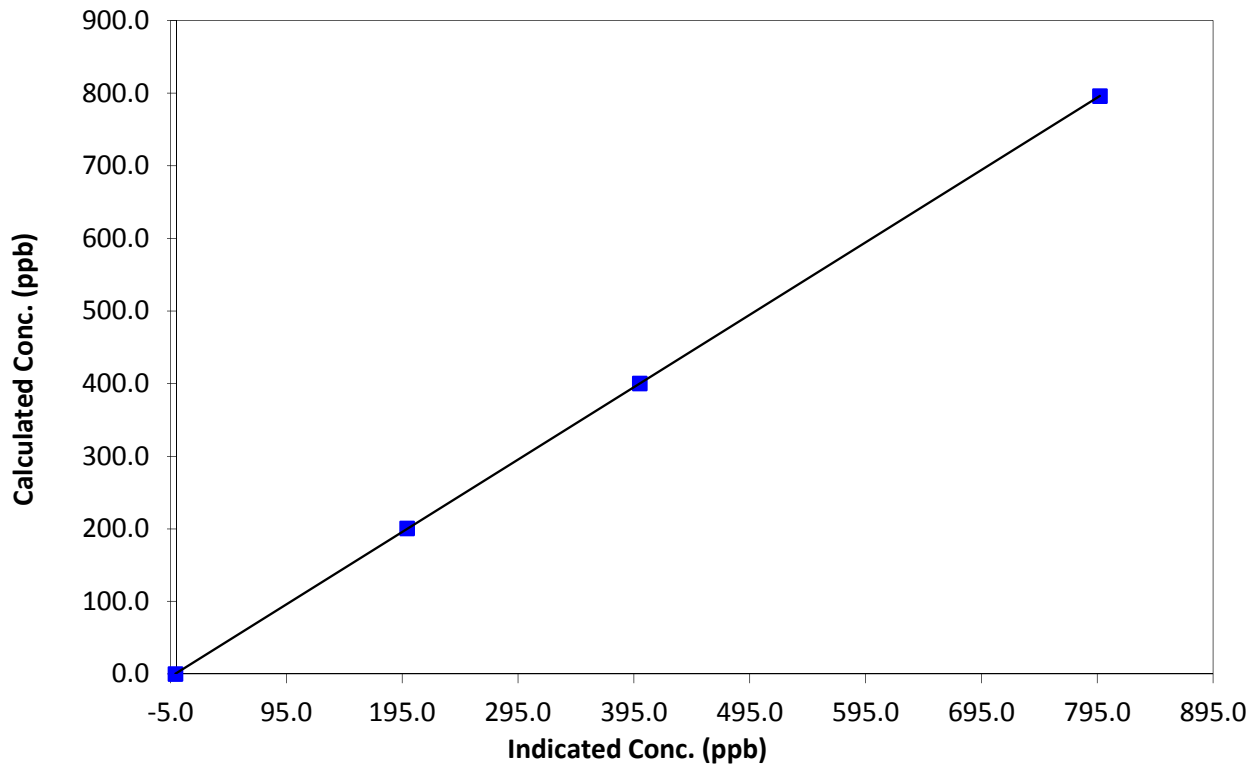
Station Information

Calibration Date	March 24, 2015	Previous Calibration	February 18, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:50	End Time (MST)	11:40
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	-0.6	N/A	Correlation Coefficient	0.999998
796.1	797.3	0.9986		
400.1	400.2	0.9997	Slope	0.997499
200.4	199.3	1.0058		
			Intercept	0.991874

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

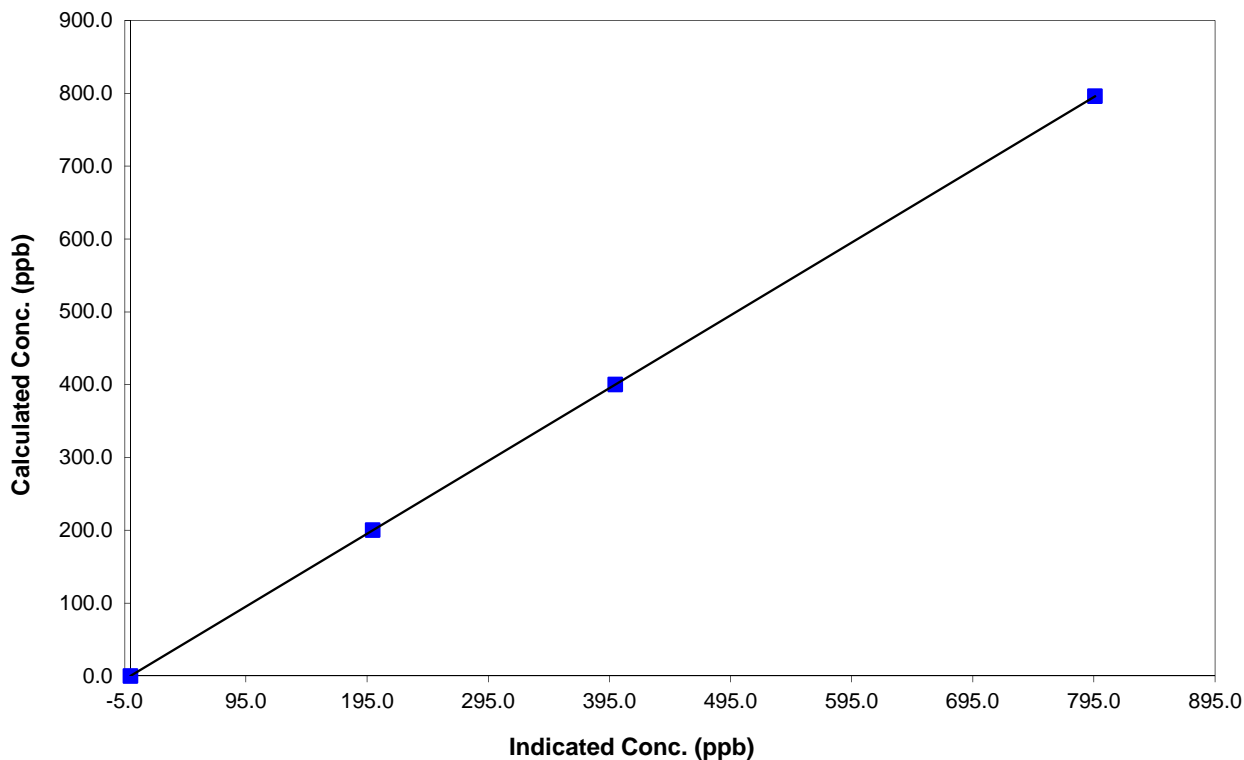
Station Information

Calibration Date	March 24, 2015	Previous Calibration	February 18, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:50	End Time (MST)	11:40
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	0.999999
796.1	795.9	1.0003		
400.1	400.0	1.0003	Slope	0.999819
200.4	199.7	1.0039		
			Intercept	0.404214

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

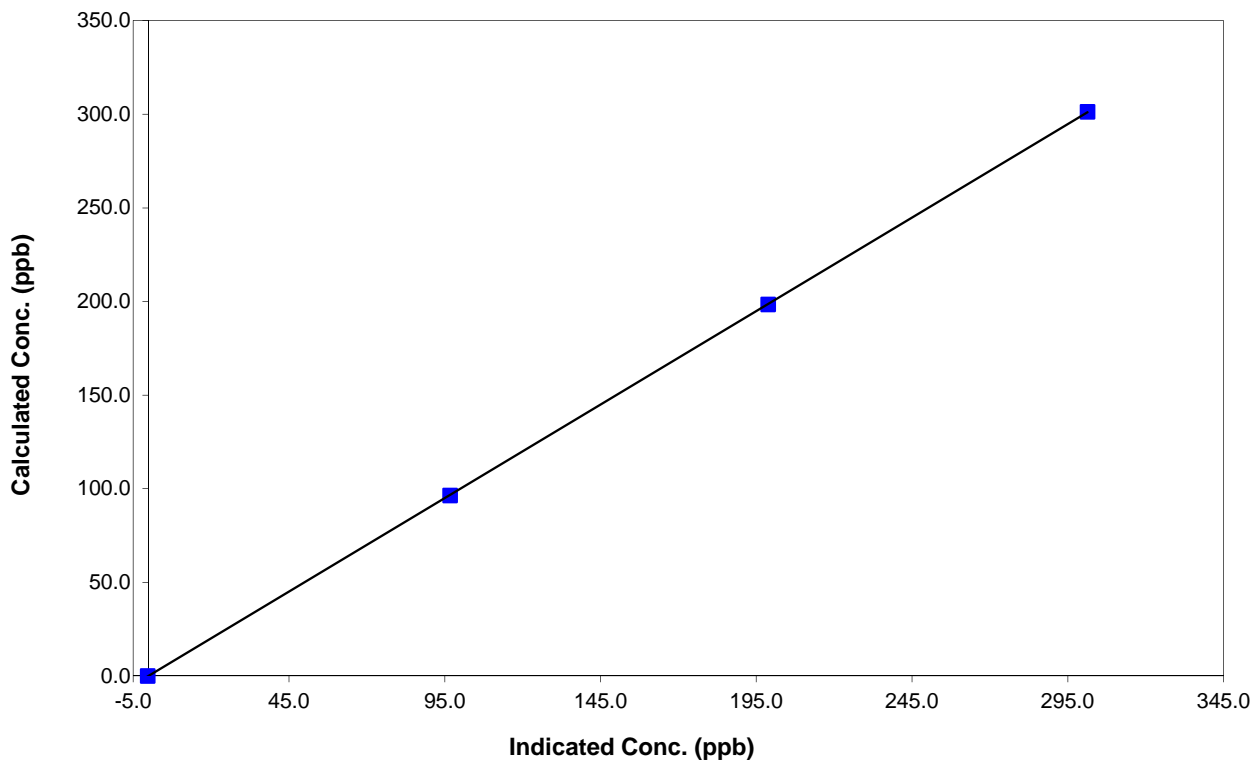
Station Information

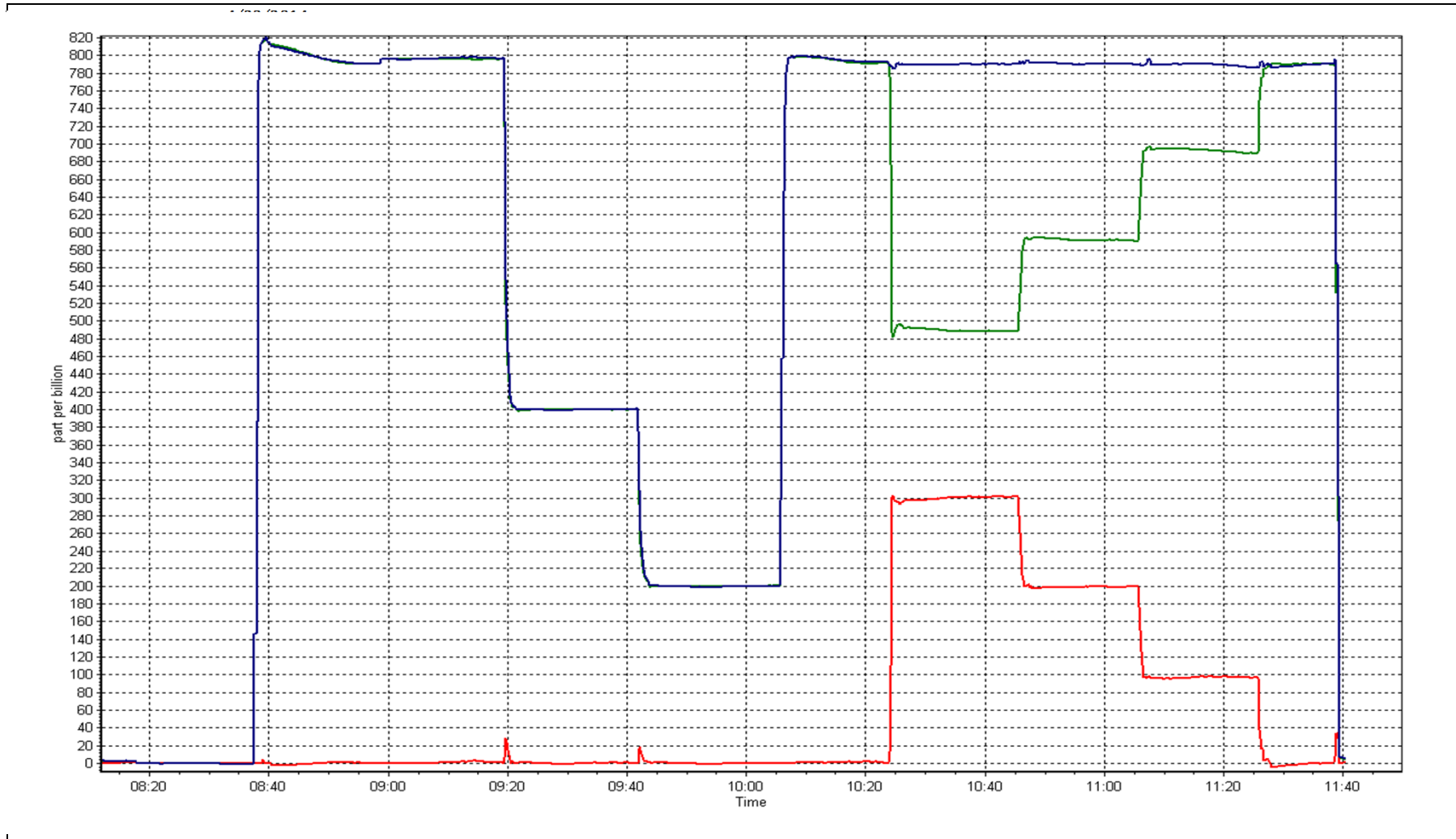
Calibration Date	March 24, 2015	Previous Calibration	February 18, 2015
Station Number	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:50	End Time (MST)	11:40
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999995
301.2	301.4	0.9996		
198.4	198.9	0.9974	Slope	0.998428
96.4	96.7	0.9971		
			Intercept	0.096932

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	706	38	38	100.00	31	0	5	0
TRS(ppb) Average	710	34	34	100.00	2	0	1	0
THC(ppm) Average	686	33	58	96.64	3.9	-	2.9	-
O3(ppb) Average	710	34	34	100.00	41	0	32	-
NO2(ppb) Average	706	38	38	100.00	34	0	17	-
NO(ppb) Average	706	38	38	100.00	40	-	9	-
NOX(ppb) Average	706	38	38	100.00	60	-	24	-
PM2.5(ug/m3) Average	734	0	10	98.66	21.8	-	8.7	0
Temperature 2 m (C) Average	744	0	0	100.00	16.3	-	5.4	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	91.0	-
Wind Speed 10 m (km/h) Average	707	0	37	95.03	19	-	12.0	-
Wind Direction 10 m (deg) Average	707	0	37	95.03	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	706	1.3	3	-	0	0	0	1	1	2	31
TRS(ppb) Average	710	0.3	0	-	0	0	0	0	0	1	2
THC(ppm) Average	686	2.28	0.3	-	1.8	2	2.1	2.2	2.4	2.6	3.9
O3(ppb) Average	710	18.9	11	-	0	2	9	20	28	33	41
NO2(ppb) Average	706	7.5	6	-	0	1	3	6	10	16	34
NO(ppb) Average	706	2.6	5	-	0	0	0	0	3	8	40
NOX(ppb) Average	706	10.1	10	-	0	1	4	7	13	23	60
PM2.5(ug/m3) Average	734	4.58	3.1	-	0	1.3	2.4	3.8	6.3	8.6	21.8
Temperature 2 m (C) Average	744	-5.4	9.2	-	-35.6	-18.2	-10.4	-4.9	0.8	5.7	16.3
Relative Humidity (%) Average	744	69.2	18	-	20	42	55	73	85	91	97
Wind Speed 10 m (km/h) Average	707	5.2	4	-	0	2	2	4	7	10	19
Wind Direction 10 m (deg) Average	707	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	11 Mar 2015 12:00	12 Mar 2015 12:00	25	Maintenance - sample pump replaced and air pressure adjusted
PM2.5	23 Mar 2015 10:00	23 Mar 2015 10:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	28 Mar 2015 10:00	28 Mar 2015 15:00	6	Intermittent unstable operation - excessive baseline drift
PM2.5	28 Mar 2015 17:00	28 Mar 2015 19:00	3	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	15 Mar 2015 01:00	16 Mar 2015 13:00	37	Flat line in sensor output signal -sensor frozen

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Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 31 ppb on Mar 18 12:00	Maximum Daily Average: 5.4 ppb on Mar 26
Minimum Value: 0 ppb on Mar 12 00:00	Hours of Data: 706
Maximum Diurnal Average: 3.6 ppb at hour 12	Hours of Missing Data: 38
Monthly Average: 1.3 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.3 ppb on Mar 3	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.4 ppb at hour 6	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 16	

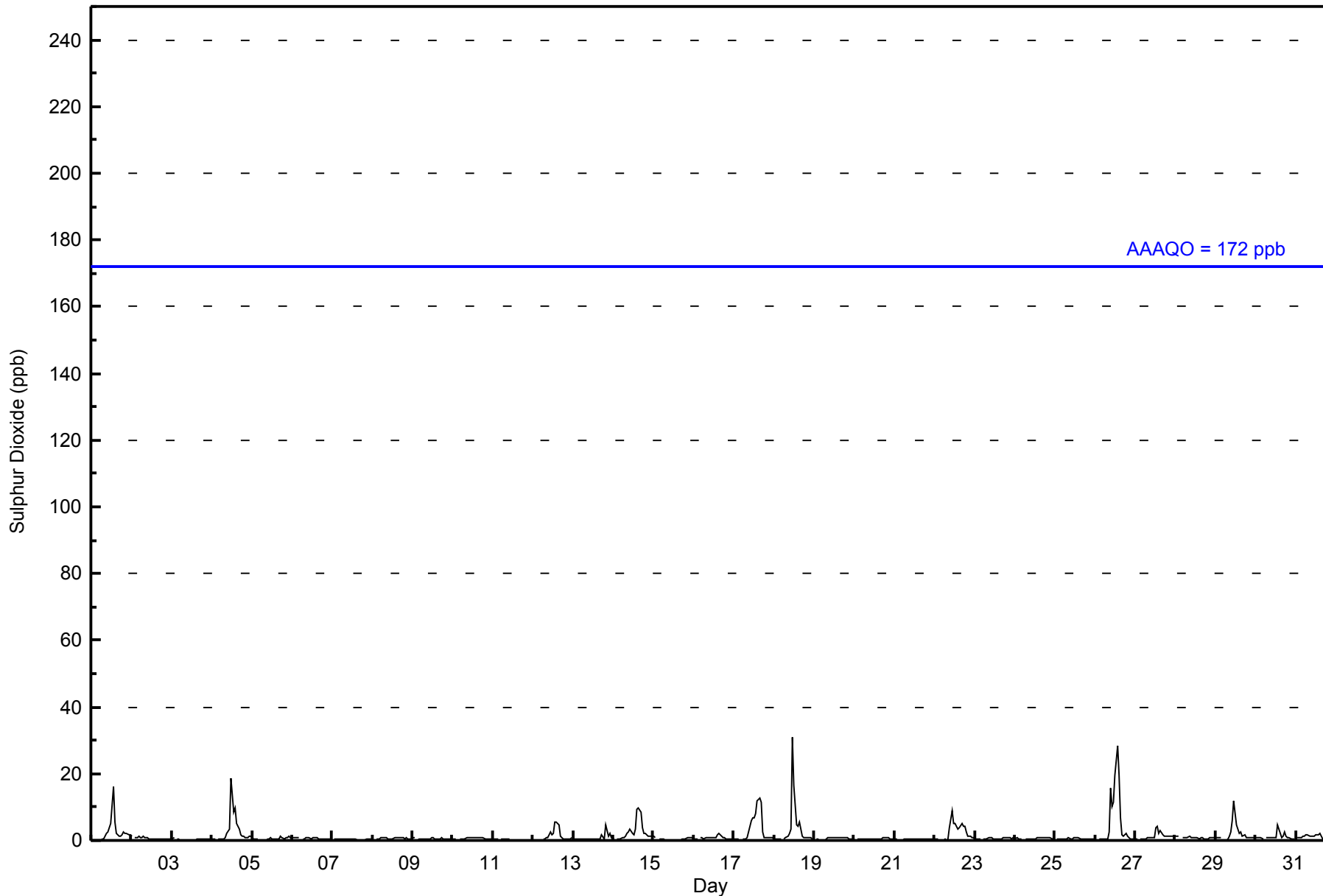
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	0	0	0	0	0	0	1	1	2	3	5	11	16	6	2	1	1	2	2	2	2	2	2	2	2.6	16																						
2-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	0.7	1																						
3-Mar	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.3	1																						
4-Mar	0	0	0	Z	0	1	1	1	1	2	3	19	14	9	10	5	3	2	1	1	1	1	1	1	1	3.4	19																						
5-Mar	1	1	1	0	Z	0	0	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1																						
6-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																						
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																						
8-Mar	1	Z	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																						
9-Mar	1	1	Z	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1	0	1	1	1	0.5	1																						
10-Mar	1	1	1	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1																						
11-Mar	0	0	0	0	Z	1	0	0	0	0	1	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	1																						
12-Mar	0	0	0	0	0	Z	0	0	1	1	3	2	2	5	5	5	1	1	1	1	1	0	0	1	1	1.3	5																						
13-Mar	Z	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	2	0	5	3	1	2	1	1	0.9	5																						
14-Mar	1	Z	1	1	1	1	1	1	1	2	3	3	2	2	3	9	10	8	4	2	2	2	1	1	1	2.6	10																						
15-Mar	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.3	1																						
16-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	0	0	1	1	0.8	2																						
17-Mar	1	1	1	1	Z	0	0	0	1	3	6	7	7	8	12	13	12	2	1	1	1	1	1	1	1	3.4	13																						
18-Mar	1	0	1	0	0	Z	0	1	1	2	3	31	17	5	4	5	4	1	1	1	1	1	1	1	1	3.5	31																						
19-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1																						
20-Mar	1	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1																						
21-Mar	1	1	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	1	1	1	0	0	0.4	1																						
22-Mar	0	0	0	Z	0	0	0	0	1	4	9	5	5	4	4	4	5	4	4	2	1	1	1	1	1	2.5	9																						
23-Mar	1	1	1	0	Z	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1																						
24-Mar	1	1	1	1	1	Z	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																						
25-Mar	Z	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	1																						
26-Mar	0	Z	0	0	0	0	0	0	2	16	10	11	20	28	20	7	2	1	2	1	1	0	0	1	1	5.4	28																						
27-Mar	0	1	Z	1	1	1	1	1	1	1	1	1	4	4	2	3	2	1	1	1	1	1	1	1	1	1.3	4																						
28-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1																						
29-Mar	1	1	1	1	Z	0	0	0	1	2	6	12	5	3	2	3	1	2	1	1	1	1	1	1	1	2.0	12																						
30-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	5	3	1	1	2	1	1	1	1	1	1	1	1.2	5																						
31-Mar	Z	1	1	1	1	1	2	2	1	1	1	1	2	2	2	1	1	0	0	0	0	0	0	0	1	1.1	2																						
																								0.6	0.6	0.6	0.5	0.5	0.4	0.5	0.5	0.8	1.6	1.9	3.6	3.2	3.4	3.0	2.3	1.7	1.2	0.9	0.9	0.8	0.7	0.7	0.7	Diurnal Average	
																								1	1	1	1	1	1	2	2	2	16	10	31	20	28	20	13	12	4	4	5	3	2	2	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	691	97.88	97.88
11 - 20	13	1.84	99.72
21 - 60	2	0.28	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2015

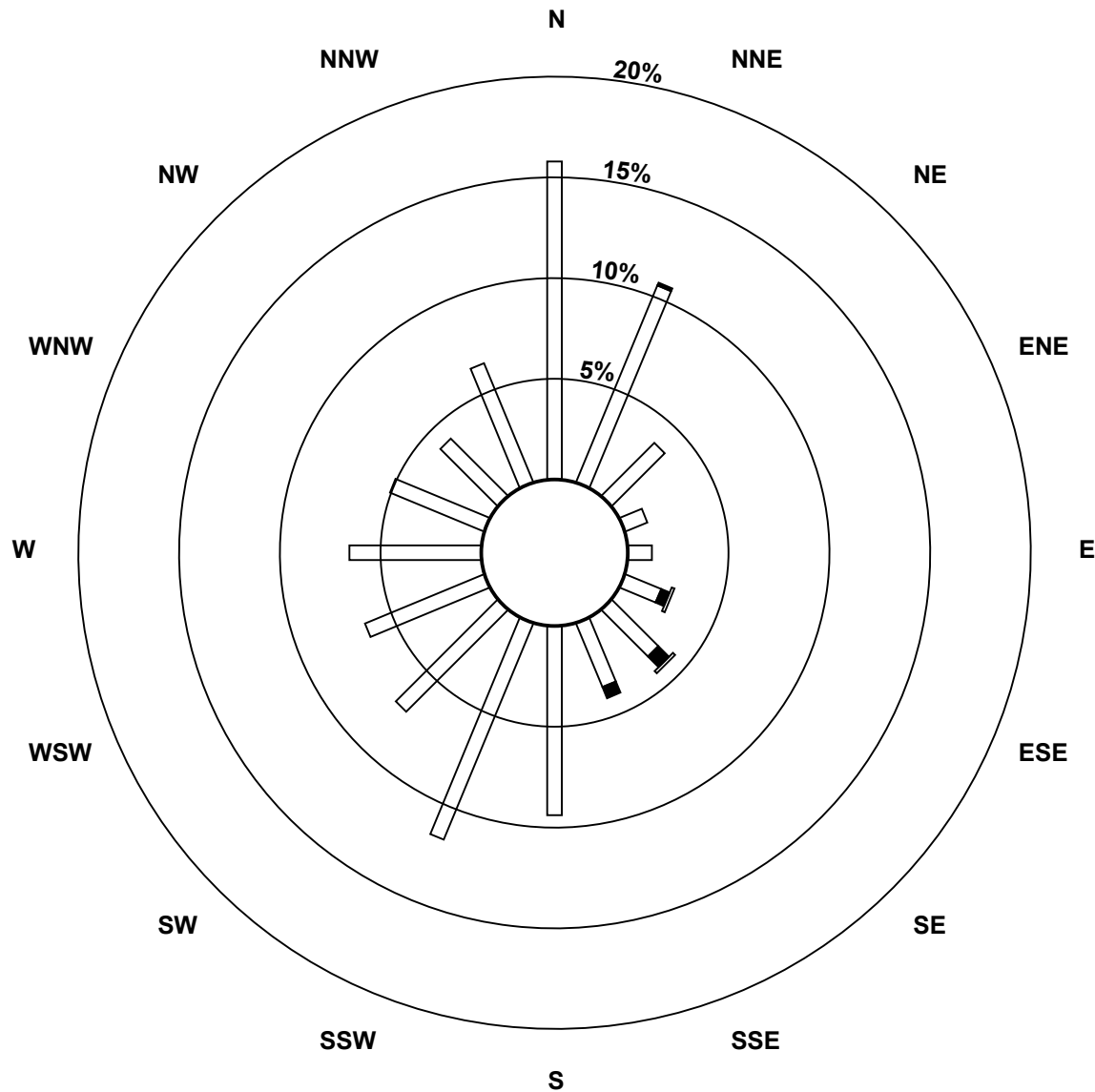
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	106	71	25	8	8	13	22	23	63	78	48	43	44	34	27	43	656
11 - 20	0	1	0	0	0	3	5	4	0	0	0	0	0	0	0	0	13
21 - 60	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	106	72	25	8	8	17	28	27	63	78	48	43	44	34	27	43	671

Total Number of Valid Hours: 671

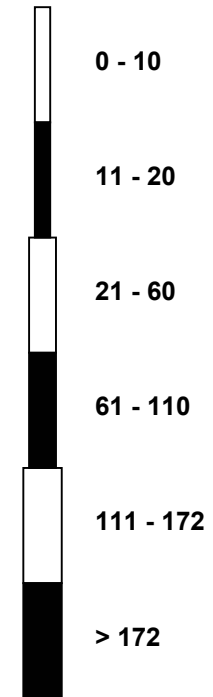
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)

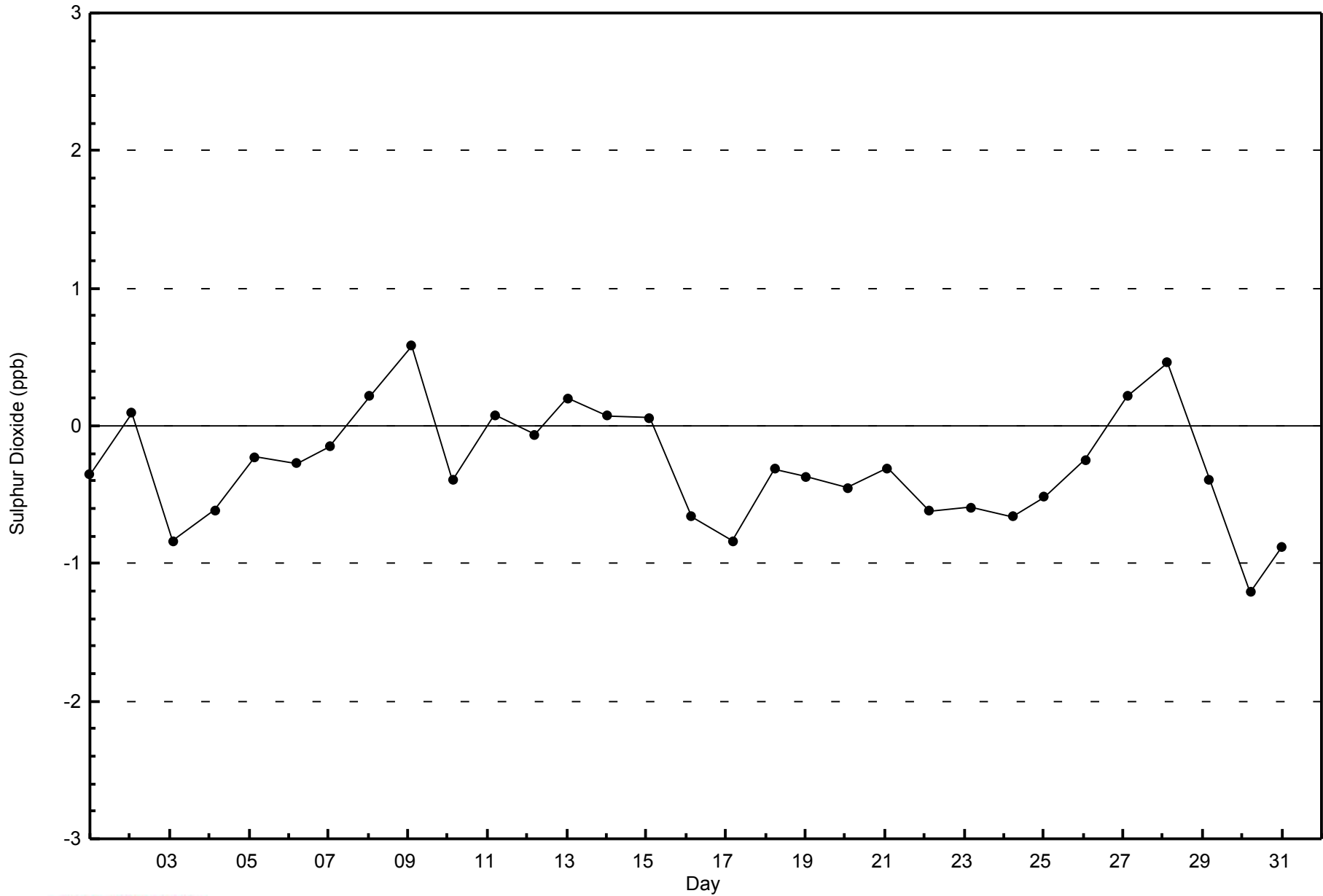


Total Number of Valid Hours: 671



WBEA
Zero Responses

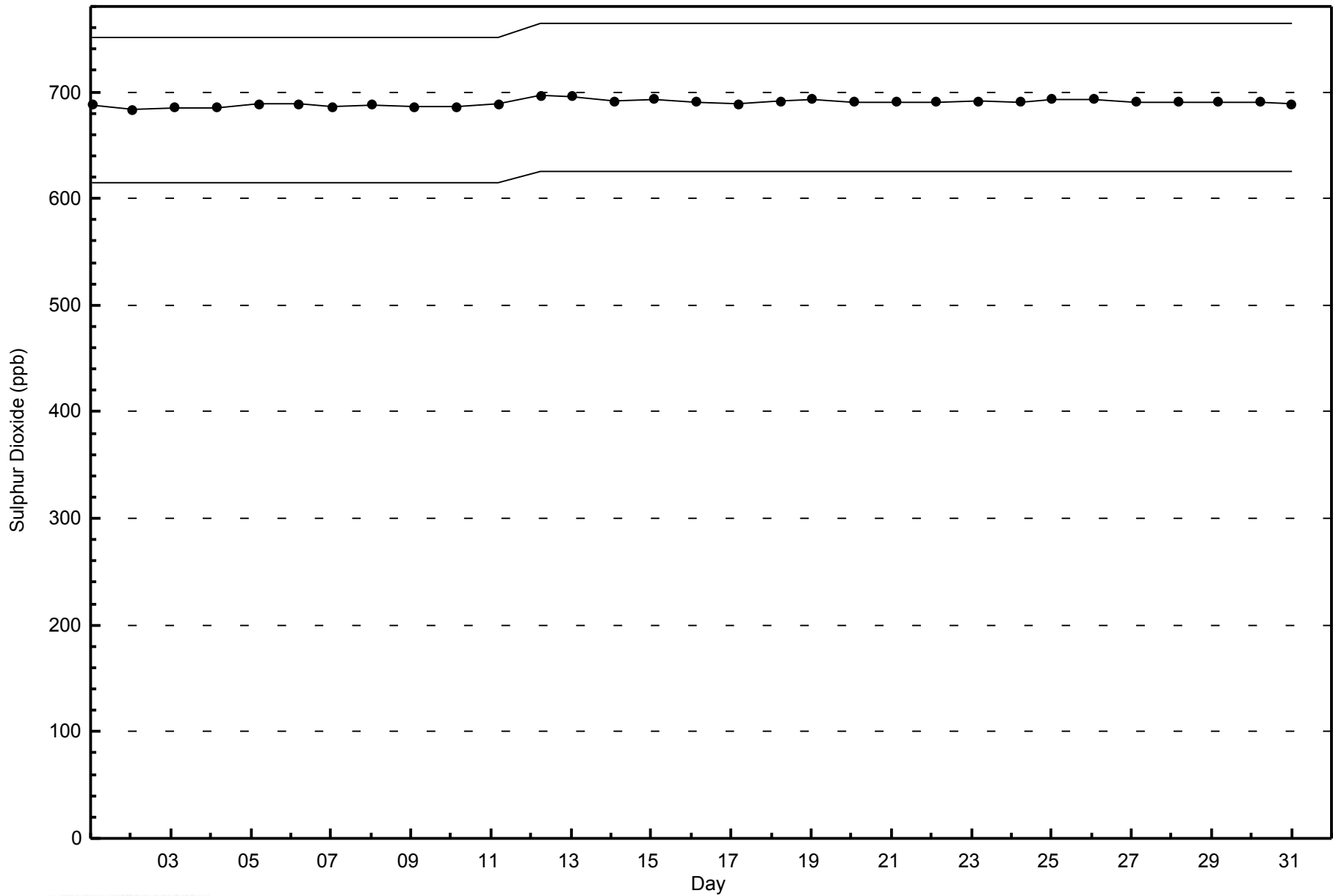
Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Mar 4 13:00	Maximum Daily Average: 0.9 ppb on Mar 14		Hours of Data:	710
Minimum Value: 0 ppb on Mar 13 16:00	Minimum Daily Average: 0.1 ppb on Mar 3		Hours of Missing Data:	34
Maximum Diurnal Average: 0.5 ppb at hour 12	Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2		Percent Operational Time:	100.0

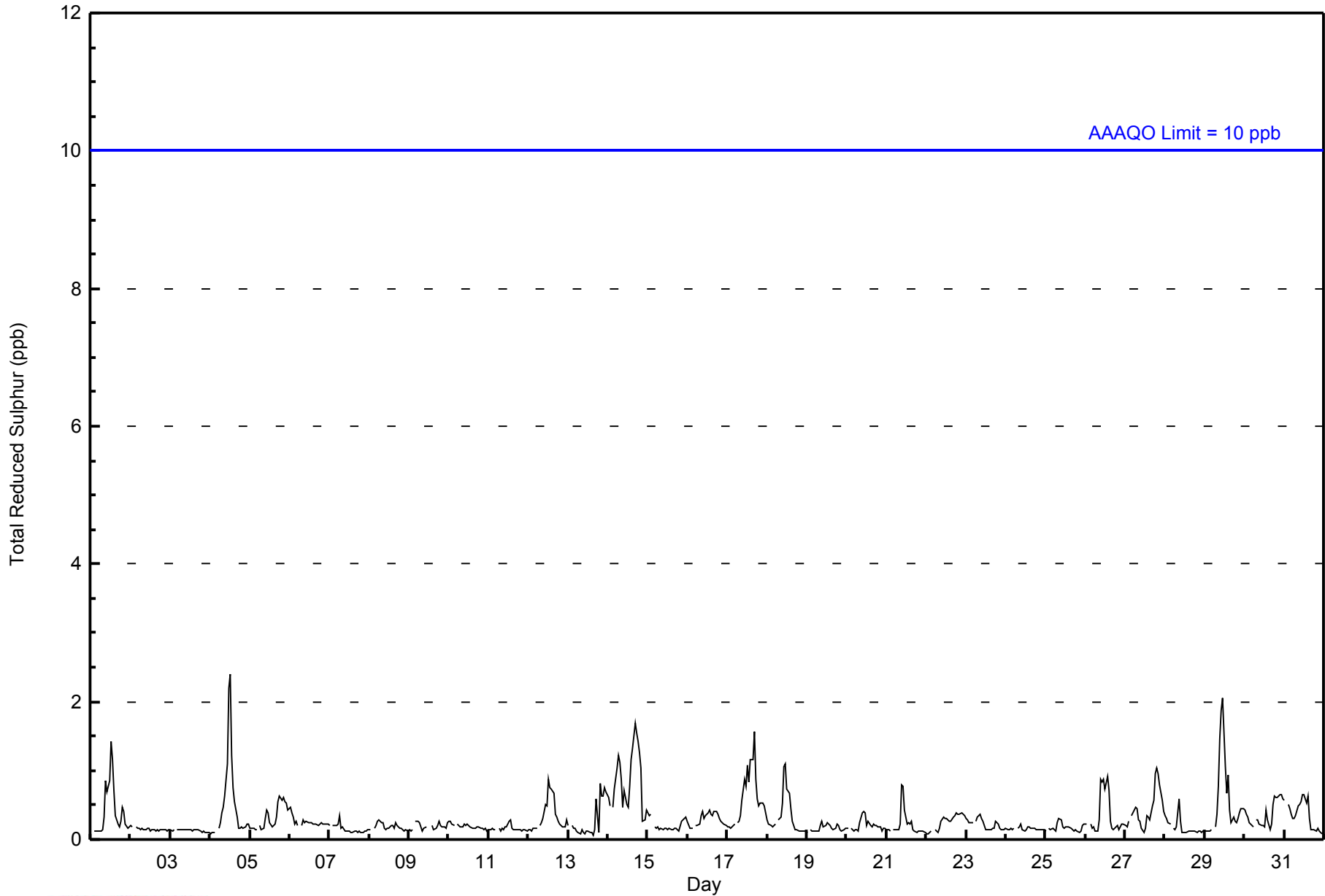
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
2-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Mar	0	0	0	Z	0	0	0	0	0	0	0	0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

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	710	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 2015

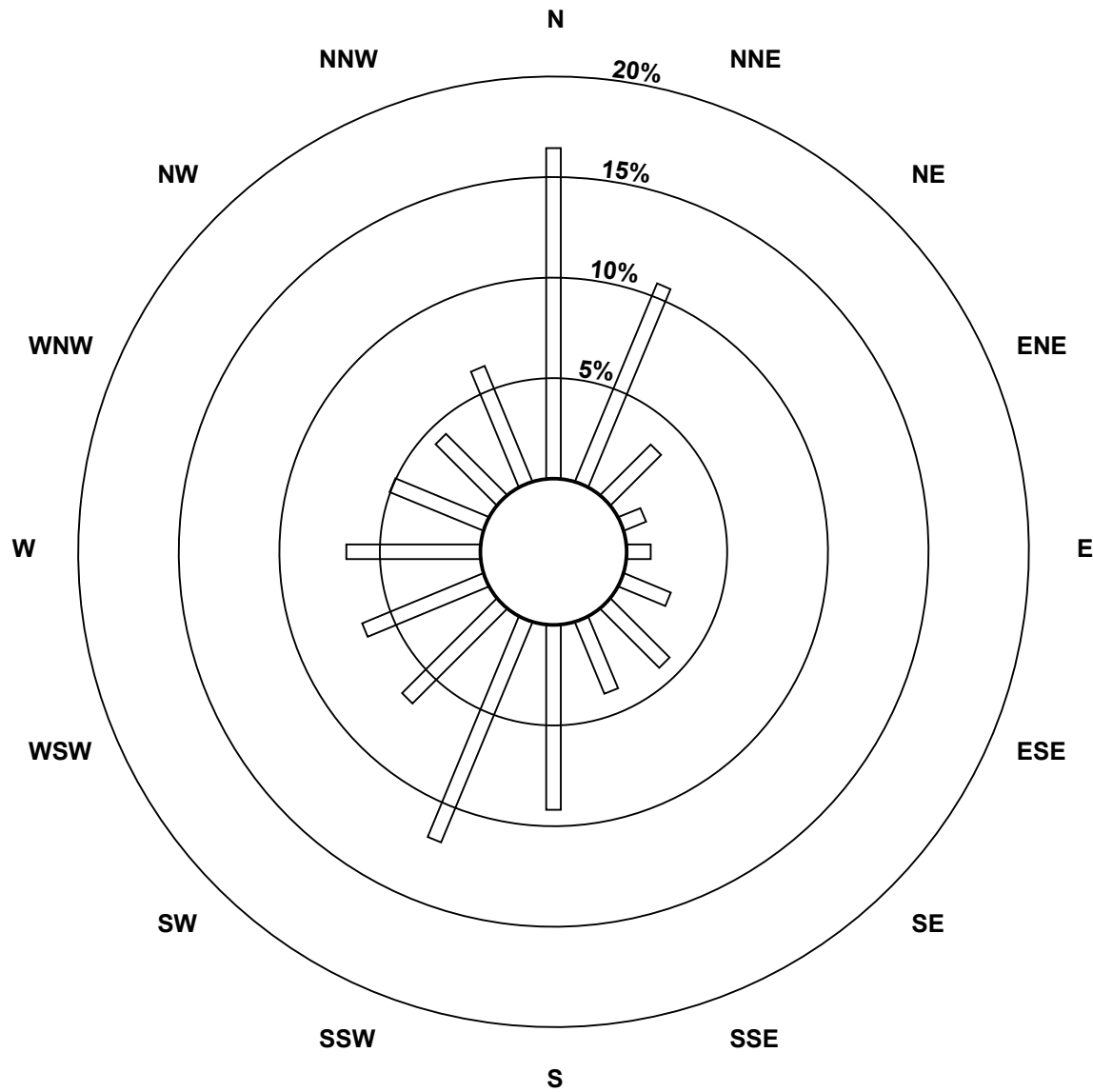
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	111	72	24	8	8	17	28	26	62	80	45	44	45	34	29	42	675
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	111	72	24	8	8	17	28	26	62	80	45	44	45	34	29	42	675

Total Number of Valid Hours: 675

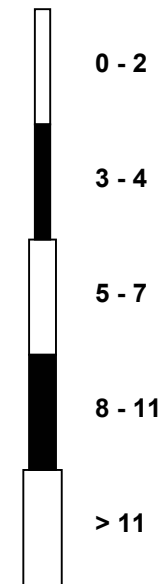
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)

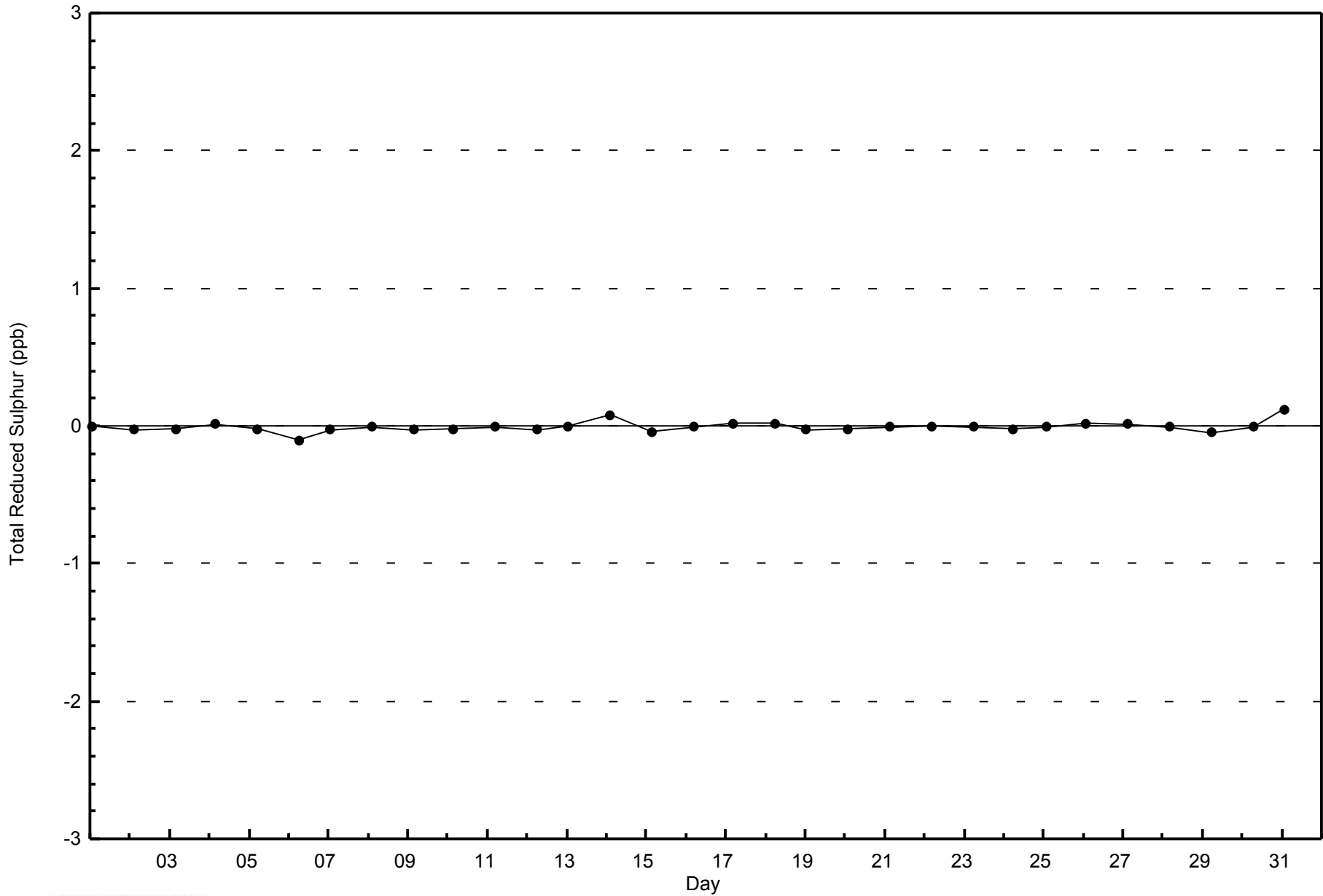


Total Number of Valid Hours: 675



WBEA
Zero Responses

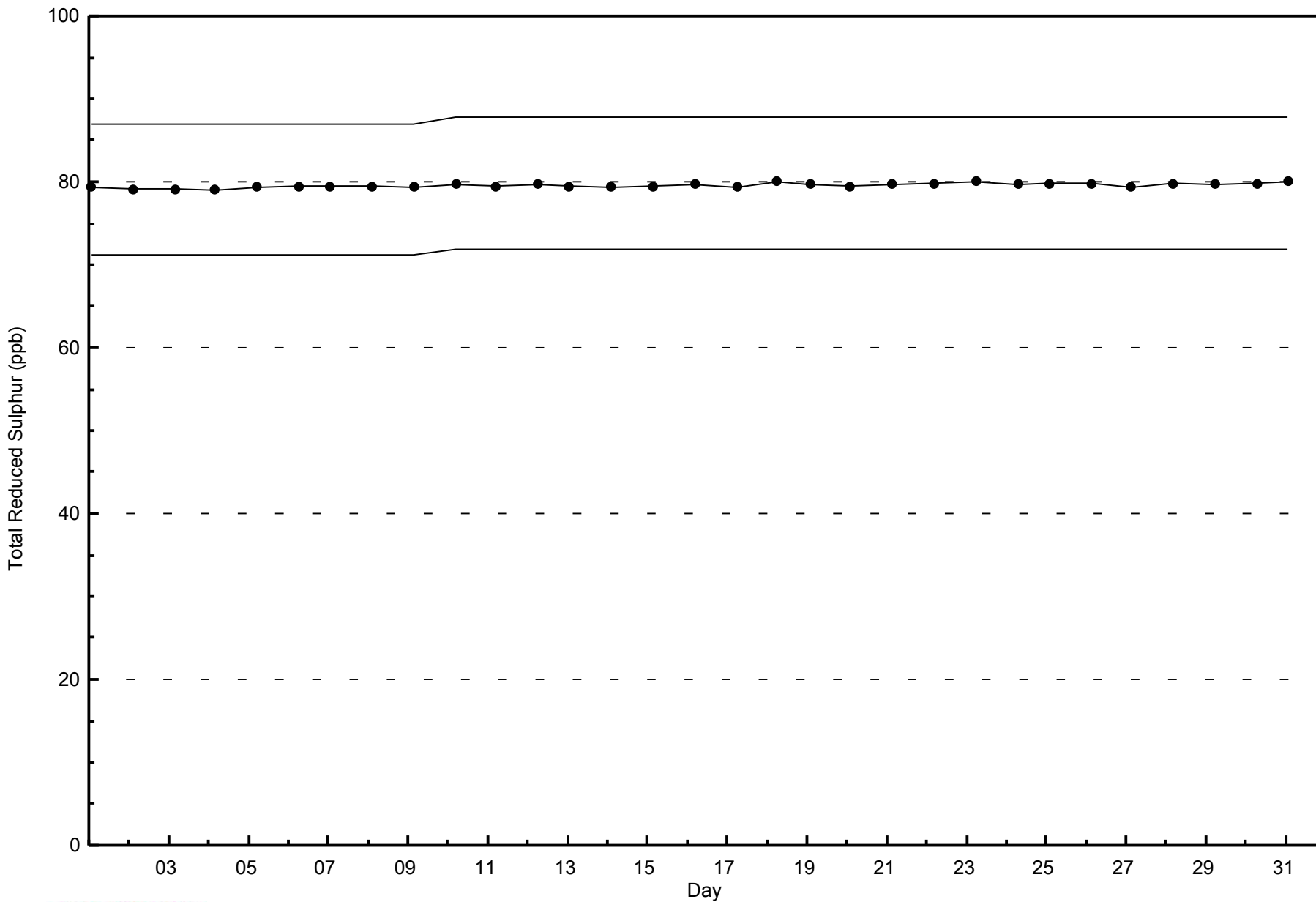
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

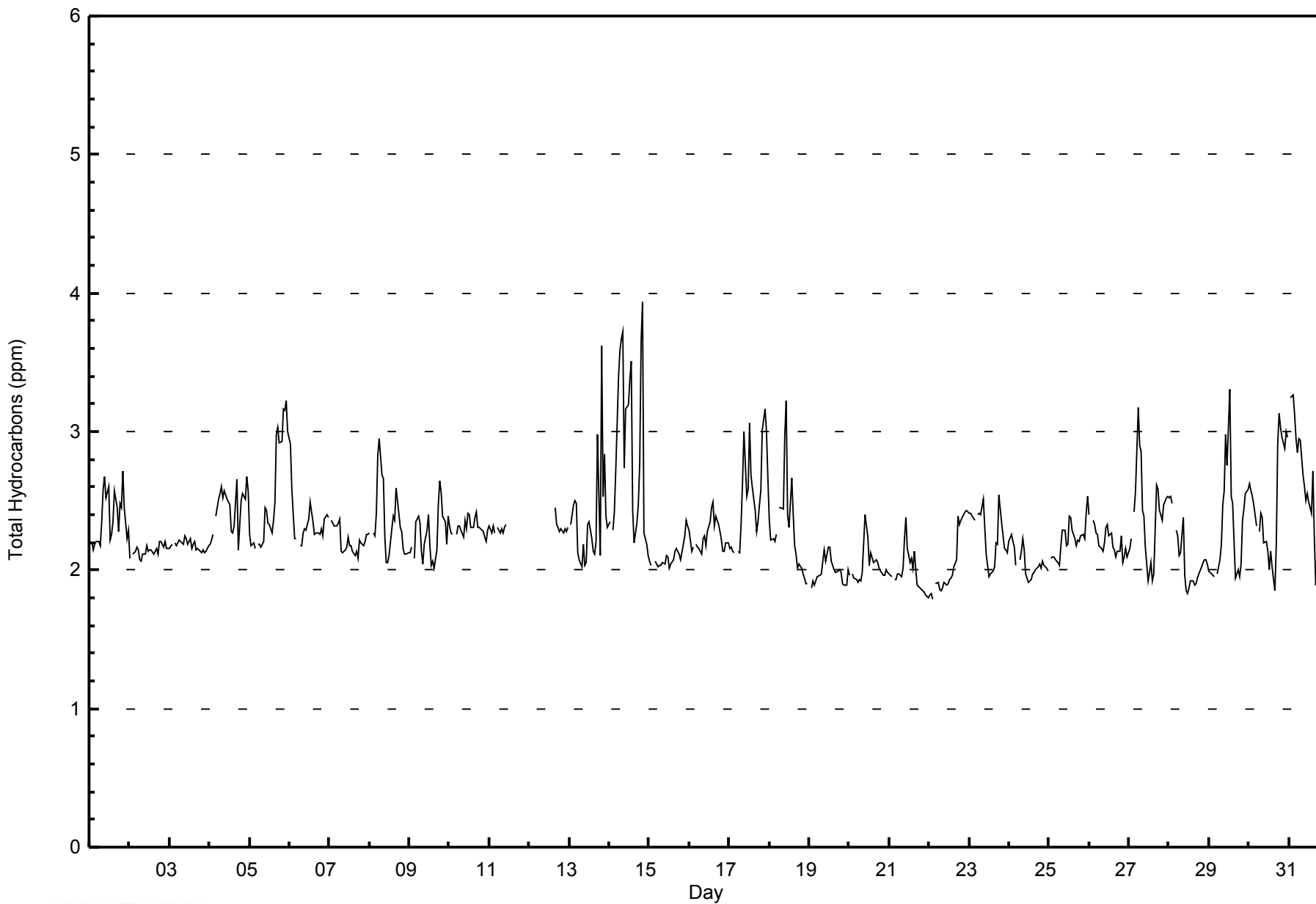
Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2015

Maximum Value: 3.9 ppm on Mar 14 21:00		Maximum Daily Average: 2.9 ppm on Mar 14		Hours in Service: 744																						
Minimum Value: 1.8 ppm on Mar 22 03:00		Minimum Daily Average: 2.0 ppm on Mar 21		Hours of Data: 686																						
Maximum Diurnal Average: 2.4 ppm at hour 20		Minimum Diurnal Average: 2.2 ppm at hour 16		Hours of Missing Data: 58																						
Monthly Average: 2.28 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.5		Hours of Calibration: 33																						
				Percent Operational Time: 96.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.6	2.7	2.5	2.6	2.2	2.3	2.4	2.6	2.4	2.3	2.5	2.5	2.7	2.4	2.2	2.3	2.4	2.7
2-Mar	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2
3-Mar	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	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2
4-Mar	2.2	2.2	2.3	Z	2.4	2.5	2.5	2.6	2.5	2.6	2.5	2.5	2.3	2.3	2.3	2.3	2.7	2.1	2.3	2.5	2.6	2.5	2.7	2.6	2.4	2.7
5-Mar	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.3	2.4	2.5	3.0	3.0	2.9	2.9	3.2	3.1	3.2	3.0	2.5	3.2
6-Mar	2.9	2.6	2.4	2.2	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.4	2.4	2.4	2.3	2.9
7-Mar	Z	2.4	2.3	2.3	2.3	2.3	2.4	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4
8-Mar	2.3	Z	2.3	2.2	2.4	2.8	2.9	2.7	2.7	2.2	2.1	2.1	2.1	2.3	2.4	2.4	2.6	2.5	2.3	2.3	2.2	2.1	2.1	2.1	2.3	2.9
9-Mar	2.1	2.2	Z	2.1	2.4	2.4	2.3	2.1	2.0	2.2	2.3	2.4	2.2	2.0	2.1	2.0	2.1	2.5	2.6	2.6	2.4	2.4	2.2	2.4	2.3	2.6
10-Mar	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.4	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4
11-Mar	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	2.3
12-Mar	M	M	M	M	M	M	M	M	M	M	M	M	C	C	C	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5
13-Mar	Z	2.3	2.5	2.5	2.5	2.1	2.1	2.0	2.2	2.0	2.1	2.3	2.3	2.2	2.1	2.1	2.2	3.0	2.1	3.6	2.5	2.8	2.4	2.3	2.4	3.6
14-Mar	2.4	Z	2.3	2.4	2.7	3.4	3.6	3.7	3.7	2.7	3.2	3.2	3.4	3.5	2.4	2.2	2.3	2.5	2.8	3.7	3.9	2.3	2.2	2.1	2.9	3.9
15-Mar	2.1	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.4	2.3	2.1	2.4
16-Mar	2.3	2.1	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.3	2.4	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.5
17-Mar	2.2	2.2	2.1	2.1	Z	2.1	2.1	2.3	2.6	3.0	2.5	2.6	3.1	2.7	2.6	2.4	2.3	2.3	2.5	2.6	3.0	3.2	3.0	2.7	2.5	3.2
18-Mar	2.4	2.2	2.2	2.2	2.3	Z	2.5	2.5	2.4	3.0	3.2	2.4	2.3	2.7	2.4	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.3	3.2
19-Mar	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.2
20-Mar	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.4	2.3	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4
21-Mar	2.0	2.0	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.2	2.4	2.2	2.1	2.1	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	2.0	2.4
22-Mar	1.8	1.8	1.8	Z	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.1	2.4
23-Mar	2.4	2.4	2.4	2.4	Z	2.4	2.4	2.4	2.5	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.5	2.3	2.2	2.2	2.1	2.1	2.2	2.5
24-Mar	2.2	2.3	2.2	2.2	2.0	Z	2.1	2.1	2.2	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.3
25-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.3	2.3	2.2	2.2	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4	2.5	2.2
26-Mar	2.4	Z	2.4	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.3	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.2	2.1	2.2	2.4
27-Mar	2.2	2.2	Z	2.4	2.6	3.2	2.9	2.9	2.4	2.4	2.2	1.9	2.0	2.1	1.9	2.0	2.6	2.6	2.4	2.4	2.4	2.5	2.5	2.5	2.4	3.2
28-Mar	2.5	2.5	2.5	Z	2.3	2.2	2.1	2.1	2.4	2.0	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.5
29-Mar	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.2	2.5	2.6	3.0	2.8	3.3	2.5	2.5	2.2	1.9	2.0	2.0	2.0	2.4	2.4	2.5	2.6	2.3	3.3
30-Mar	2.6	2.6	2.5	2.5	2.3	Z	2.3	2.4	2.4	2.2	2.2	2.1	2.0	2.1	2.0	1.9	2.2	2.9	3.1	3.0	3.0	2.9	3.0	3.0	2.5	3.1
31-Mar	Z	3.2	3.3	3.1	3.0	2.8	3.0	2.9	2.7	2.6	2.5	2.5	2.5	2.4	2.7	2.2	1.9	2.0	1.9	1.9	2.0	1.9	1.8	1.9	2.5	3.3
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	141	20.55	20.55
2.1 - 3.0	522	76.09	96.65
3.1 - 10.0	23	3.35	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2015

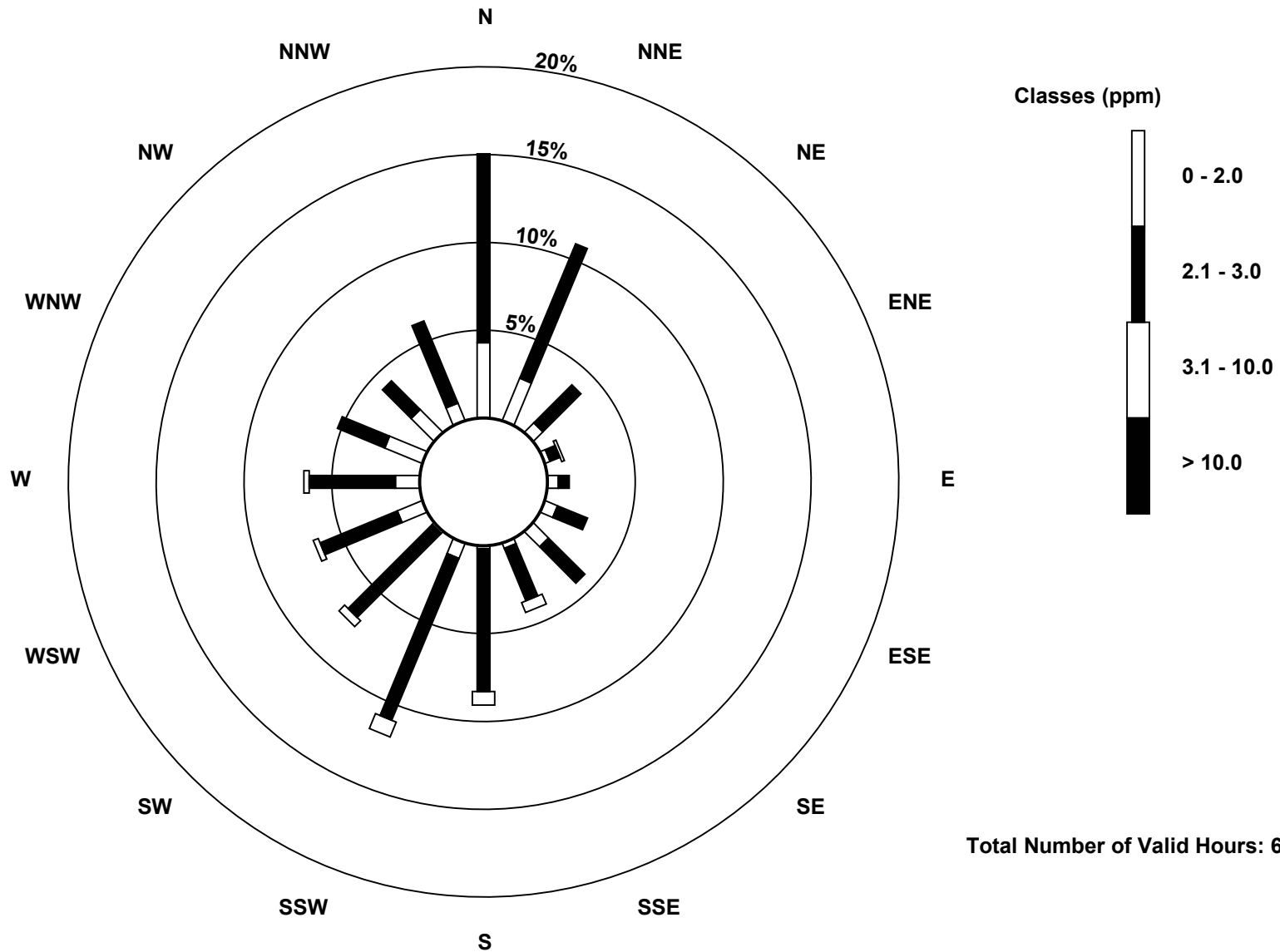
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	28	17	5	2	4	5	8	2	1	6	1	10	9	15	12	7	132
2.1 - 3.0	70	54	20	4	4	12	19	21	53	65	44	31	32	19	15	33	496
3.1 - 10.0	0	0	0	1	0	0	0	4	5	6	3	2	2	0	0	0	23
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	98	71	25	7	8	17	27	27	59	77	48	43	43	34	27	40	651

Total Number of Valid Hours: 651

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)**

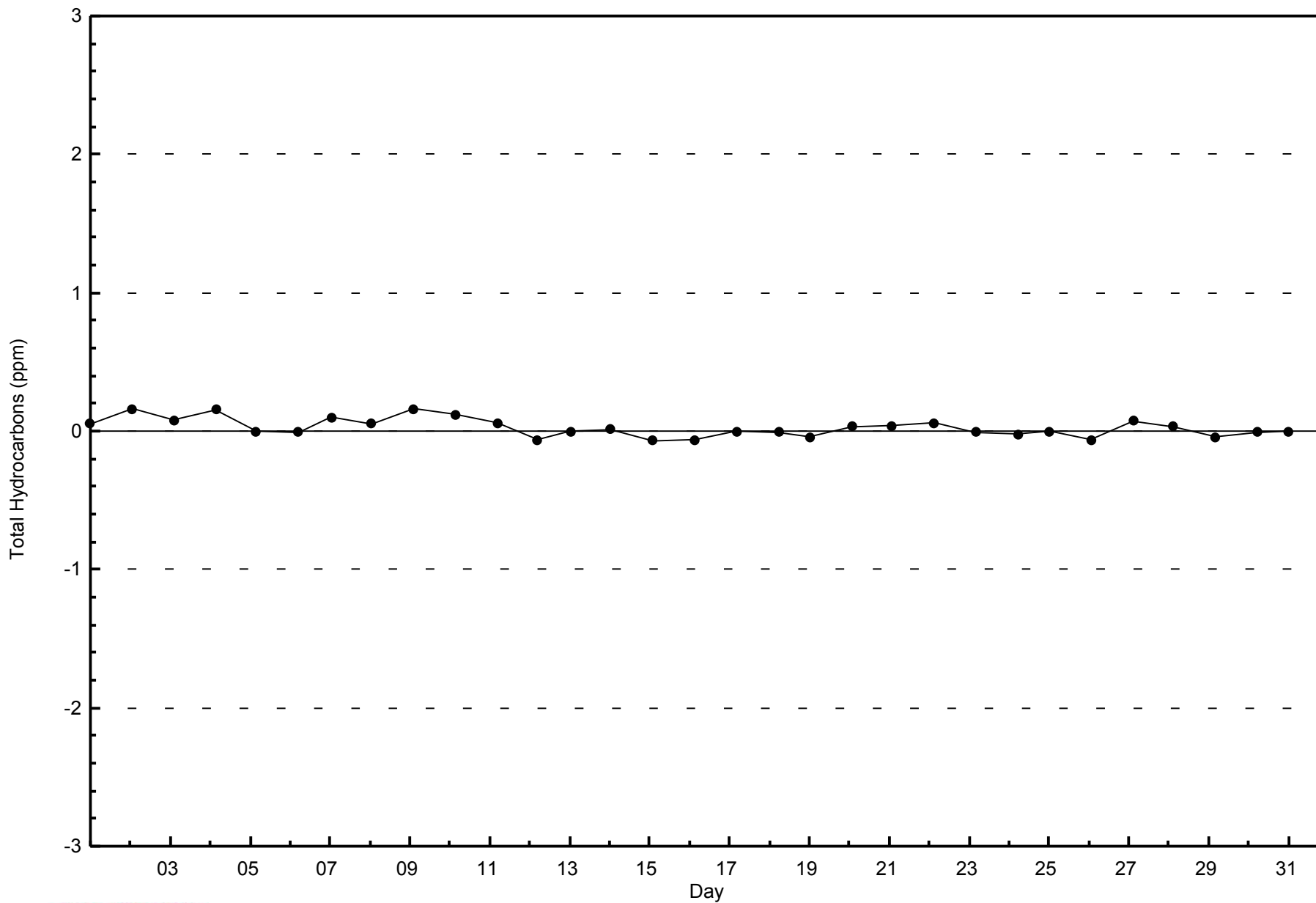


Total Number of Valid Hours: 651



WBEA
Zero Responses

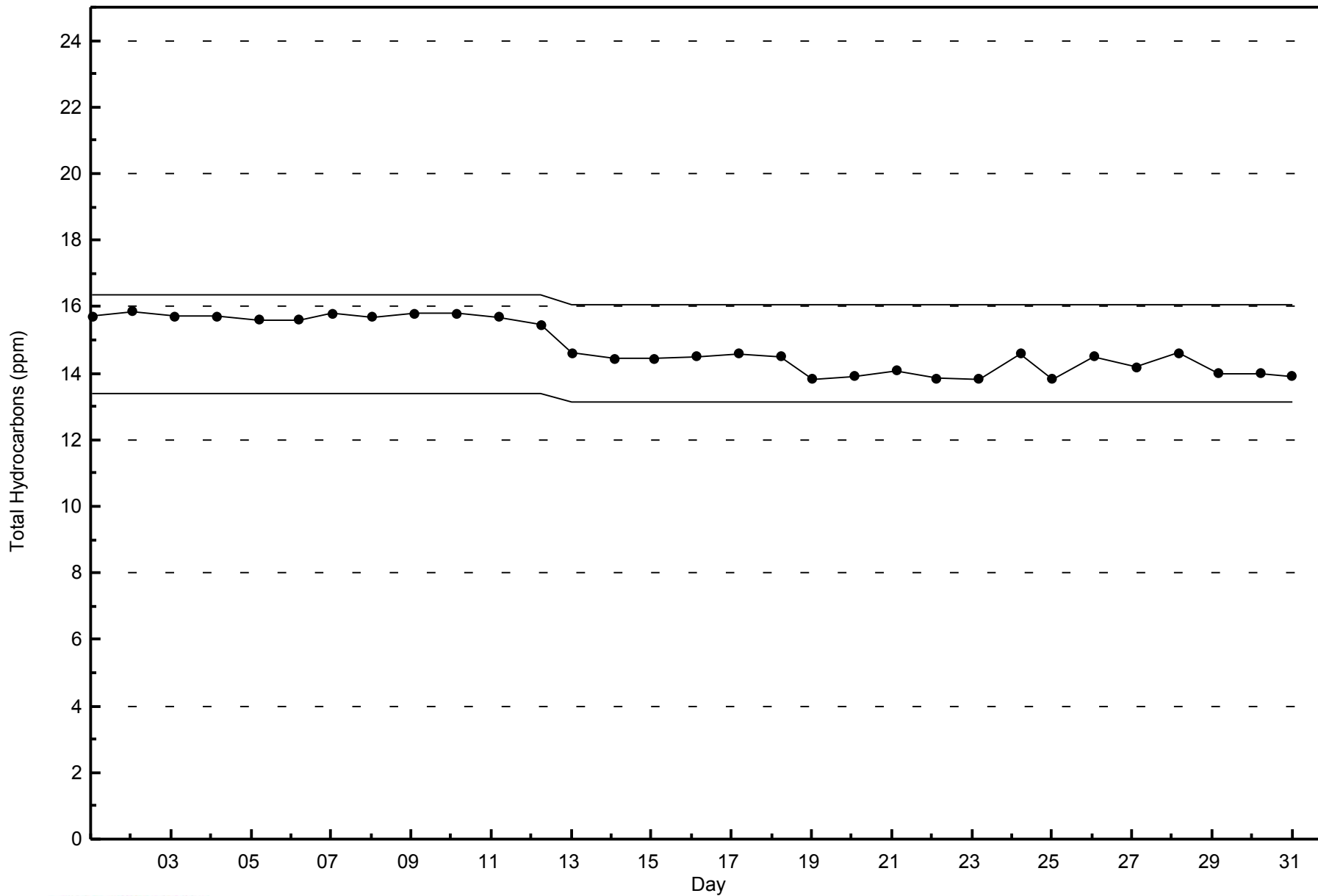
Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 41 ppb on Mar 28 13:00	Maximum Daily Average: 32.0 ppb on Mar 2		Hours of Data:	710
Minimum Value: 0 ppb on Mar 28 01:00	Minimum Daily Average: 8.6 ppb on Mar 17		Hours of Missing Data:	34
Maximum Diurnal Average: 29.0 ppb at hour 16	Minimum Diurnal Average: 10.1 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 18.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 9 Median = 20 Q ₃ = 28 P ₉₀ = 33 P ₉₉ = 40		Percent Operational Time:	100.0

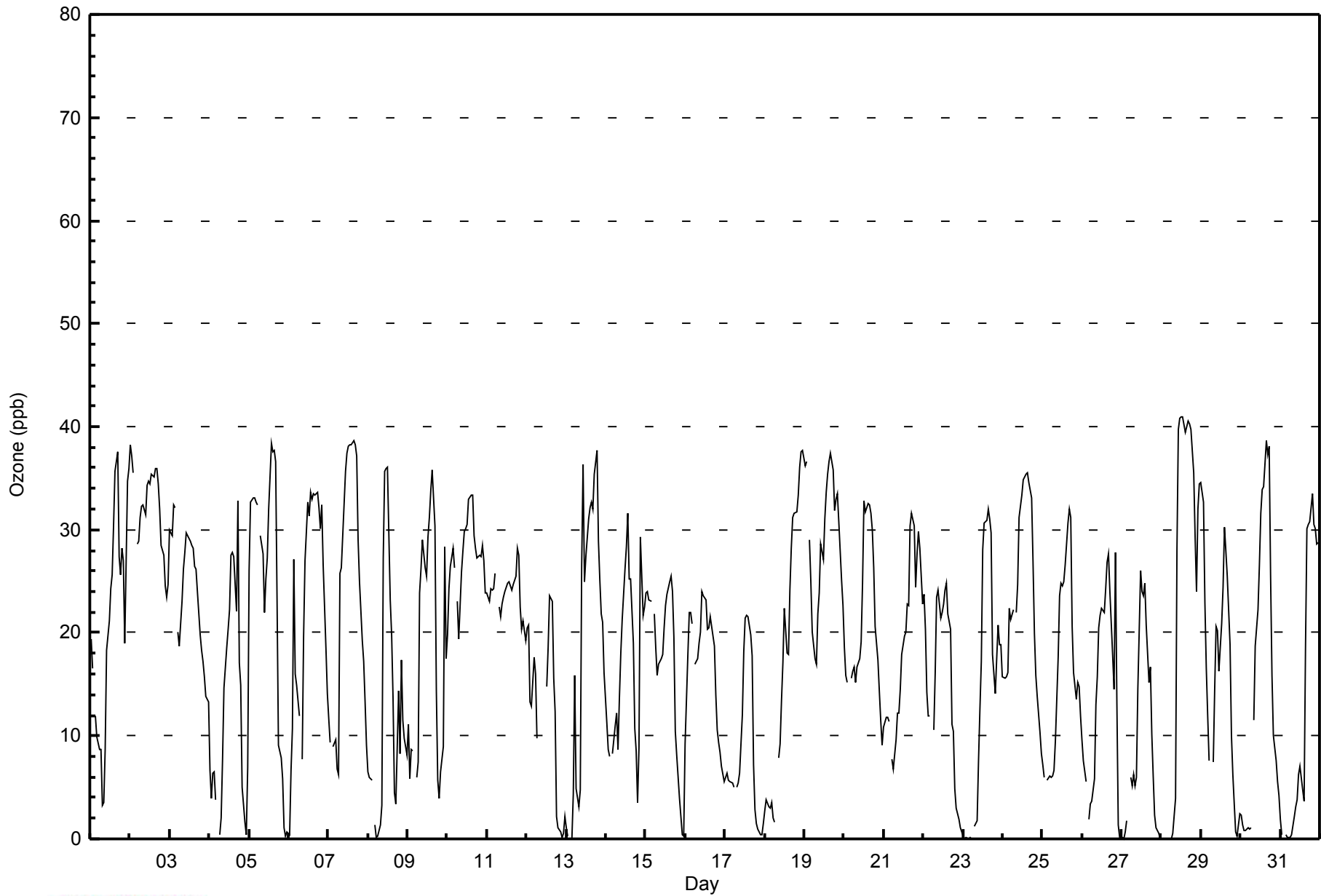
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	19	17	Z	12	10	9	9	3	3	9	18	21	24	26	30	36	38	27	26	28	27	19	35	36	20.9	38																								
2-Mar	38	37	36	Z	29	29	31	32	32	31	34	35	34	35	35	36	36	35	32	28	27	25	23	25	32.0	38																								
3-Mar	30	29	32	32	Z	20	19	23	26	28	30	29	29	29	28	26	26	24	20	18	17	16	14	13	24.3	32																								
4-Mar	7	4	6	7	4	Z	0	2	8	15	19	20	22	28	28	27	22	33	17	15	5	2	0	7	12.9	33																								
5-Mar	26	33	33	33	33	32	Z	29	28	22	25	27	32	38	38	38	37	23	9	8	6	1	0	1	24.0	38																								
6-Mar	0	7	11	27	16	15	12	Z	8	20	27	33	31	34	33	33	33	34	32	30	32	27	18	14	22.9	34																								
7-Mar	12	9	Z	9	10	7	6	26	26	33	36	37	38	38	38	39	38	37	29	25	19	17	13	9	24.0	39																								
8-Mar	6	6	6	Z	1	0	0	1	3	27	36	36	36	23	20	14	4	3	14	8	17	12	10	8	12.8	36																								
9-Mar	11	6	9	9	Z	6	8	24	26	29	26	25	29	31	34	36	30	14	6	4	7	9	28	18	18.4	36																								
10-Mar	20	24	26	28	26	Z	23	19	26	28	30	30	30	33	33	33	29	28	27	28	27	28	27	24	27.4	33																								
11-Mar	24	23	24	24	24	26	Z	22	22	23	23	24	25	25	25	24	25	25	28	28	22	20	21	19	23.8	28																								
12-Mar	20	21	13	13	18	16	10	Z	10	C	C	C	15	19	24	23	16	12	2	1	1	0	1	2	11.8	24																								
13-Mar	1	0	Z	0	4	16	5	3	5	27	36	25	27	31	32	33	32	35	38	29	25	22	21	16	20.1	38																								
14-Mar	11	9	8	Z	8	11	12	9	14	18	21	26	28	32	25	25	19	11	9	3	9	29	22	23	16.6	32																								
15-Mar	24	24	23	23	Z	22	19	16	17	17	18	21	23	24	25	25	24	20	10	8	4	2	0	0	16.9	25																								
16-Mar	9	18	22	22	21	Z	17	17	19	20	24	24	23	20	20	22	21	19	14	11	9	8	7	6	17.1	24																								
17-Mar	6	6	6	6	5	5	Z	5	5	6	12	18	21	22	22	20	18	7	3	1	1	0	0	2	8.6	22																								
18-Mar	3	4	3	3	4	2	2	Z	8	9	13	17	22	18	18	24	28	31	32	32	33	36	38	38	18.1	38																								
19-Mar	36	37	Z	29	25	20	17	17	22	24	29	27	31	34	35	37	37	36	32	33	33	31	25	23	29.1	37																								
20-Mar	19	16	15	Z	16	16	17	15	17	17	19	25	33	32	33	32	32	30	26	21	17	14	12	9	20.9	33																								
21-Mar	11	12	12	11	Z	8	7	10	12	12	15	18	20	20	23	23	30	32	30	24	28	30	28	23	19.0	32																								
22-Mar	24	20	14	12	12	Z	11	16	23	24	21	22	23	24	25	22	20	11	10	5	3	2	1	1	15.1	25																								
23-Mar	0	0	0	0	0	0	Z	1	2	8	13	17	28	31	31	32	31	30	18	14	18	21	19	19	14.4	32																								
24-Mar	16	16	16	16	22	21	Z	22	25	31	33	35	35	35	35	35	33	27	20	16	14	10	8	8	23.6	35																								
25-Mar	7	6	Z	6	6	6	6	7	9	18	24	25	24	25	27	31	32	31	21	16	13	15	15	12	16.6	32																								
26-Mar	10	8	6	Z	2	3	4	6	13	16	21	22	22	24	27	28	24	18	15	28	13	1	0	0	14.4	28																								
27-Mar	0	0	1	2	Z	6	5	6	5	6	14	26	24	24	25	21	15	17	10	6	2	1	1	0	9.4	26																								
28-Mar	0	0	0	0	0	Z	0	1	4	28	40	41	41	41	39	40	40	40	40	36	29	24	32	34	23.9	41																								
29-Mar	35	33	23	17	12	8	Z	7	15	21	20	16	21	24	30	28	26	19	10	6	3	1	0	2	16.4	35																								
30-Mar	2	1	1	1	1	1	1	Z	11	19	22	27	32	34	34	39	37	38	26	16	10	8	6	4	16.1	39																								
31-Mar	2	0	Z	0	0	0	0	0	2	3	4	6	7	5	4	19	30	31	31	34	31	30	29	29	12.9	34																								
																								13.8	13.7	13.8	13.1	11.9	11.7	10.1	12.3	14.3	19.4	23.4	25.1	26.9	27.6	28.1	29.0	28.0	25.5	20.8	17.7	16.8	15.4	14.8	13.7	Diurnal Average		
																								38	37	36	33	33	32	31	32	32	33	40	41	41	41	39	40	40	40	40	40	36	33	36	38	38	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	363	51.13	51.13
21 - 50	347	48.87	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - March 2015

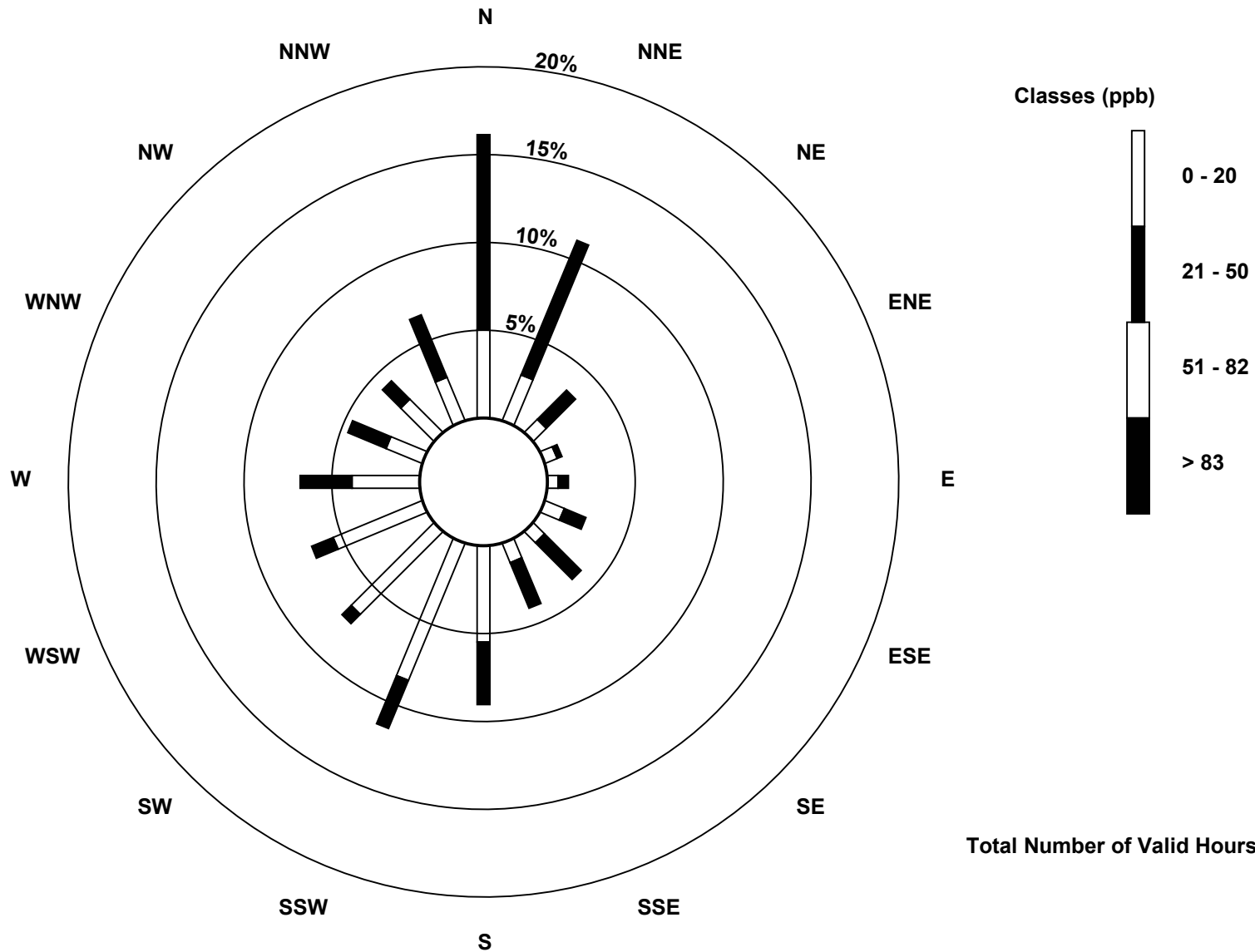
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	34	19	7	5	4	8	6	8	37	57	45	37	26	15	18	18	344
21 - 50	75	56	16	2	4	9	20	19	24	20	5	9	20	16	10	26	331
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	75	23	7	8	17	26	27	61	77	50	46	46	31	28	44	675

Total Number of Valid Hours: 675

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

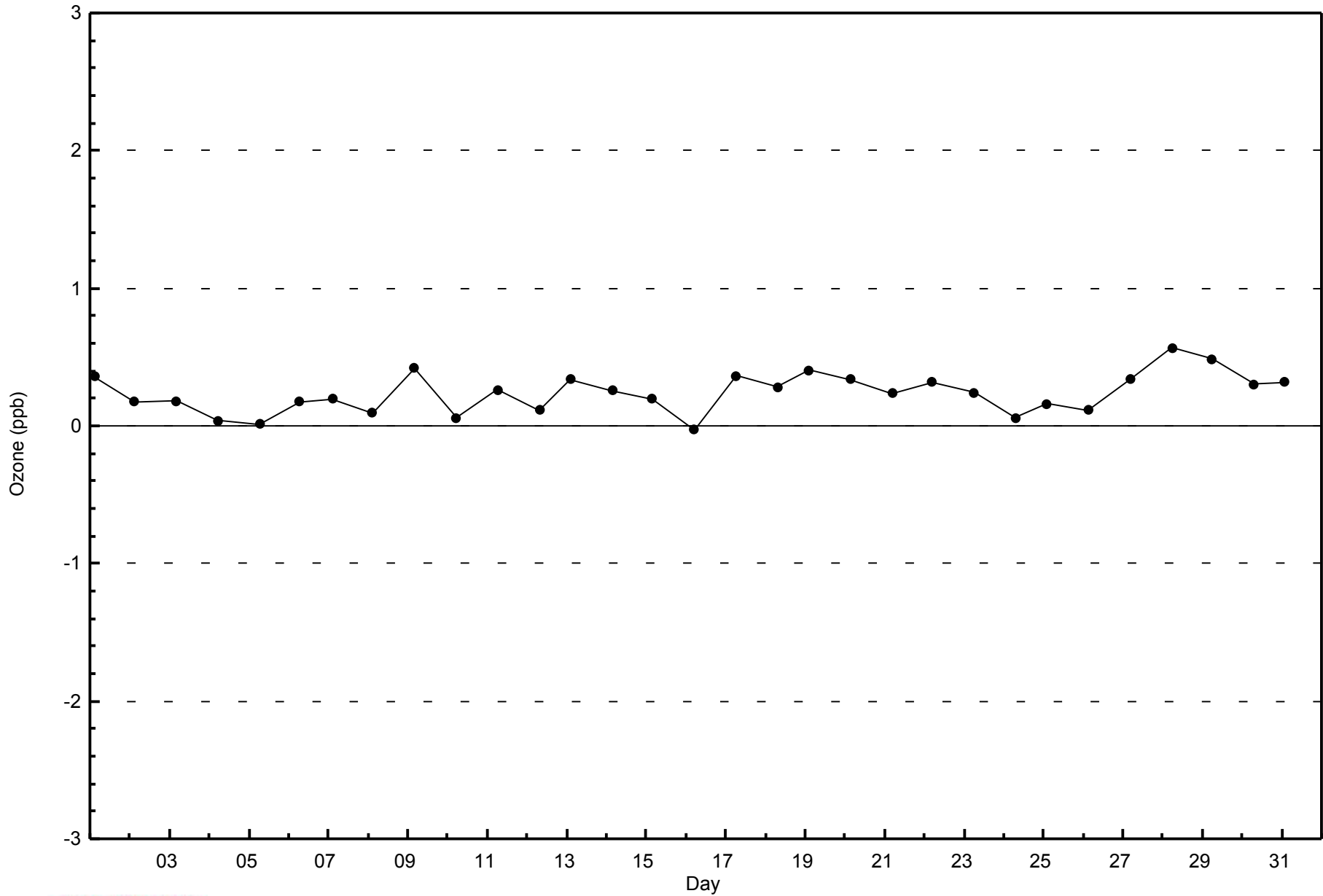
Ozone (O₃) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

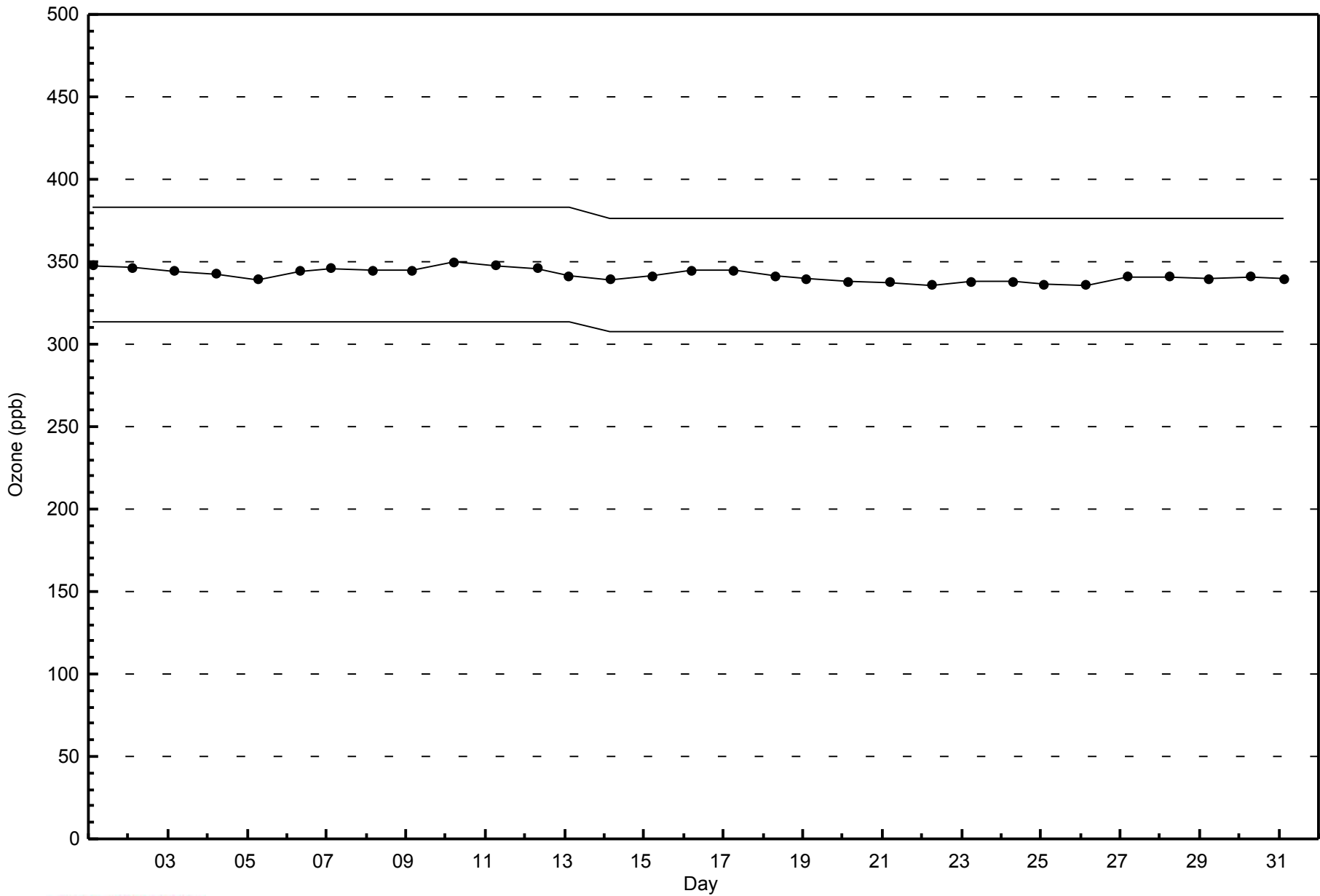
Ozone (O₃) - ppb
Fort McKay South - March 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Fort McKay South - March 2015



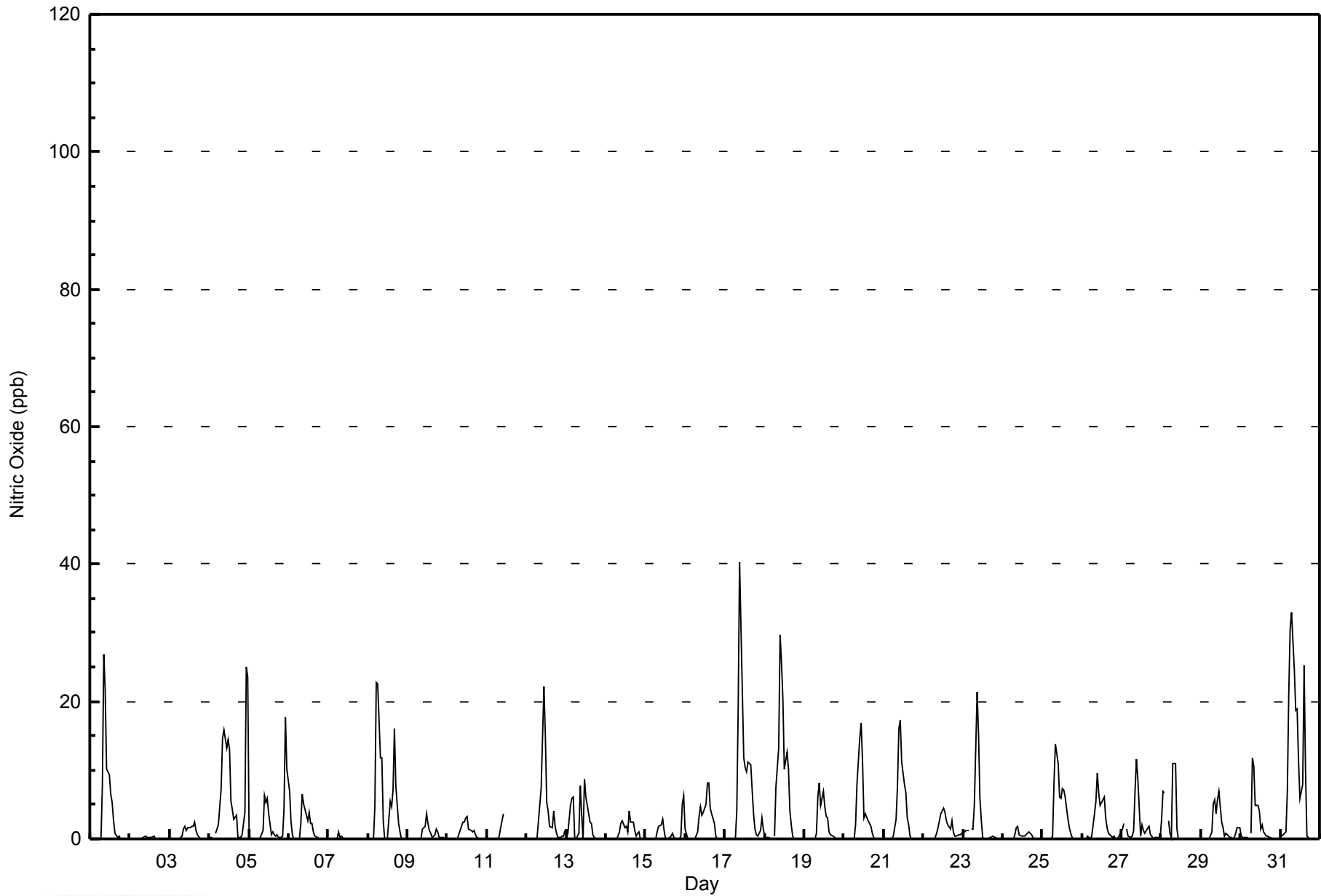


Maximum Value: 40 ppb on Mar 17 10:00																		Maximum Daily Average: 9.4 ppb on Mar 31						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 1 02:00																		Minimum Daily Average: 0.1 ppb on Mar 2						Hours of Data: 706		
Maximum Diurnal Average: 8.7 ppb at hour 10																		Minimum Diurnal Average: 0.1 ppb at hour 21						Hours of Missing Data: 38		
Monthly Average: 2.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 3 P ₉₀ = 8 P ₉₉ = 25						Hours of Calibration: 38		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	0	0	0	0	8	27	22	10	9	6	5	3	1	0	0	0	0	0	0	0	0	4.0	27
2-Mar	0	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-Mar	0	0	Z	0	0	0	0	0	1	2	1	2	2	2	2	2	1	1	0	0	0	0	0	0	0.7	2
4-Mar	0	0	0	Z	1	2	5	7	15	16	13	14	13	6	4	3	3	0	0	1	4	25	24	6.8	25	
5-Mar	1	0	0	0	Z	0	0	0	1	6	5	6	4	1	1	0	1	0	0	0	4	18	10	2.6	18	
6-Mar	7	3	1	0	0	Z	0	2	7	5	4	3	4	2	2	1	0	0	0	0	0	0	0	0	1.8	7
7-Mar	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
8-Mar	0	Z	0	0	5	23	23	12	12	3	0	0	5	5	7	16	8	2	1	0	0	0	0	0	5.3	23
9-Mar	0	0	Z	0	0	0	0	0	0	1	2	4	2	1	1	0	1	1	1	0	0	0	0	0	0.7	4
10-Mar	0	0	0	Z	0	0	0	1	2	2	2	3	3	2	1	1	1	1	0	0	0	0	0	0	0.9	3
11-Mar	0	0	0	0	Z	0	0	0	2	3	4	C	C	C	C	C	C	C	0	0	0	0	0	0	--	4
12-Mar	0	0	0	0	0	Z	0	2	5	7	22	15	5	4	2	2	4	2	1	0	0	0	0	1	3.2	22
13-Mar	Z	1	5	6	6	0	0	1	8	3	0	9	6	4	3	2	1	0	0	0	0	0	0	0	2.3	9
14-Mar	0	Z	0	0	0	0	0	0	1	2	3	2	2	1	4	2	2	1	0	1	1	0	0	0	1.0	4
15-Mar	0	0	Z	0	0	0	0	1	2	2	3	1	0	0	0	0	1	0	0	0	0	0	5	6	1.0	6
16-Mar	1	0	0	Z	0	0	0	1	3	5	3	4	5	8	8	4	4	2	0	0	0	0	0	0	2.2	8
17-Mar	0	0	0	0	Z	0	0	4	19	40	21	12	10	10	11	11	7	4	1	1	0	1	3	1	6.9	40
18-Mar	0	0	0	0	0	Z	0	8	13	30	26	20	10	13	10	4	2	0	0	0	0	0	0	0	6.0	30
19-Mar	Z	0	0	0	0	0	0	1	6	8	5	7	5	3	3	1	1	0	0	0	0	0	0	0	1.7	8
20-Mar	0	Z	0	0	0	0	0	2	8	15	17	11	3	4	3	2	2	1	0	0	0	0	0	0	2.9	17
21-Mar	0	0	Z	0	0	0	0	3	8	16	17	11	8	7	3	2	0	0	0	0	0	0	0	0	3.3	17
22-Mar	0	0	0	Z	0	0	0	0	1	2	4	4	4	4	3	2	1	3	1	0	0	1	1	1	1.4	4
23-Mar	1	1	1	1	Z	1	1	5	21	15	6	3	0	0	0	0	0	0	0	0	0	0	0	0	2.6	21
24-Mar	0	0	0	0	0	Z	0	1	2	2	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0.4	2
25-Mar	Z	0	0	0	0	0	0	8	14	11	6	6	7	7	6	3	2	1	0	0	0	0	0	0	3.1	14
26-Mar	0	Z	0	0	0	0	0	4	5	10	7	5	5	6	3	2	1	1	0	0	0	0	0	1	2.2	10
27-Mar	1	2	Z	1	0	0	0	1	7	12	9	0	2	1	1	1	2	1	0	0	0	0	0	0	1.9	12
28-Mar	3	7	7	Z	3	1	0	11	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	11
29-Mar	0	0	0	0	Z	0	1	5	6	4	6	7	2	2	0	1	1	0	0	0	0	1	2	2	1.7	7
30-Mar	0	0	0	0	0	Z	1	12	11	5	5	4	1	2	1	0	0	0	0	0	0	0	0	0	1.9	12
31-Mar	Z	0	1	1	7	21	31	33	25	19	19	11	6	8	25	10	0	0	0	0	0	0	0	0	9.4	33
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	689	97.59	97.59
21 - 40	17	2.41	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - March 2015

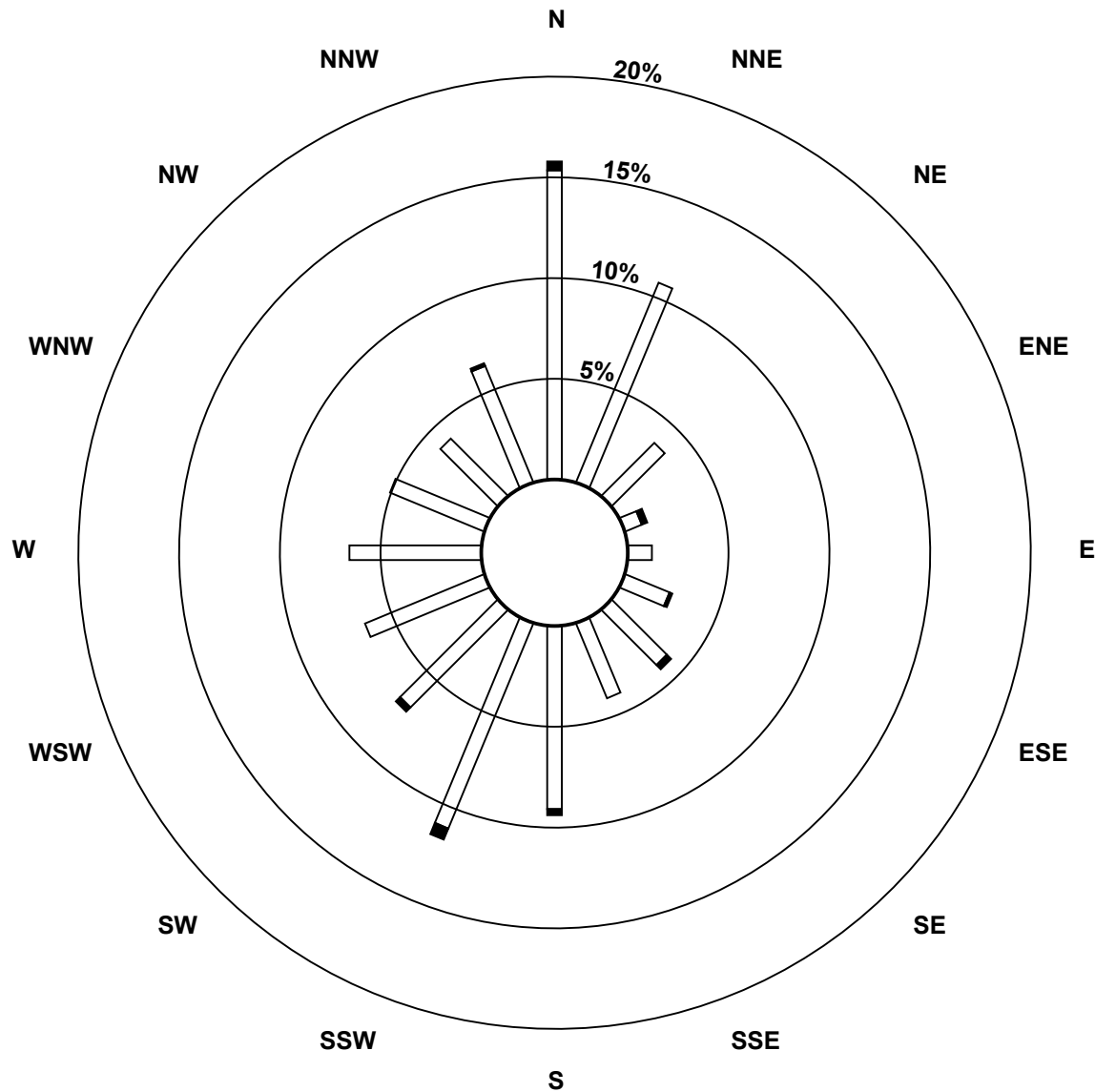
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	72	25	6	8	16	26	27	61	74	46	43	44	34	27	42	654
21 - 40	3	0	0	2	0	1	2	0	2	4	2	0	0	0	0	1	17
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	106	72	25	8	8	17	28	27	63	78	48	43	44	34	27	43	671

Total Number of Valid Hours: 671

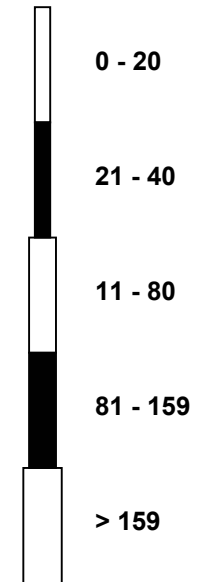
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)



Classes (ppb)

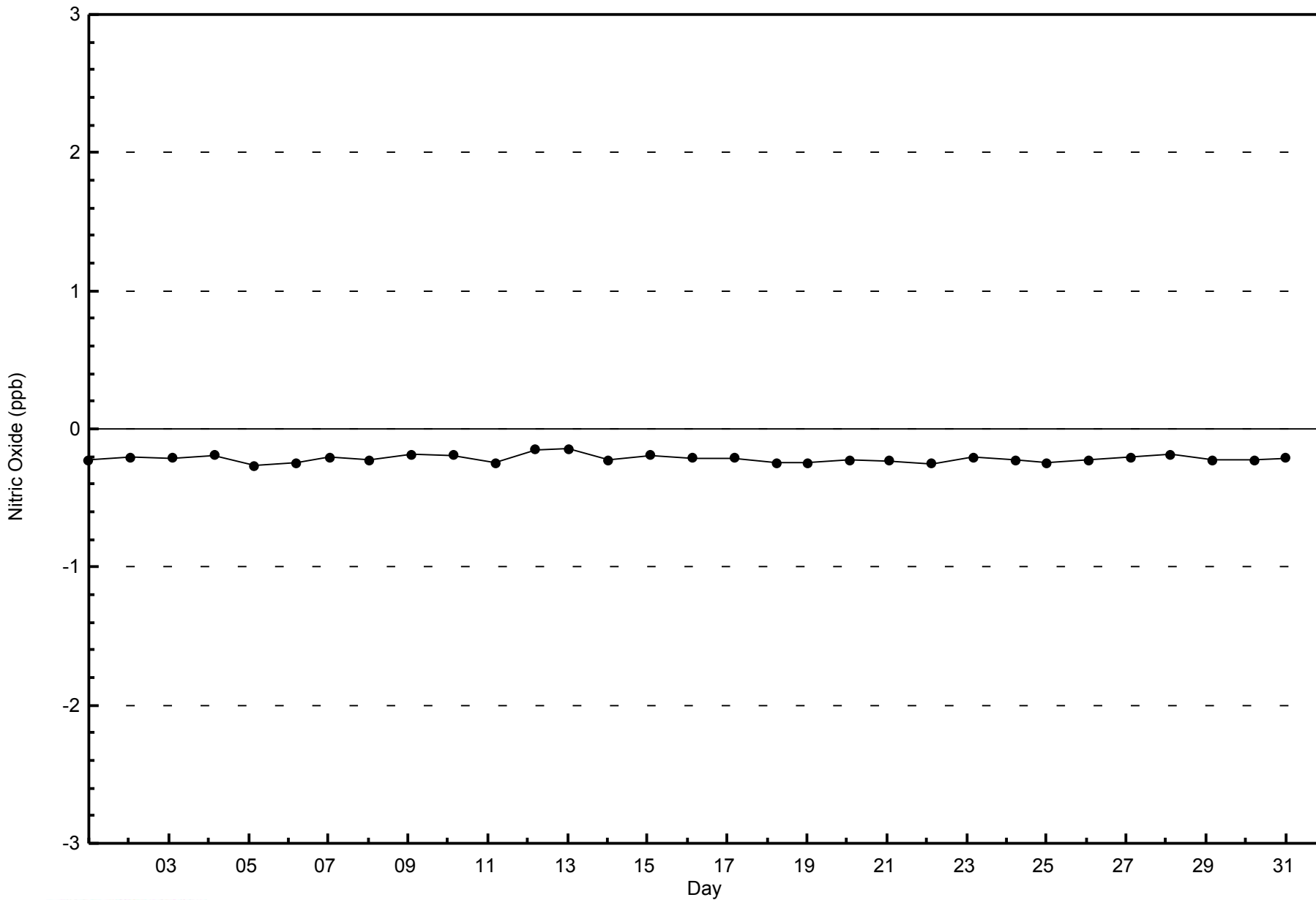


Total Number of Valid Hours: 671



WBEA
Zero Responses

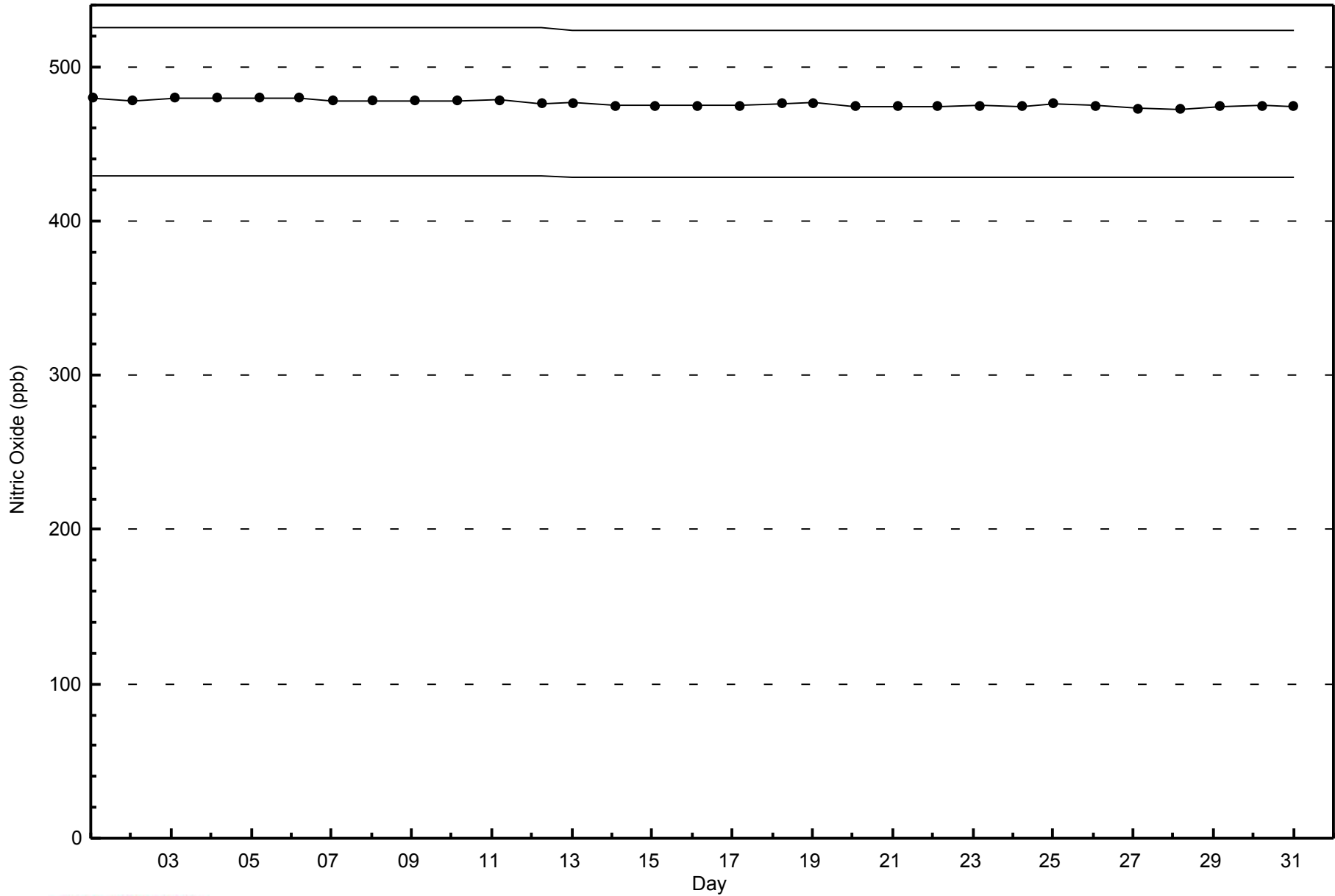
Nitric Oxide (NO) - ppb
Fort McKay South - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort McKay South - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay South - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 34 ppb on Mar 4 23:00	Maximum Daily Average: 17.2 ppb on Mar 4
Minimum Value: 0 ppb on Mar 28 14:00	Hours of Data: 706
Maximum Diurnal Average: 11.0 ppb at hour 10	Hours of Missing Data: 38
Monthly Average: 7.5 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.9 ppb on Mar 28	Percent Operational Time: 100.0
Minimum Diurnal Average: 4.8 ppb at hour 4	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 6 Q ₃ = 10 P ₉₀ = 16 P ₉₉ = 25	

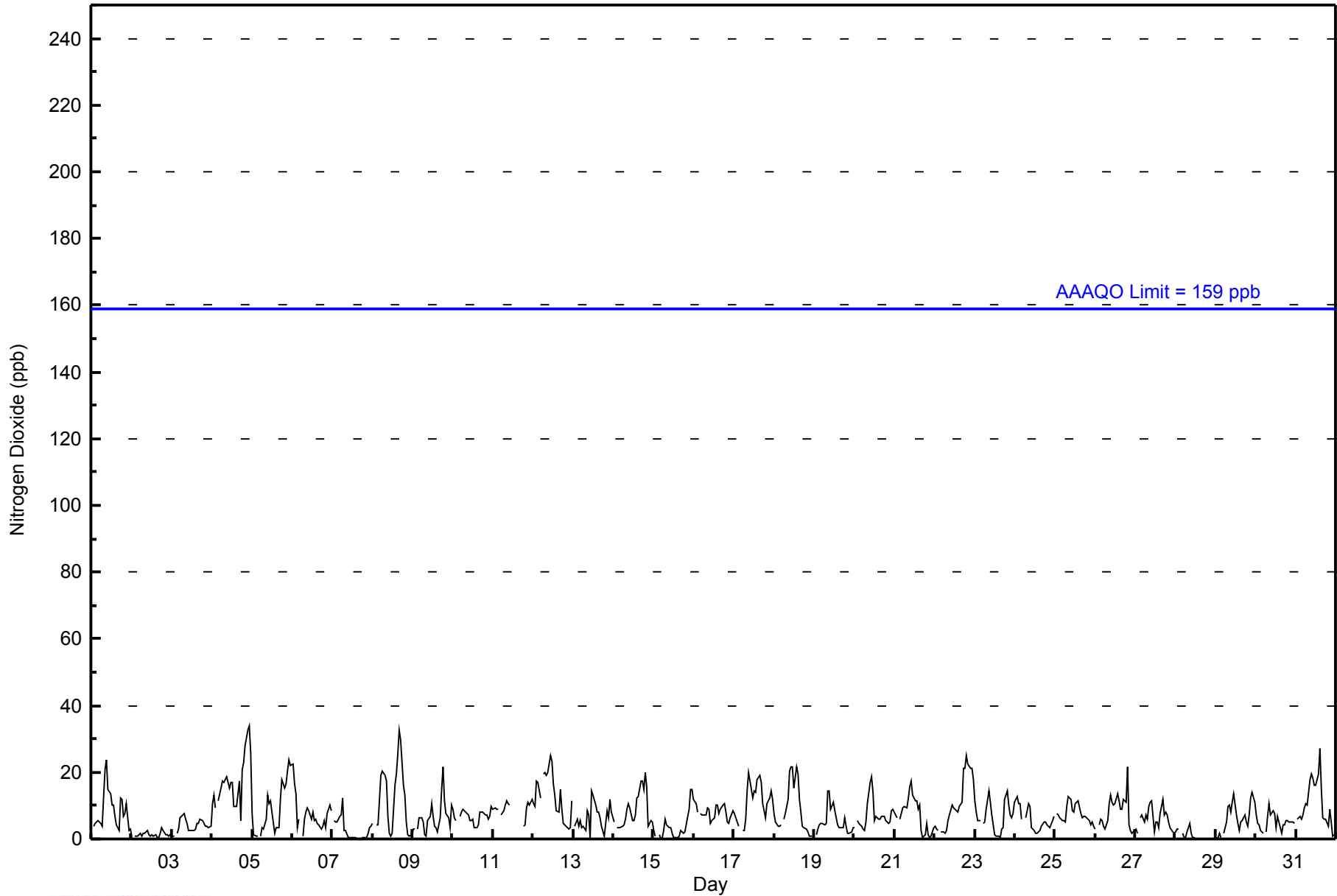
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	Z	4	5	5	6	5	4	13	21	24	15	14	10	10	7	4	3	12	12	7	8	11	3	3	8.8	24																								
2-Mar	1	Z	1	1	1	2	1	2	2	3	1	1	1	1	1	1	1	2	3	3	1	1	1	1	1.3	3																								
3-Mar	1	1	Z	2	3	6	7	8	6	5	3	3	3	3	5	5	6	6	5	4	4	4	4	4	4.0	8																								
4-Mar	10	13	9	Z	11	15	17	17	18	19	15	17	17	10	10	10	17	6	21	23	28	33	34	26	17.2	34																								
5-Mar	8	1	1	1	Z	1	3	3	6	13	11	11	8	2	4	4	4	12	18	15	17	21	24	22	9.0	24																								
6-Mar	23	16	14	3	6	Z	1	6	8	9	8	6	8	6	5	4	3	4	6	3	8	10	9	9	7.4	23																								
7-Mar	Z	6	5	5	7	7	12	3	2	1	1	0	0	0	0	0	0	0	0	0	1	2	3	4	2.6	12																								
8-Mar	5	Z	4	4	11	19	20	19	17	7	2	1	2	16	19	25	33	30	16	13	5	1	1	1	11.8	33																								
9-Mar	3	3	Z	3	6	7	5	1	1	6	7	10	7	4	4	2	7	15	22	11	8	6	4	10	6.5	22																								
10-Mar	9	6	5	Z	7	8	9	8	8	7	5	6	6	4	3	4	8	8	8	7	7	6	7	10	6.8	10																								
11-Mar	9	10	9	9	Z	7	8	10	12	11	10	C	C	C	C	C	C	C	4	4	9	11	10	12	--	12																								
12-Mar	10	10	17	17	12	Z	20	20	19	20	25	23	16	13	8	8	15	9	5	4	4	3	4	12	12.8	25																								
13-Mar	Z	4	6	4	5	3	4	2	8	7	0	15	13	10	8	8	6	4	1	5	9	7	12	8	6.5	15																								
14-Mar	5	Z	3	3	3	4	4	6	9	11	10	6	6	7	12	13	17	17	15	20	16	4	6	5	8.8	20																								
15-Mar	2	1	Z	1	0	1	3	6	4	4	3	2	0	0	1	1	2	2	2	2	7	9	15	15	3.6	15																								
16-Mar	12	11	8	Z	8	7	7	7	10	9	5	5	6	10	10	8	9	10	11	8	5	5	6	8	8.0	12																								
17-Mar	8	6	5	4	Z	3	2	6	14	20	15	12	14	14	18	19	17	11	8	7	11	12	14	12	11.0	20																								
18-Mar	8	5	4	4	4	Z	6	8	12	20	22	21	15	22	20	12	8	4	3	3	2	1	1	1	8.9	22																								
19-Mar	Z	1	3	4	5	5	4	5	14	14	9	11	8	6	4	4	3	4	6	4	2	2	2	3	5.4	14																								
20-Mar	3	Z	5	5	4	3	3	5	11	17	19	14	6	7	6	6	7	7	7	5	5	5	8	9	7.2	19																								
21-Mar	8	6	Z	6	8	9	10	9	12	16	17	13	11	12	9	10	3	1	1	5	1	1	1	3	7.5	17																								
22-Mar	4	3	2	Z	2	2	2	3	6	7	10	9	9	8	8	10	11	21	21	25	22	21	21	18	10.7	25																								
23-Mar	12	8	6	6	Z	5	5	9	14	11	7	4	1	1	1	1	3	4	12	14	10	7	7	8	6.7	14																								
24-Mar	11	13	11	11	6	Z	7	9	11	10	3	3	2	2	2	3	4	5	5	4	4	3	6	7	6.0	13																								
25-Mar	Z	8	7	7	6	5	5	10	13	12	8	8	11	11	11	8	6	7	7	6	5	4	5	4	7.5	13																								
26-Mar	3	Z	4	6	6	4	3	6	11	13	11	10	11	14	11	9	9	12	11	22	4	3	2	2	8.0	22																								
27-Mar	3	2	Z	6	7	5	7	6	10	11	11	2	5	5	3	8	12	7	8	7	5	3	2	2	6.0	12																								
28-Mar	2	3	3	Z	2	1	0	2	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5																							
29-Mar	0	0	2	1	Z	2	5	10	10	8	11	14	7	5	3	5	5	7	5	4	7	12	14	11	6.4	14																								
30-Mar	7	5	4	3	2	Z	2	7	10	7	8	8	4	7	5	2	4	4	5	5	5	5	5	5	5.2	10																								
31-Mar	Z	6	7	6	7	9	11	10	18	20	18	16	16	20	27	15	6	6	6	4	9	5	1	1	10.6	27																								
																								6.6	5.8	5.8	4.8	5.6	5.5	6.3	7.5	10.3	11.0	9.4	8.8	7.5	7.6	7.5	6.9	7.6	7.8	8.1	8.0	7.2	6.9	7.5	7.5	Diurnal Average		
																								23	16	17	17	12	19	20	20	21	24	25	23	17	22	27	25	33	30	30	22	25	28	33	34	26	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	677	95.89	95.89
21 - 40	29	4.11	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - March 2015

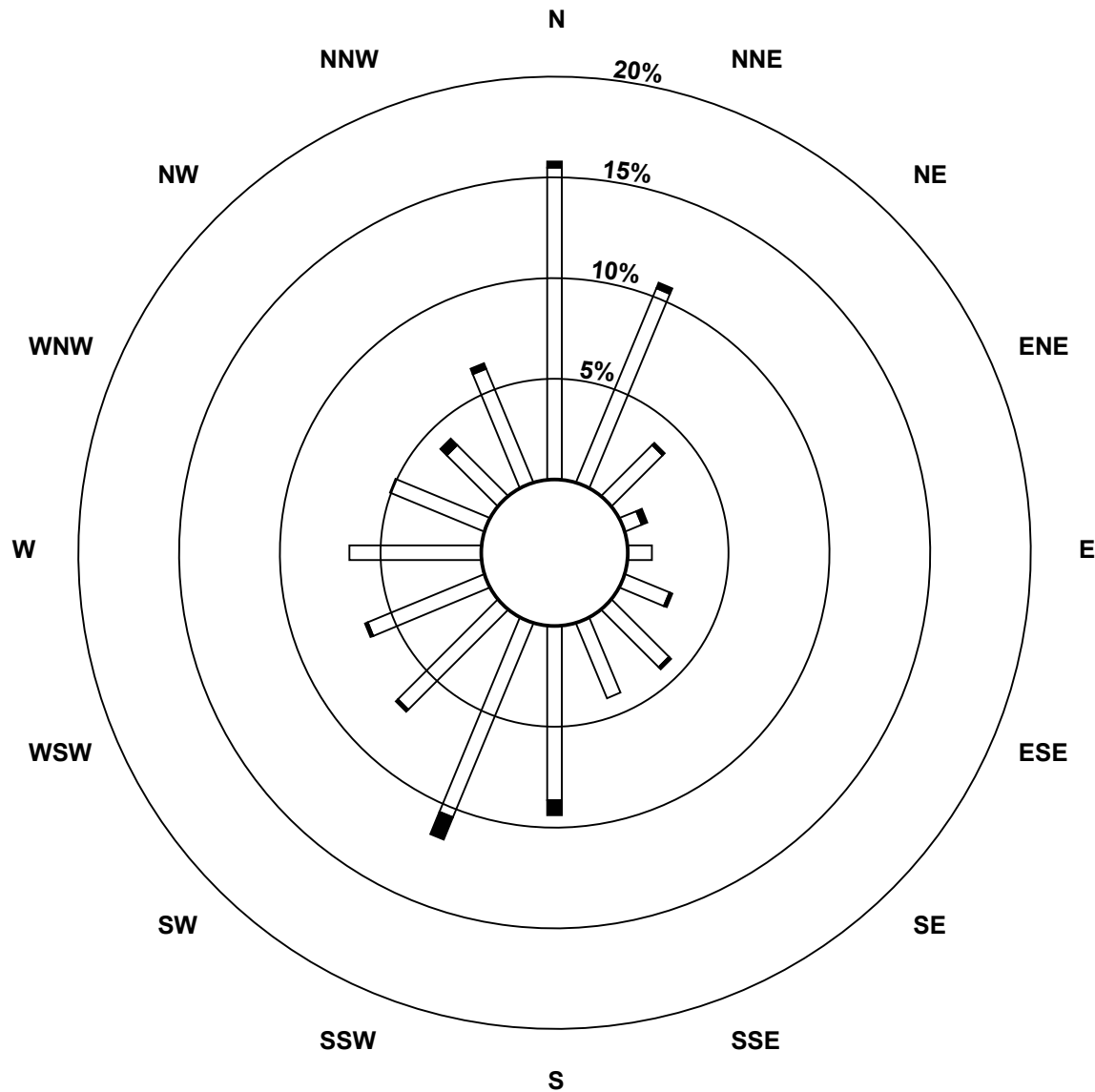
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	104	70	24	6	8	16	27	27	58	70	47	42	44	34	24	41	642
21 - 40	2	2	1	2	0	1	1	0	5	8	1	1	0	0	3	2	29
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	106	72	25	8	8	17	28	27	63	78	48	43	44	34	27	43	671

Total Number of Valid Hours: 671

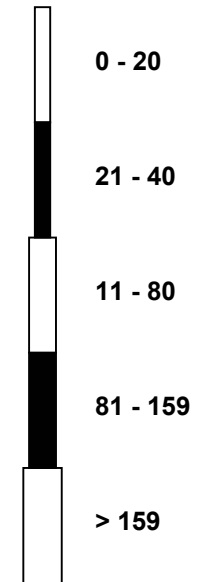
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)



Classes (ppb)

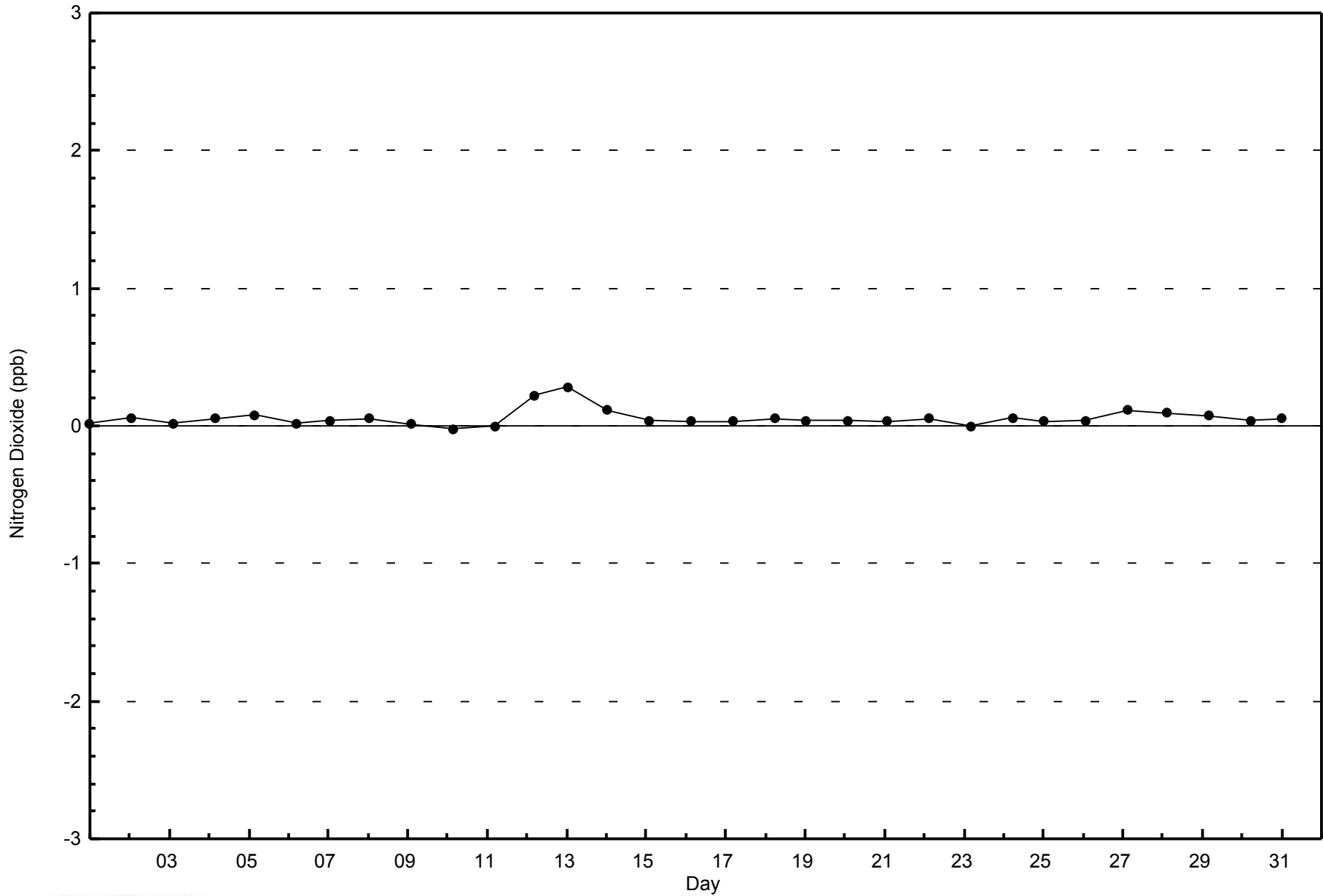


Total Number of Valid Hours: 671



WBEA
Zero Responses

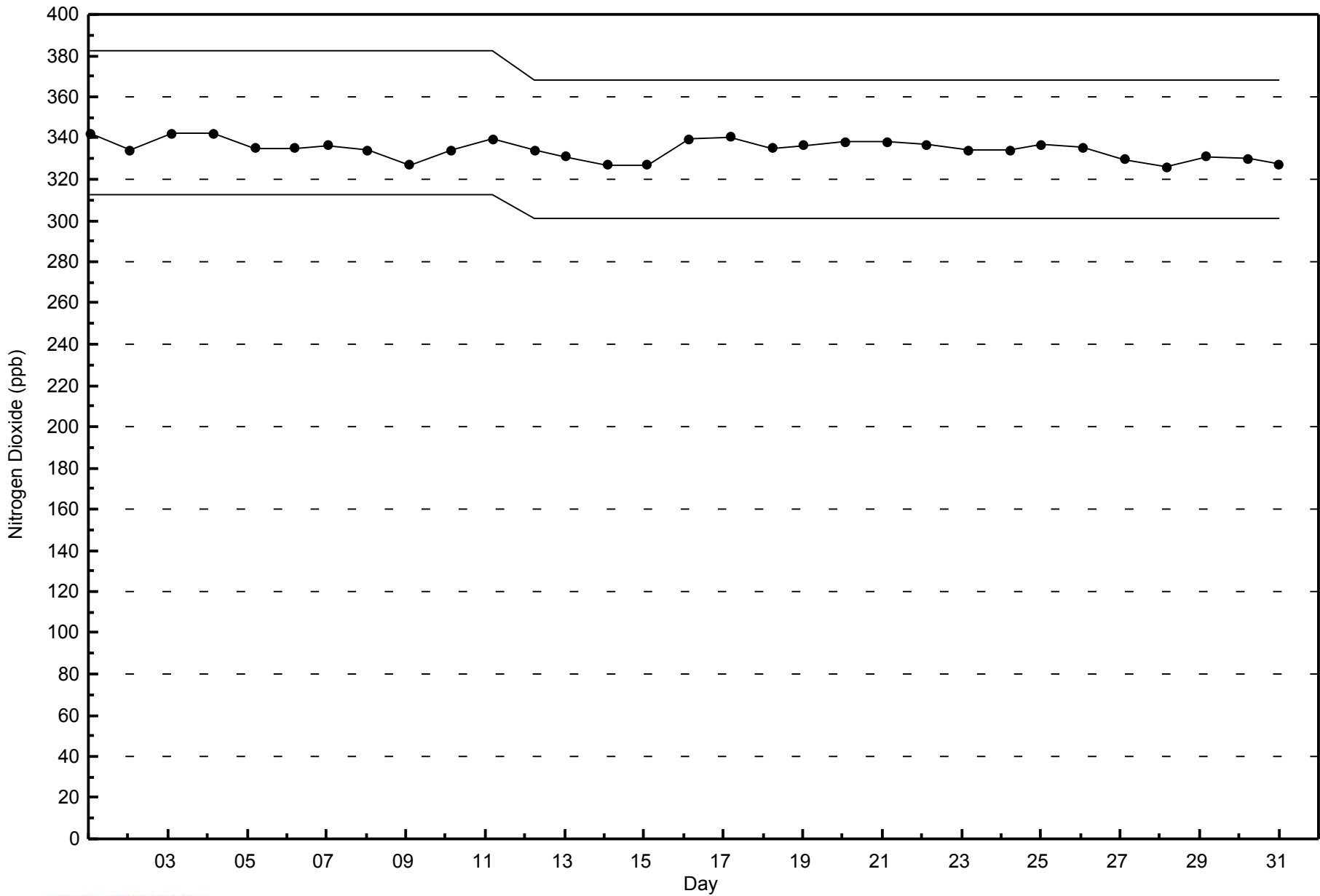
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - March 2015



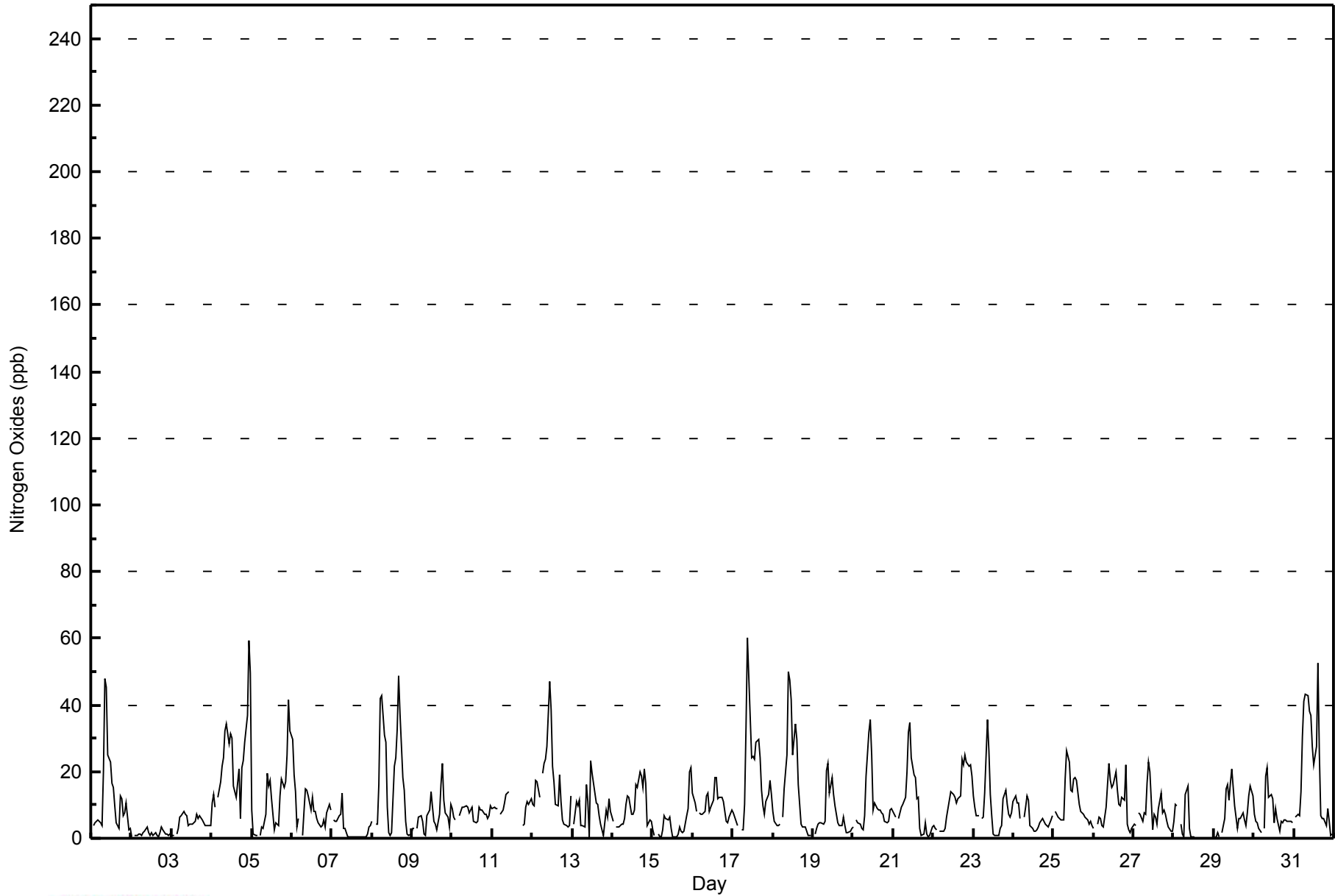


Maximum Value: 60 ppb on Mar 17 10:00																		Maximum Daily Average: 24.0 ppb on Mar 4																		Hours in Service: 744												
Minimum Value: 0 ppb on Mar 28 17:00																		Minimum Daily Average: 1.4 ppb on Mar 2																		Hours of Data: 706												
Maximum Diurnal Average: 19.6 ppb at hour 10																		Minimum Diurnal Average: 5.2 ppb at hour 4																		Hours of Missing Data: 38												
Monthly Average: 10.1 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 7 Q ₃ = 13 P ₉₀ = 23 P ₉₉ = 47																		Hours of Calibration: 38												
																																				Percent Operational Time: 100.0												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	4	5	5	6	4	4	20	48	45	25	23	17	15	10	5	3	13	12	7	7	11	3	3	12.8	48																						
2-Mar	1	Z	1	1	1	1	1	2	2	3	2	1	2	1	2	1	1	2	3	2	1	1	1	1	1.4	3																						
3-Mar	1	1	Z	1	3	6	7	8	7	7	4	4	4	4	5	7	6	7	6	5	4	4	4	4	4.7	8																						
4-Mar	11	13	9	Z	12	17	22	24	32	34	28	31	30	16	14	12	21	6	21	23	29	37	59	50	24.0	59																						
5-Mar	8	1	1	1	Z	1	3	3	7	20	16	17	12	3	4	4	4	13	18	15	17	25	41	32	11.6	41																						
6-Mar	29	19	14	3	6	Z	1	8	15	14	13	9	12	8	8	6	5	3	4	6	3	8	10	9	9.2	29																						
7-Mar	Z	6	5	5	7	7	13	3	3	0	0	0	0	0	0	0	0	0	0	0	1	1	3	4	2.7	13																						
8-Mar	5	Z	4	4	16	42	43	31	29	9	2	1	2	22	24	33	49	37	18	14	5	1	1	1	17.1	49																						
9-Mar	3	3	Z	3	6	7	5	1	1	7	9	14	9	5	4	3	7	16	22	11	8	7	4	10	7.2	22																						
10-Mar	9	6	5	Z	7	8	9	9	10	10	8	9	9	5	5	5	9	9	8	7	7	6	7	10	7.6	10																						
11-Mar	9	10	9	9	Z	7	8	11	13	13	14	C	C	C	C	C	C	C	4	4	9	11	10	12	--	14																						
12-Mar	10	10	17	17	12	Z	20	22	24	27	47	38	22	17	10	10	19	11	6	4	4	3	4	13	16.0	47																						
13-Mar	Z	4	11	10	11	4	4	3	16	11	0	23	19	14	11	10	7	4	1	5	8	7	12	8	8.8	23																						
14-Mar	5	Z	3	3	4	4	4	6	10	13	12	7	7	9	16	15	20	19	15	21	17	4	6	5	9.8	21																						
15-Mar	2	1	Z	1	0	1	3	7	6	6	6	3	0	0	1	1	3	2	2	2	7	9	20	21	4.5	21																						
16-Mar	14	11	8	Z	8	7	7	8	13	13	8	9	11	18	18	12	12	12	11	8	5	5	6	8	10.2	18																						
17-Mar	8	6	5	4	Z	3	3	10	33	60	36	24	25	24	29	30	24	14	10	7	11	13	17	13	17.8	60																						
18-Mar	8	5	4	4	4	Z	6	15	25	50	47	42	25	34	30	16	10	4	3	3	2	1	1	1	14.8	50																						
19-Mar	Z	1	3	4	4	5	4	5	20	23	14	18	13	10	7	5	4	4	6	4	2	2	2	3	7.1	23																						
20-Mar	3	Z	5	5	4	3	3	7	19	32	36	25	9	11	9	8	9	7	7	5	5	5	8	9	10.1	36																						
21-Mar	8	6	Z	6	8	9	10	12	20	32	35	24	19	18	12	12	3	1	1	5	1	1	1	3	10.8	35																						
22-Mar	4	3	2	Z	2	2	2	3	6	9	14	13	13	12	11	12	13	24	22	25	23	22	22	18	12.0	25																						
23-Mar	13	9	7	7	Z	6	6	14	35	26	13	7	1	1	1	1	3	4	12	14	10	7	7	8	9.2	35																						
24-Mar	11	13	11	11	6	Z	7	9	13	12	4	3	2	2	3	3	5	6	5	4	4	3	6	7	6.4	13																						
25-Mar	Z	8	7	7	6	5	5	18	26	23	15	14	18	18	17	10	8	8	7	6	5	4	5	4	10.7	26																						
26-Mar	3	Z	4	6	6	4	4	9	16	23	18	15	16	20	14	10	10	12	11	22	4	3	2	3	10.2	23																						
27-Mar	4	4	Z	8	7	5	7	7	17	23	20	3	7	6	4	9	14	8	9	7	5	4	2	2	7.9	23																						
28-Mar	5	10	10	Z	4	1	0	13	16	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.8	16																						
29-Mar	0	0	2	1	Z	2	6	15	16	12	17	21	10	6	3	6	6	7	5	4	7	13	15	13	8.1	21																						
30-Mar	7	5	5	3	2	Z	3	19	21	12	13	12	5	9	6	2	5	5	5	5	5	5	5	5	7.1	21																						
31-Mar	Z	7	7	7	14	30	41	43	43	38	37	27	22	27	52	26	7	6	6	4	9	5	1	1	20.0	52																						
																								7.2	6.4	6.4	5.2	6.4	7.4	8.5	11.8	18.1	19.6	16.5	14.6	11.4	11.2	11.0	9.1	9.5	8.8	8.5	8.1	7.3	7.3	9.2	9.0	Diurnal Average
																								29	19	17	17	16	42	43	43	48	60	47	42	30	34	52	33	49	37	22	25	29	37	59	50	Diurnal Maximum
Z - zerospan C - Calibration																																																



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	616	87.25	87.25
21 - 40	73	10.34	97.59
41 - 80	17	2.41	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



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - March 2015

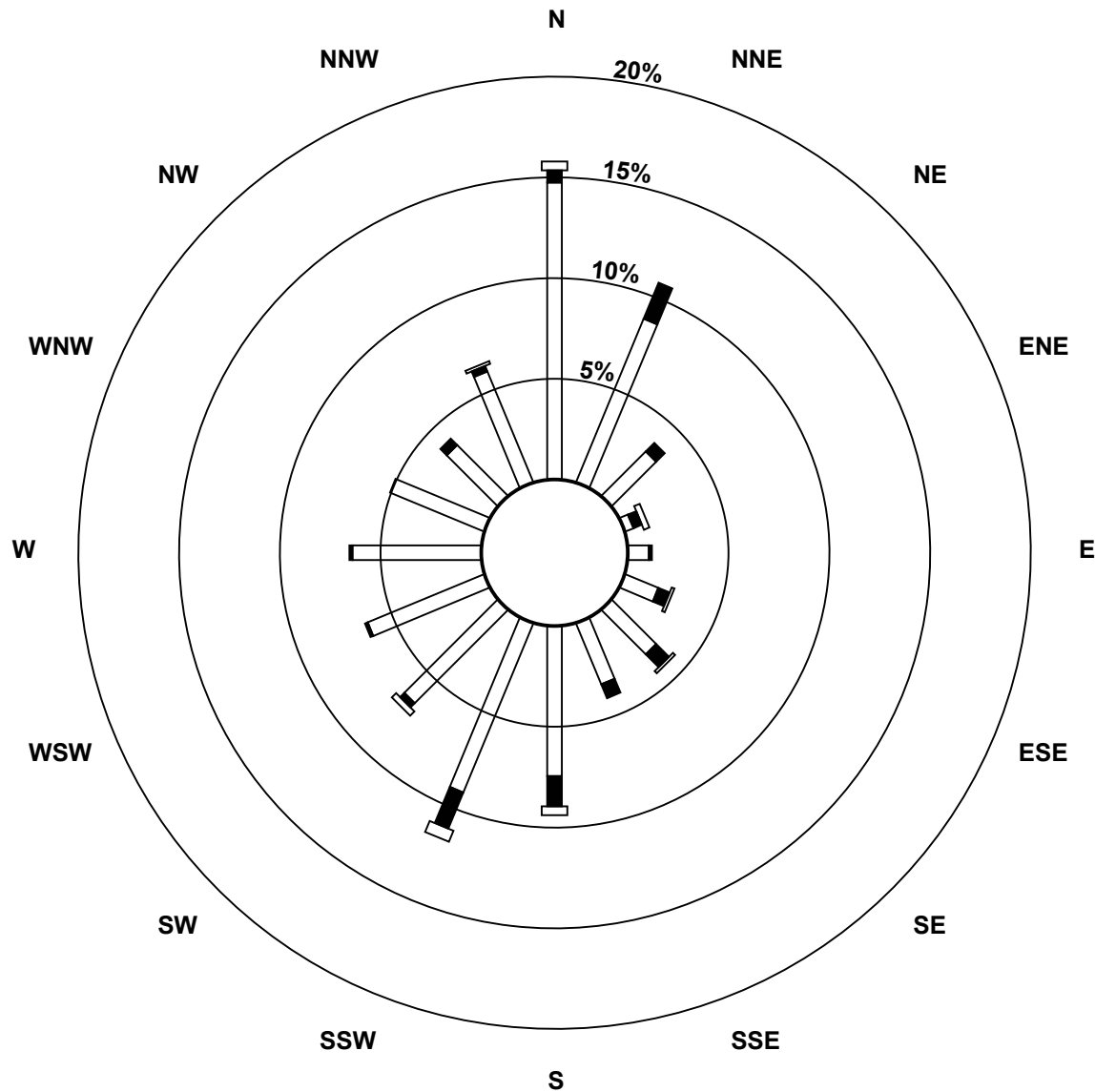
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	59	21	3	7	12	21	22	50	61	44	42	43	34	24	40	582
21 - 40	4	13	4	3	1	4	6	5	10	13	2	1	1	0	3	2	72
41 - 80	3	0	0	2	0	1	1	0	3	4	2	0	0	0	0	1	17
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	106	72	25	8	8	17	28	27	63	78	48	43	44	34	27	43	671

Total Number of Valid Hours: 671

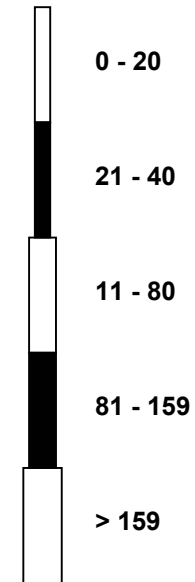
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

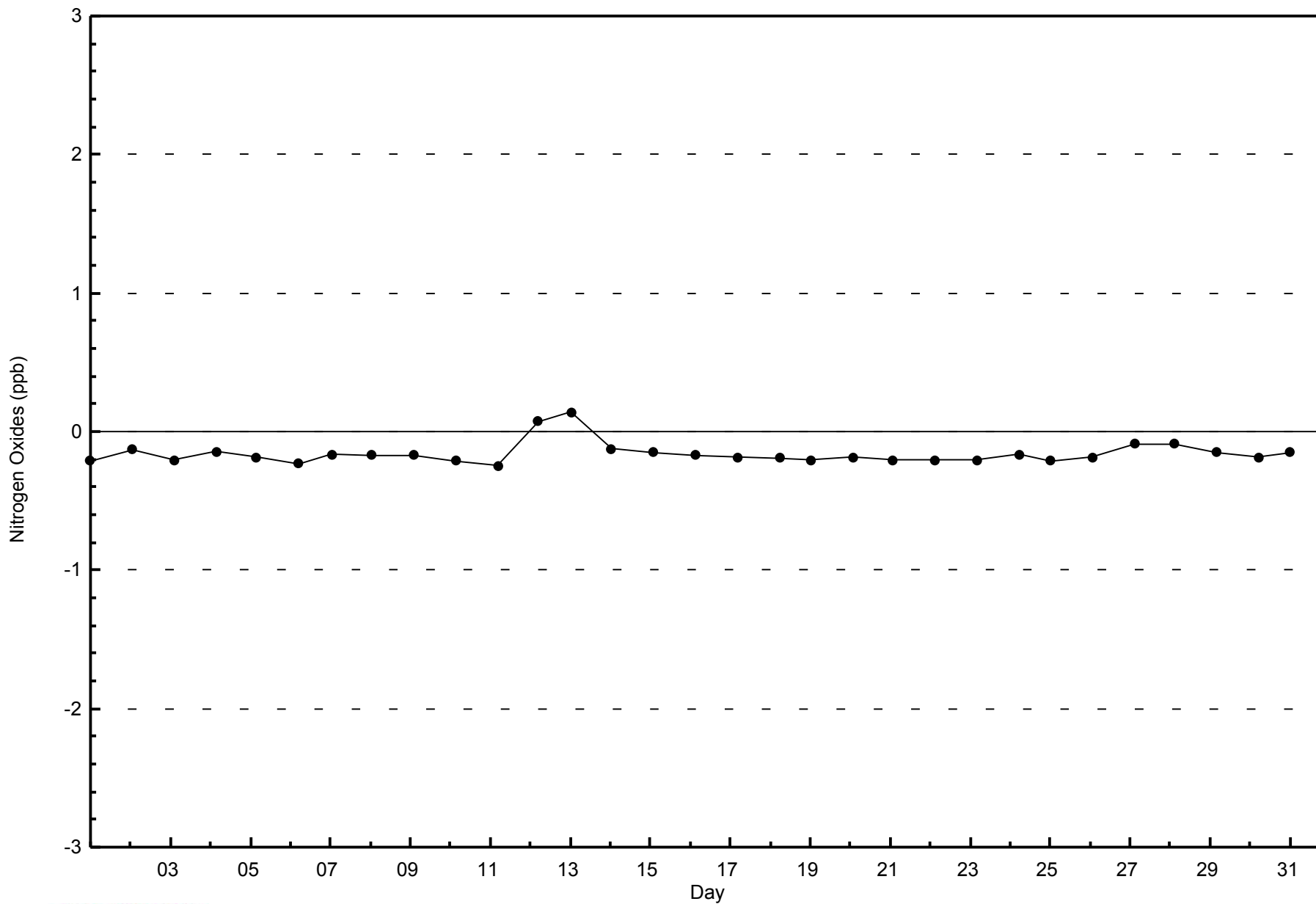
**Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)



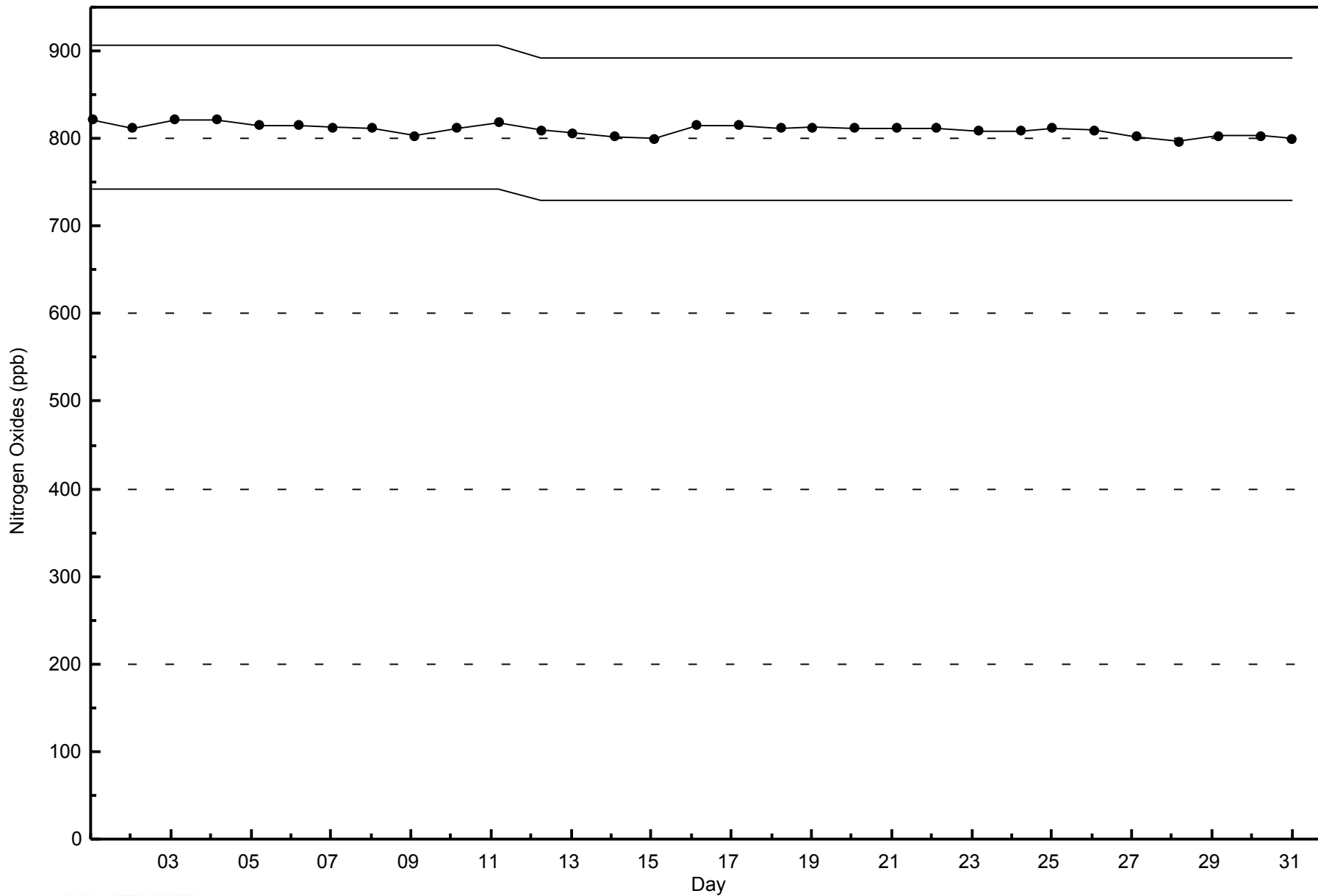
Total Number of Valid Hours: 671





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - March 2015





Summary of Hour Averages

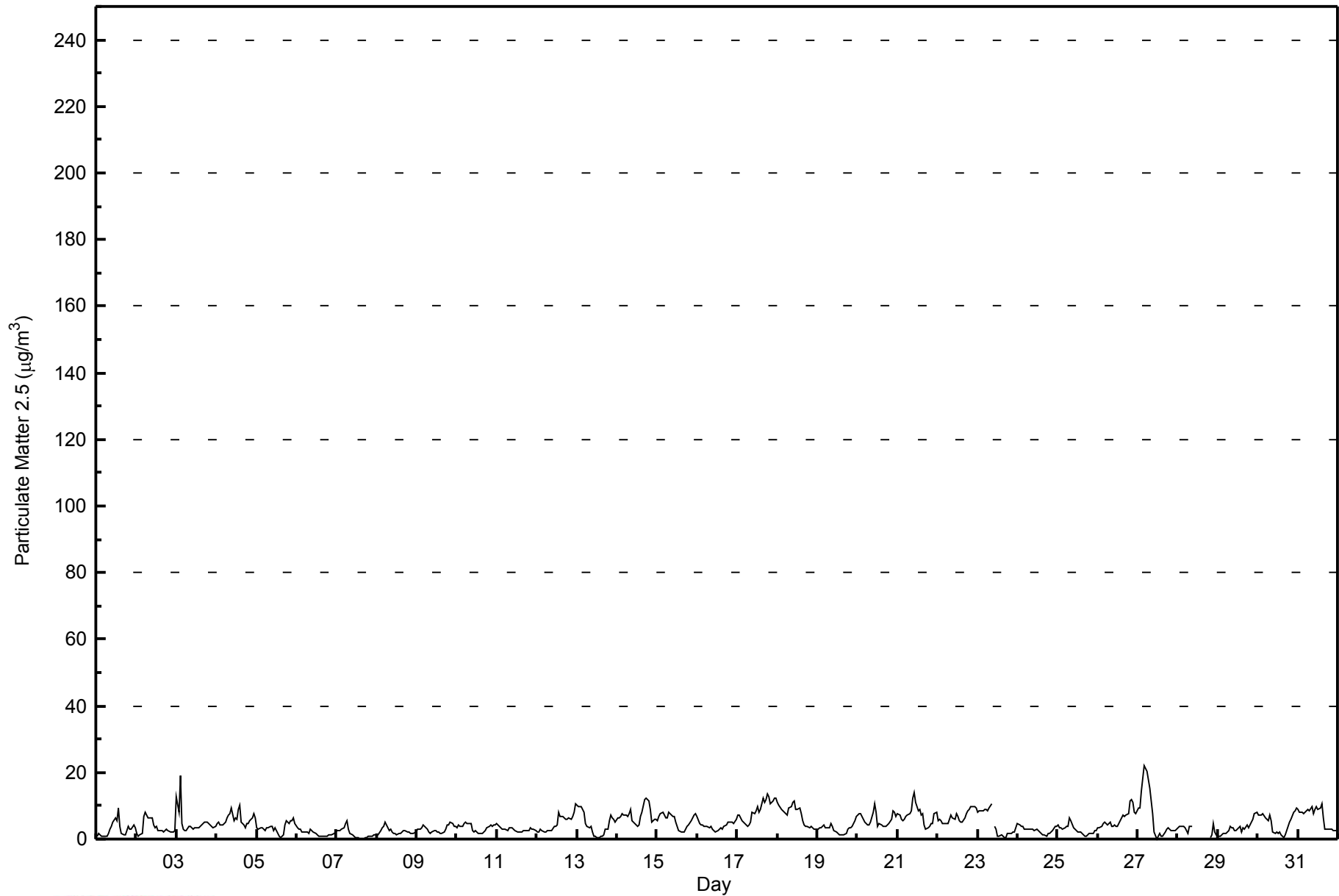
Fort McKay South - March 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																															
Maximum Value: 21.8 µg/m ³ on Mar 27 05:00		Maximum Daily Average: 8.7 µg/m ³ on Mar 17																																															
Minimum Value: 0.0 µg/m ³ on Mar 7 15:00		Hours of Data: 734																																															
Maximum Diurnal Average: 5.5 µg/m ³ at hour 3		Hours of Missing Data: 10																																															
Monthly Average: 4.58 µg/m ³		Hours of Calibration: 0																																															
Minimum Daily Average: 1.6 µg/m ³ on Mar 7		Percent Operational Time: 98.7																																															
Minimum Diurnal Average: 3.2 µg/m ³ at hour 16																																																	
Percentiles: P ₁ = 0.3 P ₁₀ = 1.3 Q ₁ = 2.4 Median = 3.8 Q ₃ = 6.3 P ₉₀ = 8.6 P ₉₉ = 14.1																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	0.9	1.6	1.1	0.9	0.8	1.0	1.0	1.6	2.8	3.7	5.1	6.3	5.4	9.5	3.7	1.7	1.1	1.4	2.6	3.6	3.0	2.9	4.1	3.5	2.9	9.5																							
2-Mar	1.6	1.0	1.3	1.8	6.8	7.9	7.3	6.3	6.4	6.5	4.3	3.5	3.6	2.5	2.3	2.4	1.9	2.5	2.9	2.5	2.3	2.1	2.2	2.4	3.5	7.9																							
3-Mar	12.6	7.9	19.0	4.5	2.8	2.4	2.7	3.9	4.0	3.3	3.1	3.3	3.4	3.5	3.6	4.3	4.5	4.9	5.1	4.8	4.3	3.7	3.5	3.8	5.0	19.0																							
4-Mar	4.7	5.0	4.3	4.1	4.4	5.2	6.2	7.2	7.5	9.5	5.3	6.2	6.1	9.1	10.3	5.0	4.2	3.2	4.7	4.9	5.5	6.3	7.5	6.2	5.9	10.3																							
5-Mar	3.5	3.2	3.5	3.4	2.9	2.6	3.5	3.5	3.8	3.8	2.7	3.5	2.3	0.8	0.5	0.8	1.2	4.3	5.6	4.8	5.3	5.6	6.2	4.6	3.4	6.2																							
6-Mar	3.3	2.9	2.9	2.1	2.3	2.3	2.2	1.9	2.8	2.4	1.9	1.5	1.3	0.8	0.8	0.7	0.7	0.9	1.0	1.3	1.1	1.3	1.6	1.9	1.7	3.3																							
7-Mar	2.5	2.6	2.6	3.0	3.4	4.6	5.4	2.8	1.8	1.2	0.8	0.4	0.3	0.3	0.0	0.0	0.1	0.2	0.5	0.7	0.8	0.8	1.3	1.3	1.6	5.4																							
8-Mar	1.4	1.4	2.7	3.3	3.7	5.2	4.1	2.5	2.9	2.1	1.7	1.5	1.3	1.8	1.6	2.0	2.6	2.5	2.2	2.3	1.9	1.5	1.5	2.3	2.3	5.2																							
9-Mar	2.8	2.9	2.8	3.4	4.3	3.4	3.0	2.2	1.7	1.9	2.4	2.4	2.2	2.3	1.5	1.6	2.1	3.0	4.3	4.4	5.1	4.8	3.7	4.0	3.0	5.1																							
10-Mar	3.6	4.3	4.0	3.7	4.6	4.9	4.5	4.8	4.5	2.7	2.3	2.5	2.3	1.8	1.8	1.8	2.0	2.4	3.4	3.9	4.0	4.0	4.1	4.4	3.4	4.9																							
11-Mar	4.6	3.9	3.3	3.0	3.1	2.8	2.7	3.2	3.3	3.2	3.1	2.5	2.3	1.9	2.1	2.3	2.5	2.7	2.6	2.7	3.3	3.1	3.0	2.7	2.9	4.6																							
12-Mar	2.0	2.0	2.8	2.6	1.9	2.2	2.5	2.6	2.8	2.5	3.7	3.7	4.4	7.9	6.9	6.8	6.2	5.9	5.7	6.5	6.1	6.7	7.9	10.7	4.7	10.7																							
13-Mar	10.0	9.6	9.9	9.0	8.2	4.6	3.9	3.3	3.8	2.0	0.7	0.7	0.6	0.6	0.7	0.7	1.3	3.0	3.0	5.6	7.0	6.5	6.0	5.1	4.4	10.0																							
14-Mar	6.4	6.4	6.8	7.7	7.4	7.1	6.6	7.6	9.1	5.6	5.2	4.1	3.8	4.4	6.7	8.0	11.8	12.1	11.7	11.3	9.1	5.3	6.0	6.1	7.3	12.1																							
15-Mar	5.6	7.0	7.7	7.9	7.3	6.6	6.3	7.9	7.6	6.9	6.6	5.1	4.0	2.7	2.2	2.1	2.2	3.1	3.9	4.2	5.4	6.5	7.0	7.8	5.6	7.9																							
16-Mar	6.7	4.7	4.3	4.2	4.0	3.9	3.7	3.6	3.7	2.8	2.7	2.2	2.5	2.9	3.2	3.0	3.7	4.3	5.2	5.0	5.1	5.2	4.9	6.0	4.1	6.7																							
17-Mar	7.1	7.2	6.5	5.6	4.7	4.2	3.9	4.3	5.0	8.2	7.5	8.5	9.6	8.0	9.1	12.4	11.1	11.7	13.7	12.8	10.7	11.3	12.3	12.2	8.7	13.7																							
18-Mar	11.0	10.2	9.1	8.4	7.9	7.6	7.2	9.2	9.6	10.9	11.5	9.1	8.8	9.3	7.5	5.3	4.3	3.8	3.6	3.4	3.6	3.3	3.0	3.0	7.1	11.5																							
19-Mar	3.0	3.4	3.6	4.0	4.2	3.6	3.6	3.5	4.5	3.9	2.6	2.2	1.8	1.3	1.1	1.1	1.2	1.5	2.9	3.3	3.3	3.9	5.4	6.6	3.1	6.6																							
20-Mar	7.1	7.6	7.8	6.9	5.2	4.7	4.4	4.2	5.2	7.9	10.7	8.1	4.0	4.6	4.1	3.7	3.9	4.0	4.4	4.7	5.7	8.6	7.9	6.8	5.9	10.7																							
21-Mar	7.5	7.0	5.8	5.5	5.9	6.7	7.2	7.6	8.5	12.5	13.8	11.0	8.5	8.8	7.0	7.4	4.3	3.1	3.5	3.8	4.7	4.5	7.4	7.9	7.1	13.8																							
22-Mar	5.7	5.9	5.4	4.8	4.7	4.7	4.7	5.9	7.0	6.3	6.1	7.6	6.9	5.7	5.1	5.2	6.3	7.8	8.4	9.0	9.6	9.9	9.8	9.2	6.7	9.9																							
23-Mar	8.0	8.4	8.3	8.6	8.9	8.7	8.3	9.3	10.5	M	4.0	2.9	1.0	1.0	1.3	1.0	0.5	0.4	1.7	1.8	1.8	1.9	2.3	3.3	4.5	10.5																							
24-Mar	4.7	4.4	3.8	3.7	3.1	3.0	2.9	3.0	3.0	2.8	2.4	3.1	2.5	2.1	1.8	1.4	1.3	0.8	1.5	1.5	2.1	2.6	3.9	3.8	2.7	4.7																							
25-Mar	4.2	3.5	3.3	3.1	3.5	3.7	3.8	6.2	5.3	3.2	3.0	2.4	2.0	2.2	2.3	1.2	0.8	0.9	1.3	1.9	1.9	1.9	2.6	2.4	2.8	6.2																							
26-Mar	3.4	3.5	3.9	4.7	5.0	4.5	4.3	5.0	3.9	3.8	4.3	3.8	3.9	5.5	6.4	7.1	6.8	7.0	7.6	11.3	12.0	11.0	7.9	7.5	6.0	12.0																							
27-Mar	9.5	9.3	14.6	18.2	21.8	20.3	17.8	15.2	11.6	7.8	1.9	0.1	0.9	1.6	0.7	1.1	2.1	2.8	3.5	3.0	2.5	2.4	2.4	2.8	7.2	21.8																							
28-Mar	3.6	4.0	4.0	3.9	3.3	2.6	1.9	3.8	3.8	UO	UO	UO	UO	UO	UO	UO	0.2	UO	UO	UO	0.4	1.2	4.5	2.0	1.2	--	4.5																						
29-Mar	0.8	0.9	1.4	1.6	1.5	1.7	2.7	3.9	3.4	3.5	2.5	2.4	3.5	3.8	2.2	3.6	3.0	4.1	3.6	4.4	5.2	5.8	7.5	8.0	3.4	8.0																							
30-Mar	7.3	7.0	7.2	7.6	6.5	5.8	5.3	7.1	5.3	2.3	1.8	2.3	1.5	2.1	1.1	0.3	1.1	2.6	3.8	5.3	6.1	8.1	8.5	9.2	4.8	9.2																							
31-Mar	8.9	8.1	8.1	7.8	8.1	8.5	8.9	8.5	9.6	7.6	8.9	9.8	8.9	9.2	10.8	6.3	3.0	2.9	2.9	2.9	3.1	2.6	2.6	2.7	6.7	10.8																							
																								5.3	5.1	5.5	5.1	5.2	5.1	4.9	5.2	5.3	4.9	4.4	4.1	3.7	3.9	3.6	3.2	3.3	3.7	4.2	4.4	4.6	4.8	5.0	5.1	Diurnal Average	
																								12.6	10.2	19.0	18.2	21.8	20.3	17.8	15.2	11.6	12.5	13.8	11.0	9.6	9.5	10.8	12.4	11.8	12.1	13.7	12.8	12.0	11.3	12.3	12.2	Diurnal Maximum	
M - Maintenance																								UO - Unstable Operation																									
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	468	63.76	63.76
6 - 15	217	29.56	93.32
16 - 25	5	0.68	94.01
26 - 80	0	0.00	94.01
> 81.0	0	0.00	94.01

Total Number of Valid Hours: 734

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay South - March 2015

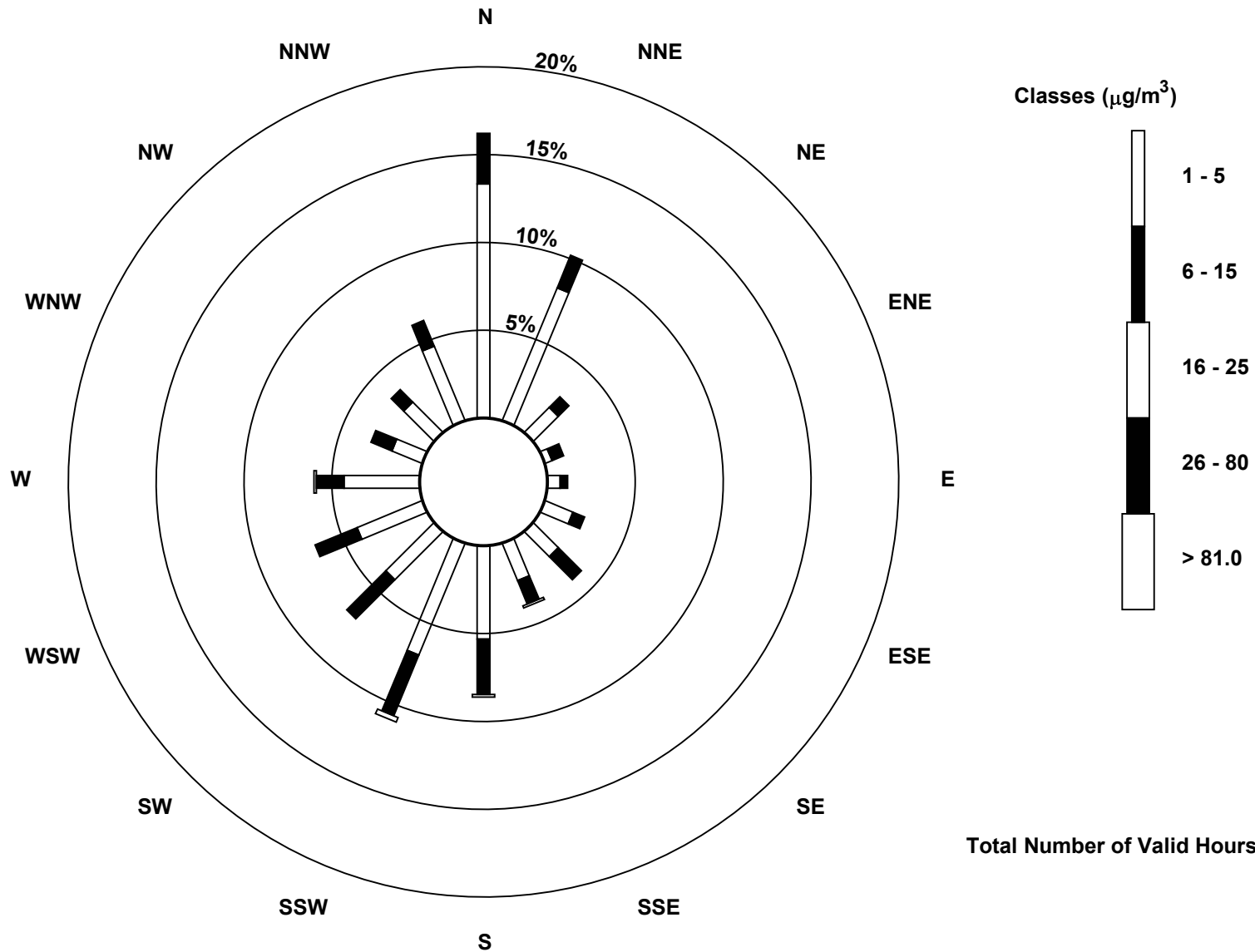
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	93	57	14	3	5	12	14	16	37	48	27	28	30	13	17	32	446
6 - 15	20	14	6	5	3	5	13	10	22	26	22	18	11	9	7	11	202
16 - 25	0	0	0	0	0	0	0	1	1	2	0	0	1	0	0	0	5
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	113	71	20	8	8	17	27	27	60	76	49	46	42	22	24	43	653

Total Number of Valid Hours: 697

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
 Fort McKay South (AMS 13)



Total Number of Valid Hours: 697

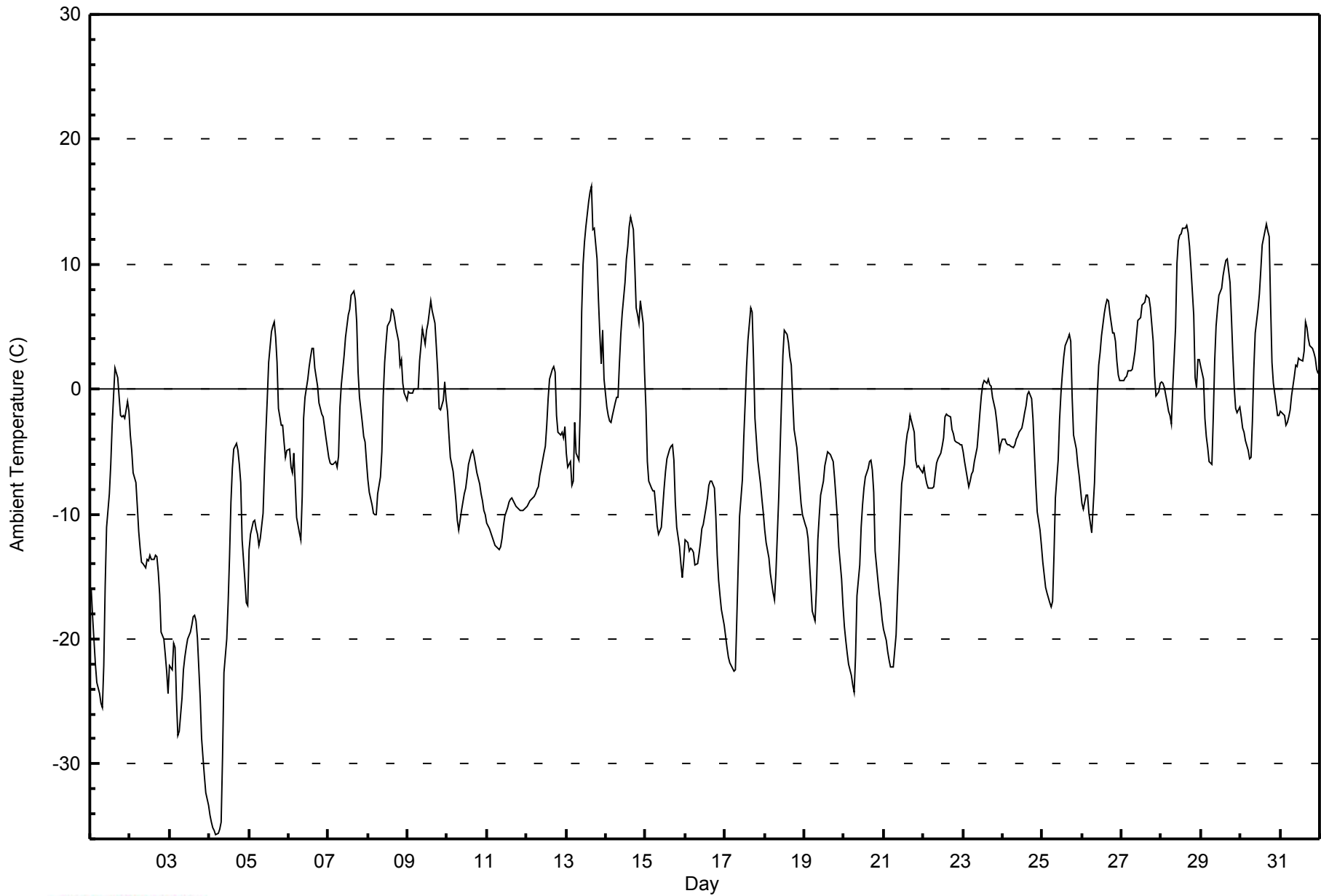


Maximum Value: 16.3 C on Mar 13 16:00		Maximum Daily Average: 5.4 C on Mar 28		Hours in Service: 744																						
Minimum Value: -35.6 C on Mar 4 05:00		Minimum Daily Average: -23.6 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.8 C at hour 16		Minimum Diurnal Average: -11.8 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -5.40 C		Percentiles: P ₁ = -34.2 P ₁₀ = -18.2 Q ₁ = -10.4 Median = -4.9 Q ₃ = 0.8 P ₉₀ = 5.7 P ₉₉ = 12.9		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-16.0	-18.2	-20.2	-22.0	-23.4	-24.4	-25.2	-25.5	-22.1	-15.8	-11.1	-8.4	-6.0	-2.9	-0.5	1.7	0.9	-0.7	-2.1	-2.2	-2.1	-2.3	-0.9	-1.8	-10.5	1.7
2-Mar	-3.7	-4.9	-6.7	-7.4	-9.4	-11.4	-12.7	-13.8	-14.0	-14.2	-13.7	-13.8	-13.3	-13.6	-13.6	-13.3	-13.4	-14.6	-16.4	-19.5	-20.0	-21.3	-22.5	-24.4	-13.8	-3.7
3-Mar	-22.2	-22.4	-20.3	-20.7	-24.8	-27.7	-27.4	-24.7	-22.5	-21.5	-20.7	-20.0	-19.4	-18.9	-18.2	-18.1	-18.5	-19.9	-24.6	-28.0	-29.6	-31.0	-32.3	-33.3	-23.6	-18.1
4-Mar	-34.1	-34.7	-35.1	-35.3	-35.6	-35.6	-35.3	-34.6	-29.4	-22.7	-19.9	-17.1	-13.4	-9.0	-6.4	-4.8	-4.4	-4.9	-6.0	-7.5	-12.0	-15.3	-17.1	-17.3	-20.3	-4.4
5-Mar	-12.9	-11.7	-10.6	-10.5	-11.2	-11.6	-12.5	-12.0	-10.0	-6.5	-3.4	-0.8	2.1	4.6	5.0	5.4	4.2	2.1	-1.6	-2.8	-2.9	-4.2	-5.5	-5.0	-4.7	5.4
6-Mar	-4.8	-6.2	-6.7	-5.1	-7.6	-10.3	-11.5	-12.1	-8.6	-2.3	-0.6	0.8	1.8	2.6	3.3	3.2	1.7	0.2	-1.1	-1.6	-2.0	-2.2	-3.9	-4.7	-3.2	3.3
7-Mar	-5.4	-5.9	-6.0	-6.0	-5.8	-6.3	-5.4	-1.4	0.3	2.8	4.2	5.0	5.9	6.4	7.5	7.9	7.2	5.4	1.4	-0.6	-2.7	-3.8	-4.2	-5.8	-0.2	7.9
8-Mar	-7.3	-8.3	-9.2	-10.0	-10.1	-10.1	-8.3	-7.1	-5.0	-0.5	2.2	3.8	5.1	5.5	6.4	6.3	5.8	5.0	3.8	1.9	2.4	0.5	-0.4	-0.9	-1.2	6.4
9-Mar	-0.2	-0.3	-0.3	-0.3	0.0	0.0	0.1	2.3	3.5	4.8	3.5	4.8	5.3	6.2	7.1	6.3	5.2	3.3	1.4	-1.6	-1.6	-0.9	0.6	-0.8	2.0	7.1
10-Mar	-1.8	-3.7	-5.5	-6.6	-7.7	-9.0	-10.5	-11.3	-9.7	-9.0	-8.4	-7.9	-7.0	-6.0	-5.1	-4.9	-5.4	-6.1	-6.6	-7.5	-8.3	-9.0	-9.7	-10.1	-7.4	-1.8
11-Mar	-10.7	-11.2	-11.5	-11.8	-12.2	-12.5	-12.7	-12.8	-12.6	-11.9	-11.0	-10.2	-9.4	-9.1	-8.9	-8.7	-8.9	-9.3	-9.4	-9.6	-9.7	-9.7	-9.7	-9.5	-10.5	-8.7
12-Mar	-9.4	-9.2	-8.9	-8.8	-8.6	-8.4	-8.1	-7.8	-6.9	-6.3	-5.1	-4.5	-2.9	-0.8	0.8	1.6	1.8	1.3	-2.1	-3.4	-3.6	-3.5	-3.9	-3.0	-4.6	1.8
13-Mar	-5.1	-6.3	-5.8	-7.7	-7.3	-2.7	-5.1	-5.7	-1.5	6.2	10.0	11.8	13.0	15.1	15.8	16.3	12.8	12.9	10.4	7.2	4.4	2.0	4.7	0.8	4.0	16.3
14-Mar	-1.4	-2.1	-2.6	-2.6	-2.1	-1.1	-0.7	-0.6	2.0	4.4	6.0	8.6	10.4	11.4	13.0	13.8	12.8	9.9	6.5	6.0	5.3	7.1	5.3	1.3	4.6	13.8
15-Mar	-1.5	-5.8	-7.3	-7.9	-8.1	-8.1	-9.4	-11.0	-11.6	-11.1	-9.5	-8.0	-6.5	-5.6	-4.8	-4.6	-4.5	-5.6	-9.1	-11.1	-12.7	-13.9	-15.0	-13.8	-8.6	-1.5
16-Mar	-12.0	-12.3	-12.9	-12.7	-12.9	-13.0	-14.0	-14.0	-13.2	-12.3	-11.2	-10.8	-9.5	-8.7	-7.7	-7.3	-7.4	-8.0	-10.2	-13.3	-15.3	-16.6	-17.7	-18.8	-12.2	-7.3
17-Mar	-19.8	-20.6	-21.4	-22.0	-22.4	-22.6	-22.4	-18.5	-14.1	-10.2	-7.2	-3.9	-1.1	1.9	3.9	6.5	6.2	2.4	-2.3	-4.0	-5.7	-7.6	-8.8	-10.0	-9.3	6.5
18-Mar	-11.3	-12.3	-13.5	-14.7	-15.6	-16.3	-16.9	-14.8	-8.7	-4.8	-1.0	2.7	4.7	4.4	3.7	2.6	1.9	-0.7	-3.3	-4.6	-6.1	-7.7	-9.2	-10.1	-6.3	4.7
19-Mar	-10.9	-11.1	-11.9	-13.9	-15.8	-17.8	-18.6	-16.0	-12.1	-10.2	-8.5	-7.3	-6.2	-5.5	-5.1	-5.1	-5.2	-5.8	-7.1	-8.7	-10.4	-12.6	-15.2	-17.3	-10.8	-5.1
20-Mar	-19.0	-20.1	-21.1	-22.0	-22.9	-23.7	-24.3	-21.4	-16.5	-14.0	-11.0	-9.2	-7.9	-7.0	-6.3	-5.8	-5.7	-6.4	-8.2	-12.9	-15.3	-16.5	-17.2	-18.4	-14.7	-5.7
21-Mar	-19.3	-20.1	-21.0	-21.7	-22.2	-22.2	-22.2	-19.7	-16.5	-13.6	-10.4	-7.6	-6.0	-4.5	-3.6	-3.1	-2.1	-2.6	-3.5	-5.7	-6.2	-6.1	-6.4	-6.7	-11.4	-2.1
22-Mar	-6.2	-7.1	-7.6	-7.9	-7.9	-7.9	-7.9	-6.8	-5.9	-5.5	-5.2	-4.5	-3.9	-2.2	-2.0	-2.1	-2.3	-3.2	-3.6	-4.1	-4.2	-4.3	-4.4	-4.5	-5.0	-2.0
23-Mar	-5.0	-5.8	-6.4	-7.8	-7.3	-6.8	-6.5	-5.8	-4.7	-3.3	-1.9	-0.6	0.3	0.7	0.5	0.8	0.4	0.2	-0.7	-1.7	-2.6	-3.7	-4.9	-4.3	-3.2	0.8
24-Mar	-4.0	-4.0	-4.3	-4.5	-4.5	-4.6	-4.6	-4.4	-4.0	-3.8	-3.5	-3.1	-2.6	-1.9	-1.3	-0.4	-0.3	-0.7	-2.4	-5.1	-7.7	-9.8	-11.2	-12.5	-4.4	-0.3
25-Mar	-13.9	-14.9	-15.9	-16.3	-17.1	-17.4	-17.0	-13.3	-8.8	-5.7	-2.5	-0.4	1.2	2.5	3.4	4.0	4.3	3.8	-0.6	-3.7	-4.8	-6.1	-6.9	-8.1	-6.4	4.3
26-Mar	-9.1	-9.6	-8.5	-8.4	-9.9	-10.7	-11.5	-7.4	-3.5	-0.5	1.9	2.9	4.3	6.0	6.7	7.1	7.1	6.1	4.5	4.5	3.8	2.3	1.1	0.7	-0.8	7.1
27-Mar	0.7	0.7	0.9	1.1	1.5	1.5	1.5	2.2	3.1	4.3	5.5	5.8	6.8	6.9	7.0	7.5	7.3	6.5	5.2	3.8	1.0	-0.5	-0.2	0.5	3.4	7.5
28-Mar	0.6	0.4	0.1	-1.1	-1.7	-2.1	-2.8	0.1	4.9	10.0	11.9	12.4	12.4	12.8	12.9	13.1	12.6	11.4	9.8	6.0	0.9	0.1	2.4	2.4	5.4	13.1
29-Mar	1.8	0.8	-2.3	-3.8	-4.7	-5.7	-6.0	-2.2	2.3	5.0	6.4	7.5	8.0	9.1	9.7	10.3	10.4	8.5	5.8	2.7	0.1	-1.6	-1.8	-1.5	2.4	10.4
30-Mar	-2.2	-3.1	-3.4	-4.1	-4.9	-5.5	-5.5	-2.5	1.6	4.5	6.5	7.6	9.5	11.5	12.1	13.3	12.7	12.2	6.8	2.2	0.4	-1.2	-2.1	-2.1	2.7	13.3
31-Mar	-1.7	-1.8	-2.1	-2.9	-2.6	-2.2	-1.6	-0.5	1.0	1.9	1.9	2.4	2.4	2.3	3.1	5.4	5.0	4.1	3.5	3.3	2.9	2.5	1.6	1.2	1.2	5.4
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Fort McKay South - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	57	7.66	7.66
-20 - 0	476	63.98	71.64
0 - 10	182	24.46	96.10
10 - 20	29	3.90	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

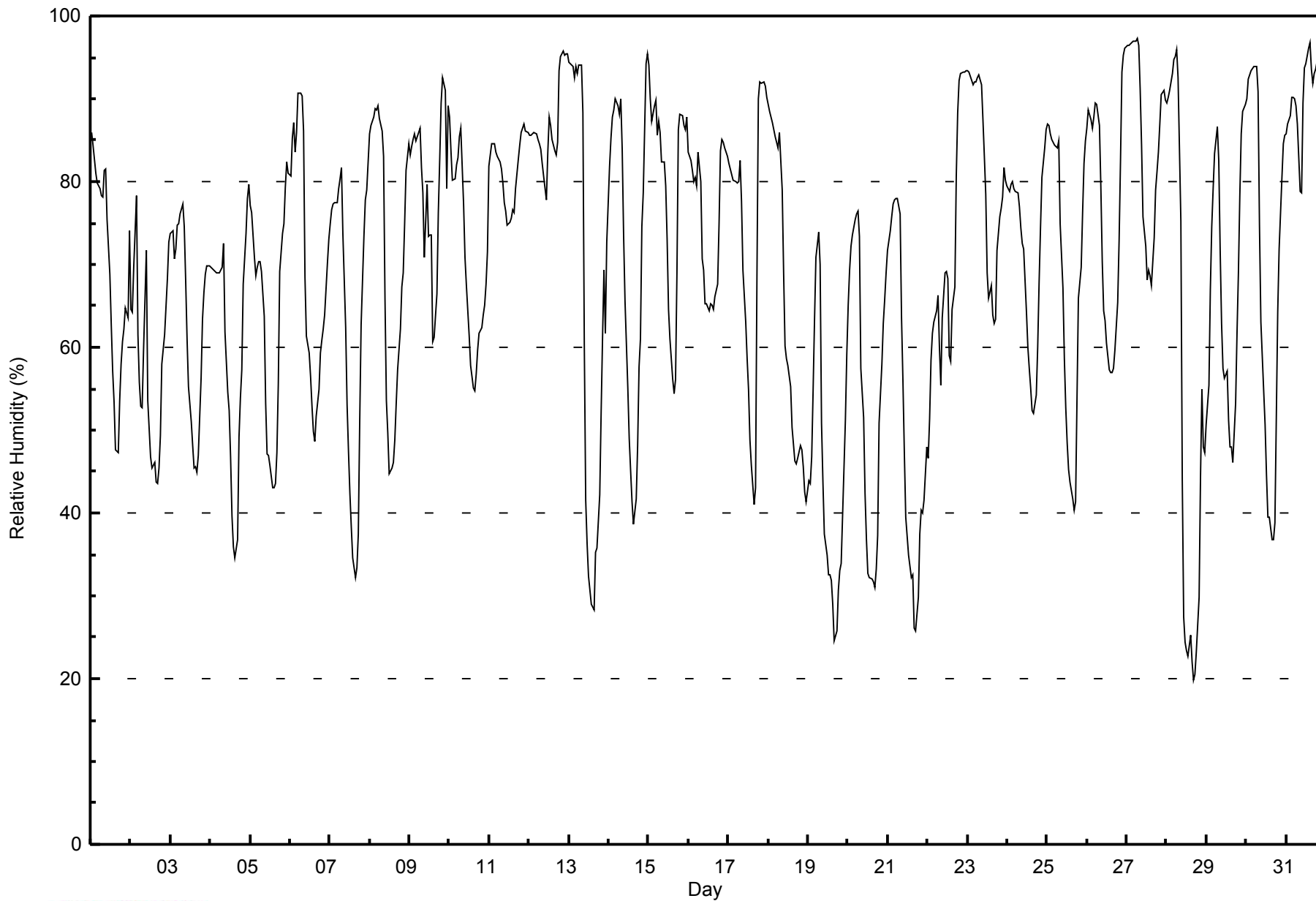


Maximum Value: 97 % on Mar 27 07:00																		Maximum Daily Average: 91.2 % on Mar 31																		Hours in Service: 744	
Minimum Value: 20 % on Mar 28 17:00																		Minimum Daily Average: 44.1 % on Mar 19																		Hours of Data: 744	
Maximum Diurnal Average: 82.7 % at hour 7																		Minimum Diurnal Average: 49.6 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 69.2 %																		Percentiles: P ₁ = 25 P ₁₀ = 42 Q ₁ = 55 Median = 73 Q ₃ = 85 P ₉₀ = 91 P ₉₉ = 96																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Mar	86	84	83	81	80	79	78	78	81	81	75	69	63	57	53	48	47	54	58	61	62	65	64	74	69.2	86											
2-Mar	65	64	70	78	61	56	53	53	60	72	54	50	47	45	46	44	44	45	49	58	61	65	68	73	57.5	78											
3-Mar	74	74	71	72	75	75	76	77	75	68	61	55	51	48	45	46	45	47	56	63	67	69	70	70	63.7	77											
4-Mar	70	69	69	69	69	69	69	70	72	62	55	52	47	40	36	35	37	49	54	57	68	74	78	80	60.4	80											
5-Mar	77	76	71	69	70	70	70	69	64	53	47	47	46	43	43	43	37	56	69	74	75	79	82	81	63.4	82											
6-Mar	81	85	87	84	86	91	91	90	86	68	61	59	56	53	50	49	52	55	59	61	62	64	70	73	69.7	91											
7-Mar	75	77	77	78	77	79	80	82	74	62	53	48	42	38	35	32	33	37	51	63	73	78	79	82	62.7	82											
8-Mar	86	87	88	89	89	89	88	86	83	66	54	50	45	45	46	49	53	57	62	67	69	75	81	85	70.3	89											
9-Mar	83	84	85	86	85	86	86	82	79	71	80	73	74	74	61	61	66	76	83	89	93	91	79	89	79.8	93											
10-Mar	88	84	80	80	82	83	85	87	77	71	67	64	61	58	55	55	57	60	62	62	64	65	68	72	70.3	88											
11-Mar	82	85	85	85	84	83	82	82	80	77	77	75	75	76	77	76	79	83	84	86	86	87	86	86	81.5	87											
12-Mar	86	86	86	86	86	85	85	84	82	81	78	84	88	87	85	84	83	85	93	95	96	95	95	95	87.0	96											
13-Mar	94	94	94	93	94	93	94	94	88	60	42	36	32	29	29	28	35	36	42	52	61	69	62	73	63.6	94											
14-Mar	82	85	88	89	90	89	88	90	84	73	66	55	49	45	41	39	42	48	58	61	75	79	94	95	71.0	95											
15-Mar	94	90	87	89	90	86	87	86	82	82	79	73	65	61	56	54	56	69	86	88	88	87	86	88	79.6	94											
16-Mar	84	83	81	80	80	80	84	80	71	69	65	65	64	65	65	65	66	68	75	84	85	85	84	83	75.4	85											
17-Mar	82	82	81	80	80	80	80	82	78	69	63	59	55	49	46	41	43	69	90	92	92	92	90	90	73.6	92											
18-Mar	89	88	87	86	85	85	84	86	79	69	60	59	58	55	50	48	46	46	47	48	48	46	43	41	63.9	89											
19-Mar	44	44	47	55	63	71	74	70	51	44	38	35	33	32	32	29	25	26	31	33	34	40	51	59	44.1	74											
20-Mar	65	69	72	74	75	76	77	73	57	52	42	37	33	32	32	32	31	33	37	51	58	63	66	69	54.4	77											
21-Mar	72	74	76	77	78	78	78	76	64	56	47	40	35	34	32	33	26	26	30	37	40	40	42	48	51.6	78											
22-Mar	47	51	58	62	63	64	66	60	55	64	69	69	68	59	58	65	67	81	88	92	93	93	93	93	70.0	93											
23-Mar	93	93	93	92	92	92	92	93	92	87	83	79	69	66	67	64	63	63	72	76	77	78	82	80	80.7	93											
24-Mar	80	79	80	80	79	79	79	77	74	72	72	64	60	57	55	52	52	54	60	68	74	80	84	86	70.8	86											
25-Mar	87	87	86	85	84	84	84	85	75	67	59	53	48	45	44	42	40	41	54	66	70	76	82	85	67.9	87											
26-Mar	86	89	87	86	88	90	89	87	79	70	64	63	60	57	57	57	57	60	65	73	82	93	95	96	76.4	96											
27-Mar	96	96	97	97	97	97	97	96	91	84	76	72	68	69	69	67	73	79	81	84	87	91	91	90	85.3	97											
28-Mar	90	90	91	93	95	95	96	93	75	44	27	24	23	23	25	22	20	21	23	30	44	55	48	47	53.9	96											
29-Mar	51	55	67	75	79	83	87	82	72	63	58	56	57	51	48	48	46	53	62	69	78	86	89	89	66.8	89											
30-Mar	90	92	93	93	94	94	94	91	75	63	55	51	45	40	40	37	37	39	51	64	72	80	85	86	69.1	94											
31-Mar	86	87	88	90	90	90	89	87	79	79	90	94	94	96	97	94	92	93	94	95	96	96	96	96	91.2	97											
	79.4	80.1	80.8	81.6	82.0	82.3	82.7	81.5	75.3	67.8	61.8	58.4	55.2	52.6	50.8	49.6	50.4	55.1	62.2	67.7	71.9	75.3	76.9	79.2	Diurnal Average												
	96	96	97	97	97	97	97	96	92	87	90	94	94	96	97	94	92	93	94	95	96	96	96	96	Diurnal Maximum												



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - March 2015





Maximum Speed: 19 km/h on Mar 2 05:00	Maximum Daily Speed Average: 11.1 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 29 18:00	Minimum Daily Speed Average: 0.7 km/h on Mar 12	Hours of Data: 707
Maximum Diurnal Speed Average: 2.3 km/h at hour 23	Minimum Diurnal Speed Average: 0.8 km/h at hour 8	Hours of Missing Data: 37
Monthly Average Velocity: 1.3 km/h 340.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 4 Q ₃ = 7 P ₉₀ = 10 P ₉₉ = 16	Percent Operational Time: 95.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	WSW2	WSW4	SW2	SSW2	SW2	SW2	SW2	SSW3	S3	S4	S7	SSE6	SE7	SSE8	SE7	S9	S10	S8	S5	S5	S6	SW3	NW9	NNW13	S3.3	NNW13
2-Mar	N18	N16	NNE11	N11	NNW19	NNW15	NNW18	NNW14	N12	N8	NNW16	NNW16	NNW14	NNW15	NNW15	NNW16	NNW15	NNW12	NW6	WNW4	W4	NNW2	W3	W5	NNW11.1	NNW19
3-Mar	W6	W7	W6	NNW6	WNW2	WSW3	NW4	N5	N8	NNE13	NNE12	NNE12	NNE11	NNE10	NNE9	NNE8	NE6	NE4	WSW2	WSW3	WSW4	WSW3	SW2	SW2	N4.0	NNE13
4-Mar	SW2	SW2	SW3	SSW3	SW3	SSW3	SSW3	SSW2	S4	SE6	SE7	SE8	SE7	SSE8	SE7	SSE6	SSW8	SSW6	SSW7	SSW6	S4	SSW2	SSW3	SW7	S4.1	SSE8
5-Mar	WSW10	W10	W9	W9	WSW9	WSW8	WSW7	SSW5	S3	ESE3	E4	SSE4	S5	SSW8	S9	S8	S6	S3	SW2	WSW2	SW3	WSW3	SSW2	NNW1	SW4.1	W10
6-Mar	NW1	SW3	SSW3	W3	WNW1	SW3	SSE0	SE1	NE1	NE2	NNE6	NNE9	NE7	NE5	NE7	NE8	NE9	NE9	NNE6	NNE5	N5	NW2	W1	N1	NNE2.8	NE9
7-Mar	S1	S2	S2	S2	S2	SSW3	NW2	W6	W6	W7	WNW8	WNW11	W9	WNW11	WNW10	WNW10	WNW8	WNW6	W4	W5	NNW3	W3	NW2	SSW3	W4.4	WNW11
8-Mar	S3	SSW3	SW2	SW2	SW2	SW2	SSW2	S3	S3	SW7	SSW6	SSW5	SW7	SSW6	SSW5	S4	S4	SSW5	SSW5	S4	SSW4	SSW2	WSW2	WNW2	SSW3.5	SW7
9-Mar	WSW1	SSW1	SSW3	S4	S3	SW1	W2	WNW4	W5	N5	N6	NE4	NNE4	W1	NNW9	NNW8	NNW4	N4	NW2	NNW2	NW3	NW4	NNW7	NNE8	NNW2.4	NNW9
10-Mar	N8	N12	N9	N7	N7	N7	N4	NE2	NE6	NNE7	N8	NNE8	NNE7	N7	NNE8	NNE8	N9	N10	N9	N11	NNE11	NNE11	N11	N10	NNE8.1	N12
11-Mar	N9	N9	N9	N9	N10	N10	N10	N11	N11	N10	N10	NNE11	NNE11	N12	N11	NNE11	N10	N10	N8	N9	N7	N7	N7	N6	N9.6	N12
12-Mar	NNW5	N4	N3	NNW3	NNW4	N2	NNE1	W1	S1	ENE2	SSW2	SE3	S2	S2	S5	SSW5	W3	WNW2	SSW2	WSW2	WNW1	N1	NNW3	NW3	WNW0.7	NNW5
13-Mar	SSW1	S2	S3	S4	SW4	SSW2	SSW3	WNW1	SSE3	SW10	SW10	SSW9	SSW12	SSW11	S12	S13	S8	S12	S9	S7	S5	SSE5	SSE7	SSW4	SSW6.1	S13
14-Mar	SSW3	W2	SW3	SSW2	SSW5	SSW5	SSW3	SSW5	S5	S6	S7	S8	SSE8	SSE7	SE6	S6	S4	SSW2	SW3	SW3	WSW5	SW5	NNW3	N11	S3.4	N11
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE8	NNE8	NNE10	N9	N9	N5	NNW4	NNW4	NNW4	NW2	SW2	---	NNE10
17-Mar	WSW3	SW2	WSW1	SW2	SW3	SW2	SSW2	S2	S3	SE4	SE6	S5	SSW6	SSE4	ESE5	SSE3	ESE4	SSW2	WSW4	WNW2	W2	W2	NNW3	S2	S1.8	SE6
18-Mar	WSW2	SW1	SSW2	WSW2	SW2	SW2	SSW2	NE1	NE2	ENE2	ENE3	ESE5	NNE5	NNE10	NNE11	NNE13	N13	N15	N16	N14	NNE13	N13	N11	N9	NNE5.7	N16
19-Mar	N8	N8	N6	NNW3	NW2	WSW3	WSW2	WSW1	NNE3	NNE7	NNE8	NNE8	N9	NNE8	NNE9	NNE12	N11	N9	NNE7	N7	N5	N5	NNW4	W3	N5.6	NNE12
20-Mar	WNW3	WSW2	WSW3	WNW3	SSW2	WSW2	W2	N1	NE4	NNE6	NNE5	NE4	N7	N8	N9	NNE9	N8	N8	N5	NNW3	NNW4	N4	N5	N4	N3.6	N9
21-Mar	NNW3	WNW3	NW3	W2	WNW2	NW3	NW3	N2	NNE4	NNE6	NNE8	NNE7	NNE7	N8	N9	NNE7	ESE6	E7	ESE4	SE4	SE4	ESE3	ENE3	SE3	NNE2.6	N9
22-Mar	E2	N3	WNW2	NW2	WSW1	WSW2	W1	NW1	SE3	SE5	SE4	ESE1	NE3	E1	NNE4	NNE6	N5	NW4	NE1	ENE2	N1	NNE2	NNW2	N1	NNE1.0	NNE6
23-Mar	WSW1	SW1	SSW2	W1	WSW1	SW1	NW0	WSW0	ESE1	SW1	ESE3	E3	WNW2	WNW4	N6	NW5	NNE5	NNE5	N6	N8	N8	N6	NNW4	N4	N2.1	N8
24-Mar	N4	N4	N4	NNW5	N6	NNW5	NNW4	N5	NNE6	NNE7	NNE5	NNE7	NE5	NE6	NE5	ENE5	NNE7	NNE5	NNE3	WNW1	WNW2	WNW2	W3	W2	N3.7	NNE7
25-Mar	WSW3	WSW2	WSW2	W2	W2	W2	NW2	NNE2	NNE5	NNE5	NNE3	NE5	NNE6	NNE6	N7	N7	NNE5	N5	NNW2	SW3	SSW3	SSW4	SSW2	S1	N1.7	N7
26-Mar	NW2	W1	N2	N1	W2	SSW2	WNW2	ENE1	SE2	ESE5	SE7	SSE7	SE6	SE6	SE7	SSE6	SE5	SSE4	S4	SSW7	SSW6	SSW3	SSW1	SW1	SSE2.6	SSW7
27-Mar	S2	SW1	S2	SSW3	SSW4	SSE3	S3	S4	S5	S6	SSW8	SW9	S8	SSE7	SE6	SSE5	S5	SSE4	S2	W1	W2	WSW2	W2	SSW3	S3.6	SSW9
28-Mar	SSW1	SSW2	SSW2	WSW2	SW3	SW1	SSW2	ESE2	E3	NW5	NW10	NW11	NW11	NW13	W12	WNW14	WNW13	WNW13	WNW9	WNW5	W5	WSW7	WSW8	WSW9	WNW5.6	WNW14
29-Mar	WSW10	WSW7	SSE2	SSW2	SW2	SSW2	SSW3	SSE3	ESE5	SE5	ESE5	SSE6	SSE6	SE7	S6	SSE4	SE4	NNE0	NNW2	NW3	W2	SW3	W2	WSW3	S2.3	WSW10
30-Mar	WNW1	WNW1	SW2	WSW1	SW2	SW1	SW2	NE2	NE3	E4	ESE5	ESE7	ESE8	SE8	SSW9	SSW8	SSW6	SSW6	SSW3	W2	W2	SW3	WSW2	WSW1	S2.0	SSW9
31-Mar	SSW2	SW2	S2	W2	WSW1	SSW2	NW1	N1	N1	E1	ENE2	N5	N4	N7	N5	NNE8	NNE7	N9	NNE9	NNE11	N12	N11	N12	N13	N4.6	N13

NW2.0	NW2.0	NNW1.2	NNW1.5	NNW1.7	W1.4	NNW1.4	NW0.8	NE1.1	NE1.4	NE1.6	NE1.7	NNE1.3	NNE1.5	NNE1.9	N2.2	N2.1	N2.2	NNW1.5	NNW1.6	NW1.6	NW1.6	NNW2.3	NNW2.2	Diurnal Average
N18	N16	NNE11	N11	NNW19	NNW15	NNW18	NNW14	N12	NNE13	NNW16	NNW16	NNW14	NNW15	NNW15	NNW16	NNW15	N15	N16	NNE14	NNE13	N13	N12	NNW13	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

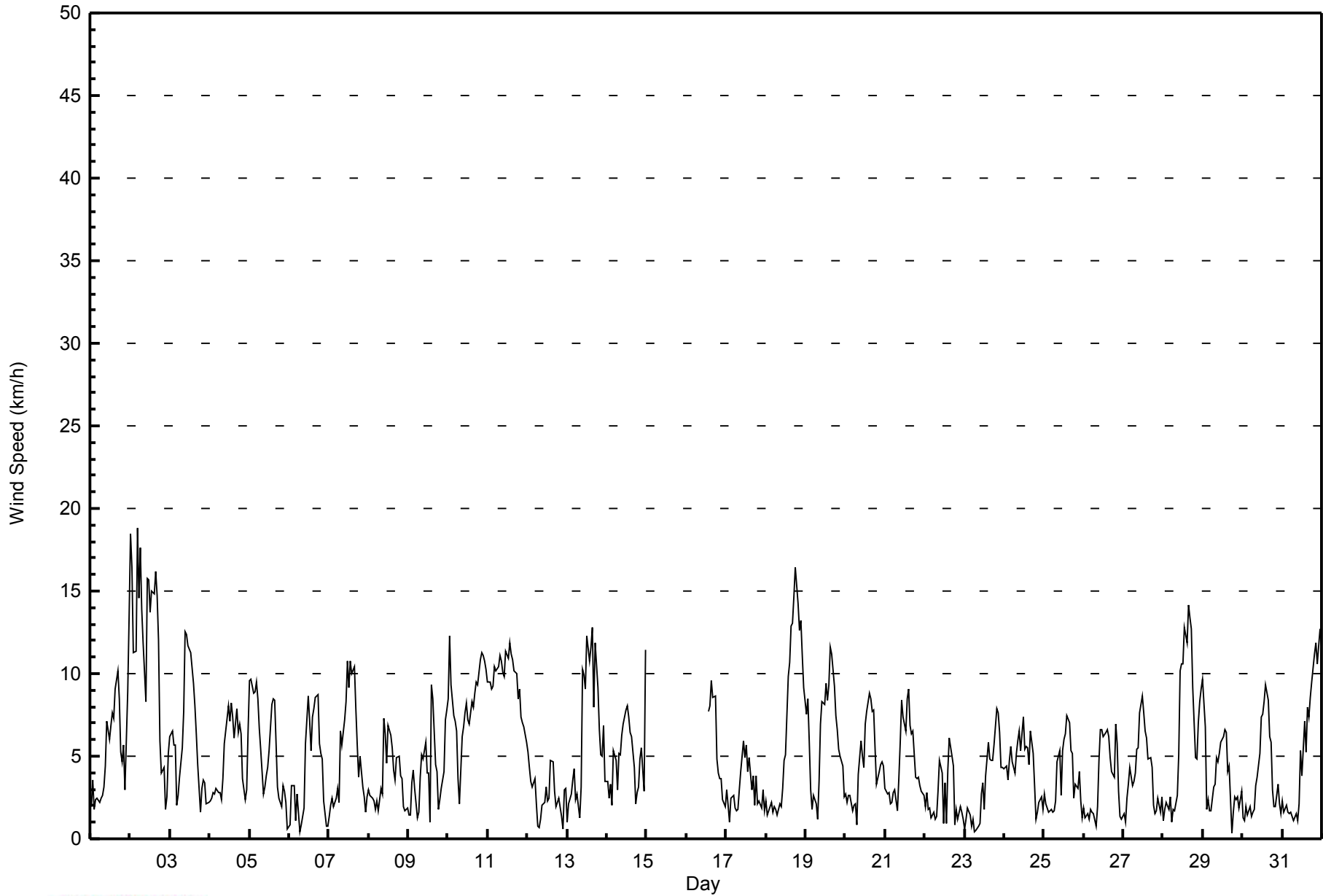
Wind Speed (WS) - km/h
Fort McKay South - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Mar 2 05:00 Minimum Value: 0 km/h on Mar 23 03:00 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: 707 Hours of Missing Data: 37 Hours of Calibration: 0 Percent Operational Time: 95.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	4	3	2	2	1	2	2	5	5	5
2-Mar	6	5	4	4	7	6	7	5	4	4	6	6	6	5	5	6	6	5	3	1	1	1	1	2	7
3-Mar	2	1	2	2	1	1	1	2	2	4	4	4	3	3	3	2	2	1	1	1	1	1	1	4	
4-Mar	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	2	3	3	2	2	1	1	1	3	
5-Mar	3	3	3	2	3	3	3	2	1	1	1	2	2	3	3	3	2	1	1	1	1	1	1	3	
6-Mar	1	3	1	2	1	1	1	1	1	1	2	3	3	2	2	2	3	3	2	2	1	1	1	3	
7-Mar	1	1	1	1	1	1	2	2	3	3	4	4	4	4	4	4	4	2	1	2	2	1	1	4	
8-Mar	1	1	1	1	1	0	1	1	1	2	2	2	3	2	2	1	1	1	1	2	2	1	1	3	
9-Mar	1	1	1	1	1	1	1	2	2	3	2	2	2	3	3	4	2	2	1	1	1	2	3	4	
10-Mar	3	4	4	2	2	2	2	1	2	2	3	3	2	2	2	2	3	3	3	3	3	3	3	4	
11-Mar	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3	
12-Mar	2	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	
13-Mar	1	1	1	1	2	2	1	1	2	4	3	3	4	4	4	4	3	4	4	2	1	2	2	4	
14-Mar	1	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	1	1	2	1	2	1	4	4	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	2	2	2	1	1	1	1	2	
17-Mar	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	
18-Mar	1	1	1	1	1	1	1	1	1	1	1	2	3	3	3	4	4	5	4	4	5	4	3	5	
19-Mar	2	3	2	2	2	1	1	1	2	2	2	2	3	3	3	3	3	3	2	2	1	1	1	3	
20-Mar	0	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	1	1	1	1	3	
21-Mar	1	1	0	1	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	1	1	1	2	3	
22-Mar	1	1	1	0	1	0	1	1	1	2	2	1	1	1	2	2	1	2	1	1	1	0	1	2	
23-Mar	1	1	0	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2	2	1	1	2	
24-Mar	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
25-Mar	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
26-Mar	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	2	2	2	2	1	1	1	3	
27-Mar	1	1	1	1	1	1	1	1	2	2	3	3	2	2	2	2	2	2	1	1	1	1	1	3	
28-Mar	1	1	1	1	1	1	1	1	1	3	5	4	4	6	5	6	6	5	4	2	1	1	2	6	
29-Mar	2	3	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1	1	1	1	1	2	3	
30-Mar	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	2	1	1	1	1	1	3	
31-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	3	3	3	3	4	4	
Diurnal Maximum																									
6 5 4 4 7 6 7 5 4 4 6 6 6 6 5 6 6 5 5 4 4 5 5 5																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	434	61.39	61.39
6 - 11	232	32.81	94.20
12 - 19	41	5.80	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: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - March 2015

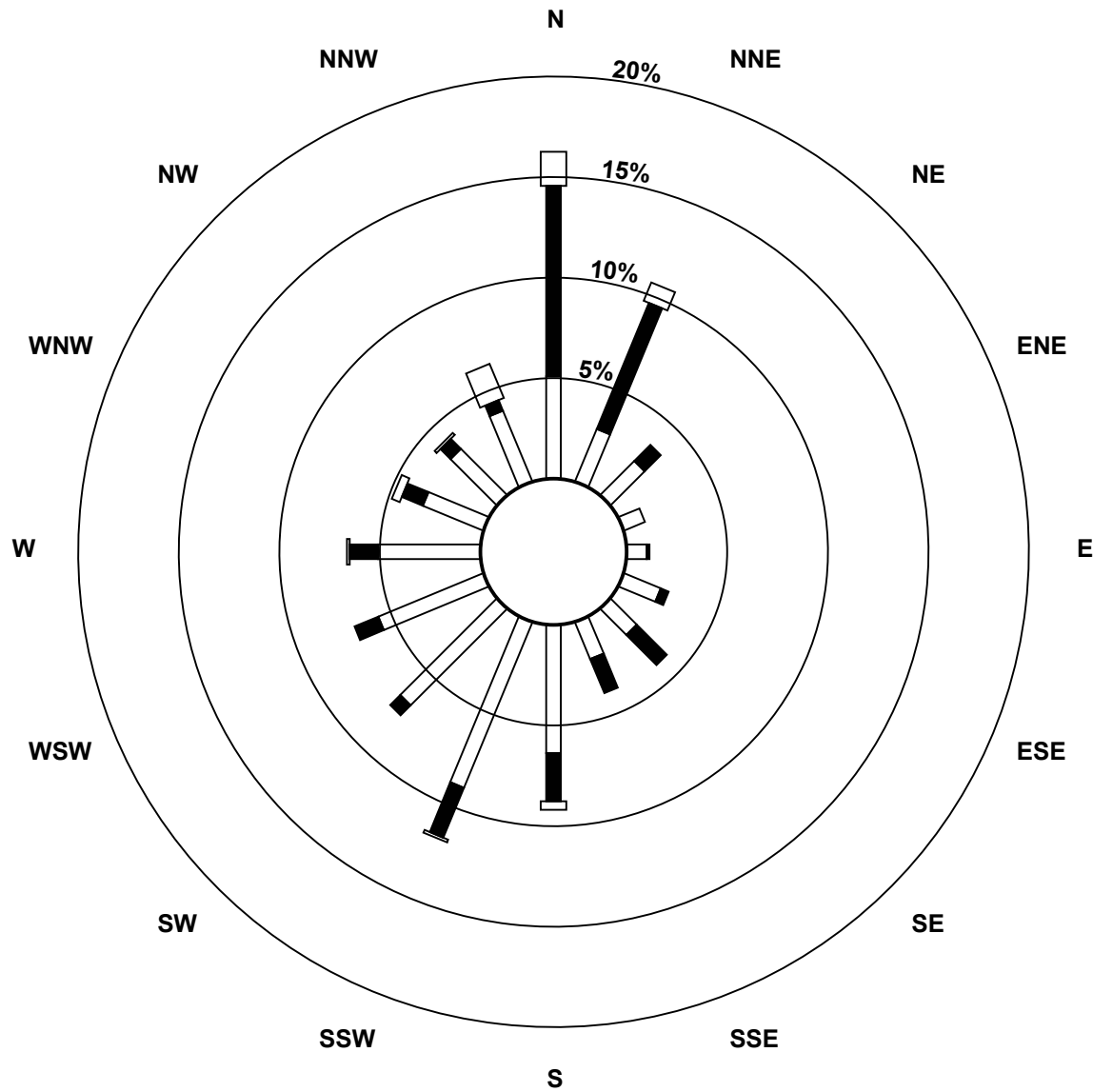
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	36	20	17	8	7	14	13	14	45	63	48	40	36	23	23	27	434
6 - 11	67	48	8	0	1	3	15	13	17	19	5	9	10	8	5	4	232
12 - 19	12	7	0	0	0	0	0	0	3	1	0	0	1	3	1	13	41
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	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	115	75	25	8	8	17	28	27	65	83	53	49	47	34	29	44	707

Total Number of Valid Hours: 707

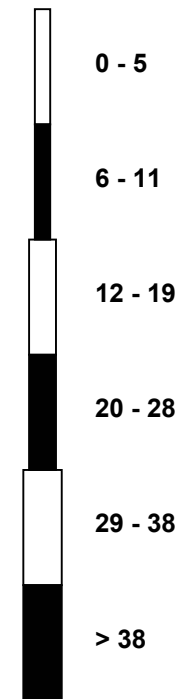
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Wind Speed (WS) - km/h
Fort McKay South (AMS 13)**



Classes (km/h)



Total Number of Valid Hours: 707



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay South - March 2015

Direction of Maximum Speed: 343 deg on Mar 2 05:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 341.1 deg on Mar 2	Hours of Data: 707
Direction of Minimum Speed: 20 deg on Mar 29 18:00	Hours of Missing Data: 37
Direction of Minimum Daily Speed Average: 0.7 deg on Mar 12	Percent Operational Time: 95.0
Monthly Average Direction: 259.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	256	243	228	213	228	216	215	212	182	172	172	148	132	156	145	177	183	186	176	175	177	214	314	336	187.4	
2-Mar	354	2	13	2	343	339	339	342	2	358	338	341	339	346	336	334	328	331	319	285	266	335	259	260	341.1	
3-Mar	275	267	278	343	292	254	323	351	9	15	19	17	18	25	19	26	38	42	256	251	247	240	226	231	355.3	
4-Mar	230	220	223	211	231	195	192	198	184	132	125	127	132	166	146	167	201	203	193	193	183	207	207	229	178.6	
5-Mar	252	260	263	261	256	249	247	208	179	108	90	163	182	199	180	180	181	169	226	238	233	245	212	330	222.0	
6-Mar	318	216	197	265	299	231	168	140	53	47	24	15	35	36	35	38	37	38	25	17	10	324	263	3	23.8	
7-Mar	180	180	184	189	183	195	316	266	269	273	286	282	277	285	284	298	293	299	267	270	348	266	310	208	276.0	
8-Mar	184	213	215	222	215	216	208	173	169	219	213	200	214	195	199	177	180	192	194	181	197	194	237	285	201.1	
9-Mar	252	209	198	179	181	228	267	284	267	352	11	42	26	259	342	332	341	357	321	332	306	310	334	19	331.8	
10-Mar	10	10	8	4	9	6	6	34	40	30	4	25	26	9	24	30	5	10	10	7	16	13	9	8	13.6	
11-Mar	6	5	5	5	4	3	5	7	5	7	6	15	13	7	11	12	8	359	0	3	8	358	355	351	5.5	
12-Mar	348	359	355	347	347	357	14	278	174	67	205	127	170	171	183	213	261	299	208	253	282	354	334	308	298.7	
13-Mar	203	182	176	173	218	210	204	287	164	222	227	203	199	202	184	185	179	181	179	171	180	164	159	200	191.5	
14-Mar	195	269	233	209	198	196	196	196	181	174	172	178	158	167	144	170	180	204	232	219	241	215	332	8	189.2	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	17	19	14	7	3	355	334	334	329	305	233	--	
17-Mar	244	233	237	217	221	220	207	183	170	125	124	179	198	154	122	154	113	197	238	302	267	266	332	184	185.1	
18-Mar	244	229	212	245	231	215	213	34	51	64	65	121	24	14	12	13	9	3	11	11	12	11	11	9	12.0	
19-Mar	352	355	1	348	314	245	252	240	33	29	23	16	9	15	14	13	5	9	15	8	2	355	345	261	4.9	
20-Mar	298	243	249	282	212	238	271	351	35	28	31	50	2	8	10	14	11	8	9	344	345	351	354	354	0.8	
21-Mar	338	300	305	275	290	308	325	359	21	20	24	24	12	6	7	19	116	100	119	127	132	102	69	131	29.2	
22-Mar	101	0	292	312	250	251	277	325	144	139	146	108	39	88	28	18	0	326	36	75	10	15	328	1	21.0	
23-Mar	247	227	195	260	251	221	320	242	115	226	115	84	291	290	354	310	22	20	3	7	359	354	342	357	352.1	
24-Mar	358	352	353	338	353	345	330	2	15	17	22	25	37	47	50	59	30	27	23	295	290	299	280	266	10.0	
25-Mar	246	243	245	269	276	275	310	29	23	27	29	55	18	16	10	10	14	9	343	230	212	194	204	177	0.4	
26-Mar	317	277	351	360	272	204	283	72	133	119	141	159	139	142	146	148	146	152	173	211	213	201	206	218	163.9	
27-Mar	177	223	181	195	194	167	175	178	183	183	196	214	185	167	142	152	175	167	173	268	271	247	260	205	185.6	
28-Mar	200	200	192	250	235	233	212	104	82	305	322	326	308	308	277	300	298	285	286	293	259	249	256	258	287.6	
29-Mar	256	251	159	195	218	212	201	164	123	128	123	161	164	144	191	147	142	20	339	313	267	230	263	252	186.2	
30-Mar	296	292	230	247	220	218	215	43	43	81	118	104	116	132	206	202	203	193	212	260	275	229	238	247	177.9	
31-Mar	197	231	189	262	258	209	326	351	350	87	58	4	2	5	9	30	12	5	16	19	10	6	6	9	8.7	

307.2 305.6 289.9 294.7 285.8 271.1 294.1 320.0 41.3 43.9 36.3 43.6 29.9 17.2 15.6 5.8 2.7 354.9 341.4 330.8 323.8 319.1 327.3 328.1
 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
Fort McKay South - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on Mar 23 08:00	Hours of Data: 707
Minimum Value: 4 deg on Mar 17 19:00	Hours of Missing Data: 37
	Hours of Calibration: 0
Percentiles: P ₁ = 12 P ₁₀ = 19 Q ₁ = 24 Median = 30 Q ₃ = 43 P ₉₀ = 63 P ₉₉ = 94	Percent Operational Time: 95.0

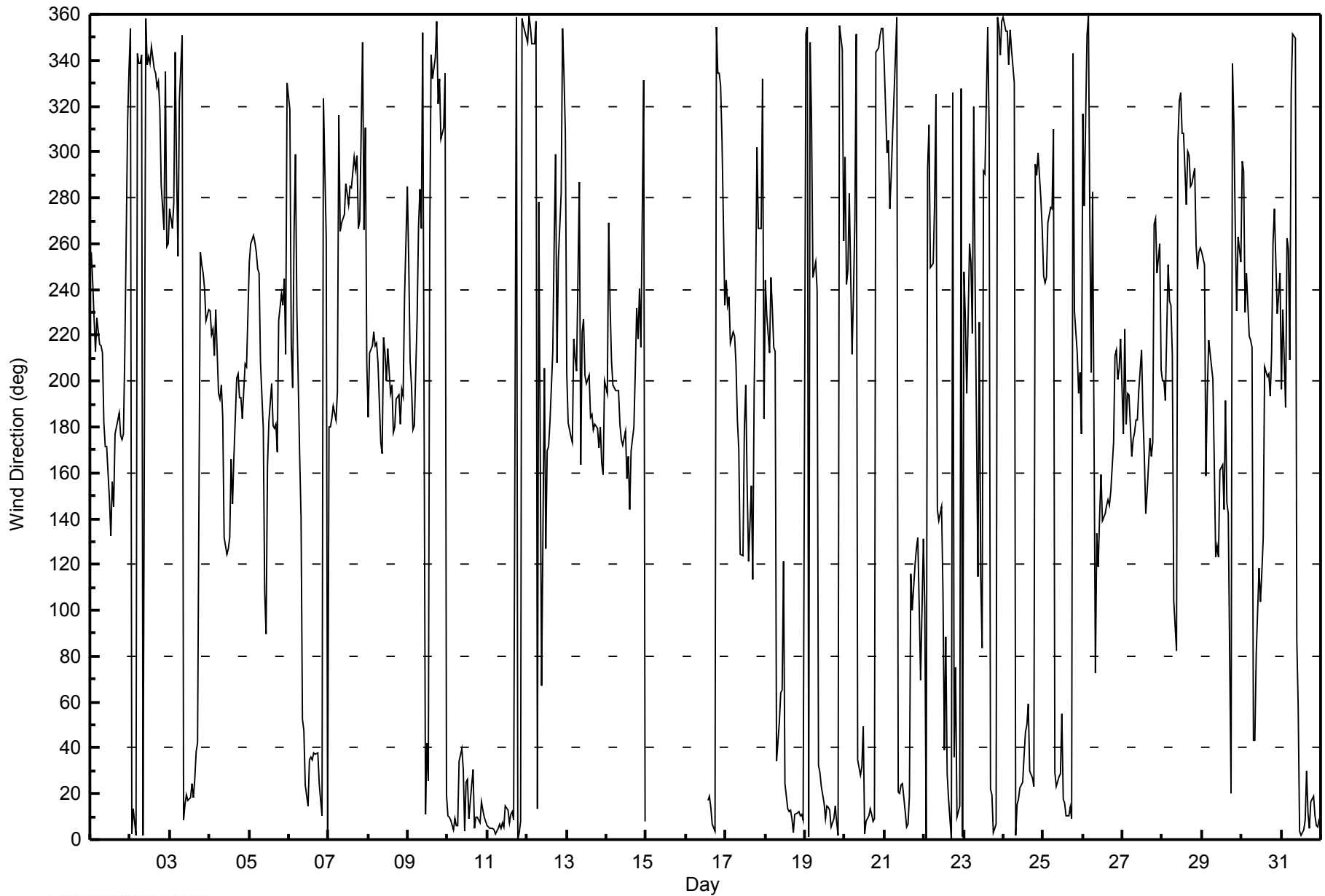
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	33	23	54	27	35	31	27	30	19	22	28	39	28	35	32	28	22	18	19	20	17	45	42	30	54
2-Mar	27	25	24	25	29	32	30	28	26	33	34	31	34	29	32	35	34	32	29	22	21	62	24	15	62
3-Mar	20	17	25	35	40	45	39	18	21	23	25	27	28	27	30	30	30	25	56	14	15	11	22	29	56
4-Mar	21	19	19	22	17	18	28	22	23	33	25	25	33	34	33	36	29	24	17	16	19	28	23	14	36
5-Mar	17	17	20	16	18	17	31	29	53	38	29	49	39	32	29	24	18	26	35	73	18	24	28	75	75
6-Mar	83	86	40	69	72	16	94	85	58	67	28	28	36	48	27	25	25	27	23	26	26	38	67	95	95
7-Mar	42	26	20	17	29	22	66	30	44	36	44	36	39	35	39	40	40	28	25	28	33	34	58	35	66
8-Mar	21	23	25	18	49	29	32	13	21	27	31	47	31	26	28	30	23	15	15	27	56	43	37	57	57
9-Mar	94	70	30	14	37	91	81	38	26	56	25	42	58	102	39	45	47	32	70	56	38	25	34	24	102
10-Mar	25	26	23	25	22	23	26	39	30	36	34	36	38	36	33	32	24	21	22	22	24	22	22	22	39
11-Mar	21	22	22	22	22	22	21	21	23	23	25	23	23	22	23	24	23	23	22	24	21	25	23	23	25
12-Mar	29	29	29	43	38	56	75	96	80	48	67	46	45	44	32	37	48	63	29	28	63	74	37	32	96
13-Mar	70	41	41	24	37	75	53	85	47	29	29	27	25	27	23	21	20	20	21	17	15	25	27	29	85
14-Mar	19	54	23	36	14	16	33	15	30	25	30	28	29	28	34	26	22	39	60	34	27	18	73	22	73
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	31	30	25	24	20	20	17	15	15	26	46	46
17-Mar	41	52	80	25	24	26	51	41	46	38	36	45	45	53	41	58	31	48	4	51	47	43	31	60	80
18-Mar	17	68	24	11	54	59	59	71	38	58	70	36	49	23	24	20	23	23	24	24	26	24	25	24	71
19-Mar	23	24	22	71	69	44	45	64	46	23	28	35	31	34	30	25	24	22	22	20	20	16	24	30	71
20-Mar	13	19	24	25	70	29	46	72	26	27	46	60	41	33	28	30	31	21	18	17	16	13	12	11	72
21-Mar	12	26	19	23	30	16	18	34	27	24	22	30	30	27	26	35	41	31	38	29	37	46	51	52	52
22-Mar	55	26	33	10	42	11	30	40	79	38	50	88	66	104	58	28	35	46	82	32	39	22	28	19	104
23-Mar	63	28	27	29	61	36	95	105	87	80	45	56	88	55	34	43	32	25	24	21	24	22	20	19	105
24-Mar	19	20	19	23	24	25	27	25	24	28	39	30	45	44	44	61	39	28	42	61	43	37	28	56	61
25-Mar	12	27	31	32	31	32	41	19	22	25	83	46	42	40	33	27	35	21	35	19	24	10	17	63	83
26-Mar	31	61	55	66	49	46	59	75	64	43	38	37	35	34	33	29	29	26	26	18	21	28	78	86	86
27-Mar	36	57	35	17	14	20	18	23	25	31	31	29	35	38	32	35	23	25	50	73	70	40	69	39	73
28-Mar	80	64	29	40	22	62	60	40	30	73	42	42	40	39	36	37	40	35	37	27	13	12	15	17	80
29-Mar	17	38	65	32	50	46	28	29	36	38	39	36	33	32	27	45	28	99	66	35	39	34	65	79	99
30-Mar	53	69	60	15	66	72	37	47	39	56	46	31	37	34	28	28	47	27	20	61	62	13	39	55	72
31-Mar	38	51	30	48	61	62	57	66	79	72	53	25	55	27	29	27	29	23	22	23	23	24	24	24	79
	94	86	80	71	72	91	95	105	87	80	83	88	88	104	58	61	48	99	82	73	70	74	78	95	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort McKay South - March 2015





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	17:40
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1377
Cal Gas Concentration	50 ppm	Cal Gas Expiry Date	9/26/2017
Gas Cert Reference	S980455A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	HVPS voltage	512	512
Analyzer Range (ppb)	1000	1000	Lamp voltage	1980	1948
Calculated slope	0.998112	0.995667	Chamber temp.	50.0	50.0
Calculated intercept	1.259212	1.568765	Pressure ("Hg)	26.3	26.4
Analyzer Background	24.2	24.2	Flow (lpm)	685	688
Analyzer Coefficient	1.757	1.770	Intensity	67	66

Analyzer make	API T100	Analyzer serial #	599
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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	NA
as found span	5000	70.3	703.0	700.5	1.004
calibrator zero	5000	0.0	0.0	-0.3	NA
high point	5000	70.3	703.0	705.3	0.997
second point	5000	35.1	351.0	349.9	1.003
third point	5000	17.6	176.0	174.2	1.011
calibrator zero					
as left zero	5000	0.0	0.0	0.8	NA
as left span	5000	78.9	789.0	697.3	NA
Average Correction Factor					1.004

Corrected As found	700.5	Previous response	703.1	% change	0.4%
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Notes:

Filter changed after as founds. Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

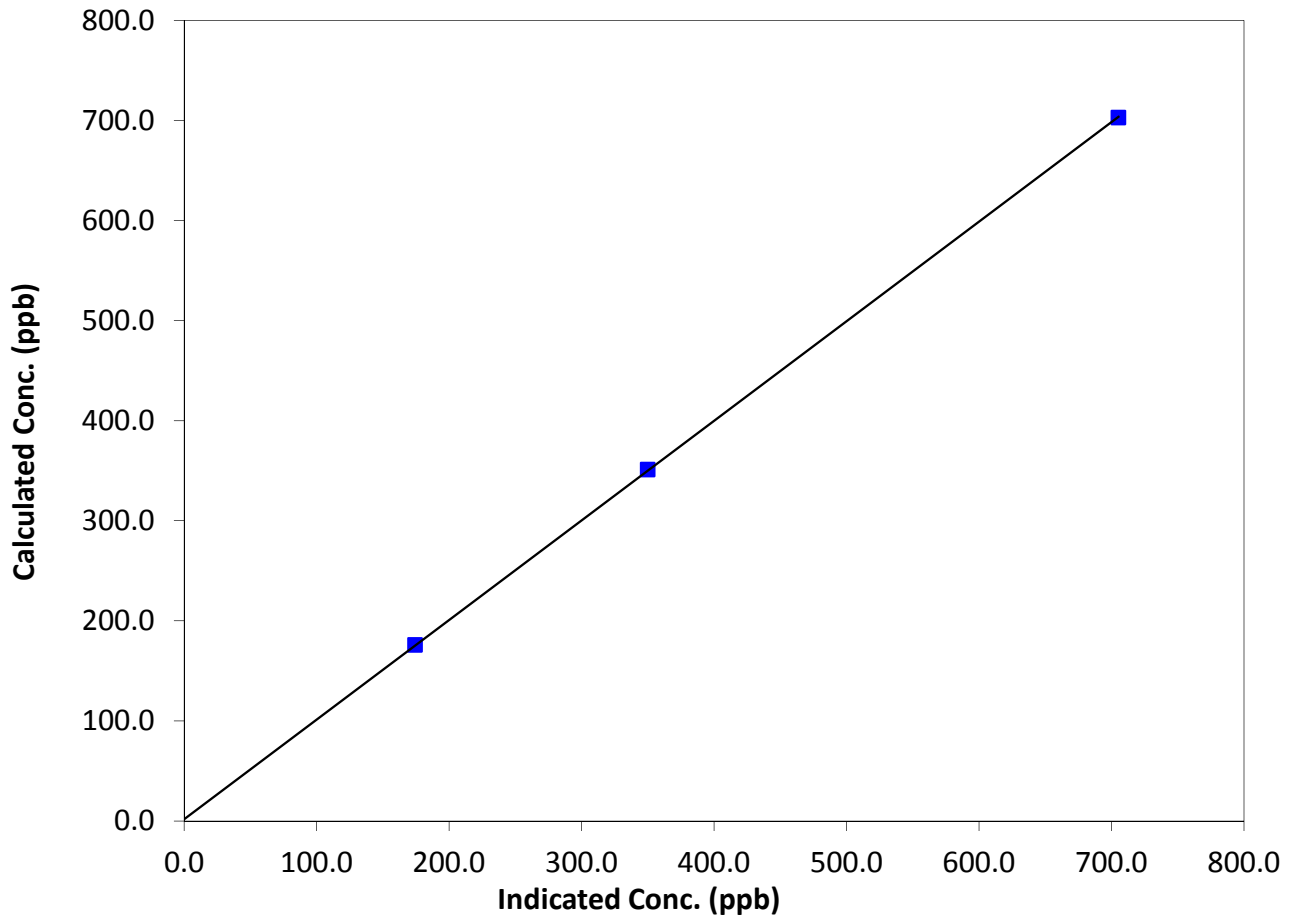
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:00	End Time (MST)	17:40
Analyzer make	API T100	Analyzer serial #	599

Calibration Data

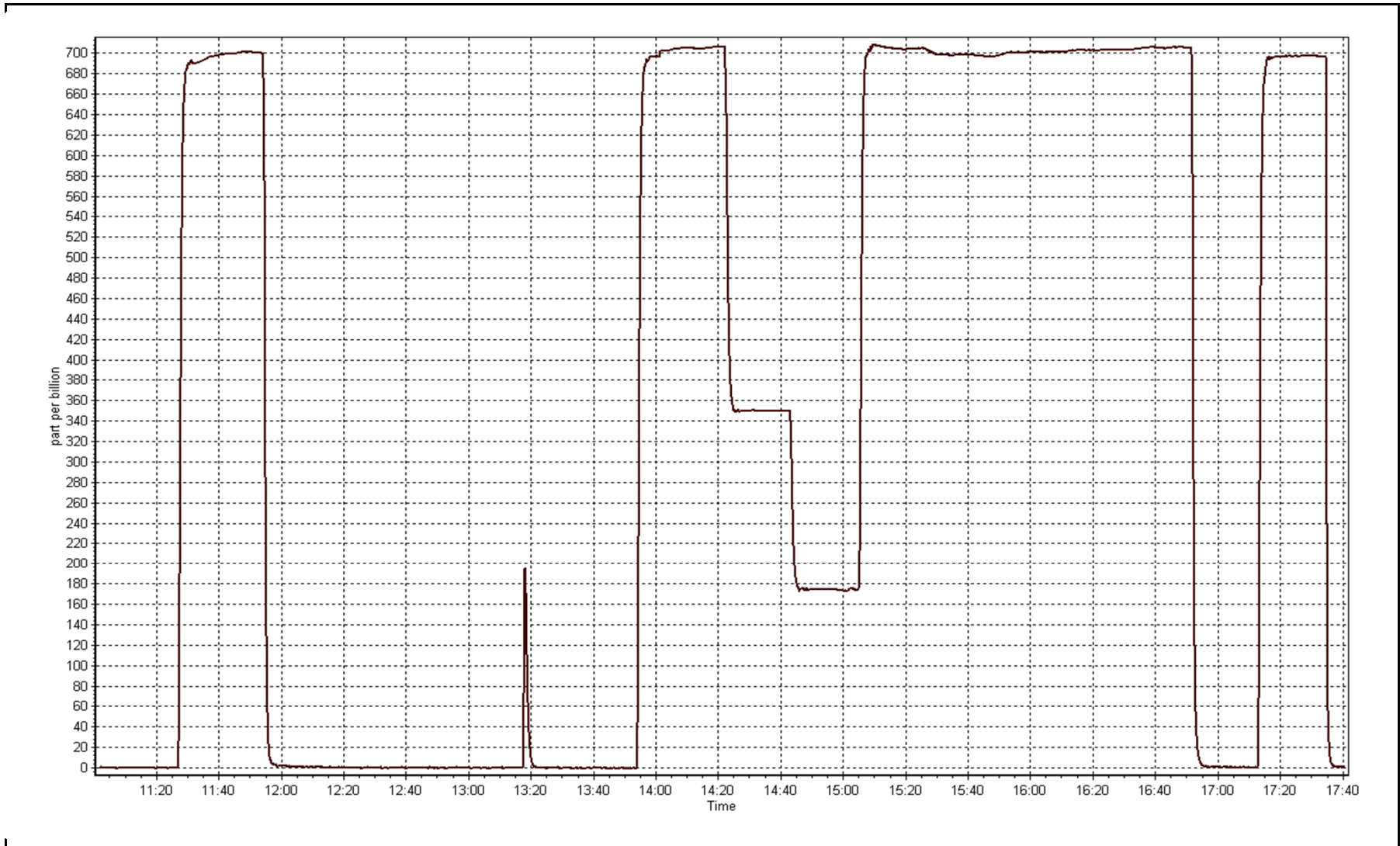
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999983
703.0	705.3	0.9968		
351.0	349.9	1.0033	Slope	0.995667
176.0	174.2	1.0106		
			Intercept	1.568765

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 11, 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 9, 2015	Previous Calibration	February 17, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	13:55
Barometric Pressure	743 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11041107
Cal Gas Concentration	5.07 ppm H2S	Cal Gas Expiry Date	5/30/2013
Gas Cert Reference	CC178364	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-727	-727
Analyzer Range (input)	100	100	Lamp voltage	1010	1013
Calculated slope	1.000445	0.998631	Chamber temp.	45	45
Calculated intercept	0.195016	0.105796	Pressure	695.6	702.8
Analyzer Background	1.82	1.81	Flow	0.447	0.452
Analyzer Coefficient	1.044	1.044	Intensity	90	90
			Converter temp.	800	800

Analyzer make/model	TEI 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	0.0	NA
as found span	5000	78.9	80.0	80.0	1.000
SO2 scrubber check	5000	17.6	179.9	0.2	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	78.9	80.0	80.0	1.000
second point	5000	39.4	40.0	39.9	1.000
third point	5000	19.7	20.0	19.8	1.010
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	78.9	80.0	80.7	0.991
Average Correction Factor					1.004

Corrected As found 80.1 Previous response 79.8 % change -0.3%

Notes:

Scrubber check completed after as found zero. No adjustments made.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

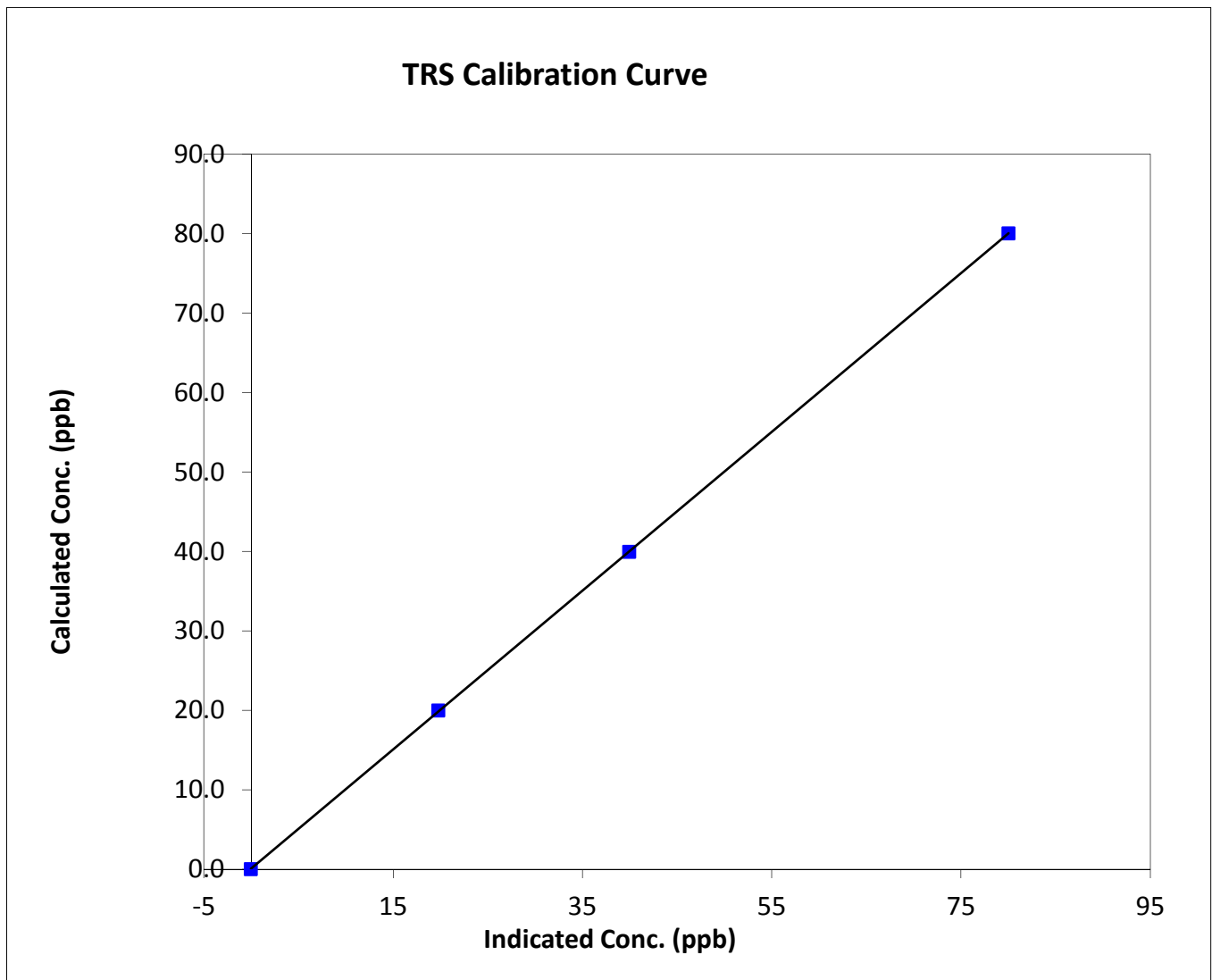
TRS Calibration Summary

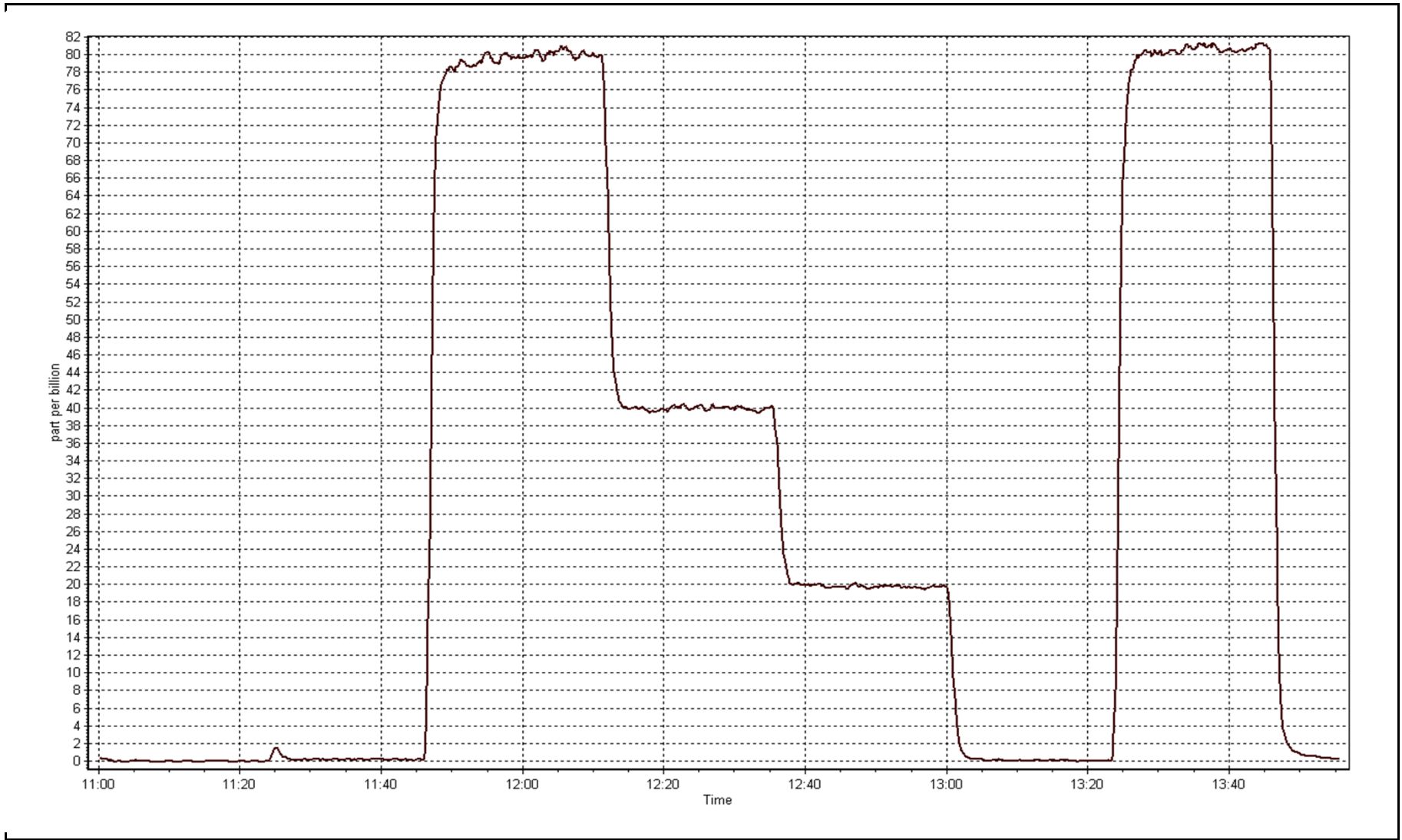
Station Information

Calibration Date	March 9, 2015	Previous Calibration	February 17, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:00	End Time (MST)	13:55
Analyzer make	TEI 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999993
80.0	80.0	0.9998		
40.0	39.9	1.0003	Slope	0.998631
20.0	19.8	1.0104		
			Intercept	0.105796







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Wednesday, March 11, 2015	Previous Calibration	Wednesday, February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	17:40
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Gas Cert Reference	S980455A	Cal Gas Expiry Date	9/26/2017
CH4 Cal Gas Conc.	497 ppm	CH4 Equiv Conc.	1033.3 ppm
C3H8 Cal Gas Conc.	195 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.0	8.0
Analyzer Range (mv)	25	25	Air or Bypass press	42.4	37.5
Calculated slope	0.997918	0.996703	Fuel Pressure	22.6	22.6
Calculated intercept	0.030181	0.047849	Flame Temp	161.0	157.1
BKG	2.3	2.30			
COEF	4.776	4.801			

Analyzer make: Thermo Model 51iLT Analyzer serial #: 1236656114

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	70.3	14.53	15.48	0.939
calibrator zero	5000	0.0	0.00	-0.04	N/A
high point	5000	70.3	14.53	14.53	1.000
second point	5000	35.1	7.25	7.23	1.003
third point	5000	17.6	3.64	3.59	1.013
calibrator zero					
as left zero	5000	0.0	0.00	0.01	N/A
as left span	5000	70.3	14.53	15.56	0.934
Average Correction Factor					1.005

Corrected As found: 15.48 Previous response: 14.53 % change: -6.1%

Notes:

Changed pump after as founds. Filter changed after as founds. Adjusted zero and span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

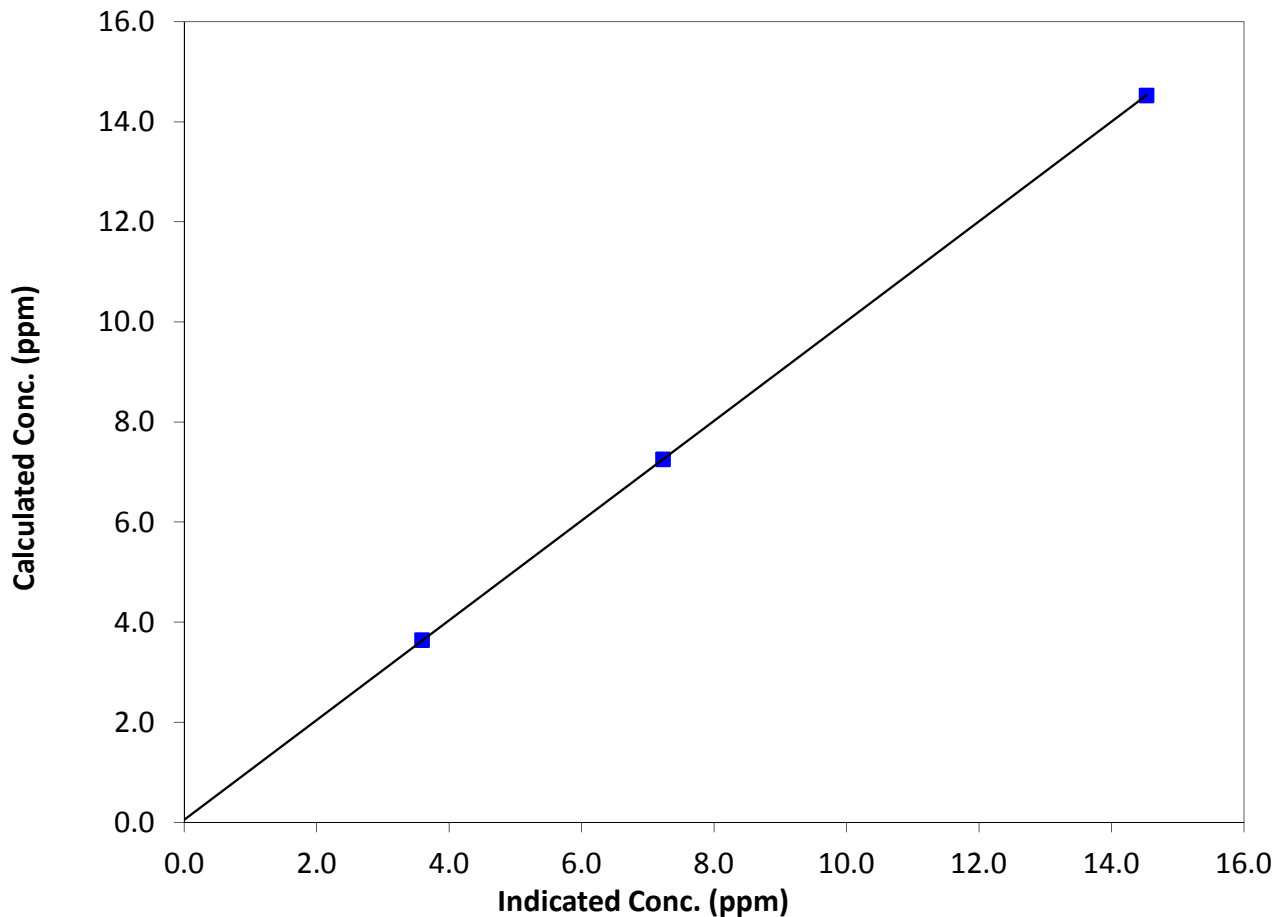
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:00	End Time (MST)	17:40
Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114

Calibration Data

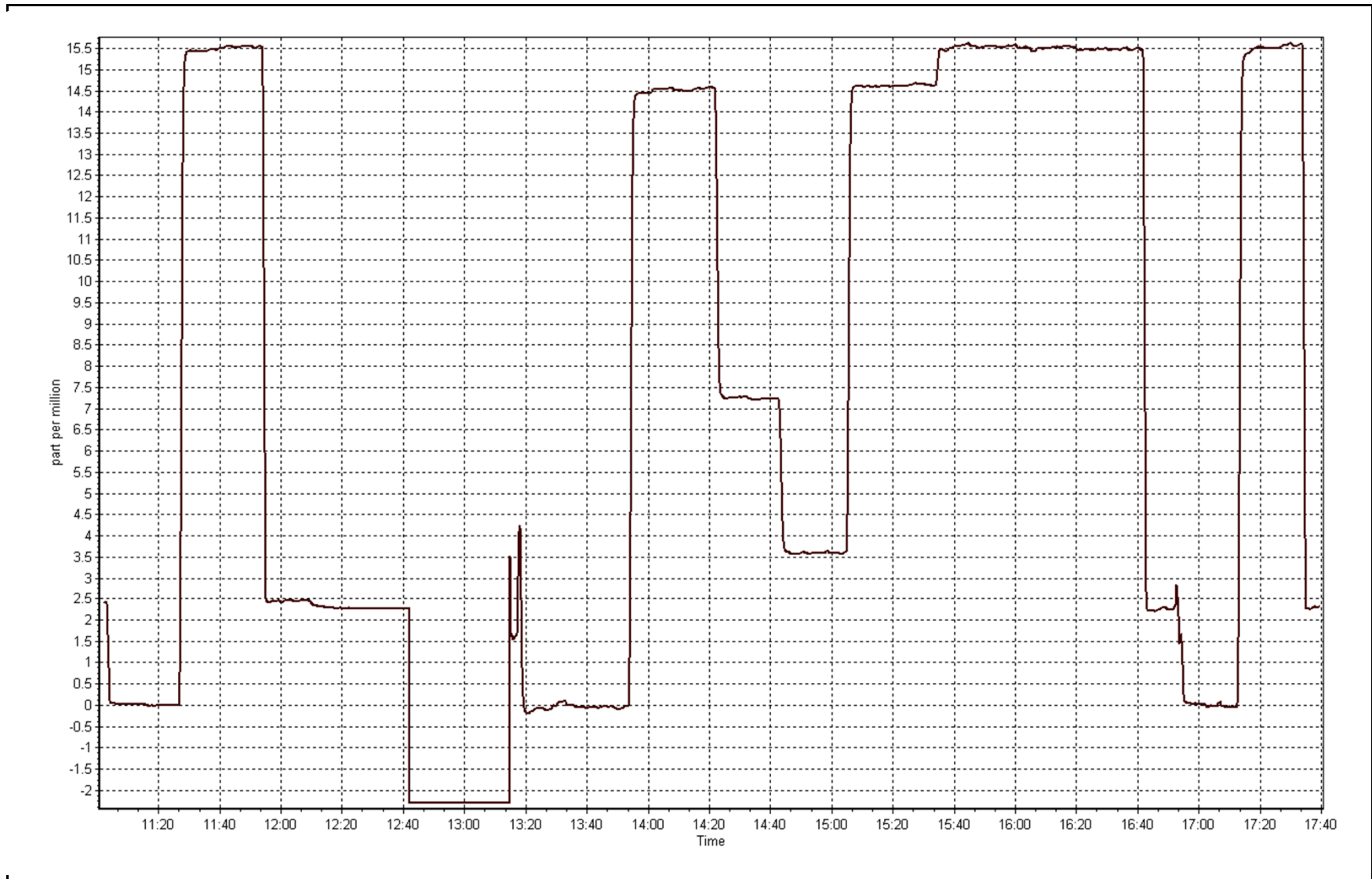
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	N/A	Correlation Coefficient	0.999998
14.53	14.53	0.9998		
7.25	7.23	1.0032	Slope	0.996703
3.64	3.59	1.0131		
			Intercept	0.047849

THC Calibration Curve



THC Calibration Plot

Date: March 11, 2015





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, March 12, 2015	Previous Calibration	Wednesday, March 11, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	14:30
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Gas Cert Reference	S980455A	Cal Gas Expiry Date	9/26/2017
CH4 Cal Gas Conc.	497 ppm	CH4 Equiv Conc.	1033.3 ppm
C3H8 Cal Gas Conc.	195 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.0	8.0
Analyzer Range (mv)	25	25	Air or Bypass press	37.5	37.4
Calculated slope	0.996703	1.000193	Fuel Pressure	22.6	22.6
Calculated intercept	0.047849	0.010761	Flame Temp	157.1	156.8
BKG	2.3	2.15			
COEF	4.801	4.498			

Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.05	N/A
as found span	5000	70.3	14.53	15.43	0.942
calibrator zero	5000	0.0	0.00	0.05	N/A
high point	5000	70.3	14.53	14.56	0.998
second point	5000	35.1	7.25	7.16	1.013
third point	5000	17.6	3.64	3.60	1.010
calibrator zero					
as left zero	5000	0.0	0.00	-0.04	N/A
as left span	5000	70.3	14.53	14.64	0.992
Average Correction Factor					1.007

Corrected As found	15.38	Previous response	14.53	% change	-5.5%
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Notes:

Readjusted span due to air pressure drop during calibration on March 11, 2015.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

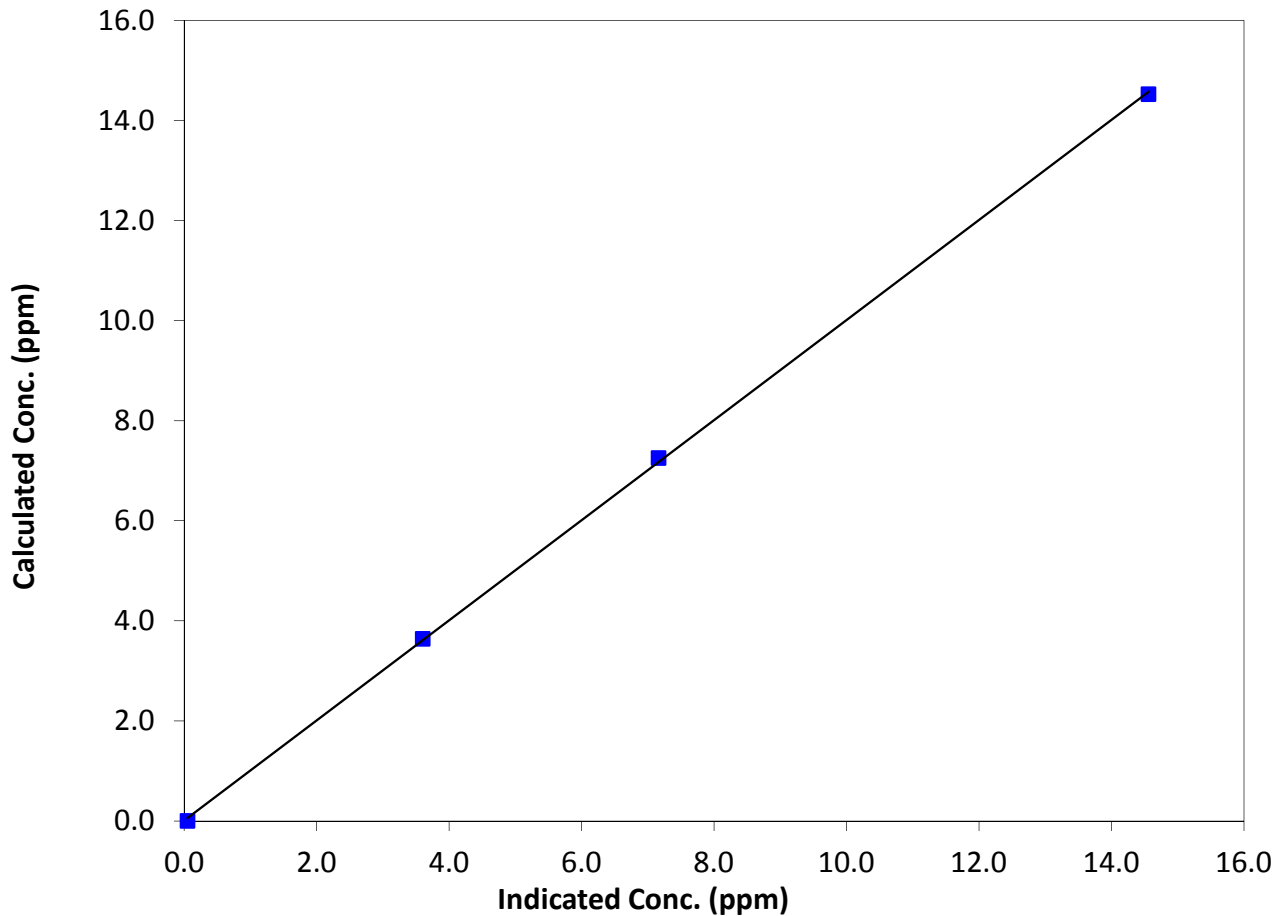
Station Information

Calibration Date	March 12, 2015	Previous Calibration	March 11, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:35	End Time (MST)	14:30
Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114

Calibration Data

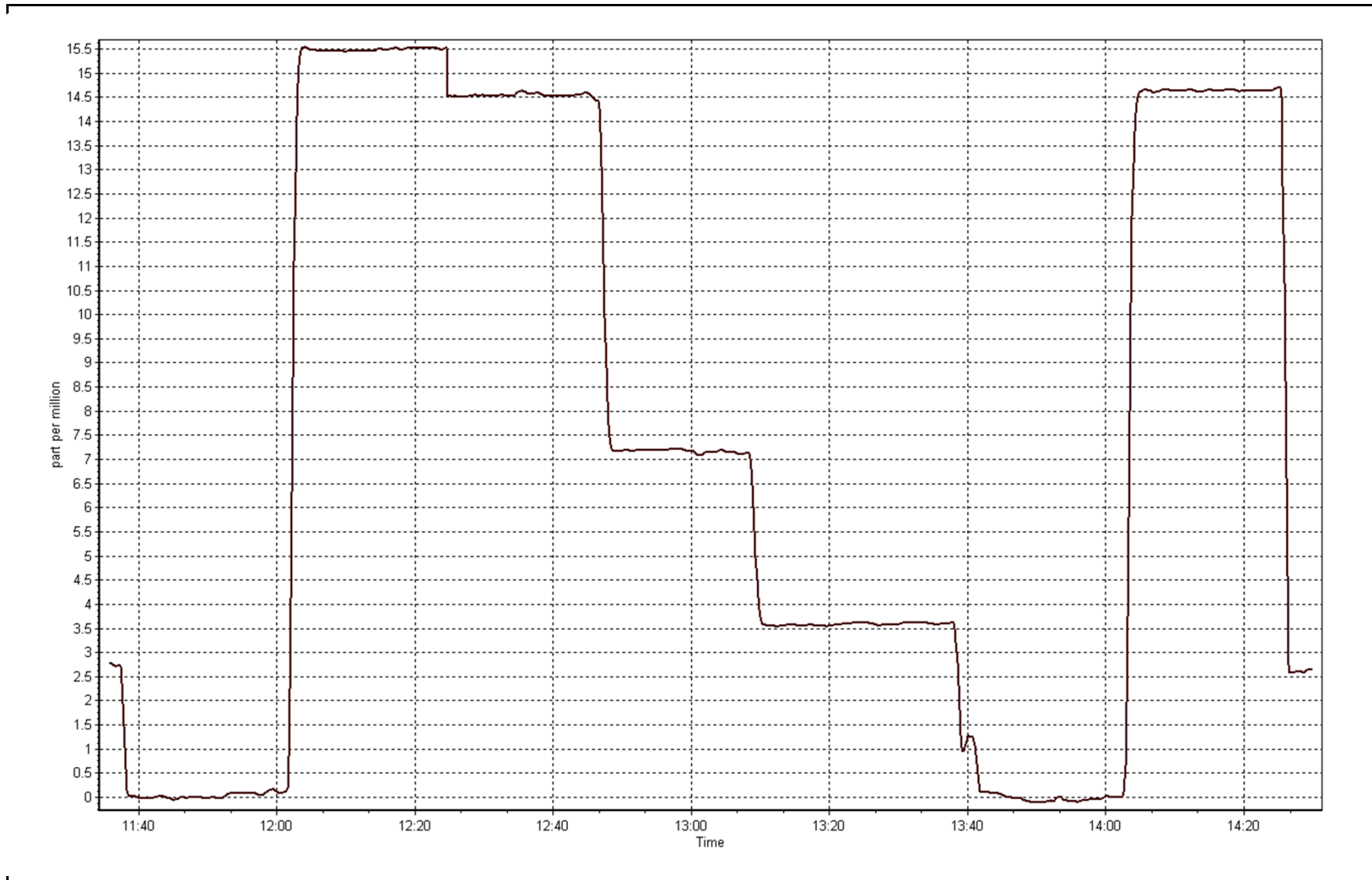
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	N/A	Correlation Coefficient	0.999887
14.53	14.56	0.9978		
7.25	7.16	1.0130	Slope	1.000193
3.64	3.60	1.0103		
			Intercept	0.010761

THC Calibration Curve



THC Calibration Plot

Date: March 12, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 12, 2015	Previous Calibration	February 19, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:35
Barometric Pressure	728 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
NO2 calibration used	Thursday, February 19, 2015	Transfer Standard	??
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	25.6	27.1
Analyzer Range (input)	500	500	Lamp temp.	58.0	58.0
Calculated slope	0.996651	1.004665	Pressure ("Hg)	26.3	26.5
Calculated intercept	-0.634510	-0.341380	Flow cell A	738	742
Analyzer Background	-0.1	-0.1			
Analyzer Coefficient	0.997	0.980			

Analyzer make	API T400	Analyzer serial #	825
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.2	N/A
as found span	5000	0.900	322.3	329.8	0.977
calibrator zero	5000	0.000	0.0	0.2	N/A
high point	5000	0.903	322.3	320.9	1.004
second point	5000	0.585	192.0	191.9	1.001
third point	5000	0.358	101.5	101.4	1.001
calibrator zero					
as left zero	5000	0.00	0.0	0.1	N/A
as left span	5000	0.903	322.3	331.8	N/A
Average Correction Factor					1.002

Corrected As found	329.6	Previous response	324.0	% change	-1.7%
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Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

O₃ Calibration Summary

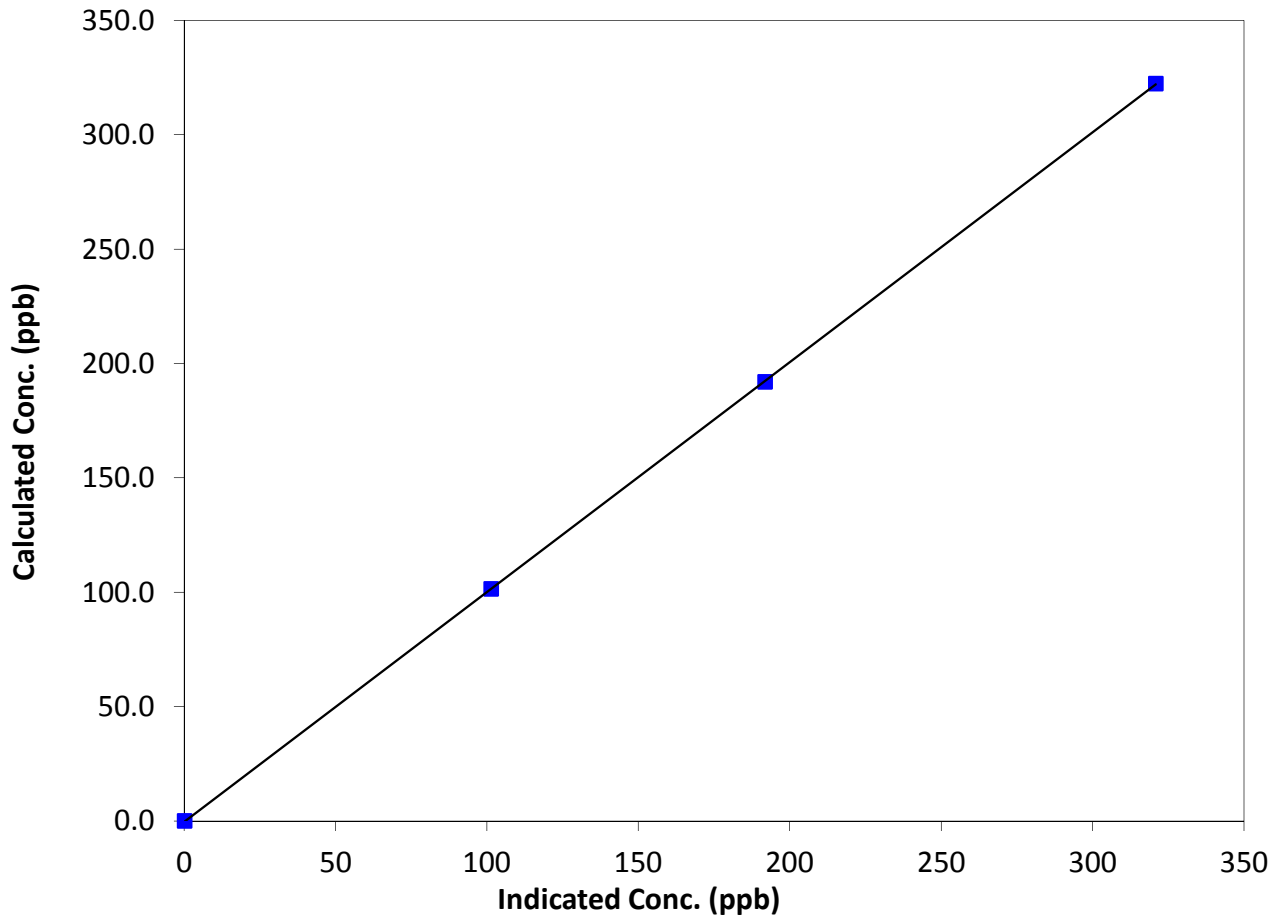
Station Information

Calibration Date	Thursday, March 12, 2015	Previous Calibration	February 19, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:50	End Time (MST)	11:35
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

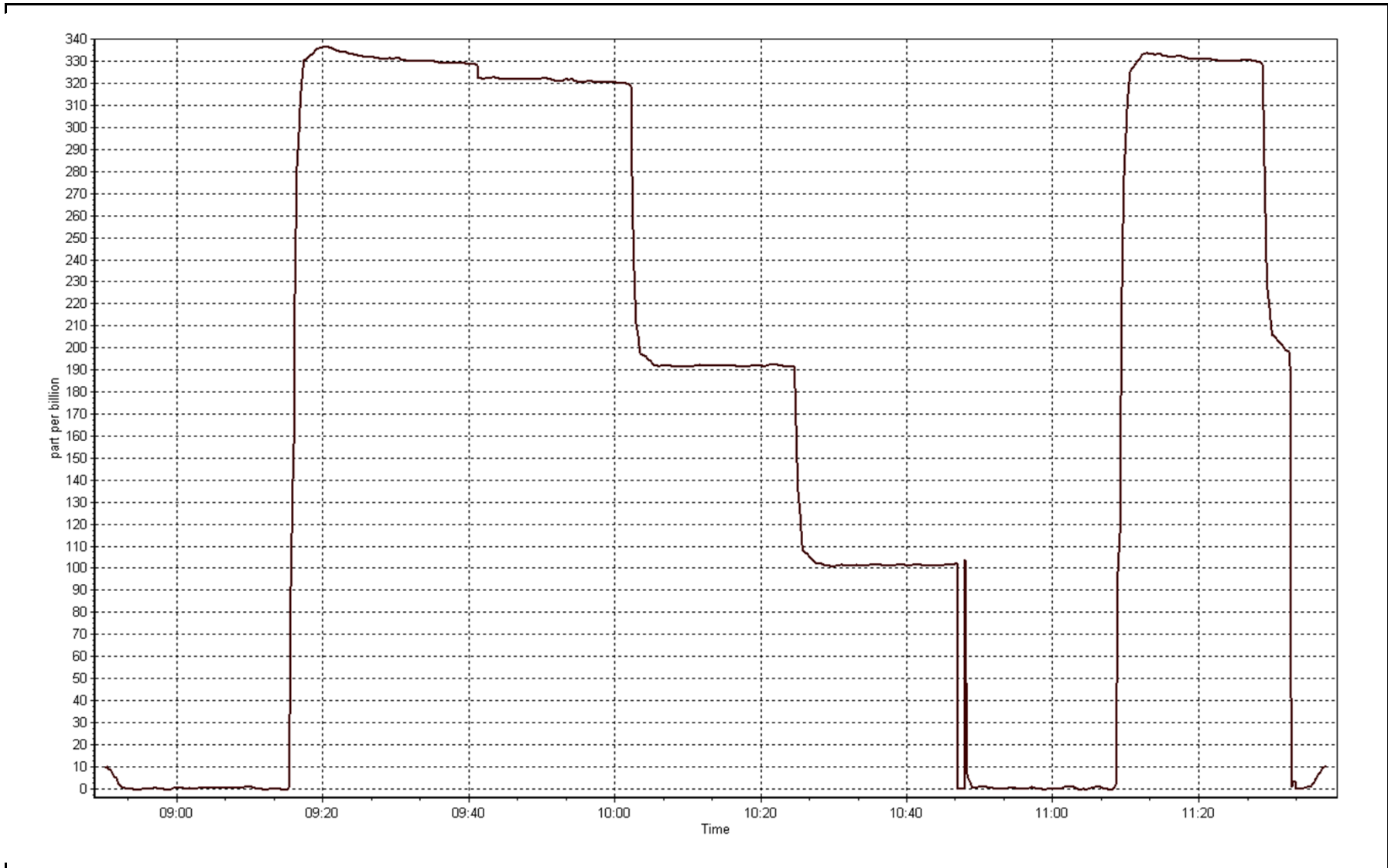
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999995
322.3	320.9	1.0044		
192.0	191.9	1.0007	Slope	1.004665
101.5	101.4	1.0014		
			Intercept	-0.341380

O₃ Calibration Curve



O3 Calibration Plot

Date: March 12, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	11:00	End Time (MST)	17:40
Barometric Pressure	729 mmHg	Station Temperature	24.0 Deg C
Calibrator	Sabio 4010	Serial Number	11041107
NO Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	September 26, 2017
NO _x Cal Gas Conc	56.9 ppm	Cal Gas Serial #	S980455A

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 1850

Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998498	0.999677	0.997091
	Data Offset	1.017311	0.960178	0.077691
After	Data Slope	0.998929	1.000996	0.994996
	Data Offset	1.144805	1.106437	-0.013106
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model Thermo 42i Analyzer serial # 1410661329

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.757	ppb	0.708	ppb
NO _x coefficient	0.998	ppb	1.000	ppb
NO ₂ coefficient	0.998	ppb	0.998	ppb
NO bkgrnd	6.5		6.3	
NO _x bkgrnd	6.7		6.4	
Nt coefficient	na		na	
Chamber Temp	50.2	Deg C	50.5	Deg C
Moly Temp	328.0	Deg C	322.4	Deg C
PMT Temp	-3.0	Deg C	-3.1	Deg C
O ₃ flow	ok	ccm	ok	ccm
R Cell Press	191.9	mmHg	180.0	mmHg
Sample Flow	0.840	ccm	0.899	ccm

Notes:

Filter changed after as founds. Adjusted span.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 11, 2015

Station Number:

AMS 13

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	-0.1	N/A	N/A
as found span	5000	70.3	800.0	800.0	0.0	808.0	806.6	1.4	0.9901	0.9918
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.1	N/A	N/A
high point	5000	70.3	800.0	800.0	0.0	800.8	799.1	1.7	0.9990	1.0011
second point	5000	35.1	399.4	399.4	0.0	397.3	396.7	0.6	1.0054	1.0070
third point	5000	17.6	200.3	200.3	0.0	197.8	197.5	0.3	1.0124	1.0141
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	-0.1	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	N/A	N/A
as left span	5000	70.3	800.0	474.8	325.3	802.2	475.5	330.5	0.9973	0.9984
Average Correction Factor									1.0056	1.0074

Corrected As found

NO_x= 808.3

NO= 806.9

Percent Change

NO_x= -1.0%

NO= -0.9%

Previous Response

NO_x= 800.2

NO= 799.3

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

70.30

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (350)	N/A	474.8	322.3	798.6	474.8	323.8	0.9879	1.0000	0.9953	100.5%
2nd NO ₂ (200)	N/A	605.1	192.0	798.2	605.1	193.1	0.9884	1.0000	0.9941	100.6%
3rd NO ₂ (100)	N/A	695.5	101.5	797.7	695.5	102.1	0.9890	1.0000	0.9941	100.6%
4th NO ₂ (0)	797.1	N/A	1.8	798.9	797.1	1.8	0.9876	1.0000	N/A	N/A
Average Correction Factor							0.9882	1.0000	0.9945	100.6%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

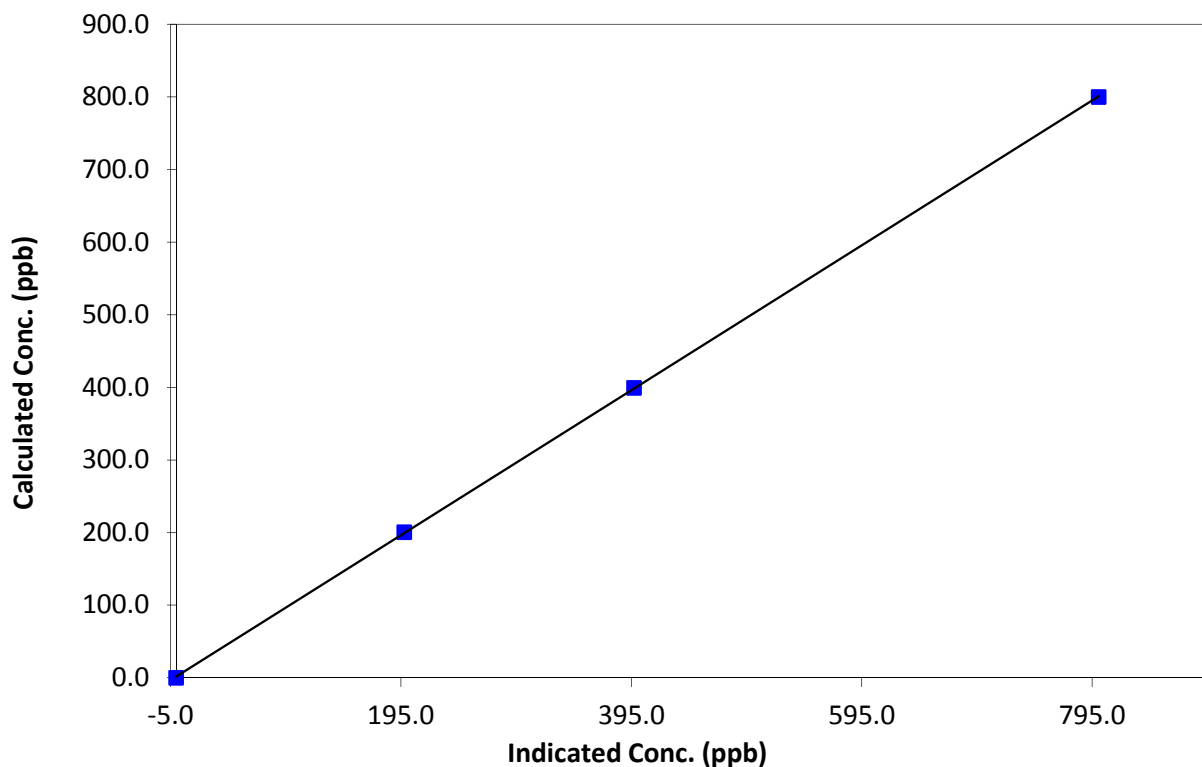
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:00	End Time (MST)	17:40
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	0.999984
800.0	800.8	0.9990		
399.4	397.3	1.0054	Slope	0.998929
200.3	197.8	1.0124		
0.0	-0.3	0.0000	Intercept	1.144805

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

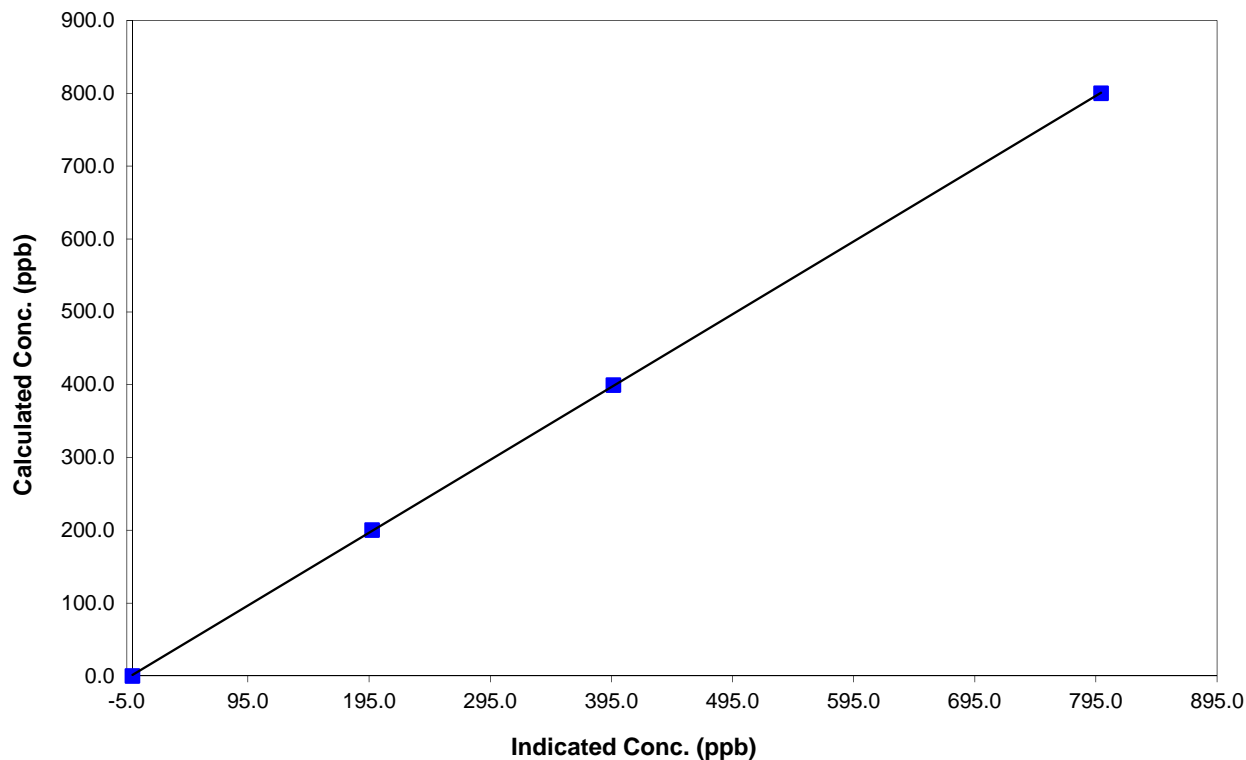
Station Information

Calibration Date	March 11, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:00	End Time (MST)	17:40
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999986
800.0	799.1	1.0011		
399.4	396.7	1.0070	Slope	1.000996
200.3	197.5	1.0141		
0.0	-0.3	0.0000	Intercept	1.106437

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

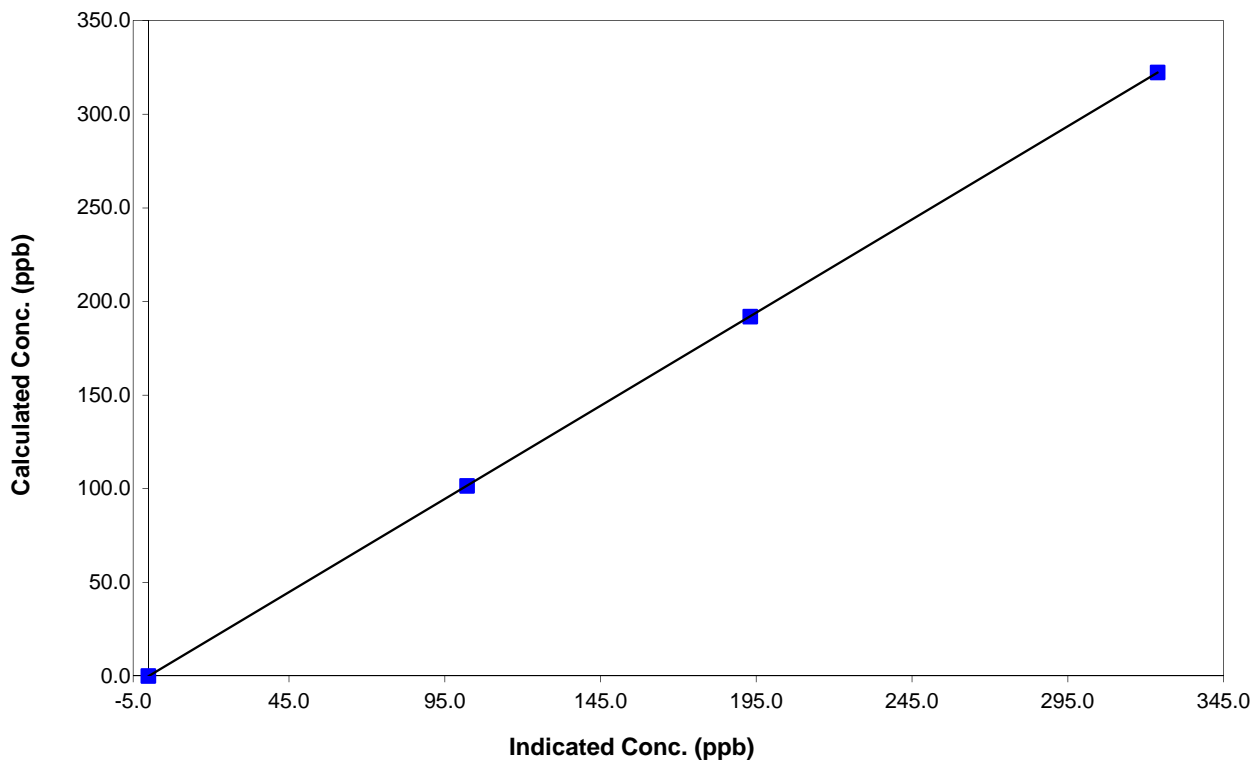
Station Information

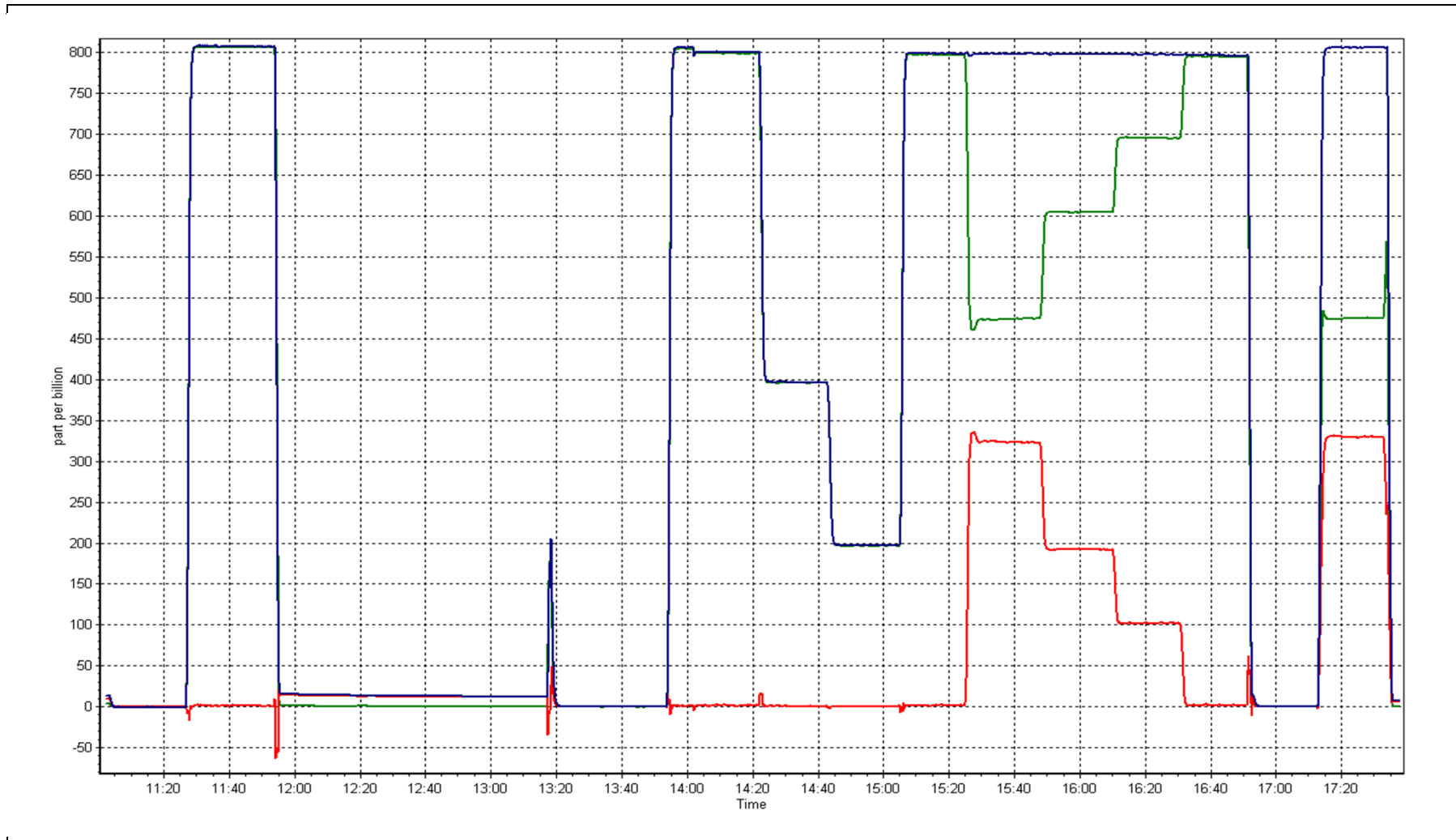
Calibration Date	March 11, 2015	Previous Calibration	February 18, 2015
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:00	End Time (MST)	17:40
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999999
322.3	323.8	0.9953		
192.0	193.1	0.9941	Slope	0.994996
101.5	102.1	0.9941		
			Intercept	-0.013106

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 14
ANZAC
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	688	37	56	97.45	15	0	2	0
TRS(ppb) Average	710	34	34	100.00	2	0	1	0
THC(ppm) Average	707	37	37	100.00	2.4	-	2.1	-
NMHC(ppm) Average	707	37	37	100.00	0.143	-	0.065	-
CH4(ppm) Average	707	37	37	100.00	2.4	-	2	-
NO2(ppb) Average	707	37	37	100.00	20	0	6	-
NO(ppb) Average	707	37	37	100.00	28	-	1	-
NOX(ppb) Average	707	37	37	100.00	45	-	7	-
O3(ppb) Average	709	35	35	100.00	51	0	46	-
PM2.5(ug/m3) Average	737	0	7	99.06	13.2	-	7.1	0
Temperature 2 m (C) Average	744	0	0	100.00	15.5	-	9	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	89	-
Surface Wetness (% of range) Average	744	0	0	100.00	31	-	6	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	18	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	0.8	-	1.5	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	688	0.6	1	-	0	0	0	0	1	1	15
TRS(ppb) Average	710	0.3	0	-	0	0	0	0	0	0	2
THC(ppm) Average	707	1.89	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2.4
NMHC (ppm) Average	707	0.007	0.019	-	0	0	0	0	0	0	0.143
CH4(ppm) Average	707	1.88	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2.4
NO2(ppb) Average	707	2.3	3	-	0	0	1	2	3	5	20
NO(ppb) Average	707	0.4	1	-	0	0	0	0	0	1	28
NOX(ppb) Average	707	2.7	3	-	0	0	1	2	3	6	45
O3(ppb) Average	709	35.2	9	-	7	23	31	37	41	44	51
PM2.5(ug/m3) Average	737	3	2.3	-	0	0.8	1.4	2.4	4	6	13.2
Temperature 2 m (C) Average	744	-2.83	8.3	-	-31.2	-14	-7.1	-2.6	3.2	6.9	15.5
Relative Humidity (%) Average	744	65.2	18	-	18	41	52	65	80	88	99
Surface Wetness (% of range) Average	744	1.1	4	-	0	0	0	0	0	3	31
Wind Speed 20 m (km/h) Average	744	8.5	4	-	0	4	5	8	11	14	28
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	5.59	0	0	0	0	0	0	0.8

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Mar 2015 07:00	01 Mar 2015 07:00	1	Stabilization after daily span
SO2	03 Mar 2015 03:00	03 Mar 2015 03:00	1	Stabilization after daily span
SO2	04 Mar 2015 04:00	04 Mar 2015 04:00	1	Stabilization after daily span
SO2	05 Mar 2015 09:00	05 Mar 2015 09:00	1	Stabilization after daily span
SO2	06 Mar 2015 07:00	06 Mar 2015 07:00	1	Stabilization after daily span
SO2	07 Mar 2015 09:00	07 Mar 2015 09:00	1	Stabilization after daily span
SO2	16 Mar 2015 15:00	16 Mar 2015 15:00	1	Intermittent unstable operation - excessive baseline drift
SO2	23 Mar 2015 05:00	23 Mar 2015 16:00	12	Intermittent unstable operation - excessive baseline drift
PM2.5	23 Mar 2015 13:00	23 Mar 2015 14:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	29 Mar 2015 20:00	29 Mar 2015 20:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	30 Mar 2015 09:00	30 Mar 2015 10:00	2	Intermittent unstable operation - excessive baseline drift
PM2.5	30 Mar 2015 14:00	30 Mar 2015 14:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	30 Mar 2015 17:00	30 Mar 2015 17:00	1	Intermittent unstable operation - excessive baseline drift

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Summary of Hour Averages

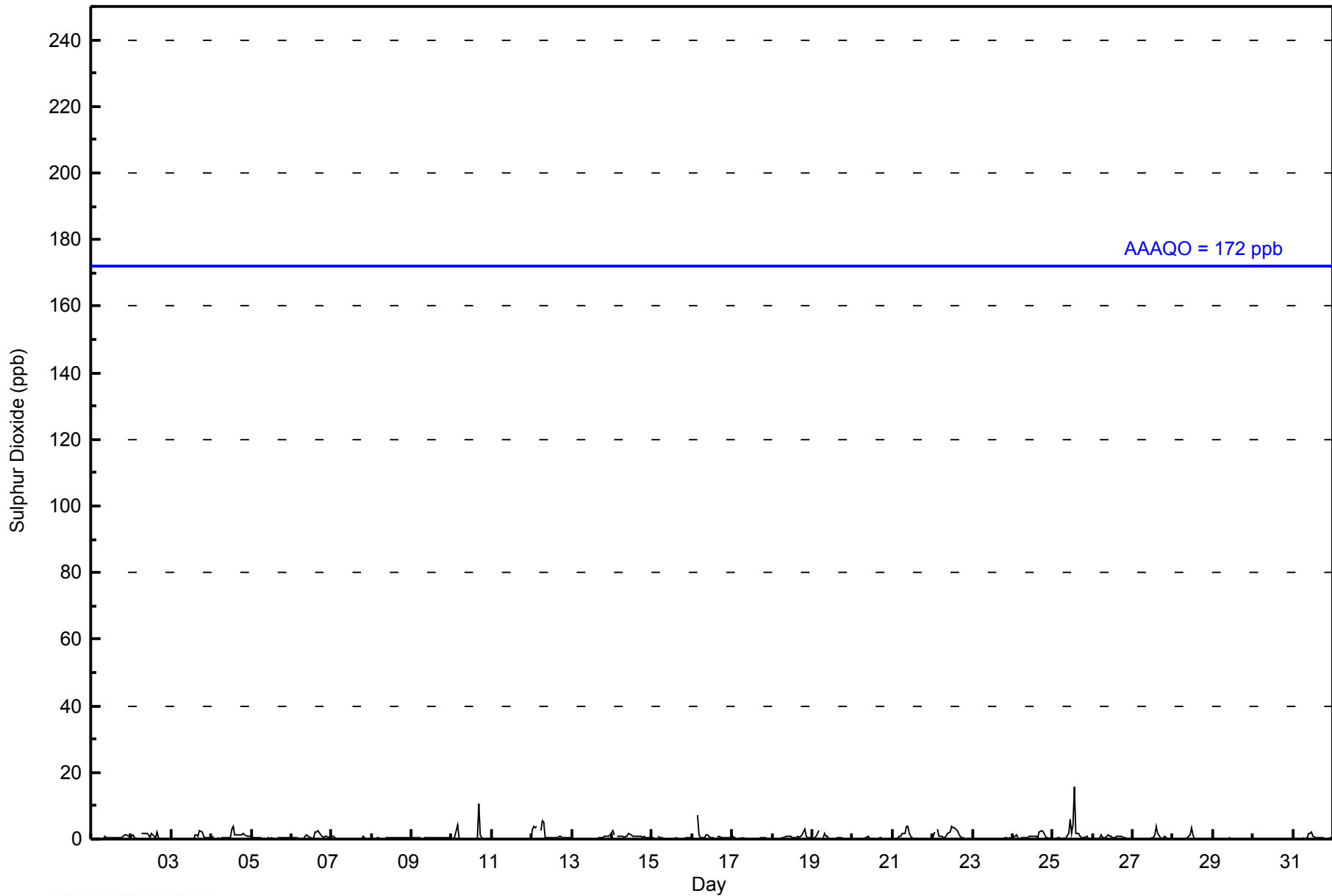
Anzac - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 15 ppb on Mar 25 14:00										Maximum Daily Average: 1.6 ppb on Mar 25										Hours of Data: 688						
Minimum Value: 0 ppb on Mar 1 04:00										Minimum Daily Average: 0.1 ppb on Mar 30										Hours of Missing Data: 56						
Maximum Diurnal Average: 1.1 ppb at hour 14										Minimum Diurnal Average: 0.3 ppb at hour 24										Hours of Calibration: 37						
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										Percent Operational Time: 97.5						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	Z	RE	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1
2-Mar	1	1	0	0	0	Z	2	2	2	2	1	0	2	1	0	2	0	0	0	0	0	0	0	0	0.8	2
3-Mar	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	2	1	1	0	0	0.5	3	
4-Mar	0	1	Z	RE	0	0	0	0	0	0	0	1	3	4	1	1	1	1	1	2	1	1	1	1.0	4	
5-Mar	1	1	1	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
6-Mar	0	0	0	0	0	Z	RE	0	1	1	1	0	0	0	2	2	2	1	1	1	1	1	0	0.8	2	
7-Mar	1	1	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1	
8-Mar	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
9-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
10-Mar	0	0	1	4	0	0	Z	0	0	0	0	0	0	0	1	11	1	1	0	0	0	0	0	0.9	11	
11-Mar	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-Mar	3	4	3	4	Z	3	5	5	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1.4	5	
13-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1	
14-Mar	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
15-Mar	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	
16-Mar	0	0	Z	7	1	0	0	1	1	1	1	0	0	UO	1	1	1	1	0	0	0	0	0	0.8	7	
17-Mar	1	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	C	1	0	0	0	0	0	0	--	1	
18-Mar	0	0	0	0	Z	0	0	1	1	1	1	1	0	0	0	1	1	1	1	3	1	0	0	0.6	3	
19-Mar	0	0	1	2	3	Z	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3	
20-Mar	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
21-Mar	0	Z	0	0	1	1	2	2	4	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0.8	4	
22-Mar	1	2	Z	3	1	1	1	1	1	2	2	4	3	3	3	3	1	0	0	0	0	0	0	1.4	4	
23-Mar	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	0	--	0	
24-Mar	0	1	1	1	Z	0	0	0	0	1	1	1	1	1	1	2	2	2	1	0	0	0	0	0.8	2	
25-Mar	0	0	0	0	0	Z	0	0	0	2	6	2	4	15	2	2	1	1	0	1	1	0	0	1.6	15	
26-Mar	Z	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1	
27-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	4	2	0	0	0	1	0	0	0	0.5	4	
28-Mar	0	0	Z	0	0	0	0	0	0	1	1	3	1	0	0	0	0	0	0	0	0	0	0	0.4	3	
29-Mar	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-Mar	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-Mar	0	0	0	0	0	Z	0	0	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0.4	2	
0.5 0.5 0.4 0.9 0.4 0.4 0.6 0.6 0.6 0.8 0.8 0.7 0.7 1.1 0.7 0.7 0.9 0.6 0.5 0.5 0.4 0.3 0.3 0.3																								Diurnal Average		
3 4 3 7 3 3 5 5 4 4 6 4 4 15 4 3 11 3 2 3 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration UO - Unstable Operation RE - Recovery																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	99.71	99.71
11 - 20	2	0.29	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: 688

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - March 2015

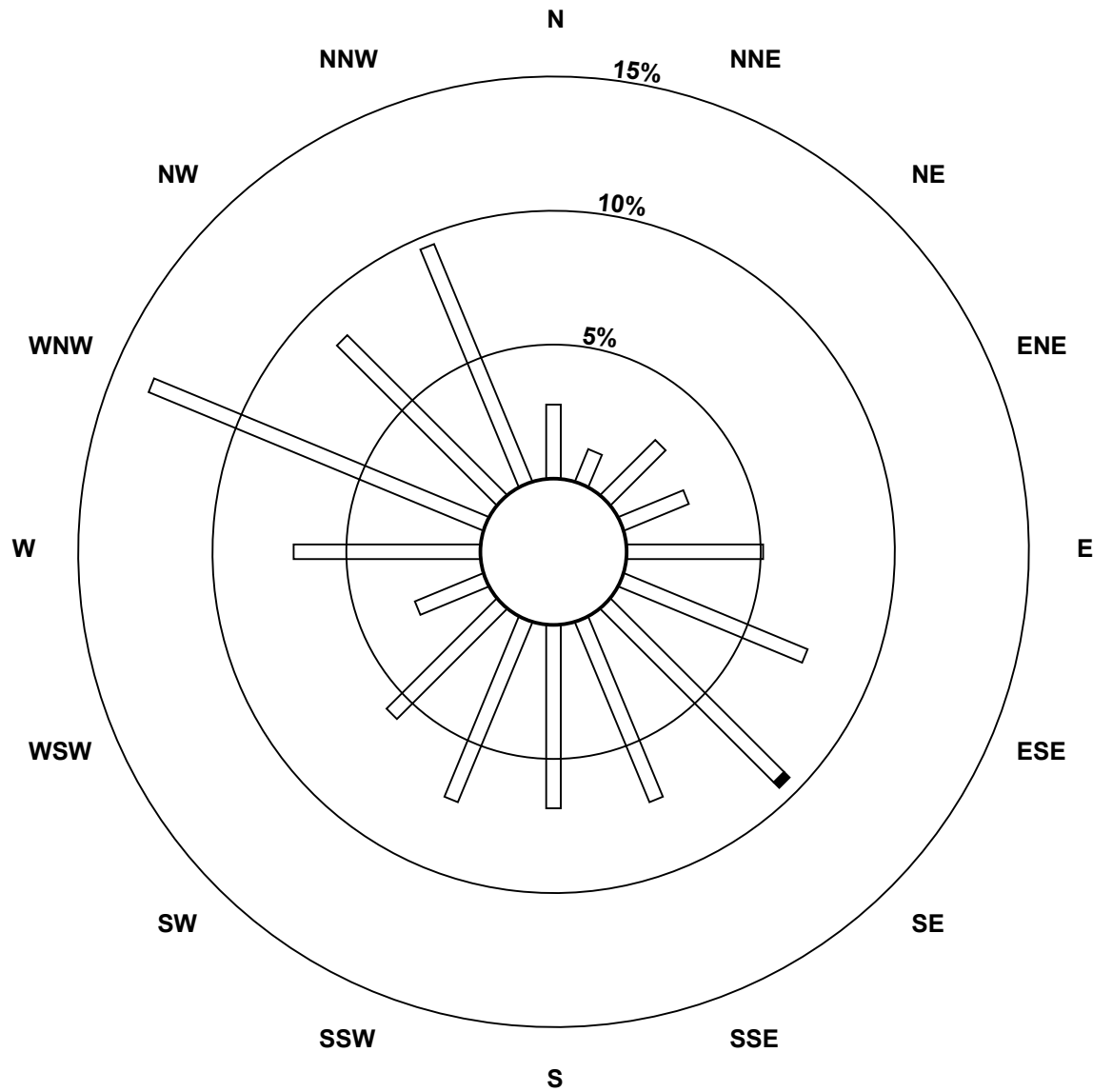
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	19	9	20	18	35	51	63	50	47	50	40	19	48	93	58	66	686
11 - 20	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	19	9	20	18	35	51	65	50	47	50	40	19	48	93	58	66	688

Total Number of Valid Hours: 688

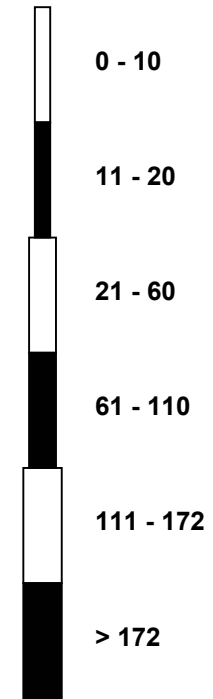
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)**



Classes (ppb)

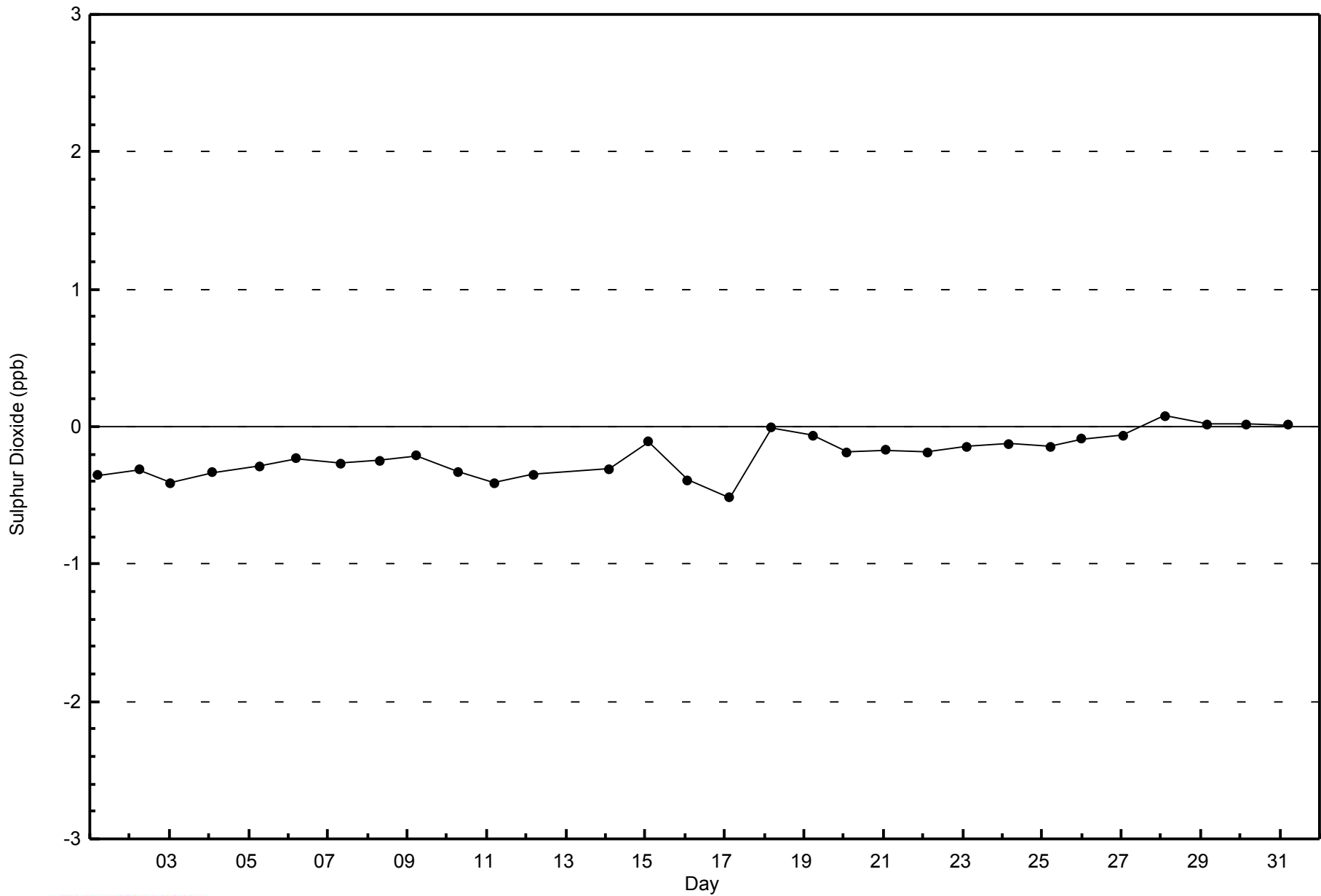


Total Number of Valid Hours: 688



WBEA
Zero Responses

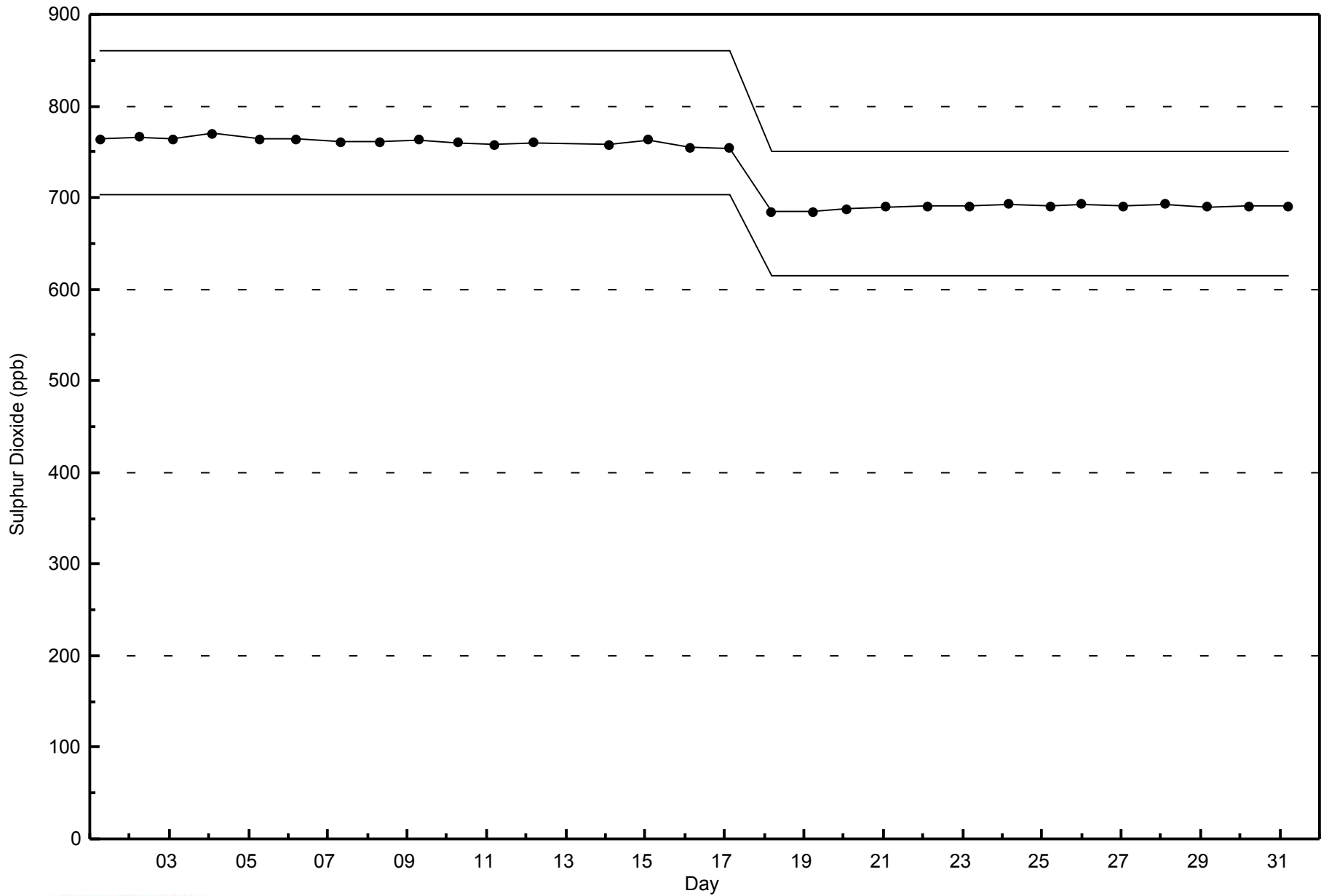
Sulphur Dioxide (SO₂) - ppb
Anzac - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Anzac - March 2015





Summary of Hour Averages

Anzac - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Mar 25 10:00	Maximum Daily Average: 0.8 ppb on Mar 26		Hours of Data:	710
Minimum Value: 0 ppb on Mar 13 12:00	Minimum Daily Average: 0.2 ppb on Mar 13		Hours of Missing Data:	34
Maximum Diurnal Average: 0.4 ppb at hour 6	Minimum Diurnal Average: 0.2 ppb at hour 18		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =0 P ₉₀ =0 P ₉₉ =2		Percent Operational Time:	100.0

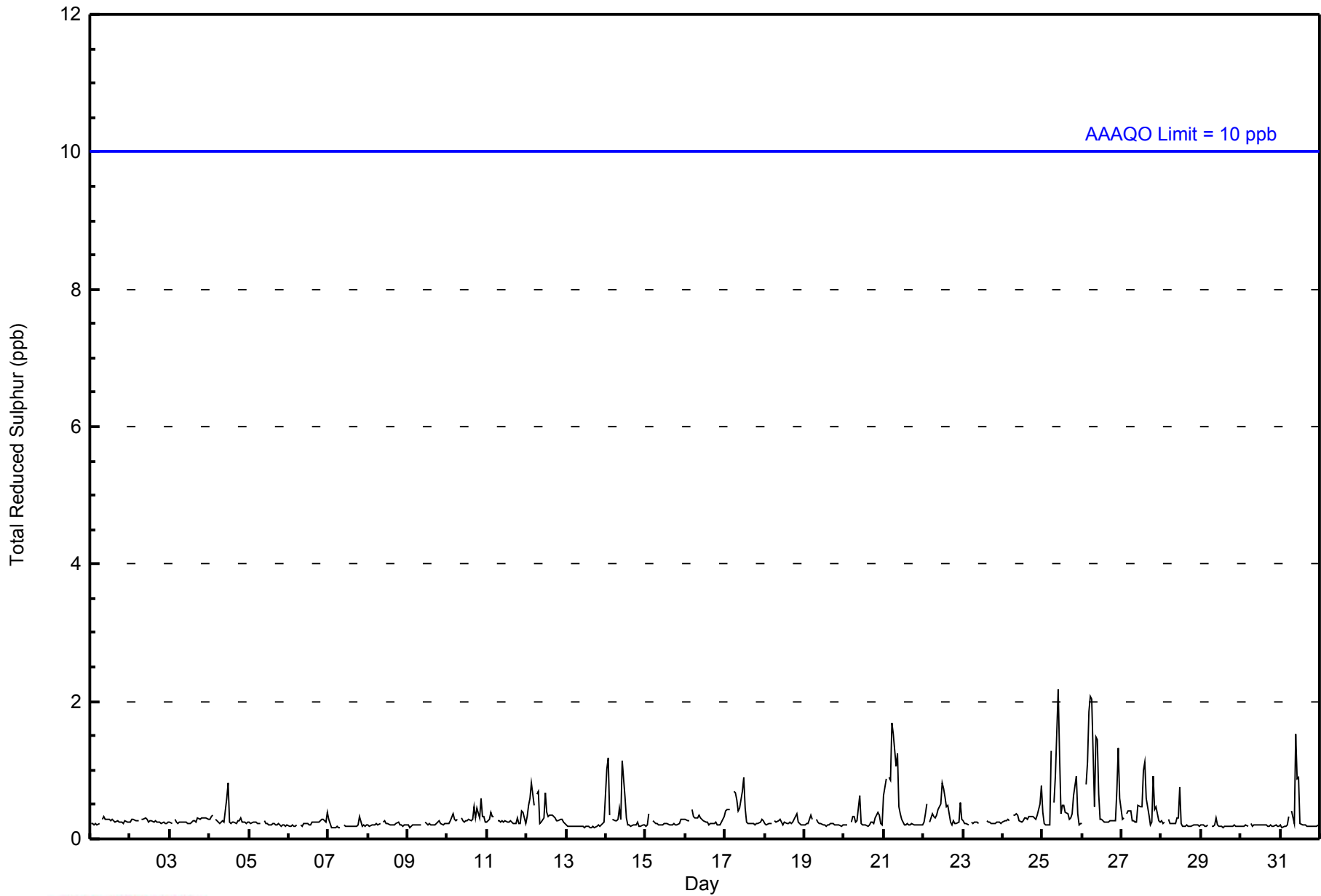
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																											
1-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
2-Mar	0	0	0	0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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	710	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - March 2015

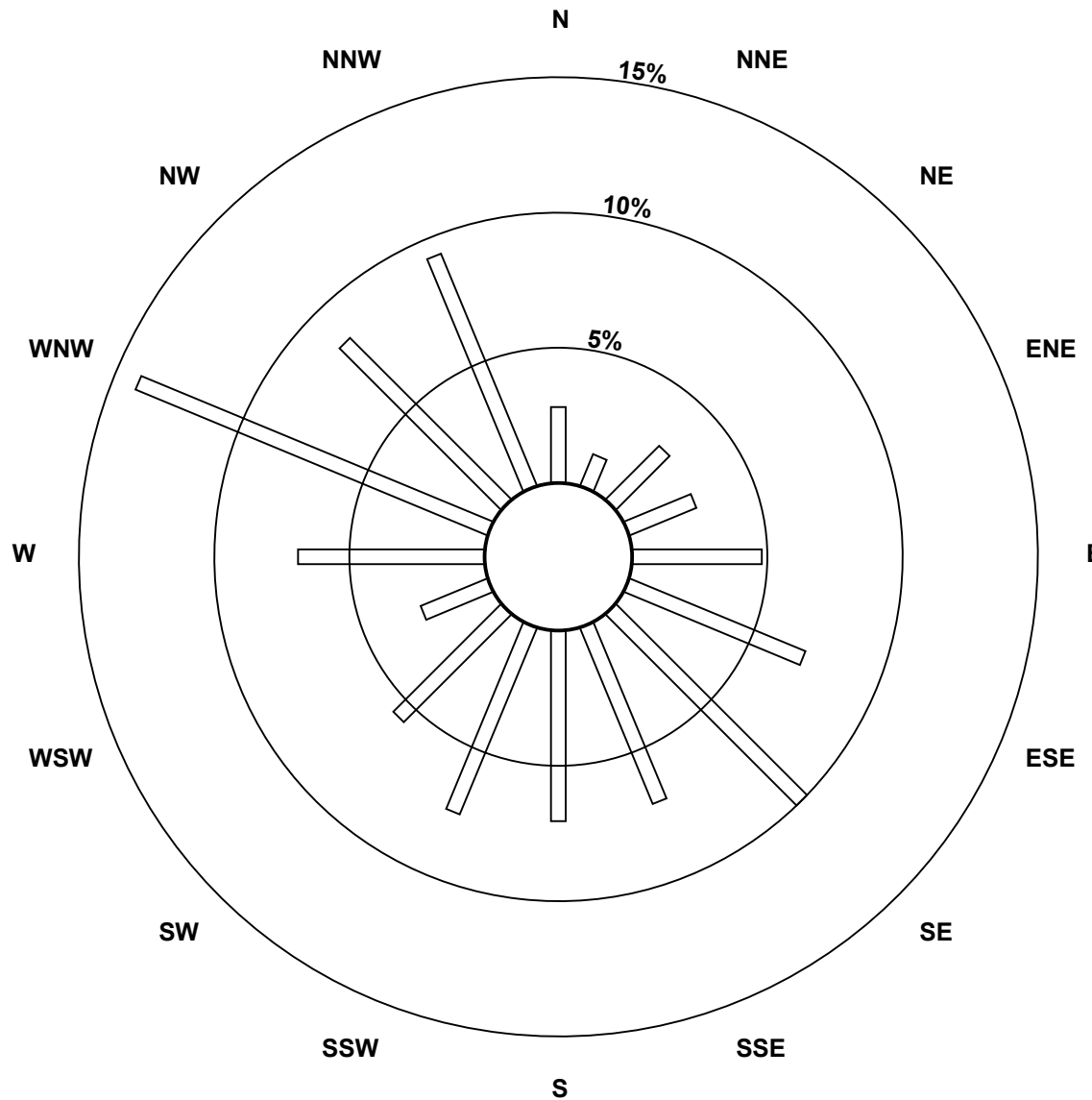
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	20	9	20	19	34	50	71	50	50	53	40	19	49	100	60	66	710
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	9	20	19	34	50	71	50	50	53	40	19	49	100	60	66	710

Total Number of Valid Hours: 710

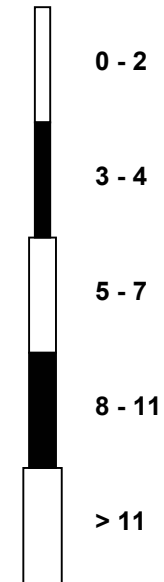
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)**



Classes (ppb)

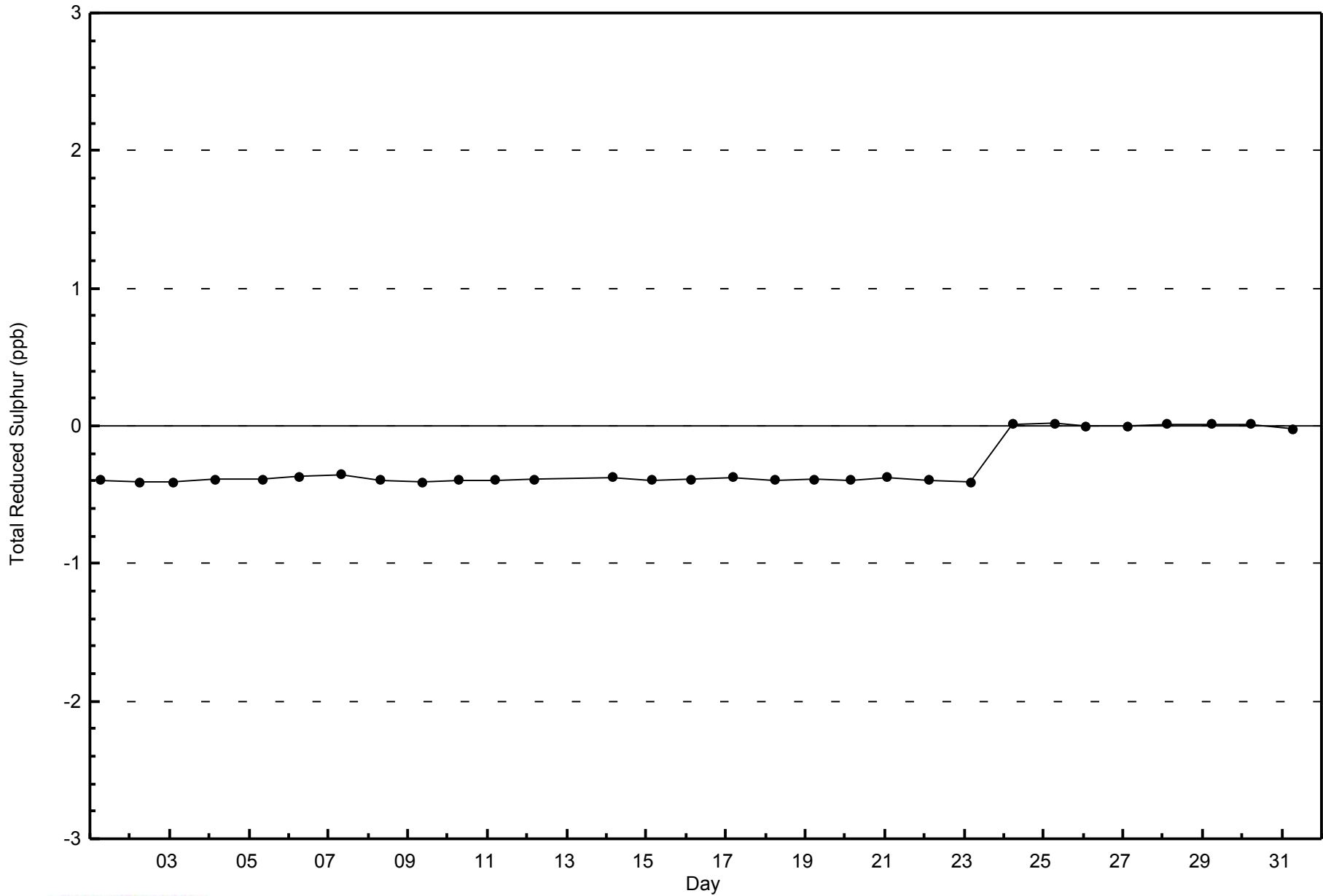


Total Number of Valid Hours: 710



WBEA
Zero Responses

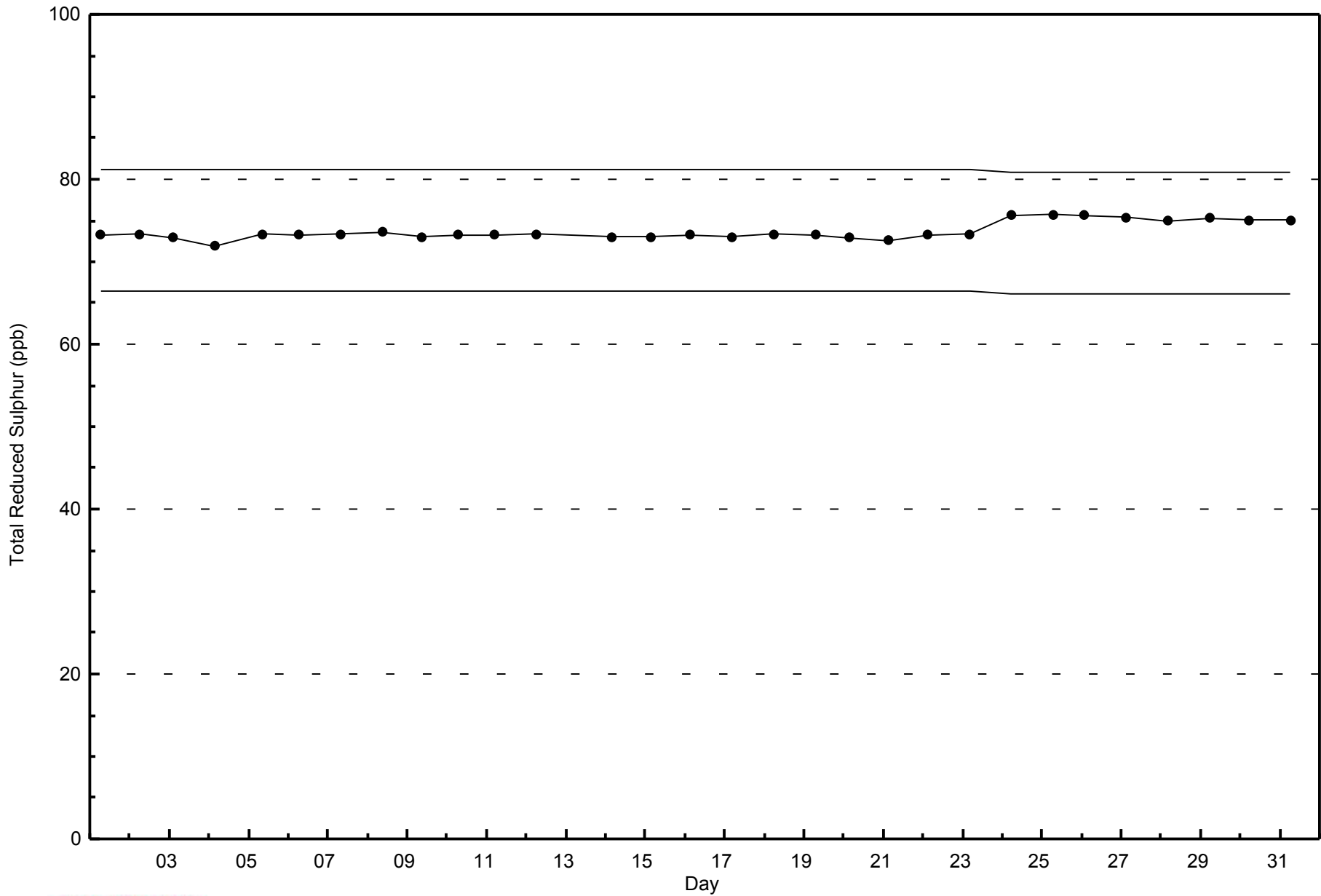
Total Reduced Sulphur (TRS) - ppb
Anzac - March 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Anzac - March 2015



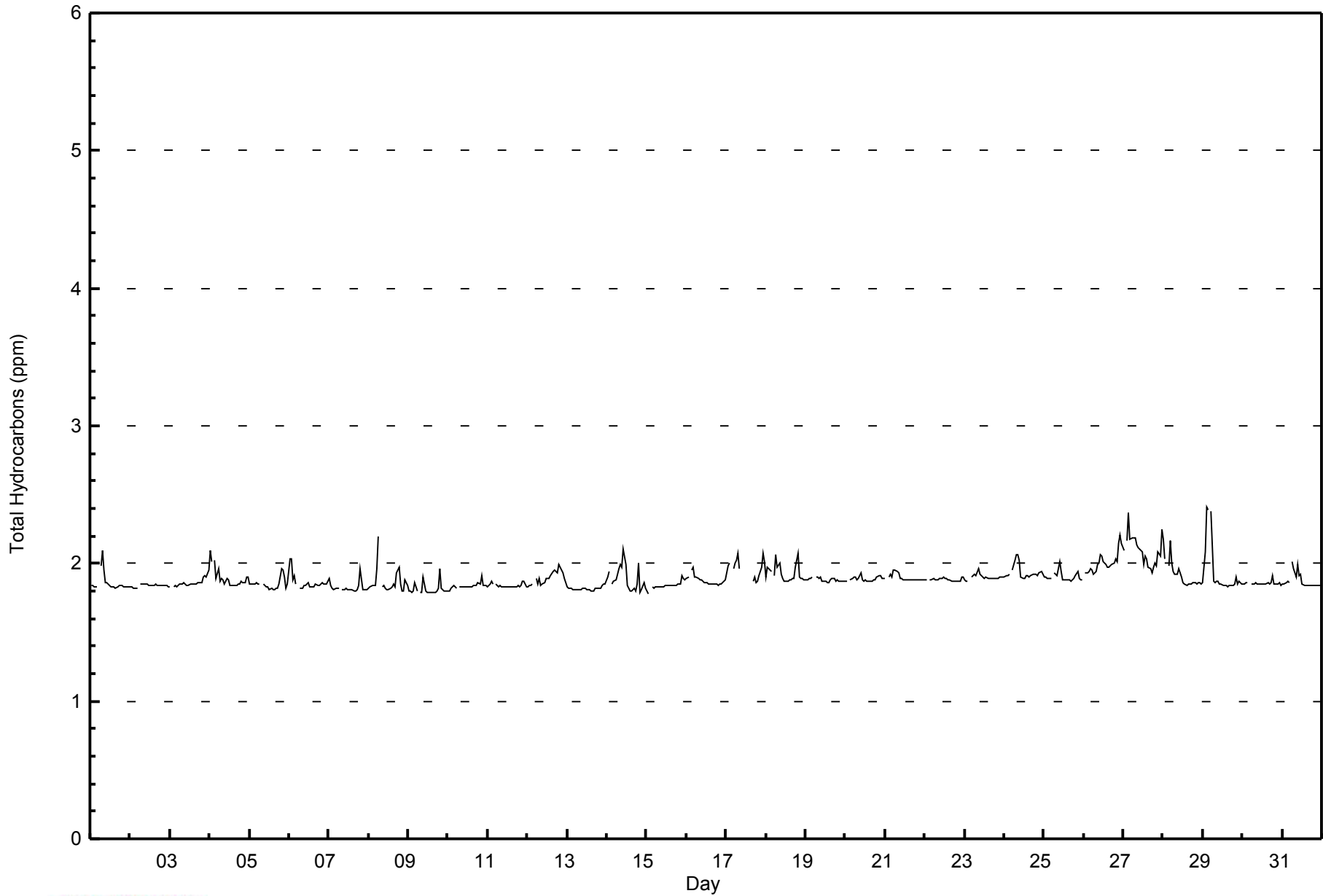


Maximum Value: 2.4 ppm on Mar 29 03:00		Maximum Daily Average: 2.1 ppm on Mar 27		Hours in Service: 744																							
Minimum Value: 1.8 ppm on Mar 15 02:00		Minimum Daily Average: 1.8 ppm on Mar 9		Hours of Data: 707																							
Maximum Diurnal Average: 1.9 ppm at hour 6		Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Missing Data: 37																							
Monthly Average: 1.89 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.2		Hours of Calibration: 37																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	1.8	1.8	1.8	1.8	1.8	Z	2.0	2.1	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.1	
2-Mar	1.8	1.8	1.8	1.8	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.1
3-Mar	1.8	Z	1.8	1.8	1.8	1.8	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
4-Mar	2.1	2.0	Z	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.1	
5-Mar	1.9	1.9	1.9	1.9	1.9	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.9	1.8	1.8	2.0	
6-Mar	2.0	2.0	1.9	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	
7-Mar	1.9	1.8	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.8	1.8	1.8	1.8	1.8	2.0	
8-Mar	1.8	1.8	1.8	1.8	1.8	2.0	2.2	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.8	1.8	1.9	1.8	2.2	
9-Mar	1.8	1.8	1.8	1.8	1.9	1.8	Z	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.8	1.8	1.8	1.8	1.8	2.0	
10-Mar	1.8	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.8	1.9	
11-Mar	1.8	1.8	1.9	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.9	
12-Mar	1.8	1.8	1.8	1.8	Z	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	
13-Mar	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	1.8	1.8	1.8	1.9	1.9	
14-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.8	1.8	1.9	1.8	1.8	2.1	
15-Mar	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	1.9	1.9	1.9	1.9	
16-Mar	1.9	1.9	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.9	2.0	
17-Mar	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	C	C	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1	
18-Mar	1.9	2.0	2.0	1.9	Z	1.9	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	1.9	2.1	
19-Mar	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	
20-Mar	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	
21-Mar	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	
22-Mar	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	
23-Mar	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	1.9	1.9	2.0	
24-Mar	1.9	1.9	1.9	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	1.9	1.9	1.9	2.1	
25-Mar	1.9	1.9	1.9	1.9	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	1.9	1.9	1.9	2.0	
26-Mar	Z	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.2	
27-Mar	2.1	Z	2.2	2.4	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.1	2.3	2.1	2.4	
28-Mar	2.2	2.0	Z	2.0	2.2	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.2	
29-Mar	1.9	2.1	2.4	2.4	Z	2.4	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.8	2.4		
30-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.9	1.8	1.9	2.4	
31-Mar	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	671	94.91	94.91
2.1 - 3.0	36	5.09	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - March 2015

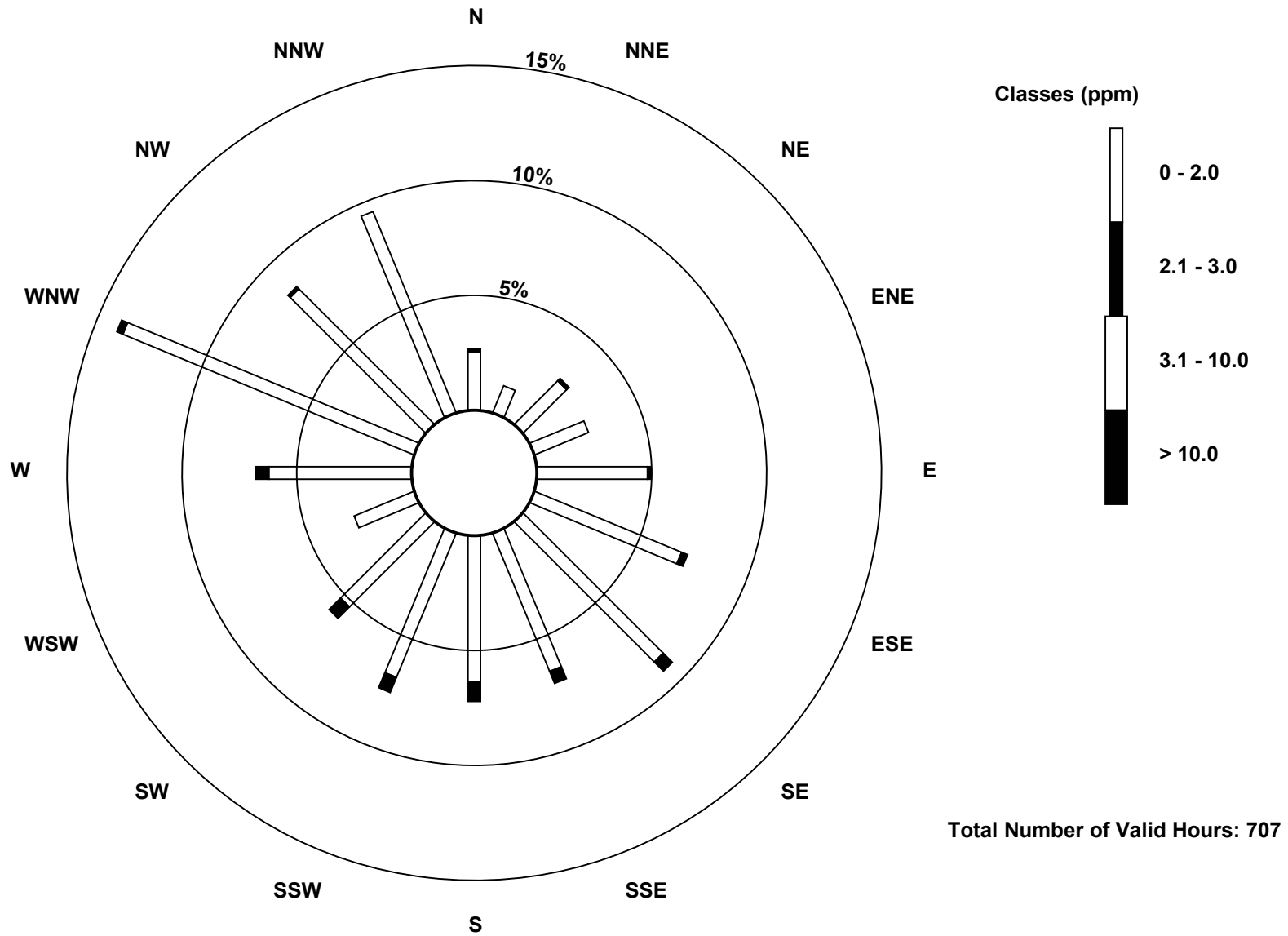
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	18	9	19	18	34	49	61	46	45	48	37	20	44	97	59	67	671
2.1 - 3.0	1	0	1	0	1	2	4	4	6	5	5	0	4	2	1	0	36
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	9	20	18	35	51	65	50	51	53	42	20	48	99	60	67	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

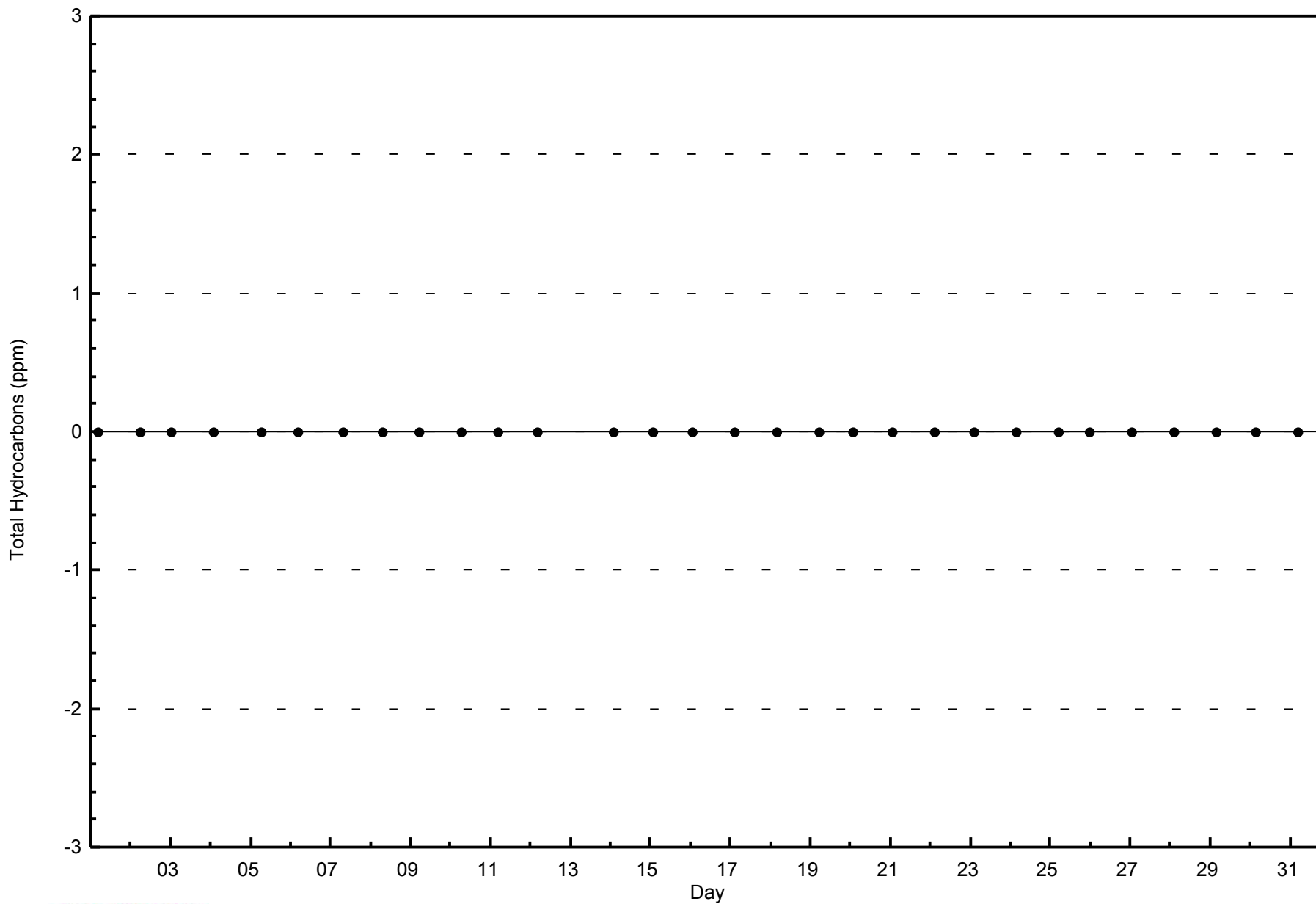
Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)





WBEA
Zero Responses

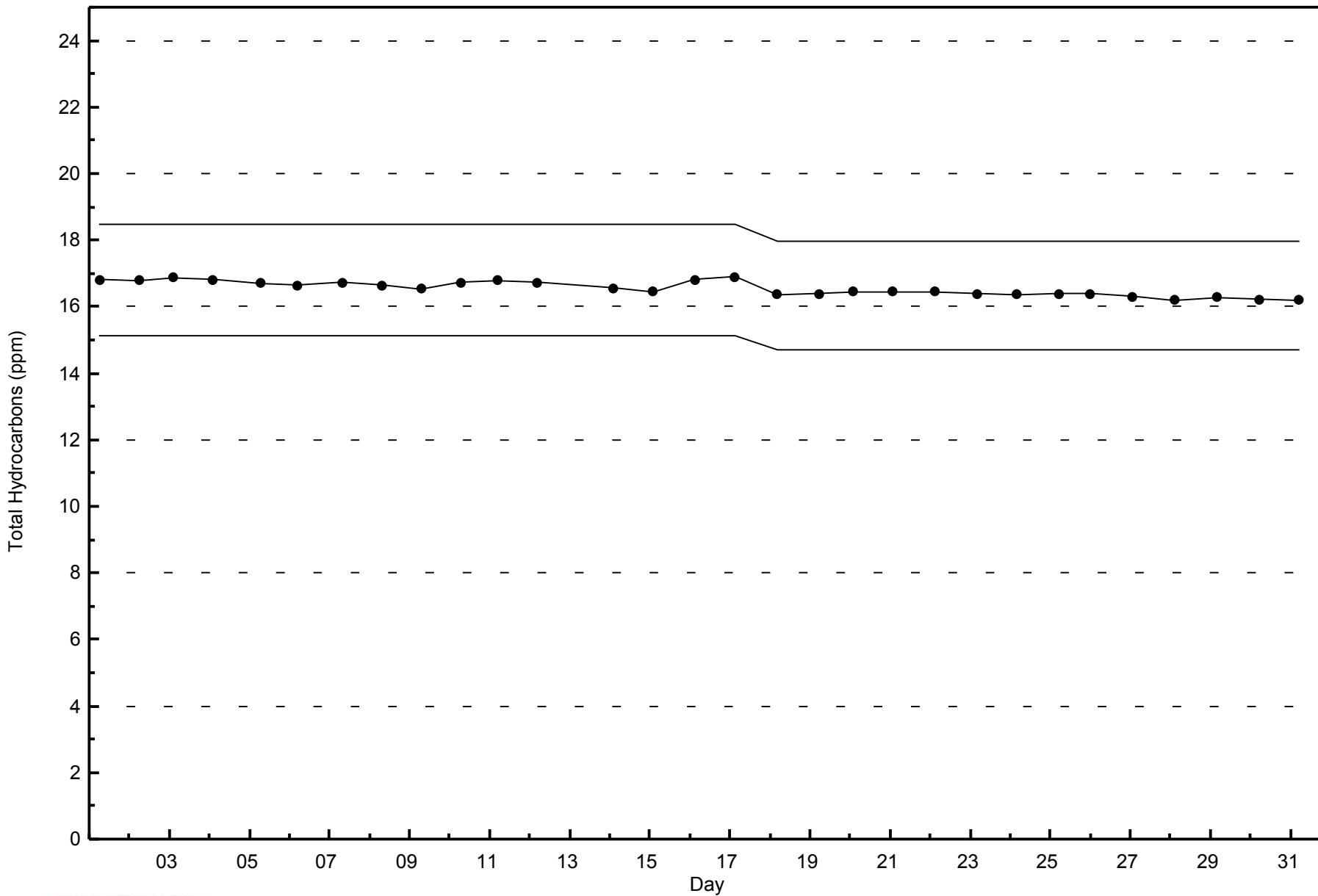
Total Hydrocarbons (THC) - ppm
Anzac - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Anzac - March 2015





Summary of Hour Averages

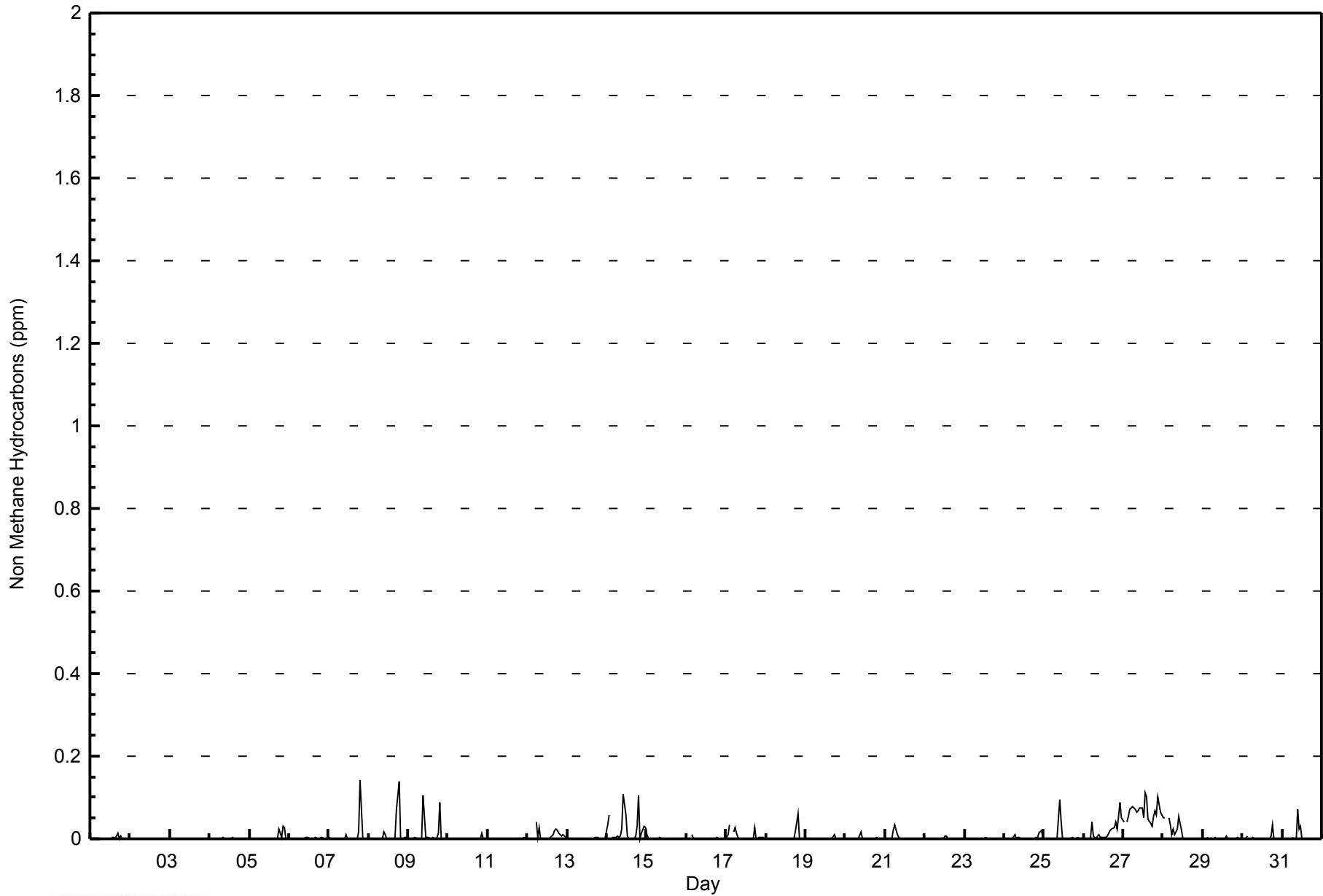
Anzac - March 2015

Maximum Value: 0.143 ppm on Mar 7 20:00		Maximum Daily Average: 0.065 ppm on Mar 27		Hours in Service: 744																							
Minimum Value: 0.000 ppm on Mar 1 01:00		Minimum Daily Average: 0.000 ppm on Mar 2		Hours of Data: 707																							
Maximum Diurnal Average: 0.017 ppm at hour 20		Minimum Diurnal Average: 0.002 ppm at hour 13		Hours of Missing Data: 37																							
Monthly Average: 0.007 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		Hours of Calibration: 37																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	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	0.004	0.004	0.002	0.013	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.001	0.013	
2-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.004	0.004
5-Mar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.025	0.002	0.032	0.027	0.000	0.000	0.004	0.032	
6-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.005	0.004	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.003	0.005	0.001	0.001	0.000	0.000	0.001	0.005	0.005
7-Mar	0.004	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.010	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.016	0.143	0.000	0.000	0.000	0.000	0.008	0.143	
8-Mar	0.000	0.000	0.000	0.000	0.001	0.000	Z	0.000	0.017	0.009	0.000	0.000	0.000	0.000	0.000	0.004	0.073	0.140	0.000	0.000	0.001	0.005	0.002	0.000	0.011	0.140	
9-Mar	0.000	0.000	0.000	0.000	0.003	0.000	Z	0.001	0.000	0.106	0.002	0.003	0.003	0.000	0.001	0.002	0.000	0.003	0.013	0.090	0.000	0.000	0.000	0.000	0.010	0.106	
10-Mar	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	0.002	0.001	0.015	0.001	0.000	0.000	0.001	0.015	
11-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.000	0.000	0.000	0.003	0.003
12-Mar	0.000	0.000	0.000	0.000	Z	0.039	0.004	0.028	0.000	0.000	0.001	0.000	0.001	0.000	0.004	0.012	0.021	0.023	0.020	0.012	0.007	0.012	0.005	0.003	0.008	0.039	0.039
13-Mar	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	0.004	0.002	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.004	0.004
14-Mar	0.033	0.057	Z	0.005	0.003	0.004	0.005	0.005	0.006	0.022	0.108	0.058	0.006	0.002	0.001	0.001	0.000	0.005	0.031	0.105	0.002	0.014	0.031	0.026	0.023	0.108	0.108
15-Mar	0.011	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.011	0.011
16-Mar	0.000	0.000	Z	0.011	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	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.011	0.011
17-Mar	0.003	0.011	0.033	Z	0.018	0.028	0.014	0.002	0.000	C	C	C	C	C	C	C	0.000	0.027	0.000	0.000	0.002	0.004	0.002	0.000	--	0.033	0.033
18-Mar	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	0.017	0.060	0.001	0.000	0.000	0.000	0.003	0.060	0.060
19-Mar	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	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010
20-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.017	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	0.017	0.017
21-Mar	0.000	Z	0.000	0.000	0.000	0.019	0.032	0.010	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.032	0.032
22-Mar	0.000	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.008	0.008
23-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003
24-Mar	0.000	0.001	0.000	0.000	Z	0.000	0.011	0.001	0.002	0.003	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.013	0.020	0.000	0.000	0.002	0.020	0.020
25-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.001	0.094	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.002	0.000	0.000	0.000	0.006	0.094	0.094
26-Mar	Z	0.000	0.000	0.000	0.003	0.039	0.005	0.000	0.006	0.011	0.004	0.005	0.004	0.003	0.008	0.015	0.020	0.023	0.026	0.041	0.023	0.053	0.088	0.052	0.019	0.088	0.088
27-Mar	0.042	Z	0.041	0.054	0.072	0.077	0.075	0.072	0.064	0.068	0.074	0.075	0.051	0.113	0.103	0.046	0.038	0.030	0.055	0.068	0.056	0.101	0.063	0.057	0.065	0.113	0.113
28-Mar	0.052	0.050	Z	0.050	0.033	0.012	0.024	0.010	0.023	0.054	0.036	0.019	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.054	0.054
29-Mar	0.001	0.002	0.001	0.002	Z	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.001	0.000	0.001	0.006	0.006
30-Mar	0.001	0.000	0.000	0.006	Z	0.000	0.003	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.007	0.034	0.000	0.000	0.001	0.000	0.002	0.034	0.034
31-Mar	0.000	0.000	0.000	0.001	0.000	Z	0.005	0.000	0.000	0.070	0.024	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.070	0.070
		0.005	0.004	0.003	0.004	0.005	0.009	0.006	0.005	0.004	0.015	0.011	0.007	0.002	0.004	0.004	0.003	0.003	0.007	0.013	0.017	0.005	0.008	0.007	0.005	Diurnal Average	
		0.052	0.057	0.041	0.054	0.072	0.077	0.075	0.072	0.064	0.106	0.108	0.075	0.051	0.113	0.103	0.046	0.038	0.073	0.140	0.143	0.056	0.101	0.088	0.057	Diurnal Maximum	
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	594	84.02	84.02
0.006 - 0.05	84	11.88	95.90
0.06 - 0.1	29	4.10	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - March 2015

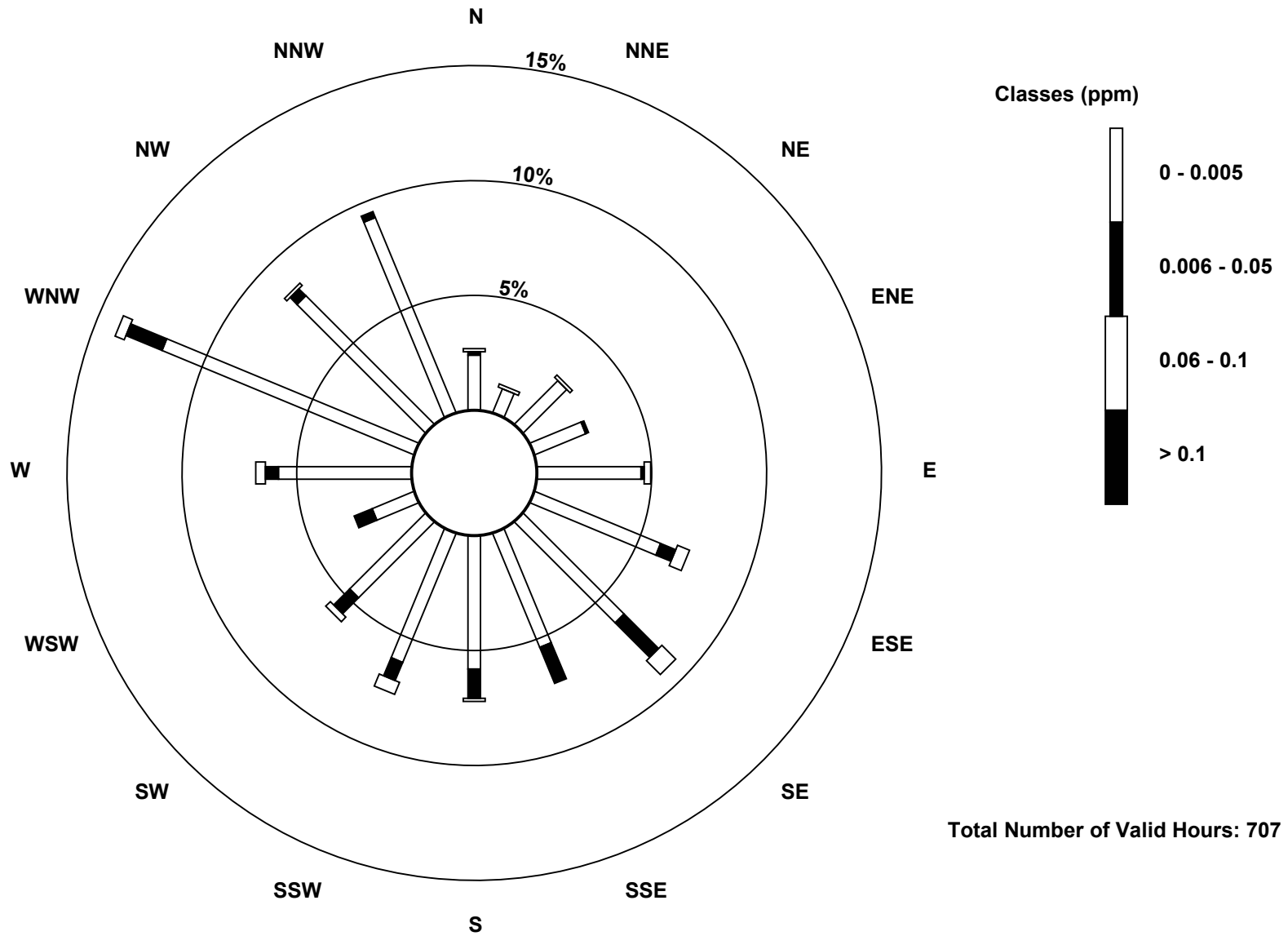
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	17	8	19	17	32	42	44	38	41	43	33	14	41	84	56	65	594
0.006 - 0.05	1	0	0	1	1	5	15	12	9	6	7	6	4	12	3	2	84
0.06 - 0.1	1	1	1	0	2	4	6	0	1	4	2	0	3	3	1	0	29
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	9	20	18	35	51	65	50	51	53	42	20	48	99	60	67	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)



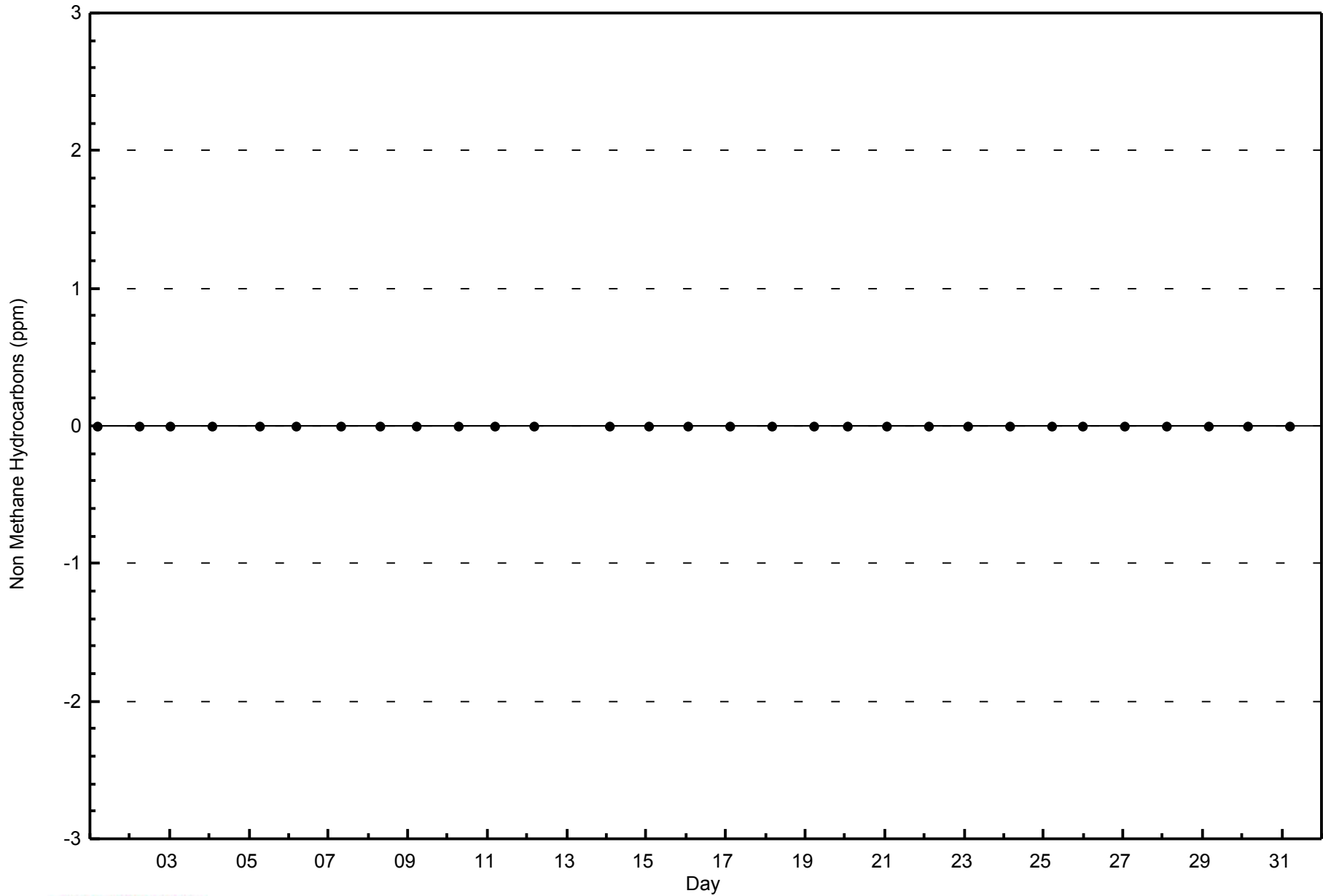


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

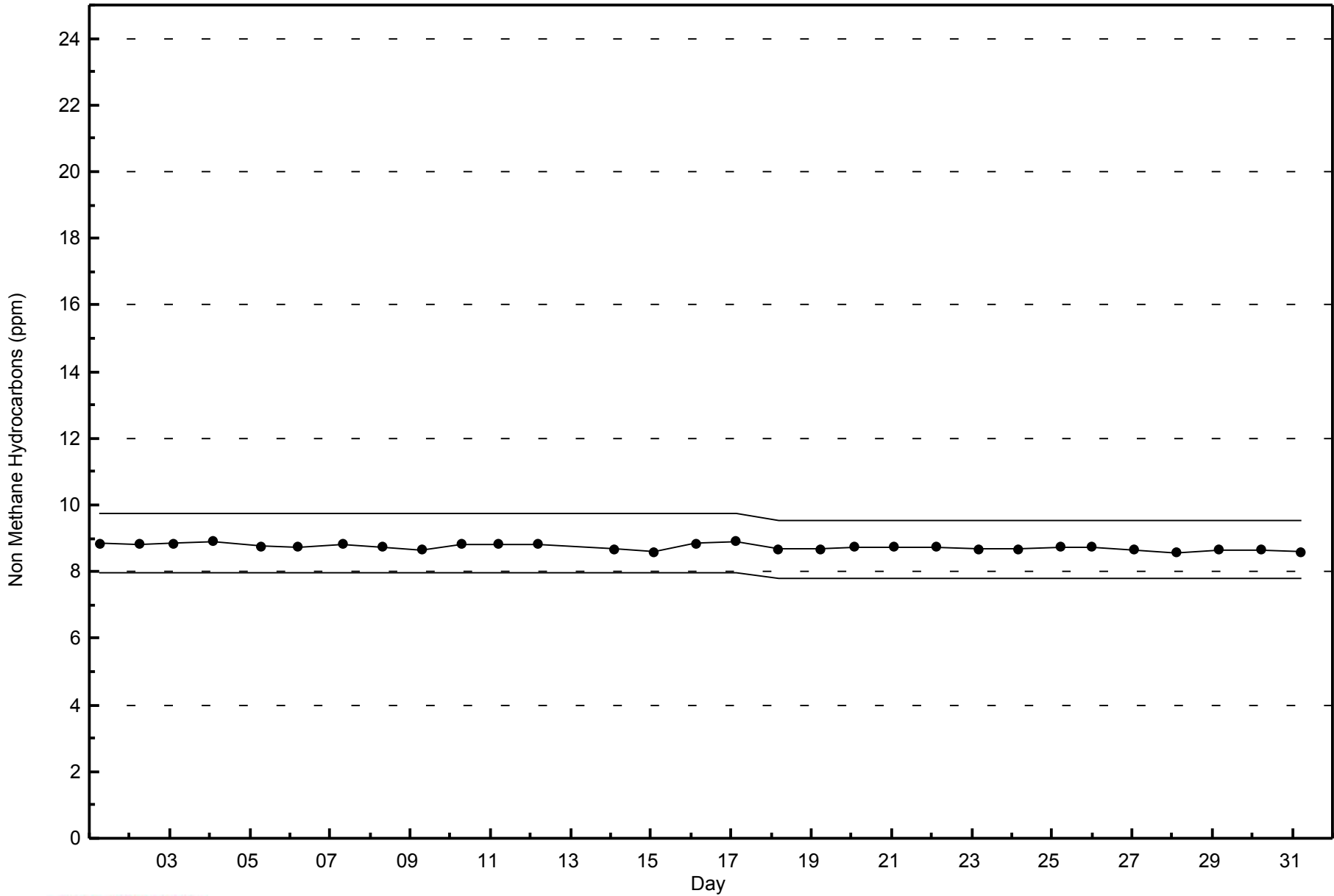
Anzac - March 2015





WBEA
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Anzac - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.4 ppm on Mar 29 03:00	Maximum Daily Average: 2.0 ppm on Mar 27		Hours of Data:	707
Minimum Value: 1.8 ppm on Mar 15 02:00	Minimum Daily Average: 1.8 ppm on Mar 9		Hours of Missing Data:	37
Maximum Diurnal Average: 1.9 ppm at hour 7	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	37
Monthly Average: 1.88 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.1		Percent Operational Time:	100.0

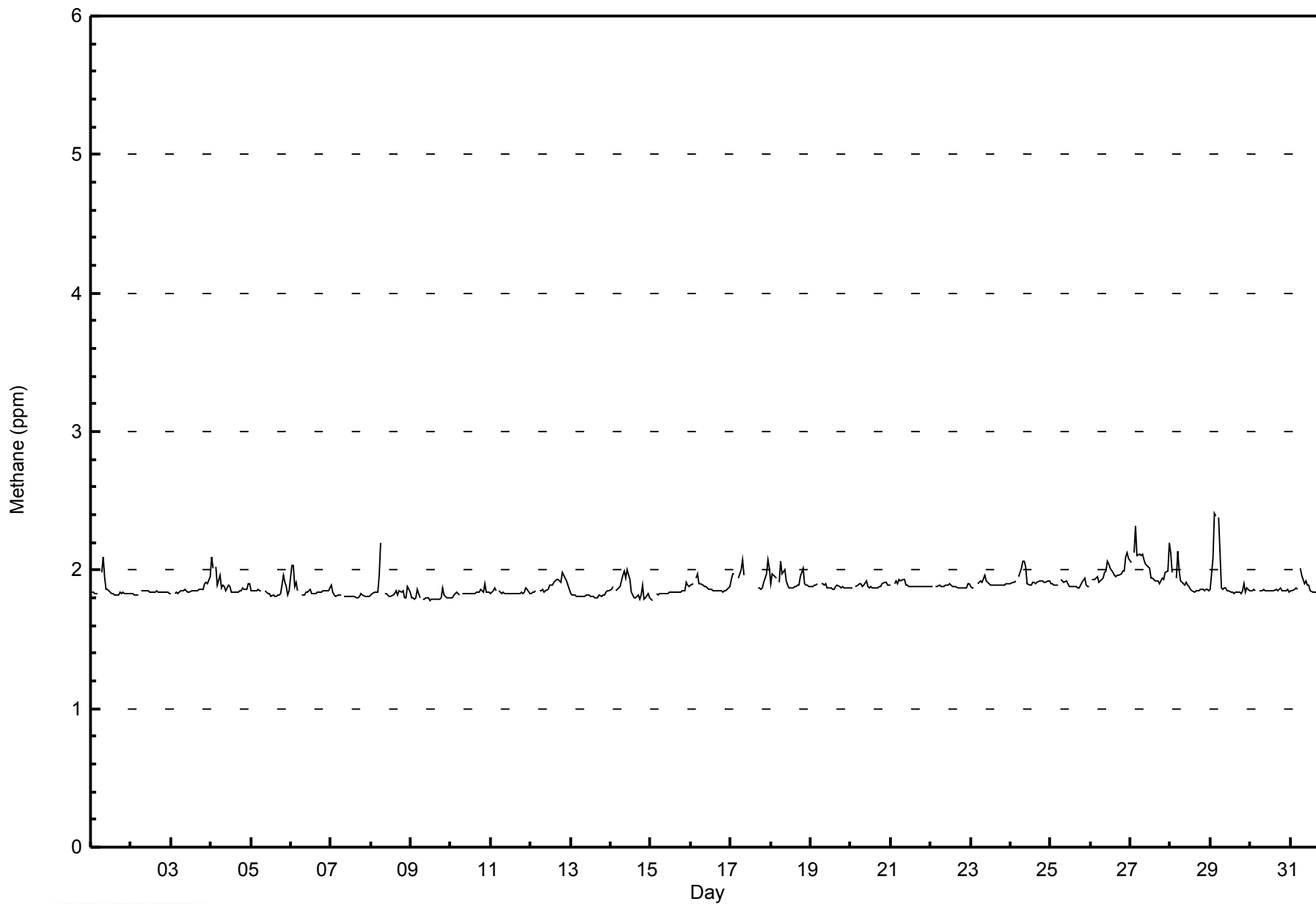
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	1.8	1.8	1.8	1.8	1.8	Z	2.0	2.1	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9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

Z - zerospan C - Calibration



WBEA
Hourly Averages

Methane (CH₄) - ppm
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Anzac - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	680	96.18	96.18
2.1 - 3.0	27	3.82	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Anzac - March 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	18	9	20	18	35	51	63	47	45	49	37	20	44	97	60	67	680
2.1 - 3.0	1	0	0	0	0	0	2	3	6	4	5	0	4	2	0	0	27
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	19	9	20	18	35	51	65	50	51	53	42	20	48	99	60	67	707

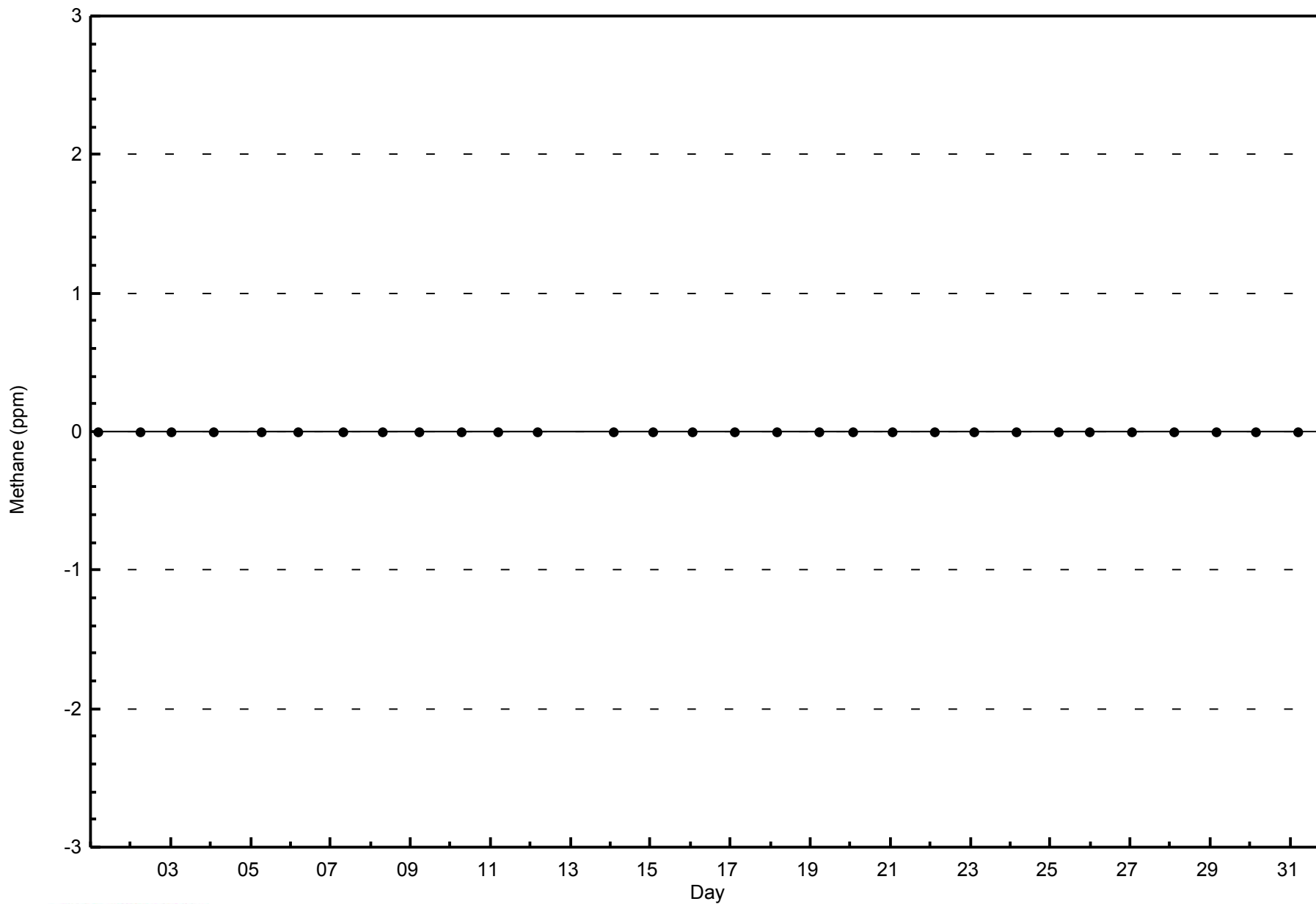
Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Zero Responses

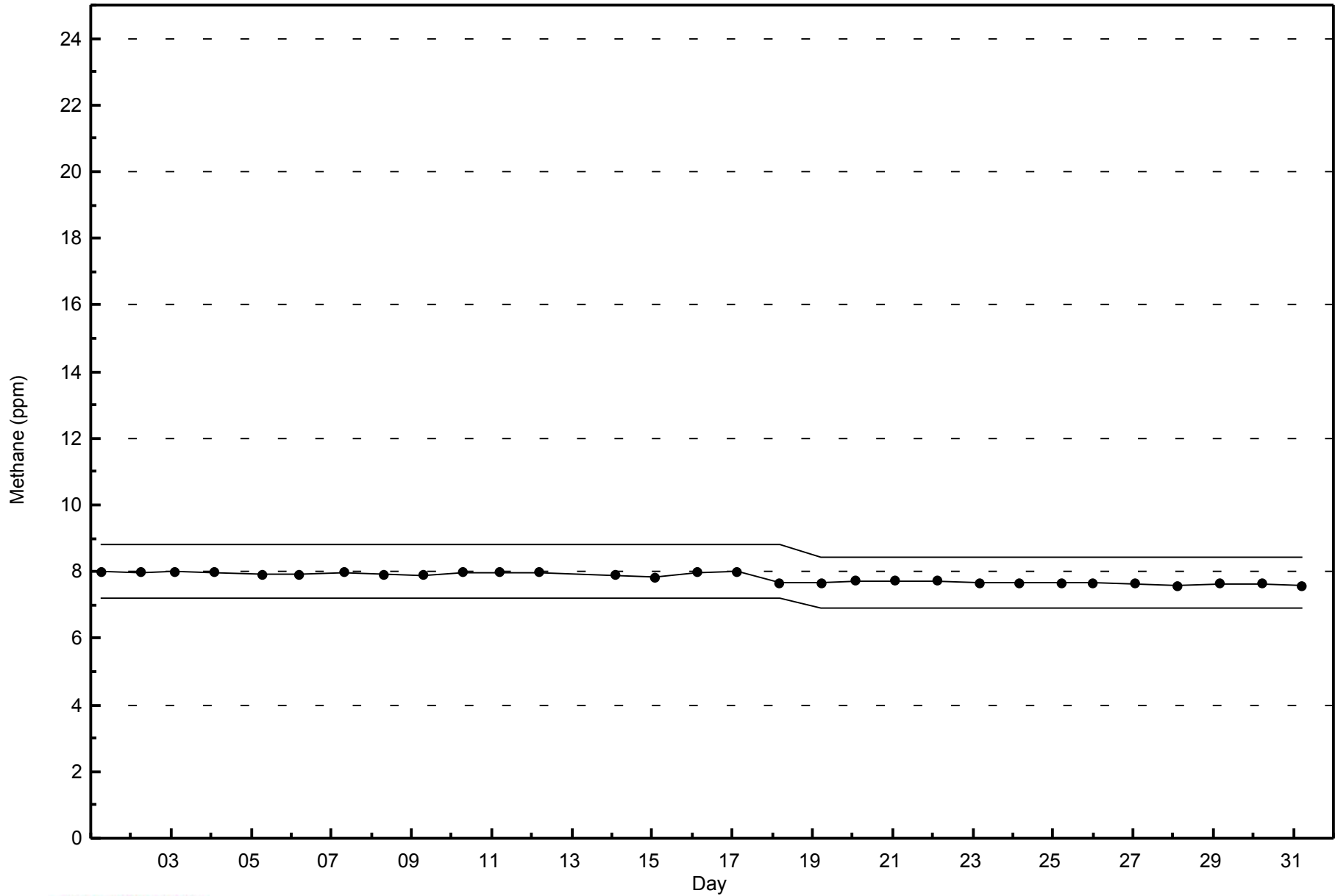
Methane (CH₄) - ppm
Anzac - March 2015





WBEA
Span Responses

Methane (CH₄) - ppm
Anzac - March 2015



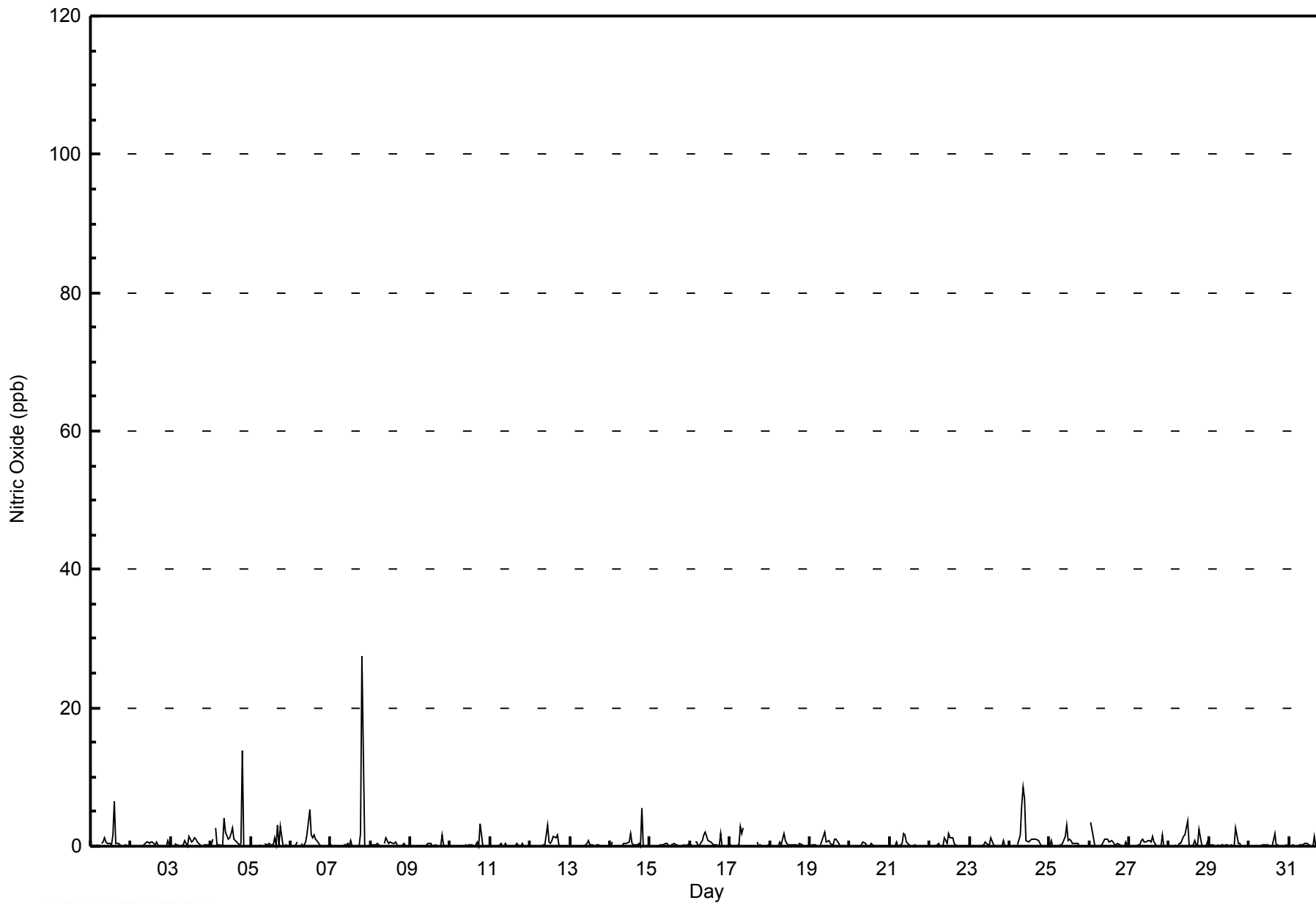


Maximum Value: 28 ppb on Mar 7 20:00																	Maximum Daily Average: 1.5 ppb on Mar 4																	Hours in Service: 744														
Minimum Value: 0 ppb on Mar 1 02:00																	Minimum Daily Average: 0.1 ppb on Mar 11																	Hours of Data: 707														
Maximum Diurnal Average: 1.6 ppb at hour 20																	Minimum Diurnal Average: 0.0 ppb at hour 22																	Hours of Missing Data: 37														
Monthly Average: 0.4 ppb																	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =0 P ₉₀ =1 P ₉₉ =5																	Hours of Calibration: 37														
																	Percent Operational Time: 100.0																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	0	0	0	0	0	Z	1	1	1	1	0	0	0	2	6	0	0	0	0	0	0	0	0	0	0.6	6																						
2-Mar	0	0	0	0	0	Z	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0.2	1																						
3-Mar	0	Z	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1																							
4-Mar	0	1	Z	3	0	0	0	0	4	2	1	1	2	3	1	1	0	0	0	14	0	0	0	1.5	14																							
5-Mar	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	3	0	0	3	0	0	0	0.4	3																							
6-Mar	0	0	0	0	1	Z	0	0	0	1	2	5	2	1	2	1	1	0	0	0	0	0	0	0.7	5																							
7-Mar	0	0	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	2	28	0	0	0	1.4	28																							
8-Mar	0	0	0	0	0	0	0	Z	0	1	1	0	1	0	0	1	0	0	0	0	1	0	0	0.3	1																							
9-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.2	2																							
10-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0.2	3																							
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
12-Mar	0	0	0	0	Z	0	0	0	0	0	3	1	0	1	1	1	2	0	0	0	0	0	0	0.4	3																							
13-Mar	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
14-Mar	0	1	Z	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	6	0	0	0	0.5	6																							
15-Mar	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-Mar	0	0	Z	1	1	0	0	1	2	2	1	1	1	0	0	0	0	0	2	0	0	0	0	0.5	2																							
17-Mar	0	0	0	Z	0	0	3	2	3	C	C	C	C	C	C	C	1	0	0	0	0	0	0	--	3																							
18-Mar	0	0	0	0	Z	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
19-Mar	0	0	0	0	0	Z	0	1	1	2	1	1	0	0	0	1	1	0	0	0	0	0	0	0.4	2																							
20-Mar	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
21-Mar	0	Z	0	0	1	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
22-Mar	0	0	Z	0	0	0	0	0	0	1	0	2	1	1	1	1	0	0	0	0	0	0	0	0.4	2																							
23-Mar	0	0	0	Z	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0.2	1																							
24-Mar	0	0	0	0	Z	0	2	6	8	7	1	1	1	1	1	1	1	1	0	0	0	0	0	1.3	8																							
25-Mar	0	1	0	0	0	Z	0	0	0	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0.4	3																							
26-Mar	Z	3	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0.5	3																							
27-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	2	0	0	0.4	2																							
28-Mar	0	0	Z	0	0	0	0	0	1	2	3	4	0	0	0	1	0	0	3	0	0	0	1	0.7	4																							
29-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0.2	3																							
30-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.1	2																							
31-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.2	1																							
																								0.1	0.2	0.1	0.2	0.1	0.1	0.3	0.5	1.0	1.0	0.8	0.8	0.5	0.5	0.7	0.5	0.5	0.2	0.5	1.6	0.1	0.0	0.1	0.1	Diurnal Average
																								0	3	1	3	1	0	3	6	8	7	3	5	2	3	6	2	3	1	3	28	2	0	1	1	Diurnal Maximum
Z - zerospan C - Calibration																																																



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - March 2015

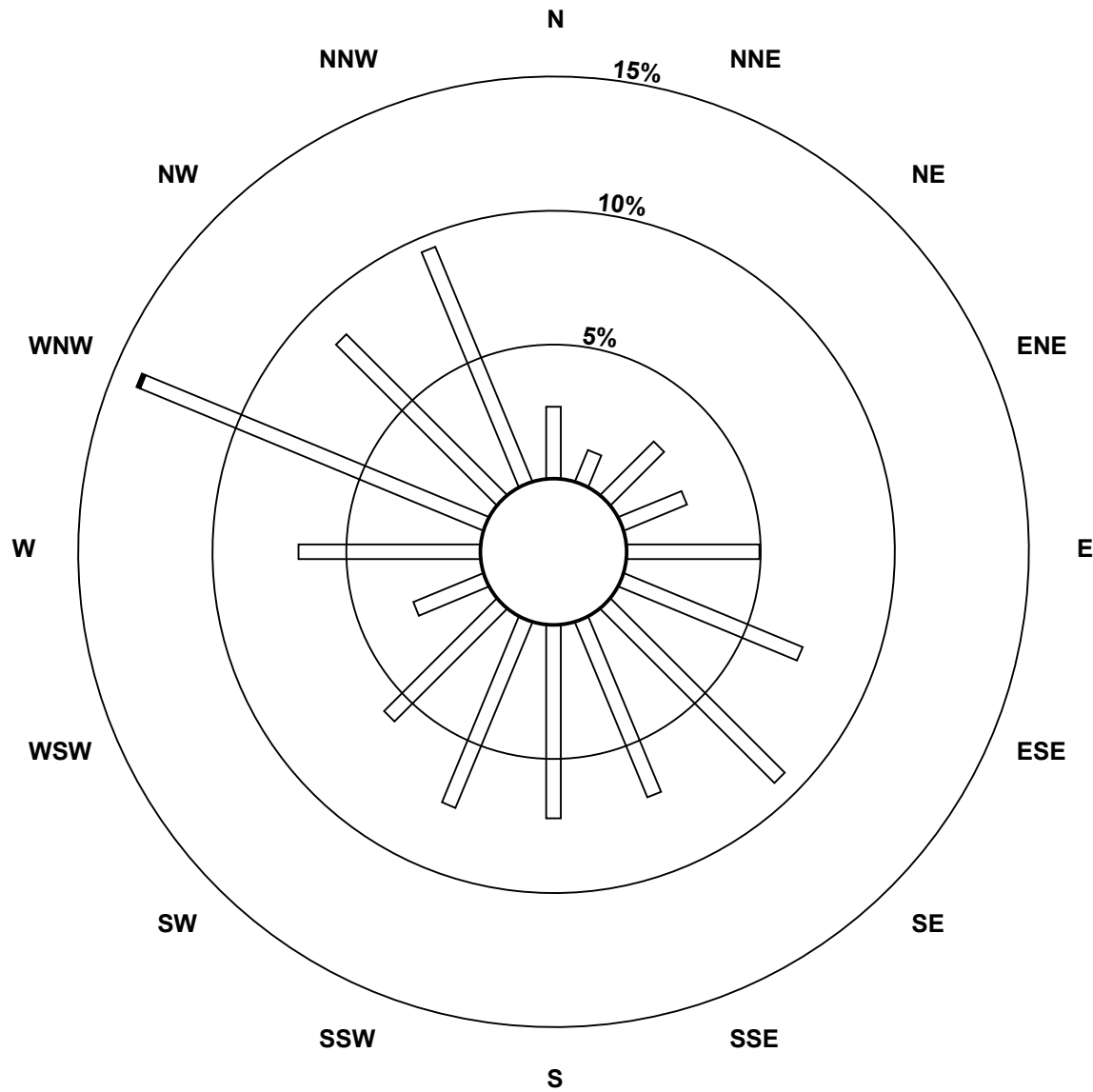
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	9	20	18	35	51	65	50	51	53	42	20	48	98	60	67	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	9	20	18	35	51	65	50	51	53	42	20	48	99	60	67	707

Total Number of Valid Hours: 707

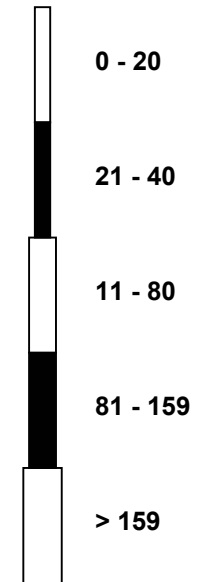
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



Classes (ppb)

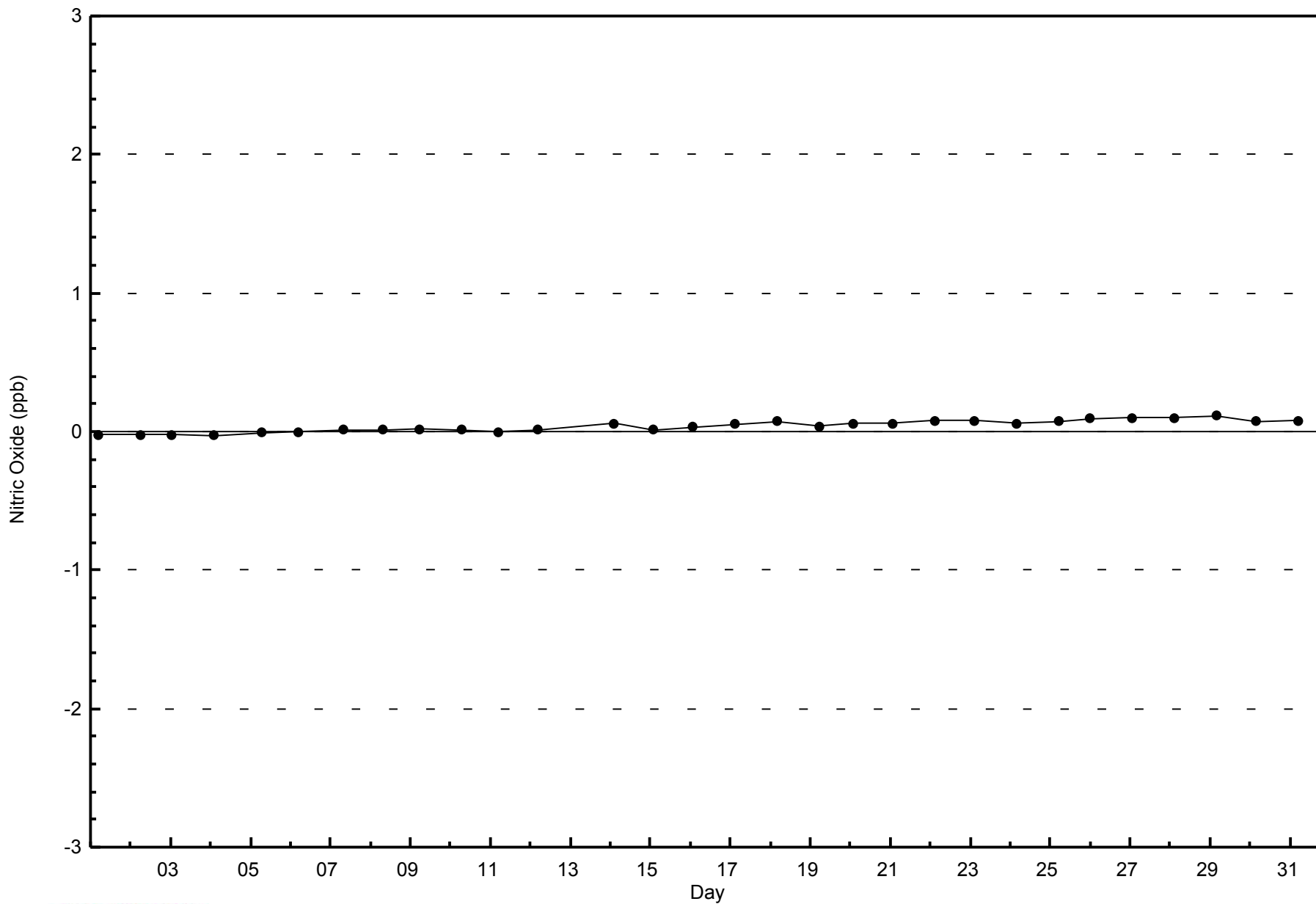


Total Number of Valid Hours: 707



WBEA
Zero Responses

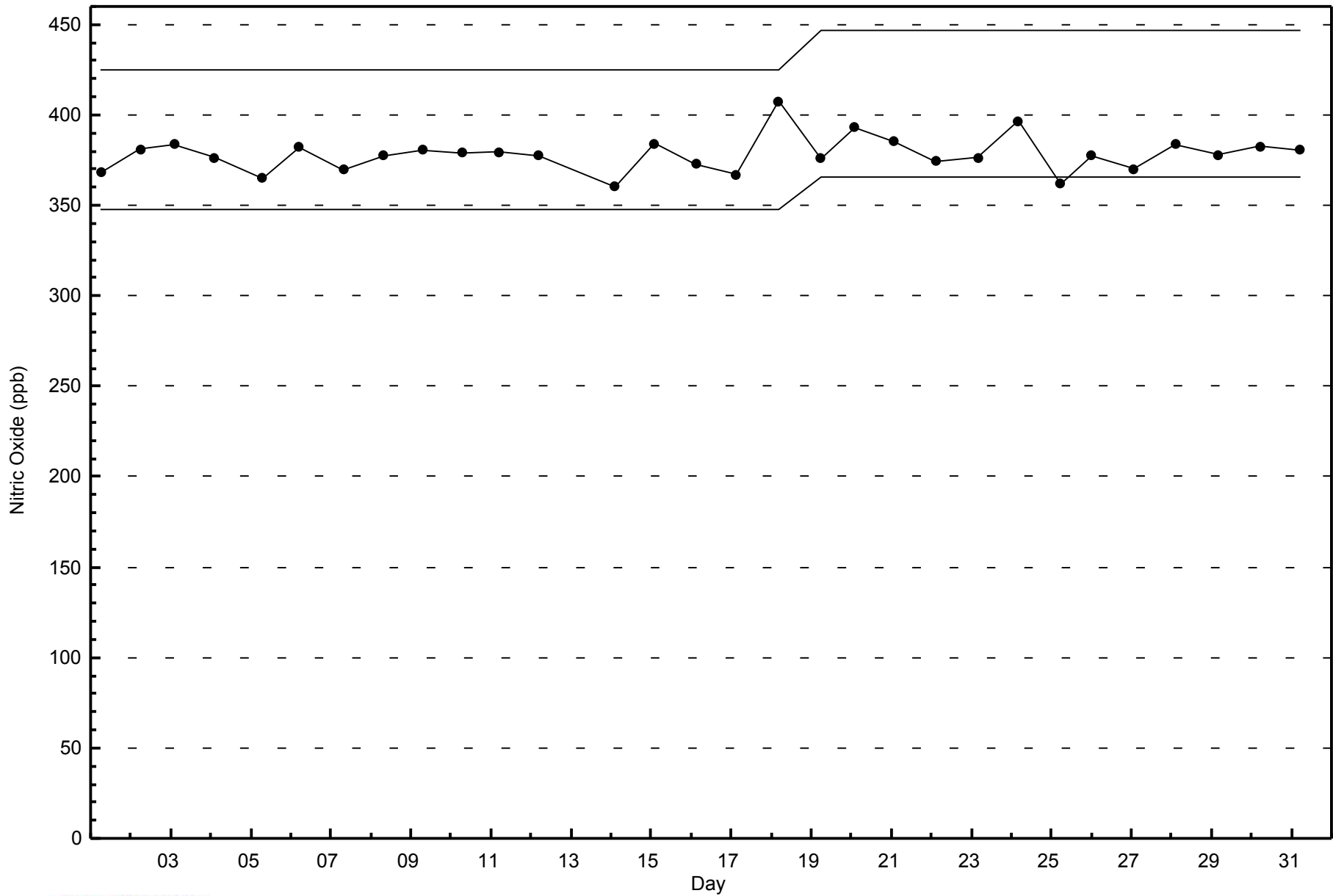
Nitric Oxide (NO) - ppb
Anzac - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Anzac - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Mar 16 05:00	Maximum Daily Average: 6.1 ppb on Mar 24		Hours of Data:	707
Minimum Value: 0 ppb on Mar 10 22:00	Minimum Daily Average: 0.2 ppb on Mar 11		Hours of Missing Data:	37
Maximum Diurnal Average: 3.4 ppb at hour 20	Minimum Diurnal Average: 1.4 ppb at hour 14		Hours of Calibration:	37
Monthly Average: 2.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 15		Percent Operational Time:	100.0

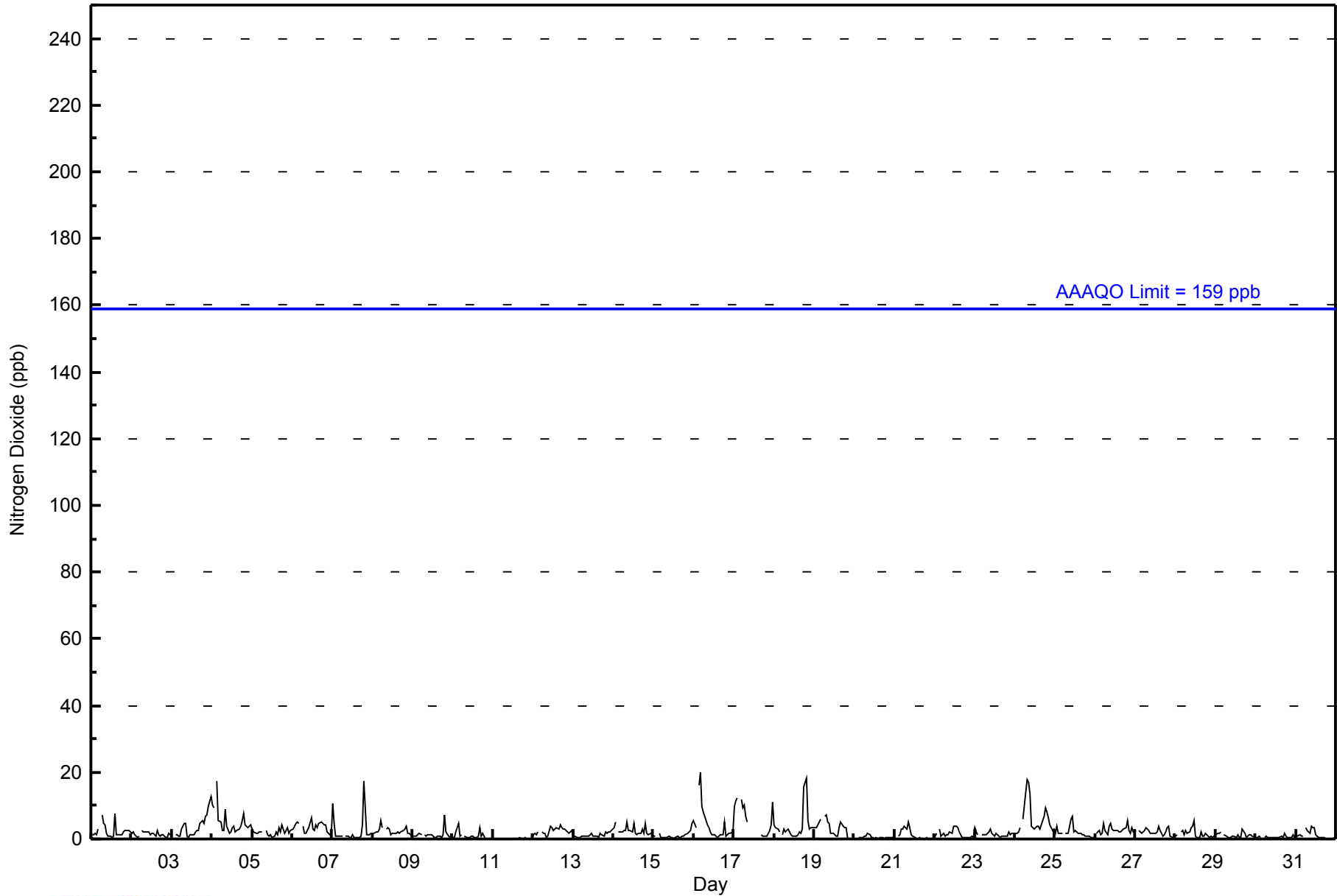
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	1	1	2	1	3	Z	7	5	4	2	1	1	1	1	8	1	1	1	1	2	2	2	3	2	2.3	8	
2-Mar	2	2	1	1	1	Z	3	2	2	2	2	1	2	2	1	3	1	1	1	1	1	1	2	1	1.5	3	
3-Mar	1	Z	1	1	1	1	3	5	5	1	0	1	1	1	2	2	3	5	6	5	7	7	10	13	3.6	13	
4-Mar	10	9	Z	17	6	5	3	2	9	4	2	2	3	4	2	3	3	4	6	8	4	4	4	4	5.1	17	
5-Mar	3	2	2	2	2	2	2	Z	3	1	1	1	1	1	2	1	3	2	4	2	3	3	2	3	2.1	4	
6-Mar	3	4	5	5	5	Z	4	2	2	3	4	6	3	3	4	4	5	5	5	4	4	2	1	2	3.6	6	
7-Mar	11	5	1	1	1	1	1	Z	1	1	1	0	1	0	0	0	0	1	4	17	1	1	1	2	2.3	17	
8-Mar	2	2	2	2	3	6	3	Z	3	3	3	1	2	2	2	2	2	2	2	3	4	2	2	1	2.4	6	
9-Mar	1	1	1	1	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	7	2	1	0	1	1.3	7	
10-Mar	1	0	2	5	1	1	Z	1	1	1	0	1	1	1	0	1	3	1	2	0	0	0	0	0	0.9	5	
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1	
12-Mar	1	2	1	2	Z	2	2	2	1	1	4	4	2	3	4	3	4	3	3	3	2	2	2	3	2.4	4	
13-Mar	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	2	2	2	2	3	1.2	3	
14-Mar	3	5	Z	2	2	2	2	3	5	3	2	2	5	2	1	2	2	3	2	5	2	1	2	1	2.6	5	
15-Mar	1	1	Z	2	0	0	0	1	0	1	1	0	0	0	1	1	1	1	1	2	2	2	2	5	1.0	5	
16-Mar	6	4	Z	16	20	10	8	6	4	4	2	1	1	1	1	1	1	1	5	1	1	2	2	2	4.3	20	
17-Mar	10	11	12	Z	12	9	10	7	5	C	C	C	C	C	C	C	1	1	1	1	1	3	4	11	--	12	
18-Mar	4	3	3	2	Z	1	3	2	3	2	1	1	1	1	1	2	2	3	16	18	5	3	4	3	3.7	18	
19-Mar	4	4	4	5	6	Z	7	7	5	5	2	2	1	1	1	3	5	4	3	3	1	0	0	0	3.1	7	
20-Mar	0	0	Z	0	0	1	1	1	2	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0.5	2	
21-Mar	1	Z	1	1	3	3	4	3	5	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.3	5	
22-Mar	1	2	Z	3	1	2	1	1	1	2	2	4	4	4	3	2	1	0	0	0	0	0	1	1	1.6	4	
23-Mar	3	2	1	Z	1	1	1	1	2	3	2	1	1	2	1	1	1	1	1	1	2	1	2	2	1.5	3	
24-Mar	2	2	2	3	Z	6	14	18	17	13	4	3	4	4	4	3	4	7	9	8	6	4	3	3	6.1	18	
25-Mar	2	4	2	2	2	Z	2	2	2	6	7	2	2	2	2	2	1	1	1	1	1	1	0	0	1.9	7	
26-Mar	Z	2	3	1	2	5	3	1	4	5	3	3	2	3	2	2	3	3	3	6	3	2	3	2	2.8	6	
27-Mar	3	Z	3	2	2	3	3	3	3	2	2	2	2	2	4	3	1	1	2	3	4	1	1	1	2.2	4	
28-Mar	1	1	Z	2	3	1	2	2	2	3	4	5	1	0	1	2	1	1	2	1	1	1	1	1	1.6	5	
29-Mar	1	2	2	2	Z	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1.0	3	
30-Mar	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	1	0	2	1	0	1	0	1	1	1	0.6	2	
31-Mar	1	1	1	1	1	Z	3	2	2	4	4	3	1	0	0	1	0	0	0	0	0	0	0	0	1	1.2	4
	2.6	2.6	2.2	2.9	3.1	2.6	3.2	2.9	3.0	2.6	1.9	1.8	1.5	1.4	1.6	1.5	1.8	1.8	2.7	3.4	2.0	1.7	1.8	2.2		Diurnal Average	
	11	11	12	17	20	10	14	18	17	13	7	6	5	4	8	4	5	7	16	18	7	7	10	13		Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - March 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	9	20	18	35	51	65	50	51	53	42	20	48	99	60	67	707
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	19	9	20	18	35	51	65	50	51	53	42	20	48	99	60	67	707

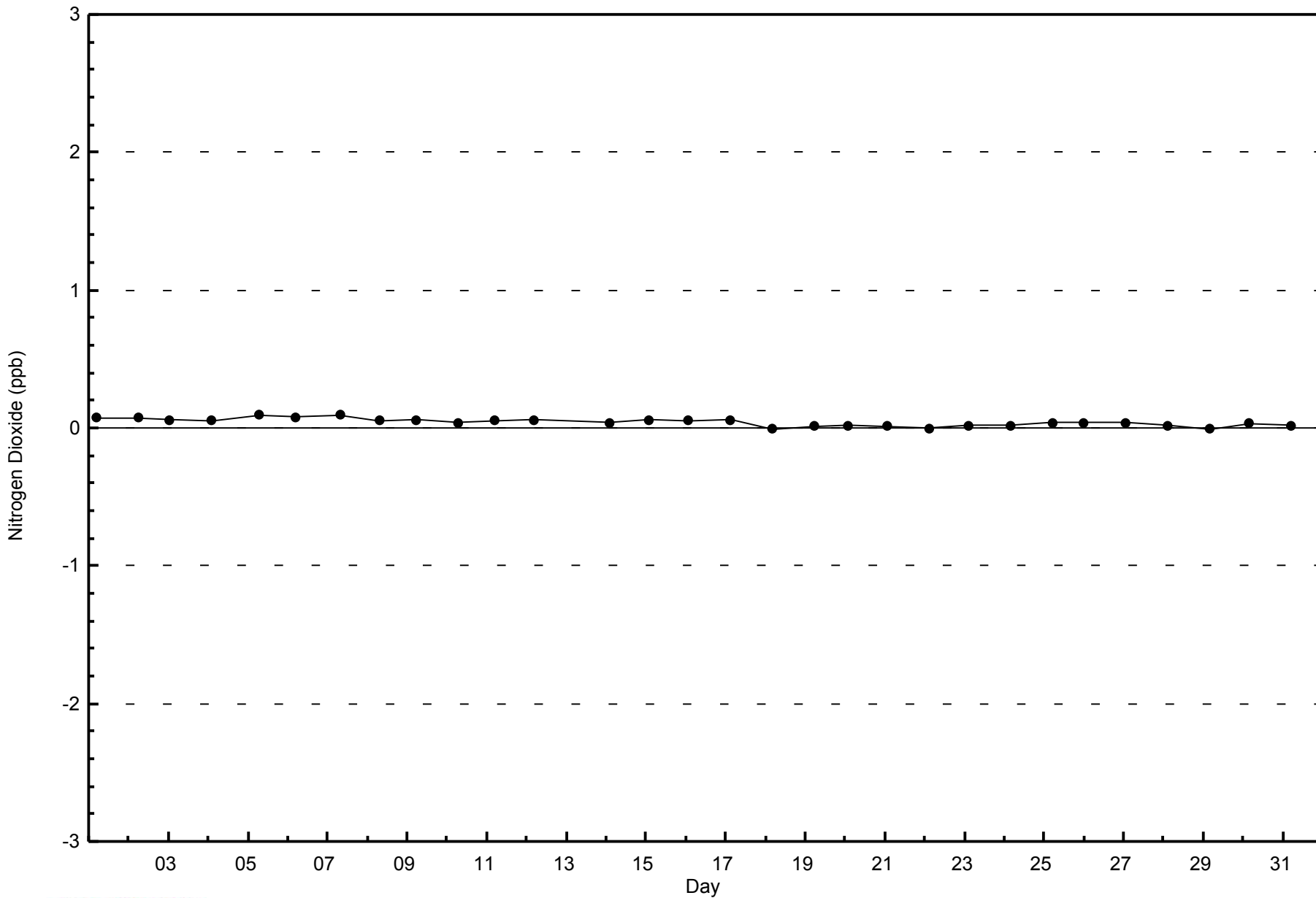
Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Zero Responses

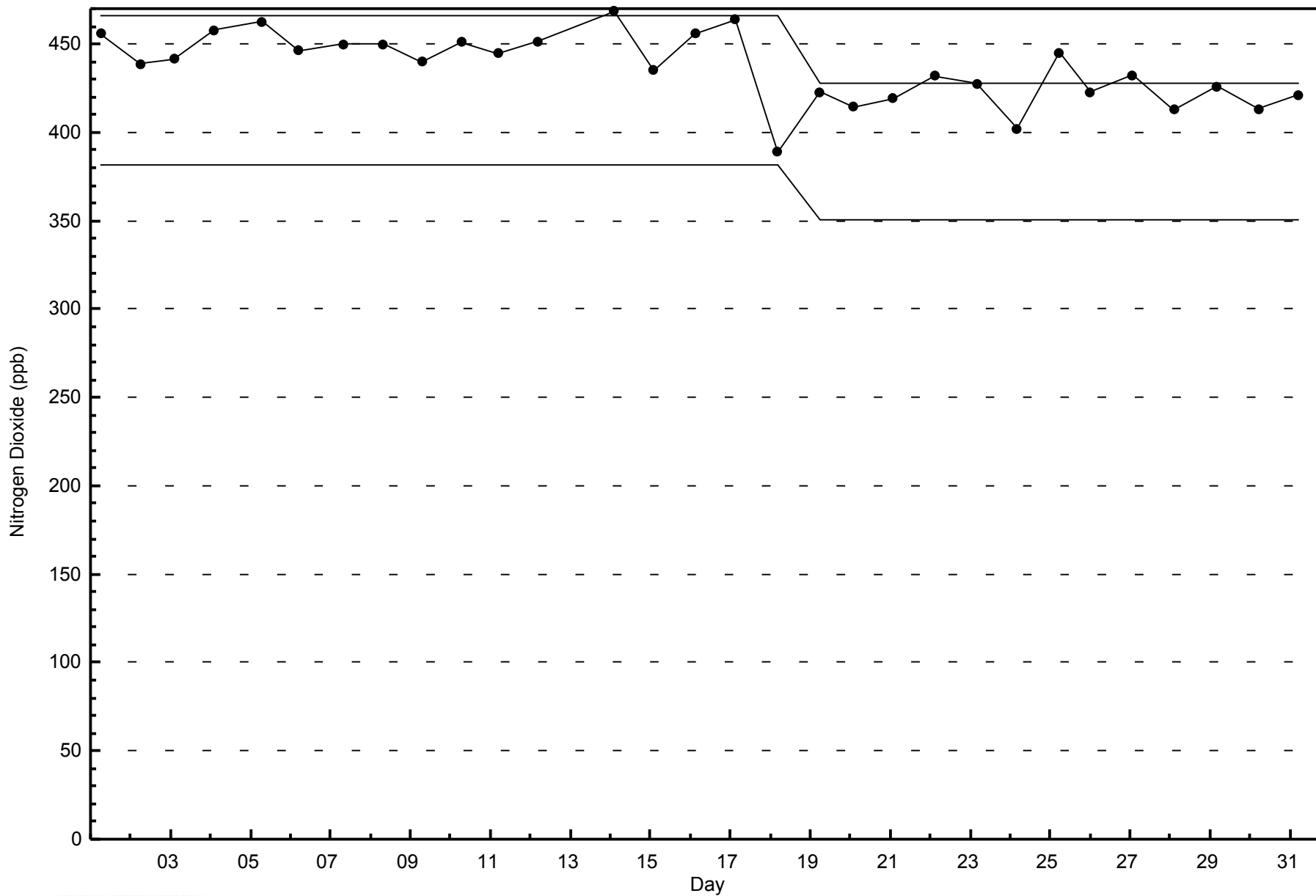
Nitrogen Dioxide (NO₂) - ppb
Anzac - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Anzac - March 2015



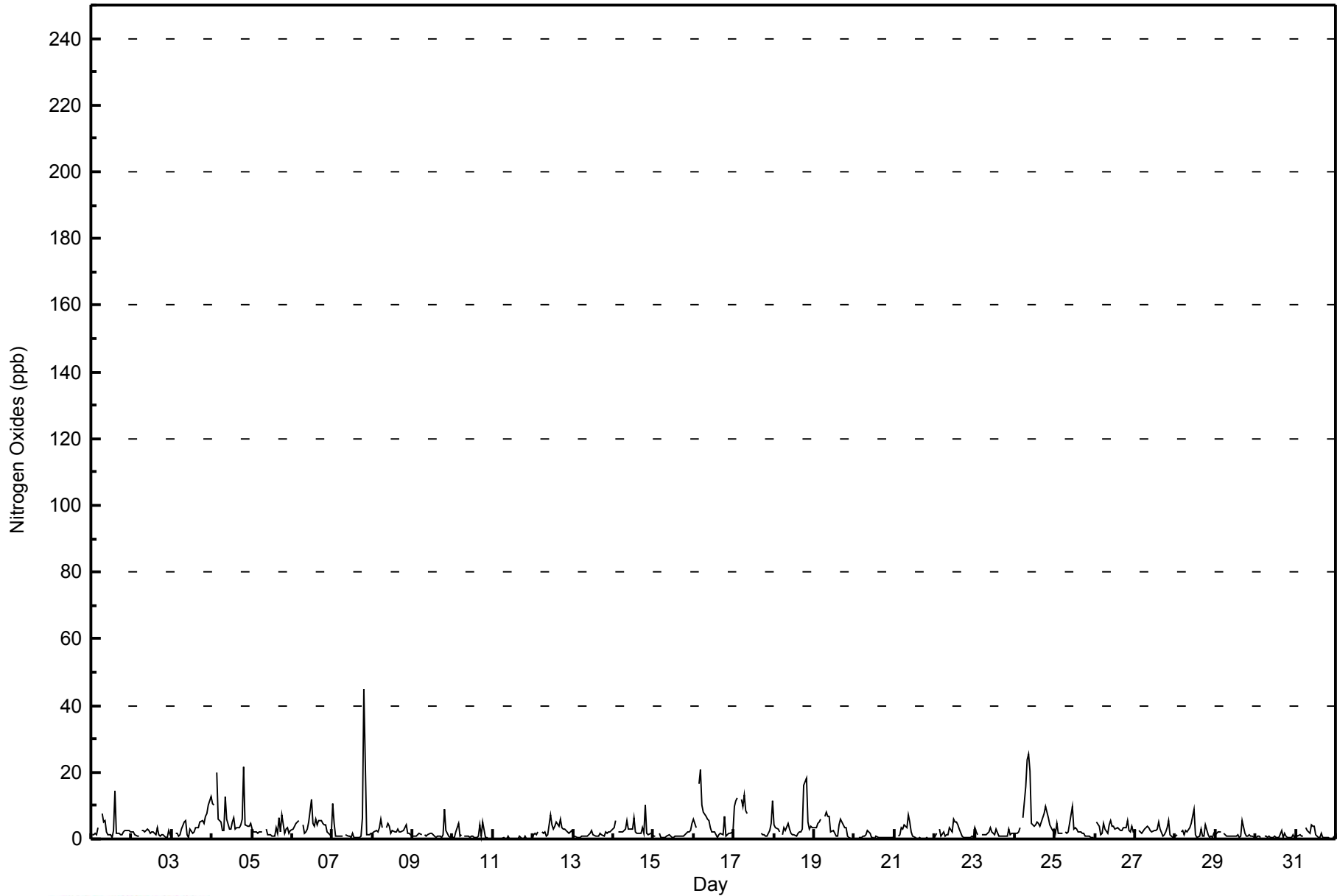


Maximum Value: 45 ppb on Mar 7 20:00																		Maximum Daily Average: 7.5 ppb on Mar 24						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 11 08:00																		Minimum Daily Average: 0.3 ppb on Mar 11						Hours of Data: 707		
Maximum Diurnal Average: 5.0 ppb at hour 20																		Minimum Diurnal Average: 1.7 ppb at hour 22						Hours of Missing Data: 37		
Monthly Average: 2.7 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 20						Hours of Calibration: 37		
																								Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1	1	2	1	3	Z	8	5	6	2	1	1	1	3	14	2	2	1	1	2	3	3	3	2	2.9	14
2-Mar	2	2	1	1	1	Z	3	2	2	3	3	2	2	2	1	3	1	1	1	1	0	1	3	1	1.8	3
3-Mar	2	Z	2	2	1	1	3	5	5	1	0	3	2	2	4	3	3	5	6	5	7	8	10	13	4.0	13
4-Mar	11	10	Z	20	6	5	3	3	13	6	3	3	5	7	3	3	3	4	6	22	4	4	4	5	6.6	22
5-Mar	3	2	2	2	2	2	2	Z	3	1	1	1	1	1	3	2	6	2	7	2	3	3	2	3	2.5	7
6-Mar	3	4	5	5	5	Z	4	2	2	3	5	12	5	4	6	4	6	5	5	4	4	2	1	2	4.3	12
7-Mar	11	5	1	1	1	1	1	Z	1	1	1	1	2	0	0	0	0	1	6	45	1	1	1	2	3.6	45
8-Mar	2	2	2	2	3	6	3	Z	3	5	4	2	2	2	2	3	2	2	2	3	4	2	2	1	2.7	6
9-Mar	1	1	1	1	2	1	Z	1	1	1	2	1	1	1	0	1	1	1	1	9	3	1	0	1	1.4	9
10-Mar	1	0	2	5	1	1	Z	1	1	1	0	1	1	1	0	1	4	1	5	0	0	0	0	0	1.2	5
11-Mar	0	0	0	0	Z	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0.3	1
12-Mar	1	2	1	2	Z	2	2	2	1	1	7	4	3	4	5	4	6	3	3	3	2	2	2	2	2.8	7
13-Mar	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	2	1	1	2	2	2	2	2	1.3	3
14-Mar	3	6	Z	2	2	2	2	3	6	3	3	6	2	2	2	2	3	2	10	1	1	2	1	1	3.0	10
15-Mar	1	1	Z	2	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1	2	2	3	5	1.2	5
16-Mar	6	3	Z	16	21	10	8	7	6	6	4	2	2	1	1	1	2	1	7	1	1	2	2	2	4.8	21
17-Mar	10	11	12	Z	12	10	13	9	8	C	C	C	C	C	C	C	2	1	1	1	1	3	4	11	--	13
18-Mar	4	3	3	2	Z	1	3	3	5	3	2	1	1	1	2	2	2	3	16	18	5	3	4	3	4.0	18
19-Mar	3	4	5	5	6	Z	7	8	7	7	2	2	2	1	1	4	6	4	3	3	1	0	0	0	3.6	8
20-Mar	0	0	Z	0	0	1	1	1	2	2	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0.6	2
21-Mar	1	Z	1	1	4	3	4	3	7	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	7
22-Mar	1	2	Z	3	1	2	1	1	1	3	2	6	5	5	4	3	1	1	0	0	0	0	1	1	1.9	6
23-Mar	3	2	1	Z	1	1	1	1	2	3	2	2	1	3	1	1	1	1	1	1	3	1	2	2	1.7	3
24-Mar	2	2	2	3	Z	6	16	24	25	20	5	4	4	5	5	4	5	8	10	8	6	4	3	3	7.5	25
25-Mar	2	5	2	2	2	Z	2	2	2	7	10	3	3	3	2	2	1	2	1	1	1	1	0	0	2.4	10
26-Mar	Z	5	4	1	2	5	3	2	4	6	4	4	3	3	3	2	3	4	3	6	3	2	4	2	3.3	6
27-Mar	3	Z	3	2	2	3	3	4	3	2	2	3	2	3	5	3	1	1	2	3	5	1	1	1	2.6	5
28-Mar	1	1	Z	2	3	1	3	2	3	5	7	9	1	0	1	3	1	1	4	1	1	1	1	2	2.3	9
29-Mar	1	2	2	2	Z	2	1	1	1	1	1	1	1	1	0	1	6	2	1	1	1	1	1	1	1.3	6
30-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	0	0	1	3	0	2	1	0	1	0	1	1	0.8	3
31-Mar	1	1	1	1	1	Z	4	3	2	4	4	4	1	1	0	2	0	0	0	0	0	0	0	1	1.4	4
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	99.29	99.29
21 - 40	4	0.57	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - March 2015

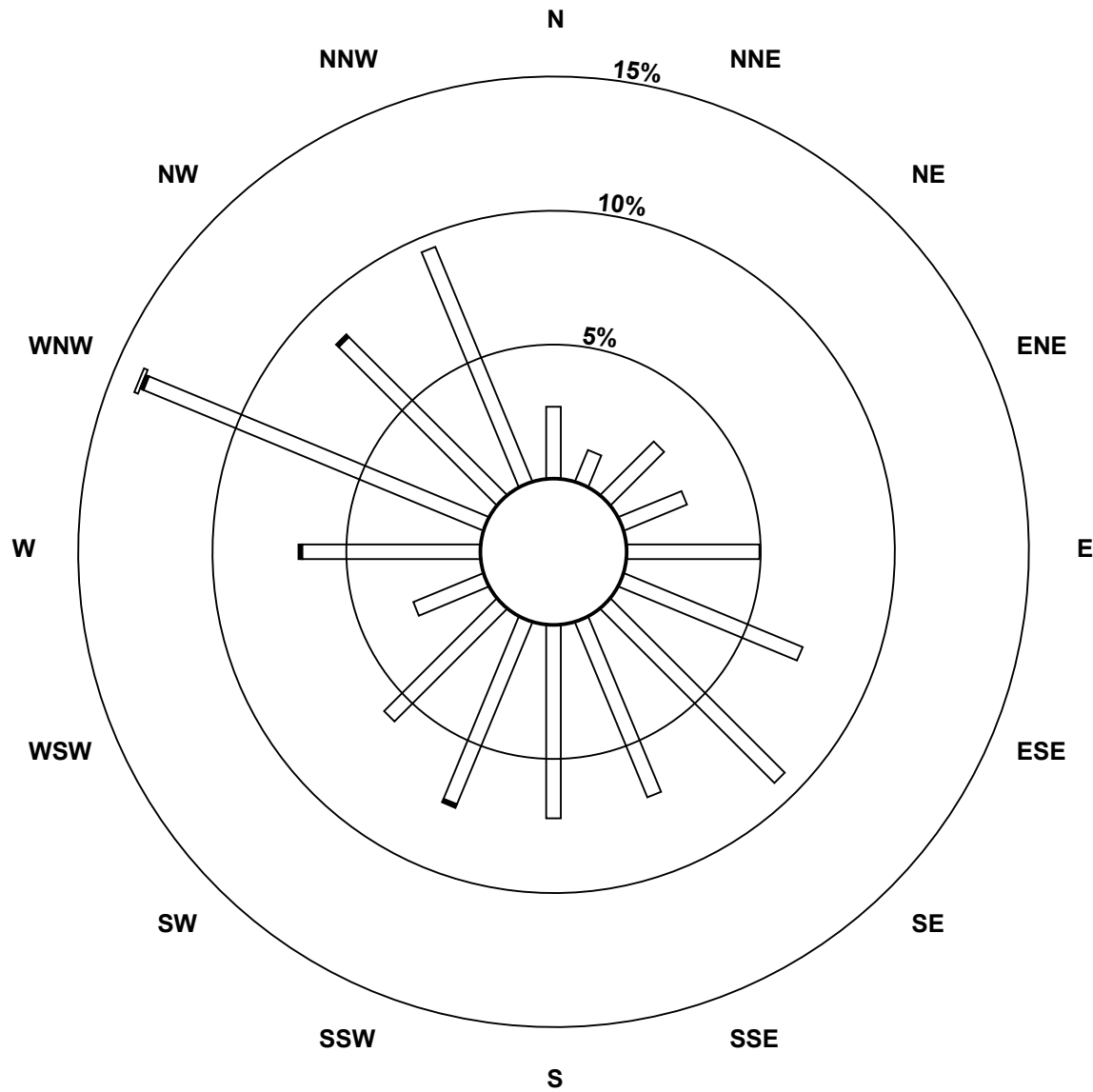
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	9	20	18	35	51	65	50	51	52	42	20	47	97	59	67	702
21 - 40	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	9	20	18	35	51	65	50	51	53	42	20	48	99	60	67	707

Total Number of Valid Hours: 707

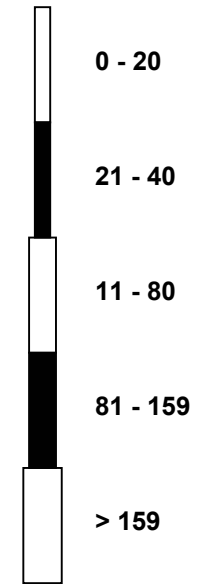
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

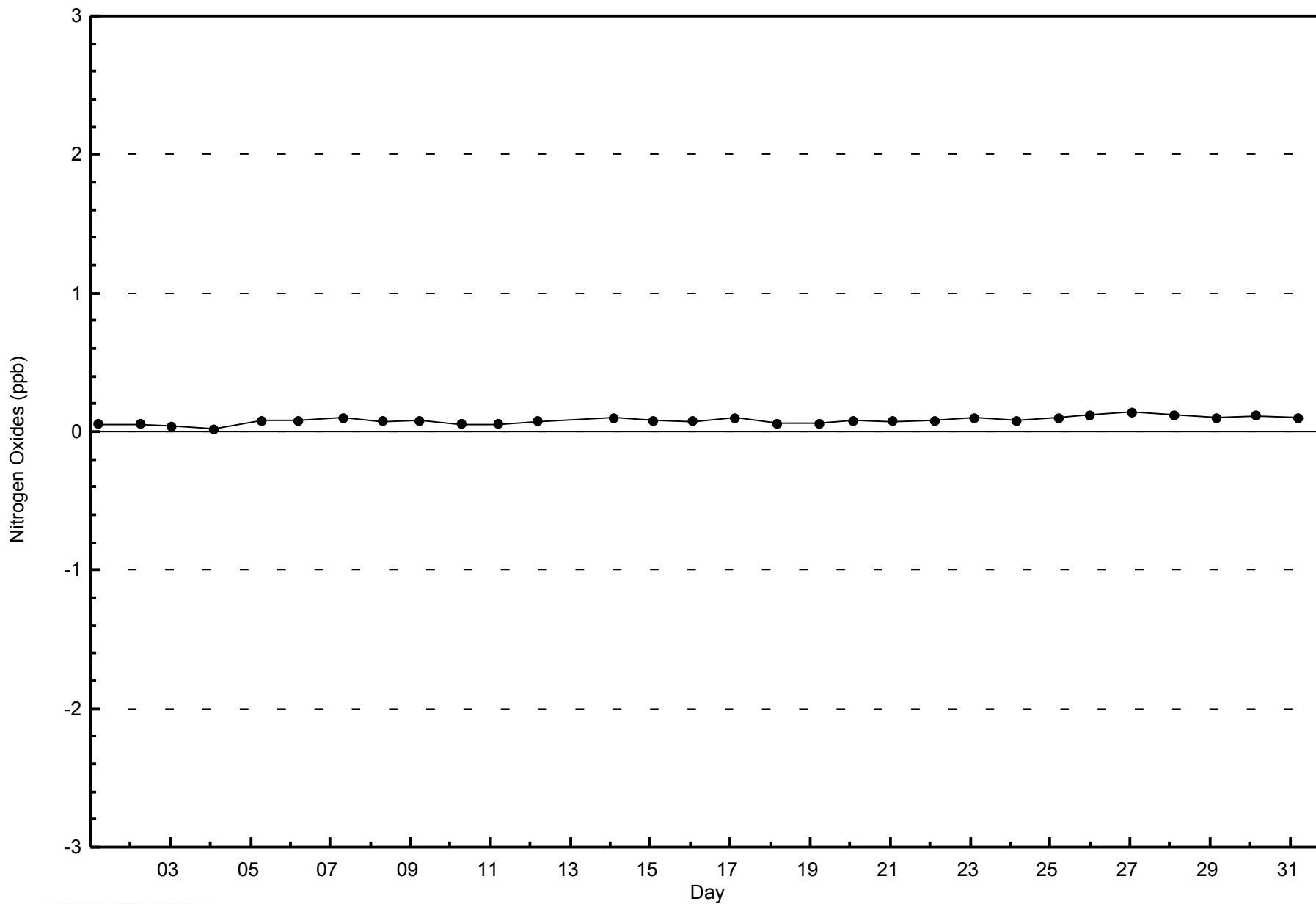
Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)



Classes (ppb)



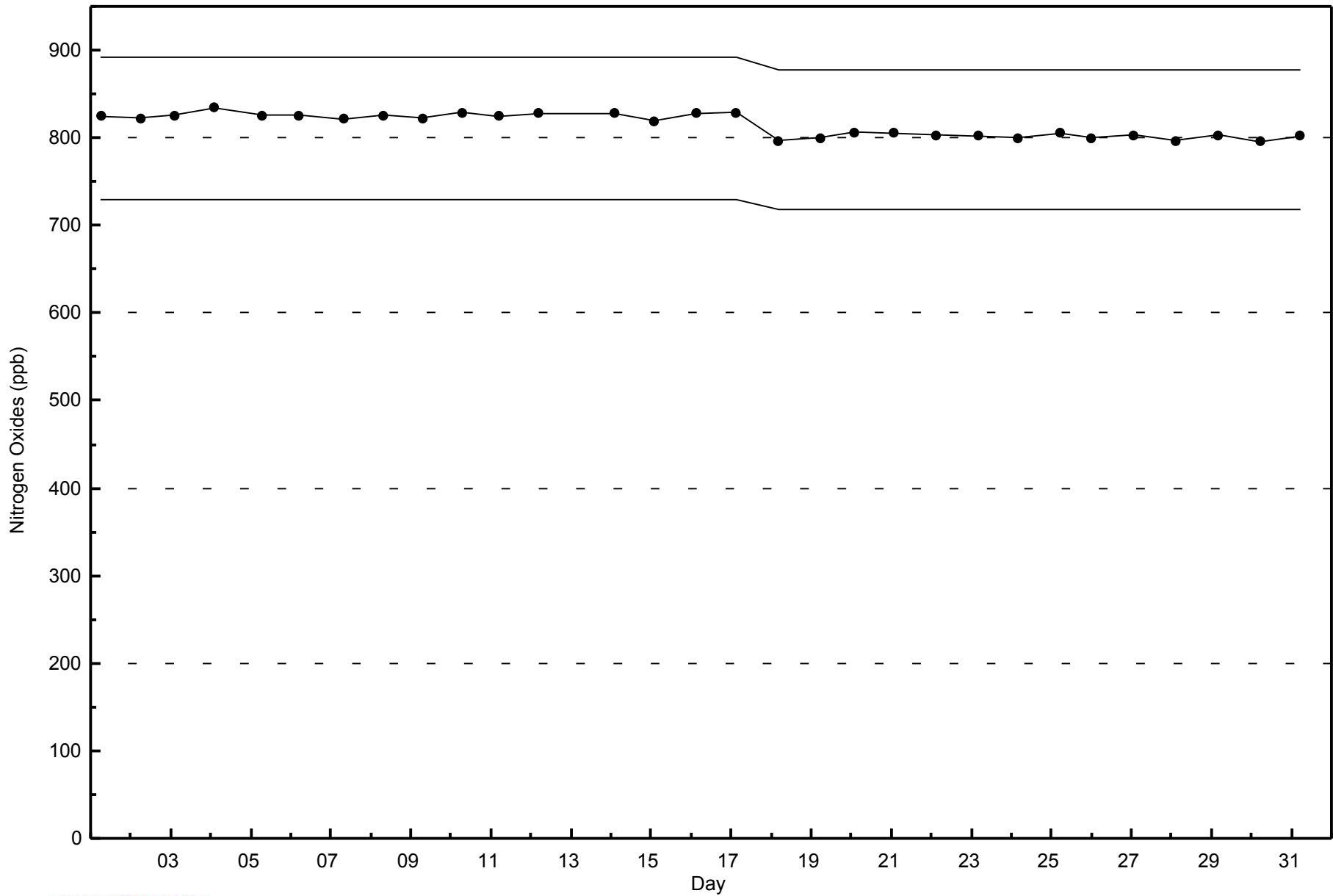
Total Number of Valid Hours: 707





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Anzac - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 51 ppb on Mar 14 16:00	Maximum Daily Average: 45.9 ppb on Mar 13		Hours of Data:	709
Minimum Value: 7 ppb on Mar 27 05:00	Minimum Daily Average: 19.0 ppb on Mar 27		Hours of Missing Data:	35
Maximum Diurnal Average: 40.9 ppb at hour 16	Minimum Diurnal Average: 30.3 ppb at hour 6		Hours of Calibration:	35
Monthly Average: 35.2 ppb	Percentiles: P ₁ = 8 P ₁₀ = 23 Q ₁ = 31 Median = 37 Q ₃ = 41 P ₉₀ = 44 P ₉₉ = 49		Percent Operational Time:	100.0

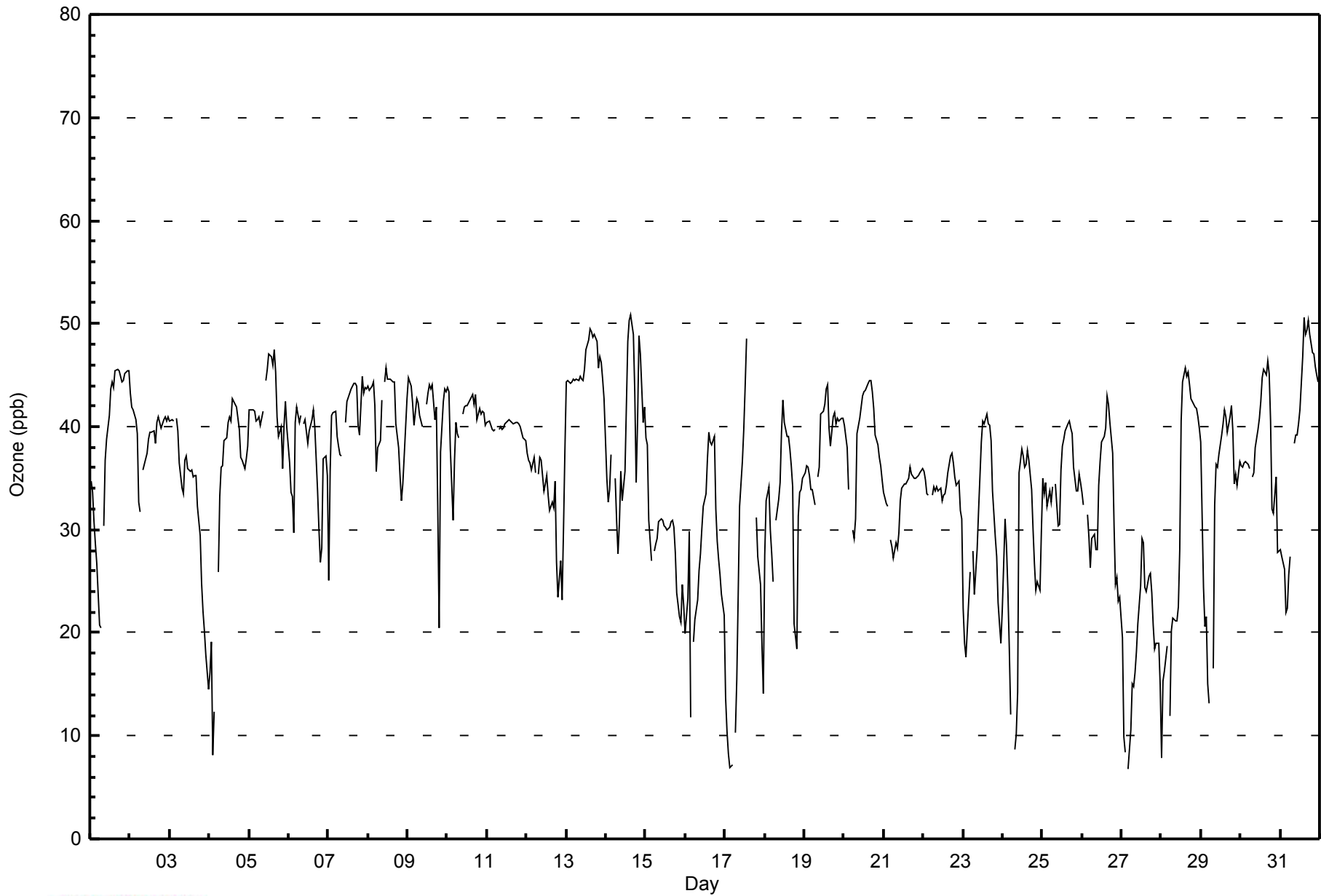
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	35	34	31	29	27	21	20	Z	30	37	39	41	44	44	44	45	46	45	45	44	45	45	45	45	38.3	46																							
2-Mar	43	42	42	41	39	33	32	Z	36	37	37	39	39	39	40	38	40	41	40	40	41	41	41	41	39.2	43																							
3-Mar	41	41	41	Z	41	40	36	34	34	37	37	36	36	36	35	35	35	32	29	25	22	20	18	15	32.8	41																							
4-Mar	16	19	8	12	Z	26	33	36	36	39	39	40	41	41	43	42	42	41	40	37	37	36	37	38	33.9	43																							
5-Mar	42	42	42	41	41	41	41	40	41	Z	45	46	47	47	46	47	45	41	39	40	36	40	42	40	42.2	47																							
6-Mar	36	34	33	30	40	42	40	41	Z	40	41	38	40	40	41	42	40	34	30	27	28	37	37	35	36.8	42																							
7-Mar	25	36	41	41	41	39	38	37	37	Z	40	40	42	43	43	44	44	44	40	39	45	43	44	44	40.7	45																							
8-Mar	44	44	44	44	42	36	38	39	43	Z	44	46	45	45	45	44	44	40	38	35	33	34	37	43	41.1	46																							
9-Mar	45	44	44	42	40	43	42	41	41	40	Z	42	43	44	44	44	41	42	32	21	38	42	44	43	40.9	45																							
10-Mar	44	43	38	31	37	40	39	39	Z	41	42	42	42	42	43	43	42	43	41	42	41	41	41	40	40.8	44																							
11-Mar	40	41	40	40	40	40	Z	40	40	40	40	40	41	41	41	40	40	40	40	40	40	39	39	39	40.0	41																							
12-Mar	37	37	36	36	37	36	Z	35	37	37	34	34	35	33	32	33	32	35	27	23	27	23	30	38	33.3	38																							
13-Mar	44	44	44	44	45	44	45	44	45	45	44	46	48	48	49	49	49	49	48	46	47	46	45	43	45.9	49																							
14-Mar	35	33	34	37	Z	35	31	28	31	36	33	36	42	48	50	51	49	43	35	41	49	47	40	42	39.3	51																							
15-Mar	39	38	31	27	Z	28	29	29	31	31	31	30	30	30	31	31	30	28	24	22	21	25	23	23	29.0	39																							
16-Mar	20	23	30	12	Z	19	21	23	26	28	30	32	33	37	39	38	38	39	32	29	27	26	24	22	28.2	39																							
17-Mar	14	10	8	7	7	Z	10	15	24	32	37	40	44	49	C	C	C	C	C	31	27	25	19	14	22.9	49																							
18-Mar	28	33	34	30	28	25	Z	31	33	35	39	43	40	39	39	38	36	34	21	18	31	34	34	35	32.9	43																							
19-Mar	36	36	36	35	34	34	32	Z	35	36	41	41	42	44	44	40	38	41	41	40	41	41	41	41	38.7	44																							
20-Mar	40	39	38	34	Z	30	29	31	39	41	42	43	43	44	44	44	44	43	42	39	38	37	36	35	39.0	44																							
21-Mar	34	33	32	Z	29	28	27	29	28	30	33	34	34	34	35	35	36	35	35	35	35	35	35	36	36	33.0	36																						
22-Mar	36	35	33	33	Z	33	34	34	34	34	34	33	33	34	34	35	37	37	37	35	34	35	32	31	34.3	37																							
23-Mar	22	19	18	23	26	Z	28	24	28	32	35	39	41	40	41	40	40	39	34	29	27	23	21	19	29.9	41																							
24-Mar	22	31	28	24	19	12	Z	9	10	14	35	38	37	36	36	38	37	34	30	27	24	25	24	30	27.0	38																							
25-Mar	35	34	35	32	34	33	34	Z	34	30	30	36	38	39	40	40	41	40	39	36	34	34	35	35	35.5	41																							
26-Mar	34	32	Z	31	29	26	29	30	28	28	34	37	38	39	40	43	42	40	37	30	25	25	23	23	32.4	43																							
27-Mar	20	10	8	Z	7	11	15	15	16	18	21	25	29	29	24	24	26	26	24	21	18	19	19	15	19.0	29																							
28-Mar	8	15	16	19	Z	12	20	21	21	21	23	28	41	44	46	45	45	44	43	42	42	42	41	40	31.2	46																							
29-Mar	38	24	21	22	15	13	Z	16	32	36	36	37	39	40	42	41	39	41	42	40	34	35	34	37	32.9	42																							
30-Mar	36	36	36	37	36	36	Z	35	36	38	40	41	43	45	46	45	46	45	41	32	32	35	28	28	37.9	46																							
31-Mar	28	27	26	22	22	26	27	Z	38	39	39	40	42	47	51	49	49	50	49	47	47	46	45	44	39.2	51																							
																								32.8	32.5	31.6	30.6	31.5	30.3	30.9	30.6	32.6	33.9	36.5	38.2	39.8	40.7	40.9	40.9	40.5	39.7	36.6	34.1	34.4	34.6	34.1	33.9	Diurnal Average	
																								45	44	44	44	45	44	45	44	45	45	45	46	48	49	51	51	49	50	49	47	49	47	45	45	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	51	7.19	7.19
21 - 50	656	92.52	99.72
51 - 82	2	0.28	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Anzac - March 2015

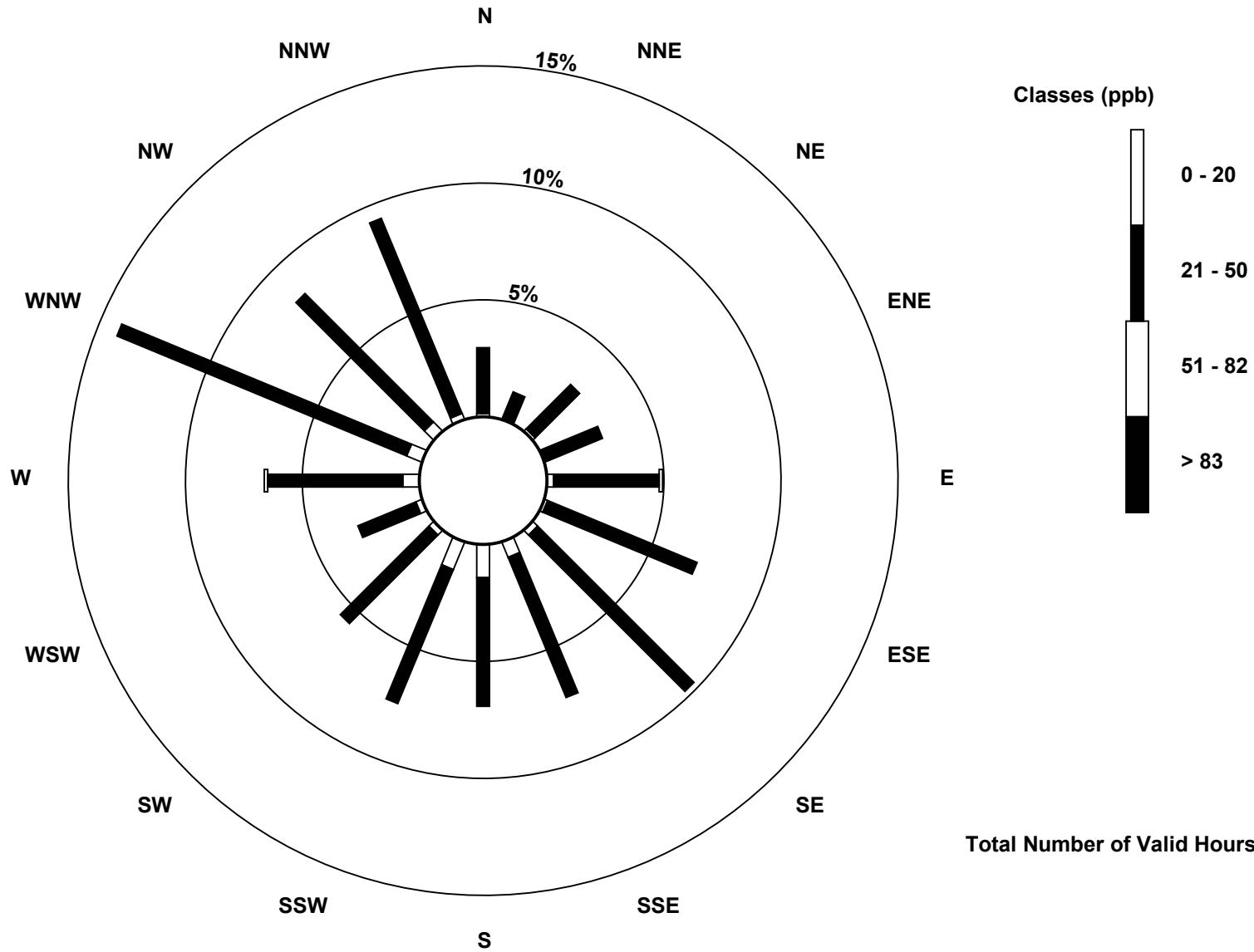
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	1	0	1	0	2	1	2	5	10	9	2	2	5	5	4	2	51
21 - 50	20	9	19	19	32	49	67	46	39	44	38	19	41	95	55	64	656
51 - 82	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	9	20	19	35	50	69	51	49	53	40	21	47	100	59	66	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Ozone (O₃) - ppb
Anzac (AMS 14)

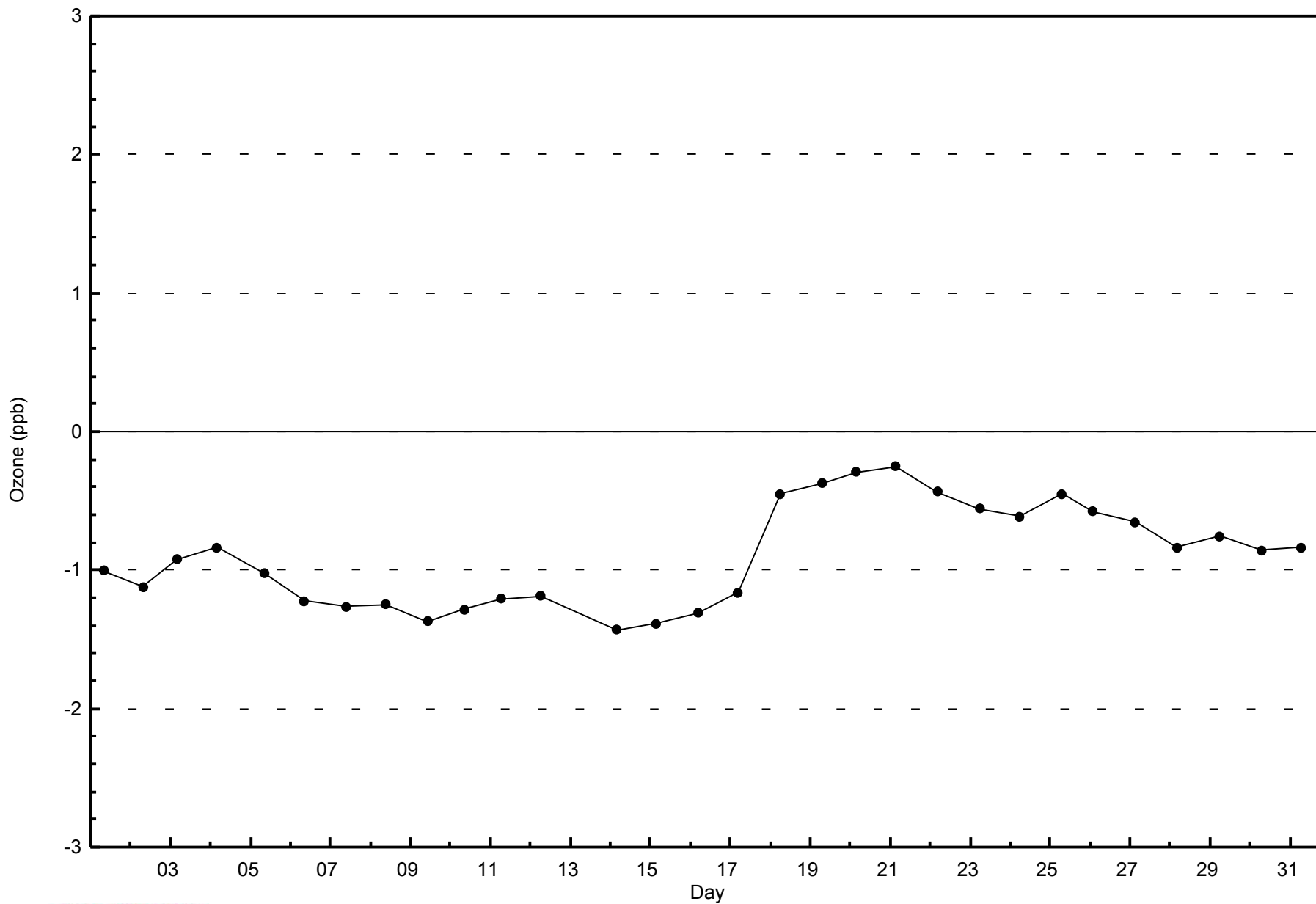


Total Number of Valid Hours: 709



WBEA
Zero Responses

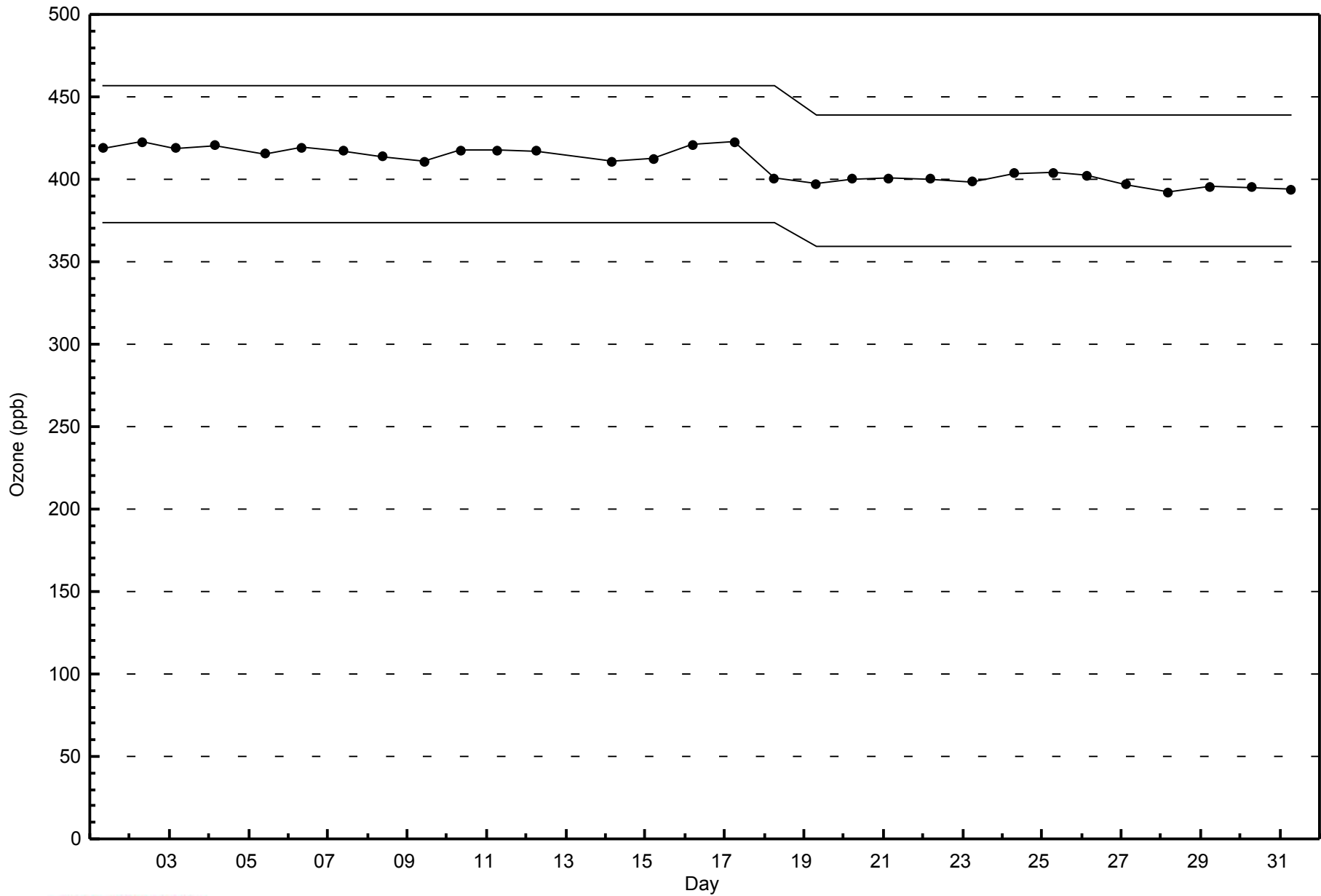
Ozone (O₃) - ppb
Anzac - March 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Anzac - March 2015





Summary of Hour Averages

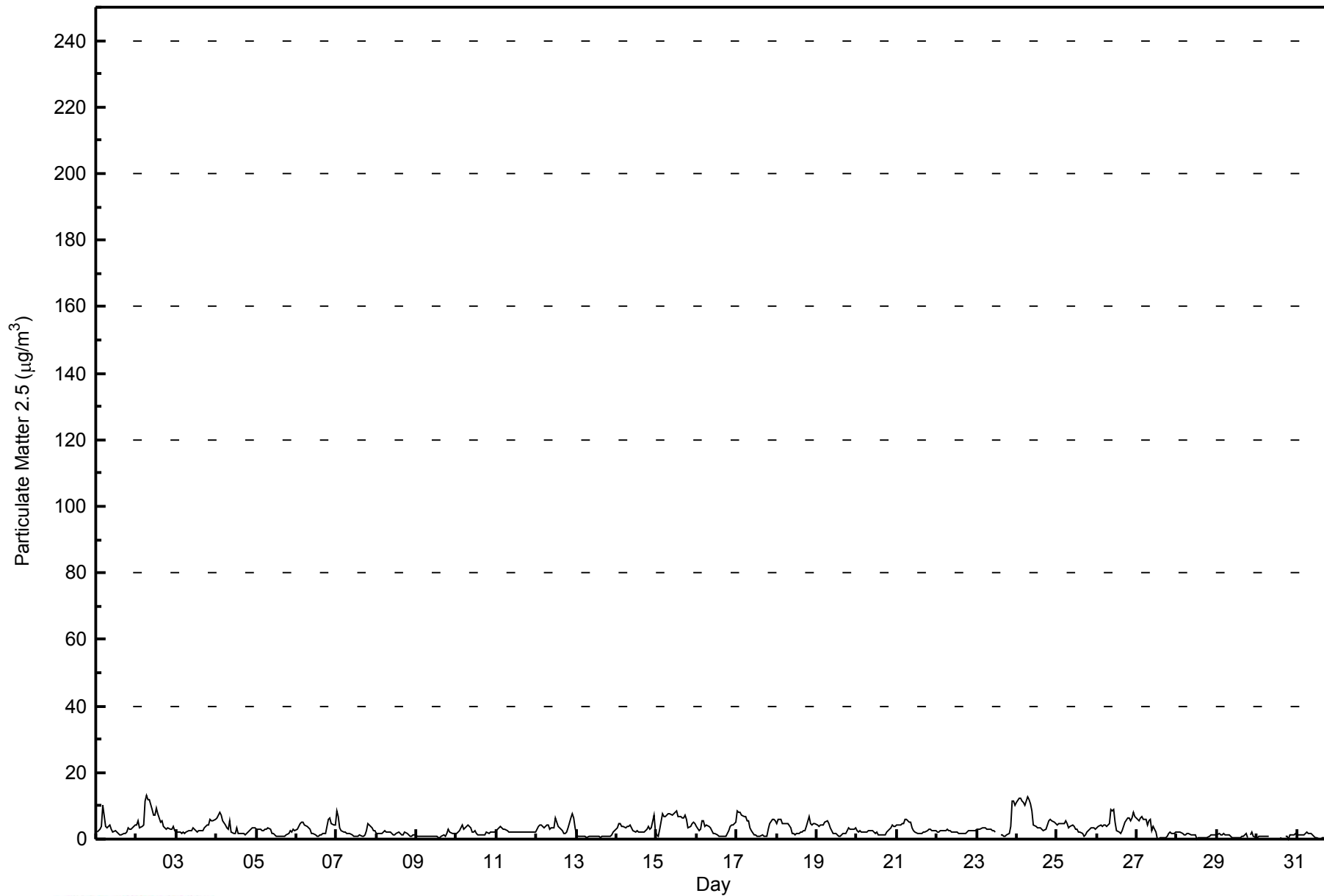
Anzac - March 2015

Number of Exceedences (AAAQO): 24-hr: 0															Hours in Service: 744																																		
Maximum Value: 13.2 µg/m ³ on Mar 2 07:00															Maximum Daily Average: 7.1 µg/m ³ on Mar 24										Hours of Data: 737																								
Minimum Value: 0.0 µg/m ³ on Mar 30 11:00															Minimum Daily Average: 0.7 µg/m ³ on Mar 30										Hours of Missing Data: 7																								
Maximum Diurnal Average: 3.9 µg/m ³ at hour 7															Minimum Diurnal Average: 1.7 µg/m ³ at hour 16										Hours of Calibration: 0																								
Monthly Average: 3.00 µg/m ³															Percentiles: P ₁ = 0.2 P ₁₀ = 0.8 Q ₁ = 1.4 Median = 2.4 Q ₃ = 4.0 P ₉₀ = 6.0 P ₉₉ = 11.9										Percent Operational Time: 99.1																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	2.1	2.7	3.1	3.6	10.2	3.8	3.5	3.7	4.1	3.0	2.1	2.4	2.0	1.8	1.4	1.3	1.6	1.8	2.1	3.6	3.2	2.8	3.8	4.3	3.1	10.2																							
2-Mar	4.2	5.6	3.4	4.0	4.3	11.3	13.2	12.0	12.0	8.7	7.3	7.2	9.4	7.8	5.1	5.6	3.9	3.4	3.1	3.5	3.1	2.9	3.6	2.7	6.1	13.2																							
3-Mar	2.2	2.1	2.1	1.9	1.9	1.9	2.2	2.7	2.7	2.6	3.5	2.8	2.3	2.4	2.6	2.5	2.4	3.3	4.2	4.3	6.1	5.5	5.4	6.0	3.1	6.1																							
4-Mar	6.4	7.4	8.0	7.3	5.6	4.1	3.4	3.1	5.6	2.2	1.5	1.6	3.2	1.5	1.5	1.6	1.5	1.5	1.6	1.9	2.5	3.5	3.2	3.4	3.5	8.0																							
5-Mar	3.0	2.8	3.0	2.5	2.6	2.9	3.2	3.3	2.8	1.6	1.5	1.2	0.7	0.7	0.6	0.7	1.0	0.8	1.2	1.9	2.5	2.2	2.9	2.4	2.0	3.3																							
6-Mar	2.9	3.8	4.6	5.2	5.0	4.2	3.7	3.6	3.0	1.8	1.7	1.5	1.0	1.0	1.2	1.3	1.5	1.9	3.7	5.7	6.4	4.8	4.2	4.4	3.3	6.4																							
7-Mar	8.6	6.7	3.3	2.4	2.0	2.1	1.7	1.8	1.8	1.3	0.8	1.0	0.9	1.0	1.1	0.8	0.9	1.3	2.5	4.7	4.0	3.2	2.7	2.4	2.5	8.6																							
8-Mar	1.8	1.5	1.6	1.8	2.0	2.3	2.0	2.1	2.1	1.8	1.5	1.4	1.6	2.3	1.6	1.2	1.3	2.0	1.6	1.1	0.8	0.9	1.1	1.1	1.6	2.3																							
9-Mar	1.0	0.8	0.8	0.9	1.0	0.9	0.8	0.9	0.9	0.9	0.7	0.7	0.6	0.6	0.6	0.8	1.1	0.9	1.5	2.8	2.0	1.8	1.6	1.6	1.1	2.8																							
10-Mar	1.6	2.0	2.5	4.2	2.8	3.3	3.7	4.0	3.5	2.2	2.2	2.3	1.7	1.2	1.2	1.2	1.4	1.5	2.0	1.8	2.0	2.2	2.1	2.1	2.3	4.2																							
11-Mar	2.6	3.5	3.6	3.2	3.0	2.8	2.5	2.1	2.2	2.0	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4	3.6																							
12-Mar	2.8	3.8	4.3	4.2	3.5	3.7	4.3	4.2	3.1	3.3	3.2	6.2	5.2	3.9	3.4	2.6	1.8	1.9	2.3	3.5	6.2	7.7	6.2	3.6	4.0	7.7																							
13-Mar	1.2	0.8	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.8	0.8	0.8	1.0	0.7	0.6	0.7	0.9	1.1	1.0	1.0	1.0	1.4	2.1	2.7	1.0	2.7																							
14-Mar	3.3	4.6	4.6	4.0	3.7	3.5	3.6	3.8	4.2	3.3	2.7	2.0	2.7	1.9	2.0	2.0	2.2	2.8	3.0	3.7	3.1	3.2	7.1	2.2	3.3	7.1																							
15-Mar	1.2	0.7	3.0	7.7	6.9	6.9	7.3	7.5	7.5	7.1	7.5	7.9	8.4	6.9	7.0	6.4	6.5	7.3	6.0	3.2	4.0	4.7	5.0	4.5	5.9	8.4																							
16-Mar	3.8	2.7	3.2	5.7	5.5	3.9	4.4	3.9	3.3	2.6	1.7	1.6	1.3	1.0	0.9	1.0	1.1	1.0	1.6	2.5	3.8	4.1	4.3	5.1	2.9	5.7																							
17-Mar	8.7	8.2	8.0	7.2	7.0	6.8	5.7	5.5	3.5	2.6	1.2	1.2	0.9	0.8	1.0	1.1	0.9	0.9	0.7	3.0	4.5	6.0	5.9	5.3	4.0	8.7																							
18-Mar	4.6	5.7	5.9	4.8	4.7	4.6	4.8	4.6	3.5	1.9	1.7	1.4	1.7	1.8	2.2	2.0	2.5	2.7	4.0	6.6	4.8	4.1	4.5	4.7	3.7	6.6																							
19-Mar	4.3	4.0	4.2	4.2	4.2	5.0	5.3	4.8	3.4	2.5	1.5	1.5	1.1	1.0	1.0	1.4	1.8	1.5	2.6	3.6	2.9	2.9	3.1	3.2	3.0	5.3																							
20-Mar	2.4	2.1	2.4	2.3	2.1	2.1	2.2	2.4	2.6	2.4	2.0	1.9	1.9	1.3	1.3	1.4	1.4	1.4	2.0	2.4	3.5	4.1	3.7	3.8	2.3	4.1																							
21-Mar	4.1	4.0	4.2	4.5	4.7	5.9	6.1	5.0	5.0	3.6	2.7	2.2	1.9	1.8	1.7	1.8	1.9	2.3	2.6	2.9	2.8	2.6	2.6	2.5	3.3	6.1																							
22-Mar	2.2	2.2	2.4	2.6	2.5	2.6	2.9	2.6	2.4	2.2	2.1	2.2	2.2	1.9	1.8	1.7	1.6	1.7	2.1	2.4	2.5	2.5	2.6	2.4	2.3	2.9																							
23-Mar	2.8	3.0	3.2	3.3	3.2	3.3	3.1	2.8	2.9	2.7	2.4	2.0	M	M	1.2	1.1	1.0	1.1	1.3	1.5	3.7	11.6	11.5	10.1	3.6	11.6																							
24-Mar	10.8	12.1	12.1	11.5	11.0	10.2	12.6	11.9	10.7	8.6	4.2	3.8	3.4	3.6	3.4	3.0	2.5	3.1	4.4	5.4	6.1	5.5	5.1	4.8	7.1	12.6																							
25-Mar	4.2	4.7	4.5	4.6	4.9	5.4	4.5	3.4	3.8	4.2	4.0	2.9	2.8	2.3	2.0	1.7	0.8	1.5	2.2	2.6	3.2	3.3	3.2	3.0	3.3	5.4																							
26-Mar	3.5	4.0	4.1	3.9	4.2	4.1	4.0	4.5	8.8	8.6	8.7	5.0	2.4	2.0	1.8	2.4	3.7	5.0	6.3	6.4	5.4	6.5	8.2	6.6	5.0	8.8																							
27-Mar	6.0	5.6	6.4	6.8	6.1	6.1	4.2	5.4	5.8	2.7	3.8	2.1	0.0	0.1	0.3	0.4	0.4	0.5	1.0	1.8	1.9	1.9	1.8	2.1	3.0	6.8																							
28-Mar	2.2	2.3	1.9	1.7	1.5	1.4	1.8	1.6	1.2	1.2	1.3	1.5	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.8	1.3	1.4	1.1	1.3	1.2	2.3																						
29-Mar	1.4	1.8	1.4	1.3	1.8	1.4	1.4	1.2	0.9	0.3	0.3	0.3	0.4	0.6	0.3	0.7	0.8	1.5	0.6	UO	1.1	2.2	1.0	0.5	1.0	2.2																							
30-Mar	0.5	0.8	0.7	1.0	0.9	0.8	0.8	0.7	UO	UO	0.0	0.2	0.1	UO	0.3	0.2	UO	0.9	0.7	0.2	1.2	1.1	1.5	1.5	0.7	1.5																							
31-Mar	1.4	1.2	1.2	1.4	1.4	1.7	2.2	1.9	1.7	1.3	1.0	0.6	0.2	0.1	0.1	0.4	0.3	0.4	0.4	0.5	0.5	1.6	1.6	1.6	1.0	2.2																							
																								3.5	3.7	3.7	3.9	3.9	3.9	3.9	3.8	3.9	3.0	2.5	2.3	2.1	1.9	1.7	1.7	1.7	1.9	2.3	2.9	3.2	3.6	3.7	3.4	Diurnal Average	
																								10.8	12.1	12.1	11.5	11.0	11.3	13.2	12.0	12.0	8.7	8.7	7.9	9.4	7.8	7.0	6.4	6.5	7.3	6.3	6.6	6.4	11.6	11.5	10.1	Diurnal Maximum	
M - Maintenance																								UO - Unstable Operation																									
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	536	72.73	72.73
6 - 15	90	12.21	84.94
16 - 25	0	0.00	84.94
26 - 80	0	0.00	84.94
> 81.0	0	0.00	84.94

Total Number of Valid Hours: 737

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	19	6	15	16	28	46	63	42	44	39	30	16	29	54	46	43	536
6 - 15	2	3	4	0	2	1	8	7	9	10	5	1	5	7	7	19	90
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	9	19	16	30	47	71	49	53	49	35	17	34	61	53	62	626

Total Number of Valid Hours: 737

Total Number of Hours: 744

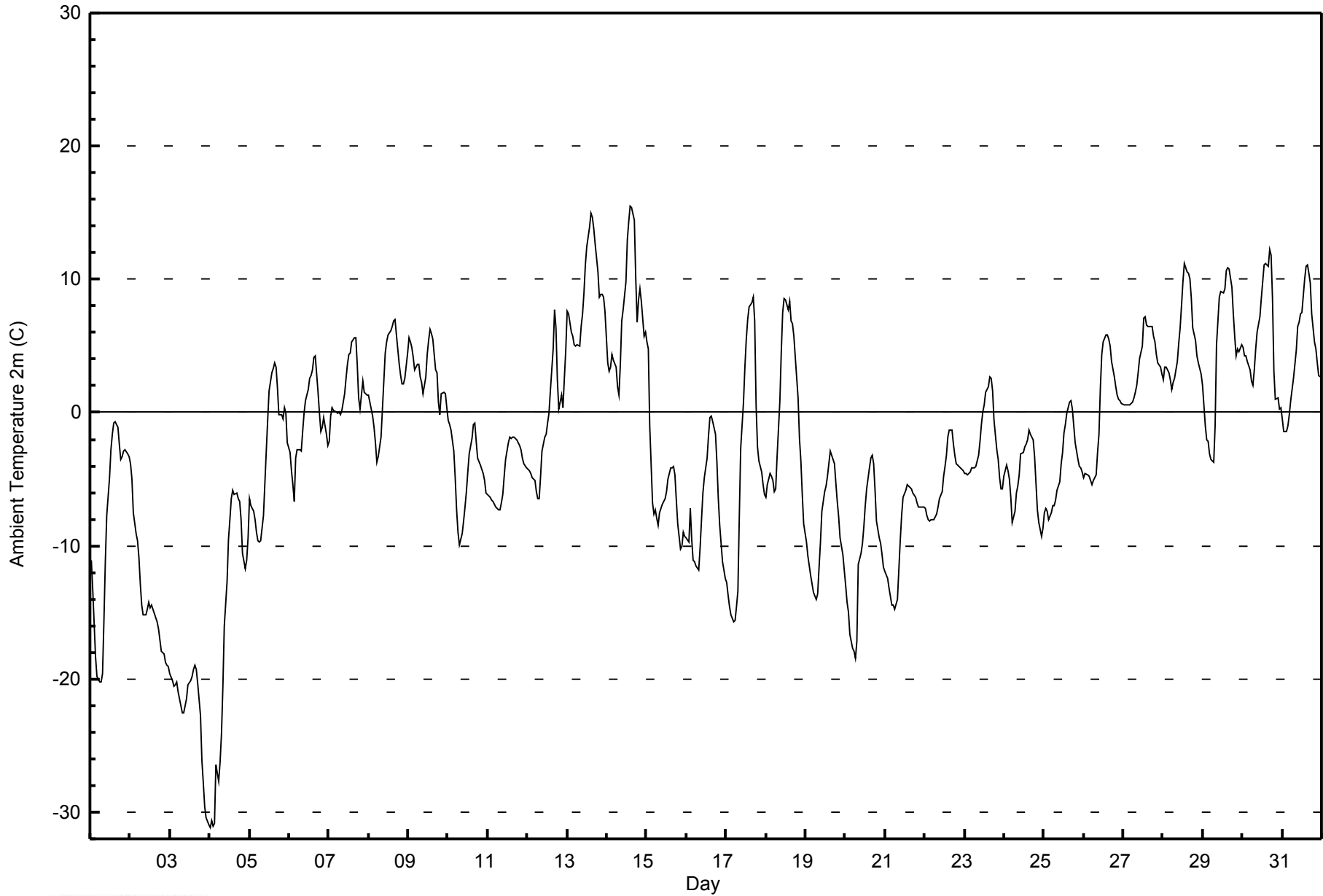


Maximum Value: 15.5 C on Mar 14 15:00		Maximum Daily Average: 9.0 C on Mar 13		Hours in Service: 744																						
Minimum Value: -31.2 C on Mar 4 01:00		Minimum Daily Average: -22.4 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 2.3 C at hour 16		Minimum Diurnal Average: -7.2 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -2.83 C		Percentiles: P ₁ = -27.9 P ₁₀ = -14.0 Q ₁ = -7.1 Median = -2.6 Q ₃ = 3.2 P ₉₀ = 6.9 P ₉₉ = 13.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-11.0	-13.3	-15.8	-18.3	-19.8	-20.2	-20.2	-19.6	-15.6	-11.2	-7.7	-4.9	-2.8	-1.6	-0.8	-0.7	-1.1	-2.4	-3.5	-3.3	-2.9	-2.8	-3.1	-3.3	-8.6	-0.7
2-Mar	-3.8	-5.0	-7.5	-9.1	-9.6	-10.8	-12.8	-14.4	-15.2	-15.2	-14.7	-14.2	-14.7	-14.4	-15.0	-15.4	-15.7	-16.2	-17.1	-17.9	-18.2	-18.7	-19.0	-19.1	-13.9	-3.8
3-Mar	-19.6	-20.1	-20.5	-20.5	-20.2	-21.0	-21.5	-22.5	-22.6	-22.0	-21.5	-20.4	-20.2	-19.8	-19.3	-19.0	-19.3	-20.3	-22.8	-26.2	-27.8	-29.5	-30.5	-30.9	-22.4	-19.0
4-Mar	-31.2	-30.6	-31.1	-30.8	-26.4	-27.7	-26.2	-24.1	-20.6	-16.0	-12.6	-9.6	-8.1	-6.5	-5.8	-6.1	-6.1	-6.4	-6.6	-8.0	-10.5	-11.7	-11.0	-9.4	-16.0	-5.8
5-Mar	-6.4	-7.0	-7.4	-8.0	-9.0	-9.6	-9.7	-9.6	-7.8	-5.3	-2.9	-0.6	1.6	3.0	3.3	3.7	3.5	1.9	-0.1	-0.2	-0.5	0.4	-0.1	-2.3	-2.9	3.7
6-Mar	-3.0	-4.3	-5.4	-6.7	-3.4	-2.8	-2.8	-2.9	-1.5	-0.1	0.9	1.7	2.6	2.8	3.2	4.1	4.3	1.5	-0.1	-1.4	-1.1	-0.4	-1.6	-2.5	-0.8	4.3
7-Mar	-2.2	-0.3	0.4	0.2	0.1	0.0	0.0	-0.2	0.1	1.4	2.6	3.6	4.4	4.5	5.3	5.6	5.7	3.6	1.1	0.2	2.4	1.5	1.4	1.3	1.8	5.7
8-Mar	1.3	0.8	-0.3	-1.1	-2.3	-3.7	-3.3	-1.8	0.2	2.3	4.5	5.4	5.8	6.1	6.5	6.8	7.0	5.8	3.7	2.8	2.1	2.2	2.5	4.5	2.4	7.0
9-Mar	5.7	5.3	4.9	4.2	3.2	3.6	3.6	2.7	2.3	1.4	2.6	4.4	5.4	6.2	5.9	5.5	3.2	3.0	0.8	-0.2	1.4	1.5	1.4	0.3	3.3	6.2
10-Mar	-0.6	-0.9	-1.3	-2.9	-4.9	-7.3	-9.0	-10.0	-9.0	-8.2	-7.1	-5.9	-4.5	-3.1	-1.9	-0.9	-0.8	-2.2	-3.4	-3.9	-4.3	-4.6	-5.1	-6.1	-4.5	-0.6
11-Mar	-6.1	-6.3	-6.6	-6.7	-6.9	-7.1	-7.3	-7.3	-6.8	-6.2	-4.8	-3.5	-2.3	-1.9	-2.0	-1.9	-1.8	-2.0	-2.3	-2.5	-2.8	-3.4	-3.8	-4.1	-4.4	-1.8
12-Mar	-4.3	-4.3	-4.6	-4.9	-5.1	-5.9	-6.5	-6.4	-4.8	-2.9	-1.9	-1.7	-0.8	0.0	1.6	4.8	7.7	6.3	2.5	0.3	1.3	0.4	2.6	4.7	-0.9	7.7
13-Mar	7.6	7.4	6.0	5.7	5.1	4.9	5.1	5.0	6.4	7.4	9.0	11.0	12.5	13.9	15.0	14.6	13.8	12.6	10.5	8.7	8.9	8.9	8.6	7.6	9.0	15.0
14-Mar	3.7	3.1	3.4	4.4	3.9	3.5	1.9	1.4	3.6	6.9	7.7	9.8	13.0	14.4	15.5	15.4	14.4	10.2	6.8	8.4	9.3	8.4	5.7	6.1	7.5	15.5
15-Mar	5.3	4.7	-1.0	-6.8	-7.6	-7.3	-7.9	-8.4	-7.6	-6.9	-6.6	-6.5	-5.9	-5.0	-4.1	-4.1	-4.0	-4.7	-6.5	-8.3	-10.2	-10.0	-9.0	-9.3	-5.7	5.3
16-Mar	-9.4	-9.7	-7.2	-9.6	-11.0	-11.2	-11.5	-11.9	-10.2	-8.1	-6.1	-4.8	-3.4	-1.8	-0.4	-0.2	-0.7	-1.7	-3.8	-6.5	-8.4	-9.8	-11.2	-12.4	-7.1	-0.2
17-Mar	-12.8	-13.7	-14.6	-15.2	-15.8	-15.6	-14.6	-13.4	-7.9	-2.6	0.8	3.4	5.5	7.0	8.0	8.2	8.7	6.9	0.5	-2.5	-3.6	-4.5	-5.4	-6.1	-4.1	8.7
18-Mar	-6.3	-5.4	-4.5	-4.7	-5.1	-5.9	-5.7	-3.3	0.9	4.6	7.5	8.5	8.5	7.7	8.3	6.9	6.6	5.8	4.2	1.1	-1.9	-3.7	-6.1	-8.4	0.4	8.5
19-Mar	-9.8	-10.8	-11.5	-12.3	-12.9	-13.5	-14.0	-13.6	-11.6	-9.7	-7.5	-5.9	-5.5	-4.7	-3.8	-2.8	-3.2	-3.9	-5.3	-6.7	-7.8	-9.5	-10.7	-11.8	-8.7	-2.8
20-Mar	-13.0	-14.2	-15.0	-16.6	-17.7	-17.9	-18.5	-17.2	-11.4	-10.6	-9.8	-8.6	-6.9	-5.8	-4.2	-3.4	-3.2	-3.9	-5.8	-8.1	-9.4	-9.8	-10.6	-11.6	-10.5	-3.2
21-Mar	-11.9	-12.5	-13.2	-13.8	-14.5	-14.4	-14.8	-14.0	-11.8	-9.7	-7.7	-6.4	-5.8	-5.4	-5.6	-5.6	-5.7	-6.0	-6.3	-6.8	-7.1	-7.1	-7.1	-7.1	-9.2	-5.4
22-Mar	-7.2	-7.7	-8.0	-8.1	-8.1	-8.0	-7.8	-7.6	-7.1	-6.5	-5.9	-4.7	-4.0	-3.2	-1.8	-1.3	-1.3	-2.3	-3.2	-3.8	-4.0	-4.1	-4.3	-4.3	-5.2	-1.3
23-Mar	-4.6	-4.6	-4.7	-4.5	-4.2	-4.2	-4.1	-4.0	-3.2	-2.1	-0.9	0.1	0.6	1.5	1.9	2.7	2.6	1.7	-0.5	-2.8	-3.5	-4.8	-5.8	-5.7	-2.2	2.7
24-Mar	-4.8	-3.9	-4.4	-5.0	-6.4	-8.2	-7.4	-6.1	-5.5	-4.7	-3.1	-3.0	-2.6	-2.4	-2.0	-1.3	-1.6	-2.0	-3.3	-5.3	-7.3	-8.2	-9.3	-8.6	-4.9	-1.3
25-Mar	-7.5	-7.2	-7.5	-8.0	-7.5	-7.0	-7.0	-6.6	-5.8	-5.2	-3.9	-3.0	-1.5	-0.9	-0.1	0.8	0.9	0.3	-1.0	-2.3	-3.5	-4.1	-4.1	-4.5	-4.0	0.9
26-Mar	-4.9	-4.6	-4.6	-4.7	-5.1	-5.4	-5.1	-4.6	-3.0	-1.6	1.8	4.4	5.3	5.8	5.8	5.6	5.0	3.8	2.7	2.0	1.3	1.0	0.9	0.7	0.1	5.8
27-Mar	0.5	0.6	0.6	0.6	0.6	0.8	1.1	1.5	2.0	3.0	4.0	5.0	7.0	7.2	6.6	6.5	6.5	6.5	5.7	5.3	4.4	3.8	3.4	2.9	3.6	7.2
28-Mar	2.4	3.5	3.4	3.0	2.4	1.7	2.3	2.6	3.9	5.2	6.3	8.0	9.8	11.2	10.6	10.4	10.0	8.5	6.4	5.4	4.3	3.7	3.4	2.9	5.5	11.2
29-Mar	2.0	-1.0	-2.0	-2.1	-3.1	-3.5	-3.7	-1.0	5.1	6.9	8.7	9.1	9.0	9.3	10.6	10.9	10.7	9.4	7.4	5.7	4.3	4.8	4.5	5.1	4.5	10.9
30-Mar	4.9	4.3	4.3	3.8	3.2	2.4	2.1	3.2	4.8	6.1	7.2	8.5	9.9	11.1	11.2	11.0	12.2	11.8	8.6	3.1	1.0	1.1	0.2	0.3	5.7	12.2
31-Mar	-0.4	-1.5	-1.4	-1.0	-0.2	0.9	1.7	2.6	4.7	6.4	6.8	7.4	7.5	10.0	11.0	11.1	10.5	9.7	7.4	5.3	4.7	3.7	2.7	2.6	4.7	11.1
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Anzac - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	30	4.03	4.03
-20 - 0	425	57.12	61.16
0 - 10	259	34.81	95.97
10 - 20	30	4.03	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

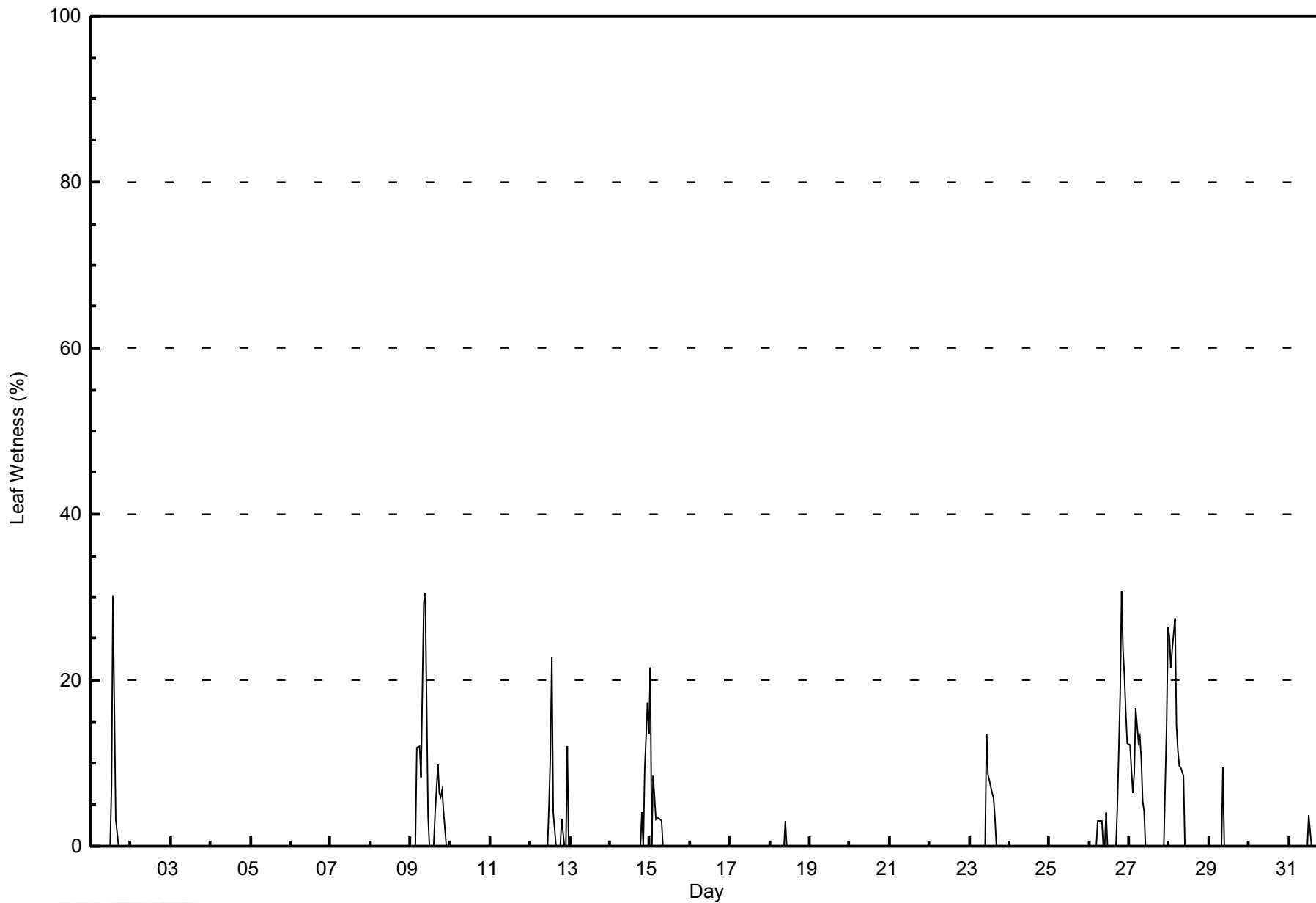


Maximum Value: 31 % on Mar 26 20:00														Maximum Daily Average: 6.3 % on Mar 9														Hours in Service: 744	
Minimum Value: 0 % on Mar 1 01:00														Minimum Daily Average: 0.0 % on Mar 2														Hours of Data: 744	
Maximum Diurnal Average: 1.9 % at hour 23														Minimum Diurnal Average: 0.3 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 1.1 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 3 P ₉₉ = 24														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	0	0	0	0	0	0	0	0	0	0	0	0	7	30	17	3	0	0	0	0	0	0	0	0	2.4	30			
2-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	0	12	12	8	19	29	30	4	0	0	0	0	4	10	6	6	7	4	0	0	0	6.3	30			
10-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	0	0	0	0	0	0	0	0	5	11	23	4	0	0	0	0	3	0	0	12	0	2.4	23			
13-Mar	0	0	0	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-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	9	17	14	1.8	17			
15-Mar	22	0	8	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	22			
16-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	3			
19-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	0	0	0	0	0	0	0	14	9	8	7	6	3	0	0	0	0	0	0	0	0	1.9	14			
24-Mar	0	0	0	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-Mar	0	0	0	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-Mar	0	0	0	0	0	3	3	3	0	0	4	0	0	0	0	0	5	18	31	24	21	16	12	5.8	31				
27-Mar	12	9	6	9	17	13	13	10	5	4	0	0	0	0	0	0	0	0	0	0	0	15	26	5.8	26				
28-Mar	25	22	24	27	15	12	10	10	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.3	27				
29-Mar	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	9				
30-Mar	0	0	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-Mar	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0.2	4				
1.9 1.0 1.2 1.3 1.5 1.4 1.2 1.5 1.7 1.2 0.7 0.4 1.0 1.9 0.9 0.3 0.3 0.4 0.8 1.4 0.9 1.0 1.9 1.7														Diurnal Average															
25 22 24 27 17 13 13 19 29 30 14 9 11 30 17 4 10 6 18 31 24 21 17 26														Diurnal Maximum															



WBEA
Hourly Averages

Leaf Wetness (SW) - %
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	669	89.92	89.92
0.4 - 0.5	0	0.00	89.92
0.6 - 0.7	0	0.00	89.92
0.8 - 1.4	0	0.00	89.92
1.5 - 10	42	5.65	95.56
> 10	33	4.44	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

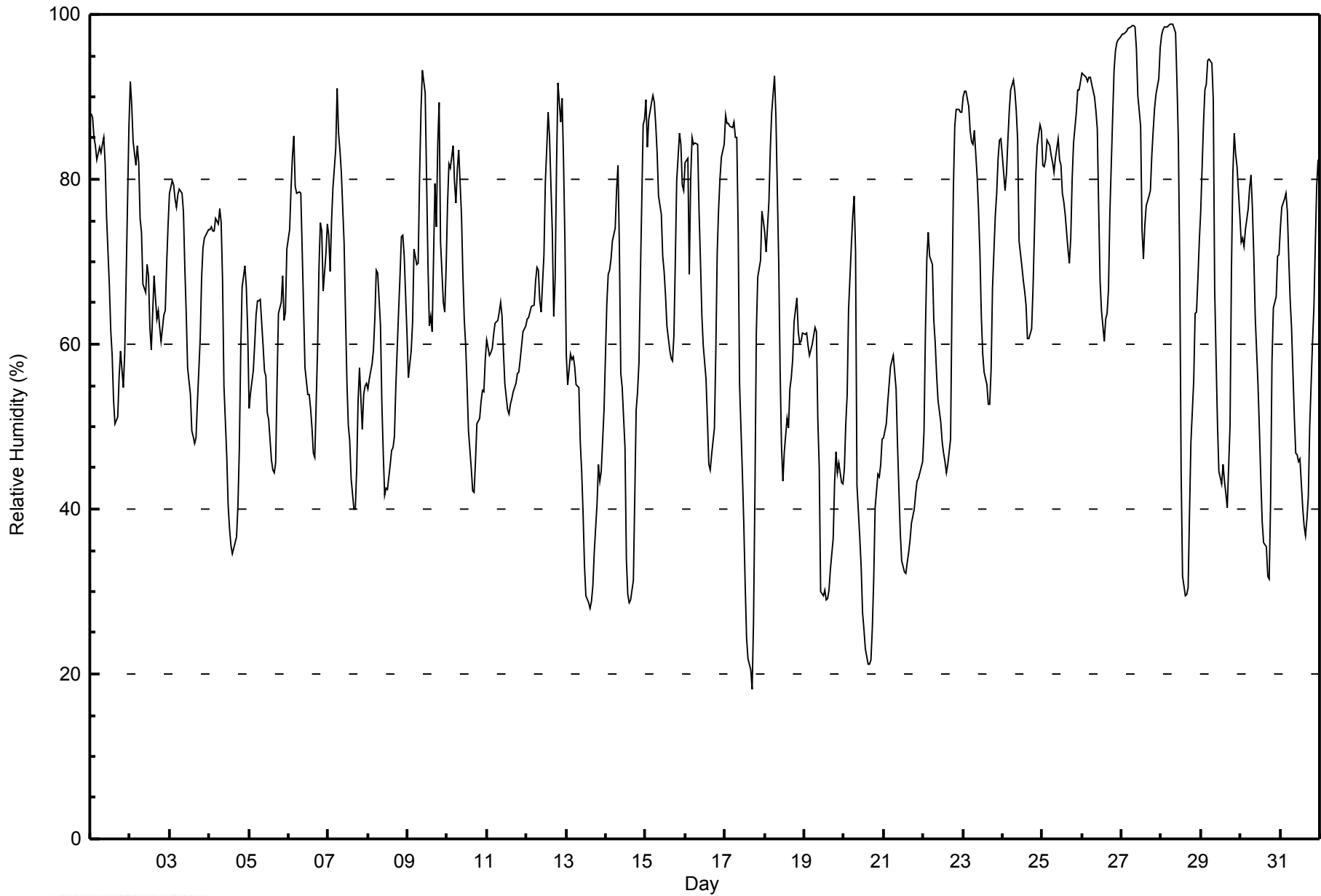


Maximum Value: 99 % on Mar 28 07:00																		Maximum Daily Average: 89.3 % on Mar 27																		Hours in Service: 744													
Minimum Value: 18 % on Mar 17 17:00																		Minimum Daily Average: 43.4 % on Mar 20																		Hours of Data: 744													
Maximum Diurnal Average: 78.6 % at hour 6																		Minimum Diurnal Average: 46.6 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 65.2 %																		Percentiles: P ₁ = 24 P ₁₀ = 41 Q ₁ = 52 Median = 65 Q ₃ = 80 P ₉₀ = 88 P ₉₉ = 98																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	88	87	85	84	82	84	83	84	85	82	75	67	62	59	53	50	51	56	59	57	55	59	77	86	71.3	88																							
2-Mar	92	89	85	82	84	82	75	74	67	66	70	68	62	59	68	66	63	64	62	60	64	64	70	74	71.3	92																							
3-Mar	78	80	79	78	77	78	79	78	76	69	64	57	54	50	49	48	49	53	61	68	72	73	73	74	67.3	80																							
4-Mar	74	74	74	74	75	75	76	75	68	55	47	40	38	36	35	35	37	40	47	59	67	69	67	61	58.2	76																							
5-Mar	52	54	57	60	64	65	65	65	60	57	56	52	51	46	45	44	46	55	64	65	68	63	64	72	57.9	72																							
6-Mar	74	79	83	85	79	78	78	78	71	64	57	54	54	52	50	47	46	59	69	75	74	66	71	74	67.5	85																							
7-Mar	73	69	75	79	84	91	86	84	81	72	64	55	50	48	44	40	40	45	53	57	50	54	55	55	62.6	91																							
8-Mar	55	56	58	59	63	69	69	62	53	47	42	42	42	45	47	47	49	55	64	68	73	73	71	61	57.1	73																							
9-Mar	56	58	59	63	72	70	70	80	88	93	90	80	70	62	63	62	80	74	84	89	72	65	64	69	72.2	93																							
10-Mar	77	82	81	84	80	77	81	84	76	68	63	60	55	49	45	42	42	46	50	51	53	54	54	58	63.0	84																							
11-Mar	61	59	59	60	61	62	63	64	65	63	59	55	52	52	53	53	54	55	56	57	58	60	61	62	58.5	65																							
12-Mar	63	63	64	65	65	68	69	69	65	64	71	80	84	88	85	74	63	68	81	92	87	90	82	73	73.8	92																							
13-Mar	59	55	59	58	58	57	55	55	48	45	39	33	29	29	28	29	31	35	41	45	43	45	48	52	44.8	59																							
14-Mar	65	69	69	70	73	74	79	82	72	56	55	47	34	30	29	29	31	41	52	54	58	68	87	87	58.7	87																							
15-Mar	90	84	87	89	90	89	87	83	78	76	71	69	66	62	59	58	58	61	70	80	86	84	79	79	76.5	90																							
16-Mar	82	83	69	80	85	84	84	84	76	70	64	60	56	51	45	45	47	50	59	71	76	80	83	84	69.5	85																							
17-Mar	88	87	87	87	86	87	85	85	74	55	44	38	31	24	22	20	18	27	42	62	68	70	76	75	59.9	88																							
18-Mar	74	71	77	84	88	90	93	88	70	57	48	43	47	51	50	55	56	58	63	66	62	60	60	61	65.4	93																							
19-Mar	61	61	60	59	59	60	62	61	51	45	30	29	30	29	29	30	33	37	43	47	44	46	43	43	45.6	62																							
20-Mar	45	50	54	64	72	76	78	71	43	37	33	27	25	23	21	21	22	26	32	40	44	44	45	48	43.4	78																							
21-Mar	49	50	53	55	57	58	59	55	48	42	37	34	32	32	34	35	36	38	40	42	43	44	44	46	44.3	59																							
22-Mar	50	62	70	73	71	70	63	60	56	53	51	48	47	46	44	45	49	65	79	86	88	88	88	88	64.2	88																							
23-Mar	90	91	91	89	86	85	84	86	80	76	71	63	59	57	55	53	53	57	67	76	78	83	85	85	74.9	91																							
24-Mar	83	79	81	85	88	91	92	91	88	85	72	69	68	67	65	61	61	62	67	74	81	84	87	86	77.7	92																							
25-Mar	82	82	82	85	84	83	82	81	83	85	82	82	78	77	76	71	70	73	80	84	88	91	91	92	81.8	92																							
26-Mar	93	93	92	92	92	92	92	90	88	86	76	68	64	60	63	64	67	76	88	93	96	97	97	97	84.0	97																							
27-Mar	98	98	98	98	98	99	99	99	98	96	90	86	74	70	74	77	78	79	83	86	89	90	92	96	89.3	99																							
28-Mar	97	98	98	99	99	99	99	99	98	92	85	70	44	32	29	30	30	40	48	56	64	64	68	73	71.2	99																							
29-Mar	76	87	91	91	94	95	94	90	67	58	50	45	43	46	43	42	40	50	69	81	86	83	82	76	69.9	95																							
30-Mar	72	73	72	74	77	79	81	76	71	63	55	50	44	39	36	35	32	32	41	58	64	66	71	71	59.6	81																							
31-Mar	74	77	78	78	76	71	65	62	51	47	47	46	46	40	38	37	39	42	50	60	64	72	79	82	59.2	82																							
																								73.2	74.1	75.0	76.8	78.1	78.6	78.3	77.2	70.8	65.3	59.9	55.5	51.3	48.7	47.7	46.6	47.4	52.2	60.1	66.4	68.2	69.3	71.4	72.3	Diurnal Average	
																								98	98	98	99	99	99	99	99	98	96	90	86	84	88	85	77	80	79	88	93	96	97	97	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	1	0.13	0.13
20 - 40	65	8.74	8.87
40 - 60	223	29.97	38.84
60 - 80	270	36.29	75.13
80 - 100	185	24.87	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 28 km/h on Mar 15 03:00	Maximum Daily Speed Average: 17.3 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 6 18:00	Minimum Daily Speed Average: 0.6 km/h on Mar 23	Hours of Data: 744
Maximum Diurnal Speed Average: 3.0 km/h at hour 2	Minimum Diurnal Speed Average: 0.5 km/h at hour 17	Hours of Missing Data: 0
Monthly Average Velocity: 1.4 km/h 271.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 21	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	N5	N2	E1	SW1	SW2	S4	S5	S6	S5	S5	S6	S8	S9	SSW11	SSW13	SSW14	SSW12	SSW9	S10	SSW12	SW17	WSW16	WSW11	WNW11	SSW6.5	SW17	
2-Mar	NW13	NNW21	NNW23	N22	NNW15	N22	NNW21	NNW20	NNW21	NNW22	NNW19	NNW19	NNW23	NNW21	NNW20	NNW19	NNW17	NNW16	NNW16	NW11	NW12	NW12	NW10	NW10	NNW17.3	NNW23	
3-Mar	NW9	NW10	NW11	WNW11	WNW11	NNW7	NNW8	NNW8	NNW11	N15	N17	NNW15	NNW17	NNW17	NNW16	NNW14	N13	NNW9	NW2	NNW3	SSW1	SSW2	S2	S3	NNW8.7	NNW17	
4-Mar	S6	S7	SSW6	SW6	SW10	SSW7	SSW8	SSW9	SSW9	S7	S7	S8	SW11	SSW11	SSW12	SSW12	SSW11	SSW8	SW10	SSW6	SSW7	SSW7	SSW9	W8	SSW7.9	SSW12	
5-Mar	WNW13	NW13	NW14	NW13	NW12	NW12	WNW10	WNW10	WNW11	WNW10	WNW10	W10	WNW9	W7	WNW6	WNW4	WSW3	S3	SSE6	S6	SSW4	WNW9	W7	W5	WNW7.4	NW14	
6-Mar	WSW7	WSW6	SW5	W5	W8	WNW10	WNW10	NW9	NW8	NNW11	NNW12	NNW11	NNW12	NNW13	N11	NNW7	NW5	WNW0	SSE2	E3	E6	ENE8	SSE4	NNW3	NW4.7	NNW13	
7-Mar	W7	WNW11	WNW12	WNW9	WNW11	WNW13	WNW13	WNW15	WNW14	WNW15	WNW14	WNW14	WNW15	WNW13	NW12	NW11	NW10	WNW7	W5	WNW9	WNW9	WNW7	WNW7	WNW7	WNW10.6	WNW15	
8-Mar	WNW7	W7	W8	W8	WSW6	SW7	SW7	SW9	SW9	SW10	WSW6	WNW9	WNW9	WNW10	W7	W8	WSW10	W4	SW4	SSW4	SW4	W4	W5	WNW7	WSW6.3	WSW10	
9-Mar	W10	WNW9	WNW7	WNW5	W7	WNW8	WNW8	WNW8	NW8	WNW7	W8	WNW12	WNW11	NW11	NNW10	WNW10	NNW8	NW7	NW5	WNW5	WNW7	NW8	NW9	WNW8	WNW7.9	WNW12	
10-Mar	WNW10	WNW11	NNW13	N15	N15	N13	N9	N7	NNW10	NNW7	NNW5	W6	WNW6	ENE5	ENE2	ENE4	SE7	ESE7	E6	E7	E7	ESE8	ENE10	ENE12	N4.3	NNW15	
11-Mar	E13	E13	E10	E10	ESE10	ESE10	ESE13	ESE11	ESE14	ESE14	ESE15	ESE13	ESE13	ESE12	E12	E12	E11	E9	E9	E11	E10	E9	E8	ESE8	ESE11.1	ESE15	
12-Mar	ESE8	ESE8	ESE9	SE10	SE10	ESE9	SE8	SSE10	SSE12	SSE9	SE9	SSE6	SE9	SSE10	SSE9	SSE8	S4	W7	SW3	S7	SSW6	SSW7	SW6	SW11	SSE6.6	SSE12	
13-Mar	W16	W20	WNW17	WNW15	WNW14	WNW11	W14	WNW14	WNW15	WNW11	W11	W8	W11	WSW14	SW16	SSW15	SSW15	S12	SSE11	SSE14	S15	S14	S14	SSW9	WSW9.8	W20	
14-Mar	SSE5	S8	SSE7	SSE13	SSE13	SSE10	SE5	SSE6	SW7	SW2	NE4	NNE1	WSW6	WNW6	W5	W4	W3	SE4	SSW2	SW10	SW12	WSW10	WSW6	W16	SSW4.3	W16	
15-Mar	W18	W20	NW28	NNW23	NW20	NW19	NW17	WNW16	NW17	NW15	NW18	NNW16	NNW15	NNW12	NNW10	NNW8	NNW6	NNE5	NE5	E4	SSE4	S6	S7	SSW6	WNW10.1	NW28	
16-Mar	SSW6	WSW6	NW12	NW9	NW7	NW5	NW4	NNW4	NNW5	NW7	NW9	NNW9	NW8	NW10	NNW9	N6	NE7	NE6	ENE4	ENE5	ENE6	ESE4	ESE2	NNE3	NNW4.2	NW12	
17-Mar	W2	SSW2	SE2	SE3	SSE2	S6	SSE6	S5	S4	SE5	SE7	SE8	SSE4	WNW4	WNW6	W5	WNW5	WNW2	ESE3	SE4	S4	SSW2	S3	S4	S2.3	SE8	
18-Mar	SW7	SW6	SSW7	SSW7	S5	S5	SSW7	SSW7	S7	S6	SSW6	SW10	WSW11	SW12	WSW10	WNW8	NW6	NNW8	NNW5	NW10	NW10	NW11	NW13	NW12	WSW4.7	NW13	
19-Mar	NW12	NW11	NW11	NW9	NW9	NW7	NW6	NW6	NNW5	NW1	ENE6	NE3	NW4	NW5	W6	N7	N8	N8	NNW9	N7	NNE6	NE6	NE7	NE7	NNW5.5	NW12	
20-Mar	NE7	ENE7	ENE6	E5	SE4	S5	S5	SSE3	SE4	ENE5	NE4	NNE5	E5	NE5	ENE4	ENE3	ENE4	E6	ESE7	ESE6	SE8	SSE9	SSE8	SE8	ESE4.1	SSE9	
21-Mar	SE9	SSE10	SSE8	SE7	SE6	SE7	SE8	SE9	SE10	ESE12	SE13	SE12	ESE12	ESE12	E13	E14	E14	ESE12	ESE12	ESE11	ESE11	ESE10	ESE10	ESE9	ESE10.1	E14	
22-Mar	SE11	SE12	SE11	SE7	SE7	SE5	ESE7	ESE5	ESE6	ESE6	E6	SE7	ESE8	SE9	SE9	SE9	SE7	SSE6	ESE5	ESE4	ESE6	ESE5	S3	S3	SE6.5	SE12	
23-Mar	S2	S3	SSE3	S4	S4	S6	S5	SSW2	SSW3	SW6	SSW5	WSW4	WNW5	WNW7	WNW7	NW8	NNW7	NNE6	NE5	NE6	NE5	NE4	NE0	NE2	W0.6	NW8	
24-Mar	NNE5	NNE4	NNW4	NNW4	WNW3	WNW3	WNW4	WNW4	W4	W4	NNW7	NNW9	NNW9	NNW8	NNW9	N9	N8	NNE5	E3	ESE5	SE6	SE5	SE7	SE7	NNW3.0	NNW9	
25-Mar	SSE8	SSE9	SSE9	SSE8	SE8	SE8	SE9	SE8	SE9	SE8	SE9	SE8	SE9	ENE11	ESE11	SE10	SE10	SE11	SSE12	SSE10	SE7	SE6	SE6	SSE9	SE8.6	SSE12	
26-Mar	SE10	SE11	SE11	SE10	SE10	SE10	SE12	SE10	SE9	SE9	SSE11	SSE11	SE12	SSE12	SSE14	SSE12	SSE12	S10	S8	S6	SE5	SE5	SE4	SSE6	SSE9.2	SSE14	
27-Mar	SSE3	SSE3	S3	S1	N1	W4	W3	SSW3	SSW2	SSW1	SE4	ESE7	ESE10	SE11	ESE11	SE10	SE10	SSE9	SE9	SE8	E6	E6	ESE5	SSW4	SE4.3	ESE11	
28-Mar	WNW4	NW6	NNW6	WSW3	SW4	NNW5	WNW4	WNW5	WNW6	WNW7	WNW9	WNW8	NW13	NNW15	NW15	NW14	NW14	WNW11	WNW7	W9	W8	WNW8	WNW9	W8	WNW7.6	NNW15	
29-Mar	W6	W5	SW6	SW5	WSW5	SW3	S3	SSW5	SSE4	SSW5	SW3	WNW5	WNW6	WSW3	SW3	SSW8	SW9	SW16	SW17	SW9	SW9	WSW9	W7	WNW11	SW5.8	SW17	
30-Mar	WNW11	WNW10	WNW10	WNW10	WNW10	WNW10	WNW10	WNW10	WNW10	WNW10	WNW10	W9	W9	WNW8	WNW9	WNW7	W3	WNW6	WSW6	SW5	SSW5	SW6	SW5	SSW4	SSW4	W7.0	WNW11
31-Mar	SSW5	SW5	SSW3	S3	SSE4	SE7	SSE5	SSE7	SE5	ESE5	SE7	ESE7	E9	ESE14	E16	E18	E17	E17	ENE16	ENE13	ENE15	NE11	NE11	NE11	E7.5	E18	

W2.6	W3.0	WNW3.0	WNW2.3	W2.2	WNW1.9	W2.0	W2.3	W2.2	WNW1.8	WNW1.3	WNW2.0	NW2.7	NW2.2	NW1.8	WNW0.9	W0.5	S0.5	SSE1.3	SSE1.6	SSE1.7	SSW1.3	SSW1.5	WSW1.7	W18	NNW21	NW28	NNW23	NW20	N22	NNW21	NNW20	NNW21	NNW22	NNW19	NNW19	NNW23	NNW21	NNW20	NNW19	NNW17	Diurnal Average
																												Diurnal Maximum													

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

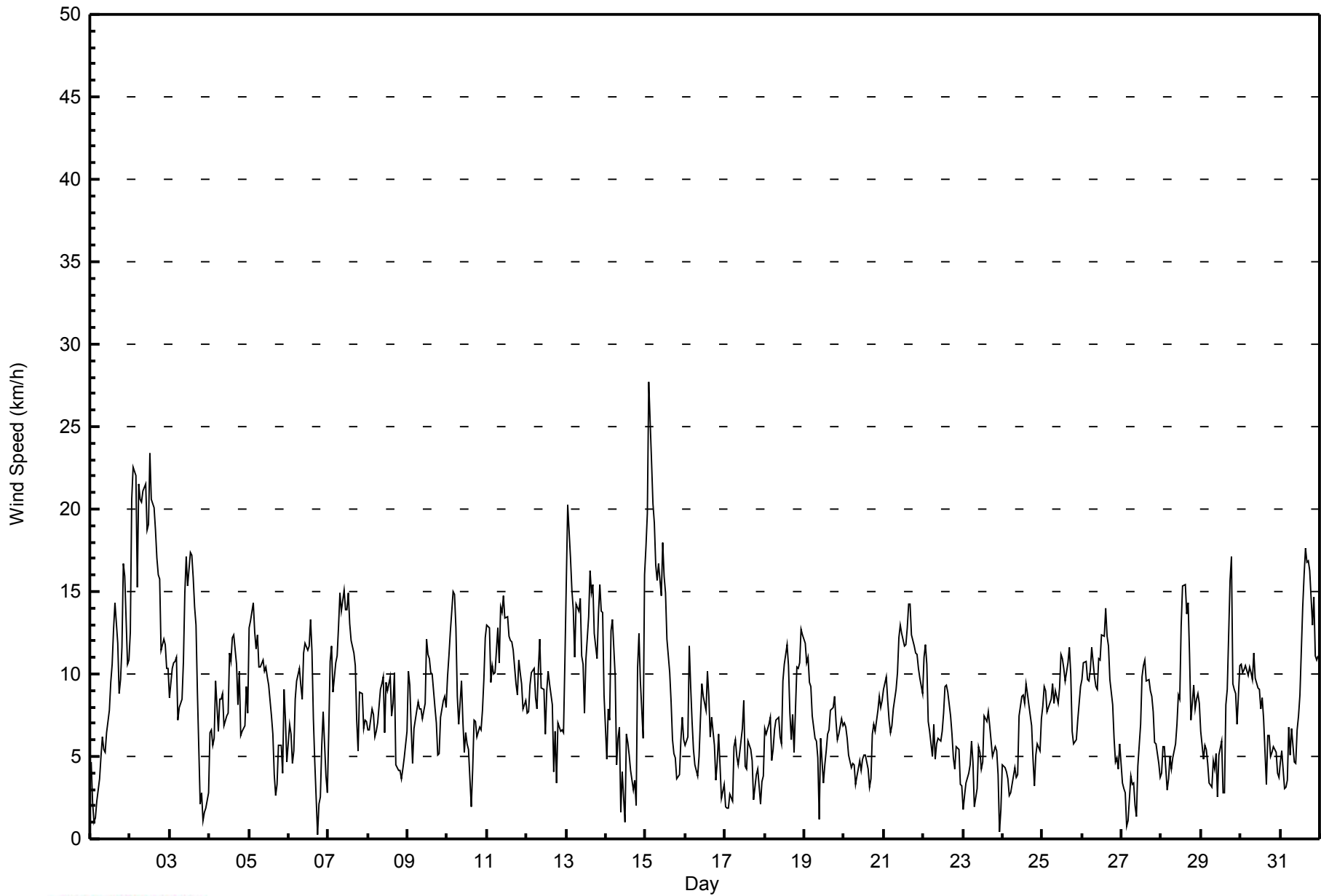


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Mar 15 03:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 1 km/h on Mar 29 04:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Mar	1	1	1	1	1	1	1	1	1	2	2	2	3	3	4	4	4	3	3	4	5	5	4	4	5
2-Mar	4	7	7	8	5	7	7	6	7	6	6	7	7	7	7	6	6	5	5	4	4	4	4	3	8
3-Mar	3	3	4	4	4	2	3	2	4	5	7	5	5	5	5	4	4	4	2	1	1	1	1	1	7
4-Mar	2	2	1	2	2	2	2	2	2	2	2	2	3	3	4	4	3	3	3	2	2	2	2	3	4
5-Mar	5	5	5	4	4	4	3	3	4	3	4	4	4	3	3	2	2	1	1	1	2	3	2	1	5
6-Mar	2	1	1	2	2	3	3	3	3	4	4	4	4	4	3	3	2	1	1	2	2	2	2	2	4
7-Mar	2	4	4	3	4	4	5	6	5	6	5	6	5	5	5	4	4	3	2	4	3	2	2	2	6
8-Mar	2	2	2	2	1	1	1	1	2	3	3	4	4	3	3	3	3	2	1	1	1	1	2	2	4
9-Mar	4	3	2	2	3	3	3	3	3	3	3	4	4	4	4	4	3	3	2	2	2	3	3	3	4
10-Mar	3	4	4	4	4	4	2	2	3	2	2	2	2	2	2	2	3	2	2	2	2	3	2	3	4
11-Mar	4	4	3	3	4	3	4	4	5	5	4	4	4	4	4	4	4	3	3	3	3	3	3	3	5
12-Mar	2	2	3	3	3	3	2	3	3	3	2	3	3	3	2	2	1	2	1	2	2	3	3	3	3
13-Mar	6	7	6	6	5	4	5	5	6	5	4	3	5	5	5	5	5	4	3	4	4	4	4	4	7
14-Mar	2	3	2	3	3	3	2	2	3	3	1	1	2	3	2	2	1	2	1	5	3	3	3	6	6
15-Mar	6	7	12	8	7	7	6	6	7	6	6	5	5	4	3	4	2	2	1	1	1	2	2	2	12
16-Mar	1	2	6	3	2	2	1	1	2	3	4	3	3	4	3	2	2	2	1	1	2	1	1	2	6
17-Mar	2	2	1	1	1	2	1	1	2	2	2	2	3	2	2	2	2	2	1	1	1	2	1	1	3
18-Mar	1	2	1	1	1	1	1	2	2	2	2	3	3	4	4	3	2	2	2	4	3	4	4	4	4
19-Mar	4	4	3	3	3	2	2	2	1	2	2	2	2	2	2	3	3	2	3	2	2	2	2	2	4
20-Mar	2	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21-Mar	2	3	2	2	2	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	4
22-Mar	4	4	3	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	2	1	2	2	1	2	4
23-Mar	1	1	1	1	1	2	2	1	1	2	2	2	2	2	3	3	3	2	1	1	1	1	1	1	3
24-Mar	2	2	1	1	1	1	1	1	1	1	3	3	2	3	3	3	3	2	1	1	1	1	1	2	3
25-Mar	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	3	2	1	1	2	2	4
26-Mar	2	2	3	2	2	2	3	2	2	2	3	3	3	3	4	4	3	3	2	2	1	1	1	1	4
27-Mar	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	2	2	2	1	2	1	3
28-Mar	2	2	2	2	1	2	1	2	2	2	3	3	5	6	6	5	5	5	3	4	3	3	3	3	6
29-Mar	2	1	1	1	1	2	1	1	1	2	2	2	2	2	2	3	3	7	6	3	2	3	2	3	7
30-Mar	4	3	4	3	3	4	3	3	4	4	3	3	3	3	3	2	3	3	2	1	1	1	1	1	4
31-Mar	1	2	1	1	1	1	3	2	2	2	2	2	3	6	6	6	6	6	5	3	5	3	3	3	6
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Anzac - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	193	25.94	25.94
6 - 11	404	54.30	80.24
12 - 19	131	17.61	97.85
20 - 28	16	2.15	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



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Anzac - March 2015

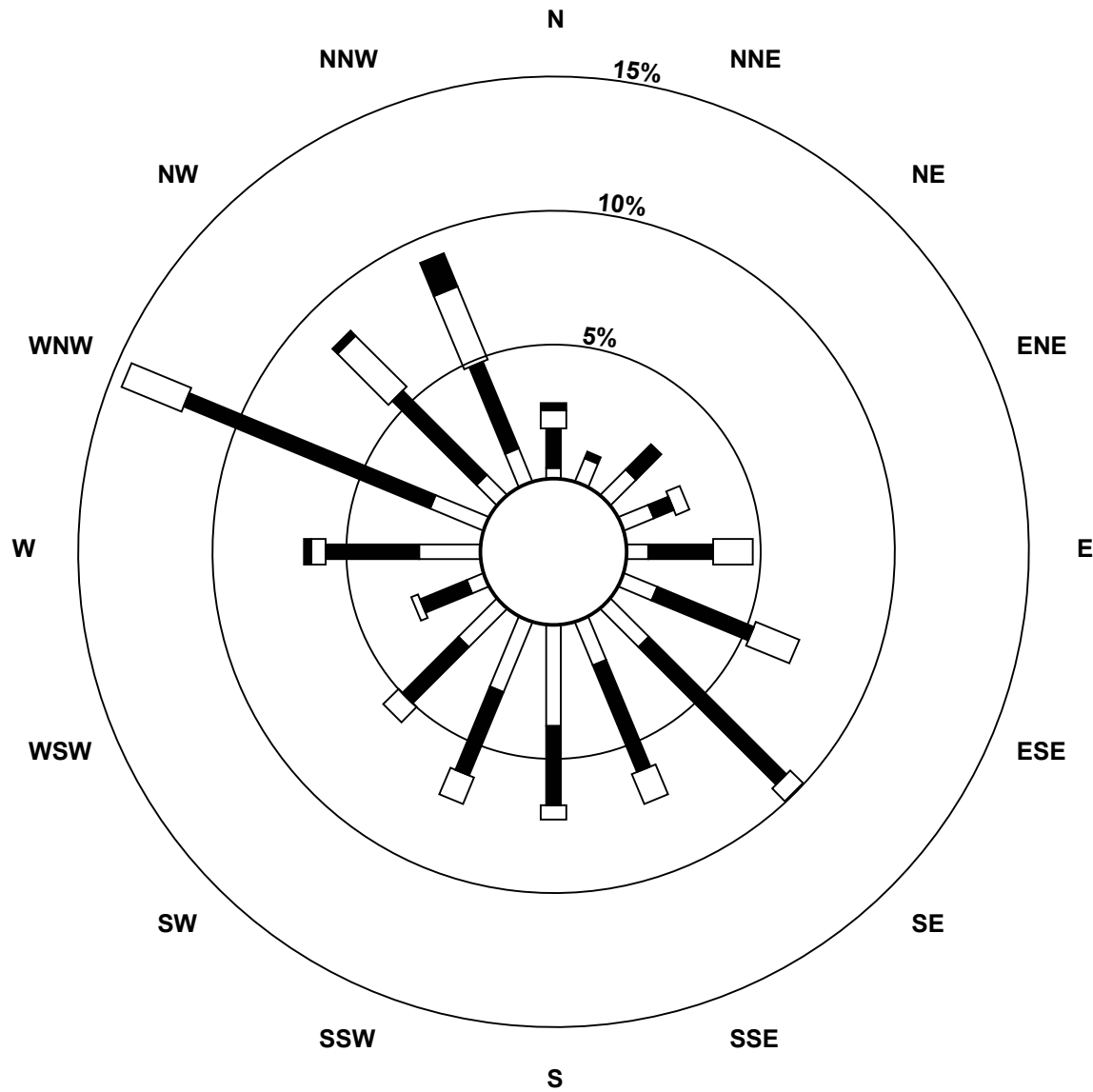
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	7	10	9	6	10	15	13	28	21	15	5	17	16	8	10	193
6 - 11	11	2	10	6	18	29	54	32	22	25	22	14	26	74	33	26	404
12 - 19	5	0	0	4	11	13	5	9	4	8	6	2	4	18	20	22	131
20 - 28	2	0	0	0	0	0	0	0	0	0	0	0	2	0	2	10	16
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	9	20	19	35	52	74	54	54	54	43	21	49	108	63	68	744

Total Number of Valid Hours: 744

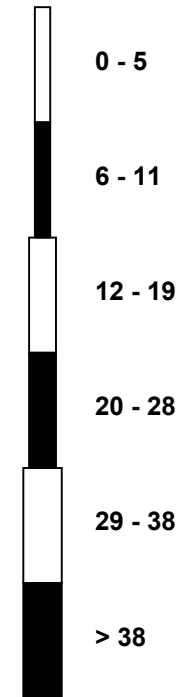
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Wind Speed (WS) - km/h
Anzac (AMS 14)**



Classes (km/h)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - March 2015

Direction of Maximum Speed: 313 deg on Mar 15 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 335.9 deg on Mar 2	Hours of Data: 744
Direction of Minimum Speed: 294 deg on Mar 6 18:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.6 deg on Mar 23	Percent Operational Time: 100.0
Monthly Average Direction: 278.7 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	11	89	218	218	183	176	174	188	182	178	179	186	196	208	213	204	197	181	204	221	250	252	284	209.4
2-Mar	314	346	345	353	343	350	339	335	337	335	336	335	339	337	338	341	336	331	332	325	319	316	307	313	335.9
3-Mar	308	304	306	300	303	331	344	338	346	349	349	347	339	344	345	345	350	346	316	331	208	210	188	174	334.2
4-Mar	171	186	203	221	224	193	205	199	207	178	171	189	222	202	205	205	199	202	222	200	210	206	212	269	205.0
5-Mar	303	306	309	313	311	305	300	297	296	295	293	275	291	280	284	286	258	174	165	174	199	293	275	280	291.3
6-Mar	251	239	227	271	276	296	300	307	306	336	333	331	333	343	358	347	310	294	157	101	98	74	148	345	319.4
7-Mar	278	296	297	296	298	290	297	298	295	296	299	301	302	296	307	311	310	293	274	298	303	285	286	291	297.1
8-Mar	287	281	272	268	256	230	218	228	228	226	237	294	297	297	279	261	242	259	229	208	227	277	259	283	257.8
9-Mar	279	286	290	283	269	283	290	292	304	295	278	296	294	311	336	295	336	311	326	292	303	304	318	297	298.8
10-Mar	295	300	328	349	355	351	349	354	335	347	346	274	288	60	58	78	138	105	95	90	93	102	74	71	9.6
11-Mar	86	95	101	97	103	106	112	108	116	115	121	115	120	109	95	91	96	97	93	90	87	92	101	108	103.0
12-Mar	114	116	121	140	144	115	124	152	155	150	137	153	139	155	160	160	186	277	219	191	208	208	217	224	157.5
13-Mar	260	269	283	284	285	285	278	288	286	284	270	279	261	248	233	212	205	187	167	166	175	180	183	204	243.5
14-Mar	149	169	166	158	157	153	143	164	222	218	54	15	258	290	272	262	279	141	206	234	232	251	248	260	208.4
15-Mar	270	270	313	332	323	309	304	301	307	315	319	330	331	332	333	333	345	25	39	83	163	169	171	198	312.8
16-Mar	212	256	319	316	319	318	307	340	330	307	309	331	316	322	330	353	39	40	57	68	69	103	119	23	334.7
17-Mar	275	210	124	125	154	170	161	170	178	138	131	137	166	298	297	277	291	283	106	131	176	202	182	191	175.3
18-Mar	231	234	209	213	187	190	197	201	180	170	197	231	246	220	250	285	324	341	334	326	320	317	325	321	258.4
19-Mar	325	317	318	317	322	319	319	308	341	316	77	46	306	307	273	2	3	350	343	358	18	37	51	53	341.5
20-Mar	52	63	77	87	144	184	177	155	132	69	44	31	83	41	69	68	72	100	102	119	138	152	152	141	104.7
21-Mar	132	156	154	124	125	126	125	134	125	120	144	129	112	107	97	100	96	102	114	110	113	113	110	114	118.4
22-Mar	124	141	134	129	143	137	122	117	113	114	93	132	121	125	127	130	142	163	108	120	102	118	172	173	128.5
23-Mar	190	187	163	170	173	169	175	194	211	223	207	250	288	295	298	323	335	28	39	42	56	56	45	56	266.0
24-Mar	22	23	346	339	301	287	291	286	281	278	330	327	329	342	340	352	6	357	30	97	117	139	146	137	347.0
25-Mar	151	158	157	154	142	133	145	146	135	127	128	119	108	127	141	141	155	148	146	144	146	154	148	152	141.3
26-Mar	144	142	140	138	132	136	142	143	129	127	147	156	140	148	159	157	164	173	178	174	126	127	136	165	147.5
27-Mar	163	164	181	178	351	281	271	212	213	194	124	113	121	131	107	125	140	148	140	124	91	86	120	201	134.3
28-Mar	298	321	337	250	219	339	289	303	293	290	290	303	325	330	326	314	308	286	283	273	281	285	285	278	301.6
29-Mar	271	260	228	231	237	223	187	199	168	194	221	303	298	258	214	198	220	235	233	220	223	243	271	288	236.2
30-Mar	282	284	291	291	299	298	303	311	300	290	273	272	287	291	291	279	282	258	229	202	223	222	206	200	279.9
31-Mar	211	216	198	182	162	138	154	152	145	111	124	109	85	103	100	93	98	97	78	65	69	50	49	51	96.4
265.8 267.7 293.0 296.2 278.4 283.4 266.7 263.5 271.1 289.1 296.5 300.5 304.9 308.9 304.9 297.9 272.8 183.4 147.1 154.9 167.0 198.3 204.3 248.7																									
Diurnal Average																									

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

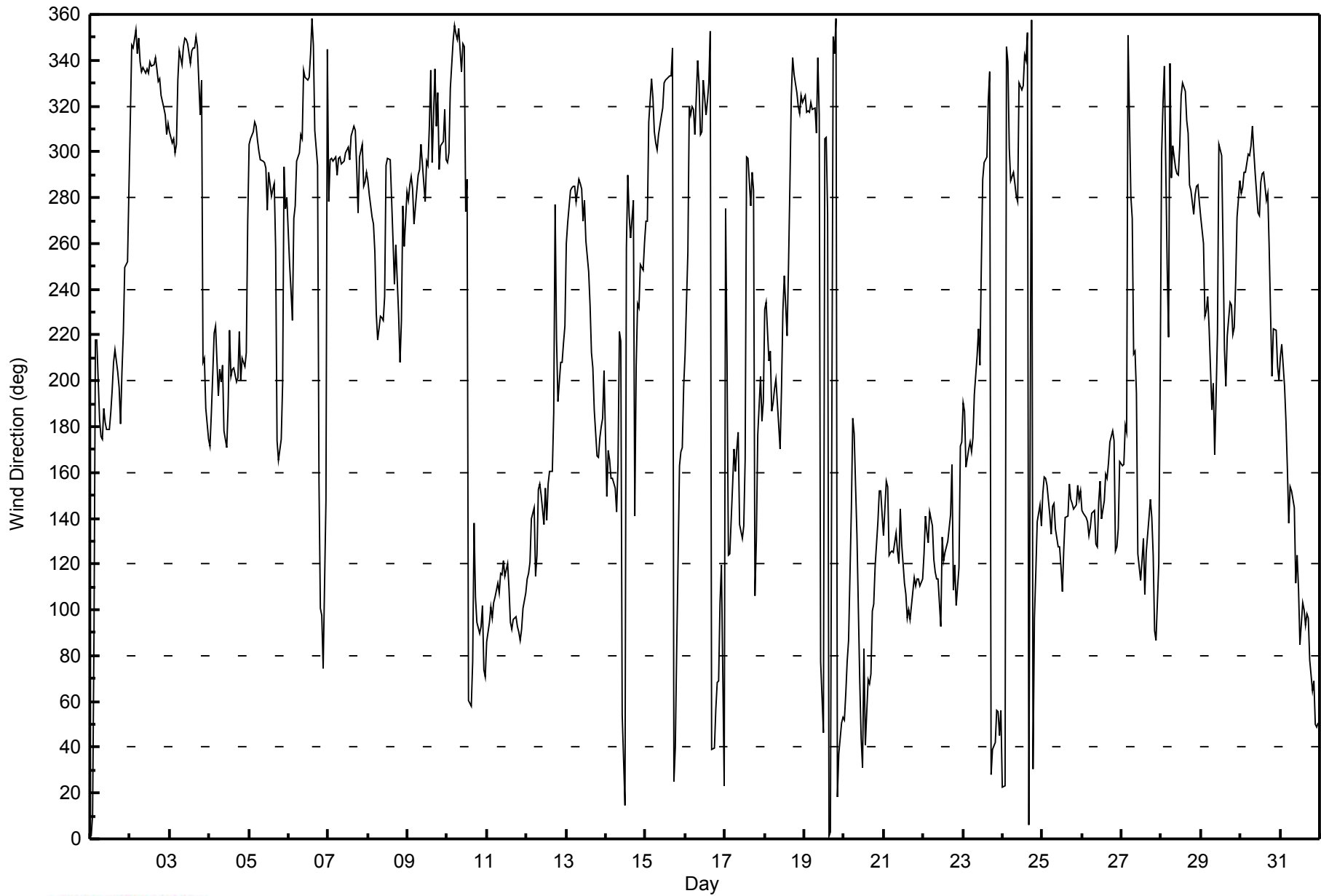
Anzac - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Mar 19 10:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: 8 deg on Mar 29 04:00																										
Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 19 Median = 24 Q ₃ = 28 P ₉₀ = 40 P ₉₉ = 86																										
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	15	26	79	60	33	13	14	12	16	21	25	25	25	26	25	22	26	25	22	28	20	26	27	29	79	
2-Mar	20	18	18	18	18	18	18	18	17	17	18	19	18	19	20	17	18	17	18	18	18	20	22	21	22	
3-Mar	19	21	19	23	23	25	17	18	16	19	18	21	19	21	22	22	16	16	53	19	85	29	34	13	85	
4-Mar	13	17	11	15	12	19	15	13	18	24	22	34	22	28	24	24	23	23	19	23	19	18	13	38	38	
5-Mar	25	22	22	20	20	20	22	22	24	27	29	31	34	42	35	47	54	22	12	12	30	25	20	15	54	
6-Mar	15	14	15	32	19	23	22	22	20	23	21	25	23	21	21	26	41	88	33	62	29	27	50	54	88	
7-Mar	29	25	23	25	24	27	26	25	24	26	27	25	24	25	27	26	27	23	21	24	24	24	25	25	29	
8-Mar	24	24	20	20	14	16	13	10	13	15	39	26	25	27	30	25	22	25	20	16	24	25	25	27	39	
9-Mar	27	29	25	24	25	26	25	23	23	26	31	24	26	35	24	31	22	28	19	24	19	22	21	24	35	
10-Mar	23	26	20	17	17	17	15	16	19	30	48	42	49	51	91	59	34	23	24	22	25	26	20	19	91	
11-Mar	21	24	27	23	25	24	23	24	23	24	19	22	24	28	25	24	25	24	24	21	23	21	25	23	28	
12-Mar	22	18	16	17	18	22	16	18	15	21	20	44	20	20	17	22	40	25	37	15	29	24	44	19	44	
13-Mar	28	28	27	30	29	32	28	29	29	33	28	34	32	27	22	23	22	23	17	18	20	23	24	36	36	
14-Mar	45	26	27	16	15	19	65	20	41	86	27	90	34	40	47	43	35	30	60	43	14	25	27	28	90	
15-Mar	27	28	34	18	18	23	23	25	25	23	23	21	19	22	25	24	29	25	16	31	27	15	20	24	34	
16-Mar	17	28	26	23	20	20	24	26	29	37	29	30	35	30	27	40	32	26	29	13	17	28	44	48	48	
17-Mar	59	57	41	14	35	13	12	19	34	30	27	25	54	64	42	39	33	46	14	27	15	37	17	18	64	
18-Mar	13	14	11	13	21	14	12	17	17	21	33	36	27	23	30	30	21	18	32	17	19	19	19	17	36	
19-Mar	17	19	17	18	18	19	20	24	34	94	47	91	62	47	49	47	27	20	16	17	17	17	14	16	94	
20-Mar	13	12	17	13	33	17	17	22	37	49	71	56	60	55	66	86	67	26	23	19	15	17	15	15	86	
21-Mar	17	18	18	24	18	17	16	20	21	20	26	24	28	27	25	25	24	24	22	23	23	23	24	23	28	
22-Mar	20	20	24	25	22	22	18	30	24	29	39	34	32	27	25	27	35	35	25	25	18	22	28	25	39	
23-Mar	62	30	15	25	24	18	25	62	27	22	25	46	40	30	34	33	36	33	16	14	13	11	74	31	74	
24-Mar	14	24	18	20	23	22	19	25	41	36	23	24	24	27	22	25	27	23	20	30	20	15	13	14	41	
25-Mar	16	16	15	14	14	15	17	19	19	18	21	20	23	25	25	28	26	22	20	16	15	18	18	17	28	
26-Mar	17	17	16	17	15	17	18	19	20	19	23	24	24	26	22	21	19	19	19	21	14	16	20	18	26	
27-Mar	36	21	23	72	47	22	26	24	42	82	49	27	28	22	25	27	19	18	19	19	20	25	51	19	82	
28-Mar	31	18	17	54	33	24	27	23	28	24	24	26	22	22	22	25	24	31	29	30	25	23	23	23	54	
29-Mar	20	9	10	8	11	45	27	15	25	30	74	30	27	52	74	37	21	19	26	16	11	22	27	23	74	
30-Mar	25	23	27	24	25	24	23	24	25	32	31	36	39	31	30	57	46	28	29	15	16	12	21	15	57	
31-Mar	19	17	29	19	25	13	29	22	53	59	37	30	28	29	28	26	27	26	20	20	21	20	19	22	59	
		62	57	79	72	47	45	65	62	53	94	74	91	62	64	91	86	67	88	60	62	85	37	74	54	
		Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
Anzac - March 2015



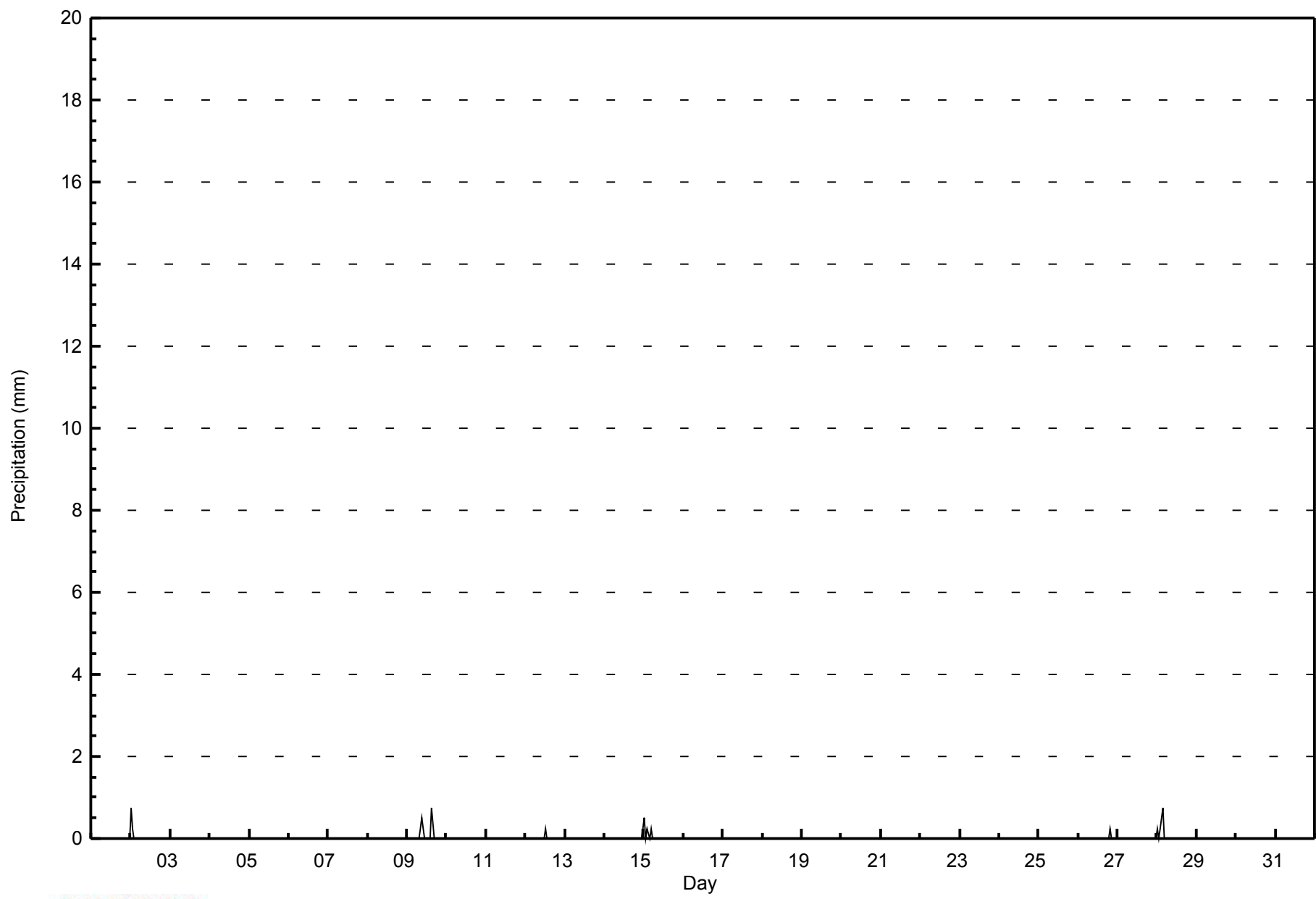


Maximum Value: 0.8 mm on Mar 2 01:00		Maximum Daily Total: 1.5 mm on Mar 9		Hours in Service: 744																									
Minimum Value: 0.0 mm on Mar 1 01:00		Minimum Daily Total: 0.0 mm on Mar 1		Hours of Data: 744																									
Maximum Diurnal Total: 1.5 mm at hour 1		Minimum Diurnal Total: 0.0 mm at hour 6		Hours of Missing Data: 0																									
Monthly Total: 5.59 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 = 0.3		Hours of Calibration: 0																									
				Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8
3-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.8
10-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
13-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
15-Mar	0.5	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
27-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.3	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.8
29-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.5	0.8	0.3	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.3	0.0	0.0	0.8	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	Diurnal Average		
		0.8	0.3	0.3	0.8	0.3	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.3	0.0	0.0	0.8	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - March 2015





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	15:25
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	47.2 ppm	Cal Gas Expiry Date	12/12/2016
Gas Cert Reference	SA130026A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	HVPS voltage	524	524
Analyzer Range (mv)	1000	1000	Lamp voltage	3773	3384
Calculated slope	0.996764	0.997962	Chamber temp.	50.0	50.0
Calculated intercept	0.014231	-0.084515	Pressure ("Hg)	25.0	25.3
Analyzer Background	20.2	19.7	Flow (ccm)	658	651
Analyzer Coefficient	1.014	0.967			

Analyzer make	API T100	Analyzer serial #	723
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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	NA
as found span	5000	78.3	798.7	764.9	1.044
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	74.9	707.1	708.9	0.997
second point	5000	37.5	354.0	353.8	1.001
third point	5000	18.7	176.5	177.8	0.993
calibrator zero	5000	0.0	0.0		NA
as left zero	5000	0.0	0.0	0.6	NA
as left span	5000	74.9	707.1	704.8	1.003
Average Correction Factor					0.997

Corrected As found	765.3	Previous response	801.3	% change	4.7%
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Notes:

Filter and calibration gas changed after As Finds. Zero and span adjusted

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

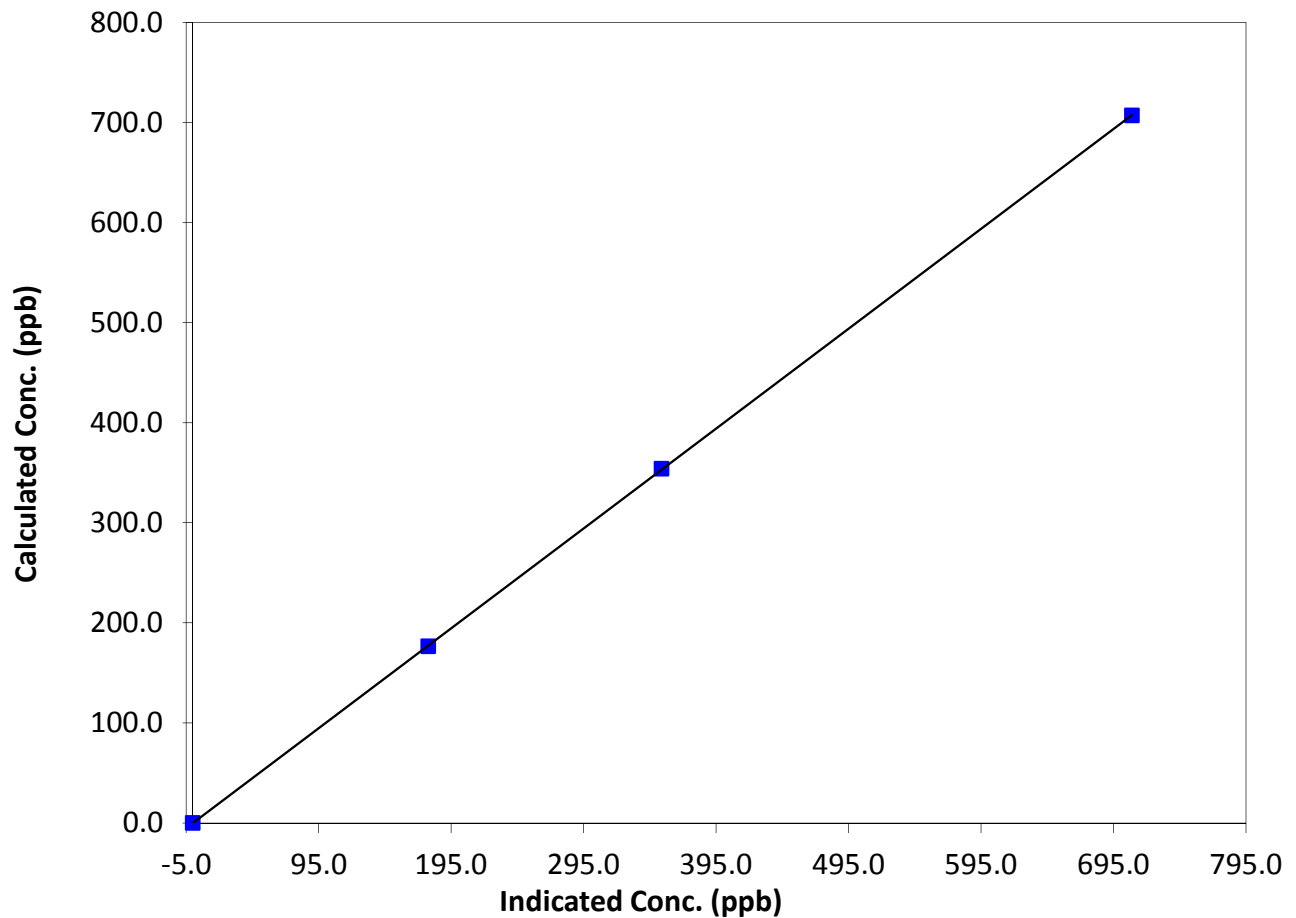
Station Information

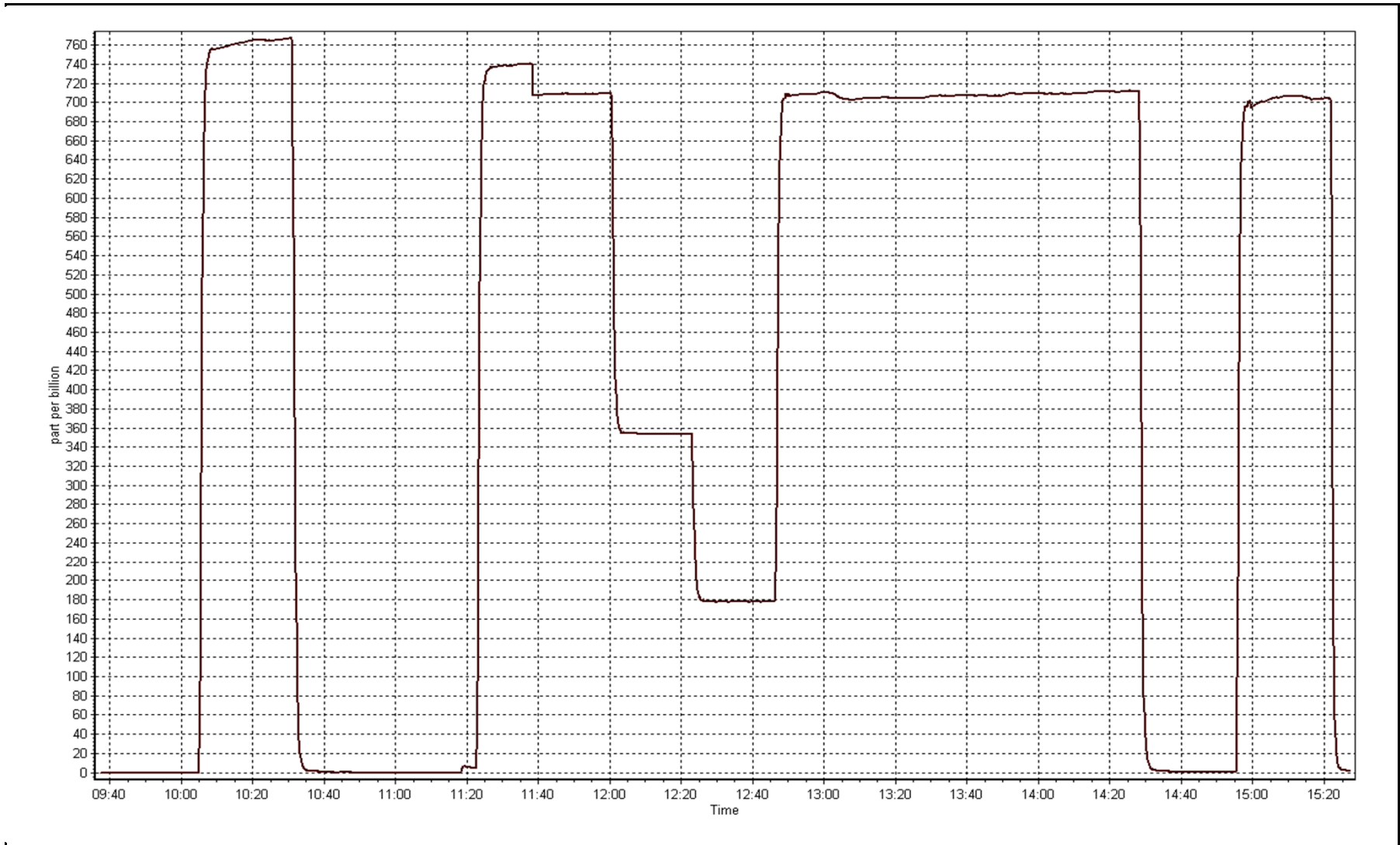
Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:40	End Time (MST)	15:25
Analyzer make	API T100	Analyzer serial #	723

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999993
707.1	708.9	0.9974		
354.0	353.8	1.0006	Slope	0.997962
176.5	177.8	0.9928		
			Intercept	-0.084515

SO₂ Calibration Curve







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 9, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:30
Barometric Pressure	732 mmHg	Station temp.	22
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	9.6 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL82745	SO2 gas conc.	47.2 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
DACS voltage range	0-5 volts	DACS channel #	Digital

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-731	-731
Analyzer Range (input)	100	100	Lamp voltage	1004	1007
Calculated slope	1.013736	0.990899	Chamber temp.	44.9	45.2
Calculated intercept	0.047429	-0.298340	Pressure	666.5	658
Analyzer Background	1.97	1.62	Flow	0.391	0.388
Analyzer Coefficient	1.094	1.117	Intensity	99	98
			Converter temp.	800	800

Analyzer make/model	43i-TL	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	-0.4	NA
as found span	5000	39.1	75.1	73.8	1.017
SO2 scrubber check	5000	18.7	176.5	0.5	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	39.1	75.1	75.9	0.990
second point	5000	20.8	39.9	40.9	0.977
third point	5000	10.4	20.0	20.7	0.966
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	39.1	75.1	75.6	0.993
Average Correction Factor					0.978

Corrected As found	74.2	Previous response	74.0	% change	-0.3%
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Notes:

Zero and Span with small adjustments. Filter changed after As Finds. Scrubber check after Calibrator Zero

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

TRS Calibration Summary

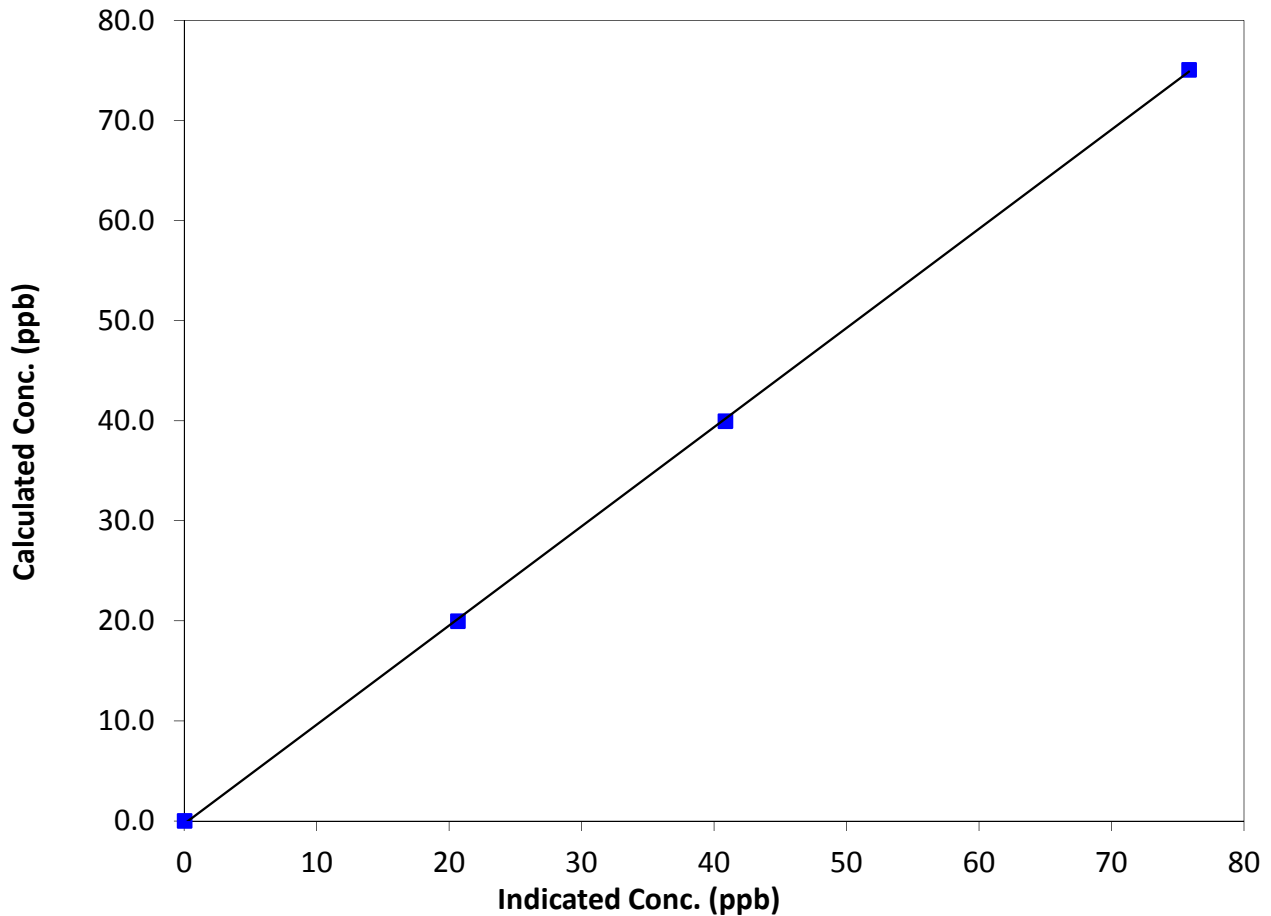
Station Information

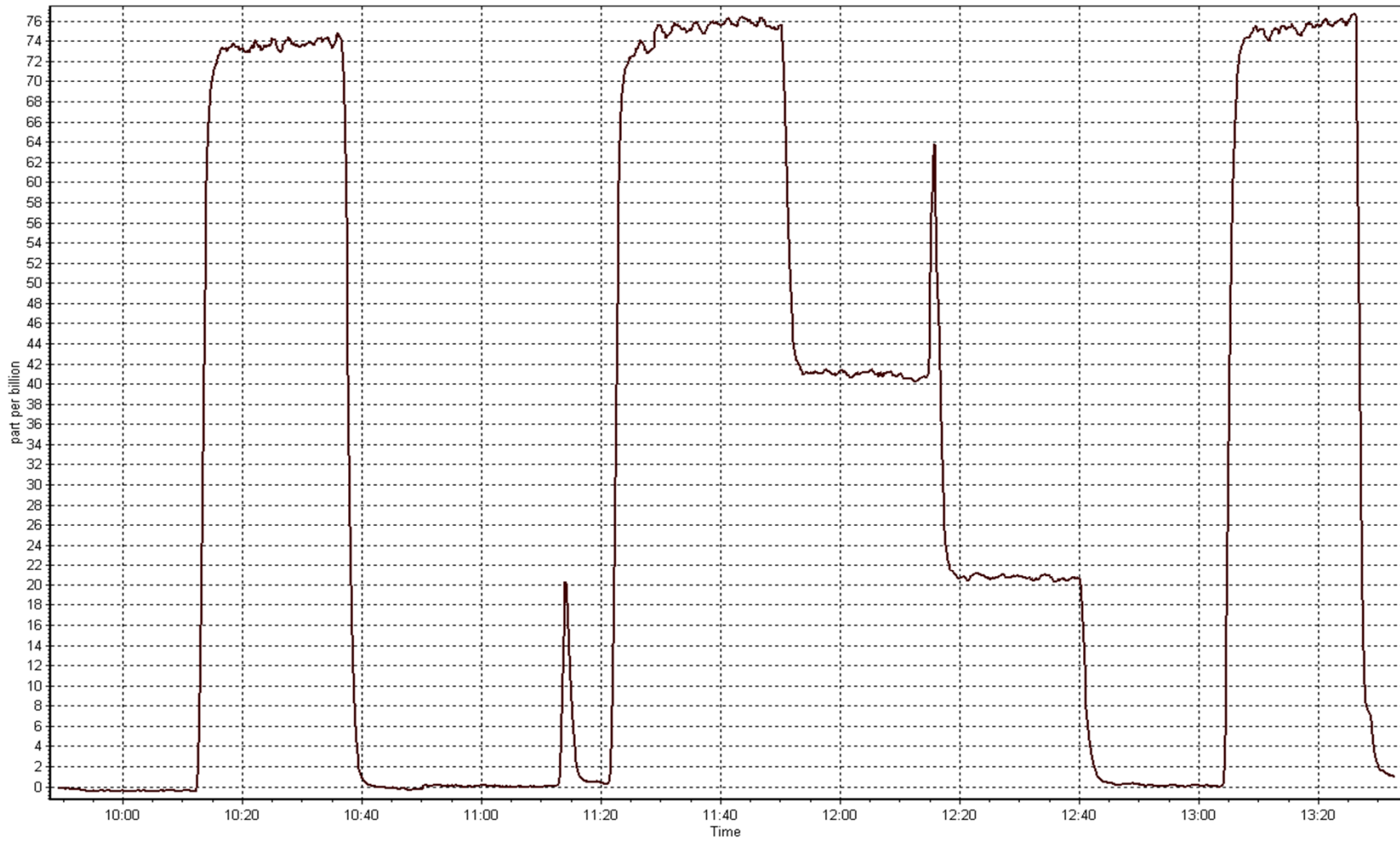
Calibration Date	March 23, 2015	Previous Calibration	February 9, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:30
Analyzer make	43i-TL	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999924
75.1	75.9	0.9896		
39.9	40.9	0.9771	Slope	0.990899
20.0	20.7	0.9660		
			Intercept	-0.298340

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Tuesday, March 17, 2015	Prev Calibration	Wednesday, February 04, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	15:25
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	SA130026A	Cal Gas Expiry Date	Monday, December 12, 2016
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	35.4	36.1
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	31.8	31.8
NMHC Range (input)	50	50	Fuel Pressure	41.4	41.4
THC Calc slope	1.004727	0.999927	Air Pressure	32.5	32.5
THC Calc intercept	0.020338	0.020218			
NMHC Calc slope	1.008465	1.001311			
NMHC Calc intercept	-0.001923	-0.003947			

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	N/A
as found span	5000	78.3	16.69	16.83	0.992
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	74.9	16.36	16.37	1.000
second point	5000	37.5	8.19	8.11	1.010
third point	5000	18.7	4.09	4.08	1.001
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	17.10	16.37	1.045
Average Correction Factor					1.004

Corrected As found 16.83 Previous response 16.59 % change -1.4%

Notes:

Filter, calibration gas changed after As Found. Span with a slight adjustment

Calibration Performed By: Ryan Power



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	N/A
as found span	5000	78.3	8.79	8.85	0.993
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	74.9	8.69	8.69	1.000
second point	5000	37.5	4.35	4.33	1.005
third point	5000	18.7	2.17	2.19	0.991
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	9.09	8.68	1.047
Average Correction Factor					0.999

Corrected As found 8.85 Previous response 8.72 % change -1.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	78.3	7.91	7.98	0.991
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	74.9	7.67	7.68	0.999
second point	5000	37.5	3.84	3.79	1.013
third point	5000	18.7	1.91	1.89	1.013
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	8.02	7.69	1.043
Average Correction Factor					1.008

Corrected As found 7.98 Previous response 7.87 % change -1.3%



Wood Buffalo Environmental Association

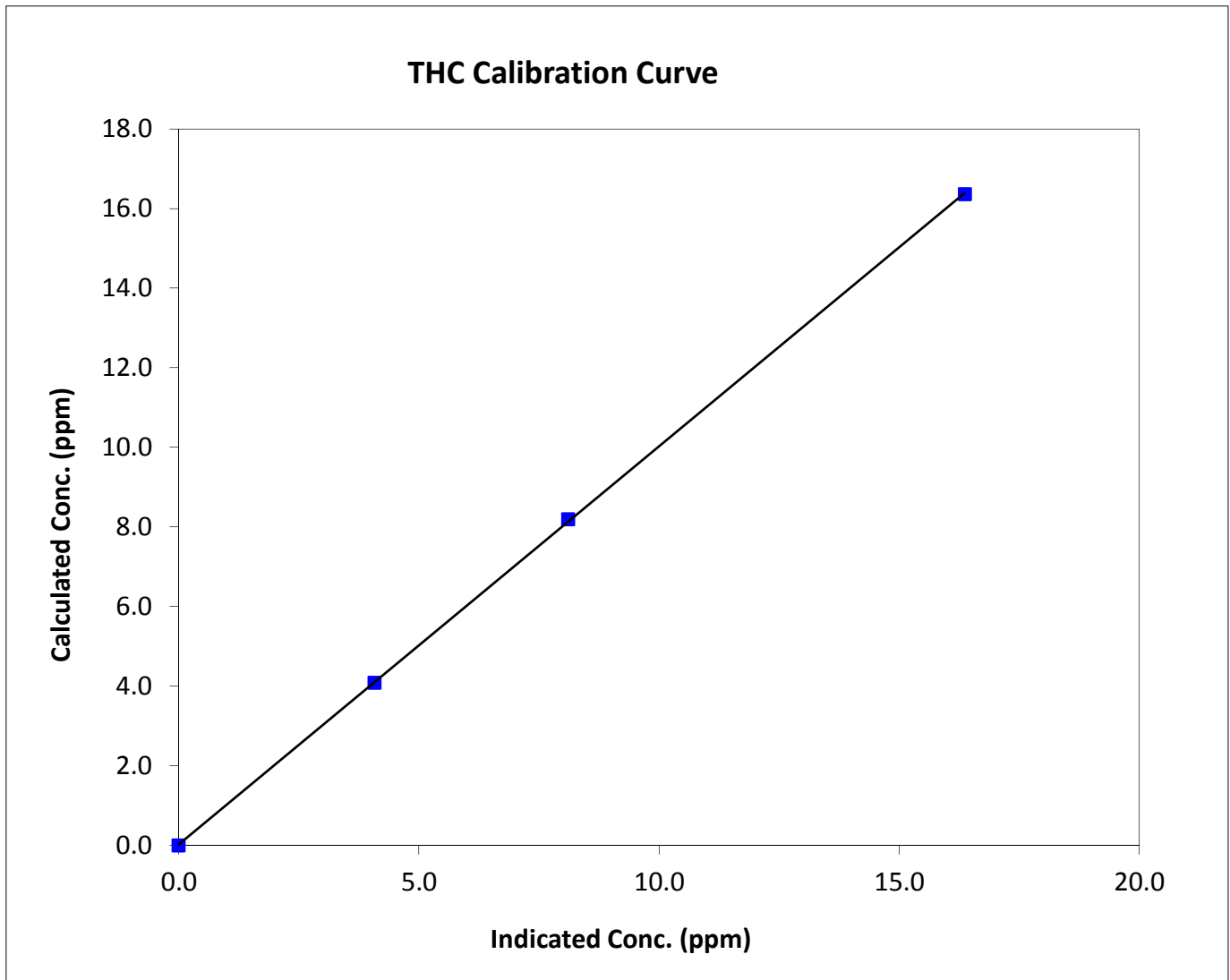
THC Calibration Summary

Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:30	End Time (MST)	15:25
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	N/A	Correlation Coefficient	0.999964
16.36	16.37	0.9995		
8.19	8.11	1.0101	Slope	0.999927
4.09	4.08	1.0012		
			Intercept	0.020218





Wood Buffalo Environmental Association

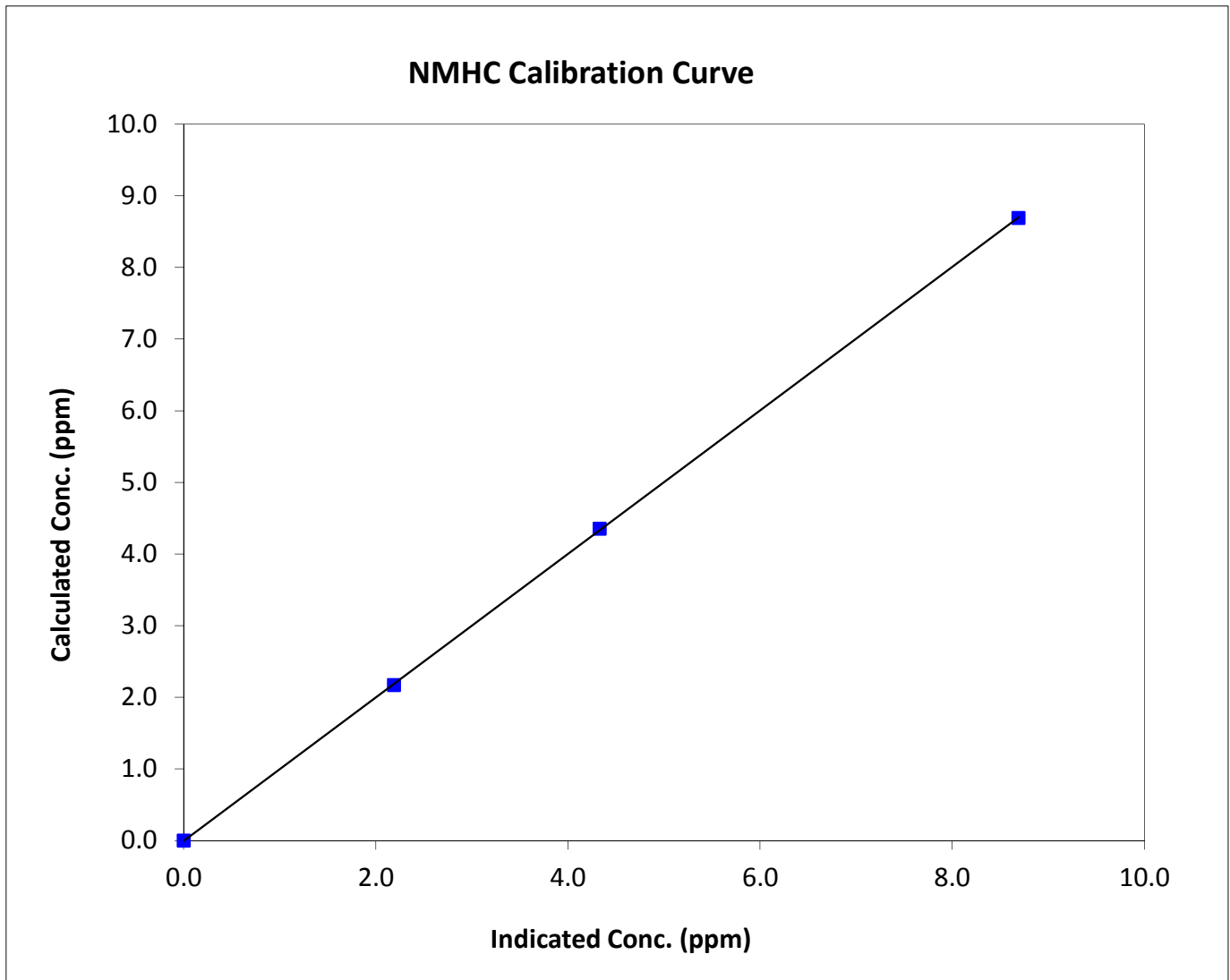
NMHC Calibration Summary

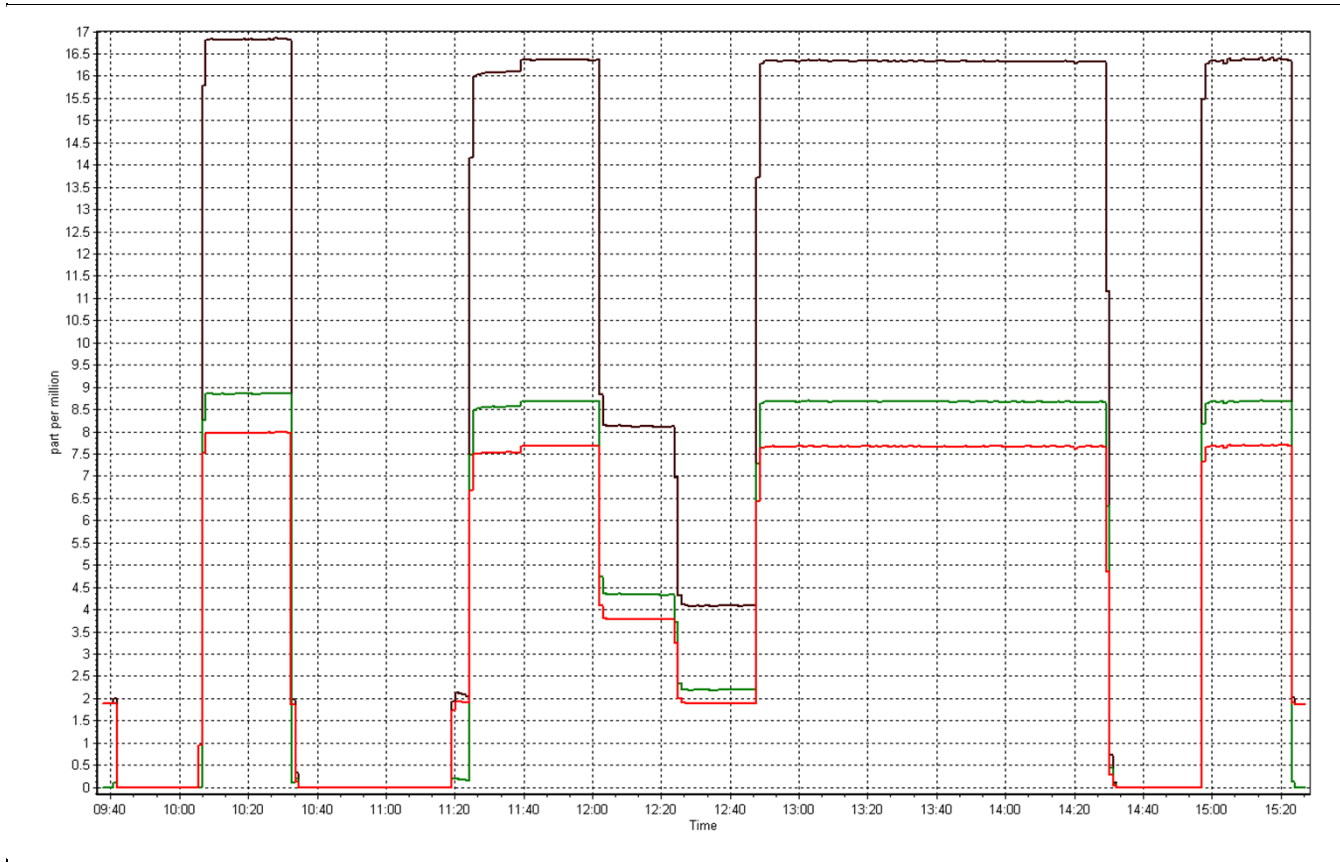
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:30	End Time (MST)	15:25
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	N/A	Correlation Coefficient	0.999981
8.69	8.69	1.0002		
4.35	4.33	1.0051	Slope	1.001311
2.17	2.19	0.9909		
			Intercept	-0.003947







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 5, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	14:25	End Time (MST)	18:07
Barometric Pressure	732 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
NO2 calibration used	Tuesday, March 17, 2015	Transfer Standard	
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
DACS voltage range	5000	DACS channel #	Digital

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	26.0	26.6
Analyzer Range (input)	500	500	Lamp temp.	53.8	53.8
Calculated slope	1.003282	0.997467	Pressure	663.4	668.6
Calculated intercept	0.172969	0.427053	Flow cell A	0.705	0.709
Analyzer Background	0	-0.7	Flow cell B	0.710	0.714
Analyzer Coefficient	1.025	0.97	Cell A Intensity	136868	133300
			Cell B Intensity	142853	139500

Analyzer make 49i Analyzer serial # 1426262596

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.7	N/A
as found span	5000	1.19	388.5	410.3	0.947
calibrator zero	5000	0.00	0.0	0.4	N/A
high point	5000	1.19	388.5	389.9	0.997
second point	5000	0.85	267.2	266.8	1.001
third point	5000	0.50	140.7	139.7	1.007
calibrator zero					
as left zero	5000	0.00	0.0	0.1	N/A
as left span	5000	1.19	388.5	397.2	0.978
Average Correction Factor					1.002

Corrected As found 411.1 Previous response 387.1 % change -5.8%

Notes:

Filter changed after As Found. Zero and span with adjustments.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

O₃ Calibration Summary

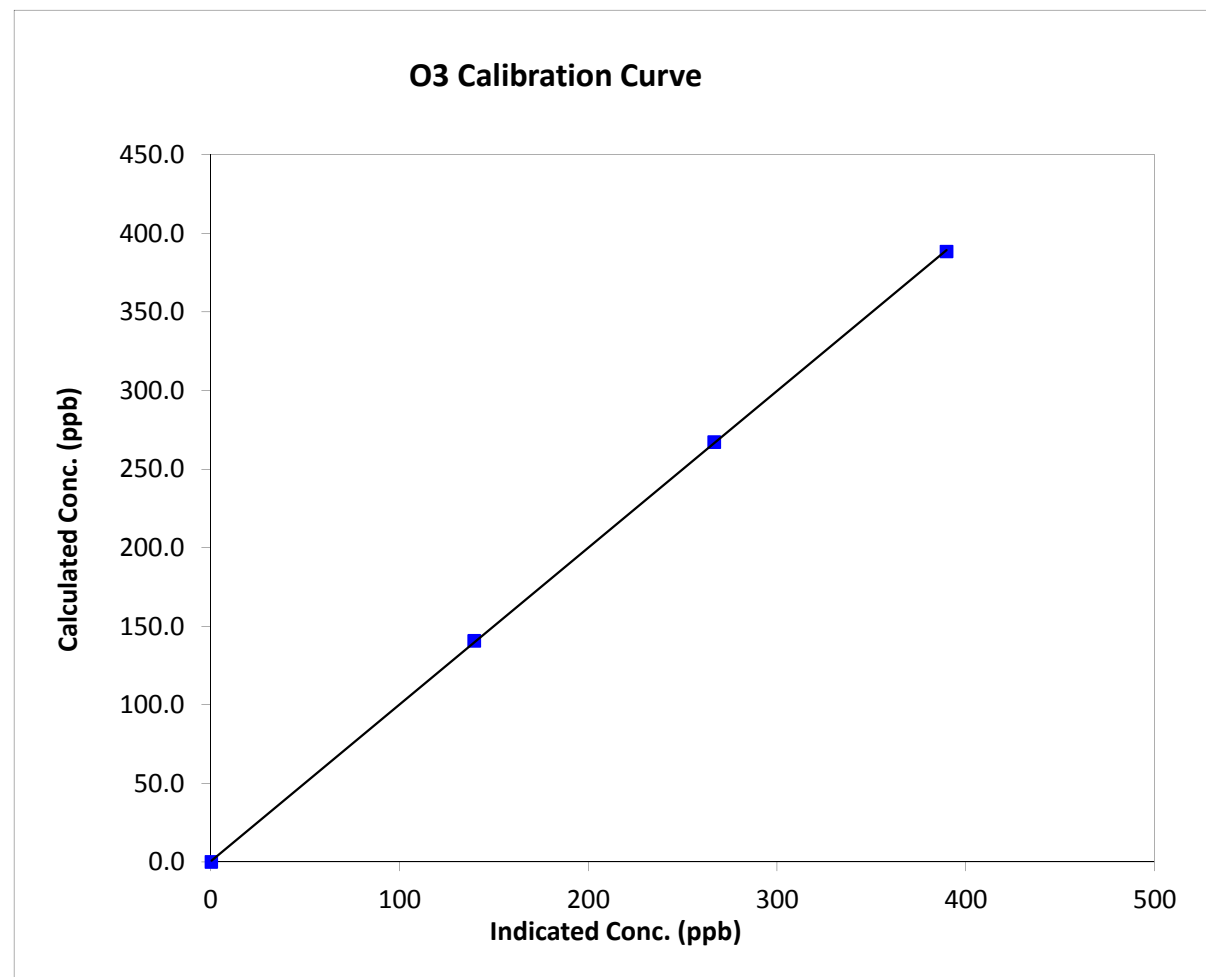
Station Information

Calibration Date	Tuesday, March 17, 2015	Previous Calibration	February 5, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	14:25	End Time (MST)	18:07
Analyzer make	49i	Analyzer serial #	1426262596

Calibration Data

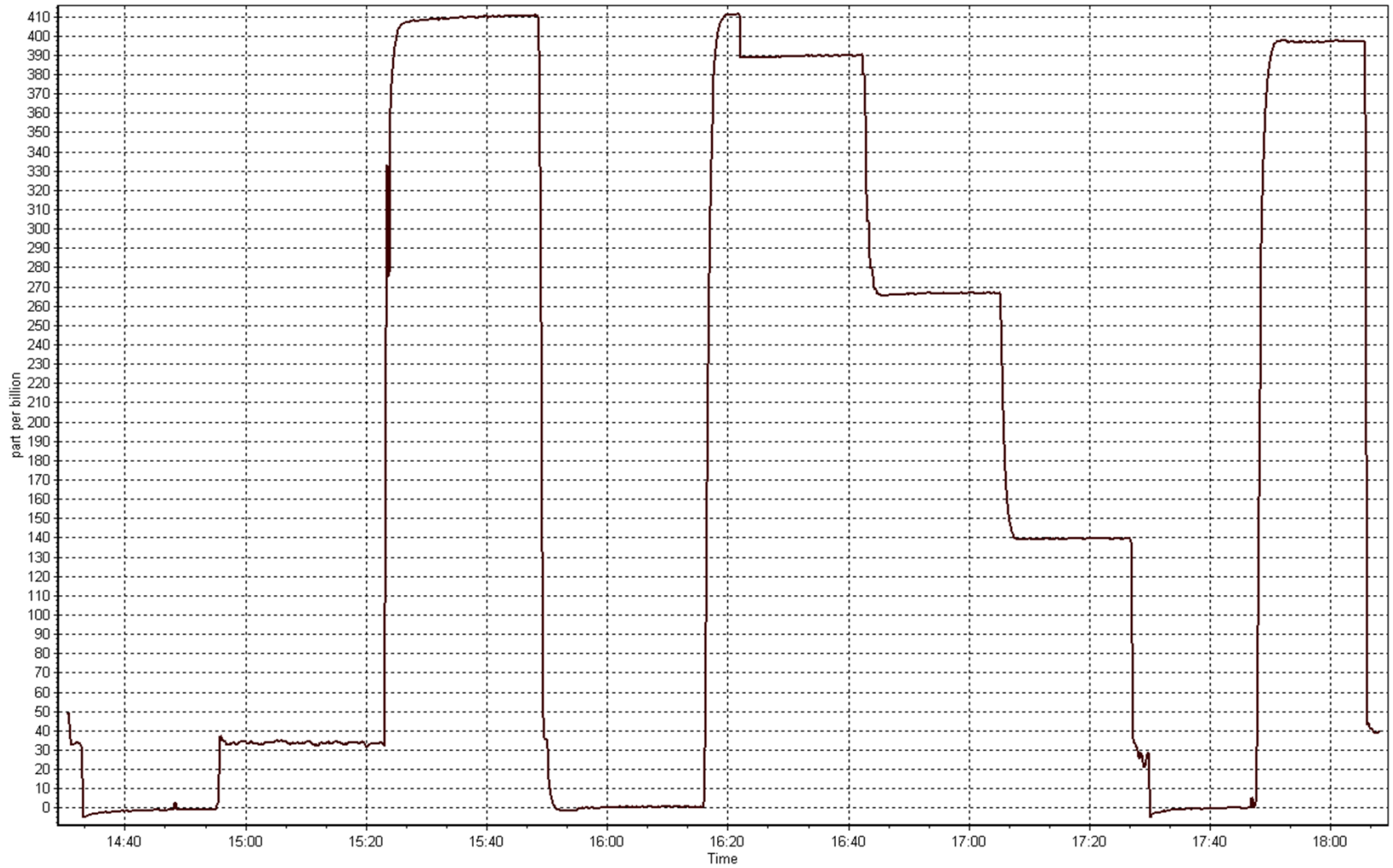
Calculated concentration (ppb) (C _c)	Indicated concentration (ppb) (I _c)	Correction factor (C _c /I _c)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999968
388.5	389.9	0.9965		
267.2	266.8	1.0015	Slope	0.997467
140.7	139.7	1.0074		
			Intercept	0.427053

O₃ Calibration Curve



O3 Calibration Plot

Date: March 17, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	15:25
Barometric Pressure	n/a	Station Temperature	22.0
Calibrator	Sabio 4010	Serial Number	8400311
NO Cal Gas Conc	53.4	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	53.4	Cal Gas Serial #	SA130026A

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 8790

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.992019	0.989513	1.002551
	Data Offset	0.253187	0.328360	0.018814
After	Data Slope	0.999468	0.999369	1.000462
	Data Offset	0.108229	0.170348	0.605779
Channel #		Digital	Digital	Digital
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model 42i Analyzer serial # 1426262592

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.740	ppb	0.682	ppb
NOX coefficient	1.000	ppb	0.998	ppb
NO2 coefficient	0.997	ppb	1.000	ppb
NO bkgrnd	3.0		2.8	
NOX bkgrnd	3.1		2.9	
Nt coefficient	n/a		n/a	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	324.5	Deg C	326.0	Deg C
PMT Temp	-2.8	Deg C	-3.0	Deg C
O3 flow	Ok	ccm	Ok	ccm
R Cell Press	158.8	mmHg	160.9	mmHg
Sample Flow	0.840	ccm	0.845	ccm

Notes:

Filter and calibration gas changed after As Finds. Span adjusted.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 17, 2015

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.0	N/A	N/A
as found span	5000	78.3	800.0	800.0	0.0	818.3	818.5	-0.2	0.9777	0.9774
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	N/A	N/A
high point	5000	74.9	799.9	799.9	0.0	800.6	800.6	-0.1	0.9992	0.9991
second point	5000	37.5	400.5	400.5	0.0	399.9	399.8	0.1	1.0016	1.0019
third point	5000	18.7	199.7	199.7	0.0	199.9	199.8	0.1	0.9991	0.9994
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	N/A	N/A
as left span	5000	78.3	836.2	411.6	424.6	800.4	403.3	397.4	1.0448	1.0208
Average Correction Factor									1.0000	1.0001

Corrected As found

NO_x= 818.2

NO= 818.4

Percent Change

NO_x= -1.5%

NO= -1.3%

Previous Response

NO_x= 806.2

NO= 808.2

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

74.90

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO ₂ (300)	N/A	411.6	388.5	799.7	411.6	388.1	0.9855	1.0000	1.0010	99.9%
2nd NO ₂ (200)	N/A	532.9	267.2	799.3	532.9	266.3	0.9861	1.0000	1.0031	99.7%
3rd NO ₂ (100)	N/A	659.4	140.7	798.5	659.4	139.2	0.9870	1.0000	1.0113	98.9%
4th NO ₂ (0)	800.1	N/A	-0.1	800.0	800.1	-0.1	0.9851	1.0000	N/A	N/A
Average Correction Factor							0.9859	1.0000	1.0051	99.5%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

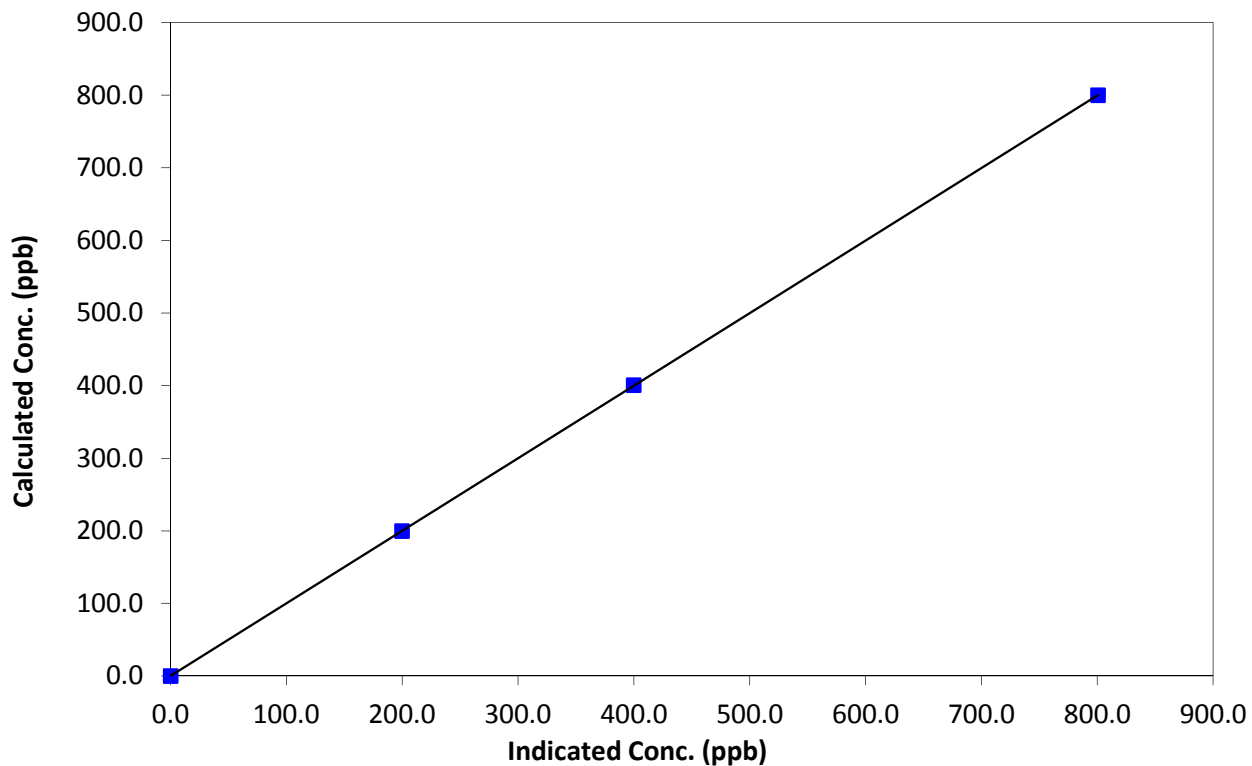
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:40	End Time (MST)	15:25
Analyzer make	42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999998
799.9	800.6	0.9992		
400.5	399.9	1.0016	Slope	0.999468
199.7	199.9	0.9991		
			Intercept	0.108229

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

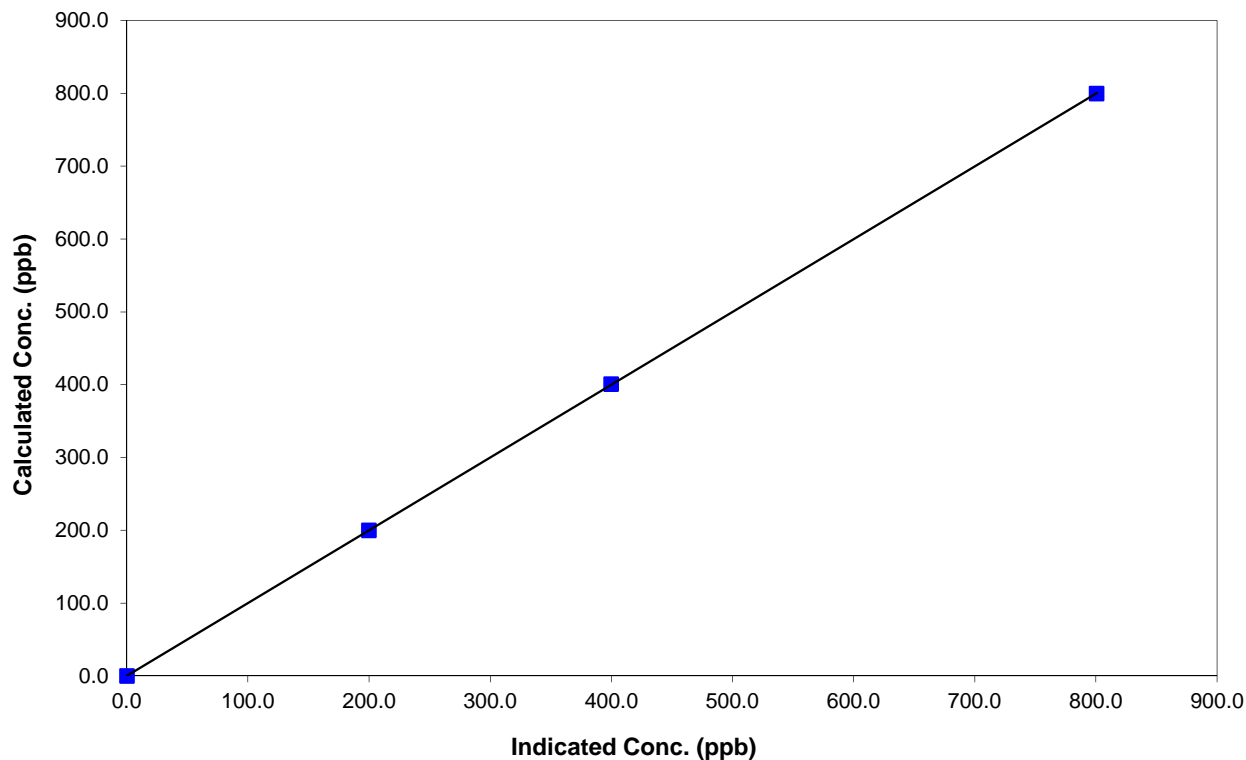
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:40	End Time (MST)	15:25
Analyzer make	42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999997
799.9	800.6	0.9991		
400.5	399.8	1.0019	Slope	0.999369
199.7	199.8	0.9994		
			Intercept	0.170348

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

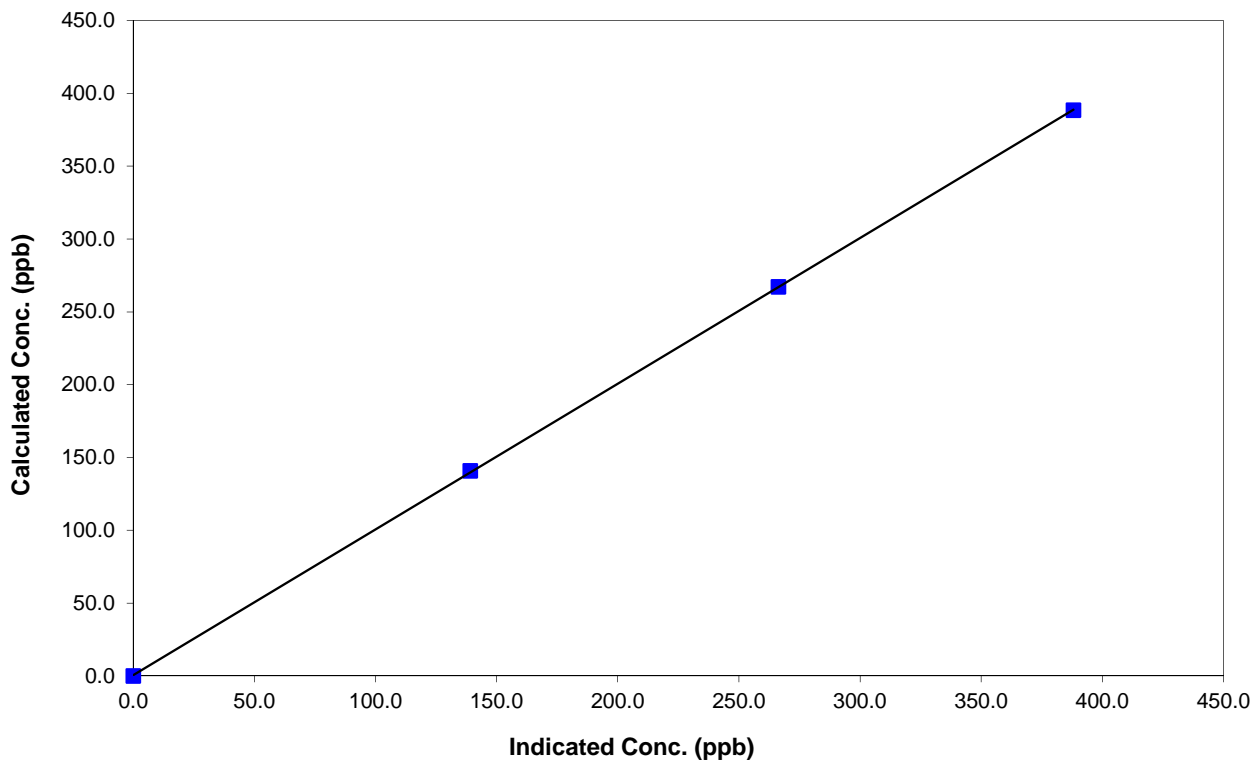
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 4, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:40	End Time (MST)	15:25
Analyzer make	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	0.999984
388.5	388.1	1.0010		
267.2	266.3	1.0031	Slope	1.000462
140.7	139.2	1.0113		
			Intercept	0.605779

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	24	0	6	0
TRS (ppb) Average	709	35	35	100.00	1	0	0	0
THC (ppm) Average	705	37	39	99.73	7.6	-	3	-
NO2 (ppb) Average	708	36	36	100.00	47	0	22	-
NO (ppb) Average	708	36	36	100.00	132	-	18	-
NOX (ppb) Average	708	36	36	100.00	176	-	33	-
PM2.5 (ug/m3) Average	739	0	5	99.33	21.3	-	11.3	0
Temperature 2 m (C) Average	744	0	0	100.00	15.2	-	5.9	-
Wind Speed 10 m (km/h) Average	709	0	35	95.30	28	-	19.0	-
Wind Direction 10 m (deg) Average	709	0	35	95.30	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	2.5	-	9.1	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	91	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	658	-	216	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.8	2	-	0	0	0	0	1	2	24
TRS (ppb) Average	709	0.3	0	-	0	0	0	0	0	1	1
THC (ppm) Average	705	2.33	0.5	-	1.9	2	2.1	2.2	2.4	2.7	7.6
NO2 (ppb) Average	708	8.7	10	-	0	1	2	5	12	23	47
NO (ppb) Average	708	3.4	11	-	0	0	0	0	3	8	132
NOX (ppb) Average	708	12.1	18	-	0	1	2	6	15	30	176
PM2.5 (ug/m3) Average	739	3.83	3.1	-	0	1.1	1.9	2.9	5	8	21.3
Temperature 2 m (C) Average	744	-4.82	8.6	-	-32.8	-15.7	-10.3	-4.5	1.4	5.8	15.2
Wind Speed 10 m (km/h) Average	709	8	4	-	0	4	5	7	10	13	28
Wind Direction 10 m (deg) Average	709	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	17.02	0	0	0	0	0	0	2.5
Relative Humidity (%) Average	744	66.6	19	-	25	41	52	69	81	91	98
Global Solar Radiation (W/m2) Average	744	128	182	-	0	0	0	5	226	445	658

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	16 Mar 2015 12:00	16 Mar 2015 13:00	2	Intermittent unstable operation - excessive baseline drift
PM2.5	25 Mar 2015 13:00	25 Mar 2015 14:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	29 Mar 2015 01:00	29 Mar 2015 01:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	31 Mar 2015 20:00	31 Mar 2015 21:00	2	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	15 Mar 2015 00:00	16 Mar 2015 10:00	35	Flat line in sensor output signal -sensor frozen

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 24 ppb on Mar 26 16:00	Maximum Daily Average: 5.9 ppb on Mar 26		Hours of Data:	707
Minimum Value: 0 ppb on Mar 1 02:00	Minimum Daily Average: 0.0 ppb on Mar 10		Hours of Missing Data:	37
Maximum Diurnal Average: 1.9 ppb at hour 15	Minimum Diurnal Average: 0.2 ppb at hour 8		Hours of Calibration:	37
Monthly Average: 0.8 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =2 P ₉₉ =9		Percent Operational Time:	100.0

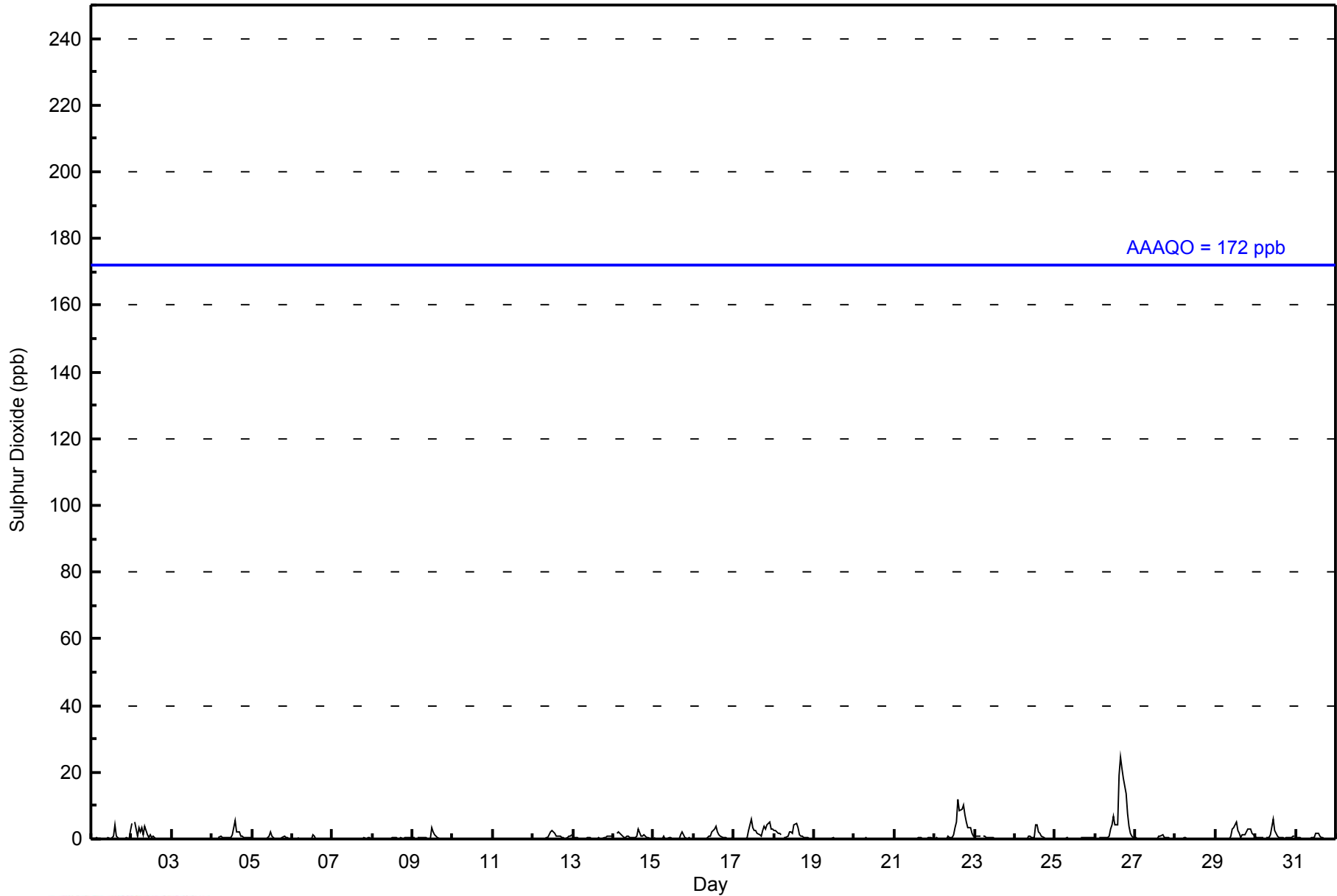
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	0	0	0	0	0	0	0	2	0.5	4
2-Mar	5	Z	5	1	3	2	3	1	4	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1.3	5
3-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Mar	0	0	0	Z	0	1	1	1	0	0	0	0	1	3	5	2	2	1	1	1	0	0	0	0	0.9	5
5-Mar	0	0	0	0	Z	0	0	0	0	0	1	2	1	0	0	0	0	0	0	1	0	0	0	0	0.3	2
6-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1
7-Mar	Z	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-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	4	2	1	1	1	0	0	0	0	0	0	0	0	0.5	4
10-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Mar	0	0	0	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-Mar	0	0	0	0	0	Z	0	0	0	0	2	3	2	2	1	1	1	1	0	0	0	1	1	1	0.7	3
13-Mar	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1
14-Mar	1	Z	1	2	2	1	0	1	1	1	1	1	1	1	3	1	1	1	1	1	0	0	0	0	0.8	3
15-Mar	0	0	Z	0	0	0	1	0	0	1	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0.4	2
16-Mar	0	0	0	Z	0	0	0	0	0	1	1	2	3	4	2	1	1	1	0	0	0	0	0	1	0.8	4
17-Mar	0	0	0	0	Z	0	0	0	0	2	6	4	3	2	2	1	1	2	4	3	4	5	3	3	2.0	6
18-Mar	3	2	2	2	1	Z	0	1	1	2	2	2	4	4	3	1	1	1	0	0	0	0	0	0	1.5	4
19-Mar	Z	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-Mar	0	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Mar	0	0	0	Z	0	0	0	0	1	1	0	1	3	5	12	9	9	10	7	5	3	3	2	1	3.2	12
23-Mar	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Mar	0	0	0	0	0	Z	0	0	1	1	0	0	4	4	2	2	1	0	0	0	0	0	0	0	0.8	4
25-Mar	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
26-Mar	0	Z	0	0	0	0	0	0	1	3	4	7	4	4	19	24	21	18	13	8	4	2	1	0	5.9	24
27-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.3	1
28-Mar	0	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
29-Mar	0	0	0	0	Z	0	0	0	0	1	3	3	5	3	2	1	1	1	2	3	3	3	2	1	1.4	5
30-Mar	0	0	1	0	0	Z	0	0	1	1	6	2	2	1	0	0	0	0	0	0	0	0	1	1	0.8	6
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0.3	2
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.15	99.15
11 - 20	4	0.57	99.72
21 - 60	2	0.28	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - March 2015

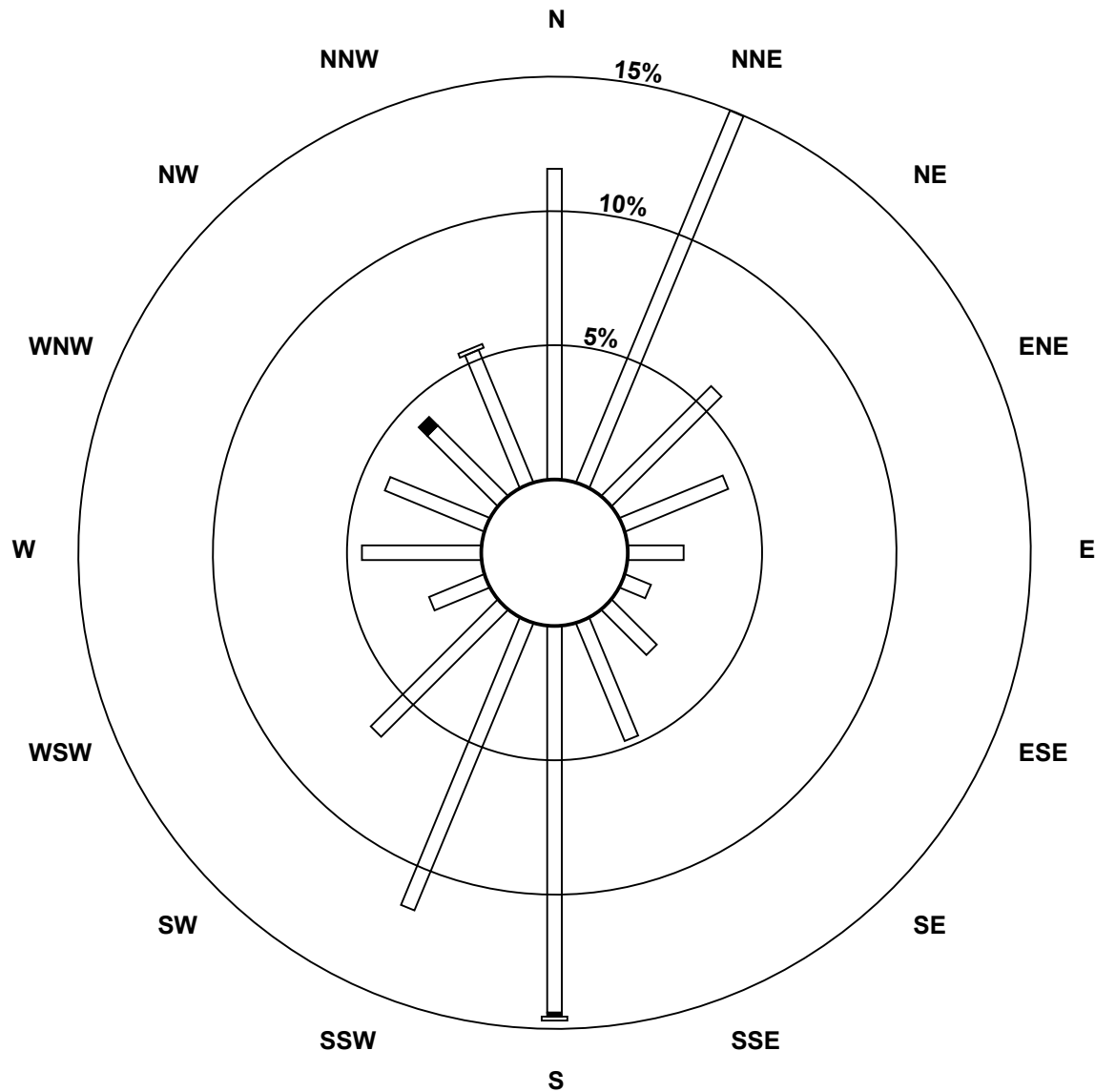
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	78	101	39	28	14	7	16	32	97	78	45	15	30	27	25	36	668
11 - 20	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	4
21 - 60	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	78	101	39	28	14	7	16	32	99	78	45	15	30	27	28	37	674

Total Number of Valid Hours: 674

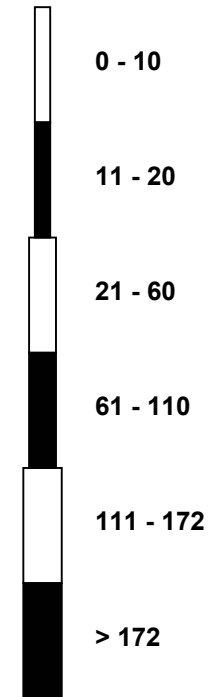
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)



Classes (ppb)

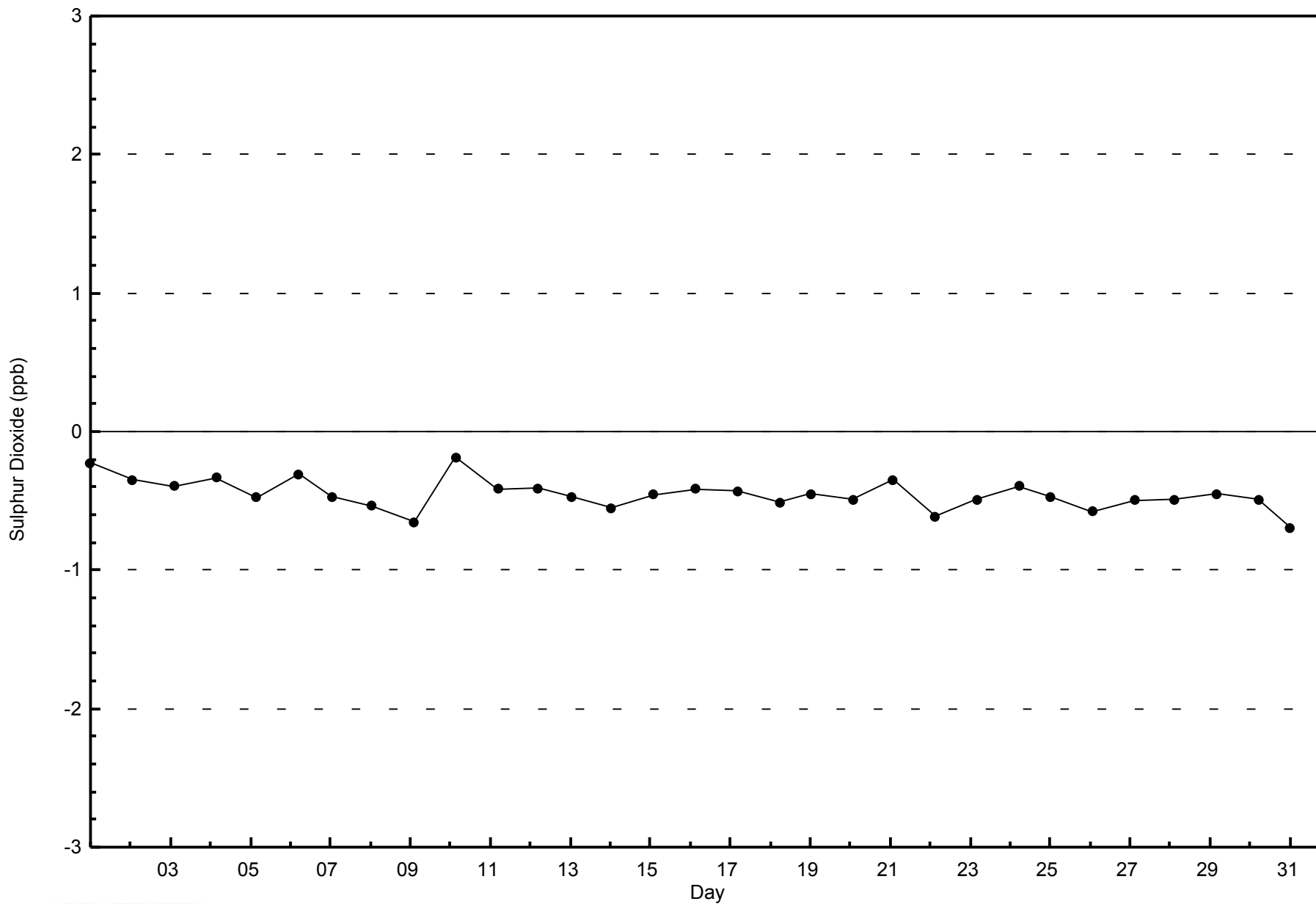


Total Number of Valid Hours: 674



WBEA
Zero Responses

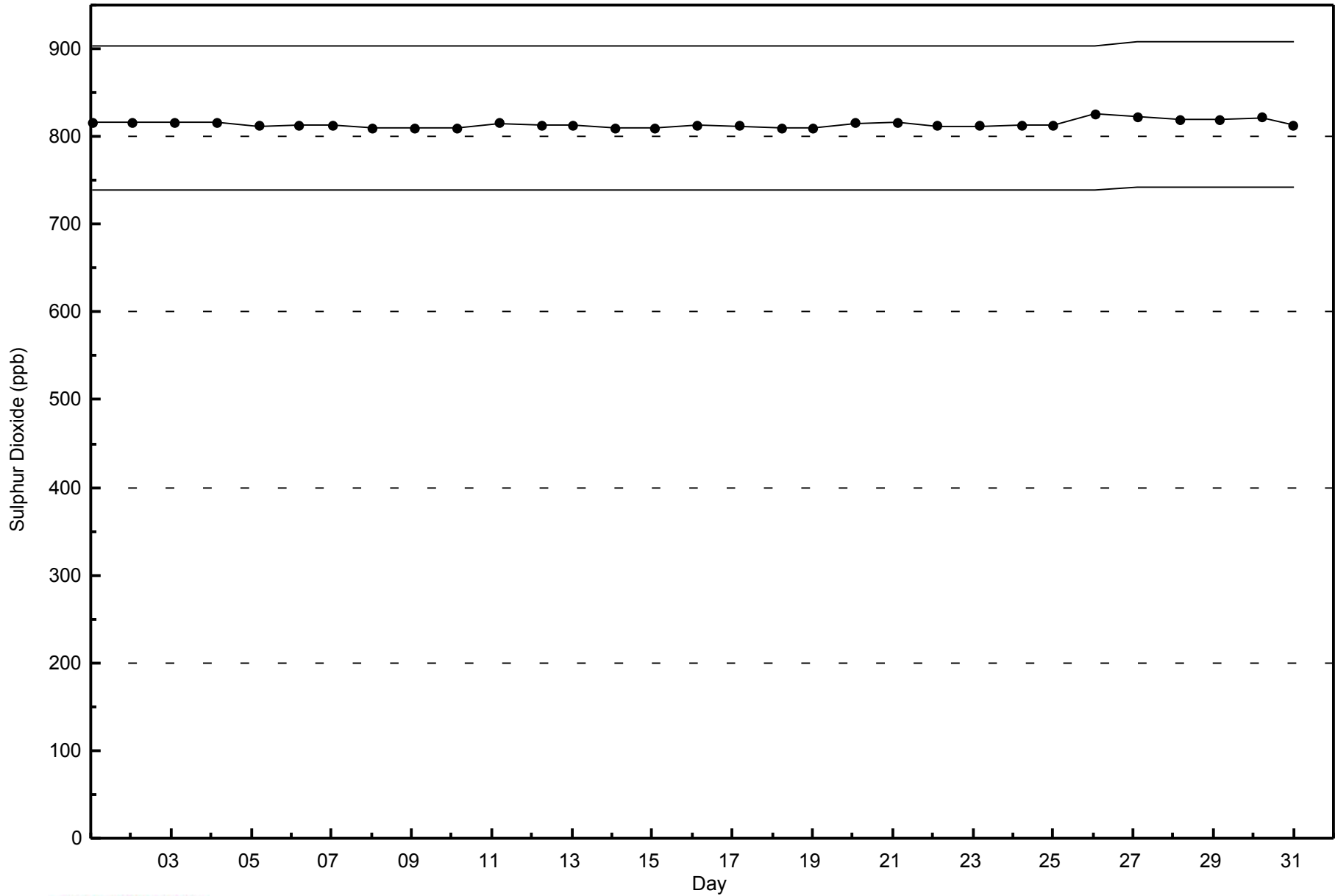
Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - March 2015





WBEA
Span Responses

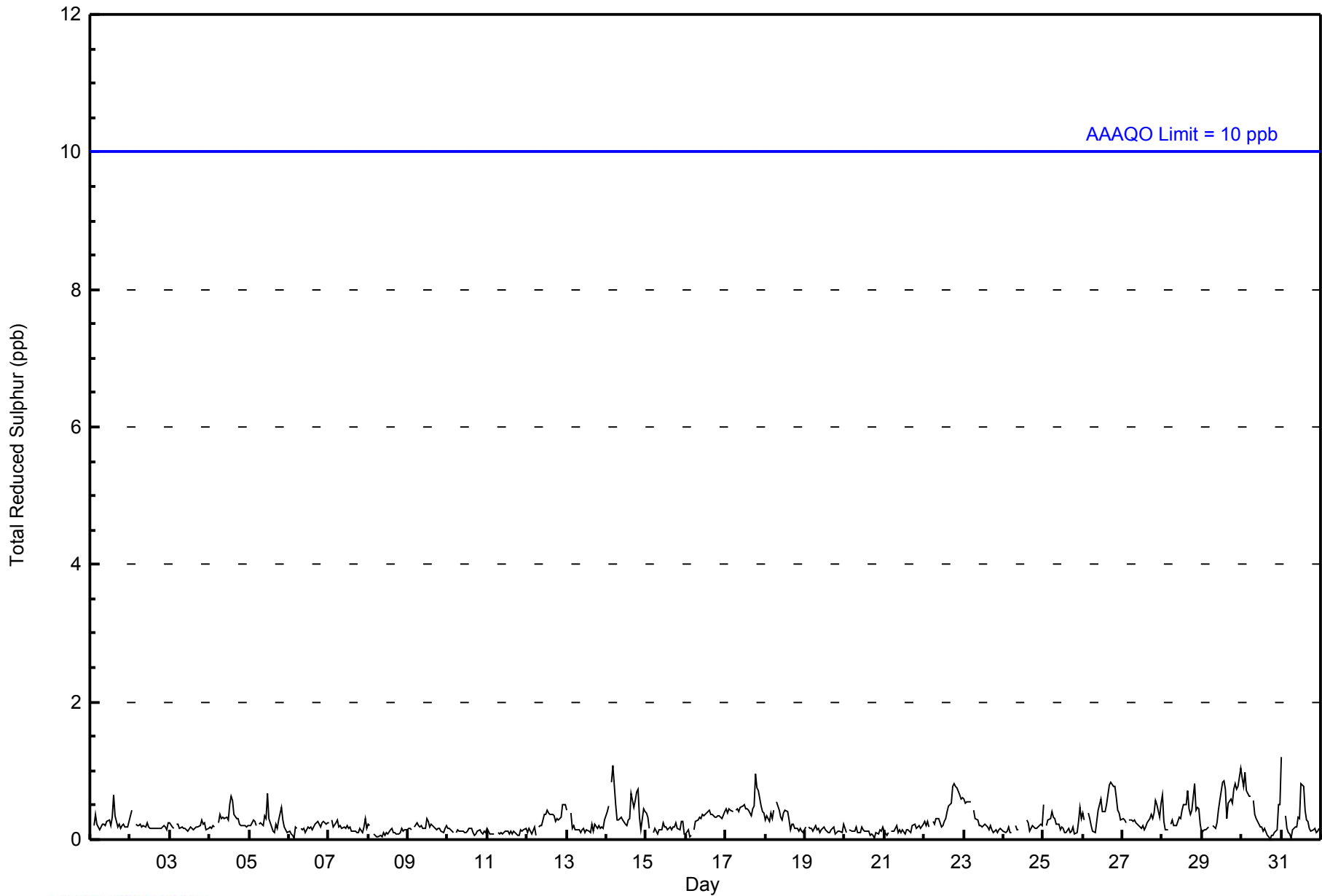
Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - March 2015





WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - March 2015

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



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - March 2015

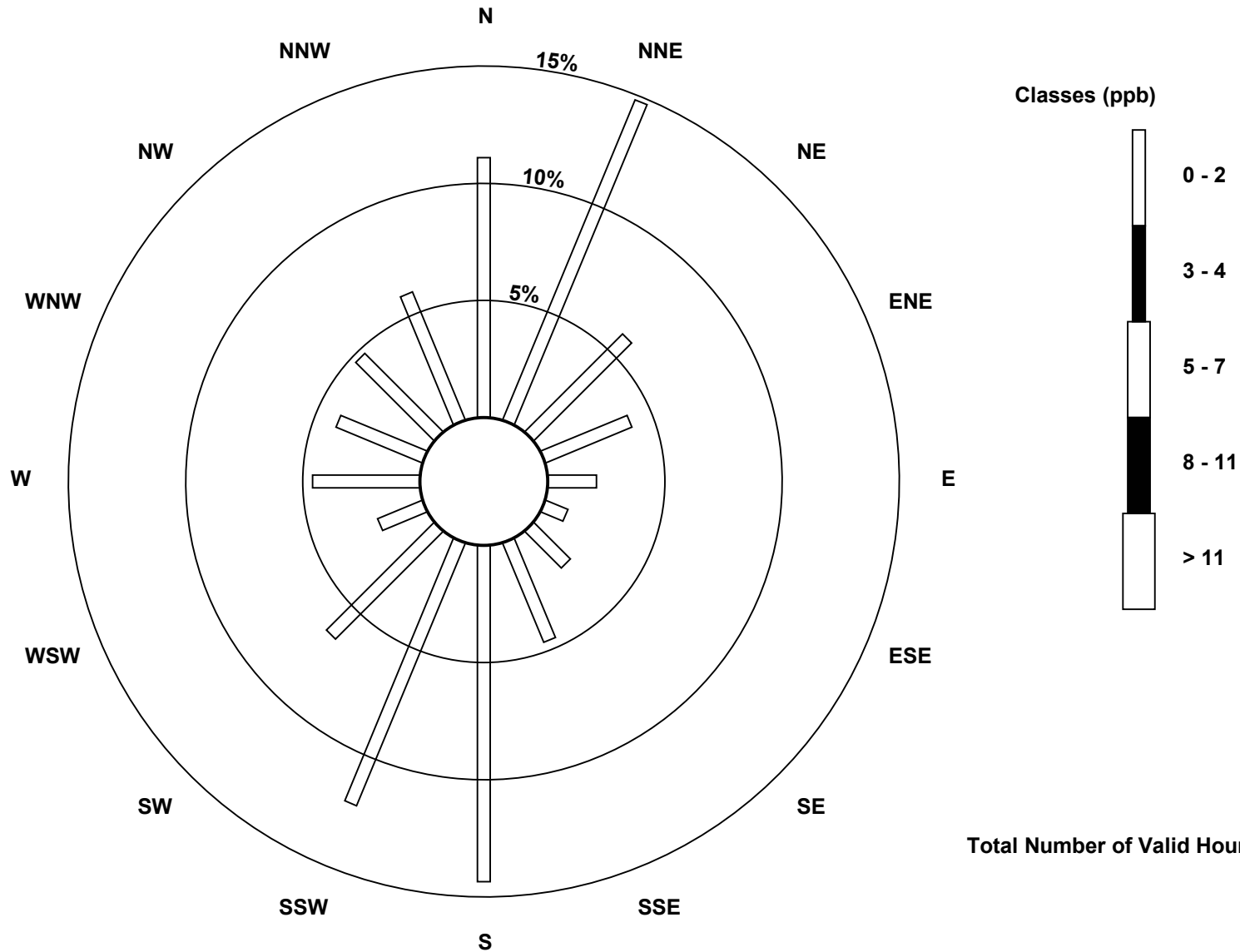
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	75	100	40	27	14	7	15	31	97	82	44	14	31	27	32	40	676
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	75	100	40	27	14	7	15	31	97	82	44	14	31	27	32	40	676

Total Number of Valid Hours: 676

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)**

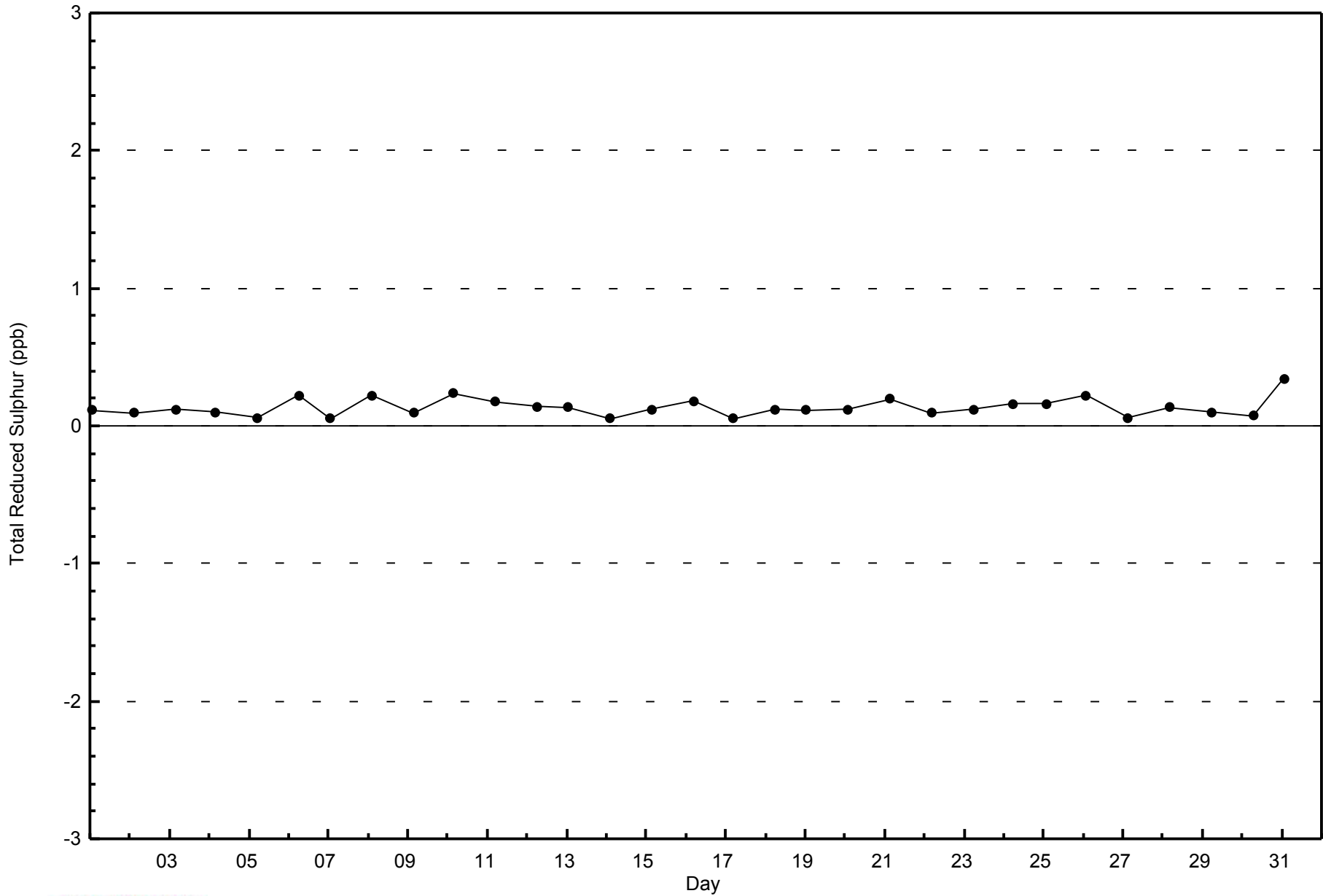


Total Number of Valid Hours: 676



WBEA
Zero Responses

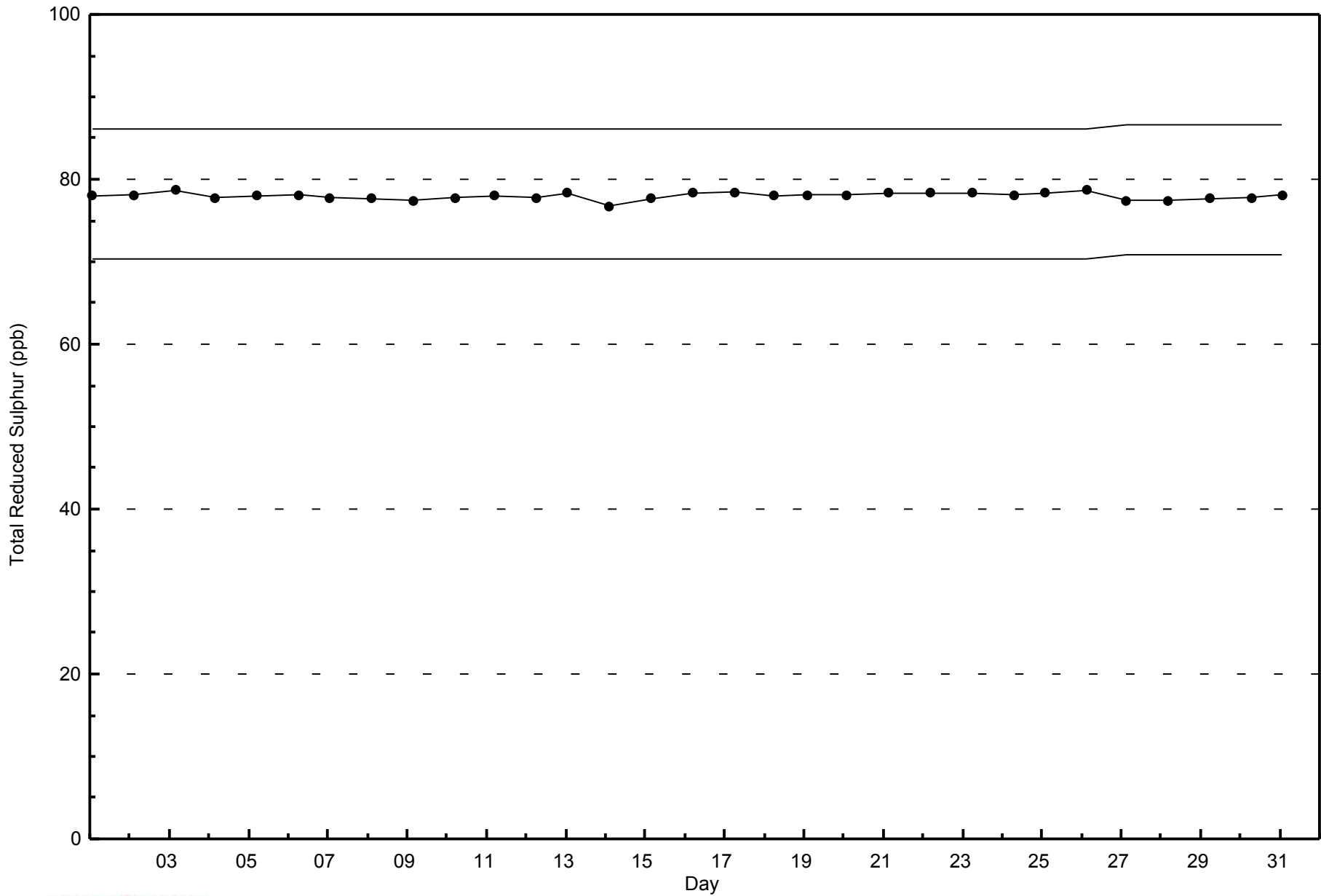
Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - March 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - March 2015





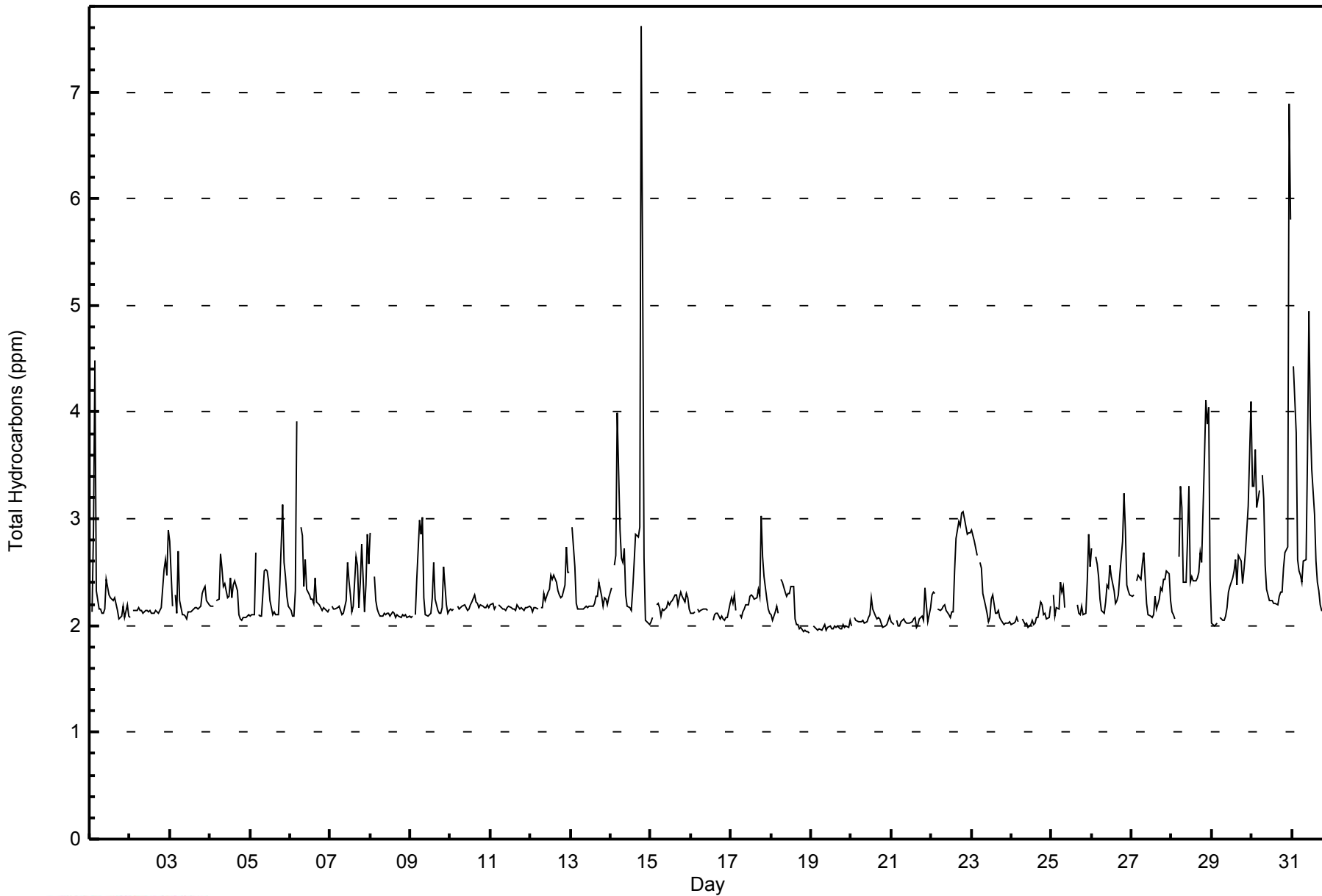
Maximum Value: 7.6 ppm on Mar 14 19:00																	Maximum Daily Average: 3.0 ppm on Mar 30																	Hours in Service: 744	
Minimum Value: 1.9 ppm on Mar 19 00:00																	Minimum Daily Average: 2.0 ppm on Mar 19																	Hours of Data: 705	
Maximum Diurnal Average: 2.5 ppm at hour 23																	Minimum Diurnal Average: 2.2 ppm at hour 14																	Hours of Missing Data: 39	
Monthly Average: 2.33 ppm																	Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 4.4																	Hours of Calibration: 37	
																																		Percent Operational Time: 99.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	2.1	2.9	4.5	2.3	2.2	2.2	2.1	2.1	2.2	2.4	2.3	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.3	4.5	2.3	4.5							
2-Mar	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.6	2.5	2.9	2.2	2.9	2.2	2.9							
3-Mar	2.8	2.2	Z	2.3	2.1	2.7	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.8	2.2	2.8						
4-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.7	2.5	2.4	2.4	2.3	2.3	2.5	2.3	2.4	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7	2.3	2.7						
5-Mar	2.1	2.1	2.1	2.7	Z	2.1	2.1	2.1	2.5	2.5	2.5	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.4	3.1	2.6	2.5	2.3	2.2	2.3	3.1	2.3	3.1							
6-Mar	2.1	2.1	2.1	2.3	3.9	Z	2.9	2.8	2.4	2.6	2.3	2.3	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.4	3.9	2.4	3.9							
7-Mar	Z	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.6	2.4	2.3	2.1	2.2	2.6	2.6	2.2	2.4	2.8	2.1	2.4	2.9	2.6	2.3	2.9	2.3	2.9							
8-Mar	2.9	Z	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.9	2.2	2.9							
9-Mar	2.1	2.1	Z	2.1	2.4	3.0	2.9	3.0	2.3	2.1	2.1	2.1	2.1	2.3	2.6	2.3	2.1	2.1	2.1	2.2	2.6	2.2	2.1	2.1	2.3	3.0	2.3	3.0							
10-Mar	2.1	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3							
11-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2						
12-Mar	2.2	2.1	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.3	2.3	2.5	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.7	2.5	2.5	2.3	2.7	2.3	2.7							
13-Mar	Z	2.9	2.5	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.9	2.3	2.9							
14-Mar	2.4	Z	2.6	2.7	4.0	2.9	2.6	2.6	2.7	2.3	2.2	2.2	2.1	2.3	2.6	2.8	2.8	2.9	7.6	5.4	2.6	2.1	2.0	2.0	2.9	7.6	2.9	7.6							
15-Mar	2.0	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.3							
16-Mar	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.1	UO	UO	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.1	2.2	2.1	2.2							
17-Mar	2.3	2.2	2.3	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	3.0	2.6	2.5	2.2	2.2	2.1	2.3	3.0	2.3	3.0							
18-Mar	2.1	2.1	2.1	2.2	2.1	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.1	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	2.1	2.4	2.1	2.4							
19-Mar	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	2.0	2.1							
20-Mar	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.1	2.3							
21-Mar	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.3	2.2	2.0	2.2	2.1	2.3	2.1	2.3							
22-Mar	2.3	2.3	2.3	Z	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.5	2.8	3.0	2.9	3.0	3.1	3.0	2.9	2.9	2.9	2.5	3.1	2.5	3.1							
23-Mar	2.9	2.8	2.8	2.7	Z	2.6	2.5	2.3	2.2	2.1	2.0	2.1	2.2	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.9	2.3	2.9							
24-Mar	2.0	2.0	2.0	2.1	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2							
25-Mar	Z	2.3	2.1	2.2	2.2	2.4	2.3	2.4	2.2	C	C	C	C	C	C	2.2	2.1	2.1	2.2	2.1	2.1	2.4	2.9	2.6	--	2.9	--	2.9							
26-Mar	2.7	Z	2.6	2.6	2.5	2.2	2.1	2.1	2.2	2.4	2.3	2.6	2.5	2.3	2.2	2.2	2.3	2.5	2.8	3.2	2.9	2.4	2.3	2.3	2.4	3.2	2.4	3.2							
27-Mar	2.3	2.3	Z	2.4	2.5	2.4	2.6	2.7	2.4	2.2	2.1	2.1	2.1	2.1	2.3	2.2	2.2	2.4	2.3	2.4	2.4	2.5	2.5	2.2	2.3	2.7	2.3	2.7							
28-Mar	2.1	2.1	2.1	Z	2.6	3.3	3.1	2.4	2.4	2.8	3.3	2.4	2.5	2.4	2.4	2.4	2.5	2.7	2.6	3.6	4.1	3.9	4.1	2.4	2.8	4.1	2.8	4.1							
29-Mar	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.5	2.6	2.4	2.7	2.6	2.4	2.5	2.7	2.9	3.1	4.1	2.4	4.1	2.4	4.1							
30-Mar	3.3	3.3	3.7	3.1	3.3	Z	3.4	3.2	2.6	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.7	2.7	6.9	5.8	3.0	6.9	5.8							
31-Mar	Z	4.4	3.8	2.6	2.5	2.5	2.4	2.6	2.6	3.6	4.9	3.9	3.5	3.0	2.6	2.4	2.3	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.8	4.9	2.8	4.9							
																								Diurnal Average											
																								Diurnal Maximum											
																								Diurnal Average											
																								Diurnal Maximum											

Z - zerospan C - Calibration UO - Unstable Operation



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	85	12.06	12.06
2.1 - 3.0	588	83.40	95.46
3.1 - 10.0	32	4.54	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - March 2015

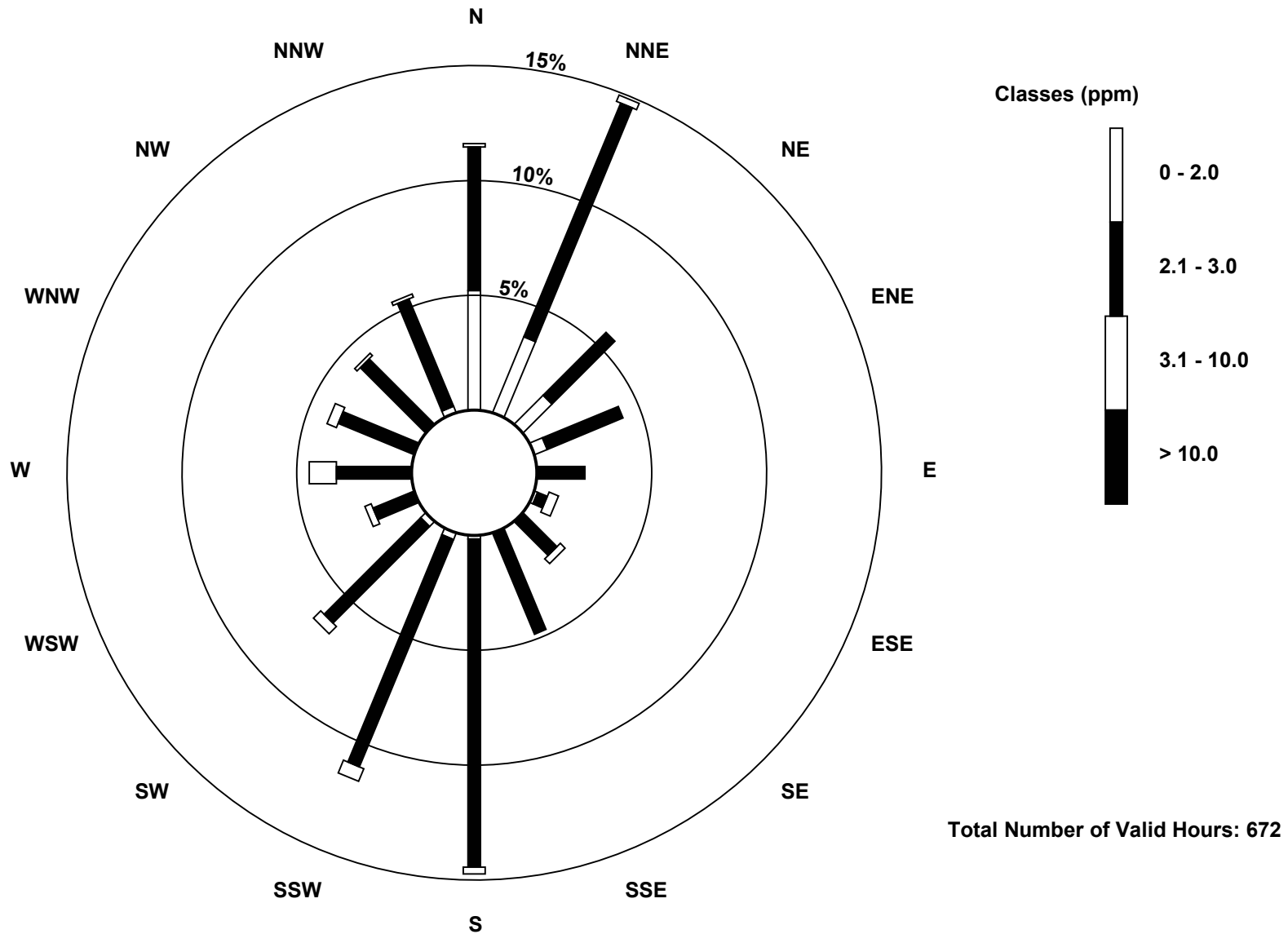
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	24	12	4	0	1	0	0	1	2	2	0	0	0	0	2	83
2.1 - 3.0	42	74	26	24	14	3	14	32	96	72	40	13	22	24	27	34	557
3.1 - 10.0	1	2	0	0	0	3	2	0	2	4	3	2	8	3	1	1	32
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	78	100	38	28	14	7	16	32	99	78	45	15	30	27	28	37	672

Total Number of Valid Hours: 672

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

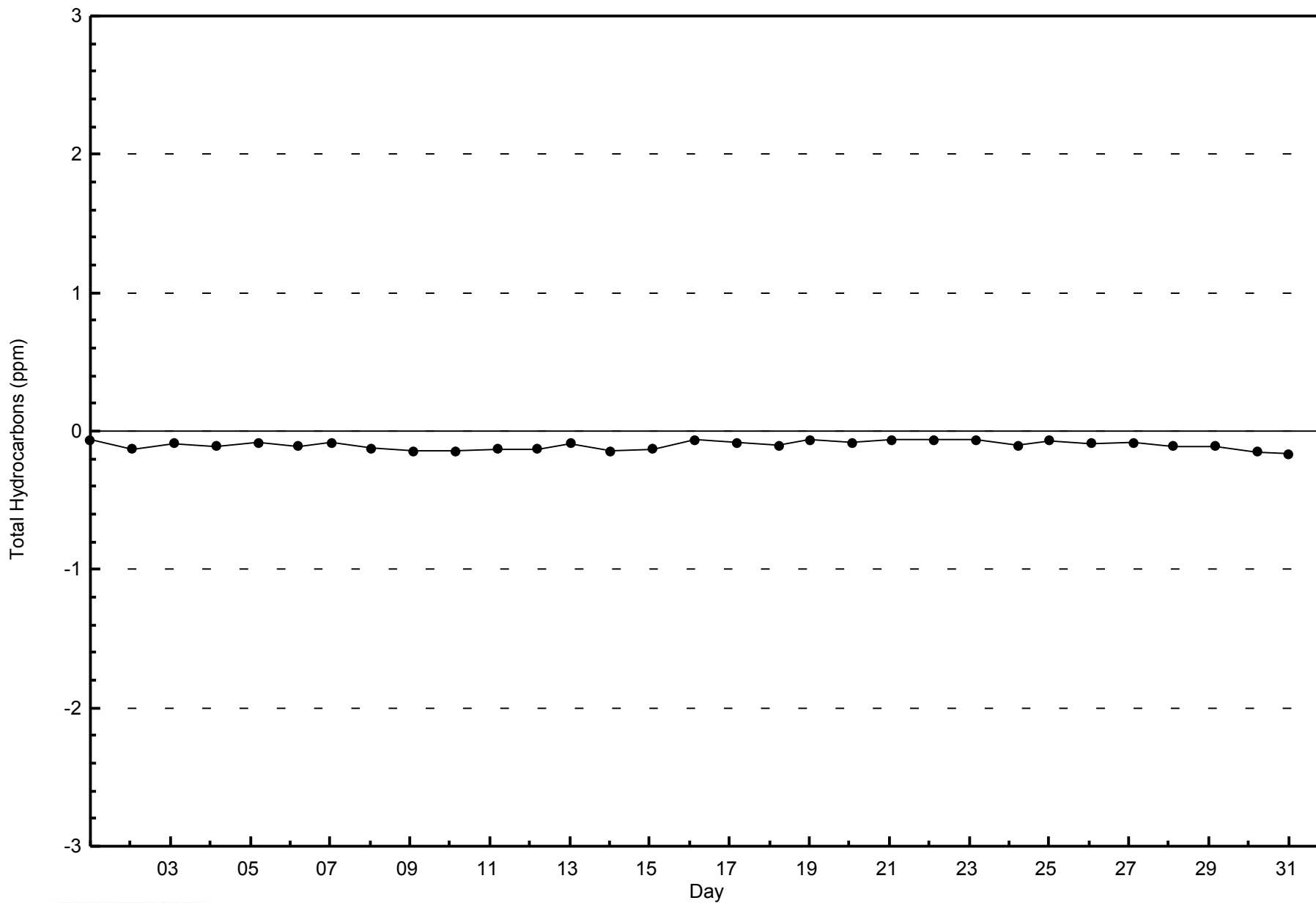
Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)





WBEA
Zero Responses

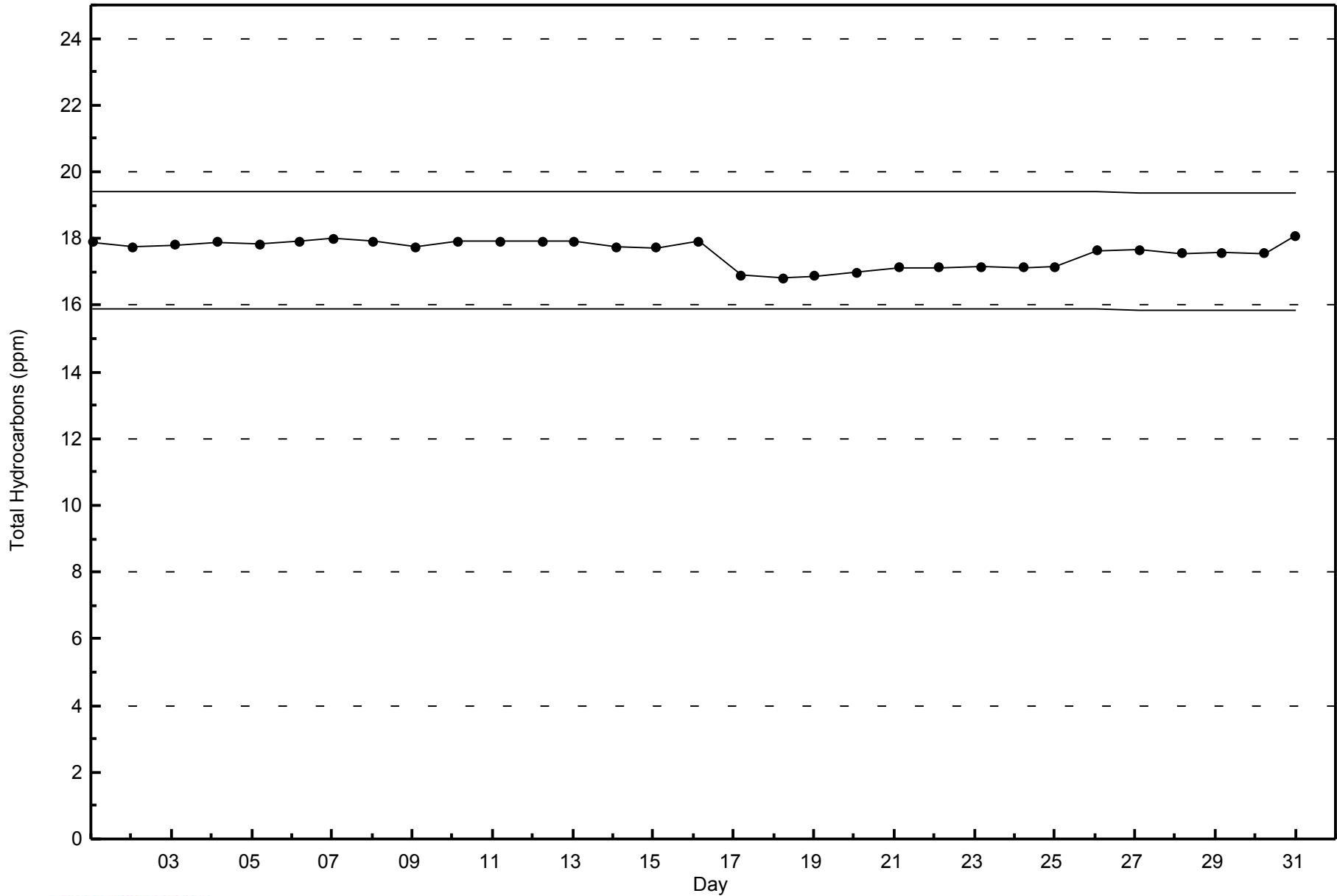
Total Hydrocarbons (THC) - ppm
CNRL Horizon - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
CNRL Horizon - March 2015



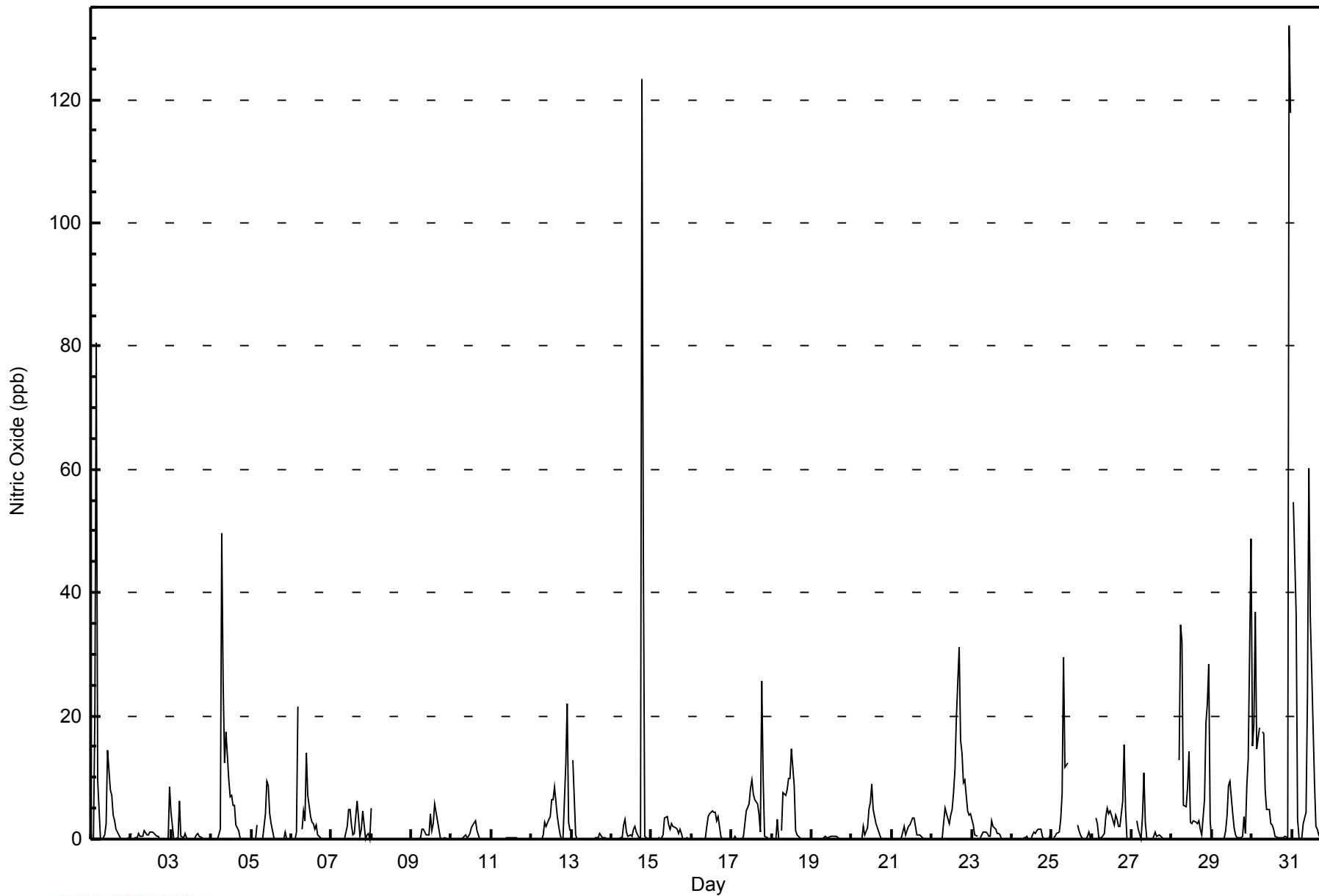


Maximum Value: 132 ppb on Mar 30 23:00																		Maximum Daily Average: 18.0 ppb on Mar 30						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 5 00:00																		Minimum Daily Average: 0.1 ppb on Mar 11						Hours of Data: 708		
Maximum Diurnal Average: 6.0 ppb at hour 24																		Minimum Diurnal Average: 1.0 ppb at hour 18						Hours of Missing Data: 36		
Monthly Average: 3.4 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 3 P ₉₀ = 8 P ₉₉ = 47						Hours of Calibration: 36		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	20	81	10	0	0	0	1	2	14	8	7	4	3	2	1	0	0	0	0	0	0	0	6.6	81
2-Mar	1	Z	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	8	0.9	8
3-Mar	4	0	Z	0	0	6	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.7	6
4-Mar	0	0	0	Z	0	2	50	25	12	17	10	7	7	5	5	2	1	0	0	0	0	0	0	0	6.3	50
5-Mar	0	0	0	2	Z	0	0	0	4	9	9	4	3	0	0	0	0	0	0	0	1	0	0	0	1.4	9
6-Mar	0	0	0	1	21	Z	2	5	3	14	7	4	3	2	2	2	1	0	0	0	0	0	0	0	2.9	21
7-Mar	Z	0	0	0	0	0	0	0	0	2	5	5	2	1	1	6	3	1	2	5	0	1	1	0	1.5	6
8-Mar	5	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	5
9-Mar	0	0	Z	0	0	0	2	2	1	1	1	4	1	3	6	4	2	0	0	0	0	0	0	0	1.1	6
10-Mar	0	0	0	Z	0	0	0	0	1	0	0	1	2	2	3	1	1	0	0	0	0	0	0	0	0.5	3
11-Mar	0	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-Mar	0	0	0	0	0	Z	0	1	3	2	3	4	6	6	9	4	2	1	0	0	12	22	3	1	3.4	22
13-Mar	Z	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.7	13
14-Mar	0	Z	0	0	0	0	0	2	3	1	1	1	2	2	1	0	0	123	47	0	0	0	0	0	8.0	123
15-Mar	0	0	Z	0	0	0	0	1	3	4	2	2	3	2	2	2	1	2	1	0	0	0	0	0	1.1	4
16-Mar	0	0	0	Z	0	0	0	0	0	2	4	4	5	4	4	3	4	1	0	0	0	0	0	0	1.3	5
17-Mar	0	0	0	0	Z	0	0	1	2	5	6	8	10	7	6	6	4	1	26	10	0	0	0	0	4.0	26
18-Mar	0	0	0	3	0	Z	1	7	7	8	10	10	15	9	1	1	0	0	0	0	0	0	0	0	3.2	15
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
20-Mar	0	Z	0	0	0	0	0	2	1	2	5	6	9	5	3	2	1	0	0	0	0	0	0	0	1.5	9
21-Mar	0	0	Z	0	0	0	0	2	1	1	2	2	3	3	2	1	1	1	0	0	0	0	0	0	0.9	3
22-Mar	0	0	0	Z	0	0	0	3	5	4	3	4	5	7	11	20	31	16	14	9	10	4	4	4	6.7	31
23-Mar	3	2	1	0	Z	0	1	1	1	1	0	1	3	2	2	1	1	1	0	0	0	0	0	0	0.9	3
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	2	0	0	0	0	0	1	0.5	2
25-Mar	Z	0	1	1	1	3	7	29	12	12	C	C	C	C	C	2	1	1	0	0	0	0	1	0	4.1	29
26-Mar	0	Z	3	3	0	0	0	1	4	5	4	5	4	2	4	3	2	2	6	15	5	0	0	0	3.0	15
27-Mar	0	0	Z	3	2	0	4	11	3	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1.1	11
28-Mar	0	0	0	Z	13	35	32	5	5	9	14	3	2	3	3	2	3	2	1	6	19	22	28	3	9.1	35
29-Mar	0	0	0	0	Z	0	0	0	1	4	9	9	4	2	1	0	0	0	0	4	1	9	13	49	4.6	49
30-Mar	15	18	37	15	18	Z	17	17	8	5	5	2	2	2	0	0	0	0	0	0	1	0	132	118	18.0	132
31-Mar	Z	55	36	3	0	0	0	2	4	23	60	36	27	9	2	2	1	0	0	0	0	0	0	0	11.4	60
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	96.61	96.61
21 - 40	15	2.12	98.73
41 - 80	5	0.71	99.44
81 - 159	3	0.42	99.86
> 159	0	0.00	99.86

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - March 2015

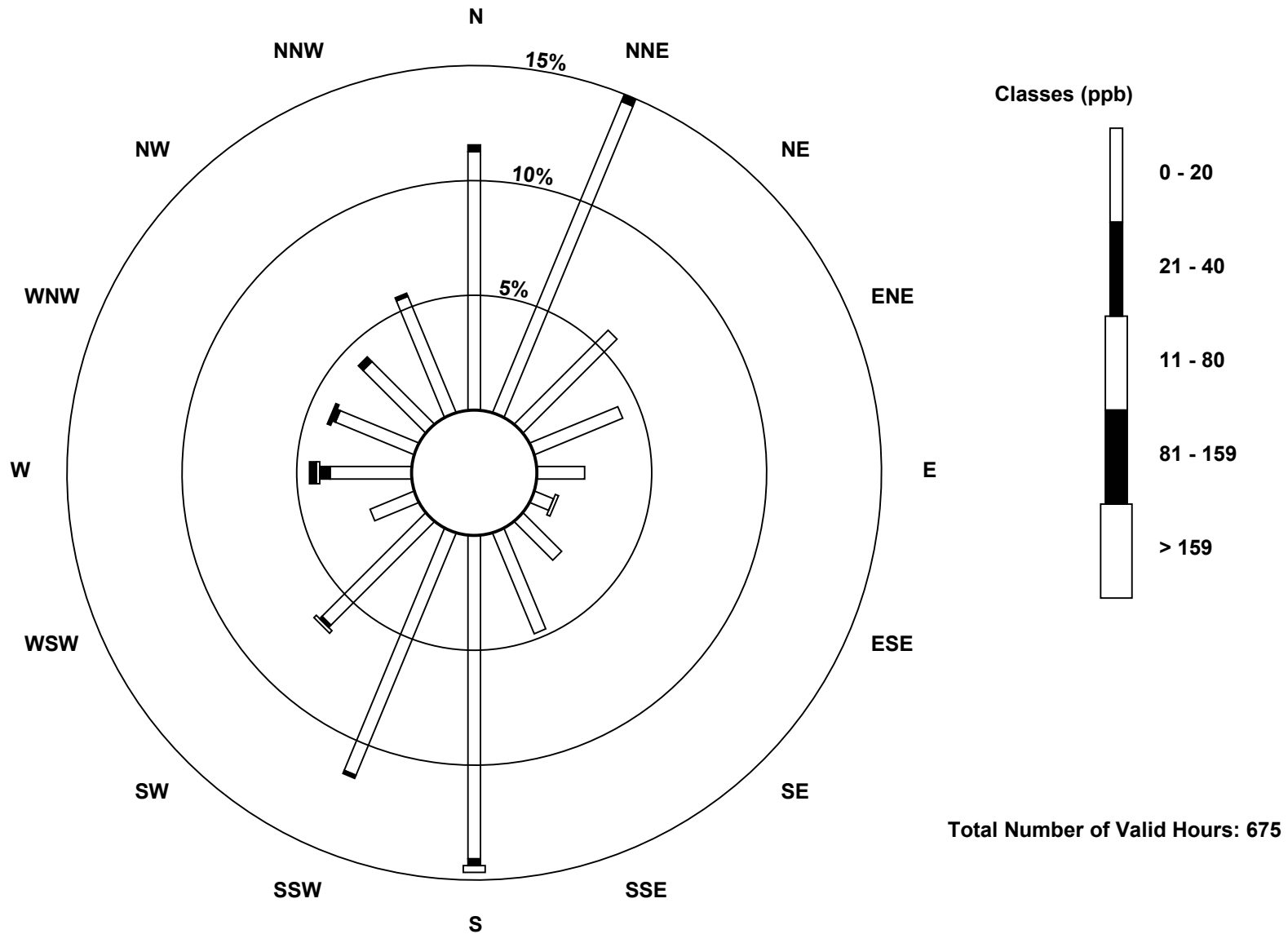
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	76	99	39	28	14	6	16	32	95	77	43	14	24	25	26	37	651
21 - 40	2	2	0	0	0	0	0	0	2	1	1	0	3	1	2	1	15
11 - 80	0	0	0	0	0	1	0	0	2	0	1	0	1	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	78	101	39	28	14	7	16	32	99	78	45	14	30	27	28	38	674

Total Number of Valid Hours: 675

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

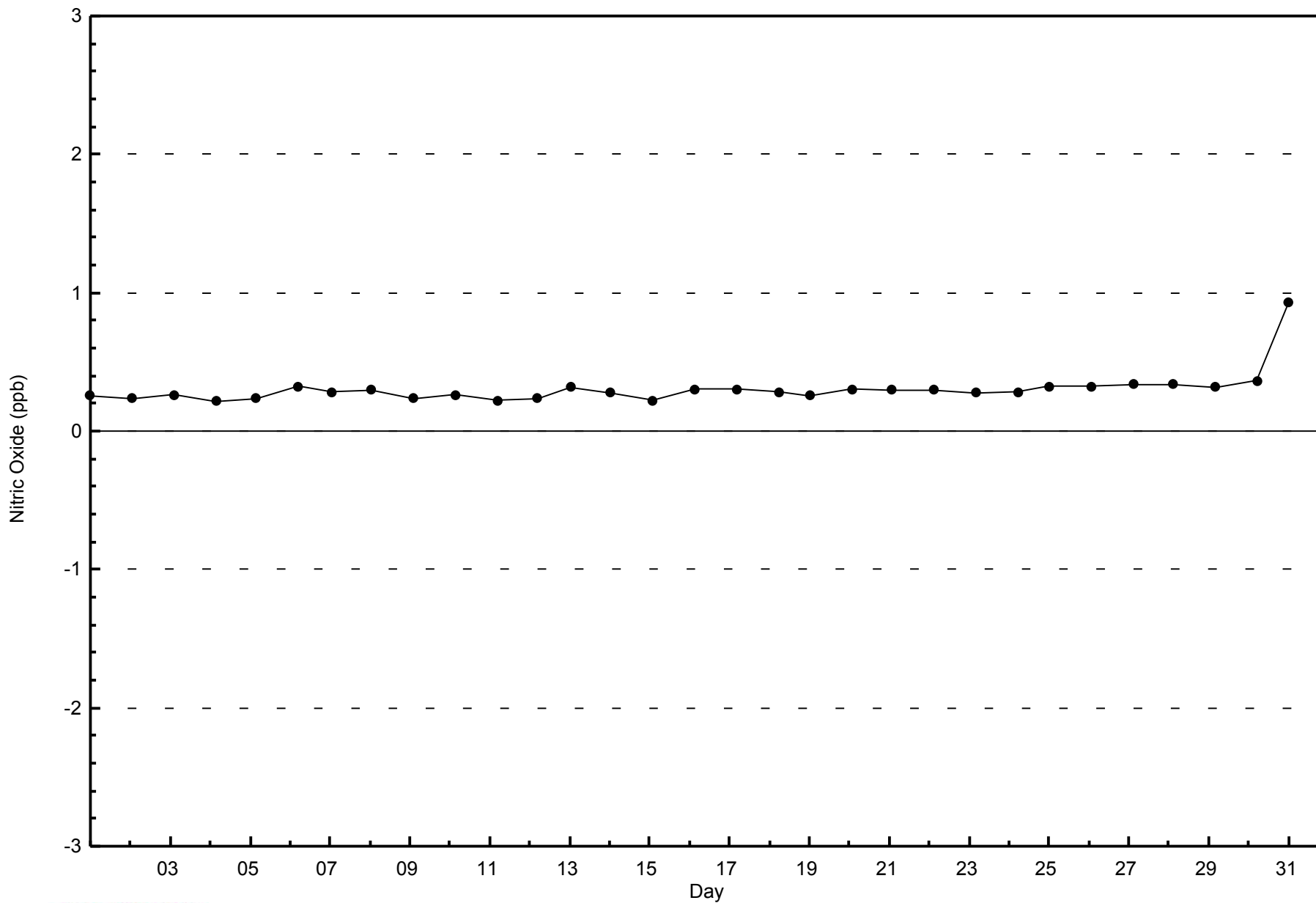
Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)





WBEA
Zero Responses

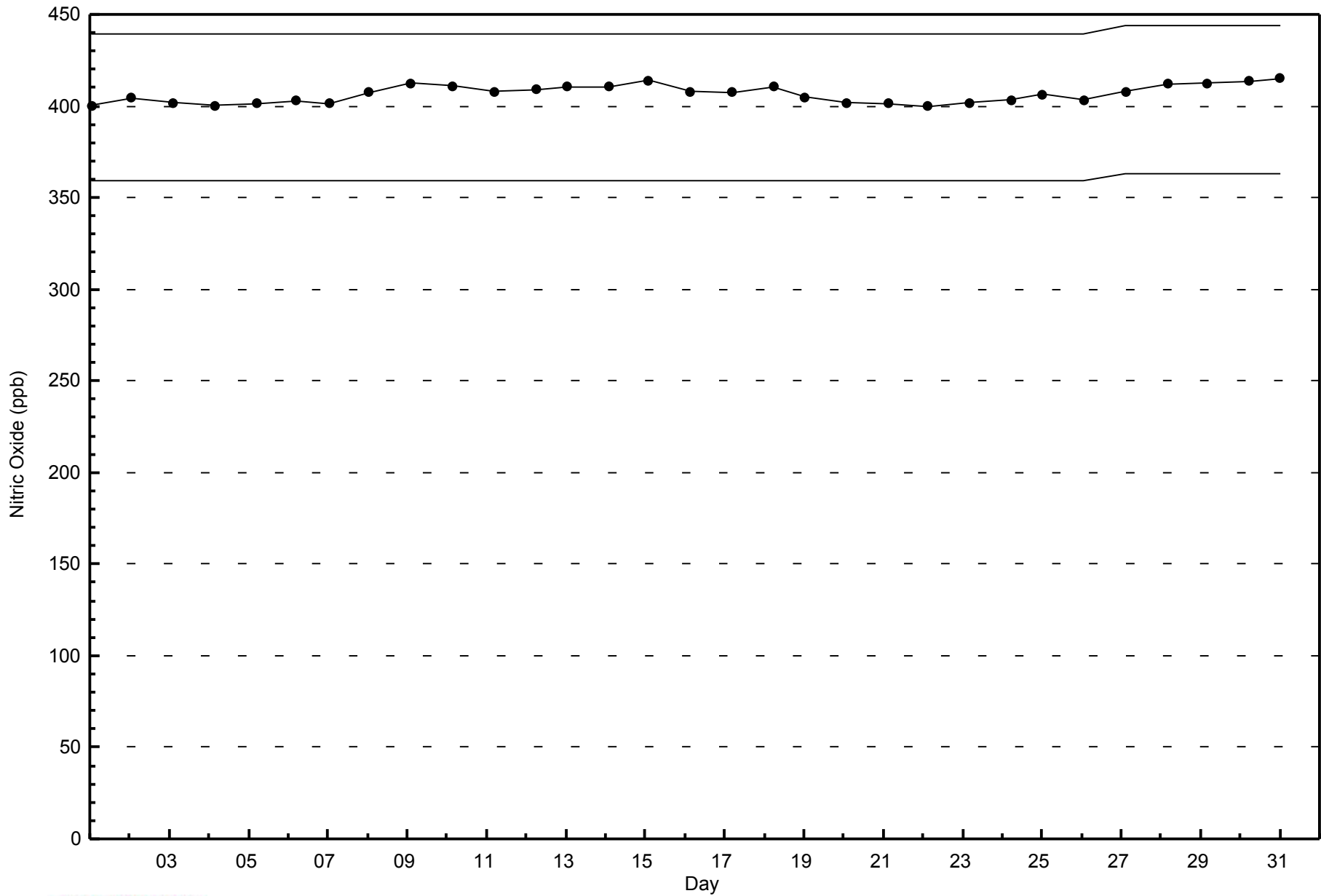
Nitric Oxide (NO) - ppb
CNRL Horizon - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
CNRL Horizon - March 2015





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 47 ppb on Mar 14 20:00	Maximum Daily Average: 21.6 ppb on Mar 22
Minimum Value: 0 ppb on Mar 31 23:00	Hours of Data: 708
Maximum Diurnal Average: 13.2 ppb at hour 21	Hours of Missing Data: 36
Monthly Average: 8.7 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.7 ppb on Mar 11	Percent Operational Time: 100.0
Minimum Diurnal Average: 5.7 ppb at hour 18	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 12 P ₉₀ = 23 P ₉₉ = 42	

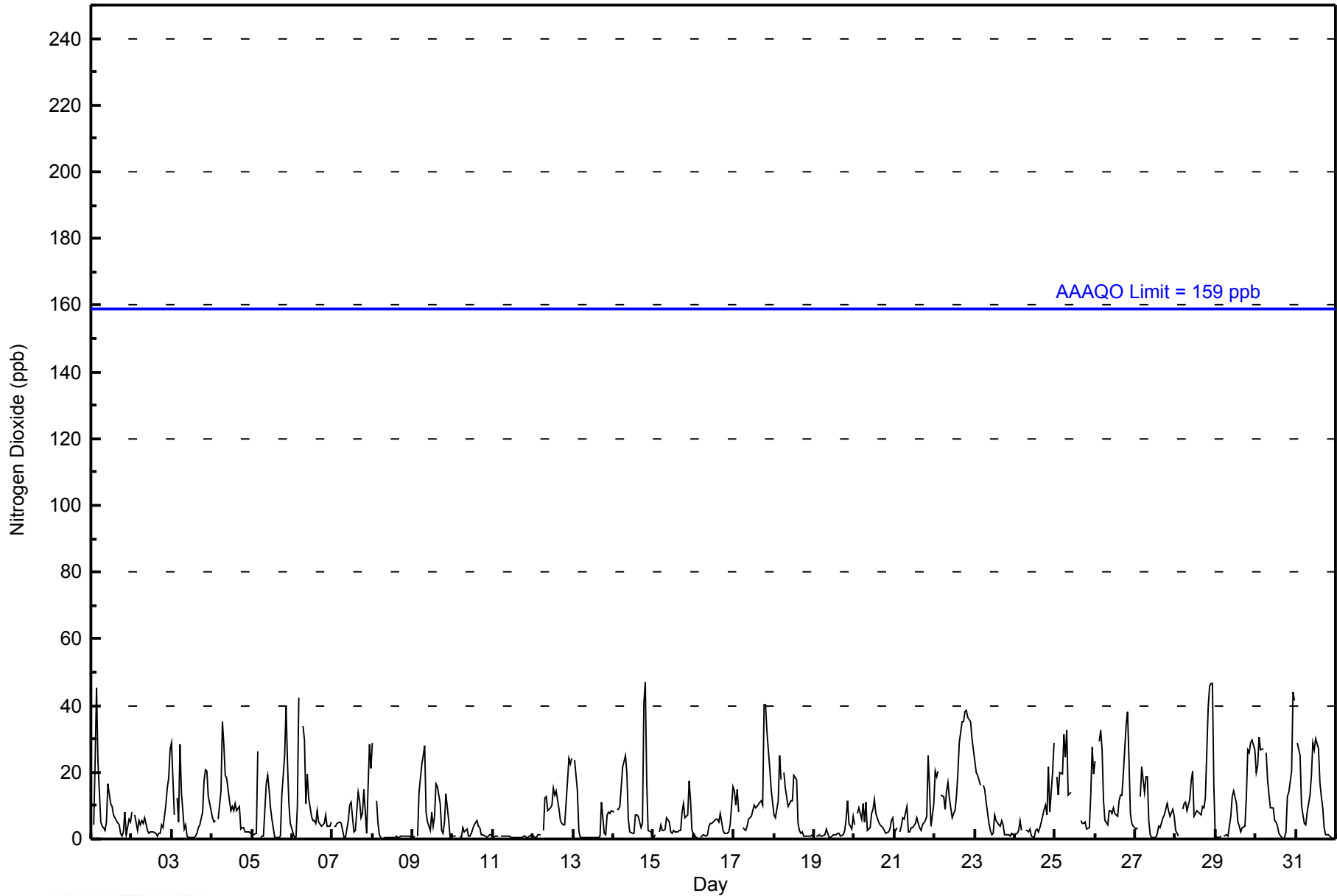
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	4	24	46	23	5	4	3	3	5	17	10	10	7	7	5	4	2	1	2	8	1	6	5	8.8	46																							
2-Mar	8	Z	7	2	6	4	6	5	6	3	2	2	2	2	1	2	2	4	4	10	15	18	27	6.0	27																								
3-Mar	29	7	Z	12	5	28	14	3	4	1	0	0	0	1	2	3	4	8	17	21	20	13	8	8.8	29																								
4-Mar	6	5	5	Z	6	14	35	29	19	18	12	9	10	9	11	8	10	3	4	3	2	2	2	2	9.7	35																							
5-Mar	1	1	2	26	Z	1	1	1	17	19	15	9	6	1	0	0	1	13	25	40	23	11	5	9.5	40																								
6-Mar	2	1	0	10	43	Z	34	30	11	19	12	7	6	5	9	5	4	4	5	7	4	4	5	10.0	43																								
7-Mar	Z	4	4	5	5	5	2	1	0	6	10	11	6	2	3	14	11	6	8	15	2	16	28	21	8.0	28																							
8-Mar	29	Z	12	5	1	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2.5	29																							
9-Mar	1	1	Z	1	14	22	25	28	8	5	2	8	4	7	16	16	10	2	2	5	14	6	1	1	8.6	28																							
10-Mar	1	1	1	Z	1	1	3	2	3	1	1	2	3	4	5	4	3	1	1	1	0	1	1	1	1.8	5																							
11-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.7	1																							
12-Mar	1	1	1	1	1	Z	3	12	13	8	9	10	15	13	14	9	5	5	4	4	17	24	22	24	9.5	24																							
13-Mar	Z	24	14	3	1	1	0	0	0	0	0	0	0	0	1	1	11	2	1	7	8	8	8	4.0	24																								
14-Mar	8	Z	9	9	10	22	23	25	19	6	2	2	2	7	7	7	4	5	41	47	17	3	2	1	12.0	47																							
15-Mar	0	1	Z	2	4	3	3	3	7	5	2	2	3	2	2	3	3	8	11	6	7	17	11	3	4.7	17																							
16-Mar	2	0	0	Z	1	1	1	1	1	4	5	5	5	6	6	5	8	3	2	2	2	2	4	16	3.5	16																							
17-Mar	14	10	15	8	Z	3	3	2	4	6	7	8	10	9	10	11	12	10	40	40	32	21	15	11	13.2	40																							
18-Mar	7	6	11	25	18	Z	20	15	10	10	11	12	19	18	5	2	2	2	1	1	1	1	1	1	8.6	25																							
19-Mar	Z	1	1	1	1	1	1	3	2	1	1	1	1	1	2	2	1	1	3	6	12	5	3	7	2.4	12																							
20-Mar	4	Z	8	9	6	11	5	11	3	4	8	9	12	8	5	4	4	3	3	2	2	3	6	6	5.8	12																							
21-Mar	2	3	Z	2	4	6	6	10	2	2	4	4	5	6	5	3	3	4	6	7	25	15	4	10	6.0	25																							
22-Mar	21	19	20	Z	13	13	9	15	17	12	6	8	9	13	19	29	35	35	38	38	37	35	30	27	21.6	38																							
23-Mar	23	20	19	16	Z	16	15	11	5	3	1	2	7	5	4	4	5	4	1	1	1	1	2	1	7.3	23																							
24-Mar	1	2	3	5	3	Z	2	3	2	3	1	1	3	3	2	4	5	9	10	7	22	8	20	29	6.4	29																							
25-Mar	Z	19	13	20	19	31	25	33	13	14	C	C	C	C	C	5	5	5	5	3	3	14	28	19	15.2	33																							
26-Mar	23	Z	29	33	27	12	5	4	8	9	8	9	8	7	12	13	13	20	34	38	24	8	5	4	15.3	38																							
27-Mar	3	4	Z	13	21	14	19	19	5	1	1	1	0	2	4	3	6	7	9	11	8	7	9	7	7.5	21																							
28-Mar	3	2	1	Z	9	11	11	8	12	17	20	7	8	9	8	7	10	10	12	39	46	47	46	16	15.6	47																							
29-Mar	1	0	1	1	Z	1	1	1	4	7	13	15	11	5	4	2	3	4	13	27	26	29	30	27	9.7	30																							
30-Mar	20	22	31	27	27	Z	26	18	13	9	9	6	5	4	2	0	0	1	2	13	14	20	44	42	15.4	44																							
31-Mar	Z	29	25	10	7	5	4	8	13	19	29	27	30	27	17	13	9	3	1	1	1	0	0	1	12.2	30																							
																								8.4	7.2	9.9	11.3	10.6	8.9	9.9	9.8	7.3	7.0	7.0	6.2	6.7	6.1	5.9	6.0	5.9	5.7	9.2	12.0	13.2	11.5	12.1	10.8	Diurnal Average	
																								29	29	31	46	43	31	35	33	19	19	29	27	30	27	19	29	35	35	41	47	46	47	46	42	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	624	88.14	88.14
21 - 40	75	10.59	98.73
41 - 80	9	1.27	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



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - March 2015

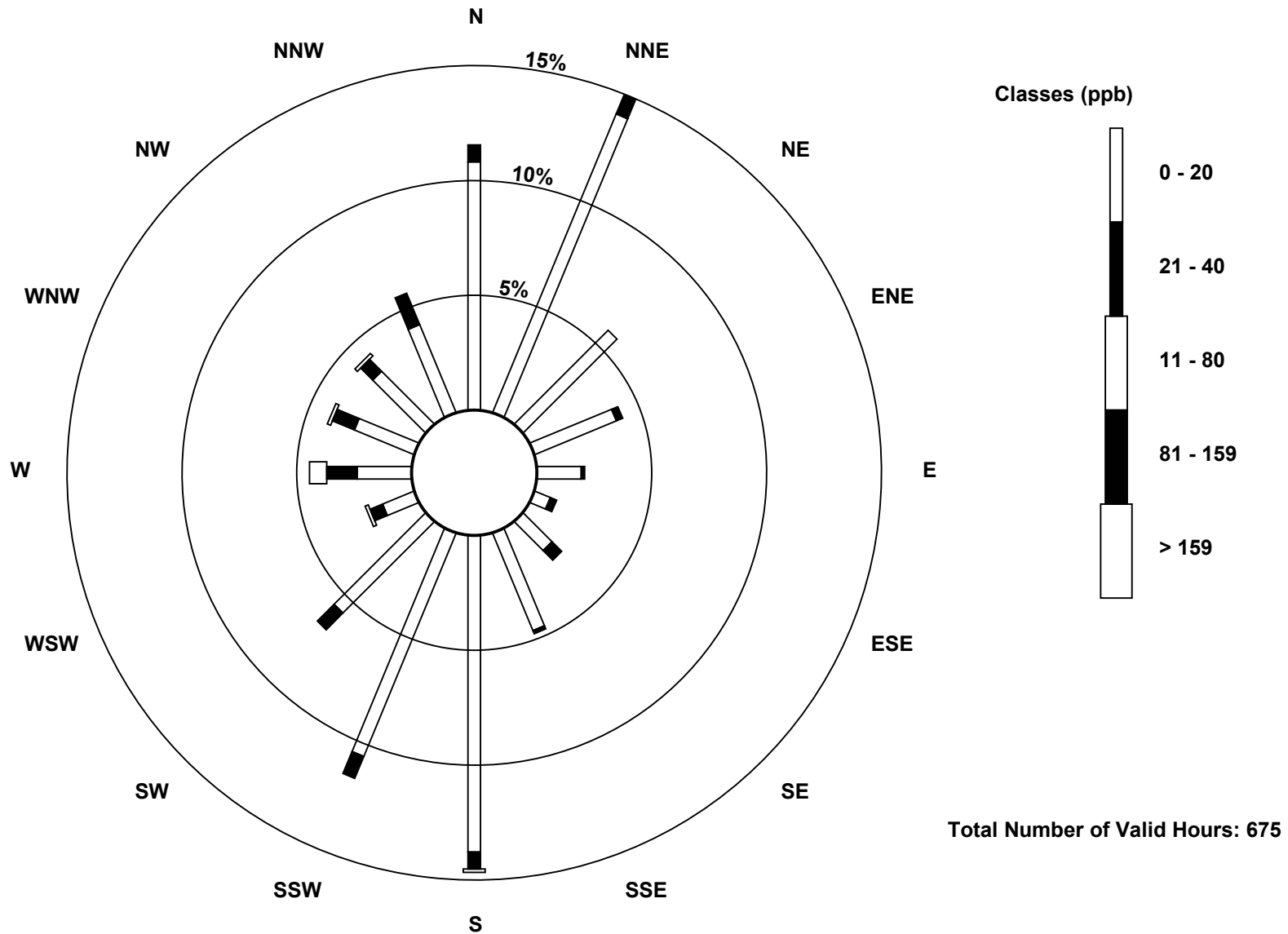
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	73	95	39	26	13	5	12	31	93	71	38	10	16	19	22	28	591
21 - 40	5	6	0	2	1	2	4	1	5	7	7	4	9	7	5	10	75
11 - 80	0	0	0	0	0	0	0	0	1	0	0	1	5	1	1	0	9
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	78	101	39	28	14	7	16	32	99	78	45	15	30	27	28	38	675

Total Number of Valid Hours: 675

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

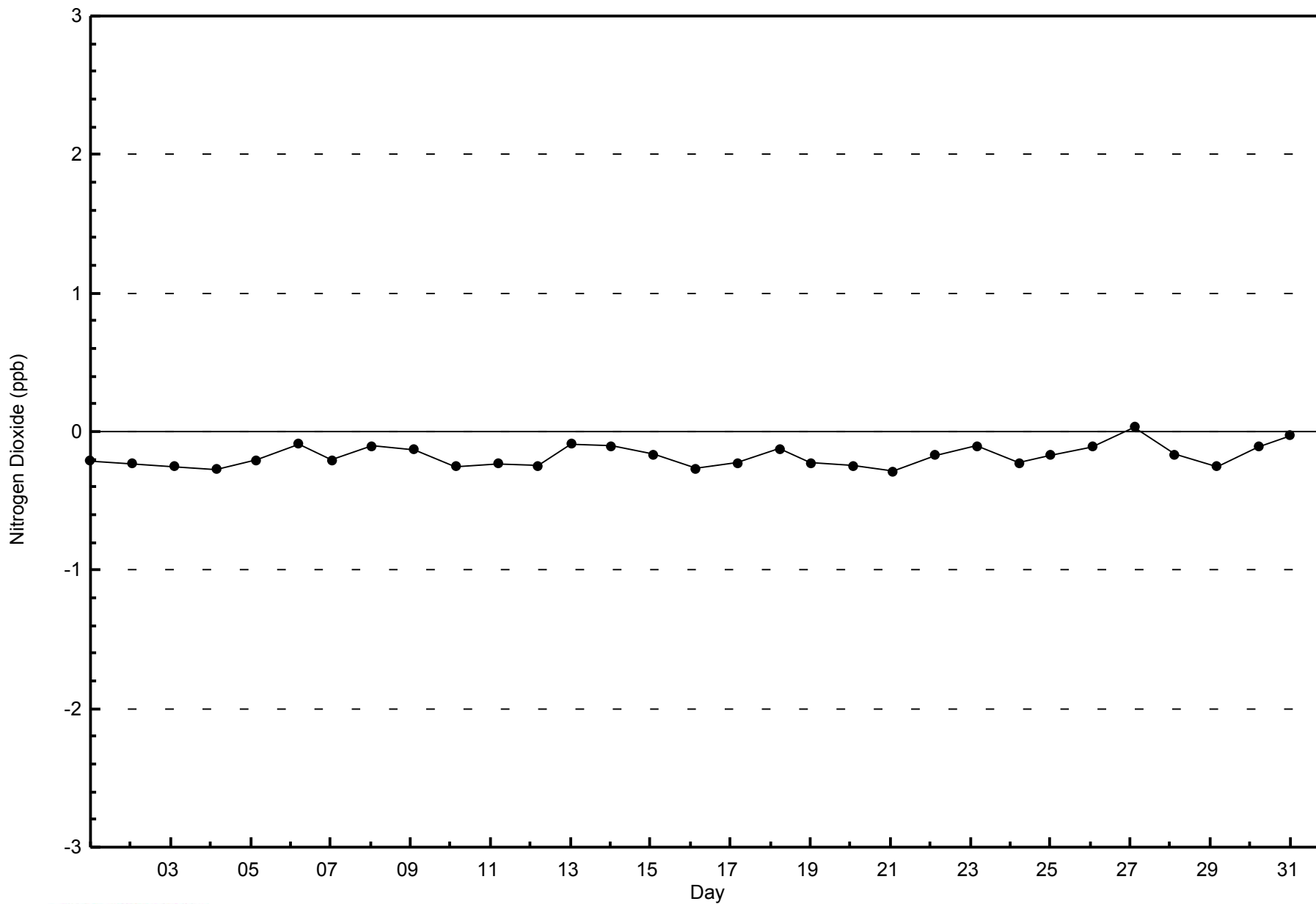
Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)





WBEA
Zero Responses

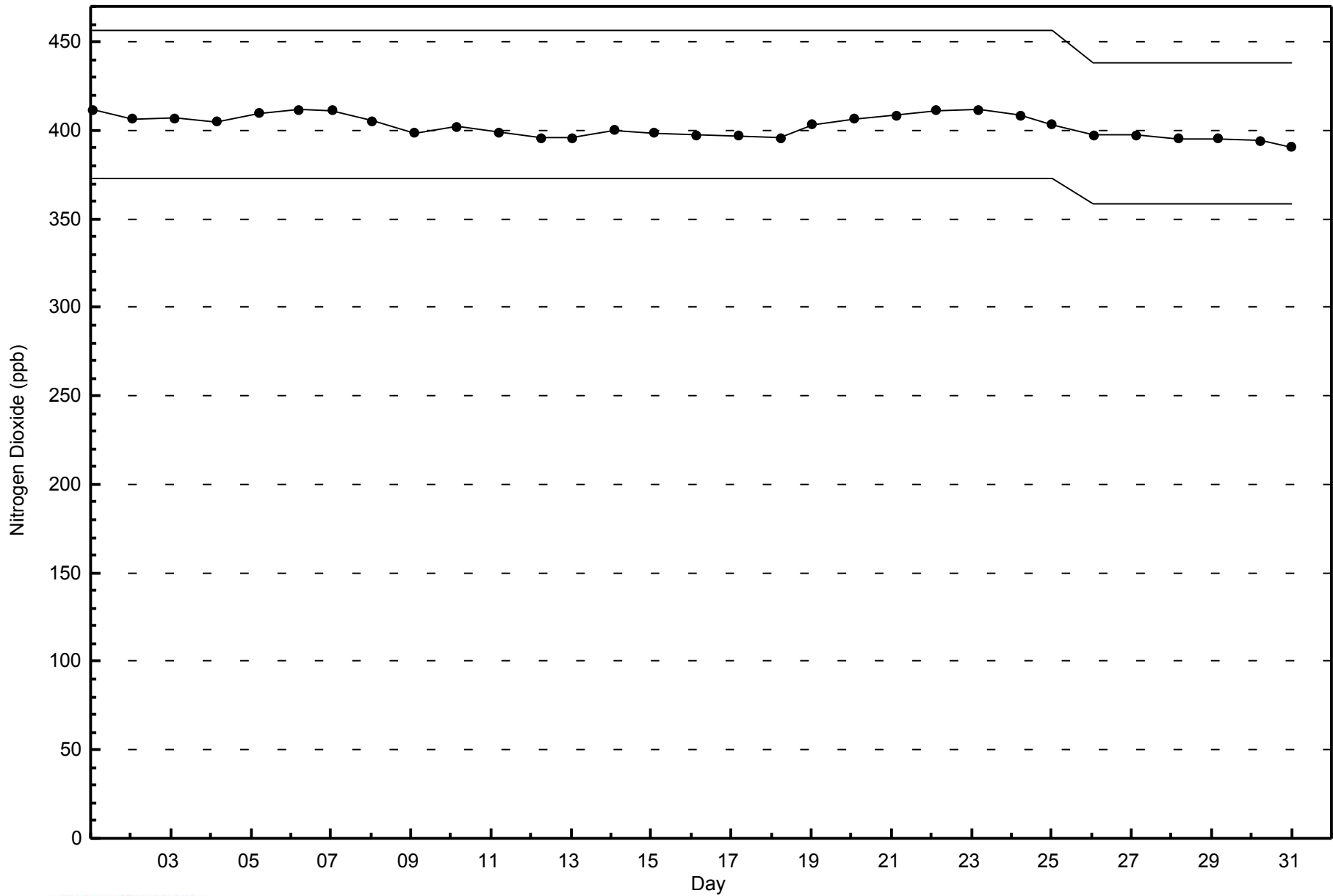
Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - March 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

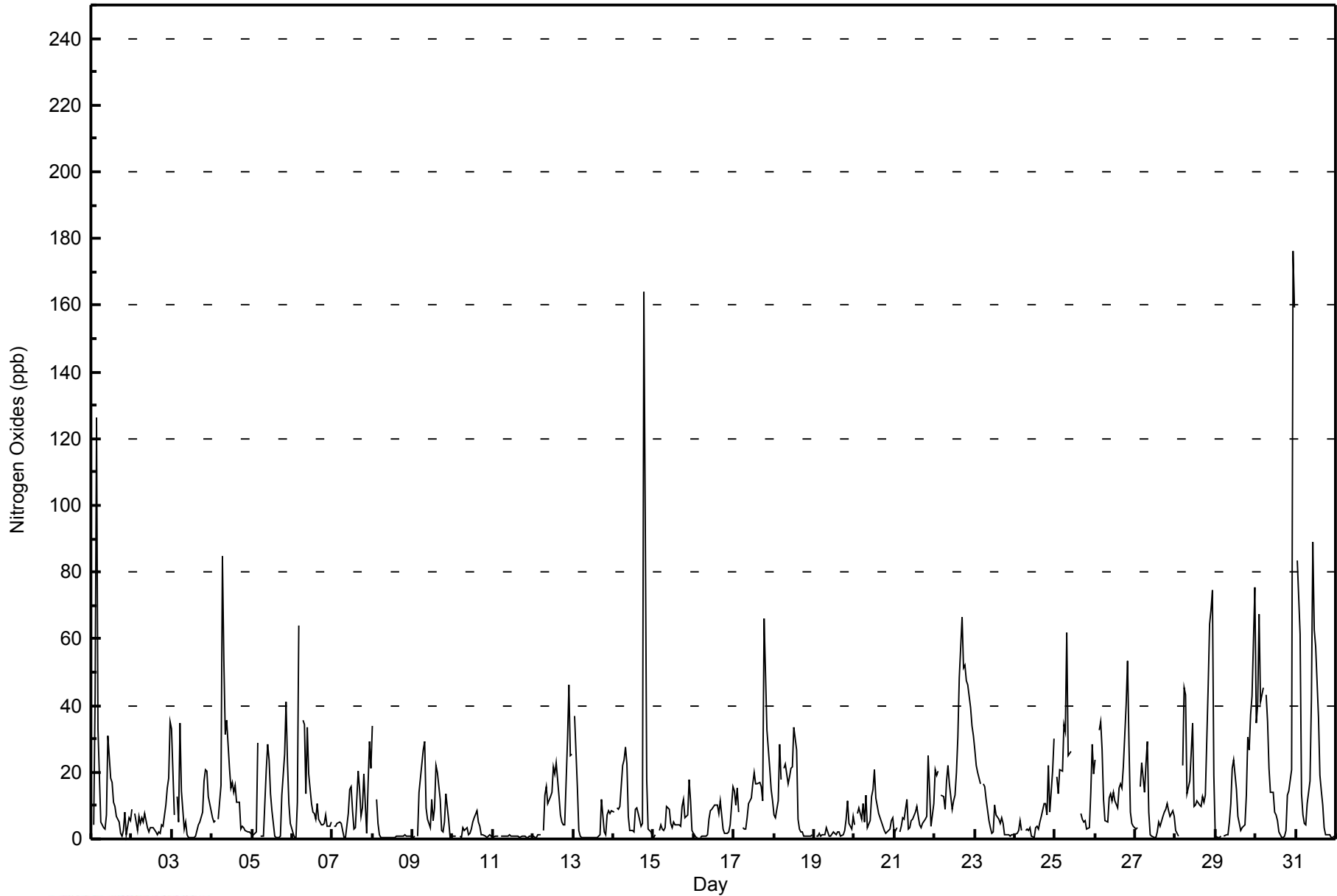
Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2015

Maximum Value: 176 ppb on Mar 30 23:00																		Maximum Daily Average: 33.4 ppb on Mar 30																		Hours in Service: 744			
Minimum Value: 0 ppb on Mar 8 07:00																		Minimum Daily Average: 0.8 ppb on Mar 11																		Hours of Data: 708			
Maximum Diurnal Average: 18.0 ppb at hour 23																		Minimum Diurnal Average: 6.7 ppb at hour 18																		Hours of Missing Data: 36			
Monthly Average: 12.1 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 15 P ₉₀ = 30 P ₉₉ = 82																		Hours of Calibration: 36			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Mar	Z	4	43	126	33	5	4	3	3	7	31	18	17	11	10	7	5	2	1	2	8	1	6	5	15.4	126													
2-Mar	9	Z	7	3	7	5	6	5	8	3	2	3	3	2	1	2	2	4	4	10	15	18	35	6.9	35														
3-Mar	33	7	Z	13	5	35	14	3	5	1	1	0	0	0	1	2	4	5	8	17	21	20	13	8	9.5	35													
4-Mar	6	5	5	Z	6	16	85	54	32	35	21	15	17	14	16	11	11	3	4	4	2	2	2	2	16.0	85													
5-Mar	1	1	2	29	Z	1	1	1	21	28	24	13	9	1	0	0	0	1	13	25	41	23	11	5	10.9	41													
6-Mar	2	1	0	11	64	Z	35	34	14	33	19	10	8	8	6	11	6	4	4	5	7	4	4	5	12.9	64													
7-Mar	Z	4	4	5	5	5	2	0	0	8	15	16	8	3	3	20	15	7	9	19	2	16	29	21	9.5	29													
8-Mar	34	Z	12	5	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2.7	34													
9-Mar	1	1	Z	1	14	23	27	29	9	6	3	12	5	9	22	20	12	3	2	5	14	6	1	1	9.7	29													
10-Mar	1	1	1	Z	1	0	3	3	4	1	2	3	5	6	8	5	4	1	1	1	0	1	1	1	2.4	8													
11-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.8	1													
12-Mar	1	1	1	1	1	Z	3	13	16	10	13	14	22	20	23	13	7	5	4	4	30	46	25	25	12.9	46													
13-Mar	Z	37	15	3	1	0	0	0	0	0	0	0	0	0	1	1	12	2	1	7	8	8	8	8	4.7	37													
14-Mar	8	Z	9	9	10	22	24	27	23	7	3	3	2	9	9	8	4	5	164	94	18	3	2	1	20.1	164													
15-Mar	0	1	Z	2	4	3	3	3	10	9	5	3	5	4	4	4	10	12	6	7	18	11	3	3	5.7	18													
16-Mar	2	0	0	Z	1	1	1	1	1	6	8	9	10	10	10	8	12	3	2	2	2	2	4	16	4.8	16													
17-Mar	14	10	15	8	Z	3	3	3	6	11	12	17	20	17	16	17	16	11	66	50	33	21	15	11	17.2	66													
18-Mar	7	6	11	28	18	Z	21	23	17	18	21	21	34	27	6	3	2	2	1	1	1	1	1	1	11.8	34													
19-Mar	Z	1	1	2	1	1	1	3	2	1	1	2	2	1	2	2	1	1	2	6	12	5	3	7	2.6	12													
20-Mar	4	Z	8	9	6	11	5	13	3	5	13	15	21	12	7	6	5	4	3	2	2	3	6	6	7.3	21													
21-Mar	2	3	Z	2	4	6	6	12	3	4	6	6	8	10	7	4	3	5	6	7	25	15	4	10	6.8	25													
22-Mar	21	19	20	Z	13	13	9	17	22	16	9	11	13	20	30	48	67	51	52	47	46	40	34	31	28.3	67													
23-Mar	27	22	20	17	Z	17	16	12	6	3	2	2	10	7	6	5	6	5	1	1	1	1	1	1	8.2	27													
24-Mar	1	2	2	5	3	Z	3	3	2	3	1	1	3	4	3	5	7	11	11	7	22	8	20	30	6.8	30													
25-Mar	Z	19	14	21	20	34	32	62	25	26	C	C	C	C	C	7	6	5	5	3	3	14	28	20	19.2	62													
26-Mar	24	Z	33	35	27	12	6	5	12	14	12	14	11	9	15	16	15	22	40	53	29	8	5	4	18.3	53													
27-Mar	3	4	Z	16	23	14	22	29	8	1	1	1	1	2	5	4	7	8	9	11	8	7	9	7	8.6	29													
28-Mar	3	2	1	Z	22	45	43	14	17	26	35	10	10	12	10	10	13	11	13	46	65	68	75	19	24.7	75													
29-Mar	1	0	1	1	Z	1	1	1	5	11	21	24	15	7	4	3	3	4	13	31	27	37	43	76	14.3	76													
30-Mar	35	40	67	41	45	Z	43	35	21	14	14	8	7	6	2	0	0	1	3	13	14	21	176	159	33.4	176													
31-Mar	Z	83	62	13	7	5	4	11	18	42	89	63	58	36	19	14	10	4	1	1	1	0	0	1	23.6	89													
																		9.6 10.6 13.7 15.6 13.1 10.7 13.7 13.6 10.1 11.4 12.8 10.5 10.9 9.0 8.4 8.3 8.1 6.7 14.8 15.2 14.8 13.4 18.0 16.8																		Diurnal Average			
																		35 83 67 126 64 45 85 62 32 42 89 63 58 36 30 48 67 51 164 94 65 68 176 159																		Diurnal Maximum			
Z - zerospan																		C - Calibration																					



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	583	82.34	82.34
21 - 40	86	12.15	94.49
41 - 80	31	4.38	98.87
81 - 159	6	0.85	99.72
> 159	2	0.28	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2015

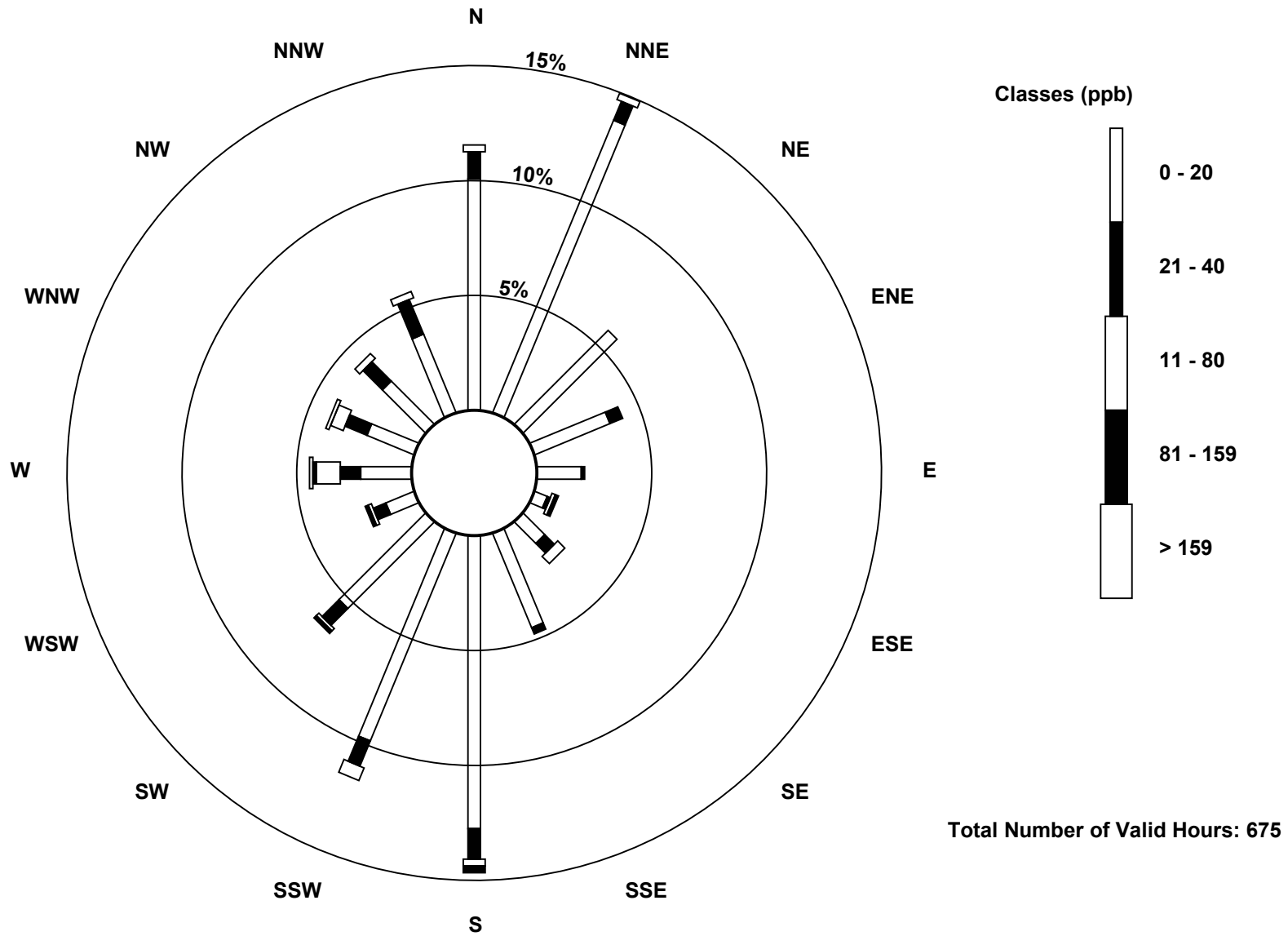
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	68	93	39	24	13	4	9	30	86	66	36	9	15	15	18	25	550
21 - 40	8	6	0	4	1	1	4	2	9	8	7	4	6	7	8	11	86
11 - 80	2	2	0	0	0	1	3	0	2	4	1	1	7	4	2	2	31
81 - 159	0	0	0	0	0	1	0	0	2	0	1	1	1	0	0	0	6
> 159	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Totals	78	101	39	28	14	7	16	32	99	78	45	15	30	27	28	38	675

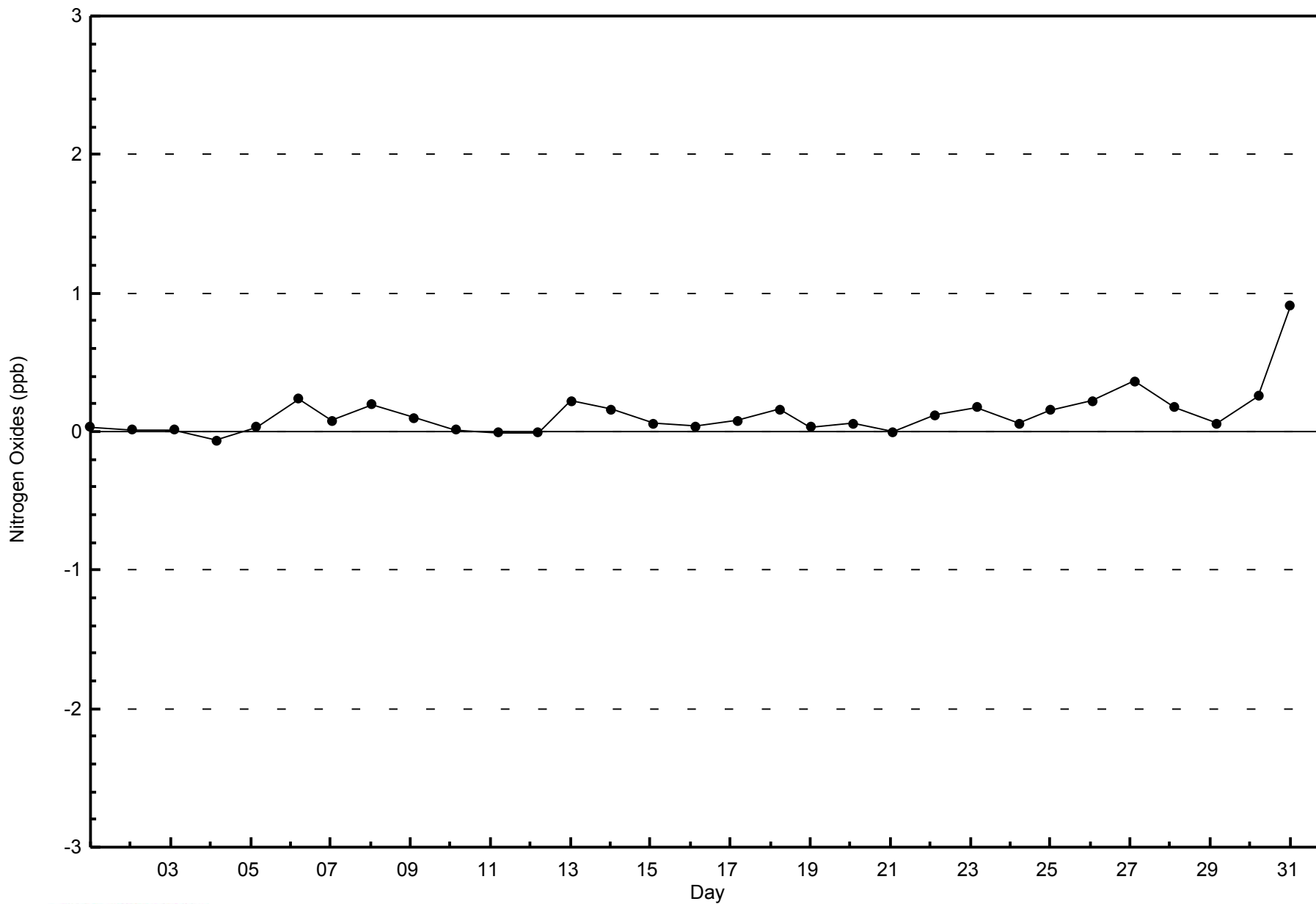
Total Number of Valid Hours: 675

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)

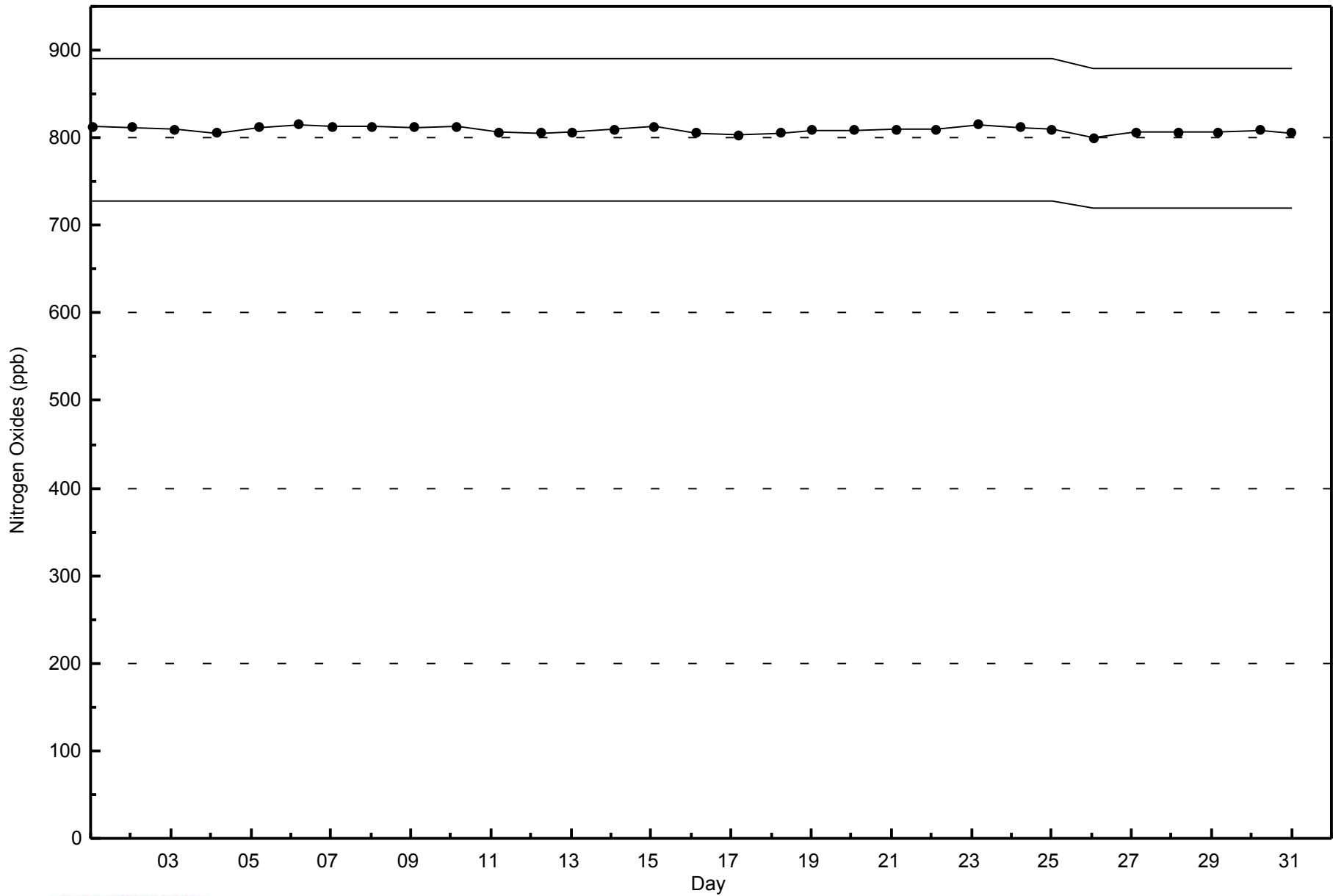






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2015





Summary of Hour Averages

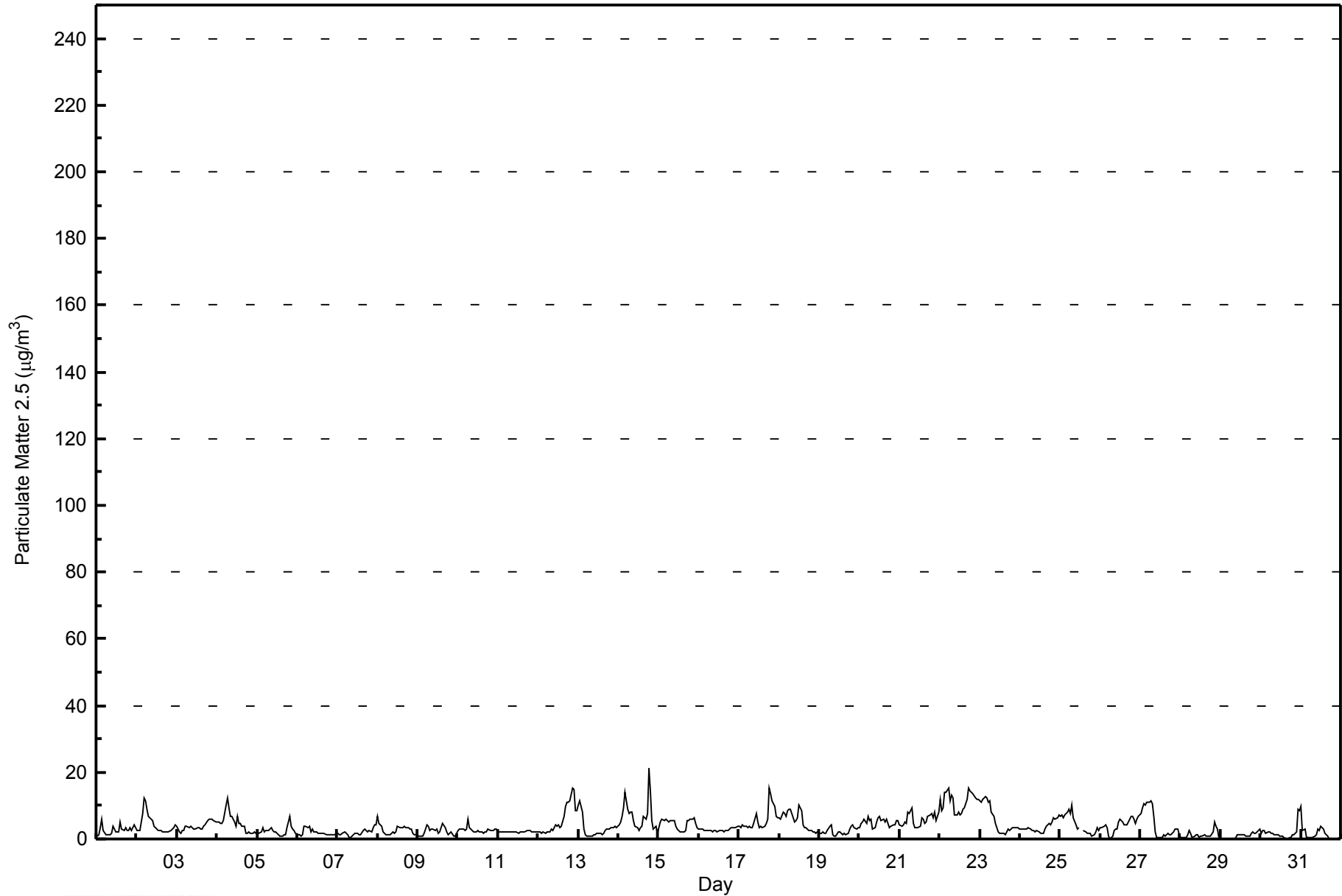
CNRL Horizon - March 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 21.3 µg/m ³ on Mar 14 19:00 Minimum Value: 0.0 µg/m ³ on Mar 29 02:00 Maximum Diurnal Average: 4.8 µg/m ³ at hour 6 Monthly Average: 3.83 µg/m ³		Maximum Daily Average: 11.3 µg/m ³ on Mar 22 Minimum Daily Average: 1.0 µg/m ³ on Mar 29 Minimum Diurnal Average: 2.9 µg/m ³ at hour 15 Percentiles: P ₁ = 0.1 P ₁₀ = 1.1 Q ₁ = 1.9 Median = 2.9 Q ₃ = 5.0 P ₉₀ = 8.0 P ₉₉ = 14.2		Hours in Service: 744 Hours of Data: 739 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	1.0	1.1	3.5	5.8	2.4	1.3	1.2	1.1	1.2	1.5	4.0	2.2	2.3	2.3	5.1	3.0	2.4	3.3	2.4	2.5	3.4	2.5	4.1	3.5	2.6	5.8																						
2-Mar	2.3	2.3	2.6	7.7	12.2	11.4	8.8	6.8	6.2	5.7	3.8	3.4	2.9	2.6	2.5	2.1	1.9	2.1	2.3	2.3	2.7	2.9	3.2	4.0	4.4	12.2																						
3-Mar	3.7	2.0	1.8	2.5	2.4	3.7	3.8	3.3	3.7	3.3	3.0	3.0	3.3	3.2	3.1	3.1	3.6	4.4	5.4	6.1	6.0	6.1	5.6	5.0	3.8	6.1																						
4-Mar	5.1	5.0	4.7	4.7	5.4	10.1	12.3	9.2	6.7	6.7	5.2	3.9	6.6	4.8	4.7	3.8	3.9	1.6	1.6	1.9	1.8	1.8	1.9	1.9	4.8	12.3																						
5-Mar	1.9	1.9	2.1	3.3	2.3	2.4	2.4	2.3	3.2	2.5	2.1	2.3	1.8	1.0	1.0	1.1	1.2	1.3	3.4	6.9	3.7	3.0	2.4	1.7	2.4	6.9																						
6-Mar	1.3	1.1	1.0	1.4	3.9	3.7	3.5	3.6	2.0	2.8	1.9	2.0	1.7	1.5	1.5	1.9	1.8	1.2	1.2	1.2	1.4	1.3	1.4	1.7	1.9	3.9																						
7-Mar	1.6	1.4	1.4	1.7	2.0	1.8	1.2	0.6	0.5	1.1	1.7	1.7	1.5	1.2	1.3	2.6	3.1	2.6	2.3	2.7	2.1	3.4	4.1	4.1	2.0	4.1																						
8-Mar	6.9	4.8	3.6	2.1	1.5	1.3	1.3	1.4	1.8	2.1	1.8	2.1	3.7	3.5	3.3	3.6	3.7	3.4	3.3	3.1	2.9	1.9	1.1	1.1	2.7	6.9																						
9-Mar	1.0	1.0	1.0	0.9	1.7	4.1	3.8	2.5	3.0	3.0	2.5	2.8	1.7	2.1	3.4	4.6	3.3	2.2	1.1	1.6	2.1	0.9	1.0	1.8	2.2	4.6																						
10-Mar	2.5	3.1	2.8	3.0	2.7	2.9	5.9	3.3	2.6	2.2	2.3	2.1	2.4	2.2	2.2	1.7	2.1	2.1	2.8	2.7	2.6	2.6	2.9	2.8	2.7	5.9																						
11-Mar	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.2	1.9	1.9	1.9	2.2	2.0	2.2	2.4	2.5	2.5	2.3	2.2	2.1	2.2	2.1	2.5																						
12-Mar	2.0	2.0	1.9	2.0	1.9	1.9	2.0	2.3	2.9	2.6	4.3	3.8	4.2	3.5	3.7	6.8	9.7	11.2	11.1	11.6	15.4	14.8	8.4	8.4	5.8	15.4																						
13-Mar	10.2	11.6	8.2	3.0	1.1	0.8	0.7	0.7	0.9	1.4	1.5	1.5	1.6	1.6	1.4	1.8	2.3	2.9	3.1	3.4	3.4	3.5	3.7	3.3	3.1	11.6																						
14-Mar	4.2	5.0	6.7	9.2	14.0	9.0	7.4	7.9	8.1	5.3	3.7	3.3	2.6	3.6	3.7	6.6	6.0	7.8	21.3	14.5	5.5	2.9	3.6	1.9	6.8	21.3																						
15-Mar	3.4	4.9	5.9	5.3	5.7	5.4	4.9	5.7	5.5	5.5	3.9	3.1	2.5	2.0	1.9	2.3	2.7	5.4	5.7	5.8	5.8	6.3	4.8	3.4	4.5	6.3																						
16-Mar	3.0	2.8	2.9	2.8	2.6	2.5	2.6	2.6	2.2	2.4	2.3	2.3	2.5	2.5	2.4	2.1	2.5	2.4	2.9	3.2	3.4	3.4	3.3	3.9	2.7	3.9																						
17-Mar	3.6	3.6	4.1	3.8	3.6	3.5	3.7	3.2	3.3	4.5	7.4	5.2	3.6	3.9	3.4	3.7	4.6	5.8	15.1	13.4	11.3	9.8	6.7	6.3	5.7	15.1																						
18-Mar	6.4	6.1	8.0	7.5	6.7	8.3	8.8	9.1	6.3	5.2	5.7	6.2	10.3	8.5	4.1	3.4	3.4	2.9	2.6	2.4	2.2	2.0	1.9	1.9	5.4	10.3																						
19-Mar	1.8	1.8	2.0	1.9	1.9	2.6	4.0	4.2	1.2	1.0	0.9	2.3	1.9	1.5	1.5	1.6	1.4	1.8	2.8	3.6	4.2	3.3	3.1	3.4	2.3	4.2																						
20-Mar	3.4	4.8	5.1	5.8	4.7	7.0	5.4	5.9	3.1	3.2	4.9	6.2	6.8	5.6	5.9	5.1	5.8	4.5	3.6	3.9	4.0	4.1	5.7	5.5	5.0	7.0																						
21-Mar	4.3	3.9	4.1	5.2	4.8	7.9	7.6	9.2	4.7	3.6	3.6	3.3	3.8	6.2	5.7	4.6	5.1	6.7	7.0	7.8	6.6	8.2	5.3	7.8	5.7	9.2																						
22-Mar	12.0	8.6	9.2	14.1	14.0	15.3	11.4	13.2	12.3	7.4	7.0	8.2	7.3	7.6	8.7	9.5	12.1	15.3	14.5	13.9	13.6	12.4	12.0	11.8	11.3	15.3																						
23-Mar	11.5	11.2	12.0	12.7	12.2	11.2	11.5	8.0	6.7	4.6	3.2	2.2	1.8	1.7	1.5	1.4	2.2	3.0	2.7	3.4	3.4	3.4	3.6	3.2	5.8	12.7																						
24-Mar	3.0	3.0	3.0	2.8	3.1	3.3	2.8	2.6	2.4	2.3	2.5	2.0	1.9	1.8	1.9	2.8	3.7	4.5	4.0	4.9	6.2	6.1	6.3	7.3	3.5	7.3																						
25-Mar	6.7	7.3	6.2	7.2	8.0	8.8	7.8	10.2	6.2	4.4	2.8	3.2	M	M	2.4	2.0	1.9	1.7	1.6	1.0	1.1	2.3	3.3	2.4	4.5	10.2																						
26-Mar	3.3	3.3	3.9	4.1	3.3	1.0	0.1	0.8	2.4	2.9	3.1	5.2	6.0	5.1	4.1	4.2	4.2	5.3	6.6	6.8	5.9	4.8	5.8	6.8	4.1	6.8																						
27-Mar	7.6	9.2	10.6	10.3	11.1	11.0	11.3	10.8	6.7	2.0	0.2	0.3	0.5	0.6	1.3	0.9	1.5	1.3	1.2	1.8	2.1	2.8	3.0	1.3	4.6	11.3																						
28-Mar	0.5	0.4	0.3	0.6	1.3	2.5	1.6	0.5	0.6	1.1	1.4	0.6	0.7	0.9	1.3	0.9	1.0	0.9	1.0	1.9	5.1	3.8	3.1	0.4	1.3	5.1																						
29-Mar	UO	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.6	1.1	1.4	1.3	1.2	1.4	0.9	0.8	0.9	1.7	2.0	1.7	1.9	1.9	3.0	1.0	3.0																						
30-Mar	1.8	2.4	2.5	1.7	2.1	1.9	1.9	1.8	1.3	1.2	1.1	1.0	1.0	0.9	0.5	0.2	0.2	0.2	0.3	1.1	1.4	2.0	8.7	8.6	1.9	8.7																						
31-Mar	9.8	2.5	2.8	0.4	0.4	0.2	0.2	0.6	0.9	1.4	3.2	2.7	3.8	3.1	1.7	1.1	0.7	0.2	0.0	UO	UO	0.2	0.2	0.3	1.7	9.8																						
																								4.3	3.9	4.1	4.4	4.5	4.8	4.6	4.4	3.6	3.1	3.0	3.0	3.1	2.9	2.9	2.9	3.3	3.6	4.4	4.7	4.4	4.1	4.0	3.9	Diurnal Average
																								12.0	11.6	12.0	14.1	14.0	15.3	12.3	13.2	12.3	7.4	7.4	8.2	10.3	8.5	8.7	9.5	12.1	15.3	21.3	14.5	15.4	14.8	12.0	11.8	Diurnal Maximum
M - Maintenance																								UO - Unstable Operation																								
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	513	69.42	69.42
6 - 15	157	21.24	90.66
16 - 25	1	0.14	90.80
26 - 80	0	0.00	90.80
> 81.0	0	0.00	90.80

Total Number of Valid Hours: 739

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - March 2015

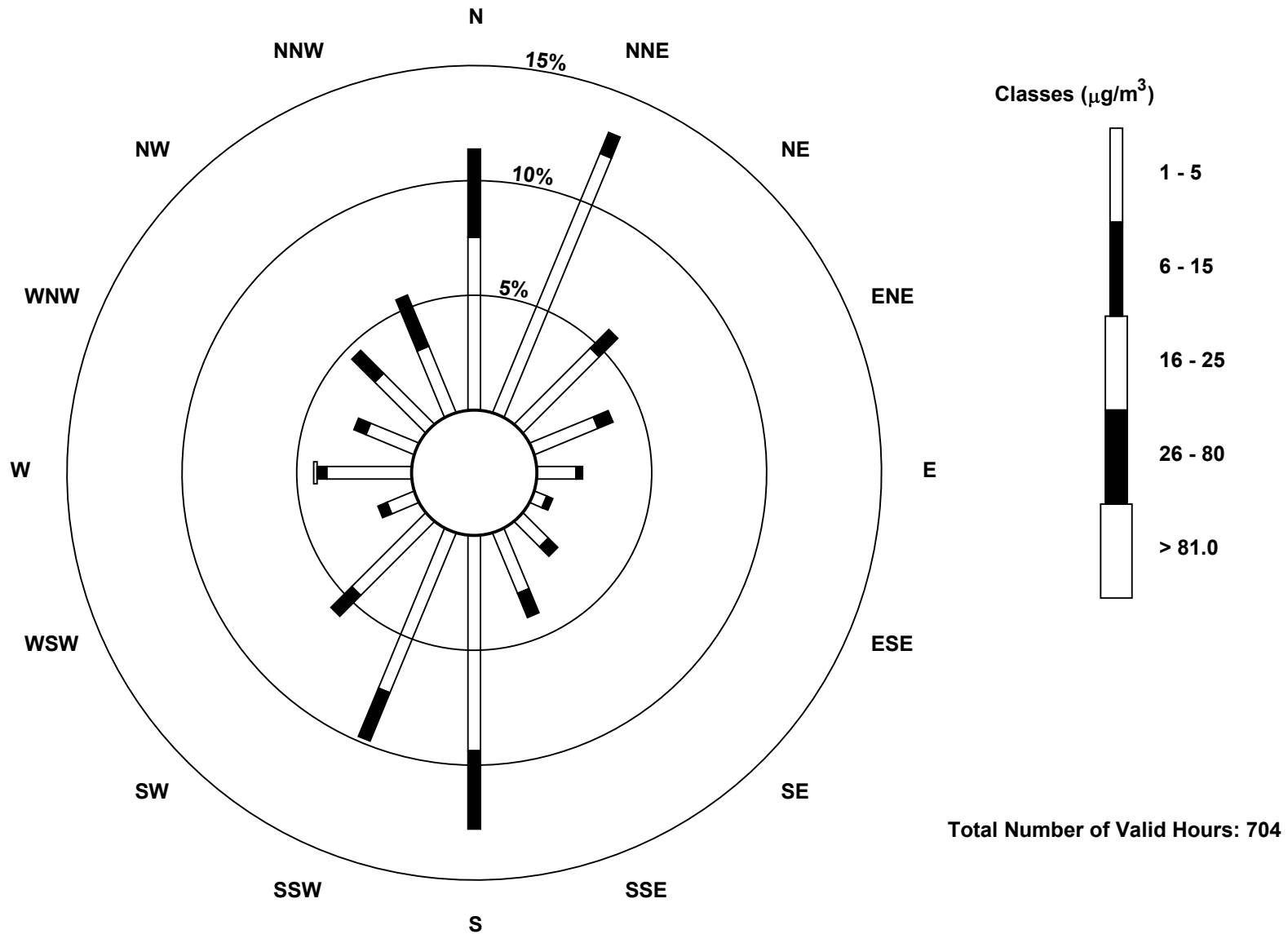
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	53	86	33	21	12	4	11	20	66	53	32	9	26	16	22	22	486
6 - 15	27	7	8	5	2	2	4	8	24	16	9	3	3	4	10	17	149
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	93	41	26	14	6	15	28	90	69	41	12	30	20	32	39	636

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)



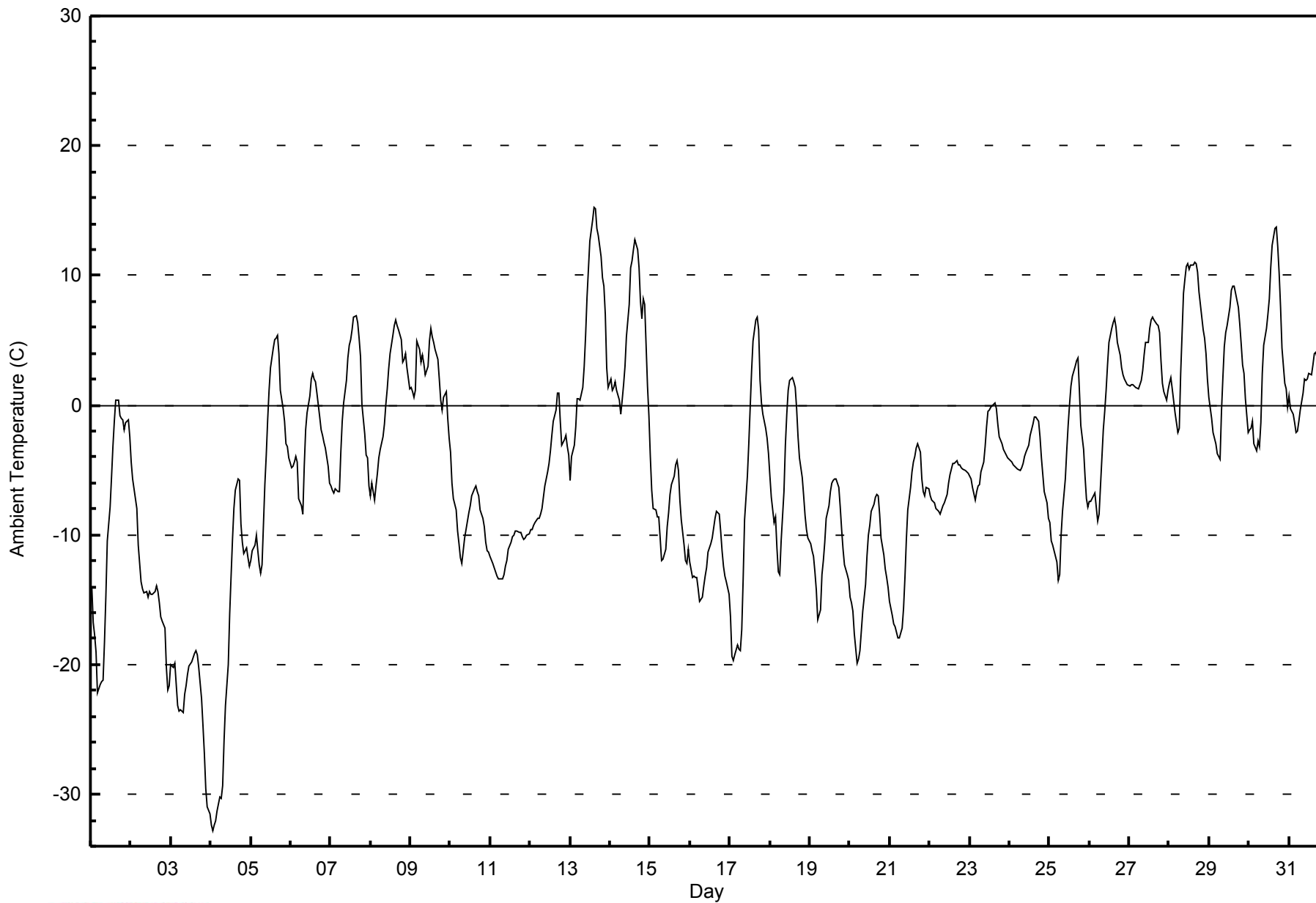


Maximum Value: 15.2 C on Mar 13 15:00		Maximum Daily Average: 5.9 C on Mar 13		Hours in Service: 744																						
Minimum Value: -32.8 C on Mar 4 02:00		Minimum Daily Average: -22.6 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 0.8 C at hour 16		Minimum Diurnal Average: -9.9 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -4.82 C		Percentiles: P ₁ = -30.3 P ₁₀ = -15.7 Q ₁ = -10.3 Median = -4.5 Q ₃ = 1.4 P ₉₀ = 5.8 P ₉₉ = 12.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-14.0	-16.7	-17.7	-19.0	-22.1	-21.5	-21.3	-21.2	-18.3	-14.7	-10.5	-7.9	-5.5	-3.2	-1.2	0.4	0.4	-0.8	-1.0	-1.2	-1.9	-1.4	-1.1	-2.4	-9.3	0.4
2-Mar	-4.4	-5.6	-6.5	-8.0	-10.7	-12.2	-13.6	-14.2	-14.5	-14.3	-14.8	-14.4	-14.6	-14.6	-14.4	-14.0	-14.3	-15.2	-16.3	-16.7	-17.2	-20.2	-22.0	-21.7	-13.9	-4.4
3-Mar	-20.0	-20.2	-19.9	-21.5	-23.2	-23.6	-23.5	-23.7	-22.3	-21.6	-20.7	-20.1	-19.8	-19.5	-19.1	-18.9	-19.2	-20.2	-22.6	-24.7	-26.9	-29.5	-30.9	-31.5	-22.6	-18.9
4-Mar	-32.4	-32.8	-32.4	-32.1	-31.3	-30.2	-30.3	-29.3	-25.9	-23.1	-20.0	-16.1	-13.1	-10.4	-7.9	-6.5	-5.7	-5.8	-9.1	-10.6	-11.5	-11.1	-11.8	-12.4	-18.8	-5.7
5-Mar	-11.9	-11.2	-10.8	-10.0	-11.2	-12.3	-13.0	-12.3	-6.1	-3.8	-1.1	1.1	2.9	4.4	5.1	5.2	5.3	3.9	1.2	-0.2	-1.2	-2.9	-3.2	-4.1	-3.6	5.3
6-Mar	-4.8	-4.7	-4.4	-4.0	-4.4	-7.2	-7.8	-8.4	-4.7	-1.9	-0.6	0.8	2.1	2.5	2.0	1.8	1.0	-1.0	-1.9	-2.3	-2.9	-3.3	-4.7	-6.0	-2.7	2.5
7-Mar	-6.3	-6.6	-6.7	-6.5	-6.7	-6.7	-3.6	-1.3	0.2	1.9	3.6	4.6	5.0	5.8	6.8	6.8	6.3	5.1	3.8	0.1	-2.2	-3.8	-4.1	-6.3	-0.4	6.8
8-Mar	-7.0	-6.1	-7.3	-6.2	-5.3	-4.1	-3.4	-2.5	-1.5	0.0	1.3	2.8	4.0	5.3	6.1	6.6	6.1	5.8	5.0	3.3	3.5	3.9	2.8	1.3	0.6	6.6
9-Mar	1.3	1.0	0.6	1.1	5.0	4.3	3.3	3.8	3.2	2.4	3.0	4.9	6.0	5.3	4.8	4.3	3.5	2.0	0.4	-0.4	0.6	1.1	-1.0	-2.6	2.4	6.0
10-Mar	-3.6	-6.0	-7.2	-8.1	-9.6	-10.7	-11.7	-12.1	-10.3	-9.6	-9.0	-8.3	-7.7	-7.0	-6.4	-6.2	-6.7	-7.0	-8.1	-8.8	-9.4	-10.6	-11.2	-11.3	-8.6	-3.6
11-Mar	-11.7	-12.2	-12.6	-12.9	-13.2	-13.4	-13.4	-13.4	-13.1	-12.5	-11.9	-11.1	-10.6	-10.1	-10.1	-9.7	-9.7	-9.8	-9.8	-10.1	-10.3	-10.3	-10.1	-9.9	-11.3	-9.7
12-Mar	-9.6	-9.6	-9.3	-9.1	-8.7	-8.7	-8.4	-8.0	-7.1	-6.3	-5.2	-4.5	-3.6	-2.3	-1.2	-0.4	1.0	0.9	-1.3	-3.0	-2.7	-2.3	-3.1	-3.8	-4.8	1.0
13-Mar	-5.8	-4.0	-3.1	-1.7	0.5	0.5	0.4	1.4	3.0	5.4	8.3	10.5	12.6	14.3	15.2	15.2	13.7	13.1	11.5	9.8	9.2	7.0	2.9	1.4	5.9	15.2
14-Mar	2.0	1.2	1.4	1.8	1.1	0.4	-0.8	0.4	1.5	2.9	5.3	7.8	10.6	11.2	12.0	12.8	12.0	10.6	8.0	6.7	8.2	7.8	1.5	-0.8	5.2	12.8
15-Mar	-4.0	-6.5	-8.0	-8.1	-8.6	-8.6	-10.3	-12.0	-11.9	-11.1	-9.3	-8.3	-6.9	-6.2	-5.5	-4.6	-4.2	-5.0	-7.3	-8.8	-10.8	-12.0	-12.2	-11.2	-8.4	-4.0
16-Mar	-12.1	-13.3	-13.2	-13.2	-13.3	-14.2	-15.1	-14.8	-13.9	-13.2	-12.5	-11.4	-10.7	-10.3	-9.5	-8.7	-8.2	-8.4	-9.7	-11.2	-12.5	-13.2	-13.6	-14.5	-12.1	-8.2
17-Mar	-16.3	-19.3	-19.7	-19.3	-18.5	-18.8	-18.9	-17.3	-13.4	-8.8	-5.5	-3.0	-0.2	2.6	5.0	6.6	6.8	5.8	1.9	0.2	-0.7	-1.8	-2.5	-3.8	-6.6	6.8
18-Mar	-5.4	-7.1	-9.0	-8.7	-11.0	-12.9	-13.1	-10.5	-6.6	-3.1	-0.7	1.2	1.9	2.1	1.8	1.3	-0.3	-2.4	-4.1	-5.6	-7.0	-8.5	-9.6	-10.2	-5.3	2.1
19-Mar	-10.6	-11.2	-11.6	-12.8	-14.3	-16.5	-15.8	-13.1	-12.0	-10.6	-8.7	-7.7	-6.7	-6.1	-5.7	-5.7	-5.7	-6.3	-7.9	-9.6	-11.2	-12.3	-13.1	-13.6	-10.4	-5.7
20-Mar	-14.8	-15.2	-15.9	-17.6	-19.9	-19.5	-18.9	-17.4	-15.9	-13.8	-11.7	-10.0	-9.2	-8.2	-7.6	-7.1	-6.9	-7.0	-8.4	-10.2	-11.6	-12.6	-13.3	-14.1	-12.8	-6.9
21-Mar	-15.2	-16.2	-16.8	-17.1	-17.5	-17.9	-18.0	-17.2	-15.7	-13.2	-10.3	-8.1	-6.4	-5.2	-4.4	-3.9	-3.3	-2.9	-3.7	-5.7	-6.6	-6.9	-6.3	-6.4	-10.2	-2.9
22-Mar	-7.0	-7.3	-7.4	-7.6	-7.9	-8.2	-8.4	-8.0	-7.8	-7.6	-6.9	-6.0	-5.4	-4.9	-4.4	-4.5	-4.3	-4.6	-4.5	-4.8	-5.0	-5.0	-5.1	-5.2	-6.2	-4.3
23-Mar	-5.4	-5.7	-6.3	-7.3	-6.7	-6.3	-6.1	-5.2	-4.4	-3.2	-1.7	-0.5	-0.3	-0.1	0.1	0.2	-0.3	-1.4	-2.4	-3.0	-3.4	-3.6	-3.8	-4.0	-3.4	0.2
24-Mar	-4.2	-4.4	-4.6	-4.7	-4.8	-4.9	-5.0	-4.9	-4.5	-3.9	-3.6	-3.1	-2.3	-1.9	-1.4	-0.9	-0.9	-1.3	-2.4	-4.0	-5.3	-6.6	-7.5	-8.7	-4.0	-0.9
25-Mar	-9.0	-10.5	-10.8	-11.3	-12.0	-13.5	-13.0	-10.0	-8.2	-5.6	-3.5	-1.5	0.1	1.4	2.2	3.0	3.4	3.6	1.2	-1.6	-3.4	-5.5	-7.2	-7.8	-5.0	3.6
26-Mar	-7.4	-7.4	-7.0	-6.7	-7.9	-8.9	-8.4	-4.0	-1.9	-0.5	1.1	3.1	4.9	5.9	6.3	6.6	6.1	4.9	3.9	2.9	2.3	2.0	1.8	1.5	-0.3	6.6
27-Mar	1.5	1.6	1.6	1.5	1.4	1.2	1.6	1.9	2.6	3.9	4.8	4.9	5.9	6.5	6.8	6.6	6.2	6.1	5.6	3.4	1.7	1.1	0.4	1.2	3.3	6.8
28-Mar	1.7	2.1	1.3	-0.6	-1.3	-2.1	-1.7	2.4	8.7	9.7	10.7	10.9	10.5	10.8	10.8	11.0	10.9	10.3	8.7	6.8	5.8	5.2	4.0	2.0	5.8	11.0
29-Mar	0.6	-1.0	-2.1	-2.5	-3.0	-3.8	-4.2	-0.5	2.2	4.6	5.6	6.2	7.6	8.8	9.1	9.2	8.7	7.5	6.2	4.8	3.1	2.5	0.5	-2.1	2.8	9.2
30-Mar	-1.9	-1.7	-1.2	-3.0	-3.5	-2.7	-3.2	-1.3	2.5	4.6	5.9	7.0	8.2	10.5	12.3	13.6	13.7	12.2	10.2	7.5	4.4	1.7	1.3	-0.1	4.0	13.7
31-Mar	0.8	-0.3	-0.7	-1.3	-2.1	-2.0	-1.2	-0.4	1.0	2.0	2.0	2.0	2.4	2.3	3.1	3.9	4.1	3.6	3.0	2.4	1.8	1.2	0.8	0.8	1.2	4.1
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
CNRL Horizon - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	35	4.70	4.70
-20 - 0	474	63.71	68.41
0 - 10	207	27.82	96.24
10 - 20	28	3.76	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

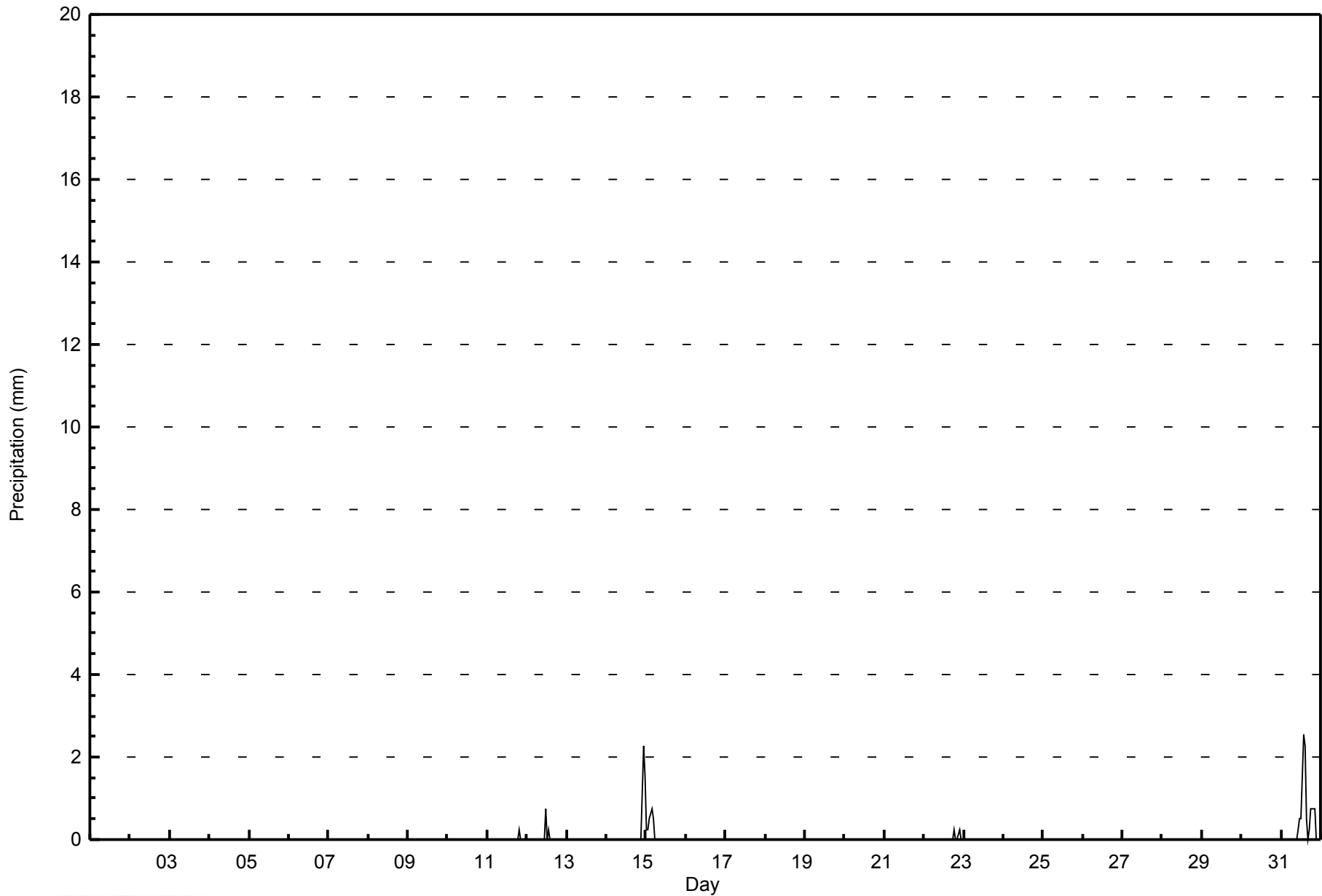


Maximum Value: 2.5 mm on Mar 31 14:00		Maximum Daily Total: 9.1 mm on Mar 31		Hours in Service: 744																								
Minimum Value: 0.0 mm on Mar 1 01:00		Minimum Daily Total: 0.0 mm on Mar 1		Hours of Data: 744																								
Maximum Diurnal Total: 2.8 mm at hour 14		Minimum Diurnal Total: 0.0 mm at hour 6		Hours of Missing Data: 0																								
Monthly Total: 17.02 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.8		Hours of Calibration: 0																								
				Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
12-Mar	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8
13-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.5	3.8	2.3	
15-Mar	0.3	0.3	0.5	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.8	
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.3	
23-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	2.5	2.3	0.5	0.0	0.3	0.8	0.8	0.8	0.0	0.0	0.0	0.0	9.1	2.5	
																								Diurnal Average				
																								Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
CNRL Horizon - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

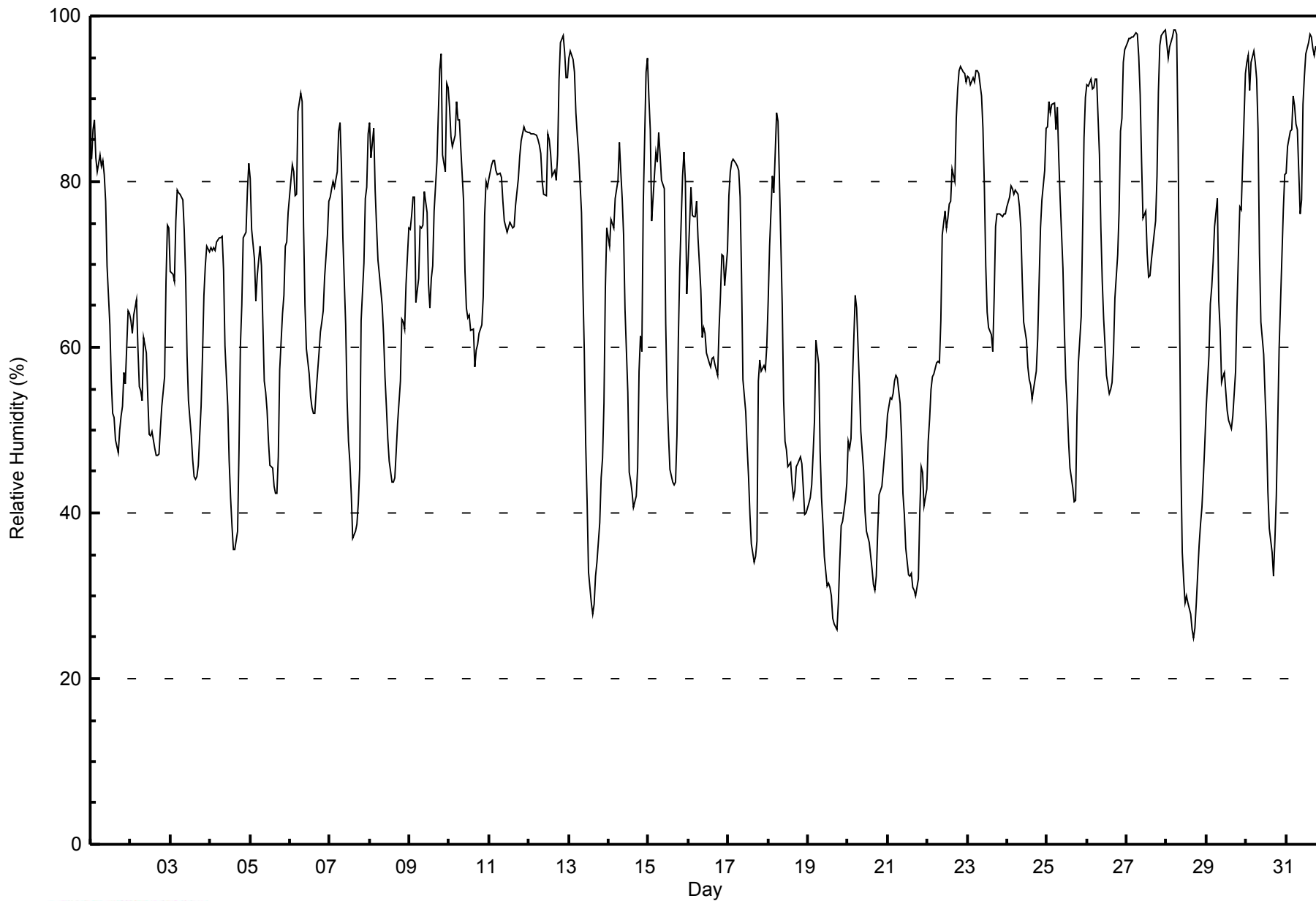
CNRL Horizon - March 2015

Maximum Value: 98 % on Mar 28 00:00																		Maximum Daily Average: 91.1 % on Mar 31																		Hours in Service: 744							
Minimum Value: 25 % on Mar 28 17:00																		Minimum Daily Average: 39.0 % on Mar 19																		Hours of Data: 744							
Maximum Diurnal Average: 79.6 % at hour 7																		Minimum Diurnal Average: 50.1 % at hour 16																		Hours of Missing Data: 0							
Monthly Average: 66.6 %																		Percentiles: P ₁ = 28 P ₁₀ = 41 Q ₁ = 52 Median = 69 Q ₃ = 81 P ₉₀ = 91 P ₉₉ = 98																		Hours of Calibration: 0							
																																				Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-Mar	83	86	87	83	81	83	82	82	81	78	70	63	56	52	51	49	47	50	52	53	57	56	64	64	67.1	87																	
2-Mar	63	62	64	66	60	55	55	54	61	59	54	49	49	50	48	47	47	47	50	53	56	68	75	74	56.9	75																	
3-Mar	69	69	68	75	79	79	79	78	74	68	59	54	49	47	44	44	44	46	53	59	66	70	72	71	63.2	79																	
4-Mar	72	72	72	72	73	73	73	73	69	60	53	46	42	38	36	36	38	48	60	65	73	74	79	82	61.6	82																	
5-Mar	80	74	71	66	69	70	72	70	56	55	52	49	46	45	43	42	42	47	57	64	66	72	73	76	60.8	80																	
6-Mar	80	82	81	78	78	88	91	90	75	65	60	57	54	53	52	52	55	59	62	63	64	68	74	78	69.1	91																	
7-Mar	78	79	80	79	81	86	87	82	73	63	54	49	46	42	37	38	39	41	46	63	70	78	79	86	64.8	87																	
8-Mar	87	83	86	79	75	70	69	65	62	56	53	49	46	44	44	44	47	51	56	63	63	62	68	74	62.4	87																	
9-Mar	74	76	78	78	65	68	75	74	75	79	76	68	65	68	70	76	82	88	94	95	83	81	92	91	78.1	95																	
10-Mar	89	85	84	86	90	87	87	84	78	69	65	64	64	62	62	58	60	60	62	63	66	76	80	79	73.3	90																	
11-Mar	80	82	83	83	81	81	81	81	78	75	75	74	75	75	74	75	77	80	83	85	86	87	86	86	80.1	87																	
12-Mar	86	86	86	86	86	85	84	83	80	78	78	86	85	83	81	81	80	83	92	97	98	96	93	92	86.1	98																	
13-Mar	95	96	95	93	88	86	83	76	67	60	48	41	33	29	28	29	32	34	39	44	47	53	67	74	59.9	96																	
14-Mar	72	75	75	74	78	80	85	81	78	73	65	54	45	44	43	41	42	45	57	61	59	77	93	95	66.4	95																	
15-Mar	90	86	75	81	84	82	86	83	80	79	63	54	49	45	44	43	44	49	61	69	81	84	80	66	69.2	90																	
16-Mar	71	79	76	76	76	78	73	67	61	62	62	59	58	58	59	59	58	57	62	66	71	71	68	72	66.6	79																	
17-Mar	78	81	82	83	82	82	81	78	69	56	52	48	44	40	36	34	35	37	56	58	57	58	57	60	60.2	83																	
18-Mar	66	72	81	79	83	88	87	80	65	54	49	48	46	46	43	42	43	46	46	47	46	43	40	40	57.4	88																	
19-Mar	41	42	43	47	51	61	58	48	42	39	35	31	32	31	30	27	27	26	29	34	38	39	42	44	39.0	61																	
20-Mar	49	48	49	56	66	65	60	56	50	45	40	38	37	36	33	31	31	32	38	42	43	45	47	49	45.3	66																	
21-Mar	52	54	54	54	56	57	56	53	49	42	40	36	33	32	33	31	31	30	32	40	46	45	41	43	43.3	57																	
22-Mar	49	51	55	56	57	58	58	58	63	73	76	74	76	77	78	82	80	88	91	93	94	93	93	92	73.6	94																	
23-Mar	93	93	92	93	92	93	93	93	90	86	79	70	64	62	61	60	66	75	76	76	76	76	76	76	79.7	93																	
24-Mar	77	78	79	79	78	79	79	77	74	68	63	61	58	56	55	54	55	57	61	68	74	78	81	86	69.9	86																	
25-Mar	87	90	88	89	90	86	89	83	78	70	62	56	53	49	45	43	41	41	52	58	64	74	85	90	69.3	90																	
26-Mar	92	92	92	91	91	92	92	83	74	68	63	60	57	54	55	56	60	66	71	76	86	88	94	96	77.1	96																	
27-Mar	97	97	97	97	98	98	98	95	91	82	76	76	71	69	69	71	74	75	81	91	96	98	98	98	87.2	98																	
28-Mar	97	95	96	98	98	98	98	86	46	35	32	29	30	29	28	26	25	26	29	36	39	41	44	48	54.5	98																	
29-Mar	53	59	65	67	70	75	78	66	62	56	56	57	52	51	51	50	52	57	65	71	77	77	82	93	64.2	93																	
30-Mar	94	95	91	94	96	94	92	86	71	63	59	54	50	42	38	35	32	37	42	51	60	71	77	81	67.0	96																	
31-Mar	81	84	86	86	90	89	87	86	76	78	89	93	95	97	98	98	96	95	96	97	97	97	97	97	91.1	98																	
																		76.6	77.5	77.8	78.2	78.8	79.6	79.6	75.9	69.3	64.4	60.0	56.3	53.6	51.9	50.6	50.1	51.0	54.0	59.7	64.6	67.8	70.8	74.1	76.0	Diurnal Average	
																		97	97	97	98	98	98	98	95	91	86	89	93	95	97	98	98	96	95	96	97	98	98	98	98	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	67	9.01	9.01
40 - 60	217	29.17	38.17
60 - 80	248	33.33	71.51
80 - 100	212	28.49	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

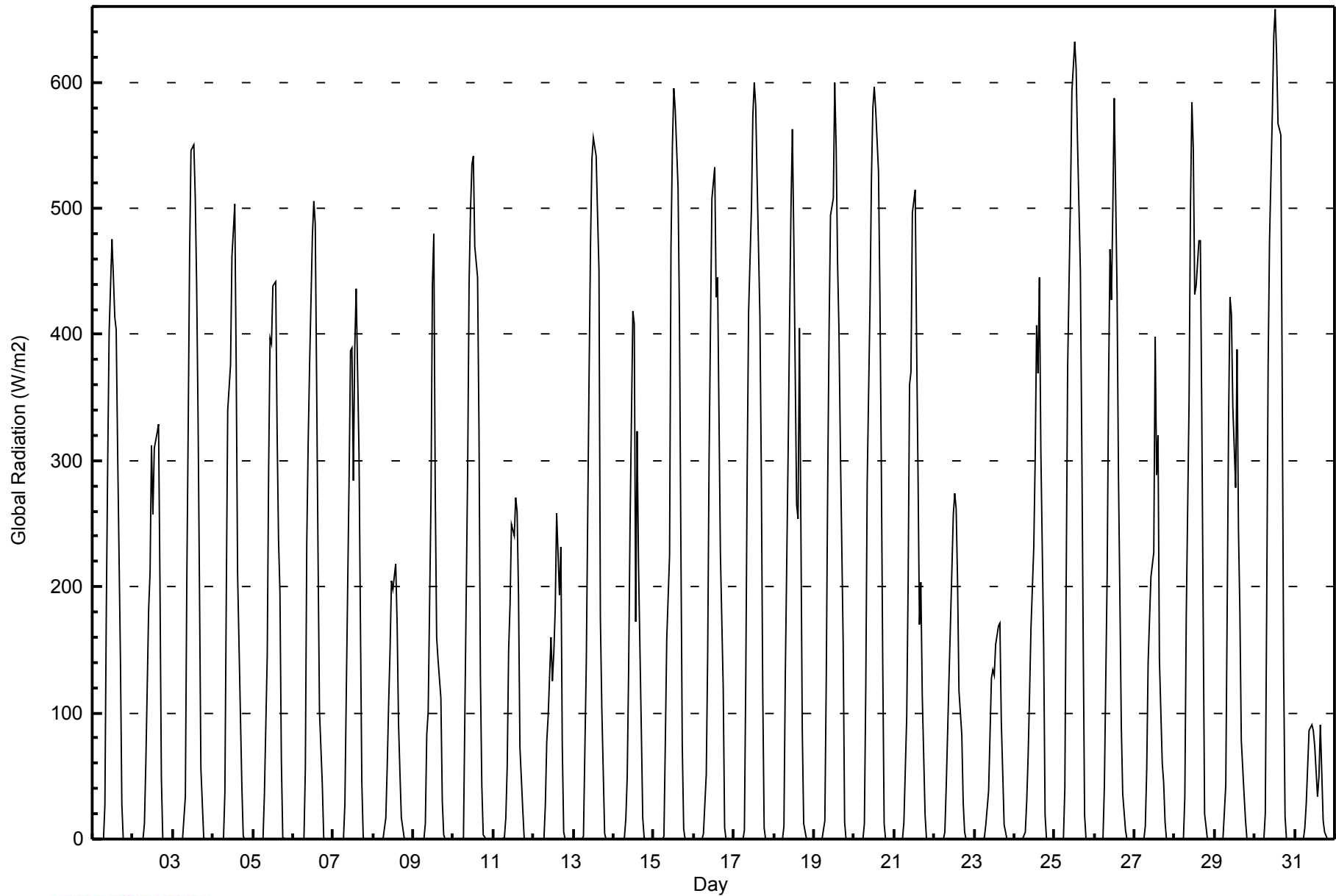


Maximum Value: 658 W/m2 on Mar 30 13:00		Maximum Daily Average: 215.9 W/m2 on Mar 30		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Mar 1 01:00		Minimum Daily Average: 29.6 W/m2 on Mar 31		Hours of Data: 744																						
Maximum Diurnal Average: 426.4 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 1		Hours of Missing Data: 0																						
Monthly Average: 128.0 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 5 Q ₃ = 226 P ₉₀ = 445 P ₉₉ = 588		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	0	0	27	182	300	401	475	446	414	404	310	144	28	0	0	0	0	0	0	130.5	475
2-Mar	0	0	0	0	0	0	0	13	61	183	211	312	257	310	322	329	203	49	0	0	0	0	0	0	93.8	329
3-Mar	0	0	0	0	0	0	0	34	201	326	463	546	551	510	438	333	199	56	2	0	0	0	0	0	152.4	551
4-Mar	0	0	0	0	0	0	0	37	195	341	376	462	483	503	376	211	99	43	2	0	0	0	0	0	130.3	503
5-Mar	0	0	0	0	0	0	0	36	146	294	397	393	439	441	322	237	196	62	1	0	0	0	0	0	123.5	441
6-Mar	0	0	0	0	0	0	0	56	235	315	376	478	506	488	360	223	102	44	1	0	0	0	0	0	132.7	506
7-Mar	0	0	0	0	0	0	0	28	116	287	387	389	284	389	436	306	174	45	1	0	0	0	0	0	118.5	436
8-Mar	0	0	0	0	0	0	0	17	58	108	150	205	198	218	171	92	52	17	1	0	0	0	0	0	53.6	218
9-Mar	0	0	0	0	0	0	0	12	83	100	270	440	480	277	160	142	112	30	4	0	0	0	0	0	87.9	480
10-Mar	0	0	0	0	0	0	1	99	297	442	499	535	541	469	445	324	130	43	3	0	0	0	0	0	159.5	541
11-Mar	0	0	0	0	0	0	1	17	58	149	186	249	241	270	260	193	73	23	1	0	0	0	0	0	71.7	270
12-Mar	0	0	0	0	0	0	0	26	77	97	160	125	148	182	259	194	232	74	5	0	0	0	0	0	65.8	259
13-Mar	0	0	0	0	0	0	2	139	254	369	471	539	556	541	494	451	175	105	5	0	0	0	0	0	170.9	556
14-Mar	0	0	0	0	0	0	1	16	50	134	248	419	408	172	323	218	86	17	1	0	0	0	0	0	87.2	419
15-Mar	0	0	0	0	0	0	2	77	158	224	468	550	595	578	517	414	237	74	8	0	0	0	0	0	162.6	595
16-Mar	0	0	0	0	0	0	4	52	147	304	407	508	532	430	445	336	228	120	9	0	0	0	0	0	146.8	532
17-Mar	0	0	0	0	0	0	7	130	295	418	501	574	599	581	523	414	288	118	9	0	0	0	0	0	185.7	599
18-Mar	0	0	0	0	0	0	10	131	308	410	499	563	477	265	253	405	252	87	13	0	0	0	0	0	153.0	563
19-Mar	0	0	0	0	0	0	15	127	279	404	494	507	599	549	457	403	310	153	14	0	0	0	0	0	179.7	599
20-Mar	0	0	0	0	0	0	13	121	282	425	523	579	597	579	529	431	296	140	12	0	0	0	0	0	188.6	597
21-Mar	0	0	0	0	0	0	13	98	204	360	370	497	514	392	290	171	204	114	19	0	0	0	0	0	135.2	514
22-Mar	0	0	0	0	0	0	6	43	86	130	214	258	274	262	205	118	83	30	5	0	0	0	0	0	71.4	274
23-Mar	0	0	0	0	0	0	1	11	38	83	127	134	130	154	169	172	93	53	11	0	0	0	0	0	49.0	172
24-Mar	0	0	0	0	0	0	5	30	66	114	167	232	302	407	369	445	309	153	19	0	0	0	0	0	109.1	445
25-Mar	0	0	0	0	0	0	40	211	374	508	593	612	633	611	551	451	314	159	19	1	0	0	0	0	211.6	633
26-Mar	0	0	0	0	0	0	41	212	363	468	427	500	588	433	287	192	89	35	7	0	0	0	0	0	151.8	588
27-Mar	0	0	0	0	0	0	10	55	139	174	209	227	399	288	319	142	60	44	13	0	0	0	0	0	86.7	399
28-Mar	0	0	0	0	0	0	34	176	347	501	584	547	432	438	475	474	339	178	20	0	0	0	0	0	189.3	584
29-Mar	0	0	0	0	0	0	42	181	331	430	417	342	278	388	245	180	78	35	15	0	0	0	0	0	123.5	430
30-Mar	0	0	0	0	0	0	20	187	375	474	576	636	658	622	567	558	357	134	18	0	0	0	0	0	215.9	658
31-Mar	0	0	0	0	0	0	9	28	87	89	91	87	74	34	49	90	53	15	6	0	0	0	0	0	29.6	91
		0.0	0.0	0.0	0.0	0.0	0.0	9.0	78.2	190.1	289.0	363.3	416.8	426.4	393.4	355.6	289.0	179.5	73.4	7.9	0.1	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	42	212	375	508	593	636	658	622	567	558	357	178	20	1	0	0	0	0	Diurnal Maximum



WBEA
Hourly Averages

Global Radiation (GR) - W/m²
CNRL Horizon - March 2015





Maximum Speed: 28 km/h on Mar 2 05:00	Maximum Daily Speed Average: 18.4 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 31 11:00	Minimum Daily Speed Average: 0.3 km/h on Mar 12	Hours of Data: 709
Maximum Diurnal Speed Average: 3.2 km/h at hour 23	Minimum Diurnal Speed Average: 0.0 km/h at hour 13	Hours of Missing Data: 35
Monthly Average Velocity: 1.1 km/h 323.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 24	Percent Operational Time: 95.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	NW3	SW2	W4	WSW7	SW7	SSW8	SSW8	S8	S8	S9	S10	S11	S9	S9	SSE13	SSE13	S13	S12	S12	S10	SSW6	SW8	NW18	NNW22	SSW6.0	NNW22	
2-Mar	NNW27	N28	NNW18	NNW22	NNW28	NNW26	NNW27	NNW24	N17	NW19	NW24	NNW23	NNW24	NW21	NW24	NW24	NW23	NW19	NW11	NW10	WNW7	SW0	SSW2	W9	NNW18.4	NNW28	
3-Mar	W10	WSW10	W10	N5	NNW3	NNW2	NNE6	N6	N9	NNE12	NNE11	NNE11	NNE11	NE10	NE8	ENE9	E8	E6	E6	ESE3	SSE2	SW6	SW8	SW8	NNE3.0	NNE12	
4-Mar	SW9	SW8	SSW9	SSW9	S10	S10	S11	S11	S13	SSE12	S13	SSE11	SSE10	S11	S8	S9	SSW9	SSW9	S6	S8	S8	SSW8	SSW10	SSW10	S9.3	S13	
5-Mar	WSW11	WSW8	W7	WSW9	SW11	SW10	SSW10	SSW8	NNW11	NNW6	NW7	E2	SE6	SSE8	S8	S8	S9	S9	S9	SSW9	SSW7	S6	SSW9	SW7	SW6.0	WSW11	
6-Mar	SSW8	SSW10	SW9	W8	NW5	SSW6	SW6	W2	SSE4	ENE5	ENE5	E6	SE4	E7	ENE10	ENE10	ENE10	NE11	NE8	NE6	NE6	NW2	W1	WSW3	E1.5	NE11	
7-Mar	SW4	S5	S5	S6	S4	WSW2	W6	WSW9	SW5	W10	WNW9	W12	W10	W11	W13	WNW11	W11	W9	W7	N6	N4	WNW4	NNW3	WSW4	W5.6	W13	
8-Mar	SW9	SSW8	SSW9	SSW10	SW13	SW12	SW9	SW11	SW11	SW12	SW13	SW8	SW8	SSW9	SSW7	SSW5	S7	S9	SSW6	SSE1	S8	S8	S8	S6	SSW8.2	SW13	
9-Mar	S7	SSW7	S7	SSW6	W9	WNW2	NNW4	W5	N4	NE7	E4	SE5	S8	NNE5	NW7	ENE4	NNE6	NNE4	NNE4	WNW4	WNW7	NNW7	NNE9	NNE9	NNW1.3	W9	
10-Mar	NNE14	NNE13	N11	NNE7	NNE7	NNE8	NNE6	E4	NE7	NE8	NE8	NE8	ENE8	ENE8	ENE9	NE10	NNE10	NNE11	NNE13	NNE16	NNE15	NNE13	NNE12	N12	NNE9.4	NNE16	
11-Mar	NNE14	NNE15	NNE15	NNE15	NNE16	NNE15	NNE14	NNE13	NNE16	NNE17	NNE15	NNE14	NNE14	NNE16	NNE17	NNE15	NNE13	NNE12	NNE13	NNE11	NNE10	NNE9	NNE11	NNE8	NNE13.6	NNE17	
12-Mar	NNE7	NNE7	NNE6	N6	NE6	NE4	NE3	W1	S2	SSE4	S6	S6	SSW6	SSW5	S6	S7	SSE7	SSW7	S5	SSE2	NNW5	N6	N7	NW4	SSE0.3	SSE7	
13-Mar	SW5	SW8	SSW9	SSW10	SW14	SW14	SSW12	SSW9	S11	SSW14	SW12	SSW14	SSW15	SSW13	SSW13	S16	S15	SSE15	S14	S12	SSE13	SSE8	SSE5	S6	SSW10.8	S16	
14-Mar	SSW7	SSW7	S8	S9	SSW8	SSW8	SSW7	SSW9	SSW8	SSW10	S11	S12	S10	SSE8	SE8	SSE8	S8	S7	W4	S4	SW7	WSW5	NNE16	AF	S6.2	NNE16	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NE5	NNE5	NE7	ENE8	ENE10	NE8	NE10	NNE8	NNE7	N6	N6	N6	NNW5	NW7	---	ENE10
17-Mar	NW4	SW4	SSW5	SSW6	SSW7	S7	S7	SSW8	S9	S10	S7	SSE8	SSE9	SSE10	S10	S9	SSE9	SSE8	NNW5	NNW7	NNW7	NNW9	NNW9	N6	S3.5	S10	
18-Mar	NNE6	N4	NNW4	N5	NW3	S4	SSW3	S3	SE3	SE4	SE4	N6	NNE8	NNE11	NNE13	N16	NNE17	NNE18	NNE19	N19	N18	N18	N16	N12	N8.1	NNE19	
19-Mar	N10	N8	N8	NNE5	NE5	ENE3	ENE2	NNE4	NNE6	NNE7	NNE7	NE10	NE10	NE11	NE9	NE12	NE12	NE10	NE9	NE6	NE7	NNE6	N7	N7	NNE7.3	NE12	
20-Mar	N5	N7	N6	N5	NNE5	N6	N6	N5	N5	NNE6	ENE6	ENE5	ENE6	NE6	NE7	NE9	NE8	NE7	NNE9	N9	NNE8	N7	N8	N9	NNE6.2	N9	
21-Mar	N7	NNE6	NNE7	N7	N7	N8	N8	N7	N5	N6	N5	NNW6	N5	NE8	NNE11	NNE11	NNE10	NE9	ENE7	NE5	ENE7	E6	ESE7	E6	NNE6.0	NNE11	
22-Mar	ENE4	NE4	NE4	N4	N5	N4	N4	N5	N4	NNW4	NNW4	N4	NNW4	NW6	NW5	WNW6	WNW7	WNW5	SSW1	ESE2	SE3	SE2	W2	WSW1	NNW2.6	WNW7	
23-Mar	W2	SSW2	S2	SSW4	SW3	SW3	SSW2	SW4	SSW4	SSW6	S6	SW3	WNW7	NW8	NW8	NW7	NNE7	NNE10	NNE10	NNE10	N9	N9	N8	NNE6	NNW2.5	NNE10	
24-Mar	N6	N6	N6	N7	N6	N4	N4	NNE4	N6	NNW7	NNE6	N5	ENE2	NNE4	ENE6	E6	ENE8	ENE7	E5	ENE5	NNE6	N6	NNW5	NW5	NNE4.5	ENE8	
25-Mar	NW6	N4	N6	N6	N5	N4	NNW5	NW3	N4	NNW5	NW6	NNW6	NNW7	N5	NE7	ENE6	NNE5	NNW4	NNW4	NNE5	NNW3	SSW5	SSW5	SSW5	N3.3	NE7	
26-Mar	NNE4	NNW2	NNE3	E2	W1	S4	SSW3	SW1	S6	SSW7	SSW6	S7	SSW7	SSW6	S7	S4	NNW3	NW4	NW5	WSW5	SW7	SW8	SSW6	S5	SSW2.8	SW8	
27-Mar	S5	S6	S6	SSE6	S8	S7	S9	S8	S9	SSW8	SW11	SSW10	S9	S9	SSE11	S10	S10	S8	S5	SSE4	SSE4	SSW5	S4	SSW8	S7.2	SSE11	
28-Mar	SSW8	SSW9	ENE2	S0	WSW5	W6	SW5	WSW5	W7	WNW10	WNW11	WNW16	WNW16	WNW19	WNW23	WNW21	WNW19	WNW17	WNW19	W9	W9	W10	W8	WSW8	W9.8	WNW23	
29-Mar	SW9	SW9	SSW7	SSW7	SSW8	S6	SSE6	S7	S7	SSW4	SE4	N3	E1	SE7	S6	SSE4	ENE4	NNE5	N5	NNW5	NW5	WNW7	WNW5	W3	SSW2.4	SW9	
30-Mar	SW4	NNW4	NNE4	SE2	SSW5	SW7	SE2	ESE3	SE4	SSE3	SE6	ESE8	ESE10	SE11	S11	SSW13	SW11	SSW9	SW9	SSW2	S3	WNW4	WNW4	W4	S3.6	SSW13	
31-Mar	NW2	SW4	S2	SSW5	SSE4	SSW4	S1	N2	S2	SSW4	ESE0	NNE4	N6	NNE7	NNE8	NNE12	NNE11	NNE13	NNE16	NNE17	NNE12	NNE14	NNE16	N17	NNE5.5	N17	

NW2.5	WNW1.7	NW1.4	W1.4	W2.0	WSW2.0	W1.4	WSW1.7	SW0.8	W1.0	W0.7	NW0.4	NE0.0	NE0.7	NE1.0	NE1.0	NNE1.6	NNE1.6	N2.4	N2.6	N2.0	NNW2.3	NNW3.2	NW2.7	Diurnal Average	
NNW27	N28	NNW18	NNW22	NNW28	NNW26	NNW27	NNW24	N17	NW19	NW24	NNW23	NNW24	NW21	NW24	NW24	NW23	NW19	NNE19	N19	N18	N18	NW18	NNW22	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
CNRL Horizon - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Mar 2 04:00	Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 0 Percent Operational Time: 95.3
Minimum Value: 0 km/h on Mar 22 02:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	

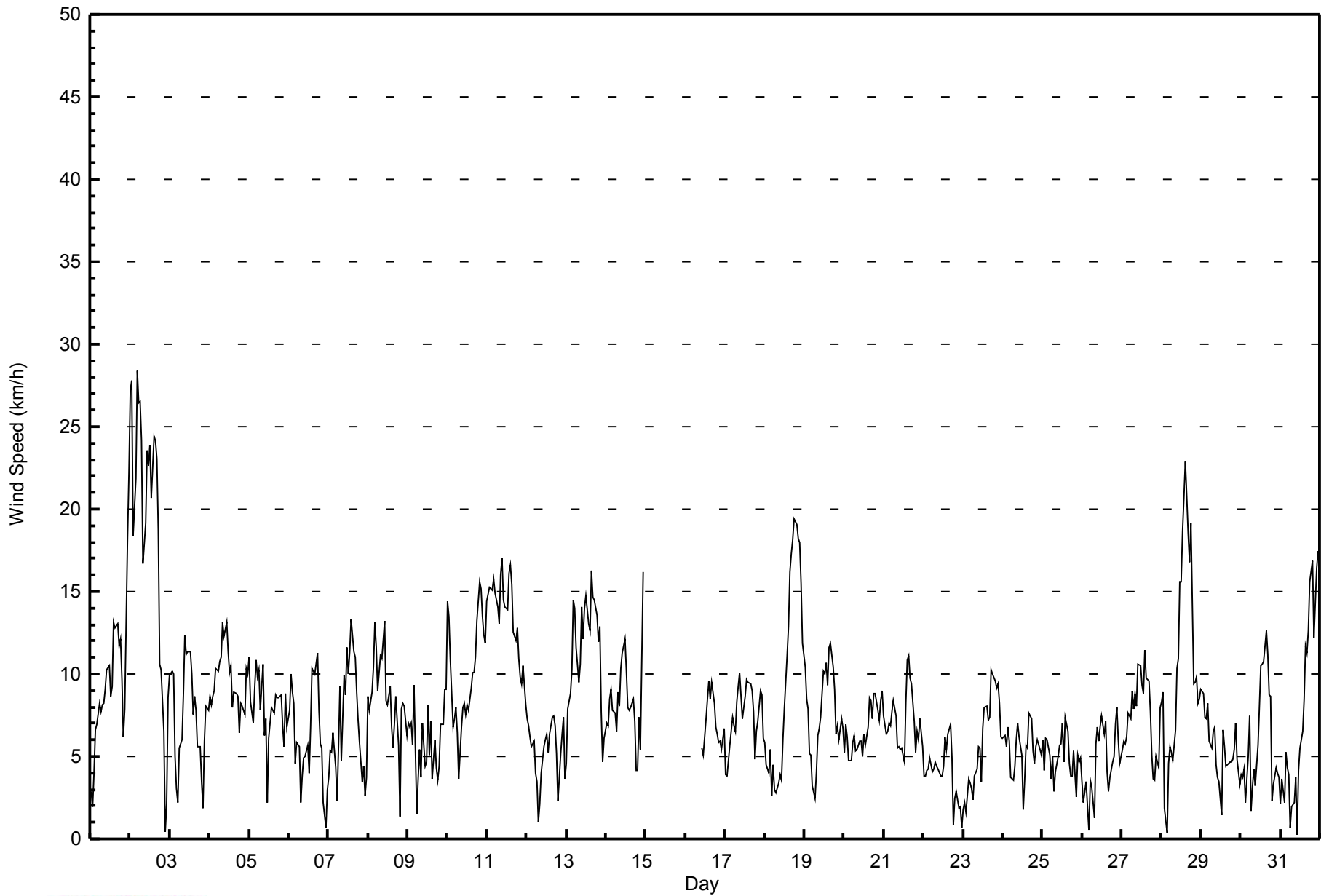
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	1	1	1	1	1	1	2	1	2	2	3	2	2	3	3	4	3	2	2	2	2	5	7	7
2-Mar	7	9	5	10	7	8	7	6	6	8	6	6	6	6	6	5	5	5	3	3	1	1	1	2	10
3-Mar	2	2	2	1	1	2	2	1	3	3	3	3	3	3	2	2	2	1	1	1	1	1	1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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	211	29.76	29.76
6 - 11	390	55.01	84.77
12 - 19	91	12.83	97.60
20 - 28	17	2.40	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - March 2015

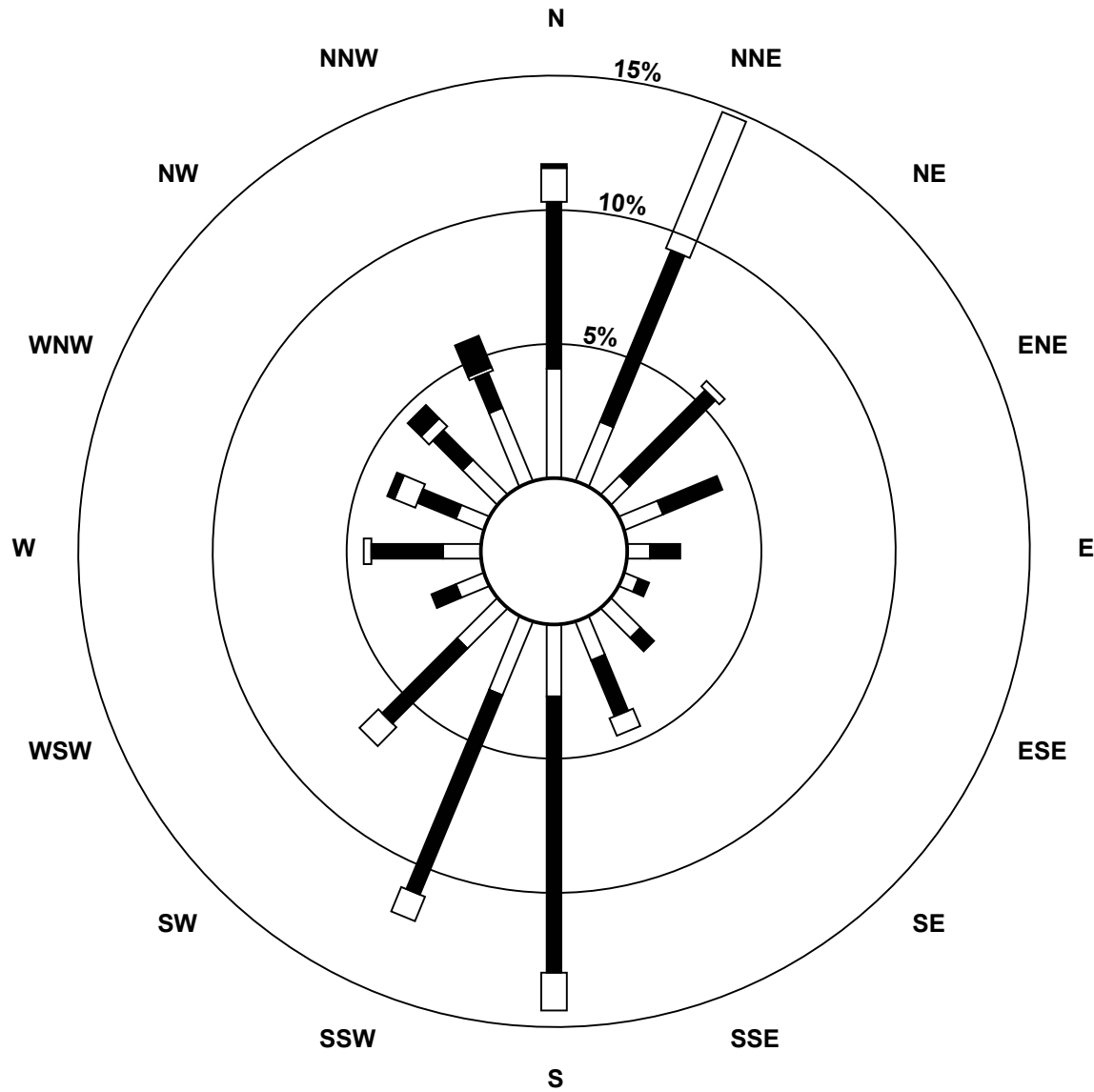
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	29	17	7	11	6	4	11	11	19	21	15	8	10	8	13	21	211
6 - 11	44	49	32	17	8	3	5	16	73	57	28	7	19	11	11	10	390
12 - 19	9	39	2	0	0	0	0	5	10	7	7	0	2	6	3	1	91
20 - 28	1	0	0	0	0	0	0	0	0	0	0	0	0	2	5	9	17
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	83	105	41	28	14	7	16	32	102	85	50	15	31	27	32	41	709

Total Number of Valid Hours: 709

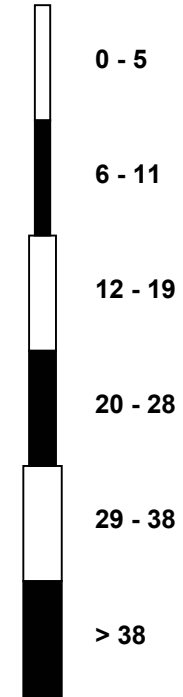
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)**



Classes (km/h)



Total Number of Valid Hours: 709



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - March 2015

Direction of Maximum Speed: 335 deg on Mar 2 05:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 327.9 deg on Mar 2	Hours of Data: 709
Direction of Minimum Speed: 109 deg on Mar 31 11:00	Hours of Missing Data: 35
Direction of Minimum Daily Speed Average: 0.3 deg on Mar 12	Percent Operational Time: 95.3
Monthly Average Direction: 254.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	306	229	266	250	220	209	196	186	184	177	174	175	171	177	158	163	175	182	184	181	199	226	311	335	197.9	
2-Mar	338	349	347	333	335	330	330	331	349	326	319	328	330	323	323	317	322	316	319	309	288	217	201	278	327.9	
3-Mar	267	256	271	4	333	333	18	359	11	13	19	28	32	36	42	61	90	81	79	114	167	221	227	234	11.4	
4-Mar	221	219	209	201	191	185	181	182	182	166	172	167	163	182	180	185	194	207	169	178	178	198	201	193	186.5	
5-Mar	240	243	260	252	226	221	213	205	284	338	310	88	134	166	180	190	190	186	181	194	199	182	205	223	215.0	
6-Mar	213	211	227	266	310	197	231	281	167	70	58	79	138	91	72	72	68	48	44	43	45	321	281	258	83.7	
7-Mar	225	186	186	176	183	243	266	237	230	273	286	268	268	276	276	284	280	269	274	357	349	299	343	238	264.8	
8-Mar	224	210	193	202	220	225	224	229	218	225	225	230	222	206	194	202	177	185	193	167	184	185	184	178	208.4	
9-Mar	191	200	191	205	263	297	328	278	356	39	90	140	184	25	309	66	27	32	14	302	299	340	23	18	333.2	
10-Mar	24	19	11	26	22	27	15	93	48	56	53	56	74	78	62	40	26	23	14	16	26	17	15	10	30.2	
11-Mar	14	19	17	16	16	16	16	16	17	19	21	23	24	20	19	20	24	17	15	23	26	23	20	23	19.1	
12-Mar	25	26	23	11	37	34	41	279	187	164	183	189	208	212	191	184	167	193	181	164	327	349	351	322	164.7	
13-Mar	235	219	205	206	219	214	203	210	188	209	222	205	204	203	192	188	178	165	173	170	168	162	167	190	195.3	
14-Mar	198	193	176	183	197	208	213	211	195	192	179	176	178	148	143	152	175	173	277	180	224	243	23	AF	185.7	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	48	18	46	62	62	52	44	32	12	11	2	2	345	306	--	
17-Mar	304	231	201	208	196	188	184	192	181	185	176	166	163	163	169	176	162	160	330	345	341	341	348	10	187.5	
18-Mar	18	2	342	356	324	190	198	170	126	139	134	6	16	12	17	10	16	15	14	6	4	360	0	0	10.2	
19-Mar	3	8	6	18	35	58	75	22	28	21	17	42	37	50	42	55	36	45	47	40	36	17	359	358	30.6	
20-Mar	5	1	351	8	14	359	2	0	6	18	61	59	57	55	41	51	55	40	19	10	14	9	357	358	20.8	
21-Mar	2	14	15	6	2	357	355	358	356	356	351	341	4	35	27	28	21	50	73	40	60	95	109	96	24.5	
22-Mar	63	51	50	11	5	360	5	358	0	346	348	350	335	323	321	301	294	291	208	119	126	140	280	239	347.1	
23-Mar	280	197	188	205	219	227	196	229	201	197	172	231	296	317	325	313	19	18	14	13	10	8	6	17	337.7	
24-Mar	4	11	2	353	5	349	5	14	11	346	13	10	60	25	71	89	66	76	79	60	23	1	340	318	20.9	
25-Mar	305	9	356	0	3	349	346	322	355	332	313	330	335	358	53	62	27	332	345	20	344	211	217	194	348.8	
26-Mar	29	344	14	86	261	175	206	220	175	211	200	186	192	197	182	187	341	324	319	256	235	219	206	190	209.5	
27-Mar	182	175	190	166	189	171	180	176	183	199	215	205	179	170	164	179	184	179	171	151	160	205	173	201	182.8	
28-Mar	199	211	63	191	248	264	233	250	280	290	292	293	295	293	295	293	292	286	293	280	271	276	264	246	280.4	
29-Mar	228	217	205	196	198	181	158	175	179	194	126	6	99	143	174	147	77	16	357	335	322	295	282	261	200.9	
30-Mar	230	343	23	145	200	222	133	102	141	154	131	122	121	143	179	199	219	201	216	195	180	292	295	280	182.7	
31-Mar	321	223	185	198	156	197	188	357	186	196	109	15	358	20	15	24	12	18	15	13	13	23	13	7	14.2	

304.5 298.0 304.5 281.0 269.0 248.7 262.8 252.9 223.4 270.0 267.6 320.1 52.7 48.8 35.8 43.9 28.6 22.4 4.7 10.4 354.4 331.3 341.1 320.3
 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
CNRL Horizon - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 103 deg on Mar 31 11:00	Hours of Data: 709
Minimum Value: 5 deg on Mar 3 23:00	Hours of Missing Data: 35
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 15 Median = 19 Q ₃ = 27 P ₉₀ = 46 P ₉₉ = 88	Hours of Calibration: 0
	Percent Operational Time: 95.3

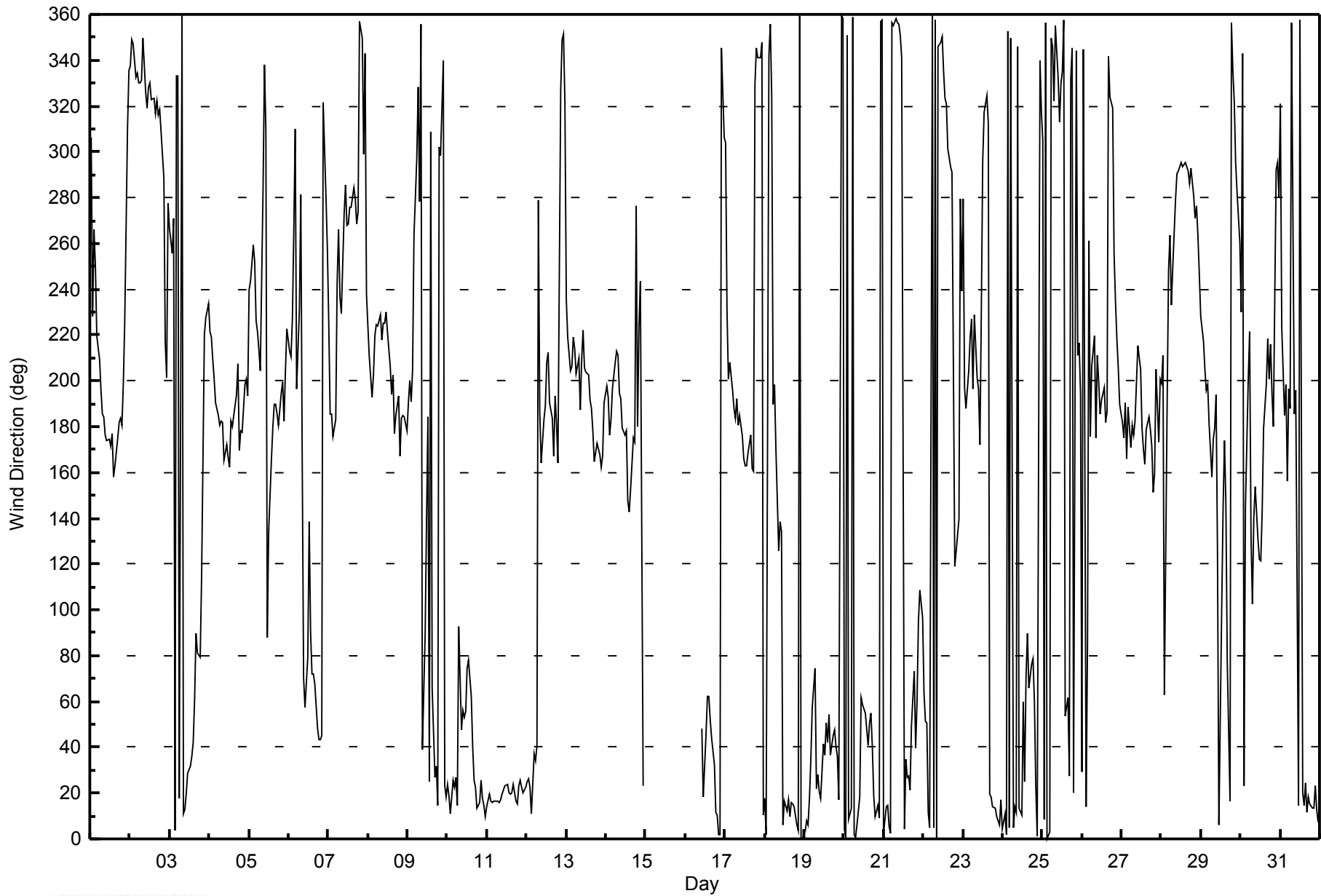
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	49	50	15	11	9	10	17	19	14	13	16	18	18	18	16	17	15	13	14	14	25	29	16	21	50	
2-Mar	19	20	19	22	19	18	16	16	21	21	16	17	16	17	15	16	16	14	14	14	17	101	72	16	101	
3-Mar	15	14	35	23	50	72	16	14	18	20	21	24	21	27	29	26	23	14	8	36	42	10	5	9	72	
4-Mar	6	9	8	12	12	10	9	13	13	13	15	17	18	18	22	17	22	19	17	8	12	10	14	11	22	
5-Mar	24	15	17	15	15	13	12	30	24	27	24	74	42	20	18	24	20	12	9	9	9	17	12	29	74	
6-Mar	43	11	19	17	62	24	15	67	47	41	61	63	61	45	19	19	20	15	13	17	21	54	81	41	81	
7-Mar	17	10	10	13	34	84	44	19	40	25	28	24	27	26	21	23	20	19	21	28	50	25	55	17	84	
8-Mar	6	13	8	12	13	15	18	17	16	18	19	44	28	21	19	23	11	11	26	73	8	10	8	12	73	
9-Mar	6	11	10	34	17	84	39	23	53	16	43	47	34	39	48	68	23	29	21	50	27	39	23	21	84	
10-Mar	18	18	17	37	14	14	24	28	20	29	26	34	28	32	27	20	19	19	18	17	17	17	18	18	37	
11-Mar	18	17	18	18	18	18	18	18	18	18	18	18	19	19	18	18	19	18	17	17	18	18	16	18	19	
12-Mar	24	18	18	23	19	26	27	96	62	21	24	23	23	30	28	22	18	19	14	57	11	17	15	35	96	
13-Mar	32	14	11	17	16	14	16	17	15	20	27	21	22	21	19	15	17	14	15	14	14	16	36	32	36	
14-Mar	15	10	12	14	13	14	13	12	24	23	17	16	16	21	18	21	11	10	39	39	19	50	18	AF	50	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	49	50	31	24	22	24	20	18	13	14	12	11	17	12	50	
17-Mar	43	25	11	15	12	12	13	16	15	14	23	25	19	18	20	18	15	11	55	13	8	10	13	19	55	
18-Mar	15	12	15	12	37	32	41	36	36	31	47	51	23	18	18	18	20	19	18	20	19	19	19	18	51	
19-Mar	18	14	15	11	10	21	54	61	25	24	26	22	28	24	30	24	19	19	14	8	10	15	14	12	61	
20-Mar	8	12	17	14	17	15	15	16	20	29	35	58	36	52	36	23	21	22	17	15	12	14	14	16	58	
21-Mar	14	8	12	13	14	12	12	14	19	22	26	26	51	25	20	21	21	18	17	19	9	22	18	25	51	
22-Mar	9	8	6	14	12	11	12	16	21	23	31	30	27	19	20	15	16	17	58	13	15	15	15	54	58	
23-Mar	14	46	55	25	17	22	50	25	23	18	21	64	34	19	18	19	35	20	17	17	17	17	17	16	64	
24-Mar	16	15	17	16	18	28	18	16	27	30	31	30	89	65	46	42	26	22	12	34	16	16	9	13	89	
25-Mar	7	17	10	9	7	19	10	26	26	22	22	25	20	55	30	34	37	25	25	5	58	27	9	16	58	
26-Mar	37	36	21	37	88	16	30	53	27	27	31	30	29	31	19	29	24	21	13	20	19	15	17	28	88	
27-Mar	19	16	12	21	15	10	12	13	14	22	23	22	18	20	16	15	12	13	35	36	16	36	29	12	36	
28-Mar	14	19	82	91	27	17	16	25	25	21	20	17	16	16	16	16	16	17	17	17	15	15	15	13	91	
29-Mar	12	11	11	13	14	28	21	14	23	51	53	47	85	28	33	32	31	14	11	63	34	32	33	38	85	
30-Mar	58	45	24	51	22	8	67	32	28	59	41	29	22	30	33	23	26	19	38	65	61	28	53	46	67	
31-Mar	77	18	75	12	15	14	89	69	45	38	103	36	43	24	17	17	20	16	16	17	17	17	19	19	103	
Diurnal Maximum																										
77 50 82 91 88 84 89 96 62 59 103 74 89 65 48 68 37 29 58 73 61 101 81 54																										

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
CNRL Horizon - March 2015





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Name	CNRL	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	14:15
Barometric Pressure	745 mmHg	Station temp.	20 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Cal Gas Concentration	50.3 ppm	Cal Gas Expiry Date	11/6/2014
Gas Cert Reference	LL107945		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
DACS voltage range	ethernet connection	DACS channel #	192.168.1.43

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-622	-622
Analyzer Range (mv)	1000	1000	Lamp voltage	845	845
Calculated slope	1.005666	0.998903	Chamber temp.	45.1	45.3
Calculated intercept	0.339146	1.118328	Pressure (mmHg)	723.7	709.7
Analyzer Background	17.5	17.6	Flow (lpm)	0.437	0.428
Analyzer Coefficient	0.933	0.943	Intensity	91	91

Analyzer make 43i Analyzer serial # 10710321322

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	NA
as found span	5000	82.3	827.9	818.4	1.012
calibrator zero	5000	0.0	0.0	-0.5	NA
high point	5000	82.3	827.9	827.7	1.000
second point	5000	41.2	414.5	414.4	1.000
third point	5000	20.6	207.2	205.1	1.010
calibrator zero	5000	0.0	0.0		NA
as left zero	5000	0.0	0.0	-0.1	NA
as left span	5000	82.3	827.9	830.1	0.997
Average Correction Factor					1.004

Corrected As found 819.0 Previous response 822.9 % change 0.5%

Notes:

Span adjusted. As Found Zero used as Calibrator Zero. Filter changed during As Lefts

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

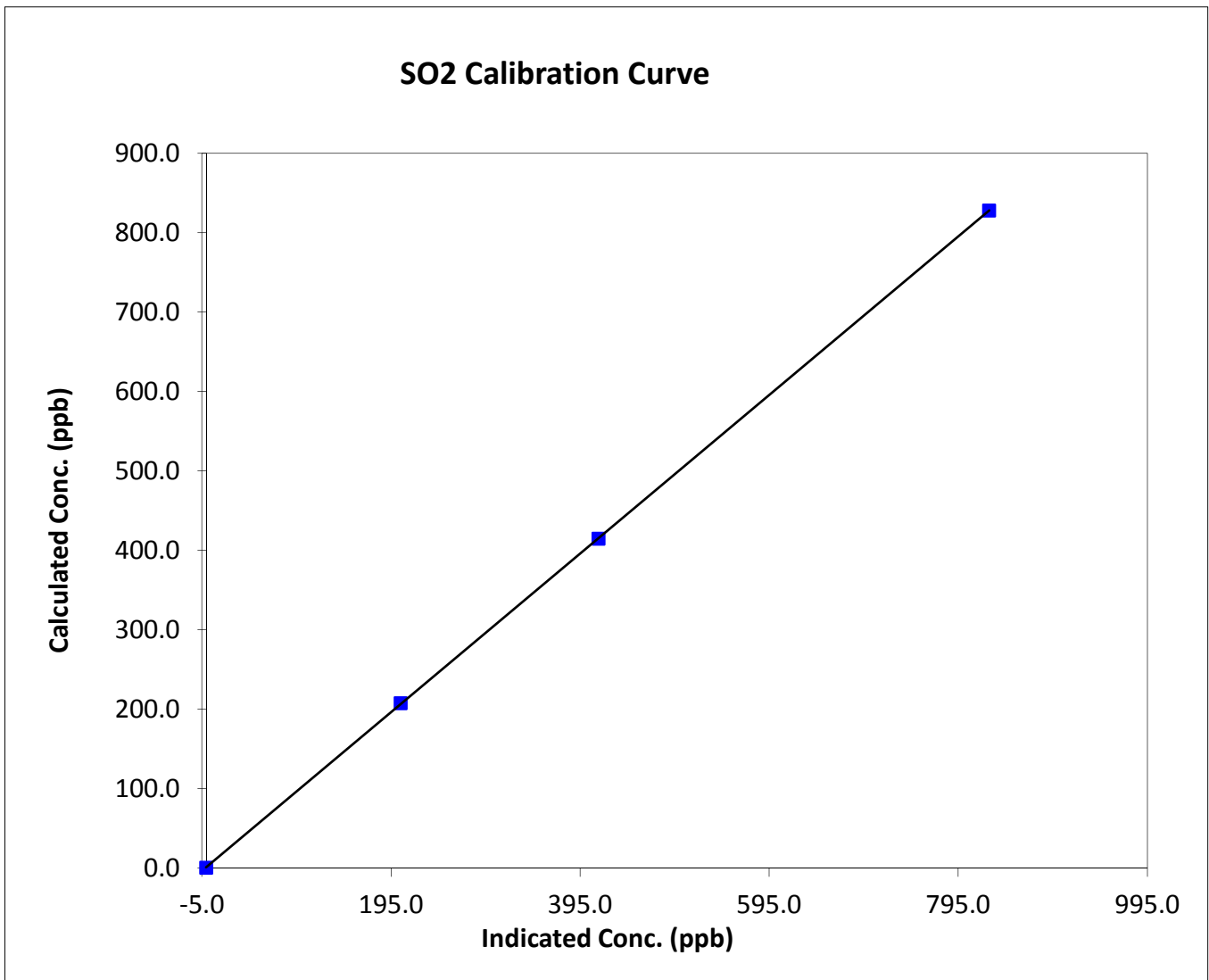
SO₂ Calibration Summary

Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Name	CNRL	Station Number	AMS 15
Start Time (MST)	9:50	End Time (MST)	14:15
Analyzer make	43i	Analyzer serial #	10710321322

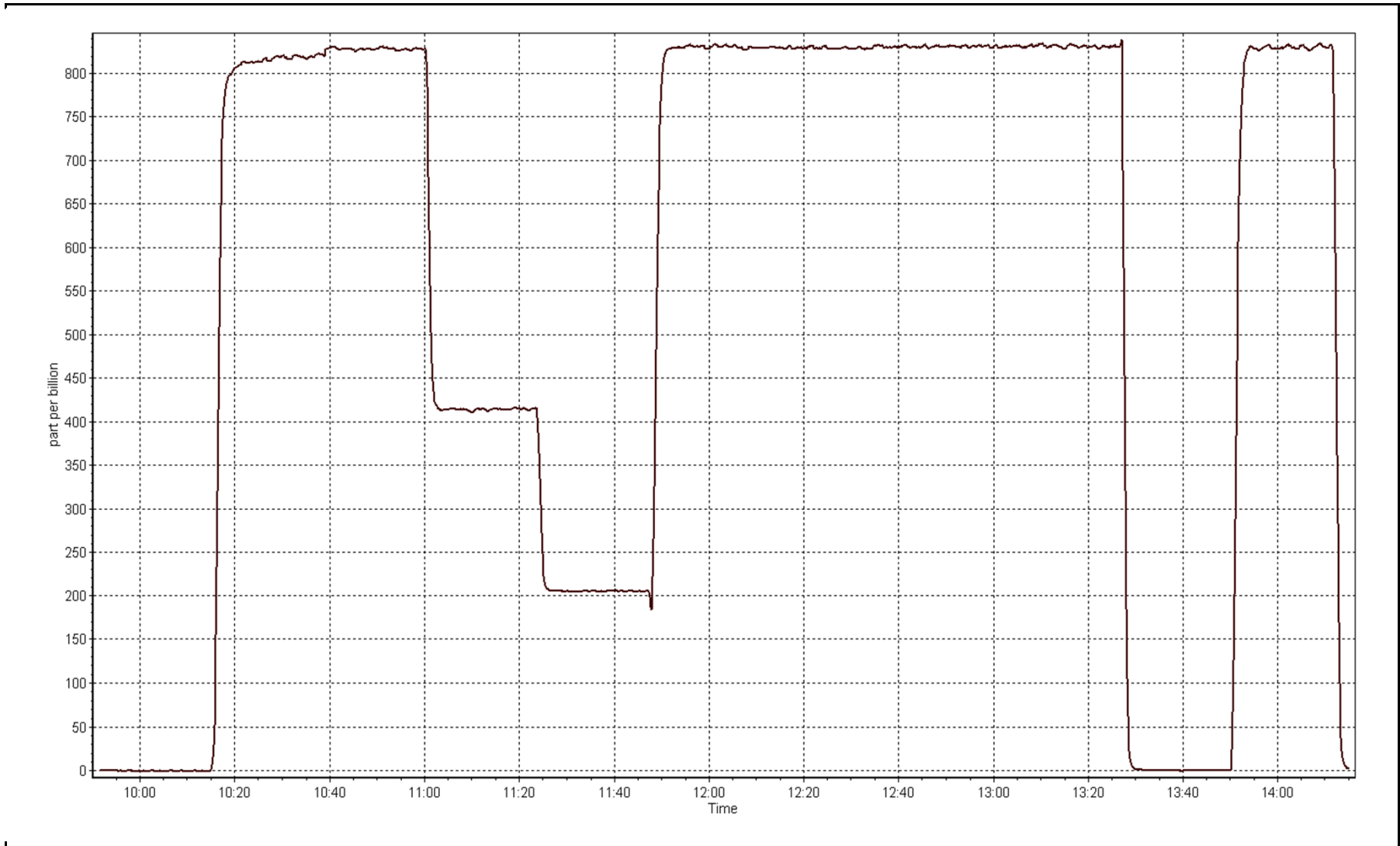
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999994
827.9	827.7	1.0003		
414.5	414.4	1.0001	Slope	0.998903
207.2	205.1	1.0102		
			Intercept	1.118328



SO2 Calibration Plot

Date: March 25, 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 24, 2015	Previous Calibration	February 10, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:41	End Time (MST)	13:22
Barometric Pressure	n/a mmHg	Station temp.	25 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	LL155297
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5-30-2013
Gas Cert Reference	cc257967	SO2 gas conc.	50.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
DACS voltage range	Ethernet connection	DACS channel #	192.168.1.44

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-672	-672
Analyzer Range (input)	100	100	Lamp voltage	770	766
Calculated slope	1.005657	1.007428	Chamber temp.	45	45
Calculated intercept	0.058943	0.021579	Pressure	702.0	690.9
Analyzer Background	8.8	8.9	Flow	0.426	0.419
Analyzer Coefficient	0.889	0.889	Intensity	90	90
			Converter temp.	809	809

Analyzer make/model	TEI 431	Analyzer serial #	0710321323
Converter make/model	NOVA model CDN101	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	NA
as found span	5000	38.5	80.1	79.5	1.007
SO2 scrubber check	5000	20.6	207.2	0.7	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	38.5	80.0	79.5	1.007
second point	5000	19.2	40.0	39.5	1.011
third point	6000	11.5	20.0	19.7	1.013
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	38.5	80.1	79.4	1.009
Average Correction Factor					1.010

Corrected As found	79.4	Previous response	79.6	% change	0.2%
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Notes:

No adjustments. As Found used as Calibrator Zero and High Point. Scrubber check performed after third point.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

TRS Calibration Summary

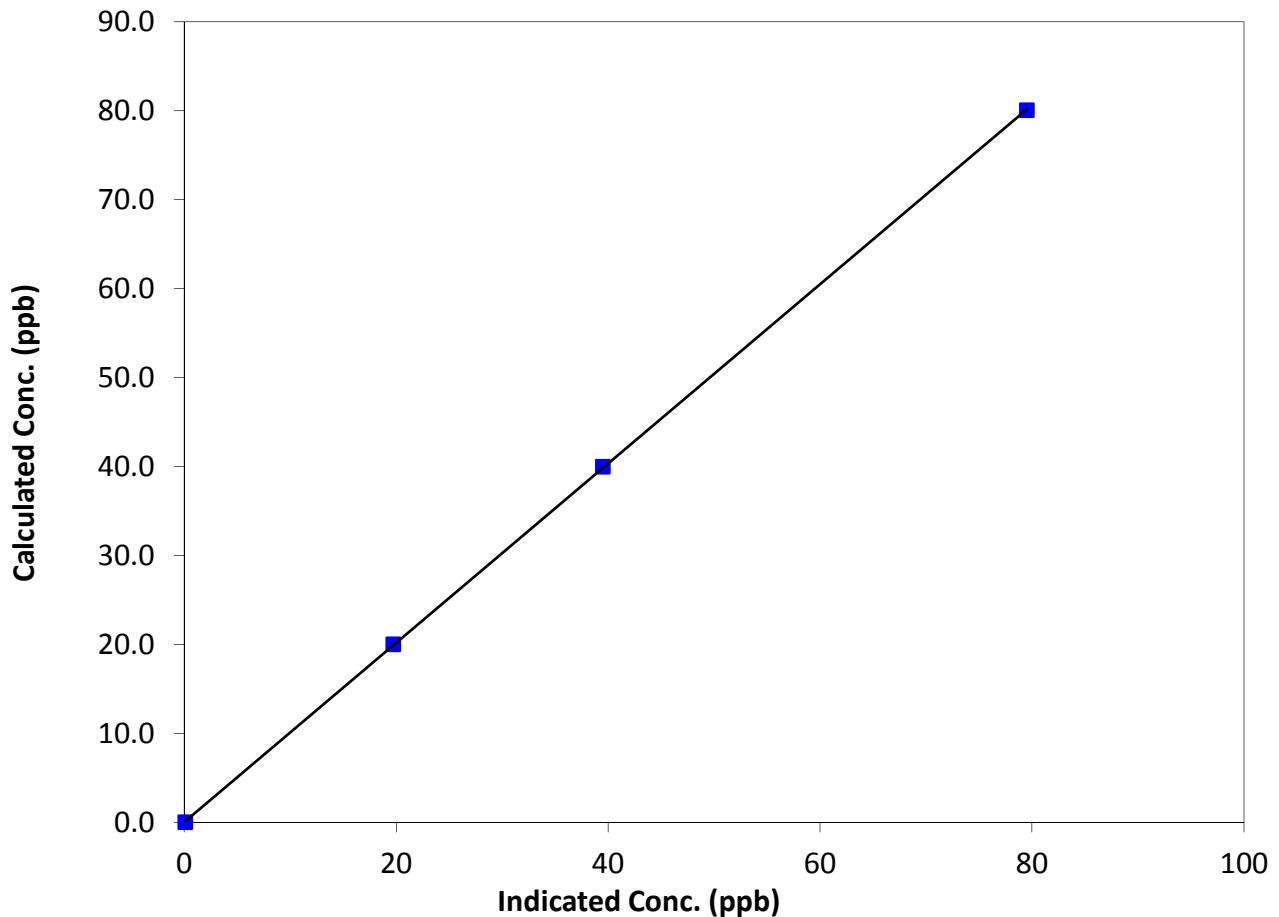
Station Information

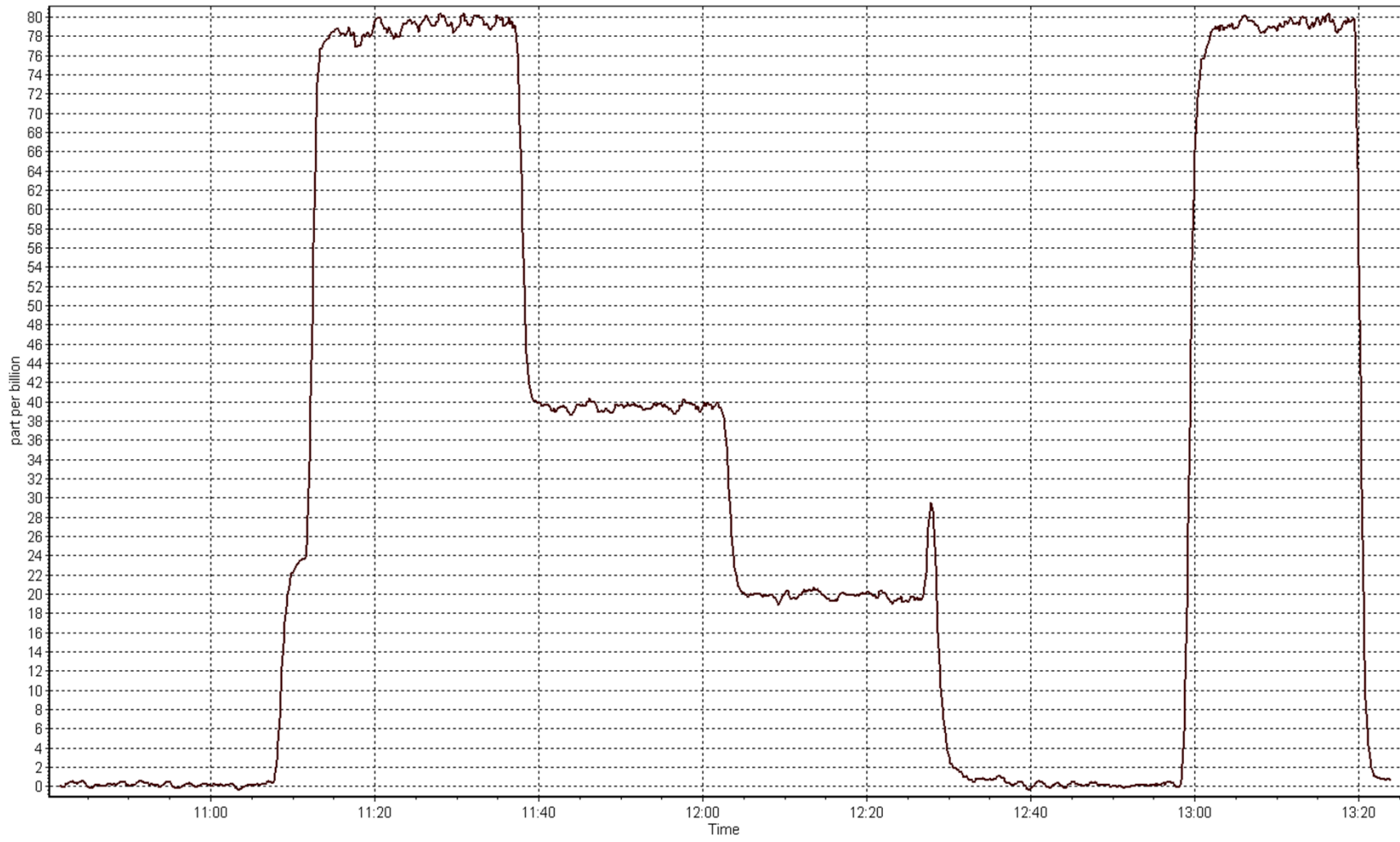
Calibration Date	March 24, 2015	Previous Calibration	February 10, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:41	End Time (MST)	13:22
Analyzer make	TEI 43I	Analyzer serial #	0710321323

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999986
80.0	79.5	1.0066		
40.0	39.5	1.0111	Slope	1.007428
20.0	19.7	1.0133		
			Intercept	0.021579

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	14:13
Barometric Pressure	745 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Gas Cert Reference	LL107945	Cal Gas Expiry Date	11/6/2014
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1062.0 ppm
C3H8 Cal Gas Conc.	208 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
DACS voltage range	ethernet connection	DACS channel #	192.168.1.51

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.7	8.7
Analyzer Range (mv)	25	25	Air or Bypass press	37.3	38.0
Calculated slope	0.987201	0.988361	Fuel Pressure	26.3	26.3
Calculated intercept	-0.070671	0.122866			
Bkg	NA	0.2			
Coef	NA	3.258			

Analyzer make Thermo 51i 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	-0.12	N/A
as found span	5000	82.3	17.48	17.04	1.026
calibrator zero	5000	0.0	0.00	-0.12	N/A
high point	5000	82.3	17.48	17.56	0.995
second point	5000	41.2	8.75	8.74	1.001
third point	5000	20.6	4.38	4.29	1.020
calibrator zero					
as left zero	5000	0.0	0.00	-0.12	N/A
as left span	5000	82.3	17.48	17.64	0.991
Average Correction Factor					1.006

Corrected As found 17.16 Previous response 17.78 % change 3.6%

Notes:

Span adjusted. As Found Zero used as Calibrator Zero.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

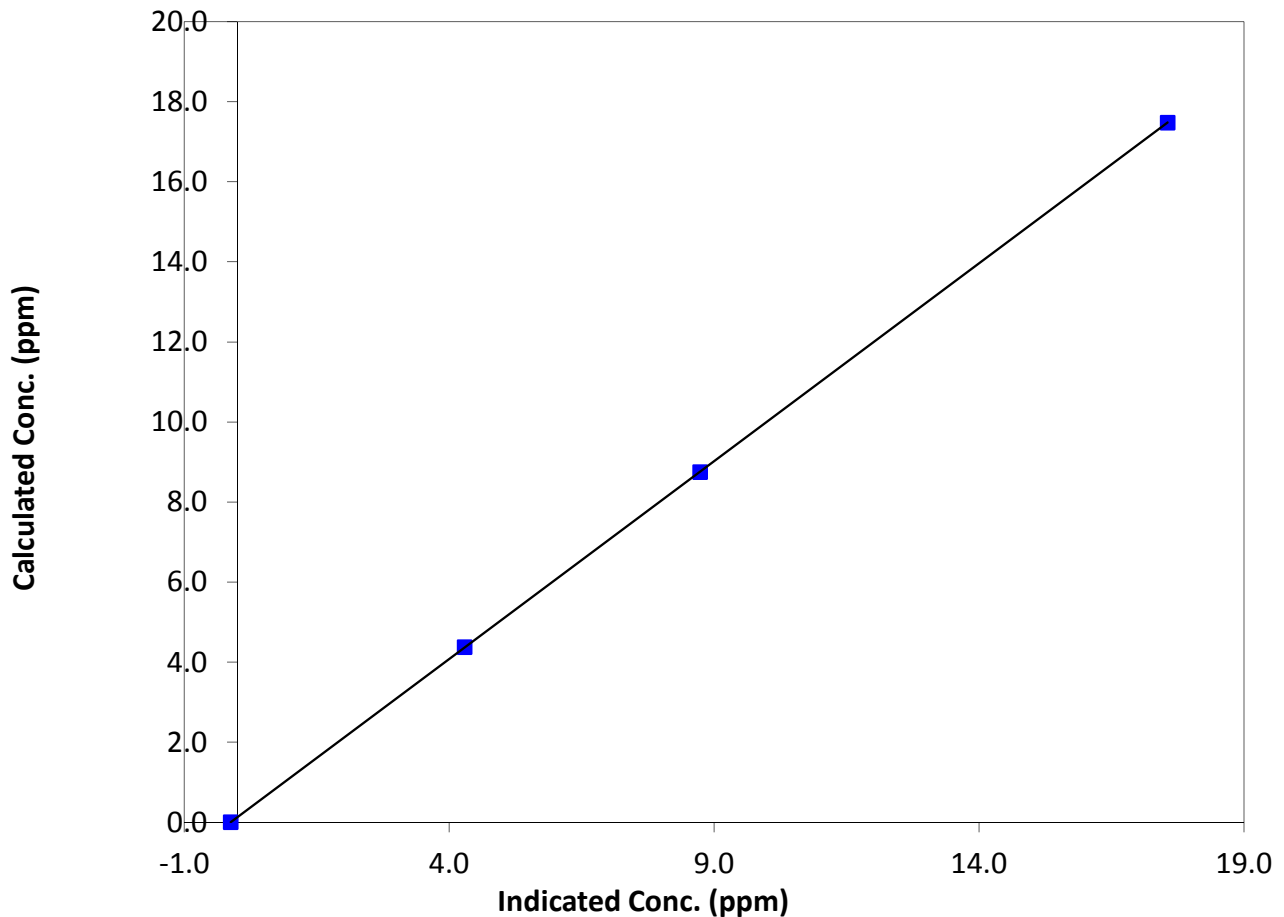
Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:50	End Time (MST)	14:13
Analyzer make	Thermo 51i	Analyzer serial #	1327059295

Calibration Data

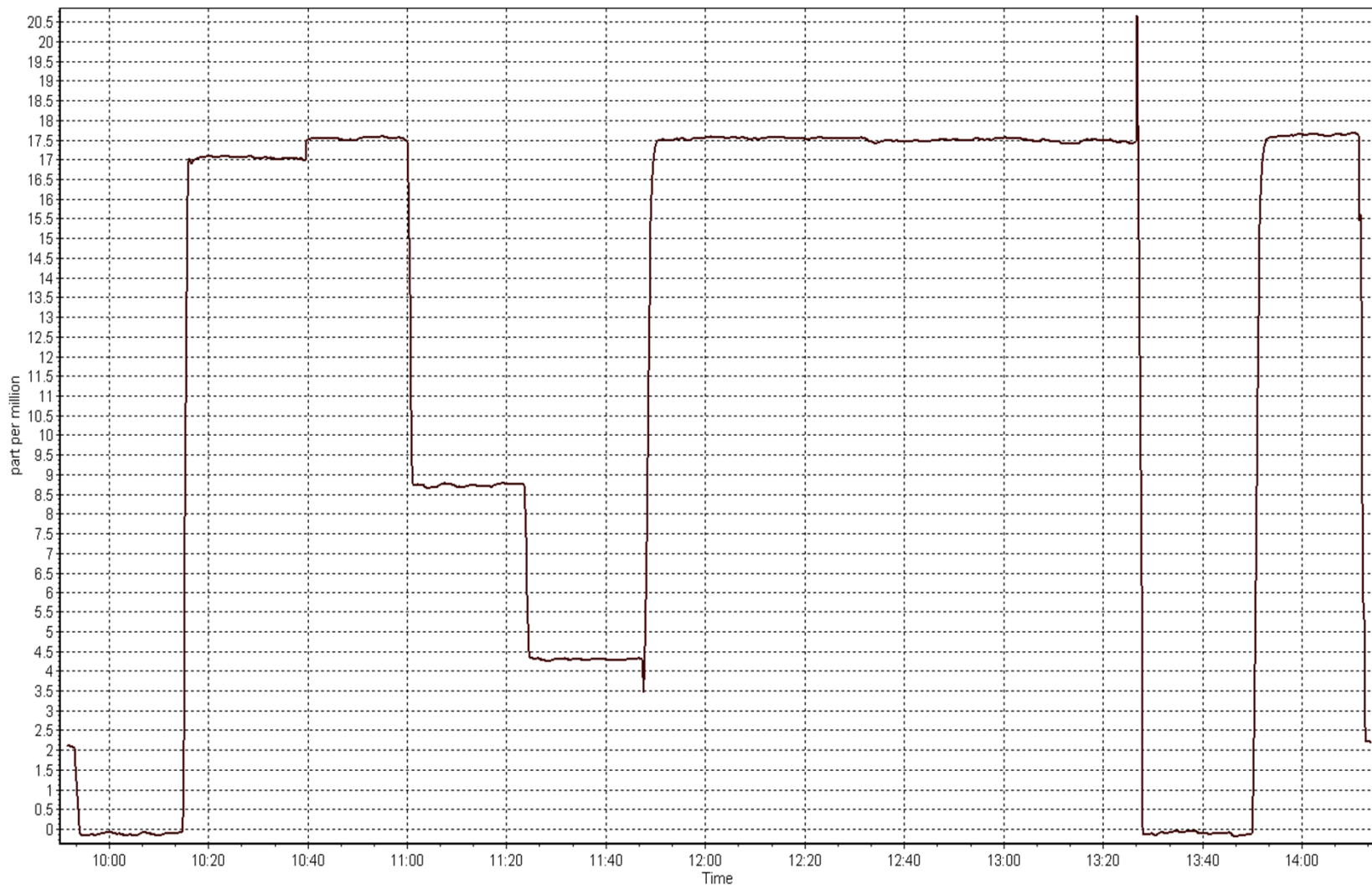
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.12	N/A	Correlation Coefficient	0.999998
17.48	17.56	0.9955		
8.75	8.74	1.0012	Slope	0.988361
4.38	4.29	1.0199		
			Intercept	0.122866

THC Calibration Curve



THC Calibration Plot

Date: March 25, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:50	End Time (MST)	14:15
Barometric Pressure	745 mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	10880507
NO Cal Gas Conc	48.6 ppm	Cal Gas Expiry Date	November 6, 2014
NO _x Cal Gas Conc	48.6 ppm	Cal Gas Serial #	LL107945

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.983395	0.983646	0.990558
	Data Offset	0.782557	0.730198	-0.480559
After	Data Slope	0.999350	1.001452	0.991875
	Data Offset	0.332939	0.395866	-1.126356
Channel #		ethernet connection		
IP address		192.168.1.42		

Analyzer Information

Analyzer make/model	42i	Analyzer serial #	710321429
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.798	ppb	0.795	ppb
NO _x coefficient	1.003	ppb	1.003	ppb
NO ₂ coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	9.5		9.5	
NO _x bkgrnd	9.9		9.8	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	325.0	Deg C	325.5	Deg C
PMT Temp	-3.0	Deg C	-2.7	Deg C
O ₃ flow	ok	ccm	ok	ccm
R Cell Press	168.6	mmHg	166.5	mmHg
Sample Flow	0.734	ccm	0.727	ccm

Notes:

Span adjusted. As Found Zero used as Calibrator zero. Filter changed after GPT



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 25, 2015

Station Number:

AMS 15

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1	N/A	N/A
as found span	5000	82.3	800.0	800.0	0.0	805.0	803.0	2.1	0.9937	0.9963
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1	N/A	N/A
high point	5000	82.3	800.0	800.0	0.0	800.1	798.4	1.7	0.9999	1.0020
second point	5000	41.2	400.5	400.5	0.0	401.2	400.3	1.0	0.9982	1.0005
third point	5000	20.6	200.2	200.2	0.0	198.8	198.1	0.7	1.0074	1.0107
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	11.8	11.6	0.2	N/A	N/A
as left span	5000	82.3	800.0	405.5	394.4	796.3	404.6	391.6	1.0046	1.0022
Average Correction Factor									1.0018	1.0044

Corrected As found

NO_x= 804.8

NO= 802.7

Percent Change

NO_x= 1.0%

NO= 1.2%

Previous Response

NO_x= 812.7

NO= 812.5

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

82.30

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (300)	N/A	405.5	390.1	798.9	405.5	393.4	0.9851	1.0000	0.9917	100.8%
2nd NO ₂ (200)	N/A	532.1	263.6	799.7	532.1	267.6	0.9842	1.0000	0.9849	101.5%
3rd NO ₂ (100)	N/A	659.7	135.9	799.4	659.7	139.7	0.9845	1.0000	0.9729	102.8%
4th NO ₂ (0)	795.6	N/A	3.2	798.8	795.6	3.2	0.9852	1.0000	N/A	N/A
Average Correction Factor							0.9847	1.0000	0.9832	101.7%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

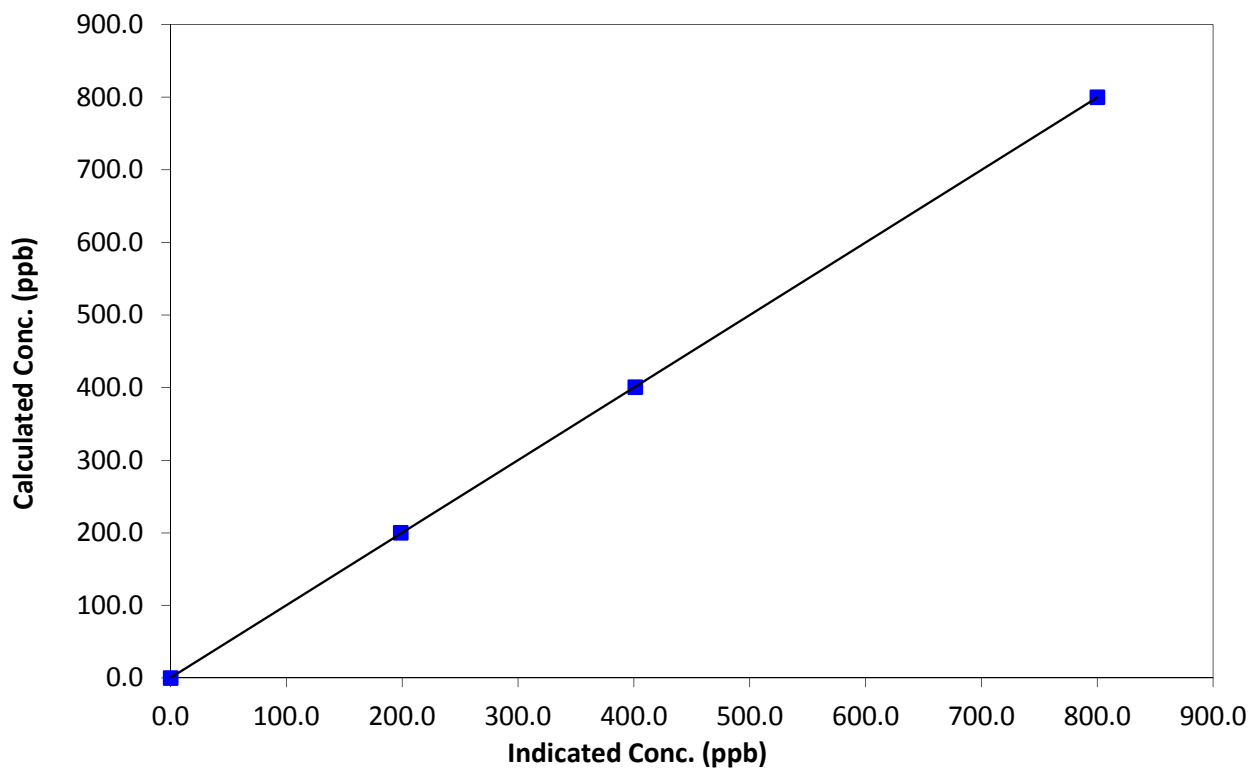
Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:50	End Time (MST)	14:15
Analyzer make	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	0.999993
800.0	800.1	0.9999		
400.5	401.2	0.9982	Slope	0.999350
200.2	198.8	1.0074		
			Intercept	0.332939

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

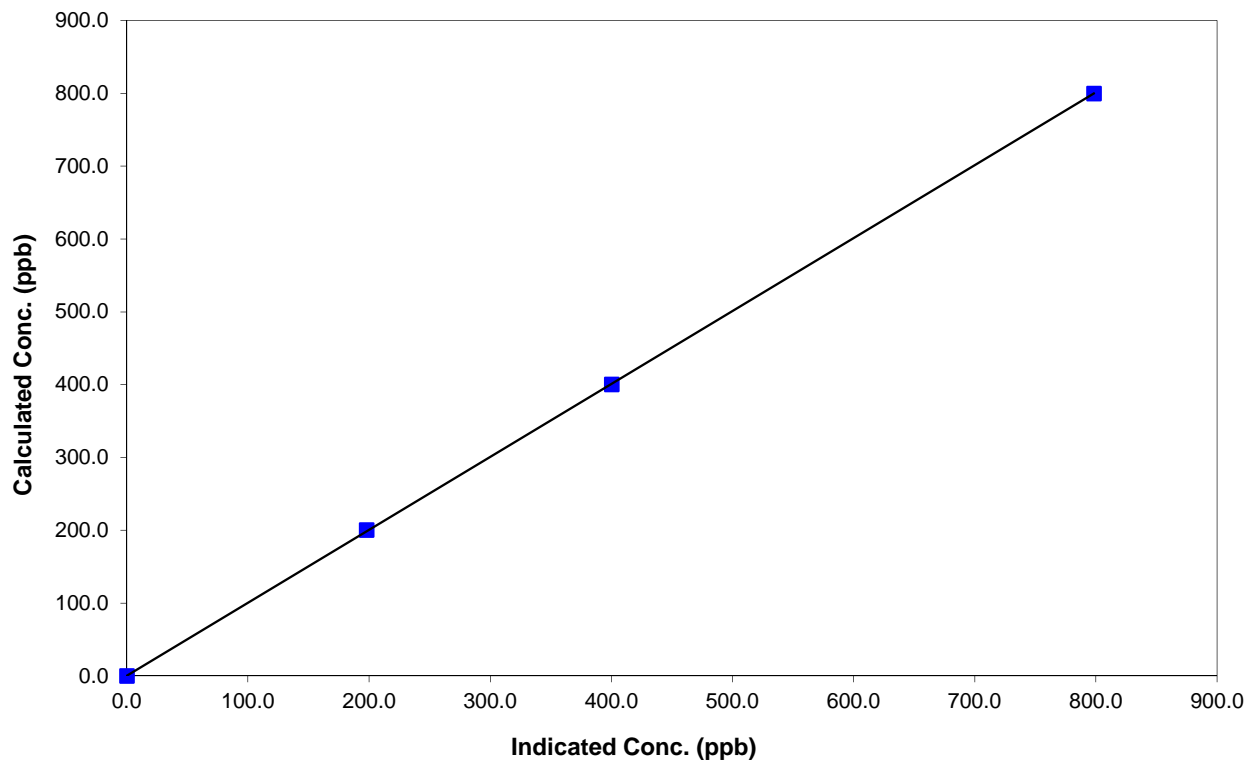
Station Information

Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:50	End Time (MST)	14:15
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999991
800.0	798.4	1.0020		
400.5	400.3	1.0005	Slope	1.001452
200.2	198.1	1.0107		
			Intercept	0.395866

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

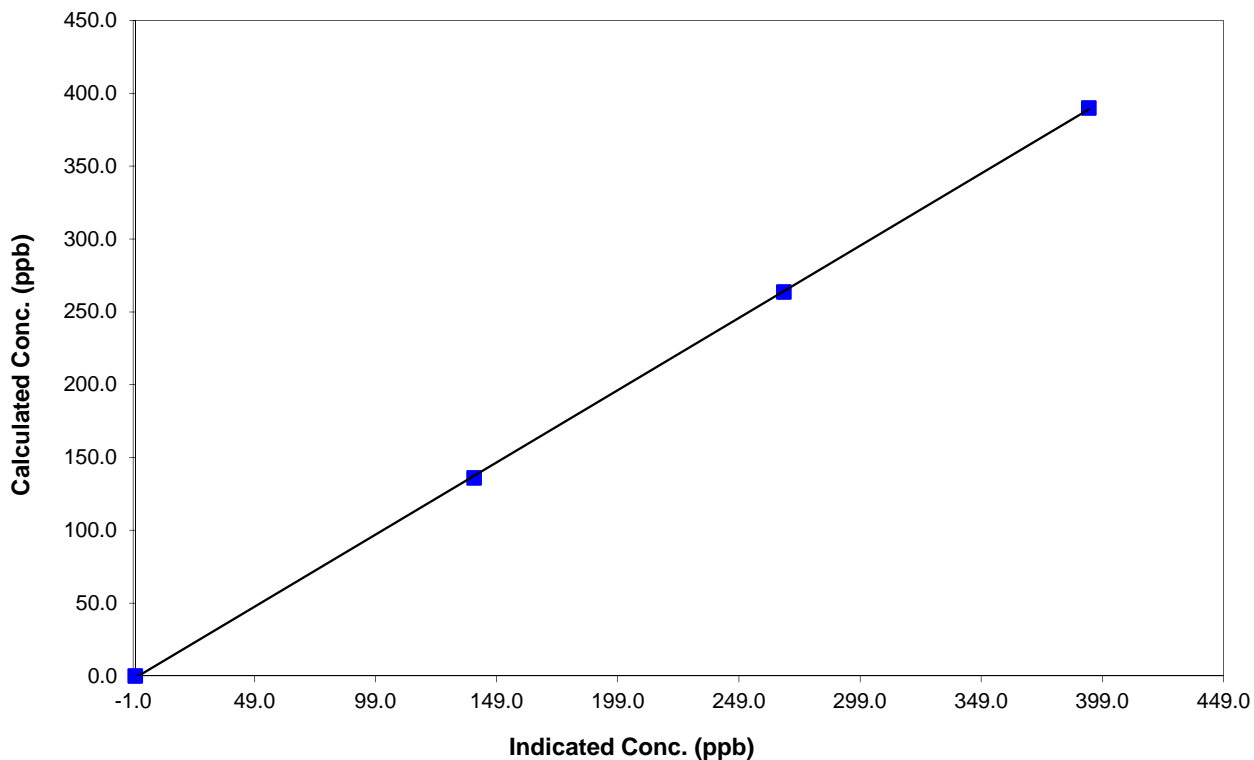
Station Information

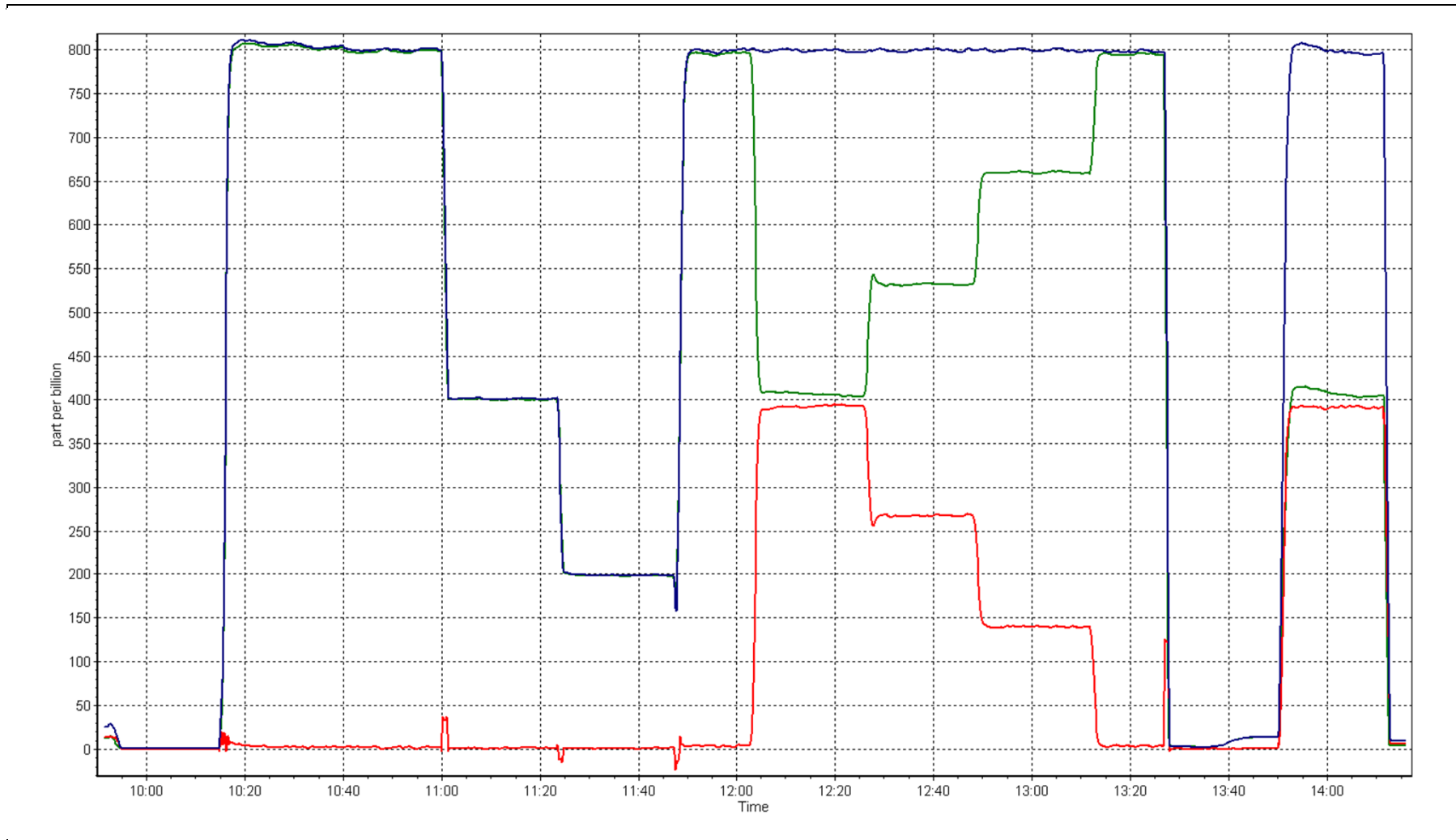
Calibration Date	March 25, 2015	Previous Calibration	February 11, 2015
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:50	End Time (MST)	14:15
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999936
390.1	393.4	0.9917		
263.6	267.6	0.9849	Slope	0.991875
135.9	139.7	0.9729		
			Intercept	-1.126356

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 16
SHELL MUSKEG RIVER
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospherics Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	23	0	7	0
THC (ppm) Average	707	37	37	100.00	6.5	-	3.1	-
NO2 (ppb) Average	707	37	37	100.00	54	0	25	-
NO (ppb) Average	707	37	37	100.00	206	-	33	-
NOX (ppb) Average	707	37	37	100.00	250	-	59	-
PM2.5 (ug/m3) Average	742	0	2	99.73	37.3	-	11.9	0
Temperature 2 m (C) Average	744	0	0	100.00	15.6	-	5.5	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	88	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.4	-	29.3	-
Wind Speed 10 m (km/h) Average	707	0	37	95.03	28	-	18	-
Wind Direction 10 m (deg) Average	707	0	37	95.03	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.4	3	-	0	0	0	0	1	4	23
THC (ppm) Average	707	2.57	0.5	-	2	2.2	2.3	2.4	2.7	3	6.5
NO2 (ppb) Average	707	14.3	9	-	0	3	7	13	19	27	54
NO (ppb) Average	707	9.4	18	-	0	0	0	4	11	20	206
NOX (ppb) Average	707	23.7	25	-	0	4	9	18	30	44	250
PM2.5 (ug/m3) Average	742	5.79	4.4	-	0.3	1.8	2.8	4.7	7.7	11	37.3
Temperature 2 m (C) Average	744	-4.91	8.6	-	-32.3	-15.8	-10.2	-4.4	1.3	5.4	15.6
Relative Humidity (%) Average	744	69.7	17	-	26	45	56	72	84	91	99
Barometric Pressure (inHg) Average	744	28.9	0.3	-	28	28.5	28.7	28.9	29.1	29.2	29.4
Wind Speed 10 m (km/h) Average	707	9.5	6	-	0	3	5	8	13	18	28
Wind Direction 10 m (deg) Average	707	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	17 Mar 2015 13:00	17 Mar 2015 14:00	2	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	15 Mar 2015 01:00	16 Mar 2015 13:00	37	Flat line in sensor output signal -sensor frozen

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on Mar 1 12:00	Maximum Daily Average: 6.9 ppb on Mar 4		Hours of Data:	708
Minimum Value: 0 ppb on Mar 1 02:00	Minimum Daily Average: 0.1 ppb on Mar 11		Hours of Missing Data:	36
Maximum Diurnal Average: 4.0 ppb at hour 15	Minimum Diurnal Average: 0.3 ppb at hour 7		Hours of Calibration:	36
Monthly Average: 1.4 ppb	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =4 P ₉₉ =18		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	0	0	0	0	0	5	12	17	23	23	14	15	9	2	1	2	3	4	3	1	1	5.9	23
2-Mar	0	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-Mar	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
4-Mar	0	0	0	Z	1	2	1	5	6	12	21	19	15	13	23	15	9	3	2	1	2	3	2	2	6.9	23
5-Mar	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	2	5	2	2	2	2	1	1	1.0	5
6-Mar	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
7-Mar	Z	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-Mar	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0.4	1
10-Mar	0	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
11-Mar	0	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-Mar	0	0	0	0	0	Z	0	0	0	1	4	2	1	2	3	3	3	1	1	0	1	0	1	1	1.0	4
13-Mar	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	6	4	2	2	6	6	6	6	4	2.0	6
14-Mar	4	Z	3	2	3	2	1	1	1	3	7	5	4	9	18	13	12	5	3	2	1	1	1	0	4.4	18
15-Mar	1	1	Z	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	1	1	1	0.7	2
16-Mar	0	1	0	Z	0	0	0	0	0	0	1	1	2	4	3	2	1	1	0	0	0	0	0	0	0.9	4
17-Mar	0	0	0	0	Z	0	0	0	1	C	C	C	C	C	13	7	10	8	5	5	4	3	2	1	3.4	13
18-Mar	1	1	1	1	0	Z	1	1	1	3	3	4	8	5	5	5	2	1	1	1	1	0	1	0	1.9	8
19-Mar	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0.3	1
21-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
22-Mar	0	0	0	Z	0	0	0	0	1	3	5	2	3	2	2	1	4	6	4	4	2	2	2	1	2.0	6
23-Mar	1	1	0	0	Z	0	0	0	1	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0.5	2
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Mar	Z	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
26-Mar	0	Z	0	0	0	0	0	0	0	0	1	23	18	16	11	3	1	1	1	1	0	0	0	0	3.3	23
27-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	3	4	11	6	2	1	1	0	0	0	0	0	1.4	11
28-Mar	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0.4	2
29-Mar	0	0	0	0	Z	0	0	0	2	10	9	9	20	13	7	5	6	4	5	4	3	2	2	1	4.5	20
30-Mar	1	1	0	0	0	Z	0	0	0	1	1	1	1	0	2	0	0	0	0	1	1	1	1	0	0.6	2
31-Mar	Z	0	0	0	0	0	0	0	0	0	3	6	12	8	2	1	0	0	0	0	0	0	0	0	1.6	12

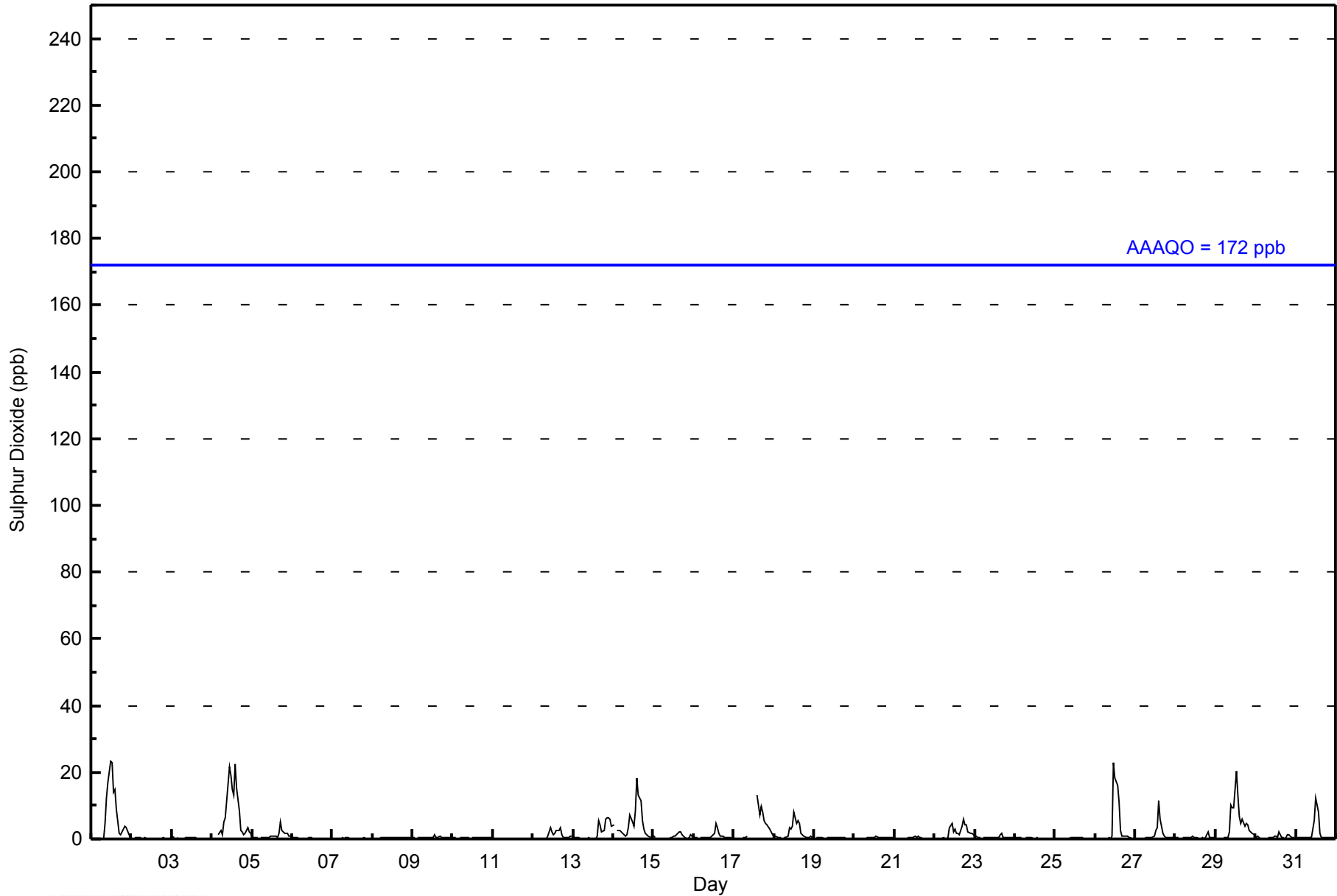
0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.7	1.8	2.6	3.4	3.9	3.2	4.0	2.7	2.1	1.4	1.1	1.1	1.0	0.9	0.8	0.5	Diurnal Average
4	1	3	2	3	2	1	5	6	12	21	23	23	16	23	15	12	8	5	6	6	6	6	6	4	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	683	96.47	96.47
11 - 20	20	2.82	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: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - March 2015

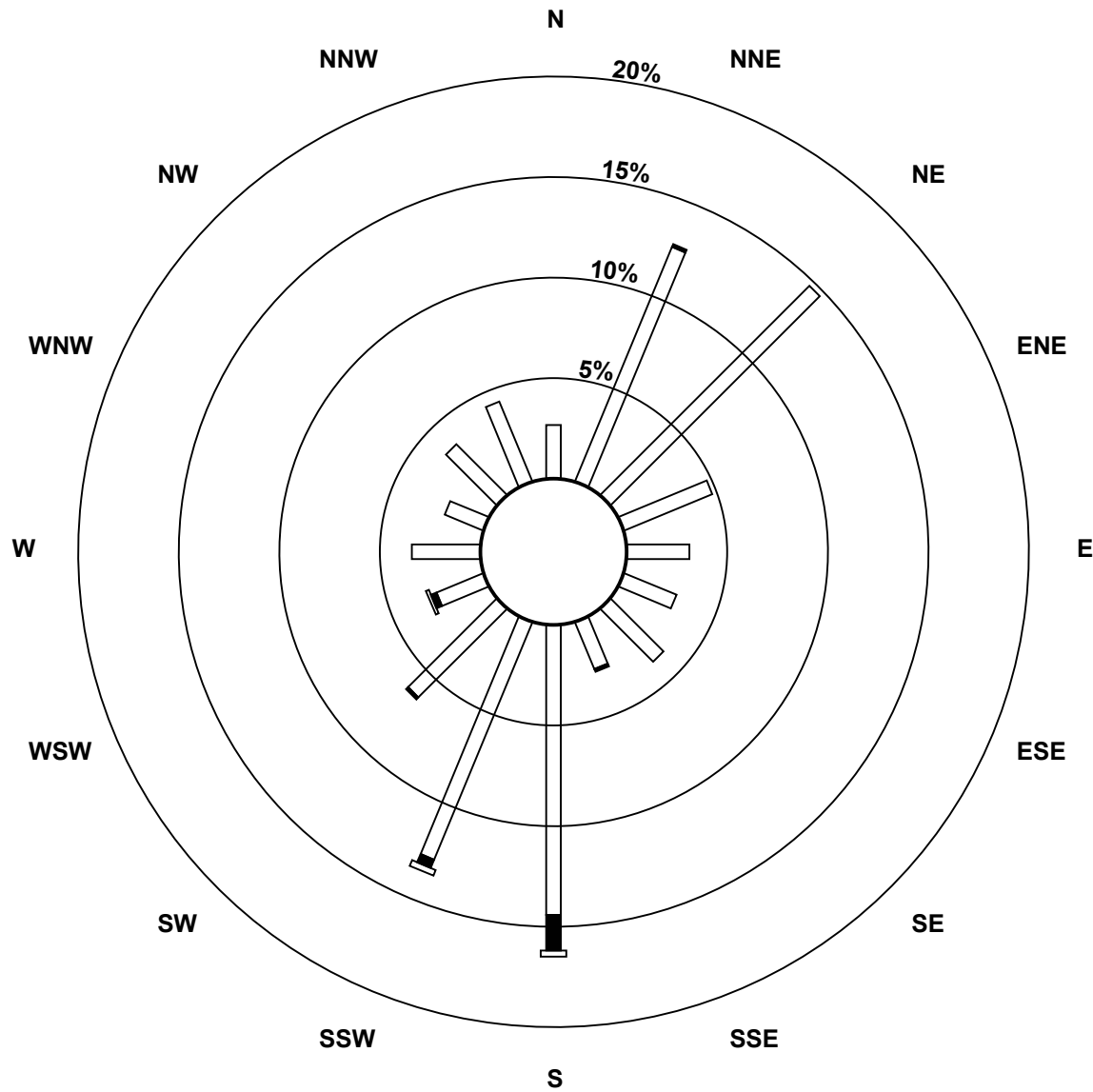
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	18	85	99	32	21	19	25	17	97	86	42	17	23	14	24	29	648
11 - 20	0	1	0	0	0	0	0	1	12	3	1	2	0	0	0	0	20
21 - 60	0	0	0	0	0	0	0	0	2	2	0	1	0	0	0	0	5
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	18	86	99	32	21	19	25	18	111	91	43	20	23	14	24	29	673

Total Number of Valid Hours: 673

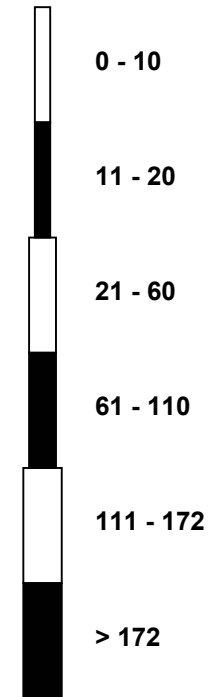
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)**



Classes (ppb)

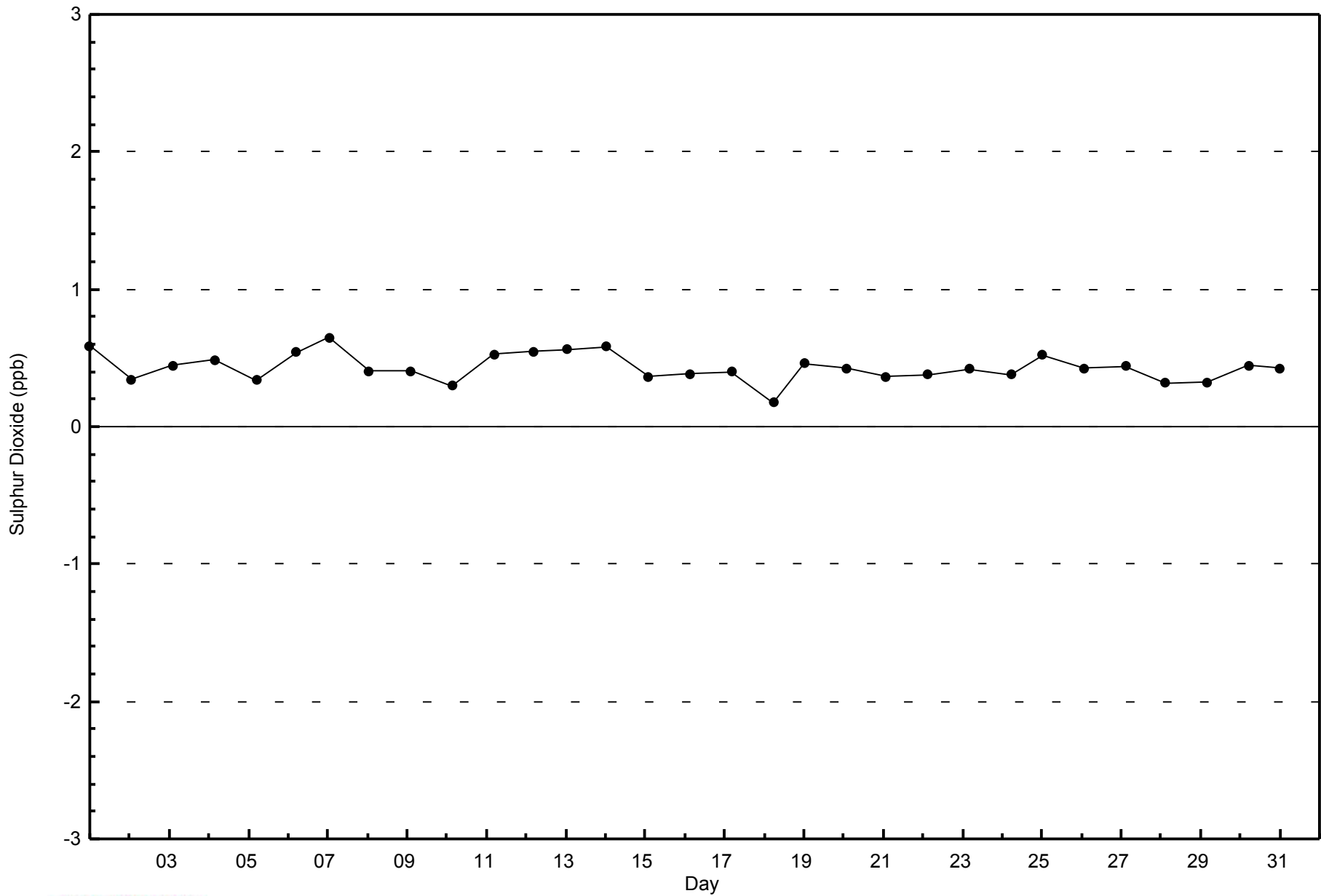


Total Number of Valid Hours: 673



WBEA
Zero Responses

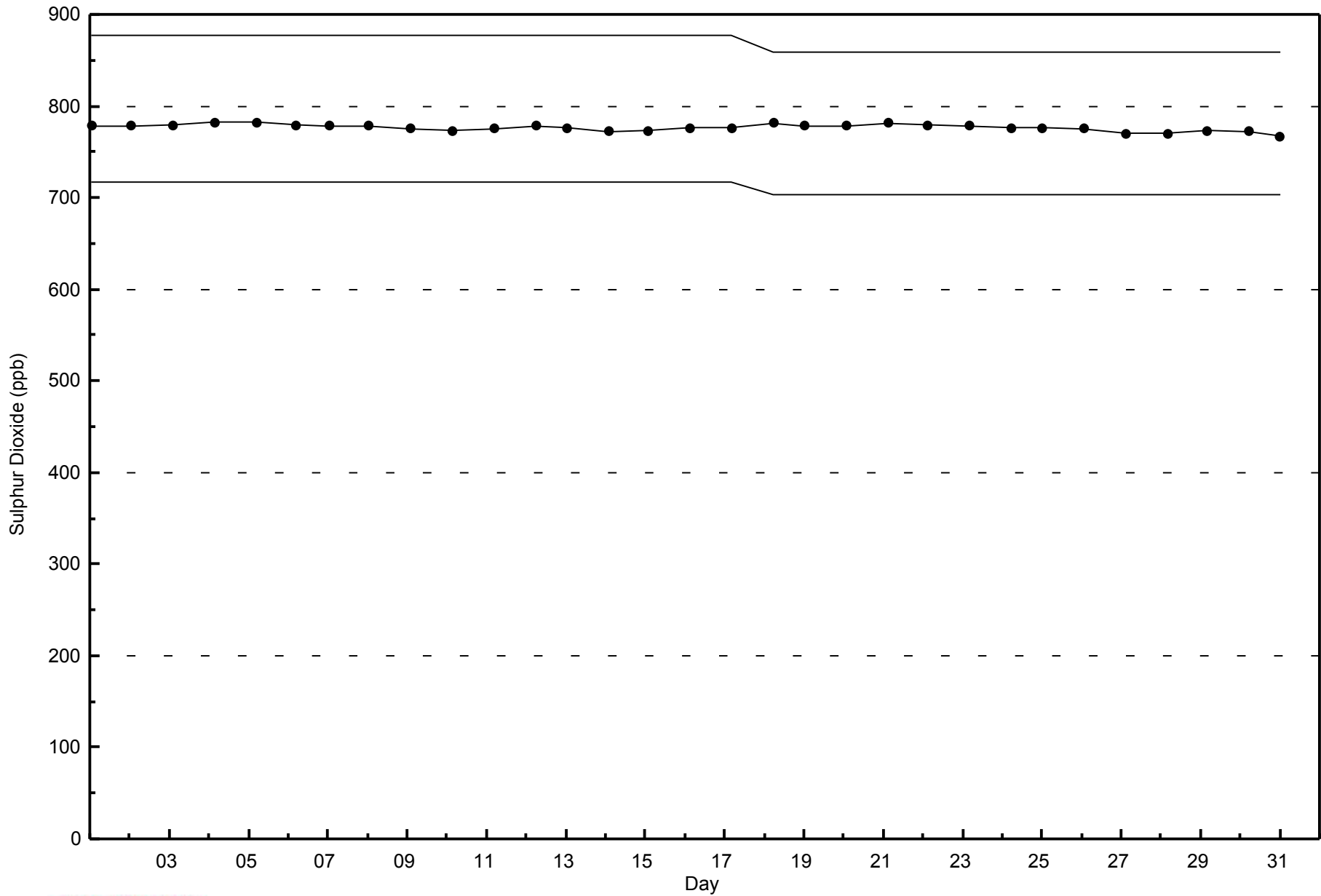
Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - March 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

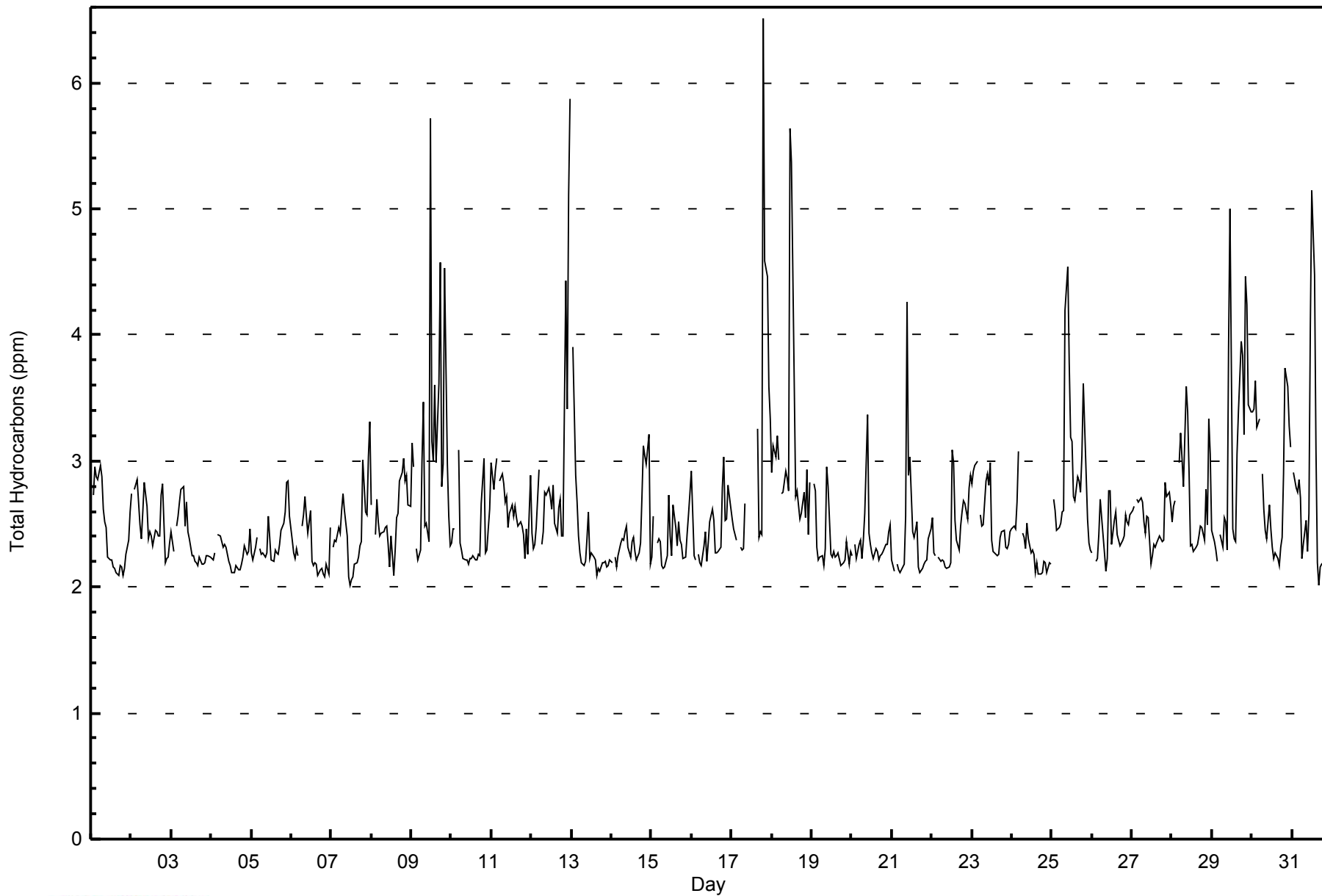
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2015

Maximum Value: 6.5 ppm on Mar 17 20:00																	Maximum Daily Average: 3.1 ppm on Mar 9																	Hours in Service: 744	
Minimum Value: 2.0 ppm on Mar 7 12:00																	Minimum Daily Average: 2.3 ppm on Mar 4																	Hours of Data: 707	
Maximum Diurnal Average: 2.8 ppm at hour 12																	Minimum Diurnal Average: 2.4 ppm at hour 17																	Hours of Missing Data: 37	
Monthly Average: 2.57 ppm																	Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.4 Q ₃ = 2.7 P ₉₀ = 3.0 P ₉₉ = 5.1																	Hours of Calibration: 37	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	2.7	3.0	2.9	2.9	3.0	2.9	2.6	2.5	2.5	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.3	2.4	2.6	2.4	3.0									
2-Mar	2.7	Z	2.8	2.9	2.7	2.5	2.4	2.6	2.8	2.6	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.7	2.8	2.2	2.2	2.2	2.3	2.5	2.9									
3-Mar	2.4	2.3	Z	2.5	2.6	2.7	2.8	2.8	2.5	2.7	2.4	2.4	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.8									
4-Mar	2.2	2.2	2.3	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.5	2.3	2.5									
5-Mar	2.3	2.2	2.3	2.4	Z	2.3	2.3	2.3	2.2	2.3	2.6	2.4	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.5	2.6	2.8	2.8	2.6	2.4	2.8									
6-Mar	2.4	2.3	2.2	2.3	2.3	Z	2.5	2.6	2.7	2.6	2.4	2.6	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.5	2.3	2.7									
7-Mar	Z	2.3	2.4	2.4	2.5	2.4	2.6	2.7	2.6	2.4	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.4	3.0	2.6	2.6	3.0	3.3	2.5	3.3									
8-Mar	2.7	Z	2.4	2.7	2.5	2.4	2.4	2.4	2.5	2.5	2.3	2.2	2.4	2.1	2.3	2.6	2.6	2.8	2.9	3.0	2.8	2.9	2.6	2.6	2.6	3.0									
9-Mar	3.1	3.0	Z	2.3	2.2	2.3	3.0	3.5	2.5	2.5	2.4	5.7	3.1	3.0	3.6	3.0	3.6	4.6	2.8	3.0	4.5	3.0	2.6	2.3	3.1	5.7									
10-Mar	2.3	2.5	2.5	Z	3.1	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.7	3.0	2.3	2.3	2.5	2.6	2.4	3.1									
11-Mar	3.0	2.8	2.9	3.0	Z	2.8	2.9	2.8	2.7	2.7	2.5	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.2	2.5	2.3	2.9	2.6	3.0									
12-Mar	2.4	2.3	2.3	2.5	2.9	Z	2.3	2.4	2.8	2.7	2.8	2.7	2.6	2.8	2.5	2.4	2.6	2.7	2.4	2.4	4.4	3.4	5.1	5.9	2.9	5.9									
13-Mar	Z	3.9	2.9	2.7	2.4	2.3	2.2	2.2	2.2	2.4	2.6	2.2	2.3	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.9									
14-Mar	2.2	Z	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.5	2.3	2.2	2.4	2.4	2.3	2.2	2.3	2.4	2.7	3.1	3.0	3.0	3.2	2.2	2.5	3.2									
15-Mar	2.2	2.6	Z	2.3	2.4	2.4	2.2	2.1	2.2	2.2	2.7	2.4	2.2	2.7	2.5	2.3	2.5	2.4	2.3	2.2	2.2	2.4	2.6	2.7	2.4	2.7									
16-Mar	2.9	2.3	2.2	Z	2.3	2.2	2.2	2.3	2.4	2.2	2.4	2.5	2.6	2.5	2.3	2.3	2.3	2.3	2.8	3.0	2.5	2.5	2.8	2.6	2.5	3.0									
17-Mar	2.5	2.5	2.4	2.4	Z	2.3	2.3	2.3	2.7	C	C	C	C	C	C	3.2	2.4	2.4	2.4	6.5	4.6	4.5	3.6	3.3	--	6.5									
18-Mar	2.9	3.1	3.0	3.2	3.0	Z	2.7	2.8	2.9	2.9	2.8	5.6	5.4	3.6	2.7	2.8	2.7	2.5	2.6	2.8	2.6	2.9	2.4	2.8	3.1	5.6									
19-Mar	Z	2.8	2.8	2.3	2.2	2.2	2.2	2.2	2.3	3.0	2.8	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.4	2.2	2.3	2.3	3.0									
20-Mar	2.2	Z	2.3	2.2	2.3	2.4	2.2	2.4	2.6	3.4	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.4	3.4									
21-Mar	2.2	2.1	Z	2.2	2.1	2.1	2.1	2.2	2.6	4.3	2.9	3.0	2.4	2.4	2.4	2.5	2.2	2.1	2.1	2.2	2.2	2.2	2.4	2.5	2.4	4.3									
22-Mar	2.5	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	3.1	3.0	2.5	2.4	2.3	2.5	2.6	2.7	2.7	2.5	2.8	2.9	2.5	3.1									
23-Mar	2.8	2.9	3.0	3.0	Z	2.6	2.5	2.5	2.8	2.9	2.8	3.0	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.3	2.3	2.3	2.4	2.6	3.0									
24-Mar	2.5	2.5	2.5	2.7	3.1	Z	2.4	2.4	2.3	2.5	2.4	2.3	2.3	2.3	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.3	3.1									
25-Mar	Z	2.7	2.6	2.5	2.5	2.5	2.6	2.6	4.2	4.5	3.8	3.2	3.2	2.7	2.7	2.9	2.8	2.7	3.0	3.6	2.9	2.5	2.3	2.3	2.9	4.5									
26-Mar	2.3	Z	2.2	2.2	2.4	2.7	2.5	2.3	2.1	2.2	2.8	2.8	2.3	2.5	2.6	2.4	2.4	2.3	2.4	2.4	2.6	2.5	2.5	2.6	2.4	2.8									
27-Mar	2.6	2.6	Z	2.7	2.7	2.7	2.7	2.5	2.4	2.6	2.6	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.8	2.7	2.8	2.7	2.5	2.8									
28-Mar	2.5	2.6	2.7	Z	3.0	3.2	3.0	2.8	3.6	3.4	2.9	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.4	2.8	2.5	3.3	3.1	2.7	3.6									
29-Mar	2.4	2.4	2.3	2.2	Z	2.4	2.3	2.6	2.5	2.3	3.9	5.0	2.5	2.4	2.4	3.1	3.4	3.9	3.8	3.2	4.5	4.2	3.4	3.4	3.1	5.0									
30-Mar	3.4	3.4	3.6	3.3	3.3	Z	2.9	2.6	2.4	2.4	2.7	2.5	2.3	2.2	2.3	2.2	2.2	2.3	2.4	2.9	3.7	3.6	3.3	3.1	2.8	3.7									
31-Mar	Z	2.9	2.8	2.7	2.9	2.7	2.2	2.3	2.5	2.3	2.6	4.1	5.1	4.5	3.1	2.2	2.0	2.2	2.2	2.2	2.2	2.6	2.7	2.7	2.8	5.1									
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.28	0.28
2.1 - 3.0	638	90.24	90.52
3.1 - 10.0	67	9.48	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2015

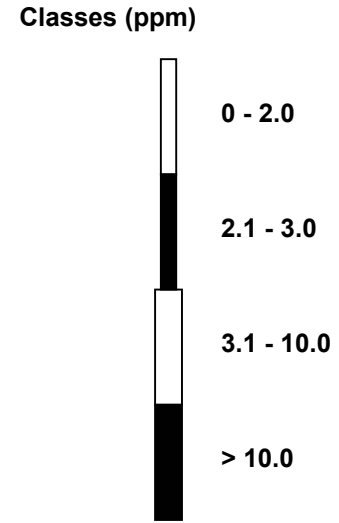
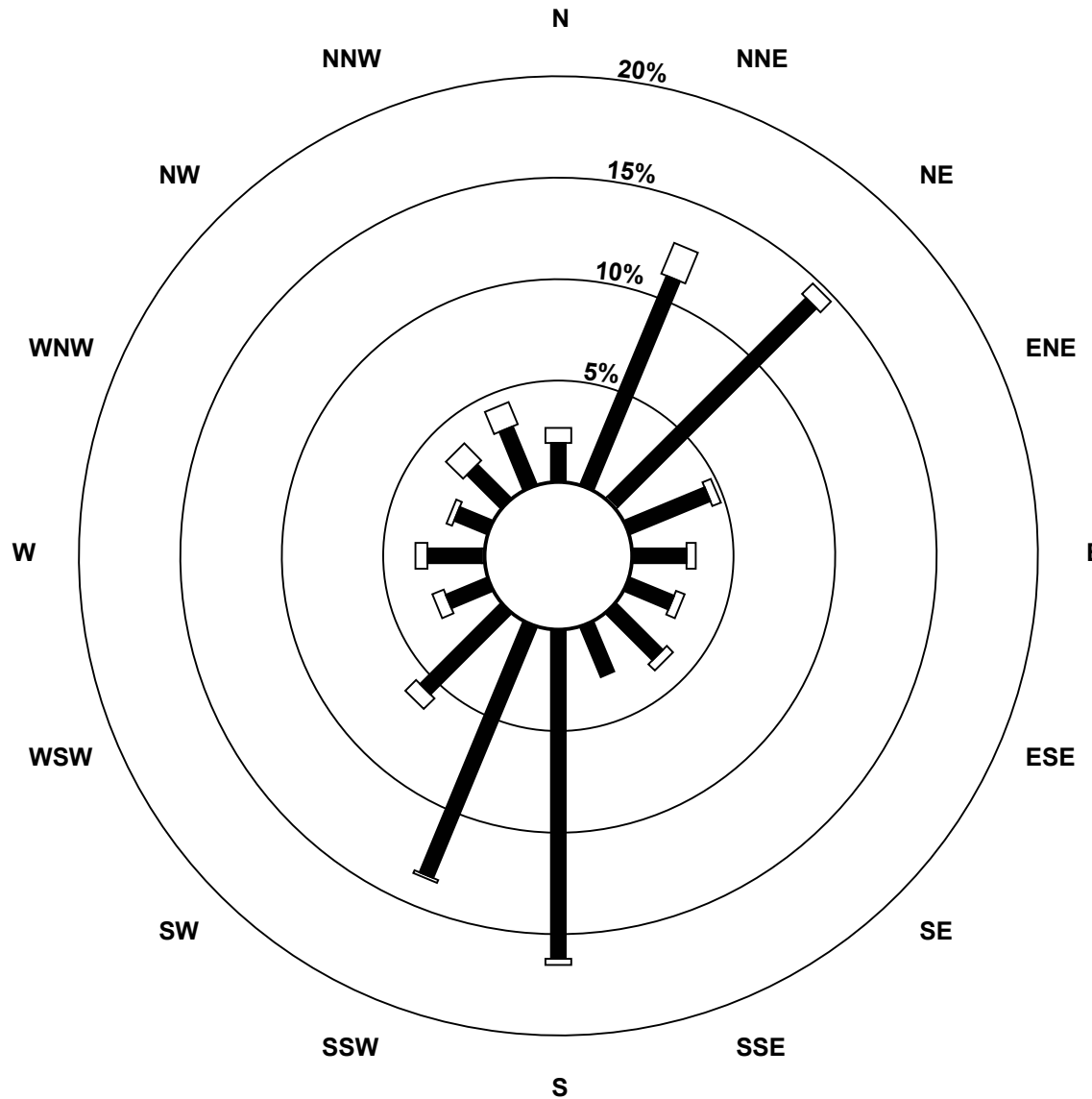
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
2.1 - 3.0	13	75	93	29	18	16	22	18	109	90	38	15	18	12	16	21	603
3.1 - 10.0	5	11	5	3	3	3	3	0	2	1	5	4	4	2	8	8	67
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	18	86	99	32	21	19	25	18	111	91	43	19	23	14	24	29	672

Total Number of Valid Hours: 672

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)

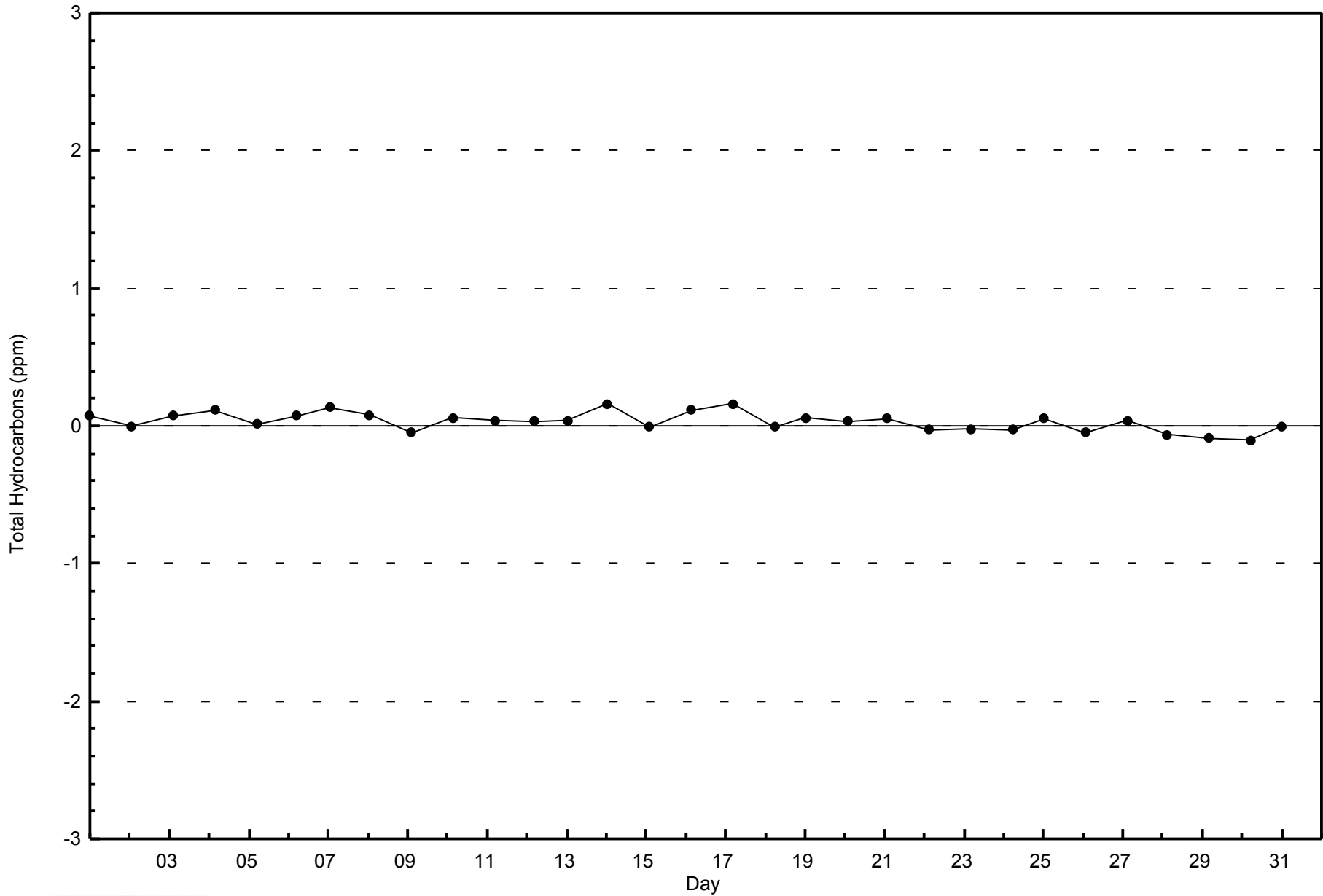


Total Number of Valid Hours: 672



WBEA
Zero Responses

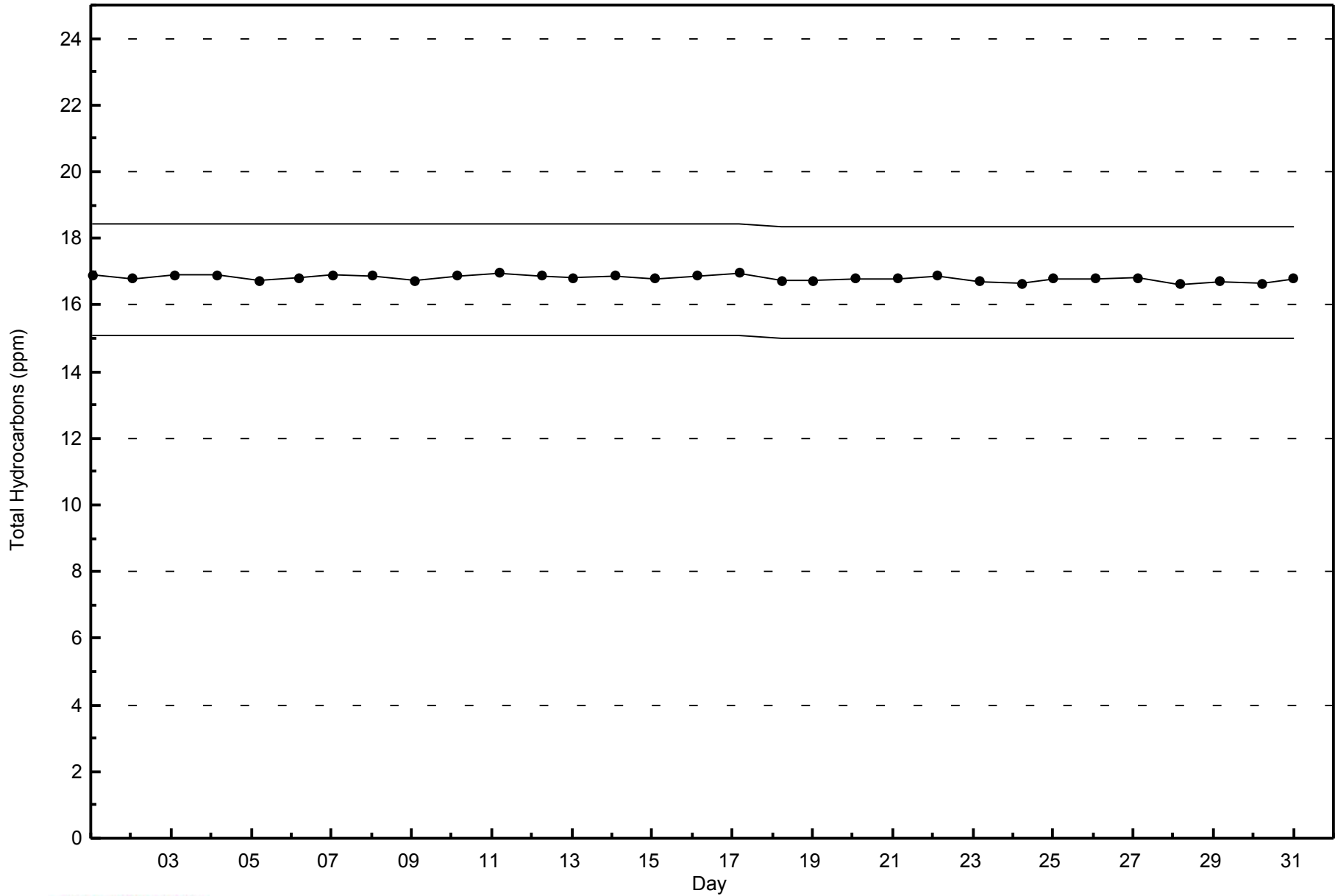
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2015



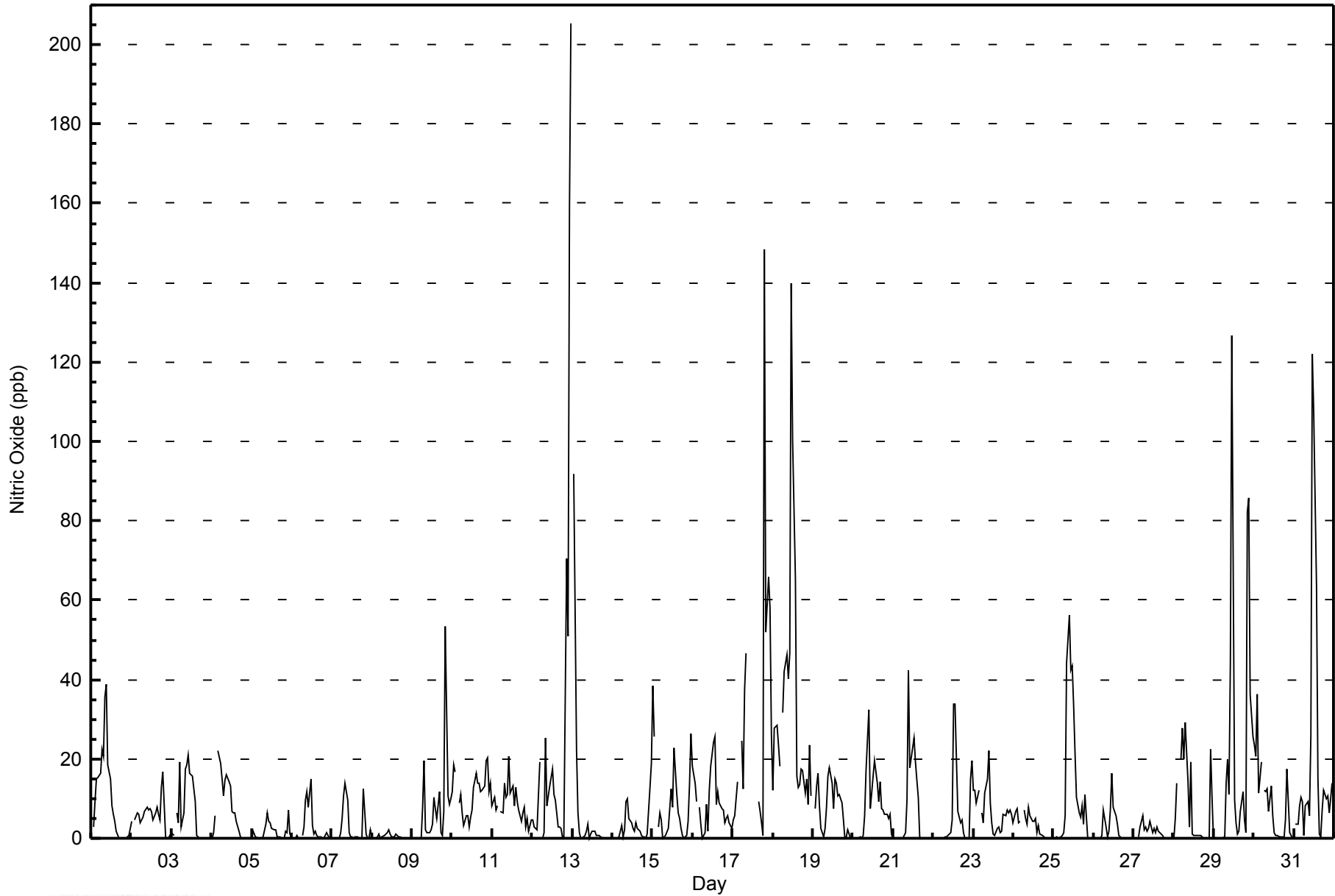


Maximum Value: 206 ppb on Mar 13 00:00																			Maximum Daily Average: 33.3 ppb on Mar 18						Hours in Service: 744	
Minimum Value: 0 ppb on Mar 1 18:00																			Minimum Daily Average: 0.5 ppb on Mar 8						Hours of Data: 707	
Maximum Diurnal Average: 21.9 ppb at hour 12																			Minimum Diurnal Average: 3.2 ppb at hour 19						Hours of Missing Data: 37	
Monthly Average: 9.4 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 4 Q ₃ = 11 P ₉₀ = 20 P ₉₉ = 99						Hours of Calibration: 37	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	3	9	15	15	16	23	21	35	39	19	15	8	6	4	2	0	0	0	0	0	0	1	3	10.2	39
2-Mar	4	Z	5	6	6	4	5	5	7	8	7	7	7	5	6	8	6	5	13	17	0	0	0	1	5.7	17
3-Mar	1	1	Z	6	4	19	3	7	17	18	21	16	12	9	1	0	0	0	0	0	0	0	0	0	6.6	21
4-Mar	0	1	6	Z	22	19	15	11	15	16	14	13	7	6	7	4	2	0	0	0	0	0	0	0	6.8	22
5-Mar	0	2	0	0	Z	0	0	0	3	6	4	4	3	2	2	0	0	0	0	0	2	2	7	1	1.7	7
6-Mar	0	0	0	1	0	Z	1	3	9	12	8	15	3	1	2	1	0	0	0	0	1	1	0	0	2.5	15
7-Mar	Z	0	0	0	0	1	5	11	14	10	1	0	0	0	0	0	0	0	0	12	1	0	0	2	2.6	14
8-Mar	0	Z	0	1	1	0	0	1	1	1	2	1	0	1	1	1	0	0	0	0	0	0	0	0	0.5	2
9-Mar	0	0	Z	0	0	0	8	20	2	1	2	2	4	10	7	5	12	1	1	7	53	11	9	10	7.1	53
10-Mar	12	18	17	Z	9	11	6	3	6	6	3	5	7	13	16	14	14	12	12	13	20	20	12	14	11.4	20
11-Mar	8	10	7	8	Z	7	7	14	10	11	21	11	13	8	13	9	7	4	7	8	3	5	2	5	8.6	21
12-Mar	5	3	2	2	19	Z	0	2	25	8	13	15	18	11	10	3	3	3	0	0	70	51	159	206	27.3	206
13-Mar	Z	92	22	6	1	0	0	1	2	4	0	1	2	2	1	1	1	0	0	0	0	0	0	0	5.8	92
14-Mar	0	Z	0	0	0	3	0	2	9	10	5	4	3	2	4	3	2	1	1	0	0	1	13	19	3.5	19
15-Mar	38	26	Z	3	7	5	0	0	1	3	7	12	8	23	11	6	5	3	1	0	1	4	14	26	8.8	38
16-Mar	18	14	9	Z	8	3	0	2	9	2	12	18	24	26	9	12	9	7	7	4	5	6	4	3	9.1	26
17-Mar	4	6	10	14	Z	25	13	37	47	C	C	C	C	C	C	9	7	4	1	148	52	66	58	26	--	148
18-Mar	12	28	29	23	18	Z	32	42	46	40	47	140	100	65	16	13	14	17	17	11	15	8	24	11	33.3	140
19-Mar	Z	7	13	16	8	2	0	2	8	16	18	14	7	15	14	11	11	9	5	0	1	2	0	0	7.8	18
20-Mar	0	Z	0	0	0	0	1	6	17	32	7	12	16	19	14	9	14	7	7	6	6	5	6	1	8.1	32
21-Mar	0	0	Z	0	0	0	0	1	10	42	18	20	25	19	15	10	0	0	0	0	0	0	0	0	7.0	42
22-Mar	0	0	0	Z	0	0	0	0	0	1	1	5	34	34	20	7	4	5	2	0	0	0	15	20	6.4	34
23-Mar	12	12	9	12	Z	6	4	11	15	22	9	4	1	1	2	3	1	2	6	6	7	6	7	6	7.2	22
24-Mar	4	7	7	4	4	Z	7	5	3	8	6	4	4	5	2	3	1	1	0	0	0	0	0	0	3.3	8
25-Mar	Z	0	0	0	0	1	1	6	44	56	42	43	33	21	10	7	6	8	3	11	0	0	0	0	12.8	56
26-Mar	0	Z	0	0	0	1	7	3	0	2	7	16	8	6	4	1	0	0	0	0	0	0	0	0	2.4	16
27-Mar	0	0	Z	0	3	6	2	3	2	2	4	1	2	2	3	2	1	1	0	0	0	0	0	0	1.5	6
28-Mar	0	5	14	Z	20	28	20	29	14	3	19	1	1	1	1	1	1	1	0	0	0	0	22	10	8.3	29
29-Mar	0	0	0	0	Z	0	0	14	20	11	45	127	10	4	1	2	7	12	5	2	82	86	36	26	21.2	127
30-Mar	24	21	36	11	19	Z	12	12	12	7	13	6	2	1	1	0	0	0	0	5	17	1	1	0	8.7	36
31-Mar	Z	3	4	8	10	9	1	8	9	6	26	122	107	63	15	1	0	7	12	10	11	6	10	14	20.2	122
																			5.7 9.9 7.7 5.3 6.8 6.4 5.6 9.1 13.3 13.4 13.4 21.9 15.7 12.8 7.3 4.7 4.1 3.5 3.2 8.4 11.2 9.1 12.9 13.0						Diurnal Average	
																			38 92 36 23 22 28 32 42 47 56 47 140 107 65 20 14 14 17 17 148 82 86 159 206						Diurnal Maximum	
Z - zerospan																			C - Calibration							



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	90.24	90.24
21 - 40	40	5.66	95.90
41 - 80	18	2.55	98.44
81 - 159	10	1.41	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - March 2015

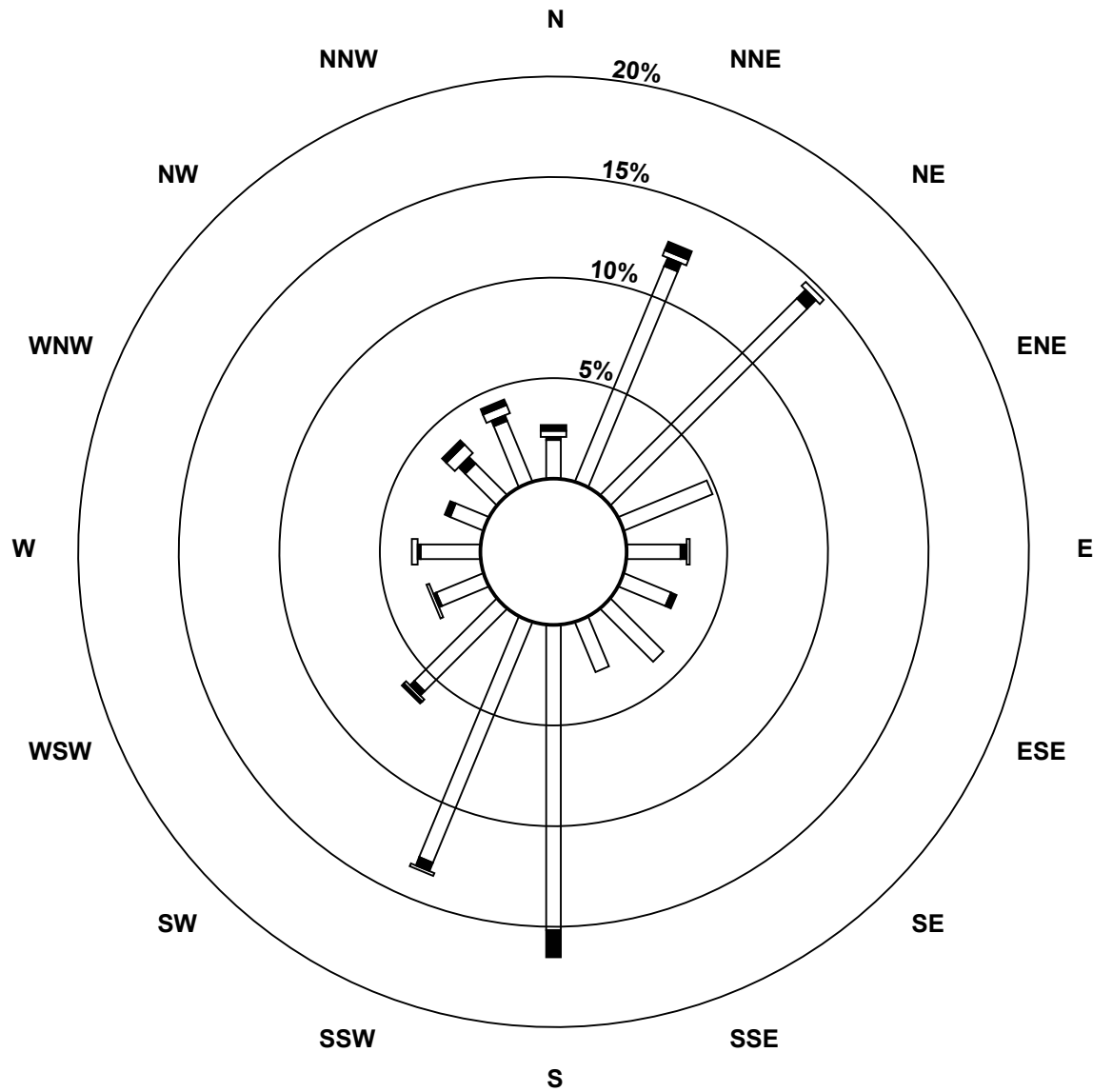
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	78	93	32	18	17	25	18	102	87	39	17	20	12	15	22	608
21 - 40	1	3	4	0	2	2	0	0	9	3	2	1	1	2	3	2	35
11 - 80	2	2	2	0	1	0	0	0	0	1	1	0	2	0	4	3	18
81 - 159	2	3	0	0	0	0	0	0	0	0	1	0	0	0	2	2	10
> 159	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Totals	18	86	99	32	21	19	25	18	111	91	43	19	23	14	24	29	672

Total Number of Valid Hours: 672

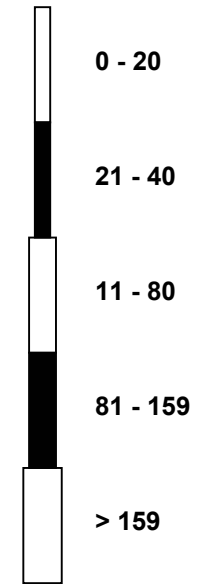
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)**



Classes (ppb)

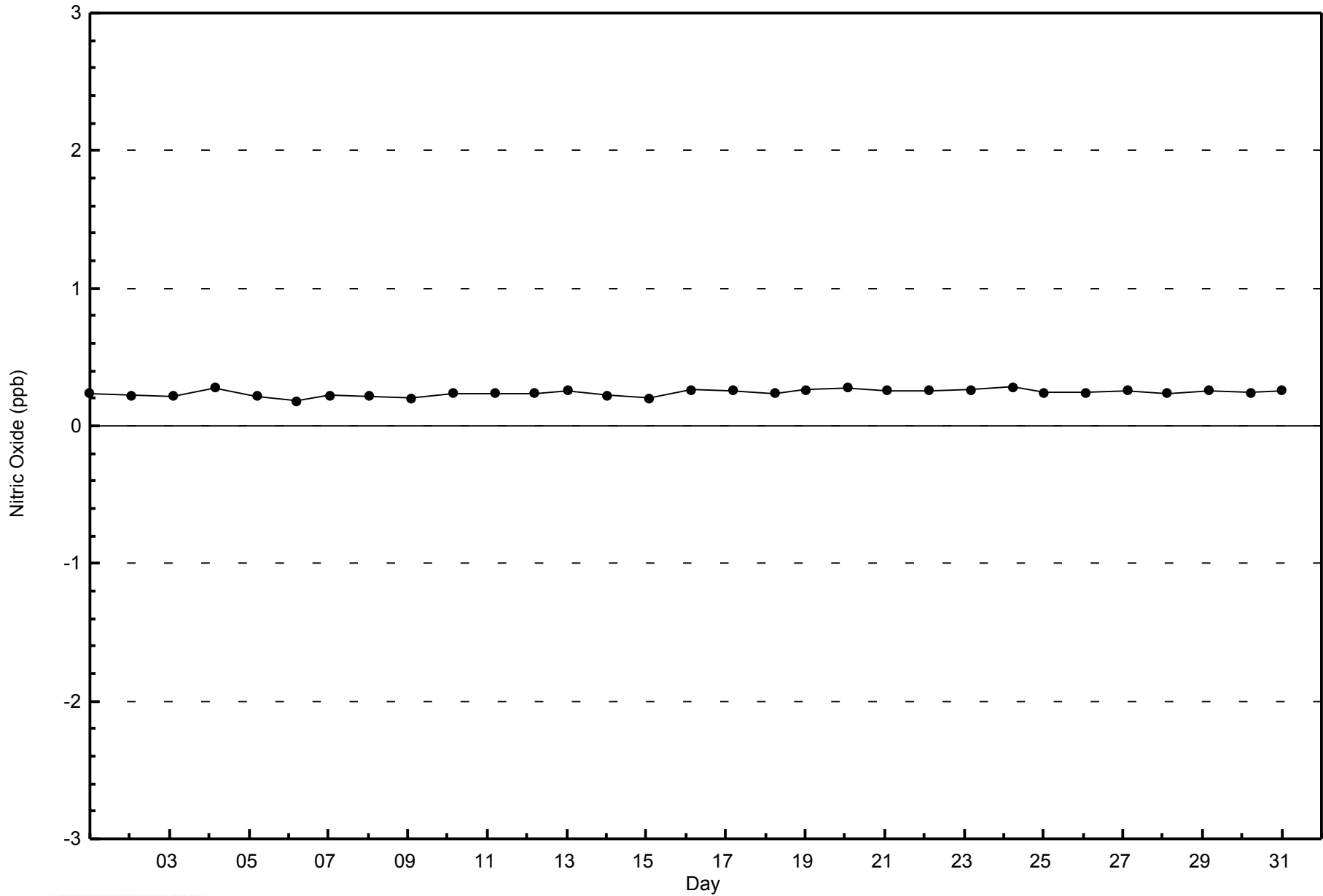


Total Number of Valid Hours: 672



WBEA
Zero Responses

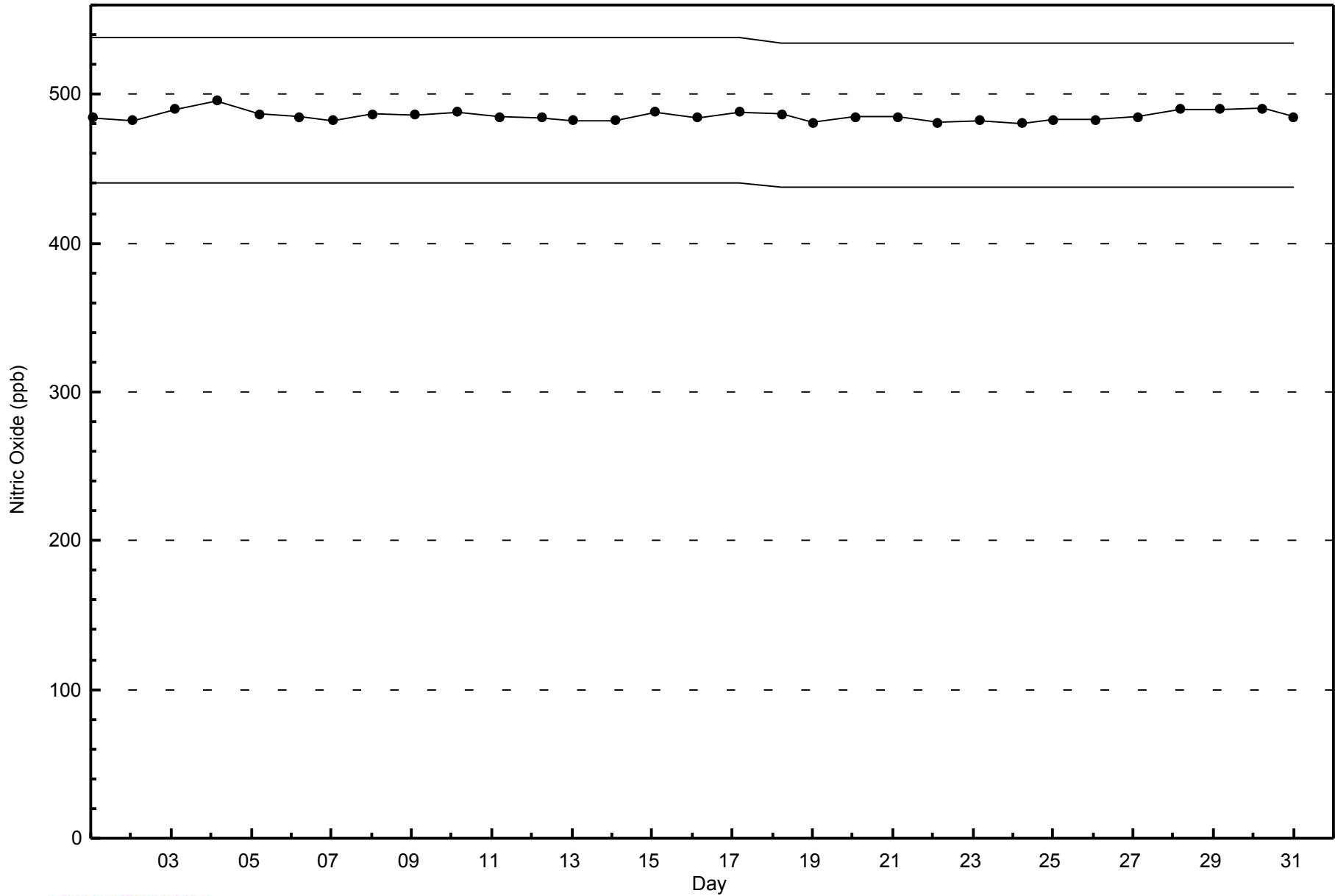
Nitric Oxide (NO) - ppb
Shell Muskeg River - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Shell Muskeg River - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 54 ppb on Mar 17 20:00	Maximum Daily Average: 25.4 ppb on Mar 18		Hours of Data:	707
Minimum Value: 0 ppb on Mar 7 14:00	Minimum Daily Average: 9.0 ppb on Mar 6		Hours of Missing Data:	37
Maximum Diurnal Average: 18.2 ppb at hour 24	Minimum Diurnal Average: 8.7 ppb at hour 16		Hours of Calibration:	37
Monthly Average: 14.3 ppb	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 7 Median = 13 Q ₃ = 19 P ₉₀ = 27 P ₉₉ = 44		Percent Operational Time:	100.0

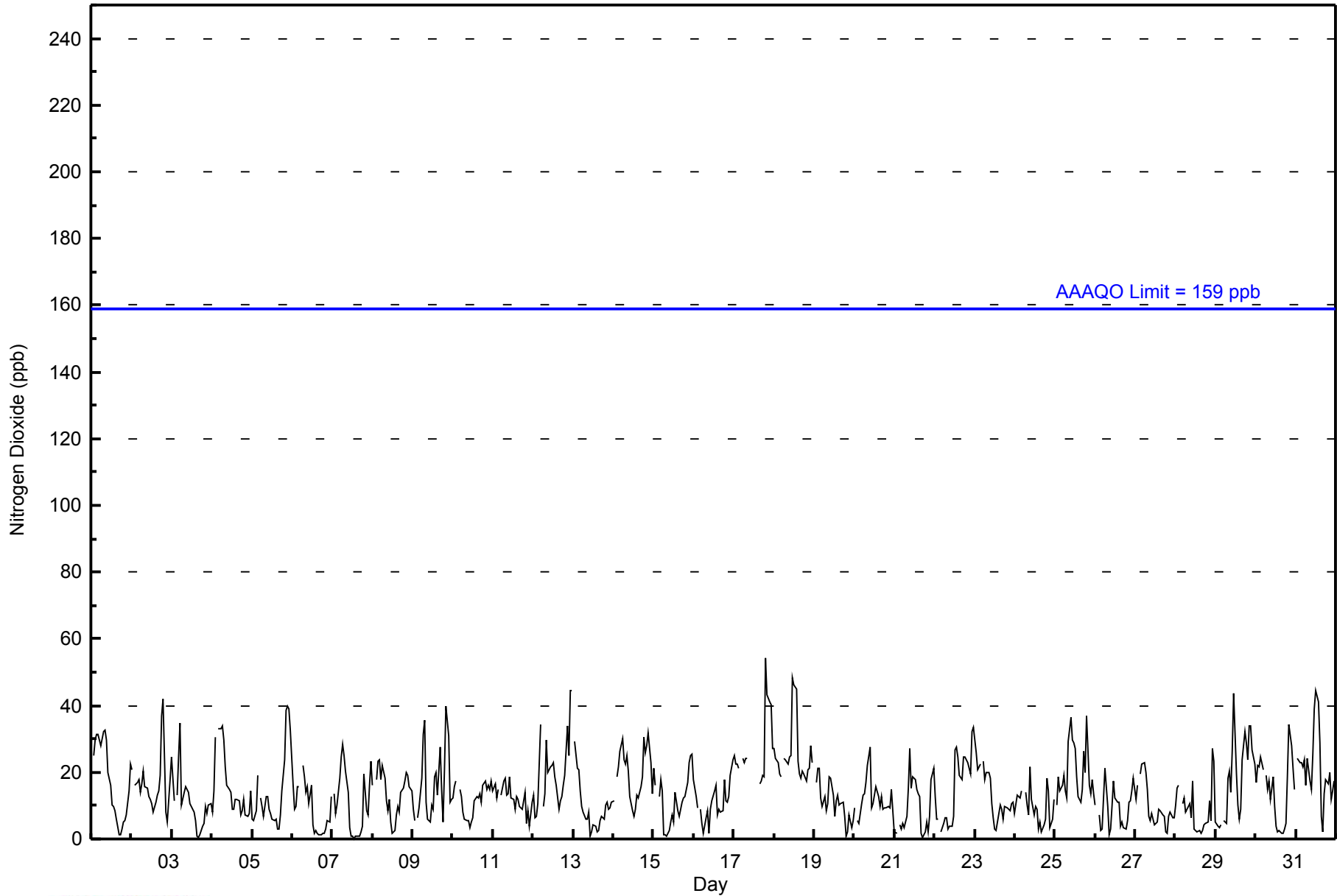
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	25	30	31	31	28	30	32	33	30	20	16	10	10	9	6	1	1	3	5	5	7	15	22	17.4	33																							
2-Mar	21	Z	16	17	18	14	17	20	16	15	13	12	11	8	11	13	15	19	37	42	8	5	11	18	16.4	42																							
3-Mar	25	11	Z	13	25	35	10	14	16	15	14	11	9	8	6	1	1	1	4	5	10	8	10	10	11.3	35																							
4-Mar	8	14	31	Z	33	33	34	30	21	16	15	14	9	9	12	12	11	7	8	12	7	7	8	15	15.9	34																							
5-Mar	6	6	9	19	Z	12	10	7	13	13	9	8	6	6	6	3	3	7	14	24	38	40	39	33	14.3	40																							
6-Mar	16	9	10	16	16	Z	22	19	14	16	11	16	4	2	3	2	1	1	2	2	3	6	5	13	9.0	22																							
7-Mar	Z	14	8	10	18	24	29	25	20	14	3	1	1	0	1	1	1	2	4	20	9	7	16	23	10.9	29																							
8-Mar	16	Z	18	23	24	18	22	18	12	8	12	5	2	3	7	10	8	14	15	18	20	19	16	14	13.9	24																							
9-Mar	9	6	Z	6	9	18	31	36	11	6	5	10	9	19	20	13	27	15	5	21	40	31	11	12	16.1	40																							
10-Mar	12	16	17	Z	15	13	8	6	5	5	3	5	6	11	13	12	14	11	16	17	15	16	15	17	11.7	17																							
11-Mar	15	17	12	15	Z	13	17	18	13	13	19	12	12	9	13	12	10	9	11	14	5	8	4	11	12.2	19																							
12-Mar	13	7	7	11	34	Z	10	14	30	20	21	22	23	19	16	9	11	13	16	19	34	25	45	44	20.1	45																							
13-Mar	Z	29	21	21	14	10	8	6	6	8	1	2	4	4	2	3	5	7	6	10	11	9	10	11	9.0	29																							
14-Mar	11	Z	19	21	26	30	24	22	25	21	13	8	7	9	13	12	16	19	30	26	28	32	23	13	19.5	32																							
15-Mar	21	16	Z	13	18	15	1	1	1	3	5	7	5	14	9	7	9	11	12	13	17	23	25	26	11.7	26																							
16-Mar	18	13	9	Z	9	5	2	6	9	2	9	11	14	16	7	9	8	9	18	12	11	13	19	24	10.9	24																							
17-Mar	25	22	23	21	Z	24	23	24	24	C	C	C	C	C	C	16	17	19	19	54	43	41	40	27	--	54																							
18-Mar	27	24	23	20	19	Z	24	24	22	25	25	49	46	45	24	20	18	20	20	17	21	21	28	23	25.4	49																							
19-Mar	Z	17	21	21	12	10	13	8	10	19	18	13	7	12	13	10	11	11	7	1	2	7	4	5	11.0	21																							
20-Mar	10	Z	6	5	11	13	14	17	22	27	9	11	13	16	13	10	13	9	10	10	10	10	15	9	12.1	27																							
21-Mar	2	2	Z	4	3	5	3	7	15	27	15	19	18	15	14	13	2	0	2	5	2	7	18	21	9.4	27																							
22-Mar	13	6	6	Z	2	5	6	7	3	4	4	7	27	28	25	19	18	25	25	24	23	20	32	33	15.6	33																							
23-Mar	30	26	21	22	Z	23	18	20	20	18	11	6	3	3	8	10	9	6	10	9	9	9	11	11	13.5	30																							
24-Mar	8	13	13	12	15	Z	14	10	7	21	12	7	10	9	3	5	2	4	6	18	15	3	6	12	9.8	21																							
25-Mar	Z	10	19	15	16	19	14	12	29	36	30	29	27	19	13	11	15	26	20	37	16	14	18	14	19.9	37																							
26-Mar	10	Z	7	3	3	12	21	10	1	3	10	17	12	11	11	4	5	3	3	6	11	12	14	18	9.0	21																							
27-Mar	12	16	Z	19	22	23	20	15	7	6	8	4	5	5	9	9	7	7	2	2	7	8	6	6	9.8	23																							
28-Mar	10	15	16	Z	11	12	8	9	11	6	17	3	3	2	2	2	3	4	5	5	11	6	27	23	9.2	27																							
29-Mar	5	4	3	4	Z	6	5	18	20	14	26	44	20	10	6	9	24	32	29	24	34	34	27	22	18.2	44																							
30-Mar	17	22	21	25	21	Z	19	15	17	12	19	10	4	2	3	2	2	3	5	19	34	28	21	15	14.5	34																							
31-Mar	Z	24	23	23	21	24	16	24	17	15	26	39	45	41	29	7	2	13	18	16	20	12	14	17	21.2	45																							
																								14.4	14.7	15.7	15.8	17.1	17.0	15.9	15.9	15.2	14.6	13.4	13.9	12.3	12.1	10.6	8.7	9.3	10.6	12.2	16.2	16.7	15.6	17.8	18.2	Diurnal Average	
																								30	29	31	31	34	35	34	36	33	36	30	49	46	45	29	20	27	32	37	54	43	41	45	44	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	547	77.37	77.37
21 - 40	148	20.93	98.30
41 - 80	12	1.70	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



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - March 2015

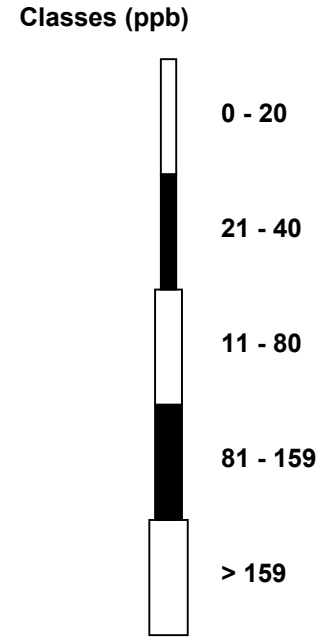
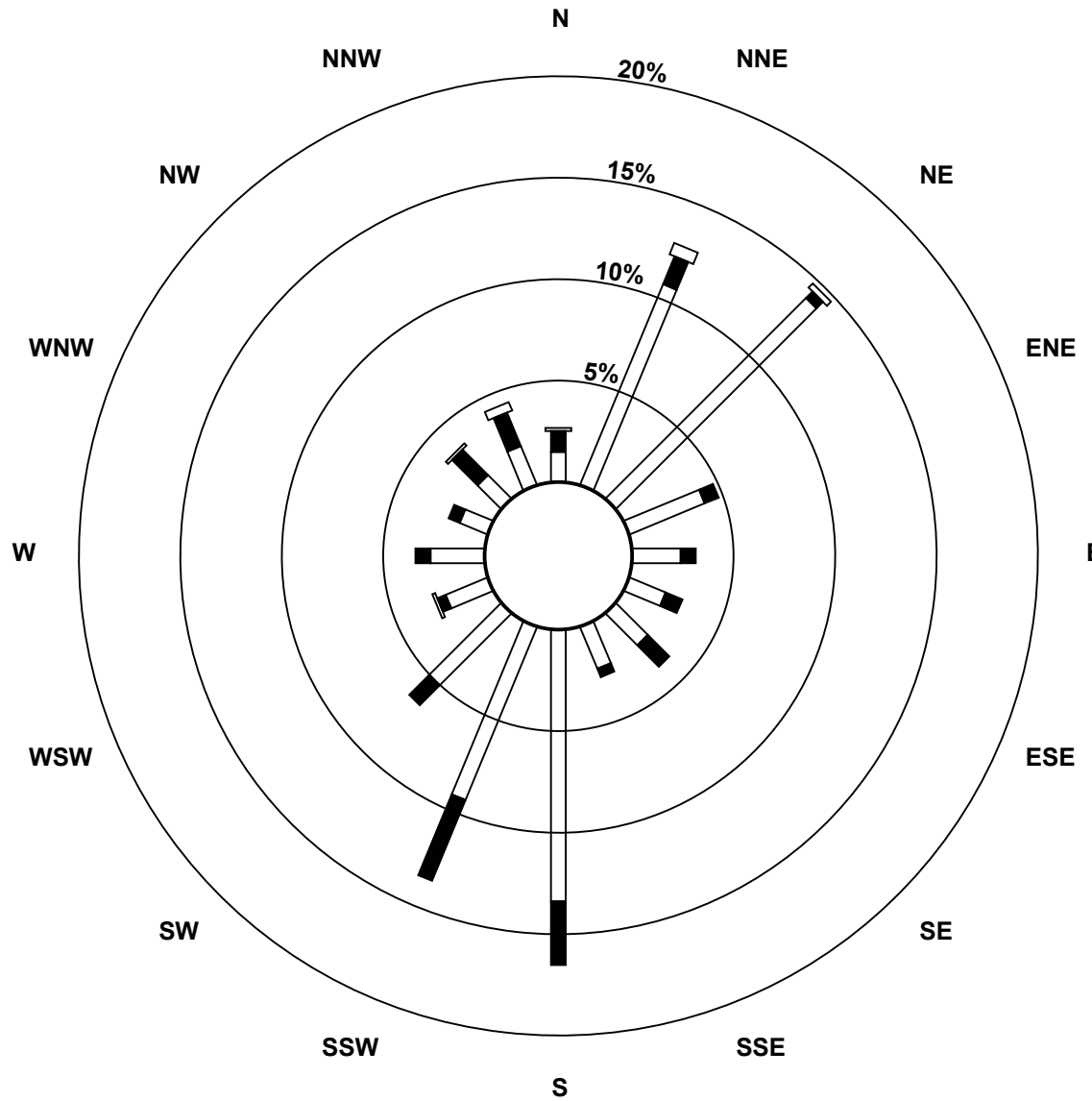
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	10	72	94	27	16	13	15	15	90	62	34	15	18	10	11	14	516
21 - 40	7	10	3	5	5	6	10	3	21	29	9	3	5	4	12	12	144
11 - 80	1	4	2	0	0	0	0	0	0	0	0	1	0	0	1	3	12
81 - 159	0	0	0	0	0	0	0	0	0	0	0	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	18	86	99	32	21	19	25	18	111	91	43	19	23	14	24	29	672

Total Number of Valid Hours: 672

Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)**

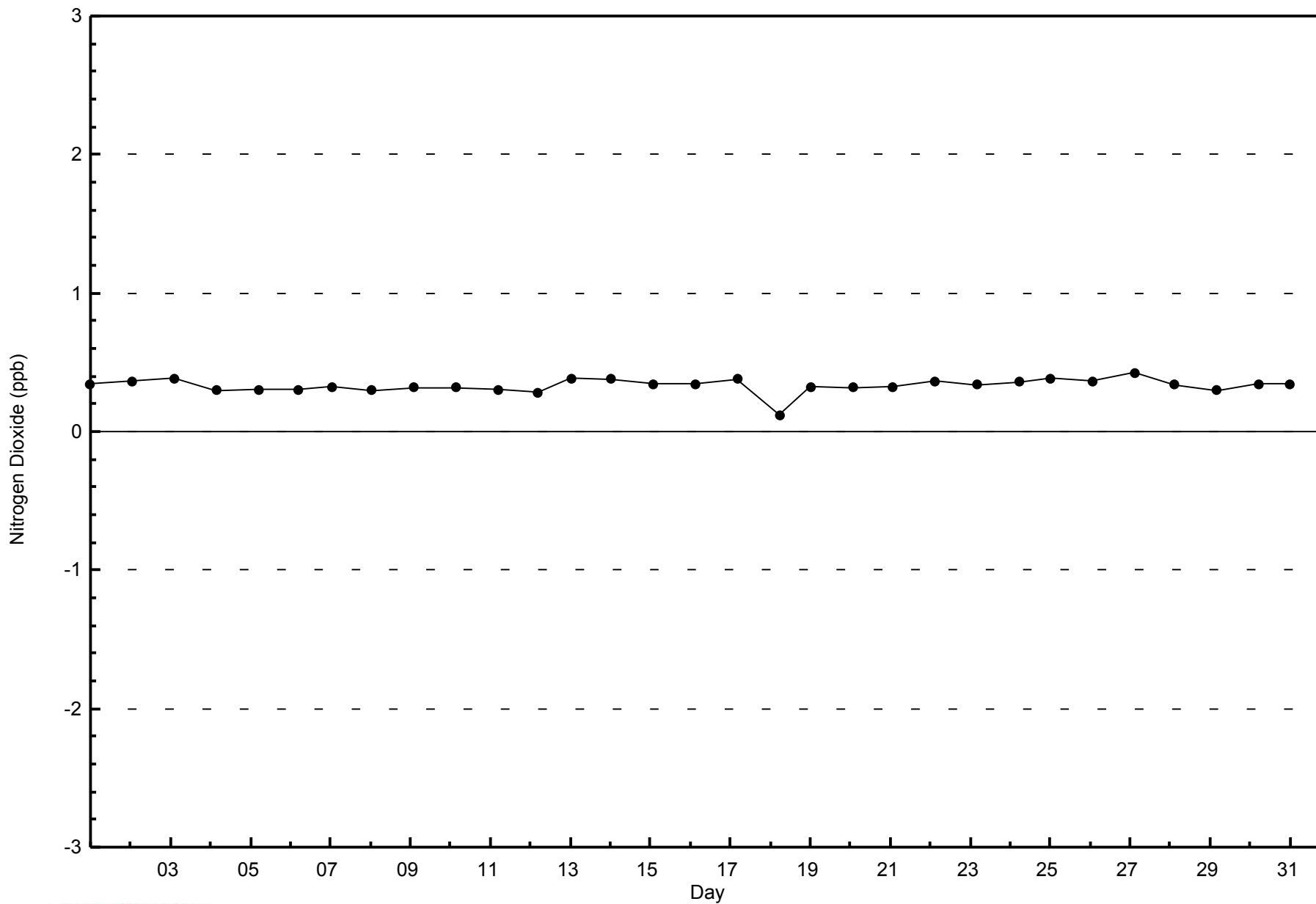


Total Number of Valid Hours: 672



WBEA
Zero Responses

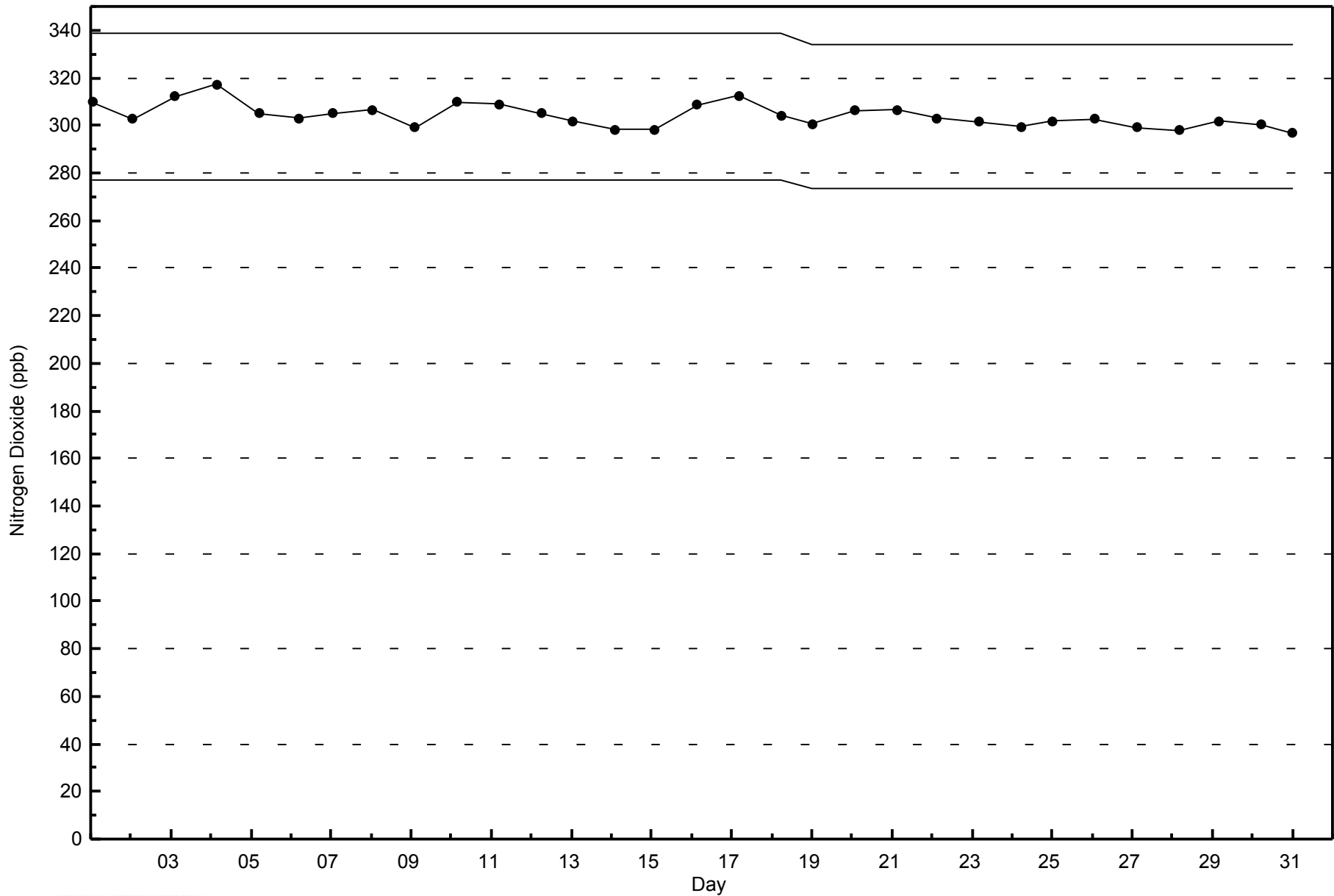
Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - March 2015



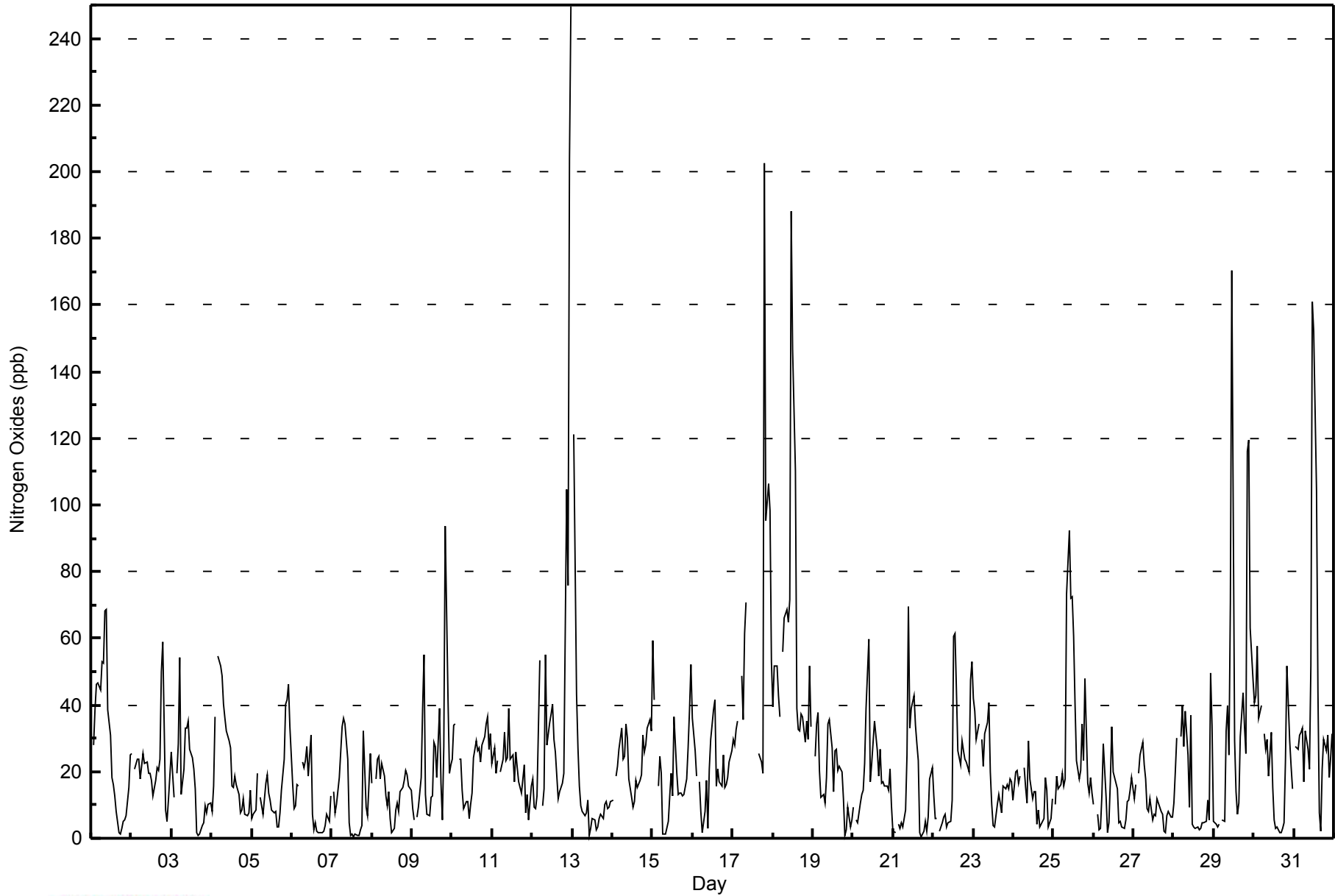


Maximum Value: 250 ppb on Mar 13 00:00		Maximum Daily Average: 58.7 ppb on Mar 18		Hours in Service: 744																							
Minimum Value: 0 ppb on Mar 21 18:00		Minimum Daily Average: 11.3 ppb on Mar 27		Hours of Data: 707																							
Maximum Diurnal Average: 35.8 ppb at hour 12		Minimum Diurnal Average: 13.4 ppb at hour 17		Hours of Missing Data: 37																							
Monthly Average: 23.7 ppb		Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 9 Median = 18 Q ₃ = 30 P ₉₀ = 44 P ₉₉ = 147		Hours of Calibration: 37																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	28	39	46	47	44	53	53	68	69	38	31	18	16	13	8	2	1	3	5	5	7	15	25	27.5	69	
2-Mar	25	Z	21	24	24	18	21	26	22	23	20	19	18	13	18	21	20	24	50	59	9	5	12	18	22.1	59	
3-Mar	26	12	Z	20	28	54	13	21	33	33	35	27	24	21	15	2	1	1	4	5	10	7	10	10	17.9	54	
4-Mar	8	16	37	Z	55	52	49	40	36	32	29	27	16	15	19	16	13	7	8	12	7	7	8	15	22.7	55	
5-Mar	6	7	9	19	Z	12	10	7	16	19	14	12	8	8	8	3	3	7	14	24	40	41	46	34	16.1	46	
6-Mar	16	9	10	16	16	Z	23	21	23	28	19	31	7	2	4	2	2	2	2	2	4	7	5	13	11.5	31	
7-Mar	Z	14	8	10	18	26	34	36	34	24	4	1	1	0	1	1	1	2	4	32	9	7	16	25	13.5	36	
8-Mar	16	Z	18	24	24	18	22	19	13	10	14	6	2	3	8	11	8	14	15	18	20	19	16	14	14.4	24	
9-Mar	9	6	Z	6	9	18	39	55	13	7	7	12	13	29	27	18	39	16	6	28	94	41	20	22	23.2	94	
10-Mar	24	34	34	Z	24	24	14	9	11	11	6	10	13	24	29	26	27	23	28	30	34	36	27	31	23.1	36	
11-Mar	23	27	19	23	Z	20	24	32	23	24	39	24	25	17	26	21	17	13	18	22	7	13	5	16	20.8	39	
12-Mar	18	9	9	13	54	Z	10	15	55	28	35	37	40	30	26	12	14	15	17	19	105	76	204	250	47.4	250	
13-Mar	Z	121	43	27	16	10	8	7	8	11	1	3	6	6	3	3	6	7	6	10	11	9	9	11	14.9	121	
14-Mar	11	Z	19	21	27	33	24	25	34	30	18	12	9	11	17	15	17	19	31	26	28	33	36	32	23.0	36	
15-Mar	60	42	Z	16	24	19	1	1	1	5	13	20	13	37	19	13	14	14	13	13	18	27	39	52	20.6	60	
16-Mar	36	26	19	Z	17	8	2	8	17	3	21	30	38	41	16	21	17	16	25	15	16	18	23	26	20.0	41	
17-Mar	29	28	33	35	Z	49	36	62	71	C	C	C	C	C	C	26	24	23	19	203	95	107	98	53	--	203	
18-Mar	39	52	52	43	37	Z	56	66	69	65	72	188	146	110	39	33	32	37	36	29	35	30	52	34	58.7	188	
19-Mar	Z	24	34	38	20	12	13	11	18	34	36	27	14	26	27	20	22	20	12	1	3	9	3	6	18.8	38	
20-Mar	9	Z	6	5	11	13	14	23	39	60	17	22	29	35	26	19	27	16	17	16	16	14	21	10	20.1	60	
21-Mar	2	2	Z	4	3	5	3	8	25	69	33	39	43	34	28	23	2	0	2	5	2	7	18	21	16.4	69	
22-Mar	13	6	6	Z	2	5	6	7	3	5	5	11	60	62	44	26	22	29	26	24	23	20	47	53	22.0	62	
23-Mar	42	38	30	34	Z	30	21	31	35	40	20	10	4	3	10	13	10	8	16	15	16	15	18	17	20.7	42	
24-Mar	12	20	20	16	19	Z	21	15	11	29	18	12	14	14	4	9	3	5	6	18	15	3	6	12	13.1	29	
25-Mar	Z	10	19	15	16	20	16	18	73	92	72	72	61	40	23	18	21	34	23	48	16	14	18	14	32.7	92	
26-Mar	10	Z	7	3	3	13	28	12	2	5	17	33	20	17	15	5	5	3	3	6	11	11	14	18	11.4	33	
27-Mar	12	16	Z	20	25	29	22	18	9	8	12	6	7	7	12	10	8	7	2	2	7	8	7	6	11.3	29	
28-Mar	10	20	30	Z	31	40	28	38	25	9	37	4	3	3	3	3	3	5	5	5	11	5	50	34	17.5	50	
29-Mar	5	4	3	4	Z	6	5	32	40	25	71	170	29	14	7	11	30	44	33	25	116	119	63	48	39.4	170	
30-Mar	41	43	58	36	40	Z	31	27	30	18	32	15	6	3	3	2	2	3	5	23	52	29	22	15	23.2	58	
31-Mar	Z	28	26	31	32	33	17	32	27	21	51	161	152	104	44	8	2	21	30	26	31	18	24	31	41.3	161	
		20.1	24.7	23.3	21.1	23.9	23.4	21.4	24.9	28.5	28.0	26.8	35.8	28.0	24.8	17.9	13.5	13.4	14.2	15.4	24.6	27.9	24.7	30.6	31.1	Diurnal Average	
		60	121	58	46	55	54	56	66	73	92	72	188	152	110	44	33	39	44	50	203	116	119	204	250	Diurnal Maximum	
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	402	56.86	56.86
21 - 40	223	31.54	88.40
41 - 80	63	8.91	97.31
81 - 159	13	1.84	99.15
> 159	6	0.85	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - March 2015

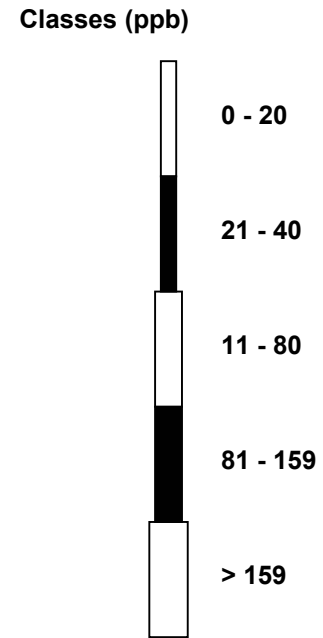
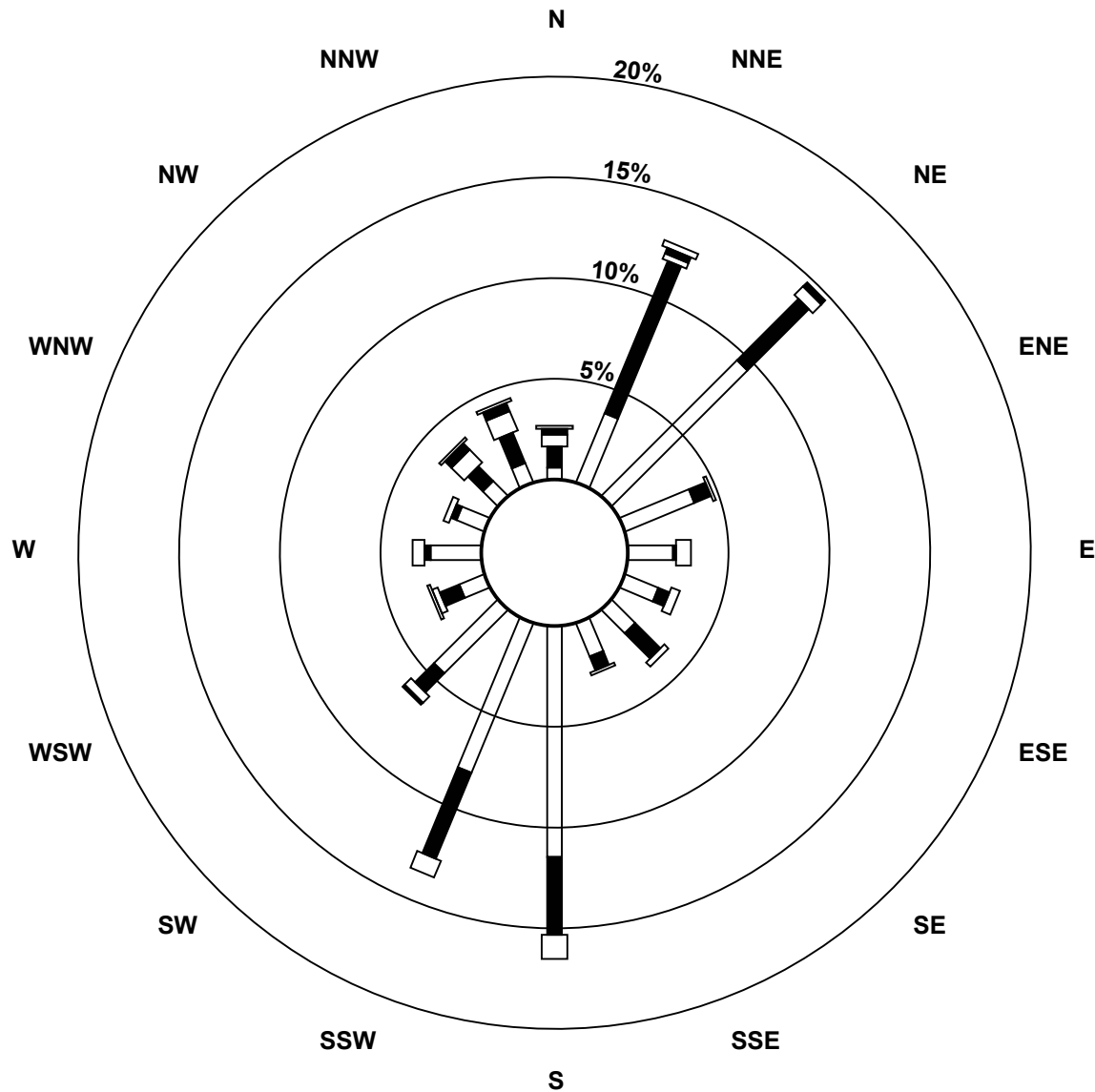
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	4	25	64	25	15	12	11	12	77	54	30	9	17	10	7	7	379
21 - 40	7	55	29	6	1	4	12	5	26	31	9	7	2	2	7	11	214
41 - 80	4	2	4	1	5	3	2	1	8	6	3	2	4	2	6	7	60
81 - 159	2	2	2	0	0	0	0	0	0	0	1	0	0	0	3	3	13
> 159	1	2	0	0	0	0	0	0	0	0	0	1	0	0	1	1	6
Totals	18	86	99	32	21	19	25	18	111	91	43	19	23	14	24	29	672

Total Number of Valid Hours: 672

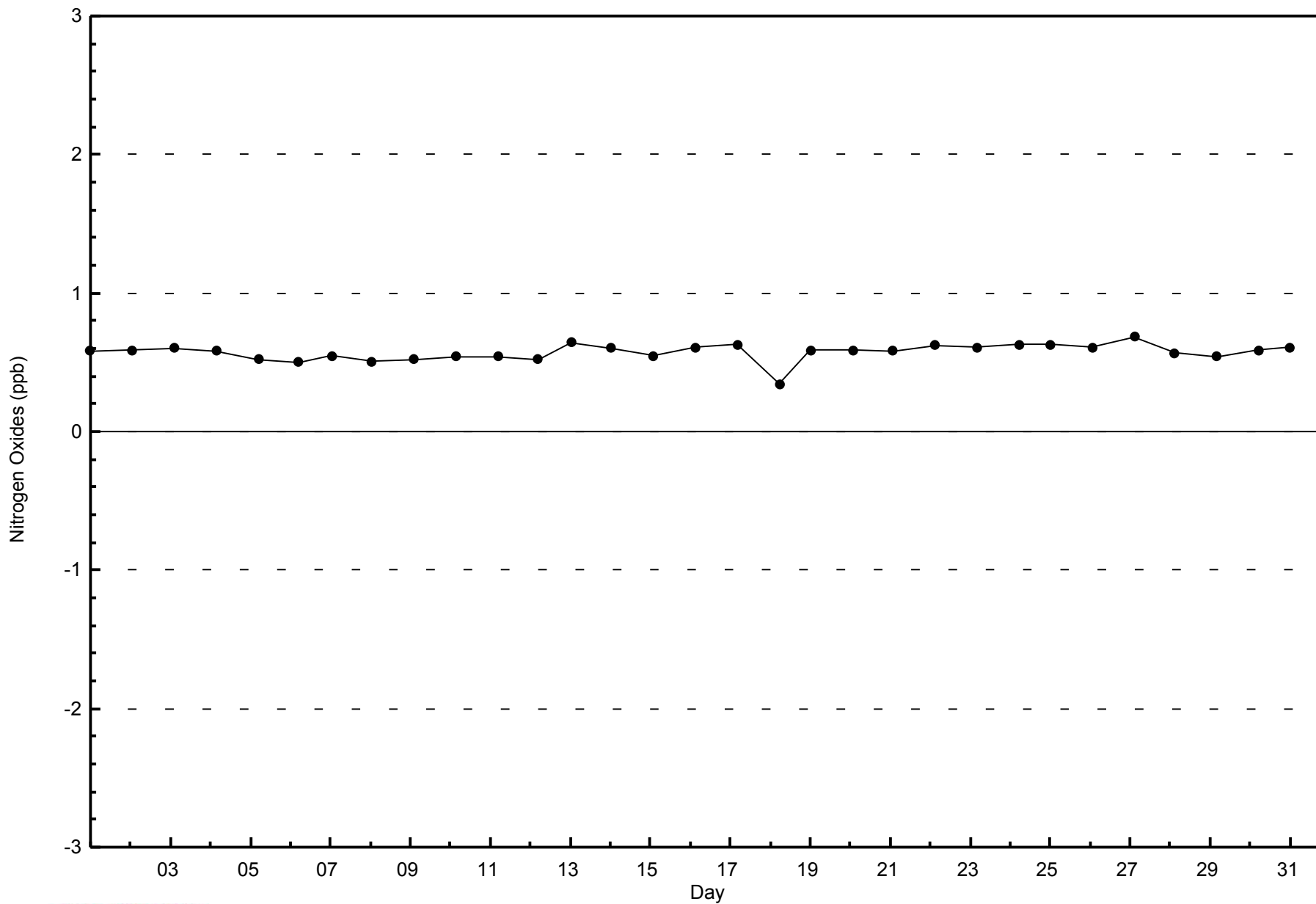
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)**



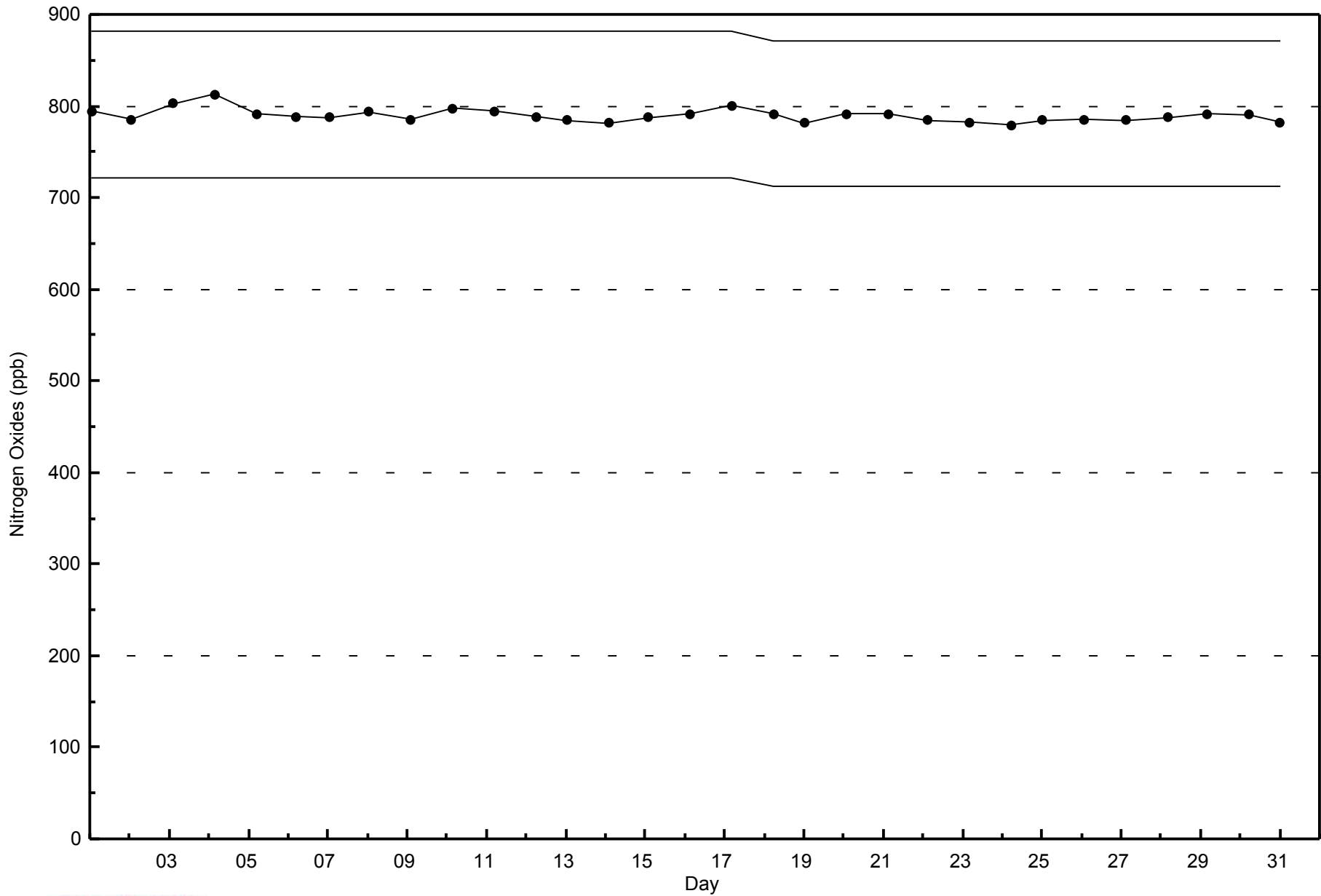
Total Number of Valid Hours: 672





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - March 2015



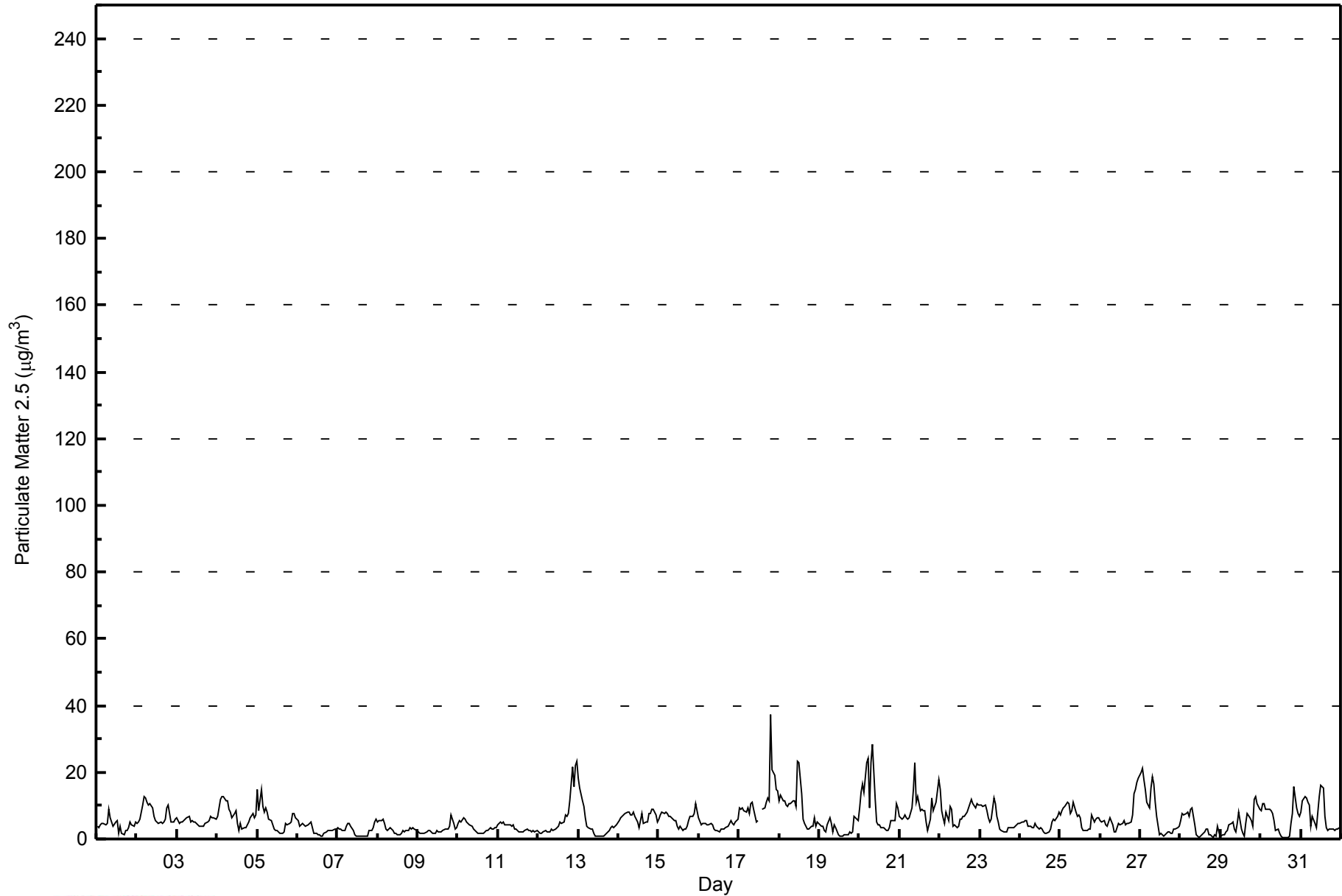


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																															
Maximum Value: 37.3 µg/m ³ on Mar 17 20:00		Maximum Daily Average: 11.9 µg/m ³ on Mar 17																																															
Minimum Value: 0.3 µg/m ³ on Mar 28 12:00		Hours of Data: 742																																															
Maximum Diurnal Average: 7.5 µg/m ³ at hour 3		Hours of Missing Data: 2																																															
Monthly Average: 5.79 µg/m ³		Hours of Calibration: 0																																															
Minimum Daily Average: 2.6 µg/m ³ on Mar 7		Percent Operational Time: 99.7																																															
Minimum Diurnal Average: 3.2 µg/m ³ at hour 16		Percentiles: P ₁ = 0.7 P ₁₀ = 1.8 Q ₁ = 2.8 Median = 4.7 Q ₃ = 7.7 P ₉₀ = 11.0 P ₉₉ = 22.8																																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	3.6	3.6	4.2	4.7	4.5	4.2	4.8	8.8	6.2	4.9	3.9	4.9	5.6	1.9	3.7	1.6	1.5	2.6	2.7	3.2	5.1	4.4	3.8	5.2	4.1	8.8																							
2-Mar	4.8	4.9	5.8	10.0	12.7	12.4	10.9	10.3	10.8	9.1	6.6	5.4	5.0	4.5	4.9	4.8	5.0	6.1	9.1	10.1	5.1	5.0	5.3	6.0	7.3	12.7																							
3-Mar	6.5	4.5	5.2	5.0	5.6	6.1	6.5	6.9	5.3	5.5	5.0	5.0	4.4	3.8	3.7	3.7	4.0	4.5	5.2	5.6	6.7	6.2	6.5	6.0	5.3	6.9																							
4-Mar	6.8	9.2	11.7	12.7	12.6	11.4	11.4	8.7	8.1	6.5	7.5	8.3	4.7	2.7	4.6	2.8	3.4	3.6	4.2	5.1	6.2	7.5	6.5	7.2	7.2	12.7																							
5-Mar	14.8	8.6	14.8	9.6	8.2	9.4	8.1	6.0	5.5	4.3	2.9	2.5	2.4	1.6	1.6	1.5	2.0	4.6	4.3	4.5	5.3	7.7	7.5	6.5	6.0	14.8																							
6-Mar	5.7	3.7	4.1	4.7	4.2	4.0	4.3	4.8	4.9	3.3	1.8	1.9	1.2	1.1	1.1	1.0	1.5	2.1	2.5	2.6	2.5	2.7	2.9	3.2	3.0	5.7																							
7-Mar	3.4	2.9	2.8	2.5	2.7	4.0	4.6	4.6	3.8	2.5	1.3	1.0	1.0	0.9	0.9	0.7	0.7	0.7	1.0	2.6	2.7	3.5	5.0	5.9	2.6	5.9																							
8-Mar	5.2	5.4	5.5	6.1	4.7	3.1	2.7	3.3	3.1	2.3	1.8	1.6	1.4	1.5	1.8	2.4	2.2	2.5	2.7	3.3	3.1	3.3	2.8	2.4	3.1	6.1																							
9-Mar	1.9	1.6	1.5	1.6	1.8	2.0	2.4	2.5	2.0	1.9	1.8	2.6	1.9	2.0	2.2	2.4	2.9	2.9	2.8	3.9	7.4	4.5	3.2	3.3	2.6	7.4																							
10-Mar	4.7	5.4	5.3	6.2	5.7	5.0	4.6	4.3	3.7	2.9	2.5	2.2	1.8	1.9	1.9	1.9	2.1	2.4	2.6	3.2	3.1	3.1	3.3	3.4	3.5	6.2																							
11-Mar	4.3	4.9	4.7	4.9	4.1	4.1	4.2	4.3	3.9	4.1	3.1	3.2	2.3	2.1	2.3	2.2	2.4	2.8	2.8	2.5	2.3	2.6	2.1	2.6	3.3	4.9																							
12-Mar	2.3	1.8	1.9	2.0	2.6	2.1	2.1	2.3	2.9	2.4	3.0	3.4	3.8	5.1	4.6	4.9	7.2	6.6	7.7	11.4	21.7	15.6	21.8	23.2	6.8	23.2																							
13-Mar	18.1	15.2	11.5	9.8	6.3	4.0	3.2	3.1	3.1	1.9	1.0	0.7	0.7	0.7	0.9	1.1	1.6	2.5	3.4	3.7	3.6	3.8	4.2	4.4	18.1																								
14-Mar	5.5	6.5	6.7	7.4	7.7	8.2	7.9	7.0	7.3	8.1	6.9	4.9	3.6	5.4	7.5	4.6	5.0	5.1	7.7	7.7	9.0	8.7	7.3	5.0	6.7	9.0																							
15-Mar	5.9	7.4	8.3	7.7	8.2	7.8	6.6	6.9	6.2	5.3	5.4	3.8	3.2	4.0	2.7	2.9	3.1	3.9	5.7	6.6	6.7	7.7	10.5	8.5	6.0	10.5																							
16-Mar	6.2	4.4	4.5	4.6	4.6	4.3	4.0	4.7	4.1	3.1	2.6	2.4	2.3	2.9	3.1	2.8	3.5	3.7	4.8	5.6	4.8	4.4	4.9	5.8	4.1	6.2																							
17-Mar	9.2	9.0	9.3	8.3	8.0	9.3	7.8	10.7	10.9	9.0	5.0	5.6	M	M	9.0	9.5	11.1	12.2	11.5	37.3	20.8	18.9	14.7	14.4	11.9	37.3																							
18-Mar	11.2	13.3	11.5	11.3	10.2	9.9	10.5	10.6	11.6	11.3	9.7	23.5	22.9	13.6	5.8	4.5	3.9	2.9	2.8	3.7	3.6	6.3	3.7	5.1	9.3	23.5																							
19-Mar	4.2	3.8	3.7	2.5	2.3	4.3	6.5	4.7	1.9	4.0	3.2	1.2	0.9	0.8	0.8	1.2	1.2	1.3	2.1	1.9	2.2	6.6	5.9	5.7	3.0	6.6																							
20-Mar	9.4	14.0	16.6	13.9	23.0	24.4	9.3	22.7	28.5	11.8	5.2	4.3	4.0	3.3	3.4	3.0	2.5	2.5	3.5	5.4	5.5	5.5	10.7	9.3	10.1	28.5																							
21-Mar	6.9	6.0	6.5	7.0	6.5	6.1	6.3	9.3	15.0	22.8	10.8	12.6	8.5	8.7	8.5	8.4	5.0	2.6	6.1	12.3	8.6	9.8	11.0	17.7	9.3	22.8																							
22-Mar	14.8	8.4	6.4	4.6	8.0	5.5	9.7	8.8	3.9	4.3	3.5	3.6	5.9	6.0	6.8	6.9	8.0	9.2	10.8	12.0	10.6	9.5	10.6	10.1	7.8	14.8																							
23-Mar	10.0	10.0	9.7	10.0	8.6	6.2	5.0	6.1	12.1	10.4	6.9	5.1	3.0	2.5	1.9	1.9	1.9	3.3	3.5	3.4	3.6	3.8	4.3	4.5	5.7	12.1																							
24-Mar	4.5	5.1	4.9	5.5	5.7	4.0	3.9	3.5	3.3	4.5	3.6	2.9	3.2	2.8	2.2	1.8	1.6	2.1	2.8	5.2	6.1	5.6	6.9	8.1	4.2	8.1																							
25-Mar	7.2	8.6	9.4	9.7	11.2	10.7	7.7	8.4	11.0	8.1	6.8	7.1	6.5	3.3	2.7	2.6	2.7	3.0	3.0	7.2	4.9	5.9	6.6	6.2	6.7	11.2																							
26-Mar	5.5	5.2	5.4	4.3	4.0	5.2	6.4	4.4	2.0	2.0	3.5	4.6	4.3	4.5	5.4	4.4	4.7	4.5	5.0	7.1	13.5	14.9	16.7	18.3	6.5	18.3																							
27-Mar	20.1	21.2	17.6	15.0	11.1	9.4	15.4	18.7	16.4	11.1	6.7	1.4	1.6	1.3	1.0	1.4	2.1	2.2	1.7	1.8	3.0	3.1	3.2	4.0	7.9	21.2																							
28-Mar	5.5	7.5	7.3	7.6	7.9	6.9	8.9	9.3	4.3	1.2	0.8	0.3	0.7	1.3	2.2	2.9	3.0	1.4	1.1	0.4	1.5	1.0	3.7	2.3	3.7	9.3																							
29-Mar	0.8	1.1	1.4	1.9	2.5	4.3	4.8	4.9	2.8	2.0	4.6	8.2	3.0	1.9	1.0	4.7	7.7	6.2	5.3	3.9	11.8	12.8	10.6	8.7	4.9	12.8																							
30-Mar	8.6	10.6	10.6	8.9	9.1	8.8	8.4	7.6	5.4	2.5	3.0	1.8	0.9	0.4	0.4	0.4	0.3	0.9	4.6	7.8	15.8	9.4	7.8	6.8	5.9	15.8																							
31-Mar	8.0	11.3	12.7	12.2	11.0	10.0	3.7	6.7	4.5	3.4	8.3	12.9	16.1	15.3	7.0	3.6	2.6	2.8	3.0	2.8	2.7	2.9	3.1	3.3	7.1	16.1																							
																								7.3	7.3	7.5	7.2	7.3	7.0	6.5	7.3	6.9	5.7	4.5	4.8	4.2	3.6	3.4	3.2	3.4	3.6	4.4	6.2	6.8	6.7	7.0	7.2	Diurnal Average	
																								20.1	21.2	17.6	15.0	23.0	24.4	15.4	22.7	28.5	22.8	10.8	23.5	22.9	15.3	9.0	9.5	11.1	12.2	11.5	37.3	21.7	18.9	21.8	23.2	Diurnal Maximum	
M - Maintenance				Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																													



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	424	57.14	57.14
6 - 15	266	35.85	92.99
16 - 25	24	3.23	96.23
26 - 80	2	0.27	96.50
> 81.0	0	0.00	96.50

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Shell Muskeg River - March 2015

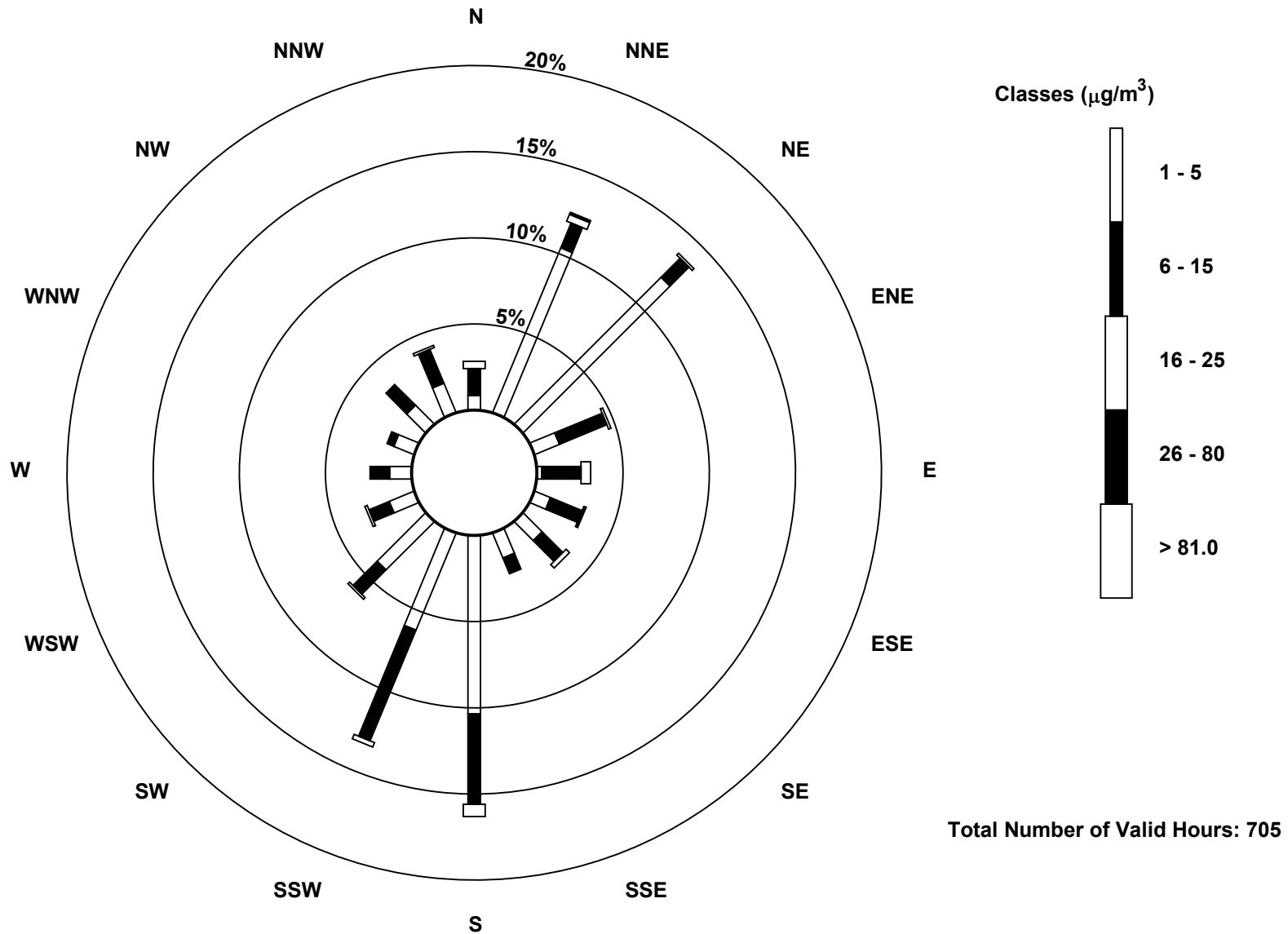
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	6	73	85	11	2	7	11	11	73	43	28	11	9	9	11	13	403
6 - 15	11	11	11	21	16	14	12	7	37	49	14	9	8	3	12	15	250
16 - 25	3	3	1	1	4	0	2	0	5	2	1	1	0	0	0	1	24
26 - 80	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	88	97	33	22	22	25	18	115	94	43	21	17	12	23	29	679

Total Number of Valid Hours: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
 Shell Muskeg River (AMS 16)



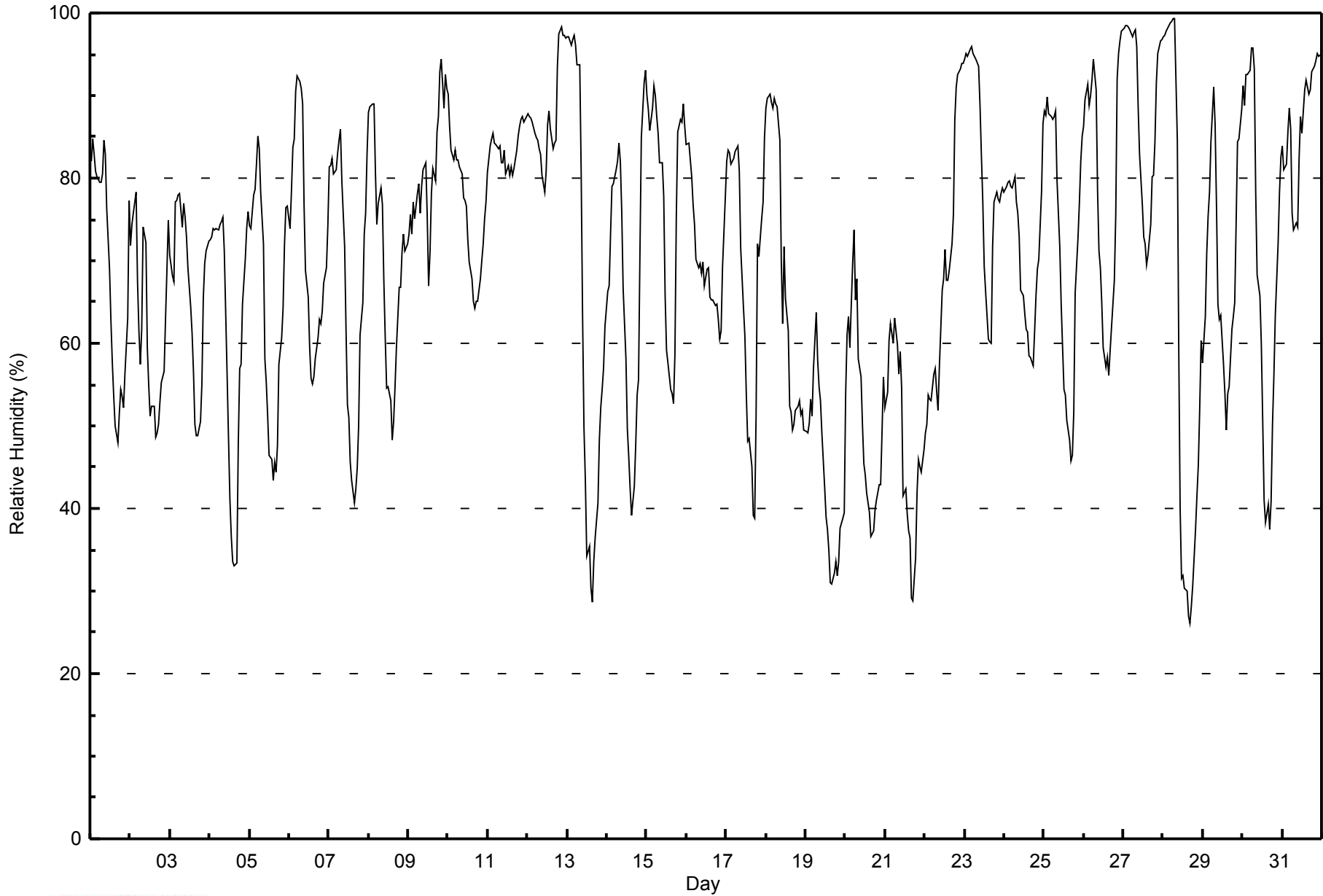


Maximum Value: 99 % on Mar 28 08:00														Maximum Daily Average: 88.0 % on Mar 27														Hours in Service: 744	
Minimum Value: 26 % on Mar 28 17:00														Minimum Daily Average: 43.8 % on Mar 19														Hours of Data: 744	
Maximum Diurnal Average: 81.7 % at hour 6														Minimum Diurnal Average: 53.1 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 69.7 %														Percentiles: P ₁ = 30 P ₁₀ = 45 Q ₁ = 56 Median = 72 Q ₃ = 84 P ₉₀ = 91 P ₉₉ = 98														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	82	85	83	81	80	79	80	81	85	83	76	69	63	58	53	50	48	52	54	53	52	56	63	77	68.5	85			
2-Mar	72	74	76	78	67	62	57	62	74	72	59	55	51	52	52	49	49	50	53	55	57	63	69	75	61.8	78			
3-Mar	71	68	68	77	77	78	78	74	77	75	73	69	64	61	56	50	49	49	51	55	65	70	71	72	66.6	78			
4-Mar	73	73	74	74	74	74	74	75	75	71	56	49	41	37	33	33	33	48	57	58	65	70	74	76	61.1	76			
5-Mar	74	74	78	79	82	85	84	78	72	58	55	51	46	46	43	46	44	48	57	61	64	72	76	77	64.6	85			
6-Mar	74	78	84	85	90	92	92	91	89	77	69	66	59	56	55	56	58	61	63	62	64	67	69	74	72.1	92			
7-Mar	81	81	82	81	81	83	85	86	80	72	62	53	51	46	43	41	42	45	50	61	65	73	76	83	66.7	86			
8-Mar	88	89	89	89	81	74	77	79	77	68	61	55	55	53	48	50	55	60	67	67	71	73	71	72	69.4	89			
9-Mar	73	76	73	77	75	78	79	76	79	81	82	75	67	71	78	81	80	86	87	93	94	88	93	91	80.6	94			
10-Mar	90	86	83	82	83	82	82	81	80	78	77	77	73	70	68	65	64	65	65	68	70	72	75	77	75.6	90			
11-Mar	81	84	85	86	84	84	84	84	82	82	83	81	82	80	81	80	81	83	85	86	87	87	87	88	83.6	88			
12-Mar	88	88	87	87	85	85	84	84	83	80	78	81	86	88	86	84	84	85	93	97	98	97	97	97	87.6	98			
13-Mar	97	97	96	97	97	96	94	94	81	63	50	43	34	35	30	29	33	36	41	48	52	54	57	62	63.3	97			
14-Mar	66	67	73	79	79	81	82	84	82	76	67	58	50	46	42	39	43	48	54	56	71	85	92	93	67.2	93			
15-Mar	90	88	86	88	91	90	87	85	82	82	78	66	59	58	54	54	53	59	75	86	87	87	89	86	77.5	91			
16-Mar	84	84	82	80	77	74	70	69	70	69	70	67	69	69	66	65	65	65	65	63	61	62	69	78	70.5	84			
17-Mar	82	83	83	82	82	83	84	84	81	72	64	61	54	48	48	45	39	39	51	72	70	75	77	85	68.6	85			
18-Mar	89	90	90	89	88	90	89	89	85	70	62	72	65	62	52	52	50	50	52	52	53	51	52	49	68.5	90			
19-Mar	49	49	50	53	51	57	64	58	55	53	49	42	39	37	35	31	31	32	34	32	34	38	39	39	43.8	64			
20-Mar	54	61	63	59	70	74	65	68	58	56	50	45	44	42	40	37	37	37	40	41	43	43	49	56	51.3	74			
21-Mar	52	54	60	62	61	60	63	60	56	59	55	42	42	39	37	36	29	29	34	42	46	45	44	47	48.2	63			
22-Mar	49	50	54	53	53	56	57	54	52	57	66	68	71	68	68	69	72	76	87	91	93	93	94	94	68.5	94			
23-Mar	94	95	95	96	96	95	95	94	89	83	77	69	66	61	60	60	72	77	78	77	77	78	79	79	81.5	96			
24-Mar	78	79	80	80	79	79	80	77	76	73	66	66	64	62	61	58	58	57	61	66	69	70	79	87	71.0	87			
25-Mar	88	88	90	88	87	87	87	88	80	72	65	59	54	54	51	48	46	46	52	66	73	77	82	85	71.4	90			
26-Mar	86	89	91	89	90	92	94	91	78	71	69	65	60	57	58	56	59	62	68	76	92	95	97	98	78.5	98			
27-Mar	98	98	98	98	98	97	98	98	96	89	83	77	73	72	70	71	74	80	80	84	91	95	97	97	88.0	98			
28-Mar	97	97	98	98	99	99	99	99	85	60	40	32	32	30	30	27	26	28	31	37	42	45	52	60	60.2	99			
29-Mar	58	63	71	75	78	84	91	86	76	65	63	63	58	54	49	54	55	62	63	65	74	84	85	88	69.4	91			
30-Mar	91	89	92	92	93	96	96	93	78	68	66	60	51	41	38	40	37	41	50	56	63	72	78	83	69.4	96			
31-Mar	84	81	82	86	88	86	76	74	75	74	82	87	85	91	92	91	90	91	93	94	94	95	95	95	86.6	95			
														78.5 79.3 80.5 81.3 81.3 81.7 81.5 80.5 77.1 71.4 66.5 62.2 58.4 56.4 54.3 53.1 53.1 56.1 61.0 65.2 69.0 72.1 75.0 78.0														Diurnal Average	
														98 98 98 98 99 99 99 99 96 89 83 87 86 91 92 91 90 91 93 97 98 97 97 98														Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	47	6.32	6.32
40 - 60	180	24.19	30.51
60 - 80	262	35.22	65.73
80 - 100	255	34.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

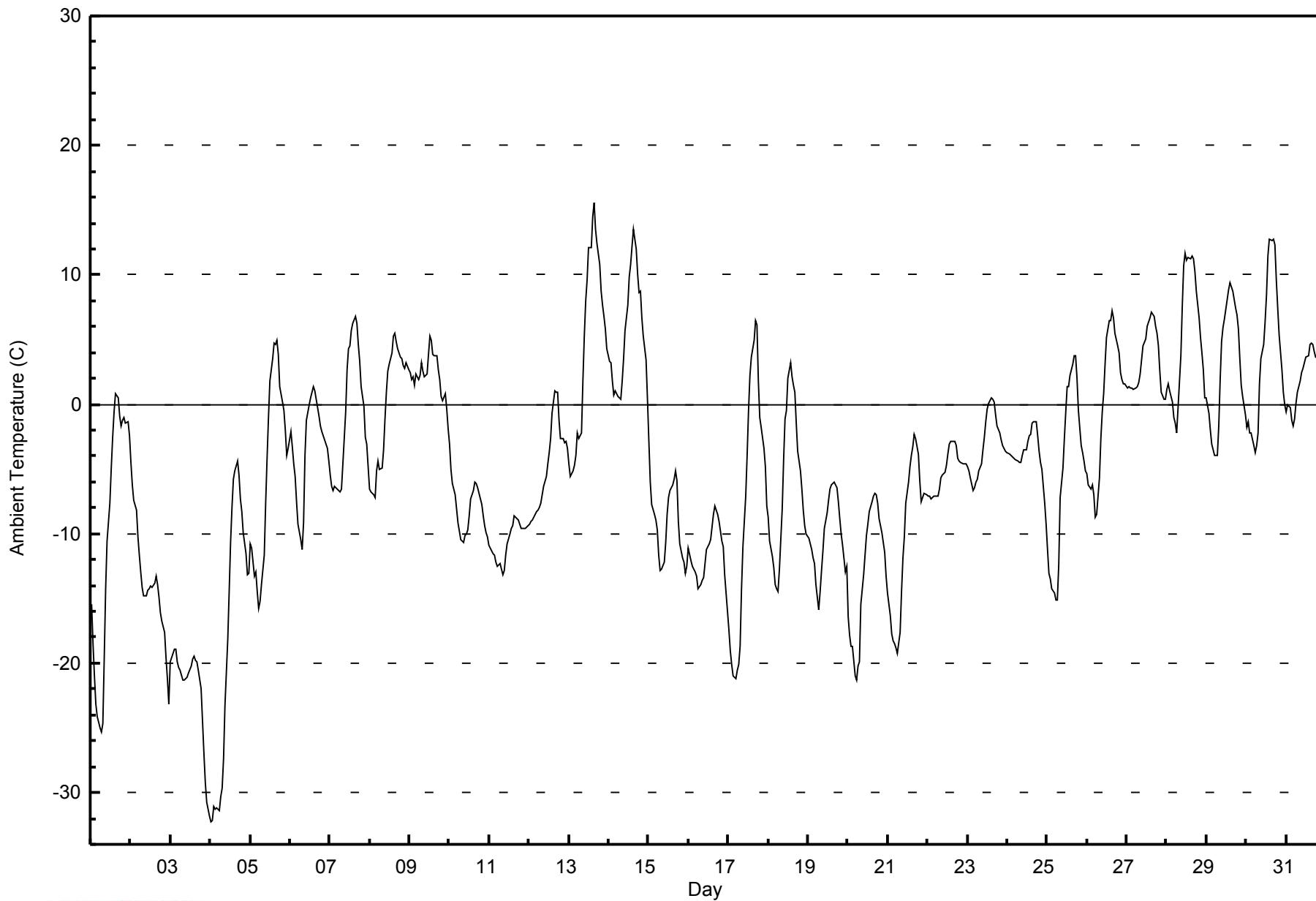


Maximum Value: 15.6 C on Mar 13 16:00		Maximum Daily Average: 5.5 C on Mar 14		Hours in Service: 744																						
Minimum Value: -32.3 C on Mar 4 01:00		Minimum Daily Average: -22.0 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 0.9 C at hour 16		Minimum Diurnal Average: -10.4 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -4.91 C		Percentiles: P ₁ = -30.8 P ₁₀ = -15.8 Q ₁ = -10.2 Median = -4.4 Q ₃ = 1.3 P ₉₀ = 5.4 P ₉₉ = 12.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-15.5	-18.5	-20.9	-23.1	-24.2	-25.0	-25.3	-24.7	-19.6	-14.3	-10.5	-7.6	-5.0	-2.5	-0.5	0.9	0.5	-0.9	-1.7	-1.2	-1.0	-1.5	-1.3	-2.4	-10.2	0.9
2-Mar	-4.5	-6.2	-7.4	-8.2	-10.2	-11.7	-12.9	-14.1	-14.8	-14.8	-14.3	-14.2	-14.1	-14.2	-13.8	-13.3	-13.9	-14.9	-16.1	-16.7	-17.6	-19.6	-21.2	-23.2	-13.8	-4.5
3-Mar	-19.9	-19.2	-19.0	-18.9	-19.9	-20.3	-20.6	-21.4	-21.3	-21.2	-21.1	-20.7	-20.2	-19.6	-19.5	-19.8	-20.0	-20.5	-22.0	-24.5	-27.0	-29.3	-30.7	-31.9	-22.0	-18.9
4-Mar	-32.3	-32.1	-31.1	-31.3	-31.2	-31.4	-30.3	-29.7	-27.3	-23.2	-18.1	-14.5	-10.7	-7.9	-5.8	-5.1	-4.4	-5.5	-7.3	-8.2	-9.9	-11.5	-13.2	-13.1	-18.1	-4.4
5-Mar	-10.8	-11.2	-13.3	-13.0	-14.5	-15.8	-15.2	-13.9	-11.7	-7.7	-4.2	-1.1	1.9	3.5	4.8	4.6	5.0	3.9	1.3	0.2	-0.5	-2.0	-3.9	-3.5	-4.9	5.0
6-Mar	-2.1	-3.3	-4.7	-5.6	-7.5	-9.2	-10.5	-11.3	-9.2	-4.0	-1.3	0.0	0.5	0.9	1.3	1.1	0.3	-0.9	-1.7	-2.1	-2.4	-2.8	-3.4	-4.4	-3.4	1.3
7-Mar	-5.5	-6.4	-6.7	-6.3	-6.5	-6.7	-6.7	-6.5	-4.6	-0.6	2.6	4.2	4.5	5.7	6.3	6.8	6.2	4.7	3.3	1.3	-0.2	-2.5	-3.0	-4.8	-0.9	6.8
8-Mar	-6.6	-6.8	-7.0	-7.2	-5.2	-4.4	-5.0	-4.9	-3.5	-1.1	0.9	2.5	3.1	4.0	5.2	5.5	4.8	4.3	3.6	3.6	3.0	2.8	3.2	2.6	-0.1	5.5
9-Mar	2.5	2.0	2.2	1.5	2.3	1.9	2.2	3.3	2.5	2.1	2.3	3.8	5.3	5.0	3.9	3.8	3.7	2.6	2.0	0.6	0.2	0.8	-0.4	-1.9	2.3	5.3
10-Mar	-3.1	-5.0	-6.1	-7.0	-8.1	-9.2	-9.9	-10.5	-10.6	-10.1	-10.0	-9.7	-8.7	-7.3	-6.6	-6.0	-6.1	-6.4	-6.9	-7.8	-8.6	-9.3	-9.9	-10.3	-8.1	-3.1
11-Mar	-10.9	-11.3	-11.5	-11.6	-12.2	-12.5	-12.4	-12.7	-13.2	-12.8	-11.6	-10.8	-10.0	-9.6	-9.3	-8.7	-8.7	-9.0	-9.3	-9.6	-9.6	-9.6	-9.6	-9.4	-10.7	-8.7
12-Mar	-9.2	-9.1	-9.0	-8.8	-8.3	-8.2	-8.0	-7.6	-7.0	-6.4	-5.6	-4.6	-3.7	-2.6	-0.7	1.0	1.0	0.9	-1.2	-2.6	-2.6	-3.0	-2.9	-3.4	-4.6	1.0
13-Mar	-4.6	-5.5	-5.1	-4.7	-3.9	-2.2	-2.6	-2.2	1.8	5.2	8.0	9.6	12.1	12.1	14.5	15.6	13.5	12.4	10.8	8.7	7.7	6.8	5.9	4.3	4.9	15.6
14-Mar	3.3	3.2	1.8	0.7	1.1	0.6	0.5	0.4	1.8	3.5	5.7	7.6	9.8	10.8	12.2	13.5	12.0	10.1	8.6	8.7	6.6	5.3	3.4	0.4	5.5	13.5
15-Mar	-2.9	-6.1	-7.7	-8.5	-8.9	-9.7	-11.6	-12.9	-12.7	-12.2	-10.6	-8.5	-7.2	-6.7	-6.2	-5.8	-5.2	-5.9	-9.0	-10.8	-11.8	-12.2	-13.1	-12.6	-9.1	-2.9
16-Mar	-11.1	-12.1	-12.6	-12.8	-13.0	-13.3	-14.3	-13.9	-13.7	-13.4	-12.3	-11.2	-10.8	-10.4	-9.5	-8.5	-7.9	-8.5	-9.0	-9.8	-10.5	-11.0	-13.2	-16.0	-11.6	-7.9
17-Mar	-17.4	-19.1	-20.1	-21.0	-21.2	-20.6	-20.2	-18.7	-14.2	-11.0	-7.1	-4.0	-0.5	2.2	3.6	4.9	6.4	6.2	1.8	-1.0	-1.7	-3.4	-4.8	-7.9	-7.9	6.4
18-Mar	-8.7	-10.6	-11.7	-12.6	-14.0	-14.3	-14.5	-12.8	-8.1	-4.3	-1.1	-0.5	2.0	3.2	2.1	1.5	0.9	-1.4	-3.6	-5.2	-6.6	-8.2	-9.4	-10.0	-6.2	3.2
19-Mar	-10.4	-10.8	-11.2	-11.8	-12.3	-14.0	-15.9	-14.4	-12.8	-11.3	-9.6	-8.5	-7.5	-6.6	-6.2	-6.1	-6.0	-6.4	-7.6	-8.8	-10.0	-10.9	-12.9	-12.5	-10.2	-6.0
20-Mar	-16.5	-17.8	-18.7	-18.7	-21.0	-21.3	-20.2	-19.9	-15.5	-13.1	-11.7	-10.2	-9.3	-8.3	-7.6	-7.1	-6.9	-7.0	-7.7	-8.8	-9.9	-10.7	-11.4	-13.3	-13.0	-6.9
21-Mar	-14.6	-16.3	-17.7	-18.3	-18.5	-18.8	-19.3	-17.6	-14.4	-11.9	-10.2	-7.6	-6.0	-4.9	-3.9	-3.3	-2.3	-2.6	-3.9	-5.9	-7.5	-7.2	-6.8	-7.0	-10.3	-2.3
22-Mar	-7.1	-7.1	-7.4	-7.2	-7.1	-7.1	-7.1	-6.5	-5.7	-5.4	-5.3	-4.7	-3.9	-3.1	-2.9	-2.9	-2.8	-3.2	-4.1	-4.4	-4.5	-4.6	-4.6	-4.6	-5.1	-2.8
23-Mar	-4.8	-5.1	-5.7	-6.7	-6.4	-6.0	-5.8	-5.2	-4.6	-3.5	-2.5	-1.3	-0.3	0.0	0.5	0.4	0.2	-0.9	-1.6	-2.2	-2.8	-3.2	-3.4	-3.6	-3.1	0.5
24-Mar	-3.8	-3.8	-3.9	-4.1	-4.1	-4.3	-4.4	-4.5	-4.5	-3.9	-3.5	-3.5	-2.9	-2.4	-2.3	-1.4	-1.4	-1.3	-2.5	-3.6	-4.5	-5.0	-7.6	-9.3	-3.9	-1.3
25-Mar	-11.2	-13.1	-13.5	-14.2	-14.6	-15.1	-15.1	-12.4	-7.2	-4.9	-2.6	-0.6	1.3	1.4	2.2	3.1	3.8	3.7	2.0	-0.5	-3.2	-3.8	-4.4	-5.2	-5.2	3.8
26-Mar	-5.4	-6.2	-6.6	-6.3	-7.0	-8.7	-8.5	-5.7	-2.7	-0.5	0.9	3.1	5.2	6.4	6.5	7.3	6.7	5.5	4.5	3.9	2.5	1.9	1.6	1.6	0.0	7.3
27-Mar	1.3	1.4	1.3	1.2	1.2	1.3	1.3	1.6	2.4	3.5	4.5	5.0	6.0	6.4	6.7	7.1	6.8	6.0	5.5	4.5	2.5	0.9	0.4	0.4	3.3	7.1
28-Mar	1.1	1.6	1.1	0.2	-1.0	-1.5	-2.3	-0.3	3.8	7.6	10.7	11.7	11.2	11.3	11.3	11.4	11.3	10.3	8.8	6.7	5.2	4.0	2.7	0.5	5.3	11.7
29-Mar	0.5	-0.7	-2.0	-3.1	-3.5	-4.0	-4.0	-1.7	1.9	4.8	5.9	6.6	8.1	8.9	9.4	9.1	8.8	7.4	6.9	5.8	3.5	1.4	0.6	-0.8	2.9	9.4
30-Mar	-1.8	-1.3	-2.2	-2.2	-3.2	-3.7	-3.1	-2.2	1.6	3.6	4.6	6.3	8.5	11.5	12.7	12.6	12.8	12.3	9.6	7.5	5.4	2.7	1.0	-0.1	3.9	12.8
31-Mar	-0.6	0.0	-0.3	-1.2	-1.6	-1.1	0.0	0.9	1.8	2.5	2.7	3.2	3.6	3.8	4.6	4.8	4.6	4.0	3.7	3.6	3.4	2.5	1.9	1.8	2.0	4.8
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Shell Muskeg River - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	41	5.51	5.51
-20 - 0	470	63.17	68.68
0 - 10	208	27.96	96.64
10 - 20	25	3.36	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

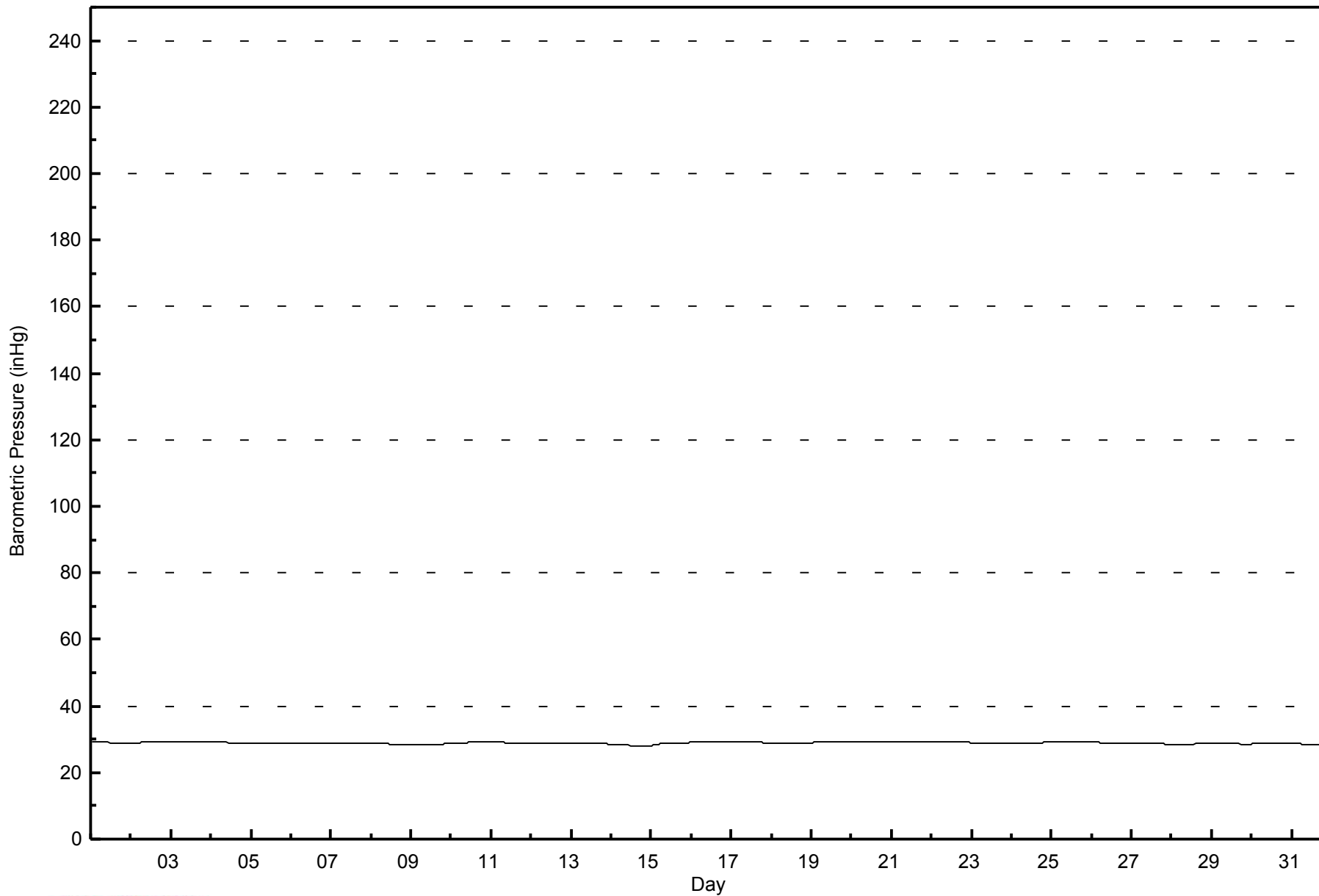
Barometric Pressure (BP) - inHg
Shell Muskeg River - March 2015

Maximum Value: 29.4 inHg on Mar 16 12:00		Maximum Daily Average: 29.3 inHg on Mar 16		Hours in Service: 744																							
Minimum Value: 28.0 inHg on Mar 14 20:00		Minimum Daily Average: 28.2 inHg on Mar 14		Hours of Data: 744																							
Maximum Diurnal Average: 28.9 inHg at hour 10		Minimum Diurnal Average: 28.9 inHg at hour 19		Hours of Missing Data: 0																							
Monthly Average: 28.90 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 of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.9	29.2
2-Mar	28.8	28.8	28.9	28.9	29.0	29.0	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.2	29.2	29.2	29.1	29.3
3-Mar	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3
4-Mar	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	29.0	29.2
5-Mar	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8
6-Mar	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
7-Mar	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9
8-Mar	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.6	28.8
9-Mar	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.5	28.7
10-Mar	28.7	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.0	29.1	29.1
11-Mar	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	29.0	29.0	29.1	29.1
12-Mar	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9	28.9
13-Mar	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.8	28.8	29.0
14-Mar	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.2	28.2	28.1	28.1	28.1	28.1	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.1	28.1	28.2	28.5
15-Mar	28.2	28.3	28.4	28.5	28.6	28.7	28.7	28.7	28.8	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.8	29.0
16-Mar	29.1	29.1	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.4	29.4
17-Mar	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.2	29.4	29.4
18-Mar	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	28.9	28.9	28.9	28.9	29.0	29.0	29.0	28.9	29.0	29.0
19-Mar	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
20-Mar	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3
21-Mar	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
22-Mar	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.1	29.2	29.2
23-Mar	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
24-Mar	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.0	29.1	29.1
25-Mar	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1
26-Mar	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	29.0	29.0
27-Mar	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	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8	28.8
28-Mar	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.8	28.8
29-Mar	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8	28.8
30-Mar	28.6	28.6	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8
31-Mar	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.5	28.5	28.5	28.6	28.7	28.8
																								Diurnal Average			
																								Diurnal Maximum			



WBEA
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - March 2015





Maximum Speed: 28 km/h on Mar 28 16:00	Maximum Daily Speed Average: 18.2 km/h on Mar 11	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 25 08:00	Minimum Daily Speed Average: 0.5 km/h on Mar 22	Hours of Data: 707
Maximum Diurnal Speed Average: 4.2 km/h at hour 20	Minimum Diurnal Speed Average: 0.5 km/h at hour 8	Hours of Missing Data: 37
Monthly Average Velocity: 1.7 km/h 33.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 25	Percent Operational Time: 95.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	ESE3	SE2	SW2	SSE4	SE3	S6	S6	S6	S5	S7	S9	S9	SSW9	S13	S14	S14	S15	S13	S13	S15	S13	SW10	NW11	NNW19	S6.8	NNW19	
2-Mar	N25	N26	N23	N25	NNW24	NNW24	NNW27	N21	N20	N17	NNW23	NNW23	NNW23	NNW21	NNW19	NNW19	NNW20	NNW19	NNW11	NNW9	ENE6	SE2	WSW4	W9	NNW17.1	NNW27	
3-Mar	WNW13	W15	NW11	NNE16	NNW12	N13	N15	N18	NNE21	NNE19	NNE22	NNE20	NNE20	NE17	NE16	NE14	NE15	ENE13	ENE10	ENE7	S2	SSW5	S7	S9	NNE9.4	NNE22	
4-Mar	S9	S8	SSW6	SSW8	SSW7	SSW7	SSW10	SSW10	SSW8	SW8	SSW10	S9	S12	S12	S12	S14	SSW12	SW16	SSW9	S10	S9	SSW7	S9	SW12	SSW9.5	SW16	
5-Mar	W14	W12	WSW3	WSW4	SSW5	SSW8	SSW8	SSW10	SSW6	SSW5	SSW6	SW6	SSW6	SSW9	S9	SSW10	S10	S7	S7	SSW8	SSW9	SW8	WSW5	S5	SSW6.7	W14	
6-Mar	SSW7	SSW8	SSW5	NW2	SSW5	SSW5	S5	SSE3	SE4	ENE5	NE7	NE9	NE10	NE9	NE11	NE16	NE18	NE19	NE12	NE14	NE11	ENE6	ENE4	WSW1	NE4.9	NE19	
7-Mar	SW3	S5	SSW4	S5	SE5	SE4	SE5	S5	SSE4	SSW4	W8	W18	W16	W14	W10	W13	W13	W12	WNW12	NNE11	NE11	ENE3	NE4	S2	W3.8	W18	
8-Mar	SSW9	S8	S8	SSW8	SSW10	S8	S6	SSE7	S9	S9	S8	SW10	SW10	SW13	S7	S5	S7	SSW9	SSW9	SW6	SW11	SW10	SW10	SW5	SSW7.8	SW13	
9-Mar	SW8	SSW6	S6	S6	SSW6	SSW5	NW8	NNW8	ENE7	NE7	NE5	W3	WSW4	N4	NNE6	NNE6	NNE4	NNE5	NE9	NW4	NW7	NNW9	NE17	NNE19	N2.8	NNE19	
10-Mar	NNE23	NNE24	NNE21	N14	NNE17	NNE19	NE15	NE12	NE17	NE13	NE12	NE12	NE12	NE11	NE14	NE14	NE16	NE20	NNE20	NNE21	NE22	NE22	NE19	NNE17	NE16.9	NNE24	
11-Mar	NNE23	NNE22	NNE23	NNE20	NNE23	NNE21	NNE20	NNE20	NNE26	NNE23	NE16	NNE13	NNE16	NNE15	NNE17	NNE15	NNE16	NNE16	NNE17	NNE20	NE17	NNE15	NE16	NNE11	NNE18.2	NNE26	
12-Mar	NNE10	NE10	NE8	NNE3	N1	SE2	S2	S2	WSW4	SW4	SW7	S5	W3	WSW4	WSW5	SW10	WSW7	SSW5	SSE5	SSE3	N4	E4	NNW4	WSW1	SW0.7	NE10	
13-Mar	SW4	SW6	S9	S9	SE10	SSE6	SSW8	S7	S9	SSW11	SSW10	SW15	SSW17	SW20	SSW16	S17	S15	S17	S17	S16	S16	SSE15	S10	S7	S11.4	SW20	
14-Mar	S7	SSW7	SSW6	S4	SSW5	SSW6	SSW7	SSW9	SSW8	SSW10	S12	S11	S10	S10	SSE8	S8	S8	S4	SW5	SSW6	SW6	SSW6	NNE18	NE22	S5.1	NE22	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	NE16
17-Mar	SE3	SSE3	SSW3	S5	SSW8	S7	SSW7	SSW6	SSW7	SW9	SW8	WSW6	WSW9	SW8	WSW6	WSW6	S7	SSW6	SSE3	NNE5	NE8	NNE4	NW3	E1	SSW3.5	WSW9	
18-Mar	ENE6	ESE3	E5	ESE3	S5	SSW6	S5	W3	SW3	SW5	W4	NNE6	N10	NNW10	NNE16	NNE14	NNE18	NNE22	NNE20	N22	NNE20	NNE22	NNE17	NNE16	NNE8.0	NNE22	
19-Mar	NNE15	NNE17	NNE16	NNE17	NNE18	NE7	ENE6	E5	NE9	NNE6	NNE7	NE12	NE15	NE16	NE16	NE17	NNE18	NE19	NE18	NE15	NE17	NE14	ENE8	NE12	NE13.0	NE19	
20-Mar	ESE3	E5	E6	E6	E6	E7	ENE7	SE2	ESE2	NE4	NE6	NE8	NE11	NE12	NNE10	NNE11	NE13	NE15	NE17	NNE18	NE17	NE17	NE13	NE9	NE8.7	NNE18	
21-Mar	ENE10	ENE5	ENE5	ENE4	ENE5	ENE6	ENE5	E3	E1	N6	NNE8	NNW8	NE10	NE15	NNE16	NE14	ESE9	ESE11	E9	SE6	ESE8	ESE9	E7	ENE6	ENE6.2	NNE16	
22-Mar	E4	ESE3	ESE5	ESE6	ESE6	SE6	SE6	SE5	SSE7	SSE6	SSE3	NW2	NNW7	NW9	NW8	NW7	NW7	NW9	WNW7	SE2	ESE3	E3	E3	E3	E0.5	NW9	
23-Mar	ESE2	SSE2	SE4	S4	SSW5	SSW4	S4	WSW6	WSW3	SW6	SW7	SW7	SW5	WSW4	NW7	NW6	W1	NE16	NE15	NE14	NNE17	NE19	NNE16	NE14	NE2.5	NE19	
24-Mar	NE15	NE13	NE12	NNE9	NNE10	NE14	NE11	NE13	NE12	NNW9	N11	NNE9	N8	NNE6	NE10	NE7	ENE9	ESE9	ESE6	E9	ENE12	ENE13	E5	E2	NE8.6	NE15	
25-Mar	ESE2	ESE6	E6	ENE6	ENE5	ENE5	ENE6	ENE0	NNE2	NNW6	NNW6	NW9	NNW8	NNE9	NNE8	N8	N9	NNW7	NNE7	W1	SSE7	S8	S8	S7	NNE2.4	NW9	
26-Mar	S4	S2	SSW4	S3	SW0	SSW3	SW2	SSW4	S6	SW5	WNW6	WSW8	SSW9	WSW9	SSW6	S8	SE7	SE7	SE7	S10	SSW8	SSW7	SSW6	S4	SSW4.7	S10	
27-Mar	S5	SSW6	S5	S6	S7	S6	S9	S7	S8	SSW9	SW10	SW17	SSW11	S11	S10	S9	S11	S9	S7	SSW5	SW7	ESE4	SSW4	SSW7	SSW7.6	SW17	
28-Mar	SSW6	SSW5	S5	SSW3	S4	S5	SSW5	S5	SW5	SW6	NW8	NW16	NNW20	NNW21	NW24	NW28	NNW24	NW21	WNW22	WNW16	WNW13	W13	WNW9	WSW7	WNW9.7	WNW28	
29-Mar	SW6	WSW7	SW7	SSW8	S7	S7	S6	S7	S7	SSW6	NW3	NW5	SSW8	S8	SSW6	W4	ENE3	ENE5	ENE6	NE6	NNW1	NW6	NW7	NW5	SSW2.4	SSW8	
30-Mar	W6	N5	WNW1	SE1	SW4	SSW4	SE4	SE3	SSE3	W3	NW4	SW3	SE7	SSE9	SSW13	SW14	SSW8	SW10	SSW7	NNE2	SE3	SE7	ESE4	E5	SSW3.2	SSW14	
31-Mar	SSE6	S3	SSW5	SSW6	SSW6	SSW6	SSW5	W3	SSW3	SSW4	SSW2	N5	NNE6	NE6	NE17	NE19	NE17	NE23	NE26	NE23	NE18	NNE18	NNE17	NNE18	NE6.9	NE26	

NNE1.5 NNE1.5 ENE1.7 ENE1.6 ENE1.1 ESE1.2 ESE0.9 SE0.5 E1.4 W0.6 NW1.8 NW2.7 NW1.8 NNW1.5 NNE2.5 NNE2.1 NE2.6 NE3.5 NE3.8 NE4.2 NE3.9 NE3.3 NE3.5 NNE3.0	Diurnal Average
N25 N26 NNE23 N25 NNW24 NNW24 NNW27 N21 NNE26 NNE23 NNW23 NNW23 NNW23 NNW21 NW24 NNW28 NNW24 NE23 NE26 NE23 NE22 NE22 NE19 NE22	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

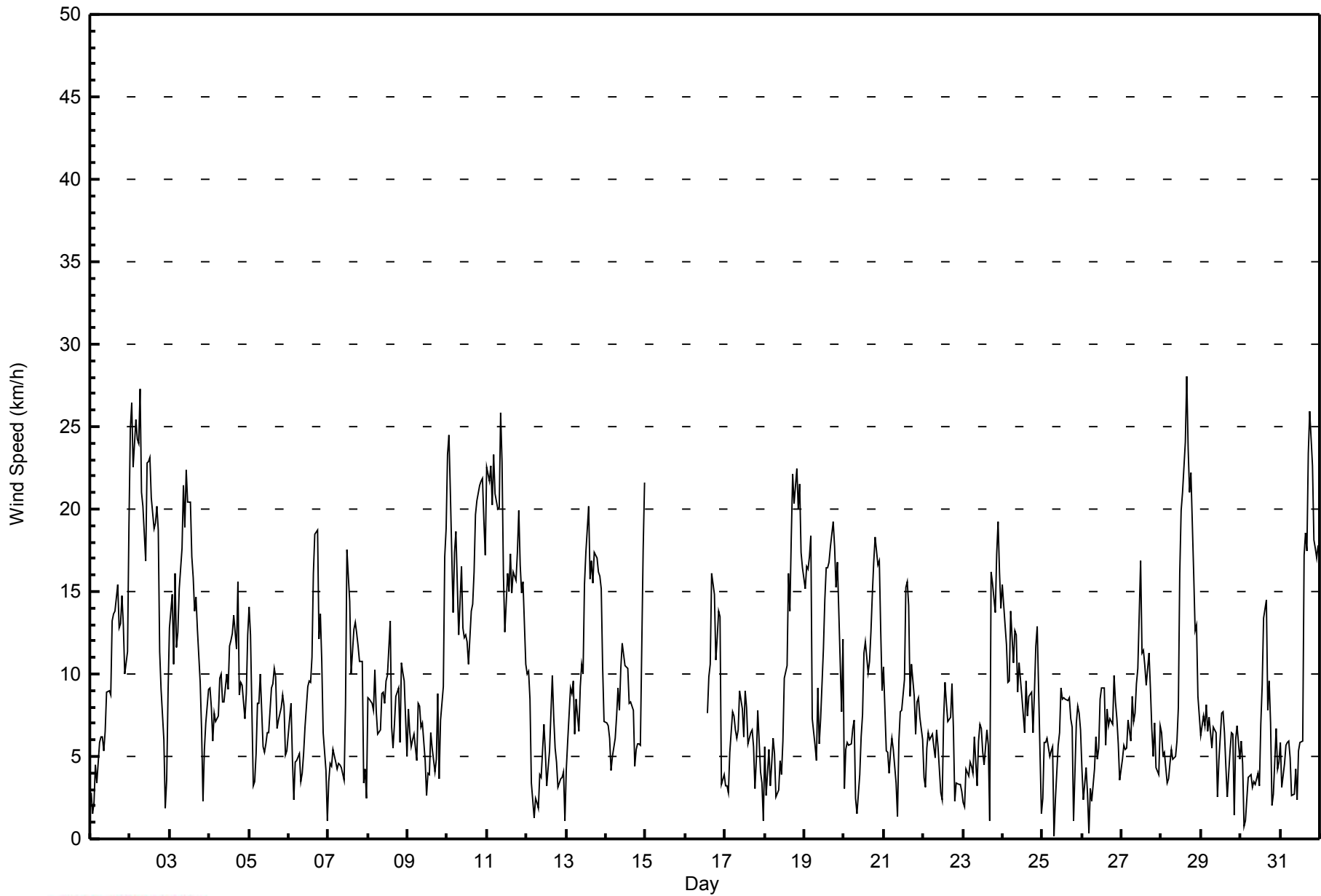
Wind Speed (WS) - km/h
Shell Muskeg River - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 2 01:00 Minimum Value: 1 km/h on Mar 1 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 8																	Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 0 Percent Operational Time: 95.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	1	1	1	1	2	1	1	1	2	3	3	3	3	4	4	5	3	3	3	4	2	5	8	8
2-Mar	9	8	7	9	8	9	9	6	6	5	8	8	7	6	7	7	7	6	5	3	4	2	2	3	9
3-Mar	1	3	3	5	3	4	4	5	6	6	6	5	5	4	3	2	3	2	3	2	1	1	2	1	6
4-Mar	1	1	2	1	1	1	2	2	2	2	3	3	4	4	4	4	3	5	2	2	1	1	2	3	5
5-Mar	2	2	3	2	2	2	2	3	2	1	1	3	2	4	3	3	3	2	1	2	2	2	2	2	4
6-Mar	3	2	3	1	2	1	1	1	1	2	4	4	4	2	3	2	3	3	3	3	2	3	2	1	4
7-Mar	1	1	1	1	1	2	1	1	1	1	4	5	4	3	2	3	3	2	2	2	5	4	3	1	5
8-Mar	2	1	1	2	2	2	1	1	3	3	2	4	3	4	2	2	1	2	2	1	2	2	3	1	4
9-Mar	2	1	2	2	1	2	3	2	3	3	2	1	1	3	4	4	3	3	4	3	2	3	5	3	5
10-Mar	4	5	4	4	5	4	3	4	3	5	3	3	3	3	3	2	2	3	4	5	4	4	3	3	5
11-Mar	4	3	4	4	4	3	2	3	4	3	3	4	4	4	5	4	4	4	5	4	2	3	2	3	5
12-Mar	2	2	2	2	2	1	1	2	1	1	1	2	2	1	2	4	2	2	1	1	1	1	1	1	4
13-Mar	1	2	2	2	2	2	2	2	3	3	3	3	5	4	5	5	4	4	4	3	3	3	3	2	5
14-Mar	2	1	2	1	2	2	2	2	3	4	3	3	3	3	2	2	2	1	2	4	2	2	8	8	8
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	2	2	2	4	4	2	2	3	1	4
17-Mar	1	1	1	2	1	1	1	1	2	2	2	2	2	2	2	1	2	2	2	2	3	2	2	2	3
18-Mar	1	1	1	1	2	1	2	1	1	2	1	1	2	4	4	5	6	6	6	6	6	6	4	5	6
19-Mar	4	5	5	3	3	4	5	4	2	2	2	2	4	3	3	4	4	3	3	4	2	4	1	2	5
20-Mar	1	2	2	2	1	1	2	1	1	2	2	3	3	3	3	3	3	2	2	4	3	3	2	2	4
21-Mar	4	1	1	1	1	1	2	1	1	2	2	2	3	3	3	3	3	3	2	2	2	2	2	1	4
22-Mar	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	1	1	1	1	1	3
23-Mar	1	1	1	1	1	1	1	3	2	2	1	1	1	1	2	2	1	3	2	2	3	2	3	2	3
24-Mar	2	2	2	2	3	2	2	3	3	3	4	4	3	3	3	3	3	2	1	1	3	3	1	1	4
25-Mar	1	1	1	1	1	1	1	1	2	1	2	3	2	3	2	3	3	3	3	1	2	1	1	1	3
26-Mar	2	1	1	1	1	1	2	1	2	1	2	2	3	2	2	3	2	2	2	2	2	1	1	2	3
27-Mar	2	1	1	1	1	1	2	2	3	3	3	4	4	3	3	3	3	3	2	2	2	2	1	2	4
28-Mar	2	2	2	2	1	1	1	1	1	1	3	4	4	5	6	6	6	4	5	3	2	1	3	1	6
29-Mar	2	3	2	2	1	1	1	1	2	2	2	2	3	3	2	2	3	2	2	3	2	3	2	3	3
30-Mar	1	1	1	1	2	2	1	1	1	2	1	2	2	3	6	5	3	4	1	2	3	1	1	1	6
31-Mar	1	2	2	1	1	1	1	1	2	2	1	3	2	5	3	3	4	5	4	5	3	5	5	5	5
																	9 8 7 9 8 9 9 6 6 6 8 8 7 6 7 7 7 6 6 6 6 6 8 8								
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Shell Muskeg River - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	188	26.59	26.59
6 - 11	309	43.71	70.30
12 - 19	156	22.07	92.36
20 - 28	54	7.64	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - March 2015

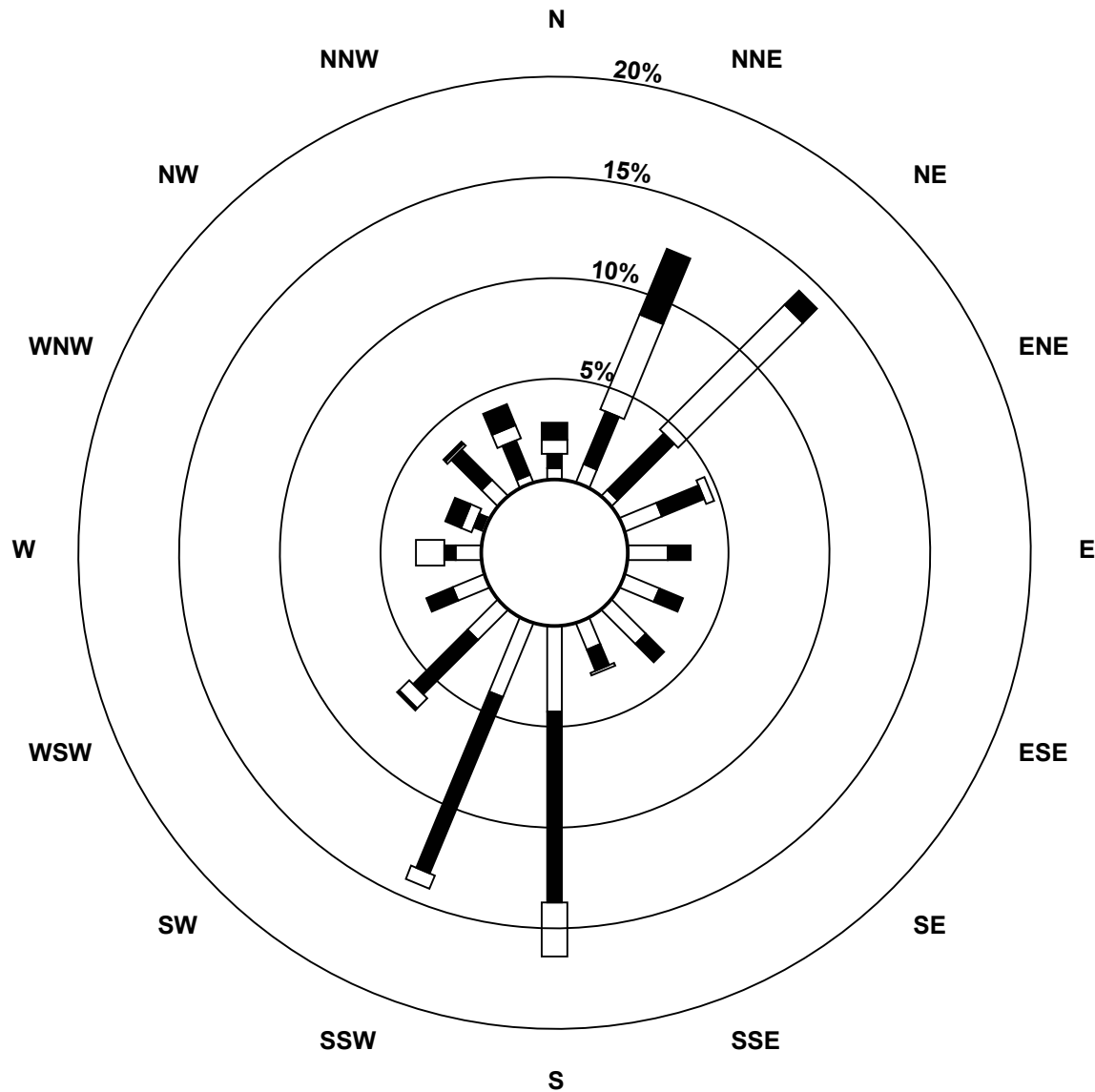
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	7	3	14	14	13	17	10	30	28	15	12	9	1	8	3	188
6 - 11	5	20	28	16	8	9	9	8	67	67	27	10	4	3	15	13	309
12 - 19	5	36	62	3	0	0	0	1	19	5	5	0	10	4	1	5	156
20 - 28	6	25	7	0	0	0	0	0	0	0	1	0	0	6	1	8	54
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	88	100	33	22	22	26	19	116	100	48	22	23	14	25	29	707

Total Number of Valid Hours: 707

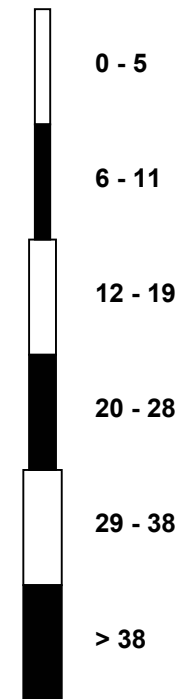
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Wind Speed (WS) - km/h
Shell Muskeg River (AMS 16)**



Classes (km/h)



Total Number of Valid Hours: 707



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Shell Muskeg River - March 2015

Direction of Maximum Speed: 304 deg on Mar 28 16:00																				Hours in Service: 744							
Direction of Maximum Daily Speed Average: 27.5 deg on Mar 11																				Hours of Data: 707							
Direction of Minimum Speed: 61 deg on Mar 25 08:00										Direction of Minimum Daily Speed Average: 0.5 deg on Mar 22										Hours of Missing Data: 37							
Monthly Average Direction: 221.3 deg																				Percent Operational Time: 95.0							
Day	Hourly Period Ending At (MST)																								Daily Average		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	110	129	226	168	146	178	184	183	189	185	191	188	192	180	179	174	177	181	184	183	190	215	304	336	189.3		
2-Mar	355	3	3	2	347	333	343	350	359	352	337	338	343	335	339	333	329	328	329	334	75	145	251	266	344.0		
3-Mar	295	277	304	21	347	357	5	2	21	17	23	23	28	35	41	53	52	59	67	75	186	209	190	176	19.4		
4-Mar	185	188	199	201	200	198	203	203	201	223	204	185	180	191	183	186	194	217	199	190	177	194	191	225	196.7		
5-Mar	260	281	244	253	205	201	208	225	196	204	211	228	200	204	180	193	191	189	183	201	206	234	238	185	213.7		
6-Mar	213	211	202	311	205	199	175	157	138	72	39	43	40	41	43	44	45	42	47	53	42	60	70	256	55.2		
7-Mar	217	177	192	181	126	143	133	183	147	201	266	275	271	270	259	266	270	276	285	29	44	67	51	182	259.5		
8-Mar	205	180	179	206	202	186	179	154	174	180	180	215	229	216	184	169	187	205	212	220	227	222	229	220	200.6		
9-Mar	234	210	185	172	204	200	314	334	62	42	49	270	248	349	17	32	15	23	47	318	323	333	35	30	5.6		
10-Mar	30	27	26	11	26	27	42	53	45	43	38	42	43	44	40	37	35	41	29	25	36	35	35	32	34.0		
11-Mar	27	26	27	28	26	30	26	25	28	29	35	16	27	20	25	20	21	23	24	27	46	32	46	27	27.5		
12-Mar	29	47	45	31	353	125	175	183	238	223	231	178	279	241	243	228	254	210	157	156	356	88	348	244	228.2		
13-Mar	221	231	176	186	144	151	192	181	184	192	211	218	200	217	195	189	177	176	184	178	172	166	179	189	187.9		
14-Mar	179	193	196	191	208	204	202	210	202	199	187	191	185	179	161	173	177	187	232	205	214	197	27	35	186.4		
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	45	49	51	48	45	20	23	31	49	63	122	--		
17-Mar	125	158	193	184	195	187	197	202	205	228	227	253	239	231	253	239	184	209	151	12	38	16	323	98	213.4		
18-Mar	67	106	90	103	190	194	191	269	217	229	260	20	349	346	29	20	24	22	17	11	17	13	31	18	19.1		
19-Mar	23	21	26	32	30	52	76	79	55	20	27	51	52	39	37	35	33	34	43	52	46	49	74	46	39.9		
20-Mar	120	85	85	79	93	89	76	132	107	44	44	55	48	37	30	31	43	47	43	33	37	46	45	54	50.5		
21-Mar	57	70	78	67	70	73	74	97	92	353	23	346	40	34	32	41	110	114	101	127	117	108	95	77	66.0		
22-Mar	86	105	102	118	117	139	135	131	162	159	158	311	333	312	315	313	315	308	285	136	115	99	83	92	85.5		
23-Mar	107	166	131	177	193	201	187	244	242	221	233	229	220	237	318	318	269	47	47	42	32	34	32	44	34.3		
24-Mar	50	49	48	31	15	34	37	46	45	343	2	30	6	20	55	38	58	107	110	85	65	63	89	95	45.5		
25-Mar	110	102	98	76	76	61	58	61	20	340	341	309	327	33	24	7	349	345	32	281	149	178	183	172	33.2		
26-Mar	186	186	206	180	214	211	224	206	180	229	296	255	209	241	194	176	143	145	144	182	204	212	197	184	198.2		
27-Mar	187	195	187	186	190	180	185	182	189	201	215	225	208	178	184	187	186	183	181	196	230	118	196	194	193.5		
28-Mar	211	197	178	193	172	183	197	191	219	231	310	311	296	300	305	304	300	304	302	303	287	280	291	251	287.5		
29-Mar	236	242	220	204	175	179	182	180	177	195	308	324	209	176	194	260	65	69	59	40	333	321	317	305	211.4		
30-Mar	281	11	295	124	224	192	136	146	166	276	324	214	143	163	208	214	205	225	208	15	130	144	122	96	192.2		
31-Mar	152	175	201	200	196	192	196	263	193	209	206	352	26	48	43	49	55	42	43	44	37	18	17	15	41.8		
20.0 28.4 65.5 62.5 76.7 118.3 111.1 141.8 96.6 278.2 321.3 306.7 318.4 327.1 22.1 12.2 36.8 37.3 41.1 42.7 51.7 48.5 36.9 31.9																								Diurnal Average			
AF - Analyzer Failure All monthly, daily, and diurnal averages have been calculated using vector methods																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

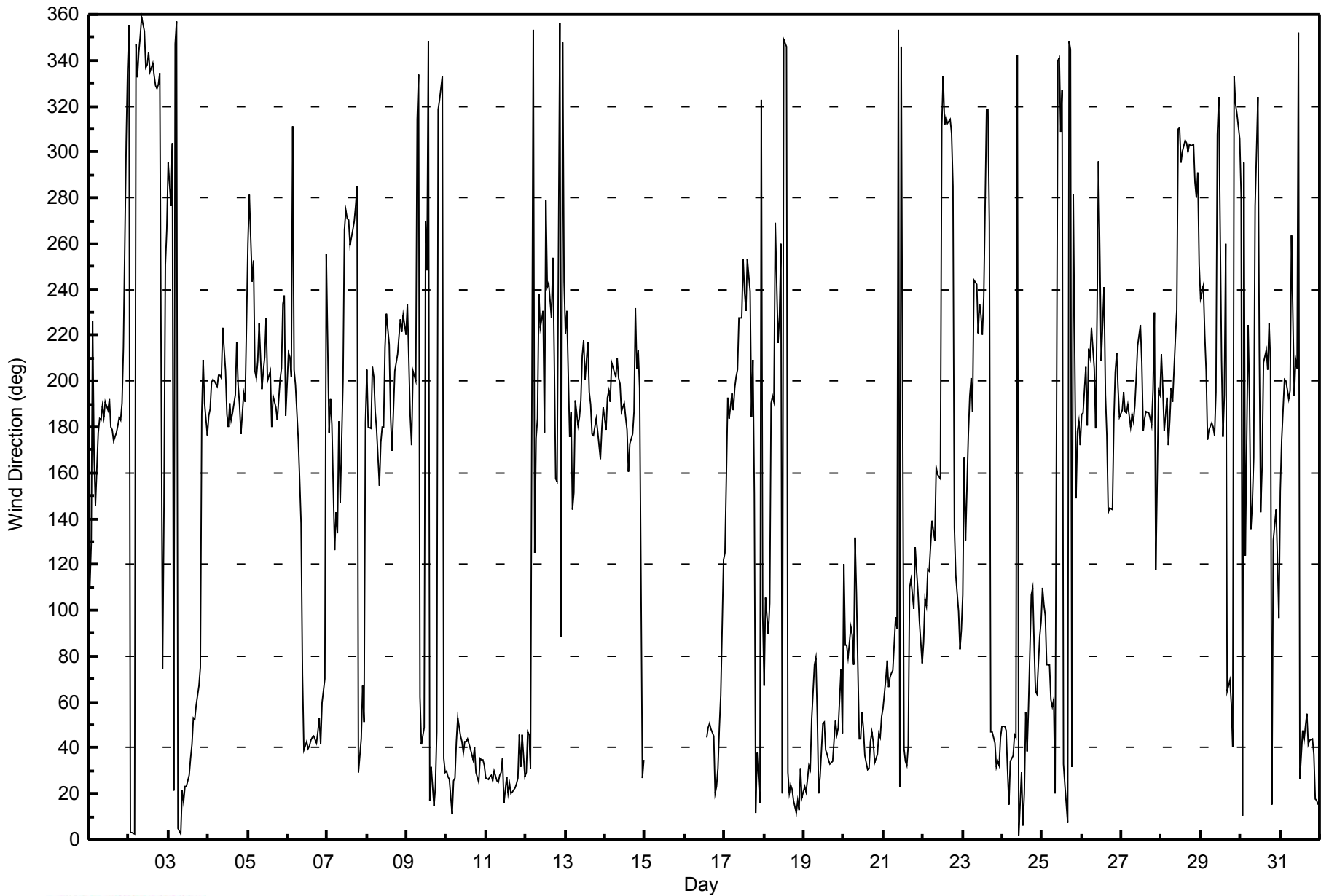
Wind Direction (WD) - deg
Shell Muskeg River - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Mar 30 03:00 Minimum Value: 4 deg on Mar 4 00:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 18 Q ₃ = 27 P ₉₀ = 41 P ₉₉ = 89																								Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 0 Percent Operational Time: 95.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	50	67	39	18	18	8	10	13	16	23	23	25	26	17	16	16	15	15	15	15	17	16	36	22	67
2-Mar	20	19	18	19	22	21	19	18	18	19	21	21	19	22	23	23	24	22	22	26	35	57	52	26	57
3-Mar	8	9	40	19	19	23	18	18	17	21	19	19	17	19	14	12	9	10	14	32	34	13	10	4	40
4-Mar	7	10	14	14	14	12	12	14	16	11	26	24	20	22	20	18	20	12	15	16	10	11	15	18	26
5-Mar	11	8	78	57	30	17	15	13	21	23	16	14	33	33	23	21	19	29	16	15	17	16	36	26	78
6-Mar	34	17	76	74	36	19	14	32	37	40	63	50	34	10	11	6	10	9	15	13	8	23	18	90	90
7-Mar	20	14	14	17	19	30	22	23	20	26	23	13	12	13	16	12	11	9	22	22	34	61	40	69	69
8-Mar	11	11	9	15	14	15	20	13	18	17	20	25	14	20	19	15	15	14	11	10	7	5	9	17	25
9-Mar	12	17	24	20	14	27	28	34	38	33	36	57	41	66	31	66	44	60	18	76	28	25	19	12	76
10-Mar	11	11	12	20	17	13	11	21	10	24	15	13	14	17	14	15	13	10	11	11	12	12	14	13	24
11-Mar	8	9	9	12	8	8	7	8	8	8	13	20	15	19	16	18	19	16	14	10	7	18	7	22	22
12-Mar	30	12	15	62	92	36	41	70	35	37	12	28	78	29	22	24	14	37	18	18	41	29	39	87	92
13-Mar	23	28	11	22	12	30	28	21	18	23	16	13	19	11	20	18	17	14	15	13	11	12	19	19	30
14-Mar	17	14	18	16	17	18	13	13	27	20	18	22	22	16	16	17	13	17	51	55	29	22	62	12	62
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	34	15	24	10	11	23	18	12	9	46	31	46
17-Mar	41	39	31	13	11	14	11	13	19	16	21	18	11	18	27	18	24	17	54	29	25	39	41	96	96
18-Mar	16	39	18	21	15	12	22	31	39	25	29	33	16	23	14	20	16	17	17	16	18	18	16	18	39
19-Mar	17	19	18	13	9	60	61	63	16	43	38	15	14	15	15	18	15	12	11	11	7	17	15	9	63
20-Mar	41	17	19	15	11	11	11	36	82	71	19	27	17	20	28	26	17	13	12	10	11	9	10	17	82
21-Mar	18	18	16	18	13	13	19	27	79	31	31	31	21	13	15	17	29	20	17	17	16	14	15	12	79
22-Mar	13	15	16	13	13	13	14	19	22	34	68	92	28	17	21	21	21	17	17	54	15	15	12	19	92
23-Mar	15	37	9	22	18	16	30	27	54	21	11	13	18	37	24	28	85	7	11	13	9	7	9	13	85
24-Mar	8	11	12	23	19	12	15	18	25	22	35	38	40	51	24	44	28	16	14	10	19	13	17	70	70
25-Mar	28	7	8	12	15	8	12	91	63	23	30	21	29	34	30	32	25	26	40	87	20	12	10	9	91
26-Mar	32	33	18	36	86	13	46	25	27	37	41	28	25	24	41	18	15	15	17	15	17	15	16	39	86
27-Mar	30	17	17	19	13	17	15	16	18	20	24	14	27	15	17	18	16	16	16	22	9	50	32	14	50
28-Mar	16	30	17	54	11	13	12	16	15	23	29	21	13	13	14	13	13	12	13	12	9	7	26	11	54
29-Mar	19	18	20	13	16	15	21	15	22	32	79	41	25	23	26	35	67	24	32	27	89	26	25	31	89
30-Mar	22	38	99	89	57	41	19	27	49	52	50	80	31	30	26	22	27	22	15	79	62	10	19	22	99
31-Mar	15	28	25	12	8	12	26	29	40	48	56	50	26	62	8	11	15	9	10	11	12	19	17	18	62
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Shell Muskeg River - March 2015



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	14:00
Barometric Pressure	742 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
Cal Gas Concentration	50.8 ppm	Cal Gas Expiry Date	41788
Gas Cert Reference	LL107937		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632
DACS voltage range	ethernet connection	DACS channel #	192.168.1.43

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-710	-710
Analyzer Range (mv)	1000	1000	Lamp voltage	827	826
Calculated slope	0.998632	1.007336	Chamber temp.	44.9	44.9
Calculated intercept	2.692679	2.919281	Pressure (mmHg)	723.4	718.6
Analyzer Background	6.0	6.0	Flow (lpm)	0.456	0.452
Analyzer Coefficient	1.221	1.221	Intensity	88	90

Analyzer make Thermo 43i Analyzer serial # 1118148498

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	78.7	799.6	791.4	1.010
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	78.7	799.6	793.3	1.008
second point	5000	39.4	400.3	390.2	1.026
third point	5000	19.7	200.2	194.4	1.030
calibrator zero					
as left zero	5000	0.0	0.0	0.5	NA
as left span	5000	78.7	799.6	781.3	1.023
Average Correction Factor					1.021

Corrected As found 791.2 Previous response 798.0 % change 0.9%

Notes:

No adjustments required.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

SO₂ Calibration Summary

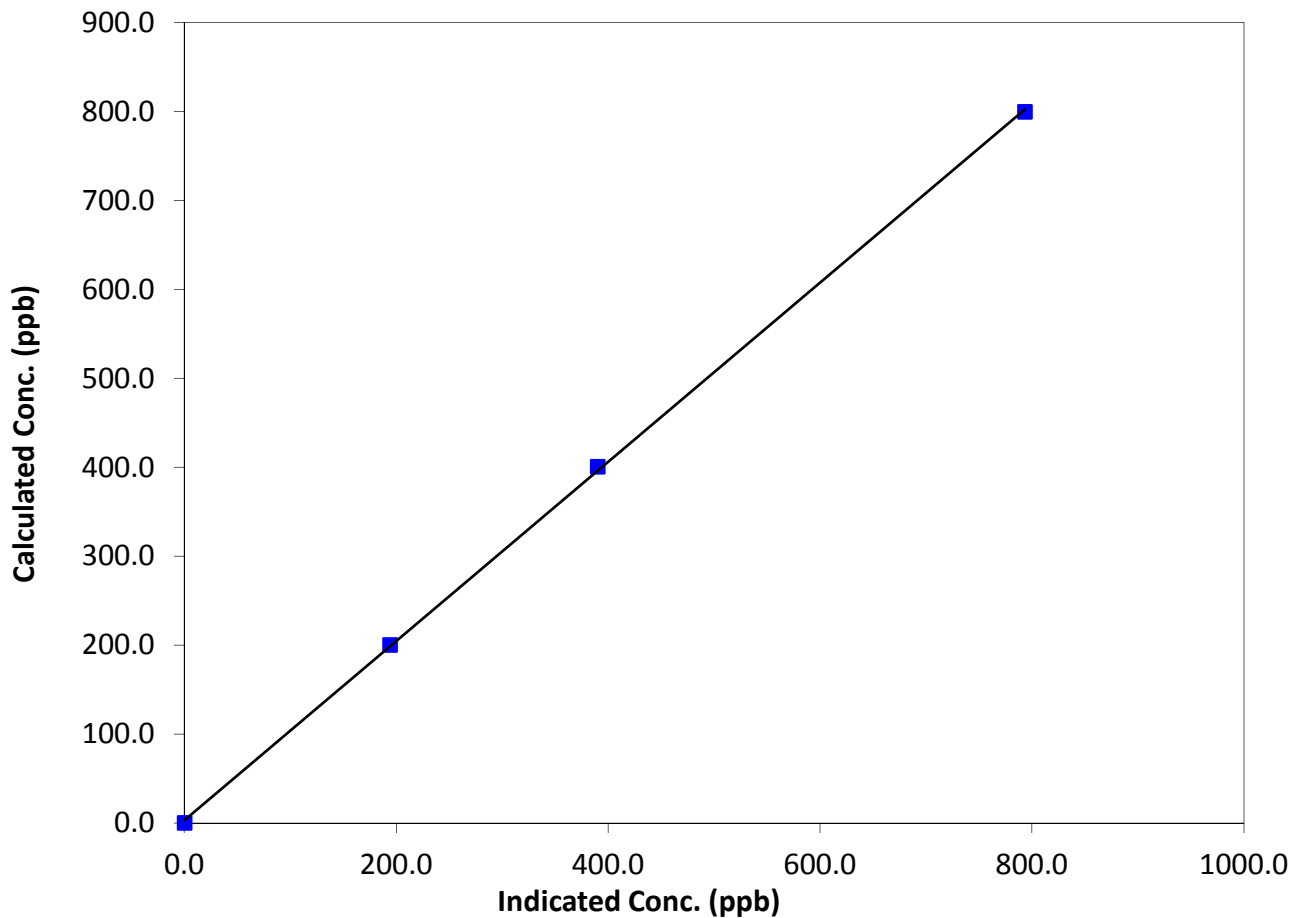
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:05	End Time (MST)	14:00
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

Calibration Data

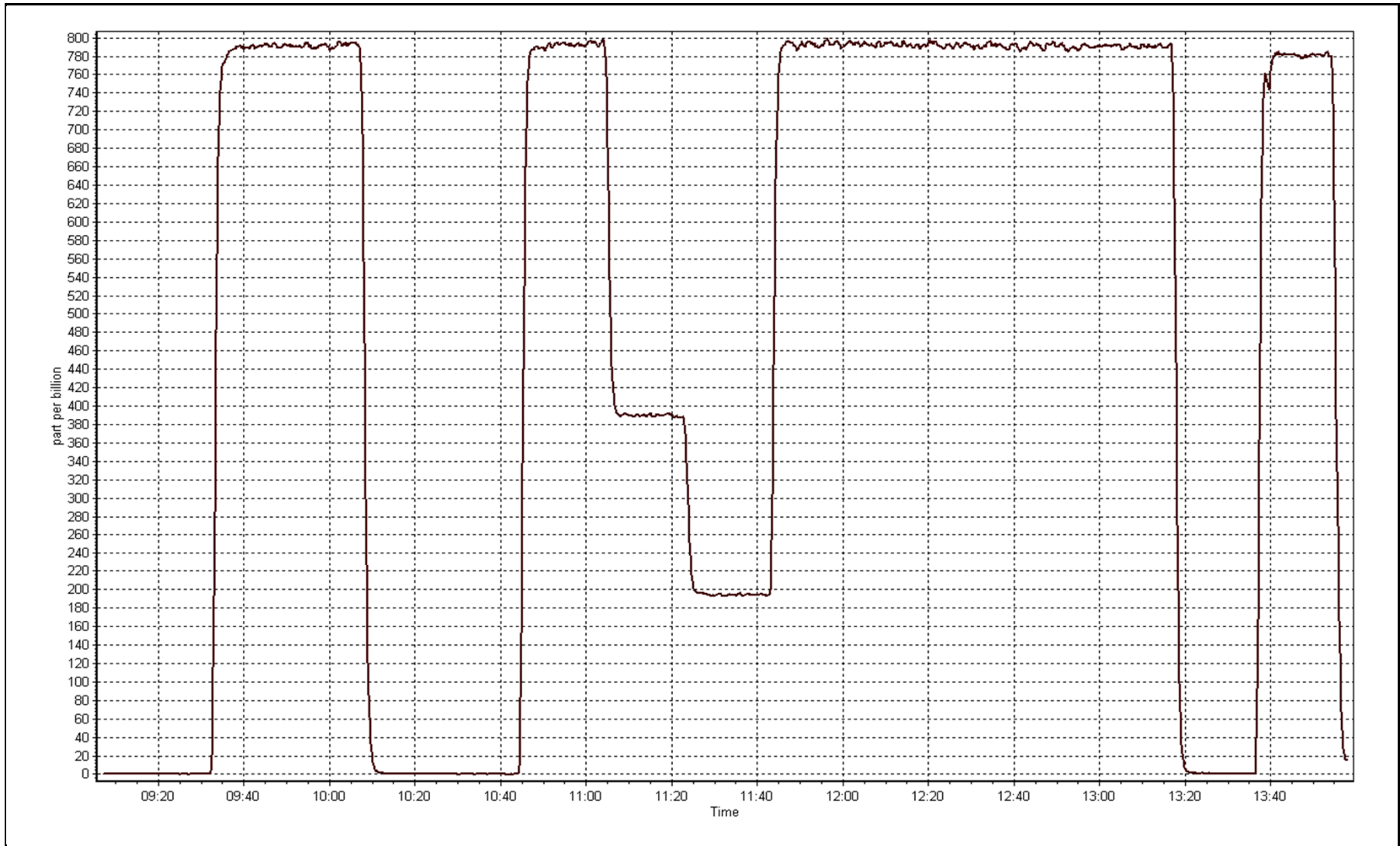
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999894
799.6	793.3	1.0079		
400.3	390.2	1.0258	Slope	1.007336
200.2	194.4	1.0297		
			Intercept	2.919281

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 17, 2015





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, March 17, 2015	Previous Calibration	Wednesday, February 18, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	14:00
Barometric Pressure	742 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
Gas Cert Reference	LL107937	Cal Gas Expiry Date	41788
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1078.8 ppm
C3H8 Cal Gas Conc.	205 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632
DACS voltage range	ethernet connection	DACS channel #	192.168.1.51

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	25	25	Air or Bypass press	34.8	34.8
Calculated slope	1.002175	1.000234	Fuel Pressure	24.2	24.2
Calculated intercept	0.046560	0.040861	Flame	157.0	157.7

Analyzer make Thermo 51i-LT Analyzer serial # 1218153458

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.07	N/A
as found span	5000	78.7	16.98	16.97	1.001
calibrator zero	5000	0.0	0.00	0.01	N/A
high point	5000	78.7	16.98	16.98	1.000
second point	5000	39.4	8.50	8.37	1.016
third point	5000	19.7	4.25	4.20	1.012
calibrator zero					
as left zero	5000	0.0	0.00	0.18	N/A
as left span	5000	78.7	16.98	16.72	1.016
Average Correction Factor					1.009

Corrected As found 16.90 Previous response 16.90 % change 0.0%

Notes:

changed hydrogen cylinder after as founds; adjusted zero and span.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

THC Calibration Summary

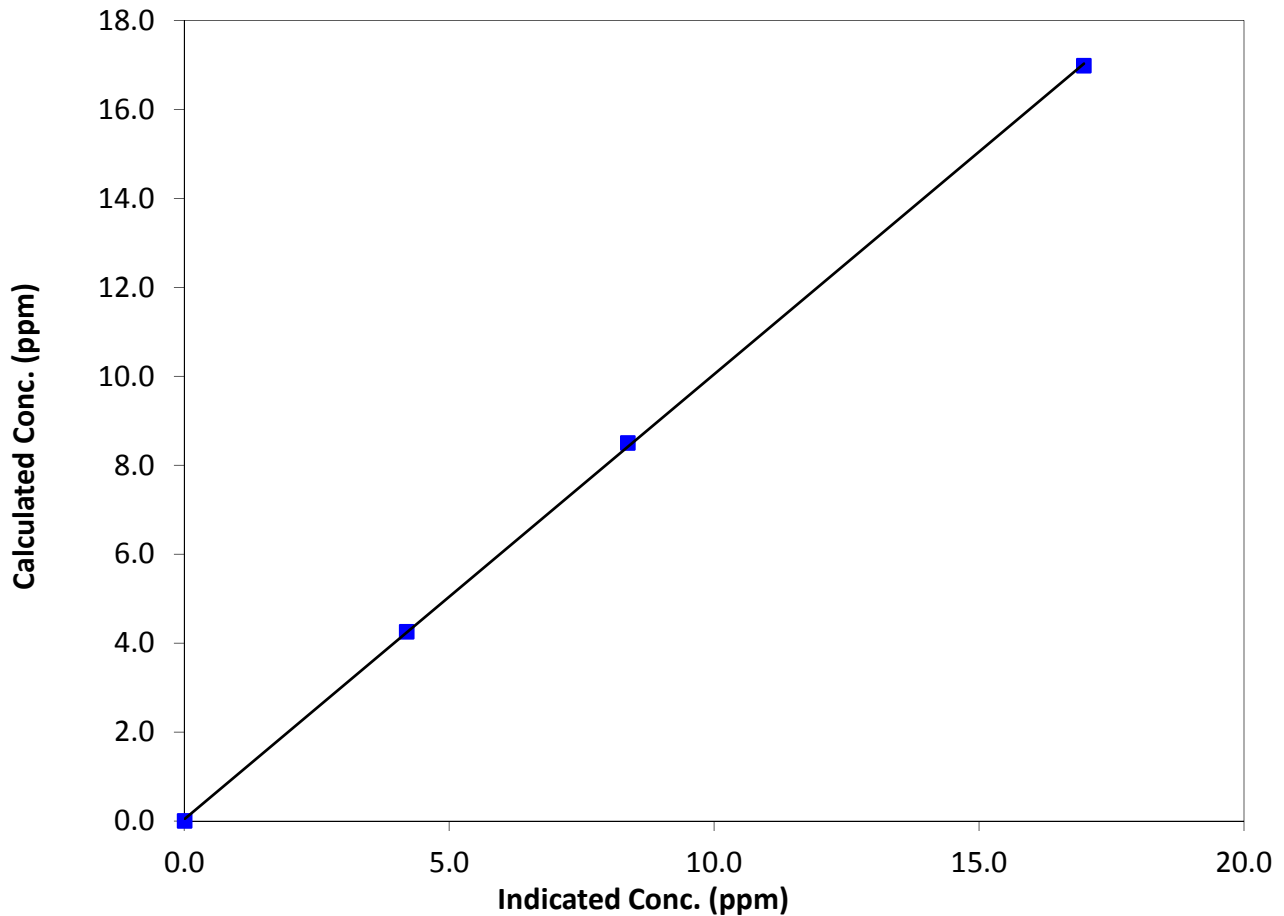
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 18, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:05	End Time (MST)	14:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

Calibration Data

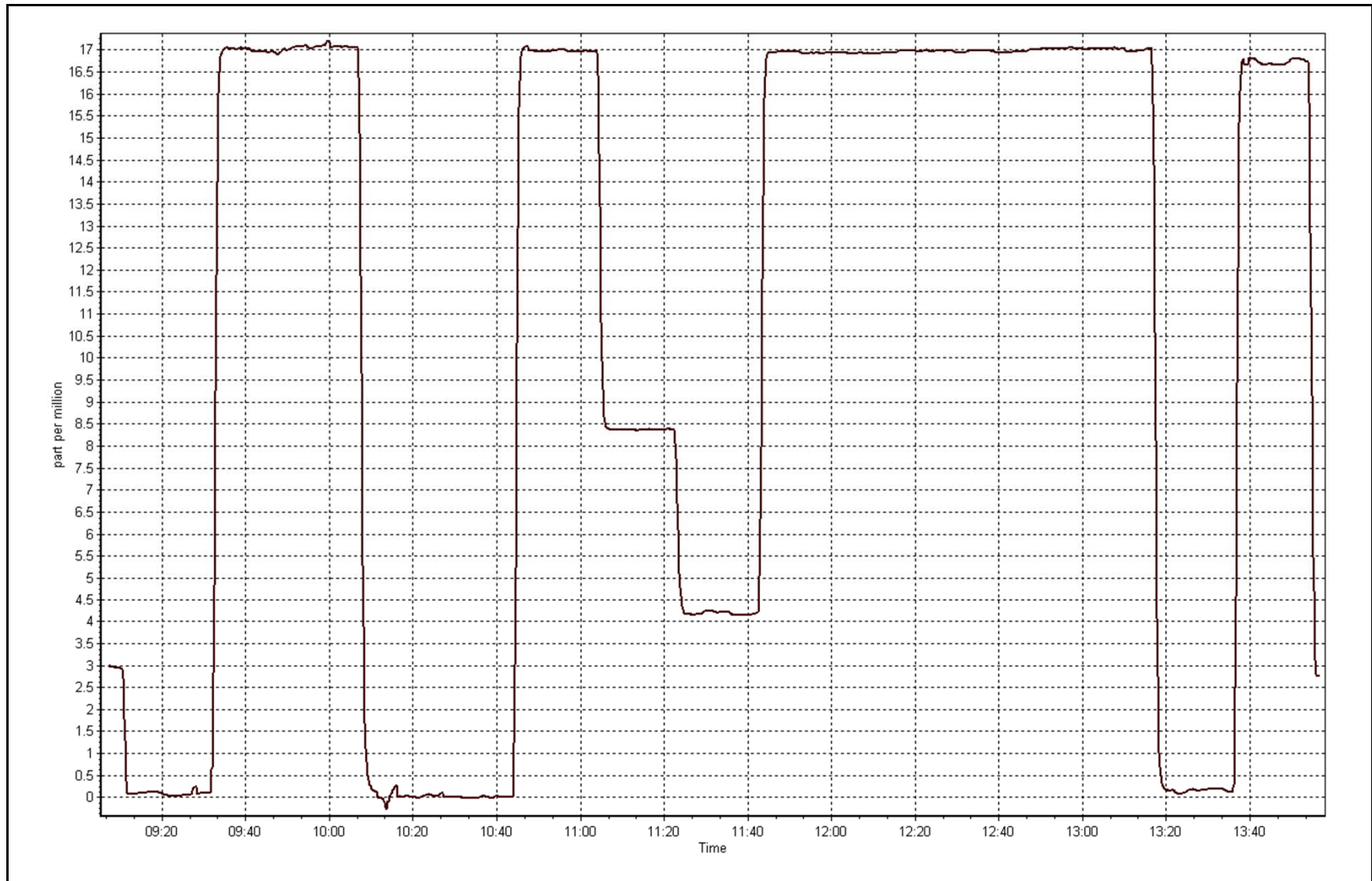
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	N/A	Correlation Coefficient	0.999921
16.98	16.98	1.0000		
8.50	8.37	1.0156	Slope	1.000234
4.25	4.20	1.0120		
			Intercept	0.040861

THC Calibration Curve



THC Calibration Plot

Date: March 17, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 18, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	14:00
Barometric Pressure	742 mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	11081107
NO Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	May 29, 2014
NO _x Cal Gas Conc	51.3 ppm	Cal Gas Serial #	LL107937

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.000090	0.999220	0.996995
	Data Offset	2.555321	2.781236	-0.067243
After	Data Slope	1.015754	1.014935	1.000486
	Data Offset	2.537000	2.754807	1.601965
IP address		192.168.1.42		

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.812	ppb	0.812	ppb
NO _x coefficient	0.999	ppb	0.999	ppb
NO ₂ coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	8.5		8.5	
NO _x bkgrnd	8.6		8.6	
Chamber Temp	50.1	Deg C	50.5	Deg C
Moly Temp	322.9	Deg C	323.0	Deg C
PMT Temp	-2.8	Deg C	-3.1	Deg C
O ₃ flow	ok	ccm	ok	ccm
R Cell Press	173.1	mmHg	172.8	mmHg
Sample Flow	885	ccm	971	ccm

Notes:

No adjustments required.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 17, 2015

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.7	0.3	0.5	N/A	N/A
as found span	5000	78.7	807.5	805.9	1.6	799.4	797.6	1.8	1.0101	1.0104
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.3	0.2	N/A	N/A
high point	5000	78.7	807.5	805.9	1.6	794.6	793.5	1.1	1.0162	1.0156
second point	5000	39.4	404.2	403.5	0.8	391.8	391.1	0.8	1.0317	1.0317
third point	5000	19.7	202.1	201.7	0.4	194.9	194.5	0.4	1.0370	1.0371
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.7	0.4	0.3	N/A	N/A
as left span	5000	78.1	801.3	483.0	318.3	778.0	479.4	298.6	1.0300	1.0076
Average Correction Factor									1.0283	1.0281

Corrected As found NO_x= 798.7 NO= 797.3 Percent Change NO_x= 0.8% NO= 0.8%
 Previous Response NO_x= 804.8 NO= 803.7

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 78.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO ₂ (300)	N/A	483.0	306.6	789.0	483.0	306.0	1.0075	1.0000	1.0020	99.8%
2nd NO ₂ (200)	N/A	580.4	209.2	787.6	580.4	207.2	1.0094	1.0000	1.0098	99.0%
3rd NO ₂ (100)	N/A	676.9	112.7	785.3	676.9	108.4	1.0123	1.0000	1.0395	96.2%
4th NO ₂ (0)	789.6	N/A	1.2	790.8	789.6	1.2	1.0053	1.0000	N/A	N/A
Average Correction Factor							1.0086	1.0000	1.0171	98.3%

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

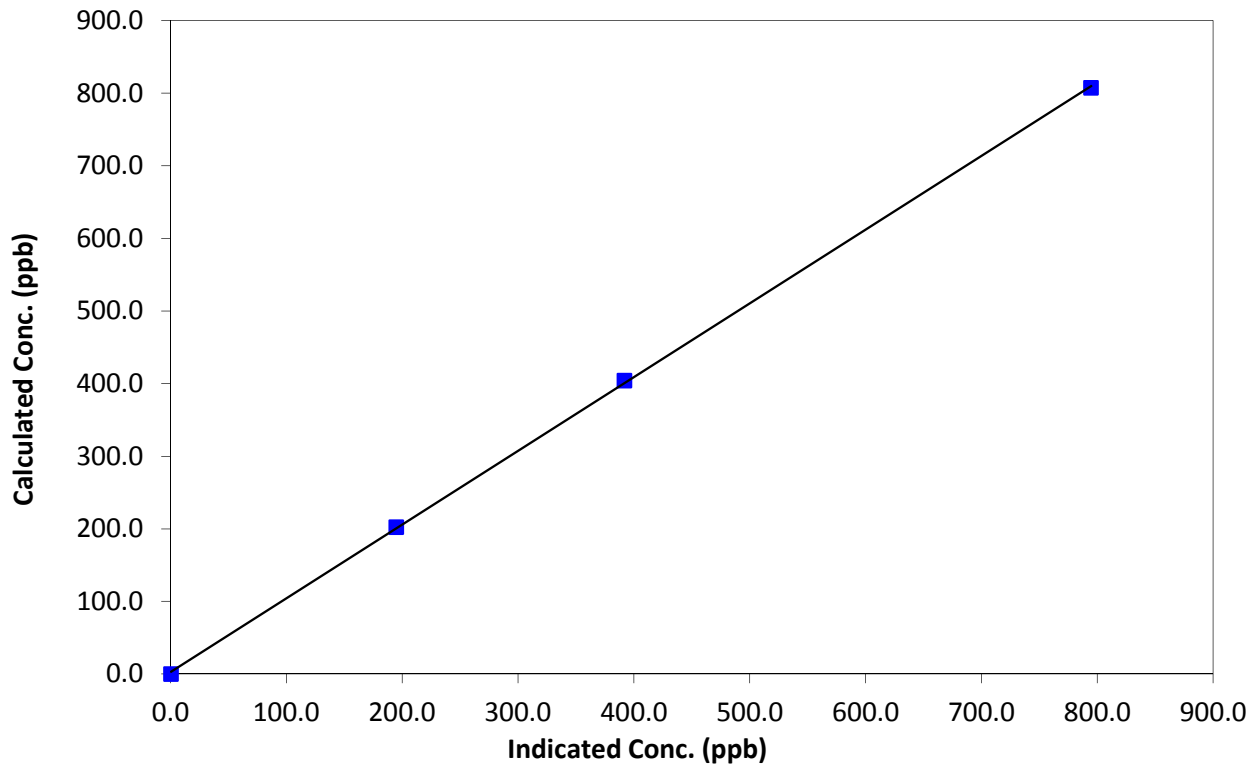
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 18, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:05	End Time (MST)	14:00
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	0.5	N/A	Correlation Coefficient	0.999914
807.5	794.6	1.0162		
404.2	391.8	1.0317	Slope	1.015754
202.1	194.9	1.0370		
			Intercept	2.537000

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

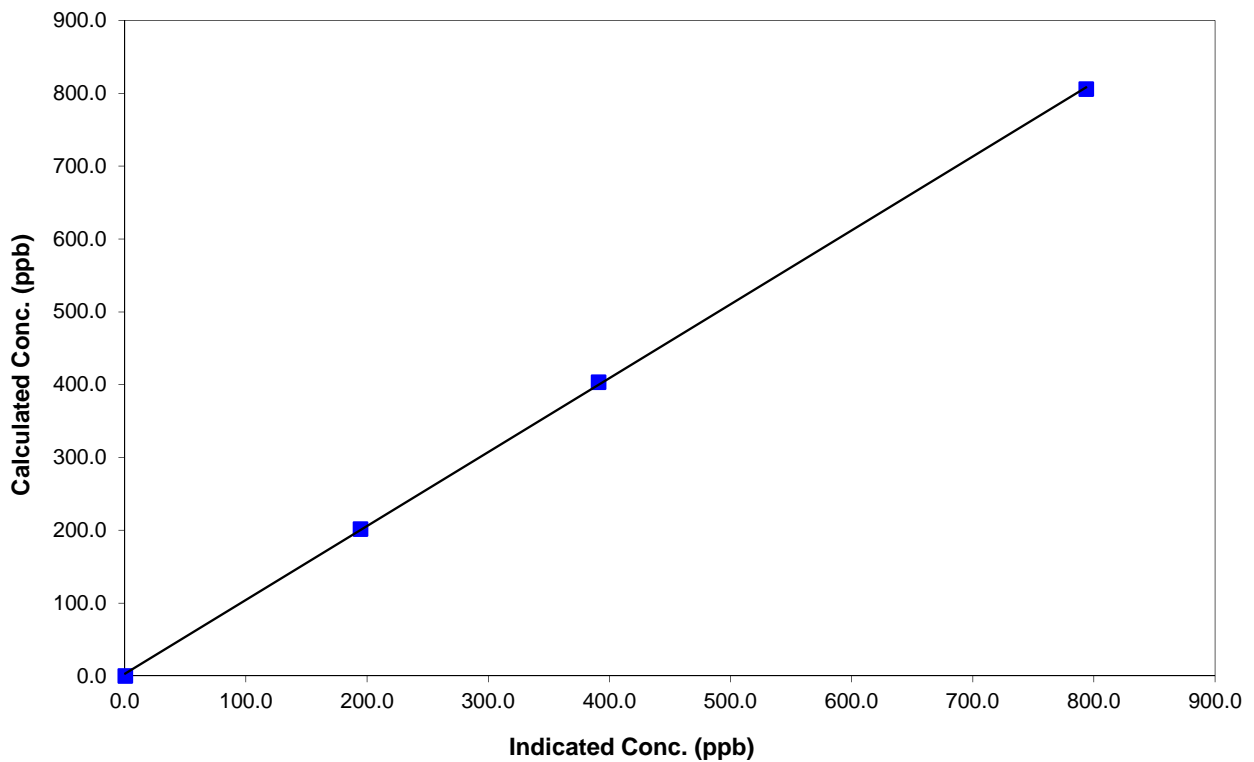
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 18, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:05	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999911
805.9	793.5	1.0156		
403.5	391.1	1.0317	Slope	1.014935
201.7	194.5	1.0371		
			Intercept	2.754807

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

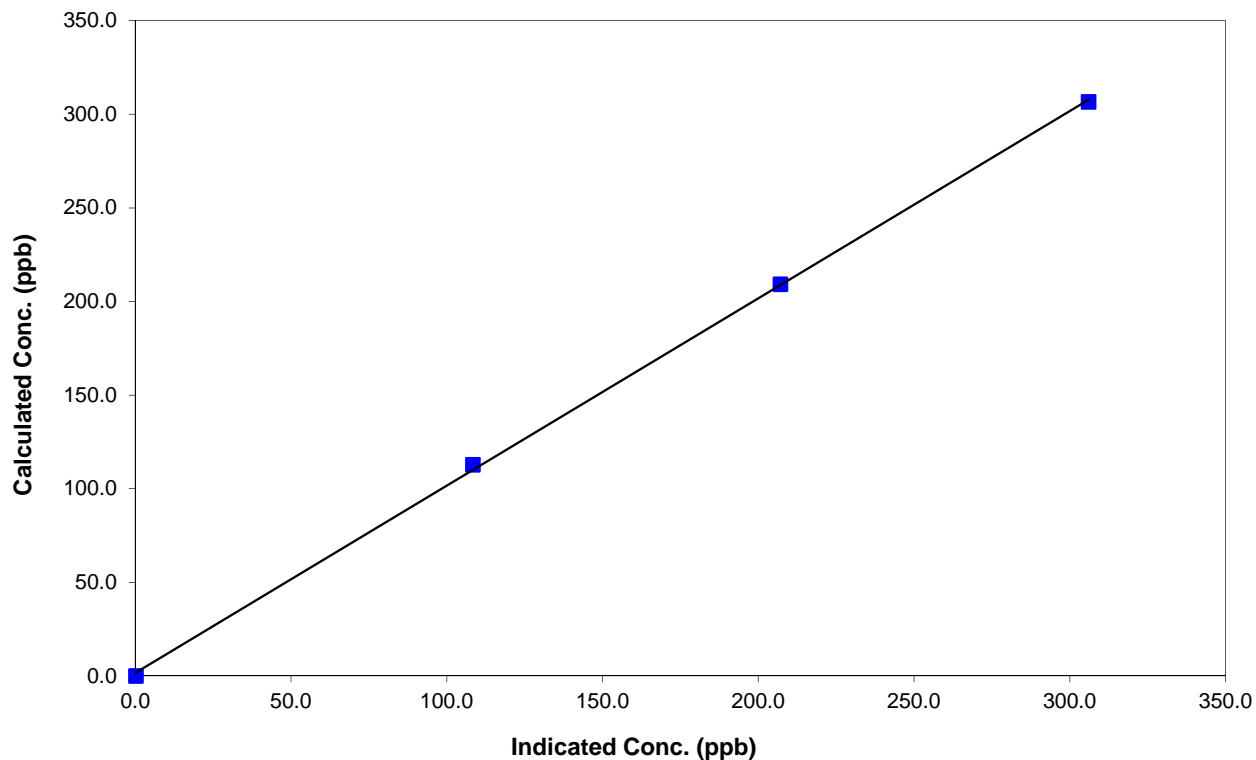
Station Information

Calibration Date	March 17, 2015	Previous Calibration	February 18, 2015
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:05	End Time (MST)	14:00
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	0.999776
306.6	306.0	1.0020		
209.2	207.2	1.0098	Slope	1.000486
112.7	108.4	1.0395		
			Intercept	1.601965

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 17
WAPASU
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	678	35	66	95.83	29	0	4	0
H2S (ppb) Average	700	36	44	98.92	1	0	0	0
THC (ppm) Average	701	36	43	99.06	3.8	-	2.2	-
O3 (ppb) Average	704	34	40	99.19	48	0	42	-
NO2 (ppb) Average	698	37	46	98.79	32	0	13	-
NO (ppb) Average	698	37	46	98.79	15	-	2	-
NOX (ppb) Average	698	37	46	98.79	36	-	15	-
PM2.5 (ug/m3) Average	735	0	9	98.79	27.4	-	5.9	0
Temperature 2 m (C) Average	744	0	0	100.00	14.4	-	7.8	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	89	-
Wind Speed 10 m (km/h) Average	705	0	39	94.76	24	-	18	-
Wind Direction 10 m (deg) Average	705	0	39	94.76	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	678	0.9	2	-	0	0	0	0	1	2	29
H2S (ppb) Average	700	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	701	2.1	0.1	-	2	2	2	2.1	2.1	2.2	3.8
O3 (ppb) Average	704	33.3	8	-	1	22	28	36	39	42	48
NO2 (ppb) Average	698	3.5	5	-	0	0	1	2	4	10	32
NO (ppb) Average	698	0.8	1	-	0	0	0	0	1	1	15
NOX (ppb) Average	698	4.3	6	-	0	1	1	2	5	11	36
PM2.5 (ug/m3) Average	735	3.31	2.4	-	0.3	1.1	1.6	2.8	4.3	6.4	27.4
Temperature 2 m (C) Average	744	-4.81	8.8	-	-34.4	-16.8	-10.2	-4.4	2	5.4	14.4
Relative Humidity (%) Average	744	66.2	19	-	20	38	52	68	82	89	99
Wind Speed 10 m (km/h) Average	705	8	4	-	1	4	5	7	10	12	24
Wind Direction 10 m (deg) Average	705	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	14 Mar 2015 08:00	15 Mar 2015 13:00	31	Station power failure and stabilization period
H2S	14 Mar 2015 08:00	14 Mar 2015 14:00	7	Station power failure and stabilization period
H2S	31 Mar 2015 10:00	31 Mar 2015 10:00	1	Intermittent unstable operation - excessive baseline drift
THC	14 Mar 2015 08:00	14 Mar 2015 14:00	7	Station power failure and stabilization period
O3	14 Mar 2015 08:00	14 Mar 2015 13:00	6	Station power failure and stabilization period
NO2, NO, NOX	10 Mar 2015 10:00	10 Mar 2015 12:00	3	Maintenance - confirmed calibration points for Ozone
NO2, NO, NOX	14 Mar 2015 08:00	14 Mar 2015 13:00	6	Station power failure and stabilization period
PM2.5	14 Mar 2015 08:00	14 Mar 2015 13:00	6	Station power failure and stabilization period
PM2.5	15 Mar 2015 14:00	15 Mar 2015 15:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	19 Mar 2015 14:00	19 Mar 2015 14:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	15 Mar 2015 00:00	16 Mar 2015 14:00	39	Flat line in sensor output signal -sensor frozen

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Summary of Hour Averages

Wapasu - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 29 ppb on Mar 18 11:00	Maximum Daily Average: 4.3 ppb on Mar 18
Minimum Value: 0 ppb on Mar 12 01:00	Hours of Data: 678
Maximum Diurnal Average: 2.1 ppb at hour 11	Hours of Missing Data: 66
Monthly Average: 0.9 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.2 ppb on Mar 2	Percent Operational Time: 95.8
Minimum Diurnal Average: 0.5 ppb at hour 21	
Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =2 P ₉₉ =8	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	2	0	0.5	2
2-Mar	Z	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-Mar	0	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
4-Mar	0	0	Z	1	1	1	1	1	1	1	0	1	0	1	1	3	2	2	1	1	1	1	1	3	1.1	3
5-Mar	2	1	1	Z	0	0	1	1	1	1	1	0	0	0	1	6	9	7	3	1	1	1	1	1	1.8	9
6-Mar	1	1	1	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.3	1
7-Mar	0	0	0	2	3	Z	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.7	3
8-Mar	Z	0	0	2	4	7	7	4	4	6	7	5	4	5	8	5	3	2	2	3	3	2	2	2	3.8	8
9-Mar	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Mar	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	1
11-Mar	0	1	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Mar	0	0	0	0	Z	0	0	0	0	0	1	0	1	0	1	1	1	2	3	2	1	1	1	1	0.7	3
13-Mar	1	4	3	1	1	Z	2	4	4	3	1	2	7	3	3	1	0	0	0	1	2	2	2	2	2.1	7
14-Mar	2	2	2	Z	3	3	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	3
15-Mar	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	0	0	0	0	0	0	0	2	4	3	--	4
16-Mar	3	1	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	3
17-Mar	0	0	0	Z	1	1	1	1	2	3	3	1	1	1	4	5	6	8	4	2	2	2	1	1	2.0	8
18-Mar	0	0	1	2	1	Z	1	1	3	14	29	6	9	11	8	6	2	1	0	0	0	0	0	0	4.3	29
19-Mar	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Mar	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
21-Mar	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
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Mar	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	1	0	1	1	0	0	0	0	0	0	0.5	2
24-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Mar	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
27-Mar	0	Z	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
28-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Mar	0	0	0	Z	1	2	3	7	2	4	5	1	0	0	1	1	1	0	0	0	0	1	1	1	1.4	7
30-Mar	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	4	2	3	1	1	1	1	1	0.8	4
31-Mar	0	1	0	0	0	0	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1

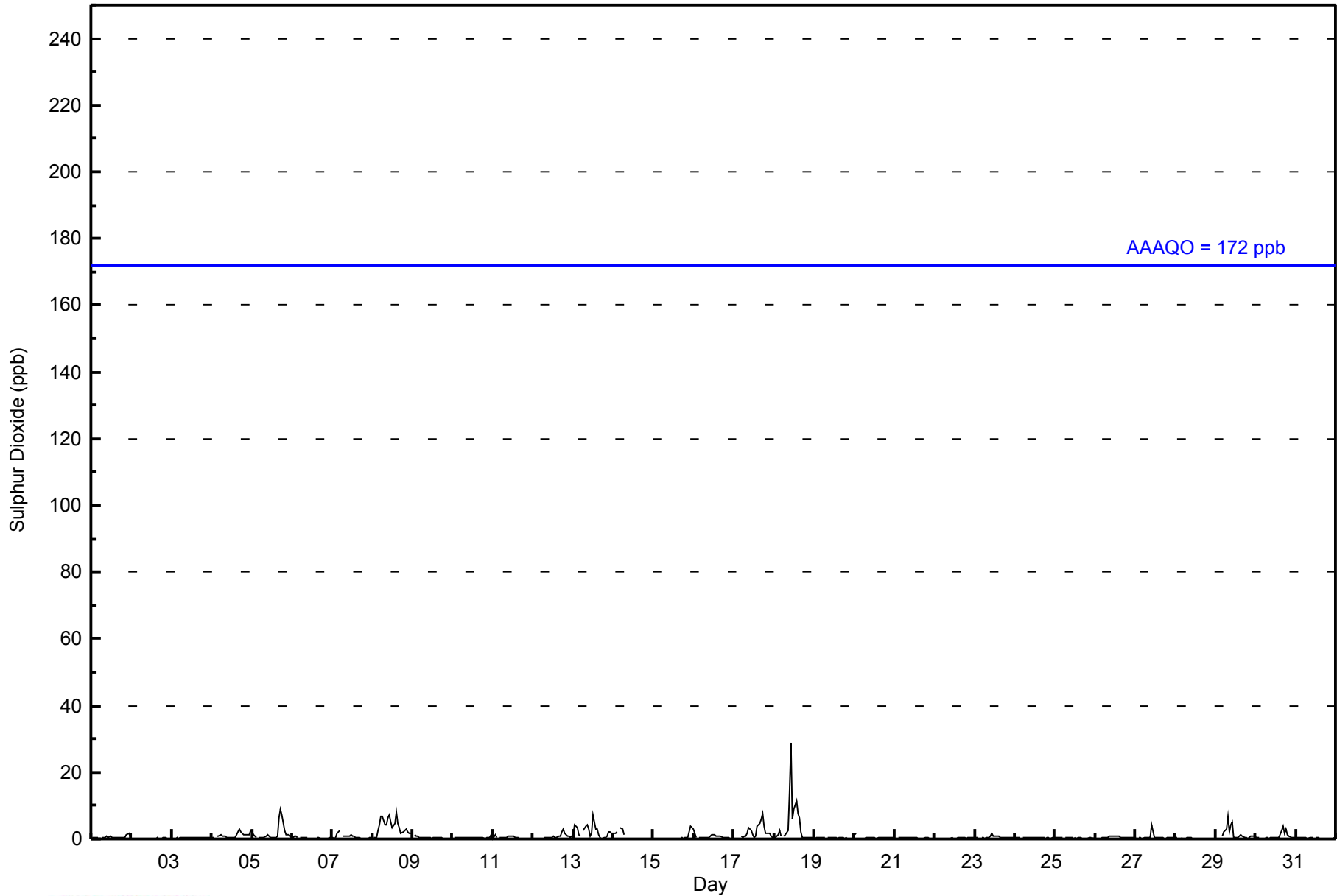
0.6	0.6	0.5	0.6	0.7	0.8	0.8	0.9	0.8	1.4	2.1	0.9	1.1	1.0	1.1	1.0	1.1	1.0	0.9	0.6	0.5	0.6	0.7	0.7	Diurnal Average	
3	4	3	2	4	7	7	7	4	14	29	6	9	11	8	6	6	9	7	3	3	2	4	3	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	675	99.56	99.56
11 - 20	2	0.29	99.85
21 - 60	1	0.15	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 678

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - March 2015

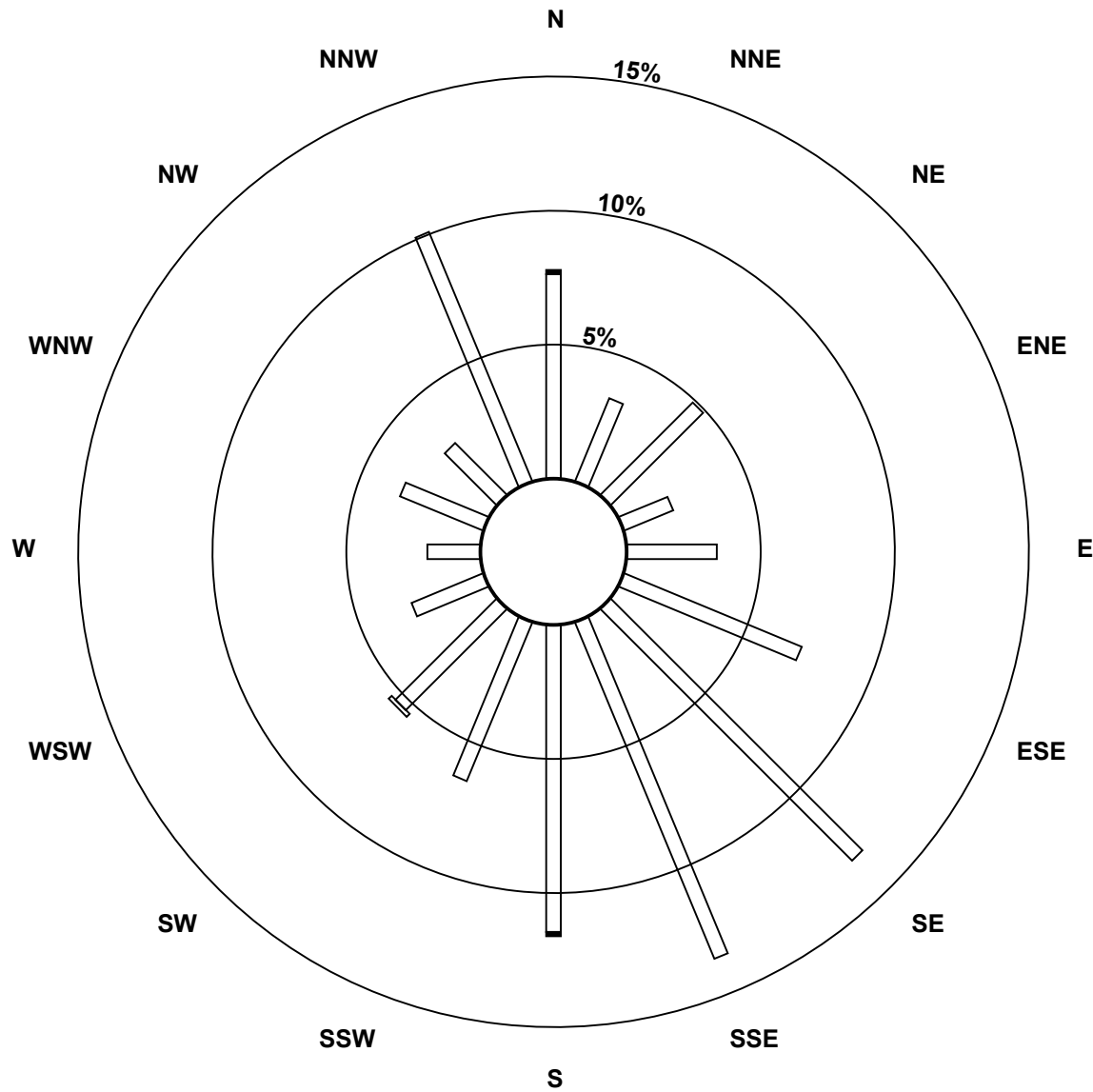
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	50	22	32	13	22	47	87	89	75	42	35	19	13	22	18	66	652
11 - 20	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	51	22	32	13	22	47	87	89	76	42	36	19	13	22	18	66	655

Total Number of Valid Hours: 655

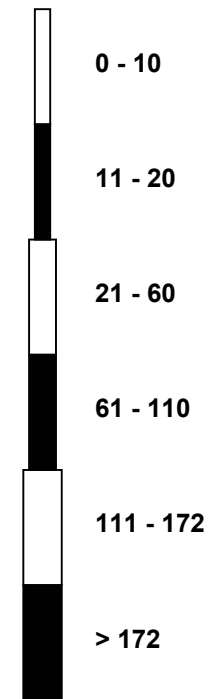
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)**



Classes (ppb)

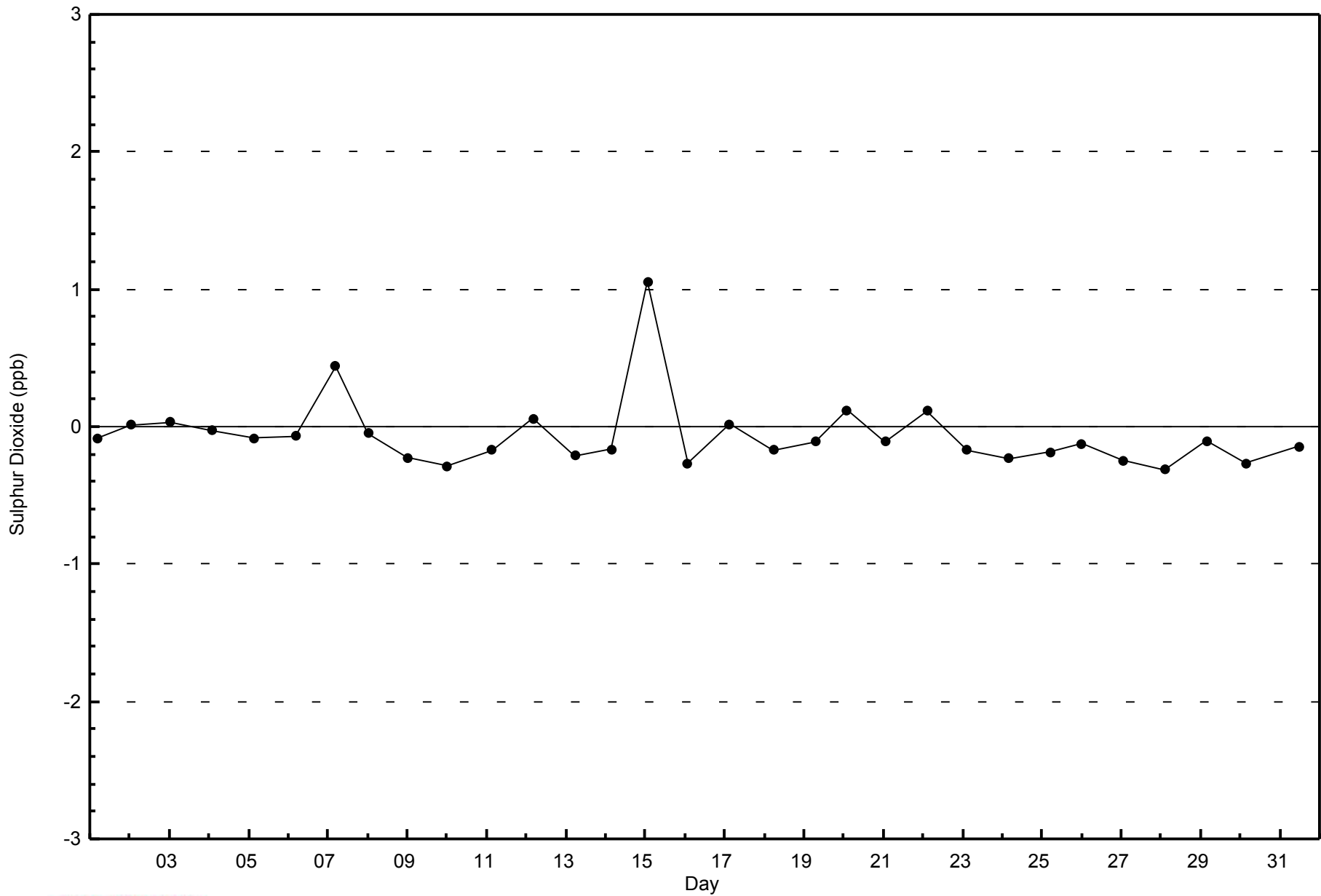


Total Number of Valid Hours: 655



WBEA
Zero Responses

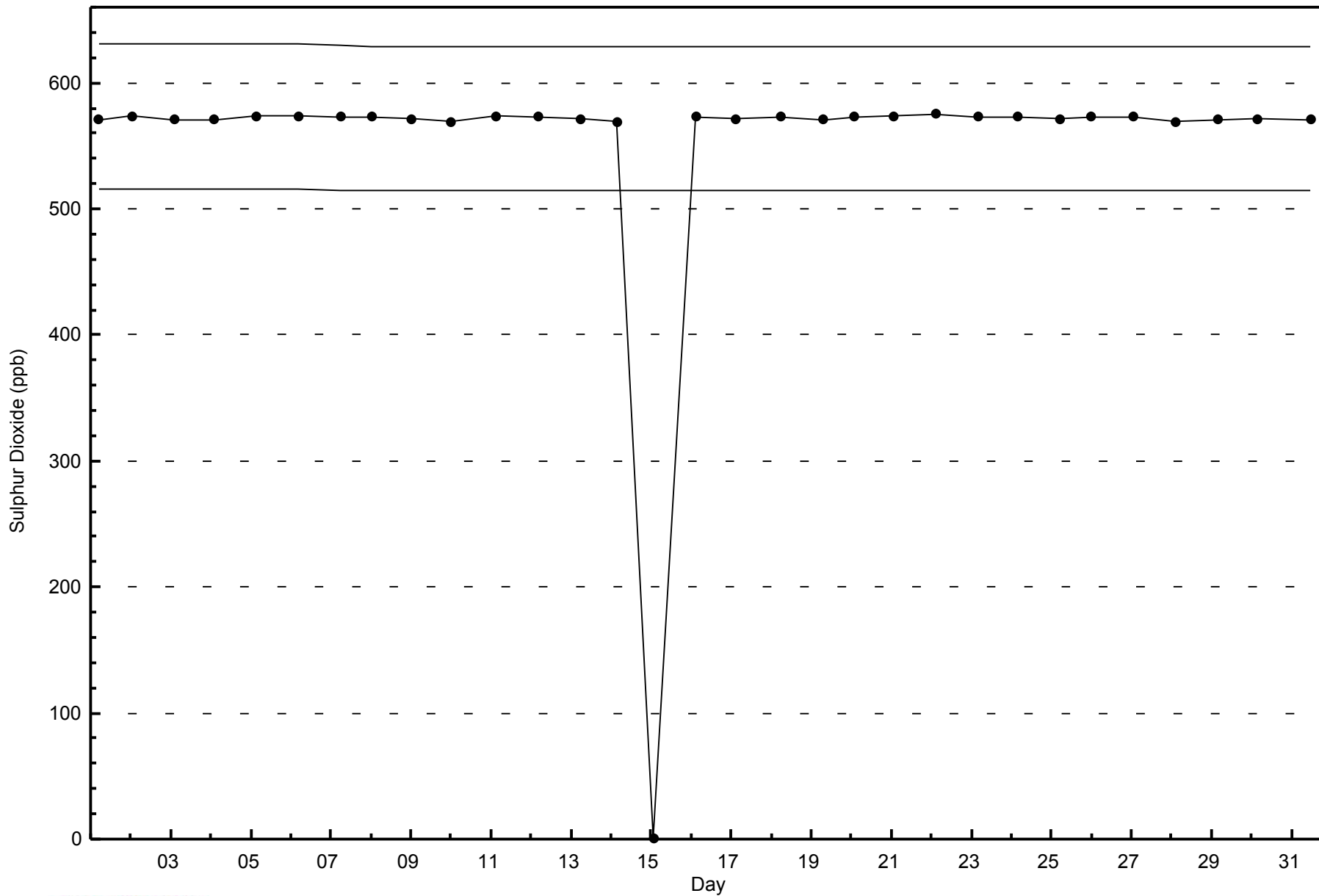
Sulphur Dioxide (SO₂) - ppb
Wapasu - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Wapasu - March 2015





Summary of Hour Averages

Wapasu - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0		Hours in Service: 744	
Maximum Value: 1 ppb on Mar 8 05:00		Maximum Daily Average: 0.5 ppb on Mar 8	
Minimum Value: 0 ppb on Mar 22 02:00		Hours of Data: 700	
Maximum Diurnal Average: 0.3 ppb at hour 7		Hours of Missing Data: 44	
Monthly Average: 0.3 ppb		Hours of Calibration: 36	
Minimum Daily Average: 0.2 ppb on Mar 1		Percent Operational Time: 98.9	
Minimum Diurnal Average: 0.2 ppb at hour 22		Percentages: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1	

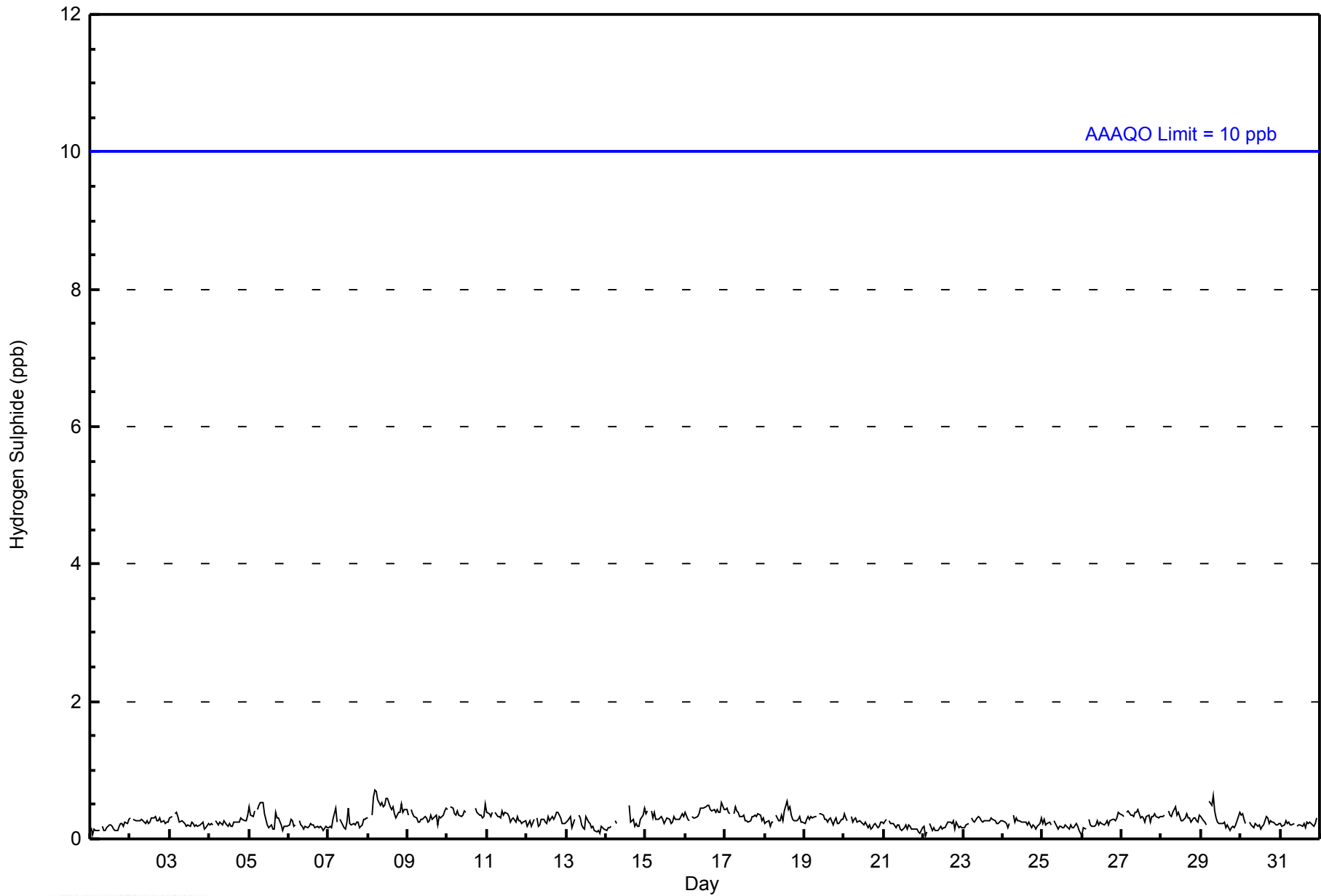
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Mar	0	0	Z	0	0	0	0	0	0	0	0	0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

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	700	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: 700

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	54	22	28	14	22	47	87	89	78	46	37	19	13	23	18	66	663
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	54	22	28	14	22	47	87	89	78	46	37	19	13	23	18	66	663

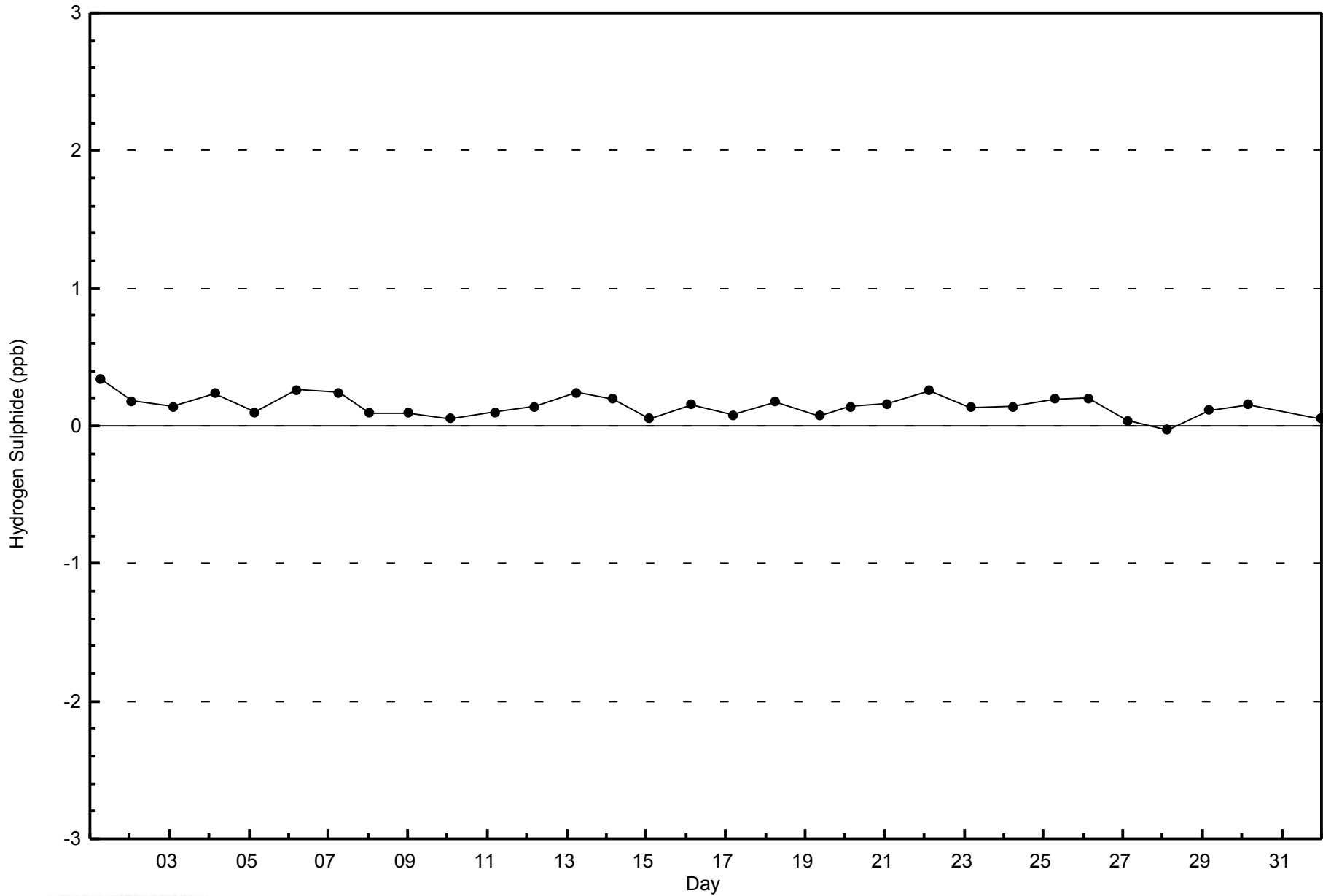
Total Number of Valid Hours: 663

Total Number of Hours: 744



WBEA
Zero Responses

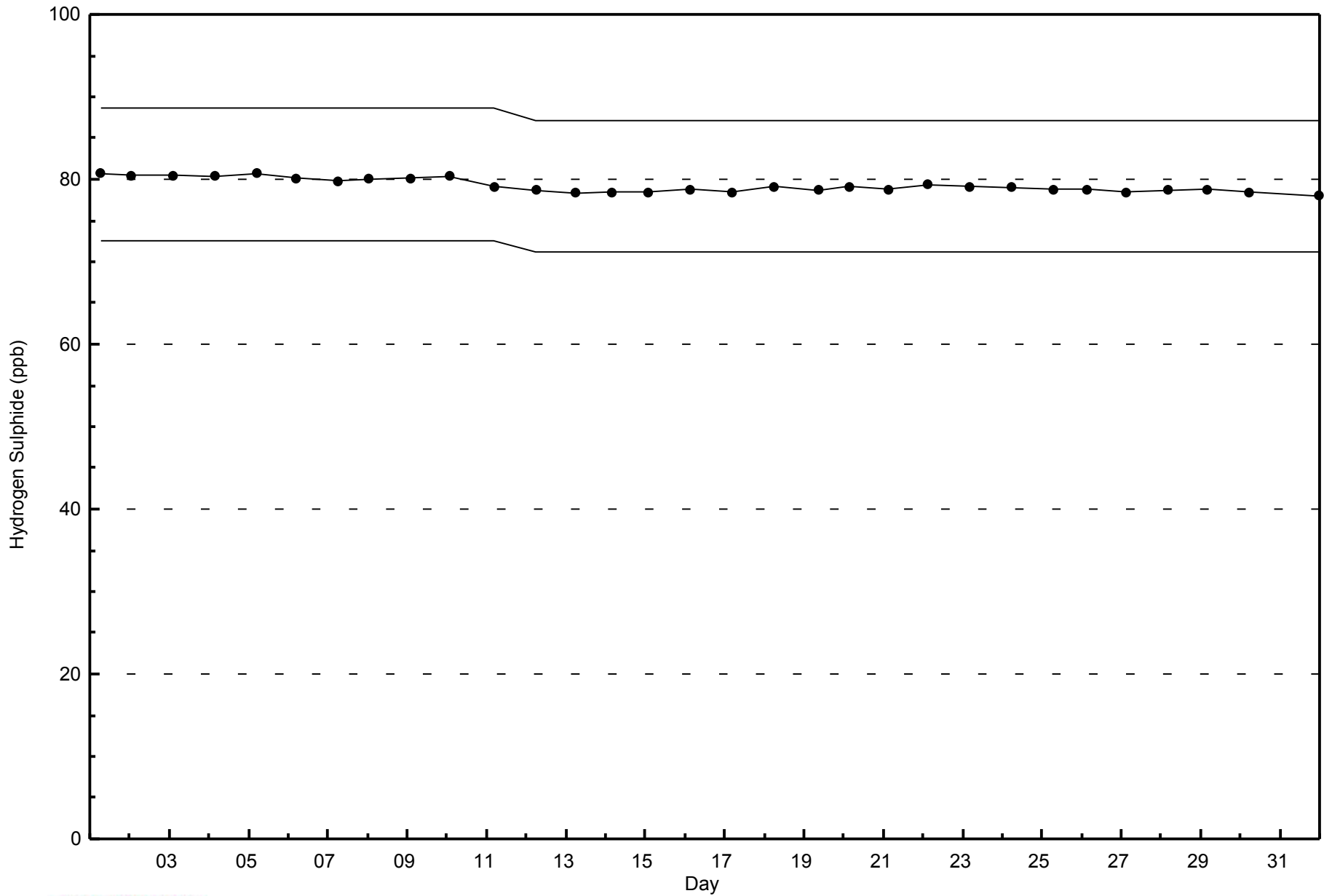
Hydrogen Sulphide (H₂S) - ppb
Wapasu - March 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Wapasu - March 2015



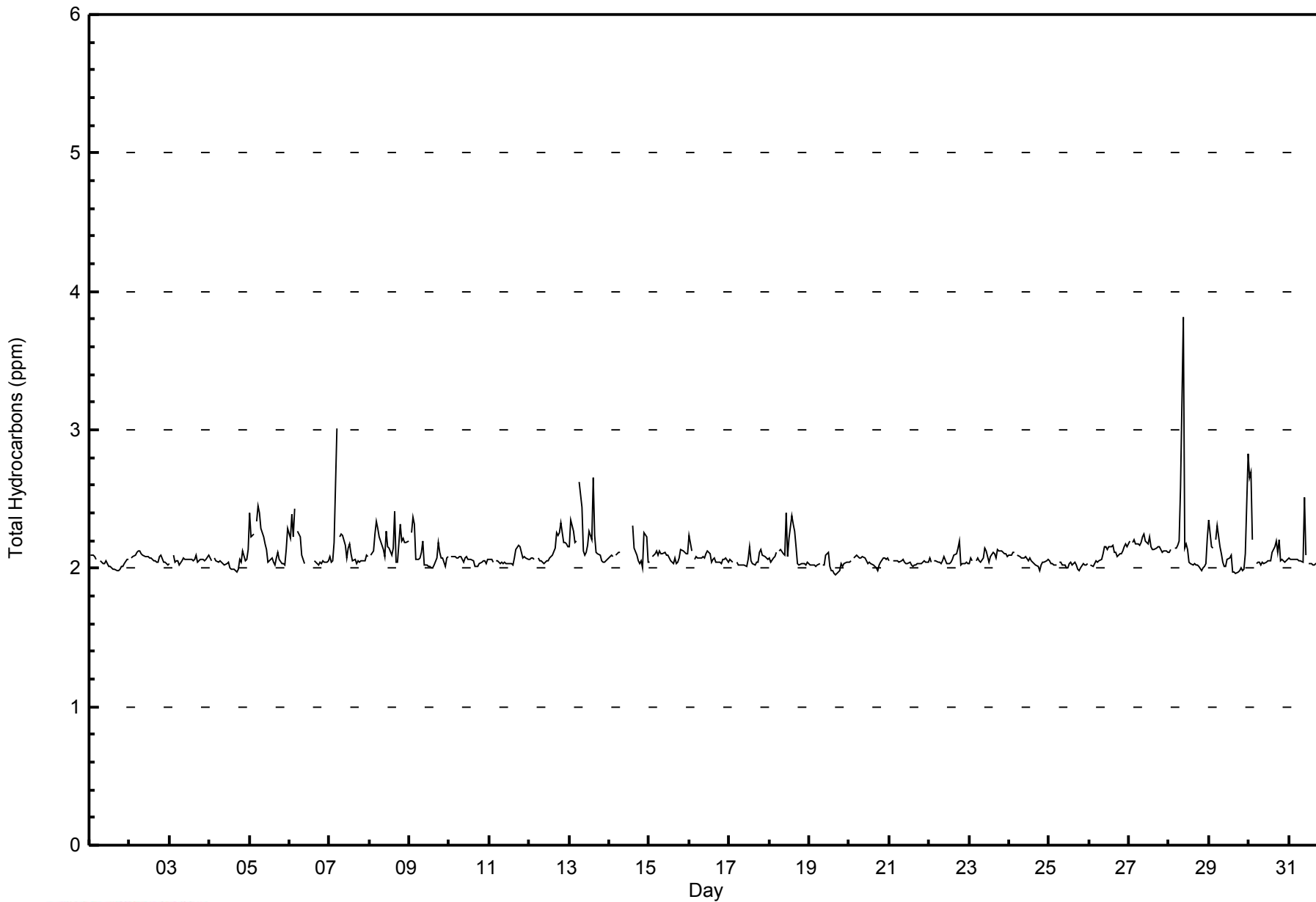


Maximum Value: 3.8 ppm on Mar 28 09:00		Maximum Daily Average: 2.2 ppm on Mar 13		Hours in Service: 744																						
Minimum Value: 2.0 ppm on Mar 19 17:00		Minimum Daily Average: 2.0 ppm on Mar 19		Hours of Data: 701																						
Maximum Diurnal Average: 2.1 ppm at hour 9		Minimum Diurnal Average: 2.1 ppm at hour 18		Hours of Missing Data: 43																						
Monthly Average: 2.10 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.6		Hours of Calibration: 36																						
				Percent Operational Time: 99.1																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1
2-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1
3-Mar	2.0	Z	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
4-Mar	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0
5-Mar	2.4	2.2	2.3	Z	2.3	2.4	2.4	2.3	2.2	2.2	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.3	2.2	2.4
6-Mar	2.2	2.4	2.2	2.4	Z	2.3	2.2	2.1	2.1	2.0	C	C	C	C	C	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.4
7-Mar	2.1	2.0	2.1	2.2	3.0	Z	2.2	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	3.0
8-Mar	Z	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.4	2.0	2.0	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4
9-Mar	Z	2.3	2.4	2.3	2.1	2.1	2.1	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.4
10-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1
11-Mar	2.1	2.1	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	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2
12-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3
13-Mar	2.2	2.3	2.3	2.2	2.2	Z	2.6	2.4	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.7	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.7
14-Mar	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	PF	PF	PF	PF	PF	PF	PF	2.3	2.1	2.1	2.1	2.0	2.1	2.0	2.3	2.2	2.0	-
15-Mar	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
16-Mar	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.2
17-Mar	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
18-Mar	2.1	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.4	2.1	2.2	2.4	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4
19-Mar	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
20-Mar	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1
21-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1
22-Mar	2.1	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.2
23-Mar	2.0	2.1	2.0	Z	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	2.1	2.1	2.1
24-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1
25-Mar	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
26-Mar	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2
27-Mar	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	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2
28-Mar	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.6	3.8	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	3.8
29-Mar	2.4	2.2	2.1	Z	2.2	2.3	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.8	2.1	2.8
30-Mar	2.7	2.7	2.2	Z	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	2.1	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.7
31-Mar	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.5	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	2.5
																								Diurnal Average		
																								Diurnal Maximum		
																								2.1		
																								2.8		
																								Z - zerospan C - Calibration PF - Power Failure		



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	262	37.38	37.38
2.1 - 3.0	438	62.48	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - March 2015

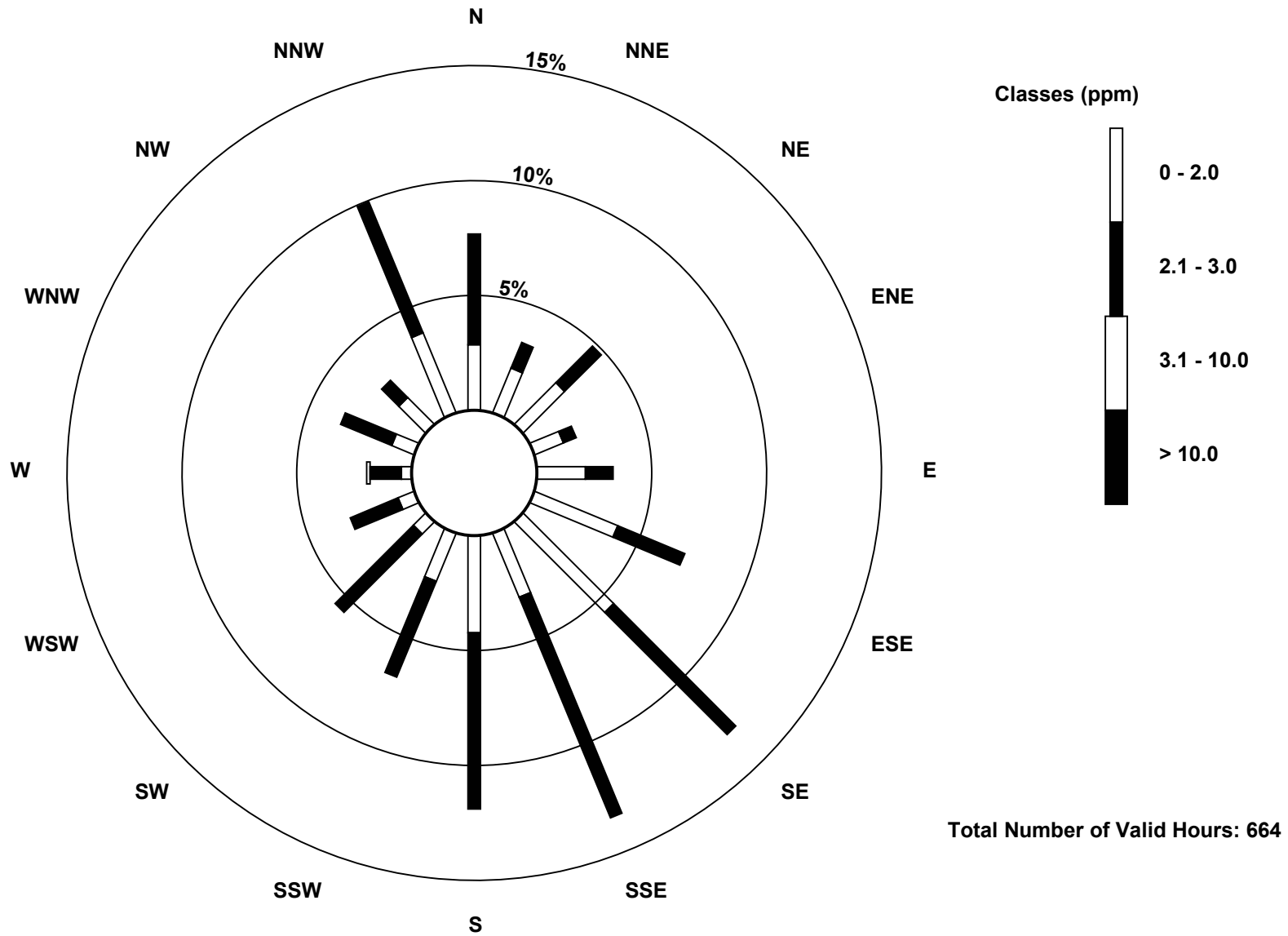
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	19	14	17	9	14	26	37	20	28	15	5	5	3	7	11	25	255
2.1 - 3.0	32	8	15	4	8	21	50	69	51	30	32	15	9	16	7	41	408
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	51	22	32	13	22	47	87	89	79	45	37	20	13	23	18	66	664

Total Number of Valid Hours: 664

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

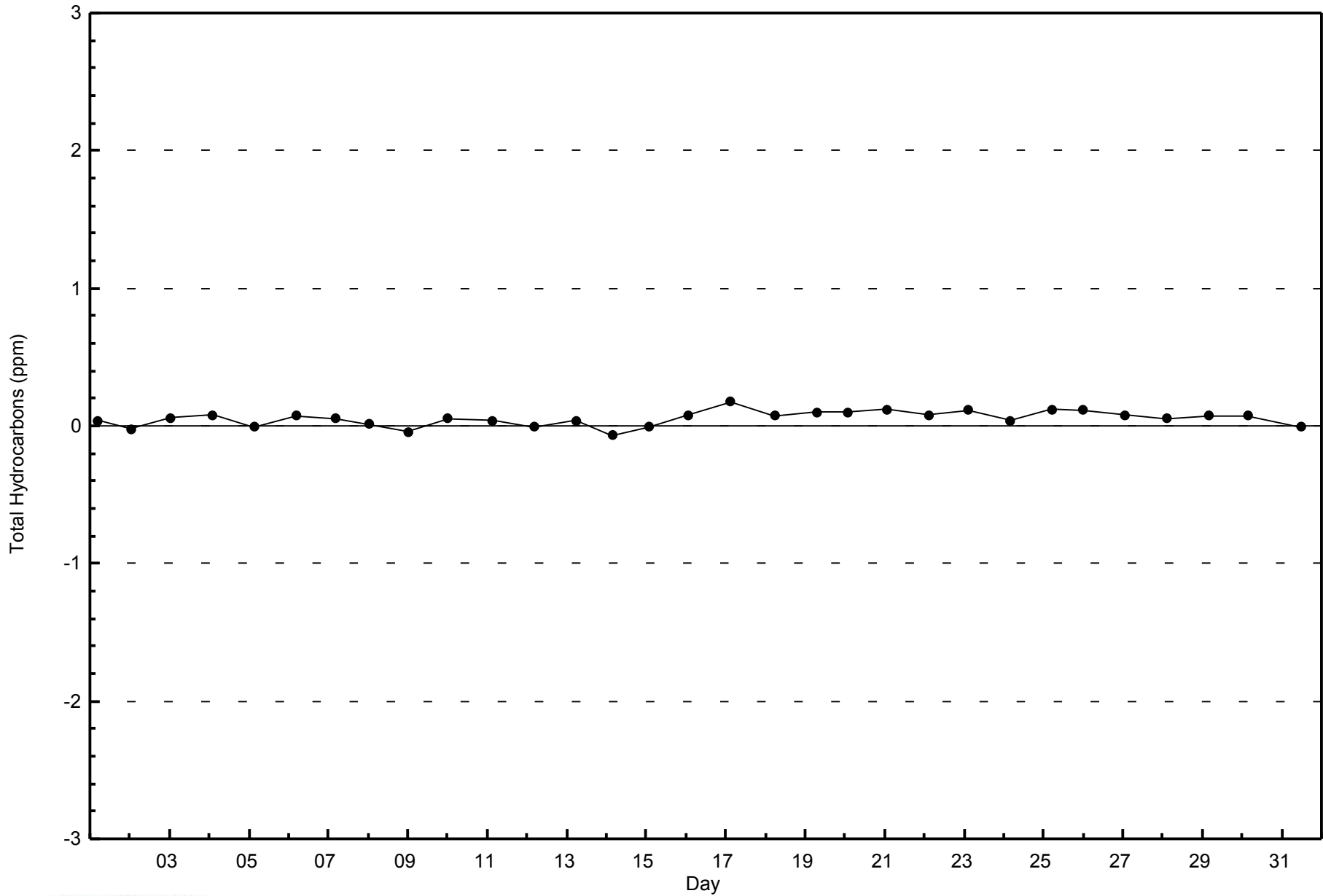
Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)





WBEA
Zero Responses

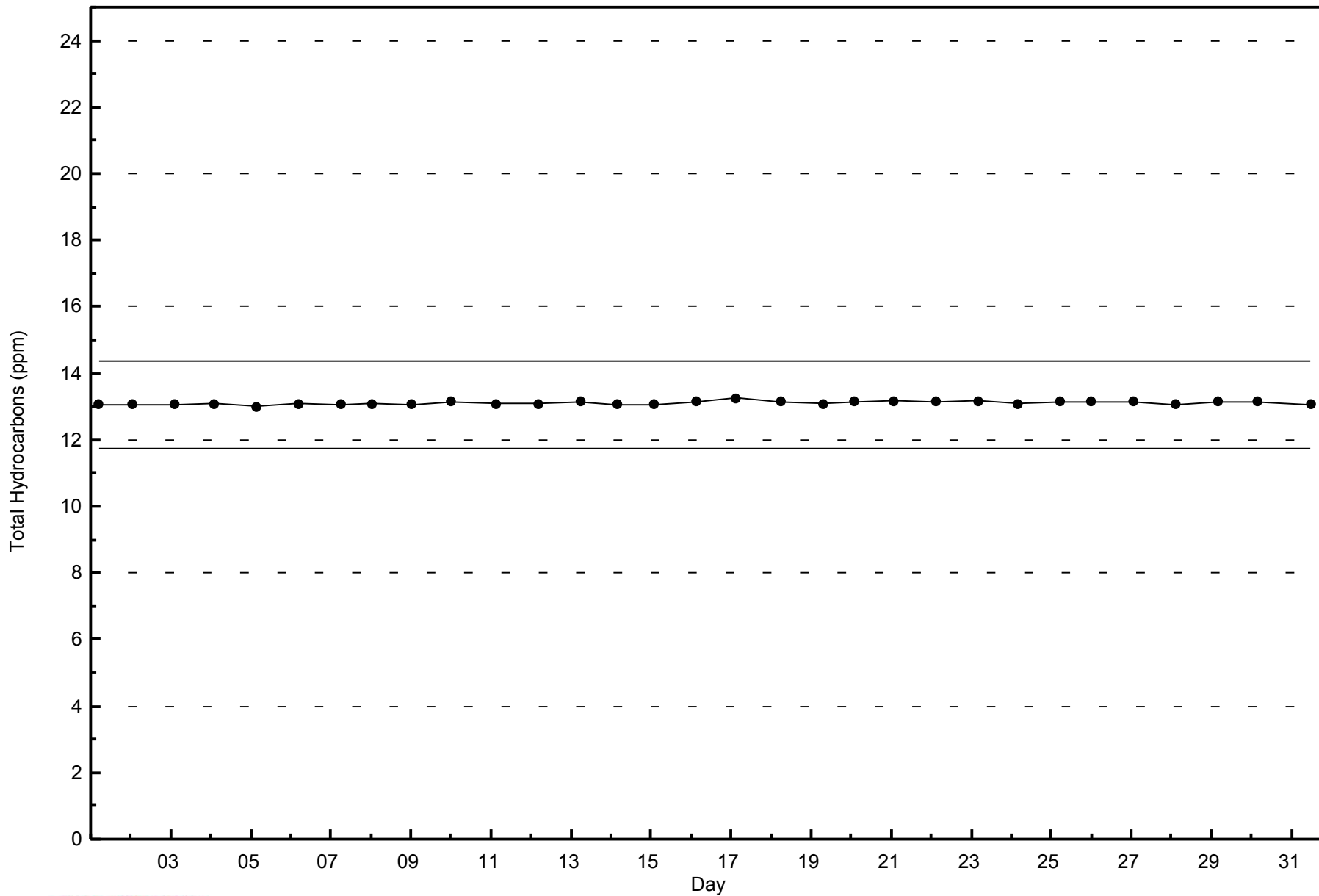
Total Hydrocarbons (THC) - ppm
Wapasu - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Wapasu - March 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Wapasu - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 48 ppb on Mar 31 12:00	Maximum Daily Average: 42.3 ppb on Mar 31		Hours of Data:	704
Minimum Value: 1 ppb on Mar 30 02:00	Minimum Daily Average: 23.3 ppb on Mar 15		Hours of Missing Data:	40
Maximum Diurnal Average: 38.1 ppb at hour 14	Minimum Diurnal Average: 28.5 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 33.3 ppb	Percentiles: P ₁ = 6 P ₁₀ = 22 Q ₁ = 28 Median = 36 Q ₃ = 39 P ₉₀ = 42 P ₉₉ = 47		Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	22	22	21	22	25	37	38	Z	37	38	38	38	40	42	41	42	43	43	43	43	43	39	38	38	36.2	43
2-Mar	40	40	38	33	Z	31	32	35	37	37	38	38	38	39	38	39	38	37	34	36	37	36	36	37	36.7	40
3-Mar	32	30	29	Z	34	33	34	33	34	33	33	32	32	31	32	31	30	31	26	24	20	19	20	20	29.3	34
4-Mar	23	25	23	28	Z	31	30	29	34	37	38	38	40	41	41	40	37	37	30	27	22	33	32	26	32.3	41
5-Mar	16	22	17	13	9	Z	8	17	28	35	38	43	44	43	43	43	36	24	30	38	38	36	27	19	29.0	44
6-Mar	20	18	15	9	13	13	Z	30	36	40	40	42	42	42	41	40	41	41	41	40	39	40	37	33	32.7	42
7-Mar	32	34	34	24	7	24	25	Z	23	31	37	35	35	39	40	40	39	37	33	34	35	36	32	33	32.2	40
8-Mar	34	33	Z	26	18	12	16	25	27	33	30	31	33	35	31	29	33	36	23	23	17	28	27	27	27.2	36
9-Mar	24	27	Z	24	36	34	33	34	34	38	39	41	41	42	39	39	36	34	31	27	31	32	28	31	33.6	42
10-Mar	31	33	Z	36	36	35	36	36	36	36	C	C	C	C	39	39	38	38	37	37	36	36	36	32	35.9	39
11-Mar	38	37	38	37	37	Z	39	39	39	38	38	37	38	38	39	34	30	29	27	30	30	29	28	36	34.9	39
12-Mar	28	28	37	37	37	37	Z	37	37	37	36	36	38	38	36	34	27	24	17	9	22	23	26	26	30.7	38
13-Mar	23	10	20	27	29	12	18	Z	28	38	41	40	38	43	41	44	45	46	47	46	45	44	43	42	35.3	47
14-Mar	42	40	40	37	37	Z	34	PF	PF	PF	PF	PF	PF	32	36	45	39	40	40	44	43	32	27	29	--	45
15-Mar	28	26	24	Z	23	22	21	22	22	23	23	24	24	25	27	28	27	26	20	21	21	22	19	18	23.3	28
16-Mar	11	25	32	32	Z	31	30	30	30	29	29	28	28	28	28	28	29	29	27	24	22	18	19	24	26.6	32
17-Mar	23	24	23	27	28	Z	29	29	32	36	39	40	41	42	41	41	39	36	26	19	18	23	30	37	31.6	42
18-Mar	36	41	39	39	39	38	36	Z	36	34	28	37	28	20	23	24	33	36	37	38	38	40	40	39	34.6	41
19-Mar	41	41	39	38	34	31	30	38	41	Z	41	41	43	43	44	45	44	44	42	41	41	41	41	41	40.2	45
20-Mar	38	38	39	35	Z	27	27	28	38	40	41	41	41	41	41	41	42	39	36	35	33	31	32	34	36.4	42
21-Mar	34	33	34	Z	33	33	33	32	33	34	35	35	36	36	36	37	36	36	37	36	36	35	36	36	34.9	37
22-Mar	36	36	36	36	Z	35	34	35	35	35	36	37	39	36	36	33	31	25	21	37	35	35	37	38	34.5	39
23-Mar	36	36	34	32	29	Z	28	29	30	25	26	30	35	34	35	37	38	31	29	28	29	30	30	30	31.2	38
24-Mar	30	30	30	32	35	34	Z	32	35	37	36	39	39	40	40	41	41	41	40	33	28	31	34	34	35.4	41
25-Mar	33	34	35	36	36	36	35	Z	38	40	42	42	42	42	43	43	42	42	41	38	36	38	39	40	38.9	43
26-Mar	40	39	38	37	Z	36	35	36	37	38	38	39	40	42	42	42	42	42	42	41	40	36	32	29	38.4	42
27-Mar	28	27	24	Z	22	22	25	25	27	26	25	27	30	30	31	31	28	27	26	25	24	22	20	17	25.4	31
28-Mar	20	16	14	7	Z	1	2	7	17	33	36	42	47	47	47	46	45	45	44	43	41	37	30	20	29.8	47
29-Mar	17	28	25	25	20	Z	21	27	39	40	42	43	40	38	36	38	38	35	35	35	33	31	22	4	31.0	43
30-Mar	3	1	22	36	32	Z	34	37	38	40	42	42	42	43	42	42	41	44	36	33	38	38	39	38	35.0	44
31-Mar	37	38	40	40	41	41	41	41	42	39	45	48	47	48	45	46	46	44	43	43	42	40	39	38	42.3	48

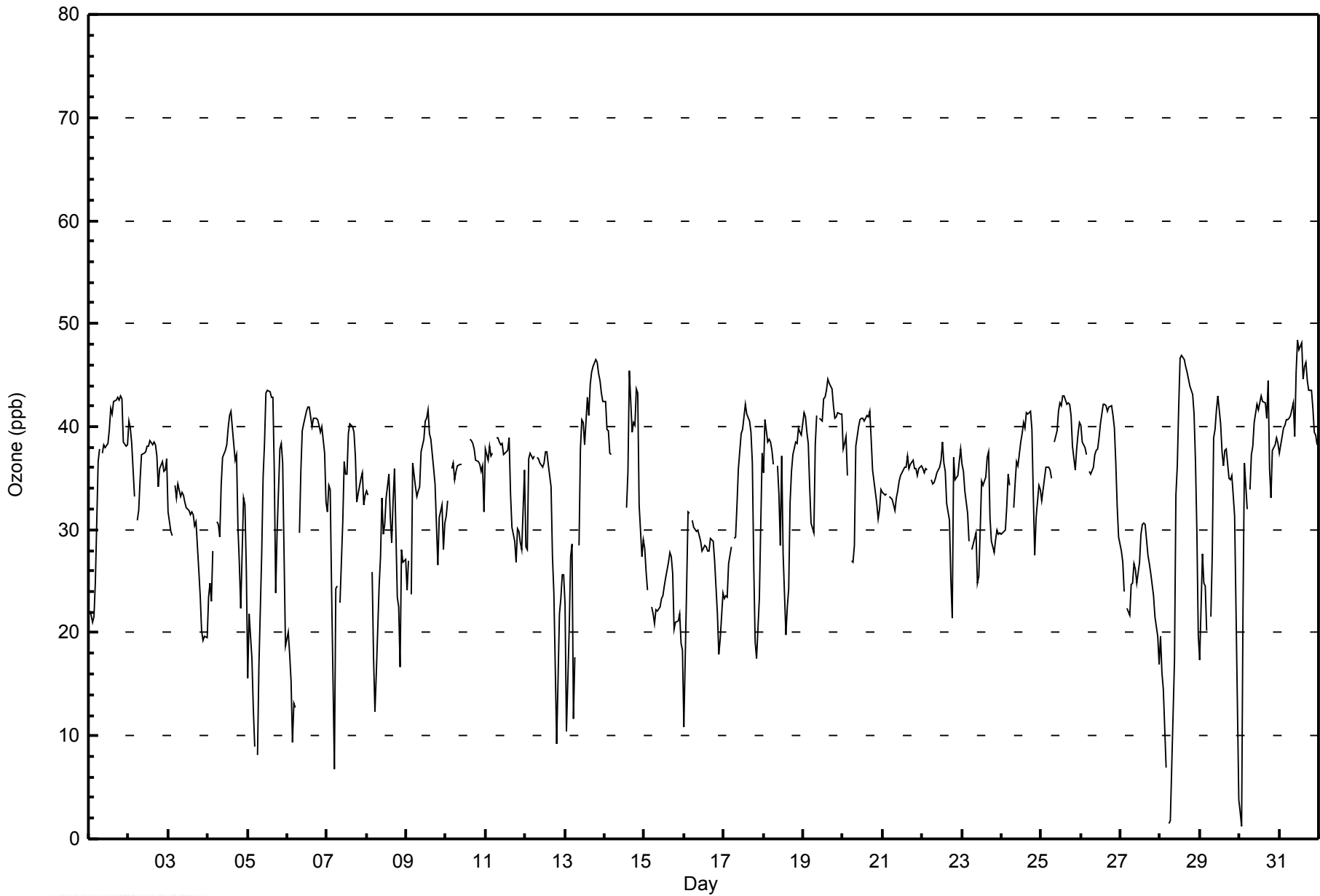
28.9	29.3	30.1	29.8	28.8	28.5	28.7	30.5	33.4	35.2	36.1	37.4	37.9	38.1	37.9	38.0	37.3	36.1	33.5	33.1	32.6	32.7	31.5	30.5	Diurnal Average
42	41	40	40	41	41	41	41	42	40	45	48	47	48	47	46	46	46	47	46	45	44	43	42	Diurnal Maximum

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	53	7.53	7.53
21 - 50	651	92.47	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	1	0	0	1	2	3	7	10	6	7	7	3	1	1	0	0	49
21 - 50	54	22	31	13	19	45	81	79	71	40	32	16	12	22	18	63	618
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	55	22	31	14	21	48	88	89	77	47	39	19	13	23	18	63	667

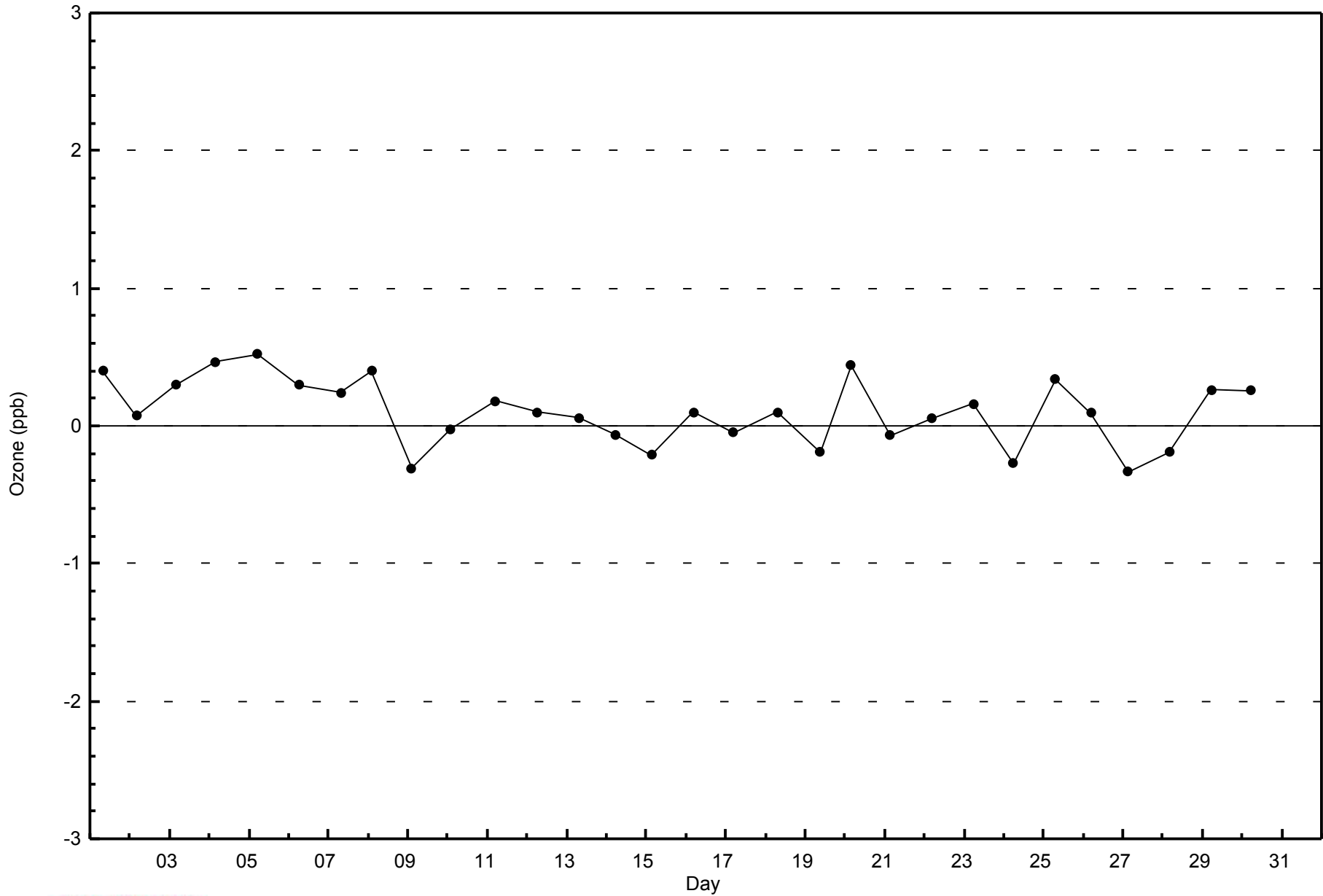
Total Number of Valid Hours: 667

Total Number of Hours: 744



WBEA
Zero Responses

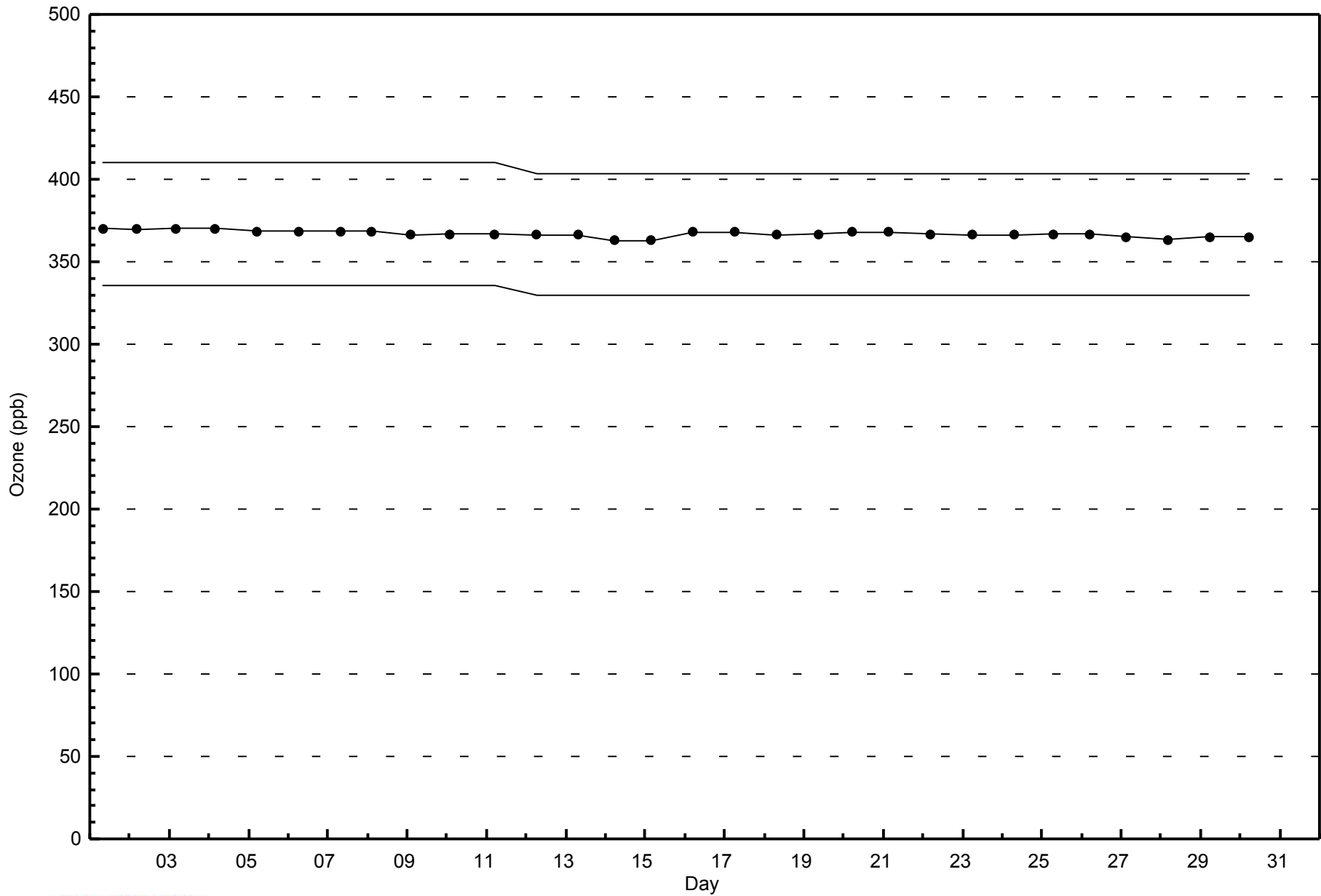
Ozone (O₃) - ppb
Wapasu - March 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Wapasu - March 2015



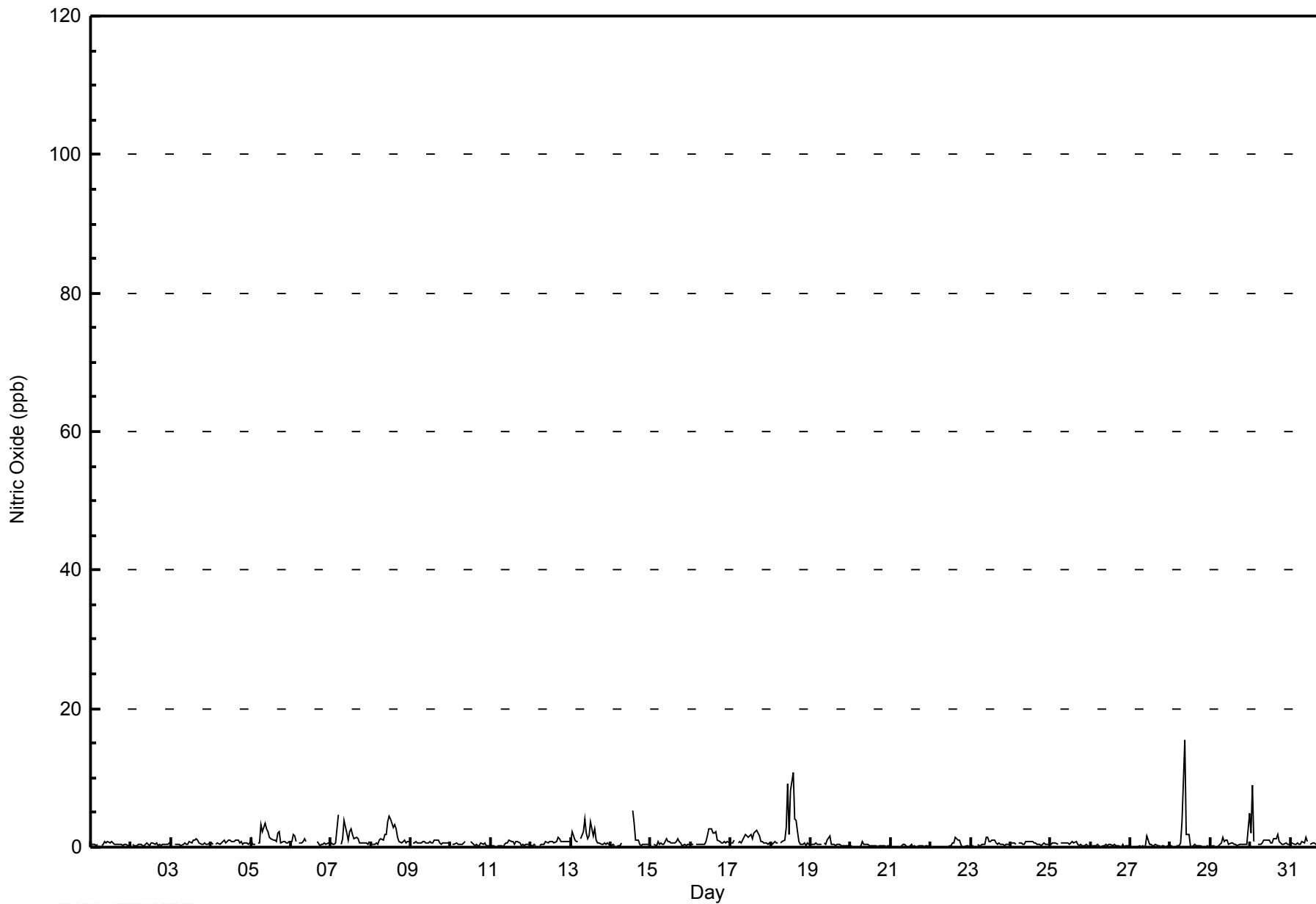


Maximum Value: 15 ppb on Mar 28 09:00																		Maximum Daily Average: 2.2 ppb on Mar 18																		Hours in Service: 744	
Minimum Value: 0 ppb on Mar 20 22:00																		Minimum Daily Average: 0.1 ppb on Mar 21																		Hours of Data: 698	
Maximum Diurnal Average: 1.5 ppb at hour 9																		Minimum Diurnal Average: 0.4 ppb at hour 6																		Hours of Missing Data: 46	
Monthly Average: 0.8 ppb																		Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =1 P ₉₉ =5																		Hours of Calibration: 37	
																																				Percent Operational Time: 98.8	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Mar	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1											
2-Mar	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0.4	1											
3-Mar	0	Z	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0	0	1	0	0	0.6	1												
4-Mar	1	0	Z	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0.7	1												
5-Mar	1	0	0	Z	1	1	3	2	3	3	2	1	1	1	1	1	2	2	1	1	1	1	1	1.4	3												
6-Mar	1	2	2	1	Z	1	1	1	1	1	C	C	C	C	C	C	1	0	0	0	1	0	1	--	2												
7-Mar	1	0	0	1	5	Z	1	1	4	2	1	2	3	2	1	1	1	1	1	1	1	1	0	1.3	5												
8-Mar	Z	0	0	1	0	1	1	1	2	2	4	4	4	3	3	3	1	1	1	1	1	1	1	1.6	4												
9-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0.7	1												
10-Mar	Z	0	0	1	0	0	0	0	1	M	M	M	1	1	0	0	0	0	1	0	1	0	0	0.4	1												
11-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0.5	1												
12-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1												
13-Mar	1	2	1	1	1	Z	1	2	4	2	1	2	4	2	3	1	1	1	0	0	1	0	1	1.4	4												
14-Mar	0	0	0	Z	0	0	1	PF	PF	PF	PF	PF	PF	PF	5	3	1	1	0	0	0	0	0	--	5												
15-Mar	0	Z	0	0	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1												
16-Mar	0	0	Z	0	0	0	0	0	0	1	2	3	3	2	2	2	1	1	1	1	1	1	1	1.0	3												
17-Mar	1	1	1	Z	1	1	1	1	1	2	1	2	2	1	2	2	2	2	2	1	1	1	1	1.2	2												
18-Mar	1	0	1	1	1	Z	1	1	1	3	9	2	8	11	4	4	2	1	0	0	1	0	1	2.2	11												
19-Mar	0	0	0	1	0	0	0	Z	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0.5	2												
20-Mar	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1												
21-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0												
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.3	1												
23-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0.6	1												
24-Mar	1	1	1	1	Z	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0.6	1												
25-Mar	0	1	1	1	0	Z	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0.5	1												
26-Mar	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-Mar	0	Z	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2												
28-Mar	0	0	Z	0	0	0	1	4	15	2	2	2	0	0	0	0	0	0	0	0	0	0	0	1.2	15												
29-Mar	0	0	0	Z	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0.7	5												
30-Mar	2	9	1	Z	0	1	0	1	1	1	1	1	1	1	1	1	2	1	1	0	0	1	0	1.2	9												
31-Mar	0	1	0	0	1	0	0	1	1	1	1	Z	0	1	1	0	0	0	0	1	1	0	0	0.5	1												
																								Diurnal Average													
																								Diurnal Maximum													
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																					



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - March 2015

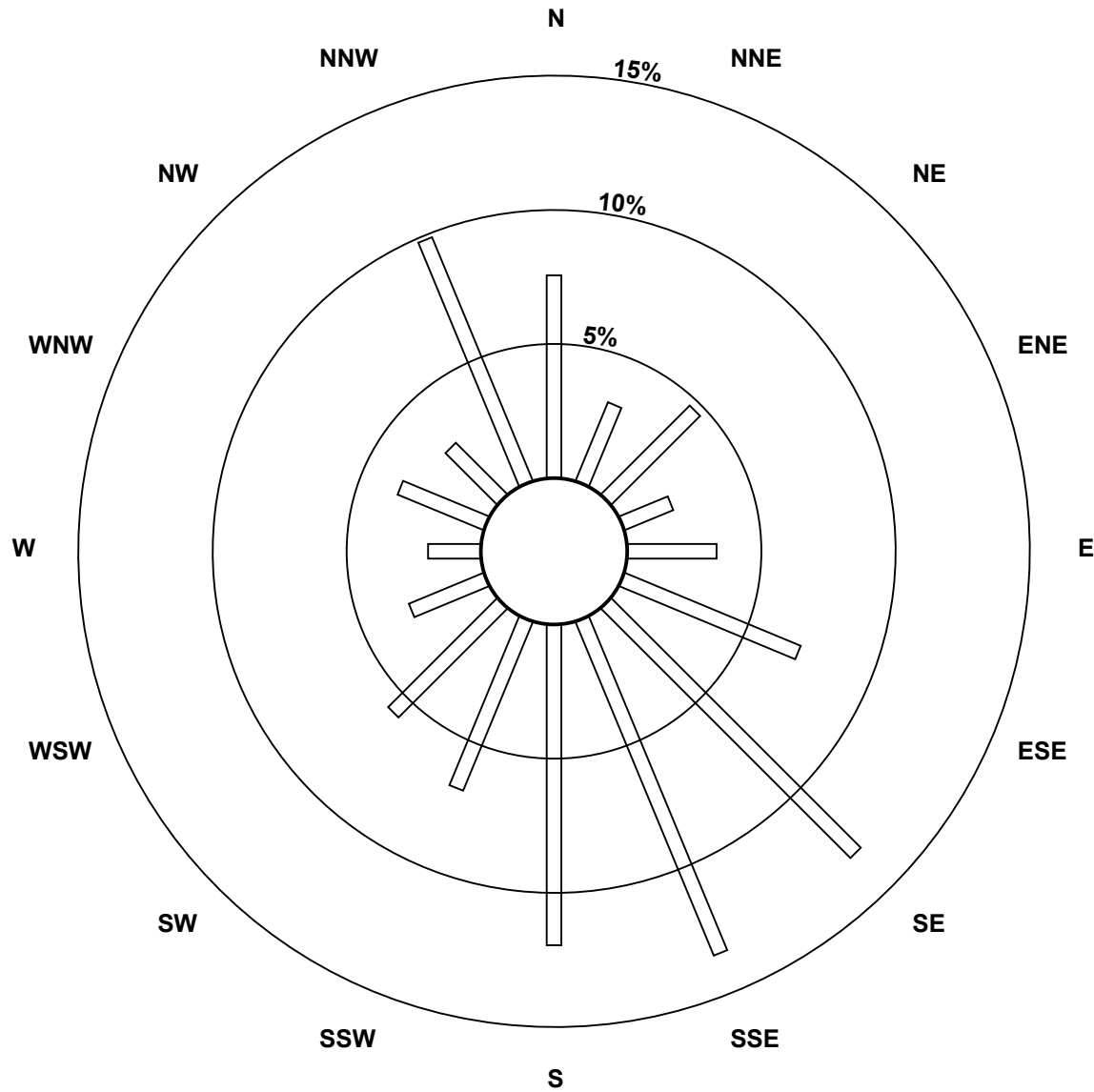
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	50	21	31	13	22	47	87	89	79	45	38	20	13	23	18	65	661
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	21	31	13	22	47	87	89	79	45	38	20	13	23	18	65	661

Total Number of Valid Hours: 661

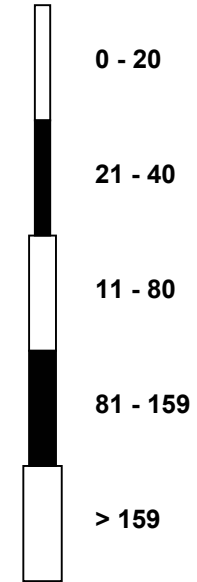
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)



Classes (ppb)

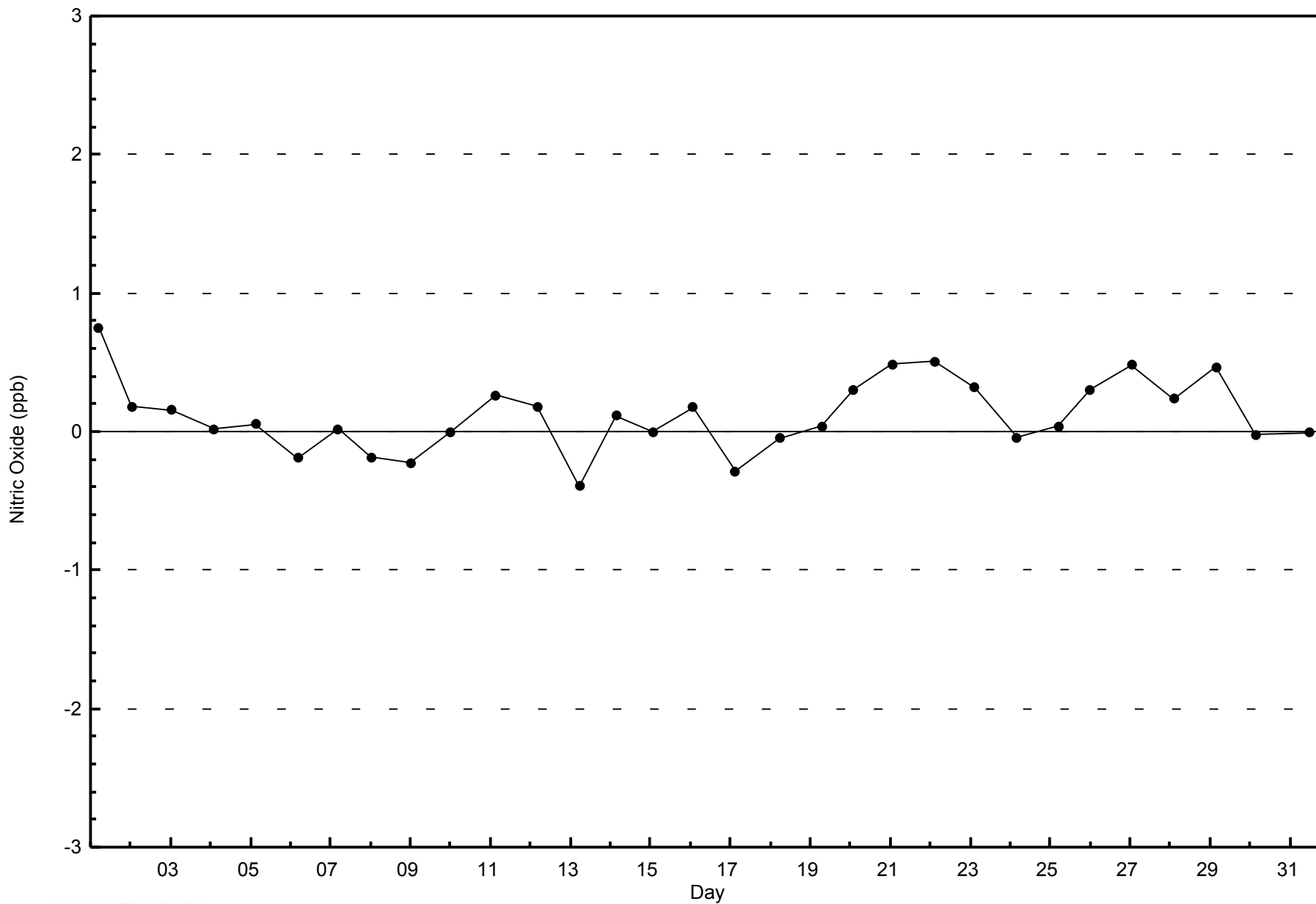


Total Number of Valid Hours: 661



WBEA
Zero Responses

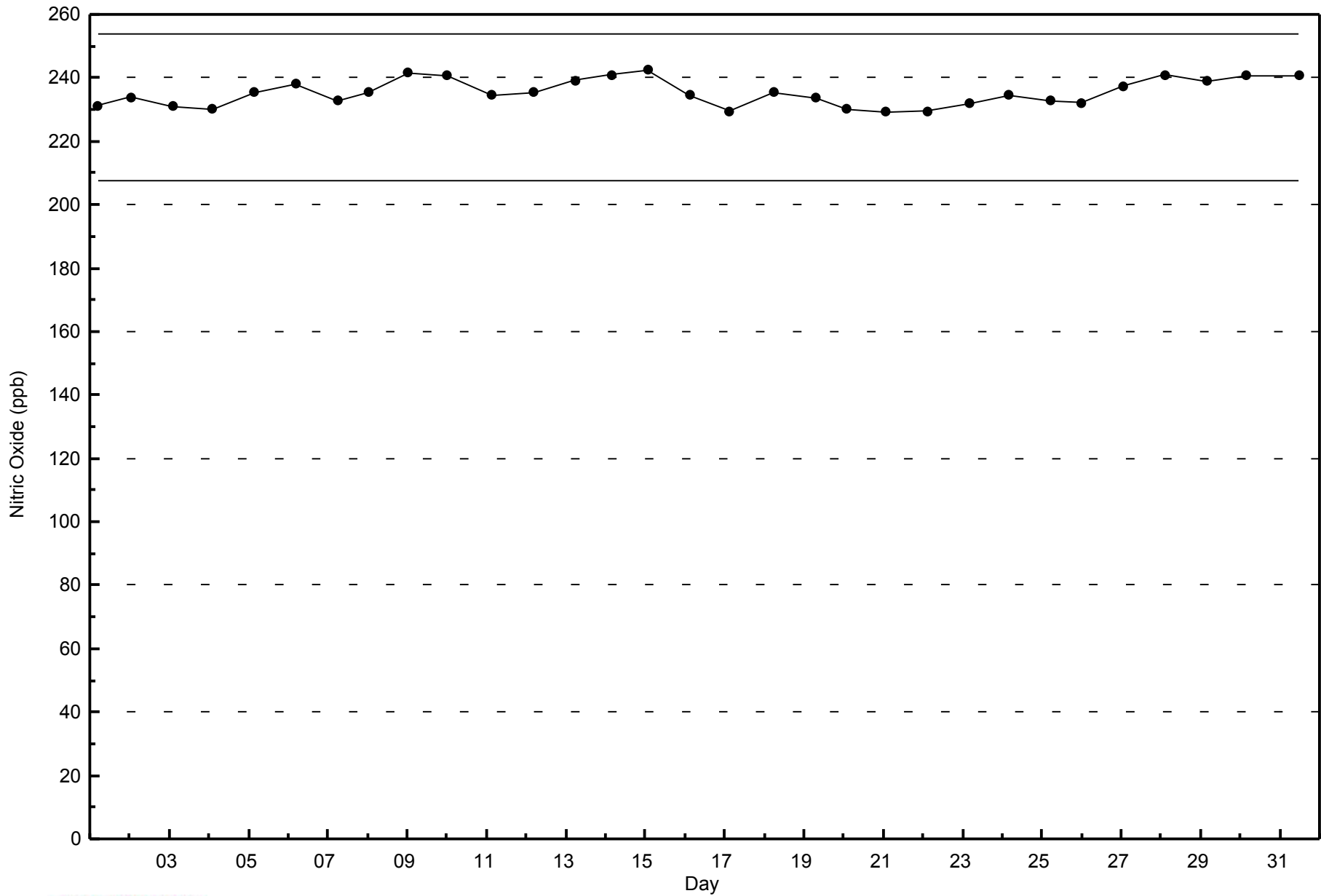
Nitric Oxide (NO) - ppb
Wapasu - March 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 32 ppb on Mar 7 05:00	Maximum Daily Average: 13.3 ppb on Mar 8		Hours of Data:	698
Minimum Value: 0 ppb on Mar 19 06:00	Minimum Daily Average: 0.5 ppb on Mar 19		Hours of Missing Data:	46
Maximum Diurnal Average: 5.3 ppb at hour 2	Minimum Diurnal Average: 2.2 ppb at hour 12		Hours of Calibration:	37
Monthly Average: 3.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 10 P ₉₉ = 23		Percent Operational Time:	98.8

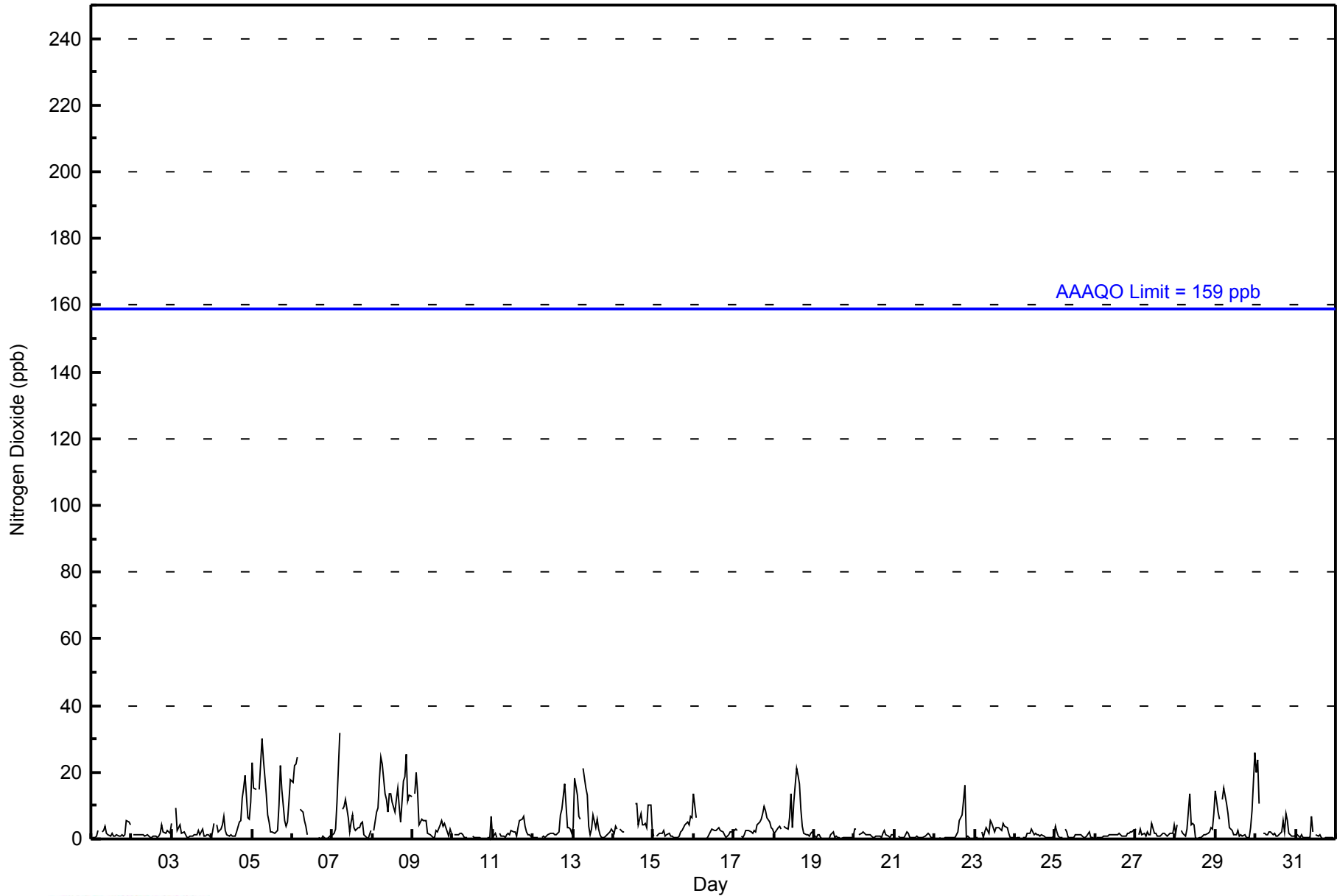
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	1	2	Z	2	2	4	2	1	1	2	1	1	1	1	1	1	1	1	5	5	4	1.8	5
2-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	2	2	3	2	2	1.4	4
3-Mar	5	Z	9	3	3	4	2	2	1	1	1	1	1	1	1	3	1	3	1	1	1	1	1	0	2.1	9
4-Mar	2	5	Z	4	2	3	4	7	3	1	1	1	1	1	1	2	5	6	12	15	19	6	6	11	5.2	19
5-Mar	23	15	15	Z	15	22	30	24	14	7	5	2	2	2	2	3	10	22	15	6	4	5	11	18	11.8	30
6-Mar	17	22	22	25	Z	9	8	6	4	1	C	C	C	C	C	C	0	0	1	0	0	0	1	1	--	25
7-Mar	1	2	3	11	32	Z	9	10	12	6	2	5	7	4	2	3	3	5	5	1	0	0	1	3	5.6	32
8-Mar	Z	3	8	10	18	25	23	13	12	8	14	14	11	8	12	15	10	5	17	19	25	12	13	13	13.3	25
9-Mar	Z	13	20	14	4	6	6	5	5	2	1	1	1	1	2	2	4	6	4	5	3	1	3	2	4.8	20
10-Mar	Z	1	1	1	2	2	1	1	0	M	M	M	1	1	0	0	0	0	0	0	0	0	0	7	1.0	7
11-Mar	1	2	1	Z	2	1	1	1	1	2	1	3	2	2	1	4	5	6	7	4	2	1	1	1	2.1	7
12-Mar	0	1	0	1	Z	1	1	1	1	1	2	2	2	1	1	2	7	9	13	17	4	3	3	2	3.1	17
13-Mar	4	18	13	7	6	Z	21	15	13	4	1	3	7	4	6	3	1	1	1	1	1	2	2	3	5.9	21
14-Mar	2	4	3	Z	3	2	2	PF	PF	PF	PF	PF	PF	PF	11	11	4	8	4	5	3	10	10	2	--	11
15-Mar	1	Z	1	2	2	2	2	1	1	2	1	1	0	0	1	1	2	3	4	4	5	4	7	7	2.2	7
16-Mar	13	6	Z	0	0	0	0	0	0	1	2	3	3	3	3	3	2	2	1	1	1	1	2	2	2.2	13
17-Mar	3	3	3	Z	1	1	1	3	3	3	2	2	3	2	4	5	6	8	10	8	6	5	3	3	3.7	10
18-Mar	2	2	4	4	3	Z	4	3	3	6	13	4	11	21	19	17	9	4	2	1	1	1	2	2	5.9	21
19-Mar	1	0	1	1	0	0	0	Z	0	0	1	2	1	1	1	0	0	0	0	0	0	1	0	1	0.5	2
20-Mar	3	3	Z	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	1	1.3	3
21-Mar	1	Z	1	1	1	1	1	2	2	1	0	1	1	1	1	1	1	1	1	1	2	1	1	0	0.8	2
22-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	2	5	7	11	16	1	1	0	0	0	2.1	16
23-Mar	1	0	0	Z	2	0	2	3	2	5	5	3	2	4	3	3	5	4	3	2	1	0	0	0	2.3	5
24-Mar	0	0	1	1	Z	0	1	2	2	2	3	1	2	1	1	1	1	1	0	0	0	0	1	0	0.9	3
25-Mar	4	2	1	1	1	Z	3	2	1	1	1	0	1	1	1	1	1	0	0	1	2	0	0	0	1.1	4
26-Mar	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	3	1.2	3
27-Mar	3	Z	1	3	1	2	1	2	1	1	5	2	2	1	1	1	2	2	1	1	1	2	2	4	1.8	5
28-Mar	2	4	Z	3	2	1	1	3	14	4	5	4	0	0	0	1	1	1	1	2	2	3	3	8	2.8	14
29-Mar	14	8	6	Z	12	15	11	8	4	3	3	1	1	3	1	1	1	1	1	0	1	3	8	26	5.7	26
30-Mar	20	24	11	Z	2	2	1	1	2	2	1	2	1	1	1	2	5	2	8	6	2	1	1	1	4.2	24
31-Mar	1	1	1	1	0	0	1	0	1	7	2	Z	1	1	1	0	0	0	0	0	0	0	0	0	0.9	7
	4.7	5.3	4.9	3.9	4.2	3.9	4.6	4.2	3.6	2.6	2.7	2.2	2.3	2.6	2.8	2.9	3.3	3.6	4.5	3.5	3.1	2.5	3.0	4.1	Diurnal Average	
	23	24	22	25	32	25	30	24	14	8	14	14	11	21	19	17	10	22	17	19	25	12	13	26	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	97.71	97.71
21 - 40	16	2.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - March 2015

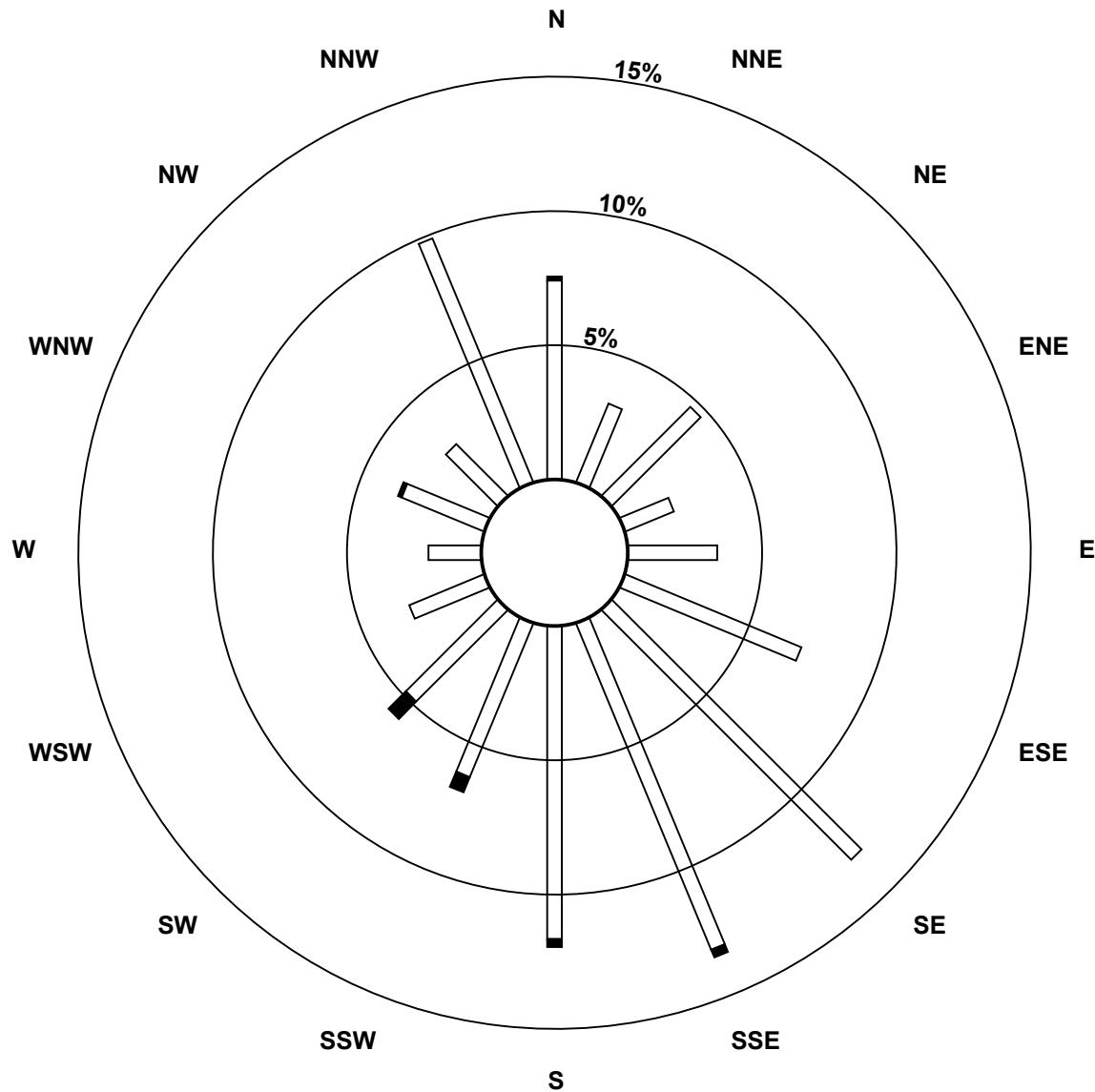
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	49	21	31	13	22	47	87	87	77	41	32	20	13	22	18	65	645
21 - 40	1	0	0	0	0	0	0	2	2	4	6	0	0	1	0	0	16
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	21	31	13	22	47	87	89	79	45	38	20	13	23	18	65	661

Total Number of Valid Hours: 661

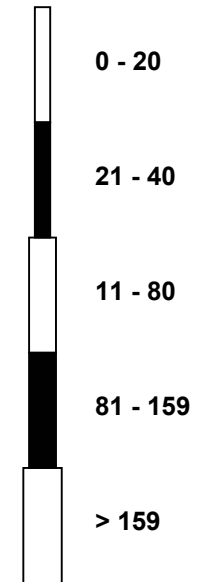
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)



Classes (ppb)

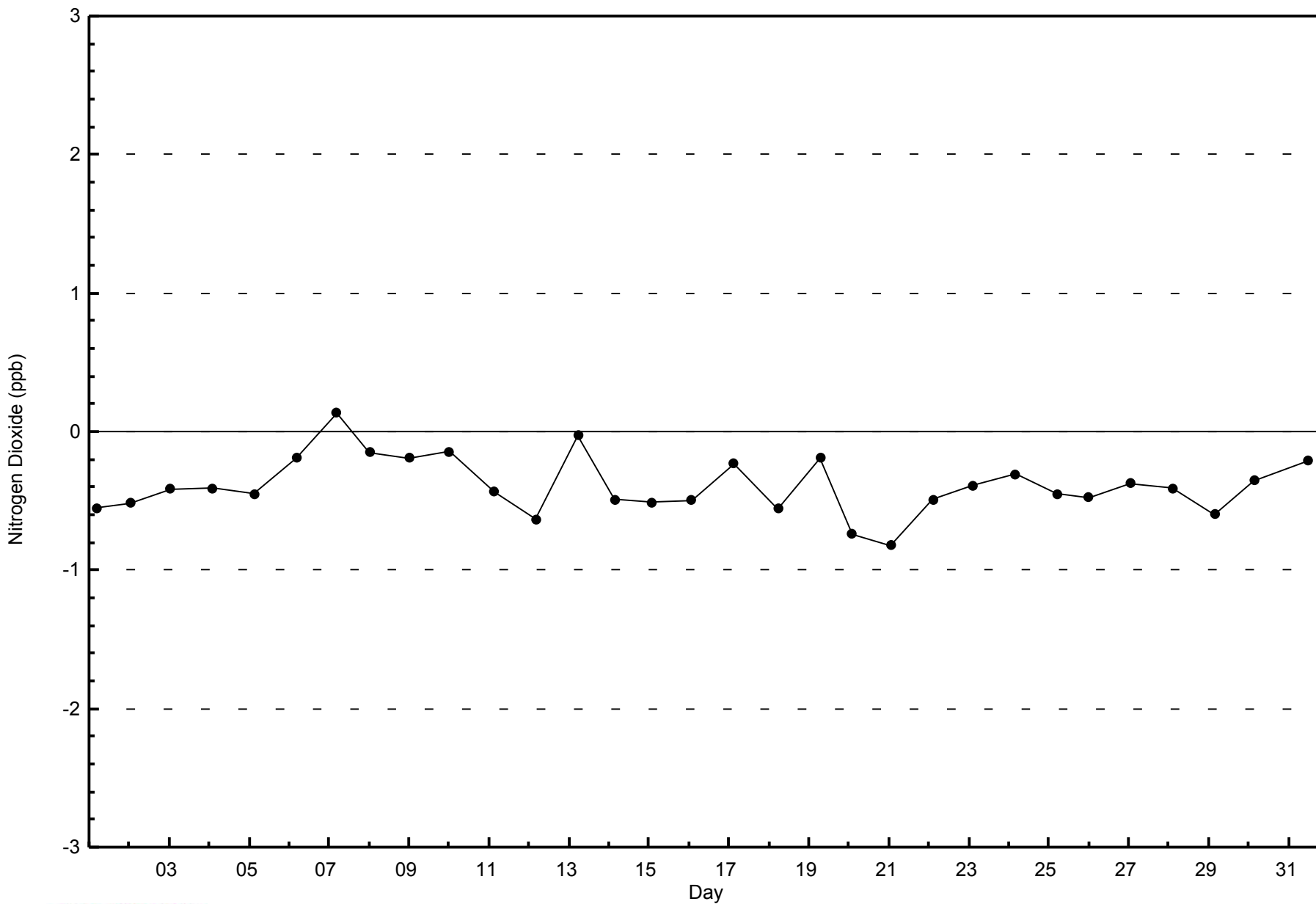


Total Number of Valid Hours: 661



WBEA
Zero Responses

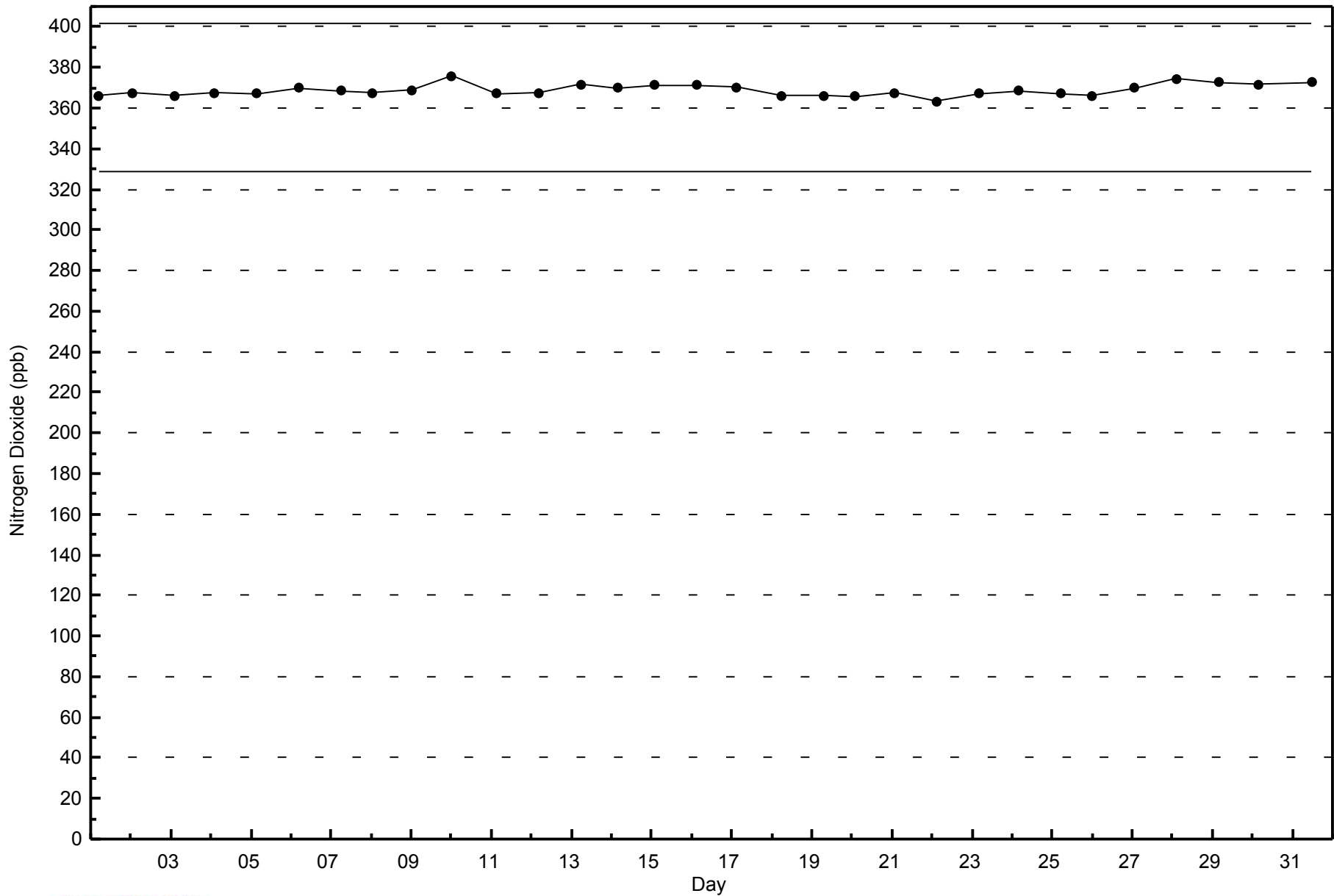
Nitrogen Dioxide (NO₂) - ppb
Wapasu - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Wapasu - March 2015



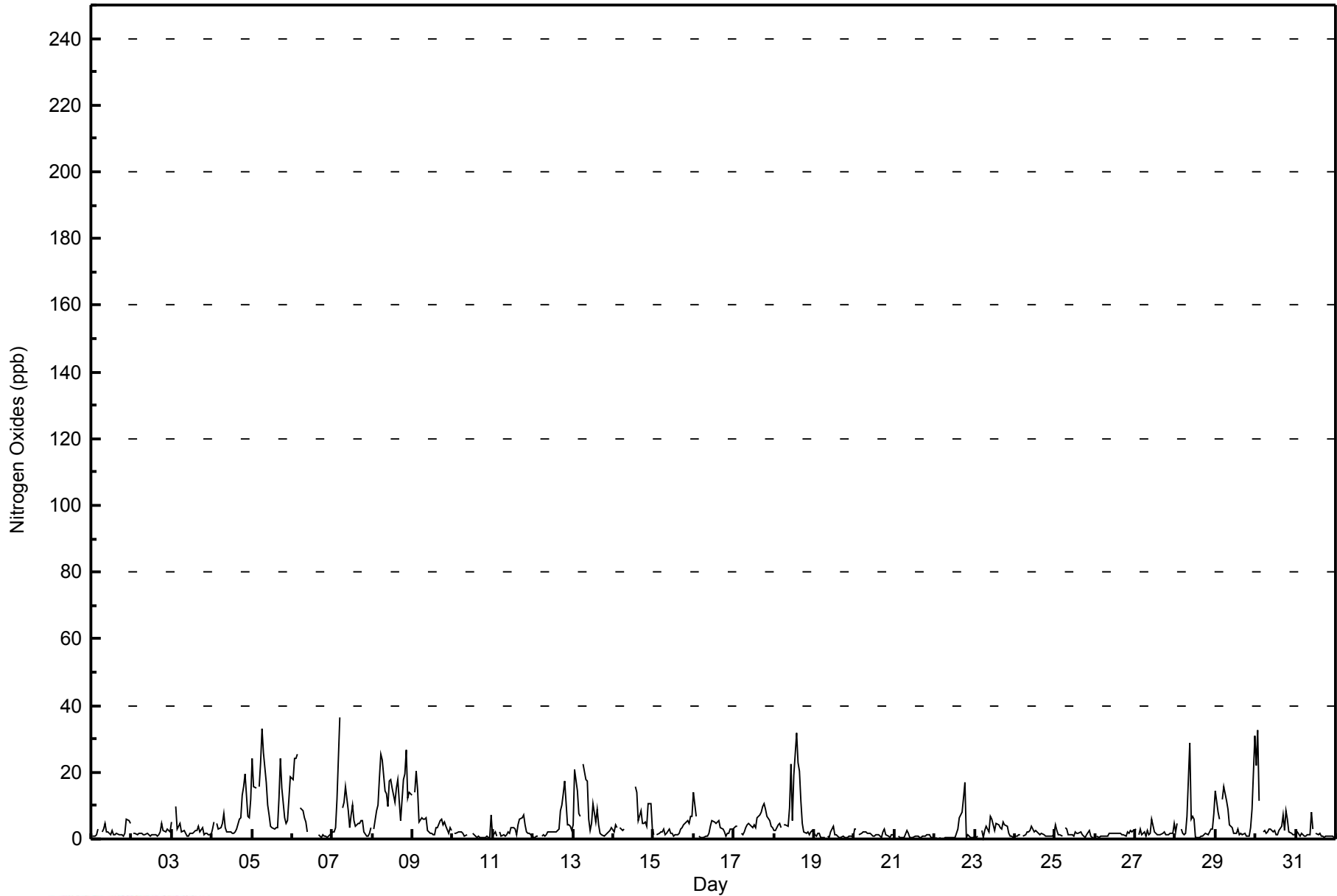


Maximum Value: 36 ppb on Mar 7 05:00														Maximum Daily Average: 14.9 ppb on Mar 8														Hours in Service: 744	
Minimum Value: 0 ppb on Mar 22 06:00														Minimum Daily Average: 0.9 ppb on Mar 21														Hours of Data: 698	
Maximum Diurnal Average: 6.1 ppb at hour 2														Minimum Diurnal Average: 2.8 ppb at hour 22														Hours of Missing Data: 46	
Monthly Average: 4.3 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 11 P ₉₉ = 25														Hours of Calibration: 37	
																												Percent Operational Time: 98.8	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	1	1	1	1	3	Z	2	3	5	2	2	1	3	1	1	2	1	1	1	1	2	6	5	5	2.2	6			
2-Mar	Z	2	2	1	2	2	2	1	1	2	1	1	1	1	1	1	1	2	5	3	2	3	3	2	1.8	5			
3-Mar	5	Z	10	3	4	5	2	3	2	1	1	2	2	2	2	3	4	2	3	1	2	2	1	1	2.7	10			
4-Mar	3	5	Z	5	3	3	5	8	3	2	2	2	2	2	2	3	6	6	13	16	20	7	6	12	5.9	20			
5-Mar	24	16	15	Z	16	23	33	26	17	10	7	4	3	3	3	3	12	24	15	6	4	6	12	19	13.2	33			
6-Mar	18	24	24	26	Z	9	9	6	5	2	C	C	C	C	C	C	1	1	1	1	1	1	1	2	--	26			
7-Mar	2	2	3	12	36	Z	9	11	16	8	3	7	10	5	4	5	4	5	5	2	1	1	2	3	6.9	36			
8-Mar	Z	3	8	10	18	25	24	14	14	10	17	18	15	11	15	18	11	6	18	20	27	12	14	13	14.9	27			
9-Mar	Z	14	20	15	5	7	6	6	6	2	2	1	1	1	3	3	5	6	4	5	4	2	4	2	5.5	20			
10-Mar	Z	2	2	2	2	2	2	1	1	M	M	M	2	1	1	1	1	0	1	0	1	0	1	7	1.4	7			
11-Mar	1	2	1	Z	2	1	1	1	1	1	2	2	4	3	3	1	4	6	6	7	4	2	2	1	1	2.6	7		
12-Mar	1	1	1	1	Z	1	1	1	1	1	2	2	2	2	2	3	9	10	14	17	4	4	4	3	3.8	17			
13-Mar	4	21	14	7	7	Z	22	18	17	6	3	5	11	5	9	4	2	1	1	1	2	2	3	3	7.3	22			
14-Mar	2	4	3	Z	3	2	3	PF	PF	PF	PF	PF	PF	PF	16	14	5	9	5	4	11	10	3	--	16				
15-Mar	1	Z	1	2	2	2	3	1	2	3	2	2	1	1	1	2	3	3	4	5	6	4	7	7	2.8	7			
16-Mar	14	7	Z	1	1	1	1	1	1	2	4	6	5	5	5	5	4	3	2	1	2	2	3	3	3.2	14			
17-Mar	3	4	4	Z	2	1	2	3	4	5	4	3	4	3	6	7	8	10	10	9	7	6	4	3	4.9	10			
18-Mar	2	2	4	4	3	Z	4	4	4	9	22	6	19	32	23	21	11	5	2	1	2	1	2	3	8.2	32			
19-Mar	1	1	2	2	1	0	0	Z	1	0	2	4	1	1	1	0	1	1	0	1	1	1	1	1	1.0	4			
20-Mar	3	3	Z	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	3	1	1	0	1	1	1.5	3		
21-Mar	1	Z	1	1	1	1	0	3	2	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0.9	3			
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	3	7	8	12	17	1	1	1	0	0	2.4	17			
23-Mar	1	1	1	Z	3	1	2	4	2	7	6	4	3	4	4	3	5	4	4	2	1	1	1	1	2.9	7			
24-Mar	1	1	1	1	Z	1	1	2	2	2	4	2	3	2	2	1	2	1	1	1	1	1	1	2	1.5	4			
25-Mar	4	3	1	1	1	Z	3	3	1	1	1	1	2	2	2	2	1	1	1	1	2	1	1	1	1.6	4			
26-Mar	Z	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2	3	1.4	3			
27-Mar	3	Z	1	3	1	2	1	2	1	2	6	2	2	1	1	1	2	2	1	1	1	2	2	5	2.0	6			
28-Mar	2	5	Z	3	2	1	2	7	29	6	7	6	0	0	1	1	1	1	2	1	2	3	3	8	4.0	29			
29-Mar	14	8	6	Z	12	16	11	9	4	4	3	2	2	3	1	2	1	2	1	1	1	4	9	31	6.3	31			
30-Mar	22	33	11	Z	2	2	2	2	3	3	2	2	1	1	2	4	7	3	8	6	2	2	1	1	5.4	33			
31-Mar	2	2	1	2	1	1	1	1	1	8	3	Z	2	1	2	1	1	1	1	1	1	1	1	0	1.5	8			
																								Diurnal Average					
																								Diurnal Maximum					
5.2 6.1 5.3 4.3 4.8 4.3 5.1 4.9 5.0 3.6 4.0 3.3 3.6 3.9 3.9 3.8 4.1 4.2 4.9 3.9 3.5 2.8 3.4 4.7																													
24 33 24 26 36 25 33 26 29 10 22 18 19 32 23 21 12 24 18 20 27 12 14 31																													
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																													



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	676	96.85	96.85
21 - 40	22	3.15	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - March 2015

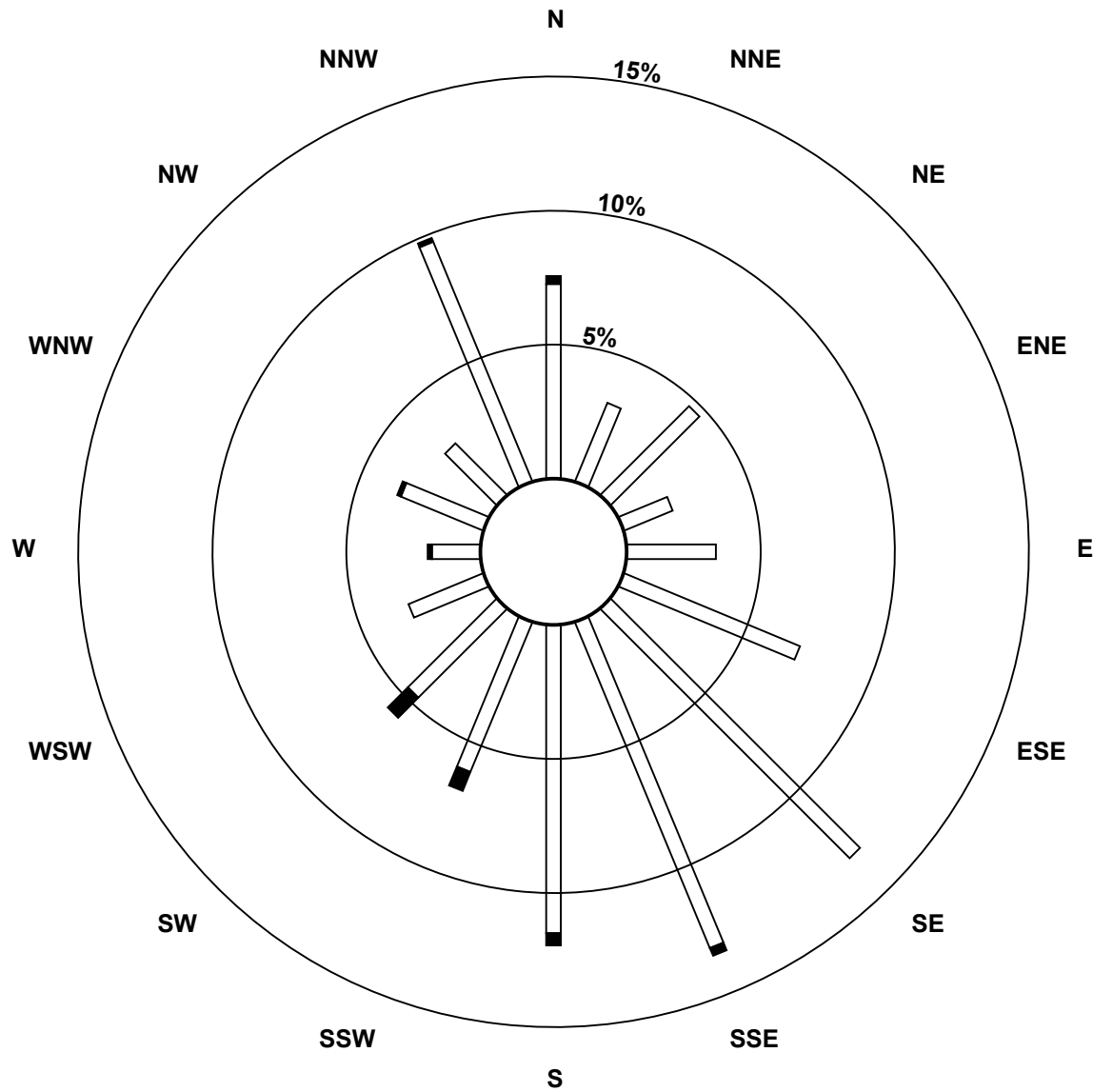
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	48	21	31	13	22	47	87	87	76	40	31	20	12	22	18	64	639
21 - 40	2	0	0	0	0	0	0	2	3	5	7	0	1	1	0	1	22
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	21	31	13	22	47	87	89	79	45	38	20	13	23	18	65	661

Total Number of Valid Hours: 661

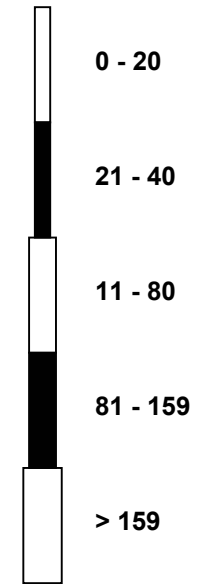
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

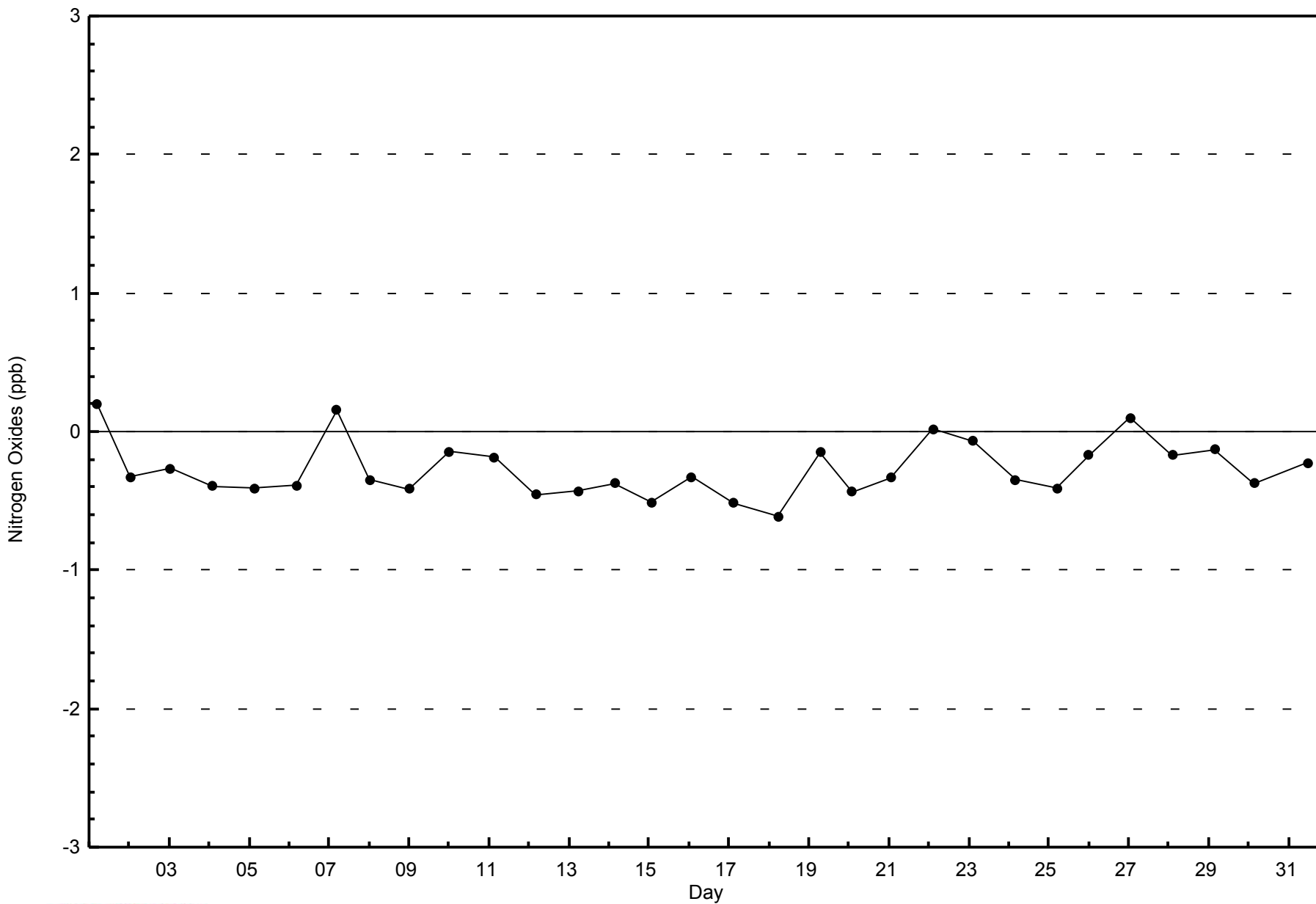
**Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)**



Classes (ppb)



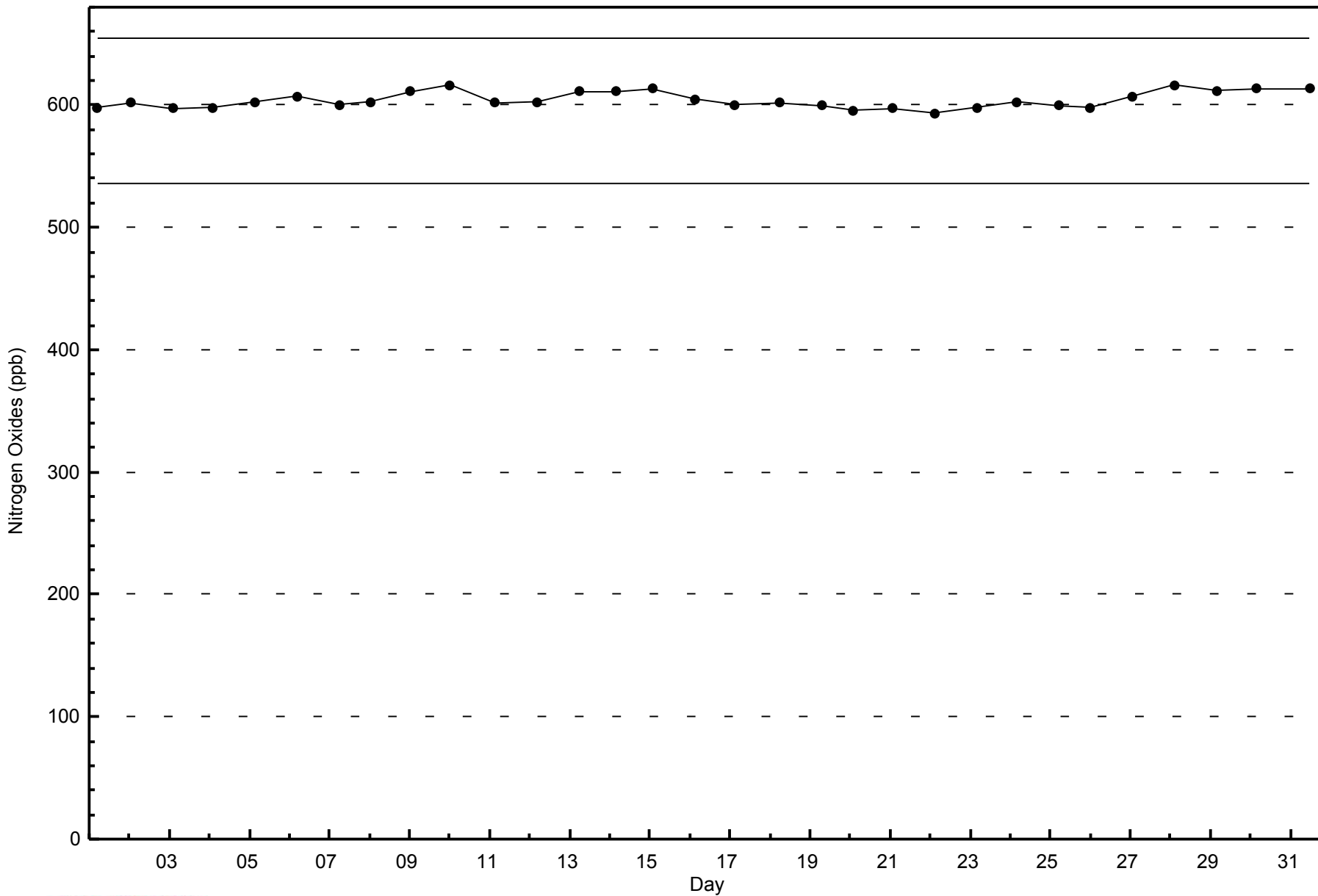
Total Number of Valid Hours: 661





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Wapasu - March 2015





Summary of Hour Averages

Wapasu - March 2015

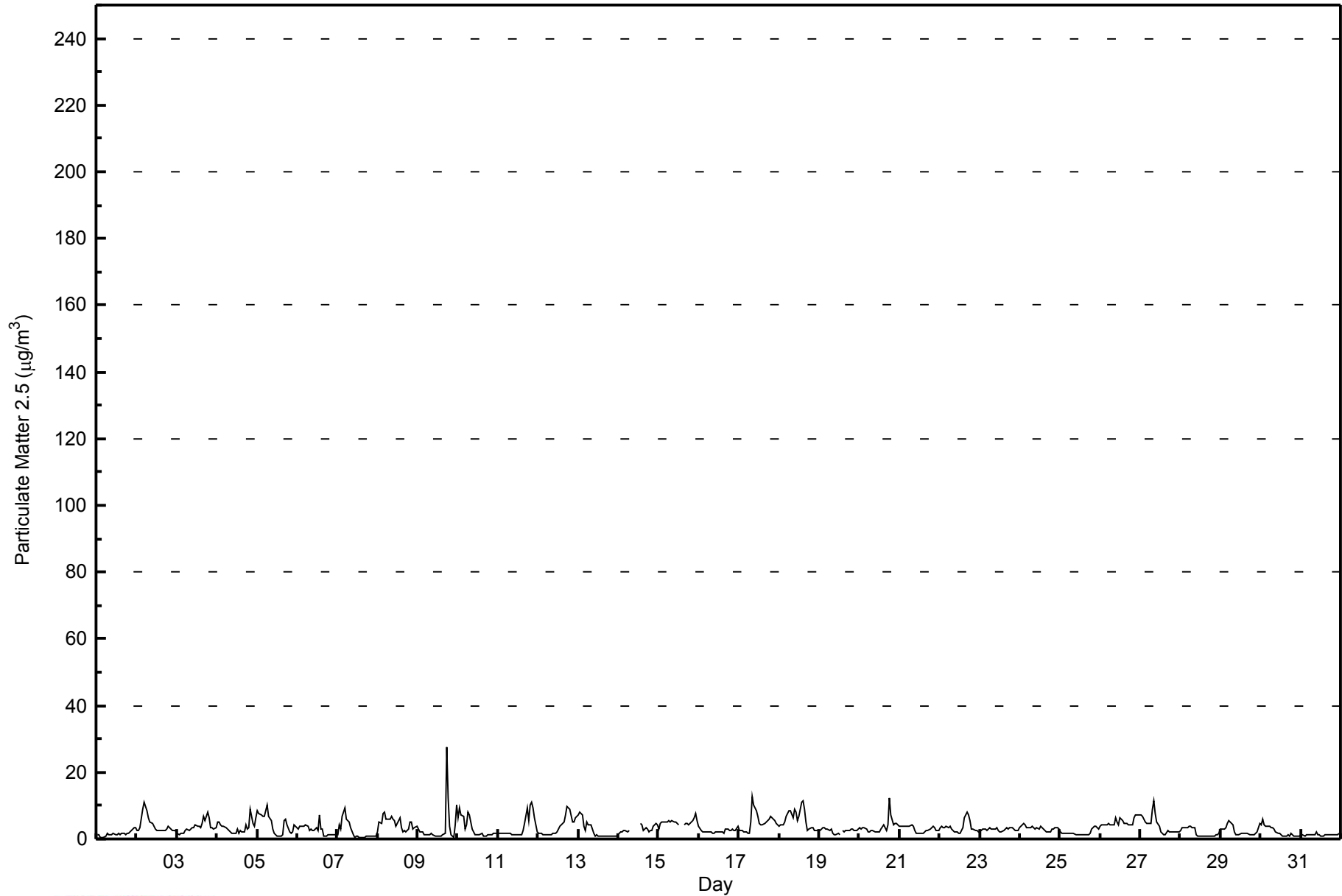
Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 27.4 µg/m ³ on Mar 9 18:00 Maximum Daily Average: 5.9 µg/m ³ on Mar 18																	Hours in Service: 744 Hours of Data: 735									
Minimum Value: 0.3 µg/m ³ on Mar 1 04:00 Maximum Diurnal Average: 4.0 µg/m ³ at hour 18 Monthly Average: 3.31 µg/m ³																	Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8									
Minimum Daily Average: 1.3 µg/m ³ on Mar 31 Minimum Diurnal Average: 2.4 µg/m ³ at hour 12 Percentiles: P ₁ = 0.6 P ₁₀ = 1.1 Q ₁ = 1.6 Median = 2.8 Q ₃ = 4.3 P ₉₀ = 6.4 P ₉₉ = 11.1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1.2	1.2	0.3	0.3	0.5	1.0	1.5	1.2	1.5	1.4	1.5	1.4	1.4	1.6	1.5	1.5	1.5	1.5	1.7	1.7	2.0	2.6	3.3	3.6	1.5	3.6
2-Mar	2.7	2.4	3.3	8.7	11.2	9.8	8.3	6.2	5.0	4.5	3.9	3.0	2.7	2.5	2.6	2.4	2.5	2.7	3.0	4.0	2.8	2.7	2.5	2.4	4.2	11.2
3-Mar	1.8	1.3	1.6	1.6	1.8	2.4	2.8	2.5	2.8	3.3	3.3	4.0	3.8	3.7	3.5	4.5	6.6	5.7	8.2	6.3	3.6	3.4	3.1	3.3	3.5	8.2
4-Mar	5.1	5.0	4.4	4.0	4.0	3.3	2.9	2.4	2.1	1.9	1.8	1.7	3.0	1.8	2.4	2.2	2.2	4.3	3.0	3.4	9.1	4.7	4.0	6.5	3.5	9.1
5-Mar	8.4	7.6	7.3	6.8	6.7	8.5	10.3	6.8	5.3	2.9	1.8	1.1	0.9	0.8	0.8	1.1	5.4	6.1	4.4	2.2	1.8	2.1	4.2	4.0	4.5	10.3
6-Mar	3.1	3.6	3.7	4.0	3.6	4.1	3.9	2.7	2.8	2.5	2.7	3.3	2.7	7.2	3.0	3.2	1.0	1.0	1.1	1.1	1.1	1.2	1.3	1.3	2.7	7.2
7-Mar	1.3	4.1	3.2	6.7	9.2	6.1	5.5	5.0	3.3	1.1	0.6	0.7	0.7	0.5	0.4	0.5	0.6	0.6	0.9	1.0	0.9	0.9	1.0	1.0	2.3	9.2
8-Mar	2.3	5.2	4.8	7.5	8.2	6.1	5.8	6.0	6.9	6.1	5.6	4.0	4.6	6.5	3.2	2.3	2.7	2.1	3.0	4.9	5.0	3.0	3.4	3.7	4.7	8.2
9-Mar	3.1	2.2	2.2	2.1	1.2	1.1	1.1	1.3	1.9	1.2	1.0	0.8	0.8	0.8	1.0	1.2	1.9	27.4	12.3	3.8	1.1	0.6	4.4	10.0	3.5	27.4
10-Mar	6.5	9.5	7.2	6.8	2.8	4.1	7.9	7.3	3.1	2.3	1.3	1.3	1.2	1.2	1.7	1.0	0.9	1.0	1.2	1.3	1.5	1.5	1.5	1.6	3.2	9.5
11-Mar	1.6	1.7	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3	2.7	4.6	9.4	5.3	10.2	10.9	9.4	6.2	2.2	3.4	10.9
12-Mar	1.9	1.6	1.5	1.4	1.4	1.3	1.3	1.4	1.4	1.5	1.6	1.9	3.0	3.6	4.3	5.1	7.2	9.9	9.4	8.7	5.1	5.3	6.4	7.0	3.9	9.9
13-Mar	7.0	8.2	7.1	3.9	2.4	5.0	4.2	4.2	2.8	1.7	0.8	1.2	1.0	0.7	0.9	0.7	0.7	0.8	0.8	0.7	0.8	0.9	1.0	1.0	2.4	8.2
14-Mar	1.6	2.0	2.3	2.6	2.6	2.3	2.6	PF	PF	PF	PF	PF	PF	4.5	4.1	2.6	3.2	2.9	2.3	2.4	2.7	3.8	4.8	4.4	3.0	4.8
15-Mar	3.0	4.5	5.1	5.0	5.1	5.1	5.3	5.3	5.4	5.1	4.9	4.6	4.4	M	M	4.4	4.7	4.5	4.3	4.7	5.4	6.4	7.5	5.5	5.0	7.5
16-Mar	3.8	2.7	2.2	2.1	2.3	2.2	2.1	2.0	1.9	1.8	2.1	2.2	2.0	1.9	1.9	1.9	2.9	3.0	2.5	2.5	2.9	2.7	2.6	3.9	2.4	3.9
17-Mar	2.5	2.6	2.5	2.2	1.9	1.8	1.7	5.0	12.7	10.3	8.4	6.6	4.9	4.2	4.4	4.8	5.1	5.5	6.1	6.7	6.2	5.5	4.8	4.1	5.0	12.7
18-Mar	3.9	4.3	4.4	5.1	6.6	7.6	8.5	8.5	6.2	9.1	8.3	5.5	6.8	11.1	11.5	8.7	5.2	2.7	3.0	3.4	3.2	2.6	2.6	2.4	5.9	11.5
19-Mar	2.7	3.0	3.6	3.3	2.9	2.8	2.7	2.8	1.7	1.1	1.3	1.9	1.4	M	2.7	2.3	2.4	2.3	2.5	3.0	2.9	2.7	2.7	2.9	2.5	3.6
20-Mar	3.2	3.0	3.2	3.5	2.9	2.1	2.1	2.7	2.7	2.3	2.2	2.1	2.1	3.1	4.1	3.5	2.4	4.1	12.3	7.2	4.1	4.6	4.7	4.3	3.7	12.3
21-Mar	3.6	3.6	4.0	3.8	3.8	3.9	4.0	4.4	3.6	2.4	1.9	1.8	1.7	1.5	1.7	2.0	2.4	2.5	3.0	3.5	3.8	3.4	2.7	2.4	3.0	4.4
22-Mar	3.4	3.7	3.4	3.6	3.7	3.5	3.8	3.1	2.6	2.3	2.0	1.8	1.7	2.7	3.5	6.2	8.1	7.3	5.5	2.9	2.8	2.7	2.6	2.2	3.5	8.1
23-Mar	2.4	2.7	2.9	2.8	2.7	3.0	3.4	3.1	2.9	3.1	3.2	2.7	2.1	2.2	2.5	2.9	3.2	3.1	3.4	3.5	3.0	2.7	2.6	2.7	2.9	3.5
24-Mar	3.3	4.4	4.8	4.3	3.5	3.3	3.4	3.6	3.4	3.0	3.4	2.9	3.7	3.2	2.9	2.6	2.3	2.1	2.1	2.8	3.0	3.6	3.4	2.8	3.2	4.8
25-Mar	2.2	1.7	1.7	1.7	1.8	1.8	1.6	1.6	1.6	1.4	1.3	1.2	1.2	1.1	1.1	1.3	1.1	1.1	1.9	3.1	3.6	3.8	3.4	3.2	1.9	3.8
26-Mar	3.9	4.3	4.2	4.4	4.2	4.6	4.4	4.4	4.3	6.3	5.2	4.1	6.2	5.4	4.6	4.7	4.6	4.4	4.2	4.4	6.2	7.1	7.4	7.3	5.0	7.4
27-Mar	7.1	6.8	5.9	5.1	4.9	4.7	4.6	8.9	11.4	7.7	5.1	3.7	2.0	1.5	1.4	1.4	2.4	2.3	2.1	2.1	2.1	2.3	2.2	2.1	4.2	11.4
28-Mar	2.7	3.4	3.3	3.3	3.4	3.6	3.6	3.3	3.3	1.2	1.0	0.9	0.7	0.7	0.8	0.9	0.9	1.0	1.0	0.8	1.0	1.2	1.3	1.7	1.9	3.6
29-Mar	3.2	3.0	2.8	3.2	4.6	5.7	4.6	4.4	2.0	1.4	1.4	1.4	1.5	1.8	1.7	1.9	1.8	1.5	1.4	1.5	1.5	1.6	2.3	4.5	2.5	5.7
30-Mar	4.3	5.8	4.3	3.8	4.0	3.9	3.6	3.3	3.1	2.1	1.9	1.6	1.2	1.0	0.9	1.0	1.1	0.7	1.5	1.4	1.0	1.0	1.0	1.1	2.3	5.8
31-Mar	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.2	2.0	1.3	1.1	1.0	1.1	1.3	1.4	1.3	1.4	1.4	1.5	1.4	1.5	1.5	1.5	1.3	2.0
																								Diurnal Average		
																								Diurnal Maximum		
																								3.3 3.7 3.5 3.8 3.8 3.8 3.9 3.9 3.7 3.1 2.7 2.4 2.4 2.7 2.6 2.7 3.0 4.0 3.7 3.4 3.3 3.1 3.3 3.4		
																								8.4 9.5 7.3 8.7 11.2 9.8 10.3 8.9 12.7 10.3 8.4 6.6 6.8 11.1 11.5 8.7 8.1 27.4 12.3 10.2 10.9 9.4 7.5 10.0		

M - Maintenance PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - March 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	585	79.59	79.59
6 - 15	95	12.93	92.52
16 - 25	0	0.00	92.52
26 - 80	1	0.14	92.65
> 81.0	0	0.00	92.65

Total Number of Valid Hours: 735

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - March 2015

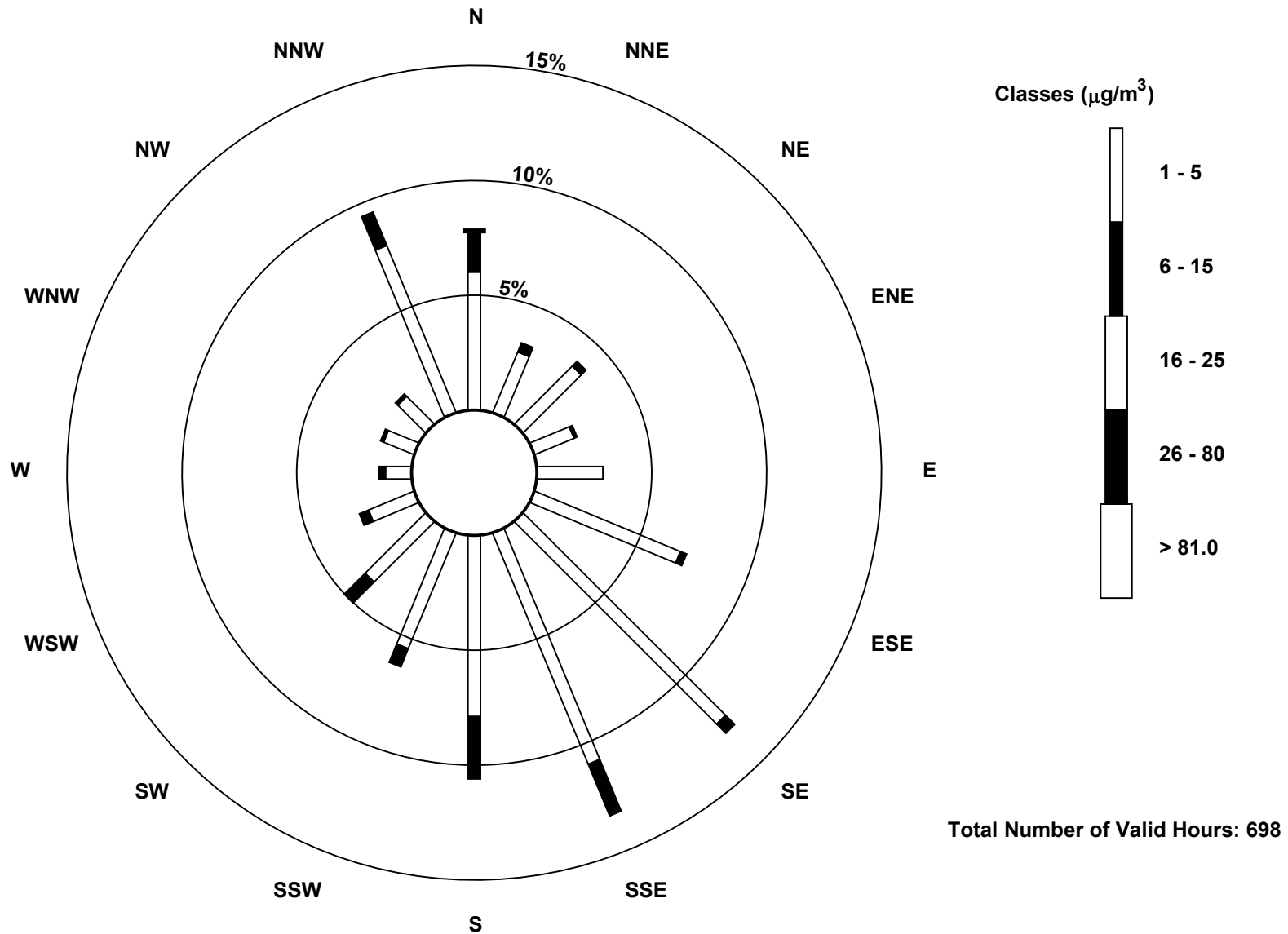
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	42	20	25	13	20	48	87	76	55	38	26	15	8	10	12	55	550
6 - 15	12	3	2	1	0	2	4	17	19	6	9	3	2	1	1	11	93
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	23	27	14	20	50	91	93	74	44	35	18	10	11	13	66	644

Total Number of Valid Hours: 698

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu (AMS 17)



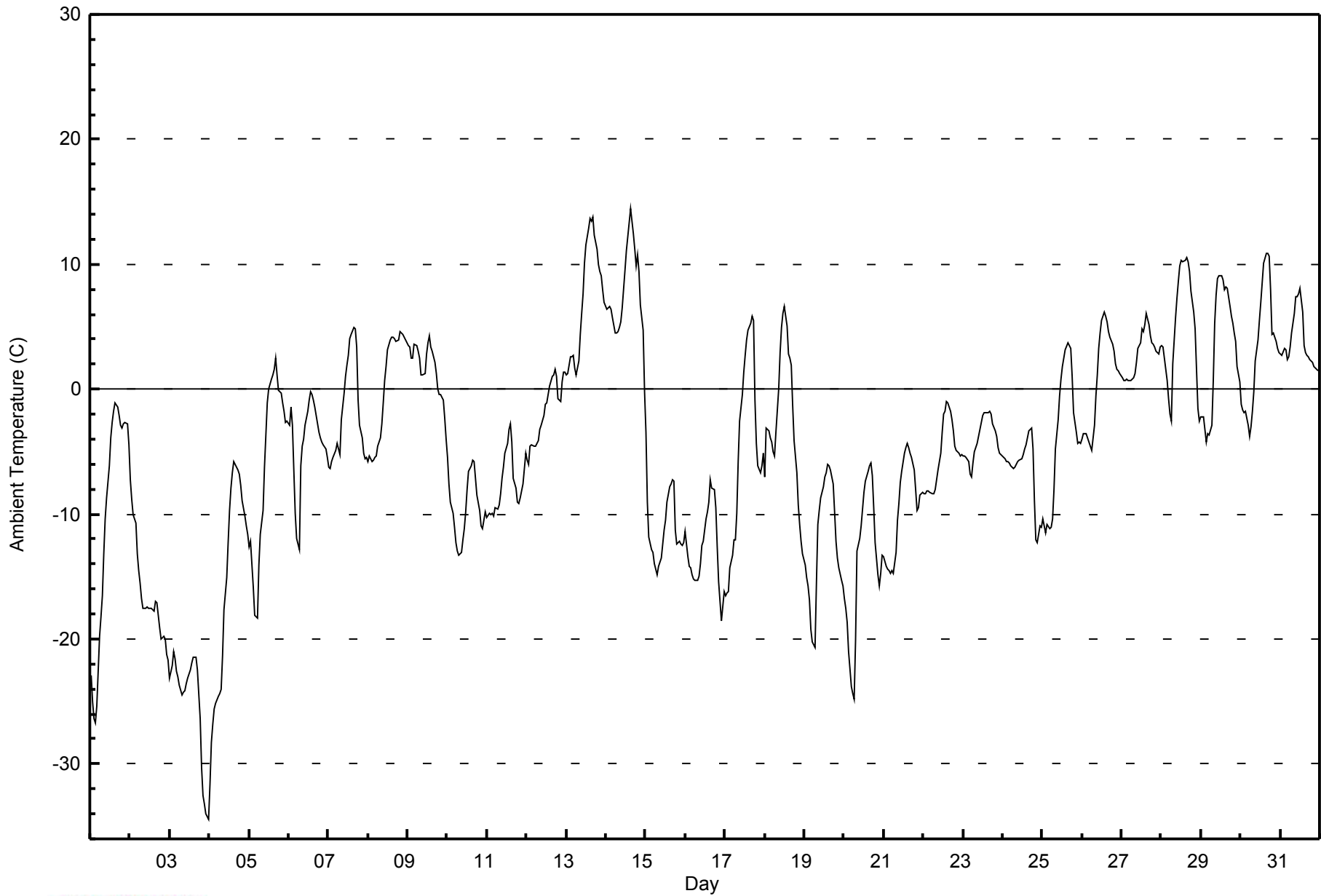


Maximum Value: 14.4 C on Mar 14 16:00		Maximum Daily Average: 7.8 C on Mar 14		Hours in Service: 744																						
Minimum Value: -34.4 C on Mar 4 00:00		Minimum Daily Average: -25.0 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 0.1 C at hour 16		Minimum Diurnal Average: -9.3 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: -4.81 C		Percentiles: P ₁ = -26.8 P ₁₀ = -16.8 Q ₁ = -10.2 Median = -4.4 Q ₃ = 2.0 P ₉₀ = 5.4 P ₉₉ = 11.9		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-22.9	-25.0	-26.4	-26.7	-25.4	-19.8	-18.2	-16.6	-13.2	-10.4	-8.7	-6.1	-3.8	-2.7	-1.7	-1.1	-1.4	-2.1	-2.9	-3.1	-2.8	-2.6	-2.8	-4.5	-10.5	-1.1
2-Mar	-7.3	-8.8	-10.1	-10.7	-13.2	-14.5	-15.5	-16.8	-17.5	-17.6	-17.5	-17.5	-17.5	-17.6	-17.8	-16.9	-17.1	-18.1	-19.1	-20.0	-19.8	-20.1	-21.3	-21.6	-16.4	-7.3
3-Mar	-23.2	-22.2	-21.0	-21.6	-22.6	-23.0	-23.7	-24.4	-24.3	-24.2	-23.6	-23.2	-22.5	-21.9	-21.4	-21.4	-21.5	-22.5	-26.4	-30.3	-32.6	-33.2	-34.0	-34.4	-25.0	-21.0
4-Mar	-31.6	-28.3	-26.8	-25.6	-25.1	-24.6	-24.4	-24.0	-21.3	-17.7	-15.1	-12.3	-9.7	-7.9	-6.7	-5.8	-6.2	-6.5	-6.8	-7.7	-9.0	-10.2	-11.0	-11.7	-15.7	-5.8
5-Mar	-12.6	-12.2	-15.9	-18.1	-18.2	-18.4	-14.0	-11.6	-9.7	-6.2	-3.6	-1.1	0.0	0.8	1.1	1.6	2.5	1.2	-0.1	-0.3	-1.0	-1.8	-2.6	-2.6	-6.0	2.5
6-Mar	-2.9	-1.4	-2.9	-6.4	-10.0	-11.9	-12.9	-6.2	-4.6	-4.0	-2.9	-1.8	-0.8	-0.2	-0.4	-0.8	-1.5	-2.8	-3.5	-3.9	-4.3	-4.5	-4.8	-5.4	-4.2	-0.2
7-Mar	-6.3	-6.4	-5.8	-5.5	-4.9	-4.3	-4.8	-5.2	-2.4	-0.3	1.0	1.9	2.7	4.0	4.4	4.9	4.9	3.4	-0.8	-2.9	-3.9	-5.1	-5.6	-5.4	-1.8	4.9
8-Mar	-5.7	-5.3	-5.8	-5.7	-5.5	-5.4	-4.6	-3.9	-2.7	-1.1	0.7	1.8	3.2	3.9	4.2	4.2	4.0	3.9	3.9	4.6	4.5	4.4	4.2	3.7	0.2	4.6
9-Mar	3.5	3.3	2.5	2.5	3.6	3.5	3.1	2.4	1.2	1.1	1.2	2.8	3.7	4.3	3.3	3.0	2.1	1.3	0.1	-0.4	-0.5	-0.9	-2.4	-4.0	1.7	4.3
10-Mar	-5.5	-7.6	-9.0	-9.9	-11.1	-12.3	-13.0	-13.3	-13.1	-12.0	-11.1	-9.8	-8.1	-6.6	-6.1	-5.7	-5.8	-7.2	-8.4	-9.7	-11.0	-11.1	-10.5	-9.8	-9.5	-5.5
11-Mar	-10.3	-10.0	-10.0	-9.9	-10.1	-9.5	-9.6	-9.3	-8.3	-7.1	-6.2	-5.1	-4.4	-3.3	-2.8	-4.2	-7.2	-7.9	-9.0	-9.1	-8.7	-8.2	-7.6	-5.2	-7.6	-2.8
12-Mar	-5.6	-6.0	-4.6	-4.5	-4.6	-4.5	-4.3	-4.1	-3.3	-2.9	-2.2	-1.2	-1.1	-0.5	0.2	1.1	1.2	1.6	1.0	-0.7	-1.0	0.6	1.4	1.3	-1.8	1.6
13-Mar	1.1	1.2	2.6	2.5	2.7	1.7	1.2	2.3	4.4	6.0	7.7	10.0	11.6	12.8	13.6	13.4	13.8	12.3	11.2	9.9	9.4	9.0	7.9	6.9	7.3	13.8
14-Mar	6.4	6.5	6.6	6.4	5.7	4.5	4.5	4.7	4.9	5.4	6.5	9.5	11.1	12.2	13.3	14.4	12.4	11.2	9.9	10.8	9.4	6.8	4.8	-0.2	7.8	14.4
15-Mar	-3.4	-9.0	-11.9	-12.9	-13.1	-13.9	-14.4	-14.9	-14.2	-13.5	-12.4	-11.3	-10.4	-9.1	-7.9	-7.6	-7.3	-7.4	-11.2	-12.4	-12.1	-12.3	-12.6	-12.3	-11.1	-3.4
16-Mar	-11.4	-13.4	-14.2	-14.4	-14.8	-15.2	-15.3	-15.3	-15.0	-14.0	-12.5	-12.2	-10.4	-9.8	-9.0	-7.3	-7.9	-8.1	-9.5	-12.7	-15.4	-17.0	-18.5	-16.2	-12.9	-7.3
17-Mar	-16.5	-16.3	-16.2	-14.3	-13.3	-12.1	-12.1	-9.9	-5.8	-2.6	-0.5	1.4	2.7	4.0	4.7	5.3	5.8	5.5	-0.8	-4.3	-6.1	-6.7	-6.1	-5.1	-5.0	5.8
18-Mar	-7.0	-3.1	-3.4	-3.9	-4.3	-5.0	-5.3	-3.4	0.0	2.9	4.9	6.1	6.7	5.0	2.8	2.5	1.9	-1.4	-4.1	-6.7	-9.3	-10.8	-12.1	-13.2	-2.5	6.7
19-Mar	-14.1	-15.1	-15.7	-16.9	-19.2	-20.3	-20.6	-15.5	-10.8	-9.7	-8.8	-7.8	-7.0	-6.7	-6.0	-6.1	-6.4	-7.5	-9.8	-12.1	-13.5	-14.3	-15.3	-15.8	-12.3	-6.0
20-Mar	-16.8	-17.5	-18.6	-21.0	-23.8	-24.3	-24.9	-20.1	-13.0	-11.9	-11.0	-9.7	-8.3	-7.4	-6.6	-6.1	-5.9	-6.9	-9.5	-12.3	-14.9	-15.7	-14.7	-13.3	-13.9	-5.9
21-Mar	-13.4	-14.2	-14.4	-14.6	-14.7	-14.6	-14.7	-13.0	-10.5	-9.2	-7.4	-6.5	-5.1	-4.7	-4.4	-4.7	-5.1	-5.4	-6.5	-8.0	-9.7	-9.5	-8.4	-8.3	-9.5	-4.4
22-Mar	-8.4	-8.4	-8.1	-8.2	-8.3	-8.4	-8.4	-8.0	-7.3	-6.4	-5.1	-3.4	-2.0	-1.8	-1.0	-1.1	-1.8	-2.5	-3.4	-4.5	-4.9	-5.1	-5.3	-5.3	-5.3	-1.0
23-Mar	-5.3	-5.3	-5.5	-5.8	-6.8	-7.0	-5.9	-5.0	-4.4	-3.8	-3.3	-2.7	-2.1	-1.8	-1.9	-1.8	-1.8	-2.0	-2.8	-3.3	-3.8	-4.7	-5.1	-5.3	-4.1	-1.8
24-Mar	-5.4	-5.6	-5.8	-5.8	-5.9	-6.1	-6.3	-6.3	-6.1	-5.8	-5.7	-5.6	-5.2	-4.8	-4.5	-3.9	-3.3	-3.1	-4.8	-9.0	-12.1	-12.3	-11.0	-11.1	-6.5	-3.1
25-Mar	-10.4	-10.9	-11.5	-10.9	-11.2	-11.1	-10.4	-8.0	-4.8	-2.4	-0.5	0.8	1.8	2.4	3.2	3.7	3.5	3.2	1.0	-1.9	-3.5	-4.3	-4.2	-4.4	-3.8	3.7
26-Mar	-4.0	-3.6	-3.6	-3.9	-4.3	-4.6	-4.9	-2.9	-0.5	1.2	3.3	4.4	5.5	6.1	5.8	5.4	4.6	4.2	3.6	3.0	2.0	1.5	1.4	1.2	0.9	6.1
27-Mar	0.9	0.7	0.7	0.8	0.7	0.7	0.8	0.9	1.3	2.1	3.2	3.7	4.8	4.6	5.2	6.1	5.2	4.2	3.7	3.6	3.4	3.1	2.8	3.3	2.8	6.1
28-Mar	3.5	3.3	2.5	0.7	-0.7	-2.0	-2.6	2.0	5.7	7.3	8.6	9.8	10.3	10.3	10.3	10.6	10.2	9.4	7.8	6.2	4.8	1.6	-1.6	-2.6	4.8	10.6
29-Mar	-2.2	-2.2	-3.2	-4.2	-3.6	-3.6	-2.9	0.7	5.2	7.6	8.9	9.1	9.0	8.7	8.0	8.2	8.1	6.6	5.8	5.3	4.5	3.8	1.9	0.6	3.3	9.1
30-Mar	-1.2	-1.7	-1.8	-1.8	-2.9	-3.8	-3.0	-1.7	-0.2	2.3	4.0	5.5	6.9	8.5	10.1	10.9	10.9	10.6	8.0	4.4	4.5	3.8	3.3	2.9	3.3	10.9
31-Mar	2.8	2.8	3.2	3.2	2.3	2.6	3.4	4.5	6.1	7.4	7.4	7.6	8.1	6.1	3.5	2.9	2.7	2.6	2.4	2.1	1.8	1.7	1.6	1.5	3.8	8.1
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Wapasu - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	48	6.45	6.45
-20 - 0	456	61.29	67.74
0 - 10	216	29.03	96.77
10 - 20	24	3.23	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

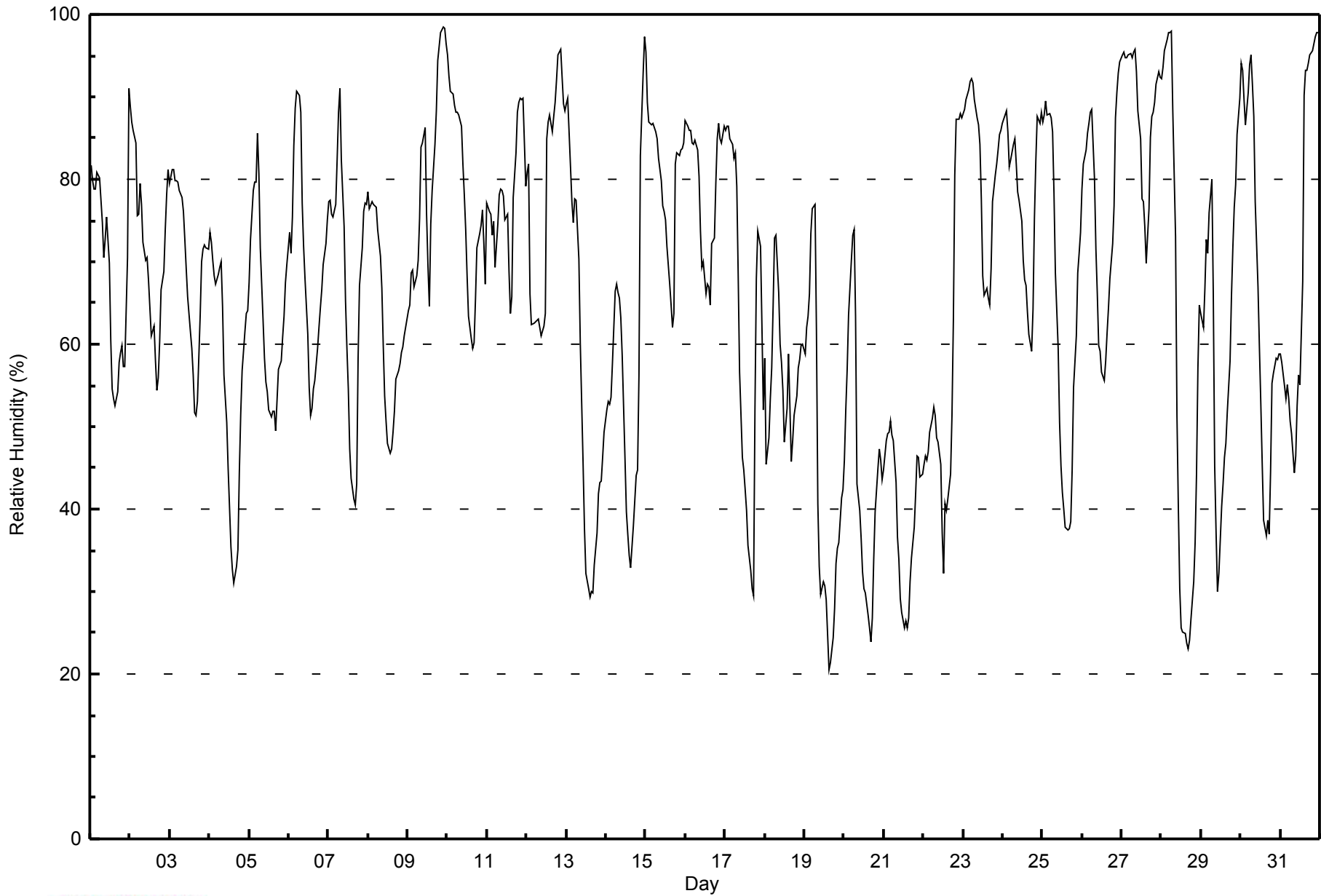


Maximum Value: 99 % on Mar 9 22:00																		Maximum Daily Average: 88.6 % on Mar 27																		Hours in Service: 744													
Minimum Value: 20 % on Mar 19 16:00																		Minimum Daily Average: 39.1 % on Mar 21																		Hours of Data: 744													
Maximum Diurnal Average: 78.2 % at hour 7																		Minimum Diurnal Average: 50.7 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 66.2 %																		Percentiles: P ₁ = 25 P ₁₀ = 38 Q ₁ = 52 Median = 68 Q ₃ = 82 P ₉₀ = 89 P ₉₉ = 98																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	82	80	79	79	81	80	77	75	71	73	75	70	60	55	53	52	54	58	59	60	57	57	71	91	68.7	91																							
2-Mar	89	87	86	84	76	76	79	77	72	70	71	68	64	61	62	58	54	56	60	67	69	74	78	81	71.7	89																							
3-Mar	79	81	81	80	80	80	79	78	76	73	69	66	62	59	56	52	51	53	64	70	72	72	72	72	69.8	81																							
4-Mar	73	72	70	68	67	69	69	70	65	56	51	45	40	36	33	31	33	35	44	51	57	62	64	64	55.2	73																							
5-Mar	68	73	79	80	80	86	81	72	63	58	55	54	52	51	52	52	50	53	57	58	61	63	67	70	63.9	86																							
6-Mar	74	71	75	84	89	91	90	88	77	72	68	61	55	51	52	55	56	60	62	64	67	70	72	75	69.9	91																							
7-Mar	77	78	76	75	77	82	88	91	82	74	65	59	55	47	44	41	41	43	58	67	72	76	77	77	67.6	91																							
8-Mar	78	76	77	77	77	77	74	71	67	60	54	51	48	47	47	49	52	56	57	58	59	60	61	63	62.3	78																							
9-Mar	64	65	69	69	67	68	70	75	84	84	86	76	70	65	75	79	84	88	94	96	98	99	98	96	79.9	99																							
10-Mar	95	93	91	90	89	88	88	88	87	82	78	74	68	63	61	60	60	65	72	73	74	76	72	67	77.3	95																							
11-Mar	77	76	76	73	75	69	75	78	79	79	78	75	76	69	64	66	78	83	88	89	90	90	90	79	77.9	90																							
12-Mar	81	82	66	62	63	63	63	63	62	61	62	64	85	87	88	86	88	89	92	95	96	92	89	88	77.8	96																							
13-Mar	89	90	82	77	75	78	77	70	60	53	46	38	32	30	29	30	30	33	37	42	43	43	46	49	53.3	90																							
14-Mar	52	53	53	54	58	66	67	66	66	63	59	46	40	37	34	33	38	41	44	45	56	83	93	97	56.0	97																							
15-Mar	96	89	87	87	87	86	86	85	82	80	77	76	75	72	67	65	62	64	82	83	83	84	84	84	80.1	96																							
16-Mar	87	87	86	86	84	84	85	84	80	74	69	70	66	67	67	65	72	73	80	85	87	85	84	87	78.9	87																							
17-Mar	86	86	87	85	84	83	83	79	69	57	46	45	42	40	36	33	30	29	52	68	74	72	62	52	61.6	87																							
18-Mar	58	45	49	53	57	65	73	73	66	60	58	54	48	52	59	52	46	48	51	54	57	58	60	60	56.6	73																							
19-Mar	59	62	63	66	73	76	77	62	41	33	30	31	31	29	25	20	21	24	28	33	35	36	41	42	43.3	77																							
20-Mar	46	52	57	64	70	73	74	63	43	40	36	32	30	30	27	26	24	27	34	40	45	47	46	44	44.6	74																							
21-Mar	45	48	49	49	51	49	48	43	37	34	29	27	26	26	26	27	31	34	38	42	46	46	44	44	39.1	51																							
22-Mar	45	46	46	47	49	51	52	51	49	48	45	37	32	41	40	41	44	51	63	80	87	87	88	87	54.6	88																							
23-Mar	88	88	90	91	92	92	92	90	87	87	84	78	68	66	67	66	65	69	77	80	82	84	85	86	81.4	92																							
24-Mar	87	88	88	86	81	82	84	85	82	79	77	75	70	68	67	64	61	59	64	75	82	88	87	88	77.8	88																							
25-Mar	87	88	89	88	88	88	86	78	69	59	50	45	42	40	38	38	38	39	45	55	61	69	71	73	63.4	89																							
26-Mar	79	82	84	86	87	88	88	80	72	66	60	59	57	56	58	61	64	68	72	77	88	91	93	94	75.3	94																							
27-Mar	95	95	95	95	95	95	95	95	96	93	88	85	78	77	74	70	76	85	88	88	89	91	93	92	88.6	96																							
28-Mar	92	94	96	97	98	98	98	88	73	51	40	30	26	25	25	24	23	24	27	31	36	44	57	65	56.7	98																							
29-Mar	64	62	67	73	71	76	80	66	45	37	30	32	40	43	46	48	52	58	66	72	77	79	85	90	60.8	90																							
30-Mar	94	93	90	87	91	94	95	92	88	77	67	60	53	46	39	37	39	37	45	55	56	58	58	59	67.0	95																							
31-Mar	59	58	55	53	55	53	51	49	44	46	53	56	55	68	90	93	93	94	95	96	96	97	98	98	71.1	98																							
																								75.6	75.5	75.3	75.6	76.3	77.6	78.2	75.0	68.8	63.9	59.9	56.1	53.1	51.7	51.6	50.7	51.9	54.8	61.1	66.1	69.4	72.0	73.8	74.7	Diurnal Average	
																								96	95	96	97	98	98	98	95	96	93	88	85	85	87	90	93	93	94	95	96	98	99	98	98	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	82	11.02	11.02
40 - 60	191	25.67	36.69
60 - 80	267	35.89	72.58
80 - 100	204	27.42	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 24 km/h on Mar 2 05:00	Maximum Daily Speed Average: 17.7 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 3 19:00	Minimum Daily Speed Average: 1.1 km/h on Mar 23	Hours of Data: 705
Maximum Diurnal Speed Average: 3.4 km/h at hour 13	Minimum Diurnal Speed Average: 0.3 km/h at hour 18	Hours of Missing Data: 39
Monthly Average Velocity: 1.4 km/h 162.7 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 12 P ₉₉ = 22	Percent Operational Time: 94.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	SE4	SE4	SE5	SSE6	SE8	SSE7	SSE8	SSE8	SSE10	S10	S11	SSW12	SSW12	SSW13	SSW13	S13	S13	S13	S14	S12	S11	SSW9	W11	NNW17	S7.9	NNW17	
2-Mar	NNW22	NNW22	NNW21	NNW21	NNW24	NNW21	NNW19	NNW20	NNW23	NNW21	NNW23	NNW23	NNW22	NNW20	NNW19	NNW18	NNW17	NNW16	NNW10	N9	NNW10	NNW8	NW9	NNW8	NNW17.7	NNW24	
3-Mar	NW4	NW7	NNW10	NNW11	NNW10	NNW11	NNW11	NNW11	N11	N13	N14	N14	NNW14	NNW13	N11	N12	N8	N6	NNE1	ESE3	ESE4	SE4	SSE5	SSE6	N7.2	NNW14	
4-Mar	SSE8	SSE7	SSE9	S9	S9	S9	S10	SSE10	S10	S11	S11	SSW10	SSW12	S12	S12	S13	SSW11	SSW11	SSW10	SSW8	S7	S7	S6	S6	S9.3	S13	
5-Mar	SW5	W5	WSW2	SW1	SSE4	SSE5	SSW5	SW5	SW6	WNW6	NW9	NNW12	NW10	WNW9	WSW6	SW6	SSW6	SSW4	S5	S6	SSE6	S5	S4	SSW3	WSW3.3	NNW12	
6-Mar	SSW5	SW7	SW4	SSE3	SE5	SE4	NNE3	N7	N9	NNW10	N11	N12	N11	NNW11	N9	NNE8	NE8	ENE8	ENE8	ENE4	E5	ESE5	ESE2	SSW1	NNE3.5	N12	
7-Mar	S4	SSE5	S6	S6	SW5	SW6	WSW6	WSW5	W6	WNW9	NNW11	NNW11	NNW12	W13	WNW12	W12	W10	WNW6	NE3	ENE5	E4	E5	SE6	SSE6	WSW4.1	W13	
8-Mar	SSE7	SSE6	SSE6	S7	S6	S6	S6	S7	S7	S8	SW10	SW9	SW10	SW10	SW10	SSW7	S7	SSW7	SSW6	SW6	SW5	SW7	SW5	SW5	SSW6.4	SW10	
9-Mar	SW5	SW5	S5	SSW5	WSW9	W6	NW4	NNW8	NNW7	NNW9	NNW7	NNW6	NW7	NNW9	NNW6	NNW8	NNW6	N3	N3	NNW2	NNW6	NW7	N9	N10	NW4.6	N10	
10-Mar	N11	N12	NNW13	N11	NNW11	N12	N8	N9	N7	N5	NE3	NNW4	NNW4	NE5	NE5	NE7	NE8	NE8	NE7	NE9	NE9	ENE7	ENE7	ESE11	NNE6.7	NNW13	
11-Mar	ESE13	ESE12	ESE13	ESE12	ESE12	E7	ESE12	ESE13	ESE10	E10	ESE11	E11	E11	E10	ESE11	NE5	N7	NNW6	N5	NNE5	NE5	NNE4	ENE4	ESE5	E7.5	ESE13	
12-Mar	ESE2	ESE3	SSE7	SE8	SSE4	SE8	SSE8	SE10	SSE9	SSE9	SSE9	S10	S12	S12	S10	SSW11	SSW9	SW9	WSW5	SSE5	SSE6	S8	S7	S8	S7.1	S12	
13-Mar	S7	SSW7	WSW11	WSW14	WSW11	SSW7	SSW7	SW10	SW10	WSW13	WSW13	SSW9	SW14	SW16	SSW13	SSW13	SSW15	S15	S15	S15	S16	S15	SSE14	S12	SSW11.0	S16	
14-Mar	S12	S14	S12	SSE12	SSE13	SSE13	SSE12	S9	SSW9	SSW10	SSW10	SW9	SW8	SW9	S6	SSW5	S6	S5	S7	WSW9	SW7	SSW4	WNW5	AF	S7.8	SSE14	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---	---
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---	---
17-Mar	ESE4	ESE4	SE5	SE6	SSE6	SSE7	SSE7	SSE7	S7	S9	S10	SSW10	SW10	SW11	WSW11	WSW9	WSW6	SW4	SE3	ESE4	SE5	SE6	SE6	SSE5	S5.1	WSW11	
18-Mar	SSE5	SSE7	SSE5	SE7	SSE7	SSE7	SSE7	SE7	SSE6	S6	SW6	WSW7	NNW6	N7	NNW8	N8	NNW10	NNW13	N12	NNW13	N11	N9	N7	N8	N1.8	NNW13	
19-Mar	N7	N5	N5	NNE4	E3	ESE3	NNE4	ENE4	N5	N7	N9	NNW8	NNW9	N9	NNW10	NNE10	NNE10	NNE9	NNE6	NNE6	NE8	ENE7	E7	E7	NNE5.7	NNE10	
20-Mar	ESE7	ESE6	ESE5	SE2	ESE4	SE5	SE4	SE3	N3	NNE5	N7	N6	NNE5	N7	N6	N7	NNE6	N7	N5	NE6	ENE5	E6	ESE7	SE8	NE3.2	SE8	
21-Mar	ESE8	SE9	SE10	SE9	SE9	SE8	ESE8	SE10	SE11	SE10	SE9	ESE9	SE6	E10	ESE11	ESE12	ESE10	ESE10	ESE8	ESE6	ESE8	ESE10	ESE15	SE14	ESE9.4	ESE15	
22-Mar	SE11	SE10	SE8	SE6	SE8	SE7	SE5	SE7	SSE7	SSE6	SSE4	SSW3	SSW3	NW6	N3	NW5	NNW5	W5	SSW4	S5	SSE4	SE6	SE8	SSE8	SSE3.8	SE11	
23-Mar	SSE7	S7	S5	SSE5	SSE5	SE5	SSE5	SSE7	S7	SSW6	SW7	WSW6	W8	W9	WNW8	WNW8	WNW6	N5	NE6	NE5	NE5	NE6	NNE4	NE5	SSW1.1	W9	
24-Mar	NE5	NE5	NE6	NE6	NE5	NNE4	NNW4	N5	N5	N6	NNW6	NW7	NNW8	NNW8	NNW8	NNW6	N6	NNE6	NNE3	E3	E4	E5	ESE7	SE6	NNE3.7	NW8	
25-Mar	SE6	SE6	SE7	SE7	SE6	ESE6	ESE7	SE8	SE9	SE8	SE4	SE6	SSW6	SW7	WSW6	N4	ESE5	ESE5	SE6	SSE6	SE6	SE7	SE9	SE11	SE5.3	SE11	
26-Mar	SE12	SE11	SE11	SE11	SE10	SE11	SE12	SE11	SSE11	SSE10	SSE9	S9	S9	S10	S9	SSE10	SE12	SE12	SSE10	SSE10	SSE9	SSE7	SSE5	SSE4	SSE9.5	SE12	
27-Mar	SSE5	SE4	SSE4	SSE5	SSE6	SSE6	SSE7	SSE7	S7	S8	SSW8	S9	S10	SSE11	SSE12	SSE11	SSE10	SSE11	SSE11	SSE9	SSE8	SSE7	SE6	SSE6	SSE7.7	SSE12	
28-Mar	SSE6	S4	SSE3	SE3	ESE3	E3	SE3	S3	W5	WNW8	NNW10	NNW14	NW17	NW16	NW16	NNW18	NNW17	WNW15	WNW13	WNW11	W7	WNW1	SW3	SSE4	WNW6.0	WNW18	
29-Mar	SSE5	SSE5	SSE5	SE6	SE7	SSE7	SE8	SE6	SE8	SSW6	S7	S8	S7	SSW7	S7	S6	SSE4	ESE4	SE7	SE7	SE6	S6	SSW4	SSW4	SSE5.6	SE8	
30-Mar	S4	WNW3	NNW5	NNW7	NW4	NW4	NW5	NNW2	NNW3	NNW5	WNW7	W4	WSW7	SW8	SW8	SW10	SW8	SW8	SSE4	SE5	SE6	ESE6	SE7	SE6	WSW2.1	SW10	
31-Mar	SE6	SE6	SE7	SSE7	SE6	SE6	SE6	SE6	SE7	SW6	SSW6	NNE4	NE7	SE9	E11	E13	E16	ENE12	ENE13	ENE11	NE9	NE9	NE9	NE10	E5.9	E16	

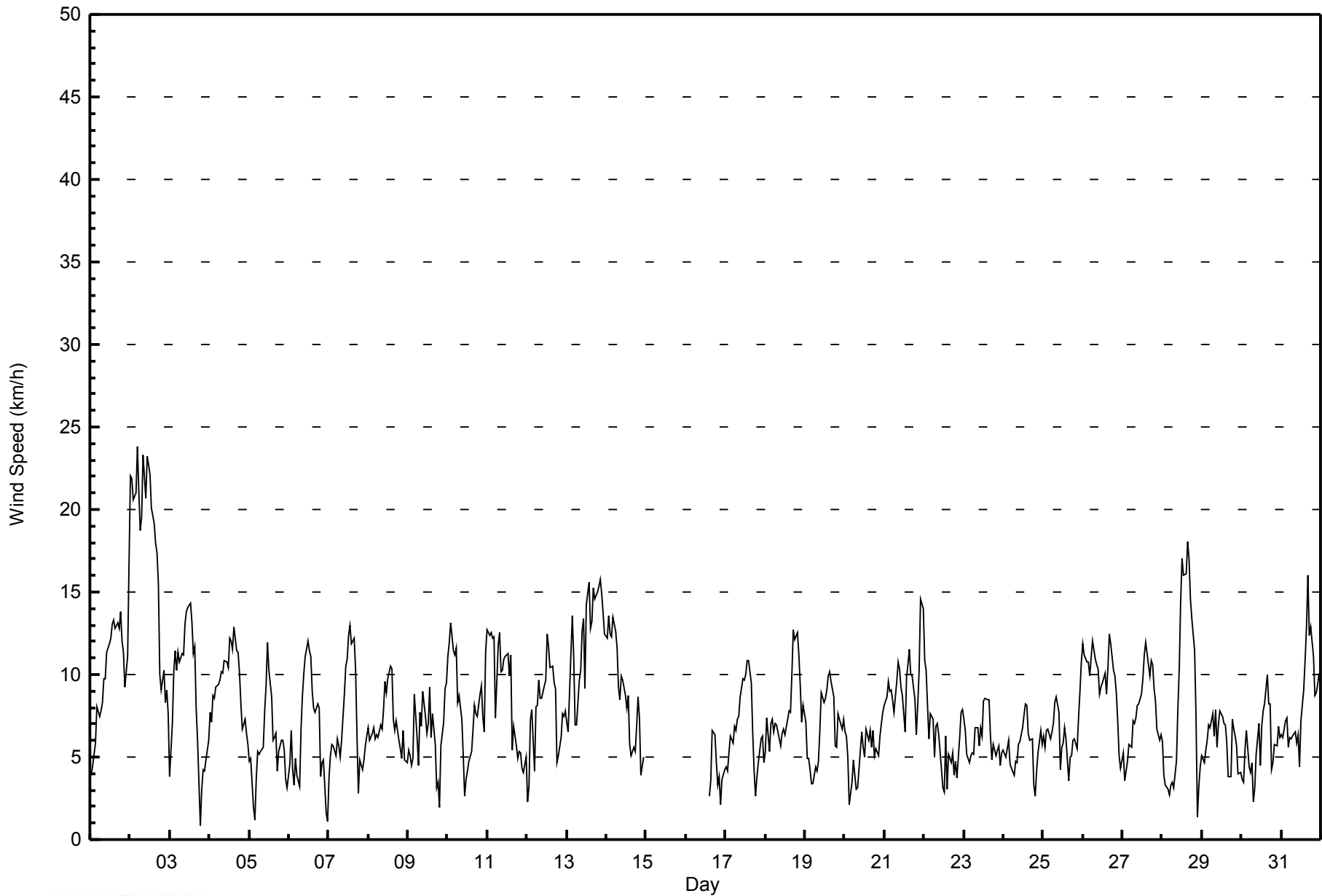
SE3.3 SE2.7 SE2.8 SE2.7 SSE2.8 SE2.9 SE2.8 SE2.8 SSE2.0 SW1.5WSW2.1 W2.3 W3.4 W3.1 W2.1 W1.4WSW0.6 SE0.3 ESE1.4 SE2.0 SE2.4 SE2.7 SE2.6 SE3.1	Diurnal Average
NNW22 NNW22 NNW21 NNW21 NNW24 NNW21 NNW19 NNW20 NNW23 NNW21 NNW23 NNW23 NNW22 NNW20 NNW19 NNW18 NNW17 NNW16 S15 S15 S16 S15 ESE15 NNW17	Diurnal Maximum

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	184	26.10	26.10
6 - 11	420	59.57	85.67
12 - 19	88	12.48	98.16
20 - 28	13	1.84	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - March 2015

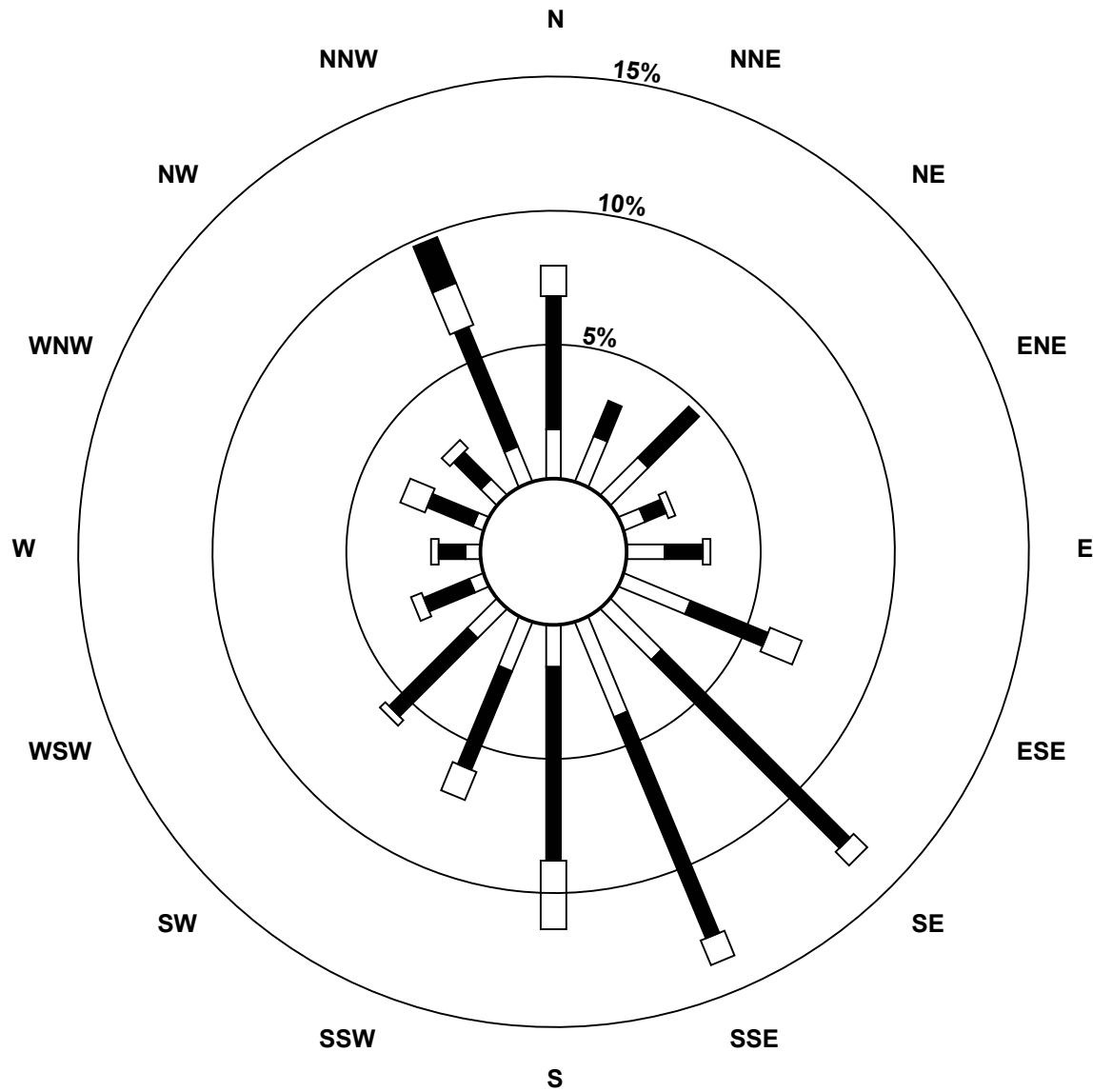
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	13	14	6	10	19	19	27	11	14	11	4	4	3	6	10	184
6 - 11	35	10	19	6	10	22	70	63	51	28	29	13	7	13	10	34	420
12 - 19	8	0	0	2	2	9	5	7	18	8	2	3	2	7	3	12	88
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13
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	56	23	33	14	22	50	94	97	80	50	42	20	13	23	19	69	705

Total Number of Valid Hours: 705

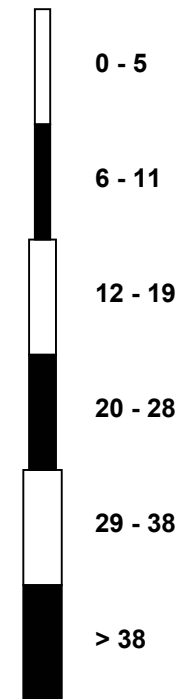
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Wind Speed (WS) - km/h
Wapasu (AMS 17)**



Classes (km/h)



Total Number of Valid Hours: 705



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 2 12:00 Minimum Value: 0 km/h on Mar 3 23:00 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: 705 Hours of Missing Data: 39 Hours of Calibration: 0 Percent Operational Time: 94.8								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	1	1	1	1	1	1	2	3	3	4	4	4	5	5	5	4	4	4	4	4	3	4	7	7
2-Mar	7	8	7	7	8	7	7	7	7	7	8	8	7	7	6	5	6	5	3	3	4	2	2	2	8
3-Mar	1	2	3	4	3	3	4	4	5	5	5	5	4	4	4	3	2	1	1	1	1	0	2	5	
4-Mar	1	1	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	3	2	2	2	2	4	
5-Mar	2	2	1	1	1	1	2	2	2	3	3	4	3	3	2	3	3	1	1	1	1	1	1	4	
6-Mar	1	2	2	1	1	1	1	2	3	3	4	4	4	4	3	3	3	3	2	2	2	1	2	1	4
7-Mar	1	1	2	1	1	2	1	1	2	3	3	4	4	4	4	4	3	3	2	1	1	1	1	1	4
8-Mar	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	2	2	2	2	2	2	2	2	1	4
9-Mar	2	2	1	1	2	2	1	2	3	3	3	2	2	3	3	2	3	2	2	2	2	2	3	3	3
10-Mar	3	4	4	4	4	4	3	3	3	2	2	2	2	2	3	2	3	2	2	3	3	2	2	4	4
11-Mar	4	3	3	4	4	3	3	4	4	3	4	4	4	3	4	4	2	2	1	2	1	1	2	2	4
12-Mar	2	2	3	2	2	3	2	2	3	3	3	3	4	4	4	4	3	3	2	1	2	2	2	2	4
13-Mar	2	2	4	4	4	2	2	3	4	4	4	5	5	5	5	6	5	5	5	5	5	4	4	6	
14-Mar	3	4	4	4	4	4	3	3	3	3	3	3	3	3	2	2	1	1	3	4	2	1	3	AF	4
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	2	1	1	1	1	1	1	2
17-Mar	1	1	1	1	1	2	1	2	2	3	3	3	4	3	3	3	2	2	1	1	1	1	1	2	4
18-Mar	1	2	1	1	1	1	1	1	2	2	2	3	2	2	2	2	4	4	4	4	4	3	3	3	4
19-Mar	3	1	2	2	2	1	2	2	2	2	3	3	3	3	3	4	3	3	2	2	2	2	2	2	4
20-Mar	2	2	1	1	1	1	0	1	2	2	3	2	3	3	3	3	2	2	1	1	1	1	2	1	3
21-Mar	2	2	2	2	2	2	2	2	3	4	3	3	3	3	3	3	3	3	2	1	2	2	4	4	4
22-Mar	3	3	2	2	2	2	2	3	2	2	2	1	2	2	3	2	2	2	3	2	1	2	2	2	3
23-Mar	2	2	2	1	1	1	2	2	2	2	2	2	2	3	2	3	2	2	2	1	2	2	1	1	3
24-Mar	1	1	1	2	1	2	1	2	1	2	2	2	3	3	3	3	2	2	2	1	1	1	1	1	3
25-Mar	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	2	2	2	1	1	1	2	2	3	3
26-Mar	3	2	2	3	3	3	3	3	3	4	3	3	3	4	3	3	4	3	3	3	3	2	2	1	4
27-Mar	1	1	1	1	1	2	2	2	2	3	3	3	4	3	4	4	3	3	3	3	2	2	1	1	4
28-Mar	2	1	1	1	0	0	1	1	1	3	3	5	5	5	5	6	5	5	5	4	2	2	1	1	6
29-Mar	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	1	1	2	2	1	2	1	1	3
30-Mar	1	1	2	2	1	1	1	1	2	2	3	2	3	3	3	5	4	3	1	1	1	1	1	1	5
31-Mar	1	1	2	2	1	1	1	1	2	2	3	2	3	4	3	4	5	3	4	3	3	3	3	3	5
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Wapasu - March 2015

Direction of Maximum Speed: 342 deg on Mar 2 05:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 340.2 deg on Mar 2	Hours of Data: 705
Direction of Minimum Speed: 18 deg on Mar 3 19:00	Direction of Minimum Daily Speed Average: 1.1 deg on Mar 23
Direction of Minimum Speed: 18 deg on Mar 3 19:00	Hours of Missing Data: 39
Monthly Average Direction: 225.6 deg	Percent Operational Time: 94.8

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	135	135	139	151	146	151	155	158	166	178	183	193	203	192	195	191	183	190	181	180	189	212	274	332	184.8	
2-Mar	338	342	345	342	342	339	344	346	342	343	337	337	336	341	337	338	339	341	342	356	344	336	321	330	340.2	
3-Mar	314	317	333	343	337	340	347	342	360	358	2	357	344	344	352	354	2	353	18	109	110	144	150	151	351.2	
4-Mar	150	160	163	173	176	175	169	167	175	183	187	192	193	189	185	188	195	195	208	201	186	179	177	188	182.5	
5-Mar	228	271	240	234	166	157	202	215	231	282	307	333	317	295	237	229	206	198	179	178	167	183	190	200	237.1	
6-Mar	206	223	221	155	140	124	13	355	354	348	350	358	354	348	355	20	34	57	60	78	93	106	107	207	16.5	
7-Mar	173	167	177	189	218	234	243	254	266	283	282	283	283	274	285	269	263	293	34	77	87	92	139	148	256.2	
8-Mar	163	167	160	169	169	187	179	181	187	187	218	219	231	234	228	203	187	193	203	219	229	233	221	228	201.6	
9-Mar	214	224	183	206	251	276	313	338	341	336	337	335	318	328	339	343	341	353	4	347	327	322	351	357	322.5	
10-Mar	355	357	346	353	345	353	3	6	11	8	36	334	338	42	42	44	50	48	47	40	44	63	65	114	20.2	
11-Mar	116	115	113	115	112	98	109	115	106	98	102	96	97	97	102	52	353	348	356	28	45	33	68	120	95.4	
12-Mar	121	115	149	144	167	144	151	144	161	166	168	173	171	184	186	195	213	234	252	149	157	170	174	186	172.2	
13-Mar	179	199	238	244	242	209	198	222	220	237	240	205	231	227	211	198	195	185	187	174	178	178	168	170	204.8	
14-Mar	169	169	172	167	165	158	159	169	192	193	194	217	229	217	191	199	187	170	172	237	234	204	302	AF	186.3	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
17-Mar	122	121	132	139	147	157	149	158	169	177	188	197	219	228	241	242	237	235	129	111	140	141	139	155	178.9	
18-Mar	149	160	161	143	154	153	150	146	163	187	216	240	327	352	338	355	342	347	352	348	352	353	359	350	351.2	
19-Mar	356	1	2	27	88	103	20	64	6	349	1	347	348	355	348	16	17	26	24	24	45	58	86	88	19.7	
20-Mar	104	111	118	140	109	138	127	125	7	14	4	354	15	357	5	7	16	3	5	44	68	92	117	128	56.0	
21-Mar	122	129	133	133	131	127	123	130	132	125	127	115	129	96	103	110	108	110	105	113	114	113	123	127	119.9	
22-Mar	130	134	146	137	137	140	142	142	155	162	168	211	211	325	351	323	328	263	212	172	150	142	144	152	152.7	
23-Mar	167	177	173	165	156	143	154	154	169	197	231	254	261	273	298	298	286	3	40	49	37	42	27	40	212.9	
24-Mar	42	48	54	46	48	15	341	351	8	354	329	310	319	326	328	336	354	31	33	84	89	85	102	124	14.0	
25-Mar	126	127	132	130	124	121	123	127	139	135	127	145	213	233	249	11	107	111	134	152	144	134	136	138	138.0	
26-Mar	136	136	138	136	136	131	129	137	156	154	159	174	186	177	173	148	146	143	147	155	167	165	164	160	150.3	
27-Mar	151	130	147	158	153	158	164	162	173	172	193	185	178	167	160	167	163	155	152	150	160	151	145	158	162.2	
28-Mar	164	189	154	126	116	92	130	171	259	297	303	300	308	305	305	285	285	282	288	287	280	298	216	158	285.5	
29-Mar	158	167	150	146	144	148	134	144	135	192	190	185	191	196	183	172	166	114	144	146	143	172	209	202	163.0	
30-Mar	188	293	330	329	317	314	319	344	346	329	303	273	253	228	223	224	216	234	158	125	131	121	132	128	243.7	
31-Mar	134	137	146	154	142	141	132	125	135	218	198	17	35	138	79	83	88	77	60	66	55	44	39	40	92.2	

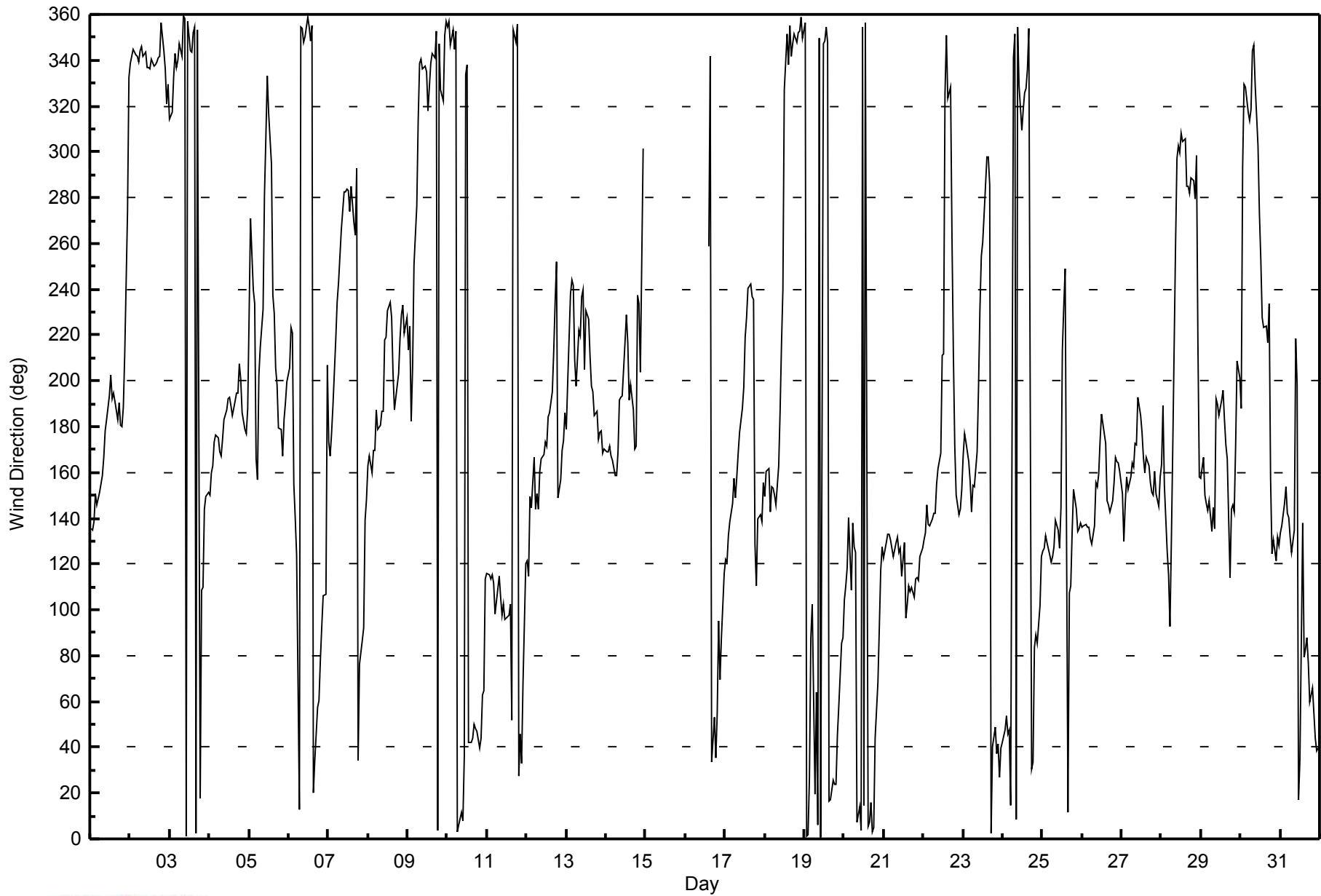
140.6 145.7 146.2 144.8 148.3 143.0 138.2 140.9 159.7 216.1 246.4 264.4 269.6 263.2 262.0 266.8 237.0 138.7 122.2 125.2 125.0 128.2 130.8 130.9
 Diurnal Average

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Wapasu - March 2015





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 86 deg on Mar 9 20:00 Minimum Value: 4 deg on Mar 1 05:00 Percentiles: P ₁ = 8 P ₁₀ = 15 Q ₁ = 22 Median = 28 Q ₃ = 34 P ₉₀ = 42 P ₉₉ = 77																		Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 0 Percent Operational Time: 94.8																													
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Mar	22	19	9	6	4	9	15	18	24	30	32	35	37	34	36	34	31	33	29	31	35	41	30	28	41																						
2-Mar	24	28	28	28	29	25	27	29	27	29	23	27	24	29	26	25	27	26	26	30	30	26	18	17	30																						
3-Mar	23	21	21	26	23	24	31	27	35	36	36	34	31	30	34	33	36	33	78	35	20	15	7	8	78																						
4-Mar	6	12	18	23	25	27	23	23	28	30	30	37	32	35	36	32	31	32	34	30	28	24	20	28	37																						
5-Mar	36	29	36	77	30	11	24	29	33	29	23	27	25	27	36	31	37	28	20	25	18	24	18	39	77																						
6-Mar	22	23	39	32	14	27	47	25	30	32	31	36	38	38	37	37	32	27	23	31	28	27	21	67	67																						
7-Mar	26	18	24	23	22	20	23	21	23	27	27	28	27	30	29	25	25	26	56	15	28	9	22	11	56																						
8-Mar	11	14	12	14	21	24	25	27	32	32	33	38	28	30	30	31	29	31	29	31	28	26	29	25	38																						
9-Mar	30	29	20	29	23	25	28	30	30	29	30	38	42	32	45	33	43	44	39	86	31	23	32	34	86																						
10-Mar	33	34	30	32	28	33	34	39	42	44	80	81	62	60	54	35	27	21	24	28	25	25	31	23	81																						
11-Mar	21	21	22	22	24	42	24	22	31	28	26	30	27	27	29	63	29	29	31	32	24	34	40	25	63																						
12-Mar	53	58	25	22	55	19	21	19	34	32	28	28	30	31	31	34	33	30	39	13	16	21	28	29	58																						
13-Mar	26	29	27	21	26	29	32	32	32	28	25	37	29	28	35	35	35	31	32	27	29	31	26	25	37																						
14-Mar	25	25	28	24	24	23	22	29	33	32	33	36	32	33	36	36	28	26	27	37	25	31	56	AF	56																						
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--																					
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	81	54	28	25	26	33	33	47	14	19	81																						
17-Mar	17	27	16	10	16	20	16	21	30	31	34	36	34	29	25	26	34	31	36	15	10	4	6	52	52																						
18-Mar	10	15	19	7	11	11	14	17	29	38	46	50	46	36	29	32	31	32	34	33	32	35	35	32	50																						
19-Mar	35	31	32	29	12	16	35	25	42	43	40	43	39	41	39	39	37	34	30	25	23	22	15	17	43																						
20-Mar	17	17	15	47	28	15	26	29	75	51	46	57	69	53	64	52	49	38	28	20	14	17	16	14	75																						
21-Mar	17	15	15	14	14	12	15	17	19	26	32	29	39	29	28	23	24	20	20	16	13	17	19	17	39																						
22-Mar	18	19	20	18	17	19	21	24	28	36	56	71	72	41	77	44	43	31	52	31	23	21	18	23	77																						
23-Mar	27	30	29	21	17	16	20	23	35	40	27	28	28	32	25	26	27	49	28	26	27	23	29	25	49																						
24-Mar	24	26	22	23	30	40	36	38	36	40	37	27	33	33	36	51	44	37	35	20	14	11	14	11	51																						
25-Mar	11	9	8	9	11	13	14	17	20	28	60	55	58	50	55	74	60	38	17	19	14	12	15	16	74																						
26-Mar	17	16	17	18	18	16	16	19	24	26	34	34	41	37	37	24	22	20	27	23	27	25	33	22	41																						
27-Mar	22	34	16	22	20	26	27	25	29	30	35	33	37	31	30	28	28	25	21	28	26	20	15	15	37																						
28-Mar	23	24	24	32	13	21	21	35	34	27	29	25	26	26	24	26	26	26	26	27	28	80	29	12	80																						
29-Mar	10	12	13	9	10	12	14	17	21	44	42	41	41	39	37	34	32	27	21	20	23	24	38	26	44																						
30-Mar	34	37	23	21	19	16	23	56	73	44	40	66	48	39	37	43	41	25	31	13	13	12	9	12	73																						
31-Mar	12	12	20	22	15	11	15	18	30	36	41	48	40	45	25	23	22	23	23	24	23	25	27	29	48																						
Diurnal Maximum																								53	58	39	77	55	42	47	56	75	51	80	81	72	60	81	74	60	49	78	86	35	80	56	67
AF - Analyzer Failure																																															

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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:55
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Cal Gas Concentration	47.8 ppm	Cal Gas Expiry Date	12-Dec-16
Gas Cert Reference	SA130010A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-702	-702
Analyzer Range (mv)	1000	1000	Lamp voltage	895	899
Calculated slope	0.995682	0.995136	Chamber temp.	44.9	44.9
Calculated intercept	-0.026312	-0.240967	Pressure (mmHg)	693.4	694.0
Analyzer Background	8.3	8.4	Flow (lpm)	0.453	0.454
Analyzer Coefficient	0.808	0.808	Intensity	82	83

Analyzer make	Thermo 43i	Analyzer serial #	1218153459
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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	NA
as found span	5000	60.4	577.4	579.7	0.996
calibrator zero	5000	0.0	0.0	-0.4	NA
high point	5000	60.4	577.4	579.7	0.996
second point	5000	30.2	288.7	292.1	0.988
third point	5000	15.1	144.4	144.9	0.996
calibrator zero					
as left zero	6000	0.0	0.0	0.2	NA
as left span	5000	60.4	577.4	583.6	0.989
Average Correction Factor					0.993

Corrected As found	580.1	Previous response	580.0	% change	0.0%
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Notes:

No adjustments made.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

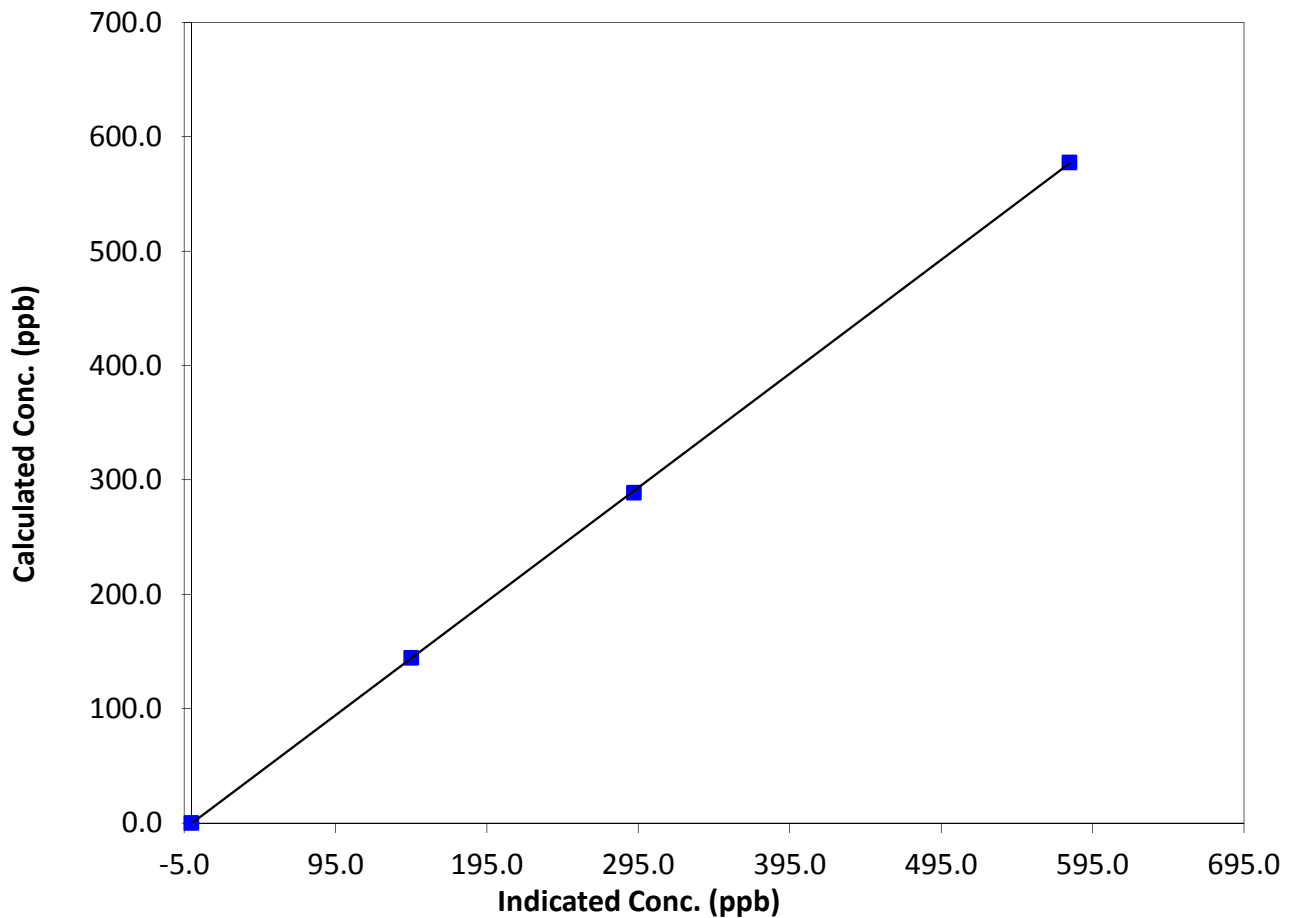
Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

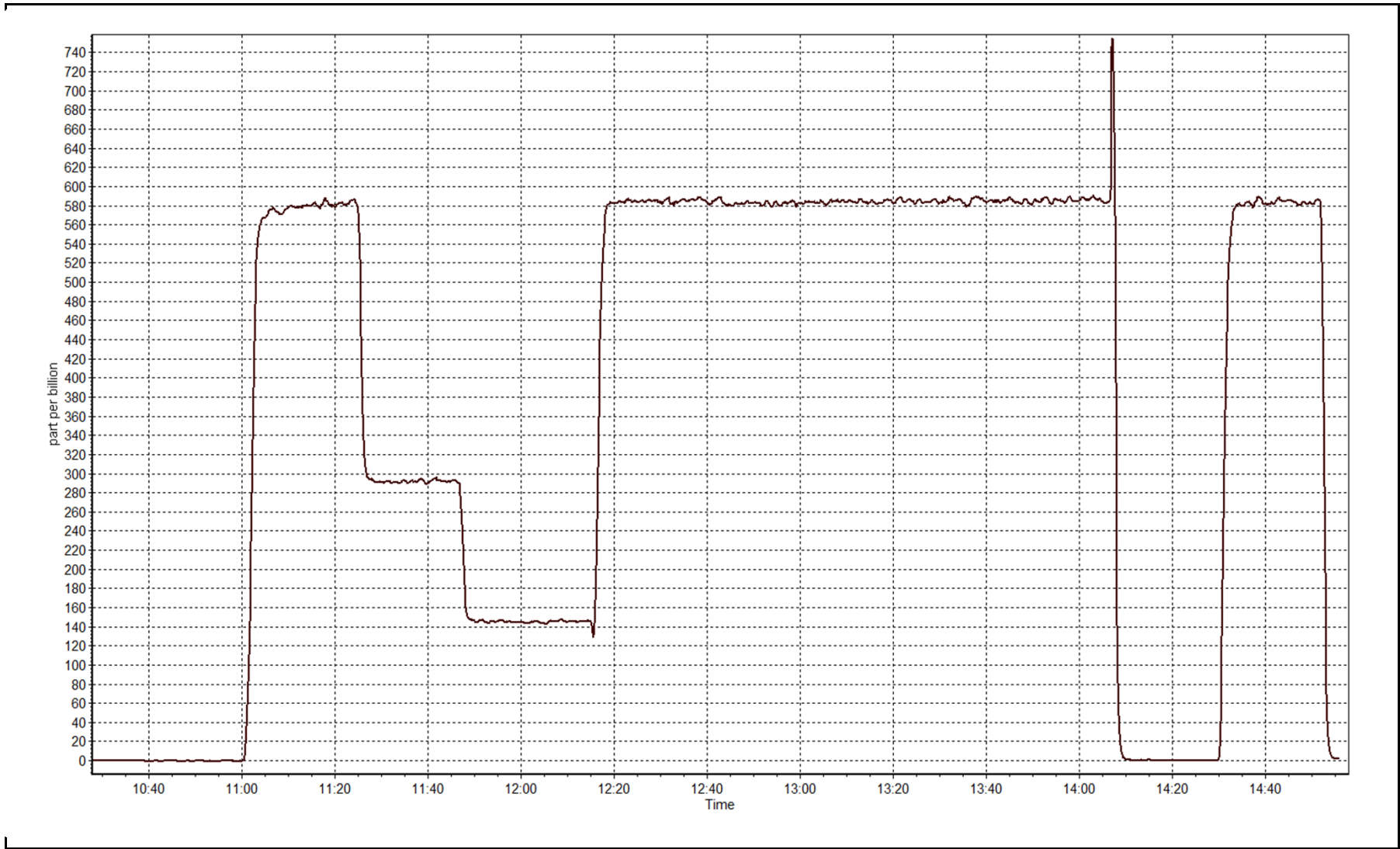
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999977
577.4	579.7	0.9961		
288.7	292.1	0.9883	Slope	0.995136
144.4	144.9	0.9960		
			Intercept	-0.240967

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 6, 2015





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	12:45	End Time (MST)	15:55
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	997
Cal Gas Concentration	5.1 ppm H2S	Cal Gas Expiry Date	9-Sep-17
Gas Cert Reference	CC107167	SO2 gas conc.	47.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-651	-651
Analyzer Range (mv)	100	100	Lamp voltage	813	815
Calculated slope	0.988745	1.001516	Chamber temp.	45	45
Calculated intercept	0.649370	-0.326526	Pressure	563.0	559.1
Analyzer Background	11.7	11.5	Flow	0.978	0.981
Analyzer Coefficient	0.863	0.842	Intensity	91	90
			Converter temp.	342	339

Analyzer make/model	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	NA
as found span	5000	78.5	80.1	81.3	0.985
SO2 scrubber check	5000	20.9	199.8	1.5	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	78.5	80.1	80.1	1.000
second point	5000	39.2	40.0	40.5	0.987
third point	5000	19.7	20.1	20.5	0.979
calibrator zero					
as left zero	5000	0.0	0.0	0.4	NA
as left span	5000	78.4	80.0	80.2	0.997
Average Correction Factor					0.989

Corrected As found	81.2	Previous response	80.3	% change	-1.1%
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Notes:

Scrubber check completed after as found zero. Span adjusted.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

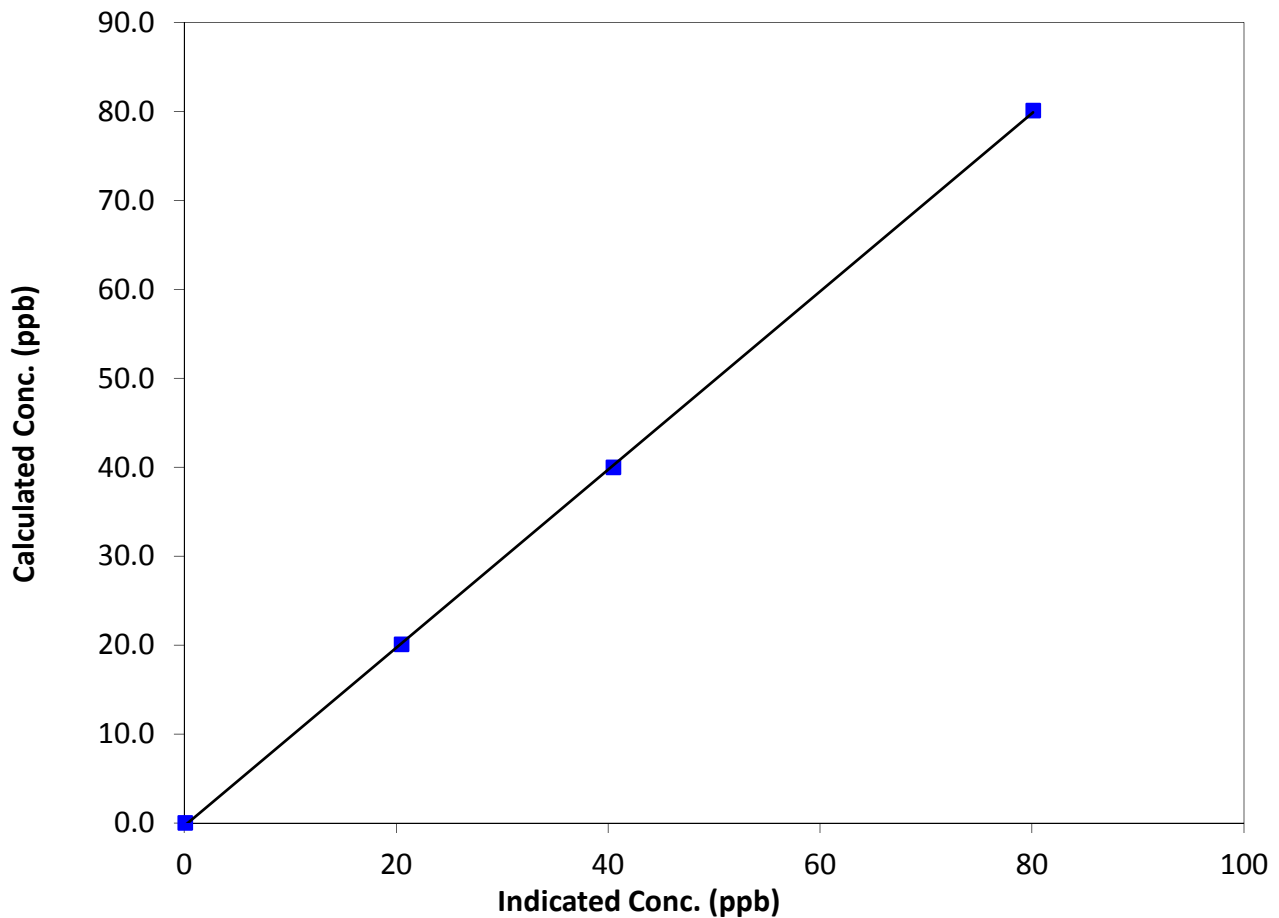
Station Information

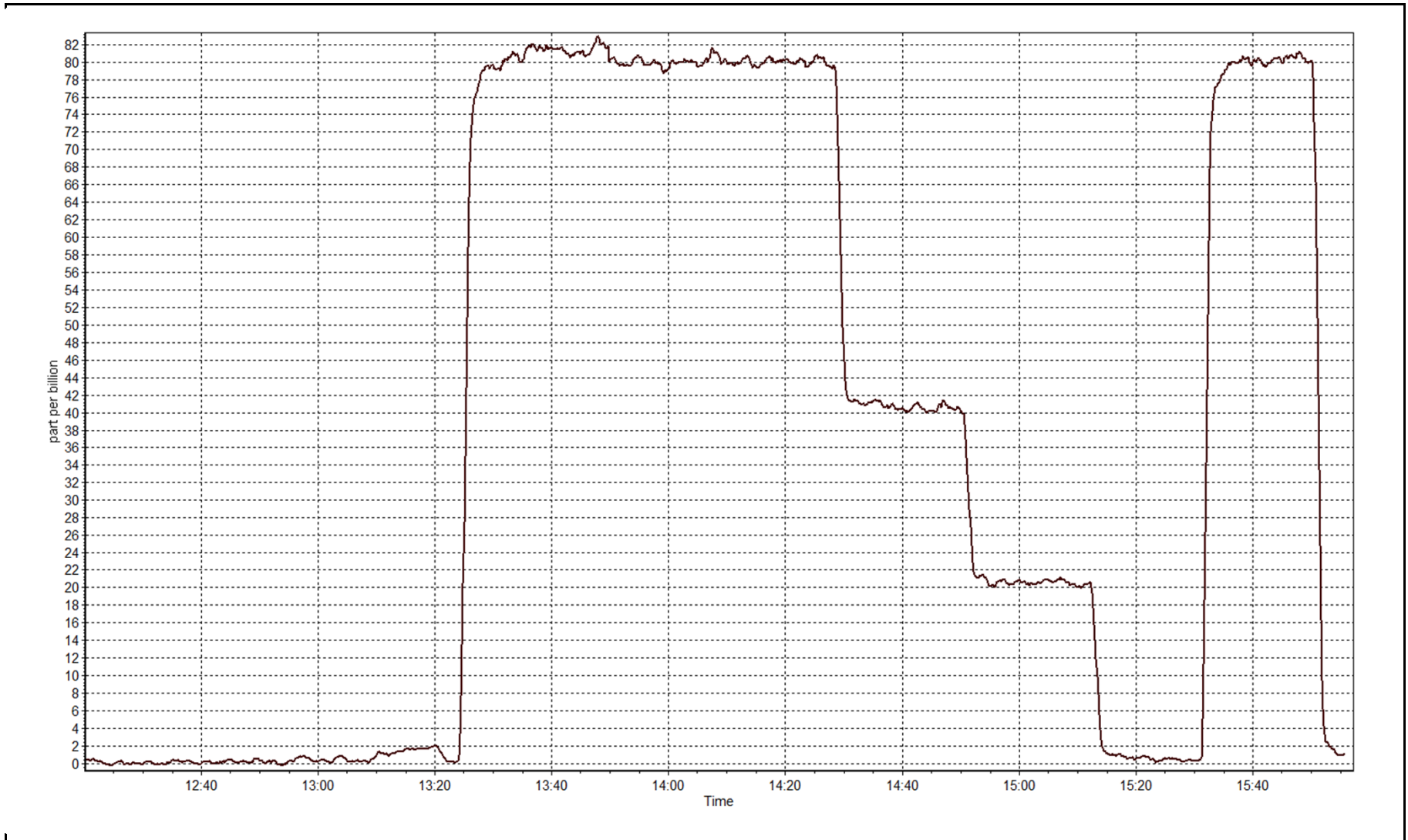
Calibration Date	March 10, 2015	Previous Calibration	February 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	12:45	End Time (MST)	15:55
Analyzer make	450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999953
80.1	80.1	0.9995		
40.0	40.5	0.9870	Slope	1.001516
20.1	20.5	0.9792		
			Intercept	-0.326526

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, March 06, 2015	Previous Calibration	Friday, February 06, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:55
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	39.6	39.9
Calculated slope	1.005925	1.006750	Fuel Pressure	24.8	24.8
Calculated intercept	-0.003983	-0.074158		2.7	2.7
				4.976	4.976

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.03	N/A
as found span	5000	60.4	13.19	13.15	1.003
calibrator zero	5000	0.0	0.00	0.03	N/A
high point	5000	60.4	13.19	13.15	1.003
second point	5000	30.2	6.60	6.67	0.989
third point	5000	15.1	3.30	3.38	0.976
calibrator zero					
as left zero	5000	0.0	0.00	0.05	N/A
as left span	5000	60.4	13.19	13.17	1.002
Average Correction Factor					0.989

Corrected As found	13.12	Previous response	13.12	% change	0.0%
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Notes:

No adjustments made.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

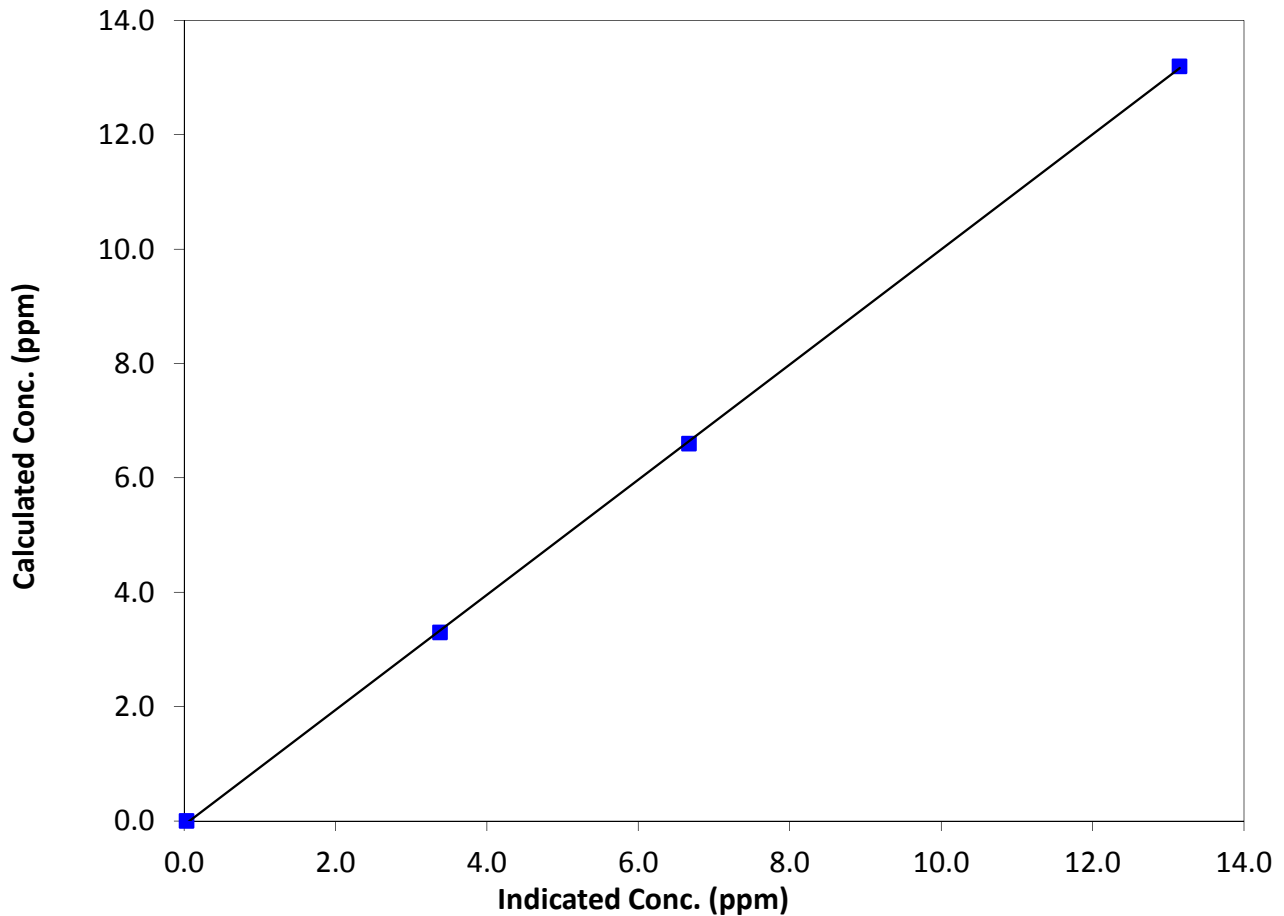
Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

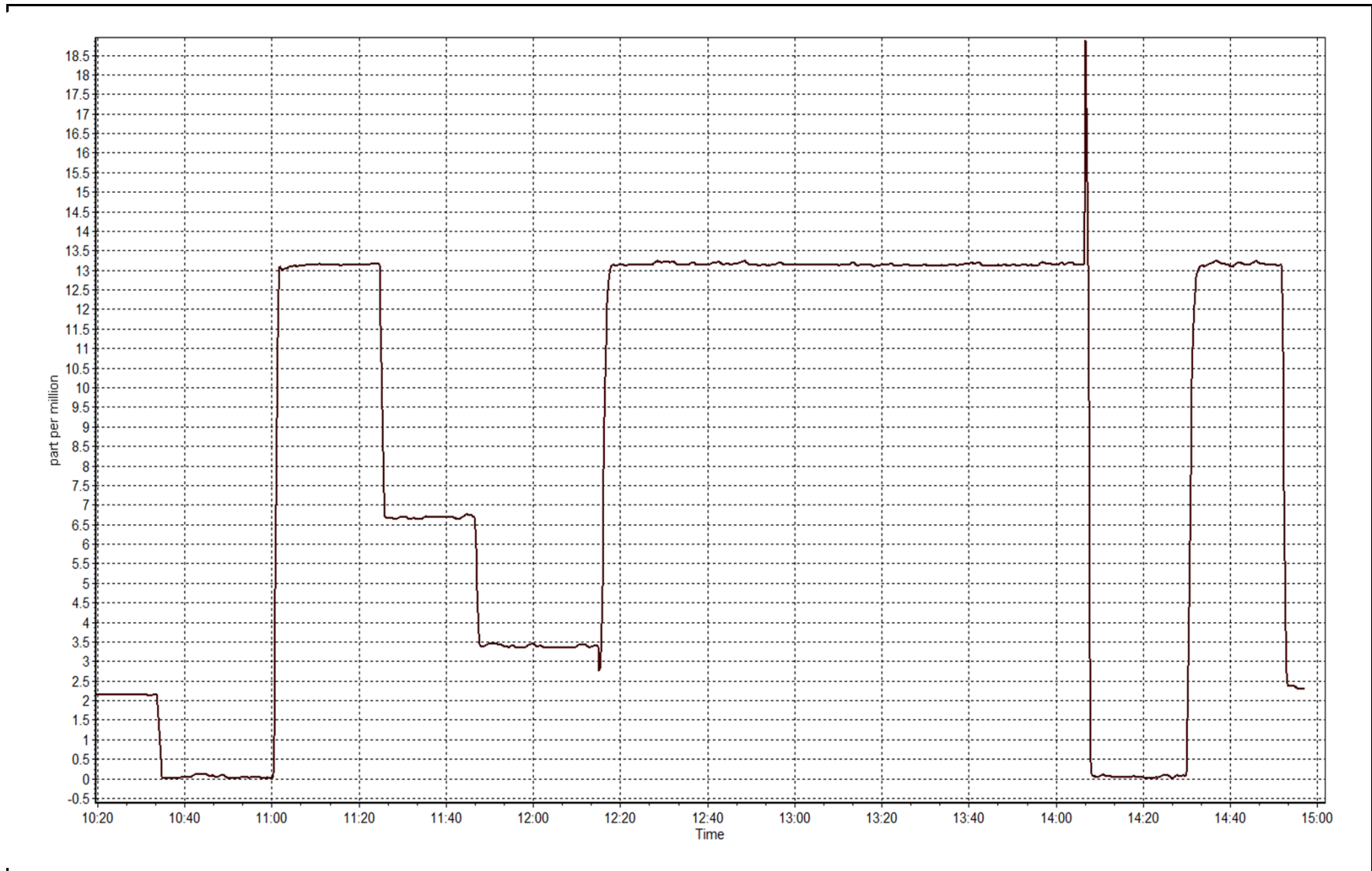
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	N/A	Correlation Coefficient	0.999941
13.19	13.15	1.0034		
6.60	6.67	0.9891	Slope	1.006750
3.30	3.38	0.9759		
			Intercept	-0.074158

THC Calibration Curve



THC Calibration Plot

Date: March 6, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 10, 2015	Previous Calibration	February 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	13:10
Barometric Pressure	23 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	T700	Serial Number	997
NO2 calibration used	Tuesday, March 10, 2015	Transfer Standard	23
DACS make/model	N/A	DACS serial No.	N/A
DACS voltage range	N/A	DACS channel #	N/A

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Box temp.	26.8	26.5
Analyzer Range (input)	500	500	Photo Lamp Temp.	58.0	58.0
Calculated slope	0.979633	0.997655	Pressure	26.5	26.2
Calculated intercept	-0.064520	-0.010647	Flow	732-751	718-732
Analyzer Background	5.506	5.461			
Analyzer Coefficient	0.982	0.974			

Analyzer make	T400	Analyzer serial #	824
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mV) Ref/Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	194.1/800	0.0	0.1	N/A
as found span	5000	714.0/1082.3	365.1	368.3	0.991
calibrator zero	5000	0.00	0.0	0.1	N/A
high point	5000	714.0/1082.3	365.1	365.9	0.998
second point	5000	494.3/973.8	246.7	247.4	0.997
third point	5000	259.6/845.6	127.2	127.4	0.998
calibrator zero					
as left zero	5000	194.1/800	0.0	0.1	N/A
as left span	5000	714.0/1082.3	365.1	364.5	1.002
Average Correction Factor					0.998

Corrected As found 368.3 Previous response 372.8 % change 1.2%

Notes:

Adjusted span. Calibration conducted 4 days past last GPT calibration; re-verified O₃ response in GPT test prior to calibration.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

O₃ Calibration Summary

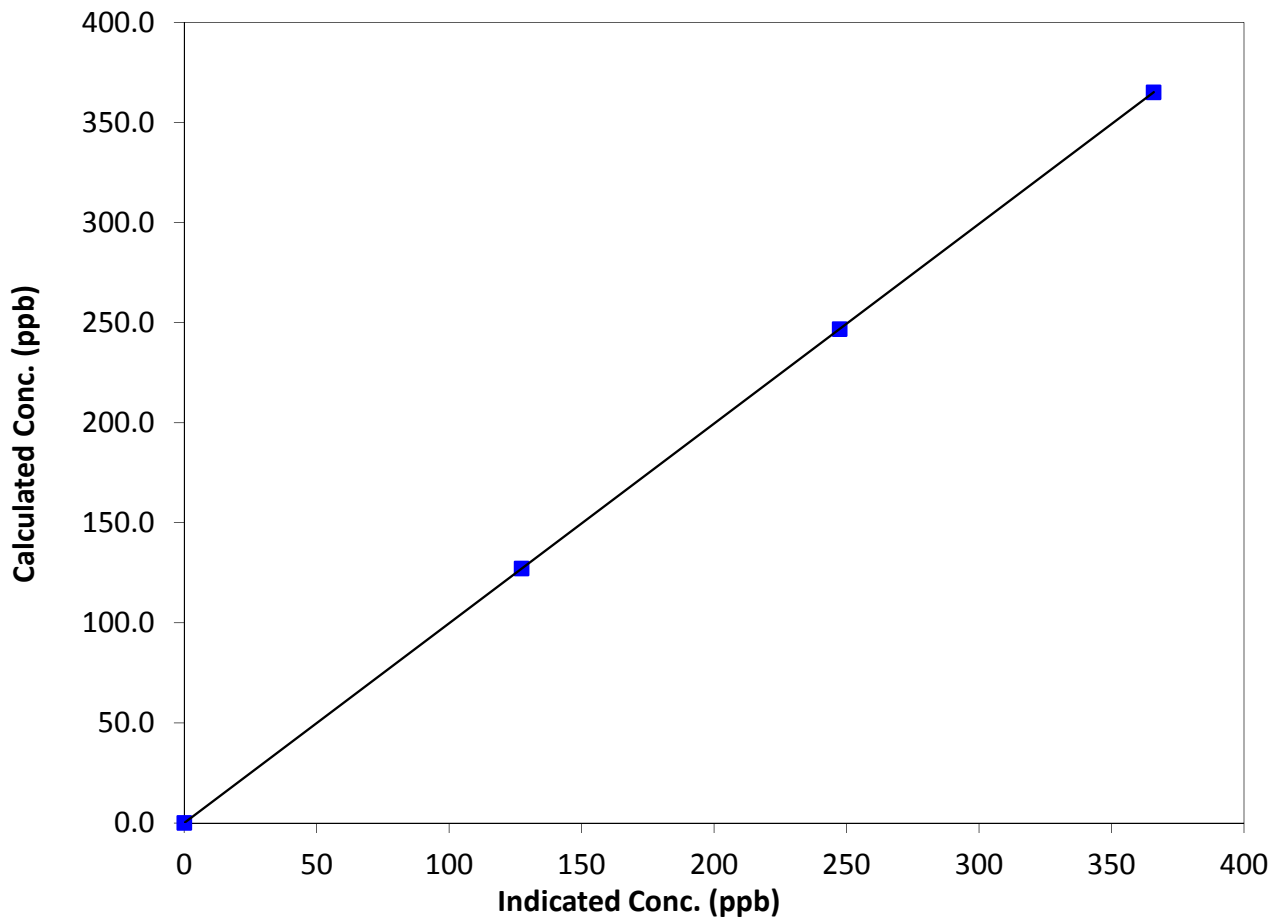
Station Information

Calibration Date	Tuesday, March 10, 2015	Previous Calibration	February 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:25	End Time (MST)	13:10
Analyzer make	T400	Analyzer serial #	824

Calibration Data

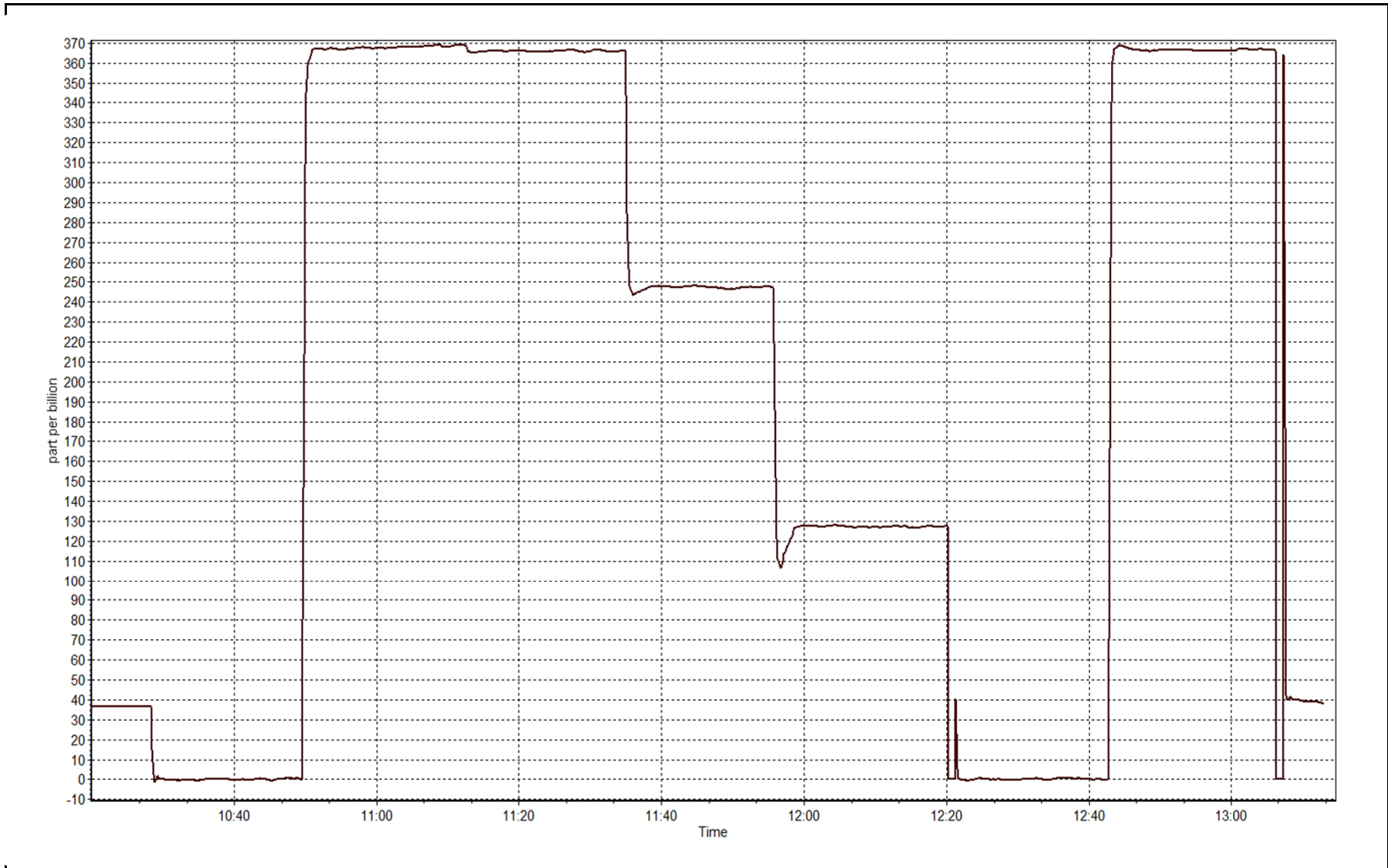
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	1.000000
365.1	365.9	0.9977		
246.7	247.4	0.9972	Slope	0.997655
127.2	127.4	0.9984		
			Intercept	-0.010647

O₃ Calibration Curve



O3 Calibration Plot

Date: March 10, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:55
Barometric Pressure	mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	997
NO Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	49.7 ppm	Cal Gas Serial #	SA130010A

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.008742	1.010384	0.993471
	Data Offset	0.323390	0.210137	-0.136903
After	Data Slope	0.993328	0.995618	0.998843
	Data Offset	-0.224600	-0.387626	-0.402994
Channel #				
Voltage Range				

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.993	ppb	0.993	ppb
NOX coefficient	0.993	ppb	0.993	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	-0.4		-0.4	
NOX bkgrnd	0.7		0.7	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.0	Deg C	314.5	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	72.0	ccm	72.0	ccm
R Cell Press	5.9	mmHg	5.9	"Hg
Sample Flow	445	ccm	443.000	ccm

Notes:

No adjustments made.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 6, 2015

Station Number:

AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.3	N/A	N/A
as found span	5000	60.4	600.4	600.4	0.0	604.2	603.2	1.1	0.9937	0.9954
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.3	N/A	N/A
high point	5000	60.4	600.4	600.4	0.0	604.2	603.2	1.1	0.9937	0.9954
second point	5000	30.2	300.2	300.2	0.0	303.5	302.5	1.0	0.9892	0.9923
third point	5000	15.1	150.1	150.1	0.0	151.0	151.0	0.1	0.9937	0.9943
calibrator zero										
as left zero	6000	0.0	0.0	0.0	0.0	-0.2	0.2	-0.3	N/A	N/A
as left span	5000	60.4	600.4	239.7	360.7	606.1	239.5	366.6	0.9906	1.0011
Average Correction Factor									0.9922	0.9940

Corrected As found

NO_x= 604.3

NO= 602.9

Percent Change

NO_x= -1.6%

NO= -1.5%

Previous Response

NO_x= 594.8

NO= 594.0

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

60.40

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.3			N/A	
1st NO ₂ (300)	N/A	239.7	365.1	605.6	239.7	365.8	0.9796	1.0000	0.9980	100.2%
2nd NO ₂ (200)	N/A	358.1	246.7	605.0	358.1	246.8	0.9805	1.0000	0.9995	100.1%
3rd NO ₂ (100)	N/A	477.6	127.2	606.7	477.6	129.1	0.9778	1.0000	0.9851	101.5%
4th NO ₂ (0)	604.8	N/A	2.1	607.0	604.8	2.1	0.9774	1.0000	N/A	N/A
Average Correction Factor							0.9788	1.0000	0.9942	100.6%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

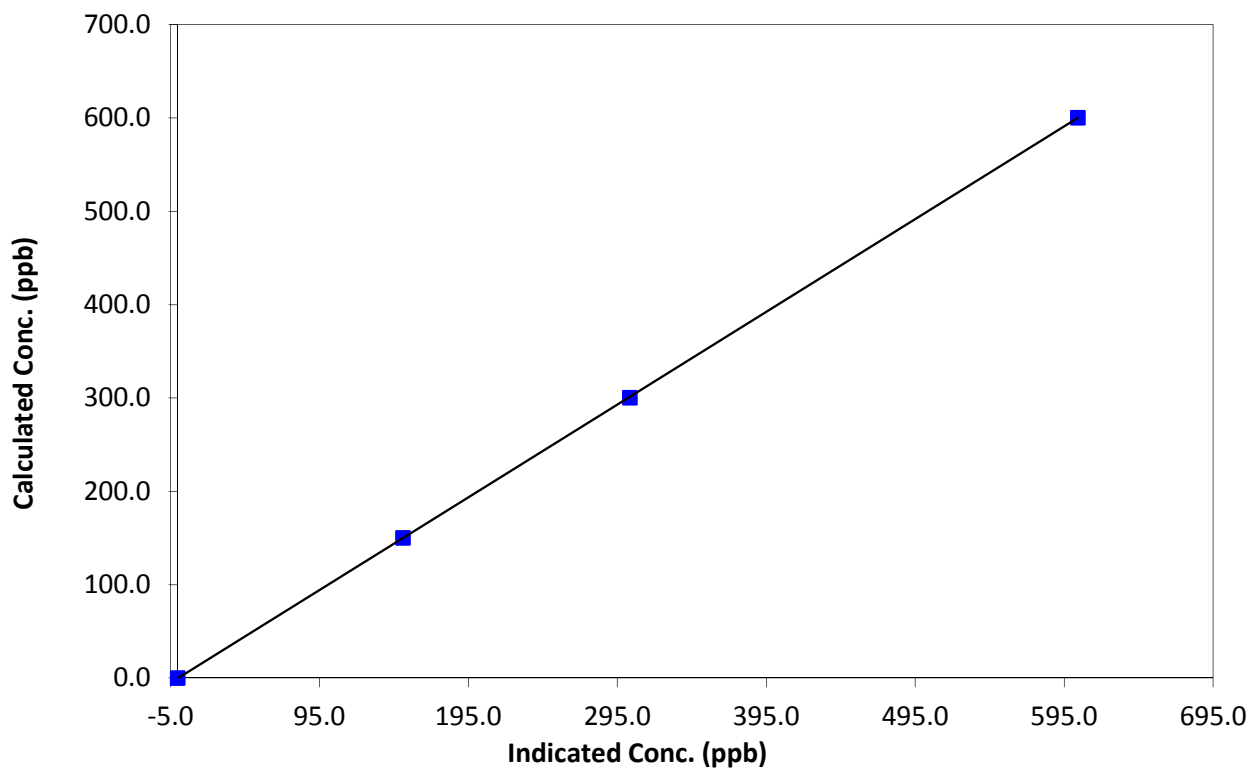
Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999993
600.4	604.2	0.9937		
300.2	303.5	0.9892	Slope	0.993328
150.1	151.0	0.9937		
			Intercept	-0.224600

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

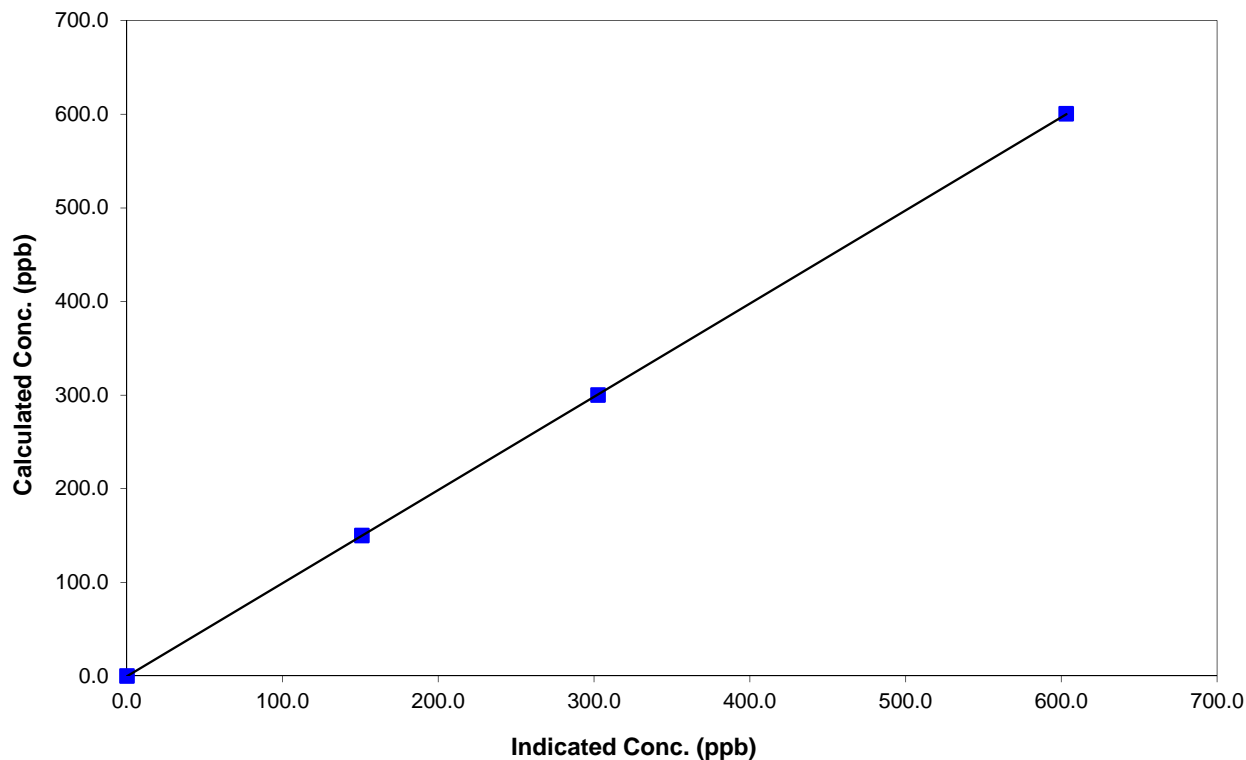
Station Information

Calibration Date	March 6, 2015	Previous Calibration	February 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999997
600.4	603.2	0.9954		
300.2	302.5	0.9923	Slope	0.995618
150.1	151.0	0.9943		
			Intercept	-0.387626

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

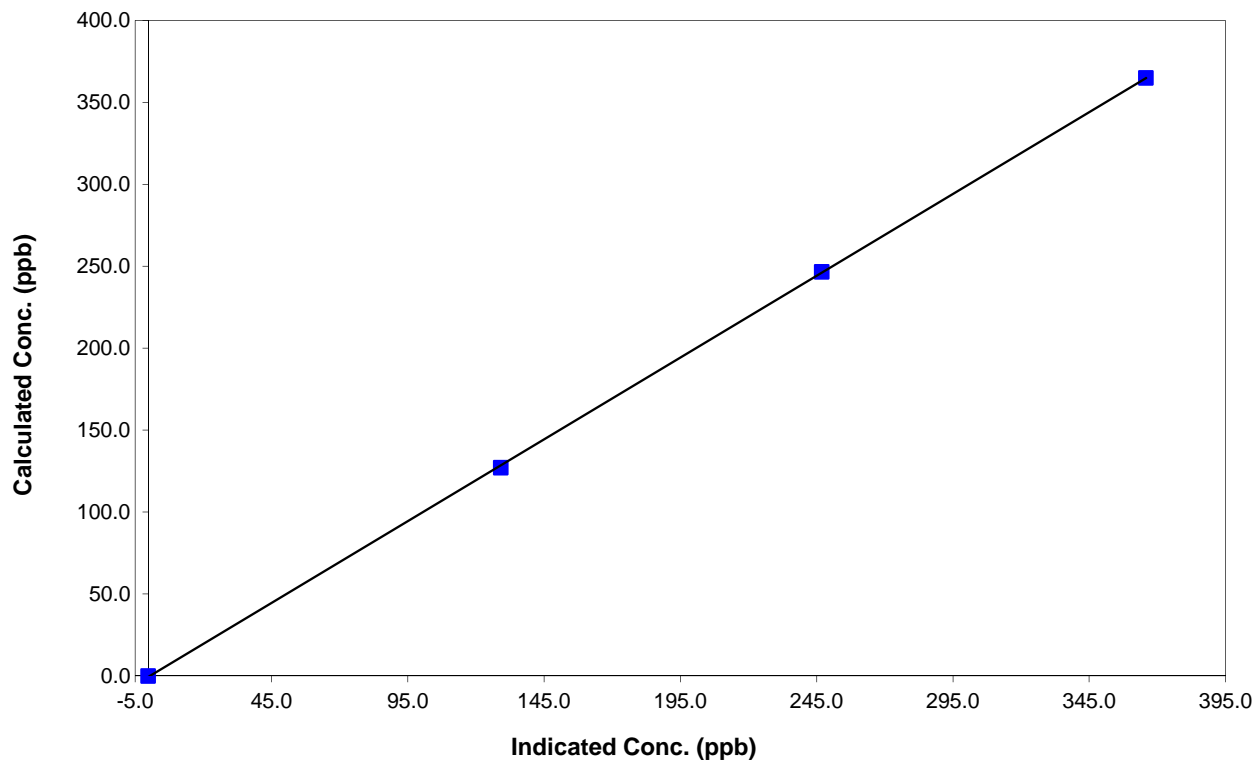
Station Information

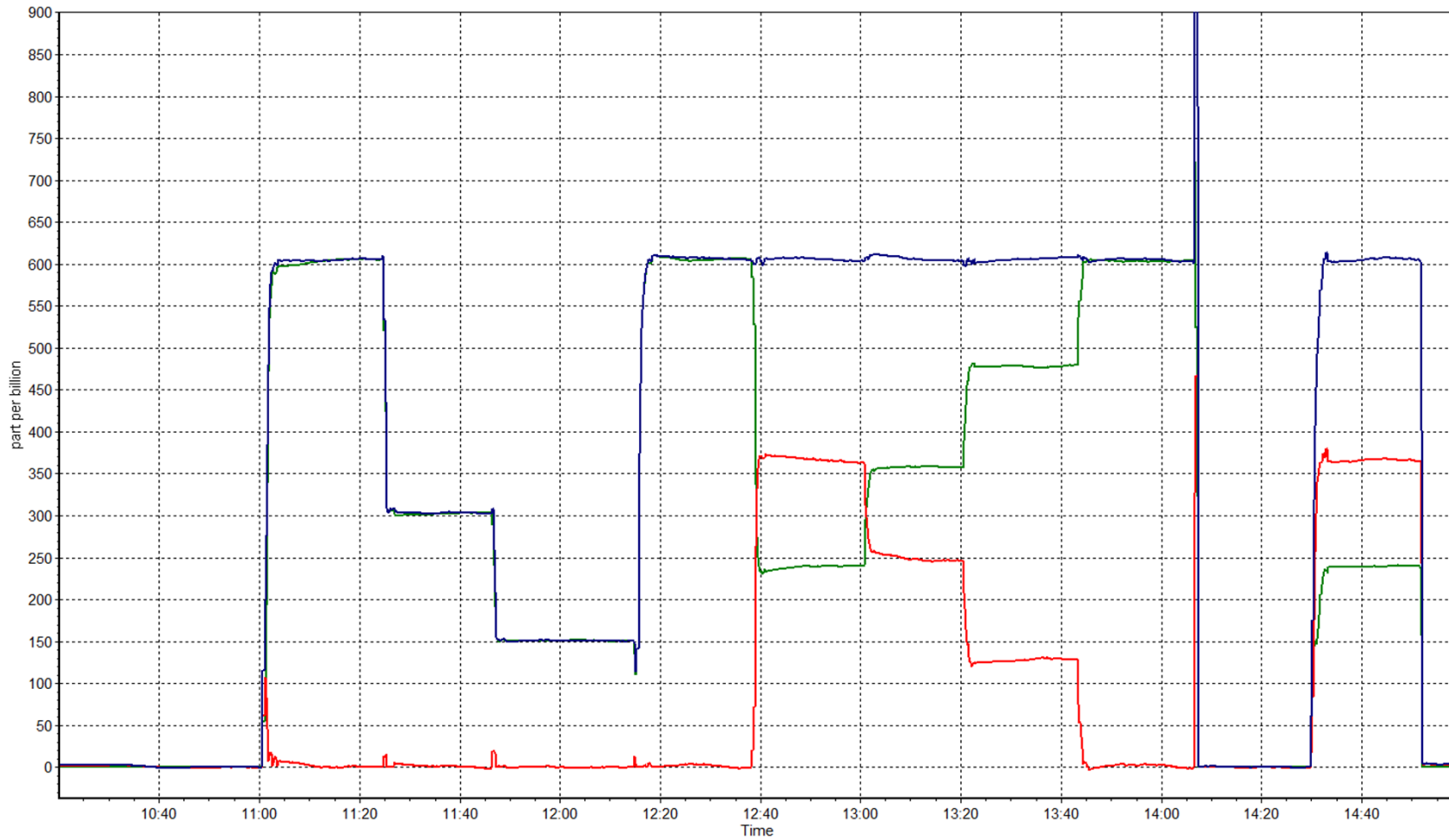
Calibration Date	March 6, 2015	Previous Calibration	February 6, 2015
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999964
365.1	365.8	0.9980		
246.7	246.8	0.9995	Slope	0.998843
127.2	129.1	0.9851		
			Intercept	-0.402994

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 19
FIREBAG
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospherics Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)

MARCH 2015
MONTHLY SUMMARY for
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	17	0	4	0
H2S (ppb) Average	708	36	36	100.00	7	0	1	0
THC (ppm) Average	707	37	37	100.00	2.5	-	2.2	-
NO2 (ppb) Average	706	38	38	100.00	97	0	15	-
NO (ppb) Average	706	38	38	100.00	218	-	19	-
NOX (ppb) Average	706	38	38	100.00	315	-	32	-
Temperature 2 m (C) Average	744	0	0	100.00	12.6	-	6.8	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	94	-
Wind Speed 10 m (km/h) Average	706	0	38	94.89	41	-	32	-
Wind Direction 10 m (deg) Average	706	0	38	94.89	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.1	2	-	0	0	0	0	1	3	17
H2S (ppb) Average	708	0.4	0	-	0	0	0	0	0	1	7
THC (ppm) Average	707	2.15	0.1	-	1.9	2.1	2.1	2.1	2.2	2.2	2.5
NO2 (ppb) Average	706	6.1	9	-	0	0	1	3	7	17	97
NO (ppb) Average	706	2.7	11	-	0	0	0	0	2	5	218
NOX (ppb) Average	706	8.7	18	-	0	0	1	4	8	23	315
Temperature 2 m (C) Average	744	-5.21	8.3	-	-30.3	-16.1	-10.6	-4.7	1.4	4.6	12.6
Relative Humidity (%) Average	744	67.8	18	-	26	40	56	70	82	90	99
Wind Speed 10 m (km/h) Average	706	13.7	7	-	0	7	9	13	17	21	41
Wind Direction 10 m (deg) Average	706	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	03 Mar 2015 22:00	03 Mar 2015 23:00	2	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	15 Mar 2015 01:00	16 Mar 2015 12:00	36	Flat line in sensor output signal - sensor frozen

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Summary of Hour Averages

Firebag - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 17 ppb on Mar 18 10:00	Maximum Daily Average: 4.5 ppb on Mar 8		Hours of Data:	707
Minimum Value: 0 ppb on Mar 3 13:00	Minimum Daily Average: 0.2 ppb on Mar 3		Hours of Missing Data:	37
Maximum Diurnal Average: 1.7 ppb at hour 11	Minimum Diurnal Average: 0.8 ppb at hour 22		Hours of Calibration:	37
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 =8		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	1	1	2	1	0.7	2
2-Mar	0	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
4-Mar	0	1	3	Z	2	2	1	1	1	0	0	0	0	0	0	1	2	3	2	1	1	1	2	3	1.2	3
5-Mar	3	2	1	1	Z	1	1	1	1	1	1	0	0	0	0	1	5	14	10	2	1	1	2	1	2.1	14
6-Mar	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Mar	Z	0	0	2	2	2	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0.9	2
8-Mar	0	Z	1	5	6	10	7	5	5	7	7	7	4	6	5	9	2	2	1	3	4	3	2	2	4.5	10
9-Mar	2	2	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
10-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0.4	3
11-Mar	3	4	3	7	Z	1	2	3	6	7	5	3	2	1	1	2	0	0	2	4	5	0	0	0	2.7	7
12-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	2	3	2	1	1	1	1	0.8	3
13-Mar	Z	3	6	5	1	3	3	6	5	4	3	4	7	2	2	1	0	0	0	1	2	2	2	2	2.9	7
14-Mar	2	Z	3	3	3	2	1	1	2	2	3	3	5	6	5	1	2	4	2	1	2	2	1	0	2.4	6
15-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	7	4	0.9	7
16-Mar	4	1	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	4
17-Mar	0	0	1	0	Z	1	1	1	2	2	3	1	1	1	1	1	3	6	5	3	3	2	2	1	1.8	6
18-Mar	1	1	1	2	1	Z	1	1	5	17	17	1	1	5	12	8	6	2	1	0	0	0	0	0	3.7	17
19-Mar	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	1
20-Mar	3	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	3
21-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	8	0	0	0	0	0	0.6	8
22-Mar	0	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
23-Mar	0	0	0	0	Z	0	0	0	0	0	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	3
24-Mar	0	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
25-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
26-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0.5	1
27-Mar	0	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
28-Mar	1	1	1	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Mar	0	0	0	0	Z	3	4	6	1	1	3	1	0	0	0	1	0	0	0	0	0	1	2	2	1.2	6
30-Mar	1	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	2	3	2	2	1	1	1	1	1	0.9	3
31-Mar	Z	1	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

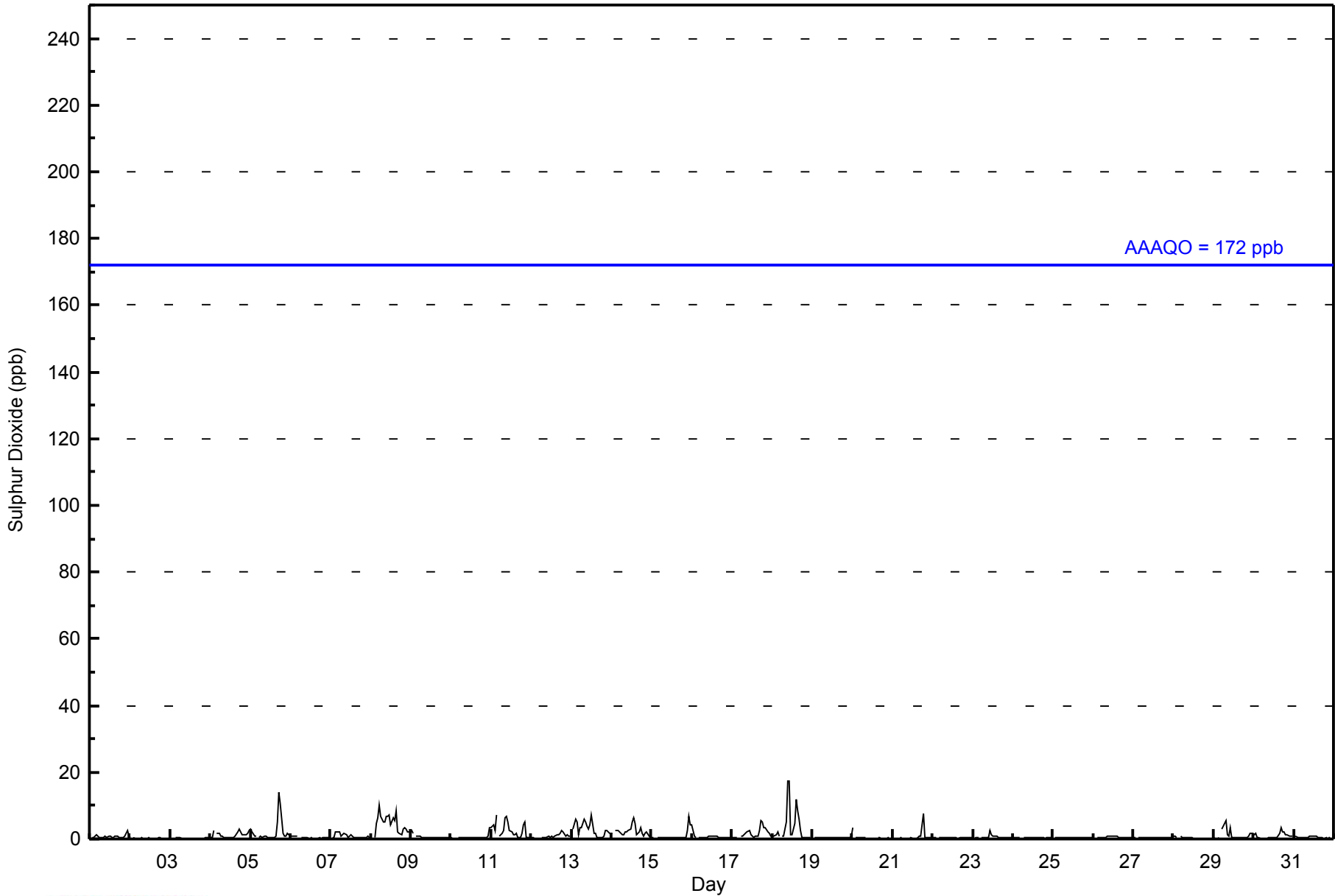
1.0	0.8	0.9	1.2	0.9	1.1	0.9	1.0	1.2	1.7	1.7	1.0	1.1	1.0	1.2	1.1	1.1	1.3	1.3	0.8	0.9	0.8	1.0	0.9	Diurnal Average	
4	4	6	7	6	10	7	6	6	17	17	7	7	6	12	9	6	14	10	4	5	3	7	4	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	703	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: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - March 2015

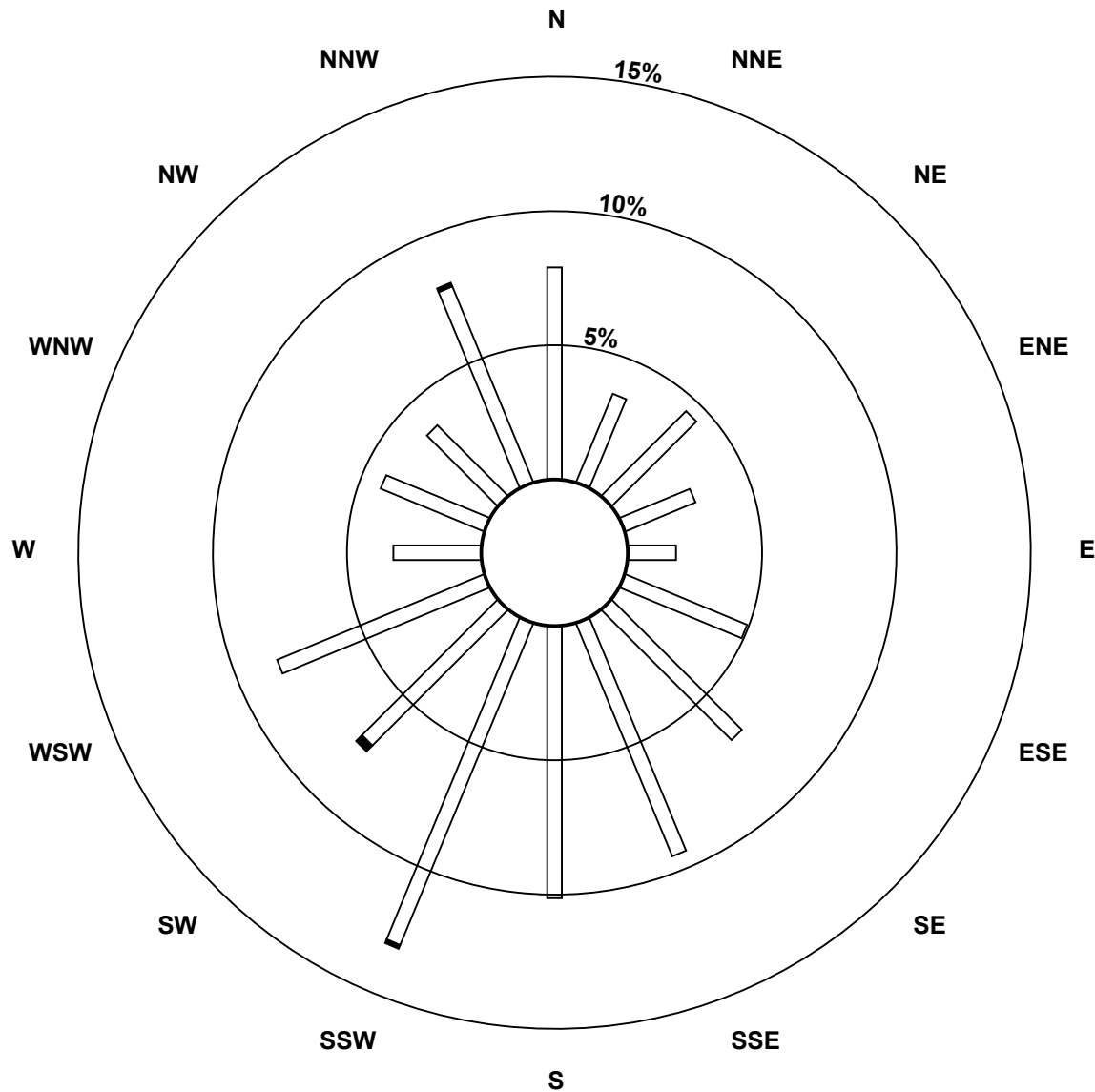
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	53	24	30	19	12	33	46	63	68	87	48	56	22	28	25	53	667
11 - 20	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	53	24	30	19	12	33	46	63	68	88	50	56	22	28	25	54	671

Total Number of Valid Hours: 671

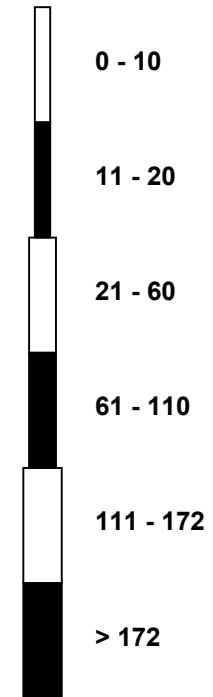
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)**



Classes (ppb)

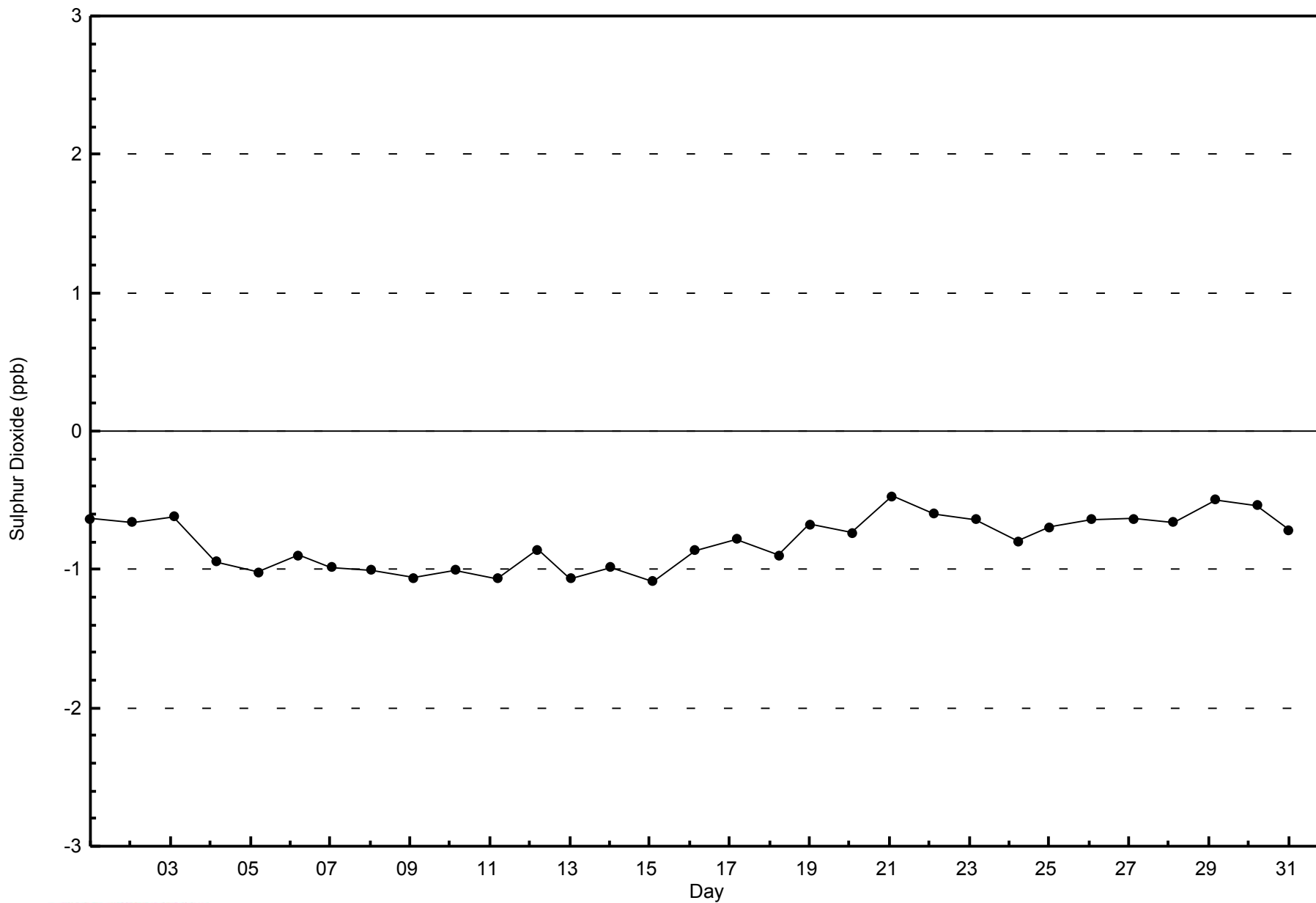


Total Number of Valid Hours: 671



WBEA
Zero Responses

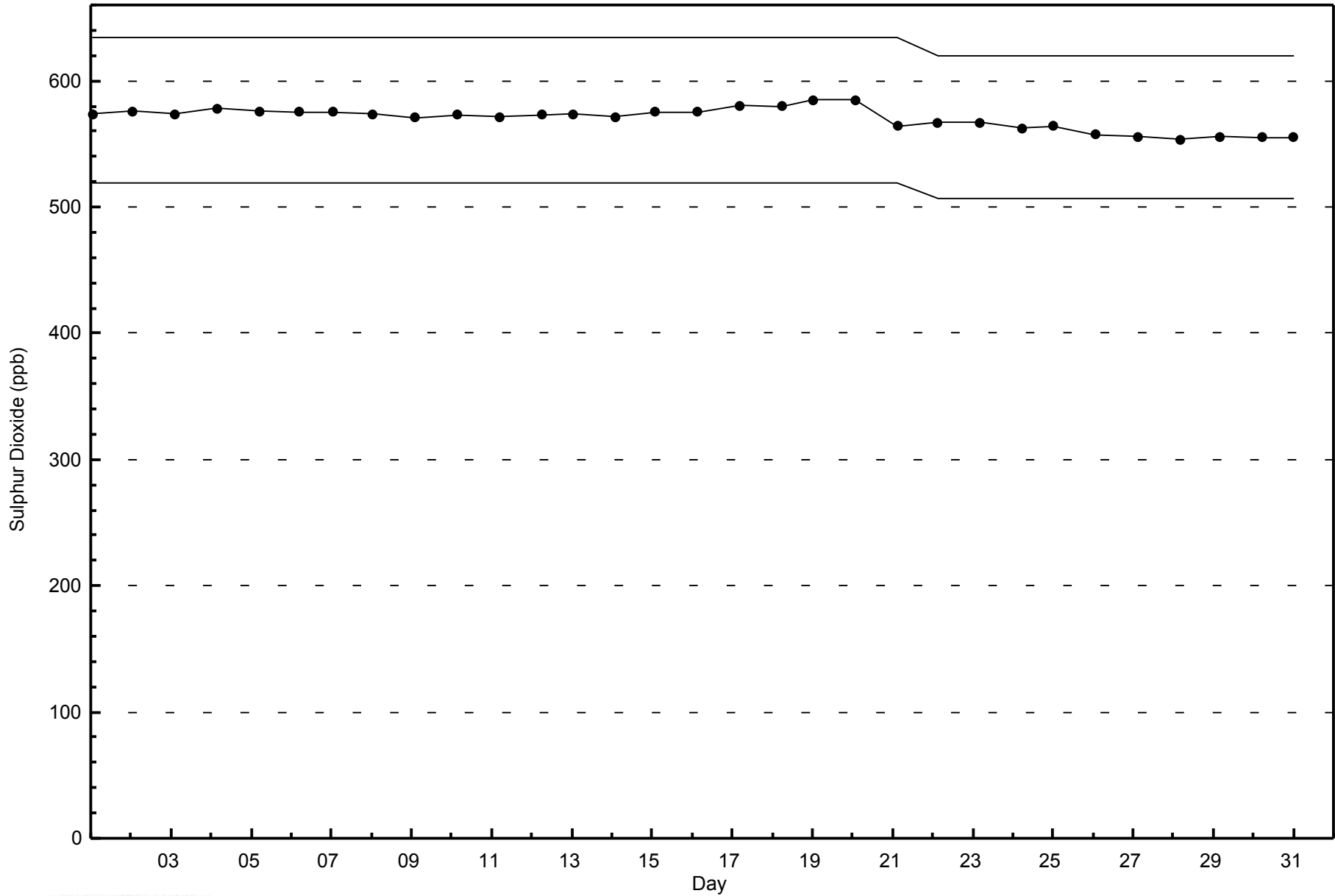
Sulphur Dioxide (SO₂) - ppb
Firebag - March 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Firebag - March 2015





Summary of Hour Averages

Firebag - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Mar 1 05:00	Maximum Daily Average: 1.0 ppb on Mar 1		Hours of Data:	708
Minimum Value: 0 ppb on Mar 9 05:00	Minimum Daily Average: 0.2 ppb on Mar 9		Hours of Missing Data:	36
Maximum Diurnal Average: 0.7 ppb at hour 5	Minimum Diurnal Average: 0.3 ppb at hour 14		Hours of Calibration:	36
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 1		Percent Operational Time:	100.0

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

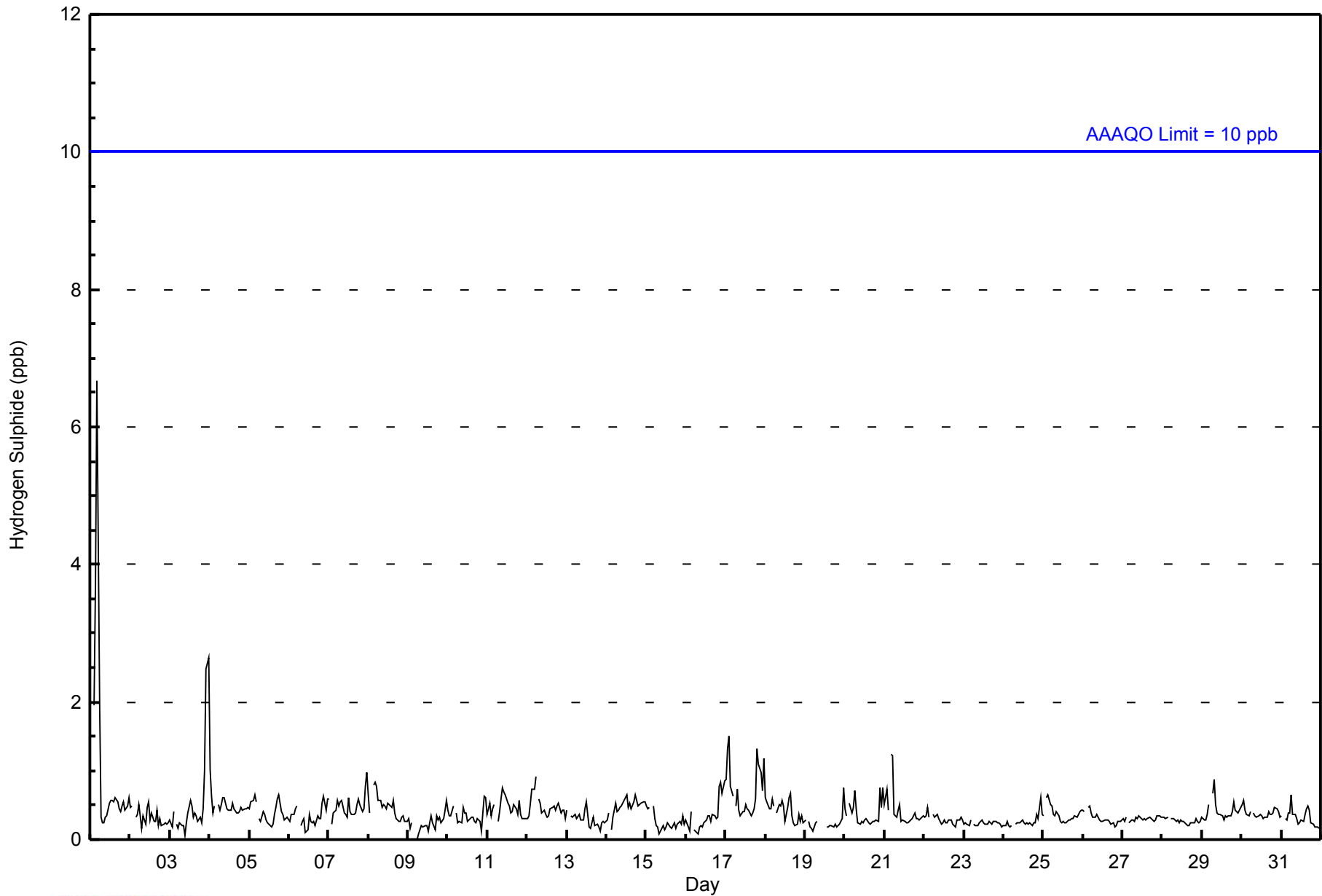
0.4	0.4	0.5	0.6	0.7	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	Diurnal Average
1	1	2	4	7	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	Diurnal Maximum

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	705	99.58	99.58
3 - 4	2	0.28	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: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - March 2015

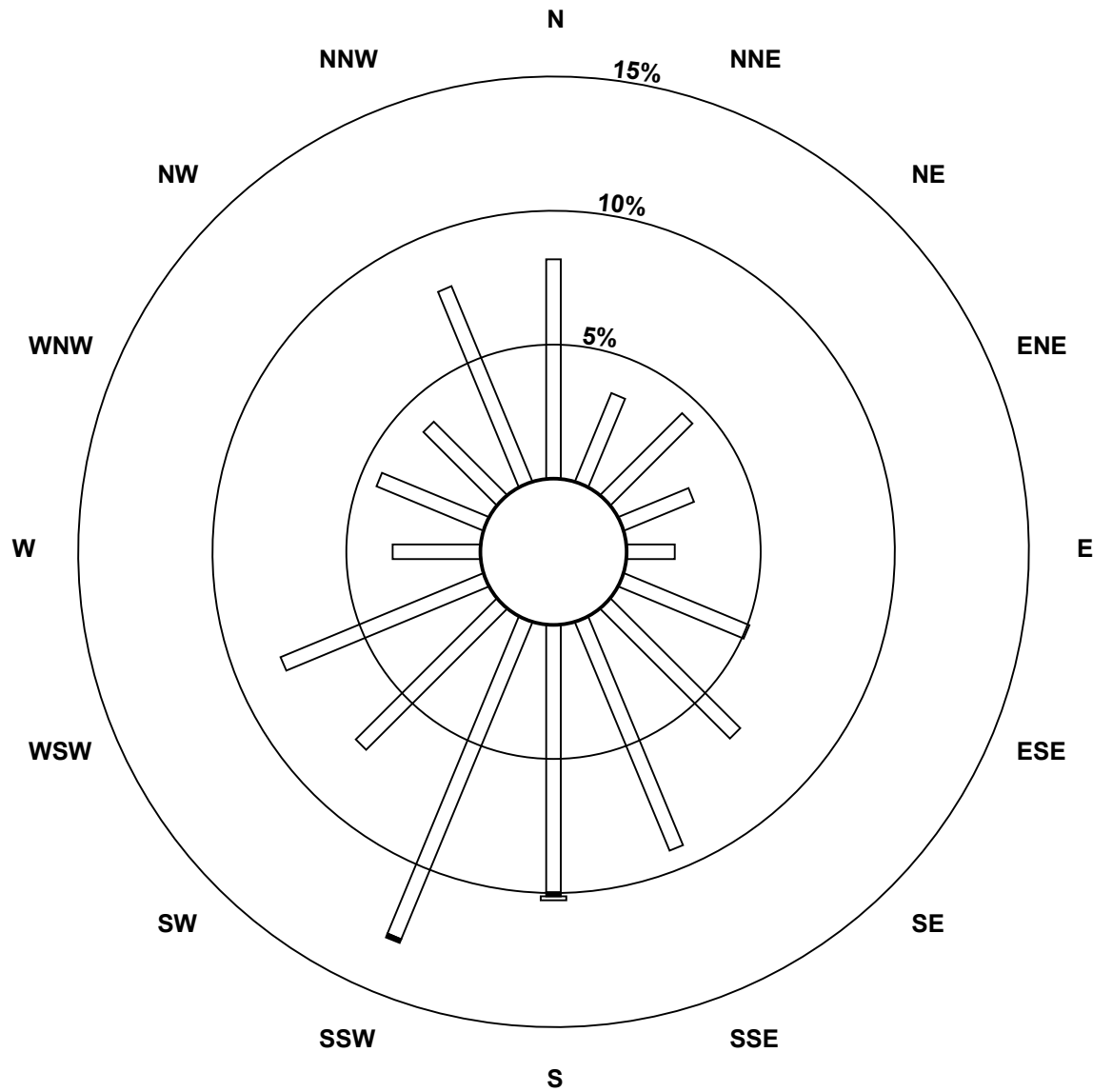
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	55	24	29	19	12	34	46	62	67	86	50	55	22	29	26	53	669
3 - 4	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	24	29	19	12	34	46	62	69	87	50	55	22	29	26	53	672

Total Number of Valid Hours: 672

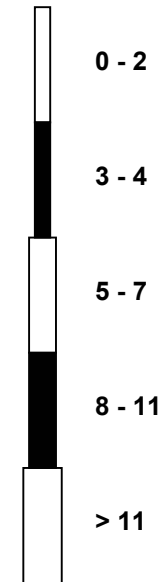
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)



Classes (ppb)

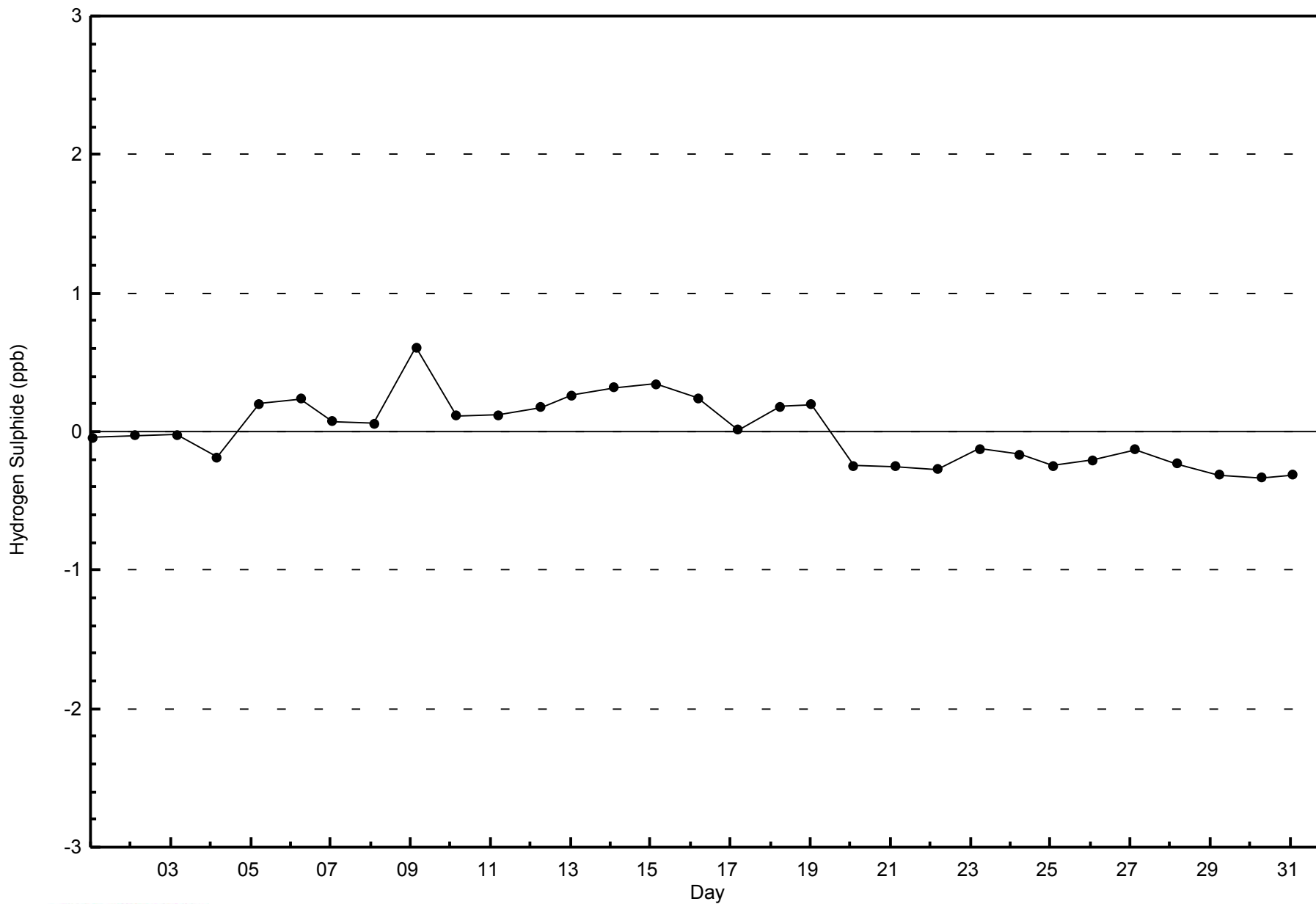


Total Number of Valid Hours: 672



WBEA
Zero Responses

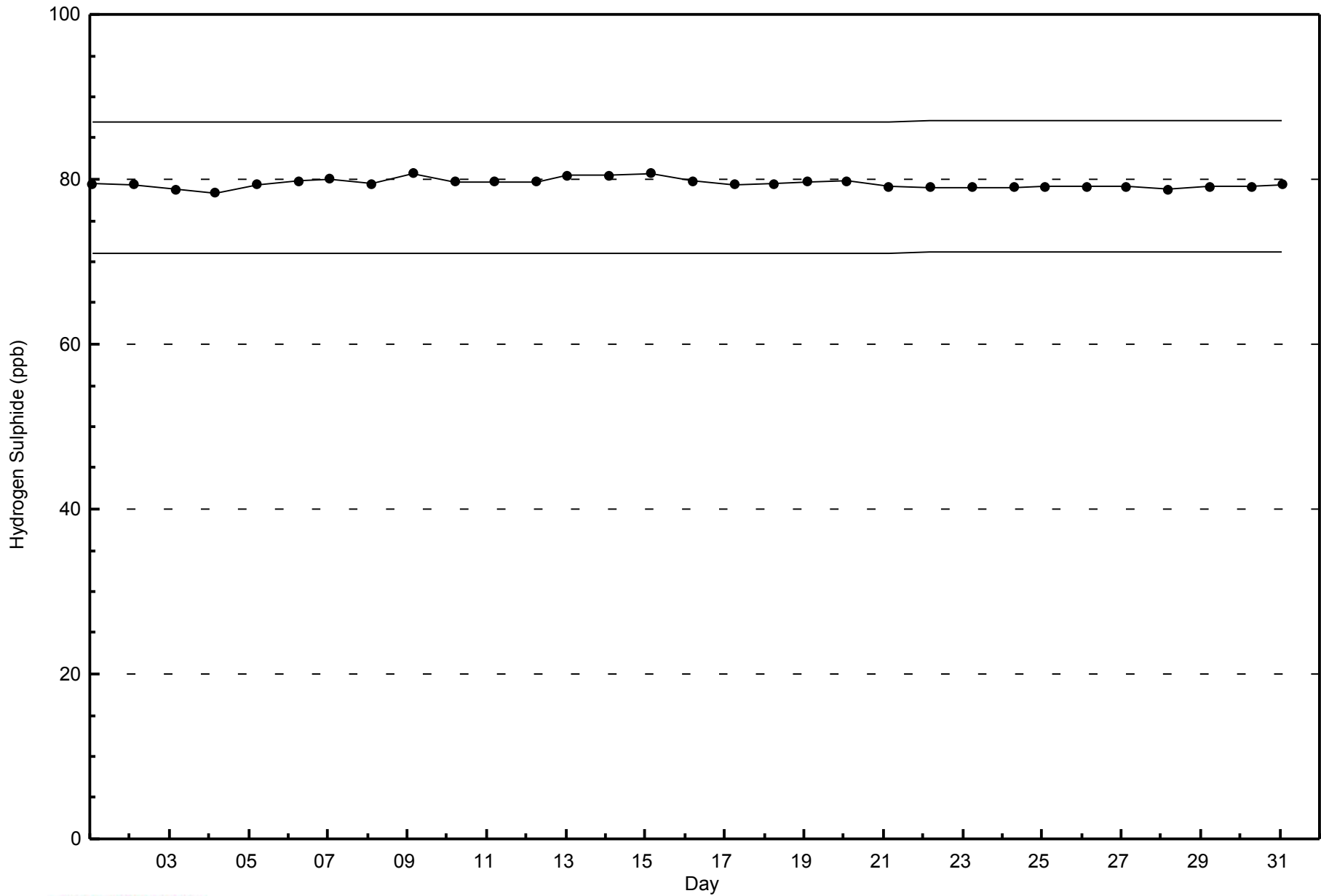
Hydrogen Sulphide (H₂S) - ppb
Firebag - March 2015





WBEA
Span Responses

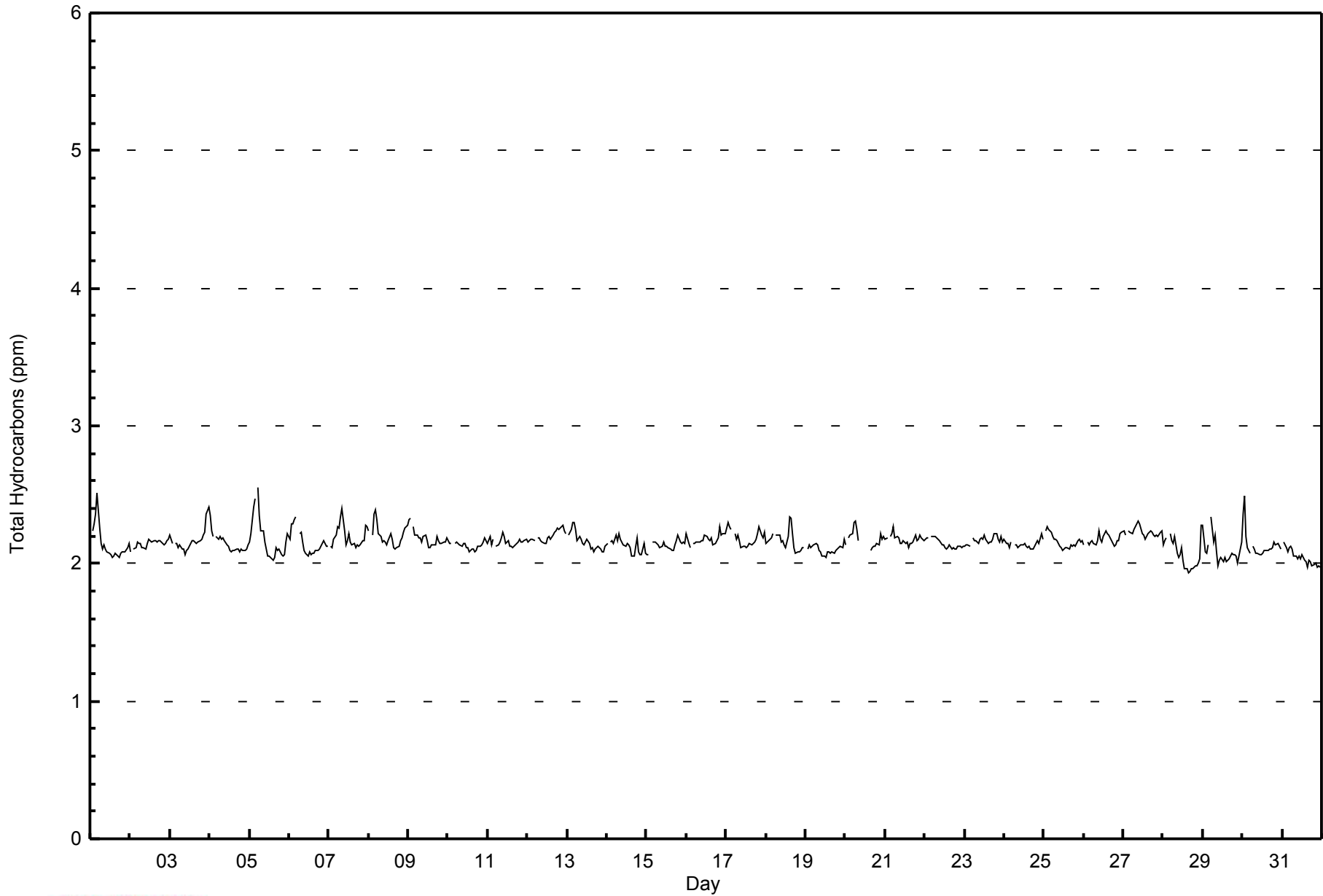
Hydrogen Sulphide (H₂S) - ppb
Firebag - March 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - March 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	40	5.66	5.66
2.1 - 3.0	667	94.34	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - March 2015

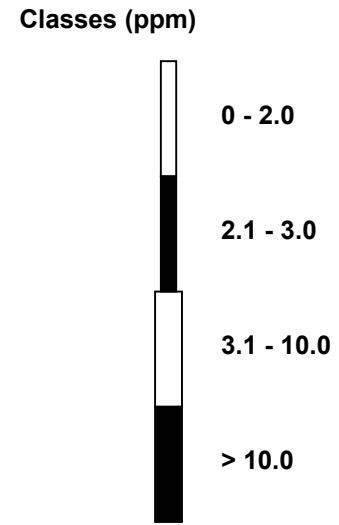
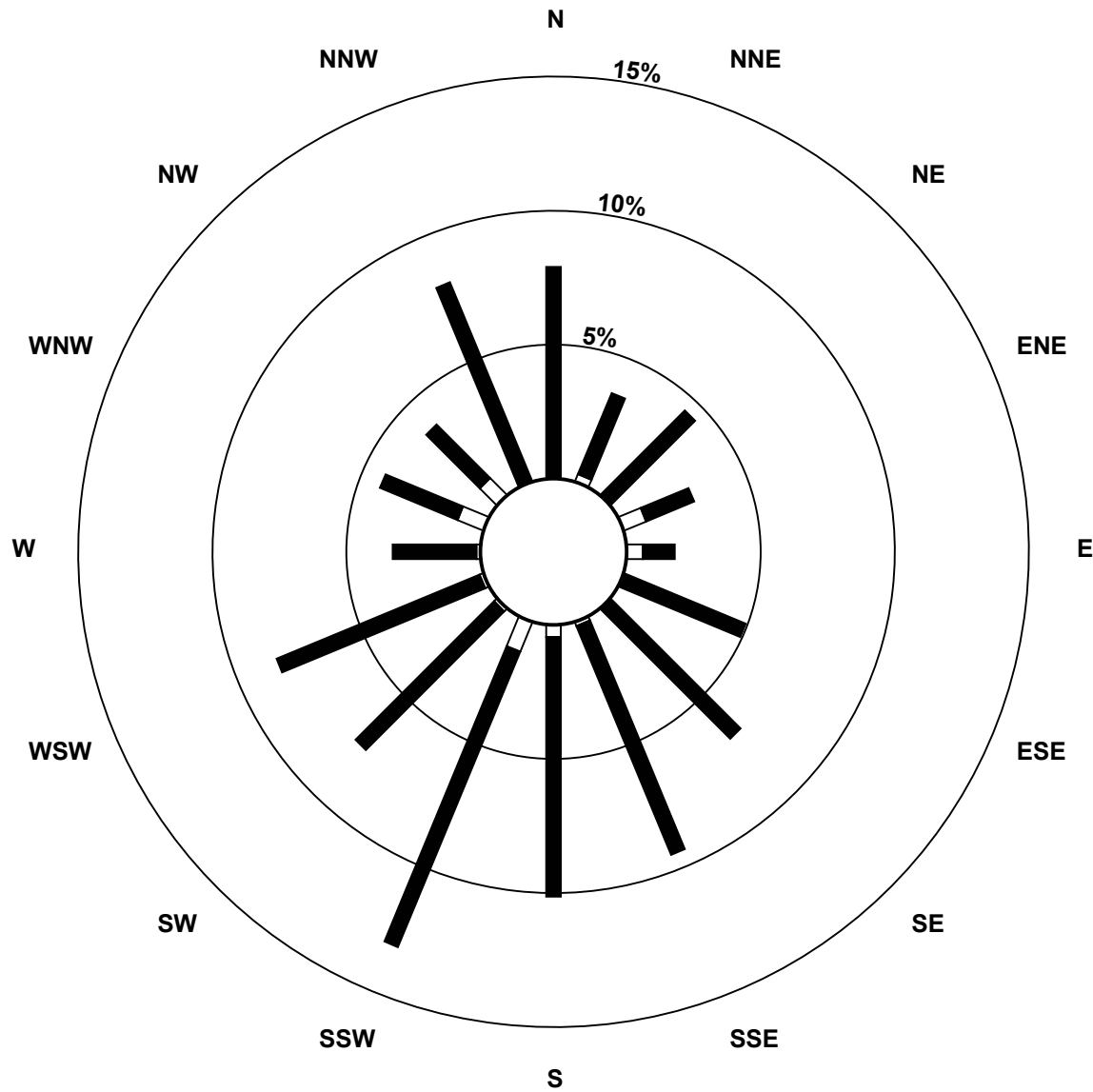
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	2	0	6	4	0	0	1	3	8	1	1	1	7	6	0	40
2.1 - 3.0	53	22	30	13	8	33	46	62	65	80	49	55	21	21	19	54	631
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	53	24	30	19	12	33	46	63	68	88	50	56	22	28	25	54	671

Total Number of Valid Hours: 671

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)

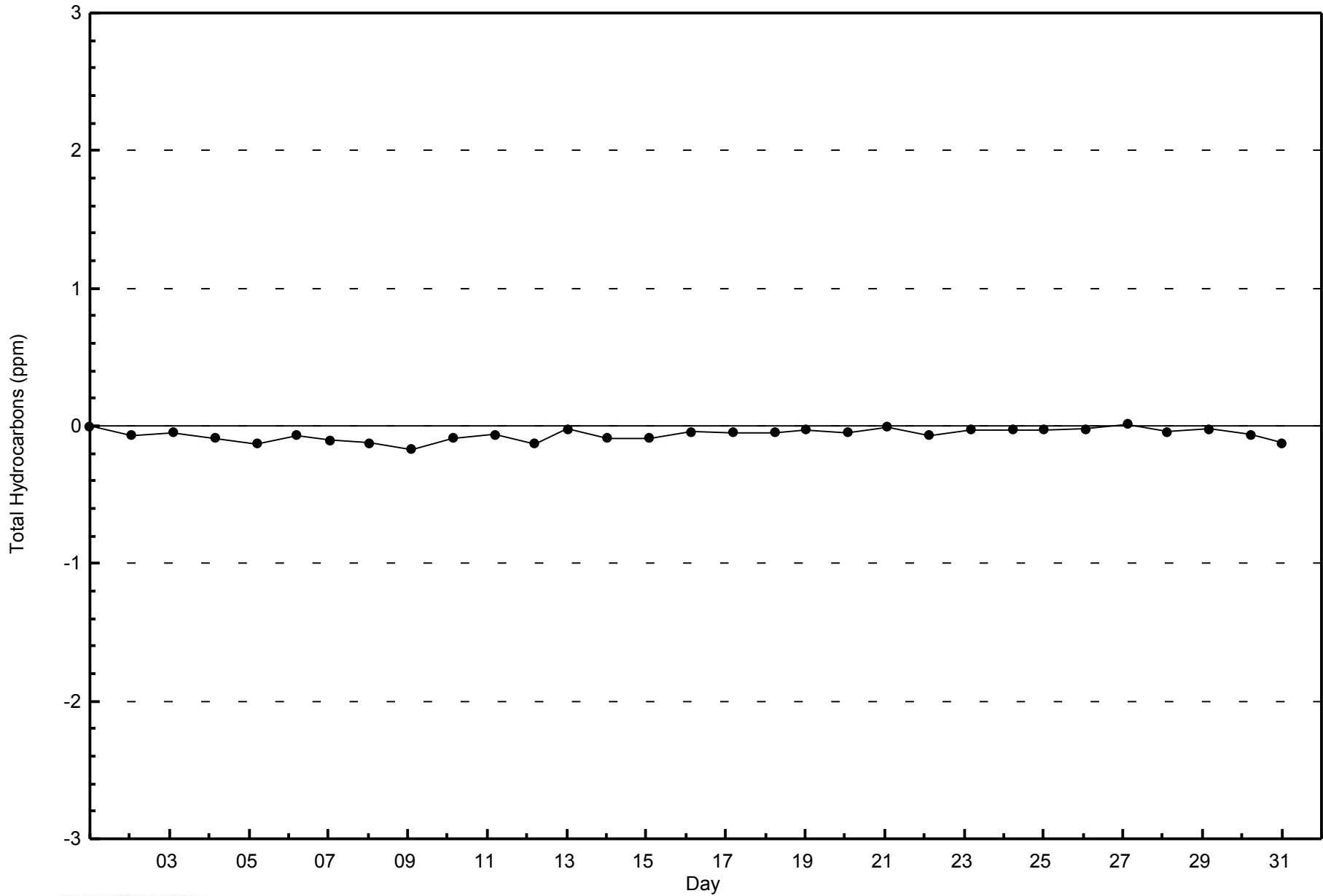


Total Number of Valid Hours: 671



WBEA
Zero Responses

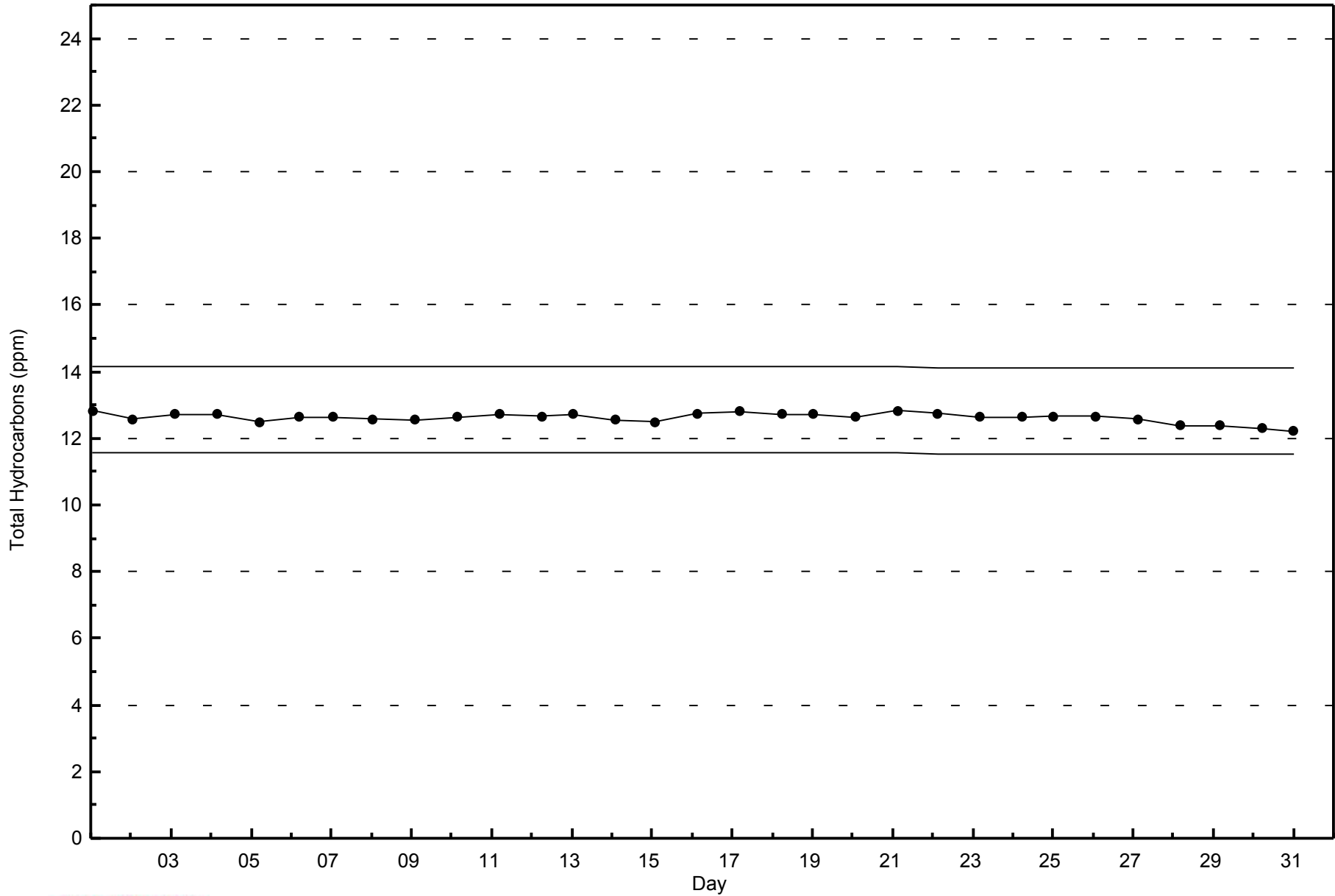
Total Hydrocarbons (THC) - ppm
Firebag - March 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Firebag - March 2015





Summary of Hour Averages

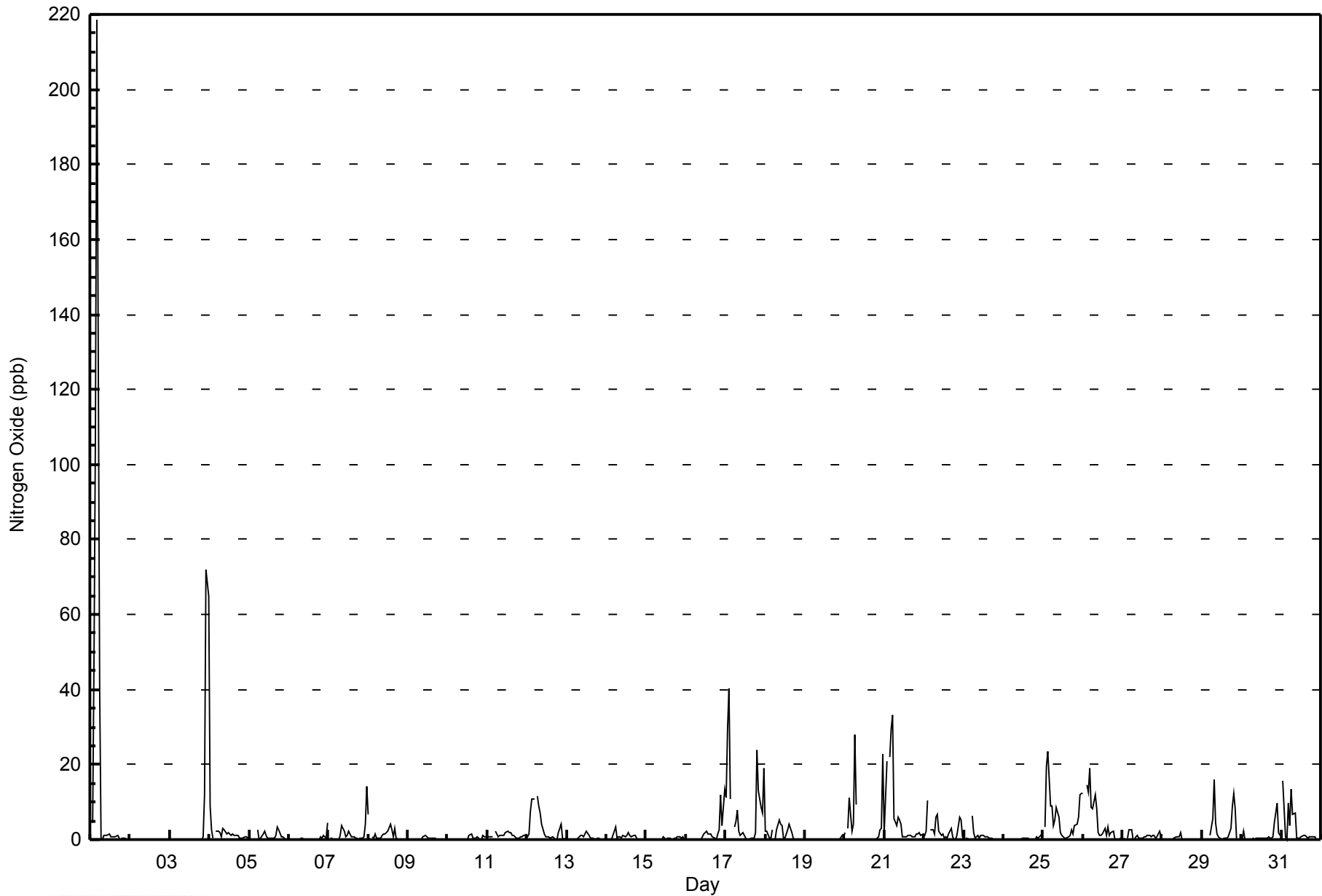
Firebag - March 2015

Maximum Value: 218 ppb on Mar 1 05:00																		Maximum Daily Average: 18.9 ppb on Mar 1						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 1 23:00																		Minimum Daily Average: 0.0 ppb on Mar 2						Hours of Data: 706		
Maximum Diurnal Average: 12.0 ppb at hour 5																		Minimum Diurnal Average: 0.7 ppb at hour 18						Hours of Missing Data: 38		
Monthly Average: 2.7 ppb																		Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =2 P ₉₀ =5 P ₉₉ =40						Hours of Calibration: 38		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	5	50	110	218	40	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	18.9	218
2-Mar	0	Z	0	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12	72	65	6.5	72
4-Mar	9	3	0	Z	2	2	2	1	3	3	2	2	1	1	1	1	1	1	0	0	0	1	1	0	1.7	9
5-Mar	0	0	0	0	Z	3	0	0	2	2	1	0	0	0	0	0	1	3	2	1	1	0	0	0	0.8	3
6-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	4	0.4	4
7-Mar	Z	0	0	0	0	0	0	1	4	2	1	1	2	1	1	1	0	0	0	0	0	1	4	14	1.5	14
8-Mar	7	Z	1	0	1	0	0	1	1	1	2	2	2	4	3	1	3	0	0	0	0	0	0	0	1.3	7
9-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
10-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	1	1	1	1	0.3	1
11-Mar	1	1	1	1	Z	2	1	1	1	1	1	2	2	2	2	1	1	1	1	0	1	1	1	1	1.1	2
12-Mar	1	1	8	11	11	Z	11	9	7	4	2	1	1	1	0	1	0	0	0	2	4	0	0	0	3.3	11
13-Mar	Z	0	0	0	0	0	0	1	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0.5	2
14-Mar	0	Z	0	0	1	3	0	1	1	0	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0.7	3
15-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	1	1	1	0	0.3	1
16-Mar	0	0	0	Z	0	0	0	0	0	0	1	2	2	2	1	2	1	0	0	1	3	12	4	13	1.9	13
17-Mar	11	29	40	11	Z	3	5	8	2	1	2	1	1	0	0	0	1	1	2	24	13	8	7	19	8.2	40
18-Mar	2	2	0	0	3	Z	0	3	5	4	4	0	0	3	4	3	2	0	0	0	0	0	0	0	1.5	5
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1	1
20-Mar	2	Z	3	11	2	4	28	9	C	C	C	C	C	C	C	0	0	0	0	0	1	3	3	23	--	28
21-Mar	2	21	Z	22	29	33	6	4	6	5	4	1	1	1	1	1	1	1	1	1	2	2	1	2	6.4	33
22-Mar	1	2	10	Z	3	2	2	6	7	2	1	1	0	1	0	1	3	1	0	0	1	6	5	1	2.5	10
23-Mar	0	0	0	0	Z	6	2	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	6
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0.3	2
25-Mar	Z	3	20	24	9	9	4	5	9	6	2	1	1	0	0	1	1	3	2	4	4	6	12	12	6.0	24
26-Mar	12	Z	14	13	19	9	8	12	8	2	1	1	2	3	1	3	1	2	2	0	0	0	0	0	5.0	19
27-Mar	0	0	Z	0	3	3	0	0	1	1	1	0	0	1	1	1	1	1	1	1	0	1	2	1	0.9	3
28-Mar	0	0	0	Z	0	0	0	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
29-Mar	0	0	0	0	Z	1	5	16	5	2	1	0	0	0	0	0	1	3	9	12	8	0	0	0	2.8	16
30-Mar	0	2	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	1	0	0	1	5	10	2	1	1.1	10
31-Mar	Z	16	1	0	10	4	13	7	7	1	0	0	1	1	1	1	0	1	1	1	1	0	0	0	2.8	16
																		Diurnal Average								
																		Diurnal Maximum								
Z - zerospan																		C - Calibration								



WBEA
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	690	97.73	97.73
21 - 40	11	1.56	99.29
41 - 80	3	0.42	99.72
81 - 159	1	0.14	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - March 2015

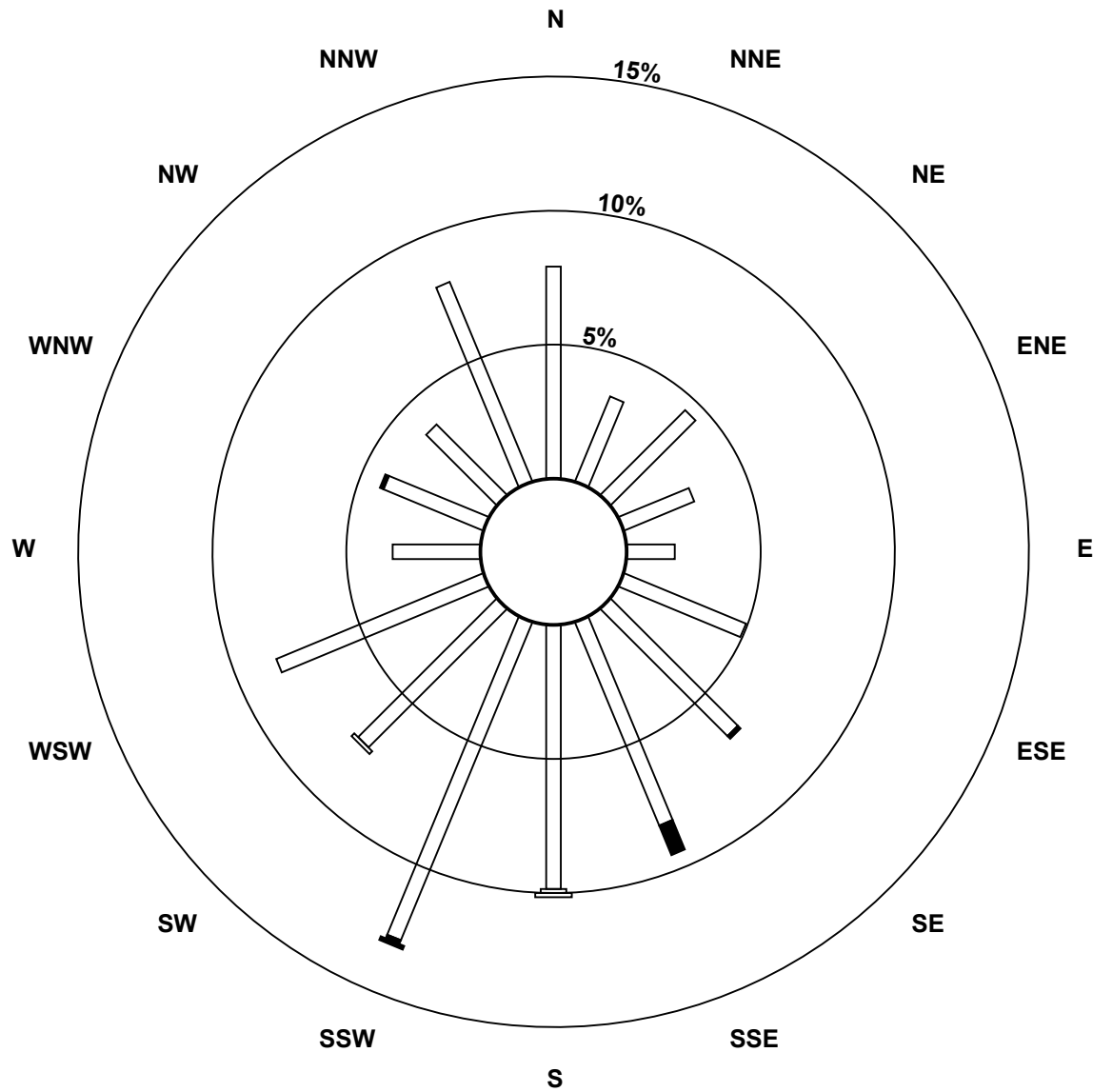
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	53	23	30	19	12	33	45	55	66	86	49	56	22	27	25	54	655
21 - 40	0	0	0	0	0	0	1	8	0	1	0	0	0	1	0	0	11
11 - 80	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Totals	53	23	30	19	12	33	46	63	68	88	50	56	22	28	25	54	670

Total Number of Valid Hours: 670

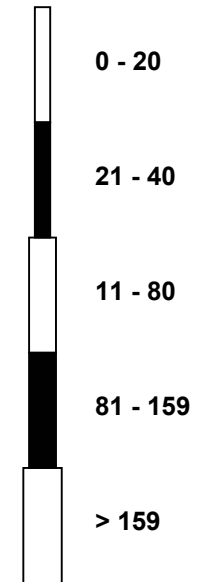
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)**



Classes (ppb)

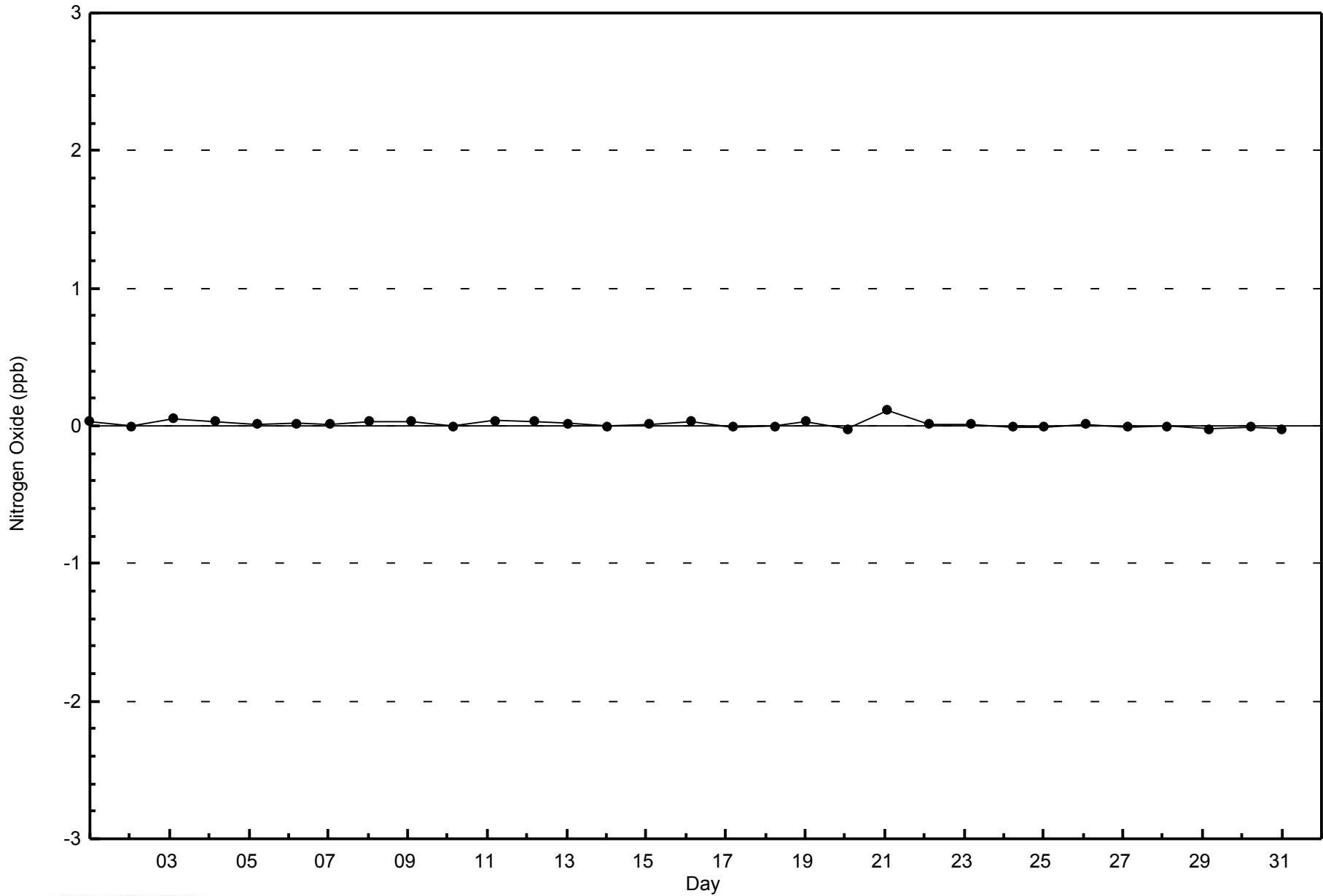


Total Number of Valid Hours: 670



WBEA
Zero Responses

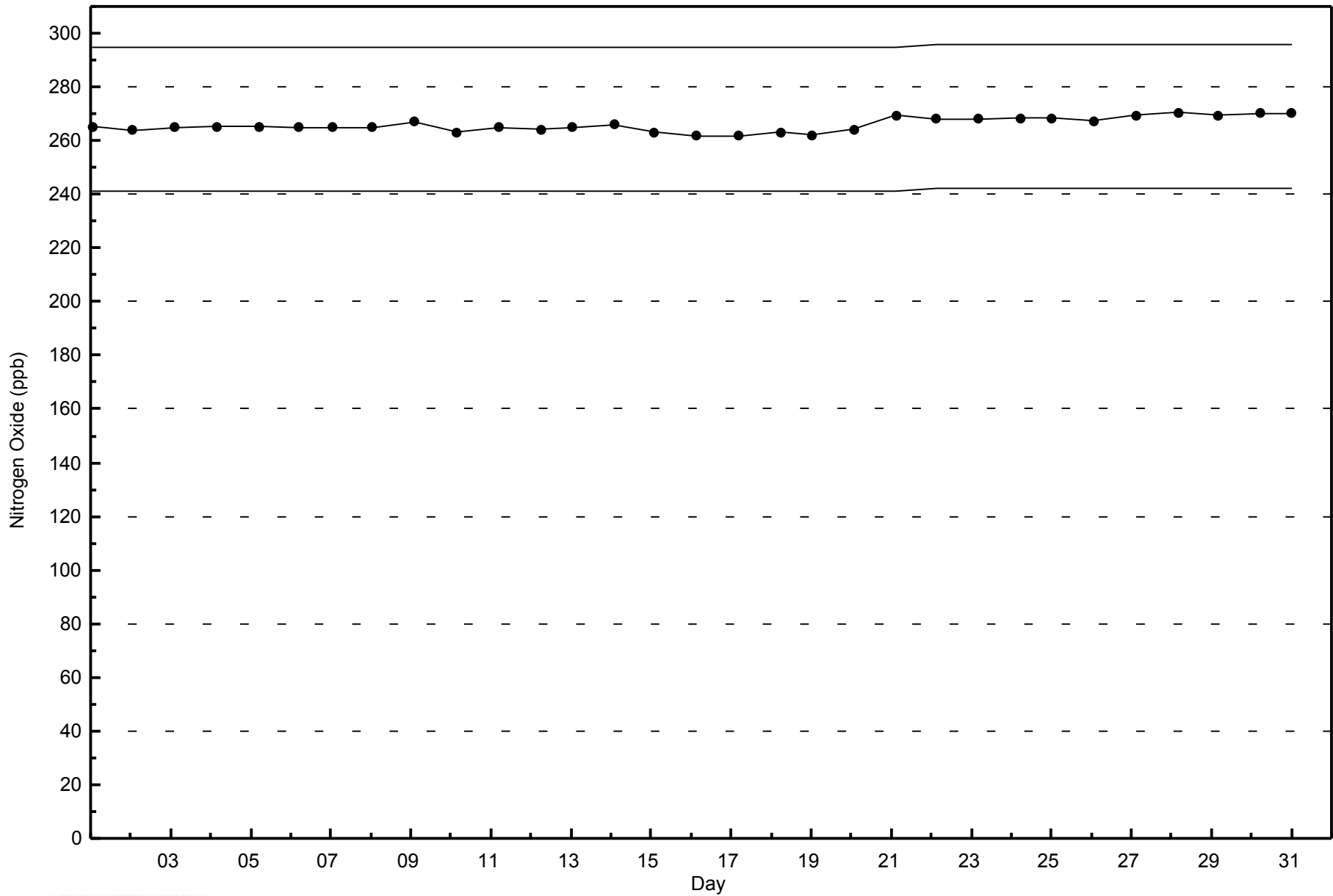
Nitrogen Oxide (NO) - ppb
Firebag - March 2015





WBEA
Span Responses

Nitrogen Oxide (NO) - ppb
Firebag - March 2015





Summary of Hour Averages

Firebag - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 97 ppb on Mar 1 05:00	Maximum Daily Average: 15.2 ppb on Mar 17		Hours of Data:	706
Minimum Value: 0 ppb on Mar 2 03:00	Minimum Daily Average: 0.6 ppb on Mar 2		Hours of Missing Data:	38
Maximum Diurnal Average: 13.1 ppb at hour 5	Minimum Diurnal Average: 1.9 ppb at hour 13		Hours of Calibration:	38
Monthly Average: 6.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 17 P ₉₉ = 37		Percent Operational Time:	100.0

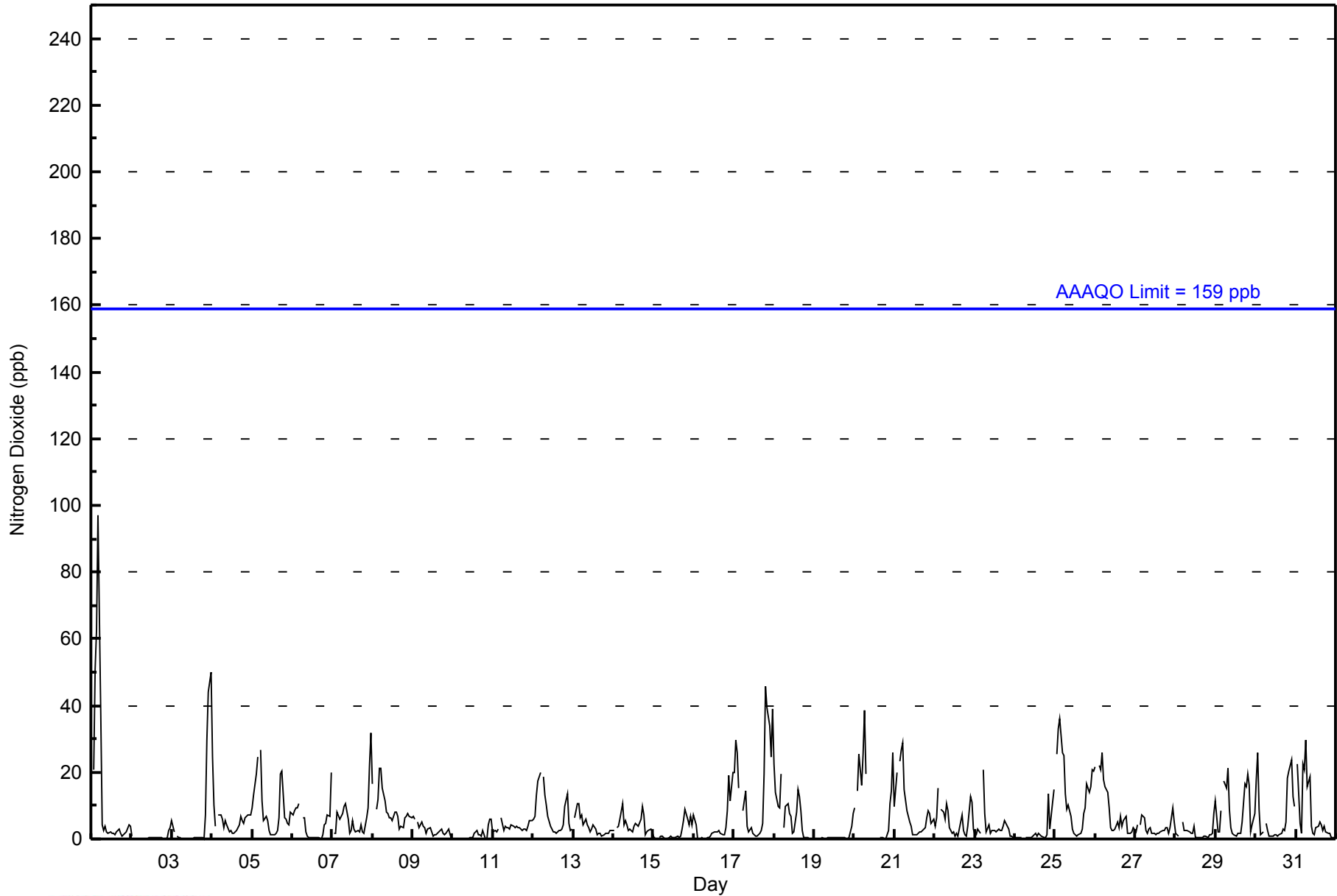
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	21	51	63	97	37	4	3	4	2	2	2	2	2	1	2	3	2	1	1	2	2	4	4	13.5	97																						
2-Mar	1	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	3	4	0.6	4																						
3-Mar	5	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	30	44	50	6.2	50																						
4-Mar	25	10	4	Z	7	7	6	4	6	4	2	3	2	2	2	3	4	7	5	5	6	7	7	7	5.9	25																						
5-Mar	9	13	20	25	Z	27	11	5	7	6	3	1	1	1	2	3	6	19	20	6	6	5	4	8	9.0	27																						
6-Mar	7	8	9	9	10	Z	6	6	2	1	1	0	0	0	0	0	0	0	1	4	5	7	7	20	4.6	20																						
7-Mar	Z	2	2	8	6	7	8	10	11	6	2	3	5	3	2	3	2	4	2	2	7	10	22	32	6.8	32																						
8-Mar	17	Z	9	12	21	21	15	11	8	8	6	6	8	8	7	3	4	4	4	6	7	8	7	6	9.0	21																						
9-Mar	7	6	Z	5	4	5	4	4	2	3	3	2	1	1	1	2	3	3	2	1	2	3	1	0	2.8	7																						
10-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	2	2	1	1	1	3	0	0	4	6	6	1.3	6																						
11-Mar	2	3	2	3	Z	6	2	4	3	3	3	4	4	4	3	3	3	3	3	3	3	4	6	6	3.5	6																						
12-Mar	6	7	13	17	20	Z	19	13	10	7	4	3	2	2	2	3	3	3	4	10	14	5	2	3	7.4	20																						
13-Mar	Z	6	11	11	6	7	4	6	4	3	2	3	4	3	1	2	2	1	1	2	2	2	2	3	3.8	11																						
14-Mar	3	Z	4	4	6	11	4	5	4	3	2	4	5	4	4	6	10	7	1	2	3	3	2	2	4.3	11																						
15-Mar	0	0	Z	1	1	1	0	0	0	0	1	1	0	1	1	1	1	3	5	9	6	4	7	4	2.0	9																						
16-Mar	7	4	0	Z	0	0	0	0	0	1	1	2	2	2	2	3	2	1	1	3	9	19	12	20	4.0	20																						
17-Mar	20	30	26	15	Z	9	12	15	4	2	3	2	1	1	1	2	2	5	19	46	39	34	25	39	15.2	46																						
18-Mar	22	14	10	9	20	Z	3	10	11	8	7	2	2	8	15	13	9	3	0	0	0	0	0	0	7.2	22																						
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	0.7	8																						
20-Mar	10	Z	15	25	16	26	39	19	Z	Z	Z	Z	Z	Z	Z	0	0	0	0	0	2	10	15	26	--	39																						
21-Mar	10	20	Z	23	27	29	15	8	7	5	4	1	1	1	2	2	2	3	3	6	9	8	5	6	8.5	29																						
22-Mar	4	6	15	Z	9	8	6	11	9	3	2	2	1	2	1	3	7	3	1	1	4	13	11	3	5.4	15																						
23-Mar	1	1	3	2	Z	21	8	2	4	2	3	3	2	3	3	3	4	5	4	3	1	1	1	1	3.5	21																						
24-Mar	1	1	1	0	0	Z	0	0	0	0	1	1	2	1	2	1	1	1	0	1	13	3	11	15	2.4	15																						
25-Mar	Z	26	33	36	26	25	14	9	10	7	3	2	1	1	1	2	3	8	10	16	14	16	21	21	13.1	36																						
26-Mar	22	Z	22	21	26	18	16	14	9	4	3	2	3	5	3	7	4	6	7	2	2	2	2	4	8.7	26																						
27-Mar	2	4	Z	4	7	6	2	2	3	3	2	2	1	2	2	2	3	2	4	3	2	3	9	5	3.3	9																						
28-Mar	2	1	1	Z	5	3	2	2	2	2	2	4	0	0	0	0	0	1	1	1	1	1	2	8	1.8	8																						
29-Mar	12	2	2	8	Z	17	15	21	9	4	2	1	1	2	2	2	5	17	16	19	16	2	4	8	8.1	21																						
30-Mar	18	26	9	1	2	Z	5	3	1	1	1	1	1	1	1	2	3	2	5	18	20	24	13	10	7.3	26																						
31-Mar	Z	22	5	2	23	21	30	16	19	4	2	1	4	4	5	4	3	4	2	2	2	1	0	0	7.5	30																						
																								8.5	9.1	10.2	11.8	13.1	12.0	8.1	6.6	5.0	3.0	2.2	1.9	1.9	2.2	2.4	2.5	2.7	3.8	4.3	5.6	6.6	7.4	8.3	10.5	Diurnal Average
																								25	30	51	63	97	37	39	21	19	8	7	6	6	8	15	13	9	19	20	46	39	34	44	50	Diurnal Maximum

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	658	93.20	93.20
21 - 40	42	5.95	99.15
41 - 80	5	0.71	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - March 2015

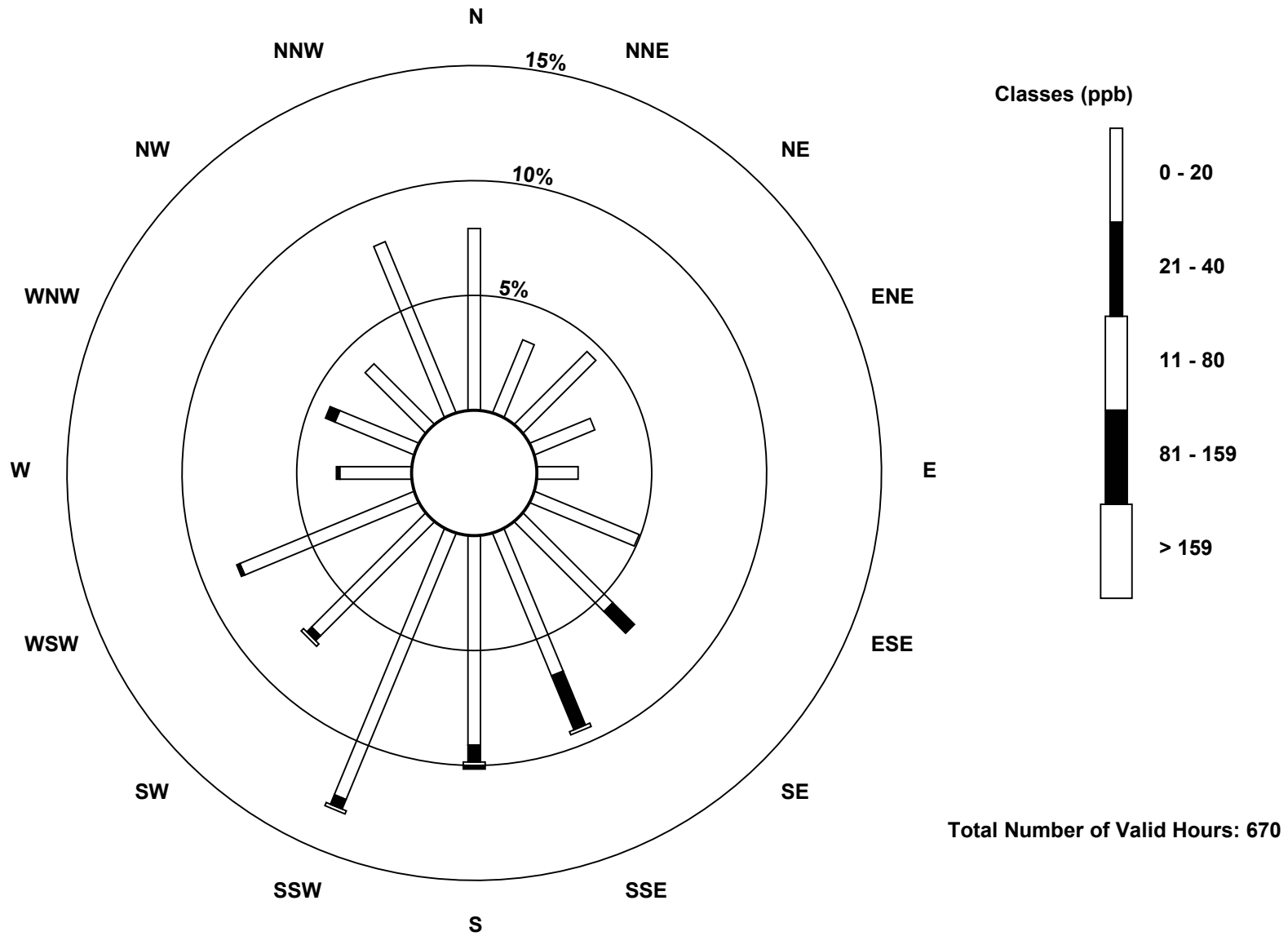
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	53	23	30	19	12	33	37	45	61	84	47	55	21	25	25	54	624
21 - 40	0	0	0	0	0	0	9	17	5	3	2	1	1	3	0	0	41
11 - 80	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	4
81 - 159	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	53	23	30	19	12	33	46	63	68	88	50	56	22	28	25	54	670

Total Number of Valid Hours: 670

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Mar 2015

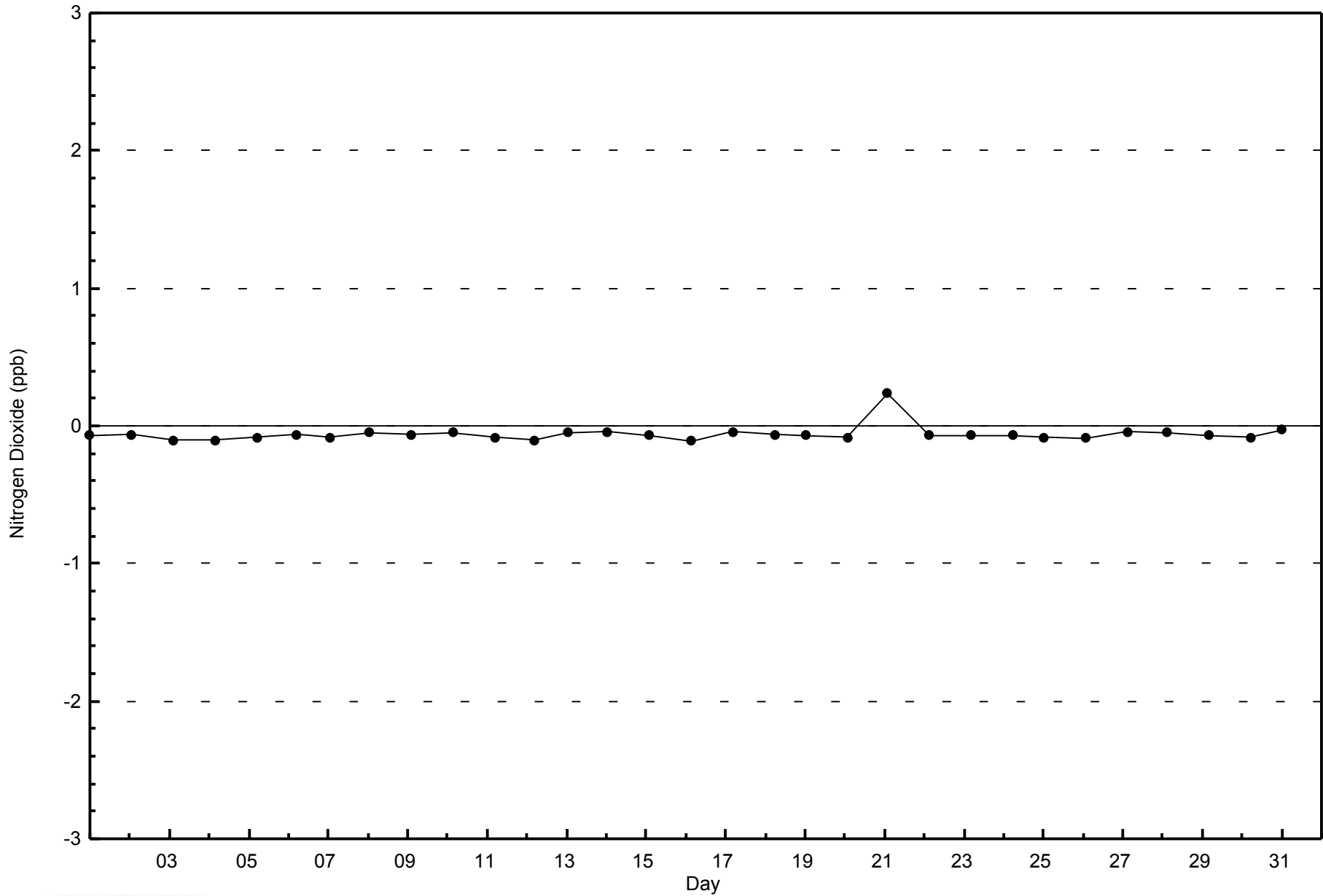
Nitrogen Dioxide (NO₂) - ppb
 Firebag (AMS 19)





WBEA
Zero Responses

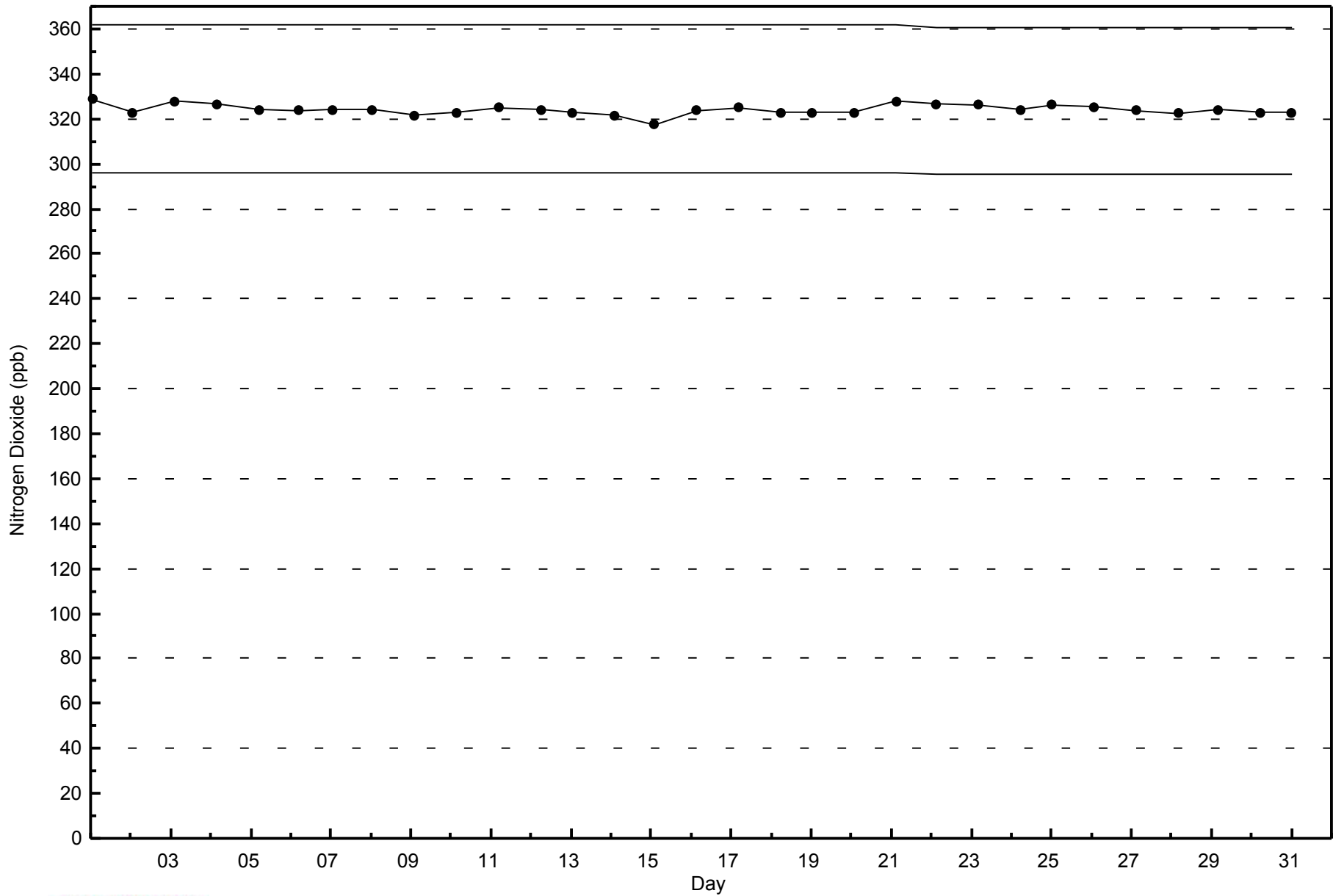
Nitrogen Dioxide (NO₂) - ppb
Firebag - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Firebag - March 2015





Summary of Hour Averages

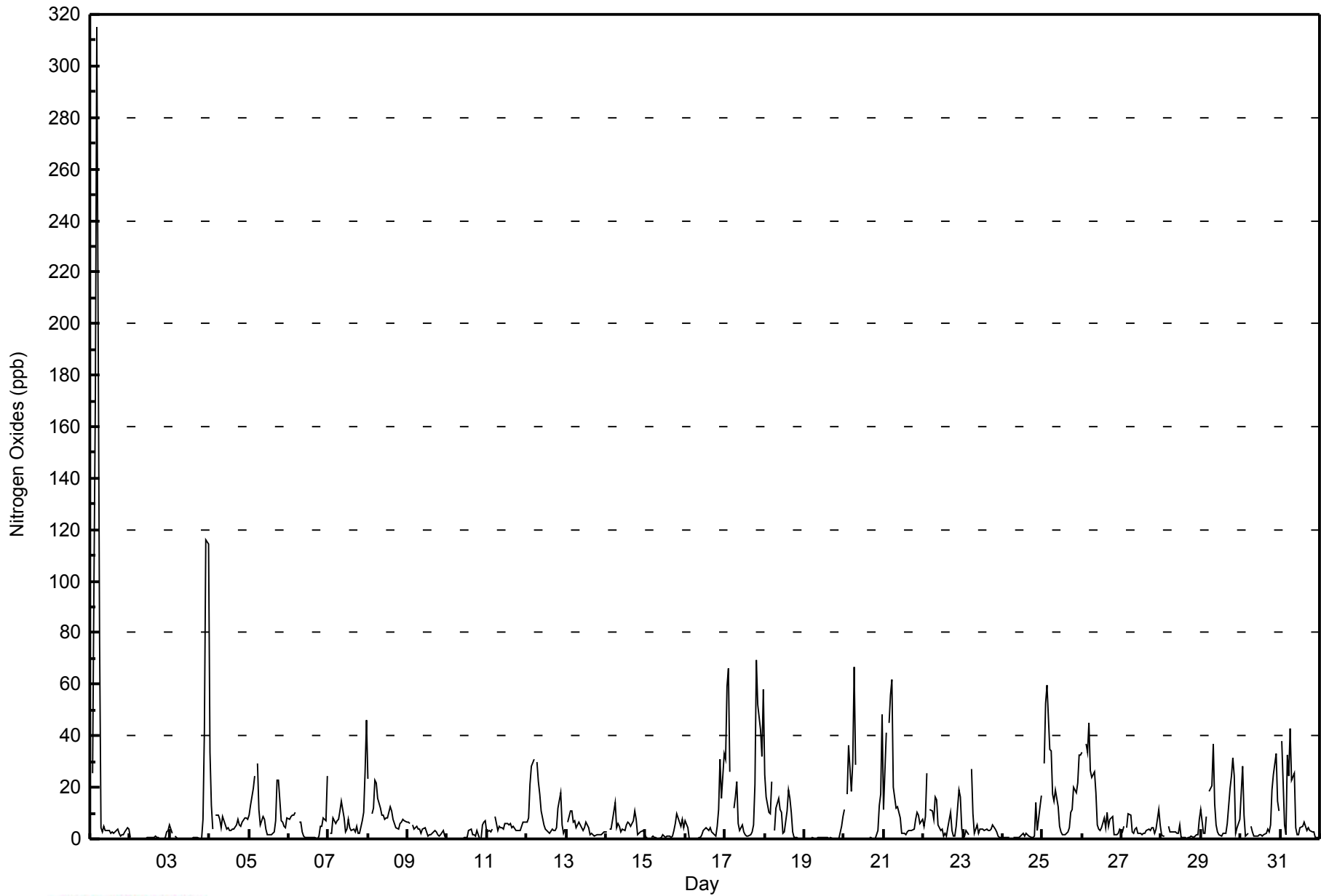
Firebag - March 2015

Maximum Value: 315 ppb on Mar 1 05:00																	Maximum Daily Average: 32.4 ppb on Mar 1																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 10 21:00																	Minimum Daily Average: 0.6 ppb on Mar 2																	Hours of Data: 706	
Maximum Diurnal Average: 25.0 ppb at hour 5																	Minimum Diurnal Average: 2.7 ppb at hour 13																	Hours of Missing Data: 38	
Monthly Average: 8.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 8 P ₉₀ = 23 P ₉₉ = 65																	Hours of Calibration: 38	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Mar	Z	25	101	173	315	77	4	3	5	3	3	2	2	2	3	4	2	1	1	2	2	4	4	32.4	315										
2-Mar	1	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	3	4	0.6	4										
3-Mar	5	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	42	116	115	12.7	116									
4-Mar	34	13	4	Z	9	9	8	4	9	7	4	4	3	3	4	4	6	8	6	5	7	8	8	7	7.6	34									
5-Mar	9	13	20	25	Z	29	11	6	9	8	4	2	1	1	2	3	7	23	23	7	7	5	4	8	9.8	29									
6-Mar	7	8	9	9	10	Z	6	7	2	1	0	0	0	0	0	0	0	0	1	5	5	8	7	24	5.0	24									
7-Mar	Z	2	2	8	6	7	8	11	15	8	3	4	8	5	3	4	2	5	2	2	7	10	26	46	8.4	46									
8-Mar	23	Z	10	12	23	22	16	12	9	9	8	8	8	12	11	8	6	4	4	6	7	8	7	6	10.3	23									
9-Mar	7	6	Z	5	4	5	4	4	2	4	4	3	1	2	1	2	3	3	2	1	2	3	1	0	3.0	7									
10-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	3	4	2	2	1	3	0	0	5	7	7	1.6	7									
11-Mar	3	3	3	4	Z	8	3	5	4	4	4	6	6	6	6	5	5	3	4	3	3	5	7	7	4.6	8									
12-Mar	7	8	21	28	31	Z	30	22	17	11	6	4	3	3	2	4	3	3	4	12	18	5	2	4	10.7	31									
13-Mar	Z	6	11	11	6	7	4	7	5	4	3	5	7	4	2	2	2	1	1	2	2	2	2	3	4.3	11									
14-Mar	2	Z	4	4	7	14	4	6	5	3	4	3	5	7	6	5	7	11	8	1	2	3	3	2	5.0	14									
15-Mar	0	0	Z	1	1	1	0	0	0	0	2	1	0	1	1	1	1	3	6	10	7	5	7	4	2.3	10									
16-Mar	7	4	0	Z	0	0	0	0	0	1	2	3	4	4	3	4	3	2	1	5	11	31	16	33	5.9	33									
17-Mar	31	59	66	26	Z	12	16	22	6	3	5	3	2	1	1	2	3	5	21	70	52	42	32	58	23.5	70									
18-Mar	25	16	10	10	22	Z	3	12	16	11	10	2	3	11	19	16	10	3	0	0	0	0	0	0	8.7	25									
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	0.8	8									
20-Mar	11	Z	17	37	18	30	67	29	C	C	C	C	C	C	C	0	0	0	0	0	3	13	17	48	--	67									
21-Mar	11	41	Z	45	56	62	20	12	13	10	8	2	2	2	3	3	3	3	4	8	10	9	6	8	14.9	62									
22-Mar	5	9	26	Z	11	11	8	16	15	6	3	4	1	2	1	4	10	3	1	1	5	19	16	4	7.9	26									
23-Mar	1	1	3	2	Z	27	10	2	5	2	4	4	4	3	4	3	3	4	5	4	3	1	1	1	4.2	27									
24-Mar	1	0	0	0	Z	0	0	0	0	1	2	2	1	2	1	2	1	0	0	1	14	3	12	17	2.7	17									
25-Mar	Z	29	53	60	35	34	17	14	19	13	5	3	2	1	2	3	4	11	11	20	18	22	33	33	19.1	60									
26-Mar	34	Z	37	33	45	26	24	26	18	5	4	3	5	8	4	10	5	8	9	2	2	2	2	4	13.7	45									
27-Mar	2	5	Z	4	10	9	3	2	4	4	2	2	2	2	2	3	4	3	4	4	2	4	11	6	4.2	11									
28-Mar	2	1	1	Z	5	3	3	3	3	2	2	6	0	0	0	0	0	1	1	1	1	1	2	8	2.0	8									
29-Mar	12	2	2	9	Z	18	21	37	14	5	3	1	1	2	2	2	6	19	24	32	24	2	4	8	10.9	37									
30-Mar	18	28	9	1	2	Z	5	3	1	1	1	2	2	1	1	2	4	3	5	19	25	33	15	11	8.4	33									
31-Mar	Z	38	5	1	32	24	43	23	25	4	2	2	4	5	6	5	3	4	3	3	2	1	0	0	10.3	43									
																								Diurnal Average											
																								Diurnal Maximum											
10.4 12.4 15.9 19.6 25.0 16.8 10.9 9.3 7.4 4.4 3.2 2.8 2.7 3.1 3.2 3.3 3.5 4.4 5.1 7.3 8.1 9.5 12.2 15.7																																			
34 59 101 173 315 77 67 37 25 13 10 8 8 12 19 16 10 23 24 70 52 42 116 115																																			
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	627	88.81	88.81
21 - 40	55	7.79	96.60
41 - 80	19	2.69	99.29
81 - 159	3	0.42	99.72
> 159	2	0.28	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



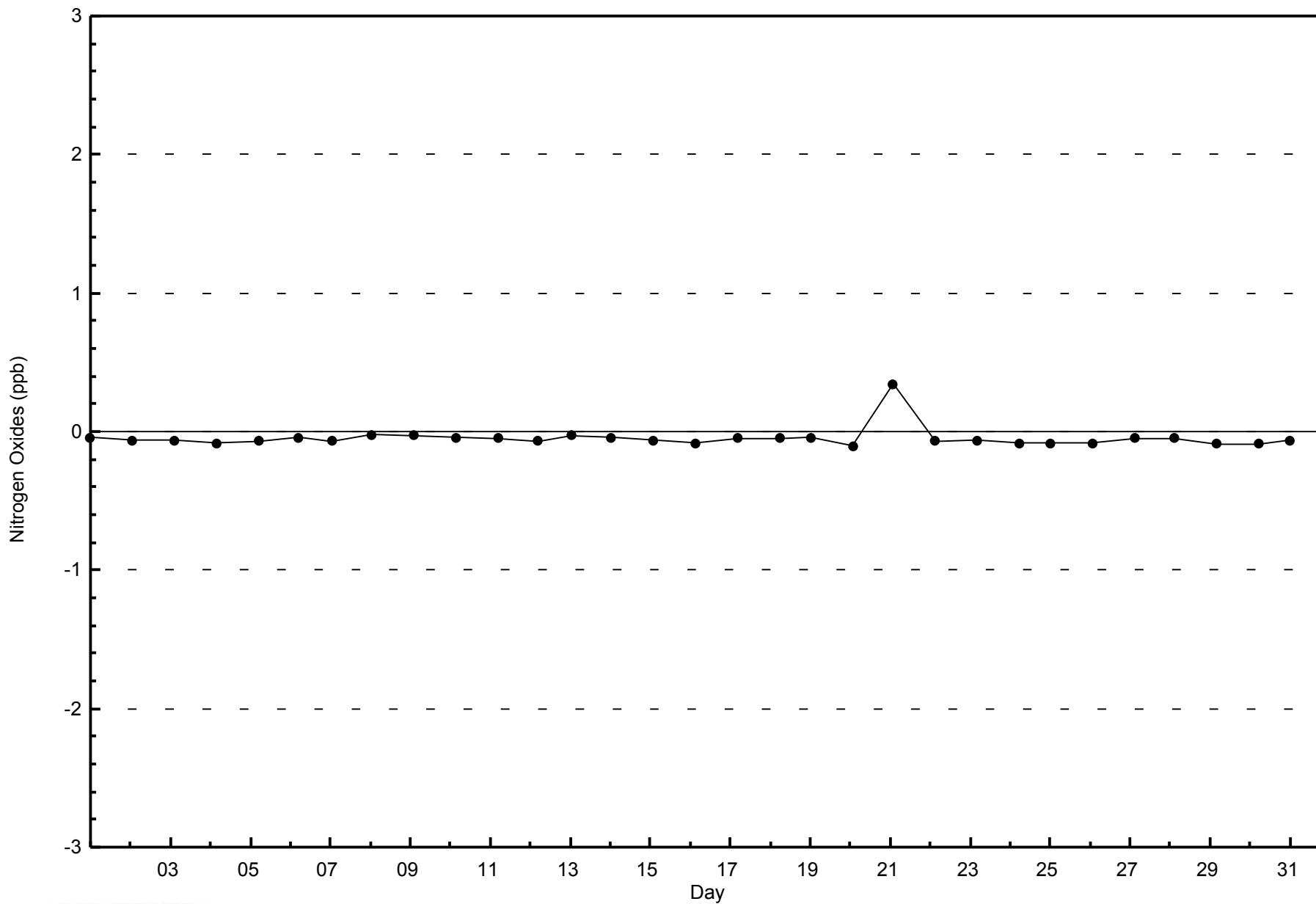
WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - March 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	52	23	30	19	12	33	34	26	58	81	45	55	21	25	25	54	593
21 - 40	1	0	0	0	0	0	9	25	7	5	4	1	1	2	0	0	55
11 - 80	0	0	0	0	0	0	3	12	1	1	0	0	0	1	0	0	18
81 - 159	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Totals	53	23	30	19	12	33	46	63	68	88	50	56	22	28	25	54	670

Total Number of Valid Hours: 670

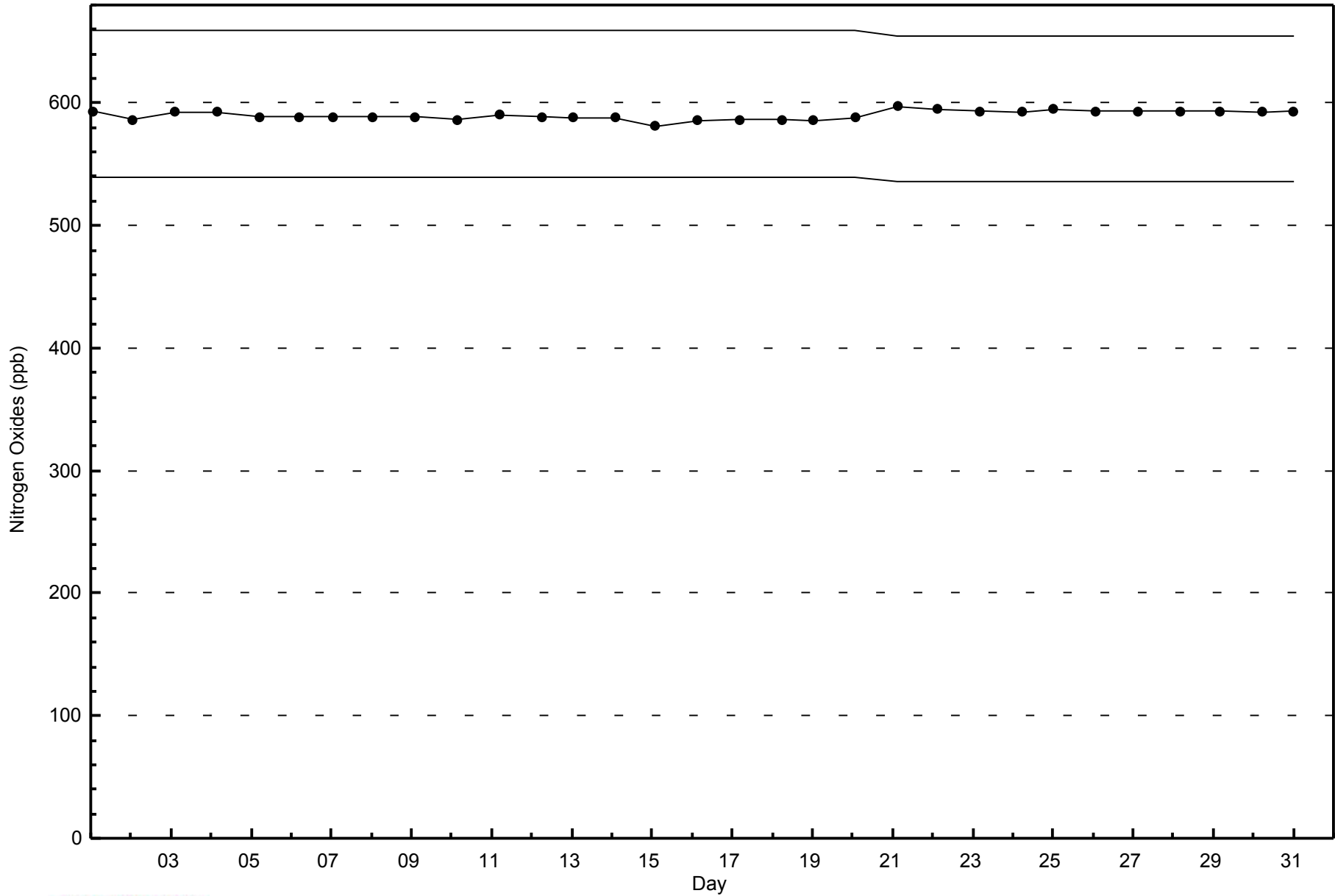
Total Number of Hours: 744





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Firebag - March 2015



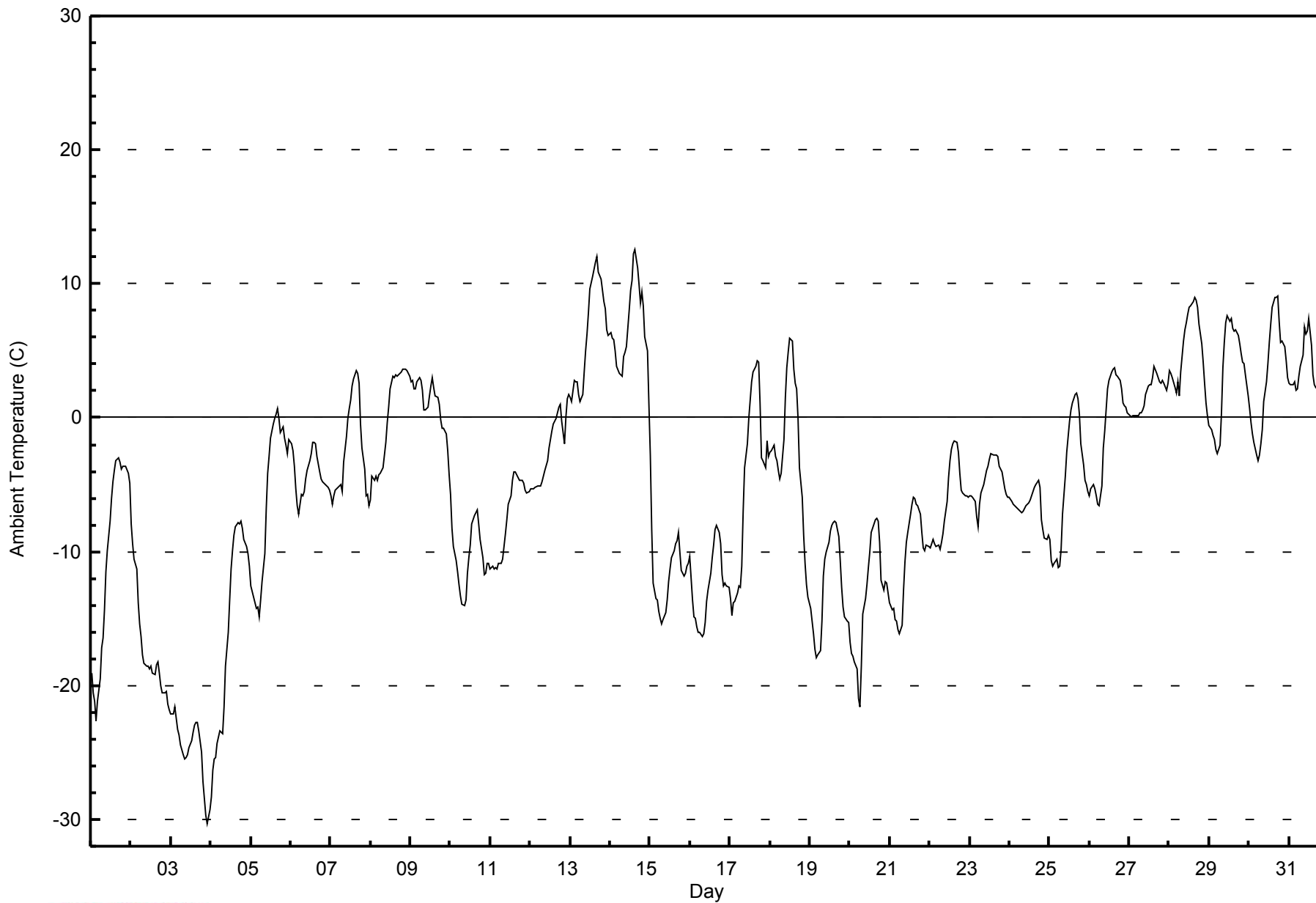


Maximum Value: 12.6 C on Mar 14 16:00		Maximum Daily Average: 6.8 C on Mar 14		Hours in Service: 744																						
Minimum Value: -30.3 C on Mar 3 23:00		Minimum Daily Average: -24.8 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: -1.3 C at hour 16		Minimum Diurnal Average: -9.0 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: -5.21 C		Percentiles: P ₁ = -25.5 P ₁₀ = -16.1 Q ₁ = -10.6 Median = -4.7 Q ₃ = 1.4 P ₉₀ = 4.6 P ₉₉ = 10.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-19.1	-20.5	-21.2	-22.6	-21.2	-19.5	-17.2	-16.5	-14.3	-11.5	-10.0	-7.7	-6.0	-4.8	-3.9	-3.2	-3.0	-3.3	-3.8	-3.6	-3.6	-3.6	-4.2	-4.9	-10.4	-3.0
2-Mar	-7.9	-9.4	-10.6	-11.3	-13.8	-15.4	-16.4	-17.7	-18.3	-18.6	-18.5	-18.8	-18.6	-19.1	-19.2	-18.4	-18.2	-19.0	-20.0	-20.6	-20.5	-20.4	-21.4	-21.8	-17.3	-7.9
3-Mar	-22.1	-22.1	-21.6	-22.4	-23.3	-23.7	-24.4	-25.2	-25.4	-25.2	-24.7	-24.1	-23.5	-22.9	-22.7	-22.7	-23.4	-25.0	-27.2	-28.4	-29.7	-30.3	-29.3	-24.8	-21.6	
4-Mar	-28.3	-26.4	-25.5	-25.4	-24.4	-23.4	-23.4	-23.6	-21.6	-18.5	-16.0	-13.6	-11.3	-9.9	-8.8	-8.2	-7.8	-8.0	-7.7	-8.3	-9.1	-9.6	-10.2	-11.1	-15.8	-7.7
5-Mar	-12.6	-13.0	-13.8	-14.2	-14.1	-14.9	-13.6	-12.2	-10.1	-6.7	-4.1	-2.9	-1.5	-0.5	-0.1	0.2	0.7	-0.1	-1.1	-0.6	-1.5	-2.1	-2.7	-1.7	-6.0	0.7
6-Mar	-1.9	-2.5	-3.7	-5.3	-6.5	-7.2	-5.8	-5.9	-5.5	-4.6	-4.0	-3.2	-2.6	-1.9	-1.8	-2.0	-2.9	-4.0	-4.5	-4.8	-4.9	-4.9	-5.2	-5.4	-4.2	-1.8
7-Mar	-5.8	-6.4	-5.8	-5.5	-5.2	-5.1	-5.0	-5.5	-3.3	-1.4	-0.1	0.6	1.3	2.4	2.9	3.5	3.3	2.5	-0.5	-2.2	-3.8	-5.8	-5.8	-6.6	-2.4	3.5
8-Mar	-6.1	-4.3	-4.7	-4.4	-4.7	-4.3	-4.1	-3.8	-2.8	-1.8	-0.4	0.8	2.2	3.1	3.0	3.2	3.1	3.2	3.4	3.6	3.6	3.6	3.5	3.1	-0.1	3.6
9-Mar	2.7	2.8	2.2	2.1	2.6	3.0	2.8	2.1	0.6	0.6	0.8	1.7	2.3	3.0	2.3	1.7	1.5	1.0	-0.2	-0.8	-0.7	-1.2	-2.5	-4.2	1.1	3.0
10-Mar	-5.7	-8.3	-9.6	-10.7	-11.5	-12.4	-13.3	-13.9	-14.1	-13.6	-11.6	-10.5	-9.5	-8.0	-7.3	-7.1	-6.9	-7.9	-9.1	-10.4	-11.7	-11.6	-10.8	-10.9	-10.3	-5.7
11-Mar	-11.3	-11.1	-11.3	-11.2	-11.3	-10.8	-10.8	-10.6	-9.6	-8.7	-7.6	-6.4	-5.8	-4.7	-4.1	-4.0	-4.3	-4.7	-4.6	-4.6	-4.9	-5.5	-5.6	-5.5	-7.5	-4.0
12-Mar	-5.3	-5.3	-5.3	-5.2	-5.1	-5.1	-5.1	-4.8	-4.4	-3.9	-3.2	-2.2	-1.7	-1.0	-0.5	0.0	0.4	0.8	1.0	-0.2	-2.0	0.0	1.4	1.8	-2.3	1.8
13-Mar	1.6	1.2	2.8	2.6	2.6	1.7	1.2	1.8	3.5	5.0	6.3	7.8	9.7	10.6	11.1	11.6	12.0	10.8	10.4	9.5	8.7	8.1	6.5	6.1	6.4	12.0
14-Mar	6.4	5.9	5.8	5.0	3.9	3.3	3.3	3.1	4.6	4.9	5.3	8.0	9.5	10.2	12.2	12.6	11.2	9.9	8.6	9.4	8.3	6.0	5.0	1.0	6.8	12.6
15-Mar	-2.8	-8.4	-12.3	-13.5	-13.7	-14.5	-15.0	-15.4	-15.1	-14.6	-13.6	-12.3	-11.2	-10.5	-9.9	-9.4	-9.2	-8.6	-10.0	-11.4	-11.8	-11.6	-11.1	-10.9	-11.5	-2.8
16-Mar	-10.4	-13.6	-14.8	-15.0	-15.6	-16.0	-16.1	-16.4	-16.1	-15.2	-13.8	-12.9	-11.6	-10.5	-9.5	-8.3	-8.1	-8.6	-9.4	-11.7	-12.5	-12.4	-12.5	-12.6	-12.7	-8.1
17-Mar	-13.5	-14.7	-13.8	-13.7	-13.1	-12.6	-12.6	-11.1	-7.0	-3.7	-2.0	-0.1	1.4	2.6	3.4	3.8	4.3	4.2	1.1	-3.0	-3.2	-3.7	-1.7	-2.9	-4.7	4.3
18-Mar	-2.6	-2.4	-2.1	-2.9	-3.2	-4.0	-4.5	-4.1	-1.6	1.5	3.7	4.9	5.9	5.8	3.6	2.6	2.2	0.0	-3.7	-6.0	-8.8	-10.9	-12.4	-13.4	-2.2	5.9
19-Mar	-14.3	-15.2	-16.1	-17.3	-17.9	-17.7	-17.4	-15.2	-11.9	-10.6	-10.0	-9.3	-8.4	-8.1	-7.8	-7.8	-7.9	-8.9	-10.6	-12.7	-14.2	-14.9	-15.2	-15.3	-12.7	-7.8
20-Mar	-16.7	-17.7	-17.8	-18.2	-18.8	-21.0	-21.6	-18.6	-14.7	-13.5	-12.4	-11.2	-10.0	-8.6	-8.0	-7.6	-7.5	-7.7	-9.3	-12.1	-12.8	-12.2	-12.4	-13.1	-13.5	-7.5
21-Mar	-13.8	-14.3	-14.3	-15.1	-15.2	-15.8	-16.2	-15.5	-12.8	-10.8	-9.3	-8.6	-7.2	-6.5	-5.9	-6.0	-6.4	-6.6	-7.2	-8.5	-9.7	-9.9	-9.5	-9.6	-10.6	-5.9
22-Mar	-9.7	-9.4	-9.1	-9.4	-9.6	-9.5	-9.8	-9.4	-8.7	-7.8	-6.2	-4.4	-3.3	-2.4	-2.0	-1.8	-1.9	-2.6	-4.1	-5.4	-5.6	-5.8	-5.9	-5.9	-6.2	-1.8
23-Mar	-5.8	-5.8	-5.9	-6.2	-7.5	-8.1	-6.5	-5.7	-5.0	-4.4	-4.0	-3.6	-3.1	-2.7	-2.8	-2.7	-2.8	-2.9	-3.6	-4.1	-4.7	-5.3	-5.8	-5.9	-4.8	-2.7
24-Mar	-6.0	-6.2	-6.4	-6.6	-6.7	-6.8	-7.0	-7.1	-7.0	-6.8	-6.6	-6.4	-6.1	-5.8	-5.6	-5.3	-5.0	-4.6	-5.2	-7.6	-8.4	-9.0	-9.1	-8.8	-6.7	-4.6
25-Mar	-9.1	-10.6	-11.1	-10.8	-10.5	-11.2	-11.1	-9.8	-7.2	-4.4	-2.6	-1.4	-0.3	0.6	1.1	1.8	1.9	1.4	0.3	-1.9	-3.5	-4.6	-5.0	-5.5	-4.7	1.9
26-Mar	-5.8	-5.3	-5.0	-5.3	-5.9	-6.5	-6.5	-5.1	-2.2	-1.0	0.6	2.2	2.7	3.4	3.6	3.7	3.2	3.1	2.8	2.1	1.1	0.8	0.8	0.4	-0.7	3.7
27-Mar	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.4	0.6	0.9	1.7	2.4	2.5	2.4	3.0	3.9	3.3	2.9	2.6	2.6	2.8	2.6	2.0	2.5	1.7	3.9
28-Mar	3.5	3.3	3.0	2.3	1.9	2.7	1.7	3.4	5.7	6.6	7.1	7.7	8.3	8.3	8.6	9.0	8.8	8.2	7.0	5.5	4.2	2.6	1.1	0.1	5.0	9.0
29-Mar	-0.5	-0.9	-1.3	-1.6	-2.3	-2.7	-2.1	0.3	3.7	5.6	7.1	7.6	7.2	7.4	6.7	6.5	6.5	6.1	5.5	4.7	4.1	4.0	3.2	1.7	3.2	7.6
30-Mar	0.7	-0.3	-1.2	-1.8	-2.8	-3.2	-2.8	-1.9	-0.9	1.2	2.7	4.1	5.6	7.0	8.3	9.0	9.0	9.1	7.2	5.6	5.7	5.3	4.2	3.0	3.0	9.1
31-Mar	2.6	2.5	2.4	2.6	2.0	2.2	3.0	3.8	4.7	6.7	6.3	6.4	7.4	5.5	3.2	2.5	2.2	2.3	2.0	1.6	1.3	1.3	1.1	1.0	3.2	7.4
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Firebag - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	45	6.05	6.05
-20 - 0	465	62.50	68.55
0 - 10	224	30.11	98.66
10 - 20	10	1.34	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

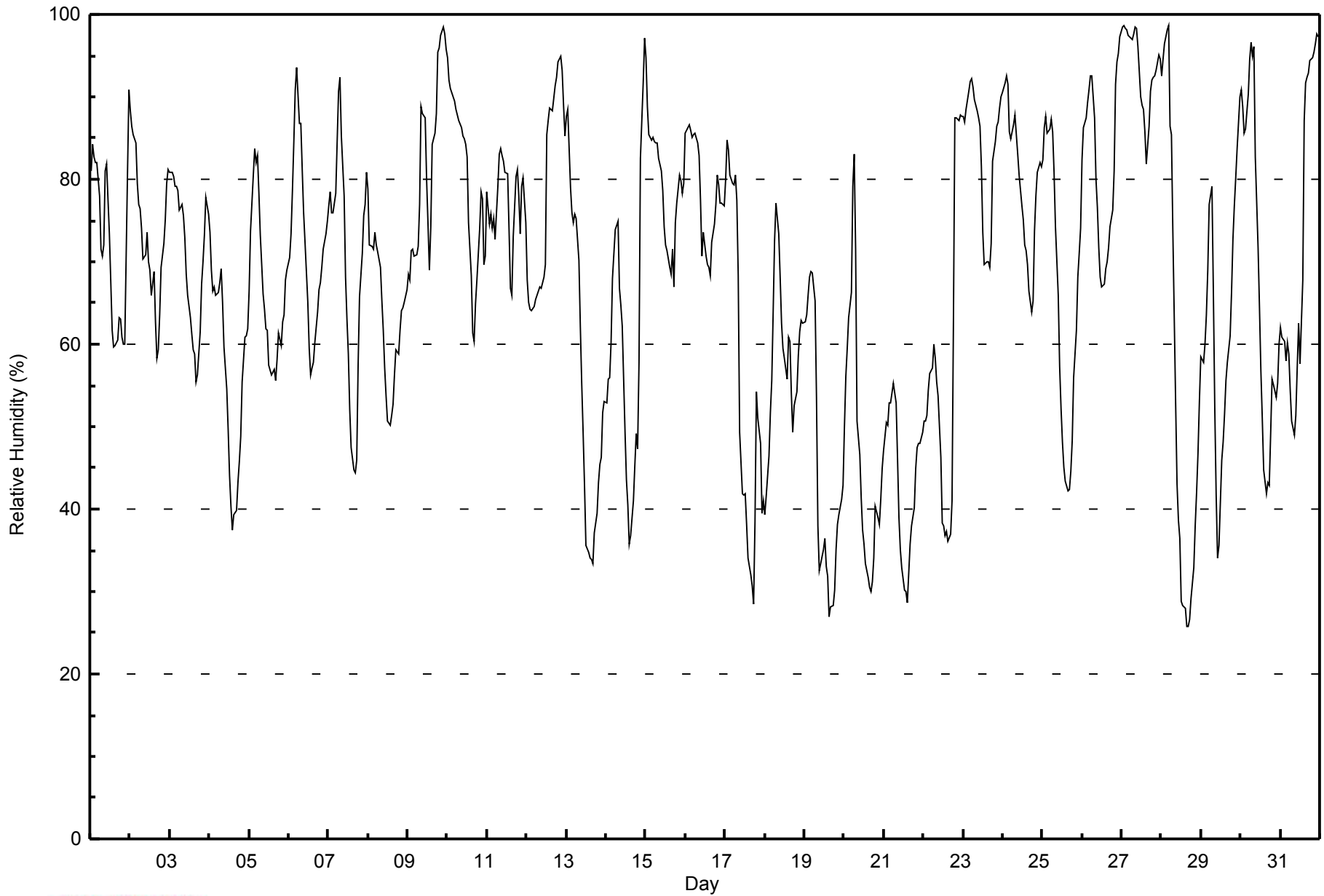


Maximum Value: 99 % on Mar 27 02:00														Maximum Daily Average: 93.7 % on Mar 27														Hours in Service: 744	
Minimum Value: 26 % on Mar 28 16:00														Minimum Daily Average: 43.4 % on Mar 21														Hours of Data: 744	
Maximum Diurnal Average: 78.3 % at hour 7														Minimum Diurnal Average: 55.1 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 67.8 %														Percentiles: P ₁ = 28 P ₁₀ = 40 Q ₁ = 56 Median = 70 Q ₃ = 82 P ₉₀ = 90 P ₉₉ = 98														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	81	84	83	82	82	78	71	71	72	81	82	73	68	62	60	60	61	63	63	61	60	60	81	91	72.0	91			
2-Mar	88	86	85	84	79	77	77	74	70	71	73	70	69	66	69	63	58	59	64	69	72	75	80	81	73.4	88			
3-Mar	81	81	80	79	79	79	76	77	76	73	68	66	63	61	59	59	55	56	61	67	70	73	78	76	70.6	81			
4-Mar	74	69	66	67	66	66	67	69	65	60	54	50	44	40	38	39	40	43	46	49	55	61	61	62	56.3	74			
5-Mar	66	74	81	84	82	83	78	73	66	64	62	62	57	56	57	57	56	58	61	60	63	64	68	69	66.7	84			
6-Mar	70	73	79	85	91	94	87	87	81	76	72	65	59	56	57	58	60	64	67	68	69	72	73	75	72.4	94			
7-Mar	77	78	76	76	78	85	91	92	85	78	68	63	59	52	47	45	44	46	58	66	71	76	77	81	69.5	92			
8-Mar	79	72	72	71	74	72	71	69	65	62	57	54	51	50	51	53	56	59	59	62	64	64	65	67	63.3	79			
9-Mar	69	68	71	71	71	71	72	77	89	88	87	80	75	69	74	84	86	88	95	96	98	98	98	96	82.1	98			
10-Mar	95	92	91	90	89	88	88	87	86	85	85	84	83	75	68	61	60	65	68	74	78	78	70	71	79.7	95			
11-Mar	78	75	76	74	75	73	79	83	84	83	82	81	81	74	67	66	73	80	81	78	73	79	80	75	77.1	84			
12-Mar	68	65	64	64	65	65	66	67	67	67	68	70	85	87	89	88	90	91	92	94	95	93	89	85	78.1	95			
13-Mar	88	88	79	76	75	76	75	70	62	55	49	43	36	35	34	34	33	37	39	43	45	46	52	53	55.2	88			
14-Mar	53	56	56	60	68	74	74	75	67	65	62	49	44	41	36	37	41	45	49	47	58	83	92	97	59.5	97			
15-Mar	95	89	85	85	85	85	84	84	83	81	79	74	72	71	69	69	71	67	75	77	81	80	78	80	79.1	95			
16-Mar	86	86	87	86	85	85	86	84	83	77	71	74	71	70	69	68	72	75	77	81	79	77	77	77	78.4	87			
17-Mar	80	85	83	81	79	79	80	77	68	49	42	42	42	38	34	32	31	28	38	54	51	48	39	41	55.2	85			
18-Mar	39	42	46	52	56	64	73	77	73	68	63	60	58	56	61	60	54	49	53	54	59	61	63	63	58.4	77			
19-Mar	63	64	66	68	69	69	65	54	38	33	33	35	37	33	32	27	28	28	30	35	38	39	41	43	44.5	69			
20-Mar	50	56	60	63	66	79	83	71	51	47	41	38	36	33	32	31	30	31	34	40	39	38	41	45	47.3	83			
21-Mar	47	51	50	53	53	54	55	53	46	39	35	33	30	30	29	32	36	38	40	45	48	48	48	49	43.4	55			
22-Mar	51	51	51	54	56	57	60	58	55	54	46	38	38	37	37	36	37	41	63	87	87	87	88	88	56.6	88			
23-Mar	88	87	89	91	92	92	91	90	88	88	87	81	73	70	70	69	72	82	85	86	87	89	90	90	83.6	92			
24-Mar	90	92	93	91	86	85	87	88	85	83	80	77	75	72	71	70	66	64	65	74	78	81	82	82	79.9	93			
25-Mar	82	86	88	86	86	87	86	81	74	66	57	52	48	45	43	42	42	45	48	56	62	68	71	74	65.7	88			
26-Mar	82	86	87	89	91	93	93	87	80	77	72	68	67	67	69	70	72	74	76	81	92	94	95	97	81.7	97			
27-Mar	98	99	98	98	97	97	97	98	98	98	96	90	89	89	86	82	86	91	92	92	92	93	95	94	93.7	99			
28-Mar	93	95	96	98	99	86	85	74	53	43	39	36	29	28	28	26	26	27	29	33	38	42	47	53	54.2	99			
29-Mar	58	58	60	64	69	77	79	66	52	42	34	36	46	48	52	56	58	61	66	73	77	80	84	90	61.9	90			
30-Mar	91	89	86	86	90	95	97	95	96	83	72	64	57	51	45	42	43	43	49	56	55	54	55	60	68.8	97			
31-Mar	62	61	60	58	60	59	54	51	49	51	57	62	58	68	87	92	92	93	94	95	95	96	98	97	72.9	98			
														74.9 75.4 75.6 76.3 77.2 78.2 78.3 76.1 71.3 67.3 63.7 60.3 58.0 55.8 55.5 55.1 55.8 57.5 61.8 66.2 68.7 70.9 72.7 74.2														Diurnal Average	
														98 99 98 98 99 97 97 98 98 98 96 90 89 89 89 92 92 93 95 96 98 98 98 97														Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	72	9.68	9.68
40 - 60	166	22.31	31.99
60 - 80	285	38.31	70.30
80 - 100	221	29.70	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 41 km/h on Mar 2 09:00	Maximum Daily Speed Average: 31.6 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 20 07:00	Minimum Daily Speed Average: 2.7 km/h on Mar 23	Hours of Data: 706
Maximum Diurnal Speed Average: 5.4 km/h at hour 14	Minimum Diurnal Speed Average: 2.0 km/h at hour 18	Hours of Missing Data: 38
Monthly Average Velocity: 2.7 km/h 219.9 deg	Percentiles: P ₁ = 3 P ₁₀ = 7 Q ₁ = 9 Median = 13 Q ₃ = 17 P ₉₀ = 21 P ₉₉ = 38	Percent Operational Time: 94.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	NNE7	W4	SW3	SSW5	S7	SSW10	SSW13	SSW14	S15	SSW18	SSW20	SSW23	SSW23	SSW23	SSW25	SSW24	S23	SSW24	SSW27	SSW25	SSW24	SW20	W17	NNW26	SSW14.5	SSW27	
2-Mar	NNW32	N39	N38	NNW40	NNW41	N34	N38	N40	NNW41	N38	NNW35	NNW38	NNW34	NNW36	NNW33	NNW31	NNW31	NNW28	N19	N22	NNW21	NNW20	NNW17	NNW14	NNW31.6	NNW41	
3-Mar	NW10	NW9	NNW14	NNW20	NNW20	N23	N26	N25	N27	N25	N27	N25	N23	N21	NNW18	NNW15	NNW14	N11	N8	N4	NNE5	AF	AF	S5	N16.4	N27	
4-Mar	SSW8	SSW11	SSW14	SSW13	SSW16	SSW17	SSW17	SSW16	SSW17	SSW14	SW17	SW18	SSW20	SSW20	SSW21	SSW23	SSW21	SSW18	SW17	SW17	SW17	SW16	SW15	SW14	SSW16.5	SSW23	
5-Mar	WSW12	W13	WNW9	WNW8	W7	WSW9	WSW12	W13	W13	WNW17	NW18	NNW20	NW15	NW14	WNW10	WSW11	SW11	SW9	SSW9	SSW13	SSW10	SW12	WSW9	WSW12	W9.3	NNW20	
6-Mar	WSW10	WSW10	W8	WSW8	W6	NW5	N8	NNW9	NNW13	N14	N20	N23	N21	N22	NNW17	N14	NNE14	NE12	NE10	E8	E6	ESE8	SE6	SSE6	N7.0	N23	
7-Mar	S8	SSW10	SW12	WSW13	WSW11	W12	W13	W11	W12	WNW16	WNW20	WNW21	WNW21	WNW20	WNW19	W18	WNW11	NNE6	ENE9	ENE5	E6	SE4	S6	W9.0	WNW21		
8-Mar	SSW10	SW15	SW12	SW15	SW14	SW16	SW16	SW16	SW17	SW15	WSW18	WSW19	WSW17	WSW18	WSW18	SW15	SW15	SW15	SW14	WSW10	WSW12	WSW12	W11	WSW11	SW14.2	WSW19	
9-Mar	WSW12	WSW12	WSW9	WSW13	W16	WNW12	WNW9	NNW13	NNW13	NNW15	NNW13	NW12	NW13	NNW12	NNW11	NNW13	NNW13	NW7	NNW7	NW6	NW14	NW14	NNW17	N17	NW10.2	N17	
10-Mar	N19	N22	N21	N21	N19	N17	N16	N18	NNE15	NNE7	NNW2	N4	NE2	S1	ENE1	ENE8	ENE10	ENE11	ENE10	NE14	NE15	ENE12	E15	ESE16	NNE9.6	N22	
11-Mar	ESE19	ESE19	ESE19	ESE20	ESE20	SE19	ESE20	ESE19	ESE22	ESE21	ESE21	ESE21	ESE18	ESE15	ESE17	ESE17	E14	E13	ESE13	ESE14	ESE17	ESE14	SE14	SE13	ESE17.3	ESE22	
12-Mar	SE12	SE11	SSE15	SSE16	SSE13	SSE13	SSE15	SSE16	SSE17	S18	S17	S17	S24	SSW23	SSW21	SSW21	SW19	SW16	W12	SSW7	S11	SSW11	SSW15	SW20	S14.0	S24	
13-Mar	SW16	SW16	WSW24	W21	W21	WSW18	SW18	WSW20	WSW21	WSW25	WSW25	SW15	SW23	SW26	SW27	SW25	SSW27	SSW28	SSW31	SSW32	SSW30	SSW27	S25	SSW21	SW21.6	SSW32	
14-Mar	SSW22	SSW20	SSW20	S19	S19	S20	S16	S16	SSW16	SW20	SW19	WSW17	WSW15	WSW15	W5	WSW6	SW10	SSW10	SSW11	WSW12	WSW13	WSW9	W11	N19	SW11.9	SSW22	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---	
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW6	NNW5	NW6	WNW3	NE7	NE8	NE8	ENE9	ESE6	SE12	SE13	SE11	---	SE13
17-Mar	SE11	SE7	SSE10	SSE11	S12	S12	S12	S11	SSW13	SSW19	SSW18	SW18	SW16	WSW19	WSW17	WSW14	WSW11	WSW8	SW3	SSE4	SE5	SE6	SE10	SSE7	SSW9.1	WSW19	
18-Mar	S11	SSW11	SSW12	SSW10	SSW12	SSW12	SSW11	S9	S9	SSW9	SW9	WSW10	WSW6	NNW8	NNW13	N10	NNE15	NNE19	N21	N22	N21	N20	N15	N14	NNW3.0	N22	
19-Mar	NNE13	NNE12	N8	NE8	NE7	NE4	NE8	NE8	NE10	NNE13	NNE15	NNE13	NNE13	N14	N15	NNE16	NNE15	NNE15	NNE11	NNE10	NE13	NE13	ENE12	ESE11	NNE10.7	NNE16	
20-Mar	SE12	SE12	SE9	SE3	S3	SSW2	WNW0	N4	NNE6	NNE8	N8	N6	NNE5	NNE4	N5	NNE8	N7	NE7	NNE9	NE8	ENE9	ESE8	SE10	SSE11	ENE3.7	SE12	
21-Mar	SE12	SSE13	SSE15	SSE13	SSE12	SSE11	SE10	SE9	SE13	SSE18	SSE16	ESE13	SE13	SE14	SE15	SE16	ESE16	ESE15	ESE16	ESE11	SE10	SE12	SE15	SE14	SE12.9	SSE18	
22-Mar	SE15	SE14	SSE12	SE10	SE12	SE13	SE11	SSE11	SSE12	SSE10	S8	SSE8	S7	SSE7	S7	SSE9	SSE11	S12	S14	SSW10	S11	SSE11	SSE13	S14	SSE10.5	SE15	
23-Mar	S14	SSW12	SSW10	SSW9	S8	S10	SSW9	SSW12	S12	SW11	WSW11	W9	W11	W11	WNW12	WNW10	NW8	NNW7	NE10	NE8	NE10	NE11	NE9	NE9	SW2.7	S14	
24-Mar	NE7	NE8	NE8	NE9	NE8	NNE8	NNE10	N9	NNE10	N9	NNW8	NNW9	NNW10	NNW10	NNW11	N10	NNW10	N7	NE8	NE3	E4	ENE6	ESE7	SE8	NNE6.3	NNW11	
25-Mar	SE8	SE5	SSE8	SSE8	SE10	SE9	SE10	SE11	SSE11	SSE12	SE9	SSE9	SSE5	ESE4	ESE5	ESE4	SSE9	SE10	SSE9	SSE10	SSE10	SSE12	SSE12	SSE12	SSE8.4	SSE12	
26-Mar	SSE13	SSE14	SSE13	SSE12	SSE12	SSE13	SSE15	SSE15	SSE16	S18	S16	S15	S18	SSE17	S16	S15	S18	SSE17	S15	S17	S15	SSW14	S11	S10	S14.4	S18	
27-Mar	SSW9	SE4	S5	S7	S9	S9	SSW11	S13	SSW14	S14	SSW14	SW17	SSW18	S19	S18	S20	S18	S18	S16	S14	S15	SSW9	S9	SSW9	S12.5	S20	
28-Mar	SW11	WSW8	WSW6	WNW5	NNW5	N9	N5	NW4	NNW13	NW16	NNW18	NNW17	NW24	NW25	NW23	NW25	WNW27	WNW25	WNW20	WNW19	WNW12	WNW8	W8	WSW9	NW12.6	WNW27	
29-Mar	WSW10	WSW11	WSW8	SSW6	SSW6	SSW8	S7	SSE6	SSE8	S8	SSW9	SSW10	SSW15	SSW11	SSW13	S11	S7	SSE7	SSE13	SSE12	SSE12	SW14	SW13	WSW9	SSW8.6	SSW15	
30-Mar	WSW9	WNW11	NW13	NW16	NW10	NW10	NW8	NNW7	N8	NNW9	NW10	WNW8	WNW10	W11	WSW12	WSW15	WSW17	SW11	SSW8	S7	SSE8	SSE10	SSE11	SE10	W5.6	WSW17	
31-Mar	SE9	SSE13	S12	SSW12	S10	S9	SSE9	SSE10	S8	SSW8	SW13	NNE5	E12	SSE19	E16	E19	E23	E20	ENE20	ENE19	ENE17	ENE17	ENE18	ENE21	ESE9.3	E23	

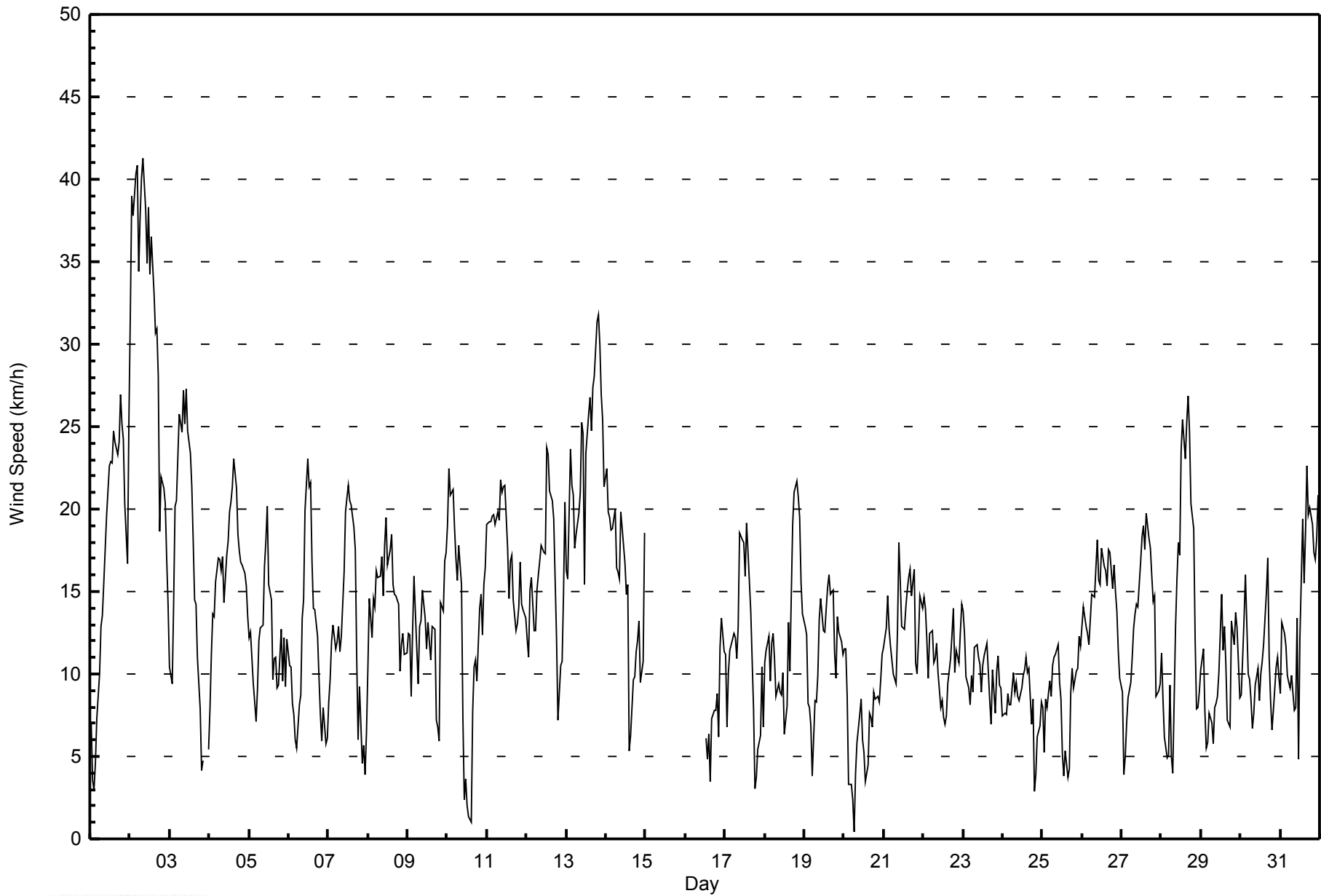
S4.1 SSW3.5 SSW3.7 SW3.1 SW3.1 SSW3.2 SSW2.6 SSW2.1 SW2.3 WSW3.3 WSW4.6 W4.7 W5.0 W5.4 W4.6 WSW3.3 SW2.8 SSW2.0 SSE2.3 SSE2.3 SSE2.9 S3.2 SSE3.8 SSE2.8	Diurnal Average
NNW32 N39 N38 NNW40 NNW41 N34 N38 N40 NNW41 N38 NNW35 NNW38 NNW34 NNW36 NNW33 NNW31 NNW31 SSW28 SSW31 SSW32 SSW30 SSW27 S25 NNW26	Diurnal Maximum

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Firebag - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Firebag - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	44	6.23	6.23
6 - 11	255	36.12	42.35
12 - 19	292	41.36	83.71
20 - 28	95	13.46	97.17
29 - 38	15	2.12	99.29
> 38	5	0.71	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Firebag - March 2015

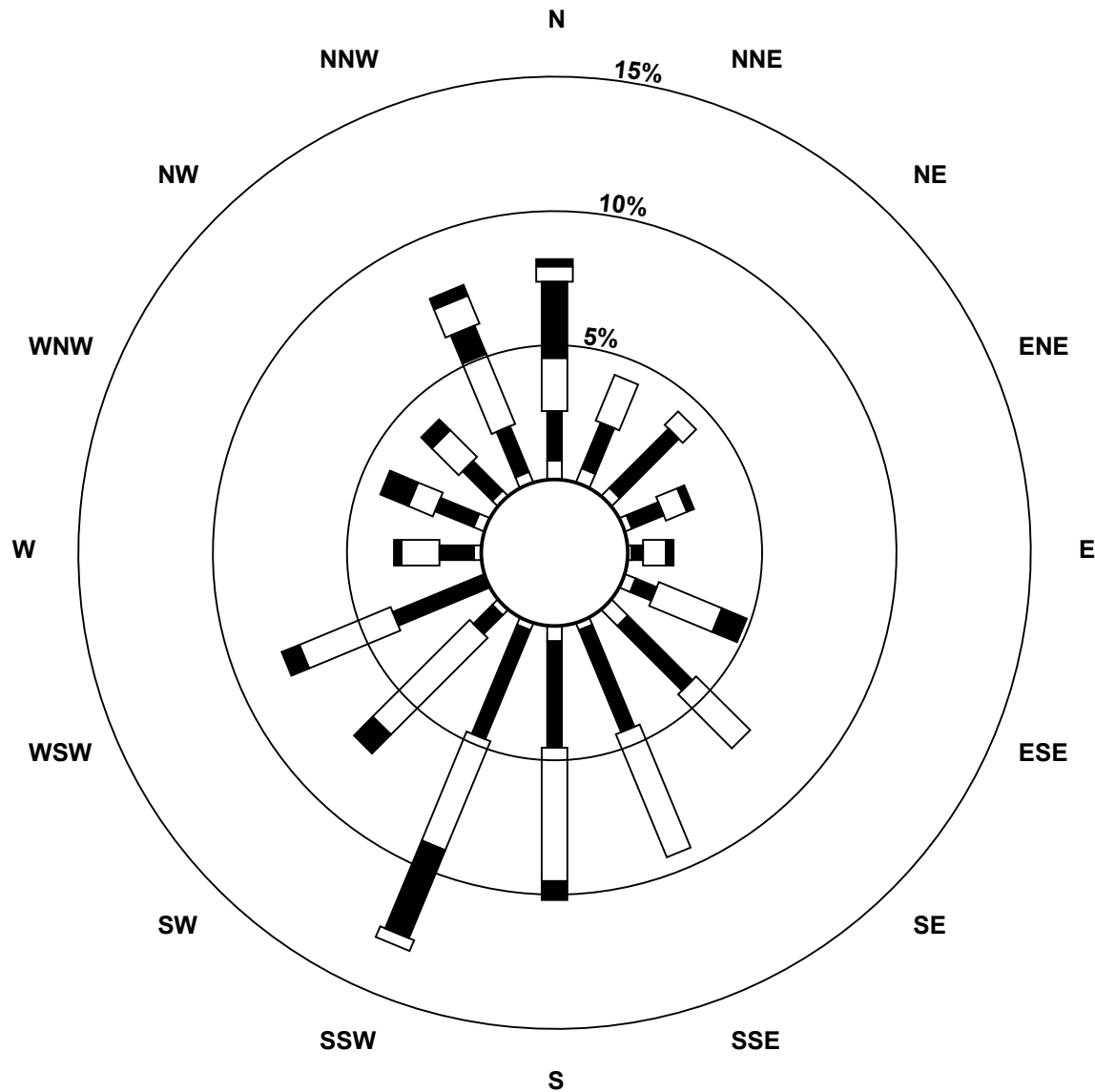
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	4	3	2	1	3	6	2	4	2	2	0	2	3	2	3	44
6 - 11	13	13	22	9	3	6	24	29	28	31	7	26	9	11	11	13	255
12 - 19	14	13	5	6	6	18	20	35	35	31	36	26	10	7	10	20	292
20 - 28	20	0	0	2	2	7	0	0	5	25	7	5	2	8	4	8	95
29 - 38	4	0	0	0	0	0	0	0	0	3	0	0	0	0	0	8	15
> 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5
Totals	58	30	30	19	12	34	50	66	72	92	52	57	23	29	27	55	706

Total Number of Valid Hours: 706

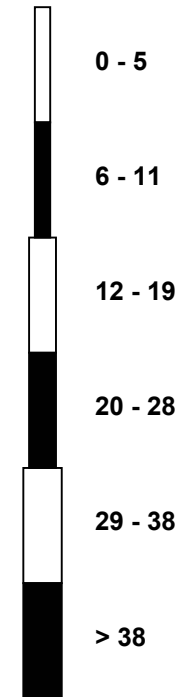
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Wind Speed (WS) - km/h
Firebag (AMS 19)



Classes (km/h)



Total Number of Valid Hours: 706



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 9 km/h on Mar 2 01:00	Hours of Data: 706
Minimum Value: 1 km/h on Mar 1 04:00	Hours of Missing Data: 38
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 94.9

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

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - March 2015

Direction of Maximum Speed: 348 deg on Mar 2 09:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 345.4 deg on Mar 2	Hours of Data: 706
Direction of Minimum Speed: 283 deg on Mar 20 07:00	Direction of Minimum Daily Speed Average: 2.7 deg on Mar 23
Direction of Minimum Speed: 283 deg on Mar 20 07:00	Hours of Missing Data: 38
Monthly Average Direction: 242.5 deg	Percent Operational Time: 94.9

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	15	276	226	194	190	196	201	199	191	201	205	211	207	202	200	198	187	195	201	205	205	226	264	334	208.1
2-Mar	348	349	350	348	347	349	349	352	348	351	342	342	340	338	343	340	339	344	350	351	347	338	330	335	345.4
3-Mar	320	323	344	345	347	349	355	357	0	8	6	357	355	349	347	348	348	2	356	351	25	AF	AF	188	352.9
4-Mar	204	207	200	203	209	213	210	202	210	211	215	215	210	203	198	192	199	200	219	219	219	215	215	222	208.4
5-Mar	242	278	282	282	274	240	250	262	281	300	318	330	322	323	293	253	228	220	204	219	205	219	243	255	269.0
6-Mar	249	248	259	255	271	318	351	343	347	4	360	353	349	352	345	3	31	43	53	84	89	105	127	153	356.0
7-Mar	182	198	221	242	256	265	266	268	278	291	296	290	290	291	292	284	270	292	19	63	69	80	138	171	275.4
8-Mar	207	219	220	221	218	218	220	222	223	222	237	239	246	241	241	233	223	218	228	252	250	255	259	258	231.6
9-Mar	251	258	238	239	263	286	297	333	334	327	335	312	311	330	342	329	327	320	334	314	325	325	341	354	313.0
10-Mar	354	357	351	356	355	356	1	8	16	16	336	1	51	171	70	57	67	69	75	51	53	76	98	115	25.9
11-Mar	120	119	118	117	119	125	119	119	118	117	118	114	109	115	120	116	91	98	112	111	116	122	126	133	116.6
12-Mar	137	140	151	156	156	152	158	160	168	170	177	187	186	195	199	203	221	234	261	195	181	200	197	216	184.4
13-Mar	217	233	257	261	261	242	235	245	247	257	252	230	229	234	235	217	207	197	205	204	199	198	190	194	224.8
14-Mar	196	193	193	189	179	177	181	188	213	222	220	241	258	254	263	243	218	211	199	246	239	247	272	7	214.7
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	313	329	319	299	37	56	56	70	102	132	139	138	--
17-Mar	141	145	160	168	181	187	178	181	197	202	204	217	233	238	248	251	252	257	236	148	139	133	140	160	199.6
18-Mar	177	193	211	200	207	206	199	189	191	212	218	237	238	344	345	8	13	14	9	7	6	4	5	2	327.6
19-Mar	16	15	6	36	34	50	45	46	37	20	13	25	18	0	3	23	29	21	21	31	43	55	76	103	29.1
20-Mar	124	128	132	135	180	212	283	9	23	22	4	1	32	12	10	17	2	35	30	43	66	102	134	157	66.3
21-Mar	140	155	163	158	156	148	135	131	145	147	147	121	128	129	133	125	120	119	116	123	129	131	138	135	136.0
22-Mar	137	144	149	132	141	142	140	150	160	168	170	158	179	168	187	159	159	180	187	194	170	162	165	172	160.4
23-Mar	187	200	203	198	182	175	195	193	182	217	239	267	277	281	302	297	306	342	39	50	43	45	43	42	232.4
24-Mar	48	35	41	46	51	28	22	11	13	8	339	329	335	343	337	350	336	352	46	35	93	66	111	134	16.8
25-Mar	140	146	149	147	136	135	134	144	149	155	141	149	168	119	121	116	134	147	141	147	166	166	150	160	146.3
26-Mar	159	152	155	150	151	148	148	151	167	171	176	178	174	167	181	169	171	168	169	180	189	196	191	186	168.8
27-Mar	194	145	173	186	172	173	194	189	195	191	201	216	195	188	178	180	177	179	173	173	187	195	181	202	186.4
28-Mar	216	244	250	293	329	5	9	315	333	326	333	328	324	321	315	308	295	293	297	297	295	300	278	252	306.6
29-Mar	237	240	240	213	201	204	189	163	159	183	202	192	212	208	199	190	178	154	166	154	168	217	236	240	198.9
30-Mar	246	283	316	320	315	317	325	344	355	335	306	300	291	269	255	249	245	236	205	181	163	159	150	134	273.6
31-Mar	137	153	176	195	181	173	156	148	169	202	214	28	87	166	89	94	99	93	75	74	72	63	58	57	110.8

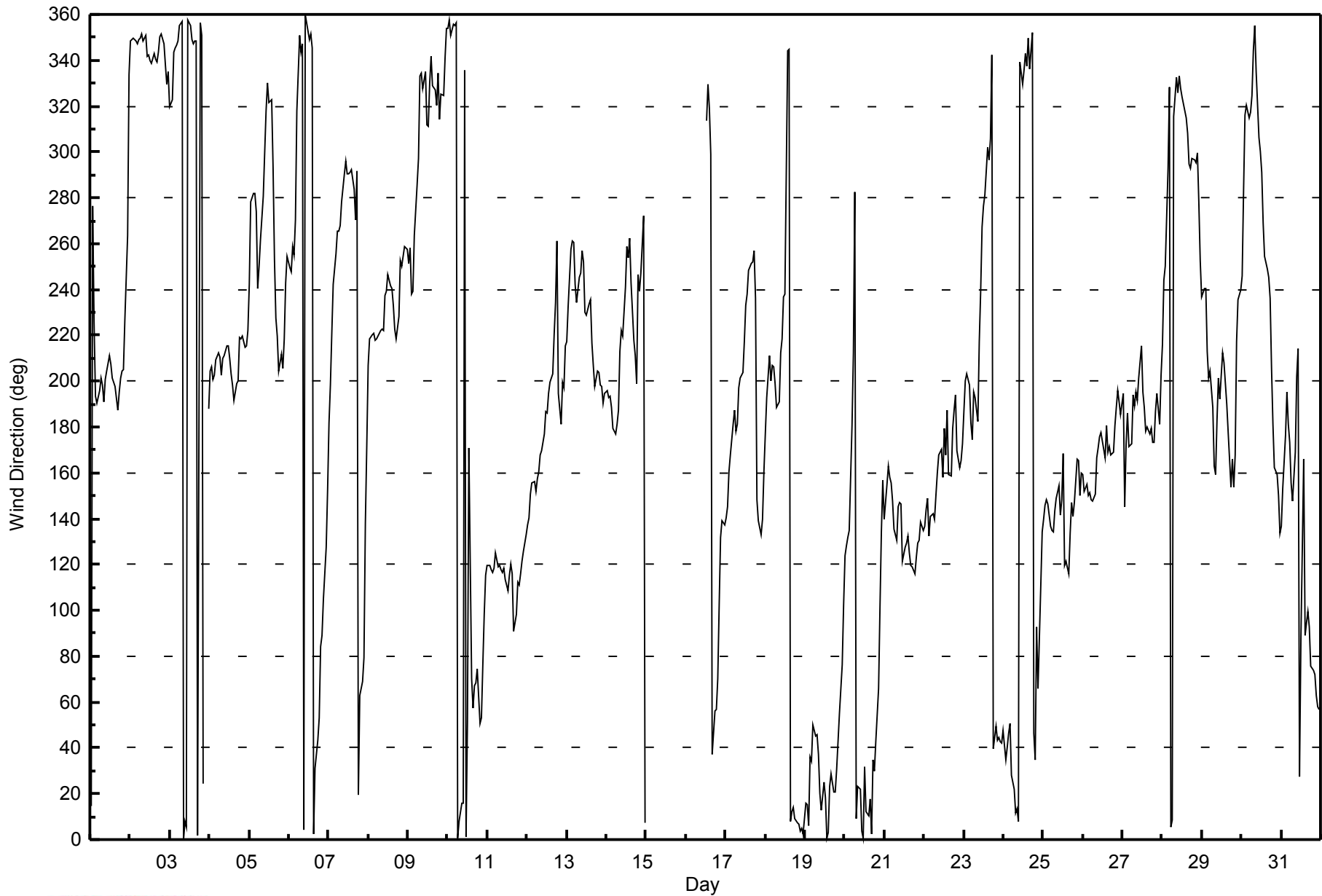
186.2 206.2 213.2 220.1 215.5 206.8 203.0 204.4 225.4 243.0 258.4 269.9 265.2 261.8 263.7 245.0 231.9 202.6 168.3 163.7 161.6 169.5 168.1 166.7
 Diurnal Average

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Firebag - March 2015





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Firebag - March 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 89 deg on Mar 10 15:00			Hours of Data:	706
Minimum Value: 4 deg on Mar 18 07:00			Hours of Missing Data:	38
Percentiles: P ₁ = 4 P ₁₀ = 7 Q ₁ = 9 Median = 11 Q ₃ = 15 P ₉₀ = 23 P ₉₉ = 71			Hours of Calibration:	0
			Percent Operational Time:	94.9

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	18	45	32	15	7	8	5	4	4	8	9	9	9	10	10	10	8	7	8	8	8	20	17	18	45	
2-Mar	12	11	13	14	11	12	12	13	13	14	13	12	12	11	14	12	12	10	10	10	11	10	10	9	14	
3-Mar	12	12	12	11	11	11	14	13	13	13	13	15	13	13	13	16	14	9	16	15	14	AF	AF	11	16	
4-Mar	5	6	6	8	7	7	8	7	8	9	10	9	10	10	12	10	9	7	9	7	7	7	8	7	12	
5-Mar	11	10	6	9	9	13	8	8	14	12	13	14	20	16	28	15	11	14	8	7	7	10	8	6	28	
6-Mar	12	6	12	13	11	22	12	12	10	13	15	13	14	14	17	17	14	10	17	18	23	18	18	19	23	
7-Mar	12	8	10	7	8	8	7	8	10	10	12	12	12	13	13	15	10	16	37	8	48	27	32	13	48	
8-Mar	12	6	6	6	7	7	7	7	7	8	10	10	10	13	9	9	8	8	9	13	7	8	9	5	13	
9-Mar	7	9	15	10	12	11	11	21	11	11	12	15	17	21	18	16	18	17	17	30	11	12	15	12	30	
10-Mar	13	13	13	12	13	13	12	11	12	22	61	34	62	88	89	26	11	12	15	7	9	14	10	11	89	
11-Mar	9	9	8	8	9	10	8	9	9	10	10	11	14	18	13	14	11	11	12	11	10	10	10	12	18	
12-Mar	11	13	9	9	9	9	9	10	14	8	8	8	9	9	8	9	12	12	11	23	8	11	8	8	23	
13-Mar	7	10	9	8	8	7	7	9	7	10	9	19	11	12	10	11	9	8	8	8	7	7	6	9	19	
14-Mar	8	8	9	7	7	7	6	12	11	8	9	12	9	8	32	33	7	12	17	17	11	8	25	14	33	
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
16-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	39	48	28	60	23	10	6	17	13	11	8	11	60
17-Mar	9	24	10	7	8	6	7	7	6	7	10	11	15	12	13	17	14	9	48	14	6	12	9	20	48	
18-Mar	5	8	5	4	4	6	4	9	8	10	17	22	41	42	10	17	10	12	12	13	13	13	12	12	42	
19-Mar	10	9	11	8	7	40	4	4	13	16	17	23	23	21	16	17	18	10	9	8	6	11	10	12	40	
20-Mar	9	9	13	25	30	40	81	16	18	21	20	38	45	82	71	37	24	15	8	9	13	18	11	8	82	
21-Mar	10	10	7	8	8	9	10	12	12	11	16	14	18	14	17	13	11	10	9	9	12	12	11	11	18	
22-Mar	11	10	11	12	10	10	10	12	13	14	22	24	33	24	24	25	16	12	14	11	9	11	10	9	33	
23-Mar	11	8	8	7	10	7	9	8	11	11	13	22	16	19	18	17	15	38	8	11	8	8	9	7	38	
24-Mar	11	12	13	11	12	26	15	12	11	17	29	19	21	26	18	26	19	23	14	64	34	10	20	9	64	
25-Mar	9	14	6	8	8	8	8	9	11	12	22	26	45	71	48	71	53	18	10	11	8	10	9	10	71	
26-Mar	9	9	9	8	9	8	9	9	13	8	10	12	11	13	13	11	9	8	9	11	9	7	9	13	13	
27-Mar	11	52	21	8	9	11	8	7	7	7	9	12	10	10	8	12	8	8	7	8	9	31	6	10	52	
28-Mar	7	8	14	18	16	10	15	26	13	14	15	18	17	14	14	16	12	10	11	10	9	15	10	10	26	
29-Mar	6	6	34	13	14	11	25	14	14	12	21	22	12	15	10	11	8	12	16	11	12	8	15	8	34	
30-Mar	6	24	10	9	9	10	15	14	18	18	21	25	22	22	18	17	12	16	21	6	13	8	11	13	25	
31-Mar	10	10	9	4	7	6	8	17	20	28	26	39	25	27	18	11	10	14	10	10	10	10	9	9	39	
Diurnal Maximum																										
18 52 34 25 30 40 81 26 20 28 61 39 62 88 89 71 53 38 48 64 48 31 32 20																										

AF - Analyzer Failure

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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 20, 2015	Previous Calibration	February 13, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	14:15
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
Cal Gas Concentration	49.3 ppm	Cal Gas Expiry Date	12-Dec-16
Gas Cert Reference	SA130123A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range	NA	DACS channel #	N/A

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-606	-606
Analyzer Range (mv)	1000	1000	Lamp voltage	807	818
Calculated slope	0.986550	0.997541	Chamber temp.	45.0	45.1
Calculated intercept	-0.317852	0.051348	Pressure (mmHg)	694.7	692.9
Analyzer Background	8.7	8.2	Flow (lpm)	0.453	0.453
Analyzer Coefficient	0.958	0.928	Intensity	90	88

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	-0.7	NA
as found span	5000	58.3	574.8	589.7	0.975
calibrator zero	5000	0.0	0.0	-0.7	NA
high point	5000	58.3	574.8	575.6	0.999
second point	5000	29.2	287.9	289.8	0.993
third point	5000	14.7	144.9	145.3	0.998
calibrator zero					
as left zero	6000	0.0	0.0	-0.3	NA
as left span	5000	58.3	574.8	572.5	1.004
Average Correction Factor					0.997

Corrected As found 590.5 Previous response 583.0 % change -1.3%

Notes:

Filter changed after as founds. Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

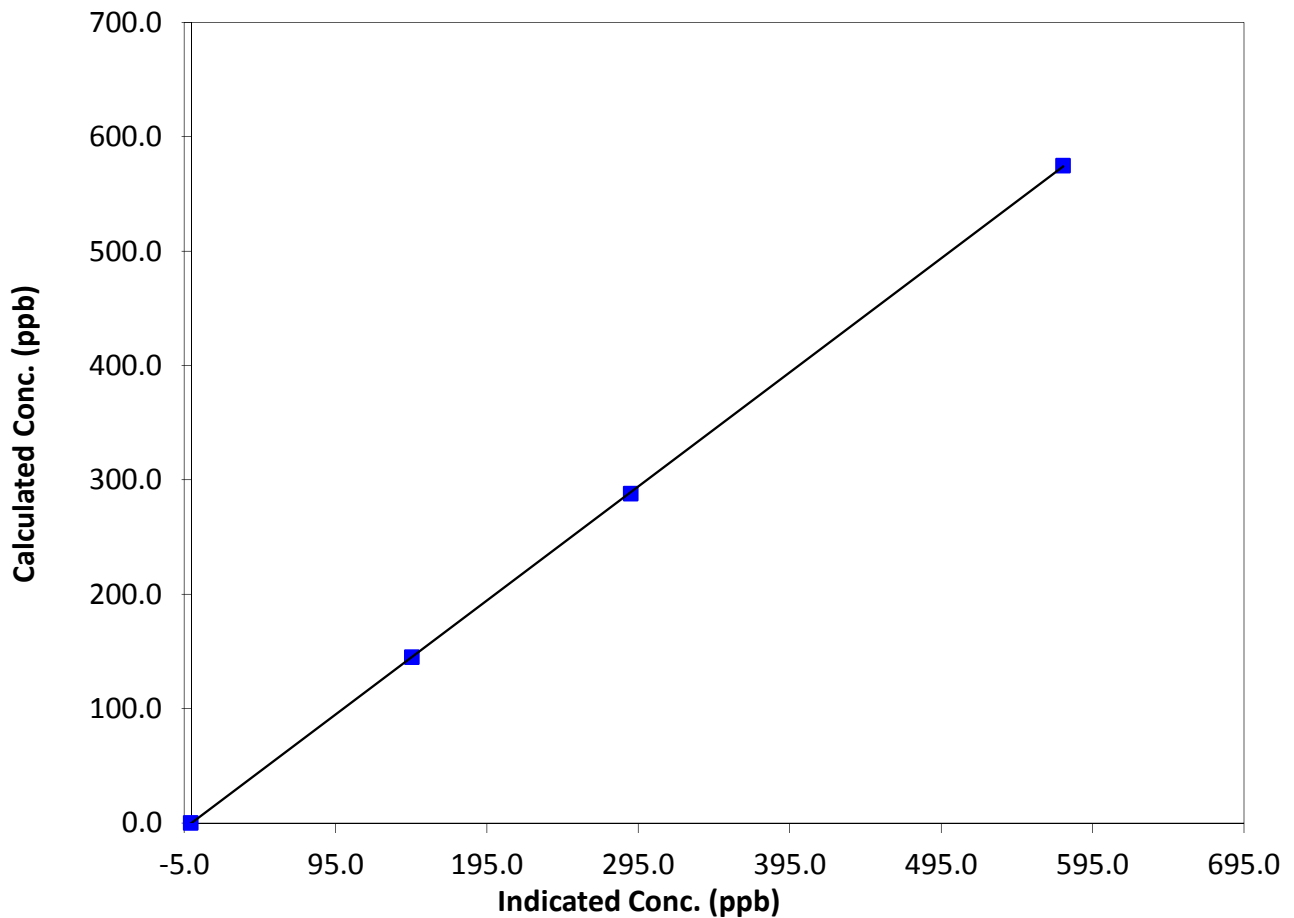
Station Information

Calibration Date	March 20, 2015	Previous Calibration	February 13, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:10	End Time (MST)	14:15
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

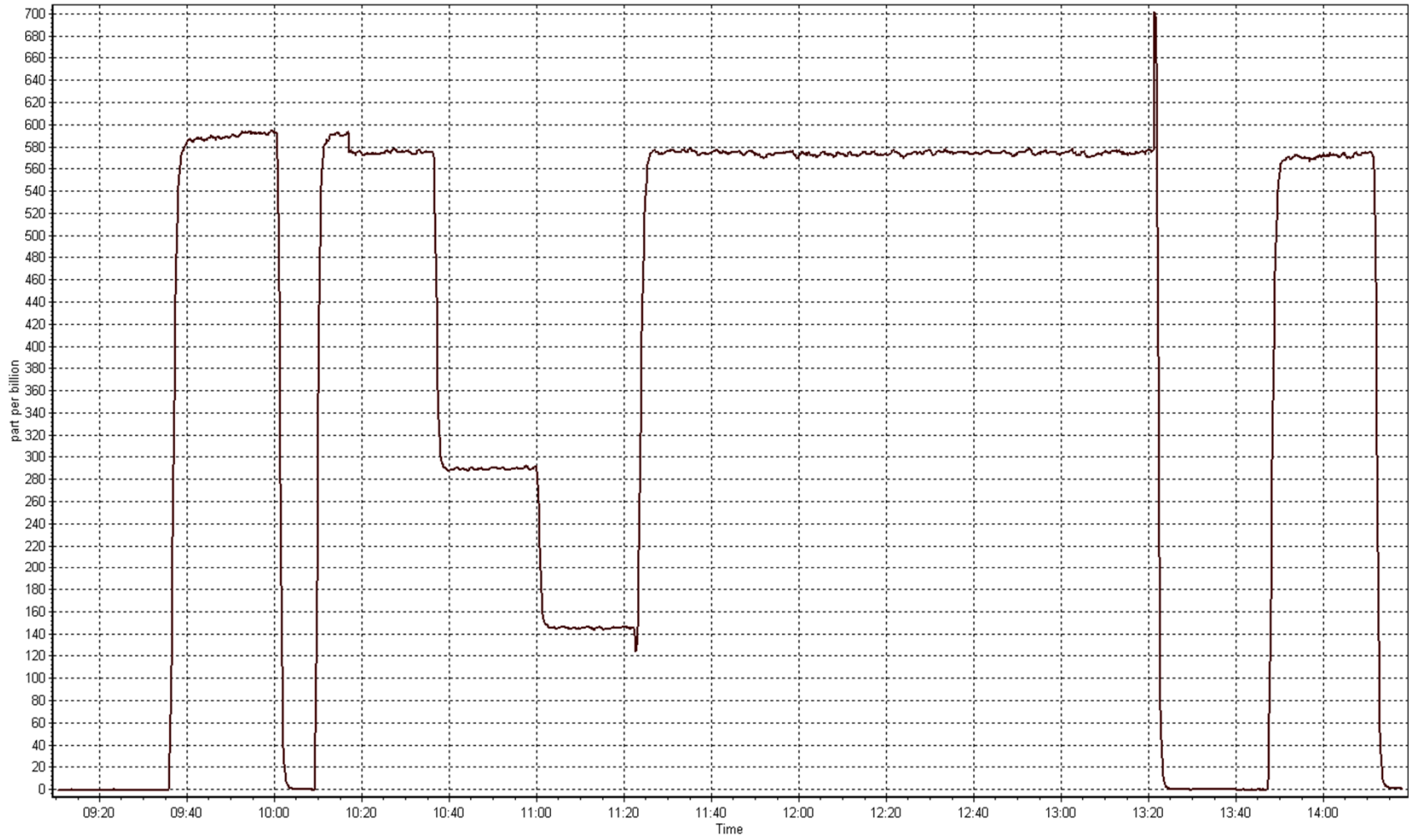
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	N/A	Correlation Coefficient	0.999986
574.8	575.6	0.9988		
287.9	289.8	0.9933	Slope	0.997541
144.9	145.3	0.9975		
			Intercept	0.051348

SO₂ Calibration Curve



SO2 Calibration Plot

Date: March 20, 2015





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 19, 2015	Previous Calibration	February 12, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Removal		
Start Time (MST)	8:10	End Time (MST)	9:40
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	996
Cal Gas Concentration	4.85 ppm H2S	Cal Gas Expiry Date	10-Jun-14
Gas Cert Reference	ALM066720	SO2 gas conc.	49.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	N/A
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	HVPS	488	488
Analyzer Range (mv)	100	100	Lamp voltage	2081	2081
Calculated slope	0.995992	0.999199	Chamber temp.	31	31
Calculated intercept	0.226548	0.198226	Pressure	23.4	23.4
Analyzer Background	19.3	19.3	Flow	594	594
Analyzer Coefficient	1.099	1.099	Intensity	52	52
			Converter temp.	315	315

Analyzer make/model	API H2S T101	Analyzer serial #	158
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	-0.6	NA
as found span	5000	83.3	80.8	80.4	1.005
SO2 scrubber check	5000	15.2	149.9	2.4	NA
calibrator zero	5000	0.0	0.0	-0.6	NA
high point	5000	83.3	80.8	80.4	1.005
second point	5000	41.7	40.4	40.7	0.994
third point	5000	21.0	20.4	20.4	0.999
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.999

Corrected As found	81.0	Previous response	80.9	% change	-0.1%
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Notes:

Analyzer removal calibration; SOX scrubber checked after the as found zero.

Calibration Performed By:

Melissa Lemay /Devin Russell



Wood Buffalo Environmental Association

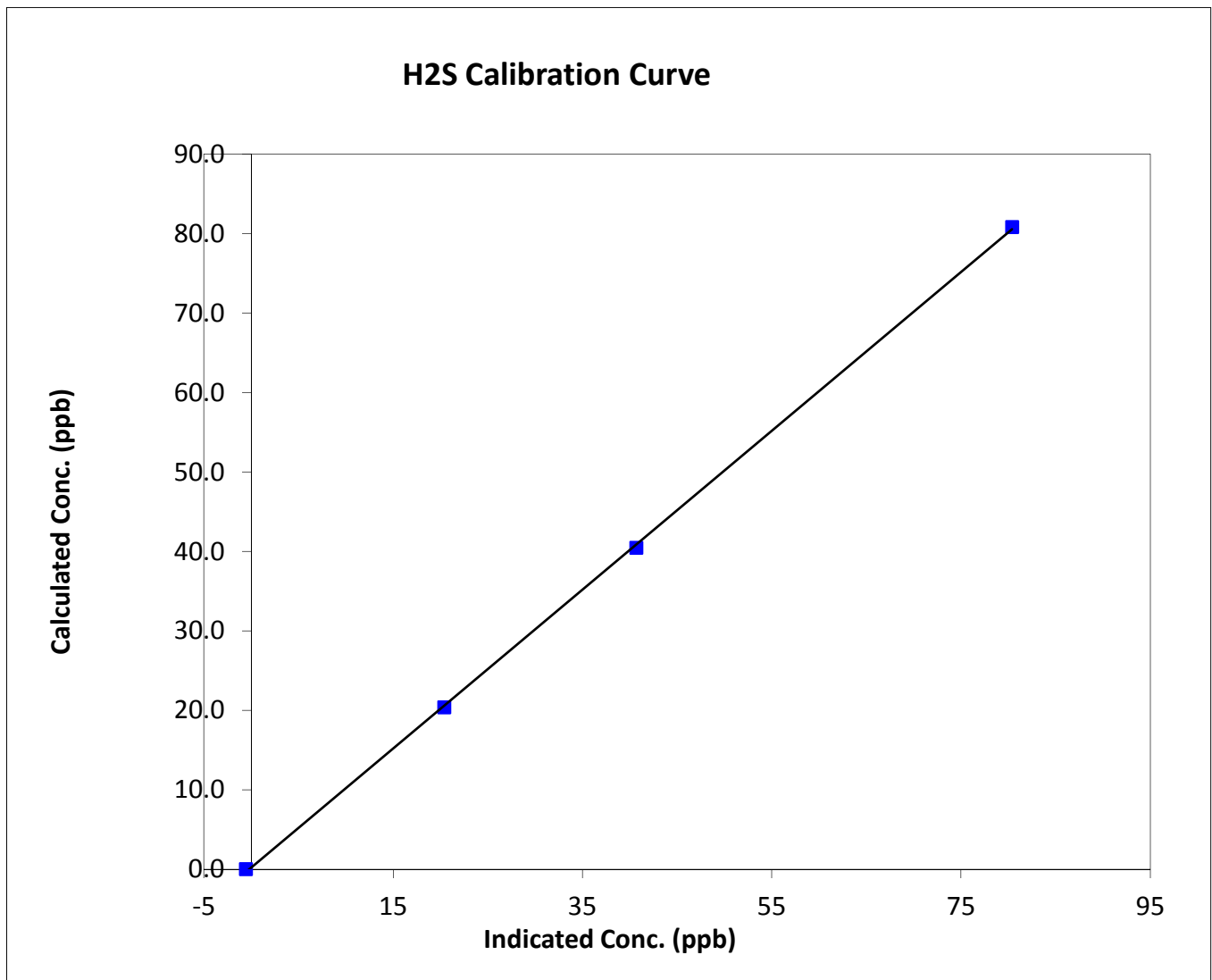
H2S Calibration Summary

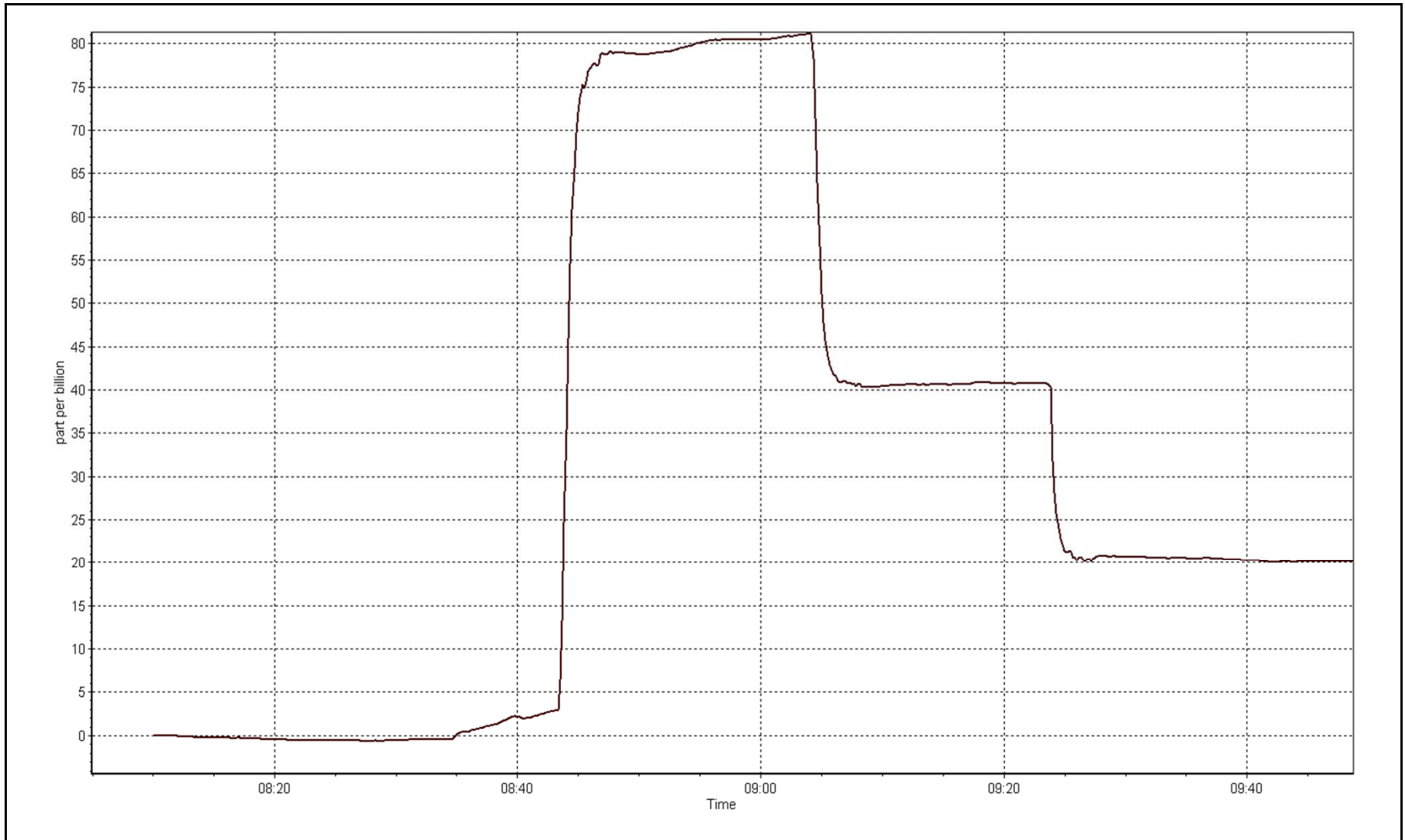
Station Information

Calibration Date	March 19, 2015	Previous Calibration	February 12, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:10	End Time (MST)	9:40
Analyzer make	API H2S T101	Analyzer serial #	158

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	N/A	Correlation Coefficient	0.999882
80.8	80.4	1.0050		
40.4	40.7	0.9938	Slope	0.999199
20.4	20.4	0.9985		
			Intercept	0.198226







Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 19, 2015	Previous Calibration	NA
Station Name	Firebag	Station Number	AMS 19
Reason:	Install		
Start Time (MST)	8:10	End Time (MST)	12:50
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	996
Cal Gas Concentration	4.85 ppm H2S	Cal Gas Expiry Date	10-Jun-14
Gas Cert Reference	ALM066720	SO2 gas conc.	49.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	N/A
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	HVPS	NA	-574
Analyzer Range (mv)	100	100	Lamp voltage	NA	924
Calculated slope	NA	0.993460	Chamber temp.	NA	45
Calculated intercept	NA	0.107382	Pressure	NA	543.4
Analyzer Background	NA	12	Flow	NA	0.960
Analyzer Coefficient	NA	1.070	Intensity	NA	84
			Converter temp.	NA	332

Analyzer make/model	Thermo 450i	Analyzer serial #	815129098
Converter make/model	internal	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	14.6	144.0	1.2	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	83.3	80.8	81.2	0.995
second point	5000	41.7	40.4	40.7	0.995
third point	5000	21.0	20.4	20.3	1.002
calibrator zero					
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	83.3	80.8	81.3	0.994
Average Correction Factor					0.997

Corrected As found NA Previous response NA % change NA

Notes:

Scrubber checked after third point

Calibration Performed By:

Melissa Lemay /Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

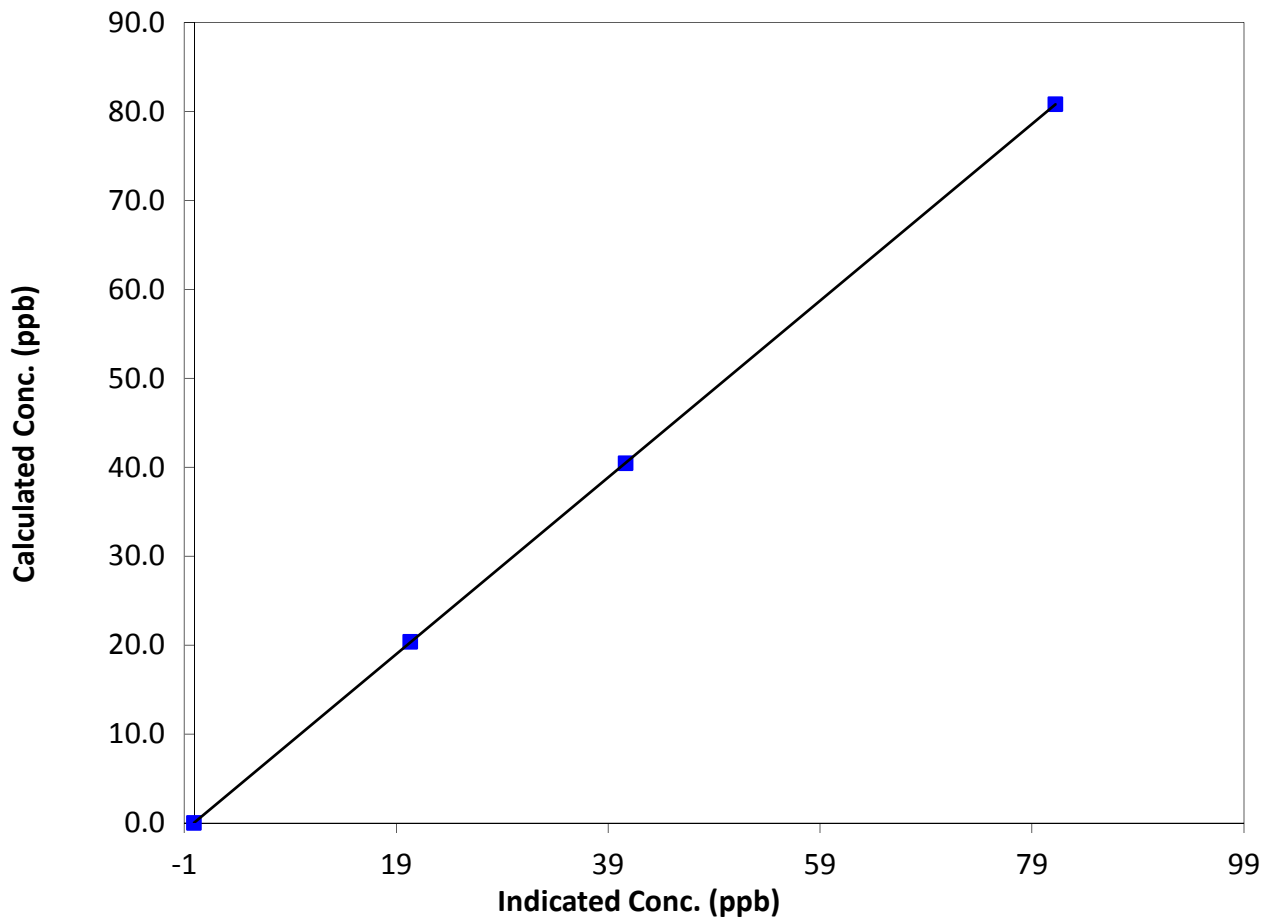
Station Information

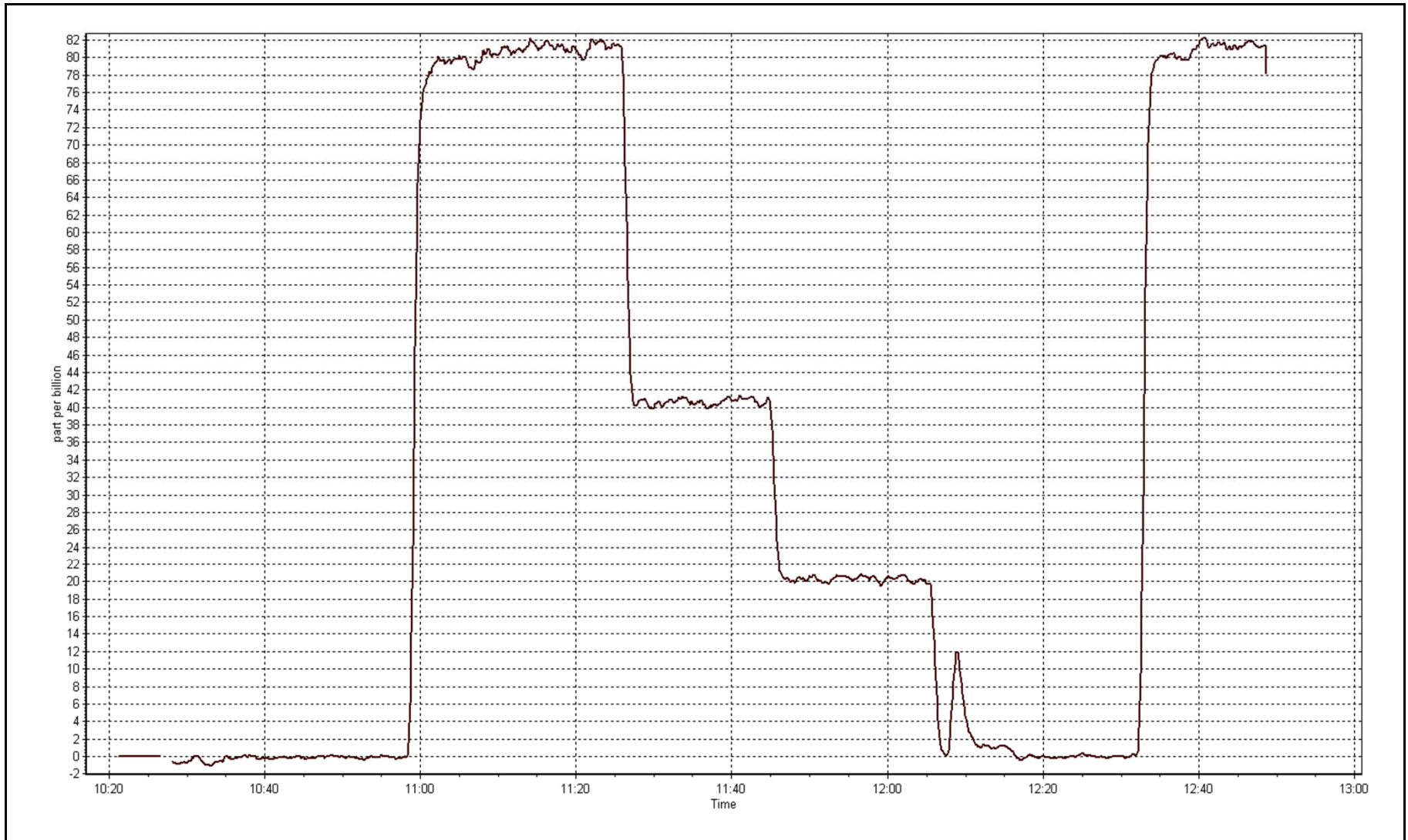
Calibration Date	March 19, 2015	Previous Calibration	NA
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:10	End Time (MST)	12:50
Analyzer make	Thermo 450i	Analyzer serial #	815129098

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999998
80.8	81.2	0.9948		
40.4	40.7	0.9951	Slope	0.993460
20.4	20.3	1.0020		
			Intercept	0.107382

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, March 20, 2015	Previous Calibration	Friday, February 13, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	14:15
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	34.9	34.9
Calculated slope	1.000495	0.994506	Fuel Pressure	23.0	23.0
Calculated intercept	-0.078901	0.027083	Background	4.5	4.6
			Coefficient	3.439	3.482

Analyzer make Thermo 51i-LT Analyzer serial # 1336160089

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.04	N/A
as found span	5000	58.3	12.74	12.63	1.008
calibrator zero	5000	0.0	0.00	-0.04	N/A
high point	5000	58.3	12.74	12.77	0.997
second point	5000	29.2	6.38	6.40	0.997
third point	5000	14.7	3.21	3.21	1.000
calibrator zero					
as left zero	5000	0.0	0.00	-0.04	N/A
as left span	5000	58.3	12.74	12.80	0.995
Average Correction Factor					0.998

Corrected As found 12.67 Previous response 12.81 % change 1.1%

Notes:

Filter changed after as founds. Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

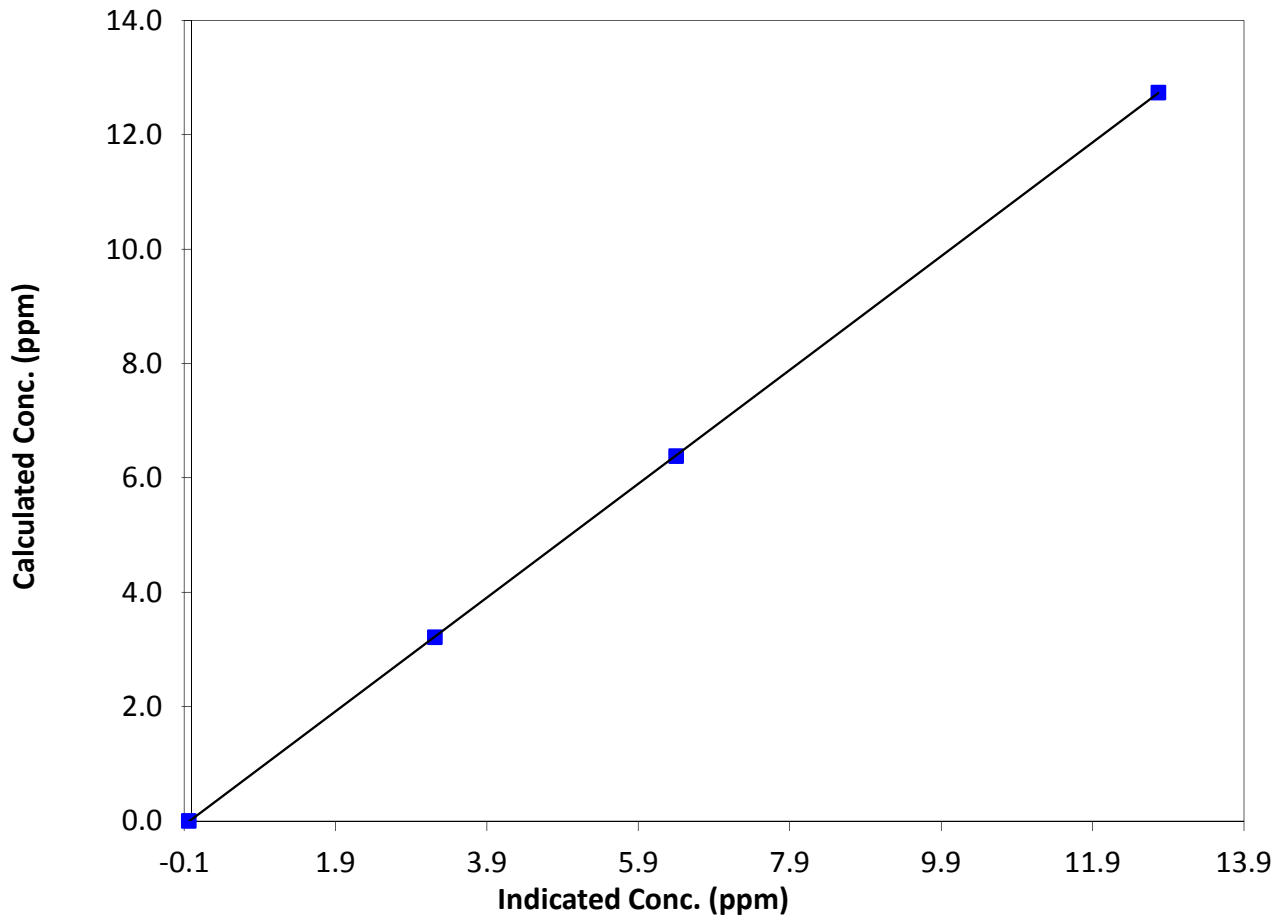
Station Information

Calibration Date	March 20, 2015	Previous Calibration	February 13, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:10	End Time (MST)	14:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

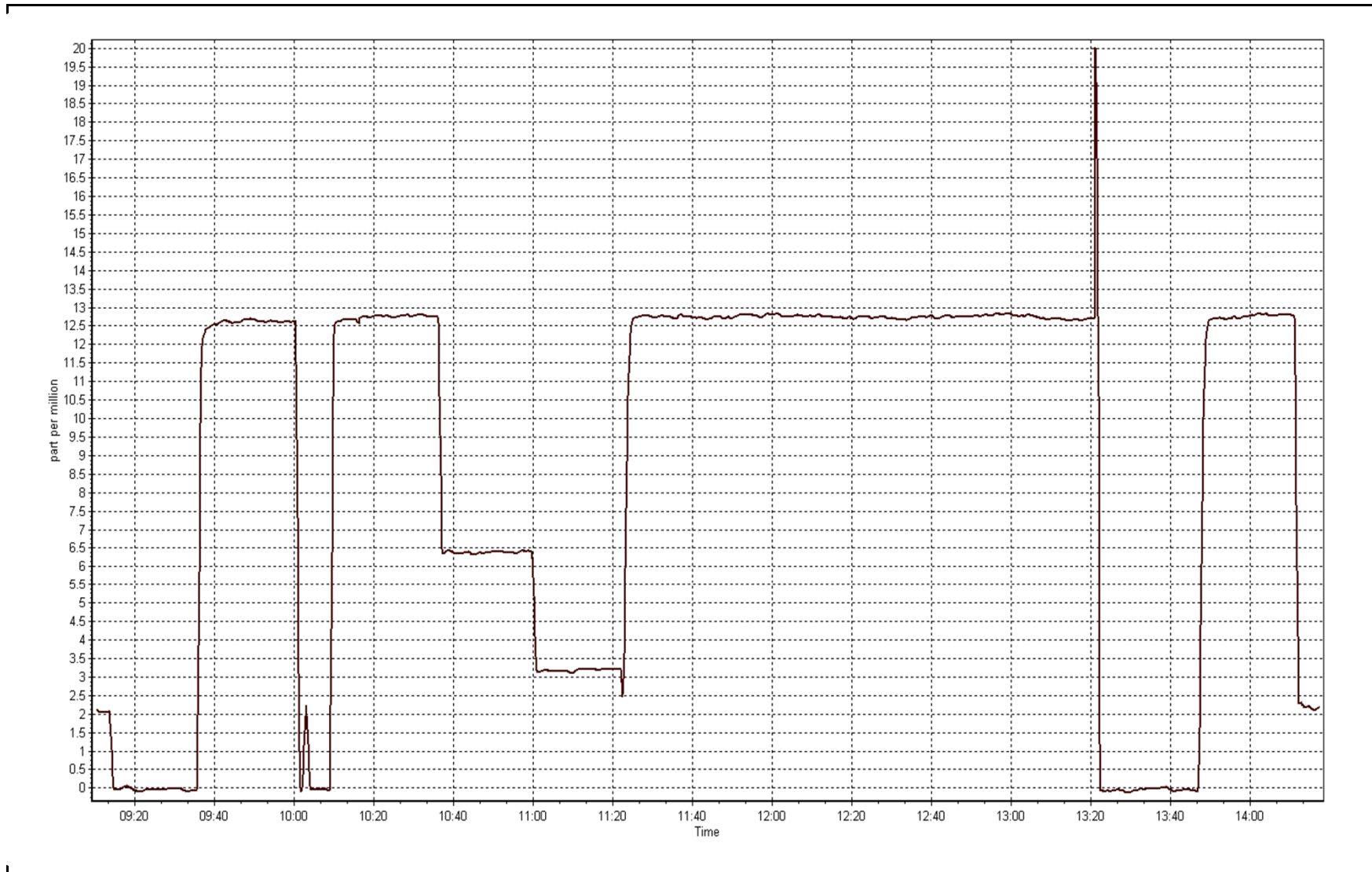
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	N/A	Correlation Coefficient	0.999995
12.74	12.77	0.9973		
6.38	6.40	0.9967	Slope	0.994506
3.21	3.21	1.0004		
			Intercept	0.027083

THC Calibration Curve



THC Calibration Plot

Date: March 20, 2015





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 20, 2015	Previous Calibration	February 13, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:10	End Time (MST)	14:15
Barometric Pressure	mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	996
NO Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	51.5 ppm	Cal Gas Serial #	SA130123A

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.000665	1.007877	0.995865
	Data Offset	-0.586147	-0.538063	-0.534697
After	Data Slope	0.998504	0.999925	0.994862
	Data Offset	-0.465870	-0.386161	-0.598550
Channel #				
Voltage Range				

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.910	ppb	0.929	ppb
NOX coefficient	1.004	ppb	1.001	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.8		3.9	
NOX bkgrnd	4.0		4.0	
Nt coefficient	N/A		N/A	
Chamber Temp	50.7	Deg C	50.6	Deg C
Moly Temp	325.7	Deg C	327.4	Deg C
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	171.9	mmHg	172.2	mmHg
Sample Flow	0.610	ccm	0.598	ccm

Notes:

Filter changed after as founds. Adjusted span.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 20, 2015

Station Number:

AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	N/A	N/A
as found span	5000	58.3	600.5	600.5	0.0	590.3	586.6	3.7	1.0173	1.0237
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	N/A	N/A
high point	5000	58.3	600.5	600.5	0.0	601.1	600.3	0.8	0.9991	1.0003
second point	5000	29.2	300.8	300.8	0.0	302.9	302.2	0.7	0.9929	0.9951
third point	5000	14.7	151.4	151.4	0.0	152.8	152.2	0.6	0.9907	0.9949
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	N/A	N/A
as left span	5000	58.3	600.5	276.7	323.8	596.9	273.6	323.3	1.0060	1.0114
Average Correction Factor									0.9942	0.9968

Corrected As found

NO_x= 590.4

NO= 586.6

Percent Change

NO_x= 1.7%

NO= 1.7%

Previous Response

NO_x= 600.7

NO= 596.3

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.30

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (300)	N/A	276.7	322.8	601.6	276.7	324.9	0.9867	1.0000	0.9936	100.6%
2nd NO ₂ (200)	N/A	382.0	217.5	600.9	382.0	218.9	0.9878	1.0000	0.9938	100.6%
3rd NO ₂ (100)	N/A	488.6	110.9	601.9	488.6	113.3	0.9861	1.0000	0.9786	102.2%
4th NO ₂ (0)	599.5	N/A	2.1	601.6	599.5	2.1	0.9866	1.0000	N/A	N/A
Average Correction Factor							0.9868	1.0000	0.9887	101.2%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

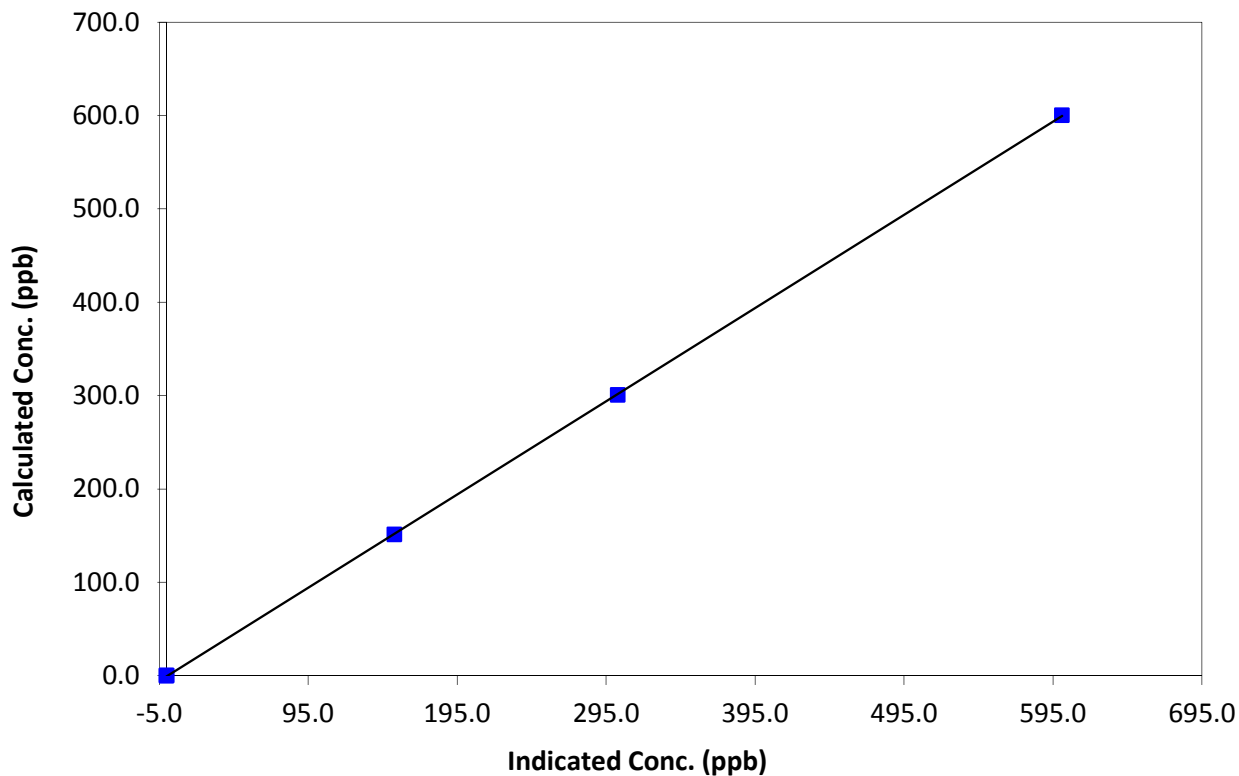
Station Information

Calibration Date	March 20, 2015	Previous Calibration	February 13, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:10	End Time (MST)	14:15
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	0.999987
600.5	601.1	0.9991		
300.8	302.9	0.9929	Slope	0.998504
151.4	152.8	0.9907		
0.0	-0.1	0.0000	Intercept	-0.465870

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

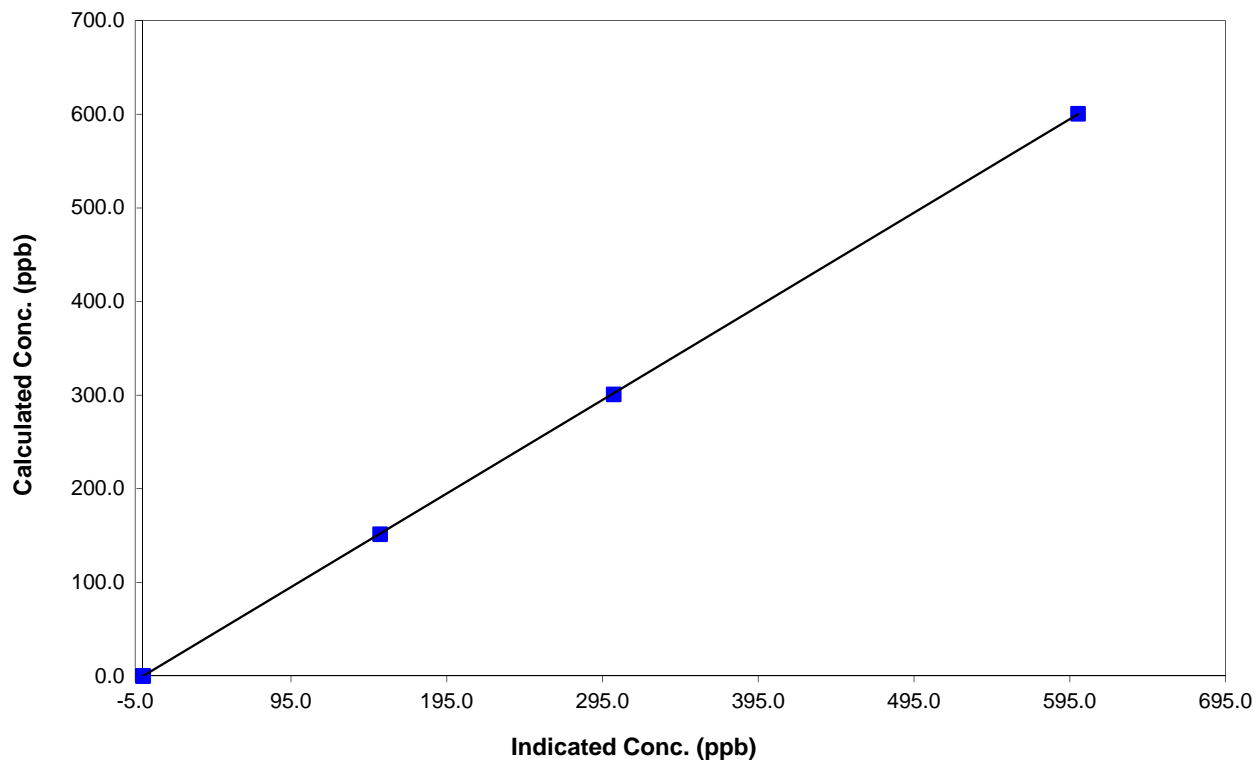
Station Information

Calibration Date	March 20, 2015	Previous Calibration	February 13, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:10	End Time (MST)	14:15
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999992
600.5	600.3	1.0003		
300.8	302.2	0.9951	Slope	0.999925
151.4	152.2	0.9949		
0.0	0.0	0.0000	Intercept	-0.386161

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

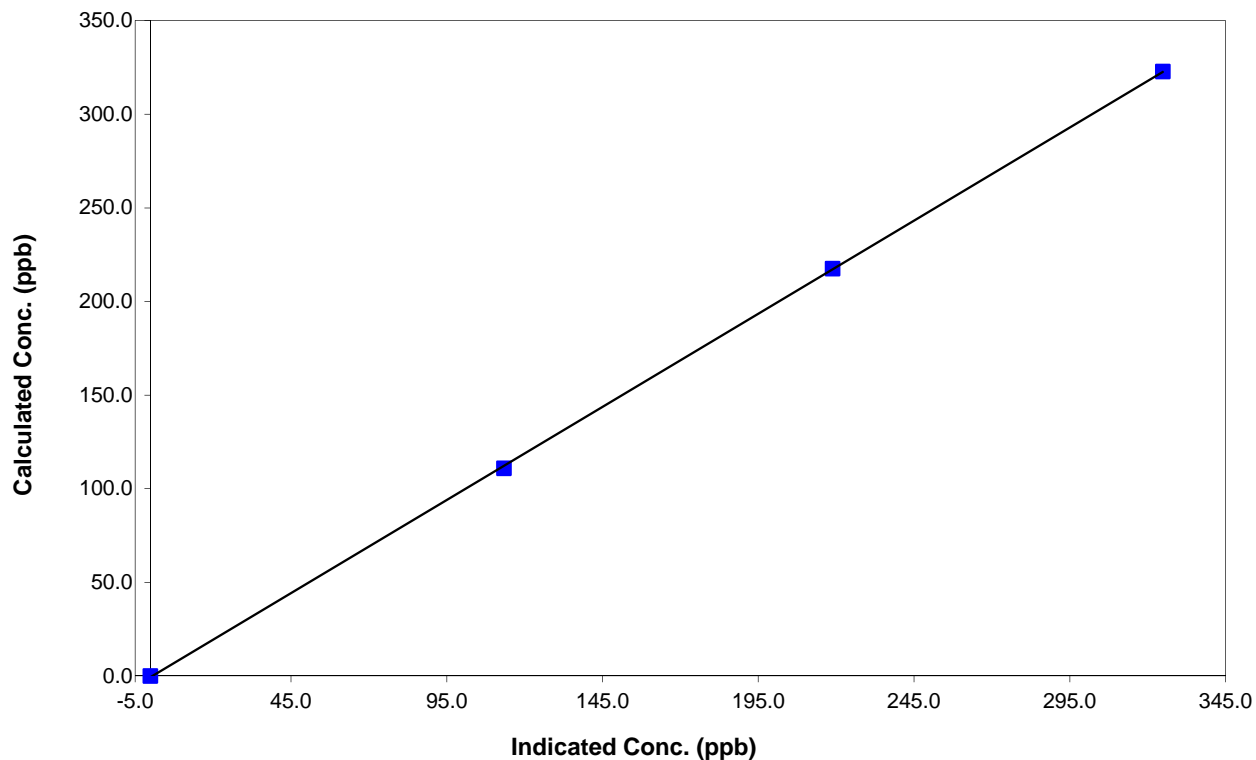
Station Information

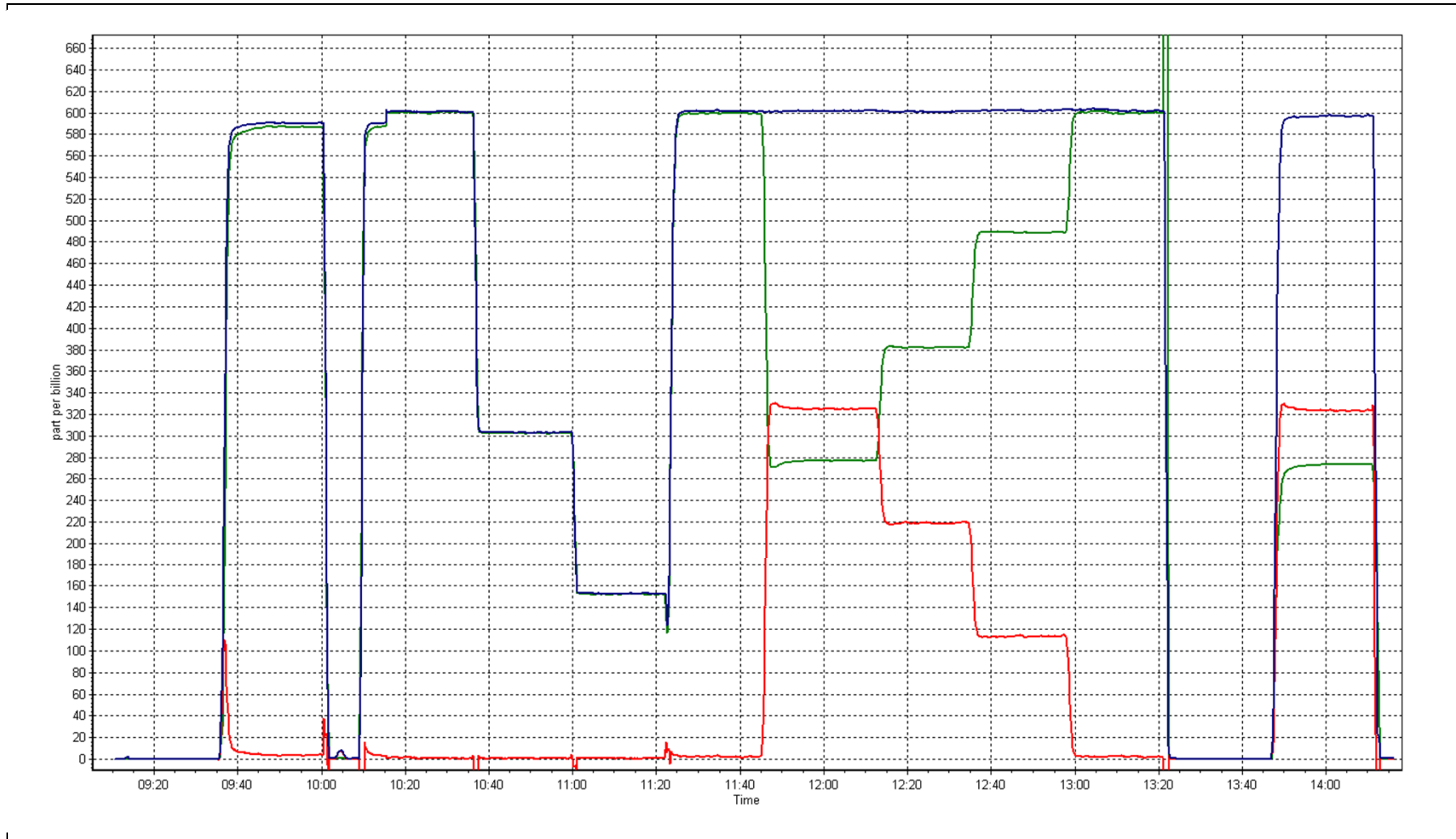
Calibration Date	March 20, 2015	Previous Calibration	February 13, 2015
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	9:10	End Time (MST)	14:15
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999962
322.8	324.9	0.9936		
217.5	218.9	0.9938	Slope	0.994862
110.9	113.3	0.9786		
			Intercept	-0.598550

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS SURMONT
MARCH 2015**

Operations and Data Collection by:
Wood Buffalo Environmental Association
Fort McMurray, Alberta

QA/QC, Data Validation and Reporting by:
Aurora Atmospheric Inc.
Calgary, Alberta

April 21, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	696	36	48	98.39	10	0	4	0
H2S (ppb) Average	704	37	40	99.60	2	0	1	0
NO2 (ppb) Average	708	36	36	100.00	21	0	8	-
NO (ppb) Average	708	36	36	100.00	20	-	9	-
NOX (ppb) Average	708	36	36	100.00	32	-	15	-
Temperature 2 m (C) Average	744	0	0	100.00	14.8	-	8.6	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	91.0	-
Wind Speed 10 m (km/h) Average	741	0	3	99.60	50	-	27.0	-
Wind Direction 10 m (deg) Average	741	0	3	99.60	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	696	0.9	1	-	0	0	0	0	1	2	10
H2S (ppb) Average	704	0.2	0	-	0	0	0	0	0	0	2
NO2 (ppb) Average	708	4	4	-	0	1	1	3	6	9	21
NO (ppb) Average	708	1.7	3	-	0	0	0	1	2	4	20
NOX (ppb) Average	708	5.7	5	-	0	1	2	4	8	13	32
Temperature 2 m (C) Average	744	-2.29	7.7	-	-25	-12.2	-6.9	-2.1	3.7	6.7	14.8
Relative Humidity (%) Average	744	63.8	18	-	19	41	51	63	79	87	100
Wind Speed 10 m (km/h) Average	741	14.3	7	-	1	6	9	13	19	23	50
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	03 Mar 2015 03:00	03 Mar 2015 03:00	1	Stabilization after daily span
SO2	06 Mar 2015 06:00	06 Mar 2015 06:00	1	Stabilization after daily span
SO2	12 Mar 2015 06:00	12 Mar 2015 15:00	10	Intermittent unstable operation - excessive baseline drift
H2S	05 Mar 2015 09:00	05 Mar 2015 09:00	1	Intermittent unstable operation - excessive baseline drift
H2S	11 Mar 2015 09:00	11 Mar 2015 09:00	1	Intermittent unstable operation - excessive baseline drift
H2S	23 Mar 2015 13:00	23 Mar 2015 13:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	15 Mar 2015 21:00	15 Mar 2015 21:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	26 Mar 2015 23:00	27 Mar 2015 00:00	2	Flat line in sensor output signal - sensor frozen

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 ppb on Mar 28 16:00	Maximum Daily Average: 4.1 ppb on Mar 2		Hours of Data:	696
Minimum Value: 0 ppb on Mar 31 00:00	Minimum Daily Average: 0.1 ppb on Mar 22		Hours of Missing Data:	48
Maximum Diurnal Average: 1.5 ppb at hour 16	Minimum Diurnal Average: 0.6 ppb at hour 3		Hours of Calibration:	36
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		Percent Operational Time:	98.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1	0	0	0	0	Z	2	1	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	0.7	2
2-Mar	Z	5	2	1	0	1	3	5	3	5	5	4	3	2	4	7	5	5	5	5	6	7	6	5	4.1	7
3-Mar	3	Z	RE	0	0	1	0	0	0	1	1	1	2	2	3	3	3	3	3	3	4	6	6	5	2.3	6
4-Mar	3	2	Z	1	1	0	0	0	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1.2	3
5-Mar	1	3	2	Z	6	8	2	2	1	1	1	1	1	4	3	1	0	1	1	1	1	0	0	0	1.7	8
6-Mar	0	1	1	1	Z	RE	0	1	2	2	2	1	3	4	1	1	2	3	2	2	1	0	0	0	1.4	4
7-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	6	4	1	0	0	0	0	0	0	0.7	6
8-Mar	Z	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.4	1
9-Mar	Z	1	0	0	0	0	0	1	1	1	1	1	2	1	1	1	1	4	0	0	0	0	2	1	0.9	4
10-Mar	Z	1	1	5	2	1	2	2	1	1	1	1	2	3	2	1	0	0	0	0	0	0	0	0	1.1	5
11-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Mar	0	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	1	0	0	0	0	0	0	--	1
13-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1	0.5	1
14-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	1.0	2
15-Mar	0	Z	0	0	0	0	0	0	0	0	2	9	6	5	6	3	1	1	1	1	0	1	1	0	1.7	9
16-Mar	0	0	Z	0	2	2	1	1	1	0	0	1	3	4	2	0	0	1	1	1	1	1	1	0	1.0	4
17-Mar	0	0	0	Z	1	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.5	1
18-Mar	1	1	1	1	Z	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1	3	2	1	2	0.8	3
19-Mar	2	2	2	2	2	Z	3	4	3	2	1	0	0	0	2	2	1	0	1	0	0	0	0	0	1.4	4
20-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Mar	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Mar	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0.3	1
24-Mar	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	1	1	0.7	2
25-Mar	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
26-Mar	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
27-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Mar	0	1	Z	0	0	0	0	1	1	2	2	4	5	7	9	10	6	2	1	0	0	0	0	0	2.3	10
29-Mar	0	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
30-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
31-Mar	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1

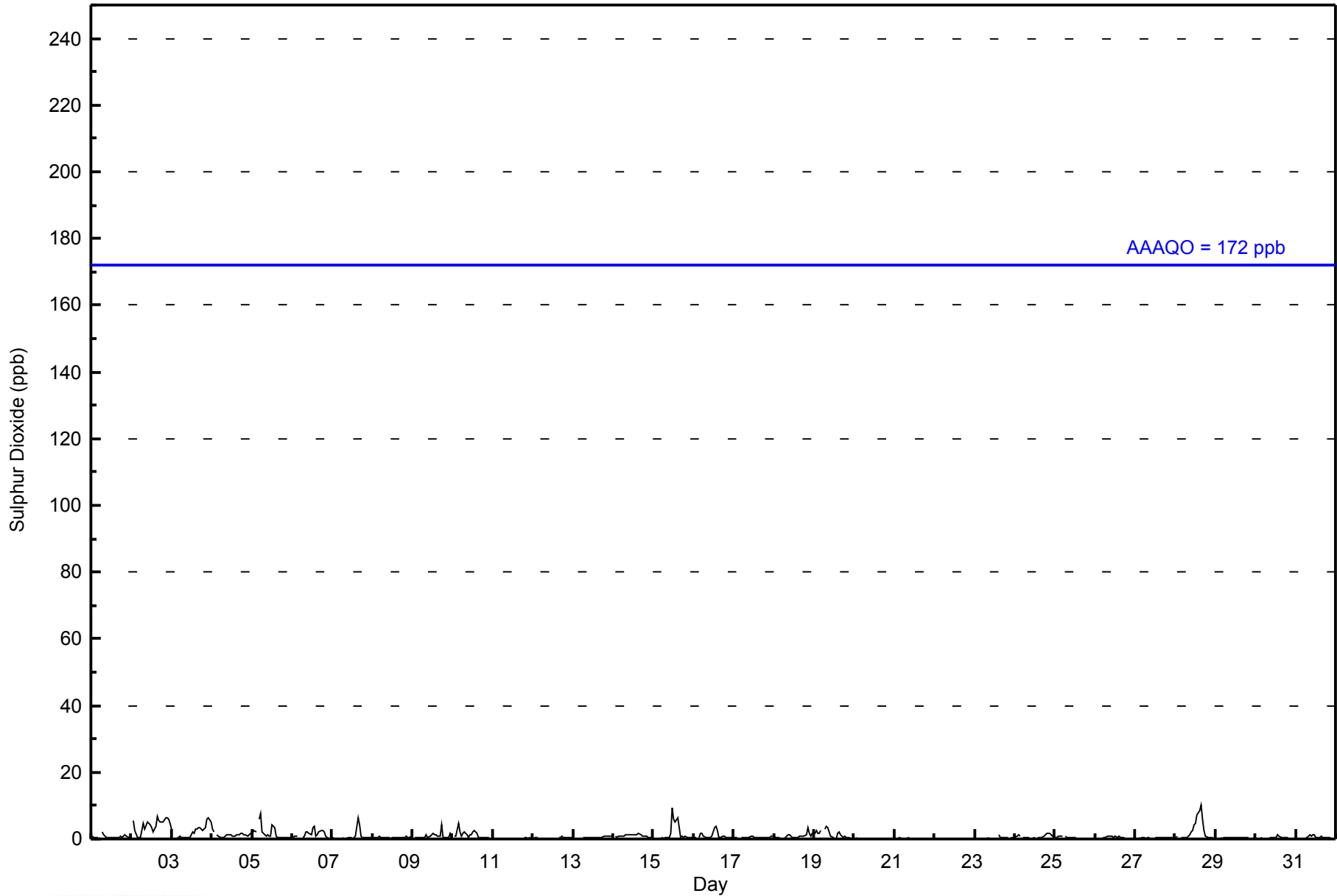
0.6	0.8	0.6	0.6	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.8	1.1	1.3	1.4	1.4	1.5	1.1	1.0	0.8	0.8	0.9	0.8	0.8	0.7	Diurnal Average
3	5	2	5	6	8	3	5	3	5	5	5	9	6	7	9	10	6	5	5	5	6	7	6	5	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	696	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: 696

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - March 2015

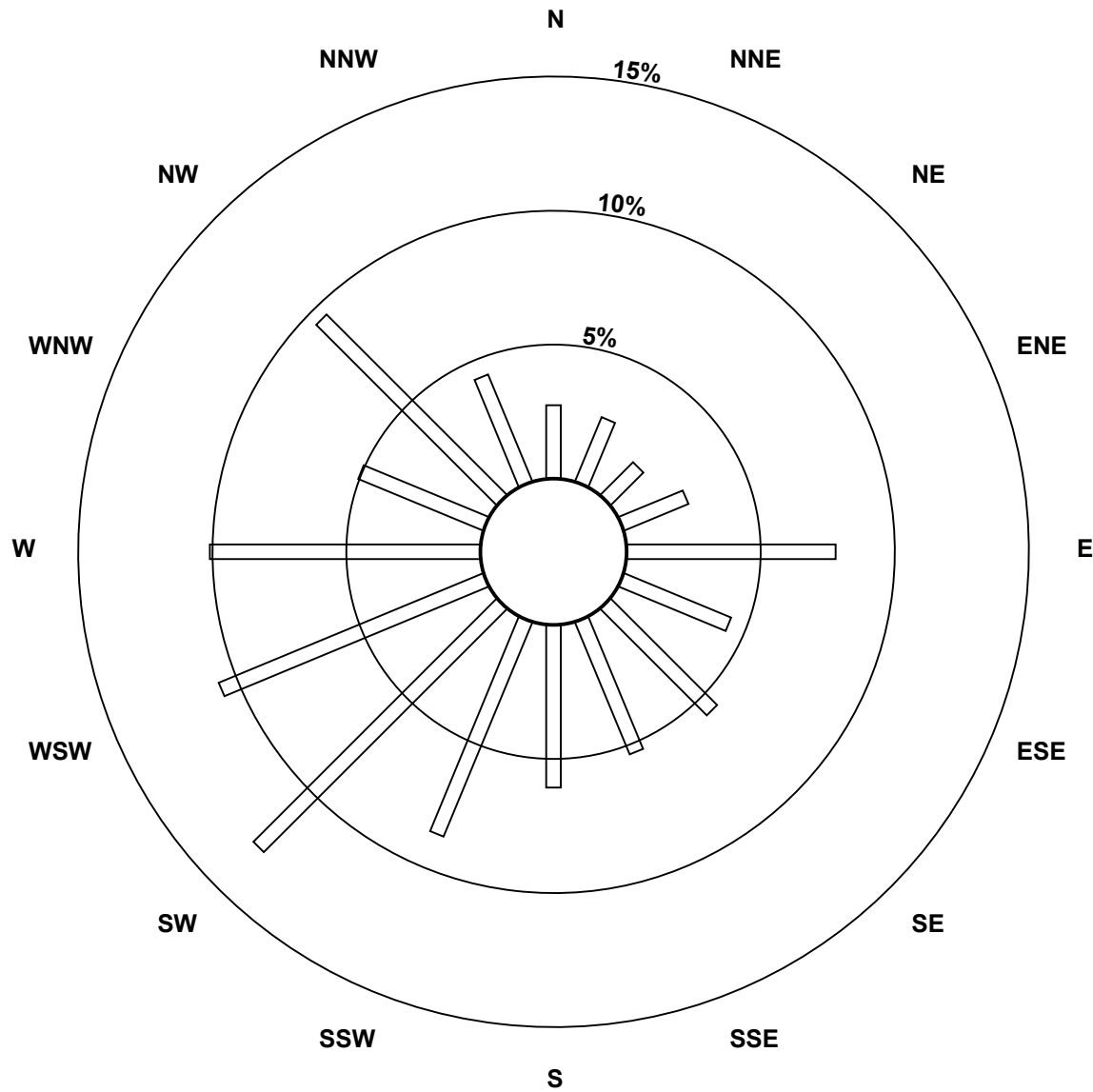
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	19	18	12	18	54	30	39	37	42	60	89	74	70	35	66	30	693
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	19	18	12	18	54	30	39	37	42	60	89	74	70	35	66	30	693

Total Number of Valid Hours: 693

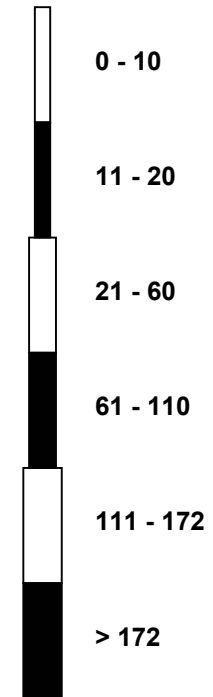
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

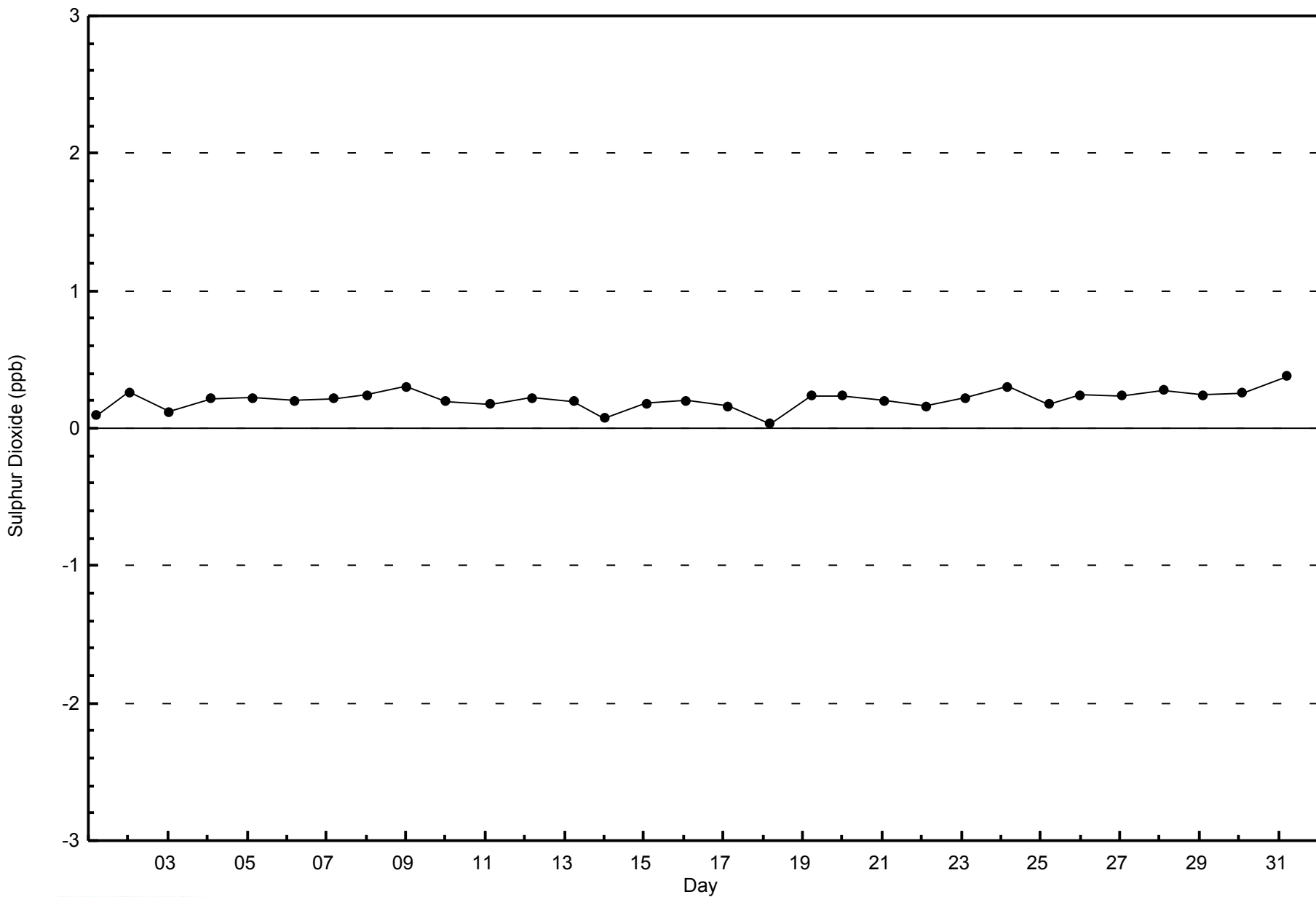


Total Number of Valid Hours: 693



WBEA
Zero Responses

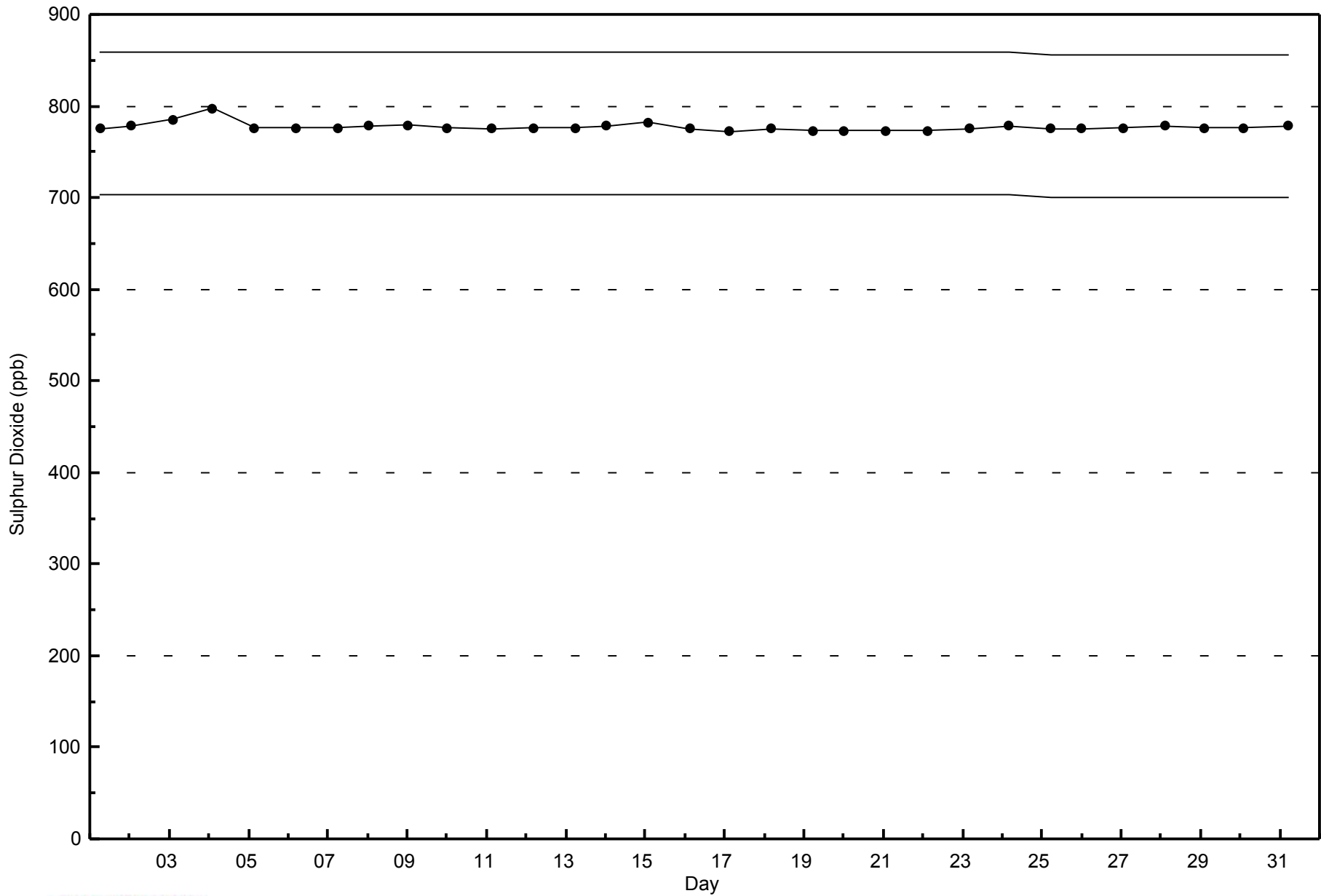
Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Span Responses

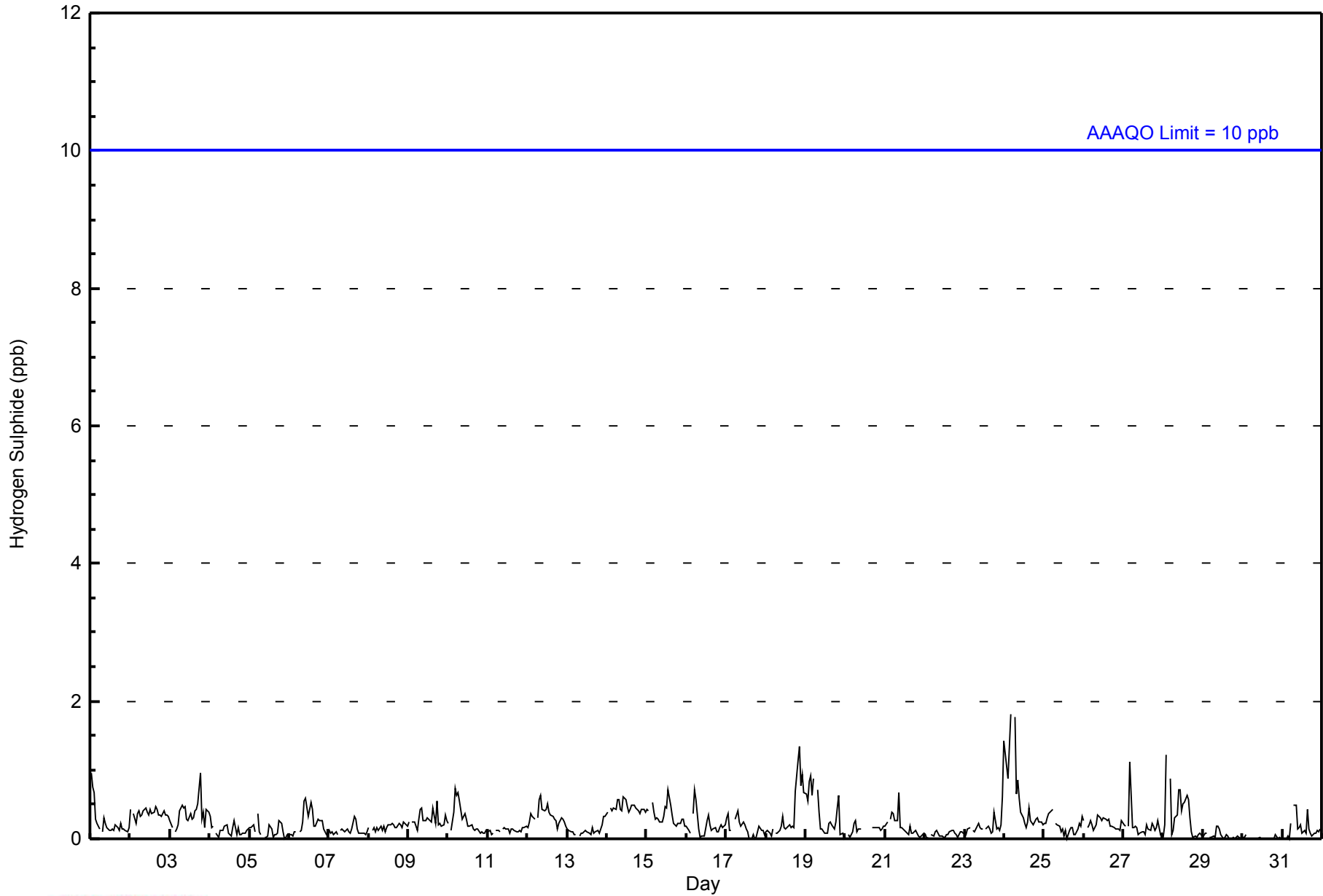
Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	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: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - March 2015

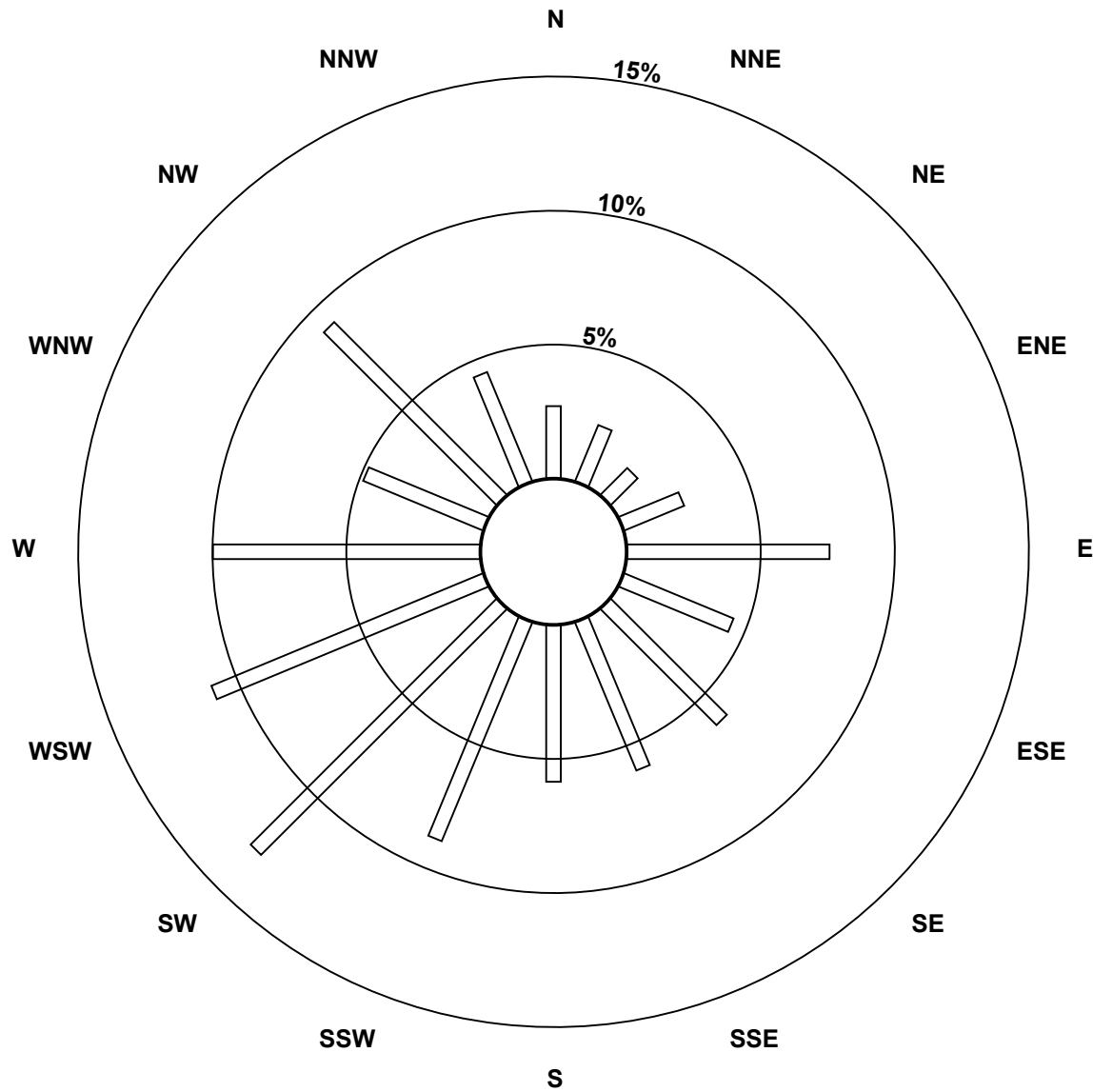
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	19	16	10	17	53	31	43	42	41	62	91	77	70	34	64	31	701
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	16	10	17	53	31	43	42	41	62	91	77	70	34	64	31	701

Total Number of Valid Hours: 701

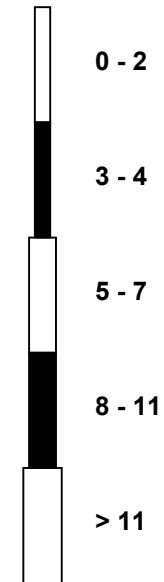
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

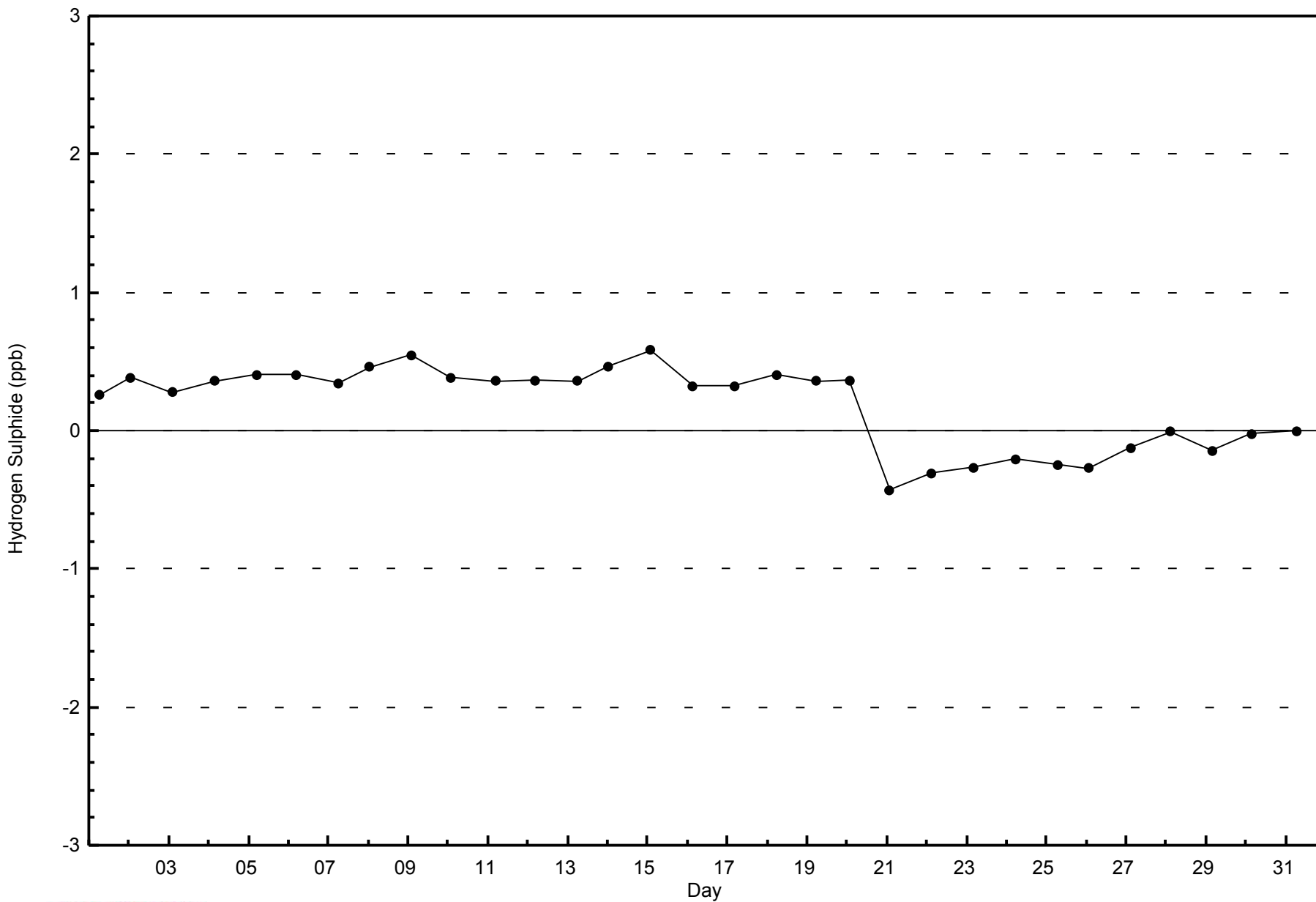


Total Number of Valid Hours: 701



WBEA
Zero Responses

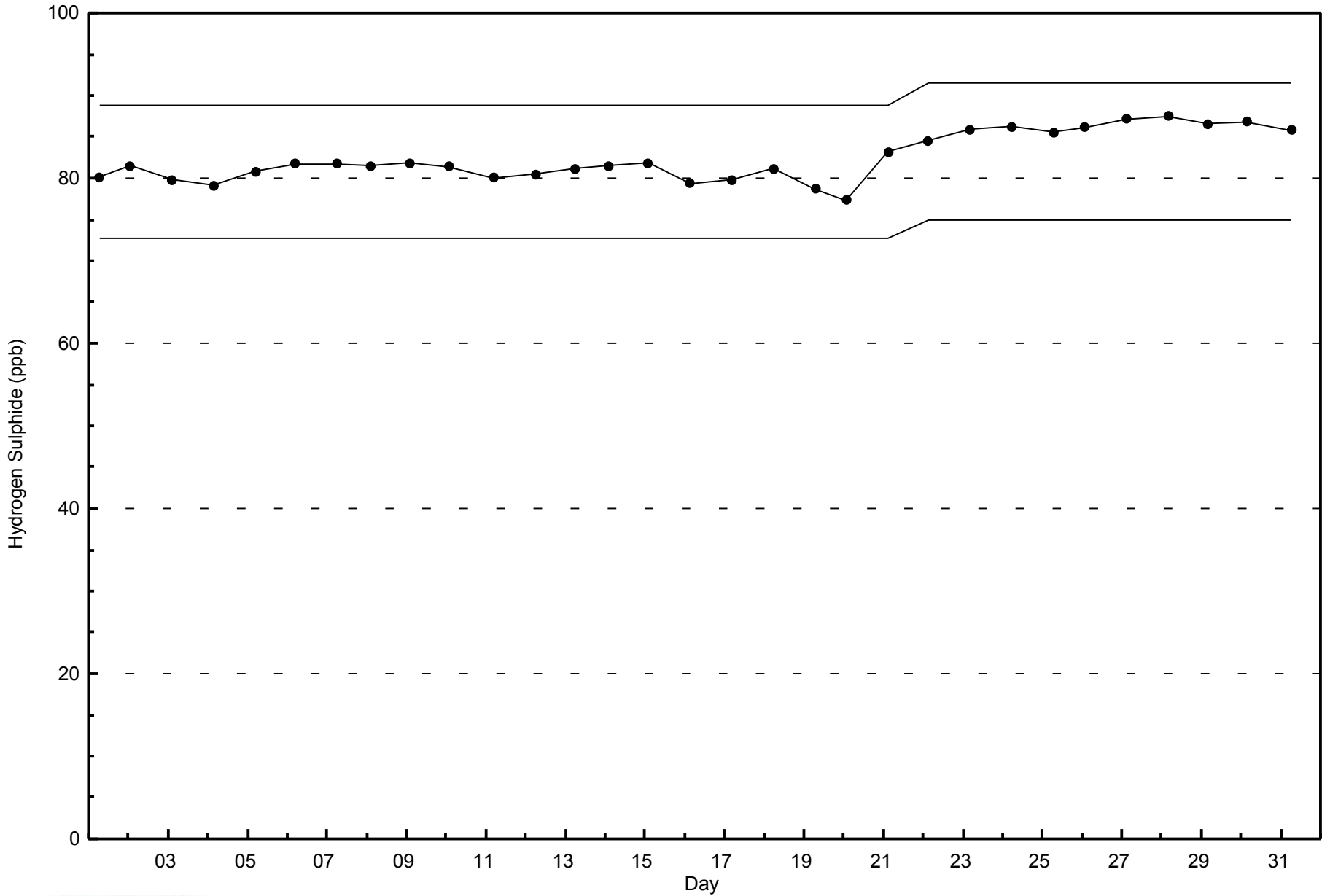
Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - March 2015





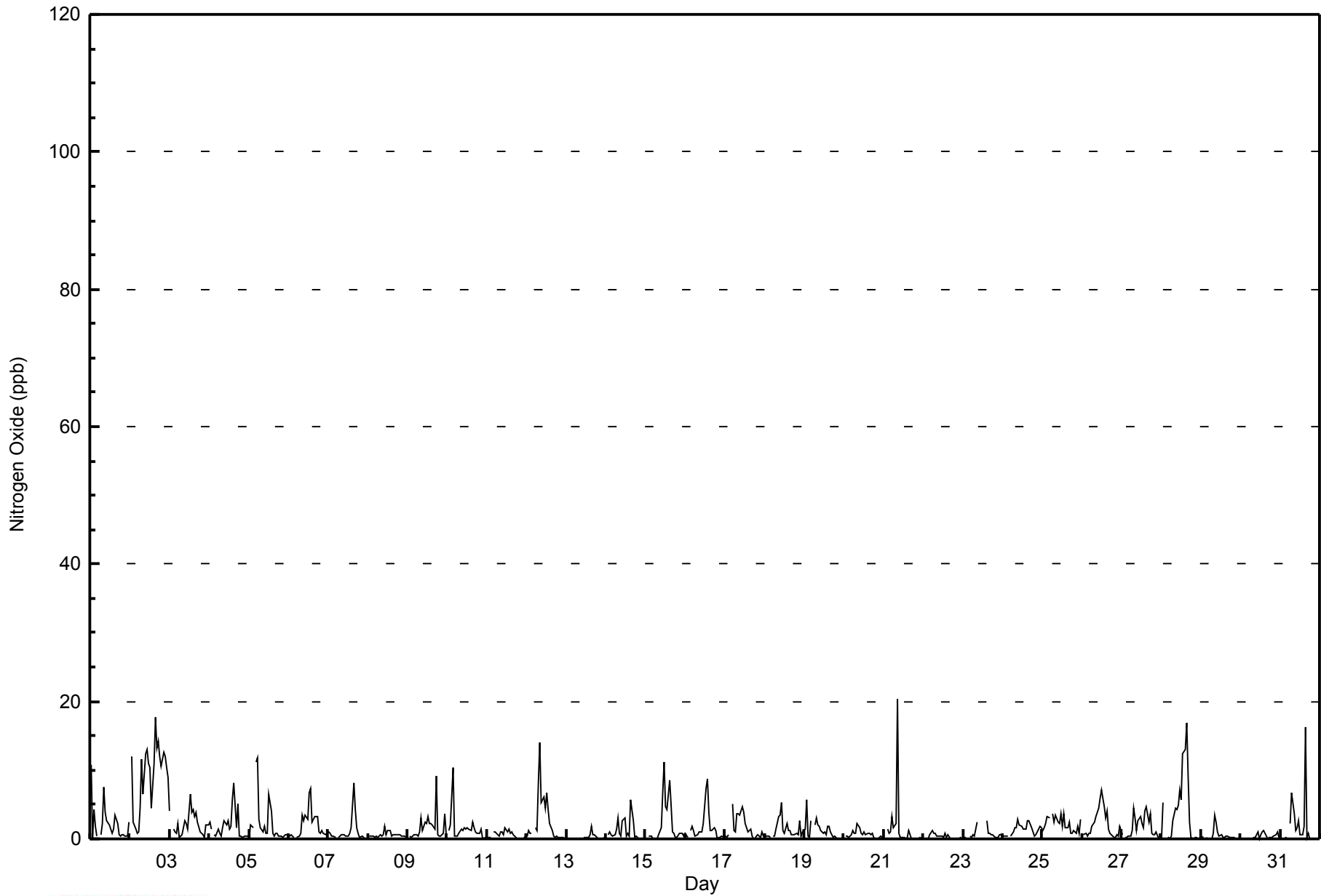
Maximum Value: 20 ppb on Mar 21 09:00														Maximum Daily Average: 9.3 ppb on Mar 2														Hours in Service: 744	
Minimum Value: 0 ppb on Mar 8 00:00														Minimum Daily Average: 0.2 ppb on Mar 13														Hours of Data: 708	
Maximum Diurnal Average: 3.9 ppb at hour 16														Minimum Diurnal Average: 0.7 ppb at hour 20														Hours of Missing Data: 36	
Monthly Average: 1.7 ppb														Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=1 Q ₃ =2 P ₉₀ =4 P ₉₉ =13														Hours of Calibration: 36	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	11	0	4	2	0	Z	1	2	7	4	3	2	1	1	1	3	2	1	0	1	1	0	0	3	2.2	11			
2-Mar	Z	12	2	1	1	1	5	12	7	12	13	11	10	4	11	18	13	14	12	11	13	12	10	9	9.3	18			
3-Mar	4	Z	1	1	1	2	0	1	2	3	2	1	6	4	4	3	4	2	1	1	1	0	2	2	2.1	6			
4-Mar	2	1	Z	1	0	1	1	0	2	3	2	3	1	2	6	8	2	5	0	1	0	0	0	0	1.8	8			
5-Mar	0	2	2	Z	11	12	3	2	1	2	1	6	4	1	0	1	1	0	0	0	0	1	1	2.2	12				
6-Mar	0	1	1	0	Z	0	0	1	3	3	3	3	7	7	2	3	3	3	1	1	1	1	1	1	2.0	7			
7-Mar	1	1	0	0	0	Z	0	0	1	1	0	0	1	2	8	4	2	1	0	0	0	0	0	0	1.1	8			
8-Mar	Z	0	0	0	0	0	0	1	0	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	2			
9-Mar	Z	0	0	0	1	1	0	1	3	1	3	2	3	2	2	2	1	9	1	0	0	1	4	1	1.7	9			
10-Mar	Z	1	2	10	0	0	0	1	Z	1	1	2	1	2	1	2	2	1	1	1	0	0	0	0	1.5	10			
11-Mar	0	0	0	Z	1	1	1	0	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.6	2			
12-Mar	0	1	1	1	Z	2	1	8	14	5	6	4	7	4	2	1	0	0	0	0	0	0	0	0	2.6	14			
13-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0.2	2			
14-Mar	Z	1	1	1	0	1	1	3	1	0	3	3	0	1	0	6	3	0	0	0	0	0	0	0	1.1	6			
15-Mar	0	Z	0	0	0	0	0	0	1	2	7	11	5	4	9	5	1	1	0	0	1	1	1	1	2.1	11			
16-Mar	1	0	Z	1	2	1	1	1	1	1	1	2	7	9	4	1	1	2	1	0	0	0	0	0	1.6	9			
17-Mar	0	0	1	Z	5	1	1	4	4	3	5	4	2	2	1	1	0	0	0	0	1	0	1	0	1.6	5			
18-Mar	0	0	0	0	Z	0	0	1	3	3	5	1	1	2	1	1	1	1	1	1	1	3	0	1	1.3	5			
19-Mar	1	6	0	0	3	Z	2	3	2	2	1	1	1	1	2	2	1	0	0	0	0	0	0	0	1.3	6			
20-Mar	Z	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.7	2			
21-Mar	1	Z	1	1	1	3	2	2	20	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1.5	20			
22-Mar	0	0	Z	0	1	1	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.3	1			
23-Mar	0	0	0	Z	0	0	1	0	2	C	C	C	C	C	3	1	1	1	1	0	0	0	1	1	0.6	3			
24-Mar	0	0	0	0	Z	0	1	2	2	3	2	2	1	2	2	3	3	2	1	0	1	1	2	2	1.3	3			
25-Mar	1	2	2	3	3	Z	4	2	3	2	2	4	2	4	2	2	2	1	1	1	1	2	1	3	2.2	4			
26-Mar	Z	1	1	0	1	1	2	3	3	4	4	6	7	5	3	4	2	1	0	0	0	1	0	2	2.2	7			
27-Mar	1	Z	0	0	0	0	1	5	3	1	3	3	2	2	4	5	2	4	1	1	1	1	0	0	1.7	5			
28-Mar	0	5	Z	0	0	0	0	3	4	4	5	7	6	12	13	17	9	2	0	0	0	0	0	0	3.9	17			
29-Mar	0	0	Z	0	0	0	0	1	3	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	3			
30-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	1	1	0	0.3	1			
31-Mar	0	0	0	0	0	Z	2	7	4	1	2	3	1	1	2	16	0	1	0	0	0	0	0	0	1.7	16			
1.1														1.3														Diurnal Average	
11														12														Diurnal Maximum	
0.9														1.0															
1.2														1.3															
1.0														2.1															
3.3														2.3															
2.7														2.6															
2.9														2.6															
2.6														2.6															
3.9														2.0															
1.8														0.8															
0.8														0.7															
0.8														0.8															
0.9														0.9															

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - March 2015

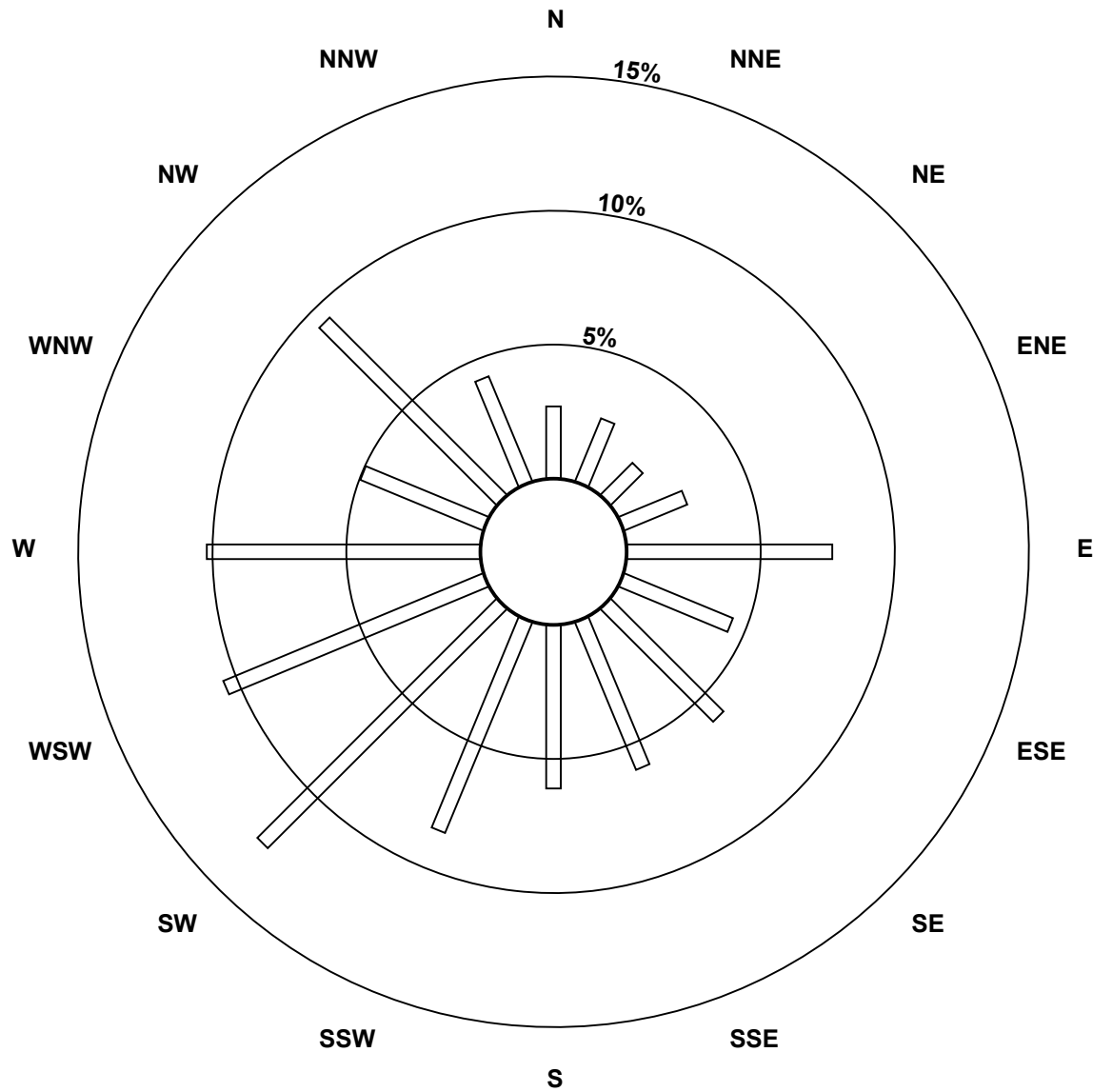
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	18	12	18	54	31	42	42	43	60	89	74	72	35	66	30	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	18	12	18	54	31	42	42	43	60	89	74	72	35	66	30	705

Total Number of Valid Hours: 705

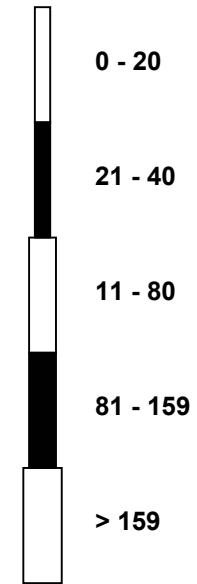
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

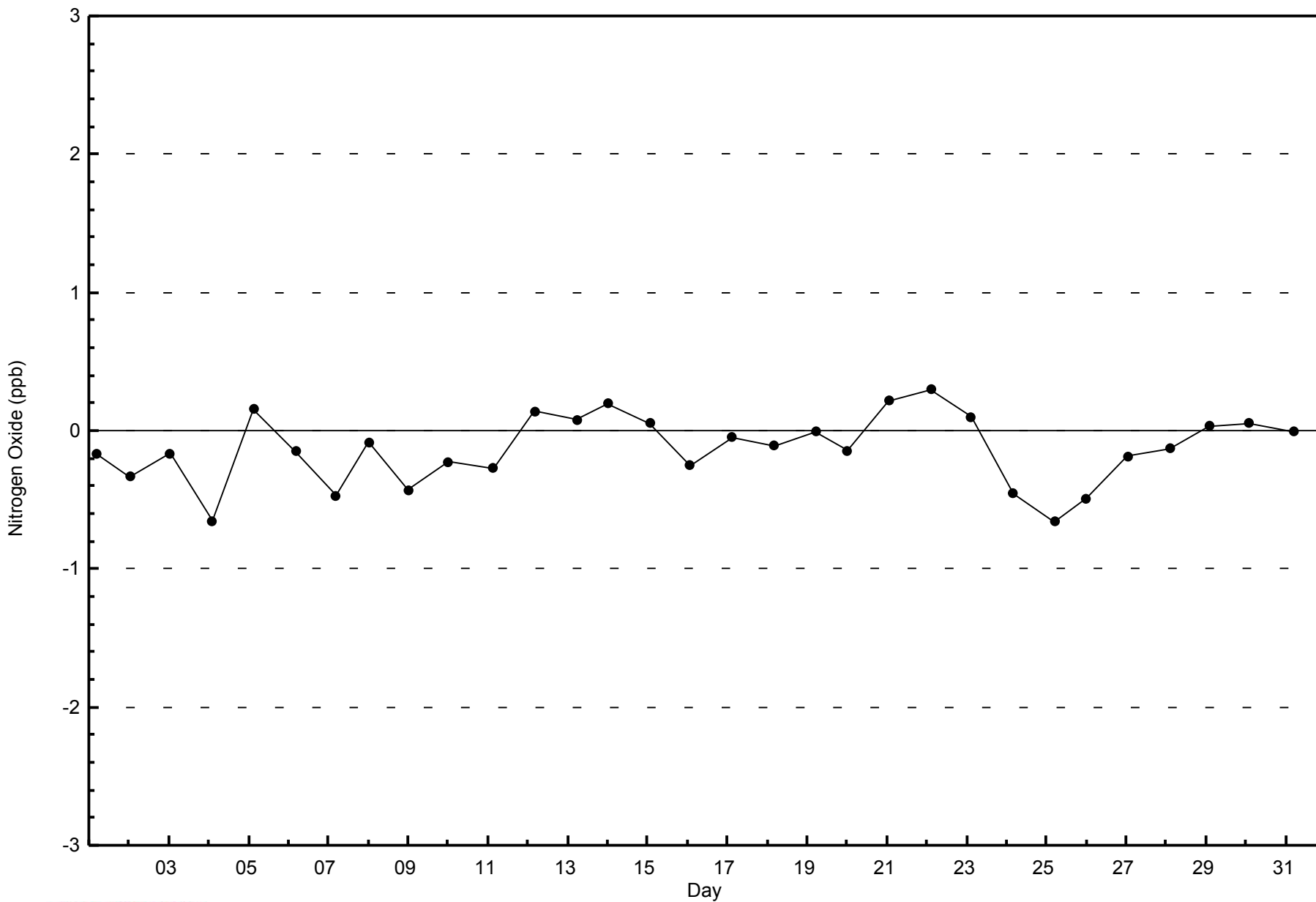


Total Number of Valid Hours: 705



WBEA
Zero Responses

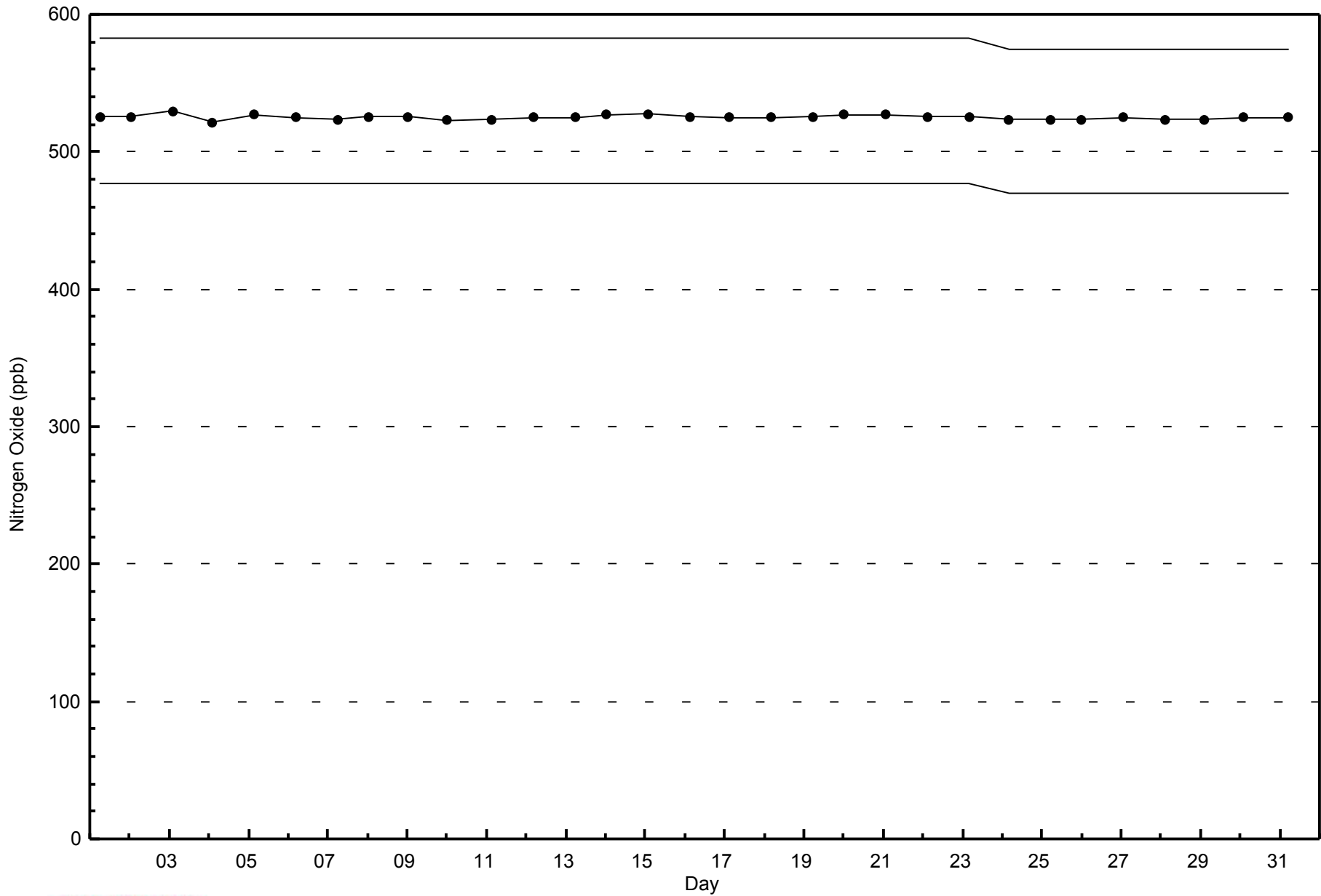
Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Span Responses

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - March 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 21 ppb on Mar 31 08:00	Maximum Daily Average: 8.3 ppb on Mar 12		Hours of Data:	708
Minimum Value: 0 ppb on Mar 22 02:00	Minimum Daily Average: 1.1 ppb on Mar 7		Hours of Missing Data:	36
Maximum Diurnal Average: 5.6 ppb at hour 8	Minimum Diurnal Average: 2.7 ppb at hour 14		Hours of Calibration:	36
Monthly Average: 4.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 17		Percent Operational Time:	100.0

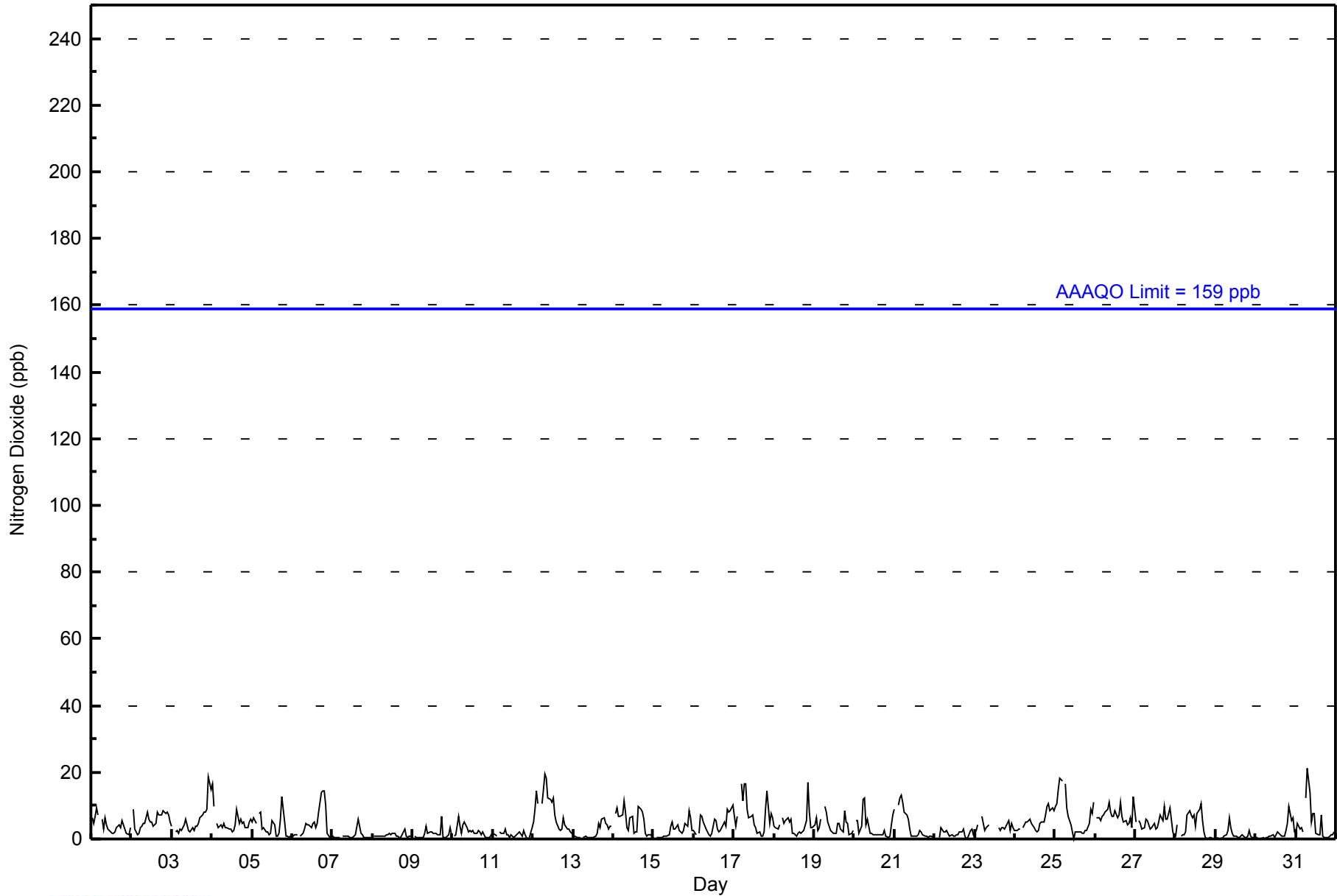
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	6	5	7	10	7	Z	6	3	7	4	3	2	2	2	3	4	3	6	4	3	2	1	3	4.1	10	
2-Mar	Z	9	3	1	2	3	4	5	5	8	6	5	5	4	5	8	7	7	7	9	8	8	7	5	5.7	9
3-Mar	4	Z	2	3	2	3	3	4	6	4	2	2	3	3	4	4	5	6	7	8	8	9	19	15	5.4	19
4-Mar	17	10	Z	5	4	4	3	5	3	3	3	2	3	4	9	5	6	5	5	4	3	5	6	5.0	17	
5-Mar	5	6	5	Z	8	8	3	4	2	2	1	2	5	4	1	1	2	6	13	5	1	1	1	3.7	13	
6-Mar	1	1	1	1	Z	1	2	3	5	4	4	3	5	5	3	5	8	14	14	14	10	2	0	1	4.7	14
7-Mar	1	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	6	4	2	1	1	1	1	1	0	1.1	6
8-Mar	Z	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	0	0	2	3	1	1	1	1	1.1	3
9-Mar	Z	1	1	1	1	0	1	2	4	2	2	2	2	2	2	1	1	7	0	0	1	1	4	1	1.6	7
10-Mar	Z	1	1	7	4	2	4	5	4	2	3	2	3	2	2	2	2	1	2	1	1	0	0	1	2.2	7
11-Mar	2	1	1	Z	2	2	2	3	1	1	1	1	0	1	1	2	2	1	3	1	1	0	0	3	1.4	3
12-Mar	5	9	14	11	Z	10	15	20	18	12	12	11	12	7	5	3	3	3	7	4	3	3	2	2	8.3	20
13-Mar	1	1	0	1	0	Z	1	1	0	1	1	1	0	1	2	5	4	6	6	5	4	3	4	4	2.2	6
14-Mar	Z	8	9	7	7	7	12	8	4	3	6	7	2	2	2	10	9	8	6	2	1	1	1	1	5.2	12
15-Mar	0	Z	1	1	0	1	1	1	1	1	4	5	3	3	4	2	2	2	3	5	4	8	6	3	2.6	8
16-Mar	3	1	Z	2	7	7	5	3	2	1	1	2	6	6	3	2	3	4	5	4	9	8	8	10	4.4	10
17-Mar	7	4	7	Z	17	12	17	16	9	6	7	7	4	3	2	2	1	1	2	9	14	5	8	7	7.2	17
18-Mar	4	4	3	4	Z	7	5	6	6	5	6	2	2	1	2	2	2	2	3	6	17	8	3	4	4.4	17
19-Mar	4	6	3	3	6	Z	10	8	5	4	3	2	2	2	5	5	3	2	8	5	5	1	2	3	4.1	10
20-Mar	Z	5	6	2	4	12	12	4	6	2	2	1	1	1	1	1	1	1	3	1	0	1	4	7	3.4	12
21-Mar	9	Z	10	12	13	11	8	7	6	3	1	1	1	1	1	3	2	1	1	1	1	1	1	0	4.1	13
22-Mar	0	0	Z	1	3	2	2	3	2	1	1	1	1	1	1	2	2	3	1	0	0	3	3	1	1.5	3
23-Mar	2	2	4	Z	7	5	3	3	4	C	C	C	C	C	4	3	3	3	3	5	6	3	5	4	3.7	7
24-Mar	2	3	3	3	Z	4	5	5	6	6	5	3	2	2	3	5	5	5	7	10	11	9	10	8	5.2	11
25-Mar	10	11	15	18	18	Z	17	9	7	4	2	0	2	2	2	2	2	2	2	3	5	9	8	11	6.9	18
26-Mar	Z	7	6	6	7	7	8	9	11	8	7	7	9	6	7	11	7	5	6	4	5	6	3	13	7.1	13
27-Mar	5	Z	6	5	3	4	6	5	4	3	4	5	3	3	5	7	6	10	6	6	8	9	2	1	5.0	10
28-Mar	1	4	Z	1	1	1	2	7	8	7	6	7	4	8	9	10	6	2	0	0	0	0	0	0	3.8	10
29-Mar	0	0	Z	1	0	1	1	3	6	4	2	1	1	1	1	1	1	0	0	1	2	1	0	1	1.2	6
30-Mar	1	0	Z	0	0	0	0	1	1	1	1	1	1	2	2	1	1	1	3	5	10	5	6	2	1.9	10
31-Mar	2	5	3	3	2	Z	12	21	14	5	8	8	2	1	1	7	1	1	1	0	1	1	1	2	4.4	21
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - March 2015

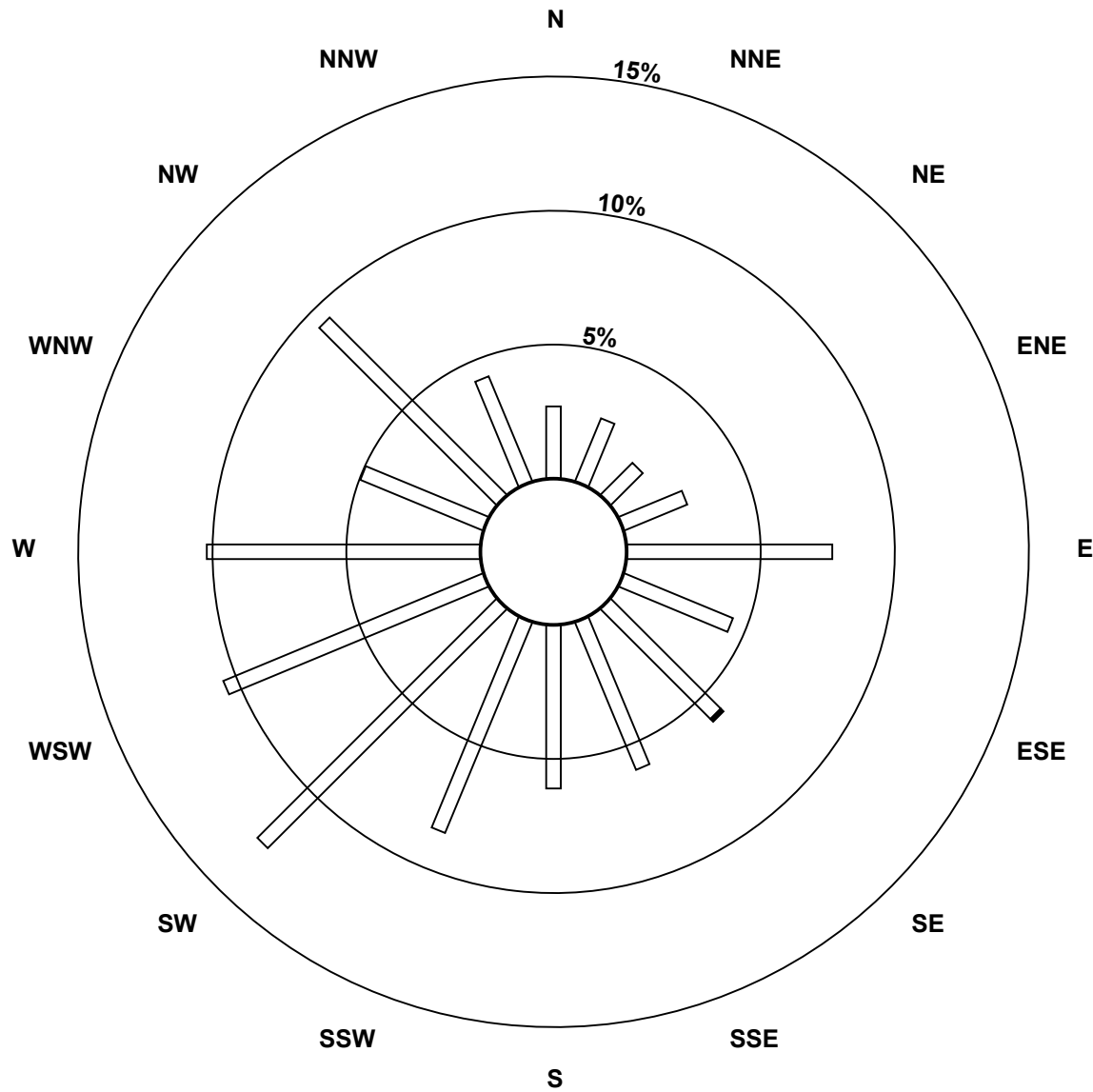
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	18	12	18	54	31	41	42	43	60	89	74	72	35	66	30	704
21 - 40	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	18	12	18	54	31	42	42	43	60	89	74	72	35	66	30	705

Total Number of Valid Hours: 705

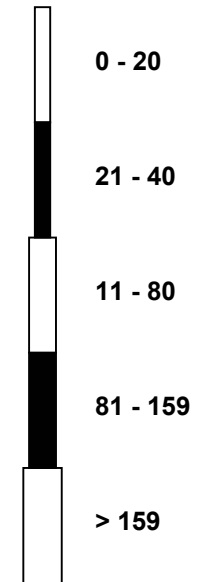
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

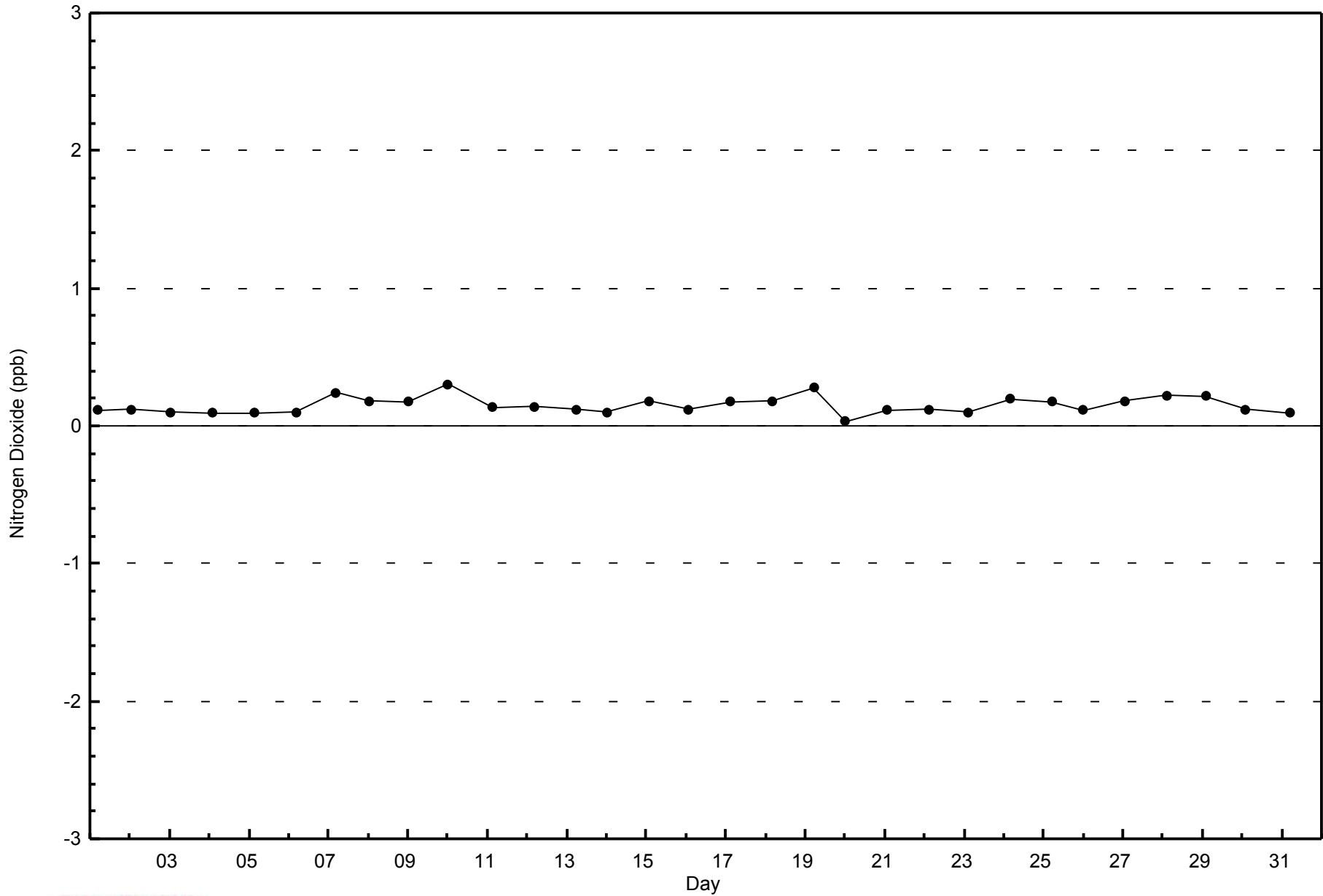


Total Number of Valid Hours: 705



WBEA
Zero Responses

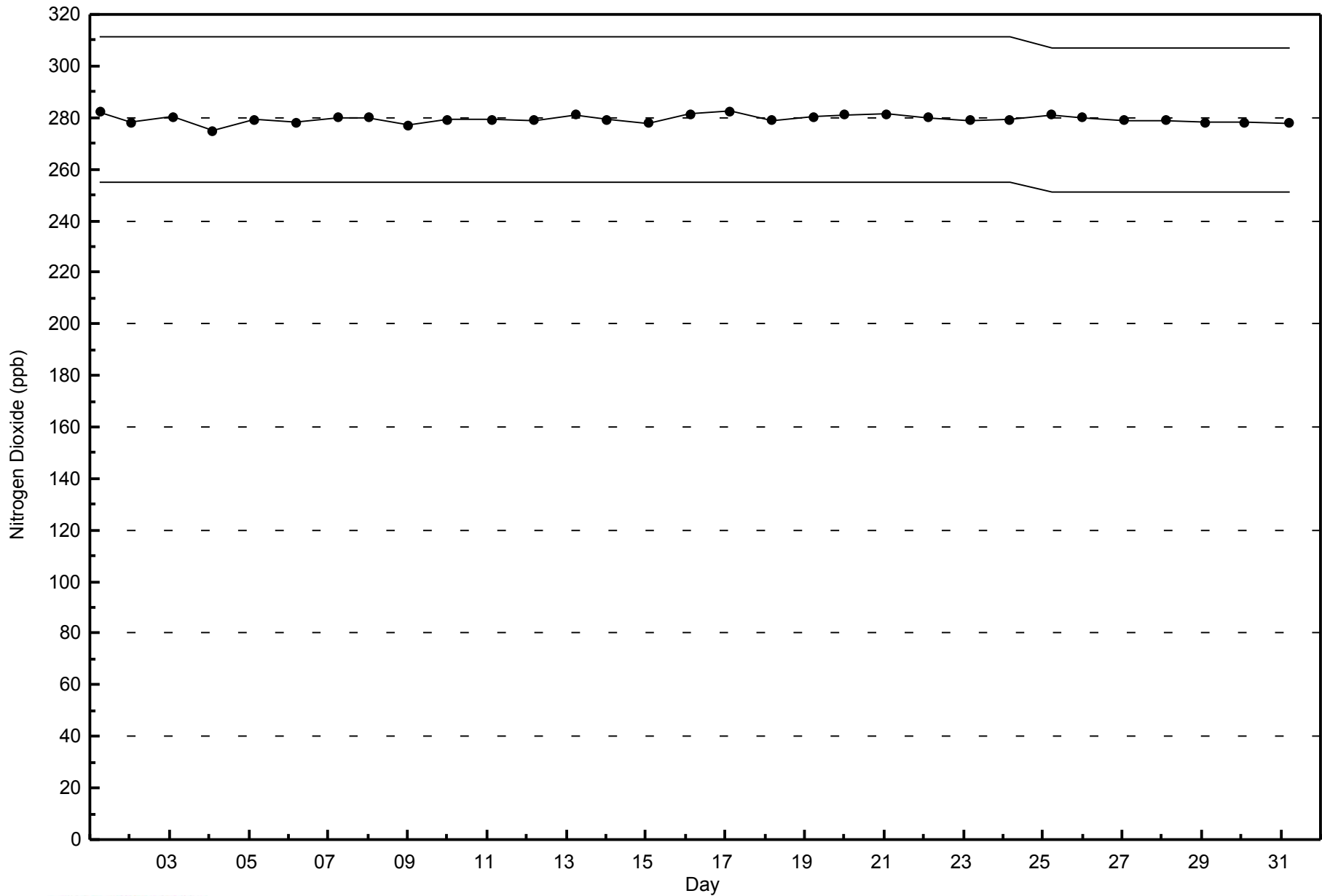
Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - March 2015



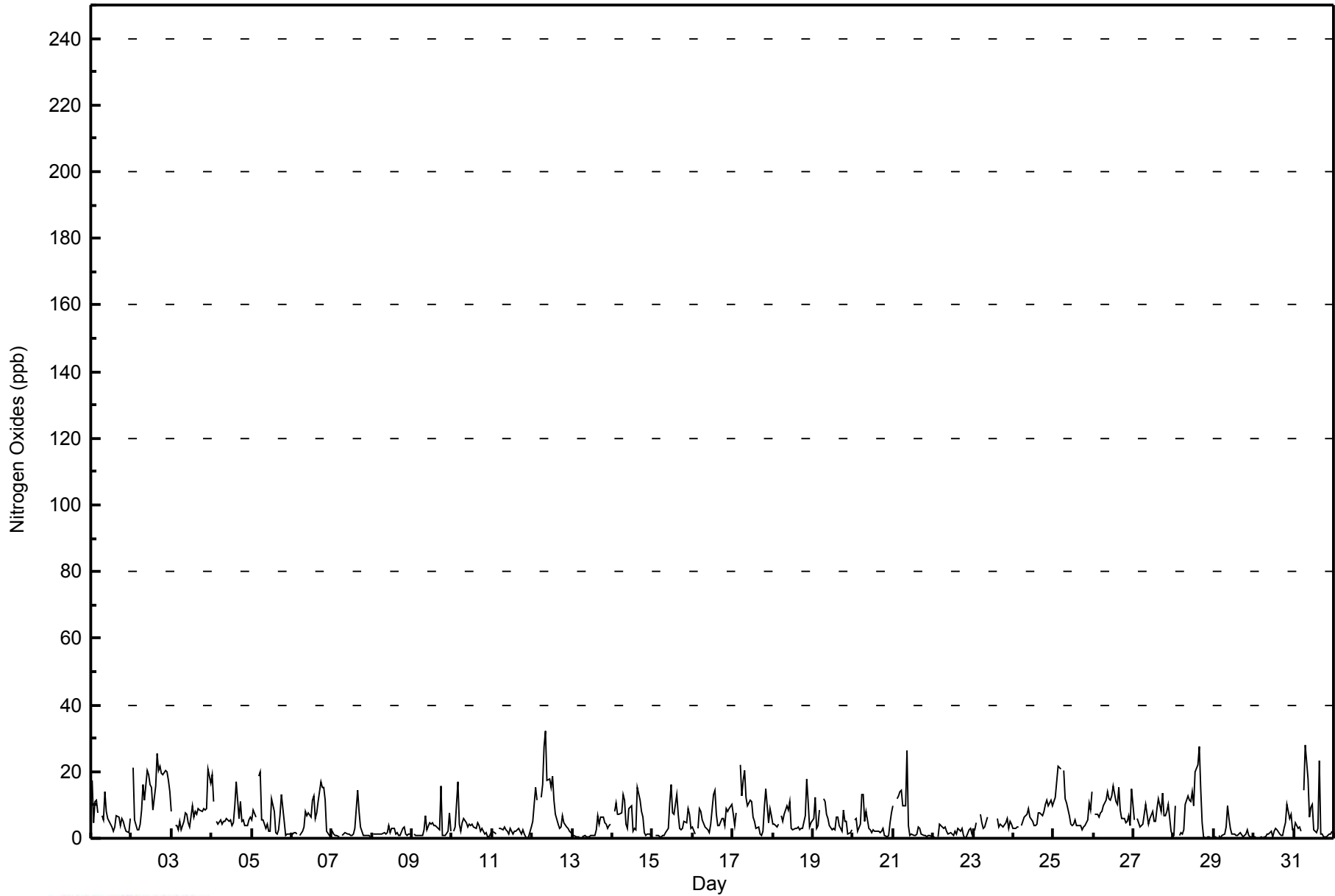


Maximum Value: 32 ppb on Mar 12 09:00										Maximum Daily Average: 15.0 ppb on Mar 2										Hours in Service: 744						
Minimum Value: 0 ppb on Mar 22 02:00										Minimum Daily Average: 1.7 ppb on Mar 8										Hours of Data: 708						
Maximum Diurnal Average: 8.4 ppb at hour 9										Minimum Diurnal Average: 4.4 ppb at hour 22										Hours of Missing Data: 36						
Monthly Average: 5.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 8 P ₉₀ = 13 P ₉₉ = 22										Hours of Calibration: 36						
																				Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	17	5	11	11	8	Z	7	5	14	8	6	4	3	2	3	7	7	4	6	5	3	2	2	6	6.3	17
2-Mar	Z	21	5	3	2	4	8	16	11	20	19	16	15	8	16	26	20	22	19	19	20	20	18	14	15.0	26
3-Mar	8	Z	4	4	3	5	3	5	8	7	5	3	10	6	8	7	9	9	8	9	9	9	21	17	7.6	21
4-Mar	19	11	Z	5	4	6	4	5	5	6	5	6	4	4	10	17	6	11	5	6	4	4	6	6	6.9	19
5-Mar	6	8	6	Z	19	20	6	5	3	4	2	2	12	8	2	1	2	7	13	5	1	1	1	1	5.9	20
6-Mar	1	2	2	1	Z	1	2	4	8	7	8	6	11	13	6	7	11	17	15	15	11	2	1	1	6.7	17
7-Mar	2	1	1	1	0	Z	1	1	2	1	1	1	1	1	3	14	8	3	2	1	1	1	1	0	2.2	14
8-Mar	Z	1	1	1	1	1	1	2	1	2	4	2	3	3	1	2	1	1	3	3	1	1	1	1	1.7	4
9-Mar	Z	1	1	1	1	1	1	3	7	3	5	4	5	4	4	3	3	16	1	1	1	2	7	2	3.3	16
10-Mar	Z	2	3	17	4	2	5	6	5	3	4	4	4	3	3	5	4	2	3	1	2	1	1	1	3.7	17
11-Mar	2	2	1	Z	3	3	2	3	2	2	1	3	1	2	2	3	3	1	3	1	1	0	0	4	2.0	4
12-Mar	5	10	15	11	Z	12	16	28	32	17	18	15	19	12	7	4	3	3	7	5	3	3	2	2	10.9	32
13-Mar	1	1	0	0	0	Z	1	1	0	1	1	1	1	1	2	7	4	6	6	5	4	3	4	4	2.4	7
14-Mar	Z	8	10	7	7	8	13	11	4	3	9	10	2	3	2	15	11	8	6	2	1	1	1	1	6.3	15
15-Mar	0	Z	1	1	0	1	1	1	2	3	10	16	8	7	13	7	3	3	3	5	5	9	7	3	4.7	16
16-Mar	3	1	Z	3	9	8	5	3	3	2	2	4	13	14	7	4	4	6	6	4	9	8	9	10	6.0	14
17-Mar	7	4	8	Z	22	13	18	20	12	10	11	11	6	5	3	4	1	1	2	9	15	5	9	7	8.8	22
18-Mar	4	4	3	4	Z	7	5	7	10	8	11	3	3	3	3	3	3	3	3	7	18	11	3	5	5.7	18
19-Mar	6	12	3	4	8	Z	12	11	7	6	4	3	3	2	6	6	4	2	9	5	5	1	2	3	5.4	12
20-Mar	Z	6	6	2	4	13	13	5	8	3	3	2	2	2	2	2	2	2	3	1	0	1	5	7	4.1	13
21-Mar	10	Z	12	13	14	14	10	10	26	4	1	1	1	1	1	4	3	1	1	1	1	1	1	0	5.6	26
22-Mar	0	0	Z	1	4	3	3	3	2	1	2	1	1	2	1	3	2	3	1	0	0	2	3	1	1.8	4
23-Mar	2	3	4	Z	7	5	3	4	7	C	C	C	C	C	6	3	4	4	4	5	6	3	5	4	4.3	7
24-Mar	3	3	3	3	Z	4	6	7	7	9	7	5	4	4	4	7	8	7	8	10	11	10	11	10	6.6	11
25-Mar	11	12	17	21	21	Z	20	12	10	7	4	4	4	6	4	4	4	2	3	4	6	10	9	14	9.1	21
26-Mar	Z	7	7	6	7	8	10	11	14	12	11	13	16	11	10	15	8	6	6	5	5	7	4	15	9.3	16
27-Mar	6	Z	6	5	3	4	7	10	7	4	6	8	5	5	9	12	8	13	7	7	8	10	2	1	6.7	13
28-Mar	1	10	Z	1	2	1	2	10	13	12	11	14	10	20	22	27	15	5	0	0	1	1	0	0	7.7	27
29-Mar	1	1	Z	1	0	1	1	3	10	6	3	1	1	1	1	1	2	1	1	1	3	1	0	1	1.7	10
30-Mar	1	0	Z	0	0	0	0	1	1	1	2	0	2	3	3	1	1	1	3	5	10	6	7	2	2.2	10
31-Mar	2	5	3	3	2	Z	14	28	18	6	9	10	2	2	3	23	1	1	1	0	1	1	1	2	6.1	28
																				Diurnal Average						
4.9										5.2										5.4						
19										21										17						
																				Diurnal Maximum						
																				4.7						
																				20						
																				21						
																				17						
Z - zerospan C - Calibration																										



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - March 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	694	98.02	98.02
21 - 40	14	1.98	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - March 2015

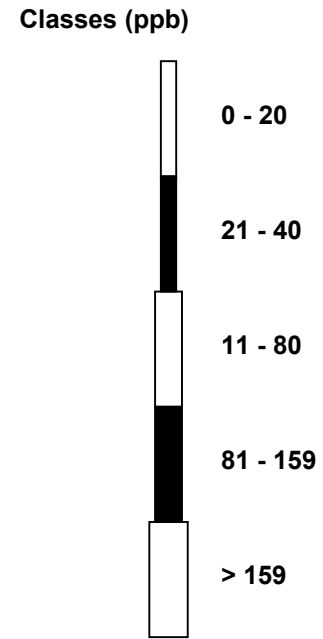
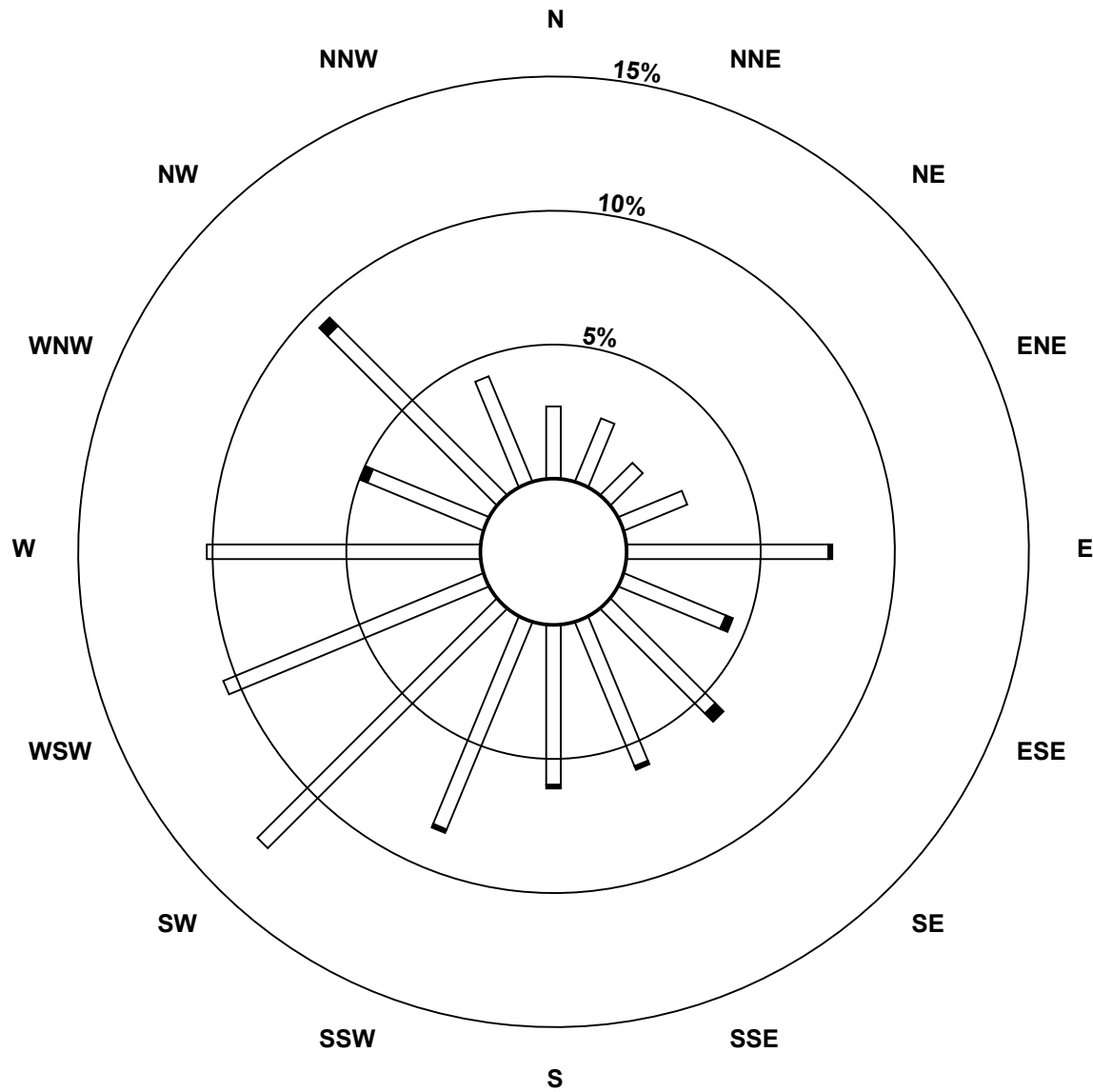
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	18	12	18	53	29	39	41	42	59	89	74	72	33	63	30	691
21 - 40	0	0	0	0	1	2	3	1	1	1	0	0	0	2	3	0	14
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	18	12	18	54	31	42	42	43	60	89	74	72	35	66	30	705

Total Number of Valid Hours: 705

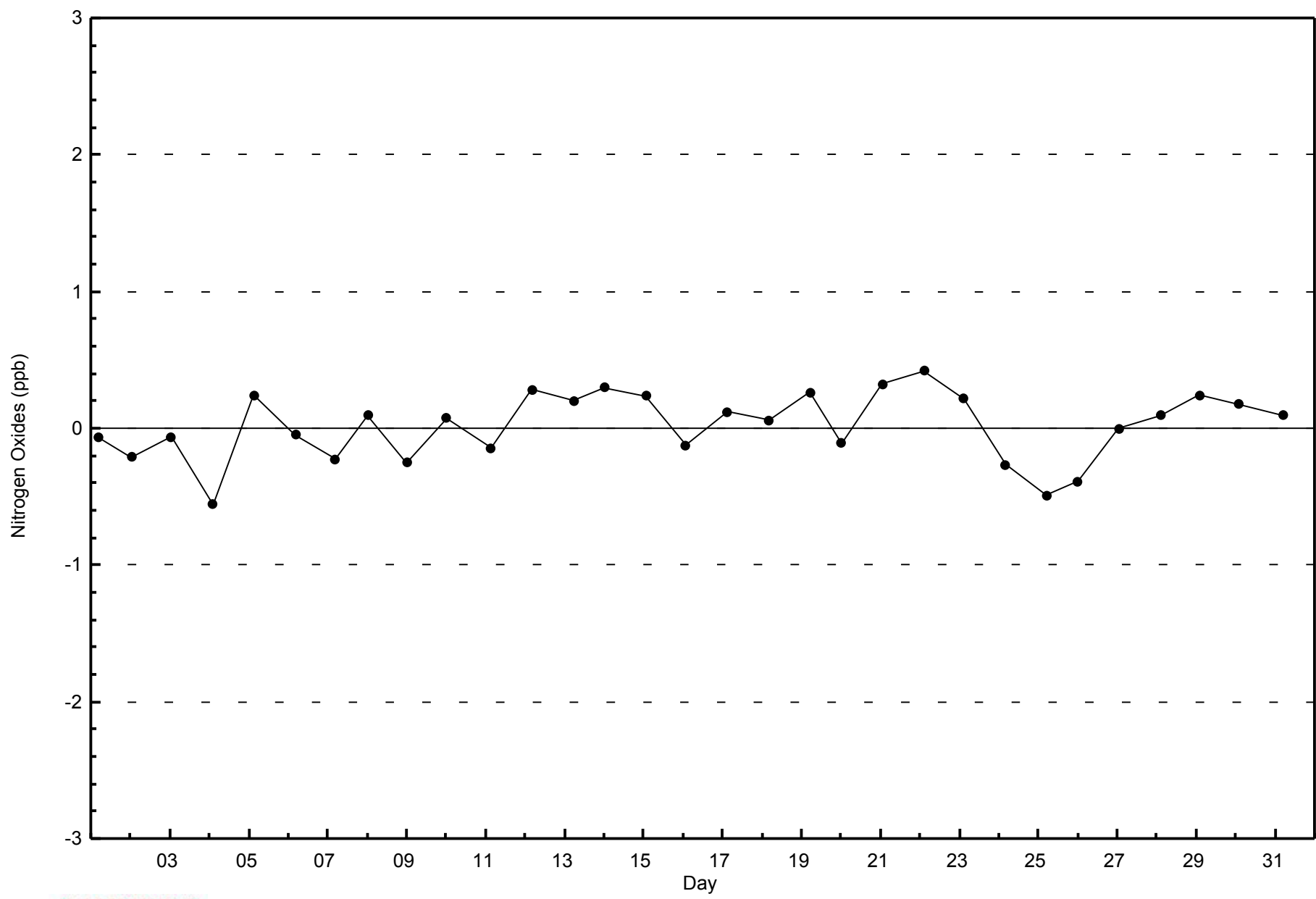
Total Number of Hours: 744

**Wood Buffalo Environmental Association
Wind Rose Mar 2015**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)**



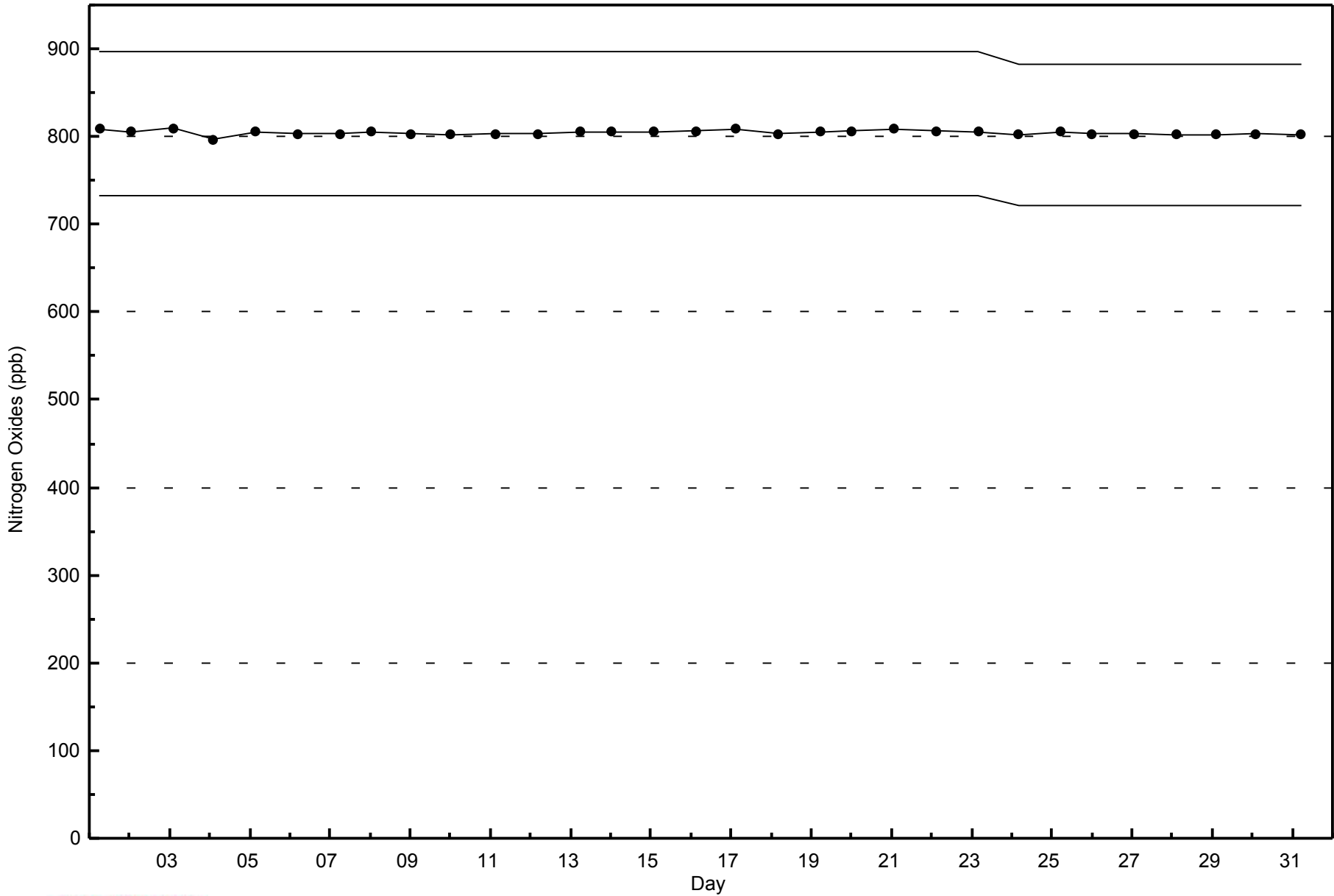
Total Number of Valid Hours: 705





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - March 2015



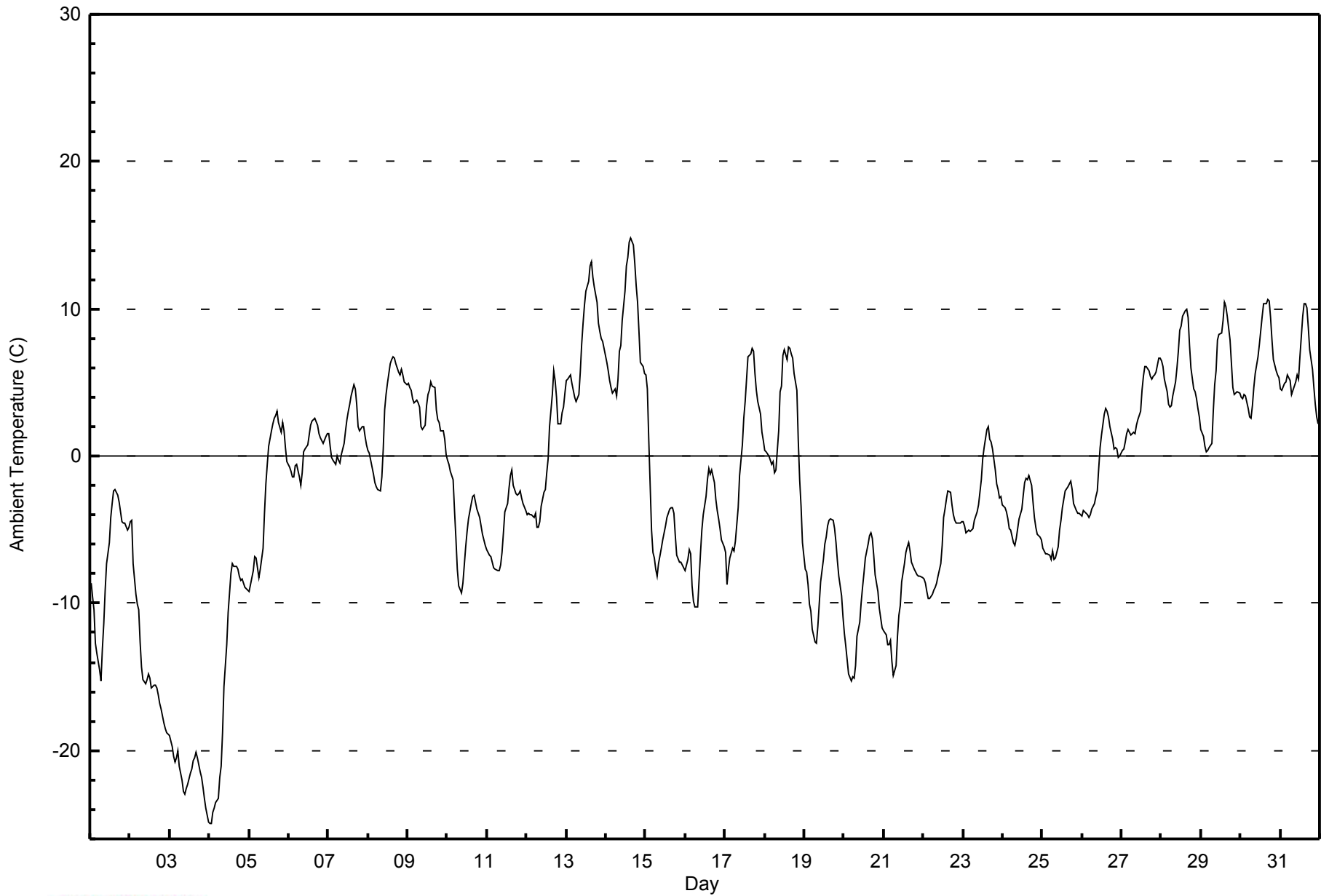


Maximum Value: 14.8 C on Mar 14 16:00		Maximum Daily Average: 8.6 C on Mar 14		Hours in Service: 744																						
Minimum Value: -25.0 C on Mar 4 02:00		Minimum Daily Average: -21.5 C on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 1.4 C at hour 16		Minimum Diurnal Average: -5.7 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -2.29 C		Percentiles: P ₁ = -23.3 P ₁₀ = -12.2 Q ₁ = -6.9 Median = -2.1 Q ₃ = 3.7 P ₉₀ = 6.7 P ₉₉ = 12.8		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-8.6	-9.6	-10.4	-12.7	-13.4	-14.5	-15.3	-13.1	-11.3	-9.1	-7.3	-5.9	-4.2	-3.2	-2.3	-2.3	-2.6	-3.1	-3.8	-4.5	-4.6	-4.5	-5.0	-4.9	-7.3	-2.3
2-Mar	-4.4	-4.3	-7.3	-9.4	-10.1	-10.5	-12.6	-14.4	-15.2	-15.5	-15.2	-14.8	-15.0	-15.8	-15.6	-15.6	-15.7	-16.2	-16.8	-17.2	-18.1	-18.5	-18.8	-18.9	-14.0	-4.3
3-Mar	-19.0	-19.7	-20.4	-20.8	-20.5	-20.0	-21.0	-22.1	-22.7	-23.0	-22.5	-22.3	-21.5	-21.2	-20.7	-20.5	-20.1	-20.5	-21.4	-21.8	-22.5	-23.3	-23.9	-24.8	-21.5	-19.0
4-Mar	-24.9	-25.0	-24.2	-23.9	-23.5	-23.2	-21.8	-21.0	-18.8	-15.6	-12.8	-10.6	-9.3	-7.9	-7.3	-7.5	-7.5	-7.7	-8.1	-8.4	-8.4	-8.9	-9.0	-9.1	-14.4	-7.3
5-Mar	-9.2	-8.7	-7.7	-6.9	-6.9	-7.6	-8.2	-7.7	-6.3	-3.9	-1.8	-0.5	0.7	1.7	2.2	2.6	2.8	3.0	2.3	1.6	2.3	1.7	0.5	-0.4	-2.3	3.0
6-Mar	-0.7	-1.0	-1.4	-1.4	-0.6	-0.5	-1.4	-2.0	-1.1	0.3	0.4	0.8	1.4	2.1	2.4	2.4	2.6	2.1	1.5	1.2	1.1	0.8	1.3	1.5	0.5	2.6
7-Mar	1.6	0.6	-0.1	-0.3	-0.5	0.1	-0.3	-0.5	0.1	0.9	1.7	2.5	3.1	3.5	4.1	4.8	4.5	3.5	2.0	1.7	2.0	2.0	1.4	0.8	1.6	4.8
8-Mar	0.4	0.2	-0.8	-1.2	-1.8	-2.1	-2.3	-2.4	-1.4	0.5	3.1	4.2	5.0	6.3	6.5	6.8	6.7	6.3	5.7	5.5	5.9	5.5	5.1	4.8	2.8	6.8
9-Mar	4.9	4.6	4.5	3.9	3.6	3.8	3.6	3.3	2.0	1.8	2.1	3.4	4.2	4.5	5.0	4.8	4.7	3.1	2.4	2.3	1.7	1.7	1.2	0.1	3.2	5.0
10-Mar	-0.3	-0.6	-1.1	-1.6	-3.7	-5.6	-7.6	-8.8	-9.3	-8.6	-7.4	-6.2	-5.1	-4.2	-3.2	-2.8	-2.7	-3.1	-3.6	-4.2	-4.7	-5.3	-5.7	-6.0	-4.6	-0.3
11-Mar	-6.4	-6.7	-6.9	-7.2	-7.6	-7.7	-7.8	-7.8	-7.4	-6.5	-5.3	-3.8	-3.2	-2.2	-1.3	-0.9	-2.0	-2.5	-2.7	-2.5	-2.3	-2.8	-3.2	-3.7	-4.6	-0.9
12-Mar	-4.0	-3.9	-4.0	-4.0	-4.2	-3.9	-4.8	-4.9	-4.5	-3.4	-2.4	-2.3	-1.2	-0.2	2.0	4.2	5.8	5.2	4.0	2.2	2.2	2.9	3.3	4.3	-0.5	5.8
13-Mar	5.1	5.2	5.6	5.0	4.5	4.0	3.7	4.2	5.7	7.6	9.0	10.2	11.2	11.9	12.9	13.2	12.1	11.5	10.5	9.1	8.4	8.0	7.8	7.3	8.1	13.2
14-Mar	6.4	5.8	5.1	4.7	4.3	4.6	4.1	5.2	7.1	7.5	9.2	11.2	13.0	13.5	14.5	14.8	14.3	13.1	11.6	10.4	8.4	6.4	6.1	5.6	8.6	14.8
15-Mar	5.5	4.5	1.2	-5.0	-6.6	-7.0	-7.7	-8.2	-7.3	-6.3	-5.7	-5.2	-4.7	-4.2	-3.6	-3.5	-3.5	-3.9	-5.4	-6.7	-7.2	-7.2	-7.4	-7.6	-4.7	5.5
16-Mar	-7.8	-7.0	-6.3	-6.6	-8.8	-9.9	-10.3	-10.3	-8.4	-6.6	-5.0	-4.0	-2.7	-1.6	-0.8	-1.2	-0.9	-1.8	-3.0	-3.7	-4.2	-4.9	-5.7	-6.2	-5.3	-0.8
17-Mar	-6.5	-8.7	-7.7	-6.9	-6.3	-6.5	-5.8	-4.7	-3.5	-1.4	0.7	2.6	3.7	5.2	6.8	7.0	7.3	7.1	5.6	4.5	3.7	2.9	1.6	1.1	0.1	7.3
18-Mar	0.4	0.2	0.1	-0.2	-0.6	-0.4	-1.1	-1.0	1.7	4.3	4.8	6.9	7.2	6.6	7.4	7.3	6.9	6.7	5.6	4.5	1.1	-1.6	-3.4	-5.9	2.4	7.4
19-Mar	-7.6	-7.9	-8.7	-10.1	-10.5	-11.7	-12.6	-12.7	-11.6	-10.0	-8.5	-7.0	-6.0	-5.5	-4.7	-4.4	-4.3	-4.3	-4.9	-5.9	-7.1	-8.2	-9.5	-10.9	-8.1	-4.3
20-Mar	-12.0	-12.9	-13.9	-14.8	-15.3	-15.0	-15.1	-14.3	-12.2	-11.2	-10.0	-8.9	-7.9	-6.9	-6.0	-5.4	-5.2	-5.6	-6.7	-8.0	-9.2	-10.4	-11.0	-11.6	-10.4	-5.2
21-Mar	-11.9	-12.2	-12.8	-12.8	-12.5	-13.9	-14.9	-14.3	-12.2	-10.8	-10.1	-8.5	-7.3	-6.6	-6.1	-5.9	-6.5	-7.2	-7.7	-7.9	-8.0	-8.1	-8.2	-8.2	-9.8	-5.9
22-Mar	-8.3	-8.6	-9.2	-9.7	-9.7	-9.4	-9.1	-8.9	-8.7	-8.1	-7.3	-6.1	-4.1	-3.6	-3.0	-2.3	-2.5	-3.3	-4.0	-4.4	-4.6	-4.6	-4.6	-4.5	-6.2	-2.3
23-Mar	-4.5	-4.8	-5.2	-5.0	-5.1	-5.0	-4.9	-4.3	-3.8	-3.3	-2.5	-1.6	-0.2	0.6	1.8	2.0	1.2	1.0	0.5	-1.0	-1.8	-2.3	-2.8	-2.8	-2.2	2.0
24-Mar	-3.4	-3.5	-3.8	-4.3	-4.9	-5.1	-5.9	-6.0	-5.6	-4.9	-4.2	-3.6	-2.6	-1.8	-1.5	-1.6	-1.3	-2.0	-3.1	-4.2	-4.8	-5.3	-5.5	-5.7	-3.9	-1.3
25-Mar	-6.3	-6.5	-6.6	-6.7	-6.7	-7.0	-6.4	-7.1	-6.9	-6.2	-5.0	-4.4	-3.5	-3.0	-2.4	-2.0	-1.9	-1.7	-2.2	-3.2	-3.7	-3.8	-3.9	-4.0	-4.6	-1.7
26-Mar	-4.0	-3.7	-3.8	-4.0	-4.2	-4.0	-3.6	-3.2	-2.7	-2.3	-0.8	0.6	1.4	2.8	3.2	3.0	2.6	2.0	1.2	0.5	0.5	0.5	-0.1	0.0	-0.7	3.2
27-Mar	0.4	0.5	1.0	1.5	1.8	1.5	1.5	1.6	1.5	2.1	2.5	3.1	4.5	5.4	6.1	6.1	5.8	5.4	5.2	5.4	5.5	5.7	6.7	6.6	3.6	6.7
28-Mar	6.5	6.0	5.2	4.4	3.6	3.4	3.4	4.1	5.0	6.0	7.1	8.6	8.8	9.5	9.8	9.9	9.4	7.5	5.9	4.6	4.3	3.9	3.2	2.6	5.9	9.9
29-Mar	1.8	1.3	0.7	0.3	0.4	0.6	0.9	3.1	4.8	5.8	7.9	8.3	8.4	9.2	10.4	10.1	9.5	7.9	6.3	4.7	4.2	4.3	4.4	4.2	5.0	10.4
30-Mar	4.0	3.9	4.1	4.1	3.3	2.6	2.6	3.4	4.6	5.6	6.7	7.6	8.6	9.5	10.3	10.3	10.7	10.5	9.4	7.9	6.6	5.8	5.6	5.3	6.4	10.7
31-Mar	4.6	4.4	5.0	5.1	5.5	5.3	5.1	4.2	4.8	5.0	5.5	5.2	6.7	9.5	10.3	10.4	10.0	8.8	7.2	5.9	4.7	3.5	2.7	2.2	5.9	10.4
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - March 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	30	4.03	4.03
-20 - 0	399	53.63	57.66
0 - 10	289	38.84	96.51
10 - 20	26	3.49	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

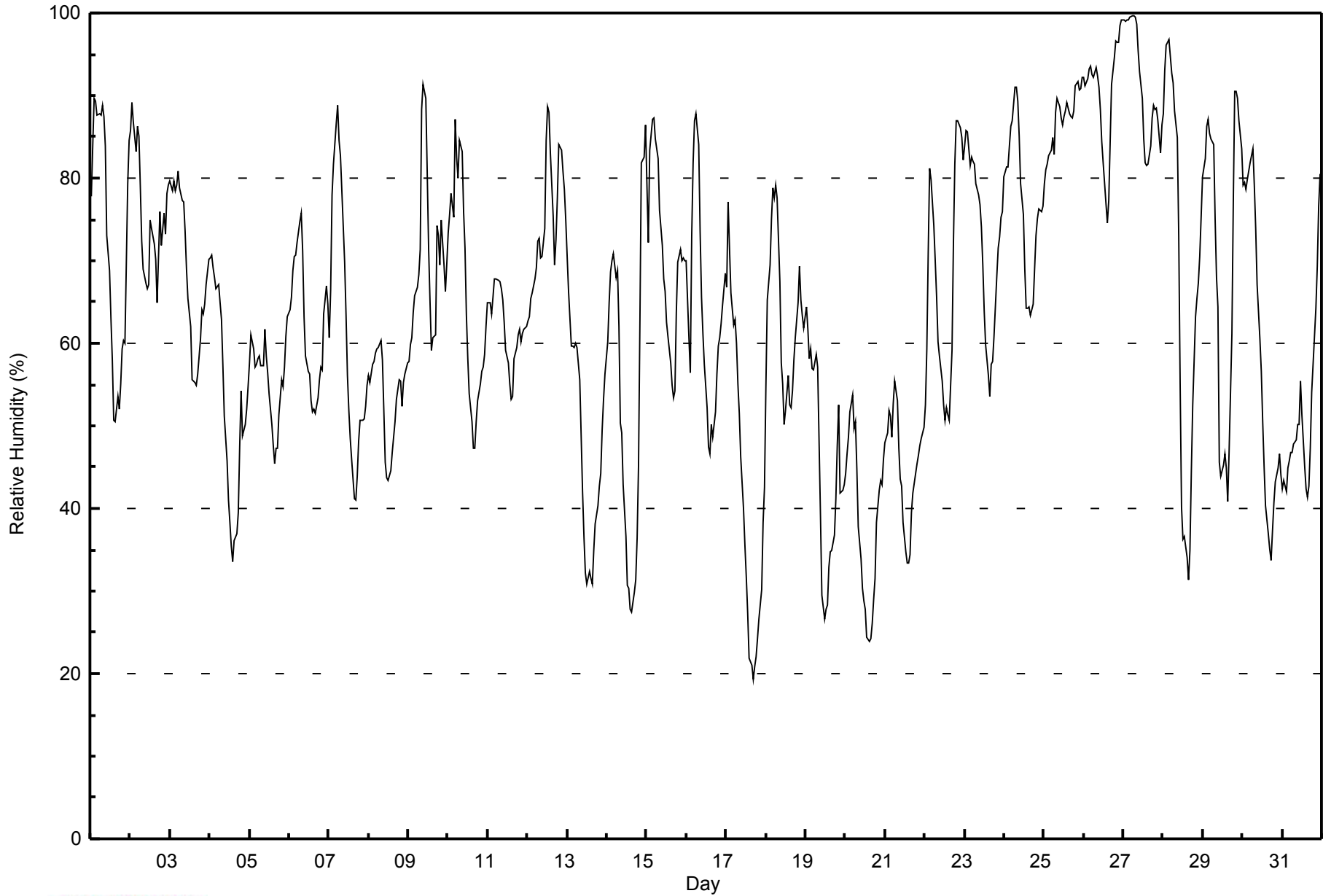


Maximum Value: 100 % on Mar 27 07:00																			Maximum Daily Average: 91.4 % on Mar 27						Hours in Service: 744																			
Minimum Value: 19 % on Mar 17 17:00																			Minimum Daily Average: 38.3 % on Mar 20						Hours of Data: 744																			
Maximum Diurnal Average: 74.7 % at hour 5																			Minimum Diurnal Average: 49.4 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 63.8 %																			Percentiles: P ₁ = 24 P ₁₀ = 41 Q ₁ = 51 Median = 63 Q ₃ = 79 P ₉₀ = 87 P ₉₉ = 99						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Mar	78	84	90	89	88	88	88	89	87	84	73	69	63	58	51	50	53	52	55	59	60	60	79	85	72.2	90																		
2-Mar	86	89	87	83	86	85	79	72	69	67	67	67	75	74	72	70	65	71	76	72	76	73	78	79	75.8	89																		
3-Mar	80	79	80	78	79	81	79	77	77	74	69	65	62	56	55	55	55	56	60	64	64	65	67	70	68.6	81																		
4-Mar	70	71	69	68	67	67	65	63	57	51	46	41	38	35	34	36	37	40	47	54	49	50	52	55	52.6	71																		
5-Mar	58	61	59	57	58	58	59	57	57	62	59	56	54	50	48	45	47	47	51	56	55	57	61	63	55.6	63																		
6-Mar	64	66	69	70	71	72	75	76	71	63	58	57	56	53	52	52	52	53	56	57	57	64	67	65	62.3	76																		
7-Mar	61	66	78	82	87	89	85	83	79	70	63	56	52	48	46	41	41	44	48	51	51	51	52	55	61.6	89																		
8-Mar	56	55	57	58	59	59	60	60	58	52	46	44	43	45	47	49	51	53	56	55	52	55	56	58	53.5	60																		
9-Mar	58	60	61	64	66	67	68	71	88	91	90	81	71	65	59	61	61	74	73	70	75	69	66	70	69.9	91																		
10-Mar	73	76	78	75	87	82	80	85	83	76	72	63	58	54	51	47	47	50	53	55	57	57	59	62	65.9	87																		
11-Mar	65	65	63	66	68	68	68	67	67	65	63	59	58	55	53	54	58	60	61	62	60	61	62	62	62.0	68																		
12-Mar	63	63	65	66	68	69	72	73	70	70	74	85	89	88	83	75	69	73	78	84	83	81	79	75	74.8	89																		
13-Mar	71	66	60	60	59	60	60	56	49	42	37	32	31	32	31	35	38	40	43	44	49	53	56	47.3	71																			
14-Mar	60	65	69	70	71	68	69	62	50	49	43	37	31	30	28	27	30	31	36	45	63	82	83	86	53.5	86																		
15-Mar	79	72	83	87	87	85	84	82	76	72	68	66	62	61	58	55	53	54	64	70	71	70	70	70	70.9	87																		
16-Mar	70	61	56	73	82	87	88	84	74	66	61	57	52	48	47	50	49	52	56	60	61	62	65	68	63.7	88																		
17-Mar	67	77	72	66	62	63	60	55	52	46	40	36	32	27	22	21	19	21	22	24	27	30	38	43	42.5	77																		
18-Mar	55	65	70	75	79	78	79	78	68	58	55	50	52	56	53	52	54	58	61	65	69	65	63	62	63.3	79																		
19-Mar	64	62	58	59	57	57	59	57	48	39	30	27	28	28	33	35	35	37	41	48	52	42	42	43	45.0	64																		
20-Mar	44	47	49	52	54	50	50	45	38	34	30	29	28	24	24	24	26	29	31	38	42	43	43	46	38.3	54																		
21-Mar	48	49	52	51	49	53	55	53	47	44	43	38	35	33	33	34	39	42	44	45	46	48	49	50	45.0	55																		
22-Mar	53	59	71	81	80	74	70	66	60	58	56	53	51	52	51	51	59	72	82	87	87	86	85	82	67.7	87																		
23-Mar	84	86	86	82	83	82	82	79	78	77	74	69	64	60	56	53	57	58	61	68	71	73	75	76	72.2	86																		
24-Mar	80	81	81	84	86	87	91	91	89	85	79	76	69	64	64	64	63	65	69	73	75	76	76	77	77.0	91																		
25-Mar	79	81	82	83	83	85	83	88	90	89	87	86	87	88	89	88	87	87	88	91	92	91	91	92	87.0	92																		
26-Mar	92	91	92	93	94	93	92	93	92	91	88	84	82	77	75	77	84	91	95	97	96	97	99	99	90.2	99																		
27-Mar	99	99	99	99	99	100	100	100	99	95	93	90	85	82	82	82	84	87	89	88	88	87	83	86	91.4	100																		
28-Mar	88	93	96	97	95	93	91	88	85	73	55	40	36	37	34	31	35	44	53	63	65	67	71	75	66.9	97																		
29-Mar	80	82	86	87	85	85	84	75	68	64	46	44	45	47	45	41	47	61	77	90	91	90	87	84	70.5	91																		
30-Mar	79	79	79	80	82	83	83	79	74	67	61	57	51	45	40	37	35	34	37	41	43	45	47	44	58.4	83																		
31-Mar	42	43	42	45	46	47	47	48	48	50	50	56	51	45	42	41	43	47	54	61	64	69	77	81	51.7	81																		
																			69.2	70.7	72.2	73.6	74.7	74.6	74.3	72.7	69.3	65.3	60.4	57.1	54.5	52.2	50.2	49.4	50.7	54.3	58.6	62.5	64.1	65.0	66.9	68.3	Diurnal Average	
																			99	99	99	99	99	100	100	100	99	95	93	90	89	88	89	88	87	91	95	97	96	97	99	99	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - March 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	1	0.13	0.13
20 - 40	69	9.27	9.41
40 - 60	255	34.27	43.68
60 - 80	251	33.74	77.42
80 - 100	168	22.58	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 50 km/h on Mar 15 04:00	Maximum Daily Speed Average: 26.8 km/h on Mar 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 22 22:00	Minimum Daily Speed Average: 3.6 km/h on Mar 23	Hours of Data: 741
Maximum Diurnal Speed Average: 10.2 km/h at hour 1	Minimum Diurnal Speed Average: 2.0 km/h at hour 19	Hours of Missing Data: 3
Monthly Average Velocity: 6.3 km/h 250.1 deg	Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 13 Q ₃ = 19 P ₉₀ = 23 P ₉₉ = 38	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	NW10	NNW11	NNW8	SW5	SSW8	SSW6	SW11	SW16	SW12	SSW7	SSW10	SSW15	SSW14	SSW15	SSW15	S16	S18	S17	S16	S18	SSW18	SW23	SW30	WSW22	SSW11.7	SW30	
2-Mar	W21	NW26	NW38	NW39	NW28	NW31	NW39	NW33	NW31	NW32	NW30	NW27	NW27	NW26	NW28	NW26	NW27	NW24	NW23	WNW19	WNW22	WNW22	WNW22	WNW22	NW26.8	NW39	
3-Mar	WNW18	W16	W21	W20	W21	WNW18	NNW18	NW18	NNW18	NW22	NW26	NW27	NW24	NW26	NW22	NW23	NW19	NW17	NNW14	NW11	NW8	WSW3	SSW6	SSW10	NW15.7	NW27	
4-Mar	SSW11	SSW12	SW14	SW16	SW15	SSW16	SSW12	S10	SSW15	SSW18	SSW16	SSW16	SSW18	SSW15	S14	S14	S14	S14	S14	SSW18	SW26	SW29	SW28	SW27	SSW16.2	SW29	
5-Mar	SW26	W11	W15	W26	WNW25	WNW22	WNW21	W22	W24	W22	W20	W19	WNW15	W14	W14	WSW14	WSW10	SW6	SSW7	SW13	WSW18	WSW19	WSW19	WSW22	W16.4	W26	
6-Mar	SW20	SW22	SW21	WSW22	WSW21	W19	W18	W17	WNW13	NW18	NW20	NNW20	NW20	NW19	NNW15	N9	NNE6	E3	SE4	S8	SSW9	WSW12	WSW16	WSW18	W10.7	WSW22	
7-Mar	W21	WSW20	W19	WSW17	WSW18	W21	W23	W27	W30	W32	W30	W30	W29	W24	W24	WNW21	W19	W15	WSW14	WSW18	WSW17	WSW16	WSW17	SW18	W21.3	W32	
8-Mar	WSW19	WSW19	SW19	WSW21	SW20	SW20	SW21	SW23	SW22	SW18	SW18	SW23	SW21	SW19	SW18	SW19	SW20	SW16	SW12	SW16	WSW17	WSW16	WSW18	WSW18	SW18.7	SW23	
9-Mar	WSW22	WSW21	WSW18	WSW17	WSW17	WSW18	WSW15	W12	WNW14	W16	W18	W21	W21	W19	W20	WNW16	W16	WNW18	W14	WSW15	W16	W16	WNW16	W15	W16.5	WSW22	
10-Mar	W18	W20	W21	WNW21	NW22	NNW21	NNW19	NNW18	NNW14	NNW13	NNW9	NNW8	NNE8	N6	NNE5	NE5	E7	E9	E9	E9	E9	E11	E12	E12	E10	NNW6.3	NW22
11-Mar	ENE10	E11	E11	E11	E10	E11	E12	E11	E12	E13	E14	E13	E15	E14	ENE11	NE10	NE11	NE9	NE7	ENE7	ESE11	ESE10	ESE9	ESE12	E10.4	E15	
12-Mar	SE13	SE11	SE6	SE7	SE11	SSE11	SE3	ESE6	SE8	SSE9	SE13	SSE13	SSE11	SSE13	S12	SSW16	SSW13	SSW12	S11	SSW14	SW19	SW20	SW22	SW27	S10.4	SW27	
13-Mar	SW26	SW27	WSW28	WSW28	WSW27	WSW25	WSW26	WSW23	WSW19	W18	WSW20	WSW22	SW22	SW24	SW21	S14	SSE15	SSE16	SSE15	S18	S21	SSW22	S20	S19	SW18.6	WSW28	
14-Mar	S16	S15	SSE13	SSE16	S17	S16	S16	SSW17	SW20	SW22	SW4	SW5	WSW11	WSW17	WSW7	SE4	SSE6	S7	SSW8	SW15	SW18	SW13	SW21	WSW31	SSW11.9	WSW31	
15-Mar	WSW40	WSW41	W50	WNW50	WNW40	W36	W33	W32	W30	W29	WNW27	WNW24	WNW23	NW19	WNW20	NW13	NNW12	N10	N9	NNE5	AF	S7	S10	SSW11	W21.3	WNW50	
16-Mar	SW15	SW20	WSW23	W16	NW17	NW17	WNW11	W10	W11	W15	W16	W18	WNW18	NW16	WNW13	NNE11	N9	NE8	NE5	SE2	SE4	ESE5	S5	SE2	W7.8	WSW23	
17-Mar	SW5	W7	SW4	SW3	S5	S7	S8	S10	S14	SSE11	SSE12	SE11	SE13	SSE9	WSW10	WSW11	SW8	WSW6	SW6	SSW7	S7	SSW8	SSW9	SSW11	SSW6.8	S14	
18-Mar	SW14	SSW13	SSW12	SSW10	SSE6	S8	SSW9	SW9	SSW8	SSE7	SE9	SW14	SW14	SSW14	SW16	WSW16	W15	W11	NNW11	NW10	NNW17	NW18	NW21	NW23	WSW7.2	NW23	
19-Mar	NW23	NW20	NW20	NW20	NW18	NNW16	NW16	NW13	NNW10	N9	N8	N7	N8	NNW7	N10	N12	N10	NNW11	NNW11	NW15	NNW13	N13	NNE11	NNE10	NNW12.1	NW23	
20-Mar	NNE9	NNE7	NE6	ENE6	E4	SE5	SSE5	SSW7	ESE5	E6	ENE4	NE4	NNE6	NNE4	ENE4	NE6	ENE8	ENE9	E9	E9	ESE9	ESE9	ESE10	SE10	E4.8	ESE10	
21-Mar	SE11	SE11	SE9	SSE7	SSE7	ESE9	SE10	SE10	ESE9	ESE13	ESE15	E14	E14	E15	E17	E15	ENE15	ENE16	E13	E12	E11	E11	E10	E10	ESE11.0	E17	
22-Mar	E11	E10	ESE10	ESE9	ESE8	E6	ESE7	ESE8	ESE9	ESE7	E7	E5	E5	ENE8	ENE8	E9	ESE9	SSE7	SSW2	SW3	WSW4	ESE1	SW3	SW6	ESE5.4	E11	
23-Mar	SSW6	SSW6	SSW7	S8	S9	S9	SSW10	S10	SSW9	SW14	SW12	SSW13	SW10	W14	W10	NNE5	NNE10	N4	N7	NNE8	N6	N6	NE4	NNW6	SW3.6	W14	
24-Mar	NW11	NW11	NW11	NW11	NW11	NW11	NW12	NW13	NW9	NNW9	NNW7	NNW9	NNW11	NNW12	NNW13	NNW12	N11	N12	N10	N7	ENE4	ESE5	SE8	SE9	NNW7.9	NW13	
25-Mar	SE11	SE9	SE7	SE8	SE8	SE7	SE8	ESE7	ESE8	ESE9	ESE9	ESE9	E9	E10	E10	E10	E10	E8	E8	E7	ESE5	SE7	SE9	SE11	SE11	ESE8.0	SE11
26-Mar	SSE11	SSE12	SSE12	SSE12	SSE13	S16	S15	S17	SSE14	SSE14	SSE16	SSE15	SE15	SE16	SSE14	SE11	SSE12	SSE11	SSE9	SSE11	SSE8	SSE5	AF	AF	SSE12.5	S17	
27-Mar	SSW7	ENE2	W3	W4	NW8	WSW3	SW4	SSW4	SSW7	S7	S8	SSE11	SE12	SSE13	SSE11	SE11	SE11	SE12	SSE13	SSE10	S11	SSW9	SW16	WSW19	S6.4	WSW19	
28-Mar	W16	WNW16	NW16	NW19	NW11	W6	W8	WNW12	WNW11	WNW10	WNW12	WNW17	NW21	NW24	WNW24	WNW23	W25	W26	WSW19	WSW24	WSW24	WSW22	WSW20	WSW22	W15.7	W26	
29-Mar	WSW19	SW17	SW16	SW17	SW17	SW14	SW12	SW4	SE5	SE7	SSW11	SW14	SW14	WSW10	SW13	SW14	SW18	WSW15	WSW14	SW11	SSW12	SW18	WSW24	WSW25	SW13.4	WSW25	
30-Mar	WSW26	WSW23	WSW25	WSW23	WSW21	WSW21	WSW18	W18	W18	W19	W19	W19	W19	W16	W16	WSW17	SW12	SW12	SW8	SSW8	SSW9	SSW9	SW9	SW12	WSW15.8	WSW26	
31-Mar	SW12	SW9	SW11	SSW10	SSW9	SSE8	SSE9	SE8	SE8	ESE8	ESE7	ENE8	ENE12	E21	E20	E19	E19	ENE18	ENE15	ENE13	NE12	NNE12	NNE13	NNE14	E7.1	E21	

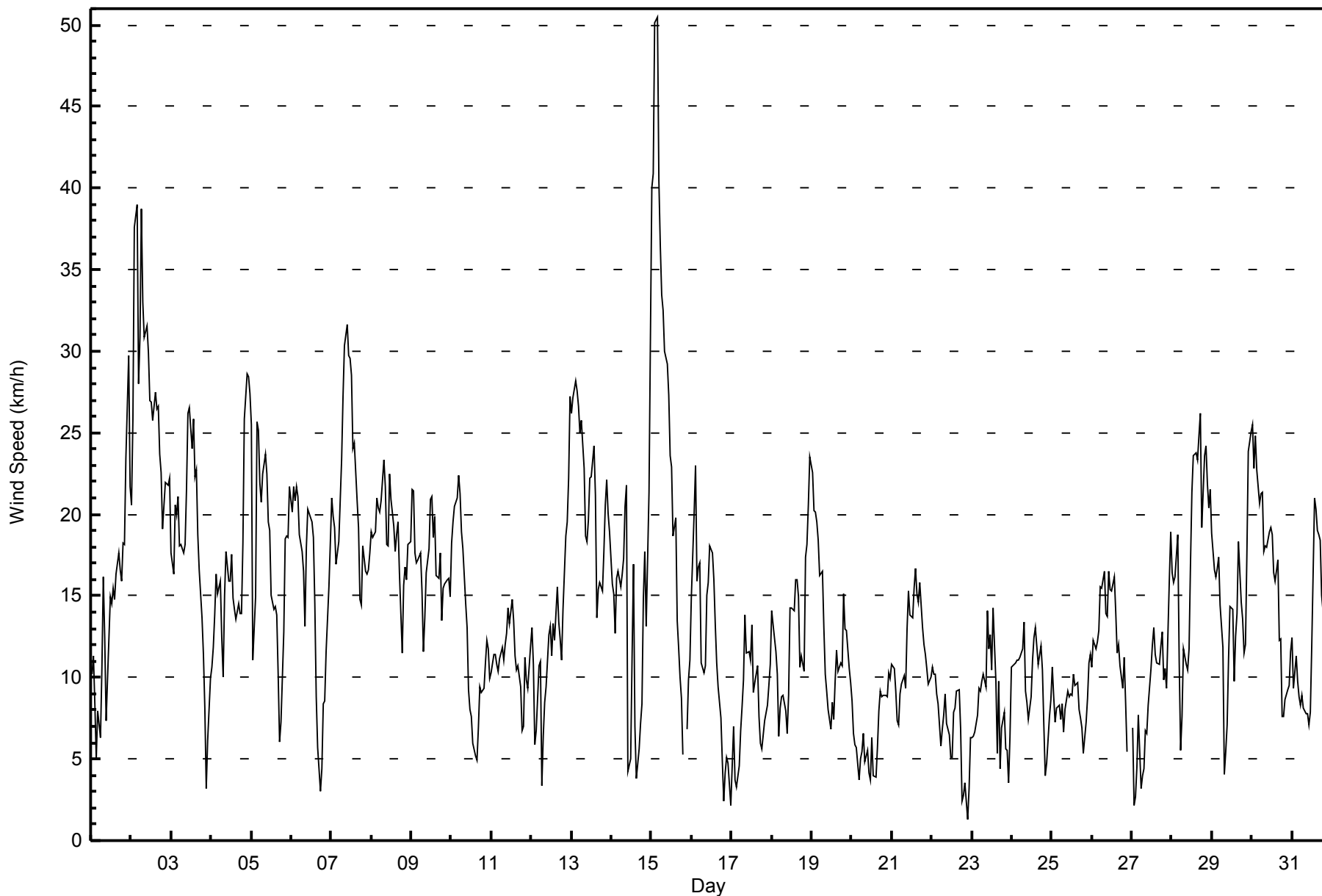
WSW10.2	WSW9.5	WSW9.7	W9.6	WSW8.5	WSW7.9	WSW7.8	WSW7.8	WSW6.8	WSW6.3	W5.7	W6.4	W5.7	W5.3	W5.3	W3.0	WSW2.7	WSW2.1	SW2.0	SW4.3	SW5.9	SW6.4	SW8.3	SW9.4	Diurnal Average	
WSW40	WSW41	W50	WNW50	WNW40	W36	NW39	NW33	NW31	W32	NW30	W30	W29	NW26	NW28	NW26	NW27	W26	NW23	WSW24	SW26	SW29	SW30	WSW31	Diurnal Maximum	

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - March 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - March 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	51	6.88	6.88
6 - 11	259	34.95	41.84
12 - 19	274	36.98	78.81
20 - 28	131	17.68	96.49
29 - 38	19	2.56	99.06
> 38	7	0.94	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - March 2015

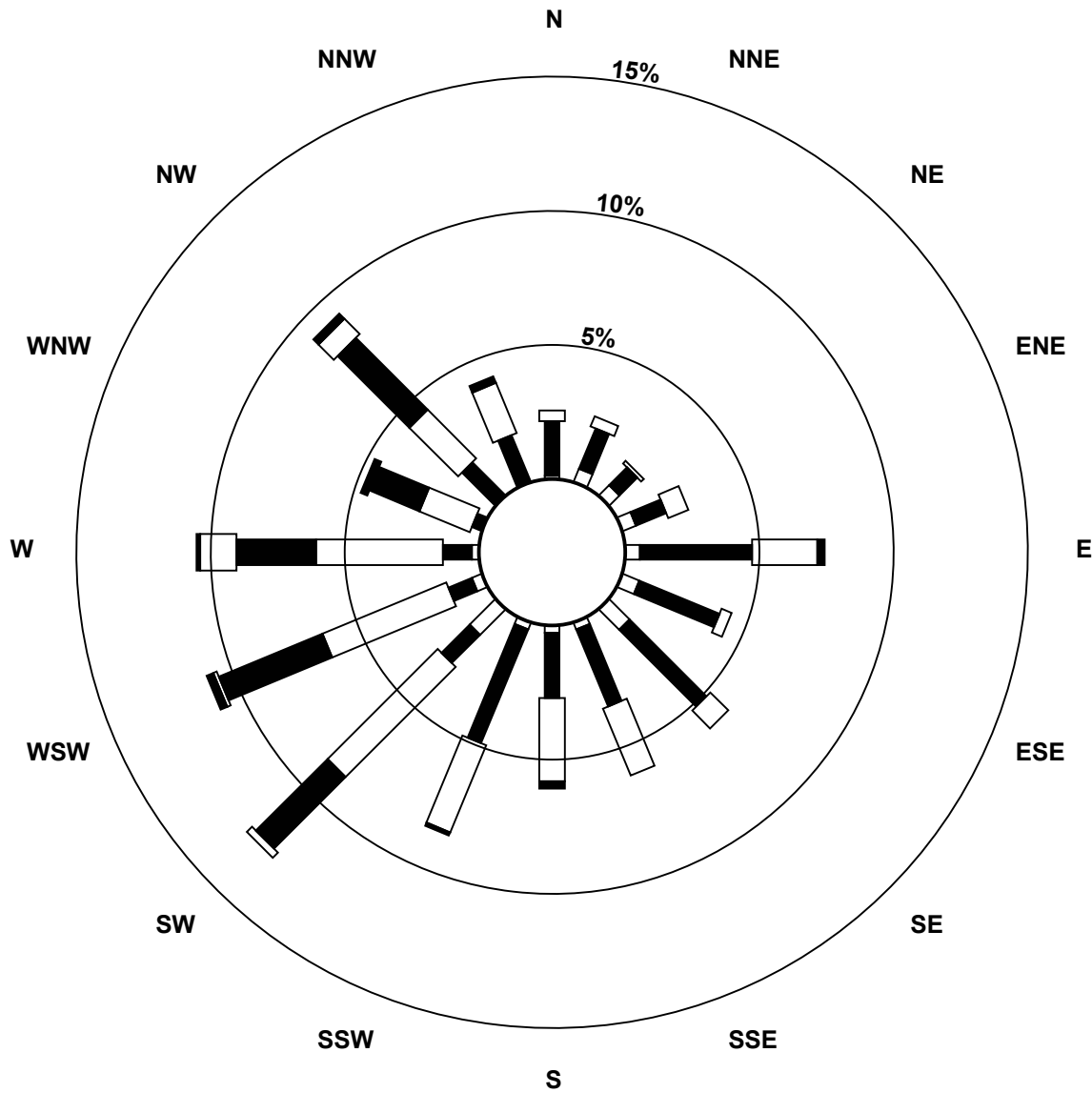
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	4	4	4	4	5	8	2	2	2	10	3	2	0	0	0	51
6 - 11	15	12	7	9	31	24	30	23	18	34	11	7	8	3	13	14	259
12 - 19	3	3	1	6	18	3	7	20	23	26	43	37	35	15	19	15	274
20 - 28	0	0	0	0	2	0	0	0	2	1	28	31	22	15	28	2	131
29 - 38	0	0	0	0	0	0	0	0	0	0	2	1	10	0	6	0	19
> 38	0	0	0	0	0	0	0	0	0	0	0	2	1	2	2	0	7
Totals	19	19	12	19	55	32	45	45	45	63	94	81	78	35	68	31	741

Total Number of Valid Hours: 741

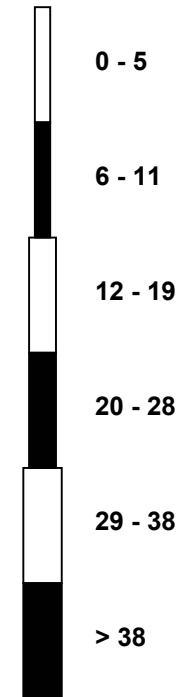
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Mar 2015

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)



Classes (km/h)



Total Number of Valid Hours: 741



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Mar 15 03:00	Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6
Minimum Value: 0 km/h on Mar 30 21:00	
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	

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

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

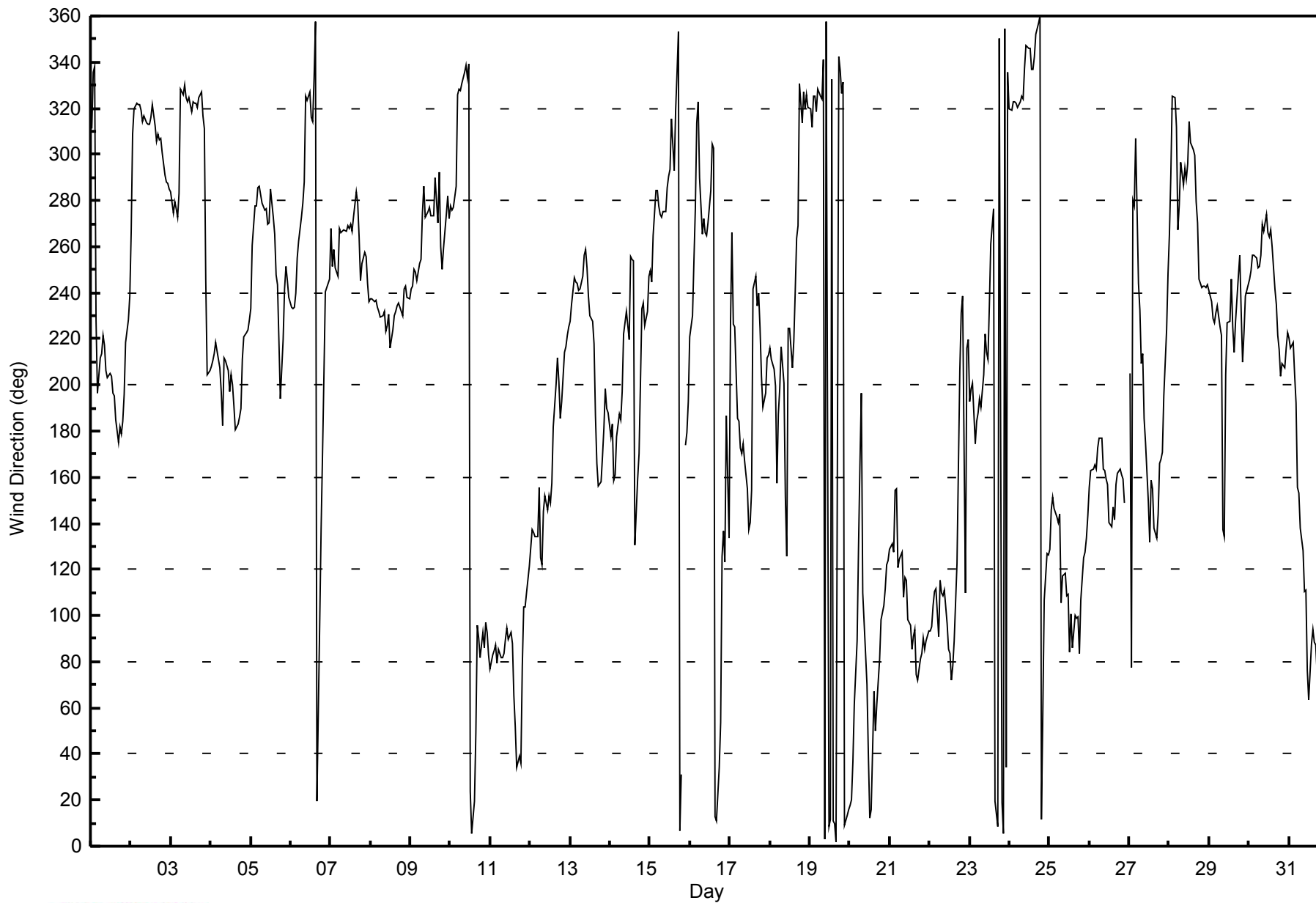
Wind Direction (WD) - deg
ConocoPhillips - Surmont - March 2015

Direction of Maximum Speed: 285 deg on Mar 15 04:00																				Hours in Service: 744					
Direction of Maximum Daily Speed Average: 309.7 deg on Mar 2																				Hours of Data: 741					
Direction of Minimum Speed: 110 deg on Mar 22 22:00										Direction of Minimum Daily Speed Average: 3.6 deg on Mar 23										Hours of Missing Data: 3					
Monthly Average Direction: 253.4 deg																				Percent Operational Time: 99.6					
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	311	335	338	228	197	212	214	221	217	206	203	205	204	197	195	185	175	182	179	184	196	219	228	239	209.4
2-Mar	266	309	320	322	322	321	319	314	317	313	313	313	316	322	312	306	309	306	307	301	291	288	287	285	309.7
3-Mar	284	275	279	276	273	283	328	326	330	325	323	324	318	323	322	322	320	325	327	317	311	246	204	207	308.2
4-Mar	208	211	214	218	215	207	197	182	212	210	206	197	204	200	191	180	183	186	190	211	221	223	224	228	208.0
5-Mar	233	261	278	278	286	286	282	279	276	277	270	270	285	273	265	248	243	219	194	219	242	252	246	238	263.0
6-Mar	234	233	234	240	255	263	273	279	288	325	323	327	316	314	333	357	19	97	138	170	205	240	244	246	273.0
7-Mar	268	251	259	251	247	268	266	267	267	267	269	268	269	267	273	283	279	264	245	253	257	256	244	236	262.9
8-Mar	238	237	236	237	234	232	229	230	232	223	226	230	216	224	230	232	234	236	232	230	242	243	238	237	232.2
9-Mar	241	243	250	249	246	252	255	274	286	273	275	277	273	274	273	290	271	293	260	250	259	274	282	272	265.9
10-Mar	278	276	277	286	326	328	327	330	336	338	333	339	24	6	19	50	96	90	82	92	86	97	93	83	340.7
11-Mar	77	83	85	87	79	85	82	82	84	90	95	90	93	88	65	52	34	39	36	78	104	104	110	122	82.8
12-Mar	129	137	136	134	134	156	125	122	145	152	146	152	149	158	182	200	212	202	185	193	214	216	222	225	179.5
13-Mar	227	235	246	244	244	241	241	247	256	259	251	239	230	228	218	187	166	157	158	169	181	199	190	188	222.2
14-Mar	178	183	158	161	177	187	185	197	222	227	232	220	256	255	254	131	159	171	201	233	236	226	232	247	210.9
15-Mar	250	245	265	285	284	278	274	273	275	275	285	290	294	316	293	319	336	353	7	31	AF	174	180	193	277.4
16-Mar	221	230	254	277	314	323	290	265	272	266	265	270	284	304	303	13	11	34	54	126	137	123	187	134	280.2
17-Mar	227	266	226	225	186	184	173	170	175	167	155	137	140	154	242	247	234	240	224	204	190	197	212	213	192.8
18-Mar	216	211	207	199	157	187	198	216	201	152	126	225	225	208	219	240	264	269	331	314	327	320	326	320	247.9
19-Mar	320	312	325	325	319	328	325	324	341	3	358	9	11	332	11	10	2	342	336	326	331	9	13	16	338.8
20-Mar	18	20	37	62	89	129	165	197	110	83	70	39	12	16	67	50	62	71	81	98	104	112	122	124	82.2
21-Mar	129	131	127	155	155	121	124	128	108	117	115	98	96	86	91	94	74	72	81	84	90	86	89	93	102.0
22-Mar	94	95	104	110	112	91	115	110	109	111	96	86	83	72	78	89	123	164	206	231	238	110	216	220	109.2
23-Mar	193	198	201	174	185	188	194	191	204	222	214	211	234	261	277	20	14	8	350	19	6	355	34	336	228.0
24-Mar	319	319	323	323	322	320	323	325	324	338	347	346	346	337	337	342	352	357	360	11	58	107	127	126	340.2
25-Mar	129	146	151	147	143	140	144	105	117	119	109	109	84	101	86	100	99	99	84	107	125	127	134	143	119.2
26-Mar	156	163	164	165	163	173	177	177	164	163	159	157	140	138	147	142	157	162	164	161	159	149	AF	AF	159.4
27-Mar	205	78	280	278	307	244	232	209	213	186	175	149	132	158	155	138	134	144	166	168	171	195	224	249	181.5
28-Mar	265	291	325	325	312	267	278	297	287	294	289	296	315	305	302	299	280	270	246	243	243	243	242	243	279.6
29-Mar	241	236	229	227	231	234	225	221	137	134	204	227	228	246	225	214	227	247	256	232	210	223	238	243	229.2
30-Mar	246	250	256	256	255	251	252	256	270	267	274	266	264	267	260	242	235	222	216	204	210	207	216	223	250.0
31-Mar	220	216	219	204	192	155	153	138	128	111	111	76	64	88	94	88	87	74	69	61	45	23	20	24	91.8
240.0 245.0 257.7 259.4 258.0 255.5 255.6 256.3 257.4 258.6 258.9 259.4 267.1 267.7 266.9 268.6 256.9 245.6 226.0 218.5 224.5 227.1 229.4 234.7																									
Diurnal Average																									
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - March 2015





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

ConocoPhillips - Surmont - March 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 90 deg on Mar 27 03:00	Hours of Data: 741
Minimum Value: 4 deg on Mar 30 21:00	Hours of Missing Data: 3
Percentiles: P ₁ = 7 P ₁₀ = 9 Q ₁ = 11 Median = 14 Q ₃ = 18 P ₉₀ = 26 P ₉₉ = 69	Hours of Calibration: 0
	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	21	11	21	66	8	18	13	10	14	16	18	15	17	18	19	17	14	15	14	14	15	14	9	13	66
2-Mar	14	16	11	11	10	11	12	13	12	13	14	16	15	13	16	17	14	15	14	15	13	11	11	10	17
3-Mar	10	9	9	8	9	13	11	10	12	12	12	11	15	15	14	11	14	10	10	18	42	37	13	5	42
4-Mar	9	9	10	10	16	14	22	19	20	19	17	16	18	22	21	21	15	16	18	14	10	9	9	8	22
5-Mar	9	19	12	10	10	10	9	10	9	10	11	12	19	19	17	13	12	22	9	9	13	8	12	7	22
6-Mar	7	7	7	8	8	9	11	9	19	11	10	13	16	18	16	20	21	26	24	13	33	24	12	9	33
7-Mar	12	8	9	9	9	11	9	9	9	10	11	10	10	11	13	16	13	13	8	10	8	8	8	7	16
8-Mar	8	8	7	8	8	8	8	8	7	10	13	13	13	14	11	12	13	10	14	13	9	8	8	8	14
9-Mar	10	8	9	10	10	7	11	31	20	10	10	11	13	19	12	28	12	20	8	12	9	9	14	10	31
10-Mar	10	10	10	13	11	12	10	12	15	18	18	29	32	46	41	43	30	14	11	12	15	12	11	15	46
11-Mar	14	13	12	12	12	12	12	13	13	15	16	17	16	19	20	17	15	14	16	27	12	12	12	12	27
12-Mar	10	13	14	22	15	15	54	15	18	23	17	20	14	15	20	17	15	12	17	12	13	12	10	9	54
13-Mar	9	9	9	8	8	8	8	8	11	12	14	14	12	14	19	15	14	14	14	15	15	15	14	19	19
14-Mar	13	14	17	14	13	11	11	11	12	9	86	49	18	17	53	45	39	28	25	14	11	9	11	10	86
15-Mar	10	11	16	10	10	10	11	10	10	12	16	16	20	18	20	27	20	18	14	32	AF	19	17	10	32
16-Mar	11	8	16	9	22	11	26	11	12	13	16	15	22	32	46	20	19	18	22	42	38	19	39	68	68
17-Mar	56	16	74	49	15	5	11	14	13	16	17	20	19	45	25	20	18	17	15	12	17	9	9	11	74
18-Mar	12	13	20	26	32	23	11	9	19	34	18	19	20	19	18	22	10	15	11	21	9	13	9	9	34
19-Mar	9	13	9	8	12	10	9	14	21	21	27	40	30	39	31	19	22	18	13	11	14	14	13	12	40
20-Mar	13	13	15	12	35	24	32	13	41	38	55	84	49	64	70	52	21	20	11	11	10	11	9	9	84
21-Mar	10	12	13	26	22	16	10	10	15	13	14	19	21	16	16	20	14	14	13	13	12	12	12	11	26
22-Mar	12	11	13	11	11	14	13	14	13	18	21	39	44	28	26	25	20	31	40	17	10	61	79	14	79
23-Mar	14	15	16	13	12	12	10	13	16	12	17	16	22	19	37	59	15	29	17	13	23	18	22	14	59
24-Mar	8	8	10	8	8	8	14	8	11	14	25	19	20	20	19	24	21	16	13	16	23	14	10	10	25
25-Mar	9	14	17	14	16	23	19	20	13	11	16	18	17	17	16	18	19	21	13	10	11	8	9	15	23
26-Mar	14	14	15	13	12	13	12	11	13	14	12	15	13	16	16	17	19	13	15	11	13	24	AF	AF	24
27-Mar	29	71	90	89	32	52	72	31	21	25	23	18	18	18	16	14	14	12	13	12	12	18	11	7	90
28-Mar	10	14	12	9	22	15	12	13	12	19	17	17	16	19	19	19	14	14	14	10	8	8	8	8	22
29-Mar	8	9	8	8	8	8	8	62	34	30	17	16	14	30	20	16	22	16	9	20	12	13	9	8	62
30-Mar	8	8	9	8	7	8	8	9	12	14	12	13	16	20	23	21	16	15	14	7	4	10	9	8	23
31-Mar	8	9	10	12	9	23	15	12	16	11	18	14	17	17	18	19	15	14	13	13	17	16	12	12	23
	56	71	90	89	35	52	72	62	41	38	86	84	49	64	70	59	39	31	40	42	42	61	79	68	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 12, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	13:35
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	622
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL110503		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	n/a	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	11	8
Analyzer Range (mv)	1000	1000	Lamp voltage	2729	2658
Calculated slope	0.996597	0.998235	Chamber temp.	50.0	50.0
Calculated intercept	0.812971	0.074732	Pressure (mmHg)	22.0	22.3
Analyzer Background	16.9	16.9	Flow (lpm)	554	561
Analyzer Coefficient	1.011	1.011	Intensity	67	66

Analyzer make	API T100	Analyzer serial #	598
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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	NA
as found span	5000	78.3	800.2	801.7	0.998
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	78.3	800.2	801.7	0.998
second point	5000	39.2	400.6	401.1	0.999
third point	5000	19.6	200.3	200.3	1.000
calibrator zero					
as left zero	5000	0.0	0.0	0.6	NA
as left span	6000	92.0	783.5	780.2	1.004
Average Correction Factor					0.999

Corrected As found	801.5	Previous response	802.1	% change	0.1%
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Notes:

Filter changed after 3rd point. No adjustments made.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

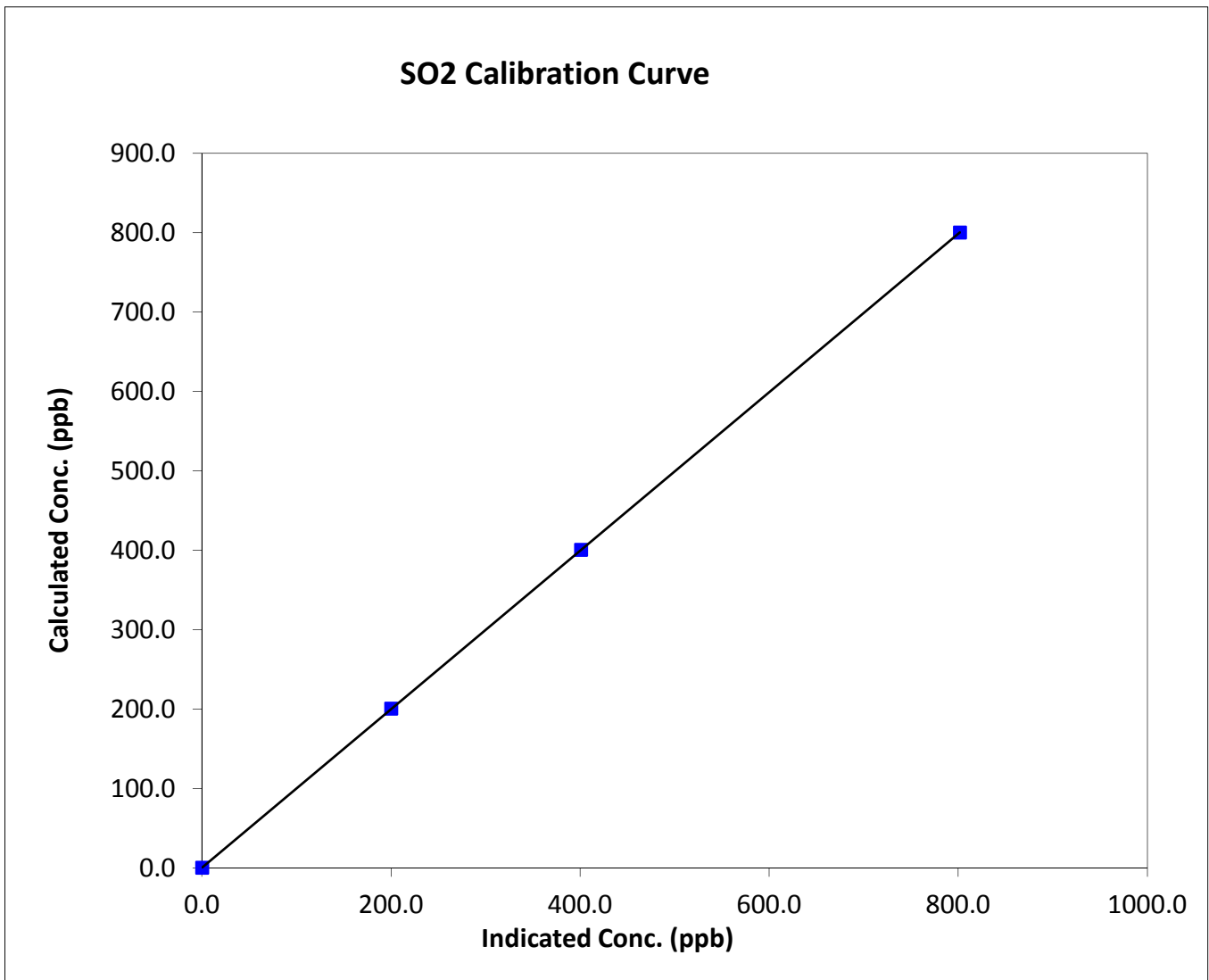
SO₂ Calibration Summary

Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 12, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	9:30	End Time (MST)	13:35
Analyzer make	API T100	Analyzer serial #	598

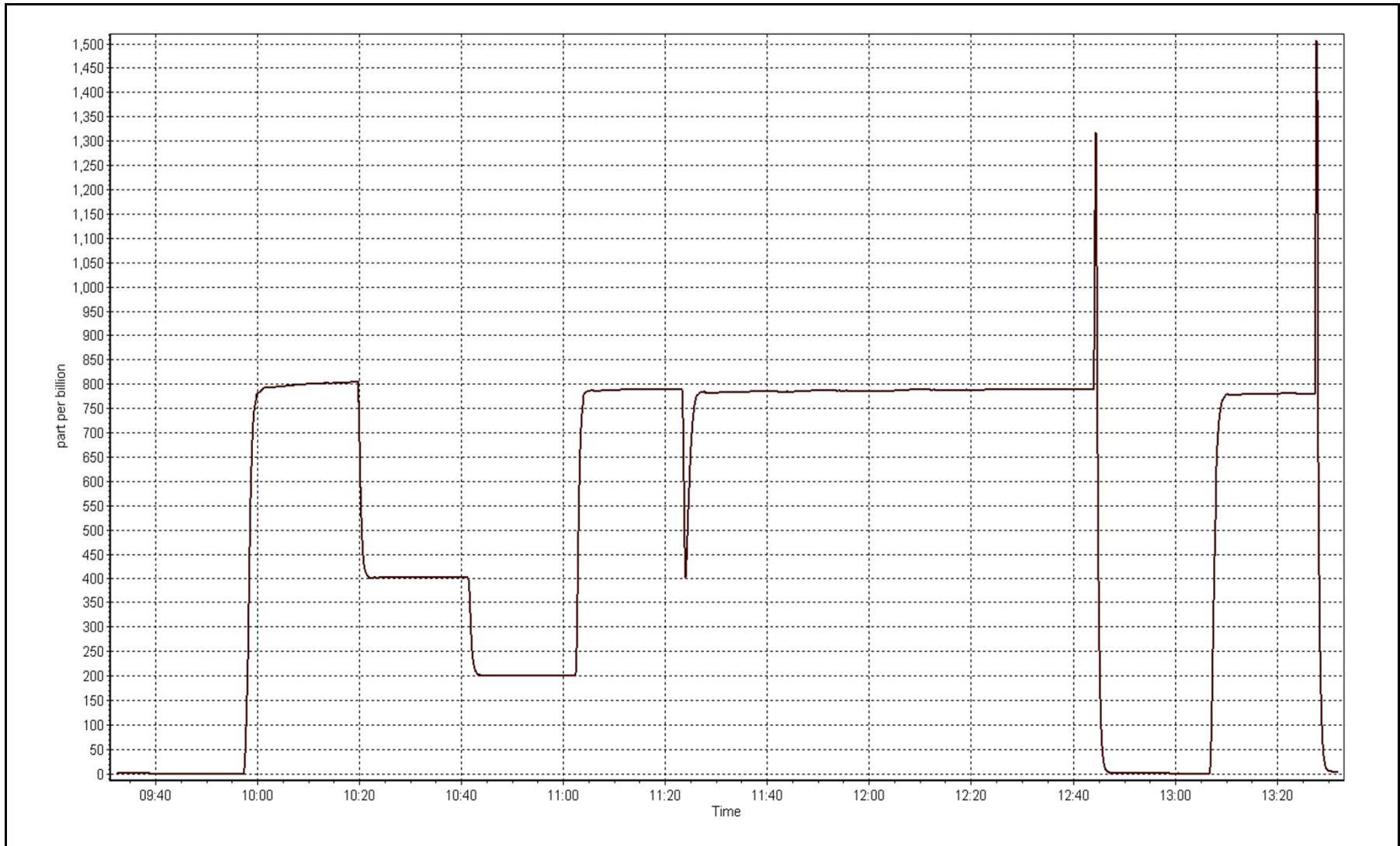
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999999
800.2	801.7	0.9981		
400.6	401.1	0.9987	Slope	0.998235
200.3	200.3	1.0003		
			Intercept	0.074732



SO2 Calibration Plot

Date: March 23, 2015





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	March 20, 2015	Previous Calibration	February 11, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:41	End Time (MST)	14:55
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	622
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	30 May, 2016
Gas Cert Reference	LL34303	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	n/a	DACS channel #	TC/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	11	9
Analyzer Range (mv)	100	100	Lamp voltage	2868	2721
Calculated slope	1.004548	0.983326	Chamber temp.	50	50
Calculated intercept	-0.370001	0.028480	Pressure	23.6	23.2
Analyzer Background	18	19.3	Flow	591	573
Analyzer Coefficient	0.998	1.072	Intensity	64	60
			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	0.3	NA
as found span	5000	38.5	80.1	76.4	1.049
SO2 scrubber check	5000	19.6	200.3	3.8	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	38.5	80.1	81.3	0.985
second point	5000	19.3	40.1	40.9	0.982
third point	5000	12.0	25.0	25.5	0.980
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	38.5	80.1	78.6	1.019
Average Correction Factor					0.982

Corrected As found	76.1	Previous response	80.1	% change	5.2%
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Notes:

Points taking long time before they stabilize. Scrubber check done after as found zero. Adjusted both zero and span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

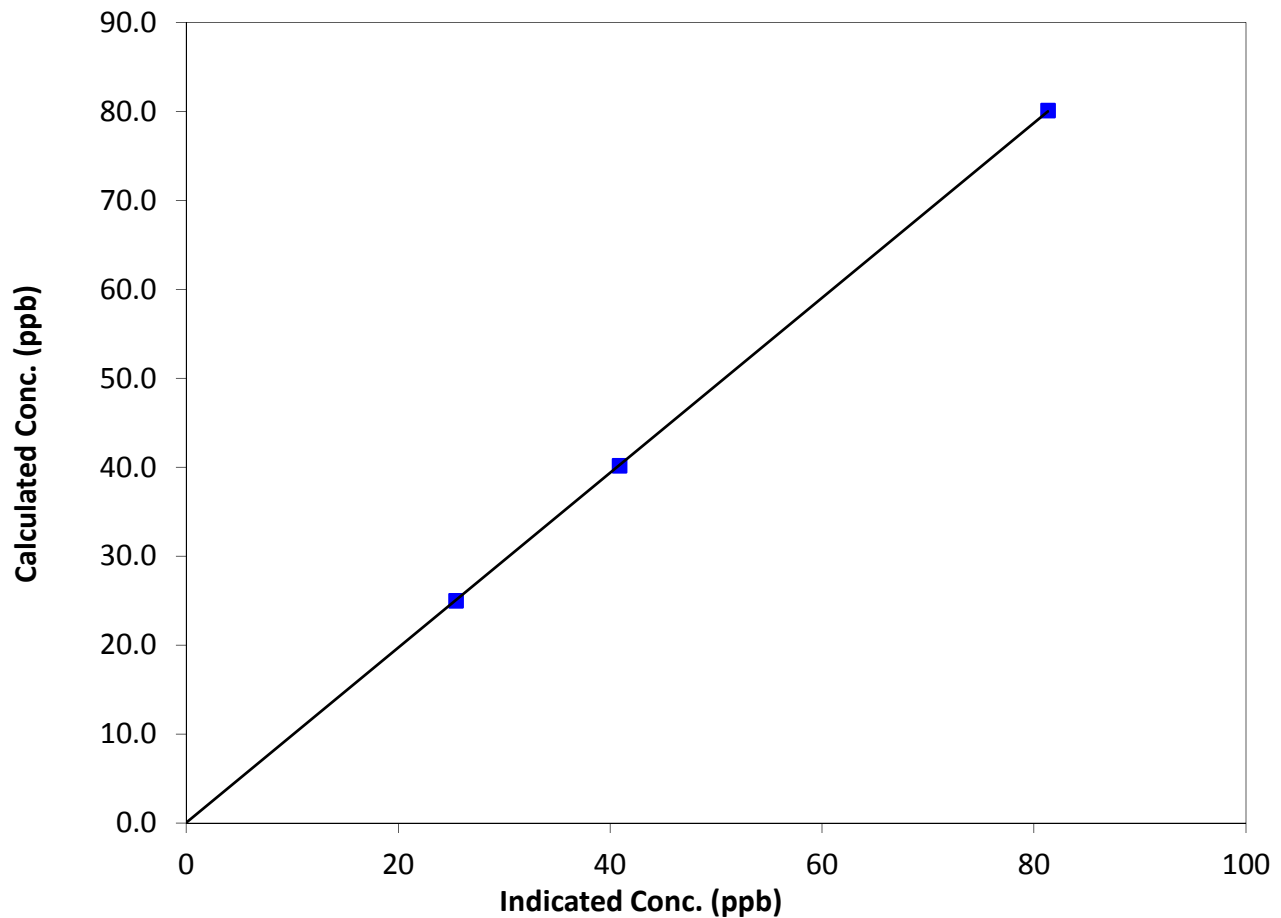
Station Information

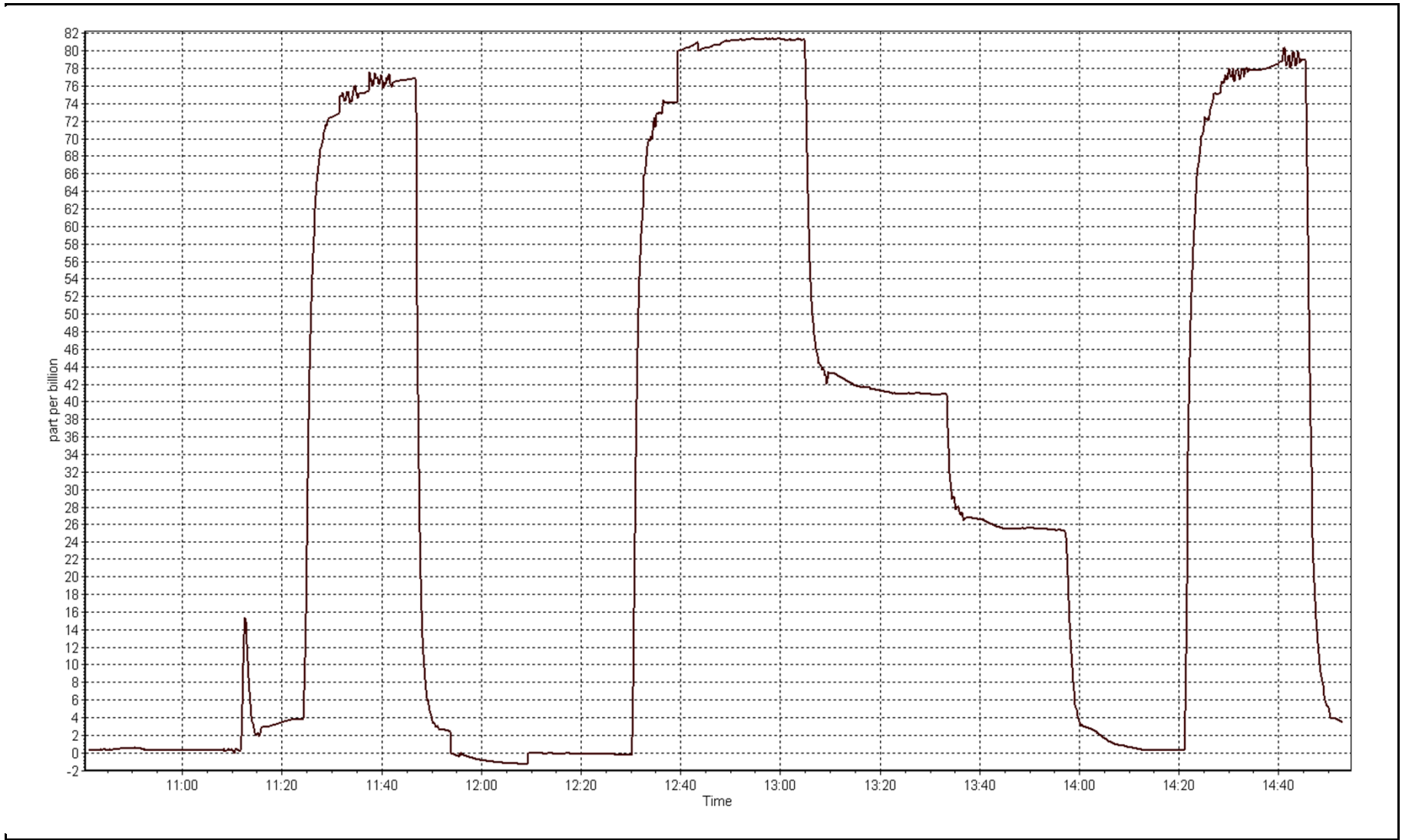
Calibration Date	March 20, 2015	Previous Calibration	February 11, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:41	End Time (MST)	14:55
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999986
80.1	81.3	0.9848		
40.1	40.9	0.9815	Slope	0.983326
25.0	25.5	0.9800		
			Intercept	0.028480

H2S Calibration Curve







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 12, 2015
Station Name	ConocoPhillips	Station Number	AMS 102
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:30	End Time (MST)	13:35
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	52.2 ppm	Cal Gas Serial #	LL110503

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.003715	1.002104	1.001722
	Data Offset	0.289059	0.686062	-0.399630
After	Data Slope	1.012761	1.011245	1.004743
	Data Offset	0.113828	0.263070	0.285947
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.721	ppb	0.721	ppb
NOX coefficient	0.997	ppb	0.997	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	4.8		4.8	
NOX bkgrnd	4.8		4.8	
PMT	-941		-941.000	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	322.4	Deg C	327.1	Deg C
Cooler Temp	-2.9	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
Chamber Press	206.7	mmHg	210.6	mmHg
Sample Flow	0.477	ccm	0.483	ccm

Notes:

No adjustments made.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

March 23, 2015

Station Number:

AMS 102

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.2	N/A	N/A
as found span	5000	78.4	818.5	818.5	0.0	808.3	809.3	-1.0	1.0126	1.0114
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.2	N/A	N/A
high point	5000	78.4	818.5	818.5	0.0	808.3	809.3	-1.0	1.0126	1.0114
second point	5000	39.2	409.2	409.2	0.0	403.5	404.2	-0.7	1.0143	1.0125
third point	5000	19.6	204.6	204.6	0.0	201.9	202.0	-0.1	1.0135	1.0131
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	N/A	N/A
as left span	6000	92.0	800.4	515.2	285.2	801.9	524.2	277.7	0.9982	0.9828
Average Correction Factor									1.0135	1.0123

Corrected As found NO_x= 808.2 NO= 809.3 Percent Change NO_x= 0.9% NO= 0.8%
 Previous Response NO_x= 815.2 NO= 816.1

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 76.80 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO ₂ (300)	N/A	515.2	277.1	791.4	515.2	276.2	0.9978	1.0000	1.0033	99.7%
2nd NO ₂ (200)	N/A	599.5	192.8	790.1	599.5	190.9	0.9994	1.0000	1.0102	99.0%
3rd NO ₂ (100)	N/A	690.0	102.3	791.1	690.0	101.1	0.9982	1.0000	1.0119	98.8%
4th NO ₂ (0)	792.3	N/A	-2.1	790.2	792.3	-2.1	0.9993	1.0000	N/A	N/A
Average Correction Factor							0.9987	1.0000	1.0085	99.2%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

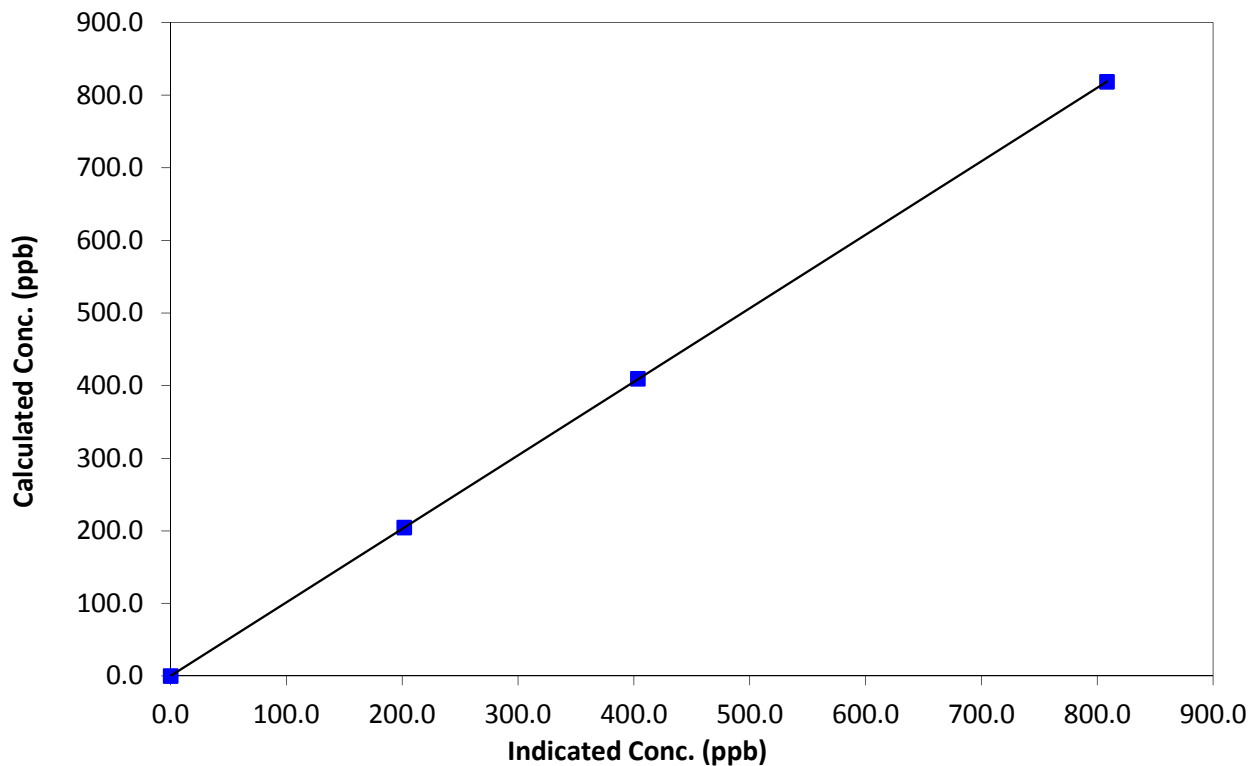
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 12, 2015
Station Name	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	9:30	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999999
818.5	808.3	1.0126		
409.2	403.5	1.0143	Slope	1.012761
204.6	201.9	1.0135		
			Intercept	0.113828

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

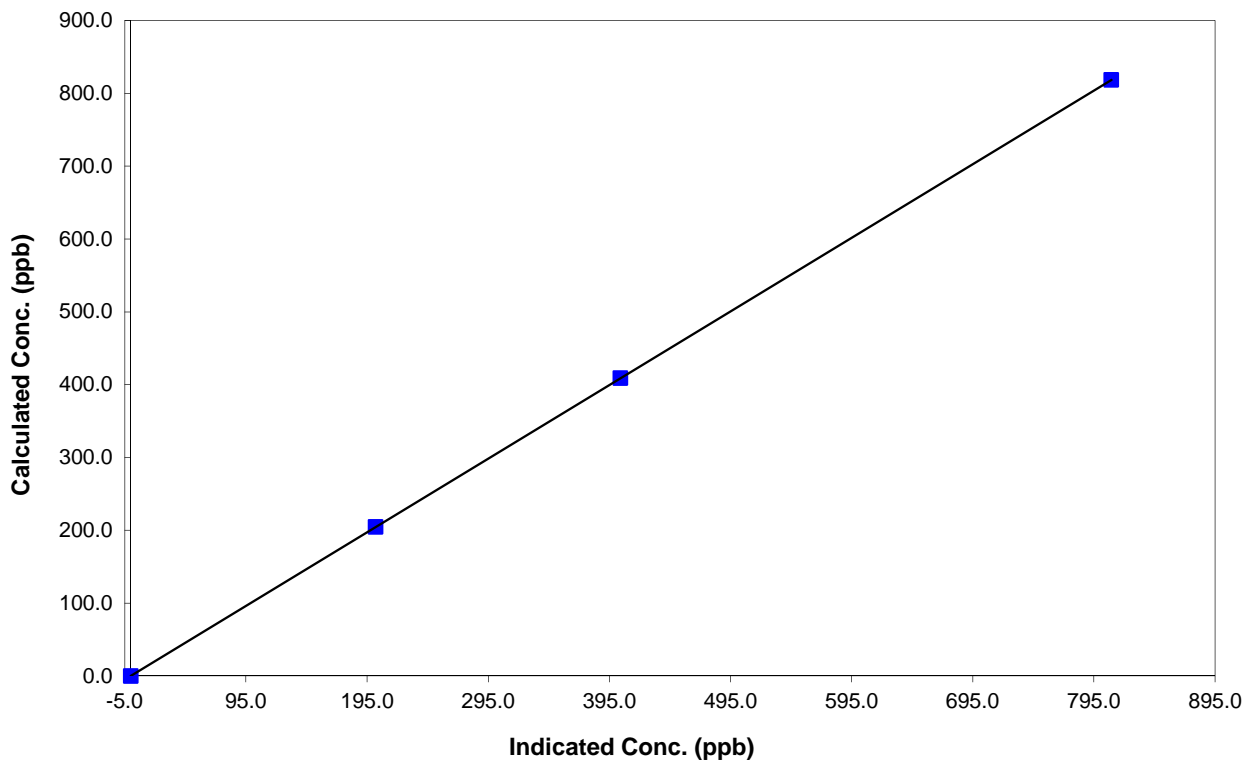
Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 12, 2015
Station Name	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	9:30	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
818.5	809.3	1.0114		
409.2	404.2	1.0125	Slope	1.011245
204.6	202.0	1.0131		
			Intercept	0.263070

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Station Information

Calibration Date	March 23, 2015	Previous Calibration	February 12, 2015
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	9:30	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999966
277.1	276.2	1.0033		
192.8	190.9	1.0102	Slope	1.004743
102.3	101.1	1.0119		
			Intercept	0.285947

NO₂ Calibration Curve

